State of Missouri
Regional Haze Plan

Missouri Air Conservation Commission
Adopted: July 29, 2009

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EXECUTIVE SUMMARY

In 1977, Congress passed amendments to the Clean Air Act (CAA) with the goal of improving visibility in Class I federal areas, such as national parks and wilderness areas. Following the enactment of the 1977 CAA amendments, some measures were taken to address issues such as “plume blight” from specific pollution sources, but little was done to improve the regional haze issues in the Eastern United States. Congress passed additional amendments to the CAA in 1990 that authorized additional research and regular progress updates.

The U.S. Environmental Protection Agency (EPA) adopted the federal Regional Haze Rule on July 1, 1999. The Regional Haze Rule and the CAA require consultation between the states, tribes and the Federal Land Managers (FLMs) for managing Class I areas. Since regional haze often results from pollution emitted across broad regions, this multi-state planning effort will help in developing the most cost-effective controls for regional haze. This consultation process will provide a coordinated effort to achieve the federal visibility requirements and aid in developing regional strategies for meeting progress goals.

The Regional Haze Rule went into effect on August 30, 1999. The EPA selected five Regional Planning Organizations (RPOs) to aid in the coordination required to achieve the national visibility goals of Class I areas by 2064. One RPO, the Central Regional Air Planning Association (CENRAP), is comprised of nine states that make up the midsection of the contiguous United States, including Missouri. Missouri has two federal Class I areas (Hercules Glades and Mingo) within its borders and is in close proximity with two Class I areas in Arkansas (Caney Creek and Upper Buffalo).

Between 2000 and 2007, Missouri participated in the CENRAP workgroup process to develop technical analyses and control strategies for the Regional Haze Plan. Missouri determined the baseline visibility conditions for each Class I area using monitoring data collected from 2000 through 2004 and compared them to the natural background conditions. The technical analyses showed that both of the Class I areas in Missouri will meet the 2018 Reasonable Progress Goal (RPG). The analyses in this Regional Haze Plan demonstrate that the 2018 visibility goals for

Mingo and Hercules Glades will be largely achieved from EGU (Electric Generating Unit) emission reductions resulting from the federal Clean Air Interstate Rule (CAIR) program. Missouri long-term strategy also consists of other air pollution programs including Missouri NO_X State Implementation Plan (SIP) call, Tier 2 vehicle emission standards, other states' SIP controls, other states' Best Available Retrofit Technology (BART) controls, as well as other programs. Additional controls not included in the RPG modeling demonstration are also identified in the long-term strategy chapter of the plan and may be considered during the five-year review.

Missouri has satisfied the consultation requirement of the federal Regional Haze Rule through the consultation process that was used to develop this plan. The consultation process is documented in a consultation plan that was used to attain and share the technical information necessary in developing this Regional Haze Plan for the Central Class I areas. A copy of the consultation plan has been provided as an appendix to this plan. In addition, Missouri has consulted with and continues to consult with other states that have included Missouri in their consultation process to meet their Regional Haze Rule requirements.

A BART analysis was used to assure that the federal Regional Haze Rule requirements were met. This analysis included BART source development, screen-modeling analyses and refined modeling. As a result of the analysis and modeling, Missouri has identified one BART-eligible source in Missouri that must undergo a BART control evaluation to ensure it meets the Regional Haze Rule requirements.

The Missouri Department of Natural Resources (department) Air Pollution Control Program will submit this Regional Haze Plan to the EPA for inclusion in the Missouri SIP to meet the requirements of EPA's Regional Haze Rule. A public hearing was held for this plan on December 6, 2007, and the plan was adopted by the Missouri Air Conservation Commission (MACC) on February 7, 2008. A public hearing was held for a revision to this plan on June 25, 2009, and the revised plan was adopted by the MACC on July 29, 2009.

Missouri will continue to coordinate with other states, FLMs, EPA, CENRAP, and other RPOs to

maintain/improve the visibility in Missouri's Class I areas. This coordination will include five-year progress reports and any necessary SIP revisions. If deemed necessary, there will be face to face consultation meetings.

1.0 BACKGROUND - FEDERAL REGIONAL HAZE REGULATION

1.1 FEDERAL REGIONAL HAZE RULE

In amendments to the CAA in 1977, Congress added Section 169 (42 U.S.C. 7491), setting forth the following national visibility goal of restoring pristine conditions in national parks and wilderness areas:

> *Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from man-made air pollution.*

Over the following years, modest steps were taken to address the visibility problems in Class I areas. The control measures taken mainly addressed plume blight from specific pollution sources and did little to address regional haze issues in the Eastern United States. Plume blight is the visual impairment of air quality that manifests itself as a coherent plume. This results from specific sources, such as a power plant smokestack, emitting pollutants into a stable atmosphere. The pollutants are then transported in some direction with little or no vertical mixing.

When the CAA was amended in 1990, Congress added Section 169B (42 U.S.C. 7492), authorizing further research and regular assessments of the progress made so far. In 1993, the National Academy of Sciences concluded that "current scientific knowledge is adequate and control technologies are available for taking regulatory action to improve and protect visibility."[1]

In addition to authorizing creation of visibility transport commissions and setting forth their duties, Section 169B(f) of the CAA specifically mandated creation of the Grand Canyon Visibility Transport Commission (GCVTC) to make recommendations to the EPA for the region affecting the visibility of the Grand Canyon National Park. Following four years of research and policy development, the GCVTC submitted its report to EPA in June 1996. This report, as well

1 National Research Council. *Protecting Visibility in National Parks and Wilderness Areas*. National Academy Press. Washington, DC: 1993.

as the many other research reports prepared by the GCVTC, contributed invaluable information to EPA in its development of the federal Regional Haze Rule.

EPA's Regional Haze Rule was adopted July 1, 1999, and went into effect on August 30, 1999. The Regional Haze Rule aimed at achieving national visibility goals by 2064. This rulemaking addressed the combined visibility effects of various pollution sources over a wide geographic region. This broad scope meant that many states – even those without Class I areas – would be required to participate in haze-reduction efforts. EPA designated five RPOs to assist with the coordination and cooperation needed to address the visibility issue. Those states that make up the midsection of the contiguous United States were designated as CENRAP.

On May 24, 2002, the U.S. Court of Appeals, D.C. District Court ruled on the challenge brought by the American Corn Growers Association against EPA's Regional Haze Rule of 1999. The Court remanded to EPA the BART provisions of the rule and denied the industry's challenge to the haze rule goals of natural visibility and no degradation. EPA has proposed revisions to the Regional Haze Rule pursuant to the remand. To facilitate the review of this SIP submittal by the EPA, FLMs, stakeholders, and the public; a guide is provided in 40 CFR 51.308, *Regional Haze Program Requirements* (Appendix A).

1.2 CLASS I AREAS

The State of Missouri has the following Class I areas within its borders:

Hercules Glades Wilderness Area

Situated in southwest Missouri, Taney County, Hercules Glades Wilderness Area (Hercules Glades) is managed by the United States Department of Agriculture (USDA) Forest Service as part of the Mark Twain National Forest. The area includes 12,315 acres located in some of the most rugged hills of the Missouri Ozarks. The closest urban area is the Springfield/Branson metropolitan statistical area, 40 miles to the west/northwest.

Mingo National Wildlife Refuge

The Mingo National Wildlife Refuge (Mingo) is managed by the U.S. Fish and Wildlife Service. The refuge is situated in southeast Missouri, along the Mississippi Flyway. Only a portion of the

refuge is a Class I area (7,730 acres of a total 21,676 acres). Memphis to the south and St. Louis to the north are some of the largest urban areas nearby, although there are a few smaller population centers mostly to the east. Proximity to sources in the Ohio River Valley is a consideration.

In accordance with 40 CFR 51.308, Missouri has identified emissions sources within Missouri that have or may have impacts on the following Missouri Class I areas: Hercules Glades and Mingo. Emissions from Missouri may also contribute to visibility impairment in other states' Class I areas, such as the Caney Creek and Upper Buffalo Wilderness Areas in Arkansas (Upper Buffalo).

Improved visibility will lead to greater enjoyment of recreational opportunities at Hercules Glades and Mingo. The tourists drawn to the scenic beauty and recreational opportunities of each of these areas provide revenue to the respective regions. Missouri expects improved visibility of Hercules Glades and Mingo to provide not only enhanced scenic beauty, but also improved health benefits for people who are more susceptible to respiratory problems.

2.0 GENERAL PLANNING PROVISIONS

2.1 PLAN SUBMISSION

Pursuant to the requirements of 51.308(a) and (b), this Missouri Regional Haze Plan is being submitted for inclusion into the SIP as adopted to meet the requirements of EPA's Regional Haze Rule that was implemented to comply with requirements set forth in the CAA. Elements of this plan address the core requirements pursuant to 40 CFR 51.308(d) and the BART components of 40 CFR 50.308(e). In addition, this plan addresses regional planning; state/tribe and FLM coordination; and contains a commitment to provide plan revisions and adequacy determinations. Missouri has adopted this plan submittal in accordance with state laws and rules.

2.2 LEGAL AUTHORITY

The MACC is granted the legal authority to develop and implement regulations regarding air pollution under section 643.050 of the Revised Statues of Missouri.

2.3 PUBLIC HEARING NOTICE AND CERTIFICATION

The department's Air Pollution Control Program is required to announce a public hearing at least 30 days prior to holding such a hearing. Announcements were submitted to newspapers at least 30 days prior to the public hearing. The public hearing for this Regional Haze Plan occurred on December 6, 2007 and the public hearing for the revision to the plan occurred on June 25, 2009. Attached in Appendix B are the public hearing notices, along with certification of publication of the public notices for the Regional Haze Plan public hearings.

2.4 COMMENTS, RESPONSES, AND EXPLANATIONS OF CHANGE

Attached in Appendix C are the department's Air Pollution Control Program responses to comments received during the open public comment periods for this region haze plan. The comment period on the Regional Haze Plan was open until December 13, 2007, seven days after the Public Hearing that was held on December 6, 2007. The comment period on the revision to the Regional Haze Plan was open until July 2, 2009, seven days after the Public Hearing that was held on June 25, 2009. The department's Air Pollution Control Program is required to respond

to all comments received by either amending the plan or explaining the reasoning for not making an amendment.

2.5 MISSOURI AIR CONSERVATION COMMISSION ADOPTION CERTIFICATION

Attached in Appendix D are the MACC adoption certifications to demonstrate the approval of the Regional Haze Plan by the Commission.

2.6 COMMITMENT TO REVISE PLAN

Consultation between the states and the FLMs will continue as the federal regional haze program progresses. The consultation will continue via participation in CENRAP, and if CENRAP is no longer operating, Missouri will lead the consultation with other states and FLMs for meeting Missouri's goals. This effort will include five-year progress reports and development and review of any plan revisions deemed necessary. It will also provide for consideration of any other programs that are implemented and have the potential to contribute to impairment of visibility in Class I areas.

3.0 REGIONAL PLANNING

In 1999, EPA and affected states/tribes agreed to create five RPOs to facilitate interstate coordination on regional haze plan submittals and Tribal Implementation Plans (TIPs). Figure 3.1 shows a map of all five RPOs. The State of Missouri is a member of the CENRAP RPO. Members of CENRAP include the following states: Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma, and Texas.

Figure 3.1: Geographical Areas of Regional Planning Organizations

The governing body of CENRAP is the Policy Oversight Group (POG). The POG is made up of 18 voting members representing the states and tribes within the CENRAP region and non-voting members representing local agencies, the EPA, the Fish and Wildlife Service, Forest Service and National Park Service. The POG facilitates communication with FLMs, stakeholders, the public, and CENRAP staff.

Since its inception, CENRAP has established an active committee structure to address both technical and non-technical issues related to regional haze. The work of CENRAP is

accomplished through five standing workgroups: Monitoring; Emission Inventory; Modeling; Communications; and Implementation and Control Strategies. Participation in workgroups is open to all interested parties. Ad hoc workgroups may be formed by the POG to address specific issues. Ultimately, the CENRAP POG makes policy decisions.

CENRAP has adopted the approach that the Regional Haze Rule requires the "States to establish goals and emission reduction strategies for improving visibility in all 156 mandatory Class I parks and wilderness areas." The rule also encouraged states and tribes to work together in regional partnerships.

This plan utilizes data analysis, modeling results and other technical support documents prepared for CENRAP members. By coordinating with CENRAP and other RPOs, Missouri has worked to ensure that its long-term strategy provides sufficient reductions to mitigate impacts of sources from Missouri on affected Class I areas. Data analyses, modeling results and other technical support documents are provided to CENRAP members through either CENRAP's website or through a file transfer protocol (ftp) that allows users to copy files between their local system and CENRAP's system that they can reach on the CENRAP network.

4.0 PLAN COORDINATION AND CONSULTATION

4.1 CENTRAL CLASS I AREAS CONSULTATION

40 CFR 51.308(i) requires coordination between states/tribes and the FLMs. FLMs are an integral part of CENRAP's POG and the membership on standing committees. FLMs have contributed to the development of technical and non-technical work as a result of that participation. In addition, opportunities have been provided by CENRAP for FLMs to review and comment on each of the technical documents developed by CENRAP and included in this plan. Missouri has provided agency contacts to the FLMs as required. In development of this plan, the FLMs were consulted in accordance with the provisions of 51.308(i)(2).

Missouri provided FLMs an opportunity for consultation and an opportunity to hold a face to face meeting, if deemed necessary. All of the consultation for this plan was conducted by conference call with no need expressed for a face to face meeting and a draft of the plan was provided at least 60 days prior to holding the public hearing on the Regional Haze Plan.

During the consultation process, the FLMs were given the opportunity to address their:

- Assessment of the impairment of visibility in any Class I areas
- Recommendations on the development of RPGs
- Recommendations on the development and implementation of strategies to address visibility impairment.

According to 40 CFR 51.308(d)(3)(i), Missouri is required to consult with other states/tribes to develop coordinated emission strategies. This requirement applies both when emissions from the state are reasonably anticipated to contribute to visibility impairment in Class I areas outside the state and when emissions from other states/tribes are reasonably anticipated to contribute to visibility impairment in Class I areas within the state.

Missouri has consulted with other states/tribes in CENRAP, Visibility Improvement State and Tribal Association of the Southeast (VISTAS), the Midwest Regional Planning Organization (MRPO), FLMs and EPA Regions 5, 6 and 7 on development of coordinated strategies for

Central Class I areas, including Mingo, Hercules Glades, Upper Buffalo, and Caney Creek. Technical analyses, such as Area of Influence (AOI) and source apportionment, were developed as part of consultation planning to determine contributing states (Appendix E).

Missouri provided the Regional Haze Plan to the FLMs for review on August 23, 2007 and notified the FLMs that a public hearing would be held on this plan at a later date. The FLMs provided early comments on the draft plan and a conference call between Missouri, FLMs, and EPA Region 7 was conducted on September 25, 2007 to discuss the comments. Missouri considered all comments the FLMs provided on the early draft of the plan.

Regional modeling and other findings were used to develop RPGs for the Arkansas and Missouri Class I areas based on the existing and proposed controls through both state and federal requirements. It was also determined that these RPGs will meet the established URP goals by 2018. The consultation process determined which states significantly impacted the Arkansas and Missouri Class I areas.

Missouri is reasonably anticipated to contribute to the following Class I areas:

1) Mingo National Wildlife Refuge, Missouri
2) Hercules Glades Wilderness, Missouri
3) Upper Buffalo Wilderness Area, Arkansas
4) Caney Creek Wilderness Area, Arkansas

The state's coordination with FLMs on long-term strategy development is described in Chapter 11. The consultation was completed based on a determination that reasonable progress was achieved by contributing states.

4.2 OTHER STATE CONSULTATIONS

The consultation processes for the Wichita Mountains (WIMO) Class I area in Oklahoma was completed prior to the March 2008 submittal of this plan. The Oklahoma Department of Environmental Quality indicated their belief that Missouri sources impact WIMO. However, in response to the Oklahoma consultation letter, Missouri replied with a letter recommending that the rationale for determining contributing states deserves further examination. A more inclusive

methodology for the Central Class I areas with four different metrics (Particulate Matter Source Apportionment Technology (PSAT), PMF, AOI, and emission rate divided by five times the distance - Q/d) was used in a combined manner with three out of four positive results required before concluding that a particular state is contributing. The distance between WIMO and western Missouri's Class I area is approximately 200-250 miles farther west. Because of this distance, it is counter-intuitive to assume that planned emission controls on Missouri sources would be significant enough. It seems likely that Missouri would not be included as significant based on this level/type of PSAT analysis, and emissions/source distance ratio.

It is also not clear that additional controls in Missouri would be reasonable to reduce the visibility in WIMO. Based on the PSAT analysis presented, over half the elevated point-source impacts to WIMO are due to sources in Oklahoma, Texas, and Louisiana and most of the area source impacts are due to Oklahoma and Texas sources. Point and area are the two largest emission sectors. Controls appear likely to be more efficient in those states, on a cost-per-ton basis, than additional controls in Missouri.

Consultation processes for the Minnesota Class I areas was also conducted prior to the March 2008 submittal of this plan. The Minnesota Pollution Control Agency indicated that it believes that Missouri impacts the Boundary Waters, but not Voyageurs.

Minnesota identified Missouri as a contributing state based on LADCO 2002-2003 Trajectory analysis or LADCO 2018 PSAT modeling analysis at over a 5 percent total contribution to haze at either of their Class I areas. The criteria are met marginally at 5.2 percent for 2018 PSAT for the Boundary Waters area only.

Analysis conducted as part of the Causes of Haze II Study[2] shows emissions for the northern Class I area at Voyageurs National Park indicating the high impact of Minnesota sources, with

[2] Causes of Haze II, 2005; Sullivan, Hafner, Brown, MacDonald, Raffuse, Penfold, Roberts, Sonoma Technology

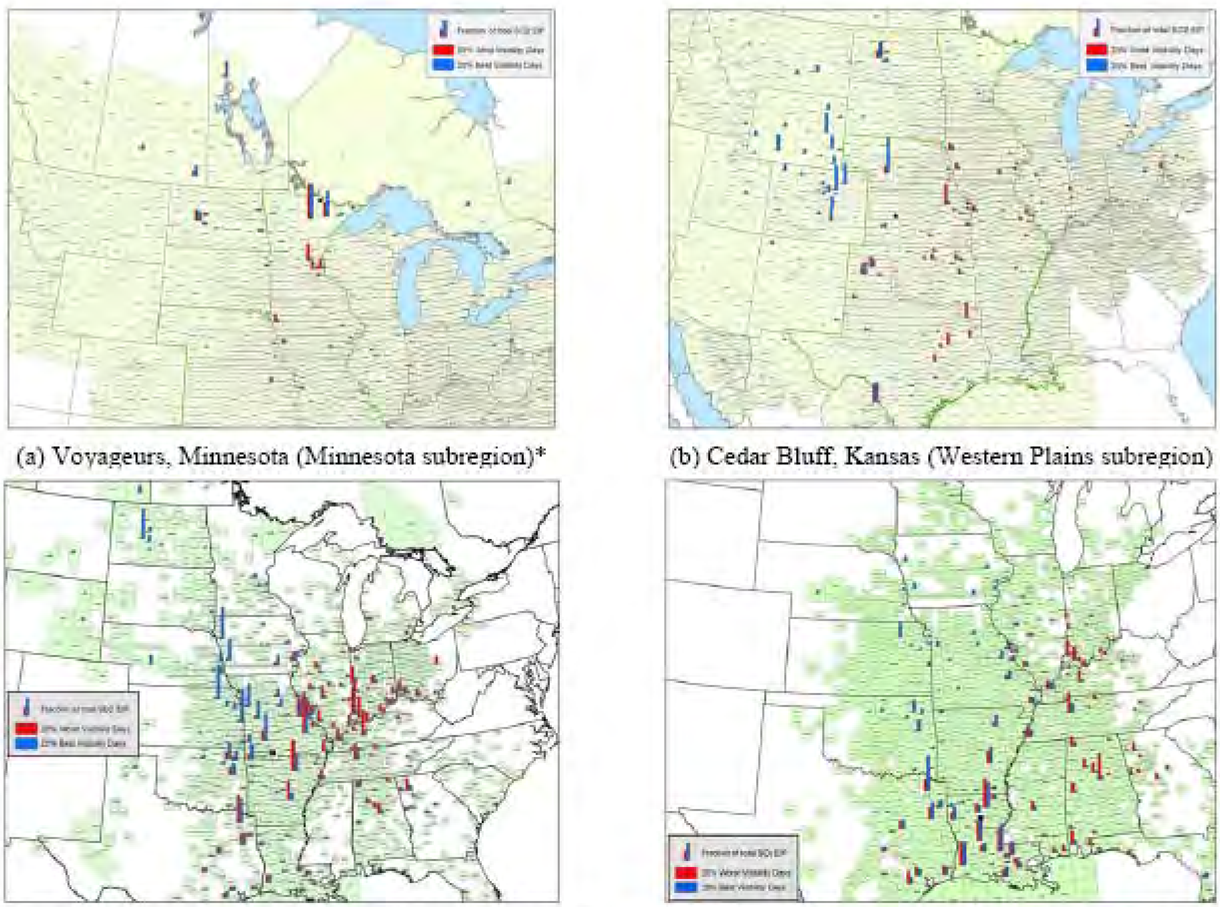
only small impact by out of state sources. Voyageurs and the Boundary Waters are very close in proximity, and the overall analysis was intended to apply regionally. The Emission Impact Potential mappings below underscore the impact of Minnesota sources on the area, and how controls on a relative few will provide much greater result than controls on sources outside Minnesota. Comparisons with Hercules Glades EIP show the difference in areas with significant external sources (Hercules) to areas with significant internal sources (Voyageurs, Boundary Waters). The conclusion reached in the Causes of Haze II is that for Voyageurs, and by geographic proximity, Boundary Waters, important emission source regions are internal (Minnesota and to a lesser extent North Dakota) on the 20 percent worst days. Area of Influence analysis for CENRAP states confirms that Level I Sulfate for both areas barely enters the northwest 20 miles of Missouri, not indicating strong source influence.

The most recent CENRAP PSAT analysis, as Figure 4.3, shows most Minnesota anthropogenic sources with very high impacts on Boundary Waters, slightly more than 15 inverse megameters for 2002. For 2018 modeling, it remains at almost 14 inverse megameters. Of other states, only Wisconsin elevated point impacts are larger than 2 inverse megameters, and Missouri impacts are 1.6. Based on the AOI and PSAT analyses, it is not reasonable to control the Missouri sources at the same level as Minnesota sources to achieve a very small impact at the Boundary Waters Class I area.

Missouri provided a written response to Minnesota regarding the Northern Class I Areas consultation.

Since other states are still involved in their consultation process for their respective plans, Missouri will continue to participate in their consultation processes, as necessary.

Figure 4.1: Causes of Haze Study II, EIP sulfate mappings



(a) Voyageurs, Minnesota (Minnesota subregion)*

(b) Cedar Bluff, Kansas (Western Plains subregion)

(c) Hercules-Glades, Missouri (Upper Midwest subregion)

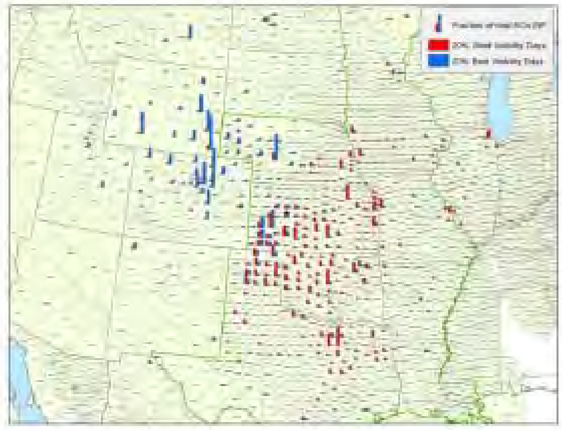
(d) Sikes, Louisiana (Southeastern Plains subregion)

* Note: Many trajectory hourly endpoints for the 20%-best days extended far northward into Canada and therefore dropped out of the analysis.

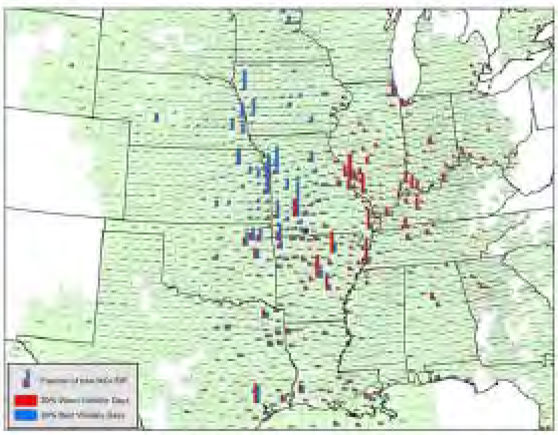
Figure 4-5. Geographic distributions of SO_2 EIP for the 20%-worst visibility days (red bars) and 20%-best visibility days (blue bars) observed at four representative sites.

Figure 4.2: Causes of Haze Study II, EIP nitrate mappings

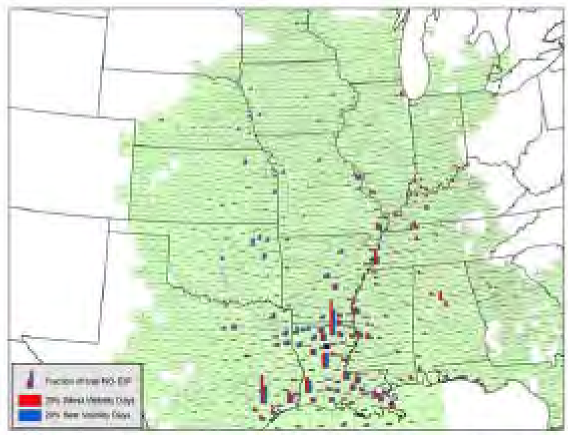
(a) Voyageurs, Minnesota (Minnesota subregion)*



(b) Cedar Bluff, Kansas (Western Plains subregion)



(c) Hercules-Glades, Missouri (Upper Midwest subregion)



(d) Sikes, Louisiana (Southeastern Plains subregion)

* Note: Many trajectory hourly endpoints for the 20%-best days extended far northward into Canada and therefore dropped out of the analysis.

Figure 4-6. Geographic distributions of NO_x EIP for the 20%-worst visibility days (red bars) and 20%-best visibility days (blue bars) observed at four representative sites.

Figure 4.3: PSAT Source Analysis for Missouri modeling demonstration (as part of CENRAP Analysis)

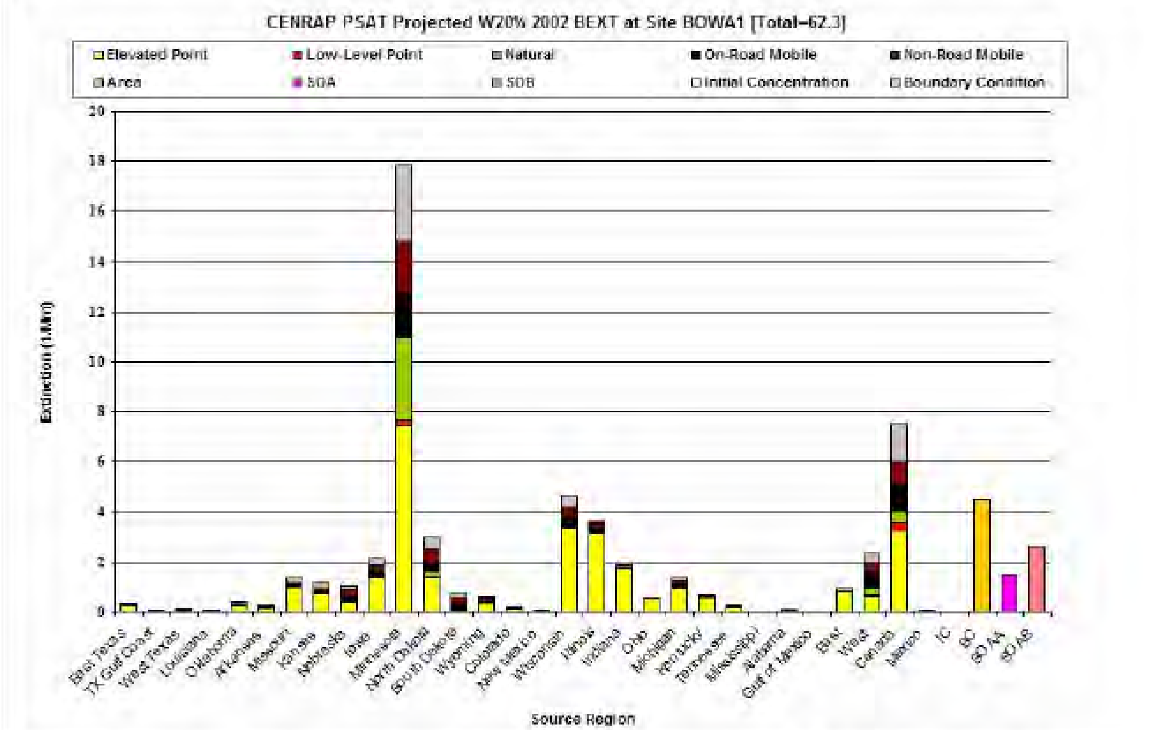


Figure E-4c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

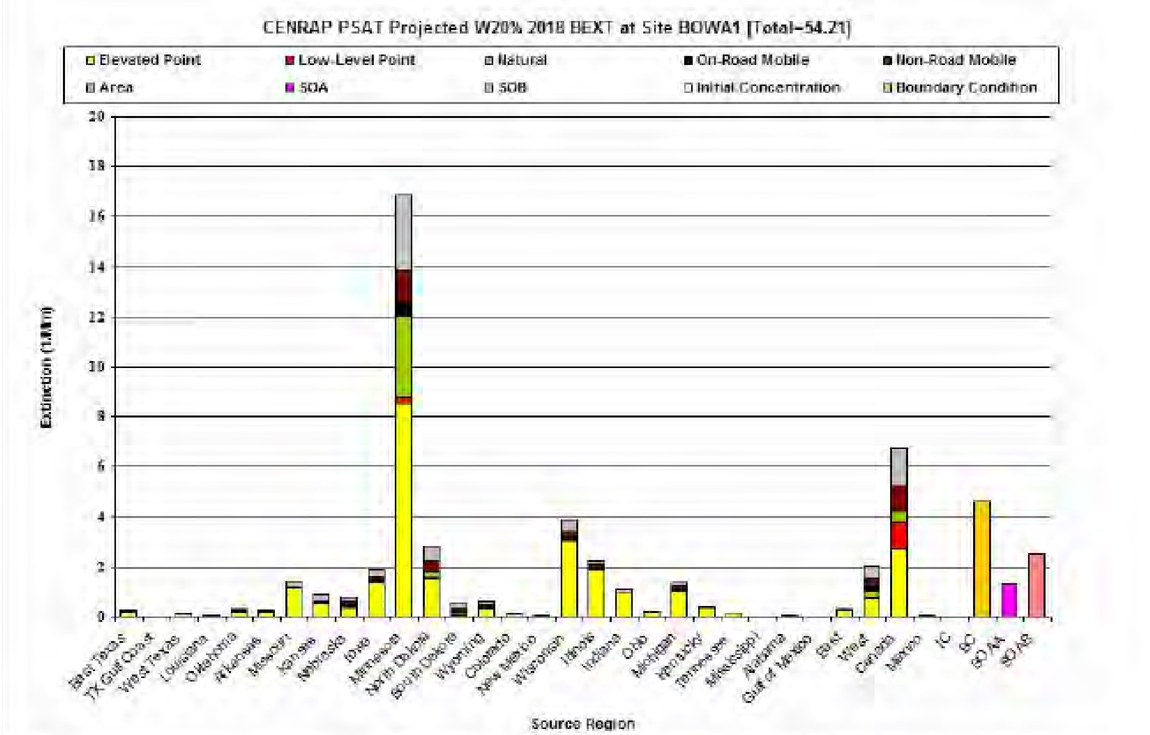


Figure E-4d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

5.0 ASSESSMENT OF BASELINE AND CURRENT CONDITIONS AND ESTIMATE OF NATURAL CONDITIONS

5.1 VISIBILITY REQUIREMENTS

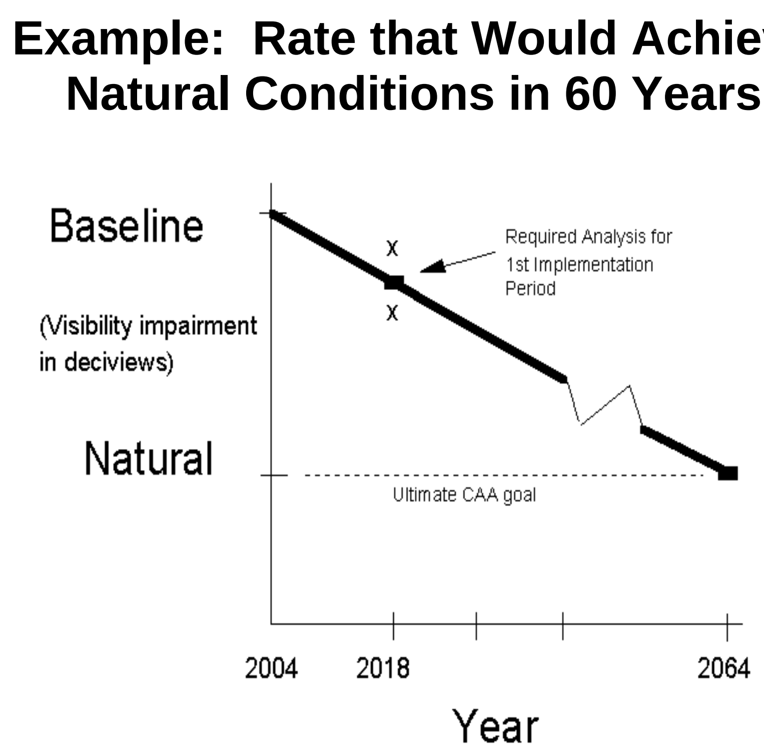
The goal of the Regional Haze Rule is to restore natural visibility conditions to the 156 Class I areas identified in the 1977 CAA Amendments. Sec. 51.301(q) defines natural conditions: "Natural conditions includes naturally occurring phenomena that reduce visibility as measured in terms of light extinction, visual range, contrast, or coloration." The regional haze plans must contain measures that make "reasonable progress" toward this goal by reducing anthropogenic emissions that cause haze. For each Class I area, there are three metrics of visibility that are part of the determination of reasonable progress:

1) baseline conditions
2) natural conditions
3) current conditions

Each of the three metrics includes the concentration data of the visibility pollutants as different terms in the light extinction algorithm, with respective extinction coefficients and relative humidity (RH) factors. Total light extinction when converted to deciviews (dv) is calculated for the average of the 20 percent best and 20 percent worst visibility days.

"Baseline" visibility is the starting point for the improvement of visibility conditions. It is the average of the Interagency Monitoring and PROtected Visual Environments (IMPROVE) monitoring data for 2000 through 2004 and can be thought of as "current" visibility conditions for this initial period. The comparison of initial baseline conditions to natural visibility conditions indicates the amount of improvement necessary to attain natural visibility by 2064. Natural visibility is determined by estimating the natural concentrations of visibility pollutants and then calculating total light extinction with the light extinction algorithm (Figure 5.1). Each state must estimate natural visibility levels for Class I areas within its borders in consultation with FLMs and other states (51.308(d)(2)). "Current conditions" are assessed every five years as part of the plan review where actual progress in reducing visibility impairment is compared to the reductions committed to in the plan (Appendix F, Chapter 4.0).

Figure 5.1: Determination of Natural Background



Consultation regarding the visibility metrics

Consultation among states is a requirement that is repeated in the Regional Haze Rule. As part of a "long-term strategy" for regional haze, a state whose emissions are "reasonably anticipated" to contribute to impairment in other states' Class I area(s) must consult with those states and also consult with any states whose emissions affect its own Class I area(s) (sec. 51.308(d)(3)).

A chief purpose of the RPO is to provide a means for states to confer on all aspects of the regional haze issue, including consultation on reasonable progress goals and long-term strategies, which are based on the current (baseline) and natural visibility determinations. This process is described in Chapter 3, *Regional Planning*. CENRAP has provided a forum for the member states and tribes to consult on the determination of baseline and natural visibility conditions in each of the Class I areas.

In addition, states in CENRAP have conferred with neighboring Class I area states outside CENRAP, both individually and by way of the states' RPO.

Sec. 51.308(i) requires Class I area states' coordination with FLMs that includes consultation on implementation, including the assessment of visibility impairment and recommendations regarding the reasonable progress goal and strategies for improvement.

Through participation in CENRAP and as a state, Missouri has completed this regulatory requirement. Details of actions taken to meet this requirement are found in the *Central Class I Areas Consultation Plan* (Appendix E).

5.2 BASELINE VISIBILITY CONDITIONS

During the five-year (2000-2004) baseline period, sites are required to have three valid years of data from which baseline conditions can be constructed. The Visibility Information Exchange Websystem (VIEWS) website (http://vista.cira.colostate.edu/views/) has posted particulate matter (PM)-species specific natural and baseline conditions based on the new IMPROVE algorithm. The new IMPROVE algorithm was developed by fitting reconstructed light extinction based on IMPROVE measured PM and nitrite (NO_2) concentrations with actual co-located measured light extinction (e.g., nephelometer measurements. The VIEWS document, *Revised IMPROVE Algorithm for Estimating Light Extinction from Particle Speciation Data*, posted under gray literature, explains the justification for the use of the new equation. Section II of this algorithm document, which provides more detail on the revised IMPROVE equation is included as Appendix G. The choice between use of the default or the refined equation for calculating the visibility metrics for each Class I area is made by the state in which the Class I area is located.[3] It is with these calculations that the state develops a RPG for each Class I area, in consultation with other states whose emissions affect visibility in that park or wilderness area (sec. 51.308(d)(1)(iv)).

Because it is based on more recent science which better exemplifies the observed light extinction values, Missouri, as well as other CENRAP states, has elected to perform their primary visibility

[3] According to sec. 51.308(d)(2), the state will make the determinations of baseline and natural visibility conditions.

projections using the new IMPROVE equation to calculate visibility metrics for the purpose of developing its reasonable progress goal (Appendix F, Section 4.2.1.1.3).

Using these PM-species specific natural conditions and the curved extinction glidepaths, we can evaluate how well visibility extinction achieves the 2018 Uniform Rate of Progress (URP) goal on a species-by-species basis in accordance with 40 CFR 51.308(d)(2).

The Mingo Class I area has an established baseline visibility of 13.76 dv for the cleanest 20 percent of the sample days and 28.02 dv for the 20 percent worst visibility days, as indicated in Table 5.1. This is based on sampling data collected at the Mingo IMPROVE monitoring site, which was established by the IMPROVE sampling staff at the University of California-Davis via their protocols. For Mingo, because of a clogged Module C Inlet, carbon data was not available from June 2000 to January 2002. The resolution was a substitution protocol developed by Warren White using organic mass hydrogen (OMH) to develop a surrogate for organic mass carbon (OMC). Data filling was used to obtain sufficient data so that three-years of valid data were available from which baseline conditions could be calculated. The data filled IMPROVE database were prepared and made available on the VIEWS website, where more information on the data filling procedures can be found (http://vista.cira.colostate.edu/views/).

The Hercules Glades Class I area has an established baseline visibility of 12.84 dv for the cleanest 20 percent of the sample days and 26.75 dv for the 20 percent worst visibility days. This is based on sampling data collected at the Hercules Glades IMPROVE monitoring site which was established by the IMPROVE sampling staff at the University of California-Davis via their protocols.

Table 5.1: Baseline Visibility Conditions for Missouri Class I Areas

Baseline Visibility Conditions 2000-2004		
Class 1 Area	**Average for 20% Worst Days (dv)**	**Average for 20% Best Days (dv)**
Mingo	28.02	13.76
Hercules Glades	26.75	12.84

5.3 NATURAL VISIBILITY CONDITIONS

EPA's "Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Program" (Sept 2003) provides states a "default" estimate of natural visibility. The default values of concentrations of visibility pollutants are based on a 1990 National Acid Precipitation Assessment Program report (Trijonis, J.C. 1990). In the guidance, the United States is divided into "East" and "West" along the western boundary of the states one tier west of the Mississippi River. This division divides the CENRAP states into "East" (MN, IA, MO, AR, and LA), with seven Class I areas, and "West" (NE, KS, OK, and TX), with three Class I areas. In the two equations, only sulfate (SO_4) and organic carbon have different values, but the calculated dv difference is significant (see Appendix F, Section 4.2 for further discussion of the default equation).

Using the New IMPROVE equation, Missouri has determined that natural visibility conditions for the Mingo Class I area is best represented by 12.40 dv for the 20 percent worst days (Table 5.2). The Hercules Glades Wilderness Class I area is best represented by 11.30 dv for the 20 percent worst days. Appendix F, Section 4.2.1.1.3 provides calculations, methodologies, and a discussion of the reasons for selection of the methodology and a demonstration of the appropriateness of these values for both Class I areas.

Table 5.2: Natural Background Conditions for the Class 1 Areas in Missouri

Class 1 area	20% Worst Days Goal (dv)	20% Best Days Goal
Mingo	12.40	No degradation
Hercules Glades	11.30	No degradation

6.0 MONITORING STRATEGY

6.1 MONITORING REQUIREMENTS

Section 51.308(d)(4) of the federal Regional Haze Rule requires a monitoring strategy for measuring, characterizing, and reporting regional haze visibility impairment that is representative of all mandatory Class I areas within the State of Missouri. The monitoring strategy relies upon participation in the IMPROVE network.

6.2 CURRENT MONITORING STRATEGY

Upon the creation of CENRAP, the newly formed Monitoring Workgroup identified large visibility data voids in Southern Arkansas, Iowa, Kansas, Southern Minnesota, Nebraska, and Oklahoma. Only five IMPROVE sites were located in the CENRAP region. Between 2000 and 2003, five more IMPROVE sites and 15 IMPROVE protocol sites were installed. In Missouri, IMPROVE Sites are located at Hercules Glades and Mingo (Figures 6.1 and 6.2). An IMPROVE protocol sampler is located at the site near El Dorado Springs (Figure 6.3). Missouri commits to meet the requirements under 40 CFR 51.308(d)(4)(iv) to report to EPA visibility data for each of Missouri's Class I areas annually.

The filter samples from the IMPROVE modules are sent for analysis to the Crocker Nuclear Laboratory of the University of California in Davis and the data is posted to the IMPROVE website and the VIEWS website.[4] Details regarding the monitors (location, date of installation, etc., and monitoring data) are found at the VIEWS website. This fulfills Missouri's reporting requirement of visibility data (electronic) under subsection (iv).

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[4] The IMPROVE website can be found at: http://vista.cira.colostate.edu/improve/. The VIEWS website can be found at: http://vista.cira.colostate.edu/views/.

Figure 6.1: Hercules Glades IMPROVE Monitoring Station

Figure 6.2: Mingo IMPROVE Monitoring Station

Figure 6.3: El Dorado Springs IMPROVE Protocol Monitoring Station

6.3 FUTURE MONITORING STRATEGY

In order to assess progress in reducing visibility impairment in Class I areas, the existing IMPROVE and IMPROVE Protocol sites will be maintained contingent upon continued national funding to measure, characterize and report regional haze visibility impairment to satisfy requirements of subsection (i). If EPA elects to revise funding for this network, Missouri will evaluate the IMPROVE protocol site at El Dorado Springs. Any changes appropriate to continued monitoring of Regional Haze for the Missouri Class I areas will be evaluated during the Missouri five-year review. The five-year review will include the following aspects:

- QA IMPROVE data from Mingo and Hercules Glades.
- Calculate current visibility conditions for most impaired and least impaired days.
- Calculate differences between current conditions and baseline conditions.
- Determine whether RPGs are being met.

Missouri will also evaluate technology changes and the need for new monitors as appropriate.

6.4 SPECIAL MONITORING STUDIES

Special monitoring in the CENRAP region for ammonia was conducted from November 1, 2003 through June 28, 2006. In all, approximately 7,200 individual ammonia and associated measurements were attempted in the course of this project. One of the primary outcomes of this sampling was the disclosure that high concentrations of ammonia are occurring in the northern and central CENRAP regions with a considerable regularity. It seems likely that these are due to the agricultural sources that have been documented as emitters of ammonia, including animal raising and fertilizer application.[5]

[5] Caughey, Mike, David Gay, and Clyde Sweet. *CENRAP Project Report: Monitoring Ambient Ammonia and Related Compounds in the Midwest 2003-2006*. Illinois State Water Survey. (Champaign, IL): August 31, 2006. A copy of the report is available from David A. Gay, Associate Research Scientist, Illinois State Water Survey, University of Illinois, 217-244-0462.

7.0 EMISSIONS INVENTORY

7.1 2002 AND 2018 EMISSIONS INVENTORY SUMMARY

As specified in the EPA guidance document, *Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations* (August 2005), the regional haze emissions inventory includes carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), volatile organic compounds (VOCs), fine particulate ($PM_{2.5}$), coarse particulate (PM_{10}), and ammonia (NH_3). Missouri used the CENRAP Base G emissions inventory for both the baseline year of 2002 and future year of 2018. Tables 7.1 and 7.2 summarize the Missouri 2002 and 2018 inventories, respectively. Tables H.1-8 in Appendix H include the complete 2002 and 2018 emissions inventory for Missouri.

Table 7.1: 2002 Missouri Emissions Inventory Summary

Source Sector	NO_X (TPY*)	SO_2 (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	CO (TPY)	VOC (TPY)	NH_3 (TPY)
Point EGU**	145,437.9	272,128.1	4,093.2	2,523.2	11,357.0	1,796.4	19.2
Point NEGU***	36,143.8	97,117.0	15,092.2	7,045.3	107,756.3	38,473.6	6,233.9
Area	31,337.8	48,510.9	29,975.9	26,385.8	135,292.9	204,940.2	2,276.7
Offroad Mobile	99,305.6	9,350.5	13,063.5	11,985.3	754,272.8	141,183.3	73.9
Onroad Mobile	189,852.3	5,353.5	4,486.6	3,297.4	1,585,277.1	97,245.6	5,993.5
Fire	3,539.6	936.2	12,407.2	10,642.3	151,389.6	12,867.9	1,447.2
Ag and Soil Ammonia	0.0	0.0	0.0	0.0	0.0	0.0	152,904.1
Fugitive Dust	0.0	0.0	95,240.0	19,006.9	0.0	0.0	0.0
Road Dust	0.0	0.0	367,390.3	55,011.6	0.0	0.0	0.0
Biogenics	22,518.6	0.0	0.0	0.0	134,123.4	1,428,260.0	0.0
Totals	528,135.5	433,396.3	541,748.9	135,897.8	2,879,469.2	1,924,767.1	168,948.5

Table 7.2: 2018 Missouri Emissions Inventory Summary

Source Sector	NO_X (TPY)	SO_2 (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	CO (TPY)	VOC (TPY)	NH_3 (TPY)
Point EGU	84,619.8	289,330.1	18,958.2	17,036.6	15,752.7	2,080.5	874.4
Point NEGU	49,290.8	66,731.1	23,598.8	10,171.7	184,350.9	54,908.6	8,600.2
Area	35,212.8	49,726.1	29,193.0	25,528.5	120,114.9	265,737.4	4,411.8
Offroad Mobile	59,624.9	565.2	8,371.3	7,675.0	739,932.9	72,794.1	84.8
Onroad Mobile	50,860.9	797.4	1,415.5	1,415.5	895,481.6	39,672.3	8,316.0
Fire	3,539.6	936.2	12,407.2	10,642.3	151,389.6	12,867.9	1,447.2
Ag and Soil Ammonia	0.0	0.0	0.0	0.0	0.0	0.0	182,451.5
Fugitive Dust	0.0	0.0	106,045.3	21,147.2	0.0	0.0	0.0
Road Dust	0.0	0.0	313,576.4	46,957.9	0.0	0.0	0.0
Biogenics	22,518.6	0.0	0.0	0.0	134,123.4	1,428,260.0	0.0
TOTALS	305,667.4	408,086.1	513,565.8	140,574.6	2,241,146.0	1,876,320.7	206,185.9

* Tons Per Year
** Electric Generating Unit
*** Non-Electric Generating Unit

7.2 OVERVIEW OF EMISSIONS INVENTORY DEVELOPMENT

7.2.1 Point Sources

The 2002 point source inventory is based on information reported by facilities on Emission Inventory Questionnaires (EIQs). The 2002 EIQ data collection process was conducted by the department's Air Pollution Control Program and the local air pollution agencies of St. Louis County and the City of St. Louis. As the coordinating agency for point source inventory development, the department's Air Pollution Control Program performed the overall quality-assurance procedures and submitted the data to EPA's 2002 National Emissions Inventory (NEI) to meet the requirements of the CERR.

Following submission of the Missouri point source inventory to the 2002 NEI, additional quality assurance, and revision of the data was completed through the CENRAP process. E. H. Pechan & Associates (Pechan), through a contract with CENRAP, obtained the Missouri point source inventory and worked with the department's Air Pollution Control Program to make corrections where needed. In particular, an error that resulted in the double counting of emissions from a number of emission units was corrected. The problem affected VOC emissions only. For example, for the Chrysler-North facility (291890231), emission unit number 20949, which emitted a total of 112 tons/year (about 0.3 tons/day) VOC in 2002, was associated with stack numbers 44387 and 44388. Instead of being proportioned between the two stacks, the total amount of 112 tons/year was linked to each stack, which doubled the emissions. In all, this problem resulted in overstating VOC emissions in the St. Louis nonattainment area by a total of 751 tons/year (roughly 2 tons/day). Other revisions included corrections to facility coordinates and stack parameters. Pechan also converted the point source inventory to the Sparse Matrix Operator Kernel Emissions/Inventory Data Analyzer (SMOKE/IDA) format. Pechan's work is described in detail in the two documents included in Appendix H: *The Consolidation of Emissions Inventories* (April 28, 2005) and *Refinement of CENRAP's 2002 Emissions Inventories* (August 31, 2005).

The 2018 point source emissions inventory was prepared by CENRAP. For non-EGUs, the 2002 emissions were projected to 2018 by applying growth and control factors using the SMOKE

model. The growth and control factors were prepared by Pechan and are documented in the following report in Appendix H.4: *Development of Growth and Control Inputs for CENRAP 2018 Emissions Draft Technical Support Document* (May 2005). The control factors for non-EGU point sources account for Maximum Achievable Control Technology (MACT) standards and the NO_X SIP Call for industrial boilers. In addition, the newly permitted Holcim cement kiln in Ste. Genevieve County was added to the 2018 non-EGU point inventory.

The Integrated Planning Model (IPM) version 2.1.9 model output for 2018 was used for 2018 EGU point source emissions. The SMOKE IDA formatted version of the 2018 Integrated Planning Model (IPM) 2.1.9 file was prepared by Pechan for CENRAP. See the Pechan report, *Refinement of CENRAP's 2002 Emissions Inventories* (August 31, 2005), in Appendix H.3 for more information. The proprietary IPM model has been used by the EPA to simulate electrical power generation and electrical power distribution scenarios based upon "least-cost" assumptions for future years and, simultaneously, generate estimates of pollutant emissions associated with these scenarios. The IPM run was conducted by ICF under contract to the RPOs. This run corresponds with the "VISTASII_PC_1f" modeling run. This run specifically addressed the emission reductions to be realized through implementation of CAIR assuming all states participate in the EPA's trading program, Acid Rain Program (Title IV – Phases I and II), NO_X SIP Call, and state and local regulations, while incorporating unit-level updates provided by power company stakeholders.

The University of California-Riverside (UCR) ran the SMOKE model for 2018 point source emissions. The edited IPM file for EGUs was processed in SMOKE without adjustments. The growth and control factors for non-EGUs were applied using the SMOKE model. The technical support document in Appendix F describes UCR's work on the 2018 point source inventory.

7.2.2 Area Sources

The 2002 area source inventory includes emissions estimates prepared by the department's Air Pollution Control Program and CENRAP, with remaining gaps filled in with data from the NEI. Table H.9 in Appendix H.1 lists the source of the emissions estimates for each SCC in the base year area source inventory. For the categories developed by the department's Air Pollution

Control Program, the data and methods used are described in the document *Missouri Statewide Estimates for the 2002 National Emissions Inventory (NEI): Area Sources* (January 8, 2007) in Appendix H.5. The data and methods used to develop the prescribed burning, agricultural dust, and soil agricultural ammonia inventories for CENRAP can be found in the following reports prepared by Sonoma Technology in Appendix H: *Research and Development of Planned Burning Emission Inventories for the Central States Regional Air Planning Association* (July 30, 2004), *Emission Inventory Development for Mobile Sources and Agricultural Dust Sources for the Central States* (October 28, 2004), and *Research and Development of Ammonia Emission Inventories for the Central States Regional Air Planning Association* (October 30, 2003). Documentation of EPA's methods for the NEI may be found on EPA's Clearinghouse for Inventories and Emission Factors (CHIEF) website at http://www.epa.gov/ttn/chief/net/2002inventory.html.

In a contract with CENRAP, Pechan consolidated the area source data from the various sources, conducted additional quality assurance, and worked with the department's Air Pollution Control Program to make revisions where needed. In particular, corrections were made to a double-counting error of industrial surface coating VOC emissions. Pechan also converted the area source inventory to the SMOKE/IDA format. Pechan's work is described in detail in two documents included in Appendix H: *The Consolidation of Emissions Inventories* (April 28, 2005) and *Refinement of CENRAP's 2002 Emissions Inventories* (August 31, 2005).

To prepare the area inventories for modeling, UCR made several modifications to the IDA files by removing selected sources either to model them as separate source categories or to omit them from simulations completely. Fugitive and road dust sources were extracted from all stationary-area inventories and adjusted by transport factors following *Methodology to Estimate the Transportable Fraction (TF) of Fugitive Dust Emissions for Regional and Urban Scale Air Quality Analyses* (Pace 2005).

The 2018 area source emissions inventory was based on data provided by CENRAP states. Area source growth and control factors were prepared by Pechan and are documented in the following report in Appendix H.5: Development of Growth and Control Inputs for CENRAP 2018

Emissions Draft Technical Support Document (May 2005). The control factors reflect New Source Performance Standards (NSPS) for residential wood combustion and Stage II vapor recovery controls, including onboard vapor recovery.

UCR ran the SMOKE model for the 2018 area source emissions. The growth and control factors for area sources were applied within SMOKE. The technical support document in Appendix F describes UCR's work on the 2018 area source inventory. Windblown dust from non-agricultural land use categories and fire emissions were held constant from 2002 to 2018.

7.2.3 Offroad Mobile Sources

The 2002 offroad mobile source includes emissions estimates prepared by the department's Air Pollution Control Program and CENRAP, with remaining gaps filled in with EPA NEI data. Table H.10 in Appendix H.1 lists the source of the emissions estimates for each SCC in the base year offroad mobile inventory. The majority of the offroad mobile inventory was developed by Sonoma Technology under a contract with CENRAP. The methods and data used by Sonoma are described in the report *Emissions Inventory Development for Mobile Sources and Agricultural Dust Sources for the Central States* (October 28, 2004) in Appendix H.7. Information on the NONROAD model is at http://www.epa.gov/otaq/nonrdmdl.htm.

Pechan, under a contract with CENRAP, consolidated the offroad mobile source inventories from the various data sources, quality-assured the data, worked with the department's Air Pollution Control Program to make corrections where needed, and created SMOKE/IDA-formatted files. In particular, Pechan made corrections to the fuel oxygenate content used in the NONROAD model. Pechan's work is described in detail in the two documents included in Appendix H: *The Consolidation of Emissions Inventories* (April 28, 2005) and *Refinement of CENRAP's 2002 Emissions Inventories* (August 31, 2005).

The 2018 offroad mobile inventory was based on inputs from CENRAP states. Growth and control factors for locomotives, aircraft, and commercial marine vessels were prepared by Pechan. The control factors accounted for federal standards for commercial marine vessels and locomotives. For the remaining offroad mobile categories, Pechan ran the EPA's

NONROAD2004 model for 2018. EPA's NONROAD2004 model accounts for growth in equipment populations and incorporates the effects of most final federal standards, including the Tier 4 diesel engine standards and the exhaust emission standards for large spark-ignition engines, diesel marine, and land-based recreational engines. Pechan's methods are described in greater detail in the following report in Appendix H.4: Development of Growth and Control Inputs for CENRAP 2018 Emissions Draft Technical Support Document (May 2005).

UCR and applied the growth and control factors to non-NONROAD categories using the SMOKE model. In addition, UCR processed NONROAD-model categories in SMOKE without adjustments. The technical support document in Appendix F describes UCR's work on the 2018 offroad inventory

7.2.4 Onroad Mobile Sources

The department's Air Pollution Control Program and CENRAP, with contractor support, developed the 2002 and 2018 onroad mobile source emissions inventories. Sonoma Technology provided 2002 VMT data and MOBILE6 input files for all counties in the CENRAP region. MOBILE6 input files were provided only for the months of January and July for 2002. The methods and data used by Sonoma are described in the report Emissions Inventory Development for Mobile Sources and Agricultural Dust Sources for the Central States (October 28, 2004) in Appendix H.7. UCR prepared MOBILE6 input files for the remaining months of 2002 and processed the 2002 mobile emissions using the MOBILE6 model within the SMOKE framework.

Pechan prepared the VMT and MOBILE6 inputs for the 2018 onroad mobile source emissions inventory. The VMT growth factors and MOBILE6 input files were provided in SMOKE format. The MOBILE6 input files incorporated state/local control program information, including Reformulated Gasoline and the inspection and maintenance program in the St. Louis nonattainment area and low Reid vapor pressure (RVP) gasoline in the Kansas City maintenance area. For each county or group of counties modeled, two SMOKE-formatted MOBILE6 files were prepared: one representing July conditions and one representing January conditions. Pechan's methods are described in greater detail in the following report in Appendix H.4:

Development of Growth and Control Inputs for CENRAP 2018 Emissions Draft Technical Support Document (May 2005).

UCR prepared MOBILE6 input files for the remaining months of 2018 and processed the 2018 onroad mobile emissions by running the MOBILE6 model within the SMOKE framework. The SMOKE model applies the VMT growth factors. The MOBILE6 model accounts for federal motor vehicle controls, including light-duty motor vehicle engine standards and low-sulfur gasoline, and the federal heavy-duty diesel engine standards and low-sulfur diesel. The technical support document in Appendix F describes UCR's onroad mobile emissions inventory processing.

7.2.5 Biogenic Emissions

UCR generated biogenic emissions by running the BEIS3 model within the SMOKE framework. BEIS3 is a system integrated into SMOKE for deriving emissions estimates of biogenic gas-phase pollutants from land use information, emissions factors for different plant species, and hourly, gridded meteorology data. Biogenic emissions were held constant from 2002 to 2018. The technical support document in Appendix F describes the development of the biogenic emissions inventory.

7.3 PERIODIC UPDATES OF EMISSIONS INVENTORIES

Recognizing the importance of maintaining current, valid emissions information, the department's Air Pollution Control Program commits to periodically updating the Missouri statewide emissions inventories. The point source inventories will be updated on an annual basis, and the area, onroad mobile, and offroad mobile inventories will be updated every three years. The three-year updates will begin with the inventory for calendar year 2008, and follow with 2011, 2014, and so on, consistent with EPA's emissions inventory reporting requirements.

In addition to completing regular updates of Missouri's emissions inventory, the Air Pollution Control Program commits to periodically reviewing emissions information for other states and future-year emissions projections and making adjustments where needed. This effort will consist of reviewing and updating any technical data and assumptions regarding emissions growth rates,

implementation of emissions controls, and geographic distribution of emissions. The periodic reviews will be coordinated with other states and consultation partners and will be conducted in conjunction with the five-year progress reports discussed in section 2.6.

8.0 MODELING ASSESSMENT

8.1 MODELING REQUIREMENTS

40 CFR 51, Appendix W provides modeling guidelines for conducting regional-scale modeling for particulate matter and visibility. The EPA recommends the use of one of the three following models to simulate pollutants impairing visibility: Community Multiscale Air Quality (CMAQ), Comprehensive Air quality Model with extensions (CAMx), and Regional Modeling System for Aerosols and Deposition (REMSAD). CENRAP contractors performed regional modeling using CMAQ and CAMx.

The CMAQ Model is an Eulerian model that simulates the atmospheric and surface processes affecting the transport, transformation and deposition of air pollutants and their precursors. An Eulerian model computes the numerical solution of partial differential equations of plumes on a fixed grid, while other models may lose accuracy or need regridding as the plumes expand.

CAMx is a computer modeling system for the integrated assessment of photochemical and particulate air pollution. CAMx incorporates all of the technical attributes demanded of state-of-the-art photochemical grid models, including two-way grid nesting, a subgrid-scale Plume-in-Grid module to treat the early dispersion and chemistry of point source NO_X plumes, and a fast chemistry solver.

In the July 1, 1999 publication of the Regional Haze Rule in the Federal Register, EPA defined the uses of regional modeling as follows:

- Analyses and determination of the extent of emissions reductions needed from individual states
- Analyses and determination of emissions needed to meet the progress goal for the Class I area
- Analyses to support conclusion that the Long-Term Strategy provides for reasonable progress
- Analyses to calculate the resulting degree of visibility improvement that would be achieved at each Class I area

- Analyses to compare visibility improvement between proposed control strategies

8.2 MODEL INPUTS

8.2.1 Selection of Episodes

The calendar year 2002 was selected for the base year for CENRAP regional haze annual modeling consistent with EPA guidance. The Technical Support Document provides additional information on the selection of 2002 as the base year for regional haze modeling and is found at Appendix F.

8.2.2 Selection of Modeling Domain

CENRAP conducted emissions and air quality modeling on the 36 km national RPO domain. This domain consists of a 148 by 112 array of 36 km by 36 km grid cells and covers the continental United States. The Technical Support Document provides additional information on the modeling domain and is found at Appendix F.

8.2.3 Emission Inventories

The emissions inventory includes VOC, NO_X, CO, SO_2, PM_{10}, $PM_{2.5}$, and NH_3 emissions from all anthropogenic and biogenic sources. The emissions inventory information submitted by state, tribal, and local agencies to the 2002 NEI formed the basis of the 2002 CENRAP emissions inventory. The NEI data was supplemented with non-point source emissions inventories developed for CENRAP by Sonoma Technology. These CENRAP-specific inventories addressed agricultural and prescribed burning, onroad and offroad mobile sources, agricultural tilling and livestock dust, and agricultural ammonia. In addition, Pechan assisted CENRAP by quality-assuring the emissions inventory and preparing day- and hour-specific emissions for EGUs based on Continuous Emissions Monitor (CEM) data for the model performance evaluation.

Emissions inputs for the air quality model were prepared using the SMOKE emissions modeling system. The CENRAP modeling emissions inventory consists of several distinct datasets: the 2002 base case for model performance evaluation, 2002 typical, 2018 base case, and the 2018 control strategy scenario. Its spatial extent is the RPO 36 km modeling domain, which covers

the continental U.S. plus portions of Canada and Mexico. The inventory was refined through several rounds of CENRAP workgroup review and revision, beginning with the initial Base A version and culminating in the Base G inventory. The Technical Support Document provides the methodologies for the SMOKE emissions processing and is found at Appendix F. A summary of the development of the emissions inventory can be found in Chapter 7.

8.2.4 Meteorology

The Fifth-Generation NCAR / Penn State Mesoscale Model (MM5) is the latest in a series that developed from a mesoscale model used by Anthes at Penn State in the early 70's that was later documented by Anthes and Warner (1978). Since that time, it has undergone many changes designed to broaden its usage. These include (i) a multiple-nest capability, (ii) nonhydrostatic dynamics, which allows the model to be used at a few-kilometer scale, (iii) multitasking capability on shared- and distributed-memory machines, (iv) a four-dimensional data-assimilation capability, and (v) more physics options. The model (known as MM5) is supported by several auxiliary programs, which are referred to collectively as the MM5 modeling system. Since MM5 is a regional model, it requires an initial condition as well as a lateral boundary condition to run. To produce a lateral boundary condition for a model run, one needs gridded data to cover the entire time period that the model is integrated. The Technical Support Document provides the methodologies for this process and is found at Appendix F.

8.3 MODEL PERFORMANCE EVALUATION

Model evaluations compared concentrations of various pollutants simulated by CMAQ and CAMx with observations from:

- IMPROVE
- Clean Air Status and Trends Network (CASTNet)
- Speciated Trends Network (STN)
- Aerometric Information Retrieval Systems (AIRS)
- South Eastern Aerosol Research and Characterization (SEARCH)

The CMAQ and CAMx models were evaluated against ambient measurements of PM species, gas-phase species and wet deposition. Numerous iterations of CMAQ and CAMx 2002 base

case simulations and model performance evaluations were conducted during the course of the CENRAP modeling study, most of which have been posted on the CENRAP modeling website (http://pah.cert.ucr.edu/aqm/cenrap/cmaq.shtml) and presented in previous reports and presentations for CENRAP. In general, the model performance of the CMAQ and CAMx models for SO_4 and elemental carbon (EC) was good. Model performance for nitrate (NO_3) was variable, with a summer underestimation and winter overestimation bias. Performance for OMC was also variable, with the inclusion of the Secondary Organic Aerosol Modules enhancement in CMAQ Version 4.5 greatly improving the CMAQ summer OMC model performance. Model performance for Soil and coarse mass was generally poor. Part of the poor performance for soil and coarse mass is believed to be due to measurement-model incommensurability whereby the IMPROVE measured values are due in part to local fugitive dust sources that are not captured in the model's emission inputs and 36 km grid resolution. Detailed information on the model performance evaluations is found in the Technical Support Document in Appendix F.

8.4 BASE G MODEL SIMULATIONS

8.4.1 2018 Base G visibility projections

The 2018 Base G modeling run reflects emissions growth and "on the books" controls, which are state and federal controls that will be implemented between the 2002 base year and the 2018 future year. The 2018 emissions for EGUs were based on simulations of the IPM that took into account the effects of the CAIR trading program. In addition, reductions anticipated from BART controls for EGUs in Oklahoma, Arkansas, Kansas, and Nebraska were included. Emissions for onroad and offroad mobile sources were based on activity growth and emissions factors from the EPA MOBILE6 and NONROAD models, respectively, which reflected emissions reductions from the Tier 2 and Tier 4 mobile source rules. Area sources and non-EGU point sources were grown to 2018 levels.

The two important regional haze metrics are the average visibility for the worst 20 percent and best 20 percent days from the 2000-2004 five-year baseline period. The results from the 2002 and 2018 CMAQ and CAMx simulations were used in a relative sense to scale observed PM concentrations from the 2000-2004 baseline to 2018 levels from which 2018 visibility estimates were obtained. The CENRAP 2018 visibility conditions were calculated following EPA default

visibility projection procedures and are labeled “Method 1 Prediction” in Figures 8.1 and 8.2. The steps involved in the visibility calculations are described below:

1. For each Class I area and each monitored day, daily visibility based on IMPROVE data and the new IMPROVE equation was ranked for the five-year baseline period (2000-2004) to identify the worst 20 percent and best 20 percent visibility days for each year in the baseline period.
2. The CMAQ air quality model was used to simulate the base year (for CENRAP the 2002 annual period was simulated) and a future-year (2018). The resulting information was used to develop Class I area-specific relative reduction factors (RRFs) for each of the six components of light extinction in the IMPROVE equation (SO_4, NO_3, EC, OMC, Soil and CM).
3. The RRFs were multiplied by the measured 24-hour PM concentration for each day from the worst and best 20 percent days in each year from the five-year baseline period to obtain projected future-year 24-hour PM concentrations for the worst and best 20 percent days.
4. The future-year (2018) daily extinction was computed using the new IMPROVE equation and the projected PM concentrations for each of the worst and best 20 percent days in the five-year baseline from step 3.
5. For each of the worst and best 20 percent days within each year of the five-year baseline, the future-year daily extinction was converted to deciview. The daily deciview values were averaged within each of the five years separately to obtain five years (or as many years with valid data in the 2000-2004 baseline) of average deciview visibility for the worst and best 20 percent days.
6. The five years of deciview visibility were averaged to obtain the 2018 estimated visibility.

The 2018 visibility projections for the worst 20 percent days and best 20 percent days are compared against a 2018 point on the Uniform Rate of Progress (URP) glidepath or the “2018 URP point.” The 2018 URP point is obtained by constructing a linear visibility glidepath in deciviews from the observed 2000-2004 Baseline for the worst 20 percent days to the 2064

Natural Conditions. The 2018 URP point is where the linear glidepath crosses the year 2018. Figures 8.1 and 8.2 present the 2018 visibility projections for Hercules Glades and Mingo. As seen in these figures, the 2018 visibility projections at both the Hercules Glades and Mingo Class I areas meet the 2018 point on the URP glidepath for the worst visibility days and exhibit no degradation on the best visibility days. For the worst 20 percent days, the 2018 projection for Hercules Glades is 23.06 dv, compared to the URP point of 23.14 dv. The 2018 projection for Mingo is 23.71 dv, as compared to the URP point of 24.37 dv.

Additional information on the CENRAP visibility projections based on the Base G modeling results is summarized in 4.4. of the Technical Support Document (TSD), which indicates that Appendix D of the TSD provides details for each Class I area in the CENRAP region using the new IMPROVE equation.

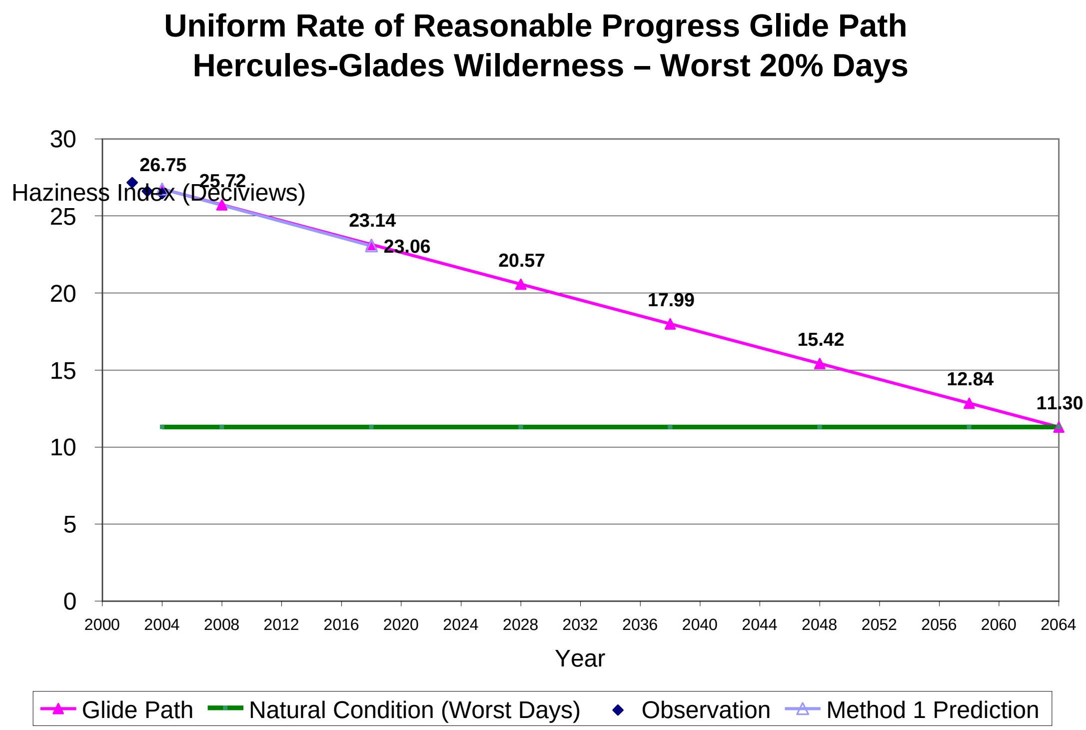

Figure 8.1a: 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Hercules Glades, Missouri, and Worst 20% days using 2002/2018 Base G CMAQ 36 km modeling results.

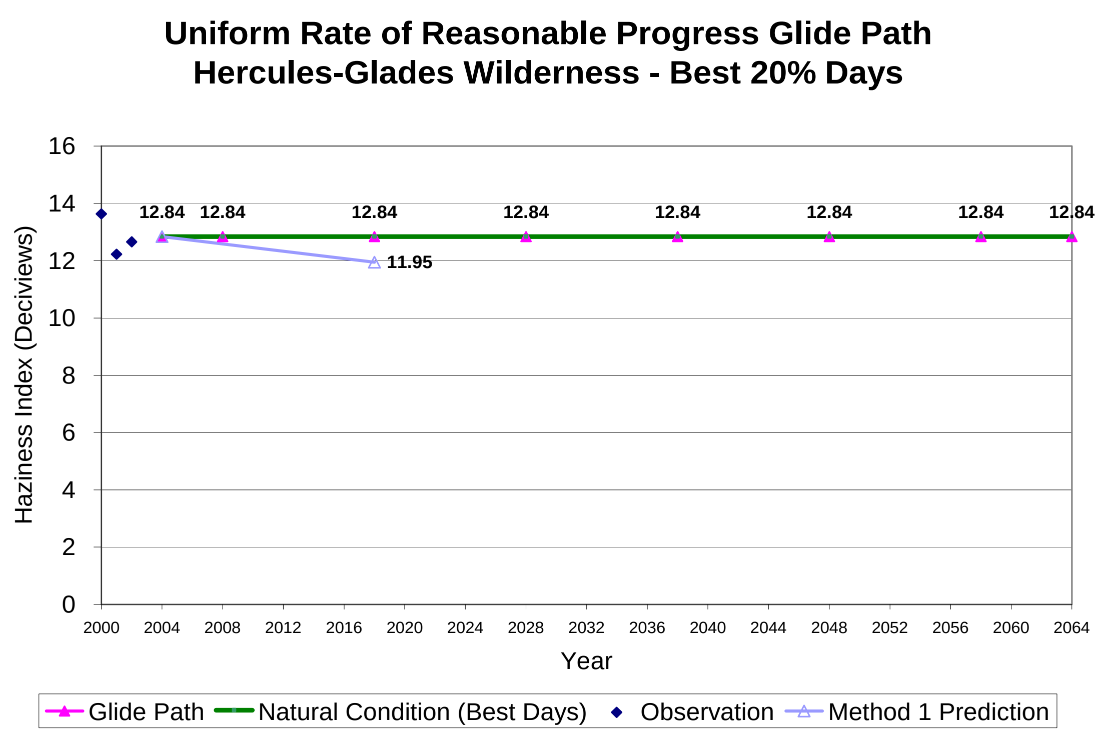

Figure 8.1b: 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Hercules Glades, Missouri, and Best 20% days using 2002/2018 Base G CMAQ 36 km modeling results.

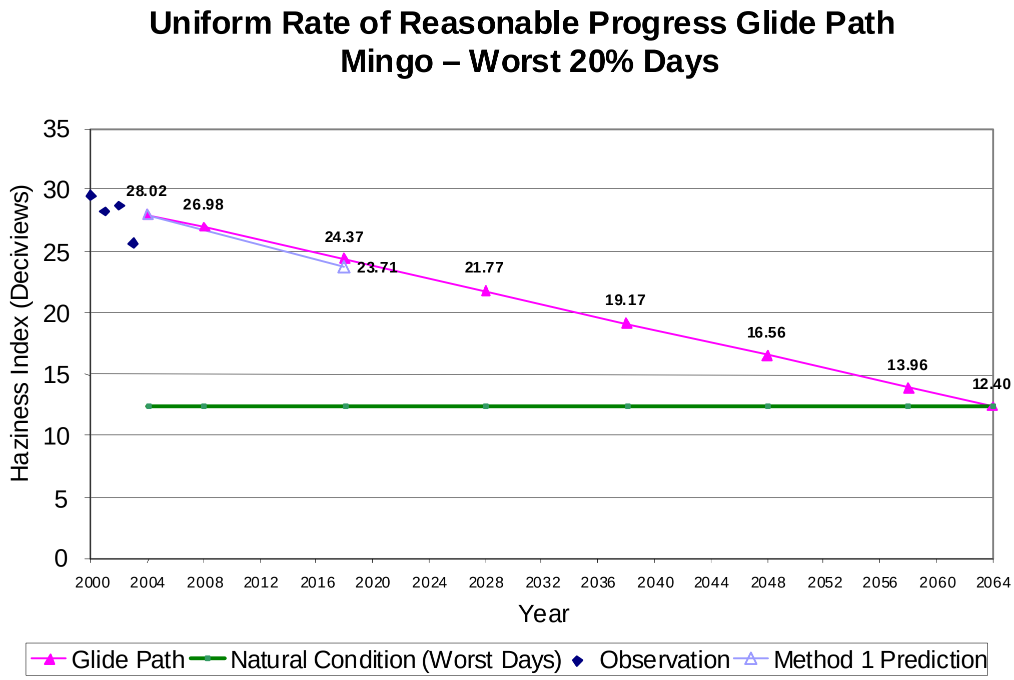

Figure 8.2a: 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Mingo, Missouri, and Worst 20% days using 2002/2018 Base G CMAQ 36 km modeling results.

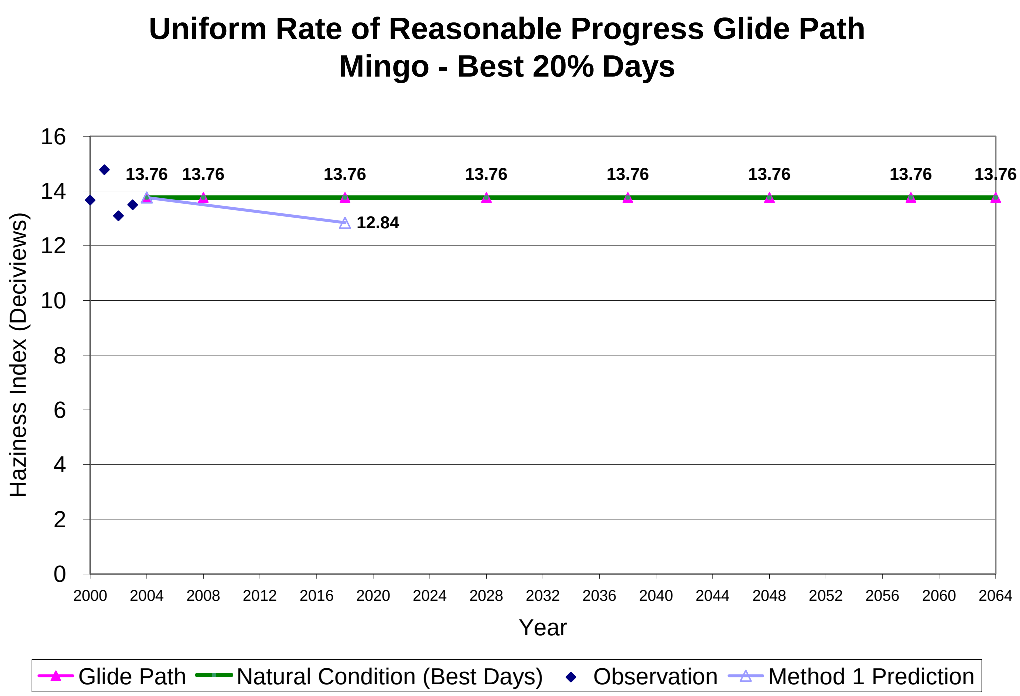

Figure 8.2b: 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Mingo, Missouri, and Best 20% days using 2002/2018 Base G CMAQ 36 km modeling results.

8.4.2 Other RPO's visibility projections

The 2018 visibility projections for the two Missouri Class I areas are also available from the VISTAS and MRPO modeling. At Hercules Glades, the three RPOs' 2018 visibility projections are in close agreement with each other, estimated to achieve 102 percent, 101 percent and 96 percent of the 2018 URP point. The CENRAP and VISTAS 2018 visibility projections are also very close at Mingo, 118 percent and 114 percent, respectively. However, the MRPO 2018 visibility projections are approximately 15 percentage points lower than the CENRAP and VISTAS projections at Mingo. The reasons why the MRPO 2018 visibility projections are less optimistic than CENRAP and VISTAS are unclear. The discrepancy could be due to the use of different emissions inventories. CENRAP's Base G inventory included IPM 2.1.9 results for 2018 EGU emissions that had been quality-assured and edited by CENRAP and VISTAS states and stakeholders, while MRPO's latest modeling inventory used IPM 3.0 results that did not include edits from VISTAS or most of the CENRAP states. The department's Air Pollution Control Program concluded that CENRAP projections for Mingo and Hercules Glades should be more accurate due to a better emissions inventory for our states. Additional analysis including the IPM 3.0 results with states' review will be considered during the five-year review period.

9.0 BEST AVAILABLE RETROFIT TECHNOLOGY (BART)

9.1 BART REQUIREMENTS

The EPA's 1999 Regional Haze Rule singles out certain older emission sources that have not been regulated under other provisions of the Clean Air Act for additional controls. Older sources that contribute to visibility impairment in Class I areas are required to implement BART or an emissions trading or other alternative program that will achieve greater reasonable progress than would be achieved through the installation and operation of BART. On July 6, 2005, EPA published a revised final rule, including Appendix Y to 40 CFR 51 "Guidelines for BART Determinations Under the Regional Haze Rule" that provides direction to states on determining which of these older sources may need to install BART and how to determine BART.

Based on comments received from EPA Region VII, sources originally not included in the BART air quality review were re-examined. Some additional sources were found to be BART eligible and were evaluated in the same fashion as the original sources. Upon completion of the BART air quality screen and draft refined modeling analyses; the State of Missouri has found one source that is subject to BART. This source (Holcim – Clarksville) has signed a consent agreement with emission limits that represent BART for the applicable source. This agreement with the department is included in this submittal as the enforceable mechanism for the necessary emission control requirements. No other sources were found to be subject to BART and, therefore, implementation of an emissions trading program, other emission controls or other alternative measure in place of BART are not necessary.

9.2 BART – ELIGIBLE SOURCES IN STATE OF MISSOURI

The facilities with BART-eligible units in the State of Missouri are shown in Table 9.1 (including the newly identified sources). A detailed description of each BART-eligible emission unit is included in Appendix I.

Table 9.1: Facilities with BART-eligible Units in the State of Missouri

BART Source Category Name	SIC Code	Facility ID	Facility Name	BART-Eligible Emission Units
Fossil-fuel fired steam electric plants of more than 250 MMBTU (1)*	4911	29-071-0003	Ameren – Labadie	Boiler 1 – B1, Boiler 2 – B2, Boiler 3 – B3, and Boiler 4 – B4
(1)*	4911	29-183-0001	Ameren – Sioux	Boiler 1 – B1 and Boiler 2 – B2
(1)*	4911	29-099-0016	Ameren – Rush Island	Boiler 1 – B1 and Boiler 2 – B2
(1)*	4911	29-095-0031	Aquila – Sibley	Boiler 3 – 5C
(1)*	4911	29-143-0004	Associated Electric – New Madrid	Boiler 1 – EP-01 and Boiler 2 – EP – 02
(1)*	4911	29-077-0039	City Utilities Springfield - Southwest	Boiler 1 – E09
(1)*	4911	29-077-0005	City Utilities Springfield – James River	Utility Boiler #4 – E07 and Utility Boiler #5 – E08
(1)*	4911	29-097-0001	Empire District Electric – Asbury	Boiler – 7
(1)*	4911	29-083-0001	Kansas City Power and Light – Montrose	Boiler Unit 3 – EP08
*(1)**	*4911*	*29-021-0004*	*Aquila – Lake Road*	*Boiler 6 – EP06*
*(1)**	*4911*	*29-175-0001*	*Associated Electric – Thomas Hill*	*Boiler 1 - EP-01 and Boiler 2 – EP-02*
(1)	4911	29-095-0021	Trigen – Kansas City	Boiler 1A
(1)	*4911*	*29-019-0002*	*City of Columbia Municipal Power Plant*	*Boiler #7 - EP02*
(1)	*4911*	*29-195-0010*	*Marshall Municipal Utilities*	*Coal-Fired Boiler - EP05*
(1)	*4911*	*29-095-0050*	*Independence Power and Light – Blue Valley*	*Boiler #3 – EP05*
Portland cement plants (4)	3241	29-099-0002	RC Cement	4-K-02 (Kiln)
(4)	*3241*	*29-173-0001*	*Continental Cement*	*KP01 (Kiln)*
(4)	*3241*	*29-163-0001*	*Holcim - Clarksville*	*Kiln – EP14 and a variety of supporting units*
Primary aluminum ore reduction plants (7)	3334	29-143-0008	Noranda Aluminum	Potlines 1 & 2 – EP-59,60,& 61, Carbon Bake 1 and 2 Stacks – EP 98 & 99, and a variety of supporting units**
Hydrofluoric, sulfuric, and nitric acid plants (10)	2873	29-163-0031	Dyno Nobel – Lomo Plant	Ammonia Oxidation Process – E01
Lime plants (12)	3274	29-186-0001	Mississippi Lime	Peerless Rotary Kilns 3,4,5&6 – EP-68-71
Primary lead smelters (17)	3339	29-099-0003	Doe Run – Herculaneum	Blast Furnace – EP059
(17)	3339	29-093-0008	Doe Run – Glover	Sinter Plant - EP-01 and Other Units at the facility
Secondary metal production facilities (20)	3341	29-087-0001	Exide Technologies	Main Stack – EP01
(20)	*3339*	*29-093-0009*	*Doe Run – Buick*	Main Stack – EP08
Chemical Process Plants (21)	*2879*	*29-127-0001*	*BASF Corporation*	*PR08 – HNO3 Storage Tank, PR53/54 Incinerators, TC01 Incinerator, UTIL07 – 2 Gas-fired boilers*
Fossil-fuel boilers >250 MMBTUs per hour (22)	4911	29-019-0004	University of Missouri – Columbia	Boiler 10

*BART-eligible EGU units included in the CAIR assumed to be BART for SO_2 and NO_X
** Other supporting units listed in facility summary later in this section
Italics means BART-eligible source identified after EPA comments

The BART-eligible sources were identified using the methodology in the Guidelines for BART Determinations under the Regional Haze Rules or "Guidelines" (40 CFR 51, Appendix Y). For an emission unit source to be identified as BART-eligible, the State of Missouri used these criteria from the Guidelines:

- One or more emissions units at the facility fit within one of the 26 categories listed in the Guidelines;
- The emission unit(s) were in existence on August 7, 1977 and began operation at some point on or after August 7, 1962; and
- The limited potential emissions from all emission units identified in the previous two bullets emission units were greater than 250 tons or more per year of any of these visibility-impairing pollutants: SO_2, NO_X, and PM_{10}.

The Guidelines recommend addressing these visibility-impairing pollutants: SO_2, NO_X, and particulate matter. The State of Missouri addressed these three pollutants and used particulate matter less than 10 microns in diameter (PM_{10}) as an indicator for particulate matter to identify BART-eligible units, as the Guidelines suggest. Consistent with the Guidelines, the State of Missouri did not evaluate emissions of VOCs and ammonia in BART determinations for these reasons:

1) the majority of VOC emissions in Missouri are biogenic in nature and specifically the areas near Mingo and Hercules Glades are very rich in biogenic emissions (limited ability to reduce organic concentrations at the Class I areas),
2) the largest areas of anthropogenic VOC emissions in Missouri exist in the metropolitan areas (St. Louis and Kansas City) where VOC emission control has been undertaken to address ozone attainment issues (meaning large VOC sources have already been controlled),
3) the other category that would have substantial, uncontrolled VOC emissions is charcoal kilns, the department required existing charcoal kilns to install afterburners or shutdown noncompliant kilns as a result of 10 CSR 10-6.330,
4) the overall ammonia inventory is very uncertain and the amount of anthropogenic emissions at the sources that were BART-eligible was relatively small, and

5) No additional sources were identified that had greater than 250 tons per year ammonia and required a subsequent BART analysis.

The State of Missouri identified potentially BART-eligible source by reviewing the emission inventory database and extracting data for facilities within the 26 categories identified. A survey was conducted for the facilities within this group asking for large source identification and the timing of the installation and operation of those sources. The sources listed in Table 9.1 have been identified as sources that meet the criteria for inclusion as BART-eligible sources. Beyond the three primary visibility-impairing pollutants (SO_2, NO_X, and PM_{10}), the sources were also asked to identify ammonia and VOC emissions. The survey and resultant tabular response information are contained in Appendix J and Appendix I, respectively.

9.3 DETERMINATION OF SOURCES SUBJECT TO BART

Upon completion of the survey, the BART-eligible sources were divided into four distinct groups: (1) electric generating units participating in the CAIR trading program, (2) sources that have final new source review (construction) permits requiring a BART-eligible unit "shutdown" or no current operating permit at the facility, (3) sources that have gone through a subsequent construction permitting exercise for units that would have been BART-eligible based on original installation date, and (4) all other units that underwent a screen-modeling evaluation to determine the visibility impact on the applicable Class I area(s).

The first and fourth groups were evaluated initially using a screen-modeling technique for visibility impact. The first group (CAIR EGUs) was modeled collectively using all BART-eligible sources for only the PM impacts on the applicable Class I areas (NOTE: After EPA comment, two additional CAIR EGU facilities were discovered to be BART-eligible and additional analysis was performed). All the sources in the fourth group were modeled independently. The second group included some or all of the BART-eligible sources at four installations. River Cement, Doe Run – Glover, Continental Cement, and Mississippi Lime all had units that were part of a voluntary shutdown or being removed due a specific construction permit condition. To be clear, the Doe Run – Glover facility does not have a current operating permit for any of the BART-eligible units at the facility. The department sent a notice to the

company on November 13, 2007, that detailed the termination of the operating permit for the BART-eligible units after a thirty-day period allowed for the company to provide additional information. This period expired on December 13, 2007, and the permit was closed out. Therefore, the pyro-process units at Glover can not restart without a new construction permit requiring Best Available Control Technology (BACT) evaluation for each. These BART-eligible units were not included in the modeling analyses and are shown in Table 9.2. During the public comment period, Mississippi Lime Company provided a comment that changed the units that were subject to the BART air quality screening evaluation. Mississippi Lime Company has provided a permit modification that includes the continued use of Peerless Rotary Kiln #4 (EP69) at the facility. The unit was originally subject to shutdown provisions in the applicable permit, but the updated information required a new evaluation of the facilities' BART-eligible units. The other unit in the shutdown provision (PRK #3 – EP68) has been dismantled.

Table 9.2: Units Removed from BART Consideration Due to Shutdown or Federal Permit Requiring Shutdown

Facility/Facility ID	Units	Reason for Removal from BART Consideration
Doe Run – Glover / 29-083-0008	Pyro-process units	No operating permit
RC Cement / 29-099-0002	4-K-02	Permit #122005-005
Mississippi Lime / 29-186-0001	EP68	Permit #122002-007
Continental Cement / 29-173-0001	KP01	Permit #072007-008

The third category illustrates a source that has undergone a major source permitting exercise for the units that would have been BART-eligible based on installation date. Doe Run – Buick underwent a Prevention of Significant Deterioration (PSD) review for Permit #0989-003 and a subsequent review for Permit #012005-008. Each review found that the blast furnace units had installed Best Available Control Technology (BACT).

The BART-eligible unit at Doe Run – Buick is the blast furnace (referenced as EP-08, Main Stack). Under the 2005 construction permit, the entire facility is limited to 3,400 tons per year of SO_2 with vast majority coming from the blast furnace. The other emissions from this unit are very limited - NOx and PM emissions are less than 10 tons per year. Therefore, a BART evaluation of the source could be required for SO_2 if impact predicted from visibility modeling

exceeded the 0.5 deciview threshold at the nearby Mingo National Wildlife Refuge. However, the department did not conduct this visibility evaluation initially due to a 2005 Best Available Control Technology (BACT) review for blast furnace SO_2 control. The department assumed that since a BACT finding was made for this unit in the recent past that a BART evaluation was unnecessary. However, EPA Region VII commented that this was not sufficient for a BART finding.

Therefore, department staff reviewed the SO_2 BACT finding for the blast furnace and found that three different technologies were considered: wet scrubbing, dry scrubbing, and de-sulfurization of feed materials. Dry scrubbing was eliminated as technically infeasible due to excess hazardous waste generation. Wet scrubbing of the exhaust gas in a packed tower scrubber was selected as the best available technical option for significant control. However, the capital cost of this type of unit was estimated to be $24,100,000 with an annualized system cost of $11,000,000. The cost per ton SO_2 reduced was $3,537, which demonstrated that this alternative was cost-ineffective. The continued use of chemical de-sulfurization of the battery paste input to the smelting process at the Buick facility was determined to be BACT and resulted in the SO_2 emission limit in the 2005 permit. The BART finding is equivalent to the BACT finding in this case due to the high cost of the wet scrubbing technology and the on-going benefit of the de-sulfurization process. In addition to this cost finding and to better understand the visibility impact of the BART-eligible unit, the department conducted a sensitivity analysis of the Doe Run Buick facility on the nearby Mingo Class I area. The results of this sensitivity are included below in the refined screening discussion under Section 9.3.7 – Doe Run Buick.

Under the Guidelines, the State has these options regarding its BART-eligible sources: a) make BART determinations for all sources or b) consider exempting some sources from BART because they do not cause or contribute to visibility impairment in a Class I area. The State of

Missouri has chosen option b. If a state chooses option b, then the Guidelines suggest three sub-options for determining that certain sources need not be subject to BART:

(1) Individual source attribution approach (dispersion modeling).

(2) Use of model plants to exempt sources with common characteristics.

(3) Cumulative modeling to show that no sources in a state are subject to BART.

The State of Missouri has chosen sub-options 1 and 3 above to notify sources that would be required to conduct refined analyses based on the results of the screening analyses discussed previously. The goal was to determine if these sources cause or contribute to visibility impairment using the CALPUFF model. As discussed previously, the CAIR-affected electric generating units were collectively modeled for PM emissions only due to the presumptive BART determination for NO_X and SO_2 emissions from these sources. The results of this evaluation are included in Table 9.3. Examples of CALPUFF/CALPOST modeling input files used for determining which facilities are subject to BART are included in Appendix K. The CALPOST files included are not universal for all the facilities modeled. The Noranda facility utilized speciation of the PM emissions to include both a coarse fraction and a fine fraction. In addition, the remaining facilities included the PM_{10} emissions component as fine particulate matter (PMF) in the CALPOST analyses, but were sometimes called PM_{10} or PMF depending on the individual screening analysis.

The State of Missouri utilized two different methods for evaluation of visibility impacts: (1) Method 2 – modeled relative humidity factors are calculated for each hour/day of the modeling period and (2) Method 6 – an average relative humidity factor is applied for each Class 1 area being evaluated. Based on the analyses, it was determined that Method 2 provides more conservative results for visibility calculation. Since only Method 6 was required by the BART rulemaking, the use of Method 2 gives added confidence to the findings regarding sources that did not trigger refined modeling. Some or all of the following Class 1 areas were evaluated based on source location: Mingo, Hercules Glades, Upper Buffalo, and Mammoth Cave (Kentucky). The screening evaluation criterion was a maximum deciview impact of greater than 0.5 deciview to require a refined analysis. Six sources were identified during the source-specific screening analyses and these sources were notified to provide refined CALPUFF modeling

analyses and/or the department conducted the refined screening analyses. In accordance with the guidelines, a contribution threshold of 0.5 deciview (98th percentile) was used for determining which sources were subject to BART using the refined modeling approach.

The results of the individual screening analyses for each source are included in Table 9.3.

Table 9.3: CALPUFF/CALPOST Screening Results

Facility	**Class I Area**	**Maximum Method 2 Impact**	**Maximum Method 6 Impact**	**Year**
CAIR EGUs	Hercules Glades	0.400	0.363	2001
CAIR EGUs	Hercules Glades	0.197	0.185	2002
CAIR EGUs	Hercules Glades	0.204	0.242	2003
CAIR EGUs	Mingo	0.078	0.088	2001
CAIR EGUs	Mingo	0.056	0.060	2002
CAIR EGUs	Mingo	0.060	0.068	2003
CAIR EGUs	Upper Buffalo	0.134	0.127	2001
CAIR EGUs	Upper Buffalo	0.147	0.151	2002
CAIR EGUs	Upper Buffalo	0.094	0.093	2003
Exide	Hercules Glades	0.019	0.010	2001
Exide	Hercules Glades	0.055	0.024	2002
Exide	Hercules Glades	0.032	0.021	2003
Exide	Upper Buffalo	0.034	0.018	2001
Exide	Upper Buffalo	0.056	0.025	2002
Exide	Upper Buffalo	0.035	0.022	2003
Trigen - KC	Hercules Glades	0.393	0.189	2001
Trigen - KC	Hercules Glades	0.200	0.092	2002
Trigen - KC	Hercules Glades	0.142	0.056	2003
Trigen - KC	Upper Buffalo	0.321	0.146	2001
Trigen - KC	Upper Buffalo	0.138	0.061	2002
Trigen - KC	Upper Buffalo	0.129	0.071	2003
Dyno Nobel	Mingo	0.185	0.081	2001
Dyno Nobel	Mingo	0.206	0.093	2002
Dyno Nobel	Mingo	0.118	0.049	2003
Mississippi Lime	Mingo	0.271	0.172	2001
Mississippi Lime	Mingo	0.302	0.263	2002
Mississippi Lime	Mingo	0.194	0.099	2003
Mississippi Lime (Rev)	*Mingo*	*0.385*	*0.246*	*2001*
Mississippi Lime (Rev)	*Mingo*	*0.434*	*0.367*	*2002*
Mississippi Lime (Rev)	*Mingo*	*0.288*	*0.136*	*2003*
Doe Run - Herc	Mingo	0.399	0.356	2001
Doe Run - Herc	Mingo	0.487	0.228	2002
Doe Run - Herc	Mingo	0.231	0.211	2003
Noranda	Mingo	**1.118**	**0.663**	2001
Noranda	Mingo	**1.555**	**0.893**	2002
Noranda	Mingo	**1.816**	**1.080**	2003
Noranda	Hercules Glades	**0.512**	0.411	2001
Noranda	Hercules Glades	**1.098**	**0.534**	2002
Noranda	Hercules Glades	**0.617**	**0.520**	2003
Noranda	Upper Buffalo	0.499	0.425	2001
Noranda	Upper Buffalo	**0.841**	**0.648**	2002
Noranda	Upper Buffalo	**0.853**	**0.533**	2003

Noranda	Mammoth Cave	**0.634**	0.352	2001
Noranda	Mammoth Cave	**1.197**	**0.654**	2002
Noranda	Mammoth Cave	**0.547**	0.265	2003
UMC*	Mingo	**1.042**	**0.617**	2001
UMC	Mingo	**2.857**	**1.618**	2002
UMC	Mingo	**1.012**	**0.512**	2003
UMC	Hercules Glades	**0.996**	**0.601**	2001
UMC	Hercules Glades	**1.882**	**0.867**	2002
UMC	Hercules Glades	**0.917**	**0.593**	2003
UMC	Upper Buffalo	**1.152**	**0.518**	2001
UMC	Upper Buffalo	**1.614**	**0.819**	2002
UMC	Upper Buffalo	**0.867**	0.470	2003
Independence P&L	*Mingo*	***1.282***	***1.131***	*2001*
Independence P&L	*Mingo*	***1.071***	***0.701***	*2002*
Independence P&L	*Mingo*	***1.116***	***0.629***	*2003*
Independence P&L	*Hercules Glade*	***3.332***	***1.972***	*2001*
Independence P&L	*Hercules Glade*	***3.016***	***1.500***	*2002*
Independence P&L	*Hercules Glade*	***0.728***	*0.358*	*2003*
Independence P&L	*Upper Buffalo*	***2.418***	***1.136***	*2001*
Independence P&L	*Upper Buffalo*	***1.960***	***0.909***	*2002*
Independence P&L	*Upper Buffalo*	***0.589***	***0.683***	*2003*
Marshall	*Mingo*	*0.362*	*0.430*	*2001*
Marshall	*Mingo*	***1.717***	***0.994***	*2002*
Marshall	*Mingo*	***0.758***	*0.378*	*2003*
Marshall	*Hercules Glade*	***1.966***	*0.453*	*2001*
Marshall	*Hercules Glade*	***1.377***	***0.523***	*2002*
Marshall	*Hercules Glade*	***0.71***	*0.420*	*2003*
Marshall	*Upper Buffalo*	***0.825***	***0.505***	*2001*
Marshall	*Upper Buffalo*	***0.827***	*0.381*	*2002*
Marshall	*Upper Buffalo*	***0.823***	***0.519***	*2003*
Columbia	*Mingo*	*0.492*	*0.250*	*2001*
Columbia	*Mingo*	***1.462***	***0.808***	*2002*
Columbia	*Mingo*	***0.754***	*0.244*	*2003*
Columbia	*Hercules Glade*	*0.398*	*0.236*	*2001*
Columbia	*Hercules Glade*	***0.877***	*0.391*	*2002*
Columbia	*Hercules Glade*	*0.386*	*0.238*	*2003*
Columbia	*Upper Buffalo*	***0.517***	*0.194*	*2001*
Columbia	*Upper Buffalo*	***0.679***	*0.345*	*2002*
Columbia	*Upper Buffalo*	*0.385*	*0.184*	*2003*
Holcim - Clarksville	*Mingo*	***5.960***	***3.078***	*2001*
Holcim - Clarksville	*Mingo*	***3.351***	***2.084***	*2002*
Holcim - Clarksville	*Mingo*	***2.502***	***1.357***	*2003*
Holcim - Clarksville	*Hercules Glade*	***3.111***	***1.420***	*2001*
Holcim - Clarksville	*Hercules Glade*	***3.919***	***2.530***	*2002*
Holcim - Clarksville	*Hercules Glade*	***1.966***	***1.084***	*2003*
Holcim - Clarksville	*Upper Buffalo*	***2.705***	***1.248***	*2001*
Holcim - Clarksville	*Upper Buffalo*	***4.391***	***2.469***	*2002*
Holcim - Clarksville	*Upper Buffalo*	***1.839***	***1.072***	*2003*

BOLD denotes deciview impact over the 0.5 threshold
Italics denotes sources that were included as a result of a public comment
* University of Missouri – Columbia

The additional analysis on the two CAIR EGU facilities (Associated Electric – Thomas Hill and Aquila – Lake Road) mentioned above did not illustrate any discernable visibility difference (all CALPOST values are less than or equal to 0.001). Therefore, results were not presented in Table 9.3. Emissions from BART-eligible units at BASF Corporation were not included in the screening analysis, but were included in the refined screening analysis detailed below.

In addition to the maximum impact metric shown above in the screening analyses, the State of Missouri evaluated the number of days with visibility impacts over the contribute (0.5 deciview) and cause (1.0 deciview) thresholds to decide which Class I area would be necessary for refined analyses. The results shown in Table 9.4 illustrate the number of days over the threshold for each source/Class I area combination. Again, these results were utilized to identify which Class I areas were more likely to be impacted and would need further refined analyses.

Table 9.4: Number of Days over the 0.5 Deciview Threshold

Facility	Class I Area	Method 2 Days	Method 6 Days	Year
Noranda	Hercules Glades	1	0	2001
Noranda	Hercules Glades	4	1	2002
Noranda	Hercules Glades	1	1	2003
Noranda	Mingo	**9**	3	2001
Noranda	Mingo	**8**	4	2002
Noranda	Mingo	**10**	6	2003
Noranda	Upper Buffalo	0	0	2001
Noranda	Upper Buffalo	5	1	2002
Noranda	Upper Buffalo	3	1	2003
Noranda	Mammoth Cave	1	0	2001
Noranda	Mammoth Cave	4	2	2002
Noranda	Mammoth Cave	1	0	2003
UMC	Hercules Glades	**8**	2	2001
UMC	Hercules Glades	**8**	1	2002
UMC	Hercules Glades	7	2	2003
UMC	Mingo	5	2	2001
UMC	Mingo	6	3	2002
UMC	Mingo	**8**	1	2003
UMC	Upper Buffalo	2	1	2001
UMC	Upper Buffalo	**10**	3	2002
UMC	Upper Buffalo	6	0	2003
Independence P&L	Mingo	2	1	2001
Independence P&L	Mingo	6	1	2002
Independence P&L	Mingo	4	2	2003
Independence P&L	Hercules Glade	5	5	2001
Independence P&L	Hercules Glade	5	3	2002
Independence P&L	Hercules Glade	2	0	2003
Independence P&L	Upper Buffalo	**8**	4	2001
Independence P&L	Upper Buffalo	6	1	2002

Independence P&L	Upper Buffalo	4	1	2003
Marshall	Mingo	0	0	2001
Marshall	Mingo	3	2	2002
Marshall	Mingo	2	0	2003
Marshall	Hercules Glade	4	1	2001
Marshall	Hercules Glade	7	2	2002
Marshall	Hercules Glade	4	0	2003
Marshall	Upper Buffalo	3	1	2001
Marshall	Upper Buffalo	4	0	2002
Marshall	Upper Buffalo	6	1	2003
Columbia	Mingo	0	0	2001
Columbia	Mingo	2	1	2002
Columbia	Mingo	1	0	2003
Columbia	Hercules Glade	0	0	2001
Columbia	Hercules Glade	2	0	2002
Columbia	Hercules Glade	0	0	2003
Columbia	Upper Buffalo	1	0	2001
Columbia	Upper Buffalo	2	0	2002
Columbia	Upper Buffalo	0	0	2003
Holcim - Clarksville	Mingo	**27**	**29**	2001
Holcim - Clarksville	Mingo	**28**	**26**	2002
Holcim - Clarksville	Mingo	**40**	**25**	2003
Holcim - Clarksville	Hercules Glade	5	7	2001
Holcim - Clarksville	Hercules Glade	**18**	**14**	2002
Holcim - Clarksville	Hercules Glade	**19**	**16**	2003
Holcim - Clarksville	Upper Buffalo	7	4	2001
Holcim - Clarksville	Upper Buffalo	**14**	**9**	2002
Holcim - Clarksville	Upper Buffalo	**14**	**9**	2003

Based on the screening analyses, the State of Missouri required Noranda to submit refined modeling for Mingo, and the University of Missouri-Columbia (UMC) to submit refined analysis for Mingo, Hercules Glades, and Upper Buffalo. The fundamental difference between both sets of refined analyses and the previous screening evaluation was the use of meteorological observations in the development of the CALMET files used in the CALPUFF evaluations. The emission rates were consistent between the screening analyses and the refined analyses, as were the meteorological years for the evaluation (2001-2003). In order to develop the new refined meteorological dataset, both companies chose different grid parameters for the evaluation. The grid structure is contained in Table 9.5 for both analyses. It should be noted that the UMC CALMET analyses were utilized for all the other refined modeling conducted by the department based on the revision to the BART-eligible source list detailed above. This means that the same meteorological dataset was utilized for refined modeling of: BASF Corporation, Independence Power and Light – Blue Valley, Columbia Municipal Power Plant, Marshall Municipal, and

Holcim - Clarksville. Each of these BART-eligible sources were evaluated for Mingo, Hercules Glade, and Upper Buffalo Class I areas.

Table 9.5: Grid Structure for Refined Terrain, Land Use, and CALMET Analyses

Variable	RLAT0	RLON0	RLAT1	RLAT2	XREFKM	YREFKM	NX	NY	DGRIDKM
Noranda	36.0874	90.8491	36	40	0	0	83	80	2.0
UMC	37	92	30	45	-258	-330	87	111	6.0

The choices of the domain are appropriate for these evaluations of the relevant Class I areas. Please note that based on previous guidance from the FLMs on new source review evaluations, the domain for each analysis extends at least 50 km beyond the source(s) and Class I area(s) in each direction. The very fine grid spacing for Noranda is due to the proximity of the source to the Mingo National Wildlife Refuge (~60 km). The list of terrain and land use files used in the analyses for each project is included in Appendix L.

In addition to the grid structure change, meteorological observations were also utilized to refine the MM5 data used in the screening analyses. The lists of specific stations used along with relevant locational information for each station and upper air, surface, and precipitation data are included in Appendix L.

Based on the review process and discussions with the facilities during the screening analysis, the source parameter, emissions, and many other CALPUFF/CALPOST issues were addressed to allow for the use of the screening files as a basis for the development of the refined analysis. Nonetheless, the issues noted are presented below for clarification purposes.

9.3.1 University of Missouri-Columbia

The review for the BART-eligible unit at UMC (Boiler 10) included the verification of the CALPUFF concentration results along with a slightly different methodology for calculation of the visibility impacts at the relevant Class I areas. The methodology utilized by the contractor in this case included the use of speciation for the PM_{10} emissions from the boiler and the POSTUTIL program for the CALPUFF results. The speciation profile was obtained from the National Park Service web site at www2.nature.nps.gov/air/Permits/ect/ectCoalFiredBoiler.cfm from the Pulverized Coal – Dry Bottom Boiler with fabric filter (baghouse) control spreadsheet.

The department used the PM_{10} emission rate from the boiler and converted the concentrations directly to PMF for calculation of the visibility change at the relevant Class I areas. Each set of results is presented below in Table 9.6, 9.7, and 9.8.

Table 9.6: UMC Refined Analysis Results (Boiler PM Speciation Profile)

Facility	Class I Area	Maximum Method 6 Impact	8^{th} Highest (98%) M6 Impact	Days over 0.5 Deciview Threshold	Year
UMC	Mingo	0.291	0.144	0	2001
UMC	Mingo	1.389	0.188	2	2002
UMC	Mingo	0.582	0.323	2	2003
UMC	Hercules Glades	0.709	0.310	2	2001
UMC	Hercules Glades	0.542	0.195	1	2002
UMC	Hercules Glades	0.591	0.271	2	2003
UMC	Upper Buffalo	0.466	0.232	0	2001
UMC	Upper Buffalo	0.714	0.210	1	2002
UMC	Upper Buffalo	0.406	0.226	0	2003

Table 9.7: UMC Refined Analysis Results (PM_{10}=PMF) Method 2

Facility	Class I Area	Maximum Method 2 Impact	8^{th} Highest (98%) M2 Impact	Days over 0.5 Deciview Threshold	Year
UMC	Mingo	0.304	0.193	0	2001
UMC	Mingo	2.757	0.236	2	2002
UMC	Mingo	0.641	0.376	2	2003
UMC	Hercules Glades	0.804	0.377	3	2001
UMC	Hercules Glades	0.524	0.228	1	2002
UMC	Hercules Glades	0.647	0.413	5	2003
UMC	Upper Buffalo	0.855	0.248	2	2001
UMC	Upper Buffalo	0.941	0.227	3	2002
UMC	Upper Buffalo	0.549	0.339	1	2003

Table 9.8: UMC Refined Analysis Results (PM_{10}=PMF) Method 6

Facility	Class I Area	Maximum Method 6 Impact	8^{th} Highest (98%) M6 Impact	Days over 0.5 Deciview Threshold	Year
UMC	Mingo	0.290	0.144	0	2001
UMC	Mingo	1.389	0.188	2	2002
UMC	Mingo	0.581	0.323	2	2003
UMC	Hercules Glades	0.708	0.310	2	2001
UMC	Hercules Glades	0.542	0.195	1	2002
UMC	Hercules Glades	0.591	0.270	2	2003
UMC	Upper Buffalo	0.465	0.232	0	2001
UMC	Upper Buffalo	0.714	0.210	1	2002
UMC	Upper Buffalo	0.405	0.226	0	2003

The results clearly demonstrate that Boiler 10 at the University of Missouri – Columbia does not exceed the 98th percentile visibility impact threshold of 0.5 deciview for CALPOST Method 2 methodology, which is more conservative than the required Method 6 methodology. When comparing Table 9.6 and 9.8, it is apparent that the use of the PM_{10} speciation profile by the source did not impact the visibility change. This is due to the fact that SO_2 emissions from this boiler contribute over 90 percent of the visibility impact at all the relevant Class I areas evaluated when the impacts are above 0.5 deciview. Further, the SO_2 emissions calculation from this source was based on a potential maximum emission rate (maximum hourly design rate * emission factor).

9.3.2 Noranda

The Noranda evaluation is one of the BART analysis conducted by the State of Missouri with emission rates that do not represent the maximum allowable rates for all pollutants. In fact, most of the sources from Noranda are represented by the maximum allowable rates. However, there are five sources that had maximum 24-hour actual SO_2 emissions calculated: (1) EP-59, Monitor – Potline 1; (2) EP-60, Monitor – Potline 2; (3) EP-61, Stack – Potline 1&2; (4) EP-98, Carbon Bake Furnace 1; and (5) EP-99, Carbon Bake Furnace 2. For the first three sources, the methodology for calculating the emissions was as follows:

1) Obtain the maximum combined daily aluminum tapped for Lines 1 & 2 from 2000-2005 with the knowledge that tapped aluminum does not necessarily reflect production in the plant due to day-to-day carryover of aluminum in certain situations,
2) Obtain the maximum coke sulfur content,
3) Calculate the maximum ratio of tons anode consumed to tons aluminum, and
4) Multiply the maximum daily tapped aluminum (December 24, 2004) by the maximum ratio of tons anode/tons aluminum (0.413), the maximum coke sulfur content (2.82 percent), and the molecular weight ratio of SO_2 to S in the process (1.998).

The resultant calculation follows:

Line 1 468,725 tons aluminum/day * 0.413 * 0.0282 * 1.998 = 10,907.2 lb SO_2/day

Line 2 600,400 tons aluminum/day * 0.413 * 0.0282 * 1.998 = 13,971.3 lb SO_2/day

These emissions were then distributed to the stack and roof monitors using a previous permit relationship (95 percent stack vs. 5 percent monitor) for each line. The final modeled emission rate for these three sources was:

Monitor – Potline 1 => 10,907.2 lb SO_2/day * 0.05 = 545.4 lb SO_2/day
Monitor – Potline 2 => 13,971.3 lb SO_2/day * 0.05 = 698.6 lb SO_2/day
Stack for Potline 1&2 => 24,878.5 lb SO_2/day * 0.95 = 23,634.5 lb SO_2/day

It should be noted that the NO_X emission rates for these sources also used the same maximum tapping rates for this calculation.

The carbon bake furnace emissions were calculated using the monthly amount of pitch received along with the maximum sulfur content of the pitch in any month during the 5-year period. This information was evaluated for January 2000 – December 2005. The maximum product of the amount and the pitch S content was September 2005 (2,230 tons pitch received). The maximum sulfur content in the pitch was observed in November 2005 (0.72 percent S). The calculation of emissions from all three furnaces is as follows:

2,230 tons pitch/month * (0.0072 ton S/ ton pitch) * 1.998 ton SO_2/ton S =
31.634 ton SO_2/month

Then, the aluminum production at the three potline/furnace combinations for September 2005 was documented and a production ratio was calculated for each set. This ratio was then multiplied for potlines 1 and 2 by the total maximum SO_2 emissions/month. The daily "maximum" was evaluated using the maximum monthly emissions divided by 30 days/month. The calculation of emissions is as follows:

14,068,215 September 2005 production Line 1
13,844,190 Production Line 2

15,045,080 Production Line 3

Percent Line 1 Production = 32.75%

Percent Line 2 Production = 32.23%

Percent Line 3 Production = 35.02%

Line 1 Emissions = 31.634 ton SO_2/month * 0.3275 / 30 day/month =
0.3453 ton SO_2/day = 690.68 lb SO_2/day

Line 2 Emissions = 31.634 ton SO_2/month * 0.3223 / 30 day/month =
0.3399 ton SO_2/day = 679.71 lb SO_2/day

All these emissions were utilized in both the screening and the refined meteorological evaluations for Noranda's impacts and can be found in Appendix M.

One issue was identified with respect to the refined analyses completed by Noranda's contractor. In CALMET, the location of the surface, upper air, and precipitation stations is required to allow the model to develop the appropriate 3-D meteorological fields for input into CALPUFF. During the review, it was discovered that the location of the precipitation stations utilized in the Noranda project were based on incorrect latitude and longitude data procured from another source. Therefore, at this time, the results presented in Tables 9.9 and 9.10 reflect the previous Noranda submittal and the corrected submittal. As can be seen by direct comparison of the results, both sets are nearly identical and reflect that Noranda's BART-eligible sources do not cause or contribute to a visibility problem at Mingo.

Table 9.9: Noranda Refined Analysis Results (Original Submittal)

Facility	Class I Area	Max M2 Impact	98% M2 Impact	Days > 0.5 (M2)	Max M6 Impact	98% M6 Impact	Days >0.5 (M6)	Year
Noranda	Mingo	0.770	0.340	3	0.654	0.373	2	2001
Noranda	Mingo	0.812	0.427	3	0.653	0.416	3	2002
Noranda	Mingo	0.804	0.444	5	0.745	0.406	4	2003

Table 9.10: Noranda Refined Analysis Results (Revised CALMET)

Facility	Class I Area	Max M2 Impact	98% M2 Impact	Days > 0.5 (M2)	Max M6 Impact	98% M6 Impact	Days >0.5 (M6)	Year
Noranda	Mingo	0.769	0.340	2	0.660	0.373	2	2001
Noranda	Mingo	0.775	0.412	3	0.653	0.416	3	2002
Noranda	Mingo	0.799	0.447	5	0.745	0.435	4	2003

The results clearly demonstrate that the sources at Noranda do not exceed the 98th percentile visibility impact threshold of 0.5 deciview even if the more conservative CALPOST Method 2 methodology is used.

9.3.3 Independence Power and Light – Blue Valley

The emission rates used for the BART-eligible unit (Boiler #3) at Independence Power and Light were generated by using the maximum boiler heat input (540 MMBTU/hr) and the minimum heat content for the coal used over the last five years (10,100 BTU/lb in 2004). This produced a maximum hourly design rate of 26.73 tons coal / hour. This design rate was multiplied by the highest annual emission factor for the last five years for each pollutant of interest: SO_2 – 115.14 lb SO_2/ton coal, 9.70 lb NO_X /ton coal, and 35.88 lb PM_{10}/ton coal (pre-control). For PM_{10}, the uncontrolled emissions were multiplied by (1-Control Efficiency%/100) to reflect the operation of an electrostatic precipitator. The resultant emissions were:

SO_2 -- 26.73 tons coal/hour * 115.14 lb SO_2/ ton coal * 24 hours/day = <u>73,684.6 lb SO_2/day</u>
NO_X – 26.73 tons coal/hour * 9.7 lb NO_X /ton coal * 24 hours/day = <u>6,222.7 lb NO_X /day</u>
PM_{10} – 26.73 tons coal/hour * 35.88 lb PM_{10}/ton coal * (1-95.5/100) * 24 hours/day =
<u>1035.80 lb PM_{10}/day</u>

As previously mentioned, the refined meteorological dataset for this analysis was originated by the University of Missouri – Columbia. The results of the refined analysis for Mingo, Hercules, and Upper Buffalo are presented in Table 9.11 including the 8th highest (98 percentile) values. Also, as with the department's analysis of the University of Missouri – Columbia's boiler, the same PM_{10} direct conversion to PMF calculation methodology was utilized to determine visibility impacts in CALPOST.

Table 9.11: Independence Power and Light Refined Analysis Results

Facility	Class I Area	Max M2 Impact	98% M2 Impact	Days > 0.5 (M2)	Max M6 Impact	98% M6 Impact	Days >0.5 (M6)	Year
Ind. P&L	Mingo	0.724	0.288	2	0.513	0.226	1	2001
Ind. P&L	Mingo	1.990	0.346	6	1.415	0.289	3	2002
Ind. P&L	Mingo	0.912	0.295	3	0.487	0.233	0	2003
Ind. P&L	Hercules	1.726	0.328	3	0.890	0.327	2	2001
Ind. P&L	Hercules	1.031	0.283	3	0.506	0.301	1	2002
Ind. P&L	Hercules	0.939	0.345	3	0.501	0.217	1	2003
Ind. P&L	Upper Buffalo	1.097	0.333	5	0.737	0.286	2	2001
Ind. P&L	Upper Buffalo	0.465	0.292	0	0.449	0.277	0	2002
Ind. P&L	Upper Buffalo	0.453	0.263	0	0.455	0.299	0	2003

The results demonstrate that the source at Independence Power and Light does not exceed the 98th percentile visibility impact threshold of 0.5 deciview even if the more conservative CALPOST Method 2 methodology is used.

9.3.4 Marshall Municipal Utilities

The emission rates used for the BART-eligible unit (Coal-fired Boiler – EP05) at Marshall were generated by using the maximum boiler heat input (235 MMBTU/hr) and the minimum heat content for the coal used over the last five years (10,653 BTU/lb in 2005). This produced a maximum hourly design rate of 11.03 tons coal / hour. This design rate was multiplied by the highest annual emission factor for the last five years for each pollutant of interest: SO_2 – 134.90 lb SO_2/ton coal, 22 lb NO_X/ton coal, and 19.92 lb PM_{10}/ton coal (pre-control). For PM_{10}, the uncontrolled emissions were multiplied by (1-Control Efficiency%/100) to reflect the operation of an electrostatic precipitator. The resultant emissions were:

SO_2 -- 11.03 tons coal/hour * 134.90 lb SO_2/ ton coal * 24 hours/day = <u>35,709.9 lb SO_2/day</u>
NO_X – 11.03 tons coal/hour * 22 lb NO_X/ton coal * 24 hours/day = <u>5,823.7 lb NO_X/day</u>
PM_{10} – 11.03 tons coal/hour * 19.92 lb PM_{10}/ton coal * (1-87.5/100) * 24 hours/day =
<u>659.07 lb PM_{10}/day</u>

As previously mentioned, the refined meteorological dataset for this analysis was originated by the University of Missouri – Columbia. The results of the refined analysis for Mingo, Hercules, and Upper Buffalo are presented in Table 9.12, including the 8th highest (98 percentile) values. Also, as with the department's analysis of the University of Missouri – Columbia's boiler, the

same PM_{10} direct conversion to PMF calculation methodology was utilized to determine visibility impacts in CALPOST.

Table 9.12: Marshall Municipal Utilities Refined Analysis Results

Facility	Class I Area	Max M2 Impact	98% M2 Impact	Days > 0.5 (M2)	Max M6 Impact	98% M6 Impact	Days >0.5 (M6)	Year
Marshall	Mingo	0.371	0.133	0	0.355	0.104	0	2001
Marshall	Mingo	1.487	0.143	2	0.698	0.143	2	2002
Marshall	Mingo	0.429	0.160	0	0.436	0.143	0	2003
Marshall	Hercules	1.074	0.263	6	0.453	0.235	0	2001
Marshall	Hercules	0.99	0.210	2	0.523	0.173	1	2002
Marshall	Hercules	0.495	0.432	0	0.420	0.211	0	2003
Marshall	Upper Buffalo	0.400	0.184	0	0.416	0.159	0	2001
Marshall	Upper Buffalo	0.474	0.187	0	0.341	0.175	0	2002
Marshall	Upper Buffalo	0.747	0.395	2	0.442	0.236	0	2003

The results demonstrate that the source at Marshall Municipal Utilities does not exceed the 98^{th} percentile visibility impact threshold of 0.5 deciview even if the more conservative CALPOST Method 2 methodology is used.

9.3.5 Columbia Municipal Power Plant

The emission rates used for the BART-eligible unit (Boiler #7– EP02) at Columbia were generated by using the maximum boiler heat input (371 MMBTU/hr) and the minimum heat content for the coal used over the last five years (13,304 BTU/lb in 2004). This produced a maximum hourly design rate of 13.94 tons coal / hour. This design rate was multiplied by the highest annual emission factor for the last five years for each pollutant of interest: SO_2 – 47.42 lb SO_2/ton coal, 14.74 lb NO_X/ton coal, and 13.2 lb PM_{10}/ton coal (pre-control). For PM_{10}, the uncontrolled emissions were multiplied by (1-Control Efficiency%/100) to reflect the operation of a cyclone/baghouse combination. The resultant emissions were:

SO_2 -- 13.94 tons coal/hour * 47.42 lb SO_2/ ton coal * 24 hours/day = <u>15,868.5 lb SO_2/day</u>

NO_X – 13.94 tons coal/hour * 14.74 lb NO_X/ton coal * 24 hours/day = <u>4,932.5 lb NO_X/day</u>

PM_{10} – 13.94 tons coal/hour * 13.2 lb PM_{10}/ton coal * (1-99.75/100) * 24 hours/day =

<u>11.04 lb PM_{10}/day</u>

As previously mentioned, the refined meteorological dataset for this analysis was originated by the University of Missouri – Columbia. The results of the refined analysis for Mingo, Hercules, and Upper Buffalo are presented in Table 9.13 including the 8^{th}-highest (98 percentile) values. The same PM_{10} direct conversion to PMF calculation methodology was utilized to determine visibility impacts in CALPOST as with the other boilers reviewed.

Table 9.13: Columbia Municipal Utilities Refined Analysis Results

Facility	Class I Area	Max M2 Impact	98% M2 Impact	Days > 0.5 (M2)	Max M6 Impact	98% M6 Impact	Days >0.5 (M6)	Year
Columbia	Mingo	0.137	0.090	0	0.200	0.074	0	2001
Columbia	Mingo	1.337	0.102	1	0.645	0.095	1	2002
Columbia	Mingo	0.265	0.166	0	0.244	0.152	0	2003
Columbia	Hercules	0.467	0.183	0	0.411	0.130	0	2001
Columbia	Hercules	0.255	0.137	0	0.196	0.102	0	2002
Columbia	Hercules	0.343	0.171	0	0.232	0.119	0	2003
Columbia	Upper Buffalo	0.465	0.098	0	0.241	0.094	0	2001
Columbia	Upper Buffalo	0.401	0.090	0	0.301	0.091	0	2002
Columbia	Upper Buffalo	0.211	0.147	0	0.152	0.100	0	2003

The results demonstrate that the source at Columbia Municipal Power Plant does not exceed the 98^{th} percentile visibility impact threshold of 0.5 deciview even if the more conservative CALPOST Method 2 methodology is used.

9.3.6 BASF Corporation - Palmyra

The emission rates used for the BART-eligible units (124,000 Gallon Nitric Acid Tank – PR08, D Incinerator – TC01, A Incinerator – PR53, B Incinerator – PR54, and 2 Natural Gas Fired Boilers – UTIL07) at BASF were generated by utilizing the potential throughput for each unit and the maximum emission factor over the last five years. The remaining units at this facility were installed outside the BART timeframe or did not emit one of the visibility impairing pollutants. Unit PR08 has NO_X emissions from two components: working loss and breathing loss. The working loss throughput was calculated by assessing the maximum amount of acid moved through the tank in the last five years (2,130,000 gallons in 2005) and dividing by the number of hours acid was "worked" in the tank (5,544 hours – 24 hours, 7 days, 33 weeks). This results in 384.1 gallons/hour. The emission factor is 0.16 lb NO_X /1000 gallons. The resultant emission calculation is:

NO_X – 0.3841 1000 gal acid/hour * 0.16 lb NO_X/1000 gallon * 24 hours/day =
<u>1.5 lb NO_X/day</u>

The breathing loss was calculated using the tank capacity multiplied by the appropriate emission factor.

NO_X – 124 1000 gal capacity * 1.94 lb NO_X/1000 gallons / 365 days/year =
<u>0.66 lb NO_X/day</u>

The emissions from the D Incinerator (TC01) utilized the maximum hourly design rate of material (7.75 tons/hour) and the maximum emission factor for the last five years for each pollutant – all were 2005. The emissions calculations are below:

SO_2 -- 7.75 tons/hour * 3.841 lb SO_2/ ton * 24 hours/day = <u>714.4 lb SO_2/day</u>
NO_X – 7.75 tons/hour * 1.662 lb NO_X/ton * 24 hours/day = <u>309.1 lb NO_X/day</u>
PM_{10} – 7.75 tons/hour * 1.923 lb PM_{10}/ton * 24 hours/day = <u>357.7 lb PM_{10}/day</u>

The emissions from the A Incinerator (PR53) utilized the maximum hourly design rate of material (25 tons/hour) and the maximum emission factor for the last five years for each applicable pollutant – both were 2006. The emissions calculations are below:

NO_X – 25 tons/hour * 8.90 lb NO_X/ton * 24 hours/day = <u>5,340.0 lb NO_X/day</u>
PM_{10} – 25 tons/hour * 1.35 lb PM_{10}/ton * 24 hours/day = <u>810.0 lb PM_{10}/day</u>

The emissions from the B Incinerator (PR54) utilized the maximum hourly design rate of material (25 tons/hour) and the maximum emission factor for the last five years for each applicable pollutant – NO_X – 2004 and PM_{10} - 2005. The emissions calculations are below:

NO_X – 25 tons/hour * 3.99 lb NO_X/ton * 24 hours/day = <u>2,394.0 lb NO_X/day</u>
PM_{10} – 25 tons/hour * 0.588 lb PM_{10}/ton * 24 hours/day = <u>352.5 lb PM_{10}/day</u>

The emissions from the two natural gas-fired boilers (UTIL07) utilized the maximum heat input of the two boilers (232.5 MMBTU/hour) along with a heat content of 1,050 MMBTU/MMCF for natural gas to arrive at 0.2214 MMCF/hour. The emission factor (140 lb NOx / MMCF) was obtained from EPA's AP-42 guidance document. The emissions calculations are below:

NO_X – 0.2214 MMCF/hour * 140 lb NO_X/MMCF * 24 hours/day = <u>743.9 lb NO_X/day</u>

As previously mentioned, the refined meteorological dataset for this analysis was originated by the University of Missouri – Columbia. The results of the refined analysis for Mingo, Hercules, and Upper Buffalo are presented in Table 9.14 including the 8^{th}-highest (98 percentile) values. The same PM_{10} direct conversion to PMF calculation methodology was utilized to determine visibility impacts in CALPOST as with the other boilers reviewed.

Table 9.14: BASF Corporation Refined Analysis Results

Facility	Class I Area	Max M2 Impact	98% M2 Impact	Days > 0.5 (M2)	Max M6 Impact	98% M6 Impact	Days >0.5 (M6)	Year
BASF	Mingo	0.152	0.062	0	0.100	0.065	0	2001
BASF	Mingo	0.260	0.059	0	0.153	0.050	0	2002
BASF	Mingo	0.088	0.040	0	0.080	0.038	0	2003
BASF	Hercules	0.210	0.032	0	0.121	0.022	0	2001
BASF	Hercules	0.097	0.020	0	0.081	0.018	0	2002
BASF	Hercules	0.170	0.043	0	0.082	0.030	0	2003
BASF	Upper Buffalo	0.198	0.024	0	0.119	0.012	0	2001
BASF	Upper Buffalo	0.059	0.022	0	0.059	0.018	0	2002
BASF	Upper Buffalo	0.155	0.028	0	0.075	0.020	0	2003

The results demonstrate that the BART-eligible sources at BASF Corporation - Palmyra Plant do not exceed the maximum visibility impact threshold of 0.5 deciview even if the more conservative CALPOST Method 2 methodology is used.

9.3.7 Doe Run - Buick

The emission rates used in this visibility sensitivity for the BART-eligible unit (Blast Furnace - Main Stack EP08) at Doe Run Buick were generated using the 2005 construction permit limits for this source. Specifically, the facility-wide SO_2 limit was utilized, while the unit specific limits for NOx and PM10 were used. The emission rates are as follows:

SO_2 -- <u>18,630.1 lb SO_2/day</u>

NO_X – <u>20.6 lb NO_X /day</u>

PM_{10} – <u>184.8 lb PM_{10}/day</u>

The refined meteorological dataset for this sensitivity was originated by the University of Missouri – Columbia. The results of the refined analysis for Mingo are presented in Table 9.15 including the 8th highest (98 percentile) values. Also, as with the department's analysis of the University of Missouri – Columbia's boiler, the same PM_{10} direct conversion to PMF calculation methodology was utilized to determine visibility impacts in CALPOST.

Table 9.15: Doe Run Buick Refined Sensitivity Results

Facility	Class I Area	Max M2 Impact	98% M2 Impact (8th high)	Days > 0.5 (M2)	Max M6 Impact	98% M6 Impact (8th high)	Days >0.5 (M6)	Year
DR Buick	Mingo	1.007	0.230	2	0.643	0.233	2	2001
DR Buick	Mingo	0.714	0.246	2	0.365	0.171	0	2002
DR Buick	Mingo	0.424	0.252	0	0.397	0.203	0	2003

These results demonstrate that the current set of emissions at Doe Run – Buick will not have an adverse impact on the Mingo Refuge and bolster the finding of no additional SO_2 control necessary for BART.

9.3.8 Holcim - Clarksville

Prior to the March 2008 regional haze state implementation plan submittal, there were two different modeling analyses conducted for Holcim – Clarksville. The first evaluation utilized SO_2 and NO_X emissions from the calculation documented below (tons clinker per hour X lb pollutant / ton clinker). The other analysis utilized a maximum 24-hour actual emission rate for SO_2 and NO_X from 2004-07 based on Holcim's continuous emission monitoring system.

The emission rates used in this analysis for the largest BART-eligible units at Holcim – Clarksville (EP14 – Main Stack) were generated by using the maximum clinker throughput for the kiln (175 tons/hour) and the maximum emission factors over the last five years. The highest annual emission factor for the last five years for each pollutant of interest is: SO_2 – 22.97 lb SO_2/ton clinker, 13.89 lb NO_X/ton clinker, and 0.22 lb PM_{10}/ton clinker. The resultant emissions were:

SO_2 -- 175 tons clinker/hour * 22.97 lb SO_2/ ton clinker * 24 hours/day = 96,474.0 lb SO_2/day

NO_X – 175 tons clinker/hour * 13.89 lb NO_X /ton clinker * 24 hours/day = 58,338.0 lb NO_X /day

PM_{10} – 175 tons clinker/hour * 0.22 lb PM_{10}/ton coal * 24 hours/day = 924.0 lb PM_{10}/day

The remaining emission points (mostly handling of materials) were only PM_{10} emissions and were calculated based on maximum hourly design rate and emission factor for the particular operation. These emission points are further documented in Appendix I.

As previously mentioned, the refined meteorological dataset for this analysis was originated by the University of Missouri – Columbia. The results of the refined analysis for Mingo, Hercules, and Upper Buffalo are presented in Table 9.16 including the 8^{th}-highest (98 percentile) values. The same PM_{10} direct conversion to PMF calculation methodology was utilized to determine visibility impacts in CALPOST as with the other boilers reviewed.

Table 9.16: Holcim - Clarksville Refined Analysis Results

Facility	Class I Area	Max M2 Impact	98% M2 Impact	Days > 0.5 (M2)	Max M6 Impact	98% M6 Impact	Days >0.5 (M6)	Year
Holcim	Mingo	1.975	**1.214**	26	1.378	**0.924**	23	2001
Holcim	Mingo	3.135	**1.088**	24	1.784	**0.834**	19	2002
Holcim	Mingo	1.861	**1.042**	18	1.719	**0.734**	15	2003
Holcim	Hercules	1.607	**0.650**	8	1.274	0.480	7	2001
Holcim	Hercules	2.699	**0.667**	11	1.758	**0.799**	10	2002
Holcim	Hercules	1.847	**0.804**	16	1.147	**0.626**	13	2003
Holcim	Upper Buffalo	1.543	0.389	7	1.101	0.382	5	2001
Holcim	Upper Buffalo	2.847	**0.557**	10	1.955	0.465	7	2002
Holcim	Upper Buffalo	1.502	**0.776**	15	1.309	**0.580**	12	2003

The refined modeling impacts from Holcim – Clarksville exceed the 0.5 deciview threshold for all three Class 1 areas for both the Method 2 and the Method 6 CALPOST methodology. Therefore, the department contacted Holcim to pursue control of SO_2 and NO_X for BART. The PM_{10} impact on visibility is less than 1 percent and does not constitute enough impact to pursue control. Holcim initially responded (prior to the March 2008 submittal) that they were in the process of retrofitting the kiln under permit #082007-019 that requires them to install a mid-kiln firing system for NO_X control. As a point of reference, the department determined that mid-kiln

firing was equivalent to a 30 percent reduction from 1990 cement kiln NO_X emissions based on EPA information provided during the development of the NO_X SIP call.

After the March 2008 SIP submittal, Holcim provided additional information detailing the maximum 24-hour SO_2 and NO_X emissions using continuous emission monitoring (CEM) data. Holcim installed the CEM data in 2004, began collection of hourly emission data, and has maintained the necessary quality assurance measures to ensure accuracy of this data. The use of maximum 24-hour emission rates is the preferred methodology for determination of visibility impacts from BART sources (if available). The department utilized the maximum 24-hour emission rates provided by Holcim with the necessary filling of missing hourly data. The PM_{10} emission rates used in the new analysis were identical to the previous screening and refined modeling analyses. The resultant emissions obtained from the CEM data were:

SO_2 – 4,900.95 lb SO_2/hr = <u>117,622.7 lb SO_2/day</u> on 12/2/2004
NO_X – 3049.39 lb NO_X/hr = <u>73,185.3 lb NO_X /day</u> on 11/24/2007

These emissions were modeled using the refined analysis method described above. The Method 6 results are presented in Table 9.17.

Table 9.17: Holcim - Clarksville Post-Submittal Refined Analysis Results

Facility	Class I Area	Max M6 Impact	98% M6 Impact (8th high)	Days >0.5 (M6)	Year
Holcim	Mingo	1.685	**1.124**	26	2001
Holcim	Mingo	2.183	**1.018**	25	2002
Holcim	Mingo	2.063	**0.894**	23	2003
Holcim	Hercules	1.534	**0.595**	9	2001
Holcim	Hercules	2.129	**0.968**	11	2002
Holcim	Hercules	1.391	**0.769**	18	2003
Holcim	Upper Buffalo	1.331	0.465	7	2001
Holcim	Upper Buffalo	2.364	**0.572**	9	2002
Holcim	Upper Buffalo	1.577	**0.716**	17	2003

Based on confirmation of the visibility impacts over the 0.5 deciview impact, Holcim provided a BART proposal in late April 2008 that included inherent scrubbing (no additional control) for SO_2 and existing low NO_X burners and cement kiln dust insufflation along with the mid-kiln firing of tires at 12 percent fuel rate for NO_X control. The mid-kiln firing of tires was estimated

by Holcim to provide a 20 percent reduction from existing NO_X emission levels. This submittal is included as part of Appendix N.

Based on the review of the Holcim submittal, the department requested additional SO_2 control information regarding scrubber problems with opacity and installation cost, cost evaluation of "local" fuels (specifically, switching from current petroleum coke at 6 percent sulfur to medium sulfur coal), and detailed information regarding sulfur balance of the kiln inputs from fuel and other raw materials and outputs as sulfur in product, solid waste streams, and stack exhaust gases (SO_2). The department was specifically interested in a partial control of the exhaust stream with a scrubber that would include a by-pass for part of the stream to help eliminate the opacity associated with reduced temperature after SO_2 scrubbing.

Holcim provided revised submittals in June and July 2008 (Appendix O and Appendix P, respectively) that addressed the partial stream scrubbing question for the kiln and provided sufficient information for the ultimate finding of emissions that would satisfy BART for the kiln operation at Clarksville. Holcim proposed a 20 percent reduction of NO_X and a 23 percent reduction of SO_2 from their maximum 24-hour emission rates modeled. The proposal also requested this limit be expressed as a 30-day rolling average. Based on a comprehensive review of these submittals along with visibility modeling of the impacts from this source, the department concluded that the mid-kiln firing of tires (using 12 percent total heat input substitution) and a switch from petroleum coke as the primary kiln fuel to 3 percent sulfur coal (along with the tire-derived fuel for NO_X control) would constitute BART for this source. However, the department did not agree with the emission limits proposed by Holcim. Specifically, the department did not agree to the use of the percentage reduction from the maximum 24-hour emission rate when using a thirty-day rolling average.

The SO_2 finding was based primarily on the economic evaluation of several different control scenarios for the kiln including both wet and dry scrubbing of the kiln exhaust gas. The department found the overall net cost per ton of cement produced (~$15-20/ton) was excessive and would have seriously compromised the Clarksville kiln's ability to compete in the cement production market. The fuel switch provided a significant amount of emission reductions at a

cost of approximately \$3/ton cement produced. The overall cost per ton SO_2 reduced was calculated as \$1,148/ton removed. The NO_X finding was based on information provided by Cinar (kiln design contractor for Holcim) regarding NO_X emission rates when burning tire-derived fuel and the department's serious concern over the use of selective non-catalytic reduction on the world's largest long wet cement kiln. The increased certainty of the mid-kiln firing of tires, along with the use of low-NO_X burners and cement kiln dust insufflation, provide a firm basis for the finding of NO_X BART at Clarksville. In addition, this reduction of emissions was to have very little additional cost for the plant due to the planned installation of the mid-kiln firing project. The department findings result in a 20 percent reduction of NO_X and a 27 percent reduction of SO_2 from the maximum 30-day average emissions using the CEM data. As provided in the presumptive BART finding for utilities, the emission limits are expressed as 30-day rolling averages of 42,287 pounds NO_X/day and 58,787 pounds SO_2/day. The calculation of these averages will include all hours when the kiln is not operating and those emissions for both pollutants will be entered as zero pounds. Detailed SO_2 cost spreadsheets along with calculations of emission reductions are included in Appendix Q.

Refined visibility modeling was conducted with the BART limits prescribed by the department using the previous refined modeling analysis as a baseline to determine the extent of visibility improvement for each of the three impacted Class I areas. The results are provided in Table 9.18.

Table 9.18: Holcim - Clarksville BART Limit Refined Analysis Results

Facility	Class I Area	Max M6 Impact	98% M6 Impact (8^{th} high)	Days >0.5 (M6)	Year
Holcim	Mingo	0.963	**0.598**	13	2001
Holcim	Mingo	1.254	**0.532**	8	2002
Holcim	Mingo	1.094	0.471	7	2003
Holcim	Hercules	0.800	0.331	3	2001
Holcim	Hercules	1.163	0.499	7	2002
Holcim	Hercules	0.734	0.412	4	2003
Holcim	Upper Buffalo	0.697	0.236	4	2001
Holcim	Upper Buffalo	1.293	0.300	3	2002
Holcim	Upper Buffalo	0.825	0.370	3	2003

These results demonstrate less than the 0.5 deciview threshold for the 98^{th} percentile visibility impact at the Hercules Glade and Upper Buffalo Wilderness Areas. Further, great improvement

at the more proximate Mingo National Wildlife Refuge was also demonstrated. The highest 98th percentile impact was in 2001 and this impact was reduced 47 percent from the original refined modeling estimate.

The BART finding was provided to Holcim on August 18, 2008, along with the rationale for the finding and a draft consent agreement drafted by the department to codify the emission requirements for Holcim – Clarksville (also included in Appendix R). Subsequent comments provided by both Holcim and EPA Region VII necessitated some changes to the draft. In December 2008, Holcim informed the department of its intention to stop production at the Clarksville facility after the 1st quarter of 2009. A mutual decision was made to finalize the agreement in the event that Holcim would need to restart the Clarksville kiln operation in the near future. However, at this point, there has been no indication that the kiln will be operated further. The final consent agreement was signed by the department on April 14, 2009, and is included in Appendix S for inclusion in the regional haze State Implementation Plan.

As discussed previously, the EPA has found that, as a whole, the CAIR cap-and-trade program improves visibility more than implementing BART in states affected by CAIR. The state of Missouri has opted to participate in the CAIR program under part 96 AAA-EEE and, therefore, the CAIR EGU sources are not required to install, operate, and maintain BART for SO_2 or NO_X.

In summary, the State of Missouri has identified one BART-eligible source in Missouri that entered into a consent agreement with the department to limit emissions of SO_2 and NO_X. This agreement is the mechanism for enforcement of the BART requirements for this source. All other sources were examined and the findings were as follows:

1) sources were not operating or have a federally-enforceable construction permit to shutdown the applicable units,
2) sources were Clean Air Interstate Rule units (EGUs) that were determined to have installed BART based on their CAIR status,
3) one source was found to have been issued two subsequent Prevention of Significant Deterioration permits with a BACT finding, or

4) units were eliminated based on less than the threshold (0.5 deciview) impact from a screening analysis (maximum impact) or a refined analysis for four facilities (98 percent impact)

10.0 REASONABLE PROGRESS GOALS

10.1 Reasonable Progress Goal Requirements

40 CFR 51.308(d)(1) requires Missouri to establish RPGs for each Class I area within the state (in dv) that provide for reasonable progress towards achieving natural visibility. In addition, EPA released guidance on June 1, 2007 to use in setting RPGs (Appendix N). The goals must provide improvement in visibility for the most impaired days, and ensure no degradation in visibility for the least impaired days over the plan period. The state must also provide an assessment of the number of years it would take to attain natural visibility conditions if improvement continues at the rate represented by the RPG.

The EPA guidance referenced above describes the RPG development process as follows:

> *RPGs should be initially developed considering available control measures as evaluated using the statutory factors. Based on emission reductions anticipated from the resulting control strategy for all visibility impairing pollutants, the state should ensure that the RPGs define visibility conditions at, or better than, conditions based on the uniform rate of progress. If a state finds that its initial RPG will not result in visibility improvement equal to or better than the uniform rate of progress, then the state should reconsider available control measures, and additional measures should be evaluated as appropriate. The RPGs should then be revised based upon a more stringent suite of controls.*

The "statutory factors" that the state must consider are identified in 40 CFR 51.308(d)(1)(i)(A) as:

a) The costs of compliance,
b) The time necessary for compliance,
c) The energy and non-air quality environmental impacts of compliance, and
d) The remaining useful life of existing sources that contribute to visibility impairment.

The state must demonstrate how these factors were taken into consideration in selecting the goal

for its mandatory Class I areas.

10.2 MISSOURI REASONABLE PROGRESS GOAL

In determining reasonable progress goals, CAA §169A(g)(1) requires states to take into consideration four factors, however, flexibility in consideration of factors may be used. The EPA guidance indicates that

> *…the factors could be used to select which sources or activities should or should not be regulated, or they could be used to determine the level or stringency of control, if any, for selected sources or activities, or some combination of both. The factors may be considered both individually and/or in combination. As noted in section 4.1, given the significant emissions reductions that we anticipate to result from BART, the CAIR, and the implementation of other CAA programs, these reductions may be all that is necessary to achieve reasonable progress in the first planning period for some States. Also, as noted in section 4.2, it is not necessary for you to reassess the reasonable progress factors for sources subject to BART for which you have already completed a BART analysis.*

Missouri's four-factor analysis for this Regional Haze Plan is achieved using the factor analyses conducted by EPA, CENRAP and other RPOs. Chapter 11, the Long-Term Strategy Plan, identifies the control measures necessary to achieve the Reasonable Progress Goals. The BART analysis for Missouri also contributes to the four-factor analysis.

10.2.1 Cost and time necessary for compliance factor analysis by EPA

The analyses in this Regional Haze Plan demonstrate that the 2018 visibility goals for Mingo and Hercules Glades have been largely achieved through EGU emission reductions. These reductions will be energy and environmental neutral, but are clearly most effective in improving haze levels. In addition, controls under CAIR are effective for a considerable lifetime of the operating units. A discussion in the CAIR rule highlighted below (70 FR 25197) addresses their analysis of reasonable progress factors of cost and time necessary for compliance.

> *From past experience in examining multi-pollutant emissions trading programs for SO_2 and NO_X, EPA recognized that the air pollution control retrofits that*

result from a program to achieve highly cost-effective reductions are quite significant and can not be immediately installed. Such retrofits require a large pool of specialized labor resources, in particular, boilermakers, the availability of which will be a major limiting factor in the amount and timing of reductions.

Also, EPA recognized that the regulated industry will need to secure large amounts of capital to meet the control requirements while managing an already large debt load, and is facing other large capital requirements to improve the transmission system. Furthermore, allowing pollution control retrofits to be installed over time enables the industry to take advantage of planned outages at power plants (unplanned outages can lead to lost revenue) and to enable project management to learn from early installations how to deal with some of the engineering challenges that will exist, especially for the smaller units that often present space limitations.

Based on these and other considerations, EPA determined in the NPR that the earliest reasonable deadline for compliance with the final highly cost-effective control levels for reducing emissions was 2015 (taking into consideration the existing bank of title IV SO_2 *allowances). First, the Agency confirmed that the levels of* SO_2 *and* NO_X *emissions it believed were reasonable to set as annual emissions caps for 2015 lead to highly cost-effective controls for the CAIR region.*

Once EPA determined the 2015 emissions reductions levels, the Agency determined a proposed first (interim) phase control level that would commence January 1, 2010, the earliest the Agency believed initial pollution controls could be fully operational (in today's final action, the first NO_X *control phase commences in 2009 instead of in 2010, as explained in detail in section IV.C). The first phase would be the initial step on the slope of emissions reductions (the glide-path) leading to the final (second) control phase to commence in 2015. The EPA determined the first phase based on the feasibility of installing the necessary emission control retrofits, as described in section IV.C.*

Although EPA's primary cost-effectiveness determination is for the 2015 emissions reductions levels, the Agency also evaluated the cost effectiveness of the first phase control levels to ensure that they were also highly cost effective. Throughout this preamble section, EPA reports both the 2015 and 2010 (and 2009 for NO_X) cost-effectiveness results, although the first phase levels were determined based on feasibility rather than cost effectiveness. The 2015 emissions reductions include the 2010 (and 2009 for NO_X) emissions reductions as a subset of the more stringent requirements that EPA is imposing in the second phase.

10.2.2 Cost analysis by CENRAP

CENRAP, assisted by Alpine Geophysics, conducted additional cost analysis for its 10 Class I areas including Mingo and Hercules Glades areas in Missouri. Alpine primarily looked at controls on EGUs; Industrial, Commercial and Institutional (ICI) boilers; internal combustion engines; and cement kilns. Most of the Missouri facilities identified in the analysis were EGUs already participating in federal CAIR rule. The analysis also provided recommendations on additional controls for non-EGUs, which were considered but not adopted due to the following reasons:

- Proposed controls are not cost effective – over $2,000 per ton of SO_2 or NO_X
- Emissions below the threshold limit of 100 tons
- Sources passed the BART screening analysis
- Sources already installed controls required by the NO_X SIP Call

10.2.3 Four-factor analysis by MRPO

In addition to the EPA and Alpine's analyses, the MRPO and the Minnesota Pollution Control Agency published a report on the four-factor analysis (referred to as the "4-factor report"). The report looked at the factors in a nine-state area (Minnesota, Wisconsin, Michigan, Indiana, Illinois, Missouri, Iowa, North Dakota, and South Dakota.). The 4-factor report primarily looked at controls on EGUs; ICI boilers; reciprocating engines and turbines; and mobile sources. Tables summarizing the nine-state impacts are listed in the appendices of this published report.

10.2.3.1 Cost of compliance and remaining useful life

The 4-factor report looked at the cost effectiveness of additional SO_2 and NO_X emissions reduction using two possible control strategies categorized as EGU1 and EGU2. The EGU1 scenario would cap EGU NO_X emissions at 0.10 lb/MMBtu of fossil fuel consumption and SO_2 would be limited to 0.15 lb/MMBtu of fossil fuel consumption at EGUs. The EGU2 caps are more stringent at 0.07 lb/MMBtu and 0.10 lb/MMBtu of fossil fuel consumption for NO_X and SO_2, respectively. The caps are not enforced at the unit level but represent a proposed region wide average emission rate to be met through a trading program.

Missouri has concluded that additional controls from ICI boilers is unwarranted. Costs across the nine-state region, in terms of dollars per deciview, exceed two billion dollars. Similar reasons apply to other point sources, such as reciprocating engines and combustion turbines. Because Missouri has determined that additional emission controls are not required based on the cost of compliance, it is not necessary to determine the remaining useful life of each unit.

10.2.3.2 Energy and non-air quality environmental impacts of compliance

The 4-factor report also demonstrates the energy and non-air quality environmental impacts of controlling emissions. In the nine-state region, carbon dioxide emissions are projected to increase from 3,766,000 tons/year to 5,302,000 tons/year due to the EGU1 and EGU2 controls, respectively.

An additional 1,128,000 – 1,919,000 gallons of wastewater per year is projected to be produced by 2018 in the nine-state region under the EGU1 and EGU2 controls, respectively. The 4-factor report states that the additional gallons would be treated in existing facilities. The cost of treating the additional wastewater and the likelihood of new facilities increases the costs of compliance.

The nine-state region would also incur a projected increase in solid waste production by 2018 of 347,000 – 538,000 tons as part of the EGU1 and EGU2 controls, respectively. The process of siting a new landfill can take decades.

10.2.4 Missouri reasonable progress goals

It is reasonable to implement CAIR as EPA intended during the first regional haze planning period. Missouri's four-factor analysis finds that ongoing air pollution control programs, including CAIR, BACT, and BART, are sufficient to meet the 2018 Uniform Rate of Progress for the Mingo and Hercules Glades Class 1 areas. Missouri has adopted EPA's CAIR cap and trade program and will participate fully in the SO_2, annual NO_X, and ozone season NOx trading programs. Missouri's intent is to allow the market forces of the CAIR cap and trade program to drive the installation and operation of cost efficient controls.

Figures 8.1a and 8.1.b. show the Uniform Rate of Progress (URP) and modeled 2018 visibility projections. The 2018 projections were below the URPs for both Missouri Class I areas. Missouri has determined that the modeled rate of visibility improvement by 2018 shown in Table 10.1 is reasonable and hereby adopts it as the RPG for the listed Class I areas. Table 10.1 provides a Uniform Rate of Progress and Reasonable Progress for Class I areas in Missouri.

Table 10.1: Uniform Rate of Progress and Reasonable Progress Goals for Class I areas in Missouri

Class I Area	2000/2004 Baseline Conditions (dv)	2018 URP Point (dv)	2018 Modeled Predictions (dv)	2064 Natural Background Conditions (dv)	Deciview Improvement Needed by 2018 assuming RPG	Progress Annually to 2018 assuming RPG (dv)
Mingo	28.02	24.37	23.71	12.40	4.31	0.308
Hercules Glades	26.75	23.14	23.06	11.30	3.69	0. 264

To ensure that the emissions from new stationary sources and major modifications will be consistent with making reasonable progress toward the national visibility goal, Missouri has a requirement to do a visibility impairment evaluation as part of the major construction permitting process.

10.3 CONSULTATION

In determining a reasonable progress rate for each Class I area discussed above, Missouri has consulted with FLMs and the other states/tribes, which (are) reasonably anticipated to cause or

contribute to visibility impairment in each of these Class I areas. A description of the consultation process is provided in Appendix E, *United States Central Class I Areas Consultation Plan*, Missouri Department of Natural Resources, 2007. In addition, the minutes from those meetings are in Appendix U)

10.4 REPORTING

Progress will be reported to the EPA every five years in accordance with 51.308 (g).

11.0 LONG-TERM STRATEGY TO REACH REASONABLE PROGRESS GOALS

11.1 LONG-TERM STRATEGY REQUIREMENTS

40 CFR 51.308(d)(3) requires Missouri to submit a long-term strategy that addresses regional haze visibility impairment for each mandatory Class I federal area within and outside the state, which may be affected by emissions from within the state. The long-term strategy must include enforceable emissions limitations, compliance schedules and other measures necessary to achieve the RPGs established by states/tribes where the Class I areas are located. This chapter describes how Missouri meets the long-term strategy requirements.

11.2 CONSULTATION

Missouri will continue to coordinate and consult with the consultation stakeholders during the development of future progress reports and plan revisions, as well as during the implementation of programs having the potential to contribute to visibility impairment in the mandatory Class I areas. Face to face meetings will be held if deemed necessary. Otherwise, consultation will be in the form of conference calls and/or letter or email correspondence. The Central Class I areas consultation will be initiated through the Central Class I areas contacts listed in the consultation plan (Appendix E).

Missouri also participated in the consultation processes for Arkansas, Oklahoma and Minnesota; and will continue to participate in other consultation processes in response to any other states that request our participation.

11.3 SHARE OF EMISSION REDUCTIONS

40 CFR 51.308(d)(3)(ii) requires Missouri to demonstrate that its implementation plan includes all measures necessary to obtain its fair share of emission reductions needed to meet RPGs.

Missouri relied on technical analyses developed by CENRAP and additional weight of evidence analysis developed as part of consultation planning to determine contributing states (Appendix E). Nine states, including Missouri, Arkansas, Kentucky, Illinois, Indiana, Ohio, Oklahoma,

Tennessee and Texas, were identified as contributing to visibility in Mingo and/or Hercules Glades Class I areas. The modeling demonstration has shown that the emission reductions from these contributing states are sufficient to achieve RPGs in Missouri's Class I areas.

Current visibility is estimated from monitored components of $PM_{2.5}$ and coarse mass. Models are used in a relative sense to estimate how current concentrations respond to emission reduction measures. Data analysis is used to identify source categories and regions. Current concentrations of particulate matter components are adjusted by the relative modeled response to estimate concentrations at the end the first implementation period in 2018. Future visibility is estimated from estimated component concentrations of $PM_{2.5}$ and PM_{10} at the end of the first implementation period. The difference between present visibility and future estimated visibility is compared with the RPGs to determine if the goal is met. The CENRAP technical analyses on visibility conditions and RPGs projections can be found in Appendix F. All applicable measures reflected in the modeling demonstration and weight of evidence analysis have been incorporated in the state's long-term strategy. Section 11.4 provides information on these control measures.

11.4 LONG-TERM STRATEGY COMPONENTS

40 CFR 51.308(d)(3)(v) requires Missouri to consider several factors in developing its long-term strategy. The ongoing air pollution control programs described in section 11.4.1. below were used in the modeling demonstration to show that Missouri Class I Areas meet the 2018 RPG. Additional controls beyond the RPG modeling demonstration that may be considered for use in the long term strategy at a future date are described in section 11.4.2 below.

11.4.1 Ongoing air pollution control programs – "on the books" controls

40 CFR 51.308(d)(3)(v)(A) requires states to consider emission reductions from ongoing pollution control programs. The NO_X and SO_2 emissions reductions resulting from these ongoing programs will help improve air quality throughout the state of Missouri.

Missouri used the following "on the books" control programs in the modeling demonstration to meet the RPG requirements as presented in Table 10.1 of this Regional Haze Plan. The substantial improvements in visibility impairment at the Mingo site for the worst 20 percent days

from 2002 (141 Mm-1) to 2018 (96 Mm-1) is primarily due to reductions in SO_4 (35 Mm-1 improvement) from elevated point sources (Figures E-7a through E-7d of the TSD). Elevated point sources also contribute over half to the total extinction for the worst 20 percent days at Hercules Glades in 2002 (Figures E-6a and E-6b of the TSD). Going from 2002 to 2018 the contributions due to elevated point sources (essentially CAIR and NO_X SIP call), on-road mobile and non-road mobile are reduced substantially, over 25 Mm-1.

11.4.1.1 Clean Air Interstate Rule (CAIR)

On March 10, 2005, EPA signed the CAIR, following three years modeling study and cost analysis on SO_2 and NO_X controls.

As required by CAIR, Missouri developed draft rules through the workgroup process.

The rules were presented for public hearing at the December 7, 2006, MACC Meeting and they were adopted at the February 1, 2007, MACC Meeting. The rules establish a cap and trade system for NO_X and SO_2 emissions, and Missouri sources will be included in the national program. The state rules are 10 CSR 10-6.362 Clean Air Interstate Rule Annual NO_X Trading Program and 10 CSR 10-6.366 Clean Air Interstate Rule SO_X Trading Program. The state rules include schedules for compliance, sources affected by the rule and emissions limitations.

Table 11.1 summarizes the NO_X emissions cap for each unit for each calendar year between 2009-2014 and 2015 and beyond. Table 11.2 summarizes the SO_2 emissions cap for each unit for each calendar year between 2010-2014 and 2015 and beyond. These rules can be found in Appendix V.

Table 11.1: CAIR NO_X Emissions Allocation (tons/yr)

County	Plant	Facility Name	Unit ID	2009 - 2014	2015 and beyond
097	0001	EMPIRE - ASBURY	1	1,097	914
095	0022	KCPL - HAWTHORN	5A	3,294	2,743
095	0022	KCPL - HAWTHORN	6	31	26
095	0022	KCPL - HAWTHORN	7	18	15
095	0022	KCPL - HAWTHORN	8	16	13
095	0022	KCPL - HAWTHORN	9	69	58
083	0001	KCPL - MONTROSE	1	911	759
083	0001	KCPL - MONTROSE	2	947	788
083	0001	KCPL - MONTROSE	3	942	784
095	0023	KCPL - NORTHEAST	11	3	2
095	0023	KCPL - NORTHEAST	12	2	2
095	0023	KCPL - NORTHEAST	13	7	6
095	0023	KCPL - NORTHEAST	14	5	5
095	0023	KCPL - NORTHEAST	15	4	4
095	0023	KCPL - NORTHEAST	16	3	2
095	0023	KCPL - NORTHEAST	17	6	5
095	0023	KCPL - NORTHEAST	18	4	3
051	0049	AMEREN - FAIRGROUNDS		2	2
037	0003	AQUILA - RALPH GREEN	3	9	8
095	0031	AQUILA - SIBLEY	1	306	255
095	0031	AQUILA - SIBLEY	2	305	254
095	0031	AQUILA - SIBLEY	3	1,977	1,646
031	0090	AMEREN VIADUCT		-	-
021	0004	AQUILA - LAKE ROAD	6	542	452
021	0004	AQUILA - LAKE ROAD	5	5	4
189	0023	AMEREN - HOWARD BEND		1	1
071	0003	AMEREN - LABADIE	1	2,913	2,425
071	0003	AMEREN - LABADIE	2	2,998	2,496
071	0003	AMEREN - LABADIE	3	3,329	2,772
071	0003	AMEREN - LABADIE	4	2,984	2,484
189	0010	AMEREN - MERAMEC	1	730	607
189	0010	AMEREN - MERAMEC	2	676	562
189	0010	AMEREN - MERAMEC	3	1,171	975
189	0010	AMEREN - MERAMEC	4	1,778	1,480
189	0010	AMEREN - MERAMEC	GT1	2	2
189	0010	AMEREN - MERAMEC	GT2	3	2
183	0001	AMEREN - SIOUX	1	2,318	1,930
183	0001	AMEREN - SIOUX	2	2,282	1,900
117	0002	CHILLICOTHE		2	2
019	0002	COLUMBIA	6	41	34
019	0002	COLUMBIA	7	44	36
019	0002	COLUMBIA	8	1	-
095	0050	BLUE VALLEY POWER	3	161	134
095	0050	BLUE VALLEY POWER	GT1	-	-
077	0005	CU - JAMES RIVER	GT1	15	12
077	0005	CU - JAMES RIVER	GT2	9	8
077	0005	CU - JAMES RIVER	3	293	244

077	0005	CU - JAMES RIVER	4	360	300
077	0005	CU - JAMES RIVER	5	614	511
143	0004	AECI - NEW MADRID	1	2,747	2,287
143	0004	AECI - NEW MADRID	2	3,035	2,527
175	0001	AECI - THOMAS HILL	MB1	1,126	938
175	0001	AECI - THOMAS HILL	MB2	1,663	1,385
175	0001	AECI - THOMAS HILL	MB3	4,046	3,369
151	0002	CENTRAL ELECTRIC - CHAMOIS	2	315	263
165	0007	KCPL - IATAN	1	3,990	3,322
095	0139	AQUILA - GREENWOOD ENERGY CENTER	1	12	10
095	0139	AQUILA - GREENWOOD ENERGY CENTER	2	12	10
095	0139	AQUILA - GREENWOOD ENERGY CENTER	3	14	12
095	0139	AQUILA - GREENWOOD ENERGY CENTER	4	15	12
099	0016	AMEREN - RUSH ISLAND	1	2,882	2,399
099	0016	AMEREN - RUSH ISLAND	2	2,748	2,287
077	0039	SOUTHWEST	1	1,339	1,115
077	0039	SOUTHWEST	CT1A	3	2
077	0039	SOUTHWEST	CT1B	3	2
077	0039	SOUTHWEST	CT2A	3	2
077	0039	SOUTHWEST	CT2B	3	2
097	0062	EMPIRE – ENERGY CENTER	3A	2	2
097	0062	EMPIRE – ENERGY CENTER	3B	2	2
097	0062	EMPIRE – ENERGY CENTER	4A	2	2
097	0062	EMPIRE – ENERGY CENTER	4B	2	2
097	0062	EMPIRE – ENERGY CENTER 1	1	21	18
097	0062	EMPIRE – ENERGY CENTER 2	2	19	16
007	0012	AMEREN – MEXICO		2	2
175	0010	AMEREN - MOBERLY		2	1
051	0008	AMEREN - MOREAU		2	2
201	0017	SIKESTON	1	1,556	1,295
097	0104	EMPIRE - STATE LINE	1	78	65
097	0104	EMPIRE - STATE LINE	2-1	122	101
097	0104	EMPIRE - STATE LINE	2-2	153	127
069	0066	ST. FRANCIS POWER PL	1	92	77
069	0066	ST. FRANCIS POWER PL	2	70	58
207	0064	ESSEX POWER PLANT	1	11	9
147	0032	NODAWAY POWER PLANT	1	11	9
147	0032	NODAWAY POWER PLANT	2	11	9
101	0051	HOLDEN POWER PLANT	1	2	2
101	0051	HOLDEN POWER PLANT	2	4	3
101	0051	HOLDEN POWER PLANT	3	2	2
077	0164	CU - MCCARTNEY	MGS1A	1	1
077	0164	CU - MCCARTNEY	MGS1B	1	1
077	0164	CU - MCCARTNEY	MGS2A	1	1
077	0164	CU - MCCARTNEY	MGS2B	1	1
163	0047	AMEREN - PENO CREEK	CT1A	2	1
163	0047	AMEREN - PENO CREEK	CT1B	2	1
163	0047	AMEREN - PENO CREEK	CT2A	2	1
163	0047	AMEREN - PENO CREEK	CT2B	2	1
163	0047	AMEREN - PENO CREEK	CT3A	2	1

163	0047	AMEREN - PENO CREEK	CT3B	2	1
163	0047	AMEREN - PENO CREEK	CT4A	1	1
163	0047	AMEREN - PENO CREEK	CT4B	1	1
107	0038	HIGGINSVILLE		3	3
037	0056	MEP PLEASANT HILL	CT-1	99	82
037	0056	MEP PLEASANT HILL	CT-2	91	76
007	0053	AMEREN - AUDRAIN	CT1	1	1
007	0053	AMEREN - AUDRAIN	CT2	1	-
007	0053	AMEREN - AUDRAIN	CT3	1	-
007	0053	AMEREN - AUDRAIN	CT4	1	-
007	0053	AMEREN - AUDRAIN	CT5	1	1
007	0053	AMEREN - AUDRAIN	CT6	-	-
007	0053	AMEREN - AUDRAIN	CT7	-	-
007	0053	AMEREN - AUDRAIN	CT8	-	-
019	0105	COLUMBIA ENERGY CTR	CT01	1	1
019	0105	COLUMBIA ENERGY CTR	CT02	1	1
019	0105	COLUMBIA ENERGY CTR	CT03	1	-
019	0105	COLUMBIA ENERGY CTR	CT04	-	-
		EE/RE set aside		300	300
		TOTAL		59,871	49,892

Table 11.2: CAIR SO_2 Emissions Allocation (tons/yr)

County	Plant	Facility Name	Unit ID	2010 Acid Rain Allowances	2010- 2014 (tons/yr)	2015/after
097	0001	EMPIRE - ASBURY	1	6,986	3,493	2,445
095	0050	BLUE VALLEY	3	4,678	2,339	1,637
151	0002	CENTRAL ELECTRIC - CHAMOIS	2	5,466	2,733	1,913
019	0002	COLUMBIA	7	3,639	1,820	1,274
019	0002	COLUMBIA	6	905	453	317
019	0002	COLUMBIA	8	125	63	44
095	0022	KCPL - HAWTHORN	5	12,309	6,155	4,308
165	0007	KCPL - IATAN	1	16,236	8,118	5,683
077	0005	CU - JAMES RIVER	5	2,136	1,068	748
077	0005	CU - JAMES RIVER	4	1,253	627	439
077	0005	CU - JAMES RIVER	3	681	341	238
077	0005	CU - JAMES RIVER	**GT2	605	303	212
071	0003	AMEREN - LABADIE	1	17,583	8,792	6,154
071	0003	AMEREN - LABADIE	3	17,516	8,758	6,131
071	0003	AMEREN - LABADIE	2	16,391	8,196	5,737
071	0003	AMEREN - LABADIE	4	15,611	7,806	5,464
021	0004	AQUILA - LAKE ROAD	6	606	303	212
189	0010	AMEREN - MERAMEC	4	2,554	1,277	894
189	0010	AMEREN - MERAMEC	3	2,362	1,181	827
189	0010	AMEREN - MERAMEC	2	1,105	553	387
189	0010	AMEREN - MERAMEC	1	1,029	515	360
083	0001	KCPL - MONTROSE	3	4,356	2,178	1,525
083	0001	KCPL – MONTROSE	2	3,541	1,771	1,239
083	0001	KCPL – MONTROSE	1	3,194	1,597	1,118

143	0004	AECI – NEW MADRID	2	14,033	7,017	4,912
143	0004	AECI – NEW MADRID	1	12,198	6,099	4,269
099	0016	AMEREN - RUSH ISLAND	2	15,518	7,759	5,431
099	0016	AMEREN - RUSH ISLAND	1	13,900	6,950	4,865
095	0031	AQUILA – SIBLEY	3	7,648	3,824	2,677
095	0031	AQUILA – SIBLEY	2	639	320	224
095	0031	AQUILA – SIBLEY	1	520	260	182
201	0017	SIKESTON	1	6,802	3,401	2,381
183	0001	AMEREN – SIOUX	1	10,842	5,421	3,795
183	0001	AMEREN – SIOUX	2	9,507	4,754	3,327
077	0039	CU – SOUTHWEST	1	4,127	2,064	1,444
175	0001	AECI - THOMAS HILL	MB3	18,288	9,144	6,401
175	0001	AECI - THOMAS HILL	MB2	7,444	3,722	2,605
175	0001	AECI - THOMAS HILL	MB1	4,429	2,215	1,550
		TOTAL		266,762	133,381	93,367

* 0.5 multiplier for CAIR allowances between 2010-2014

** 0.35 multiplier for CAIR allowances 2015 and after

The long-term strategy also includes any CAIR controls that are being undertaken in other impacting states that were identified during the Central Class I areas consultation process.

11.4.1.2 BART

Twenty-six potential BART sources have been identified.   Twenty-five have been dropped through the screening and refined analyses. The remaining source (Holcim – Clarksville) entered into a consent agreement with the Missouri Department of Natural Resources to limit emissions of SO_2 and NO_X. No other sources were found to be subject to BART and, therefore, implementation of an emissions trading program, other emission controls or other alternative measure in place of BART are not necessary. Detailed analyses can be found in Chapter 9 of the SIP.

Missouri will include BART controls proposed by the eight other impacting states in its long-term strategy. Arkansas, Oklahoma and Texas have already had their BART rules proposed. Missouri is working with these states to document the emissions reduction and control measures required from their sources. Since not all of the BART determinations are completed for other states, the five-year review will be the mechanism used to adjust the Reasonable Progress Goal based on the other states' final BART determinations.

11.4.1.3 Other federal ongoing air pollution control programs

Tier 2

Tier 2 standards are federal emission standards for passenger cars, light trucks and larger passenger vehicles. The program is designed to focus on reducing the emissions most responsible for the ozone and PM impact from these vehicles – NO_X and non-methane organic gases, consisting primarily of hydrocarbons and contributing to VOCs. The Tier 2 standards will reduce new vehicle NO_X levels to an average of 0.07 grams per mile. For new passenger cars and light duty trucks, these standards were phased in starting in 2004, and the standards were fully phased in by 2007. For heavy trucks and similar vehicles, the Tier 2 standards will be phased in beginning in 2008, with full compliance in 2009.

During the phase-in period from 2004-2007, all passenger cars and light trucks not certified to the primary Tier 2 standards had to meet an interim average standard of 0.30 g/mi NO_X. During the period 2004-2008, heavy trucks and similar vehicles not certified to the final Tier 2 standards will phase in to an interim program with an average standard of 0.20 g/mi NO_X, with those not covered by the phase-in meeting a per-vehicle standard (i.e., an emissions “cap”) of 0.60 g/mi NO_X trucks and 0.09 g/mi for similar vehicles.

Tier 4

EPA's Clean Air Nonroad Diesel Rule (Tier 4) requires stringent pollution controls on diesel engines used in industries such as construction, agriculture and mining, and it will slash sulfur content of diesel fuel. This rule is the latest in a series of actions that are designed to reduce emissions from nearly every type of diesel vehicle and equipment. This nonroad diesel program combines cleaner engine technologies with cleaner fuel – similar to the on-highway diesel program. The standards will cut emissions from nonroad diesel engines by over 90 percent. Nonroad diesel equipment, as described in this rule, currently accounts for 47 percent of diesel PM and 25 percent of NO_X from mobile sources nationwide.

Sulfur levels will also be reduced in nonroad diesel fuel by 99 percent from current levels (from approximately 3,000 parts per million (ppm) now to 15 ppm in 2010). The lower sulfur fuel will also reduce PM from engines in existing nonroad equipment. It makes it possible for engine

manufacturers to use advanced clean technologies, similar to catalytic technologies used in passenger cars. The new engine standards take effect, based on engine horsepower, starting in 2008.

11.4.1.4 NO_X SIP Call

The NO_X SIP call was designed to assist downwind ozone areas in attaining the one-hour and 8-hour ozone NAAQS by providing upwind NO_X emission control. This rulemaking was developed through the EPA's interpretation of the Ozone Transport Assessment Group recommendations and subsequent modeling and cost analysis of NO_X controls to reduce ozone transport. The final NO_X SIP call was published in the *Federal Register* on October 27, 1998.

Missouri's initial rule in response to the NO_X SIP Call, 10 CSR 10-6.*350 Emission Limitations and Emissions Trading of Oxides of Nitrogen*, was adopted by the MACC on April 24, 2003. The rule established an emission limitation of 0.25 lbs NO_X /MMBtu heat input for electric generating units in the eastern one-third of the state and a lower limit of 0.18 lb/MMBtu heat input for Labadie, Rush Island, and Meramec power plants. EGUs in the western two-third of the state were limited to an emission rate of 0.35 lbs NO_X /MMBtu of heat input. Cyclone boilers (Sibley and Asbury power plants) that burn tire-derived fuels are allowed to meet 0.68 lbs NO_X /MMBtu heat input. The compliance date was May 1, 2004.

On April 21, 2004, the EPA finalized the second phase of NO_X SIP call. Phase II of the SIP call excluded the portion known as the "coarse grid" (the western 2/3 of Missouri) from the NO_X SIP Call, defined the area of the eastern 1/3 of Missouri to include the same counties as established in 10 CSR 10-6.350, with the one exception of not including Phelps County, and revised the cap for NO_X emissions from the previous statewide budget of 114,532 tons of NO_X per ozone season to a partial state budget of 61,406 tons of NO_X per ozone season in the eastern 1/3 of Missouri. The budget assumed control levels of 0.15 lbs/MMBtu for electric generating units, 82 percent emissions reductions for large natural gas-fired stationary internal combustion engines, 90 percent emissions reductions for diesel and dual fuel stationary internal combustion engines, 60 percent emissions reductions for non-utility boilers and turbines, and 30 percent emissions reductions for cement manufacturing plants. Small cogeneration units were excluded from the

NO_X SIP Call. Small cogeneration units are units that supply one-third or less of their potential electrical output capacity, or 25 megawatts or less, to any utility power distribution system for sale.

The department's Air Pollution Control Program developed 10 CSR 10-6.360 *Control of NO_X Emissions from Electric Generating Units and Non-Electric Generating Boilers*, 10 CSR 10-6.*380 Control of NO_X Emissions from Portland Cement Kilns*, and 10 CSR 10-6.*390 Control of NO_X Emission from Large Stationary Internal Combustion Engines*. This set of three rules constitutes Missouri's response to EPA's NO_X SIP Call. These rules were presented at public hearing on April 28, 2005 and were adopted at the May 26, 2005 MACC meeting. The state rules include schedules for compliance, sources affected by the rule and emissions limitations. Table 11.3 summarizes the NO_X allowances for each unit during the ozone season.

Table 11.3: NO_X SIP Call Emissions Allocation (tons/ozone season)

County	Plant	Facility Name	Unit ID	NO_X Allocation
031	0090	AMEREN – VIADUCT	Combustion Turbine 1	4
071	0003	AMEREN – LABADIE	Boiler 1	1146
071	0003	AMEREN – LABADIE	Boiler 2	1263
071	0003	AMEREN – LABADIE	Boiler 3	1449
071	0003	AMEREN – LABADIE	Boiler 4	1339
099	0016	AMEREN - RUSH ISLAND	Boiler 1	1405
099	0016	AMEREN - RUSH ISLAND	Boiler 2	1395
143	0004	AECI - NEW MADRID	Boiler 1	1126
143	0004	AECI - NEW MADRID	Boiler 2	1182
183	0001	AMEREN – SIOUX	Boiler 1	809
183	0001	AMEREN – SIOUX	Boiler 2	726
189	0010	AMEREN – MERAMEC	Boiler 1	114
189	0010	AMEREN – MERAMEC	Boiler 2	88
189	0010	AMEREN – MERAMEC	Boiler 3	152
189	0010	AMEREN – MERAMEC	Boiler 4	280
189	0010	AMEREN – MERAMEC	Unit 5	5
189	0023	AMEREN – HOWARD BEND	Combustion Turbine 1	3
201	0017	CITY OF SIKESTON	Boiler 1	780
		Energy Efficiency Set-Aside		134
		TOTAL EGU Tons per Ozone Season NO_X		13400
510	0003	ANHEUSER BUSCH	Boiler 6	14
510	0038	TRIGEN ASHLEY STREET	Boiler 5	9
510	0038	TRIGEN ASHLEY STREET	Boiler 6	36
		TOTAL Non-EGU Tons per Ozone Season NO_X		59

11.4.2 Additional controls beyond RPG modeling demonstration

Ongoing air pollution control programs, as described in Section 11.4.1, are sufficient to meet the 2018 Uniform Rate of Progress for the Mingo and Hercules Glades Class 1 areas. These ongoing programs such as CAIR, BACT, or BART have been demonstrated to be very cost-effective in reducing the visibility in Missouri's Class I areas.

Additional controls not included in the modeling demonstration in the plan may be considered during the five-year review. A number of control strategies include SO_2/NO_X Reasonably Available Control Technology (RACT) in the St Louis $PM_{2.5}$ plan, Illinois Multi-Pollutant Strategy, regional SO_2 and NO_X control strategy proposed by Alpine Geophysics (Alpine) for CENRAP.

11.4.2.1 SO_2 and NO_X RACT in St Louis

Missouri is in the process of preparing an implementation plan to address the St. Louis $PM_{2.5}$ nonattainment problem. In addition to the development of an attainment demonstration, the $PM_{2.5}$ implementation rule requires states to develop all RACT and Reasonably Achievable Control Measures (RACM). All non-EGU SO_2 and NO_X sources were identified in the St. Louis $PM_{2.5}$ nonattainment area that had actual emissions exceeding 25 tons per year. These include large boilers, stationary internal combustion engines, two glass melting furnaces, a biosolids incinerator, a cement kiln and a lead smelter. The emission reductions associated with these sources will be determined and included in the $PM_{2.5}$ plan.

11.4.2.2 Illinois Multi-Pollutant Regulation

In 2006, a multi-pollutant standard (MPS) rule was approved by the Illinois Pollution Control Board and the Joint Committee on Administrative Rules. This multi-pollutant rule will result in measurable reduction in mercury, SO_2, and NO_X emissions. The rule targets the three largest coal-fired power plant companies in Illinois: Midwest Generation, Ameren and Dynegy. These three companies represent 88 percent of Illinois' 17,007 Megawatts of electric generating capacity from coal-fired plants. By implementation of this rule, the Illinois Environmental Protection Agency estimates the total emissions reduction from all three power companies is

233,600 tons per year of SO_2 and 61,434 tons per year of NO_X. This is a drastic improvement compared to emissions reduction achieved by the CAIR.

11.4.2.3 Regional Controls proposed by Alpine Geophysics (Alpine)

In February 2006, Alpine was contracted by CENRAP to assist in developing control strategies for CENRAP Class I areas. Based on the available cost information and the Area of Influence (AOI) analyses, Alpine proposed a methodology for constructing control strategy for both EGUs and non-EGUs. Control technologies for different industrial source categories were identified. Regional "CAIR-like" EGU controls, and sub-regional (AOI region) – Industrial, Commercial, and Institutional boilers and natural gas compressors controls – were recommended by Alpine. The final report from Alpine can be found in Appendix W.

11.4.3 Measures to mitigate the impacts of construction activities

40 CFR 51.308(d)(3)(v)(B) requires Missouri to consider measures to mitigate the impacts of construction activities. Under the NAAQS, any nonattainment area in Missouri is required to consider construction emissions as part of the general conformity rule. Missouri meets this commitment through rule 10 CSR 10-6.300 *Conformity of General Federal Actions to State Implementation Plans*, which can be found in Appendix V. This rule sets forth policy, criteria and procedures for demonstrating and assuring conformity to applicable implementation plans.

11.4.4 Source retirement and replacement schedules

40 CFR 51.308(d)(3)(v)(D) requires Missouri to consider source retirement and replacement schedules in developing RPGs. Retirement and replacement will be managed in conformance with existing SIP/TIP requirements pertaining to PSD and New Source Review (NSR).

11.4.5 Smoke Management Plan

40 CFR 51.308(d)(3)(v)(E) requires Missouri to consider smoke management techniques for the purposes of agricultural and forestry management in developing RPGs.

The purpose of the Smoke Management Plan (SMP) adopted by Missouri is to identify the responsibilities of the Missouri Department of Natural Resources, FLMs, and state land managers to coordinate procedures that mitigate the impacts of prescribed fire and wildland fire

used for resource benefits on public health, safety and visibility. This plan is designed to meet the policies of the EPA’s *Interim Air Quality Policy on Wildland and Prescribed Fires* (April 1998) and addresses smoke management through various procedures and requirements in place at various agencies throughout the state.

The department does not intend to submit the SMP for inclusion in the Missouri SIP, but a copy of the Missouri SMP is provided in Appendix X for reference. A letter certifying that the SMP meets the basic requirements will be provided to EPA.

The purpose of a SMP is to mitigate the nuisance and public safety hazards (e.g., on roadways and at airports) posed by smoke intrusions into populated areas; to prevent deterioration of air quality and NAAQS violations; and to address visibility impacts in mandatory federal Class I areas. Some strong indications that an area needs a SMP are: (1) citizens increasingly complain of smoke intrusions; (2) the trend of monitored air quality values is increasing (approaching the daily or annual NAAQS for $PM_{2.5}$ or PM_{10}) because of significant contributions from fires managed for resource benefits; (3) fires cause or significantly contribute to monitored air quality that is already greater than 85 percent of the daily or annual NAAQS for $PM_{2.5}$ or PM_{10}; or (4) fires in the area significantly contribute to visibility impairment in mandatory federal Class I areas. None of these four indicators currently shows a problem in Missouri. However, the Missouri SMP should provide additional protection to the federal Class I areas.

11.4.6 Enforceability of Emission Limitations and Control Measures

40 CFR 51.308(d)(3)(v)(F) requires Missouri to ensure that emission limitations and control measures used to meet RPGs are enforceable.

Missouri has ensured that all emission limitations and control measures used to meet RPGs are enforceable by Missouri law through section 643 of the Revised Statutes of Missouri. In addition, rules developed for CAIR and the NO_X SIP call have placed emission limits on both EGU and non-EGU units. These rules can be found in Appendix V.

11.4.7 Anticipated net effect on visibility resulting from projected changes to emissions

40 CFR 51.308(d)(3)(v)(G) requires Missouri to address the net effect on visibility resulting from changes projected in point, area and mobile source emissions by 2018.

The emission inventory for Missouri projects changes to point, area and mobile source inventories by the end of the first implementation period resulting from population growth; industrial, energy and natural resources development; land management; and air pollution control. A summary of these changes is given in Tables 7.1 and 7.2 for each of the pollutants addressed in the regional haze plan inventory.

The net effect on visibility in Missouri Class I areas resulting from these emission differences is discussed in the CENRAP Technical Support Document (Appendix F).

11.5 FIVE-YEAR REVIEW

For the 2013 five-year review process, Missouri intends to conduct a five factor analysis (four factors plus visibility impact) to address reasonable progress goals set for Mingo and Hercules Glades Class 1 areas.

12.0 COMPREHENSIVE PERIODIC PLAN REVISIONS

40 CFR 51.308(f) requires a state/tribe to revise its regional haze implementation plan and submit a plan revision to EPA by July 31, 2018 and every ten years thereafter. In accordance with the requirements listed in section 51.308(f) of the federal Regional Haze Rule, Missouri commits to revising and submitting this regional haze implementation plan by July 31, 2018 and every ten years thereafter.

The Missouri Department of Natural Resources Air Pollution Control Program is responsible for developing and submitting the required SIP revisions and periodic reports. The plan has been developed and will be maintained in electronic (computer) format as well as in paper copy.

In addition, 40 CFR 51.308(g) requires periodic reports evaluating progress towards the RPGs established for each mandatory Class I area. In accordance with the requirements listed in Section 51.308(g) of the federal rule for regional haze, Missouri commits to submitting a report on reasonable progress to EPA every five years following the initial submittal of the plan. The reasonable progress report will evaluate the progress made towards the RPG for each mandatory Class I area located within Missouri and in each mandatory Class I area located outside Missouri that may be affected by emissions from within Missouri**.** The report will be in the form of a SIP revision.

To establish the criteria in evaluating progress, all requirements listed in 40 CFR 51.308(g) shall be addressed in the plan revision for reasonable progress. These criteria are as follows:

1) Assessment of visibility conditions and changes for each federal Class I area in Missouri;

2) Implementation status of control measures included in plan and a summary of emissions reductions achieved from measures;

3) Analysis of emission reductions by pollutant, identified by source or activity;

4) Assessment of any significant changes in anthropogenic emissions;

5) Assessment of whether current plan is sufficient to meet RPGs; and

6) Review of Missouri's visibility monitoring strategy and any necessary strategy modifications

Figure 12.1 shows a flow chart for 5-year review criteria and actions to be taken if the criteria cannot be met.

All of the required documents (status, summaries, assessments, analysis and reviews will be done by the Missouri Department of Natural Resources Air Pollution Control Program.

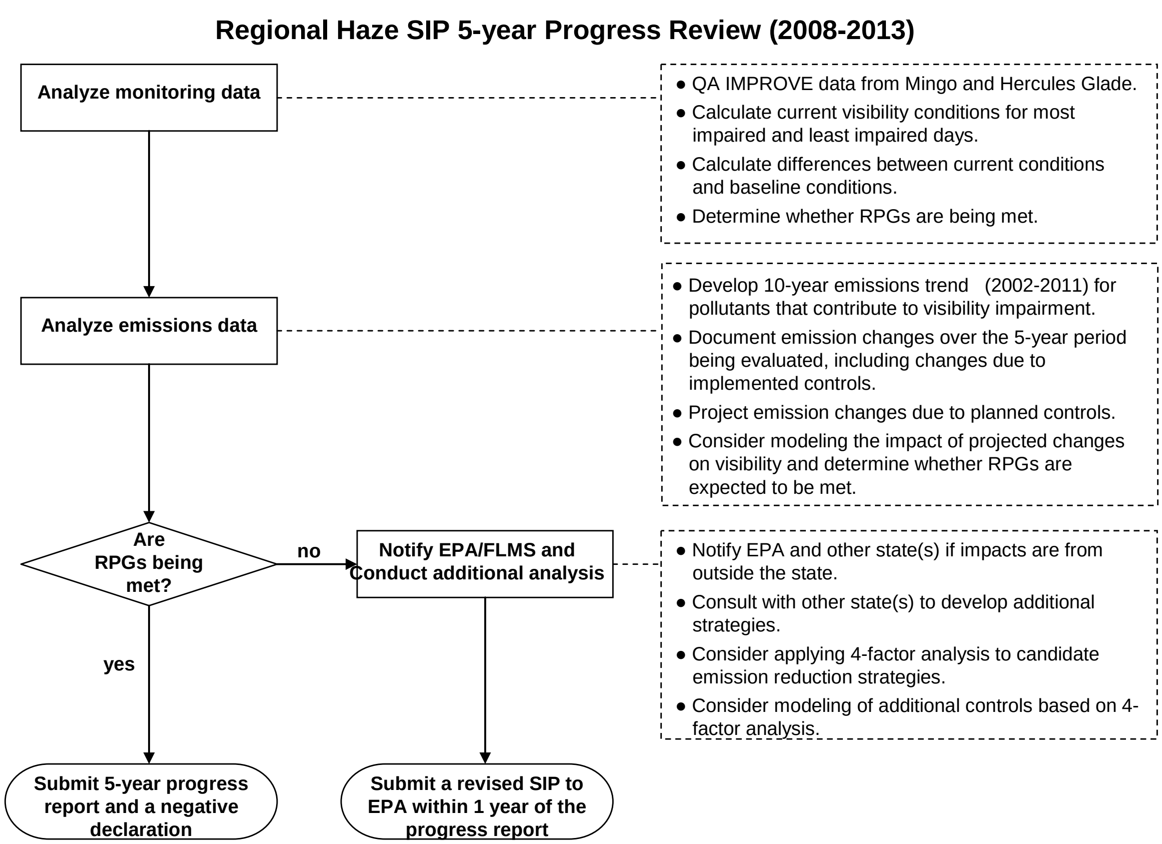

Figure 12.1: 5-Year Progress Review Criteria and Actions

13.0 DETERMINATION OF THE ADEQUACY OF THE EXISTING PLAN

Using the modeling and monitoring as described in this plan, a determination has been made that the plan will continue to meet the goal of showing progress towards reducing visibility. Using the consultation process described in this plan, Missouri's visibility goals have been adequately addressed. In addition, through participation in other states' consultation processes, Missouri's contribution to other states visibility goals is being adequately addressed.

The findings of the five-year progress report as described in Chapter 12.0 will determine which action is appropriate and necessary. Depending on the findings of the five-year progress report, Missouri commits to taking one of the actions listed in 40 CFR 51.308(h):

1) If Missouri determines that the existing plan requires no further substantive revision in order to achieve established goals, the state will provide the EPA with a negative declaration that further revision of the plan is not needed at this time.
2) If Missouri determines that the existing plan may be inadequate to ensure reasonable progress due to emissions from other states that participated in the regional planning process, Missouri will provide notification to the EPA and the other states that participated in regional planning. Missouri will collaborate with the other states through the regional planning process to address the plan's deficiencies.
3) Where Missouri determines that the current plan may be inadequate to ensure reasonable progress due to emissions from another country, the state shall provide notification, along with available information, to the EPA.
4) Where Missouri determines that the existing plan is inadequate to ensure reasonable progress due to emissions within the state, Missouri shall revise its plan to address the plan's deficiencies within one year.

Modeling and monitoring information will be used and the consultation process described in the plan will be followed in carrying out the scheduled incremental administrative and technical actions required in the plan. Any resulting plan revisions could include a revision to goals,

contingency measures, the monitoring strategy, and any other parts of the plan as deemed necessary.

14.0 REFERENCE INFORMATION

14.1 LIST OF REFERENCES

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14.2 List of Acronyms and Abbreviations

AIRS	Aerometric Information Retrieval System
Alpine	Alpine Geophysics
AOI	Area of Influence
BACT	Best Available Control Technology
BART	Best Available Retrofit Technology
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CAMx	Comprehensive Air quality Model with Extensions
CASTNet	Clean Air Status and Trends Network
CEM	Continuous Emissions Monitor
CENRAP	Central Regional Air Planning Association
CFR	Code of Federal Regulations
CHIEF	Clearinghouse for Inventories and Emission Factors
CMAQ	Community Multiscale Air Quality
CO	Carbon Monoxide
department	Missouri Department of Natural Resources
dv	deciviews
EC	elemental carbon
EGU	Electric Generating Unit
EIQ	Emission Inventory Questionnaire
EPA	United States Environmental Protection Agency
FLM	Federal Land Manager
ftp	file transfer protocol
GCVTC	Grand Canyon Visibility Transport Commission
IDA	Inventory Data Analyzer
IMPROVE	Interagency Monitoring of PROtected Visual Environments
IPM	Integrated Planning Model
MACC	Missouri Air Conservation Commission
MACT	Maximum Achievable Control Technology
MM5	Fifth-Generation NCAR / Penn State Mesoscale Model
MPS	Multi-Pollutant Standard
MRPO	Midwest Regional Planning Organization
NAAQS	National Ambient Air Quality Standard
NCAR	National Center for Atmospheric Research
NEI	National Emissions Inventory
NH_3	Ammonia
NO_x	Nitrogen Oxides
NO_2	Nitrite
NO_3	Nitrate
NSPS	New Source Performance Standards
NSR	New Source Review
OMC	Organic Mass Carbon
OMH	Organic Mass Hydrogen
PM	Particulate Matter

Pechan	E. H. Pechan & Associates
PMF	Fine Particulate Matter
POG	Policy Oversight Group
ppm	parts per million
PSAT	Particulate Matter Source Apportionment Technology
PSD	Prevention of Significant Deterioration
RACM	Reasonably Achievable Control Measures
RACT	Reasonably Available Control Technology
REMSAD	Regional Modeling System for Aerosols and Deposition
RH	Relative Humidity
RPG	Reasonable Progress Goals
RPO	Regional Planning Organizations
RVP	Reid Vapor Pressure
SEARCH	South Eastern Aerosol Research and Characterization
SIC	Standard Industrial Code
SIP	State Implementation Plan
SMOKE	Sparse Matrix Operator Kernel
SMP	Smoke Management Program
SO_4	Sulfate
SO_2	Sulfur Dioxide
STN	Speciated Trends Network
TIP	Tribal Implementation Plan
TPY	Tons Per Year
UCR	University of California-Riverside
UMC	University of Missouri-Columbia
URP	Uniform Rate of Progress
USDA	United States Department of Agriculture
VIEWS	Visibility Information Exchange Websystem
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VOC	Volatile Organic Compound
WIMO	Wichita Mountains Class I Area

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Enclosure of

Public Hearing Transcript Introductory Statement

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DEPARTMENT OF NATURAL RESOURCES
STATE OF MISSOURI

AIR CONSERVATION COMMISSION

PUBLIC HEARING

MISSOURI REGIONAL HAZE PLAN
DOE RUN HERCULANEUM LEAD NONATTAINMENT AREA PLAN REVISION

June 25, 2009

ORIGINAL

DEPARTMENT OF NATURAL RESOURCES
STATE OF MISSOURI

AIR CONSERVATION COMMISSION

June 25, 2009
1738 East Elm Street
Bennett Springs Conference Room
Jefferson City, Missouri

Public Hearing

Missouri Regional Haze Plan
Doe Run Herculaneum Lead Nonattainment Area Plan Revision

BEFORE: Gary Pendergrass, Chairman
Jack Baker, Commissioner
Ron Boyer, Commissioner
Kevin L. Rosenbohm, Commissioner
Mark S. Garnett, Commissioner

REPORTED BY:

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Jefferson City, MO 65109
(573)636-7551

P R O C E E D I N G S

CHAIRMAN PENDERGRASS: The hearing will come to order. Let the record show that Commissioners Jack Baker, Kevin Rosenbohm, Mark Garnett, Gary Pendergrass and Ron Boyer are present.

The Air Conservation Commission of the State of Missouri has called this public hearing pursuant to Section 643.070, Revised Statutes of Missouri, EPA Promulgated Rule 40 CFR 51.102, for the purpose of hearing testimony relating to Missouri Regional Haze Plan and Doe Run Herculaneum Lead Nonattainment Area Plan Revision.

The hearing record will close at 5 p.m., July 2nd, 2009. Anyone who has not been scheduled to appear but who wishes to be heard should indicate that you wish to speak on the sign-in sheets available at the door.

Section 643.100 of the Missouri Statutes provides that all oral testimony be given under oath. Accordingly, when you're called to testify, please present yourself to the court reporter first to be sworn in. When you testify, please state your name, business address and your occupation or affiliation. If you have a prepared statement, it would be helpful if you would provide a copy to the Staff Director, court reporter and members of the Commission.

Mr. Jim Kavanaugh.

MR. GRAF: Good morning, Chairman, members of the Commission. My name is Wayne Graf, and I am employed as the Rules and SIP Unit Chief for the Air Quality Planning Section of the Missouri Department of Natural Resources' Air Pollution Control Program. I work at 1659 East Elm Street in Jefferson City.

I am here to provide testimony on a proposed revision to the Missouri Regional Haze Plan that is summarized beginning on page 95 of the briefing document.

The Missouri Regional Haze Plan was developed to meet the requirements in the U.S. Environmental Protection Agency's Regional Haze Rule. Regional haze consists of very fine particles and gases that impair visibility. In 1977, Congress passed amendments to the Clean Air Act with the goal of improving visibility in Class 1 federal areas. Class 1 areas, as defined by the Clean Air Act, are national parks greater than 6,000 acres, wilderness areas and national memorial parks greater than 5,000 acres and international parks that existed as of 1977.

EPA adopted the Federal Regional Haze Rule on July 1st, 1999. The rule applies to all visibility-impairing pollutants, which includes nitrogen oxides, sulfur dioxides, volatile organic compounds, and

Appendix A

Regional Haze Program Requirements, 40 CFR 51.308

or major modification may have an adverse impact on visibility in any Federal Class I area. Where the State finds that such an analysis does not demonstrate to the satisfaction of the State that an adverse impact will result in the Federal Class I area, the State must, in the notice of public hearing, either explain its decision or give notice as to where the explanation can be obtained.

(b) The plan shall also provide for the review of any new major stationary source or major modification:

(1) That may have an impact on any integral vista of a mandatory Class I Federal area, if it is identified in accordance with § 51.304 by the Federal Land Manager at least 12 months before submission of a complete permit application, except where the Federal Land Manager has provided notice and opportunity for public comment on the integral vista in which case the review must include impacts on any integral vista identified at least 6 months prior to submission of a complete permit application, unless the State determines under § 51.304(d) that the identification was not in accordance with the identification criteria, or

(2) That proposes to locate in an area classified as nonattainment under section 107(d)(1)(A), (B), or (C) of the Clean Air Act that may have an impact on visibility in any mandatory Class I Federal area.

(c) Review of any major stationary source or major modification under paragraph (b) of this section, shall be conducted in accordance with paragraph (a) of this section, and § 51.166(o), (p)(1) through (2), and (q). In conducting such reviews the State must ensure that the source's emissions will be consistent with making reasonable progress toward the national visibility goal referred to in § 51.300(a). The State may take into account the costs of compliance, the time necessary for compliance, the energy and nonair quality environmental impacts of compliance, and the useful life of the source.

(d) The State may require monitoring of visibility in any Federal Class I area near the proposed new stationary source or major modification for such purposes and by such means as the State deems necessary and appropriate.

[45 FR 80089, Dec. 2, 1980, as amended at 64 FR 35765, 35774, July 1, 1999]

§ 51.308 Regional haze program requirements.

(a) *What is the purpose of this section?* This section establishes requirements for implementation plans, plan revisions, and periodic progress reviews to address regional haze.

(b) *When are the first implementation plans due under the regional haze program?* Except as provided in § 51.309(c), each State identified in § 51.300(b)(3) must submit, for the entire State, an implementation plan for regional haze meeting the requirements of paragraphs (d) and (e) of this section no later than December 17, 2007.

(c) [Reserved]

(d) *What are the core requirements for the implementation plan for regional haze?* The State must address regional haze in each mandatory Class I Federal area located within the State and in each mandatory Class I Federal area located outside the State which may be affected by emissions from within the State. To meet the core requirements for regional haze for these areas, the State must submit an implementation plan containing the following plan elements and supporting documentation for all required analyses:

(1) *Reasonable progress goals.* For each mandatory Class I Federal area located within the State, the State must establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period.

(i) In establishing a reasonable progress goal for any mandatory Class I Federal area within the State, the State must:

(A) Consider the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially

affected sources, and include a demonstration showing how these factors were taken into consideration in selecting the goal.

(B) Analyze and determine the rate of progress needed to attain natural visibility conditions by the year 2064. To calculate this rate of progress, the State must compare baseline visibility conditions to natural visibility conditions in the mandatory Federal Class I area and determine the uniform rate of visibility improvement (measured in deciviews) that would need to be maintained during each implementation period in order to attain natural visibility conditions by 2064. In establishing the reasonable progress goal, the State must consider the uniform rate of improvement in visibility and the emission reduction measures needed to achieve it for the period covered by the implementation plan.

(ii) For the period of the implementation plan, if the State establishes a reasonable progress goal that provides for a slower rate of improvement in visibility than the rate that would be needed to attain natural conditions by 2064, the State must demonstrate, based on the factors in paragraph (d)(1)(i)(A) of this section, that the rate of progress for the implementation plan to attain natural conditions by 2064 is not reasonable; and that the progress goal adopted by the State is reasonable. The State must provide to the public for review as part of its implementation plan an assessment of the number of years it would take to attain natural conditions if visibility improvement continues at the rate of progress selected by the State as reasonable.

(iii) In determining whether the State's goal for visibility improvement provides for reasonable progress towards natural visibility conditions, the Administrator will evaluate the demonstrations developed by the State pursuant to paragraphs (d)(1)(i) and (d)(1)(ii) of this section.

(iv) In developing each reasonable progress goal, the State must consult with those States which may reasonably be anticipated to cause or contribute to visibility impairment in the mandatory Class I Federal area. In any situation in which the State cannot agree with another such State or group of States that a goal provides for reasonable progress, the State must describe in its submittal the actions taken to resolve the disagreement. In reviewing the State's implementation plan submittal, the Administrator will take this information into account in determining whether the State's goal for visibility improvement provides for reasonable progress towards natural visibility conditions.

(v) The reasonable progress goals established by the State are not directly enforceable but will be considered by the Administrator in evaluating the adequacy of the measures in the implementation plan to achieve the progress goal adopted by the State.

(vi) The State may not adopt a reasonable progress goal that represents less visibility improvement than is expected to result from implementation of other requirements of the CAA during the applicable planning period.

(2) *Calculations of baseline and natural visibility conditions.* For each mandatory Class I Federal area located within the State, the State must determine the following visibility conditions (expressed in deciviews):

(i) Baseline visibility conditions for the most impaired and least impaired days. The period for establishing baseline visibility conditions is 2000 to 2004. Baseline visibility conditions must be calculated, using available monitoring data, by establishing the average degree of visibility impairment for the most and least impaired days for each calendar year from 2000 to 2004. The baseline visibility conditions are the average of these annual values. For mandatory Class I Federal areas without onsite monitoring data for 2000–2004, the State must establish baseline values using the most representative available monitoring data for 2000–2004, in consultation with the Administrator or his or her designee;

(ii) For an implementation plan that is submitted by 2003, the period for establishing baseline visibility conditions for the period of the first long-term strategy is the most recent 5-year period for which visibility monitoring data are available for the mandatory Class I Federal areas addressed by the plan. For mandatory Class I Federal

areas without onsite monitoring data, the State must establish baseline values using the most representative available monitoring data, in consultation with the Administrator or his or her designee;

(iii) Natural visibility conditions for the most impaired and least impaired days. Natural visibility conditions must be calculated by estimating the degree of visibility impairment existing under natural conditions for the most impaired and least impaired days, based on available monitoring information and appropriate data analysis techniques; and

(iv)(A) For the first implementation plan addressing the requirements of paragraphs (d) and (e) of this section, the number of deciviews by which baseline conditions exceed natural visibility conditions for the most impaired and least impaired days; or

(B) For all future implementation plan revisions, the number of deciviews by which current conditions, as calculated under paragraph (f)(1) of this section, exceed natural visibility conditions for the most impaired and least impaired days.

(3) *Long-term strategy for regional haze*. Each State listed in § 51.300(b)(3) must submit a long-term strategy that addresses regional haze visibility impairment for each mandatory Class I Federal area within the State and for each mandatory Class I Federal area located outside the State which may be affected by emissions from the State. The long-term strategy must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas. In establishing its long-term strategy for regional haze, the State must meet the following requirements:

(i) Where the State has emissions that are reasonably anticipated to contribute to visibility impairment in any mandatory Class I Federal area located in another State or States, the State must consult with the other State(s) in order to develop coordinated emission management strategies. The State must consult with any other State having emissions that are reasonably anticipated to contribute to visibility impairment in any mandatory Class I Federal area within the State.

(ii) Where other States cause or contribute to impairment in a mandatory Class I Federal area, the State must demonstrate that it has included in its implementation plan all measures necessary to obtain its share of the emission reductions needed to meet the progress goal for the area. If the State has participated in a regional planning process, the State must ensure it has included all measures needed to achieve its apportionment of emission reduction obligations agreed upon through that process.

(iii) The State must document the technical basis, including modeling, monitoring and emissions information, on which the State is relying to determine its apportionment of emission reduction obligations necessary for achieving reasonable progress in each mandatory Class I Federal area it affects. The State may meet this requirement by relying on technical analyses developed by the regional planning organization and approved by all State participants. The State must identify the baseline emissions inventory on which its strategies are based. The baseline emissions inventory year is presumed to be the most recent year of the consolidate periodic emissions inventory.

(iv) The State must identify all anthropogenic sources of visibility impairment considered by the State in developing its long-term strategy. The State should consider major and minor stationary sources, mobile sources, and area sources.

(v) The State must consider, at a minimum, the following factors in developing its long-term strategy:

(A) Emission reductions due to ongoing air pollution control programs, including measures to address reasonably attributable visibility impairment;

(B) Measures to mitigate the impacts of construction activities;

(C) Emissions limitations and schedules for compliance to achieve the reasonable progress goal;

(D) Source retirement and replacement schedules;

(E) Smoke management techniques for agricultural and forestry management purposes including plans as currently exist within the State for these purposes;

(F) Enforceability of emissions limitations and control measures; and

(G) The anticipated net effect on visibility due to projected changes in point, area, and mobile source emissions over the period addressed by the long-term strategy.

(4) *Monitoring strategy and other implementation plan requirements.* The State must submit with the implementation plan a monitoring strategy for measuring, characterizing, and reporting of regional haze visibility impairment that is representative of all mandatory Class I Federal areas within the State. This monitoring strategy must be coordinated with the monitoring strategy required in §51.305 for reasonably attributable visibility impairment. Compliance with this requirement may be met through participation in the Interagency Monitoring of Protected Visual Environments network. The implementation plan must also provide for the following:

(i) The establishment of any additional monitoring sites or equipment needed to assess whether reasonable progress goals to address regional haze for all mandatory Class I Federal areas within the State are being achieved.

(ii) Procedures by which monitoring data and other information are used in determining the contribution of emissions from within the State to regional haze visibility impairment at mandatory Class I Federal areas both within and outside the State.

(iii) For a State with no mandatory Class I Federal areas, procedures by which monitoring data and other information are used in determining the contribution of emissions from within the State to regional haze visibility impairment at mandatory Class I Federal areas in other States.

(iv) The implementation plan must provide for the reporting of all visibility monitoring data to the Administrator at least annually for each mandatory Class I Federal area in the State. To the extent possible, the State should report visibility monitoring data electronically.

(v) A statewide inventory of emissions of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory Class I Federal area. The inventory must include emissions for a baseline year, emissions for the most recent year for which data are available, and estimates of future projected emissions. The State must also include a commitment to update the inventory periodically.

(vi) Other elements, including reporting, recordkeeping, and other measures, necessary to assess and report on visibility.

(e) *Best Available Retrofit Technology (BART) requirements for regional haze visibility impairment.* The State must submit an implementation plan containing emission limitations representing BART and schedules for compliance with BART for each BART-eligible source that may reasonably be anticipated to cause or contribute to any impairment of visibility in any mandatory Class I Federal area, unless the State demonstrates that an emissions trading program or other alternative will achieve greater reasonable progress toward natural visibility conditions.

(1) To address the requirements for BART, the State must submit an implementation plan containing the following plan elements and include documentation for all required analyses:

(i) A list of all BART-eligible sources within the State.

(ii) A determination of BART for each BART-eligible source in the State that emits any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in any mandatory Class I Federal area. All such sources are subject to BART.

(A) The determination of BART must be based on an analysis of the best system of continuous emission control technology available and associated emission reductions achievable for each BART-eligible source that is subject to BART within the State. In this analysis, the State must take into consideration the technology available, the costs of compliance, the energy and nonair quality environmental impacts of compliance, any pollution control

equipment in use at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.

(B) The determination of BART for fossil-fuel fired power plants having a total generating capacity greater than 750 megawatts must be made pursuant to the guidelines in appendix Y of this part (Guidelines for BART Determinations Under the Regional Haze Rule).

(C) *Exception.* A State is not required to make a determination of BART for SO_2 or for NO_X if a BART-eligible source has the potential to emit less than 40 tons per year of such pollutant(s), or for PM_{10} if a BART-eligible source emits less than 15 tons per year of such pollutant.

(iii) If the State determines in establishing BART that technological or economic limitations on the applicability of measurement methodology to a particular source would make the imposition of an emission standard infeasible, it may instead prescribe a design, equipment, work practice, or other operational standard, or combination thereof, to require the application of BART. Such standard, to the degree possible, is to set forth the emission reduction to be achieved by implementation of such design, equipment, work practice or operation, and must provide for compliance by means which achieve equivalent results.

(iv) A requirement that each source subject to BART be required to install and operate BART as expeditiously as practicable, but in no event later than 5 years after approval of the implementation plan revision.

(v) A requirement that each source subject to BART maintain the control equipment required by this subpart and establish procedures to ensure such equipment is properly operated and maintained.

(2) A State may opt to implement an emissions trading program or other alternative measure rather than to require sources subject to BART to install, operate, and maintain BART. To do so, the State must demonstrate that this emissions trading program or other alternative measure will achieve greater reasonable progress than would be achieved through the installation and operation of BART. To make this demonstration, the State must submit an implementation plan containing the following plan elements and include documentation for all required analyses:

(i) A demonstration that the emissions trading program or other alternative measure will achieve greater reasonable progress than would have resulted from the installation and operation of BART at all sources subject to BART in the State. This demonstration must be based on the following:

(A) A list of all BART-eligible sources within the State.

(B) An analysis of the best system of continuous emission control technology available and associated emission reductions achievable for each source within the State subject to BART. In this analysis, the State must take into consideration the technology available, the costs of compliance, the energy and nonair quality environmental impacts of compliance, any pollution control equipment in use at the source, and the remaining useful life of the source. The best system of continuous emission control technology and the above factors may be determined on a source category basis. The State may elect to consider both source-specific and category-wide information, as appropriate, in conducting its analysis.

(C) An analysis of the degree of visibility improvement that would be achieved in each mandatory Class I Federal area as a result of the emission reductions achievable from all such sources subject to BART located within the region that contributes to visibility impairment in the Class I area, based on the analysis conducted under paragraph (e)(2)(i)(B) of this section.

(ii) A demonstration that the emissions trading program or alternative measure will apply, at a minimum, to all BART-eligible sources in the State. Those sources having a federally enforceable emission limitation determined by the State and approved by EPA as meeting BART in accordance with § 51.302(c) or paragraph (e)(1) of this section do not need to meet the requirements of the emissions trading program or alternative measure, but may choose to participate if they meet

the requirements of the emissions trading program or alternative measure.

(iii) A requirement that all necessary emission reductions take place during the period of the first long-term strategy for regional haze. To meet this requirement, the State must provide a detailed description of the emissions trading program or other alternative measure, including schedules for implementation, the emission reductions required by the program, all necessary administrative and technical procedures for implementing the program, rules for accounting and monitoring emissions, and procedures for enforcement.

(iv) A demonstration that the emission reductions resulting from the emissions trading program or other alternative measure will be surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP.

(v) At the State's option, a provision that the emissions trading program or other alternative measure may include a geographic enhancement to the program to address the requirement under § 51.302(c) related to BART for reasonably attributable impairment from the pollutants covered under the emissions trading program or other alternative measure.

(3) A State which opts under 40 CFR 51.308(e)(2) to implement an emissions trading program or other alternative measure rather than to require sources subject to BART to install, operate, and maintain BART may satisfy the final step of the demonstration required by that section as follows: If the distribution of emissions is not substantially different than under BART, and the alternative measure results in greater emission reductions, then the alternative measure may be deemed to achieve greater reasonable progress. If the distribution of emissions is significantly different, the State must conduct dispersion modeling to determine differences in visibility between BART and the trading program for each impacted Class I area, for the worst and best 20 percent of days. The modeling would demonstrate ''greater reasonable progress'' if both of the following two criteria are met:

(i) Visibility does not decline in any Class I area, and

(ii) There is an overall improvement in visibility, determined by comparing the average differences between BART and the alternative over all affected Class I areas.

(4) A State that opts to participate in the Clean Air Interstate Rule cap-and-trade and trade program under part 96 AAA–EEE need not require affected BART-eligible EGU's to install, operate, and maintain BART. A State that chooses this option may also include provisions for a geographic enhancement to the program to address the requirement under § 51.302(c) related to BART for reasonably attributable impairment from the pollutants covered by the CAIR cap-and-trade program.

(5) After a State has met the requirements for BART or implemented emissions trading program or other alternative measure that achieves more reasonable progress than the installation and operation of BART, BART-eligible sources will be subject to the requirements of paragraph (d) of this section in the same manner as other sources.

(6) Any BART-eligible facility subject to the requirement under paragraph (e) of this section to install, operate, and maintain BART may apply to the Administrator for an exemption from that requirement. An application for an exemption will be subject to the requirements of § 51.303(a)(2)–(h).

(f) *Requirements for comprehensive periodic revisions of implementation plans for regional haze.* Each State identified in § 51.300(b)(3) must revise and submit its regional haze implementation plan revision to EPA by July 31, 2018 and every ten years thereafter. In each plan revision, the State must evaluate and reassess all of the elements required in paragraph (d) of this section, taking into account improvements in monitoring data collection and analysis techniques, control technologies, and other relevant factors. In evaluating and reassessing these elements, the State must address the following:

(1) Current visibility conditions for the most impaired and least impaired days, and actual progress made towards natural conditions during the previous implementation period. The period for calculating current visibility

conditions is the most recent five year period preceding the required date of the implementation plan submittal for which data are available. Current visibility conditions must be calculated based on the annual average level of visibility impairment for the most and least impaired days for each of these five years. Current visibility conditions are the average of these annual values.

(2) The effectiveness of the long-term strategy for achieving reasonable progress goals over the prior implementation period(s); and

(3) Affirmation of, or revision to, the reasonable progress goal in accordance with the procedures set forth in paragraph (d)(1) of this section. If the State established a reasonable progress goal for the prior period which provided a slower rate of progress than that needed to attain natural conditions by the year 2064, the State must evaluate and determine the reasonableness, based on the factors in paragraph (d)(1)(i)(A) of this section, of additional measures that could be adopted to achieve the degree of visibility improvement projected by the analysis contained in the first implementation plan described in paragraph (d)(1)(i)(B) of this section.

(g) *Requirements for periodic reports describing progress towards the reasonable progress goals.* Each State identified in § 51.300(b)(3) must submit a report to the Administrator every 5 years evaluating progress towards the reasonable progress goal for each mandatory Class I Federal area located within the State and in each mandatory Class I Federal area located outside the State which may be affected by emissions from within the State. The first progress report is due 5 years from submittal of the initial implementation plan addressing paragraphs (d) and (e) of this section. The progress reports must be in the form of implementation plan revisions that comply with the procedural requirements of § 51.102 and § 51.103. Periodic progress reports must contain at a minimum the following elements:

(1) A description of the status of implementation of all measures included in the implementation plan for achieving reasonable progress goals for mandatory Class I Federal areas both within and outside the State.

(2) A summary of the emissions reductions achieved throughout the State through implementation of the measures described in paragraph (g)(1) of this section.

(3) For each mandatory Class I Federal area within the State, the State must assess the following visibility conditions and changes, with values for most impaired and least impaired days expressed in terms of 5-year averages of these annual values.

(i) The current visibility conditions for the most impaired and least impaired days;

(ii) The difference between current visibility conditions for the most impaired and least impaired days and baseline visibility conditions;

(iii) The change in visibility impairment for the most impaired and least impaired days over the past 5 years;

(4) An analysis tracking the change over the past 5 years in emissions of pollutants contributing to visibility impairment from all sources and activities within the State. Emissions changes should be identified by type of source or activity. The analysis must be based on the most recent updated emissions inventory, with estimates projected forward as necessary and appropriate, to account for emissions changes during the applicable 5-year period.

(5) An assessment of any significant changes in anthropogenic emissions within or outside the State that have occurred over the past 5 years that have limited or impeded progress in reducing pollutant emissions and improving visibility.

(6) An assessment of whether the current implementation plan elements and strategies are sufficient to enable the State, or other States with mandatory Federal Class I areas affected by emissions from the State, to meet all established reasonable progress goals.

(7) A review of the State's visibility monitoring strategy and any modifications to the strategy as necessary.

(h) *Determination of the adequacy of existing implementation plan.* At the same time the State is required to submit any 5-year progress report to EPA in accordance with paragraph (g) of this section, the State must also take one of the following actions based upon

the information presented in the progress report:

(1) If the State determines that the existing implementation plan requires no further substantive revision at this time in order to achieve established goals for visibility improvement and emissions reductions, the State must provide to the Administrator a negative declaration that further revision of the existing implementation plan is not needed at this time.

(2) If the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources in another State(s) which participated in a regional planning process, the State must provide notification to the Administrator and to the other State(s) which participated in the regional planning process with the States. The State must also collaborate with the other State(s) through the regional planning process for the purpose of developing additional strategies to address the plan's deficiencies.

(3) Where the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources in another country, the State shall provide notification, along with available information, to the Administrator.

(4) Where the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources within the State, the State shall revise its implementation plan to address the plan's deficiencies within one year.

(i) *What are the requirements for State and Federal Land Manager coordination?* (1) By November 29, 1999, the State must identify in writing to the Federal Land Managers the title of the official to which the Federal Land Manager of any mandatory Class I Federal area can submit any recommendations on the implementation of this subpart including, but not limited to:

(i) Identification of impairment of visibility in any mandatory Class I Federal area(s); and

(ii) Identification of elements for inclusion in the visibility monitoring strategy required by § 51.305 and this section.

(2) The State must provide the Federal Land Manager with an opportunity for consultation, in person and at least 60 days prior to holding any public hearing on an implementation plan (or plan revision) for regional haze required by this subpart. This consultation must include the opportunity for the affected Federal Land Managers to discuss their:

(i) Assessment of impairment of visibility in any mandatory Class I Federal area; and

(ii) Recommendations on the development of the reasonable progress goal and on the development and implementation of strategies to address visibility impairment.

(3) In developing any implementation plan (or plan revision), the State must include a description of how it addressed any comments provided by the Federal Land Managers.

(4) The plan (or plan revision) must provide procedures for continuing consultation between the State and Federal Land Manager on the implementation of the visibility protection program required by this subpart, including development and review of implementation plan revisions and 5-year progress reports, and on the implementation of other programs having the potential to contribute to impairment of visibility in mandatory Class I Federal areas.

[64 FR 35765, July 1, 1999, as amended at 70 FR 39156, July 6, 2005]

§ 51.309 Requirements related to the Grand Canyon Visibility Transport Commission.

(a) *What is the purpose of this section?* This section establishes the requirements for the first regional haze implementation plan to address regional haze visibility impairment in the 16 Class I areas covered by the Grand Canyon Visibility Transport Commission Report. For the years 2003 to 2018, certain States (defined in paragraph (b) of this section as Transport Region States) may choose to implement the Commission's recommendations within the framework of the national regional haze program and applicable requirements of the Act by complying with the provisions of this section, as supplemented by an approvable Annex to

Appendix B

December 6, 2007 Public Hearing Notice and Certification of Publication of the Notice

AND

June 25, 2009 Public Hearing Notice and Certification of Publication of the Notice

PUBLISHER'S AFFIDAVIT

STATE OF MISSOURI,)
)ss.
COUNTY OF COLE)

Mike Vivion ......being duly sworn, according to law, says he/she is Treasurer ......of the News Tribune Company, Publisher of the News Tribune ......

a newspaper printed and published in the County of Cole, and State aforesaid; that said newspaper has been published continuously for more than three years; and that the notice hereto attached was published in said paper in compliance with the provisions of Section 493.050

R.S. of Mo. for 2000 as amended for 1 time as follows:

1st insertion, No. ......, 3rd day of November, 20 07

2nd insertion, No. ......,......day of......, 20......

3rd insertion, No. ......,......day of......, 20......

4th insertion, No. ......,......day of......, 20......

5th insertion, No. ......,......day of......, 20......

Fee: $143.40 ...... Mike Vivion

Subscribed and sworn to before me this 5th

day of November, 20 07,

Barbara Kliethermes

BARBARA KLIETHERMES
Notary Public - State of Missouri
My Commission Expires March 13, 2009
Cole County
Commission #05529328

Notary Public

My term as Notary Public expires......

MISSOURI AIR CONSERVATION COMMISSION
WILL HOLD PUBLIC HEARING

JEFFERSON CITY, MO – The Missouri Air Conservation Commission will hold a public hearing on Missouri State Implementation Plan--Missouri Regional Haze Plan on Thursday, December 6, 2007. The Public Hearing will begin at 9 a.m. at the Harry S. Truman Building, Room 400, 301 W. High Street, Jefferson City, MO. The commission will hear testimony related to the following item(s).

* Missouri State Implementation Plan--Missouri Regional Haze Plan

On July 1, 1999, the U.S. Environmental Protection Agency (EPA) adopted the federal Regional Haze Rule with federal visibility requirements. Missouri has two federal Class I areas within its borders. The Missouri Regional Haze Plan was developed to meet the requirements of EPA's Regional Haze Rule and includes a description of the consultation process used to develop the plan, reasonable progress goals for achieving natural visibility conditions, calculations of baseline and natural visibility conditions, long-term strategy for regional haze, monitoring strategy and other implementation plan requirements.

Documents for the above item(s) will be available for review at the Missouri Department of Natural Resources, Air Pollution Control Program, 1659 Elm Street, Jefferson City, (573) 751-4817 and in the Public Notices section of the program web site www.dnr.mo.gov/env/apcp/index.html.

Persons with disabilities requiring special services or accommodations to attend the meeting can make arrangements by calling the department directly at (573) 526-4679, the department's toll free number at (800) 334-6946, or by writing two weeks in advance of the meeting to: Missouri Department of Natural Resources, Air Conservation Commission Secretary, P.O. Box 176, Jefferson City, MO 65102. Hearing impaired persons may contact the program through Relay Missouri, (800) 735-2966.

The commission holds public hearings under the provisions of chapter 643, RSMo. Citizens wishing to speak at the public hearing should notify the secretary to the Missouri Air Conservation Commission, Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, Missouri 65102-0176, or telephone (573) 526-4679. The department requests persons intending to give verbal presentations also provide a written copy of their testimony to the commission secretary at the time of the public hearing. The department also will accept written or email comments for the record until 5 p.m. on December 13, 2007; please send two copies of written comments to Chief, Operations Section, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176. Email comments regarding rule actions shall be sent to apcprulespn@dnr.mo.gov and email comments regarding plan actions shall be sent to apcpsppn@dnr.mo.gov. All written and email comments and public hearing testimony will be equally considered.

Public hearing items may be adopted by the Missouri Air Conservation Commission as provided for under authority of 643.050, RSMo. For more information or a complete meeting agenda, including items being presented for adoption, contact the Missouri Department of Natural Resources' Air Pollution Control Program at (573) 751-4817.

N.T. Nov. 3, 2007

PUBLISHER'S AFFIDAVIT

STATE OF MISSOURI,)
)ss.
COUNTY OF COLE)

Mike Vivion being duly sworn, according to law, says he is Vice President of Central Missouri Newspapers, Inc., Publisher of the News Tribune, a newspaper printed and published in the County of Cole, and State aforesaid; that said newspaper has been published continuously for more than three years; and that the notice hereto attached was published in said paper in compliance with the provisions of Section 493.050

R.S. of Mo. For 2000 as amended for 1 time as follows:

1st insertion, No. ______, 21st day of May, 20 09

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3rd insertion, No. ______, ______ day of ______, 20____

4th insertion, No. ______, ______ day of ______, 20____

5th insertion, No. ______, ______ day of ______, 20____

Fee: $227.00 Mike Vivion

Subscribed and sworn to before me this 22nd

day of May, 20 09

Barbara Kliethermes

Notary Public, BARBARA KLIETHERMES Notary Public - State of Missouri My Commission Expires March 13, 2013 Cole County Commission #09529328

My term as Notary Public expires ______

MISSOURI AIR CONSERVATION COMMISSION WILL HOLD PUBLIC HEARING

JEFFERSON CITY, MO -- The Missouri Air Conservation Commission will hold a public hearing on the Missouri State Implementation Plan regarding the Regional Haze Plan and the Doe Run Herculaneum Lead Nonattainment Area Plan on Thursday, June 25, 2009. The Public Hearing will begin at 9 a.m. at the Elm Street Conference Center, 1730 East Elm Street, Lower Level, Bennett Springs Conference Room, Jefferson City, Missouri. The commission will hear testimony related to the following item(s).

* Missouri State Implementation Plan--Missouri Regional Haze Plan
The Missouri Regional Haze Plan was developed to meet the requirements of the federal Regional Haze Rule. The Missouri Regional Haze Plan is being revised as result of the Holcim, Inc. Clarksville kiln Best Available Retrofit Technology (BART) findings and the U.S. Court of Appeal's late December 2008 decision on the Clean Air Interstate Rule. The department finalized a BART agreement with Holcim to address air quality issues related to visibility impacts at nearby Class I areas. At the same time, clarifications have been made to the content of the plan as a result of inquiries made by the U.S. Environmental Protection Agency during review of this plan for inclusion in the Missouri State Implementation Plan.

* Missouri State Implementation Plan - Doe Run Herculaneum Lead Nonattainment Area
This proposed amendment to the 2007 Revision to the State Implementation Plan (SIP) for the Herculaneum Lead Nonattainment Area will establish the enforceable building ventilation system limits for the Building Ventilation and Particle Capture project. Minimum fan amperages and flow rate limits at the Doe Run Company's Herculaneum Primary Lead Smelter are used to meet the requirements of the 2007 Consent Judgment. These limits are based upon the results of a building ventilation study completed by Doe Run and, once adopted, will become enforceable as an amendment to the 2007 Consent Judgement. Also as a result of this study, the Doe Run Herculaneum Work Practices Manual is being amended with the test methods, implementation and compliance provisions related to these limits. For the purposes of continual improvement, the Work Practices Manual is also being updated to restrict construction projects during periods of low temperature that would prohibit the use of water for dust suppression.

Documents for the above item(s) will be available for review at the Missouri Department of Natural Resources, Air Pollution Control Program, 1659 Elm Street, Jefferson City, (573) 751-4817 and in the Public Notices section of the program web site www.dnr.mo.gov/env/apcp/index.html. This information will be available at least 30 days prior to the public hearing date.

Persons with disabilities requiring special services or accommodations to attend the meeting can make

Appendix C

Comments and Responses to the Missouri Regional Haze Plan

AND

Comments and Responses to the 2009 Revision to the Missouri Regional Haze Plan

COMMENTS AND RESPONSES ON

PROPOSED MISSOURI STATE IMPLEMENTATION PLAN– STATE OF MISSOURI REGIONAL HAZE PLAN

AND

RECOMMENDATION FOR ADOPTION

On December 6, 2007, the Missouri Air Conservation Commission held a public hearing concerning the proposed revision to the Missouri State Implementation Plan for inclusion of a State of Missouri Regional Haze Plan. The following is a summary of comments received and the Missouri Department of Natural Resources' corresponding responses. Any changes to the proposed regional haze plan are identified in the responses to the comments.

The Missouri Department of Natural Resources' Air Pollution Control Program recommends the commission adopt the plan as revised. If the commission adopts this plan action, it will be the department's intention to submit this new plan to the U.S. Environmental Protection Agency to replace the current visibility plan in the Missouri State Implementation Plan.

SUMMARY OF COMMENTS: The department's Air Pollution Control Program received comments from five (5) sources: the Mississippi Lime Company, a private citizen, the U.S. Department of Interior Fish and Wildlife Service (FWS), the U.S. Environmental Protection Agency (EPA), and the U.S. Department of Agriculture Forest Service (FS).

COMMENT #1: The Mississippi Lime Company commented that one of their two units that were removed from Best Available Retrofit Technology (BART) consideration due to a permit condition requiring shutdown, has become a BART-eligible emission unit as a result of their request to remove that condition from the permit for that unit. As a BART-eligible unit, it is subject to BART screening evaluation. This evaluation has been conducted and the results show that this unit along with the company's other two current BART-eligible emission units remain below the 0.5 deciview impact level and, therefore, remain exempt from BART.
RESPONSE AND EXPLANATION OF CHANGE: The language in the BART chapter of the plan has been revised to reflect that Mississippi Lime Company has three BART-eligible units that do not need to install BART controls to meet the federal Regional Haze Rule requirements.

COMMENT #2: A private citizen commented that the regional haze plan does not appear to monitor or address nighttime visibility concerns, particularly with regard to man-made light emissions. The comment requests justification for how the plan will achieve the natural visibility controls of the Clean Air Act without a plan to reduce nighttime light emissions.
RESPONSE: The EPA's Regional Haze Rule does not regulate light emissions directly. The goals of the rule, as shown in the regional haze plan, can be met without requiring reductions in nighttime emissions. However, the improved visibility levels that will result from regional haze plans will help improve nighttime visibility. No changes were made to the plan as a result of this comment.

COMMENT #3: The FWS commented that that it was their understanding that the comments submitted by the U.S. Department of Interior in October 2007 on the draft Missouri Regional

Haze Plan were not considered to be “on the public record” because they were provided prior to the official public comment period. Therefore, the FWS resubmitted their comments into the official rulemaking process by attachment to a December 2007 letter.
RESPONSE AND EXPLANATION OF CHANGE: The official “rulemaking” process does not typically include early draft rule text comments in the formal comments and responses on proposed rule actions because these early comments are taken into account in the proposed rulemaking that is presented at public hearing. However, extra effort was made to share early draft plan comments as a result of this comment. The public hearing presentation made before the Missouri Air Conservation Commission and the public included discussion on the regional haze plan consultation process. This discussion mentioned that the consultation process included the Federal Land Managers and that they provided comments on the draft plan. The summary of comments and responses includes comments received during the consultation process and on the proposed plan that was presented at public hearing.

COMMENT #4: The FWS and the FS commented that their review of the draft Missouri Regional Haze Plan indicated a need to more completely address the land management agency priorities which include the following areas of interest: baseline, natural condition and uniform rate, emission inventories, area of influence, reasonable progress goals and long-term strategy, fire, regional consistency, verification and contingencies and coordination and consultation.
RESPONSE AND EXPLANATION OF CHANGE: This comment on the early draft plan resulted in additional language being added to the proposed plan that was presented at public hearing to more completely address the land management agency priorities and additional revisions have been made to the plan as a result of comments received during the public comment period.

COMMENT #5: The FWS commented that the draft Missouri Regional Haze Plan relied on a pattern of referencing technical documents that did not include explanations of the State’s reasoning on deriving conclusions. They also requested that the discussion in the draft plan be expanded regarding how important federal rule elements were approached and evaluated.
RESPONSE AND EXPLANATION OF CHANGE: This comment on the early draft plan was considered and additional explanatory language was added to the proposed plan that was presented at public hearing to describe the State’s approach, evaluation and reasoning on deriving conclusions. In addition, revisions have been made to the plan as a result of comments received during the public comment period.

COMMENT #6: The FWS commented that discussions of specific plan elements are re-visited in several sections, often with contradictory or incorrect information. More robust explanations of specific topic areas are often included in non-related chapters.
RESPONSE AND EXPLANATION OF CHANGE: Early in the development of the regional haze plan, it was decided to structure the Missouri Regional Haze Plan as closely as possible to the plan template provided by the Central Regional Air Planning Association (CENRAP). The reasoning was that if all states were to structure their plans to align to this template, then the review of plans would be much easier for the Federal Land Managers. Since it is not our intent to have contradictory or incorrect information in the plan, the plan was reviewed for accuracy at the same time that more robust explanations were added with the reasoning for the conclusions being drawn in the plan. At the same time, information in each chapter of the document was

reviewed to determine if it was in an appropriate section of the document while keeping with the template structure.

COMMENT #7: The FWS requested that the baseline and natural condition values being used as a basis for the draft Missouri Regional Haze Plan be reviewed for consistency with the latest available information. They also asked that the plan state if the estimates were generated using the old or the new Interagency Monitoring of PROtected Visual Environments (IMPROVE) equation.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, IMPROVE information in the early draft plan was reviewed for consistency with the latest available information. Additional language was also added to the proposed plan that was presented at public hearing explaining that the plan is based on the new IMPROVE equation.

COMMENT #8: The FWS commented that the department should consider providing additional information in the draft Missouri Regional Haze Plan. They suggest a summary of the IMPROVE equations and the calculations necessary to evaluate baseline conditions and providing a specific description in an appendix. Also, it was noted that the plan references an "ftp" website that is not publicly available.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, Appendix G has been added to the plan to provide a more detailed explanation of the revised IMPROVE equation. Therefore, the website reference was no longer necessary and has been removed from the plan text.

COMMENT #9: The FWS commented that the department should identify whether the "Uniform Rate of Reasonable Progress Glide Paths" in section 8.4 of the draft Missouri Regional Haze Plan were produced using actual model output or the results of applying a relative reduction factor. Also, the concept of "Method 1" is mentioned in the Uniform Rate of Progress graphs and should be explained in the plan.
RESPONSE AND EXPLANATION OF CHANGE: Section 8.4 of the plan indicates that the uniform rate of reasonable progress glide paths were produced by drawing a line from the baseline observed visibility conditions for the 20 percent worst days to natural visibility conditions in 2064. Neither model output nor relative reduction factors were used in the construction of the glide paths. Therefore, no changes were made to the plan regarding how uniform rate of reasonable progress glide paths were produced. However, language was added to section 8.4 clarifying the procedures used in the CENRAP 2018 modeled visibility projections, which are labeled "Method 1" in the uniform rate of progress graphs in the plan. The "Method 1" procedures conform to the EPA's default method of calculating future-year visibility conditions.

COMMENT #10: The FWS commented that statements in section 6.4, referencing ambient ammonia monitoring in CENRAP regions and indicating that high concentrations of ammonia are occurring with a considerable regularity, are in conflict with section 9.2 that stated ammonia was being discarded from consideration due to the inventory being "very uncertain" regarding anthropogenic contribution. The FWS requests the plan discuss whether the observations apply in Missouri, whether the department has investigated winter dates when 20% worst visibility occurs and how ammonia emissions were considered in evaluating the reasonable progress goal. The FWS is concerned that the department should re-evaluate ammonia emission effects on

visibility at the Mingo Wilderness Area, considering the high nature of measurements that have potentially occurred.
RESPONSE: The CENRAP/Midwest Regional Planning Organization (RPO) special ammonia sampling was conducted in the upper Midwest, including central Missouri, where agricultural sources of ammonia are numerous. The sampling was conducted primarily to aid in understanding the association of free ammonia with regional haze pollutants, but was not able to directly relate ammonia sources to haze. While that seems to be a given, the BART discussion in section 9.2 points out that not only is the overall ammonia inventory, including agricultural, very limited nationally, but that the BART eligible sources were not large ammonia emitters, so that pollutant was not considered in the BART evaluation. Ammonia was part of the modeling analysis for the 20% worst days, and is discussed in the CENRAP Modeling Technical Support Document used as a basis for reasonable progress growth evaluation. Currently, the EPA is conducting a study with large concentrated animal feeding operations to determine improved emission factors. Contingent on the outcome of the mid-course review discussed in section 13, an evaluation of ammonia controls may be included in the four (five) factor analysis, which could include these new emission factors. No changes were made to the plan as a result of this comment.

COMMENT #11: The FWS commented that the department should consider combining the draft Missouri Regional Haze Plan discussions on emission inventories into one chapter.
RESPONSE: Early in the development of the regional haze plan, it was decided to structure the Missouri Regional Haze Plan as closely as possible to the plan template provided by the CENRAP. The reasoning was that if all states were to structure their plans to align to this template, then the review of plans would be much easier for the Federal Land Managers. Therefore, no changes were made to the plan as a result of this comment.

COMMENT #12: The FWS and EPA commented that the draft Missouri Regional Haze Plan needs to commit to periodically updating the future emission inventory projections used for regional haze decision making.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, section 7.3 was added to the plan with language that commits to periodic reviews and updates of base year inventories and future-year emissions projections.

COMMENT #13: The FWS commented that the BART chapter discussion of the draft Missouri Regional Haze Plan regarding the Doe Run-Glover facility should explicitly address the potential scenario that Doe Run-Glover might resume operation under their valid air quality permit.
RESPONSE AND EXPLANATION OF CHANGE: This comment on the early draft plan resulted in additional language being added to section 9.2 of the proposed plan that was presented at public hearing to further address address Doe Run-Glover possibly resuming operation under their valid air quality permit. To supplement this comment and on-going operating permit issues, the department has sent a letter to Doe Run-Glover requesting clarification of Doe Run’s plans. This letter clarified the intent of the department to require a BART analysis for the facility if operations of the large units commenced. The letter is included in Appendix J. At this time, the department does not believe the source will commence operation and does not intend to pursue a BART evaluation unless contrary information is presented.

COMMENT #14: The FWS requested that the reasons for excluding volatile organic compounds (VOCs) and ammonia from BART determinations should be expanded in the draft Missouri Regional Haze Plan.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, language was added to the proposed plan that was presented at public hearing expanding on the reasoning for excluding VOCs and ammonia from BART determinations.

COMMENT #15: The FWS requested that the text in the draft Missouri Regional Haze Plan specify whether the CALPUFF/CALPOST screening analyses followed the CENRAP screening modeling protocol, and if not, the reasons for not following that protocol.
RESPONSE: The CALPUFF/CALPOST screening analyses conducted do not explicitly follow the CENRAP protocol for this evaluation because the department evaluated CALPOST Method2 and Method6. This level of review is beyond the CENRAP protocol and ensures that sources were screened using a more conservative approach than specified in the CENRAP protocol. No changes were made to the plan as a result of this comment.

COMMENT #16: The FWS commented that the draft Missouri Regional Haze Plan approach that uses the 98th percentile test on modeling results to determine BART eligible source impacts is not appropriate according to CENRAP screening modeling protocol. In is unclear whether the department refined the meterorology processing done in the modeling in order to move to refined modeling which would then allow for use of the 98th percentile approach. Also, when using the 98th percentile approach, the eigth-highest daily visibility impact predicted in a modeling year should be used rather than the seventh-highest value.
RESPONSE AND EXPLANATION OF CHANGE: The first portion of this comment on the early draft plan resulted in language being included in the proposed plan that was presented at public hearing to include information specific to the use of “refined” meteorology and the 98th percentile visibility change. As a result of the second part of the comment regarding the use of the 8th highest daily visibility impact, supplemental changes have been made to the plan to reflect that the 98th percentile values represent the 8th highest visibility impact instead of the the 7th highest visibility impact.

COMMENT #17: The FWS requested that the BART chapter of the draft Missouri Regional Haze Plan include information regarding Noranda Aluminum and the University of Missouri-Columbia, including any modeling protocols for the refined analyses, modeling results and BART engineering determinations as they become available.
RESPONSE AND EXPLANATION OF CHANGE: The information requested by this comment was included in the proposed plan that was presented at public hearing.

COMMENT #18: The FWS commented that there are inconsistent statements in the draft Missouri Regional Haze Plan about the BART decisions pertaining to electric generating units (EGUs) that are also subject to the Clean Air Interstate Rule (CAIR). They requested that additional information be provided explaining how CAIR EGU sources were evaluated for primary particulate matter and primary sulfate emissions.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, the BART chapter in the proposed plan that was presented at public hearing was amended to remove

inconsistencies and additional information was included explaining the evaluation of EGUs including the determination of primary particulate matter emissions.

COMMENT #19: The FWS recommended that the tables in Appendices G and I of the draft Missouri Regional Haze Plan be reformatted for ease in reading this information.
RESPONSE AND EXPLANATION OF CHANGE: The tables in these appendices have been reformatted in the proposed plan that was presented at public hearing.

COMMENT #20: The FWS commented that the consultation plan in Appendix F of the draft Missouri Regional Haze Plan contains several Area of Influence (AOI) maps for the affected Class I areas in and near Missouri. These maps should be integral to the discussions in the plan. The information in section 11.5 of the draft Missouri Regional Haze Plan references tables in the emissions inventory section that only presents a summary of 2002 and 2018 emissions inventory for just Missouri sources and only in aggregrate by source category. Also, section 11.5 does not provide any of the CENRAP graphics for Class I areas of concern. The plan needs to discuss attribution of haze-causing pollution and the results of consultations with neighboring states regarding achieving Reasonable Progress Goals for the Missouri Class I areas.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment and FS comments on the early draft plan, discussion language in the proposed plan that was presented at public hearing was expanded to include AOI maps, applicable CENRAP graphics, additional emissions allocation information and attribution of haze-causing pollution that includes results of consultations with neighboring states.

COMMENT #21: The FWS and the FS commented that Chapter 10 of the draft Missouri Regional Haze Plan establishes that 2018 reasonable progress goals are equal to the 2018 year value of the uniform rate of progress graph. This is not consistent with the federal Regional Haze Rule. However, the 2018 visibility projections presented in section 8.4 were based on emission growth and on-the-books controls that will be implemented between 2002 and 2018. Based on this information, the federal Regional Haze Rule requires Missouri to adopt the results of the visibility projection as its 2018 Reasonable Progress Goal.
RESPONSE AND EXPLANATION OF CHANGE: As a result of FWS and FS comments on the early draft plan, discussion language in the proposed plan that was presented at public hearing was revised to show that the 2018 visibility projections based on emissions growth and on-the books controls are the reasonable progress goals.

COMMENT #22: The FWS and the FS commented that Chapter 10 of the draft Missouri Regional Haze Plan does not address the reasonable progress goals for the best 20% visibility days as required by the federal Regional Haze Rule.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, the discussions in the proposed plan that was presented at public hearing were expanded to address the best 20% visibility days.

COMMENT #23: The FWS commented that the discussion in Chapter 10 of the draft Missouri Regional Haze Plan does not include the required four-factor analysis for establishing Reasonable Progress Goals. The plan only applies the four-factor analysis to the CAIR-affected and BART-affected sources within Missouri. The plan does not include the required four-factor

analysis for non-EGUs in establishing the Reasonable Progress Goals. This is a misinterpretation of the EPA guidance that states that the four-factor analysis doesn't need to "reassess the reasonable progress factors for sources subject to BART for which you have already completed a BART analysis."

RESPONSE: The glide slope approach required in the 1999 federal Regional Haze Rule was applied in establishing the reasonable progress goals for each Class I area. The draft regional haze guidance published in 2006 radically departs from the federal Regional Haze Rule. The guidance declares that the States should conduct reviews (4-factor analysis) for all stationary sources to identify any potential controls before determining the reasonable progress goal. The reasonable progress goal selection process in the guidance is fundamentally inconsistent with the glide slope analytical approach contained in the federal Regional Haze Rule. It also contradicts the traditional approach used in state implementation plans for nonattainment areas.

If modeling failed to achieve the Uniform Rate of Progress goals for Missouri Class I areas, then conducting a 4-factor analysis would be appropriate for non-EGUs. However, visibility projections based on CENRAP modeling indicate that Missouri will be able to meet the Uniform Rate of Progress goals for both Mingo and Hercules Glades Class I areas in 2018. Missouri has not selected a strategy to achieve greater reductions than necessary to meet the Uniform Rate of Progress goals because the state must follow state statute 643.055 that does not allow standards stricter than those required under the provisions of the federal Clean Air Act. No changes were made to the plan as a result of this comment.

COMMENT #24: The FWS commented that section 11.4 of the draft Missouri Regional Haze Plan inaccurately refers to the regional haze process as an attainment demonstration. However, it provides the framework for each State to establish those Reasonable Progress Goals based upon the statutory four-factor analysis.

RESPONSE: The glide slope approach required in the 1999 federal Regional Haze Rule was applied in establishing the reasonable progress goals for each Class I area as described in the response to COMMENT #23. Therefore, no changes were made to the plan as a result of this comment.

COMMENT #25: The FWS, the FS and EPA requested that the discussion in section 11.6.4 of the draft Missouri Regional Haze Plan be expanded to elaborate on how the Prevention of Significant Deterioration (PSD) and New Source Review (NSR) permitting programs will be utilized as part of the long term strategy for meeting Reasonable Progress Goals. EPA stated that, along with explaining to what extent the State relied on the PSD and NSR programs in developing the long-term strategy, the State should provide more explanation in the plan on how these programs satisfy the State's obligation to consider construction activity, and source retirement and replacement schedules.

RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, the discussions in the proposed plan that was presented at public hearing were expanded to elaborate on how the PSD and NSR permitting programs will be used in the long term strategy. The department still plans to coordinate the visbility review of major new source review permits with the Federal Land Manager for applicable Class I areas. The requirements of the Clean Air Act with respect to this type of coordination will still be met. In addition, the continued application of nonattainment permitting and the PSD program in Missouri will help ensure that facilities are in

compliance with all standards including the National Ambient Air Quality and PSD increment standards in Missouri. The existing permitting program to ensure compliance with the applicable standards remains sufficient to meet the obligation to consider construction activities in Missouri along with the continued coordination with EPA and the land managers.

COMMENT #26: The FWS commented that the draft Missouri Regional Haze Plan should describe how natural and non-natural smoke emissions from wild and prescribed fires currently affect the Class I areas and how these effects may change during the planning period.
RESPONSE AND EXPLANATION OF CHANGE: Fire, while not considered to be a main source of visibility impairment in any Class I area, is one source of regional haze. Minimizing the adverse effects of smoke results from a concerted effort to utilize prescribed fires in a beneficial manner consistent with proven management strategies. These strategies include understanding and using meteorological conditions when scheduling burning to avoid sending smoke into a sensitive area, controlling the rate of emissions to promote dilution and dispersion, and minimizing smoke output per unit area through emissions reduction techniques. Currently, fires do not significantly contribute to visibility impairment in Class I Federal areas located in Missouri and the affects of wild and prescribed fires are not expected to change over the planning period of this plan. However, language was added to the plan to describe how adverse affects of smoke from wild and prescribed fires are minimized.

COMMENT #27: The FWS commented that the draft Missouri Regional Haze Plan and the Missouri Smoke Management Plan should identify Mingo as a smoke sensitive area and prescribed burners should be required to apply the appropriate smoke management techniques to minimize smoke impacts.
RESPONSE: Both the Mingo National Wildlife Area and the Hercules Glades Wilderness Area are identified as federal Class I Areas and, as such, are considered smoke sensitive. The implementation of the Missouri Smoke Management Plan encourages prescribed burners to use best smoke management practicies to minimize smoke impacts. No changes were made to the plan as a result of this comment.

COMMENT #28: The FWS commented that the draft Missouri Regional Haze Plan should refer to the Missouri Smoke Management Plan in a way that does not require plan updates each time the Smoke Management Plan is updated. They also request that Missouri indicate whether Missouri intends to certify the Smoke Management Plan as provided for by the 1998 EPA Interim Air Quality Policy on Wildland and Prescribed Fire.
RESPONSE AND EXPLANATION OF CHANGE: The Missouri Regional Haze Plan that was presented at public hearing refers to the Missouri Smoke Management Plan in a way that does not require plan updates each time the Smoke Management Plan is updated. A copy of the Missouri Smoke Management Plan is provided as an appendix to the plan for reference. Missouri does intend for the Missouri Smoke Management Plan to be certified as provided for by the 1998 EPA Interim Air Quality Policy on Wildland and Prescribed Fire. A letter certifying that the smoke management plan meets the basic requirements is being provided to EPA.

COMMENT #29: The FWS commented that neither section 11.6.5 of the draft Missouri Regional Haze Plan nor the Missouri Smoke Management Plan addresses ongoing development, review and updating of the plan as a result of coordination and consultation during the

development of future progress reports and plan revisions. Also, they do not provide for federal land manager agency involvement.
RESPONSE AND EXPLANATION OF CHANGE: This comment on the early draft plan resulted in additional language being added in Section 11.4.5 of the proposed plan that was presented at public hearing to clarify that the department does not intend to submit the smoke management plan for inclusion in the Missouri SIP. The additional plan language states that a copy of the Missouri Smoke Management Plan is included in the appendix of the regional haze plan for reference and a letter certifying that the smoke management plan meets the basic requirements will be provided to EPA. This allows changes to be made to the smoke management plan without undergoing a SIP revision. The language in Section 11.2 of the proposed plan that was presented at public hearing addresses the coordination and consultation during the development of future progress reports and plan revisions.

COMMENT #30: The FWS commented that there are three RPOs that also cover the Mingo Wilderness Area. Missouri should consider including language in the draft Missouri Regional Haze Plan to highlight the importance of the ongoing verification and contingency provisions in view of the varying and different results of the three RPOs.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, a new section 8.4.2 "Other RPO's visibility projections" has been added to the proposed plan that was presented at public hearing. The section compares the visibility projections from CENRAP, Visibility Improvement State and Tribal Association of the Southeast (VISTAS), and Midwest Regional Planning Organization (MRPO) for Mingo and Hercules Glades Class I areas. Missouri used CENRAP modeling results in developing the RH plan based on a better quality-assured inventory.

COMMENT #31: The FWS commented that section 6.3 of the draft Missouri Regional Haze Plan discusses the ongoing and future monitoring strategy for measuring visibility parameters and progress at the Class I areas within Missouri. Given the uncertain future of any individual monitoring site, the plan should address the representativeness of both primary and alternative data sites, and also provide a more specific plan for ensuring that monitoring is continued if national funding is not available.
RESPONSE AND EXPLANATION OF CHANGE: This comment on the early draft plan resulted in additional language being added to the proposed plan that was presented at public hearing to address future monitoring if national funding is not available.

COMMENT #32: The FWS encourages Missouri to not only consider the need for monitoring data to measure progress, but also how the plan accounts for and reconciles both unexpected and reasonably foreseeable emissions growth, changes to the geographic distribution of emissions and substantive discrepancies that may be found in emission inventories or other technical bases of the plan.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, section 7.3 was added to the plan with language that commits to periodic reviews and updates of base year inventories and future-year emissions projections.

COMMENT #33: The FWS commented that Chapter 13 of the draft Missouri Regional Haze Plan discusses options for action following the five-year review. This discussion should include

the anticipated criteria that will be used to evaluate the progress at the five-year review and to select the course of action that will be taken based upon that review.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, criteria for evaluating the progress of the RPGs at the five-year review has been added to the plan. A process flow chart with the review criteria and course of action has also been added to the plan. If the monitoring and emission data does not support the RPG projections for Missouri Class I areas, a 5-factor analysis will be conducted at the five-year review.

COMMENT #34: The FWS commented that the draft Missouri Regional Haze Plan refers to appendices of the plan for documentation of the consultation process but the plan lacks discussion of Missouri's decisions based upon the results of those meetings.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, section 4.1 of the plan was expanded to include more discussion of the basis for the decisions that resulted from the consultation process.

COMMENT #35: The FWS commented that the draft Missouri Regional Haze Plan should outline how Missouri would accomplish future ongoing consultation activities if the CENRAP organization no longer existed. Also, the future consultation activities mentioned in the plan should consistently mention the Federal Land Manager agencies as a partner in that consultation.
RESPONSE AND EXPLANATION OF CHANGE: This comment on the early draft plan resulted in additional language being added to the proposed plan that was presented at public hearing stating that ongoing consultation activities would be led by Missouri if the CENRAP organization no longer existed. In addition, language has been added to sections 2.6 and 10.3 of the plan to clarify that federal land managers are included in the consultation process.

COMMENT #36: The FS commented that Chapters 1 and 4 of the Missouri Regional Haze Plan should include the Boundary Waters Canoe Class I area in Minnesota since earlier RPO discussions identified Missouri as effecting visibility in that area. Also, the discussion should clarify what states contributed to achieving reasonable progress in Missouri and an evaluation of the additional Missouri controls that was requested by Minnesota.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment on the early draft plan, additional discussion language regarding Boundary Waters was added to section 4 of the proposed plan that was presented at public hearing to clarify the lack of contribution by Missouri on that Class I Area.

COMMENT #37: The FS commented that Chapter 7 of the Missouri Regional Haze Plan should include a discussion of the Area of Influence for the emissions that cause or contribute to visibility impairment in the affected Class I areas and identify those affected areas. The State is required by 40 CFR 51.308(d)(4)(ii) to state the procedures by which monitoring data and other information are used in determining the contribution of emissions from within the state to regional haze visibility impairment at mandatory federal Class I Areas both within and outside the state. It should also be mentioned in the plan if Missouri intends to update the inventory periodically.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment and FWS comments on the early draft plan, discussion language in the proposed plan that was presented at public hearing was expanded to include AOI maps, applicable CENRAP graphics, additional

emissions allocation information and attribution of haze-causing pollution that includes results of consultations with neighboring states. In addition, section 7.3 was added to the plan with language that commits to periodic reviews and updates of base year inventories and future-year emissions projections.

COMMENT #38: The FS commented that Chapter 8 of the Missouri Regional Haze Plan should include a discussion of what differences actually occurred in the various RPO inventories used for visibility projections. Then one could assess which modeling scenario best represents impacts at the affected Class I areas.
RESPONSE AND EXPLANATION OF CHANGE: This comment on the early draft plan resulted in additional language being added to section 8.4.2 of the proposed plan that was presented at public hearing to more completely address the land management agency priorities.

COMMENT #39: The FS commented that Chapter 10 of the Missouri Regional Haze Plan states that the 2018 visibility goals for Mingo and Hercules Glades have been largely achieved through EGU emissions reductions and that the four-factor analyses had been conducted by EPA, CENRAP and other RPOs. Although, background and reference material was prepared by these entities, it is the responsibility of the States to apply the four-factor analysis appropriately. EPA also commented that Missouri must include the required four-factor analysis, the results of the analysis and the effect(s) on visibility improvements at Class I areas in the plan.
RESPONSE: Missouri has included the four-factor analyses from CENRAP, and the effects on visibility improvement at Missouri Class I areas in the plan. Additional CENRAP control sensitivity run controls will be considered if the five-year review does not indicate sufficient progress is being met with the proposed controls. No changes were made to the plan as a result of this comment.

COMMENT #40: The FS requested clarification of the status of the Central Class I area consultation since they thought that the consultation had ended.
RESPONSE: The discussion in section 11.2 is referring to subsequent coordination and consultation that will occur in the development of future progress reports and plan revisions, as well as during the implementation of programs having the potential to contribute to visibility impairment in the mandatory Class I areas. No text changes have been made to the plan as a result of this comment.

COMMENT #41: The FS commented that the draft Missouri Regional Haze Plan listed those Class I areas which Missouri would reasonably be anticipated to impact. Such a list in Chapter 11 of the plan would be useful and they recommend including the appropriate list in the plan.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment on the early draft plan, discussion language in section 4.1 of the proposed plan that was presented at public hearing was expanded to include a list of impacted Class I Areas.

COMMENT #42: The FS commented that Chapter 11 of the Missouri Regional Haze Plan states that Missouri will include BART controls proposed by the other impacting states in its long term strategy. Since not all of these BART determinations are completed, they want to know what mechanism will be used to adjust the Reasonable Progress Goal based on the other states' final BART determinations.

RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, section 11.4.1.2 has been revised to reflect that the five-year review will be the mechanism used to adjust the Reasonable Progress Goal based on the other states' final BART determinations.

COMMENT #43: The FS commented that section 11.4.2 of the Missouri Regional Haze Plan refers to the 2018 Reasonable Progress Goals for Mingo and Hercules Glades Class I areas but should refer to the Uniform Rate of Progress goal for 2018. While the CAIR controls are very cost effective, Missouri has made no showing that additional cost effective controls are not available. If Missouri chooses not to consider the CENRAP developed "C1" control strategy, then Missouri should explain its rationale for not selecting a strategy which would achieve greater reductions than its present strategy.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, the language in section 11.4.2 of the plan has been revised to reflect the Uniform Rate of Progress (URP) goal for 2018. Visibility projections based on CENRAP modeling indicate that Missouri will be able to meet the Uniform Rate of Progress goals for both Mingo and Hercules Glades Class I areas during the first planning period ending in 2018. All applicable measures reflected in the modeling and weight of evidence analysis have been incorporated in the state's long-term strategy. Missouri has not selected a strategy to achieve greater reductions than necessary to meet the Uniform Rate of Progress because the state must follow state statute 643.055 that does not allow standards stricter than those required under the provisions of the federal Clean Air Act. Additional cost effective controls including SO_2/NO_X Reasonably Available Control Technology (RACT) in the St Louis $PM_{2.5}$ plan and Illinois Multi-Pollutant Strategy will provide more air quality benefit in visibility improvement. These additional controls were not modeled by CENRAP.

COMMENT #44: The FS commented that section 11.4.5 of the Missouri Regional Haze Plan should include discussion stating that Missouri has not documented smoke contributing significantly to visibility impairment in Class I areas for consistency with the Missouri Smoke Management Plan. Since it appears the current prescribed fire smoke management techniques implemented in Missouri are adequate to protect visibility in the Class I areas and the Missouri Smoke Management Plan should provide additional protection, these points should be noted in the plan discussion.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, additional language was added to section 11.4.5 of the plan stating that Missouri is not aware of any smoke contributing significantly to visibility impairment in Class I areas and that the Missouri Smoke Management Plan should provide additional protection for these areas.

COMMENT #45: The FS suggested that it may be prudent to omit specific elements of the Interim Air Quality Policy from section 11.4.5 of the Missouri Regional Haze Plan to help maintain flexibility for modification since the policy is due to be revised by July 2008.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, the specific elements of the Interim Air Quality Policy has been removed from section 11.4.5 of the plan.

COMMENT #46: The FS commented that Section 13 of the Missouri Regional Haze Plan should contain greater detail relating to judging adequacy of the existing plan. For example, explain how Missouri will determine if the plan is adequate, if the inadequacy is due to

emissions from Missouri or other states/areas and what plan revisions will be made if the inadequacy is due to Missouri sources.
RESPONSE AND EXPLANATION OF CHANGE: Section 13 of the plan already states that the findings of the five-year progress report will determine what plan revisions will be made if it is determined to be inadequate due to Missouri sources. Any resulting plan revisions could include a revision to goals, contingency measures, the monitoring strategy, and any other parts of the plan as deemed necessary. In response to COMMENT #50, criteria has been added to the plan for evaluating the progress to meet the Reasonable Progress Goals in Missouri Class I areas.

COMMENT #47: The FS requested that Missouri consider how the Missouri Regional Haze Plan accounts for and reconciles both unexpected and reasonably foreseeable emissions growth, changes to the geographic distribution of emissions, and substantive discrepancies that may be found in emissions inventories or other technical bases of the state implementation plan. As an example, the predictions of the "IPM" model and the assumptions for CAIR implementation that were used to project the future 2018 electric utility generation industry sources and emissions may be greatly different from the outcomes that are actually realized in that future year. Such factors, as well as other unanticipated circumstances, may adversely affect Missouri's ability to achieve the emissions reductions projected by the plan.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, section 7.3 was added to the plan with language that commits to periodic reviews and updates of base year inventories and future-year emissions projections.

COMMENT #48: The EPA provided a statement at public hearing supporting Missouri's efforts in developing the Missouri Regional Haze Plan. Appreciation was expressed for the opportunity to provide early comment on the draft regional haze plan. They believe that this cooperation resulted in a more efficient and effective plan review process for both the department and the EPA.
RESPONSE: EPA's support for these efforts is appreciated.

COMMENT #49: The EPA commented that the Missouri Regional Haze Plan must include a discussion of what action was taken or not taken in adddressing each Federal Land Manager comment including the rationale for the decisions. The FWS and the FS also anticipate these responses to their questions in accordance with the 40 CFR 51.308(i)(3) requirement.
RESPONSE AND EXPLANATION OF CHANGE: A copy of the comments, along with responses to those comments, have been included in Appendix C of the Missouri Regional Haze Plan.

COMMENT #50: The EPA commented that Section 13 of the Missouri Regional Haze Plan must include a definitive statement that the modeling and monitoring information will be used and the consultation process described in the plan will be followed in carrying out the scheduled incremental administrative and technical actions required in the plan.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, a more definitive statement has been added to Section 13 of the plan.

COMMENT #51: The EPA commented that the Missouri Regional Haze Plan does not contain any information concerning how the plan will be managed throughout its administrative and/or

regulatory life. The plan should identify what Missouri agency and/or official will be responsible for conducting the numerous time critical actions required. The plan should also identify the form(s) or format(s) in which the plan will be maintained. A digital (i.e. computer) format with specific intervals to revisit the format for periodic technology updates is suggested for the long-term plan retention and accessibility. It is also suggested that one or more paper copies of the plan be retained by the State for easy retrieval by the public and others.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, sections 12.0 and 13.0 have been revised to include the suggested information pertaining to plan management. Criteria has also been developed for evaluating the progress to meet the Reasonable Progress Goals in Missouri Class I areas.

COMMENT #52: The EPA commented that Chapter 12 of the Missouri Regional Haze Plan provides no specific information as to actions that will be taken by the State during the important first five-year Reasonable Progress reporting period. The plan should include a discussion of the planned activities during this period.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, sections 12.0 and 13.0 have been revised to include specific information regarding planned activities during the five-year reasonable progress reporting period. Criteria has also been developed for evaluating the progress to meet the Reasonable Progress Goals in Missouri Class I areas.

COMMENT #53: The EPA commented that interstate regional haze consultation discussion in the Missouri Regional Haze Plan is unclear on whether or not there is an agreement between Missouri and the states of Minnesota and Okalahoma over the significance of Missouri's emissions at Class I areas in those states. The status of the consultations between the states, including a discussion of resolved issues, should be provided in the plan.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment on the early draft plan, discussion language in section 4.2 of the proposed plan that was presented at public hearing was revised to expand discussion on the disagreement between Minnesota, Oklahoma and Missouri regarding Missouri source influences on the Minnesota and Oklahoma Class I Areas.

COMMENT #54: The EPA commented that the discussion in section 11.4 of the Missouri Regional Haze Plan needs to be clarified as to which programs listed are relied upon to demonstrate that the plan will meet its Reasonable Progress Goal.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, the plan has been revised to specify that "on the book controls" under section 11.4.1. are the only programs used in modeling demonstration in meeting the RPG requirements.

COMMENT #55: The EPA commented that the inventory development discussion in the Missouri Regional Haze Plan should clarify that the department's Air Pollution Control Program and CENRAP, with contractor support, prepared the onroad inventory. Also, Missouri should indicate what entity processed the data used in developing the final onroad inventory. Finally, the inventory development discussion should state whether the 2018 emissions inventory was based on 12 months of data inputs or a different time frame.

RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, language was added clarifying which entity prepared the onroad mobile emissions inventory and stating that the 2018 emissions inventory was based on 12 months of data inputs.

COMMENT #56: The EPA commented that Table 9.1 in Chapter 9 of the Missouri Regional Haze Plan should be revised to include the dates for facilities, the emissions that make the sources BART-eligible and an evaluation of emission type and amount. These dates should be included since BART-eligible determinations involve consideration of both the "start-up" and "in operation" dates. Missouri should clarify how it determined which sources should undergo further BART modeling analysis. For example, the State should state whether it used the Q/d (emissions divided by distance) approach in deterimining which sources needed to be modeled further or some other approach. EPA commented that Appendix H of the plan is both difficult to read and to extrapolate emission source information. Therefore, both Table 9.1 and Appendix H should be revised to provide emission information and construction dates rather than the "X" that was inserted in certain tabular fields without an explanation.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, Appendix I (original Appendix H) of the plan has been revised to include an explanation of the finding of BART-eligibility, specifically detailing the elimination methodology including date or size of emission source as the rationale. Upon consideration of this comment, the department discovered eight (8) additional sources that were mis-characterized as having no BART eligible sources. The plan has been revised to include these sources in Table 9.1 and the rationale for inclusion or exclusion is detailed in Appendix I (original Appendix H). In response to the portion of the comment regarding Q/d, the department did not use a Q/d approach for eliminating sources but, instead, performed a screening evaluation of all BART-eligible sources in Missouri. The results of the screening analyses were utilized to determine the need for refined CALPUFF modeling.

COMMENT #57: The EPA commented that the information in Chapter 9 of the Missouri Regional Haze Plan needs to clarify the following issues. The plan is unclear as to the regulatory status of Portland Cement Plants in Missouri. The plan suggests that these plants are subject to seasonal limits under the NOx SIP Call but doesn't address SO_2 throughout the year, NO_x during non-ozone months or the applicability to plants in the western part of the state. Since Portland Cement Plants are not affected by CAIR, it doesn't seem appropriate to use the NO_x SIP Call to permanently exclude Portland Cement Plants from review under BART.
RESPONSE AND EXPLANATION OF CHANGE: It was not suggested that Portland Cement Plants are not eligible for BART review due to inclusion in the NOx SIP Call. Chapter 9 of the draft regional haze plan had only identified River Cement as a BART-eligible source due to its installation and operation date and size. This plant was issued a construction permit for a new kiln to replace the existing kilns at this location. Therefore, since the units do not exist that were BART eligible, then the subsequent review is moot. However, review of the other cement kilns in Missouri found that two others had units that were BART-eligible: Continental Cement in Hannibal and Holcim – Clarksville. Continental Cement has been awarded a construction permit for elimination of the existing kiln and the same logic applies to this plant as was applied to River Cement. The Holcim – Clarksville facility is BART-eligible and has screening and refined impacts over the visibility threshold. Currently, the Holcim facility has been asked to evaluate additional controls for SO_2 and NOx including cost of control. This information will be provided

to the department for a decision regarding potential control of the existing kiln at Holcim. Chapter 9 of the plan has been revised to include this discussion.

COMMENT #58: The EPA commented that the information in Appendix H of the Missouri Regional Haze Plan is either incomplete or inconsistent with the State's finding that the River Cement Plant is exempt from further BART review. The plan needs to be revised to address the data omissions and inconsistencies.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, the plan has been revised to address the BART data omissions and inconsistencies.

COMMENTS AND RESPONSES ON
THE 2009 REVISION TO THE MISSOURI REGIONAL HAZE PLAN

On June 25, 2009, the Missouri Air Conservation Commission held a public hearing concerning the 2009 revision to the Missouri Regional Haze Plan. The following is a summary of comments received and the Missouri Department of Natural Resources' corresponding responses. Any changes to the proposed 2009 revision to the plan are identified in the responses to the comments.

The Missouri Department of Natural Resources' Air Pollution Control Program recommends the commission adopt the plan action as amended. If the commission adopts this plan action, it will be the department's intention to submit this revised plan to the U.S. Environmental Protection Agency for inclusion in the Missouri State Implementation Plan.

SUMMARY OF COMMENTS: The department's Air Pollution Control Program received comments from the U.S. Environmental Protection Agency (EPA). Some comments were general in nature and others were specific to the interstate consultation, reasonable progress goal, long-term strategy, and best achievable retrofit technology (BART) sections. Some comments were also specific to the Holcim Cement-Clarksville BART determination and consent agreement.

COMMENT #1: The EPA recommended that the plan, including appendices, be reviewed to assure that it has up-to-date and correct language. As an example, the original plan was submitted to the EPA in March of 2008 but the plan language refers to it as the February 2008 submittal on plan pages 69, 70 and 71. Another example is repetitively listing the BASF facility twice in one sentence on page 58. In addition, the plan mentions documents as being incorporated into an appendix, but the information is not actually in the named appendix in all cases (e.g. Missouri's letter to Doe Run-Glover regarding operating permits).
RESPONSE AND EXPLANATION OF CHANGE: In response to these comments, the plan has been reviewed and updated to reflect the appropriate information.

COMMENT #2: The EPA requested that the reasonable progress, best available control technology equivalency to BART, potential to emit permit limitation and all Holcim BART consent agreement comments to be considered major issue comments.
RESPONSE AND EXPLANATION OF CHANGE: The plan has been reviewed considering the areas identified as major issues and changes were made when deemed necessary and feasible to address these areas.

COMMENT #3: The EPA noted that, since Missouri's Regional Haze Plan is relying on emission reductions from sources in other states in order to meet the 2018 Uniform Rate of Progress (URP) goal for Missouri's Class I areas, Missouri should clearly communicate this reliance to the other states.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, letters will be sent to the states on which Missouri is relying for emission reductions to meet the URP. The letter will reiterate what was concluded during the consultation conference calls regarding Missouri's reliance on other states' emission reductions to meet the URP goal.

COMMENT #4: The EPA requested additional explanation of how the four statutory factors were considered in arriving at the Reasonable Progress Goal for both Missouri Class I areas.
RESPONSE AND EXPLANATION OF CHANGE: To address this comment, section 10 of the plan was rewritten to provide more explanation of the how Missouri achieved the four factor analysis requirement.

COMMENT #5: The EPA requested that section 11.4 of the long term strategy chapter have a reference added to Table 10.1 in order to link it to the reasonable further progress chapter.
RESPONSE AND EXPLANATION OF CHANGE: As suggested, a reference to Table 10.1 was added to section 11.4.

COMMENT #6: The EPA commented that section 11.4.2 should be revised to only list those programs that Missouri is relying on for long term strategy.
RESPONSE AND EXPLANATION OF CHANGE: Only the programs listed in section 11.4.1. are relied upon for Missouri's long term strategy as stated at the beginning of section 11.4.2. As stated in section 11.4.2, the programs listed in section 11.4.2. are additional control strategies not included in the modeling demonstration that may be considered during the five-year review. These programs are retained in section 11.4.2. for future reference. As a result of this comment, additional explanatory language has been added to section 11.4 for additional clarification.

COMMENT #7: The EPA commented that Appendix I of the plan should be revised to provide consistency in the type of information provided.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, Appendix I has been revised so that information provided is presented in a consistent format.

COMMENT #8: The EPA commented that the potential to emit (PTE) limits referenced in this appendix as reasons for exempting sources from BART should be included in the plan in a permanent and enforceable manner.
RESPONSE AND EXPLANATION OF CHANGE: The limits referenced in this comment were for charcoal kiln facilities that were developed after the kilns were required to comply with 10 CSR 10-6.330, Restriction of Emissions from Batch-Type Charcoal Kilns. This rule limits each kiln control system to emission limits of 1.5 pounds per hour of particulate matter and 0.24 pounds per hour of volatile organic compounds; which translates to less than 10 tons per year for both pollutants. The limits are permanent and enforceable because they are in this rule which is part of the Missouri State Implementation Plan (SIP) and, therefore, federally enforceable. The control systems required by implementation of this rule have resulted in dramatically reduced emissions of all air pollutants from the charcoal kiln industry in Missouri. These reductions have have also resulted in many of the kiln facilities to be classified as Basic operating permit sources instead of Part 70 (major) sources. Including these permits in the SIP will not bring additional enforceability to these facilities due to the ongoing requirements contained in the charcoal kiln rule. Therefore, reference to these permits has been removed from Appendix I.

COMMENT #9: The EPA commented that Appendix J is missing a copy of the Doe Run-Glover facility termination letter that is mentioned in the Appendix C responses to comments.
RESPONSE AND EXPLANATION OF CHANGE: As a result of this comment, a copy of the Doe Run-Glover facility termination letter has been added to Appendix J.

COMMENT #10: The EPA commented that some form of technical detail should be provided regarding the Missouri's determination in Section 9.3 that BACT at Doe Run-Buick is equal to or better than BART. Also, using this determination in the plan requires that the permit must be amended to specify and reference the origin of an authority for the emission unit as cited in 40 CFR 70.6(a)(1)(ii).
RESPONSE AND EXPLANATION OF CHANGE: In response to this comment, Section 9.3 has been revised to address the finding for Doe Run-Buick's BART-eligible unit. Specifically, more documentation was provided to establish the BART finding for this unit.

COMMENT #11: The EPA commented that the explanation of how Missouri performed a more robust screening of sources subject to BART should describe how the screening criteria was applied.
RESPONSE: The approach outlined in the plan does not rely on a particular number of impact days that the State found significant enough to require further analysis at a particular Class I area. The refined screening approach used is consistent with other modeling outcomes that evaluate only a particular set of receptors when these receptors are clearly higher and provide the most conservative outcome for the given emissions set. The methodology utilized to perform the refined screening approach only removed the Hercules, Upper Buffalo, and Mammoth Cave Class I areas from consideration for the Noranda source. This was done because the very nearby Mingo Class I area was obviously impacted the most of any of these areas by the Noranda BART-eligible sources. The remaining sources that underwent refined screening were evaluated for the Mingo, Hercules, and Upper Buffalo Class I areas except the sensitivity analyses conducted for Doe Run Buick at Mingo. This refined screening approach was determined primarily based on distance from the relevant Class I areas to each source. No change was made to the plan as a result of this comment.

COMMENT #12: The EPA commented that additional clarifying documentation should be provided describing how Missouri established both the NOx and SO_2 BART limits for Holcim.
RESPONSE: In the comment, EPA asserts that the NOx control efficiencies used by the department are questionable. The comment does not provide a true and accurate representation of the BART finding for NOx as only mid-kiln firing and selective non-catalytic reduction (SNCR) are mentioned. As discussed in the plan, the department found that mid-kiln firing of tires at a 12 percent total fuel rate along with the existing low-NOx burners and cement kiln dust insufflation represent BART. The department also found that the effective use of SNCR on this long-wet kiln had significant uncertainty. This provided further evidence that established BART as mid-kiln firing of tires with a 20 percent reduction in NOx emissions.

EPA claims that the use of wet lime scrubbing at the facility was cost effective and available for the facility and implies that the department should have selected this control as BART for SO_2. In the plan, the department clearly outlines its basis for the removal of scrubbing technology as BART under Section 9.3.8, "The department found the overall net cost per ton of cement produced (~$15/20) was excessive and would have seriously compromised the Clarksville kiln's ability to compete in the cement production market." On page 39130 of the Final Rule for Regional Haze Regulations and Guidelines for BART Determinations published on July 6, 2005; EPA states, "…we recognize there may be unusual circumstances that justify taking into

consideration the conditions of the plant and the economic effects of requiring the use of a given control technology. These effects would include effects on product prices, the market share, and profitability of the source. We did not intend, for example, that the most stringent control alternative must always be selected in that level would cause a plant to shut down…". The statement from the rule characterizes the exact approach used by the department in this instance. Further, the current operational shutdown at the facility supports the use of fuel switching as SO_2 BART (27 percent reduction) at $3/ton cement produced instead of wet scrubbing at nearly $20/ton cement produced. No changes were made to the plan as a result of this comment.

COMMENT #13: The EPA noted that the 30-day rolling average language in the Holcim Cement-Clarksville consent agreement and the plan language are not consistent.
RESPONSE: The plan states that the calculation of these averages will include all hours when the kiln is not operating and those emissions for both pollutants will be entered as zero pounds. The agreement specifies conditions where the kiln is not operating and continuous emission monitoring data is not required to be collected (paragraph 20 of the agreement). This condition was implemented to allow shutdown of the monitoring equipment when the kiln is not operating for an extended period of time. It follows logically that if the kiln is not operating and is sufficiently cooled there will be no emissions of NOx or SO_2. In paragraph 22 of the agreement, Holcim is required to, "…record the hourly CEM data or data supporting lack of kiln operation to demonstrate compliance with the [emission] limits…". The intention of this statement is to allow the use of non-operational, zero emission data as part of the 30-day rolling averages for compliance with the SO_2 and NOx BART limits. Therefore, this is consistent with the language in the plan. No change to the plan was made as a result of this comment.

COMMENT #14: The EPA recommends that the agreement stay in place in the event of a shutdown, or, if the shutdown-termination language is retained, they recommend clarifying that a current or subsequent owner or operator may only utilize post-BART control emissions, if any, for the purposes of netting.
RESPONSE: In the event of a shutdown, Holcim or any subsequent owner will be subject to the agreement until a permanent cessation letter is sent to the department and the owner agrees to terminate all operating and construction permits for the site as outlined in Condition 26(G) of the consent agreement. Once these conditions are met, the source does not exist any longer and is permanently shutdown for the purpose of new source review. This would mean that any new kiln or start-up of the existing kiln would be required to undergo a major source permitting analysis due to the modification requirement of the construction permit regulation. Therefore, the new source would not be allowed to net out of a major review and would be subject to the requirements of best available control technology and visibility impairment analysis under the permitting regulations. The department would only allow post-BART control emissions for any netting of a new source at this site. No change was made to the plan as a result of this comment.

Appendix D

MACC Adoption Certification

Pursuant to 643.055 RSMo, the Missouri Air Conservation Commission has determined that this action is needed to have a U.S. Environmental Protection Agency approved State Implementation Plan.

The Missouri Regional Haze Plan is hereby adopted by the Missouri Air Conservation Commission this 7th day of February, 2008.

Mark C. Y________________, Chairman

Samy J Pard________________, Vice-Chairman

R. H. R.________________, Member

M. R. ________________, Member

________________, Member

Jack C Baker________________, Member

Kevin L. Rosenbohm________________, Member

Pursuant to 643.055 RSMo, the Missouri Air Conservation Commission has determined that this action is needed to have a U.S. Environmental Protection Agency approved State Implementation Plan.

The Missouri Regional Haze Plan is hereby adopted by the Missouri Air Conservation Commission this 29th day of July, 2009.

______________________________, Chairman

______________________________, Vice-Chairman

______________________________, Member

______________________________, Member

______________________________, Member

______________________________, Member

______________________________, Member

Appendix E

Central Class I Areas Consultation Plan

UNITED STATES
Central Class I Areas Consultation Plan

Scope

This consultation plan establishes the objectives, activities, and timelines to facilitate stakeholder input for meeting visibility requirements in the federal Regional Haze Rule for the following federal Class I areas:

- Hercules Glades Wilderness Area (Missouri)
- Mingo Wilderness Area (Missouri)
- Caney Creek Wilderness Area (Arkansas)
- Upper Buffalo Wilderness Area (Arkansas)

Background

The U.S. Environmental Protection Agency (EPA) promulgated the federal Regional Haze Rule on July 1, 1999. The federal Regional Haze Rule and the Clean Air Act require consultation between the states, tribes, and the Federal Land Managers (FLM) for managing Class I areas. Since regional haze often results from pollution emitted across broad regions, this multi-state planning effort will help in developing the most cost-effective controls for regional haze. This consultation process will provide a coordinated effort to achieve the federal visibility requirements and aid in developing regional strategies for meeting progress goals.

Plan Objectives

This consultation plan provides state air quality agencies with technical information including emission sources, modeling analysis, and source apportionment for Missouri and Arkansas' Class I areas. These state agencies are being given the opportunity to review this analysis and to participate in consultation to develop plans for meeting regional haze reduction requirements for these Class I areas. Regional Planning Organizations (RPOs), FLMs, and the EPA will also be contacted with the opportunity to participate in the development of actions and control strategies for meeting the federal Regional Haze Rule requirements. This plan includes:

1. Consultation Process
2. Technical Analyses
3. Agency Roles/Responsibilities

1. Consultation Process

Consultation discussion will focus on the primary reasonable progress issues including:

- Source area identifications
- State contribution apportionment
- Emission management strategies

The consultation process will be initiated in early 2007. Draft and final documents will be circulated via email to participating consulting agencies. After the initial kick-off, most consultation discussions will occur through conference calls. However, there will be some instances where a meeting may be desirable (e.g. unresolved issues, complex technical discussions, etc.).

The Missouri Department of Natural Resources' Air Pollution Control Program will work with the Arkansas Department of Environmental Quality and the Central States Regional Air Partnership (CENRAP) to set up conference calls/meetings for the consultation process. Technical documents will be provided for discussion before conference calls or meetings.

Draft and final documents will include supporting materials that describe analytical methods, assumptions, and conclusions that were relied upon in developing the documents. Comments on any draft documents will be requested from the consultation group members.

All consultation activities will be documented, including who participated in consultation discussions and on what dates, outcomes of consultation discussions (issues agreed, disagreed, resolutions) and justification for long term strategy. Each contributing state will be requested to share documentation confirming implementation of emission controls being relied on to meet regional haze Uniform Reasonable Progress (URP) goals.

Documents and consultation logs will be posted on the Missouri Department of Natural Resources' Air Pollution Control Program website for public viewing. All conference call/meeting minutes will also be posted on the agency website. When new documents are posted on the website, the Missouri Department of Natural Resources' Air Pollution Control Program will email all consultation participants to inform them that new information has been posted.

MDNR/ADEQ will work with the FLMs and EPA for consultation through conference calls/meeting. This will include an opportunity for consultation with FLMs in person and at least 60 days prior to holding any public hearing on a state implementation plan as required by federal rule.

Action Items

Participate in kick-off
Comment on the draft consultation plan

Confirm emissions inventory and planned control activities
Develop/share individual state timelines for control implementation
Develop/share control progress
Other actions as needed

Reconciliation of Unresolved Issues

If a contributing state/tribe cannot agree with the lead agency establishing the reasonable progress goal, then certain actions will be taken to resolve the disagreement. These actions are as follows:

- Discuss position and supporting documentation
- If still unresolved, elevate to necessary decision makers
- If still unresolved, document disagreement by describing issue(s) in a letter to the EPA, including regional offices and the Office of Air Quality Planning and Standards

All issues must be addressed and incorporated into the long-term strategy. These outreach efforts will also be documented in the state implementation plan.

Contact Information

Contact information is provided in Attachment A.

Continued Consultation

Consultation between the States and the FLMs will continue as the federal Regional Haze program progresses. The consultation will continue in a similar manner via participation in an RPO. This effort will include development and review of SIP revisions and 5-year progress reports. It will also provide for consideration of any other programs that are implemented and have the potential to contribute to impairment of visibility in Class I areas.

Consultation Timeline

Below, in Table 1, is the consultation process timeline that will be used to achieve milestones for consultation on the federal Regional Haze program.

2. Technical Analyses

In assisting the states/tribes in developing regional haze control strategies for Class I areas within CENRAP states and tribes, CENRAP has contracted Environ/Alpine to conduct the modeling and other technical analyses. Alpine assembled available information that was useful in quantifying the reduction in individual fine particulate aerosol species concentrations needed to

satisfy the URP goals. Pertinent “attribution of haze” documents were evaluated. These documents include CENRAP Comprehensive Air Quality Model with extensions (CAMx)/Community Multiscale Air Quality (CMAQ) modeling system visibility modeling results, fine particulate modeling results for the central US, and other technical reports, papers, and analyses bearing directly on the quantification of emissions-source/visibility-receptor impacts at the ten CENRAP Class I and twelve adjoining areas.

Current Regional Haze modeling continues to indicate visibility shortfalls to reaching the necessary URP goals for deciview increments for some of the Central Class I areas in CENRAP. A deciview is a haze index used to quantify incremental changes in visibility perception, where higher deciview values indicate greater levels of visibility impairment. In some of the areas,

Table 1: Consultation Process Timeline

2006 Fall	2006 Winter	2007 Early Spring	2007 Spring	2007 Late Spring	2007 Summer
Develop Baseline and URP Goals	Develop a Consultation Plan	Initiate Collaboration with States	Develop Long Term Strategy (LTS)	Negotiate Changes to LTS	Document Consultation
Back trajectory & Factor analysis	Identify issues for discussion	Consultation log	Follow consultation plan	Emission reduction requirements/ strategies	Who met and when (FLM, RPO, EPA) and discussion
Identify probable area of influence	Review baseline, URP goals, and emissions reduction targets	Discuss URP Goals & contributions assessment	Discuss emissions reduction strategies	Emission budget discrepancies	Consultation outcome Issues agreed, disagreed, resolutions
Apportion state contributions	Develop Action items	Follow consultation plan	Consult with FLM & EPA	Tribal Impacts	Justification of LTS
Develop initial emission cuts to meet 2018 URP Goals	Issues for FLM & EPA input	Consult with FLM & EPA (thru RPO?)	Note areas of irreconcilable disagreement	Additional control strategies	
	Timetable for resolution	Evaluate and identify sources upwind (BART, non-BART, CAMR, other)			

URP goals are expected to be met based on modeling results, but consultation may be necessary to ensure that the emission reductions used in the modeling are actually planned to occur.

Individual Class I Area Characteristics

The Central Class I areas each have individual characteristics. Individual examination of each area elicits a greater understanding of how the Regional Haze problem affects each, and what aspects are of greatest significance.

Hercules Glades

Situated in extreme southwest Missouri, Taney County, Hercules Glades is managed by the United States Department of Agriculture (USDA) Forest Service. The area is 12,315 acres and in some of the most rugged hills of the Missouri Ozarks. The closest urban area is the Springfield/Branson metropolitan statistical area, 40 miles to the west/northwest.

Mingo National Wildlife Refuge

The Mingo National Wildlife Refuge is managed by the federal Fish and Wildlife Service. The Refuge is situated in the Mississippi Flyway. Only part of it is a Class I area (7,730 acres). Memphis to the south and St. Louis to the north are some of the largest urban areas nearby, although there are a few smaller population centers mostly to the east. Proximity to sources in the Ohio River Valley is a consideration.

Upper Buffalo National Area

The Upper Buffalo Class I area (2,200 acres) is managed by the National Park Service in conjunction with overseeing the Buffalo National River. This area in north central Arkansas is south of Springfield, Missouri and east of Fayetteville and Fort Smith. It is an area of low mountains and largely forested, with bisecting streams.

Caney Creek Class I Area

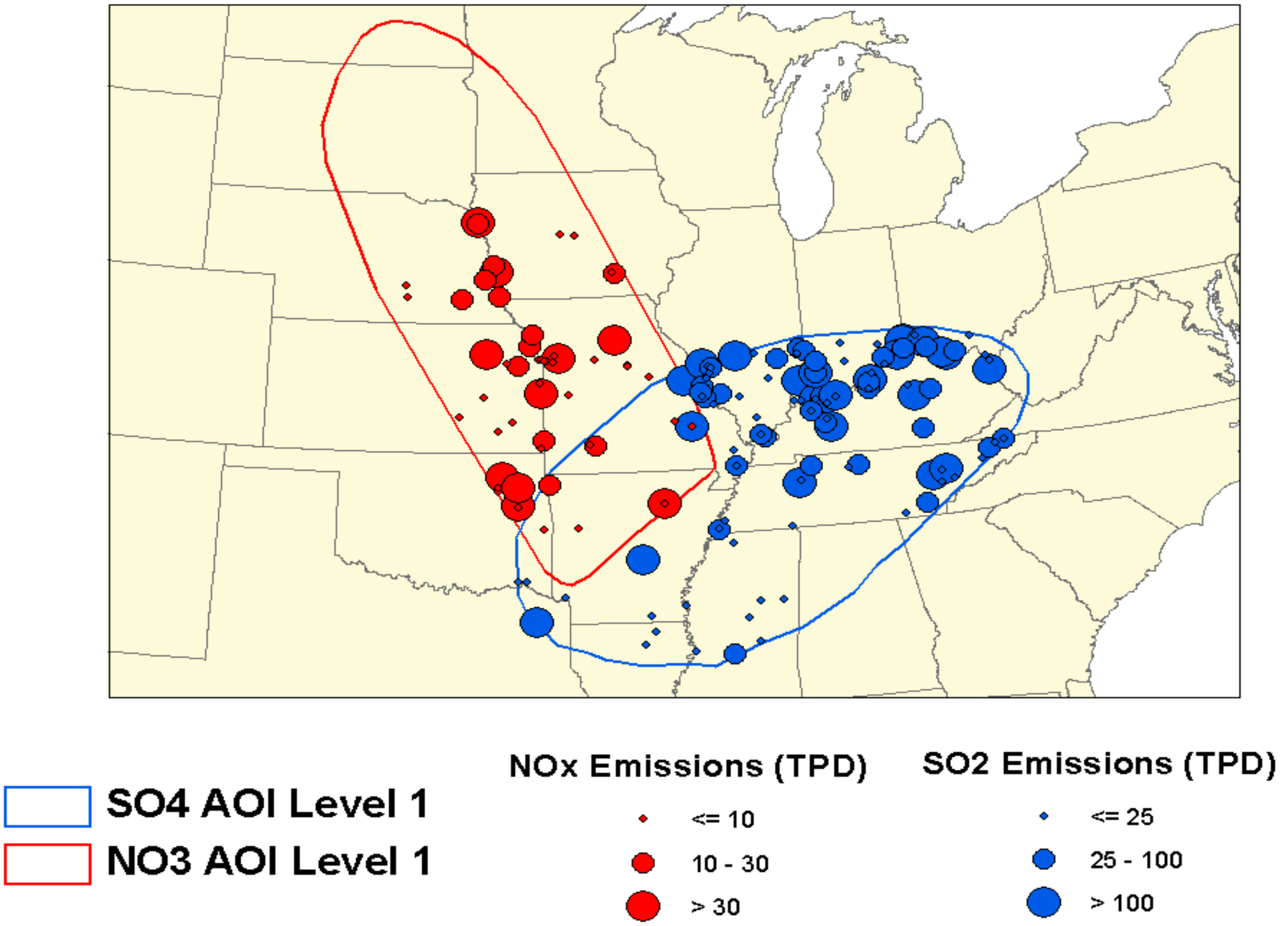
Caney Creek is a 14,460 acre area in the Oachita Mountains of west-southwest Arkansas, the tallest mountain range between the Appalachians and the Rockies. It is south of Fort Smith and west of Little Rock. The area is managed by the USDA Forest Service.

Identification of Source Areas (Areas of Influence)

Source areas must be determined in order to focus the consultation process. That is, locations of significant sources that are likely to affect each Class I area must be identified, and sources within those areas considered for control. Alpine, under its contract to CENRAP, identified Areas of Influence (AOIs), using a variety of data and analyses. In combining the AOI information with emission inventories for the areas, we are able to identify a number of large sources which are of interest.

Figure 1 indicates two Level I AOI's for the Central Class I Areas, one for nitrate (NO_3), and a second grouped collectively for sulfate (SO_4), elemental carbon (EC), organic carbon (OC), coarse mass, and fine soil, along with indicators for sources contained in those areas.

Figure 1 – Alpine AOI's for Central Class I Areas



Attachment B identifies total emissions reductions necessary for level 1 AOI's based on control of sulfate and nitrate species across all four Class I areas. Attachment B also includes inventory tables developed listing possible sources where emissions can be reduced in each state to meet the goals. These emissions provide an overall frame of reference for any reductions in those species.

Contributing States

Source apportionments have recently been conducted on modeling (using Particulate Matter Source Apportionment Technology; PSAT, a source apportionment tool implemented in CAMx) and monitoring data (using positive matrix factorization; PMF/Trajectories) for all four Class I Areas. Attachment C provides both model and monitoring data source apportionment results. Attachment D provides a list of results for Q/D (emissions/distance) used as a third analysis measure. All these, along with Alpine sulfate AOI's described above have been analyzed in tables in attachment E to determine a list of contributing states for each Class I area.

Methodology

Table 2 and 3 (for illustration) below indicate the overall (average) significant contributing states to decreased visibility due to sulfate and nitrate precursor emissions at the Mingo Site. A decision on whether a given state was a contributor was based on the combined analysis results of the four approaches, i.e., PMF/Trajectories, AOI, PSAT, and Q/D. If a state is found to be a major contributor in at least 3 of the 4 approaches, it is believed that inclusion of this state is appropriate. All states in red/bold in the Average row are determined to have sources that are significant contributors to decreased visibility.

Specific to each analysis type, inclusion of a state under the PMF/Trajectories approach depended on the level of probability that an air mass originated from the state during the days of high contribution by sulfate or nitrate sources where the emission impact potential was significant. A state with a high potential of emission impact would be considered a significant contributor.

States were included in the AOI listing if they were part of the level 1 group as determined by Alpine Geophysics. This AOI was based primarily on residence time of air masses, along with evaluation of source emissions of, in this case, nitrate and sulfate.

PSAT analysis was determined based on the 2018 Modeled sulfate and nitrate contribution to average extinction for the 20% worst days. Any state with the contribution of 2.0 deciview or higher was identified as a candidate.

Lastly, Q/D was determined by dividing total SO_2 and NO2 precursor emissions for the state by distance from a state geographic centroid. If totals were less than 200, the state was not indicated as a significant contributor under Q/D.

Table 2 – Contributing States for the Mingo Wildlife Refuge Area Sulfate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	**WI**	WI
IA	IA	IA	IA	IA
NE	NE	NE	NE	NE
KS	KS	KS	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	**IL**	**IL**	**IL**
IN	**IN**	**IN**	**IN**	**IN**
OH	**OH**	**OH**	**OH**	**OH**
MI	MI	MI	**MI**	MI
KY	**KY**	**KY**	**KY**	**KY**
TN	**TN**	**TN**	**TN**	**TN**
AR	AR	**AR**	AR	AR
OK	OK	**OK**	OK	OK
TX	**TX**	**TX**	TX	**TX**
LA	LA	LA	LA	LA
MS	MS	**MS**	MS	MS
AL	AL	AL	AL	AL

*Informational

State in Red/Bold = Major Contributing States

Table 3 – Contributing States for the Mingo Wildlife Refuge Area Nitrate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	**IA**	IA	IA
NE	NE	**NE**	NE	NE
KS	KS	**KS**	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	IL	**IL**	**IL**
IN	**IN**	IN	IN	IN
OH	OH	OH	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	KY	KY	KY
TN	**TN**	TN	TN	TN
AR	**AR**	**AR**	AR	**AR**
OK	OK	**OK**	OK	OK
TX	TX	TX	TX	TX
LA	**LA**	LA	LA	LA
MS	**MS**	MS	MS	MS
AL	**AL**	AL	AL	AL

*Informational

State in Red/Bold = Major Contributing States

State list

Following are lists of the contributing states for Central Class 1 Areas in Missouri and Arkansas based on the analysis described above;

Hercules Glades

Missouri, Illinois, Indiana, Kentucky, Tennessee, Arkansas, and Texas

Mingo National Wildlife Refuge

Missouri, Illinois, Indiana, Ohio, Kentucky, Tennessee, Arkansas, and Texas

Upper Buffalo National Area

Missouri, Illinois, Indiana, Ohio, Kentucky, Tennessee, Arkansas, Oklahoma, and Texas

Caney Creek Class I Area

Missouri, Illinois, Indiana, Kentucky, Tennessee, Arkansas, Oklahoma, and Texas

3. Agency Roles/Responsibilities

The agencies listed in this section are being requested to participate in the consultation process for the federal Regional Haze Rule. Part of this process is the opportunity for States to review the foregoing analysis and the attachments to this plan and provide feedback, and to consider necessary controls available that will assist in meeting the goals prescribed by the regional haze requirements. Federally enforceable measures to control emissions and thereby achieve the URP will be our ultimate measure of success.

Proposed Roles and/or responsibilities are as follows:

- Missouri Department of Natural Resources' Air Pollution Control Program
  - Co-lead consultation effort for Central Class I areas (Missouri and Arkansas) (i.e. schedule conference calls/meetings, etc. and lead discussions)
  - Evaluate regional haze modeling for reasonable progress
  - Evaluate emissions data
  - Identify air pollutants for Missouri Class I areas
  - Evaluate back trajectory analysis
  - Evaluate probable source area identifications
  - Evaluate state contribution apportionment
  - Share upwind source information (including Best Achievable Retrofit Technology (BART), non-BART, Clean Air Mercury Rule (CAMR), etc.)

- Determine emission management strategies necessary to meet federal Regional Haze Rule requirements
- Provide detailed description of methods used in the SIP to calculate baseline, natural condition, and uniform rate (including supporting documentation for any methods that are not previously established, documented, or supported)
- Document consultation process

- Arkansas Department of Environmental Quality
  - Co-lead consultation effort for Central Class I areas (Missouri and Arkansas) (i.e. schedule conference calls/meetings, etc. and lead discussions)
  - Evaluate regional haze modeling for reasonable progress
  - Evaluate emissions data
  - Identify air pollutants for Arkansas Class I areas
  - Evaluate back trajectory analysis
  - Evaluate probable source area identifications
  - Evaluate state contribution apportionment
  - Share upwind source information (including BART, non-BART, CAMR, etc.)
  - Determine emission management strategies necessary to meet federal Regional Haze Rule requirements
  - Document consultation process
- Illinois Environmental Protection Agency, Ohio Environmental Protection Agency, Indiana Department of Environmental Management, Kentucky Department of Environmental Protection, Tennessee Department of Environment and Conservation, Oklahoma Division of Environmental Quality, Iowa Department of Natural Resources, Kansas Department of Health and Environment, Texas Commission on Environmental Quality, and Louisiana Department of Environmental Quality
- United Keetoowah Band of Cherokee Indians in Oklahoma, Eastern Shawnee Tribe of Oklahoma, Alabama Coushatta Tribe of Texas, Sac and Fox Nation of Missouri, Kickapoo Tribe in Kansas, Potawatomi Nation
  - Participate in consultation effort for Central Class I areas (Missouri and Arkansas) (i.e. conference calls/meetings, discussions, etc.)
  - Provide feedback on reasonable progress analysis (modeling, emissions data, back trajectory, source area identifications, state contribution apportionment)
  - Share upwind source information (including BART, non-BART, CAMR, etc.)
  - Determine emission management strategies necessary to meet federal Regional Haze Rule requirements
- EPA
  - Participate in consultation effort for Central Class I areas (Missouri and Arkansas) (i.e. conference calls/meetings, discussions, etc.)
  - Provide comments on approvability of consultation plan
  - Provide reconciliation on unresolved issues

- FLMs (US Fish and Wildlife Service, National Park Service and the US DA Forest Service)
  - Participate in consultation effort for Central Class I areas (Missouri and Arkansas) (i.e. conference calls/meetings, discussions, etc.)
  - Provide feedback on reasonable progress analysis (modeling, emissions data, back trajectory, source area identifications, state contribution apportionment)
  - Provide feedback on controls necessary to meet federal Regional Haze Rule requirements
- Regional Planning Organization
  - Participate in consultation effort for Central Class I areas (Missouri and Arkansas) (i.e. conference calls/meetings, discussions, etc.)
  - Provide updates and summaries of any work in process (e.g. development of baselines and natural conditions, inventories, modeling efforts and contribution assessments)

Attachment A

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Attachment B

Table 1. EMISSION REDUCTIONS NEEDED TO MEET THE 2018 RPG IN CENTRAL CLASS I AREAS

			Level 1 AOI		Emissions Reductions Needed (Tons)			
			sulfate/SO2	nitrate/NOx	One pollutant control		Proportionate Controls	
Class I Area	ST	Name	DV	DV	Sulfate	Nitrate	Sulfate	Nitrate
Big Bend Nat'l	TX	BIBE	-0.004	-0.002	133,000	265,000	82,000	10,000
Boundary Wate	MN	BWCA	-0.006	-0.004	91,000	136,000	39,000	51,000
Breton Island	LA	BRET	-0.002	-0.002	96,000	96,000	70,000	9,000
Caney Creek	AR	CACR	-0.002	-0.002	18,000	12,000	11,000	2,000
Guadalupe Mo	TX	GUMO	-0.004	-0.01	147,000	59,000	58,000	7,000
Hercules-Glade	MO	HEGL	-0.002	-0.002	200,000	127,000	113,000	23,000
Mingo	MO	MING	-0.002	-0.002	235,000	149,000	118,000	33,000
Upper Buffalo	AR	UPBU	-0.002	-0.002	112,000	71,000	65,000	11,000
Voyageurs	MN	VOYA2	-0.006	-0.004	43,000	65,000	11,000	24,000
Wichita Mounta	OK	WIMO	-0.001	-0.005	368,000	74,000	158,000	22,000

Table 2. SO4 Inventory Tables For Level I AOI Contributing States

(tons/summer day)

PLANT ID	STATE	PLANT NAME	SIC	SIC DESCRIPTION	SO2_TPD	NOX_TPD
4800310	Texas	FULLERTON GAS PLANT	1321	NATURAL GAS LIQUIDS	6.50599	0.00000
484691	Texas	EI DU PONT DE NEMOURS	2869	INDUSTRIAL ORGANIC CHEMICALS,NEC	0.00000	10.33888
470850011	Tennessee	TVA JOHNSONVILLE FOSSIL PLANT	4911	ELECTRIC SERVICES	300.62585	68.40613
470730007	Tennessee	TVA JOHN SEVIER FOSSIL PLANT	4911	ELECTRIC SERVICES	98.99900	28.54810
471650025	Tennessee	TVA GALLATIN FOSSIL PLANT	4911	ELECTRIC SERVICES	94.72930	33.50815
471630003	Tennessee	EASTMAN CHEMICAL COMPANY	2869	INDUSTRIAL ORGANIC CHEMICALS,NEC	66.36360	35.39940
4715700528	Tennessee	ALLEN FOSSIL PLANT	4911	ELECTRIC SERVICES	52.32034	40.03523
471610011	Tennessee	TVA CUMBERLAND FOSSIL PLANT	4911	ELECTRIC SERVICES	45.79200	137.25500
471070012	Tennessee	BOWATER NEWSPRINT & DIRECTORY - CALHOUN	2611	PULP MILLS	25.40730	17.57016
470374703700002	Tennessee	E I DUPONT DE NEMOURS & CO INC	2869	INDUSTRIAL ORGANIC CHEMICALS,NEC	18.74385	0.00000
470630197	Tennessee	LIBERTY FIBERS CORPORATION	2823	CELLULOSIC MAN-MADE FIBERS	14.73094	5.63459
470090008	Tennessee	ALUMINUM COMPANY OF AMERICA - SOUTH PLAN	3334	PRIMARY ALUMINUM	11.24313	0.00000
471050081	Tennessee	A.E. STALEY MANUFACTURING COMPANY	2046	WET CORN MILLING	9.40970	5.27573
4715700475	Tennessee	LUCITE INTERNATIONAL INC.	2819	INDUSTRIAL INORGANIC CHEMICALS	9.39796	0.00000
470710002	Tennessee	PACKAGING CORPORATION OF AMERICA	2631	PAPERBOARD MILLS	8.02611	7.42406
4715700045	Tennessee	CARGILL CORN MILLING	2046	WET CORN MILLING	7.53864	0.00000
470653070	Tennessee	SIGNAL MOUNTAIN CEMENT CO.	3241	CEMENT, HYDRAULIC	7.45430	14.19100
470010020	Tennessee	U.S. DEPARTMENT OF ENERGY Y-12 PLANT	3499	FABRICATED METAL PRODUCTS, NEC	6.45058	0.00000
470850010	Tennessee	INLAND PAPERBOARD & PACKAGING INC.	2679	CONVERTED PAPER PRODUCTS, NEC	6.05144	0.00000
471390004	Tennessee	INTERTRADE HOLDINGS INC.	2819	INDUSTRIAL INORGANIC CHEMICALS	5.12497	0.00000
470730026	Tennessee	AFG INDUSTRIES - GREENLAND PLANT	3211	FLAT GLASS	0.00000	5.53680
471630007	Tennessee	SEAMAN CORPORATION	2295	COATED FABRICS, NOT RUBBERIZED	0.00000	13.59050
40097799	Oklahoma	GRAND RIVER DAM AUTH	4911	ELECTRIC SERVICES	43.79260	38.29550
400891733	Oklahoma	WEYERHAEUSER - VALLIANT	2631	PAPERBOARD MILLS	6.85920	8.73920
40031211	Oklahoma	PUBLIC SVC CO OF OK	4911	ELECTRIC SERVICES	0.00000	8.07136
390310616000000	Ohio	CONESVILLE POWER PLANT	4911	ELECTRIC SERVICES	415.59965	80.90937
390251413100008	Ohio	CINERGY CG&E WC BECKJORD STATION	4931	ELEC & OTHER SERVICES COMBINED	189.03354	48.73621
390010701000060	Ohio	DP&L KILLEN GENERATING STATION	4911	ELECTRIC SERVICES	62.09508	24.70857
391390370020002	Ohio	SHELBY MUNICIPAL LIGHT PLANT	4911	ELECTRIC SERVICES	10.97583	0.00000
390690335010105	Ohio	CAMPBELL SOUP COMPANY	2032	CANNED SPECIALTIES	9.19665	0.00000
390030302020012	Ohio	PREMCOR REFINING GROUP	2911	PETROLEUM REFINING	8.63332	5.82966
390611431390903	Ohio	THE PROCTER AND GAMBLE CO.	2841	SOAP AND OTHER DETERGENTS	5.06495	0.00000
3100100042	Nebraska	Whelan Energy Center	4911	ELECTRIC SERVICES	6.04710	0.00000
290990016	Missouri	AMERENUE-RUSH ISLAND PLANT	4911	ELECTRIC SERVICES	61.58000	10.63480
291890010	Missouri	AMERENUE-MERAMEC PLANT	4911	ELECTRIC SERVICES	42.16141	22.98658
291430004	Missouri	ASSOCIATED ELECTRIC COOPERATIVE INC-NEW	4911	ELECTRIC SERVICES	38.72200	98.94600
290990003	Missouri	DOE RUN COMPANY-HERCULANEUM SMELTER	3339	PRIMARY NONFERROUS METALS, NEC	38.52199	0.00000
290830001	Missouri	KANSAS CITY POWER & LIGHT CO-MONTROSE GE	4911	ELECTRIC SERVICES	24.74788	8.80744
290950021	Missouri	TRIGEN ENERGY CORPORATION-GRAND AVENUE S	4911	ELECTRIC SERVICES	23.22464	0.00000
290770005	Missouri	CITY UTILITIES OF SPRINGFIELD MISSOURI-J	4911	ELECTRIC SERVICES	18.58675	19.25697
295100003	Missouri	ANHEUSER-BUSCH INC-ST. LOUIS	2082	MALT BEVERAGES	17.82469	0.00000
291860001	Missouri	MISSISSIPPI LIME COMPANY-MISSISSIPPI LIM	3274	LIME	16.44205	7.57345
290770039	Missouri	CITY UTILITIES OF SPRINGFIELD MISSOURI-S	4911	ELECTRIC SERVICES	11.91107	7.09601
290930009	Missouri	DOE RUN COMPANY-BUICK SMELTER	3339	PRIMARY NONFERROUS METALS, NEC	11.47904	0.00000
291430008	Missouri	NORANDA ALUMINUM INC-NORANDA ALUMINUM IN	3334	PRIMARY ALUMINUM	11.21103	0.00000
291510002	Missouri	CENTRAL ELECTRIC POWER COOPERATIVE-CHAMO	4911	ELECTRIC SERVICES	10.40103	7.95615
291950010	Missouri	MARSHALL MUNICIPAL UTILITIES-MARSHALL MU	4911	ELECTRIC SERVICES	8.36287	0.00000
290190002	Missouri	COLUMBIA MUNICIPAL POWER PLANT-COLUMBIA	4911	ELECTRIC SERVICES	5.23420	0.00000
281212812100036	Mississippi	PURSUE ENERGY CORPORATION THOMASVILLE G	2819	INDUSTRIAL INORGANIC CHEMICALS	33.21600	0.00000
280592805900058	Mississippi	CHEVRON PRODUCTS COMPANY PASCAGOULA REF	2911	PETROLEUM REFINING	15.54386	11.21247
280192801900011	Mississippi	CHOCTAW GENERATION LLP RED HILLS GENERA	4911	ELECTRIC SERVICES	12.12464	0.00000
280232802300031	Mississippi	MAGNOLIA RESOURCES INC PACHUTA HARMONY	1321	NATURAL GAS LIQUIDS	6.16490	0.00000
281372813700025	Mississippi	TRUNKLINE GAS COMPANY INDEPENDENCE COMP	4922	NATURAL GAS TRANSMISSION	0.00000	5.90938
281492814900027	Mississippi	ENTERGY MISSISSIPPI INCBAXTER WILSON PL	4911	ELECTRIC SERVICES	0.00000	21.38220
281512815100048	Mississippi	ENTERGY MISSISSIPPI INC GERALD ANDRUS P	4911	ELECTRIC SERVICES	0.00000	16.13000
220750015	Louisiana	CONOCOPHILLIPS COALLIANCE REFINERY	2911	PETROLEUM REFINING	9.05244	6.99716
220050004	Louisiana	CF INDUSTRIES INC.DONALDSONVILLE NITRO	2873	NITROGENOUS FERTILIZERS	0.00000	9.40132
220710014	Louisiana	ENTERGY NOMICHOUD	4911	ELECTRIC SERVICES	0.00000	12.34510
211772117700006	Kentucky	TVA PARADISE STEAM PLANT	4911	ELECTRIC SERVICES	231.14800	129.45000
210912109100003	Kentucky	WESTERN KY ENERGY CORP COLEMAN STATION	4911	ELECTRIC SERVICES	136.73500	18.52110
210412104100010	Kentucky	KENTUCKY UTILITIES CO GHENT GENERATING S	4911	ELECTRIC SERVICES	128.63700	53.32750
211672116700001	Kentucky	KENTUCKY UTILITIES CO BROWN FACILITY	4911	ELECTRIC SERVICES	126.12264	22.49524
211272112700003	Kentucky	KENTUCKY POWER CO BIG SANDY PLANT	4911	ELECTRIC SERVICES	116.35500	40.56600
211612116100009	Kentucky	EAST KY POWER COOP SPURLOCK ST. MAYSVILL	4911	ELECTRIC SERVICES	114.74800	22.85900
211452114500006	Kentucky	TVA-ENVIRONMENTAL AFFAIRS SHAWNEE PLANT	4911	ELECTRIC SERVICES	93.72150	52.22210
211110127	Kentucky	LOU GAS & ELEC MILL CREEK	4911	ELECTRIC SERVICES	62.90400	40.62600
211992119900005	Kentucky	EAST KY POWER COOP JOHN SHERMAN COOPER P	4911	ELECTRIC SERVICES	60.98100	12.39360
211110126	Kentucky	LOU GAS & ELEC CANE RUN	4911	ELECTRIC SERVICES	41.51100	17.38838
211772117700001	Kentucky	KENTUCKY UTILITIES CO GREEN RIVER STATIO	4911	ELECTRIC SERVICES	36.53400	0.00000
212332123300001-B	Kentucky	WESTERN KY ENERGY CORP REID	4911	ELECTRIC SERVICES	26.99800	0.00000
210492104900003	Kentucky	EAST KY POWER COOP WILLIAM C DALE PLANT	4911	ELECTRIC SERVICES	25.84360	6.17140
211832118300069	Kentucky	WESTERN KY ENERGY CORP WILSON STATION	4911	ELECTRIC SERVICES	24.39500	22.78500
212232122300002	Kentucky	LOUISVILLE GAS & ELECTRIC TRIMBLE CO GEN	4911	ELECTRIC SERVICES	23.13700	14.14800
210592105900027	Kentucky	OWENSBORO MUNICIPAL UTIL ELMER SMITH STA	4911	ELECTRIC SERVICES	19.66360	25.20099

Table 3. NO3 Inventory Tables For Level I AOI Contributing States

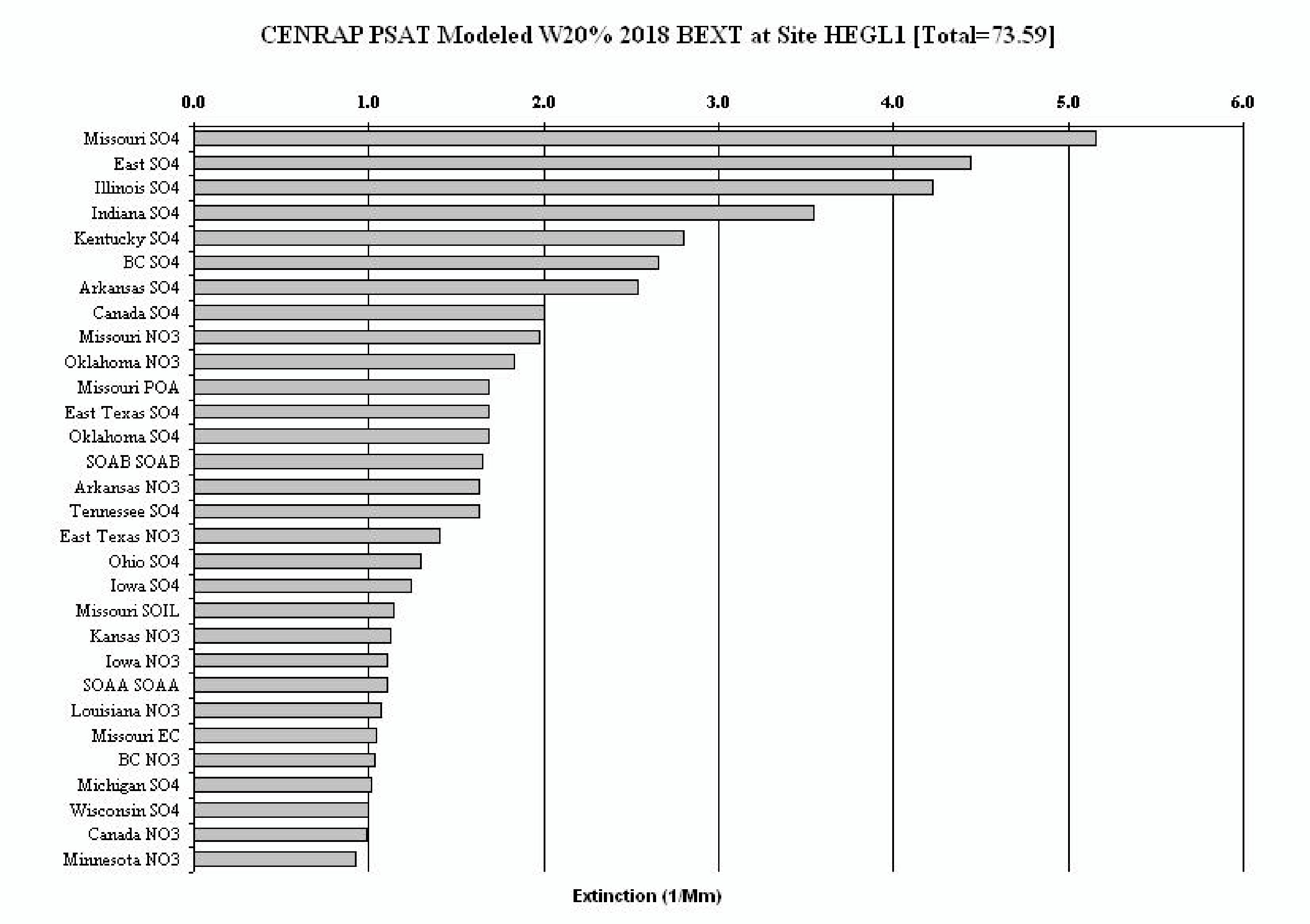
(tons/summer day)

Plant ID	STATE	PLANT NAME	SIC	SIC DESCRIPTION	NOX_TPD	SO2_TPD
40131212	Oklahoma	PUBLIC SVC CO OF OK	4911	ELECTRIC SERVICES	50.98726	100.50654
401011209	Oklahoma	OG&E	4911	ELECTRIC SERVICES	50.35082	78.30093
40097799	Oklahoma	GRAND RIVER DAM AUTH	4911	ELECTRIC SERVICES	38.29550	43.79260
40143639	Oklahoma	VISTEON TULSA FIELD PLT	3211	FLAT GLASS	6.83041	0.00000
40101643	Oklahoma	FORT JAMES OPERATING CO	2621	PAPER MILLS EXC BUILDING PAPER	5.45118	6.43248
40131166	Oklahoma	LAFARGE BDLG MATERIALS	3241	CEMENT, HYDRAULIC	5.36456	6.48181
4007911	Oklahoma	AES SHADY POINT LLC	4911	ELECTRIC SERVICES	0.00000	16.77580
311090005	Nebraska	NPPD Sheldon Station	4911	ELECTRIC SERVICES	22.06600	16.02900
3113100036	Nebraska	OPPD Nebraska City Station	4911	ELECTRIC SERVICES	19.00005	30.02221
310550002	Nebraska	Omaha Public Power District - North Omah	4911	ELECTRIC SERVICES	16.69760	32.90430
3102500002	Nebraska	Ash Grove Cement Co	3241	CEMENT, HYDRAULIC	10.15431	13.17575
3100100042	Nebraska	Whelan Energy Center	4911	ELECTRIC SERVICES	0.00000	6.04710
3107900606	Nebraska	Platte Generating Station	4911	ELECTRIC SERVICES	0.00000	6.27660
291750001	Missouri	ASSOCIATED ELECTRIC COOPERATIVE INC-THOM	4911	ELECTRIC SERVICES	38.53500	35.04050
290950031	Missouri	AQUILA INC-SIBLEY GENERATING STATION	4911	ELECTRIC SERVICES	32.55300	31.17500
290970001	Missouri	EMPIRE DISTRICT ELECTRIC CO-ASBURY PLANT	4911	ELECTRIC SERVICES	21.33100	15.26500
290770005	Missouri	CITY UTILITIES OF SPRINGFIELD MISSOURI-J	4911	ELECTRIC SERVICES	19.25697	18.58675
291650007	Missouri	KANSAS CITY POWER & LIGHT CO-IATAN GENER	4911	ELECTRIC SERVICES	18.34496	37.06906
290210004	Missouri	AQUILA INC-LAKE ROAD PLANT	4911	ELECTRIC SERVICES	12.39498	10.36408
290830001	Missouri	KANSAS CITY POWER & LIGHT CO-MONTROSE GE	4911	ELECTRIC SERVICES	8.80744	24.74788
291510002	Missouri	CENTRAL ELECTRIC POWER COOPERATIVE-CHAMO	4911	ELECTRIC SERVICES	7.95615	10.40103
290770039	Missouri	CITY UTILITIES OF SPRINGFIELD MISSOURI-S	4911	ELECTRIC SERVICES	7.09601	11.91107
290950022	Missouri	KANSAS CITY POWER & LIGHT CO-HAWTHORN ST	4911	ELECTRIC SERVICES	5.53993	8.89822
290190002	Missouri	COLUMBIA MUNICIPAL POWER PLANT-COLUMBIA	4911	ELECTRIC SERVICES	0.00000	5.23420
290190004	Missouri	UNIVERSITY OF MISSOURI - COLUMBIA-POWER	4911	ELECTRIC SERVICES	0.00000	34.08629
290470096	Missouri	INDEPENDENCE POWER AND LIGHT-MISSOURI CI	4911	ELECTRIC SERVICES	0.00000	16.42886
290930008	Missouri	DOE RUN COMPANY-GLOVER SMELTER	3339	PRIMARY NONFERROUS METALS, NEC	0.00000	128.82087
290930009	Missouri	DOE RUN COMPANY-BUICK SMELTER	3339	PRIMARY NONFERROUS METALS, NEC	0.00000	11.47904
290950021	Missouri	TRIGEN ENERGY CORPORATION-GRAND AVENUE S	4911	ELECTRIC SERVICES	0.00000	23.22464
290950050	Missouri	INDEPENDENCE POWER AND LIGHT-BLUE VALLEY	4911	ELECTRIC SERVICES	0.00000	16.31967
291950010	Missouri	MARSHALL MUNICIPAL UTILITIES-MARSHALL MU	4911	ELECTRIC SERVICES	0.00000	8.36287
201070005	Kansas	KANSAS CITY POWER & LIGHT CO.	4911	ELECTRIC SERVICES	107.52207	71.32573
201490001	Kansas	WESTAR ENERGY INC.	4911	ELECTRIC SERVICES	75.33946	167.18284
200450014	Kansas	WESTAR ENERGY INC.	4911	ELECTRIC SERVICES	16.77377	25.03380
202090008	Kansas	BOARD OF PUBLIC UTILITIES - NEARMAN	4911	ELECTRIC SERVICES	9.45550	20.95800
202090048	Kansas	BOARD OF PUBLIC UTILITIES - QUINDARO	4911	ELECTRIC SERVICES	9.00230	10.32060
201770030	Kansas	WESTAR ENERGY INC.	4911	ELECTRIC SERVICES	8.97410	19.17812
200150004	Kansas	FRONTIER EL DORADO REFINING COMPANY	2911	PETROLEUM REFINING	6.48527	0.00000
201110007	Kansas	PANHANDLE EASTERN PIPE LINE COMPANY	4922	NATURAL GAS TRANSMISSION	5.99508	0.00000
201330001	Kansas	ASH GROVE CEMENT COMPANY	3241	CEMENT, HYDRAULIC	5.81100	0.00000
202057022	Kansas	LAFARGE MIDWEST INC.	3241	CEMENT, HYDRAULIC	5.73203	6.35085
201210015	Kansas	PANHANDLE EASTERN PIPE LINE COMPANY	4922	NATURAL GAS TRANSMISSION	5.12310	0.00000
200210002	Kansas	EMPIRE DISTRICT ELECTRIC COMPANY (THE)	4911	ELECTRIC SERVICES	0.00000	9.32330
1915578-01-026	Iowa	MIDAMERICAN ENERGY CO. - COUNCIL BLUFFS	4911	ELECTRIC SERVICES	32.06380	49.21420
1919397-04-010	Iowa	MIDAMERICAN ENERGY CO. - GEORGE NEAL NOR	4911	ELECTRIC SERVICES	30.01136	59.63300
1919397-04-011	Iowa	MIDAMERICAN ENERGY CO. - GEORGE NEAL SOU	4911	ELECTRIC SERVICES	21.21000	40.52000
1917990-07-001	Iowa	IPL - OTTUMWA GENERATING STATION	4911	ELECTRIC SERVICES	19.83300	37.82200
1901508-03-004	Iowa	NORTHERN NATURAL GAS CO. - OGDEN COMPRES	4922	NATURAL GAS TRANSMISSION	5.17890	0.00000
1916985-01-007	Iowa	IOWA STATE UNIVERSITY ISU HEATING PLANT	8221	COLLEGES AND UNIVERSITIES, NEC	0.00000	5.64581
1917968-09-001	Iowa	CARGILL INC. - EDDYVILLE	2046	WET CORN MILLING	0.00000	6.08014
050630506300042	Arkansas	ENTERGY ARK-INDEPENDENCE	4911	ELECTRIC SERVICES	46.64000	72.93600
050070500700107	Arkansas	SWEPCO-FLINT CREEK POWER PLANT	4911	ELECTRIC SERVICES	15.50800	33.27100
050830508300088	Arkansas	CENTERPOINT ENERGY-DUNN COMPRESSOR	4922	NATURAL GAS TRANSMISSION	5.46066	0.00000
050630506300036	Arkansas	EASTMAN CHEMICAL COMPANY-ARK EASTMAN DIV	2869	INDUSTRIAL ORGANIC CHEMICALS,NEC	0.00000	17.27739

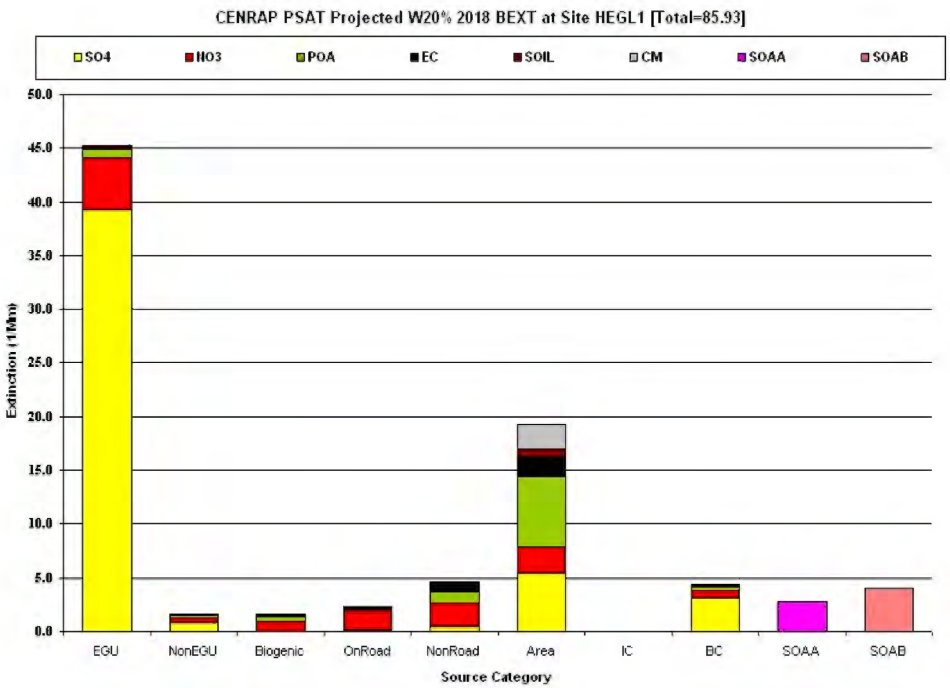
Attachment C – Source Apportionment Analysis

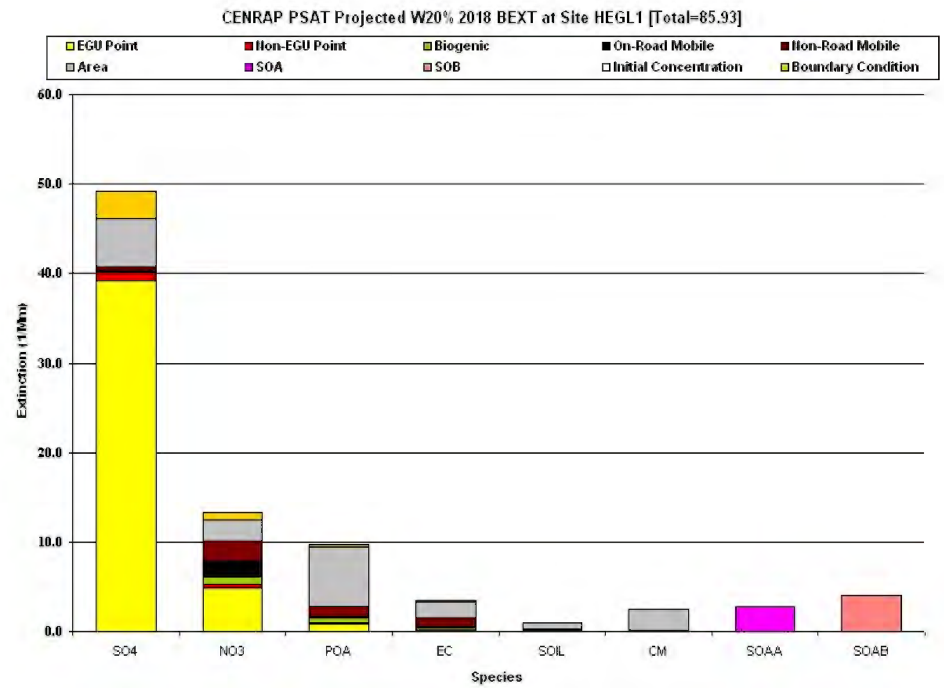
Source Apportionment for the Hercules Glades Class I Area

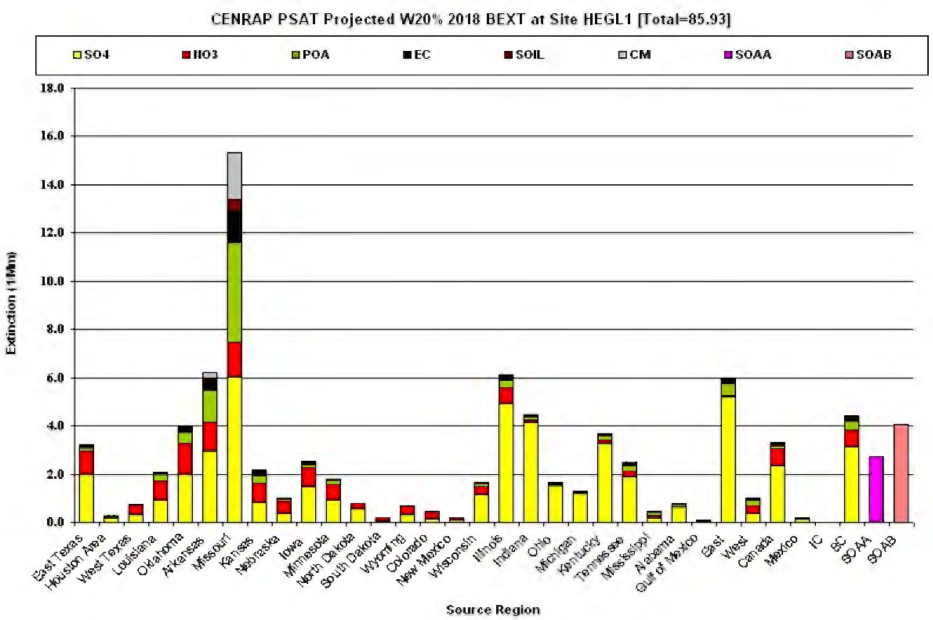
PSAT Model Source Apportionment

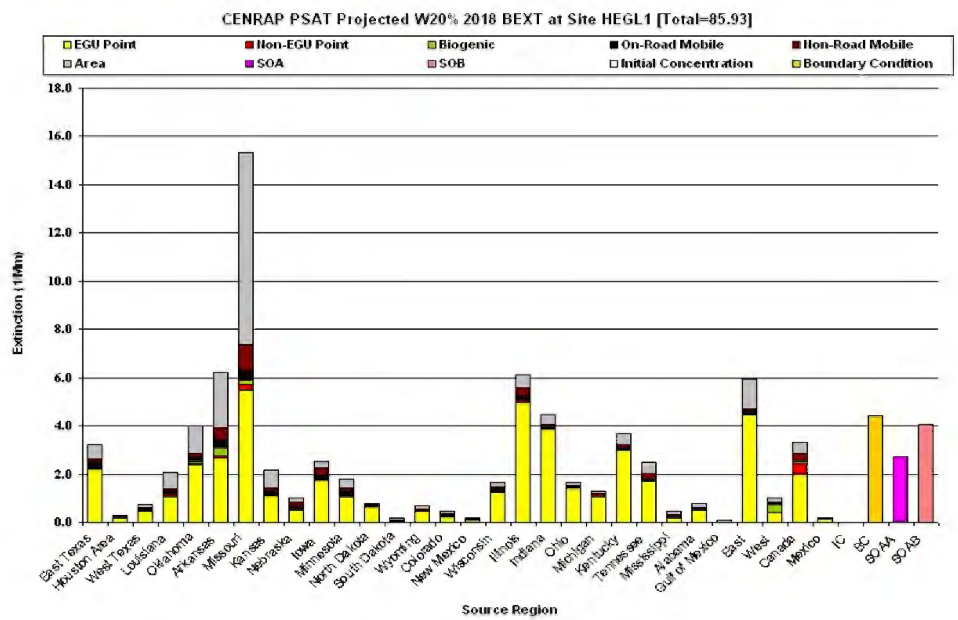


Hercules Glades Projected 2018 – Worst 20%



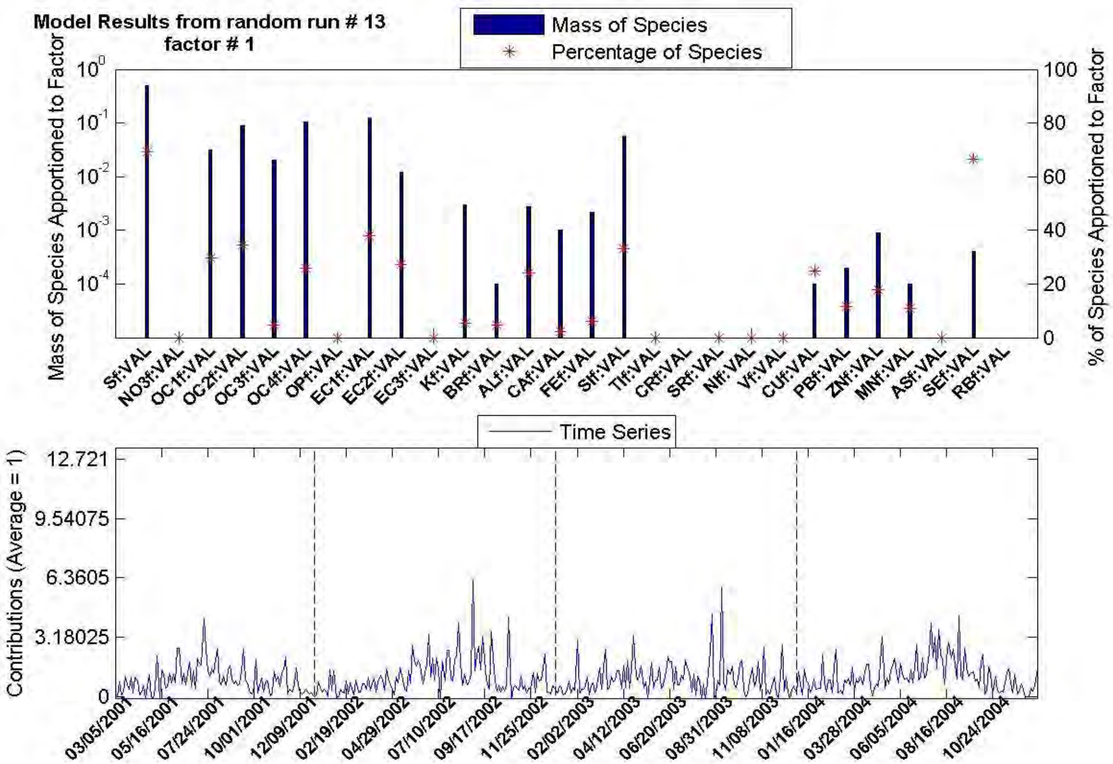




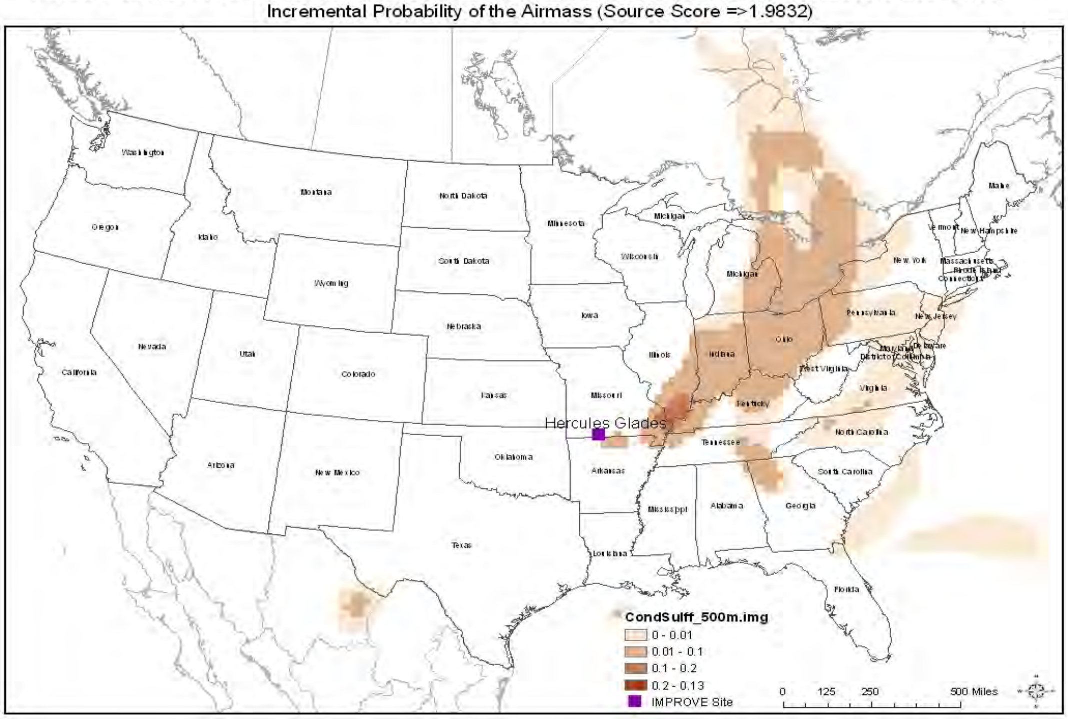


Monitoring Data Source Apportionment

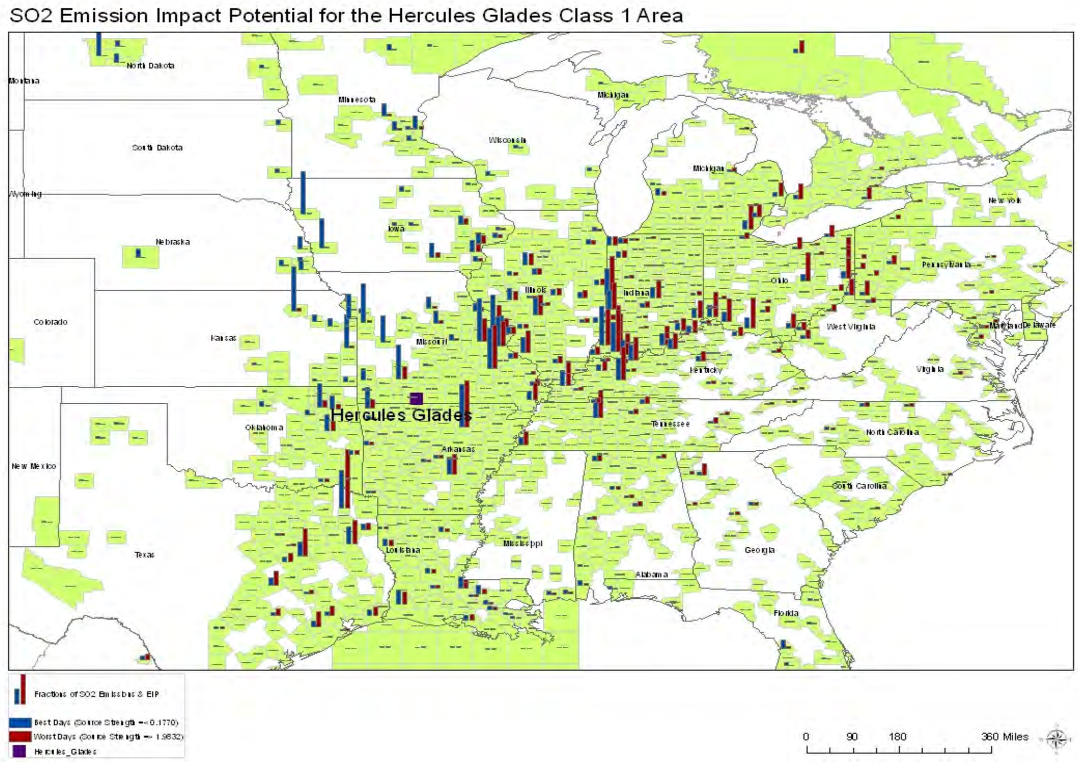
The Coal Combustion Factor at the Hercules Glades Class I Area

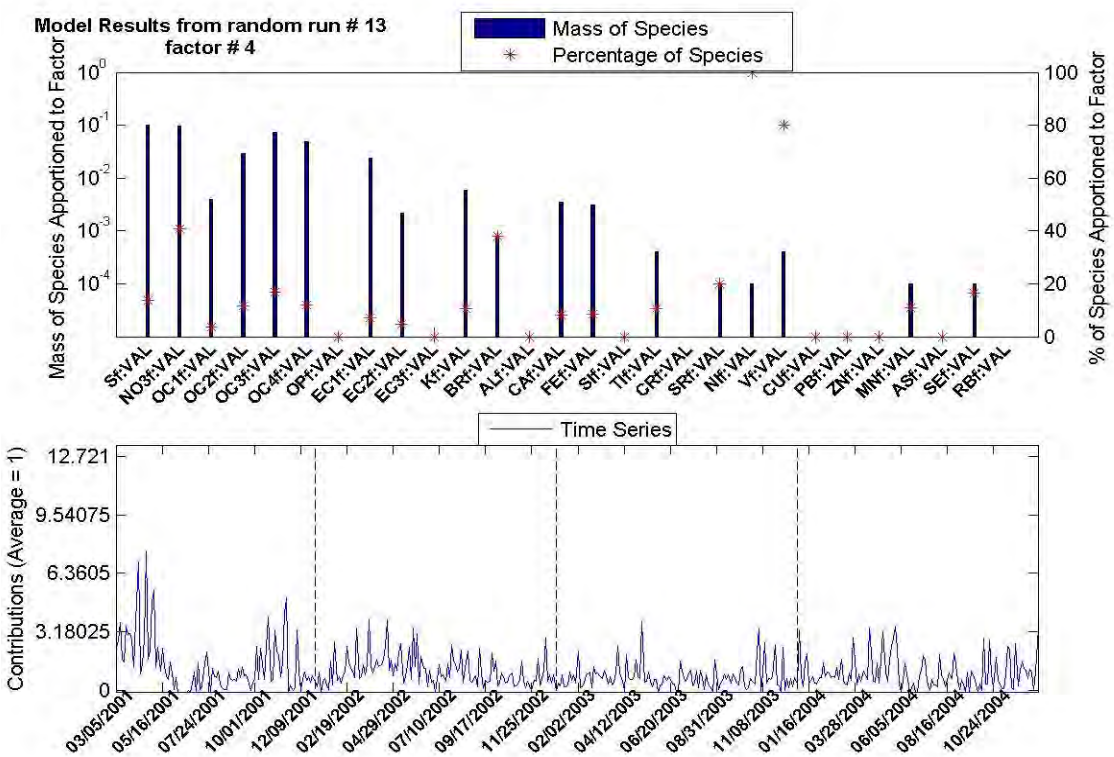


Possible Source Area of the Identified Coal Combustion Factor at the Hercules Glades Class I Area
Incremental Probability of the Airmass (Source Score =>1.9832)

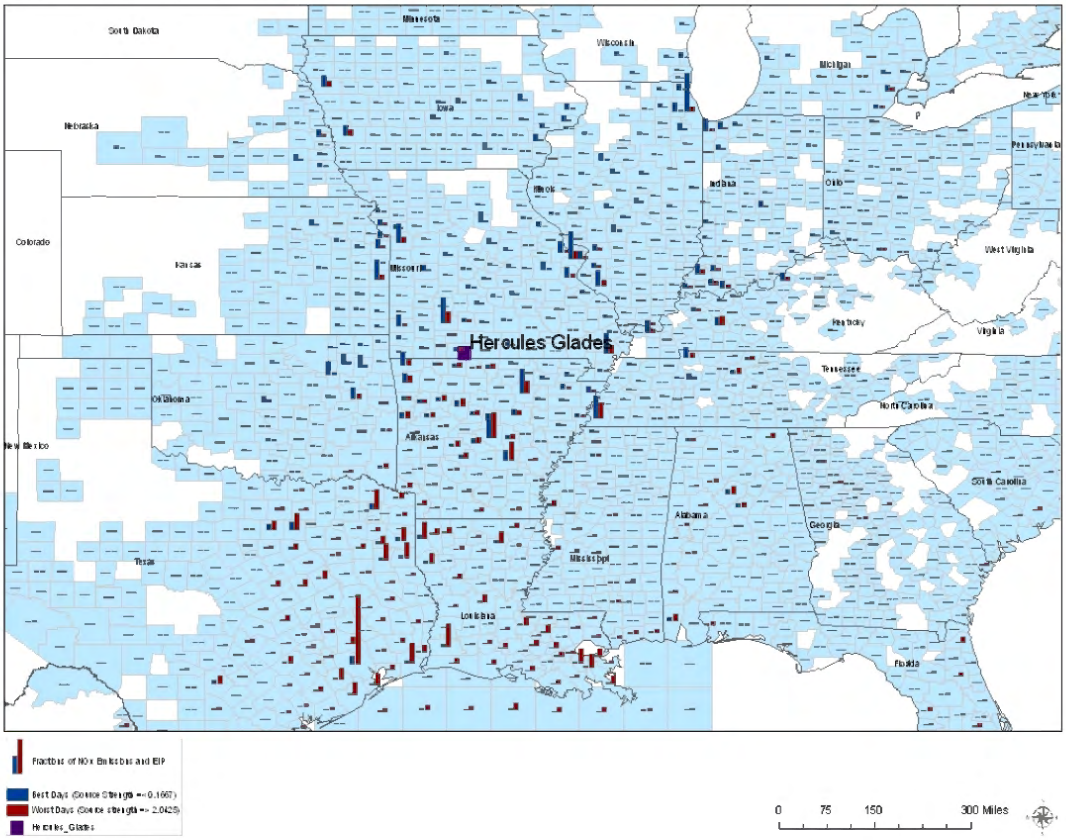


The Secondary Nitrate plus Oil Combustion Factor at the Hercules Glades Class I Area

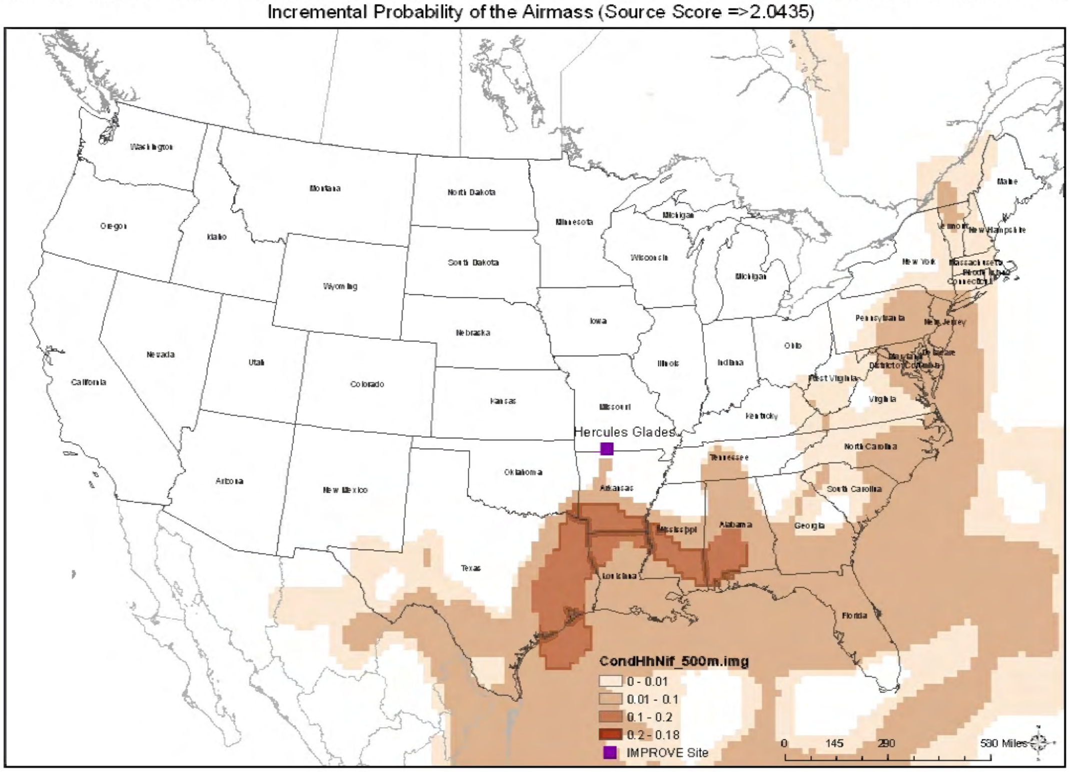




NOx Emission Impact Potential for the Hercules Glades Class I Area

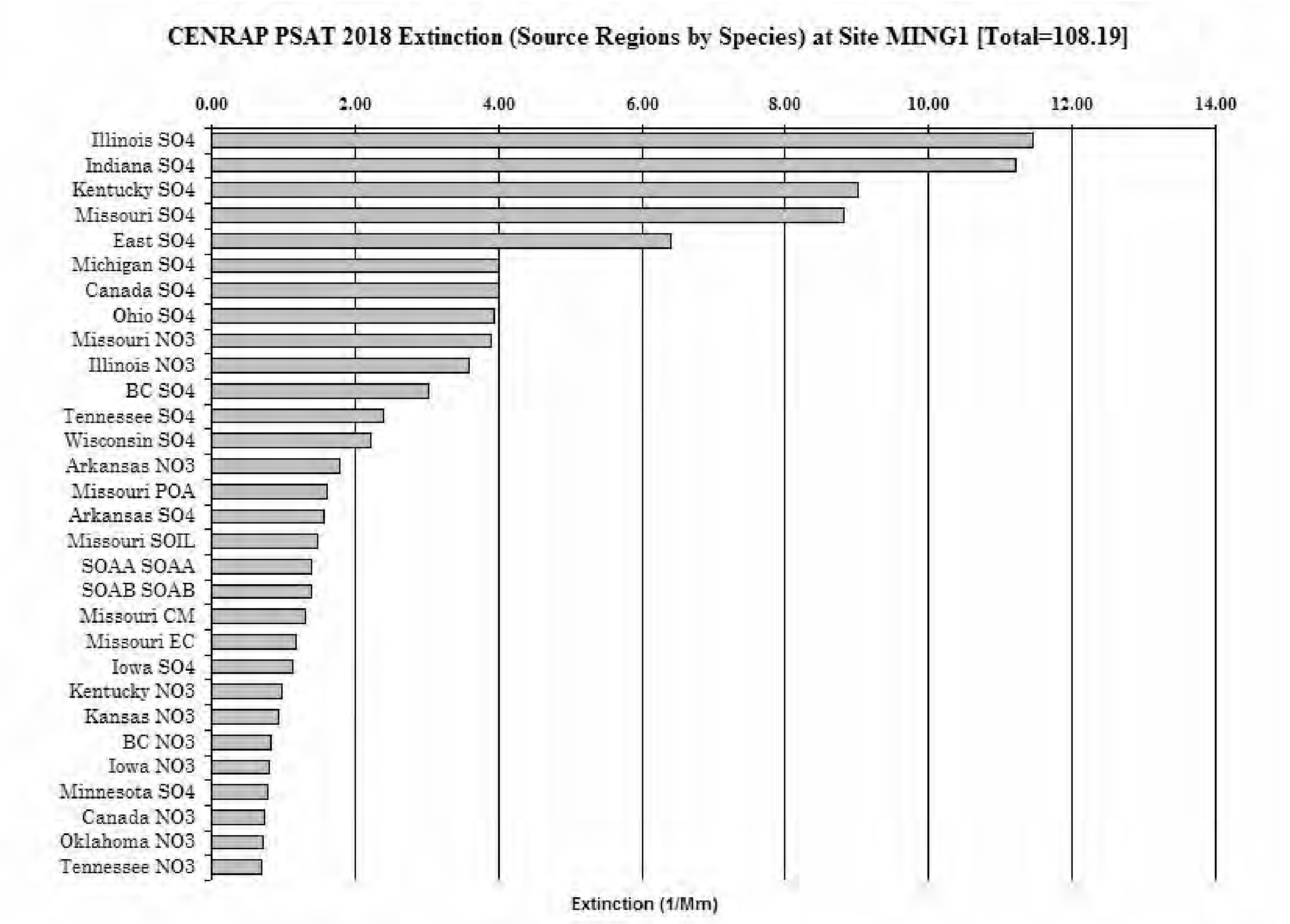


Possible Source Area of the Identified Nitrate Plus Oil Combustion Factor at the Hercules Glades Class I Area
Incremental Probability of the Airmass (Source Score =>2.0435)

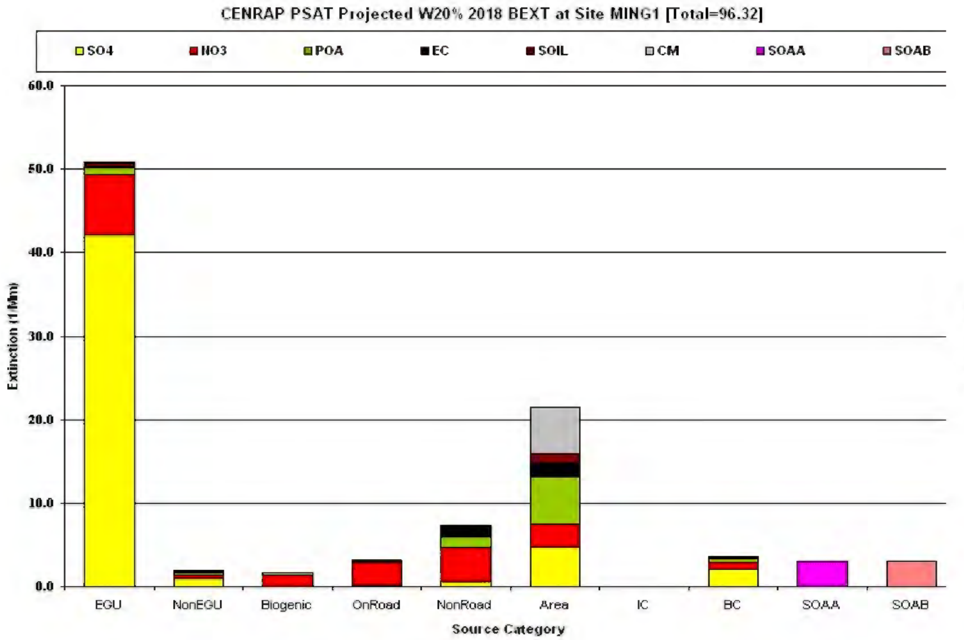


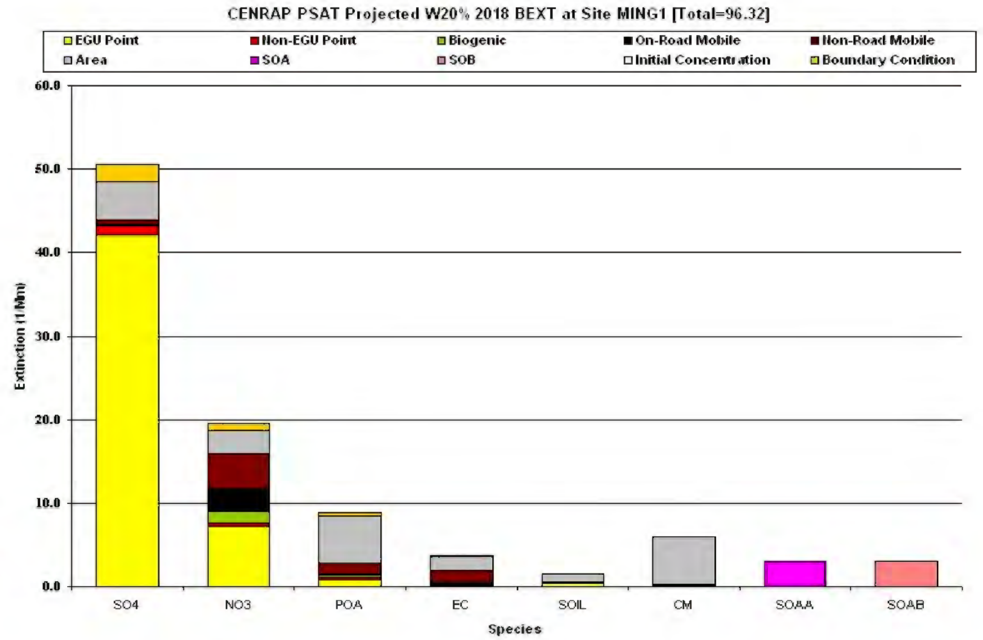
Source Apportionment for the Mingo Class I Area

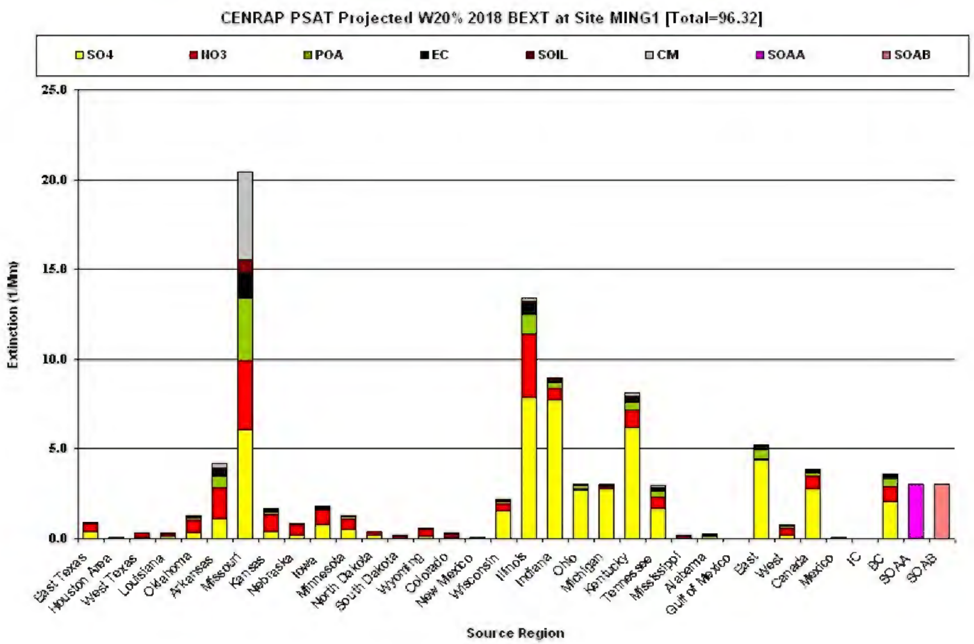
PSAT Model Source Apportionment

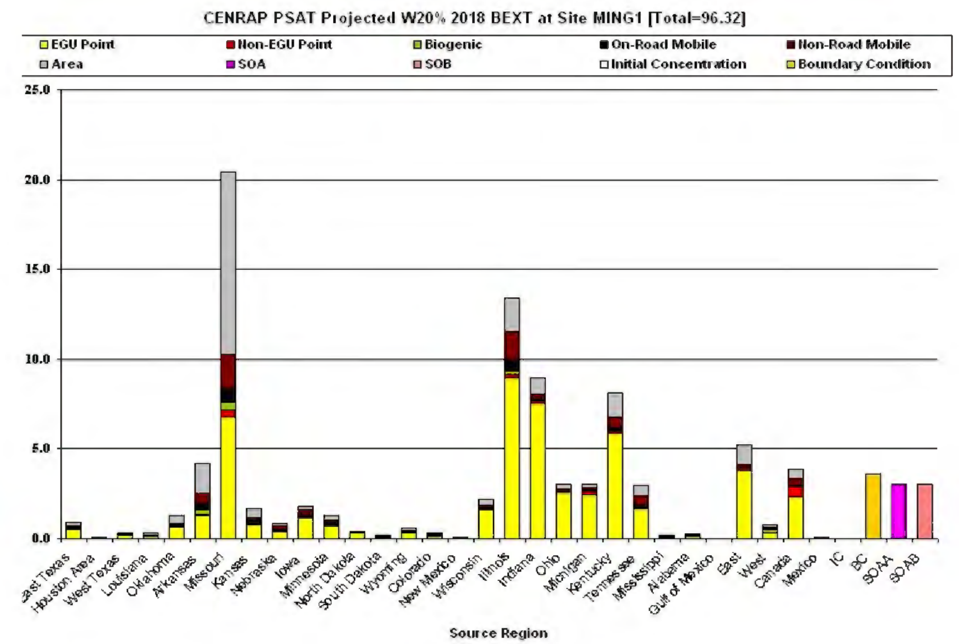


Mingo Projected 2018 – Worst 20%



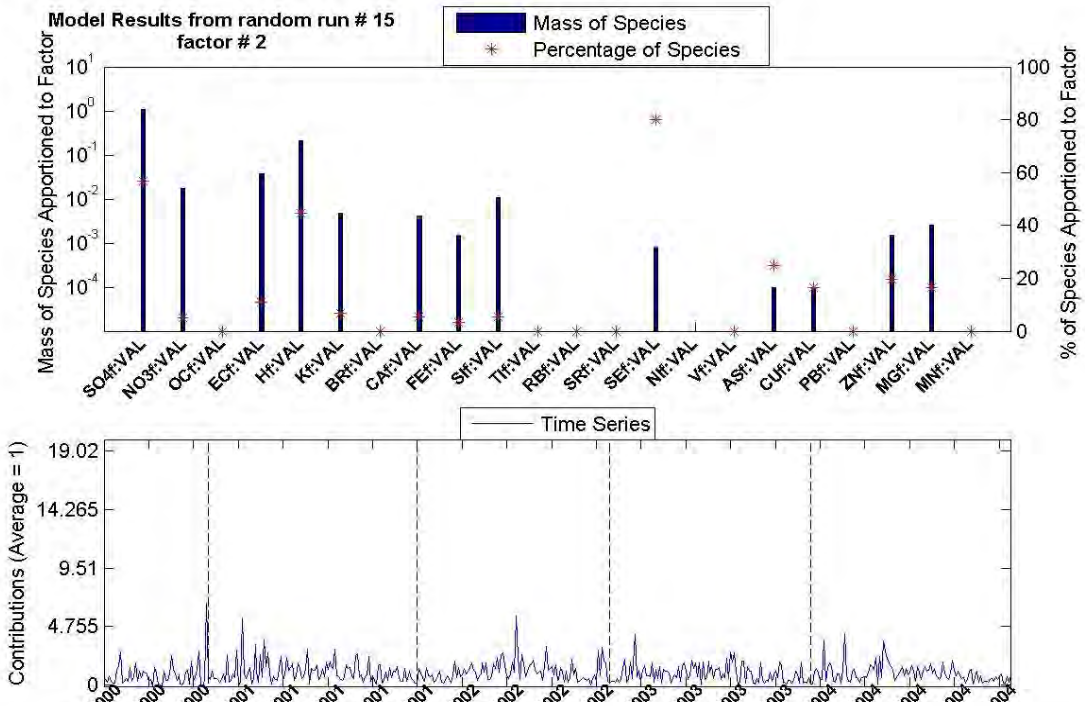




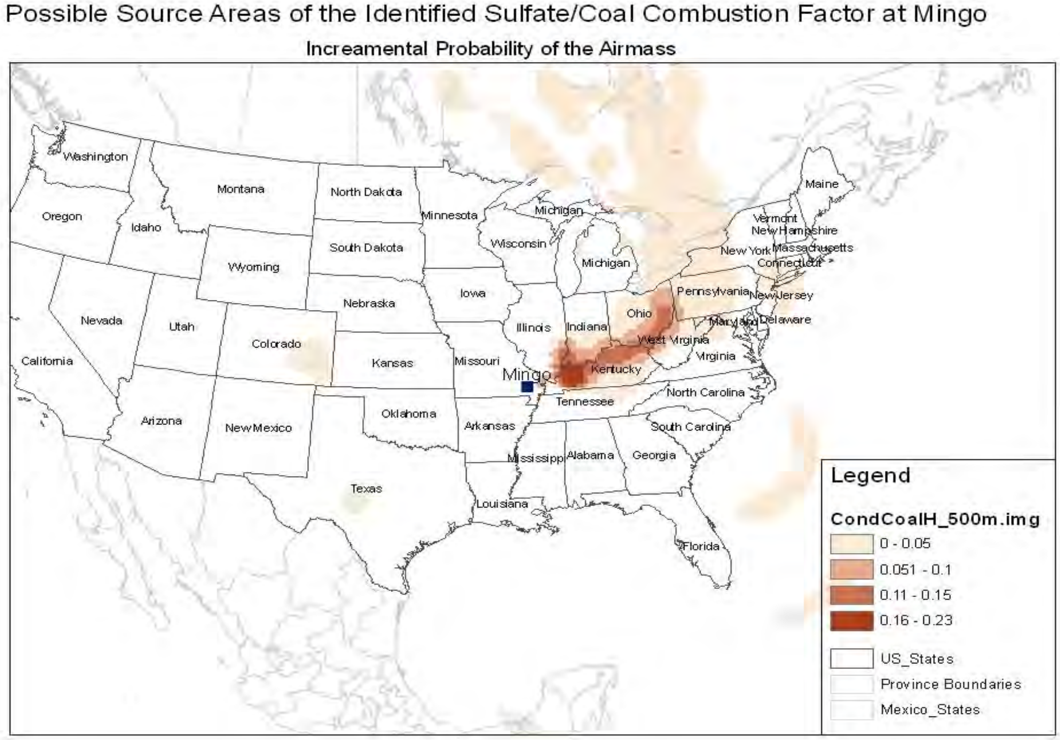


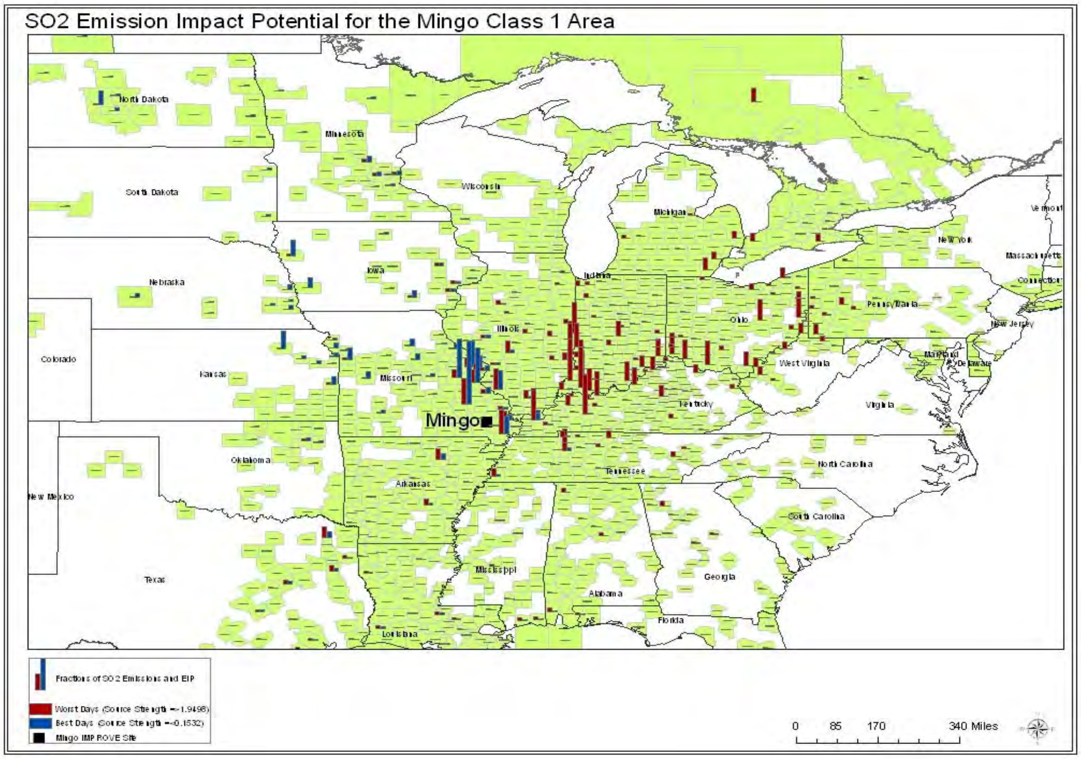
Monitoring Data Source Apportionment

The Coal Combustion Factor at the Mingo Class I Area

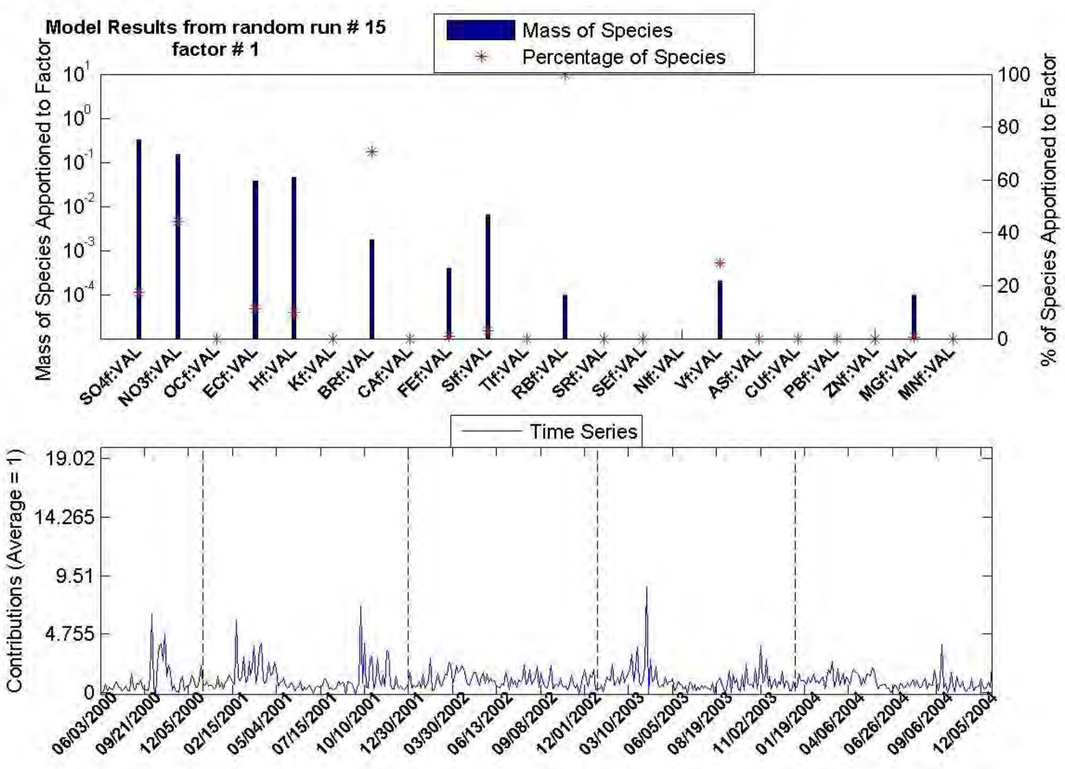


Possible Source Areas of the Identified Sulfate/Coal Combustion Factor at Mingo



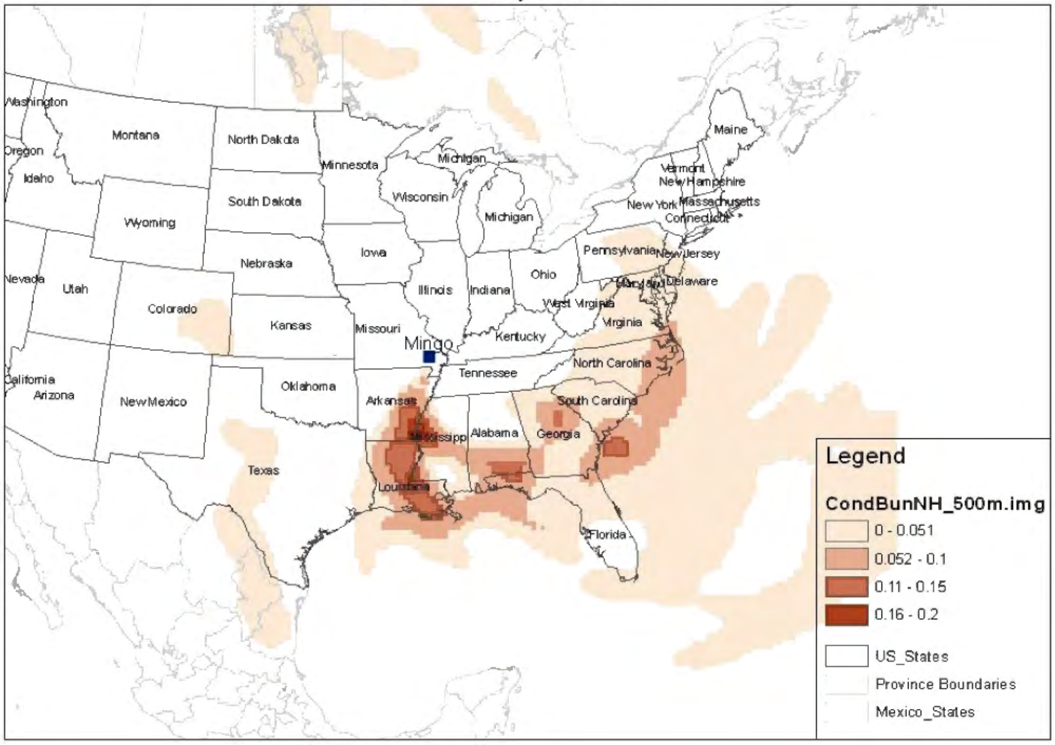


The Nitrate plus Spring Burning Factor at the Mingo Class I Area

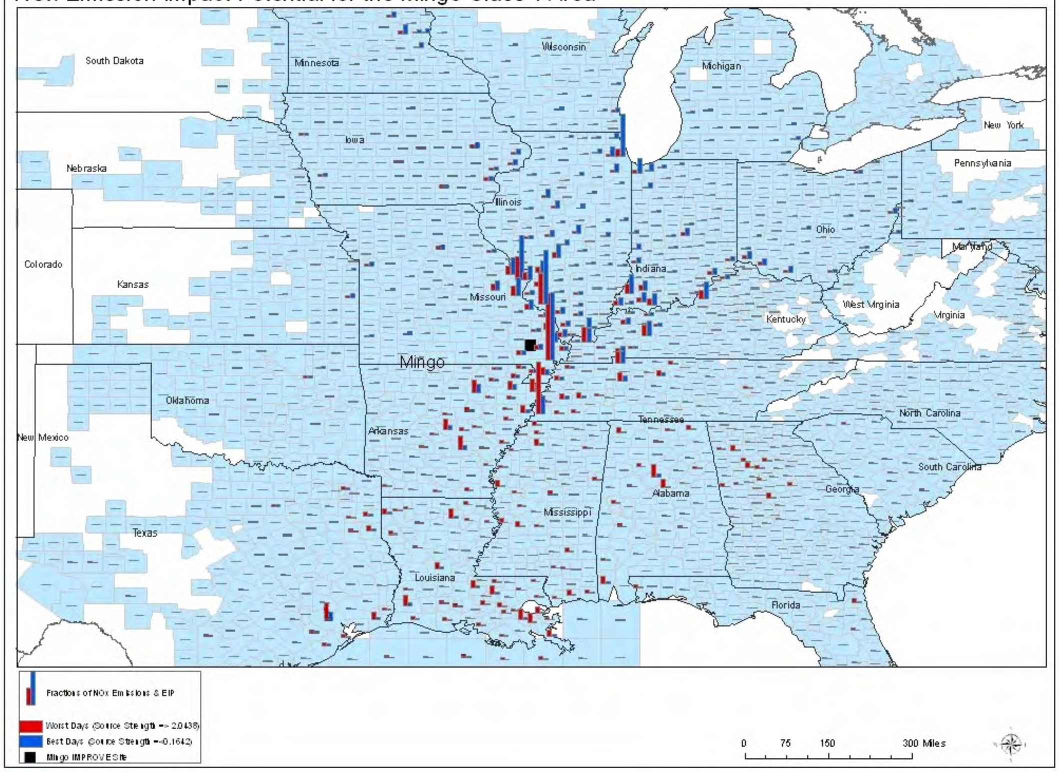


Possible Source Areas of the Identified Burning and Nitrate Factor at Mingo

Increamental Probability of the Airmass

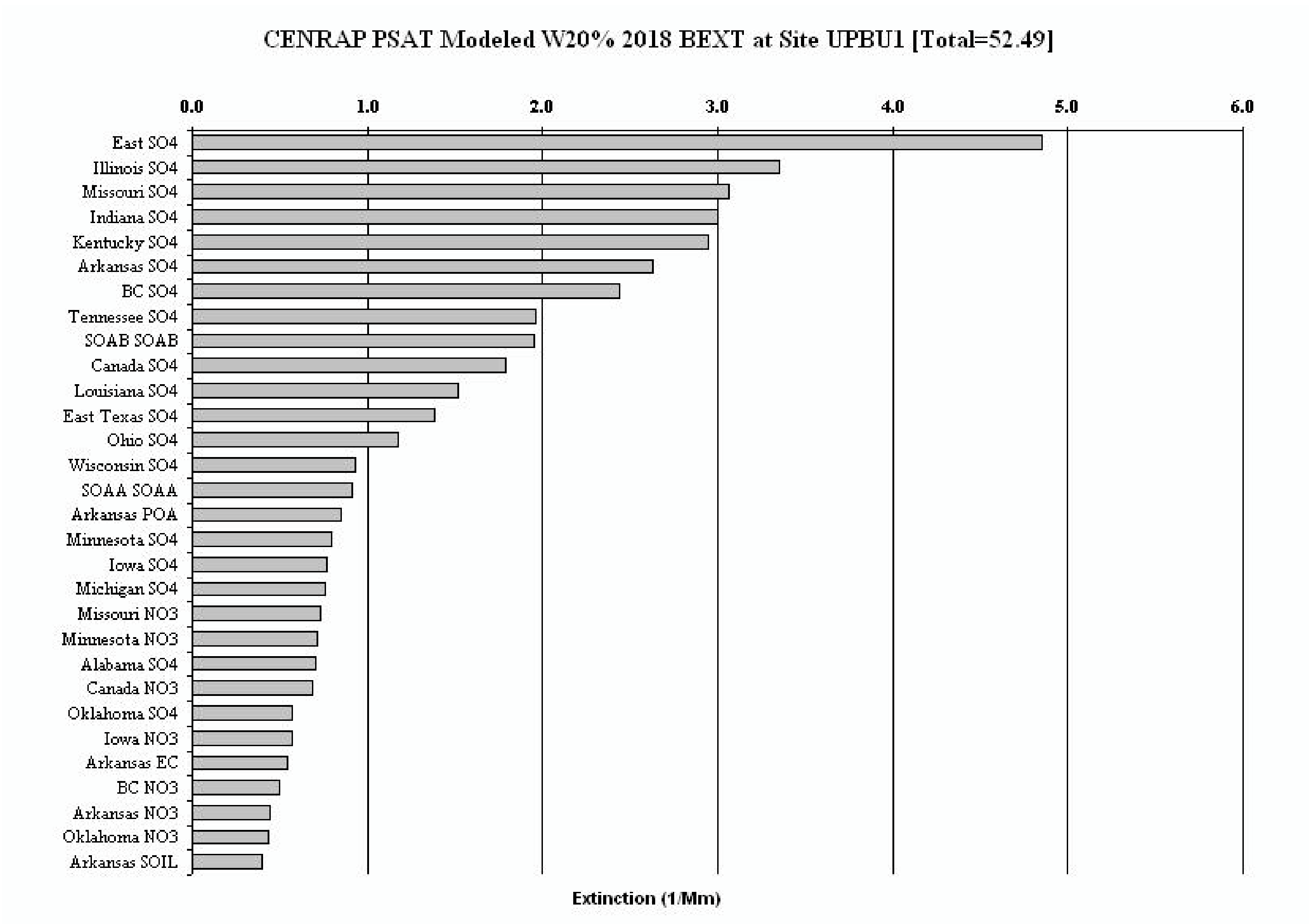


NOx Emission Impact Potential for the Mingo Class 1 Area

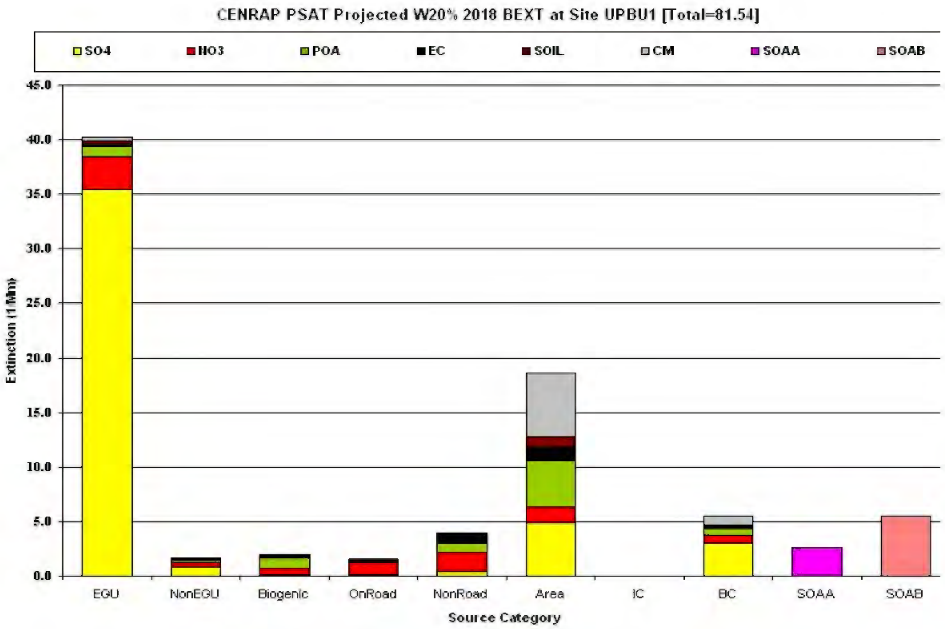


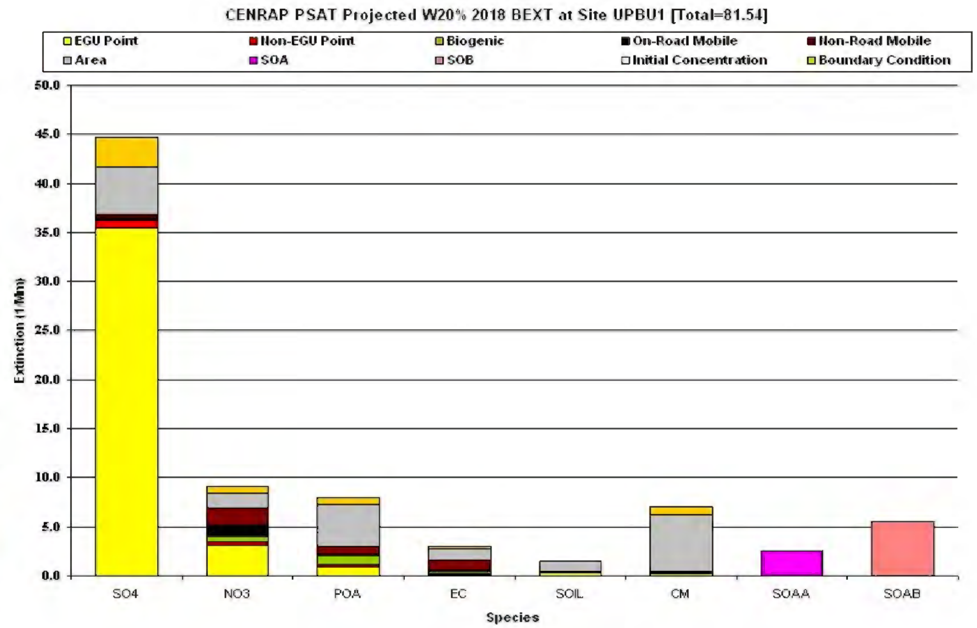
Source Apportionment for the Upper Buffalo Class I Area

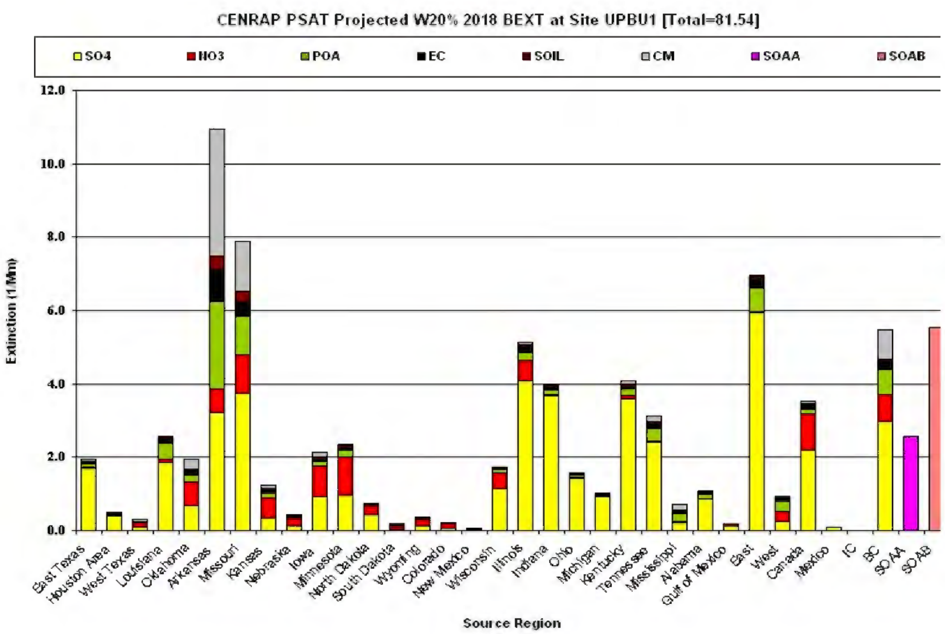
PSAT Model Source Apportionment

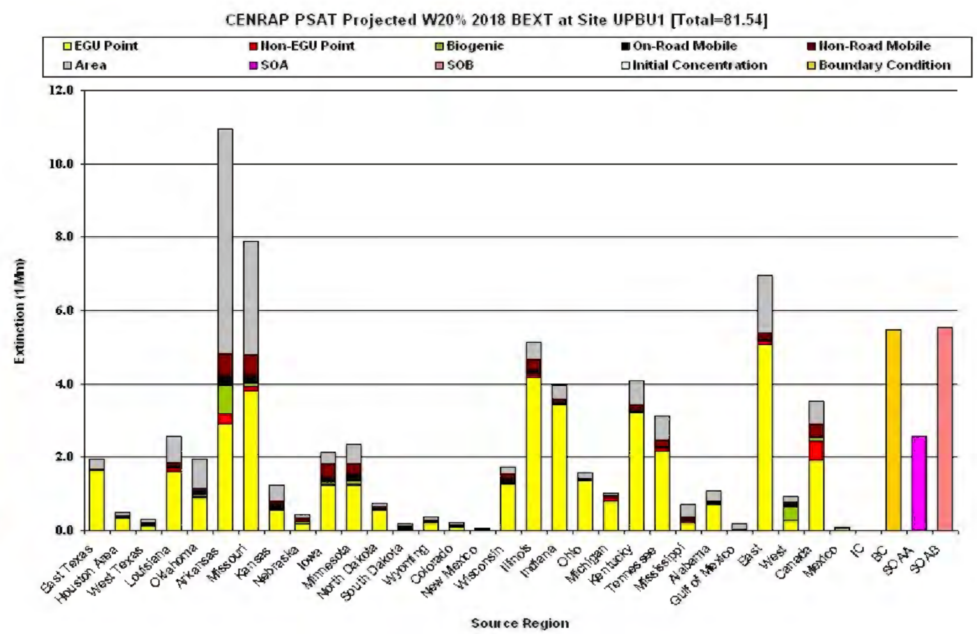


Upper Buffalo Projected 2018 – Worst 20%



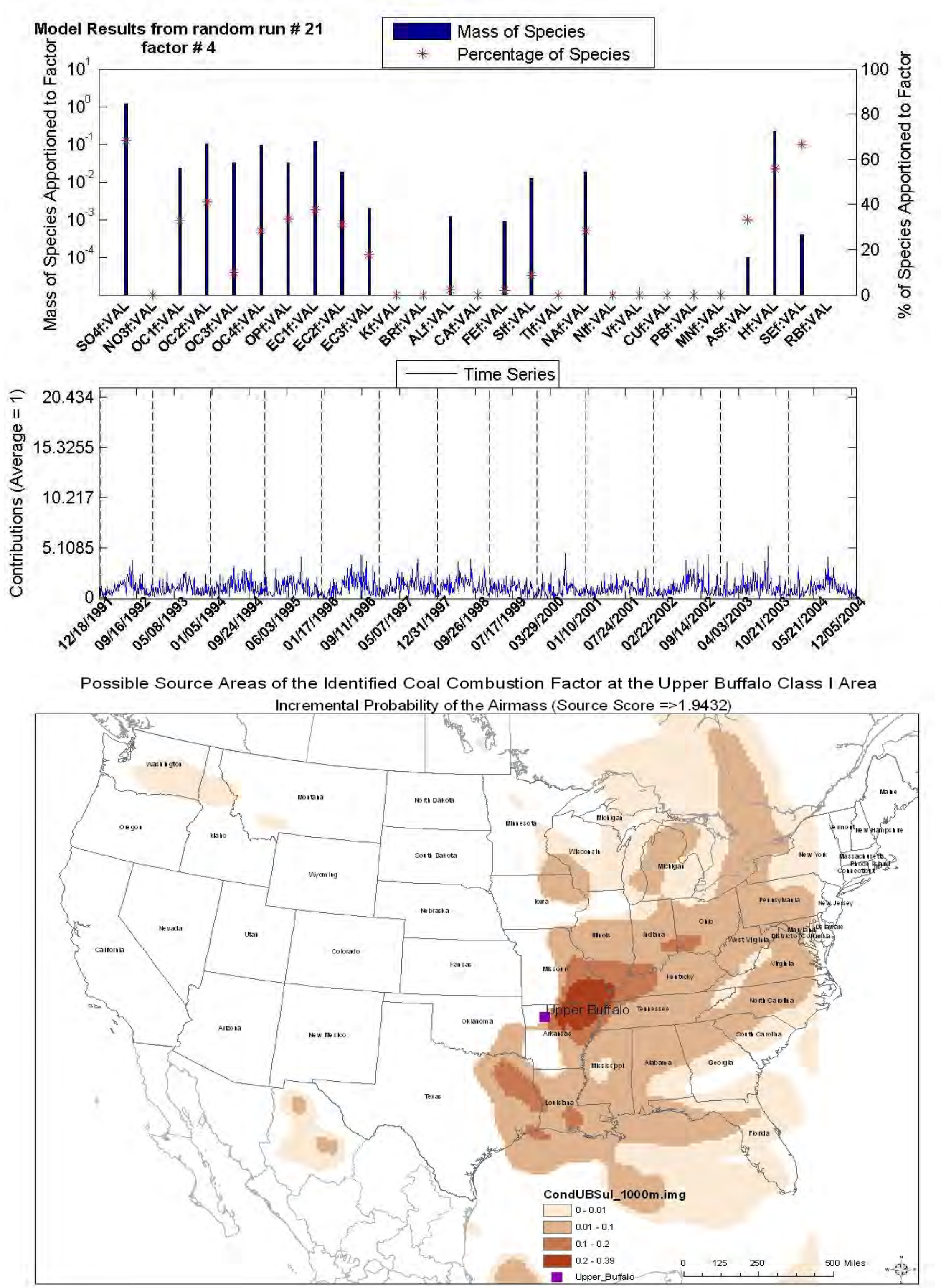


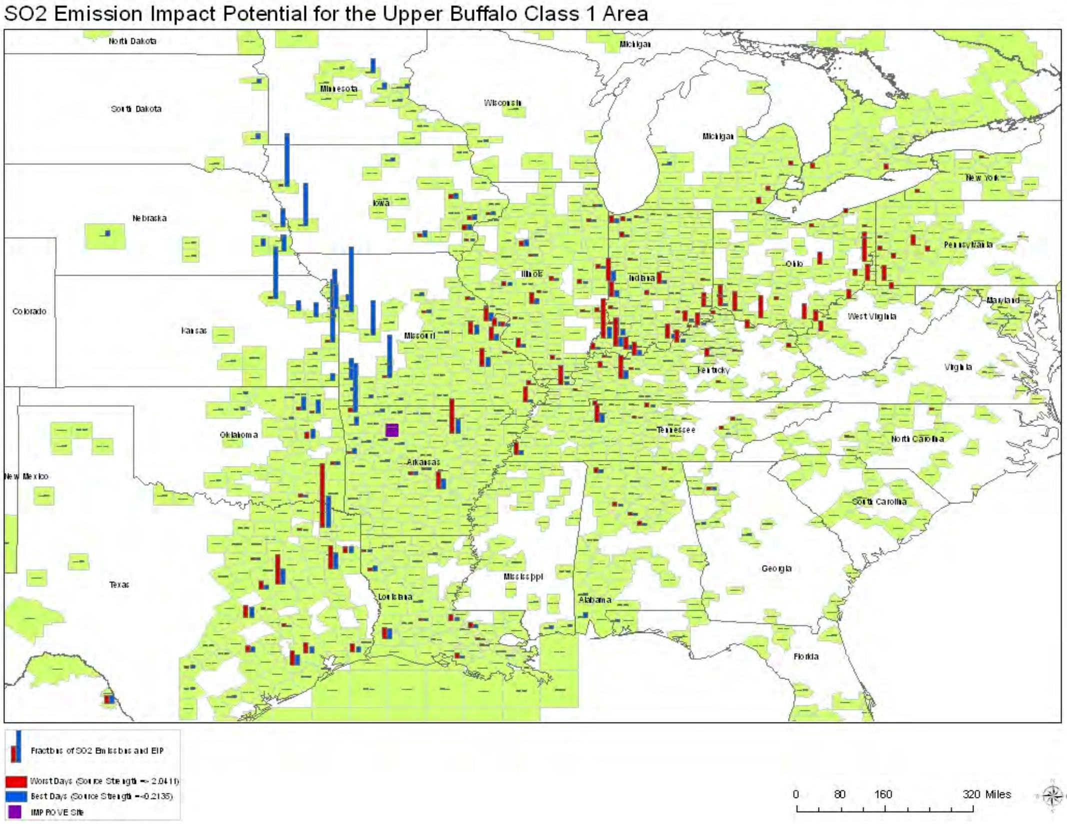




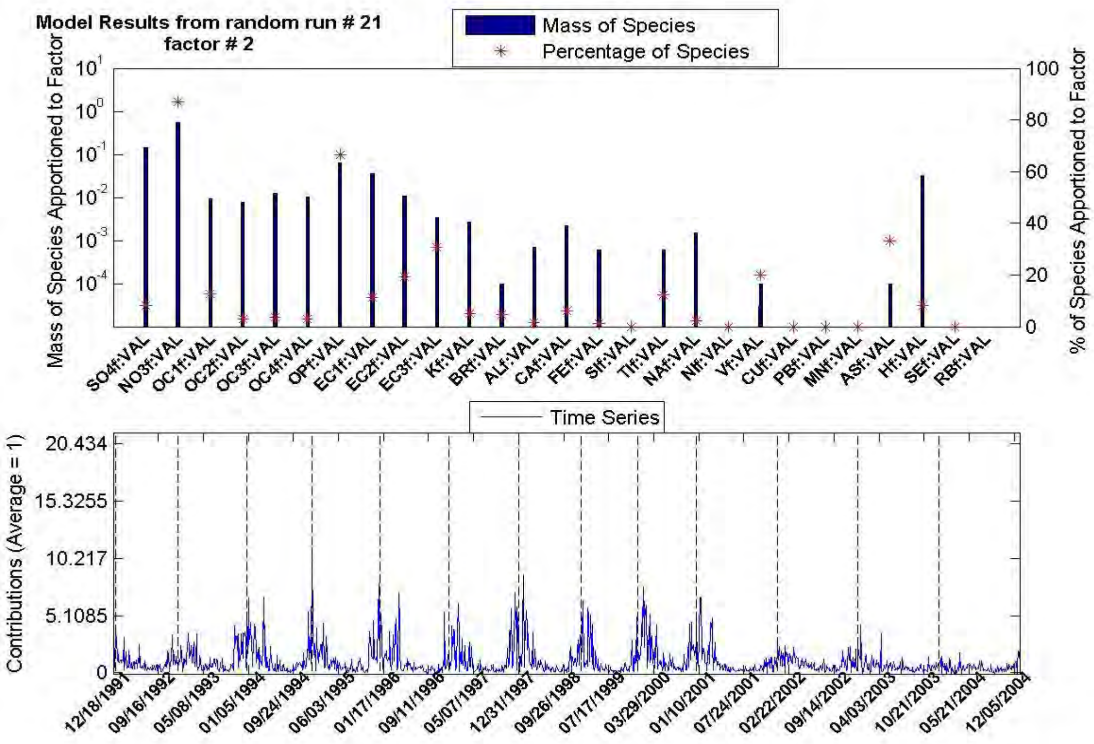
Monitoring Data Source Apportionment

The Coal Combustion Factor at the Upper Buffalo Class I Area



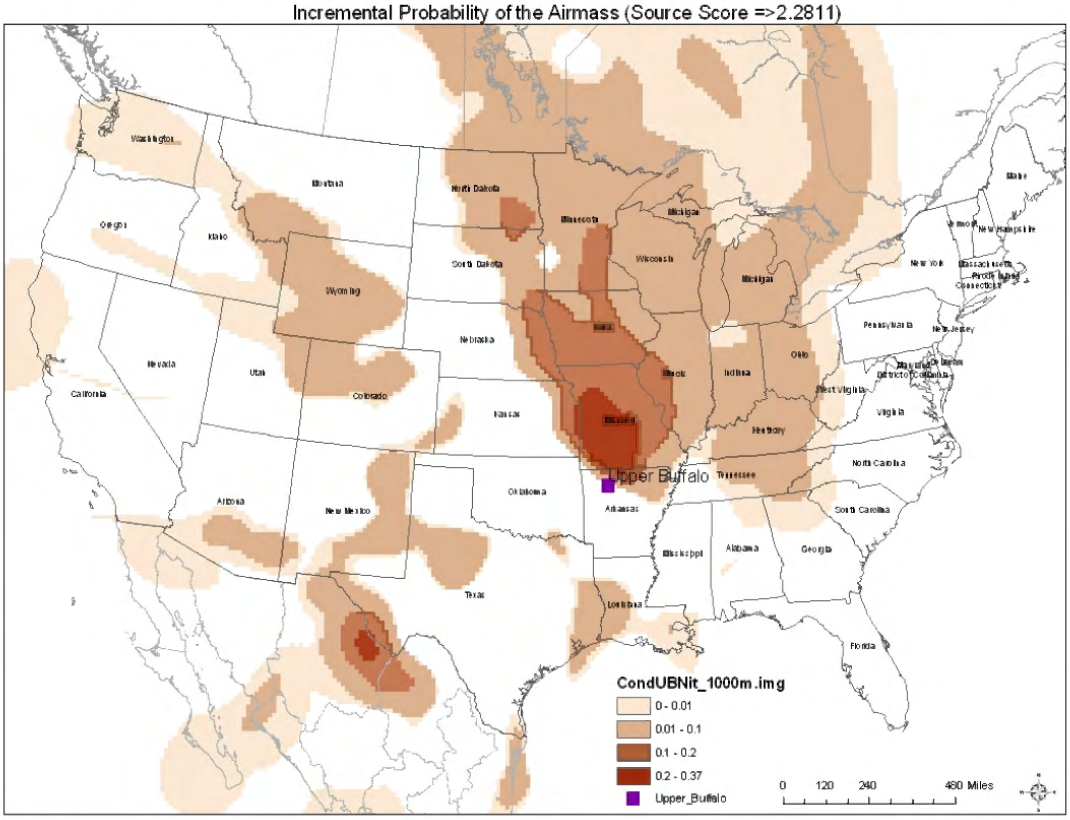


The Secondary Nitrate Factor at the Upper Buffalo Class I Area

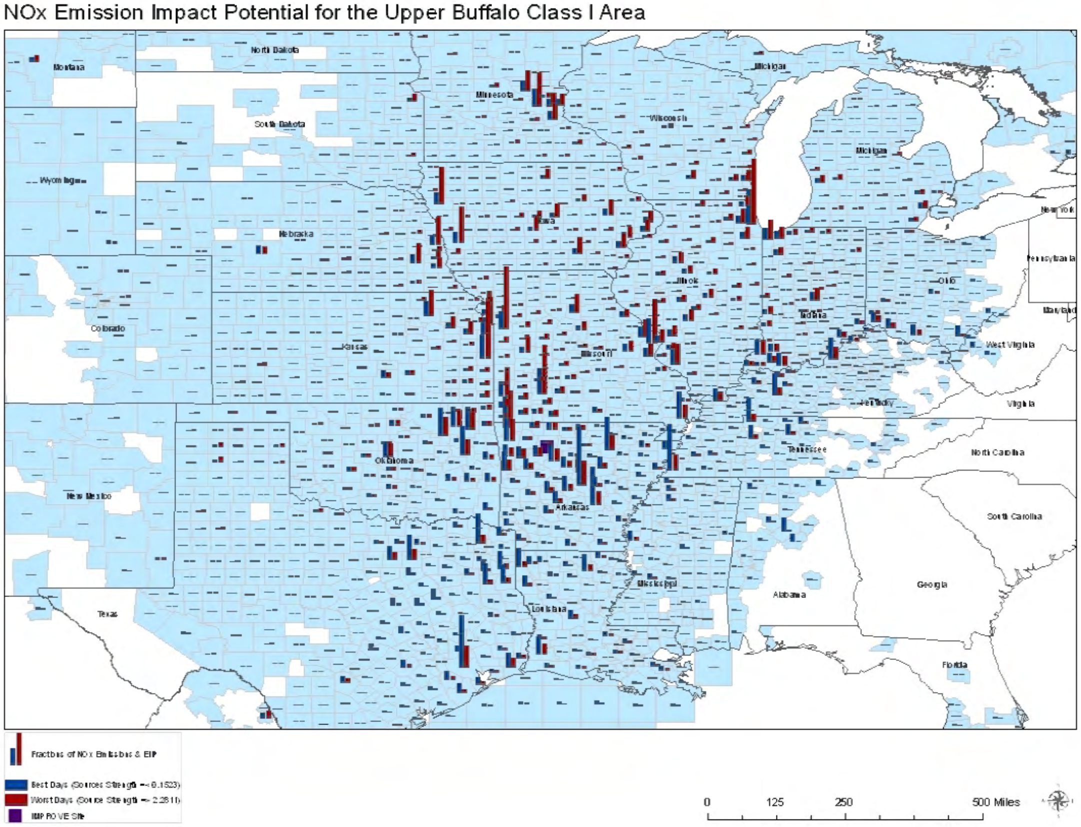


Possible Source Areas of the Identified Secondary Nitrate Factor at the Upper Buffalo Class I Area

Incremental Probability of the Airmass (Source Score =>2.2811)

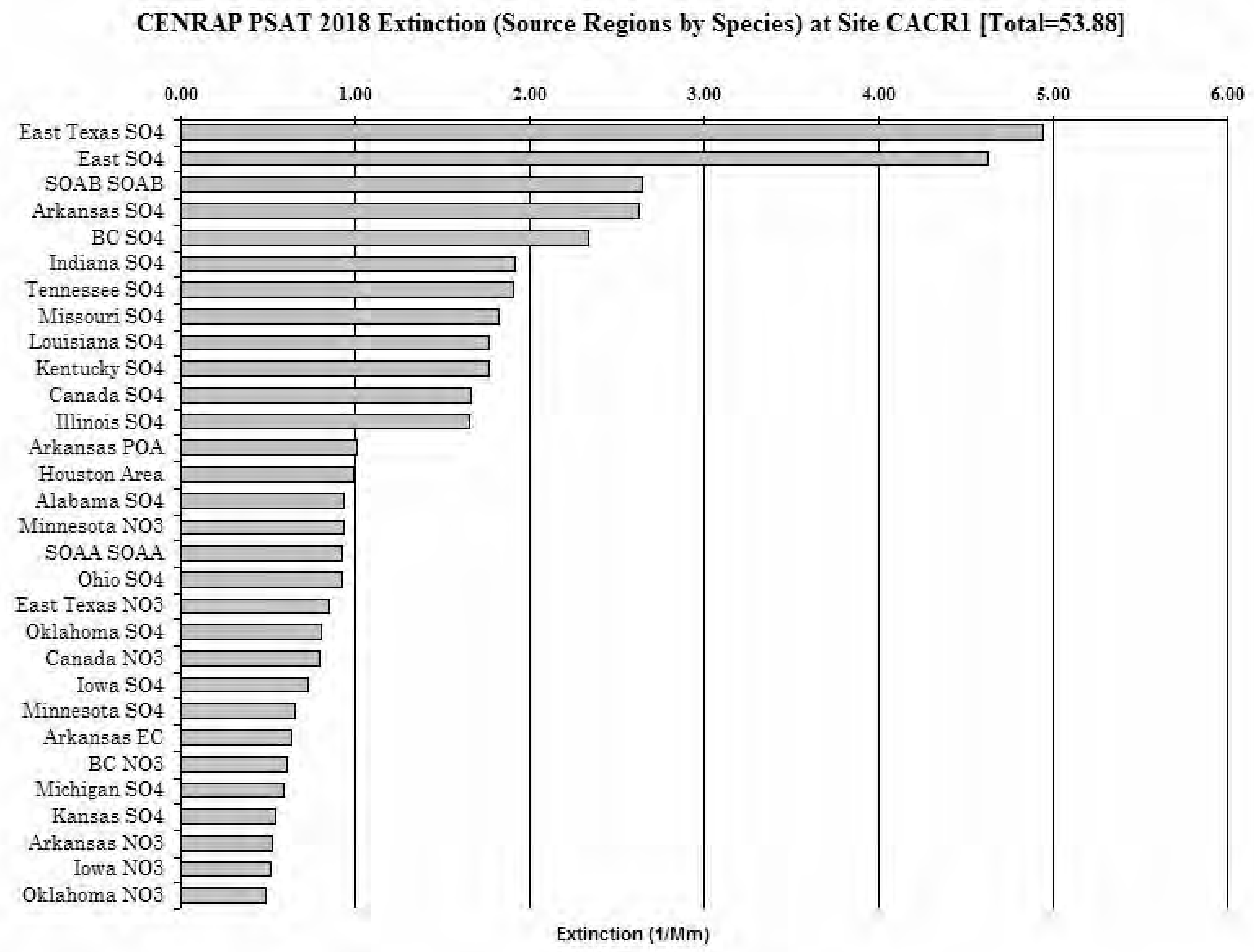


NOx Emission Impact Potential for the Upper Buffalo Class I Area

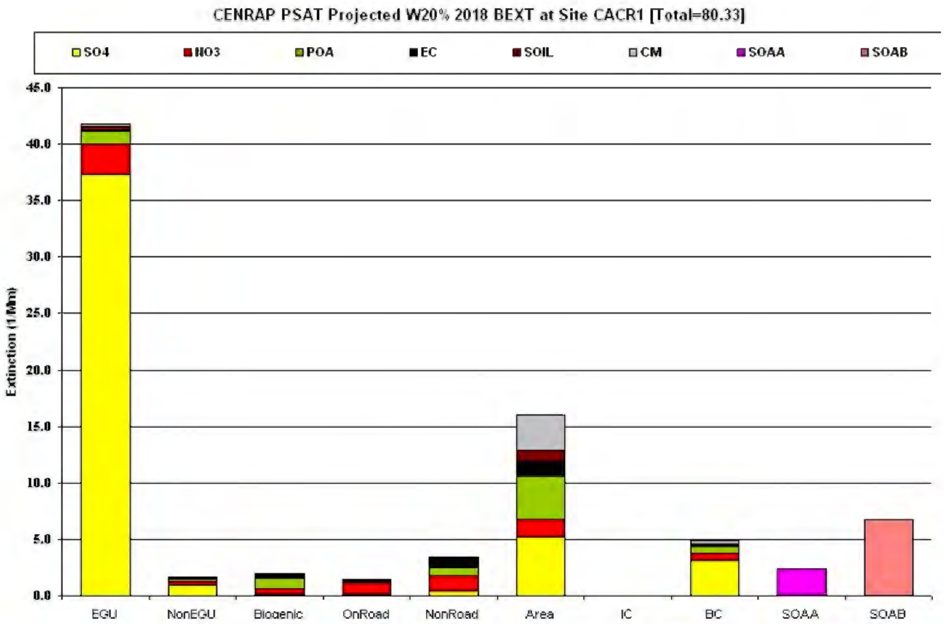


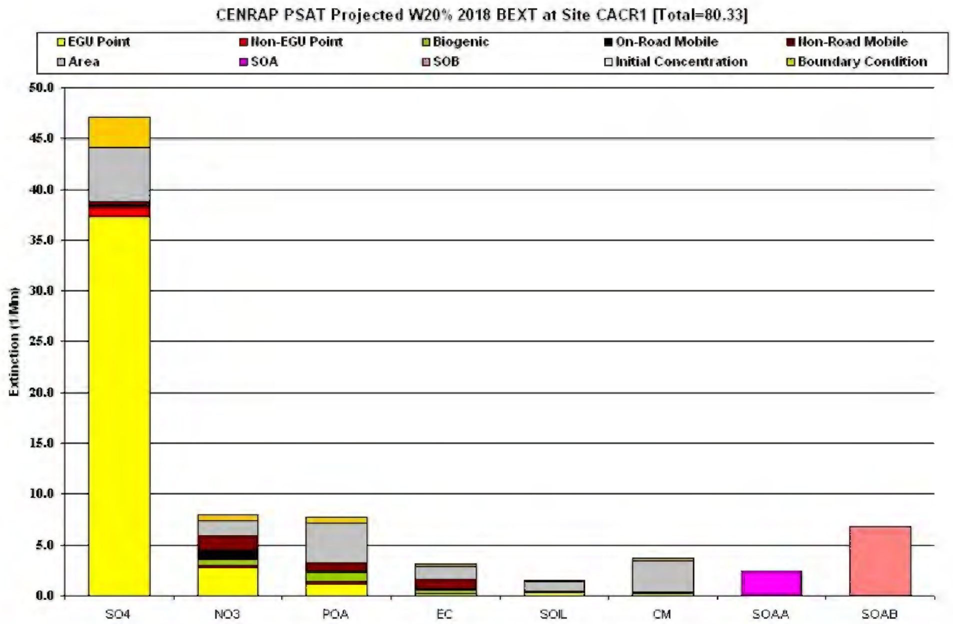
Source Apportionment for the Caney Creek Class I Area

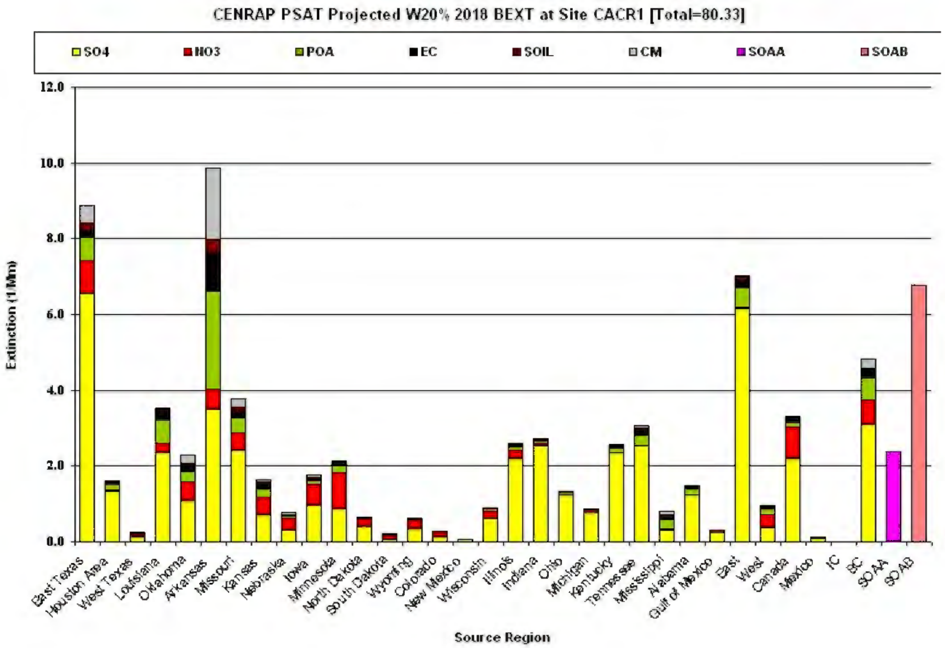
PSAT Model Source Apportionment

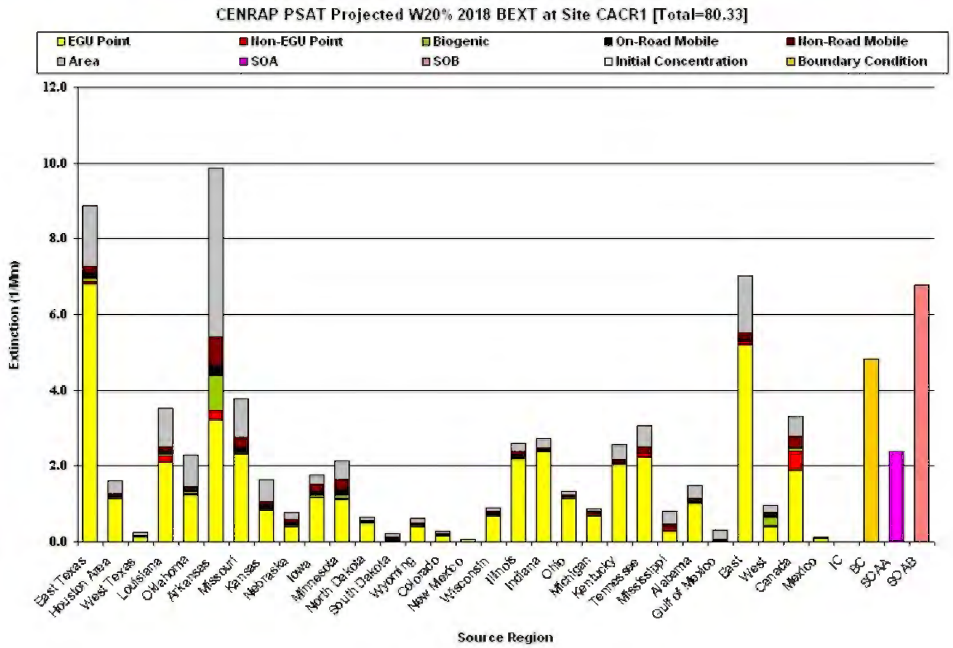


Caney Creek Projected 2018 – Worst 20%



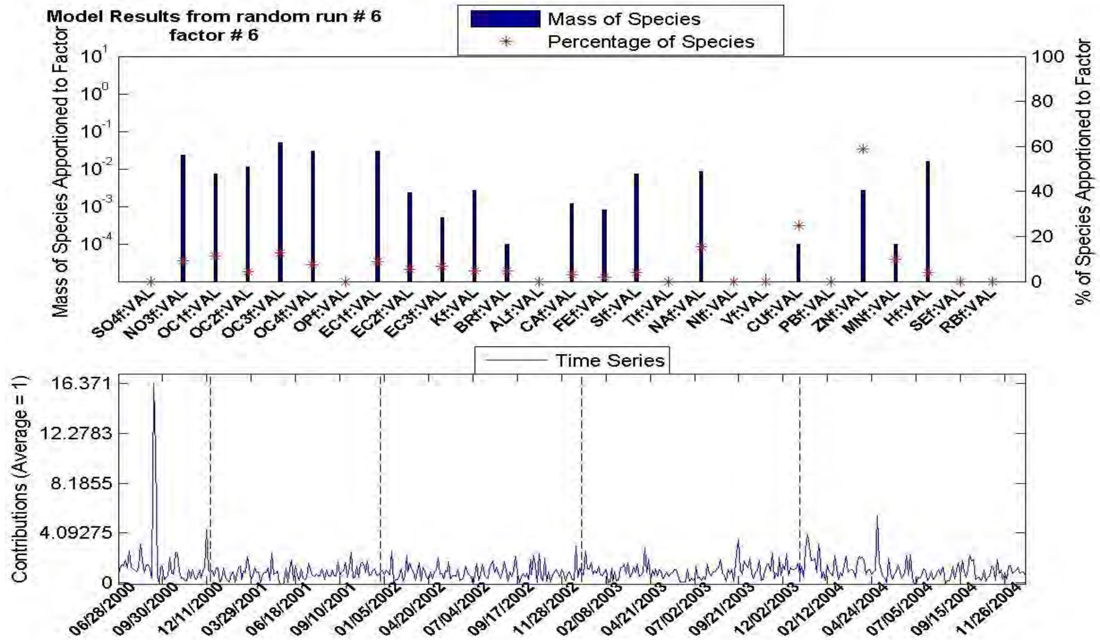


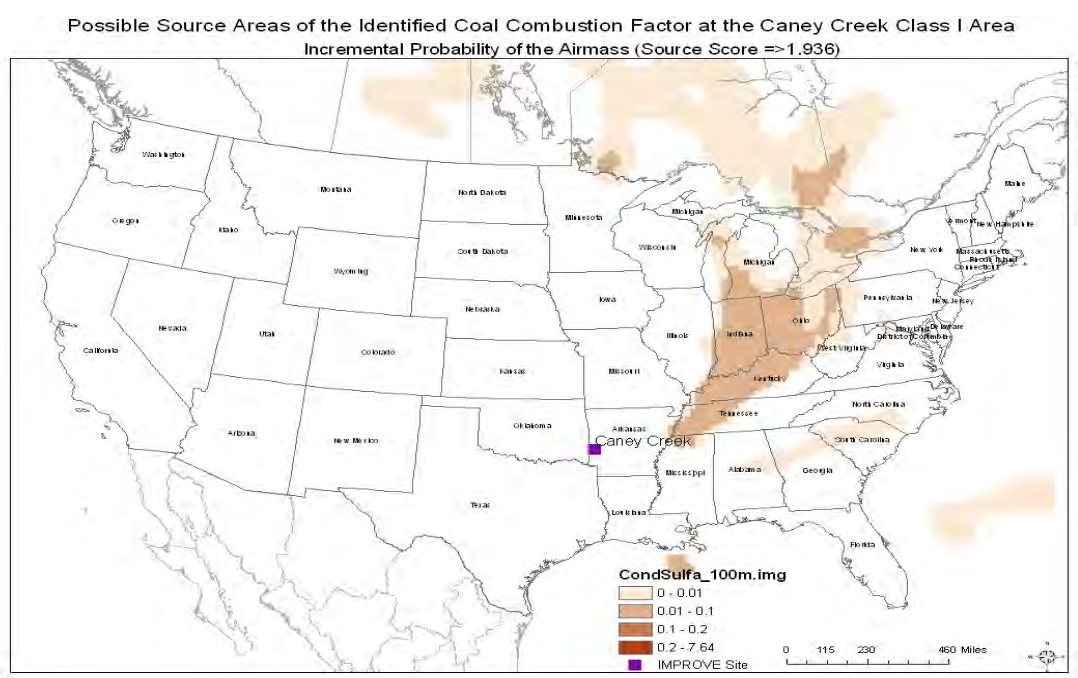


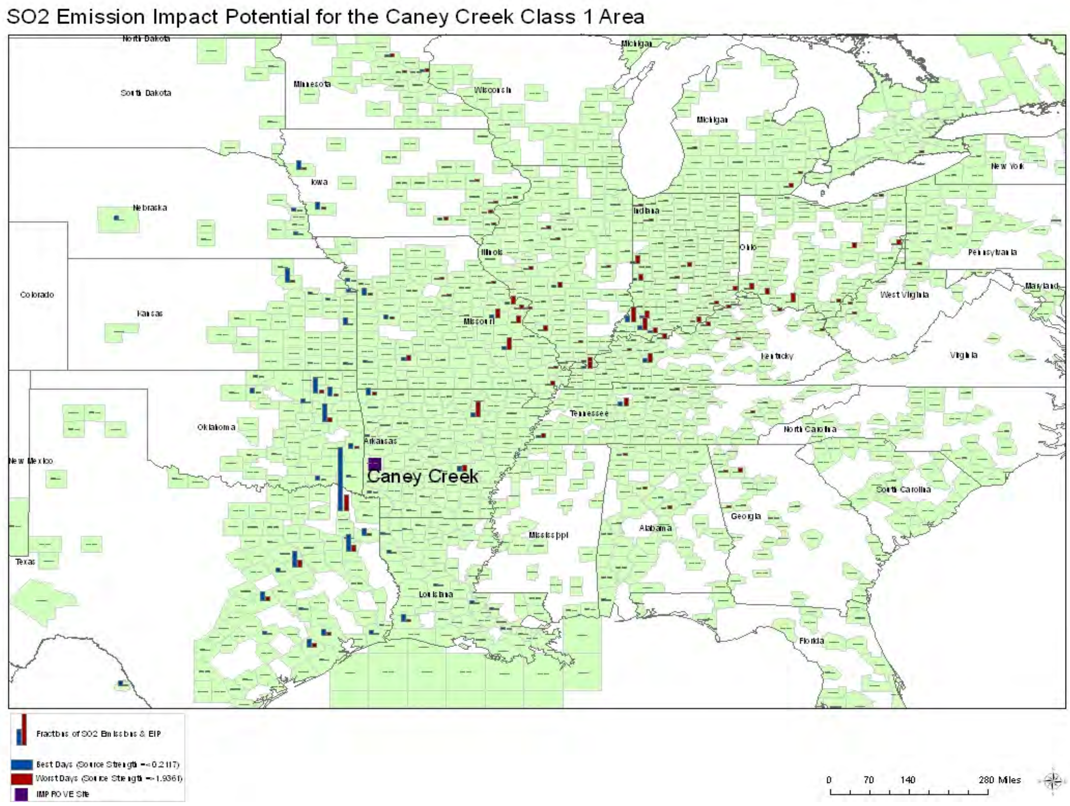


Monitoring Data Source Apportionment

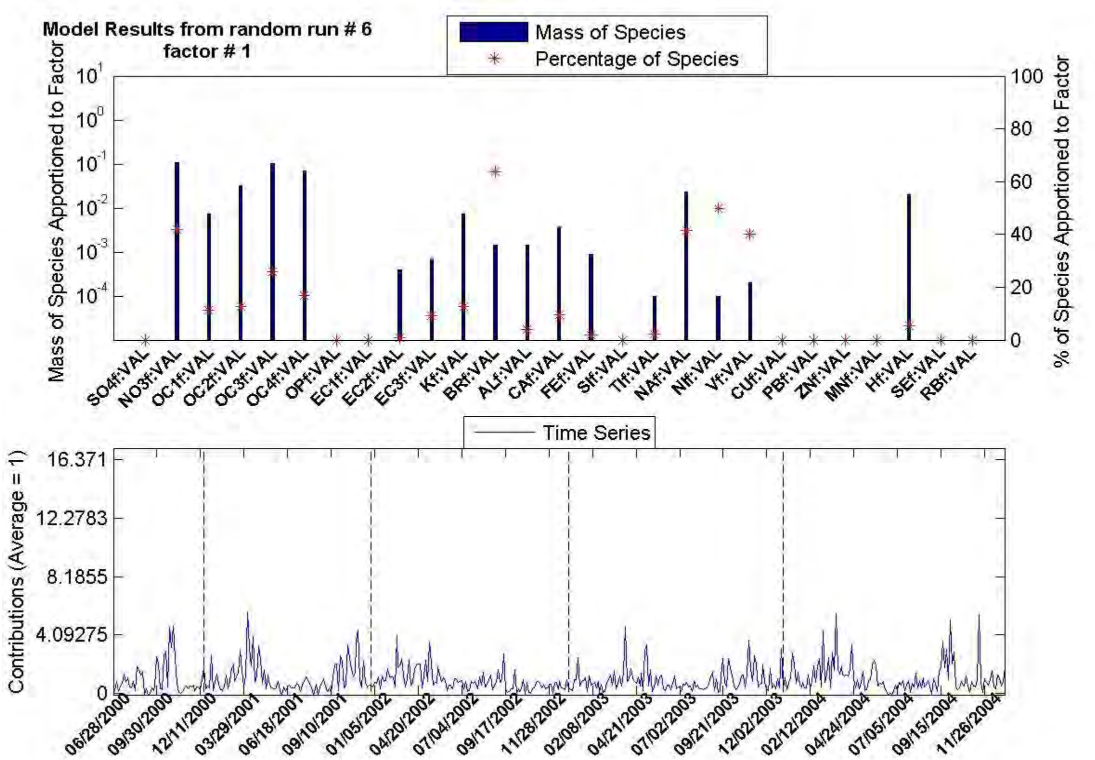
The Coal Combustion Factor at the Caney Creek Class I Area



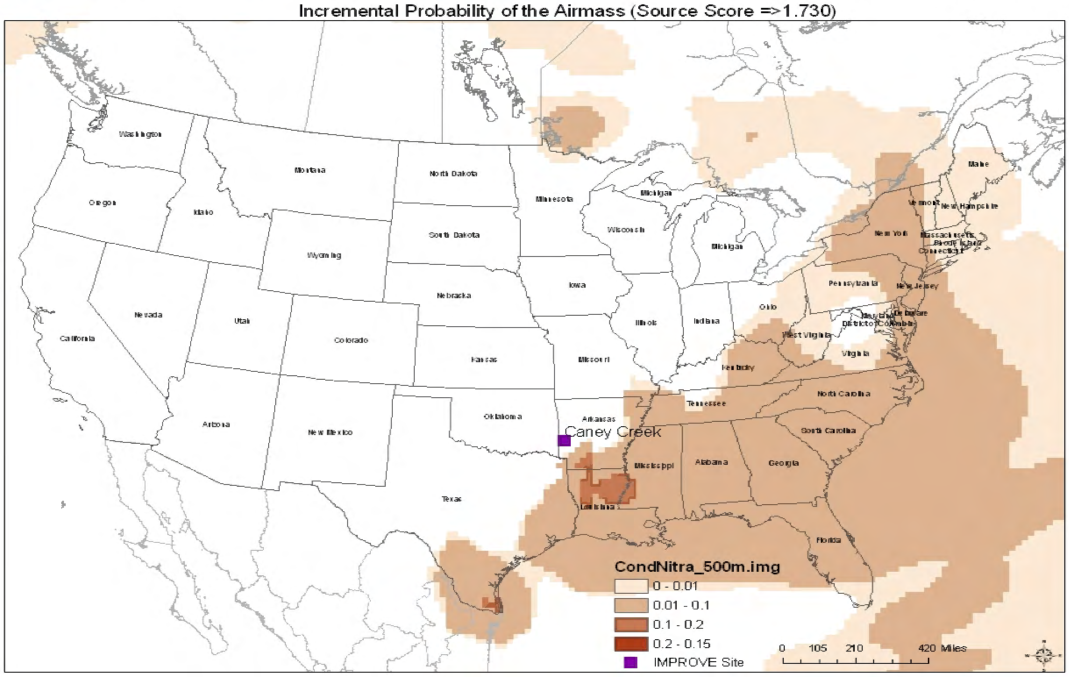




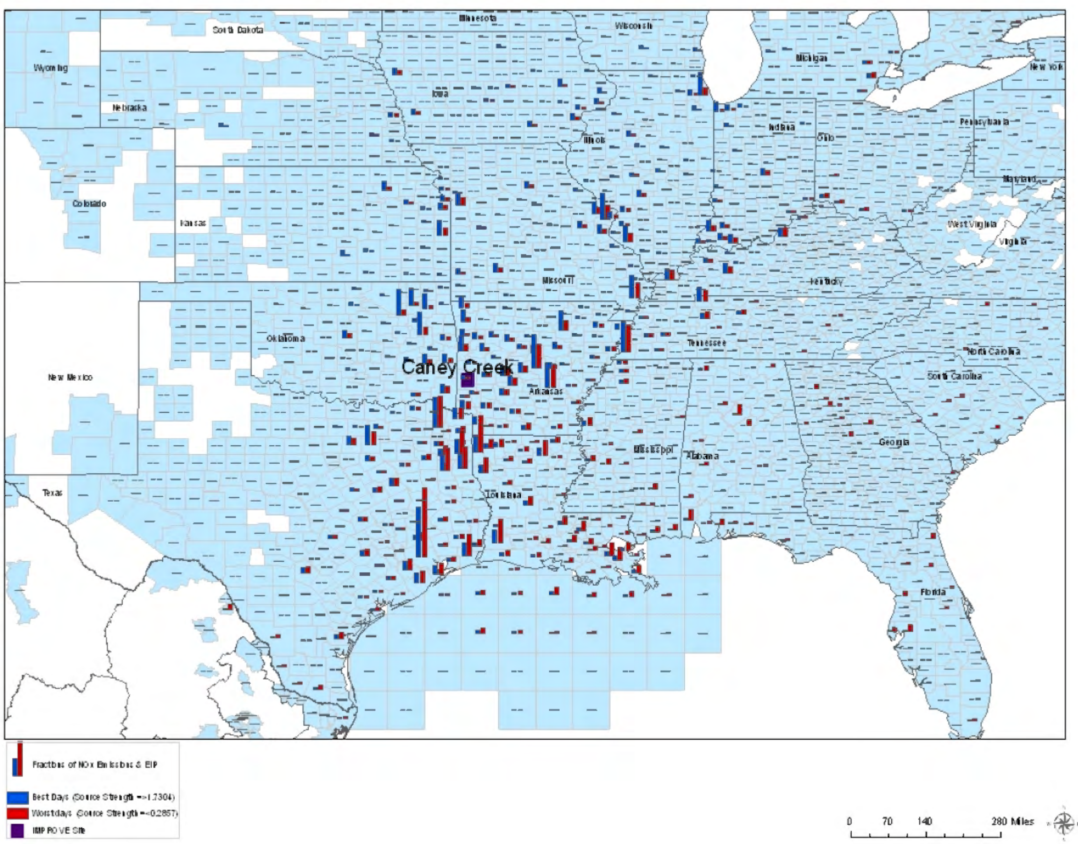
The Secondary Nitrate plus Oil Combustion Factor at the Caney Creek Class I Area



Possible Source Areas of the Identified Nitrate Plus Oil Combustion Factor at the Caney Creek Class I Area
Incremental Probability of the Airmass (Source Score =>1.730)



NOx Emission Impact Potential for the Caney Creek Class 1 Area



Attachment D

StateCo	UPBU/so2Total	UPBU/no2Total	UPBU/so2Max	UPBU/no2Max	StateCo	UPBUso2/no2Total	StateCo	UPBUso2/no2Max
AR	606.3	307.9	247.1	106.8	MO	1,264.1	AR	353.9
IL	518.6	150.6	50.6	14.4	TX	1,254.7	MO	211.9
IN	601.5	172.8	109.2	33.3	AR	914.2	TX	191.5
IA	234.1	72.4	31.7	19.5	OK	777.8	OK	182.7
KS	182.4	200.7	33.9	36.3	IN	774.3	IN	142.5
KY	409.5	96.1	81.8	46.3	LA	746.1	KY	128.1
LA	540.2	205.9	87.9	23.4	IL	669.2	TN	126.0
MS	78.4	48.2	31.4	15.1	KY	505.6	LA	111.3
MO	945.9	318.2	177.3	34.6	TN	435.0	KS	70.2
OH	225.0	56.5	21.7	10.0	KS	383.1	IL	65.0
OK	453.8	324.0	106.0	76.7	IA	306.5	IA	51.2
TN	341.9	93.1	107.2	18.8	OH	281.5	MS	46.5
TX	902.9	351.8	146.1	45.4	MS	126.6	OH	31.7

StateCode	Ming/so2Total	MING/no2Total	MING/so2Max	MING/no2Max	StateCo	MINGso2/no2Total	StateCo	MINGso2/no2Max
AR	365.7	213.0	141.8	87.5	MO	2,450.5	KY	439.9
IL	1,020.0	326.5	198.0	50.8	IN	1,368.2	MO	425.0
IN	1,063.8	304.4	221.2	67.5	IL	1,346.5	IN	288.7
IA	268.5	77.3	35.1	18.4	KY	1,158.6	TN	263.4
KS	136.3	143.7	26.9	28.8	TX	837.9	IL	248.8
KY	906.8	251.8	280.9	159.0	TN	776.4	AR	229.3
LA	442.6	164.1	74.0	19.7	LA	606.7	TX	110.4
MS	77.8	51.3	29.7	15.3	AR	578.7	LA	93.7
MO	1,820.1	630.4	349.8	75.2	OH	401.6	OK	75.0
OH	320.3	81.3	32.9	13.3	OK	347.3	KS	55.7
OK	205.4	141.9	43.5	31.5	IA	345.8	IA	53.5
TN	613.8	162.6	229.7	33.7	KS	280.0	OH	46.2
TX	604.4	233.5	81.9	28.5	MS	129.1	MS	45.0

StateCo	Carc/so2Total	CACR/Total	CACR/so2Max	CACR/Max	StateCo	CACRso2/no2Total	StateCo	CACRso2/no2Max
AR	499.6	269.4	244.8	58.4	TX	1,921.0	TX	371.8
IL	399.4	115.0	37.6	11.1	LA	940.8	AR	303.2
IN	488.6	140.3	87.4	26.7	OK	928.4	OK	181.7
IA	191.3	59.9	26.8	16.3	MO	853.1	MO	139.7
KS	139.8	157.5	27.7	29.7	AR	769.0	LA	134.7
KY	328.9	75.6	60.7	34.4	IN	628.9	IN	114.1
LA	676.3	264.5	106.4	28.3	IL	514.4	TN	101.9
MS	83.5	48.7	34.2	15.9	KY	404.5	KY	95.1
MO	640.9	212.2	120.5	19.2	TN	354.2	KS	57.4
OH	195.8	49.0	18.6	8.9	KS	297.3	MS	50.1
OK	553.5	374.9	114.5	67.2	IA	251.2	IL	48.7
TN	277.3	76.9	86.1	15.8	OH	244.8	IA	43.1
TX	1,381.8	539.2	294.0	77.8	MS	132.2	OH	27.5

Attachment D (cont')

StateCo	Hegl/so2Total	HEGL1/Total	Hegl/so2Max	HEGL1/Max	StateCo	HEGL1so2/no2Total	StateCo	HEGL1so2/no2Max
AR	498.5	254.6	178.5	101.9	MO	1,706.0	MO	309.5
IL	603.4	175.5	57.2	17.8	TX	1,080.6	AR	280.4
IN	666.2	191.5	120.3	36.7	IN	857.7	OK	161.7
IA	267.4	82.0	35.7	22.0	IL	778.9	IN	157.0
KS	214.2	231.3	38.4	41.1	AR	753.1	TX	153.6
KY	448.3	106.2	92.5	52.3	OK	664.6	KY	144.8
LA	475.4	179.2	77.7	20.7	LA	654.6	TN	132.5
MS	71.4	44.2	28.1	13.8	KY	554.5	LA	98.4
MO	1,261.9	444.1	230.6	78.9	KS	445.5	KS	79.5
OH	239.6	60.2	23.2	10.6	TN	445.2	IL	75.0
OK	388.0	276.6	93.8	67.9	IA	349.4	IA	57.7
TN	349.5	95.7	112.8	19.7	OH	299.8	MS	41.9
TX	778.4	302.2	116.3	37.3	MS	115.6	OH	33.8

Attachment E

Table 1 – Contributing States for Hercules Glades Sulfate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	IA	IA	IA
NE	NE	NE	NE	NE
KS	KS	KS	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	**IL**	**IL**	**IL**
IN	**IN**	**IN**	**IN**	**IN**
OH	**OH**	**OH**	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	**KY**	**KY**	**KY**
TN	**TN**	**TN**	TN	**TN**
AR	**AR**	**AR**	**AR**	**AR**
OK	OK	**OK**	OK	OK
TX	**TX**	**TX**	TX	**TX**
LA	LA	LA	LA	LA
MS	MS	**MS**	MS	MS
AL	AL	AL	AL	AL

*state total > 200 tons/km

State in Red/Bold = Major Contributing States

Table 2 – Contributing States for Hercules Glades Nitrate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	**IA**	IA	IA
NE	NE	**NE**	NE	NE
KS	KS	**KS**	KS	KS
MO	**MO**	**MO**	MO	**MO**
IL	IL	IL	IL	IL
IN	**IN**	IN	IN	IN
OH	OH	OH	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	KY	KY	KY
TN	**TN**	TN	TN	TN
AR	**AR**	**AR**	AR	**AR**
OK	OK	**OK**	OK	OK
TX	**TX**	**TX**	TX	**TX**
LA	**LA**	LA	LA	LA
MS	MS	MS	MS	MS
AL	AL	AL	AL	AL

* state total > 200 tons/km

State in Red/Bold = Major Contributing States

Table 3 – Contributing States for the Mingo Wildlife Refuge Area Sulfate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	**WI**	WI
IA	IA	IA	IA	IA
NE	NE	NE	NE	NE
KS	KS	KS	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	**IL**	**IL**	**IL**
IN	**IN**	**IN**	**IN**	**IN**
OH	**OH**	**OH**	**OH**	**OH**
MI	MI	MI	**MI**	MI
KY	**KY**	**KY**	**KY**	**KY**
TN	**TN**	**TN**	**TN**	**TN**
AR	AR	**AR**	AR	AR
OK	OK	**OK**	OK	OK
TX	**TX**	**TX**	TX	**TX**
LA	LA	LA	LA	LA
MS	MS	**MS**	MS	MS
AL	AL	AL	AL	AL

*state total > 200 tons/km

State in Red/Bold = Major Contributing States

Table 4 – Contributing States for the Mingo Wildlife Refuge Area Nitrate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	**IA**	IA	IA
NE	NE	**NE**	NE	NE
KS	KS	**KS**	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	IL	**IL**	**IL**
IN	**IN**	IN	IN	IN
OH	OH	OH	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	KY	KY	KY
TN	**TN**	TN	TN	TN
AR	**AR**	**AR**	AR	**AR**
OK	OK	**OK**	OK	OK
TX	TX	TX	TX	TX
LA	**LA**	LA	LA	LA
MS	**MS**	MS	MS	MS
AL	**AL**	AL	AL	AL

* state total > 200 tons/km l

State in Red/Bold = Major Contributing States

Table 5 – Contributing States for the Upper Buffalo National Area Sulfate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	IA	IA	IA
NE	NE	NE	NE	NE
KS	KS	KS	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	**IL**	**IL**	**IL**
IN	**IN**	**IN**	**IN**	**IN**
OH	**OH**	**OH**	OH	**OH**
MI	MI	MI	MI	MI
KY	**KY**	**KY**	**KY**	**KY**
TN	**TN**	**TN**	TN	**TN**
AR	**AR**	**AR**	**AR**	**AR**
OK	OK	**OK**	OK	OK
TX	**TX**	**TX**	TX	**TX**
LA	LA	LA	LA	LA
MS	MS	**MS**	MS	MS
AL	AL	AL	AL	AL

* state total > 200 tons/km l

State in Red/Bold = Major Contributing States

Table 6 – Contributing States for the Upper Buffalo National Area Nitrate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	**MN**	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	**IA**	**IA**	IA	IA
NE	NE	**NE**	NE	NE
KS	**KS**	**KS**	KS	KS
MO	**MO**	**MO**	MO	**MO**
IL	**IL**	IL	IL	IL
IN	**IN**	IN	IN	IN
OH	OH	OH	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	KY	KY	KY
TN	**TN**	TN	TN	TN
AR	**AR**	**AR**	AR	**AR**
OK	**OK**	**OK**	OK	**OK**
TX	TX	TX	TX	TX
LA	LA	LA	LA	LA
MS	MS	MS	MS	MS
AL	AL	AL	AL	AL

* state total > 200 tons/km

State in Red/Bold = Major Contributing States

Table 7 – Contributing States for the Caney Creek Area Sulfate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	IA	IA	IA
NE	NE	NE	NE	NE
KS	KS	KS	KS	KS
MO	**MO**	**MO**	MO	**MO**
IL	**IL**	**IL**	IL	**IL**
IN	**IN**	**IN**	IN	**IN**
OH	**OH**	**OH**	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	**KY**	KY	**KY**
TN	**TN**	**TN**	TN	**TN**
AR	**AR**	**AR**	**AR**	**AR**
OK	OK	**OK**	OK	OK
TX	TX	**TX**	**TX**	**TX**
LA	LA	LA	LA	LA
MS	MS	**MS**	MS	MS
AL	AL	AL	AL	AL

* state total > 200 tons/km

State in Red/Bold = Major Contributing States

Table 8 – Contributing States for the Caney Creek Area Nitrate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	**IA**	IA	IA
NE	NE	**NE**	NE	NE
KS	KS	**KS**	KS	KS
MO	**MO**	**MO**	MO	**MO**
IL	**IL**	IL	IL	IL
IN	**IN**	IN	IN	IN
OH	OH	OH	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	KY	KY	KY
TN	**TN**	TN	TN	TN
AR	AR	**AR**	AR	AR
OK	**OK**	**OK**	OK	**OK**
TX	**TX**	TX	TX	TX
LA	**LA**	LA	LA	LA
MS	**MS**	MS	MS	MS
AL	**AL**	AL	AL	AL

* state total > 200 tons/km

State in Red/Bold = Major Contributing States

Appendix F

CENRAP Technical Support Document

Draft Report

Technical Support Document for CENRAP Emissions and Air Quality Modeling to Support Regional Haze State Implementation Plans

Prepared for:
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Prepared by:
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September 12, 2007

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1.0 INTRODUCTION

This Technical Support Document (TSD) describes the Central Regional Air Planning Association (CENRAP) regional emissions and air quality modeling to support the central states Regional Haze Rule (RHR) State Implementation Plans (SIPs). The CENRAP 2002 annual emissions and air quality modeling was performed by the contractor team of ENVIRON International Corporation (ENVIRON) and the University of California at Riverside (UCR).

1.1 Background

The 1977 Clean Air Act Amendments (CAAA) added a new Section 169A for the protection of visibility in Federal Class I areas (specific national parks, wilderness areas and wildlife refuges). Section 169A(a)(1) of the CAAA established the national goal for visibility protection: "Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution." The CAAA require States to submit SIPs containing emission limits, schedules of compliance and to "promulgate regulations to assure reasonable progress toward meeting the national goal" (Section 169A(a)(4)). In response to these mandates EPA promulgated the Regional Haze Rule (RHR) on July 1, 1999 that requires States to "establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions" at Class I areas. The States' RHR SIPs are due December 17, 2007 and an important component of the SIP will be the 2018 Reasonable Progress Goals (RPGs) toward achieving natural conditions in 2064. Regional air quality models are used to project visibility to 2018 to determine the level of visibility improvement that is expected to be achieved in 2018. This information, along with other sources, can be used by the states to assist in setting their 2018 RPGs.

CENRAP is one of five Regional Planning Organizations (RPOs) that have responsibility for coordinating development of SIPs and Tribal Implementation Plans (TIPs) in selected areas of the U.S. to address the requirements of the RHR. CENRAP is a regional partnership of states, tribes, federal agencies, stakeholders and citizen groups established to initiate and coordinate activities associated with the management of regional haze and other air quality issues within the CENRAP states. The CENRAP region includes states and tribal lands located within the boundaries of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma and Texas.

The CENRAP Emissions and Air Quality Modeling Team is composed of staff from ENVIRON and UCR, with assistance and coordination from the CENRAP states, tribes, federal agencies and stakeholders. The ENVIRON/UCR Team performs the emissions and air quality modeling simulations for states and tribes within the CENRAP region, providing analytical results used in developing implementation plans under the RHR. Figure 1-1 shows the states included in each of the five RPOs in the U.S., including CENRAP. Table 1-1 lists the Class I areas within the CENRAP states.

CENRAP is performing emissions and air quality modeling to project visibility to 2018. The modeling results will be used to determine the level of visibility improvement expected in 2018

under various emission scenarios. States will use these results to assist in determining their 2018 RPGs toward achieving natural conditions in 2064.

Figure 1-1. Regional Planning Organizations engaged in Regional Haze Modeling.

Table 1-1. Federal Mandated Class I Areas in the CENRAP States.

Class I Area	Acreage	Federal Land Manager	Public Law
Arkansas			
Caney Creek Wilderness Area	14,460	USDA-FS	93-622
Upper Buffalo Wilderness Area	12,018	USDA-FS	93-622
Louisiana			
Breton Wilderness Area	5,000+	USDI-FWS	93-632
Minnesota			
Boundary Waters Canoe Area Wilderness	810,088	USDA-FS	99-577
Voyageurs National Park	114,964	USDI-NP	99-261
Missouri			
Hercules-Glade Wilderness Area	12,314	USDA-FS	94-557
Mingo Wilderness Area	8,000	USDI-FWS	95-557
Oklahoma			
Wichita Mountains Wilderness	8,900	USDI-FWS	91-504
Texas			
Big Bend National Park	708,118	USDI-NP	74-157
Guadalupe Mountains National Park	76,292	USDI-NP	89-667

1.2 CENRAP Organizational Structure and Work Groups

The governing body of CENRAP is the Policy Oversight Group (POG) that is made up of voting members representing states and tribes within the CENRAP region and non-voting members representing local agencies, the EPA and other federal agencies. The work of CENRAP is accomplished through five standing workgroups:

- Monitoring;
- Emissions Inventory;
- Modeling;
- Communications; and
- Implementation and Control Strategies.

Participation in workgroups is open to all interested parties and the POG may form additional ad hoc workgroups to address specific issues (e.g., a Data Analysis workgroup was formed).

The RHR requires the states, and the tribes that may elect to, submit the first SIPs and TIPs that address progress toward natural conditions at federally mandated Class I areas by December 17, 2007. 40 CFR 51.308 (Section 308) discusses the following four core requirements to be included in SIPs/TIPs and Best Available Retrofit Technology (BART) requirements:

1. Reasonable progress goals;
2. Calculations of baseline and natural visibility conditions;
3. A Long-term strategy for regional haze;
4. A Monitoring strategy and other implementation plan requirements; and
5. BART requirements for regional haze visibility impairment.

One of CENRAP's goals is to provide support to states and tribes to meet each of these requirements of the RHR and to develop scientifically supportable, economical and effective control strategies that the states and tribes may adopt to reduce anthropogenic effects on visibility impairment at Class I areas. One component of CENRAP's support to states and tribes as part of compliance with the RHR is performing emissions and air quality modeling. These activities were implemented to:

- obtain a better understanding of the causes of visibility impairment and to identify potential mitigation measures for visibility impairment at Class I areas;
- to evaluate the effects of alternative control strategies for improving visibility; and
- to project future-year air quality and visibility conditions.

In October 2004, CENRAP selected the team of ENVIRON and UCR to perform their Emissions and Air Quality Modeling.

The CENRAP Emissions and Air Quality Modeling Team performs regional haze analyses by operating regional scale, three-dimensional air quality models that simulate the emissions, chemical transformations, and transport of gaseous and particulate matter (PM) species and consequently the effects on visibility in Class I Areas in the central U.S. A key element of this work includes the integration of emissions inventories and emissions models with regional transport models. The general services provided by the CENRAP Emissions and Air Quality Modeling Team include, but are not limited to:

- Emissions processing and modeling;
- Air quality and visibility modeling simulations;
- Analysis, display, and reporting of modeling results; and
- Storage/quality assurance of the modeling input and output files.

The CENRAP 2002 annual Emissions and Air Quality Modeling Team performs work for the CENRAP Modeling Workgroup through direction from the CENRAP Technical Director and CENRAP Executive Director.

1.3 Overview of 2002 Annual Emissions and Air Quality Modeling Approach

The CENRAP 2002 annual emissions and air quality modeling was initiated on October 16, 2004 and involved the preparation of numerous databases, model simulations, presentations and reports. Much of the modeling analyses have been posted to the CENRAP modeling website at: http://pah.cert.ucr.edu/aqm/cenrap/index.shtml. There were numerous versions and iterations of the modeling and interim results. The results presented in this TSD focus on the final modeling results and key findings in their development. The reader is referred to the modeling website for interim products.

1.3.1 Modeling Protocol

A Modeling Protocol was prepared at the outset of the study to serve as a road map for performing the CENRAP emissions and air quality modeling and to communicate the modeling

plans to the CENRAP participants. The Modeling Protocol was prepared following EPA guidance for preparation at the time it was prepared (EPA, 1991; 1999, 2001) and took into account CENRAP's long-term plan (CENRAP, 2003) and the modeling needs of the RHR SIPs. The first version (Version 1.0) of the Modeling Protocol was dated November 19, 2004. Based on comments received from CENRAP, the Modeling Protocol was updated to the current Version 2.0 (Morris et al., 2004a) that was dated December 8, 2004. This Modeling Protocol can be found on the CENRAP modeling Website at:

http://pah.cert.ucr.edu/aqm/cenrap/docs/CENRAP_Draft2.0_Modeling_Protocol_120804.pdf

1.3.2 Quality Assurance Project Plan (QAPP)

A Quality Assurance Project Plan (QAPP) was prepared for the CENRAP emissions and air quality modeling study that described the quality management functions performed by the modeling team. The QAPP was prepared and was based on the national consensus standards for quality assurance (ANSI/ASQC, 1994), followed EPA's guidelines for quality assurance project plans for modeling (EPA, 2002) and for QAPPs (EPA, 2001) and took into account the recommendations from the North American Research Strategy for Tropospheric Ozone (NARSTO) Quality Handbook for modeling projects (NARSTO, 1998). The EPA and NARSTO guidance documents were developed specifically for modeling projects, which have different quality assurance concerns than environmental monitoring data collection projects. The work performed in this project involves modeling at the basic research level and for regulatory/planning applications. In order to use model outputs for these purposes, it must be established that each model is scientifically sound, robust, and defensible. This is accomplished by following a project planning process that incorporates the following elements as described in the EPA modeling guidance document:

- A systematic planning process including identification of assessments and related performance criteria;
- Peer reviewed theory and equations;
- A carefully designed life-cycle development process that minimizes errors;
- Documentation of any changes from original plans;
- Clear documentation of assumptions, theory, and parameterization that is detailed enough so others can understand the model output;
- Input data and parameters that are accurate and appropriate for the analysis; and
- Output data that can be used to help inform decision makers.

The CENRAP QAPP can be found at:

http://pah.cert.ucr.edu/aqm/cenrap/docs/CENRAP_QAPP_Nov_24_2004.pdf).

A key component of the CENRAP emissions and air quality modeling QAPP was the graphical display of model inputs and outputs and multiple peer-review of each step of the modeling process. This was accomplished through use of the CENRAP modeling website where modelers posted displays of work products (e.g., emissions plots, model outputs, etc.) for review by the CENRAP modeling team, modeling workgroup and others. This website can be found at: http://pah.cert.ucr.edu/aqm/cenrap/index.shtml.

1.3.3 Model Selection

The selection of the meteorological, emissions and air quality models for the CENRAP regional haze modeling was based on a review of previous regional haze modeling studies performed in the CENRAP region (e.g., Pitchford et al., 2004; Pun, Chen and Seigneur, 2004; Tonnesen and Morris 2004) as well as elsewhere in the United States (e.g., Morris et al, 2004a; Tonnesen et al., 2003; Baker, 2004). The CENRAP emissions and air quality Modeling Protocol (Morris et al., 2004a) provides details on the justification for model selection and the formulation of the different models. Based on previous work (e.g., CENRAP, WRAP, VISTAS, MRPO, BRAVO and EPA), CENRAP selected the following models for use in modeling PM and regional haze in the central states:

- **MM5:** The Pennsylvania State University/National Center for Atmospheric Research (PSU/NCAR) Mesoscale Meteorological Model (MM5 Version 3.6 MPP) is a non-hydrostatic, prognostic meteorological model routinely used for urban- and regional-scale photochemical, fine particulate, and regional haze regulatory modeling studies (Anthes and Warner, 1978; Chen and Dudhia, 2001; Stauffer and Seaman, 1990, 1991; Xiu and Pleim, 2000).

- **SMOKE**: The Sparse Matrix Operator Kernel Emissions (SMOKE) modeling system is an emissions modeling system that generates hourly gridded speciated emission inputs of mobile, non-road, area, point, fire and biogenic emission sources for photochemical grid models. (Coats, 1995; Houyoux and Vukovich, 1999). As with most ‘emissions models’, SMOKE is principally an *emission processing system* and not a true *emissions modeling system* in which emissions estimates are simulated from ‘first principles’. This means that, with the exception of mobile and biogenic sources, its purpose is to provide an efficient tool for converting an existing base emissions inventory data into the hourly, gridded, speciated, and formatted emission files required by an air quality model.

- **CMAQ:** EPA’s Models-3/Community Multiscale Air Quality (CMAQ) modeling system is a ‘One-Atmosphere’ photochemical grid model capable of addressing ozone, PM, visibility and acid deposition at a regional scale for extended periods of time (Dennis, et al., 1996; Byun et al., 1998a; Byun and Ching, 1999, Pleim et al., 2003).

- **CAMx:** ENVIRON’s Comprehensive Air Quality Model with Extensions (CAMx) modeling system is also a state-of-science ‘One-Atmosphere’ photochemical grid model capable of addressing ozone, PM, visibility and acid deposition at a regional scale for extended periods of time. (ENVIRON, 2006).

1.3.3.1 MM5 Meteorological Model Configuration for CENRAP Annual Modeling

Application of the MM5 for the 2002 annual modeling on a 36 km grid for the continental US was performed by the Iowa Department of Natural Resources (IDNR; Johnson, 2007). Details of the 2002 36 km MM5 model application and evaluation procedures carried out by IDNR may be found in Johnson, 2007. Application of the MM5 model on a 12 km grid covering the Central States for portions of 2002 was performed by EPA Region VII and the Texas Commission on Environmental Quality (TCEQ).

The MM5 (Version 3.63) configuration used in the generation of the meteorological modeling datasets consists of the following (see Table 1-2 for more details):

- 36 km grid with 34 vertical layers;
- 12 km nested grid for episodic modeling;
- For 12 km runs use two way nesting (without feedback) within the 36 km grid;
- Initialization and boundary conditions from Eta analysis fields;
  - Eta 3D and surface analysis data (ds609.2);
  - Not using NCEP global tropospheric SST data (ds083.0) ;
  - Observational enhancement (LITTLE_R)
    - NCEP ADP surface obs (ds464.0)
    - NCEP ADP upper-air obs (ds353.4)
- Pleim-Xiu (P-X) land-surface model (LSM);
- Pleim-Chang Asymmetric Convective Mixing (ACM) PBL model;
- Kain-Fritsch 2 cumulus parameterization;
- Mixed phase (Reisner 1) cloud microphysics;
- Rapid Radiative Transfer Model (RRTM) radiation;
- No Shallow Convection (ISHALLO=0);
- Standard 3D FDDA analysis nudging outside of PBL; and
- Surface nudging of the winds only.

1.3.3.2 SMOKE Emissions Model Configuration for CENRAP Annual Modeling

SMOKE supports area, mobile, fire and point source emission processing and includes biogenic emissions modeling through a rewrite of the Biogenic Emission Inventory System, version 3 (BEIS3) (see, http://www.epa.gov/ttn/chief/software.html#pcbeis). SMOKE has been available since 1996, and has been used for emissions processing in a number of regional air quality modeling applications. In 1998 and 1999, SMOKE was redesigned and improved with the support of the U.S. Environmental Protection Agency (EPA), for use with EPA's Models-3/CMAQ (http://www.epa.gov/asmdnerl/models3). The primary purposes of the SMOKE redesign were support of: (a) emissions processing with user-selected chemical mechanisms and (b) emissions processing for reactivity assessments.

As an emissions processing system, SMOKE has far fewer ‘science configuration’ options compared with the MM5 and CMAQ models. Table 1-3 summarizes the version of the SMOKE system that was used and the sources of data that were employed in constructing the required modeling inventories.

1.3.3.3 CMAQ Air Quality Model Configuration for CENRAP Annual Modeling

CENRAP used CMAQ Version 4.5 with the “SOAmods enhancement”, described below, and used the model configuration as shown in Table 1-4. The model was set up and exercised on the same 36 km grid that was used by WRAP and VISTAS, the 36 km RPO national grid. CENRAP performed 12 km CMAQ sensitivity tests and found little change in model performance with a large penalty in computation time. Consequently, at the February 7, 2006 CENRAP Modeling

Workgroup Meeting a decision was made to proceed with the CENRAP emissions and air quality modeling using just the 36 km national RPO grid (Morris et al., 2006a).

Initial CMAQ 2002 simulations performed by VISTAS found that the model greatly underestimates organic mass carbon (OMC) concentrations, especially in the summer. A review of the CMAQ formulation found that it failed to treat Secondary Organic Aerosol (SOA) formation from sesquiterpenes and isoprene and also failed to account for the fact that SOA can become polymerized so that it is no longer volatile and stays in the particle form. Thus, VISTAS updated the CMAQ SOA module to include these missing processes and found much improved OMC model performance (Morris et al., 2006c). CENRAP tested the CMAQ Version 4.5 with SOAmods enhancement and found it performed much better for OMC than the standard versions of CMAQ Version 4.5. Therefore, CMAQ Version 4.5, with the enhanced SOAmods (Morris et al., 2006c), was adopted for the CENRAP modeling. CMAQ Version 4.5 is available from the CMAS center (www.cmascenter.org).

1.3.3.4 CAMx Air Quality Model Configuration for CENRAP Annual Modeling

CAMx Version 4.40 was applied using similar options as used by CMAQ. CAMx was used initially in side-by-side comparisons with CMAQ. Comparative model performance results and other factors for CAMx V4 and CMAQ V4.4 with SOAmods were presented at the February 7, 2006 CENRAP modeling workgroup meetings that found (Morris et al., 2006b):

- No one model was consistently performing better than the other over all species and averaging times.
- Both models performed well for sulfate.
- CMAQ's winter nitrate over-prediction tendency not as large as CAMx's.
- CAMx performed slightly better than CMAQ for elemental carbon (EC).
- CMAQ performed much better than CAMx for organic mass carbon (OMC).
- Both models over-predicted Soil and under-predicted coarse mass (CM).
- CMAQ ran faster than CAMx due to MPI multi-processing capability.
- CAMx required much less disk space than CMAQ.

Based on these factors, CMAQ was selected as the lead air quality model for the CENRAP regional haze modeling with CAMx the secondary corroborative model. However, CAMx also contained a PM Source Apportionment Technology (PSAT) capability that was used widely in the CENRAP modeling. Table 1-4 lists the main CAMx configuration used for the CENRAP annual modeling that was selected, in part, to be consistent with the CMAQ model configuration (Table 1-4). One exception to this was that the CAMx PSAT simulations used the Bott advection solver rather than the PPM advection solver. The PPM advection solver is typically used in the standard CAMx and CMAQ runs. Bott, however, is more computationally efficient and the high computational requirements of the CAMx PSAT runs dictated this choice.

Table 1-2. MM5 Meteorological Model Configuration for CENRAP 2002 Annual Modeling (Johnson, 2007).

Science Options	Configuration	Details/Comments
Model Code	MM5 version 3.63	Grell et al., 1994
Horizontal Grid Mesh	36 km	
36 km grid	165 x 129 dot points	RPO MM5 Grid
Vertical Grid Mesh	34 layers	Vertically varying; sigma pressure coordinate system
Grid Interaction	No Feedback	IFEED=0
Initialization	Eta first guess fields/LittleR	
Boundary Conditions	Eta first guess fields/LittleR	
Microphysics	Reisner I Mixed Ice	Look up table
Cumulus Scheme	Kain-Fritsch 2	On 36 and 12 km Grids
Planetary Boundary Layer	ACM PBL	
Radiation	RRTM	
Vegetation Data	USGS	24 Category Scheme
Land Surface Model	Pleim-Xiu Land Surface Model (LSM)	
Shallow Convection	None	
Sea Surface Temperature	Eta Skin	Spatially varying
Thermal Roughness	Garratt	
Snow Cover Effects	None	
4D Data Assimilation	Analysis Nudging on 36 and 12	
Surface Nudging	Wind Field Only	
Integration Time Step	90 seconds	
Simulation Periods	Annual 2002 for 36 km	12 km episodic only
Platform	Linux Cluster	Done at IDNR[1]

[1] Twelve km episodic modeling completed by EPA Region VII and the Texas Commission on Environmental Quality.

Table 1-3. SMOKE Emissions Model Configuration for CENRAP Annual Modeling.

Emissions Component	Configuration	Details/Comments
Emissions Model	SMOKE Version 2.3	Several versions of SMOKE used during course of the study
Horizontal Grid Mesh	36 km	
36 km grid	148 x 112 cells	RPO National Grid
Area Source Emissions	CENRAP Domain: CENRAP State 2002 EI	Updated '02 developed by CENRAP states (Pechan, 2005d,e)
	Other States: '02 NEI augmented with other 2002	Generated from EPA NEI02 v.1 and RPO interaction (Pechan, 2005c)
On-Road Mobile Sources	CENRAP Domain: CENRAP VMT data	Updated '02 developed by CENRAP states (Reid et al., 2004a)
	Other States: EPA '02 NEI augmented with other 2002	Generated from EPA NEI02 v.1 and RPO interaction (Pechan, 2005c)
Point Sources	CENRAP Domain: CENRAP State 2002 EI	Updated '02 developed by CENRAP states and stakeholders (Pechan, 2005a,b)
	Other States: EPA '02 NEI augmented with other 2002	Generated from EPA NEI02 v.1 and RPO interaction (Pechan, 2005c)
Off-Road Mobile Sources	CENRAP Domain: CENRAP State 2002 EI	Updated '02 developed by CENRAP states (Pechan, 2005d,e)
	Other States: EPA '02 NEI augmented with other 2002	Generated from EPA NEI02 v.1 and RPO interaction (Pechan, 2005c)
Biogenic Sources	SMOKE BEIS-3	BELD3 vegetative database
Mexican Sources	1999 Emissions for 2002 and 2018	http://www.epa.gov/ttn/chief/net/mexico.html; (ERG, 2006)
Canadian Sources	2000 Emissions for 2002 and 2020 Emissions for 2018	http://www.epa.gov/ttn/chief/net/canada.html
Temporal Adjustments	Seasonal, day, hour	Based on latest collected information and CEM-based profiles
Chemical Speciation	Revised CBM-IV Chemical Speciation	Updated January 2004
Gridding	Revised EPA Spatial Surrogates Used	Gridding of surrogates from http://www.epa.gov/ttn/chief/emch/spatial/
Growth and Controls	CENRAP developed	Pechan (2005a,b)
Quality Assurance	QA Tools in SMOKE 2.0	Follow QAPP (Morris and Tonnesen, 2004) and QA refinements (Morris and Tonnesen, 2006)
Simulation Periods	Annual 2002 for 36 km	Episodic periods at 12 km

Table 1-4. CMAQ Air Quality Model Configuration for CENRAP Annual Modeling.

Science Options	Configuration	Details/Comments
Model Code	CMAQ Version 4.5 w/ SOAmods	Secondary Organic Aerosol enhancements as described by Morris et al., (2006c)
Horizontal Grid Mesh	36 km annual	36 km covering continental U.S; some episodic 12 km sensitivity runs were also performed
36 km grid	148 x 112 cells	RPO National Grid
Vertical Grid Mesh	19 Layers	First 17 layers sync'd w/ MM5
Grid Interaction	One-way nesting	
Initial Conditions	~15 days full spin-up	Separately run 4 quarters of 2002
Boundary Conditions	2002 GEOS-CHEM day-specific	2002 GEOS-CHEM day specific 3-hour average data
Emissions		
Baseline Emissions Processing	See SMOKE model configuration	MM5 Meteorology input to SMOKE, CMAQ
Sub-grid-scale Plumes	No Plume-in-Grid (PinG)	
Chemistry		
Gas Phase Chemistry	CBM-IV	
Aerosol Chemistry	AE3/ISORROPIA	
Secondary Organic Aerosols	Secondary Organic Aerosol Model (SORGAM) w/ SOAmods update	Schell et al., (2001); Morris et al., (2006c)
Cloud Chemistry	RADM-type aqueous chemistry	Includes subgrid cloud processes
N2O5 Reaction Probability	0.01 – 0.001	
Meteorological Processor	MCIP Version 2.3	Includes dry deposition and snow cover updates
Horizontal Transport		
Numerical Scheme	PPM advection solver	
Eddy Diffusivity Scheme	K-theory with Kh grid size dependence	Multiscale Smagorinsky (1963) approach
Vertical Transport		
Eddy Diffusivity Scheme	K-theory	
Diffusivity Lower Limit	Kzmin = 0.1 to 1.0	Land use dependent Kzmin
Deposition Scheme	M3dry	Directly linked to Pleim-Xiu Land Surface Model parameters
Numerics		
Gas Phase Chemistry Solver	Euler Backward Iterative (EBI) solver	
Horizontal Advection Scheme	Piecewise Parabolic Method (PPM) scheme	
Simulation Periods	Annual 2002 for 36 km	Episodic periods at 12 km
Integration Time Step	Calculated Internally	15 minute coupling time step

Table 1-5. CAMx Air Quality Model Configuration for CENRAP Annual Modeling.

Science Options	Configuration	Details
Model Code	CAMx Version 4.40	Available at: www.camx.com
Horizontal Grid Mesh	36 km annual	36 km covering continental U.S
36 km grid	148 x 112 cells	
Vertical Grid Mesh	19 Layers	17 Layers sync'd w/ MM5
Grid Interaction	Two-way nesting	
Initial Conditions	~15 days full spin-up	Separately run 4 quarters of 2002
Boundary Conditions	2002 GEOS-CHEM day-specific	2002 GEOS-CHEM day specific 3-hour average data
Emissions		
Baseline Emissions Processing	See SMOKE model configuration	MM5 Meteorology input to SMOKE, CAMx
Sub-grid-scale Plumes	No Plume-in-Grid (PinG)	Consistent with CMAQ
Chemistry		
Gas Phase Chemistry	CBM-IV	with Isoprene updates
Aerosol Chemistry	ISORROPIA equilibrium	Dynamic and hybrid also available but not used
Secondary Organic Aerosols	SOAP	
Cloud Chemistry	RADM-type aqueous chemistry	Alternative is CMU multi-section aqueous chemistry
N2O5 Reaction Probability	None	
Meteorological Processor	MM5CAMx	
Horizontal Transport		
Eddy Diffusivity Scheme	K-theory with Kh grid size dependence	
Vertical Transport		
Eddy Diffusivity Scheme	K-Theory	
Diffusivity Lower Limit	Kzmin = 0.1 to 1.0	Land use dependent Kzmin
Planetary Boundary Layer	No Patch	
Deposition Scheme	Wesely	
Numerics		
Gas Phase Chemistry Solver	CMC Fast Solver	
Horizontal Advection Scheme	Piecewise Parabolic Method (PPM) scheme. PSAT w/ Bott scheme.	
Simulation Periods	Annual 2002 at 36 km	
Integration Time Step	Wind speed dependent	

1.3.4 Modeling Domains

The CENRAP emissions and air quality modeling was conducted on the 36 km national RPO domain as depicted in Figure 1-2. This domain consists of a 148 by 112 array of 36 km by 36 km grid cells and covers the continental United States. Sensitivity simulations were also performed for episodes on a 12 km modeling domain covering the central states, however the results were very similar to the 36 km results so CENRAP elected to proceed with the 2002 annual modeling using the 36 km domain for computational efficiency (Morris et al., 2006a).

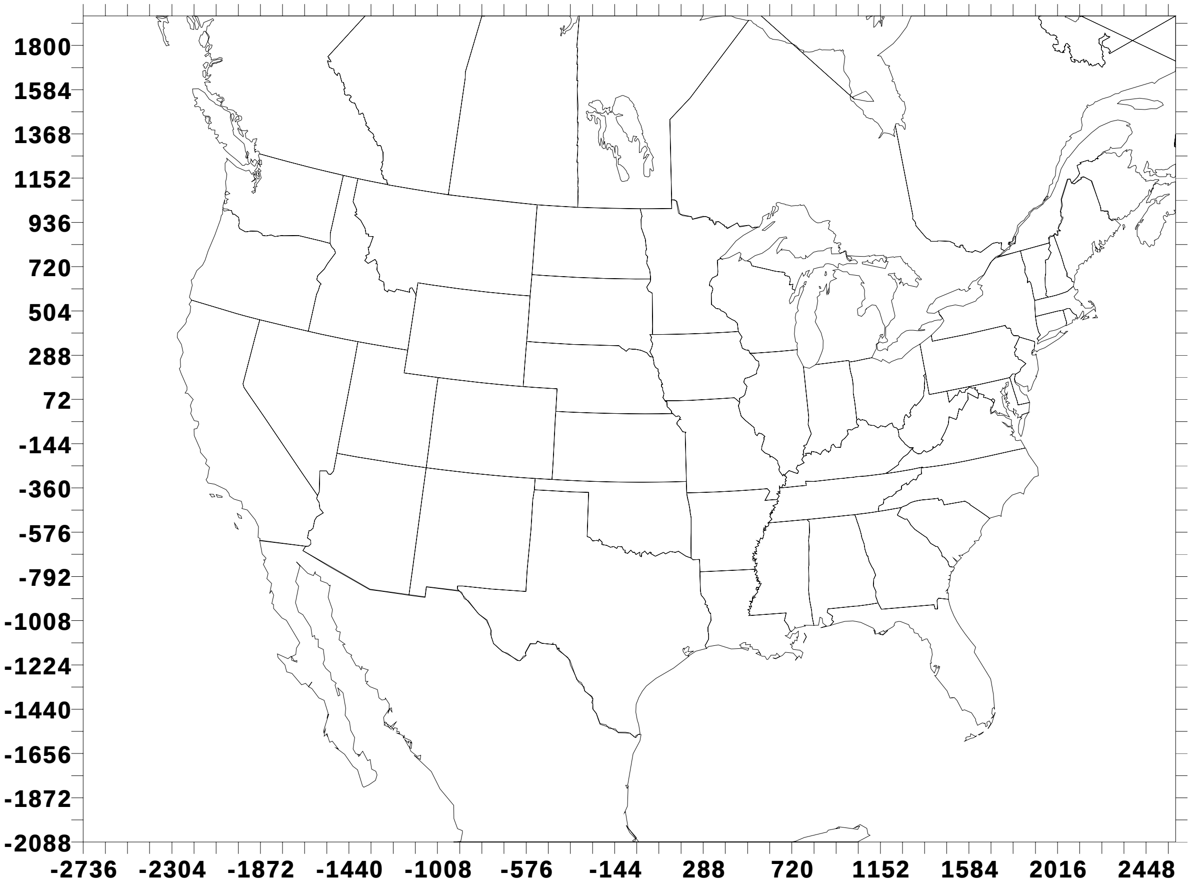


Figure 1-2. National Inter-RPO 36 km modeling domain used for the CENRAP 2002 annual SMOKE, CMAQ and CAMx modeling.

1.3.5 Vertical Structure of Modeling Domain

The MM5 meteorological model was exercised using 34 vertical layers from the surface to a pressure level of 100 mb (approximately 15 km above ground level). Both the CMAQ and CAMx air quality models can employ layer collapsing in which vertical layers in the MM5 are combined in the air quality model, which improves computational efficiency. The sensitivity of the CMAQ model estimates to the number of vertical layers was evaluated by the Western Regional Air Partnership (WRAP) and Visibility Improvements State and Tribal Association of the Southeast (VISTAS) (Tonnesen et al., 2005; 2006; Morris et al., 2004a). CMAQ model simulations were performed with no layer collapsing (i.e., the same 34 layers as used by MM5) and with various levels of layer collapsing. These studies found that using 19 vertical layers up

to 100 mb (i.e., same model top as MM5) and matching the eight lowest MM5 vertical layers near the surface produced nearly identical results as with no layer collapsing. They also found that very aggressive layer collapsing (e.g., 34 to 12 layers) produced results with substantial differences compared to no layer collapsing. Therefore, based on the WRAP/VISTAS sensitivity analysis, CENRAP adopted the 19 vertical layer configuration up to the 100 mb model top. Figure 1-3 displays the definition of the 34 MM5 vertical layers and how they were collapsed to 19 vertical layers in the air quality modeling performed by CENRAP.

MM5					CMAQ 19L				
Layer	Sigma	Pres(mb)	Height(m	Depth(m)	Layer	Sigma	Pres(mb)	Height(m)	Depth(m
34	0.000	100	14662	1841	19	0.000	100	14662	6536
33	0.050	145	12822	1466		0.050	145		
32	0.100	190	11356	1228		0.100	190		
31	0.150	235	10127	1062		0.150	235		
30	0.200	280	9066	939		0.200	280		
29	0.250	325	8127	843	18	0.250	325	8127	2966
28	0.300	370	7284	767		0.300	370		
27	0.350	415	6517	704		0.350	415		
26	0.400	460	5812	652		0.400	460		
25	0.450	505	5160	607	17	0.450	505	5160	1712
24	0.500	550	4553	569		0.500	550		
23	0.550	595	3984	536		0.550	595		
22	0.600	640	3448	506	16	0.600	640	3448	986
21	0.650	685	2942	480		0.650	685		
20	0.700	730	2462	367	15	0.700	730	2462	633
19	0.740	766	2095	266		0.740	766		
18	0.770	793	1828	259	14	0.770	793	1828	428
17	0.800	820	1569	169		0.800	820		
16	0.820	838	1400	166	13	0.820	838	1400	329
15	0.840	856	1235	163		0.840	856		
14	0.860	874	1071	160	12	0.860	874	1071	160
13	0.880	892	911	158	11	0.880	892	911	158
12	0.900	910	753	78	10	0.900	910	753	155
11	0.910	919	675	77		0.910	919		
10	0.920	928	598	77	9	0.920	928	598	153
9	0.930	937	521	76		0.930	937		
8	0.940	946	445	76	8	0.940	946	445	76
7	0.950	955	369	75	7	0.950	955	369	75
6	0.960	964	294	74	6	0.960	964	294	74
5	0.970	973	220	74	5	0.970	973	220	74
4	0.980	982	146	37	4	0.980	982	146	37
3	0.985	986.5	109	37	3	0.985	986.5	109	37
2	0.990	991	73	36	2	0.990	991	73	36
1	0.995	995.5	36	36	1	0.995	995.5	36	36
0	1.000	1000 0 0		0	0	1.000	1000 0 0		

Figure 1-3. MM5 34 vertical layer definitions and scheme for collapsing the 34 layers down to 19 layers for the CENRAP CMAQ and CAMx 2002 annual modeling.

1.3.6 2002 Calendar Year Selection

The calendar year 2002 was selected for CENRAP regional haze annual modeling as described in the CENRAP Modeling Protocol (Morris et al., 2004a). EPA's applicable guidance on $PM_{2.5}$/Regional Haze modeling at that time (EPA, 2001) identified specific goals to consider when selecting modeling periods for use in demonstrating reasonable progress in attaining the regional haze goals. However, since there is much in common with the goals for selecting episodes for annual and episodic $PM_{2.5}$ attainment demonstrations as well as regional haze, EPA's current guidance addresses all three in a common document. (EPA, 2007) At the time of the modeling period selection EPA had also published an updated summary of $PM_{2.5}$ and Regional Haze Modeling Guidance (Timin, 2002) that served, in some respects, as an interim placeholder until the final guidance was issued as part of the $PM_{2.5}$/regional haze NAAQS implementation process that was ultimately published in April 2007 (EPA, 2007). The interim EPA modeling guidance for episode selection (EPA, 2001; Timin, 2002) was consistent with the final EPA regional haze modeling guidance (EPA, 2007).

EPA recommends that the selection of a modeling period derive from three principal criteria:

- A variety of meteorological conditions should be covered that includes the types of meteorological conditions that produce the worst 20 percent and best 20 percent visibility days at Class I areas in the CENRAP States during the 2000-2004 baseline period;

- To the extent possible, the modeling data base should include days for which enhanced data bases (i.e. beyond routine aerometric and emissions monitoring) are available; and

- Sufficient days should be available such that relative response factors (RRFs) can be based on several (i.e., $\geq$ 15) days.

For regional haze modeling, the guidance goes further by suggesting that the preferred approach is to model a full, *representative* year (EPA, 2001, pg. 188). Moreover, the required RRF values should be based on model results averaged over the 20 percent worst and 20 percent best visibility days determined for each Class I area based on monitoring data from the 2000 – 2004 baseline period. More recent EPA guidance (Timin, 2002) suggests that states should model at least 10 worst and 10 best visibility days at each Class 1 area. EPA also lists several 'other considerations' to bear in mind when choosing potential PM/regional haze episodes including: (a) choose periods which have already been modeled, (b) choose periods which are drawn from the years upon which the current design values are based, (c) include weekend days among those chosen, and (d) choose modeling periods that meet as many episode selection criteria as possible in the maximum number of nonattainment or Class I areas as possible.

Due to limited available resources CENRAP was restricted to modeling a single calendar year. The RHR uses the five-year baseline of 2000-2004 period as the starting point for projecting future-year visibility. Thus, the modeling year should be selected from this five-year baseline period. The 2002 calendar year, which lies in the middle of the 2000-2004 Baseline, was selected for the following reasons:

- Based on available information, 2002 appears to be a fairly typical year in terms of meteorology for the 5-year Baseline period of 2000-2004;

- 2003 and 2004 appeared to be colder and wetter than typical in the eastern US;
- The enhanced IMPROVE and IMPROVE Protocol and Supersites PM monitoring data were fully operational by 2002. Much less IMPROVE monitoring data was available during 2000-2001, especially in the CENRAP region;
- IMPROVE data for 2003 and 2004 were not yet available at the time that the CENRAP modeling was initiated; and
- 2002 was being used by the other RPOs.

1.3.7 Initial Concentrations and Boundary Conditions

The CMAQ and CAMx models were operated separately for each of four quarters of the 2002 year using a ~15 day spin up period (i.e., the models were started approximately 15 days before the first day of interest in each quarter in order to limit the influence of the assumed initial concentrations, e.g., start June 15 for quarter 3 whose first day of interest is July 1). Sensitivity simulations demonstrated that with ~15 initialization days, the influence of initial concentrations (ICs) was minimal using the 36 km Inter-RPO continental U.S. modeling domain. Consequently, clean ICs were specified in the CMAQ and CAMx modeling using a ~15 day spin up period.

Boundary Conditions (BCs) (i.e., the assumed concentrations along the later edges of the 36 km modeling domain, see Figure 1-2) were based on a 2002 simulation by the GEOS-CHEM global circulation/chemistry model. GEOS-CHEM is a three-dimensional global chemistry model driven by assimilated meteorological observations from the Goddard Earth Observing System (GEOS) of the NASA Global Modeling and Assimilation Office. It is applied by research groups around the world to a wide range of atmospheric composition problems, including future climates and planetary atmospheres using general circulation model meteorology to drive the model. Central management and support of the model is provided by the Atmospheric Chemistry Modeling Group at Harvard University.

A joint RPO study was performed, coordinated by VISTAS, in which Harvard University applied the GEOS-CHEM global model for the 2002 calendar year (Jacob, Park and Logan, 2005). The University of Houston (UH) was retained to process the 2002 GEOS-CHEM output into BCs for the CMAQ model (Byun, 2004). The GEOS-CHEM simulations for the RPOs used GEOS meteorological observations for the year 2002. These were obtained from the Global Modeling and Assimilation Office(GMAO) as a 6-hourly archive (3-hour for surface quantities such as mixing depths). The data through August 2002 were from the GEOS-3 assimilation, with horizontal resolution of 1^ox1^o and 55 vertical layers. The data after August 2002 were from the updated GEOS-4 assimilation, with horizontal resolution of 1^ox1.25^o and 48 vertical layers (note 1^o latitude is equal to approximately 110 km). The GEOS-CHEM output was processed by mapping the GEOS-CHEM chemical compounds to the species in the CBM-IV chemical mechanism used by CMAQ/CAMx and mapping the GEOS-CHEM vertical layers to the 19 layer vertical layer structure used by CMAQ/CAMx in the CENRAP modeling (Byun, 2004). The results were day-specific three-hourly BC inputs for the CMAQ model. The CMAQ2CAMx processor was then used to transform the CMAQ day-specific 3-hourly BCs to the format used by CAMx.

There were several quality assurance (QA) checks of the BCs generated from the 2002 GEOS-CHEM output. The first QA/QC check was a range check to assure reasonable values. The BCs were compared against the GEOS-CHEM outputs to assure the mapping and interpolation was performed correctly. The code used to map the GEOS-CHEM output to the CMAQ BC format was obtained from UH, reviewed and the BC generation duplicated for several time periods during 2002.

1.3.8 Emissions Input Preparation

The CENRAP SMOKE emissions modeling was based on an updated 2002 emissions data for the U.S. (Pechan, 2005c,e; Reid et al., 2004a,b), 1999 emissions data for Mexico (ERG, 2006), and 2000 emissions data for Canada. These data were used to generate a final base 2002 Base G Typical (Typ02G) annual emissions database. Numerous iterations of the emissions modeling were conducted using interim databases before arriving at the final Base G emission inventories (e.g., Morris et al., 2005). The 2018 Base G base case emissions (Base18G) for most source categories in the U.S. were based on projections of the 2002 inventory assuming growth and control (Pechan, 2005d). 2018 EGU emissions were based on the run 2.1.9 of the Integrated Planning Model (IPM) updated by the CENRAP states. Canadian emissions for the Base18G scenario were based on a 2020 inventory, whereas the Mexican 1999 inventory was held constant for 2018.

The Typ02G and Base18G emission inventories represent significant improvements to the preliminary emissions modeling performed by CENRAP (Morris et al., 2005). While the preliminary 2002 modeling served its purpose to develop the infrastructure for modeling large emissions data sets and producing annual emissions simulations, much of the input data (both as inventories and ancillary data) were placeholders for actual 2002 data that were being prepared through calendar year 2005. As these actual 2002 data sets became available, they were integrated into the SMOKE modeling and QA system that was developed during the preliminary modeling, to produce a high-quality emissions data set for use in the final CMAQ and CAMx modeling. The addition of entirely new inventory categories, like marine shipping, added complexity to the modeling. By the end of the emissions data collection phase, there were 23 separate emissions processing streams covering a variety of sources categories necessary to general model-ready emission inputs for the 2002 calendar year.

Details on the emissions modeling are provided in Chapter 2 with additional information contained in Appendix B.

1.3.9 Meteorological Input Preparation

The 2002 36 km MM5 meteorological modeling was conducted by the Iowa Department of Natural Resources (IDNR) who also performed a preliminary model performance evaluation (Johnson, 2007). CENRAP performed an additional MM5 evaluation of the CENRAP 2002 36 km MM5 simulation that included a comparative evaluation against the final VISTAS 2002 36 km MM5 and an interim WRAP 2002 36 km simulation (Kemball-Cook et al., 2004). Kemball-Cook and co-workers (2004) found the following in the comparative evaluation of the CENRAP, WRAP and VISTAS 2002 36 km MM5 simulations, (details are provided in Appendix A):

Surface Meteorological Performance within the CENRAP Region

- The three MM5 simulations (CENRAP, VISTAS and WRAP) obtained comparable model performance for winds and humidity that were within model performance benchmarks.
- The WRAP MM5 simulation obtained better temperature model performance than the other two simulations due to the use of surface temperature data assimilation.
    - In the final WRAP MM5 simulation the use of surface temperature assimilation was dropped because it introduced instability in the vertical structure of the atmosphere.
- For all three runs, the Northern CENRAP domain had a cold bias in winter and a warm bias in summer.

Surface Meteorological Performance outside the CENRAP Region

- All three runs had similar surface wind model performance in the western U.S. that was outside the model performance benchmarks
- For temperature, the WRAP MM5 simulation had the best performance overall due to the surface temperature data assimilation that was dropped in the final WRAP run.
- The three runs had comparable humidity performance, although WRAP exhibited a larger wet bias in the summer and the southwestern U.S.

Upper-Air Meteorological Performance

- The VISTAS and CENRAP MM5 simulations were better able to reproduce the deep convective summer boundary layers compared to the WRAP MM5 simulations, which exhibited a smoother decrease in temperature with increase in altitude.
- CENRAP and VISTAS MM5 simulations better simulated the surface temperature inversions than WRAP.
- WRAP was better able to simulate the surface temperature.
- All three models exhibited similar vertical wind profiles.

Precipitation Performance

- In winter, all three MM5 simulations exhibited similar, fairly good, performance in reproducing the spatial distribution and magnitudes of the monthly average observed precipitation.
- In summer, all runs had a wet bias, particularly in the desert southwest where the interim WRAP run had the largest wet bias.

In conclusion, the VISTAS simulation appeared to perform best, the CENRAP MM5 model performance was generally between the VISTAS and WRAP performance, with performance more similar to VISTAS than WRAP. Although the interim WRAP MM5 simulation performed best for surface temperature due to the surface temperature data assimilation, the surface temperature assimilation degraded the MM5 upper-air performance including the ability to assimilate surface inversions and was ultimately dropped from the final WRAP MM5 simulations (Kemball-Cook et al., 2005).

The IDNR 12 km[2] MM5 simulations were also evaluated and compared with the performance of the 36 km MM5 simulation (Johnson et al., 2007). The IDNR 36 km and 12 km MM5 model performance was similar (Johnson, 2007), which supported the findings of the CMAQ and CAMx 36 and 12 km sensitivity simulations that there was little benefit of using a 12 km grid for simulating regional haze at rural Class I areas (Morris et al., 2006a). However, as noted by Tonnesen and co-workers (2005; 2006) and EPA modeling guidance (1991; 1999; 2001; 2007) this finding does not necessarily hold for 8-hour ozone and $PM_{2.5}$ modeling that is characterized by sharper concentration gradients and frequently occurs in the urban environment as compared to the more rural nature of regional haze.

1.3.10 Photolysis Rates Model Inputs

Several chemical reactions in the atmosphere are initiated by the photodissociation of various trace gases. To accurately represent the complex chemical transformations in the atmosphere, accurate estimates of these photodissociation rates must be made. The Models-3/CMAQ system includes the JPROC processor, which calculates a table of clear-sky photolysis rates (or J-values) for a specific date. JPROC uses default values for total aerosol loading and provides the option to use default ozone column data or to use measured total ozone column data. These data come from the Total Ozone Mapping Spectrometer (TOMS) satellite data. TOMS data that is available at 24-hour averages was obtained from http://toms.gsfc.nasa.gov/eptoms/ep.html. Day-specific TOMS data was used in the CMAQ radiation model (JPROC) to calculate photolysis rates. The TOMS data were missing or erroneous for several periods in 2002: August 2-12; June 10; and November 18-19. Thus, the TOMS data for August 1, 2002 was used for August 2-7 and TOMS data for August 13 was used for August 8-12. Similarly, TOMS data for June 9 was used for June 10 and data for August 17 was used for August 18-19. Note that the total column of ozone in the atmosphere is dominated by stratospheric ozone which has very little day-to-day variability so the use of TOMS data within a week or two of an actual day introduces minimal uncertainties in the modeling analysis.

JPROC produces a "look-up" table that provides photolysis rates as a function of latitude, altitude, and time (in terms of the number of hours of deviation from local noon, or hour angle). In the current CMAQ implementation, the J-values are calculated for six latitudinal bands (10º, 20º, 30º, 40º, 50º, and 60º N), seven altitudes (0 km, 1 km, 2 km, 3 km, 4 km, 5 km, and 10 km), and hourly values up to ∀8 hours of deviation from local noon. During model calculations, photolysis rates for each model grid cell are estimated by first interpolating the clear-sky photolysis rates from the look-up table using the grid cell latitude, altitude, and hour angle, followed by applying a cloud correction (attenuation) factor based on the cloud inputs from MM5.

The photolysis rates input file was prepared as separate look-up tables for each simulation day. Photolysis files are ASCII files that were visually checked for selected days to verify that photolysis are within the expected ranges.

[2] The IDNR twelve 12 km annual simulation domain was not sufficient for CENRAP's needs, thus Bret Anderson with EPA Region 7 in cooperation with Texas completed an episodic 12km simulation on a larger domain.

The Tropospheric Ultraviolet and Visible (TUV) Radiation Model (http://cprm.acd.ucar.edu/Models/TUV/) is used to generate the photolysis rates input file for CAMx. TOMS ozone data and land use data were used to develop the CAMx Albedo/Haze/Ozone input file for 2002. As for CMAQ, the missing TOMS data period in the fall of 2002 was filled-in using observed TOMS data on either side of the missing period using the same procedures as described above for CMAQ. Default land use specific albedo values were used and a constant haze value used, corresponding to rural conditions over North America.

1.3.11 Air Quality Input Preparation

Air quality data used with the CMAQ and CAMx modeling systems include: (1) Initial Concentrations (ICs) that are the assumed initial three-dimensional concentrations throughout the modeling domain.; (2) the Boundary Conditions (BCs) that are the concentrations assumed along the lateral edges of the RPO national 36 km modeling domain; and (3) air quality observations that are used in the model performance evaluation (MPE). The MPE is discussed in Section 3 and Appendix C of this TSD.

As noted in Section 1.3.7, CMAQ default clean Initial Concentrations (ICs) were used along with an approximately 15 day spin up (initialization) period to eliminate any significant influence of the ICs on the modeled concentrations for the days of interest. The same ICs were used with CAMx as well. Both CMAQ and CAMx were run for each quarter of the year. Each quarter's model run was initialized 15 days prior to the first day of interest (e.g., for quarter 3, Jul-Aug-Sep, the model was initialized on June 15, 2002 with the first modeling day of interest July 1, 2002). The CMAQ Boundary Conditions (BCs) for the Inter-RPO 36 km continental U.S. grid (Figure 1-2) were based on day-specific 3-hour averages from the output of the GEOS-CHEM global simulation model of 2002 (Jacob, Park and Logan, 2005). The 2002 GEOS-CHEM output was mapped to the species and vertical layer structure of CMAQ and interpolated to the lateral boundaries of the 36 km grid shown in Figure 1-2 (Byun, 2004).

Table 1-6 summarizes the surface air quality monitoring networks and the number of sites available in the CENRAP region that were used in the model performance evaluation. Data from these monitoring networks were also used to evaluate the CMAQ and CAMx models outside of the CENRAP region.

Table 1-6. Ground-level ambient data monitoring networks and stations available in the CENRAP states for calendar year 2002 used in the model performance evaluation.

Monitoring Network	Chemical Species Measured	Sampling Frequency; Duration	Approximate Number of Monitors
IMPROVE	Speciated $PM_{2.5}$ and PM_{10}	1 in 3 days; 24 hr	11
CASTNET	Speciated $PM_{2.5}$, Ozone	Hourly, Weekly; 1 hr, 1 Week	3
NADP	WSO4, WNO3, WNH4	Weekly	23
EPA-STN	Speciated $PM_{2.5}$	Varies; Varies	12
AIRS/AQS	CO, NO, NO_2, NO_x, O_3	Hourly; Hourly	25

1.3.12 2002 Base Case Modeling and Model Performance Evaluation

The CMAQ and CAMx models were evaluated against ambient measurements of PM species, gas-phase species and wet deposition. Table 1-6 summarizes the networks used in the model evaluation, the species measured and the averaging times and frequency of the measurements. Numerous iterations of CMAQ and CAMx 2002 base case simulations and model performance evaluations were conducted during the course of the CENRAP modeling study, most of which have been posted on the CENRAP modeling website (http://pah.cert.ucr.edu/aqm/cenrap/cmaq.shtml) and presented in previous reports and presentations for CENRAP (e.g., Morris et al., 2005; 2006a,b). Details on the final 2002 Base F 36 km CMAQ base case modeling performance evaluation are provided in Chapter 3 and Appendix C (because of the similarity between 2002 Base F and 2002 Base G and resource constraints the model evaluation was not re-conducted for Base G). In general, the model performance of the CMAQ and CAMx models for sulfate (SO4) and elemental carbon (EC) was good. Model performance for nitrate (NO3) was variable, with a summer underestimation and winter overestimation bias. Performance for organic mass carbon (OMC) was also variable, with the inclusion of the SOAmods enhancement in CMAQ Version 4.5 greatly improving the CMAQ summer OMC model performance (Morris et al., 2006c). Model performance for Soil and coarse mass (CM) was generally poor. Part of the poor performance for Soil and CM is believed to be due to measurement-model incommensurability. The IMPROVE measured values are due, in part, to local fugitive dust sources that are not captured in the model's emission inputs and the 36 km grid resolution is not conducive to modeling localized events.

1.3.13 2018 Modeling and Visibility Projections

Emissions for the 2018 base case were generated following the procedures discussed in Section 1.3.8 and Chapter 2. 2018 emissions for Electrical Generating Units (EGUs) were based on simulations of the Integrated Planning Model (IPM) that took into the account the effects of the Clean Air Interstate Rule (CAIR) on emissions from EGUs in CAIR states using an IPM realization of a CAIR cap-and-trade program. Emissions for on-road and non-road mobile sources were based on activity growth and emissions factors from the EPA MOBILE6 and NONROAD models, respectively. Area sources and non-EGU point sources were grown to 2018 levels (Pechan, 2005d). The Canadian year 2000 emissions inventory was replaced by a Canadian 2020 emissions inventory for the 2018 CMAQ/CAMx simulations. The following sources were assumed to remain constant between the 2002 and 2018 base case simulations:

- Biogenic VOC and NOx emissions from the BEIS3 biogenic emissions model;
- Wind blown dust associated with non-agricultural sources (i.e., natural wind blown fugitive dust);
- Off-shore emissions associated with off-shore marine and oil and gas production activities;
- Emissions from wildfires;
- Emissions from Mexico; and
- Global transport (i.e., emissions due to BCs from the 2002 GEOS-CHEM global chemistry model.

The results from the 2002 and 2018 CMAQ and CAMx simulations were used to project 2018 PM levels from which 2018 visibility estimates were obtained. The 2002 and 2018 modeling results were used in a relative sense to scale the observed PM concentrations from the 2000-2004 Baseline and the IMPROVE monitoring network to obtain the 2018 PM projections. The 2018/2002 modeled scaling factors are called Relative Response Factors (RRFs) and are constructed as the ratio of modeling results for the 2018 model simulation to the 2002 model simulation. Two important regional haze metrics are the average visibility for the worst 20 percent and best 20 percent days from the 2000-2004 five-year Baseline. For the 2018 visibility projections, EPA guidance recommends developing Class I area and PM species specific RRFs using the average modeling results for the worst 20 percent days during the 2002 modeling period and the 2002 and 2018 emission scenarios. The results of the CENRAP 2018 visibility projections following EPA guidance procedures (EPA, 2007a) are provided in Chapter 4 and Appendix D. CENRAP has also developed alternative procedures for visibility projections that are discussed in Chapter 5 and Appendix D. For example, much of the coarse mass (CM) impacts at Class I area IMPROVE monitors is believed to be natural and primarily from local sources that are subgrid-scale to the modeled 36 km grid so are not represented in the modeling. So, one alternative visibility projection approach is to set the RRF for CM to 1.0. That is, the CM impacts in 2018 are assumed to be the same as in the observed 2000-2004 Baseline. Similarly, the Soil impacts at IMPROVE monitors are likely mainly due to local dust sources so another alternative approach is to set the RRFs for both CM and Soil to 1.0.

The 2018 visibility projections for the worst 20 percent days are compared against a 2018 point on the Uniform Rate of Progress (URP) glidepath or the “2018 URP point”. The 2018 URP point is obtained by constructing a linear visibility glidepath in deciviews from the observed 2000-2004 Baseline (EPA, 2003a) for the worst 20 percent days to the 2064 Natural Conditions (EPA, 2003b; Pitchford, 2006). Where the linear glidepath crosses the year 2018 is the 2018 URP point. States may use the modeled 2018 visibility to help define their 2018 RPG in their RHR SIPs. The 2018 URP point is used as a benchmark to help judge the 2018 modeled visibility projections and the state’s RPG. However, as noted in EPA’s RPG guidance “The glidepath is not a presumptive target, and States may establish a RPG that provides for greater, lesser, or equivalent visibility improvement as that described by the glidepath” (EPA, 2007b). Chapter 4 and Appendix D present the 2018 visibility projections for the CENRAP Class I areas and their comparisons with the 2018 URP point using EPA default visibility projection procedures (EPA, 2007a) and EPA default URP glidepaths (EPA, 2003a,b; 2007b).

Various techniques have been developed to display the 2018 visibility modeling results including “DotPlots” that display the 2018 visibility projections as a percentage of meeting the 2018 point on the URP glidepath. A value of 100% on the DotPlot indicates that the Class I area is predicted to meet the 2018 point on the URP glidepath. Over 100% means the 2018 visibility projection obtains more visibility improvements (reductions) than required to meet the 2018 point on the URP glidepath (i.e., projected value is below the glidepath). And less than 100% indicates that fewer visibility improvements are projected than are needed to meet the 2018 point URP on the glidepath (i.e., above the glidepath). Figure 1-4 displays a DotPlot that compares the 2018 visibility projections from the CENRAP 2018 Base G CMAQ simulation with the 2018 URP point using the EPA default RRFs and alternative RRFs that set the CM and Soil RRFs to unity (i.e., assume CM and Soil are natural so remain unchanged from the 2000-2004 Baseline). For these results, the 2018 visibility projections at the Hercules Glade (HEGL1) Class I area meets the 2018 point on the URP glidepath (100%), whereas the 2018 visibility projections at Caney

Creek (CACR), Mingo (MING) and Upper Buffalo (UPBU) achieve more visibility improvements than needed to meet the 2018 URP point so are below the 2018 URP glidepath. However, the 2018 visibility projections at Breton Island comes up slightly short (~5%) of meeting the 2018 point on the URP glidepath and Wichita Mountains (WIMO) comes up approximately 40% short of meeting the 2018 point on the URP glidepath. Class I areas at the northern (e.g., VOYA, BOWA and ISLE) and southern (e.g., BIBE and GUMO) boundaries of the U.S. also fall short of achieving the 2018 URP point. High contributions of international transport and/or natural sources (e.g., wind blown dust) affect the ability of these Class I areas to be on the URP glidepath. These issues are discussed in more detail in Chapters 4 and 5.

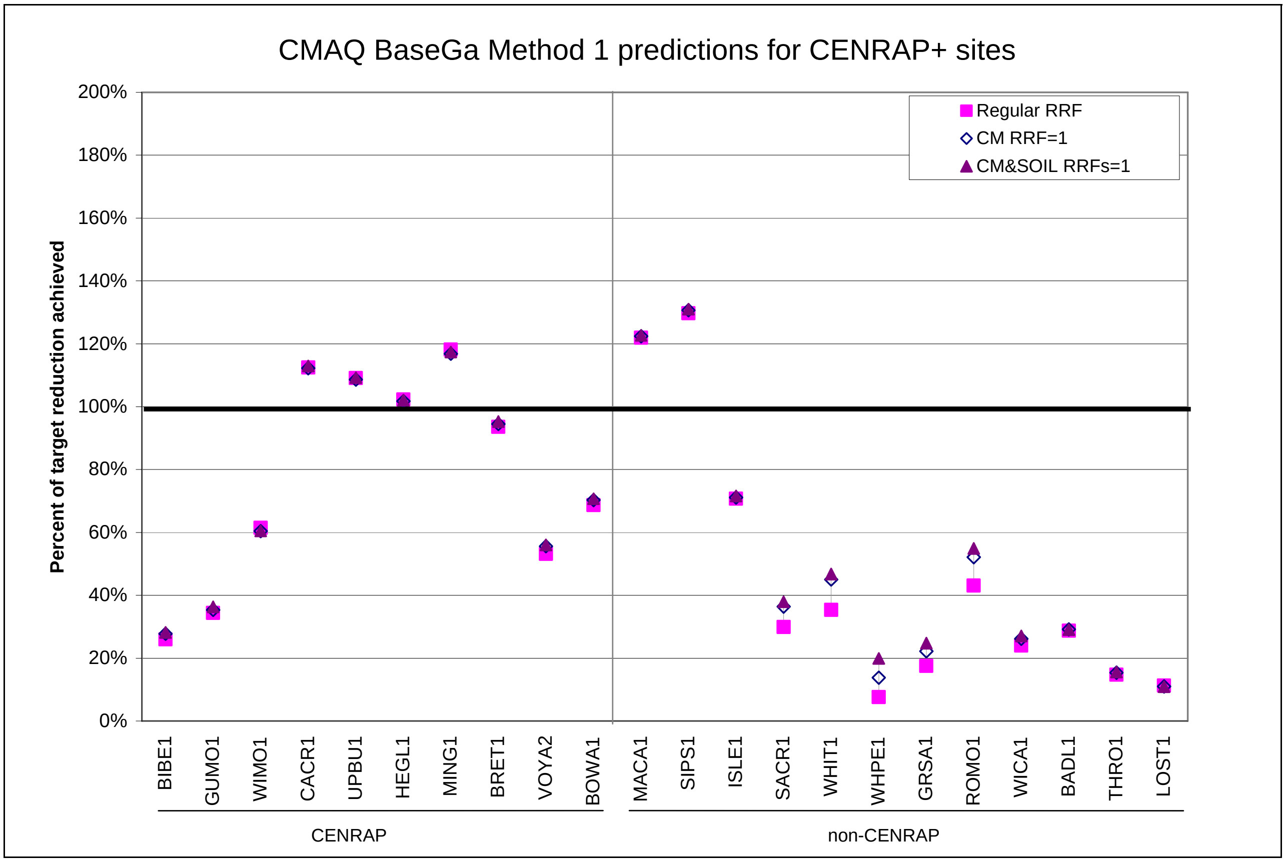


Figure 1-4. 2018 visibility projections expressed as a percent of meeting the 2018 URP point for the 2018 BaseG CMAQ base case simulation using the EPA default (EPA, 2007) Regular RRF and alternative projections procedures that set the RRFs for CM=1.0 and CM&SOIL=1.0.

1.3.14 Additional Supporting Analysis

CENRAP performed numerous supporting analyses of its modeling results including analyzing alternative glidepaths and 2018 projection Approaches and performing confirmatory analysis of the 2018 visibility projections. Details on the additional supporting analysis are contained discussed in Chapter 5, which include:

- The CENRAP 2018 visibility projections were compared with those generated by VISTAS and MRPO. There was close agreement between the CENRAP and VISTAS 2018 visibility projections at almost all common Class I areas. With the only exception being Breton Island where the CENRAP's projections were slightly more optimistic than VISTAS'. The MRPO 2018 visibility projections were less optimistic than CENRAP's at the four Arkansas-Missouri Class I area that may have been due to CENRAP's BART emission controls in CENRAP states not included in the 2018 MRPO inventory.
- Extinction based glidepaths were developed and the CENRAP 2018 visibility projections were shown to produce nearly identical estimates of achieving the 2018 URP point when using total extinction glidepaths as when the linear deciview glidepaths were used. With the extinction based glidepaths the analysis of 2018 URP could be made on a PM species-by-species basis where it was shown that 2018 extinctions due to SO4 and, to a lesser extent, NO3 and EC, achieve the URP, but the other species do not and in fact extinction due to Soil and CM is projected to get worse.
- 2018 visibility projections were made using EPA's new Modeled Attainment Test Software (MATS) program and the CENRAP Typ02G and Base18G modeling results. The CENRAP 2018 visibility projections exactly agreed with those generated by MATS with three exceptions: Breton Island, Boundary Waters and Mingo Class I areas, At these three Class I areas MATS did not produce any 2018 visibility projections due to insufficient data in the raw IMPROVE database to produce a valid observed 2000-2004 Baseline. CENRAP used filled data for these three Class I areas.
- PM Source Apportionment Technology (PSAT) modeling was conducted to estimate the contributions to visibility impairment at Class I areas by source region (e.g., states) and major source category. Source contributions were obtained for a 2002 and 2018 base case and the PSAT modeling results were implemented in a PSAT Visualization Tool that was provided to CENRAP states and others. Major findings from the PSAT source apportionment modeling include the following:
  - Sulfate from elevated point sources was the highest source category contribution to visibility impairment at CENRAP Class I areas for the worst 20 percent days.
  - International transport contributed significantly to visibility impairment at CENRAP Class I areas on the southern (BIBE and GUMO) and northern (BOWA and VOYA) borders of the U.S. and to a lesser extent at WIMO as well.
- Alternative visibility projections were made assuming that coarse mass (CM) alone and CM and Soil were natural in origin that confirmed the original 2018 visibility projections.
- Visibility projections were made using an alternative model (CAMx) that verified the projections made by CMAQ.
- The effects of International Transport were examined several ways and found that the inability of the 2018 visibility projections to achieve the 2018 URP point at the northern and southern border Class I areas was due to high contributions due to International Transport.

- Visibility trends for the worst 20 percent days, best 20 percent days and all monitored days were analyzed at CENRAP Class I areas using the period of record IMPROVE observations. At most Class I areas there was insufficient years of data to produce a discernable trend. In addition, there was significant year-to-year variability in visibility impairment with episodic events (e.g., wildfires and wind blown dust) confounding the analysis.

1.4 Organization of the Report

Chapter 1 of this TSD presents background, an overview of the approach and summary of the results of the CENRAP meteorological, emissions and air quality modeling. Appendix A contains more details on the meteorological model evaluation discussed in Chapter 1. Details on the emissions modeling are provided in Chapter 2 and Appendix B. The model performance evaluation is given in Chapter 3 and Appendix C. The 2018 visibility projections and comparisons with the 2018 URP point are provided in Chapter 4 with more details given in Appendix D. Chapter 5 contains additional supporting analysis with details on the PM source apportionment modeling and alternative projections provided in Appendices E and F, respectively. Chapter 6 lists the references cited in the report.

2.0 EMISSIONS MODELING

2.1 Emissions Modeling Overview

For the emissions modeling work conducted in support of CENRAP air quality modeling, we used updated 2002 emissions data for the U.S., 1999 emissions data for Mexico, and 2000 emissions data for Canada to generate a final base 2002 Base G Typical (Typ02G) annual emissions database. Numerous iterations of the emissions modeling were conducted using interim databases before arriving at the final Base G emission inventories. The 2002 and 2018 emissions inventories and ancillary modeling data were provided by CENRAP emissions inventory contractors (Pechan and CEP, 2005c,e; Reid et al., 2004a,b; Coe and Reid, 2003), other Regional Planning Organizations (RPOs) and EPA. Building from the CENRAP preliminary 2002 database (Pechan and CEP. 2005e) and 2018 projections (Pechan, 2005d), we integrated several updates to the inventories and ancillary data to create final emissions input files; the final simulations are referred to as 2002 Typical and 2018 Base G, or Typ02G and Base18G. We used the Sparse Matrix Operator Kernel Emissions (SMOKE) version 2.1 processing system (CEP, 2004) to prepare the inventories for input to the air quality modeling systems. The SMOKE simulations documented in this report include emissions generated for annual CMAQ and CAMx simulations at a 36-km model grid resolution, and a short-term CMAQ test simulation at a 12-km model grid resolution. We performed the modeling and quality assurance (QA) work based on the CENRAP modeling Quality Assurance Project Plan (QAPP; Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a).

The Typ02G and Base18G emission inventories represent significant improvements to the preliminary emissions modeling performed by CENRAP (Morris et al., 2005). While the preliminary 2002 modeling served its purpose to develop the infrastructure for modeling large emissions data sets and producing annual emissions simulations, much of the input data (both as inventories and ancillary data) were placeholders for actual 2002 data that were being prepared through calendar year 2005. As these actual 2002 data sets became available, they were integrated into the SMOKE modeling and QA system that was developed during the preliminary modeling, to produce a high-quality emissions data set for use in the final CMAQ and CAMx modeling. The addition of entirely new inventory categories, like marine shipping, added complexity to the modeling. By the end of the emissions data collection phase, there were 23 separate emissions processing streams covering a variety of sources categories necessary to general model-ready emission inputs for the 2002 calendar year.

2.1.1 SMOKE Emissions Modeling System Background

The purpose of SMOKE (or any emissions processor) is to process the raw emissions reported by states and EPA into gridded hourly speciated emissions required by the air quality model. Emission inventories are typically available as an annual total emissions value for each emissions source, or perhaps with an average-day emissions value. The air quality models, however, typically require emissions data on an hourly basis, for each model grid cell (and perhaps model layer), and for each model species. Consequently, emissions processing involves (at a minimum) transformation of emission inventory data by temporal allocation, chemical speciation, spatial allocation, and perhaps layer assignment, to achieve the input requirements of the air quality model. For the CENRAP modeling effort, all of these steps were needed. In

addition, CENRAP processing requires special MOBILE6 processing and growth and control of emissions for the future-year inventories. Finally, the biogenic emission processing using BEIS2 includes additional processing steps. SMOKE formulates emissions modeling in terms of sparse matrix operations. Figure 2-1 shows an example of how the matrix approach organizes the emissions processing steps for anthropogenic emissions, with the final step that creates the model-ready emissions being the merging of all the different processing streams of emissions into a total emissions input file for the air quality model. Figure 2-1 does not include all the potential processing steps, which can be different for each source category in SMOKE, but does include the major processing steps listed in the previous paragraph, except the layer assignment. Specifically, the inventory emissions are arranged as a vector of emissions, with associated vectors that include characteristics about the sources such as its state and county or source classification code (SCC). SMOKE also creates matrices that will apply the gridding, speciation, and temporal factors to the vector of emissions. In many cases, these matrices are independent from one another, and can therefore be generated in parallel. The processing approach ends with the merge step, which combines the inventory emissions vector (now an hourly inventory file) with the control, speciation, and gridding matrices to create model-ready emissions.

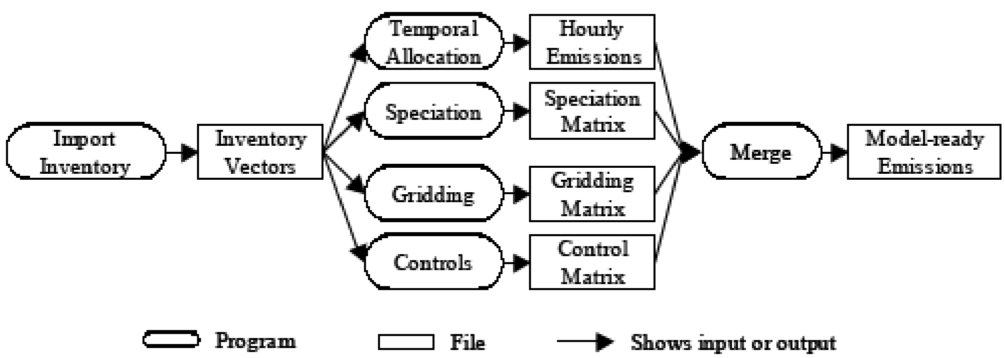


Figure 2-1. Flow diagram of major SMOKE processing steps needed by all source categories.

Temporal processing includes both seasonal or monthly adjustments and day-of-week adjustments. Emissions are known to be quite different for a typical weekday versus a typical Saturday or Sunday. For the day-of-week temporal processing step, emissions may be processed using representative Monday, weekday, Saturday, and Sunday for each month; we refer to this type of processing here as MWSS processing (note that because SMOKE operates in Greenwich Mean Time [GMT] then Monday would include some of local time Sunday so needs to be processed separately from the typical weekday). This approach significantly reduces the number of times the temporal processing step must be run. In the sections below, we have identified the cases in which we have used the MWSS processing approach. Figure 2-2 provides a schematic diagram of SMOKE/BEIS2 processing steps used in this project to generate biogenic emissions rates for Volatile Organic Compounds (VOCs) and oxides of nitrogen (NOx). Because biogenic emissions are temperature sensitive, they are generated for each day of 2002 using day-specific meteorological conditions from the MM5 meteorological model.

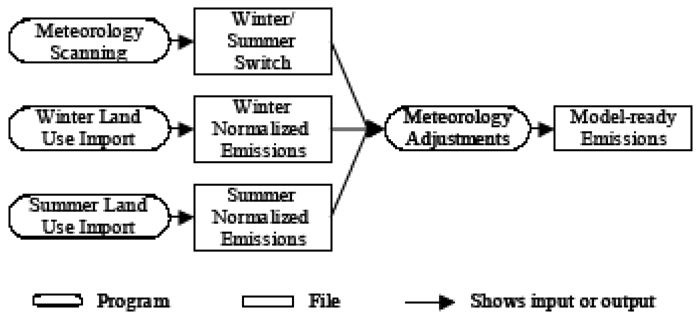


Figure 2-2. Flow diagram of SMOKE/BEIS2 processing steps.

2.1.2 SMOKE Scripts

The scripts are the interface that emissions modelers use to run SMOKE and define the set up and databases used in the emissions modeling so are important for anyone wishing to reproduce the CENRAP SMOKE emissions modeling. Many iterations of the CENRAP SMOKE emissions modeling were performed using updated and corrected emissions data and assumptions resulting in the creation of numerous SMOKE modeling scripts during the course of the study. For the CENRAP annual 2002 SMOKE emissions modeling, the default SMOKE script set up, which is based on source categories, was used to configure the scripts. We made several modifications to the default SMOKE scripts to modularize them, add error checking loops, and break up the report and logs directories by source category. The result is one script for each major source category being modeled that calls all of the SMOKE programs required for simulating that source category. 16 major source categories were modeled by SMOKE for CENRAP. An addition seven SMOKE scripts were also run to set up the emissions modeling. Table 2-1 lists all of the SMOKE scripts used for the 2002 base year modeling and the SMOKE programs called by each script. In addition to the source-specific scripts listed in Table 2-1, we also listed the SMOKE utility scripts that actually call executables, manage the log files, and manage the configuration of the SMOKE simulations.

Table 2-1. Summary of SMOKE scripts.

Source Category	Script Name	SMOKE Programs/Functions
Area	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_ar_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Area fire	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_arf_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Offshore Area	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_ofsar_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Non-road* Mobile	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_nr_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Fugitive dust	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_fd_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Road dust	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_rd_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Ammonia*	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_nh3_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
On-road Mobile (non-VMT-based)	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_mb_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
On-road non-US Mobile (non-VMT-based)	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_nusm_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
On-road Mobile (VMT-based)	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_mbv_base02f.csh	smkinev, mbsetup, grdmat, spcmat, premobl, emisfac, temporal, smkmerge, smkreport
WRAP Oil and Gas	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_wog_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Point	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_pt_base02f.csh	smkinev, grdmat, spcmat, laypoint, temporal, smkmerge, smkreport
Offshore point	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_ofs_base02f.csh	smkinev, grdmat, spcmat, laypoint, temporal, smkmerge, smkreport
Canadian Point fires	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_bsf_base02f.csh	smkinev, grdmat, spcmat, laypoint, temporal, smkmerge, smkreport
All point fires	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_alf_base02f.csh	smkinev, grdmat, spcmat, laypoint, temporal, smkmerge, smkreport
Biogenec	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smk_bg_base02f.csh	Normbies3, tmpbies3, smkmerge
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/make_invdir.csh	builds output file names and directories
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/smk_run.csh	Calls SMOKE executables for everything but projection, controls, and QA
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/qa_run.csh	Calls the SMOKE executables for running QA program & names the input/output directories for reports
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/ scripts/run/36km/smoke_calls.csh	Calls smk_run.csh, qa_run.csh, configuration and management
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/ Assignes/ASSIGNES.cenrap_base02f.cmaq.cb4 p25	Sets up the environment variables for use of SMOKE
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/ Assignes/smk_mkdir	Creates the input/output directories
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/ Assignes/setmerge_files.scr	Sets up the output environment variables for the smkmerge program

* The nr and nh3 where farther divided to nrm and nry and nh3m and nh3y for the monthly/seasonal and yearly inventories

2.1.3 SMOKE Directory Structures

The SMOKE directories can be divided into three broad categories:

1. Program Directories: These directories contain the model source code, assigns files, scripts and executables needed to run SMOKE.
2. Input Directors: These directories contain the raw emissions inventories, the meteorological data and the ancillary input files.
3. Output Directories: These directories contain all of the output from the model. Also, the output directories contain the MOBILE6 input files.

The directories are described in the Table 2-2. The final pre-merged emission file names and sources of the data re provided in Appendix B.

Table 2-2. Summary of SMOKE directories.

Category	Directory Location	Directory Contents
Program	/home/aqm2/edss2/ cenrap02f/subsys/smoke/src	SMOKE source code
	/home/aqm2/edss2/ cenrap02f/subsys/smoke/assigns	SMOKE assigns files
	/home/aqm2/edss2/ cenrap02f/subsys/smoke/scripts	SMOKE make and run scripts
	/home/aqm2/edss2/ cenrap02f/subsys/smoke/Linux2_x86pg	SMOKE executables
Input	/home/aqm2/edss2/ cenrap02f/data/met	MCIP out metrology files
	/home/aqm2/edss2/ cenrap02f/data/ge_dat	SMOKE ancillary input files
	/home/aqm2/edss2/ cenrap02f/data/inventory/cenrap2002	Raw emissions inventory files
Output	/home/aqm2/edss2/ cenrap02f/data/run_base02f/static	Non-time dependent SMOKE intermediate outputs and MOBILE6 inputs
	/home/aqm2/edss2/ cenrap02f/ data/run_base02f/scenario	Time dependent SMOKE intermediate outputs
	/home/aqm2/edss2/ cenrap02f/data/run_base02f/outputs	Model-ready SMOKE outputs
	/home/aqm2/edss2/ cenrap02f/data/reports	SMOKE QA reports

2.1.4 SMOKE Configuration

SMOKE was configured to generate emissions for all months of 2002 on the 36-km unified RPO modeling domain (Figure 1-2). For the anthropogenic emissions sources that use hourly meteorology and daily or hourly data (i.e., on-road mobile sources, point sources with CEM data, point source fires and biogenic sources) we configured SMOKE to represent the daily emissions explicitly. For the non-meteorology dependent emissions, we used a representative Saturday, Sunday, Monday, and weekday for each month as surrogate days for the entire month's emissions (we refer to this as the MWSS processing approach). For these non-meteorology dependent emissions sources we explicitly represented the holidays as Sundays. Table 2-3 lists the days that we modeled as representative days in the months that we simulated for the 2002 base year modeling. Table 2-4 lists the holidays in 2002 that were modeled as Sundays.

Table 2-3: Representative model days for 2002 base year simulation.

Saturday	Sunday	Monday	Weekday
January 5	January 6	January 7	January 4
February 2	February 3	February 4	February 5
March 2	March 3	March 4	March 5
April 6	April 7	April 8	April 2
May 4	May 5	May 6	May 7
June 8	June 9	June 3	June 4
July 6	July 7	July 8	July 3
August 3	August 4	August 5	August 6
September 7	September 8	September 9	September 10
October 5	October 6	October 7	October 8
November 2	November 3	November 4	November 5
December 7	December 8	December 9	December 10

Table 2-4: 2002 modeled holidays.

Holiday	Date
New Years	January 1, 2002 January 2, 2002
Good Friday	March 29, 2002 March 30, 2002
Memorial Day	May 27, 2002 May 28, 2002
Independence Day	July 4, 2002 July 5, 2002
Labor Day	September 2, 2002 September 3, 2002
Thanksgiving Holiday	November 28-30, 2002
Christmas Holiday	December 24-26, 2002

We used the designations in Table 2-5 to determine which months fell into each season when temporally allocating the seasonal emissions inventories. Some of the inventories for the Electrical Generating Units (EGUs) were received for Winter and Summer. Table 2-6 determines which months fell into each season

Table 2-5. Assignments of months to four seasons for use of seasonal inventory files in SMOKE.

Month	Season
January	Winter
February	Winter
March	Spring
April	Spring
May	Spring
June	Summer
July	Summer
August	Summer
September	Fall
October	Fall
November	Fall
December	Winter

Table 2-6. Assignments of months to two seasons for use of seasonal inventory files in SMOKE.

Month	Season
January	Winter
February	Winter
March	Winter
April	Winter
May	Summer
June	Summer
July	Summer
August	Summer
September	Summer
October	Winter
November	Winter
December	Winter

2.1.5 SMOKE Processing Categories

Emissions inventories are typically divided into area, on-road mobile, non-road mobile, point, and biogenic source categories. These divisions arise from differing methods for preparing the inventories, different characteristics and attributes of the categories, and how the emissions are processed through models. Generally, emissions inventories are divided into the following source categories, which we refer to later as “SMOKE processing categories.”

- Stationary Area Sources: Sources that are treated as being spread over a spatial extent (usually a county or air district) and that are not movable (as compared to non-road mobile and on-road mobile sources). Because it is not possible to collect the emissions at each point of emission, they are estimated over larger regions. Examples of stationary

area sources are residential heating and architectural coatings. Numerous sources, such as dry cleaning facilities, may be treated either as stationary area sources or as point sources.

- On-Road Mobile Sources: Vehicular sources that travel on roadways. These sources can be computed either as being spread over a spatial extent or as being assigned to a line location (called a link). Data in on-road inventories can be either emissions or activity data. Activity data consist of vehicle miles traveled (VMT) and, optionally, vehicle speed. Activity data are used when SMOKE will be computing emission factors via another model, such as MOBILE6 (U.S. EPA, 2005). Examples of on-road mobile sources include light-duty gasoline vehicles and heavy-duty diesel vehicles.

- Non-Road Mobile Sources: These sources are engines that do not always travel on roadways. They encompass a wide variety of source types from lawn and garden equipment to locomotives and airplanes. Emission estimates for most non-road sources come from EPA's NONROAD model (OFFROAD in California). The exceptions are emissions for locomotives, airplanes, pleasure craft and commercial marine vessels.

- Point Sources: These are sources that are identified by point locations, typically because they are regulated and their locations are available in regulatory reports. In addition, elevated point sources will have their emissions allocated vertically through the model layers, as opposed to being emitted into only the first model layer. Point sources are often further subdivided into electric generating unit (EGU) sources and non-EGU sources, particularly in criteria inventories in which EGUs are a primary source of NO_x and SO_2. Examples of non-EGU point sources include chemical manufacturers and furniture refinishers. Point sources are included in both criteria and toxics inventories.

- Biogenic Land Use Data: Biogenic land use data characterize the types of vegetation that exist in either county-total or grid cell values. The biogenic land use data in North America are available using two different sets of land use categories: the Biogenic Emissions Landcover Database (BELD) version 2 (BELD2), and the BELD version 3 (BELD3) (CEP, 2004b).

In addition to these standard SMOKE processing categories, we have added other categories either to represent specific emissions processes more accurately or to integrate emissions data that are not compatible with SMOKE. Examples of emissions sectors that fall outside of the SMOKE processing categories include emissions generated from process-based models for representing windblown dust and agricultural ammonia (NH_3) sources. An emissions category with data that are not compatible with SMOKE is one with gridded emissions data sets, such as commercial marine sources. Another nonstandard emissions category that we modeled was emissions from fires. All of the emissions categories that we used to build CENRAP simulations are described in detail in the following sections.

Continuing the enhancement of the emissions source categories that we initiated during the preliminary 2002 modeling, we further refined the categories from the standard definitions listed above to include more explicit emissions sectors. The advantage of using more detailed definitions of the source categories is that it leads to more flexibility in designing control strategies, substituting new inventory or profile data into the modeling, managing the input and output data from SMOKE and conducting QA of the SMOKE outputs. The major drawback to defining more emissions source categories is the increased level of complexity and computational requirements (run times and disk space) that results from having a larger number of input data sets. Another motivation behind separating the various emissions categories is related to the size and flexibility of the input data. Some data sets, like the CENRAP on-road

mobile inventory, were so large that we had to process them separately from the rest of the sources in the on-road sector due to computational constraints. We also separated the non-road mobile and ammonia sectors into yearly and monthly inventories to facilitate the application of uniform monthly temporal profiles to the monthly data. Additional details about how we prepared the emissions inventories and ancillary data for modeling are described in Sections 2.2 through 2.16. Table 2-7 summarizes the entire group of source sectors that composed simulation Typ02G. Each emissions sector listed in the table represents an explicit SMOKE simulation. As discussed in Section 2.1.2 below, after finishing all of the source-specific simulations, we used SMOKE to combine all of the data into a single file for each day for input to the air quality modeling systems. Each subsection on the emissions sectors describes each sector in terms of the SMOKE processing category, the year covered by the inventory, and the source(s) of the data.

Additional details about the inventories are also provided, including any modifications that we made to prepare them for input into SMOKE.

Table 2-7. CENRAP Typ02G emissions categories.

Emissions Sector	Abbreviation*
Fires as Point Sources (WRAP, CENRAP, VISTAS)	Alf
Area Sources (All domain)	ar
CENRAP area fires	arf
Area fires, Anthropogenic (All domain, excluding WRAP and CENRAP)	arfa
Area fires, Wild (All domain, excluding WRAP)	arfw
Biogenic	b3
Ontario, Canada, point-source fires	bsf
Fugitive dust	fd
WRAP on-road mobile	mb
CENRAP on-road mobile	mbv_CENRAP
Other US on-road mobile	mbv
Monthly CENRAP/MRPO anthropogenic NH_3	nh3m
Ammonia from annual inventory (CENRAP)	nh3y
WRAP anthropogenic NH_3	nh3
Seasonal/Monthly non-road mobile (WRAP, CENRAP, MW)	nrm
Annual non-road mobile	nry
On-road Mobile (Non-US)	nusm
Offshore shipping (Gulf, Atlantic)	ofs
Offshore area (Gulf)	ofsar
Stationary point (All domain, including offshore)	pt
Road dust	rd
Windblown dust (All domain)	wb_dust
WRAP oil and gas	wog

*These abbreviations are used in the file naming of the SMOKE output files for each sector.

Emissions models such as SMOKE are computer programs that convert annual or daily estimates of emissions at the state or county level to hourly emissions fluxes on a uniform spatial grid that are formatted for input to an air quality model. For the Typ02G and Base18G emission inventories we prepared emissions for CMAQ version 4.5 using SMOKE version 2.1 on the UCR Linux computing cluster. SMOKE integrates annual county-level emissions inventories with source-based temporal, spatial, and chemical allocation profiles to create hourly emissions fluxes on a predefined model grid. For elevated sources that require allocation of the emissions to the vertical model layers, SMOKE integrates meteorology data to derive dynamic vertical profiles. In addition to its capacity to represent the standard emissions processing categories, SMOKE is also instrumented with the Biogenic Emissions Inventory System, version 3 (BEIS3) model for estimating biogenic emissions fluxes (U.S. EPA, 2004) and the MOBILE6 model for estimating on-road mobile emissions fluxes from county-level vehicle activity data (U.S. EPA, 2005a).

SMOKE uses C-Shell scripts as user interfaces to set configuration options and call executables. SMOKE is designed with flexible QA capabilities to generate standard and custom reports for checking the emissions modeling process. After modeling all of the source categories individually, including those categories generated outside of SMOKE, we used SMOKE to merge all of the categories together to create a single CMAQ input file per simulation day. Also, for use in the CAMx modeling, we converted the CMAQ-ready emissions estimates to CAMx-ready files using the CMAQ2CAMx converter. Additional technical details about the version of SMOKE used for final simulations are available from CEP (2004b). All scripts, data, and executables used to generate the Typ02G and Base18G emissions for CMAQ and CAMx are archived on the CENRAP computing cluster.

2.1.6 2002 and 2018 Data Sources

This section describes the procedures that the CENRAP followed to collect and prepare all emissions data for Typ02G and Base18G simulations. We discuss the sources of all inventory and ancillary data used for simulations. CENRAP worked with emissions inventory contractors, other RPOs, and EPA to collect all of the data that constitute the simulation. Table 2-8 lists all of the contacts for the various U.S. anthropogenic emission inventories we used. For the CENRAP inventories, this table lists the contacts for the contractors who prepared the inventories; for the non-CENRAP inventories it lists the contacts at the RPOs who provided us inventory data. We obtained the emissions inventories for Canada and Mexico from the U.S. EPA Emissions Factors and Inventory Group (EFIG) via the Clearinghouse for Inventories and Emissions Factors (CHIEF) website (http://www.epa.gov/ttn/chief/index.html).

Table 2-8. CENRAP anthropogenic emissions inventory contacts.

Source Category	Emissions Data Contact
WRAP	
All	Tom Moore, Western Governors' Association Phone: (970) 491-8837 Email: mooret@cira.colostate.edu
CENRAP	
2002 Consolidated Inventory	Randy Strait, E.H. Pechan & Assoc., Inc. Phone: 919-493-3144 Email: rstrait@pechan.com
NH3 Inventory, Prescribed and Agricultural Fires, and On-road mobile emissions	Dana Sullivan, Sonoma Technology, Inc. Phone: 707-665-9900 Email: dana@sonomatech.com
Gulf Off-shore platform and support vessel emissions	Holly Ensz, Minerals Management Service Phone: (504) 736-2536 Email: holli.ensz@mms.gov
VISTAS	
All	Greg Stella, Alpine Geophysics, LLC, Phone: 828-675-9045 Email: gms@alpinegeophysics.com
MANE-VU	
All	Megan Schuster, MARAMA, Baltimore, MD USA Phone: 410-467-0170 Email: mschuster@marama.org
MRPO	
All	Mark Janssen, LADCO, Des Plaines, IL, USA Phone: 847-296-2181 Email:janssen@ladco.org

As mentioned above, the refinement of these inventories involved splitting some of the inventory files into more specific source sectors. As the stationary-area-source emissions sector has traditionally been a catch-all for many types of sources, this is the inventory sector that required the greatest amount of preparation. Upon receiving all stationary-area-source inventories we extracted fugitive dust, road dust, anthropogenic NH_3, and for the non-WRAP U.S. inventories, stage II refueling sources. We retained the dust sources as separate categories that we would further refine with the application of transport factors (see Section 2.8).

We collected the ancillary data used for SMOKE modeling from several sources. SMOKE ancillary modeling data include:

- Temporal and chemical allocation factors by state, county, and source classification code (SCC);
- Spatial surrogates and cross-reference files for allocating county-level emissions to the model grid;
- Hourly gridded meteorology data;
- Stack defaults for elevated point sources;
- MOBILE6 configuration files;
- A Federal Implementation Standards (FIPS) codes (i.e., country/state/county codes) definition file;

- A Source Category Classification (SCC) codes definition file;
- A pollutant definition file; and
- Biogenic emission factors.

Except for the meteorology data and the MOBILE6 configuration files, we used default data sets provided by EPA as the basis for all of the ancillary data except for temporal profiles used for Electric Generating Units (EGUs). These profiles were developed based on CEM data from 2000 through 2003 (Pechan and CEP, 2005c). CENRAP provided the meteorology data for the simulations at 36-km and 12-km grid resolutions (Johnson, 2007). The inventory contractor who prepared the MOBILE6 inventories provided the MOBILE6 configuration files either directly or via an RPO representative; details about the sources of the MOBILE6 inputs are provided in Section 2.4. We made minor modifications to the chemical allocation, pollutant definition, and country/state/county codes files for new sources, pollutants, or counties contained in the inventories that we had not previously modeled. We made major modifications to the temporal and spatial allocation inputs, as described below.

2.1.7 Temporal Allocation

Temporally allocating annual, daily, or hourly emissions inventories in SMOKE involves combining a temporal cross-reference file and a temporal profiles file.

- Temporal cross-reference files associate monthly, weekly, and diurnal temporal profile codes with specific inventory sources, through a combination of a FIPS (country/state/county) code, an SCC, and sometimes for point sources, facility and unit identification codes.
- Temporal profiles files contain coded monthly, weekly, and diurnal profiles in terms of a percentage of emissions allocated to each temporal unit (e.g., percentage of emissions per month, weekday, or hour).

As a starting point for the temporal allocation data for simulations, we used the files generated by emission inventory contractors (Pechan and CEP, 2005c). Based on guidance from the developers of some of the inventory files, we enhanced the temporal profiles and assignments for some source categories (Pechan, 2005b).

We modified the temporal allocation data for the simulations to improve the representation of temporal emissions patterns for certain source categories. We implemented the adjusted profiles in SMOKE by modifying the temporal cross-reference file for the applicable FIPS and SCC combinations.

Updated temporal profiles for EGUs were made available for MRPO in the MRPO Base K inventory. Since the non-road emissions for IA and MN were monthly emissions developed by MRPO, new temporal profiles were created for all the SCCs in these emissions files for these two states only. The monthly profile was uniform and the weekly and diurnal profiles were kept the same as were modeled for the rest of the country.

An updated temporal profile, profile 485, based on NOAA 1971-2000 population weighted average heating degree days for home heating area source emissions was obtained from

VISTAS. This profile provided state specific updates for home heating emissions and was applied to the full inventory in place of profile 17XX.

Other additions to the Base02G temporal allocation data included updates that made by other RPOs that are applicable to their inventories. These other updates to the temporal allocation files included

- VISTAS continuous emissions monitoring (CEM)-specific profiles for EGUs in the VISTAS states;
- VISTAS agricultural burning profiles;
- Wildfire and prescribed fire profiles developed by VISTAS for the entire U.S.;
- MANE-VU on-road mobile profiles;
- WRAP weekly and diurnal road dust profiles;
- WRAP diurnal wildfire, agricultural fire, and prescribed fire profiles; and
- WRAP on-road mobile weekly and diurnal profiles.

Finally, for all of the monthly and seasonal emissions inventories, we modified the temporal cross-reference files to apply uniform monthly profiles to the sources contained in these inventories. The monthly variability is inherent in monthly and seasonal inventories and does not need to be reapplied through the temporal allocation process in SMOKE. The inventories to which we applied uniform monthly temporal profiles included:

- WRAP, CENRAP, and MRPO non-road mobile sources;
- WRAP on-road mobile sources;
- WRAP road dust; and
- CENRAP anthropogenic ammonia.

2.1.8 Spatial Allocation

SMOKE uses spatial surrogates and SCC cross-reference files to allocate county-level emissions inventories to model grid cells. Geographic information system (GIS)-calculated fractional land use values define the percentage of a grid cell that is covered by standard sets of land use categories. For example, spatial surrogates can define a grid cell as being 50% urban, 10% forest, and 40% agricultural. In addition to land use categories, spatial surrogates can also be defined by demographic or industrial units, such as population or commercial area. Similar to the temporal allocation data, an accompanying spatial cross-reference file associates the spatial surrogates (indexed with a numeric code) to SCCs. Spatial allocation with surrogates is applicable only to area and mobile sources that are provided on a county level basis. Point sources are located in the model grid cells by SMOKE based on the latitude-longitude coordinates of each source. Biogenic emissions are estimated based on 1-km^2 gridded land use information that is mapped to the model grid using a processing program such as the Multimedia Integrated Modeling System (MIMS) Spatial Allocator (CEP, 2004).

We used various sources of spatial surrogate information for the U.S., Canada, and Mexico inventories in the simulations. For the U.S. and Canadian sources, we used the EPA unified

surrogates available through the EFIG web site (EPA, 2005c). For the 36-km grid, EPA provides these data already formatted for SMOKE on the RPO Unified 36-km domain that we used for the simulations. We modified the spatial surrogates for Canada on the RPO Unified 36-km domain by adopting several surrogate categories that were enhanced by the WRAP. Table 2-9 provides details about the new Canadian spatial surrogates that were developed by the WRAP and used for CENRAP simulations. For modeling Mexico, we used Shapefiles developed for the Big Bend Regional Aerosol and Visibility Observations Study (BRAVO) modeling to create surrogates for Mexico on the RPO Unified 36-km domain (EPA, 2005c).

Table 2-9. New Canadian spatial surrogates.

Attribute	Base02a Code	Shapefile	Reference
Land area	950	can_land93_land	Natural Resources Canada (1993) AVHRR land cover data
Water area	951	can_land93_water	Natural Resources Canada (1993) AVHRR land cover data
Forest land area	952	can_land93_forest	Natural Resources Canada (1993) AVHRR land cover data
Agricultural land area	953	can_land93_agri	Natural Resources Canada (1993) AVHRR land cover data
Urban land area	954	can_land93_urban	Natural Resources Canada (1993) AVHRR land cover data
Rural land area	955	can_land93_rural	Natural Resources Canada (1993) AVHRR land cover data
Airports	956	can_airport	U.S. DOT Bureau of Transportation Statistics (2005) NORTAD 1:1,000,000 scale data
Ports	957	can_port	U.S. DOT Bureau of Transportation Statistics (2005) NORTAD 1:1,000,000 scale data
Roads	958	can_road1m	Natural Resources Canada (2001) National Scale Frameworks data
Rail	959	can_rail1m	Natural Resources Canada (1999) National Scale Frameworks data

2.2 Stationary Point Source Emissions

Stationary-point-source emissions data for SMOKE consist of (1) Inventory Data Analyzer (IDA)-formatted inventory files; (2) ancillary data for allocating the inventories in space, time, and to the Carbon Bond-IV chemistry mechanism used in CMAQ and CAMx; and (3) meteorology data for calculating plume rise from the elevated point sources. This section describes where CENRAP obtained these data, how we modeled them, and the types of QA that we performed to ensure that SMOKE processed the data as expected.

2.2.1 Data Sources

For the stationary-point-source inventories in Typ02G and Base18G, we used actual 2002 data developed by the RPOs for the U.S., version 2 of the year 2000 Canadian inventory, and the BRAVO 1999 Mexican inventory. The BRAVO inventory was updated with entirely new inventories for the six northern states of Mexico for stationary area, as well as stationary point, on-road mobile, and off-road mobile sources. Emissions for the southern states of Mexico were included for the first time in CENRAP simulations Typ02G and Base18G. These data were provided by ERG, Inc., who completed an updated 1999 emissions inventory for northern Mexico (ERG, 2006b) and delivered these data to the WRAP. The CENRAP stationary-point inventory consisted of annual county-level and tribal data provided in August of 2005 (Pechan and CEP, 2005e). The WRAP (ERG, 2006a) and VISTAS Base G (MACTEC, 2006) stationary-point inventories consisted of an annual data set and monthly CEM data for selected EGUs. The WRAP and VISTAS provided these data directly to CENRAP. We downloaded the MANE-VU stationary-point inventories from the MANE-VU web sites. MRPO base K data was downloaded and processed for SMOKE modeling by Alpine Geophysics under contract from MARAMA. UCR entered into a nondisclosure agreement with Environment Canada to obtain version 2 of the 2000 Canadian point-source inventory. This inventory represented a major improvement over the version of the data that we had used in the preliminary 2002 modeling.

Reductions anticipated from BART controls for electric generating units (EGU) in Oklahoma, Arkansas, Kansas, and Nebraska were included in projections of 2018 emissions. These anticipated reductions were based on actual operating conditions and estimated control efficiencies from utilities.

Newly permitted coal-fired utilities were included in 2018 projections. Conservatively, no IPM projected new units were removed from the simulation with the addition of the permitted facilities.

Due to missing or clearly erroneous stack parameters, several facilities in CENRAP states were relegated to default stack profiles based on SCC in the NEI QA process. Prioritizing for the largest emissions sources, these default parameters were corrected by CENRAP States and updated files were provided to modeling contractors. Final IDA input files Typ02G and Base18G for point sources reflect State corrections.

For coal-fired point and area sources, The EPA Office of Air Quality and Planning Standards (OAQPS) determined that the organic carbon fraction in the speciation profile code "NCOAL" was not representative of most coal combustion occurring in the U.S. This profile has an organic carbon fraction of 20%, which includes an adjustment factor of 1.2 to account for other atoms (like oxygen) attached to the carbon. OAQPS has reverted back to the profile code "22001" for coal combustion, which has an organic carbon fraction of 1.07% (again including the 1.2 factor adjustment). This is the same profile that EPA used for previous rulemaking efforts including the Heavy Duty Diesel Rule and Non-Road Rule, which were proposed (and publicly reviewed) prior to the introduction of the NCOAL profile.

The consensus in OAQPS is that the NCOAL profile has a high organic carbon percentage because it is based on measurements of combustion of lignite coal. With the exception of Texas, lignite is not widely used in the U.S.. Thus, OAQPS staff stopped relying on this profile as a national default profile. A new coal speciation profile developed based on Eastern bituminous

coal combustion (since much of the coal burned in the U.S. is of this type) is being developed by EPA's Office of Research and Development but was not completed for this study.

The profile recently developed for MRPO by Carnegie Mellon was provided to CENRAP and is representative of combustion of eastern bituminous coal. This profile is a more appropriate profile for most facilities in the U.S. than the default NCOAL profile.

Additionally, the "22001" profile has been flagged as problematic because of the apparent inadvertent switching of the organic carbon and elemental carbon fractions, which are 1.07% and 1.83% respectively. The report discovering the discrepancy in the profile did not offer a clear alternative to correct the problem (MACTEC, 2003).

CENRAP has continued to use the NCOAL factor for facilities burning lignite in North Dakota and Texas. For the remainder of the U.S., the MRPO profile, CMU, was used. The NCOAL factor was modified reducing the organic carbon by half and assigning the remainder to $PM_{2.5}$. The modification was at the request of Texas and was reflective of the original study for the NCOAL factor conducted in Texas (Chow, 2005). Table 2-10 summarizes the $PM_{2.5}$ speciation profiles for the NCOAL, 2201 and CMU speciation profiles for coal burning sources.

Table 2-10. PM 2.5 speciation profiles for coal-burning sources.

Profile	POC	PEC	PNO3	PSO4	PM2.5
NCOAL	0.1000	0.0100	0.0050	0.1600	0.7250
22001	0.0107	0.0183	0.0000	0.1190	0.8520
CMU	0.0263	0.0315	0.0036	0.0447	0.8938

Final simulations used improved temporal allocation and speciation information relative to the preliminary 2002 modeling; the rest of the ancillary data for modeling stationary point sources stayed the same (Mansell et al., 2005).

2.2.2 Emissions Processing

For Typ02G and Base18G simulations we configured SMOKE to process the annual inventories for the U.S., Canada, and Mexico and process hourly CEM data for the VISTAS. We configured SMOKE to allocate these emissions up to model layer 15 (approximately 2,500 m AGL), which roughly corresponds to the maximum planetary boundary layer (PBL) heights across the entire domain throughout the year. As coarse particulate matter (PMC) is not an inventory pollutant but is required by the air quality models as input species, we used SMOKE to calculate PMC during the processing as (PM_{10} - $PM_{2.5}$). With the SMOKE option WKDAY_NORMALIZE set to “No,” we treated the annual inventories based on the assumption that they represent average-day data based on a seven-day week, rather than average weekday data. We also assumed that all of the volatile organic compound (VOC) emissions in the inventories are reactive organic gas (ROG), and thus used SMOKE to convert the VOC to total organic gas (TOG) before converting the emissions into CB-IV speciation for the air quality models. To capture the differences in diurnal patterns that are contained in the CEM temporal profiles for VISTAS and CENRAP states (Base02F), we configured SMOKE to generate daily temporal matrices, as opposed to using a Monday-weekday-Saturday-Sunday (MWSS) temporal allocation approach.

To QA the stationary-point emissions, we used the procedures in the CENRAP emissions modeling QA protocol (Morris and Tonnesen, 2004) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for all simulations. These QA graphics are available on the web site at: http://pah.cert.ucr.edu/aqm/cenrap/emissions.shtml

2.2.3 Uncertainties and Recommendations

There were issues with the stationary-point emissions that we left unresolved at the completion of the Typ02G and Base18G emissions modeling either because we did not feel they would have a major impact on the modeling results in CENRAP states or because we did not have alternative approaches and they represented the best available information. Canadian emissions for 2000 were found to have a significant number of missing stack parameters. These stacks when modeled with default parameters frequently resulted in lower plume heights. Stack parameters for 2000 were corrected based on cross referencing sources with the 2005 Canadian inventory for the largest emitting points. Stack parameters for many of the sources with lower emissions remain incorrect, but are assumed to have a less significant impact on CENRAP Class I areas. The 2020 projected emissions for Canada were obtained as air quality model-ready files from EPA. EPA has not confirmed that missing stack parameters were corrected for the projected inventory. It is assumed that they were not corrected and default parameters were used instead. Given confidentiality issues that surround Canadian inventories, EPA processed emissions represent the best available data.

2.3 Stationary Area Sources

Stationary-area-source emissions data for SMOKE consist of IDA-formatted inventory files and ancillary data for allocating the inventories in space, time, and to the Carbon Bond-IV chemistry mechanism used in CMAQ and CAMx. This section describes where we obtained these data, how we modeled them, and the types of QA that we performed to ensure that SMOKE processed the data as expected.

2.3.1 Data Sources

For the stationary area source inventories in the Typ02G and Base18G simulations, we used actual 2002 data developed by the RPOs for the U.S., version 2 of the year 2000 Canadian inventory, and the updated Mexican inventory, http://www.epa.gov/ttn/chief/net/mexico.html. The BRAVO inventory was updated with entirely new inventories for the six northern states of Mexico for stationary area, as well as stationary point, on-road mobile, and off-road mobile sources. Emissions for the southern states of Mexico were included for the first time in CENRAP simulations Typ02G and Base18G. The CENRAP stationary-area inventory consisted of annual county-level and tribal data provided by in August of 2005 (Pechan and CEP, 2005e). The WRAP (ERG, 2006a) and VISTAS Base G (MACTEC, 2006) stationary-area inventories consisted of an annual data set. We downloaded the MANE-VU stationary-area inventories from the MANE-VU web sites. MRPO base K data was downloaded and processed for SMOKE modeling by Alpine Geophysics under contract from MARAMA.

To prepare the stationary-area inventories for modeling, we made several modifications to the files by removing selected sources either to model them as separate source categories or to omit them from simulations completely. Using guidance provided by EPA (EPA, 2004b), we extracted fugitive and road dust sources from all stationary-area inventories for adjustment by transport factors and modeling as separate source categories (see Section 2.8). We also extracted and discarded the stage II refueling sources (Table 2-11) from the U.S. inventories; we modeled these sources with MOBILE6 as part of the on-road mobile-source emissions. We left the stage II refueling emissions in the WRAP stationary-area inventory because the on-road mobile inventory that we received for this region did not contain these emissions.

Table 2-11. Refueling SCCs removed from the non-WRAP U.S. stationary-area inventory.

SCC	Description
2501060100	Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations Stage 2: Total
2501060101	Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations Stage 2: Displacement Loss/Uncontrolled
2501060102	Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations Stage 2: Displacement Loss/Controlled
2501060103	Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations Stage 2: Spillage
2501070100	Storage and Transport Petroleum and Petroleum Product Storage Diesel Service Stations Stage 2: Total
2501070101	Storage and Transport Petroleum and Petroleum Product Storage Diesel Service Stations Stage 2: Displacement Loss/Uncontrolled
2501070102	Storage and Transport Petroleum and Petroleum Product Storage Diesel Service Stations Stage 2: Displacement Loss/Controlled
2501070103	Storage and Transport Petroleum and Petroleum Product Storage Diesel Service Stations Stage 2: Spillage

Other steps that we took to prepare the stationary-area inventories included confirming that there is no overlap between the anthropogenic NH_3 inventory (Section 2.9) and stationary area sources, and moving area-source fires in each regional inventory to separate files. In addition to these inventory modifications we made a few changes to the ancillary data files for simulation Typ02G, as described next.

Simulation Typ02G used improved temporal and spatial allocation information relative to the preliminary 2002 modeling; the rest of the ancillary data for modeling stationary area sources stayed the same as in the preliminary 2002 modeling (Mansell et al., 2005). We adopted enhanced spatial allocation data with additional area-based surrogates for Canada (Table 2-9), and added surrogates for a missing county in Colorado (Broomfield) from WRAP modeling and QA work. The WRAP had noticed when looking at the Canadian data for the preliminary 2002 modeling that forest fire emissions from the Canadian area-source inventory, which are relatively large sources of CO, NO_x, and $PM_{2.5}$, were being allocated to a surrogate for logging activities. They found similar discrepancies for other area and non-road SCCs in Canada. To improve the representation of the Canadian emissions, we adopted several land-area-based surrogates developed by the WRAP, such as forested land area, urban land area, and rural land area, and made the accompanying additions to the spatial cross-reference file to associate inventory SCCs with these surrogates. We also added spatial surrogates for Broomfield County, CO; this county was included in the inventory but was not included in the base EPA surrogates (this county was recently created from portions of other counties).

Improvements to the temporal allocation data for simulation Typ02G included the addition of several FIPS-specific profiles provided by VISTAS and CENRAP contractors (Pechan 2005b). These temporal profiles listed in Table 2-12 targeted mainly fire and agricultural NH_3 sources, such as open burning and livestock operations, respectively.

Table 2-12. New Temporal Profile Assignments for CENRAP Area Source SCCs.

SCC	Description	Month	Week	Diurnal	Recommendation Based on Profile Data for SCC	Description of Similar SCC used to Recommend Profiles
2310001000	Industrial Processes; Oil and Gas Production: SIC 13;All Processes : On-shore; Total: All Processes	262	7	26	2310000000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes;Total: All Processes
2310002000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes : Off-shore;Total: All Processes	262	7	26	2310000000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes;Total: All Processes
2461870999	Solvent Utilization;Miscellaneous Non-industrial: Commercial;Pesticide Application: Non-Agricultural;Not Elsewhere Classified	258	7	26	2461800000	Solvent Utilization;Miscellaneous Non-industrial: Commercial;Pesticide Application: All Processes;Total: All Solvent Types
2805009200	Miscellaneous Area Sources;Agriculture Production - Livestock;Poultry production - broilers;Manure handling and storage	1500	7	26	2805009300	Miscellaneous Area Sources;Agriculture Production - Livestock;Poultry production - broilers;Land application of manure
2805021100	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Confinement	1500	7	26	2805021300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Land application of manure
2805021200	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Manure handling and storage	1500	7	26	2805021300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Land application of manure
2805023100	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Confinement	1500	7	26	2805023300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Land application of manure
2805023200	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Manure handling and storage	1500	7	26	2805023300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Land application of manure
2810020000	Miscellaneous Area Sources;Other Combustion;Prescribed Burning of Rangeland;Total	3	11	13	2810015000	Miscellaneous Area Sources;Other Combustion;Prescribed Burning for Forest Management;Total

2.3.2 Emissions Processing

For simulations Typ02G and Base18G we configured SMOKE to process the annual stationary-area-source inventories for the U.S., Canada, and Mexico. As PMC is not an inventory pollutant but is required by the air quality models as input species, we used SMOKE to calculate PMC during the processing as (PM_{10} - $PM_{2.5}$). With the SMOKE option WKDAY_NORMALIZE set to "Yes," we treated the annual stationary-area inventories based on the assumption that they represent average weekday data, causing SMOKE to renormalize the data to a seven-day estimate before applying any temporal adjustments. We also assumed that all of the VOC emissions in the inventories are ROG and thus used SMOKE to convert the VOC to TOG before converting the emissions into CB-IV speciation for the air quality models. We configured SMOKE to use a MWSS temporal allocation approach, as opposed to a daily temporal approach.

To QA the stationary-area emissions, we used the procedures in the CENRAP modeling QAPP and Modeling Protocol (Morris and Tonnesen, 2004; Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for all simulations. The graphical QA summaries include, for all emissions output species, daily spatial plots summed across all model layers, daily time-series plots, and annual time-series plots. These QA graphics are available on the UCR/CENRAP web site at http://pah.cert.ucr.edu/aqm/cenrap/emissions.shtml .

2.3.3 Uncertainties and Recommendations

Most of the issues that we encountered with the stationary area sources related to the removal of certain SCCs from the base inventories for inclusion as other source categories or complete omission from simulations. We spent considerable effort on ensuring that we did not have overlap between the area inventory and the other sectors that explicitly represent sources traditionally contained in the area inventory, such as NH_3 and dust.

Both the Canadian and Mexican inventories presented minor problems that we resolved for simulation Typ02G but that can be addressed more thoroughly in future simulations. The Canadian inventory we used contained data only at the province level, essentially equivalent to a statewide rather than county-level inventory. A higher resolution inventory would have allowed us to use higher-resolution and more accurate spatial allocation data. Future modeling that uses Canadian data should move to the newly released municipality-level year 2000 inventories for Canada.

There was a discrepancy between the state and county coding in the Mexican inventory and the SMOKE file that defines acceptable FIPS codes. Differences in the ordering of the Mexican state names between these two data sets led to some of the Mexican inventory sources being mislabeled in the SMOKE QA reports. The state codes in the inventory and spatial surrogate files for two Mexican states were changed to be consistent with the SMOKE country/state/county codes file.

2.4 On-Road Mobile Sources

On-road mobile-source emissions data for SMOKE consist of IDA-formatted emissions and vehicle activity inventory files, and ancillary data for allocating the inventories in space, time, and to the Carbon Bond-IV chemistry mechanism used in CMAQ and CAMx. This section describes where we obtained these data, how we modeled them, and the types of QA that we performed to ensure that SMOKE processed the data as expected.

2.4.1 Data Sources

The SMOKE processing for CENRAP included two approaches for processing on-road mobile sources depending on the source of the data provided. The first approach was to compute mobile emissions values prior to providing them to SMOKE; we call this the pre-computed emissions approach. The second approach was to provide SMOKE with VMT data, meteorology data, and MOBILE6 inputs, and let the SMOKE/MOBILE6 module compute the mobile emissions based on these data; we call this the VMT approach. These approaches are not mutually exclusive for a single SMOKE run; therefore, we performed single SMOKE runs in which both approaches were used as follows:

- Annual VMT for computing CO, NO_x, VOC, SO2, NH3 and PM using MOBILE6 for all CENRAP States.
- Pre-computed, seasonal MOBILE6-based emissions of all pollutants for the 13 WRAP states that included pre-speciated $PM_{2.5}$ data.
- Annual VMT for computing CO, NO_x, VOC, SO2, NH3 and PM using MOBILE6 for the rest of the United States (VISTAS, MRPO and MANE-VU).
- Pre-computed, annual 1999 emissions of all pollutants for Mexico.
- Pre-computed, annual 2000 emissions of all pollutants for Canada.

For the CENRAP states, STI provided VMT data and MOBILE6 input files for all counties in the CENRAP region (Reid et al., 2004a). MOBILE6 input files were provided only for the months of January and July for 2002. MOBILE6 input files for the remaining months of 2002 had to be generated. These data were then processed within SMOKE. Using one set of MOBILE6 input files for each county in the CENRAP states resulted in compute memory requirements that were to large to process all CENRAP states together. Therefore the on-road mobile processing for the CENRAP states was split into two groups for SMOKE processing. The resulting gridded emissions data files were then merged together to obtain an on-road mobile source emissions file for the entire CENRAP region.

For the WRAP states we used actual 2002 data split into California and non-California seasonal inventories that were provided by the WRAP (Pollack et al., 2006). In addition to the standard criteria pollutants, these files contained pre-speciated $PM_{2.5}$ emissions. For the rest of the U.S. we used annual county-level activity and speed inventories with monthly, county-level MOBILE6 inputs, and hourly meteorology to estimate the hourly emissions with the SMOKE/MOBILE6 module. For the non-U.S. inventories, we used version 2 of the year 2000 Canadian inventory and the updated 1999 Mexican inventory pre-computed mobile source emissions.

2.4.2 Emissions Processing

For the Typ02G emissions modeling we configured SMOKE to process the annual on-road mobile emissions inventory data for the WRAP, Canada, and Mexico as pre-computed inventories. For the non-WRAP states, we used the SMOKE/MOBILE6 integration to process the annual activity inventories and monthly, county-based roadway information. The WRAP inventories contained pre-computed speciated PM emissions (Pollack et al, 2006) so the SMOKE PM speciation module was not used. The WRAP on-road mobile inventories were developed to represent seven-day (weekly) average emissions (as compared to the area source inventory, which represented average weekday emissions). As actual weekly average emissions, we configured SMOKE to process the WRAP on-road mobile source emissions by setting WKDAY_NORMALIZE to "No" in which case the emissions are adjusted to represent weekday and Saturday and Sunday emissions (as in contrast to the area sources where the emissions are just adjusted for Saturday and Sunday). We also assumed that all of the VOC emissions in the inventories are ROG and used SMOKE to convert the VOC to TOG before converting the emissions into CB-IV speciation for the air quality models. We configured SMOKE to create day-of-week specific rather than MWSS, temporal profiles because the WRAP on-road mobile temporal profiles contain weekly profiles that vary across the weekdays.

As noted previously, the large number of county roadway inputs for MOBILE6 processed for the non-WRAP portion of the U.S. required us to split the states mobile-source processing into three subsets because of computer memory limitations. Separate MOBILE6 input files were used for each separate county for CENRAP states, where as one MOBILE6 input file was used for several counties outside of the CENRAP region. The three subsets consisted of two sets of SMOKE/MOBILE6 simulations for the CENRAP and a simulation that computed on-road mobile emissions for the MRPO, VISTAS, and MANE-VU states. We configured MOBILE6 to use weekly temperature averaging for computing these emissions within SMOKE.

To QA the on-road mobile emissions, we used the CENRAP emissions modeling QA protocol (Morris and Tonnesen, 2004; Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulations Typ02G and Base18G. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These graphics are available at http://pah.cert.ucr.edu/aqm/cenrap/qa_base02b36.shtml#mb

2.4.3 Uncertainties and Recommendations

We approached the on-road mobile emissions preparation for simulation Typ02G from three different directions, which were based on the form of the input inventories and ancillary emissions data for different regions of the modeling domain:

- The WRAP region used emissions estimates pre-computed with EMFAC for California and MOBILE6 for the rest of WRAP states and processed like area sources with SMOKE adjusted from weekly to day-of-week emissions.
- The CENRAP, VISTAS, MRPO, and MANE-VU states used county-level activity data to compute emissions with the SMOKE/MOBILE6 module.

- The non-U.S. parts of the domain also had pre-computer on-road mobile source emissions so used an area-source approach for processing with SMOKE.

Different approaches for modeling a single emissions sector adds complexity and additional sources of error and inconsistencies to the modeling because of the different assumptions that went into the preparation of the input data. For example, refueling emissions from the on-road mobile sector are represented in the WRAP area-source sector but are computed with MOBILE6 for the rest of the U.S. Not using MOBILE6-based emissions for the non-U.S. portion of the domain neglects the effects of the actual 2002 meteorology on these emissions. Applying MOBILE6 outside of the U.S. is currently not possible because MOBILE6 is instrumented only for calculating emissions for the U.S. automotive fleet. The result of using MOBILE6 to calculate U.S. emissions and not using it to calculate the non-U.S. on-road mobile emissions estimates is that the non-U.S. emissions are not specific to this modeling year and the 2002 meteorological conditions, whereas the U.S. emissions are 2002-specific.

While we used the best available information to compute the on-road mobile emissions for the various portions of the modeling domain, inconsistent approaches for representing these emissions may lead to unnatural emissions gradients along political boundaries. We recommend for future work a unified approach for at least the U.S. inventories, where either we use MOBILE6 in SMOKE for the entire domain (or alternative emissions model such as CONCEPT), or we calculate the emissions with MOBILE6 outside of SMOKE and then use the resulting county-based emissions inventories.

2.5 Non-Road Mobile Sources

Non-road mobile source emissions data for SMOKE consist of annual, seasonal, and monthly IDA-formatted emission inventory files and ancillary data for allocating the inventories in space, time, and to the Carbon Bond-IV chemistry mechanism used in CMAQ and CAMx. This section describes where we obtained these data, how we modeled them, and the types of QA that we performed to ensure that SMOKE processed the data as expected.

2.5.1 Data Sources

The non-road mobile-source inventories in the Typ02G and Base18G emissions modeling used actual 2002 data developed by the RPOs for the U.S., version 2 of the year 2000 Canadian inventory and the improved 1999 Mexican inventory. The U.S. inventories consisted of annual, seasonal, and monthly inventories; the non-U.S. inventories were annual data. Pechan provided the CENRAP inventories divided between annual data for aircraft, locomotive, and commercial marine and annual files for all other non-road sources (Pechan and CEP, 2005e). Minnesota substituted the monthly MRPO Base K non-road inventory for the CENRAP inventory in their state. Iowa substituted the monthly estimates for non-road agricultural sources from the MRPO base K inventory for the CENRAP inventory. Texas provided estimates for 2002 non-road emissions in lieu of the CENRAP prepared inventory. WRAP provided non-road inventories divided between California and non-California seasonal inventories, further subdivided into aircraft, locomotives, shipping, and all other non-road mobile sources (Pollack et al., 2006). Note that the California Air Resources Board uses their own OFFROAD model for California non-

road emissions, whereas the EPA NONROAD model is used for the rest of the states (with the exception of locomotives, aircraft and shipping). With these data WRAP also provided temporal adjustments to apply to the inventories to split them between weekday and weekend emissions. We used these weekday/weekend splits to derive new weekly temporal profiles for the WRAP sources. The MRPO base K monthly non-road inventories were obtained from MRPO in NIF format and were converted to SMOKE format by Wendy Vit of the Missouri DNR. The VISTAS Base G and MANE-VU non-road mobile inventories consisted of annual county-level data (Pechan and CEP, 2005c). We received these inventories directly from the respective RPO inventory representatives. We received the Canadian 2000 inventory version 2 from the U.S. EPA EFIG (EPA, 2005d). For Mexico we used the improved 1999 inventory available at http://www.epa.gov/ttn/chief/net/mexico.html.

Along with adding the WRAP weekday/weekend emissions splits to the temporal allocation files, we also created temporal input files that apply a flat, uniform monthly profile to the monthly and seasonal non-road inventories. With the monthly and seasonal variability inherent in these inventories, we avoided applying redundant monthly profiles by splitting the inventories into seasonal/monthly and annual data. We applied the uniform monthly temporal profiles to the seasonal/monthly inventories and non-uniform monthly temporal profiles to the annual inventories. How the non-road emissions inventory data were split into those with monthly/seasonal emission and those with annual emissions is provided in Table 2-13.

Table 2-13. Non-road mobile-source inventory temporal configuration.

Region	Source	Temporal Coverage
WRAP (non-CA)	Non-road mobile	Seasonal
WRAP (CA)	Non-road mobile	Seasonal
WRAP	Aircraft	Seasonal
WRAP	Locomotive	Annual
WRAP	In-port and near-shore shipping	Annual
CENRAP	All non-road	Annual
CENRAP, IA	Non road Ag.	Monthly
VISTAS	All non-road	Annual
MRPO and MN	All non-road	Monthly
MANE-VU	All non-road	Annual
Canada	All non-road	Annual
Mexico	All non-road	Annual

Iowa elected to use the CENRAP-sponsored inventory for all of the non-road categories except for the agricultural equipment categories provided in Table 2-14. For these agricultural equipment categories, Iowa elected to use the Midwest RPO Base K inventory because this inventory provided improvements to the temporal allocation of emissions for the agricultural sector. The Base K inventory includes monthly emissions. The monthly emissions are used in the SMOKE IDA files for modeling.

Table 2-14. Non-road agricultural emissions categories where the MRPO Base K inventory was used instead of the CENRAP inventory in Iowa.

SCC	SCC Description
22600050xx	Off-highway Vehicle Gasoline, 2-Stroke: Agricultural Equipment (2 SCCs);
22650050xx	Off-highway Vehicle Gasoline, 4-Stroke: Agricultural Equipment (11 SCCs);
22670050xx	LPG : Agricultural Equipment (3 SCCs);
22680050xx	CNG : Agricultural Equipment (3 SCCs); and
22700050xx	Off-highway Vehicle Diesel : Agricultural Equipment (11 SCCs).

Texas provided annual and daily emissions for CO, CO_2, NO_x, VOC, SO_2, PM10-FIL, and PM25-FIL for several oil and gas field equipment non-road categories (Table 2-15). Texas provided authorization to change the pollutant codes from PM10-FIL to PM10-PRI and PM25-FIL to PM25-PRI.

Table 2-15. Non-road oil and gas development equipment categories that Texas provided emissions to be used instead of the CENRAP inventory.

SCC	SCC Description
2265010010	Off-highway Vehicle Gasoline, 4-Stroke : Industrial Equipment: Other Oil Field Equipment;
2268010010	CNG : Industrial Equipment : Other Oil Field Equipment; and
2270010010	Off-highway Vehicle Diesel : Industrial Equipment : Other Oil Field Equipment

Lancaster County Nebraska provided its own non-road inventory for SCC 2260000000 (Off-highway Vehicle Gasoline, 2-Stroke : 2-Stroke Gasoline except Rail and Marine: All). The CENRAP-sponsored inventories for SCCs starting with 226 in Lancaster County were removed to correct double-counting of emissions. This adjustment was made by Pechan for Base02b modeling.

2.5.2 Emissions Processing

We configured SMOKE to process all of the non-road mobile emissions inventory data as area-like inventories using spatial surrogates to grid the county-level emissions. As the WRAP inventories contained pre-computed PM emissions, we did not have to use SMOKE to compute coarse mass PM (PMC). The WRAP non-road mobile inventories represented seven-day average emissions (different from the area inventory, which represented weekday average emissions). As actual weekly average emissions, we configured SMOKE to process them by setting WKDAY_NORMALIZE to “No.” For the rest of the non-road mobile inventories we processed the data as weekday average data by setting WKDAY_NORMALIZE to “Yes.” We also assumed that all of the VOC emissions in the inventories are ROG and used SMOKE to convert the VOC to TOG before converting the emissions into CB-IV speciation for the air quality models. We configured SMOKE to create MWSS temporal intermediates rather than daily temporal files because the non-road mobile sources do not use weekly temporal profiles that vary across the weekdays, but do have very different emissions on weekdays versus weekend days.

We divided the non-road mobile emissions modeling based on whether the data were annual or seasonal/monthly inventories. This split facilitated the application of uniform monthly temporal profiles to the seasonal/monthly inventories. After processing the non-road emissions as two separate categories, non-road yearly and non-road monthly, we combined them with the rest of the emissions sectors to create model-ready emissions for CMAQ and CAMx.
To QA the non-road mobile emissions we used the procedures in the CENRAP emissions modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulations. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at
http://pah.cert.ucr.edu/aqm/cenrap/qa_base02f36.shtml#nr

2.5.3 Uncertainties and Recommendations

We prepared non-road mobile emissions using a combination of inventories having different temporal resolutions and various forms of ancillary data. These different combinations of information may lead to inconsistencies in how these emissions are represented across the modeling domain. In addition, the Canadian inventories contain only province-level information and thus have low-resolution spatial and temporal profiles applied to them. The Mexican non-road emissions are deficient in the number of different SCCs contained in the inventory and the availability of spatial surrogates that are applicable to non-road mobile sources. Improvements to the temporal profiles and spatial surrogates could provide a more consistent approach to representing the non-road emissions across the entire modeling domain.

2.6 Biogenic Sources

Biogenic emissions data for SMOKE consist of input files to the BEIS3 model (EPA, 2004a). BEIS3 is a system integrated into SMOKE for deriving emissions estimates of biogenic gas-phase pollutants from land use information, emissions factors for different plant species, and hourly, gridded meteorology data. The results of BEIS3 modeling are hourly, gridded emissions fluxes formatted for input to CMAQ or CAMx. This section describes the sources of the BEIS3 input data that we used for the Typ02G and Base18G emissions, how we modeled these data and the types of QA that were performed to ensure that SMOKE processed the data as expected.

2.6.1 Data Sources

The BELD3 land use data and biogenic emissions factors that were developed during the WRAP preliminary 2002 modeling were used for the CENRAP biogenic emissions modeling (Tonnesen et al., 2005). These data included BELD3 1-km resolution land use estimates and version 0.98 of the BELD emissions factors. Since the WRAP and CENRAP use the same 36 km Inter-RPO continental U.S. modeling domain, CENRAP was able to leverage of the WRAP work performed previously.

2.6.2 Emissions Processing

We used BEIS3.12 integrated in SMOKE to prepare emissions for the simulations. Most of the preparation for the biogenic emissions processing was completed during the preliminary 2002 modeling (Morris et al., 2005). As the modeling domains did not change from the preliminary 2002 to the final modeling, we re-used the gridded land use data and vegetation emissions factors that we prepared for the preliminary simulations.

To QA the biogenic emissions, we used the CENRAP emissions modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulation Base02b. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at http://pah.cert.ucr.edu/aqm/cenrap/qa_base02b36.shtml#b3

2.6.3 Uncertainties and Recommendations

The use of newer versions of BEIS (BEIS3.13) and the new MEGAN biogenic emissions models should be considered in future modeling.

2.7 Fire Emissions

Fire emissions data for SMOKE have traditionally been represented as county-level area-source inventories that were placed in only the first vertical model layer. We advanced the representation of fire emissions for air quality modeling by preparing portions of the inventory data as point sources with specific latitude-longitude coordinates for each fire centroid and pre-computed plume rise parameters that were derived from individual fire characteristics. These new inventories were based on the fire data products prepared by a CENRAP emission contractor (Reid et al., 2004b) and modified by the project team to be properly modeled as point sources. These data consist of annual, daily, and hourly IDA-formatted emissions inventory files and ancillary data for allocating the inventories in space, time, and to the Carbon Bond-IV chemistry mechanism used in CMAQ and CAMx. This section describes where we obtained these data, how we modeled them, and the types of QA performed to ensure that SMOKE processed the fire emissions data as expected.

2.7.1 Data Sources

The fire inventories in the Typ02G emissions inventory were held constant through Base18G. We used actual 2002 fire data developed by the RPOs for the U.S., version 2 of the year 2000 Canadian inventory fire data, and actual 2002 fire data for Ontario, Canada. The inventories used consisted of both area and point source data for the U.S., Canada, and Mexico. Sonoma Technology, Inc. provided the fire emissions for the CENRAP states (Reid et al., 2004b). Air Sciences provided us with the WRAP inventories divided among six different fire categories: wildfires, agricultural fires, wildland fire use, natural prescribed, anthropogenic prescribed, and non-Federal rangeland fires (Air Sciences, 2007a). These inventories consisted of annual, daily, and hourly IDA-formatted files with information on daily emissions totals and hourly plume characteristics for each fire. We received similar fire emission inventories for the other RPOS (Air Sciences, 2007b). We modeled these sources with the rest of the stationary-area-source sector.

CENRAP received data for 54 fires that occurred in Ontario during the year 2002. Information on the data code abbreviations, data definitions, and data units used in the raw data files was obtained from Mr. Rob Luik (Data Management Specialist) at the Ontario Ministry of Natural Resources (Rob.Luik@MNR. gov.on.ca). Emissions for each fire were estimated using the Emission Production Model (EPM)/CONSUME within the BlueSky framework. A fire identification code is needed to track individual fires throughout the processing. The unique fire identification code was created for each fire by concatenating the FIRE_NUMBER and CUR_DIST fields of the original data. The fire identification code also contains the FIPS code of the fire; this information is not used by BlueSky but is needed by BlueSky2Inv, the utility program that converts the BlueSky output to the SMOKE inventory format. The FIPS code 135000 was used for all fires with longitudes east of –90°, and FIPS code 135059 was used for

fires west of –90°. These FIPS codes were used to ensure that the fires would be assigned the correct time zones in later SMOKE processing. Some of the dates provided in the original data included hourly information. In all cases, the hourly information was not used leaving all data at a daily resolution.

2.7.2 Emissions Processing

SMOKE is instrumented to distribute point-source-formatted fire inventories to the vertical model layers either by using a pre-computed plume rise approach or by computing the plume rise dynamically using actual 2002 meteorology. We applied both approaches for modeling point-source fire emissions in simulation Typ02G. For the pre-computed plume rise approach, SMOKE reads an annual inventory file with information on fire locations, a daily inventory file with daily emission totals for each fire, and an hourly inventory file with hourly plume bottom, plume top, and layer 1 fractions for each fire. SMOKE uses this information to locate the fires on the horizontal model grid and to distribute the plume of each fire vertically to the model layers. Because some of these fires have plumes that reach the model top, we set the number of emissions layers for processing these inventories to the full 19 layers of the meteorology. We applied this approach to the point-source fires for the WRAP, CENRAP and VISTAS regions.
The alternative plume rise approach uses information on fuel loading and the heat flux of the fires to distribute the fires vertically to the model layers. The data are provided to SMOKE in the form of an annual inventory with information on fire locations and a daily inventory with daily emission totals for each fire, daily heat flux, and daily fuel loading. We applied this approach to the point-source fires for Ontario, Canada.

All of the point-source fires used diurnal temporal profiles and speciation profiles for VOC and $PM_{2.5}$ developed by Air Sciences (2007a) during the preliminary 2002 modeling (Morris et al., 2005).

We modeled the area-source fires for U.S. and Canada as standard stationary area sources. We applied monthly temporal profiles provided by RPOs, flat weekly temporal profiles, and the diurnal profiles developed by Air Sciences for WRAP fires (Air Sciences, 2007a), and for the rest of the RPOs we used diurnal profiles that were provided by them (Air Sciences, 2007b). We used the forestland area surrogate to distribute these emissions from the county or province level in the inventories to the model grid cells.

To QA the fire emissions, we used the procedure in the CENRAP emissions modeling QA protocol (Environ, 2004) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulation Typ02G. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, annual time-series plots, and vertical profiles. These QA graphics are available at: http://pah.cert.ucr.edu/aqm/cenrap/qa_typ02g36.shtml.

2.7.3 Uncertainties and Recommendations

We used forestland spatial surrogates to distribute these county level (province level for Canada) data to the model grid. Using spatial surrogates to locate fires is a crude approach that results in the artificial smearing of the emissions over too large an area. This issue can be remedied by

moving to a point-source approach for representing these fires, similar to the approach used by Air Sciences for preparing the WRAP fire inventories.

2.8 Dust Emissions

Dust emissions data for SMOKE have traditionally taken the form of county-level stationary-area-source inventories. As these emissions are correlated to meteorology, land use, and vegetative cover, we made several changes to how dust emissions are simulated by SMOKE to take these parameters into consideration. This section describes where we obtained data for windblown, fugitive, and road dust sources, how we modeled them, and the types of QA performed to ensure that SMOKE processed the data as expected.

2.8.1 Data Sources

For the fugitive dust and road dust inventories in the Typ02G emission scenario, we used actual 2002 data developed by the RPOs for the U.S., version 2 of the year 2000 Canadian inventory, and the BRAVO 1999 Mexican inventory. We extracted the fugitive dust inventories from the stationary-area inventories for each of the RPOs, Mexico, and Canada. Before modeling these data we further divided them into construction/mining sources and agricultural sources. We defined the fugitive dust sources in the Base02f modeling based on guidance provided by EPA (2004b). WRAP provide road dust emission inventories (Pollack et al., 2006). For the rest of the RPOs and Canada, we extracted the road dust SCCs from the stationary-area-source inventories. The BRAVO 1999 Mexico inventory did not contain any road dust SCCs. Table 2-16 lists the SCCs for the various fugitive and road dust sources that we modeled in the Base02f and Typ02G inventories. We applied near-source capture transport factors that are based on county-level vegetative cover to the fugitive and road dust inventories to prepare them for input to the air quality models.

For windblown dust, we used gridded emissions prepared outside of SMOKE using a land use and meteorology-based model developed under funding from the WRAP by ENVIRON and UC-Riverside (Mansell, 2005; Mansell et al., 2005).

Table 2-16. Fugitive and road dust SCCs.

Dust Category	SCCs
Fugitive dust (construction and mining)	2275085000, 2311000000, 2311010000, 2311010070, 2311020000, 2311030000, 2325000000, 2305070000, 2530000020, 2530000100, 2530000120
Fugitive dust (agricultural)	2801000003, 2801000005, 2801000008, 2805001000
Road dust	2294000000, 2296000000

2.8.2 Emissions Processing

We modeled the fugitive and road dust inventories through SMOKE using an area-source approach. We modeled these data on the assumption that they represented weekday, rather than seven-day week, emissions and thus used the SMOKE setting WKDAY_NORMALIZE to convert the data to a seven-day average. We configured SMOKE to compute PMC during the

processing as (PM_{10} - $PM_{2.5}$). Usually the records with dust do not include any other pollutants such as VOC, and NOx. For the few records that did include pollutants other than the PM we

split the records where the PMs processed with dust and the non PMs processed with the area. We configured SMOKE to create MWSS temporal intermediates rather than daily temporal files because the dust sources do not use weekly temporal profiles that vary across the weekdays.
As noted above, we used SMOKE to apply near-source transport factors to the raw fugitive and road dust inventories to prepare them for input to the air quality models. We used U.S. transport factors from work done by Pace (2005) and a 2001 land use/land cover database to develop a SMOKE input file of county and SCC-based transport factors for the U.S., Canada, and Mexico. We applied these factors to create a new set of inventories adjusted for these transport factors for all regions except VISTAS; the VISTAS dust sources that we received already had the transport factors applied to them.

We calculated the windblown dust emissions outside of SMOKE using an internally developed, process-based model. By "process-based" we refer to an emissions model that integrates information about the processes that lead to the emissions of interest, in this case windblown dust. The process-based windblown dust model developed by the WRAP considers wind speeds, precipitation history, and soil types to derive gridded dust fluxes resulting from wind disturbances for the modeling domain. More information on this model, its modes of operation, and the configuration used for simulation Base02a are available in Mansell et al. (2005).
To QA the fire emissions, we used the procedures in the CENRAP emissions modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for Base02f emissions. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at http://pah.cert.ucr.edu/aqm/cenrap/qa_base02f36.shtml#fd for fugitive dust, http://pah.cert.ucr.edu/aqm/cenrap/qa_base02f36.shtml#rd for road dust, and http://pah.cert.ucr.edu/aqm/cenrap/qa_base02b36.shtml#wbd for windblown dust.

2.8.3 Uncertainties and Recommendations

There are several improvements that should be made to the dust emissions modeling in future simulations. We will expand the list of fugitive dust SCCs that we extract from the stationary-area-source inventories for application of transport factors. This expanded list is based on recent work by EPA (2004b). We will also explore improvements to the assumptions that we used for generating emissions with the WRAP windblown dust model. Areas of improvement in the windblown dust model include refinements to the land use data and soil characteristics, additional information about agricultural activities in the WRAP and CENRAP regions, detailed model evaluation on targeted windblown dust case studies, and the application of snow-cover and vegetative transport factors to these emissions (Mansell et al., 2005).

2.9 Ammonia Emissions

Ammonia (NH_3) emissions from agricultural activities are a major source of ammonia and are dependent on many different environmental parameters, such as meteorology, crop and soil

types, and land use. CENRAP developed NH_3 emissions for the CENRAP states (Pechan and CEP, 2005e). Ammonia emissions were estimated for 13 source categories using the Carnegie Mellon University (CMU) model and supplemental technical work; 80% of technical work was dedicated to improving emissions estimates for two source categories—livestock production and fertilizer use. For these two categories, as well as biogenic sources, improvements were made to the activity data and/or emission factors used by the CMU model. For four other source categories (industrial point sources, landfills, ammonia refrigeration, and non-road mobile sources), emissions estimates were prepared independently of the CMU model, and for the remaining six source categories (publicly owned treatment works, wildfires, domestic animals, wild animals, human respiration, and on-road mobile sources), emissions estimates were derived by running the CMU model with no alterations.

CENRAP NH_3 model emissions estimates were combined with data provided by the other RPOs to represent agricultural NH_3 emissions in simulations Typ02G and Base18G.

2.9.1 Data Sources

The WRAP provided NH_3 emissions using the WRAP NH_3 model (Mansell et al, 2005) that generated emissions for the following sectors: domestic sources, wild animals, fertilizers, soils, and livestock. MWRPO provided monthly IDA-formatted inventories reflective of base K to CENRAP that they produced from process-based models of their own, along with temporal profiles and spatial cross-reference information for these sources. Iowa elected to use the MWRPO estimates of NH_3 emissions for fertilizer application, livestock, and wastewater treatment or SCC 28017XXXXX, 28050XXXXX, and 2630020000 respectively. Minnesota reviewed the MWRPO inventory and chose to move forward with the CENRAP developed data set. The rest of the U.S., Canada, and Mexico had agricultural NH_3 emissions contained within their annual stationary-area-source inventories.

2.9.2 Emissions Processing

The WRAP NH_3 emissions were processed outside of SMOKE using the WRAP NH_3 model and provided to CENRAP as gridded, hourly emissions in network common data form (NetCDF) files. CENRAP and MWRPO provided monthly IDA-formatted, county-level NH_3 inventories that were developed separately with process-based models. We modeled these emissions like area sources with SMOKE, applying the temporal profiles and the spatial cross-referencing developed for CENRAP that we received from the MWRPO. The agricultural NH_3 emissions for the rest of the RPOs, Canada, and Mexico are contained within their stationary-area inventories. We applied the SMOKE default temporal profiles and spatial surrogates to all non-process-based NH_3 emissions.

To QA the NH_3 emissions, we used the procedures in the CENRAP modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulations Typ02G and Base18G. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at http://pah.cert.ucr.edu/aqm/cenrap/index.shtml

2.9.3 Uncertainties and Recommendations

Like the other emissions categories that have traditionally been represented as stationary area sources, the agricultural NH_3 emissions sector is affected by interregional inconsistencies in the way these emissions are represented.

During the QA of the Base02a emissions, the WRAP discovered a problem with their soil NH_3 estimates. The emission factor for soil NH_3 that were used in developing these data produced too high an emission estimate from this sector. For simulations Base02B through Typ02G, we therefore removed the soil NH_3 sector completely from the WRAP domain. In future simulations we will include these emissions with a revised emission factor for NH_3 emissions from soils.

2.10 Oil and Gas Emissions

Emissions from oil and gas development activities have been poorly characterized in the past. Simulations These emissions have been sporadically reported by some states in their stationary-area-source inventories, but for the most part were missing from our preliminary modeling. In the Typ02G and Base18G simulations, significant effort was made to better represent oil and gas production emissions explicitly as both area and point sources.

2.10.1 Data Sources

Emissions from oil and gas production activities for the CENRAP states were included with the other CENRAP state emission source categories (Pechan and CEP, 2005e). We received oil and gas production emissions inventories for the WRAP states and for tribal lands in the WRAP region as stationary-area-source and stationary-point-source IDA-formatted inventories. ERG, Inc. provided the point-source inventories with the rest of the stationary-point data (ERG, 2006a). ENVIRON provided the area-source oil and gas inventories for non-CA WRAP states and for tribal lands in the WRAP region, along with spatial surrogates for allocating these data to the model grid (Russell and Pollack. 2005). Oil and gas production emissions data for outside of the WRAP region are contained in the stationary-area inventories.

2.10.2 Emissions Processing

We modeled the WRAP point-source oil and gas production emissions in combination with the rest of the stationary-point-source emissions. We modeled the WRAP area-source oil and gas production emissions explicitly as a separate category that included WRAP and tribal inventories. These data represent weekly average emissions and did not require any renormalization within SMOKE. We used spatial surrogates generated by ENVIRON to allocate these annual county-level emissions to the model grid. For all oil and gas emissions, we applied flat temporal profiles to create hourly inputs to CMAQ and CAMx.

2.10.3 Uncertainties and Recommendations

In future 2002 modeling California oil and gas production emissions should be replaced with revised data provided by the California Air Resources Board (CARB). In addition, WRAP has

updated their oil and gas production inventory for the base and future years in a Phase II work effort that substantially improved the emissions inventory estimates (Bar-Ilan et al., 2007).

2.11 MMS Off-shore Gulf of Mexico Emissions

Offshore area point source emissions include emissions in the Gulf of Mexico and off the coast of California that are associated with oil and gas drilling platforms.

2.11.1 Data Sources

We obtained year 2000 IDA-formatted point-source inventories for oil and gas platforms in the Gulf of Mexico from the Minerals Management Service (MMS) web site:
http://www.gomr.mms.gov/homepg/regulate/environ/airquality/gulfwide_emission_inventory/2000GulfwideEmissionInventory.html

We combined these with point-source data for coastal California provided to us by CARB during the preliminary 2002 modeling. We also obtained gridded area source emissions for platforms in the Gulf of Mexico from the MMS that we converted to the CENRAP 36-km model grid.

The 2000 MMS Gulf wide Emission Inventory was updated as of June 2006 to account for a change in vessel emissions in the non-point source (non-platform) database file. The point source (platform) emission inventory database file has not changed from the original version. Area source emissions from offshore activities in the Gulf of Mexico were developed from the latest estimates provided by the Minerals Management Service (MMS). The MMS inventory includes both platform and non-platform sources. The non-platform area source emissions estimates are spatially allocated to lease blocks and protraction units throughout the Gulf of Mexico. Temporal and spatial allocation cross-reference data were developed from the MMS inventory data and formatted for input to the SMOKE emissions model by Carolina Environmental Programs. These data were provided to the CENRAP emissions modeling team for implementation within SMOKE. The spatial allocation surrogates were provided for 4-km grid cells. The UCR team used these surrogates and developed surrogates for 36-km grid cells. Because these data are references to lease blocks/protraction units, rather than counties, this source category was processed separately form all other emissions using a customized reference data and SMOKE run scripts.

We modeled the offshore point and area sources as separate categories in the simulations. We used SMOKE to locate the offshore point sources on the model grid and to vertically allocate them into 15 model layers.

To QA the offshore platform emissions, we used the procedures in the CENRAP modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 20042) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulation Base02a. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at http://pah.cert.ucr.edu/aqm/cenrap/index.shtml for the point and area sources.

2.11.2 Uncertainties and Recommendations

While the MMS data that we used were an improvement over previously modeled Gulf of Mexico platform inventories, the data were developed for a different modeling application that covered only the extreme northwestern portion of the Gulf, so they are missing large areas of the region of the Gulf that contain drilling platforms. The California offshore inventory represents an initial attempt at compiling an emission inventory for this area and contains very few sources. Future simulations will focus on improving these emissions by expanding the coverage of the offshore platform inventories for both the Gulf of Mexico and the Pacific Coast.

2.12 Off-shore Shipping Emissions

Emission inventory development for regional- and continental-scale air quality modeling has historically neglected offshore emissions sources beyond 25 miles offshore. Concern over the environmental effects of commercial shipping emissions in the Pacific on the coastal states in the WRAP region led to the development of a commercial marine shipping inventory for the Pacific. This inventory of off-shore marine vessels emissions made a substantial difference in some of the coastal western PM estimates (e.g., SO4). VISTAS developed an off-shore marine vessels inventory for the entire modeling domain that included the Pacific and Atlantic Oceans and the Gulf Of Mexico. For Typ02G and Base18G emission inventories CENRAP adopted the offshore shipping inventories developed by VISTAS.

2.12.1 Data Sources

Initially we obtained gridded annual commercial marine shipping emissions for the Pacific on the 36-km model grid from WRAP for inclusion in CENRAP simulations in the Base F modeling (Pollack et al., 2006). The commercial marine inventory contains all of the criteria pollutants contained in the non-road mobile-source inventory: CO, NO_x, VOC, NH_3, SO_2, PM_{10}, and $PM_{2.5}$. This inventory was subsequently updated in the Typ02G and Base18G modeling with the VISTAS off-shore commercial marine emissions inventory that covered the Gulf of Mexico and the Atlantic and Pacific Oceans and was based on the EPA/ARB SOx Emissions Control Area (SECA) program. Dr. James Corbett (University of Delaware) analyzed off-shore marine vessel data and worked with ENVIRON/ICF to convert to gridded emissions for the SECA grid. ENVIRON then provided SO_2, NO_X, PM and VOC emissions for the RPO 36-km grid.

2.12.2 Emissions Processing

The commercial marine shipping inventory was not processed through SMOKE. VISTAS provided the data to the as gridded text files on the 36-km model grid. These data were reformatted to the NetCDF CMAQ input format with a utility developed by UCR. The VOC inventory was converted to CB-IV speciation and the NO_x and $PM_{2.5}$ inventory pollutants to CMAQ input species with SMOKE chemical profiles for commercial shipping sources. No temporal adjustments were applied to these emissions; they use uniform monthly, daily, and diurnal profiles. An SCC for commercial marine vessels within the MMS inventory (SCC CM80002200) was accounted for in the commercial marine inventory developed for VISTAS. The duplicate emissions were removed from the MMS inventory prior to processing emissions

for Base G simulations. The duplicated emissions amounted to 19,000 TPY of NO_X and 3,184 TPY of SO_2. For simulation Typ02G and Base18G we received binary netCDF file from ENVIRON for one day and that day was used for every day of the year.
To QA the commercial marine shipping emissions, we used the procedures in the CENRAP modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a) and a suite of graphical summaries. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at http://pah.cert.ucr.edu/aqm/cenrap/index.shtml.

2.12.3 Uncertainties and Recommendations

As a first attempt at representing shipping emissions in the Pacific in international waters, the WRAP and VISTAS 2002 commercial shipping inventory is a breakthrough in a historically neglected emissions category. As the RPOs evaluate the effects of these emissions on the air quality modeling, we anticipate that there will be refinements to the temporal profiles and to the vertical allocation of the emissions. Many of the stacks of large commercial ships contained in this inventory extend vertically above the first model layer. Future versions of this inventory should use higher-resolution temporal adjustments and should allocate the emissions to the appropriate model layers. Off-shore marine shipping activity is projected to increase. However, there are also the potential for emission controls on this source category (e.g., SECA program). Given these two off setting activities, the 2002 off-shore marine shipping emissions were assumed to be unchanged going from 2002 to 2018. Better estimates of 2018 marine emissions are being developed that should be considered in future modeling activities.

2.13 2018 Growth and Control

Base18G was based on grown inventories assuming on-the-books control strategies. CENRAP contracted with Pechan to deliver growth and control data for CENRAP and to consolidate growth and control information for other RPOs where available (Pechan, 2005d). The data are applicable to all source categories and pollutants included in the CENRAP 2002 emission inventory. This includes the following pollutants: sulfur oxides (SO_x), oxides of nitrogen (NO_x), volatile organic compounds (VOC), carbon monoxide (CO), ammonia (NH_3), and primary PM_{10} and $PM_{2.5}$. Some source categories were held constant between 2002 and 2018 because either stagnant growth was deemed appropriate or insufficient data was available to adequately project future growth or controls. These source categories include the following:

- Wind Blown Dust from non-agricultural land use categories.
- Emissions from wildfires.
- Emissions from Mexico.
- Global transport sources (i.e., the 2002 GEOS-CHEM boundary conditions).

2.13.1 Data Sources

CENRAP contracted with Pechan to provide growth and control factors to be applied with SMOKE for the CENRAP region (Pechan, 2005d). These growth and control parameters were based on growth estimates derived from EGAS 5.0 and control estimates assumed for

implementation of federal regulations and on-the-books state and local control programs. Emissions projections for electric generating units were developed for the RPOs with the Integrated Planning Model (IPM). The RPO 2.1.9 IPM results were subsequently modified by VISTAS, MRPO and CENRAP to reflect planned new construction and controls. The WRAP provided 2018 EGU estimates developed in coordination with State and Industry stakeholders. VISTAS, MWRPO and the WRAP provided emissions for 2018, having applied growth and control factors outside of SMOKE processing. EPA provided SMOKE processed emissions, applying both growth and controls, for Canada for the year 2020. These emissions were provided on the RPO 36-km grid. However, emissions were inexplicably processed for an alternative vertical structure. Alpine Geophysics, under contract to VISTAS reallocated the emissions through the vertical layers to more accurately reflect the vertical structure applied uniformly by the RPOs. The modified data was obtained directly from Alpine Geophysics. Emissions from Mexico were held constant between the inventory year 1999 and modeled 2002 and 2018. Improvements to the Mexican inventory have been continuously made between generation of the original BRAVO inventory and the present improved 1999 inventory. However, given the continued uncertainties in the improved inventory, no future year projections where attempted by CENRAP.

2.13.2 Emissions Processing

Growth and control factors developed by Pechan (2005d) for Arkansas did not match the final delivered inventory for Arkansas. Arkansas underwent major revisions to point and facility IDs in mid-2005. These updates were not available by the delivery date of the growth and control parameters. In coordination with Arkansas, a cross-walk was developed to correct the point and facility IDs.

The assumptions that went into the development of controls for engines covered under the RICE MACT were not consistent with the final rule. Rule penetration values for CENRAP states were adjusted to more accurately reflect the impact of the final rule.

The impact of the refinery global settlements was not incorporated into CENRAP modeling until the base G simulations. Control assumptions provided by EPA and referenced in EPA CAIR modeling were applied to the 2018 inventory. These reductions primarily impacted SO_2 emissions; however, NO_X reductions were applied in Oklahoma, Louisiana, and Minnesota.

2.13.3 Uncertainties and Recommendations

The impact of control programs is an area of uncertainty that will need continued review as the programs are implemented. Development of growth and control assumptions for Mexico will be necessary for continued refinement of the impact of international transport. CENRAP obtained estimates of increased prescribed burn activity for the Forest Service after processing of the base G simulations was underway. These estimates of increased activity should be reviewed for inclusion in future simulations. EPA developed 2020 estimates of Canadian emissions are assumed to include erroneous stack parameters previously addressed in the 2000 emissions processing. Further review of this data set is recommended.

2.14 2018 Base G C1 Control Sensitivity

CENRAP conducted a control sensitivity evaluating the impact of point source reductions given a maximum dollar per ton control level. The intent of the control sensitivity was to generate information on the impact of possible control strategies in support of the consultation process. The strategies were grouped together under a common set of criteria and not specifically identified by the states. The results of the modeling were not intended to be prescriptive; instead, they were intended to be a starting point for control discussions that would require much greater refinement.

2.14.1 Data Sources

CENRAP contracted with Alpine Geophysics to provide an evaluation of possible additional controls for the 2018 CENRAP point source inventory. These controls were in addition to on-the-books and BART controls assumed in the development of Base18F and Base18G emission scenarios. Base18F IDA files were enhanced with additional information on base level controls. The enhanced dataset was then linked with the control data contained in the 2006 release of EPA's AirControlNet software. Alpine developed cost curves for NO_X and SO_2 in 2005 dollars for the Base18F CENRAP point source inventory. Staff from Iowa DNR and Kansas DHE worked in conjunction to add area of influence data (Alpine Geophysics, 2006) and distance calculations to each Class I area in CENRAP. A variety of dollar per ton control levels were evaluated. CENRAP elected to base the sensitivity on a maximum control cost of $5,000 per ton. This selection was made with the understanding that the cost data under-represented the true cost of retrofit controls and did not take in to consideration more recent market fluctuations impacting costs of controls and construction. CENRAP refined the selection by applying controls to only those sources that met the criteria that the ratio of their emissions in tons per year to their distance to any Class I area in kilometers be less than 5. This distance weighting criteria allowed the sensitivity to focus on those sources with the greatest impact. Additional controls for other RPOs were not considered in this evaluation.

2.14.2 Emissions Processing

Sources considered for control were removed from the IDA files. Growth and control assumptions were applied outside of SMOKE and delivered to UCR as 2018 emissions. Stack parameter changes as a result of additional controls were not considered in this analysis.

2.14.3 Uncertainties and Recommendations

Given uncertainties in control costs more refined analyses should include an evaluation of retrofit control costs under present values.

2.15 Emissions Summaries

Appendix B provides details on the source of the emission files used in the CENRAP Typ02G and Base18G modeling. Also in Appendix B are sample emission summary plots, additional plots are available on the CENREAP modeling website:
http://pah.cert.ucr.edu/aqm/cenrap/emissions.shtml.

CENRAP has contracted with E.H. Pechan and Associates to provide emissions summaries used in the final Typ02G and Base18G modeling in Excel spreadsheets and in an Access database that are available on the CENRAP website (http://www.cenrap.org/projects.asp#). Figures 2-3 through 2-9 display the, respectively, SO2, NOx, VOC, PM2.5, PM10, NH3 and CO anthropogenic emissions for the CENRAP states and the Typ02G and Base18G emission scenarios. Emissions are broken down by major source sector. For the state of Texas the emissions are broken by three groups, northeast Texas, southeast Texas and remainder of Texas (west Texas).

For most states, EGUs are the largest contributor to SO2 emissions (Figure 2-3). As EGU SO2 emissions are generally projected to be reduced in the future, most states show a reduction in total SO2 emissions from 2002 to 2018. One exception to this is Louisiana for which non-EGU point source SO2 emissions are greater than for EGU and are projected to increase from 2002 to 2018. The reasons for these increases are unclear, but the growth factors for non-EGU points should be examined more carefully.

NOx emissions are fairly evenly distributed across non-EGU point, EGU point, non-road mobile, on-road mobile and area sources for the 2002 Typ02G emissions scenario (Figure 2-4). In 2018, the contributions of on-road mobile source NOx emissions is reduced dramatically, with some states also showing reductions in EGU NOx emissions as well, resulting in all states exhibiting lower NOx emissions in 2018 than 2002.

VOC emissions are dominated by area, non-road mobile, on-road mobile and non-EGU point sources in both 2002 and 2018 (Figure 2-5). VOC emissions from on-road and non-road mobile source are projected to go down in the future, whereas VOC emissions from non-EGU point and, especially, area sources are projected to increase. Thus, whether a state's total VOC emissions increase or decrease depends on the relative contributions of mobile versus area sources and the level of increase in area source VOC emissions. Note that the VOC emissions listed in Figure 2-5 do not include biogenic VOC emissions that would be greater than the anthropogenic VOC emissions shown in Figure 2-5. Note that because biogenic VOC emissions are processed using the SMOKE/BEIS module on the 36 km grid, state-wide biogenic VOC emissions summaries are not readily available.

Primary $PM_{2.5}$ emissions are primarily from road dust and fugitive dust, and for some states fires (Figure 2-6). Kansas, Oklahoma, Louisiana and Texas all have large contributions from fires not seen in the other states. Road dust and fugitive dust are the most dominate source categories for coarse particulate as well (Figure 2-7).

CENRAP developed a separate ammonia emissions for 13 categories using the CMU model including livestock and fertilizer that dominates the ammonia emissions across the CENRAP

states (Figure 2-8). Several states also have significant ammonia contributions from non-EGU point sources, whereas others do not.

CO emissions are dominated by the on-road and non-road mobile source sectors (Figure 2-9). However, states with fires also see large CO contributions from them as well. On-road mobile source CO emissions are projected to go down substantially from 2002 to 2018, whereas the other source categories are flat.

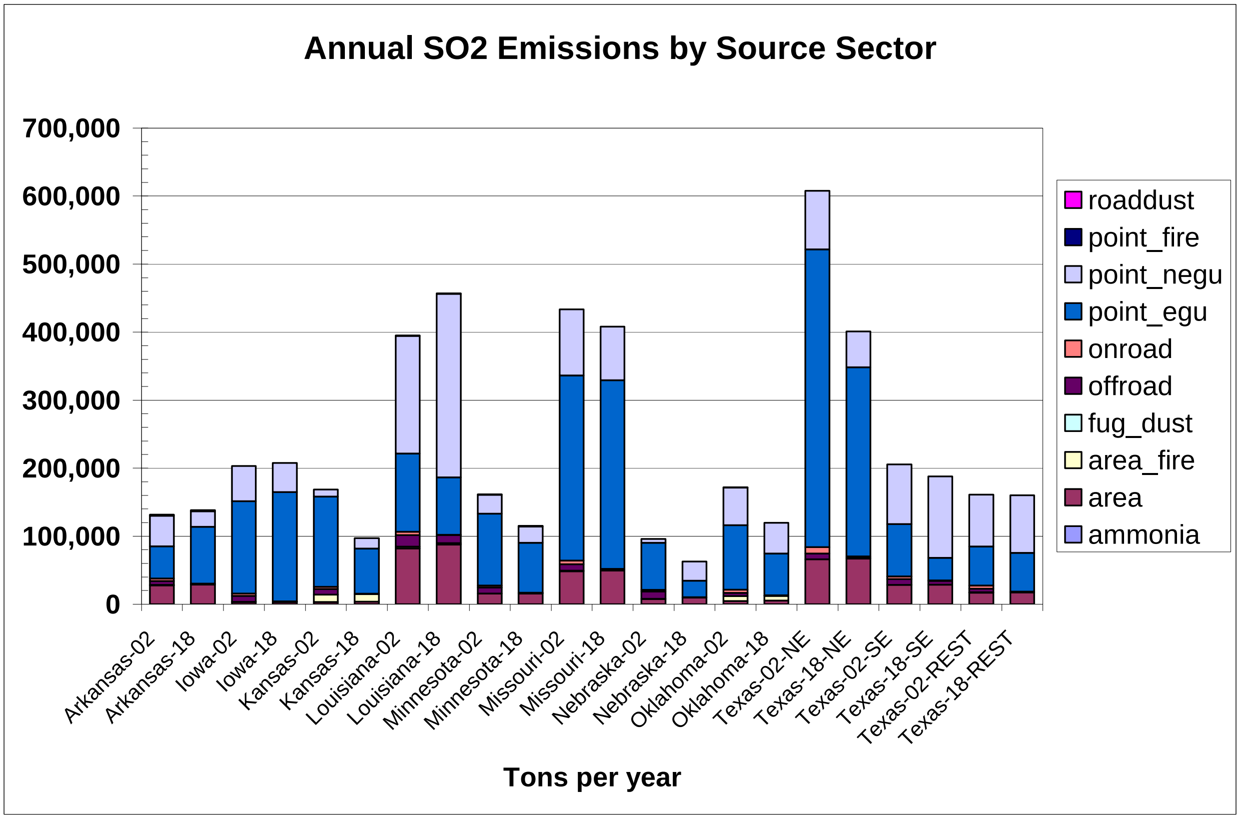


Figure 2-3. Summary of Typ02G and Base18G SO2 emissions by CENRAP state and major source sector (tons per year).

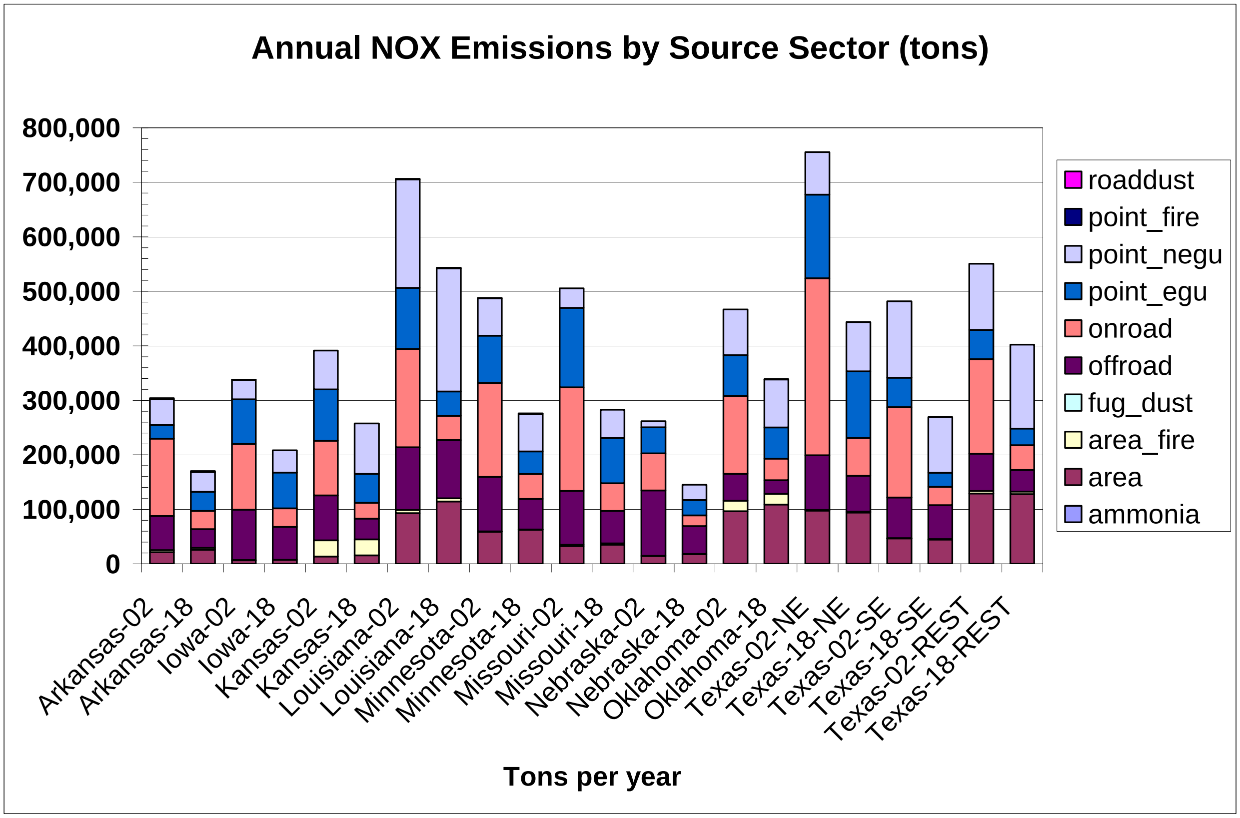


Figure 2-4. Summary of Typ02G and Base18G NOx emissions by CENRAP state and major source sector (tons per year).

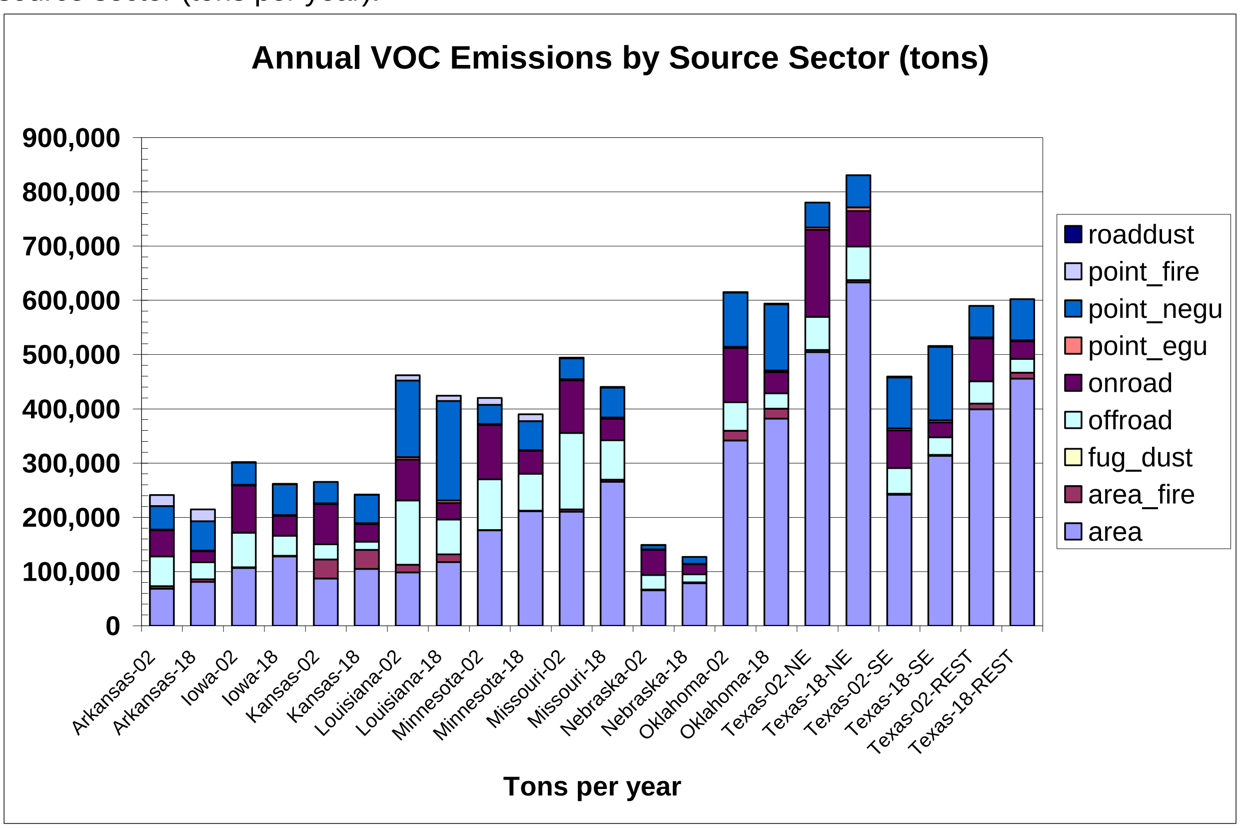


Figure 2-5. Summary of Typ02G and Base18G VOC emissions by CENRAP state and major source sector (tons per year).

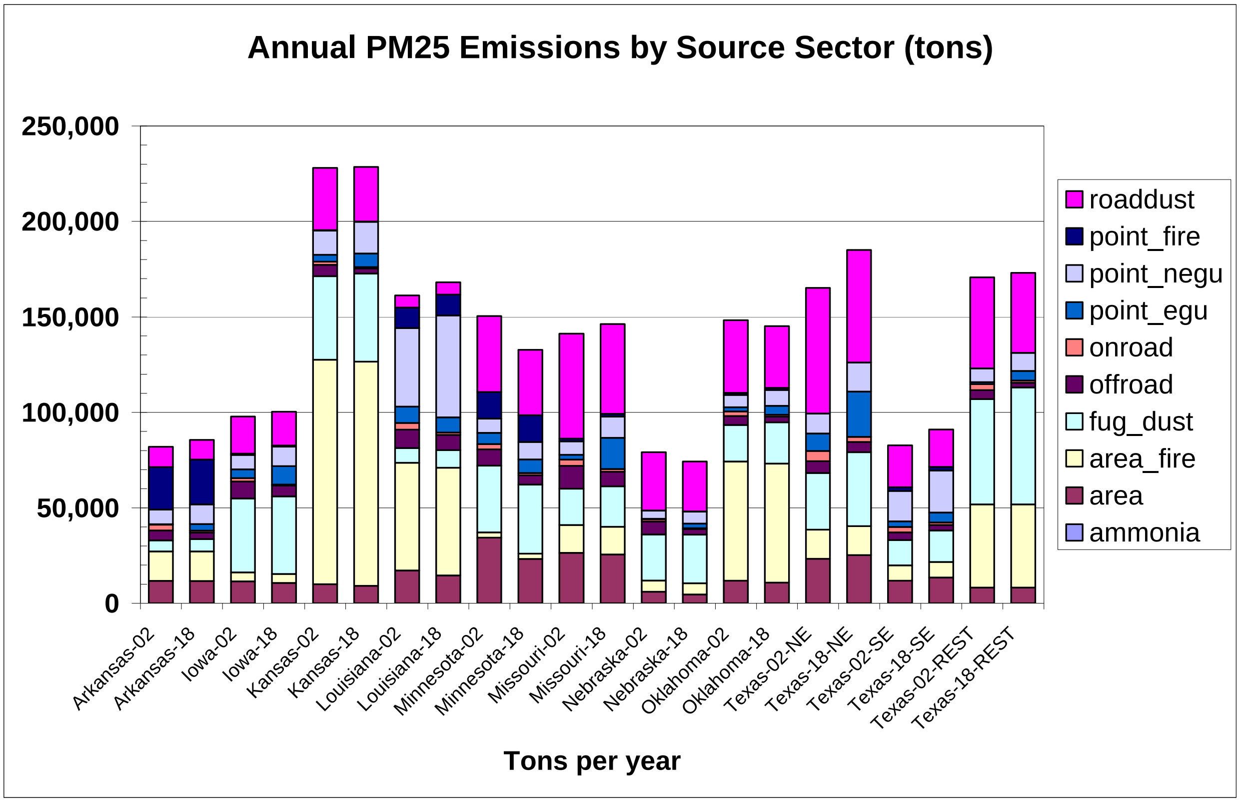


Figure 2-6. Summary of Typ02G and Base18G PM2.5 emissions by CENRAP state and major source sector (tons per year).

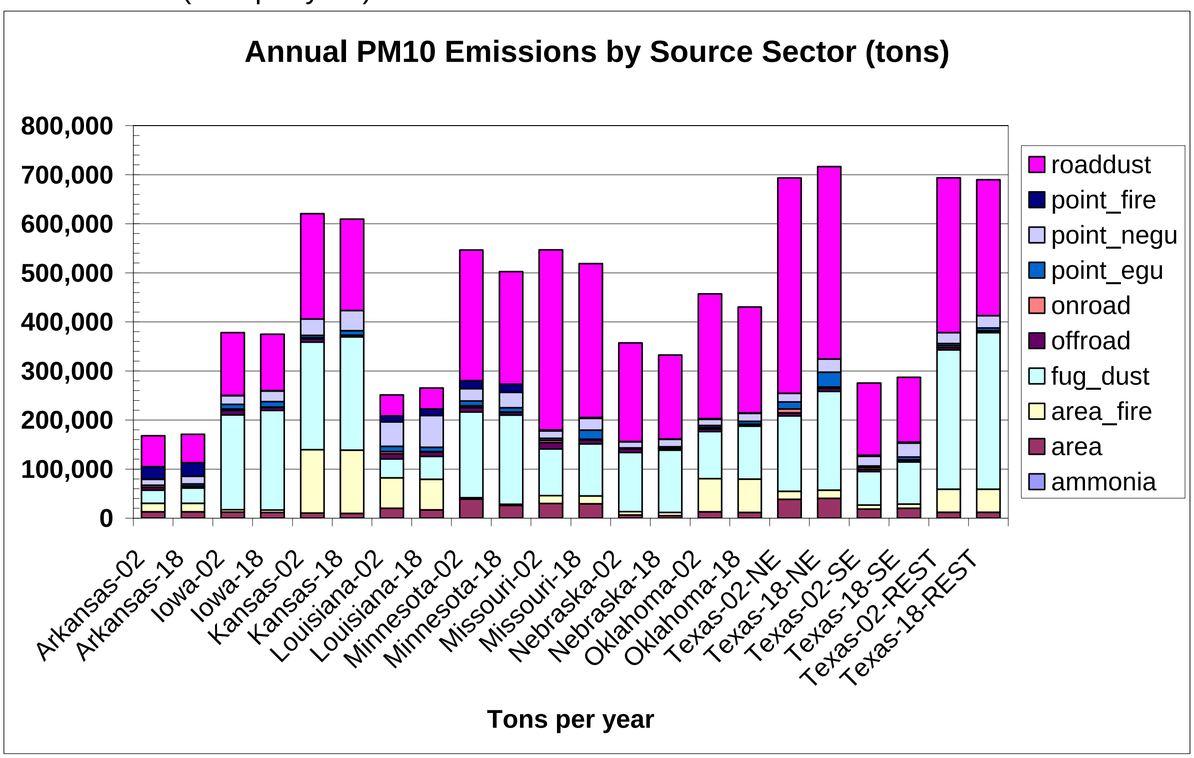


Figure 2-7. Summary of Typ02G and Base18G PM10 emissions by CENRAP state and major source sector (tons per year).

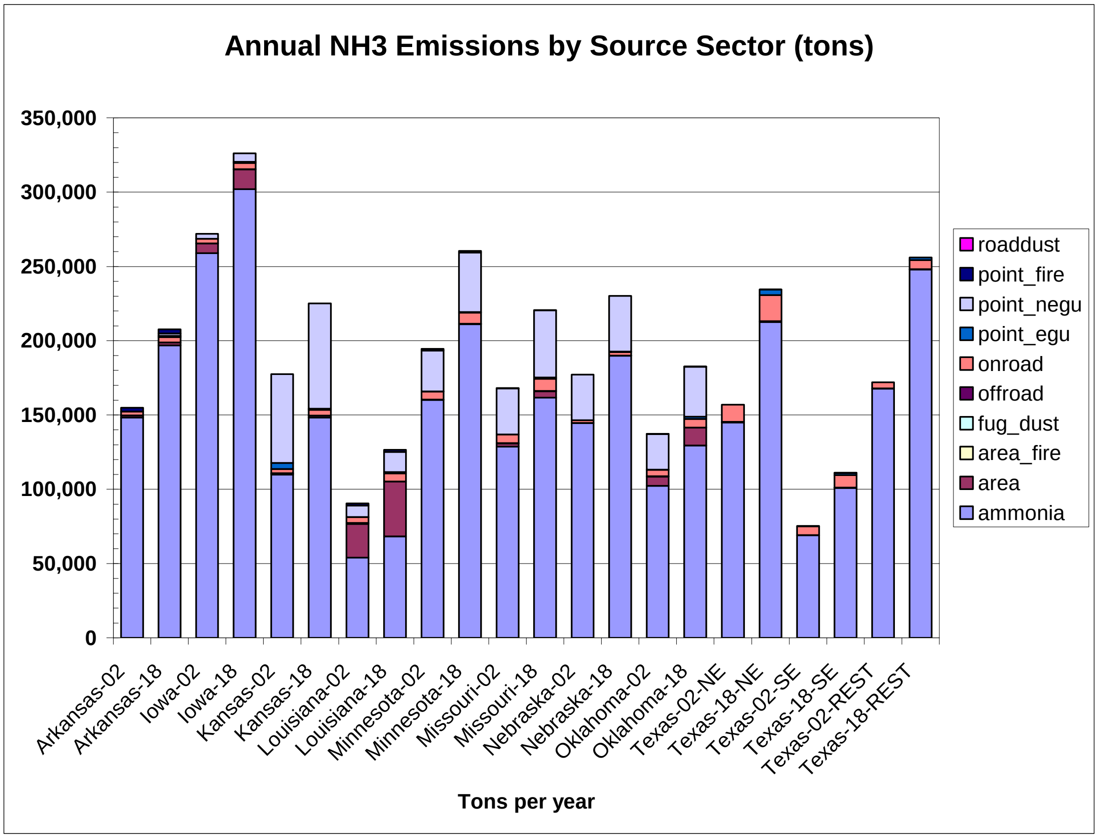


Figure 2-8. Summary of Typ02G and Base18G NH3 emissions by CENRAP state and major source sector (tons per year).

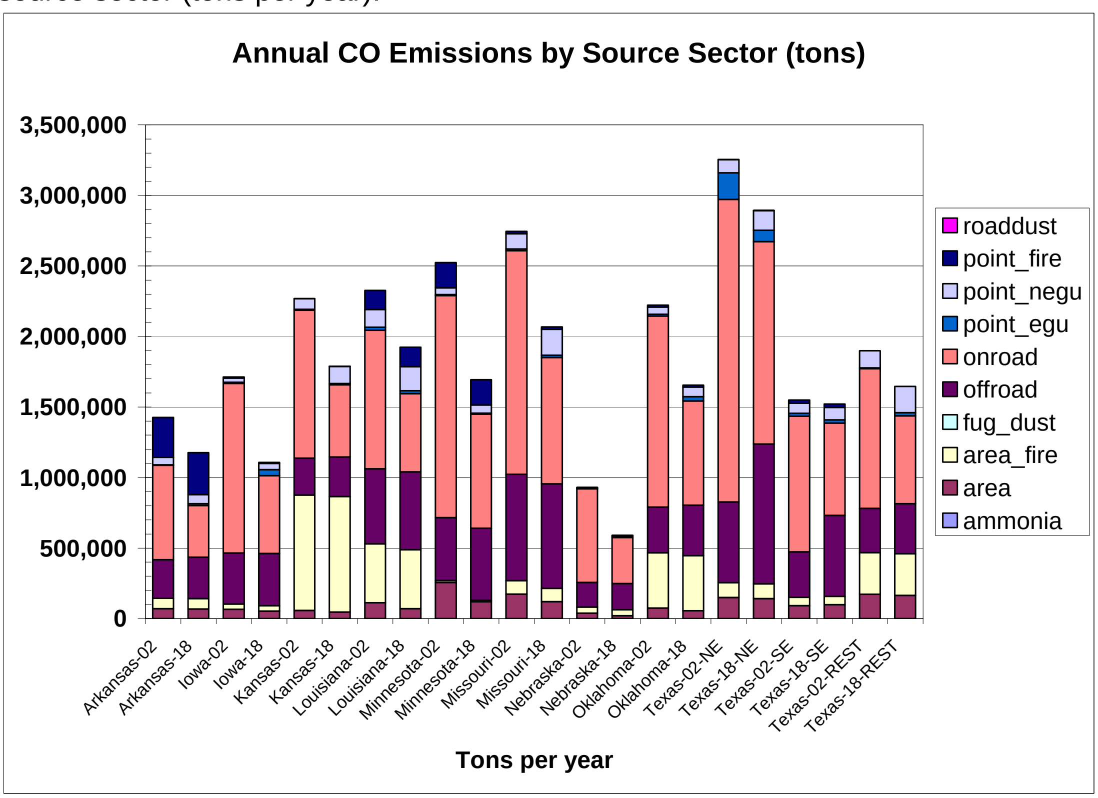


Figure 2-9. Summary of Typ02G and Base18G CO emissions by CENRAP state and major source sector (tons per year).

3.0 MODEL PERFORMANCE EVALUATION

In this Chapter we summarize the CMAQ model performance for the final 2002 36 km Base F base case simulation. Because the 2002 Base F CMAQ simulation produced nearly identical results in the U.S. as the final 2002 Base G simulation and limited resource availability, CENRAP elected not to redo the model evaluation for the 2002 Base G case. This model performance focuses on the ability of the model to predict PM species within the CENRAP region. Details on the model performance are provided in Appendix C. Previously we have documented model performance of interim versions of model base case simulations in reports (Morris et al., 2005) and presentations to the CENRAP Work Groups and POG (e.g., Morris et al., 2006a,b).

3.1 Evaluation Methodology

EPA's integrated ozone, $PM_{2.5}$ and regional haze modeling guidance calls for a comprehensive, multi-layered approach to model performance testing, consisting of the four major components: operational, diagnostic, mechanistic (or scientific) and probabilistic (EPA, 2007). The CMAQ model performance evaluation effort focused on the first two components, namely:

- **Operational Evaluation**: Tests the ability of the model to estimate PM concentrations (both fine and coarse) and the components at PM_{10} and $PM_{2.5}$ including the quantities used to characterize visibility (i.e., sulfate, nitrate, ammonium, organic carbon, elemental carbon, other $PM_{2.5}$, and coarse matter ($PM_{2.5-10}$). This evaluation examines whether the measurements are properly represented by the model predictions but does not necessarily ensure that the model is getting "the right answer for the right reason"; and

- **Diagnostic Evaluation:** Tests the ability of the model to predict visibility and extinction, PM chemical composition including PM precursors (e.g., SOx, NOx, and NH_3) and associated oxidants (e.g., ozone and nitric acid); PM size distribution; temporal variation; spatial variation; mass fluxes; and components of light extinction (i.e., scattering and absorption).

In this final model performance evaluation for the 2002 Typical Base F CMAQ simulation, the operational evaluation has been given the greatest attention since this is the primary thrust of EPA's modeling guidance. However, we have also examined certain diagnostic features dealing with the model's ability to simulate sub-regional, monthly, diurnal, gas phase and aerosol concentration distributions. In the course of the CENRAP air quality modeling and other modeling processes, numerous diagnostic sensitivity tests were performed to investigate and improve model performance. Key diagnostic tests that were performed and the results are discussed on the CENRAP modeling website: http://pah.cert.ucr.edu/aqm/cenrap/index.shtml.

3.2 Ambient Air Quality Data used in the Evaluation

The ground-level model evaluation database for 2002 was compiled by the modeling team using several routine and research-grade databases. The first is the routine gas-phase concentration measurements for ozone, SO_2, NO_2 and CO archived in EPA's Aerometric Information Retrieval System (AIRS) Air Quality System (AQS) database. Other sources of observed information come from the various PM monitoring networks in the U.S. These include the Interagency Monitoring of Protected Visual Environments (IMPROVE); Clean Air Status and Trends Network (CASTNET); EPA Speciation Trends Network (STN) of $PM_{2.5}$ species; and National Acid Deposition Program (NADP). During the course of the CENRAP modeling, the numerous base case simulations were evaluated across the continental U.S. (e.g., Morris et al., 2005). In this section and in Appendix C we focus our evaluation on model performance within the CENRAP region.

3.2 Operational Model Evaluation Approach

The CENRAP modeling databases will be used to develop the visibility State Implementation Plan (SIP) as required by the Regional Haze Rule (RHR). Accordingly, the primary focus of the operational evaluation in this report is on the six components of fine particulate ($PM_{2.5}$) and coarse mass ($PM_{2.5-10}$) within the CENRAP region that are used to characterize visibility at Class I areas:

- Sulfate (SO4);
- Particulate Nitrate (NO3);
- Elemental Carbon (EC);
- Organic Mass Carbon (OMC);
- Other inorganic fine particulate (IP or Soil); and
- Coarse Mass (CM).

The model performance for ozone, precursors, and product species (e.g., SO_4 , NO_3, NH_4 and HNO_3) is also evaluated to build confidence that the modeling system is sufficiently reliable to project future-year visibility.

3.3 Model Performance Goals and Criteria

The issue of model performance goals for PM species is an area of ongoing research and debate. For ozone modeling, EPA has established performance goals for 1-hour ozone: normalized mean bias and gross error of #±15% and #35%, respectively (EPA, 1991). EPA's draft fine particulate modeling guidance notes that performance goals for ozone should be viewed as upper bounds of model performance that PM models may not be able to always achieve and that we should demand better model performance for PM components that make up a larger fraction of the PM mass than those that are minor contributors (EPA, 2001). EPA's final modeling guidance does not list any specific model performance goals for PM and visibility modeling and instead provides a summary of PM model performance across several historical applications that can be used for comparisons, if desired. Measuring PM species is not as precise as ozone monitoring. In fact, the uncertainty in measurement techniques for some PM species is likely to

exceed the more stringent model performance goals, such as those for ozone. For example, recent comparisons of the PM species measurements using the IMPROVE and STN measurement technologies found uncertainties of approximately ∀20% (SO4) to ∀50% (EC) (Solomon et al., 2004).

For the CENRAP modeling we have adopted three levels of model performance goals and criteria for bias and gross error as listed in Table 3-1. Note that we are not suggesting that these performance goals be adopted as guidance. Rather, we are just using them to frame and put the PM model performance into context and to facilitate model performance intercomparison across episodes, species, models and sensitivity tests.

Table 3-1. Model performance goals and criteria used to assist in interpreting modeling results.

Fractional Bias	Fractional Gross Error	Comment
#∀15%	#35%	Ozone model performance goal for which PM model performance would be considered "good" – note that for many PM species measurement uncertainties may exceed this goal.
#∀30%	#50%	Proposed PM model performance goal that we would hope each PM species could meet
#∀60%	#75%	Proposed PM criteria above which indicates potential fundamental problems with the modeling system.

As noted in EPA's PM modeling guidance, less abundant PM species should have less stringent performance goals (EPA, 2001; 2007). Accordingly, we are also using performance goals that are a continuous function of average concentrations, as proposed by Dr. James Boylan at the Georgia Department of Natural Resources (GA DNR), that have the following features (Boylan, 2004):

- Asymptotically approaching proposed performance goals or criteria (i.e., the ∀30%/50% and ∀60%/75% bias/error levels listed in Table 3-1) when the mean of the observed concentrations are greater than 2.5 ug/m^3.
- Approaching 200% error and ∀200% bias when the mean of the observed concentrations are extremely small.

Bias and error are plotted as a function of average concentrations. As the mean concentration approaches zero, the bias performance goal and criteria flare out to ∀200% creating a horn shape, hence the name "Bugle Plots". Dr. Boylan has defined three Zones of model performance: Zone 1 meets the ∀30%/50% bias/error performance goal and is considered "good" model performance; Zone 2 lies between the ∀30%/50% performance goal and ∀60%/75% performance criteria and is an area where concern for model performance is raised; and Zone 3 lies above the ∀60%/75% performance criteria and is an area of questionable model performance.

3.4 Key Measures of Model Performance

Although we have generated numerous statistical performance measures (see Table C-2 in Appendix C) that are available on the CENRAP modeling website, when comparing model performance across months, subdomains, networks, grid resolution, models, studies, etc. it is useful to have a few key measurement statistics to be used to facilitate the comparisons. It is also useful to have a subset of months within the 2002 year that can represent the entire year so that a more focused evaluation can be conducted. We have found that the Mean Fractional Bias and Mean Fractional Gross Error appear to be the most consistent descriptive measure of model performance (Morris et al., 2004b; 2005). The Fractional Bias and Error are normalized by the average of the observed and predicted value (see Table C-2) because it provides descriptive power across different magnitudes of the model and observed concentrations and is bounded by -200% to +200%. This is in contrast to the normalized bias and error (as recommended for ozone performance goals, EPA, 1991) that is normalized by just the observed value so can "blow up" to infinity as the observed value approaches zero. In Appendix C we perform a focused evaluation of model performance for PM and gaseous species and four months of the 2002 year that are used to represent the seasonal variation in performance:

- January
- April
- July
- October

Scatter plots of model predictions and observations for each PM species are presented for each of the four months along with performance statistics and predicted and observed time series plots at each CENRAP Class I area. Summary plots of monthly fractional bias and error are also presented.

3.5 Operational Model Performance Evaluation

A summary of the operational evaluation is presented below. Just the monthly fractional bias performance metrics for each PM species using bar charts and Bugle Plots are presented in this section. The reader is referred to Appendix C for the complete model performance evaluation.

3.5.1 Sulfate (SO4) Model Performance

Figure 3-1 compares the monthly SO4 fractional bias across the CENRAP region for the IMPROVE, STN and CASTNet monitoring networks. An underprediction bias is clearly evident the first 8-10 months of the year. This underestimation bias is greatest across the CASTNet network which persists throughout the year. The SO4 underprediction is not as severe for the STN network and it is minimal by August becoming a slight overprediction in September. For the IMPROVE network, the SO4 fractional bias is < ±20% for the first 2 and last 3 months of the year and ranges from -30% to -50% for the late Spring and Summer months.

Figure 3-1 also includes a Bugle Plot of monthly SO4 fractional bias statistics (for Bugle Plot of fractional gross error see Appendix C) and compares them against the proposed PM model

performance goal and criteria (see Table 3-1). For the STN network, SO4 model performance meets the proposed performance goal for all months. For the IMPROVE network, approximately half of the months achieve the proposed PM performance goal with the other half outside of the goal, but within the performance criteria. Across the CASTNet network, most months are outside of the proposed goal but are within the criteria. The CASTNet fractional bias for some months is right at the performance criteria (≤±60%). With the exception of two IMPROVE months, the monthly SO4 fractional bias performance statistics achieve the proposed PM model performance goal.

3.5.2 Nitrate (NO3) Model Performance

Monthly NO3 model performance across the CENRAP region is characterized by a summer underestimation and winter overestimation bias (Figure 3-2). The summer underestimation bias is more severe, exceeding -100%. Whereas, the winter overestimation bias is approximately 50%. So based on statistics alone, it appears the summer underestimation bias is a bigger concern than the winter overestimation bias. However, the Bugle Plots in the bottom part of Figure 3-2 show that the summer underestimation bias occurs when NO3 is very low and is not an important component of PM and visibility impairment. These summer values occur in the flared horn part of the Bugle Plot and the summer NO3 performance, in most cases, achieves the model performance goal and always achieves the performance criteria. Whereas, the winter overstated NO3 performance for the most part doesn’t meet the performance goal and there are some months/networks that also don’t meet the performance criteria.

3.5.3 Organic Matter Carbon (OMC) Model Performance

The OMC monthly fractional bias across IMPROVE and STN sites in the CENRAP region are shown in Figure 3-3. The fractional bias for OMC at the IMPROVE sites is quite good throughout the year with values generally within ±20%, albeit with a slight winter overestimation and summer underestimation bias. At the urban STN sites, the model exhibits an underestimation bias throughout the year that ranges from -20% to -50%. The urban underestimation of OMC is a fairly common occurrence and suggests there may be missing sources of organic aerosol emissions in the modeling inventory.

The good performance of the model for OMC at the IMPROVE sites is also reflected in the Bugle Plot (Figure 3-3, bottom) with the bias achieving the proposed PM model performance goal for all months of the year. At the STN sites, however, the OMC bias falls between the proposed PM model performance goal and criteria, with error right at the goal for most months.

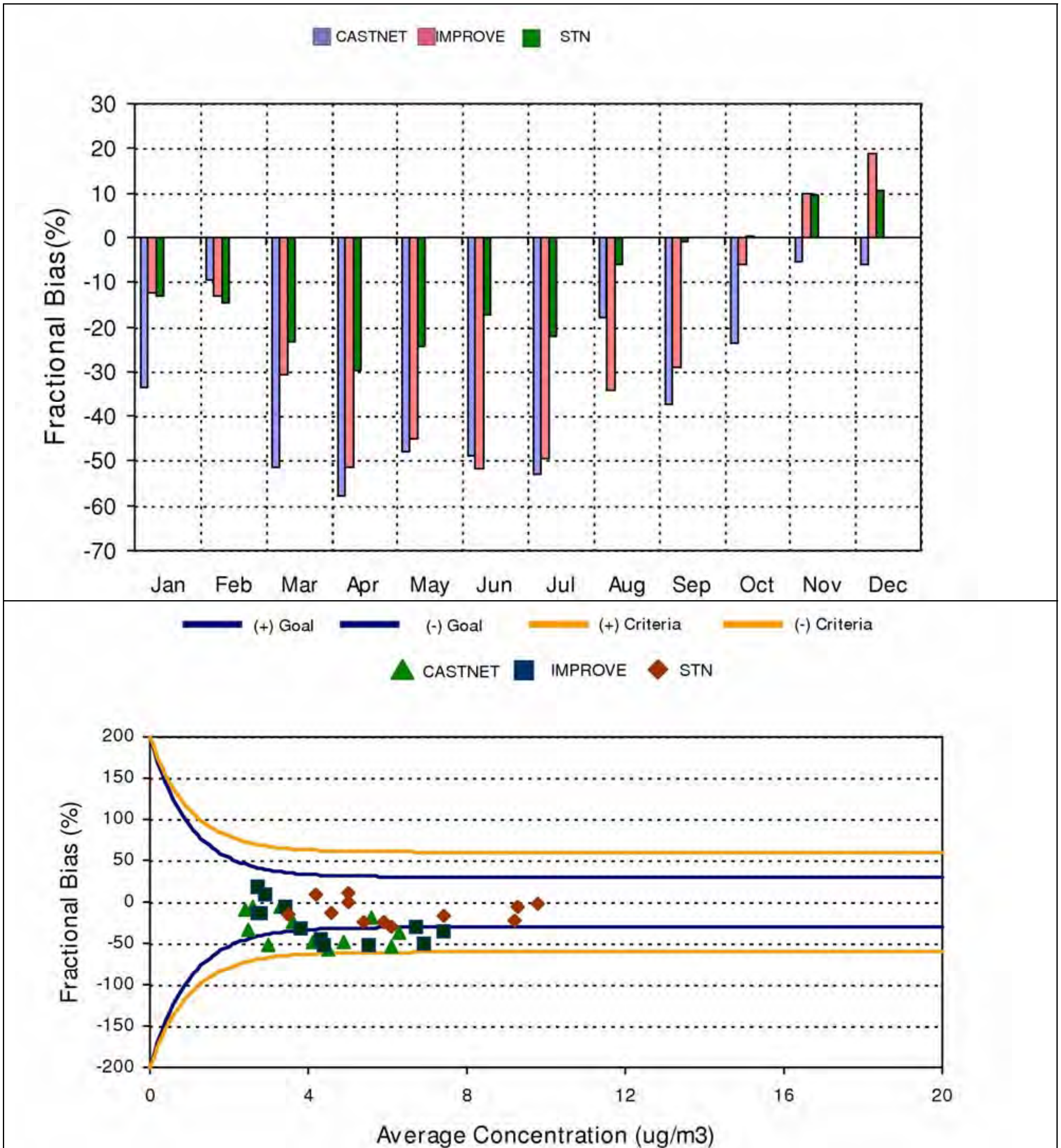


Figure 3-1. Monthly fractional bias (%) for sulfate (SO4) across the CENRAP region for the CMAQ 2002 36 km Base F base case simulation.

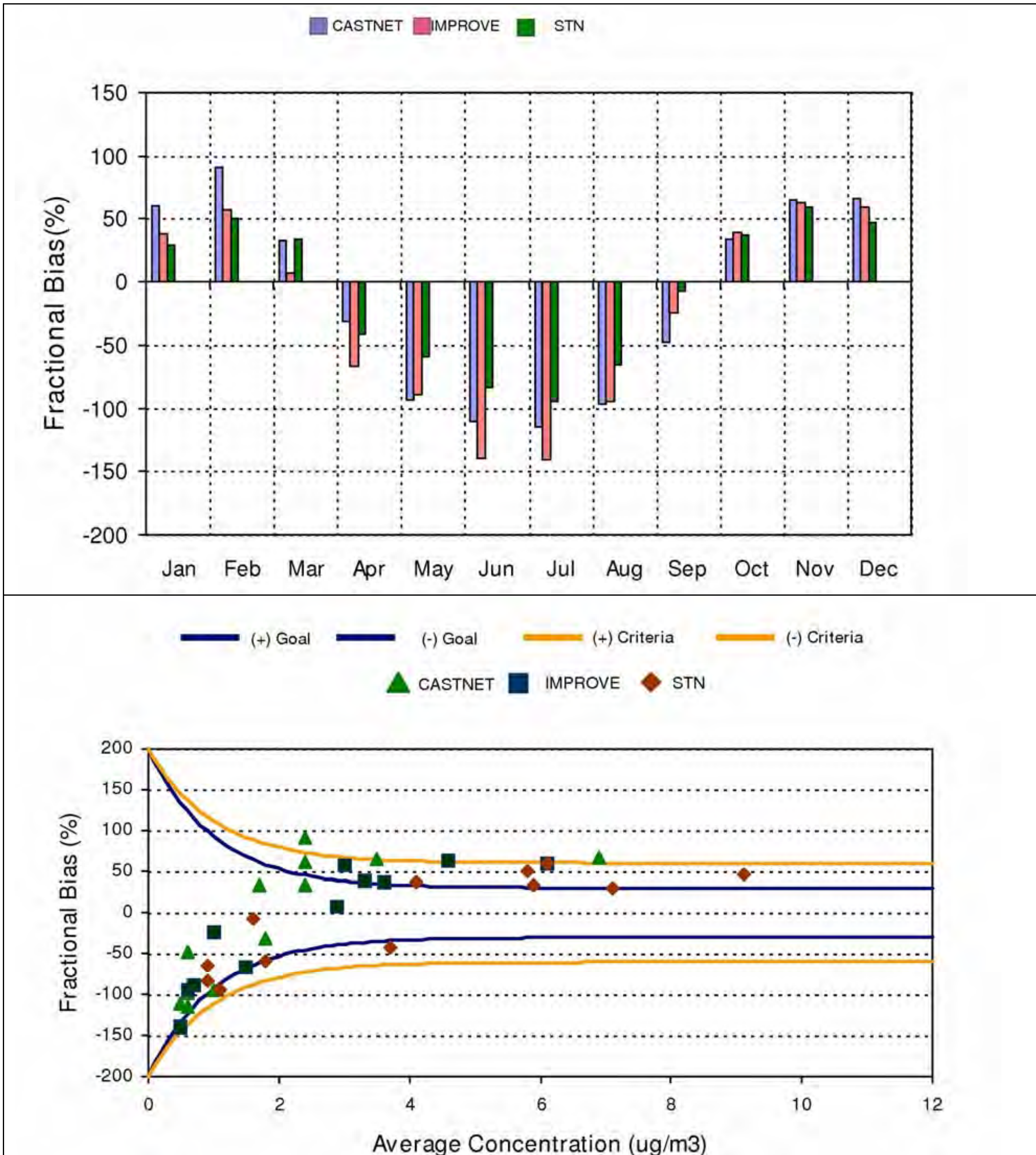
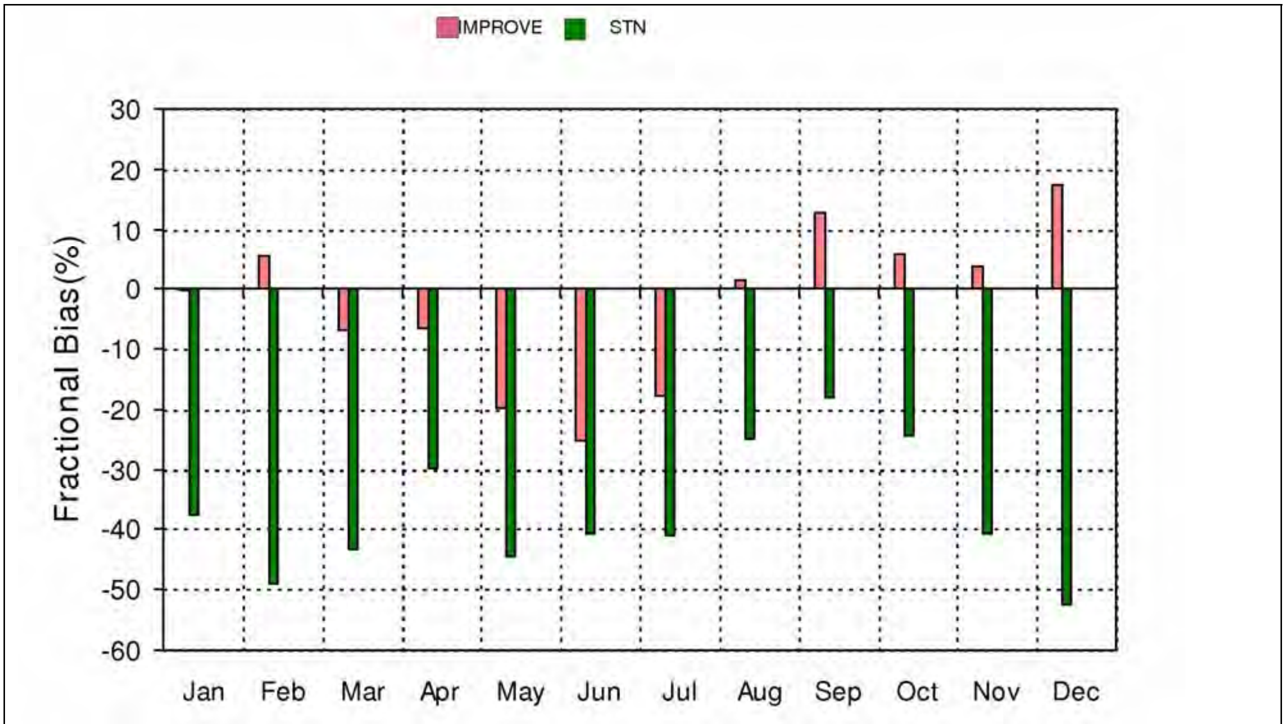


Figure 3-2. Monthly fractional bias (%) for nitrate (NO3) across the CENRAP region for the CMAQ 2002 36 km Base F base case simulation.



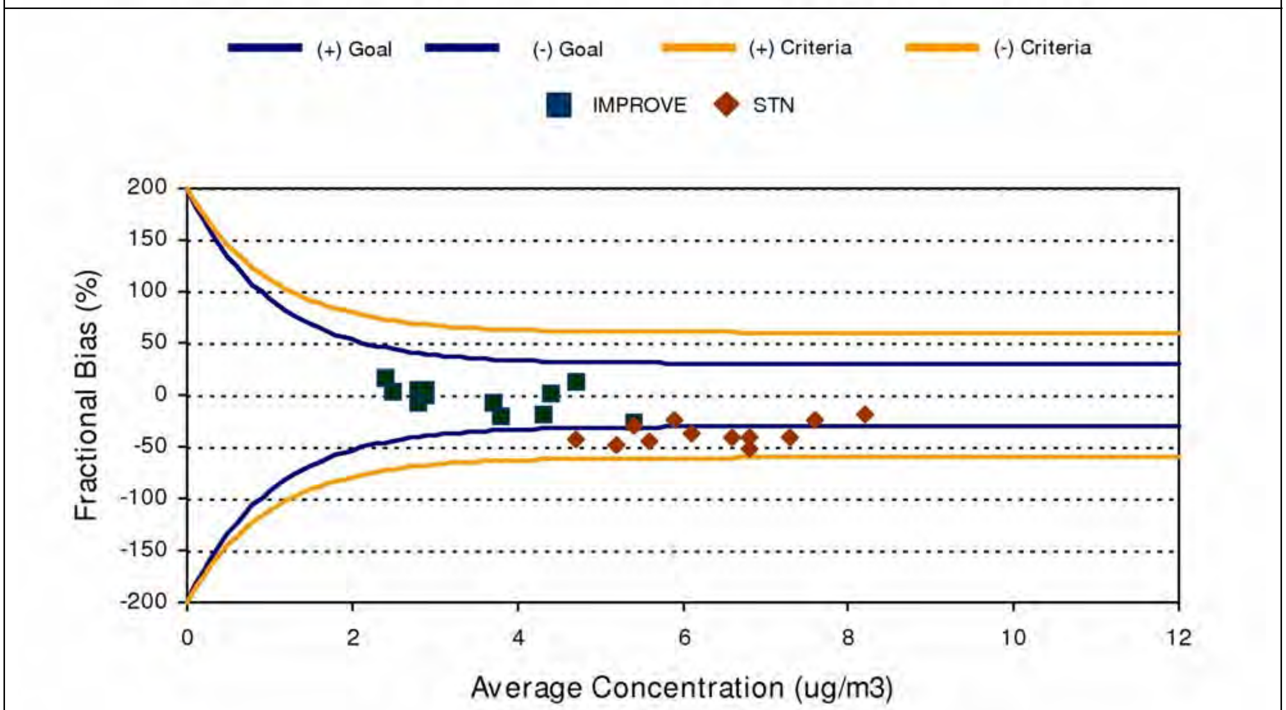


Figure 3-3. Monthly fractional bias (%) for organic matter carbon (OMC) across the CENRAP region for the CMAQ 2002 36 km Base F base case simulation.

3.5.4 Elemental Carbon (EC) Model Performance

The monthly average bias for EC across the IMPROVE and STN monitors in the CENRAP region are shown in Figure 3-4. The STN network exhibits small fractional bias year round, whereas the IMPROVE monitoring network exhibits a large underprediction bias in the summer months (-40% to -70%) and much smaller bias in the winter. The Bugle Plot puts the EC performance in context. The low EC concentrations at the IMPROVE sites results in bias values in the horn of the Bugle Plot. Thus, EC bias achieves the proposed PM performance goal for all months of the year.

3.5.5 Other $PM_{2.5}$ (Soil) Model Performance

Figure 3-5 displays the monthly variation in the Soil fractional bias using IMPROVE measurements in the CENRAP region. During the winter months, the model exhibits a very large (> 100%) overestimation bias. With the exception of July, the summer monthly bias is toward a slight overprediction but generally less than 20%. The July underestimation bias appears to be driven by impacts of high Soil values from wind blown dust events (e.g., see July 2002 discussion in Appendix C). The Bugle Plot indicates that the summer Soil performance achieves the PM performance goal, a few months in the Spring/Fall period fall between the performance goal and criteria and the winter Soil performance exceeds the model performance criteria. Thus, the Soil performance is a cause for concern.

3.5.6 Coarse Mass (CM) Model Performance

The monthly average fractional bias values for CM are shown in Figure 3-6. In the winter the underprediction bias is typically in the -60% to -80% range. In the late Spring and Summer the underprediction bias ranges from -120% to -160%. As this underprediction bias is nearly systematic (i.e., an underprediction almost always occurs), then the fractional errors are the same magnitude as the bias.

The Bugle Plots clearly show that the CM model performance is a problem. The monthly bias exceeds both the performance goal and criteria for almost every month of the year.

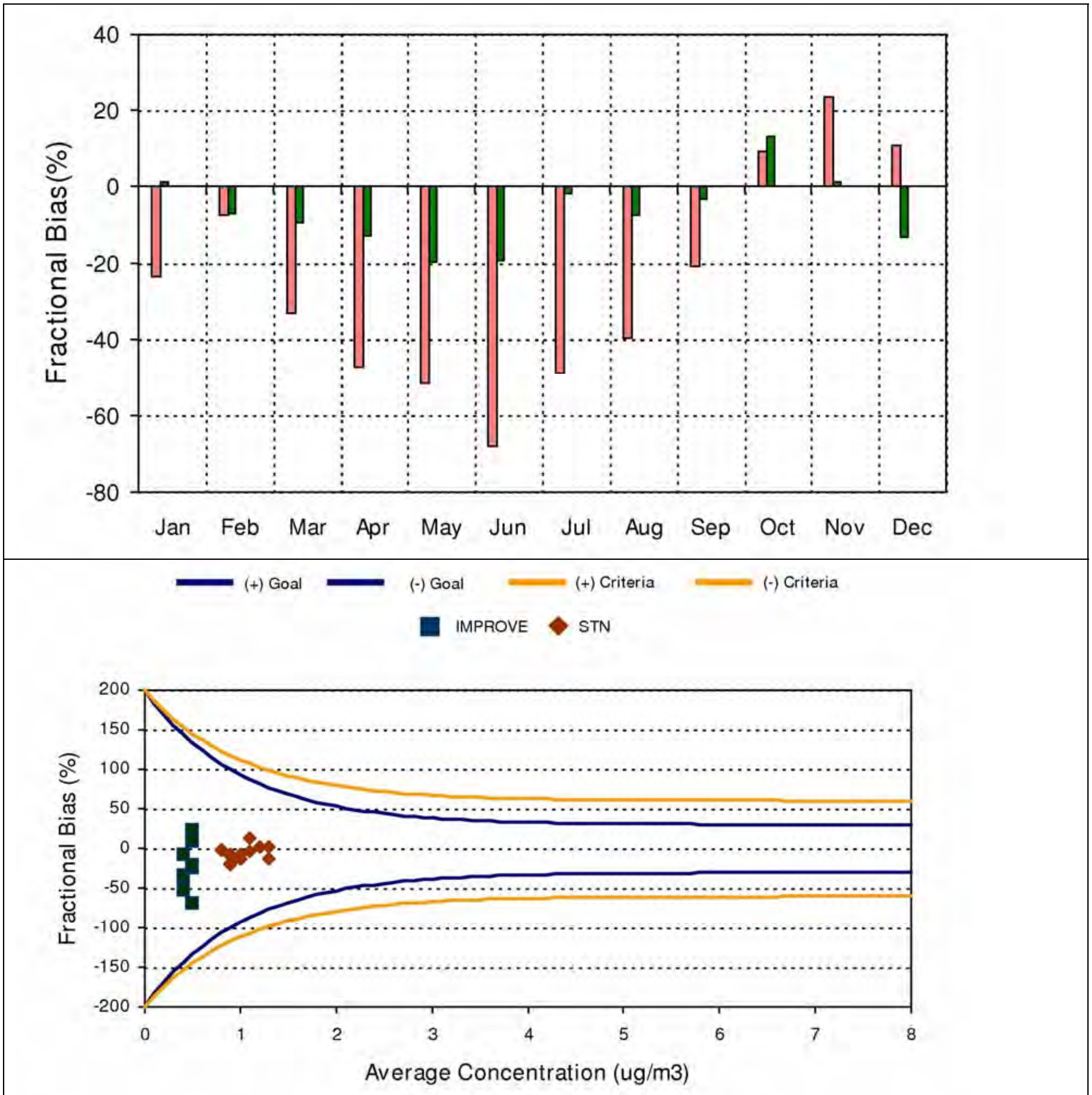


Figure 3-4. Monthly fractional bias (%) for elemental carbon (EC) across the CENRAP region for the CMAQ 2002 36 km Base F base case simulation.

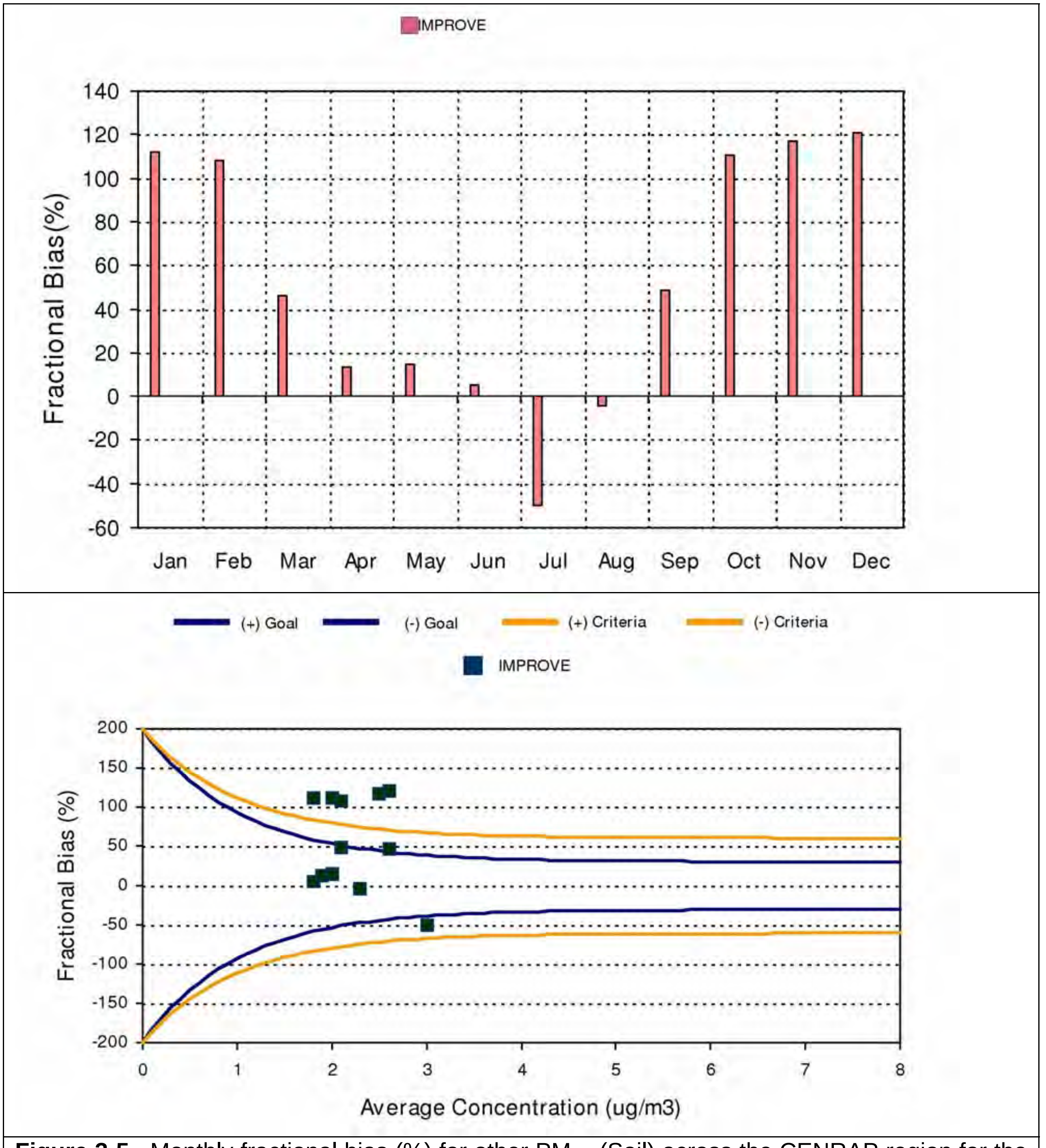


Figure 3-5. Monthly fractional bias (%) for other $PM_{2.5}$ (Soil) across the CENRAP region for the CMAQ 2002 36 km Base F base case simulation.

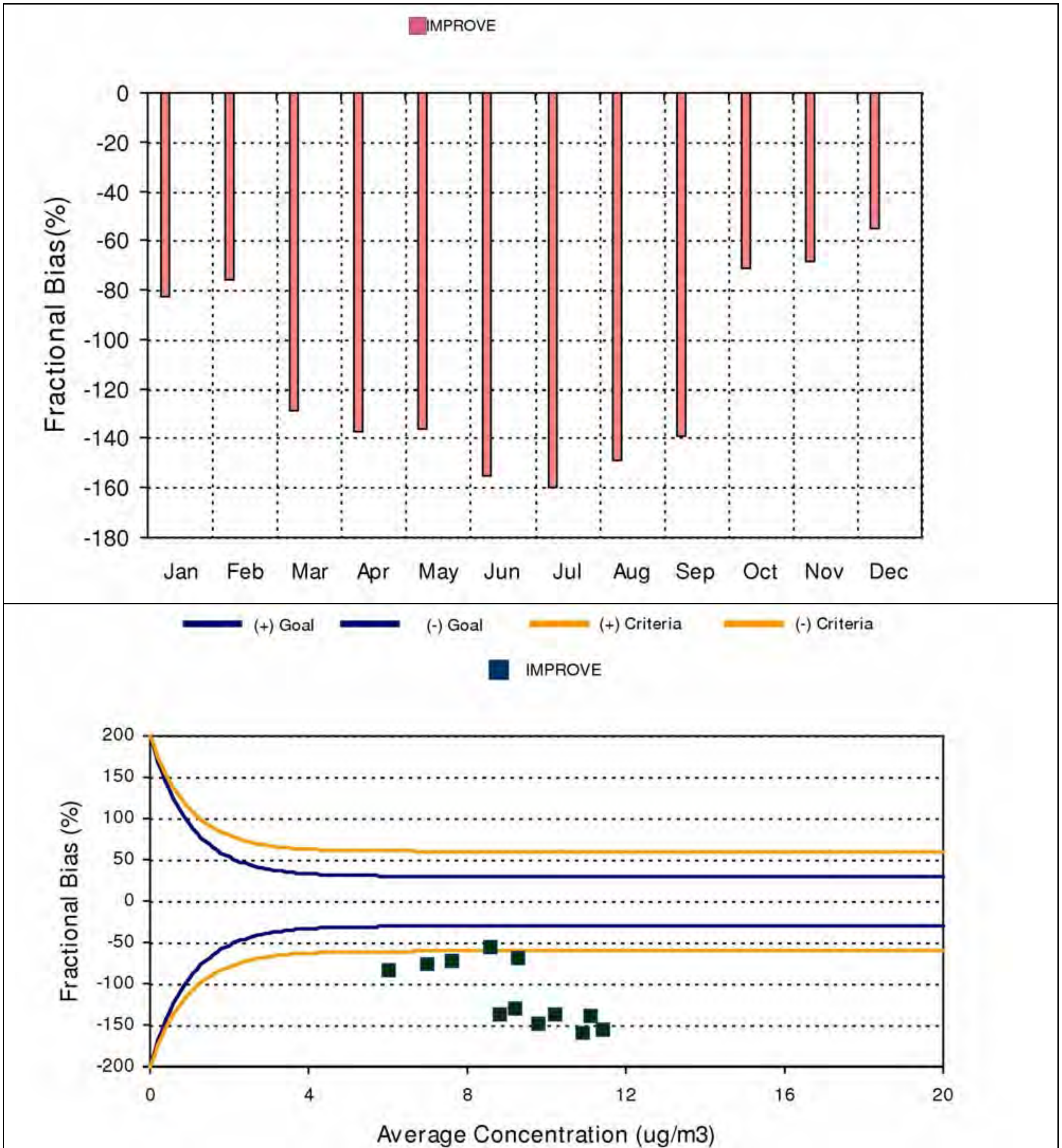


Figure 3-6. Monthly fractional bias (%) for coarse mass (CM) across the CENRAP region for the CMAQ 2002 36 km Base F base case simulation.

3.6 Diagnostic Model Performance Evaluation

The CASTNet and AQS networks also measure gas-phase species that are PM precursor or related species. The diagnostic evaluation of the 2002 36 km Base F CMAQ base case simulation for these compounds and the four seasonal months are presented in Appendix C. The displays for January are provided below as an example; the reader is referred to Appendix C for the rest of the monthly displays.

The CASTNet network measures weekly average samples of SO2, SO4, NO2, HNO3, NO3 and NH4. The AQS network collects hourly measurements of SO2, NO2, O3 and CO. A comparison of the SO2 and SO4 performance provides insight into whether the SO4 formation rate may be too slow or fast. For example, if SO4 is underestimated and SO2 is overestimated that may indicate chemical conversion rates that are too slow. Analyzing the performance for SO4, HNO3, NO3, Total NO3 and NH4 provides insight into the equilibrium of these species. For example, if Total NO3 performs well but HNO3 and NO3 do not, then there may be issues associated with the partitioning between the gaseous and particulate phases of nitrate. Causes for incorrect HNO3/NO3 partitioning could include inadequate ammonia emissions and/or poorly characterized meteorological conditions (e.g., temperature).

3.6.1 Diagnostic Model Performance in January 2002

In January, SO2 is overstated across both the CASTNet and AQS sites with fractional bias values of 38% (Figure 3-7) and 31% (Figure 3-8), respectively. SO4 is understated by -34% across the CASTNet monitors (Figure 3-7) and -12% and -13% for the IMPROVE and STN networks (Figure C-4a). Wet SO4 deposition is also overstated in January (+40%, Figure C-4a). Given that SO2 emissions are well characterized, these results suggest that the January SO4 underestimation may be partly due to understated transformation rates of SO2 to SO4 and overstated wet SO4 deposition.

Total NO3 is overestimated by 35% on average across the CASTNet sites in the CENRAP region in January (Figure 3-7). HNO3 is underestimated (-34%) and particle NO3 is overestimated (+61%) suggesting there are gas/particle equilibrium issues. An analysis of the time series of the four CASTNet stations reveals that NO3, HNO3 and NH4 performance is actually very reasonable at the west Texas site and the HNO3 underestimation and NO3 overestimation bias is coming from the east Kansas, central Arkansas and northern Minnesota CASTNet sites (see Figure C-3 for site locations). One potential contributor for this performance problem could be overstated NH3 emissions. However, the Total NO3 overestimation bias suggests that the model estimated NOx oxidation rate may be too high in January.

The SO2, NO2, O3 and CO performance across the AQS sites in January is shown in Figure 3-8. The AQS monitoring network is primarily an urban-oriented network. So, it is not surprising that the model is underestimating concentrations of primary emissions when a 36 km grid is used. NO2 is underestimated by approximately 5%, and CO by approximately 67%. Ozone is also underestimated on average, especially the maximum values above 60 ppb.

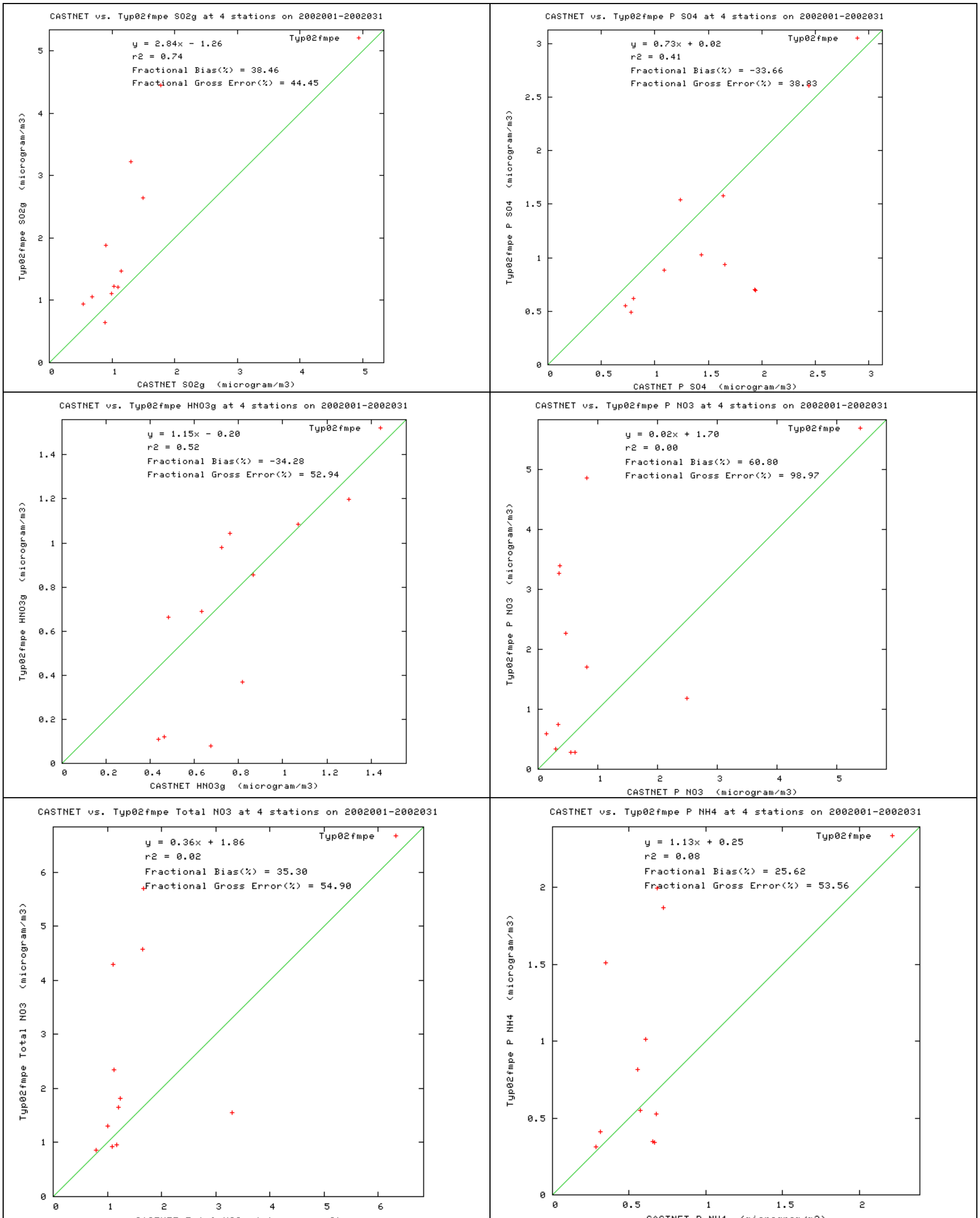


Figure 3-7. January 2002 performance at CENRAP CASTNet sites for SO2 (top left), SO4 (top right), HNO3 (middle left), NO3 (middle right), Total NO3 (bottom left) and NH4 (bottom right).

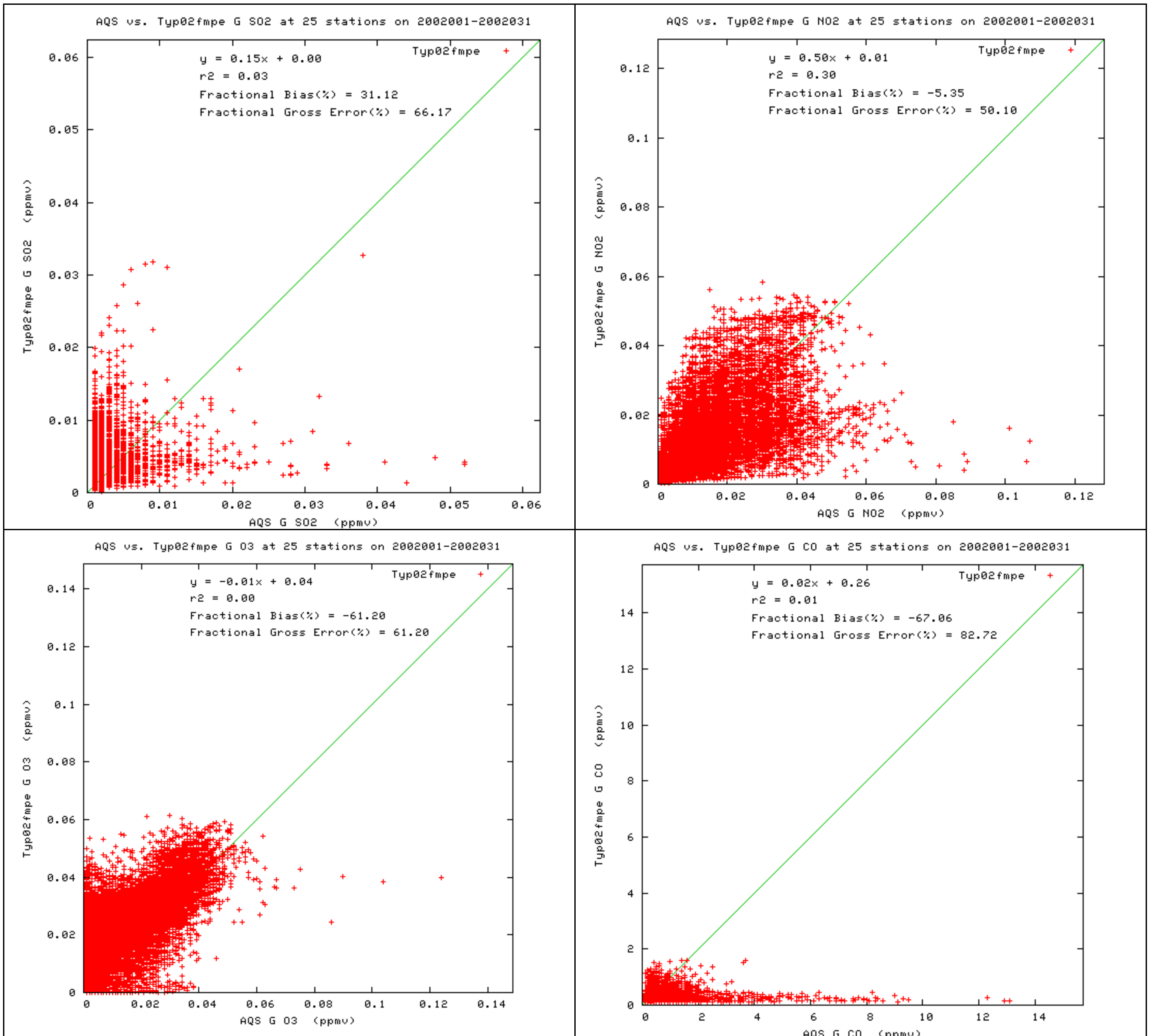


Figure 3-8. January 2002 performance at CENRAP AQS sites for SO2 (top left), NO2 (top right), O3 (bottom left) and CO (bottom right).

3.6.2 Diagnostic Model Performance In April

In April there is an average SO2 overestimation bias across the CASTNet (+15%) and underestimation bias across the AQS (-10%) networks (Figures C-42 and C-43). SO4 is underestimated across all networks by -30% to -58% (Figure C-5a). The wet SO4 deposition bias is near zero. Both SO2 and SO4 are underestimated at the west Texas CASTNet monitor in April suggesting SO2 emissions in Mexico are likely understated.

The HNO3 performance in April is interesting with almost perfect agreement except for 5 modeled-observed comparisons that drives the average underprediction bias of -29% (Figure C-42). On Julian Day 102 there is high HNO3 at the MN, KS and OK CASTNet sites that is not captured by the model. Given that HNO3, NO3 and Total NO3 are all underestimated by about the same amount (-30%), then part of the underestimation bias is likely due to too slow oxidation of NOx.

There is a lot of scatter in the NO2 and O3 performance that is more or less centered on the 1:1 line of perfect agreement with bias values of -8% and -21%, respectively (Figure C-43). CO is underestimated by -72% with the model unable to predict CO concentrations above 1 ppm due to the use of the coarse 36 km grid spacing. Mobile sources produce a vast majority of the CO emissions. So, AQS monitors for CO compliance are located near roadways, which are not simulated well using a 36 km grid.

3.6.3 Diagnostic Model Performance In July

In July SO2 is slightly underestimated across the CASTNet (-5%) and AQS (-12%) networks (Figures C-44 and C-45). SO4 is more significantly underestimated across all networks (-22% to -53%, as shown in Figure C-6a). Since wet deposition SO4 is also underestimated, it is unclear why all sulfur species are underestimated.

The nitrate species are also all underestimated with the Total NO3 bias (-56%) being between the HNO3 bias (-35%) and NO3 bias (-115%). The modeled NO3 values are all near zero with little correlation with the observations, whereas the observed HNO3 and Total NO3 is tracked well with correlation coefficients of 0.74 and 0.76. These results suggest that the July NO3 model performance problem is partly due to insufficient formation of Total NO3, but mainly due to incorrect partitioning of the Total NO3.

Again, there is abundant scatter in the AQS NO2 scatter plot for July (Figure C-45) resulting in a low bias (0%) but high error (65%). Ozone performance also exhibits a low bias (-15%) and error (20%), but the model is incapable of simulating ozone above 100 ppb. Although CO performance in July is better than the previous months, it still has a large underestimation bias of 82%.

3.6.4 Diagnostic Model Performance In October

SO2 is overstated in October across the CASTNet (+28%) and AQS (+33%) sites (Figures C-46 and C-47). Although SO4 is understated across the CASTNet sites (-24%), the bias across the IMPROVE (-6%) and STN (0%) sites are near zero (Figure C-7a).

Performance for HNO3 is fairly good with a low bias (+12%) and error (30%). But NO3 is overstated (+34%) leading to an overstatement of Total NO3 (+37%). The overstatement of NO3 leads to an overstatement of NH4 as well (Figure C-46)

As seen in the other months, NO2 exhibits a lot of scatter resulting in a low correlation (0.22) and high error (61%) but low bias (12%). The model tends to underpredict the high and overpredict the low O3 observations resulting in a -29% bias and low correlation coefficient. CO is also underpredicted (-76%) for the reasons discussed previously.

3.7 Performance at CENRAP Class I Areas for the Worst and Best 20 Percent Days

In this section, and in section C.5 of Appendix C, we present the results of the model performance evaluation at each of the CENRAP Class I areas for the worst and best 20 percent days. Performance on these days is critical since they are the days used in the 2018 visibility projections discussed in Chapter 4. For each Class I area we compared the predicted and observed extinction of the worst and best 20 percent days below. In Appendix C the PM species-specific extinction is also compared for the worst 20 percent days.

3.7.1 Caney Creek (CACR) Arkansas

The ability of the CMAQ model to estimate visibility extinction at the CACR Class I area on the 2002 worst and best 20 percent days is provide in Figures 3-9 and C-48. On most of the worst 20 percent days at CACR total extinction is dominated by SO4 extinction with some extinction due to OMC. On four of the worst 20 percent days extinction is dominated by NO3. The average extinction across the worst 20 percent days is underestimated by -33% (Figure 3-9), which is primarily due to a -51% underestimation of SO4 extinction combined with a 6% overestimation of NO3 extinction (Figure C-48). Performance for OMC extinction at CACR on the worst 20 percent days is pretty good with a -20% bias and 36% error. EC extinction is systematically underestimated. Soil extinction has low bias (-19%) buts lots of scatter and high error (74%), while CM extinction is greatly underestimated (bias of -153%).

On the best 20 percent days at CACR the observed extinction ranges from 20 to 40 Mm^{-1}. Whereas, the modeled extinction has a much larger range from 15 to 120 Mm^{-1}. Much of the modeled overestimation of total extinction on the best 20% days (+44% bias) is due to NO3 overestimation (+94% bias).

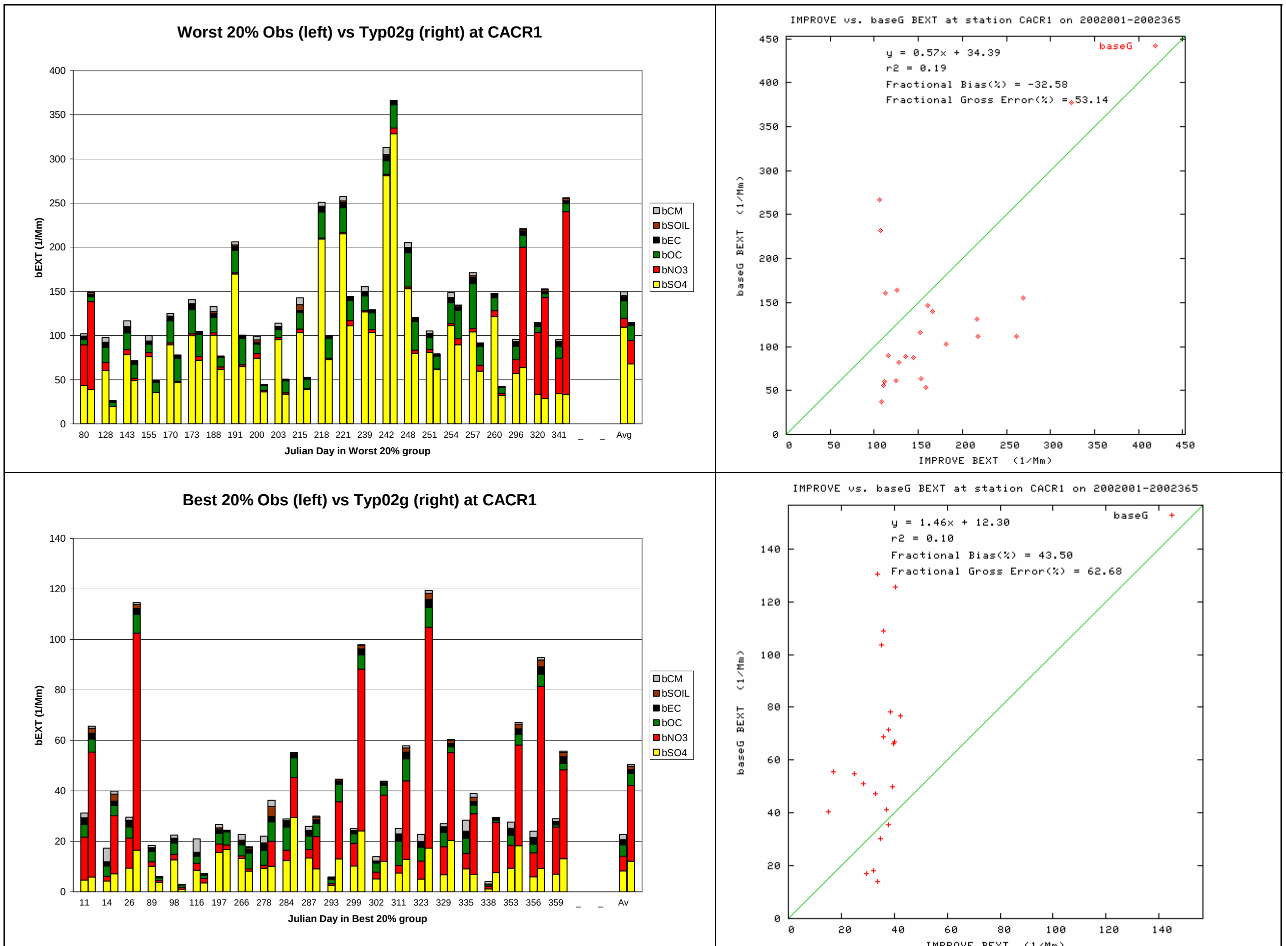


Figure 3-9. Daily extinction model performance at Caney Creek (CACR), Arkansas for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.2 Upper Buffalo (UPBU) Arkansas

Model performance at the UPBU Class I area for the worst and best 20 percent days is shown in Figures 3-10 and C-49. On most of the worst 20 percent days at UPBU, visibility impairment is dominated by SO4, although there are also two high NO3 days. The model underestimates the average of the total extinction on the worst 20 percent days at UPBU by -40% (Figure 3-10), which is due to an underestimation of extinction due to SO4, OMC and CM by -46%, -33% and -179%, respectively.

On the best 20 percent days at UPBU, the model performs reasonably well with a low bias (2%) and error (42%). But again, the model has a much wider range in extinction values across the best 20 percent days (15 to 120 Mm^{-1}) than observed (20 to 45 Mm^{-1}). There are five days in which the modeled NO3 overprediction is quite severe and when those days are removed the range in the modeled and observed extinction on the best 20 percent days is quite similar to the observed, although the model gets much cleaner on the very cleanest modeled days.

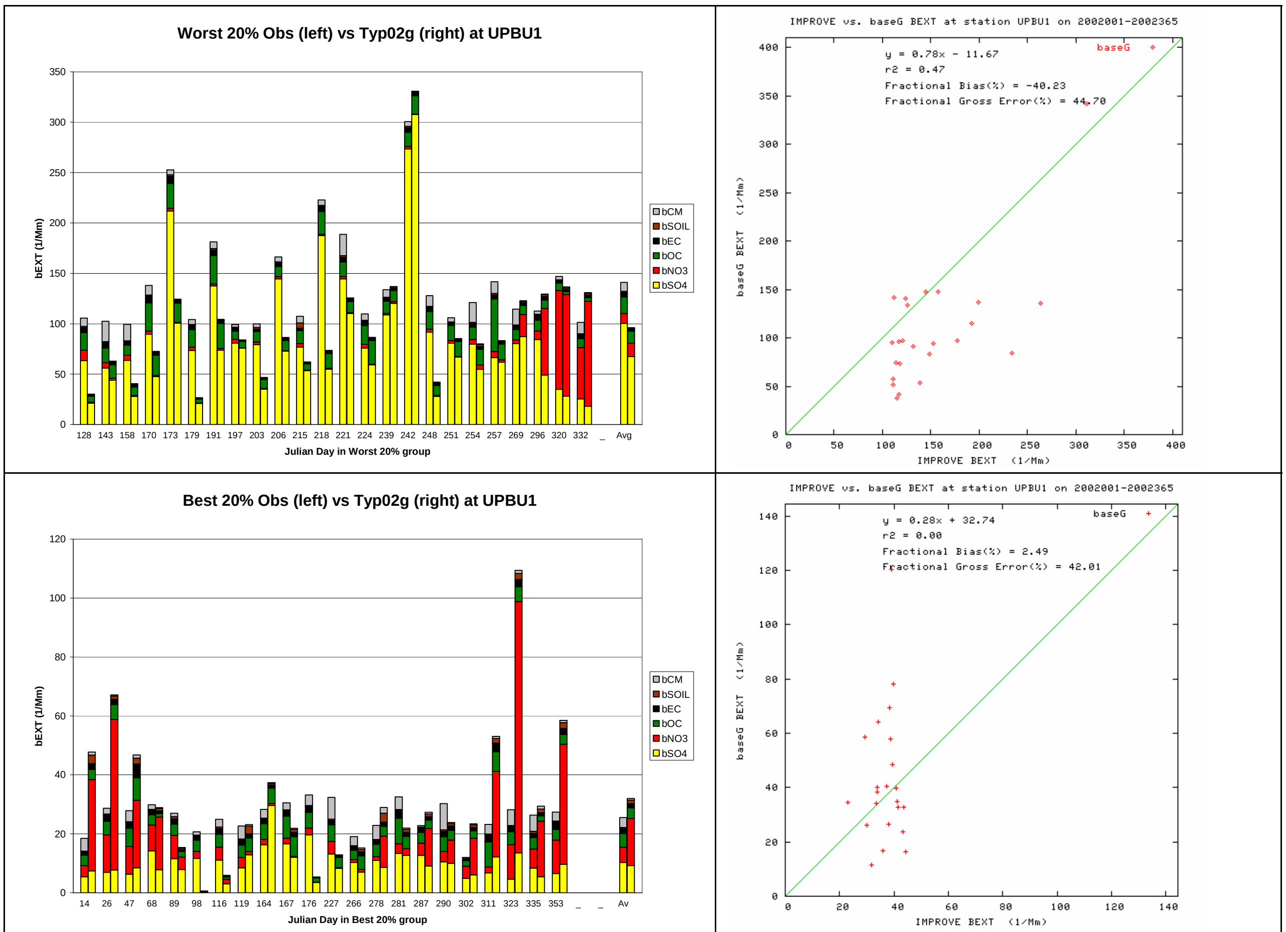


Figure 3-10. Daily extinction model performance at Upper Buffalo (UPBU), Arkansas for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.3 Breton Island (BRET), Louisiana

The observed total extinction on the worst 20 percent days at Breton Island is underestimated by -71% (Figure 3-11), which is due to an underestimation of each component of extinction (Figure C-50) by from -50% to -70% (SO4, OMC and Soil) to over -100% (EC and CM). The observed extinction on the worst 20 percent days ranges from 90 to 170 Mm^{-1}, whereas the modeled values drop down to as low as approximately 15 Mm^{-1}. On the best 20 percent days the range of the observed and modeled extinction is similar (roughly 10 to 50 Mm^{-1}) that results in a reasonably low bias (-22%), but there is little agreement on which days are higher or lower resulting in a lot of scatter and high error (54%).

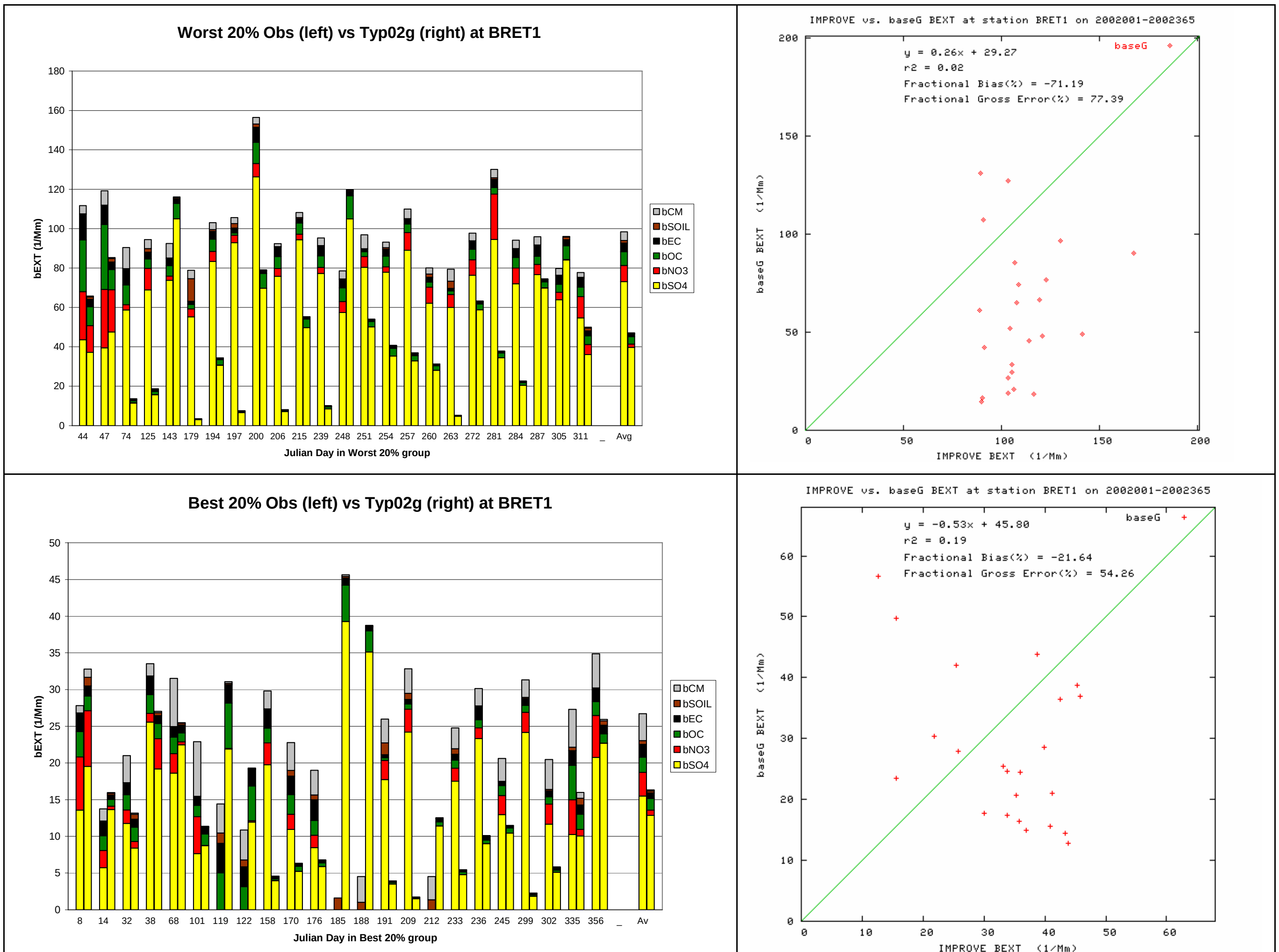


Figure 3-11. Daily extinction model performance at Breton Island (BRET), Louisiana for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.4 Boundary Waters (BOWA), Minnesota

There are three types of days during the worst 20 percent days at BOWA: SO4 days, OMC days and NO3 days (Figure 3-12). The two high OMC days are likely fire impact events that the model captures to some extent on one day and not on the other. On the five high (> 20 Mm^{-1}) NO3 extinction days the model predicts the observed extinction well on three days and overestimates by a factor of 3-4 on the other two high NO3 days. SO4 is underestimated by -43% on average across the worst 20 percent days at BOWA.

With the exception of two days, the model reproduces the total extinction for the best 20 percent days at BOWA quite well with a bias and error value of +14% and 22% (Figure 3-12). Without these two days, the modeled and observed extinction both range between 15 and 25 Mm^{-1}.

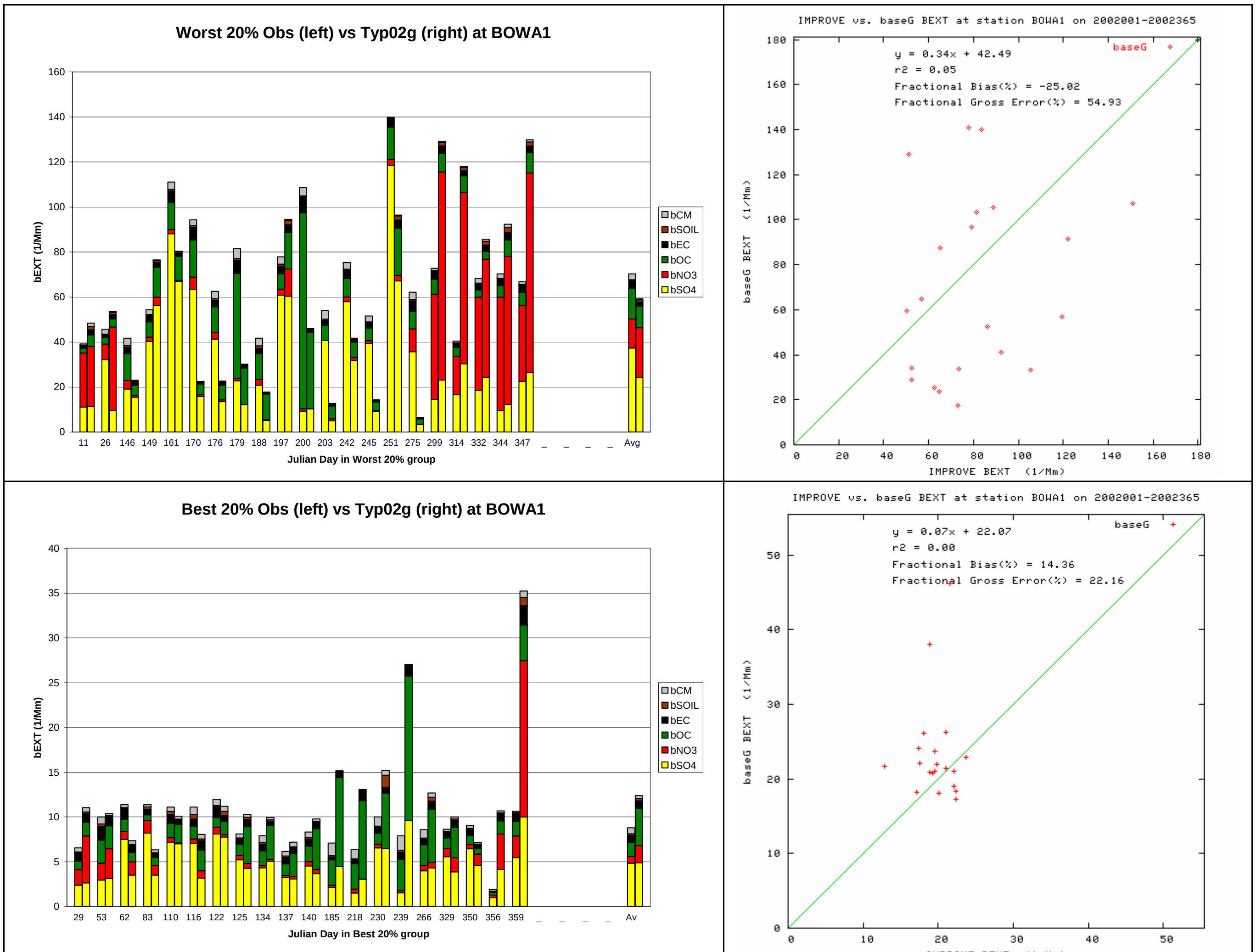


Figure 3-12. Daily extinction model performance at Boundary Waters (BOWA), Minnesota for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.5 Voyageurs (VOYA) Minnesota

VOYA is also characterized by SO4, NO3 and OMC days (Figure 3-13). Julian Days 179 and 200 are high OMC days that were also high OMC days at BOWA again indicating impacts from fires in the area that is not fully captured by the model. SO4 and NO3 performance is fairly good and, without the fire days, OMC performance looks good as well (Figure C-52). On the best 20 percent days there is one day the modeled extinction is much higher than observed and a few others that are somewhat higher, but for most of the best 20 percent days the modeled extinction is comparable to the observed values.

Figure 3-13. Daily extinction model performance at Voyageurs (VOYA), Minnesota for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.6 Hercules Glade (HEGL) Missouri

On most of the worst 20 percent days at HEGL the observed extinction ranges from 120 to 220 Mm^{-1} whereas model extinction ranges from 50 to 170 Mm^{-1} (Figure 3-14). However, there is one extreme day with extinction approaching 400 Mm^{-1} that the model does a very good job in replicating. Over all the days there is a modest underestimation bias in SO4 (-39%) and OMC (-39%) extinction, larger underestimation bias in EC (-62%) and CM (-118%) extinction and overestimation bias in Soil (+30%) extinction (Figure C-53).

On the best 20 percent days there is one day where the model overstates the observed extinction by approximately a factor of four and a handful of other days that the model overstates the extinction by a factor of 2 or so, but most of the days both the model and observed extinction sites are around 40 Mm^{-1} ±10 Mm^{-1}. On the best 20 percent days, when the observed extinction is overstated, it is due to overstatement of the NO3.

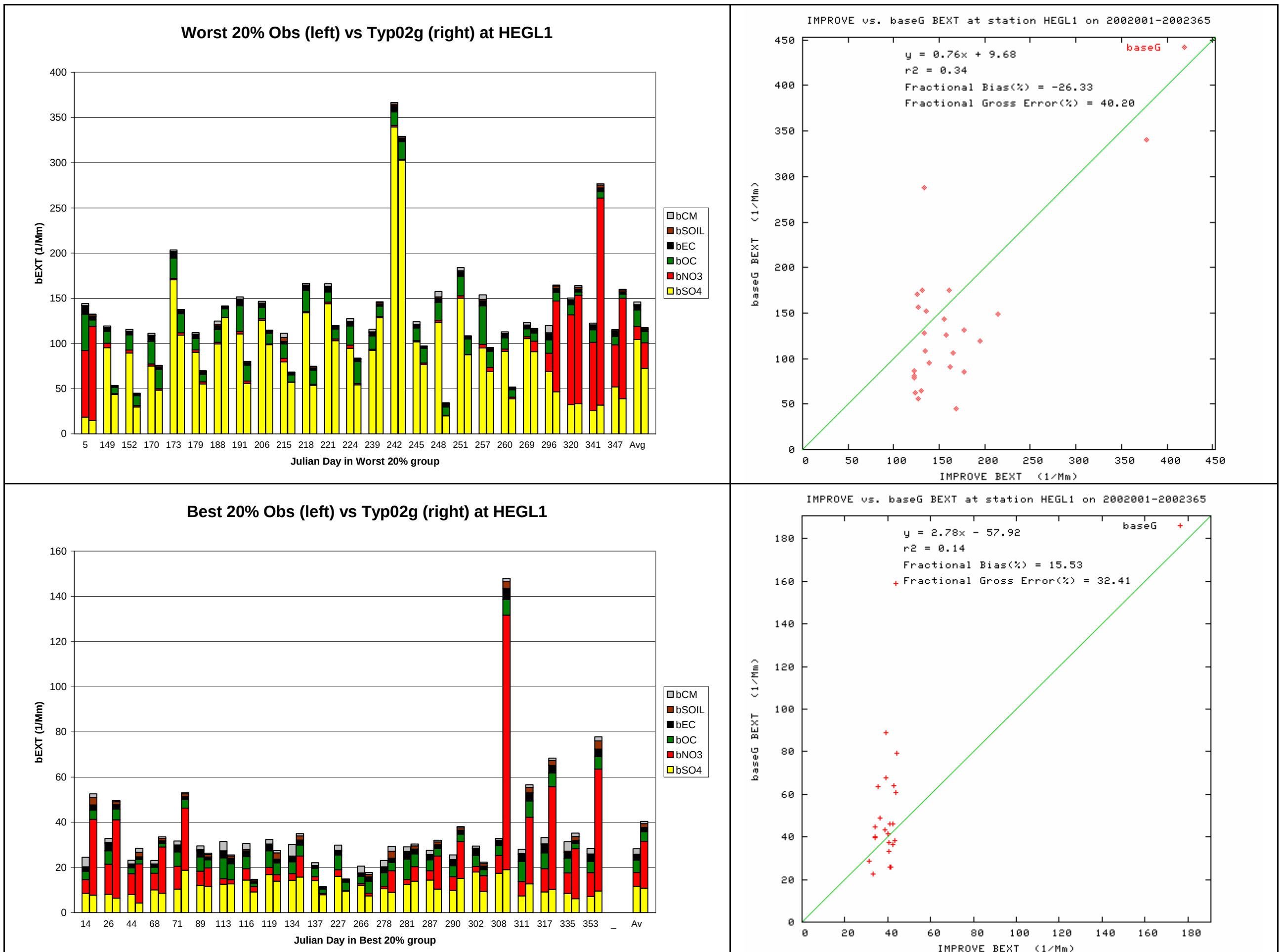


Figure 3-14. Daily extinction model performance at Hercules Glade (HEGL), Missouri for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.7 Mingo (MING) Missouri

The worst 20 percent days at MING are mainly high SO4 days with a few high NO3 days that the model reproduces reasonably well resulting in low bias (+10%) and error (38%) for total extinction (Figure 3-15). The PM species specific performance is fairly good with low bias for SO4 (+4%), good agreement with NO3 on high NO3 days except for one day, low OMC (+23%) and EC (+3%) bias and larger bias in EC (+37%) and CM (-105%) extinction (Figure C-54).

For the best 20 percent days, there is one day the model is way too high due to overstated NO3 extinction and a few other days the model overstates the observed extinction that is usually due to overpredicted NO3, but on most of the best 20 percent days the modeled extinction is comparable to the observed values. This results in low bias (+12%) and error (36%) for total extinction at MING for the best 20 percent days.

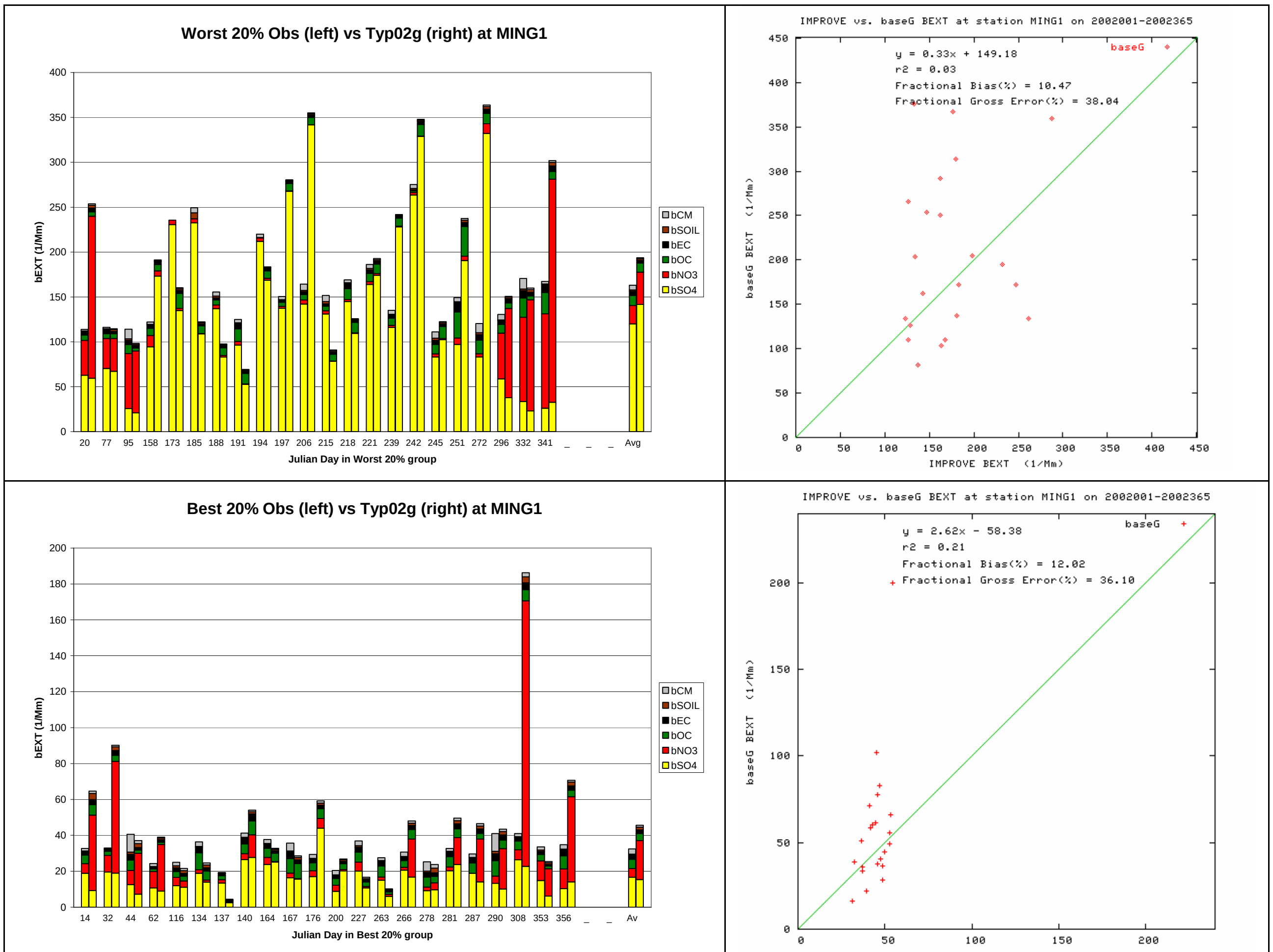


Figure 3-15. Daily extinction model performance at Mingo (MING), Missouri for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.8 Wichita Mountains (WIMO), Oklahoma

With the exception of an overprediction on day 344 due to NO3, observed total extinction on the worst 20 percent days at WIMO is understated with a bias of -42% (Figure 3-16) that is primarily due to an underestimation of extinction due to SO4 (-48%) and OMC (-69%) (Figure C-55).

CMAQ total extinction performance for the average of the best 20 percent days at WIMO is characterized by an overestimation bias (+21%) on most days that is primarily due to NO3 overprediction on several days. Again the modeled range of extinction on the best 20 percent days (12-60 Mm^{-1}) is much greater than observed (20-35 Mm^{-1}).

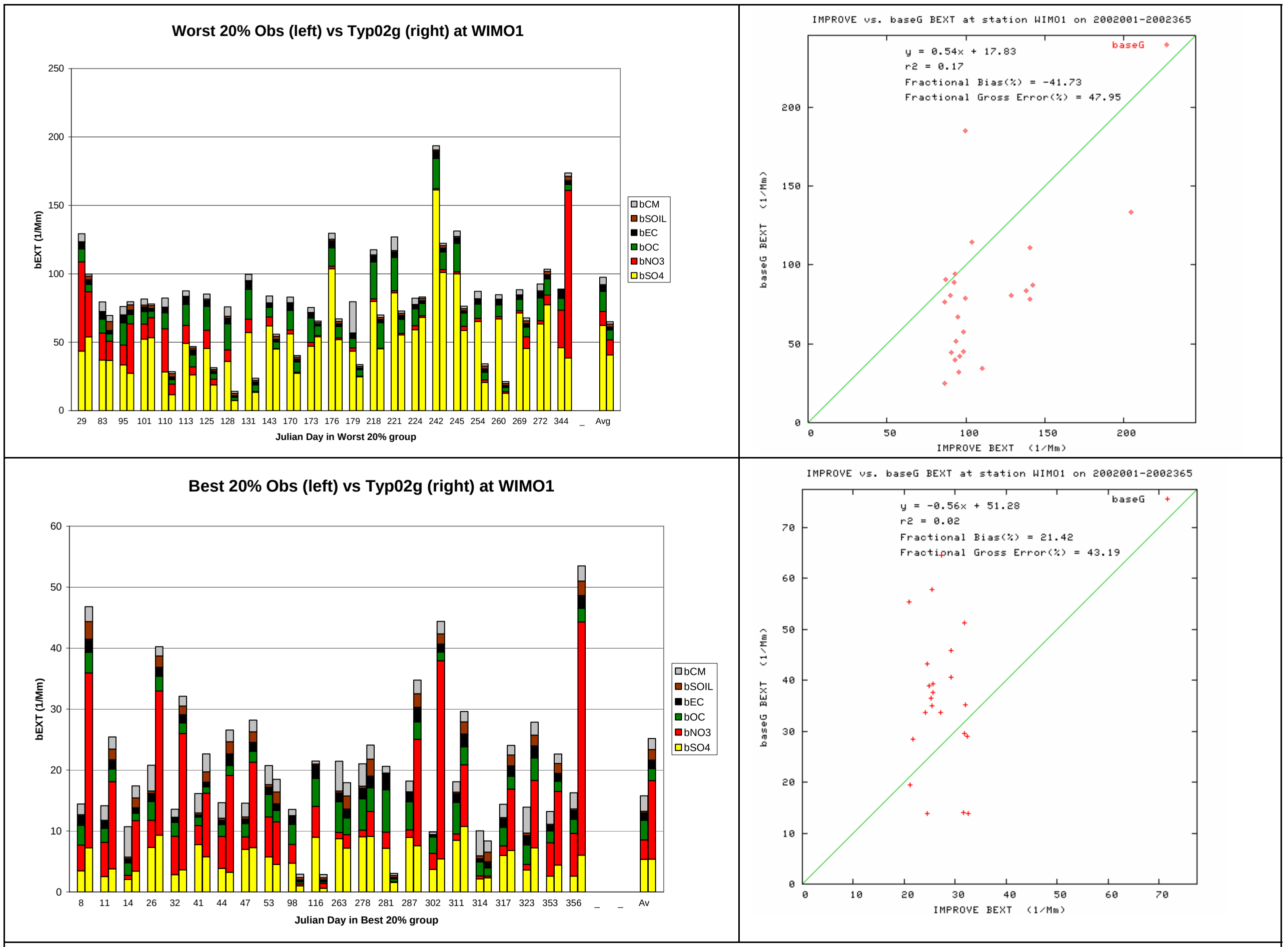


Figure 3-16. Daily extinction model performance at Wichita Mountains (WIMO), Oklahoma for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.9 Big Bend (BIBE) Texas

The observed extinction on the worst 20 percent days at BIBE is underpredicted on almost every day resulting in a fractional bias value of -72% (Figure 3-17). Every component of extinction is underestimated on average for the worst 20 percent days (Figure C-56) with the underestimation bias ranging from -24% (OMC) to -162% (CM). SO4 extinction, that typically represents the largest component of the total extinction is understated by -94%.

The model does a better job in predicting the total extinction at BIBE for the best 20 percent days with average fractional bias and error values of +13% and 19% (Figure 3-17). With the exception of one day that the observed extinction is overestimated by approximately a factor of 2, the modeled and observed extinction on the best 20 percent days at BIBE are both within 12 to 25 Mm^{-1}. However, there are some mismatches with the components of extinction with the model estimating much lower contributions due to Soil and CM.

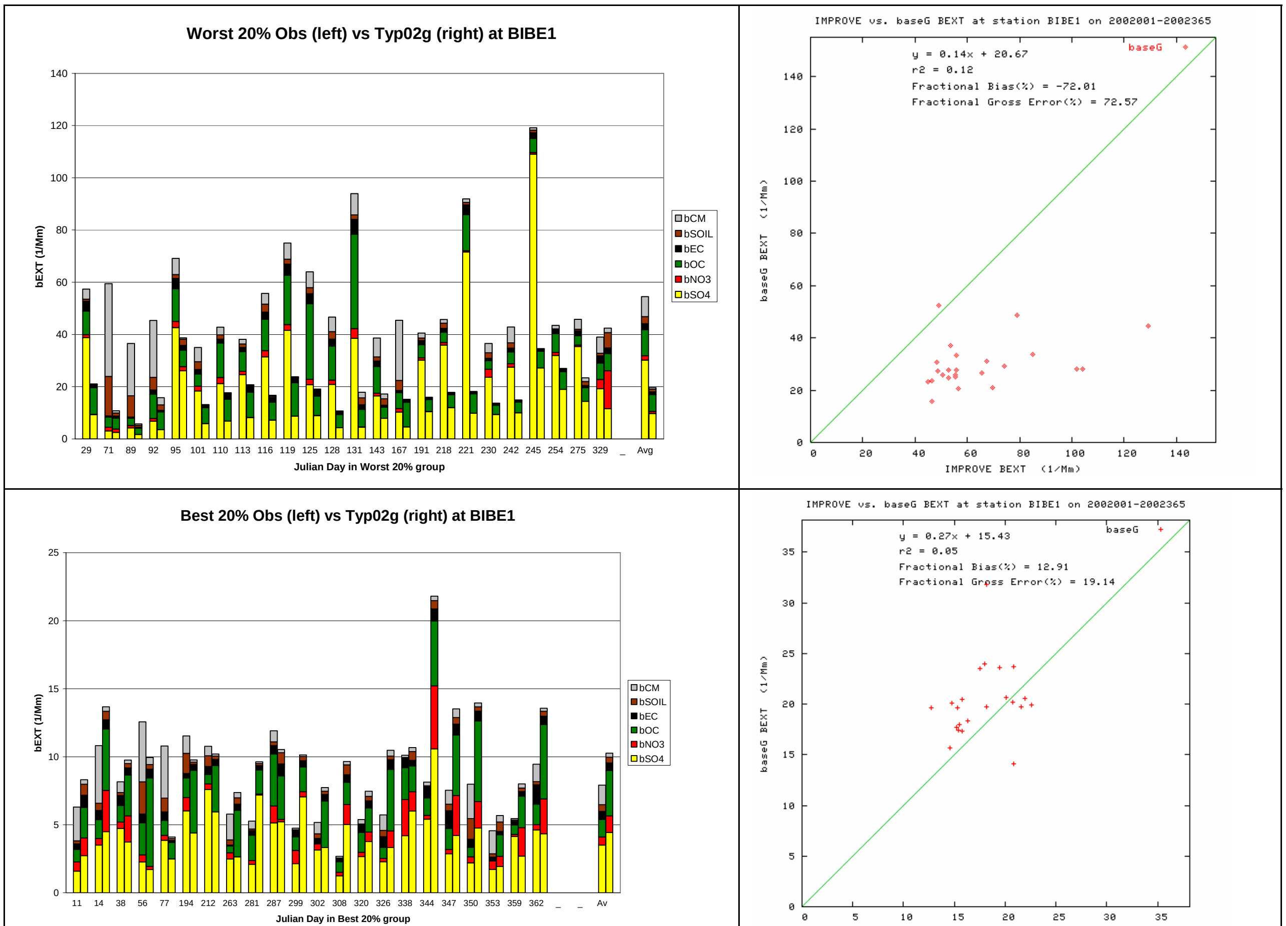


Figure 3-17. Daily extinction model performance at Big Bend (BIBE), Texas for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.10 Guadalupe Mountains (GUMO) Texas

Most of the worst 20 percent days at GUMO are high dust days with high Soil and CM that is not captured by the model (Figure 3-18). Extinction due to Soil and CM on the worst 20 percent days is underestimated by -105% and -191%, respectively (Figure C-57). Better performance is seen on the best 20 percent days with bias and error for total extinction of 8% and 21%, but the model still understates Soil and CM.

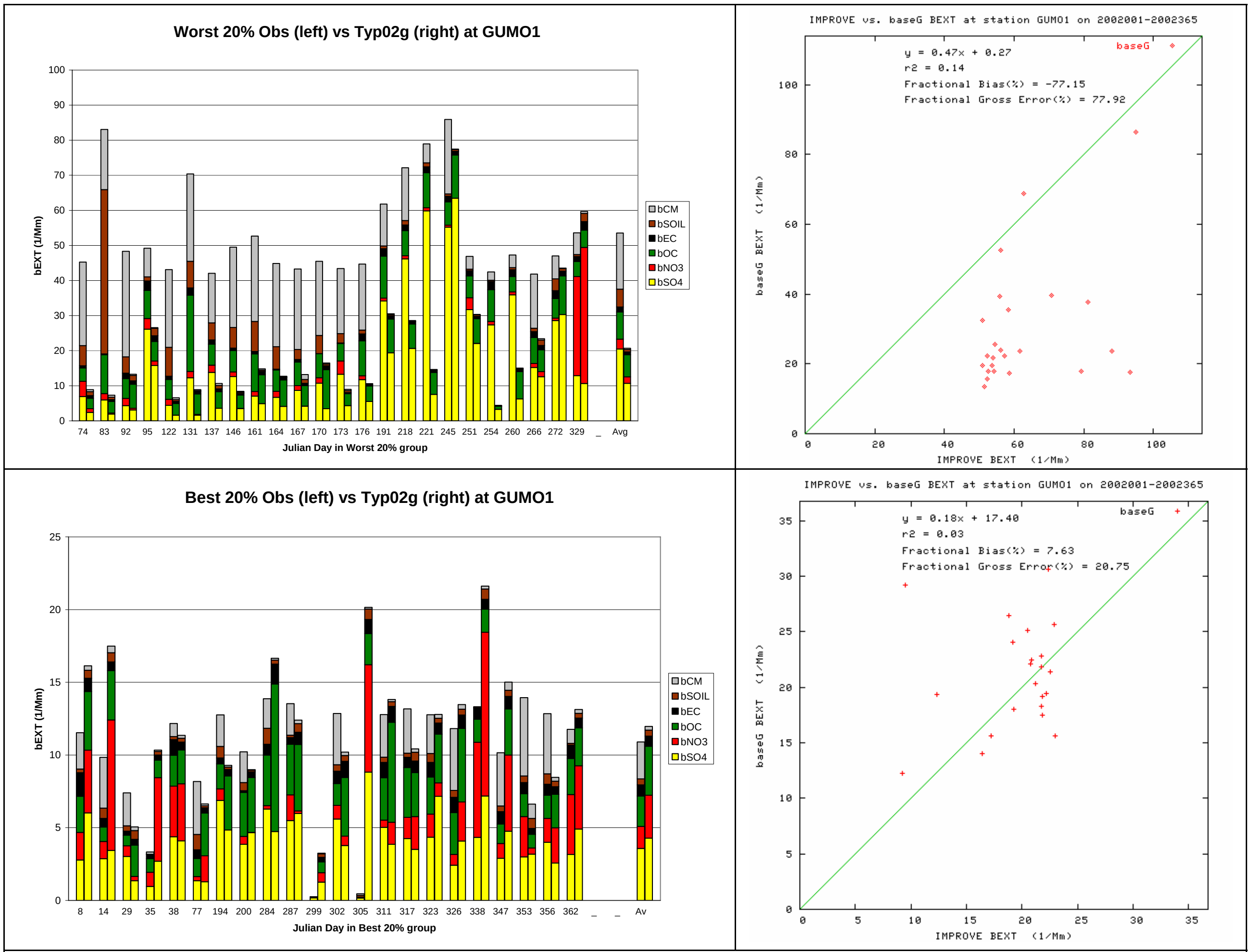


Figure 3-18. Daily extinction model performance at Guadalupe Mountains (GUMO), Texas for the worst (top) and best (bottom) 20 percent days during 2002.

3.8 Model Performance Evaluation Conclusions

The model performance evaluation reveals that the model is performing best for SO4, OMC and EC. Soil performance is mixed with a winter overestimation bias with lower bias and higher error in the summer. CM performance is poor year round. The operational evaluation reveals that SO4 performance usually achieves the PM model performance goal and always achieves the model performance criteria, although it does have an underestimation bias that is greatest in the summer. NO3 performance is characterized by a winter overestimation bias with an even greater summer underestimation bias. However, the summer underestimation bias occurs when NO3 is very low and when it is not an important component of the observed or predicted PM mass concentrations or component of visibility impairment. Performance for OMC meets the model performance goal year round at the IMPROVE sites, but is characterized by an underestimation bias at the more urban STN sites. EC exhibits very low bias at the STN sites and a summer underestimation bias at the IMPROVE sites, but meets the model performance goal throughout the year. Soil has a winter overestimation bias that is outside of the model performance goal and criteria raising questions whether the model should be used for this species. Finally, CM performance is extremely poor with an underprediction bias that is outside of the performance goal and criteria. We suspect that much of the CM concentrations measured at the IMPROVE sites is due to highly localized emissions from fugitive dust sources that are not included in the emissions inventory and would be difficult to simulate using 36 km regional modeling.

Performance for the worst 20 percent days at the CENRAP Class I areas is generally characterized by an underestimation bias. Performance at the BRET, BIBE and GUMO Class I areas for the worst 20 percent days is particularly suspect and care should be taken in the interpretation of the visibility projections at these three Class I areas.

The CMAQ 2002 36 km model appears to be working well enough to reliably make future-year projections for changes in SO4, NO3, EC and OMC at the rural Class I areas. Performance for Soil and especially CM is suspect enough that care should be taken in interpreting these modeling results. The model evaluation focused on the model's ability to predict the components of light extinction mainly at the Class I areas. Additional analysis would have to be undertaken to examine the model's ability to simulate ozone and fine particulate to address 8-hour ozone and $PM_{2.5}$ attainment issues.

4.0 VISIBILITY PROJECTIONS

This section presents the future-year visibility projections for Class I areas within and near the CENRAP states and their comparison with the 2018 Uniform Rate of Progress (URP) point. As noted in Chapter 1, the Regional Haze Rule (RHR) requires states with Class I areas to develop State Implementation Plans (SIPs) that include reasonable progress goals (RPGs) for improving visibility in each Class I area and emission reduction measures to meet those goals. For the initial SIPs due in December 2007, states are required to adopt RPGs for improving visibility from Baseline Conditions. The 2000-2004 five-year period is used to define Baseline Conditions and the first future progress period is 2018. A state is required to set RPGs for each Class I area in the state for two visibility metrics:

- Provide for an improvement in visibility for the most impaired visibility days (i.e., the worst 20 percent days); and

- Ensure no degradation in visibility for the least impaired visibility days (i.e., the best 20 percent days).

The goal of the RPGs is to provide for a rate of improvement sufficient to be on a course to attain "Natural Conditions" by 2064. States are to define controls to meet RPGs every 10 years, starting in 2018, which defines progress periods ending in 2018, 2028, 2038, 2048, 2058 and finally 2064. States will determine whether they are meeting their goals by comparing visibility conditions from one five-year period to another (e.g., 2000-2004 to 2013-2017). As stated in 40 CFR 51.308 (d) (1), baseline visibility conditions, reasonable progress goals, and changes in visibility must be expressed in terms of deciview (dv) units. The haze index (HI) metric of visibility impairment, in deciviews, is derived from light extinction (b_{ext}) as follows:

$$HI = 10 \ln (b_{ext}/10),$$

Where light extinction (b_{ext}) is expressed in terms of inverse megameters ($Mm^{-1} = 10^{-6}\ m^{-1}$). Light extinction ($b_{ext}$) is calculated using the observed fine particulate concentrations from the IMPROVE monitors using either the original or the new IMPROVE aerosol extinction equation. Both equations are discussed below.

4.1 Guidance for Visibility Projections

EPA has published several guidance documents that relate to how modeling results should be used to project future-year visibility and how states should define RPGs:

"Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze" (EPA, 2007a).

"Guidance for Tracking Progress Under the Regional Haze Rule" (EPA, 2003a).

"Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Rule" (EPA, 2003b).

"Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program" (EPA, 2007b).

The first EPA modeling guidance document listed above (EPA, 2007) discusses the use of modeling results to project future-year visibility. The second EPA guidance document (EPA, 2003a) focuses on monitored visibility, how to define the visibility Baseline Conditions and how to track visibility goals. The third EPA guidance document discusses procedures for defining Natural Conditions for a Class I area. Natural Conditions are the visibility goal for 2064. Although states may propose alternative approaches for defining Natural Conditions, in this section we use the default Natural Conditions at Class I areas (EPA, 2003b; Pitchford, 2006). The final EPA guidance document discusses how states should define their RPGs and their relationship to the 2018 URP point.

The EPA documents discussed above are followed for the visibility projections presented in this section with one notable exception. Some of the EPA documents are based on the original IMPROVE equation (e.g., EPA, 2003a, b). The CENRAP visibility projections are based on the new IMPROVE equation, although projections based on the original IMPROVE equation are also presented as an alternative approach in Chapter 5. EPA guidance allows for using either the original or the new IMPROVE equation (EPA, 2007a; Timin, 2007). CENRAP, along with the other RPOs, have elected to use the new IMPROVE equation for their visibility projections.

4.2 Calculation of Visibility and 2018 URP Point from IMPROVE Measurements

EPA guidance recommends using the model in a relative sense to project future-year visibility conditions (EPA, 2007a). This projection is made using Relative Response Factors (RRFs) that are defined as the ratio of the future-year modeling results to the base-year modeling results. The RRFs are applied to the baseline visibility conditions to project future-year visibility. The major features of EPA's recommended visibility projection approach are as follows (EPA, 2003a,b; 2007a):

- Monitored data are used to define current visibility Baseline Conditions using IMPROVE monitoring data from the 2000-2004 five-year base period.

- Monitored concentrations of PM_{10} are divided into six major components, the first five of which are assumed to be $PM_{2.5}$ and the sixth is coarse mass (CM or $PM_{2.5-10}$).
  - SO4 (sulfate) that is assumed to be ammonium sulfate [$(NH_4)_2SO_4$];
  - NO3 (particulate nitrate) that is assumed to be ammonium nitrate [NH_4NO_3];
  - OC (organic carbon) that is assumed to be total organic mass carbon (OMC)
  - EC (elemental carbon);
  - IP (other fine inorganic particulate or Soil); and
  - CM (coarse mass).

- Models are used in a relative sense to develop RRFs between baseline and future predicted concentrations of each component.

- PM component-specific RRFs are multiplied by observed Baseline monitored values to estimate future-year PM component concentrations.
- Estimates of future-year component concentrations are consolidated to provide an estimate of future-year air quality and visibility using either the original or new IMPROVE equation.
- Future-year model projected visibility is compared with the 2018 point on the URP glidepath to assist in evaluating the visibility improvements.
- It is assumed that all measured sulfate is in the form of ammonium sulfate [$(NH_4)_2SO_4$] and all particulate nitrate is in the form of ammonium nitrate [NH_4NO_3].

In order to facilitate tracking visibility progress, three important visibility concepts are required for each Class I area:

<u>Baseline Conditions</u>: Baseline Conditions represent visibility for the 20 percent best (B20%) and 20 percent worst (W20%) visibility days for the initial five-year baseline period of the regional haze program. Baseline Conditions are calculated using IMPROVE monitor data collected during the 2000-2004 five-year period and are the starting point in 2004 for the URP glidepath and 2018 visibility projections.

<u>Natural Conditions</u>: Estimates of natural visibility conditions for the best 20 percent and worst 20 percent days at a Class I area (i.e., visibility conditions that would be experienced in the absence of human-caused impairment). EPA has defined a set of default Natural Conditions for the original IMPROVE equation (EPA, 2003b) that has been updated to the new IMPROVE equation by the Natural Haze Levels II Committee (Pitchford, 2006) that we have used in this Chapter.

<u>2018 URP Point</u>: The 2018 Uniform Rate of Progress (URP) point is defined by defining a linear glidepath in deciviews starting with the 2000-2004 Baseline Conditions in 2004 and ending at Natural Conditions in 2064. Where the linear glidepath passes through 2018 is the 2018 URP point in deciviews.

4.2.1 Calculation of Visibility from IMPROVE PM Measurements

Baseline Conditions for Class I areas are calculated using the procedures in EPA's guidance document (EPA, 2003a) and fine and coarse particulate matter concentrations measured at IMPROVE monitors (Malm et al, 2000; Debell et al., 2006). Currently, each Class I area in the CENRAP domain has an associated IMPROVE monitor. The IMPROVE monitors do not directly measure visibility, but instead measure speciated fine particulate ($PM_{2.5}$) and total $PM_{2.5}$ and PM_{10} mass concentrations from which visibility is obtained through the IMPROVE equation.

Visibility conditions are estimated starting with the IMPROVE 24-hour average mass measurements for six PM species:

- Sulfate [$(NH_4)_2SO_4$];
- Particulate Nitrate [(NH_4NO_3];
- Organic Matter Carbon or Organic Mass by Carbon [OMC];
- Elemental Carbon [EC] or Light Absorbing Carbon [LAC];
- Other fine particulate [Soil]; and
- Coarse Matter or Coarse Mass [CM].

The IMPROVE monitors do not directly measure some of these species so assumptions are made as to how the IMPROVE measurements can be adjusted and combined to obtain these six components of light extinction. For example, in the IMPROVE equation sulfate and particulate nitrate are assumed to be completely neutralized by ammonium. In addition, only the fine mode ($PM_{2.5}$) of PM is speciated by the IMPROVE monitor to obtain sulfate and nitrate measurements (that is, any coarse mode sulfate and nitrate in the real atmosphere may be present in the CM IMPROVE measurement). Concentrations for the above six components of light extinction in the IMPROVE equation are obtained from the IMPROVE measured species using the mappings shown in Table 4-1:

Table 4-1. Definition of IMPROVE PM Components from Measured IMPROVE Species.

IMPROVE Component	IMPROVE Measured Species
Sulfate	1.375 x (3 x S)
Nitrate	1.29 x NO_3^-
OMC	1.4*OC (original IMPROVE) and 1.8*OC (new IMPROVE)
LAC	EC
Soil	2.2*AL + 2.49*SI + 1.63*CA + 2.42*FE + 1.94*TI
CM	MT – MF

Where:

- S is elemental sulfur as determined from proton induced x-ray emissions (PIXE) analysis of the IMPROVE Module A[1]. To estimate the mass of the sulfate ion ($SO_4^{=}$), S is multiplied by 3 to account the presence of oxygen. If S is missing then the sulfate (SO_4) measured by ion chromatography analysis of the Module B is used to replace (3 x S). For the IMPROVE aerosol extinction calculation, Sulfate is assumed to be completely neutralized by ammonium (1.375 x SO_4).
- NO_3^- is the particulate nitrate measured by ion chromatography analysis of the Module B. For the IMPROVE aerosol extinction calculation, it is assumed to be completely neutralized by ammonium (1.29 x NO_3^-).
- The IMPROVE Organic Carbon (OC) measurements are multiplied by 1.4 to obtain Organic Mass Carbon (OMC) using the original IMPROVE equation and multiplied by 1.8 for the new IMPROVE equation. This adjustment of the measured OC accounts for mass due to other elements in the OMC besides Carbon.
- Elemental Carbon (EC) is also referred to as Light Absorbing Carbon (LAC).

[1] The IMPROVE sampler consists of four independent modules (A, B, C and D). Each module incorporates a separate inlet, filter pack and pump assembly and are controlled by a common timing mechanism. Module A measures fine PM mass and elements. Module B measures sulfate and nitrate ions. Module C measures EC and OC. Module D measures PM_{10} mass. (see http://vista.cira.colostate.edu/improve/ for more details).

- Soil is determined as a sum of the masses of those elements (measured by PIXE) predominantly associated with soil (Al, Si, Ca, Fe, K and Ti), adjusted to account for oxygen associated with the common oxide forms. Since K and FE are products of the combustion of vegetation, they are both represented in the formula by 0.6 x Fe and K is not shown explicitly.
- MT and MF are total PM_{10} and $PM_{2.5}$ mass, respectively.

4.2.1.1 Original and New IMPROVE Equations

Associated with each PM species is an extinction efficiency that converts concentrations (in $\mu g/m^3$) to light extinction (in inverse megameters, Mm^{-1}). Sulfate and nitrate are hygroscopic which means that they can absorb water from the atmosphere which changes their extinction efficiency. This is accounted for through relative humidity adjustment factors [f(RH)] that increase the particle's extinction efficiency with increasing RH to account for the particles taking on water Note that some OMC may also have hygroscopic properties, but the IMPROVE equations assume OMC is non-hygroscopic.

There are currently two IMPROVE equations that are used to convert the measured PM concentrations to light extinction, the original (or old) and the new IMPROVE equations.

4.2.1.1.1 Original IMPROVE Equation

The original IMPROVE equation that converts PM species concentrations to light extinction is given as follows:

$$
\begin{aligned}
b_{Sulfate} &= 3 \times f(RH) \times [Sulfate] \\
b_{Nitrate} &= 3 \times f(RH) \times [Nitrate] \\
b_{EC} &= 10 \times [EC] \\
b_{OMC} &= 4 \times [OMC] \\
b_{Soil} &= 1 \times [Soil] \\
b_{CM} &= 0.6 \times [CM]
\end{aligned}
$$

Monthly average f(RH) factors are used as recommended in EPA's guidance (EPA, 2003a). These values are available in the final EPA guidance document (EPA, 2003a) and at: ftp://ftp.saic.com/raleigh/RegionalHaze_2002FRHcurve/fRH_analysis/.

The total light extinction (b_{ext}) is assumed to be the sum of the light extinction due to the six PM species listed above plus Rayleigh (blue sky) background (b_{Ray}) that is assumed to be 10 Mm^{-1}.

$$b_{ext} = b_{Ray} + b_{Sulfate} + b_{Nitrate} + b_{EC} + b_{OMC} + b_{Soil} + b_{CM}$$

The total light extinction (b_{ext}) in Mm^{-1} is related to visual range (VR) in km using the following relationship:

$$VR = 3912 / b_{ext},$$

for b_{ext} in Mm^{-1}.

The Regional Haze Rule requires that visibility be expressed in terms of a haze index (HI) in units of deciviews (dv), which is calculated as follows:

$$HI = 10 \ln(b_{ext}/10)$$

4.2.1.1.2 New IMPROVE Equation

The new IMPROVE equation is nonlinear in SO4, NO3 and OMC concentrations accounting for the different light scattering efficiency characteristics as a function of concentrations for these three species. It is expressed as follows:

$$b_{Sulfate} = 2.2 \times f_S(RH) \times [\text{Small Sulfate}] + 4.8\ f_S(RH) \times [\text{Large Sulfate}]$$
$$b_{Nitrate} = 2.4 \times f_S(RH) \times [\text{Small Nitrate}] + 5.1\ f_S(RH) \times [\text{Large Nitrate}]$$
$$b_{EC} = 10 \times [\text{Elemental Carbon}]$$
$$b_{OMC} = 2.8 \times [\text{Small Organic Mass}] + 6.1 \times [\text{Large Organic Mass}]$$
$$b_{Soil} = 1 \times [\text{Fine Soil}]$$
$$b_{CM} = 0.6 \times [\text{Coarse Mass}]$$
$$b_{NaCl} = 1.7 \times f_{SS}(RH) \times [\text{Sea Salt}]$$
$$b_{NO2} = 0.33 \times [NO_2\ (\text{ppb})]$$

The total Sulfate, Nitrate and OMC are each split into two fractions, representing small and large size distributions of those components. As noted in Table 4-1, the OMC is 1.8 times the IMPROVE OC measurement in the new IMPROVE algorithm, compared to 1.4 times the IMPROVE OC measurement in the original IMPROVE equation. New terms have been added for Sea Salt (important for coastal areas and possibly other areas)and for light absorption by NO2 (only used where NO2 observations are available). As none of the CENRAP Class I area IMPROVE sites measure NO2 concentrations, then this component of the new IMPROVE equations was not used. Site-specific Rayleigh scattering for each IMPROVE monitoring site is used in the new IMPROVE equation, as compared to a constant 10 Mm^{-1} value assumed in the original IMPROVE equation.

The apportionment of the Small and Large components of Sulfate, Nitrate and Organic Mass is done as follows:

$$[\text{Large Sulfate}] = [\text{Total Sulfate}] / 20 \times [\text{Total Sulfate}], \text{ for } [\text{Total Sulfate}] < 20\ \mu g/m^3$$

$$[\text{Large Sulfate}] = [\text{Total Sulfate}], \text{ for } [\text{Total Sulfate}] \geq 20\ \mu g/m^3$$

$$[\text{Small Sulfate}] = [\text{Total Sulfate}] - [\text{Large Sulfate}]$$

The same equations are used to apportion Total Nitrate and Total OMC among their Large and Small components.

The total extinction (b_{ext}) in the new IMPROVE equations is the sum of all the extinction components associated with each PM species. The new IMPROVE equation adds Sea Salt and

NO_2 as noted above. In addition, site-specific Rayleigh background is used with the new IMPROVE equation:

$$b_{ext} = b_{Ray} + b_{Sulfate} + b_{Nitrate} + b_{EC} + b_{OMC} + b_{Soil} + b_{CM} + b_{NaCl} + b_{NO2}$$

The Haze Index (HI) and Visual Range (VR) are calculated from the total extinction from the new IMPROVE equation using the same formulas as given above for the original IMPROVE equation.

4.2.1.1.3 Justification for Using the New IMPROVE Equation

The new IMPROVE equation was developed using the latest scientific information on PM species extinction properties combined with fitting reconstructed light extinction based on IMPROVE measured PM and NO2 concentrations with actual co-located measured light extinction (e.g., nephelometer measurements). Figure 4-1 displays example comparisons of 24-hour light extinction using the original and new IMPROVE equations compared against 24-hour nephelometer measurements of light extinction at the Great Smoky Mountains Class I area IMPROVE monitor. The original IMPROVE equation has a bias toward understating light extinction at the high end and overstating it at the low end, whereas the new IMPROVE equation does a better job in estimating light extinction from measured PM at all extinction levels. Because the new IMPROVE equation is based on more recent science and fits the observed light extinction values better, the CENRAP states have elected to perform their primary visibility projections using the new IMPROVE equation. Results using the original IMPROVE equation are presented in Section 5 as an alternative approach.

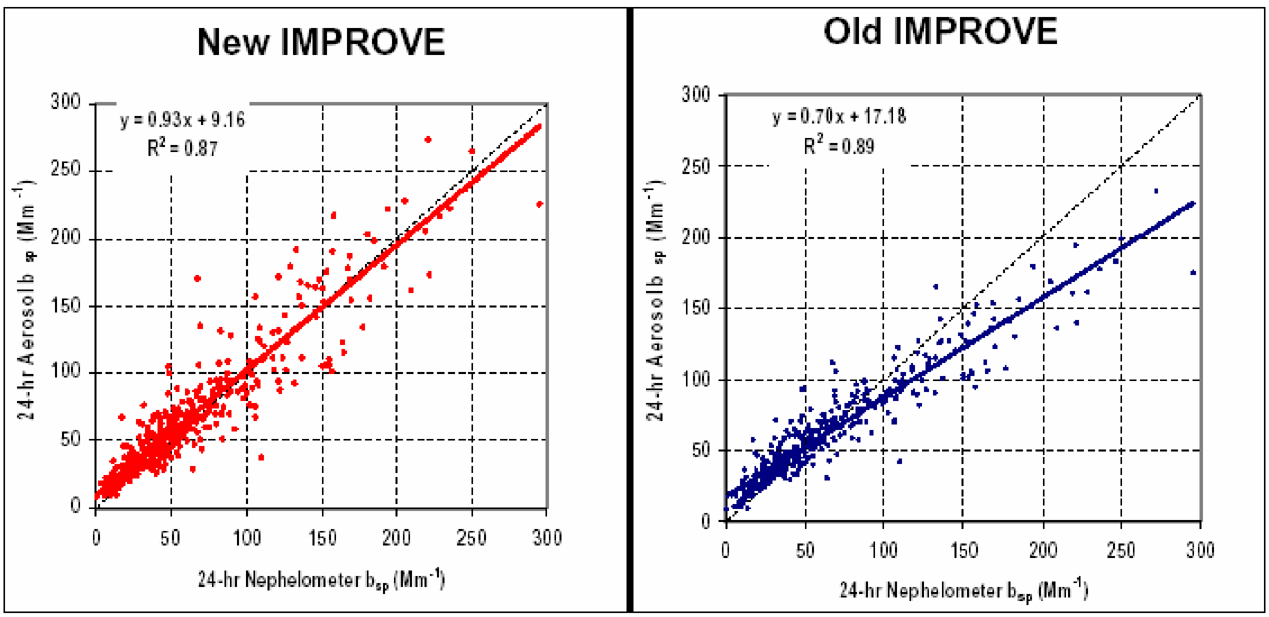


Figure 4-1. Comparisons of observed light extinction with reconstructed light extinction using the new (left) and original (right) IMPROVE equations at the Great Smoky Mountains National Park.

4.2.2 Calculation of the Baseline Conditions

The visibility Baseline Conditions for the worst 20 percent and best 20 percent days is calculated from the IMPROVE observations from the 2000-2004 period for each Class I area following EPA's guidance (EPA, 2003a). The basic procedures for calculating the Baseline Conditions are as follows:

1. Determine whether the observed IMPROVE data for each site and year satisfies EPA's minimal data capture criteria (EPA, 2003a). If there are less than three years with valid data capture for the 2000-2004 Baseline then the Baseline Conditions can not be calculated and data filling is needed.
2. For each year in the 2000-2004 period with sufficient valid data, rank the visibility in terms of extinction or deciview using either the original or new IMPROVE equation and monthly average f(RH) factors (EPA, 2003a).
3. For the worst 20 percent days, extract the 20% most impaired visibility days for each year (similarly for best 20 percent days extract 20% cleanest days). With a complete yearly data capture of IMPROVE 1:3 day sampling frequency this would result in 24 worst 20 percent and 24 best 20 percent days in a year.
4. For each worst 20 percent (or best 20 percent) day in each year, calculate 24-hour average visibility extinction using the IMPROVE measurements and either the original and new IMPROVE equation, convert the daily extinction to daily deciview and then average across each year to get yearly average deciview extinction for the worst 20 percent (or best 20 percent) days for each valid year from the 2000-2004 period.
5. Average the annual average deciview worst 20 percent (or best 20 percent) days deciview across each valid year in the 2000-2004 period (minimum of 3 valid years required) to get the worst 20 percent (or best 20 percent) Baseline Conditions.

4.2.3 Data Filling for Sites with Insufficient Valid Data to Calculate Baseline Conditions

Three CENRAP Class I areas did not contain sufficient IMPROVE observations during the five-year 2000-2004 Baseline to have three valid years of data from which Baseline Conditions could be constructed: Breton Island (BRET), Louisiana; Boundary Waters (BOWA), Minnesota and Mingo (MING), Missouri. For these three Class I areas, data filling was used to obtain sufficient data so that at least three-years of valid data were available from which Baseline Conditions could be calculated. These data filled IMPROVE databases were prepared and made available on the VIEWS website. More information on the data filling procedures can be found at the VIEWS website: (http://vista.cira.colostate.edu/views/).

4.2.4 Natural Conditions

EPA has published default Natural Conditions for Annual Average and the worst 20 percent and best 20 percent days based on the original IMPROVE equation (EPA, 2003b). These default Natural Conditions have been updated to the new IMPROVE equation by the Natural Haze Levels II Committee (Pitchford, 2006). These default Natural Conditions are used as the anchor point for the glidepaths in 2064 and are provided in Appendix D for the CENRAP Class I areas.

4.2.5 2018 URP Point

The 2018 point on the Uniform Rate of Progress (URP) glidepath is constructed by generating a linear glidepath in deciviews from the Baseline Conditions in 2004 to Natural Conditions in 2064. Where the linear glidepath crosses 2018 is the 2018 point on the URP glidepath or the 2018 URP point. Figure 4-2 displays an example linear glidepath for the Caney Creek Class I area in Arkansas. There are three years of sufficient valid IMPROVE data during the 2000-2004 Baseline (2002, 2003 and 2004) with values of 27.21, 26.52 and 25.34 dv resulting in worst 20 percent Baseline Conditions of 26.36 dv that is placed as the starting point in 2004 for the glidepath. The ending point for the glidepath is 11.58 dv which is the default Natural Conditions for the worst 20 percent days (EPA, 2003b; Pitchford, 2006). The linear glidepath crosses 2018 at 22.91 dv which becomes the 2018 URP point.

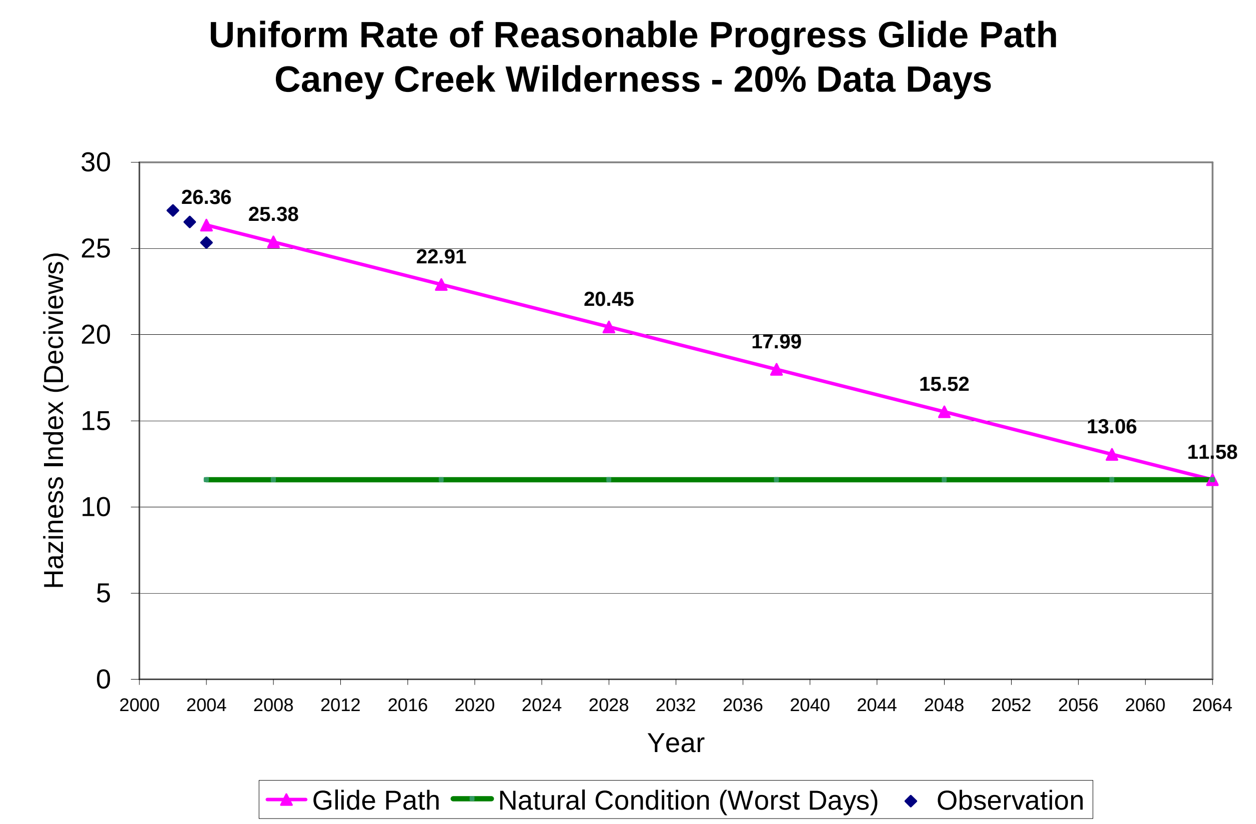


Figure 4-2. Linear Glidepath for Caney Creek (CACR), Arkansas that linearly connects the 26.36 dv Baseline Conditions in 2004 with the 11.58 dv Natural Conditions in 2064 resulting in a 22.91 dv 2018 URP Point.

4.3 EPA Default Approach to Visibility Projections

For CENRAP's model application for a single year (2002), EPA's regional haze modeling guidance recommends developing Class I area-specific and PM species-specific RRFs based on the average concentrations for the worst 20 percent days from 2002 (EPA, 2007). Thus, this is

the methodology used to project 2018 visibility estimates in this section. For example, if $SO4(2002)_i$ and $SO4(2018)_i$ are the model estimated sulfate concentrations for the 2002 worst 20 percent days (i=1…N) at a given Class I area for the 2002 and 2018 emission scenarios then the RRF for sulfate and this Class I area is given by:

$$RRF(SO4)_i \quad = \quad \sum SO4(2018)_i \,/\, \sum SO4(2002)_i$$

4.3.1 Mapping of Modeling Results to the IMPROVE Measurements

As noted above, to project future-year visibility at Class I areas the modeling results are used in a relative sense to scale current observed visibility for the worst 20 percent and best 20 percent visibility days using RRFs that are the ratio of modeling results for the future-year to current-year. This scaling is done separately for each of the six components of light extinction in the IMPROVE equations. The CMAQ modeled species do not necessarily exactly match up with the IMPROVE PM species, thus assumptions must be made to map the modeled species to the IMPROVE PM species for the purpose of projecting visibility improvements. For example, CMAQ explicitly simulates ammonium and sulfate may or may not be fully neutralized in the model by ammonium, whereas the IMPROVE equations assume sulfate is fully neutralized by ammonium. For the CMAQ Version 4.5 (September 15, 2005 release) model, the mapping of modeled species to IMPROVE equation PM species is listed in Table 4-2.

Table 4-2. Mapping of CMAQ V4.5 modeled species concentrations to IMPROVE PM components.

IMPROVE Component	CMAQ V4.3 Species
Sulfate	1.375 x (ASO4J + ASO4I)
Nitrate	1.29 x (ANO3J + ANO3I)
LAC	AECJ + AECI
OMC	AORGAJ + AORGAI + AORGPAJ + AORGPAI + AORGBJ + AORGBI
Soil	A25J + A25I
CM	ACORS + ASEAS + ASOIL

For the CENRAP visibility projections using the 2002 Typical and 2018 base case Base G emission scenarios, the secondary organic aerosol (SOA) module in CMAQ V4.5 was modified (SOAmods) to include additional processes related to the generation of SOA from biogenic emissions. In particular, three new species have been added that represent SOA products from biogenic emission compounds that is not included in the standard version of CMAQ V4.5 (Morris et al., 2006c):

- ASOC1 – SOA from biogenic sources (e.g., terpenes and isoprene) that has become polymerized so is no longer volatile.

- ASOC2 – SOA from biogenic sesquiterpene and higher reactivity and higher yield monoterpene emissions.

- ASOC3 – SOA from biogenic isoprene emissions.

Thus, the species mapping for Organic Mass Carbon (OMC) and the CMAQ V4.5 SOAmods version of the model used in CENRAP 2018 visibility projections is as given in Table 4-2 only with the addition of the three new biogenic SOA species to OMC as follows:

> OMC = AORGAJ + AORGAI + AORGPAJ + AORGPAI + AORGBJ + AORGBI + ASOC1 + ASOC2 + ASOC3

4.3.2 Using Modeling Results to Project Changes in Visibility

Modeling results are used in a relative fashion to project future-year visibility using relative response factors (RRFs). RRFs are expressed as the ratio of the modeling results for the future-year to the results of the base year (2018/2002) and are Class I area and PM species specific. RRFs are applied to the Baseline Condition observed PM species to project future-year PM levels from which visibility can be assessed using the IMPROVE equations listed above. The following six steps are used to project future-year visibility for the worst 20 percent and best 20 percent visibility days (discussion is for worst 20 percent days but also applies to best 20 percent days):

1. For each Class I area and each monitored day, daily visibility is ranked using IMPROVE data and IMPROVE equation (either original or new IMPROVE equation) for each year from the five-year baseline period (2000-2004) to identify the worst 20 percent visibility days for each year from the five-year baseline (see Baseline Conditions discussion above).

2. Use an air quality model to simulate a base year period (ideally the five-year Baseline period of 2000-2004, but for CENRAP just the 2002 annual period was simulated) and a future-year (e.g., 2018) and use the resulting information to develop Class I area-specific RRFs for each of the six components of light extinction in the IMPROVE equation (SO4, NO3, EC, OMC, Soil and CM).

3. Multiply the RRF times the measured 24-hour PM concentration data for each day from the worst 20 percent days in each year from the five-year Baseline period to obtain projected future-year 24-hour PM concentrations for the worst 20 percent days and the five-year Baseline.

4. Compute the future-year daily extinction using the IMPROVE equation and the projected PM concentrations for each of the worst 20 percent days in the five-year baseline from Step 3.

5. For each of the worst 20 percent days within each year of the five-year baseline, convert the future-year daily extinction to deciview and average the daily deciview values within each of the five years separately to obtain five-years (or as many years with valid data in the 2000-2004 Baseline) of average deciview visibility for the worst 20 percent days.

6. Average the five-years of average deciview visibility to obtain the future-year visibility Haze Index estimate that is the future-year estimated visibility.

In calculating the RRFs, EPA draft guidance recommends selecting estimated PM species concentrations "near" the monitor by taking a spatial average of PM concentrations across a grid cell resolution dependent NX by NY array of cells centered on the grid containing the monitor. The NX x NY array of cells is grid resolution specific with EPA recommending that NX=NY=1 for 36 km grids, NX=NY=3 for 12 km grids and NX=NY=7 for 4 km grids (EPA, 2007). For the CENRAP 2002 36 km modeling, just the model estimates for the grid cell containing the monitor was used (i.e., NX=NY=1).

4.4 EPA Default 2018 Visibility at CENRAP and Nearby Class I areas and Comparisons to 2018 URP Goals

Using the EPA default visibility projection procedure described in Section 4.3 and the CENRAP 2002 Typical Base G and 2018 Base Case Base G CMAQ modeling results, 2018 visibility projections were made for CENRAP and nearby Class I areas. Appendix D details the 2018 Base G visibility projections for each Class I area in the CENRAP region using the new IMPROVE equation. Results for the Caney Creek (CACR), Arkansas Class I area are discussed in Section 4.4.1 below Displays for other CENRAP Class I areas are provided in Appendix D and summarized in Section 4.4.2

4.4.1 Example 2018 Base G Visibility Projections for Caney Creek, Arkansas

The 2018 visibility projections for the Caney Creek (CACR), Arkansas Class I area given in Figure D-1 in Appendix D are reproduced in Figure 4-3 and described below.

4.4.1.1 EPA Default 2018 Visibility Projections

The 2018 Base G visibility projection using the EPA default method (EPA, 2007a) and comparison with the 2018 URP point for the worst 20 percent days and the CACR Class I area is shown in Figure 4-3a. The 2000-2004 Baseline Conditions for CACR is 26.36 dv and the 2018 URP point is 22.91 dv so that a 3.45 dv reduction in visibility for the worst 20 percent days is needed to meet the 2018 URP point. The 2018 Base G CMAQ projected visibility is 22.48 dv so that the modeling predicts more visibility improvements (3.88 dv reduction) than required to meet the 2018 URP point (3.45 dv reduction). When looking at visibility projections across several Class I areas, it has been useful to present the 2018 visibility projections as a percentage of meeting the 2018 URP point; where 100% is meeting the point, greater than 100% surpassing the point (i.e., below the glidepath) and less than 100% means that less visibility improvement is achieved than needed to meet the 2018 URP point. For 2018 Base G CMAQ modeling at CACR, we achieve 112% of the visibility reduction needed to meet the 2018 URP point. Note that meeting the 2018 URP point is not a requirement of the RHR SIPs, rather it just serves as a benchmark to compare progress toward Natural Conditions in 2064 and is designed to help states in selecting their 2018 RPGs. As clearly stated in EPA guidance "The glidepath is not a presumptive target, and States may establish a RPG that provides for greater, lesser, or equivalent improvement as that described by the glidepath" (EPA, 2007b).

The 2018 Base G CMAQ visibility projections for the best 20 percent days and CACR is shown in Figure 4-3b. Recall the RHR goal for this visibility metric is no worsening of the visibility for the best 20 percent days. The Baseline Conditions for the best 20 percent days at CACR is 11.24 dv. The 2018 Base G projected visibility for the best 20 percent days is 10.35 dv, which represents a 0.89 dv visibility improvement for the best 20 percent days at CACR and demonstrating no worsening in visibility for the best 20 percent days.

Figure 4-3c displays "StackedBar Chart" plots of observed and model estimated extinction for each of the worst 20 percent days in 2002 and the 2002 Typical Base G CMAQ simulation and the average across the worst 20 percent days. This figure allows a comparison of how well the model is reproducing the observed extinction at CACR for the worst 20 percent days in 2002 and the breakdown of the PM components that are contributing to visibility impairment (more details on model performance were presented in Chapter 3). The 2002 worst 20 percent days at CACR are dominated by SO4 days (yellow), although during the winter there are also three days dominated by NO3 (Julian Days 80, 320 and 341). For most of the worst 20 percent days at CACR, the model reproduces the observed extinction reasonably well, although it does tend to understate SO4 on a few days and overstate NO3 on the four winter days. The observed average extinction across the 2002 worst 20 percent days at CACR is 150 Mm^{-1}, compared to a modeled value that is 23% lower (115 Mm^{-1}).

Figure 4-3d displays "Boxplots" of differences in modeled extinction for the 2002 worst 20 percent days between the 2018 Base G and 2002 Typical Base G CMAQ simulations. On most days SO4 is the largest component of the extinction that is estimated to be reduced at CACR on the worst 20 percent days. The exception to this is for the winter NO3 days where NO3 is the largest component of extinction that is reduced. The modeling results are not used directly in the visibility projections, rather they are used to develop the PM-species specific RRFs. That is, an important attribute in Figures 4-3c and 4-3d is the relative changes in the modeled PM species averaged across the worst 20 percent days that are represented by the last bar in each figure and provide insight into the RRFs used in the visibility projections. These results are summarized in Table 4-3 below. Table 4-3 compares the average extinction across the 2002 worst 20 percent days at CACR from the measured IMPROVE data, the modeled values and the modeled change in extinction between the 2018 and 2002 emissions scenarios. Although the results in Table 4-3 are not RRFs (RRFs are based on ratios of concentrations not extinction) they do show how the RRFs may magnify or deflate the importance of a modeled PM species. For example, the model estimates that approximately 23% (26.66 Mm^{-1}) of the visibility extinction average across the worst 20 percent days is due to NO3, whereas it is only 7% in the observed values (10.22 Mm^{-1}). So the modeled ~40% reduction in NO3 between the 2018 and 2002 scenarios is applied to the smaller observed NO3 value to obtain the 2018 projected NO3 value making NO3 a smaller portion of the 2018 projected visibility than the 2018 modeled visibility. On the other hand, the modeled SO4 extinction is less than observed so that its importance in the 2018 projections is much greater than in the modeled 2018 SO4 values.

Table 4-3. Observed and Modeled Extinction by Species Averaged Across the Worst 20 Percent Days in 2002 at CACR.

	2002 Average Observed W20% (Mm^{-1})	2002 Average Modeled W20% (Mm^{-1})	2018-2002 Reduction (Mm^{-1})	2018-2002 Reduction (%)
bSO4	109.50	67.90	-24.47	-36%
bNO3	10.22	26.66	-10.90	-41%
bOMC	19.65	16.68	-2.12	-13%
bEC	4.38	2.32	-0.67	-29%
bSOIL	1.43	1.04	+0.21	+20%
bCM	4.30	0.37	-0.01	-3%

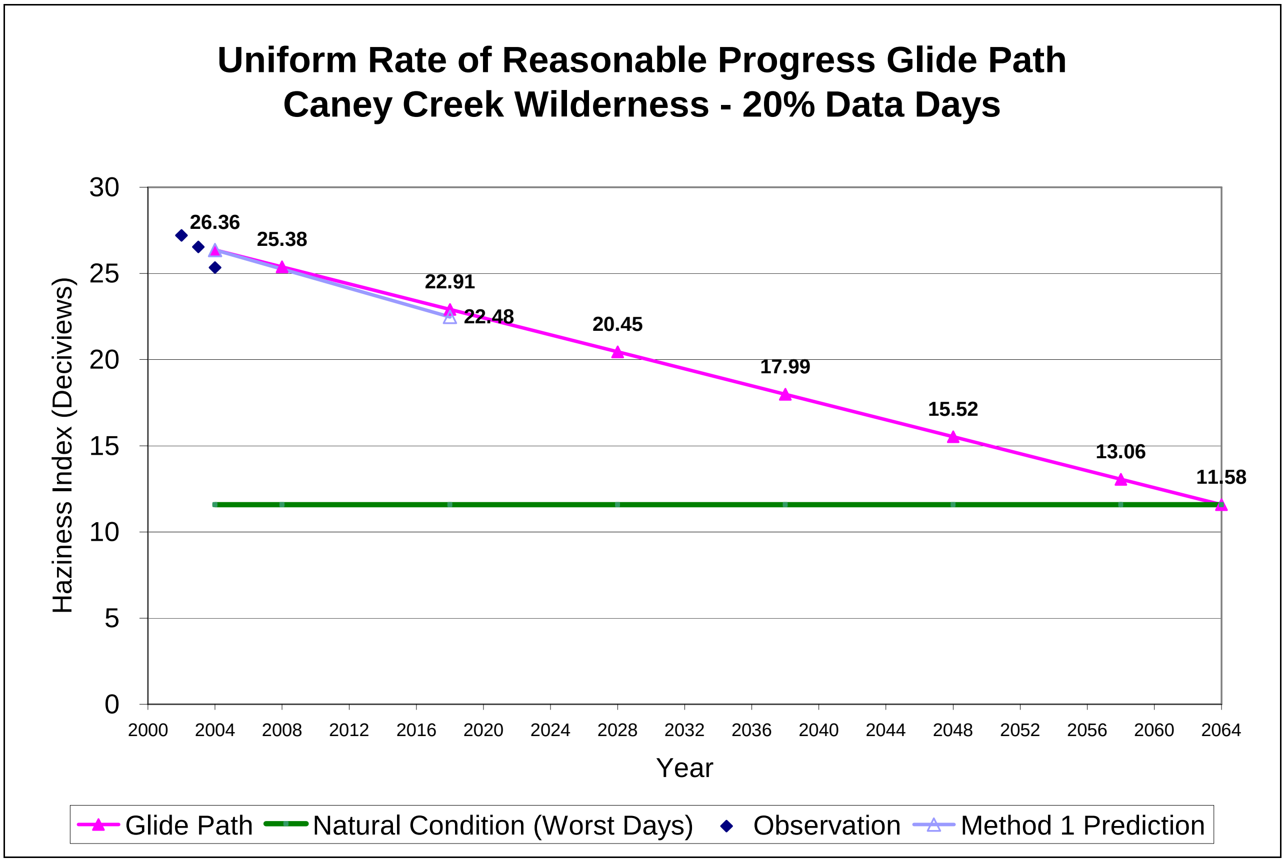


Figure 4-3a. 2018 Visibility Projections and 2018 URP Glidepaths in Deciview for Caney Creek (CACR), Arkansas and Worst 20 Percent (W20%) days Using 2002/2018 Base G CMAQ 36 km Modeling Results.

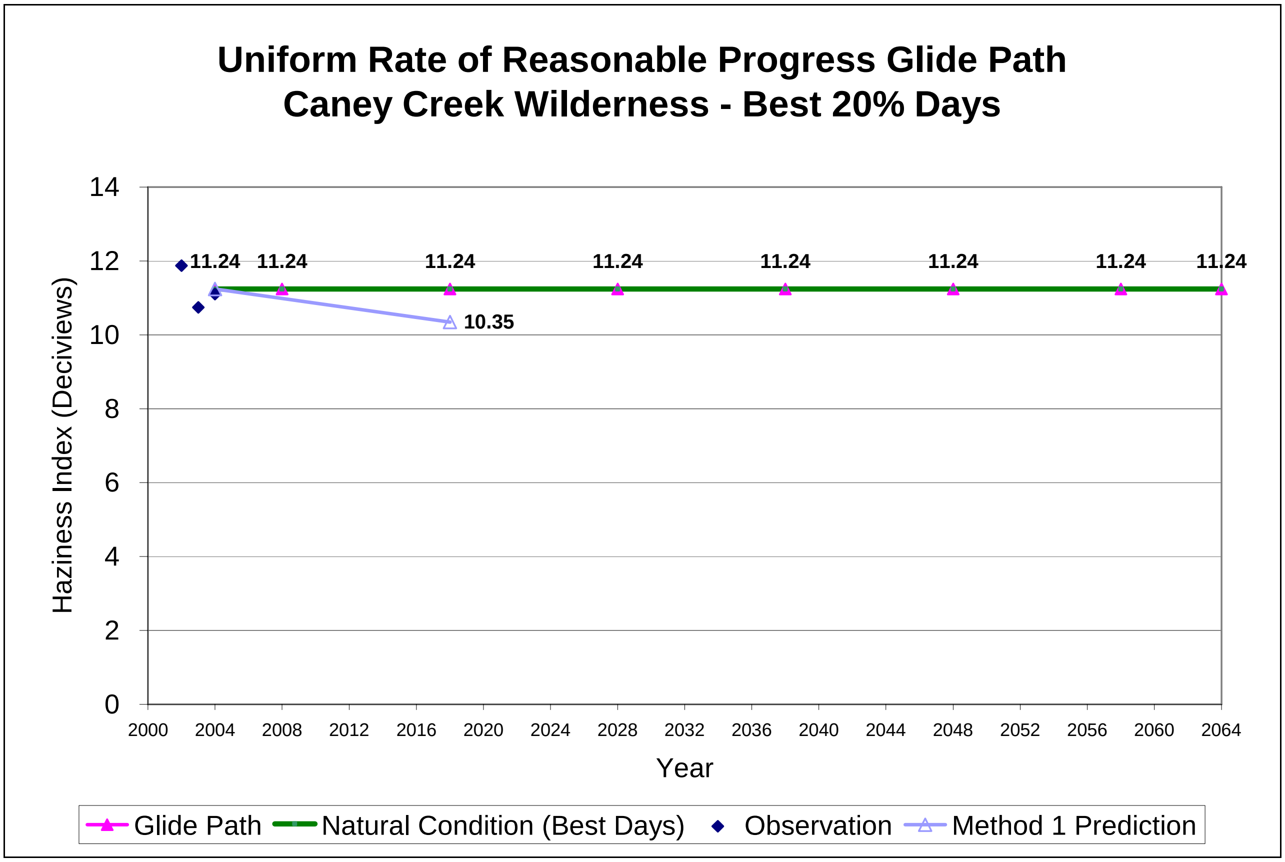


Figure 4-3b. 2018 Visibility Projections and 2018 URP Glidepaths in Deciview for CACR, Arkansas and Best 20 Percent (B20%) days Using 2002/2018 Base G CMAQ 36 m Modeling Results.

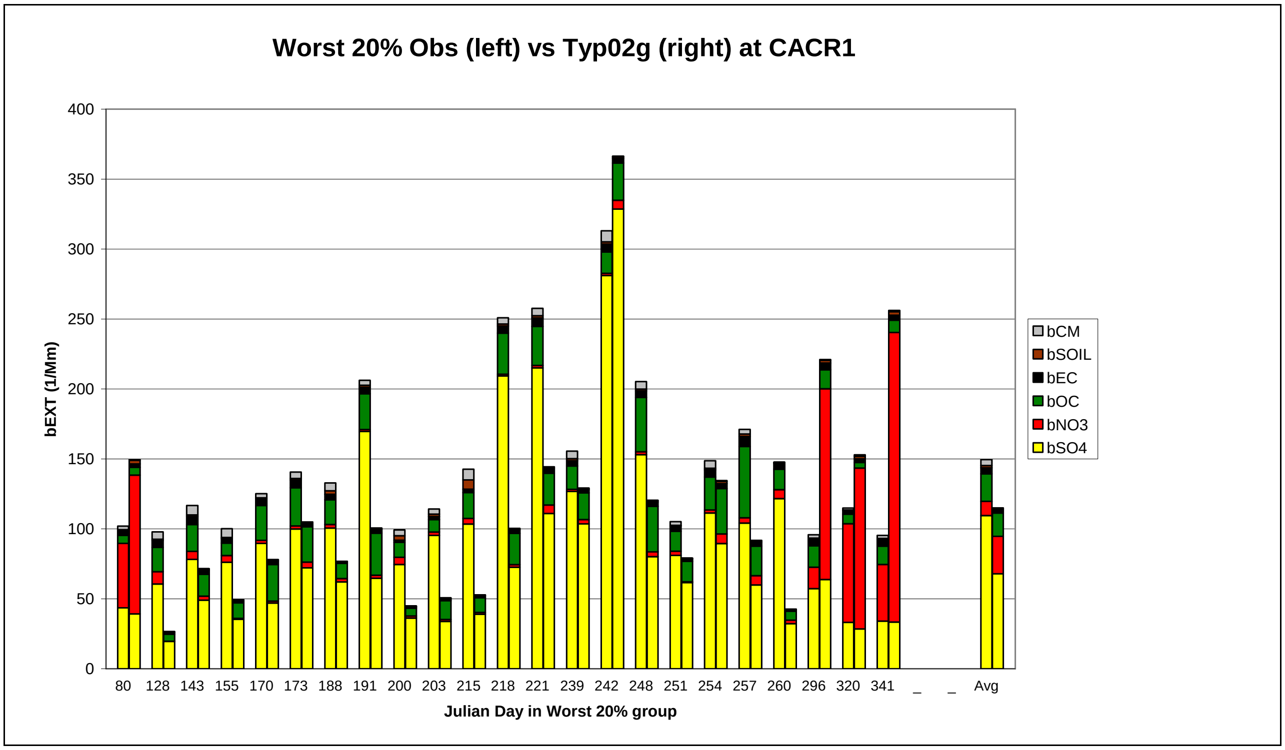


Figure 4-3c. Comparison of Observed (left) and 2002 Base G Modeled (right) Daily Extinction for Caney Creek (CACR), Arkansas and Worst 20 Percent (W20%) days in 2002.

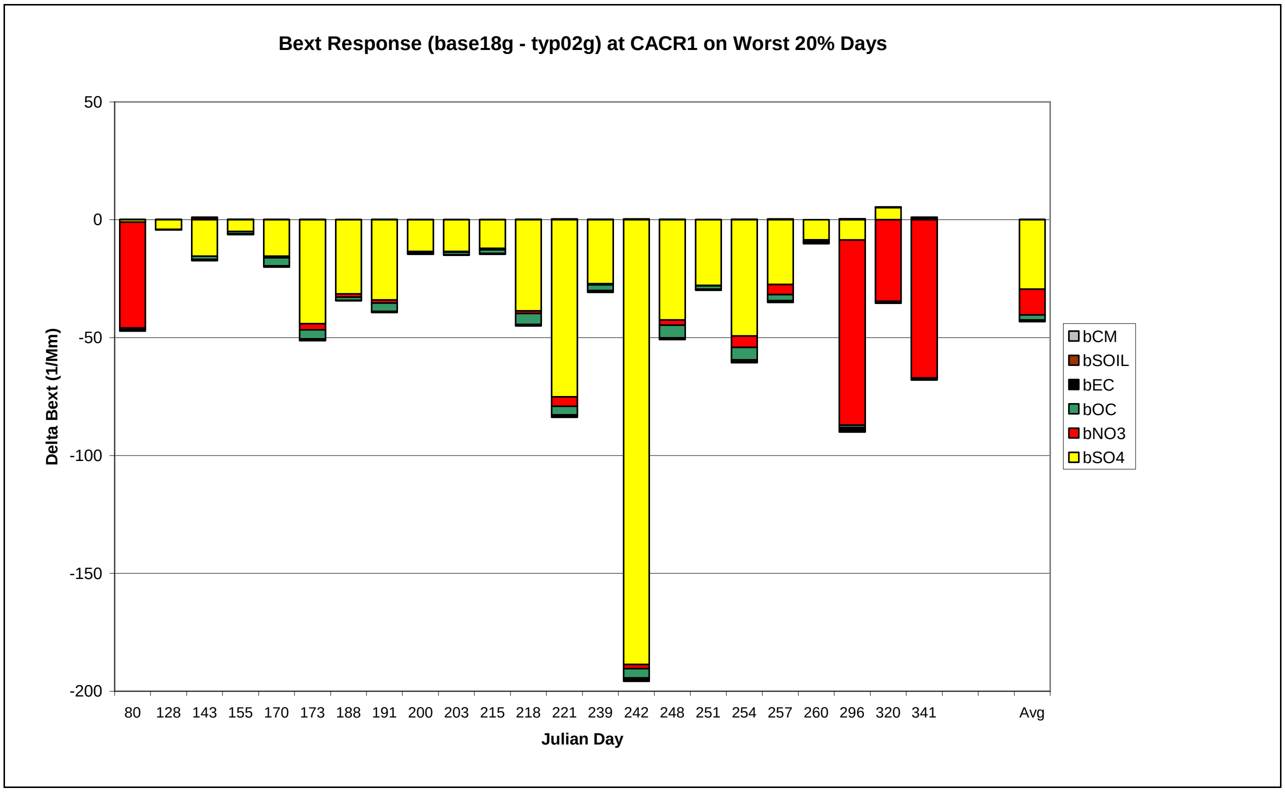


Figure 4-3d. Differences in Modeled 2002 and 2018 Base G CMAQ Results (2018-2002) Daily Extinction for Caney Creek (CACR), Arkansas and Worst 20 Percent (W20%) Days in 2002.

4.4.2 Summary 2018 Visibility Projections Across Class I Areas

Figure 4-4 displays a "DotPlot" of 2018 visibility projections using the 2002 Typical and 2018 base case Base G CMAQ 36 km modeling results. DotPlots present the 2018 visibility projections as a percentage of meeting the 2018 URP point. For example, at CACR the 2018 Base G modeling achieved 112% of the visibility reduction needed to meet the 2018 URP point so the dot under CACR is plotted at 112%. Class I areas' with dots above 100% surpass the 2018 URP point (i.e., are below the glidepath), whereas Class I areas' with dots that are under 100% fail to meet the 2018 URP point. Figure 4-4 summarizes the 2018 visibility projections using the EPA default "Regular RRF" and the two alternatives where CM is assumed to be natural (CM RRF=1) and both CM and Soil are assumed to be natural (CM&SOIL RRF=1). When CM or CM&SOIL are assumed to be natural that means that we assume the same CM or CM&SOIL occurs in the 2018 future-year as in the 2000-2004 Baseline Conditions. For the CENRAP sites, the EPA default and alternative projection, assuming CM alone or CM and Soil are natural, techniques produced similar results.

At the four eastern CENRAP Class I area sites close to the Mississippi River (CACR, UPBU, HEGL and MING), the 2018 visibility projections meet (HEGL) or surpass the 2018 URP point. Breton Island Class I area (BRET) comes up 6% short of meeting the 2018 URP point (i.e., 94% of the URP point). Wichita Mountains Class I area (WIMO) comes up approximately 40% short of the 2018 URP point. The two northern Class I areas (BOWA and VOYA) also come up about 40% short of meeting the 2018 URP point (i.e., achieve 69% and 53% of the visibility improvement needed to meet the 2018 URP point). The two Texas Class I areas only achieve

26% (BIBE) and 34% (GUMO) of the visibility improvement needed to meet the 2018 URP point for the worst 20 percent days. As discussed in more detail in Chapter 5, much of the difficulty for the Texas and some of the other CENRAP Class I areas in meeting the 2018 URP point is due to large contributions due to international transport, much of which (e.g., Mexico and global transport) is assumed to remain unchanged from 2002 to 2018.

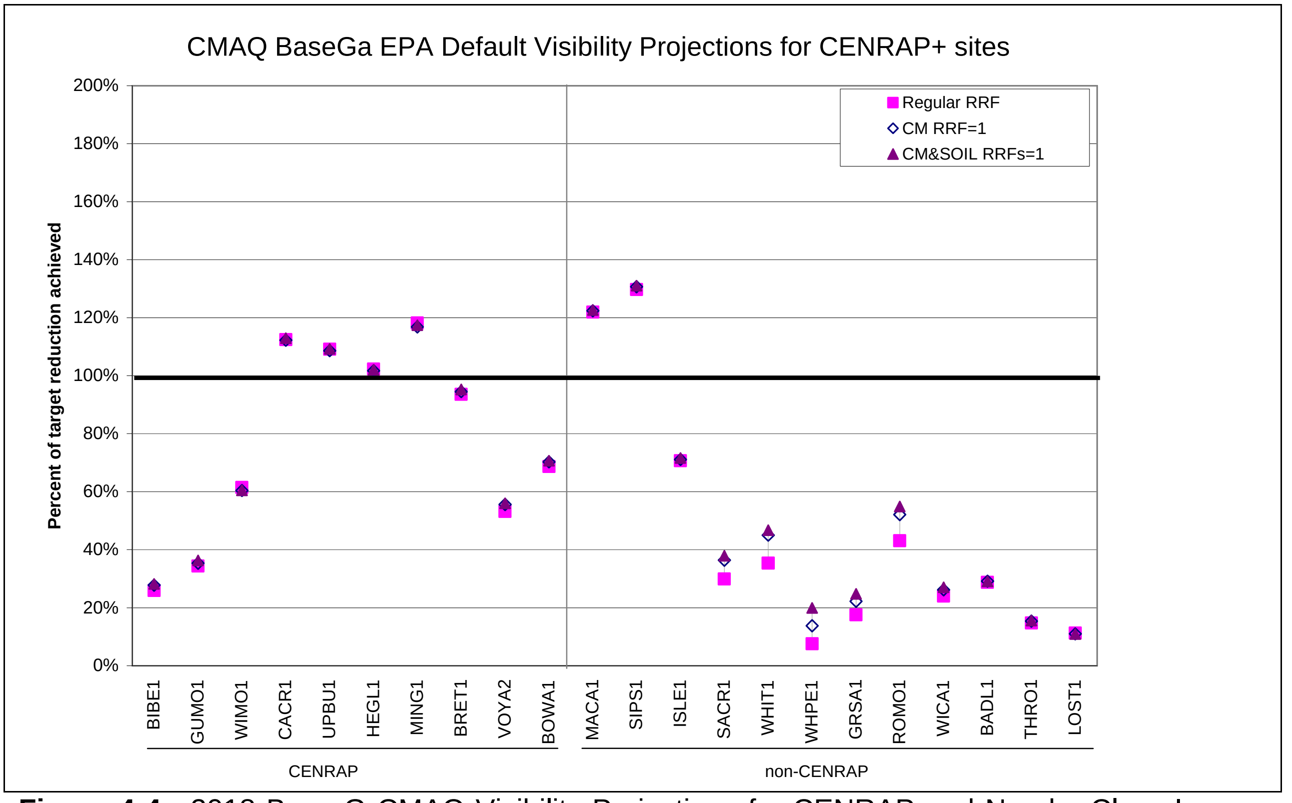
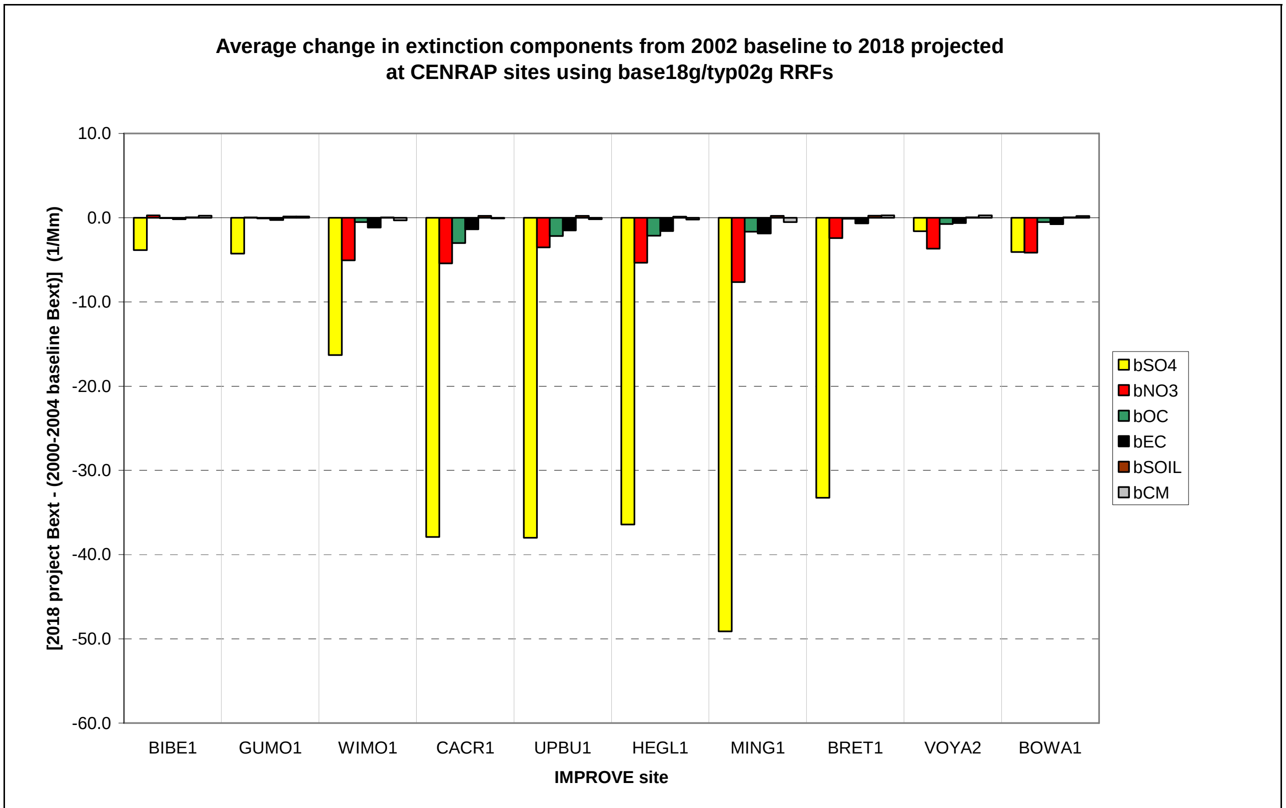


Figure 4-4. 2018 Base G CMAQ Visibility Projections for CENRAP and Nearby Class I areas Using DotPlots that Express 2018 Visibility as a Percentage of Meeting the 2018 URP Point On the Deciview Linear Glidepath.

Figure 4-5 displays the model estimated absolute change in extinction (Mm^{-1}) averaged across the 2002 worst 20 percent days at Class I areas in and near the CENRAP region. The largest modeled reductions are in SO4 extinction. Figure 4-6 displays the percent change in the projected PM extinction by PM species for each CENRAP and nearby Class I area average across the worst 20 percent days (i.e., the relative modeled change). The four CENRAP Class I areas that meet the 2018 URP point (CACR, UPBU, HEGL and MING) are characterized by large SO4, NO3 and EC extinction reductions (30-40%) with small Soil increases. At the other CENRAP Class I areas, however, there are lower levels of SO4, NO3 and EC extinction reductions and even some NO3 increases (BIBE). At the non-CENRAP Class I areas, the two VISTAS Class I areas (MACA and SIPS) have large reductions in SO4 extinction (~50%), whereas the WRAP Class I areas SO4 extinction reductions are much smaller.



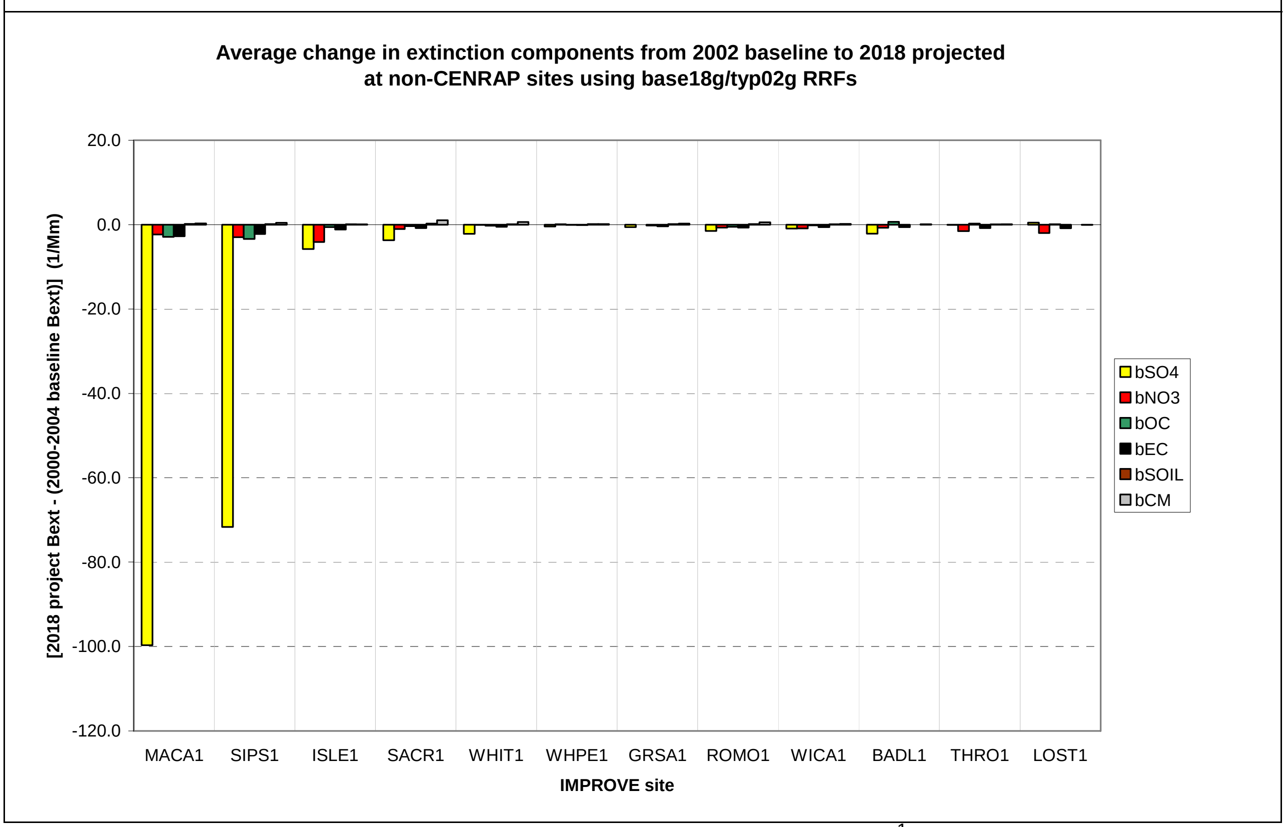


Figure 4-5. Absolute Model Estimated Changes in Extinction (Mm^{-1}) by PM Species for Class I Areas in the CENRAP region (top) and Near the CENRAP region (bottom).

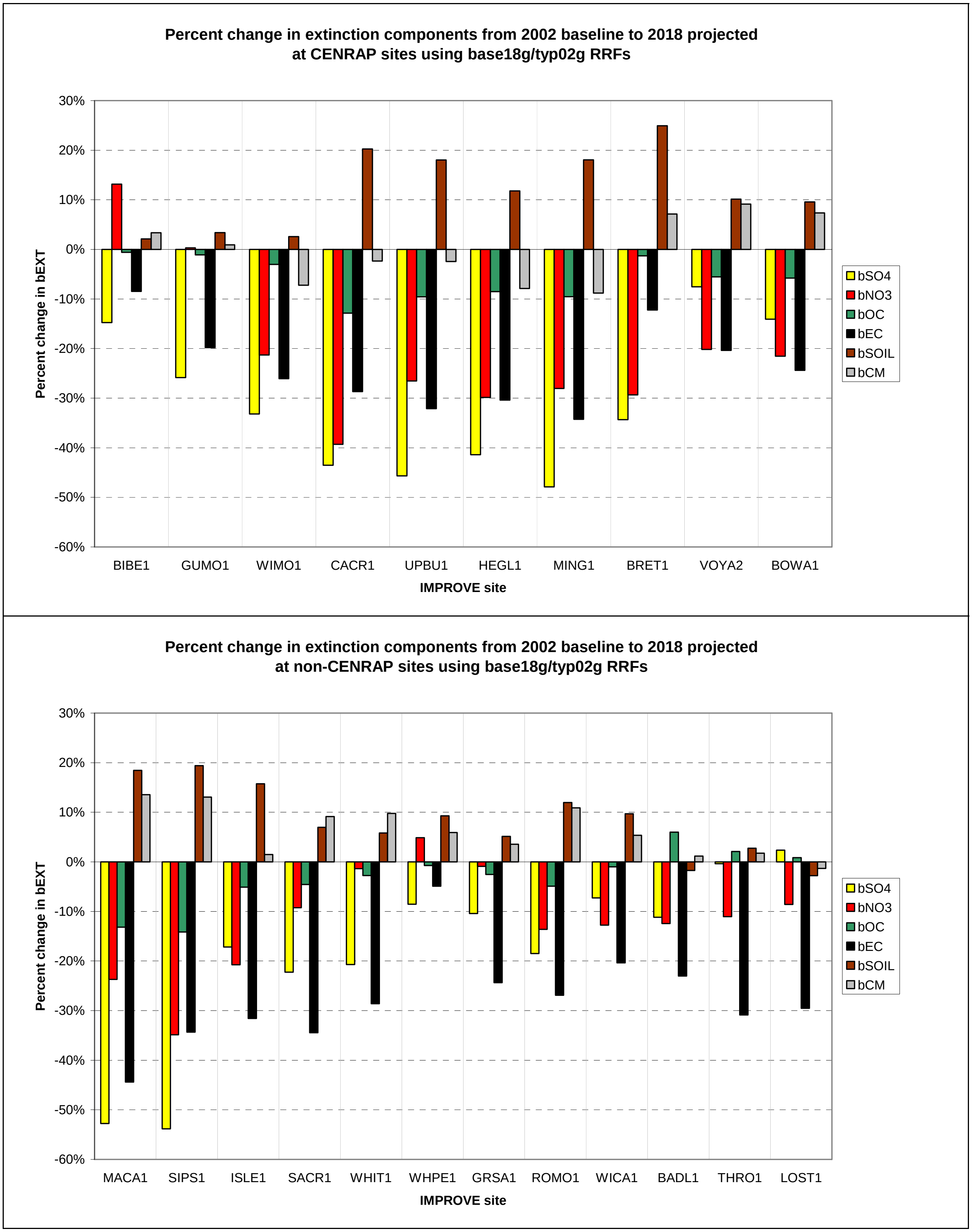


Figure 4-6. Percent Change In Modeled Extinction by PM Species Averaged Across the 2002 Worst 20 Percent Days for Class I areas in the CENRAP region (top) and Near the CENRAP region (bottom).

4.5 2018 Visibility Projections for Base G C1 Control Scenario

The 2018 visibility projections based on the CMAQ simulations for the 2018 Base G C1 Control Strategy simulations are presented in this section. The C1 Control Strategy results in reductions mainly in SO2 and NOx emissions from point sources in the CENRAP states. Consequently, PM improvements are limited to mainly SO4 and NO3 concentration reductions in the CENRAP states. Figure 4-7 displays the differences in CMAQ-estimated annual average SO4 and NO3 concentrations between the 2018 Base G base case and the 2018 Base G C1 Control Strategy case; the differences in all other PM species (with the exception of NH4) were negligible (see: http://pah.cert.ucr.edu/aqm/cenrap/cmaq.shtml#base18gc1vsbase18g). Annual average SO4 concentration reductions of over a quarter of a $\mu g/m^3$ are estimated to occur in northeast Texas, east Oklahoma, Missouri, northeast Arkansas and up into Iowa and Illinois. There are much lower reductions in NO3 that cover a similar area.

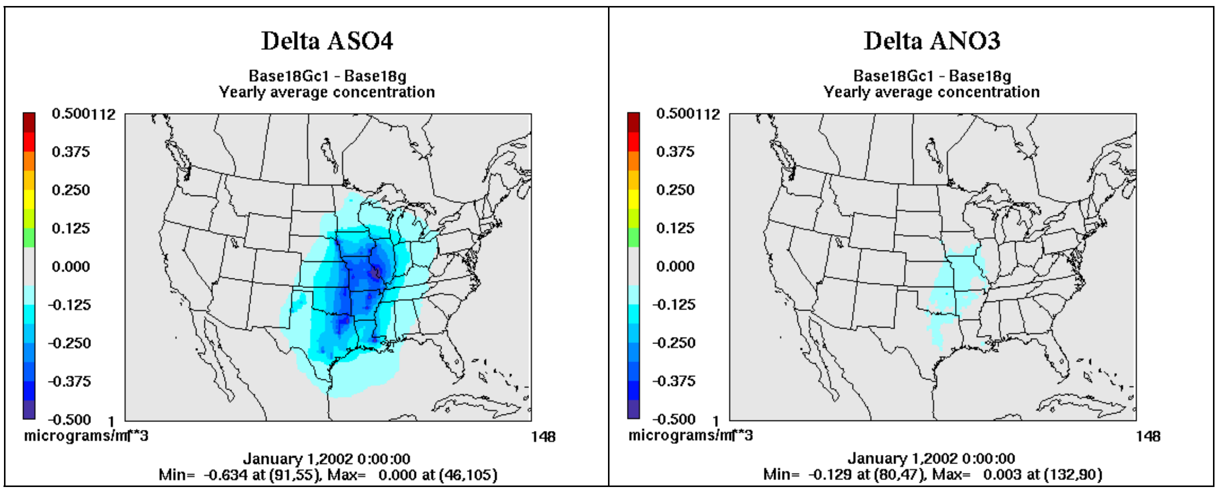


Figure 4-7. CMAQ-Estimated Reductions in Annual Average SO4 (left) and NO3 (right) Fine Particle Concentrations Between the 2018 Base G Base Case and 2018 Base G C1 Control Strategy Case.

Figure 4-8 displays the DotPlot comparisons of the 2018 visibility projections for 2018 Base G and 2018 Base G C1 Control Strategy emission scenarios. The additional controls in the C1 Control Strategy are projected to result in visibility improvements for the worst 20 percent days at Class I areas throughout and near the CENRAP region. Sites are closer to being on the glide path by 10 to 30 percent. For Breton Island this makes a difference of not meeting the 2018 URP point in 2018 Base G (94%) to surpassing the URP point in the C1 Control Strategy (106%).

Table 4-4 presents a tabular summary of the information presented in Figure 4-8, including the Baseline, 2018 URP point, and 2018 projected visibility for the Base G and C1 Control Strategy simulations.

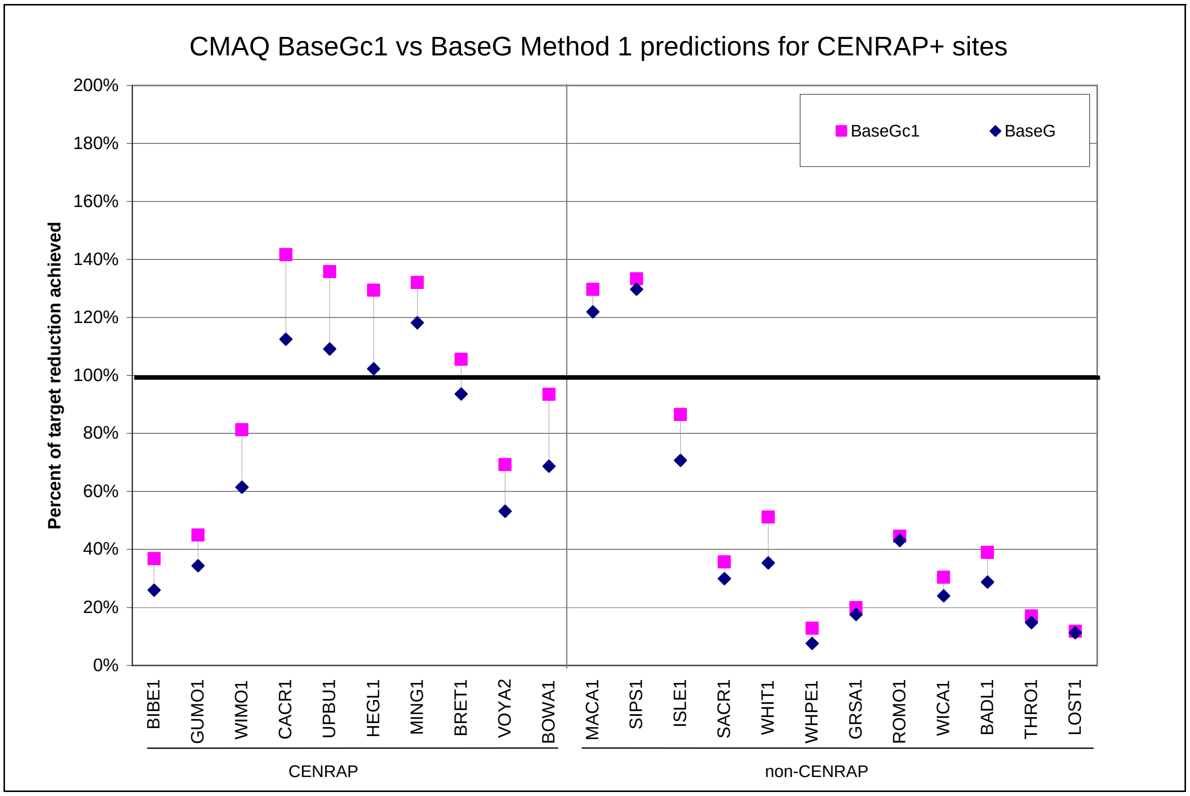


Figure 4-8. 2018 Visibility Projections as a Percentage of Meeting the 2018 URP Point (i.e., DotPlot) for the 2018 Base G and 2018 Base G C1 Control Strategy Emission Scenarios.

Table 4-4. 2000-2004 Baseline, 2018 URP Point, and Projected 2018 Visibility and Percent of Meeting the 2018 URP Point for the 2018 Base G and 2018 C1 Control Strategy CMAQ Simulations.

Class I Area Name	State	ID	Lat.	Lon.	00/04 Baseline Condit.	2018 URP Point	2018 Base G Base Case		2018 Base G C1 Control Strategy	
			(deg)	(deg)	(dv)	(dv)	(dv)	(%)	(dv)	(%)
Badlands NP	SD	BADL1	43.81	-102.36	17.14	15.02	16.53	29%	16.31	39%
Big Bend NP	TX	BIBE1	29.33	-103.31	17.30	14.93	16.69	26%	16.43	37%
Boundary Waters Canoe Area	MN	BOWA1	48.06	-91.43	19.58	17.72	18.30	69%	17.84	93%
Breton	LA	BRET1	29.87	-88.82	25.73	22.51	22.72	94%	22.34	106%
Caney Creek Wilderness	AR	CACR1	34.41	-94.08	26.36	22.91	22.48	112%	21.48	142%
Great Sand Dunes NM	CO	GRSA1	37.77	-105.57	12.78	11.35	12.53	18%	12.49	20%
Guadalupe Mountains NP	TX	GUMO1	31.91	-104.85	17.19	14.74	16.35	34%	16.09	45%
Hercules-Glades Wilderness	MO	HEGL1	36.68	-92.9	26.75	23.14	23.06	102%	22.09	129%
Isle Royale NP	MI	ISLE1	48.01	-88.83	20.74	18.78	19.36	71%	19.05	87%
Lostwood	ND	LOST1	48.59	-102.46	19.57	16.87	19.27	11%	19.26	12%
Mammoth Cave NP	KY	MACA1	37.20	-86.15	31.37	26.64	25.60	122%	25.23	130%
Mingo	MO	MING1	37.00	-90.19	28.02	24.37	23.71	118%	23.21	132%
Rocky Mountain NP	CO	ROMO1	40.35	-105.7	13.83	12.29	13.17	43%	13.14	45%
Salt Creek	NM	SACR1	33.6	-104.41	18.03	15.41	17.25	30%	17.10	36%
Sipsey Wilderness	AL	SIPS1	34.32	-87.44	29.03	24.82	23.57	130%	23.42	133%
Theodore Roosevelt NP	ND	THRO1	46.96	-103.46	17.74	15.42	17.40	15%	17.34	17%
Upper Buffalo Wilderness	AR	UPBU1	36.17	-92.41	26.27	22.84	22.52	109%	21.61	136%
Voyageurs NP	MN	VOYA2	48.47	-92.8	19.27	17.58	18.37	53%	18.10	69%
White Mountain Wilderness	NM	WHIT1	33.48	-105.85	13.70	12.11	13.14	35%	12.89	51%
Wheeler Peak Wilderness	NM	WHPE1	36.57	-105.4	10.41	9.49	10.34	8%	10.30	13%
Wind Cave NP	SD	WICA1	43.58	-103.47	15.84	13.94	15.39	24%	15.26	30%
Wichita Mountains	OK	WIMO1	34.75	-98.65	23.81	20.01	21.47	61%	20.72	81%

5.0 ADDITIONAL SUPPORTING ANALYSIS

This Chapter presents additional supporting analysis to the modeled 2018 visibility projections provided in Chapter 4. This supporting analysis may be used by the states in their RHR SIPs, along with their factor analysis, to assist in setting their 2018 RPGs for the worst 20 percent days and best 20 percent days.

5.1 Comparison of CENRAP 2018 Visibility Projections with Other Groups

2018 visibility projections for CENRAP and nearby Class I area have also been performed by the other RPOs. Thus, it is useful to compare the CENRAP 2018 visibility projections with those from the other RPOs as a quality assurance (QA) check and to foster confidence in the CENRAP modeling results.

5.1.1 Comparison of CENRAP, VISTAS, MRPO and WRAP Visibility Projections

The CENRAP 2018 Base G visibility projections were compared to the following other RPO visibility projections:

- VISTAS 2018 visibility projections based on their CMAQ 12 km 2002 annual modeling results for the 2002 Base G and 2018 Base G2a emissions scenarios.
- MRPO 2018 visibility projections based on their CAMx 36 km 2002 annual modeling for the Run 4 Scenario 1a (R4S1a) emissions scenario.
- WRAP 2018 visibility results based on their Plan02b and Base18b CMAQ 36 km modeling of the 2002 calendar year.

Figure 5-1 displays a DotPlot comparison of the four RPO visibility projections expressed as a percentage of achieving the 2018 URP point at CENRAP and nearby Class I areas. For the four CENRAP Class I areas just west of the Mississippi River in Arkansas and Missouri (CACR, UPBU, HEGL and MING), 2018 visibility projections are available from the CENRAP, VISTAS and MRPO RPOs. At HEGL, the three RPOs 2018 visibility projections are in close agreement with each other (estimated to achieve 99%, 101% and 95% of the 2018 URP point). The CENRAP and VISTAS 2018 visibility projections are also very close at the other three Arkansas-Missouri CENRAP Class I areas: CACR (112% and 116%), UPBU (109% and 112%) and MING (118% and 114%). But the MRPO 2018 visibility projections are approximately 12 to 25 percentage points lower than the CENRAP and VISTAS projections at these three Class I areas, with values of 97% to 100%. The reasons why the MRPO 2018 visibility projections are less optimistic than CENRAP and VISTAS are unclear. However, the MRPO focused on visibility projections at their northern Class I areas and likely did not use the latest CENRAP emission estimates. In addition, the CENRAP 2018 visibility projections included BART controls on several sources in CENRAP states not included in the MRPO projections. Such BART controls are even more important in those states not covered by CAIR.

For the Breton Island (BRET) Class I area, 2018 visibility projections are available from CENRAP and VISTAS. CENRAP estimates that BRET will achieve 94% of the URP point and

VISTAS is slightly less optimistic with an 84% value. One potential contributor to this is that emissions from off-shore marine vessel emissions in the oil and gas production areas of the Gulf of Mexico are double counted in the VISTAS Base G modeling. As these emissions were assumed to remain unchanged between 2002 and 2018, the double counting of their emissions will result in stiffer RRFs than there should be and consequently less visibility benefits in 2018. This double counting also occurred in the CENRAP Base F modeling but was corrected in Base G. The double counting occurred because off-shore marine vessels were present in both the MMS off-shore oil/gas development inventory for the Gulf of Mexico and the VISTAS off-shore marine vessel inventory for the Pacific and Atlanta Oceans and the Gulf of Mexico. VISTAS intends to correct this double counting in their next round of modeling.

At the two northern Minnesota Class I areas (BOWA and VOYA), the MRPO 2018 visibility projections (93% and 92%) exhibit more visibility improvements than CENRAP's (69% and 53%). This is believed to be due to higher contributions to visibility impairment from Canada in the CENRAP modeling. Figure 5-2 displays the CENRAP 2002 Base F total SO2 emissions and their differences with the 2018 Base F SO2 emissions. The SO2 emissions in Alberta Canada appear to be much higher and more wide spread when compared to the other provinces in Canada and emissions in the U.S. states. Also, there is a very large SO2 source in northern Manitoba (> 10^5 tons/year). The Alberta SO2 emissions may be overstated in the CENRAP modeling, which would overstate the Canadian contribution to visibility impairment. The western boundary of the MRPO modeling domain was east of the Rocky Mountains so did not include Alberta. CENRAP confirmed that the Alberta emissions and the source in Manitoba were present in the emissions provided by Canada. Air parcels from Canada are generally associated with clean visibility conditions at the northern Minnesota Class I areas with the worst 20 percent days generally occurring under conditions with a southerly wind component. However, in 2002 some of the worst 20 percent days did occur with transport out of Canada. For example, Figure 5-3 displays back trajectories off of the VIEWS website for two of the worst 20 percent days at Voyageurs National Park (Julian Days 347 and 332). These back trajectories suggest that the potentially overstated emissions in Alberta would have an impact at VOYA during the worst 20 percent days in 2002.

At the VISTAS Mammoth Cave (MACA), Kentucky Class I area, VISTAS, CENRAP and the MRPO estimated that 2018 visibility for the worst 20 percent days will achieve, respectively, 122%, 123% and 102% of the 2018 URP point. The close agreement between the VISTAS (122%) and CENRAP (123%) 2018 visibility projections for MACA is encouraging. Why MRPO is 20 percentage points lower is unclear, but may be due to using earlier versions of the VISTAS and CENRAP emissions. The 2018 visibility projections at Sipsey (SIPS), Alabama estimated by VISTAS (127%) and CENRAP (130%) are also extremely close.

Both the CENRAP and WRAP 2018 visibility projections agree that the WRAP Class I areas fail to achieve the 2018 URP point by a wide margin, with values achieving only ~40% or less of the 2018 URP point. The CENRAP 2018 visibility projections agrees well with the WRAP values at Great Sands (GRSA), Colorado (18% vs. 15%), Badlands (BADL), South Dakota (24% vs. 31%), Theodore Roosevelt, North Dakota (15% vs. 11%) and Lostwood (LOST), Montana (11% vs. 14%). There is also reasonable agreement between CENRAP and WRAP 2018 visibility projections at Salt Creek (SACR), New Mexico (30% vs. 12%), Rocky Mountain (ROMO), Colorado (43% vs. 30%), and Wind Cave (WICA), South Dakota (24% vs. 6%). There are two WRAP Class I areas, White Mountains (WHIT) and Wheeler Peak (WEPE), where the WRAP

2018 visibility projections estimate that visibility will degrade for the worst 20 percent days (i.e., negative percent of achieving the 2018 URP point), whereas CENRAP estimates visibility improvements. The reasons for these differences are unclear.

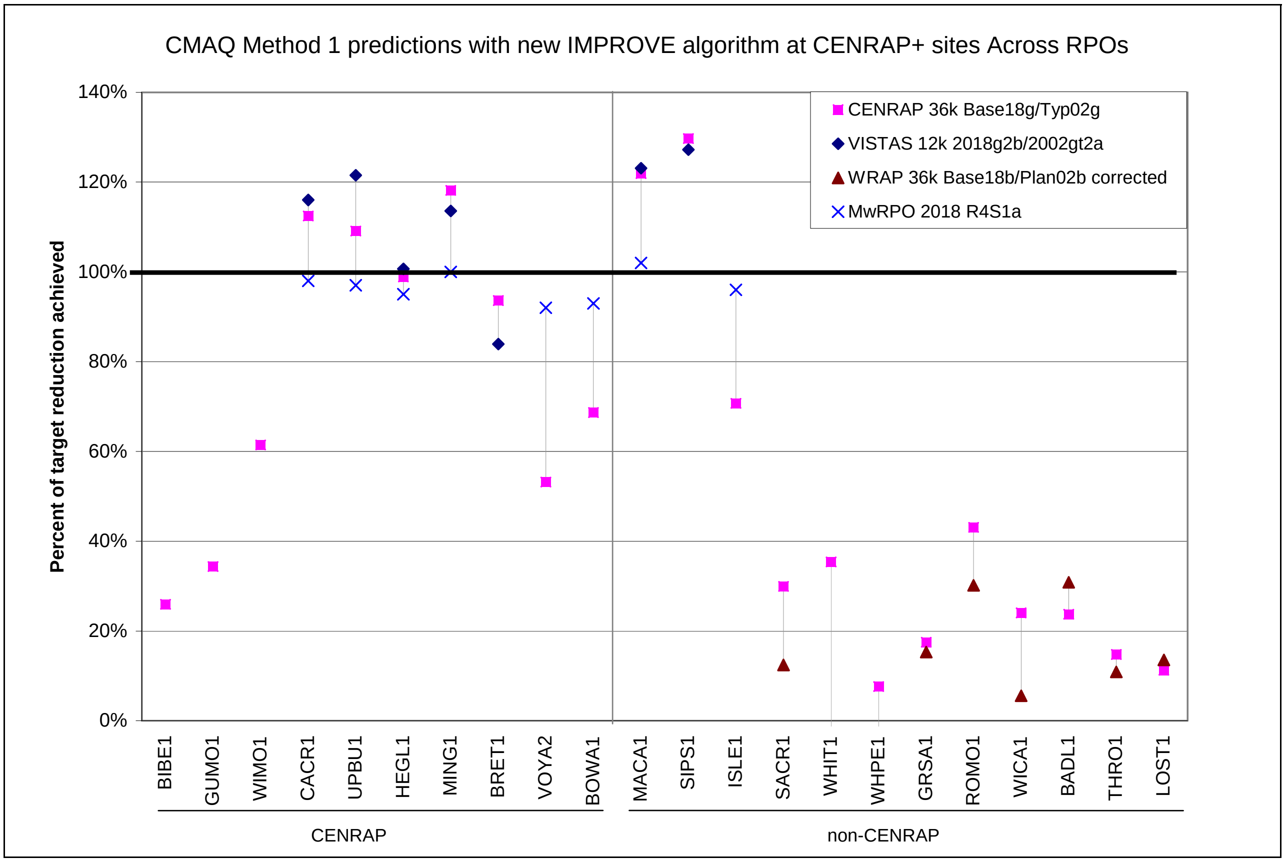


Figure 5-1. DotPlot comparing the CENRAP, VISTAS, MRPO and WRAP 2018 visibility projections expressed as a percentage of achieving the 2018 URP goal.

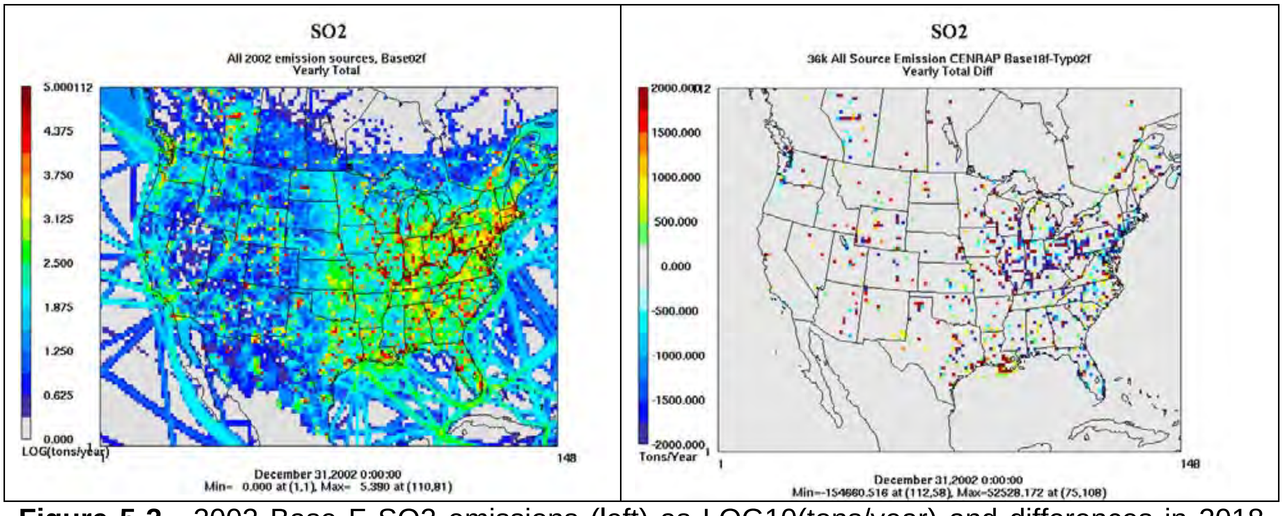


Figure 5-2. 2002 Base F SO2 emissions (left) as LOG10(tons/year) and differences in 2018 and 2002 Base F SO2 emissions (tons/year).

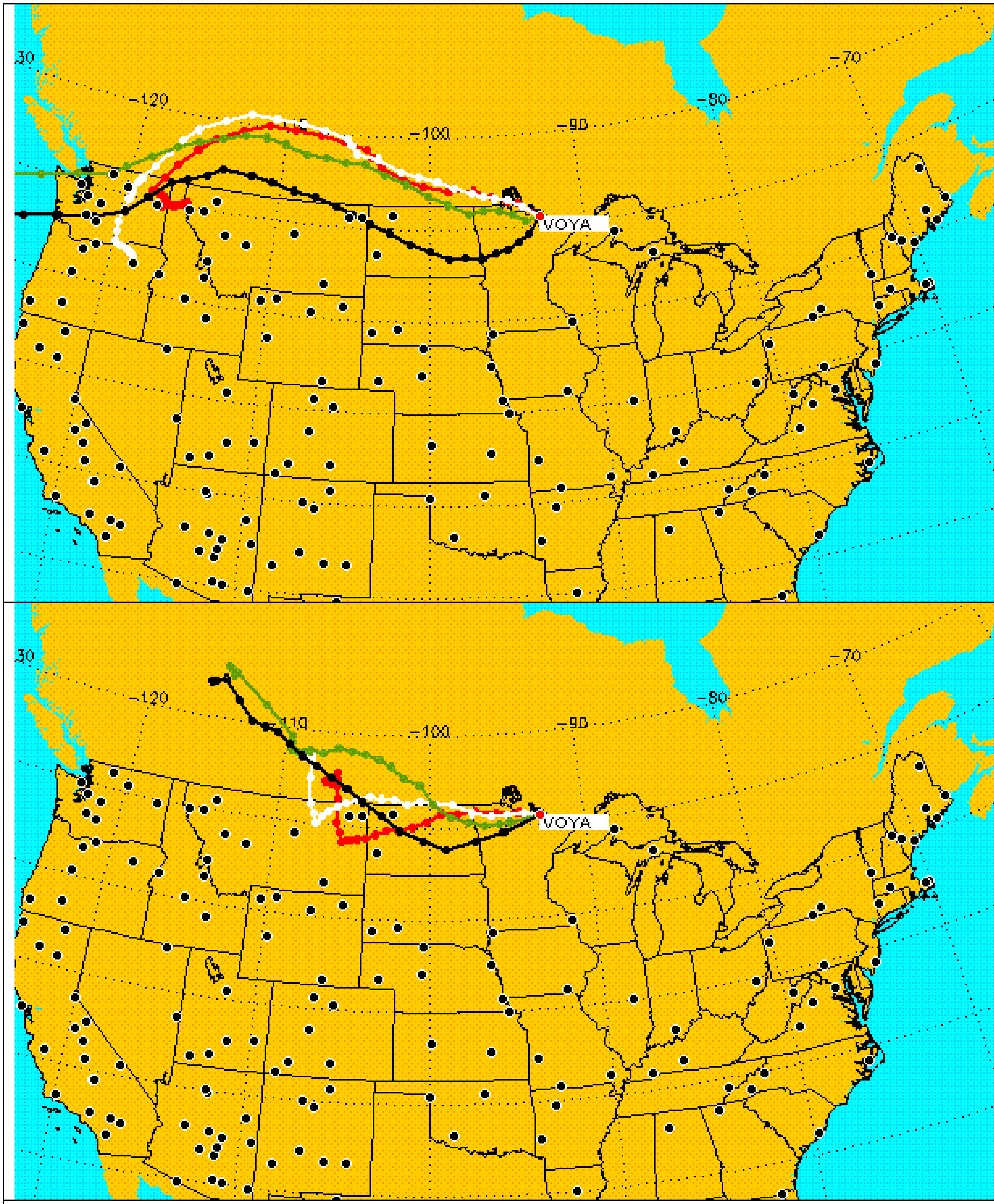


Figure 5-3. Exampled back trajectories to Voyageurs National Park for two of the worst 20 percent days from 2002: December 13, 2002 (Julian Day 347) and November 28, 2002 (Julian Day 332).

5.2 Extinction and PM Species Specific Visibility Projections and Comparisons to 2018 URP Point

It is useful to examine 2018 visibility projections by PM species to determine how each PM component of visibility is changing as both a diagnostic analysis of the visibility projections as well as whether species that are associated more with anthropogenic emissions (e.g., SO4 and NO3) are being reduced substantially compared to those that are less influenced by anthropogenic emissions (e.g., Soil and CM). However, because deciview is the natural logarithm of total extinction, such comparisons can not be made using the deciview scale and must be made using extinction. The linear glidepath from which the 2018 URP points are derived are based on deciview, thus to examine corresponding glidepath using extinction the curvature associated with the logarithmic transformation of the linear deciview glidepath to extinction must be accounted for in the extinction glidepath.

5.2.1 Total Extinction Glidepaths

Figure 5-4 displays a total extinction based glidepath for Caney Creek that is based on the EPA default deciview linear glidepath counterpart shown in Figure 4-3a. That is, the deciview linear glidepath defined by the line connecting the 26.36 dv Baseline Conditions at 2004 to the 11.58 dv Natural Conditions in 2064. The glidepath points in 2008, 2018, 2028, etc. from the linear deciview glidepath (Figure 4-3a) are turned into extinction (Bext) [Bext = 10 exp(dv/10)] to create the curved extinction glidepath that exactly match the linear deciview glidepath points. Note that the 2000-2004 Baseline using the curved extinction glidepath is slightly different than if you just converted the deciview baseline to extinction because the logarithm relationship is performed before the averaging, but they are extremely close. Using the extinction curved glidepath, the 2018 URP point is a reduction of the Baseline 145.10 Mm^{-1} to 98.88 Mm^{-1} (a 46.22 Mm^{-1} reduction). The modeled 2018 visibility projection in extinction is 97.54 Mm^{-1}, a 47.56 Mm^{-1} reduction, which achieves 103% of the reduction needed to achieve the 2018 URP point. Note that this compares with achieving 112% of the 2018 URP reduction point when using the deciview linear glidepath. The percent of achieving the 2018 URP point using the linear deciview and curved extinction glidepaths will rarely be the same due to the logarithmic relationship between the two visibility metrics and the fact that averaging within and across years in the deciview calculations occur after the logarithms have been applied. The greater the difference in extinction across the worst 20 percent days in a year and averaged across the years in the 2000-2004 Baseline and the greater number of years available from the 2000-2004 Baseline may result in greater differences in the 2018 URP points using the linear deciview and the curved extinction glidepaths.

Appendix F contains total extinction curved glidepaths for all the CENRAP Class I areas and Figure 5-5 contains a DotPlot that compares the percent of achieving the 2018 URP point at each CENRAP Class I area using the 2018 Base G modeling results and the linear deciview and curved extinction glidepaths. At most CENRAP Class I areas the ability of the 2018 modeling results to achieve the 2018 URP point is the same using either the deciview or extinction glidepaths. There are some differences at GUMO, BOWA and VOYA Class I areas which are due to these Class I areas having more complete data during the 2000-2004 Baseline period and therefore more years in the Baseline than other Class I areas as well as having variations in extinction across the worst 20 percent days and years (Appendix F). In any event, the closeness of the ability of the model to achieve the 2018 URP point using either the extinction or deciview

glidepath verifies the validity of the extinction based glidepaths and allows for the construction of PM species specific glidepaths in extinction to gain insight into how each component of extinction is being reduced to achieve a uniform rate of progress toward natural conditions in 2064.

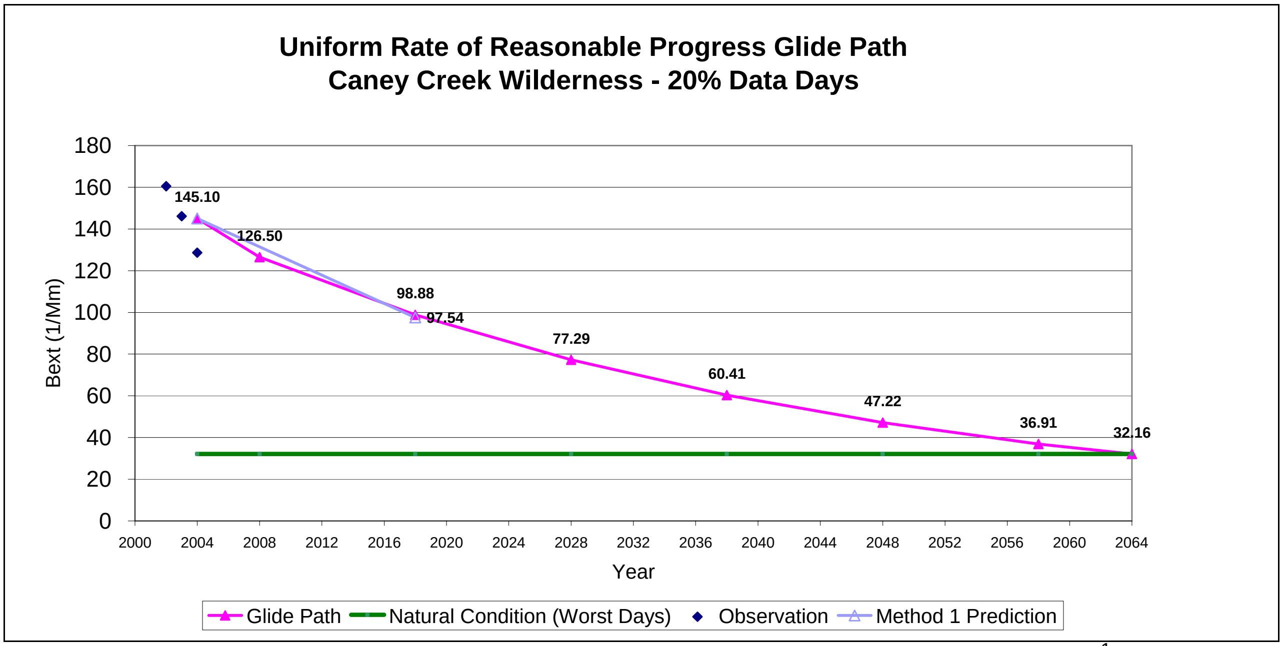


Figure 5-4. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

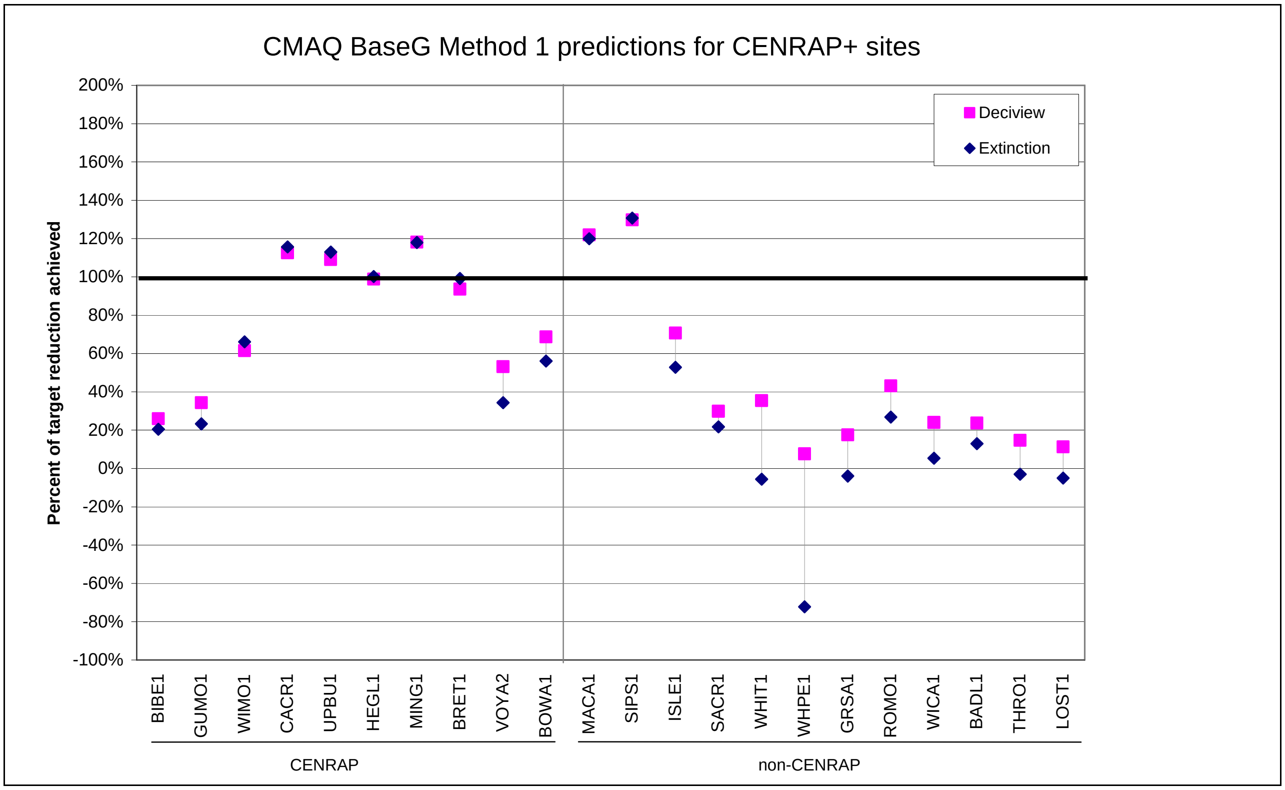


Figure 5-5. CMAQ 2018 Base G visibility projections and comparison of ability to achieve the 2018 URP point using the EPA default deciview and alternative total extinction Glidepaths.

5.2.2 PM Species specific Glidepaths

The VIEWS website (http://vista.cira.colostate.edu/views/) has posted PM species specific Natural Conditions based on the new IMPROVE equation. Using these PM species specific Natural Conditions and the curved extinction glidepaths we can evaluate how well visibility extinction achieves the 2018 URP point on a species-by-species basis. The PM species specific glidepaths are constructing starting with a Baseline at 2004 averaging the extinction for each PM species measured using the 2000-2004 IMPROVE observations and ending with the Natural Conditions in 2064 from the VIEWS website. Points in the glidepath for the years in between 2004 and 2064 are constructed based on the relative differences in the 2004 Baseline and 2064 Natural Conditions PM species extinction such that the total extinction due to all PM species at each interim year adds up to the same as the total extinction on the extinction-based glidepath (e.g., Figure 5-3). For example, for the CACR SO4 extinction glidepath the 2018 URP point is generated from the 2004 and 2064 SO4 extinction (BSO4) and the 2004, 2018 and 2064 total extinction (BTOT) as follows:

$$
\begin{aligned}
BSO4\_2018 &= BSO4\_2004 - [(BSO4\_2004 - BSO4\_2064)/ \\
&\quad (BTOT\_2004 - BTOT\_2064)] \times (BTOT\_2004 - BTOT\_2018) \\
&= 87.05 - [(87.05 - 3.20)/(145.10 - 32.16)] \times (145.10 - 98.88) \\
&= 52.73\ Mm^{-1}
\end{aligned}
$$

Note that the SO4 2018 URP point in Figure 5-5 and F-1b (52.77 Mm-1) does not exactly match the 52.73 Mm^{-1} calculated due to round off error in the above calculation that only used numbers with precision to the nearest hundredth.

As there are larger differences between the Baseline and Natural PM species extinction for some species, then the rate of improvement to achieve a species specific 2018 URP point will vary across PM species. For example, current Baseline extinction values for Soil and CM tend to be closer to Natural Conditions than extinction due to SO4 and NO3. Consequently the rate of progress to achieve the 2018 URP point for Soil and CM will be less than for SO4 and NO3.

Appendix F contains the PM species specific glidepaths compares them to the modeled 2018 projections for all CENRAP Class I areas. The species specific results for the CACR Class I area in Figure F-1 are reproduced in Figure 5-6. The modeled rate of SO4 and NO3 extinction reduction is greater than the PM species specific glidepaths and both achieve the species specific 2018 URP point by achieving 111% and 104% of the reduction needed to achieve the 2018 URP point. The modeled rate of extinction improvement at CACR for EC and OC is less than the species specific glidepath achieving only 65% and 75% of the reduction needed to achieve the species specific 2018 URP point. The PM species specific glidepath for Soil is flat because the Baseline and Natural Conditions (1.12 Mm^{-1}) are the same. This does not mean that anthropogenic emissions of Soil do not contribute on worst 20 percent days at CACR. It just points to a mismatch between the current set of worst 20 percent days and those in 2064 under Natural Conditions. The worst 20 percent days in 2064 under Natural Conditions will be dominated by wind blown dust days when Soil and CM may be higher than during the current set of worst 20 percent days that are dominated by SO4, NO3 and OMC. Thus, the Soil and CM glidepaths tend to be flatter and in some cases may even have an upward trend for some Class I areas (see Appendix F). Soil is projected to increase at CACR in 2018 so does not achieve its species specific URP point. Little reduction in CM is also seen by 2018. As discussed

previously, this is due in part to incompatibilities between the measured Soil and CM values at the IMPROVE monitor and the modeled Soil and CM species. In the model, a large component of the Soil and CM in the inventory is due to paved and unpaved road dust. These emissions are directly related to Vehicles Miles Traveled (VMT). VMT is projected to increase in future-years resulting in increases in road dust emissions. At the IMPROVE monitor, much of the measured Soil and CM is likely due to local dust events that are not simulated by the model using a 36 km grid resolution. Thus, the 2018 projections for Soil and CM are likely applying modeled changes due to road dust to local Soil and CM concentrations that in reality are likely natural and should remain unchanged in the future year. This is why alternative 2018 modeled projection approaches have been developed that assume that CM and CM and Soil are natural so remain unchanged in the future-year (see Section 5.5).

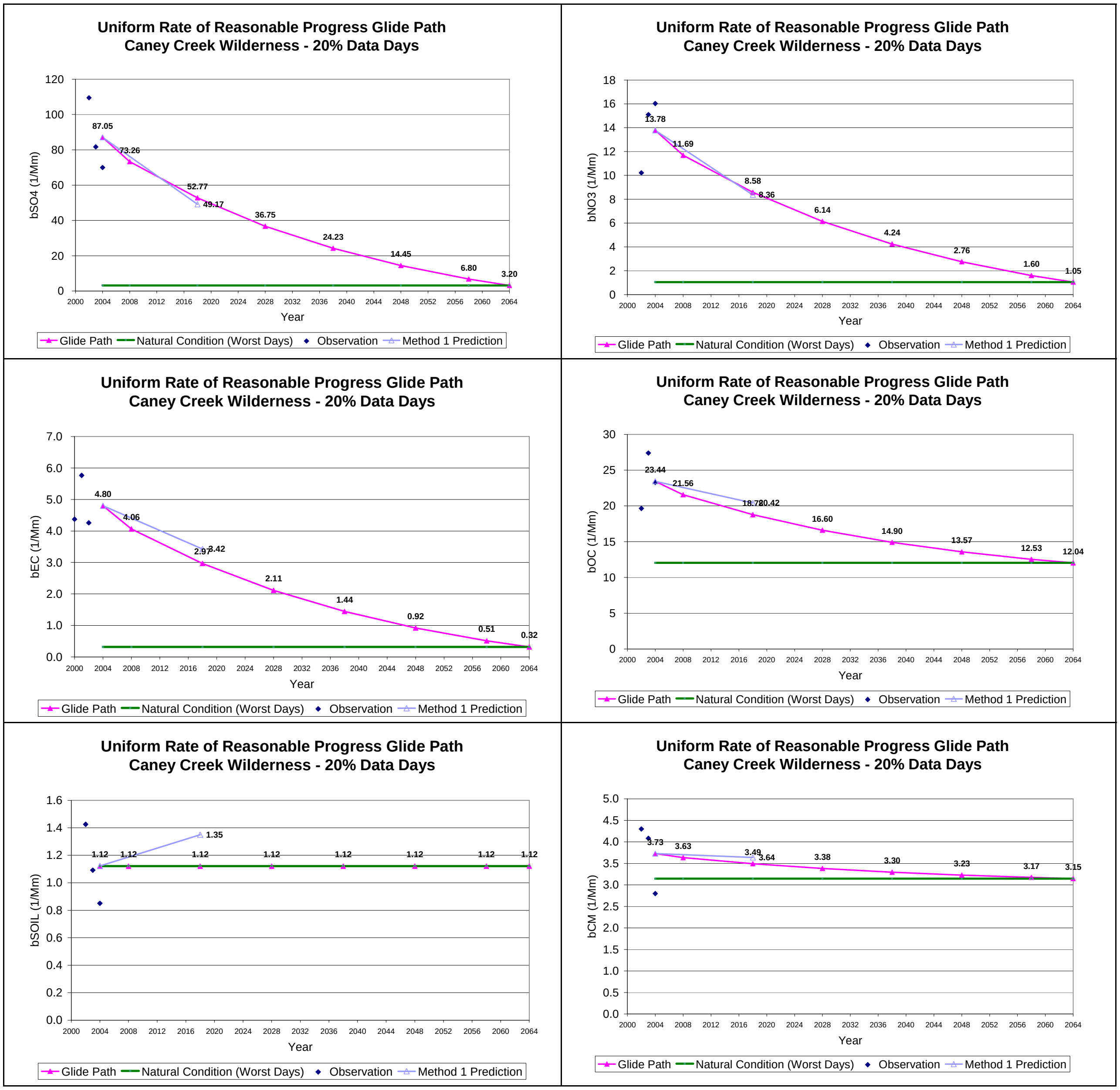


Figure 5-6. 2018 Visibility Projections and 2018 URP Glidepaths for SO4 (top left), NO3 (top right), EC (middle left), OMC (middle right), Soil (bottom left) and CM (bottom right) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20 Percent Days using 2002/2018 Base G CMAQ 36 km modeling results.

Figure 5-7 displays a DotPlot that compares the 2018 projected total and PM species specific extinction with the 2018 URP points. These results show that SO4 is most frequently achieving its 2018 URP point at those Class I areas that achieve the deciview URP point. Reductions in NO3 and EC also sometimes achieve their species specific URP point.

There are some anomalies in the species specific projections and glidepaths that bear mention and point to areas where better estimates of emissions growth and Natural Conditions are needed needed. The increase in 2018 Soil projections is not an isolated incident at CACR and occurs at other CENRAP Class I areas. There are three CENRAP Class I areas that "achieve" the Soil specific 2018 URP point (HEGL, BOWA and VOYA). An examination of these glidepaths and visibility projections (Figures F-4f, F-5f and F-6f) reveals that the current Baseline Conditions Soil at these three Class I areas is actually less than the 2064 Natural Conditions so that the glidepath is an accent rather than reduction (Figures F-4g, F-5g and F-6g). In these three cases to "achieve" the 2018 URP point the modeling results must increase the projected Soil extinction, which is why these three Class I areas "achieve" their 2018 URP point for Soil. Clearly, the 2018 URP point for Soil is not very meaningful under these conditions. The current Baseline Conditions for OMC at BRET and BOWA is also less than the Natural Conditions resulting in anomalous glidepaths (Figure F-3e and F-4e).

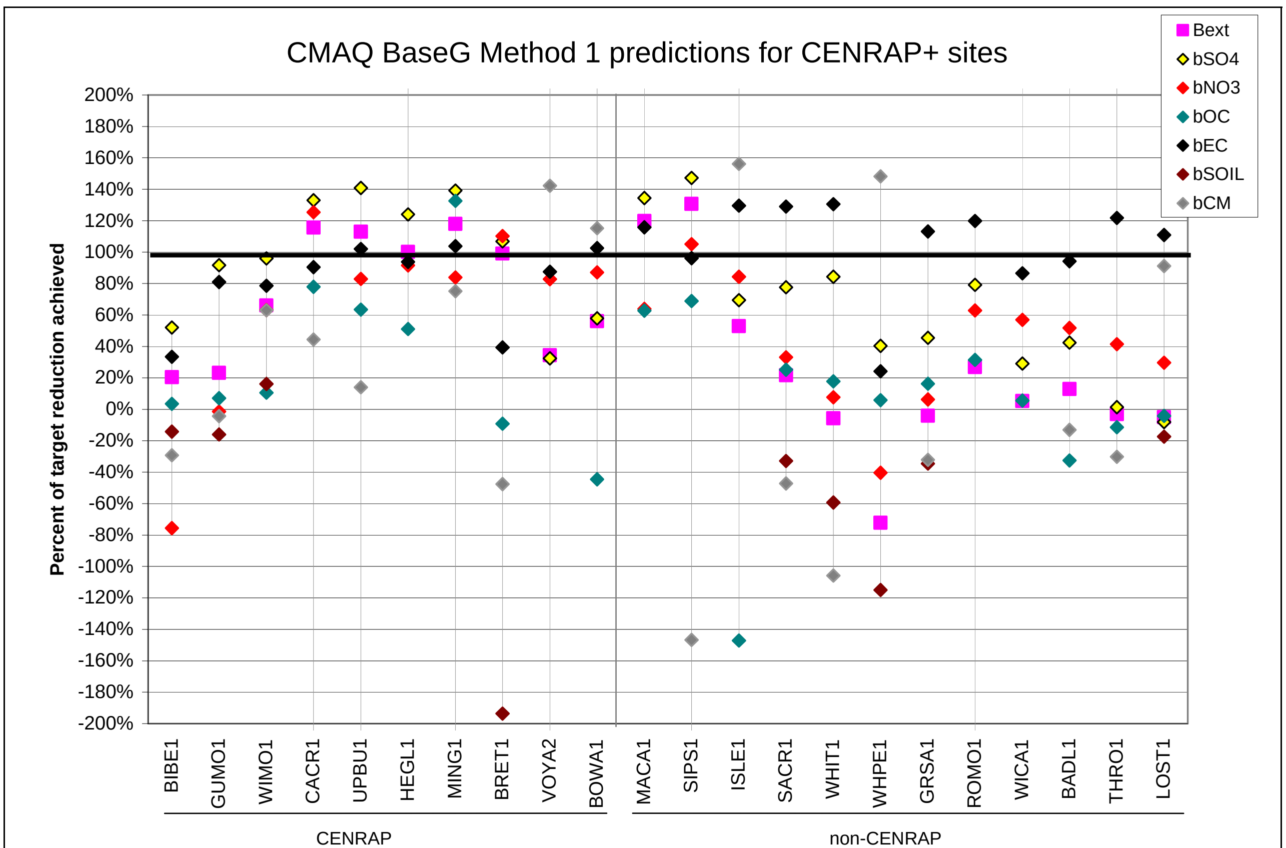


Figure 5-7. Ability of total and species specific 2018 visibility projections to achieve 2018 URP points.

5.3 Alternative 2018 Visibility Projection Software

The CENRAP 2018 visibility projections were made using software developed by the CENRAP modeling team. PM concentrations in the 36 km grid cells containing each of the Class I area IMPROVE monitoring sites were extracted using the UCR Analysis Tool. These modeling data were then ported into Excel spreadsheets that also include the filled RHR IMPROVE database available from the VIEWS website along with the EPA default Natural Conditions (EPA, 2003b). Excel macros are then used to perform the visibility projections using the EPA default procedures described in Chapter 4 and alternative procedures described in this Chapter.

EPA is developing a Modeled Attainment Test Software (MATS) program that codifies the 8-hour ozone, $PM_{2.5}$ and visibility projection procedures given in EPA's latest air quality modeling guidance (EPA, 2007a). The June 2007 release of the beta version of MATS is capable of performing 8-hour ozone and visibility projections; MATS is still under development for making $PM_{2.5}$ projections. The June 2007 beta versions of MATS was applied to the CENRAP 2002 and 2018 Base G 36 km CMAQ results and the resultant 2018 visibility projections were compared with the CENRAP values using the EPA default projection approach (see Chapter 4) at CENRAP and nearby Class I areas. The projected 2018 visibility estimates using the CENRAP and EPA MATS software are shown in Table 5-1. The biggest differences in the two 2018 visibility projections are for the Boundary Waters (BOWA). Breton Island (BRET), and Mingo (MING) Class I areas where MATS produces no 2018 visibility projections. This is because there is insufficient capture of valid IMPROVE PM measurements within the 2000-2004 five-year baseline to generate three years of annual visibility estimates that is the minimum needed to develop the Baseline Conditions following EPA's guidance (EPA, 2003a). For the CENRAP projections, data filling was used to fill out the IMPROVE measurements with sufficient data so that Baseline Conditions could be calculated at these three Class I areas. At 14 of the remaining 17 Class I areas, the CENRAP and MATS 2018 visibility projections agree exactly to within a hundredth of a deciview. At the three sites that are different (BIBE, GUMO and ISLE) the difference is 0.01 dv, which is 0.06 percent or less. These differences are likely due to round off errors in the calculations and are not significant. These results verify the consistency with the CENRAP spreadsheet based and EPA MATS software for projecting future-year visibility estimates.

Table 5-1. Comparison of CENRAP and EPA MATS 2018 visibility projections at CENRAP and nearby Class I areas.

	2018 Visibility Projections		2000-2004 Baseline Conditions	
Site	**MATS (dv)**	**CENRAP (dv)**	**MATS (dv)**	**CENRAP (dv)**
BADL	16.53	16.53	17.14	17.14
BIBE	16.70	16.69	17.30	17.30
BOWA	NA	18.30	NA	19.58
BRET	NA	22.72	NA	25.73
CACR	22.48	22.48	26.36	26.36
GRSA	12.53	12.53	12.78	12.78
GUMO	16.36	16.35	17.19	17.19
HEGL	23.06	23.06	26.75	26.75
ISLE	19.35	19.36	20.74	20.74
LOST	19.27	19.27	19.57	19.57
MACA	25.60	25.60	31.37	31.37
MING	NA	23.71	NA	28.02
ROMO	13.17	13.17	13.83	13.83
SACR	17.25	17.25	18.03	18.03
SIPS	23.57	23.57	29.03	29.03
THRO	17.40	17.40	17.74	17.74
UPBU	22.52	22.52	26.27	26.27
VOYA	18.37	18.37	19.27	19.27
WHIT	13.14	13.14	13.70	13.70
WHPE	10.34	10.34	10.41	10.41
WICA	15.39	15.39	15.84	15.84
WIMO	21.47	21.47	23.81	23.81

NA = Not Available

5.4 PM Source Apportionment Modeling

The PM Source Apportionment Technology (PSAT) was used to obtain PM source apportionment by geographic regions and major source category for the CENRAP 2002 and 2018 Base E base case conditions. PSAT uses reactive tracers that operated in parallel to the CAMx host model using the same emissions, transport, chemical transformation and deposition rates as the host model to account for the contributions of user specified source regions and categories to PM concentrations throughout the modeling domain. Details on the formulation of the CAMx PSAT source apportionment can be found in the CAMx user's guidance (ENVIRON, 2006; www.camx.com).

5.4.1 Definition of CENRAP 2002 and 2018 PM Source Apportionment Modeling

PSAT calculated PM source apportionment for user defined source groups. Source groups are usually defined by specifying a source region map of geographic regions where source contributions are desired and providing source categories as input so that source group would

consist of a geographic region plus source category (e.g., on-road mobile source emissions from Oklahoma). Although other source group configurations and even individual sources may be specified. For the CENRAP PSAT application, a source region map was used that divided up the modeling domain into 30 geographic source regions as shown in Figure 5-8. The 2002 and 2018 emissions inventories were divided into six source categories. The 30 geographic source regions consisted of CENRAP and nearby states, with Texas divided into 3 regions, remainder of the western and eastern States, Gulf of Mexico, Canada and Mexico. The original intent of the CENRAP PSAT analysis was to obtain separate contributions due to on-road mobile, non-road mobile, area, natural, EGU point and non-EGU point sources. However, the CAMx emissions for the PSAT runs were based on the CMAQ pre-merged 3-D emission files. Since all point sources were contained in a single CMAQ pre-merged emissions file, then the separate source apportionment modeling of EGU and non-EGU point sources was not possible. The six source categories that were separately tracked in the PSAT PM source apportionment modeling were:

- Elevated point sources;
- Low-level point sources (i.e., point source emissions emitted into layer 1 of the model);
- On-Road Mobile Sources;
- Non-Road Mobile Sources;
- Area Sources; and
- Natural Sources.

Natural Sources included biogenic VOC and NOx emissions from the BEIS3 biogenic emissions model, emissions from wildfires and emissions from wind blown dust due to non-agriculture land use types.

PM source apportionment in PSAT is available for five families of PM tracers: (1) Sulfate; (2) Nitrate and Ammonium; (3) Secondary Organic Aerosols (SOA); (4) Primary PM; and (5) mercury. The CENRAP PSAT 2002 and 2018 applications used three of the PSAT families of tracers and did not use the SOA and mercury families. For SOA, the standard CAMx model output was used that partitions SOA into an anthropogenic (SOAA) and biogenic (SOAB) components.

The PSAT results were extracted at the CENRAP and nearby Class I areas and the contributions for the average of the worst 20 percent and best 20 percent days were processed. A PSAT Visualization Tool was developed that can be used by States, Tribes and others to generate displays of the contributions of source regions and categories to visibility impairment for the average of the worst 20 percent and best 20 percent days at each CENRAP and nearby Class I areas.

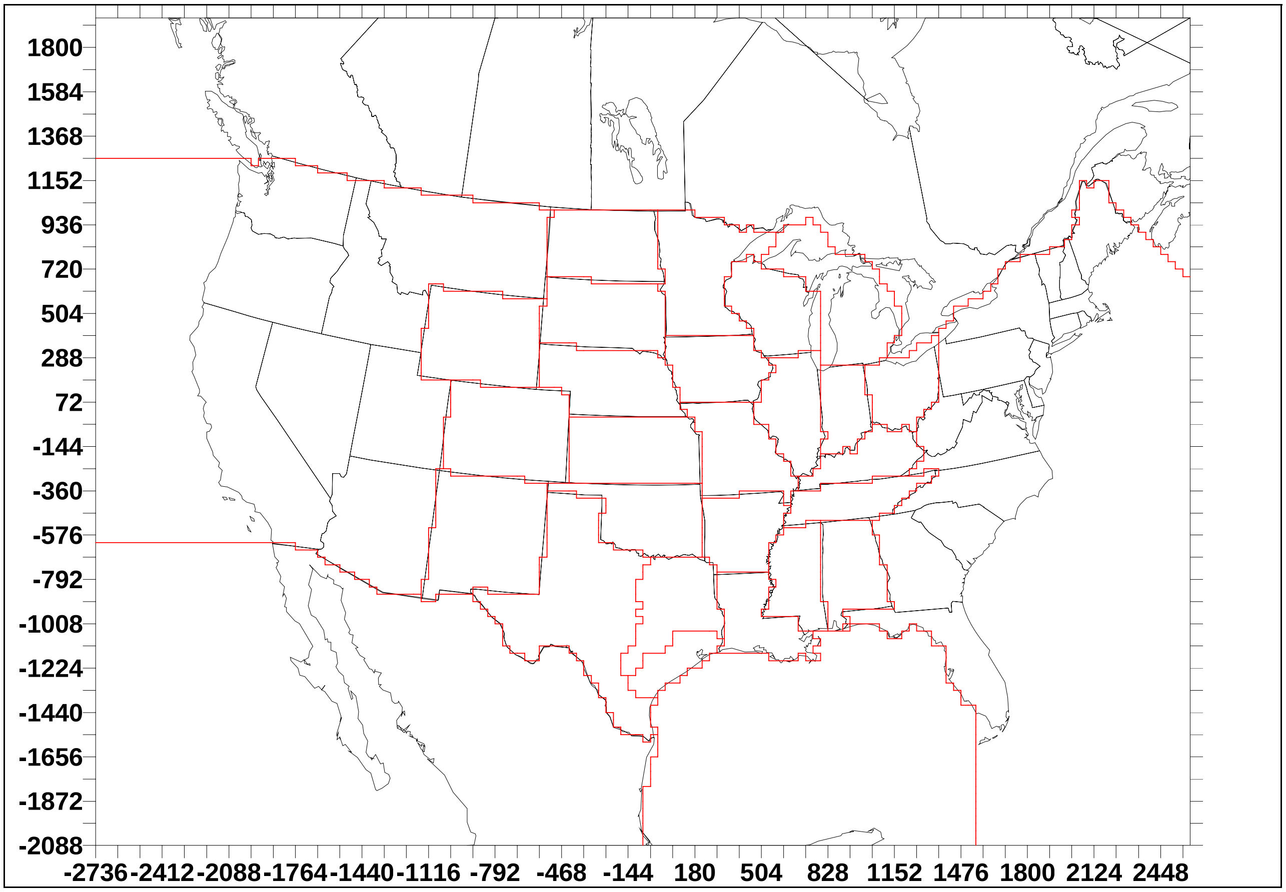


Figure 5-8. 30 source regions used in the CENRAP 2002 and 2018 CAMx PSAT PM source apportionment modeling.

5.4.2 CENRAP PSAT Visualization Tool

The PSAT Visualization Tool allows CENRAP States, Tribes and others to visualize the CENRAP 2002 and 2018 PSAT modeling results and identify which source regions, categories and PM species are contributing to visibility impairment at Class I areas for the average of the worst 20 percent and best 20 percent visibility days. The Visualization Tool is currently available on the CENRAP website (http://www.cenrap.org) under Projects. The Tool can generate bar charts of source contributions at Class I areas. It can be run in a receptor oriented mode where it identifies the contributions of PM species and source regions and categories to visibility impairment on the worst and best 20 percent days. It can also be run in a source oriented mode to examine an individual source region's (State's) contribution to visibility impairment at downwind Class I areas on the worst and best 20% days. The original IMPROVE equation is used to convert the PM species concentrations to extinction.

There are 14 air quality analysis metrics in the Tool:

> W20% Modeled Bext: The source region, source category and PM species contributions to the extinction (Bext) at a Class I area estimated by the model averaged across the worst 20 percent days in 2002.

W20% Projected Bext: The source region, source category and PM species contributions to the extinction (Bext) at a Class I area projected by the model averaged across the worst 20 percent days in the 2000-2004 Baseline.

W20% Modeled USAnthro: The source region, source category and PM species contributions to the extinction (Bext) at a Class I area for just U.S. anthropogenic emission source categories estimated by the model averaged across the worst 20 percent days in 2002.

W20% Projected USAnthro: The source region, source category and PM species contributions to the extinction (Bext) at a Class I area for just U.S. anthropogenic emission source categories projected by the model averaged across the worst 20 percent days in the 2000-2004 Baseline.

Emissions: Emissions by source region, source category and PM precursor. Precursors include SOx, NOx, primary organic aerosol (POA), primary elemental carbon (PEC) other primary fine particulate (FCRS+FPRM) and coarse mass (CCRS+CPRM). Emissions for four days have been extracted and implemented in the Tool.

Control Effectiveness: Control effectiveness is defined as the PM contribution divided by the emissions of the primary precursor. For example the SO4 contribution divided by the SO2 emissions.

Visualization Tool results are available for visibility contributions on both an absolute (Mm^{-1}) and percentage basis. When looking at contributions at a given Class I area, contributions can be examined in terms of PM species, source regions and/or source categories. Results are available for both the current year (2002 modeled or 2000-2004 projected) and future year (2018). The “2002 W20% Project Bext” metric applies the 2002 PSAT modeled source apportionment to the observed 2000-2004 Baseline extinction keeping the relative contributions of source groups to each PM species (e.g., SO4, NO3, etc.) the same averaged across the 2002 worst 20 percent days but scaling their magnitudes up or down based on the ratio of the 2000-2004 Baseline to the 2002 modeling results. Similarly, the “2018 W20% Projected” metric uses the relative contributions of the 2018 PSAT results from each source group and scales them according to the differences in the 2018 projected PM species to the 2018 modeled PM species for the average of the worst 20 percent days. The US Anthropogenic metrics just include source groups associated with U.S. man-made emissions (i.e., non-Natural source categories from states and Gulf of Mexico source regions) so excludes contributions from Canada and Mexico, Boundary Conditions, SOA from biogenic sources and the natural source category (biogenic NOx, wildfires and wind blown dust).

5.4.3 Source Contributions to Visibility Impairment at Class I Areas

Appendix E displays example contributions of PM species, source regions and source categories to visibility impairment for the worst and best 20 percent days at the CENRAP Class I areas. Some of the results from Figure E-1 for the CACR Class I area are reproduced in Figures 5-9, 5-10 and 5-11 below.

5.4.3.1 Caney Creek (CACR) Arkansas

2002 visibility impairment for the worst 20 percent days at CACR is primarily due to SO4 from elevated point sources that contributes over half (66.3 Mm^{-1}) of the total extinction of 118.8 Mm^{-1} (Figure E-1a and 5-8 left). By 2018, the total extinction at CACR for the worst 20 percent days is reduced by approximately one third (38.5 Mm^{-1}) which is primarily due to reductions in SO4 extinction from elevated point sources (from 66.3 to 37.3 Mm^{-1}) as well as reductions in visibility impairment from on-road and non-road mobile sources. Even with such large reductions in SO4 from point sources in 2018, extinction due to elevated point sources is still the highest contributor to visibility impairment on the worst 20 percent days contributing over half (41.8 Mm^{-1}) of the total extinction in 2018 of 80.3 Mm^{-1}, with area sources the next most important source category contributing 16.0 Mm^{-1} (~20%).

The geographic source apportionment for the worst 20 percent says at CACR is shown in Figures 5-10, E-1c and E-1d. Elevated point sources from the eastern source region is the largest contributor in 2002 contributing almost 18 Mm^{-1} that is reduced by over a factor of three in 2018 to approximately 5 Mm^{-1}. By 2018, Arkansas is the largest contributor to extinction at CACR for the 20 percent worst days followed by East Texas, the large Eastern U.S. region and then SOA due to biogenic sources. Figures E-1e ranks the source group contributions to extinction on the worst 20 percent days at CACR with Elevated Point Sources from East Texas being the highest contributor to total extinction, similar results are seen when examining extinction at CACR for the worst 20 percent days due to just SO4 and NO3 (Figure E-1f).

For the best 20 percent days at CACR (Figures 5-11, E-1g-j), SO4 is still a major contributor but no where near as dominate as seen for the worst 20 percent days, but elevated point is still the largest contributing source category Local contributions from within Arkansas contribute the most to the average of extinction across the best 20 percent days at CACR.

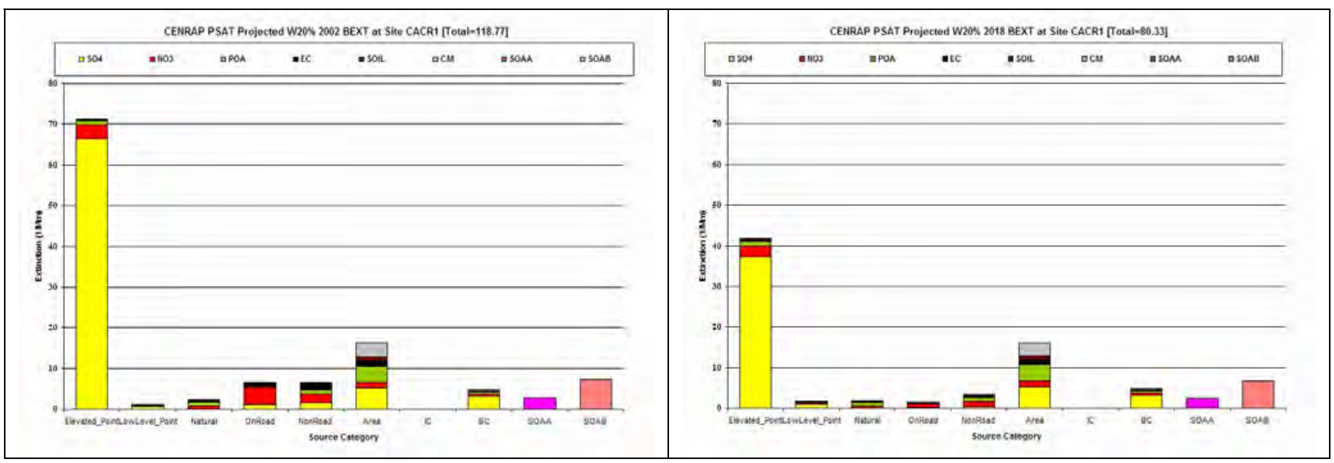


Figure 5-9. PSAT source category by PM species contributions to the average 2000-2004 Baseline and 2018 projected extinction (Mm^{-1}) for the worst 20 percent visibility days at Caney Creek (CACR), Arkansas.

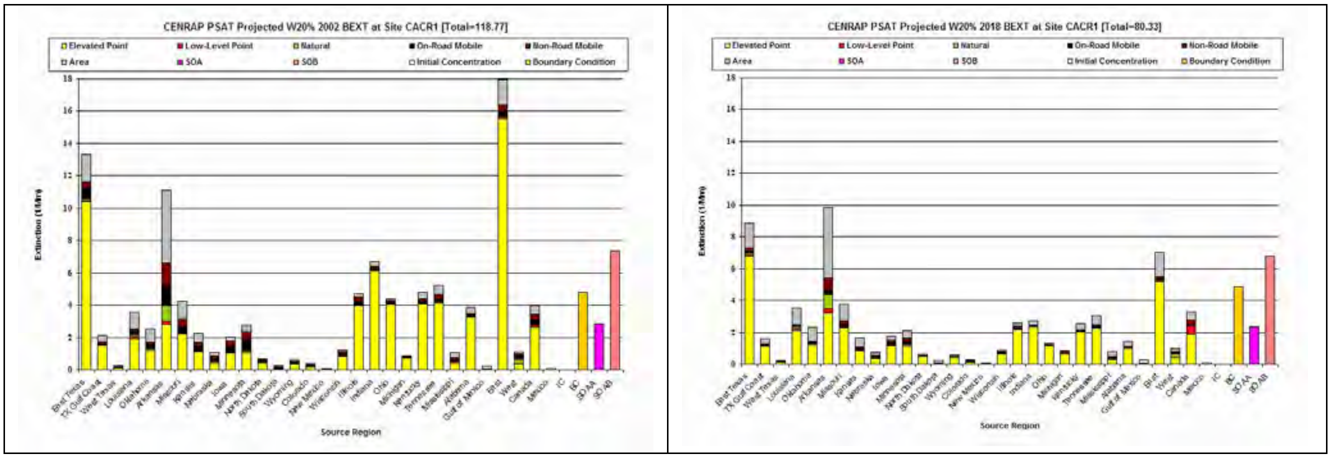


Figure 5-10. PSAT source region by source category contributions to the average 2000-2004 Baseline and 2018 projected extinction (Mm^{-1}) for the worst 20 percent visibility days at Caney Creek (CACR), Arkansas.

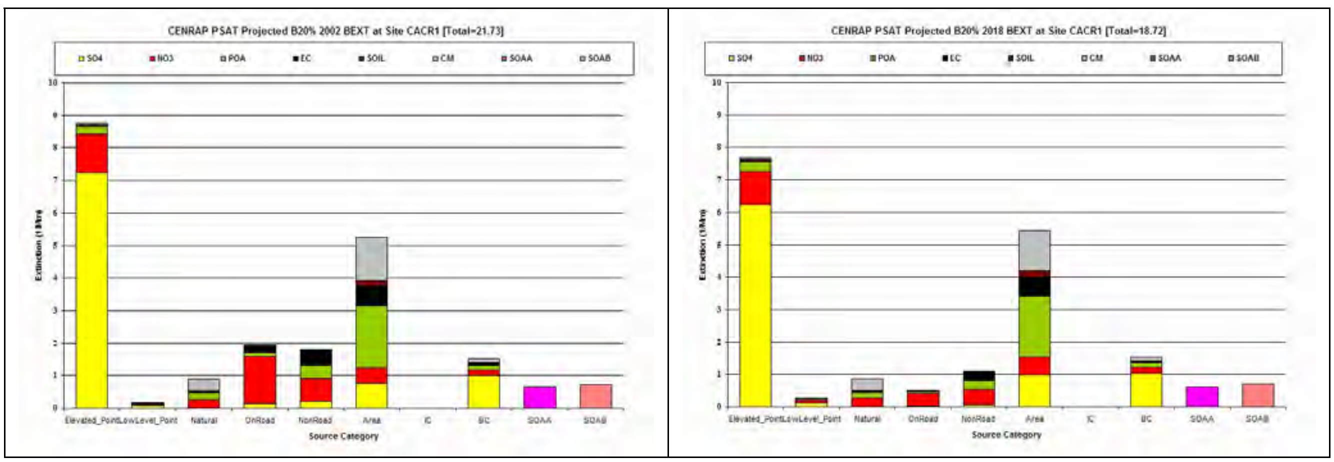


Figure 5-11. PSAT source category by PM species contributions to the average 2000-2004 Baseline and 2018 projected extinction (Mm^{-1}) for the best 20 percent visibility days at Caney Creek (CACR), Arkansas.

5.4.3.2 Upper Buffalo (UPBU) Arkansas

The contributions to extinction on the worst 20 percent days at UPBU (Figure E-2) is similar to CACR only with less contributions from East Texas and more from Missouri, Illinois and Indiana. By 2018, the top five highest contributing source groups to the average extinction on the worst 20 percent days are as follows: Arkansas Elevated Point; SOA from biogenics; Boundary Conditions, East Elevated Points, and Illinois Elevated Points (Figure E-2e). On the best 20 percent days at UPBU visibility impairment is primarily due to Arkansas and adjacent states Oklahoma, Missouri, and Kansas).

5.4.3.3 Breton Island (BRET) Missouri

Visibility impairment for the worst 20 percent days at Breton Island is primarily (69%) due to elevated point sources that contribute 77.7 Mm^{-1} out of a total of 122.2 Mm^{-1} (Figure E-3a). Although the contribution of elevated point sources is reduced substantially by 2018, they still contribute over half of the total extinction (101.1 Mm^{-1}) on the worst 20 percent days at BRET (Figure E-3b). The top five contributing source groups to 2018 visibility impairment at BRET for the worst 20 percent days are: Louisiana Elevated Point Sources; Boundary Conditions; East Elevated Point Sources; Gulf of Mexico Area Sources and Louisiana Area Sources. Gulf of Mexico Area sources includes off shore shipping and oil and gas development emissions; note that for the PSAT simulation the off-shore marine shipping emissions were double counted which was corrected in the Base G emission scenarios used in the 2018 visibility projections discussed in Chapter 4.

5.4.3.4 Boundary Waters (BOWA) Minnesota

As seen for the other Class I areas, elevated point sources contribute the largest amount (47%) to visibility impairment at BOWA for the worst 20 percent days in 2002 (Figure E-4a). However, unlike many of the other Class I areas, there is little reductions (~10%) in the elevated point source contributions going from 2002 (29.0 Mm^{-1}) to 2018 (26.2 Mm^{-1}) (Figures E-4a and E-4b). This is because there is a slight increase in the contributions of elevated point sources in Minnesota from 2002 to 2018 (Figures E-4c and E-4d) that is the highest contributing source group (Figure E-4e). Note that the 2018 emission scenario includes growth and CAIR controls but no BART controls. For the best 20 percent days, the largest contributing source group by far is Boundary Conditions (i.e., global transport) followed by Minnesota and Canada (Figures E-4g-j).

5.4.3.5 Voyageurs (VOYA) Minnesota

Results for VOYA are similar to BOWA with Minnesota, Canada and Boundary Conditions contributing the most to visibility impairment on the worst and best 20 percent days (Figure E-5).

5.4.3.6 Hercules Glade (HEGL) Missouri

Elevated point sources contribute over half to the total extinction for the worst 20 percent days at HEGL in 2002 (Figures E-6a and E-6b). Going from 2002 to 2018 the contributions due to elevated point sources, on-road mobile and non-road mobile are reduced substantially, but the contributions due to the other sources remain unchanged. The largest source group contributing to visibility impairment on the worst 20 percents days is area sources from Missouri in both 2002 and 2018 (Figures E-6c and E-6d). Since area emissions are not reduced much between 2002 and 2018 and Missouri elevated point sources are mostly unchanged because the IPM model assumed Missouri CAIR sources would buy credits, then the Missouri contributions is only reduced a little going from 2002 to 2018 (from ~18 Mm-1 to ~16 Mm-1). However, the contributions due to the Eastern U.S., Illinois and Indiana are reduced substantially. Missouri is by far the largest contribution to visibility impairment at UPBU on the best 20 percent days as

well with area sources from Missouri being the largest source category (Figures E-6h through E-6j).

5.4.3.7 Mingo (MING) Missouri

The substantial improvements in visibility impairment at MING for the worst 20 percent days from 2002 (141 Mm^{-1}) to 2018 (96 Mm^{-1}) is primarily due to reductions in SO4 from non-Missouri elevated point sources (Figures E-7a through E-7d). Even so, with the exception of the top contributing Missouri area sources the largest contributing source groups to 2018 visibility impairment for the worst 20 percent days are still elevated point sources from several CAIR states (Illinois, Indiana, Missouri, East; Figure E-7e). Missouri is the largest contributor to visibility on the best 20 percent days followed by Boundary Conditions and Illinois (Figure E-7i-j).

5.4.3.8 Wichita Mountains (WIMO) Oklahoma

Elevated point sources are the largest contributors to visibility impairment on the worst 20 percent days at WIMO in both 2002 and 2018 (Figures E-8a and E-8b). East Texas followed closely by Oklahoma are the largest contributing source regions in 2002, but by 2018 the reverse is true (Figures E-8c and E-8d). By 2018 the largest contributing source group to visibility impairment on the worst 20 percent days at WIMO is global transport (i.e., boundary conditions) followed by Oklahoma Area Sources and East Texas Elevated Point sources (Figure E-8e). Oklahoma Area Sources is the largest contributor to visibility impairment on the best 20 percent days at WIMO (Figures E-8g-j).

5.4.3.9 Big Bend (BIBE) Texas

Elevated point sources (~17 Mm^{-1}) followed by Boundary Conditions (~12 $Mm^{-}1$) are the largest contributions to total extinction (46 Mm^{-1}) on the worst 20 percent days at BIBE in 2002 (Figure E-9a). In 2018 there is very little (~2 Mm^{-1}) reduction in the contributions of elevated point sources and no reductions in global transport resulting in little reductions (~7%) in visibility impairment on the worst 20 percent days from 2002 (46 Mm^{-1}) to 2018 (43 Mm^{-1}). This is due to the extremely large contributions of emissions from Mexico in both 2002 (Figure E-9c) and 2018 (Figure E-9d). In fact, the four highest contributing source groups to visibility impairment at BIBE for the worst 20 percent days are assumed to be unchanged from 2002 to 2018: Boundary Conditions, Mexico Elevated Points, West Texas Natural and Mexico Natural (Figure E-9e). For the best 20 percent days at BIBE, West Texas, Mexico and Boundary Conditions are the highest three contributors to visibility impairment (Figures E-9g-j).

5.4.3.10 Guadalupe Mountains (GUMO) Texas

The large contribution of CM to visibility impairment at GUMO is clearly evident in the source apportionment modeling results (Figures E-10a-b). These sources are about evenly divided in the modeling between natural sources and area sources. Since these source categories are not reduced in the future year then there is little reduction in extinction from 2002 to 2018 (50 to 45

Mm^{-1}) and what reductions there are come from Elevated Point Sources. Sources in West Texas, Mexico, Boundary Conditions and New Mexico are the largest contributing source regions for both the worst 20 percent days (Figure E-10c-e) and best 20 percent days (Figures E-10g-j).

5.5 Alternative Visibility Projection Procedures

In this section we analyze several alternative visibility projection procedures from the EPA's default approach (EPA, 2007a) used in Chapter 4.

5.5.1 Treatment of Coarse Mass and Soil

As noted previously, much of the coarse mass (CM) and, to a lesser extent, Soil measured at the IMPROVE monitor is likely due to local wind blown dust that is natural in origin and not captured by the model. Consequently, even using the modeling results in a relative sense with the RRFs may not be appropriate for projecting CM and Soil. If CM and Soil are in fact local impacts due to wind blown dust from natural lands, then it would be appropriate to assume they are natural and remain unchanged from the 2000-2004 Baseline to 2018. This is probably certainly appropriate for CM because CM is primarily due to fugitive dust and it has a very short transport distance that is subgrid-scale to the model. In fact the model evaluation discussed in Chapter 3 and Appendix C clearly shows a large underprediction bias for CM that is likely due to local fugitive dust impacts at the IMPROVE monitor. For Soil this is less clear as fine particles can be transported over longer distances and is produced by anthropogenic sources, such as combustion and road dust, as well as natural sources. We initially performed two CM and Soil sensitivity tests, the first assumed CM was all natural so remains unchanged from the 2000-2004 Baseline to 2018 (i.e., set the RRF for CM equal to 1.0). The second sensitivity test assumed both CM and Soil were natural so set RRFs for both of them to 1.0. A comment from an FLM noted that we know some of the Soil is likely anthropogenic in origin. So it was suggested to subtract the 2002 base case modeled Soil from the observed values for the 2002 worst 20 percent days and assume that the remainder (if any) was natural so hold the rest of the Soil constant in 2018 and add to the 2018 modeled Soil values.

The results of the CM and Soil visibility projection sensitivity analysis are shown in the DotPlot in Figure 5-12. The CM and Soil visibility projection sensitivity analysis has little effect on the 2018 visibility projections at the CENRAP Class I areas. Even GUMO, which has a large CM and Soil component, shows very little sensitivity. This is probably because the CM at GUMO is likely dominated by wind blown dust that was assumed constant from 2002 to 2018 so the RRF calculated using the default EPA method is near 1.0 anyway. Some larger sensitivity is seen at several WRAP Class I areas. It is encouraging that CENRAP 2018 visibility projections are not sensitive to the CM and Soil components of the modeling which are highly uncertain.

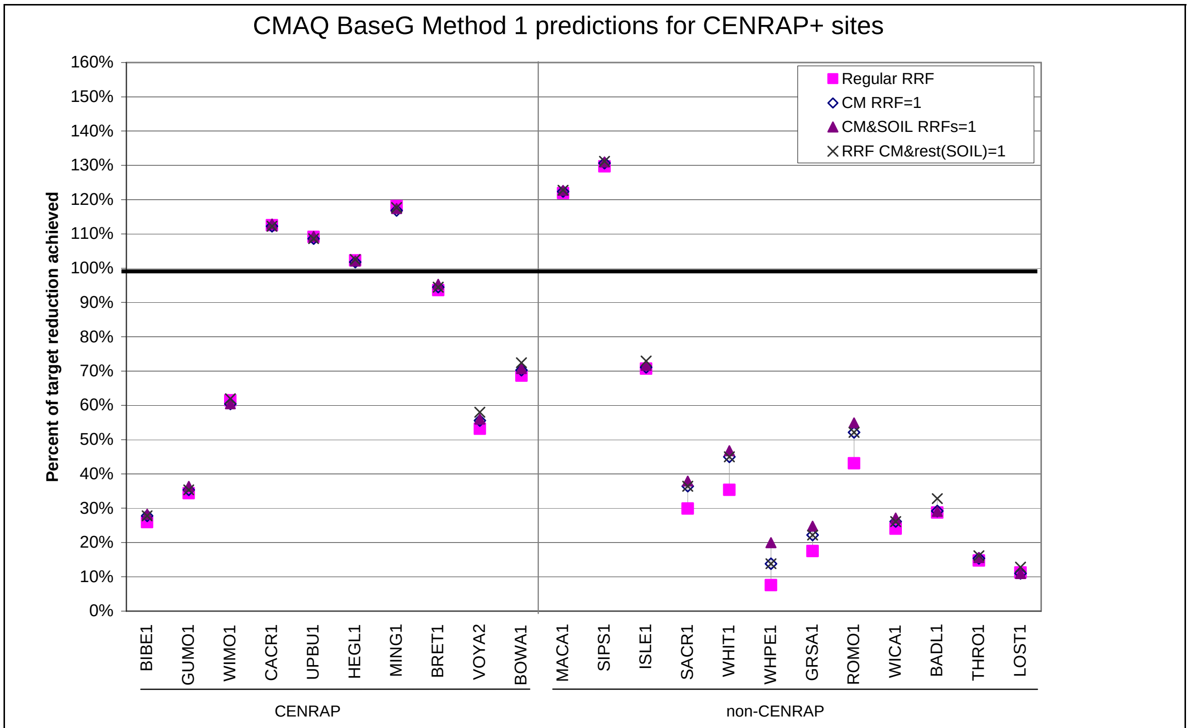


Figure 5-12. Sensitivity of 2018 visibility projections to various methods that assume all CM, all CM and Soil and all CM and part of the Soil is natural.

5.6 Alternative Model

The CAMx model was also run for a 2002 and 2018 base case scenarios with earlier versions of the CENRAP emissions (Base E modified to eliminate double counting of some area fire emissions) than the final CMAQ 2002 Base G modeling. The CAMx 2002 and 2018 output was processed the same way that the CMAQ results were to generate 2018 visibility projections at the CENRAP and nearby Class I areas that were compared with the 2018 URP point. Figure 5-13 summarizes the CAMx 2018 visibility projections using the new IMPROVE algorithm (NIA) in a DotPlot and compares them with the CMAQ 2018 Base G results (from Figure 5-12). The CMAQ and CAMx 2018 visibility projections are remarkably similar. The four Arkansas and Missouri Class I areas are projected to achieve the 2018 URP point by almost the exact same amount by the two models. The two Texas Class I areas are projected to come up short of achieving the 2018 URP point by the same amount by the two models. The largest differences are seen at BRET, and to a lesser extent BOWA and VOYA. At BRET the CAMx 2018 visibility projections are much less optimistic (< 80%) in achieving the 2018 URP point than CMAQ (> 90%). And CMAQ is slightly less optimistic than CAMx in achieving the 2018 URP point for the two northern Minnesota Class I areas. The reasons for these differences are unclear but could be partially due to the emissions updates in the final CMAQ Base G run that included eliminating the double counting of off-shore marine emissions in the Gulf of Mexico that was present in the CAMx simulation, which makes it more difficult to get visibility improvements at BRET since it is influenced by sources in the Gulf. Corrections to stack parameters for Canadian point sources were also made for the final Base G. The general close agreement of the CAMx 2018 visibility projections to the final CMAQ values is encouraging and good QA check.

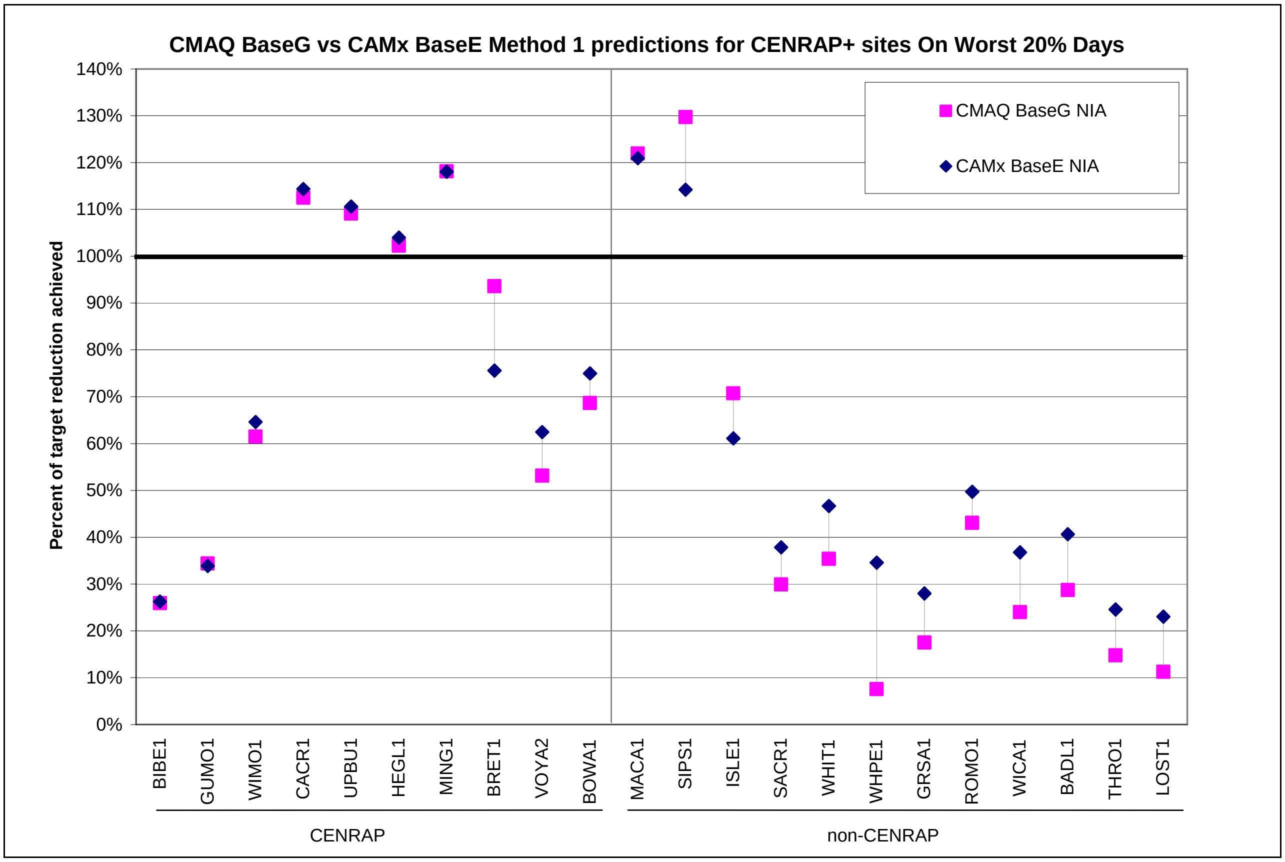


Figure 5-13. Comparison of CAMx 2018 visibility projections with 2018 URP points for CENRAP and nearby Class I areas.

5.7 Effects of International Transport on 2018 Visibility Projections

As seen in the PM source apportionment modeling discussed in Section 5.4, there is significant contributions of international sources to visibility impairment at many CENRAP Class I areas for the worst 20 percent days. With the exception of Canada, where we used a year 2000 inventory for the 2002 base case modeling and a 2020 inventory for the 2018 inventory, international sources were assumed to be constant between 2002 and 2018. Thus, Class I areas that are heavily impacted by contributions of international transport will have a difficult time achieving the 2018 URP point since international sources are assumed to remain constant. The CAMx PSAT runs discussed previously provide a framework for quantitatively assessing the contributions of international transport to the visibility projections and whether reasonable progress toward natural conditions is being achieved in the 2018 modeling.

There are several source regions (Figure 5-8) and source categories in the PSAT modeling that include international sources:

- Mexico Anthropogenic Sources (assumed all international);
- Canada Anthropogenic Sources (assumed all international);
- Gulf of Mexico (assumed all U.S. sources);
- Pacific and Atlanta Ocean (assumed all U.S. sources); and
- Boundary Conditions (assumed half international and half natural sources).

Although it can be argued that Mexico and Canada are not truly international due to the presence of numerous U.S. corporations in Mexico along with free trade among the two countries, states and federal government have no jurisdiction to regulate industry in these two countries so they are considered international in these calculations. The Gulf of Mexico includes off-shore oil and gas production facilities, support vessels and aircraft and off-shore marine shipping. Given that emissions from the oil and gas production can be regulated by the U.S., then the Gulf of Mexico is not considered an international source. Emissions from off-shore shipping in the Pacific and Atlantic Oceans are also currently not regulated by the U.S. government. However, there are current efforts to apply some regulations to these emissions so for these calculations they were not assumed to be international sources. Finally, the Boundary Conditions (BCs) for the CENRAP modeling were generated from a 2002 simulation of the GEOS-CHEM global chemistry model and held constant in 2018. These BCs would include contributions from international sources as well as natural sources, so need to be split. For the sensitivity calculations discussed below we assumed that the BCs were half due to natural and half due to international sources. This results in international sources being defined as follows:

International Contribution = Mexico Anthro + Canada Anthro + ½ BCs

Two methods were examined to see what the effects of international sources on 2018 visibility projections and a Class I areas ability to achieve the 2018 URP point:

<u>Elimination of International Contributions to 2018 Visibility Projections</u>: In this method the contribution of international emissions is taken out of the 2018 visibility projections and examined to see whether the new visibility projection achieves the URP point. If so, then international sources are hindering a Class I area in achieving the 2018 URP point, which suggests that the 2018 URP point is not a reasonable value for an RPG.

<u>Visibility Projections and Glidepaths Based on Controllable Visibility Impairment</u>: The second method would look at the visibility projections for just the U.S. controllable portion of the visibility impairment. The glidepath end point in 2064 would be to eliminate the U.S. man-made contributions to visibility impairment on the worst 20 percent days.

Note that this analysis is performed solely for providing states and others additional information on which Class I areas the modeling suggest are unduly influenced by International Transport.

5.7.1 Elimination of International Contributions to 2018 Visibility Projections

This method was also discussed in a recent technical brief prepared by the Electric Power Research Institute (EPRI), only in EPRI's analysis they used results from a global chemistry model and VISTAS CMAQ runs with no global anthropogenic emissions (EPRI, 2007). Thus, before discussing our results of this analysis using PSAT, we discuss EPRI's analysis.

5.7.1.1 EPRI's Analysis of Effects of International Contributions

EPRI funded Harvard University to perform annual simulations of the GEOS-Chem global chemistry model (http://www-as.harvard.edu/chemistry/trop/geos/) for annual simulations with and without non-U.S. anthropogenic emissions to determine the contributions of international transport to PM and visibility. The EPRI Harvard GEOS-Chem simulations were performed for 2001. Figure 5-14 and 5-15 compare the annual average ammonium sulfate, ammonium nitrate organic mass carbon (OMC, also called OCM) and elemental carbon (EC) due to the GEOS-Chem global modeling and the CAMx PSAT source apportionment modeling. The similarity of the results for ammonium sulfate is remarkable (Figure 5-14). Both methods estimate that the annual average ammonium sulfate contribution due to international sources ranges from 0.4 to 1.0 $\mu g/m^3$ across the Class I areas. There is less agreement between the two methods for ammonium nitrate due in part to a CAMx overestimation issue that is likely due in part to how ammonia emissions were classified as being anthropogenic or not in the no U.S. anthropogenic emissions simulations (Figure 5-15). Better agreement is seen between the two methods international contributions of OMC and EC, although CAMx estimates higher contributions than GEOS-Chem.

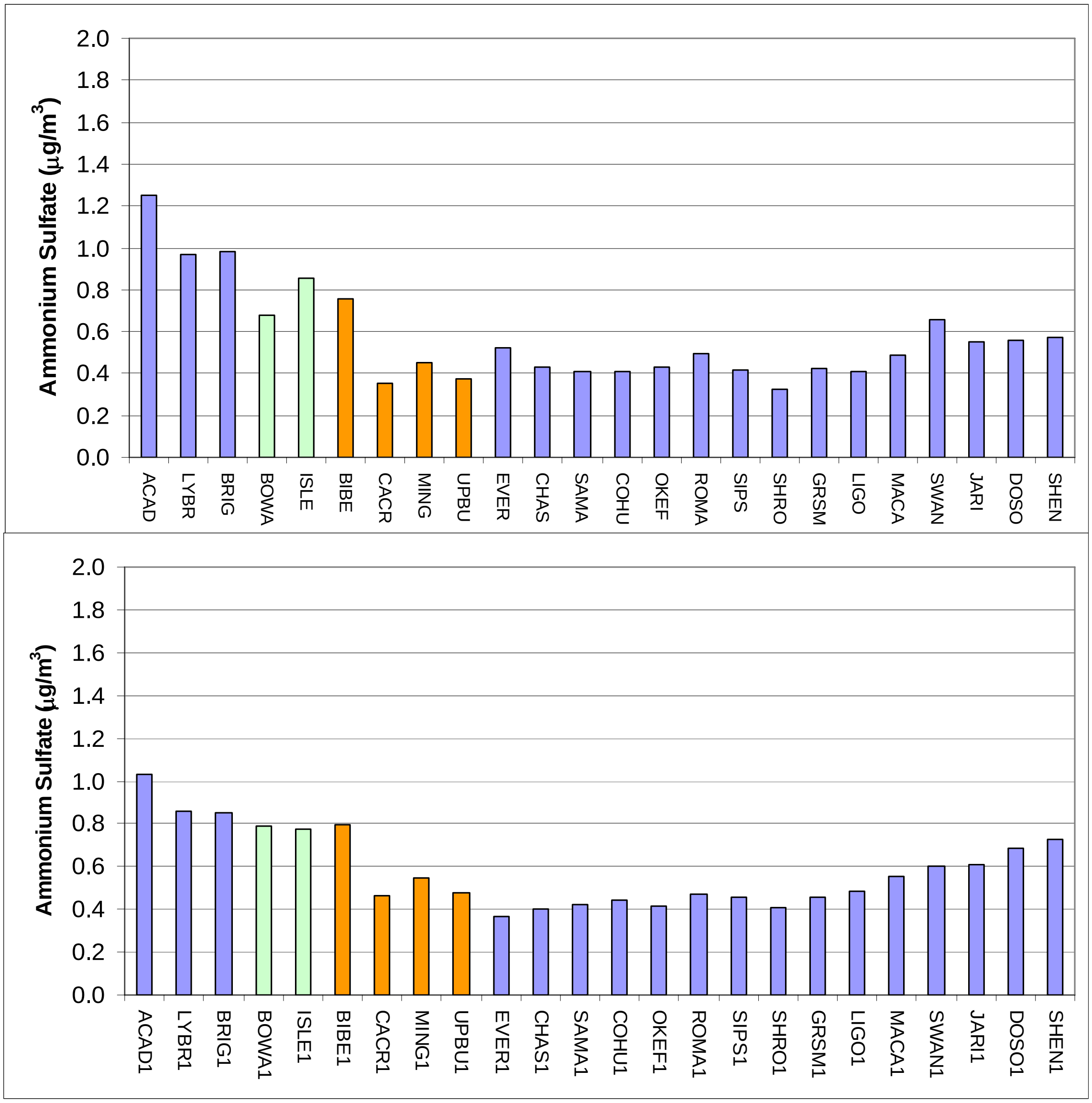
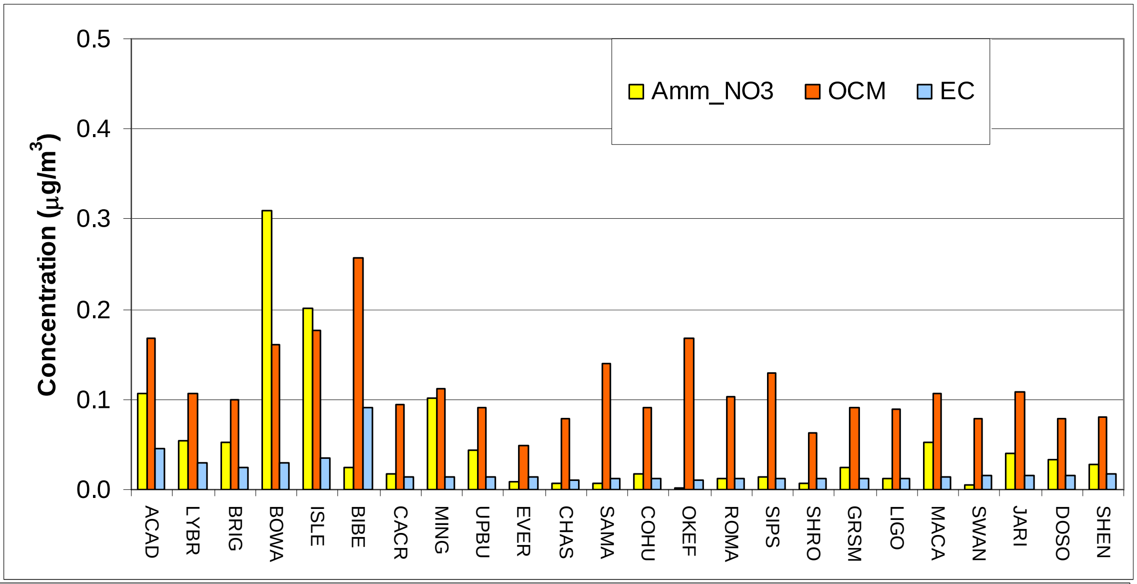


Figure 5-14. Comparison of EPRI Harvard GEOS-Chem global chemistry (top) and CENRAP PSAT (bottom) international source contributions to ammonium sulfate at Class I areas.



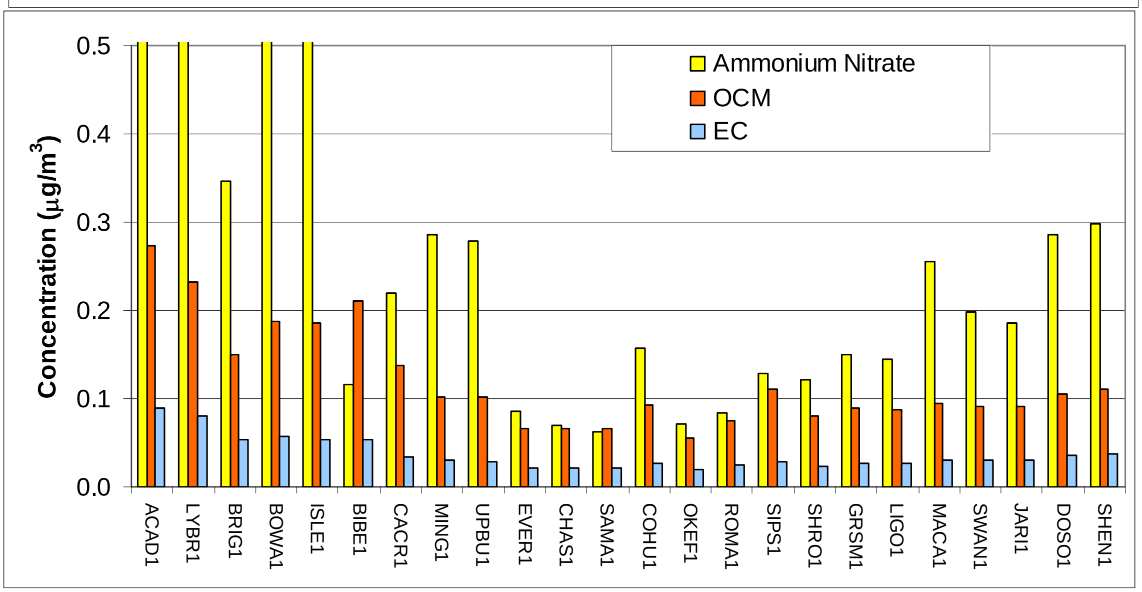


Figure 5-15. Comparison of EPRI Harvard GEOS-Chem global chemistry (top) and CENRAP PSAT (bottom) international source contributions to ammonium nitrate, organic carbon mass (OCM or OMC) and elemental carbon (EC) at Class I areas.

The EPRI technical brief used the VISTAS CMAQ runs to adjust the modeled 2018 visibility projections to eliminate the effect of international transport and compared them to the 2018 URP point. For the Boundary Waters, Voyageurs, Isle Royal and Seney Class I areas the standard 2018 visibility projections did not achieve the 2018 URP point. However, when the effect of transboundary pollutions was removed the 2018 URP point was essentially achieved or more than achieved at all four Class I areas.

5.7.1.2 CENRAP Results From Elimination International Transport

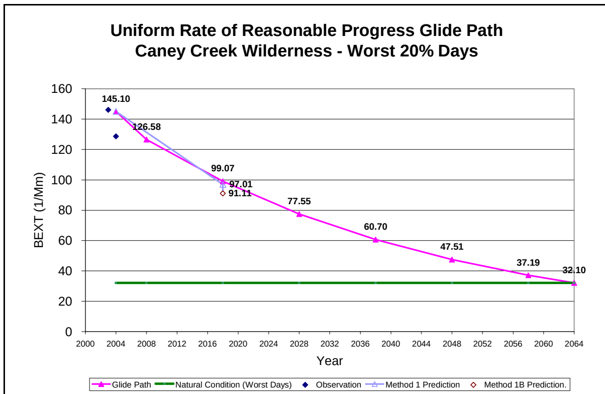
Because the elimination of the international sources from the 2018 visibility projections results in a portion of the total light extinction, then these comparisons with the 2018 URP points were done using extinction glidepaths and projections rather than deciview. In Section 5.2.1 we demonstrated that the level of achieving the 2018 URP point was almost identical at CENRAP Class I areas whether the linear deciview or curved extinction glidepaths were used. The PSAT source apportionment was used to determine the contribution to the projected extinction in 2018 due to international sources. As noted above, international sources were assumed to be due to anthropogenic emissions in Mexico and Canada and half of the Boundary Conditions.

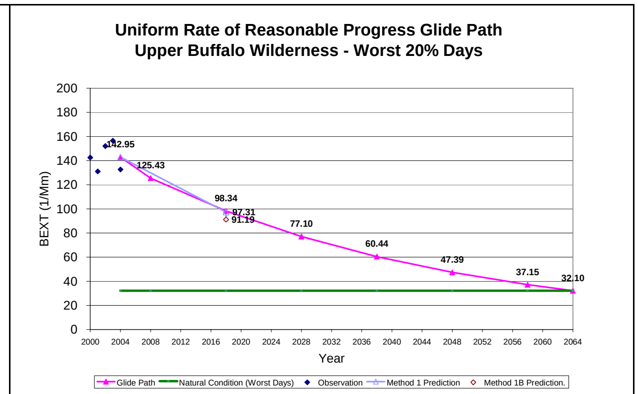
Figure 5-16 shows the standard CAMx extinction glidepaths and 2018 visibility projections and the 2018 visibility projections when the contributions of international sources is eliminated. CACR, which achieved the 2018 URP point by 104%, achieves it by even more when international sources are eliminated (117%). UPBU that barely achieved the 2018 URP point by 102% achieves it by 116% without international emissions.

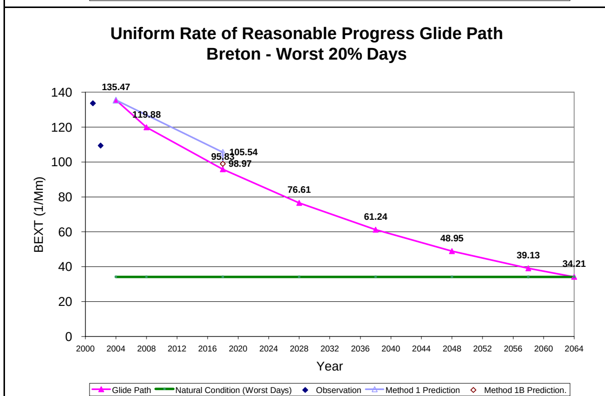
BRET comes up short of achieving the 2018 URP point when international emission are included (76%) as well as when they are eliminated (92%), although it is much closer (recall contributions of Gulf of Mexico to visibility impairment at BRET that is assumed in this analysis to be of U.S. origin). Eliminating international transport emissions makes of difference of meeting the 2018 URP point without them (120%) to not meeting it with them (64%) at BOWA. Similarly at VOYA the standard 2018 visibility projections do not achieve the 2018 URP point (54%), whereas it is achieved by a far margin when international sources are eliminated (132%).

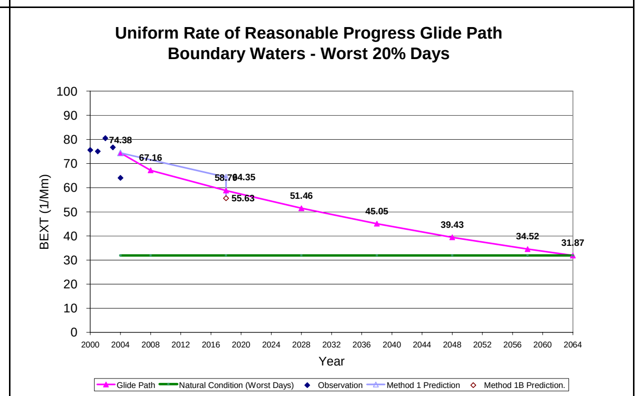
HEGL comes up short achieving the 2018 URP point when international sources are included (95%), but achieves it when they are eliminated (107%). Recall the standard CAMx deciview visibility projections barely achieved the URP point even when international emissions are included (Figure 5-13). MING achieves the 2018 URP point with (106%) and without (116%) international sources. WIMO does not achieve the 2018 URP point when international contributions are eliminated.

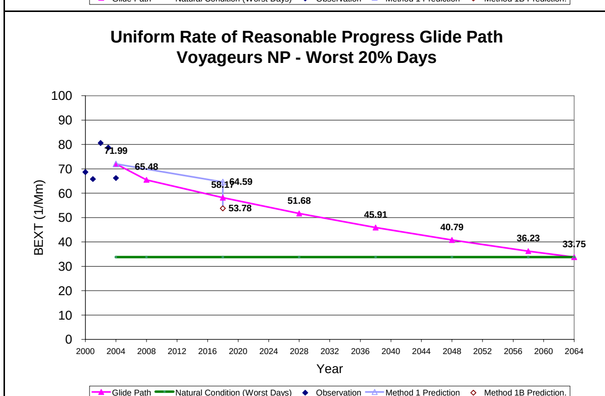
International sources have by far the largest effect at BIBE. Whereas the standard 2018 visibility projections only achieved 27% of the reductions needed to achieve the 2018 URP point, elimination of the international source contributions achieves 172% of the reduction needed. GUMO comes up short in achieving the 2018 URP point when international sources are included (31%), but achieves it when they are not (107%).

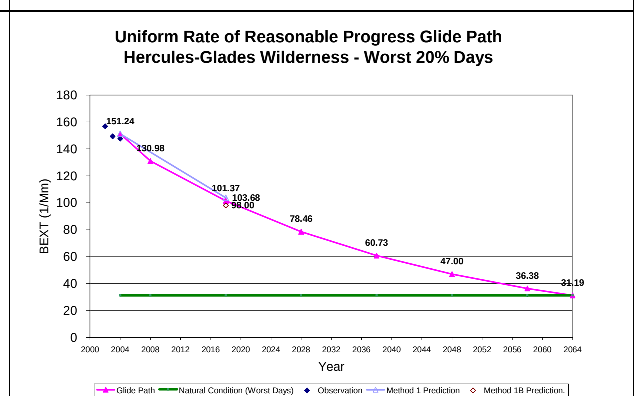

Uniform Rate of Reasonable Progress Glide Path
Caney Creek Wilderness - Worst 20% Days
BEXT (1/Mm)
Year
145.10
126.58
99.07
97.01
91.11
77.55
60.70
47.51
37.19
32.10
Glide Path
Natural Condition (Worst Days)
Observation
Method 1 Prediction
Method 1B Prediction.

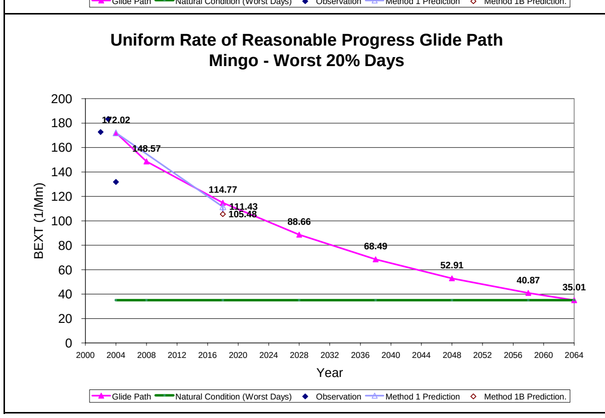

Uniform Rate of Reasonable Progress Glide Path
Upper Buffalo Wilderness - Worst 20% Days
BEXT (1/Mm)
Year
142.95
125.43
98.34
97.31
91.19
77.10
60.44
47.39
37.15
32.10
Glide Path
Natural Condition (Worst Days)
Observation
Method 1 Prediction
Method 1B Prediction.

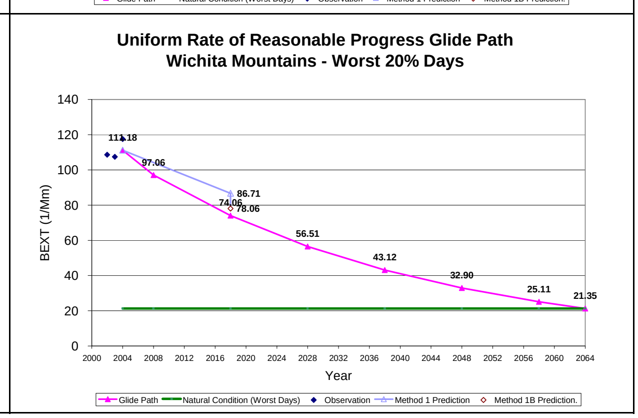

Uniform Rate of Reasonable Progress Glide Path
Breton - Worst 20% Days
BEXT (1/Mm)
Year
135.47
119.88
105.54
95.83
98.97
76.61
61.24
48.95
39.13
34.21
Glide Path
Natural Condition (Worst Days)
Observation
Method 1 Prediction
Method 1B Prediction.


Uniform Rate of Reasonable Progress Glide Path
Boundary Waters - Worst 20% Days
BEXT (1/Mm)
Year
74.38
67.16
58.76
64.35
55.63
51.46
45.05
39.43
34.52
31.87
Glide Path
Natural Condition (Worst Days)
Observation
Method 1 Prediction
Method 1B Prediction.


Uniform Rate of Reasonable Progress Glide Path
Voyageurs NP - Worst 20% Days
BEXT (1/Mm)
Year
71.99
65.48
58.17
64.59
53.78
51.68
45.91
40.79
36.23
33.75
Glide Path
Natural Condition (Worst Days)
Observation
Method 1 Prediction
Method 1B Prediction.


Uniform Rate of Reasonable Progress Glide Path
Hercules-Glades Wilderness - Worst 20% Days
BEXT (1/Mm)
Year
151.24
130.98
101.37
103.68
98.00
78.46
60.73
47.00
36.38
31.19
Glide Path
Natural Condition (Worst Days)
Observation
Method 1 Prediction
Method 1B Prediction.


Uniform Rate of Reasonable Progress Glide Path
Mingo - Worst 20% Days
BEXT (1/Mm)
Year
172.02
148.57
114.77
111.43
105.48
88.66
68.49
52.91
40.87
35.01
Glide Path
Natural Condition (Worst Days)
Observation
Method 1 Prediction
Method 1B Prediction.


Uniform Rate of Reasonable Progress Glide Path
Wichita Mountains - Worst 20% Days
BEXT (1/Mm)
Year
111.18
97.06
86.71
74.06
78.06
56.51
43.12
32.90
25.11
21.35
Glide Path
Natural Condition (Worst Days)
Observation
Method 1 Prediction
Method 1B Prediction.

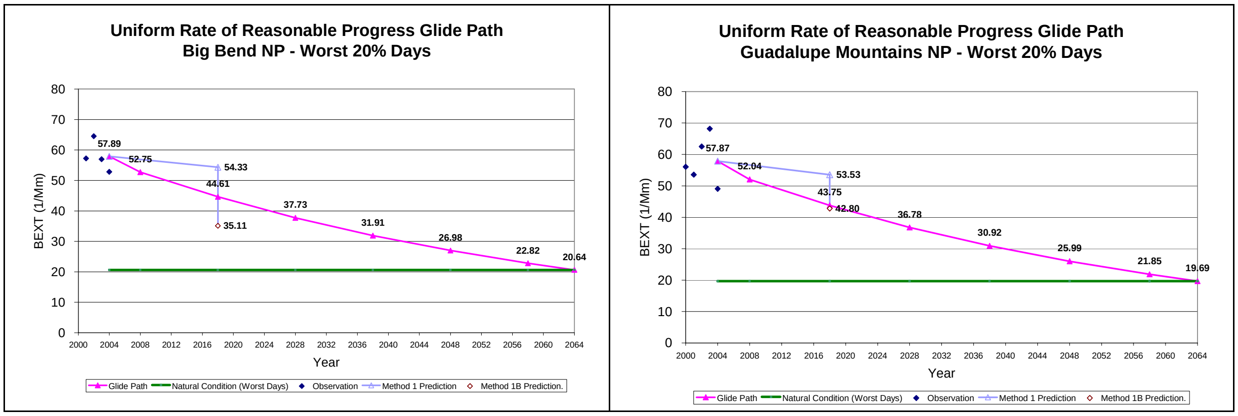


Figure 5-16. Elimination of international sources from 2018 visibility projections and comparison with 2018 URP point at CENRAP Class I areas.

5.7.2 Glidepaths Based on Controllable Extinction

Another alternative glidepath that was examined using the CAMx PSAT source apportionment results was based on the U.S. anthropogenic emissions contributions to visibility impairment on the worst 20 percent days at the CENRAP Class I areas. The RHR strives to achieve "natural visibility conditions" by 2064 and defines natural conditions as conditions that would exist "in the absence of human caused impairment". As shown above, anthropogenic emissions from international sources contribute significantly to visibility impairment at many of the CENRAP Class I areas making the RHR objective not practical if contributions from such sources are not reduced. Given that states and EPA have no jurisdiction over international sources, then we can not assume they will be controlled and have therefore held most of them constant at 2002 levels. For such Class I areas with high contributions from international sources, the comparison with the 2018 URP point is not very meaningful since the 2018 URP assumes such sources will be reduced. A more meaningful comparison would be to focus on the U.S. man-made contributions to visibility impairment at the Class I areas and develop a URP glidepath and 2018 URP point that is aimed at eliminating the U.S. anthropogenic emissions contributions to visibility impairment at Class I areas for the worst 20 percent days in 2064.

The CAMx 2002 base case PSAT PM source apportionment results were processed to identify the portion of the 2000-2004 Baseline extinction that was due to U.S. anthropogenic emissions (i.e., man-made sources). The contributions of source groups that included on-road mobile, non-road mobile, elevated point sources, low-level point sources and area sources from the PSAT source regions covering the U.S. states and Gulf of Mexico (Figure 5-8) were assumed to make up the U.S. anthropogenic contributions (i.e., excluding the Natural source category, all sources from the Mexico and Canada source regions and boundary conditions). Note that off-shore marine emissions in the Pacific and Atlantic Oceans and Gulf of Mexico were included in the U.S. anthropogenic emissions definition because they were in source regions associated with states or the Gulf of Mexico. As off-shore marine emissions may not be controllable by U.S. agencies and they were assumed to remain unchanged going from 2002 to 2018, then the 2018 visibility projections for the U.S. anthropogenic component are overstated.

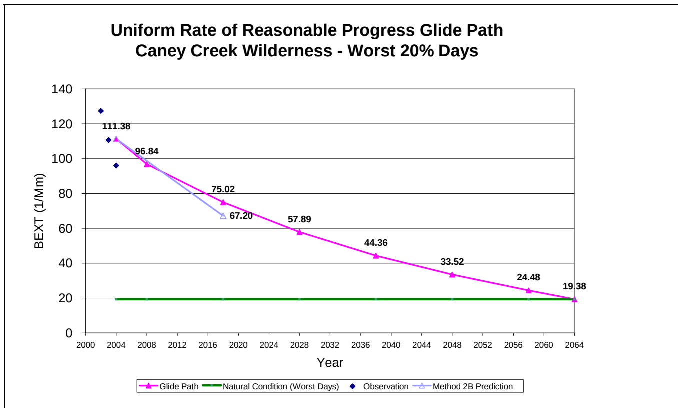
The 2064 objective for the U.S. anthropogenic emissions glidepath would be no contributions on the worst 20 percent days. This does not mean the 2064 U.S. anthropogenic extinction objective

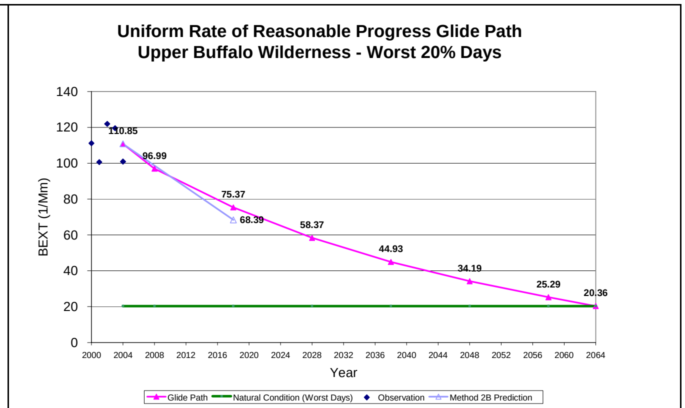
is zero, rather the U.S. anthropogenic plus natural background is less than the Natural Conditions for the worst 20 percent days. The PSAT results were used to define the natural background contributions on the current worst 20 percent days which was subtracted from the EPA default Natural Conditions to obtain the 2064 objective for the U.S. anthropogenic emissions contributions. Here the PSAT derived natural background was defined as the sum of the contributions from the Natural source category, secondary organic aerosol from biogenic sources (SOAB) and half of the boundary conditions. For example, Figure 5-17 top left displays the US anthropogenic emissions glidepath for CACR. The PSAT natural sources contribution (=Natural Source Category + SOAB + ½ BC) is approximately 13 Mm^{-1} so that is subtracted from the 2064 Natural Background (~32 Mm^{-1}, see figure 5-16) to obtain a 2064 end point of ~19 Mm^{-1} for the glidepath. The 2002 PSAT results applied to the 2000-2004 Baseline extinction estimates that 111 Mm^{-1} of the extinction is due to U.S. anthropogenic emissions which form the starting point for the glidepath. The curvature in the US anthropogenic glidepath is introduced the same way as for the extinction based glidepath to account for the logarithmic relationship between extinction and deciview.

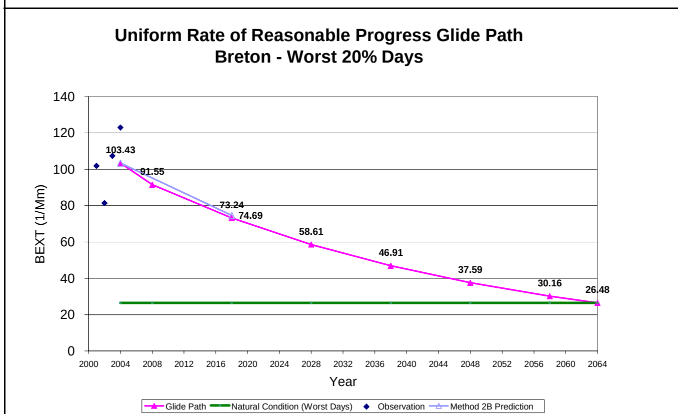
Figure 5-17 displays the U.S. anthropogenic emissions extinction glidepaths and comparison with the 2018 visibility projections for extinction due to U.S. anthropogenic emissions on the worst 20 percent days. As seen by the standard linear deciview glidepaths discussed in Chapter 4, the U.S. anthropogenic emissions 2018 URP point is achieved by a wide margin at the four Class I areas in Arkansas and Missouri (CACR, UPBU, HRGL and MING). BRET that achieved 94% of the 2018 URP point obtains similar results using the U.S. anthropogenic emissions glidepath achieving 96% of the 2018 URP point. As discussed above, the inclusion of the off-shore marine emissions in the U.S. anthropogenic emissions will greatly affect the BRET Class I area so that actual reduction in U.S. anthropogenic emissions extinction would be greater and may even achieve the 2018 URP point if off-shore marine vessels were classified as not being part of the U.S..

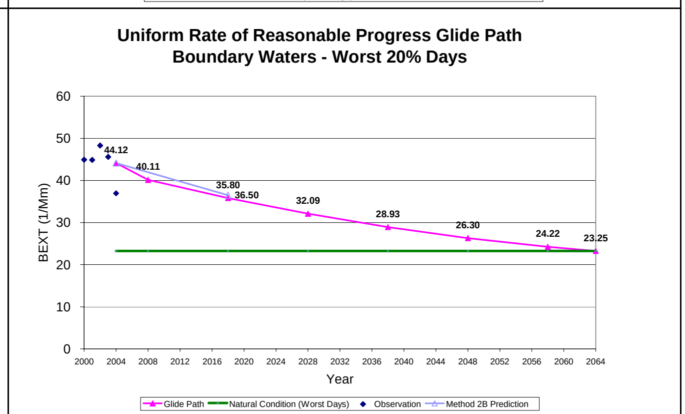
The BOWA and VOYA northern Minnesota Class I areas achieved, respectively, 69% and 53% of the 2018 URP point using the standard EPA default deciview glidepaths and projection techniques (Figure 4-4). Using the U.S. anthropogenic glidepaths BOWA and VOYA achieve 92% and 86% of the 2018 point, respectively (Figure 5-17). WIMO that came up approximately 40% short of achieving the 2018 URP point using the deciview glidepath comes up under 20% short using the U.S. anthropogenic emissions glidepath.

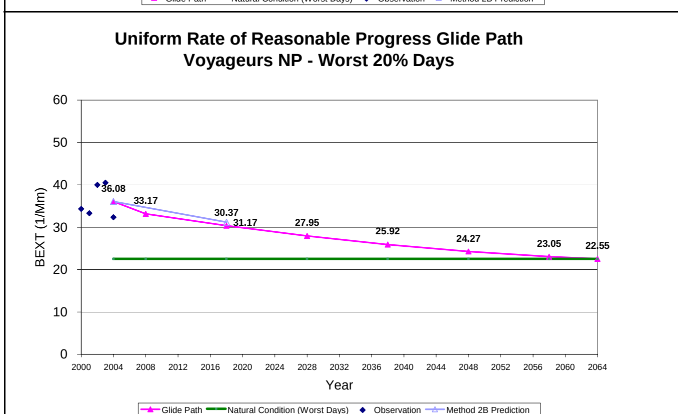
The two Texas Class I areas also come up short in achieving the 2018 URP point using the U.S. anthropogenic emissions glidepaths, but not as short as when the linear deciview glidepaths are used. BIBE increases from 26% to 67% and GUMO increases from 34% to 49%. One reason these two Class I areas fail to achieve the 2018 point for U.S. anthropogenic emissions is because of the high contributions of Soil and CM and little change in precursor emissions of these species between 2002 and 2018.

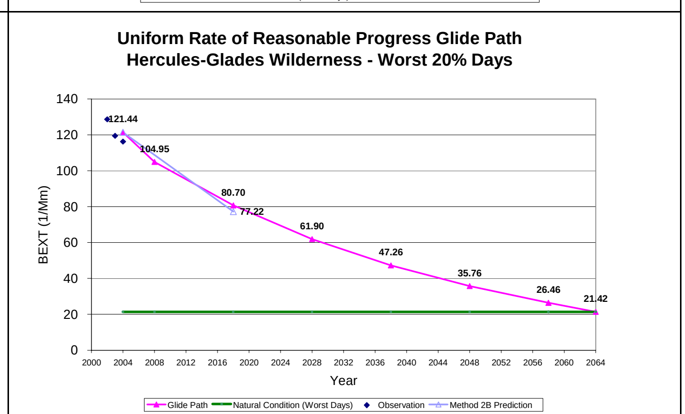

Uniform Rate of Reasonable Progress Glide Path
Caney Creek Wilderness - Worst 20% Days
BEXT (1/Mm)
Year
111.38
96.84
75.02
67.20
57.89
44.36
33.52
24.48
19.38
Glide Path
Natural Condition (Worst Days)
Observation
Method 2B Prediction

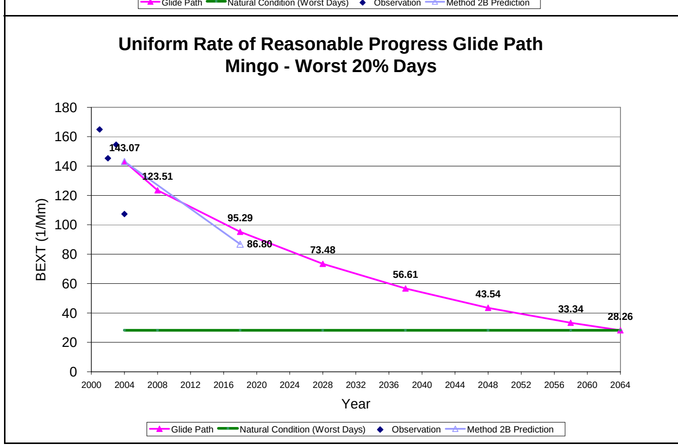

Uniform Rate of Reasonable Progress Glide Path
Upper Buffalo Wilderness - Worst 20% Days
BEXT (1/Mm)
Year
110.85
96.99
75.37
68.39
58.37
44.93
34.19
25.29
20.36
Glide Path
Natural Condition (Worst Days)
Observation
Method 2B Prediction

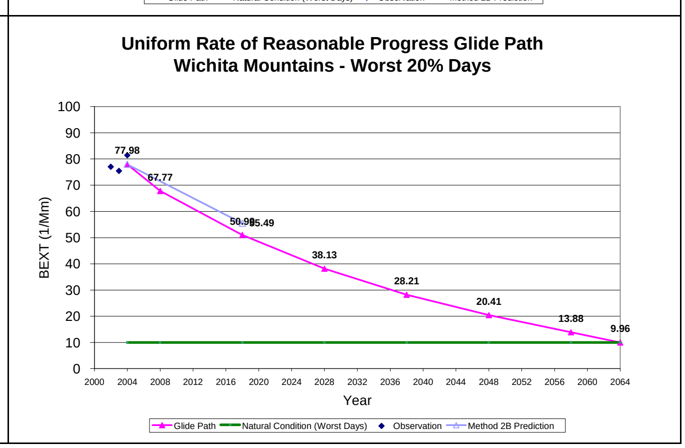

Uniform Rate of Reasonable Progress Glide Path
Breton - Worst 20% Days
BEXT (1/Mm)
Year
103.43
91.55
73.24
74.69
58.61
46.91
37.59
30.16
26.48
Glide Path
Natural Condition (Worst Days)
Observation
Method 2B Prediction


Uniform Rate of Reasonable Progress Glide Path
Boundary Waters - Worst 20% Days
BEXT (1/Mm)
Year
44.12
40.11
35.80
36.50
32.09
28.93
26.30
24.22
23.25
Glide Path
Natural Condition (Worst Days)
Observation
Method 2B Prediction


Uniform Rate of Reasonable Progress Glide Path
Voyageurs NP - Worst 20% Days
BEXT (1/Mm)
Year
36.08
33.17
30.37
31.17
27.95
25.92
24.27
23.05
22.55
Glide Path
Natural Condition (Worst Days)
Observation
Method 2B Prediction


Uniform Rate of Reasonable Progress Glide Path
Hercules-Glades Wilderness - Worst 20% Days
BEXT (1/Mm)
Year
121.44
104.95
80.70
77.22
61.90
47.26
35.76
26.46
21.42
Glide Path
Natural Condition (Worst Days)
Observation
Method 2B Prediction


Uniform Rate of Reasonable Progress Glide Path
Mingo - Worst 20% Days
BEXT (1/Mm)
Year
143.07
123.51
95.29
86.80
73.48
56.61
43.54
33.34
28.26
Glide Path
Natural Condition (Worst Days)
Observation
Method 2B Prediction


Uniform Rate of Reasonable Progress Glide Path
Wichita Mountains - Worst 20% Days
BEXT (1/Mm)
Year
77.98
67.77
55.49
38.13
28.21
20.41
13.88
9.96
Glide Path
Natural Condition (Worst Days)
Observation
Method 2B Prediction

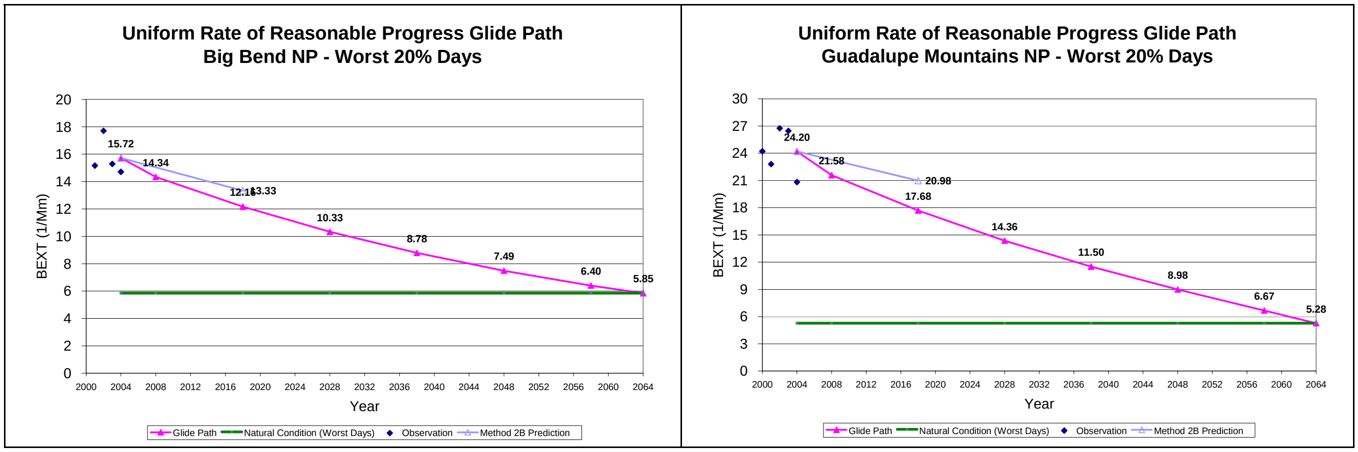


Figure 5-17. Glidepaths and 2018 visibility projections based on visibility due to U.S. anthropogenic emissions at CENRAP Class I areas.

5.8 Use of Original IMPROVE Equation

2018 visibility projections were also made using the CENRAP Typ02g and Base18g CMAQ modeling results and the original (old) IMPROVE equation. Figure 5-18 displays a DotPlot that compares the 2018 Base G visibility projections using the new IMPROVE algorithm (NIA) and the original IMPROVE algorithm (OIA). In general the new IMPROVE equation results in more optimistic 2018 visibility projections than the original IMPROVE equation. For the Texas and WRAP Class I areas, the 2018 visibility projections are nearly identical using the two IMPROVE equations. For the four Class I areas in Arkansas and Missouri the 2018 visibility projections using the new IMPROVE equation are from 7 to 21 percentage points more optimistic than the original IMPROVE equation. In the case of UPBU, HEGL and MING the 2018 visibility projections go from not achieving to achieving the 29018 URP point when switching from the old to new IMPROVE equation.

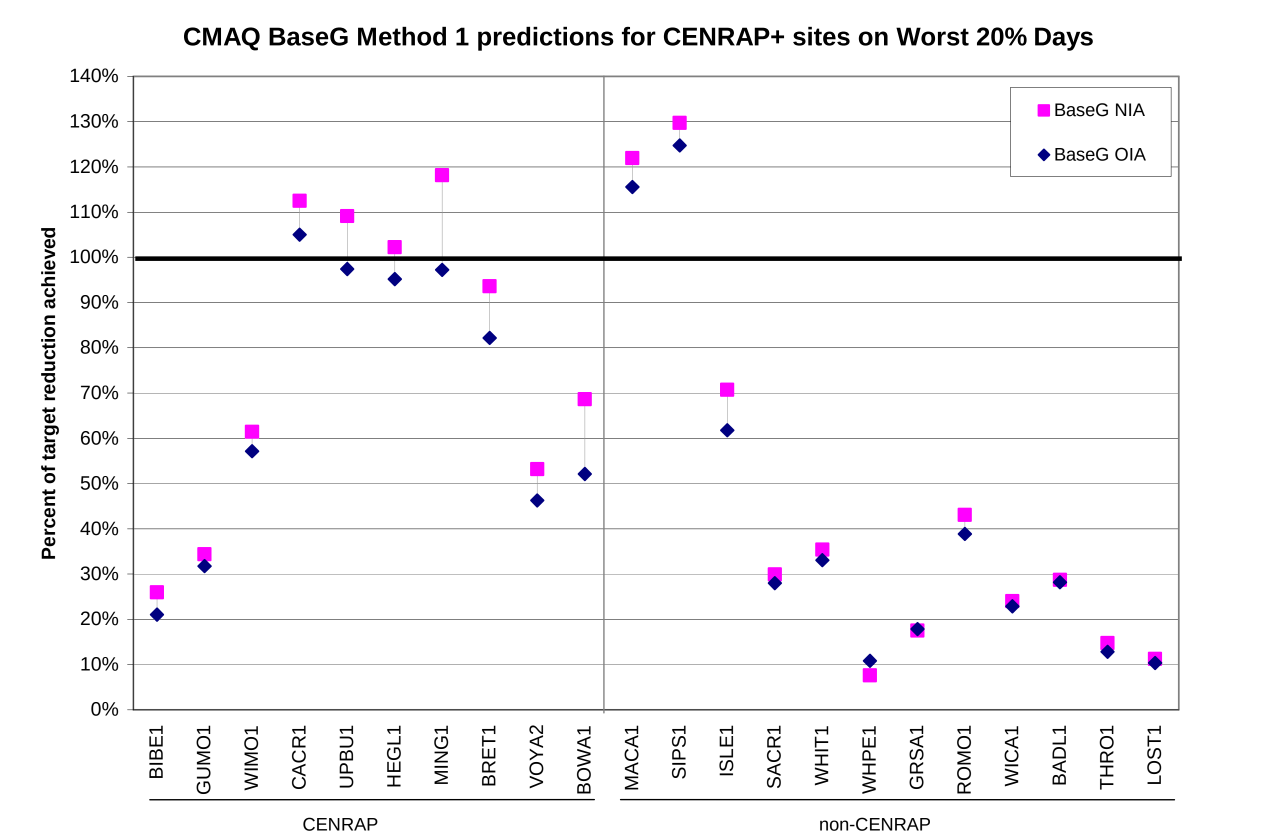


Figure 5-18. Comparison of 2018 Base G visibility projections using the New (NIA) and Old (OIA) IMPROVE algorithms expressed as a percentage of achieving the 2018 URP point visibility improvements.

5.9 Visibility Trends

Figure 5-19 displays trends in visibility impairment at the CENRAP Class I areas using the period of record of measurements at the associated IMPROVE monitor and the new IMPROVE equation. These trends include trends for the worst 20 percent days, the best 20 percent days and all IMPROVE sampled days during a year. The EPA guidance procedures were used to construct the worst and best 20 percent days that includes a minimum data capture requirement (EPA, 2003a), whereas no such minimum data capture was applied when looking at the "annual average" of all IMPROVE sampled days trends. So care must be taken when analyzing trends for the all sampled IMPROVE days trends as there could be large missing periods with high or low extinction that are not being account for. The WRAP Technical Support System (TSS) website was used to calculate the visibility trends at the CENRAP Class I areas that includes IMPROVE data from start of recording through 2004 and includes no data filling (see: http://vista.cira.colostate.edu/TSS/Default.aspx) .

Trends in visibility at CACR has three years of data (2002-2004) for the worst and best 20 percent days and fives years for the IMPROVE sampled days trends. Although it is hard to come to any conclusions regarding trends with just three years of data, there does seem to be a general downward trend, that is also supported by the five year trend in the IMPROVE sampled days.

A much longer trend plot is available for UPBU that includes 12 years of data for the worst and best 20 percent days (Figure 5-19b). Although there is a lot of a year-to-year variation in the visibility trends with cleaner years occurring in 1997, 2001 and 2004, there does appear to be a slight trend toward improved visibility at UPBU.

There is insufficient data to calculate the worst or best 20 percent days visibility for any year at the BRET Class I area so only the IMPROVE sampled days trends are presented (Figure 5-19c). The trends at BRET are inconclusive and given the large amounts of missing data at this site it is difficult to interpret the results.

There is also a lot of missing years in the worst and best 20 percent days for the BOWA Class I area making it difficult to interpret (Figure 5-19d). But visibility appears to be more impaired in the early 1990s than in more current years so improvements have been seen. VOYA has five years of valid data and shows worsening visibility for 2000-2003, and then improved visibility in 2004. It is unclear whether the 2004 improved visibility is a trend or just due to variations in meteorology so no conclusions can be drawn.

Although a downward trend in visibility impairment appears to be occurring at the two Missouri Class I areas (Figure 5-19f-g), given that there are only three years available for HEGL and lots of missing data for MING these trends are inconclusive.

Three years (2002-2004) of visibility trends for the worst and best 20 percent days are available for WIMO (Figure 5-19h). The most impaired year from the three years for the worst 20 percent days is the most recent (2004). Again, the time period is too short to draw any conclusions on trends in visibility at WIMO.

The two Texas Class I areas have a relatively long period of record. There is a lot of year-to-year variability in the visibility measurements that make interpreting the trends difficult. 1998 appears to be an anomalously high visibility impairment year at BIBE and due to the much higher OMC extinction indicates that the year was likely impacted by smoke from fires. GUMO has lots of year to year variability in CM and Soil which are likely due to occurrences of impacts due to wind blown dust. Even taking Soil and CM out of the interpretation it is difficult to interpret ay trend in visibility at the two Texas Class I areas. The higher visibility impairment in 1998 and 1999 suggests a downward trend but that may be just due to more adverse meteorological and natural emissions (e.g., wildfires) in these two years than any real long term trend.

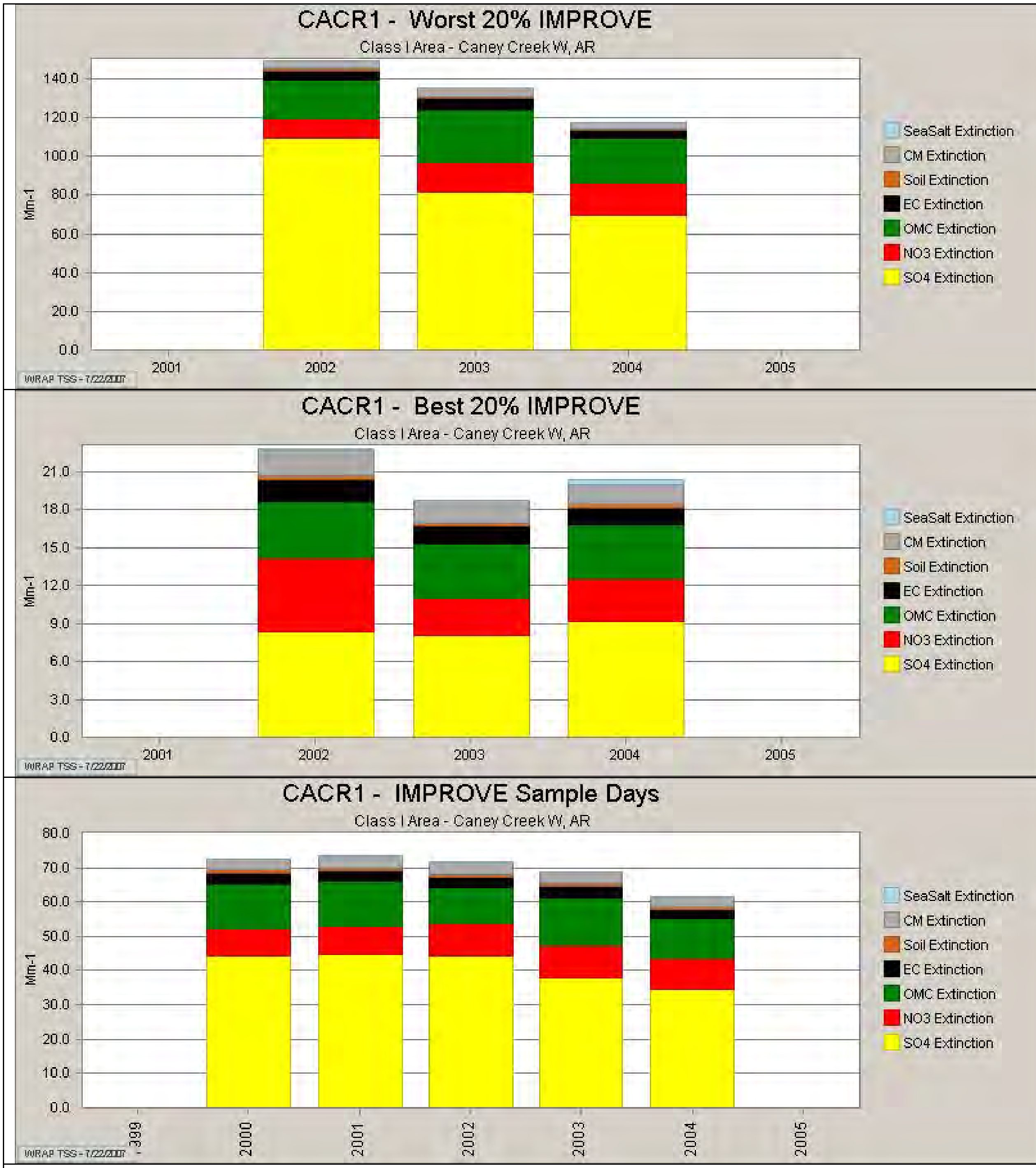


Figure 5-19a. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Caney Creek (CACR), Arkansas for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

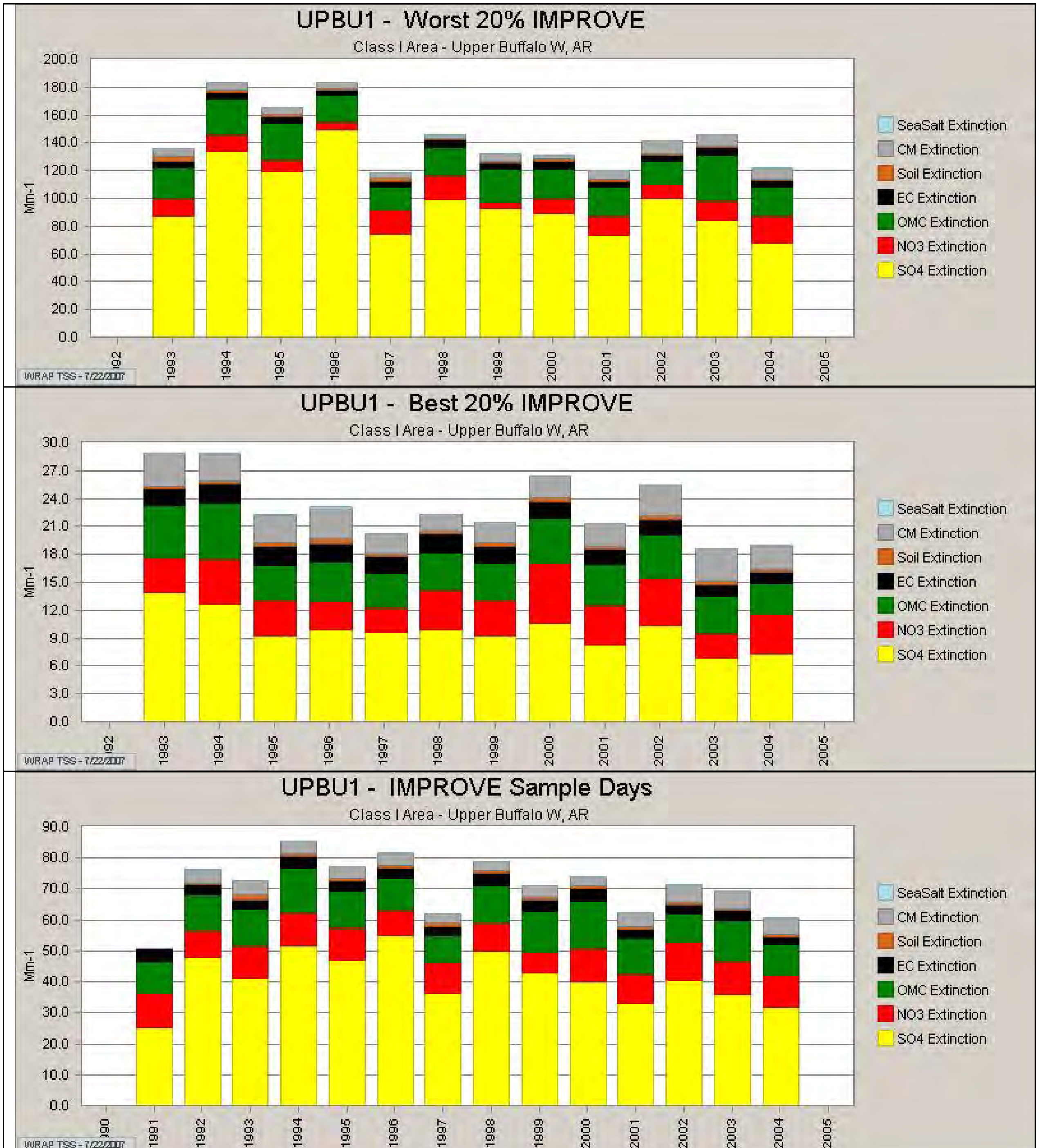


Figure 5-19b. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Upper Buffalo (UPBU), Arkansas for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

Insufficient Data to Calculate Best 20 Percent days at BRET

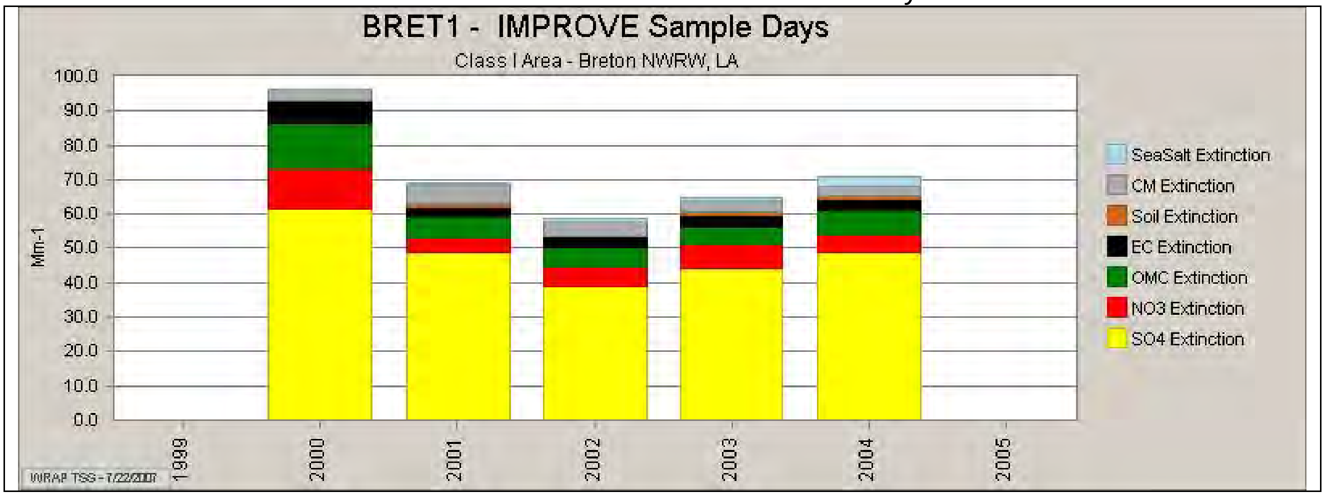


Figure 5-19c. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Breton Island (BRET), Louisiana for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

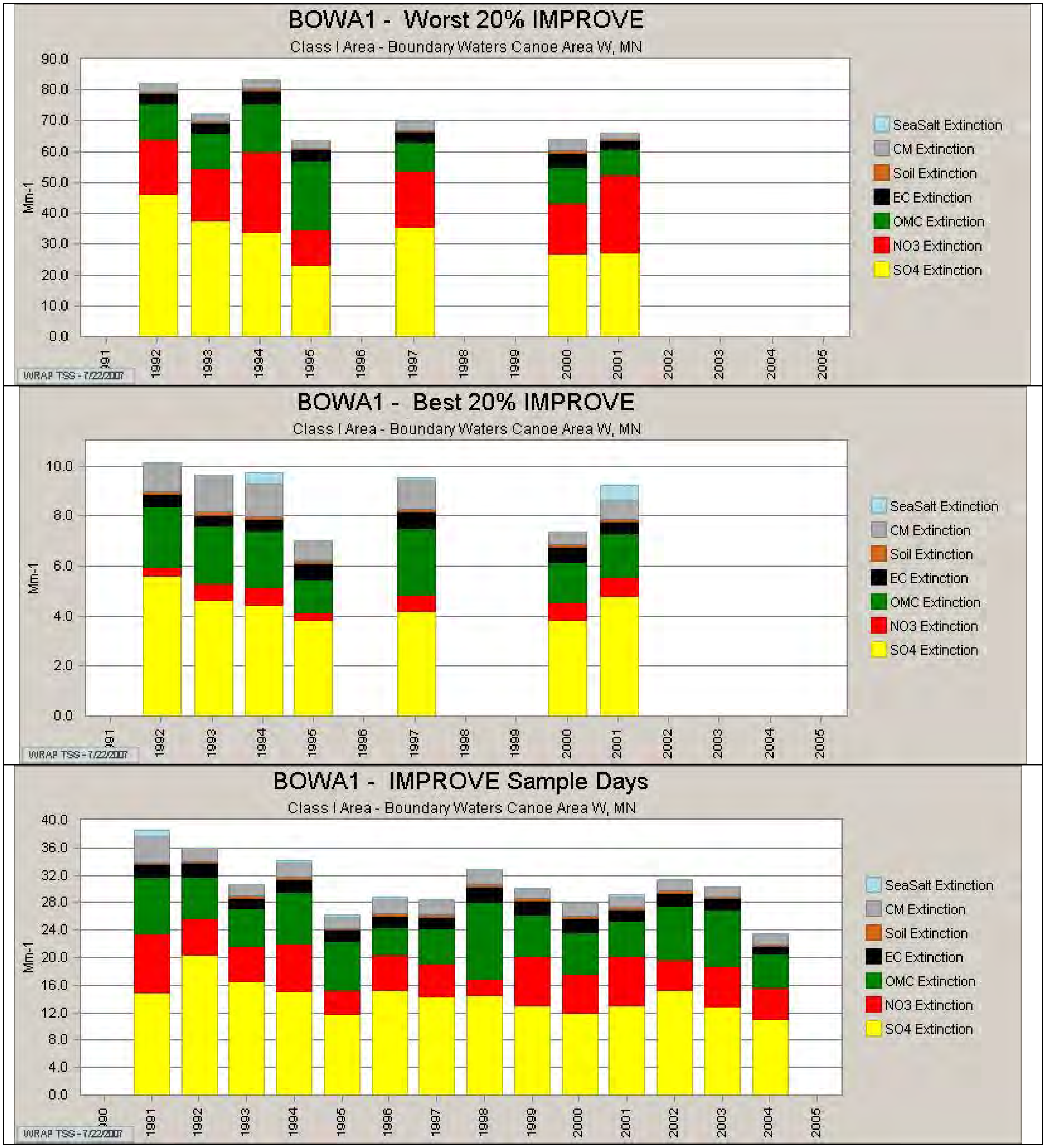


Figure 5-19d. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Boundary Waters (BOWA), Minnesota for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

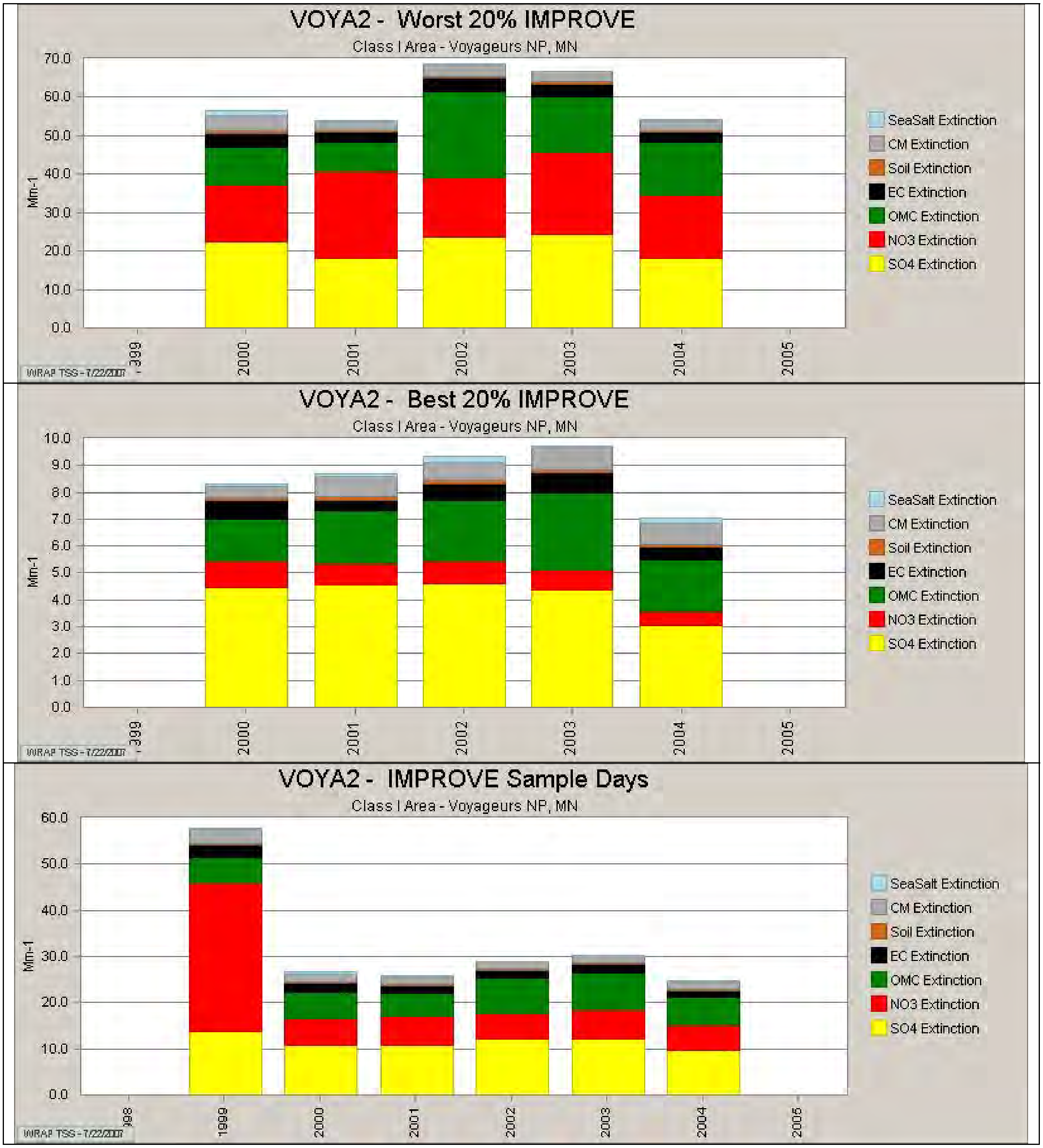


Figure 5-19e. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Voyageurs (VOYA), Minnesota for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

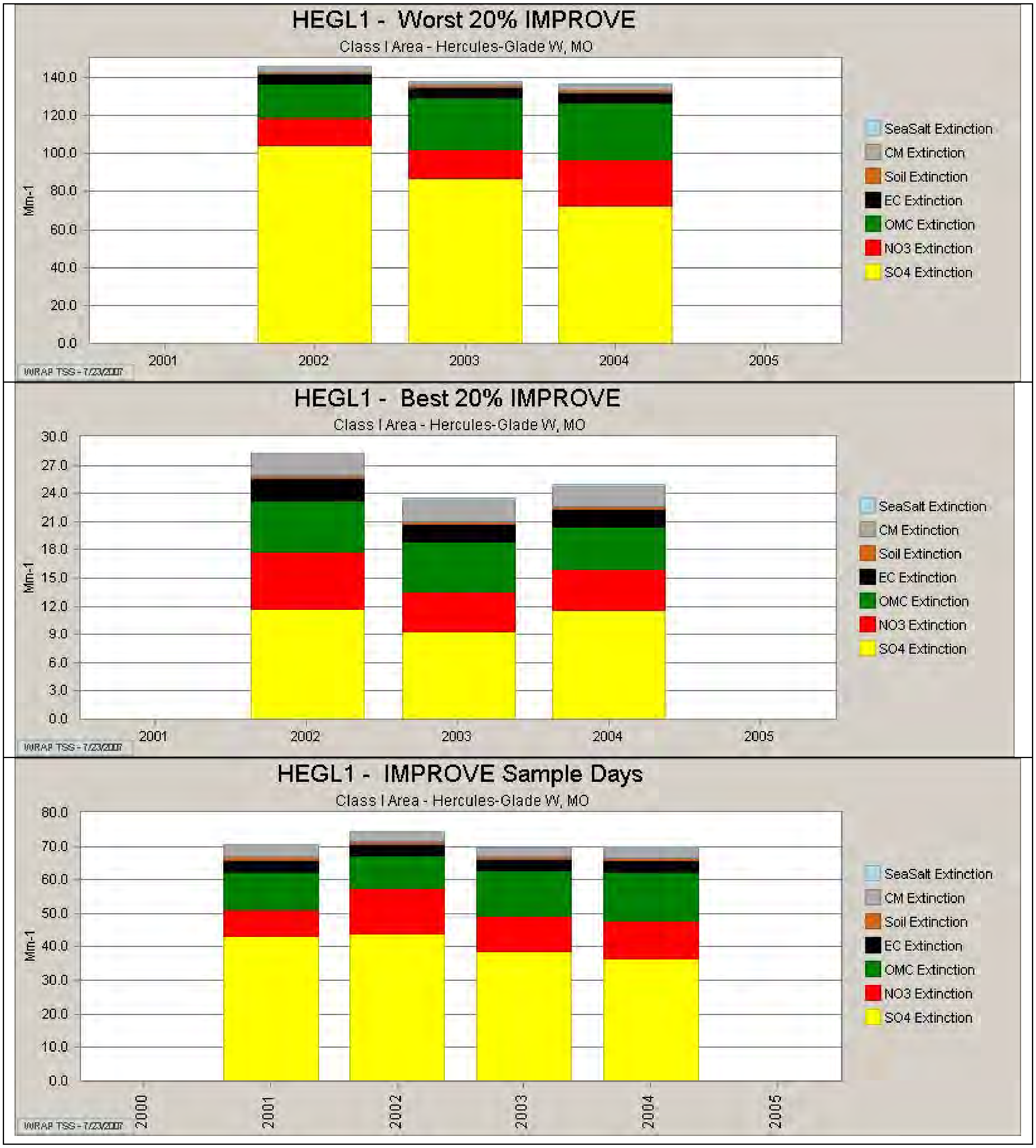


Figure 5-19f. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Hercules Glade (HEGL), Missouri for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

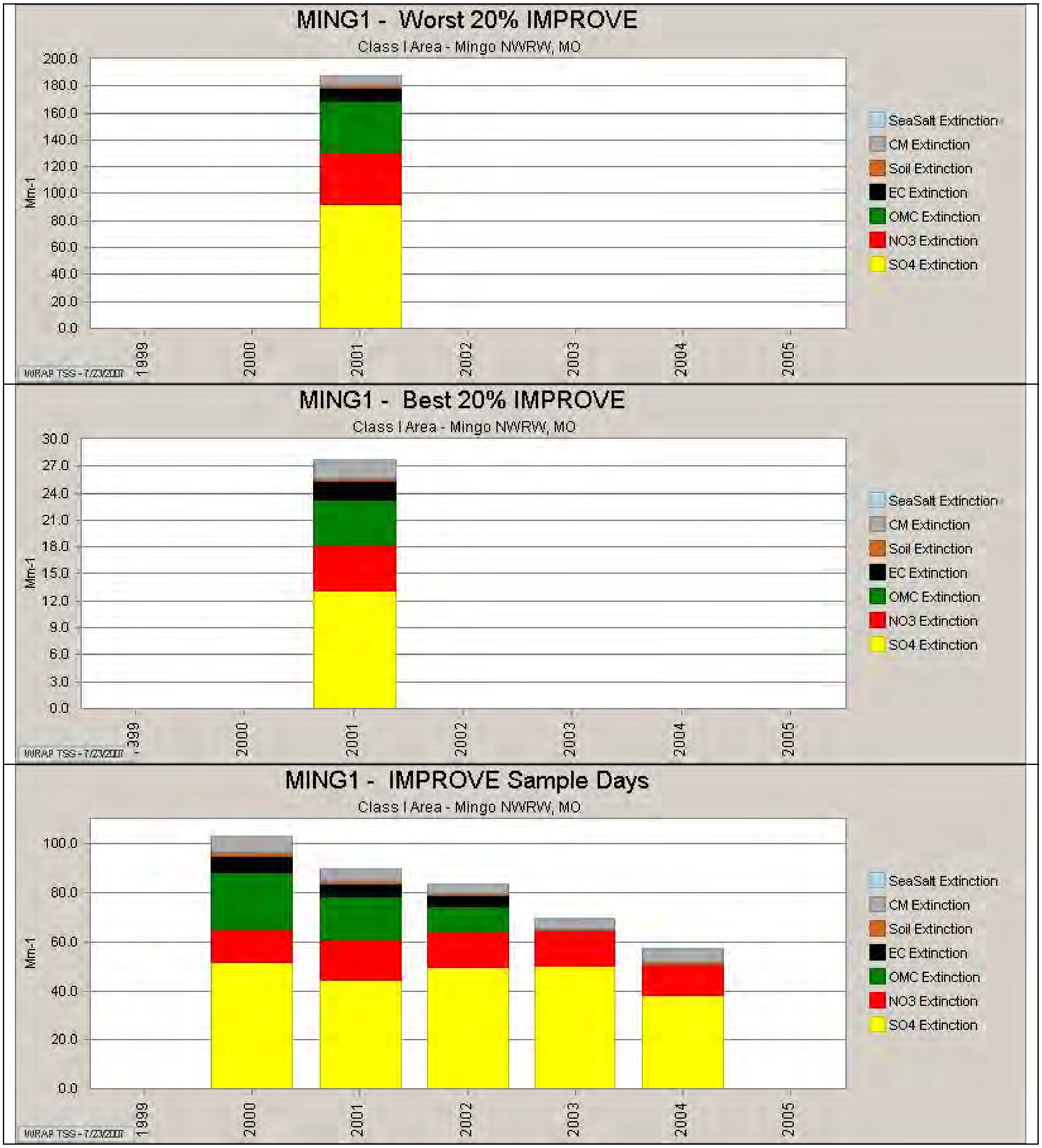


Figure 5-19g. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Mingo (MING), Missouri for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

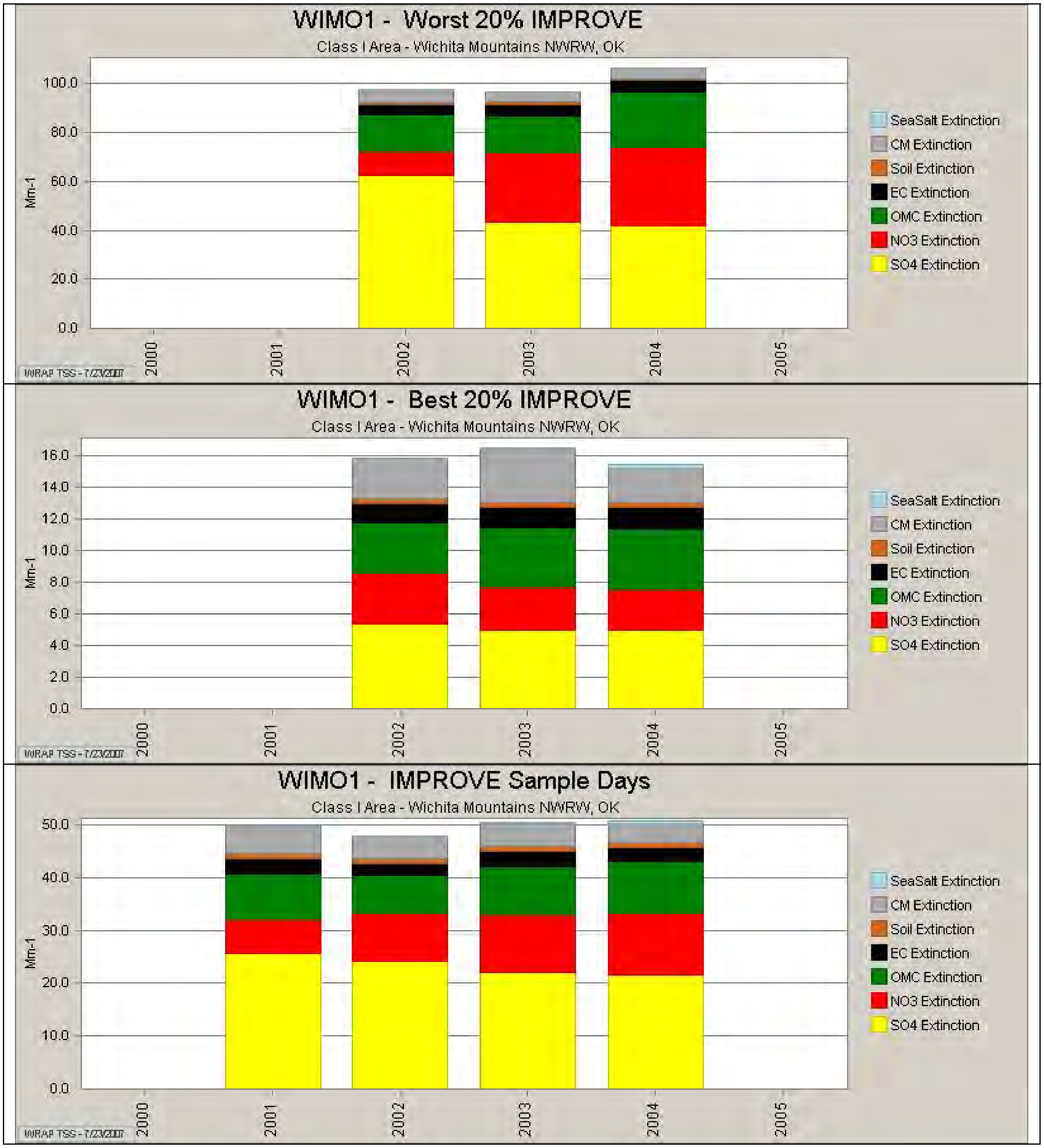


Figure 5-19h. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Wichita Mountains (WIMO), Oklahoma for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

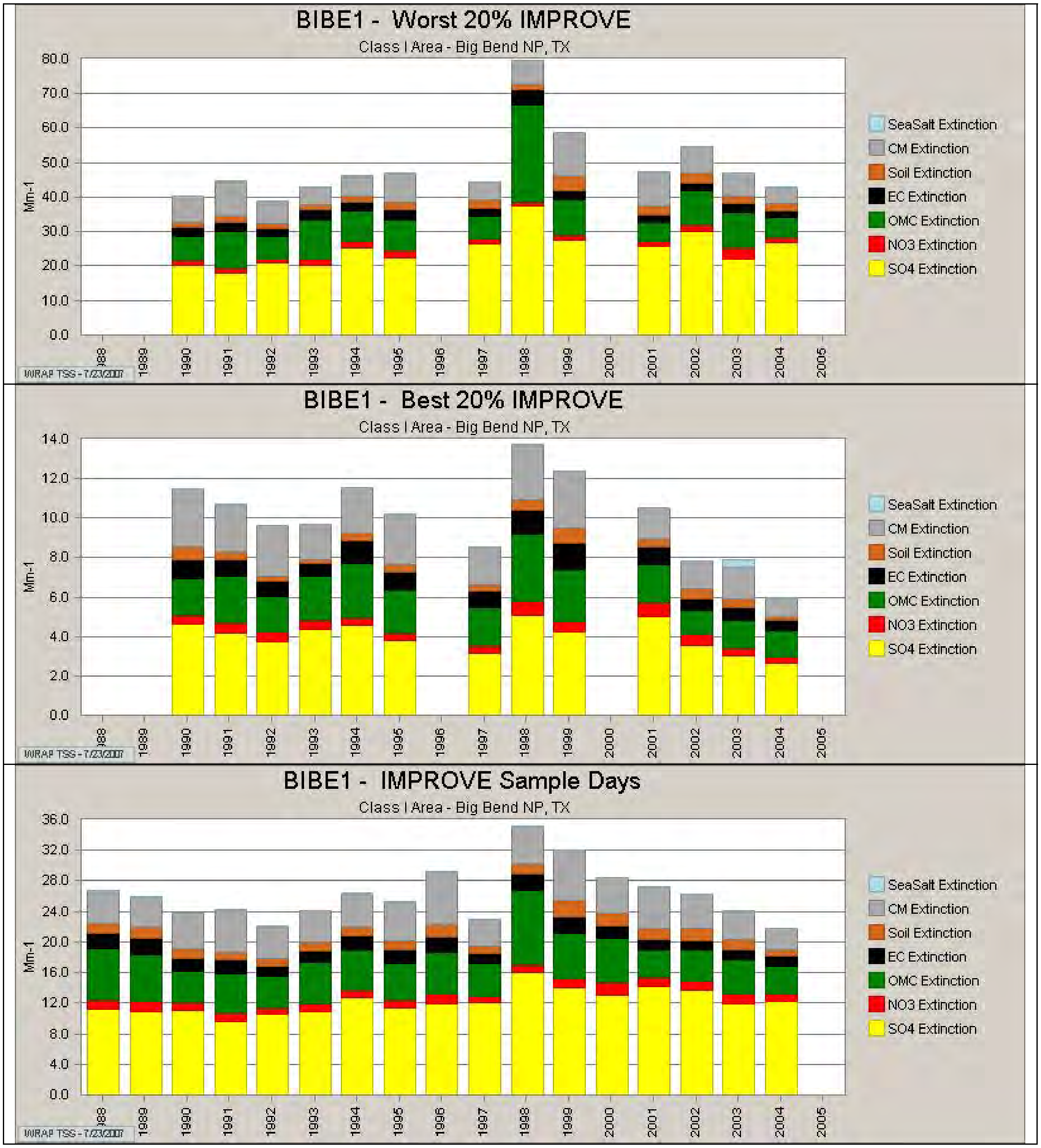


Figure 5-19i. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Big Bend (BIBE), Texas for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

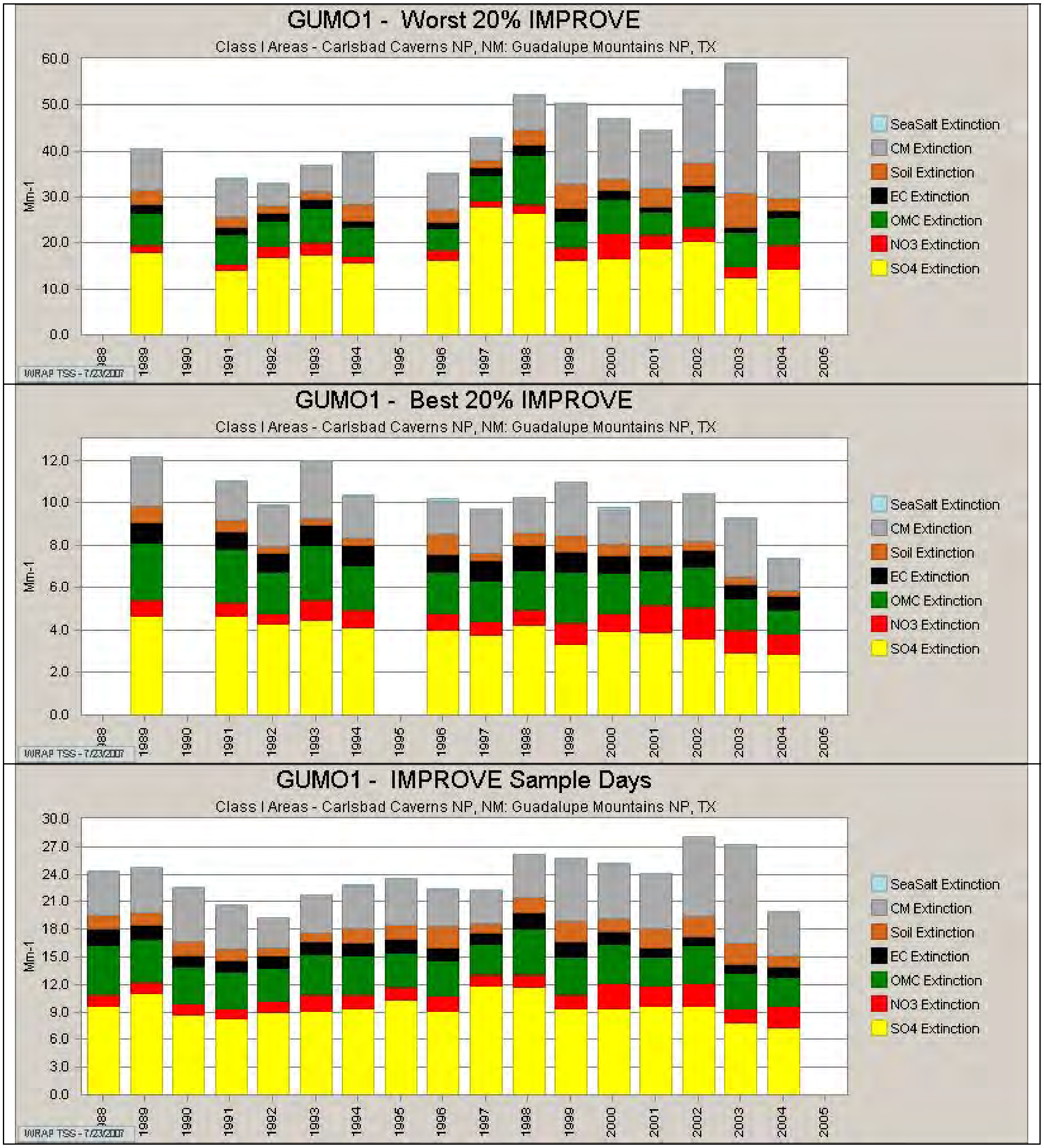


Figure 5-19j. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Guadalupe Mountains (GUMO), Texas for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

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APPENDIX A

Model Performance Evaluation of the 2002 36 km MM5 Meteorological Model Simulation used in the CENRAP Modeling and Comparison to VISTAS Final 2002 36 km MM5 and WRAP Interim 2002 36 km MM5 Simulations

The CENRAP 2002 36 km MM5 simulation (Johnson, 2007) was evaluated against observed surface and upper-air meteorological observations and observed precipitation amounts and its performance was compared against the VISTAS final and the WRAP interim 2002 36 km MM5 simulations. The CENRAP, VISTAS and WRAP 2002 36 km MM5 simulations used several common science options:

- Lambert Conformal Projection with center at (97°, 40°) and standard parallels at (33°, 45°).
- 164 by 128 36 km by 36 km horizontal grids covering the continental U.S. and adjacent regions.
- 34 vertical layers up to 100 mb (~15 km AGL).
- Pleim-Xiu Land Surface Module (LSM).
- Asymmetric Convective Mixing (ACM) Planetary Boundary Layer (PBL) model.
- RRTM long-wave radiation.
- Dudhia short-wave radiation.
- No Shallow convection.

However, there were some differences in the choice of science options:

- VISTAS and CENRAP MM5 simulations used the Kain Fritsch 2 cumulus parameterization, whereas WRAP MM5 used Kain Fritsch 1.
- VISTAS and CENRAP MM5 simulations used the Reisner 1 moist physics while WRAP MM5 used Reisner 2.
- All three MM5 simulations used Four Dimensional Data Assimilation (FDDA analysis nudging at the surface for winds, but WRAP also used surface analysis nudging to temperature and moisture.
- All three MM5 simulations used analysis nudging FDDA above the PNL to winds, temperature and moisture.

Much of the difference in the model performance for the three MM5 simulations was related to the surface temperature and moisture analysis nudging used in the interim WRAP MM5 simulations that resulted in better surface temperature model performance, but caused instabilities resulting in degradation in meteorological model performance above the surface. The final WRAP 2002 36 km MM5 simulation did not use the surface temperature and moisture FDDA and used the Betts-Miller cumulus scheme instead of Kain Fritsch that resulted in much improved meteorological model performance in the western States (Kemball-Cook et al., 2005).

A.1 Surface Meteorological Model Performance

The performance of the three MM5 simulations at the surface was evaluated through comparisons against observed surface wind, temperature and humidity measurements from the ds472 observational database. The METSTAT program was used to evaluate the MM5 simulations for each month of 2002 and across the 11 subdomains shown in Figure A-1. These subdomains are as follows:

1 = Pacific NW
2 = SW
3 = North
4 = Desert SW
5 = CenrapN
6 = CenrapS
7 = Great Lakes
8 = Ohio Valley
9 = SE
10 = NE
11 = MidAtlantic

Emery and Tai (2001) have developed model performance benchmarks by analyzing over 30 MM5RAMS meteorological model simulations and tabulating the typical level of performance that a good meteorological model achieves. These performance benchmarks are not intended to be pass/fail grades; rather they provide a framework to evaluate the model performance against past applications. Since many of the past MM5/RAMS meteorological model simulations that the benchmarks were developed from were in support of urban ozone modeling that are typically fairly stagnant conditions with little or no precipitation and involved multiple iterations to achieve the final base case simulation. Thus, we may not expect the 2002 annual MM5 simulations to achieve a similar level of performance given the complicating factors of precipitation and complex terrain associate with many Class I areas in the west. Table A-1 lists the meteorological model performance benchmarks for wind speed, wind direction, temperature and humidity.

Table A-1. Meteorological model performance benchmarks (Source: Emery et al., 1999).

Statistic	Wind Speed	Wind Direction	Temperature	Humidity
RMSE	≤ 2 m/s			
Mean Bias	≤ ±0.5 m/s	≤ ±10°	≤ ±0.5 K	≤ ±1.0 g/kg
Index of Agreement	≤ 0.6		≤ 0.8	≤ 0.6
Gross Error		≤ 30°	≤ 2.0 K	≤ 2.0 g/kg

Below we present the evaluation of the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations against surface meteorological observations for the four seasonal months of January, March, July and October and the CENRAP North (CenrapN) and CENRAP South (CenrapS) subdomains (i.e., subdomains 5 and 6 in Figure A-1). The surface evaluation of the three MM5 2002 36 km simulations outside of the CENRAP subdomains can be found in Kemball-Cook et al., (2004).

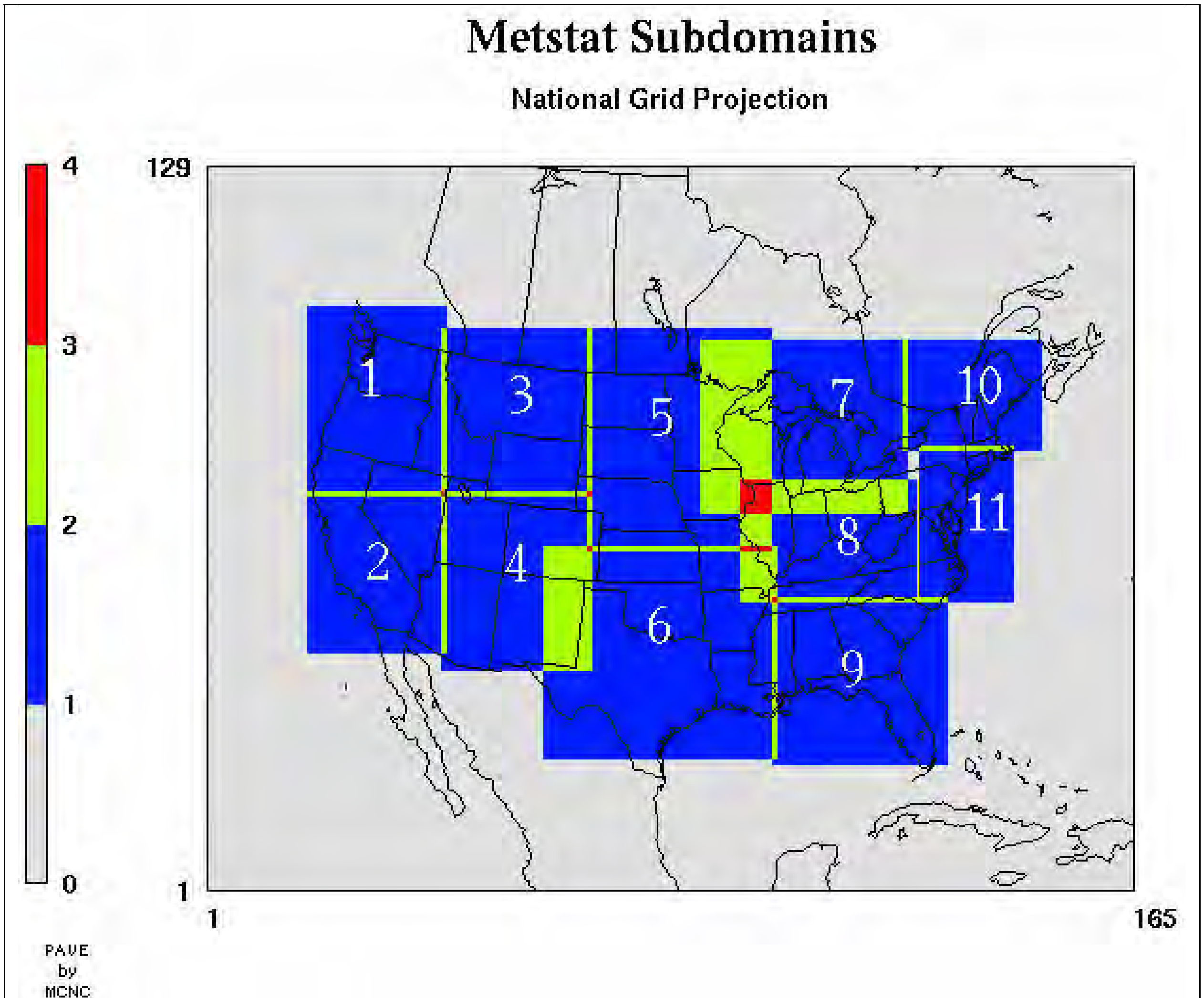


Figure A-1. Eleven subdomains where monthly evaluation of the MM5 simulations surface model performance was evaluated.

A.1.1 Temperature

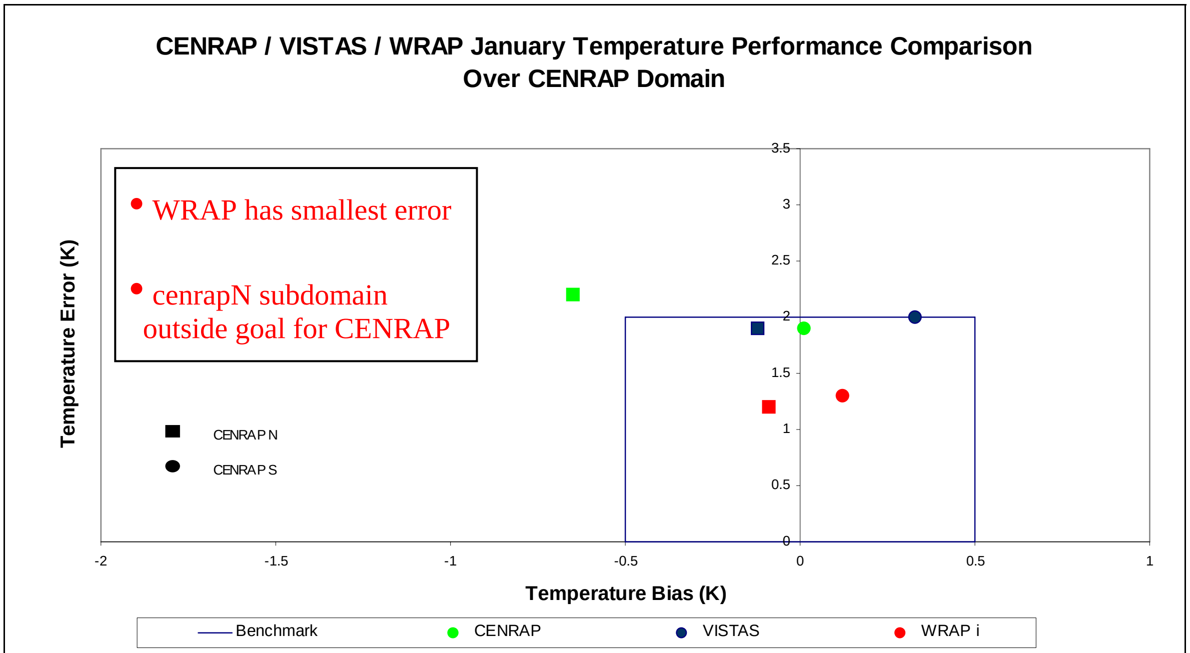
Figure A-2 displays the surface temperature model performance for the CENRAP, VISTAS and WRAP 2002 36 km MM5 simulations in the CenrapN and CenrapS subdomains and the months of January, March, July and October. The WRAP MM5 simulations are performing best for January temperature in both CENRAP domains exhibiting low bias and the lowest error that are within the benchmark. The VISTAS MM5 rum is performing next best with bias well within the benchmark and error within but close to the error benchmark. The CENRAP MM5 simulation performs well for the CenrapS domain with zero bias and error within, but approaching the benchmark. However, the CENRAP performance for the CenrapN domain does not achieve the performance benchmarks due to a too cold bias.

The temperature performance in March is similar to January with both the VISTAS and WRAP MM5 simulations achieving the benchmark for both CENRAP subdomains. Again the CENRAP MM5 simulation has a near zero bias and achieves the error benchmark in the CenrapS subdomain, but is too cold in the CenrapN domain falling out of the bias benchmark range.

In July the three simulations achieve the temperature benchmark in both CENRAP subdomains, although the WRAP MM5 simulations is cooler with the CenrapS bias right at the -0.5 K lower bound benchmark. The CENRAP MM5 simulation is slightly warmer than the VISTAS MM5 simulation.

In October, all three MM5 simulations achieve the temperature performance benchmarks. The WRAP MM5 simulation performs best with near zero bias and lower error than either the VISTAS or CENRAP simulations. The VISTAS and CENRAP MM5 simulations exhibit nearly identical temperature performance in October with a near zero bias for the CenrapS subdomain and a cool bias for the CenrapN subdomain.

In conclusion, the WRAP MM5 simulation is always performing best for surface temperature with the lowest bias and usually the lowest error. The VISTAS MM5 simulations is performing next best as the CENRAP MM5 simulations exhibits a cool bias for the CenrapN subdomain in January and March that exceed the performance benchmarks.



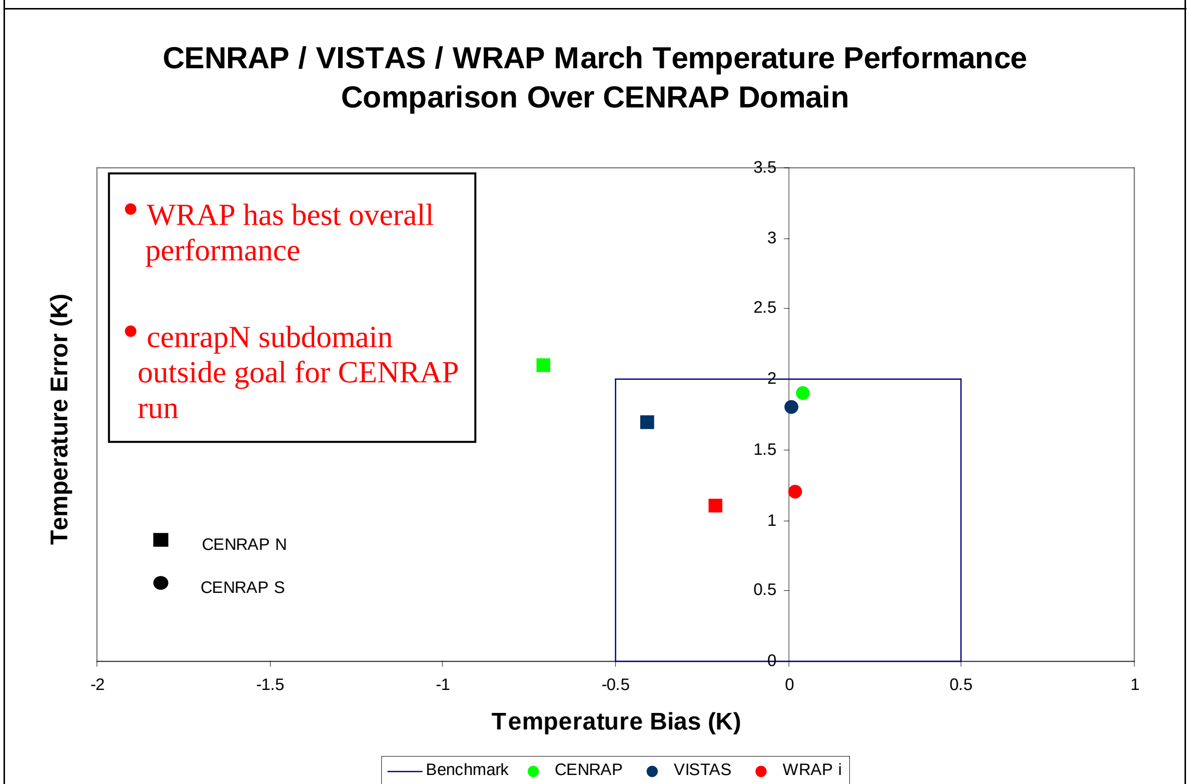


Figure A-2a. Temperature performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and January (top) and March (bottom).

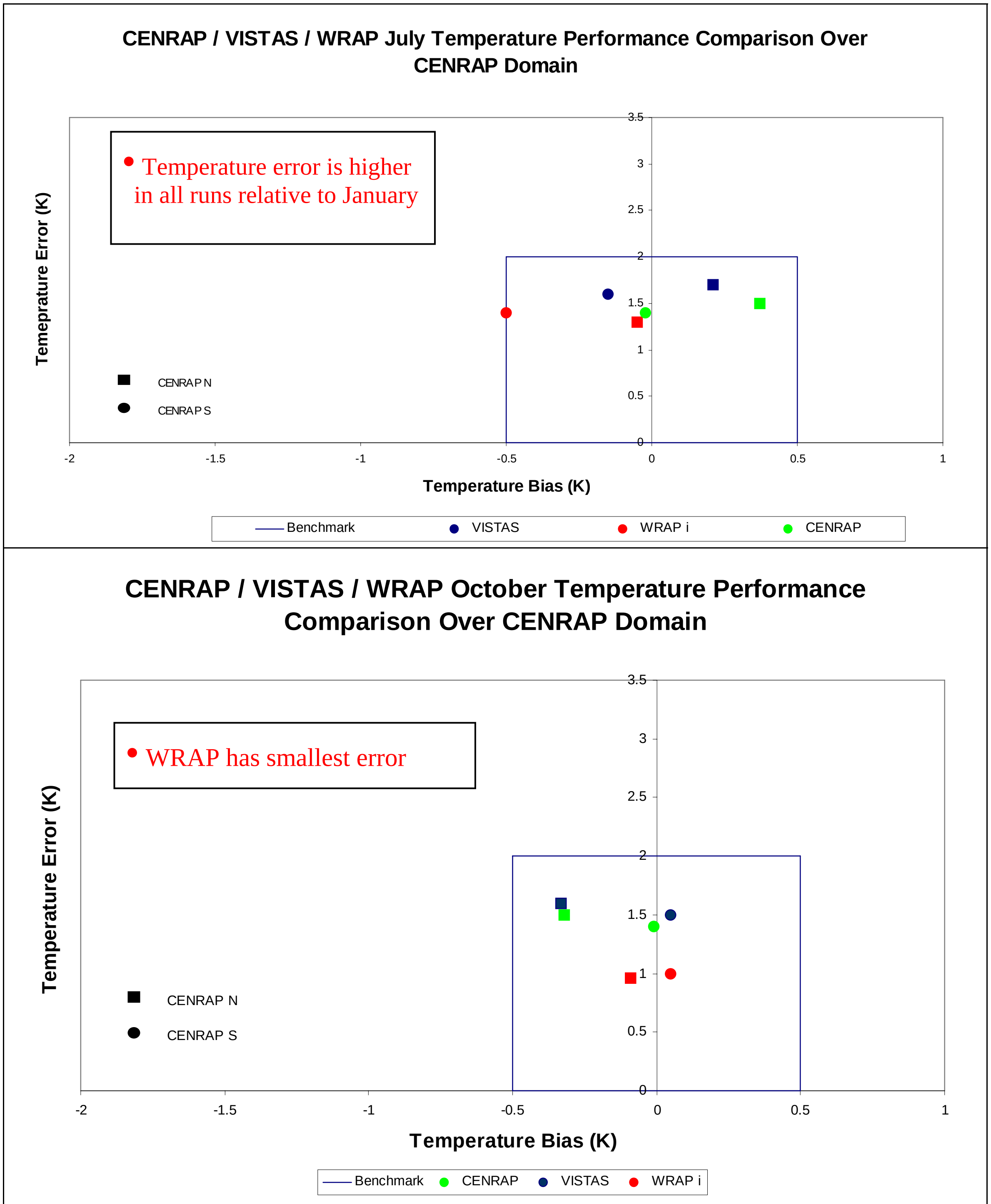
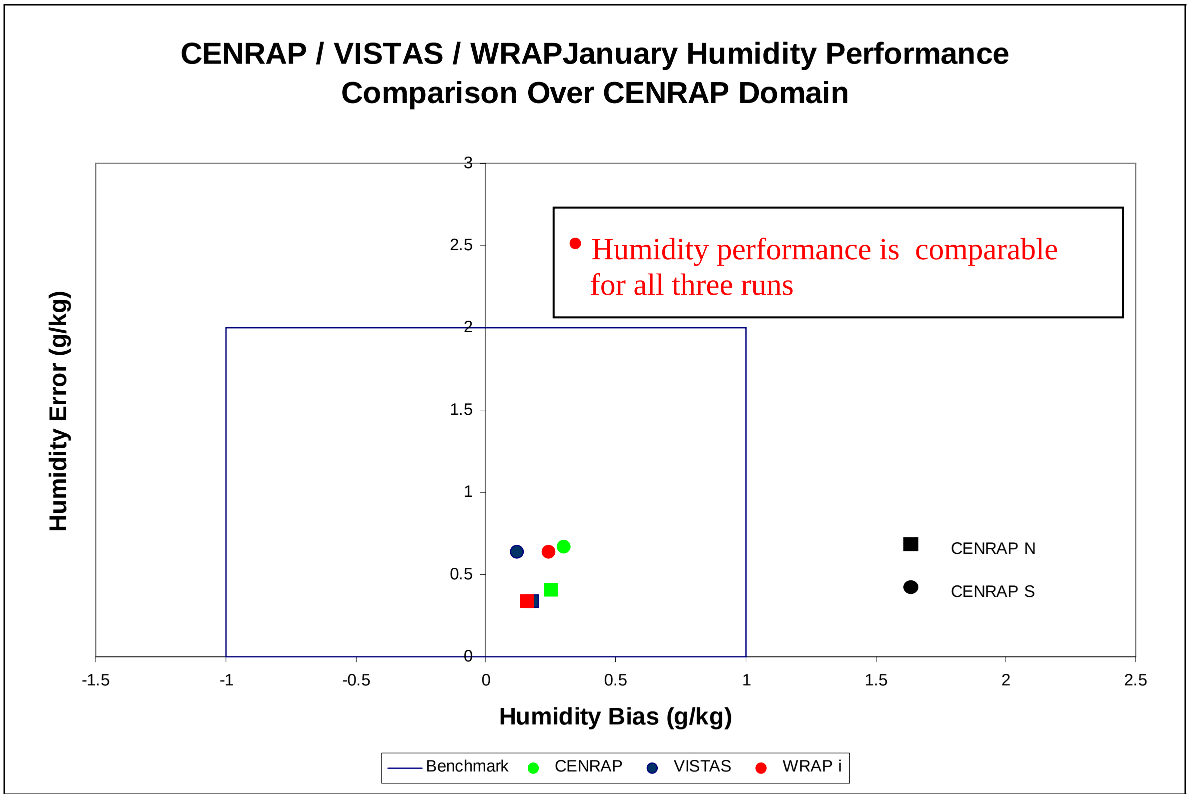


Figure A-2b. Temperature performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and July (top) and October (bottom).

A.1.2 Humidity

The humidity performance for the three MM5 simulations is comparable and always achieves the performance benchmarks. The humidity bias is always near zero for all three runs and four months. In January, March and October the humidity error is at or less than half of the 2.0 g/kg benchmark. However, in July there is more error in the humidity with it within but approaching the benchmark value for all three models.

In conclusion, all three MM5 simulations achieved the humidity benchmark performance goals for all months studied. No model simulation exhibited superior performance over another.



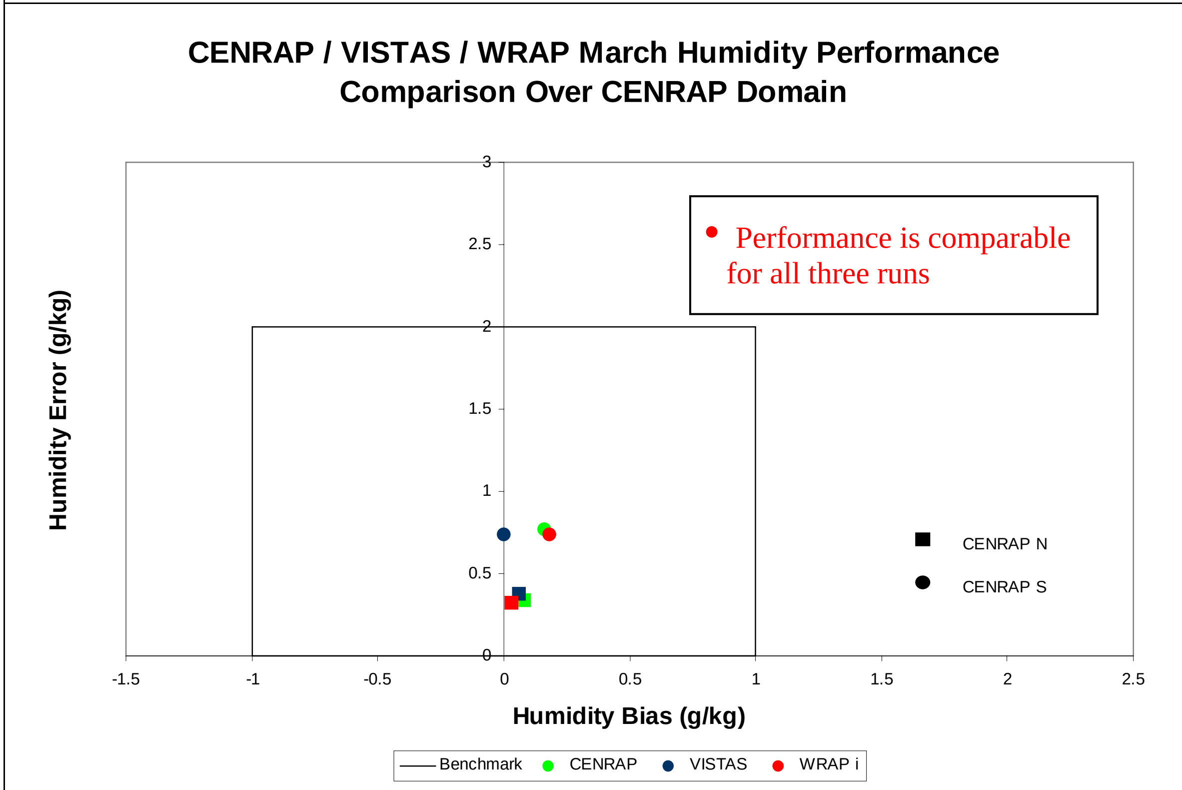


Figure A-3a. Humidity performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and January (top) and March (bottom).

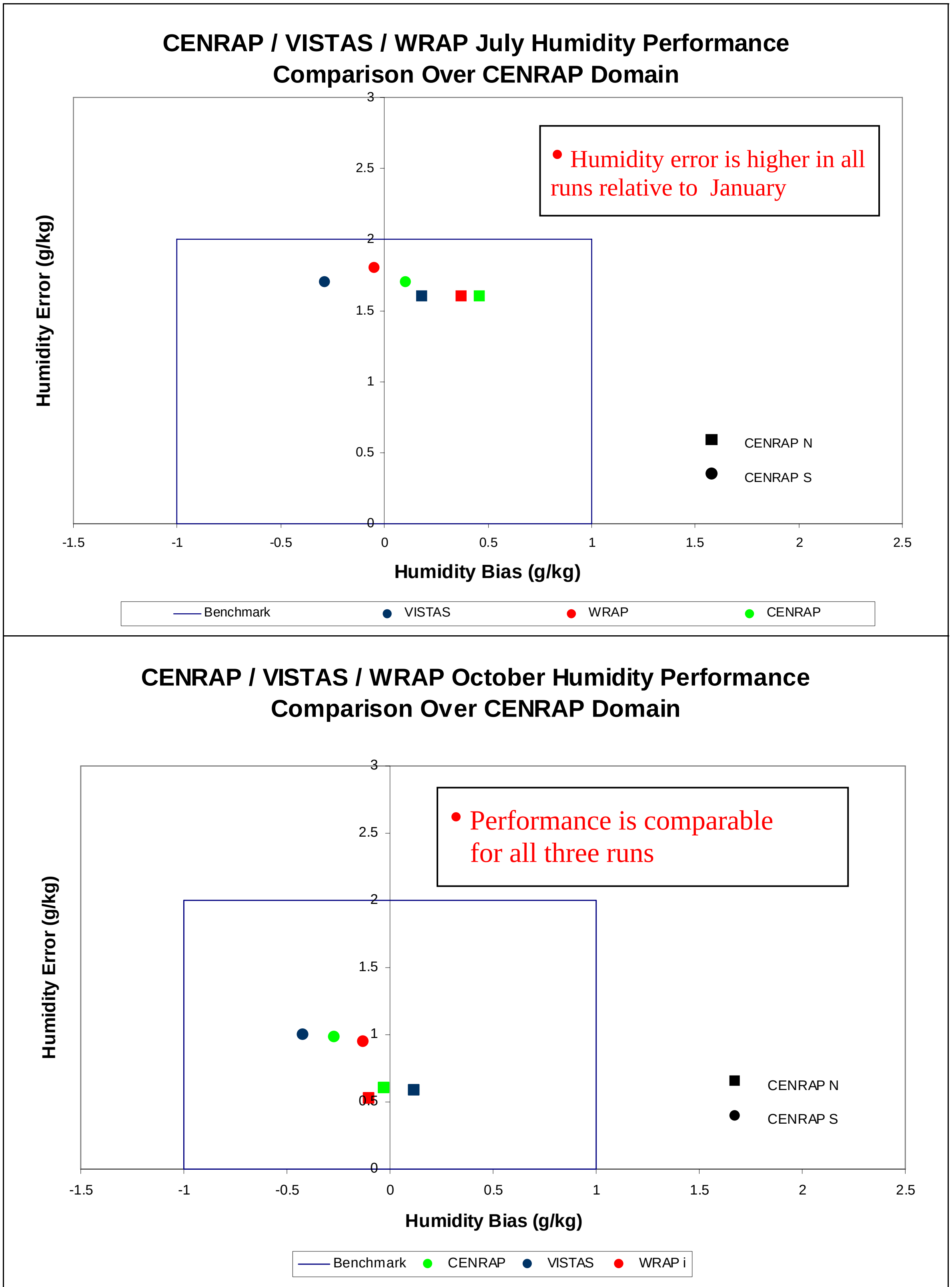


Figure A-3b. Humidity performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and July (top) and October (bottom).

A.1.3 Winds

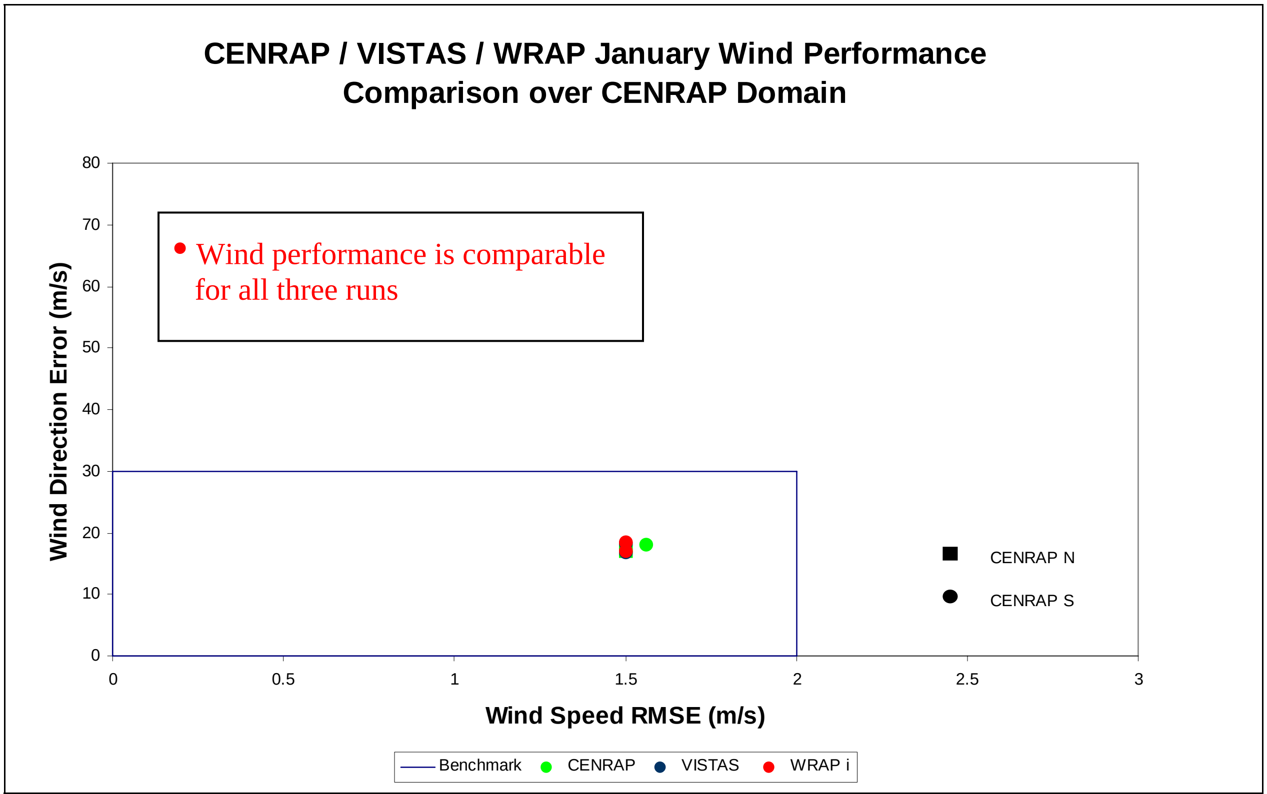
The model performance for wind speed and direction and January is almost identical and within the benchmarks for all three models and both CENRAP subdomains. In fact, the performance is so close the CenrapS symbols are plotted over and obliterate the CenrapN performance symbols.

In March, the wind performance is within the benchmark for all three MM5 simulations, which exhibit similar performance statistics. The wind performance in the CenrapS subdomain is slightly better than CenrapN with the CENRAP MM5 simulations showing the largest wind speed RMSE in the CenrapN subdomain, although still within the benchmarks.

Slight degraded wind direction performance is seen in July with the error increases to just below 20 degrees to just below the 30 degree benchmark value for all three models. Similar wind speed RMSE is seen for all three models.

The October wind performance is within the benchmarks for all three models with performance between that seen for January/March and July.

In summary, the models exhibited similar model performance for surface wind speed and direction.



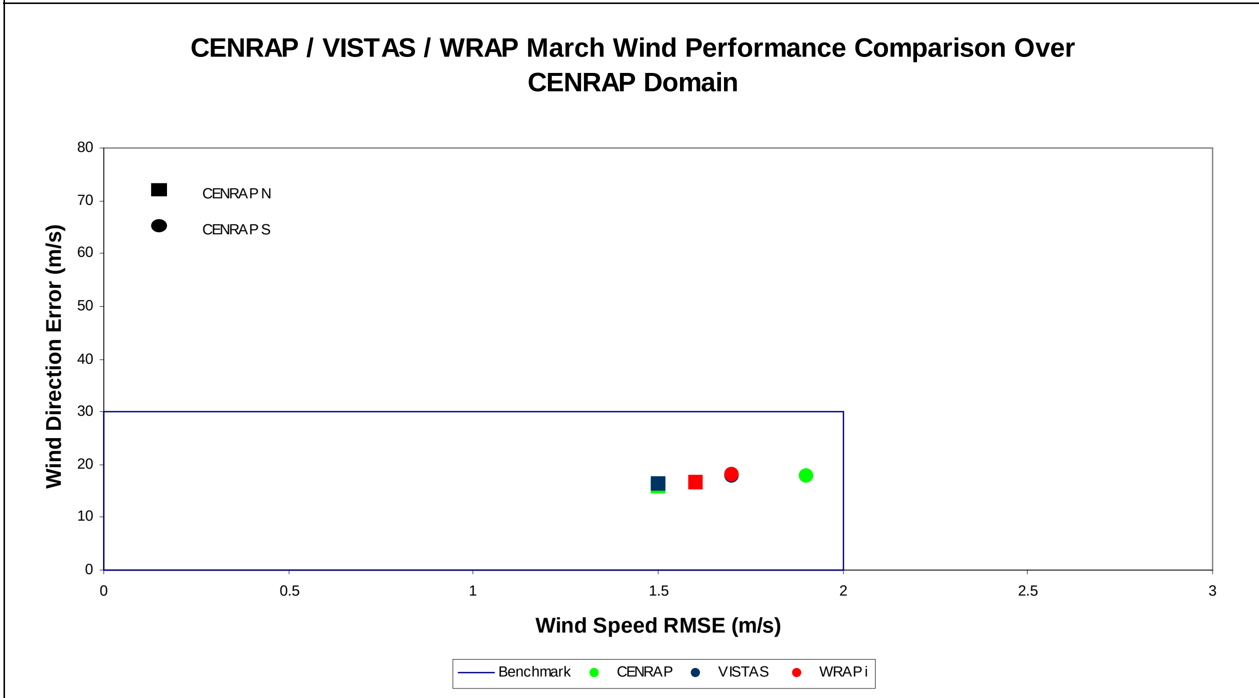
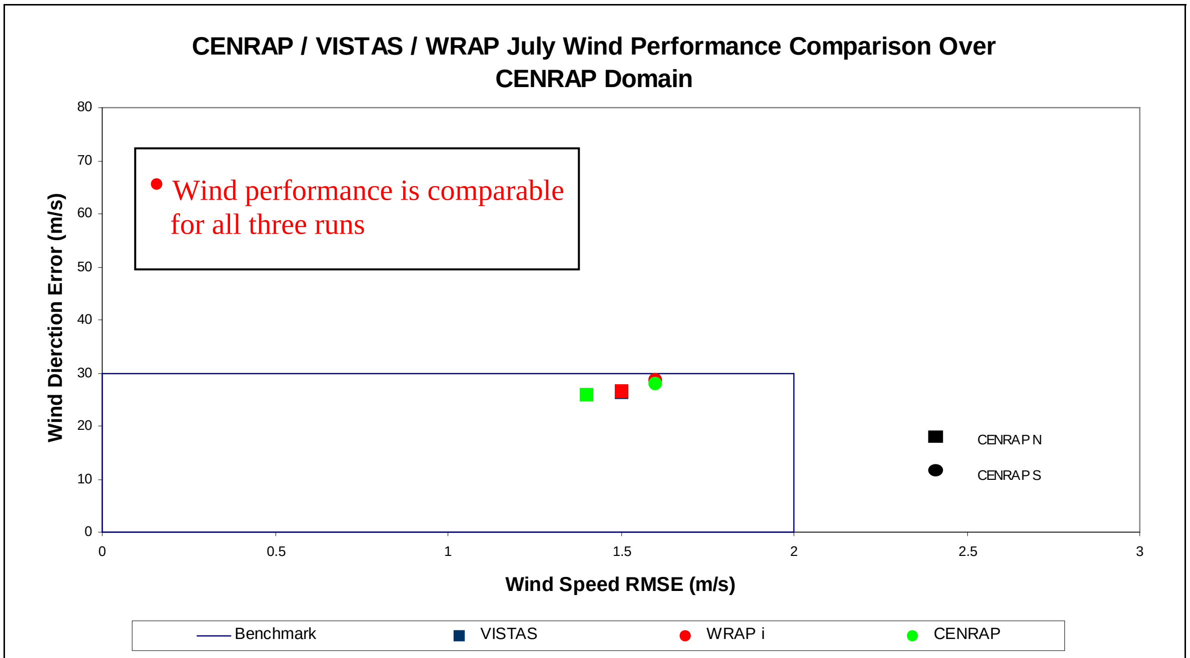


Figure A-4a. Wind Speed and Wind Direction performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and January (top) and March (bottom).



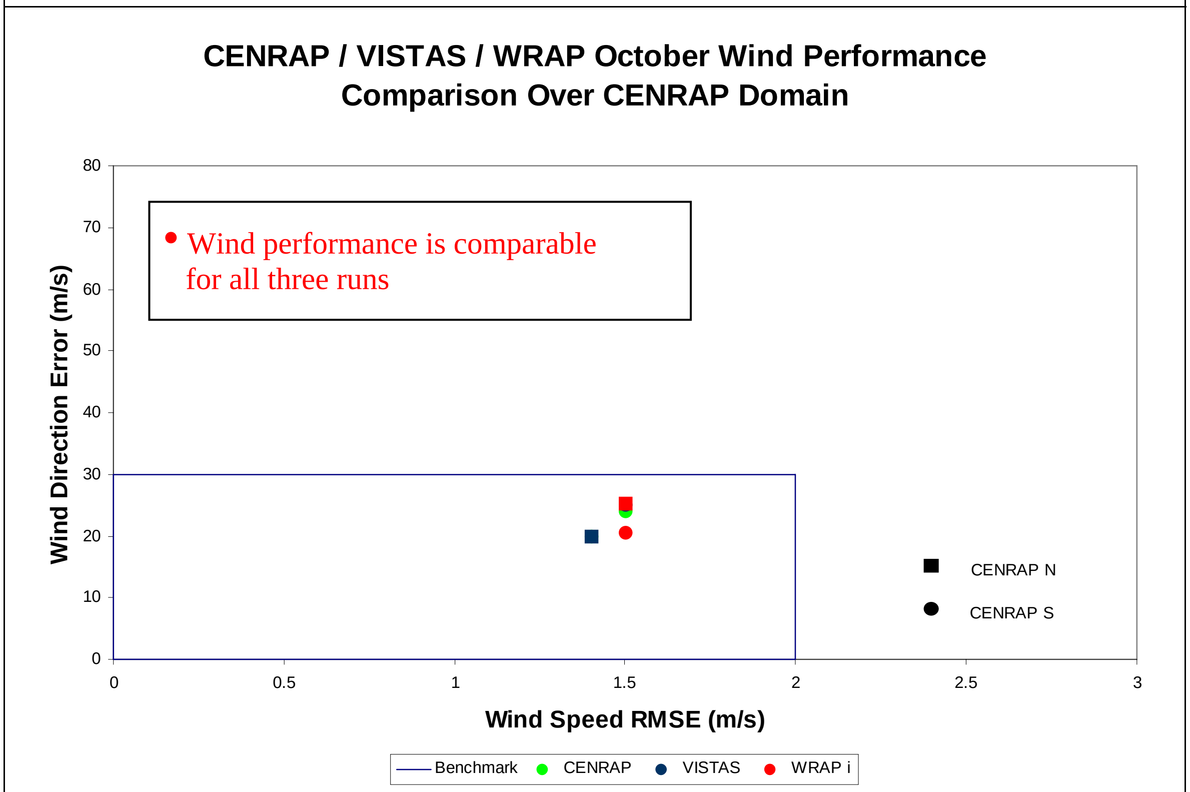


Figure A-4b. Wind Speed and Wind Direction performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and July (top) and October (bottom).

A.2 Upper-Air Meteorological Evaluation

Figure A-5 displays an example comparison of the vertical profile of predicted and observed winds and temperature for Midland, Texas and January 7 2002 at 12 GMT (6am LST) and for July 16, 2002 at 00 GMT (6pm LST). Above the surface, all three models do a good job in replicating the observed temperature, dew point temperature and winds at 6a on January 7, 2002. Although the WRAP MM5 simulation predicts the surface temperature better than the other two simulations, the vertical structure of the temperature and the surface temperature inversion is not reproduced as well.

All three models understate the afternoon PBL depth on July 16, 2002 at Midland Texas. This phenomenon was seen at other sites as well.

The upper-air meteorological model evaluation found that all three models had difficulty reproducing the observed nocturnal inversion. The day time convective mixing depths were also typically underestimated.

Although the WRAP MM5 simulation reproduced the surface temperature the best of the three models, it was worst at reproducing the observed vertical temperature structure and resultant level of mixing. These results are likely due to the surface data assimilation of temperature employed by the WRAP interim MM5 simulation and resulted in WRAP eliminating the surface temperature and humidity FDDA in their final simulation.

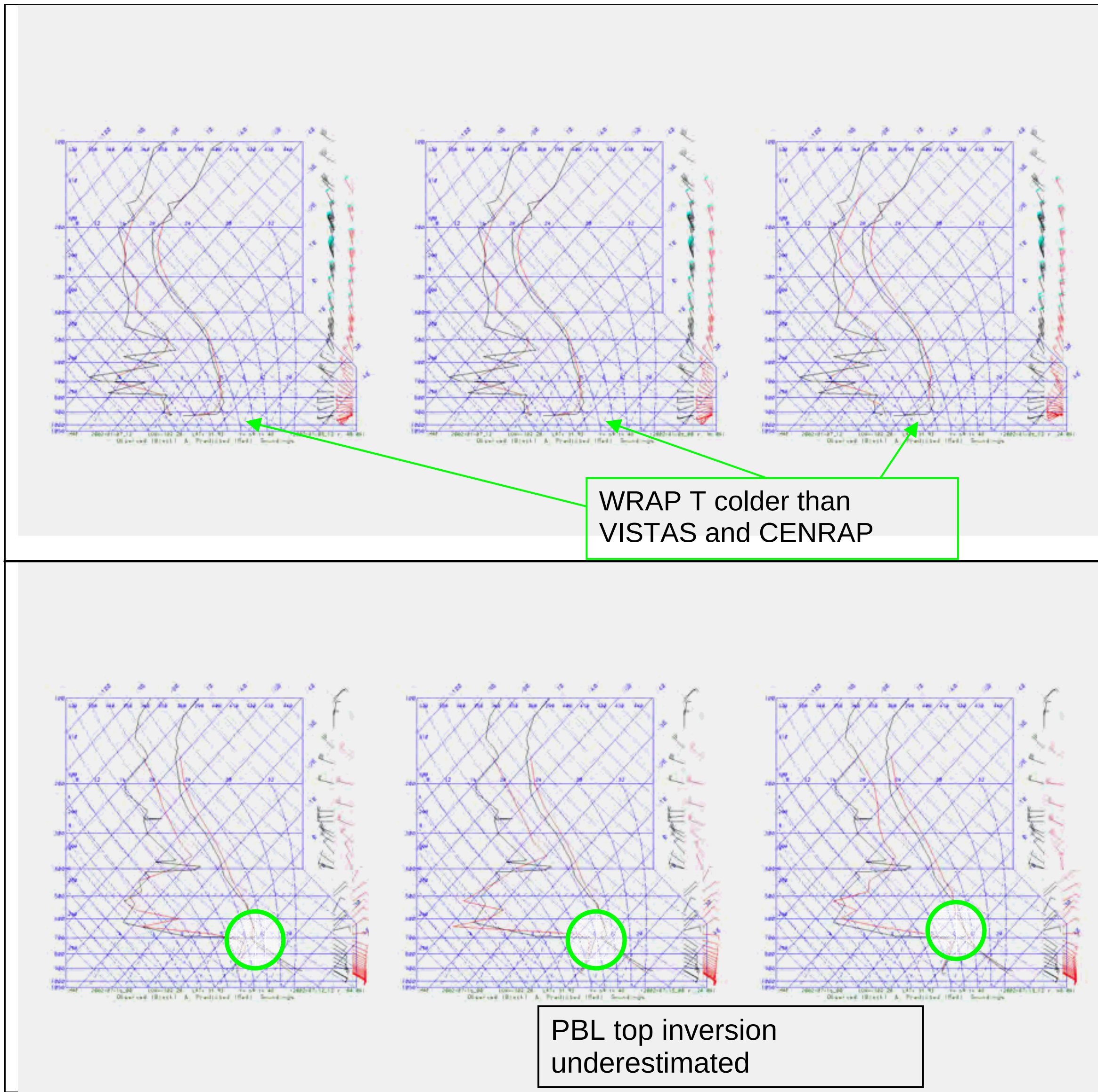


Figure A-5. Comparison of predicted and observed vertical temperature, dew point and winds profiles for the CENRAP (left), VISTAS (middle) and WRAP (right) at Midland Texas on January 7, 2002 at 12 GMT (top) and July 16, 2002 at 00 GMT (bottom).

A.4 Precipitation Model Performance Evaluation

The three MM5 model simulation precipitation estimates were evaluated by comparing the monthly average spatial distributions and amounts with observed values from the observed CPC 0.25 by 0.25 degree (approximately 28 km by 28 km) gridded analysis fields. The CPC analysis fields are gridded from on U.S. land-based observations, consequently the gridded observed fields are not available over the oceans and Canada and Mexico. The CPC observed monthly average precipitation fields were displayed using the MM5 modeling domain. The MM5 total precipitation estimates were accumulated for a month and plotted. Here total precipitation includes both explicit large scale synoptic precipitation as well as the subgrid-scale convective precipitation from the cumulus parameterization (Kain Fritsch 1 or 2).

Figures A-6 through A-9 display the monthly average precipitation fields for the months of January, March, July and October and the CPC observed and CENRAP, VISTAS and interim WRAP MM5 simulations. In January (Figure A-6), all three models reproduce the observed monthly average precipitation well with enhanced predicted and observed precipitation over the Pacific Northwest and the Appalachian Mountains. The MM5 simulations also estimated enhanced precipitation in off-shore areas north of Seattle, over the Atlantic Ocean and in the Gulf of Mexico that can not be either confirmed or refuted by the CPC observations. MM5 does overstate the amount of precipitation in January over the northern CENRAP region including over Minnesota, Iowa and Nebraska.

The three models also do a good job in reproducing the observed spatial distribution and amounts of the precipitation in March 2002 (Figure A-7). Elevated precipitation areas in the Pacific Northwest and across the lower Midwest from Arkansas and up into the Ohio River Valley and adjacent areas. The MM5 simulations do understate the highest observed precipitation amounts in Arkansas. The MM5 simulations also overstate the amount of precipitation in the desert southwest (Four Corners) area in March.

The MM5 monthly average precipitation performance is dramatically worse in July 2002 (Figure A-8). Precipitation is overstated by all three MM5 simulations throughout the U.S. and particularly in the southern states, from Arkansas across Texas to the southeastern U.S. particularly Florida South and North Carolina. This over-prediction bias is due to convective precipitation from the cumulus parameterization (either Kain Fritsch 1 or 2). This overactive precipitation is the result of the over-prediction bias I humidity seen in many subdomains (see Table A-3b and Kemball-Cook et al., 2004a).

In October 2002, the three MM5 simulations reproduced the observed monthly average rainfall fairly well across the U.S. (Figure A-9). The models predict the location of the maximum precipitation in southern Louisiana well, but under-predict the magnitude, which may be due to a slight spatial displacement offshore in the Gulf of Mexico. The MM5 simulations understate the precipitation over the CENRAP region, which explains the dry humidity bias in the CenrapS subdomain in October (Figure A-3b).

In conclusion, the three MM5 simulations do a good job in simulating the observed precipitation when it is due to synoptic weather systems. However, when precipitation is due to convective activity as seen in July that is simulated by the MM5 cumulus parameterization, MM5 greatly overstates the precipitation amounts. This is particularly pronounced in the southern states from the Four Corners area to Florida with the interim WRAP simulation exhibiting the largest over-prediction bias. In the final WRAP MM5 simulation the Betts-Miller cumulus parameterization was used that greatly reduced the convective precipitation amounts resulting in better model performance (Kemball-Cook et al., 2005). However, an overestimation bias under convective precipitation conditions still was present.

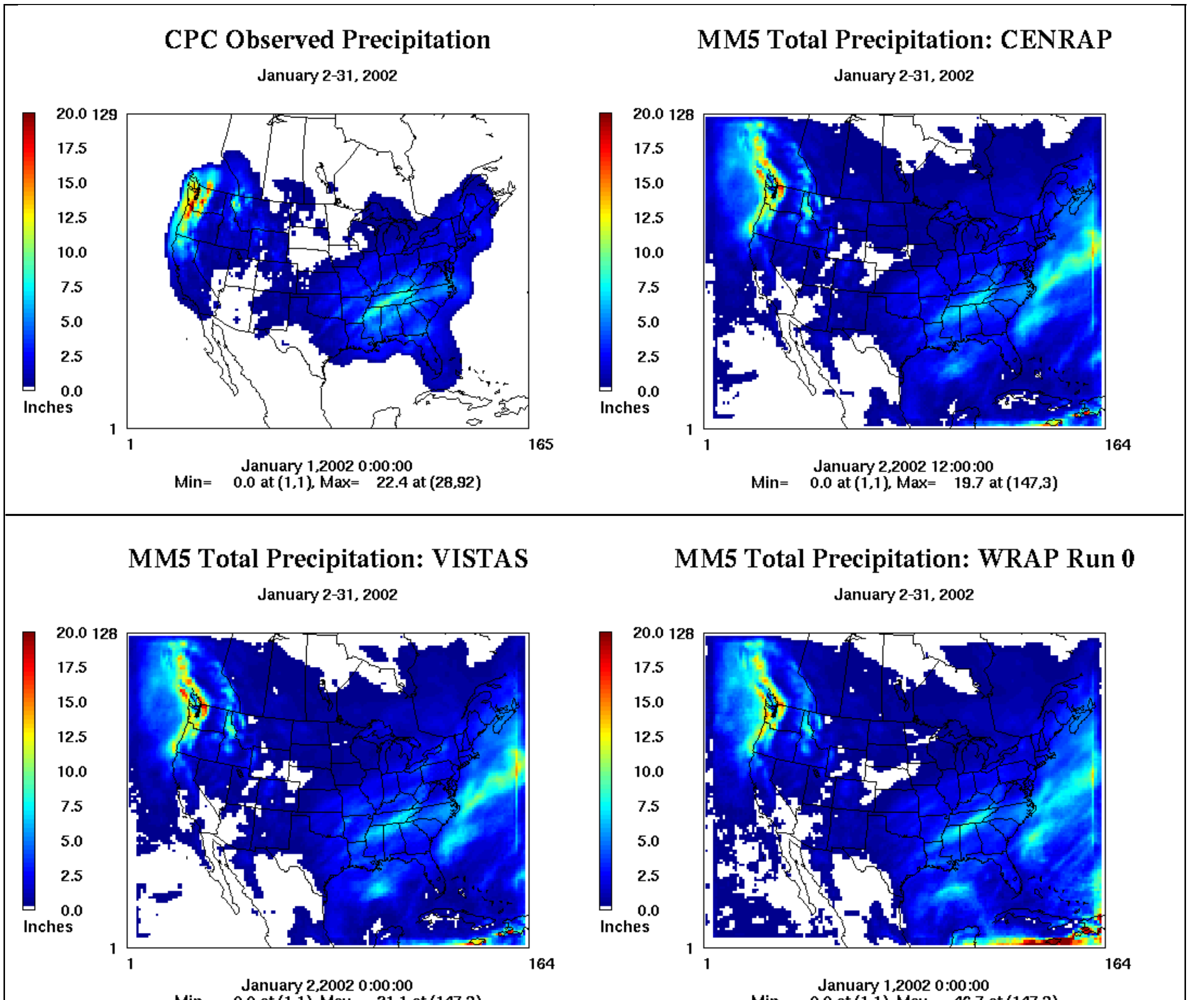


Figure A-6. Comparison of January 2002 observed monthly average precipitation (top left) with predicted values for the CENRAP (top right), VISTAS (bottom left) and WRAP (bottom right January 2002 simulation (note: observed precipitation not valid over water due to lack of measurements).

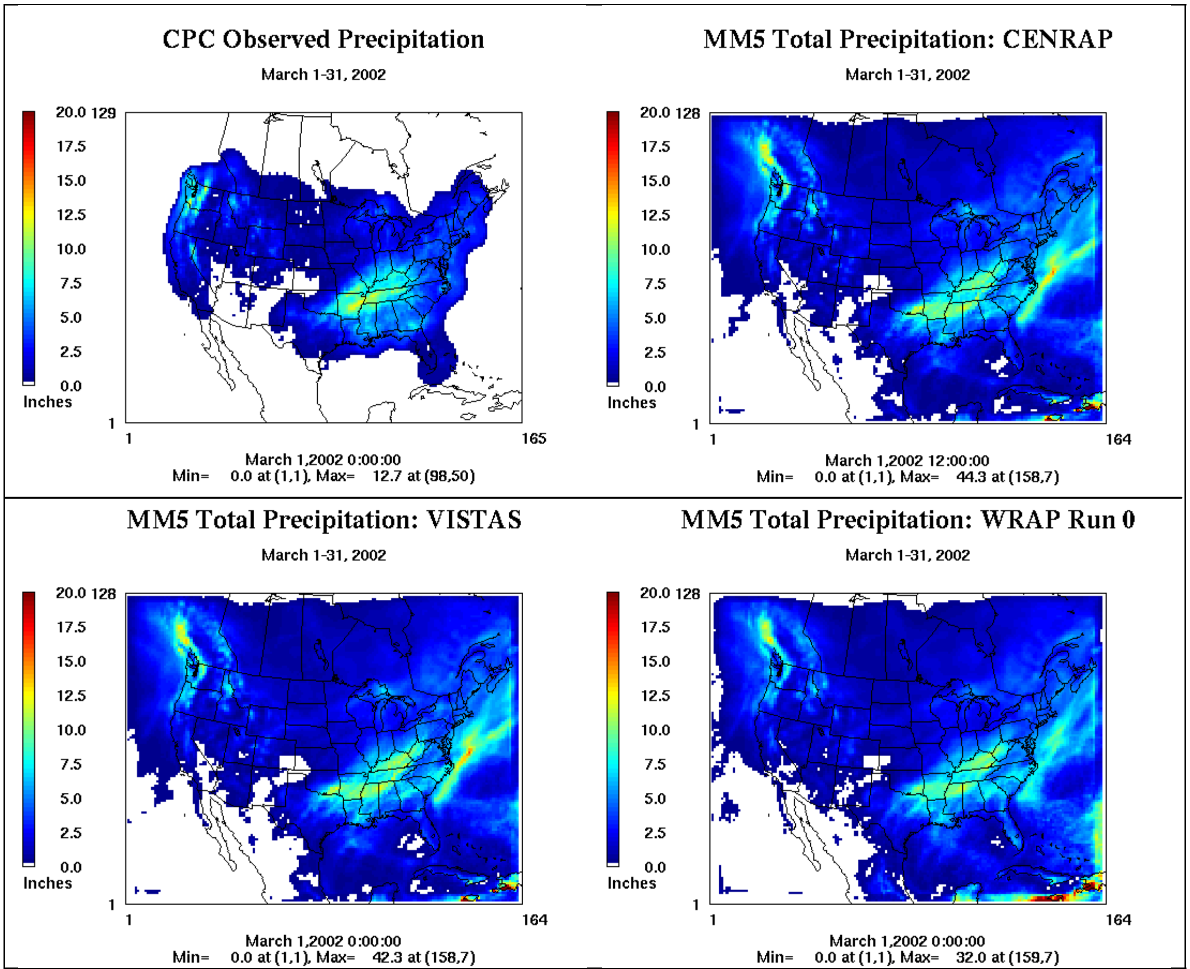


Figure A-7. Comparison of March 2002 observed monthly average precipitation (top left) with predicted values for the CENRAP (top right), VISTAS (bottom left) and WRAP (bottom right January 2002 simulation (note: observed precipitation not valid over water due to lack of measurements).

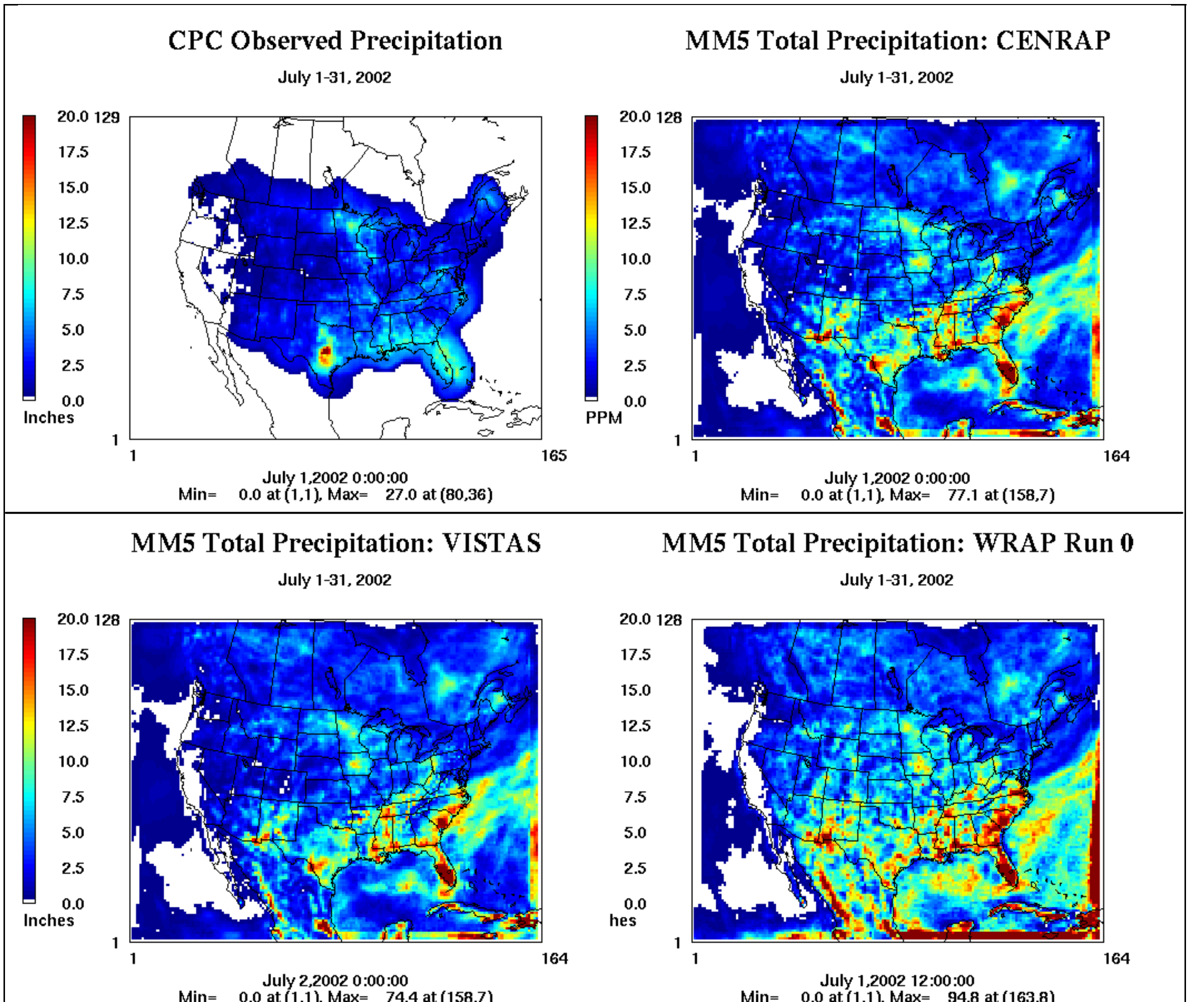


Figure A-8. Comparison of July 2002 observed monthly average precipitation (top left) with predicted values for the CENRAP (top right), VISTAS (bottom left) and WRAP (bottom right) (note: observed precipitation not valid over water due to lack of measurements).

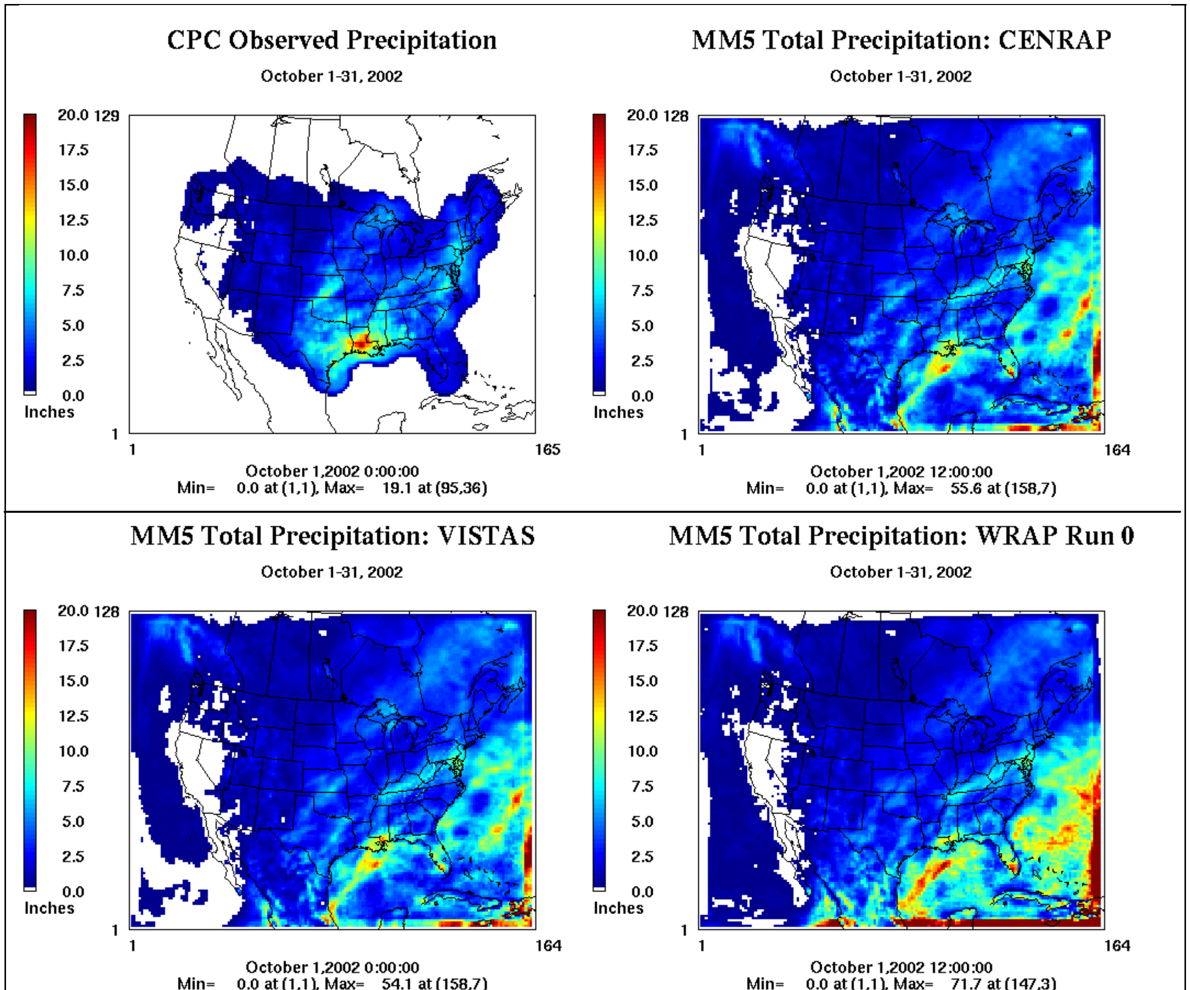


Figure A-9. Comparison of October 2002 observed monthly average precipitation (top left) with predicted values for the CENRAP (top right), VISTAS (bottom left) and WRAP (bottom right) (note: observed precipitation not valid over water due to lack of measurements).

APPENDIX B

File Names, Data Source and Type and Description of Emissions Used in the 2002 Typical and 2018 Base G Emissions Inventories

Table A-1. CENRAP 2002 Typical Base G (Typ02G) emissions inventory.

Filename	Source	Data type	Description
1 Stationary Area Sources			
arinv_Mexico99phase3_border_20051027v4_noDust_noFire.ida	**ERG**	**Text**	**1999 BRAVO Mexico inventory for the six Northern states; annual**
arinv_Mexico99phase3_interior_ERG_Oct06_noDust_noFire.ida	**ERG**	**Text**	**1999 BRAVO Mexico inventory for the Southern states; annual**
arinv_nodust_noOilGas_CA2002_111105.ida	**ERG**	**Test**	**California 2002 inventory; annual**
arinv_noDUST_noREF_vistas_2002g_2453908.ida	**Alpine Geophysics**	**Test**	**VISTAS 2002 inventory; annual**
arinv_nodust_wrap2002_v1_noCAWANDORUT_081205.ida	**ERG**	**Text**	**WRAP 2002 inventory for AZ, CO, ID, MT, NM, NV, SD, and WY ; annual**
arinv_nodust_wrap2002_v2_WANDORUT_102105.ida	**ERG**	**Text**	**WRAP 2002 inventory for ND, OR, UT, and WA; annual**
arinv_NoFire_CANADA2000_v2.ida	**Environment, Canada 011205**		**2000 Canada inventory; annual**
arinv_NoFire_noDUST_noREF_mrpok_2002_20jun2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2002 inventory; annual**
arinv_NoFire_nodust_ref_mane-vu2002_011705.ida	**MARAM web site**	**Text**	**MANE_VU 2002 inventory, annual**
arinv_NoFire_nodust_ref_nh3_cenrap2002_081705.ida	**Pechan**	**Text**	**CENRAP 2002 inventory; annual**
arinv_vistas2002_TypicalFires2610000_112704.ida	**Alpine Geophysics**	**Text**	**VISTAS 2002 inventory for SCC 2610000500**
2 Fugitive Dust			
fdinv1_CA2002_v2_wfac_111105.ida	**ERG**	**Text**	**CA 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual**
fdinv1_CANADA2000_v2_wfac.ida	**Environment Canada**	**Text**	**Canada 2000 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual**
fdinv1_cenrap2002_wfac_081705.ida	**Pechan**	**Text**	**CENRAP 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual**
fdinv1_manevu2002_wfac_011705.ida	**MARMA web site**	**Text**	**MANE-VU2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual**
fdinv1_Mexico99phase3_border_20051027v4_wTfac.ida	**MARMA web site**	**Text**	**Mexico Northern states 1999 inventory; extracted from stationary area inventory using initial list of**

Filename	Source	Data type	Description
			SCCs; transport fractions applied; annual
fdinv1_Mexico99phase3_interior_ERG_Oct06_wo_pmfac.ida	**ERG**	**Text**	**Mexico Southern states 1999 inventory; extracted from stationary area inventory using initial list of SCCs; no transport fractions applied; annual**
fdinv1_mrpok_2002_20jun2006_w_tfrac.ida	**Alpine Geophysics**	**Text**	**MWRPO 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual**
fdinv1_vistas_2002g_2453908_w_pmfac.ida	**Alpine Geophysics**	**Text**	**VISTAS 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual**
fdinv1_wrap2002_wfac_noCAWANDORUT_081205.ida	**ERG**	**Text**	**WRAP 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual**
fdinv1_wrap2002_wfac_WANDORUT_102105.ida	**ERG**	**Text**	**WRAP 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual**
fdinv2_CA2002_111105.w_tfrac.ida	**ERG**	**Text**	**CA 2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual**
fdinv2_CANADA_v2.w_tfrac.ida	**Environment Canada**	**Text**	**Canada 2000 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual**
fdinv2_cenrap2002_081705.w_tfrac.ida	**Pechan**	**Text**	**CENRAP 2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual**
fdinv2_mane-vu2002_011705.w_tfrac.ida	**MARAMA web site**	**Text**	**MANE-VU2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual**
fdinv2_vistas_2002g_2453908_w_pmfac.ida	**Alpine Geophysics**	**Text**	**VISTAS 2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport**

Filename	Source	Data type	Description
			fractions applied; annual
fdinv2_wrap2002_v1_noCAWANDORUT_081205.w_tfrac.ida	**ERG**	**Text**	**WRAP 2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual**
fdinv2_wrap2002_v2_WANDORUT_102105.w_tfrac.ida	**ERG**	**Text**	**WRAP 2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual**
3 Road Dust			
rdinv_CA2002_v2_wfac_111105.ida	**Environ**	**Text**	**California 2002 inventory; extracted from stationary area inventory; transport fractions applied; annual**
rdinv_CANADA2000_v2_wfac.ida	**Environment Canada**	**Text**	**Canada 2000 inventory; extracted from stationary area inventory; transport fractions applied; annual**
rdinv_cenrap2002_wfac_081705.ida	**Pechan**	**Text**	**CENRAP 2002 inventory; extracted from stationary area inventory; transport fractions applied; annual**
rdinv_manevu2002_wfac.ida	**Alpine Geophysics**	**Text**	**MANE-VU 2002 inventory; extracted from stationary area inventory; transport fractions applied; annual**
rdinv_vistas_2002g_2453908_w_pmfac.txt	**Alpine Geophysics**	**Text**	**VISTAS 2002 inventory; extracted from stationary area inventory; transport fractions applied; annual**
rdinv_wrap2002_wfac_${season}_082205.ida	**ENVIRON**	**Text**	**WRAP 2002 inventory; transport fractions applied; seasonal**
4 Ammonia			
arinv_nh3_2002_mrpok_${month}_3may2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2002 agricultural ammonia inventory; monthly**
arinv_nh3_cenrap02_082406__${month}.ida	**Pechan**	**Text**	**CENRAP 2002 xxxx inventory; monthly**
CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_ ${month}_072805_NoBio.txt	**Pechan**	**Text**	**CENRAP 2002 xxxx inventory; monthly**
NH3_CENRAP_ANN.082506.txt	**Pechan**	**Text**	**CENRAP 2002 xxxx inventory; annual**
CENRAP_AREA_MISC_SMOKE_INPUT_ANN_STATE_071905.txt	**Pechan**	**Text**	**CENRAP 2002 xxxx inventory; annual**
5 WRAP Ammonia			
nh3gts_l.2002###.1.WRAP36.base02b_nosoil.ncf	**Environ**	**Binary, netCDF**	**Includes domestic, livestock, fertilizer, and wild life gridded inventory; daily**
6 Area Anthropogenic Fires			
arfinv_anthro_cenrap2002_081705.ida	**Pechan**	**Text**	**CENRAP 2002 inventory; extracted**

Filename	Source	Data type	Description
			from stationary area inventory; annual
AREA_BURNING_SMOKE_INPUT_ANN_TX_NELI_071905.txt	**Pechan**	**Text**	**CENRAP 2002 inventory; extracted from stationary area inventory; annual**
arfinv_anthro_CANADA2000_v2.ida	**Environment Canada**	**Text**	**Canada 2000 inventory; extracted from stationary area inventory; annual**
arfinv_anthro_mane-vu2002_011705.ida	**MARAM web site**	**Text**	**MANE-VU2002 inventory; extracted from stationary area inventory; annual**
arfinv_anthro_Mexico99phase3_border_20051027v4.ida	**ERG**	**Text**	**Mexico 1999 inventory for Northern states; extracted from stationary area inventory; annual**
arfinv_anthro_Mexico99phase3_interior_ERG_Oct06.ida	**ERG**	**Text**	**Mexico 1999 inventory for Southern states inventory; extracted from stationary area inventory; annual**
arfinv_anthro_mrpok_2002_20jun2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2002 inventory; extracted from stationary area inventory; annual**
arfinv_anthro_vistas2002_TypicalFires_No2610000_112704.ida	**Alpine Geophysics**	**Text**	**VISTAS 2002 inventory; annual**
7 Area Wild Fires			
arfinv_wf_CANADA2000_v2.ida	**Environment Canada**	**Text**	**Canada 2000 inventory; extracted from stationary area inventory; annual**
arfinv_wf_cenrap2002_081705.ida	**Pechan**	**Text**	**CENRAP 2002 inventory; extracted from stationary area inventory; annual**
arfinv_wf_mane-vu2002_011705.ida	**MARAM web site**	**Text**	**MANE-VU 2002 inventory; extracted from stationary area inventory; annual**
arfinv_wf_Mexico99phase3_border_20051027v4.ida	**ERG**	**Text**	**Mexico 1999 inventory for Northern states inventory; extracted from stationary area inventory; annual**
arfinv_wf_Mexico99phase3_interior_ERG_Oct06.ida	**ERG**	**Text**	**Mexico 1999 inventory for Southern states inventory; extracted from stationary area inventory; annual**
arfinv_wf_mrpok_2002_20jun2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2002 inventory; extracted from stationary area inventory; annual**
arfinv_wf_vistas2002_TypicalFires_No2610000_112704.ida	**Alpine**	**Text**	**VISTAS 2002 inventory; annual**

Filename	Source	Data type	Description
	Geophysics		
8 Offshore Area Sources (Gulf of Mexico)			
CO_noCM.txt	**MMS**	**Text**	**Commercial marines records were removed; they are modeled in offshore shipping**
NOX_noCM.txt	**MMS**	**Text**	**Commercial marines records were removed; they are modeled in offshore shipping**
PM_noCM.txt	**MMS**	**Text**	**Commercial marines records were removed; they are modeled in offshore shipping**
SO2_noCM.txt	**MMS**	**Text**	**Commercial marines records were removed; they are modeled in offshore shipping**
VOC_noCM.txt	**MMS**	**Text**	**Commercial marines records were removed; they are modeled in offshore shipping**
9 Non Road (Annual Inventory)			
arinv_marine_mrpok_2002_27apr2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2002 Marine inventory; annual**
marinv_vistas_2002g_2453972.ida	**Alpine Geophysics**	**Text**	**VISTAS 2002 Marine inventory; annual**
nrinv_CANADA2000_v2_aircraft.ida	**Environment Canada**	**Text**	**Canada 2000 aircraft inventory; extracted from non-road inventory; annual**
nrinv_CANADA2000_v2.ida	**Environment Canada**	**Text**	**Canada 2000 inventory; annual**
nrinv_CANADA2000_v2_locomotive.ida	**Environment Canada**	**Text**	**Canada 2000 locomotive inventory; extracted from non-road inventory; annual**
nrinv_CANADA2000_v2_marine.ida	**Environment Canada**	**Text**	**Canada 2000 marine inventory; extracted from non-road inventory; annual**
nrinv_cenrap2002_annual_071305.ida	**Pechan**	**Text**	**CENRAP 2002 inventory; annual**
nrinv_mane-vu2002_052505.ida	**MARAM web site**	**Text**	**MANE_VU 2002 inventory; annual**
nrinv_mane-vu2002_aircraft_052505.ida	**MARAM web site**	**Text**	**MANE-VU 2002 aircraft inventory; extracted from non-road inventory; annual**
nrinv_mane-vu2002_locomotive_052505.ida	**MARAM web site**	**Text**	**MANE-VU 2002 locomotive inventory; extracted from non-road inventory; annual**
nrinv_mane-vu2002_shipping_052505.ida	**MARAM web site**	**Text**	**MANE-VU 2002 marine inventory;**

Filename	Source	Data type	Description
			extracted from non-road inventory; annual
nrinv_Mexico1999_ERG_Aircraft_Locomotive_Rec_102705.ida	**ERG**	**Text**	**Mexico 1999 aircraft and locomotive inventory; annual**
nrinv_Mexico99phase3_border_20061025v4.ida	**ERG**	**Text**	**Mexico 1999 inventory for Northern states; annual**
nrinv_Mexico99phase3_interior_ERG_Oct06.ida	**ERG**	**Text**	**Mexico 1999 inventory for Southern states; annual**
nrinv_vistas_2002g_2453908.ida	**Alpine Geophysics**	**Text**	**VISTAS 2002 inventory; annual**
nrinv_wrap2002_InshoreMarine_annual_tpd_080205.ida	**ENVIRON**	**Text**	**WRAP marine inventory; annual**
nrinv_wrap2002_v2_locomotive_annual_tpd_102705.ida	**ENVIRON**	**Text**	**WRAP locomotive inventory; annual**
11 Non Road (Monthly and Seasonal Inventory)			
nrinv_2002_mrpok_$month_3may2006.ida	**Missouri DNR**	**Text**	**MWRPO 2002 inventory; monthly**
nrinv_CA2002_v2_OffRoad_${season}_103105.ida	**EENVIRON**	**Text**	**California 2002 inventory, seasonal**
nrinv_cenrap2002_$month_082806.ida	**Pechan**	**Text**	**CENRAP 2002 inventory; monthly**
nrinv_wrap2002_nonCA_${season}_060705.ida	**ENVIRON**	**Text**	**WRAP 2002 inventory, monthly**
nrinv_wrap2002_v2_Aircraft_${season}_103105.ida	**ENVIRON**	**Text**	**WRAP 2002 aircraft inventory; seasonal**
12 Stationary Point			
pthour_2002typ_baseg_${month}_28jun2006.ems	**Alpine Geophysics**	**Text**	**VISTAS 2002 hourly inventory for the EGUs; monthly**
egu_ptinv_vistas_2002typ_baseg_2453909.ida	**Alpine Geophysics**	**Text**	**VISTAS 2002 EGUs inventory; annual**
negu_ptinv_vistas_2002typ_baseg_2453909.ida	**Alpine Geophysics**	**Text**	**VISTAS 2002 non EGUs inventory, annual**
ptinv_CA2002_101405.ida	**ERG**	**Text**	**California 2002 inventory; annual**
ptinv_CA2002_CARBofs_v1.ida	**ARB**	**Text**	**California 2002 offshore inventory; annual**
Ptinv_CANADA2000_v2_032407.ida	**Environment Canada**	**Text**	**Canada 2000 inventory; annual**
Ptinv_cenrap2002_033007.ida	**Pechan**	**Text**	**CENRAP 2002 inventory; annual**
ptinv_egu_2002_mrpok_1may2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2002 EGUs inventory; annual**
ptinv_mane-vu2002_v2_${WINSUM}_041905.ida	**MARAM web site**	**Text**	**MANE-VU 2002 inventory, seasonal; winter summer**
ptinv_Mexico99phase3_border_20061025v4.ida	**ERG**	**Text**	**Mexico 1999 inventory for Northern states; annual**
ptinv_Mexico99phase3_interior_ERG_Oct06.ida	**ERG**	**Text**	**Mexico 1999 inventory for Southern states; annual**
ptinv_negu_2002_mrpok_1may2006.ida		**Text**	**MWRPO 2002 non EGUs inventory;**

Filename	Source	Data type	Description
			annual
ptinv_wrap2002_AKAZMTNMORUTWAWY_102405.ida	**ERG**	**Text**	**WRAP 2002 inventory for AK, AZ, MT, NM, OR, UT, WA, and WY; annual**
tinv_wrap2002_v2_NVIDSDNDCO_090805.ida	**ERG**	**Text**	**WRAP 2002 inventory for NV, ID, SD, ND, and CO; annual**
ptinv_WRAPTribes2002_102005.ida	**ERG**	**Text**	**WRAP/Tribes 2002 inventory; annual**
13 Offshore Point (Gulf)			
CO.afs.gwei2000.20000801.latlong.ida	**MMS**	**Text**	
PM10.afs.gwei2000.20000801.latlong.ida	**MMS**	**Text**	
SO2.afs.gwei2000.20000801.latlong.ida	**MMS**	**Text**	
NOX.afs.gwei2000.20000801.latlong.ida	**MMS**	**Text**	
PM2_5.afs.gwei2000.20000801.latlong.ida	**MMS**	**Text**	
VOC.afs.gwei2000.20000801.latlong.ida	**MMS**	**Text**	
14 On Road Mobile (Emissions)			
mbinv_wrap2002_v2_noCA_${season}_101305.ida	**ENVIRON**	**Text**	**WRAP 2002 inventory; seasonal**
mbinv_CA2002_v2_${season}_102705.ida	**ENVIRON**	**Text**	**California 2002 inventory; seasonal**
mbinv_CANADA2000.ida	**Environment Canada**	**Text**	**Canada 2000 inventory; annual**
mbinv_Mexico99phase3_border_20051021v4.ida	**ERG**	**Text**	**Mexico 1999 inventory for Northern states; annual**
mbinv_Mexico99phase3_interior_ERG_Oct06.ida	**ERG**	**Text**	**Mexico 1999 inventory for Southern states; annual**
15 On Road Mobile (Activities, VMT)			
mbinv#_vmt_cenrap.ida	**STI**	**Text**	**CENRAP 2002 inventory; divided into three files; annual**
mbinv_2002_vmt_mane-vu.ida	**MARAM web site**	**Text**	**MANE-VU 2002 inventory; annual**
mbinv_mrpo_02f_vmt_02may06.ida	**Alpine Geophysics**	**Text**	**MWRPO 2002 inventory; annual**
mbinv_vistas_02g_vmt_12jun06.ida	**Alpine Geophysics**	**Text**	**VISTAS 2002 inventory; annual**
16 Point Fires			
ptday_2002CENRAP_ptfires_mon##.ida	**STI**	**Text**	**CENRAP 2002 prescribed fires; daily emissions; monthly**
ptday_agfires_##_vistas.ida	**Alpine Geophysics**	**Text**	**VISTA 2002 all fire sources; daily emissions; monthly**
PTDAY_200504051315_wrap2002_nfr.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 non federal rangeland fires; daily emissions; monthly**
PTDAY_200507011516_wrap2002_agf_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 Ag. Fires; daily emissions; monthly**
PTDAY_200510210936_wrap2002_wild_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fires; daily emissions; monthly**

Filename	Source	Data type	Description
PTDAY_200510211022_wrap2002_wfu_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fire use; daily emissions; monthly**
PTDAY_200510211029_wrap2002_rx_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 prescribed fires; daily emissions; monthly**
pthour_2002CENRAP_ptfires_mon##.ida	**STI**	**Text**	**CENRAP 2002 prescribed fires; hourly plume distribution; monthly**
pthour_agfires_##_vistas.ida	**Alpine Geophysics**	**Text**	**VISTA 2002 all fire sources; hourly plume distribution; monthly**
PTHOUR_200504051315_wrap2002_nfr.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 non federal rangeland; hourly plume distribution; monthly**
PTHOUR_200507011516_wrap2002_agf_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 Ag. Fires; hourly plume distribution; monthly**
PTHOUR_200510210936_wrap2002_wild_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fires; hourly plume distribution; monthly**
PTHOUR_200510211022_wrap2002_wfu_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fire use; hourly plume disributution; monthly**
PTHOUR_200510211029_wrap2002_rx_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 prescribed fires; hourly plume distribution; monthly**
ptinv_2002CENRAP_ptfires_mon##.ida	**STI**	**Text**	**CENRAP 2002 prescribed fires; fire location info.; monthly**
ptinv_agfires_##_vistas.ida	**Alpine Geophysics**	**Text**	**VISTA 2002 all fire sourcesfire location info; monthly**
PTINV_200504051315_wrap2002_nfr.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 non federal rangeland fires; fire location info; monthly**
PTINV_200507011516_wrap2002_agf_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 Ag. Fires; fire location info.; monthly**
PTINV_200510210936_wrap2002_wild_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fires; fire location info.; monthly**
PTINV_200510211022_wrap2002_wfu_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fire use; fire location info.; monthly**
PTINV_200510211029_wrap2002_rx_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 prescribed fires; fire location; monthly**
ptday.ontario_fires.2002.txt.ida	**Environment Canada**	**Text**	**Ontario/Canada wild fires; daily emissions and fire info.; monthly**
ptinv.ontario_fires.2002.txt.ida	**Environment Canada**	**Text**	**Ontario/Canada wild fires; fire location info.; monthly**
17 Biogenecs			
b3fac.beis3_efac_v0.98.txt	**EPA**	**Text**	**Version 0.98 biogenic emission factors**
b3_a.VISTAS36_148X112.beld3_v2.ncf	**Alpine Geophysics**	**Binary**	**Gridded land use**
b3_b.VISTAS36_148X112.beld3_v2.ncf	**Alpine**	**Binary**	**Gridded land use**

Filename	Source	Data type	Description
	Geophysics		
b3_t.VISTAS36_148X112.beld3_v2.ncf	**Alpine Geophysics**	**Binary**	**Gridded land use**
18 Windblown Dust			
wb_dust_ii_cenrap_cmaq_RPO36_2002###_agadj_tf_b.ncf	**ENVIRON/UCR**	**Binary; netCDF**	**Domain wide wind blown dust emissions from WRAP wind blown dust model; hourly**
19 WRAP Oil and Gas			
arinv_CA2002_v2_OilGas_111105.ida	**ENVIRON**	**Text**	**California 2002 oil and gas inventory; annual**
arinv_wrap2002_v2_OilGas_annual_082505.ida	**ENVIRON**	**Text**	**WRAP 2002 oil and gas inventory; annual**
20 Offshore Shipping			
ofsgts_l.2002###.1.vista36.baseg_2002.shipping.ncf	**ENVIRON/VISTAS**	**Binary; netCDF**	**Pacific, Gulf of Mex. and Atlantic 2002 Offshore shipping inventory; daily**

Table A-2. CENRAP 2018 Base G (Base18G) emissions inventory.

Filename	Source	Data type	Description
1 Stationary Area Sources			
arinv_Mexico99phase3_border_20051027v4_noDust_noFire.ida	**ERG**	**Text**	**1999 BRAVO Mexico inventory for the six Northern states; annual**
arinv_Mexico99phase3_interior_ERG_Oct06_noDust_noFire.ida	**ERG**	**Text**	**1999 BRAVO Mexico inventory for the Southern states; annual**
arinv_CA2018_112205.ida	**ERG**	**Text**	**California 2018 inventory; annual**
arinv_NoDust_NoREF_vistas_2018g_2453922.ida	**Alpine Geophysics**	**Test**	**VISTAS 2018 inventory; annual**
arinv_wrap2018.091205.ida	**ERG**	**Text**	**WRAP 2018 inventory; annual**
arinv_canada_2020_noDust_NoFire.ida	**Environment, Canada**		**Canada 2020 inventory; annual**
arinv_NoFire_NoDust_NoREF_mrpok_2018_22aug2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2018 inventory; annual**
arinv_mane_vu_2018v3_1_NoDust_NoFire.ida		**Text**	**MANE_VU 2018 inventory, annual**
arinv_NoFire_nodust_ref_nh3_cenrap2002-2018_101606.ida	**UCR; grown from 2002**	**Text**	**CENRAP 2018 inventory; annual**
arinv_vistas_baseg_2018t_lofire_11feb2007_scc2610000500.ida	**Alpine Geophysics**	**Text**	**VISTAS 2018 inventory for SCC 2610000500**
2 Fugitive Dust			
fdinv1.CA2018_wfac.ida	**ERG**	**Text**	**CA 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual**
fdinv1.canada_2020.wTfac.ida	**Environment Canada**	**Text**	**Canada 2000 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual**
fdinv1.cenrap2002_2018_wfac.ida	**UCR; grown from 2002**	**Text**	**CENRAP 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual**
fdinv1.mane_vu2018_wfac.ida	**MARAM web site**	**Text**	**MANE-VU 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions**

Filename	Source	Data type	Description
			applied; annual
fdinv1_Mexico99phase3_border_20051027v4_wTfac.ida	ERG	Text	Mexico Northern states 1999 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1_Mexico99phase3_interior_ERG_Oct06_wo_pmfac.ida	ERG	Text	Mexico Southern states 1999 inventory; extracted from stationary area inventory using initial list of SCCs; no transport fractions applied; annual
fdinv1_mrpok_2018_22aug2006_wfac.ida	Alpine Geophysics	Text	MWRPO 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1_vistas_2018g_2453922_w_pmfac.ida	Alpine Geophysics	Text	VISTAS 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1.wrap2018_wfac.ida	ERG	Text	WRAP 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv2.CA2018_wfac.ida	ERG	Text	CA 2018 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2.canada_2020.wTfac.ida	Environment Canada	Text	Canada 2020 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2.cenrap2002_2018_wfac.ida	UCR; grown from 2002	Text	CENRAP 2018 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2.mane-vu2018_wfac.ida	MARAM web site	Text	MANE-VU 2018 inventory;

Filename	Source	Data type	Description
			extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2_vistas_2018g_2453922_w_pmfac.ida	**Alpine Geophysics**	**Text**	**VISTAS 2018 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual**
fdinv2_wrap2018.091205_wfac.ida	**ERG**	**Text**	**WRAP 2018 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual**
3 Road Dust			
rdinv.CA2018_wfac.ida	**Environ**	**Text**	**California 2018 inventory; extracted from stationary area inventory; transport fractions applied; annual**
rdinv_canada_2020_wTfac.ida	**Environment Canada**	**Text**	**Canada 2020 inventory; extracted from stationary area inventory; transport fractions applied; annual**
rdinv.cnrap2002_2018.wfac.ida	**UCR; grown from 2002**	**Text**	**CENRAP 2018 inventory; extracted from stationary area inventory; transport fractions applied; annual**
rdinv_mane_vu_2018v3_1_wTfac.ida	**MARAM web site**	**Text**	**MANE-VU 2018 inventory; extracted from stationary area inventory; transport fractions applied; annual**
rdinv_vistas_vistas_2018g_2453922_w_pmfac.ida	**Alpine Geophysics**	**Text**	**VISTAS 2018 inventory; extracted from stationary area inventory; transport fractions applied; annual**
rdinv.wrap2018_wfac_${season}.ida	**ENVIRON**	**Text**	**WRAP 2018 inventory; transport fractions applied; seasonal**
4 Ammonia			
arinv_nh3_2018_mrpok_${month}_22aug2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2018 agricultural ammonia inventory; monthly**
nh3minv.cenrap2018gr_18.apr.ida	**UCR; grown from 2002**	**Text**	**CENRAP 2018 xxxx inventory; monthly**

Filename	Source	Data type	Description
nh3inv.misc.cnrap2002_2018.feb.ida	**UCR; grown from 2002**	**Text**	**CENRAP 2018 xxxx inventory; monthly**
nh3yinv.annual.cnrap2002_2018.100406.ida	**UCR; grown from 2002**	**Text**	**CENRAP 2018 xxxx inventory; annual**
nh3inv.misc_annual.cnrap2002_2018.ida	**UCR; grown from 2002**	**Text**	**CENRAP 2018 xxxx inventory; annual**
5 WRAP Ammonia			
nh3gts_l.2002###.1.WRAP36.base02b_nosoil.ncf	**Environ**	**Binary, netCDF**	**Includes domestic, livestock, fertilizer, and wild life gridded inventory; daily**
6 Area Anthropogenic Fires			
arfinv_anthro_cenrap2002_081705.ida	**Pechan**	**Text**	**CENRAP 2002 inventory; extracted from stationary area inventory; annual**
AREA_BURNING_SMOKE_INPUT_ANN_TX_NELI_071905.txt	**Pechan**	**Text**	**CENRAP 2002 inventory; extracted from stationary area inventory; annual**
arfinv_anthro_canda2020.ida	**Environment Canada**	**Text**	**Canada 2000 inventory; extracted from stationary area inventory; annual**
arfinv_anthro_mane_vu_2018v3_1.ida	**MARAM web site**	**Text**	**MANE-VU 2018 inventory; extracted from stationary area inventory; annual**
arfinv_anthro_Mexico99phase3_border_20051027v4.ida	**ERG**	**Text**	**Mexico 1999 inventory for Northern states; extracted from stationary area inventory; annual**
arfinv_anthro_Mexico99phase3_interior_ERG_Oct06.ida	**ERG**	**Text**	**Mexico 1999 inventory for Southern states inventory; extracted from stationary area inventory; annual**
arfinv_anthro_mrpok_2018_22aug2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2018 inventory; extracted from stationary area inventory; annual**
arfinv_anthro_vistas_baseg_2018t_11feb2007_NOscc2610000500.ida	**Alpine Geophysics**	**Text**	**VISTAS 2018 inventory; annual**
7 Area Wild Fires			
arfinv_wf_canada2020.ida	**Environment Canada**	**Text**	**Canada 2020 inventory; extracted from stationary area inventory; annual**
arfinv_wf_cenrap2002-2018_101606.ida	**UCR; grown from 2002**	**Text**	**CENRAP 2018 inventory; extracted from stationary area inventory; annual**

Filename	Source	Data type	Description
arfinv_wf_mane_vu_2018v3_1.ida	**MARAM web site**	**Text**	**MANE-VU 2018 inventory; extracted from stationary area inventory; annual**
arfinv_wf_Mexico99phase3_border_20051027v4.ida	**ERG**	**Text**	**Mexico 1999 inventory for Northern states inventory; extracted from stationary area inventory; annual**
arfinv_wf_Mexico99phase3_interior_ERG_Oct06.ida	**ERG**	**Text**	**Mexico 1999 inventory for Southern states inventory; extracted from stationary area inventory; annual**
arfinv_wf_mrpok_2018_22aug2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2018 inventory; extracted from stationary area inventory; annual**
arfinv_wf_vistas_baseg_2018t_11feb2007_NOscc2610000500.ida	**Alpine Geophysics**	**Text**	**VISTAS 2018 inventory; annual**
8 Offshore Area Sources (Gulf of Mexico)			
ofsarinv.cnrap2002_2018_noCM.ida	**UCR; grown from 2002**	**Text**	**Commercial marines records were removed; they are modeled in offshore shipping; all pollutants; annual**
9 Non Road (Annual Inventory)			
arinv_mar_mrpok_2018_22aug2006.ida		**Text**	**MWRPO 2018 Marine inventory; annual**
marinv_vistas_2018g_2453972.ida	**Alpine Geophysics**	**Text**	**VISTAS 2018 Marine inventory; annual**
NONROAD2020_Canada.ida	**Environment Canada**	**Text**	**Canada 2020 aircraft inventory; extracted from non-road inventory; annual**
CENRAP_2018_Fnl_Nrd_Emissions091506.ida	**Pecahn**	**Text**	**CENRAP 2018 inventory; annual**
nrinv_mane_vu_2018v3_1.ida	**MARAM web site**	**Text**	**MANE_VU 2018 inventory; annual**
nrinv_Mexico1999_ERG_Aircraft_Locomotive_Rec_102705.ida	**ERG**	**Text**	**Mexico 1999 aircraft and locomotive inventory; annual**
nrinv_Mexico99phase3_border_20061025v4.ida	**ERG**	**Text**	**Mexico 1999 inventory for Northern states; annual**
nrinv_Mexico99phase3_interior_ERG_Oct06.ida	**ERG**	**Text**	**Mexico 1999 inventory for Southern states; annual**
nrinv_vistas_2018g_2453908.ida	**Alpine Geophysics**	**Text**	**VISTAS 2018 inventory; annual**
nrinv_wrap2018_Locomotive_annual_tpd_111805.ida	**ENVIRON**	**Text**	**WRAP 2018 locomotive inventory; annual**

Filename	Source	Data type	Description
11 Non Road (Monthly and Seasonal Inventory)			
nrinv_2018_mrpok_apr_22aug2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2018 inventory; monthly**
nrinv_CA2018_win_111805.ida	**EENVIRON**	**Text**	**California 2018 inventory, seasonal**
2018NONROAD_AG_IA_${month}.ida	**Missouri DNR**	**Text**	**CENRAP/IA 2018 inventory; monthly**
nrinv.mrpok.minn.apr_2018.011306.ida	**Missouri DNR**	**Text**	**CENRAP/MN 2018 inventory; monthly**
nrinv_WRAP2018_${season}_102105.ida	**ENVIRON**	**Text**	**WRAP 2018 inventory, monthly**
nrinv_WRAP2018_Aircraft_${season}.111805.ida	**ENVIRON**	**Text**	**WRAP 2018 aircraft inventory; seasonal**
12 Stationary Point			
pthour_2018_baseg_sep_2453993.ems	**Alpine Geophysics**	**Text**	**VISTAS 2018 hourly inventory for the EGUs; monthly**
ptinv_egu_18_vistas_g_2453993.ida	**Alpine Geophysics**	**Text**	**VISTAS 2018 EGUs inventory; annual**
ptinv_nonEGU_vistas_2018_baseg_2453957.ida	**Alpine Geophysics**	**Text**	**VISTAS 2018 non EGUs inventory, annual**
pgts3d_l.2002###.1.cmaq.cb4p25.us36b.CANADA_20i01.19L.ncf	**EPA**	**Binary; netCDF**	**Canada 2020 inventory; daily**
Ptinv_cenrap2018_EGU_${WINSUM}_annual_050407.ida	**CENRAP**	**Text**	**CENRAP 2018 EGUs inventory, seasonal; winter summer**
ptinv_o.cenrap2002_2018_nonEGU050307.ida	**UCR; grown from 2002**	**Text**	**CENRAP 2018 non EGUs inventory; annual**
ptinv_cenrapNonegu_2018_050707_refin_new_sources.ida	**CENRAP**	**Text**	**CENRAP 2018 Additional sources; annual**
ptinv_egu_2018_mrpok_11sep006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2002 EGUs inventory; annual**
Ptinv_manevu2018_EGU_${WINSUM}_ANNUAL_080805.ida	**MARAM web site**	**Text**	**MANE-VU 2018 EGUs inventory, seasonal; winter summer**
ptinv_manevu2018_nonEGU_112105.ida		**Text**	**MANE-VU 2018 non EGUs inventory, annual**
ptinv_Mexico99phase3_border_20061025v4.ida	**ERG**	**Text**	**Mexico 1999 inventory for Northern states; annual**
ptinv_Mexico99phase3_interior_ERG_Oct06.ida	**ERG**	**Text**	**Mexico 1999 inventory for Southern states; annual**
ptinv_negu_2018_mrpok_23aug2006.ida	**Alpine Geophysics**	**Text**	**MWRPO 2018 non EGUs inventory; annual**
ptinv_wrap2018_NoOG_050406.ida	**ERG**	**Text**	**WRAP 2018 inventory; no oil and gas; annual**

Filename	Source	Data type	Description
ptinv_wrap2018_OG_091205.ida	**ERG**	**Text**	**WRAP 2018 inventory; oil and gas; annual**
ptinv_WRAPTribes2018_NoOG_091205.ida	**ERG**	**Text**	**WRAP/Tribes 2018 inventory; no oil and gas annual**
ptinv_WRAPTribes2018_OG_091205.ida	**ERG**		**WRAP/Tribes 2018 inventory; oil and gas annual**
13 Offshore Point (Gulf)			
ofsinv_o_CO.cnrap2002_2018.ida	**UCR; grown from 2002 emissions**	**Text**	
ofsinv_o_NOX.cnrap2002_2018.ida	**UCR; grown from 2002 emissions**	**Text**	
ofsinv_o_PM10.cnrap2002_2018.ida	**UCR; grown from 2002 emissions**	**Text**	
ofsinv_o_PM2_5.cnrap2002_2018.ida	**UCR; grown from 2002 emissions**	**Text**	
ofsinv_o_SO2.cnrap2002_2018.ida	**UCR; grown from 2002 emissions**	**Text**	
ofsinv_o_VOC.cnrap2002_2018.ida	**UCR; grown from 2002 emissions**	**Text**	
14 On Road Mobile (Emissions)			
mbinv_WRAP2018_aut_102105.ida	**ENVIRON**	**Text**	**WRAP 2018 inventory; seasonal**
mbinv_CA2018_win_111805.ida	**ENVIRON**	**Text**	**California 2018 inventory; seasonal**
mbinv_CANADA2020.ida	**Environment Canada**	**Text**	**Canada 2020 inventory; annual**
mbinv_Mexico99phase3_border_20051021v4.ida	**ERG**	**Text**	**Mexico 1999 inventory for Northern states; annual**
mbinv_Mexico99phase3_interior_ERG_Oct06.ida	**ERG**	**Text**	**Mexico 1999 inventory for Southern states; annual**
15 On Road Mobile (Activities, VMT)			
mbinv.mbv#_vmt_cenrap2018_072005.ida	**STI**	**Text**	**CENRAP 2018 inventory; divided into tow files; annual**
mbinv_vmt_manevu2018_update.ida	**MARAM web site**	**Text**	**MANE-VU 2018 inventory; annual**
mbinv_mrpo_18f_vmt_11aug06.ida	**Alpine Geophysics**	**Text**	**MWRPO 2018 inventory; annual**
mbinv_vistas_18g_vmt_12jun06.ida	**Alpine Geophysics**	**Text**	**VISTAS 2018 inventory; annual**
16 Point Fires			
ptday_2002CENRAP_ptfires_mon##.ida	**STI**	**Text**	**CENRAP 2002 prescribed fires; daily emissions; monthly**
ptday.plume.vistasG2_2018.##.ida	**Alpine**	**Text**	**VISTA 2018 all fire sources; daily**

Filename	Source	Data type	Description
	Geophysics		**emissions; monthly**
PTDAY_200504051315_wrap2002_nfr.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 non federal rangeland fires; daily emissions; monthly**
PTDAY_200604272314_wrap02_04_agf.mon##.ida	**AirSciences**	**Text**	**WRAP 2002-4 Ag. Fires; daily emissions; monthly**
PTDAY_200510210936_wrap2002_wild_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fires; daily emissions; monthly**
PTDAY_200510211022_wrap2002_wfu_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fire use; daily emissions; monthly**
PTDAY_200604281056_wrap02_04_arx.mon##.ida	**AirSciences**	**Text**	**WRAP 2002-4 prescribed fires; daily emissions; monthly**
PTDAY_200604281056_wrap02_04_nrx.mon##.ida	**AirSciences**	**Text**	**WRAP 2002-4 natural prescribed fires; daily emissions; monthly**
pthour_2002CENRAP_ptfires_mon##.ida	**STI**	**Text**	**CENRAP 2002 anthro. prescribed fires; hourly plume distribution; monthly**
pthour.plume.vistasG2_2018.##.ida	**Alpine Geophysics**	**Text**	**VISTA 2002 all fire sources; hourly plume distribution; monthly**
PTHOUR_200504051315_wrap2002_nfr.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 non federal rangeland; hourly plume distribution; monthly**
PTHOUR_200604272314_wrap02_04_agf.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 Ag. Fires; hourly plume distribution; monthly**
PTHOUR_200510210936_wrap2002_wild_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fires; hourly plume distribution; monthly**
PTHOUR_200510211022_wrap2002_wfu_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fire use; hourly plume disributution; monthly**
PTHOUR_200604281056_wrap02_04_arx.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 natural prescribed fires; hourly plume distribution; monthly**
PTHOUR_200604281056_wrap02_04_nrx.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 anthro. prescribed fires; hourly plume distribution; monthly**
ptinv_2002CENRAP_ptfires_mon##.ida	**STI**	**Text**	**CENRAP 2002 prescribed fires; fire location info.; monthly**
ptinv.plume.vistasG2_2018.11.ida	**Alpine Geophysics**	**Text**	**VISTA 2002 all fire sourcesfire location info; monthly**
PTINV_200504051315_wrap2002_nfr.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 non federal rangeland fires; fire location info; monthly**

Filename	Source	Data type	Description
PTINV_200507011516_wrap2002_agf_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 Ag. Fires; fire location info.; monthly**
PTINV_200510210936_wrap2002_wild_base.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fires; fire location info.; monthly**
PTINV_200604272314_wrap02_04_agf.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 wild fire use; fire location info.; monthly**
PTINV_200604281056_wrap02_04_arx.mon##.ida	**AirSciences**	**Text**	**WRAP 2002 anthro. prescribed fires; fire location; monthly**
PTINV_200604281056_wrap02_04_nrx.mon##.ida	**AirSciences**		**WRAP 2002 natural prescribed fires; fire location; monthly**
ptday.ontario_fires.2002.txt.ida	**Environment Canada**	**Text**	**Ontario/Canada wild fires; daily emissions and fire info.; monthly**
ptinv.ontario_fires.2002.txt.ida	**Environment Canada**	**Text**	**Ontario/Canada wild fires; fire location info.; monthly**
17 Biogenecs			
b3fac.beis3_efac_v0.98.txt	**EPA**	**Text**	**Version 0.98 biogenic emission factors**
b3_a.VISTAS36_148X112.beld3_v2.ncf	**Alpine Geophysics**	**Binary**	**Gridded land use**
b3_b.VISTAS36_148X112.beld3_v2.ncf	**Alpine Geophysics**	**Binary**	**Gridded land use**
b3_t.VISTAS36_148X112.beld3_v2.ncf	**Alpine Geophysics**	**Binary**	**Gridded land use**
18 Windblown Dust			
wb_dust_ii_cenrap_cmaq_RPO36_2002###_agadj_tf_b.ncf	**ENVIRON/UCR**	**Binary; netCDF**	**Domain wide wind blown dust emissions from WRAP wind blown dust model; hourly**
19 WRAP Oil and Gas			
arinv_CA2018_OilGas_112205.ida	**ENVIRON**	**Text**	**California 2018 oil and gas inventory; annual**
oginv_WRAP2018_annual_tpd_111605.ida	**ENVIRON**	**Text**	**WRAP 2018 oil and gas inventory; annual**
20 Offshore Shipping			
ofsgts_l.2002###.1.vista36.baseg_2002.shipping.ncf	**ENVIRON/VISTAS**	**Binary; netCDF**	**Pacific, Gulf of Mex. and Atlantic 2002 Offshore shipping inventory; daily**

APPENDIX C

Model Performance Evaluation for the CMAQ 2002 Base F Base Case Simulation in the CENRAP Region

C.1 2002 Typical Base F Model Performance Evaluation Scenario

This Appendix presents the operational evaluation of the CMAQ model for the 2002 36 km Typical Base F emissions scenario. The final CENRAP 2002 and 2018 emissions scenarios used in the 2018 visibility projections was Base G. The main differences between Base G and Base F emissions inventories were updated Mexican emissions in the northern states, addition of Mexican emissions in the southern states that were not included in CENRAP's emission inventories prior to Base G and correction of a few point source stack parameters and emissions in the CENRAP states and Canada (see: http://pah.cert.ucr.edu/aqm/cenrap/QA_typ02g36.plots/log_inv_categ_Typ02g.doc). Figure C-1 displays the differences in annual average $PM_{2.5}$ and ozone concentrations between the 2002 Typical Base G and Base F simulations. Most of the differences in the two simulations are concentrations within Mexico where no monitoring data were available for the model evaluation. Thus, given the very small differences between the 2002 Typical Base F and G base case simulations, the model performance evaluation is presented for just the 2002 Typical Base F simulation (for additional comparisons of Base G and F see: http://pah.cert.ucr.edu/aqm/cenrap/cmaq.shtml#typ02gvstyp02f_mpe).

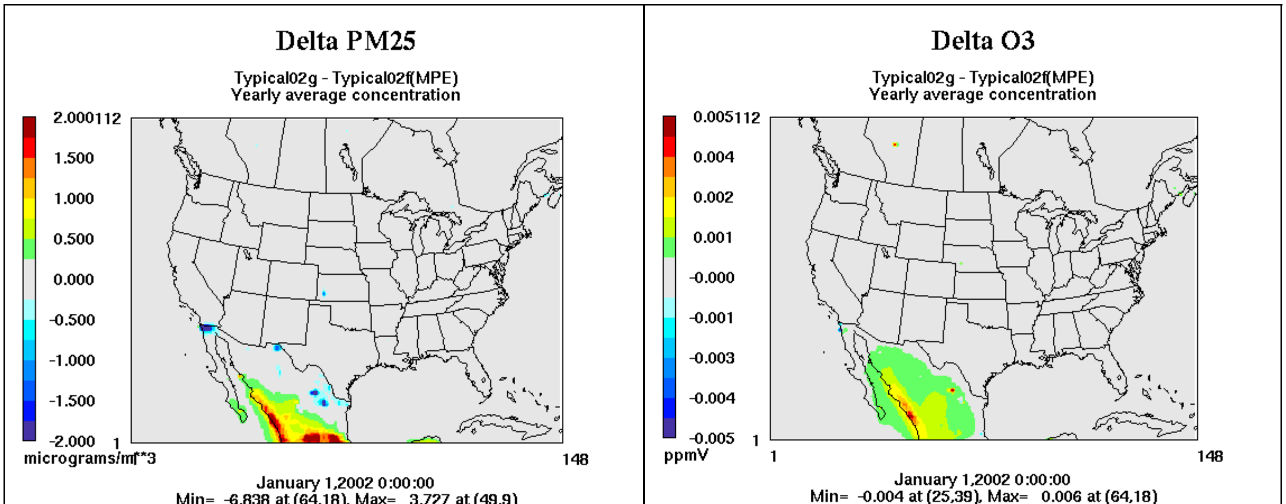


Figure C-1. Comparison of differences in annual average $PM_{2.5}$ (left) and ozone concentrations between 2002 Typical Base G and F (Base G – Base F).

The CENRAP emissions and air quality modeling initially conducted 2002 base case modeling for two 2002 base case emissions scenarios: a 2002 Actual emissions base case; and a 2002 Typical emissions base case. For the 2002 Actual base case, day-specific SO2 and NOx emissions for large stationary point sources were used based on measured continuous emissions monitoring (CEM) data along with actual 2002 fire emissions In the 2002 Typical base case, emissions for large stationary sources and fires were more representative of the 2000-2004 Baseline period. For large stationary sources' typical emissions, 5-years of CEM data were analyzed and typical seasonal and diurnally varying emissions were defined for when the sources where operating For the typical fire emissions, the locations of the 2002 Actual fire emissions were retained, but the intensity was reduced or increased to match the average conditions over the 5-year Baseline. The original intent of the CENRAP modeling of both a 2002 Actual and Typical base cases was to use the 2002 Actual base case for the model performance evaluation and the 2002 Typical base case with the 2018 emission scenario for the 2018 visibility projections.

The need to generate both the 2002 Typical and Actual base case inventories and perform CMAQ model simulations each time an emissions update or correction to the modeling occurred became burdensome and potentially could compromise the CENRAP schedule and available resources. For the Base F vintage emissions database, a model performance evaluation was conducted that compared the model performance of the 2002 Actual and Typical Base F CMAQ base case simulations to determine whether use of the Actual emissions substantially changed the interpretation of the model performance. The maximum change in model performance between the 2002 Actual and Typical base case was for sulfate and occurred during the summer months, when sulfate is the highest. Figure C-2 displays sulfate (SO4), nitrate (NO3), elemental carbon (EC) and organic matter carbon (OMC) performance for July 2002 across IMPROVE sites in the CENRAP region for the 2002 36 km Actual and Typical Base F CMAQ base case simulations. Although differences in predicted 24-hour SO4 concentrations are sometimes discernable in the scatter plot, the basic model performance conclusions remains the same and the difference in fractional bias (-48% vs. -49%) and fraction error (58% vs. 59%) are not significant. Similarly, the difference in NO3 model performance between the Actual and Typical Base F simulations are not significant. The performance of the CMAQ Actual and Typical simulation for EC and OMC is essentially identical. Given the similarity of the 2002 Base F Actual and Typical model performance evaluation, future CENRAP CMAQ model performance analysis were just performed on the Typical simulation.

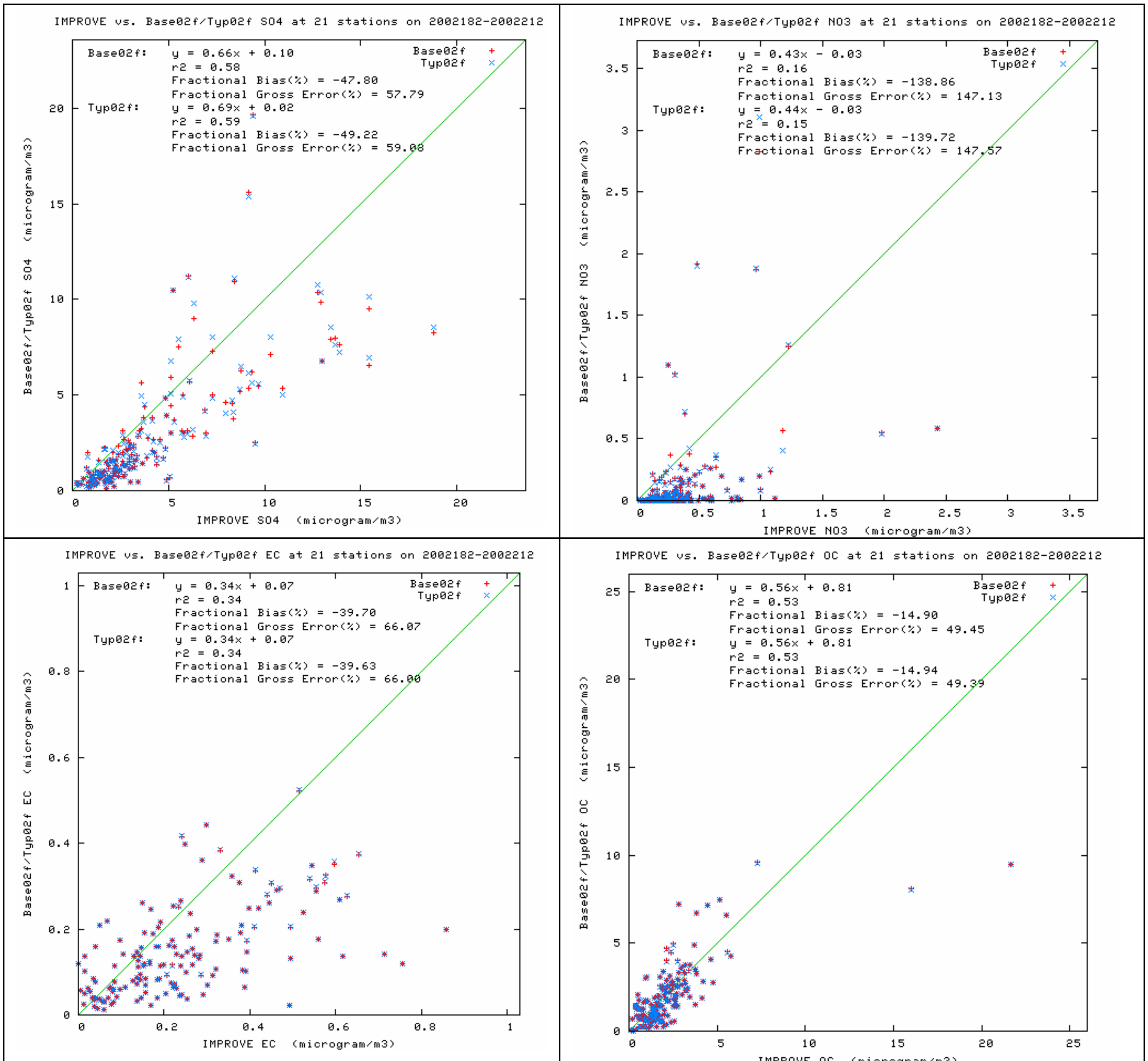


Figure C-2. Comparison of SO4 (top left), NO3 (top right), EC (bottom left) and OMC (bottom right) model performance for July 2002, the CENRAP region and the 2002 36 km Base F Actual (red) and Typical (blue) CMAQ base case simulation.

C.2 CMAQ Evaluation Methodology

EPA's integrated ozone, $PM_{2.5}$ and regional haze modeling guidance calls for a comprehensive, multi-layered approach to model performance testing, consisting of the four major components: operational, diagnostic, mechanistic (or scientific) and probabilistic (EPA, 2007). The CMAQ model performance evaluation effort focused on the first two components, namely:

- **Operational Evaluation**: Tests the ability of the model to estimate PM concentrations (both fine and coarse) and the components at PM_{10} and $PM_{2.5}$ including the quantities used to characterize visibility (i.e., sulfate, nitrate, ammonium, organic carbon, elemental carbon, other $PM_{2.5}$, and coarse matter ($PM_{2.5-10}$). This evaluation examines whether the measurements are properly represented by the model predictions but does not necessarily ensure that the model is getting "the right answer for the right reason"; and

- **Diagnostic Evaluation:** Tests the ability of the model to predict visibility and extinction, PM chemical composition including PM precursors (e.g., SOx, NOx, and NH_3) and associated oxidants (e.g., ozone and nitric acid); PM size distribution; temporal variation; spatial variation; mass fluxes; and components of light extinction (i.e., scattering and absorption).

The diagnostic evaluation also includes the performance of diagnostic tests to better understand model performance and identify potential flaws in the modeling system that can be corrected. The diagnostic evaluation may also includes the use of "probing tools" to understand why the model obtains a given prediction; probing tools include Process Analysis (PA), decoupled direct method (DDM) and source apportionment (SA).

In this final model performance evaluation for the 2002 Typical Base F CMAQ simulation, the operational evaluation has been given the greatest attention since this is the primarily thrust of EPA's modeling guidance. However, we have also examined certain diagnostic features dealing with the model's ability to simulate sub-regional and monthly/diurnal gas phase and aerosol concentration distributions. In the course of the CENRAP and other modeling process numerous diagnostic sensitivity tests were performed to investigate and improve model performance. Key diagnostic tests performed are discussed and the results for the rest are available on the CENRAP modeling website: http://pah.cert.ucr.edu/aqm/cenrap/index.shtml.

C.2.1 Ambient Air Quality Data for CENRAP Model Evaluation

The ground-level model evaluation database for 2002 was compiled by the modeling team using several routine and research-grade databases. The first is the routine gas-phase concentration measurements for ozone, NO, NO_2 and CO archived in EPA's Aerometric Information Retrieval System (AIRS) Air Quality System (AQS) database. Other sources of observed information come from the various PM monitoring networks in the U.S. These include the: (a) Interagency Monitoring of Protected Visual Environments (IMPROVE); (b) Clean Air Status and Trends Network (CASTNET); (c) Southeastern Aerosol Research and Characterization (SEARCH); (d) EPA Federal Reference Method $PM_{2.5}$ and PM_{10} Mass Networks (EPA-FRM); (e) EPA Speciation Trends Network (STN) of $PM_{2.5}$ species; and (f) National Acid Deposition Network (NADP). These PM

monitoring networks may also provide ozone and other gas phase precursors and product species, and visibility measurements at some sites. During the course of the CENRAP modeling, the numerous base case simulations were evaluated across the continental U.S. In this section we focus our evaluation on model performance within the CENRAP region. Table C-1 summarizes the observations collected at each monitoring network within the CENRAP region and their sampling frequency with Figure C-3 displaying the locations of the monitors for the various monitoring networks operating in the CENRAP region during 2002.

Table C-1. Ambient monitoring data available in the CENRAP region during 2002.

Monitoring Network	Chemical Species Measured	Sampling Frequency; Duration
IMPROVE	Speciated $PM_{2.5}$ and PM_{10}	1 in 3 days; 24 hr
CASTNET	Speciated $PM_{2.5}$, Ozone	Hourly, Weekly; 1 hr, Week
SEARCH	24-hr PM_{25} (FRM Mass, OC, BC, SO_4, NO_3, NH_4, Elem.); 24-hr PM coarse (SO_4, NO_3, NH_4, elements); Hourly $PM_{2.5}$ (Mass, SO_4, NO_3, NH_4, EC, TC); and Hourly gases (O_3, NO, NO_2, NO_y, HNO_3, SO_2, CO)	Daily, Hourly;
NADP	WSO_4, WNO_3, WNH_4	Weekly
EPA-FRM	Only total fine mass ($PM_{2.5}$)	1 in 3 days; 24 hr
EPA-STN	Speciated $PM_{2.5}$	Varies; Varies
AIRS/AQS	CO, NO, NO_2, NO_x, O_3	Hourly; Hourly

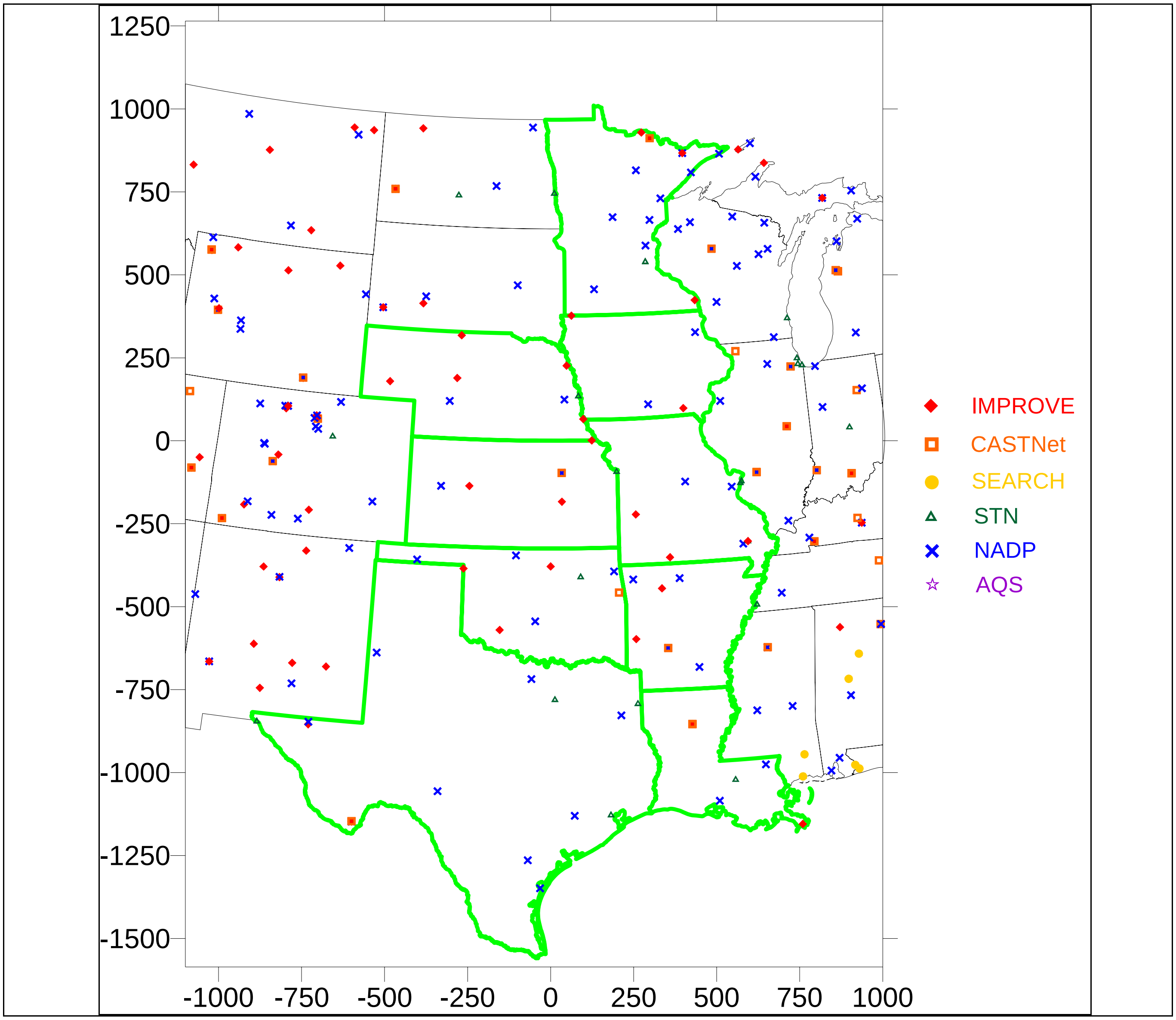


Figure C-3. Locations of surface monitors within the CENRAP states for sites operating during 2002.

C.2.2 Scope of CMAQ Model Performance Evaluation

The primary focus of the CMAQ Base F evaluation is on how well the model is able to replicate observed concentrations gas-phase pollutants and precursors, the various components of $PM_{2.5}$, total observed mass of $PM_{2.5}$, and wet deposition amounts. The CMAQ operational evaluation, model outputs are compared statistically and graphically with observational data obtained from the IMPROVE, CASTNet, STN, NADP and AQS monitoring networks. Because the SEARCH network is located in the southeastern U.S. (VISTAS region) outside of the CENRAP region, it is not a major component of our evaluation. Also, since the EPA-FRM network focuses on just $PM_{2.5}$ mass measurements primarily in $PM_{2.5}$ nonattainment or near nonattainment areas it is not very relevant for simulating regional haze at mainly remote Class I areas so is also not used in our model performance evaluation. The primary focus of the operational evaluation of the CMAQ 2002 Base F simulation is the performance of PM components in the CENRAP region for predicting regional haze at Class I areas.

Many statistical performance measures have been calculated using the different monitoring networks and across the different model performance subdomains (e.g., RPO regions). Table C-2 lists the definitions of the model performance evaluation statistical metrics. These performance metrics are routinely generate by the UCR Analysis Tool and are available on the project website. Many of them are measures of bias and error that are somewhat redundant.

Table C-2. Statistical Measures Used in the CENRAP CMAQ Model Evaluation.

Statistical Measure	Shorthand Notation	Mathematical Expression	Notes
Accuracy of paired peak (***A_p***)	**Paired_Peak**	$\frac{P - O_{peak}}{O_{peak}}$	P_{peak} = paired (in both time and space) peak prediction
Coefficient of determination (***r^2***)	**Coef_Determ**	$\frac{\left[\sum_{i=1}^{N}(P_i - \overline{P})(O_i - \overline{O})\right]^2}{\sum_{i=1}^{N}(P_i - \overline{P})^2 \sum_{i=1}^{N}(O_i - \overline{O})^2}$	P_i = prediction at time and location i; O_i = observation at time and location i; $\overline{P}$ = arithmetic average of P_i, i=1,2,…, N; $\overline{O}$ = arithmetic average of O_i, i=1,2,…,N
Normalized Mean Error (***NME***)	**Norm_Mean_Err**	$\frac{\sum_{i=1}^{N}\lvert P_i - O_i\rvert}{\sum_{i=1}^{N} O_i}$	Reported as %
Root Mean Square Error (***RMSE***)	**Rt_Mean_Sqr_Err**	$\left[\frac{1}{N}\sum_{i=1}^{N}(P_i - O_i)^2\right]^{1/2}$	Reported as %
Fractional Gross Error (***F_E***)	**Frac_Gross_Err**	$\frac{2}{N}\sum_{i=1}^{N}\left\lvert\frac{P_i - O_i}{P_i + O_i}\right\rvert$	Reported as %
Mean Absolute Gross Error (***MAGE***)	**Mean_Abs_G_Err**	$\frac{1}{N}\sum_{i=1}^{N}\lvert P_i - O_i\rvert$	
Mean Normalized Gross Error (***MNGE***)	**Mean_Norm_G_Err**	$\frac{1}{N}\sum_{i=1}^{N}\frac{\lvert P_i - O_i\rvert}{O_i}$	Reported as %
Mean Bias (***MB***)	**Mean_Bias**	$\frac{1}{N}\sum_{i=1}^{N}(P_i - O_i)$	Reported as concentration (e.g., µg/m^3)

Statistical Measure	Shorthand Notation	Mathematical Expression	Notes
Mean Normalized Bias (***MNB***)	**Mean_Norm_Bias**	$\frac{1}{N}\sum_{i=1}^{N}\frac{(P_i - O_i)}{O_i}$	Reported as %
Mean Fractionalized Bias (Fractional Bias, ***MFB***)	**Mean_Fract_Bias**	$\frac{2}{N}\sum_{i=1}^{N}\left(\frac{P_i - O_i}{P_i + O_i}\right)$	Reported as %
Normalized Mean Bias **(*NMB*)**	**Norm_Mean_Bias**	$\frac{\sum_{i=1}^{N}(P_i - O_i)}{\sum_{i=1}^{N}O_i}$	Reported as %
Bias Factor (***BF***)	**Bias Factor**	$\frac{1}{N}\sum_{i=1}^{N}\left(\frac{P_i}{O_i}\right)$	Reported as BF:1 or 1: BF or in fractional notation (BF/1 or 1/BF).

C.2.3 Operational Model Evaluation Approach

The CENRAP modeling databases will be used to develop the visibility State Implementation Plan (SIP) due in December 2007 as required by the Regional Haze Rule (RHR). Accordingly, the primary focus of the operational evaluation is on the six components of fine particulate ($PM_{2.5}$) and Coarse Matter ($PM_{2.5\text{-}10}$) within the CENRAP region that are used to characterize visibility at Class I areas:

- Sulfate (SO4);
- Particulate Nitrate (NO3);
- Elemental Carbon (EC);
- Organic Mass Carbon (OMC);
- Other inorganic fine particulate (IP or Soil); and
- Coarse Matter (CM).

The model performance for ozone and precursor and product species (e.g., SO_2 and HNO_3) is also evaluated to build confidence that the modeling system is sufficiently reliable to project future-year visibility.

C.2.5 Performance Evaluation Tools

One of the many challenges in evaluating an annual PM/ozone model simulation is how to synthesize model performance given the shear volume of output from an annual simulation. The model is run on a 148 x 112 x 19 grid with approximately 30 species producing hourly outputs for each day of the year. This results in approximately 90 trillion concentration estimates that are produced for an annual simulation. Thus, the synthesis and interpretation of numerous graphical and tabular displays of model performance into a few concise and descriptive displays that identify the most salient features of model performance is necessary. As part of the CENRAP modeling, as well as work performed by WRAP, VISTAS, MRPO and MANE-VU, several analysis tools and summary displays have been developed and are used:

<u>UCR Analysis Tools</u>: The University of California at Riverside (UCR) Analysis Tools have been used extensively to evaluate the CMAQ and CAMx models for CENRAP (e.g., Morris et al., 2005), WRAP (Tonnesen et al., 2004), VISTAS (Morris et al., 2004) as well as other studies and are run on a Linux platform separately for each network. Numerous graphical displays of model performance are automatically generated using gnuplot. The software generates the following summary and graphical displays of model performance:

- Tabular statistical measures (see Table C-2);
- Time Series Plots for each site and species; and
- Scatter Plots for each species by allsite_allday, allday_onesite and allsite_oneday.

The UCR Analysis Tool is run for a specific subregion (e.g., by RPO region) and for selected monitoring networks. Because each monitoring network has its own measurement artifacts, the model is evaluated separately for each monitoring network.

<u>Summary Bias/Error Plots</u>: The modeling team has developed additional displays of model performance statistics that elucidate model performance in a concise manner: (1) monthly time series plots of average bias and error; (2) soccer plots that display bias versus error and compares them to model performance goals and criteria; and (3) tools to analyze visibility model performance for the worst and best 20 percent visibility days that are used in visibility projections.

<u>GA DNR Analysis Plots</u>: Dr. James Boylan of the Georgia Department of Natural Resources has extended the concept in EPA's draft PM fine particulate and regional haze modeling guidance that model performance for species that make up a major contribution to visibility impairment be subjected to more stringent goals than species that are minor contributors by developing concentration-dependent performance goals and "Bugle Plots" to display them (Boylan, 2004).

The evaluation of the CENRAP 2002 36 km Base F CMAQ simulation used each of the analysis tools listed above taking advantage of their different descriptive and complimentary nature. The use of these analysis tools generated thousands of statistical measures and graphical displays of model performance that cannot all be displayed in this report. The modeling team has gone through the plots and measures using slide shows to identify those displays that are most descriptive in conveying model performance so should be included in this TSD. The complete set of model performance statistics and graphical performance displays can be found on the CENRAP modeling Website at:

http://pah.cert.ucr.edu/aqm/cenrap/cmaq.shtml#cmaq_typ02f_mpe

Note that model performance statistics are calculated separately for each of the monitoring networks. Different PM measurement technology can produce different measurement values even when measuring the same air parcel. Thus, when calculating model performance metrics, measurements in different networks are not mixed.

C.2.4 Subdomains Analyzed

CENRAP has been analyzing model performance in five subdomains corresponding to the states contained in the five RPOs (see Figure 1-1):

- CENRAP
- MRPO
- VISTAS
- MANE-VU
- WRAP

As CENRAP has refined its emissions inventory, the changes in model performance from one 2002 base case to another has diminished to the point where little has changed in the last few iterations. Thus, the CMAQ 2002 36 km Base F evaluation presented in this section was just performed for the CENRAP region and the reader is referred to the modeling Website (http://pah.cert.ucr.edu/aqm/cenrap/cmaq.shtml) and Morris and co-workers (2005) for the evaluation outside of the CENRAP region and the diagnostic model evaluation.

C.2.5 Model Performance Goals and Criteria

The issue of model performance goals for PM species is an area of ongoing research and debate. For ozone modeling, EPA has established performance goals for 1-hour ozone normalized mean bias and gross error of #±15% and #35%, respectively (EPA, 1991). EPA's draft fine particulate modeling guidance notes that performance goals for ozone should be viewed as upper bounds of model performance that PM models may not be able to always achieve and we should demand better model performance for PM components that make up a larger fraction of the PM mass than those that are minor contributors (EPA, 2001). EPA's final modeling guidance does not list any specific model performance goals for PM and visibility modeling and instead provides a summary of PM model performance across several historical applications that can be used for comparisons if desired. Measuring PM species is not as precise as ozone monitoring. In fact, the differences in measurement techniques for some species likely exceed the more stringent performance goals, such as those for ozone. For example, recent comparisons of the PM species measurements using the IMPROVE and STN measurement technologies found differences of approximately ∀20% (SO4) to ∀50% (EC) (Solomon et al., 2004).

For the CENRAP, VISTAS and WRAP modeling we have adopted three levels of model performance goals and criteria for bias and gross error as listed in Table C-3. Note that we are not suggesting that these performance goals be adopted as guidance or that they are the most appropriate goals to use. Rather, we are just using them to frame and put the PM model performance into context and to facilitate model performance intercomparison across episodes, species, models and sensitivity tests.

Table C-3. Model performance goals and criteria used to assist in interpreting modeling results.

Fractional Bias	Fractional Error	Comment
#∀15%	#35%	Ozone model performance goal for which PM model performance would be considered good – note that for many PM species measurement uncertainties may exceed this goal.
#∀30%	#50%	Proposed PM model performance goal that we would hope each PM species could meet
#∀60%	#75%	Proposed PM criteria above which indicates potential fundamental problems with the modeling system.

As noted in EPA's PM modeling guidance, less abundant PM species should have less stringent performance goals (EPA, 2001; 2007). Accordingly, we are also using performance goals that are a continuous function of average concentrations, as proposed by Dr. James Boylan at the Georgia Department of Natural Resources (GA DNR), that have the following features (Boylan, 2004):

- Asymptotically approaching proposed performance goals or criteria (i.e., the ∀30%/50% and ∀60%/75% bias/error levels listed in Table C-1) when the mean of the observed concentrations are greater than 2.5 ug/m^3.
- Approaching 200% error and ∀200% bias when the mean of the observed concentrations are extremely small.

Bias and error are plotted as a function of average concentrations. As the mean concentration approach zero, the bias performance goal and criteria flare out to ∀200% creating a horn shape, hence the name "Bugle Plots". Dr. Boylan has defined three Zones of model performance: Zone 1 meets the ∀30%/50% bias/error performance goal and is considered "good" model performance; Zone 2 lies between the ∀30%/50% performance goal and ∀60%/75% performance criteria and is an area where concern for model performance is raised; and Zone 3 lies above the ∀60%/75% performance criteria and is an area of questionable model performance.

C.2.6 Performance Time Periods

The CMAQ 2002 36 km Base F evaluation, model performance statistics and graphical displays are generated monthly using the native averaging times of each monitoring network (i.e., 24-hour for IMPROVE and STN; weekly for CASTNet and NADP; and hourly for AQS). As the focus of the RHR is on daily average visibility that is calculated from daily average PM species concentrations then the evaluation of the model for 24-hour concentrations is particularly relevant. The RHR places particular emphasis on the Worst 20% (W20%) and Best 20% (B20%) days at Class I areas. Thus, we also place particular emphasis on the model performance for PM species on the W20% and B20% days during 2002 at Class I areas.

C.2.7 Key Measures of Model Performance

Although we have generated numerous statistical performance measures (see Table C-2) that are available on the CENRAP modeling website, when comparing model performance across months, subdomains, networks, grid resolution, models, studies, etc. it is useful to have a few key measurement statistics to be used to facilitate the comparisons. It is also useful to have a subset of the 2002 year that can represent the entire year so that a more focused evaluation can be conducted. We have found that the Mean Fractional Bias and Mean Fractional Gross Error appear to be the most consistent descriptive measure of model performance (Morris et al., 2004b; 2005). The Fractional Bias and Error normalize by the average of the observed and predicted value (see Table C-2) because it provides descriptive power across different magnitudes of the model and observed concentrations and is bounded by -200% to +200%. This is in contrast to the normalized bias and error (as recommended for ozone performance goals, EPA, 1991) that is normalized by just the observed value so can "blow up" to infinity as the observed value approaches zero. Below we perform a focused evaluation of model performance for four months of the 2002 year that are used to represent the seasonal variation in performance:

- January
- April
- July
- October

We also present fractional bias and error for all months of 2002 using time series and bugle plots.

C.3 Operational Model Performance Evaluation in the CENRAP Region

In the following discussions we use selected monthly scatter plots, time series plots and model performance statistical measures from the UCR Analysis Tools application to the 2002 CMAQ Base F base case simulation in an operational evaluation of the model for PM species. We focus on the six main components of PM that are used to project visibility.

C.3.1 Sulfate (SO4) Monthly Model Performance

C.3.1.1 SO4 in January 2002

Figure C-4a displays scatter plots of predicted and observed SO4 concentrations or wet depositions for sites in the CENRAP regions using observations from the IMPROVE, STN, CASTNet and NADP monitoring networks; the IMPROVE and STN SO4 concentrations are 24-hour averages whereas the CASTNet SO4 concentrations and NADP SO4 wet deposition are weekly averages. The January SO4 performance at the IMPROVE and STN networks in the CENRAP region is quite good with low fractional bias (-12% to -13%) and some scatter (fractional error of 42% and 34%) but centered in the 1:1 line of perfect agreement. There is a net SO4 underestimation bias in January across the CASTNet network (fractional bias of -34%) with wet SO4 deposition overstated on average across the NADP sites in the CENRAP region (+40% fractional bias). Whether the overstated SO4 wet deposition is a contributor to the SO4 concentration underestimation bias is unclear, but it is in the correct direction to account for it.

The time series comparisons of predicted and observed 24-hour SO4 concentrations at CENRAP Class I area IMPROVE sites during January 2002 shown in Figure C-4b are quite encouraging. Although there are some days and sites with mismatches (e.g., January 26 at BOWA and VOYA) and sites with systematic performance problems (SO4 underestimated at BIBE), the time series in generally are quite good with the model tracking the observed temp[oral variation in daily sulfate in January and some sites exhibiting remarkable agreement (e.g., MING).

Figure C-4c displays the spatial variations in the predicted and IMPROVE observed SO4 concentrations for January 20, 23, 26 and 29, 2002, which are four consecutive days of IMPROVE monitoring using its 1:3 day monitoring frequency. On January 20 both the model and observations agree on that an elevated sulfate clouds is entering the CENRAP region across southern Illinois and Missouri. There is a sharp SO4 concentration gradient going east to west with both the model and observations estimating relatively clean SO4 values over Colorado. By January 23 the model and observations agree that elevated SO4 exists along a diagonal orientation from Chicago to East Texas. Although there are some SO4 model/observed spatial mismatches on this day (e.g., northern Louisiana and western Arkansas) the model generally reproduces the areas of elevated and low observed SO4. By January 29 the model and observations agree that SO4 has cleaned out of the CENRAP region. Although there are elevated SO4 observations in western North Dakota and northern Minnesota not reflected in the model. On January 29 there is an elevated tongue of SO3 entering the CENRAP region through southern Illinois stretching to the southwest almost to Big Bend in western Texas. Observed SO4 is measured at Big Bend but the modeled high SO4 is slightly east of there. There is very good agreement on this day between the predicted and observed spatial distribution of SO4.

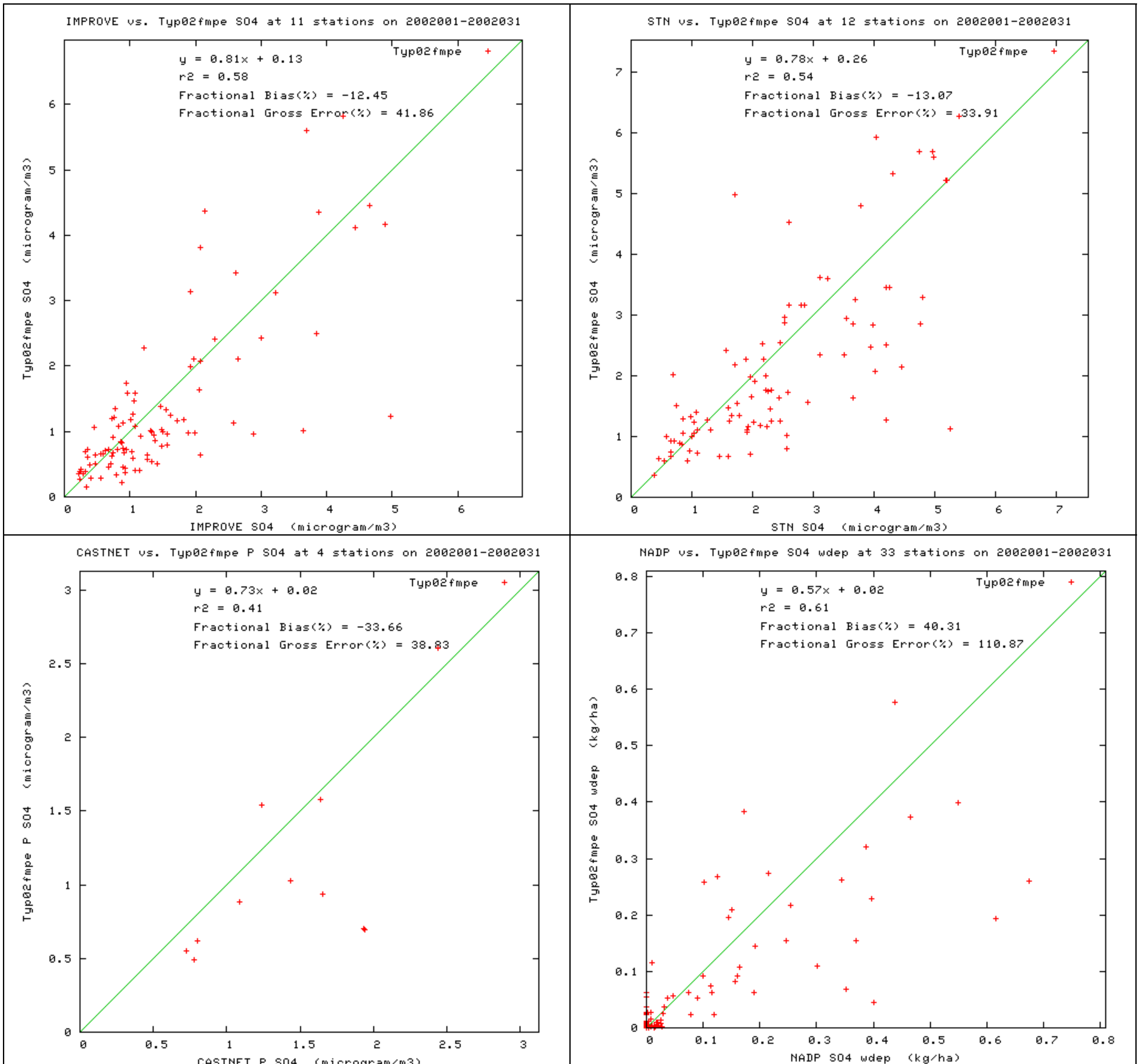
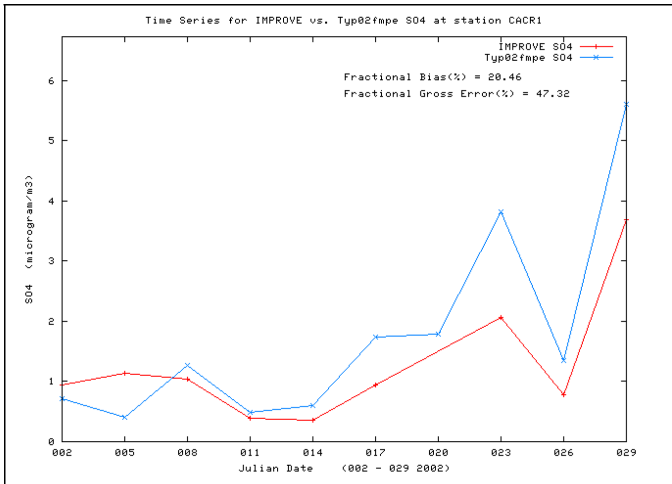
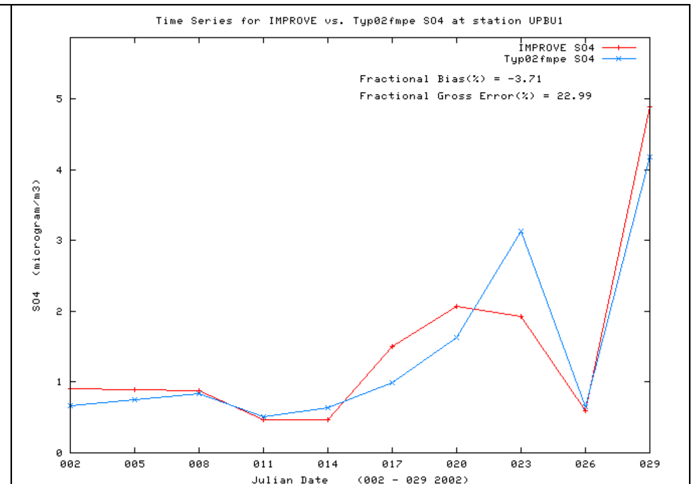
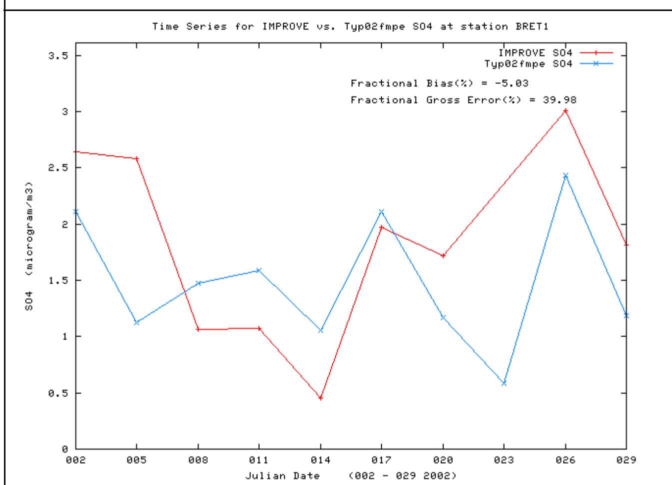
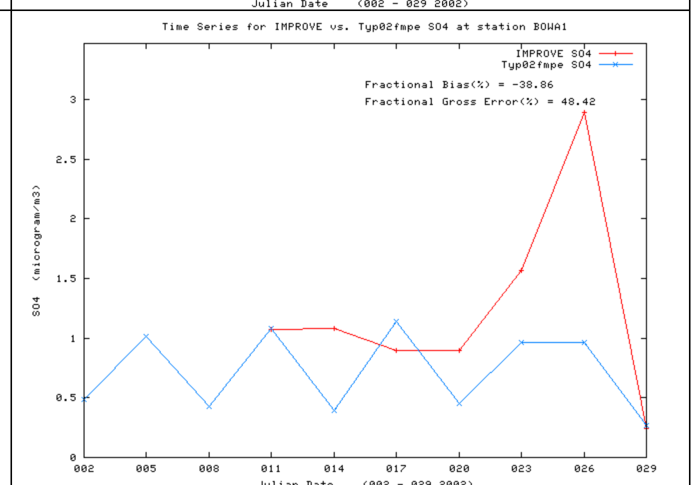


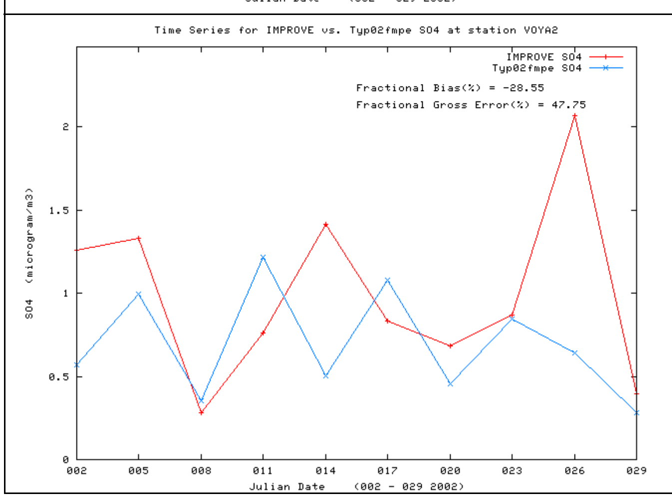
Figure C-4a. Scatter plots of predicted and observed sulfate (SO4) concentrations for January 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

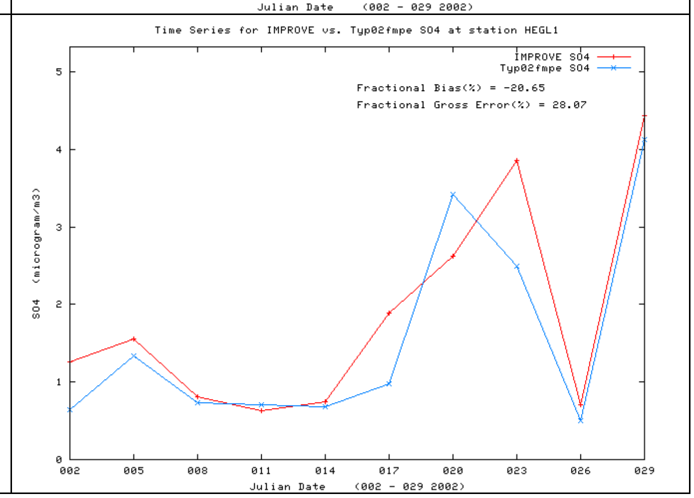

Time Series for IMPROVE vs. Typ02fmpe SO4 at station CACR1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = 20.46
Fractional Gross Error(%) = 47.32
SO4 (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe SO4 at station UPBU1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -3.71
Fractional Gross Error(%) = 22.99
SO4 (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe SO4 at station BRET1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -5.03
Fractional Gross Error(%) = 39.98
SO4 (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe SO4 at station BOWA1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -38.86
Fractional Gross Error(%) = 48.42
SO4 (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe SO4 at station VOYA2
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -28.55
Fractional Gross Error(%) = 47.75
SO4 (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe SO4 at station HEGL1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -20.65
Fractional Gross Error(%) = 28.07
SO4 (microgram/m3)
Julian Date (002 - 029 2002)

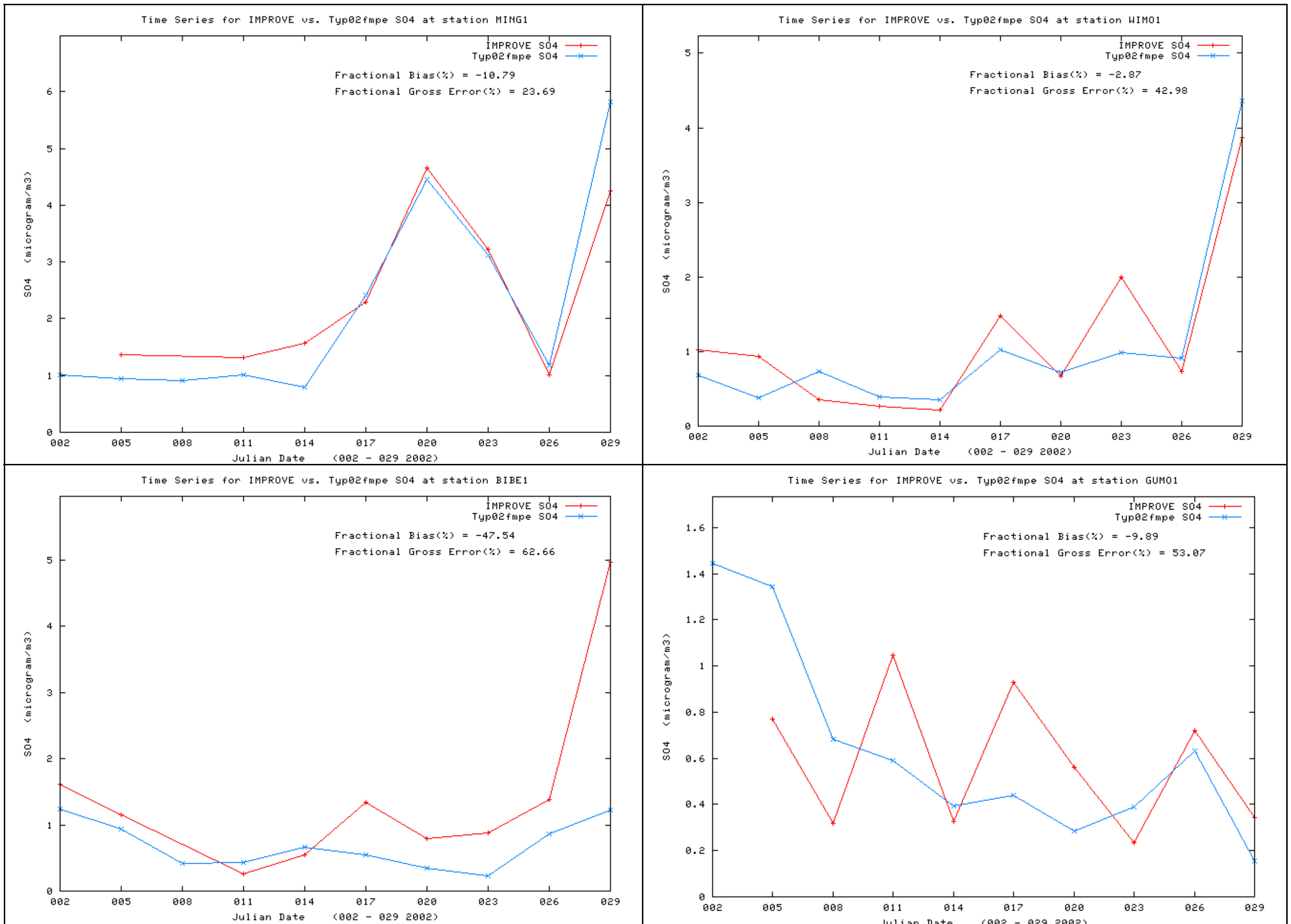


Figure C-4b. Time series of predicted and observed 24-hour sulfate (SO4) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.

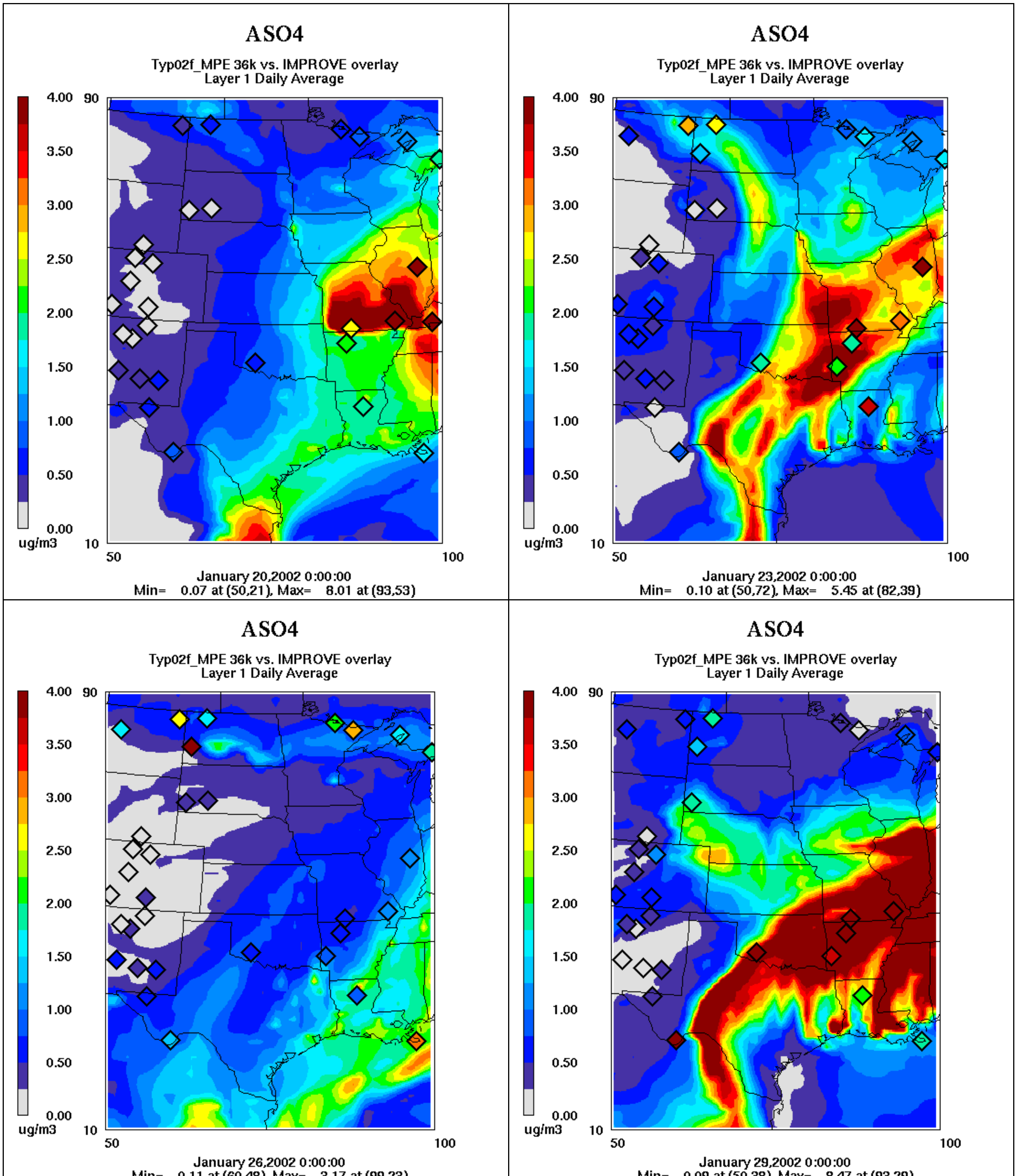


Figure C-4c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour SO4 concentrations for January 20, 23, 26 and 29, 2002.

C.3.1.2 SO4 in April 2002

In April CMAQ underestimates the observed SO4 in the CENRAP region with fractional bias values of -52%, -30% and -58% across the IMPROVE, STN and CASTNet networks (Figure C-5a). The fractional bias for wet SO4 deposition is quite low (3%) albeit with a lot of scatter which is reflected in high fractional error (78%). The ability of the model to reproduce the temporal variability of the April observed SO4 concentrations at the IMPROVE sites is quite variable. The SO4 under-prediction bias is clearly present at several sites (e.g., HEGL, BIBE and GUMO), whereas there is quite good agreement at others (UPBU, BRET and VOYA). Comparisons of the spatial distributions of the predicted and observed SO4 concentrations on April 5, 8, 11 and 14 are shown in Figure C-5c. On April 5 the model reproduces the half circle of elevated SO4 across Texas-Louisiana, but appears to not be as large an area as observed coming up short from some of the sites (e.g., BIBE and GUMO). Model and observations agree that April 8 is a relatively low SO4 day in the CENRAP region with just a small intrusion of elevated values across Mississippi. On April 14 the model has two separate clouds of elevated SO4, one over East Texas-Louisiana and one over northeastern Illinois and eastward with a clean area in between in southern Missouri. The observations agree except that it has these two elevated SO4 areas connected with the southern Missouri area not as clean as in the model.

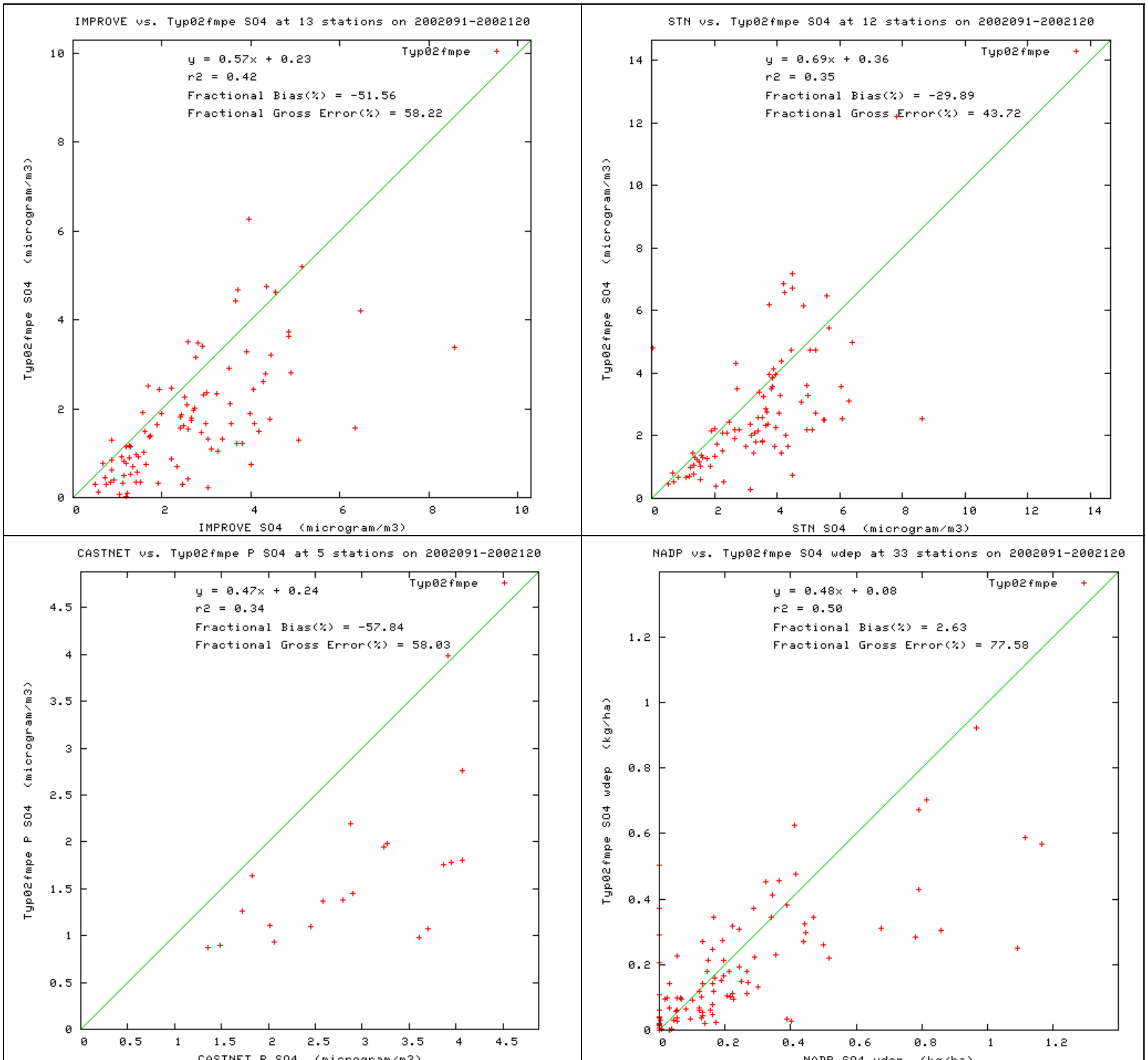
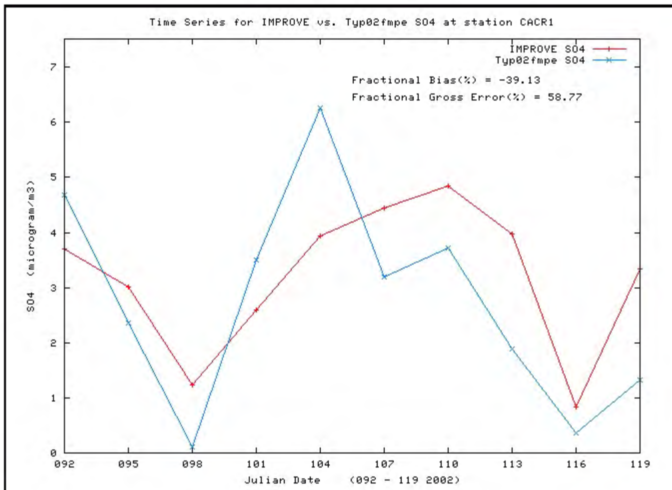
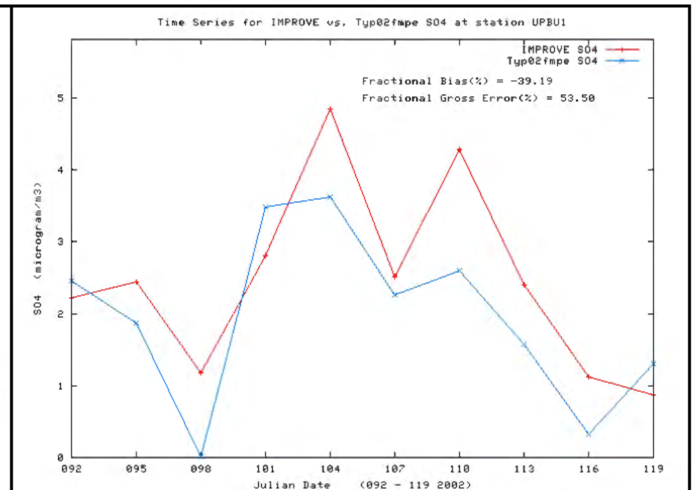
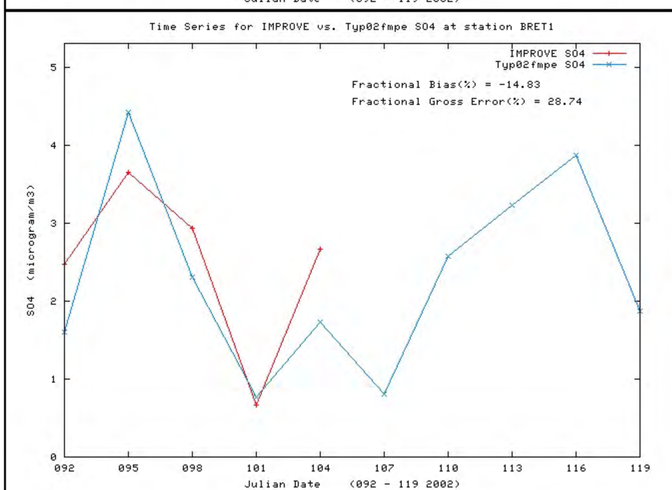
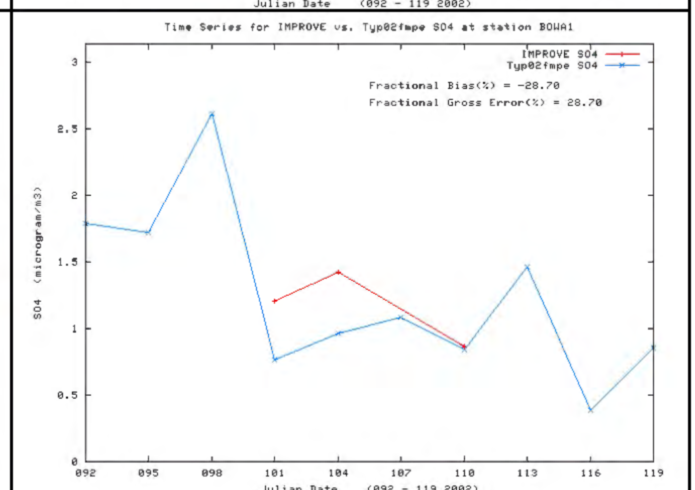


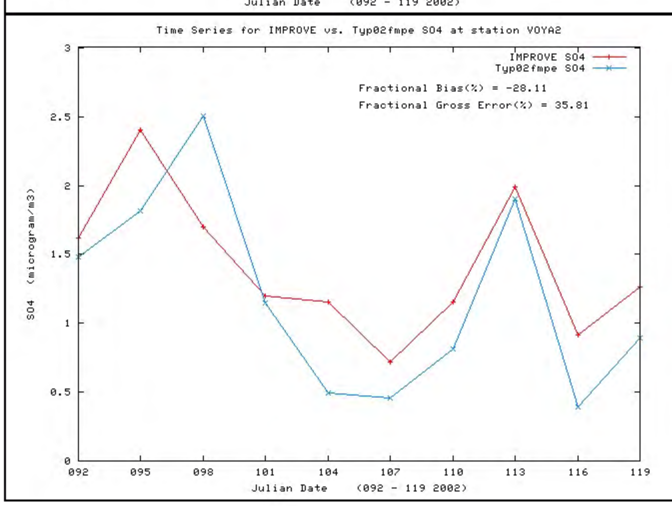
Figure C-5a. Scatter plots of predicted and observed sulfate (SO4) concentrations for April 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

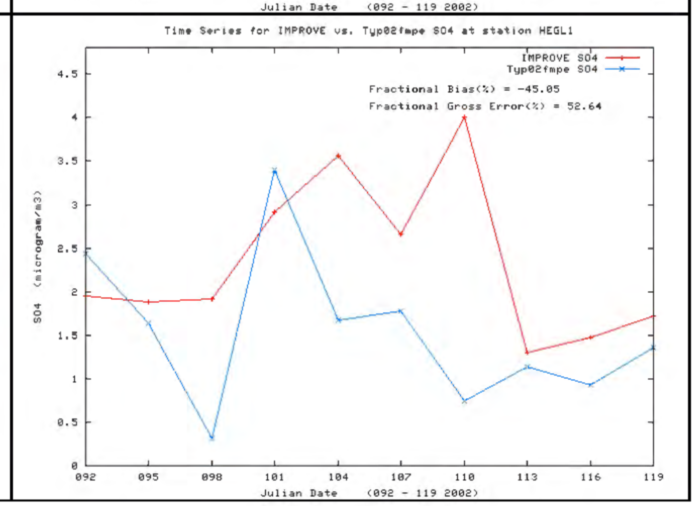

Time Series for IMPROVE vs. Typ02fmpe SO4 at station CACR1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -39.13
Fractional Gross Error(%) = 58.77
SO4 (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe SO4 at station UPBU1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -39.19
Fractional Gross Error(%) = 53.50
SO4 (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe SO4 at station BRET1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -14.83
Fractional Gross Error(%) = 28.74
SO4 (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe SO4 at station BOWA1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -28.70
Fractional Gross Error(%) = 28.70
SO4 (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe SO4 at station VOYA2
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -28.11
Fractional Gross Error(%) = 35.81
SO4 (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe SO4 at station HEGL1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -45.05
Fractional Gross Error(%) = 52.64
SO4 (microgram/m3)
Julian Date (092 - 119 2002)

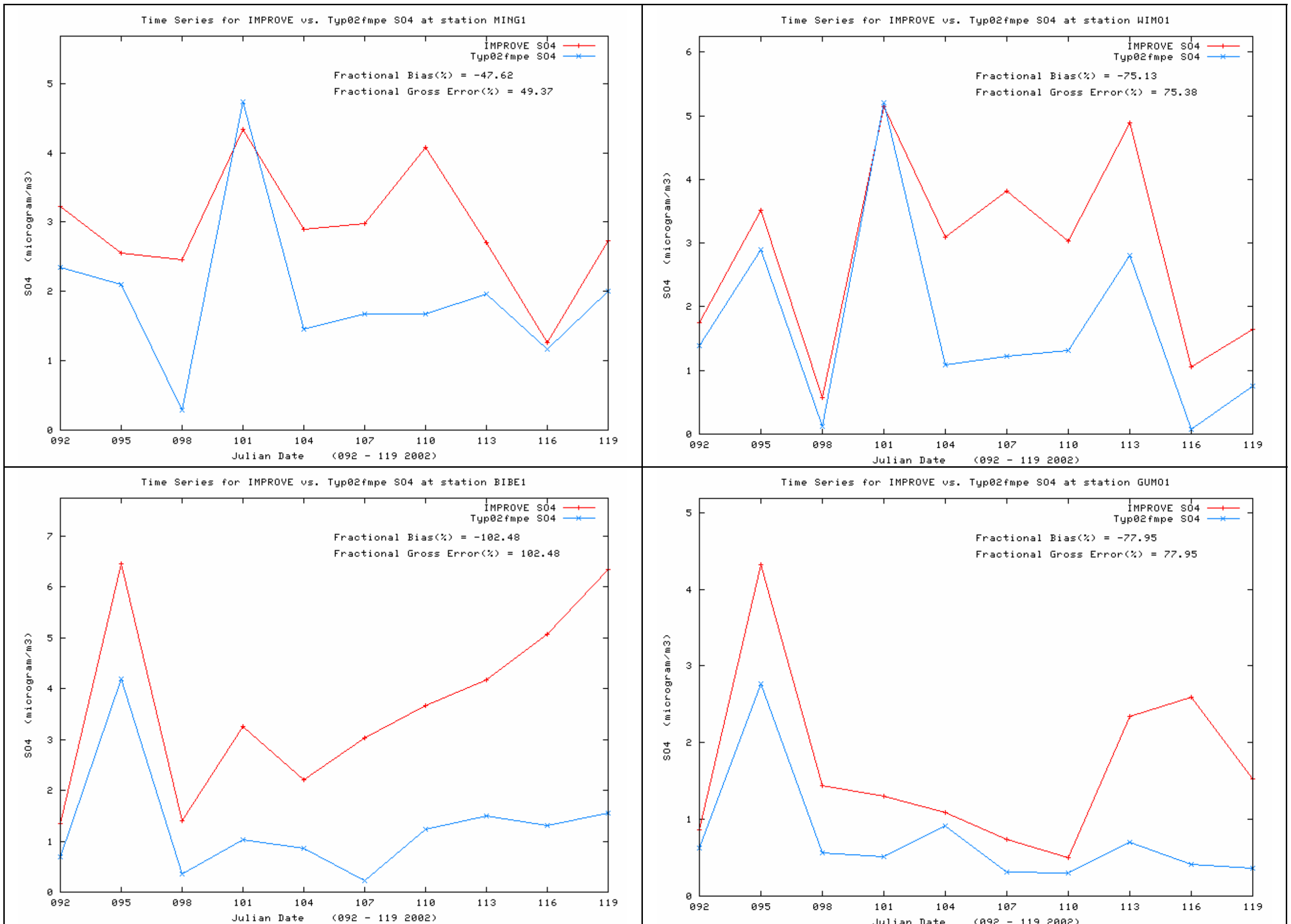


Figure C-5b. Time series of predicted and observed 24-hour sulfate (SO4) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.

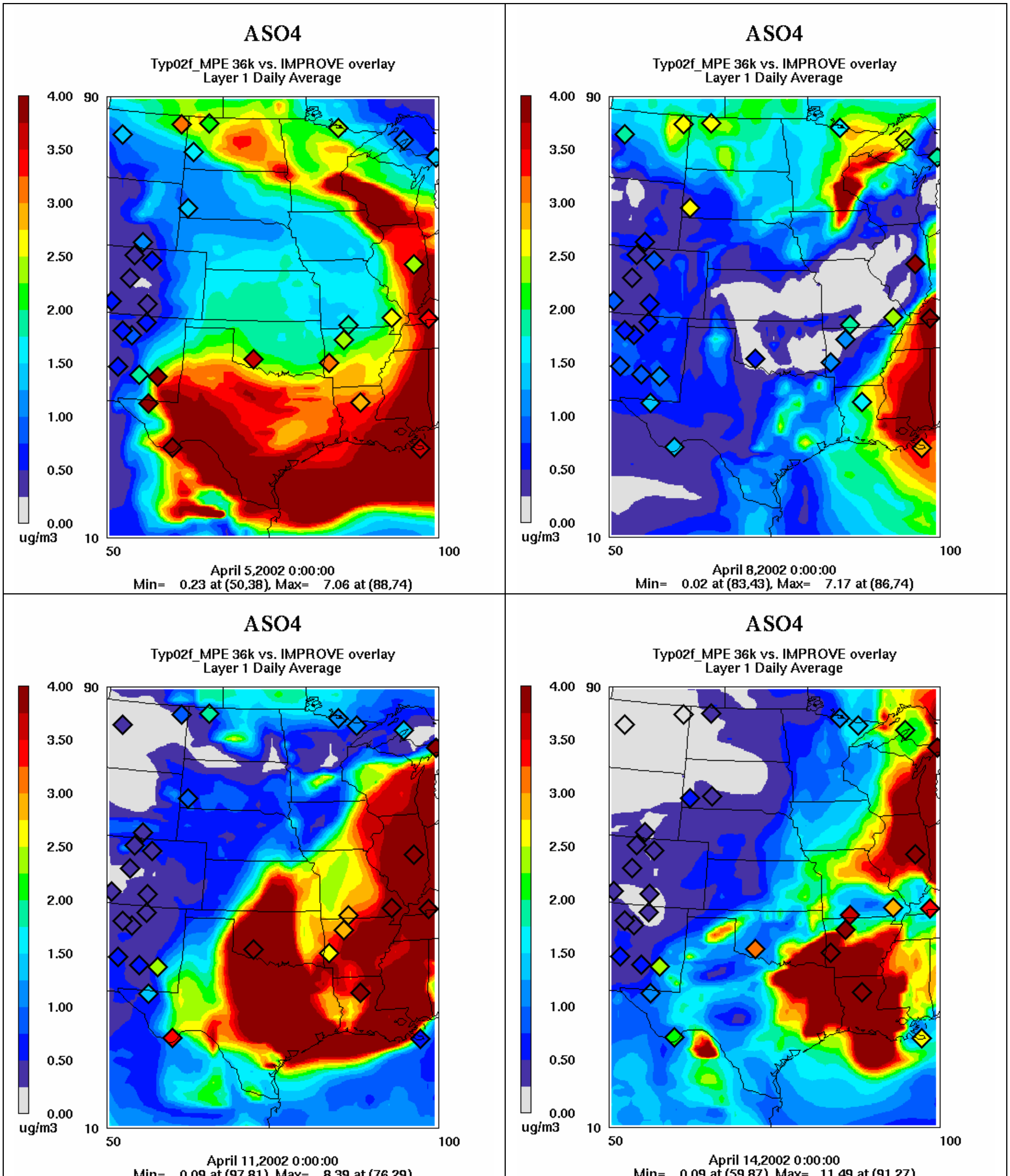


Figure C-5c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour SO4 concentrations for April 5, 8, 11 and 14, 2002.

C.3.1.3 SO4 in July 2002

SO4 concentrations are also underestimated by CMAQ in July (Figure C-6a) with fractional bias value ranging from -22 to -52%. Wet SO4 deposition is slightly overstated (22%) with a lot of scatter (83% error). The July SO4 under-prediction bias is also reflected in the time series plots (Figure C-6b). Comparisons of the predicted and observed spatial distribution of SO4 in the CENRAP region for July 7, 10, 13 and 16, 2002 are shown in Figure C-6c. In general the model and observations agree on the locations of the elevated SO4, except that the observed extent is somewhat larger so that the modeled elevated SO4 fails to impact some of the sites on the edge of the elevated cloud of SO4 (e.g., Big Bend, Guadalupe Mountains and northwestern Oklahoma).

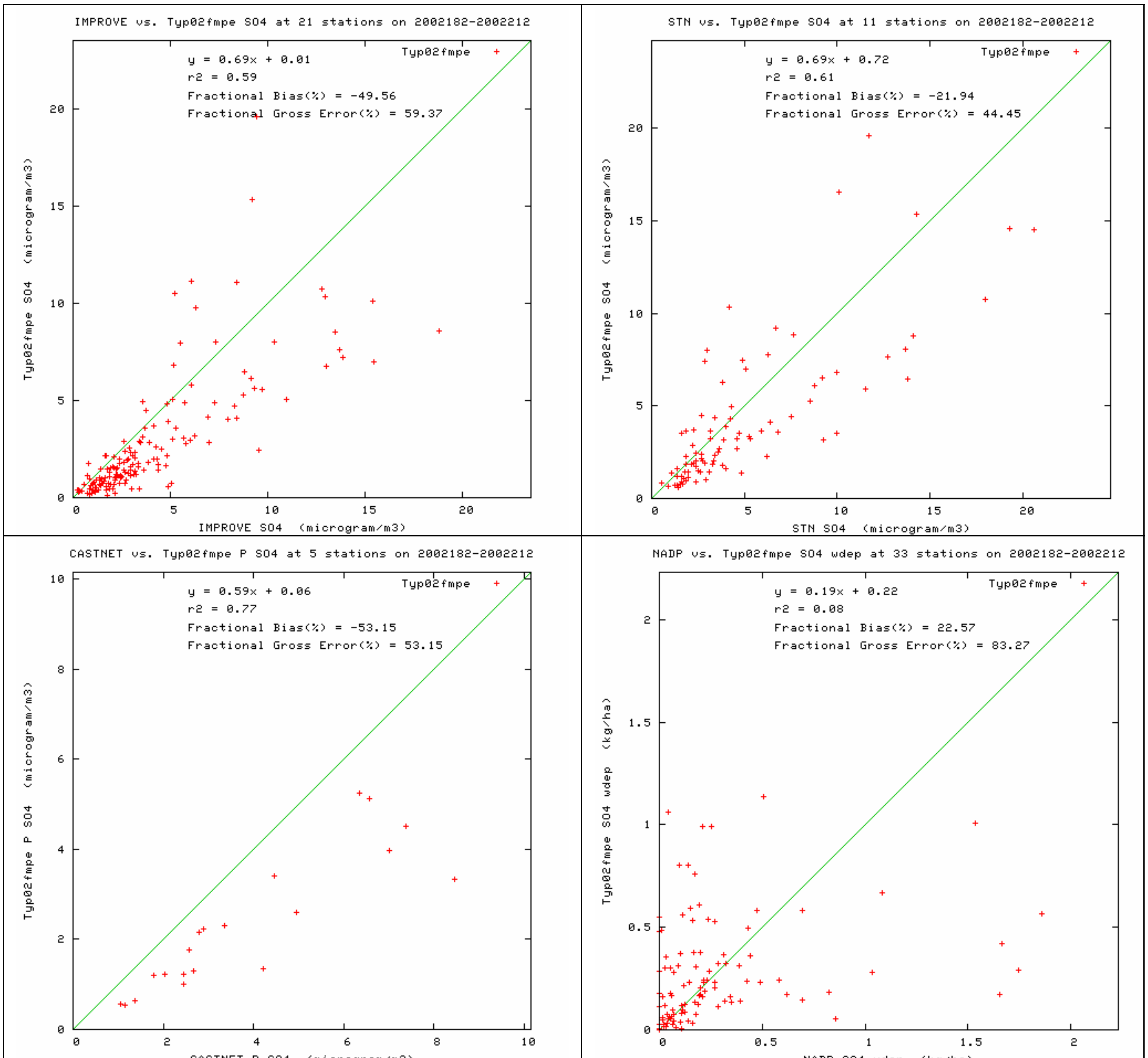
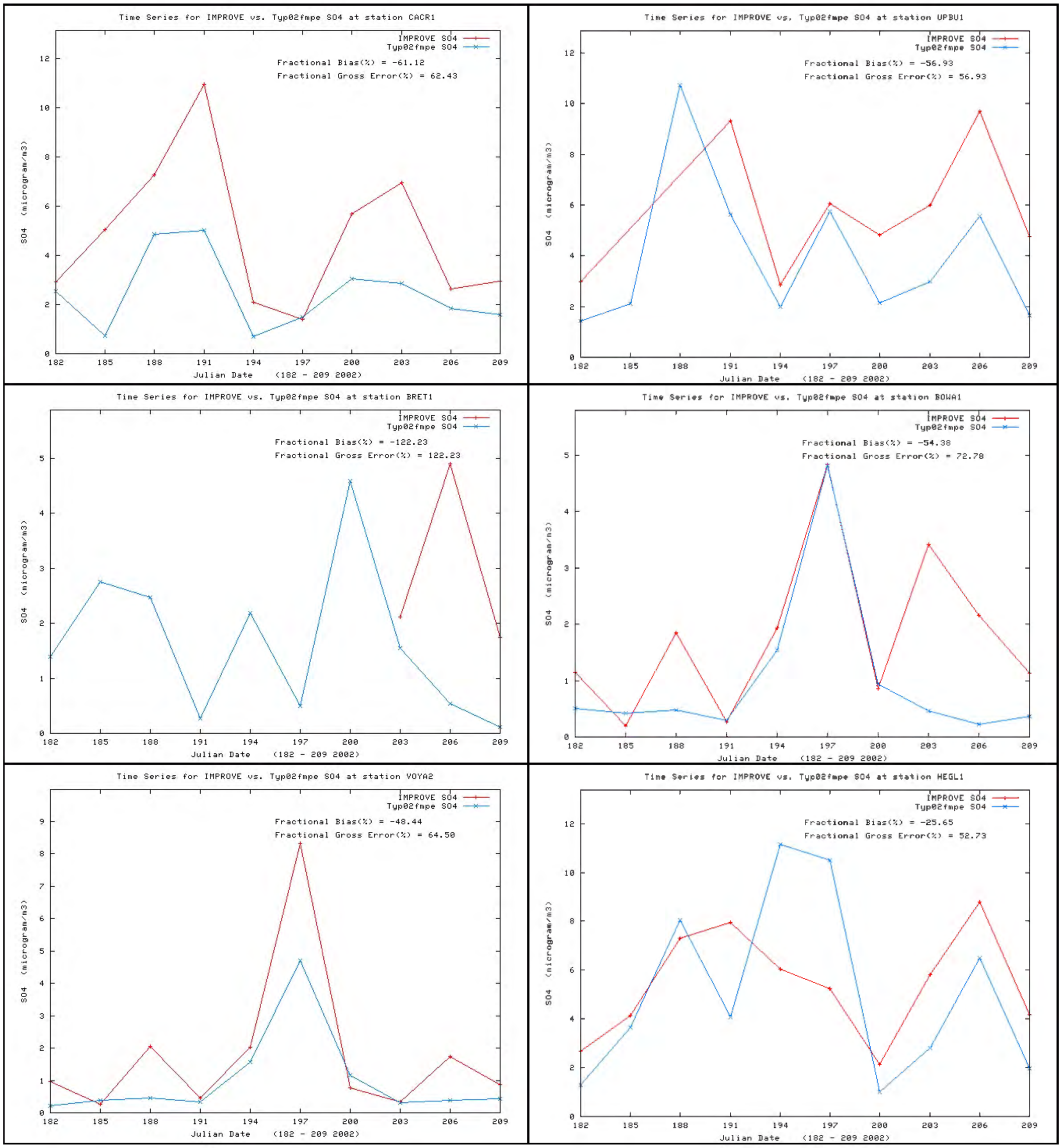


Figure C-6a. Scatter plots of predicted and observed sulfate (SO4) concentrations for July 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.


Time Series for IMPROVE vs. Typ02fmpe SO4 at station CACR1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -61.12
Fractional Gross Error(%) = 62.43
SO4 (microgram/m3)
Julian Date (182 - 209 2002)
Time Series for IMPROVE vs. Typ02fmpe SO4 at station UPBU1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -56.93
Fractional Gross Error(%) = 56.93
SO4 (microgram/m3)
Julian Date (182 - 209 2002)
Time Series for IMPROVE vs. Typ02fmpe SO4 at station BRET1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -122.23
Fractional Gross Error(%) = 122.23
SO4 (microgram/m3)
Julian Date (182 - 209 2002)
Time Series for IMPROVE vs. Typ02fmpe SO4 at station BOWA1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -54.38
Fractional Gross Error(%) = 72.78
SO4 (microgram/m3)
Julian Date (182 - 209 2002)
Time Series for IMPROVE vs. Typ02fmpe SO4 at station VOYA2
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -48.44
Fractional Gross Error(%) = 64.50
SO4 (microgram/m3)
Julian Date (182 - 209 2002)
Time Series for IMPROVE vs. Typ02fmpe SO4 at station HEGL1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -25.65
Fractional Gross Error(%) = 52.73
SO4 (microgram/m3)
Julian Date (182 - 209 2002)

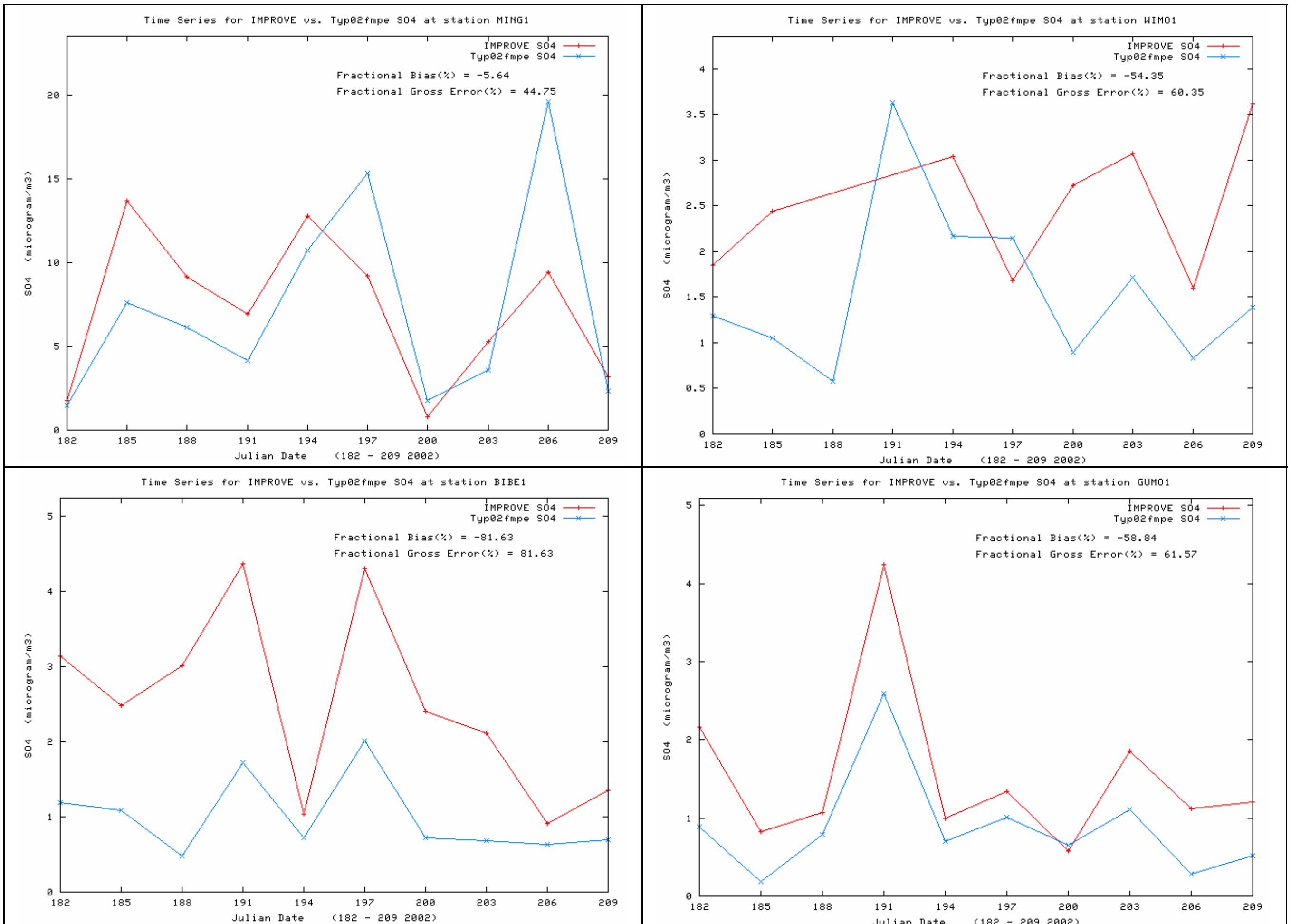


Figure C-6b. Time series of predicted and observed 24-hour sulfate (SO4) concentrations at CENRAP IMPROVE CLASS I AREA sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.

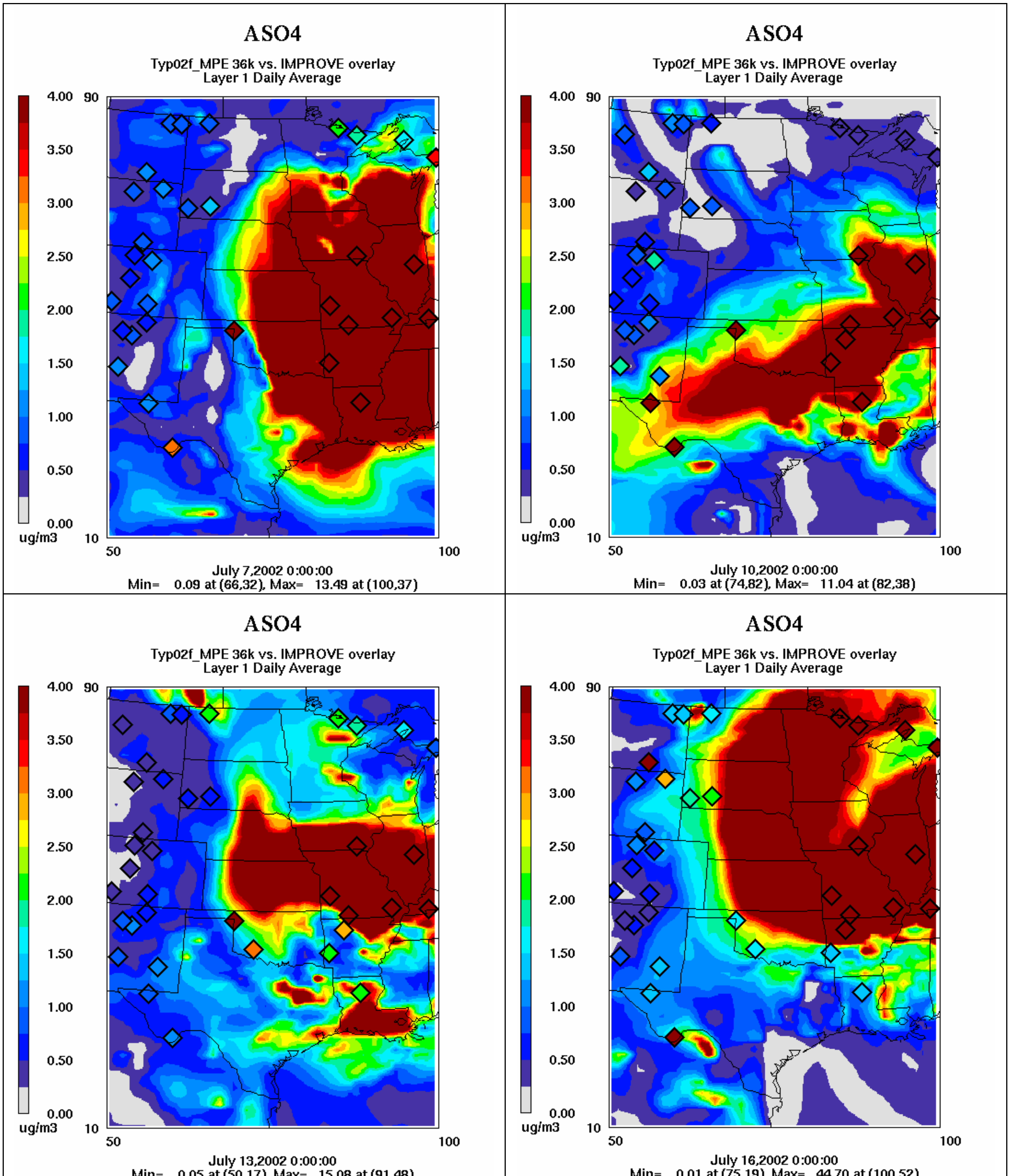


Figure C-6c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour SO4 concentrations for July 7, 10, 13 and 16, 2002.

C.3.1.4 SO4 in October 2002

In October 2002, CMAQ is doing a better job of reproducing the observed SO4 concentrations with much lower fractional bias values (-6%, 0% and -23%) and fractional errors < 40% (Figure C-7a). The observed SO4 time series are also reproduced well by the model, although an under-prediction bias is clearly evident at Big Bend, Guadalupe Mountains and Wichita Mountains. The model also reproduces the observed spatial distribution of SO4 well in October (Figure C-7c).

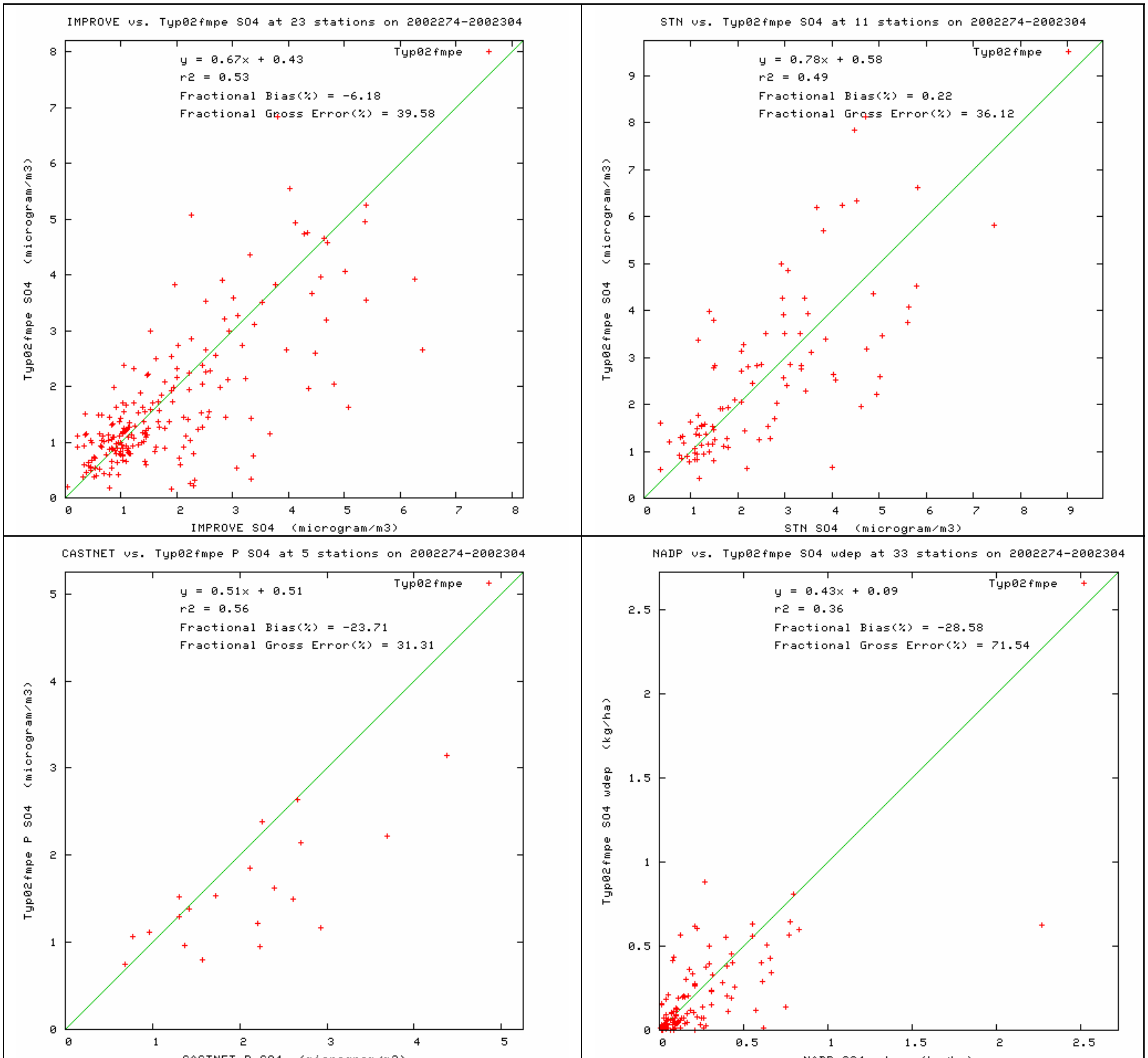
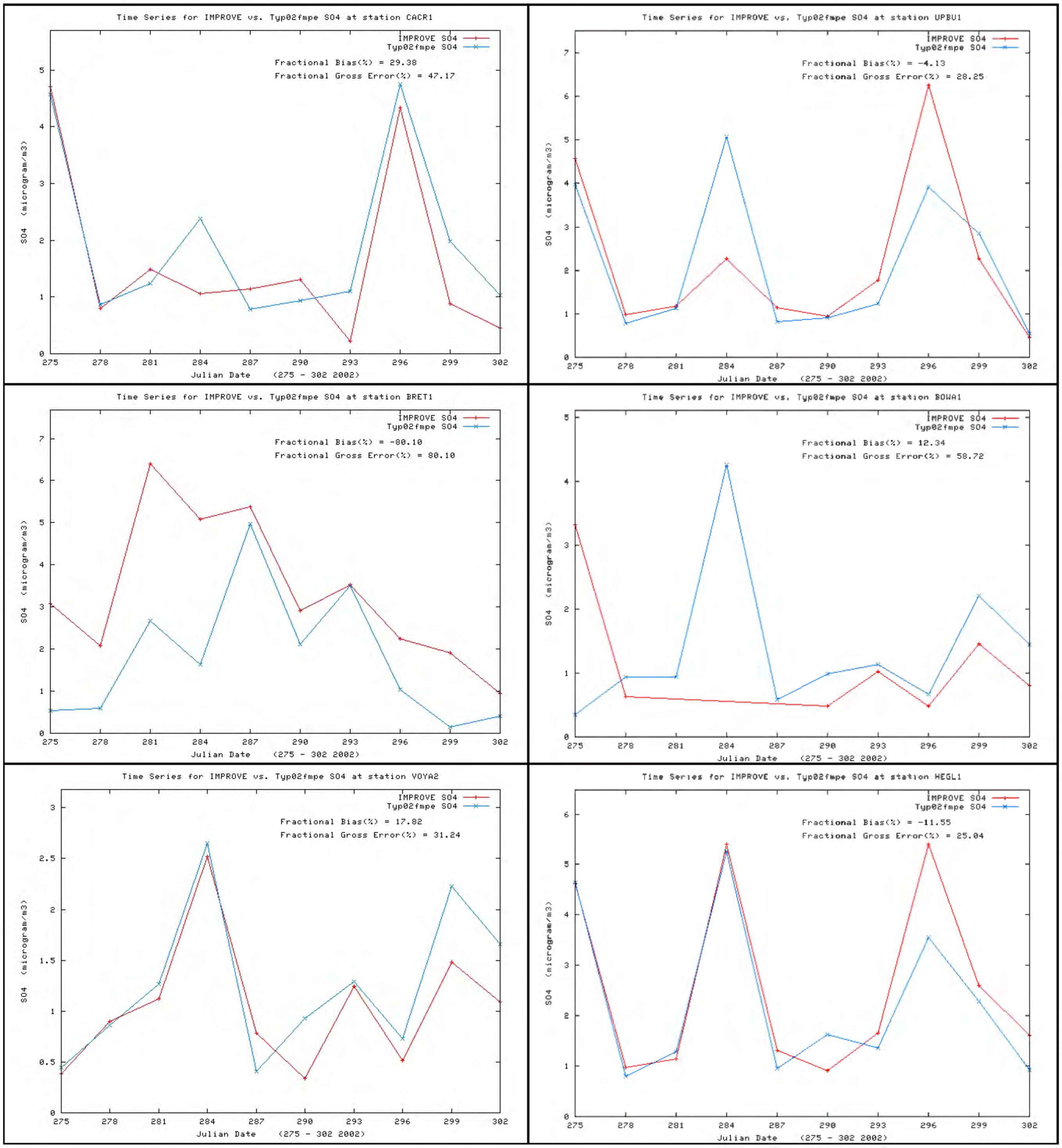


Figure C-7a. Scatter plots of predicted and observed sulfate (SO4) concentrations for October 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.


Time Series for IMPROVE vs. Typ02fmpe SO4 at station CACR1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = 29.38
Fractional Gross Error(%) = 47.17
SO4 (microgram/m3)
Julian Date (275 - 302 2002)
Time Series for IMPROVE vs. Typ02fmpe SO4 at station UPBU1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -4.13
Fractional Gross Error(%) = 28.25
SO4 (microgram/m3)
Julian Date (275 - 302 2002)
Time Series for IMPROVE vs. Typ02fmpe SO4 at station BRET1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -80.10
Fractional Gross Error(%) = 80.10
SO4 (microgram/m3)
Julian Date (275 - 302 2002)
Time Series for IMPROVE vs. Typ02fmpe SO4 at station BOWA1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = 12.34
Fractional Gross Error(%) = 58.72
SO4 (microgram/m3)
Julian Date (275 - 302 2002)
Time Series for IMPROVE vs. Typ02fmpe SO4 at station VOYA2
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = 17.82
Fractional Gross Error(%) = 31.24
SO4 (microgram/m3)
Julian Date (275 - 302 2002)
Time Series for IMPROVE vs. Typ02fmpe SO4 at station HEGL1
IMPROVE SO4
Typ02fmpe SO4
Fractional Bias(%) = -11.55
Fractional Gross Error(%) = 25.04
SO4 (microgram/m3)
Julian Date (275 - 302 2002)

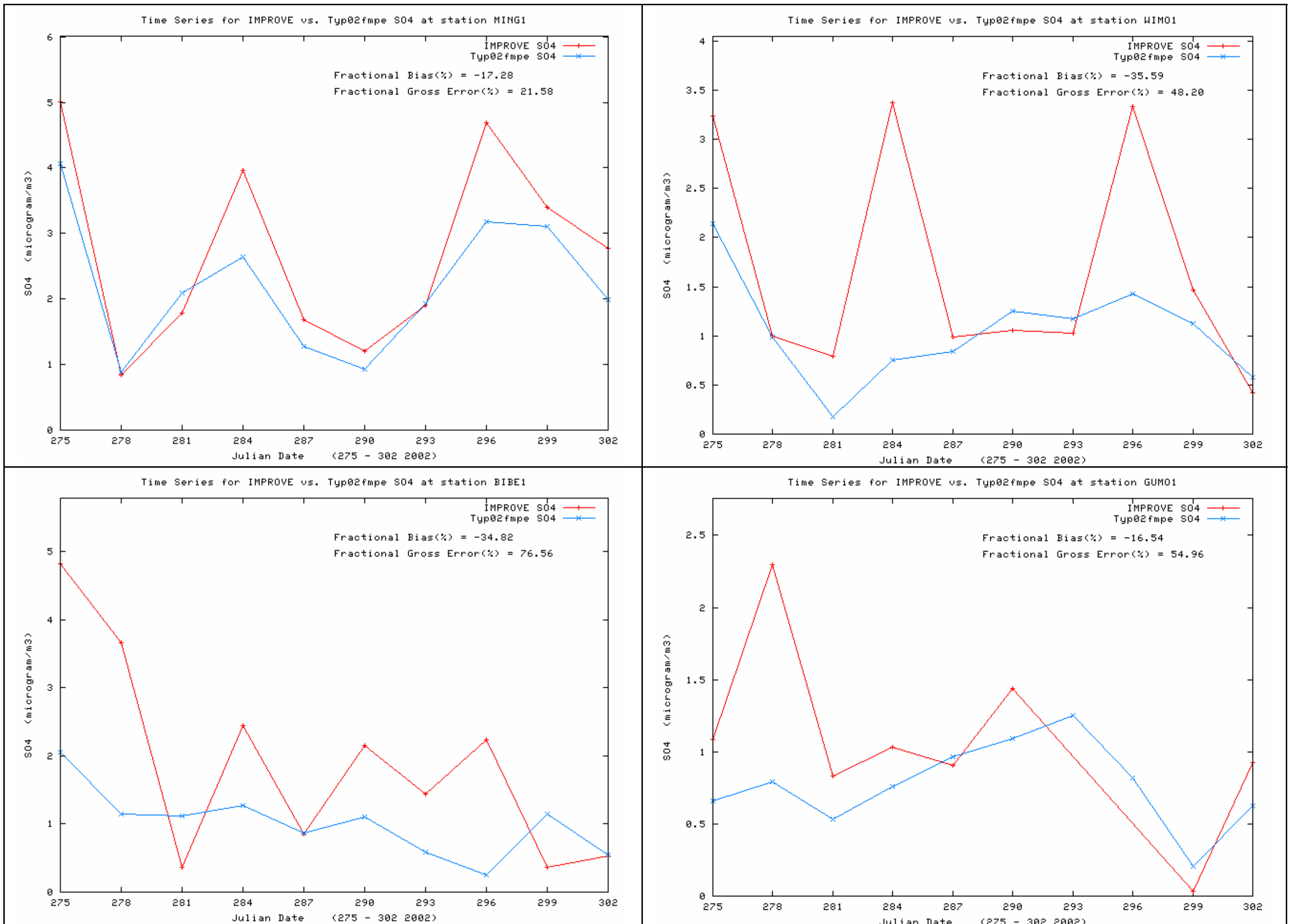


Figure C-7b. Time series of predicted and observed 24-hour sulfate (SO4) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.

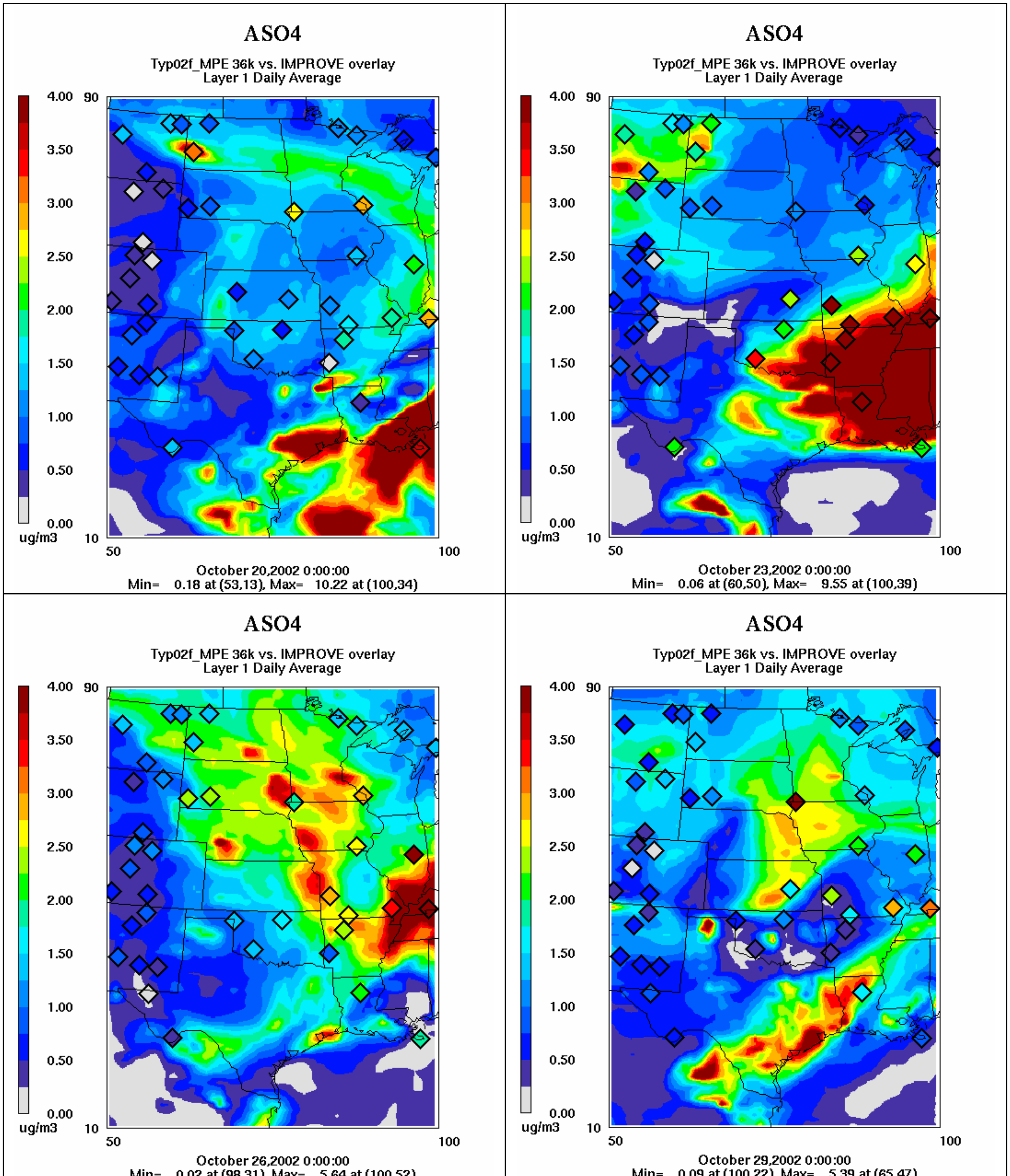


Figure C-7c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour SO4 concentrations for October 20, 23, 26 and 29, 2002.

C.3.1.5 SO4 Monthly Bias and Error

Figure C-8 compares the monthly SO4 fractional bias and error across the CENRAP region for the three monitoring networks. The under-prediction bias is clearly evident the first 8-10 months of the year. This underestimation bias is greatest across the CASTNet network which persists through out the year and is least for the STN network where it disappears by August-September. The monthly SO4 fractional errors are generally between 30% and 60% and are greatest in the summer when SO4 concentrations are the highest.

Figure C-9 presents a Bugle Plot of monthly So4 fractional bias and error statistics and compares them against the proposed PM model performance goal and criteria (see Table C-3). For the STN network, it appears that SO4 performance for all months achieves the proposed PM model performance goal. For the IMPROVE network, approximately half of the months achieve the proposed PM performance goal with the other half exceed the goal but within the performance criteria. Across the CASTNet network most months exceed the proposed goal and are within the criteria. Although the CASTNet fractional bias for some months is right at the criteria (≤±60%). With the exception of two IMPROVE months, all of the monthly SO4 fractional error performance statistics achieve the proposed PM model performance goal.

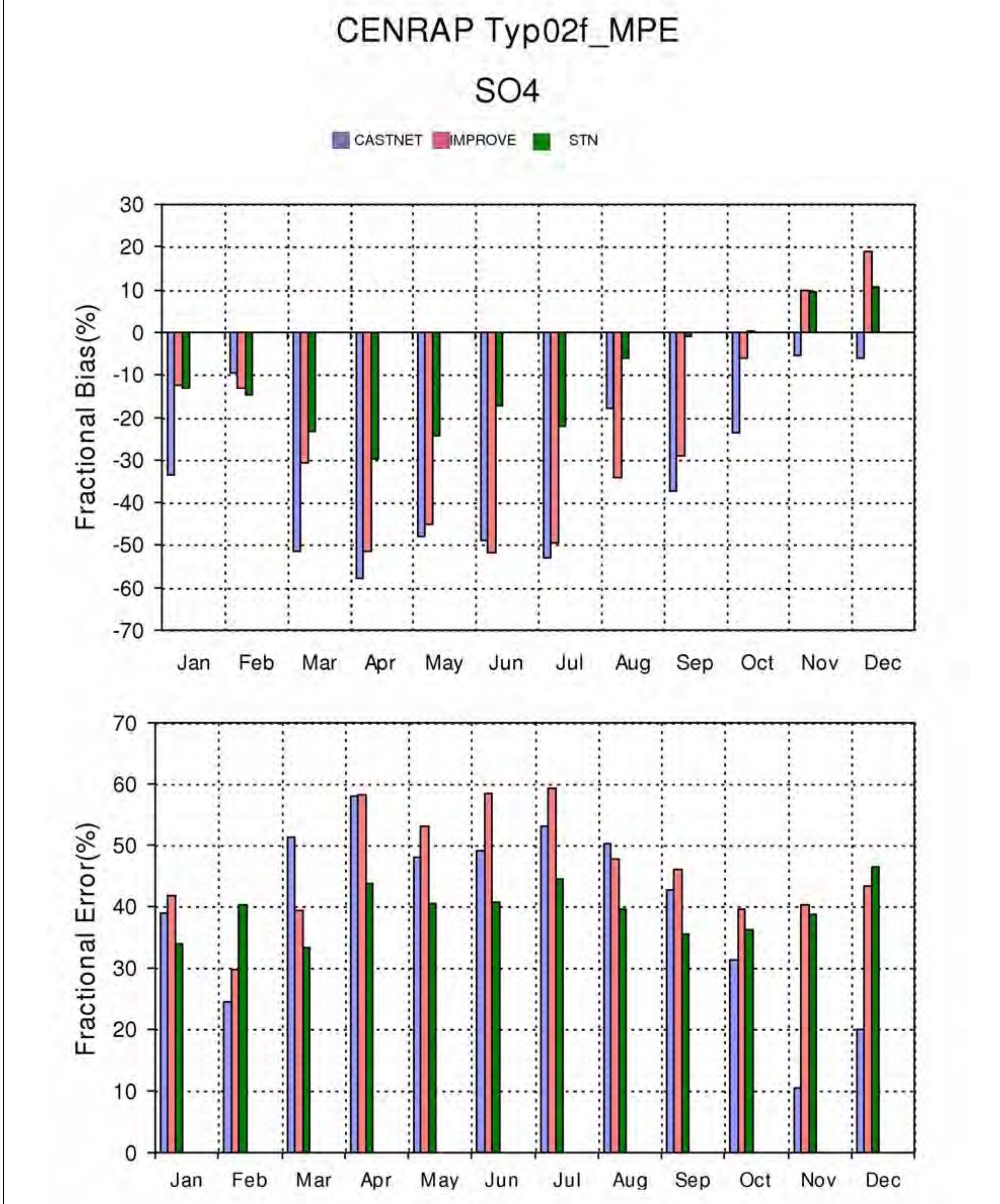


Figure C-8. Monthly SO4 fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE, STN and CASTNet monitoring sites in the CENRAP region.

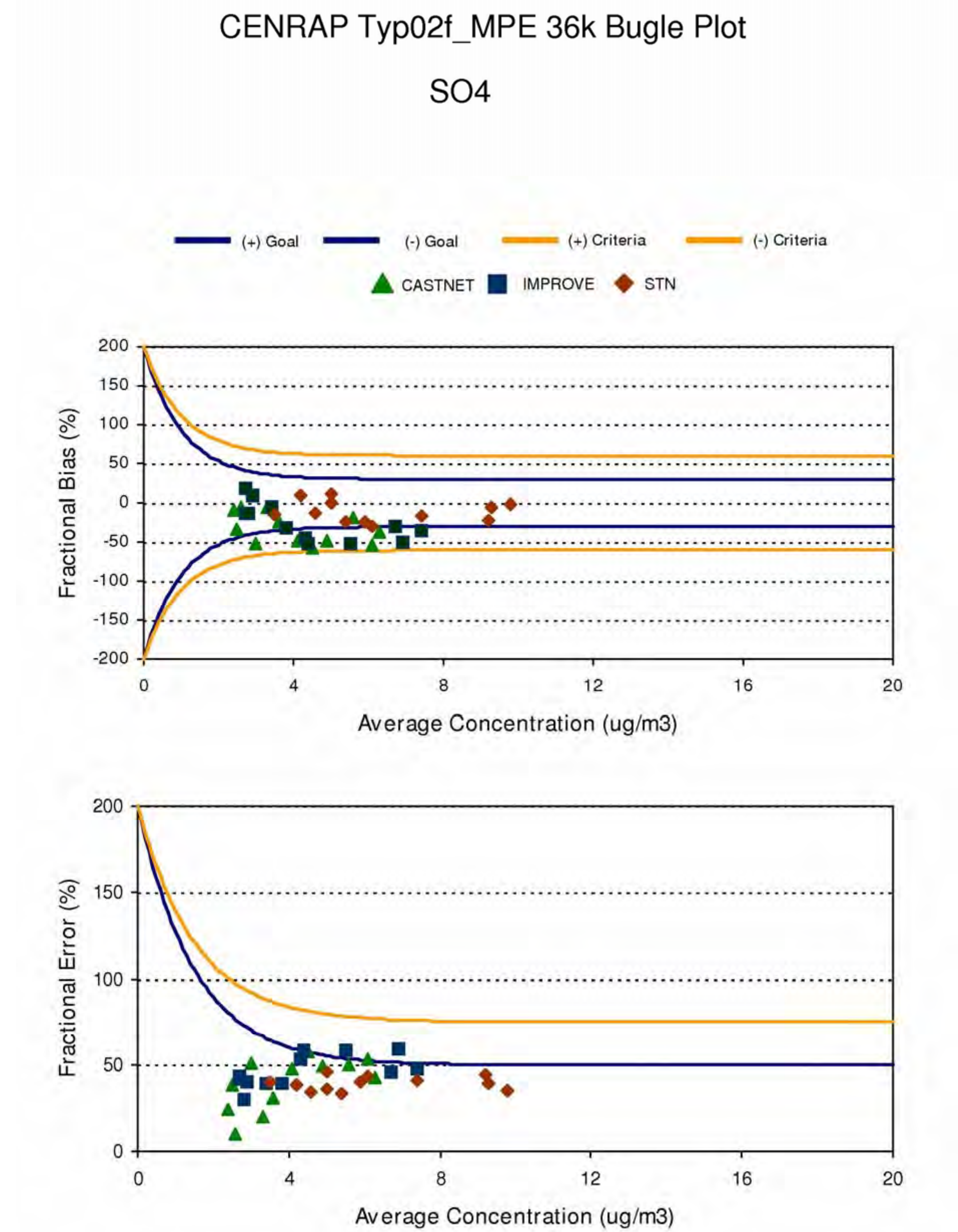


Figure C-9. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for SO4 and IMPROVE, STN and CASTNet monitoring sites in the CENRAP region.

C.3.2 Nitrate (NO3) Monthly Model Performance

The following sections discuss the monthly NO3 model performance across the IMPROVE, STN and CASTNet monitoring networks in the CENRAP region.

C.3.2.1 NO3 in January 2002

January NO3 CMAQ model performance is characterized by an overestimation bias across the CENRAP region (Figure C-10a). The fractional bias values for the IMPROVE, STN and CASTNet networks are 38%, 29% and 61%. Unlike SO4, wet deposition of NO3 is also overstated in January (43%). Fractional errors range from 90%-100% for the IMPROVE and CASTNet networks and are lower (54%) for the STN network and higher (114%) for the NADP network.

With the exception of Breton Island and Big Bend, the model NO3 over-prediction bias occurs at the other 8 CENRAP Class I areas (Figure C-10b). The observed time series is reproduced reasonable well at a couple sites, such as Wichita Mountains and the first half of January for Voyageurs. However, for most sites the observed NO3 time series is not reproduced very well and is extremely poorly reproduced for Breton Island, Big Bend and Guadalupe Mountains.

The model typically estimates a larger area of elevated NO3 concentrations than is observed. This is shown for January 20, 23, 26 and 29 in Figure C-10c. Whereas the model exhibits large areas of brown indicated daily average NO3 concentrations of 4 $\mu g/m^3$ or higher, the observed values of this high rarely occur and are usually limited to the central Illinois site. On January 20 the model estimates the entire eastern half of the CENRAP region should be covered by elevated NO3 concentrations, whereas the observations indicate much lower values. On January 23 the modeled elevated NO3 concentrations lies between the IMPROVE monitoring sites, although the central Illinois site suggests high NO3 did occur in the region. The observations on January 26 also suggest lower NO3 than the model is predicting. On January 29 the model estimates elevated NO3 from the central Illinois site to Wichita Mountains, Oklahoma that is supported by these two observations. In general, the model is estimating more wide-spread elevated NO3 concentrations than observed, whereas the observations suggest that the elevated NO3 occurrences is less frequent and more spotty.

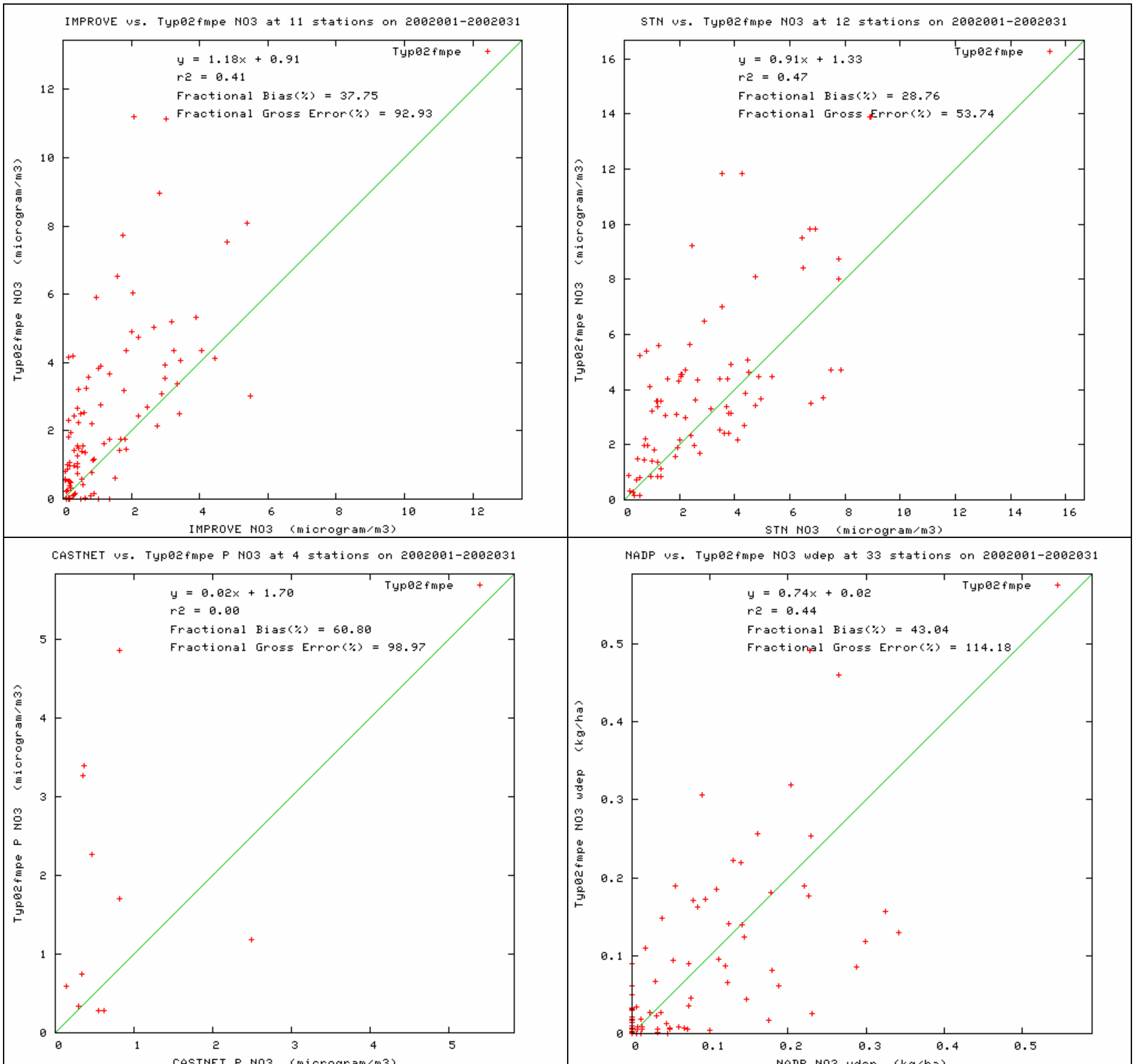
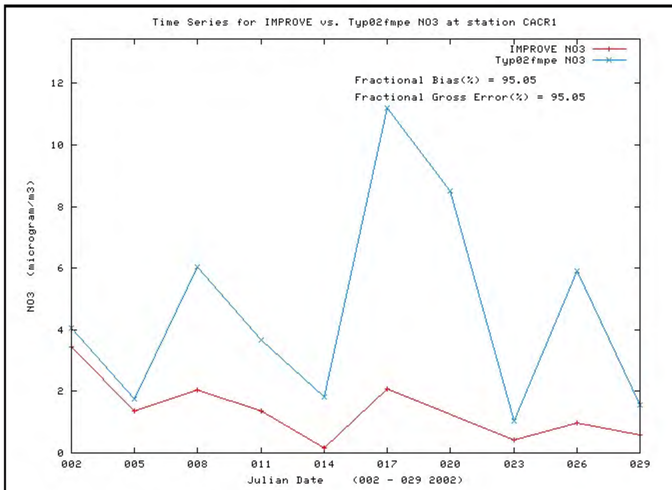
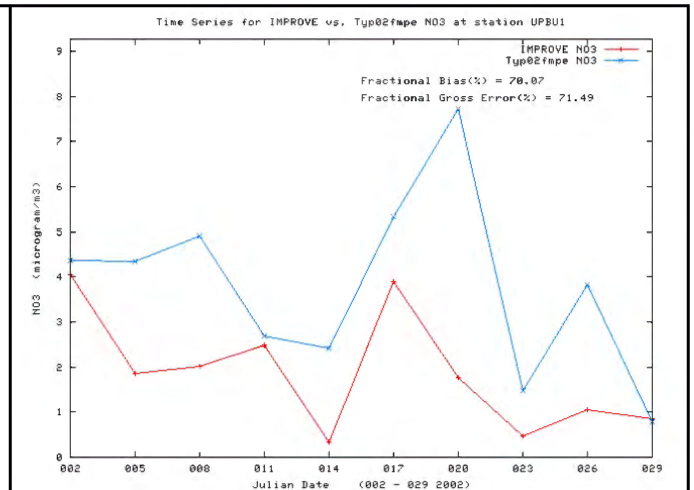
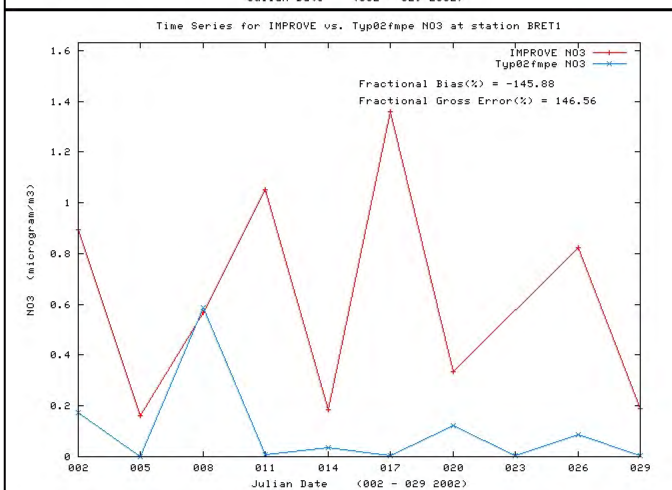
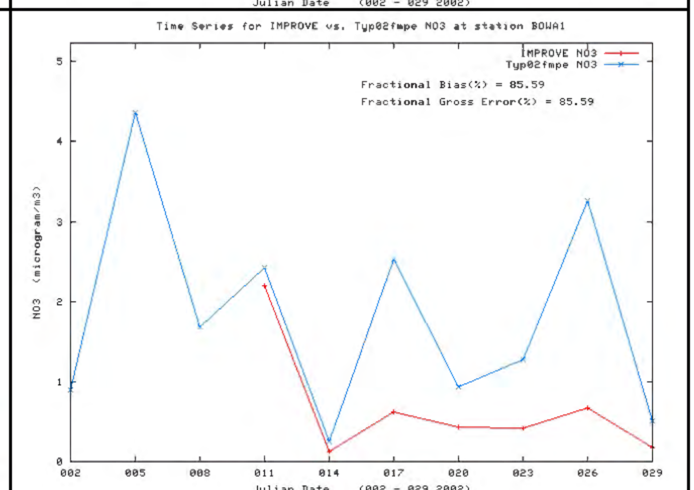


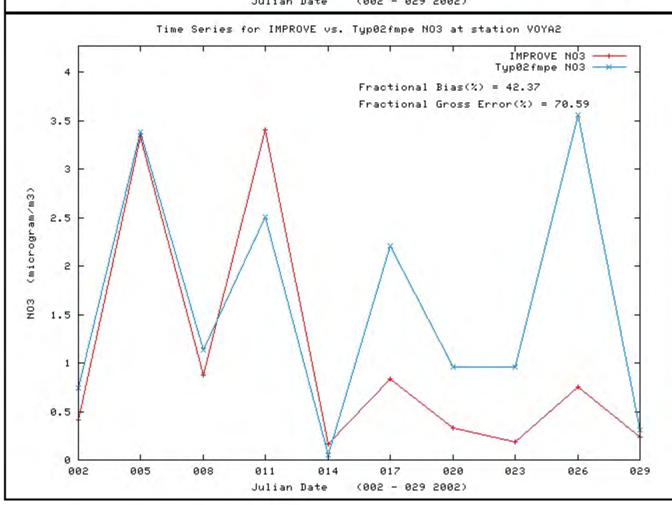
Figure C-10a. Scatter plots of predicted and observed nitrate (NO3) concentrations for January 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

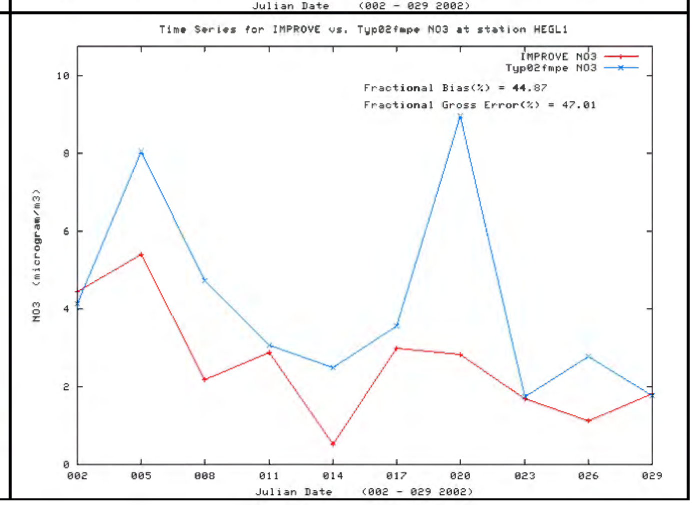

Time Series for IMPROVE vs. Typ02fmpe NO3 at station CACR1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = 95.05
Fractional Gross Error(%) = 95.05
NO3 (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe NO3 at station UPBU1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = 70.07
Fractional Gross Error(%) = 71.49
NO3 (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe NO3 at station BRET1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -145.88
Fractional Gross Error(%) = 146.56
NO3 (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe NO3 at station BOWA1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = 85.59
Fractional Gross Error(%) = 85.59
NO3 (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe NO3 at station VOYA2
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = 42.37
Fractional Gross Error(%) = 70.59
NO3 (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe NO3 at station HEGL1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = 44.87
Fractional Gross Error(%) = 47.01
NO3 (microgram/m3)
Julian Date (002 - 029 2002)

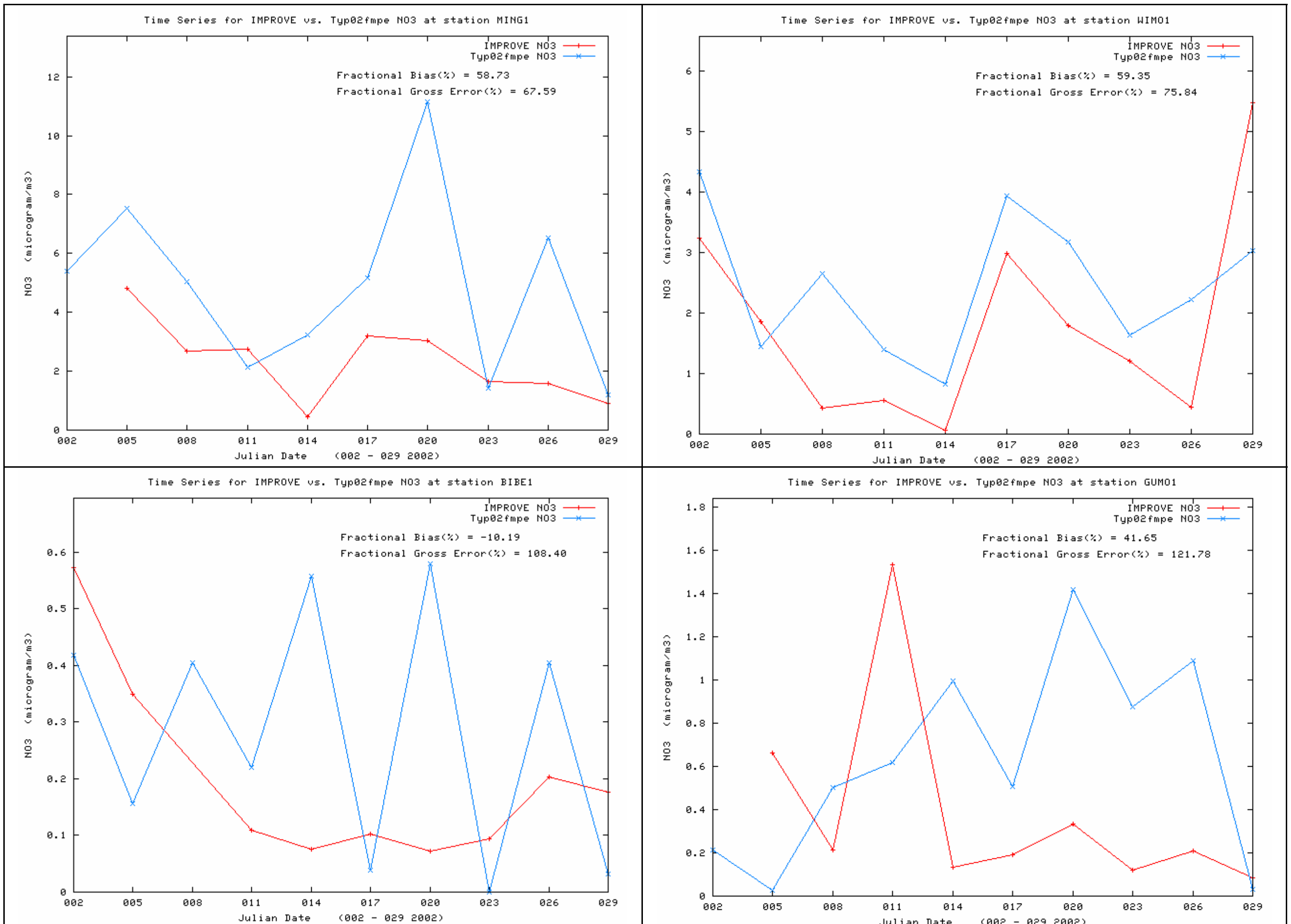


Figure C-10b. Time series of predicted and observed 24-hour nitrate (NO3) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.

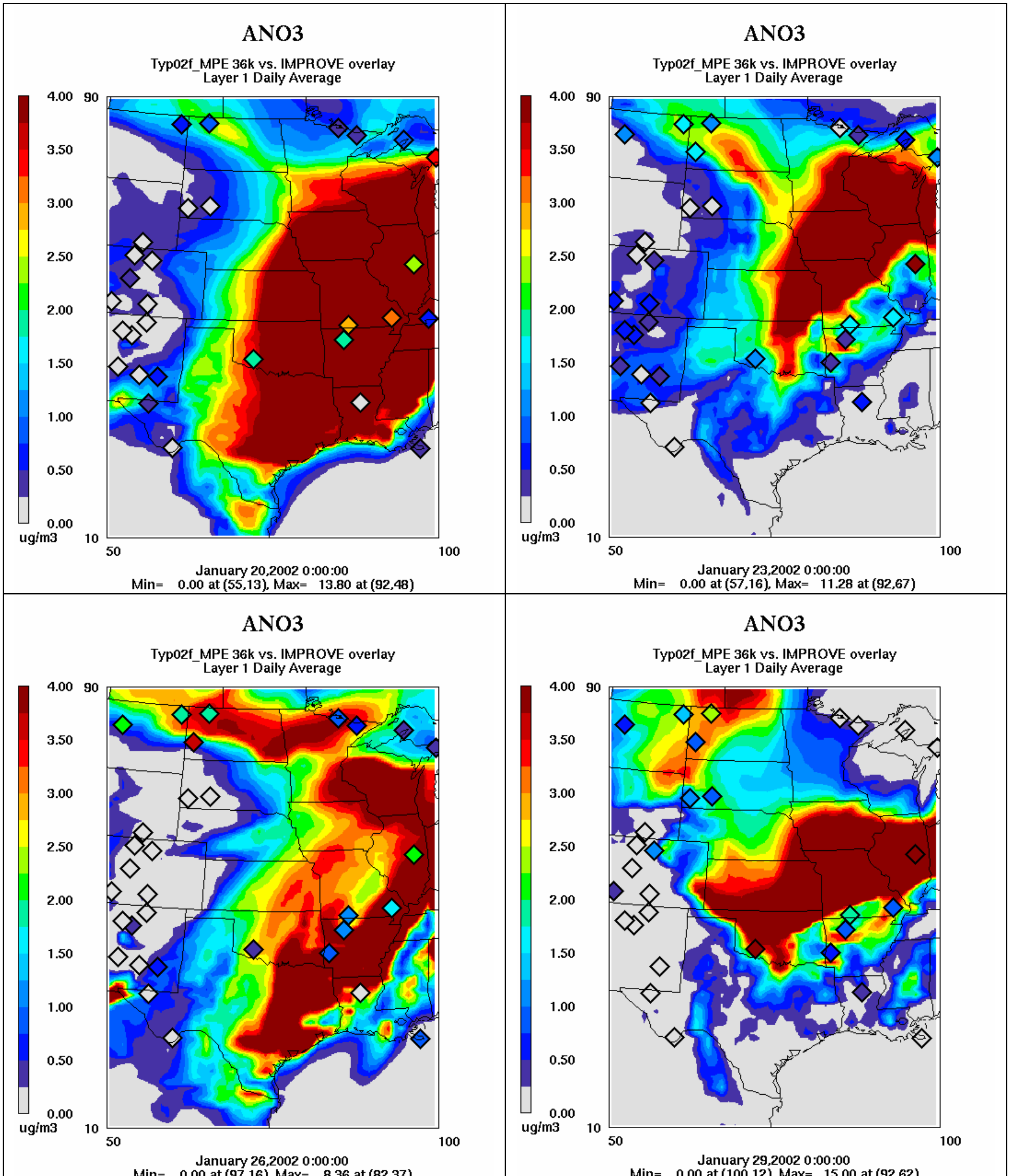


Figure C-10c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour NO3 concentrations for January 20, 23, 26 and 29, 2002.

C.3.2.2 NO3 in April 2002

Unlike the NO3 overestimation bias of January, the April NO3 performance is characterized by an underestimation bias (Figure C-11a). This under-prediction bias appears to be driven by near zero model predictions when the observed values are small (< 1 $\mu g/m^3$), but positive. This effect is especially noticeable in the NO3 time series (Figure C-11b) where at several sites the modeled NO3 concentrations foes to zero (e.g., BRET, BIBE, GUMO), whereas the observed values has an approximately 0.2 μg/m3 floor. The spatial maps suggest that the large April NO3 under-prediction bias indicated by the performance statistics is not as bad as they suggest (Figure C-11c). Mostly the model is predicting low NO3 values where low values are observed, just that the model approaches zero which results in a large relative difference with the observe values.

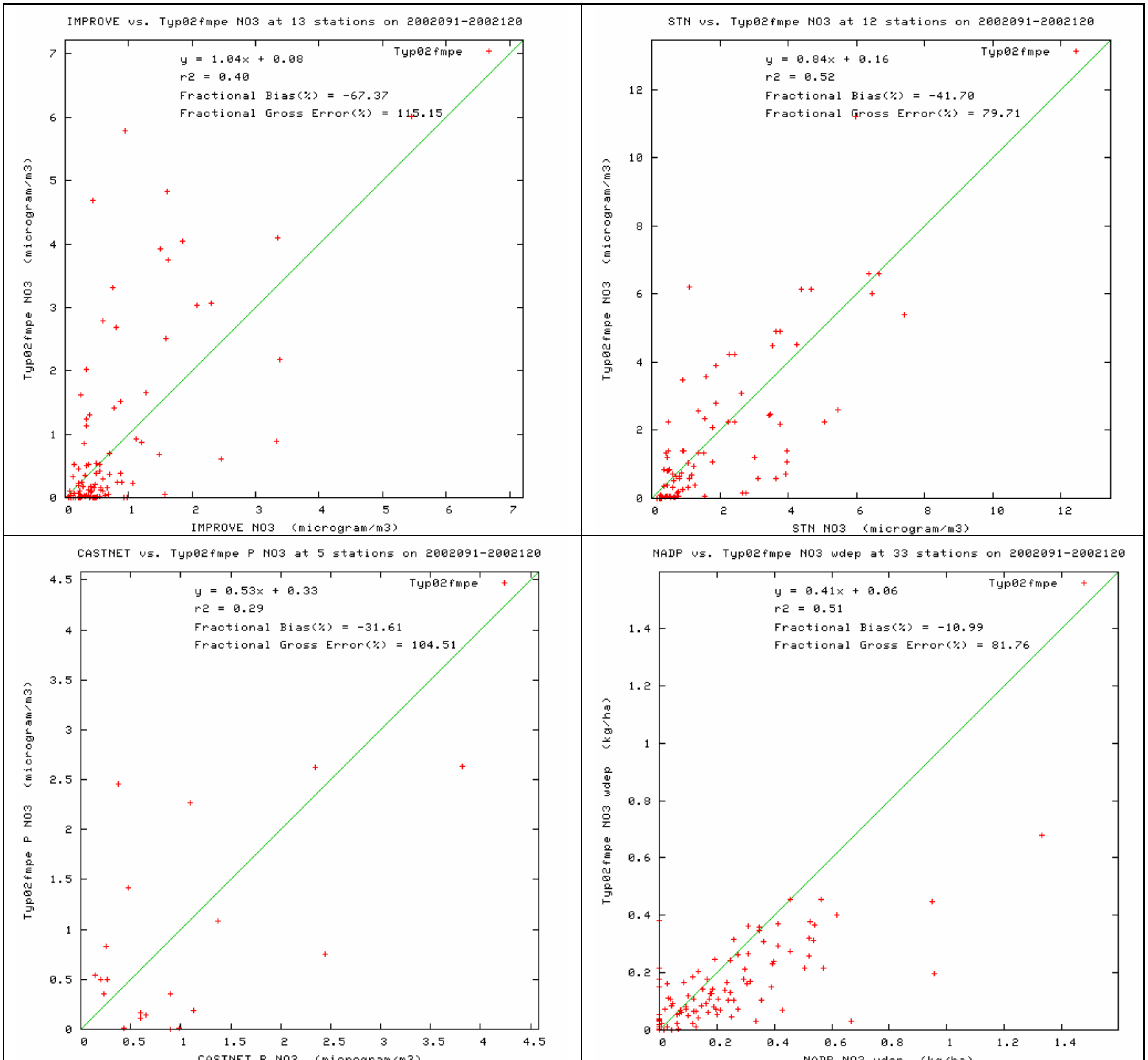
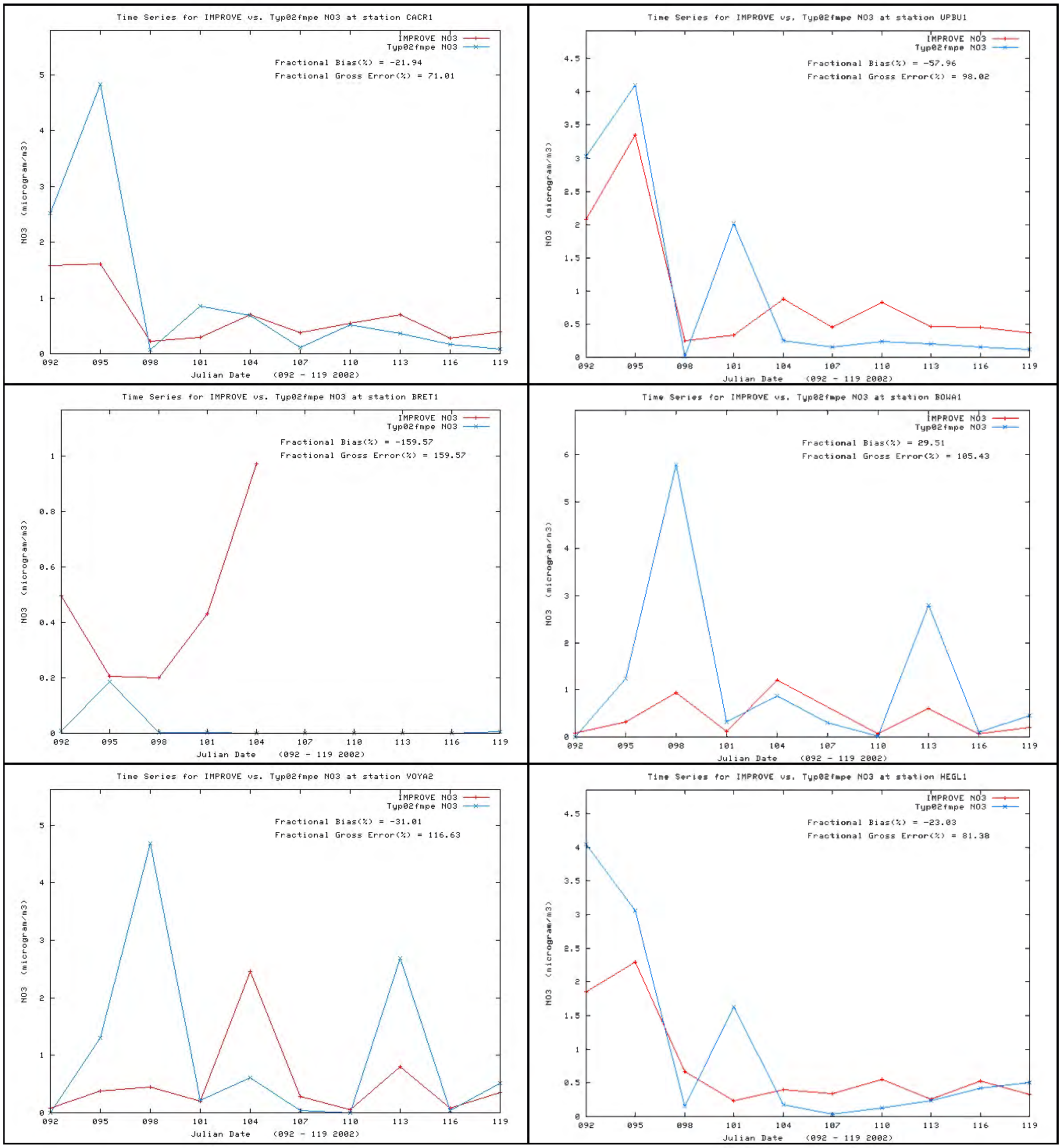


Figure C-11a. Scatter plots of predicted and observed nitrate (NO3) concentrations for April 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.


Time Series for IMPROVE vs. Typ02fmpe NO3 at station CACR1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -21.94
Fractional Gross Error(%) = 71.01
NO3 (microgram/m3)
Julian Date (092 - 119 2002)
Time Series for IMPROVE vs. Typ02fmpe NO3 at station UPBU1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -57.96
Fractional Gross Error(%) = 98.02
NO3 (microgram/m3)
Julian Date (092 - 119 2002)
Time Series for IMPROVE vs. Typ02fmpe NO3 at station BRET1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -159.57
Fractional Gross Error(%) = 159.57
NO3 (microgram/m3)
Julian Date (092 - 119 2002)
Time Series for IMPROVE vs. Typ02fmpe NO3 at station BOWA1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = 29.51
Fractional Gross Error(%) = 105.43
NO3 (microgram/m3)
Julian Date (092 - 119 2002)
Time Series for IMPROVE vs. Typ02fmpe NO3 at station VOYA2
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -31.01
Fractional Gross Error(%) = 116.63
NO3 (microgram/m3)
Julian Date (092 - 119 2002)
Time Series for IMPROVE vs. Typ02fmpe NO3 at station HEGL1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -23.03
Fractional Gross Error(%) = 81.38
NO3 (microgram/m3)
Julian Date (092 - 119 2002)

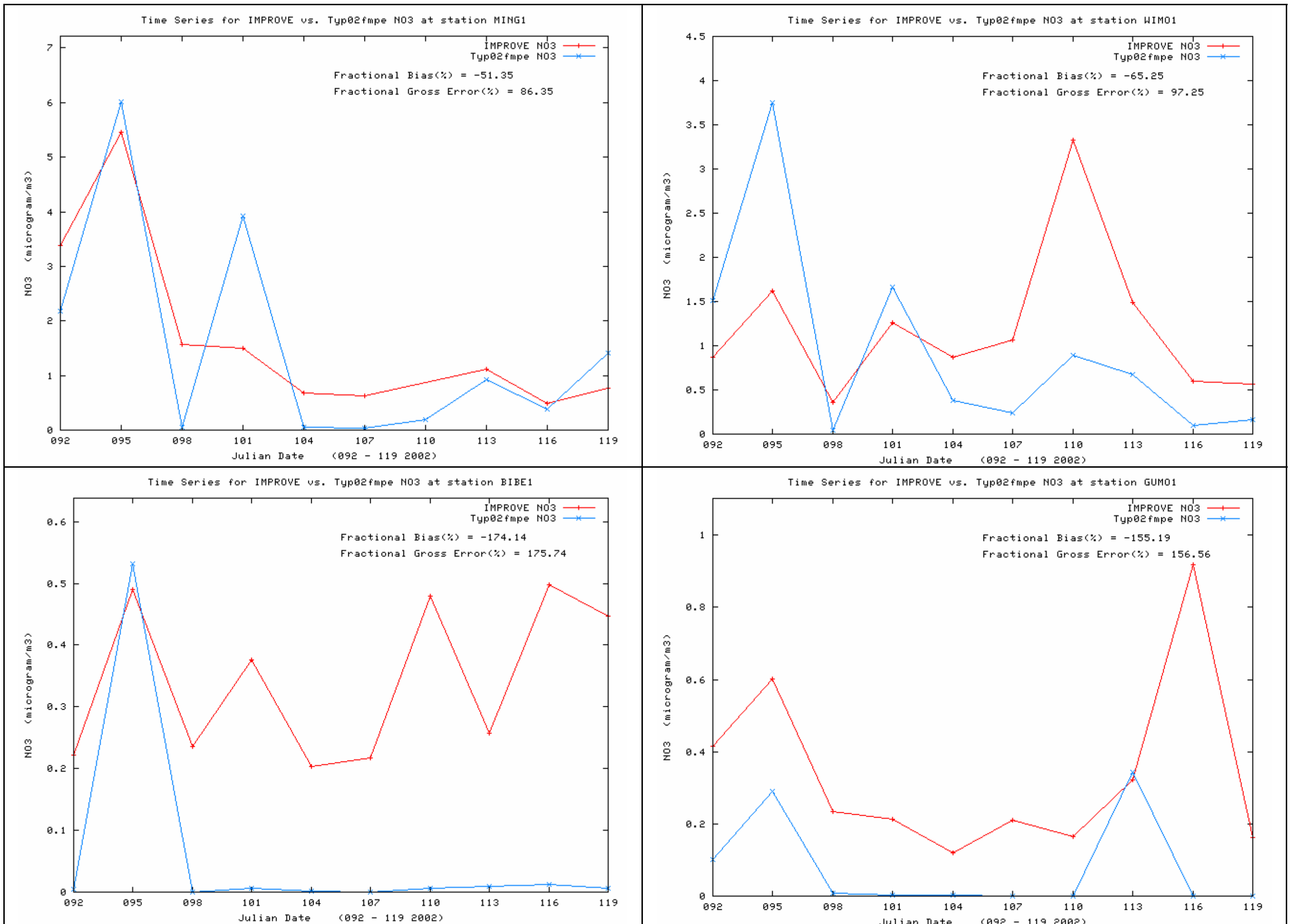


Figure C-11b. Time series of predicted and observed 24-hour nitrate (NO3) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.

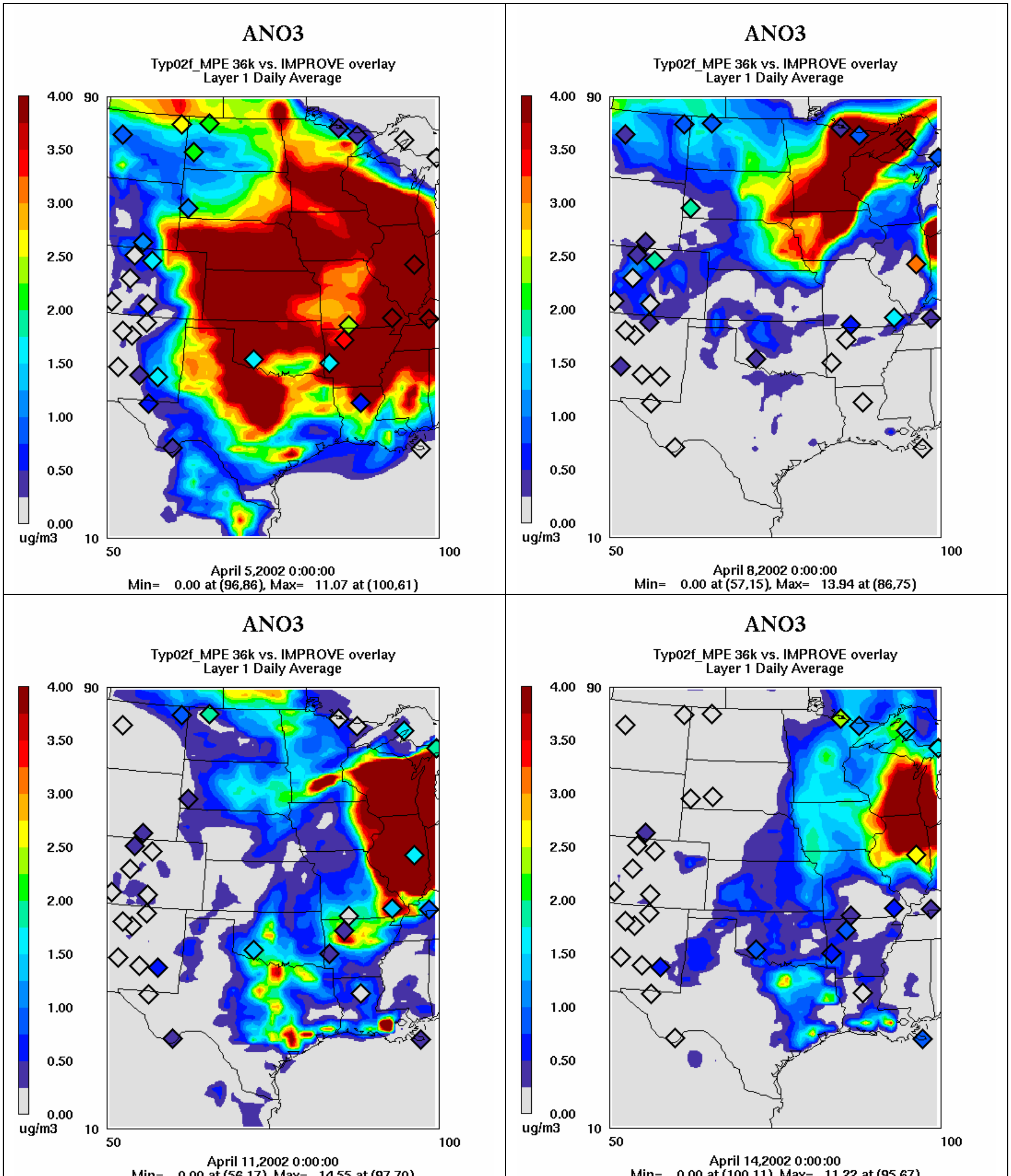


Figure C-11c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour NO3 concentrations for April 5, 8, 11 and 14, 2002.

C.3.2.3 NO3 in July 2002

NO3 performance in July 2002 is also characterized by a large under-prediction bias that is driven by the frequent occurrence of near zero modeled values (Figure C-12). Both the model and observations agree that NO3 is mostly extremely low in July, just the model produces near zero values and resultant poor performance statistics.

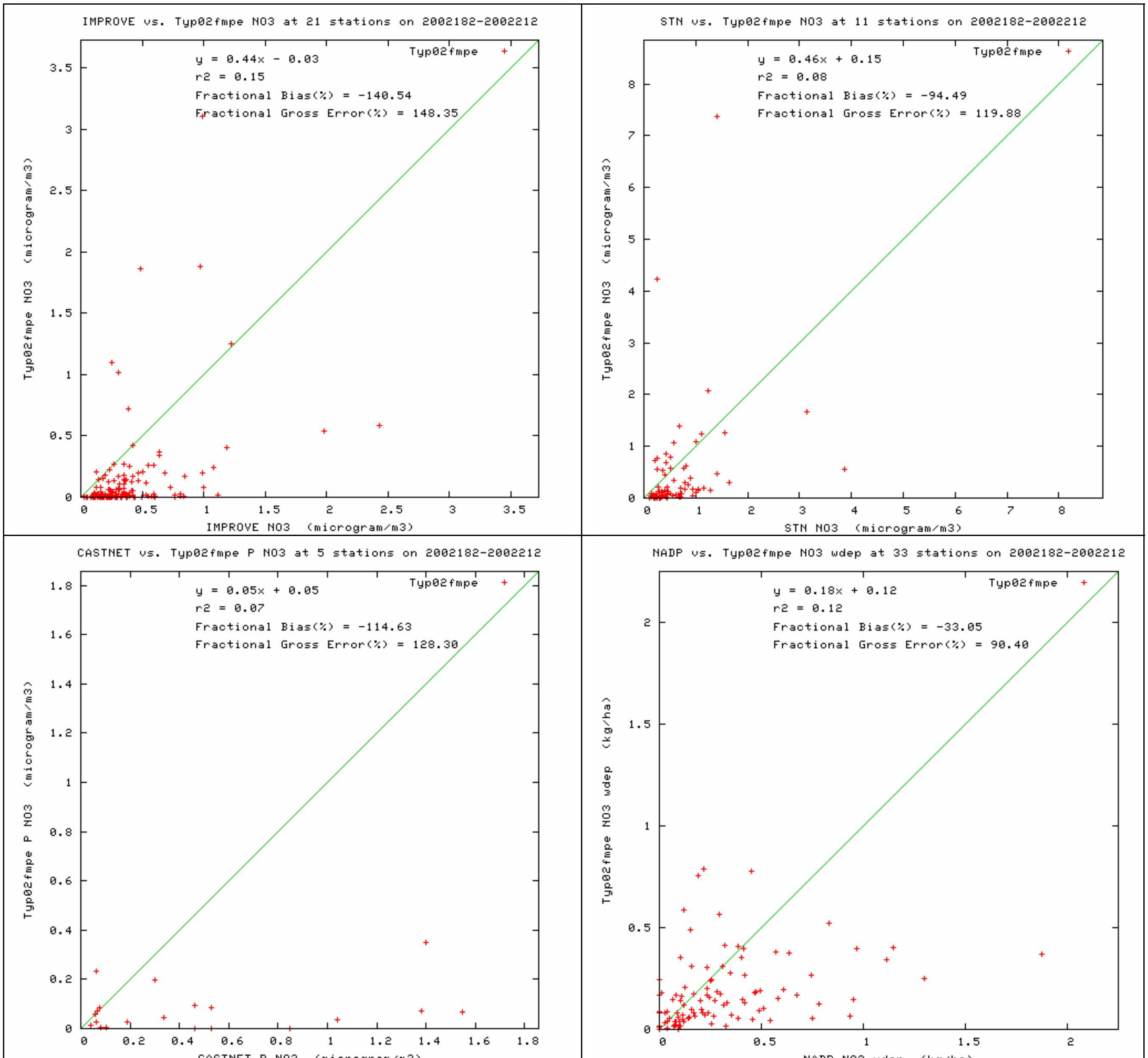
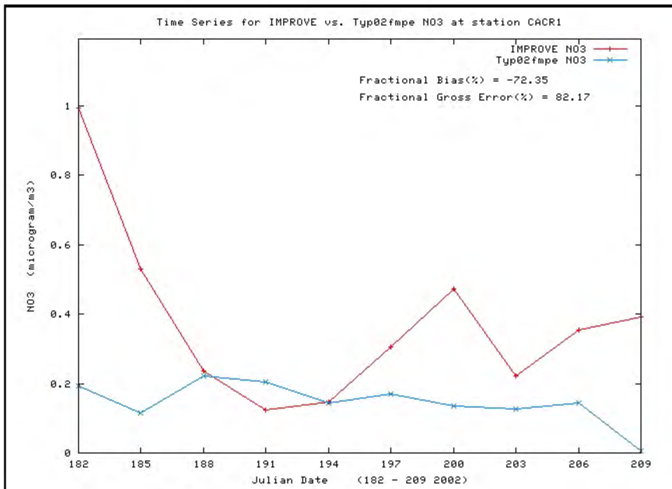
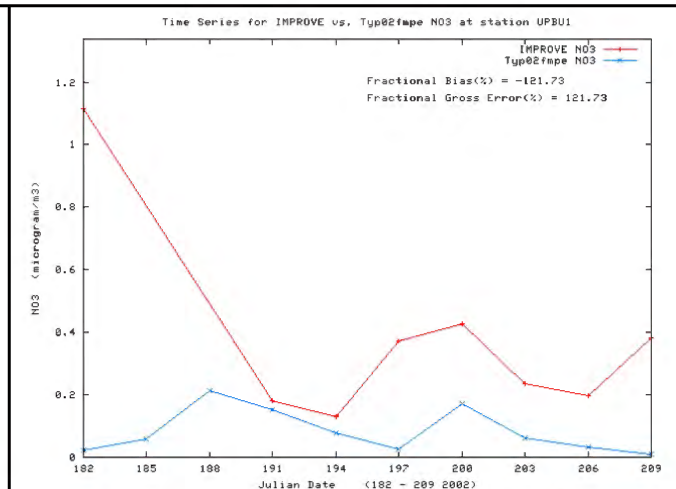
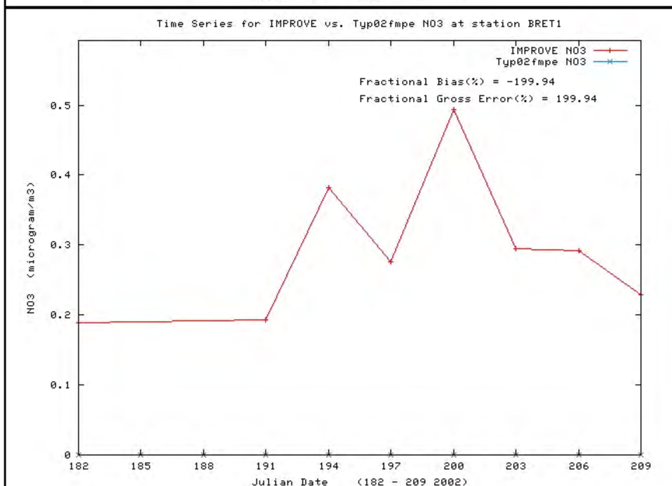
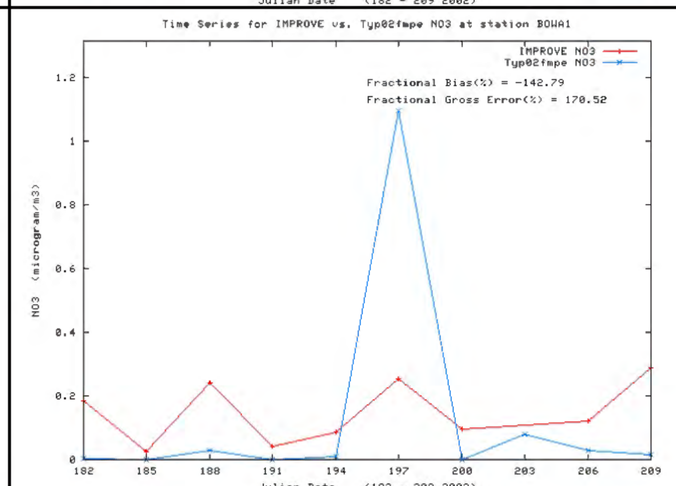


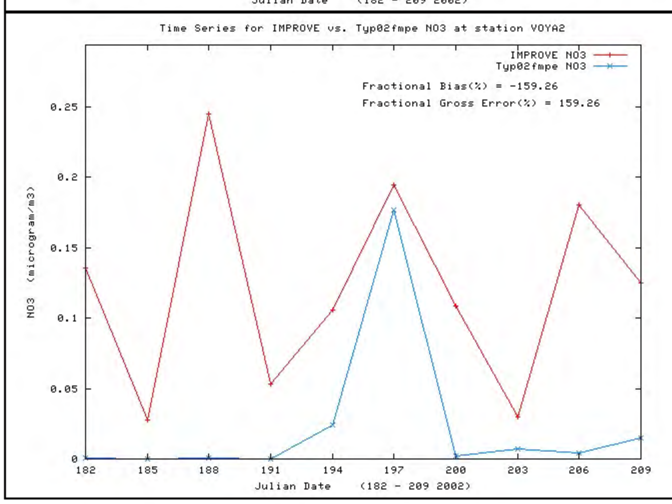
Figure C-12a. Scatter plots of predicted and observed nitrate (NO3) concentrations for July 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

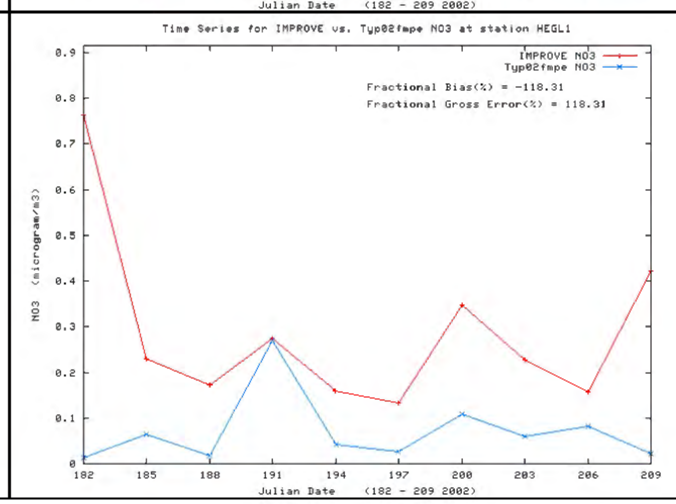

Time Series for IMPROVE vs. Typ02fmpe NO3 at station CACR1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -72.35
Fractional Gross Error(%) = 82.17
NO3 (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe NO3 at station UPBU1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -121.73
Fractional Gross Error(%) = 121.73
NO3 (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe NO3 at station BRET1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -199.94
Fractional Gross Error(%) = 199.94
NO3 (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe NO3 at station BOWA1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -142.79
Fractional Gross Error(%) = 170.52
NO3 (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe NO3 at station VOYA2
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -159.26
Fractional Gross Error(%) = 159.26
NO3 (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe NO3 at station HEGL1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = -118.31
Fractional Gross Error(%) = 118.31
NO3 (microgram/m3)
Julian Date (182 - 209 2002)

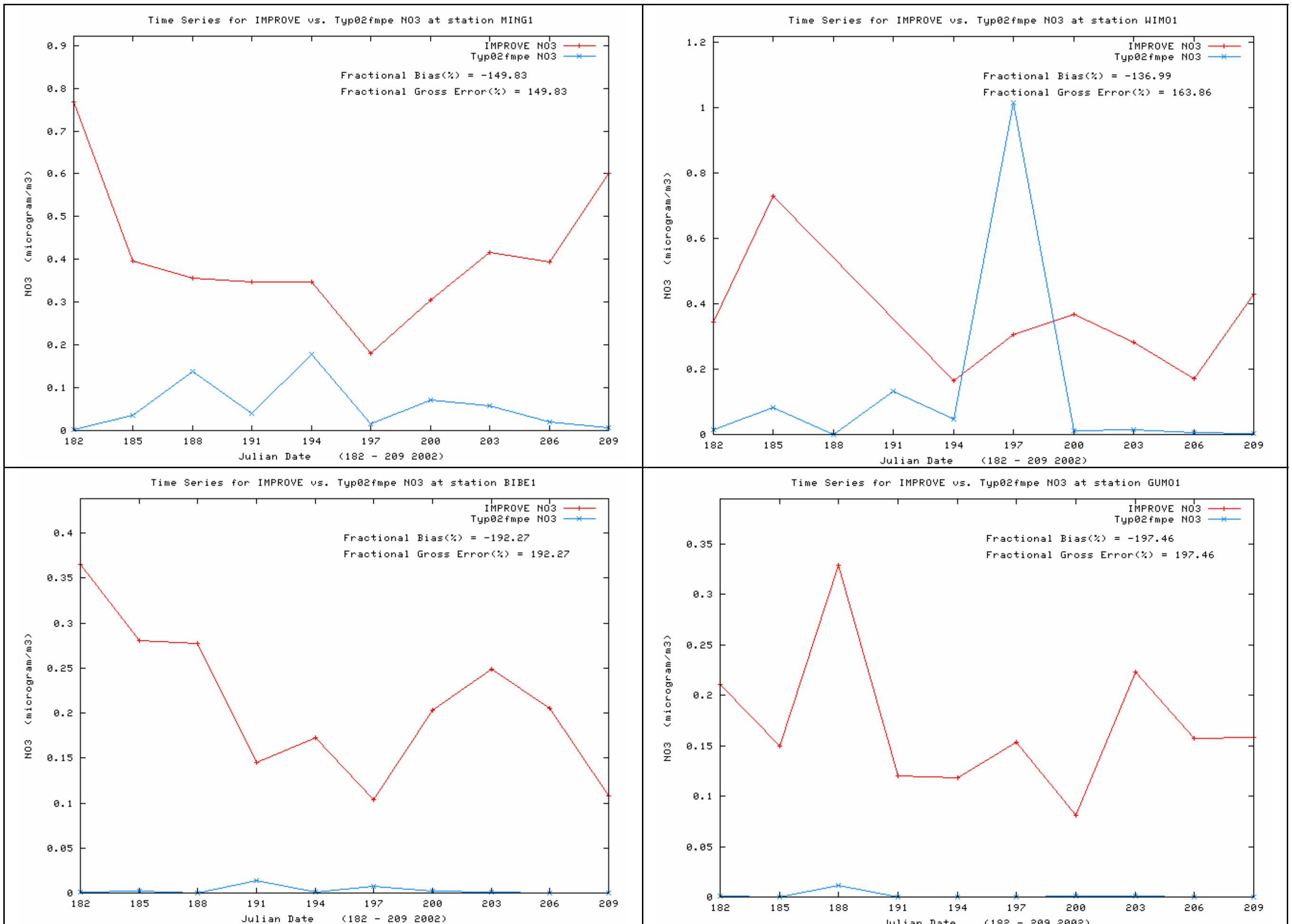


Figure C-12b. Time series of predicted and observed 24-hour nitrate (NO3) concentrations at CENRAP IMPROVE CLASS I AREA sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.

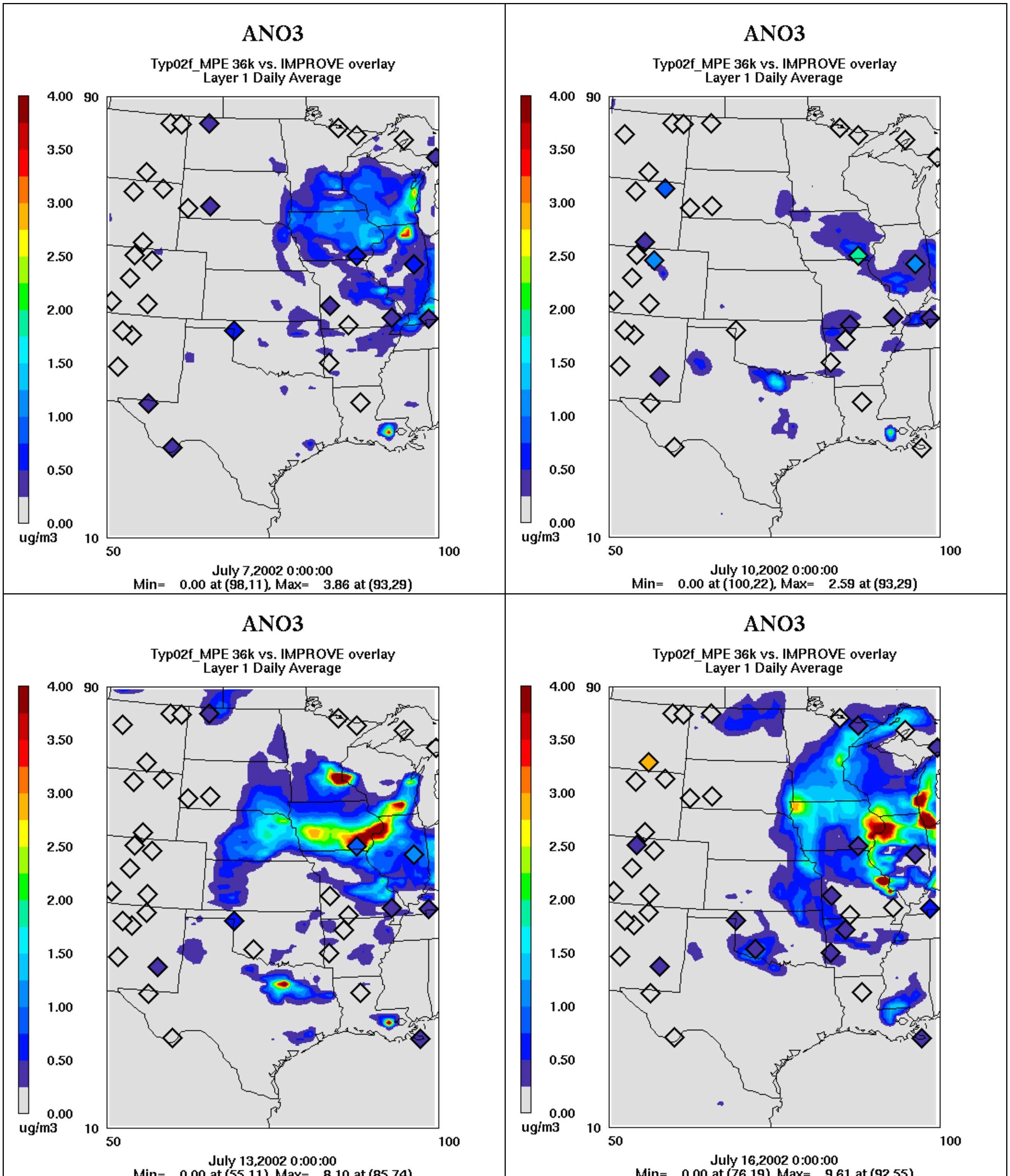


Figure C-12c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour NO3 concentrations for July 7, 10, 13 and 16, 2002.

C.3.2.4 NO3 in October 2002

Like January and unlike April and July, in October the model has a net NO3 overestimation bias of about 30%-40% (Figure C-13a). This overestimation bias occurs at all sites but BRET, BIBE and GUMO that exhibit a NO3 underestimation bias (Figure C-13b). The spatial maps suggest that the modeled elevated NO3 concentrations are more wide-spread and less spotty than observed.

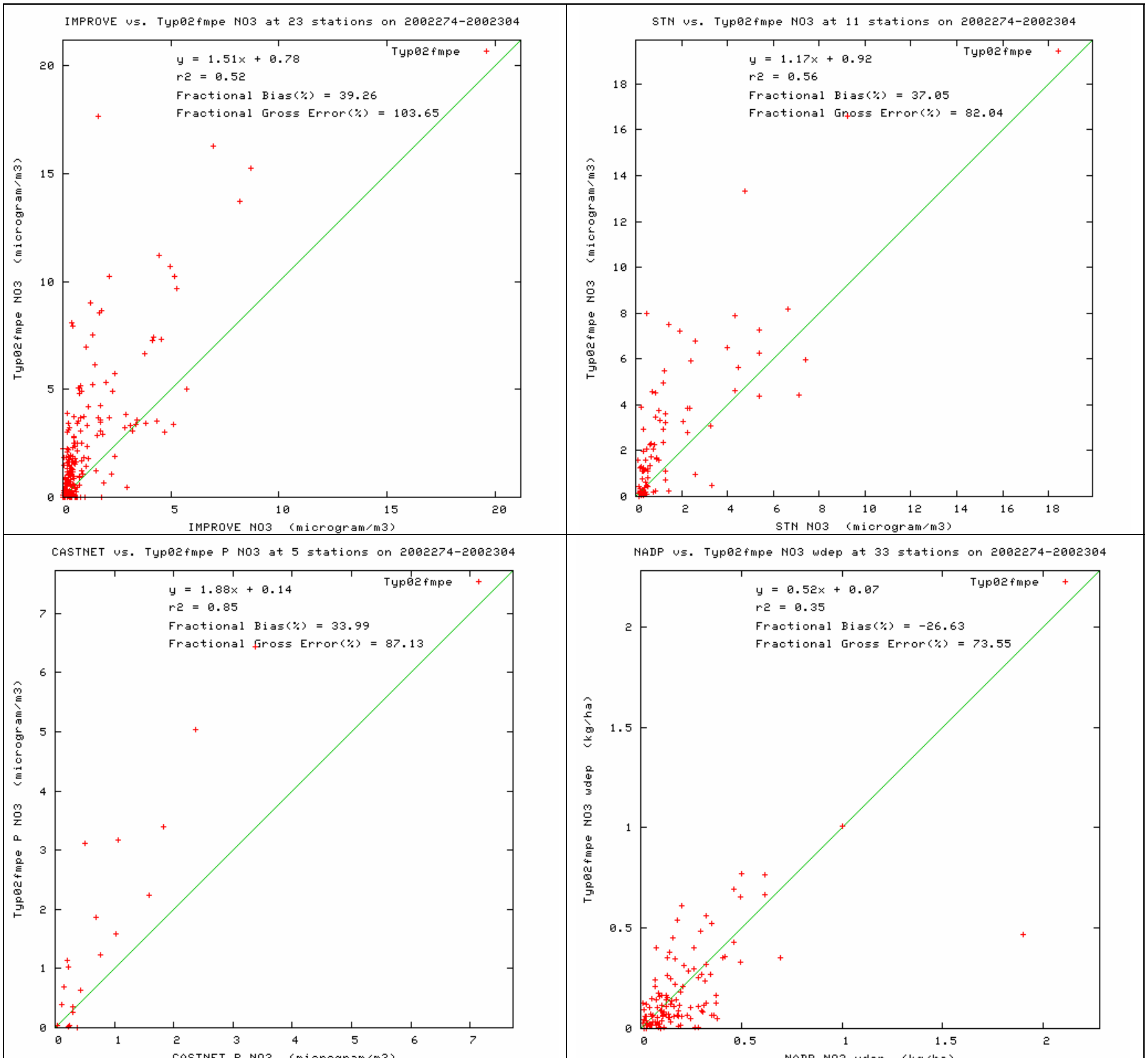
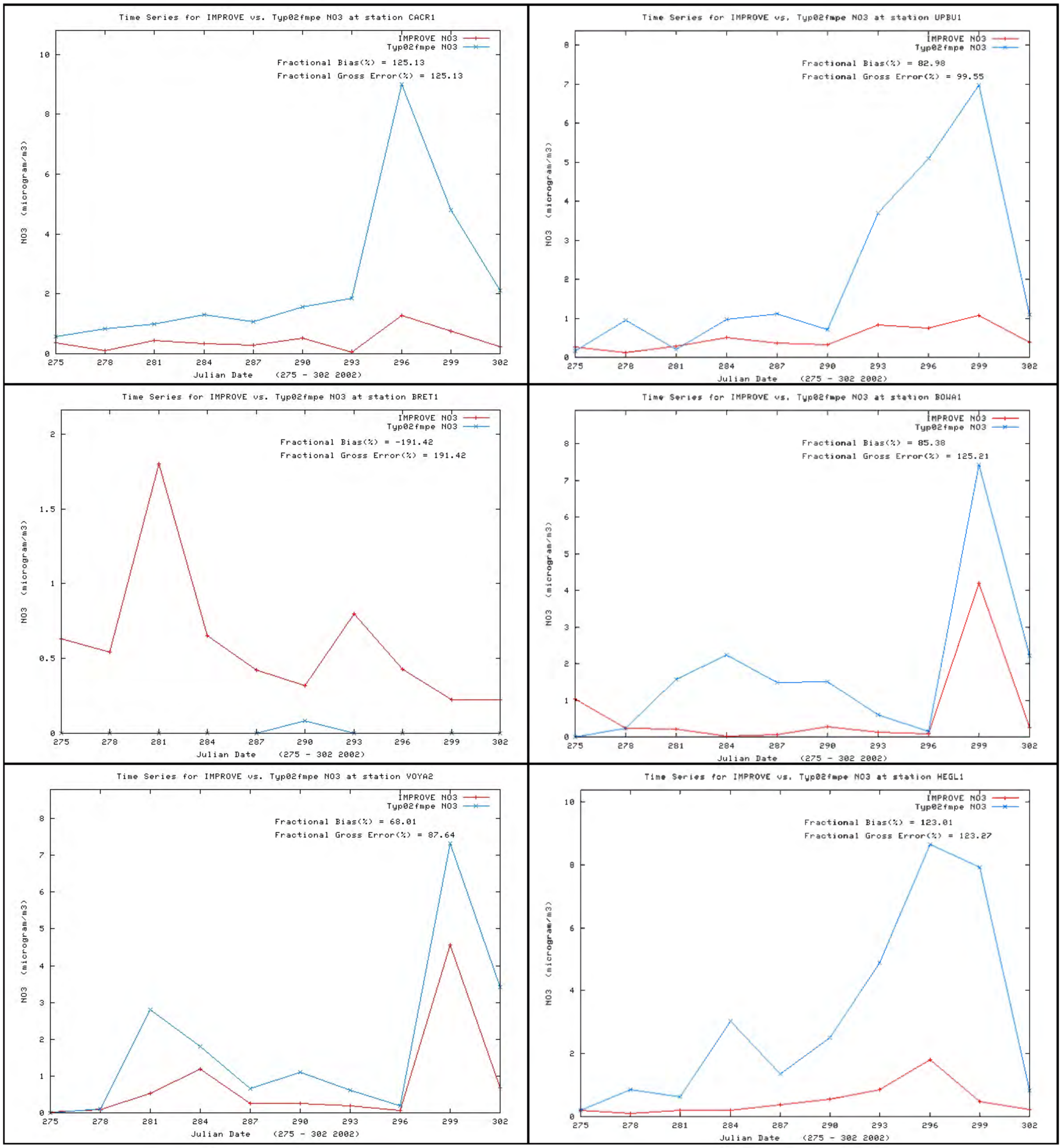


Figure C-13a. Scatter plots of predicted and observed nitrate (NO3) concentrations for October 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.


Time Series for IMPROVE vs. Typ02fmpe NO3 at station CACR1
IMPROVE NO3
Typ02fmpe NO3
Fractional Bias(%) = 125.13
Fractional Gross Error(%) = 125.13
Julian Date (275 - 302 2002)
NO3 (microgram/m3)
Time Series for IMPROVE vs. Typ02fmpe NO3 at station UPBU1
Fractional Bias(%) = 82.98
Fractional Gross Error(%) = 99.55
Time Series for IMPROVE vs. Typ02fmpe NO3 at station BRET1
Fractional Bias(%) = -191.42
Fractional Gross Error(%) = 191.42
Time Series for IMPROVE vs. Typ02fmpe NO3 at station BOWA1
Fractional Bias(%) = 85.38
Fractional Gross Error(%) = 125.21
Time Series for IMPROVE vs. Typ02fmpe NO3 at station VOYA2
Fractional Bias(%) = 68.01
Fractional Gross Error(%) = 87.64
Time Series for IMPROVE vs. Typ02fmpe NO3 at station HEGL1
Fractional Bias(%) = 123.01
Fractional Gross Error(%) = 123.27

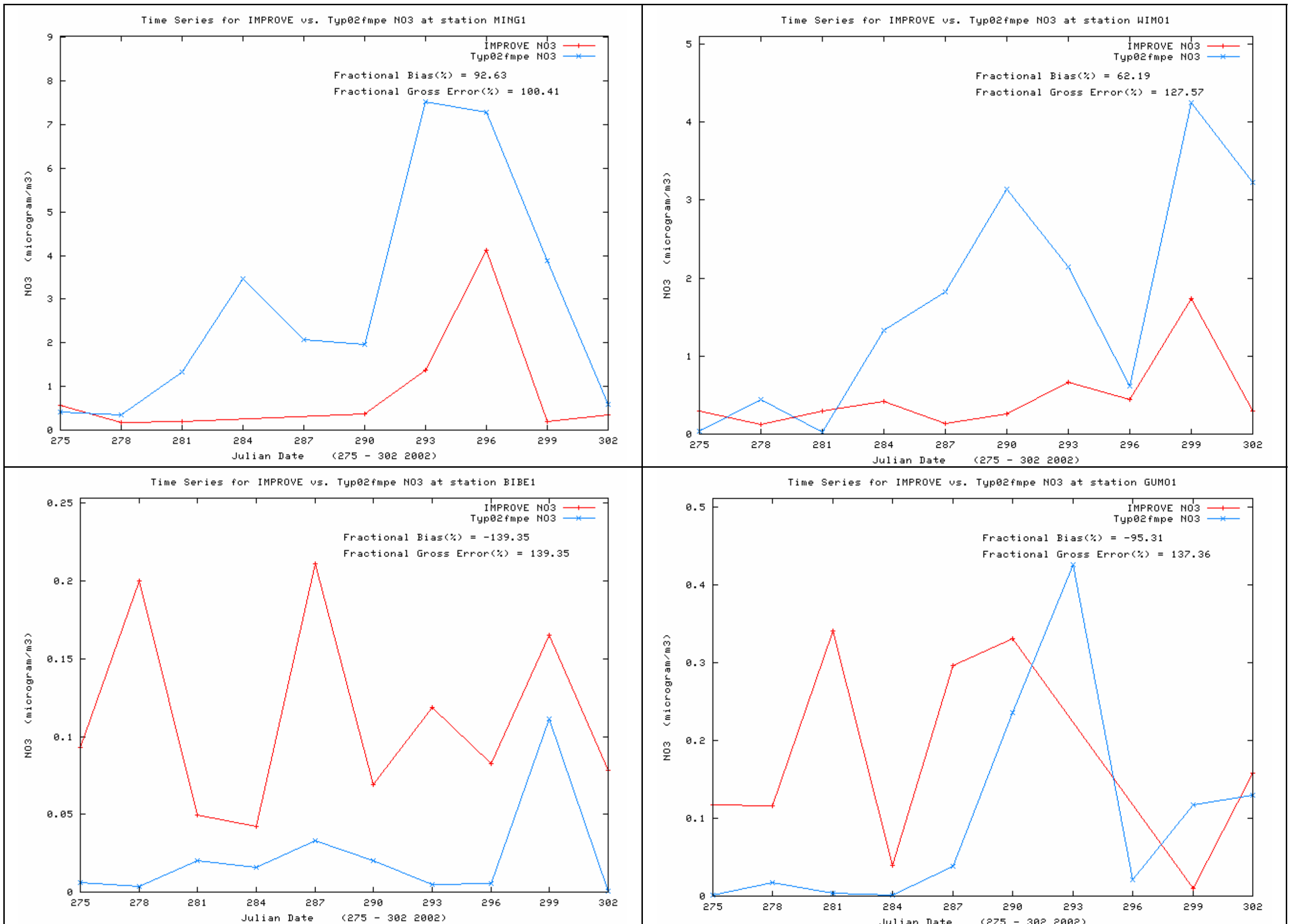


Figure C-13b. Time series of predicted and observed 24-hour nitrate (NO3) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.

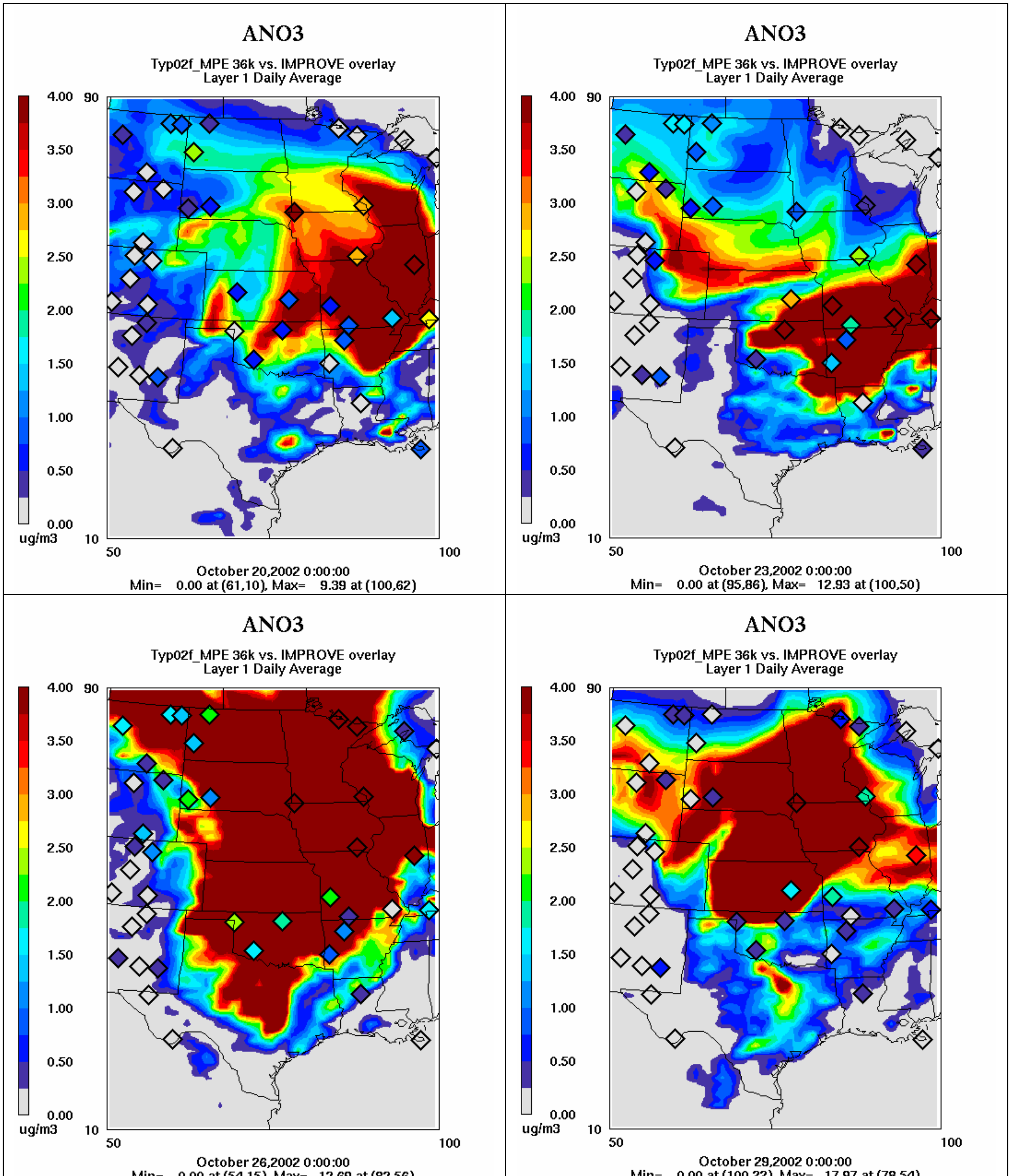


Figure C-13c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour NO3 concentrations for October 20, 23, 26 and 29, 2002.

C.3.2.5 NO3 Monthly Bias and Error

The monthly fractional bias values for NO3 clearly show the summer underestimation and winter overestimation bias (Figure C-14). The summer underestimation bias is more severe exceeding -100%, whereas the winter overestimation is closer to 50%. The fractional errors in the summer are also greater than in the winter with some values exceeding 100%. So based on statistics alone, it appears the summer underestimation bias is a bigger concern than the winter overestimation bias. However, the Bugle Plots in Figure C-15 paint a different picture entirely. The summer underestimation bias occurred when NO3 is low and is not an important component of PM and visibility impairment. These summer values occur in the flared horn part of the Bugle Plot and in fact the summer NO3 performance mostly achieves the model performance goal and always achieves the performance criteria. Whereas the winter overstated NO3 performance mostly doesn’t meet the performance goal and there are even some months/networks that don’t meet the performance criteria.

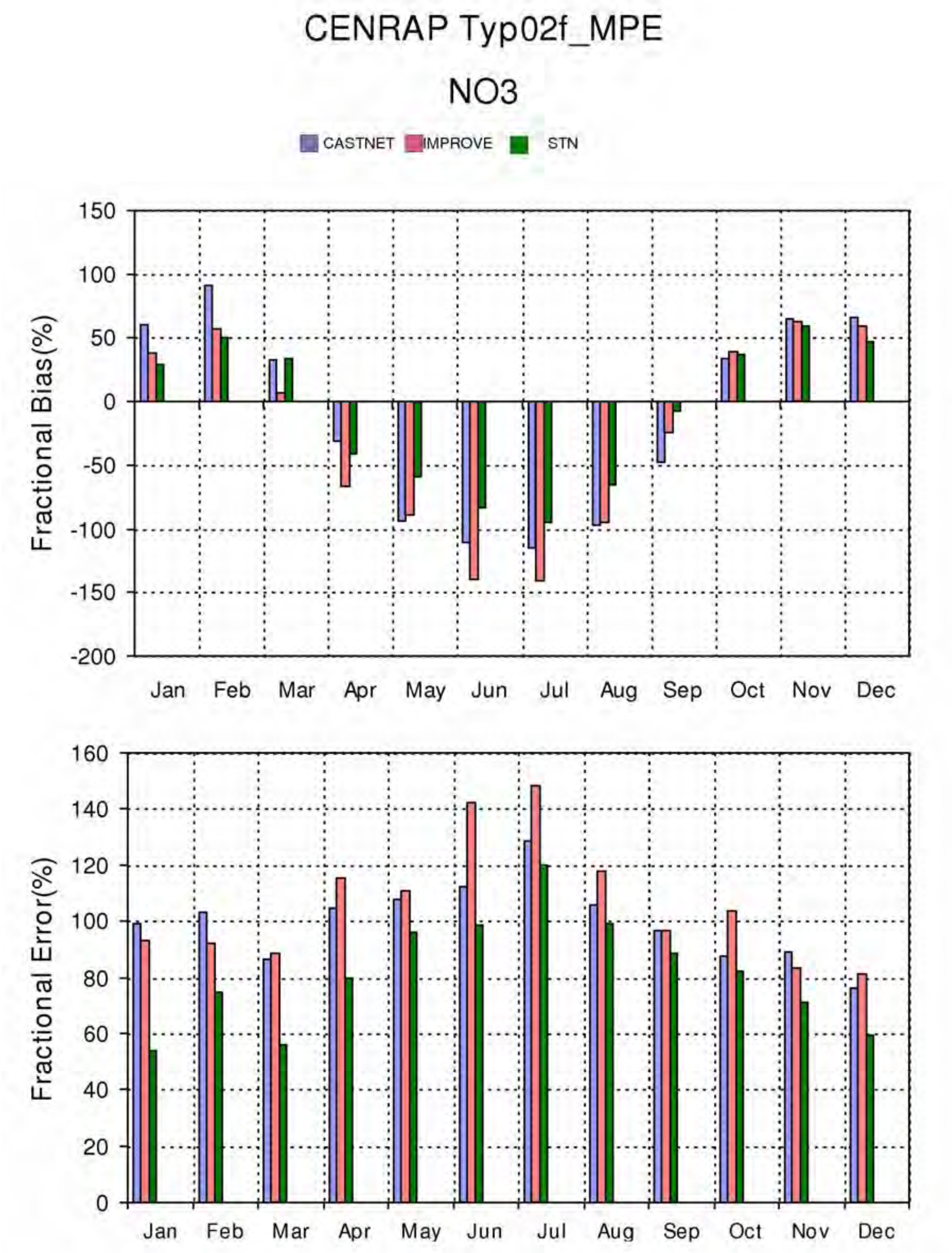


Figure C-14. Monthly NO3 fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE, STN and CASTNet monitoring sites in the CENRAP region.

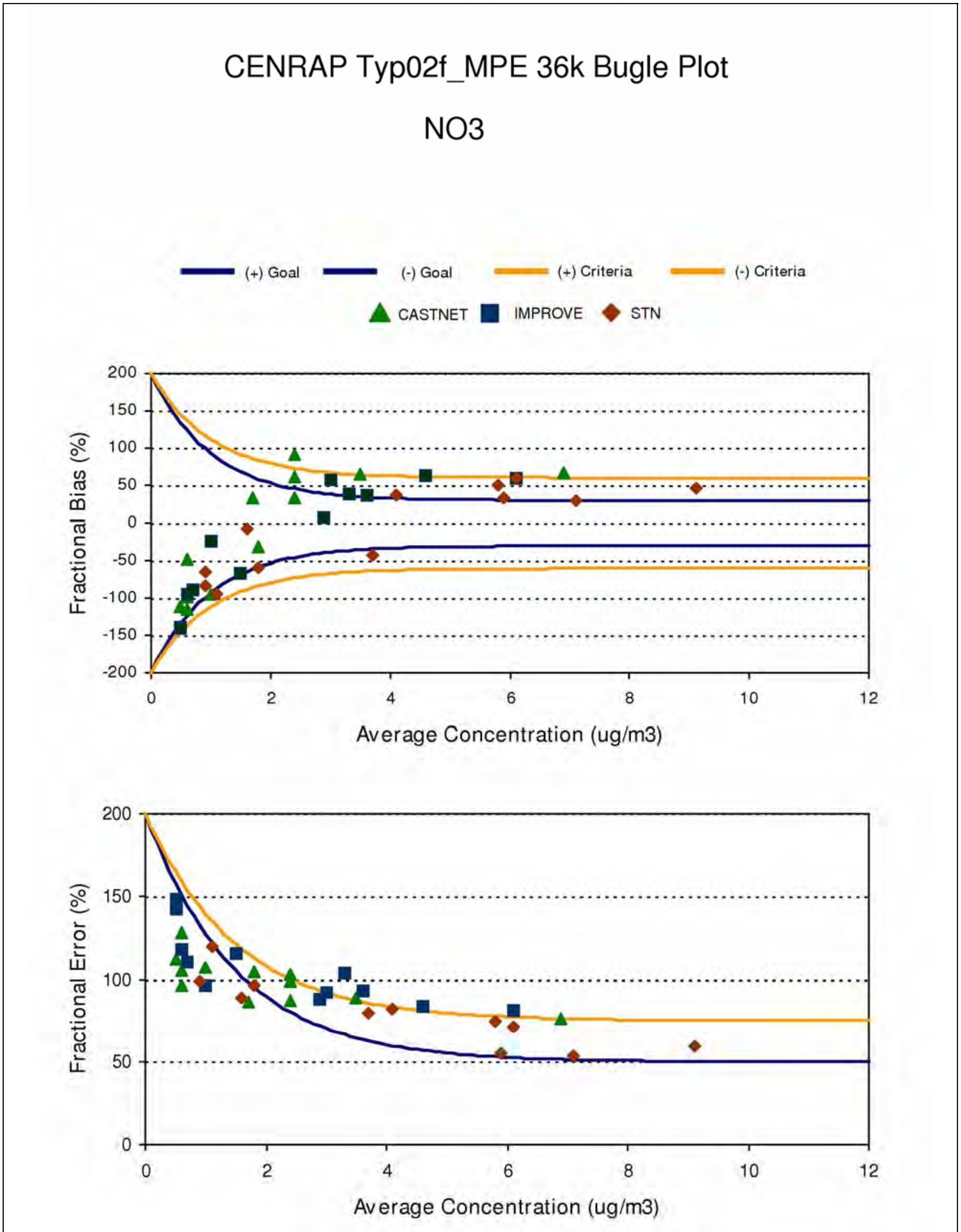


Figure C-15. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for NO3 and IMPROVE, STN and CASTNet monitoring sites in the CENRAP region.

C.3.3 Organic Matter Carbon (OMC) Monthly Model Performance

Organic Matter Carbon (OMC) model performance is presented below. There is incommensurability between the observed and modeled OMC, the model provides estimates of OMC that includes Organic Carbon (OC) as well as other elements attached to the OC (e.g., oxygen), whereas the monitoring networks measure just the carbon component of OMC (i.e., OC). Consequently, the measured OC must be adjusted to OMC for comparison with the model to account for the additional elements attached to the carbon. The OMC/OC ratio is not constant and depends in part on the age of the OMC with fresh OMC having lower OMC/OC ratios than aged OMC. The original IMPROVE equation used an OMC/OC ratio of 1.4 based mainly on urban-oriented measurements. The new IMPROVE equation uses an OMC/OC ratio of 1.8 reflecting the fact that OMC at the more rural IMPROVE monitors is more aged than urban OMC. Thus, selecting a single OMC/OC ratio for adjusting the measured OC to OMC for the model evaluation is somewhat problematic when we have both urban (STN) and rural (IMPPROVE) monitors. In addition, measured OC also has substantial uncertainty with different measurement techniques differing by as much as 50% (Solomon et al., 2005). A 1.4 OMC/OC ratio was used to convert the measured OC to OMC for the model performance evaluation.

C.3.3.1 OMC in January 2002

Figure C-16a displays scatter plots and performance statistics for January OMC model performance across the IMPROVE and STN sites in the CENRAP region. OMC model performance is fairly with near zero bias across the IMPROVE sites, -38% underestimation bias across the STN sites and errors of ~50%. The underestimation of OMC at the urban STN sites is a common occurrence in air quality modeling and may indicate a missing source of urban OMC. With the exception of an underestimation bias at Breton Island and an over-prediction bias at the two Texas IMPORVE sites (BIBE and GUMO), the model reproduces the observed OMC time series in January fairly well. The modeled spatial distribution of OMC is in general agreement with the observations although it sometimes captures the elevated values on some days (e.g., January 29, 2002 in central Illinois) and misses it on others (e.g., January 26, 2002 at Mingo).

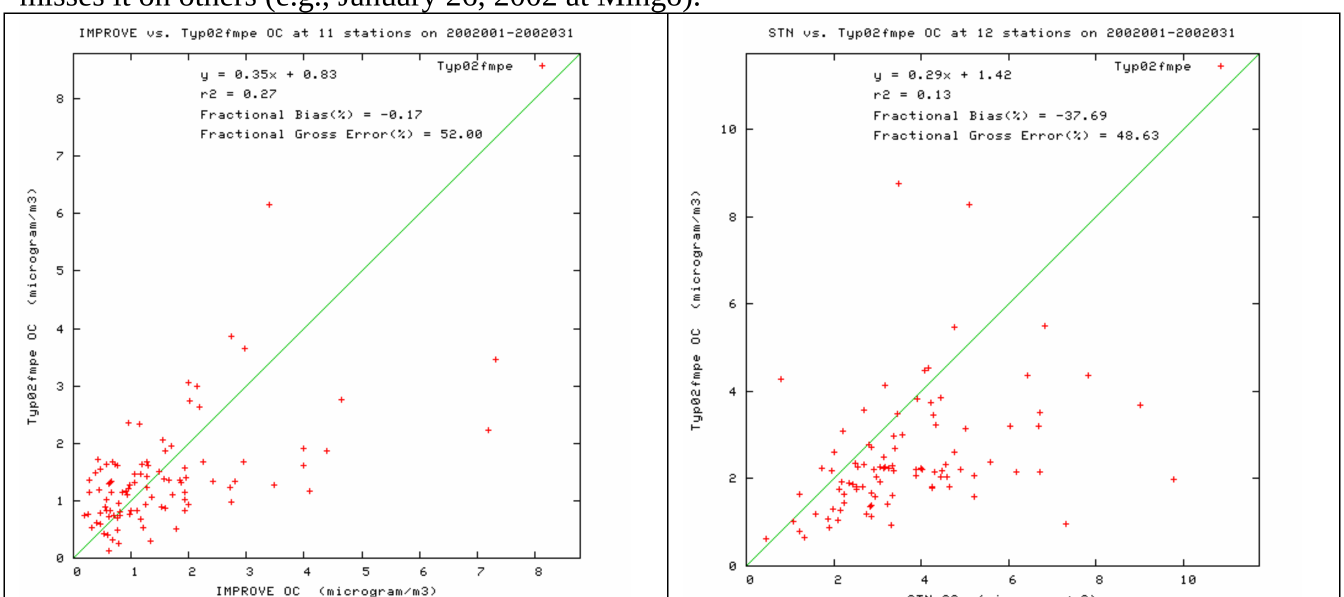
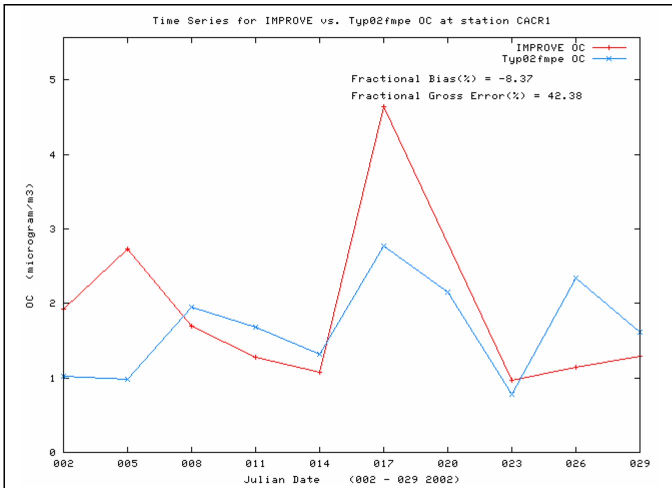
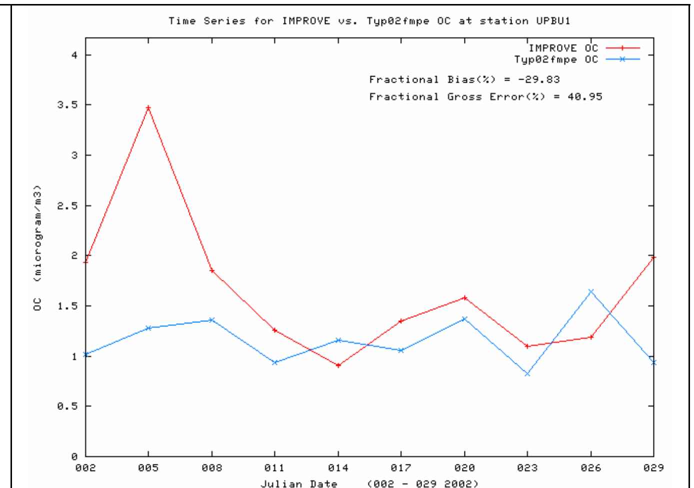
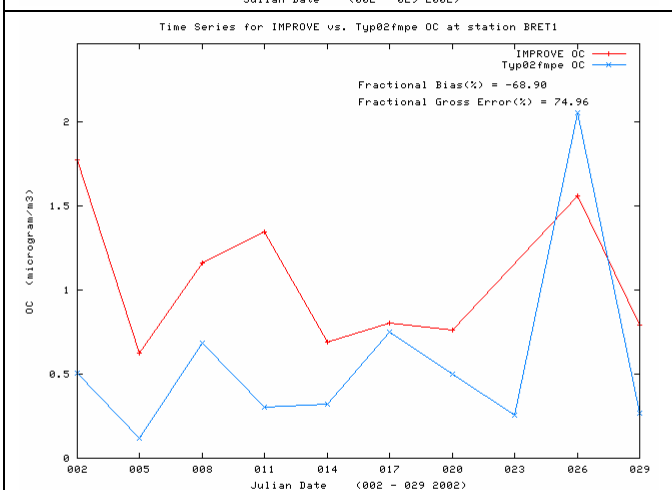
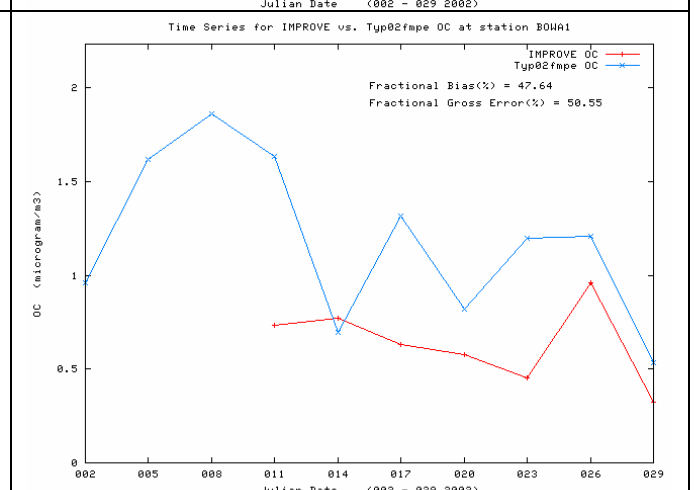


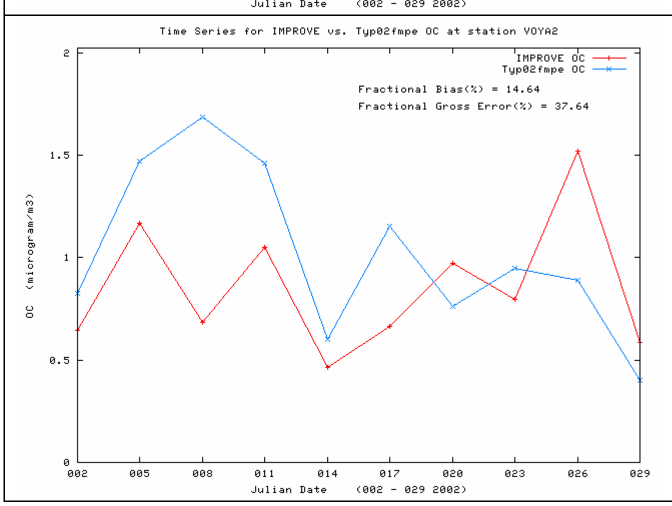
Figure C-16a. Scatter plots of predicted and observed organic matter carbon (OMC) concentrations for January 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

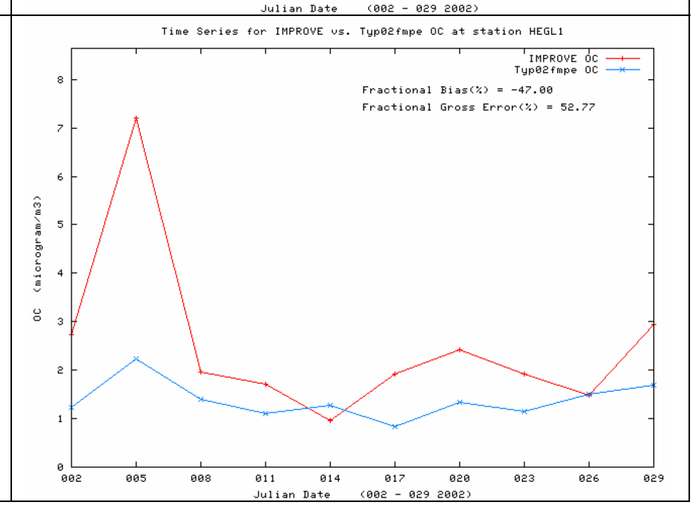

Time Series for IMPROVE vs. Typ02fmpe OC at station CACR1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -8.37
Fractional Gross Error(%) = 42.38
OC (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station UPBU1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -29.83
Fractional Gross Error(%) = 40.95
OC (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station BRET1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -68.90
Fractional Gross Error(%) = 74.96
OC (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station BOWA1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 47.64
Fractional Gross Error(%) = 50.55
OC (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station VOYA2
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 14.64
Fractional Gross Error(%) = 37.64
OC (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station HEGL1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -47.00
Fractional Gross Error(%) = 52.77
OC (microgram/m3)
Julian Date (002 - 029 2002)

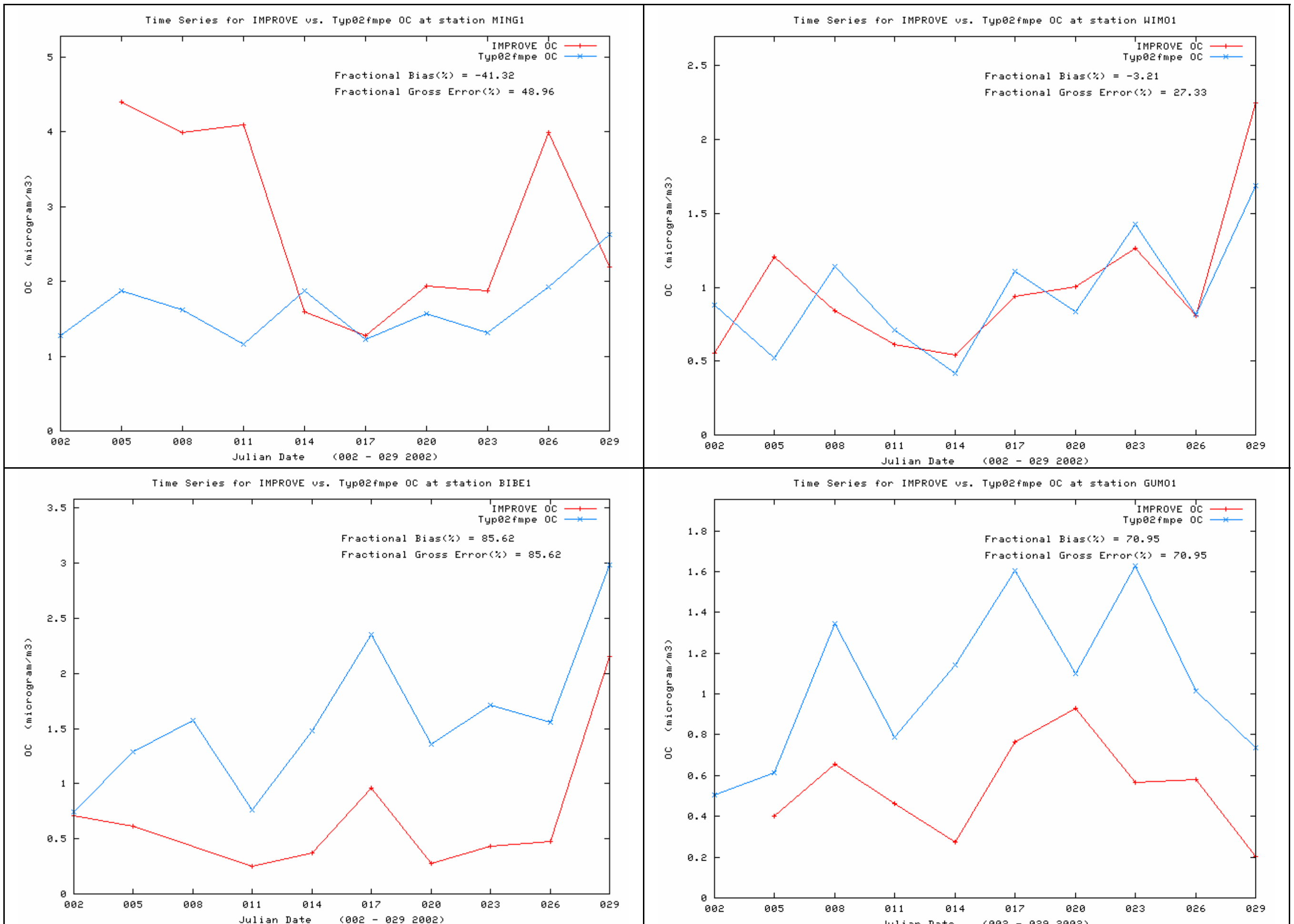


Figure C-16b. Time series of predicted and observed 24-hour organic matter carbon (OMC) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.

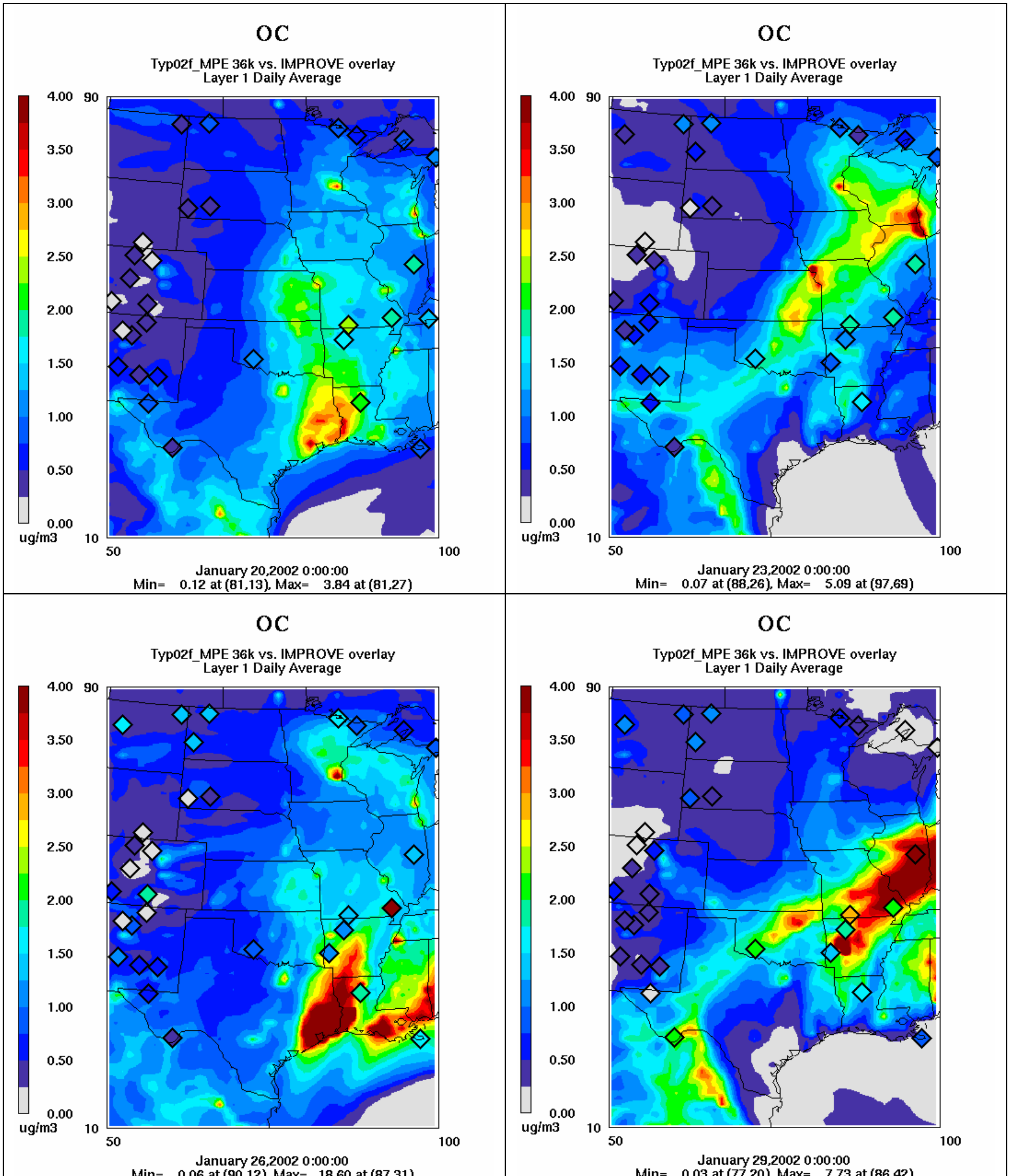


Figure C-16c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour OMC concentrations for January 20, 23, 26 and 29, 2002.

C.3.3.2 OMC in April 2002

The OMC performance in April is also fairly reasonable, again bias across the IMPROVE monitors is near zero (-7%), an underestimation bias exists across the STN sites (-30%) and errors are near 50% (Figure C-17a). The time series comparisons (Figure C-17b) are also reasonable with the model generally agreeing on the magnitudes of the observed OMC, but with an underestimation bias at several sites (e.g., MING and WIMO). The observed spatial distribution of OMCV appears to be much spottier than predicted (Figure C-17c). Thus, when the model reproduces an elevated observed OMC value like at UPBU on April 5th, it overestimates OMC at neighboring sites that have lower values (e.g., HEGL).

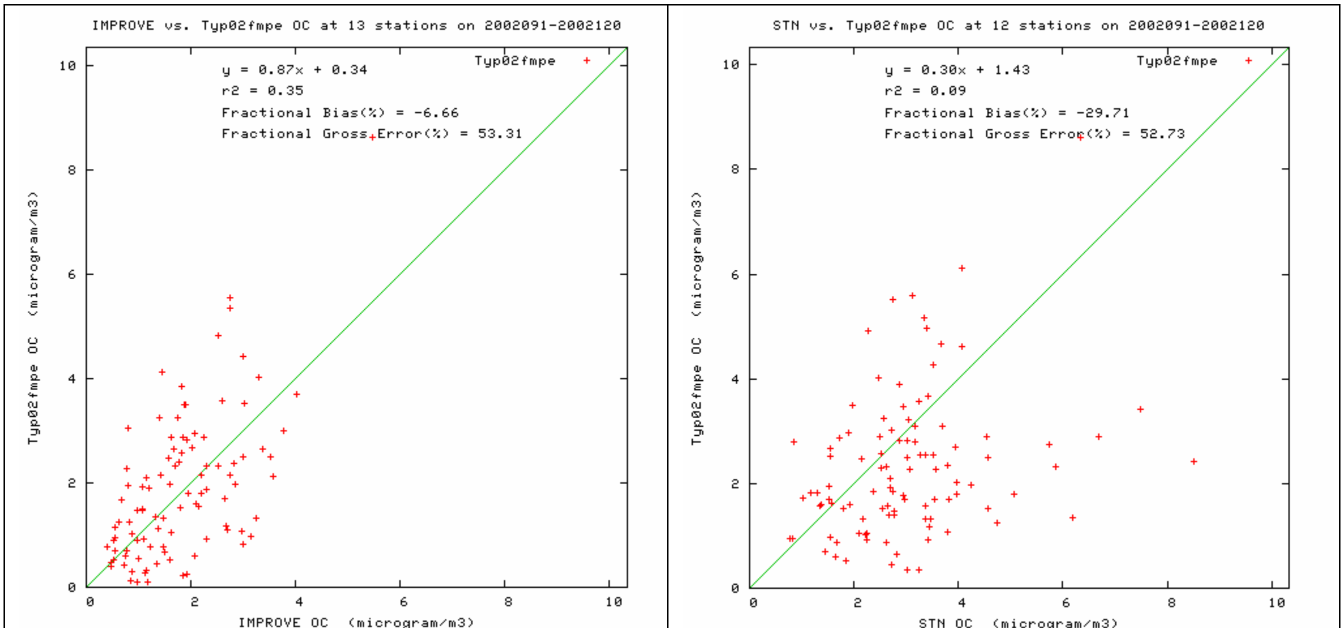
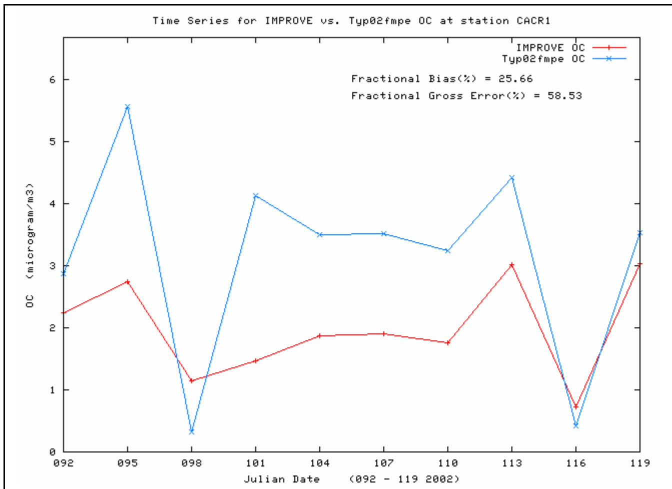
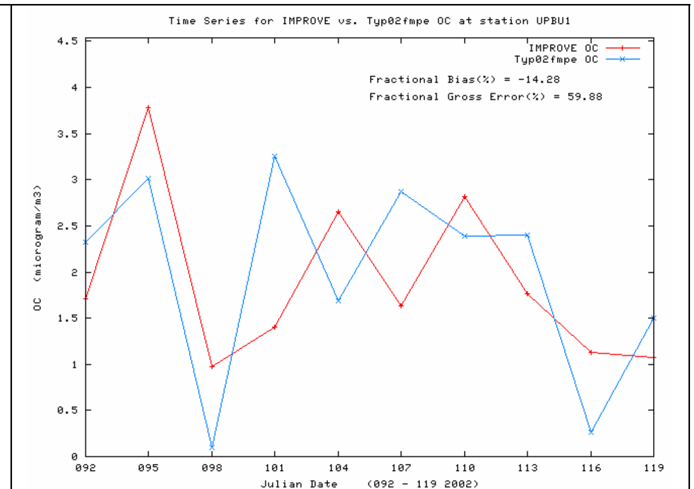
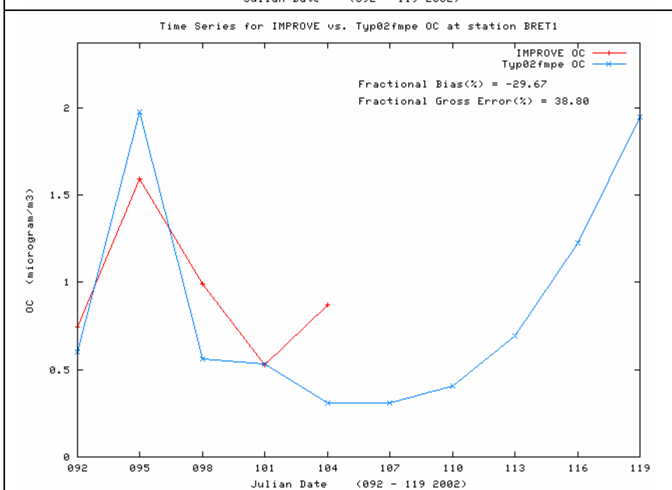
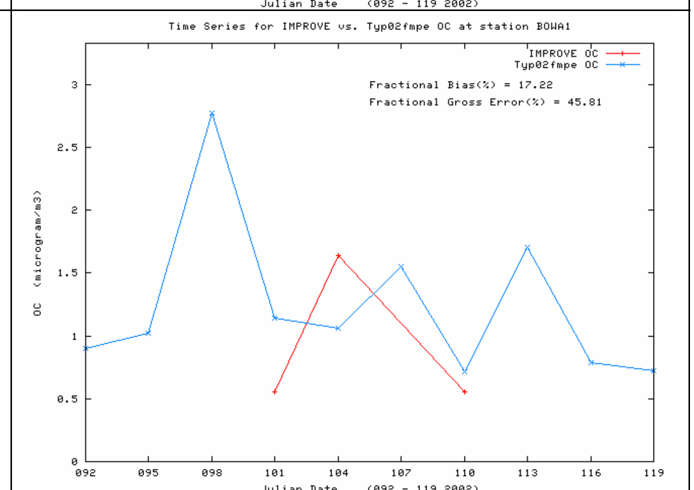


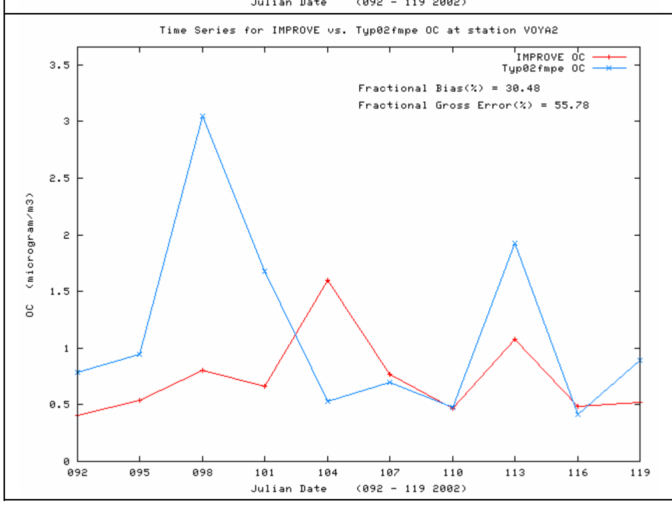
Figure C-17a. Scatter plots of predicted and observed organic matter carbon (OMC) concentrations for April 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

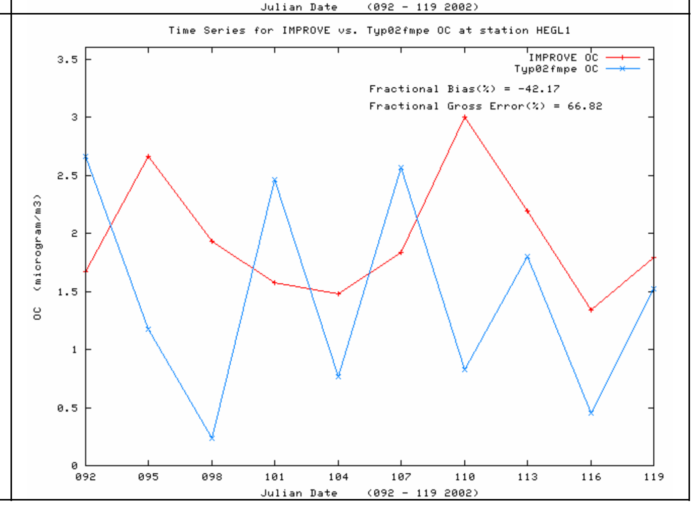

Time Series for IMPROVE vs. Typ02fmpe OC at station CACR1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 25.66
Fractional Gross Error(%) = 58.53
OC (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station UPBU1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -14.28
Fractional Gross Error(%) = 59.88
OC (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station BRET1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -29.67
Fractional Gross Error(%) = 38.80
OC (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station BOWA1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 17.22
Fractional Gross Error(%) = 45.81
OC (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station VOYA2
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 30.48
Fractional Gross Error(%) = 55.78
OC (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station HEGL1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -42.17
Fractional Gross Error(%) = 66.82
OC (microgram/m3)
Julian Date (092 - 119 2002)

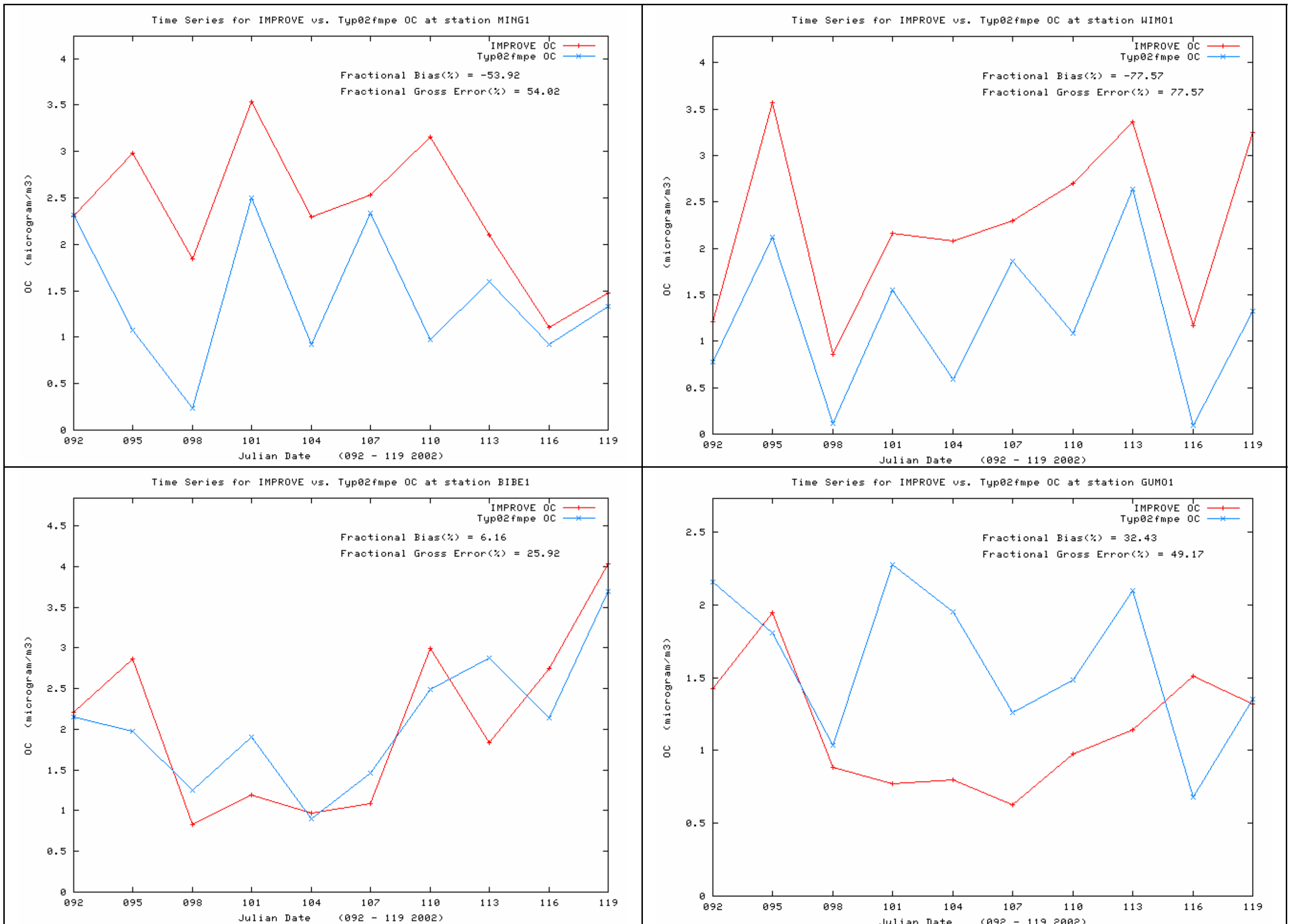


Figure C-17b. Time series of predicted and observed 24-hour organic matter carbon (OMC) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.

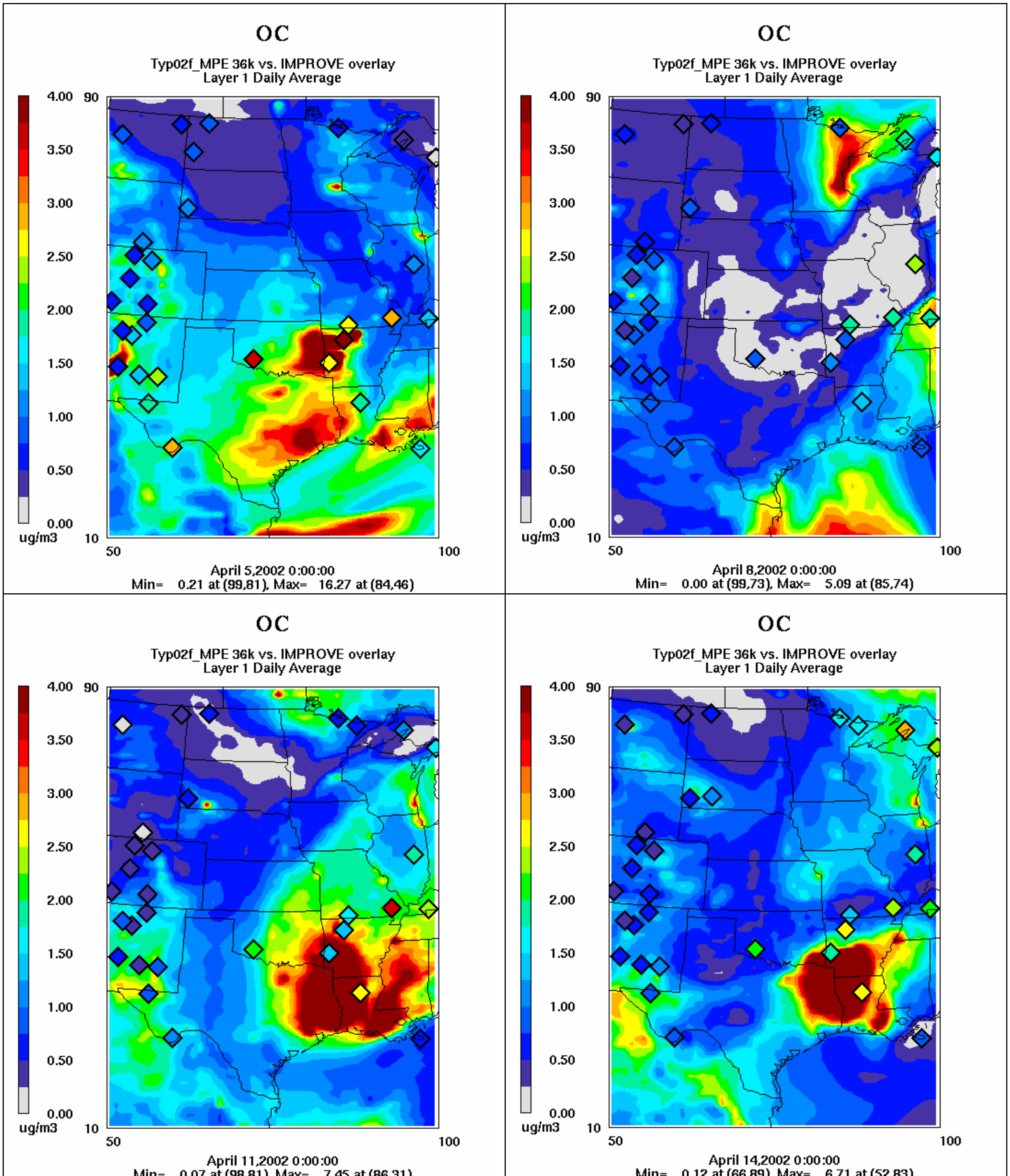
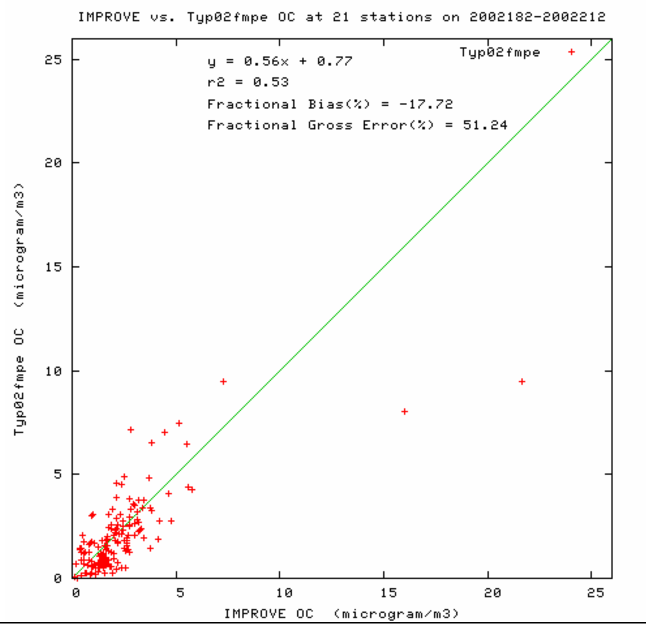


Figure C-17c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour OMC concentrations for April 5, 8, 11 and 14, 2002.

C.3.3.3 OMC in July 2002

Modeled and observed OMC are higher in July due to the impacts of more secondary organic aerosols (SOA) and fires. OMC bias values of -18% and -41% exist across the IMPROVE and STN networks in July (Figure C-18a). Two of the observed OMC values at the IMPROVE sites are very high (> 15 $\mu g/m^3$). An examination of the time series plots (Figure C-18b) reveals that these two values occur on Julian Day 200 and the two northern Minnesota sites (VOYA and BOWA) and are likely due to fire impacts. The model is also estimating elevated OMC at these sites on these two days, but not as high as observed. At most sites the model is racking the temporal variation of the observed OMC reasonably well. OMC data for MING were missing in July 2002. The model reproduces the observed high OMC in northern Minnesota and centered on Louisiana and adjacent areas on July 7 and 10 quite well, but also predicts elevated OMC in the Denver area that is not reflected in the observations (Figure C-18c). The model is exhibiting less skill in predicting the spatial distribution of the observed OMC on July 13 and 16.



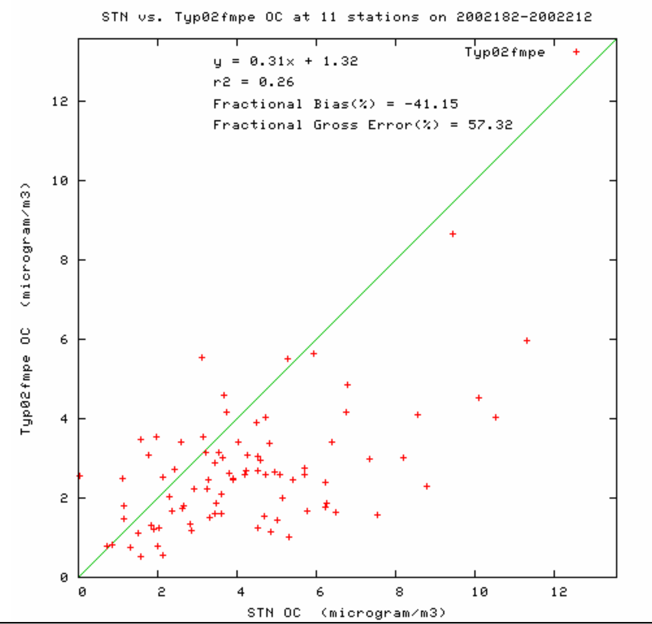
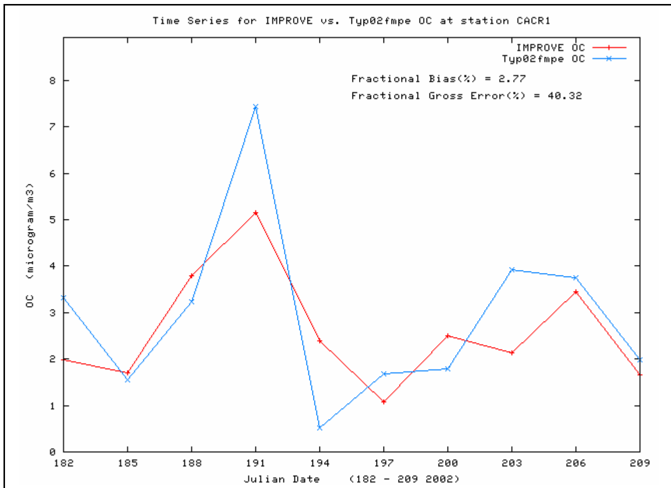
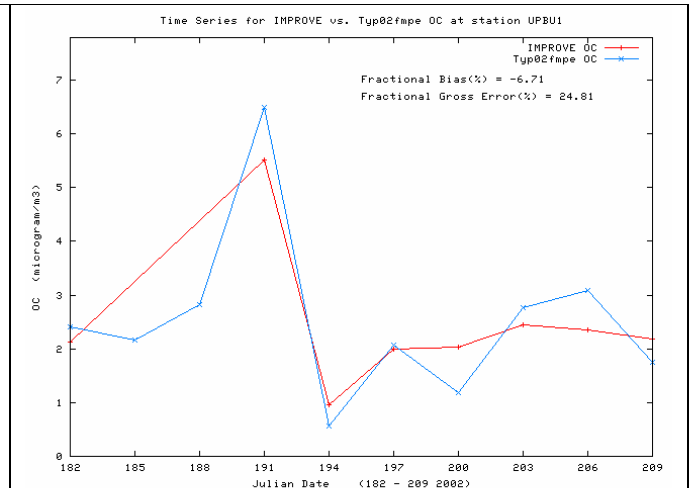
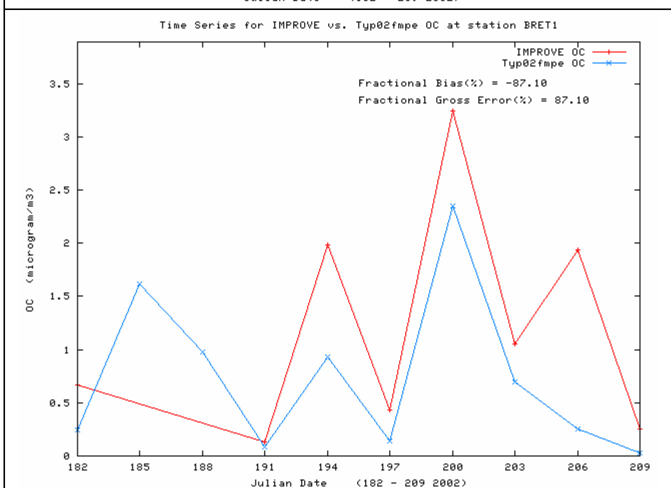
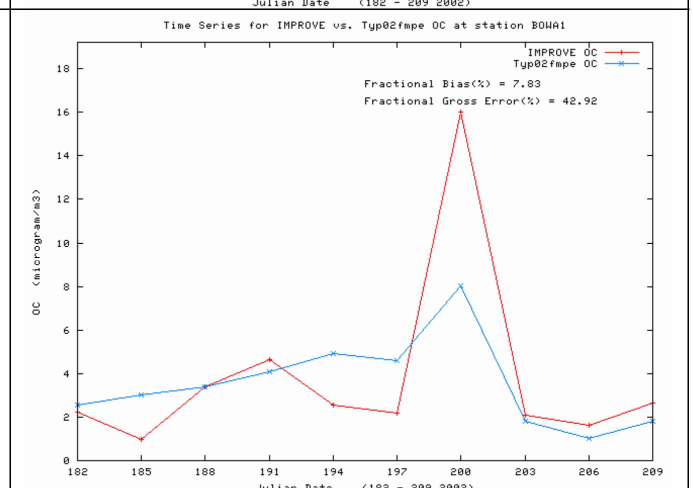


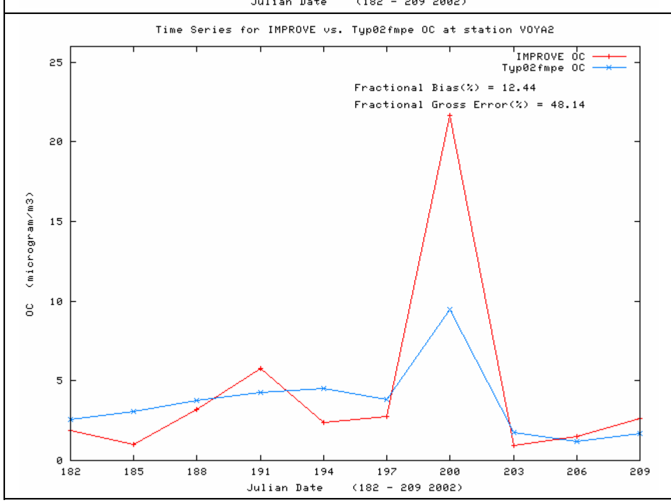
Figure C-18a. Scatter plots of predicted and observed organic matter carbon (OMC) concentrations for July 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

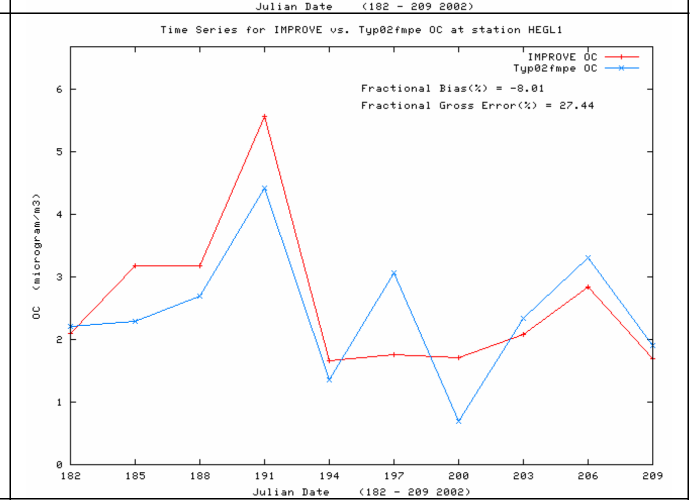

Time Series for IMPROVE vs. Typ02fmpe OC at station CACR1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 2.77
Fractional Gross Error(%) = 40.32
OC (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station UPBU1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -6.71
Fractional Gross Error(%) = 24.81
OC (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station BRET1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -87.10
Fractional Gross Error(%) = 87.10
OC (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station BOWA1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 7.83
Fractional Gross Error(%) = 42.92
OC (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station VOYA2
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 12.44
Fractional Gross Error(%) = 48.14
OC (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station HEGL1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -8.01
Fractional Gross Error(%) = 27.44
OC (microgram/m3)
Julian Date (182 - 209 2002)

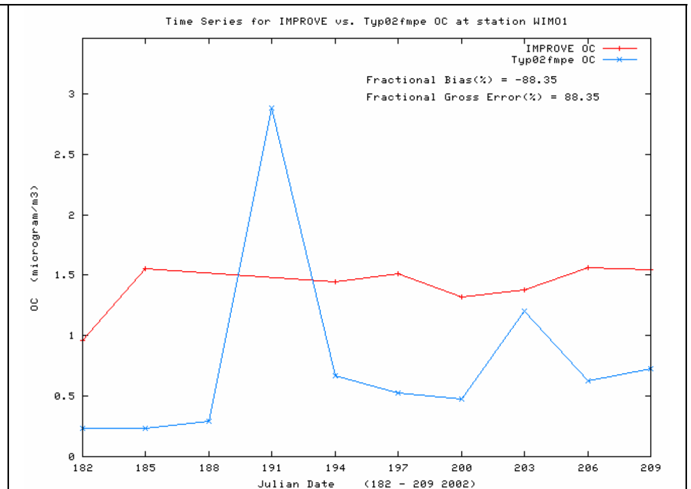
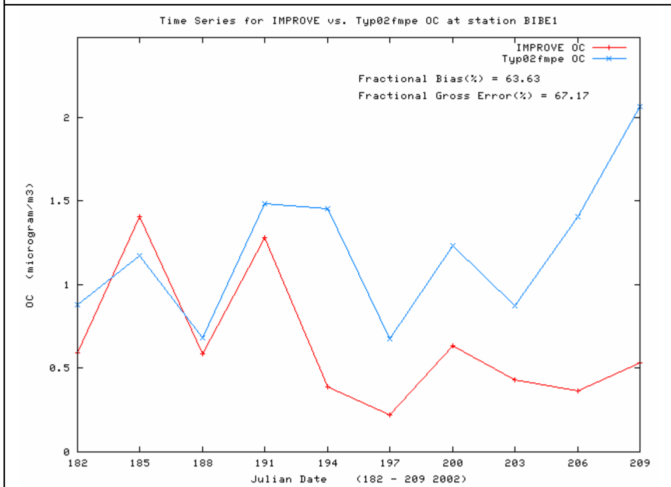
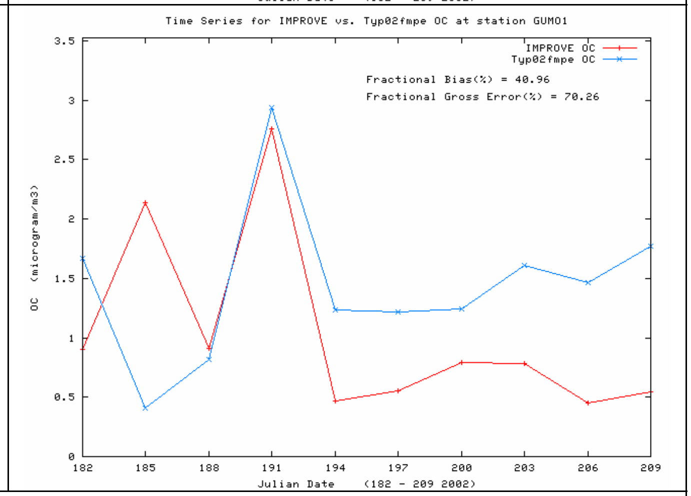
No Data for Mingo (MING)	
	

Figure C-18b. Time series of predicted and observed 24-hour organic matter carbon (OMC) concentrations at CENRAP IMPROVE CLASS I AREA sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.

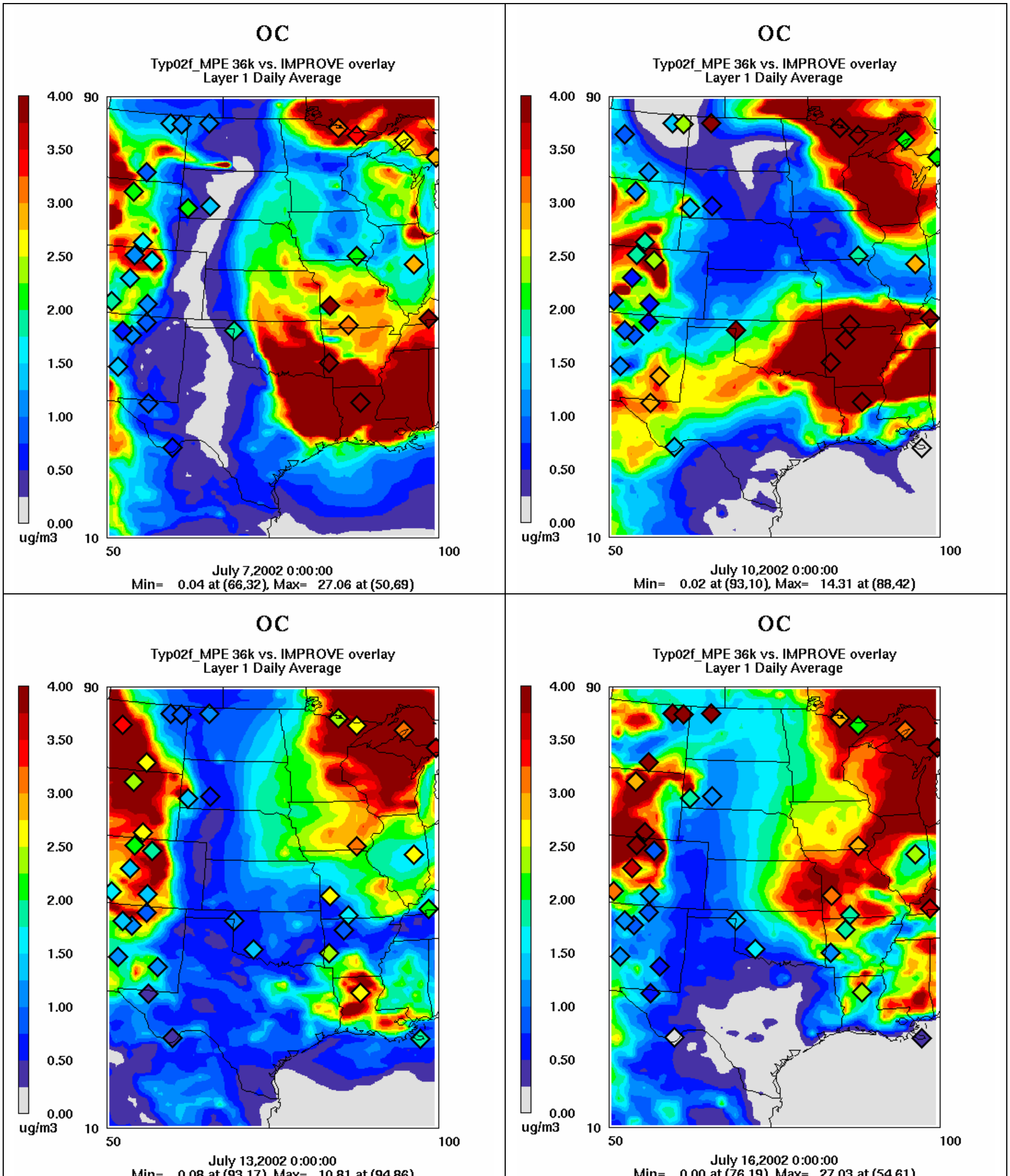


Figure C-18c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour OMC concentrations for July 7, 10, 13 and 16, 2002.

C.3.3.4 OMC in October 2002

OMC model performance in October 2002 is similar to the other months with near zero bias across the IMPROVE sites and an underestimation bias across the STN sites in the CENRAP region (Figure C-19a). Although OMC overestimation bias occurs at the Texas sites (BIBE and GUMO), the model is exhibiting remarkable ability to reproduce the observed temporal variation in OMC at several of the sites (e.g., CACR, UPBU, VOYA and HEGL; Figure C-19b). The model also performs reasonable well in reproducing the day to day and spatial variability in the observed OMC (Figure C-19c).

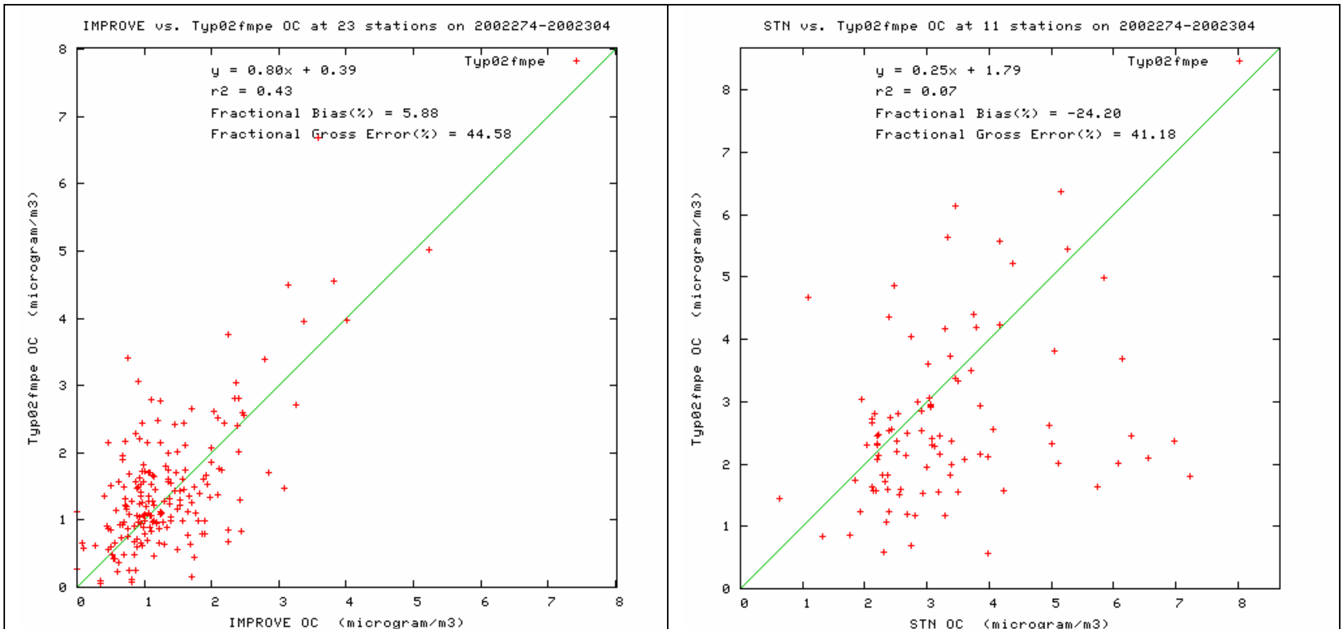
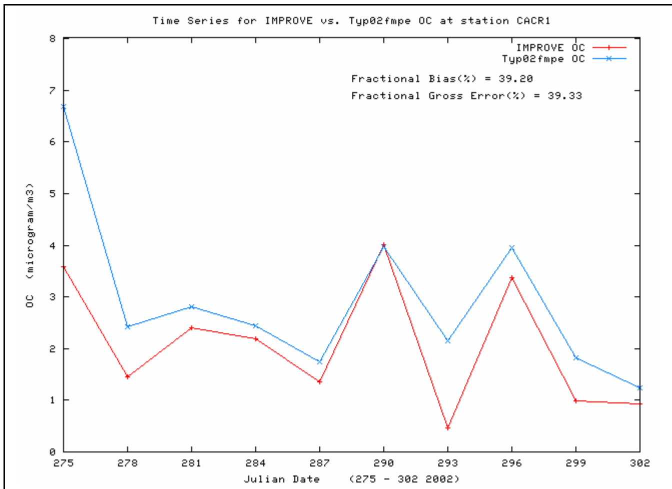
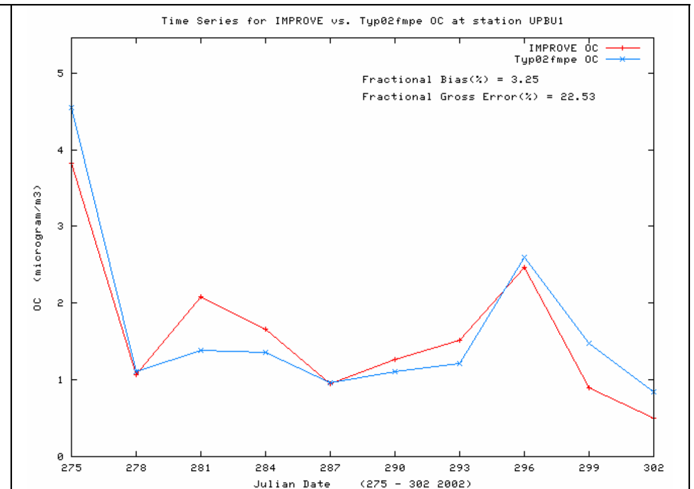
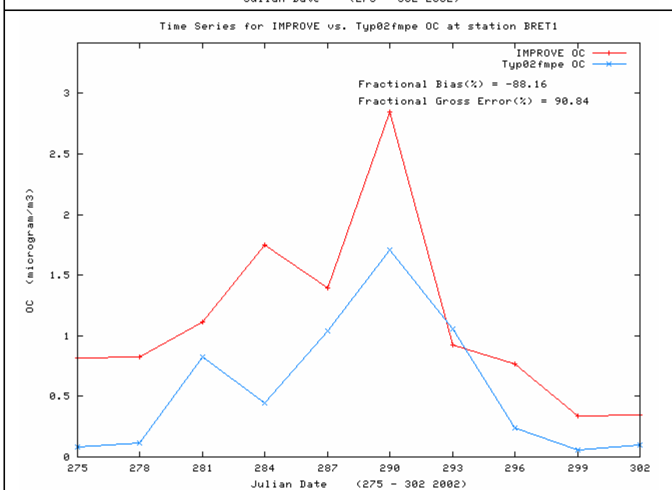
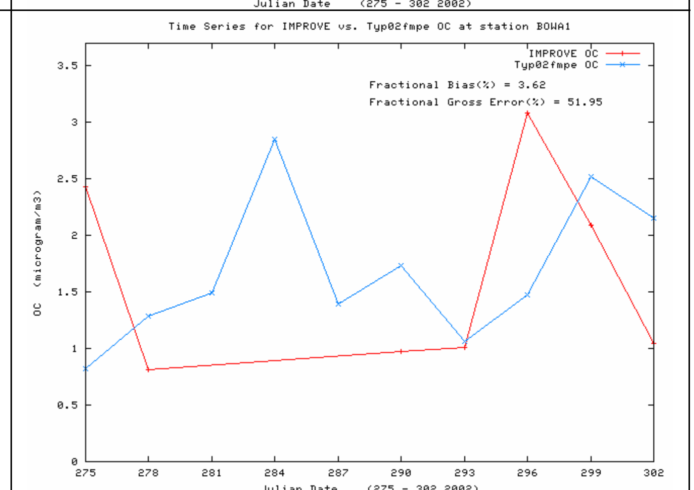


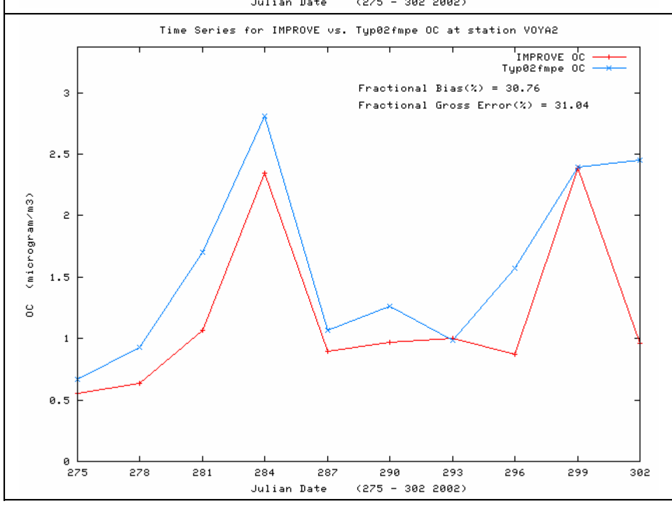
Figure C-19a. Scatter plots of predicted and observed organic matter carbon (OMC) concentrations for October 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

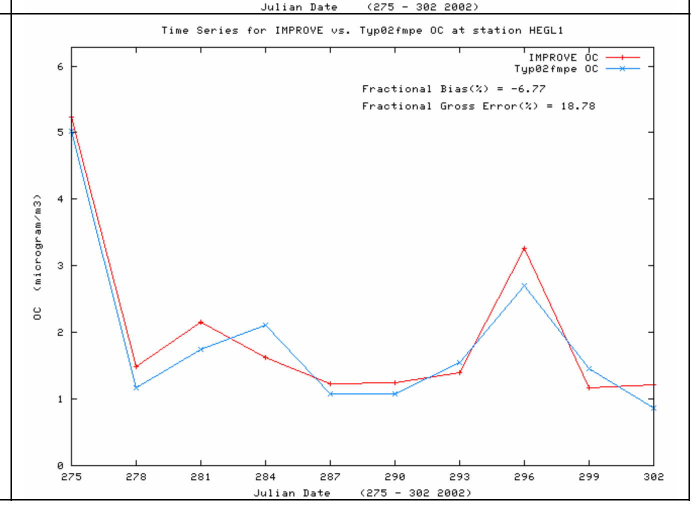

Time Series for IMPROVE vs. Typ02fmpe OC at station CACR1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 39.20
Fractional Gross Error(%) = 39.33
OC (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station UPBU1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 3.25
Fractional Gross Error(%) = 22.53
OC (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station BRET1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -88.16
Fractional Gross Error(%) = 90.84
OC (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station BOWA1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 3.62
Fractional Gross Error(%) = 51.95
OC (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station VOYA2
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = 30.76
Fractional Gross Error(%) = 31.04
OC (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe OC at station HEGL1
IMPROVE OC
Typ02fmpe OC
Fractional Bias(%) = -6.77
Fractional Gross Error(%) = 18.78
OC (microgram/m3)
Julian Date (275 - 302 2002)

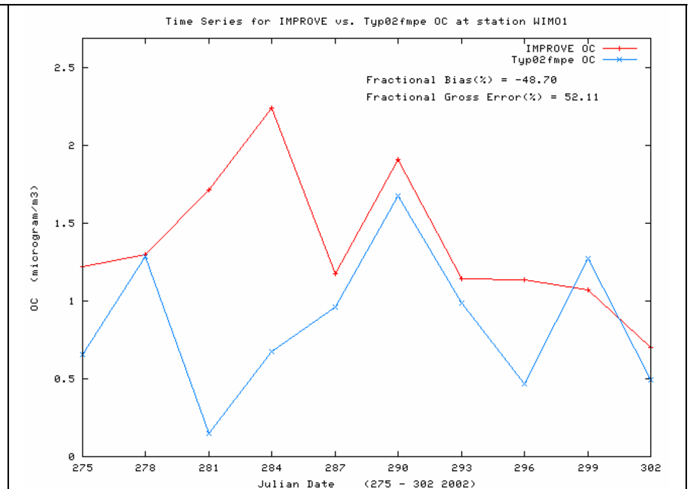
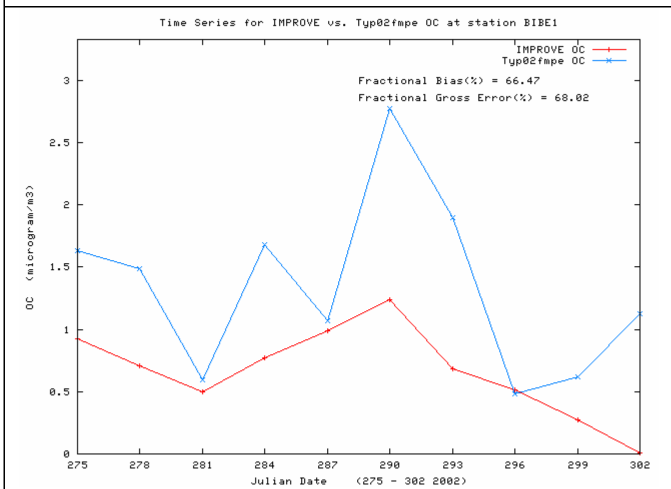
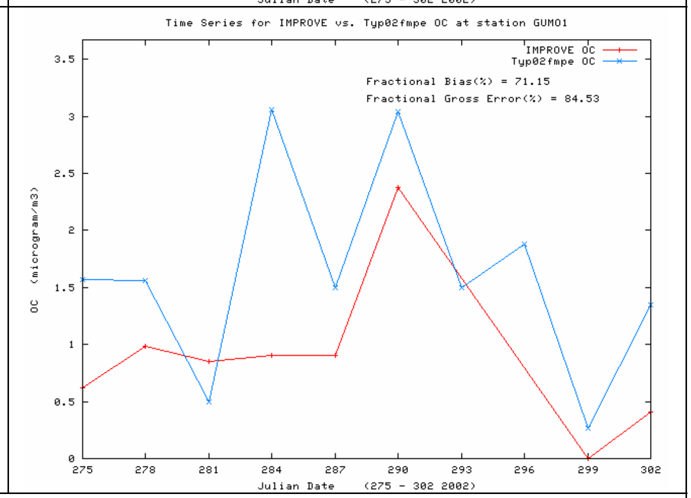
No Data for Mingo (MING)	
	

Figure C-19b. Time series of predicted and observed 24-hour organic matter carbon (OMC) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.

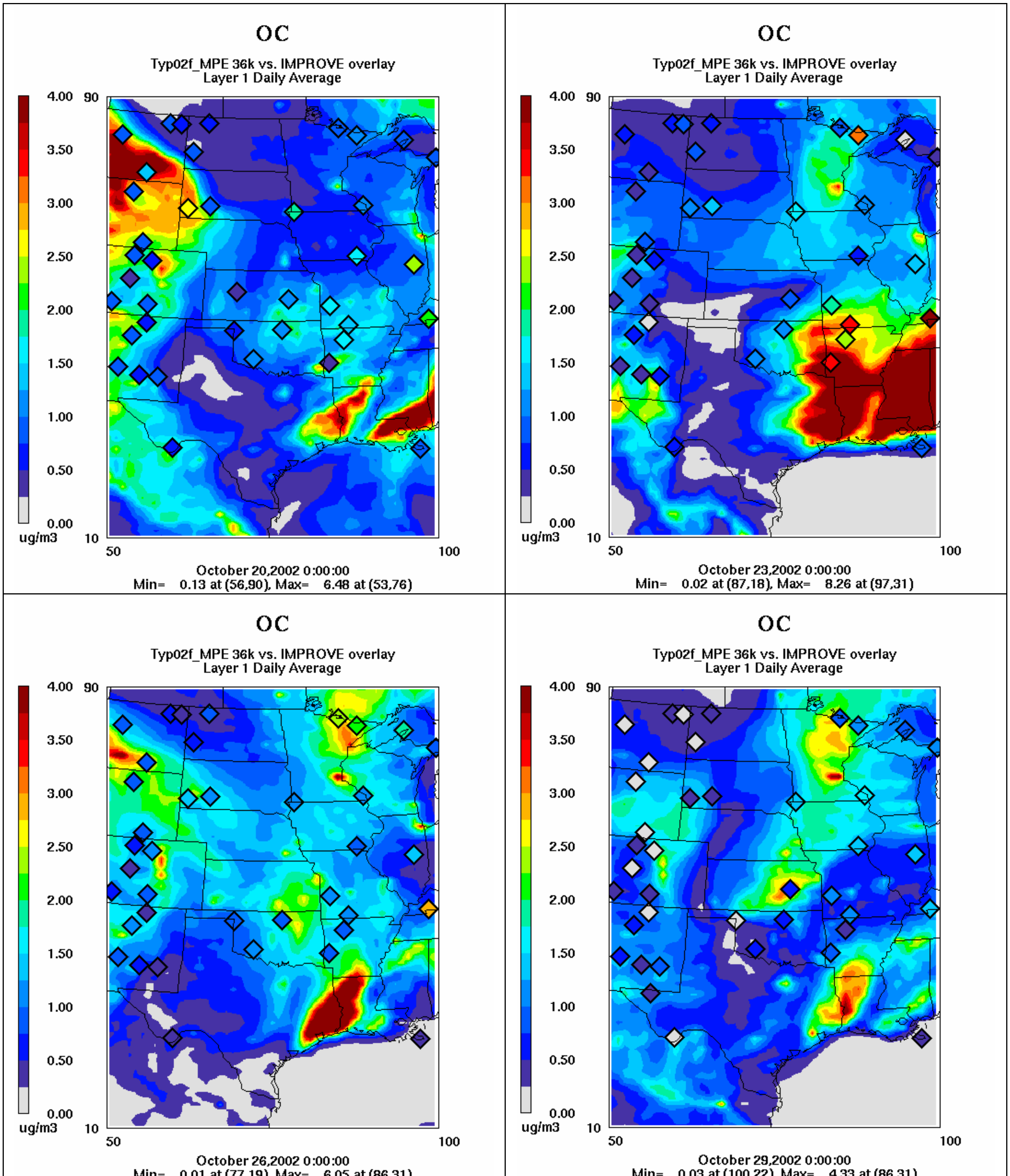


Figure C-19c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour OMC concentrations for October 20, 23, 26 and 29, 2002.

C.3.3.5 OMC Monthly Bias and Error

The OMC monthly bias and error across IMPROVE and STN sites in the CENRAP region are shown in Figure C-20. The bias performance for OMC at the IMPROVE sites are quite good throughout the year with values generally within ±20%, albeit with a slight winter overestimation and summer underestimation bias. At the urban STN sites the model exhibits an underestimation bias throughout the year that ranges from -20% to -50%. Fractional errors are mostly within 40% to 60% with the STN network generally exhibiting more error than IMPROVE.

The good performance of the model for OMC at the IMPROVE sites is also reflected in the Bugle Plot (Figure C-21) with the bias and error achieving the proposed PM model performance goal for all months of the year. At the STN sites, however, the OMC bias falls between the proposed PM model performance goal and criteria, with error right at the goal for most months.

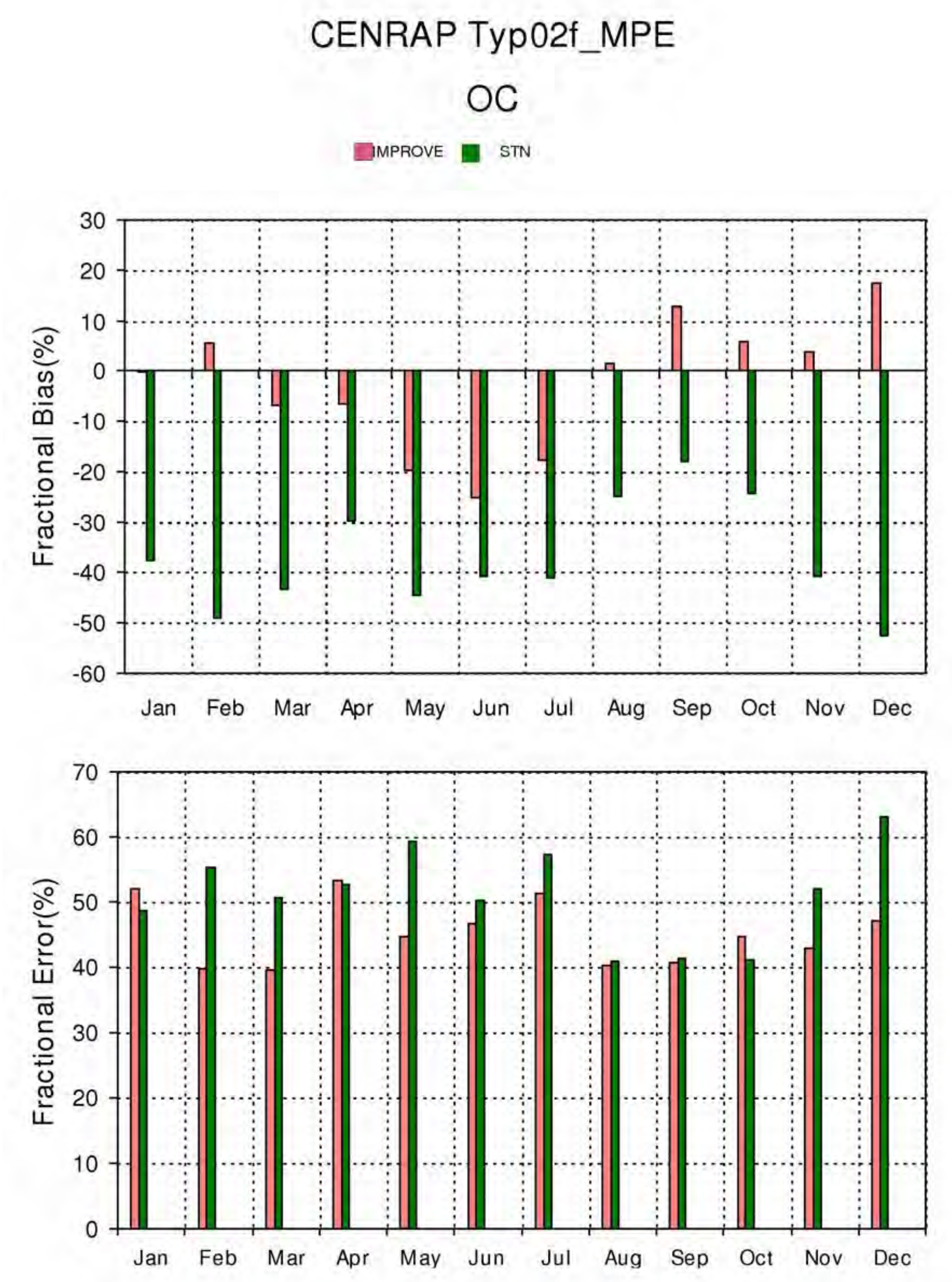


Figure C-20. Monthly OMC fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE and STN monitoring sites in the CENRAP region.

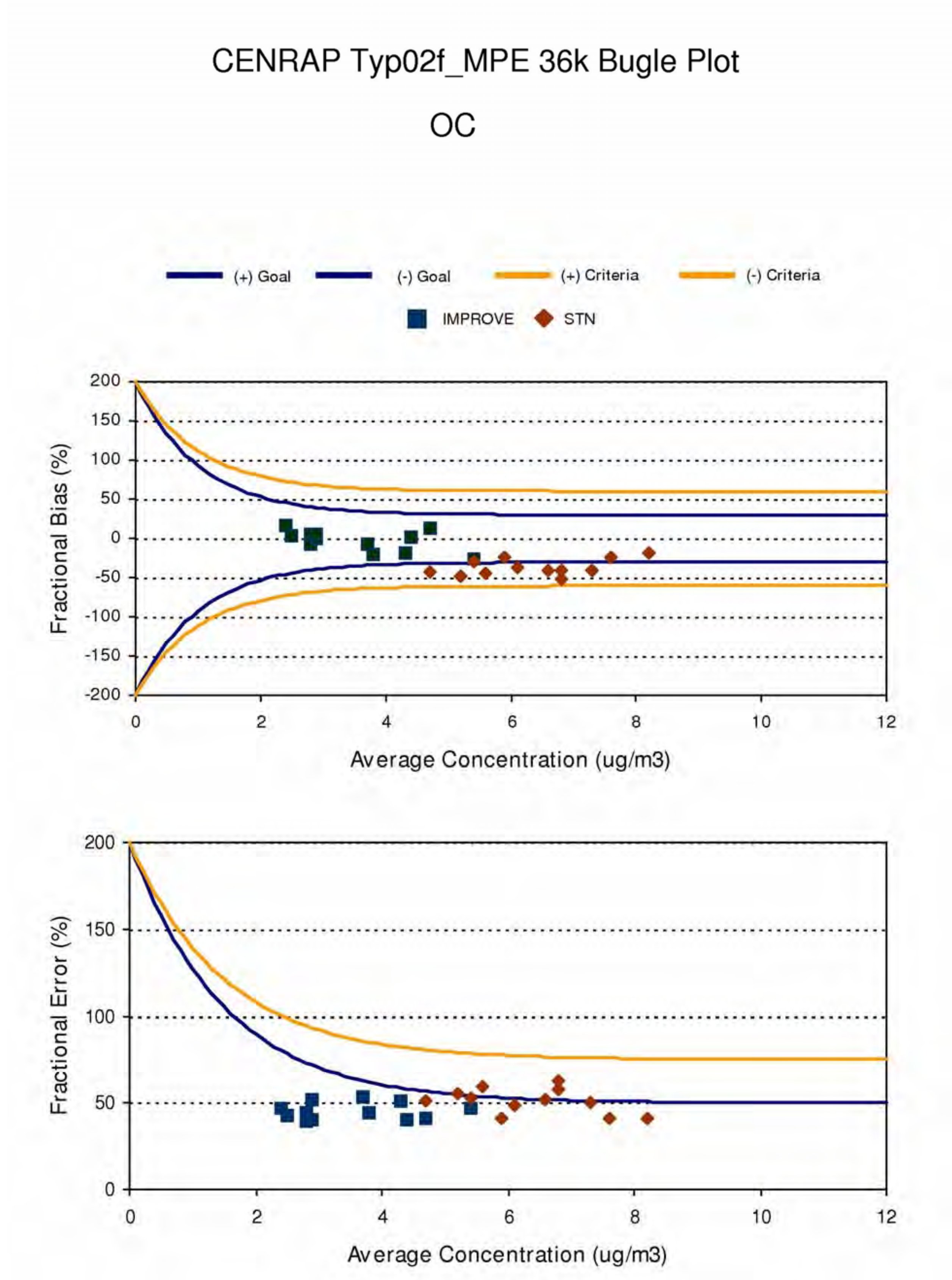


Figure C-21. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for OMC and IMPROVE and STN monitoring sites in the CENRAP region.

C.3.4 Elemental Carbon (EC) Monthly Model Performance

Elemental Carbon (EC) measurements are also uncertain, with the IMPROVE and STN using different measurement technologies with different measurement artifacts.

C.3.4.1 EC in January 2002

Although there is a lot of scatter in the January EC scatter plots at the IMPROVE and STN sites, the bias is fairly low (-24% and 1%) with errors in the 40%-50% range (Figure C-22a). The time series comparisons (Figure C-22b) suggest an EC underestimation bias at BRET and an overestimation bias at the northern Minnesota sites (VOYA and BOWA). The model generally agrees with the observed spatial distribution of EC in January with higher values on the eastern than western portions of the CENRAP region (Figure C-22c).

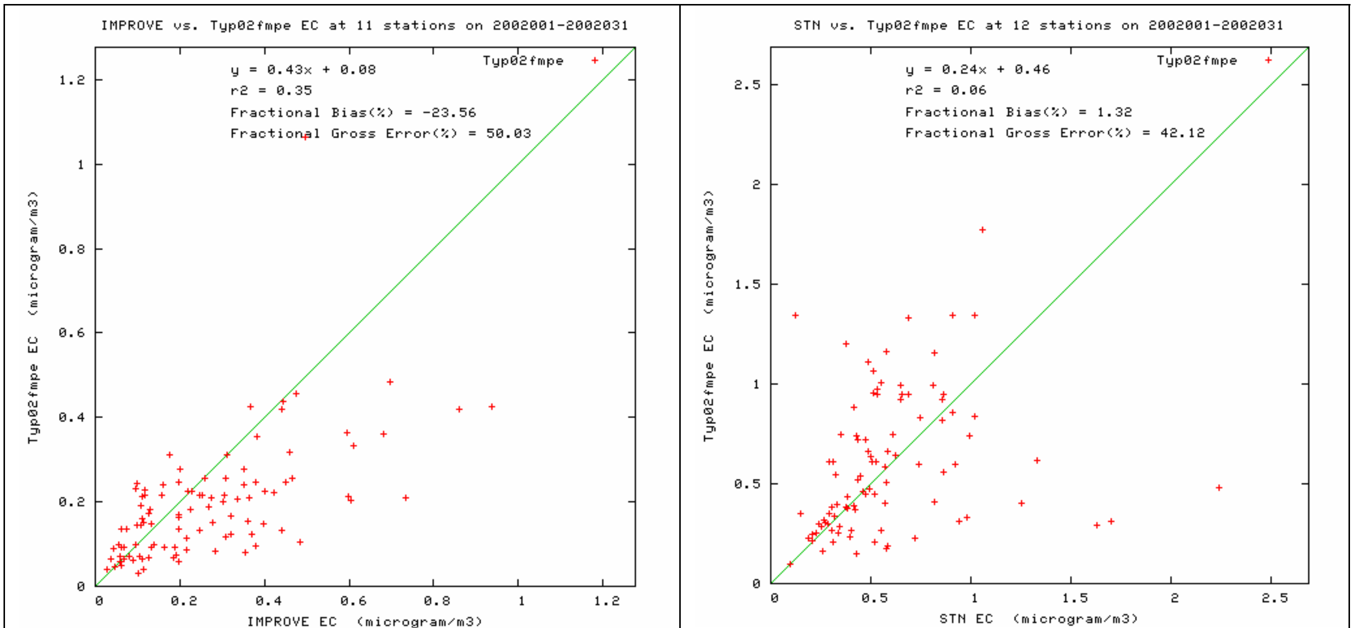
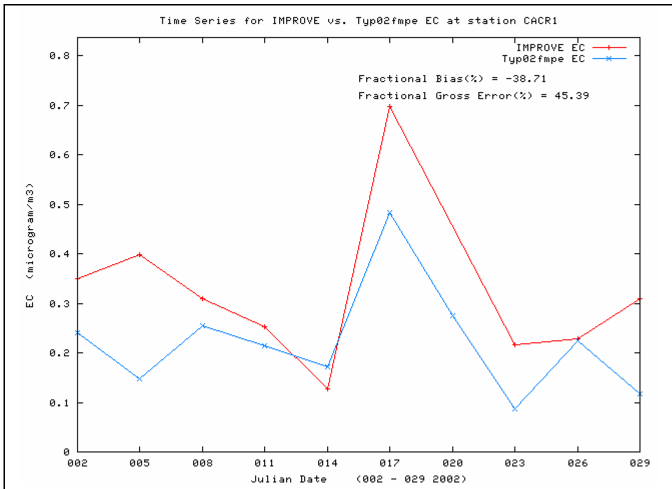
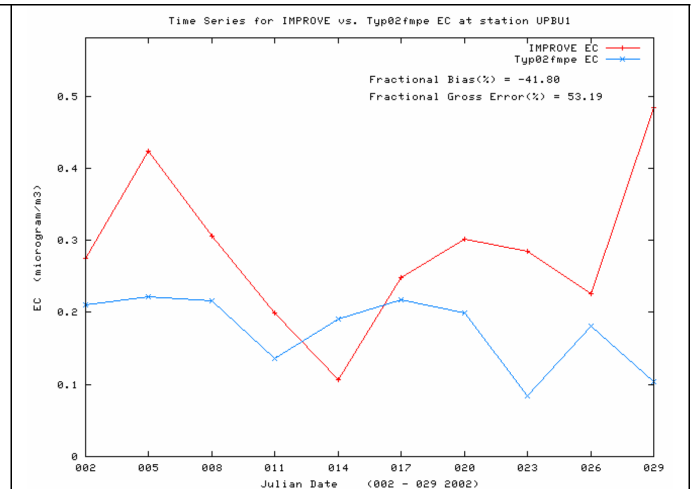
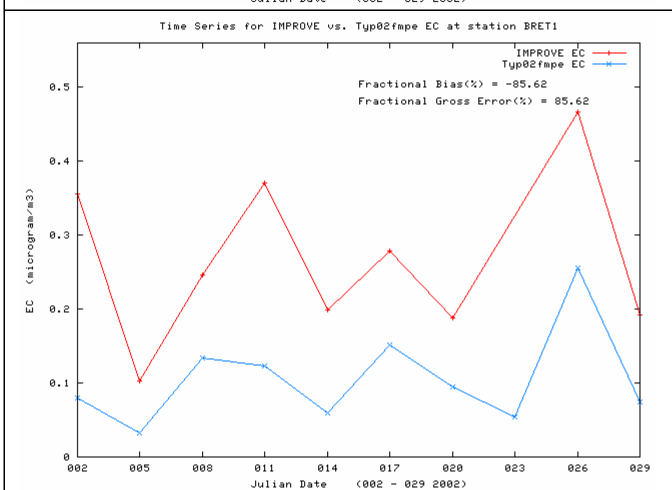
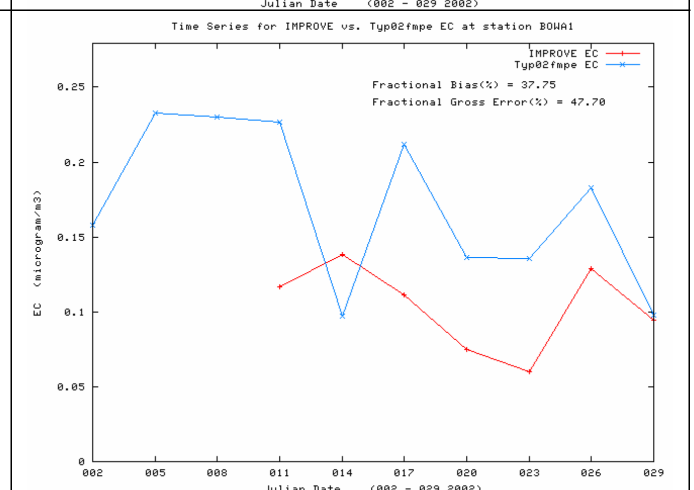


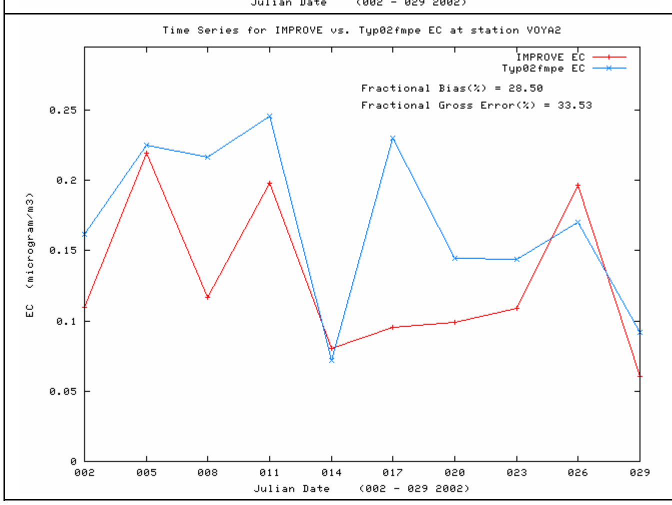
Figure C-22a. Scatter plots of predicted and observed elemental carbon (EC) concentrations for January 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

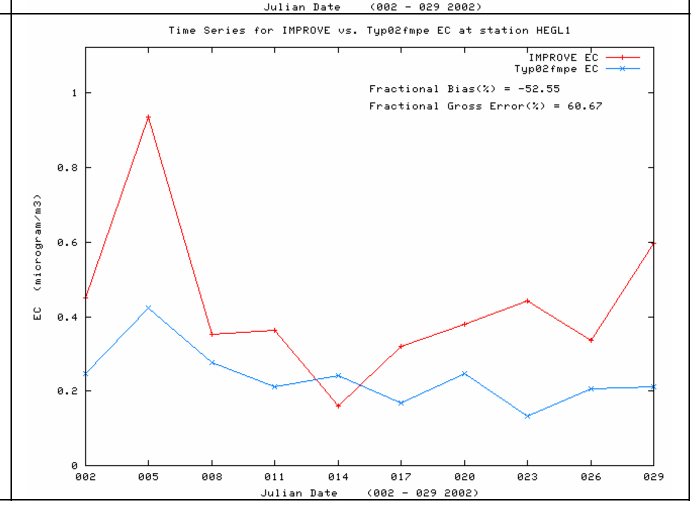

Time Series for IMPROVE vs. Typ02fmpe EC at station CACR1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -38.71
Fractional Gross Error(%) = 45.39
EC (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station UPBU1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -41.80
Fractional Gross Error(%) = 53.19
EC (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station BRET1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -85.62
Fractional Gross Error(%) = 85.62
EC (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station BOWA1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = 37.75
Fractional Gross Error(%) = 47.70
EC (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station VOYA2
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = 28.50
Fractional Gross Error(%) = 33.53
EC (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station HEGL1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -52.55
Fractional Gross Error(%) = 60.67
EC (microgram/m3)
Julian Date (002 - 029 2002)

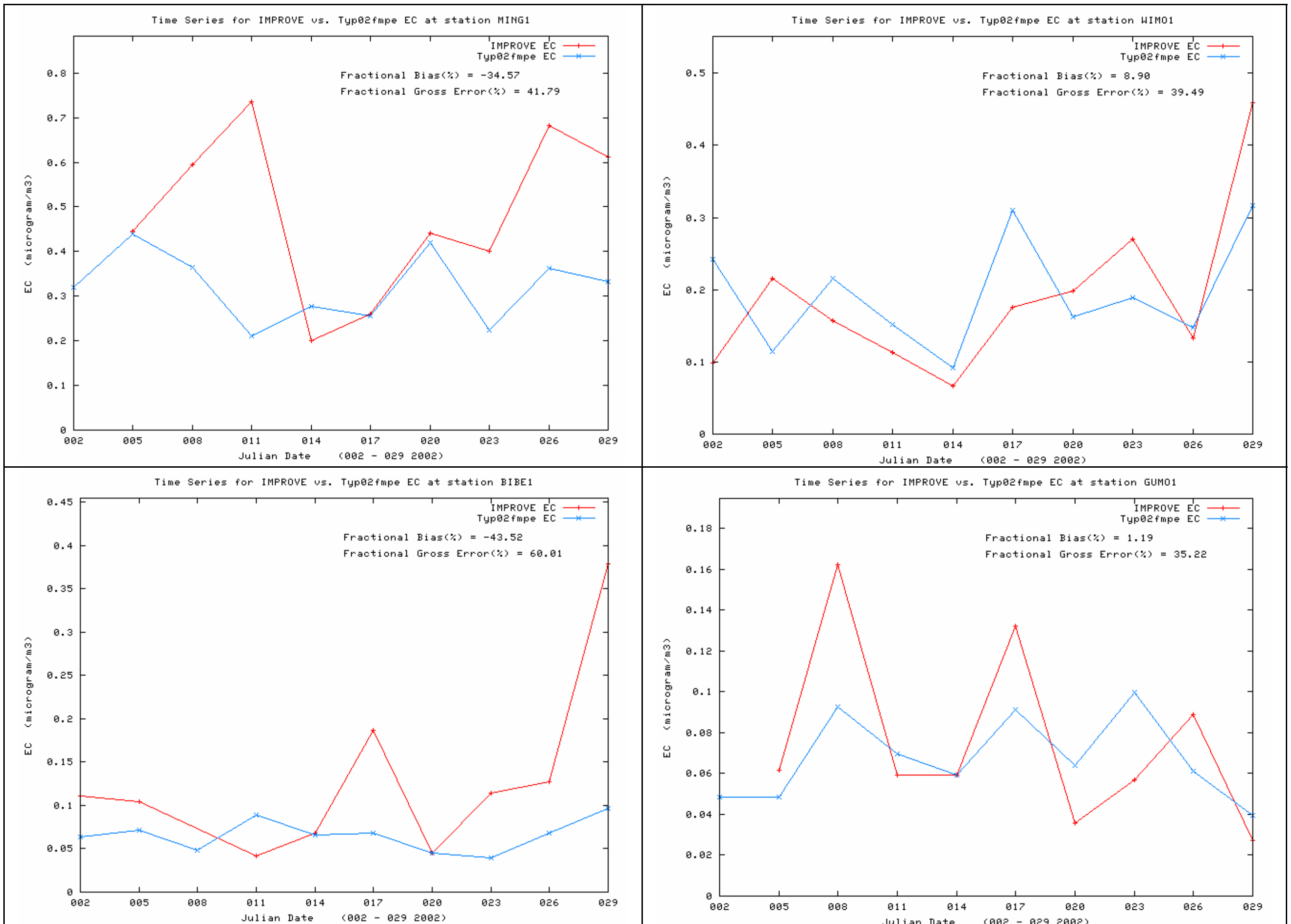


Figure C-22b. Time series of predicted and observed 24-hour elemental carbon (EC) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.

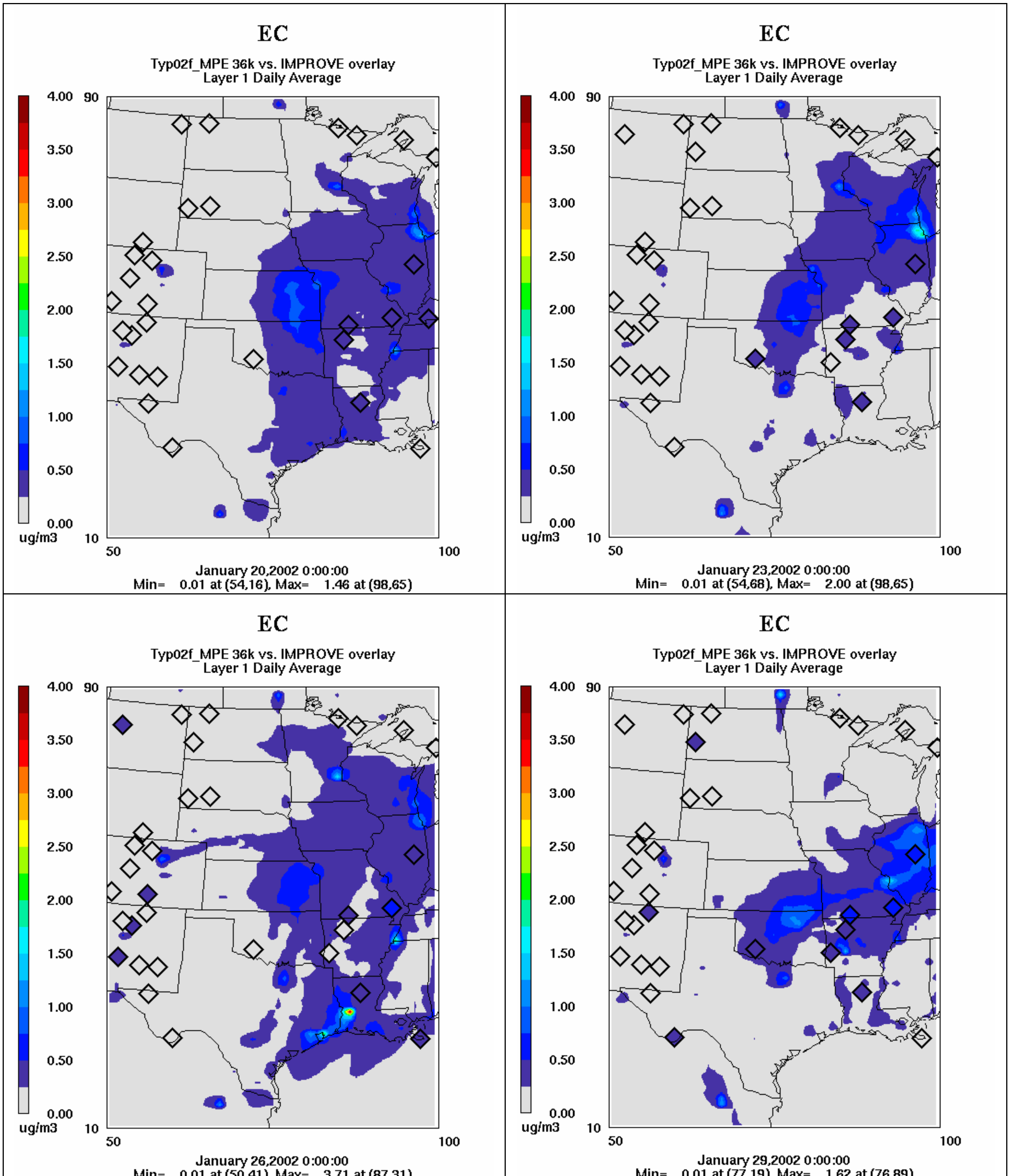


Figure C-22c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour EC concentrations for January 20, 23, 26 and 29, 2002.

C.3.4.2 EC in April 2002

EC is underestimated at the IMPROVE sites in April (bias of -48%), but reproduced well at the STN sites (bias of -13%). Although EC is underestimated at the IMPROVE sites both the model and observations agree that EC concentrations are very small and not a significant component of the PM budget. The model fails to capture the day-to-day variability in the observed EC at the IMPROVE sites and exhibits a systematic under-prediction tendency at some sites (Figure C-23b). On April 5 and 11 the model reproduces the spatial distribution of the observed EC reasonable well with higher values in the eastern than western portion of the CENRAP region. But on April 8 and 14 the model is much to clean in the eastern portion of the CENRAP region (Figure C-23c).

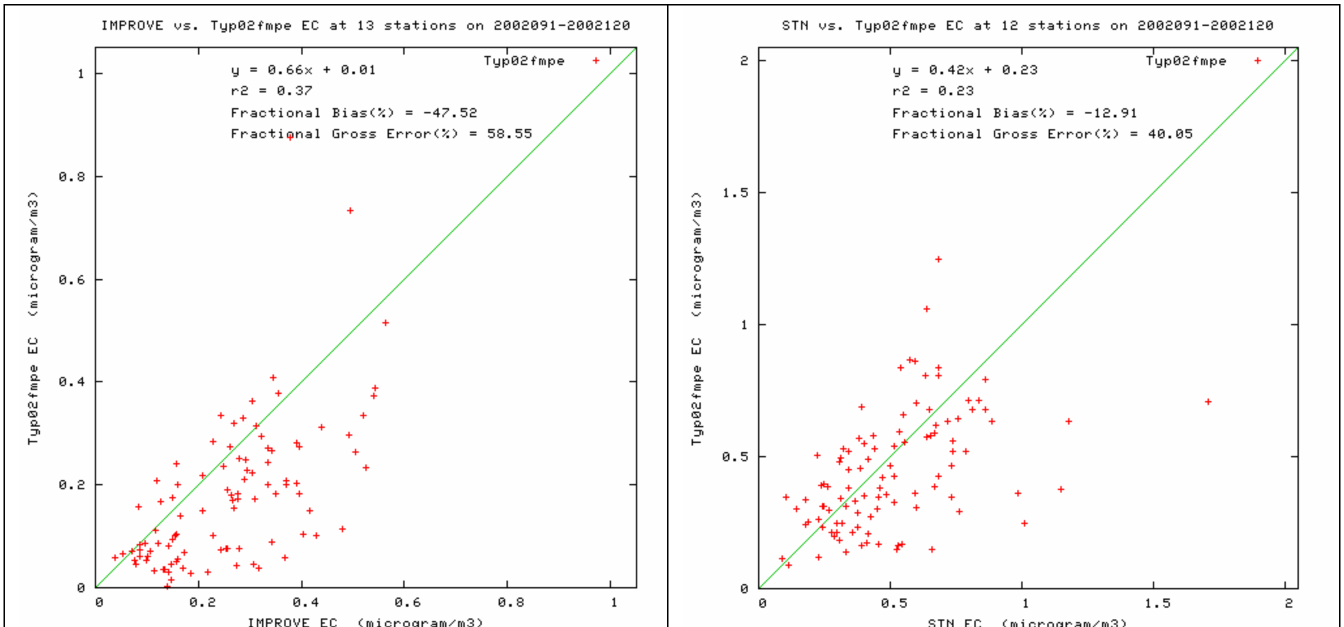
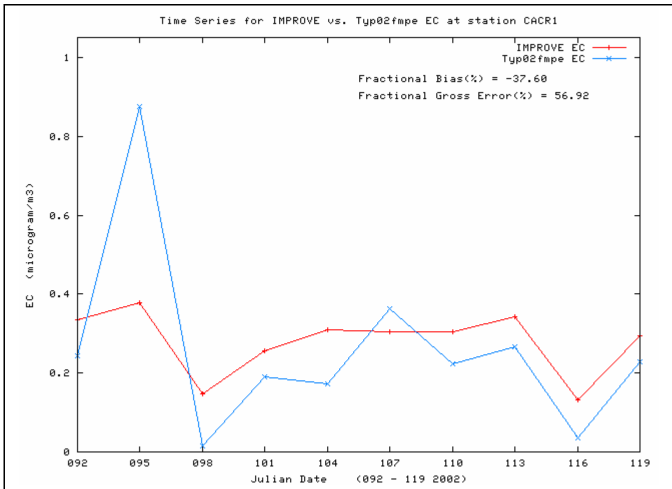
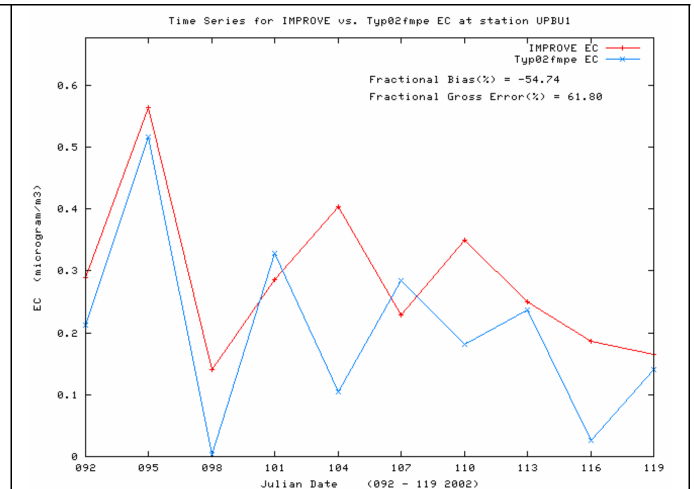
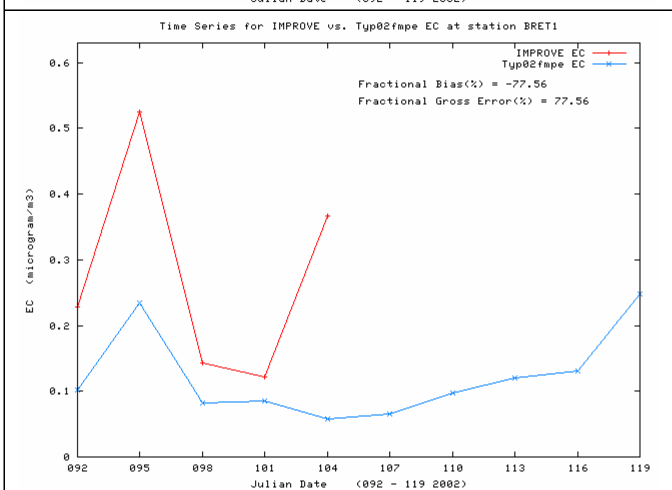
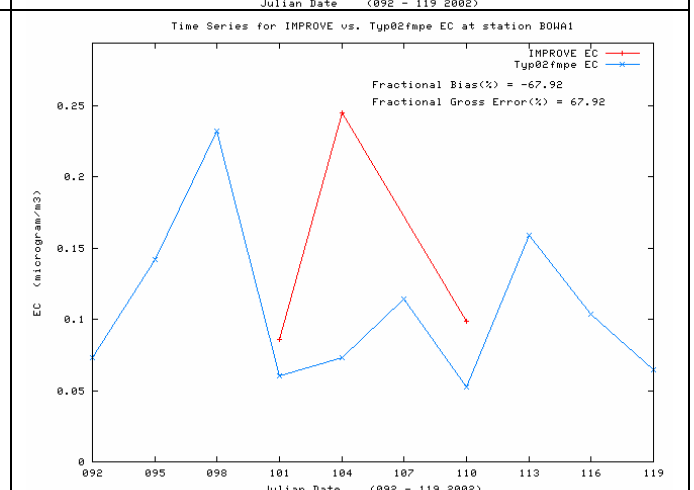


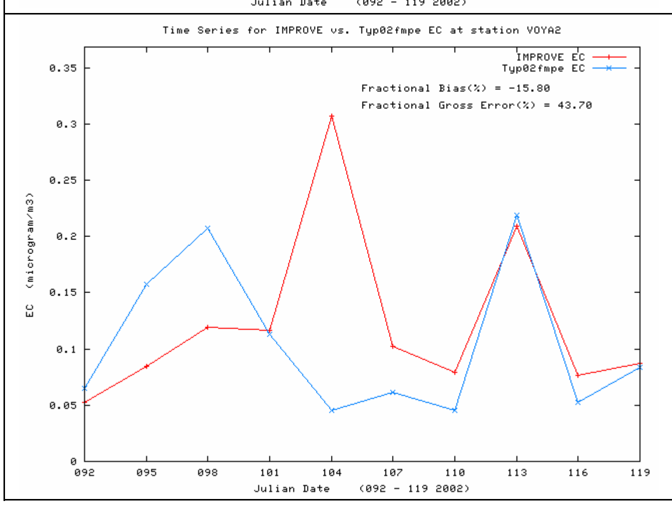
Figure C-23a. Scatter plots of predicted and observed elemental carbon (EC) concentrations for April 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation

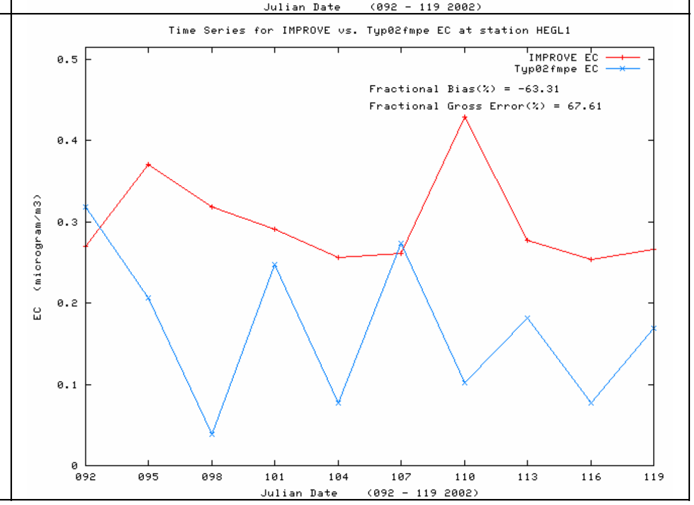

Time Series for IMPROVE vs. Typ02fmpe EC at station CACR1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -37.60
Fractional Gross Error(%) = 56.92
EC (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station UPBU1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -54.74
Fractional Gross Error(%) = 61.80
EC (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station BRET1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -77.56
Fractional Gross Error(%) = 77.56
EC (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station BOWA1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -67.92
Fractional Gross Error(%) = 67.92
EC (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station VOYA2
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -15.80
Fractional Gross Error(%) = 43.70
EC (microgram/m3)
Julian Date (092 - 119 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station HEGL1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -63.31
Fractional Gross Error(%) = 67.61
EC (microgram/m3)
Julian Date (092 - 119 2002)

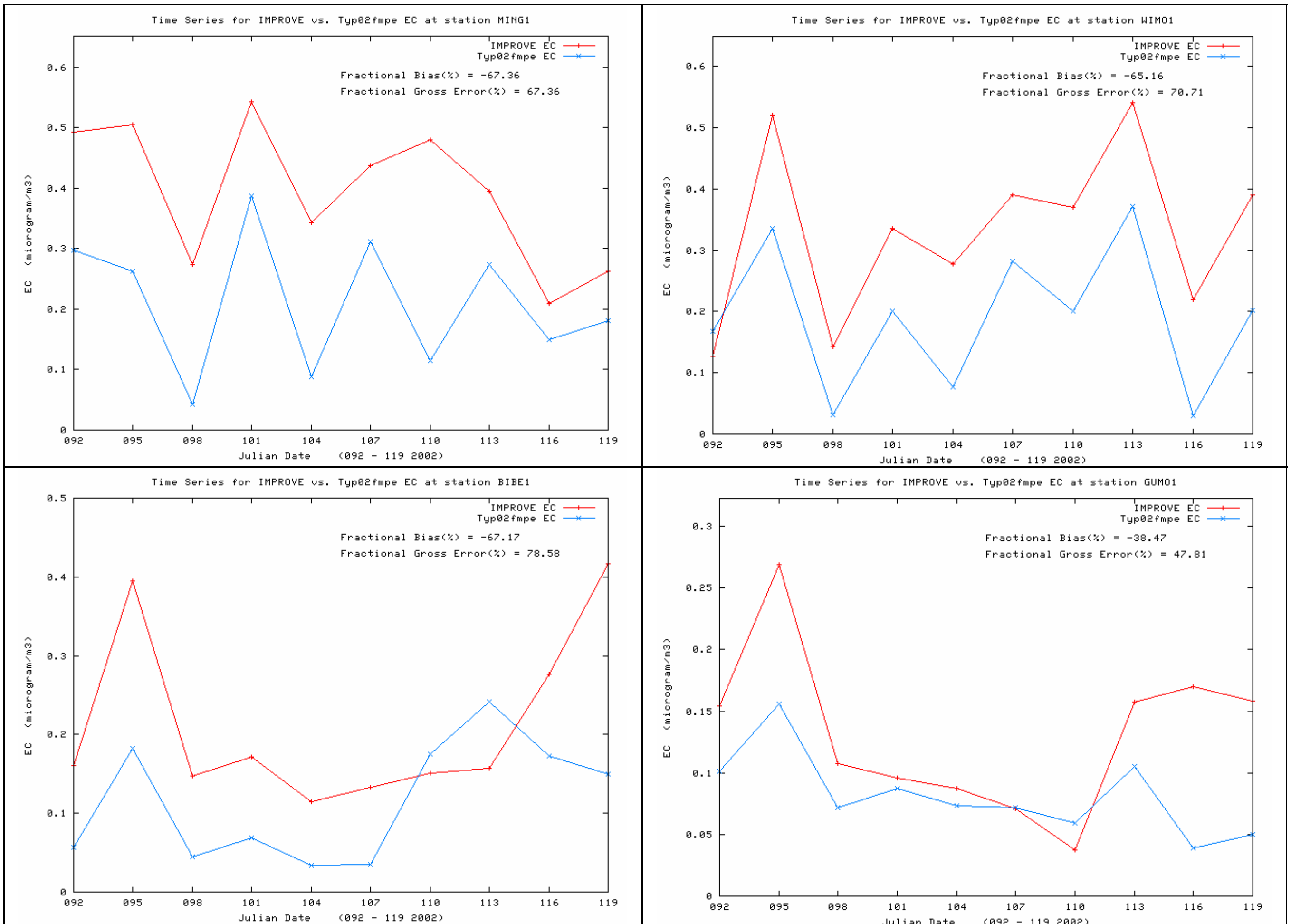


Figure C-23b. Time series of predicted and observed 24-hour elemental carbon (EC) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.

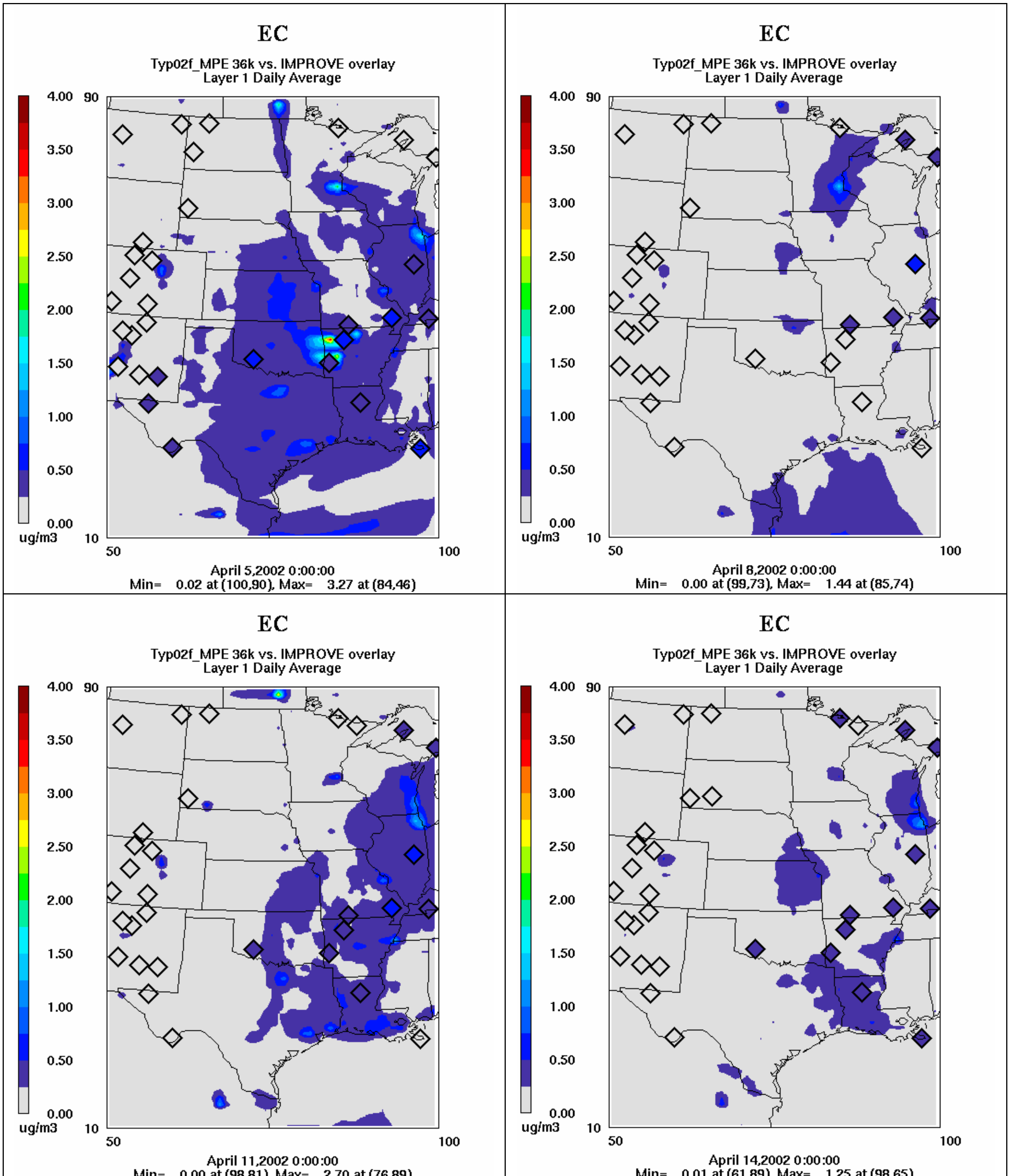


Figure C-23c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour EC concentrations for April 5, 8, 11 and 14, 2002.

C.3.3.3 EC in July 2002

July EC performance is similar to the other months with near zero bias across he STN sites and an underestimation bias across the IMPROVE sites (Figure C-24). Again the model and observations agree that EC is low in July and not a significant component of visibility impairment.

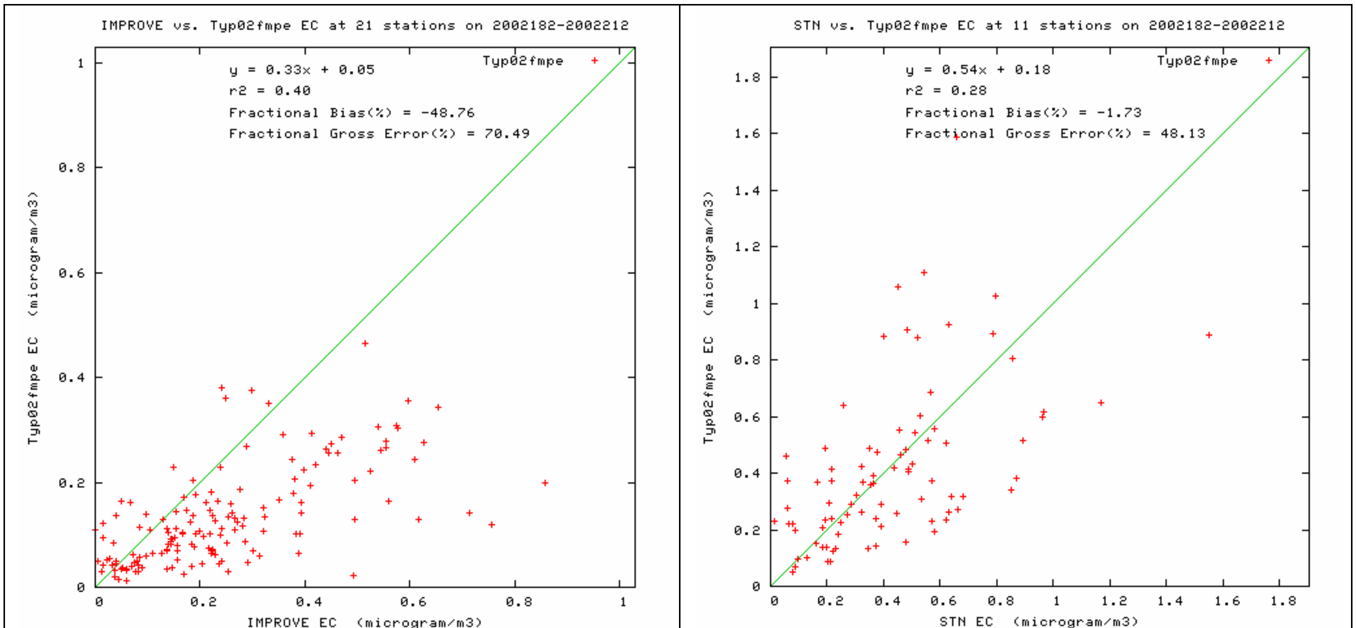
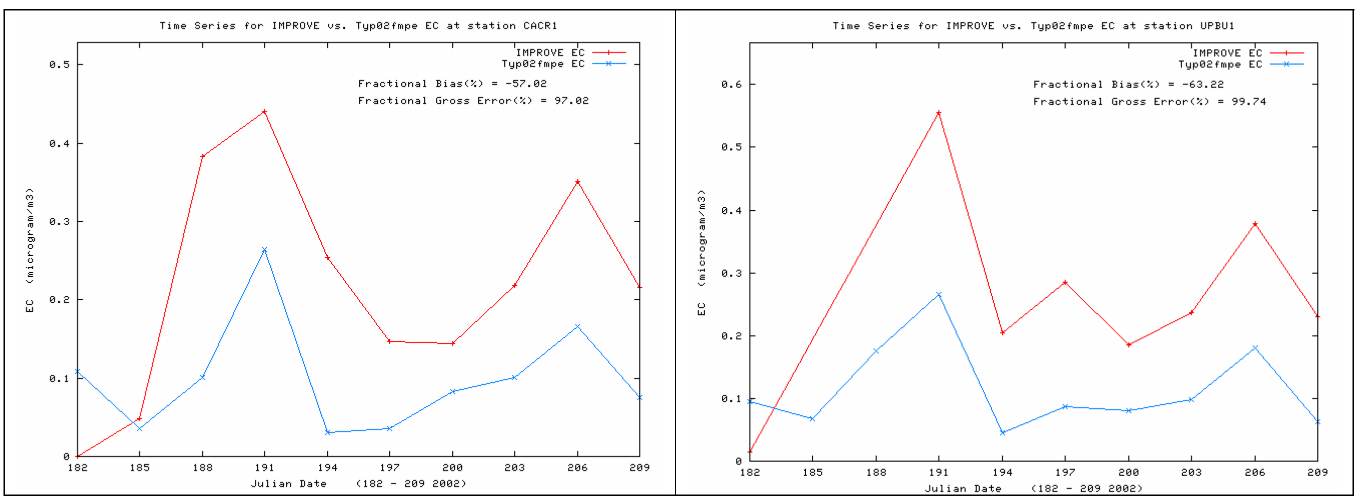
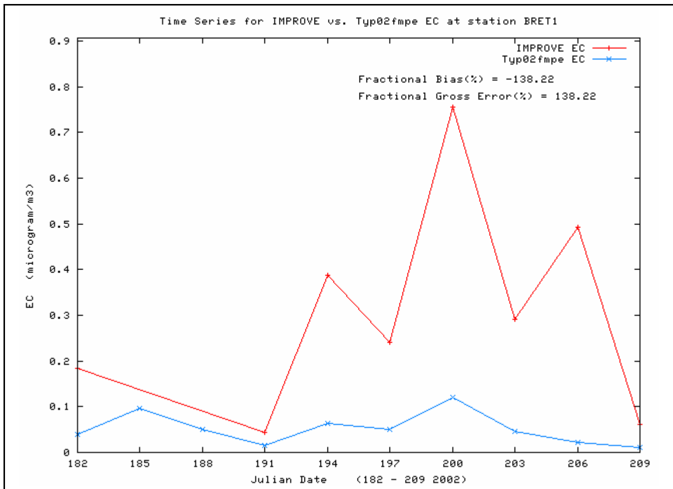
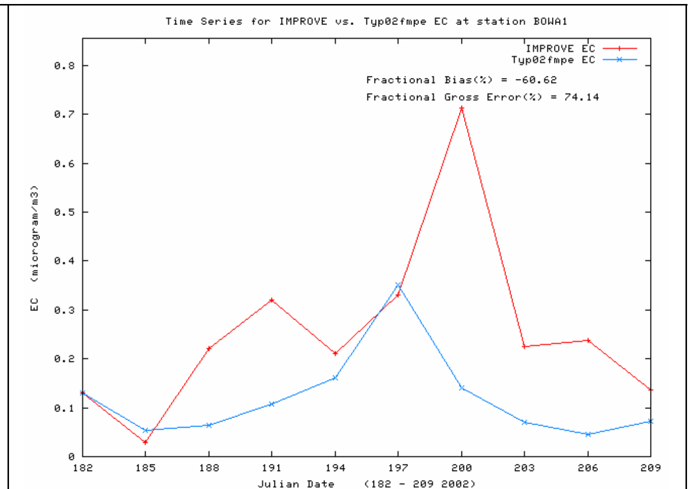
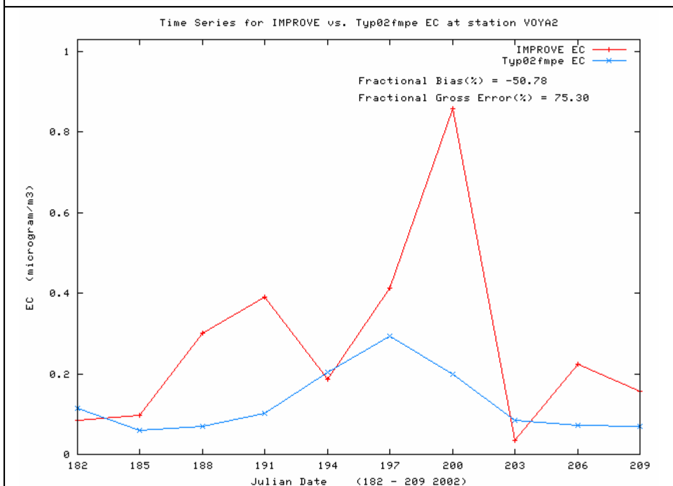


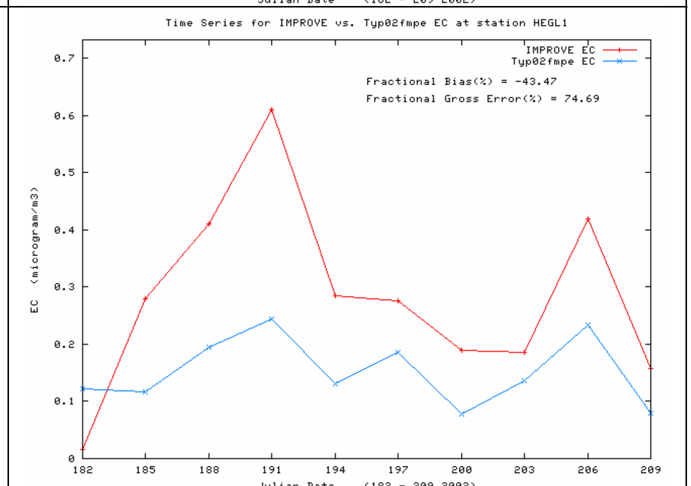
Figure C-24a. Scatter plots of predicted and observed elemental carbon (EC) concentrations for July 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



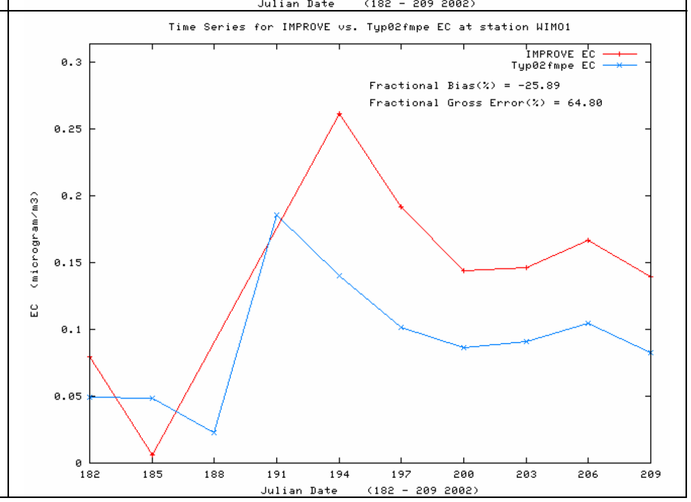


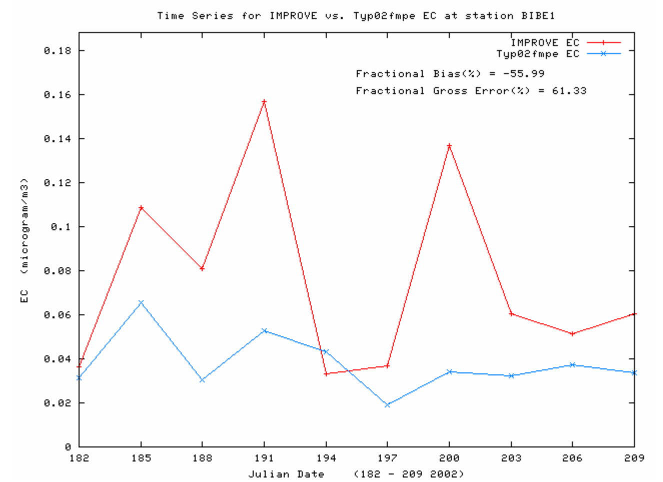






No Data for Mingo (MING)





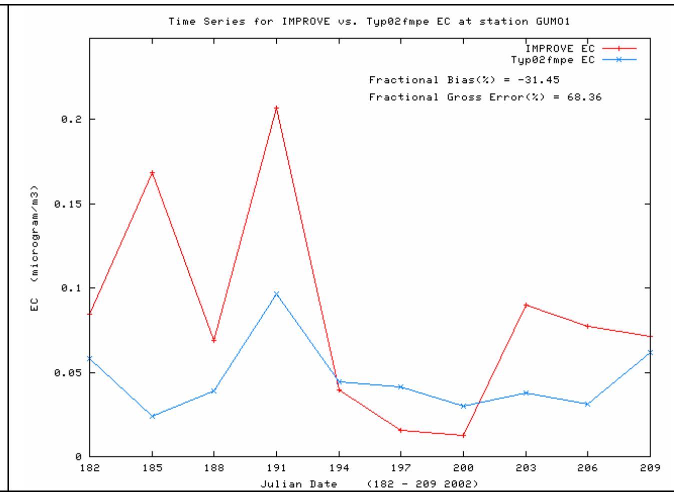


Figure C-24b. Time series of predicted and observed 24-hour elemental carbon (EC) concentrations at CENRAP IMPROVE CLASS I AREA sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.

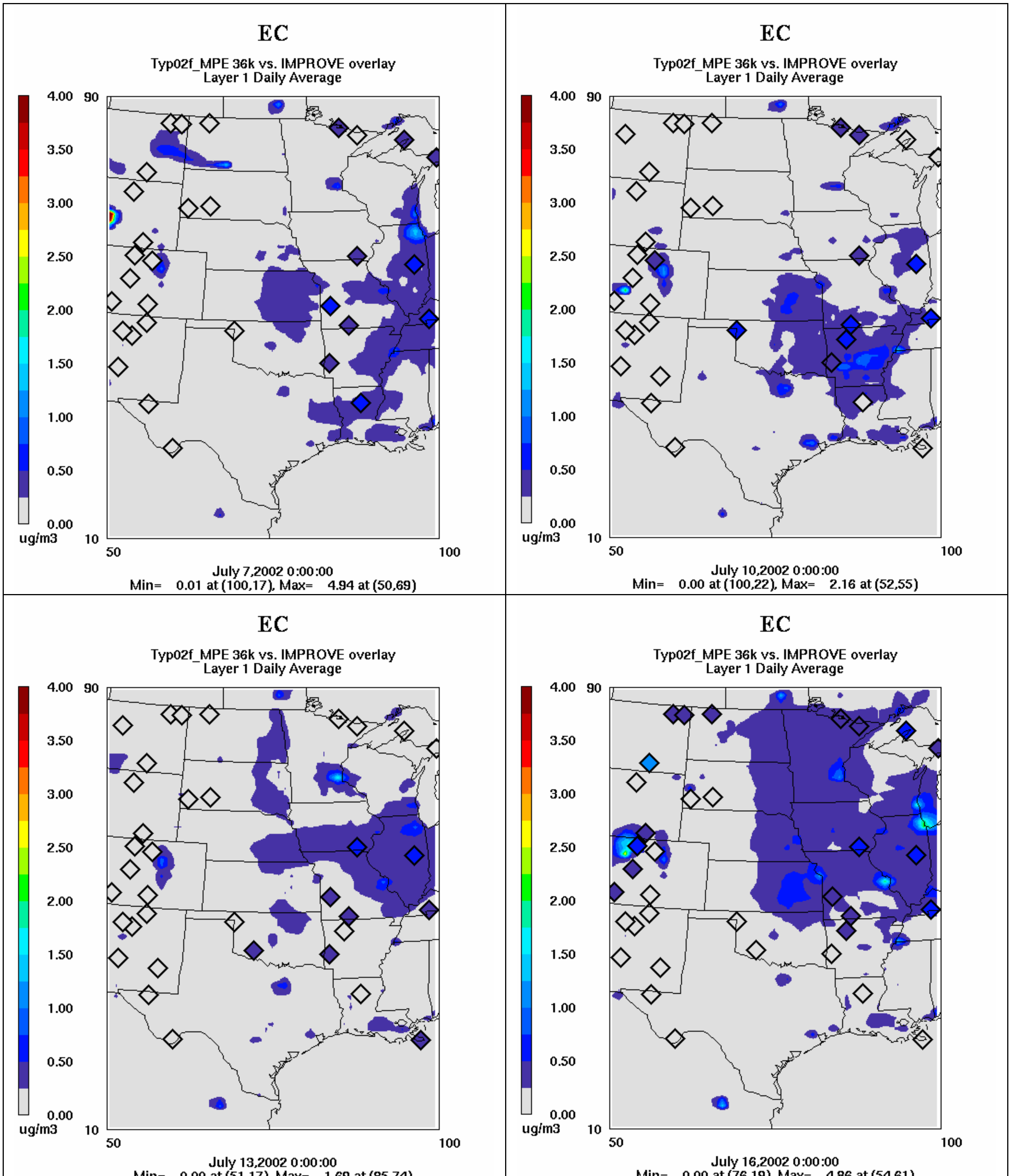


Figure C-24c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour EC concentrations for July 7, 10, 13 and 16, 2002.

C.3.4.4 EC in October 2002

EC performance is improved at the IMPROVE sites in October with lower bias (9%) than the previous months where an under-prediction tendency was seen (Figure C-25a). EC bias is also fairly low at the STN sites with errors across both networks of approximately 50%. Although there is a systematic underestimation of EC at BRET, the agreement between the predicted and observed October time series (Figure C-25b) is remarkable at several sites (e.g., CACR, UPBU, VOYA and HEGL).

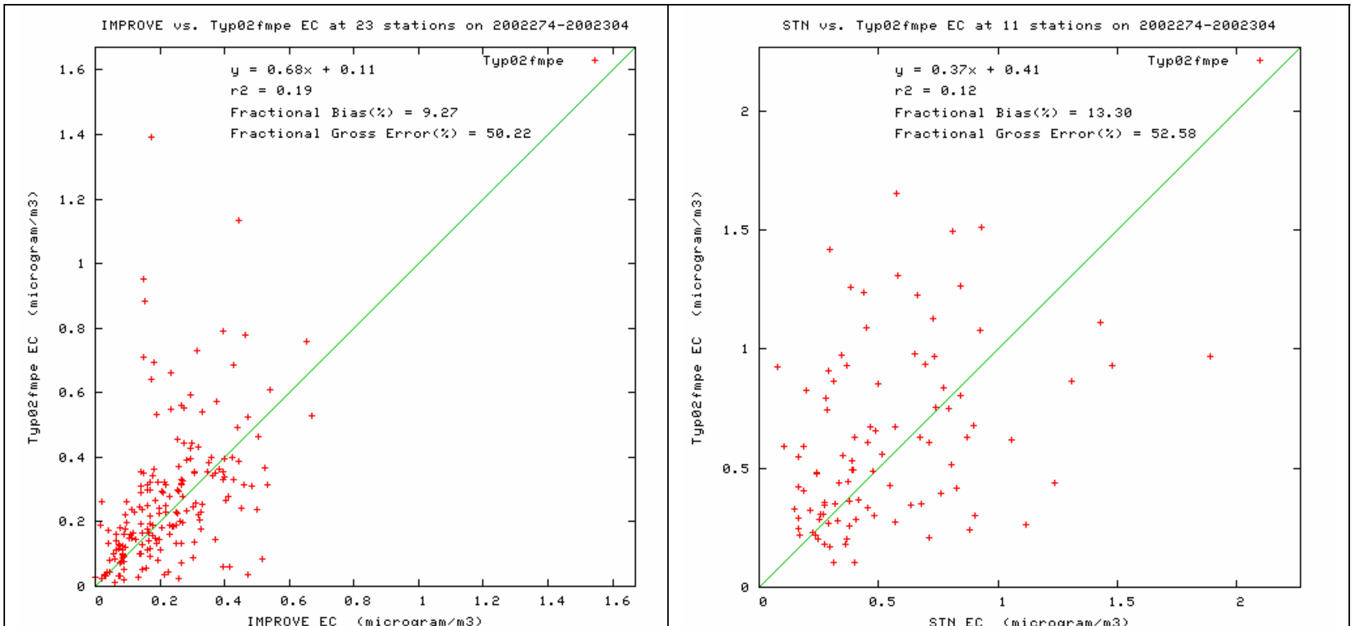
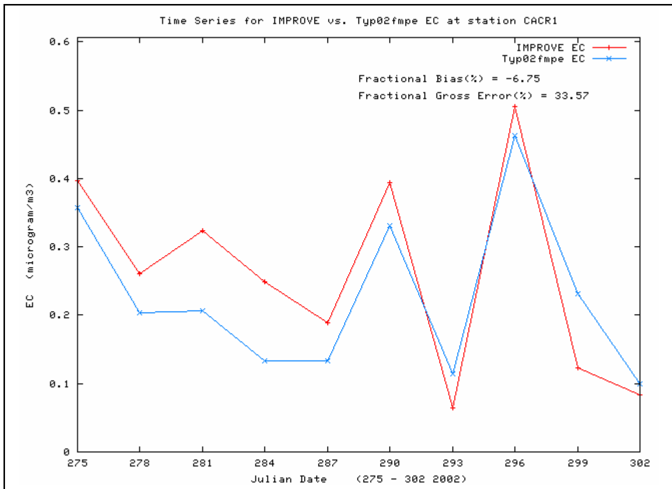
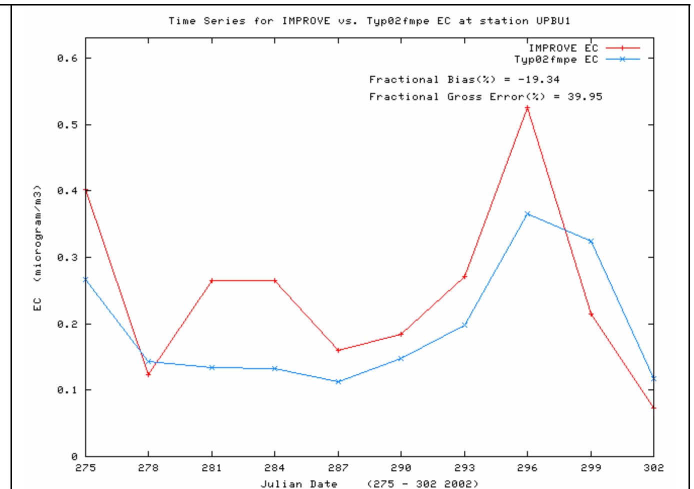
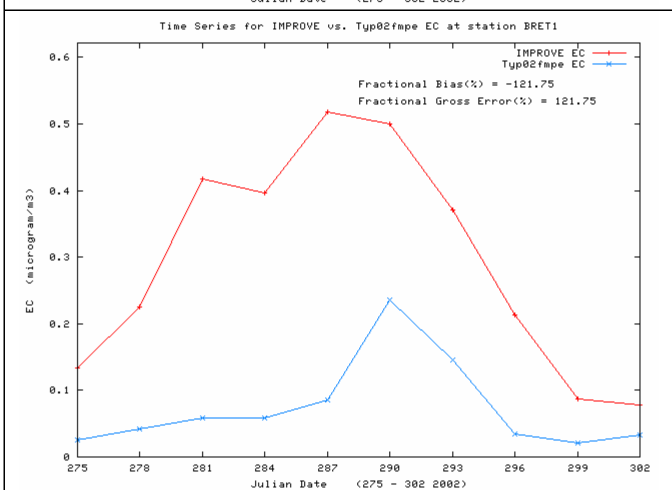
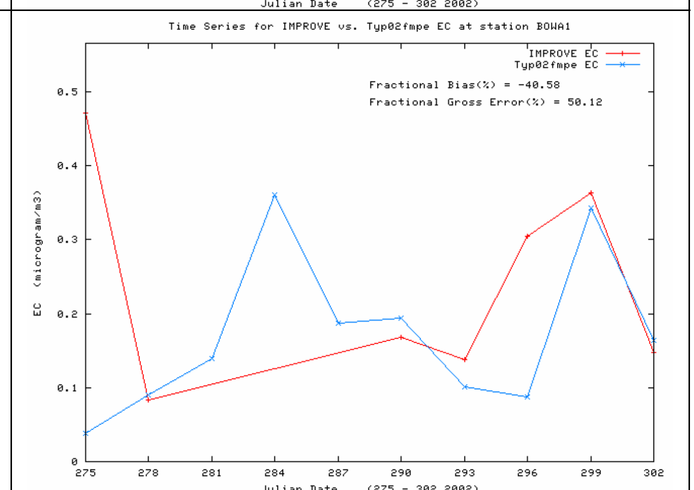


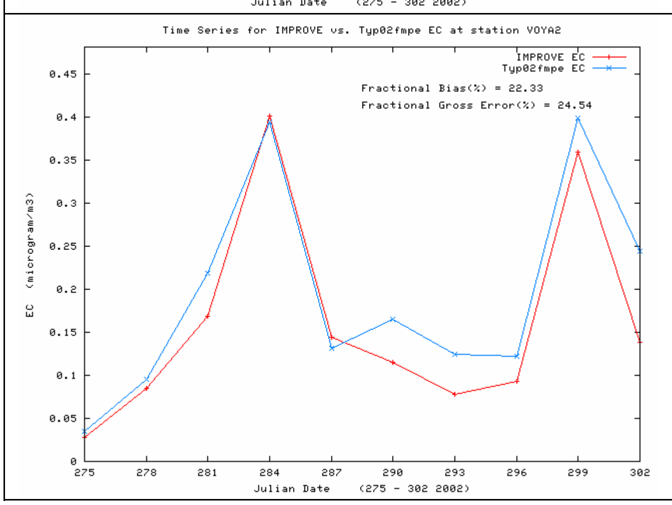
Figure C-25a. Scatter plots of predicted and observed elemental carbon (EC) concentrations for October 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

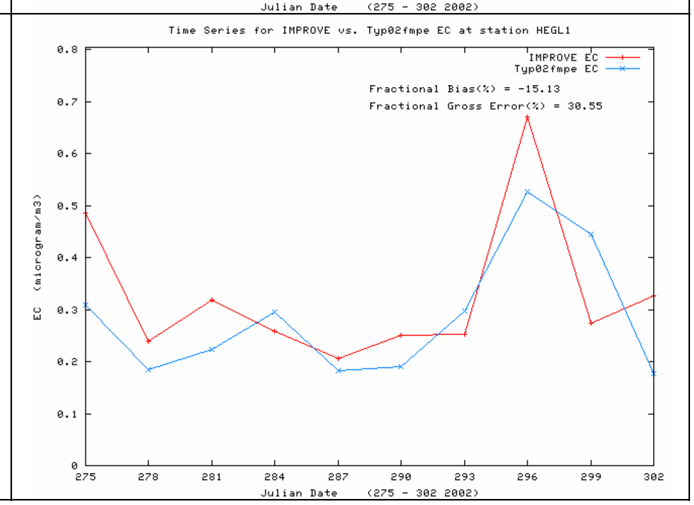

Time Series for IMPROVE vs. Typ02fmpe EC at station CACR1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -6.75
Fractional Gross Error(%) = 33.57
EC (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station UPBU1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -19.34
Fractional Gross Error(%) = 39.95
EC (microgram/m3)
Julian Date (275 - 302 2002)

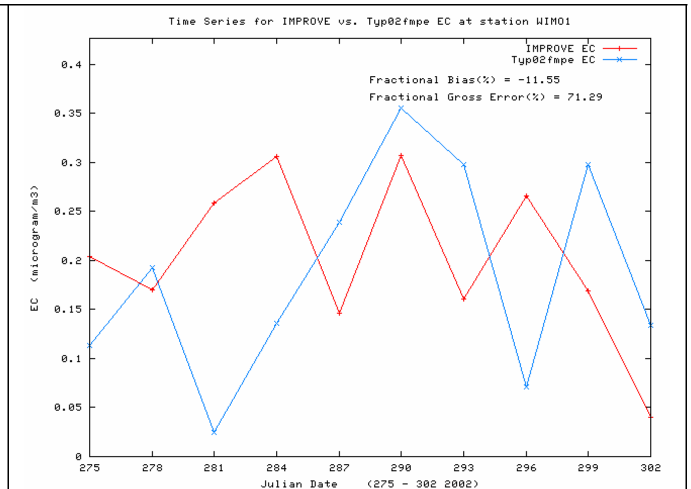

Time Series for IMPROVE vs. Typ02fmpe EC at station BRET1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -121.75
Fractional Gross Error(%) = 121.75
EC (microgram/m3)
Julian Date (275 - 302 2002)

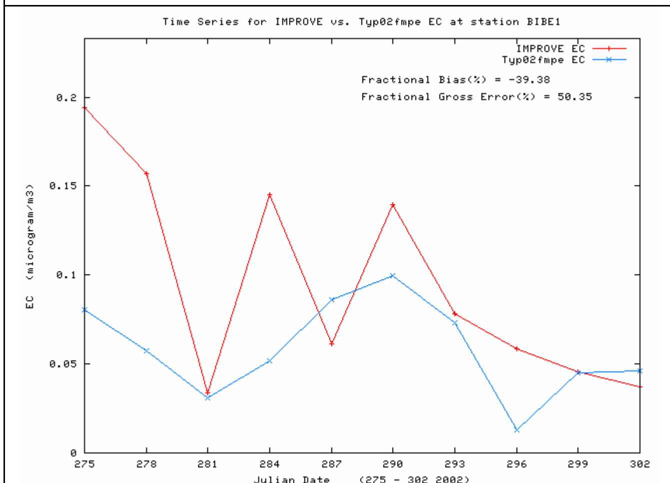

Time Series for IMPROVE vs. Typ02fmpe EC at station BOWA1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -40.58
Fractional Gross Error(%) = 50.12
EC (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station VOYA2
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = 22.33
Fractional Gross Error(%) = 24.54
EC (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe EC at station HEGL1
IMPROVE EC
Typ02fmpe EC
Fractional Bias(%) = -15.13
Fractional Gross Error(%) = 30.55
EC (microgram/m3)
Julian Date (275 - 302 2002)

No Data for Mingo (MING)





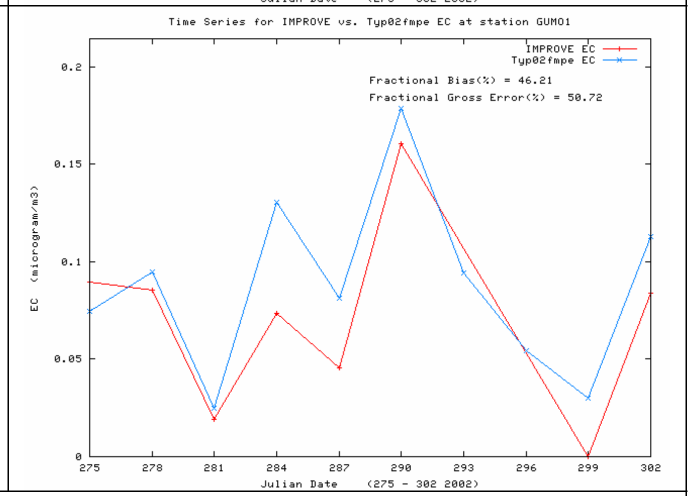


Figure C-25b. Time series of predicted and observed 24-hour elemental carbon (EC) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.

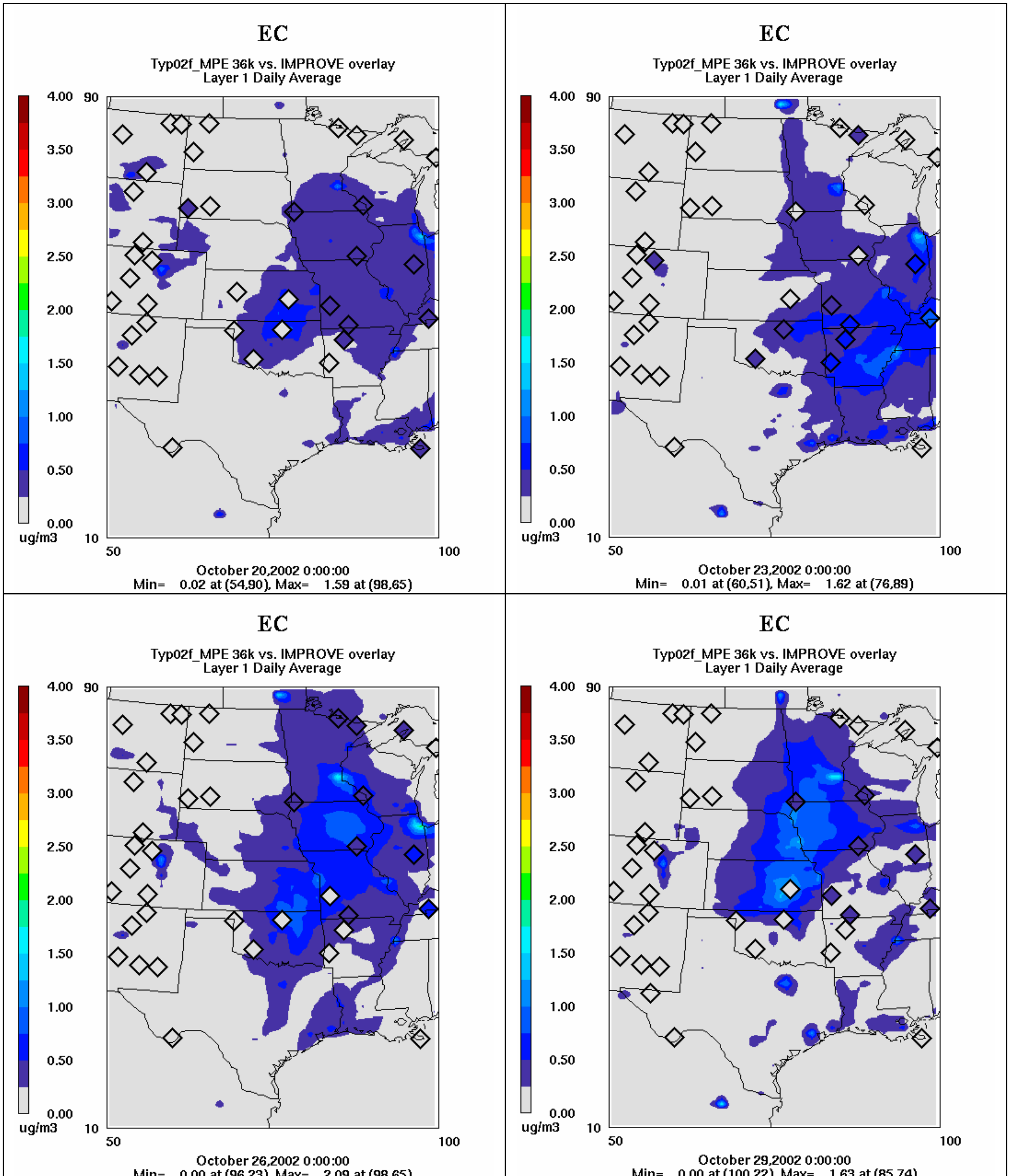


Figure C-25c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour EC concentrations for October 20, 23, 26 and 29, 2002.

C.3.4.5 EC Monthly Bias and Error

The monthly average bias and error for EC across the IMPROVE and STN monitors in the CENRAP region are shown in Figure C-26. The STN network exhibits low bias year round, whereas the IMPROVE monitoring network exhibits a large under-prediction bias in the summer months (-40% to -60%) and much lower EC bias in the winter. The errors in the IMPROVE summer EC performance are also quite high (60% to 80%), whereas during the winter the IMPROVE errors are in the 40% to 50% range which is also where the STN errors reside year round.

The Bugle Plot puts the EC performance in context (Figure C-27). The low EC concentrations put the IMPROVE EC performance in the horn of the Bugle Plot so that it achieves the proposed PM performance goal for all months of the year.

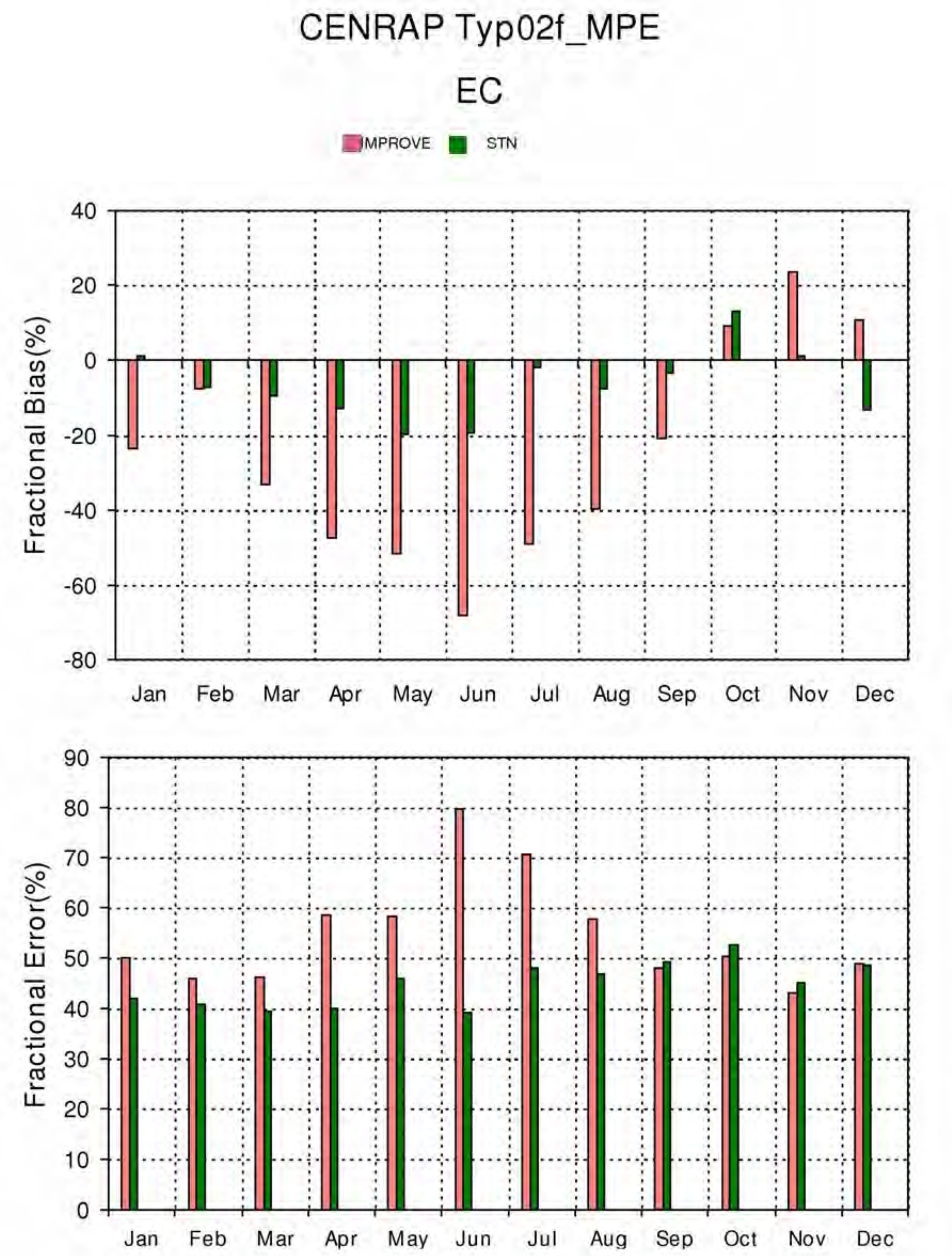


Figure C-26. Monthly EC fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE and STN monitoring sites in the CENRAP region.

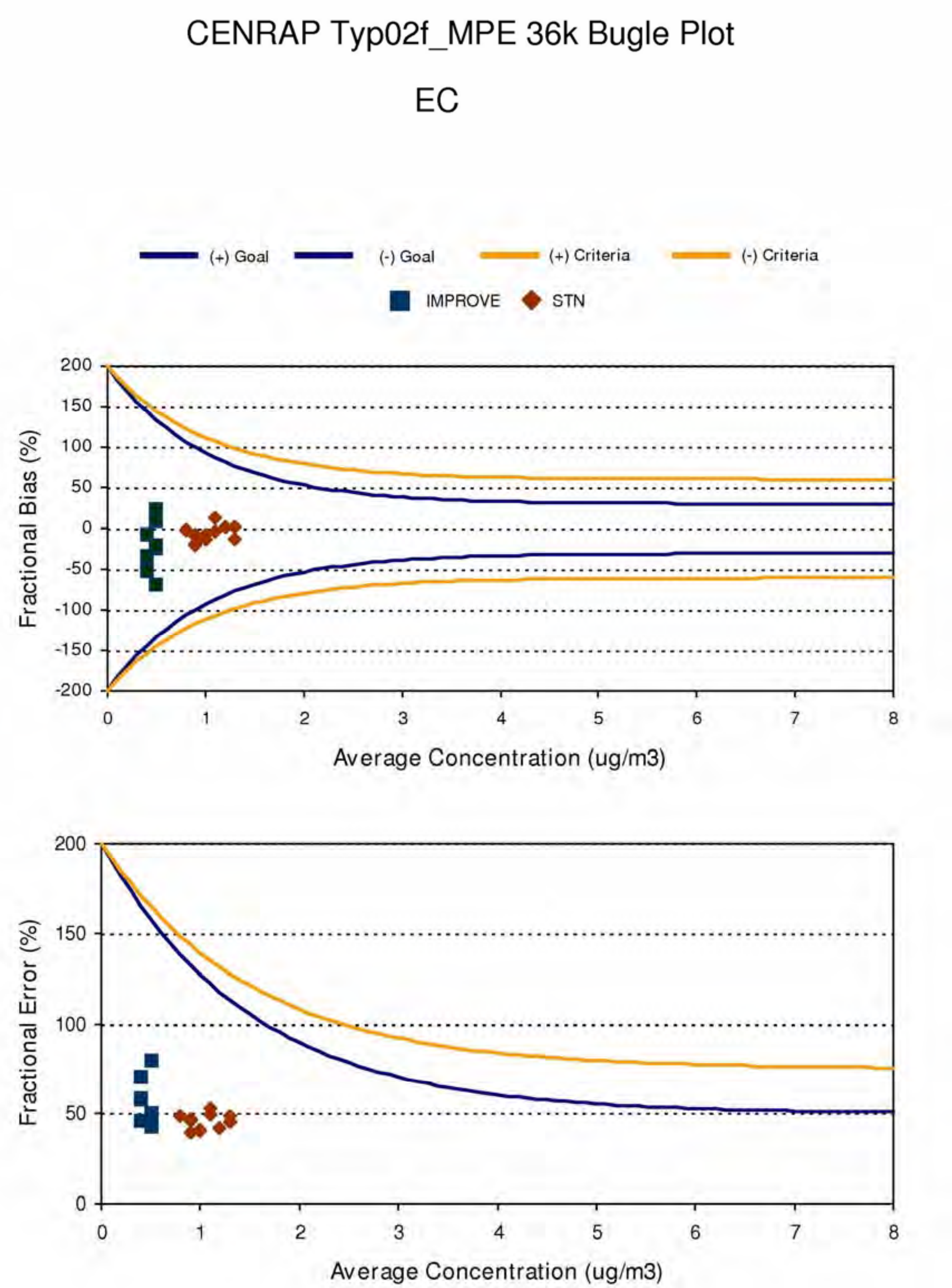


Figure C-27. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for EC and IMPROVE and STN monitoring sites in the CENRAP region.

C.3.5 Other $PM_{2.5}$ (Soil) Monthly Model Performance

There are also model-measurement incommensurability problems with the other $PM_{2.5}$ (Soil) species. Whereas the IMPROVE Soil species is built up from measure elements, the modeled other $PM_{2.5}$ concentrations are based on emissions speciation profiles that likely include other species besides just elements. Soil is only collected at the IMPROVE monitors.

C.3.5.1 Soil in January 2002

The model greatly overestimates the Soil species at IMPORVE sites in January (Figure C-28a). The fractional bias exceeds 100% with errors of almost 130%. With the possible exception of the two Texas sites, the model Soil overestimation bias occurs across all of the CENRAP Class I areas in January (Figure C-28b). The model also does a poor job in reproducing the spatial variability of the observed Soil with a general overestimation tendency except at GUMO where it fails to reproduce the high Soil events.

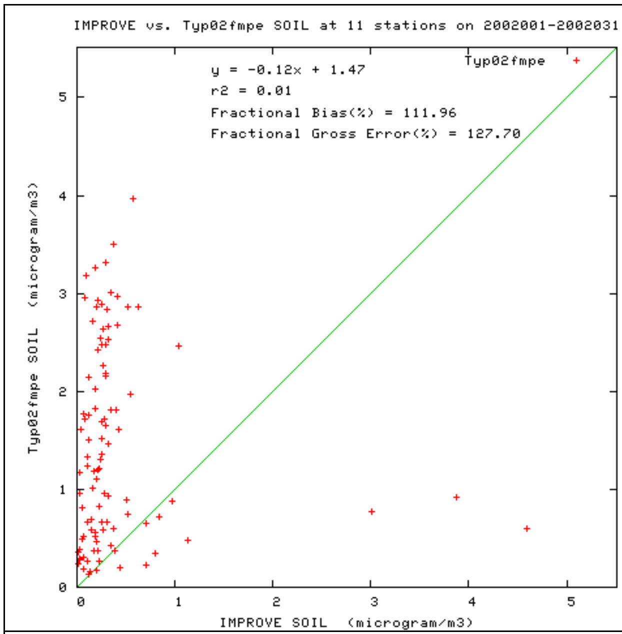
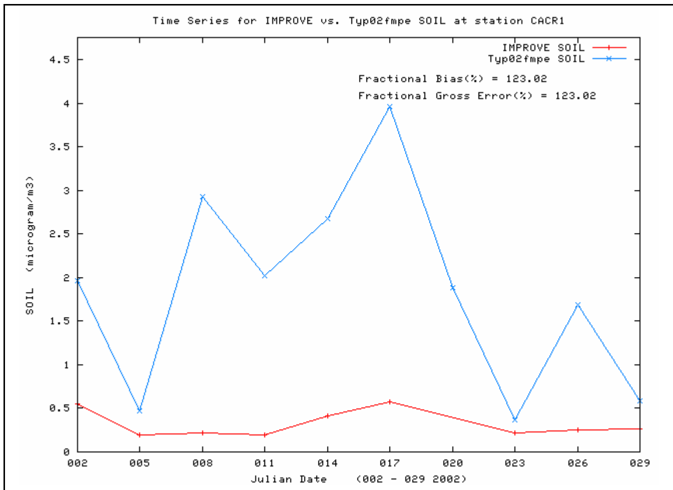
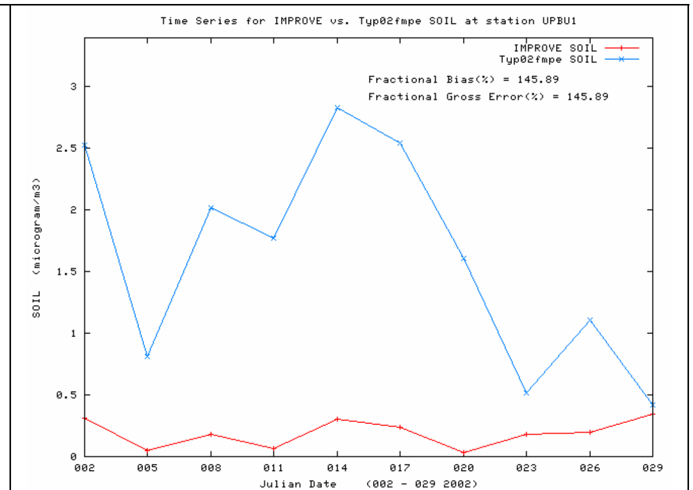


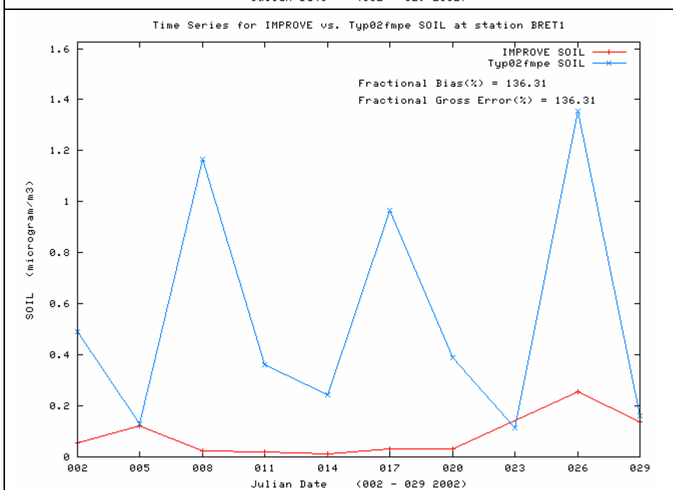
Figure C-28a. Scatter plots of predicted and observed other $PM_{2.5}$ (Soil) concentrations for January 2002 and sites in the CENRAP region using IMPROVE monitoring network and the CMAQ 2002 36 km Base F base case simulation.



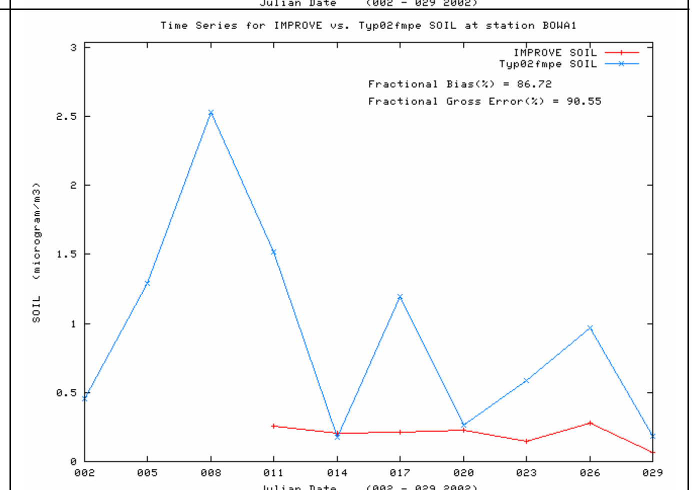
Time Series for IMPROVE vs. Typ02fmpe SOIL at station CACR1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 123.02
Fractional Gross Error(%) = 123.02
SOIL (microgram/m3)
Julian Date (002 - 029 2002)



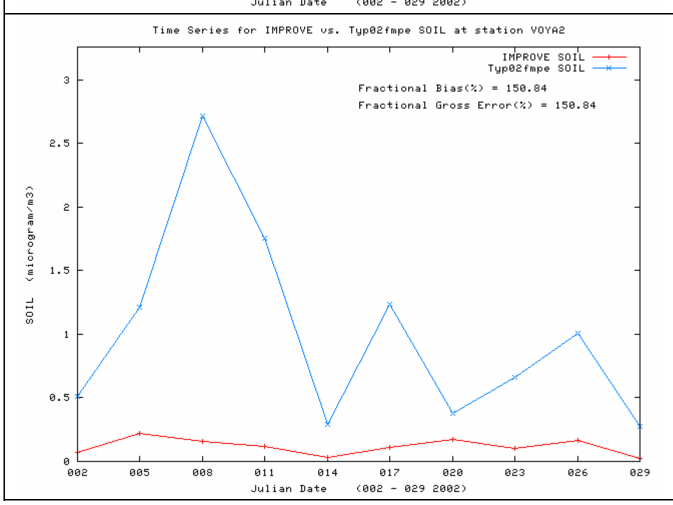
Time Series for IMPROVE vs. Typ02fmpe SOIL at station UPBU1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 145.89
Fractional Gross Error(%) = 145.89
SOIL (microgram/m3)
Julian Date (002 - 029 2002)



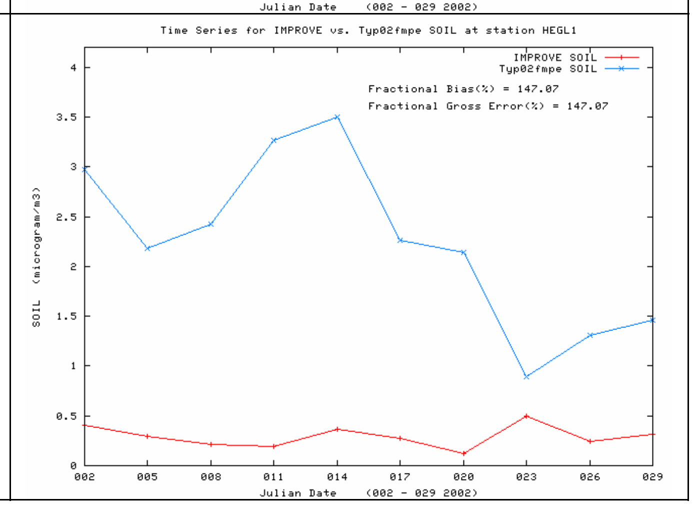
Time Series for IMPROVE vs. Typ02fmpe SOIL at station BRET1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 136.31
Fractional Gross Error(%) = 136.31
SOIL (microgram/m3)
Julian Date (002 - 029 2002)



Time Series for IMPROVE vs. Typ02fmpe SOIL at station BOWA1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 86.72
Fractional Gross Error(%) = 90.55
SOIL (microgram/m3)
Julian Date (002 - 029 2002)



Time Series for IMPROVE vs. Typ02fmpe SOIL at station VOYA2
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 150.84
Fractional Gross Error(%) = 150.84
SOIL (microgram/m3)
Julian Date (002 - 029 2002)



Time Series for IMPROVE vs. Typ02fmpe SOIL at station HEGL1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 147.07
Fractional Gross Error(%) = 147.07
SOIL (microgram/m3)
Julian Date (002 - 029 2002)

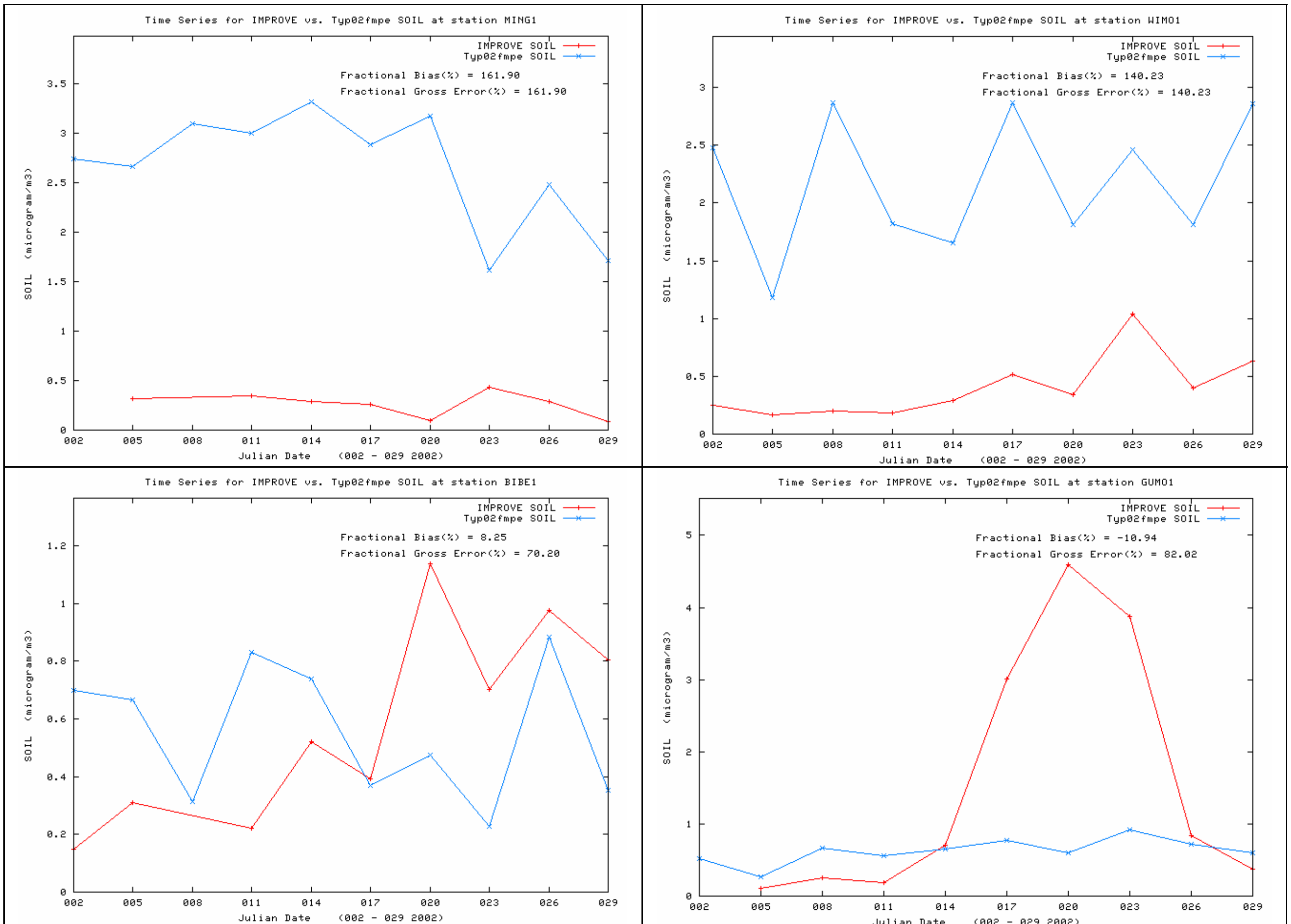


Figure C-28b. Time series of predicted and observed 24-hour other $PM_{2.5}$ (Soil) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.

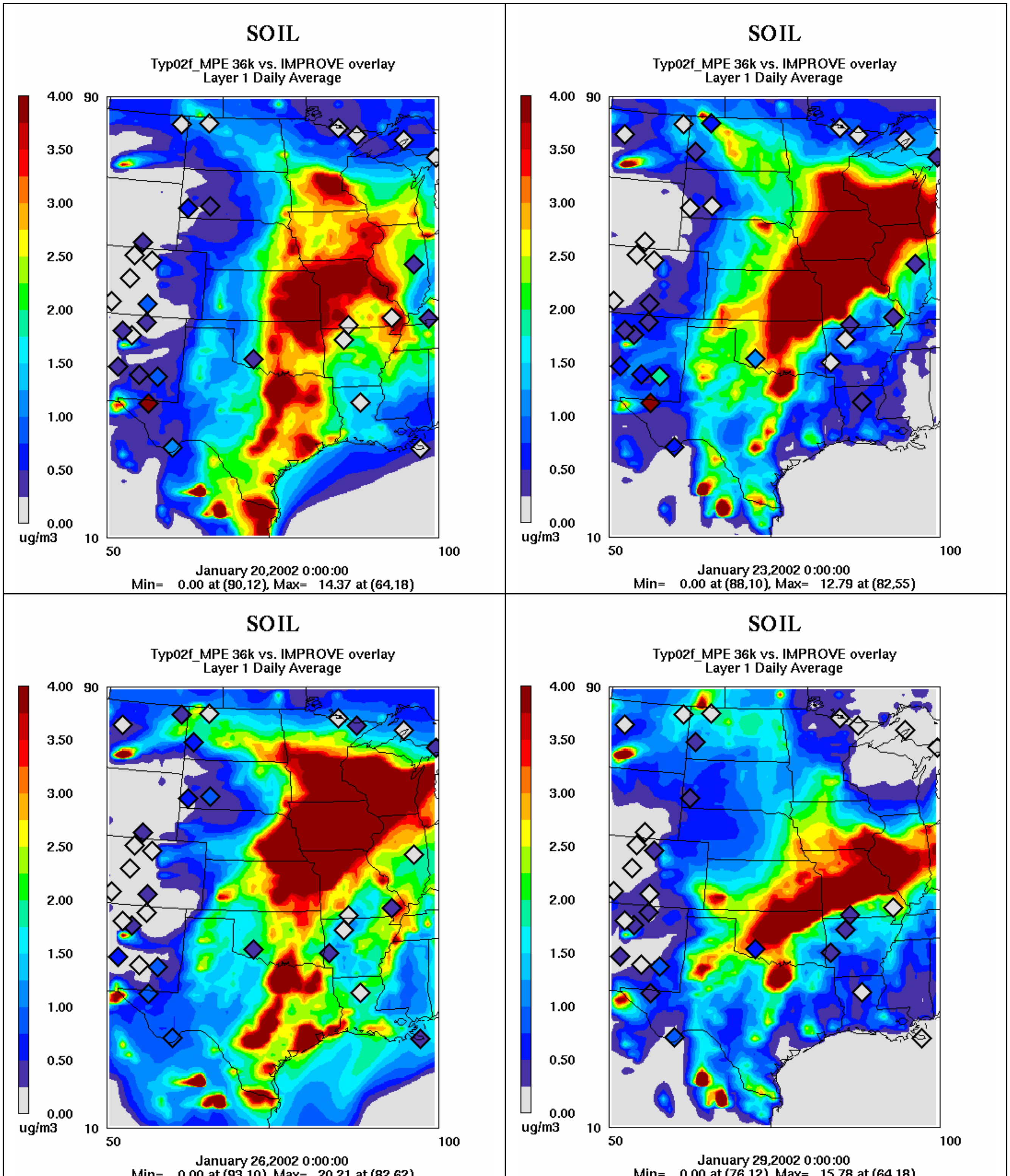


Figure C-28c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour Soil concentrations for January 20, 23, 26 and 29, 2002.

C.3.5.2 Soil in April 2002

The model does a better job in reproducing the overall magnitude of the Soil measurements in April with a bias of 13% (Figure C-29a). But it exhibits little skill with lots of scatter and an error of 81%. The model is generally exhibiting a lot more day-to-day variability than observed with the observed daily time series much flatter than the modeled values (Figure C-29b). The modeled and observed spatial variability in Soil on April 5, 8, 11 and 14 are shown in Figure C-29c. Although the model exhibits large day-to-day variability, the observations do not reflect what the model predicts.

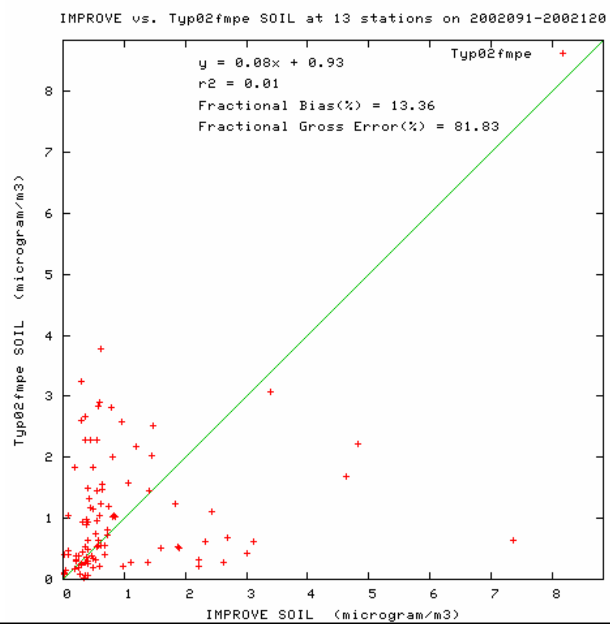
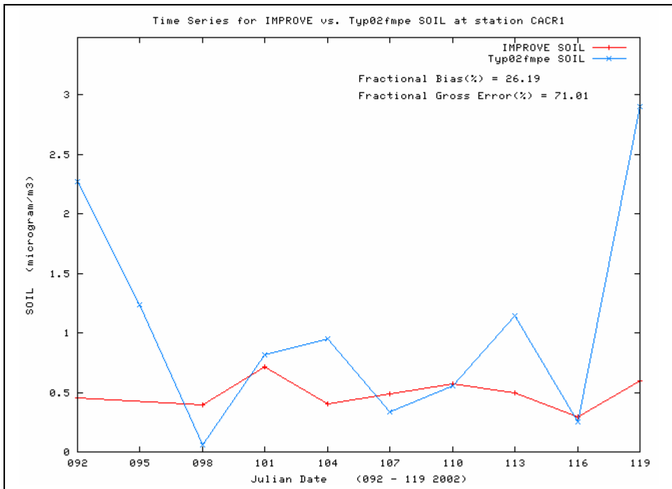
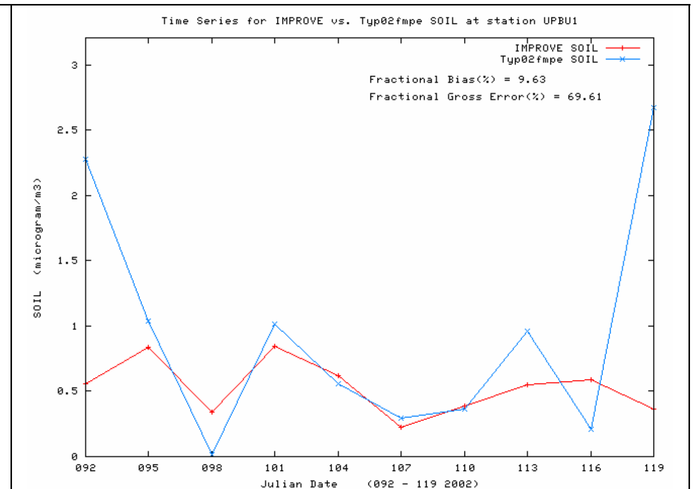


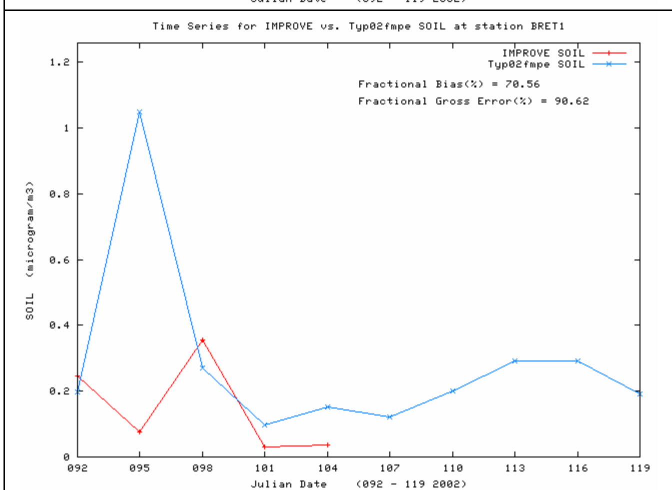
Figure C-29a. Scatter plots of predicted and observed other $PM_{2.5}$ (Soil) concentrations for April 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



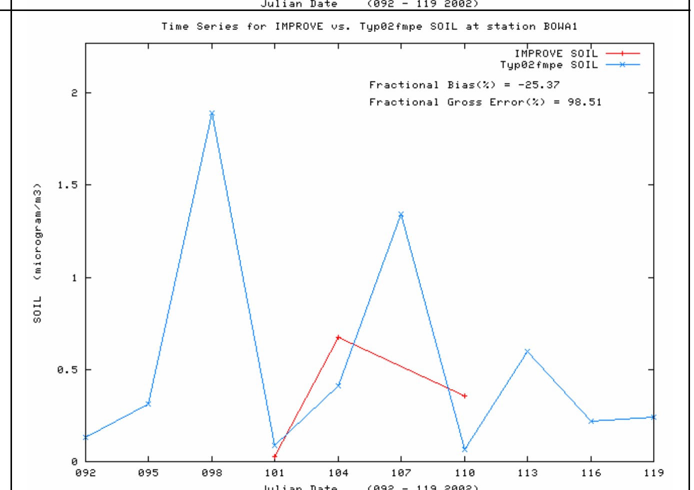
Time Series for IMPROVE vs. Typ02fmpe SOIL at station CACR1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 26.19
Fractional Gross Error(%) = 71.01
SOIL (microgram/m3)
Julian Date (092 - 119 2002)



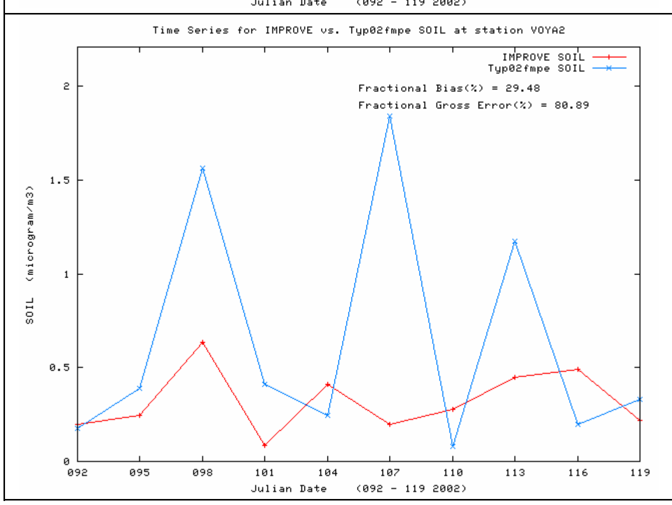
Time Series for IMPROVE vs. Typ02fmpe SOIL at station UPBU1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 9.63
Fractional Gross Error(%) = 69.61
SOIL (microgram/m3)
Julian Date (092 - 119 2002)



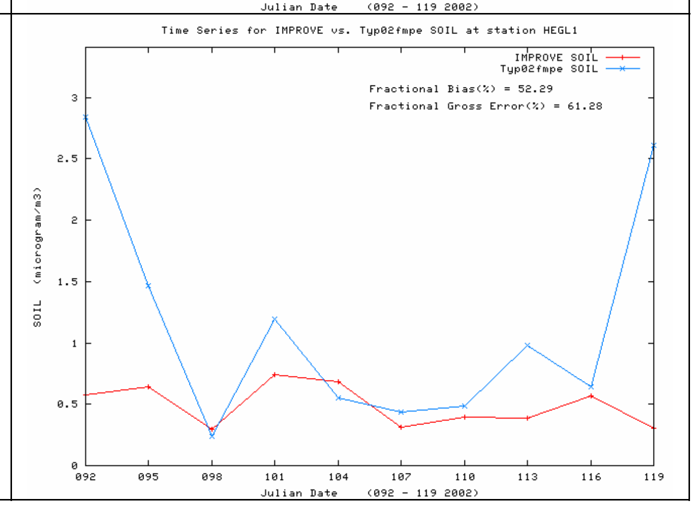
Time Series for IMPROVE vs. Typ02fmpe SOIL at station BRET1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 70.56
Fractional Gross Error(%) = 90.62
SOIL (microgram/m3)
Julian Date (092 - 119 2002)



Time Series for IMPROVE vs. Typ02fmpe SOIL at station BOWA1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = -25.37
Fractional Gross Error(%) = 98.51
SOIL (microgram/m3)
Julian Date (092 - 119 2002)



Time Series for IMPROVE vs. Typ02fmpe SOIL at station VOYA2
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 29.48
Fractional Gross Error(%) = 80.89
SOIL (microgram/m3)
Julian Date (092 - 119 2002)



Time Series for IMPROVE vs. Typ02fmpe SOIL at station HEGL1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 52.29
Fractional Gross Error(%) = 61.28
SOIL (microgram/m3)
Julian Date (092 - 119 2002)

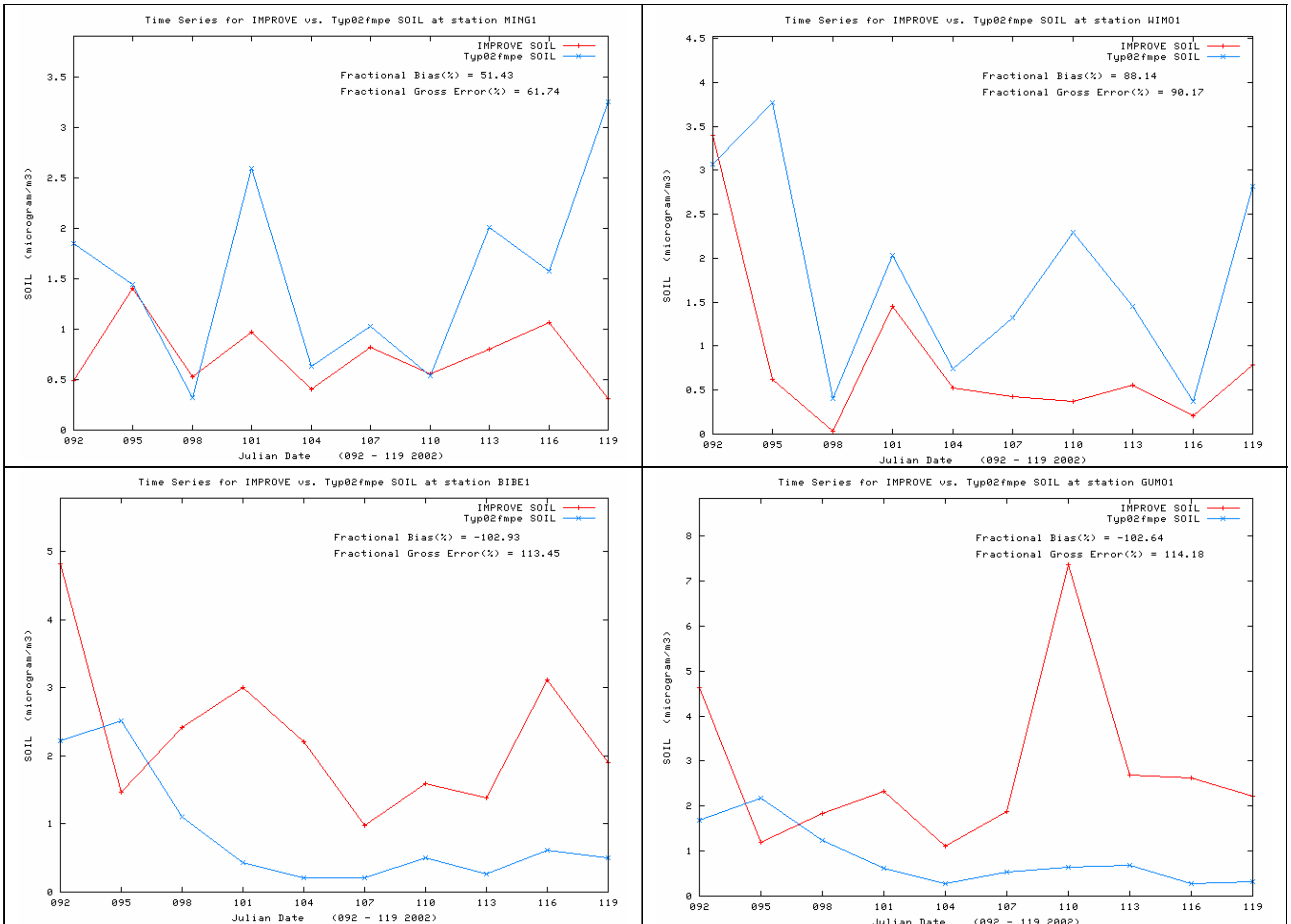


Figure C-29b. Time series of predicted and observed 24-hour other $PM_{2.5}$ (Soil) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.

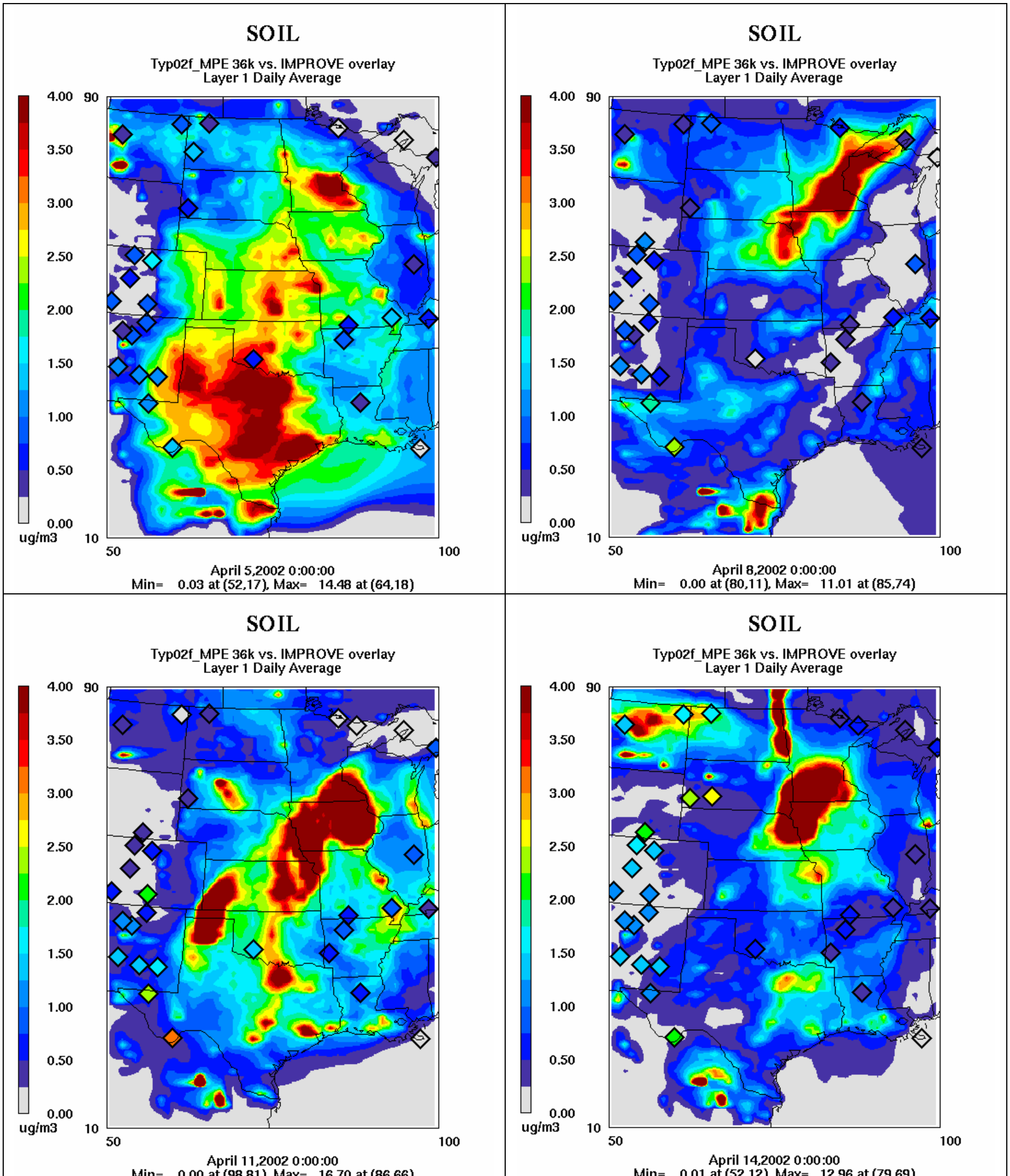


Figure C-29c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour Soil concentrations for April 5, 8, 11 and 14, 2002.

C.3.5.3 Soil in July 2002

The -50% Soil under-prediction bias seen in July appears to be driven to several high Soil measurements (Figure C-30a). An observed high Soil event took place on July 1 (Julian Day 182) across the Arkansas and Missouri Class I areas that all observed Soil values in excess of 15 $\mu g/m^3$. This event was not captured by the model. With the exception of a systematic Soil underestimation bias at the two Texas sites and missing these high Soil events, the model generally reproduces the magnitudes of the Soil observations in July.

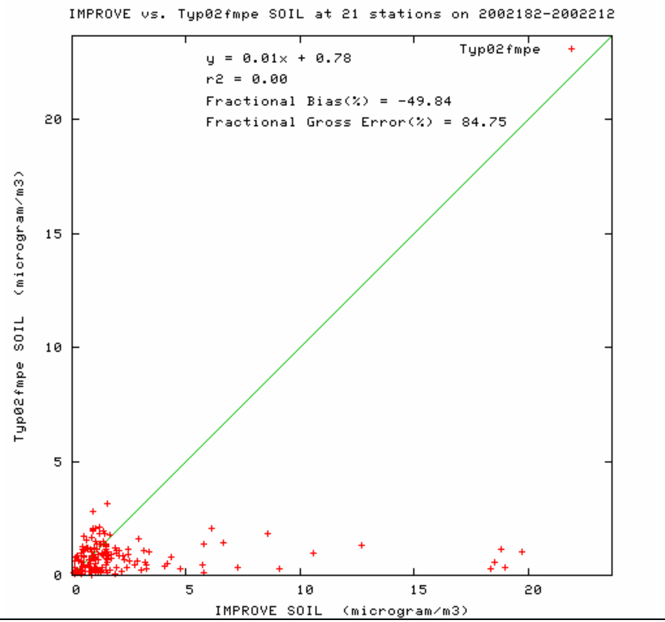
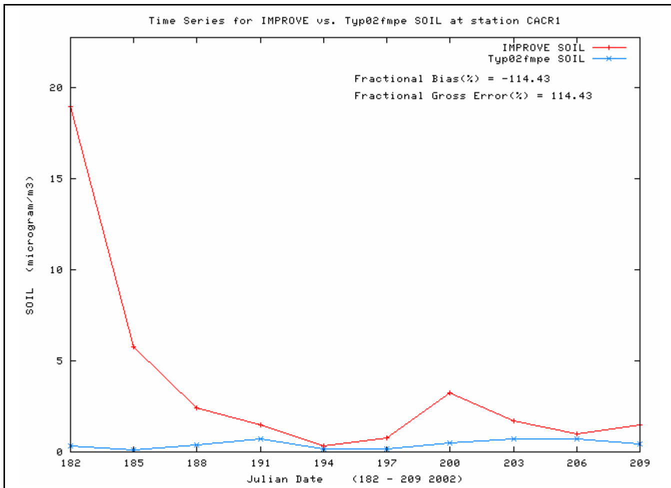
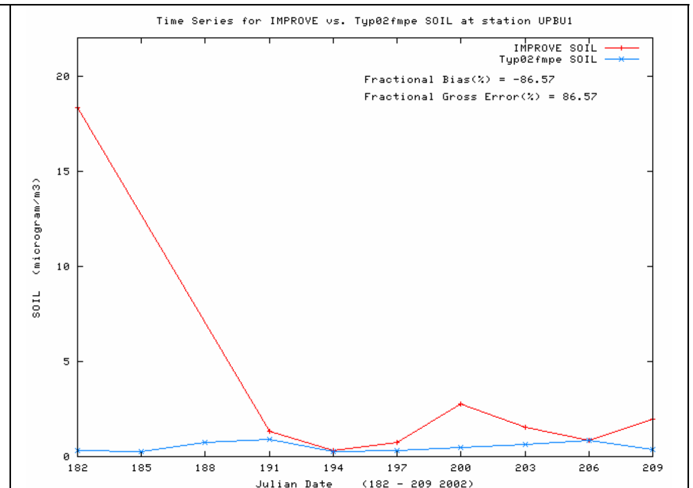
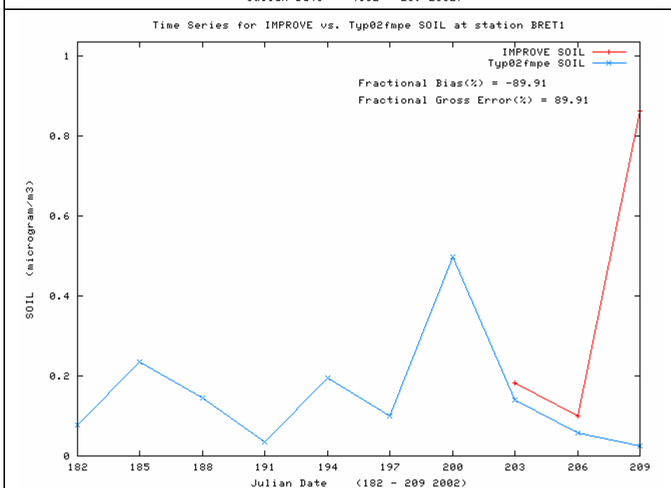
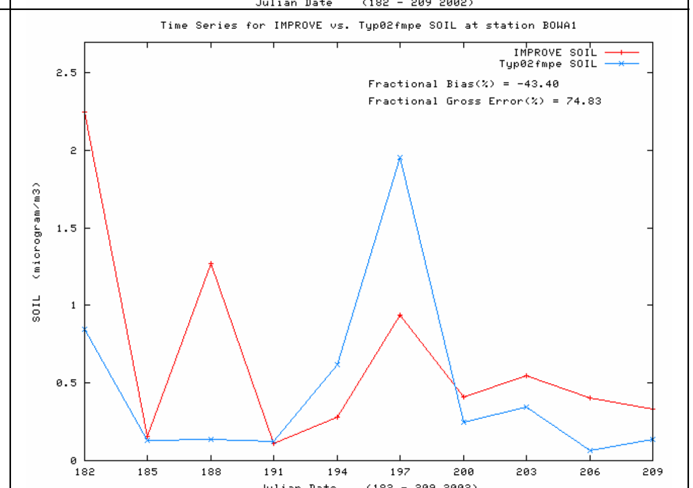


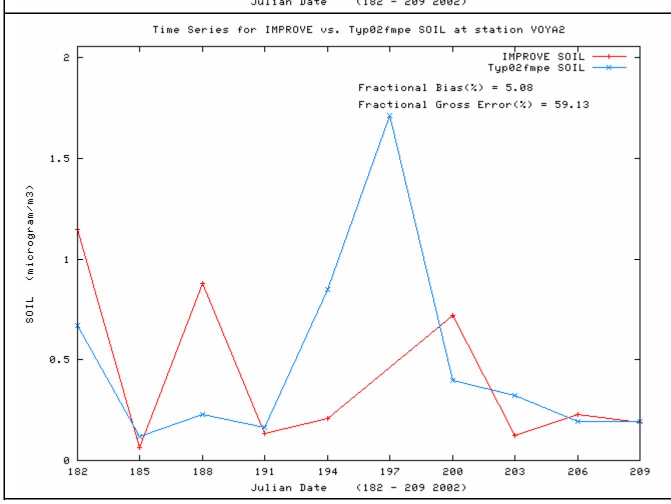
Figure C-30a. Scatter plots of predicted and observed other $PM_{2.5}$ (Soil) concentrations for July 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

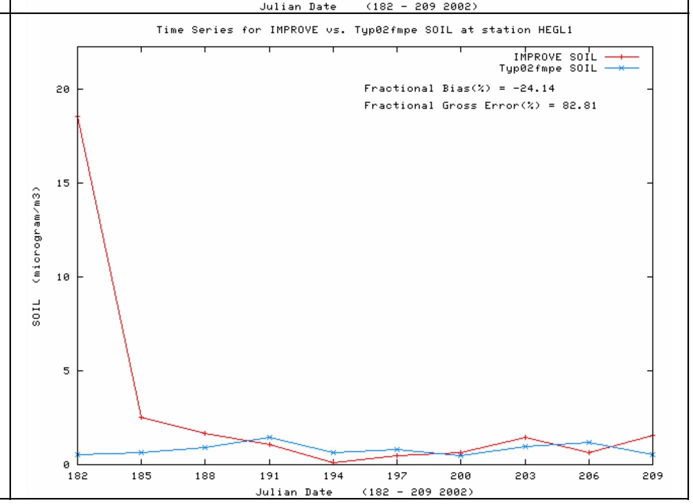

Time Series for IMPROVE vs. Typ02fmpe SOIL at station CACR1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = -114.43
Fractional Gross Error(%) = 114.43
SOIL (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe SOIL at station UPBU1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = -86.57
Fractional Gross Error(%) = 86.57
SOIL (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe SOIL at station BRET1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = -89.91
Fractional Gross Error(%) = 89.91
SOIL (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe SOIL at station BOWA1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = -43.40
Fractional Gross Error(%) = 74.83
SOIL (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe SOIL at station VOYA2
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 5.08
Fractional Gross Error(%) = 59.13
SOIL (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe SOIL at station HEGL1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = -24.14
Fractional Gross Error(%) = 82.81
SOIL (microgram/m3)
Julian Date (182 - 209 2002)

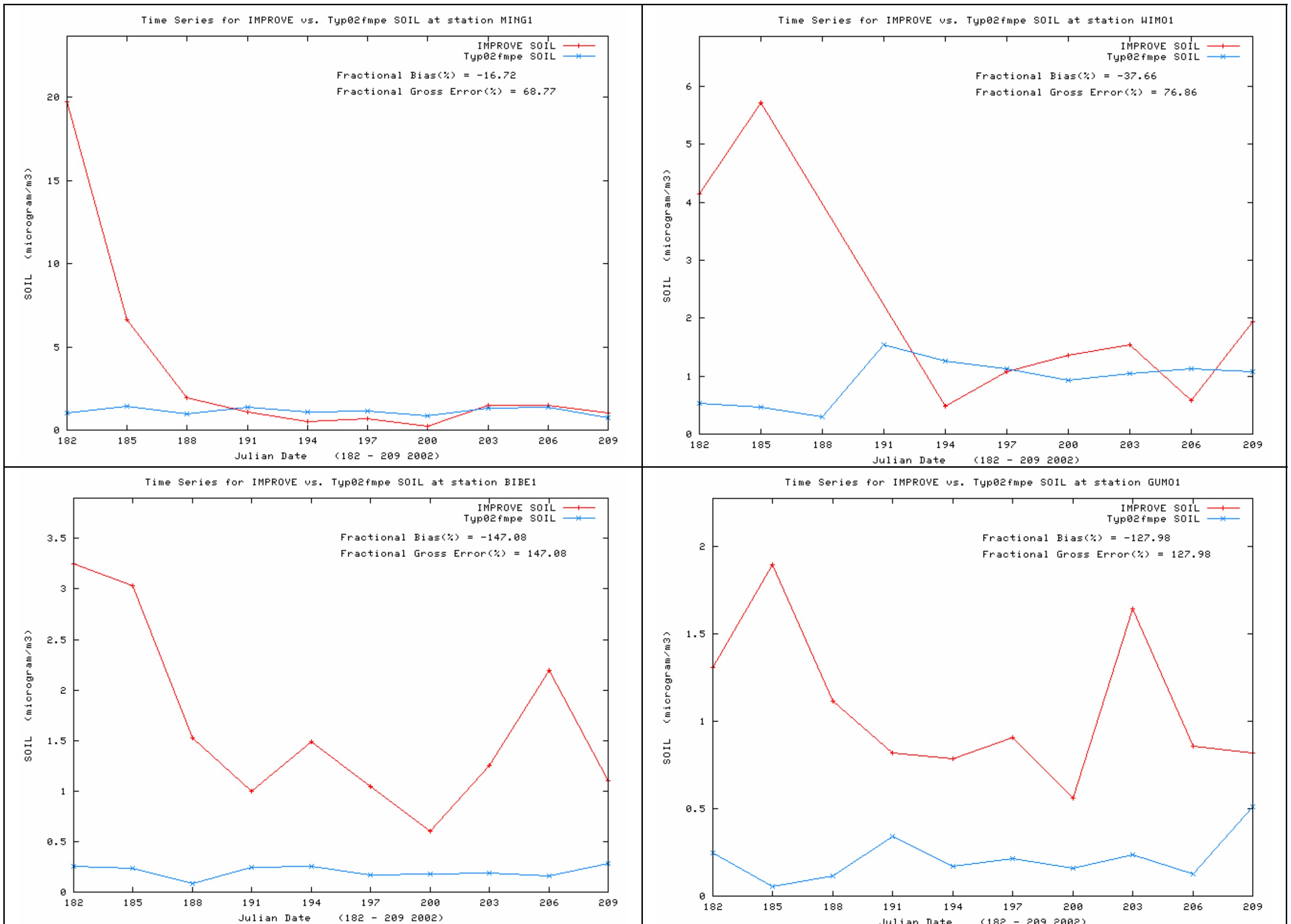


Figure C-30b. Time series of predicted and observed 24-hour other $PM_{2.5}$ (Soil) concentrations at CENRAP IMPROVE sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.

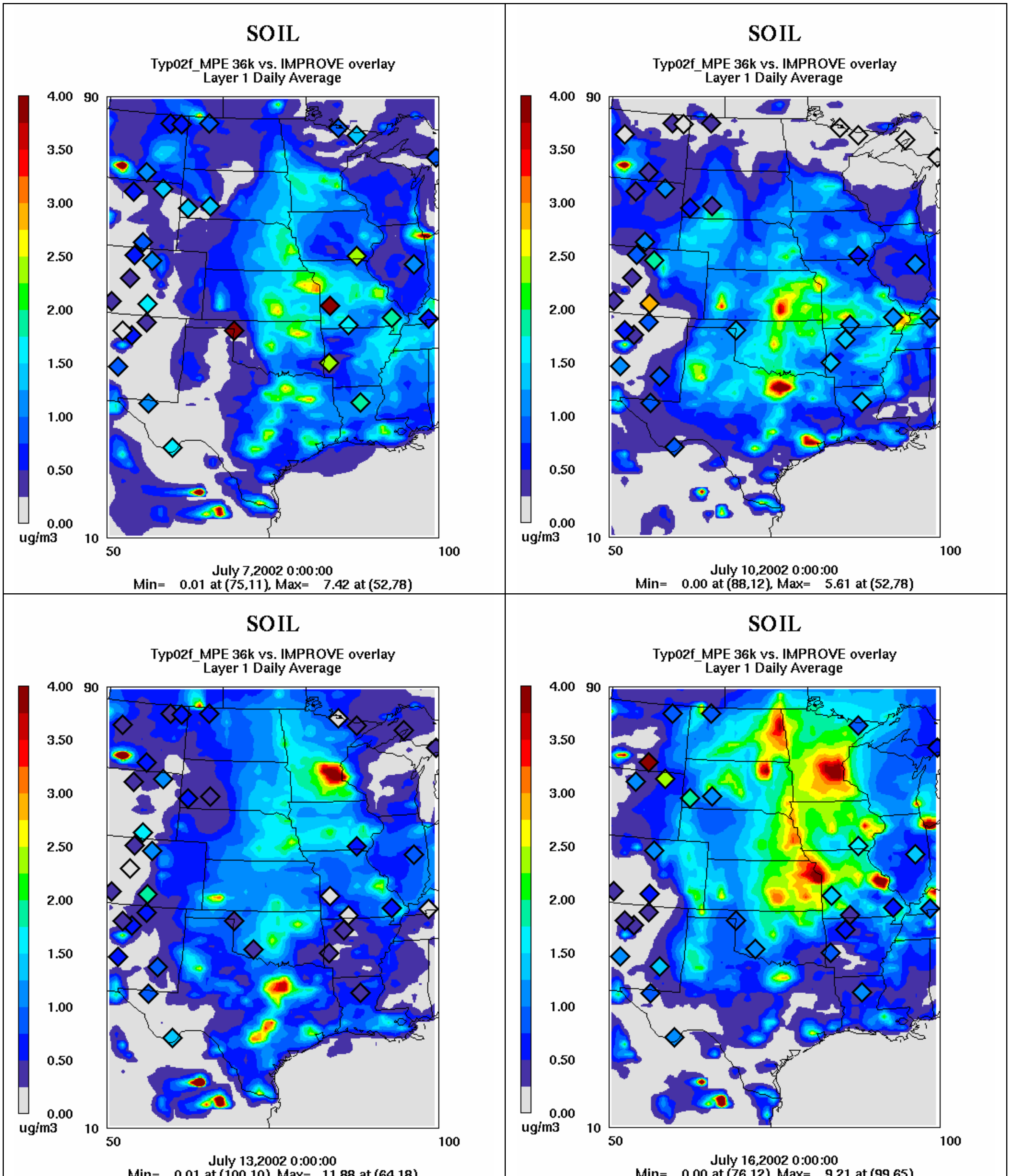


Figure C-30c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour Soil concentrations for July 7, 10, 13 and 16, 2002.

C.3.5.4 Soil in October 2002

The nearly systematic Soil over-prediction bias seen in January returns in October (Figure C-31a). Except for the two Texas sites, BRET and BOWA, the model overstates the observed Soil during all days of October at the other monitoring sites (Figure C-31b). The model is predicting elevated Soil concentrations in the OK-KS-MO-IA area that is not reflected in the measurements (Figure C-31c).

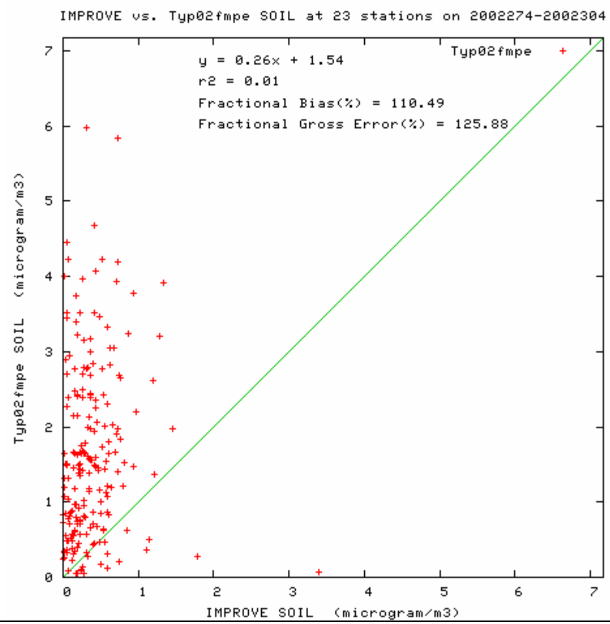
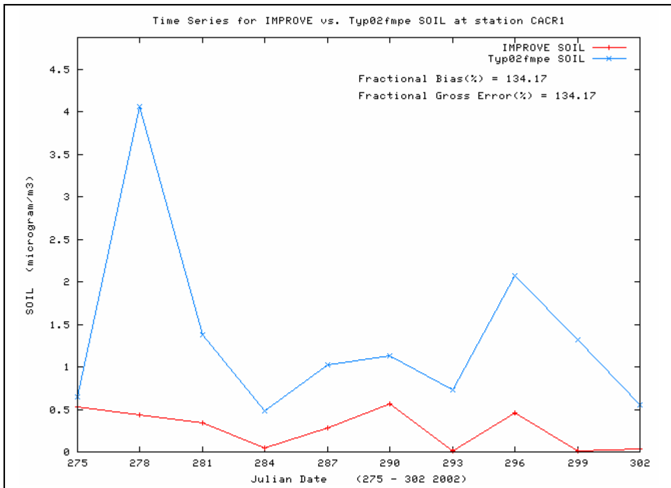
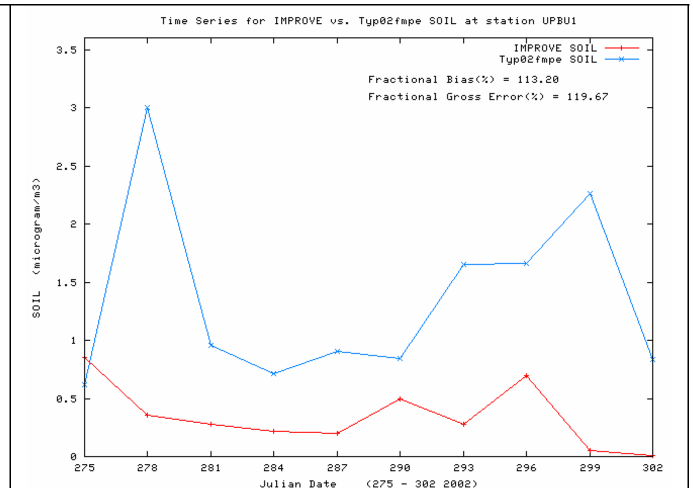
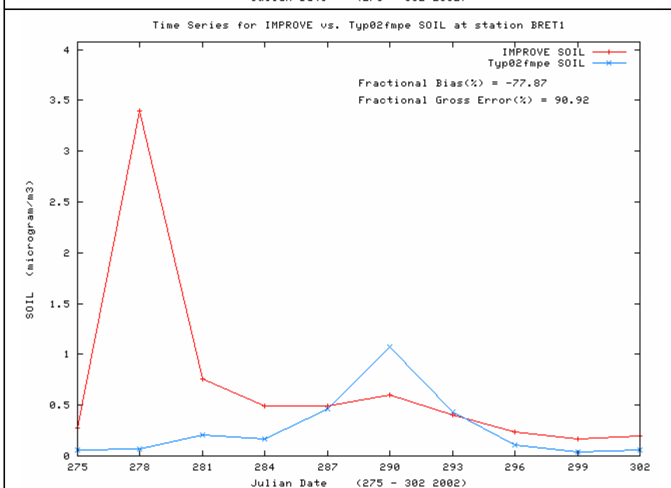
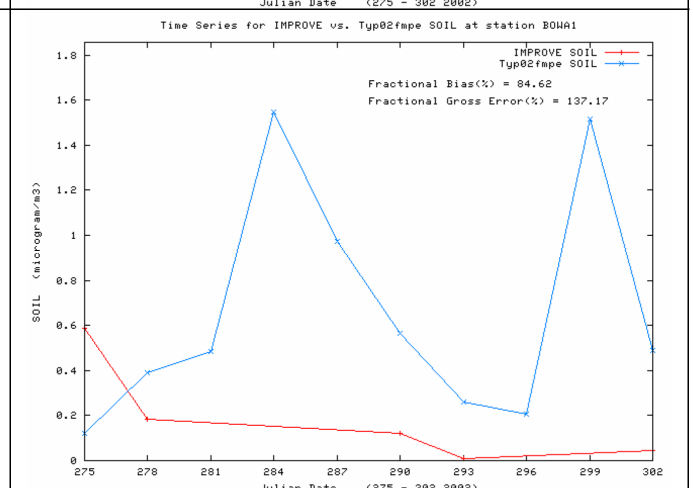


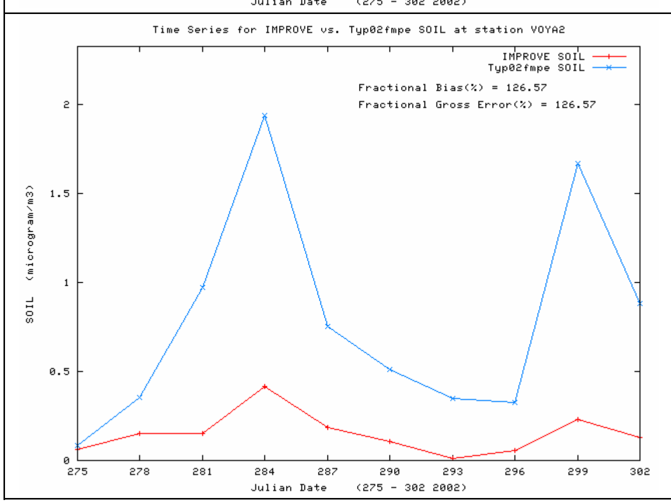
Figure C-31a. Scatter plots of predicted and observed other $PM_{2.5}$ (Soil) concentrations for October 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

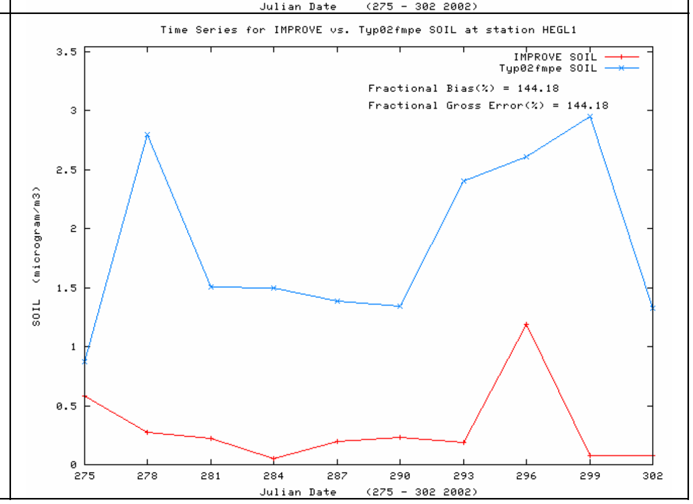

Time Series for IMPROVE vs. Typ02fmpe SOIL at station CACR1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 134.17
Fractional Gross Error(%) = 134.17
SOIL (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe SOIL at station UPBU1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 113.20
Fractional Gross Error(%) = 119.67
SOIL (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe SOIL at station BRET1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = -77.87
Fractional Gross Error(%) = 90.92
SOIL (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe SOIL at station BOWA1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 84.62
Fractional Gross Error(%) = 137.17
SOIL (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe SOIL at station VOYA2
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 126.57
Fractional Gross Error(%) = 126.57
SOIL (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe SOIL at station HEGL1
IMPROVE SOIL
Typ02fmpe SOIL
Fractional Bias(%) = 144.18
Fractional Gross Error(%) = 144.18
SOIL (microgram/m3)
Julian Date (275 - 302 2002)

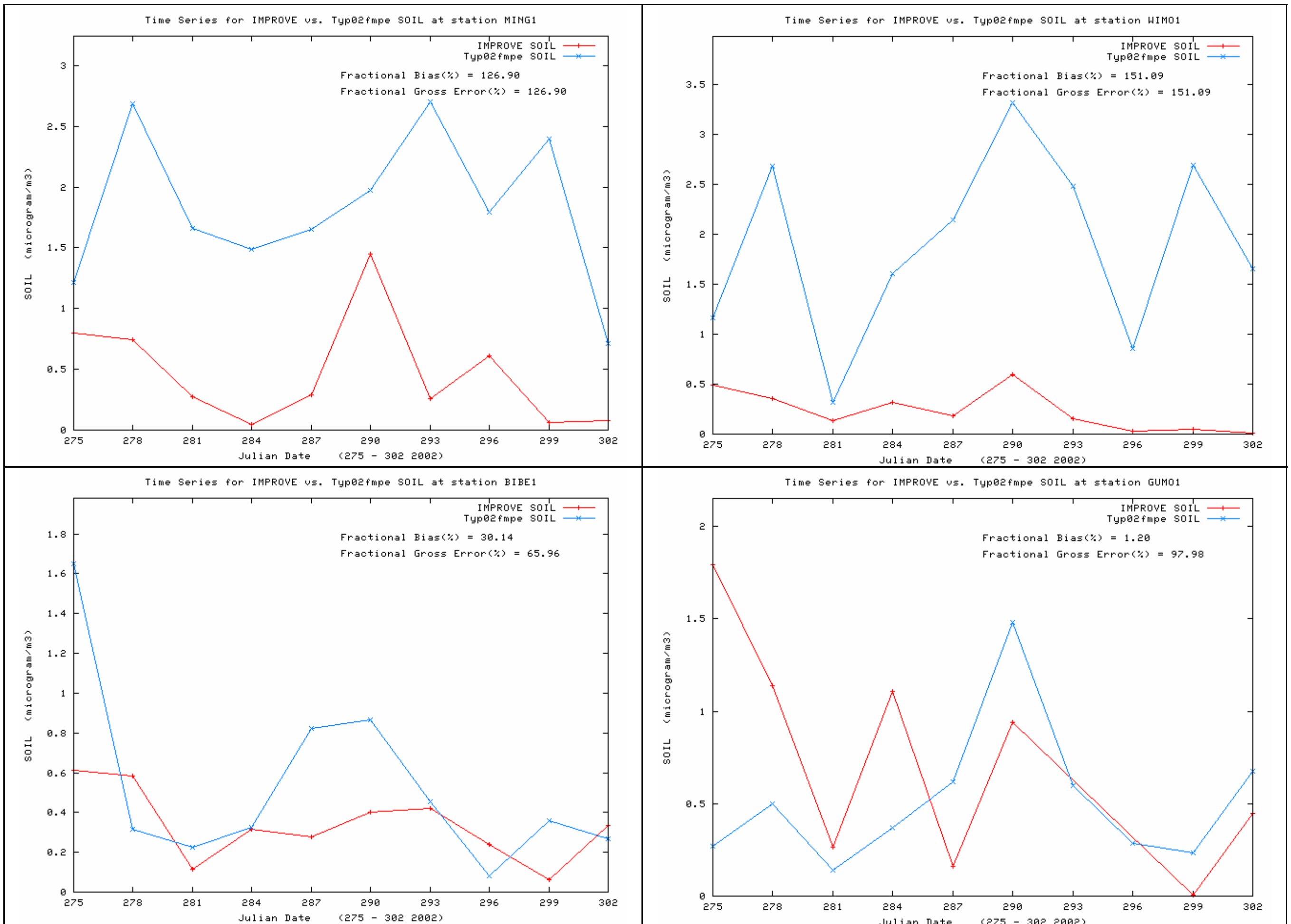


Figure C-31b. Time series of predicted and observed 24-hour other $PM_{2.5}$ (Soil) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.

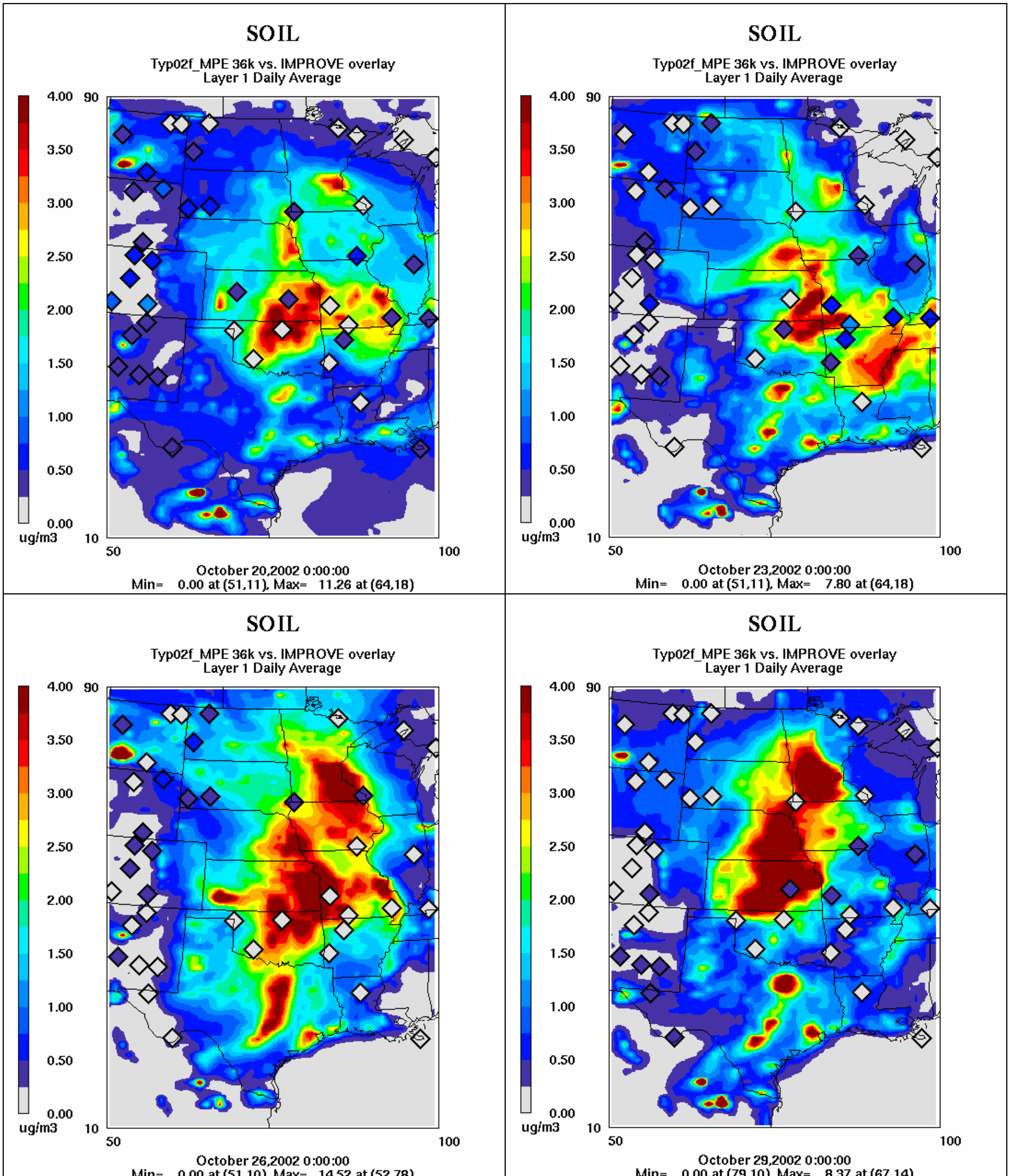


Figure C-31c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour Soil concentrations for October 20, 23, 26 and 29, 2002.

C.3.5.5 Soil Monthly Bias and Error

Figure C-32 displays the monthly variation in the Soil bias and error. During the winter months the model exhibits a very large (> 100%) overestimation bias with large errors as well. With the exception of July, in the summer the model bias is a slight over-prediction but generally less than 20% with errors of 60% to 80%. The Bugle Plot indicates that the summer Soil performance achieves the PM performance goal, a few months in the Spring/Fall period fall between the performance goal and criteria and the winter Soil performance exceeds the model performance criteria by a far margin. Thus, the Soil performance is a cause for concern.

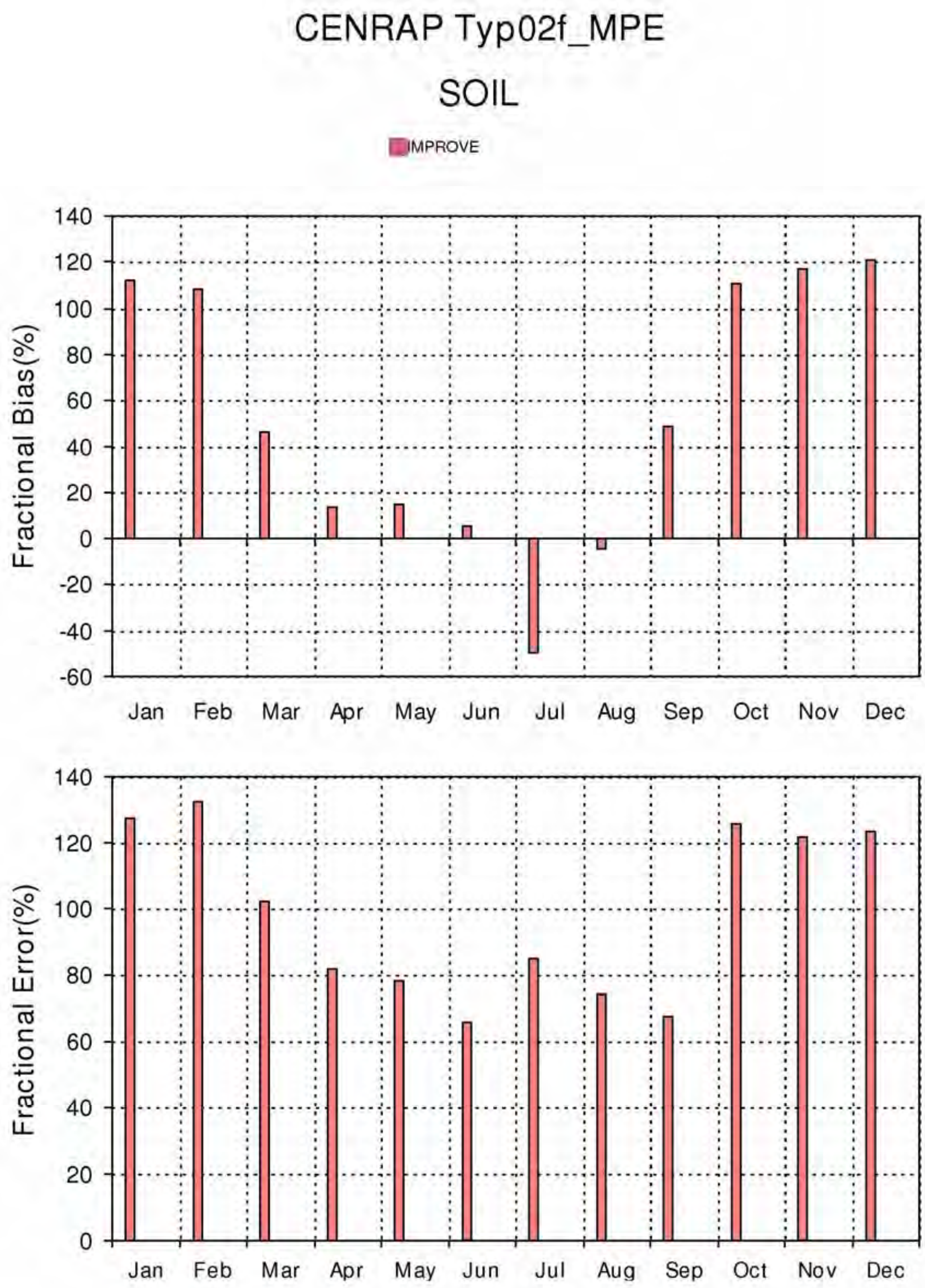


Figure C-32. Monthly Soil fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE, STN and CASTNet monitoring sites in the CENRAP region.

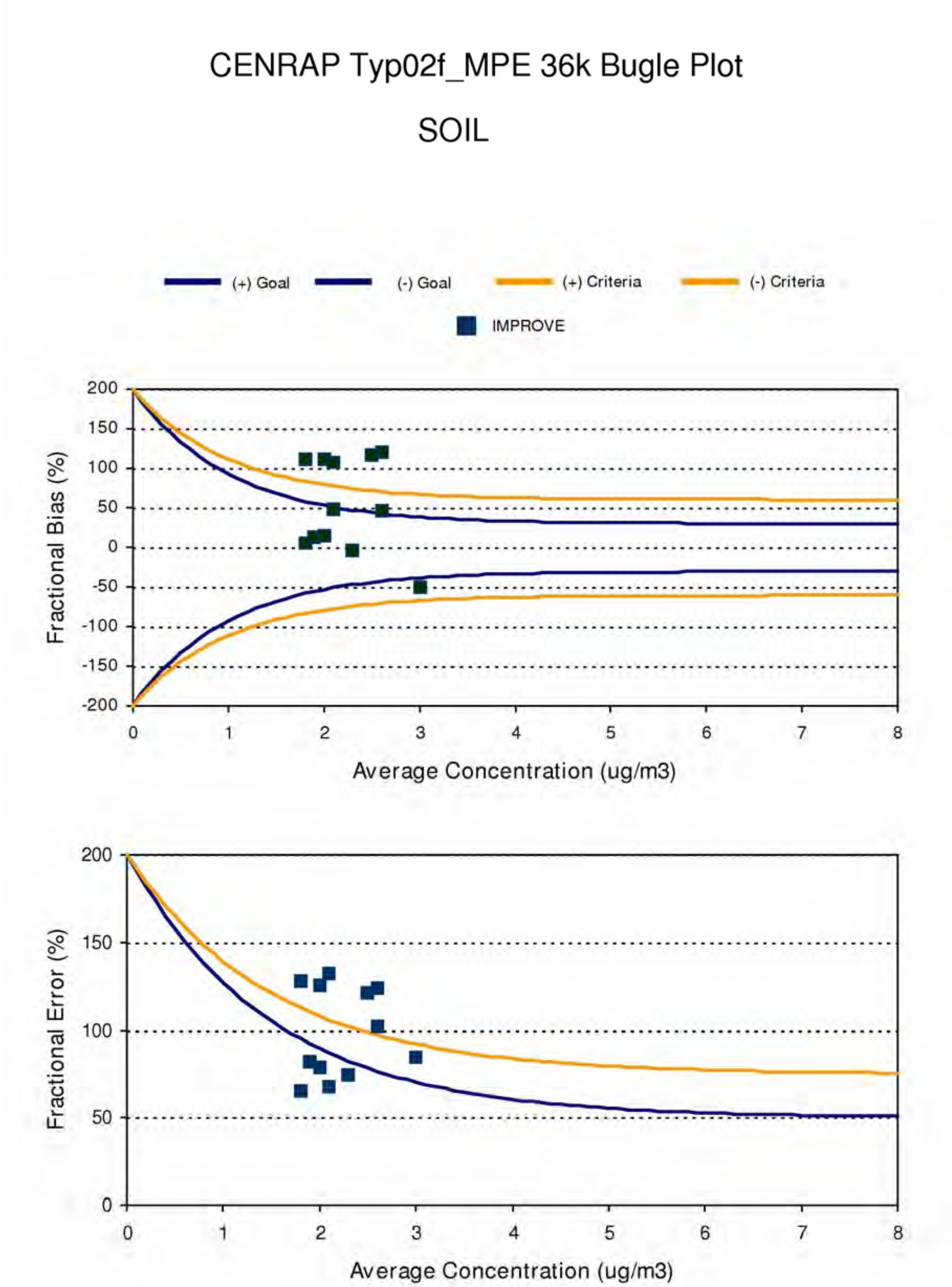


Figure C-33. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for Soil and IMPROVE monitoring sites in the CENRAP region.

C.3.6 Coarse Mass (CM) Monthly Model Performance

The IMPROVE coarse mass (CM) measurement is taken as the difference between the PM_{10} and $PM_{2.5}$ mass measurement. Any SO4 or NO3 in the coarse mode will be in the CM measurement. The model, on the other hand, only includes primary CM. Any coarse SO4 or NO3 will be in the SO4 and NO3 modeled species.

C.3.6.1 CM in January 2002

The model underestimates the observed CM in January with a fractional bias of -83% (Figure C-34a). Although the model appears to reproduce CM at some sites (e.g., VOYA) at the two Texas sites the bias is approximately -150% (Figure C-34b). The observed spatial distribution of CM in January is not reproduced by the model at all (Figure C-34c). Whereas the observations indicate high CM concentrations in the west Texas-New Mexico area, the model estimates elevated CM in northeast Texas, through Oklahoma, Kansas, Iowa and into southern Minnesota. Although the CM measurements at WIMO in this area are also elevated, the rest of the high modeled CM values fall in between the IMPROVE monitors so can not be verified or refuted by the measurements.

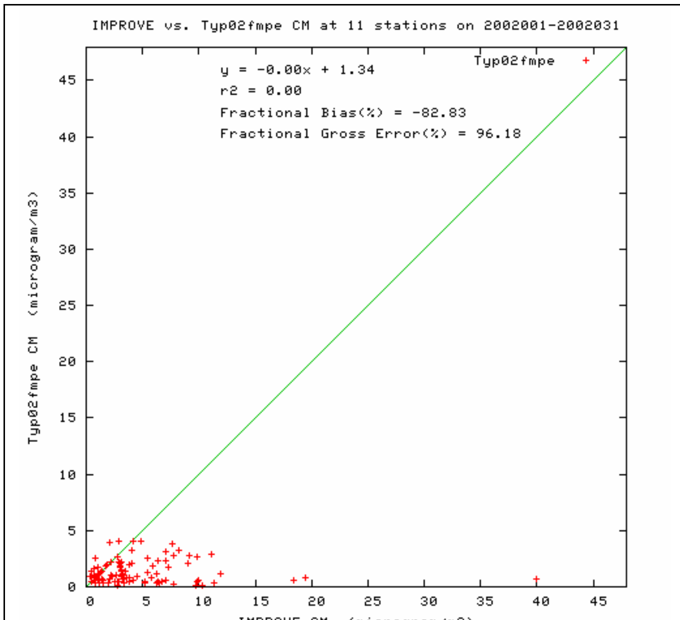
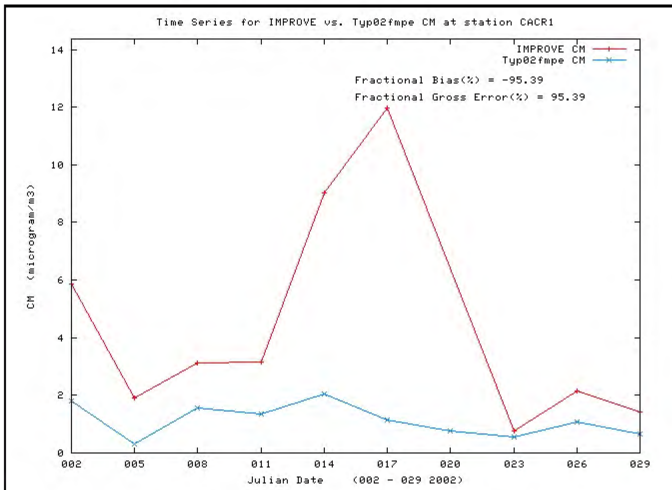
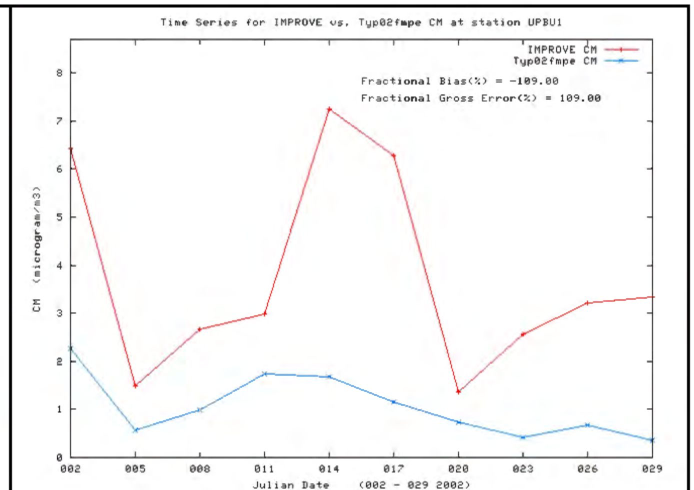
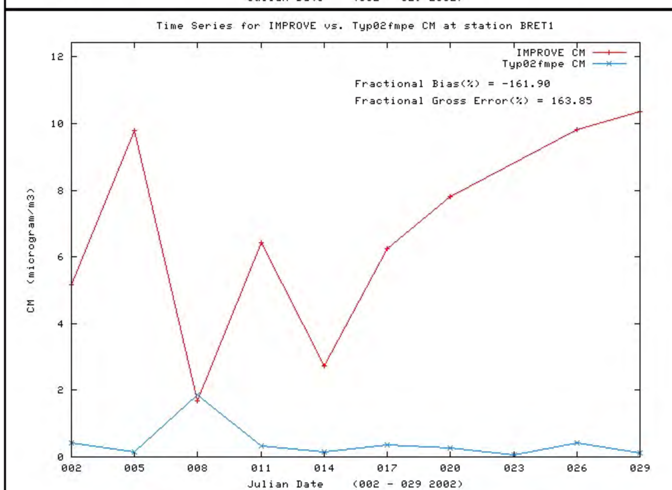
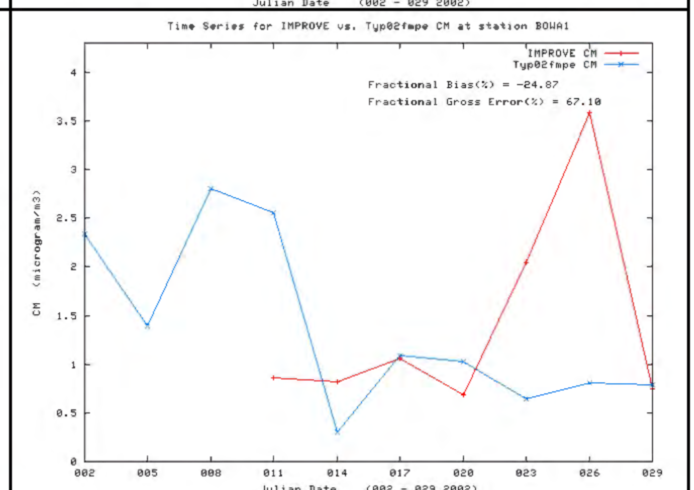


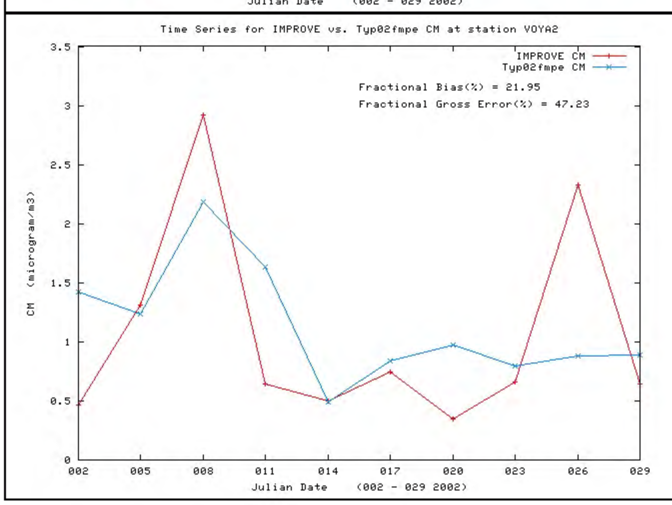
Figure C-34a. Scatter plots of predicted and observed coarse mass (CM) concentrations for January 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

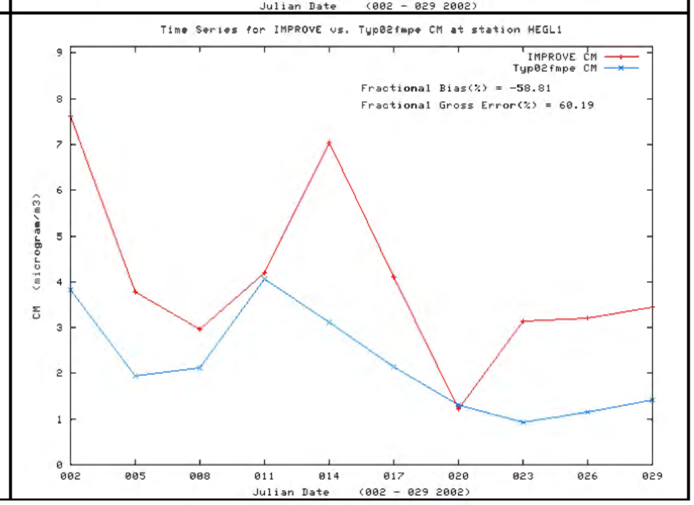

Time Series for IMPROVE vs. Typ02fmpe CM at station CACR1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -95.39
Fractional Gross Error(%) = 95.39
CM (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station UPBU1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -109.00
Fractional Gross Error(%) = 109.00
CM (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station BRET1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -161.90
Fractional Gross Error(%) = 163.85
CM (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station BOWA1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -24.87
Fractional Gross Error(%) = 67.10
CM (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station VOYA2
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = 21.95
Fractional Gross Error(%) = 47.23
CM (microgram/m3)
Julian Date (002 - 029 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station HEGL1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -58.81
Fractional Gross Error(%) = 60.19
CM (microgram/m3)
Julian Date (002 - 029 2002)

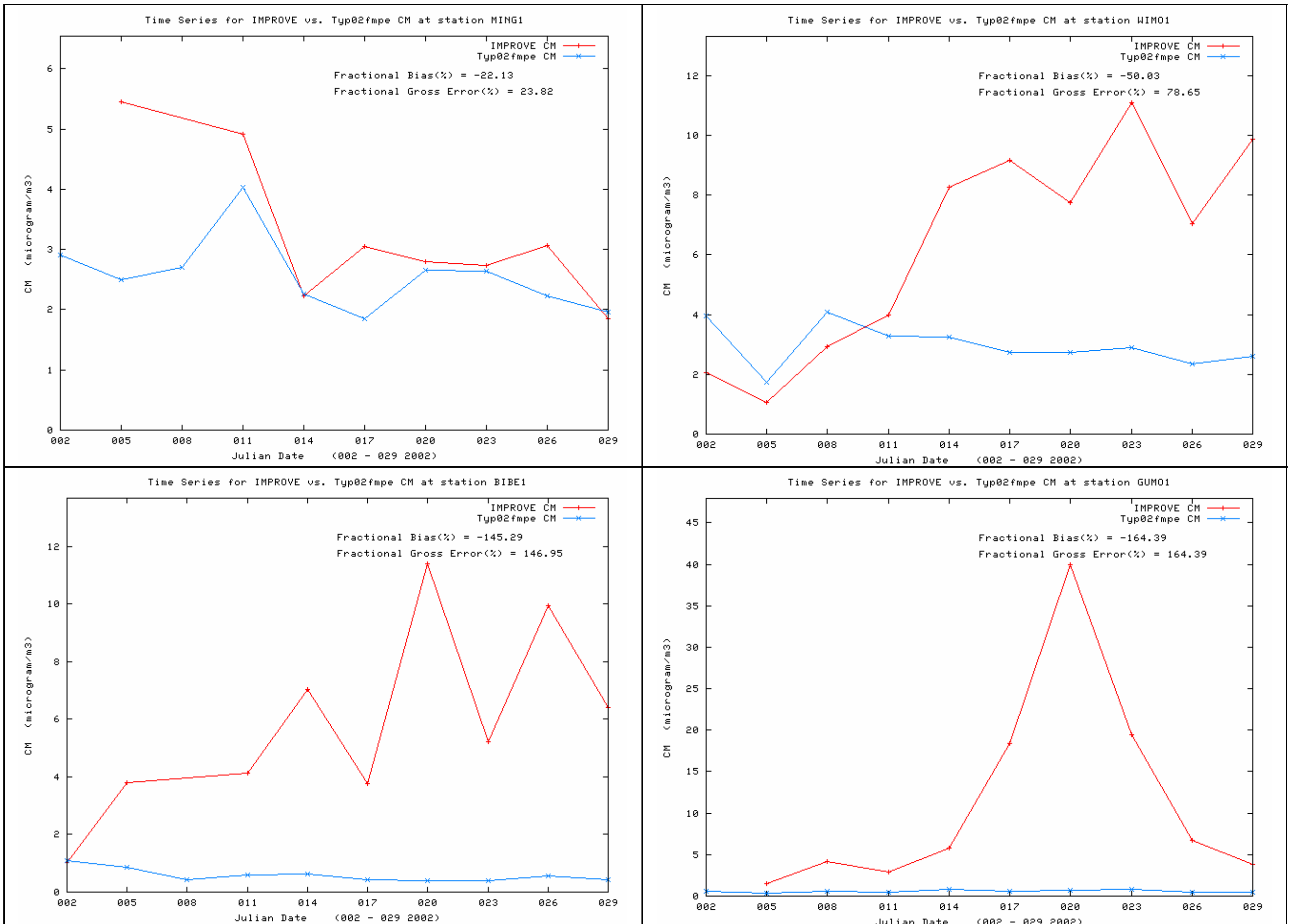


Figure C-34b. Time series of predicted and observed 24-hour coarse mass (CM) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.

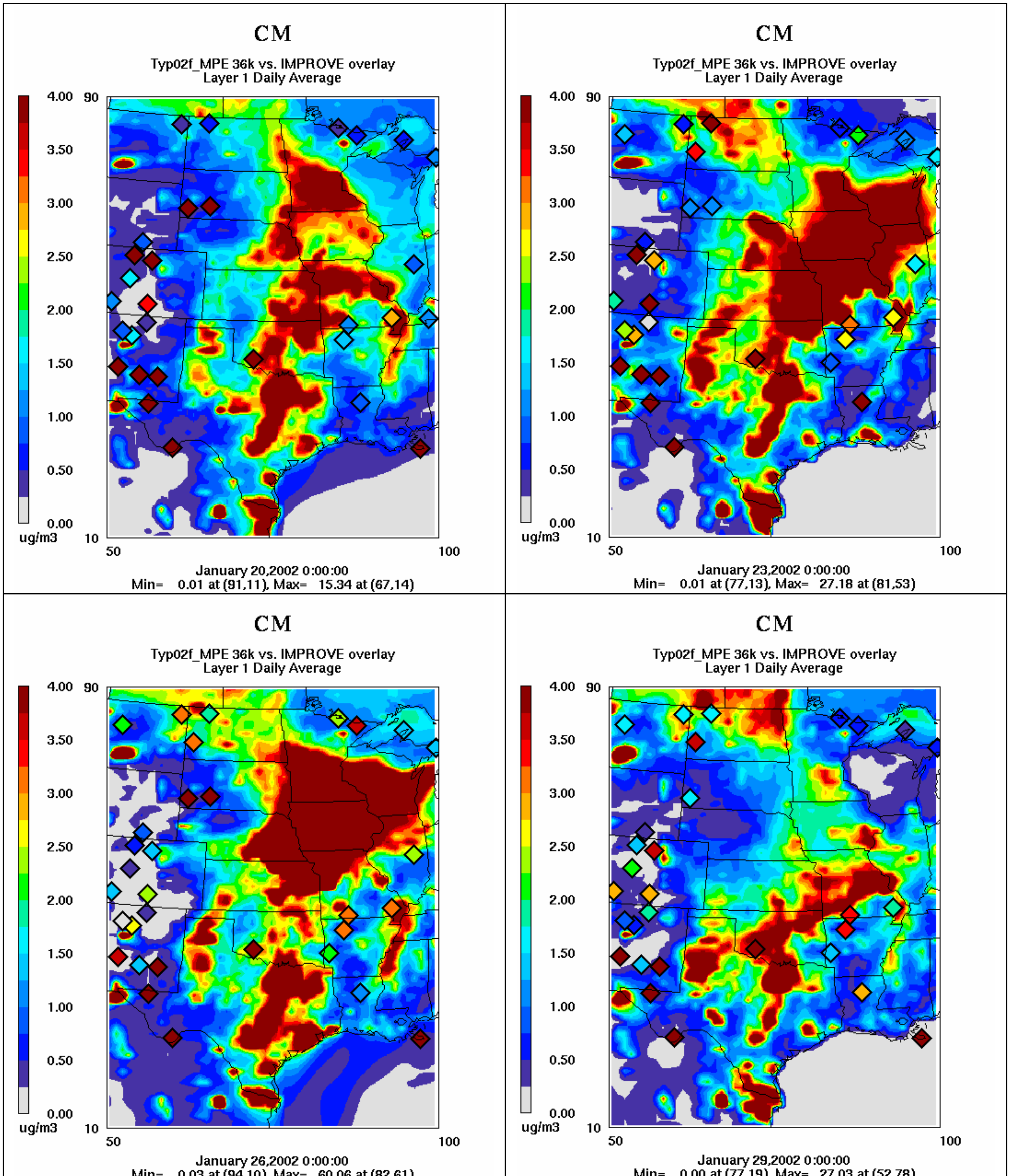


Figure C-34c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour CM concentrations for January 20, 23, 26 and 29, 2002.

C.3.6.2 CM in April 2002

The CM underestimation bias is even greater in April (-137%) and occurs at all IMPROVE sites (Figure C-35).

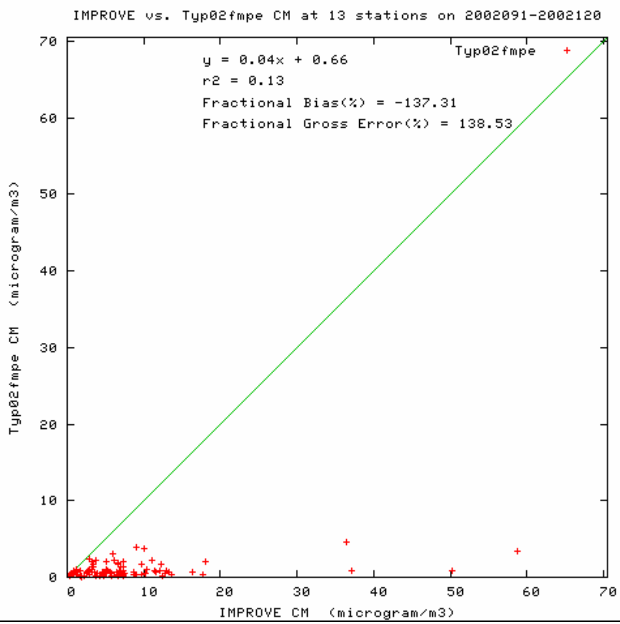
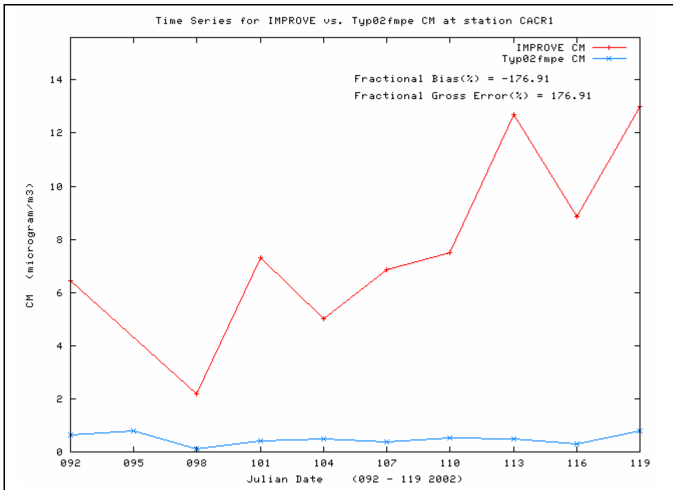
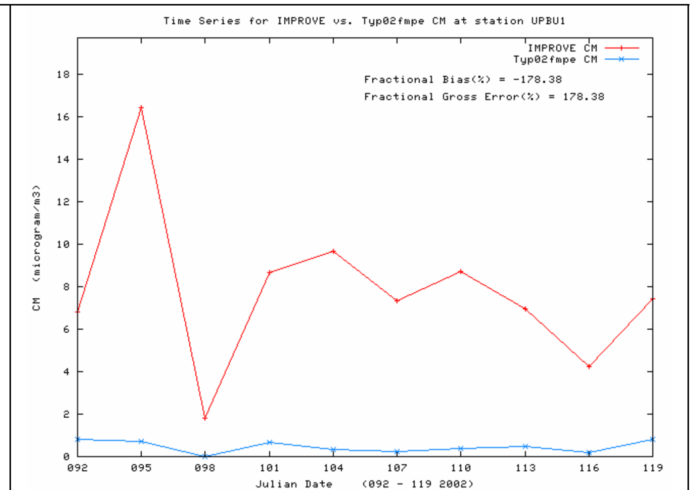


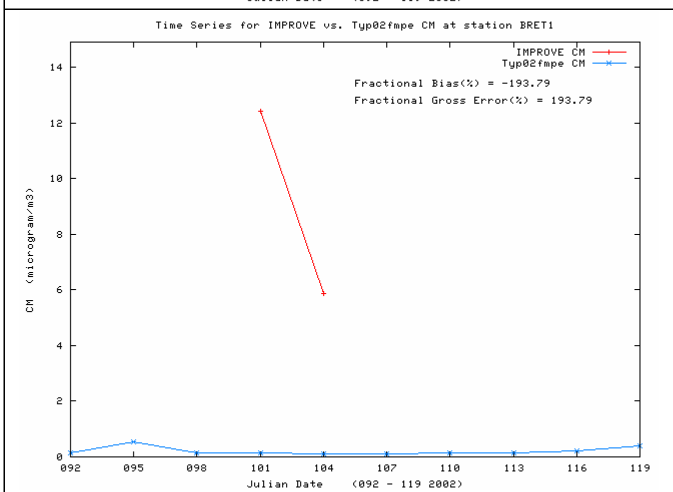
Figure C-35a. Scatter plots of predicted and observed coarse mass (CM) concentrations for April 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



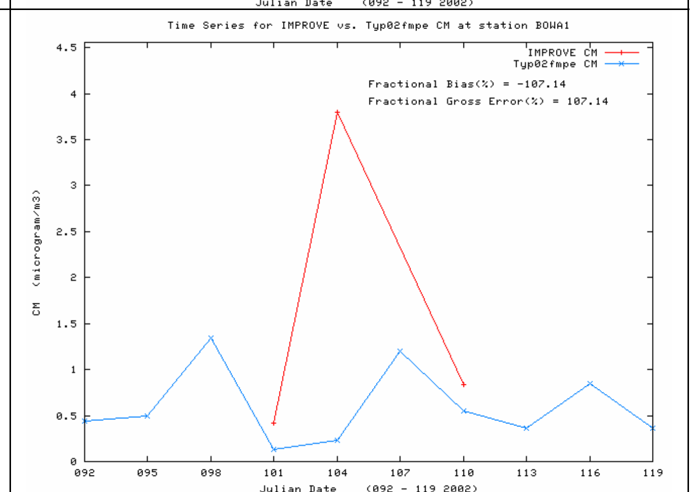
Time Series for IMPROVE vs. Typ02fmpe CM at station CACR1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -176.91
Fractional Gross Error(%) = 176.91
CM (microgram/m3)
Julian Date (092 - 119 2002)



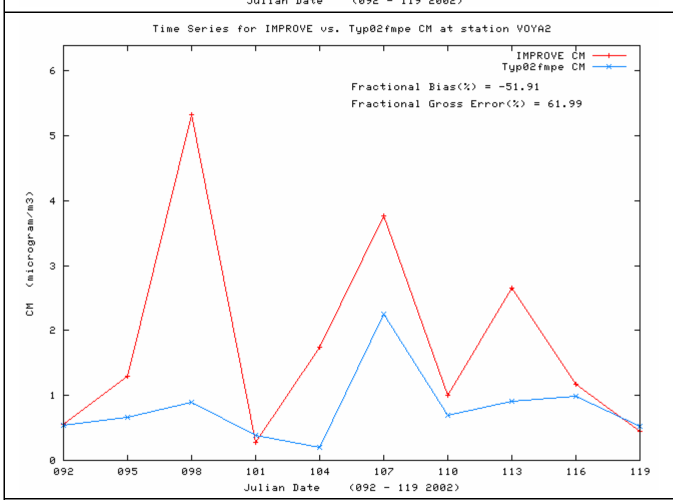
Time Series for IMPROVE vs. Typ02fmpe CM at station UPBU1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -178.38
Fractional Gross Error(%) = 178.38
CM (microgram/m3)
Julian Date (092 - 119 2002)



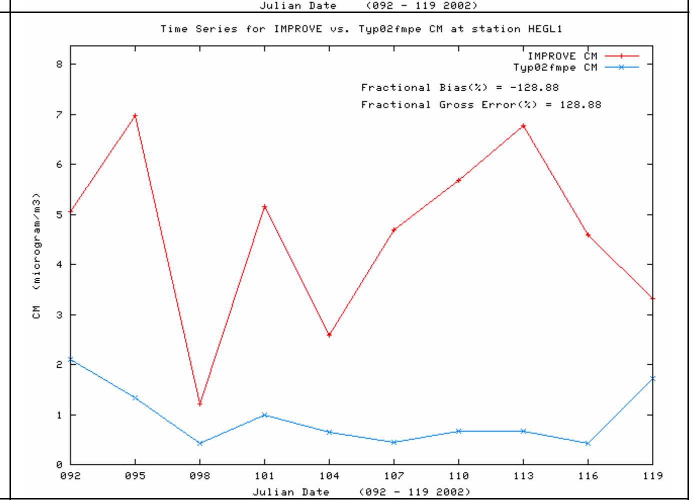
Time Series for IMPROVE vs. Typ02fmpe CM at station BRET1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -193.79
Fractional Gross Error(%) = 193.79
CM (microgram/m3)
Julian Date (092 - 119 2002)



Time Series for IMPROVE vs. Typ02fmpe CM at station BOWA1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -107.14
Fractional Gross Error(%) = 107.14
CM (microgram/m3)
Julian Date (092 - 119 2002)



Time Series for IMPROVE vs. Typ02fmpe CM at station VOYA2
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -51.91
Fractional Gross Error(%) = 61.99
CM (microgram/m3)
Julian Date (092 - 119 2002)



Time Series for IMPROVE vs. Typ02fmpe CM at station HEGL1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -128.88
Fractional Gross Error(%) = 128.88
CM (microgram/m3)
Julian Date (092 - 119 2002)

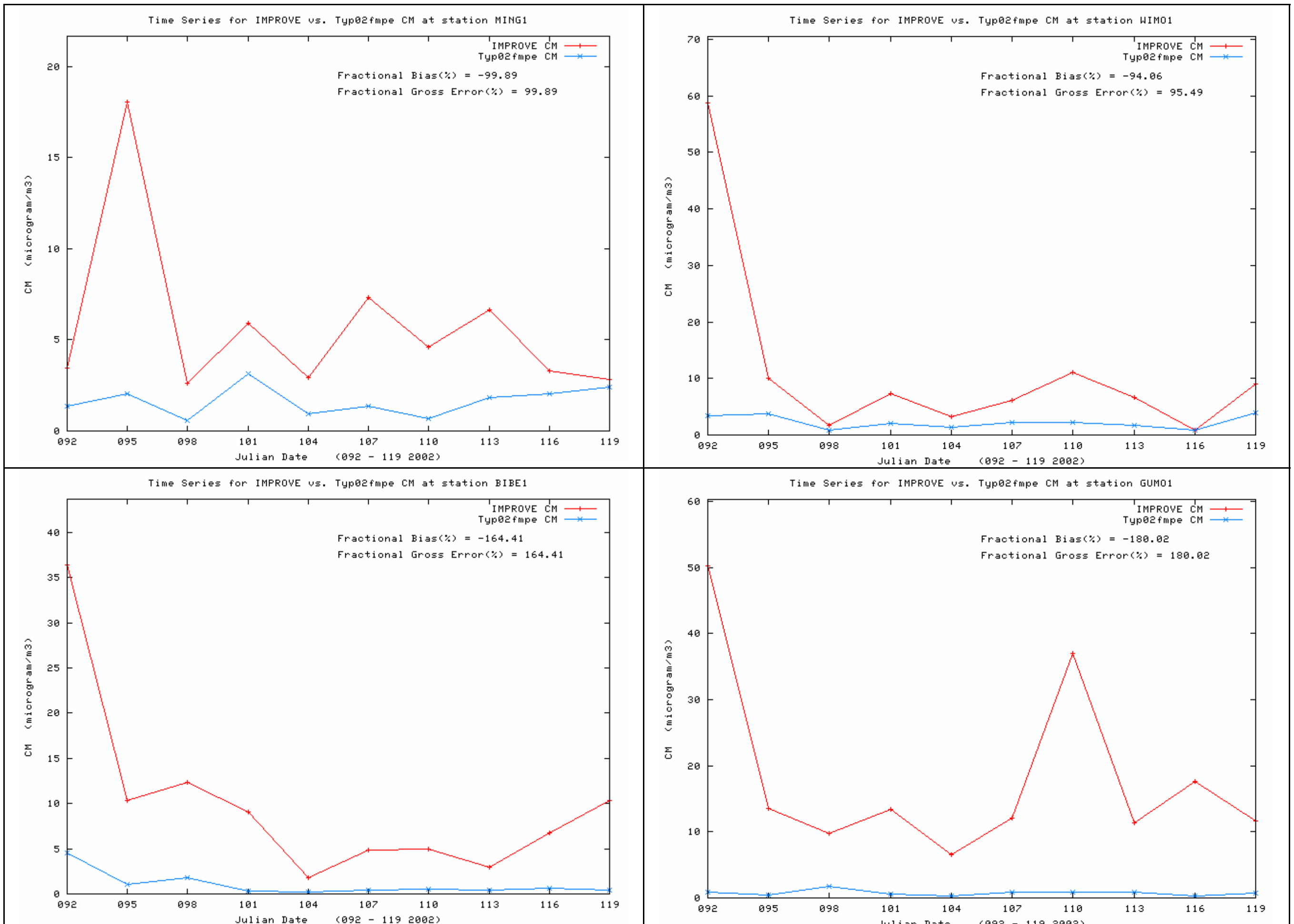


Figure C-35b. Time series of predicted and observed 24-hour coarse mass (CM) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.

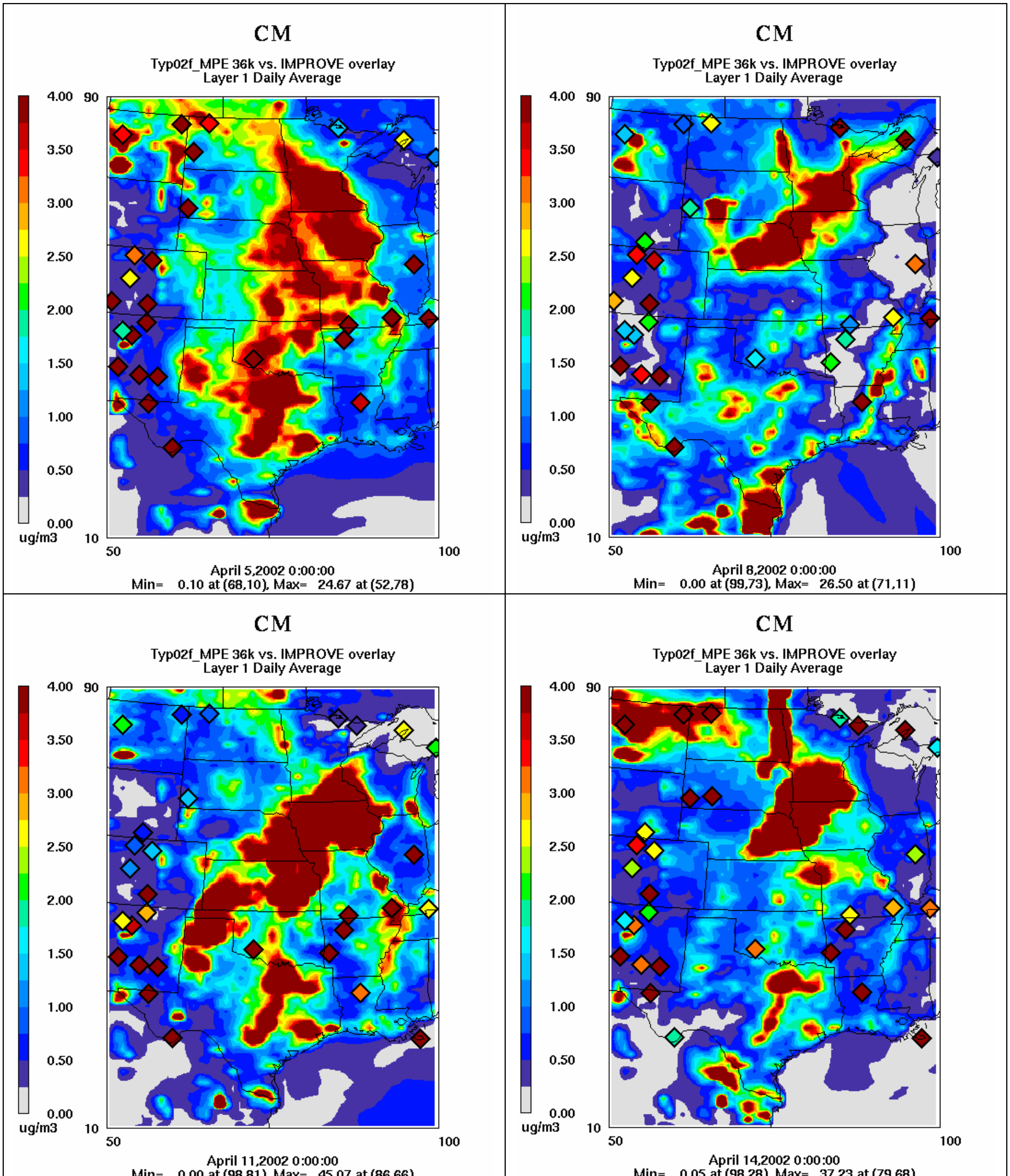


Figure C-35c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour CM concentrations for April 5, 8, 11 and 14, 2002.

C.3.6.3 CM in July 2002

CM performance in July is also very poor with a fractional bias value of -160% (Figure C-36).

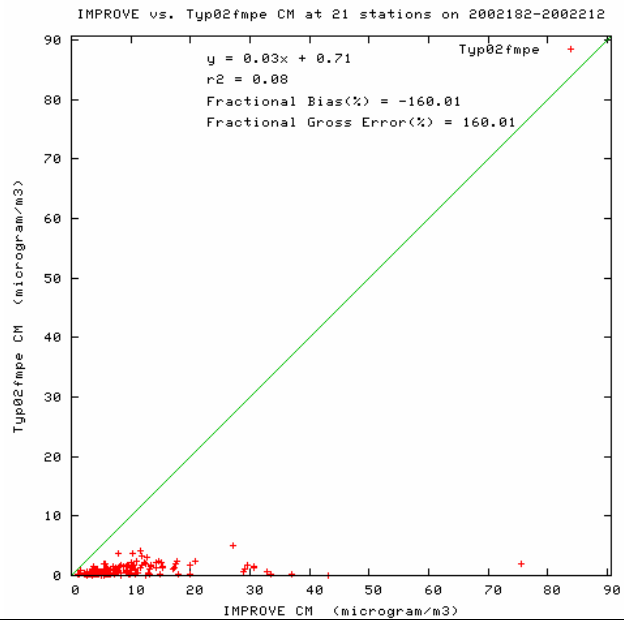
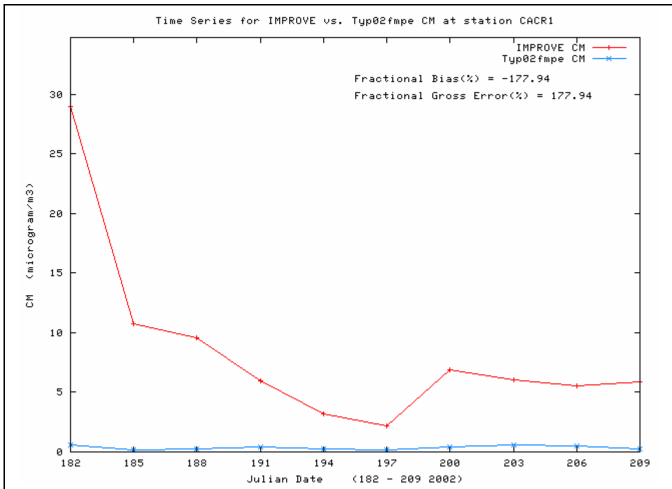
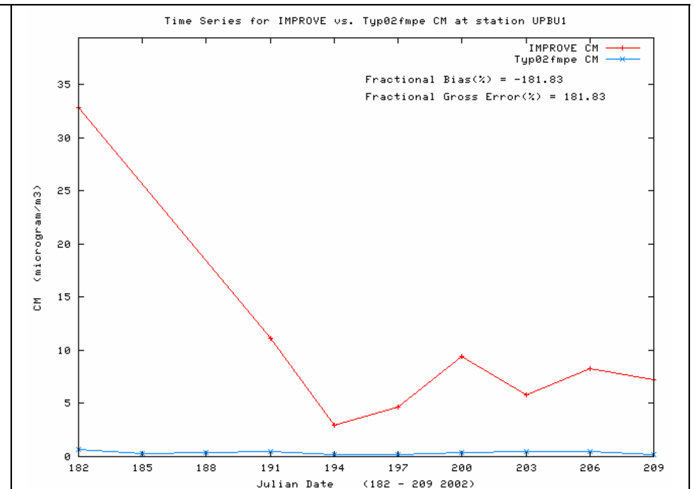
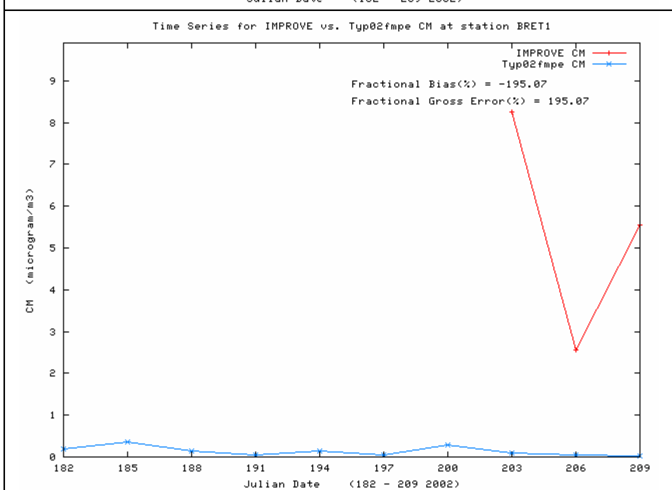
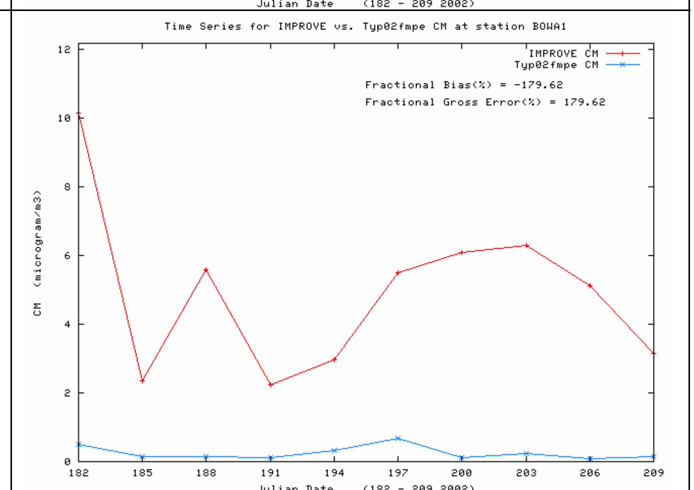


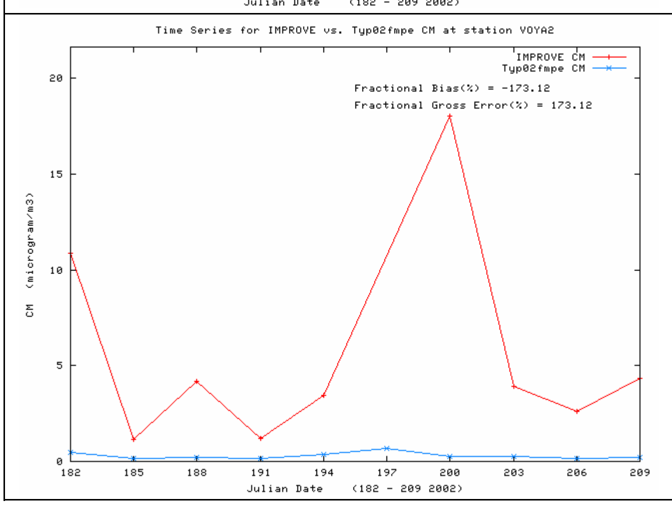
Figure C-36a. Scatter plots of predicted and observed coarse mass (CM) concentrations for July 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

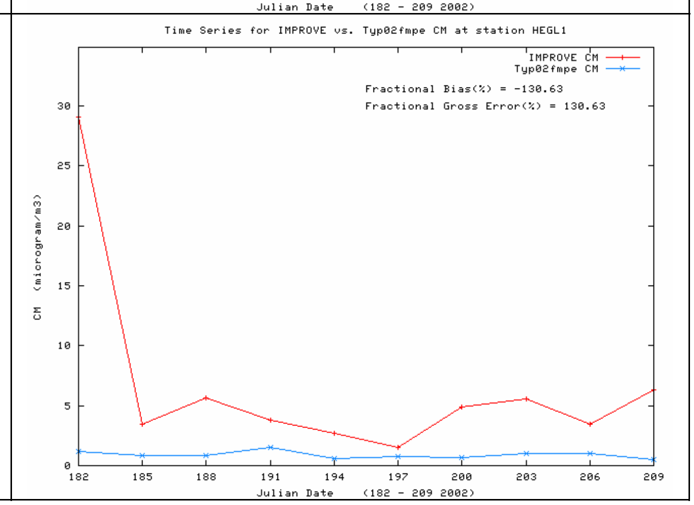

Time Series for IMPROVE vs. Typ02fmpe CM at station CACR1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -177.94
Fractional Gross Error(%) = 177.94
CM (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station UPBU1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -181.83
Fractional Gross Error(%) = 181.83
CM (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station BRET1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -195.07
Fractional Gross Error(%) = 195.07
CM (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station BOWA1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -179.62
Fractional Gross Error(%) = 179.62
CM (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station VOYA2
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -173.12
Fractional Gross Error(%) = 173.12
CM (microgram/m3)
Julian Date (182 - 209 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station HEGL1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -130.63
Fractional Gross Error(%) = 130.63
CM (microgram/m3)
Julian Date (182 - 209 2002)

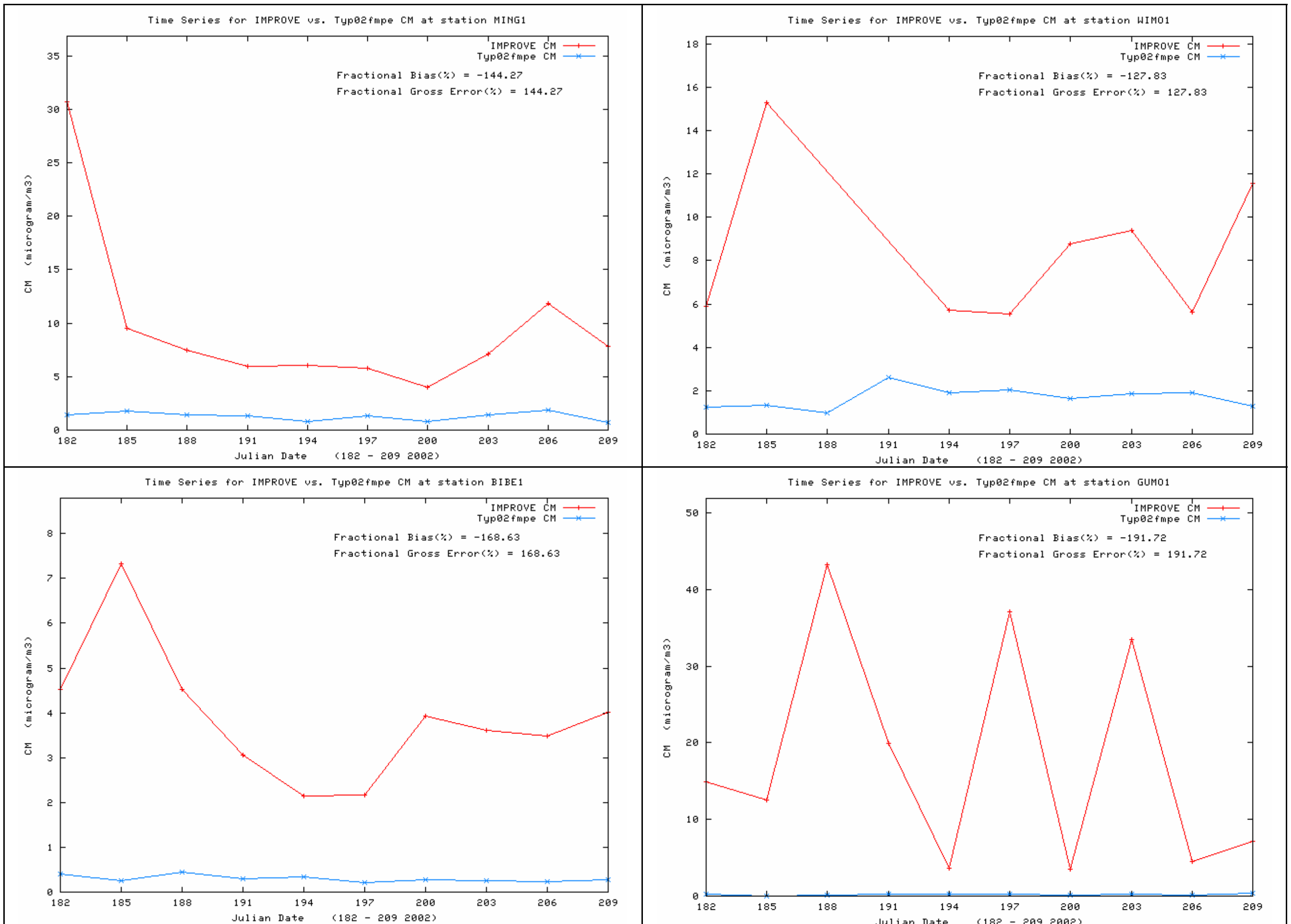


Figure C-36b. Time series of predicted and observed 24-hour coarse mass (CM) concentrations at CENRAP IMPROVE CLASS I AREA sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.

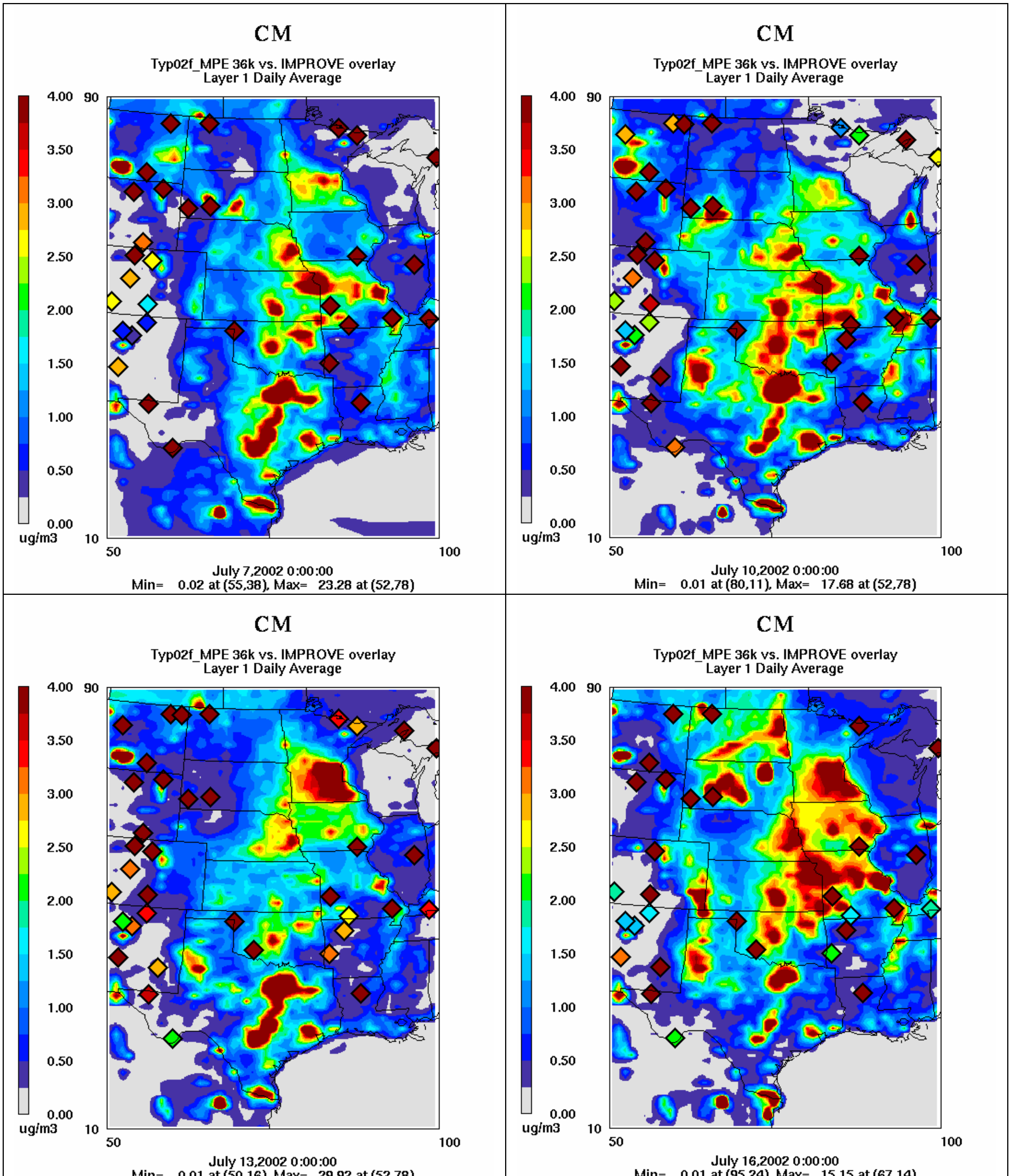


Figure C-36c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour CM concentrations for July 7, 10, 13 and 16, 2002.

C.3.6.4 CM in October 2002

CM is also underestimated in October, although the overestimation bias (-72%) is not as great as seen in July (Figure C-37).

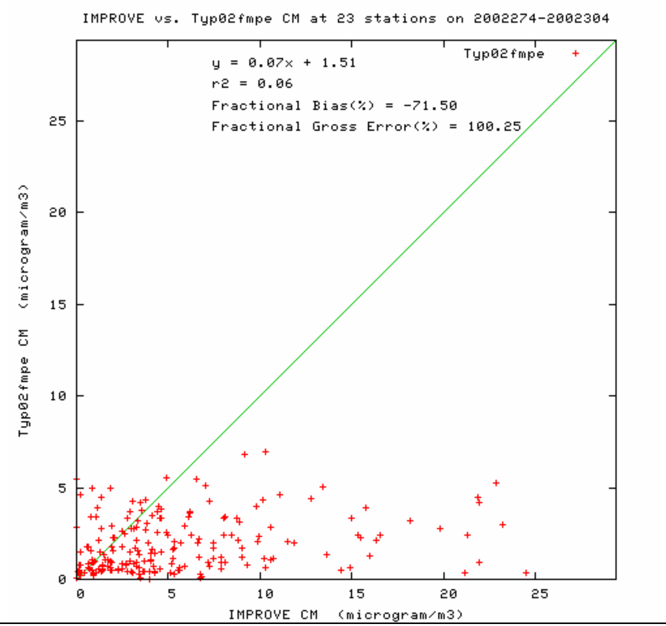
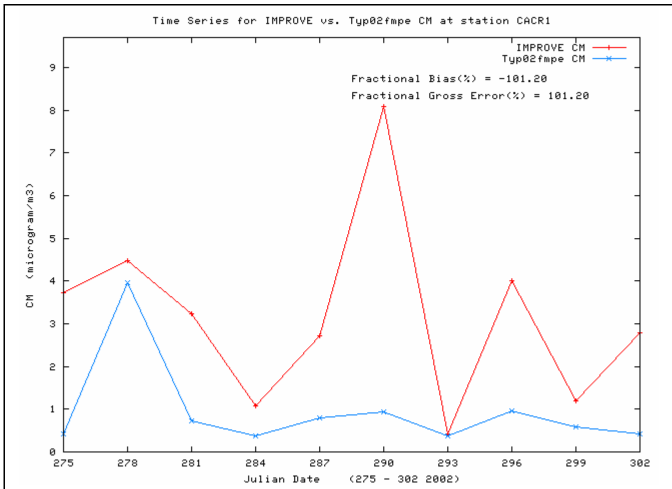
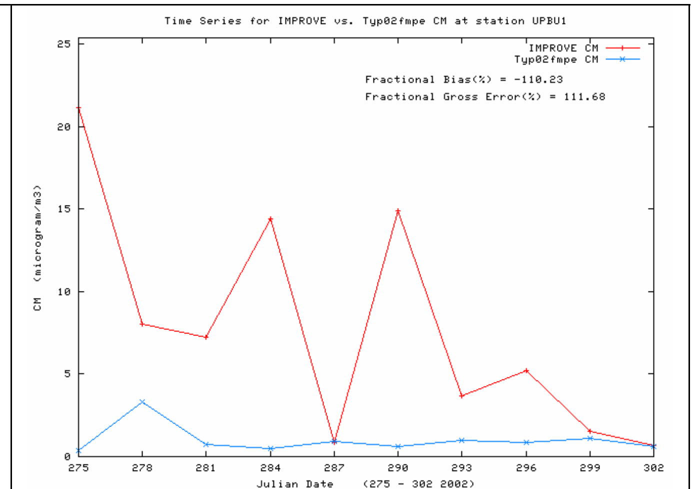
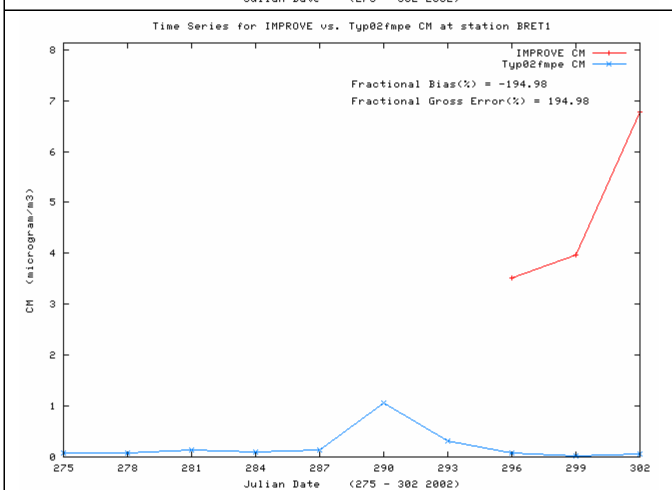
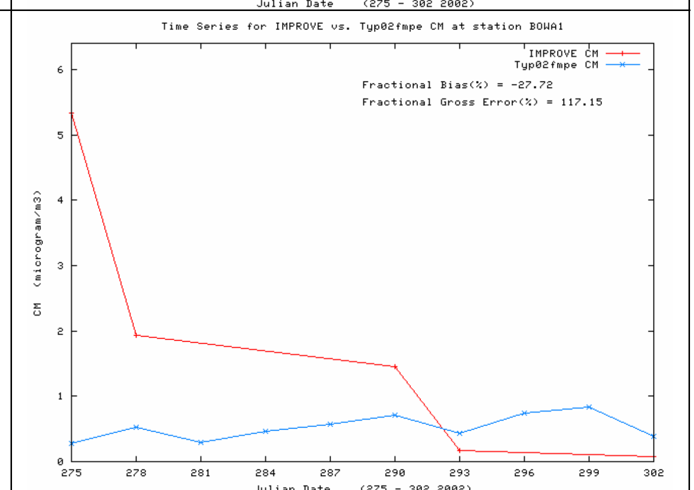


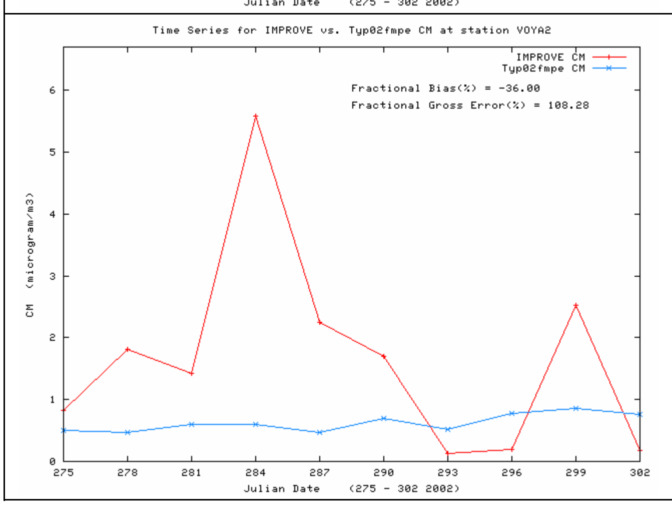
Figure C-37a. Scatter plots of predicted and observed coarse mass (CM) concentrations for October 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.

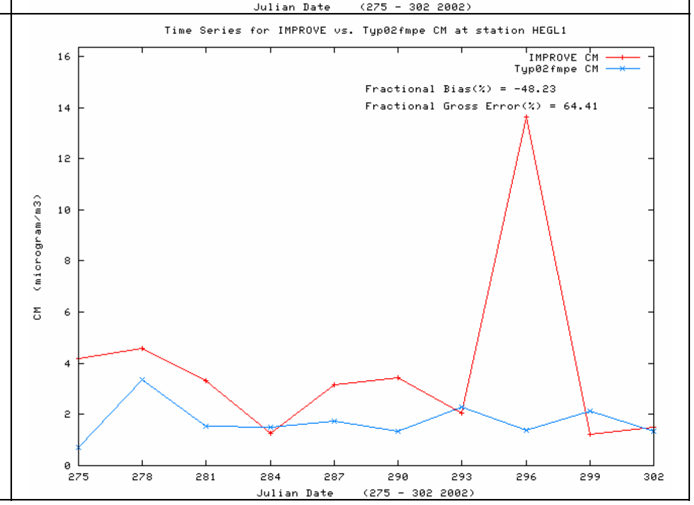

Time Series for IMPROVE vs. Typ02fmpe CM at station CACR1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -101.20
Fractional Gross Error(%) = 101.20
CM (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station UPBU1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -110.23
Fractional Gross Error(%) = 111.68
CM (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station BRET1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -194.98
Fractional Gross Error(%) = 194.98
CM (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station BOWA1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -27.72
Fractional Gross Error(%) = 117.15
CM (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station VOYA2
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -36.00
Fractional Gross Error(%) = 108.28
CM (microgram/m3)
Julian Date (275 - 302 2002)


Time Series for IMPROVE vs. Typ02fmpe CM at station HEGL1
IMPROVE CM
Typ02fmpe CM
Fractional Bias(%) = -48.23
Fractional Gross Error(%) = 64.41
CM (microgram/m3)
Julian Date (275 - 302 2002)

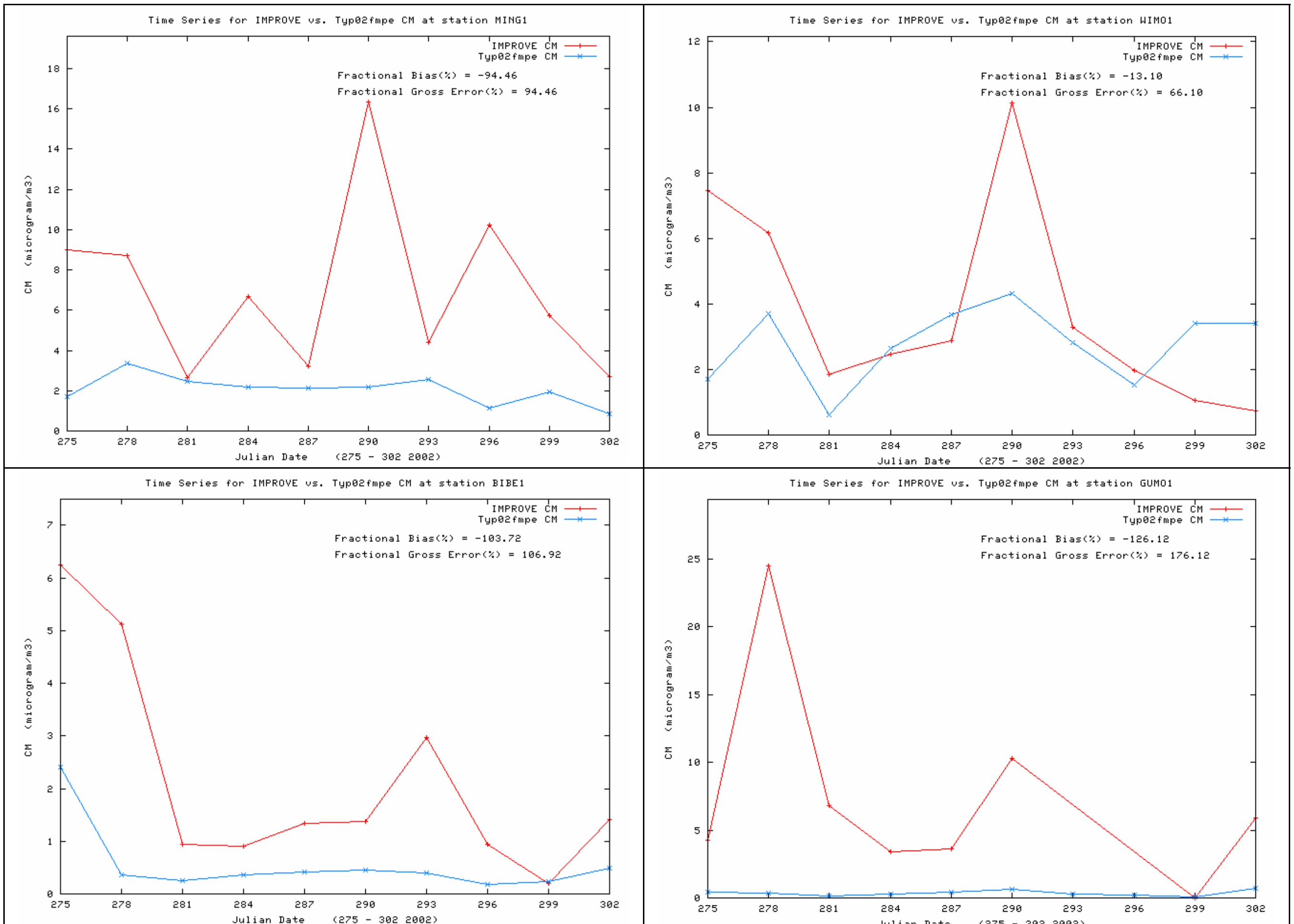


Figure C-37b. Time series of predicted and observed 24-hour coarse mass (CM) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.

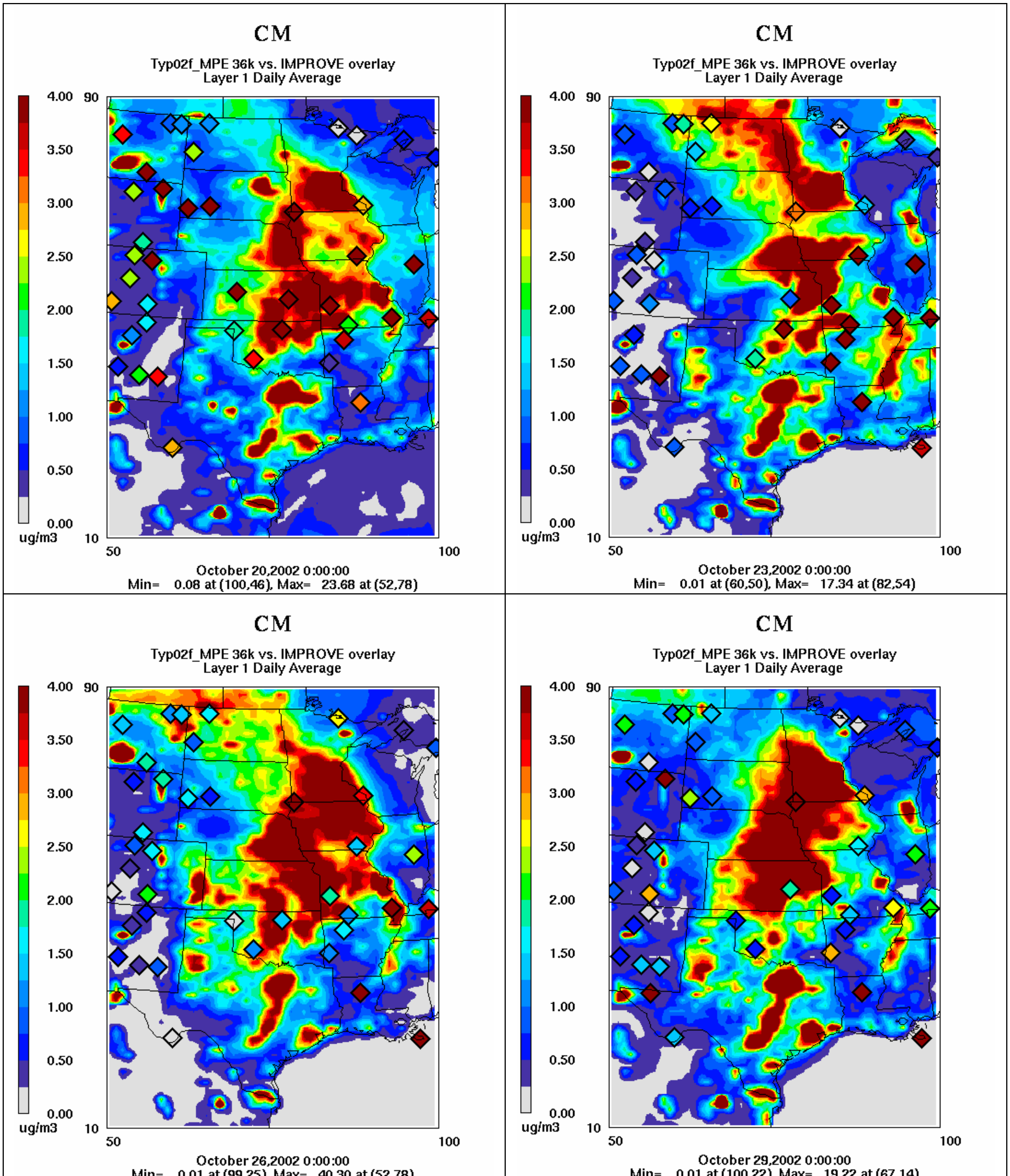


Figure C-37c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour CM concentrations for October 20, 23, 26 and 29, 2002.

C.3.6.5 CM Monthly Bias and Error

The monthly average fractional bias and error values for CM are shown in Figure C-38. In the winter the under-prediction bias is typically in the -60% to -80% range. In the late Spring and Summer the under-prediction bias ranges from -120% to -160%. As this under-prediction bias is nearly systematic, then the errors are the same magnitude as the bias.

The Bugle Plots clearly show that the CM model performance is a problem. The monthly bias exceeds both the performance goal and criteria for almost every month of the year. The error criteria are also exceeded for all months of the year.

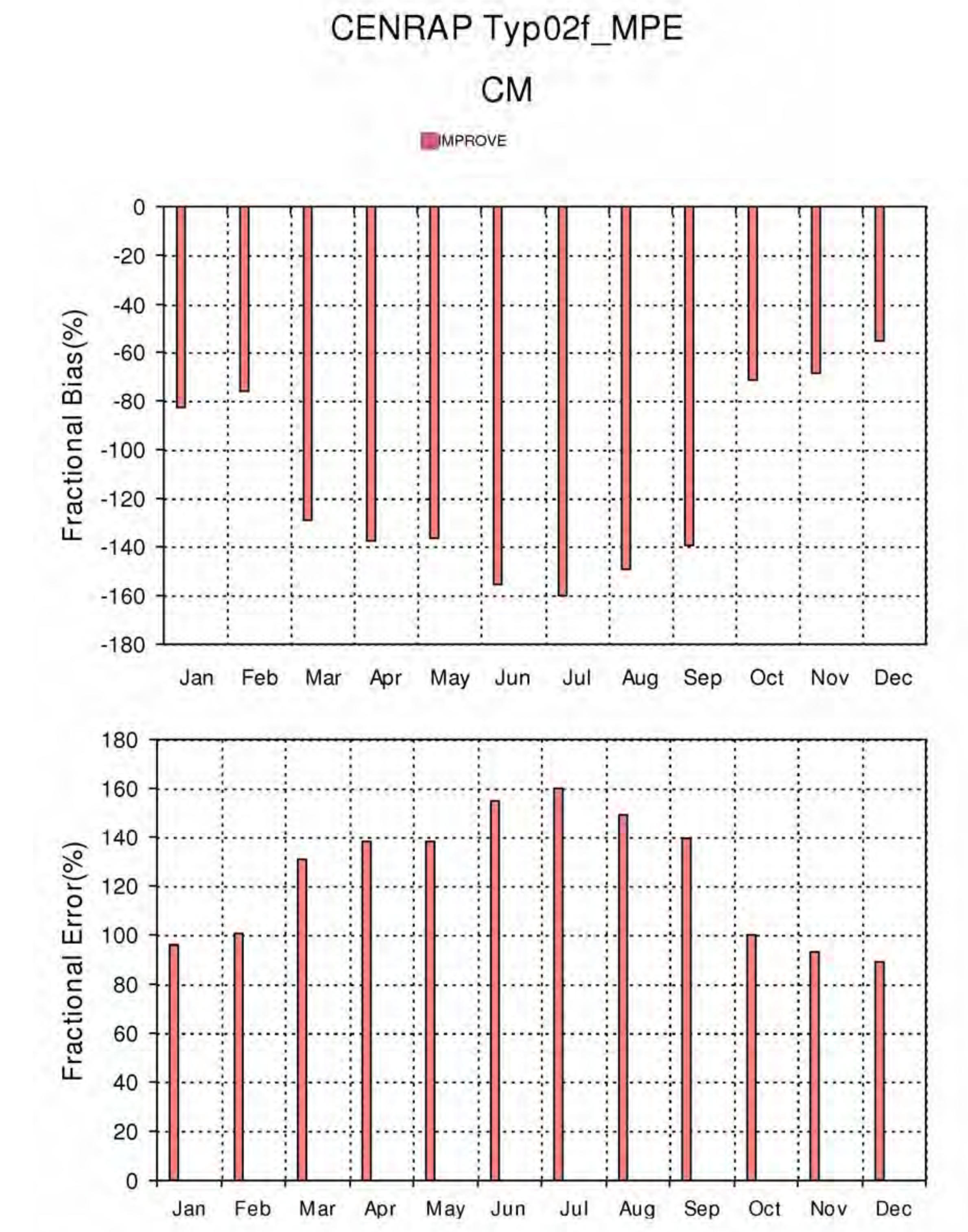


Figure C-38. Monthly CM fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE monitoring sites in the CENRAP region.

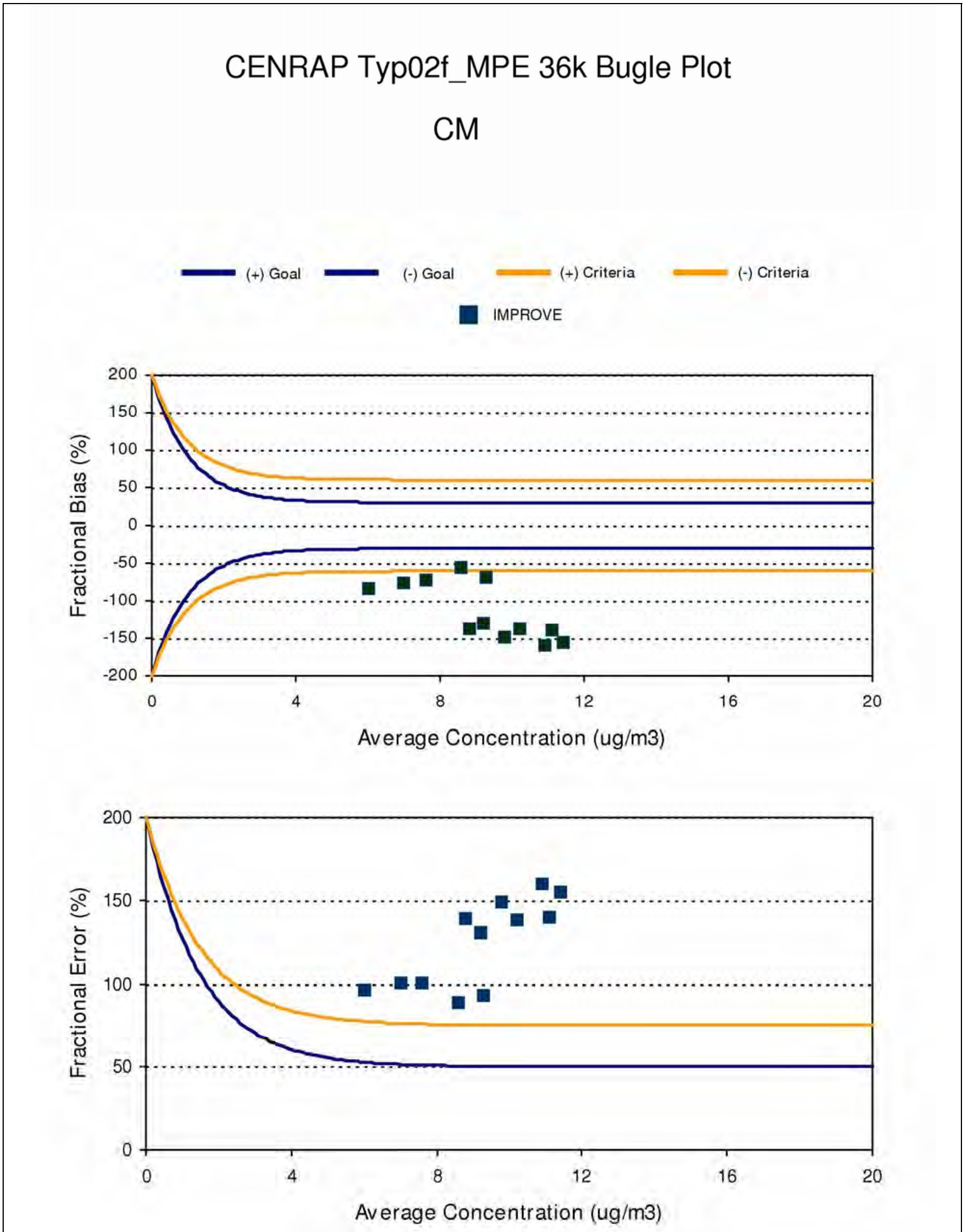


Figure C-39. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for CM and IMPROVE monitoring sites in the CENRAP region.

C.4 Diagnostic Model Evaluation for Gas-Phase and Precursor Species

The CASTNet and AQS networks also measure gas-phase species that are PM precursor or related species. The diagnostic evaluation of the 2002 36 km Base F CMAQ base case simulation for these compounds and the four seasonal months presented previously is provided below.

The CASTNet network measures weekly average samples of SO2, SO4, NO2, HNO3, NO3 and NH4. The AQS network collects hourly measurements of SO2, NO2, O3 and CO. A comparison of the SO2 and SO4 performance provides insight into whether the SO4 formation rate may be too slow or fast. For example, if SO4 is underestimated and SO2 is overestimated that may indicate too slow chemical conversion rate. Analyzing the performance for SO4, HNO3, NO3, Total NO3 and NH4 provides insight into the equilibrium of these species. For example, if Total NO3 performs well but HNO3 and NO3 do not, then there may be issues associated with the partitioning between the gaseous and particle phases of nitrate.

C.4.1 Diagnostic Model Performance in January 2002

In January, SO2 is overstated across both the CASTNet and AQS sites with fractional bias values of 38% (Figure C-40) and 31% (Figure C-41), respectively. SO4 is understated by -34% across the CASTNet monitors (Figure C-40) and -12% and -13% for the IMPROVE and STN networks (Figure C-4a). As noted previously, wet SO4 deposition is also overstated in January (+40%, Figure C-4a). Given that SO2 emissions are well characterized, these results suggest that the January SO4 underestimation may be partly due to understated transformation rates of So2 to SO4 and overstated wet SO4 deposition.

Total NO3 is overestimated by 35% on average across the CASTNet sites in the CENRAP region in January (Figure C-40). HNO3 is underestimated (-34%) and particle NO3 is overestimated (+61%) suggesting there are gas/particle equilibrium issues. An analysis of the time series of the four CASTNet stations reveals that NO3, HNO3 and NH4 performance is actually very reasonable at the west Texas and the HNO3 underestimation and NO3 overestimation bias is coming from the east Kansas, central Arkansas and northern Minnesota CASTNet sites. One potential contributor for this performance problem is overstated NH3 emissions. However the overstated Total NO3 suggests that the model estimated NOx oxidation rate may be too high in January.

The SO2, NO2, O3 and CO performance across the AQS sites in January is shown in Figure C-41. The AQS monitoring network is primarily an urban-oriented network so it is not surprising that the model is underestimating concentrations of primary emissions like NO2 (-5%) and particularly CO (-67%) when a 36 km grid is used. Ozone is also underestimated on average, especially the maximum values above 60 ppb.

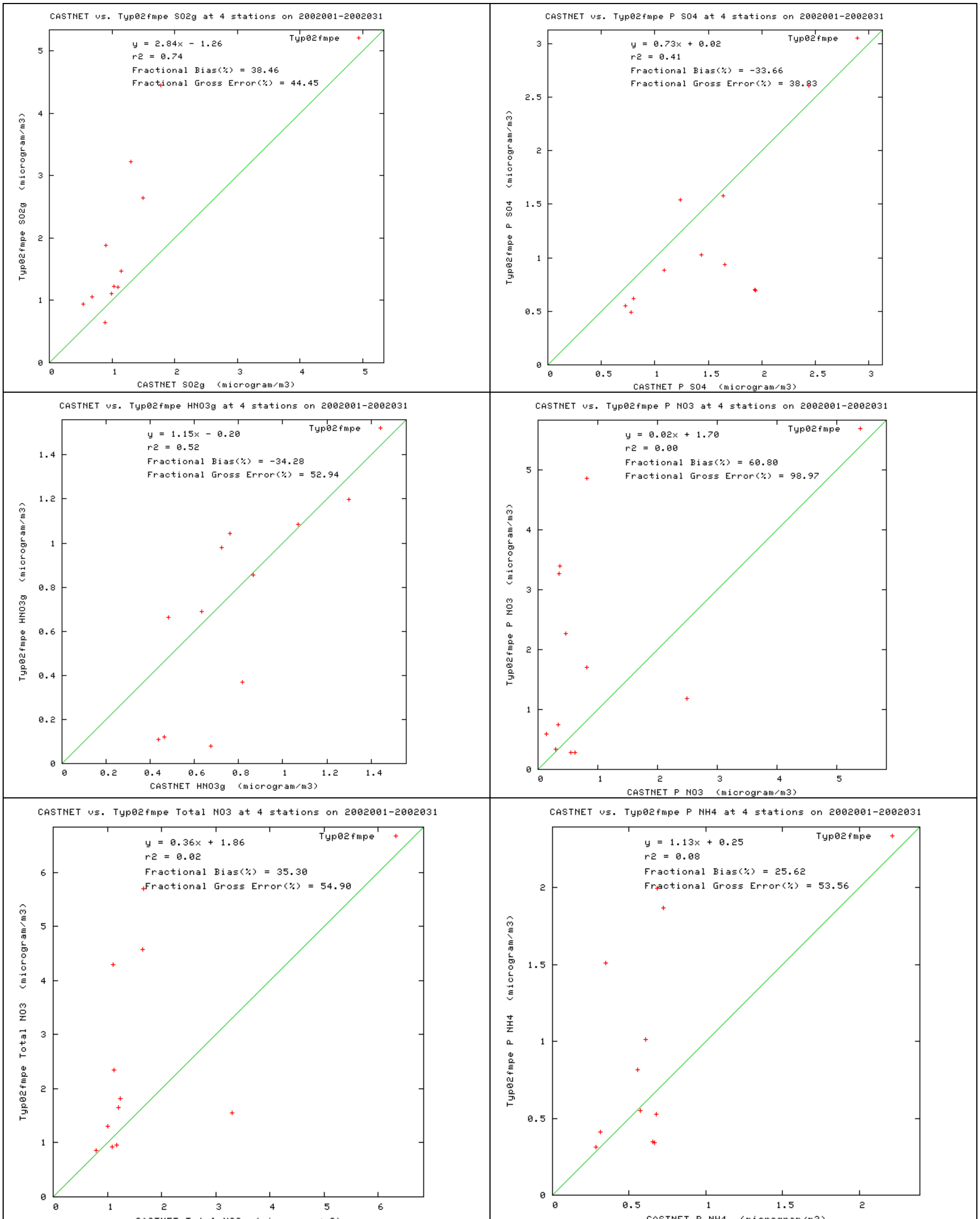


Figure C-40. January 2002 performance at CENRAP CASTNet sites for SO2 (top left), SO4 (top right), HNO3 (middle left), NO3 (middle right), Ttoal NO3 (bottom left) and NH4 (bottom right).

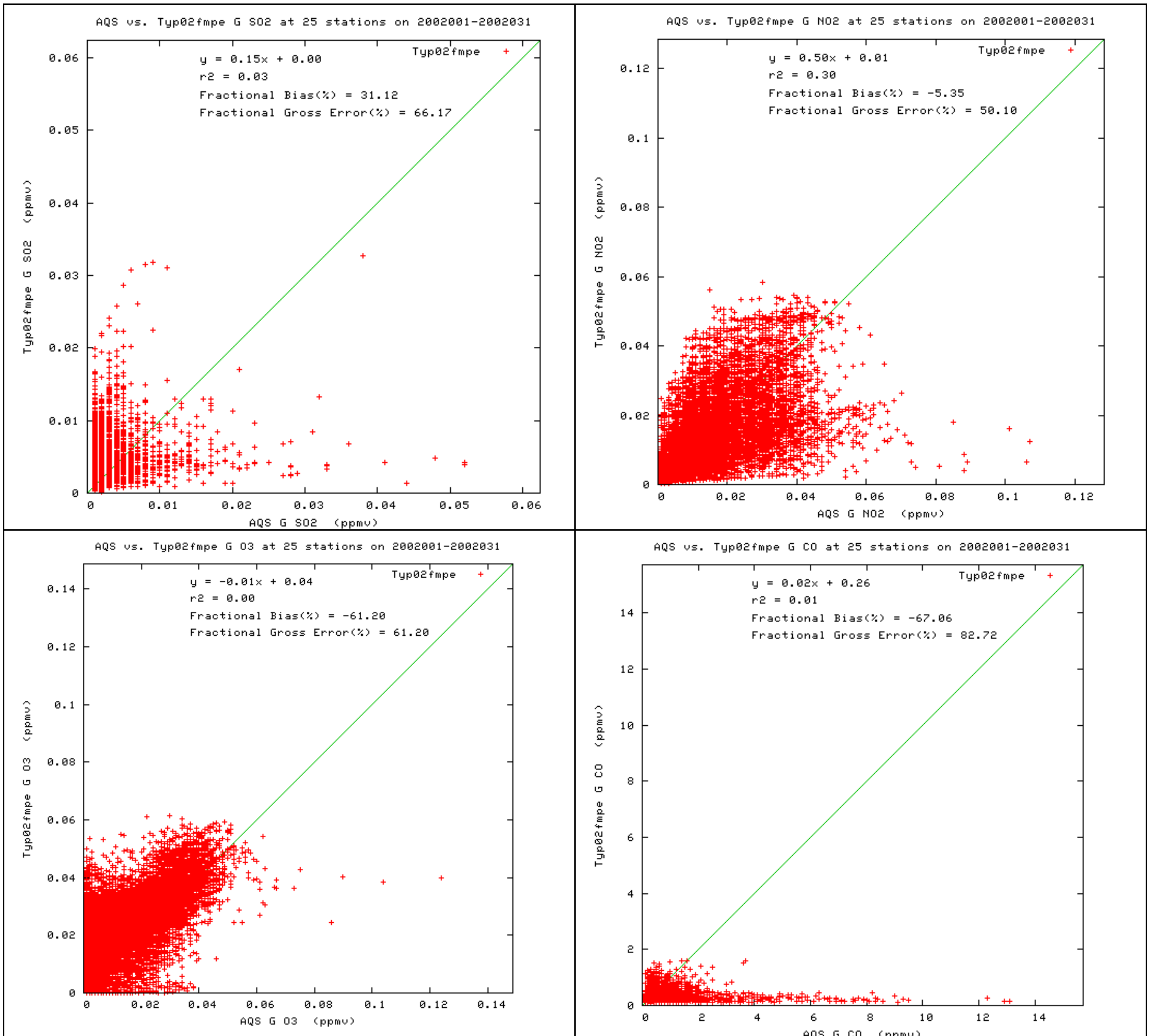


Figure C-41. January 2002 performance at CENRAP AQS sites for SO2 (top left), NO2 (top right), O3 (bottom left) and CO (bottom right).

C.4.2 Diagnostic Model Performance In April

In April there is an average SO2 overestimation bias across the CASTNet (+15%) and underestimation bias across the AQS (-10%) networks (Figures C-42 and C-43). SO4 is underestimated across all networks by -30% to -58% (Figure C-5a). The wet SO4 deposition bias is near zero. Both SO2 and SO4 are underestimated at the west Texas CASTNet monitor in April suggesting SO2 emissions in Mexico are likely understated.

The HNO3 performance in April is interesting with almost perfect agreement except for 5 modeled-observed comparisons that drives the average under-prediction bias of -29%. On Julian Day 102 there is high HNO3 at the MN, KS and OK CASTNet sites that is not captured by the model. Given that HNO3, NO3 and Total NO3 are all underestimated by about the same amount (-30%), then part of the underestimation bias is likely due to too slow oxidation of NOx.

There is a lot of scatter in the NO2 and O3 performance that is more or less centered on the 1:1 line of perfect agreement with bias values of -8% and -21%, respectively (Figure C-43). CO is underestimated by -72% with the model unable to predict CO concentrations above 1 $\mu g/m^3$ due to the use of the coarse 36 km grid spacing. Mobile sources produce a vast majority of the CO emissions so AQS monitors for CO compliance are located near roadways, which are not simulated well using a 36 km grid.

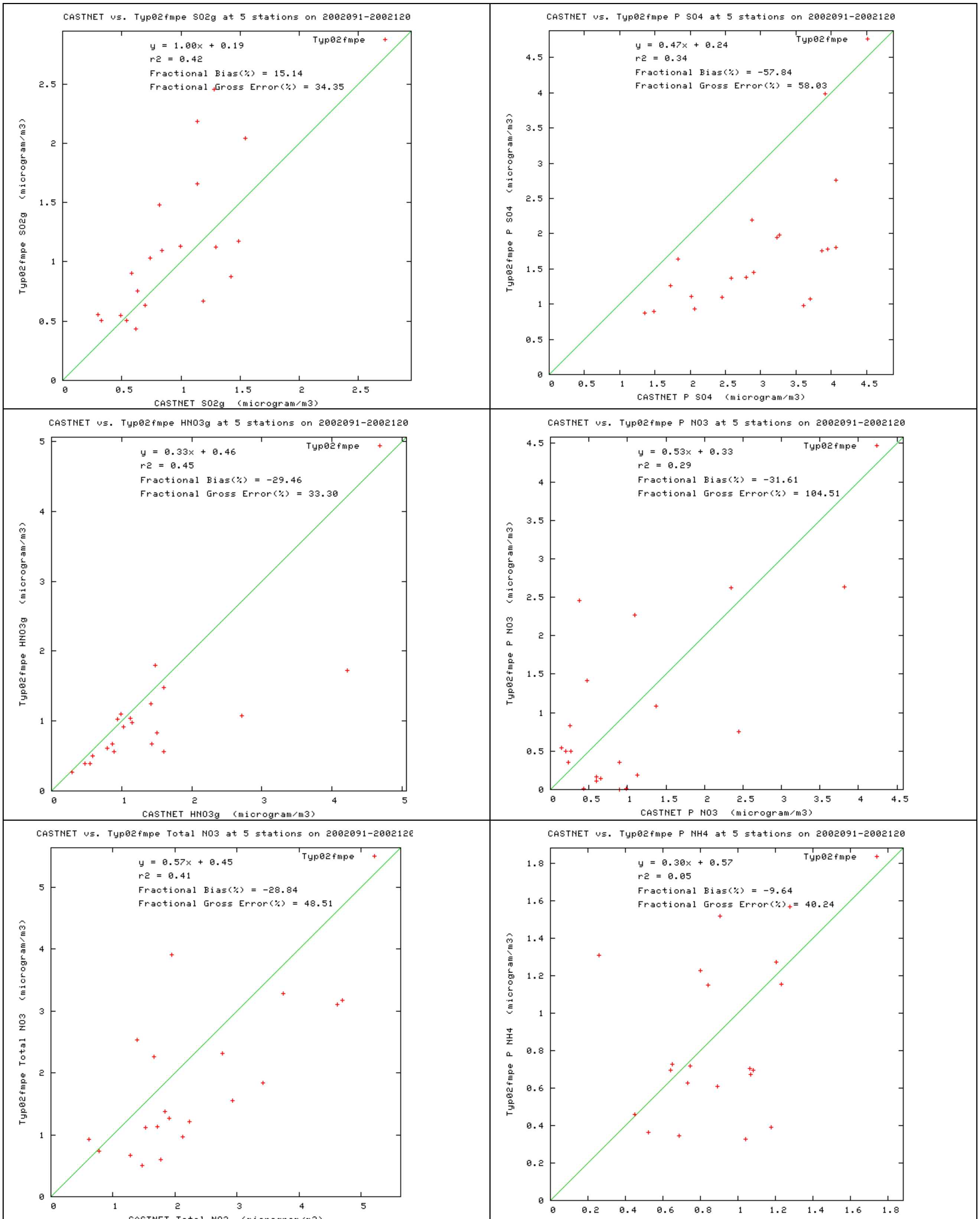


Figure C-42 April 2002 performance at CENRAP CASTNet sites for SO2 (top left), SO4 (top right), HNO3 (middle left), NO3 (middle right), Total NO3 (bottom left) and NH4 (bottom right).

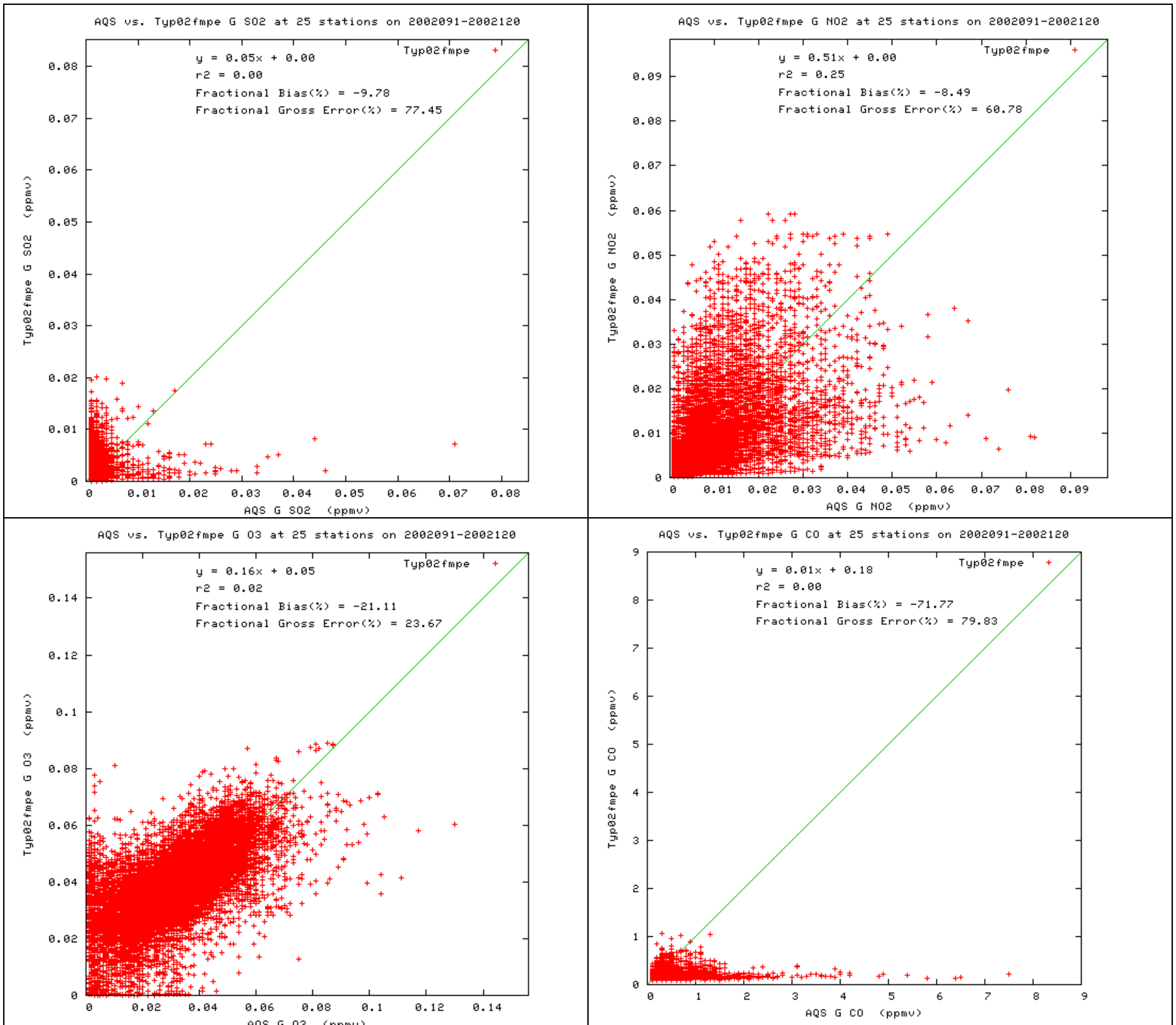


Figure C-43 April 2002 performance at CENRAP AQS sites for SO2 (top left), NO2 (top right), O3 (bottom left) and CO (bottom right).

C.4.3 Diagnostic Model Performance In July

In July SO2 is slightly underestimated across the CASTNet (-5%) and AQS (-12%) networks (Figures C-44 and C-45) and SO4 is more significantly underestimated across all networks (-22% to -53%, Figure C-6a). Since wet SO4 is also underestimated it is unclear the reasons for why all sulfur species are underestimated.

The nitrate species are also all underestimated with the Total NO3 bias (-56%) being between the HNO3 bias (-35%) and NO3 bias (-115%). The modeled NO3 values are all near zero with little correlation with the observations, whereas the observed HNO3 and Total NO3 is tracked well with correlation coefficients of 0.74 and 0.76. These results suggest that the July NO3 model performance problem is partly due to insufficient formation of Total NO3 and mainly due to too little incorrect partitioning of the Total NO3 into the particle NO3.

Again there is lots of scatter in the AQS NO2 scatter plot for July (Figure C-45) resulting in a low bias (0%) but high error (65%). Ozone performance also exhibits a low bias (-15%) and error (20%), but the model is incapable of simulating ozone above 100 ppb. Although CO performance in July is better than the previous months, it still has a large underestimation bias (-82%).

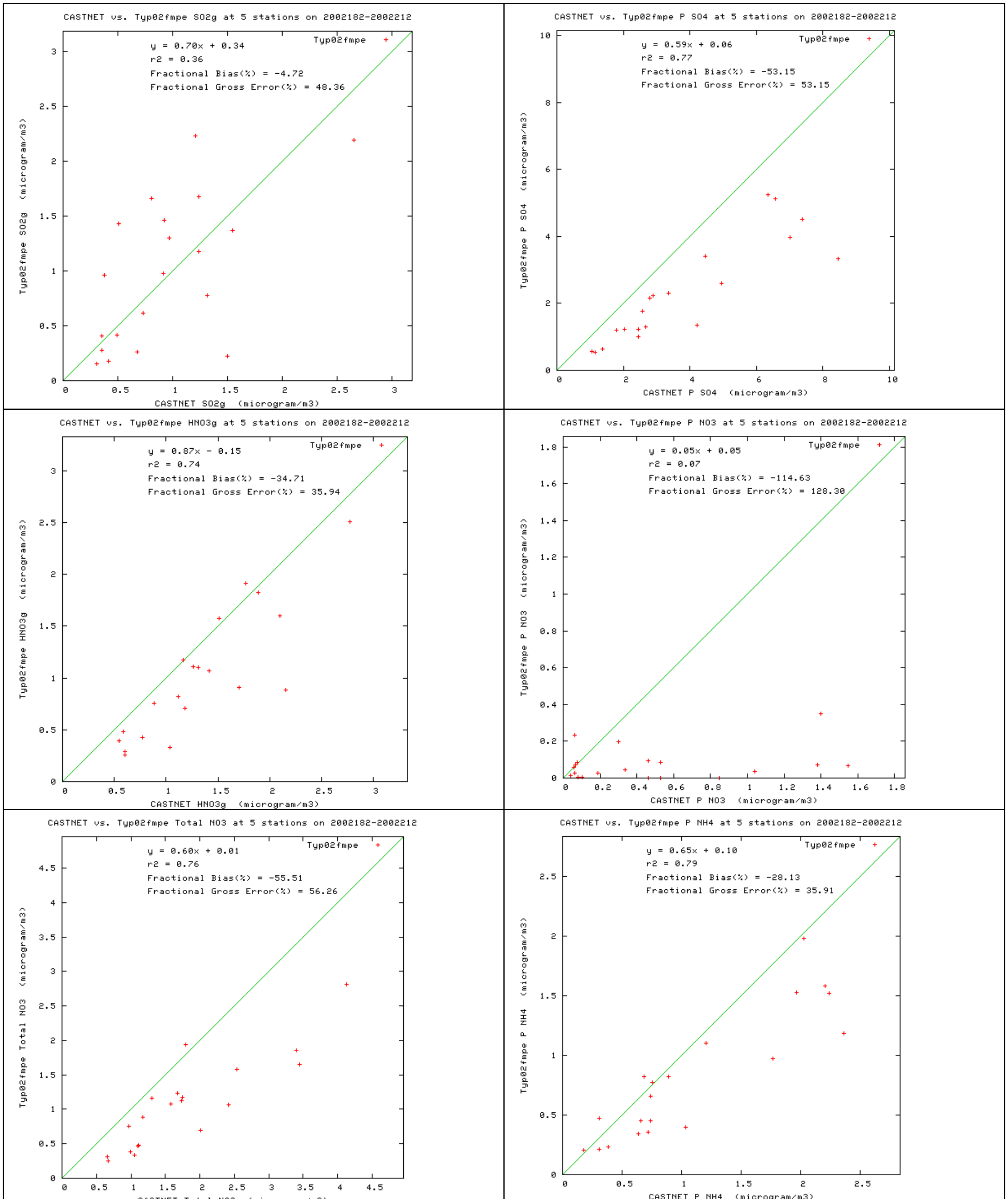


Figure C-44 July 2002 performance at CENRAP CASTNet sites for SO2 (top left), SO4 (top right), HNO3 (middle left), NO3 (middle right), Total NO3 (bottom left) and NH4 (bottom right).

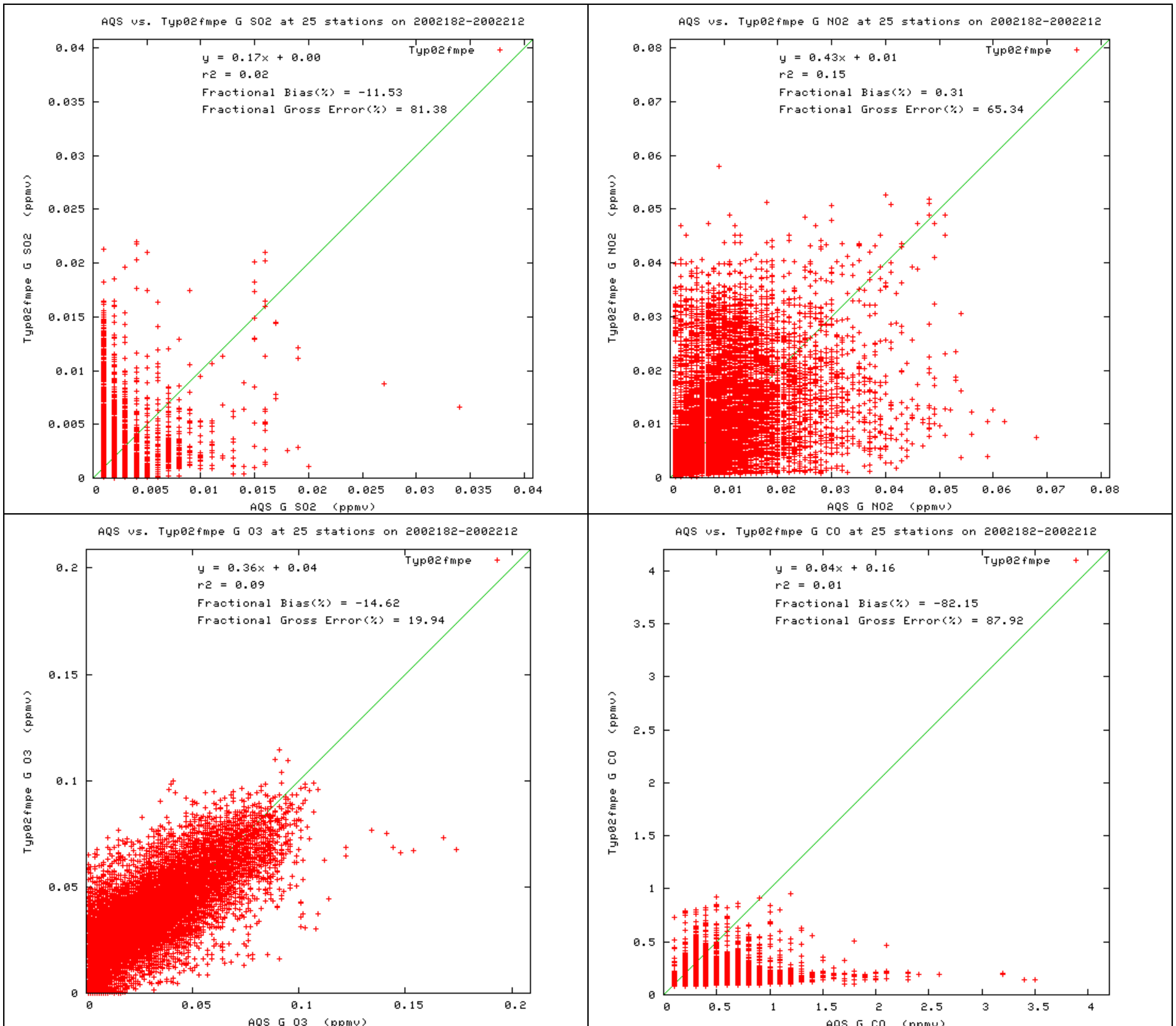


Figure C-45 July 2002 performance at CENRAP AQS sites for SO2 (top left), NO2 (top right), O3 (bottom left) and CO (bottom right).

C.4.4 Diagnostic Model Performance In October

SO2 is overstated in October across the CASTNet (+28%) and AQS (+33%) sites (Figures C-46 and C-47). Although SO4 is understated across the CASTNet sites (-24%), the bias across the IMPROVE (-6%) and STN (0%) sites are near zero (Figure C-7a).

Performance for HNO3 is fairly good with a low bias (+12%) and error (30%). But NO3 is overstated (+34%) leading to an overstatement of Total NO3 (+37%). The overstatement of NO3 leads to an overstatement of NH4 as well (Figure C-46)

As seen in the other months, NO2 exhibits a lot of scatter resulting in a low correlation (0.22) and high error (61%) but low bias (12%). The model tends to under-predict the high and over-predict the low O3 observations resulting in a -29% bias and low correlation coefficient. CO is also under-predicted (-76%) for the reasons discussed previously.

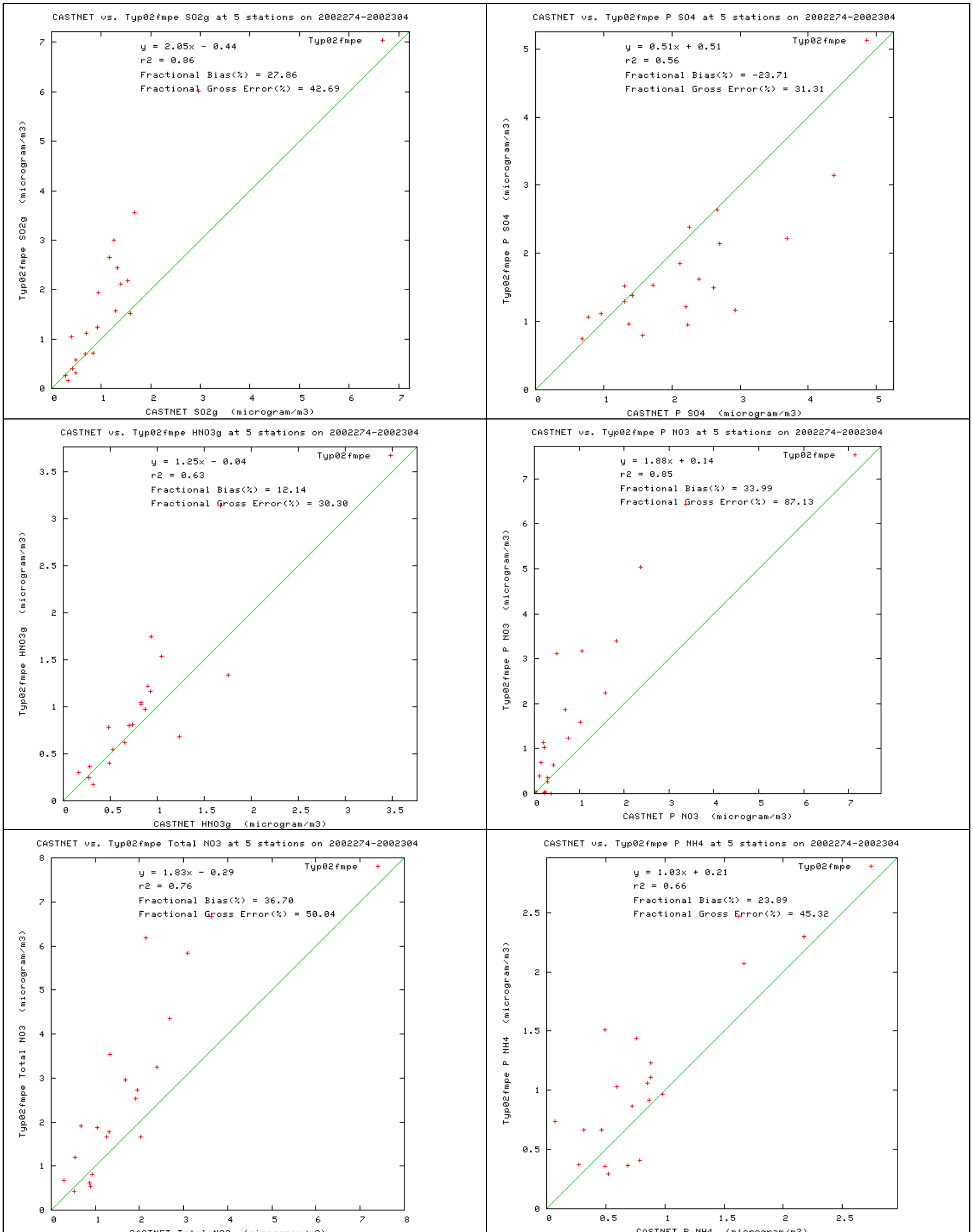


Figure C-46 October 2002 performance at CENRAP CASTNet sites for SO2 (top left), SO4 (top right), HNO3 (middle left), NO3 (middle right), Total NO3 (bottom left) and NH4 (bottom right).

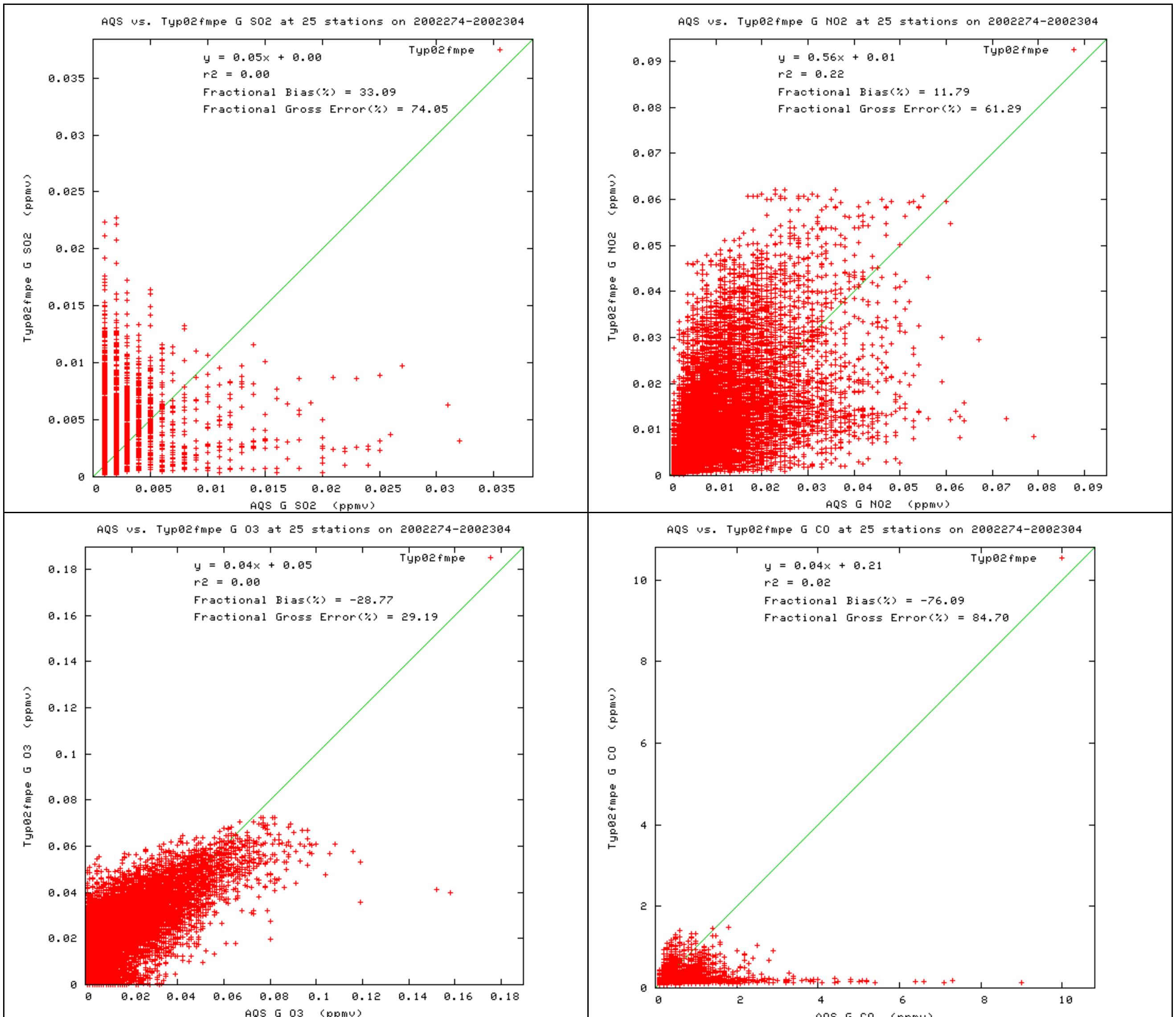


Figure C-47 October 2002 performance at CENRAP AQS sites for SO2 (top left), NO2 (top right), O3 (bottom left) and CO (bottom right).

C.5 Evaluation at Class I Areas for the Worst and Best 20 Percent Days

In this section, and in section C.5 of Appendix C, we present the results of the model performance evaluation at each of the CENRAP Class I areas for the worst and best 20 percent days. Performance on these days is critical since they are the days used in the 2018 visibility projections discussed in Chapter 4. For each Class I area we compared the predicted and observed total extinction (these figures are in Chapter 3) and PM species-specific extinction for the worst and best 20 percent days in 2002.

C.5.1 Caney Creek (CACR) Arkansas

The ability of the CMAQ model to estimate visibility extinction at the CACR Class I area on the 2002 worst and best 20 percent days is provide in Figures 3-9 and C-48. On most of the worst 20 percent days at CACR total extinction is dominated by SO4 extinction with some extinction due to OMC. On four of the worst 20 percent days extinction is dominated by NO3. The average extinction across the worst 20 percent days is underestimated by -33% (Figure 3-9), which is primarily due to a -51% underestimation of SO4 extinction combined with a 6% overestimation of NO3 extinction (Figure C-48). Performance for OMC extinction at CACR on the worst 20 percent days is pretty good with a -20% bias and 36% error, EC extinction is systematically underestimated, Soil extinction has low bias (-19%) buts lots of scatter and high error (74%), while CM extinction is greatly underestimated (bias of -153%).

On the best 20 percent days at CACR the observed extinction ranges from 20 to 40 Mm^{-1}, whereas then modeled extinction has a much larger range from 15 to 120 Mm^{-1}. Much of the modeled overestimation of total extinction on the best 20% days (+44% bias) is due to NO3 overestimation (+94% bias).

C.5.2 Upper Buffalo (UOBU) Arkansas

Model performance at the UPBU Class I area for the worst and best 20 percent days is shown in Figures 3-10 and C-49. On most of the worst 20 percent days at UPBU visibility impairment is dominated by SO4, although there are also two high NO3 days. The model underestimates the average of the total extinction on the worst 20 percent days at UPBU by -40% (Figure 3-10), which is due to an underestimation of extinction due to SO4, OMC and CM by, respectively,
-46%, -33% and -179%.

On the best 20 percent days at UPBU, the model performs reasonably well with a low bias (2%) and error (42%). But again the model has a much wider range in extinction values across the best 20 percent days (15 to 120 Mm^{-1}) than observed (20 to 45 Mm^{-1}). There are five days in which the modeled NO3 over-prediction is quite severe and when those days are removed the range in the modeled and observed extinction on the best 20 percent days is quite similar, although the model gets much cleaner on the very cleanest modeled days.

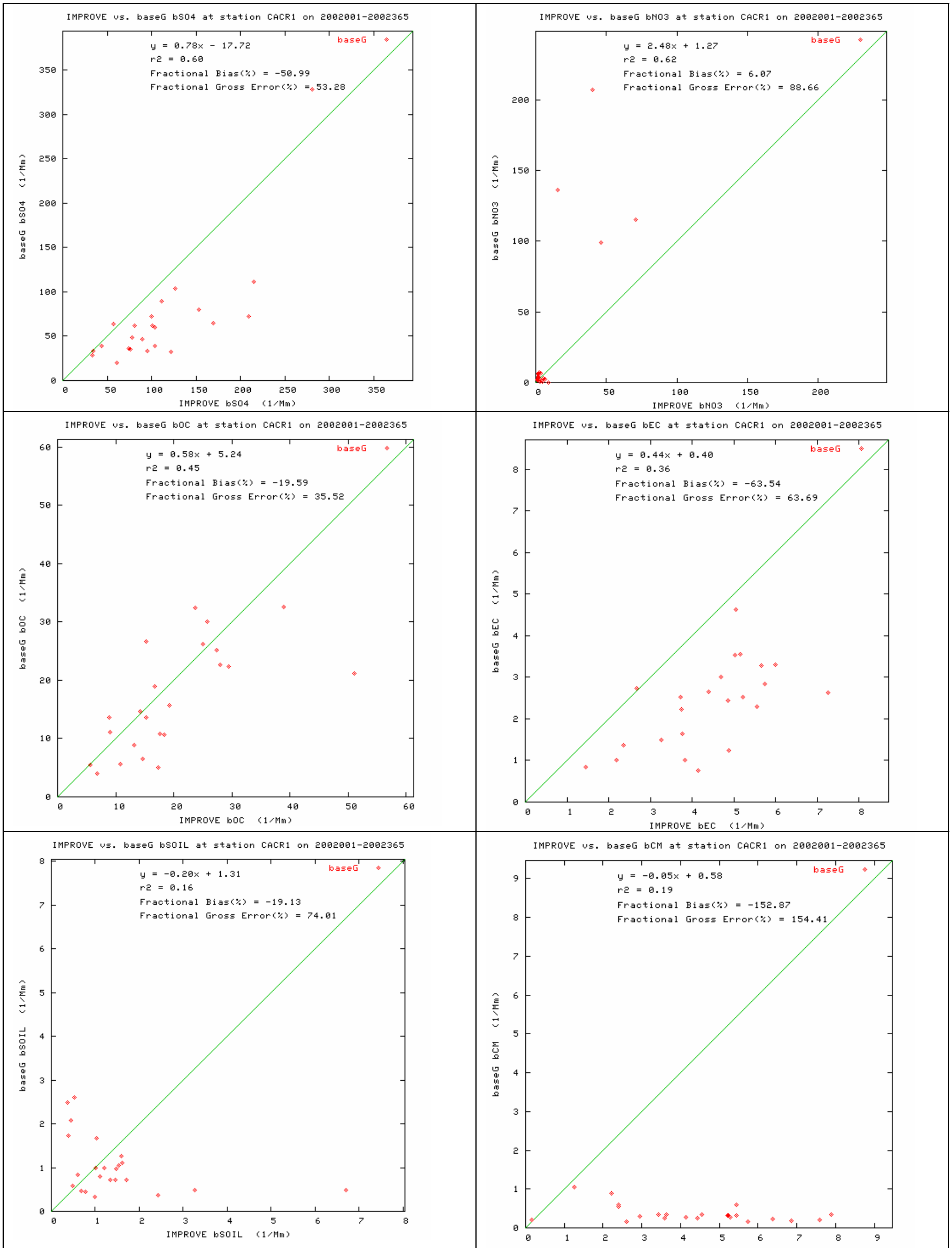


Figure C-48. PM species extinction model performance at Caney Creek (CACR) for the worst 20 percent days during 2002.

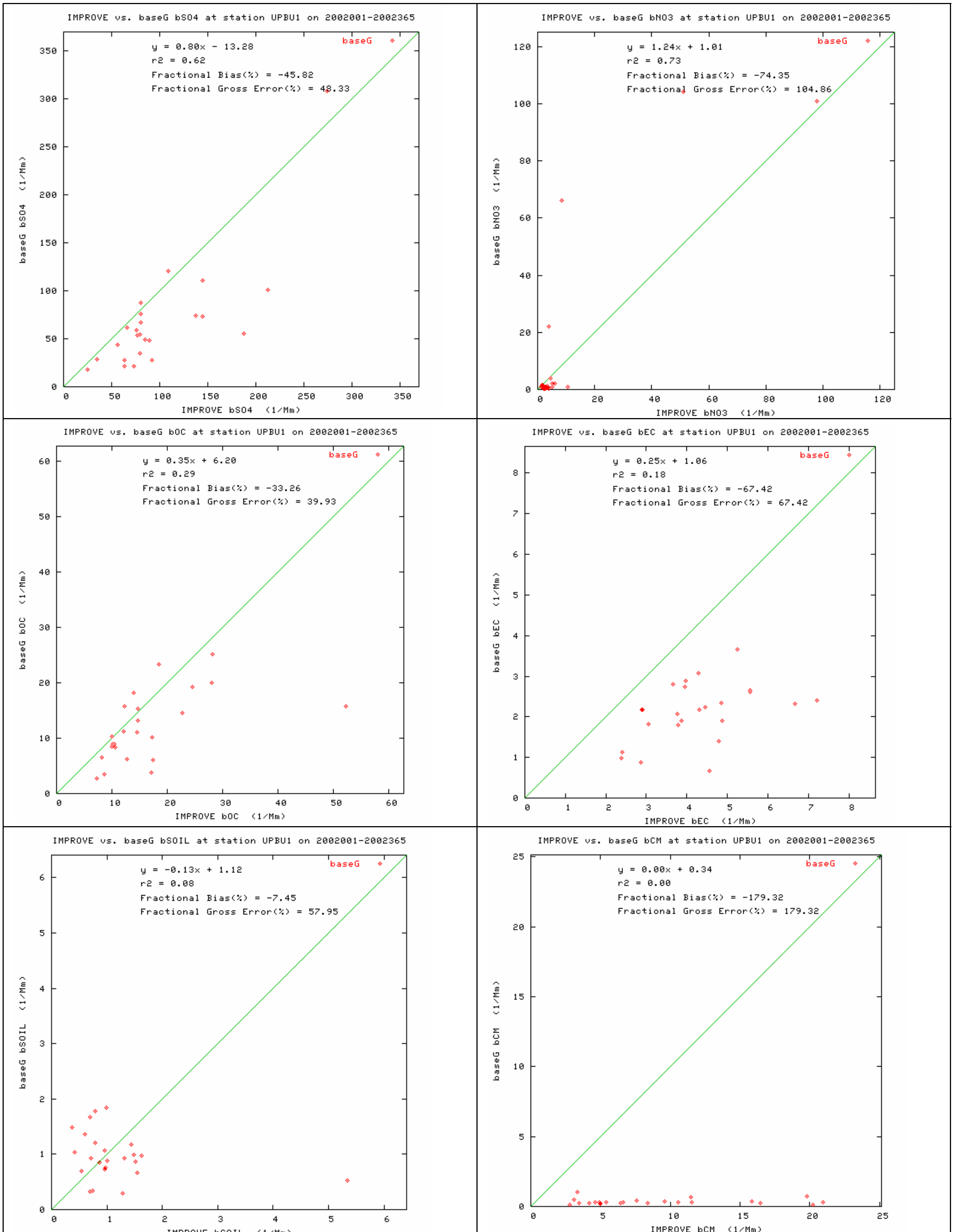


Figure C-49. PM species extinction model performance at Upper Buffalo (UPBU) for the worst 20 percent days during 2002.

C.5.3 Breton Island (BRET), Louisiana

The observed total extinction on the worst 20 percent days at Breton Island is underestimated by -71% (Figure 3-11), which is due to an underestimation of each component of extinction (Figure C-50) by from -50% to -70% (SO4, OMC and Soil) to over -100% (EC and CM). The observed extinction on the worst 20 percent days ranges from 90 to 170 Mm^{-1}, whereas the modeled values drop down to as low as approximately 15 Mm^{-1}. On the best 20 percent days the range of the observed and modeled extinction is similarly (roughly 10 to 50 Mm^{-1}) that results in a reasonably low bias (-22%), but there is little agreement on which days are higher or lower resulting in a lot of scatter and high error (54%).

C.5.4 Boundary Waters (BOWA), Minnesota

There are three types of days during the worst 20 percent days at BOWA, SO4 days, OMC days and NO3 days (Figure 3-12). The two high OMC days are likely fire impact events that the model captures to some extent on one day and not on the other. On the five high (> 20 Mm^{-1}) NO3 extinction days the model predicts the observed extinction well on three days and overestimates by a factor of 3-4 on the other two high NO3 days. SO4 in underestimate by -43% on average across the worst 20 percent days at BOWA.

With the exception of two days, the model reproduces the total extinction for the best 20 percent days at BOWA quite well with a bias and error value of +14% and 22% (Figure 3-12). Without these two days, the modeled and observed extinction both range between 15 and 25 Mm^{-1}.

C.5.5 Voyageurs (VOYA) Minnesota

VOYA is also characterized by SO4, NO3 and OMC days (Figure 3-13). Julian Days 179 and 200 are high OMC days that were also high OMC days at BOWA again indicating impacts from fires in the area that is not fully captured by the model. SO4 and NO3 extinction is fairly good and, without the fire days, OMC performance looks good as well (Figure C-52). On the best 20 percent days there is one day the modeled extinction is much higher than observed and a few others that are somewhat higher, but for most of the best 20 percent days the modeled extinction is comparable to the observed values.

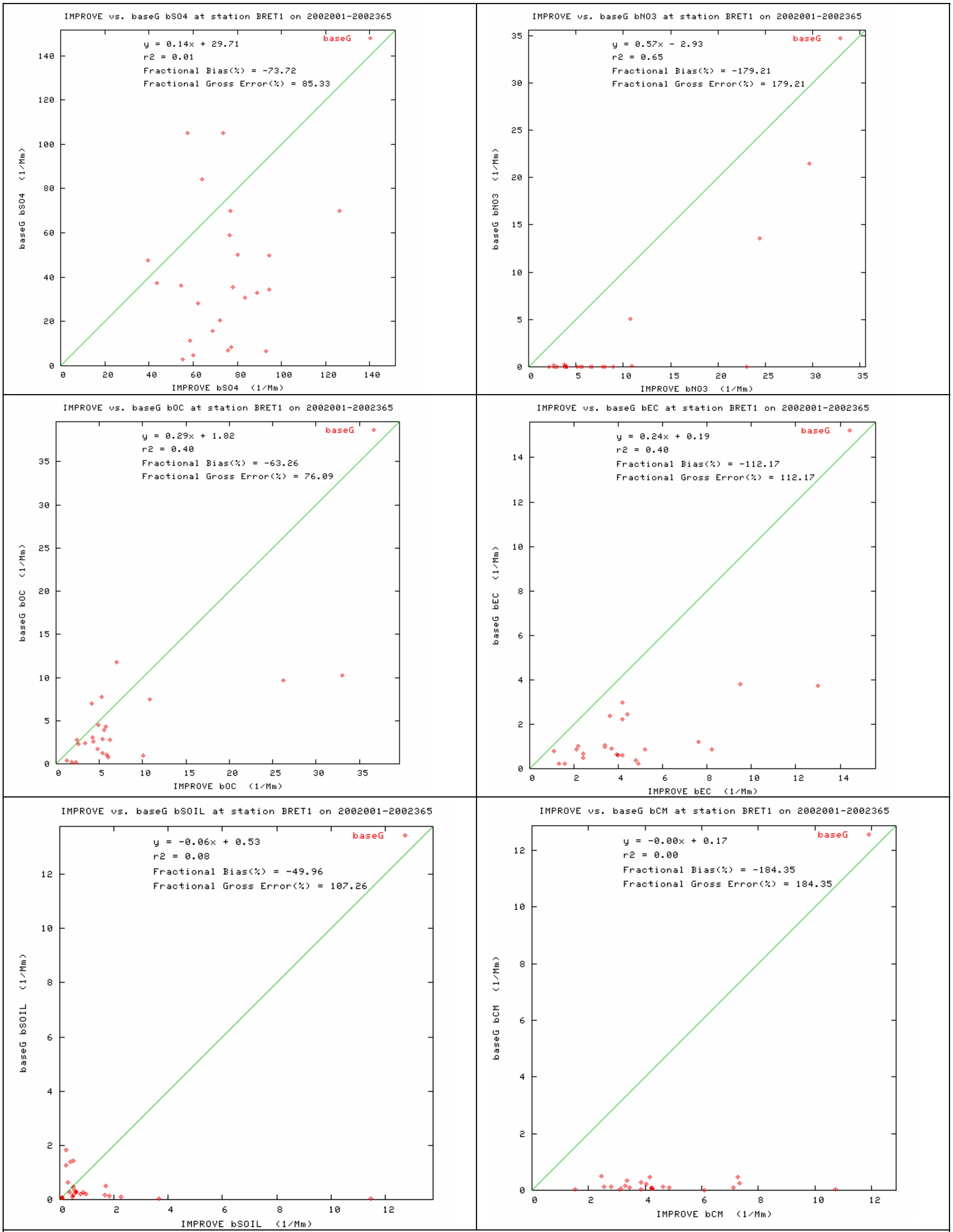


Figure C-50. PM species extinction model performance at Breton Island (BRET) for the worst 20 percent days during 2002.

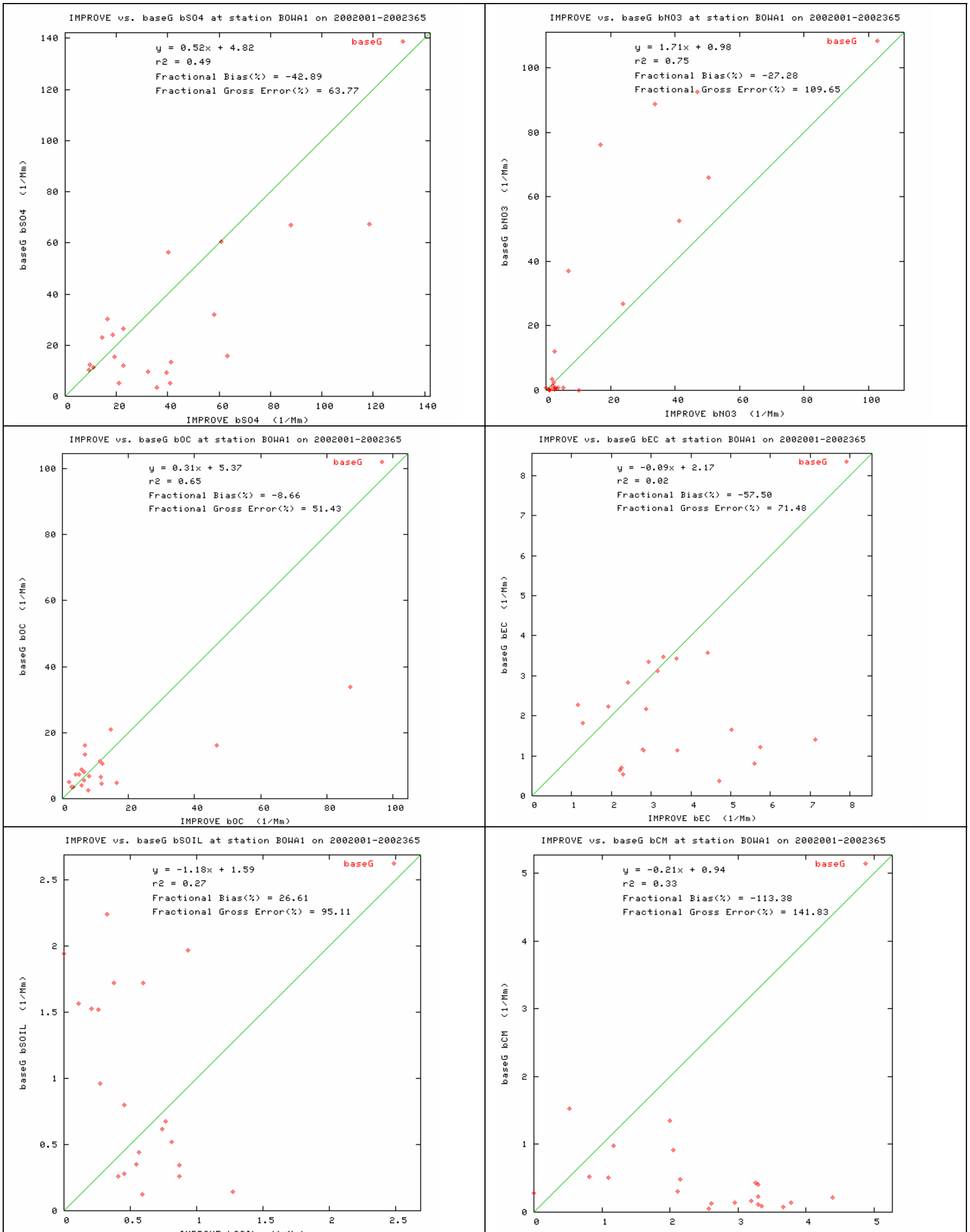


Figure C-51. PM species extinction model performance at Boundary Waters (BOWA) for the worst 20 percent days during 2002.

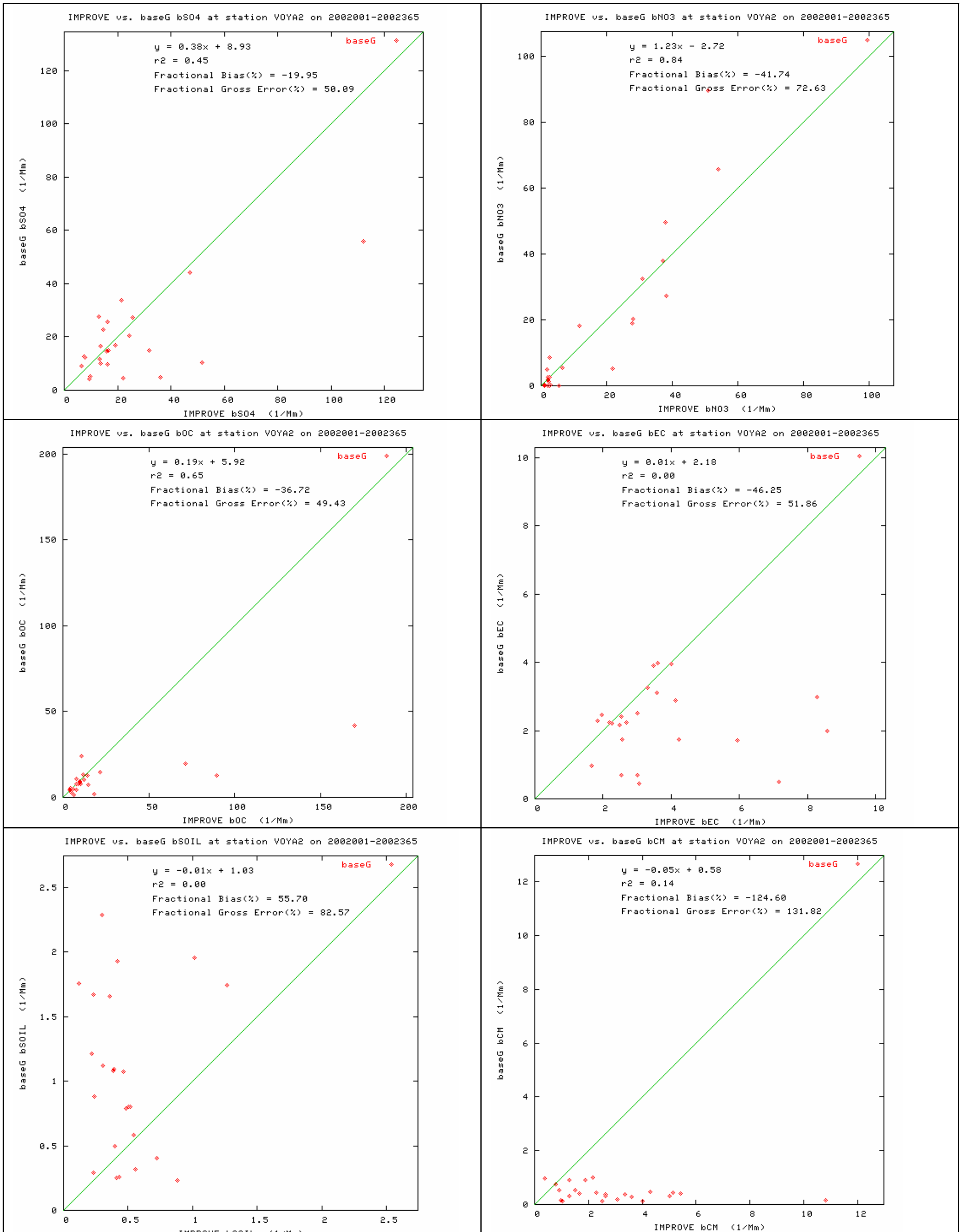


Figure C-52. PM species extinction model performance at Voyageurs (VOYA) for the worst 20 percent days during 2002.

C.5.6 Hercules Glade (HEGL) Missouri

On most of the worst 20 percent days at HEGL the observed extinction ranges from 120 to 220 Mm^{-1} whereas model extinction ranging from 50 to 170 Mm^{-1} (Figure 3-14). However, there is one extreme day with extinction approaching 400 Mm^{-1} that the model does a very good job in replicating. Over all the days there is a modest underestimation bias in SO4 (-39%) and OMC (-39%) extinction, larger underestimation bias in EC (-62%) and CM (-118%) extinction and overestimation bias in Soil (+30%) extinction (Figure C-53).

On the best 20 percent days there is one day where the model overstates the observed extinction by approximately a factor of four and a handful of other days that the model overstates the extinction by a factor of 2 or so, but most of the days both the model and observed extinction sites are around 40 Mm^{-1} plus or minus about 10 Mm^{-1}. On the best 20 percent days when the observed extinction is overstated it is due to overstatement of the NO3.

C.5.7 Mingo (MING) Missouri

The worst 20 percent days at Ming are mainly high SO4 days with a few high NO3 days that the model reproduces reasonably well resulting in low bias (+10%) and error (38%) for total extinction (Figure 3-15). The PM species specific performance is fairly good with low bias for SO4 (+4%), good agreement with NO3 on high NO3 days except for one day, low OMC (+23%) and EC (+3%) bias and larger bias in EC (+37%) and CM (-105%) extinction (Figure C-54).

For the best 20 percent days, there is one day the model is way to high due to overstated NO3 extinction and a few other days the model overstates the observed extinction that is usually due to overrated NO3, but on most of the best 20 percent days the modeled extinction is comparable to the observed values. This results in low bias (+12%) and error (36%) for total extinction at MING for the best 20 percent days.

C.5.8 Wichita Mountains (WIMO), Oklahoma

With the exception of an over-prediction on day 344 due to NO3, observed total extinction on the worst 20 percent days at WIMO is understated with a bias of -42% (Figure 3-16) that is primarily due to an underestimation of extinction due to SO4 (-48%) and OMC (-69%) (Figure C-55).

CMAQ total extinction performance for the average of the best 20 percent days at WIMO is characterized by an overestimation bias (+21%) on most days that is primarily due to NO3 over-prediction on several days. Again the modeled range of extinction on the best 20 percent days (12-60 Mm^{-1}) is much greater than observed (20-35 Mm^{-1}).

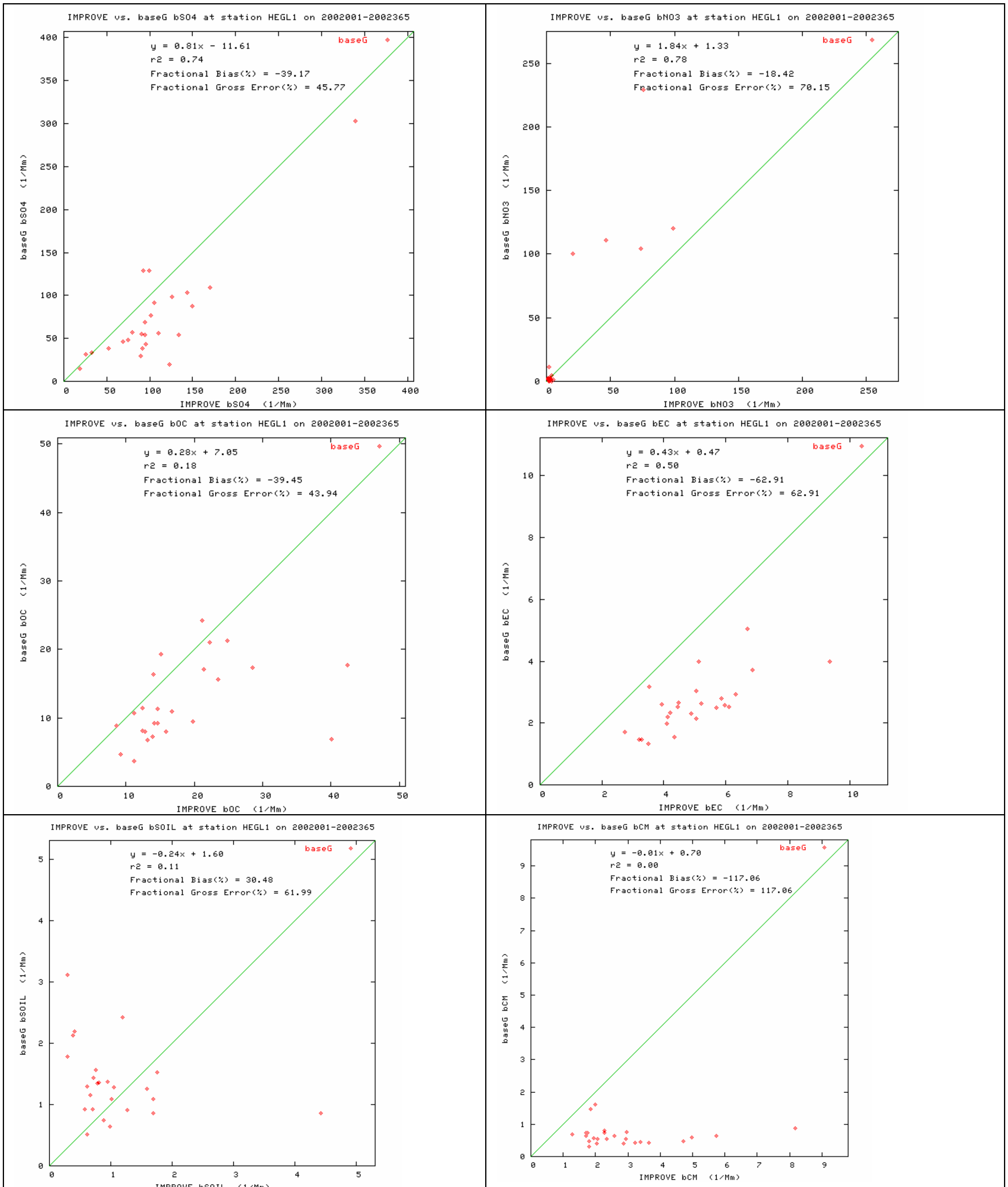


Figure C-53. PM species extinction model performance at Hercules Glade (HEGL) for the worst 20 percent days during 2002.

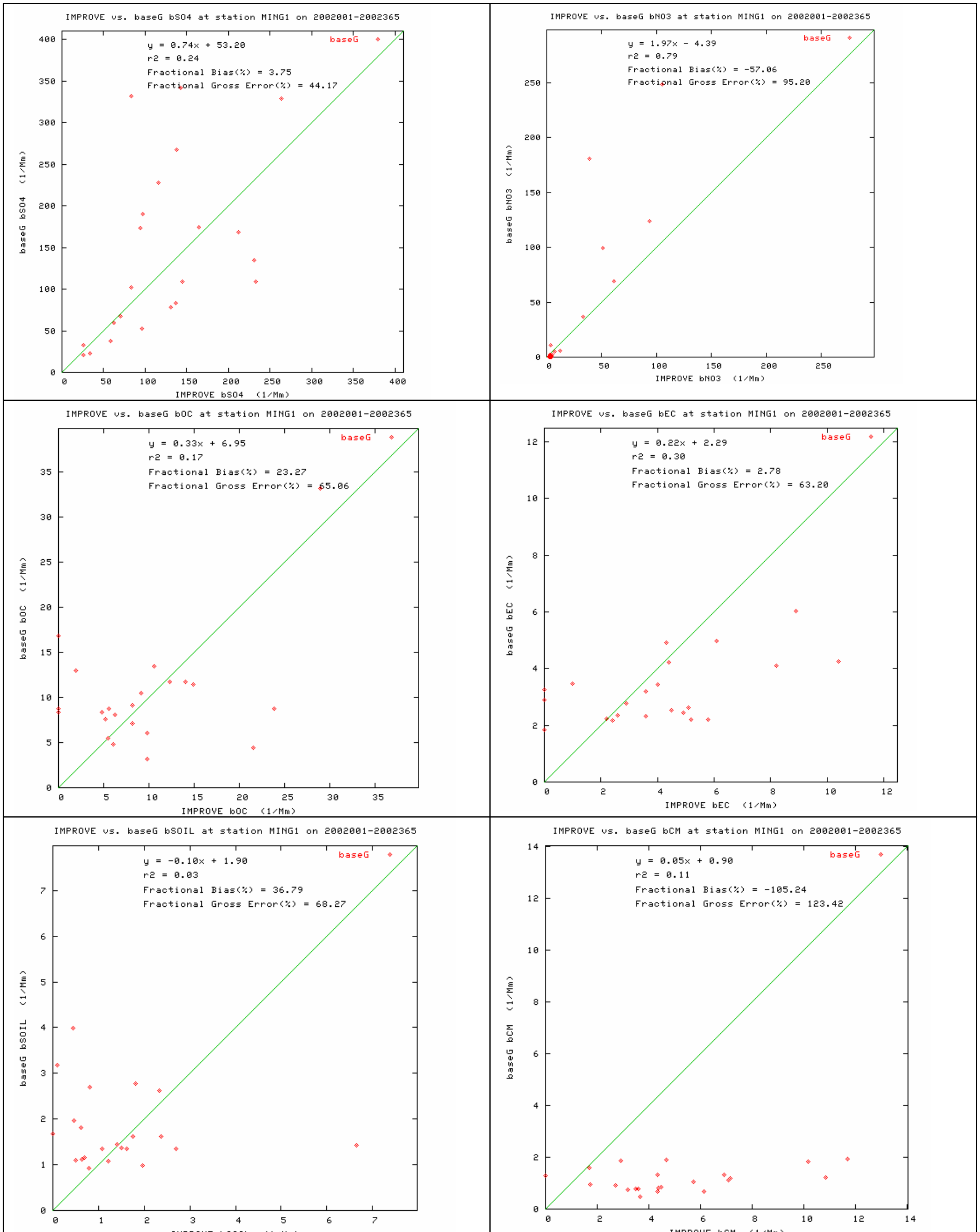


Figure C-54. PM species extinction model performance at Mingo (MING) for the worst 20 percent days during 2002.

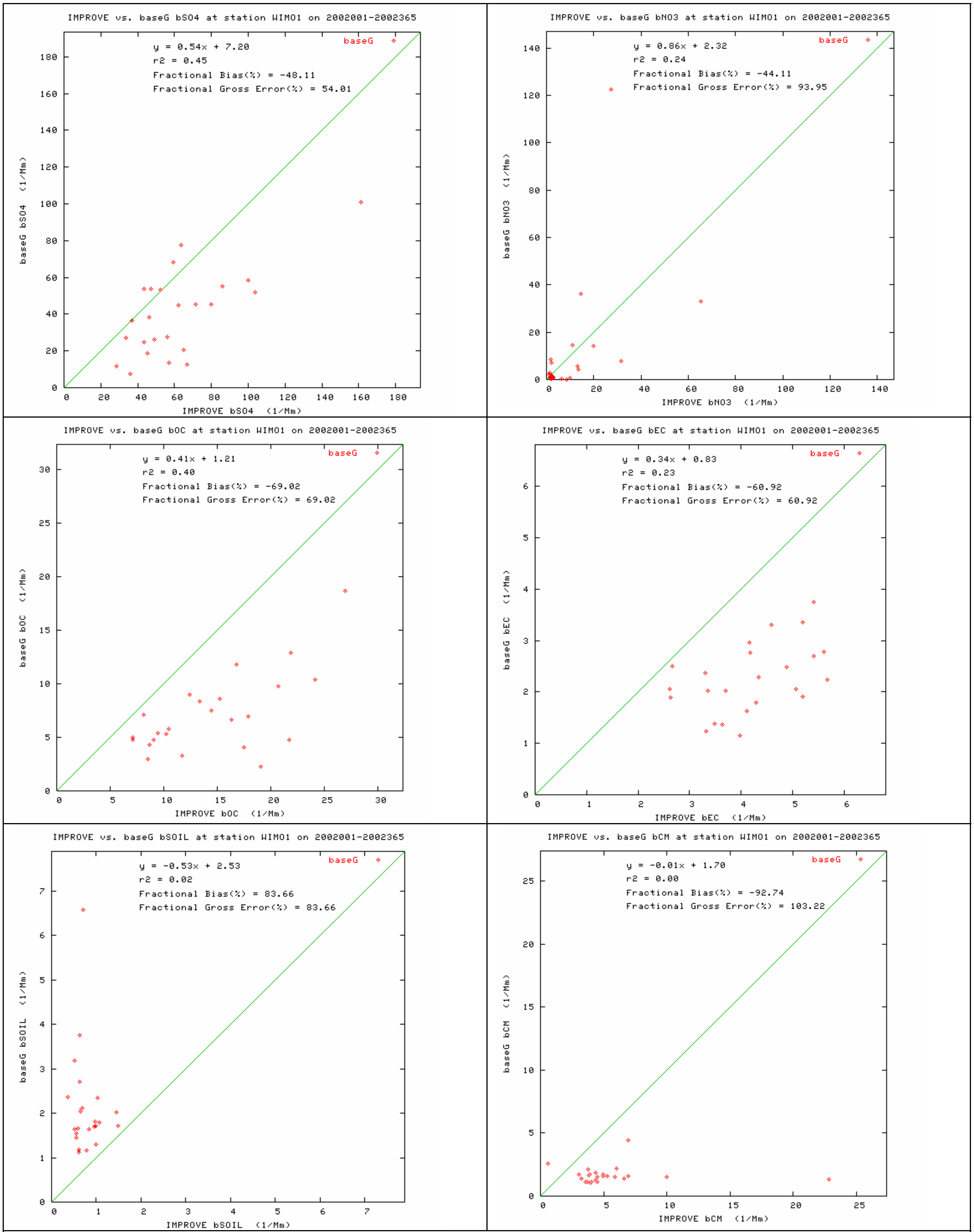


Figure C-55. PM species extinction model performance at Wichita Mountains (WIMO) for the worst 20 percent days during 2002.

C.5.9 Big Bend (BIBE) Texas

The observed extinction on the worst 20 percent days at BIBE is under-predicted on almost every day resulting in a fractional bias value of -72% (Figure 3-17). Every component of extinction is underestimated on average for the worst 20 percent days (Figure C-56) with the underestimation bias ranging from -24% (OMC) to -162% (CM). SO4 extinction, that typically represents the largest component of the total extinction is understated by -94%.

The model does a better job in predicting the total extinction at BIBE for the best 20 percent days with average fractional bias and error values of +13% and 19% (Figure 3-17). With the exception of one day that the observed extinction is overestimated by approximately a factor of 2, the modeled and observed extinction on the best 20 percent days at BIBE are both within 12 to 25 Mm^{-1}. However, there are some mismatches with the components of extinction with the model estimating much lower contributions due to Soil and CM.

C.5.10 Guadalupe Mountains (GUMO) Texas

Most of the worst 30 percent days at GUMO are dust days with high Soil and CM that is not at all captured by the model (Figure 3-18). Extinction due to Soil and CM on the worst 20 percent days is underestimated by -105% and -191%, respectively (Figure C-57). Better performance is seen on the best 20 percent days with bias and error for total extinction of 8% and 21%, but the model still understates Soil and CM.

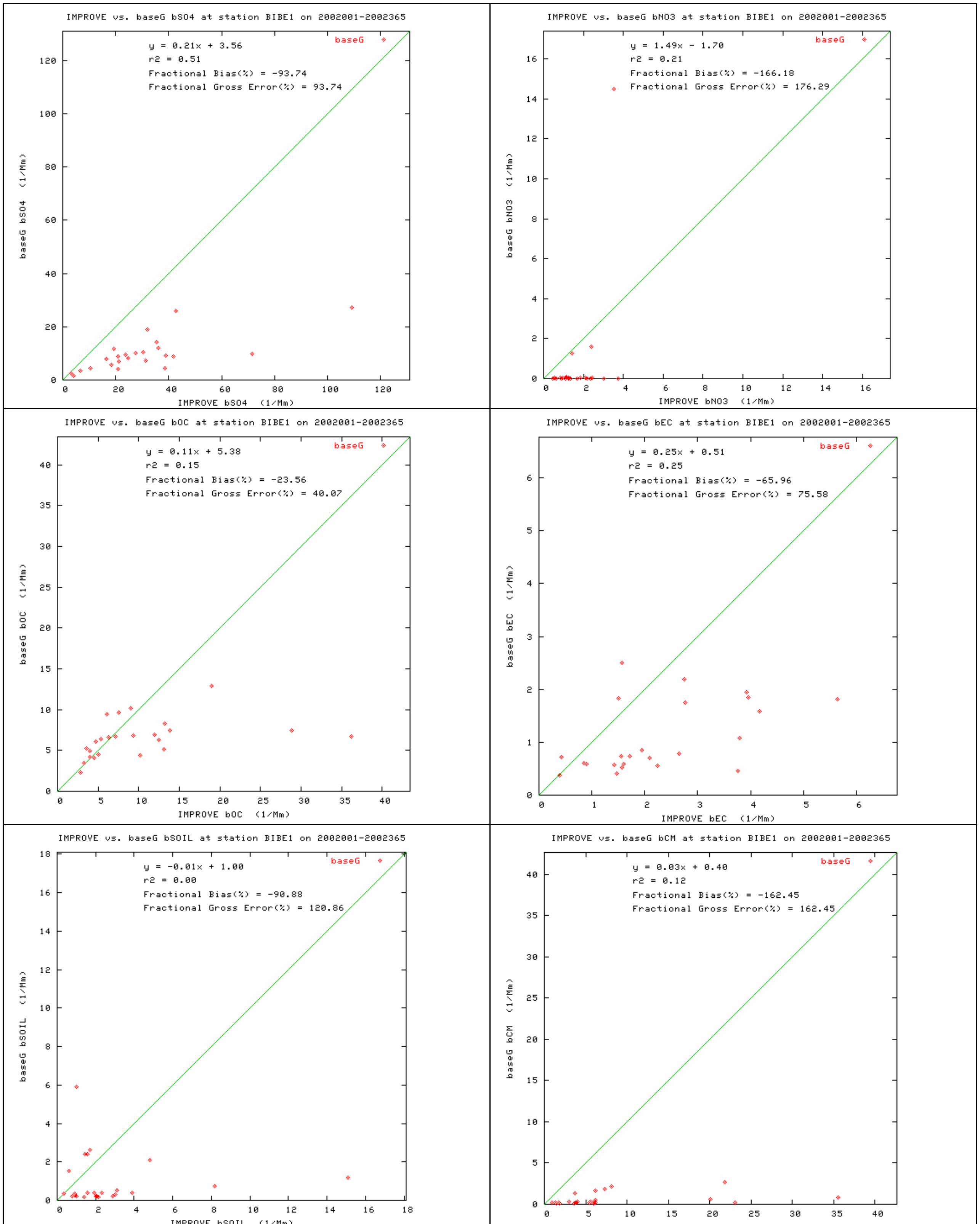


Figure C-56. PM species extinction model performance at Big Bend (BIBE) for the worst 20 percent days during 2002.

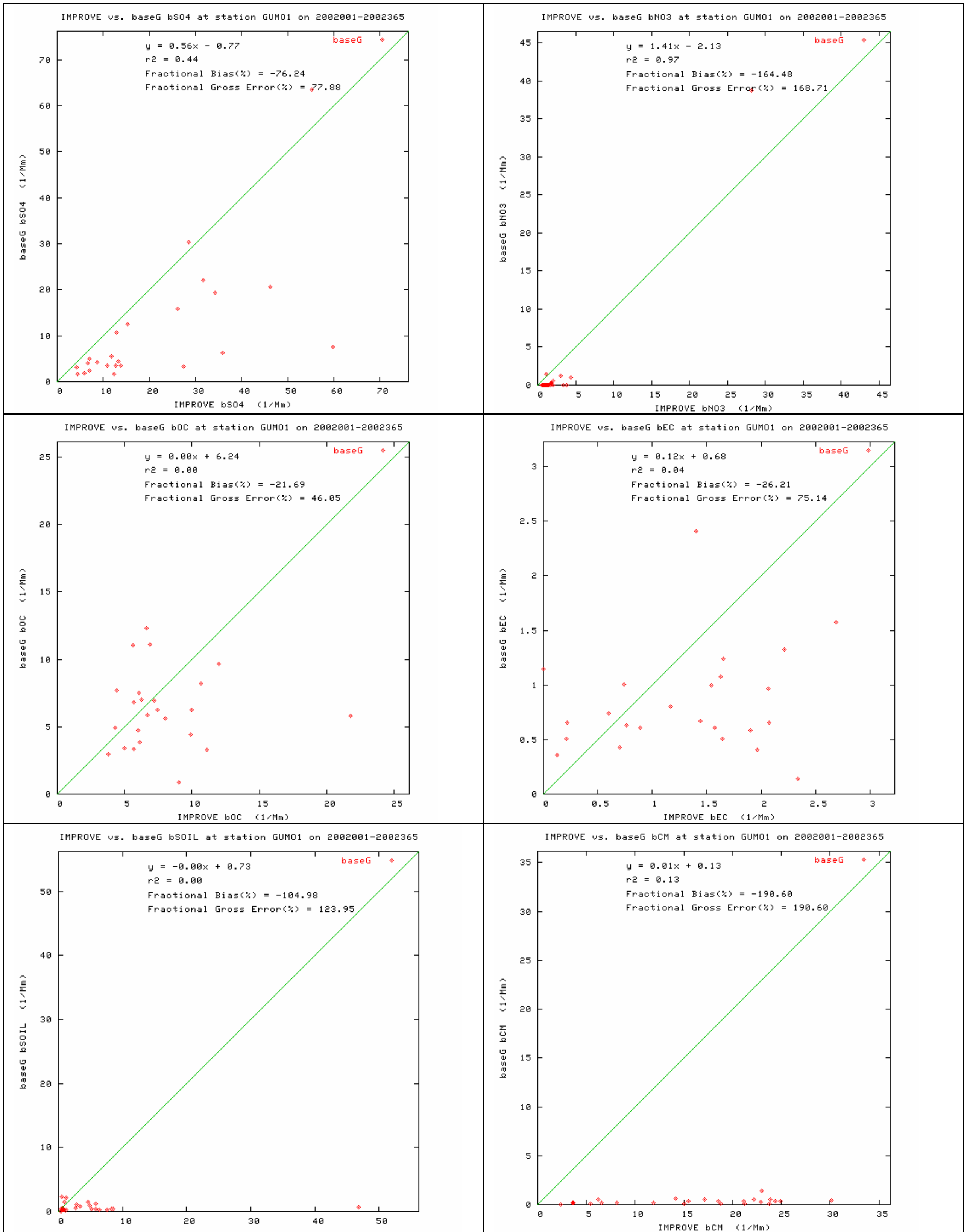


Figure C-57. PM species extinction model performance at Guadalupe Mountains (GUMO) for the worst 20 percent days during 2002.

C.6 Model Performance Evaluation Conclusions

The model performance evaluation reveals that the model is performing best for SO4, OMC and EC. Soil performance is mixed with winter overestimation bias but lower bias but high error in the summer. CM performance is poor year round. The operational evaluation reveals that SO4 performance usually achieves the PM model performance goal and always achieves the model performance criteria, although it does have an underestimation bias that is greatest in the summer. NO3 performance is characterized by a winter overestimation bias with an even greater summer underestimation bias. However, the summer underestimation bias occurs when NO3 is very low and it is not an important component of the observed or predicted PM and visibility impairment. Performance for OMC meets the model performance goal year round at the IMPROVE sites, but is characterized by an underestimation bias at the more urban STN sites. EC exhibits very low bias at the STN sites and a summer underestimation bias at the IMPROVE sites, but meets the model performance goal throughout the year. Soil has a winter overestimation bias that exceeds the model performance goal and criteria raising questions whether the model should be used for this species. Finally, CM performance is extremely poor with an under-prediction bias that exceeds the performance goal and criteria. We suspect that much of the CM concentrations measured at the IMPROVE sites is due to highly localized emissions that can not be simulated with 36 km regional modeling.

Performance for the worst 20 percent days at the CENRAP Class I areas is generally characterized by an underestimation bias. Performance at the BRET, BIBE and GUMO Class I areas for the worst 20 percent days is particularly suspect and care should be taken in the interpretation of the visibility projections at these three Class I areas.

The CMAQ 2002 36 km model appears to be working well enough to reliably make future-year projections for changes in SO4, NO3, EC and OMC at the rural Class I areas. Performance for Soil and especially CM is suspect enough that care should be taken in interpreting these modeling results. The model evaluation focused on the model's ability to predict the components of light extinction mainly at the Class I areas. Additional analysis would have to be undertaken to examine the model's ability to treat ozone and fine particulate to address 8-hour ozone and $PM_{2.5}$ attainment issues.

APPENDIX D

2018 Visibility Projections for CENRAP Class I Areas Using 2002 Typical and 2018 Base Case Base G Emission Scenario CMAQ Results and EPA Default Projection Method and Comparison with 2018 Uniform Rate of Progress (URP) Glidepaths

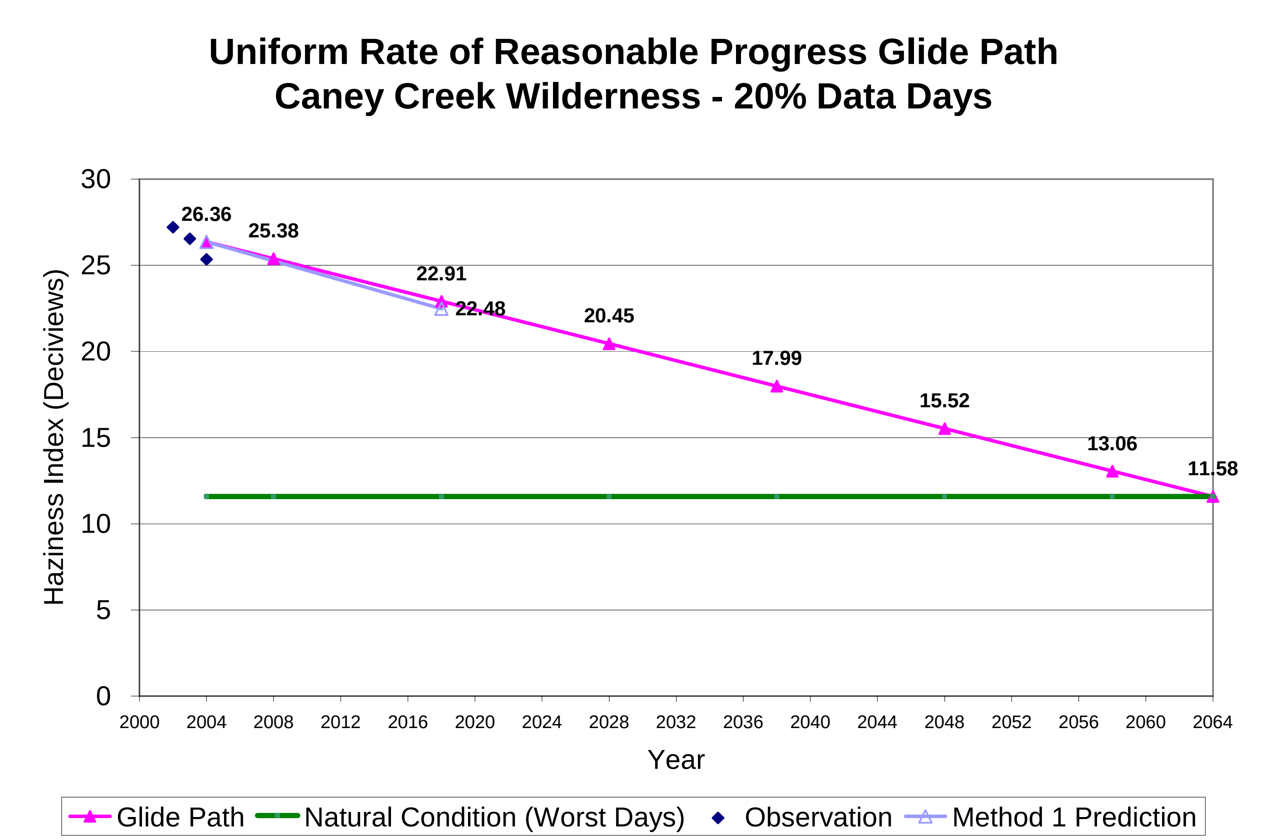


Figure D-1a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

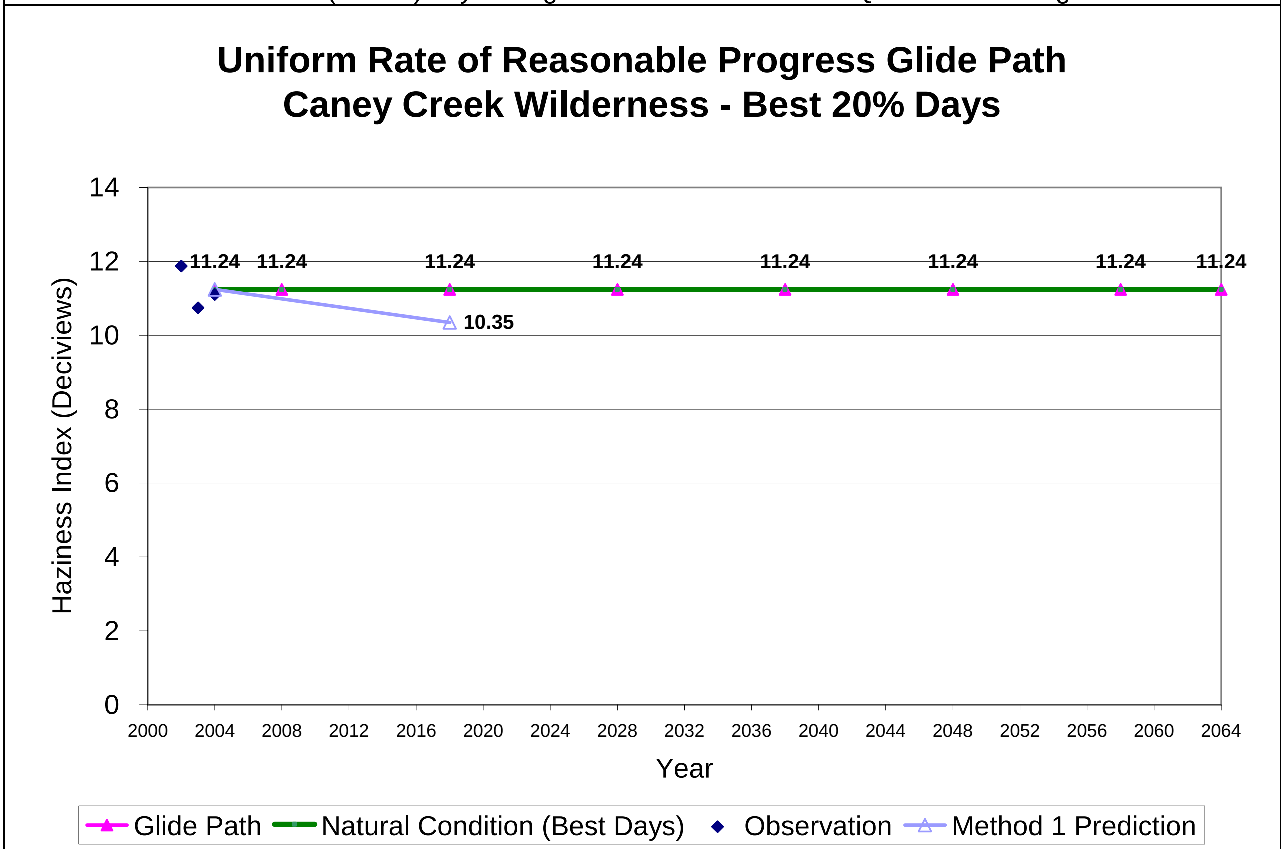


Figure D-1b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Caney Creek (CACR), Arkansas and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

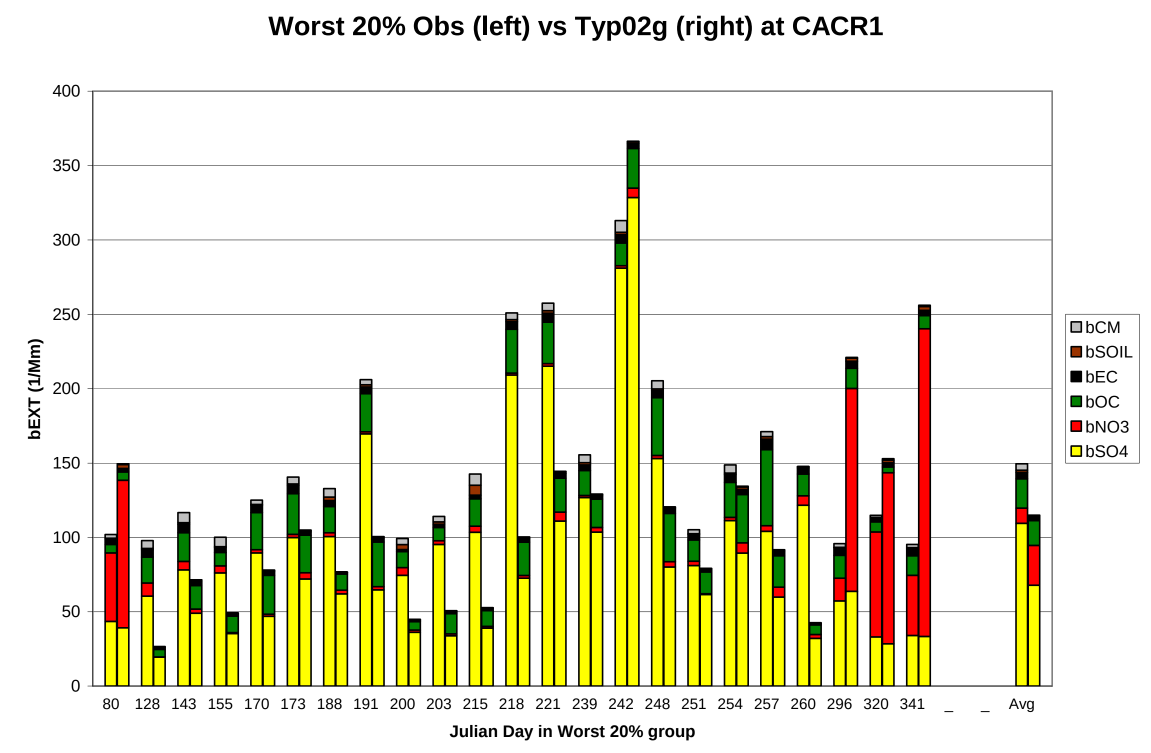


Figure D-1c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days in 2002.

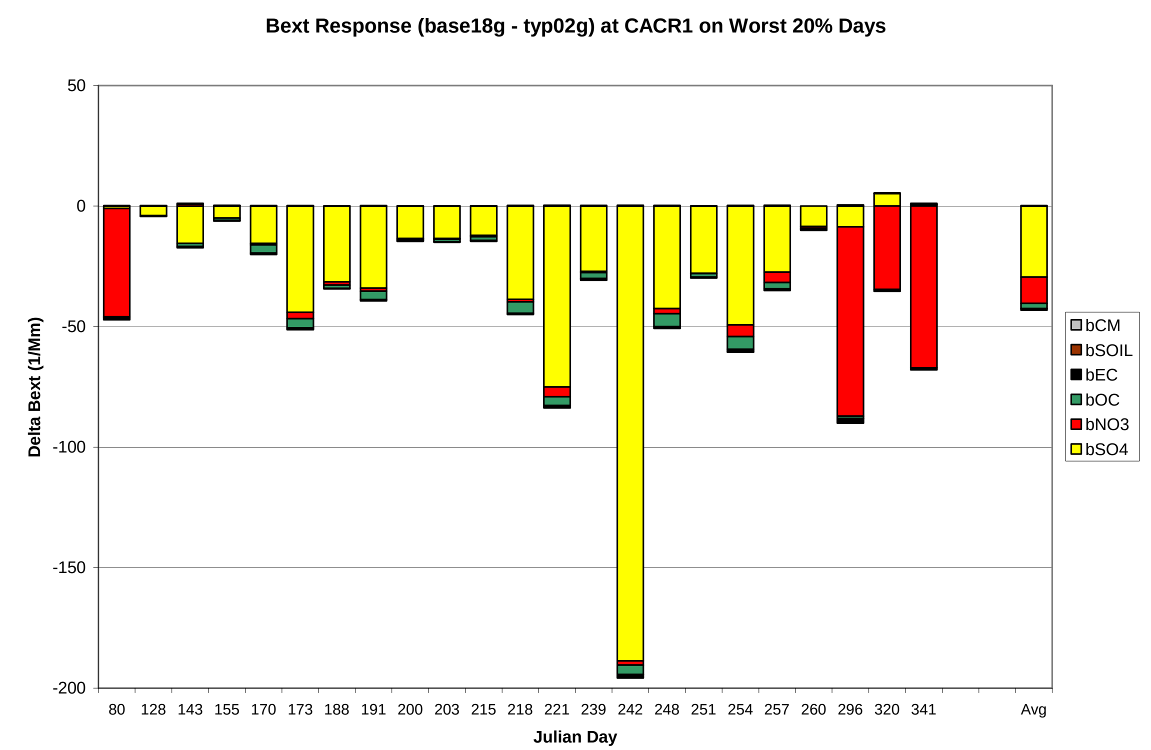


Figure D-1d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days in 2002.

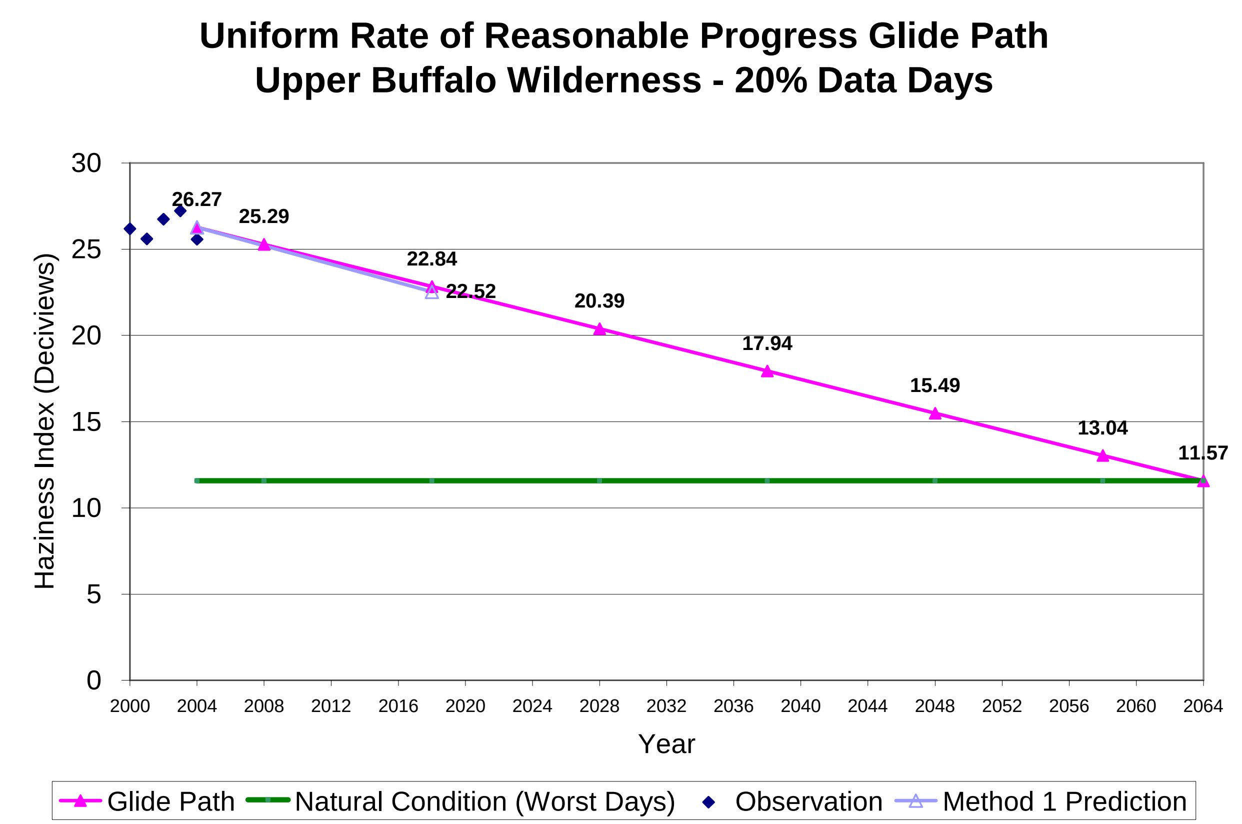


Figure D-2a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

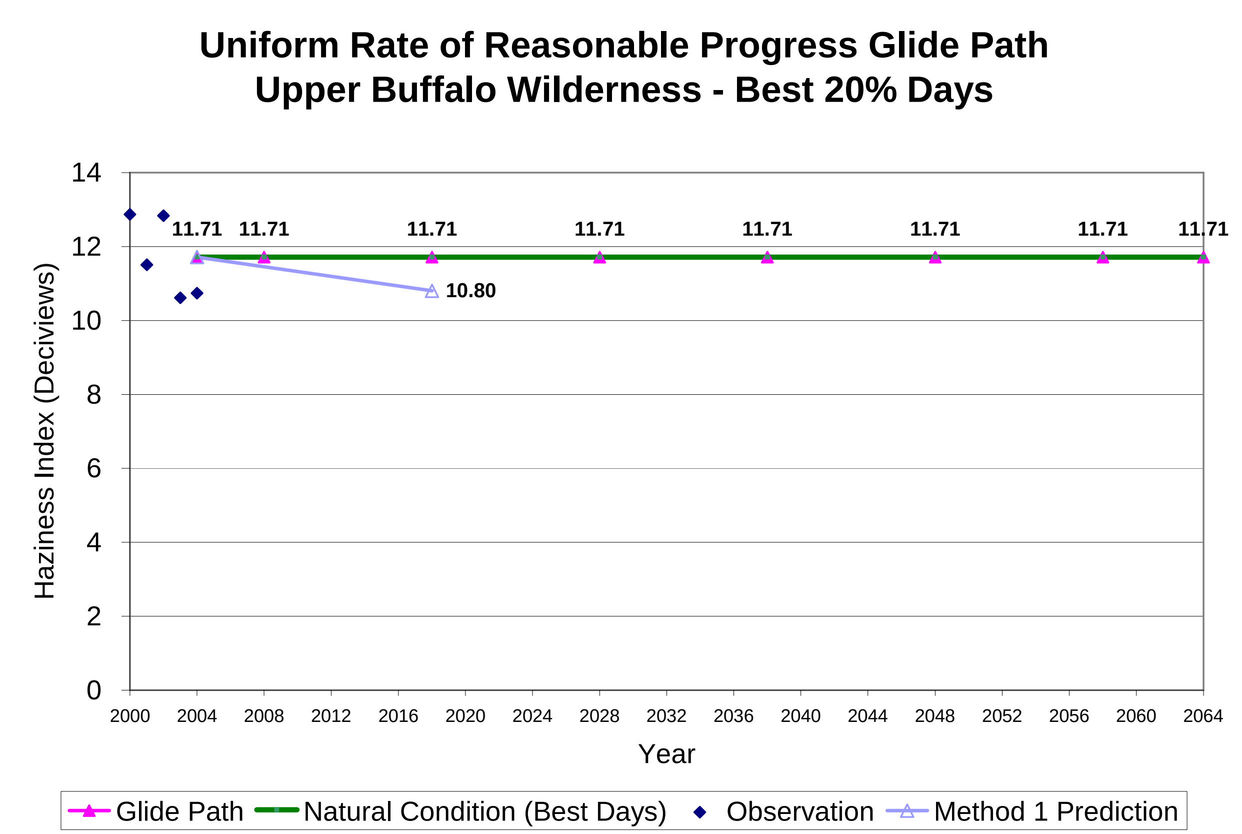


Figure D-2b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Upper Buffalo (UPBU), Arkansas and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

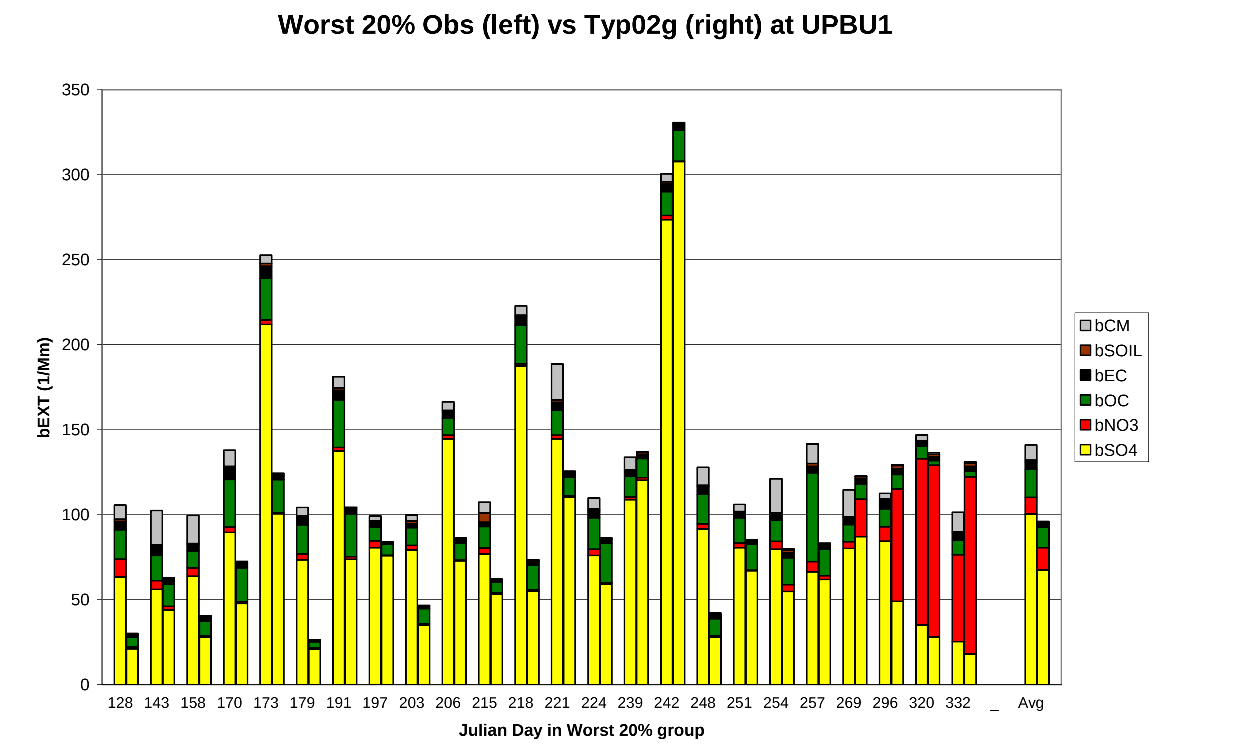


Figure D-2c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days in 2002.

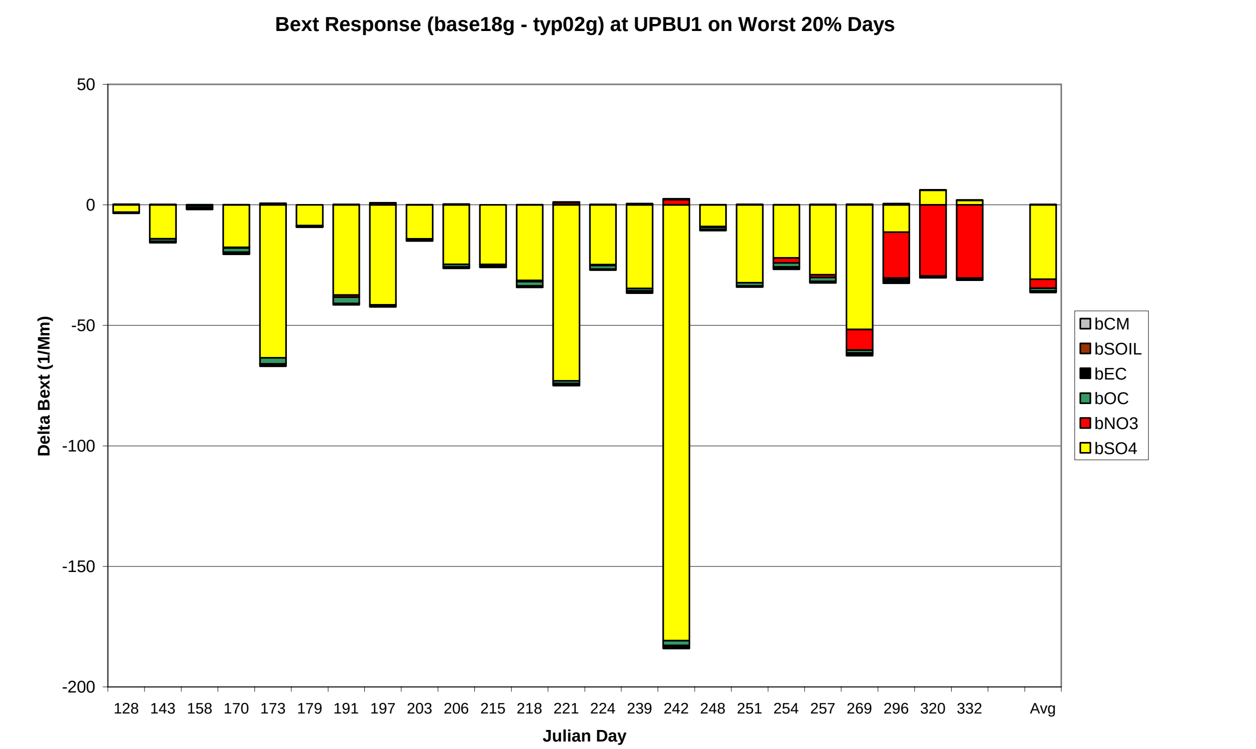


Figure D-2d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days in 2002.

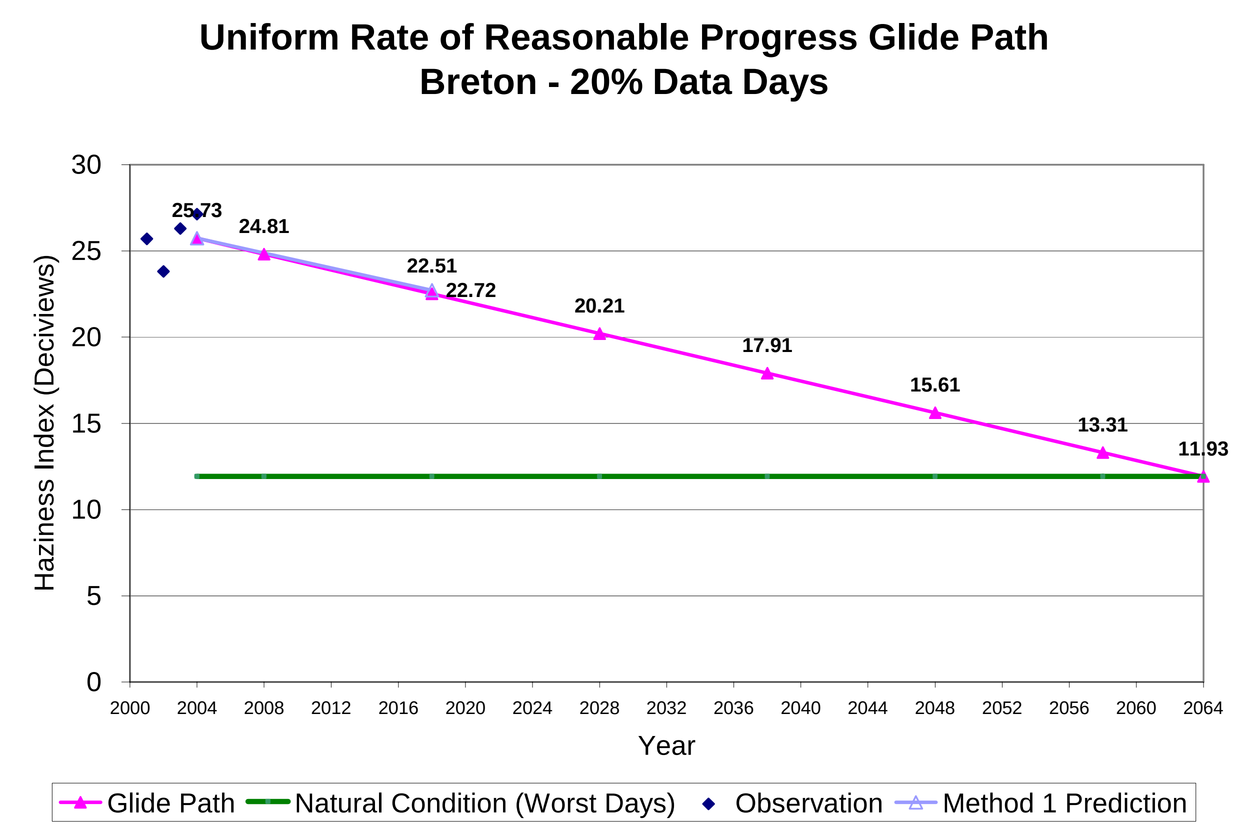


Figure D-3a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

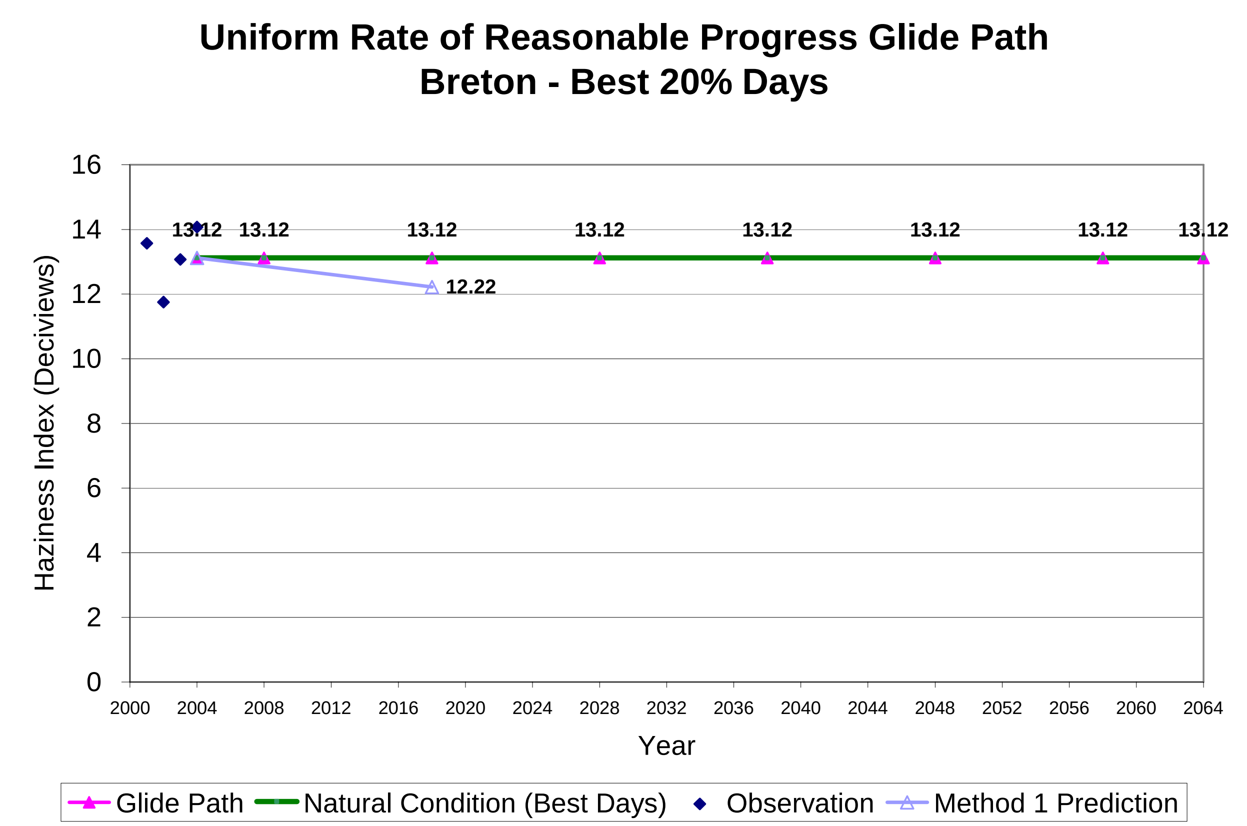


Figure D-3b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Breton Island (BRET), Louisiana and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

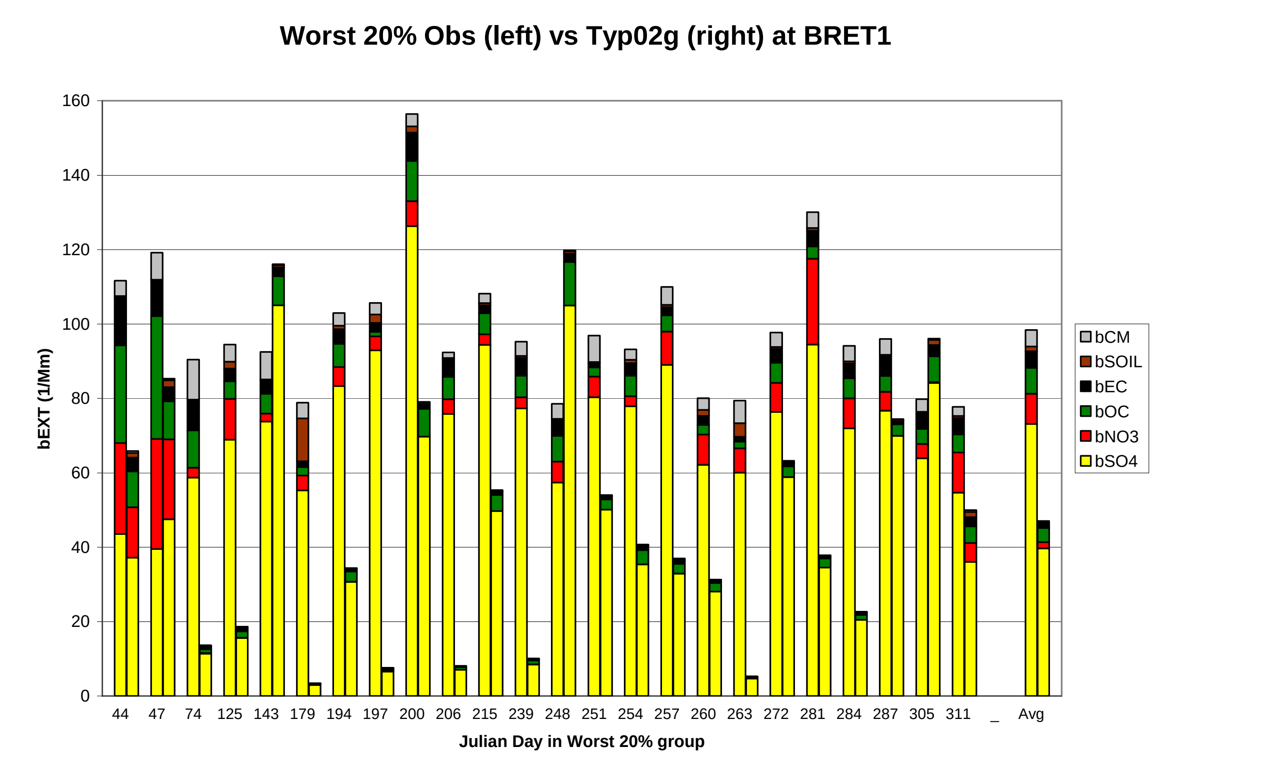


Figure D-3c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Breton Island (BRET), Louisiana and Worst 20% (W20%) days in 2002.

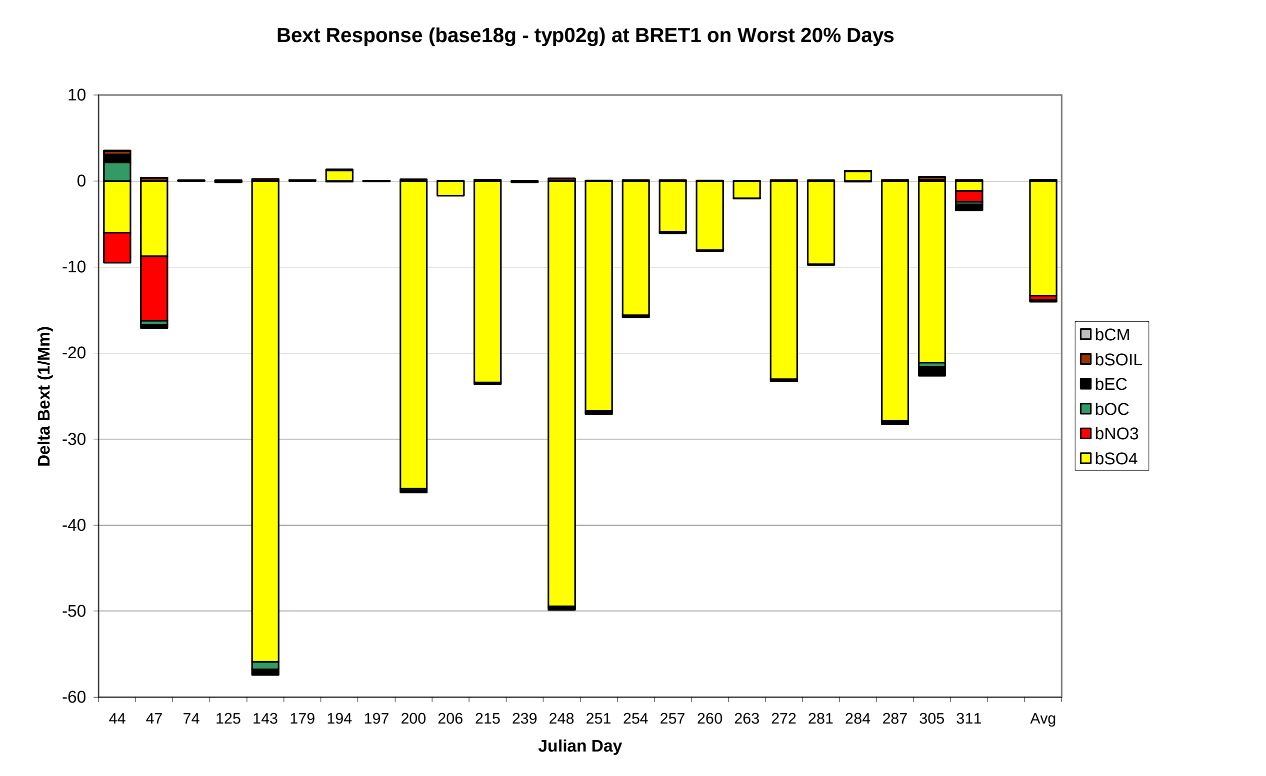


Figure D-3d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Breton Island (BRET), Louisiana and Worst 20% (W20%) days in 2002.

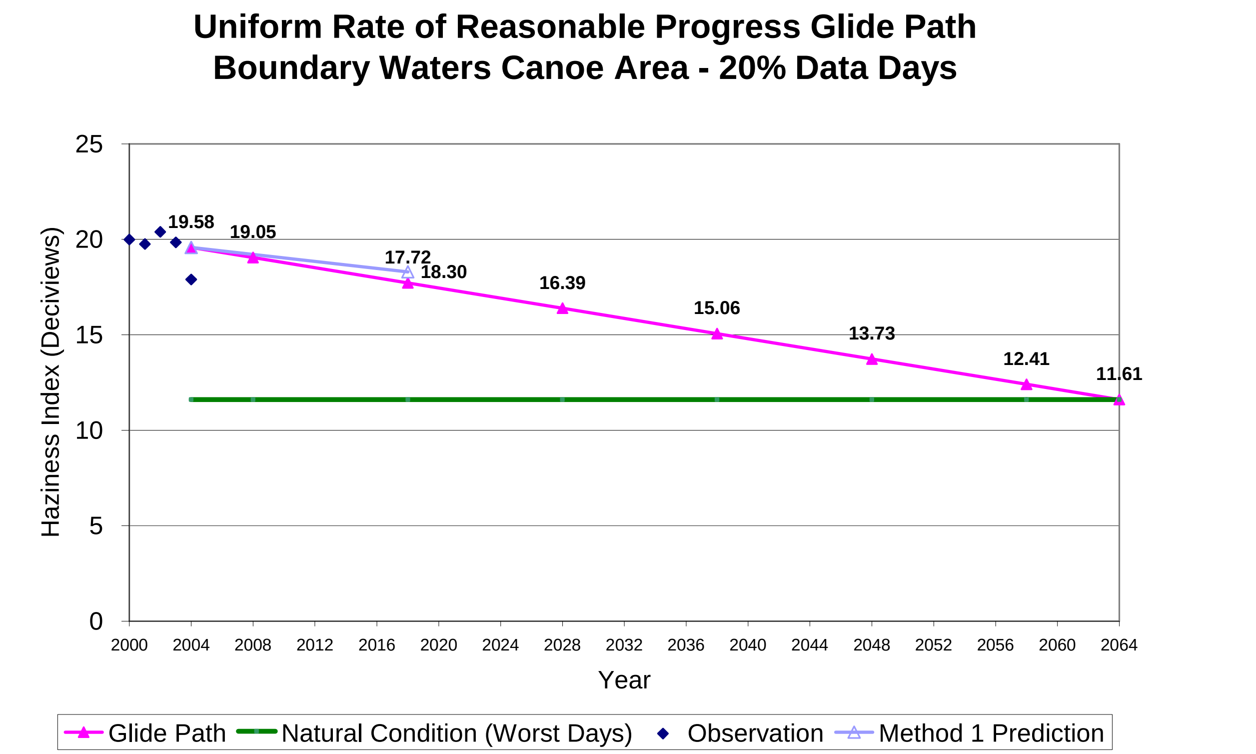


Figure D-4a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

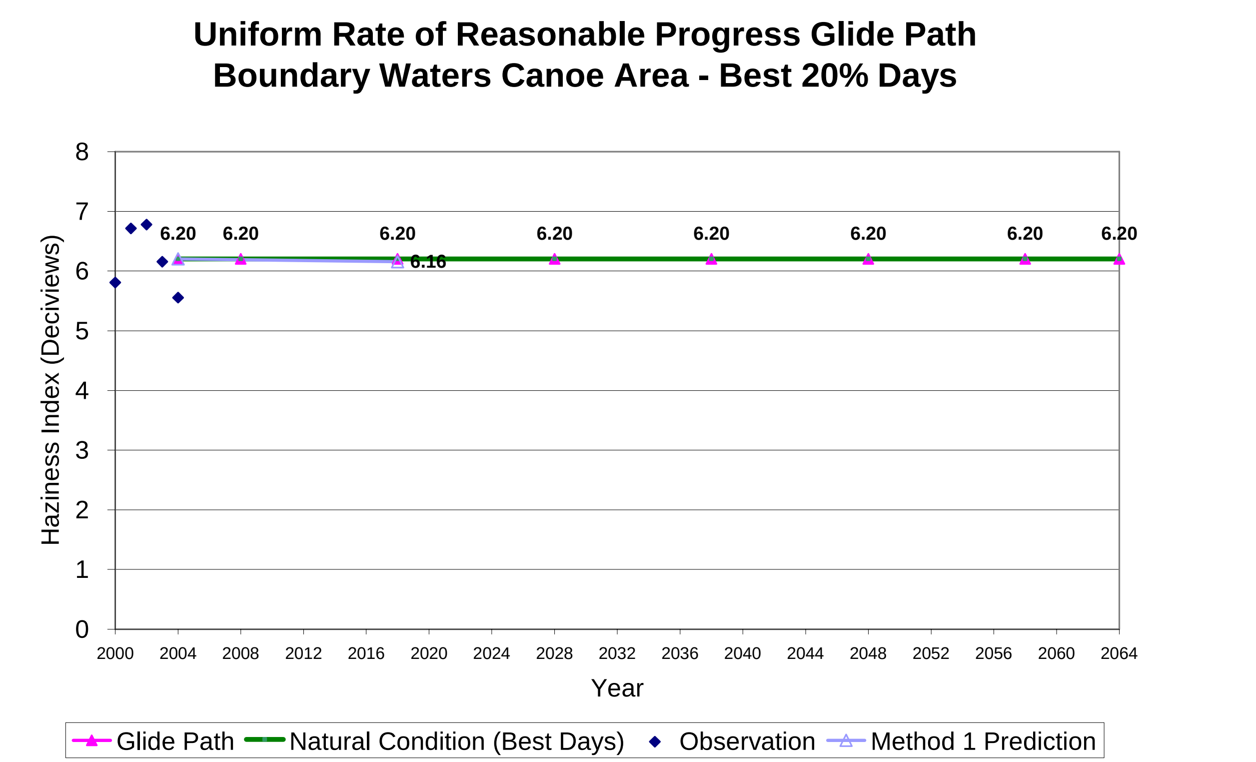


Figure D-4b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Boundary Waters (BOWA), Minnesota and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

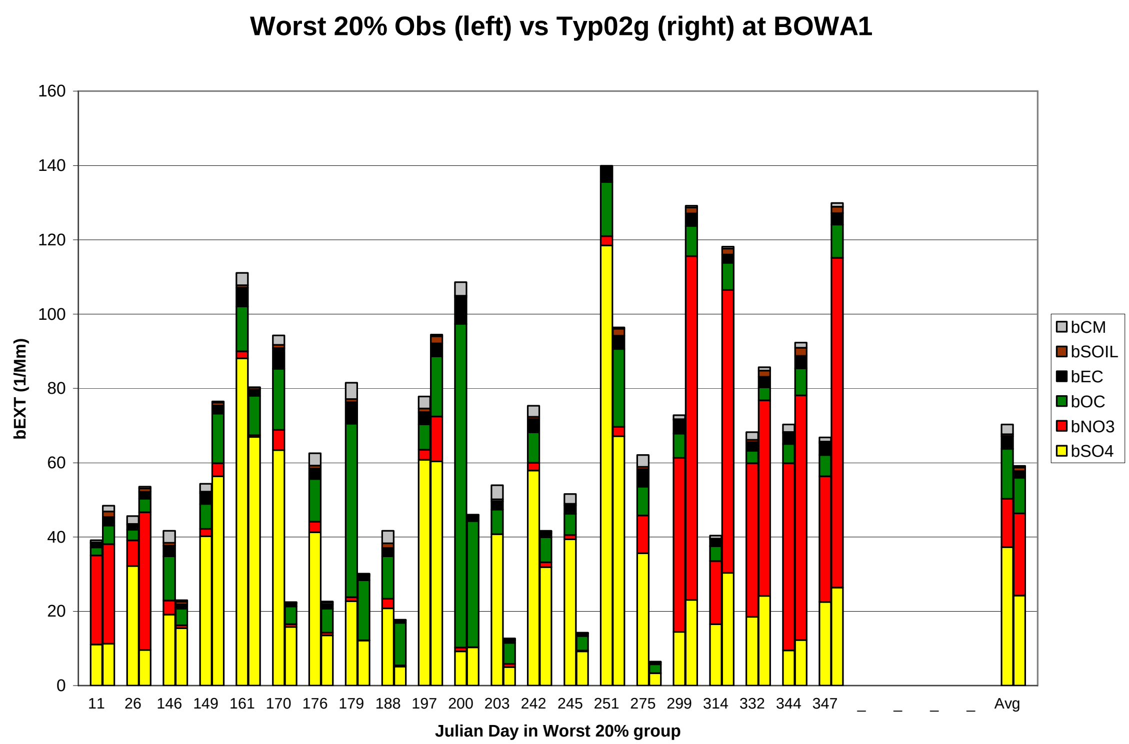


Figure D-4c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days in 2002.

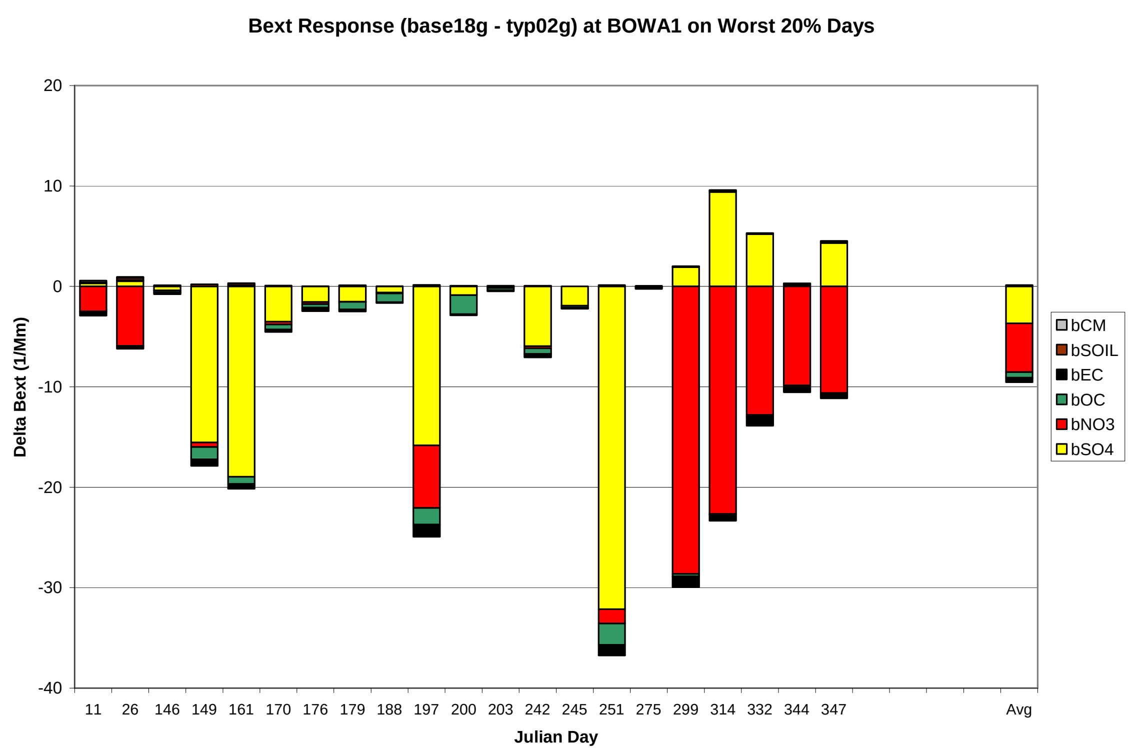


Figure D-4d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days in 2002.

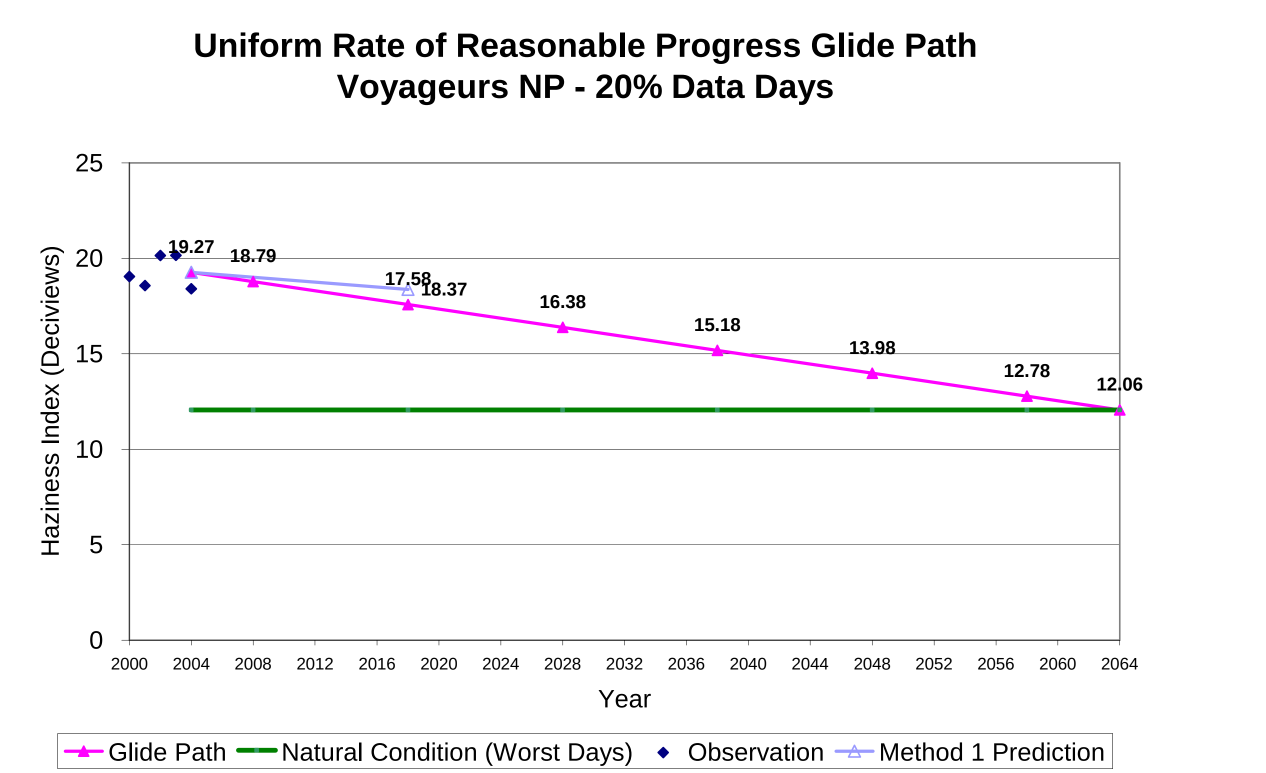


Figure D-5a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

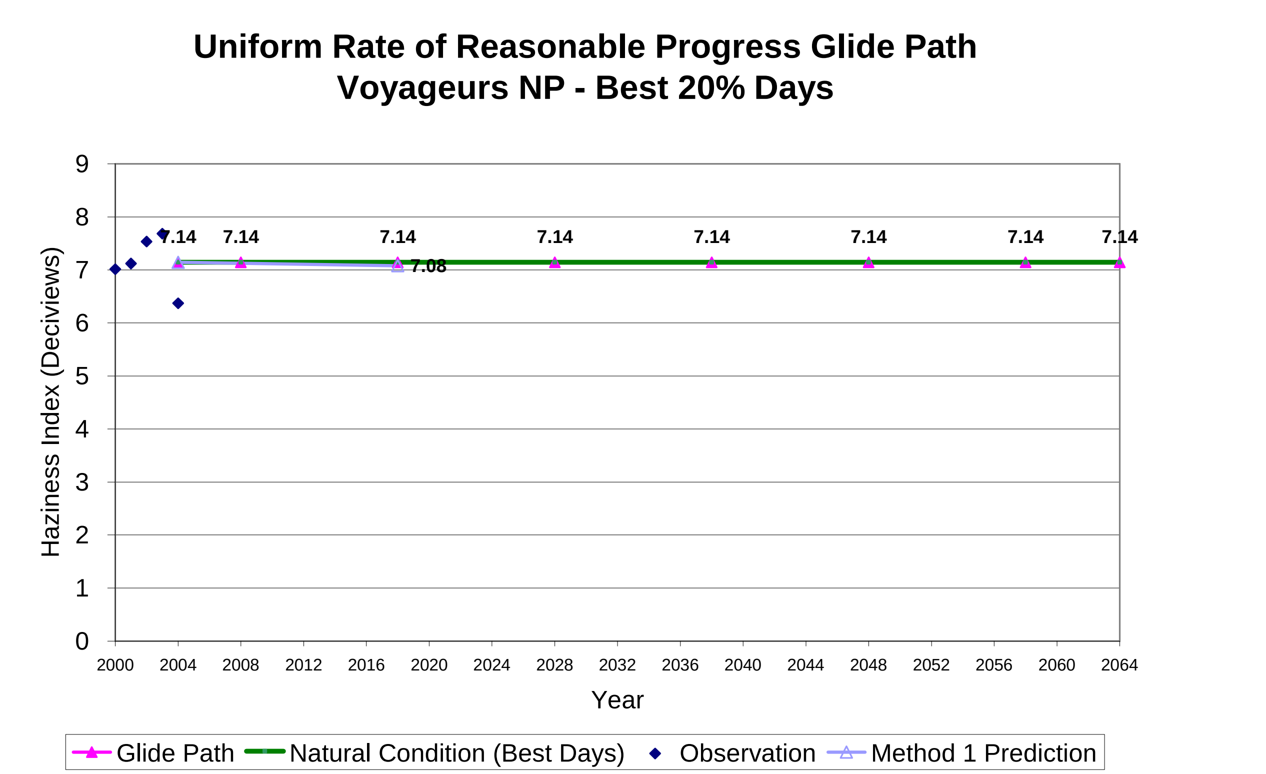


Figure D-5b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Voyageurs (VOYA), Minnesota and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

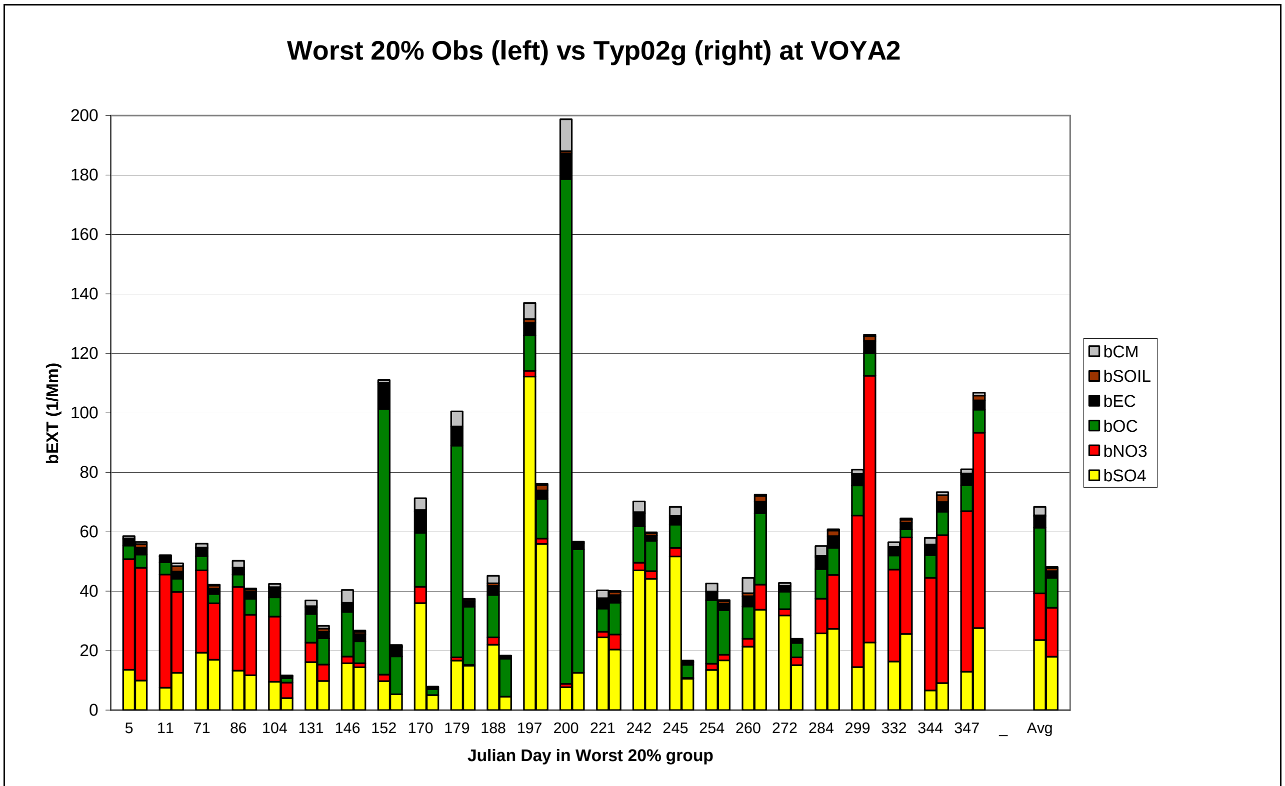


Figure D-5c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days in 2002.

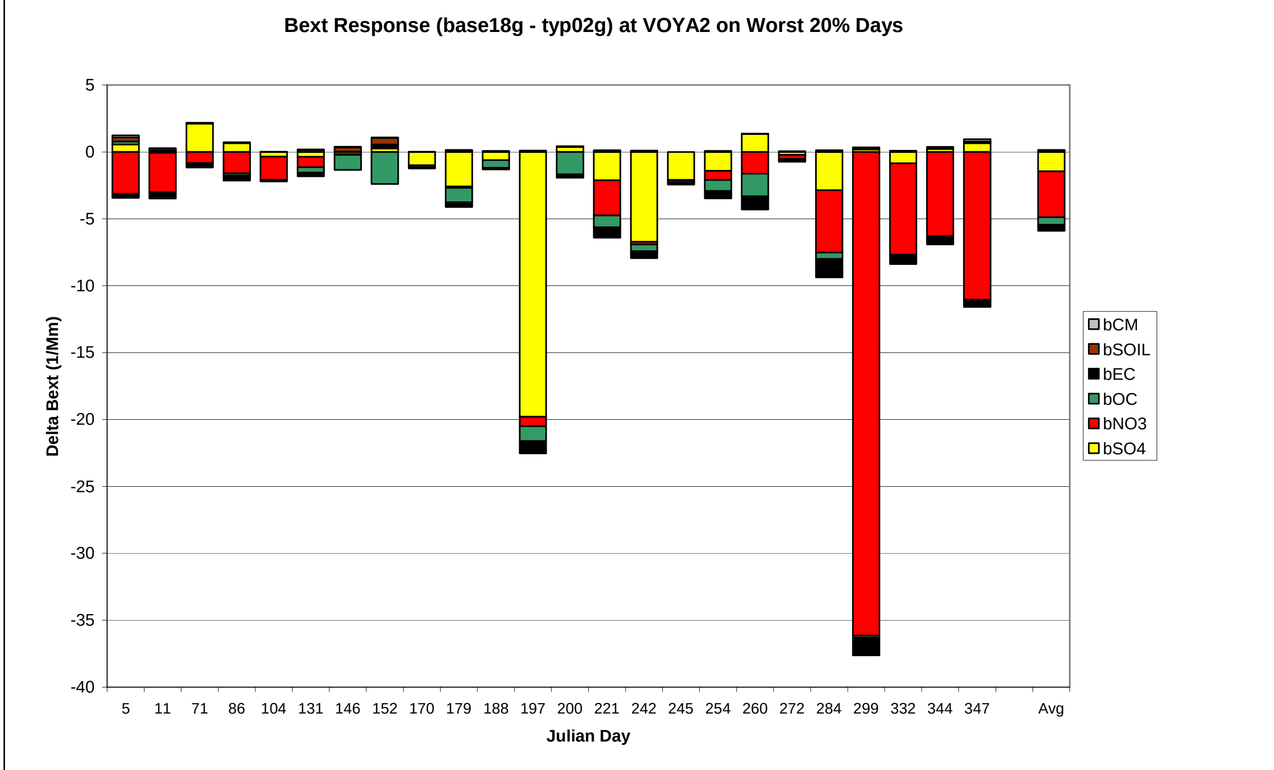


Figure D-5d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days in 2002.

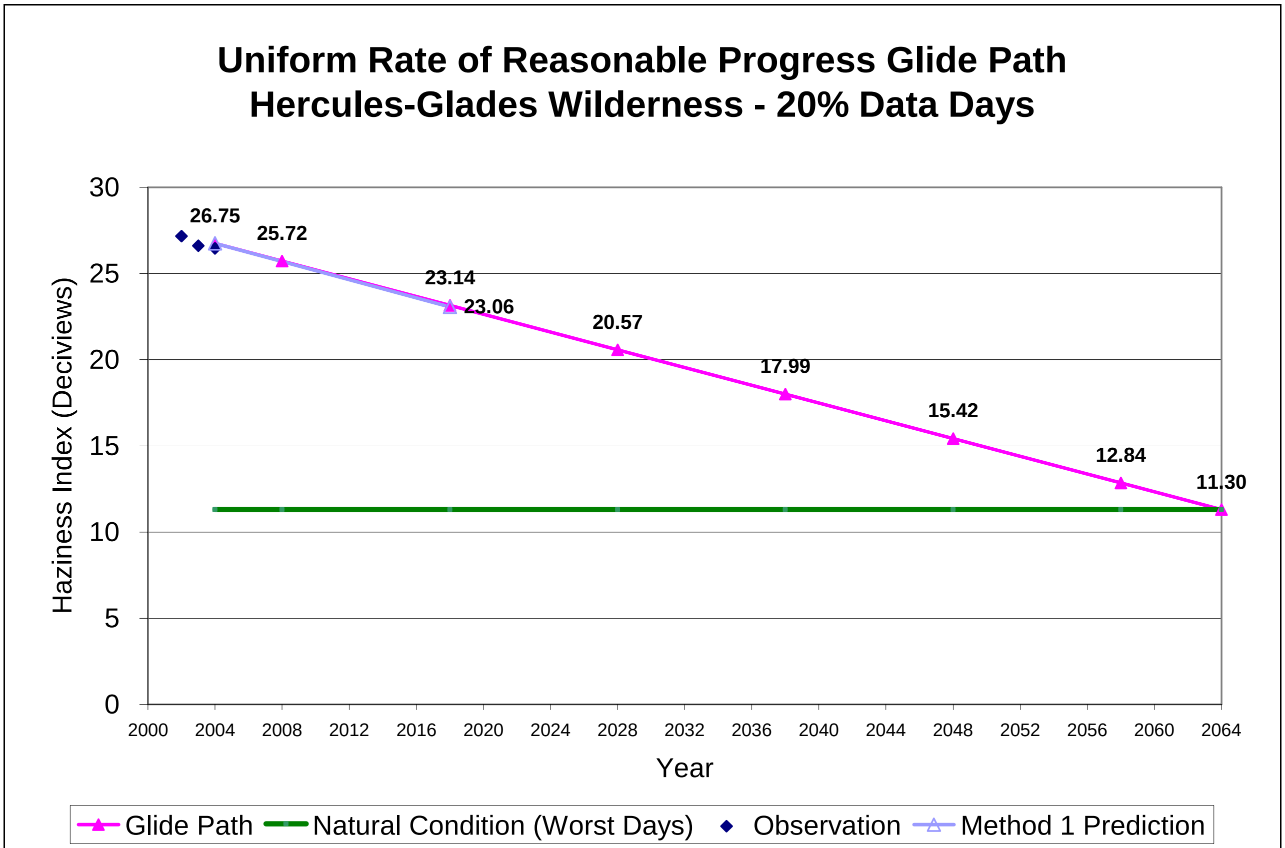


Figure D-6a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

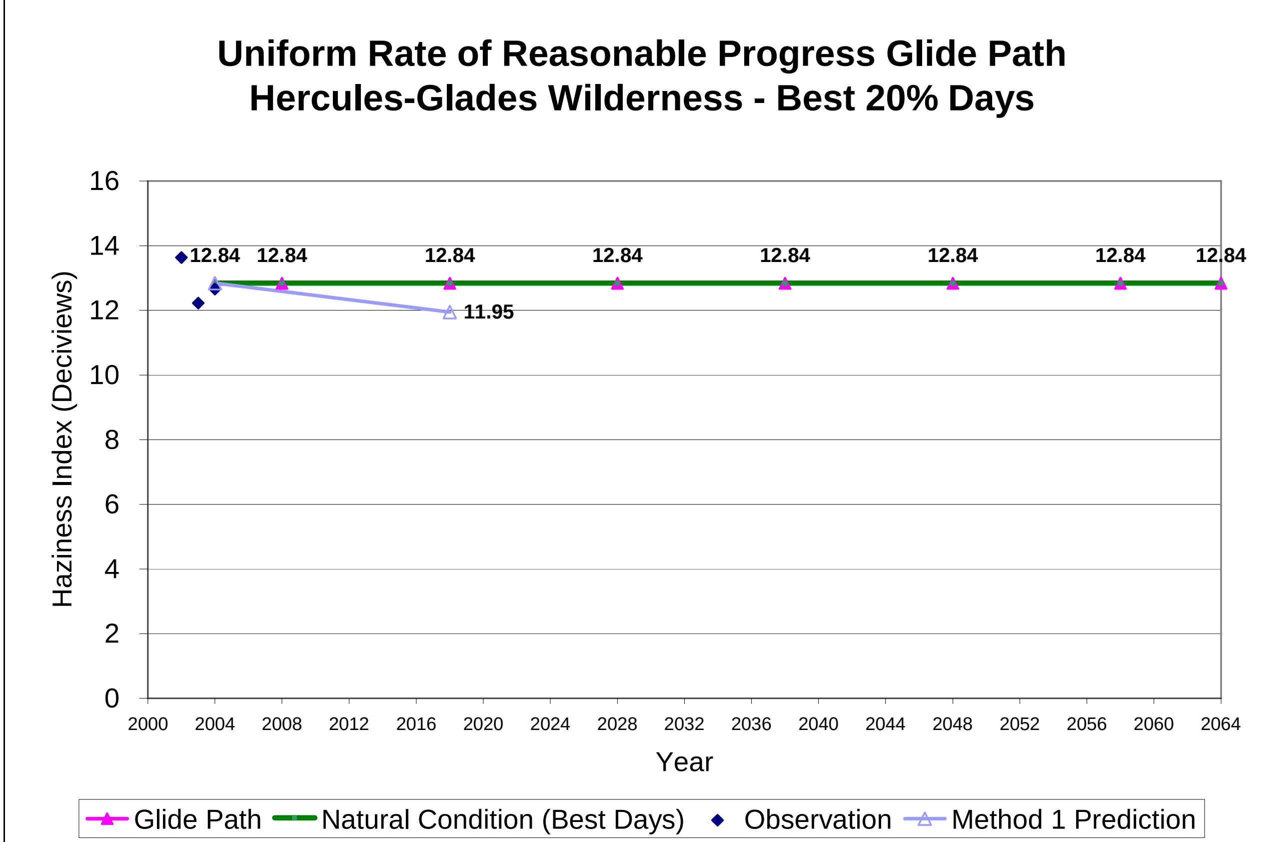


Figure D-6b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Hercules-Glade (HEGL), Missouri and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

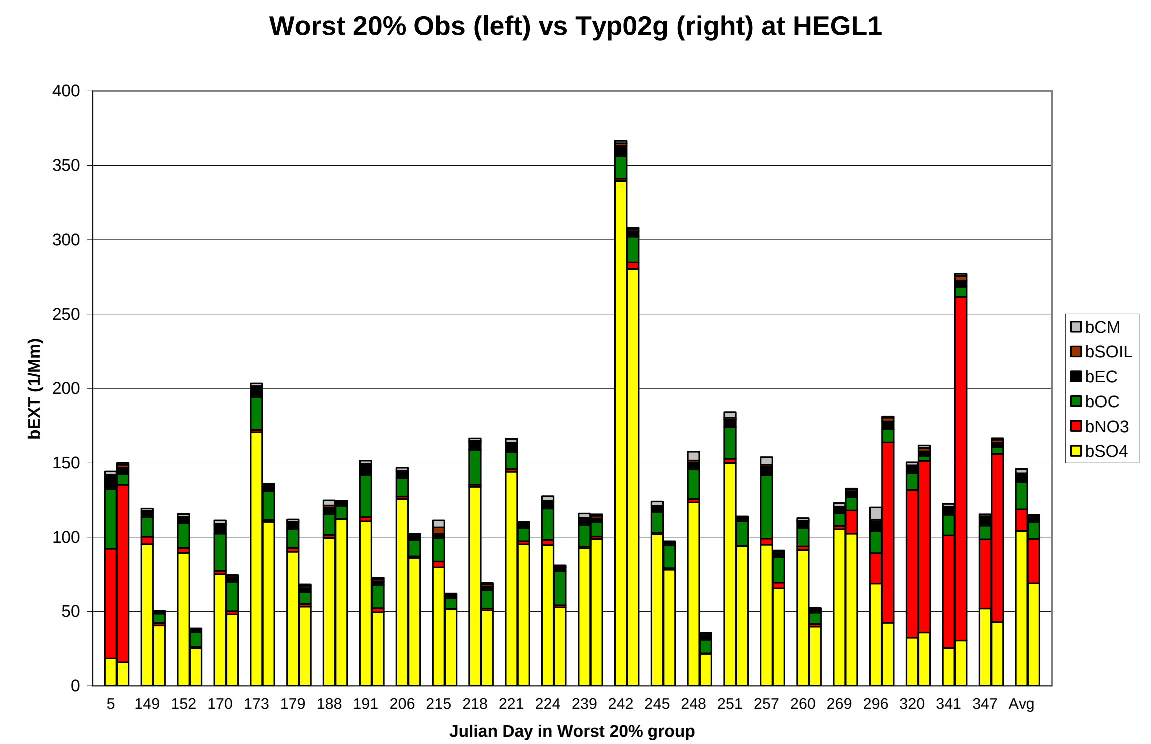


Figure D-6c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days in 2002.

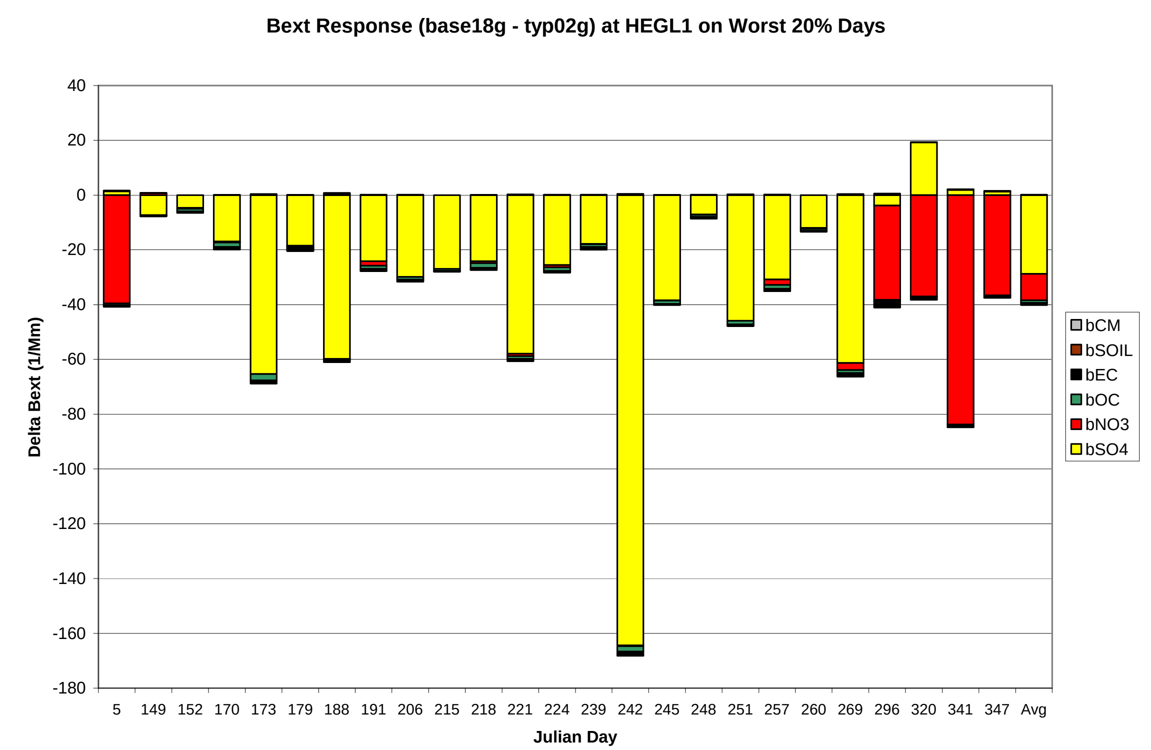


Figure D-6d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days in 2002.

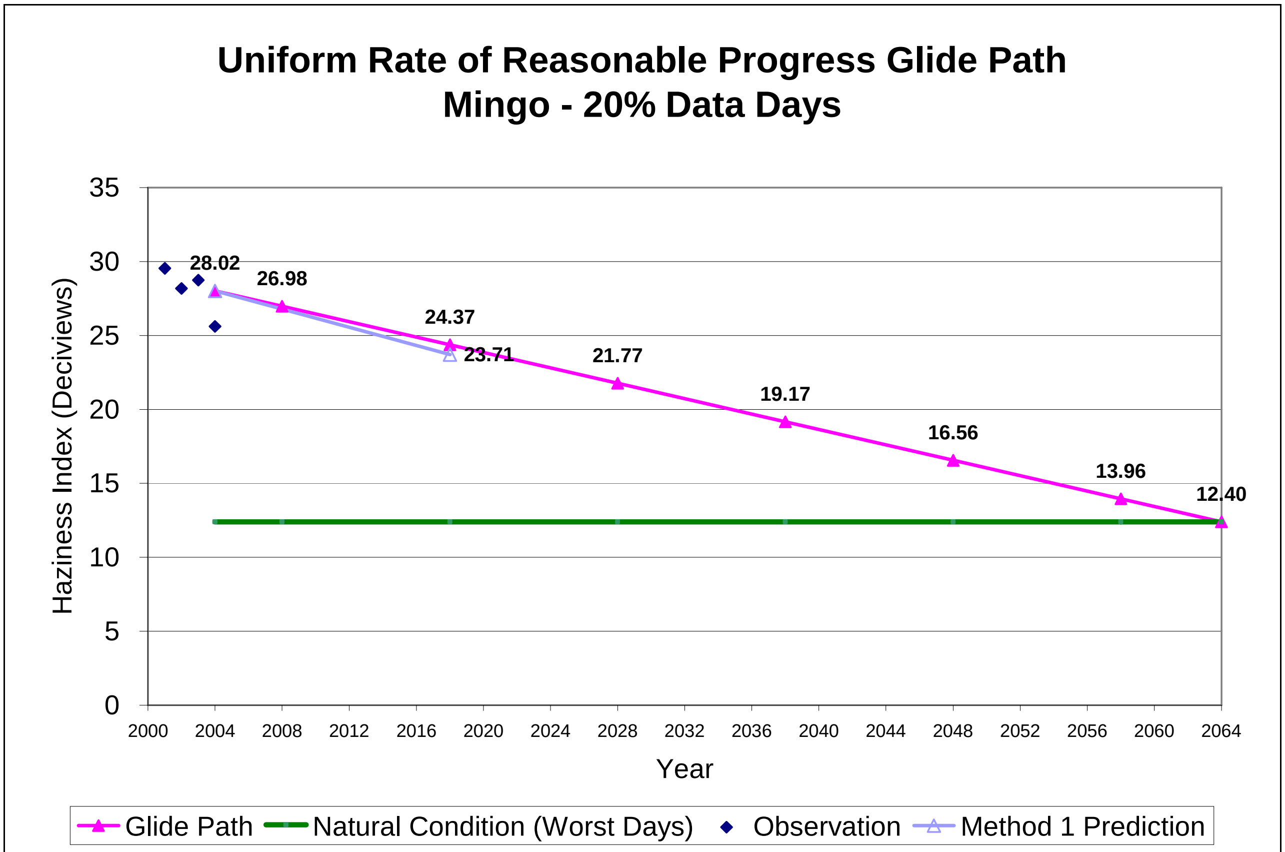


Figure D-7a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

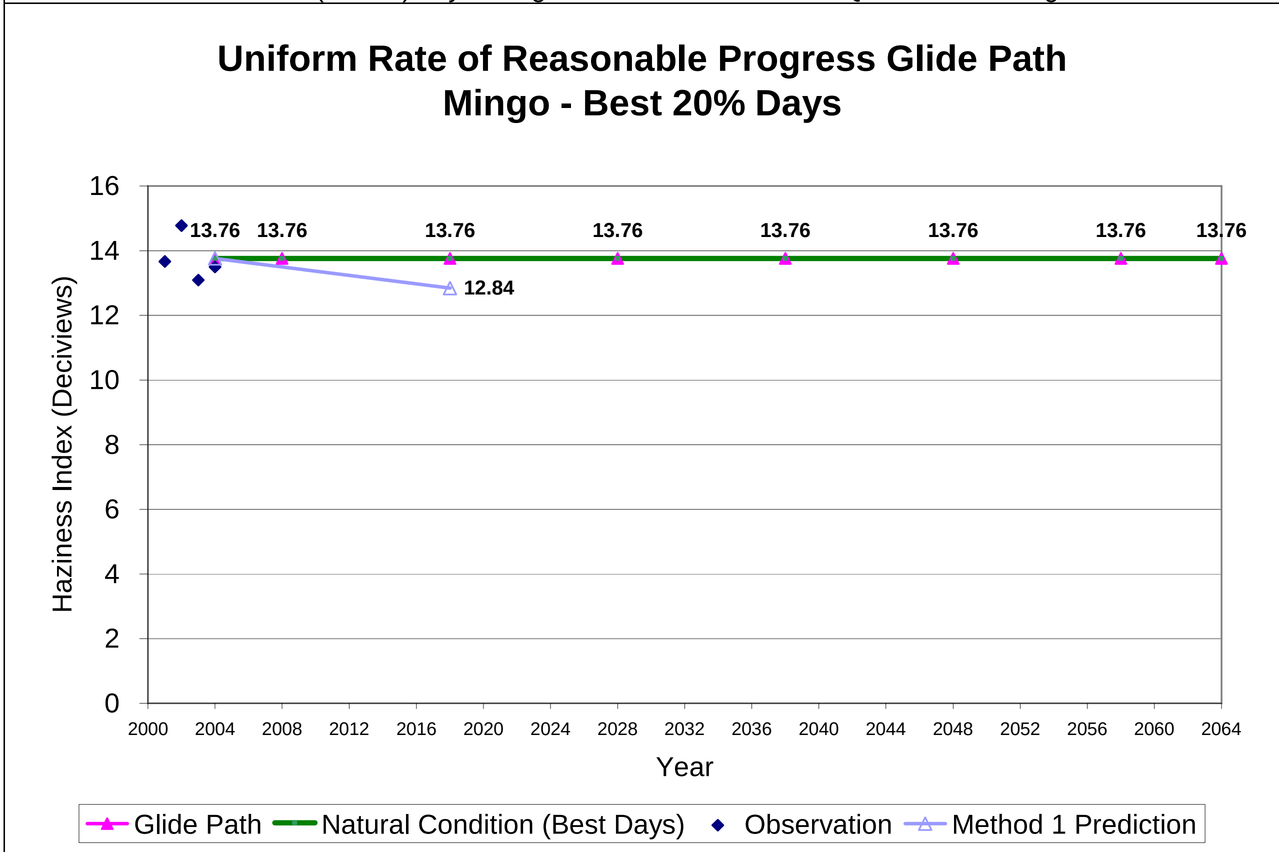


Figure D-7b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Mingo (MING), Missouri and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

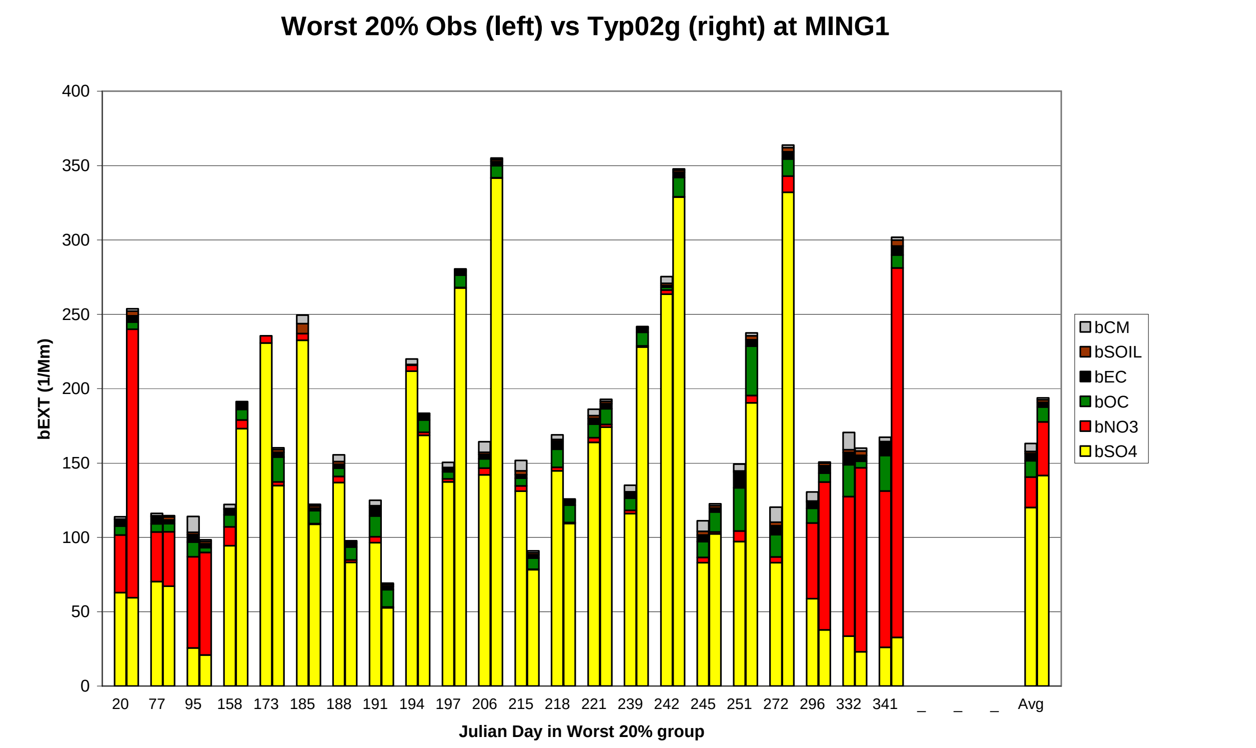


Figure D-7c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Mingo (MING), Missouri and Worst 20% (W20%) days in 2002.

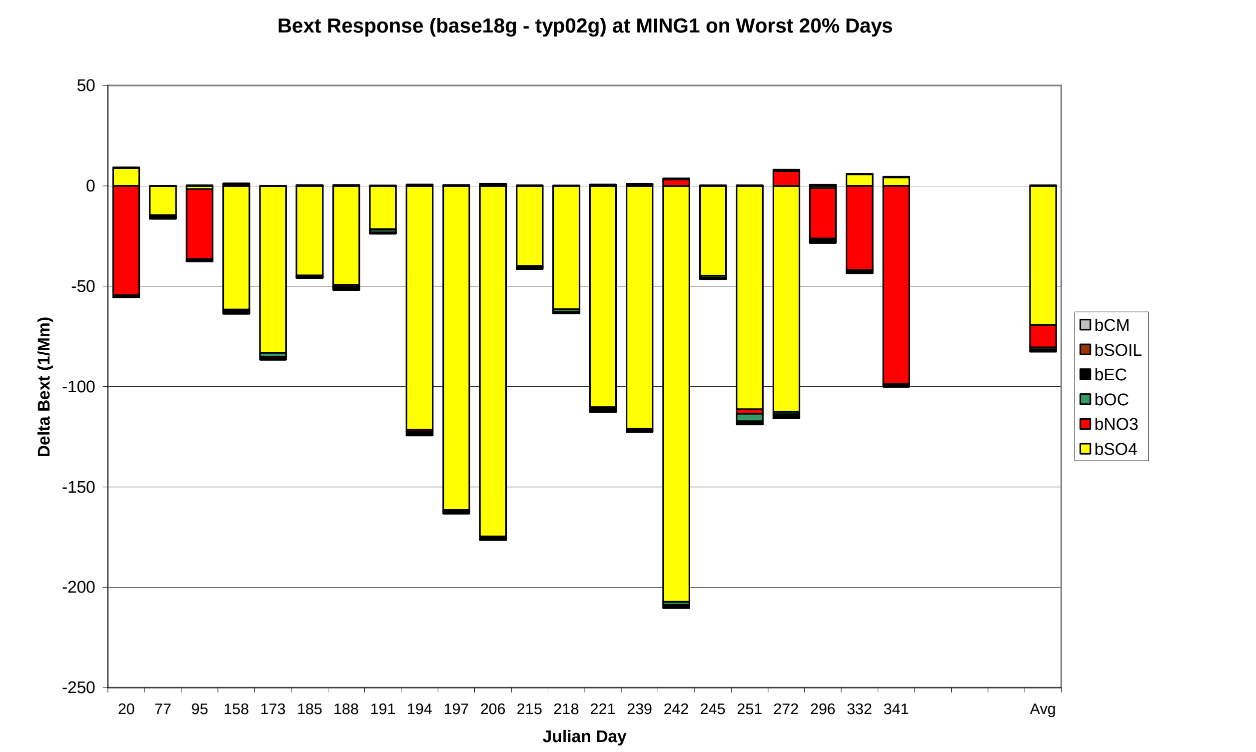


Figure D-7d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Mingo (MING), Missouri and Worst 20% (W20%) days in 2002.

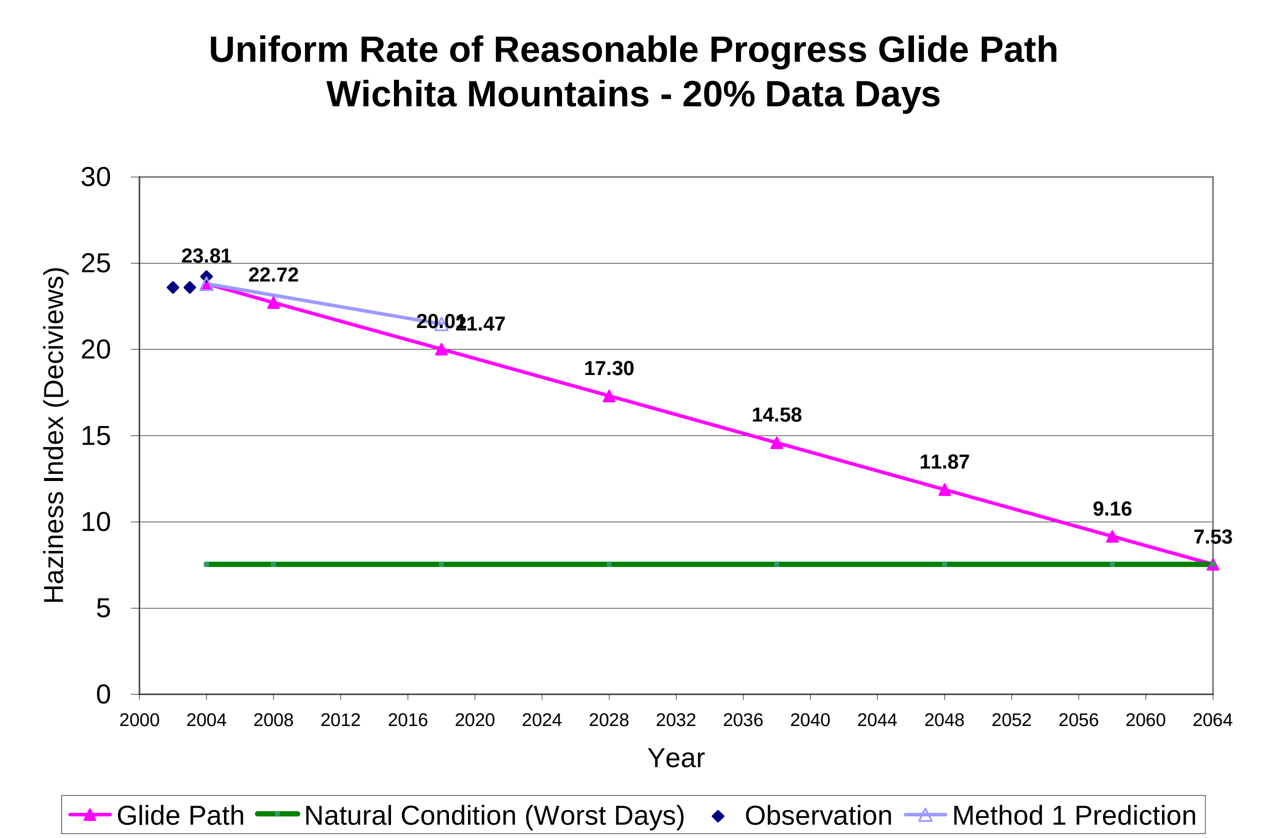


Figure D-8a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

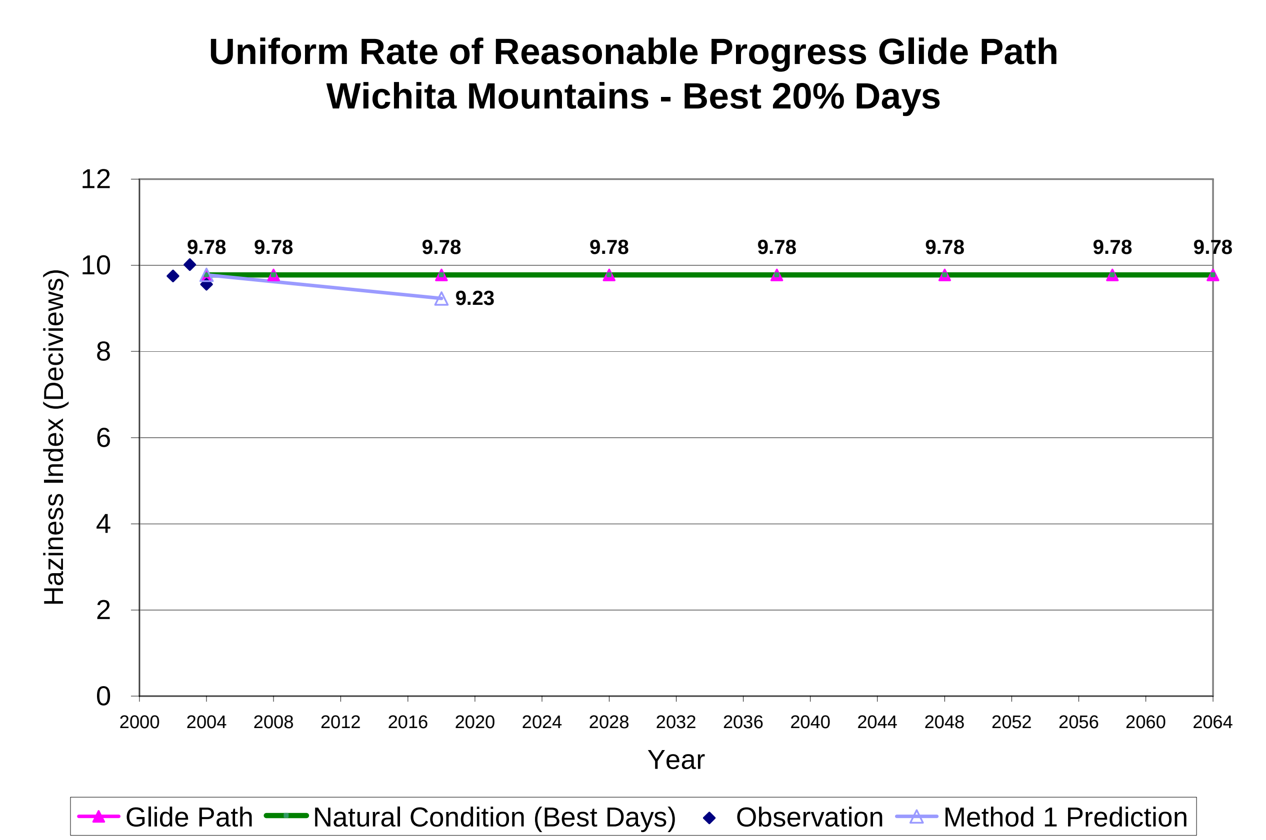


Figure D-8b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Wichita Mountains (WIMO), Oklahoma and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

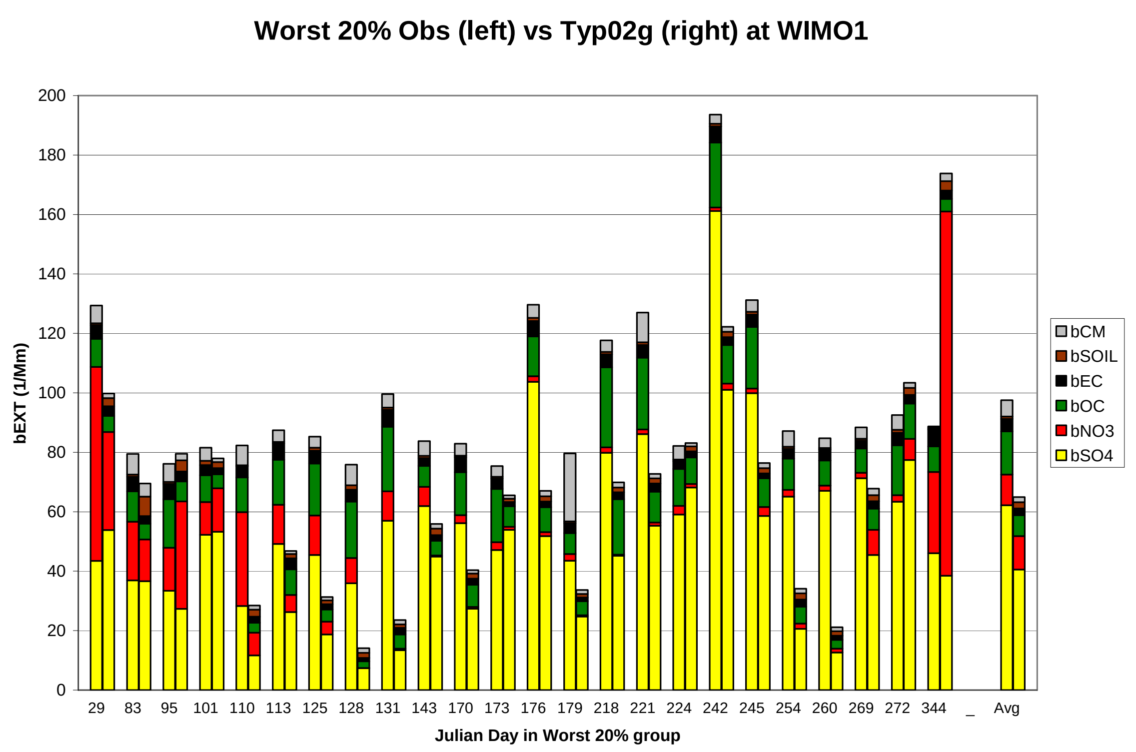


Figure D-8c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days in 2002.

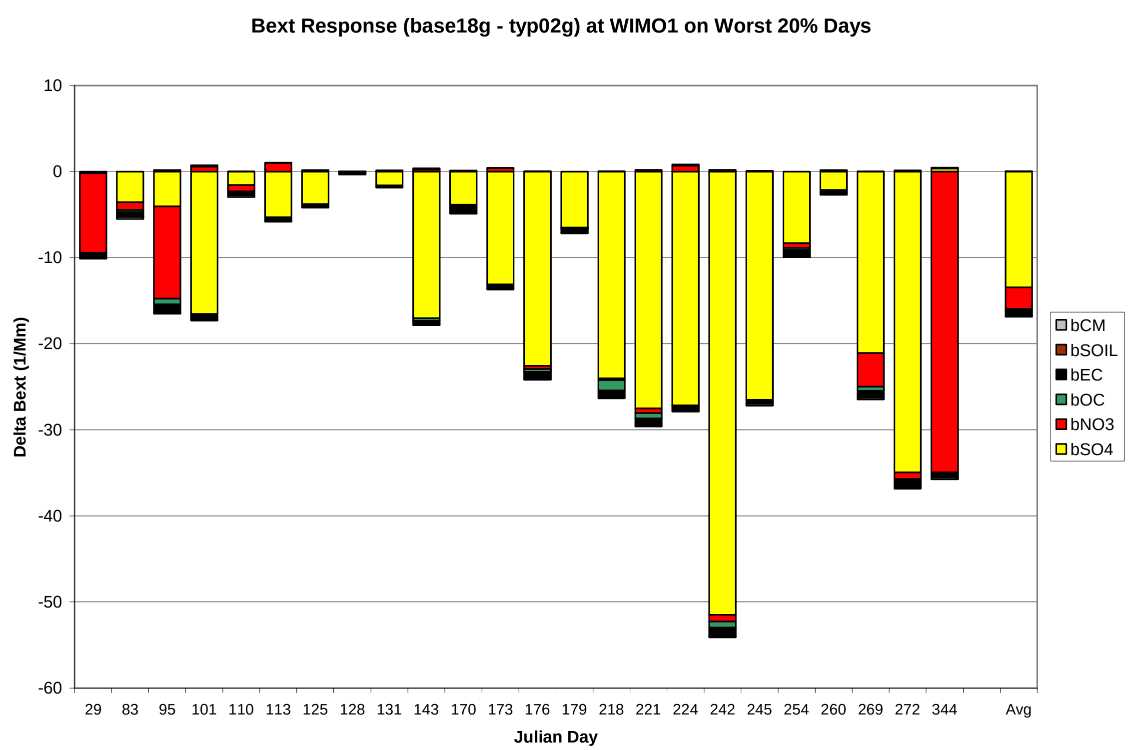


Figure D-8d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days in 2002.

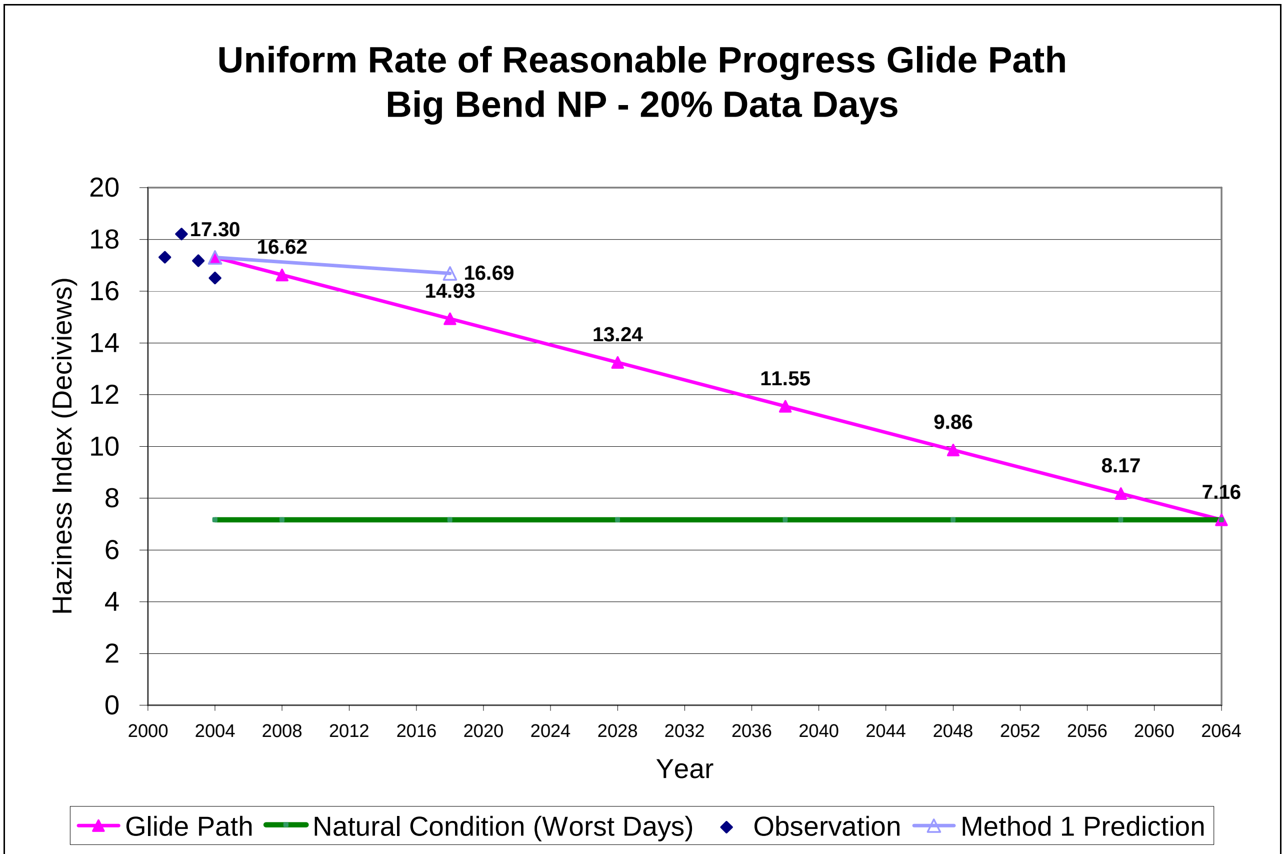


Figure D-9a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

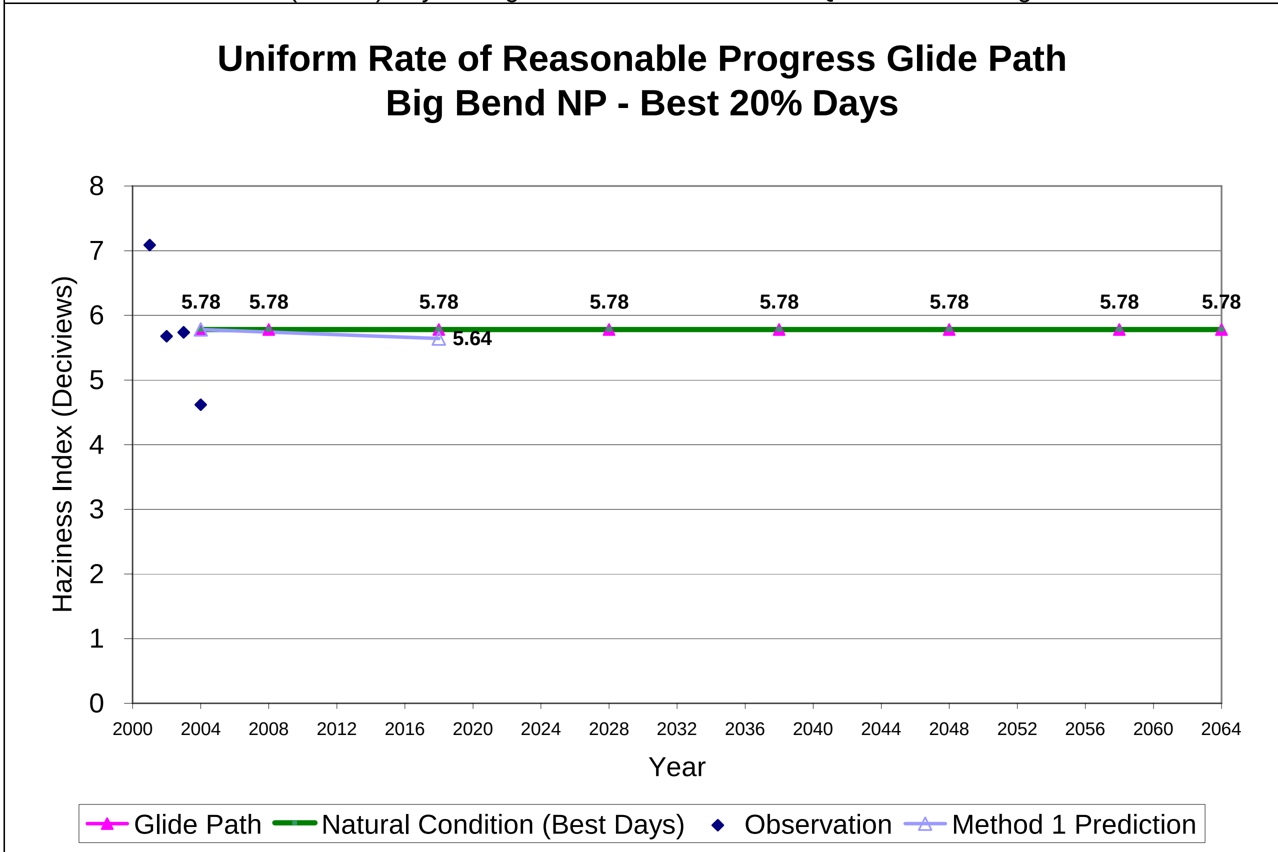


Figure D-9b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Big Bend (BIBE), Texas and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

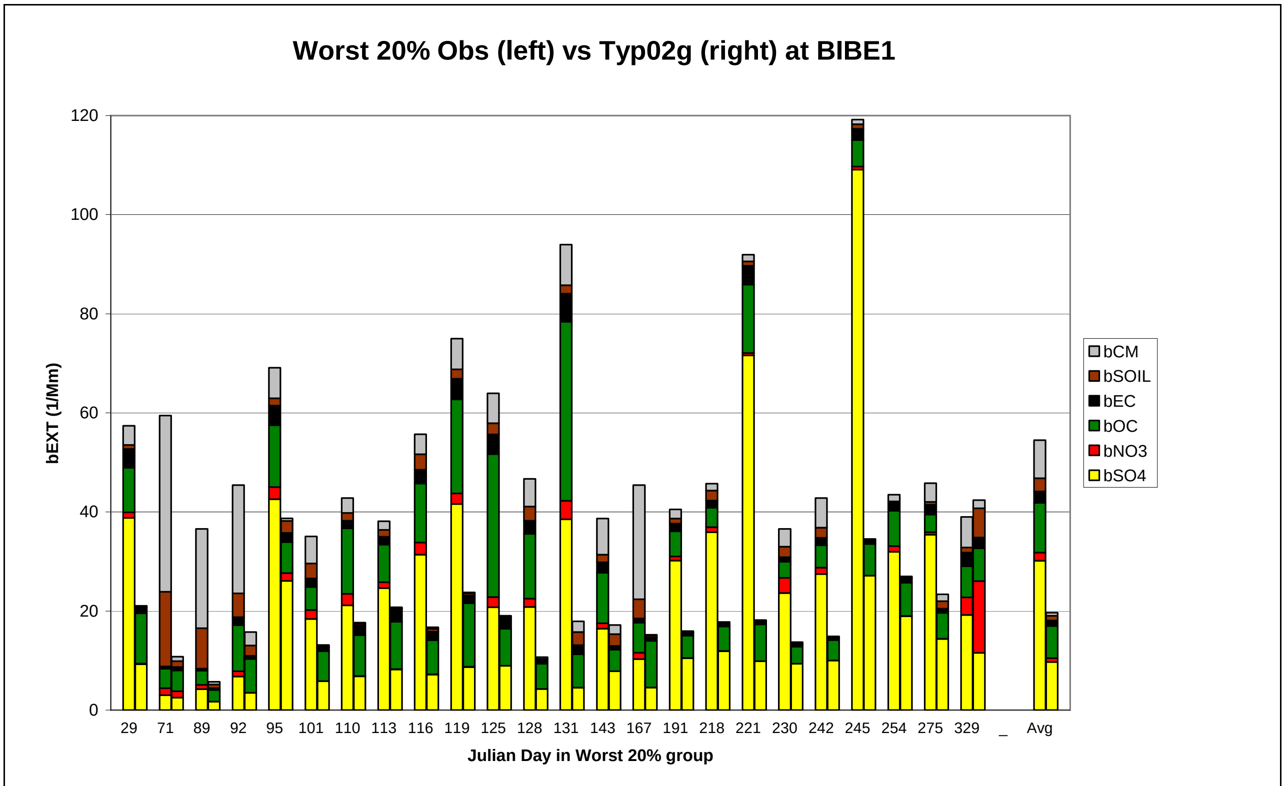


Figure D-9c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Big Bend (BIBE), Texas and Worst 20% (W20%) days in 2002.

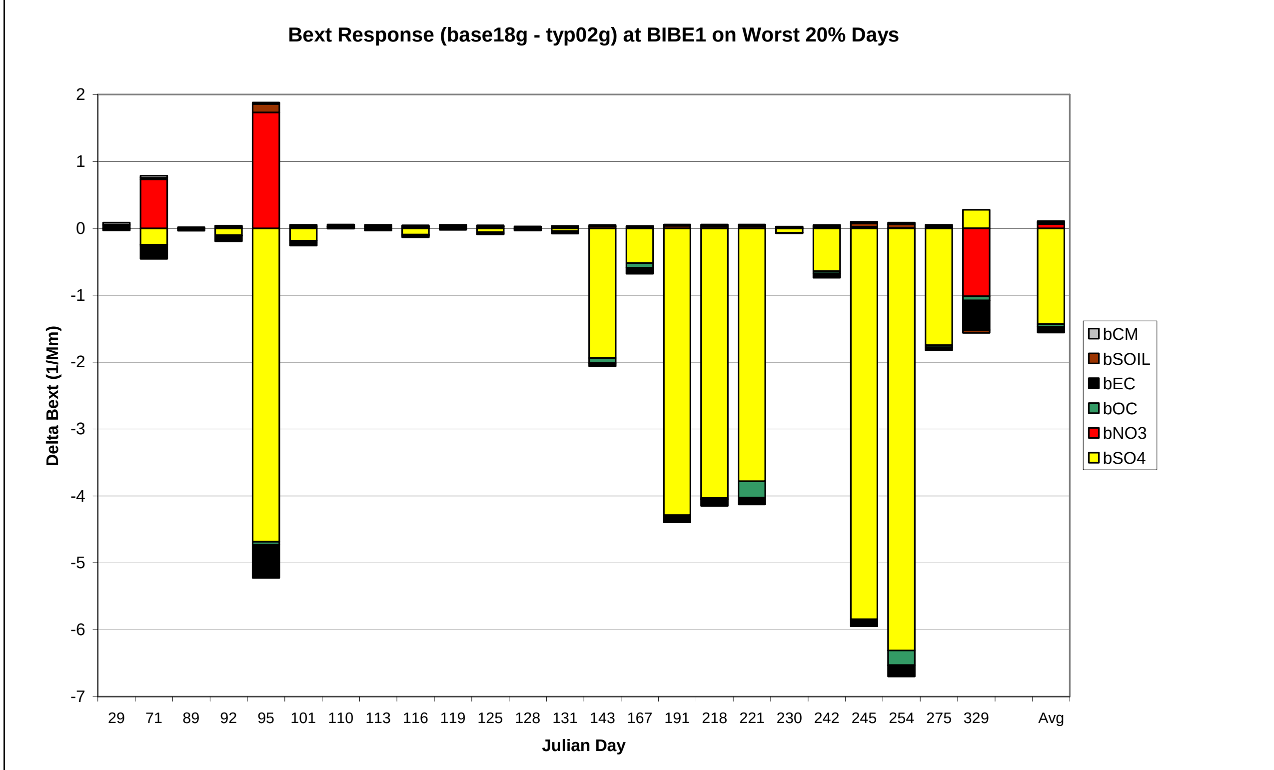


Figure D-9d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Big Bend (BIBE), Texas and Worst 20% (W20%) days in 2002.

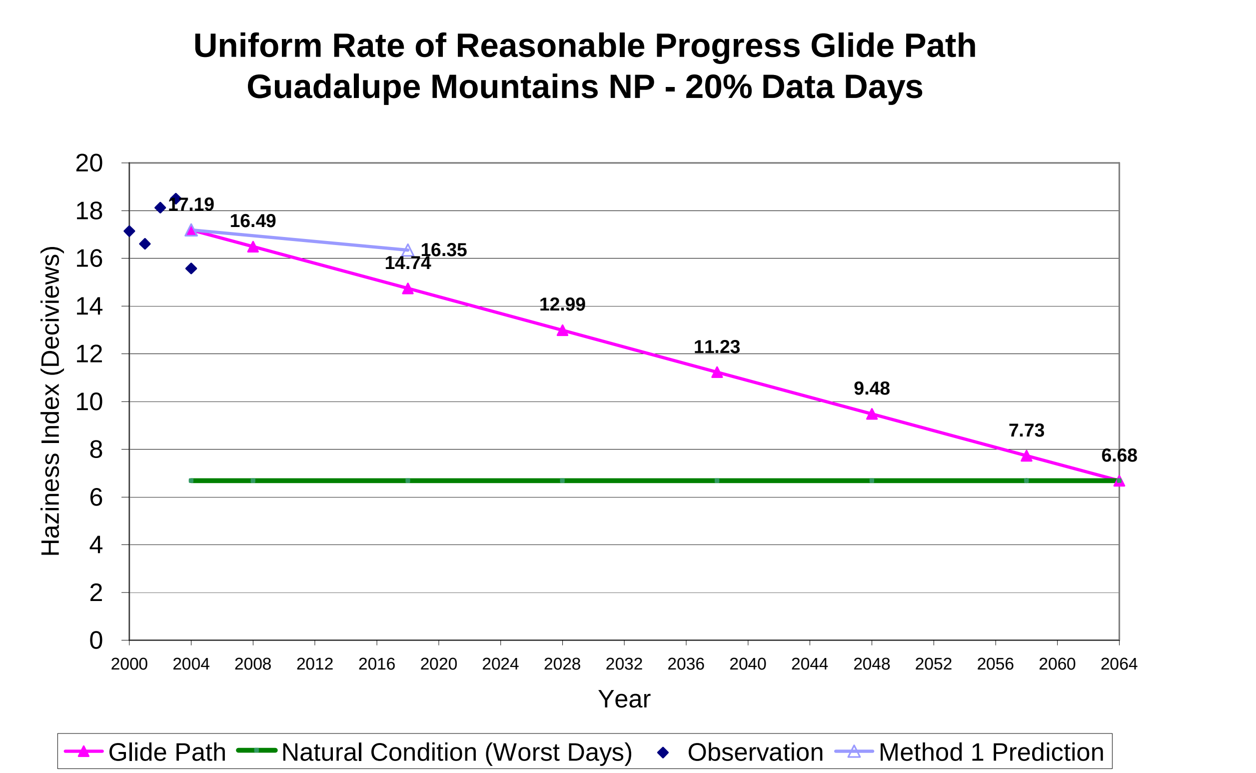


Figure D-10a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

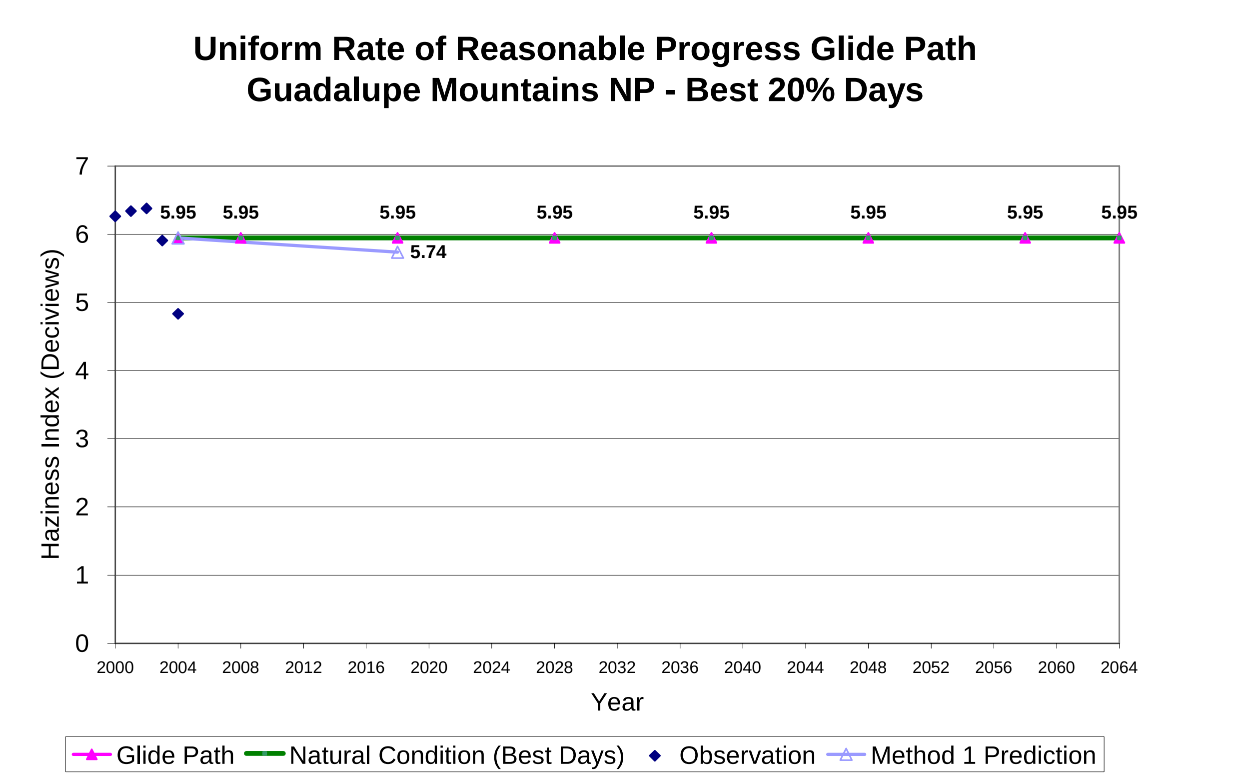


Figure D-10b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Guadalupe Mountains (GUMO), Texas and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

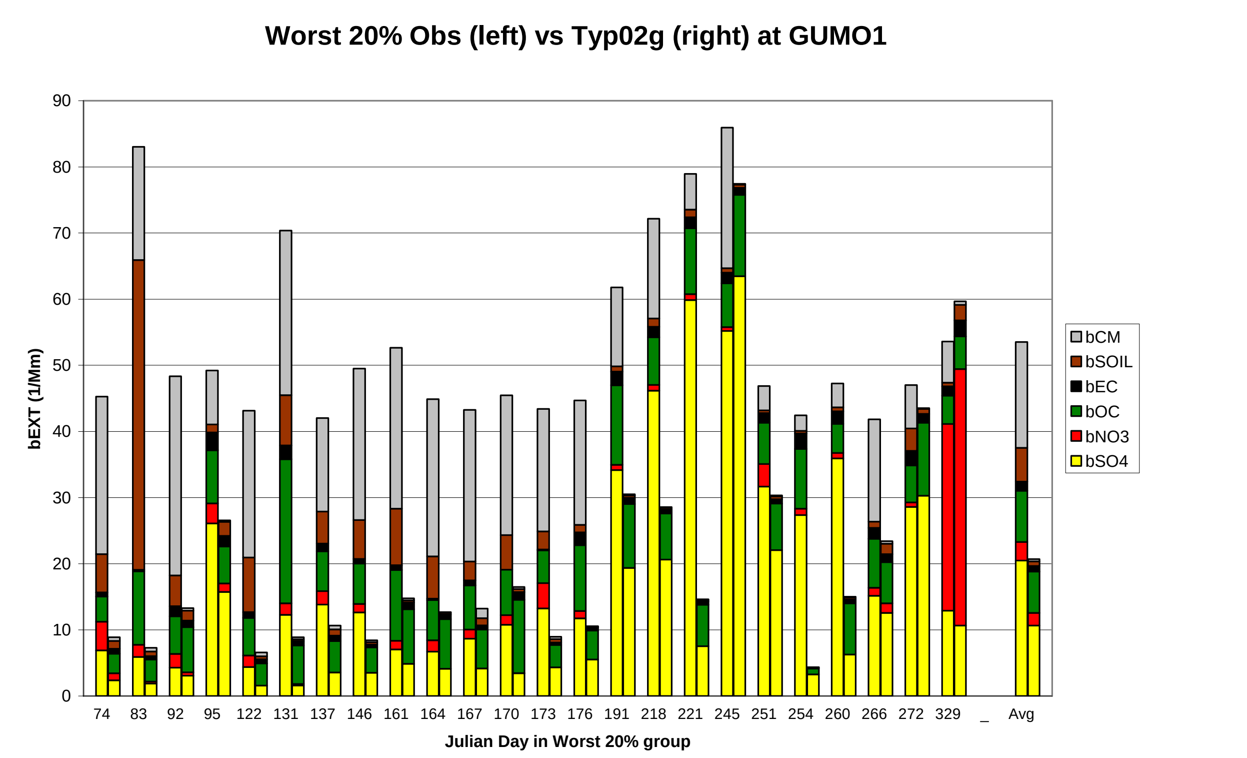


Figure D-10c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days in 2002.

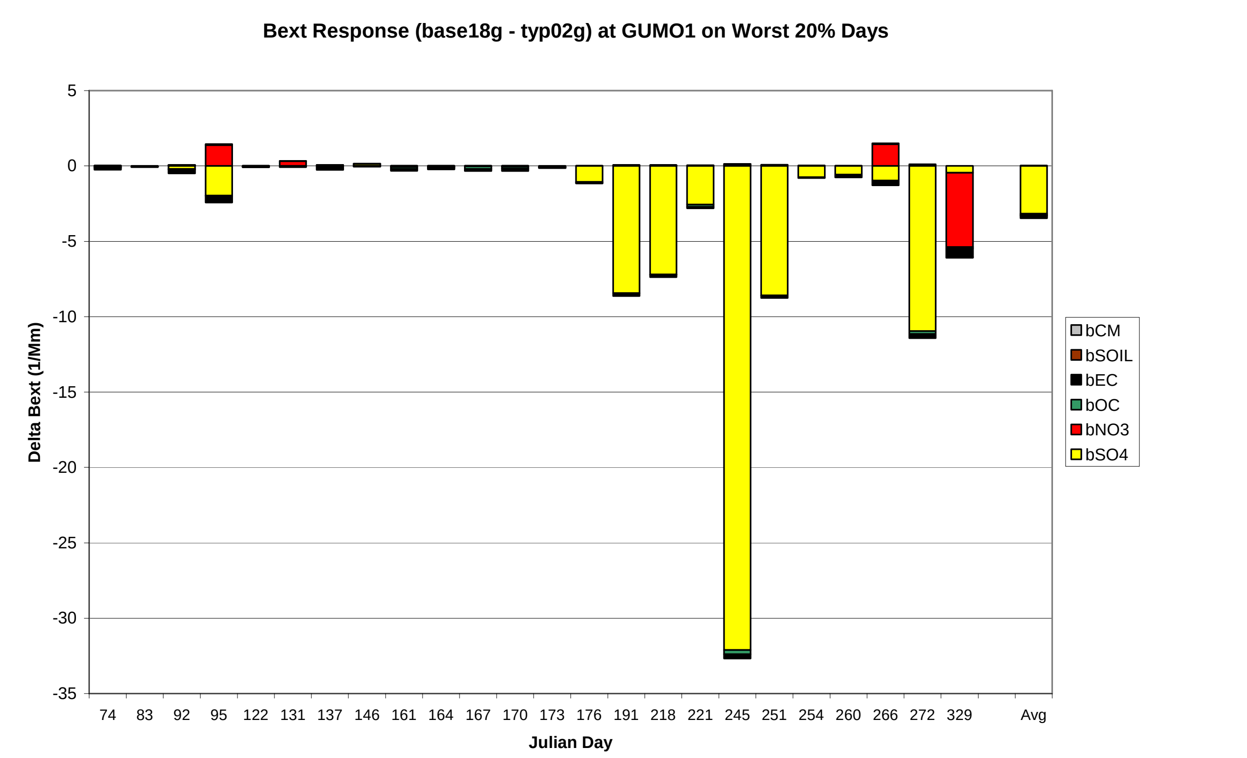


Figure D-10d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days in 2002.

APPENDIX E

CAMx PM Source Apportionment Technology (PSAT) Extinction (Mm^{-1}) Contributions for the 2002 Worst and Best 20 Percent Days at CENRAP Class I Areas

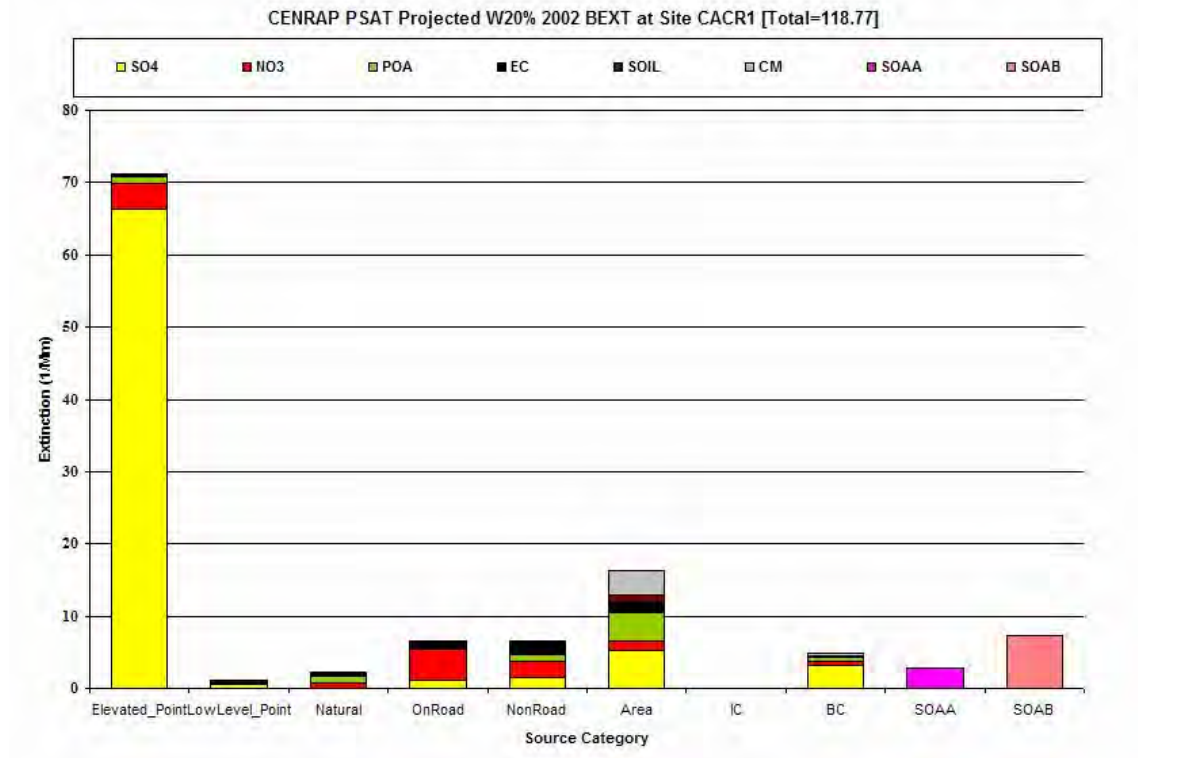


Figure E-1a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas.

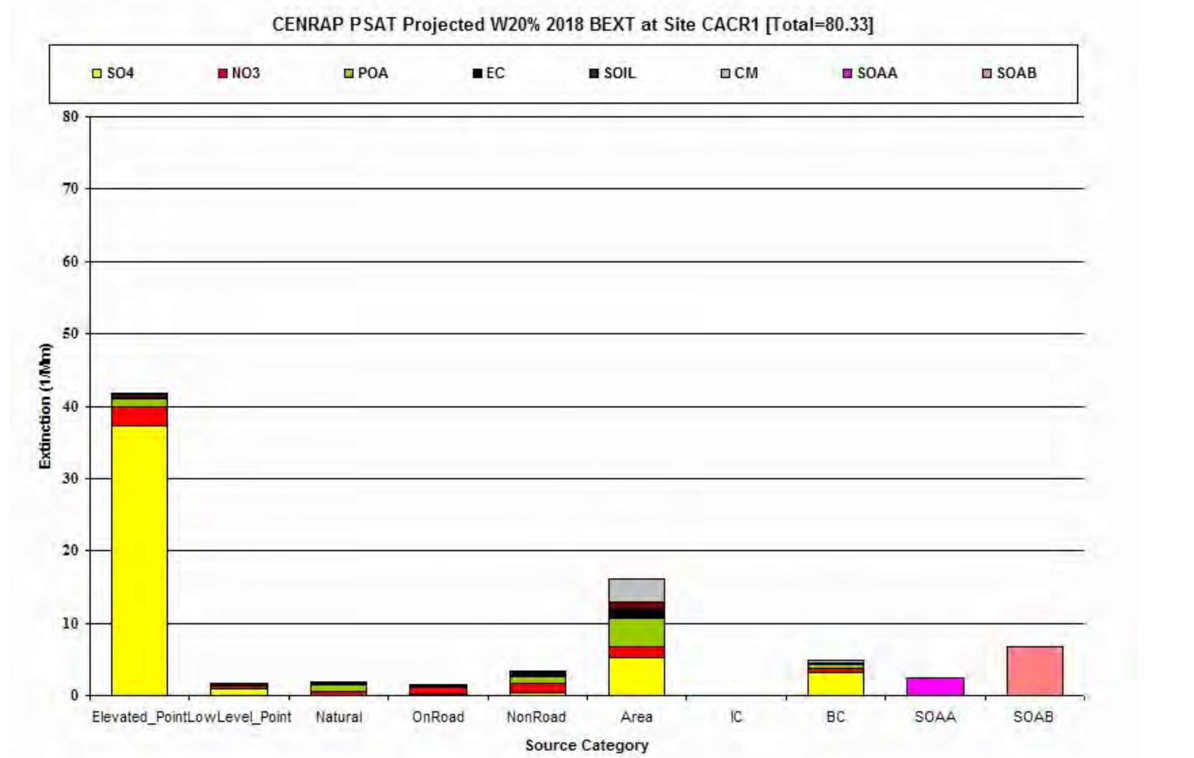


Figure E-1b. PSAT source category by PM species contributions to the average 2018 projected

extinction (Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas.

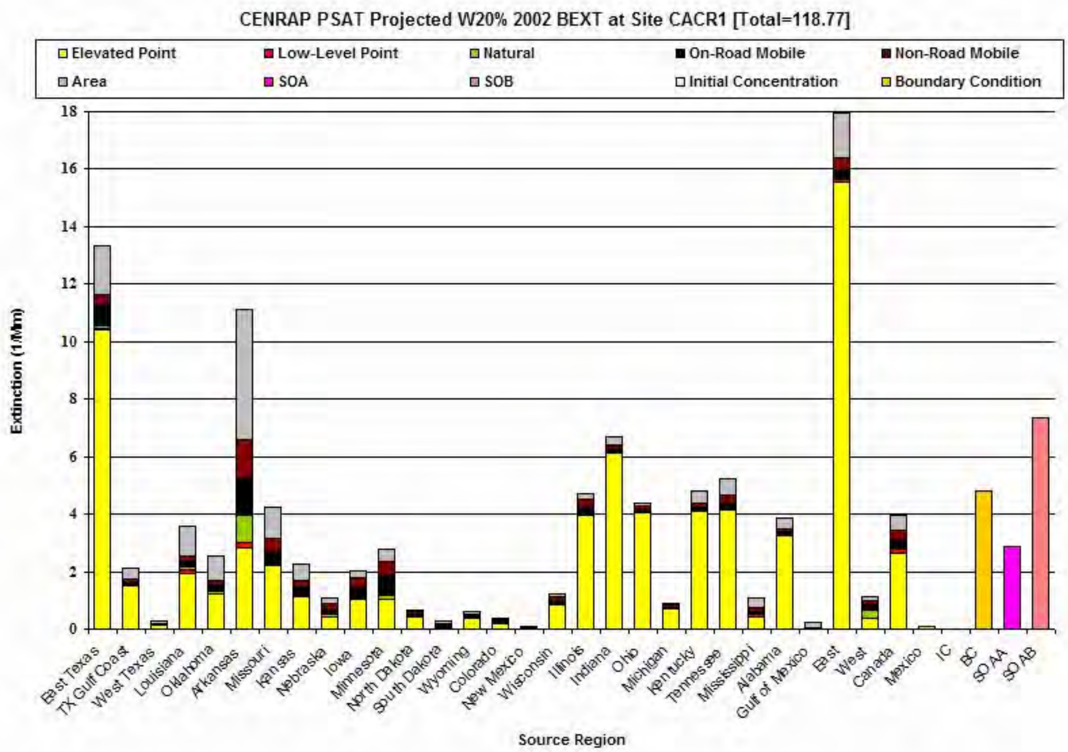


Figure E-1c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas.

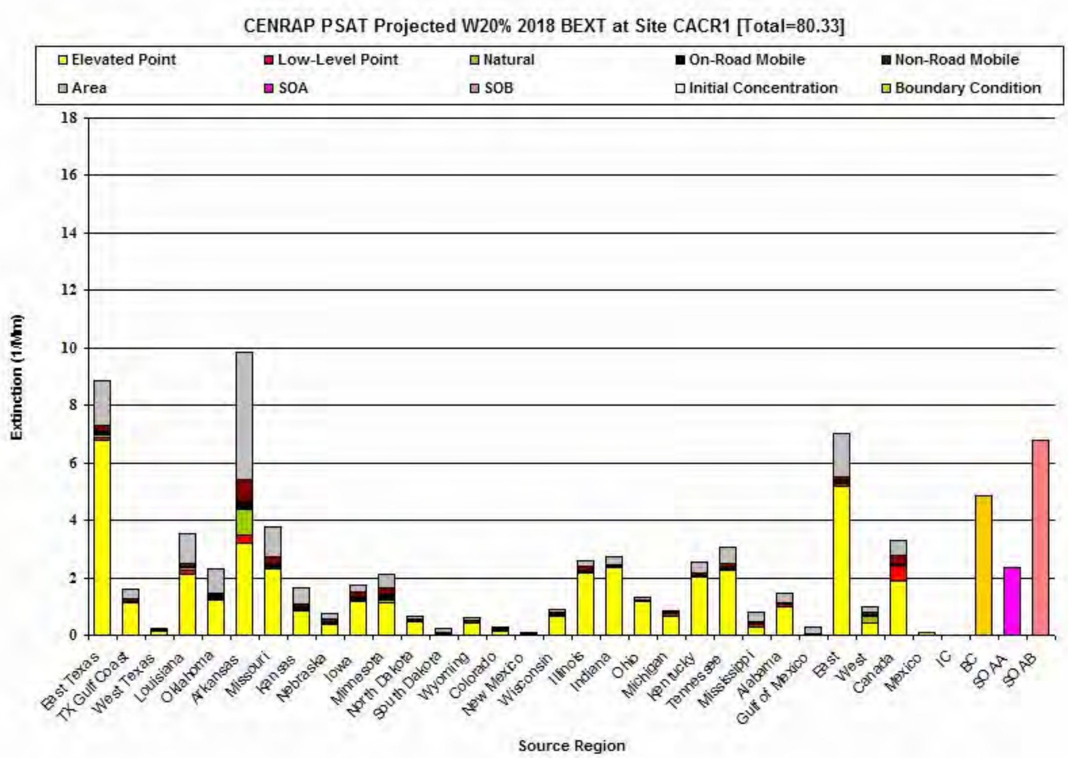


Figure E-1d. PSAT source region by source category contributions to the average 2018 extinction

(Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas.

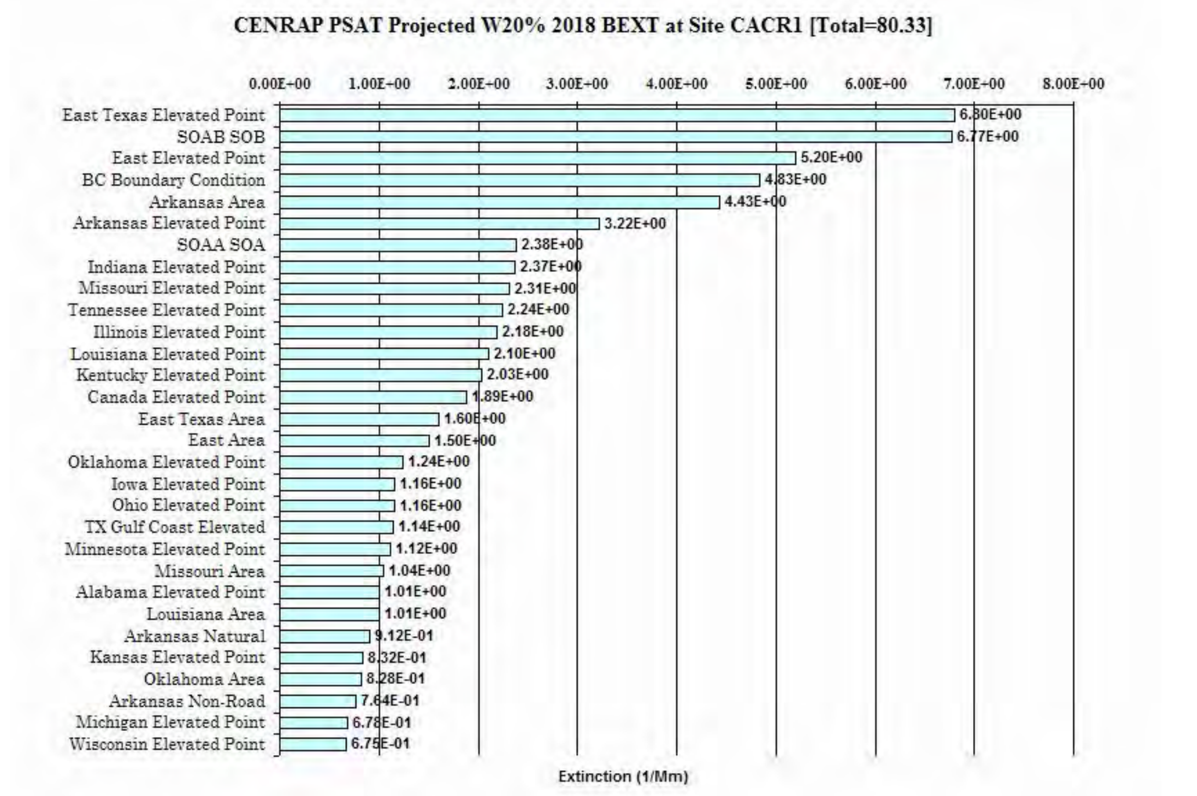
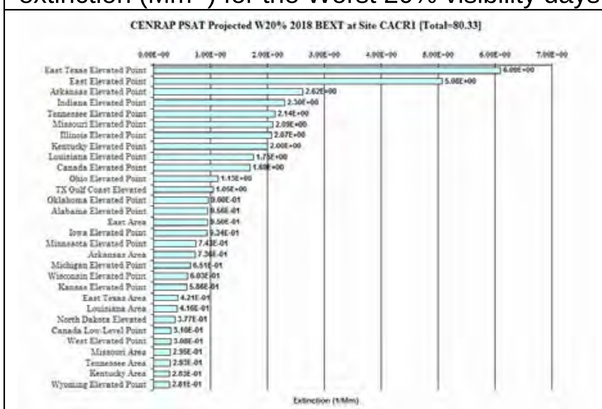


Figure E-1e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas



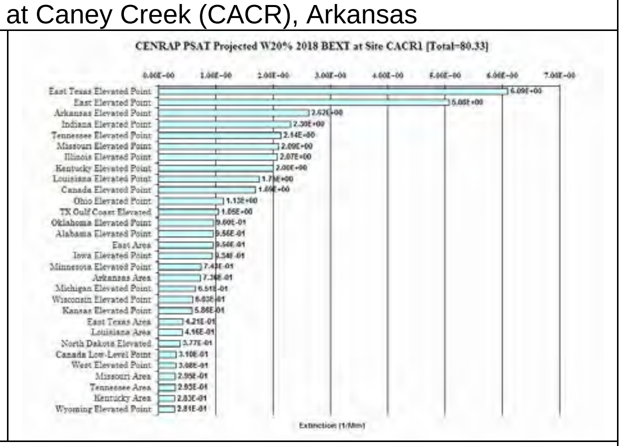


Figure E-1f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas

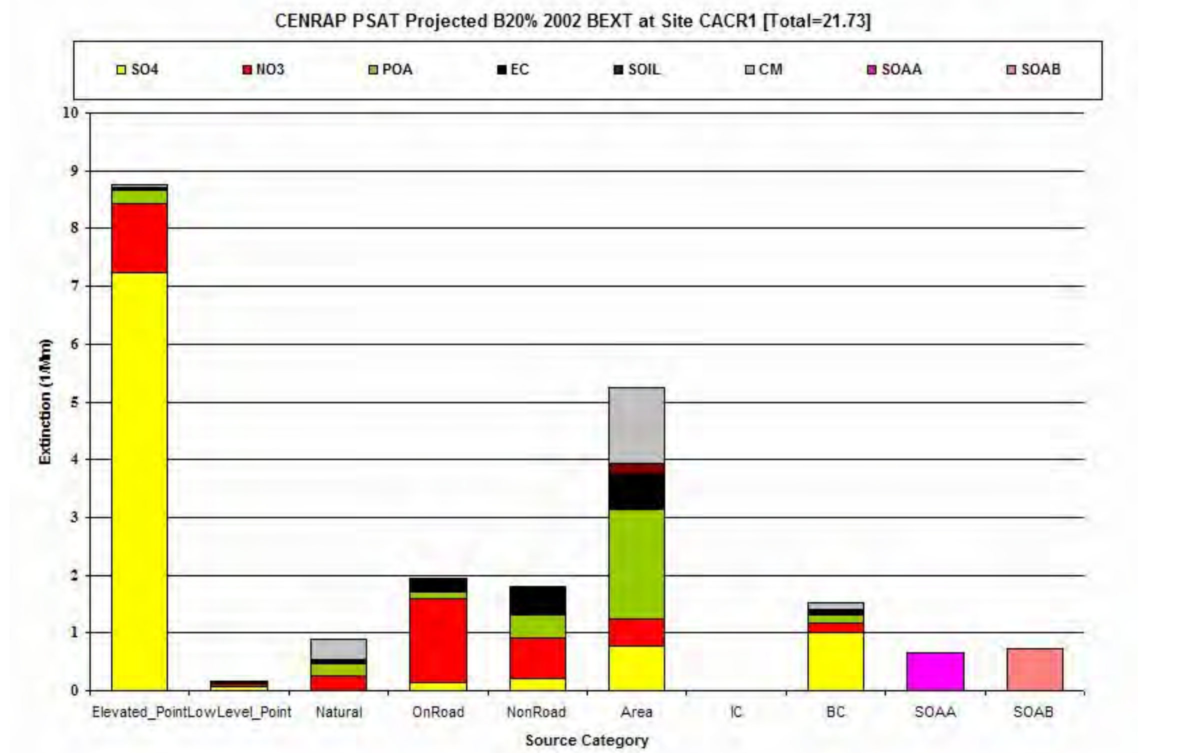


Figure E-1g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Caney Creek (CACR), Arkansas.

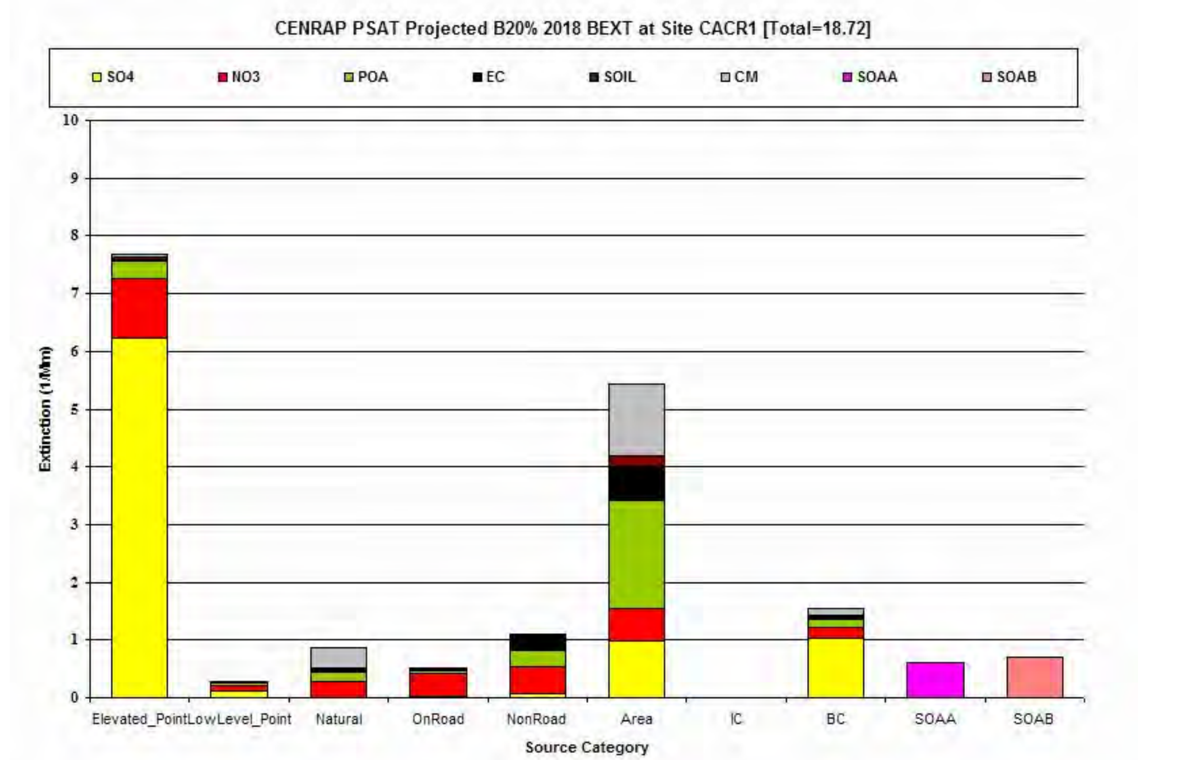


Figure E-1h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Caney Creek (CACR), Arkansas.

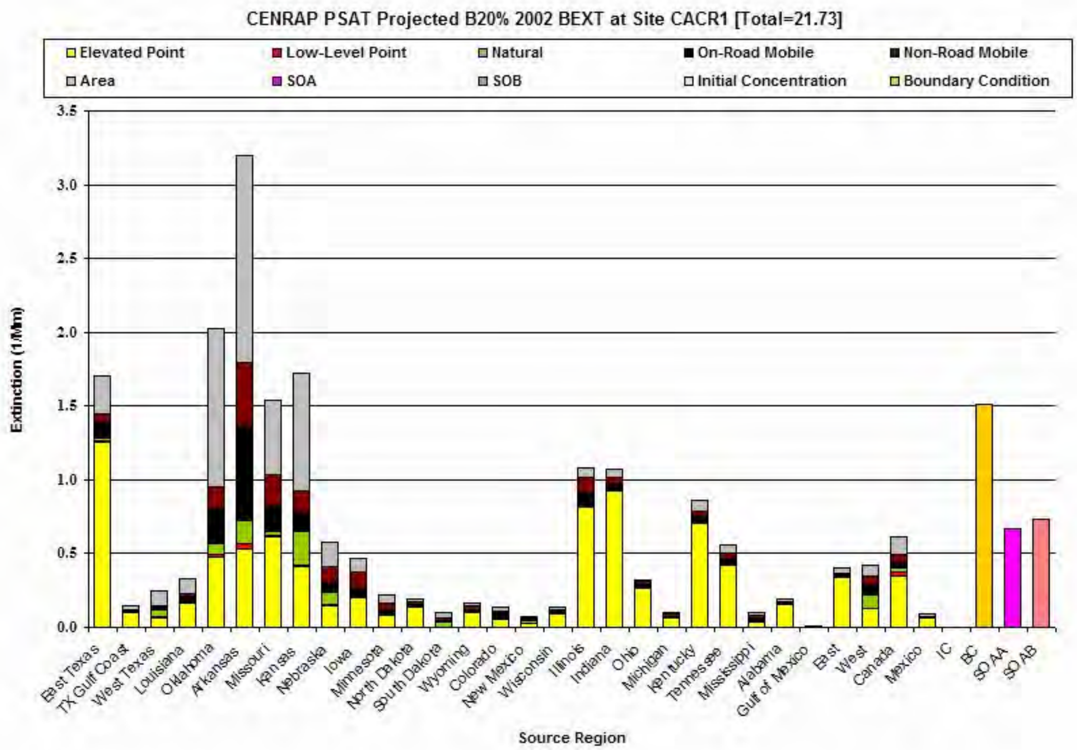


Figure E-1i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Caney Creek (CACR), Arkansas.

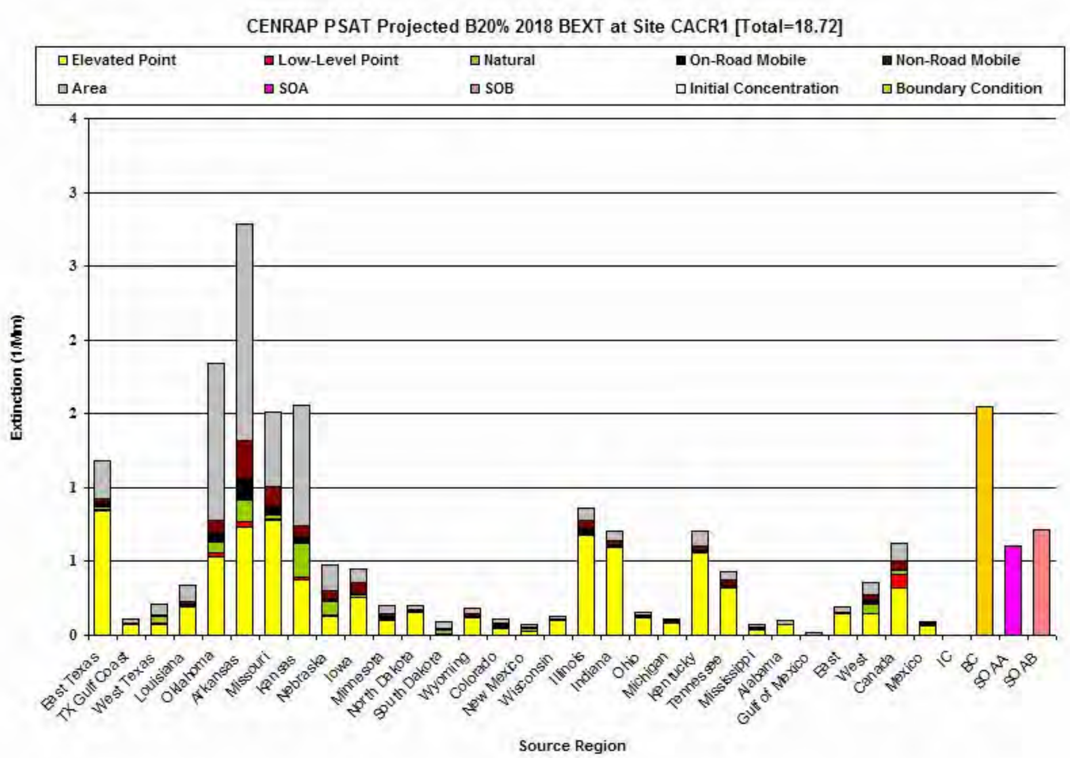


Figure E-1j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Caney Creek (CACR), Arkansas.

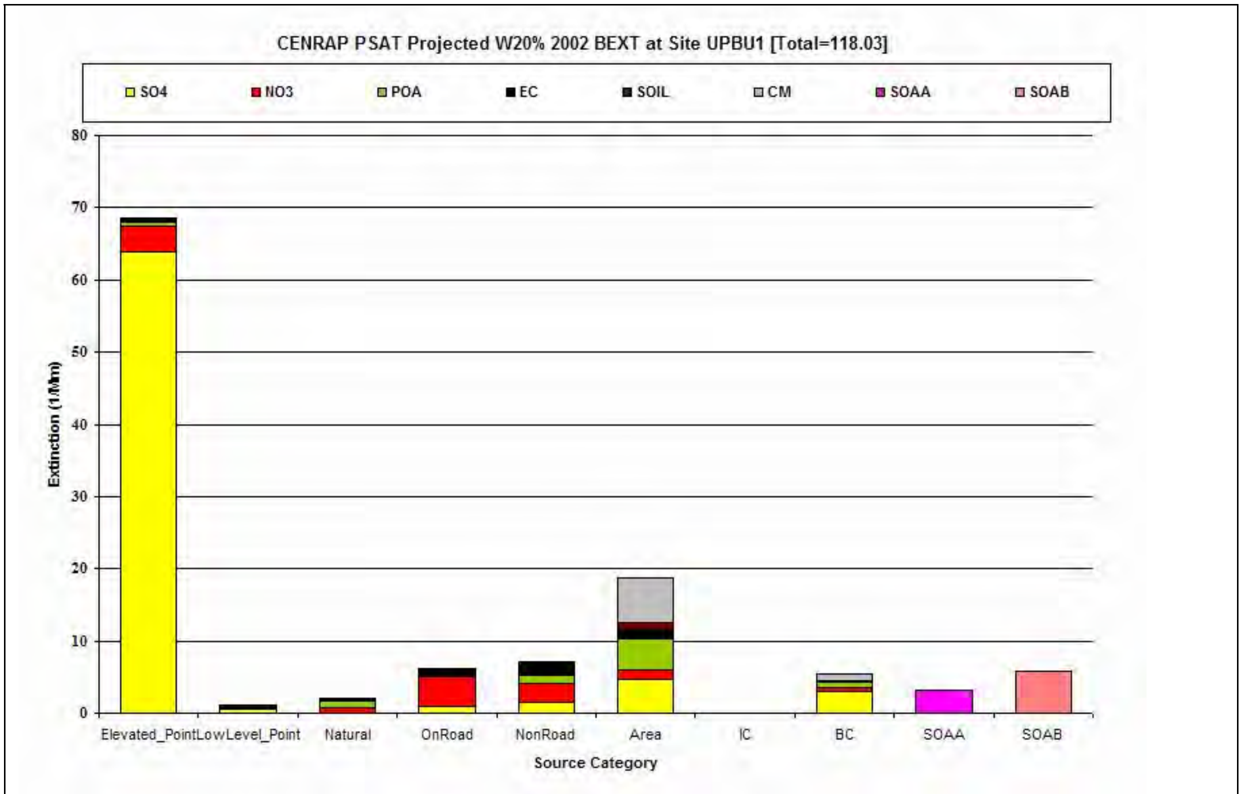


Figure E-2a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

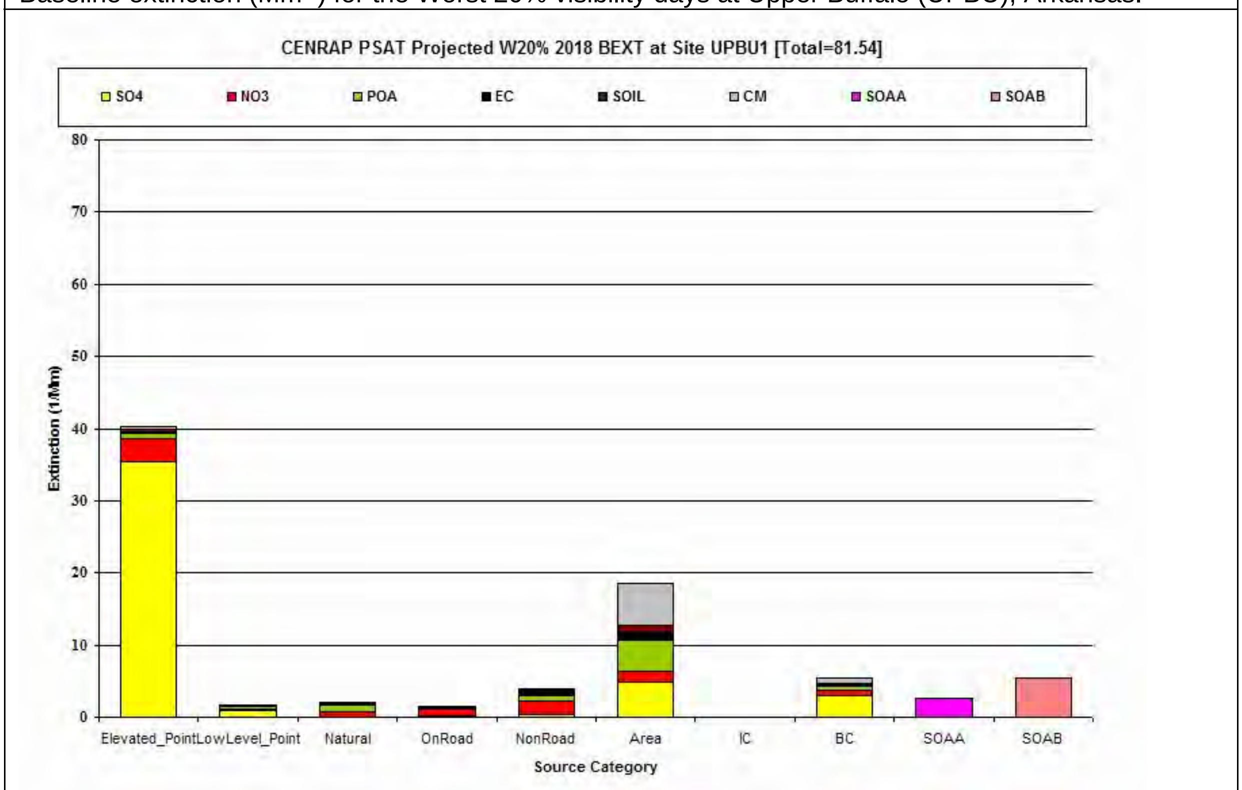


Figure E-2b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

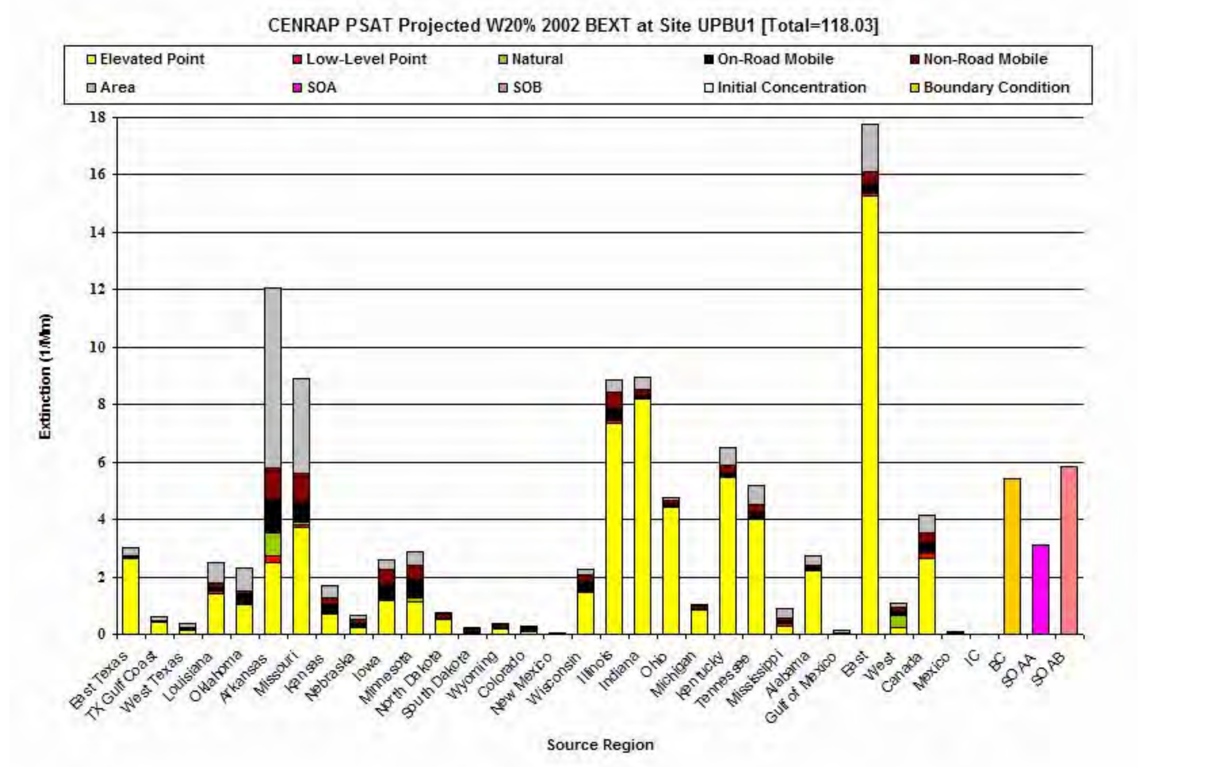


Figure E-2c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

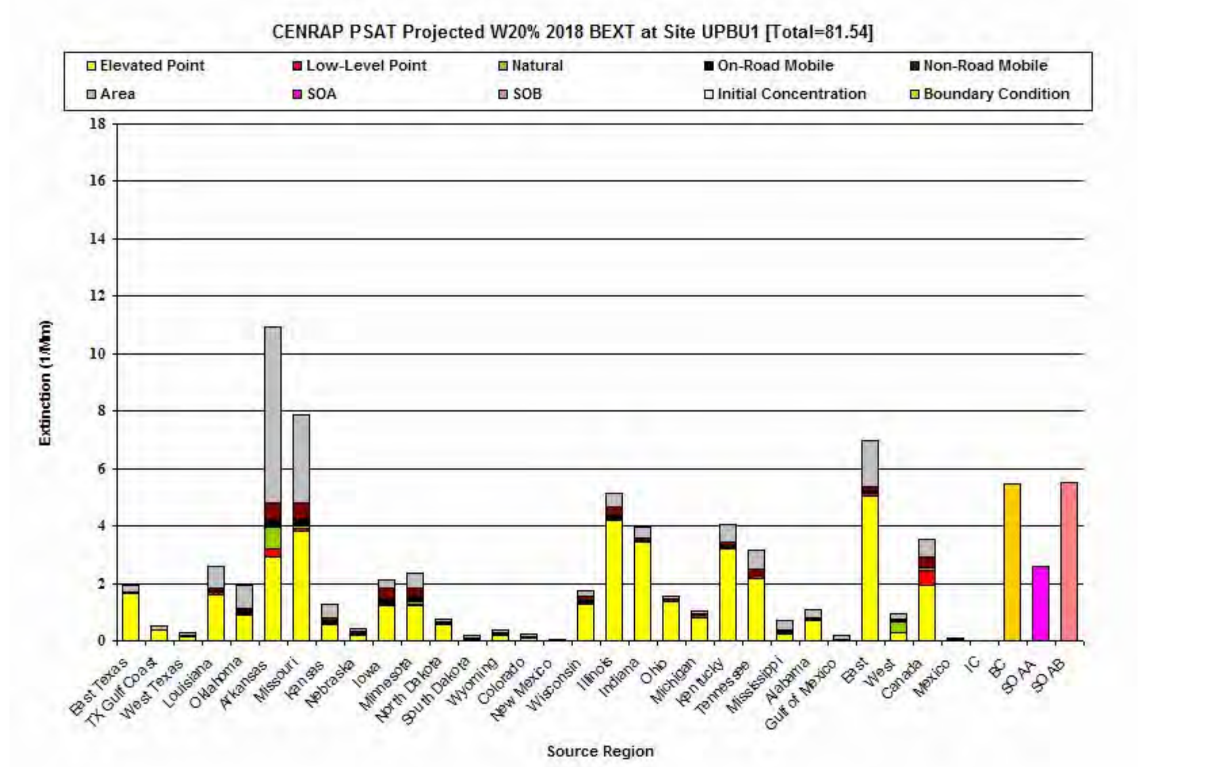


Figure E-2d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

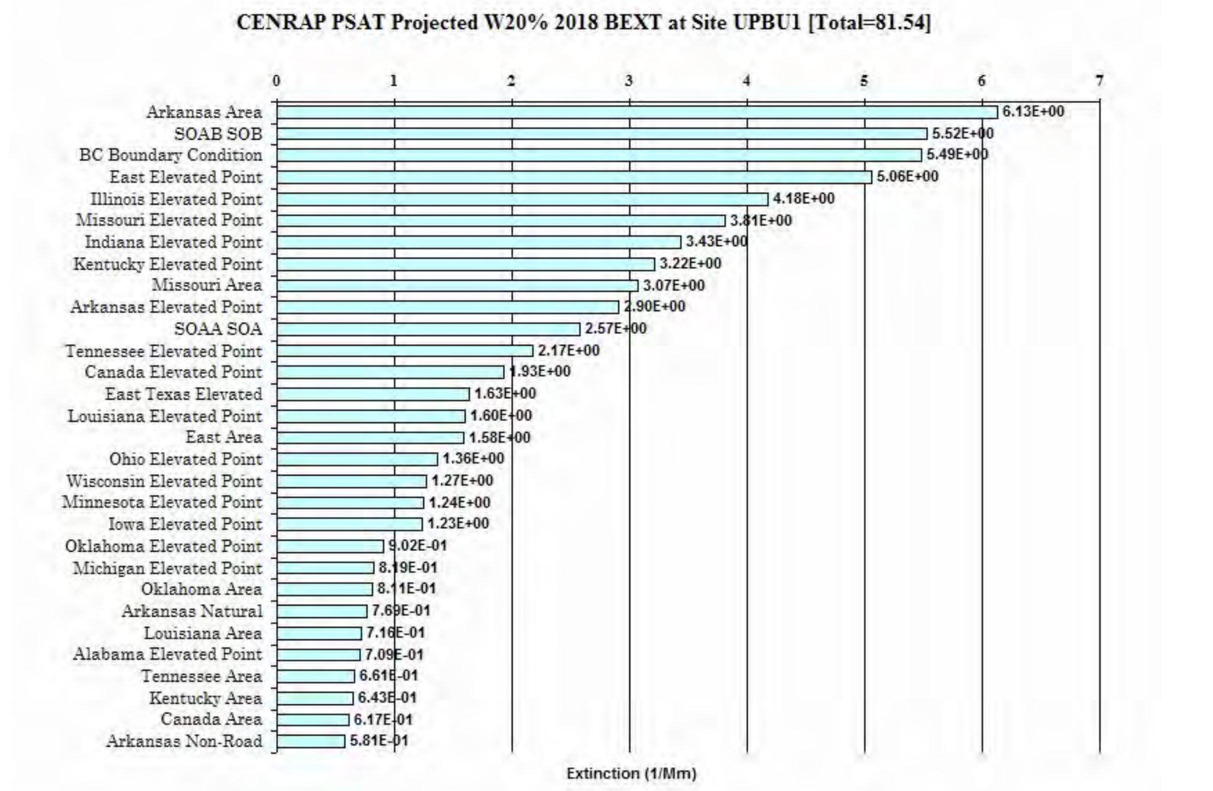


Figure E-2e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

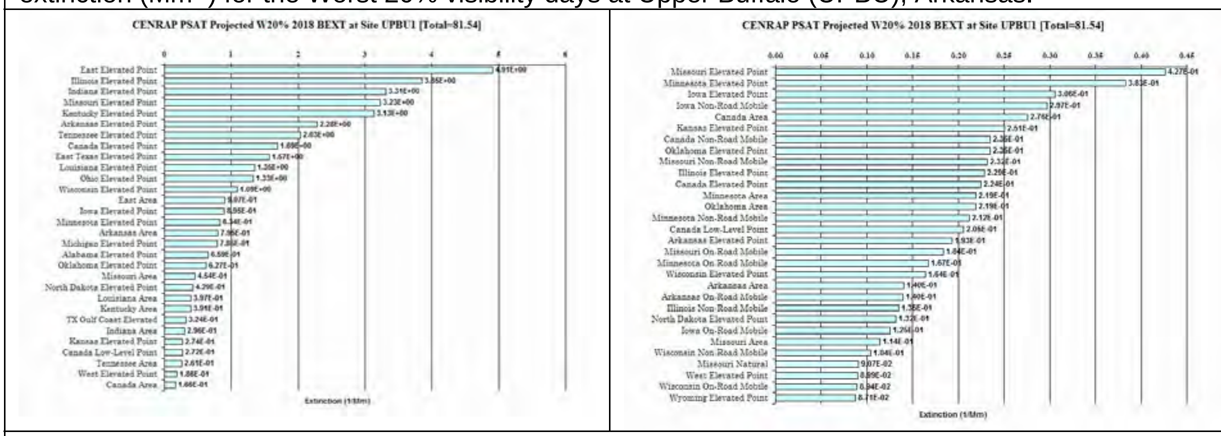


Figure E-2f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

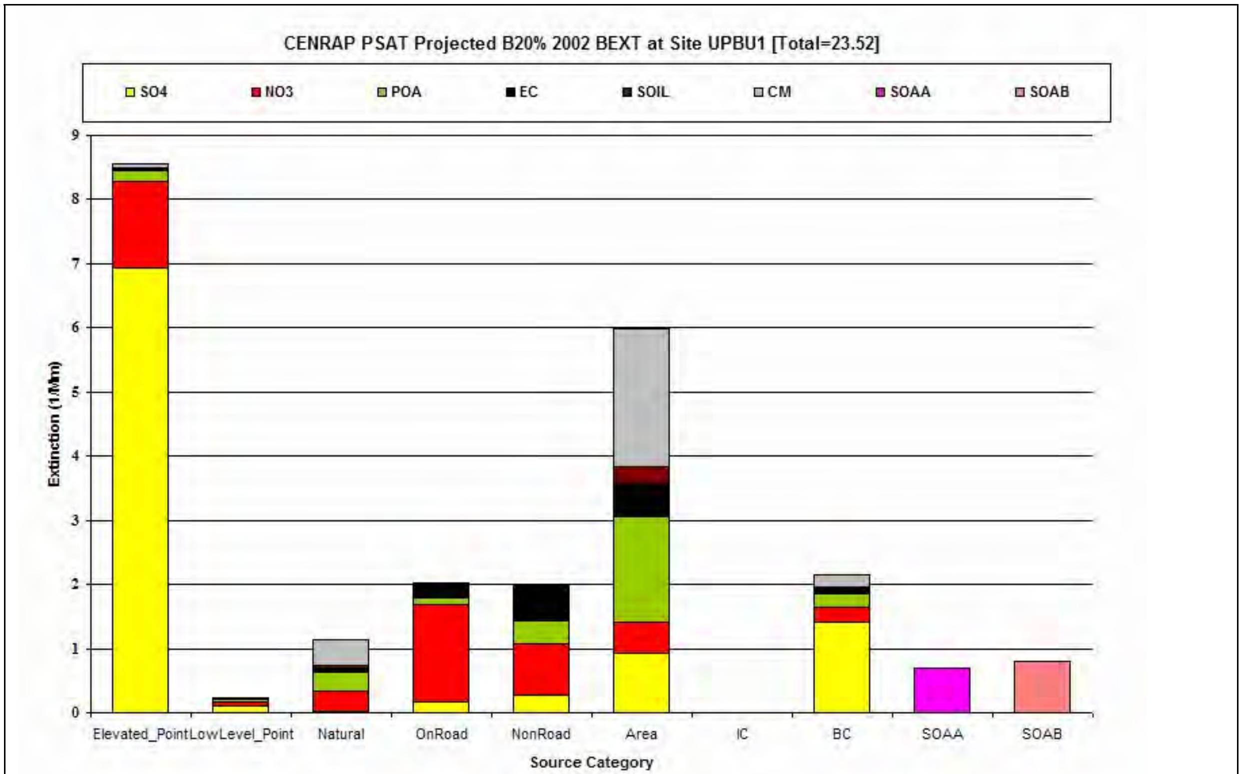


Figure E-2g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Upper Buffalo (UPBU), Arkansas.

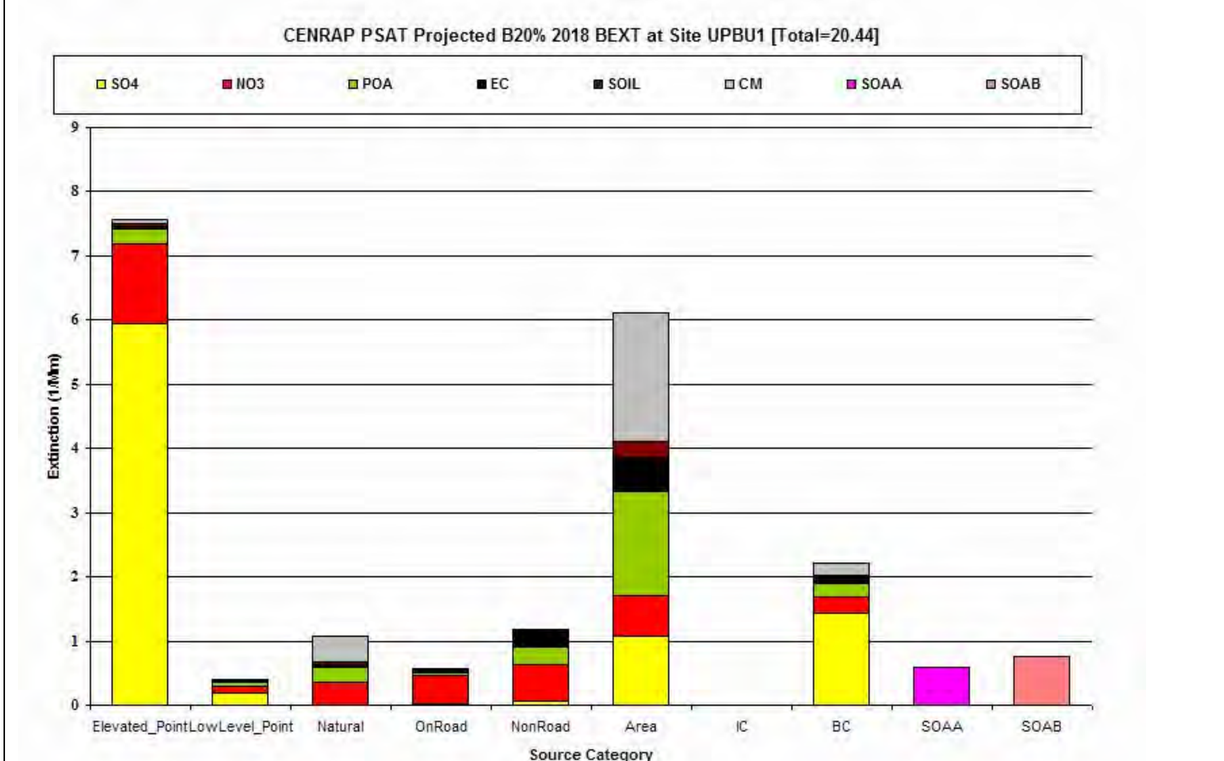


Figure E-2h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Upper Buffalo (UPBU), Arkansas.

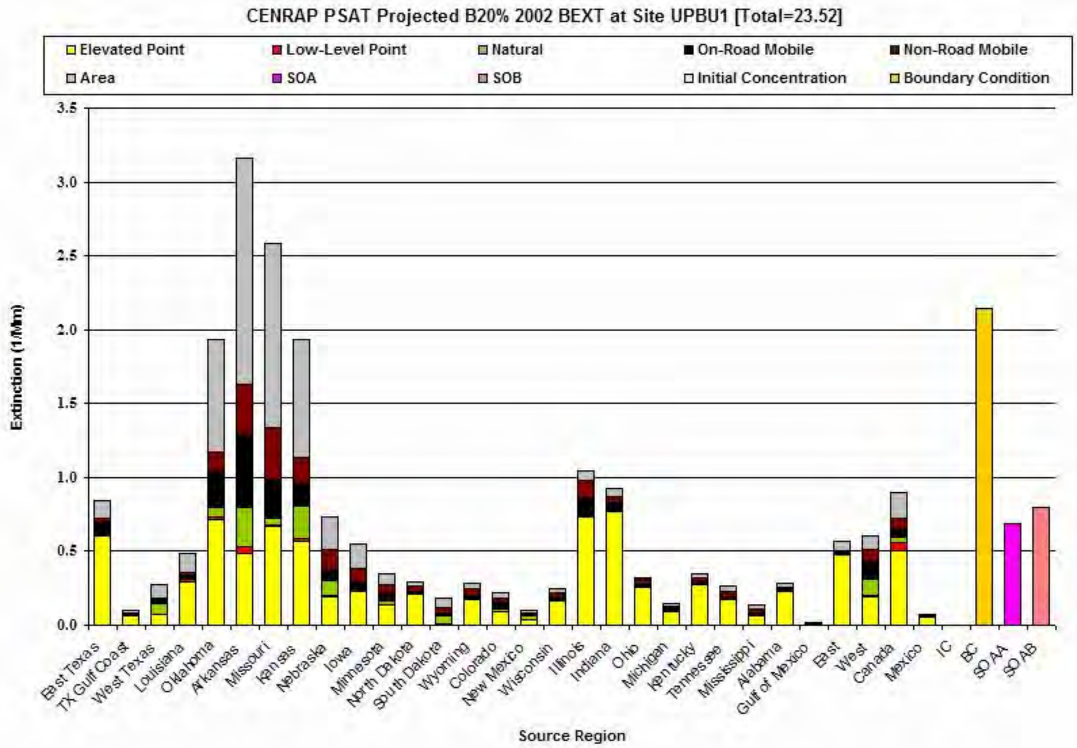


Figure E-2i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Upper Buffalo (UPBU), Arkansas.

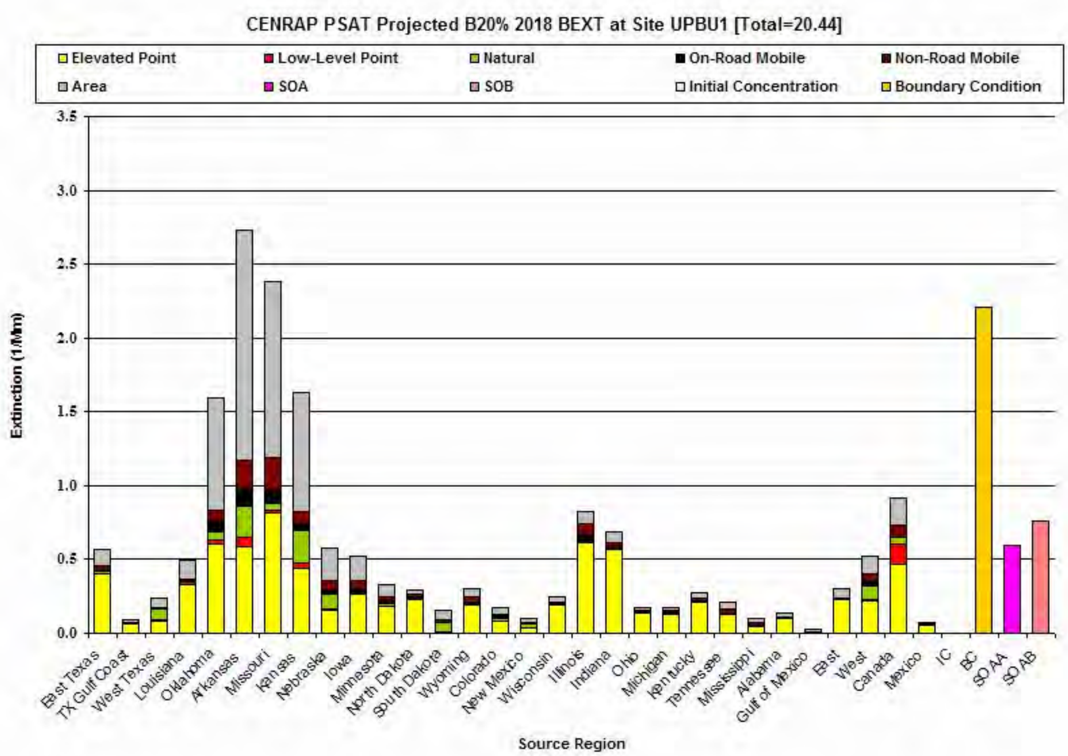


Figure E-2j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Upper Buffalo (UPBU), Arkansas.

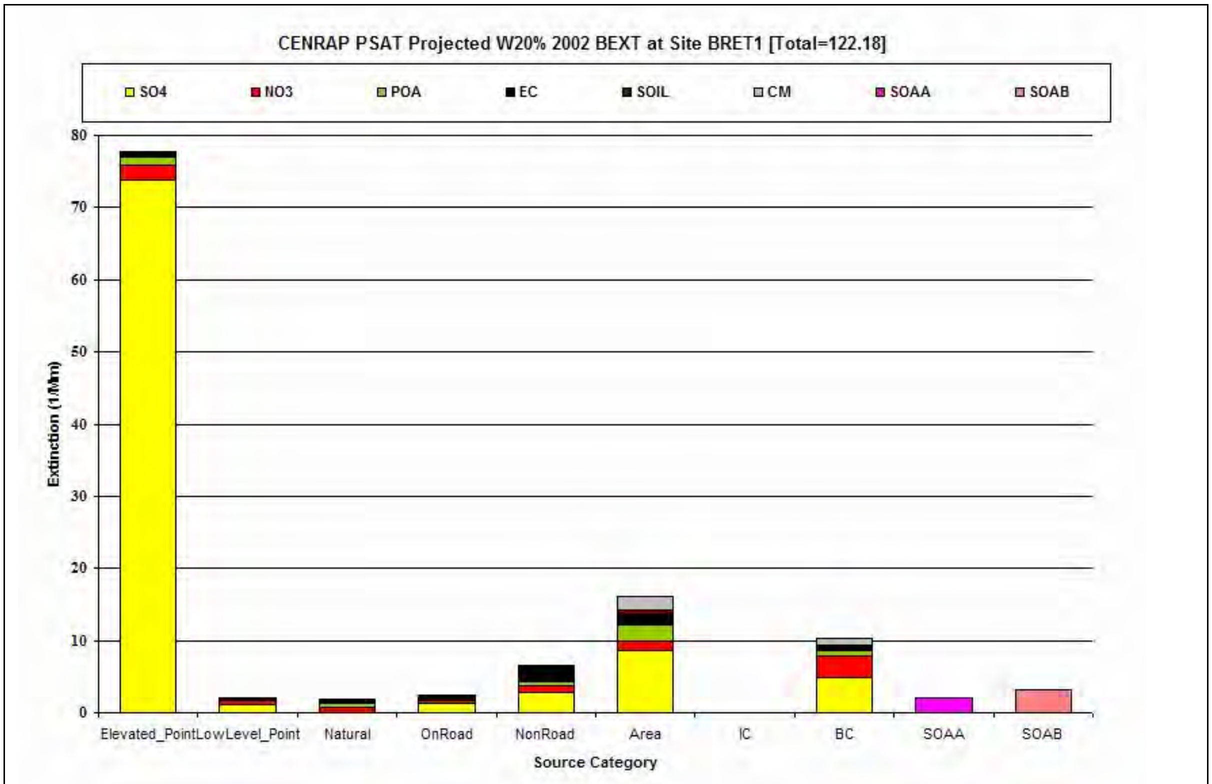


Figure E-3a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

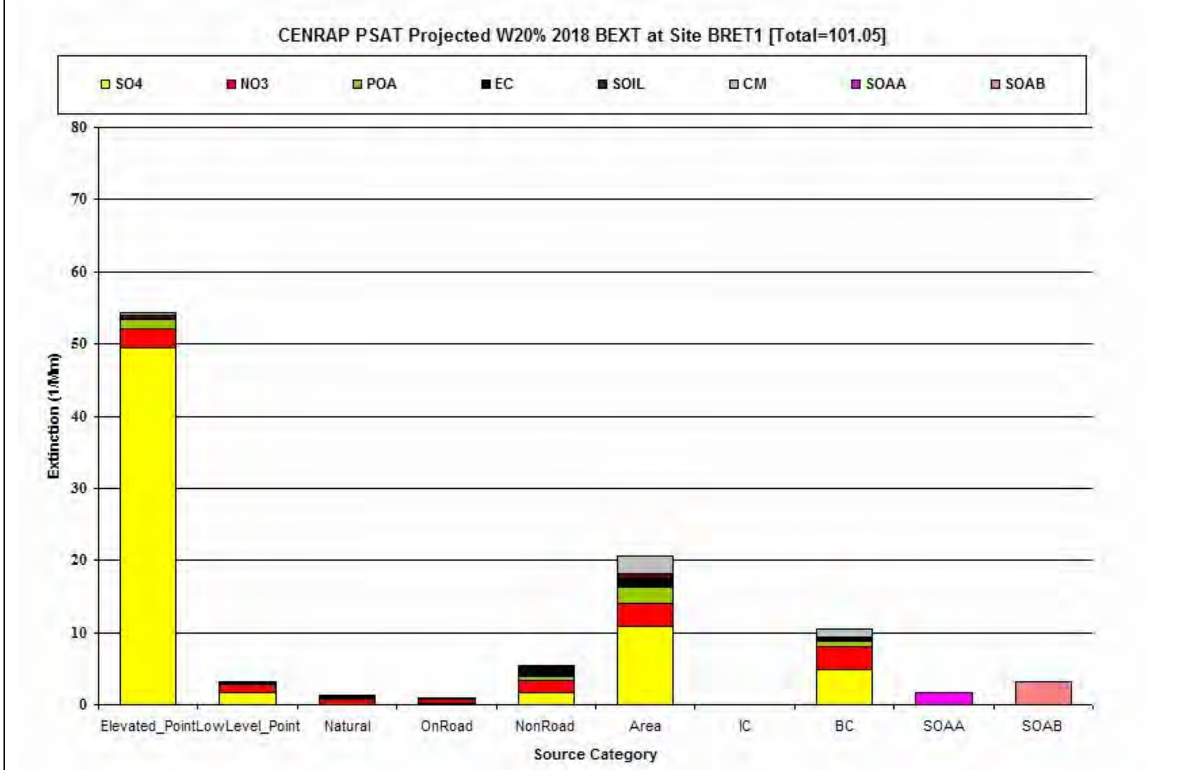


Figure E-3b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

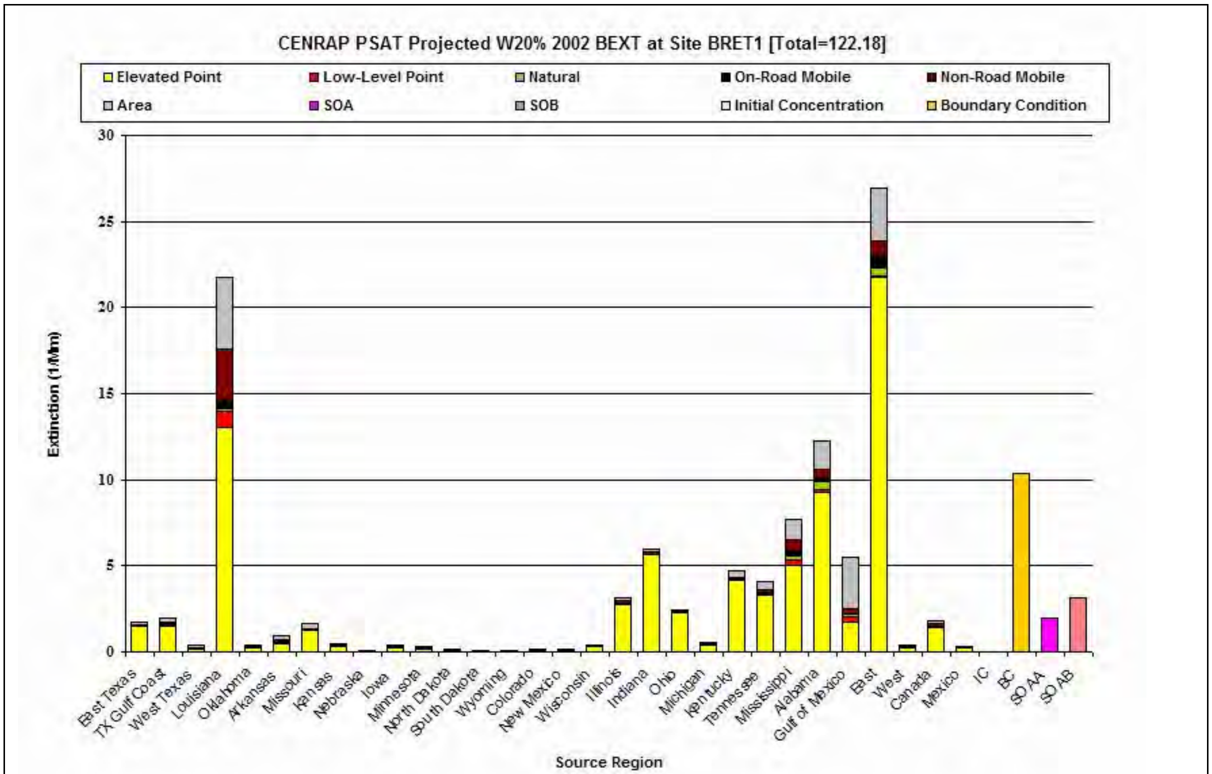


Figure E-3c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

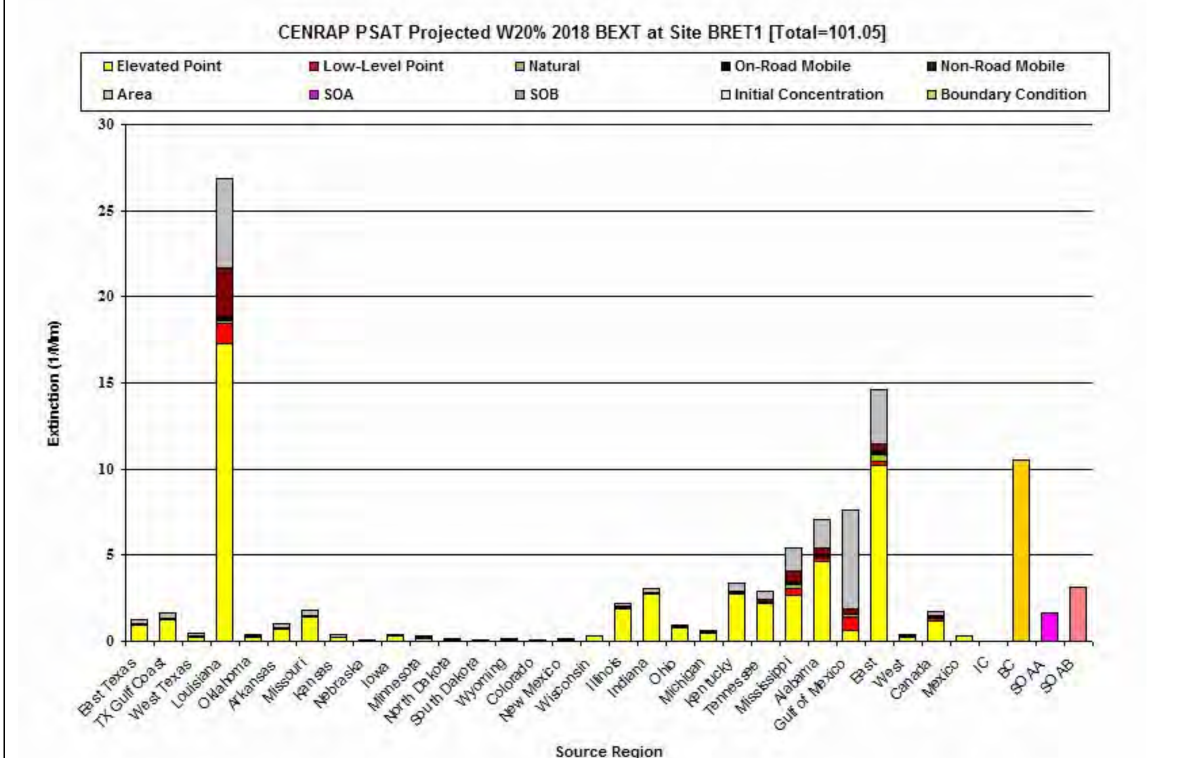


Figure E-3d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

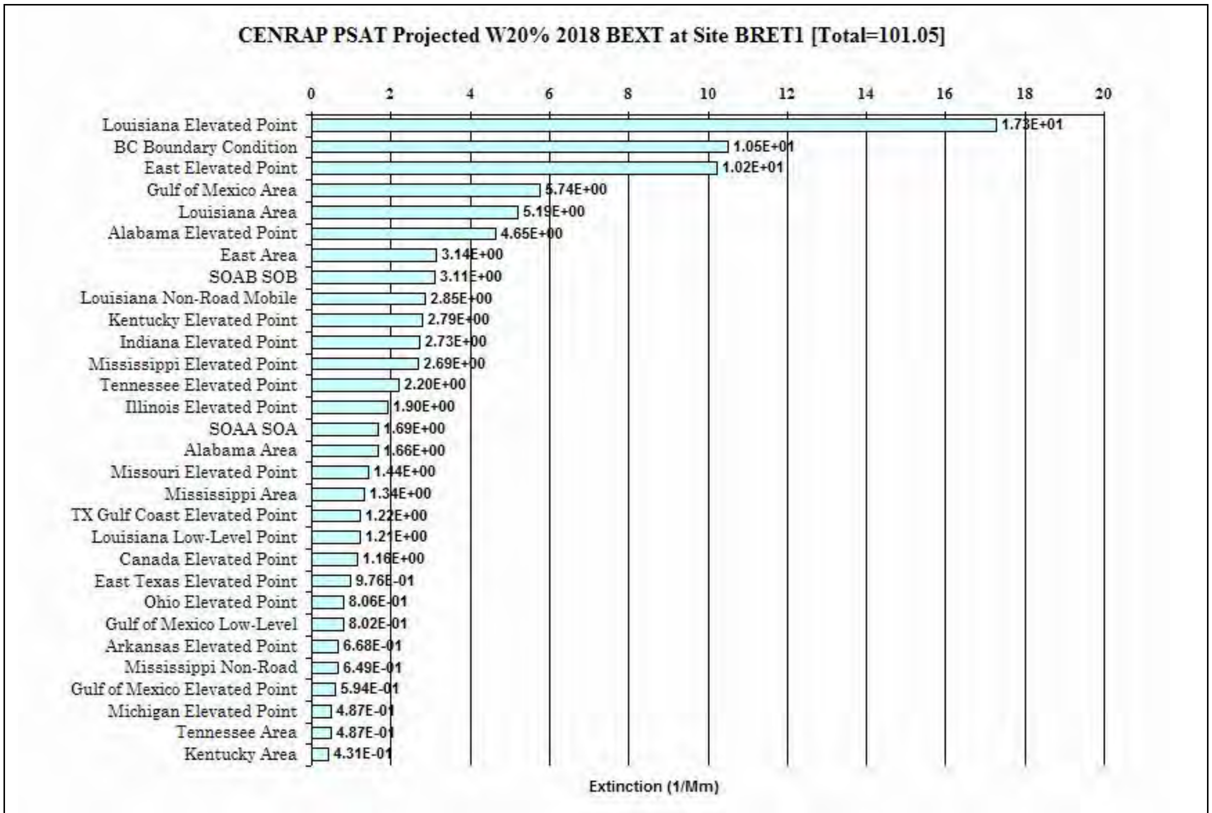


Figure E-3e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

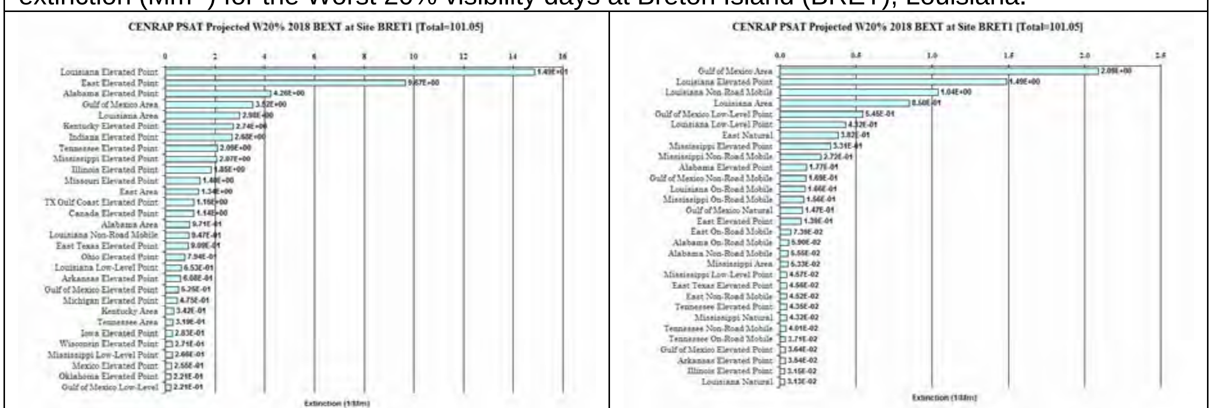


Figure E-3f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

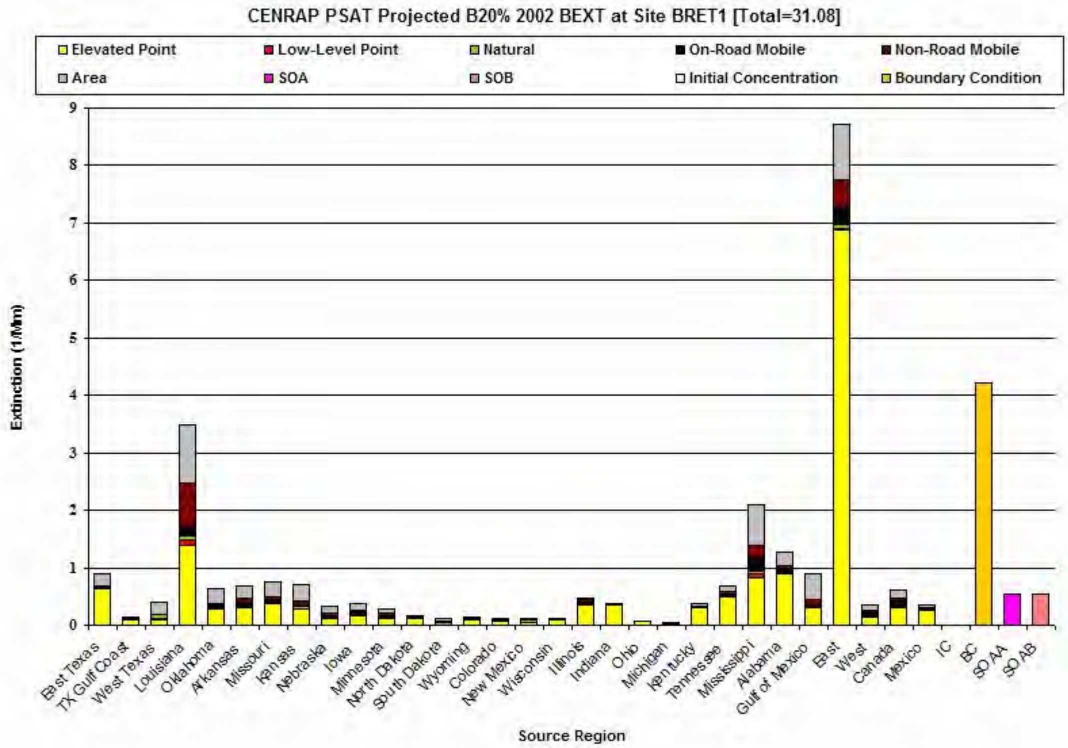


Figure E-3g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Breton Island (BRET), Louisiana.

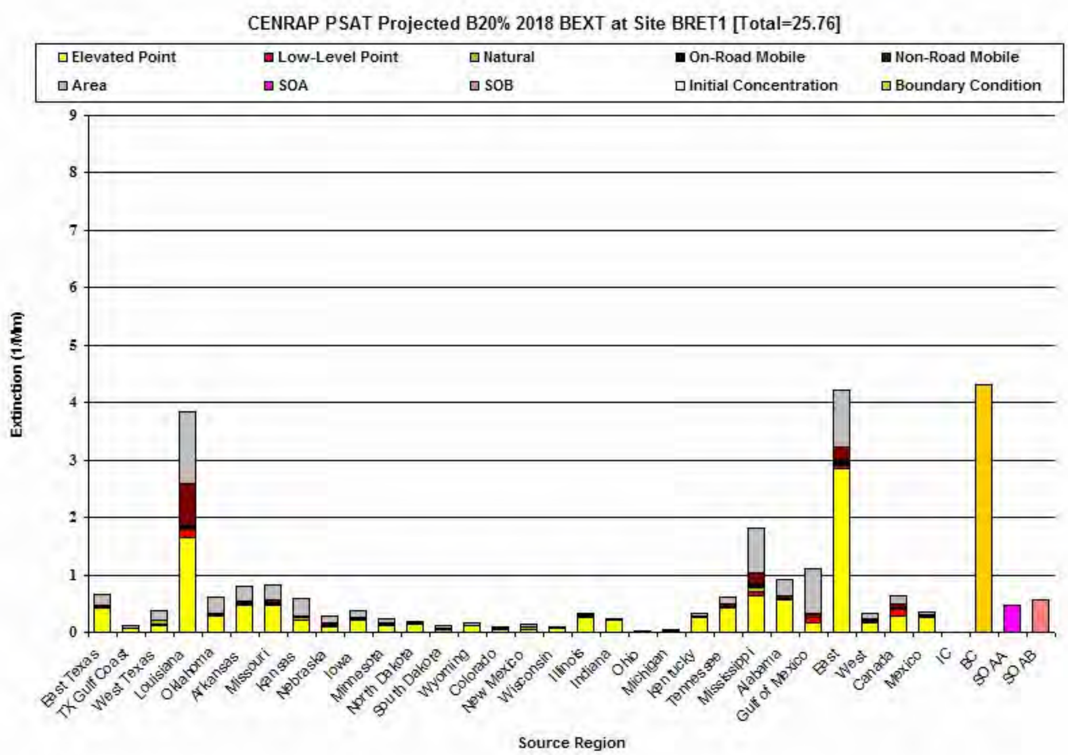


Figure E-3h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Breton Island (BRET), Louisiana.

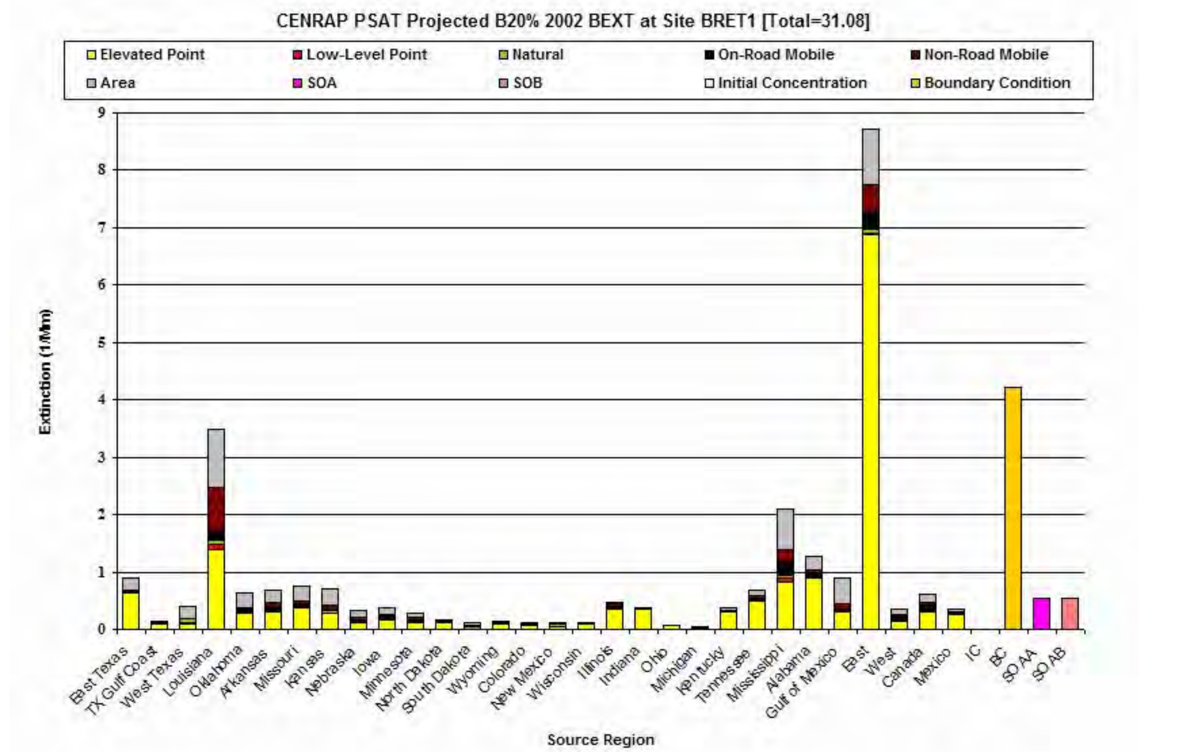


Figure E-3i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Breton Island (BRET), Louisiana.

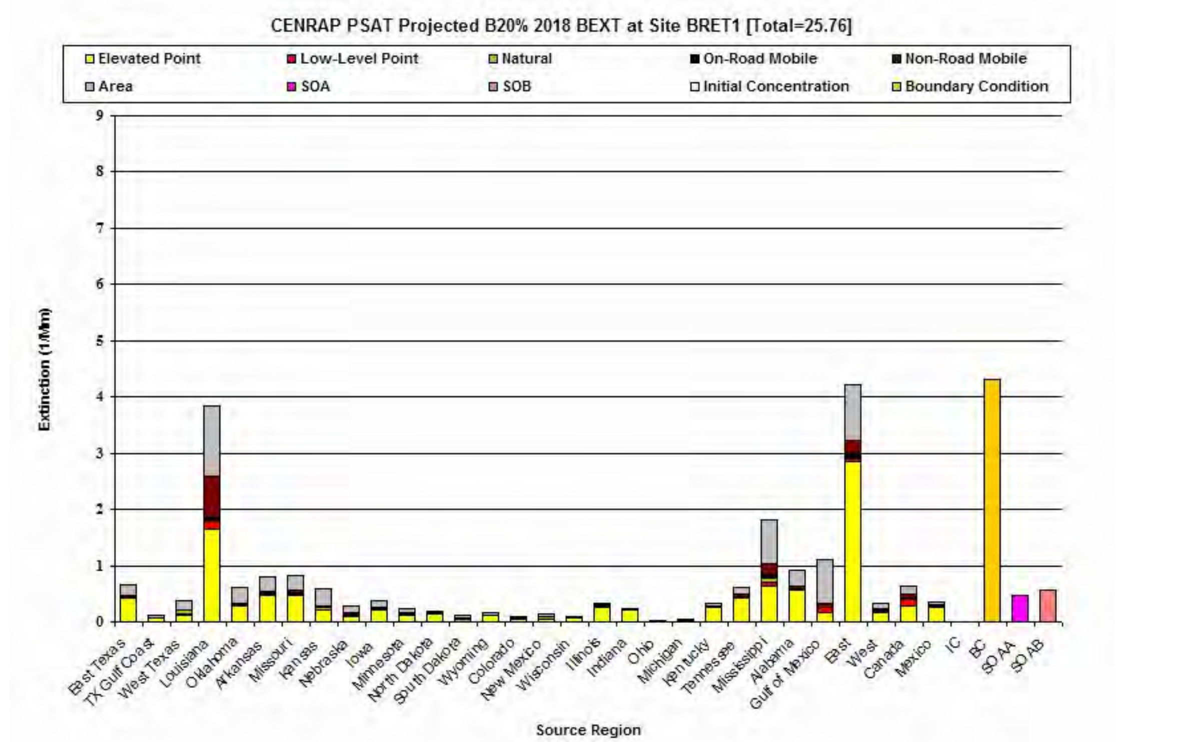


Figure E-3j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Breton Island (BRET), Louisiana.

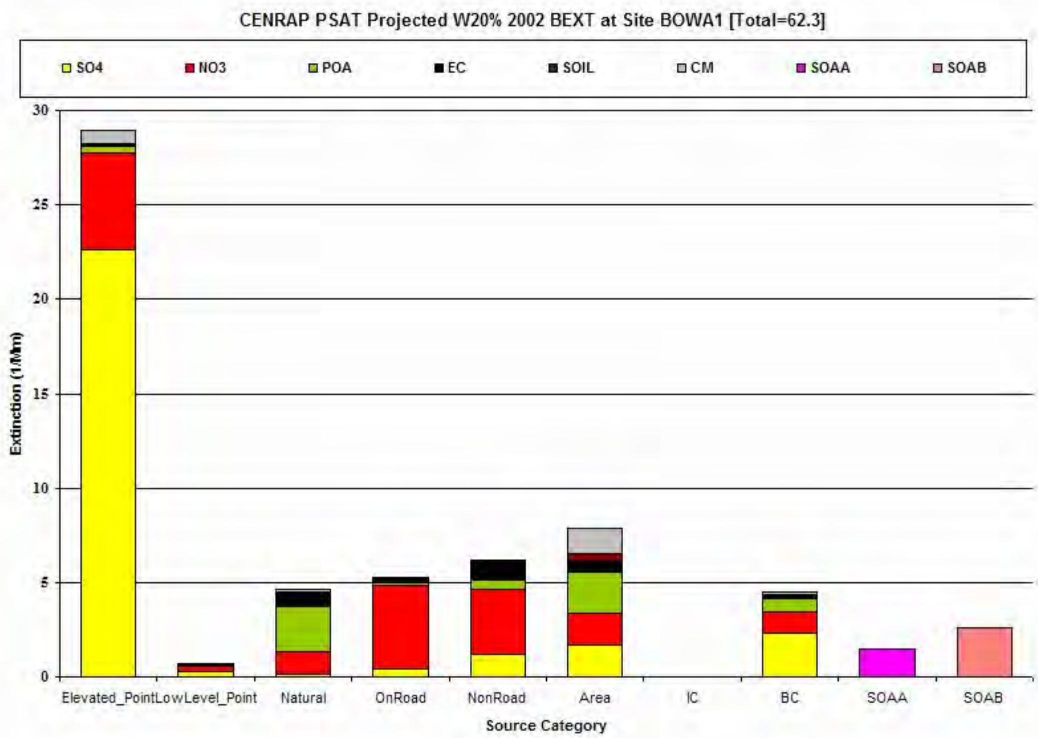


Figure E-4a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

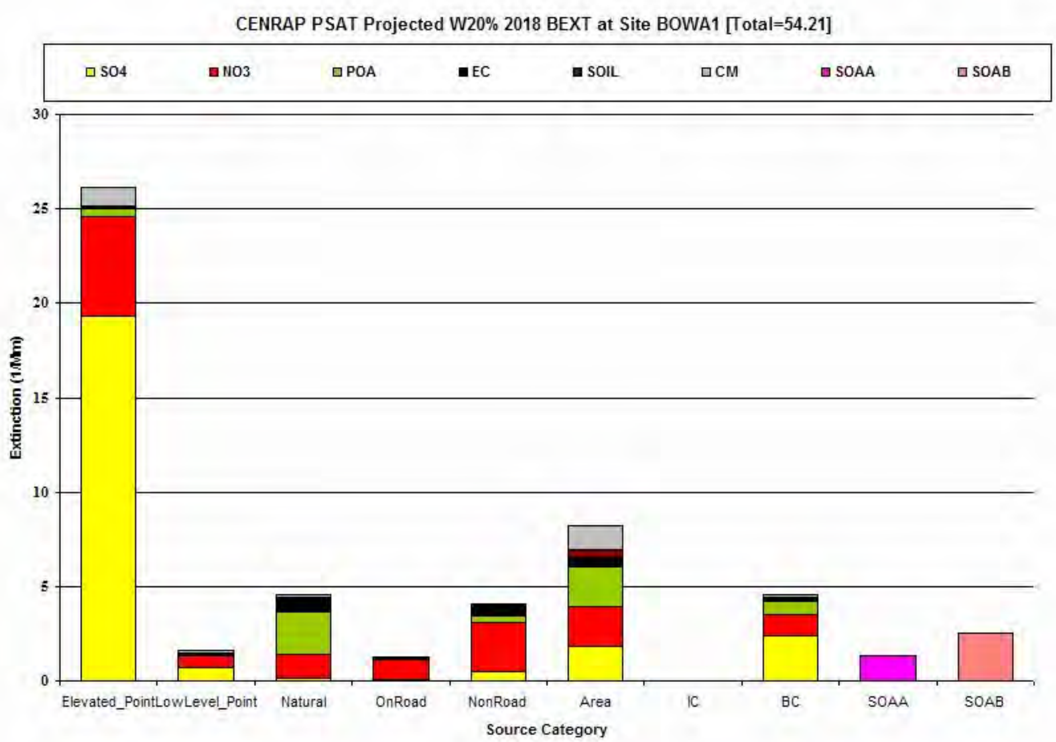


Figure E-4b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

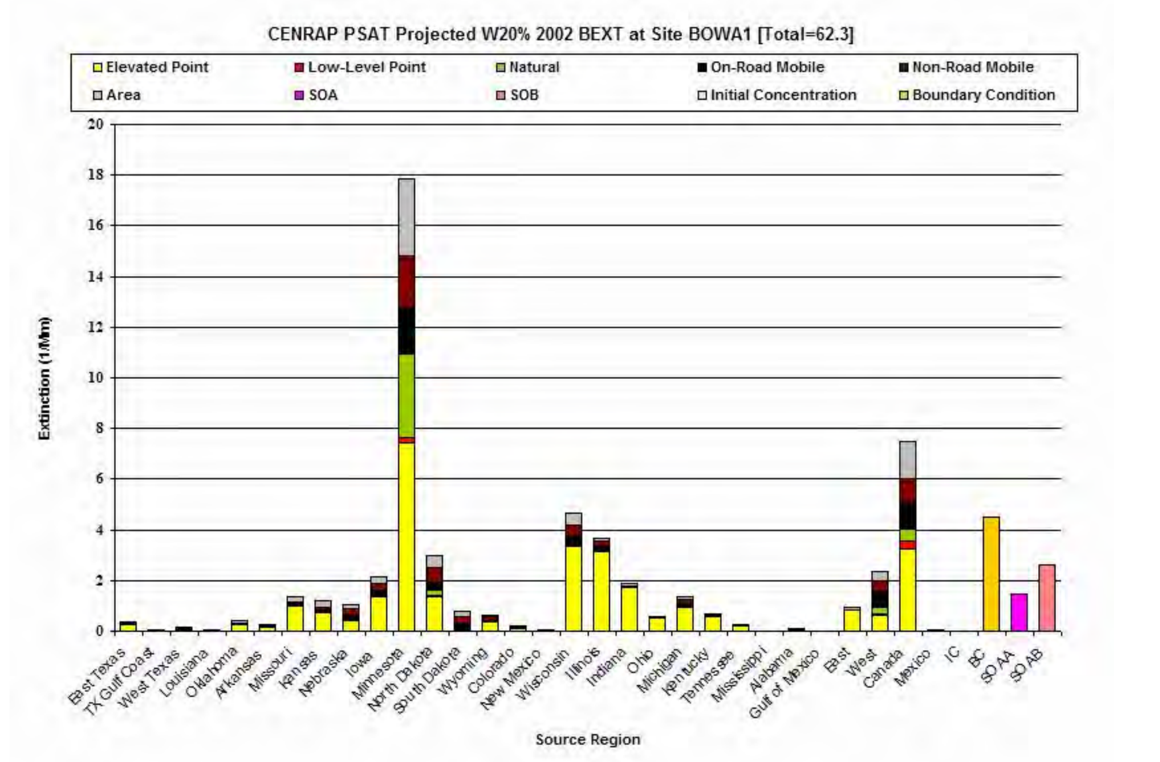


Figure E-4c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

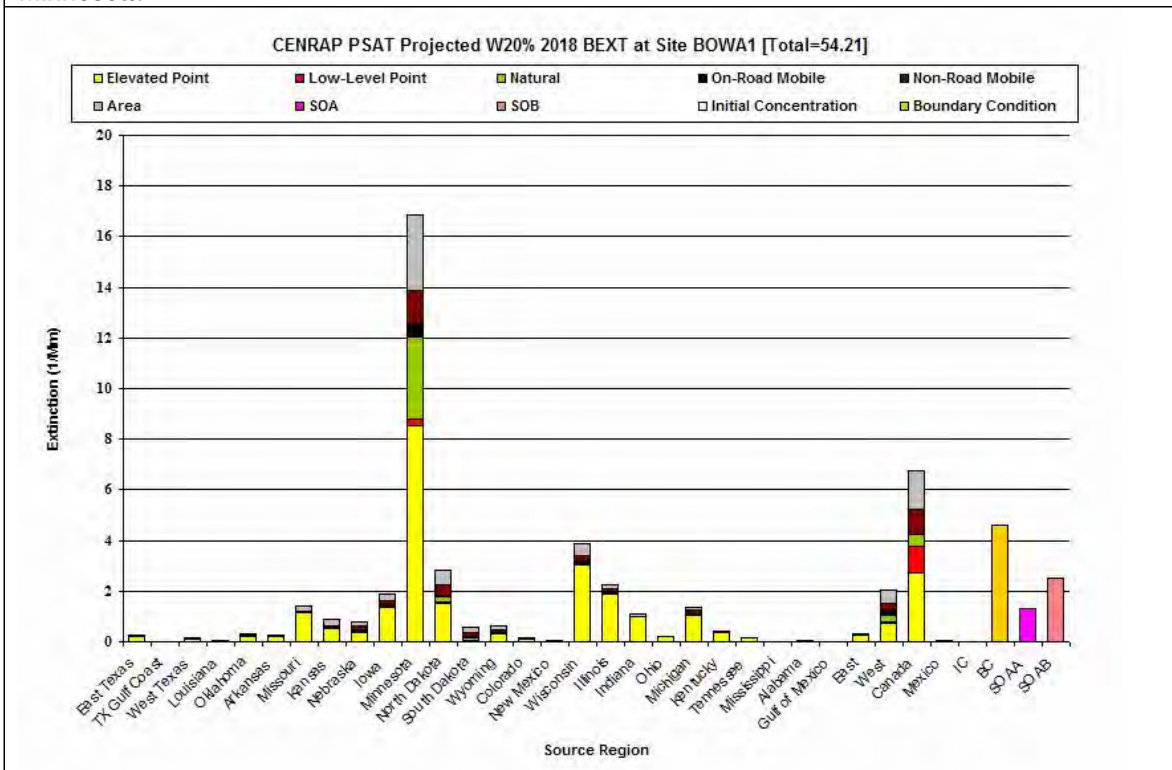


Figure E-4d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

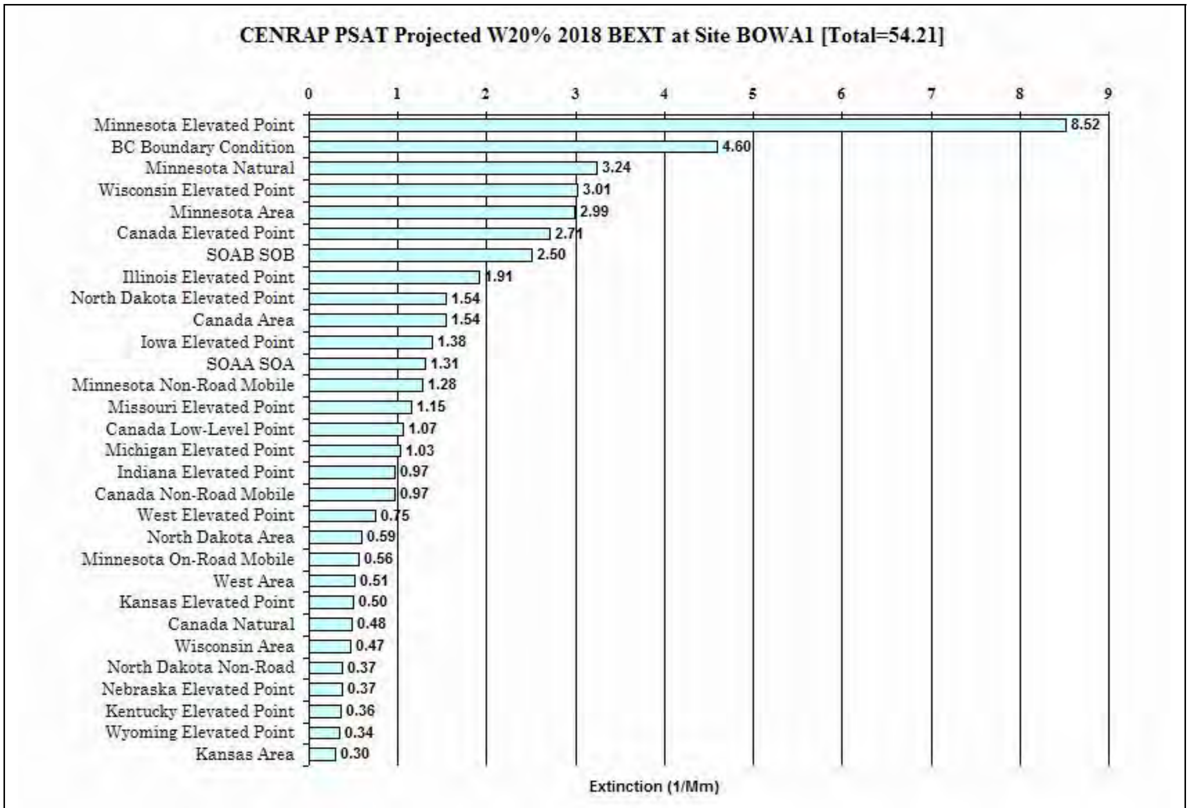
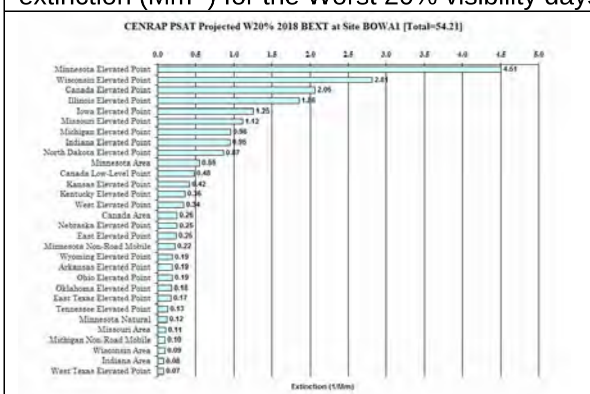


Figure E-4e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.



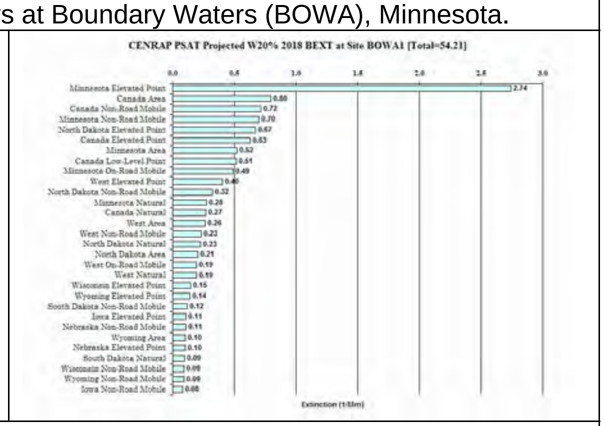


Figure E-4f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

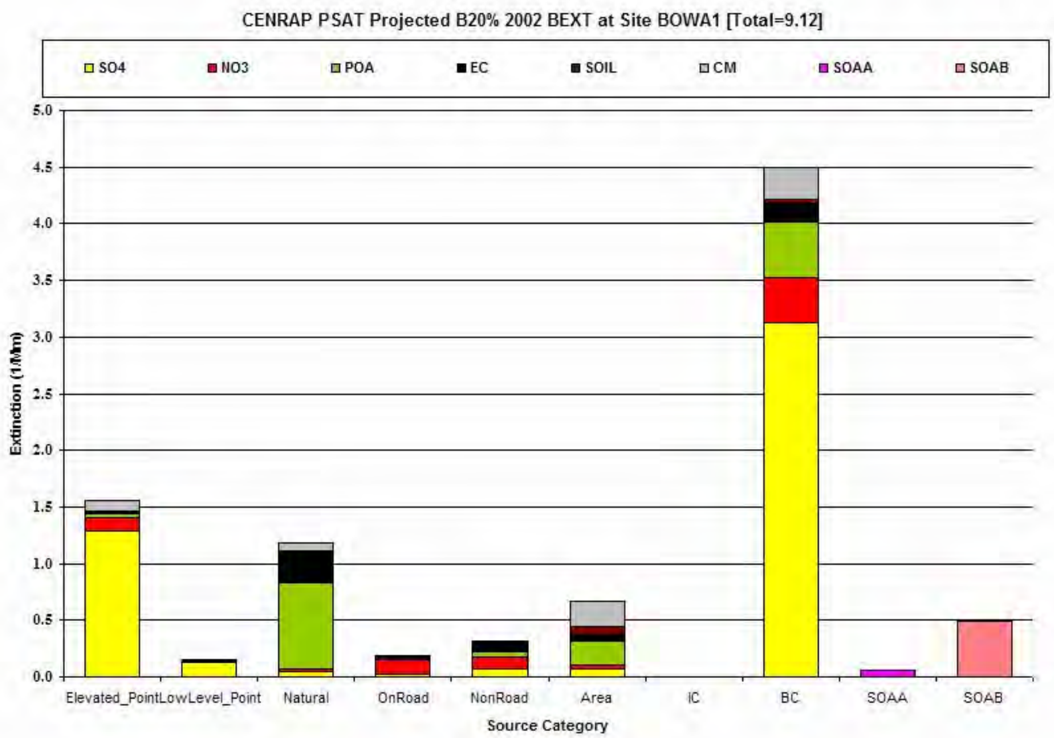


Figure E-4g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Boundary Waters (BOWA), Minnesota.

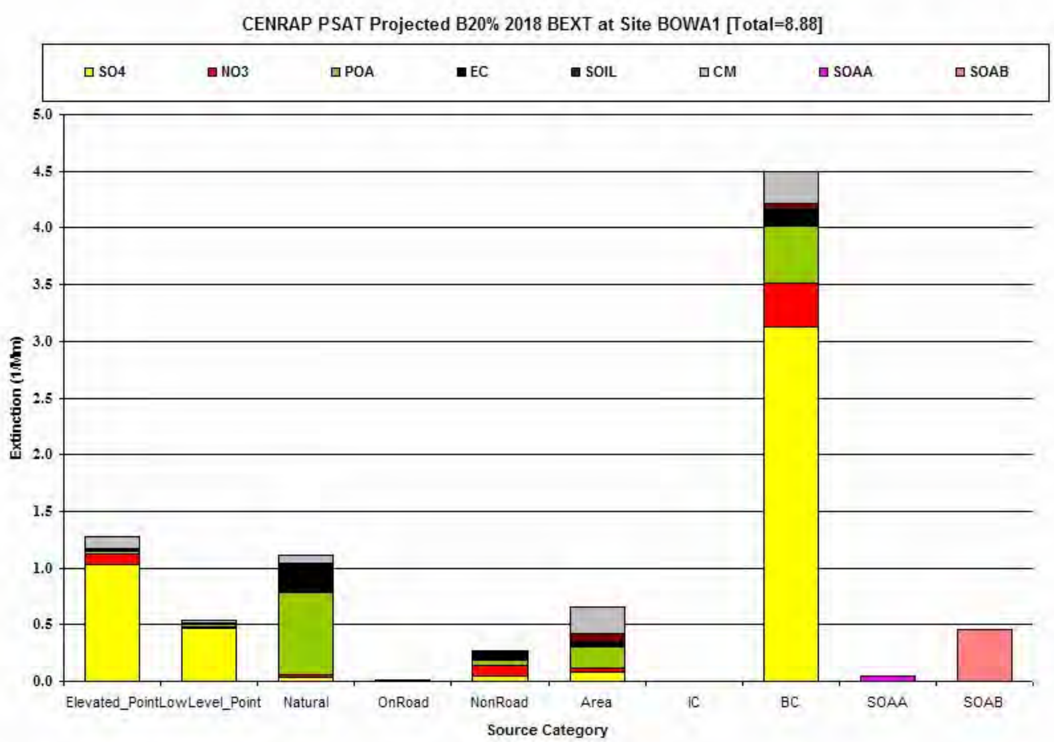


Figure E-4h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Boundary Waters (BOWA), Minnesota.

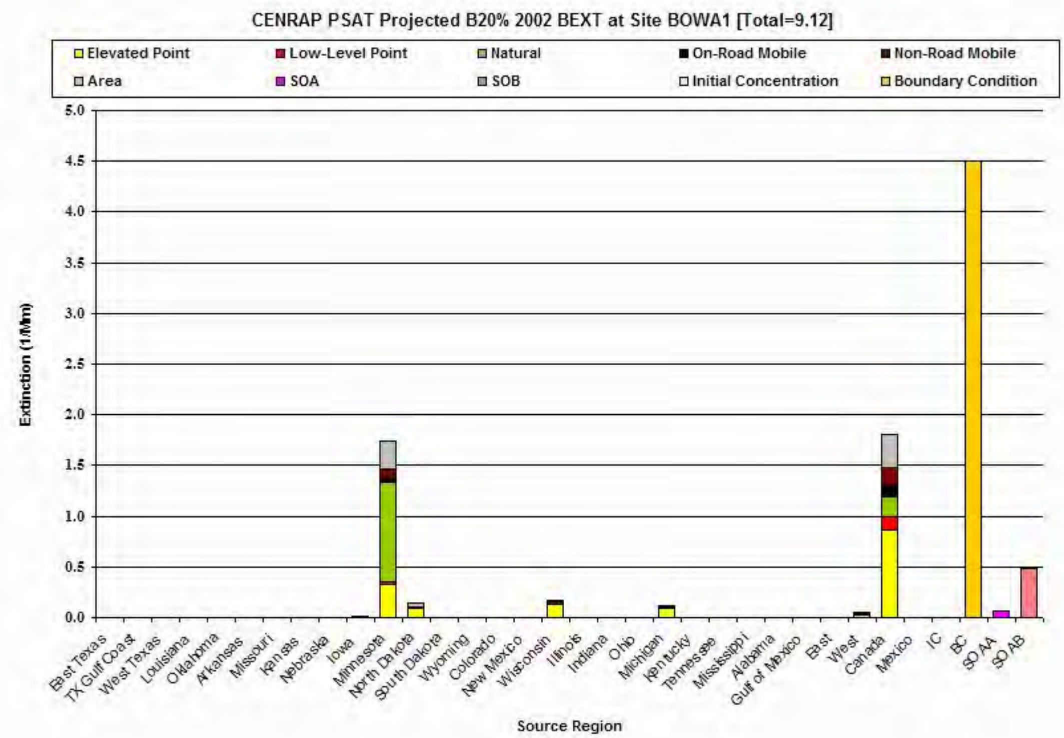


Figure E-4i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Boundary Waters (BOWA), Minnesota.

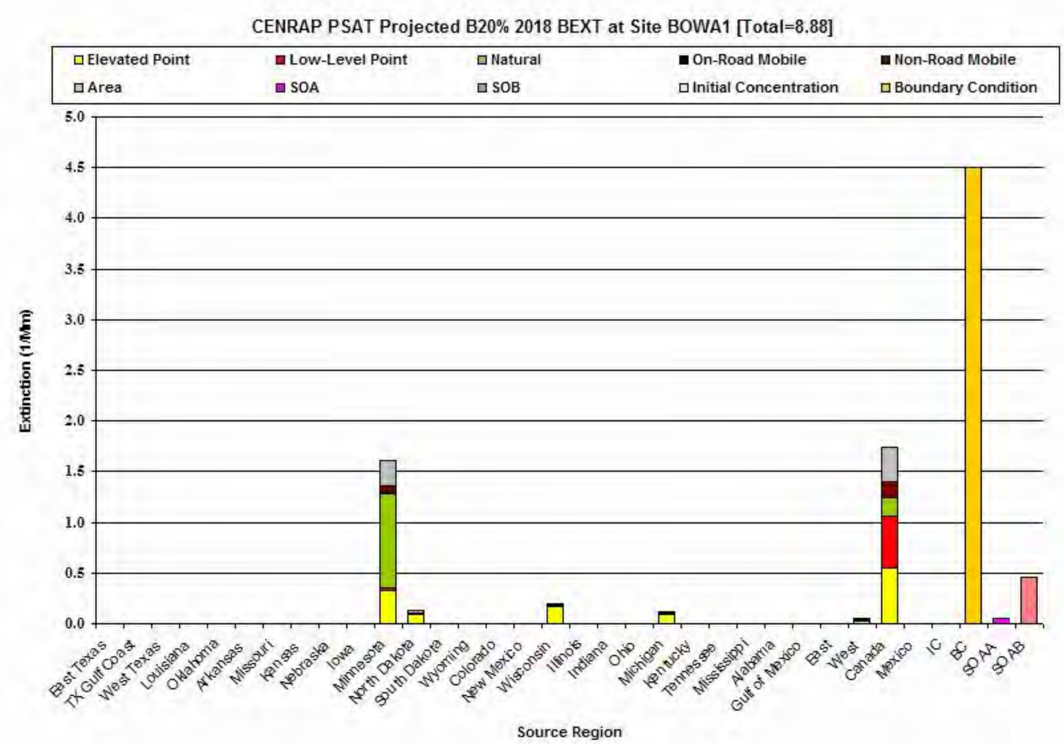


Figure E-4j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Boundary Waters (BOWA), Minnesota.

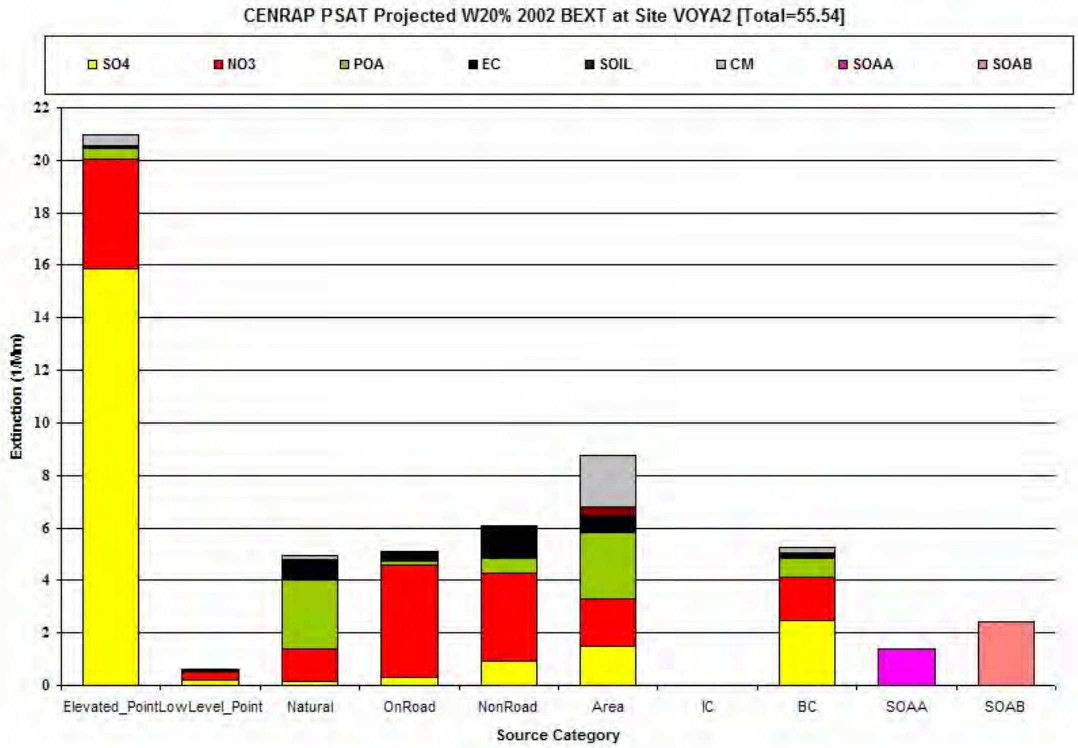


Figure E-5a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.

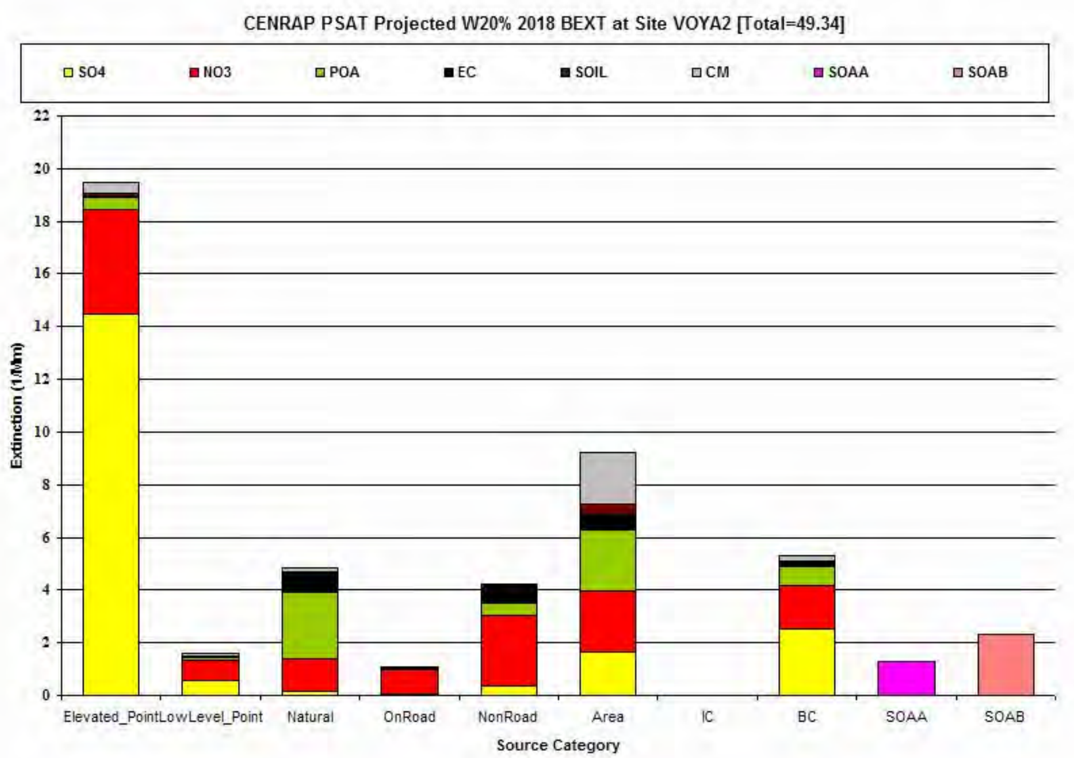


Figure E-5b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.

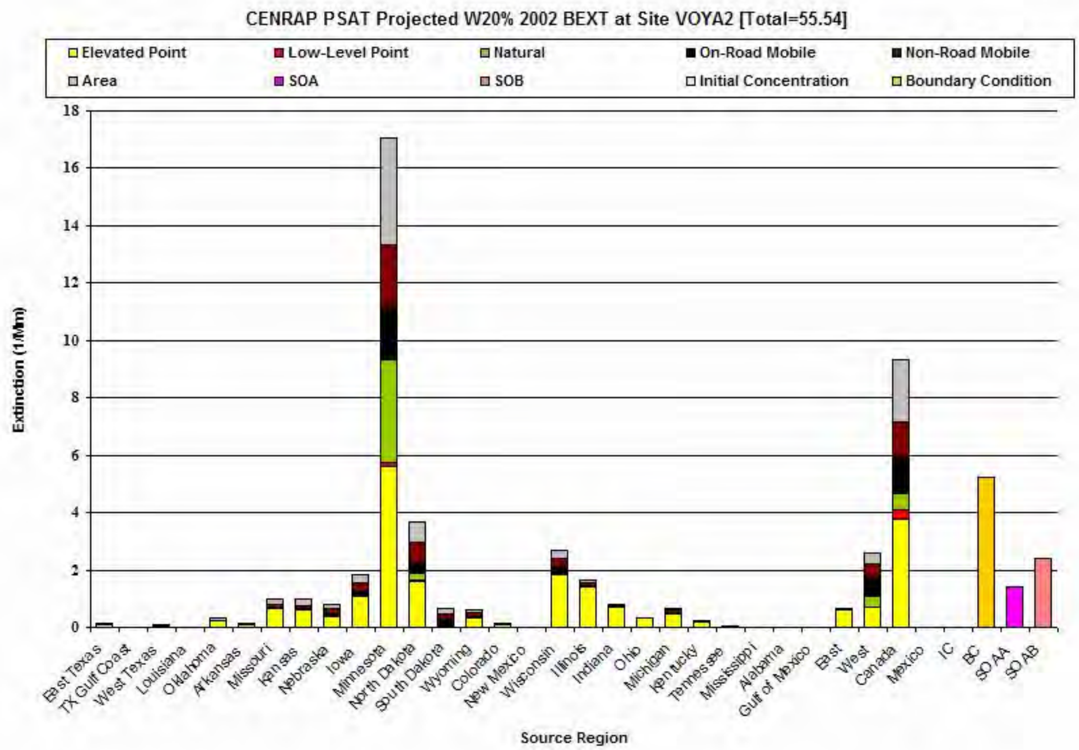


Figure E-5c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.

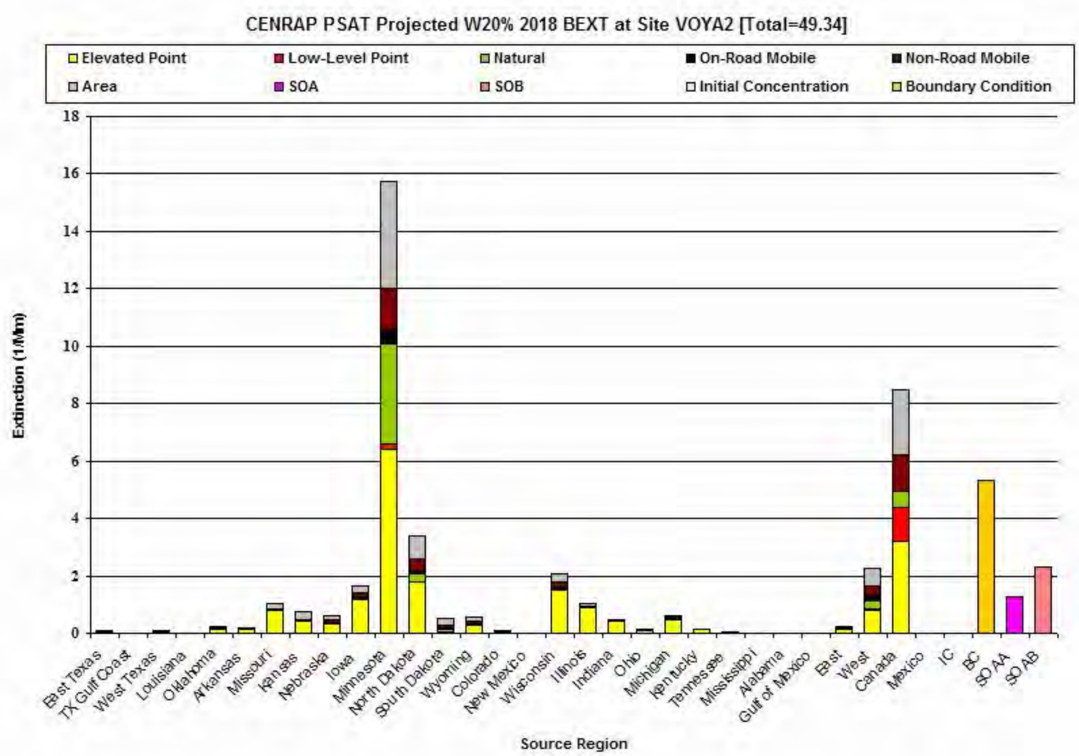


Figure E-5d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.

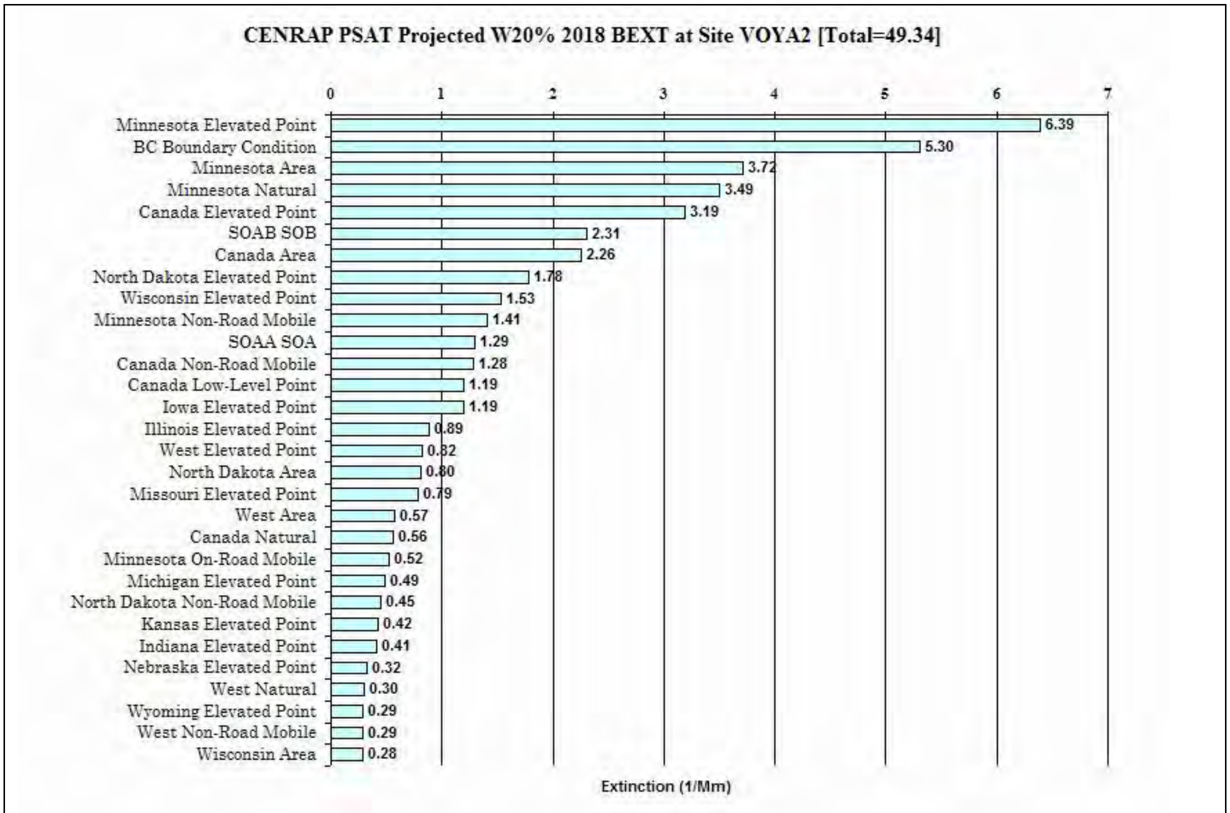
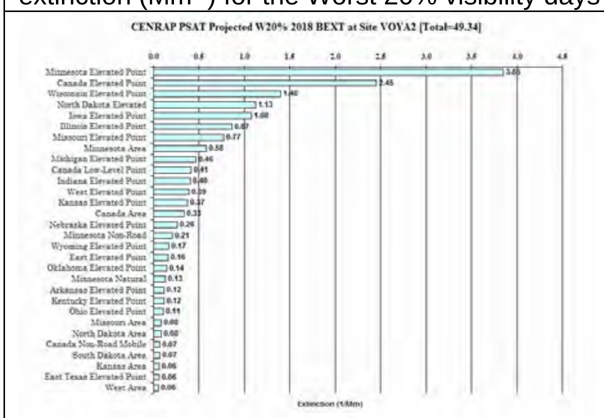


Figure E-5e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.



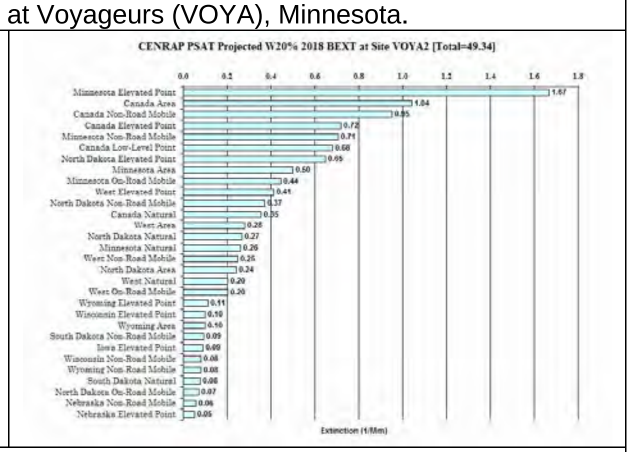


Figure E-5f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.

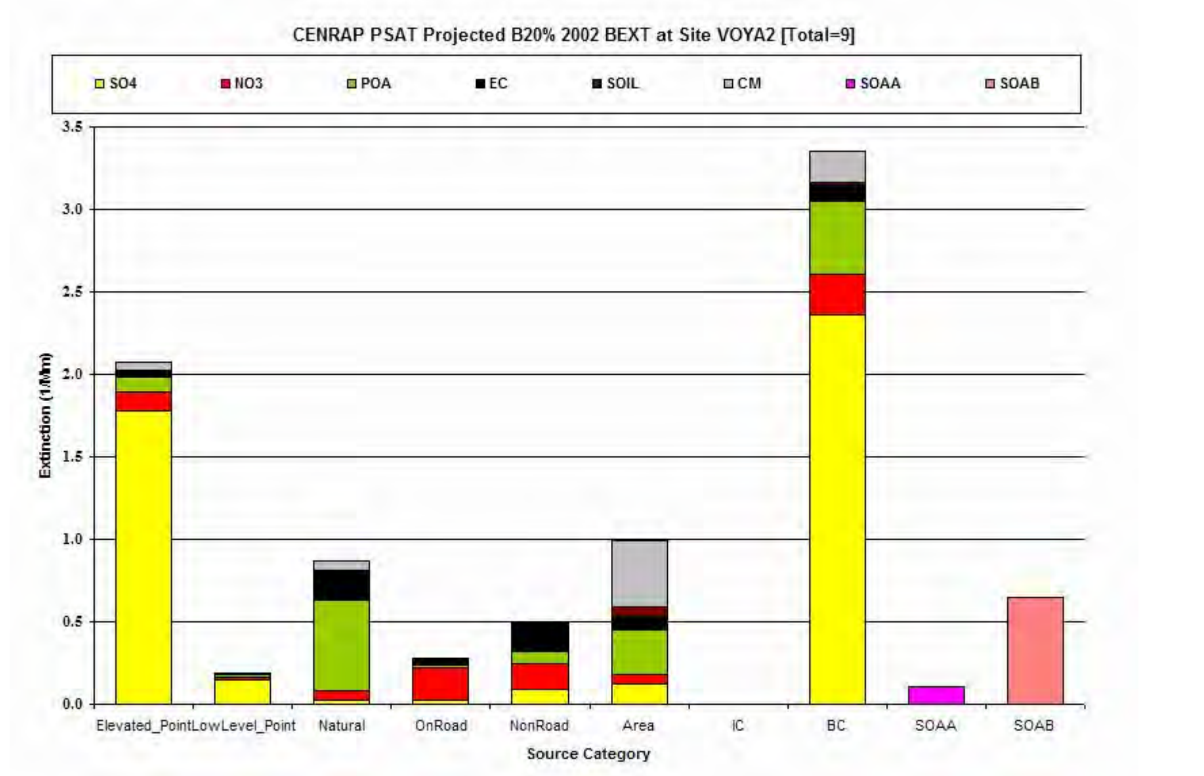


Figure E-5g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Voyageurs (VOYA), Minnesota.

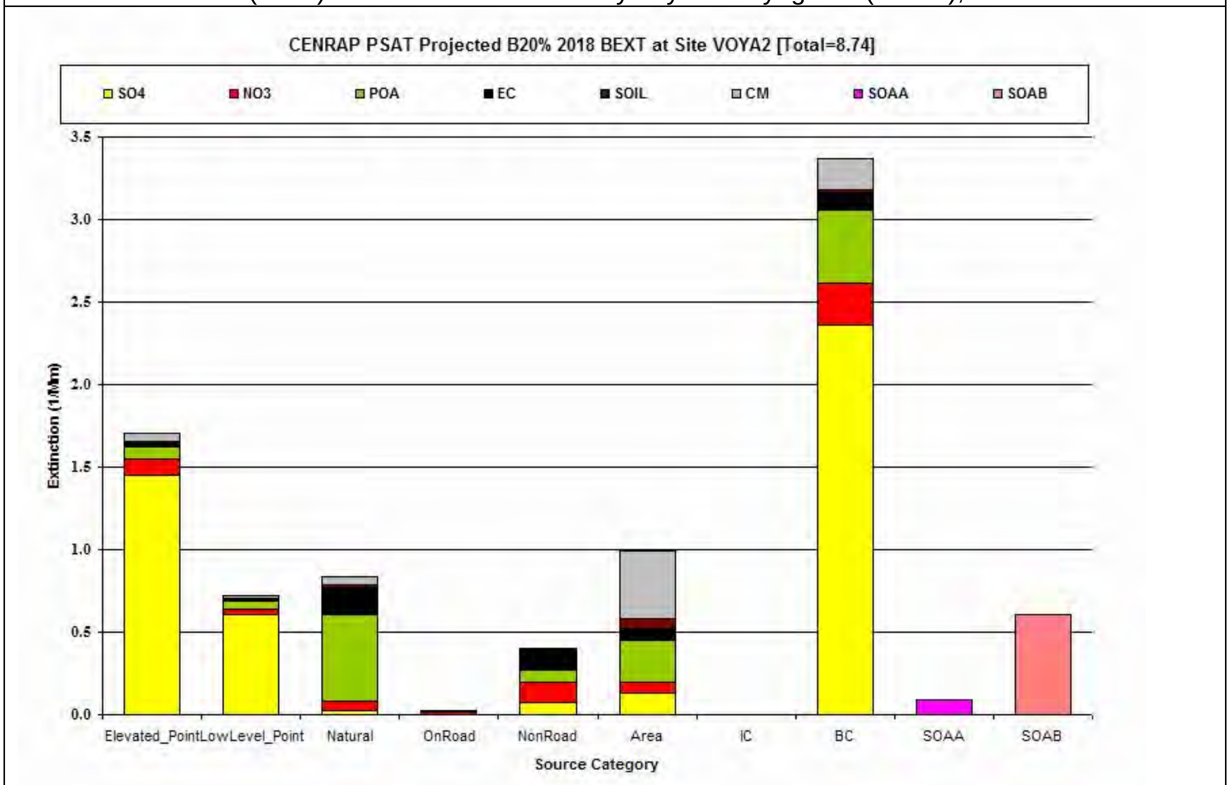


Figure E-5h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Voyageurs (VOYA), Minnesota.

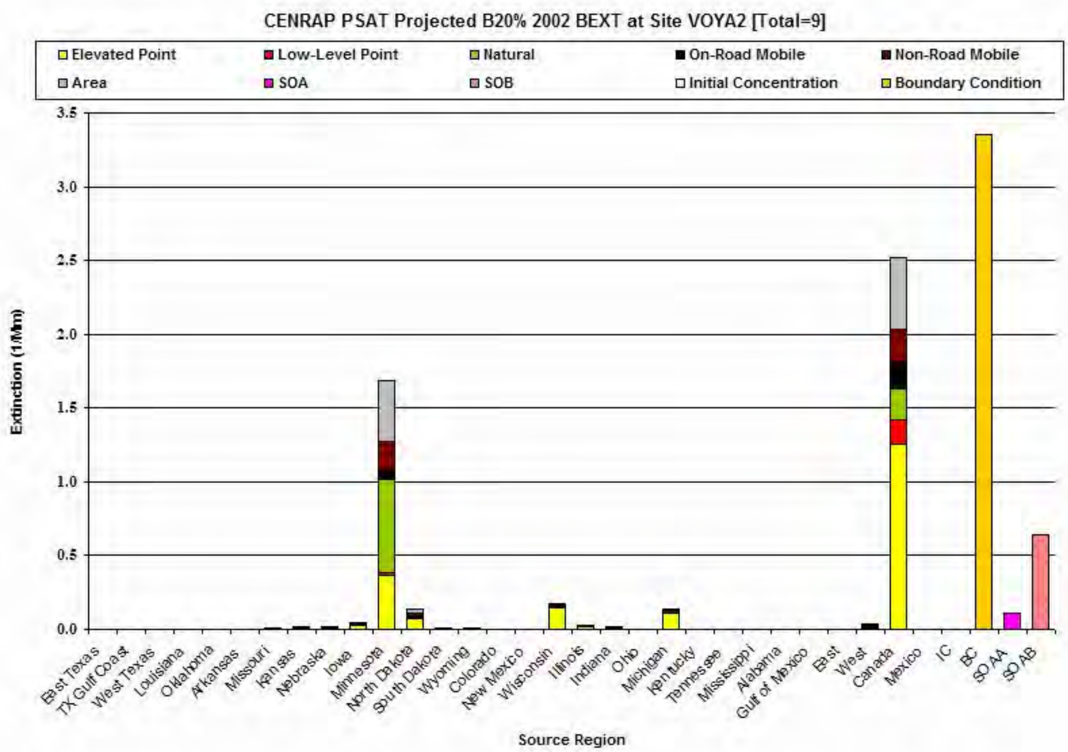


Figure E-5i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Voyageurs (VOYA), Minnesota.

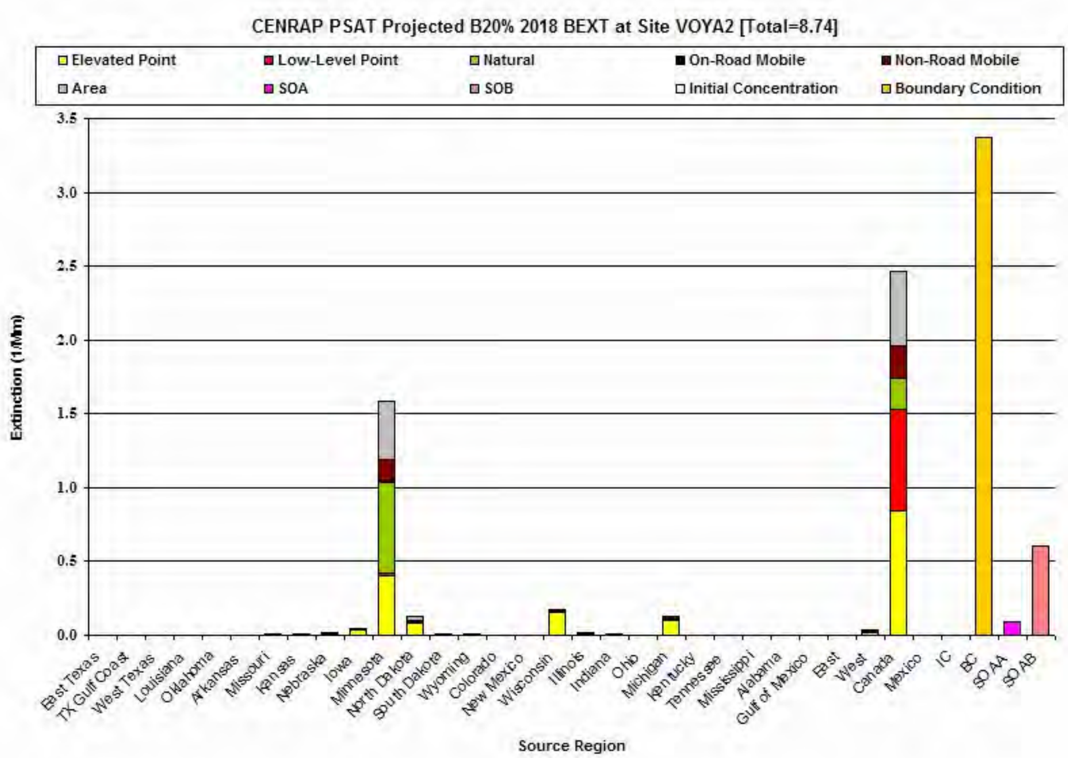


Figure E-5j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Voyageurs (VOYA), Minnesota.

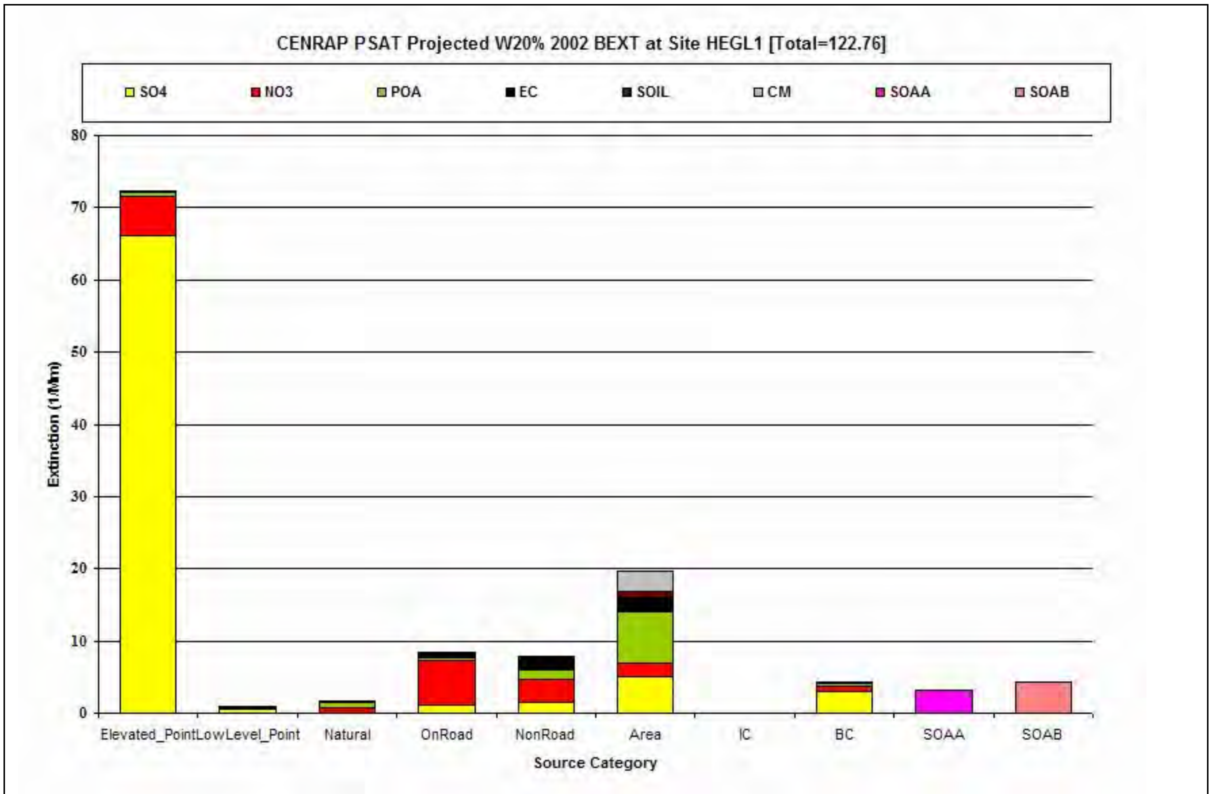


Figure E-6a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.

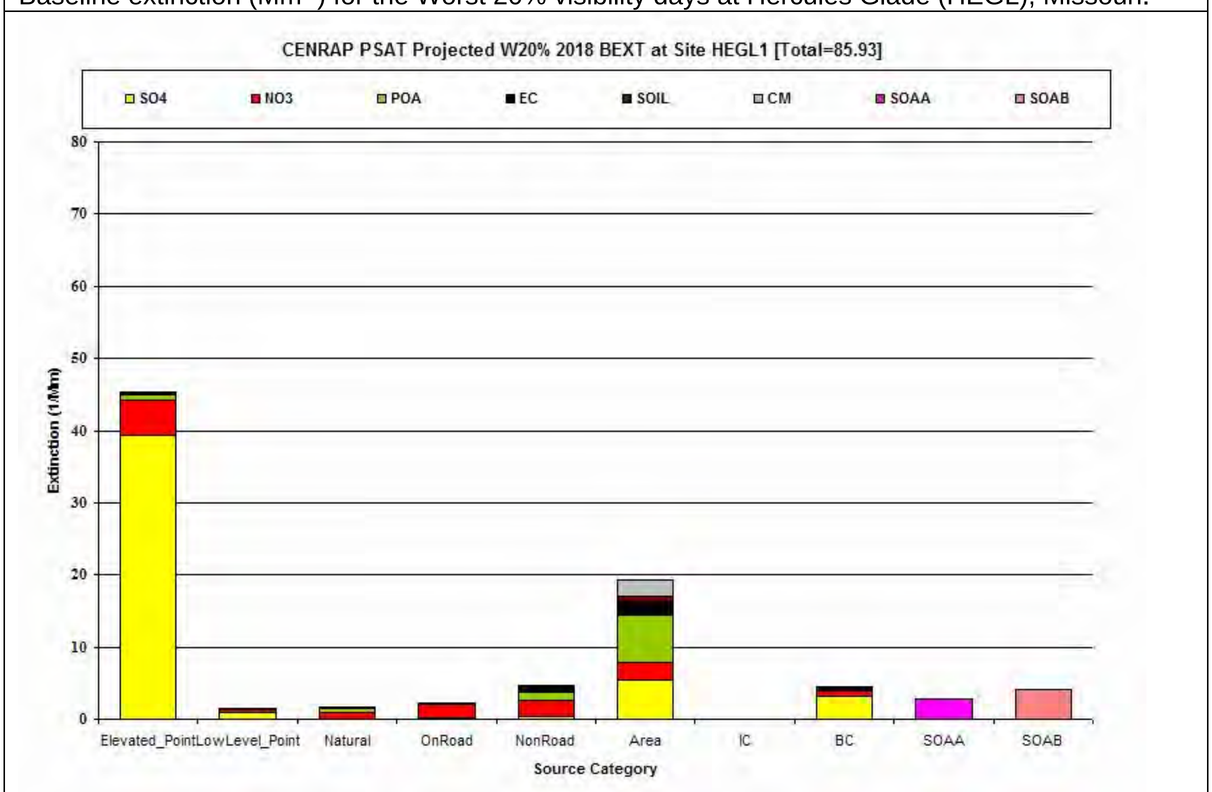


Figure E-6b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.

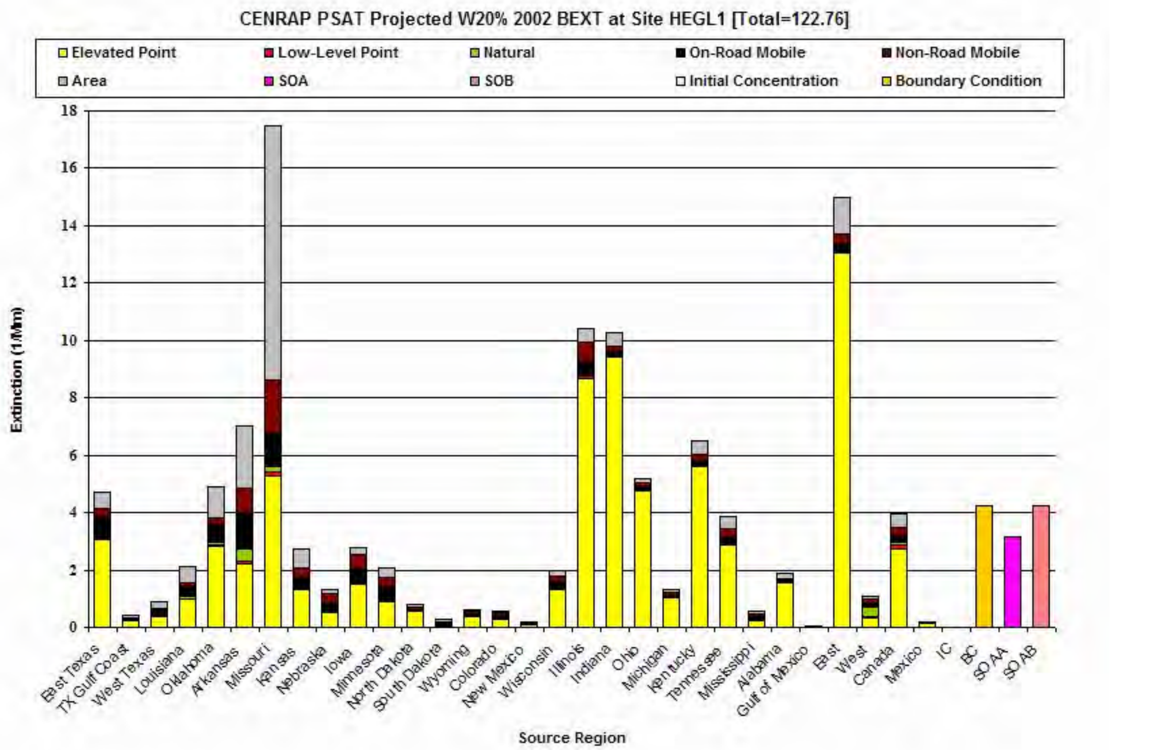


Figure E-6c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.

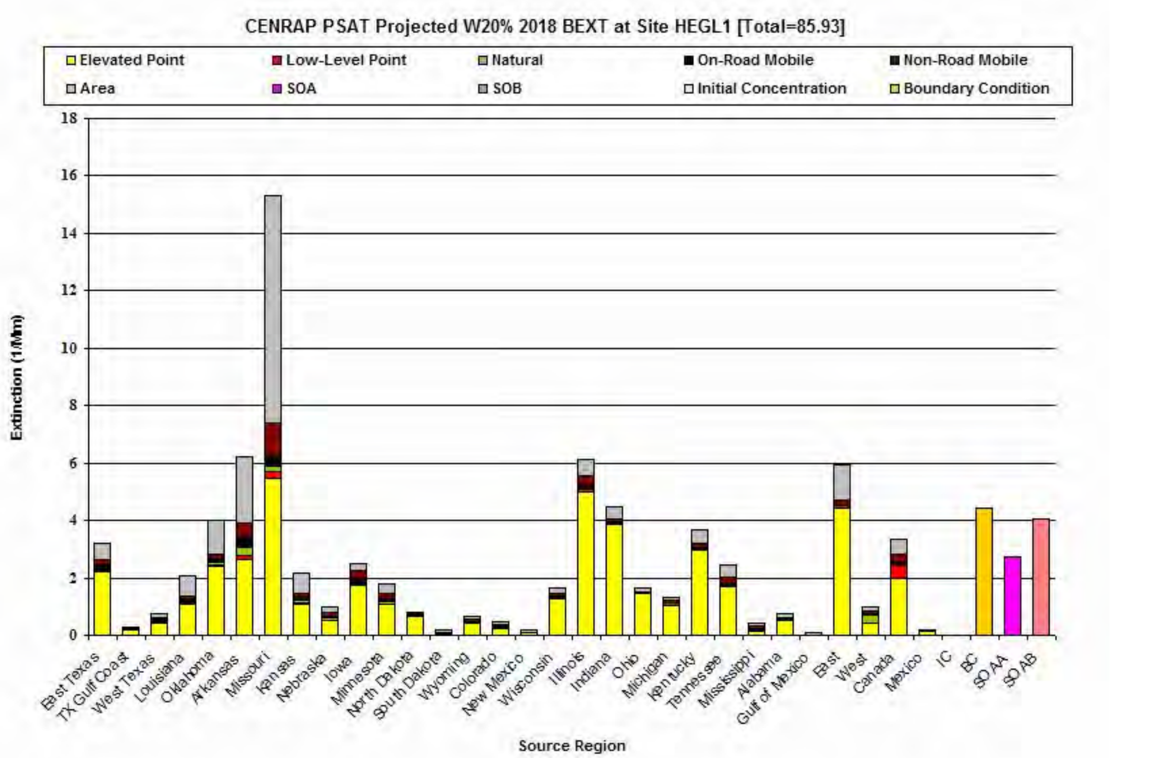


Figure E-6d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.

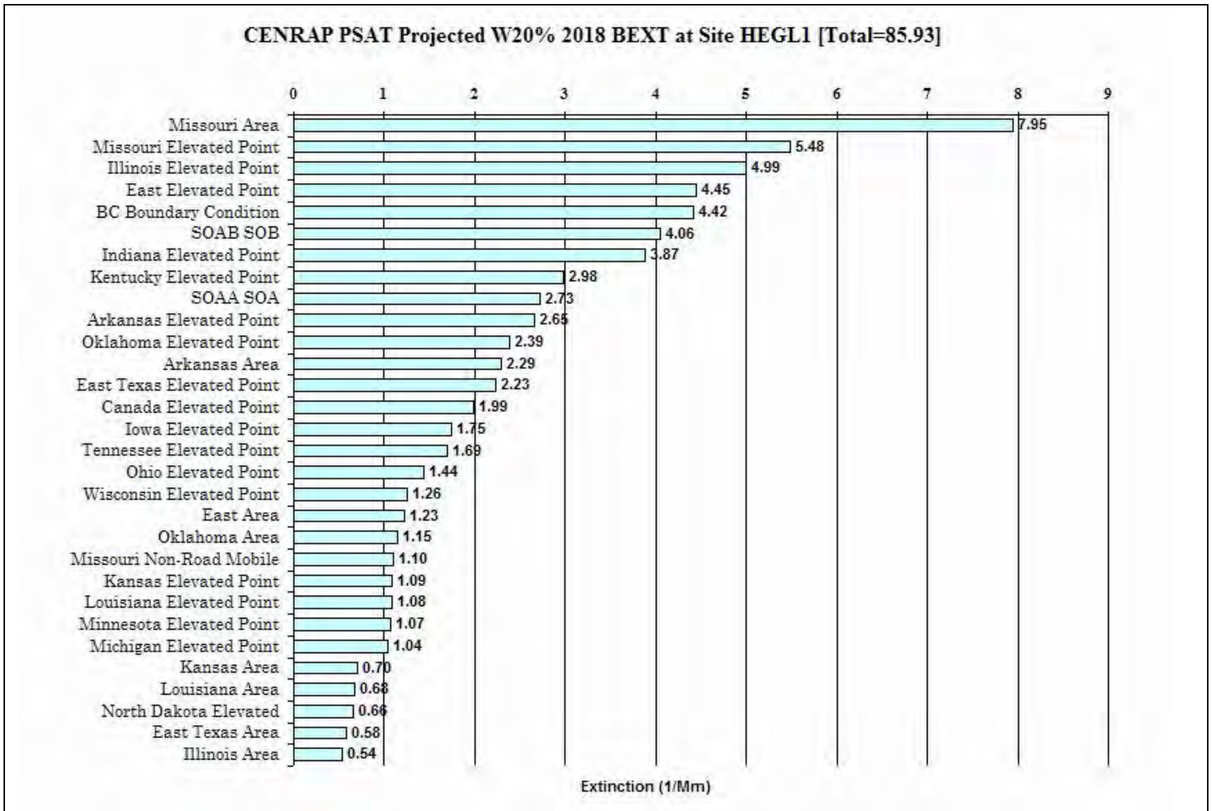
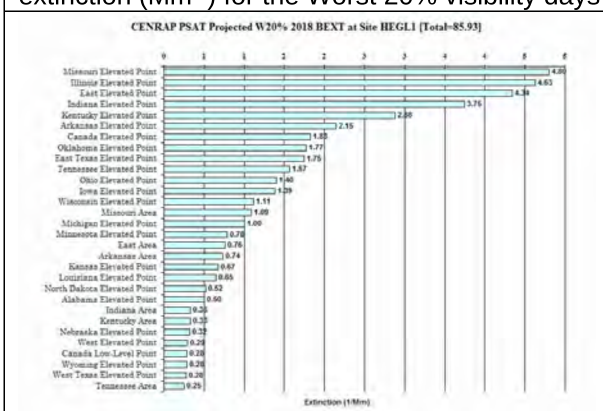


Figure E-6e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.



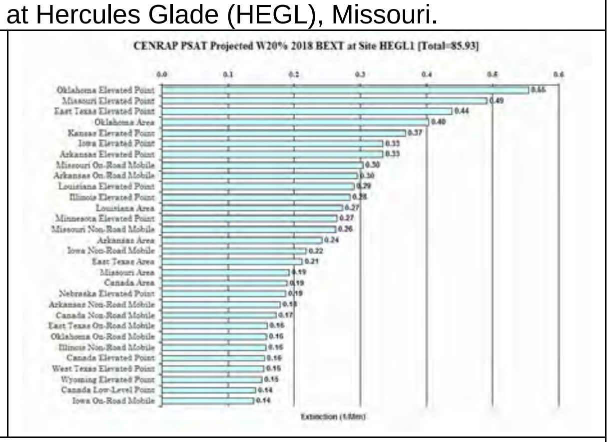


Figure E-6f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.

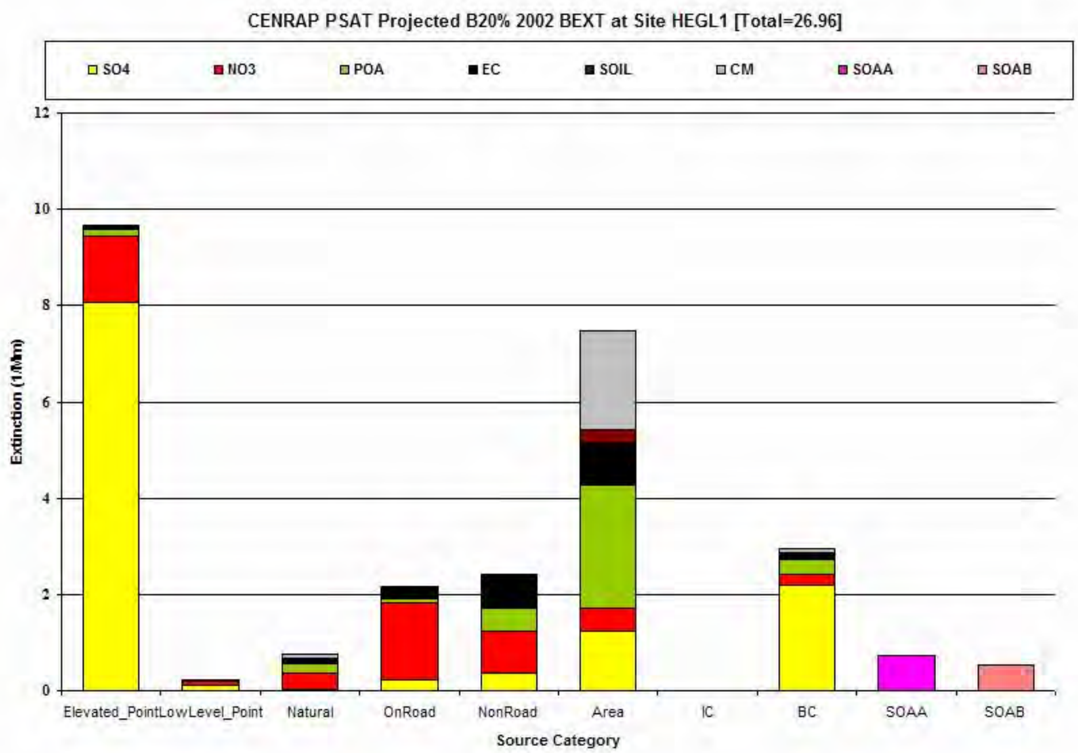


Figure E-6g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Hercules Glade (HEGL), Missouri.

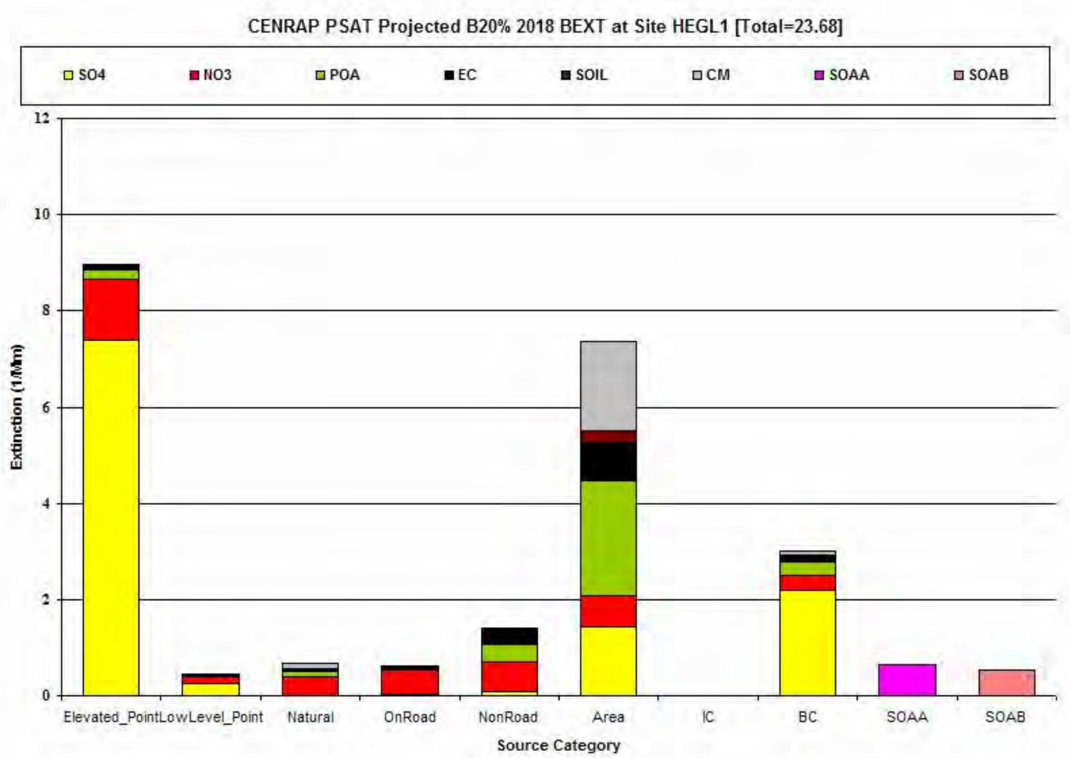


Figure E-6h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Hercules Glade (HEGL), Missouri.

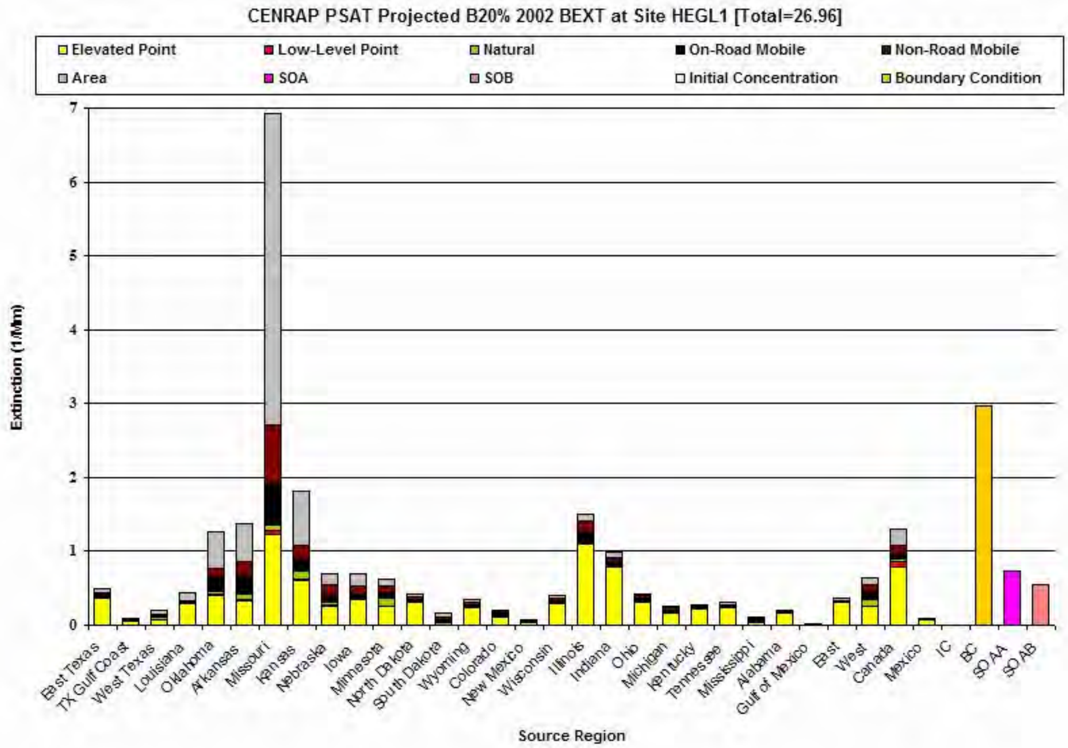


Figure E-6i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Hercules Glade (HEGL), Missouri.

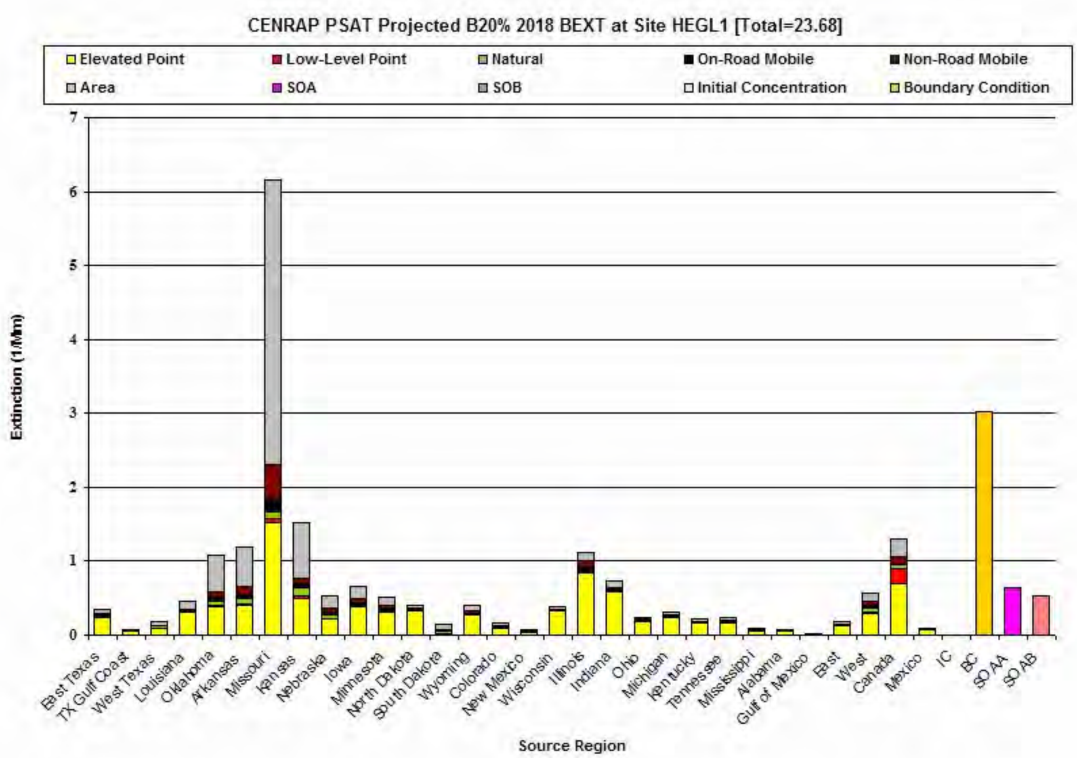


Figure E-6j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Voyageurs Hercules Glade (HEGL), Missouri.

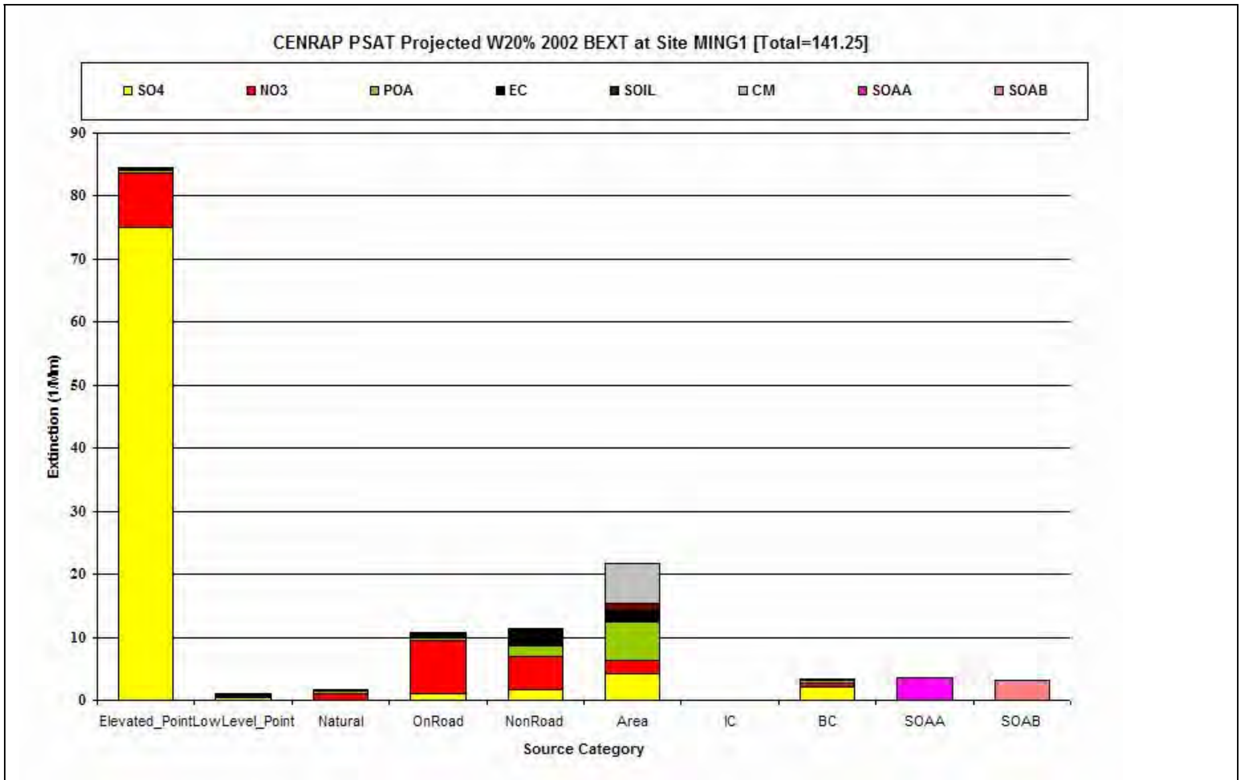


Figure E-7a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.

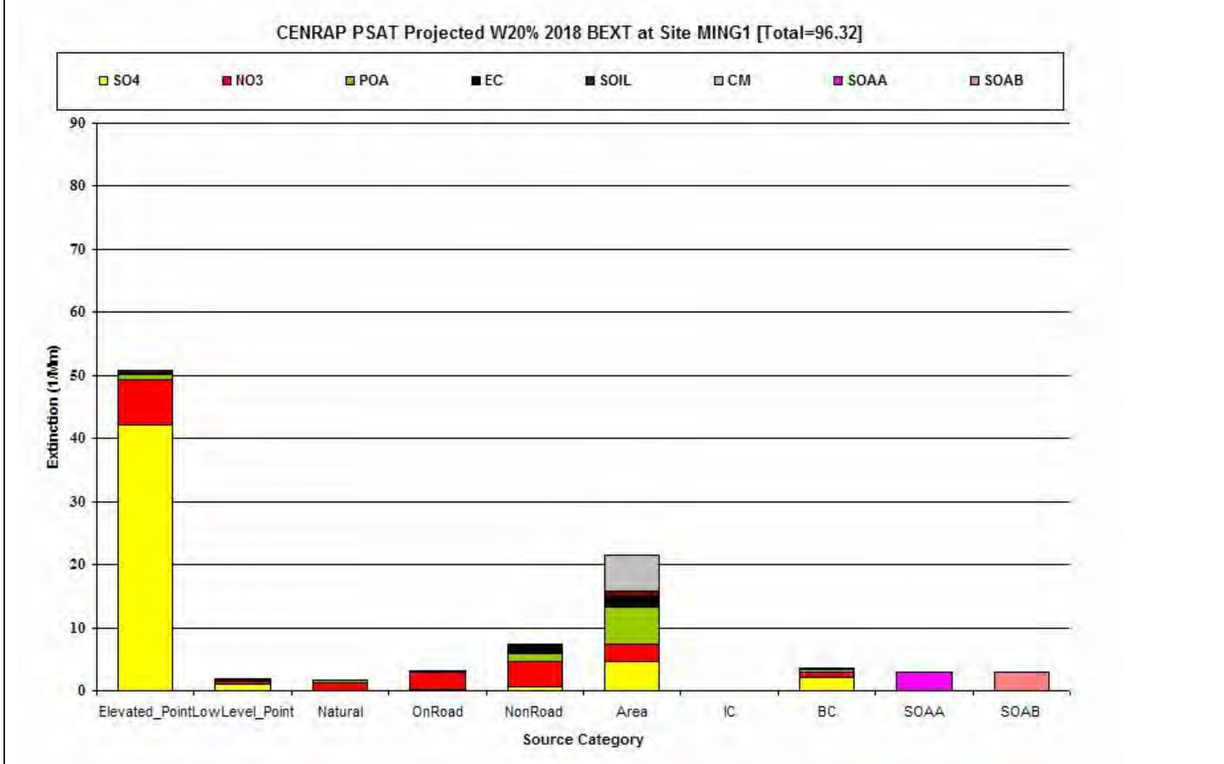


Figure E-7b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.

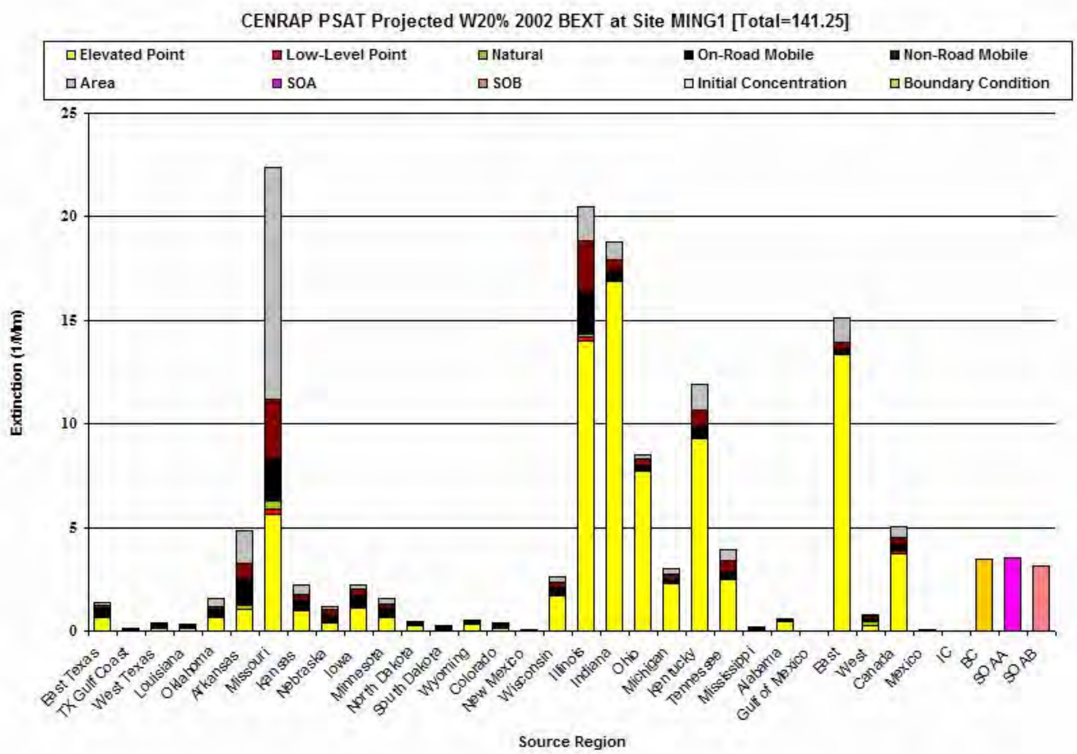


Figure E-7c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.

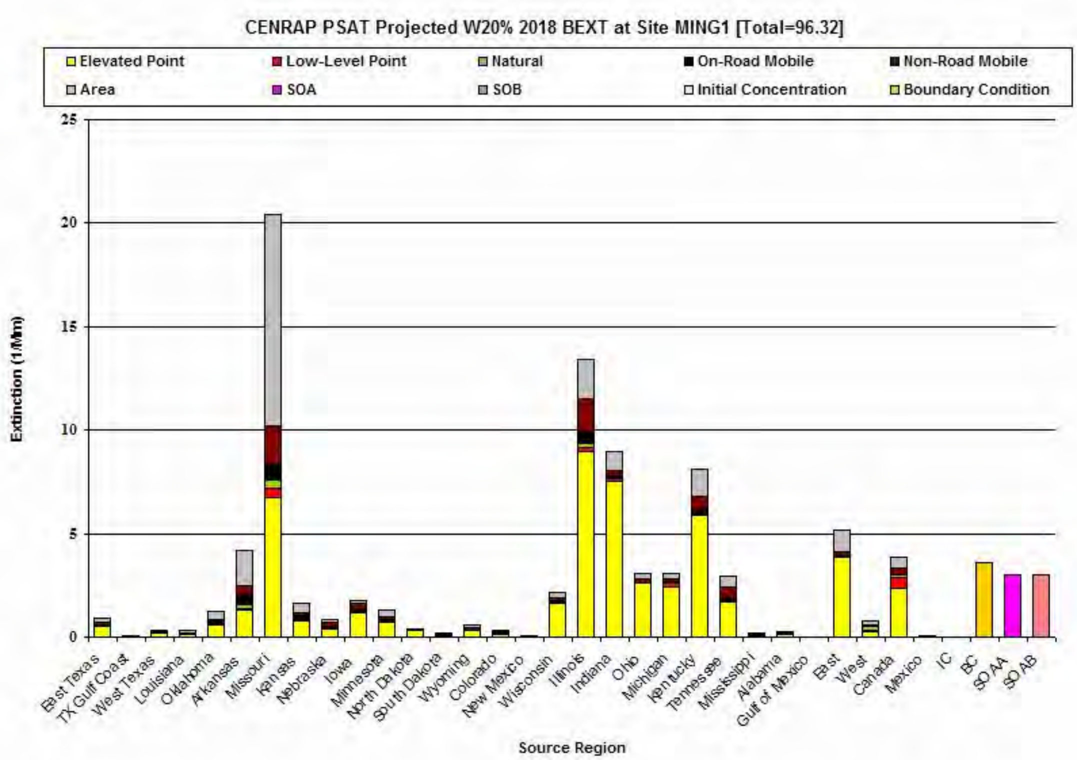


Figure E-7d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.

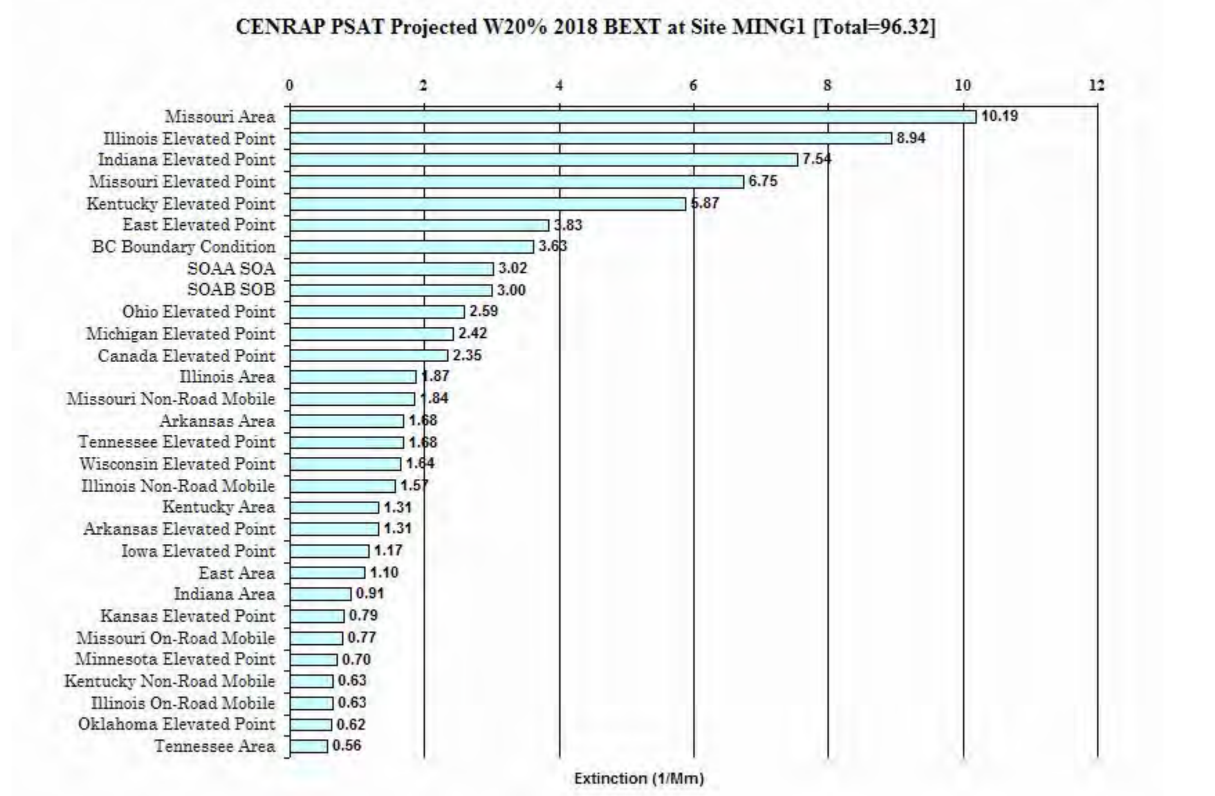
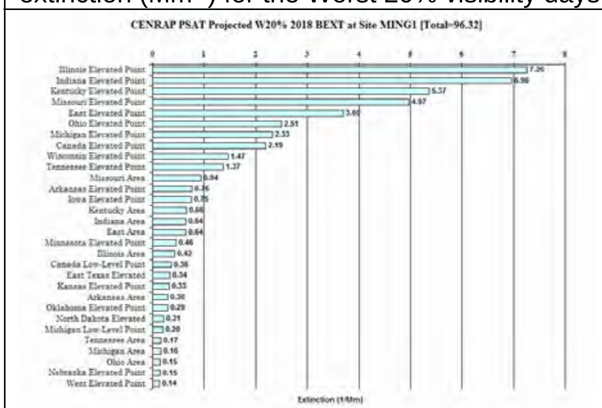


Figure E-7e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.



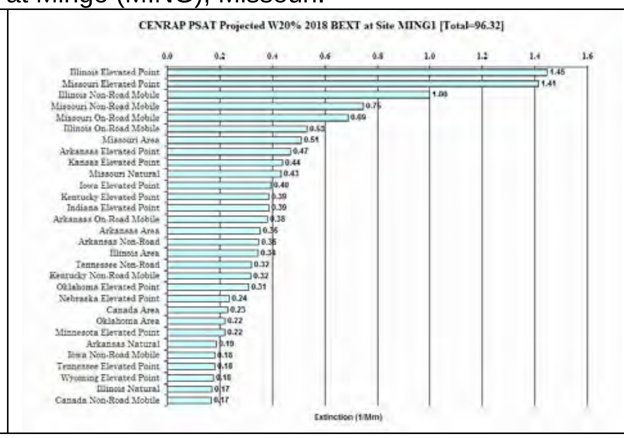


Figure E-7f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.

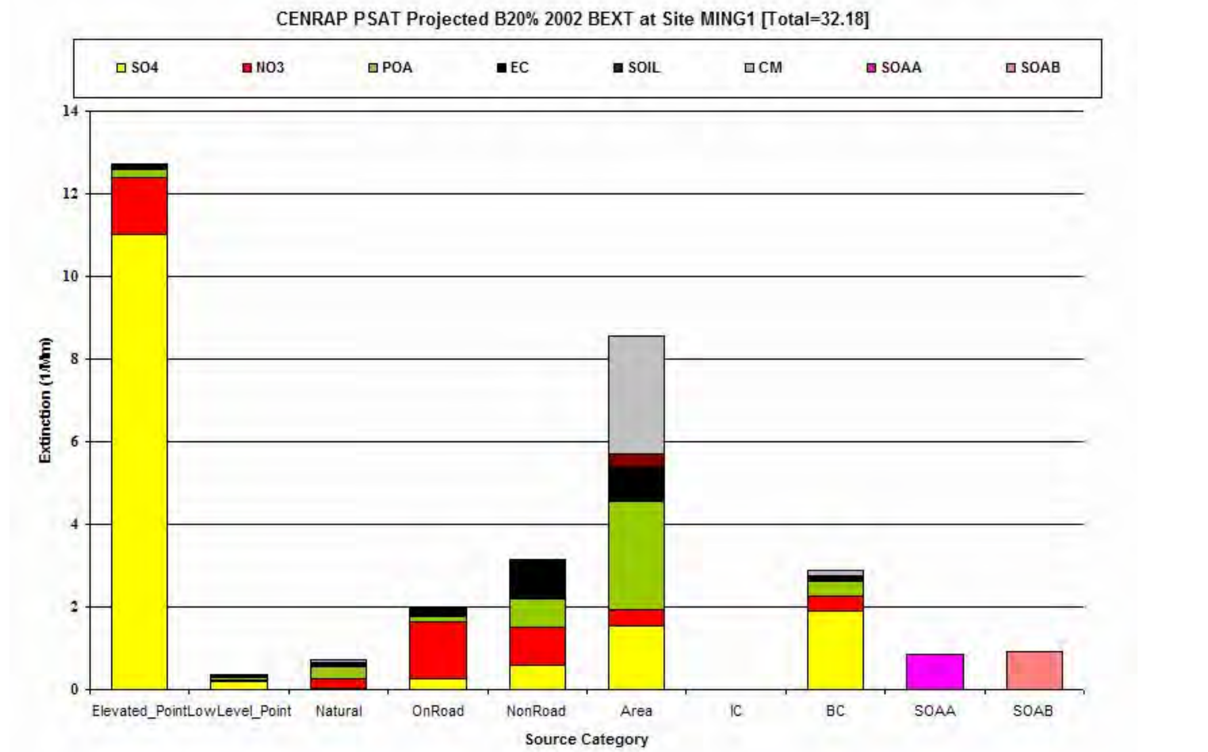


Figure E-7g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Mingo (MING), Missouri.

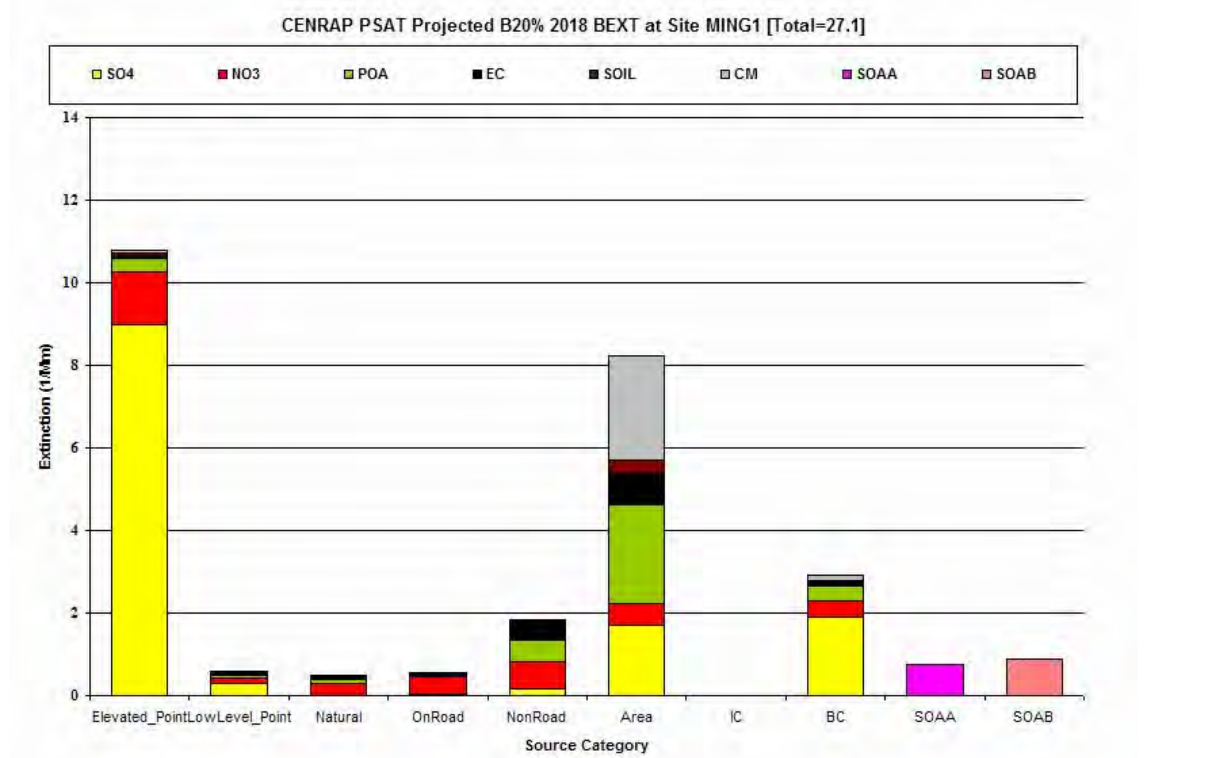


Figure E-7h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Mingo (MING), Missouri.

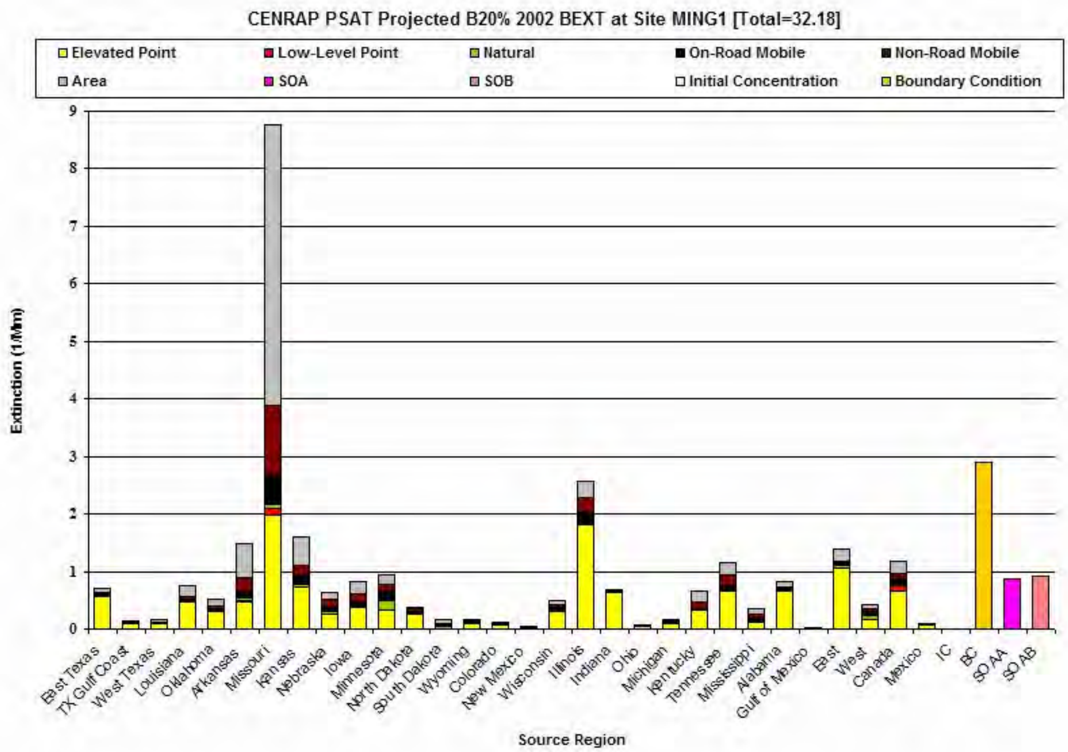


Figure E-7i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Mingo (MING), Missouri.

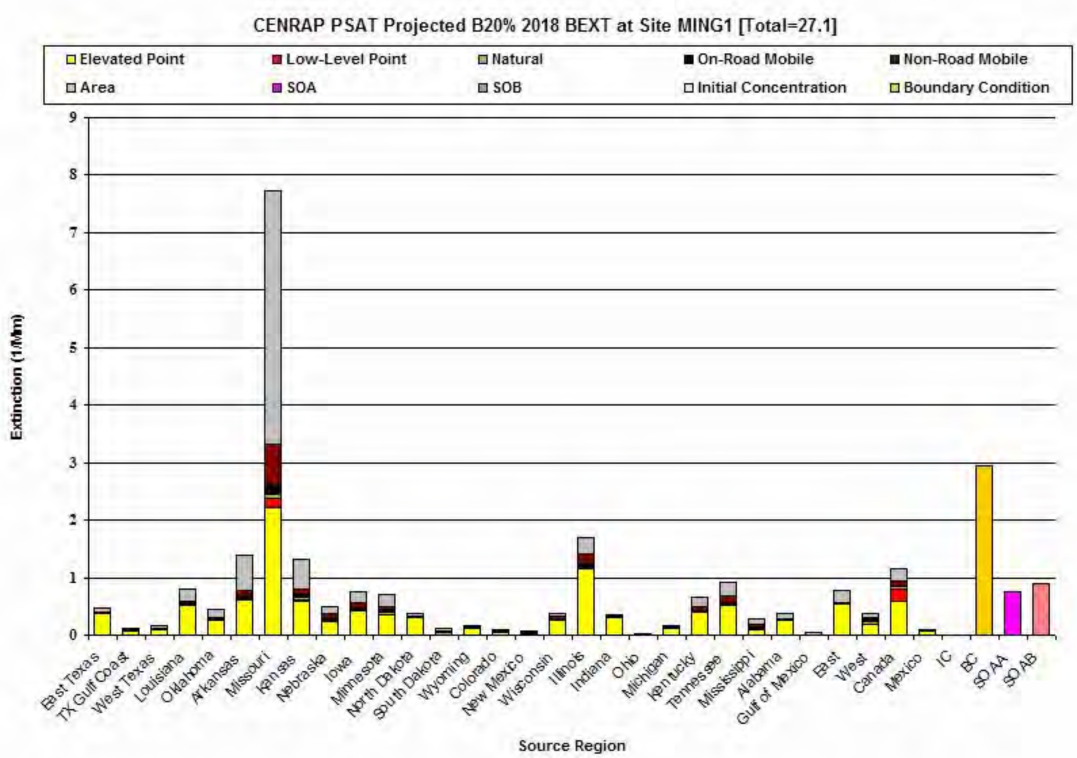


Figure E-7j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Mingo (MING), Missouri.

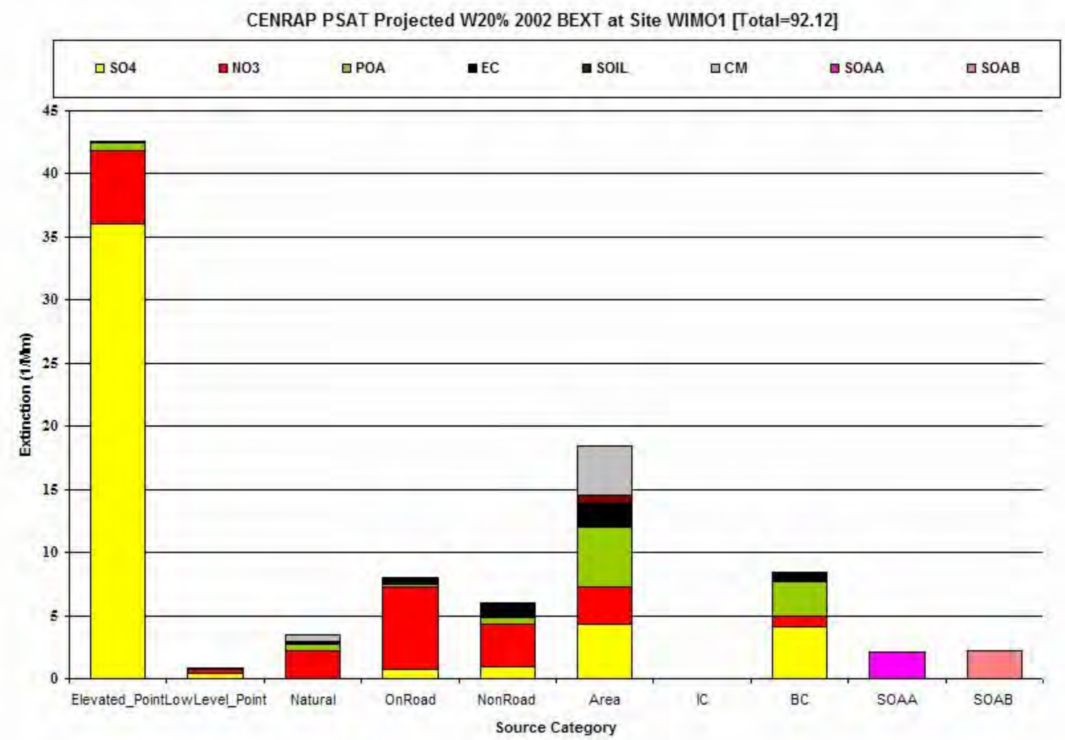


Figure E-8a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

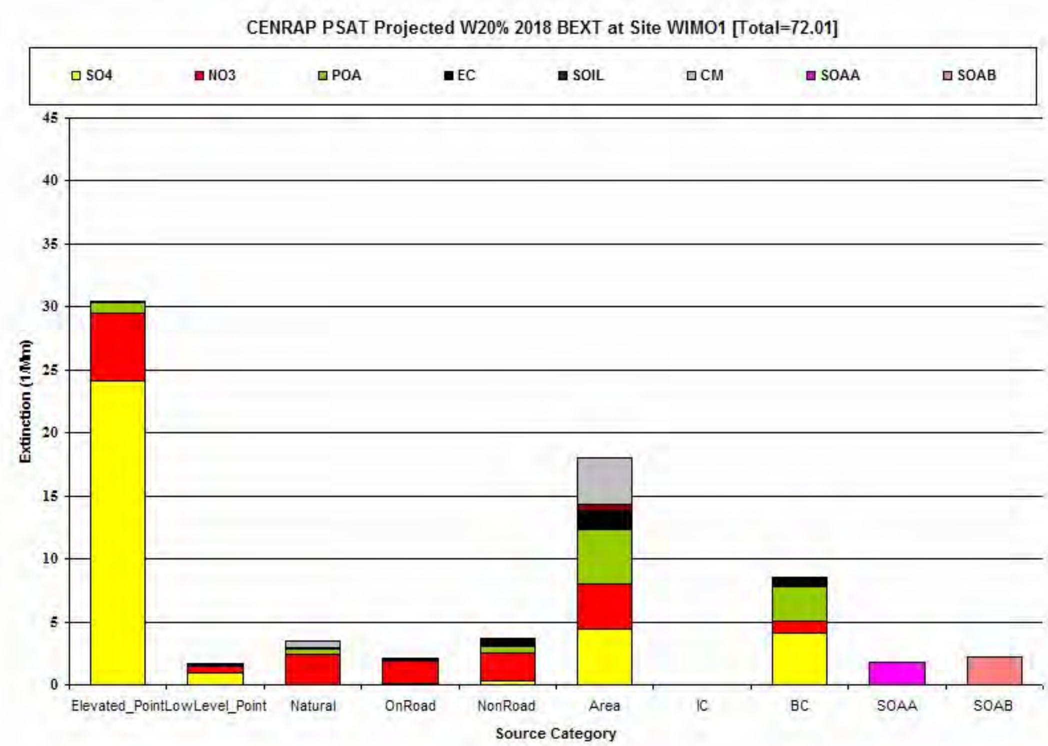


Figure E-8b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

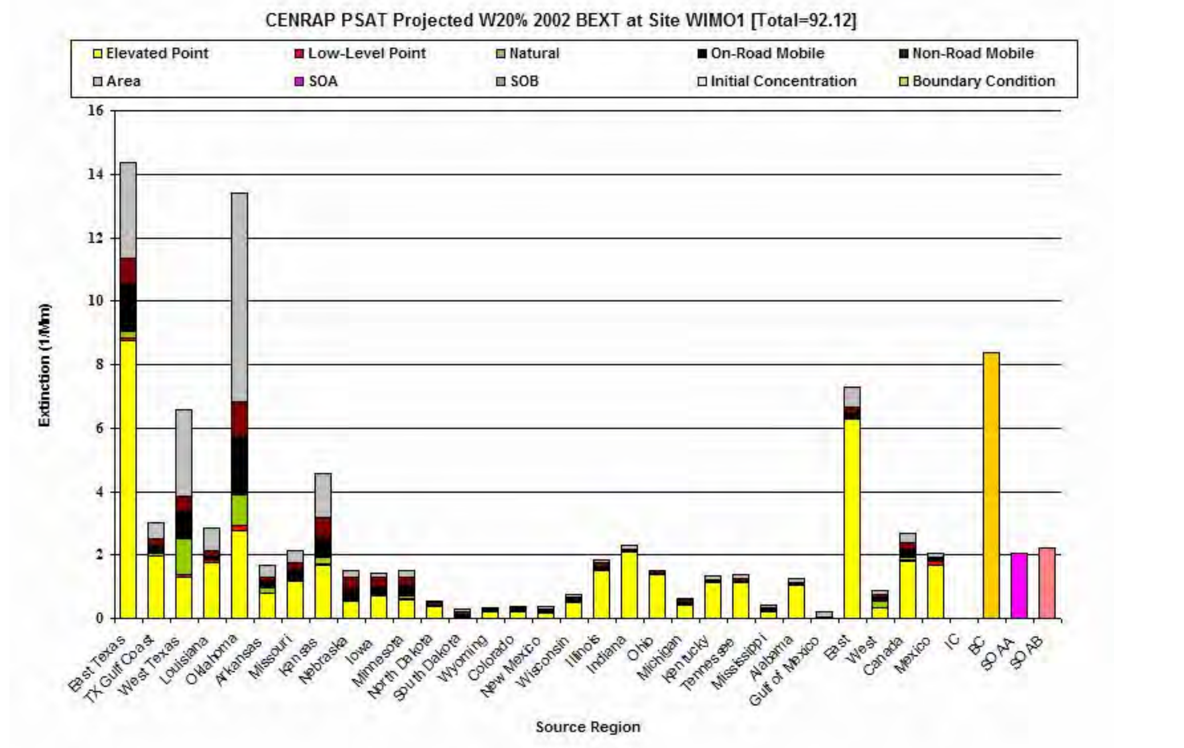


Figure E-8c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

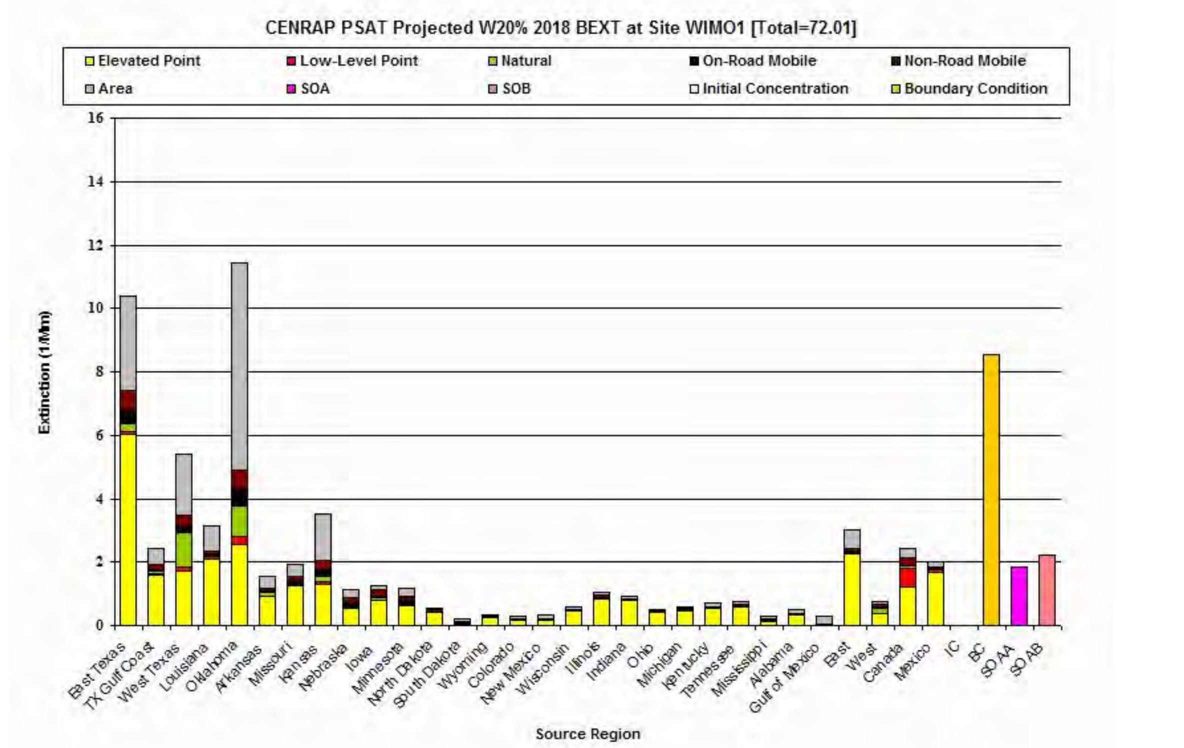


Figure E-8d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

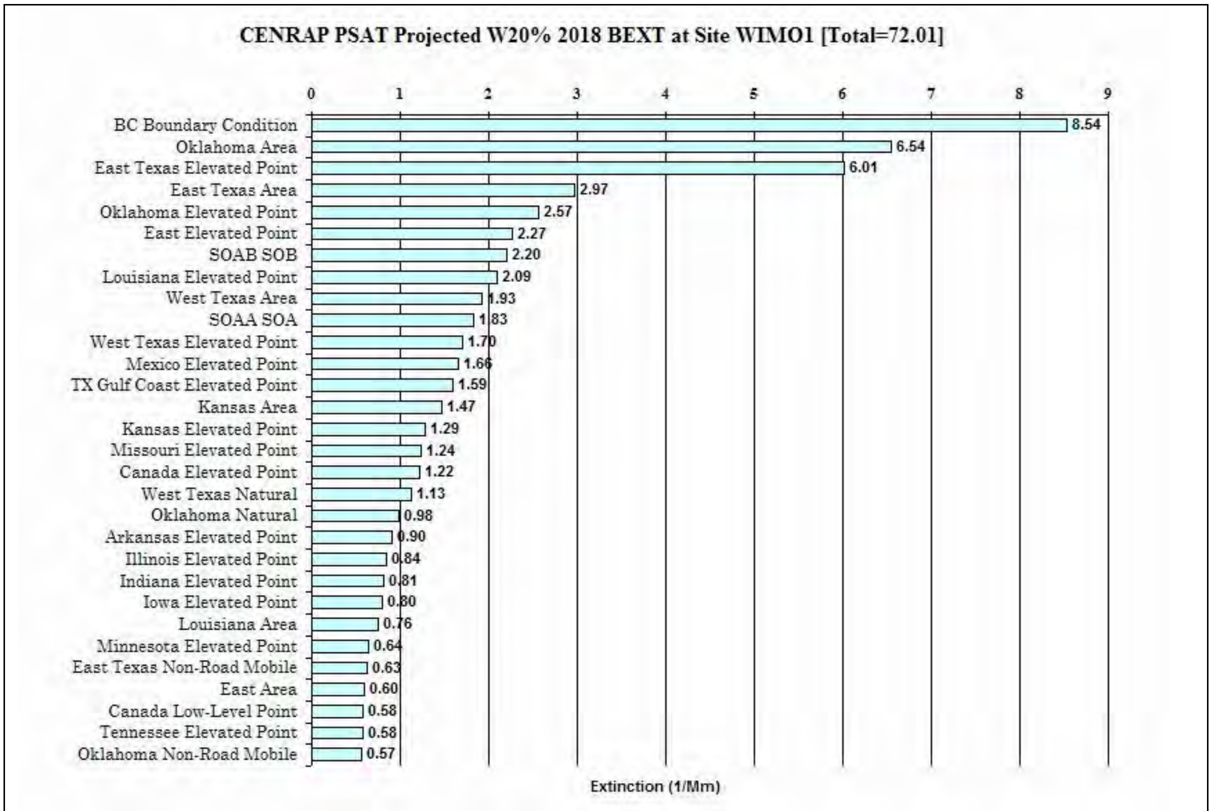


Figure E-8e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

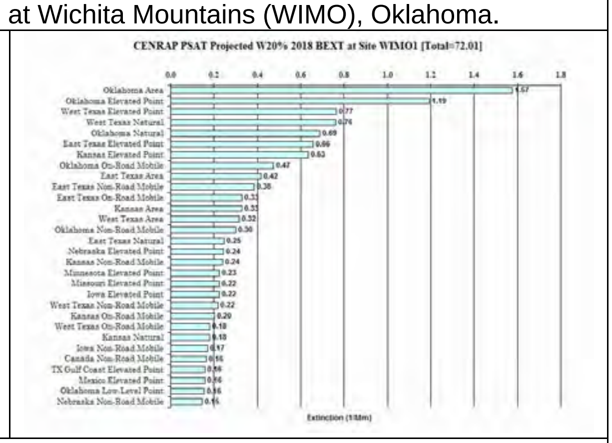


Figure E-8f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

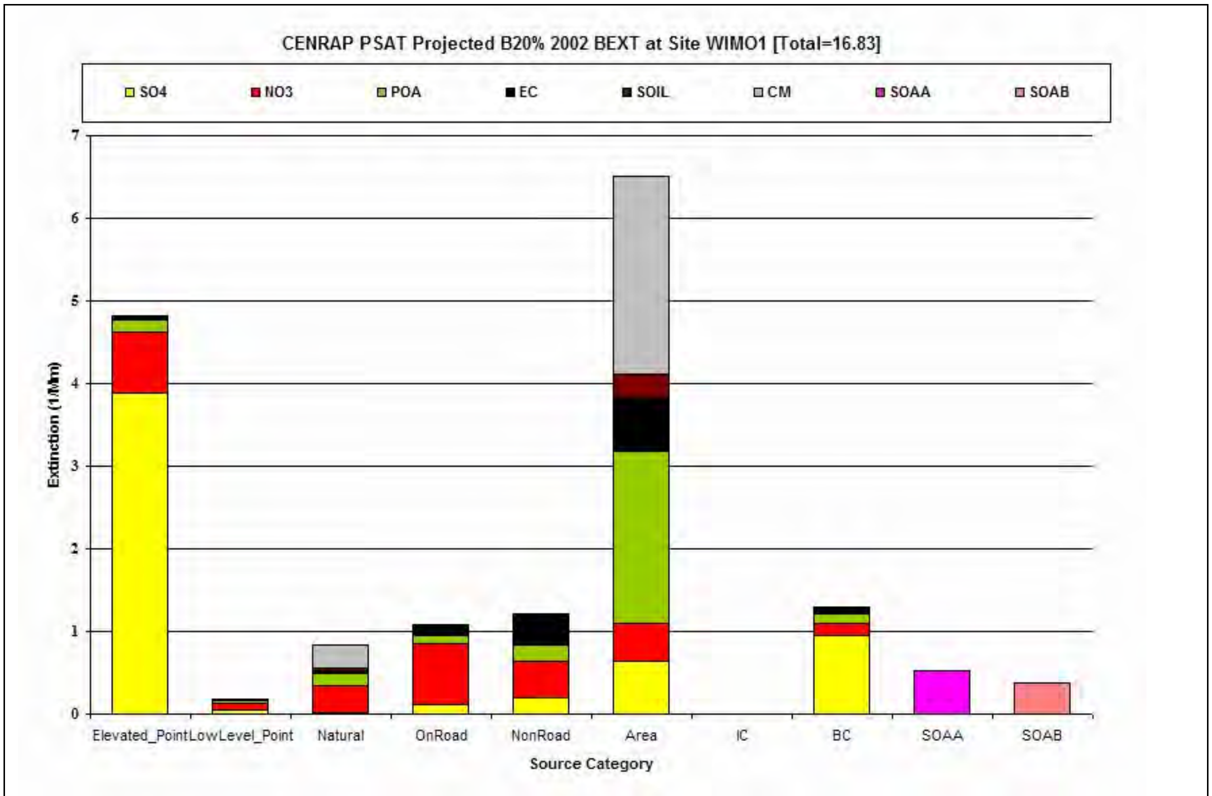


Figure E-8g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

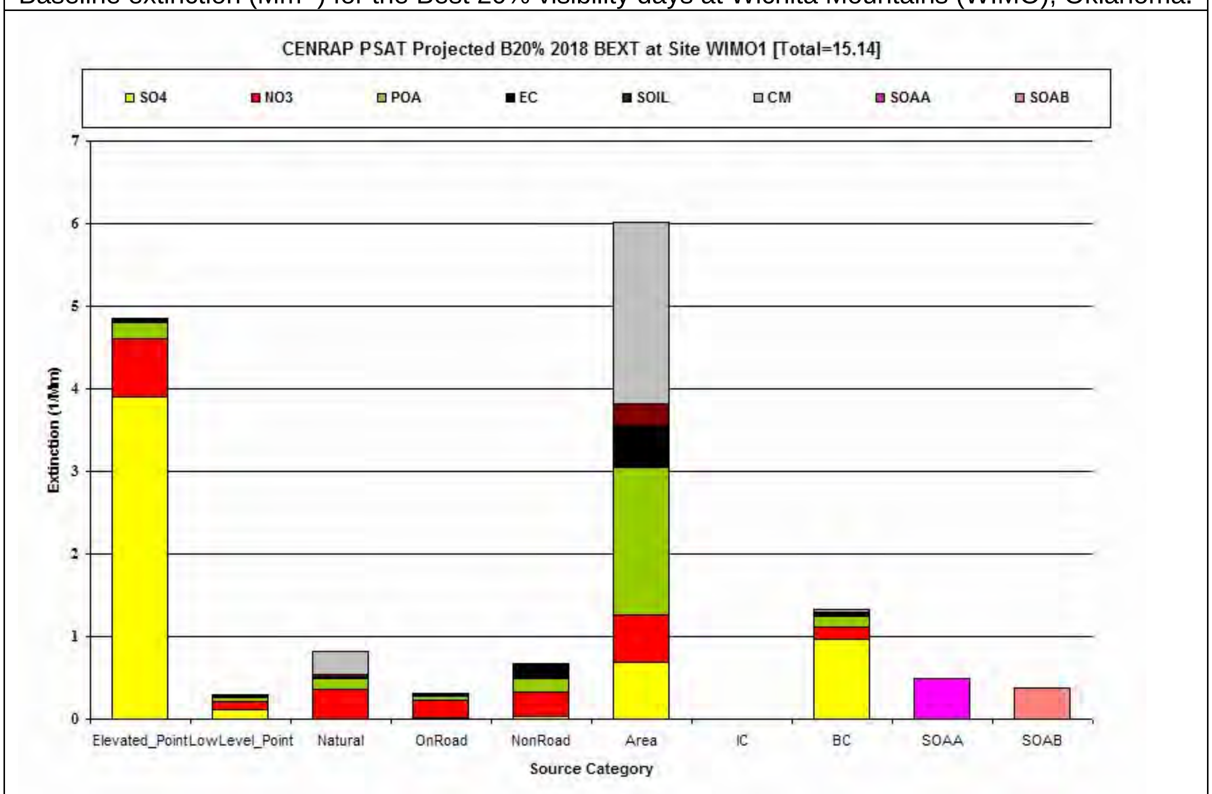


Figure E-8h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

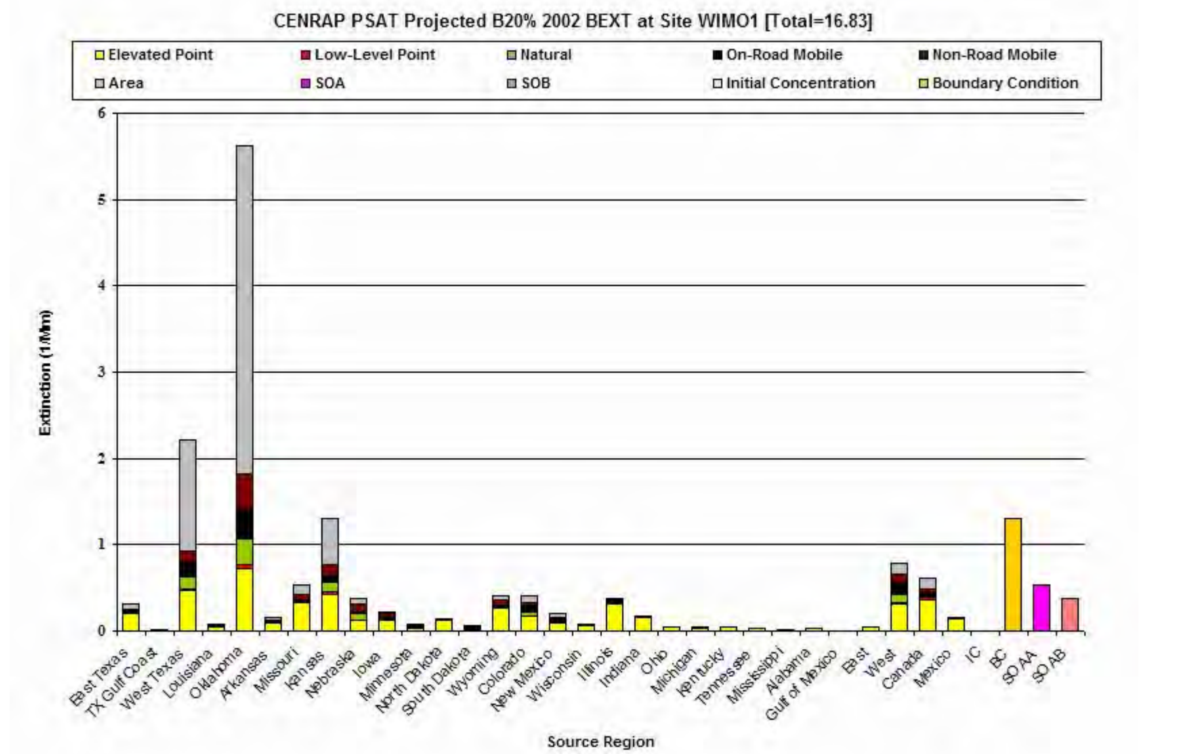


Figure E-8i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

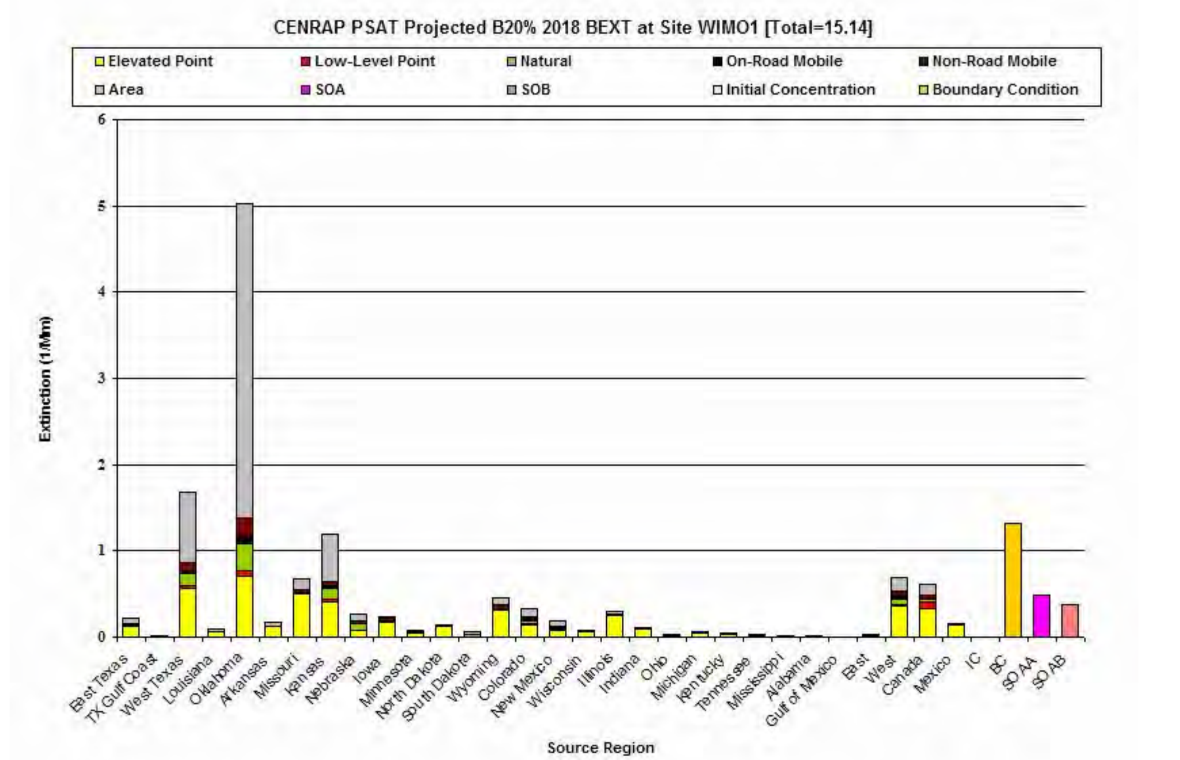


Figure E-8j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

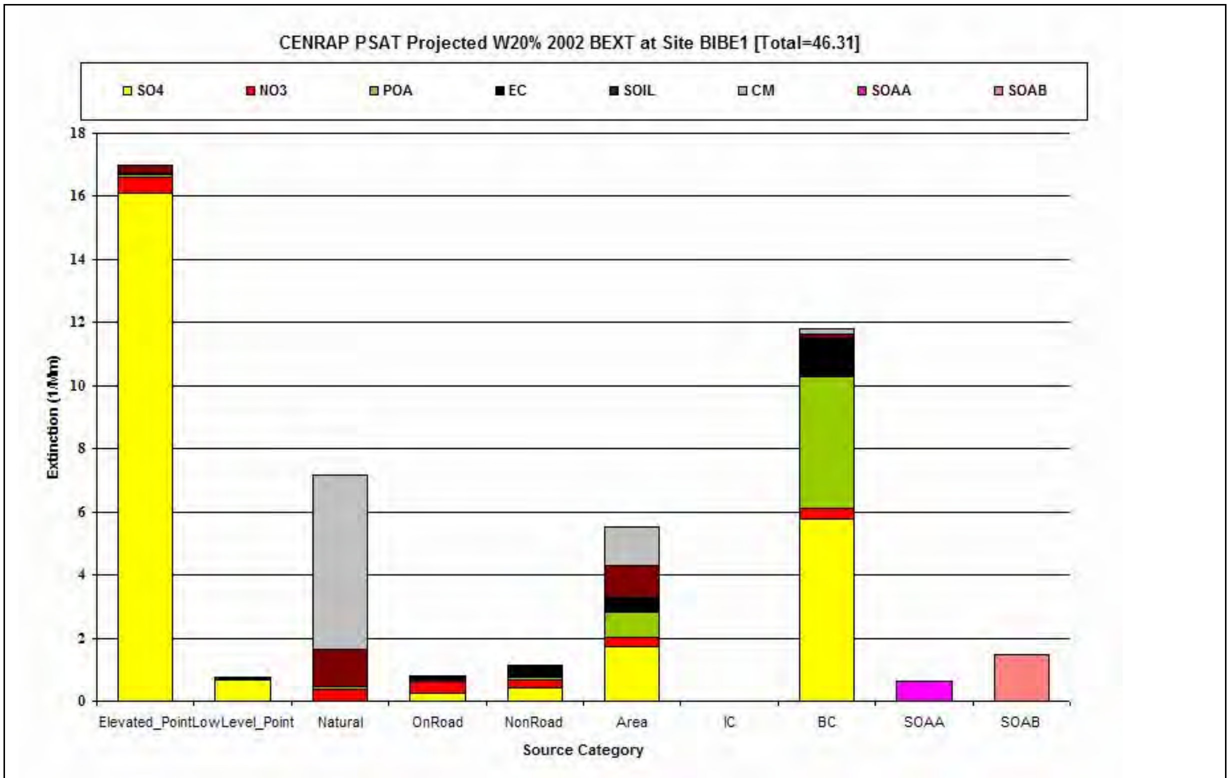


Figure E-9a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

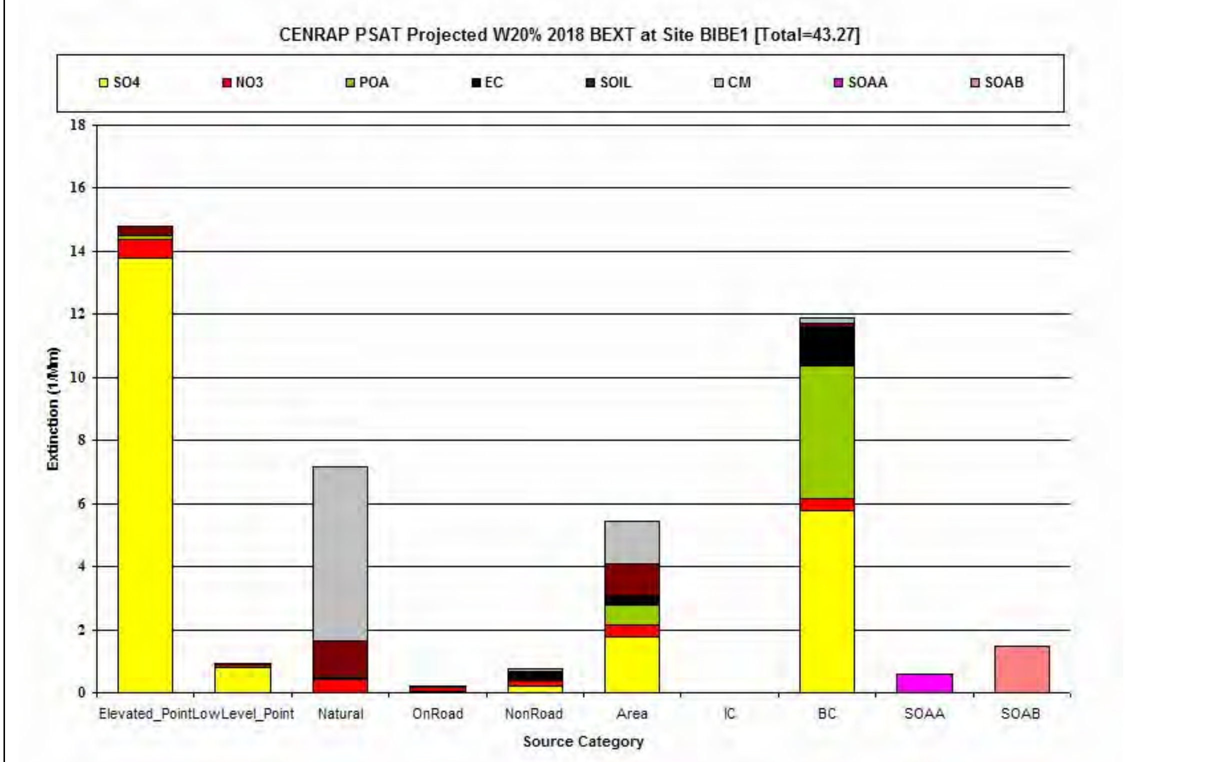


Figure E-9b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

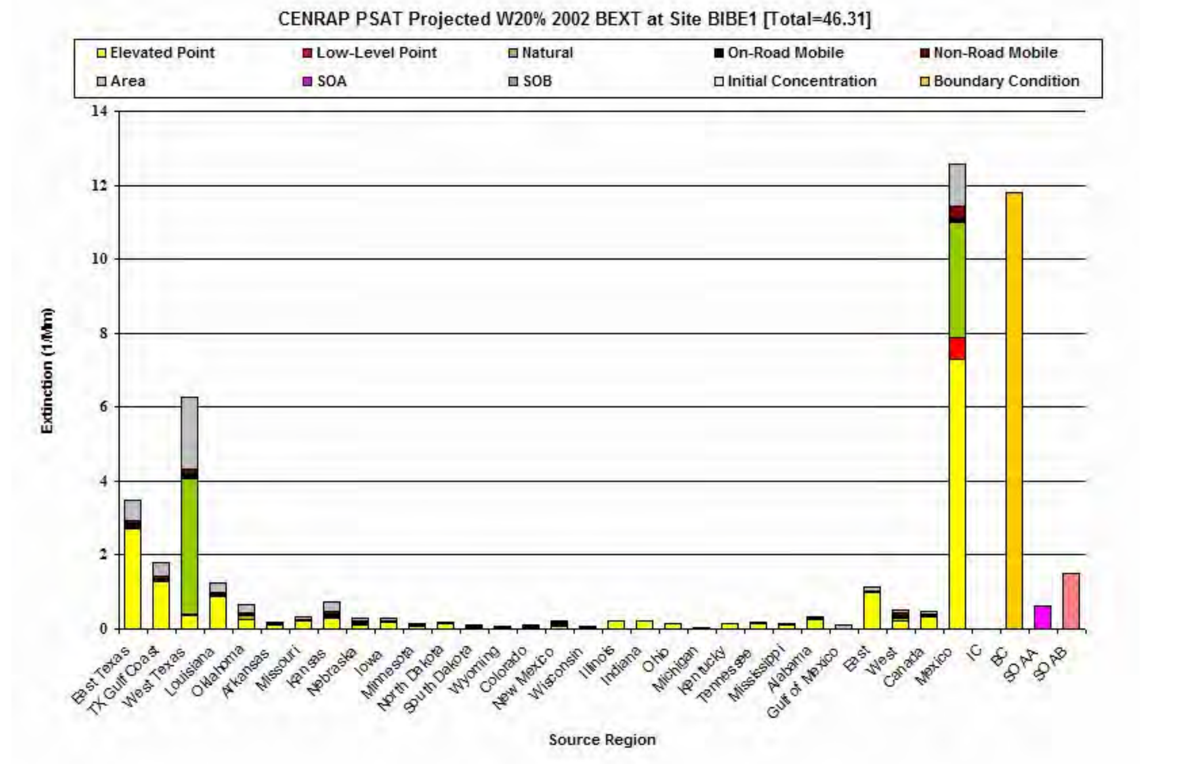


Figure E-9c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

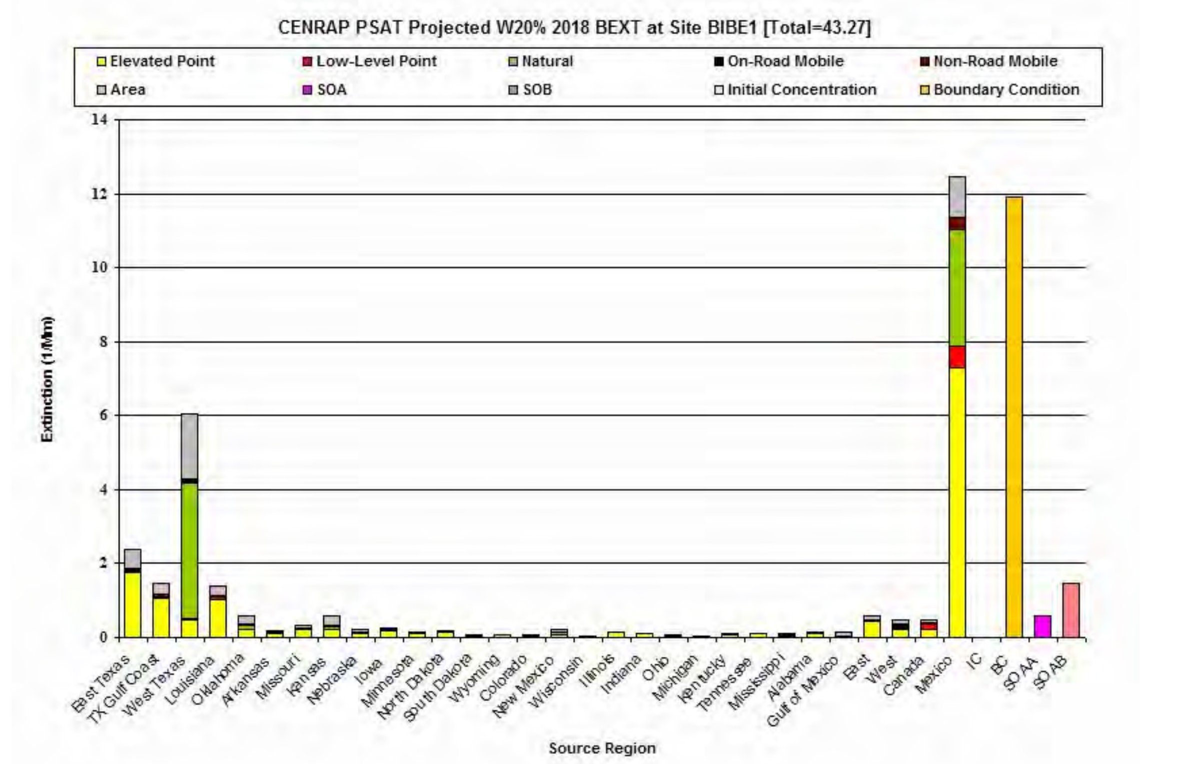


Figure E-9d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

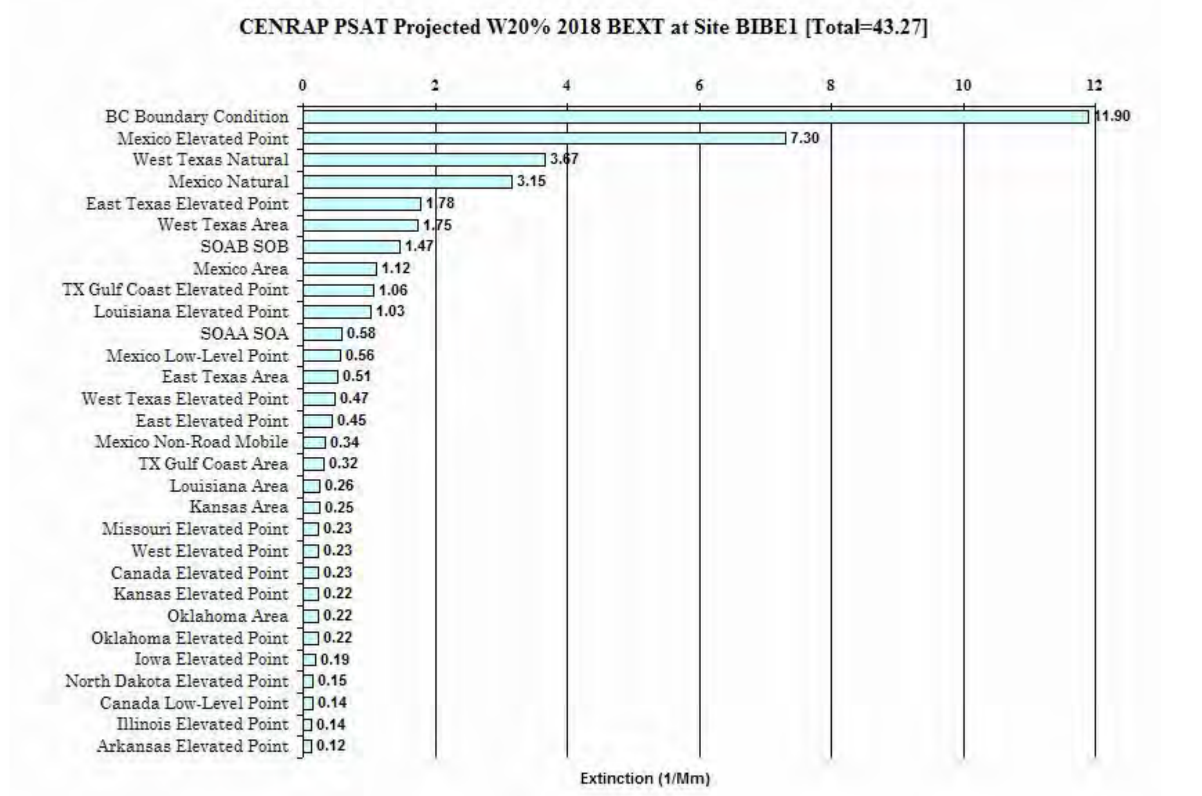
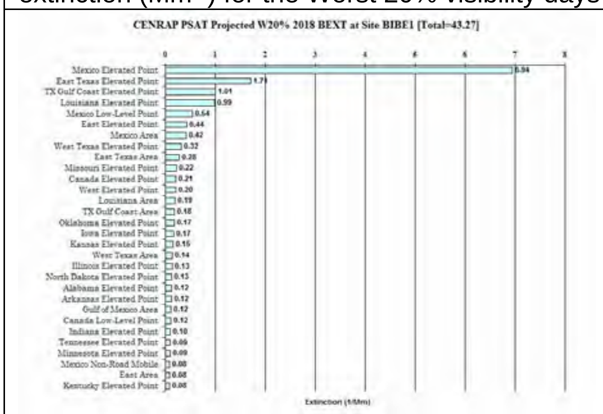


Figure E-9e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.



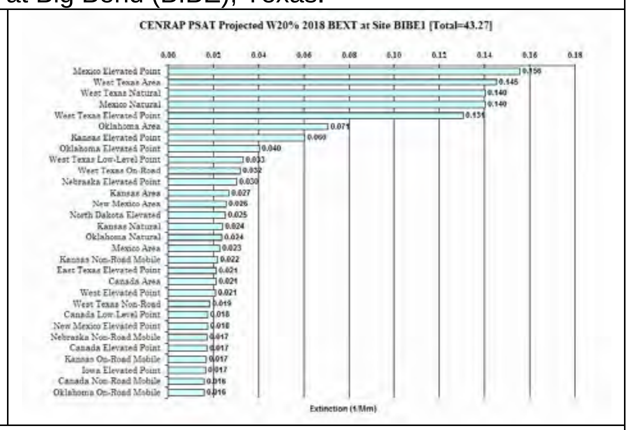


Figure E-9f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

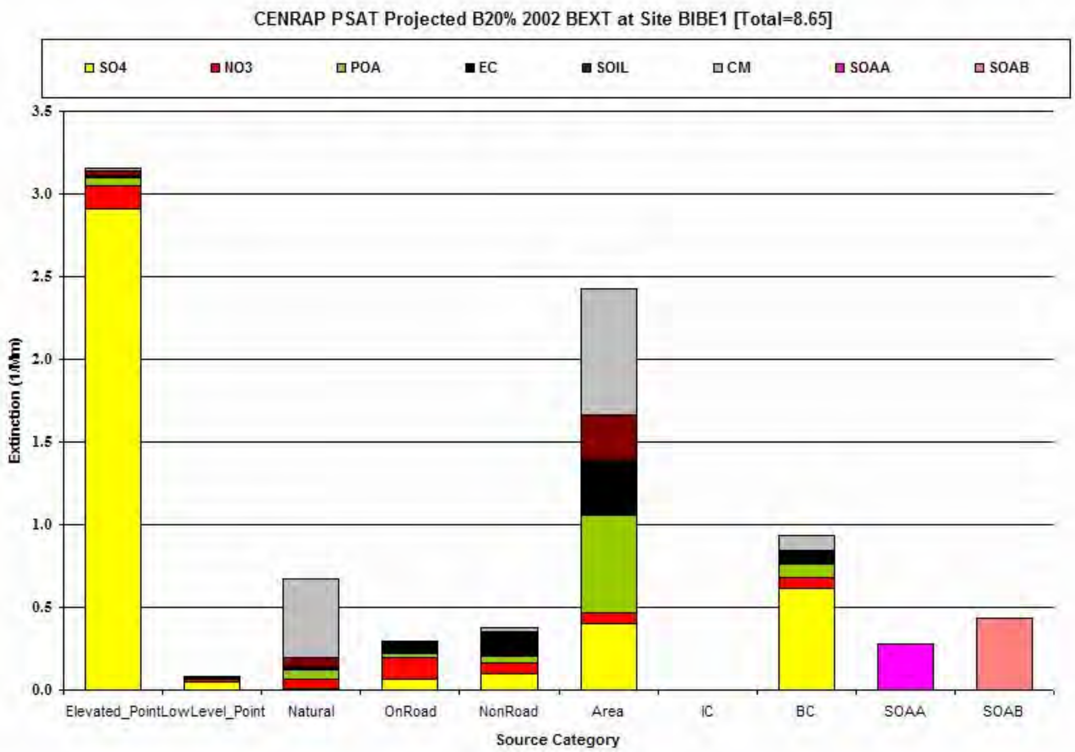


Figure E-9g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

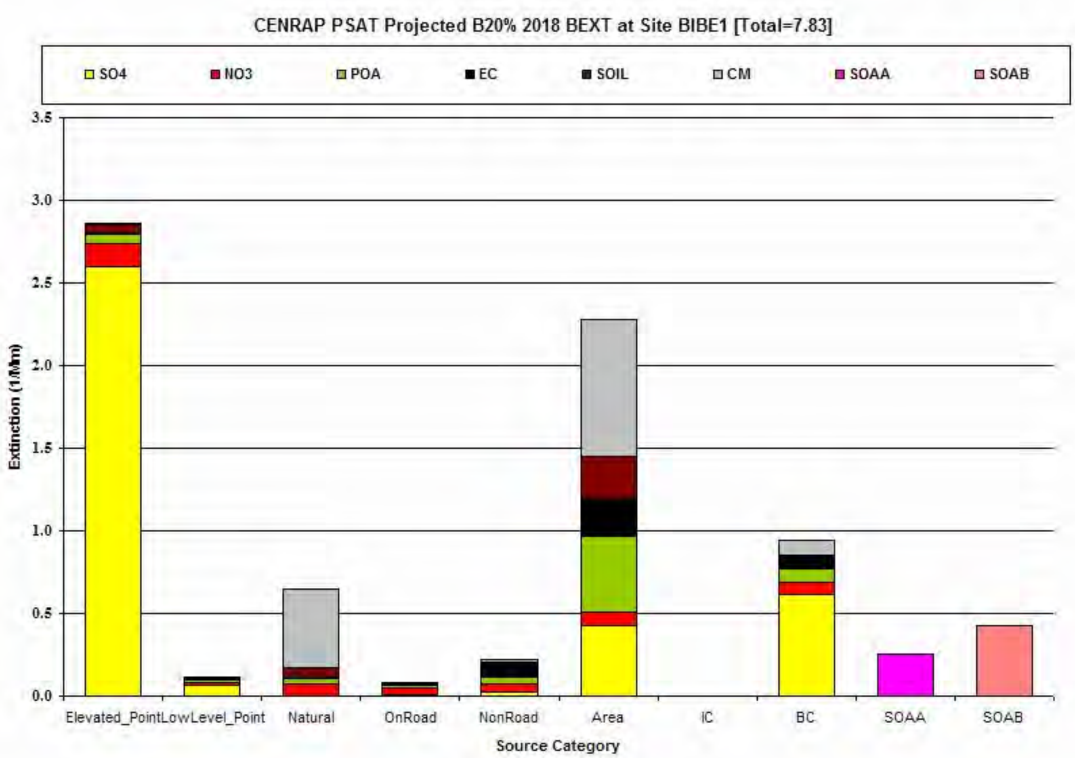


Figure E-9h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

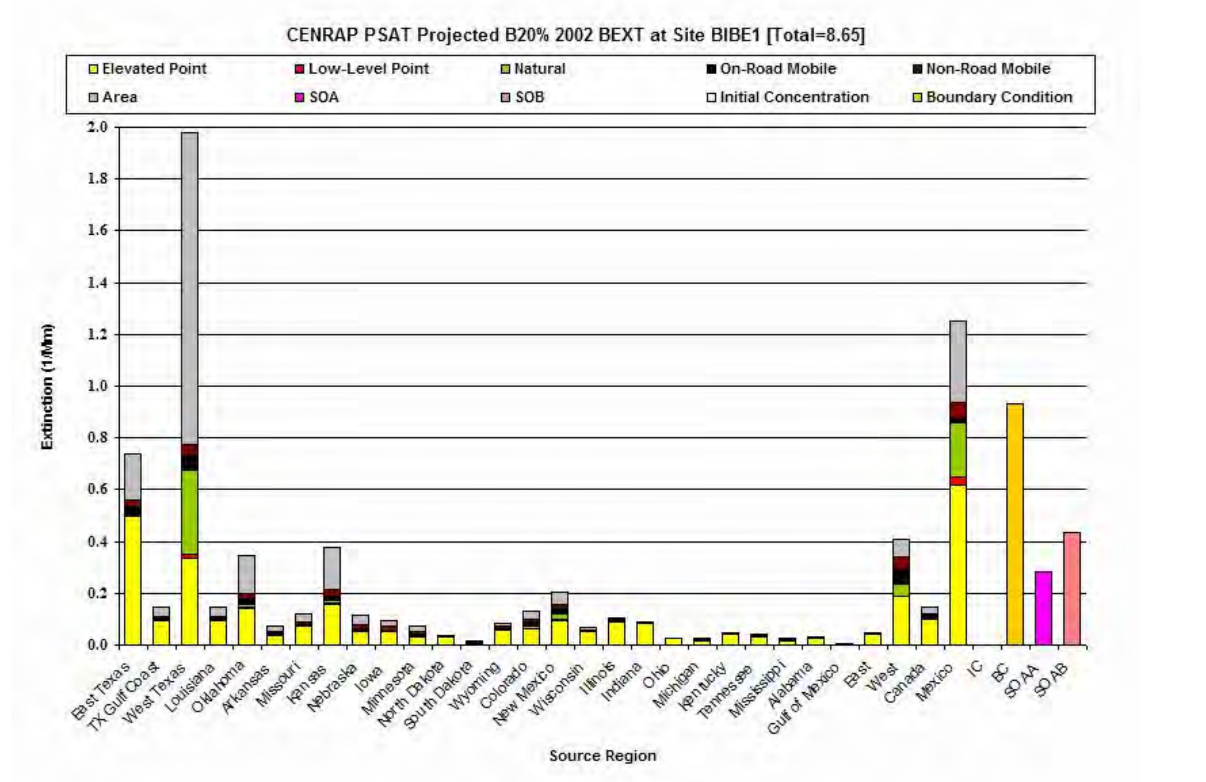


Figure E-9i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days Big Bend (BIBE), Texas.

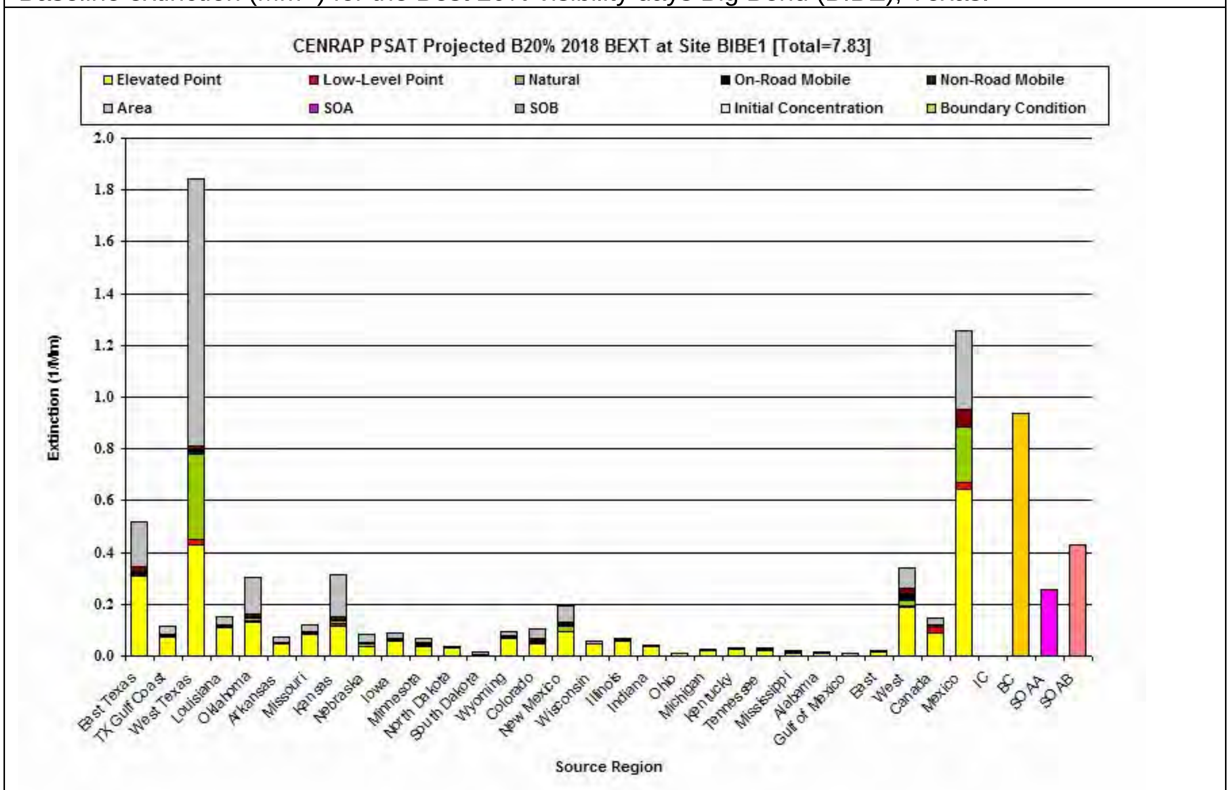


Figure E-9j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

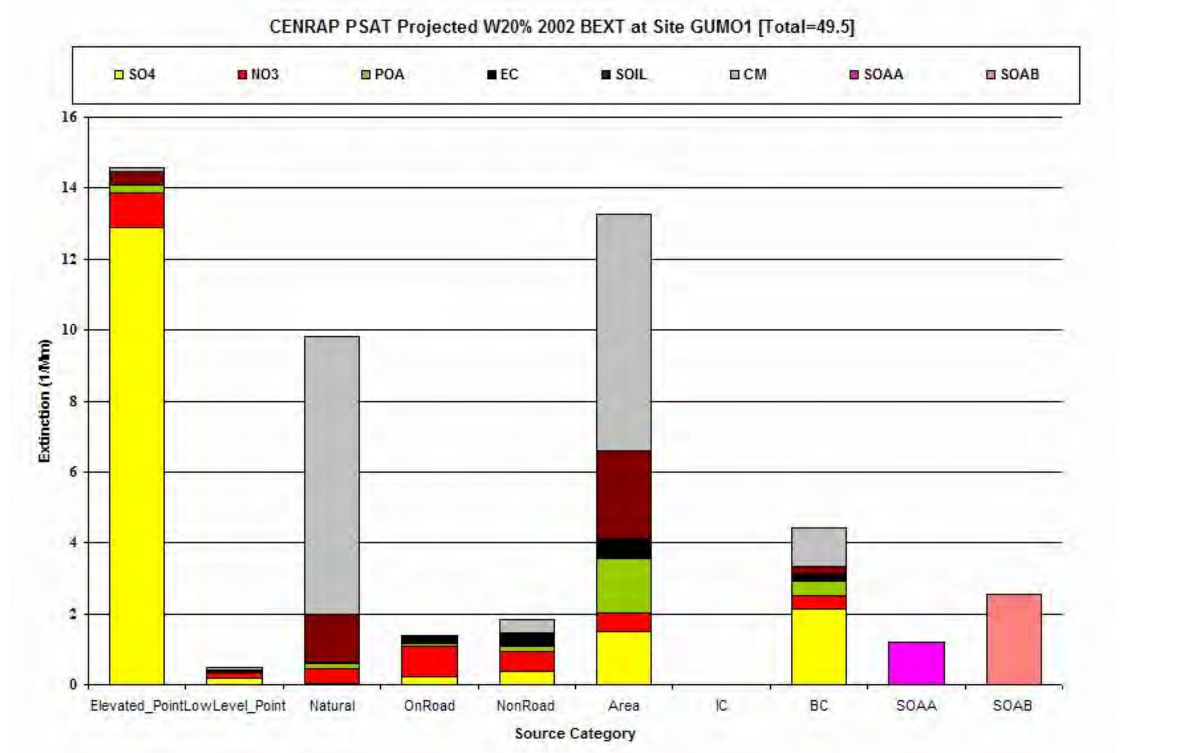


Figure E-10a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

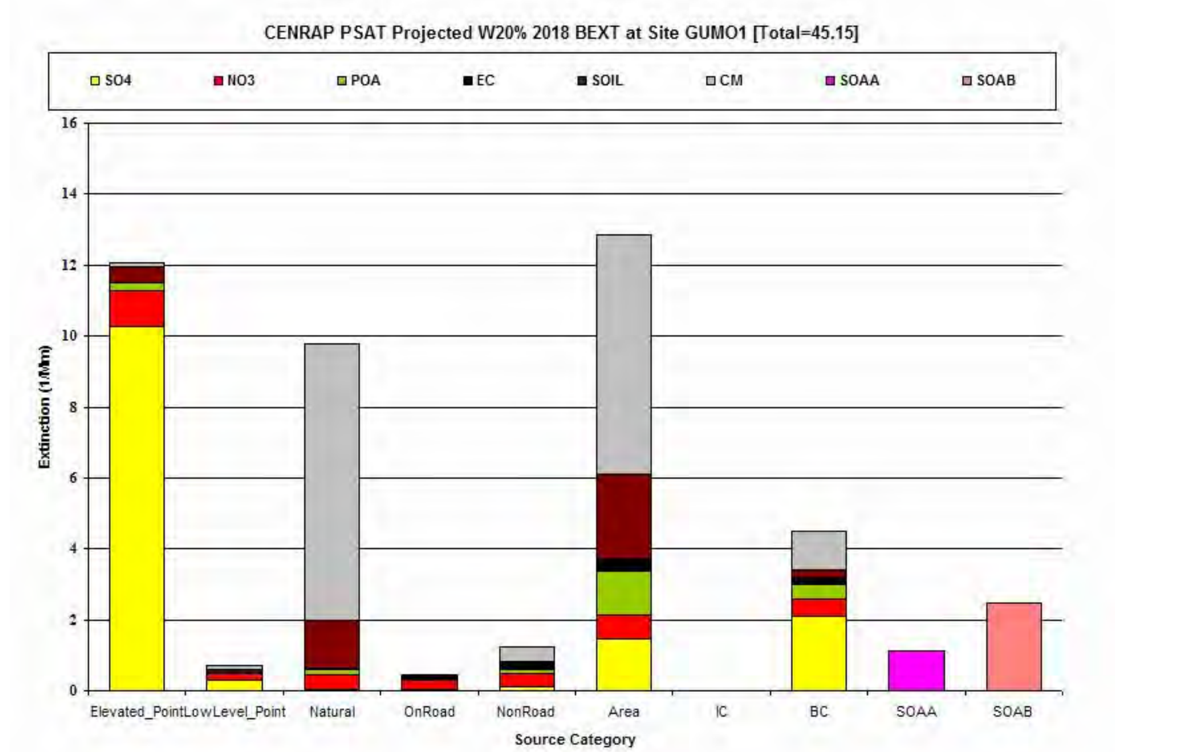


Figure E-10b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

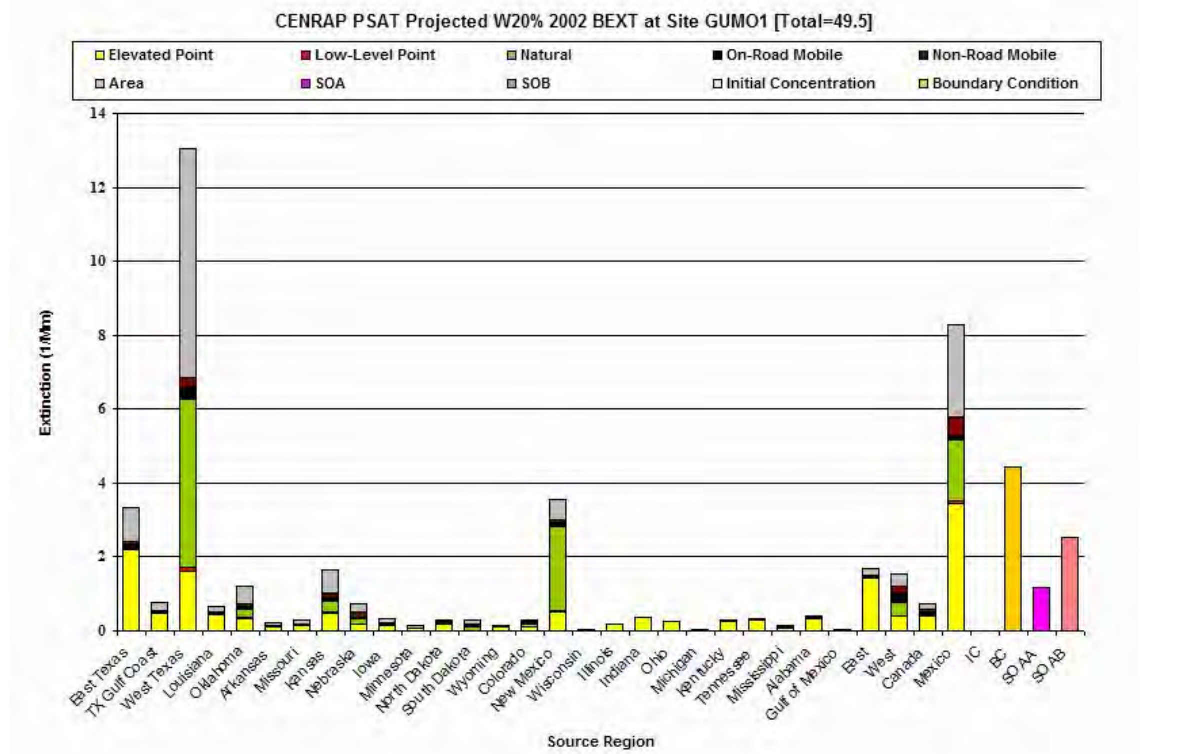


Figure E-10c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

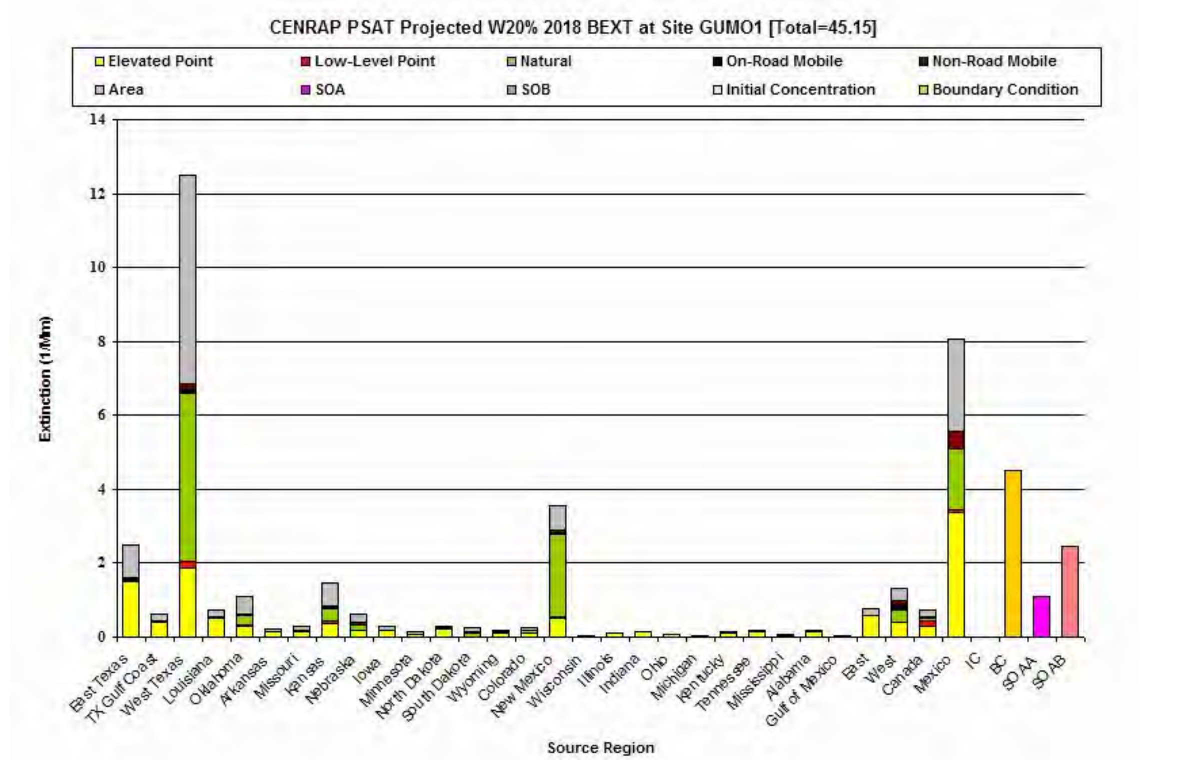


Figure E-10d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

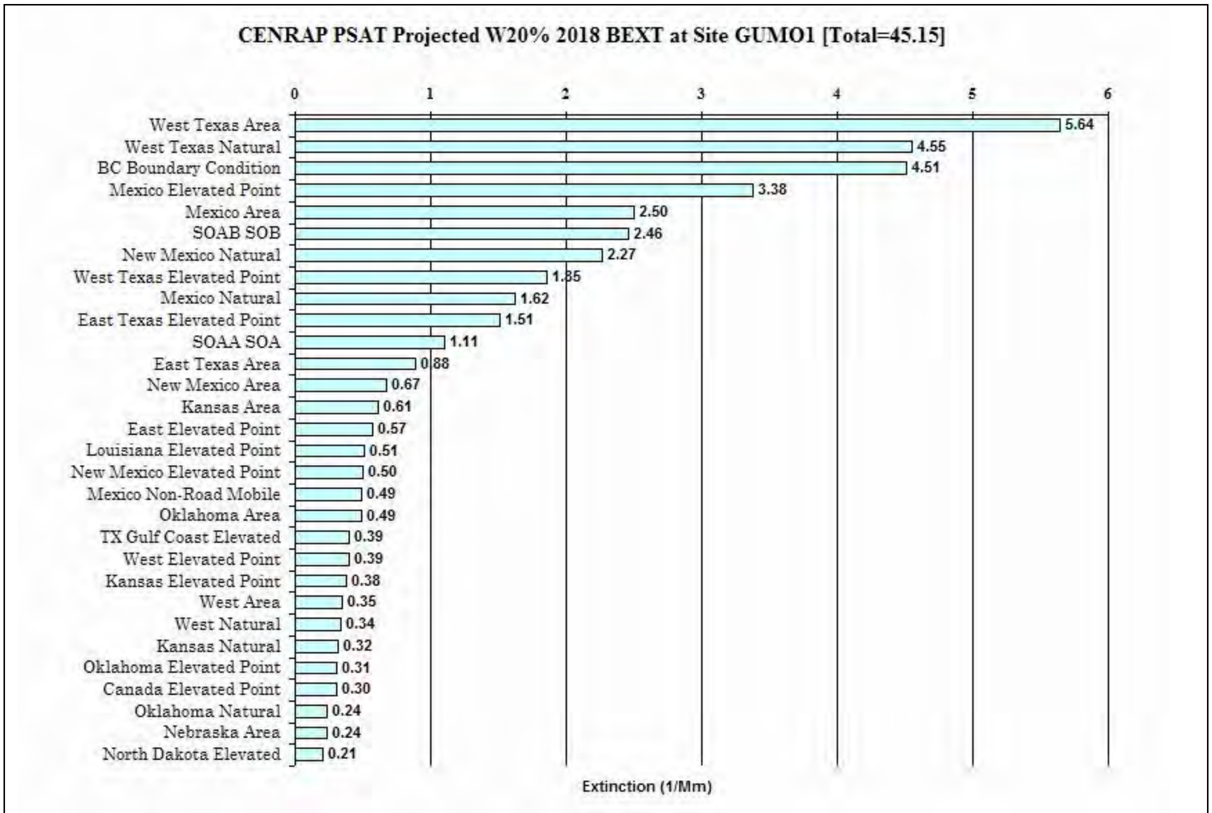
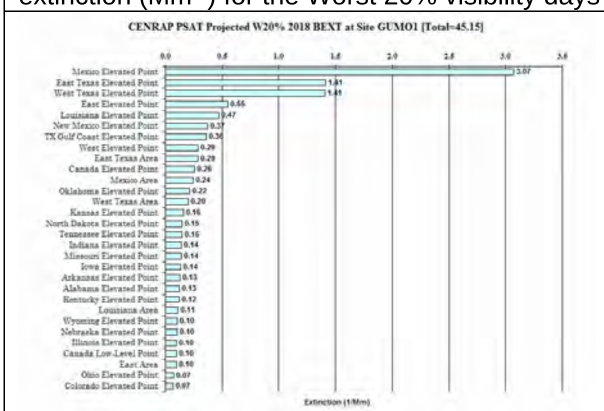


Figure E-10e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.



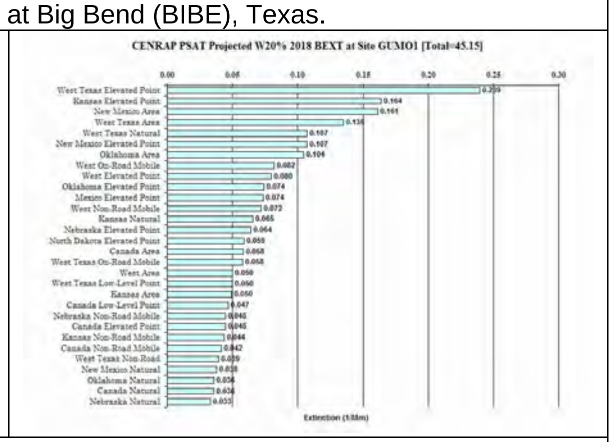


Figure E-10f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

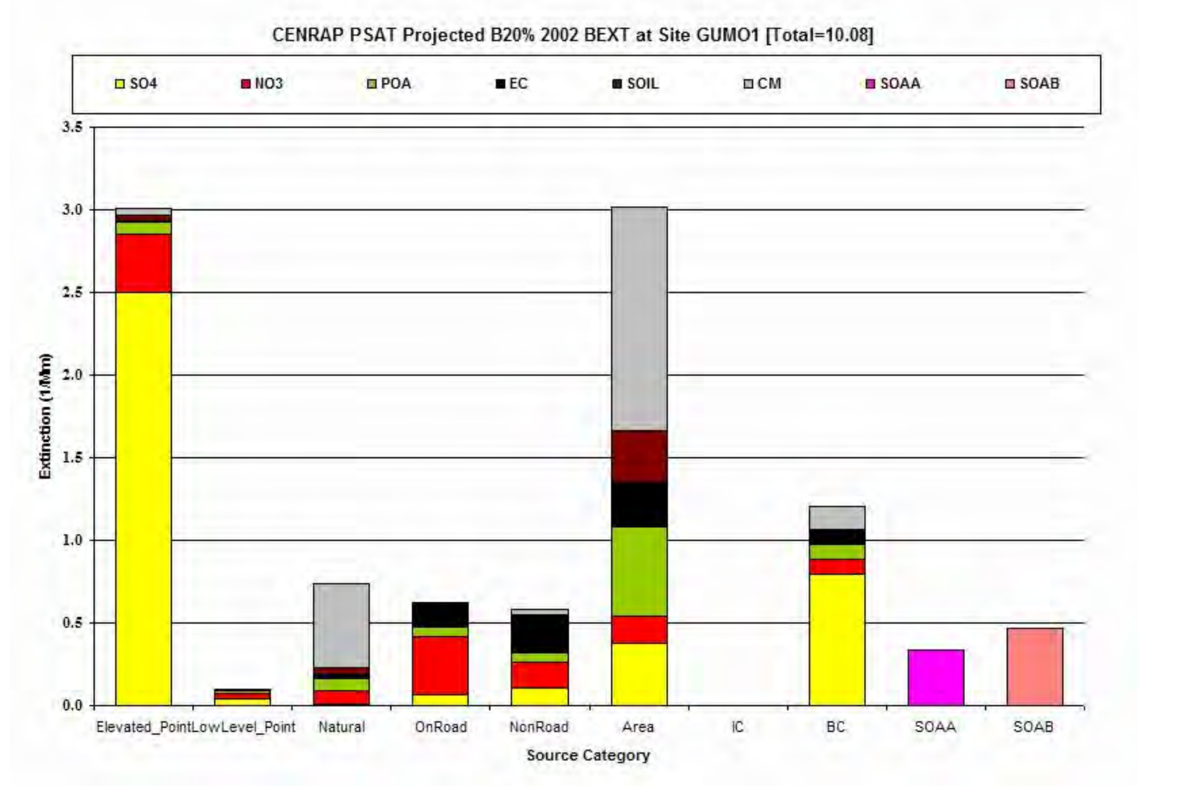


Figure E-10g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

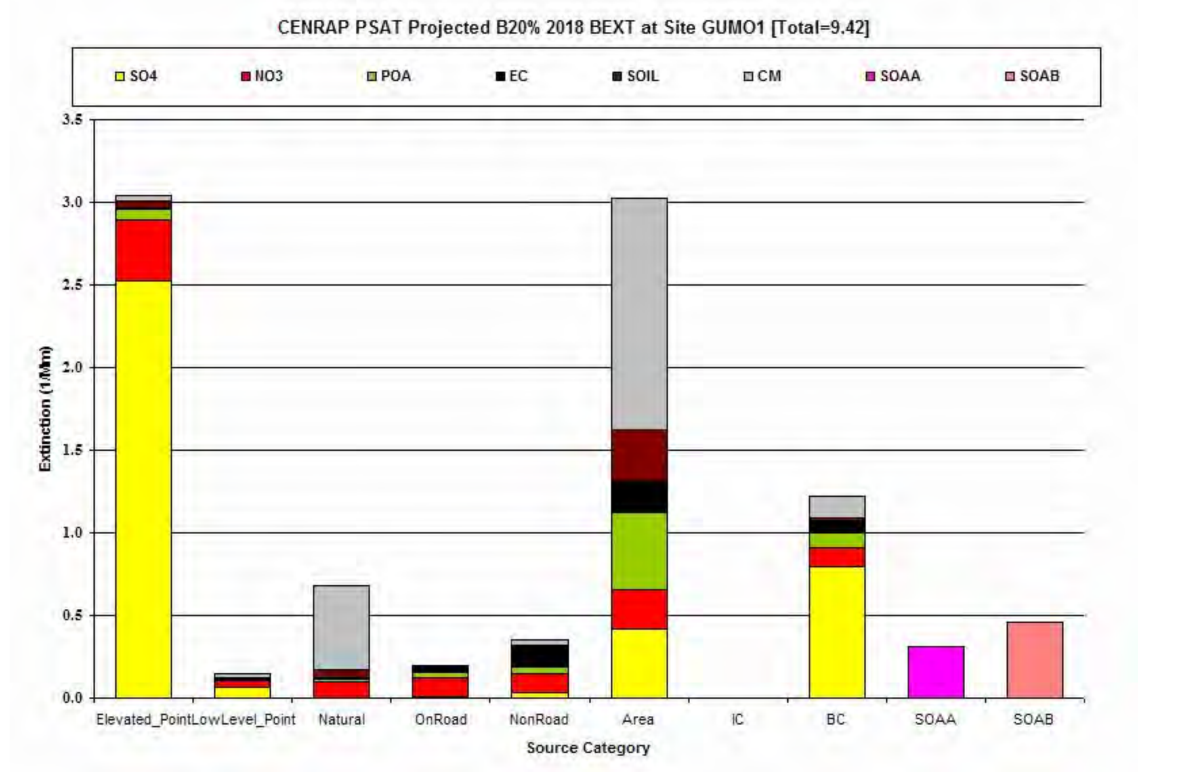


Figure E-10h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

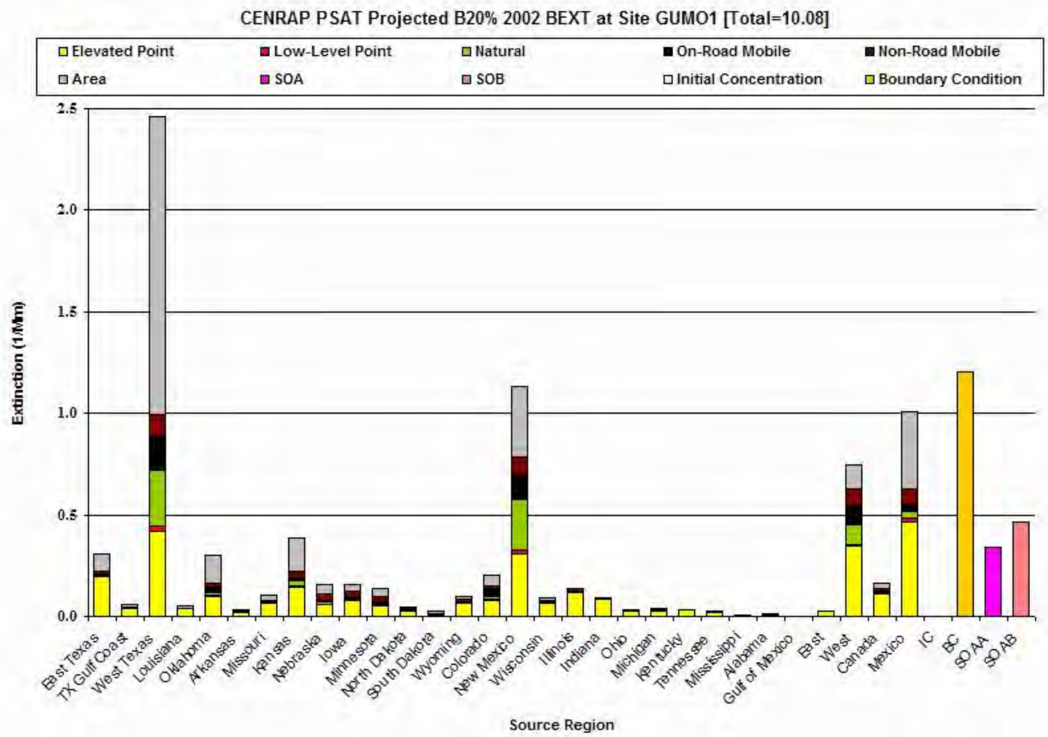


Figure E-10i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days Big Bend (BIBE), Texas.

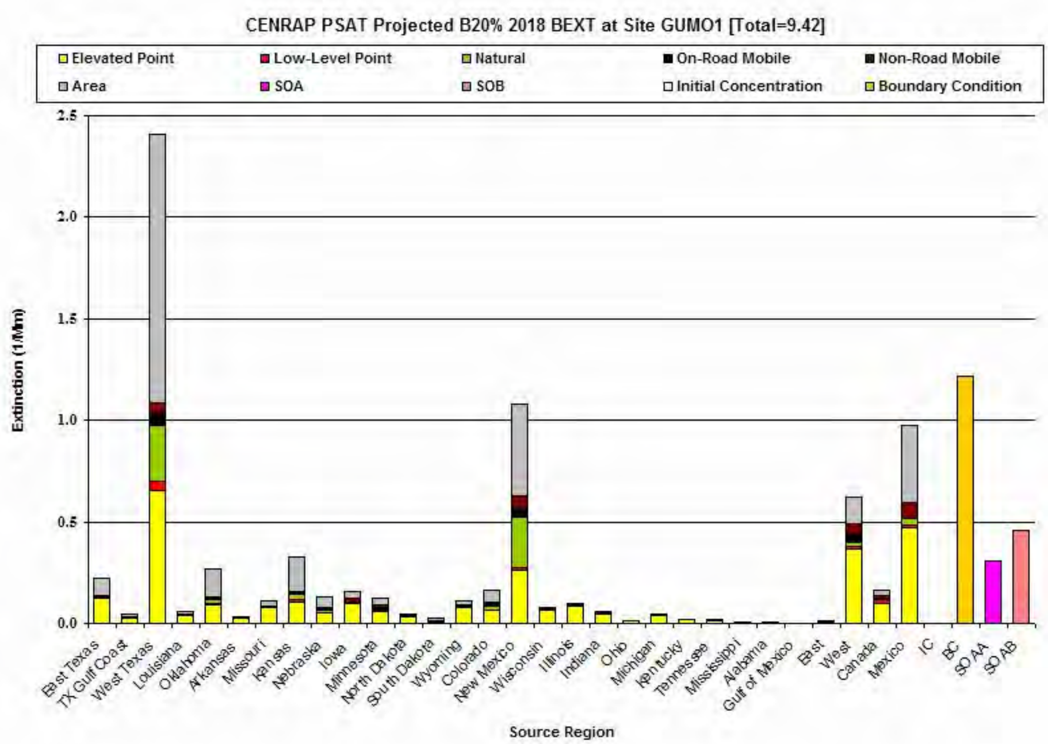


Figure E-10j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

APPENDIX F

Extinction and PM Species-Specific 2018 Visibility Projections and Comparisons with 2018 URP Points

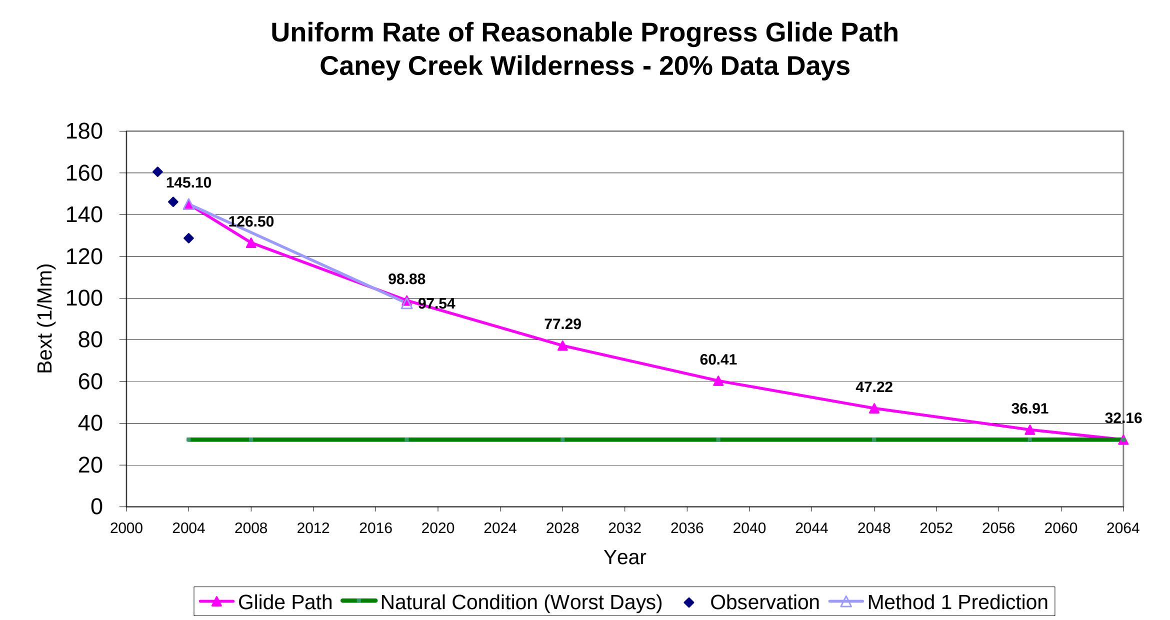


Figure F-1a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

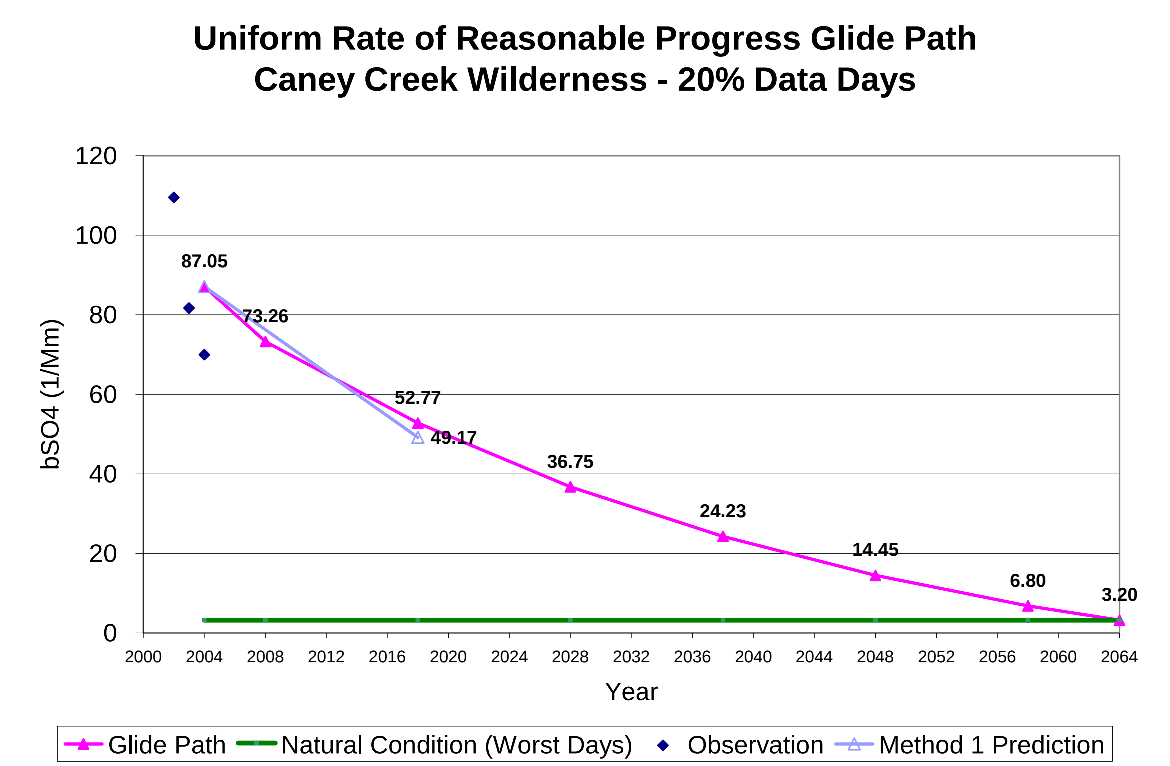


Figure F-1b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO_4) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

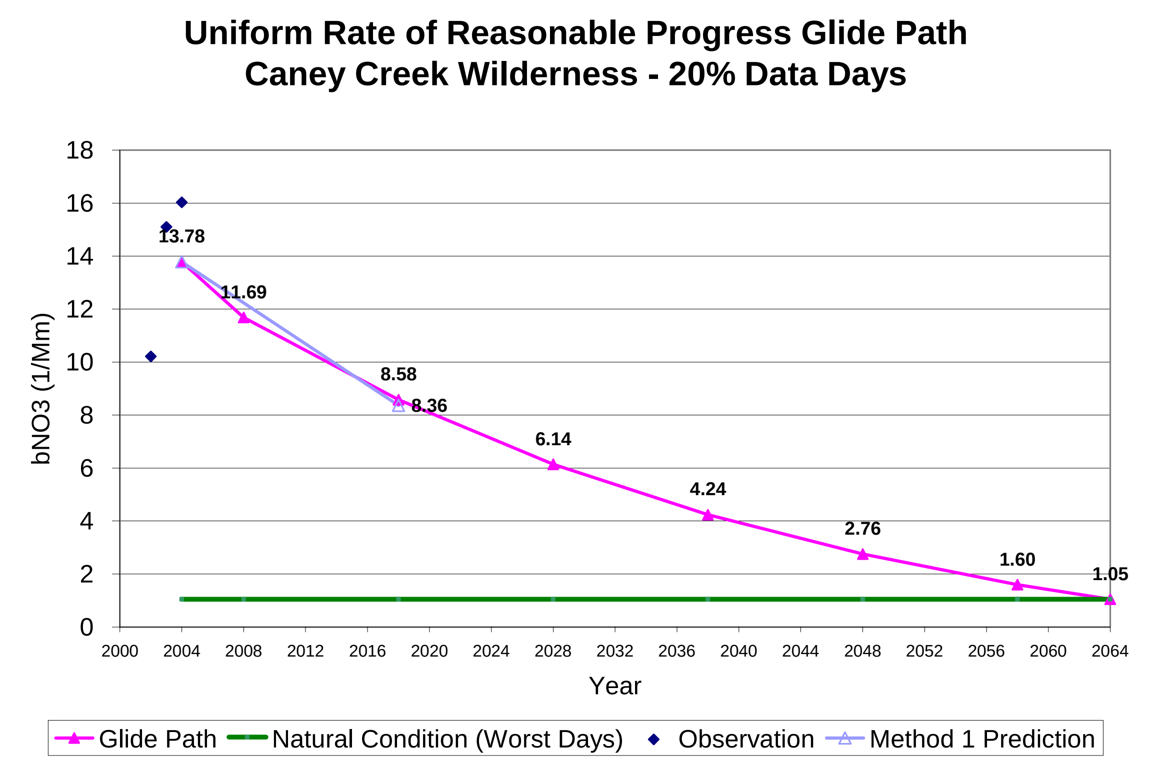


Figure F-1c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO3) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

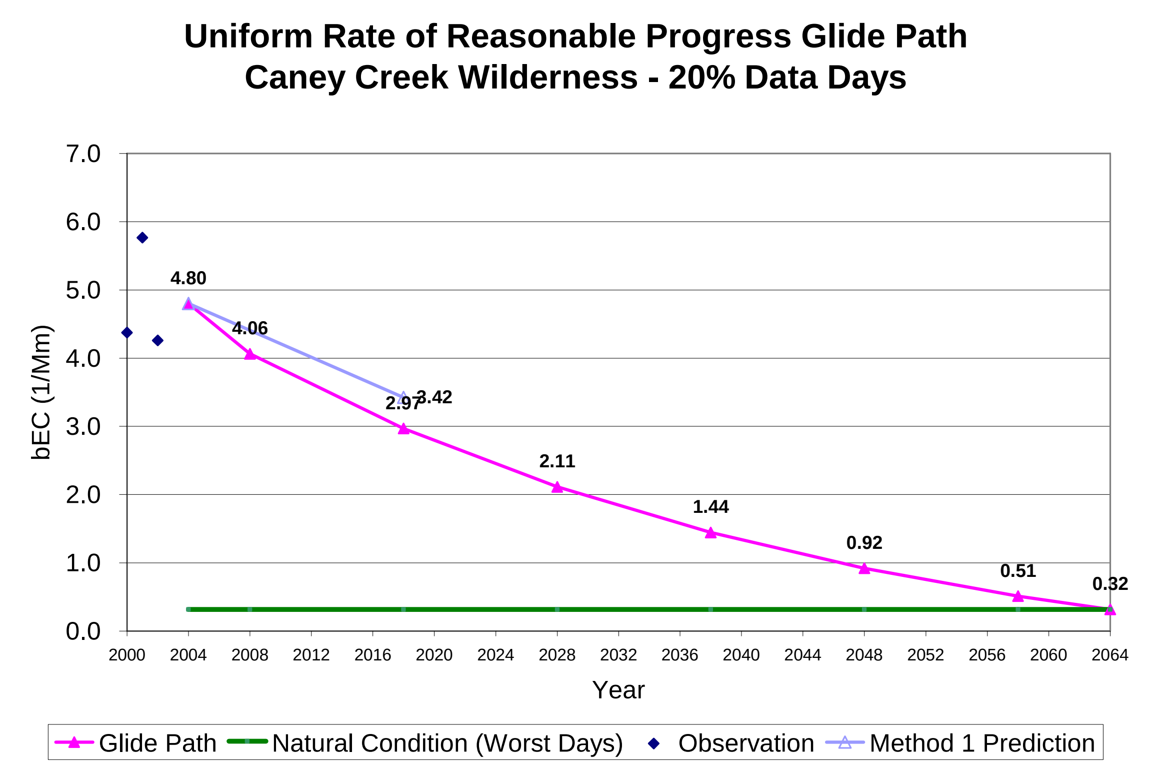


Figure F-1d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

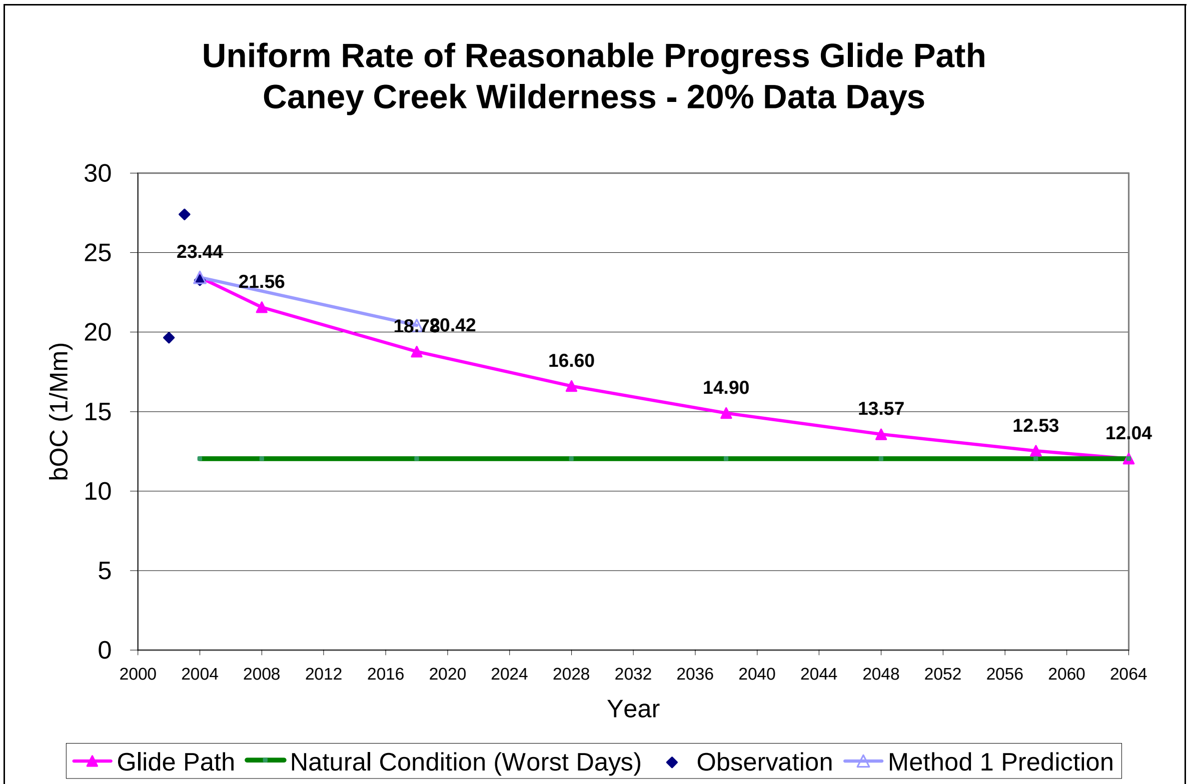


Figure F-1e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

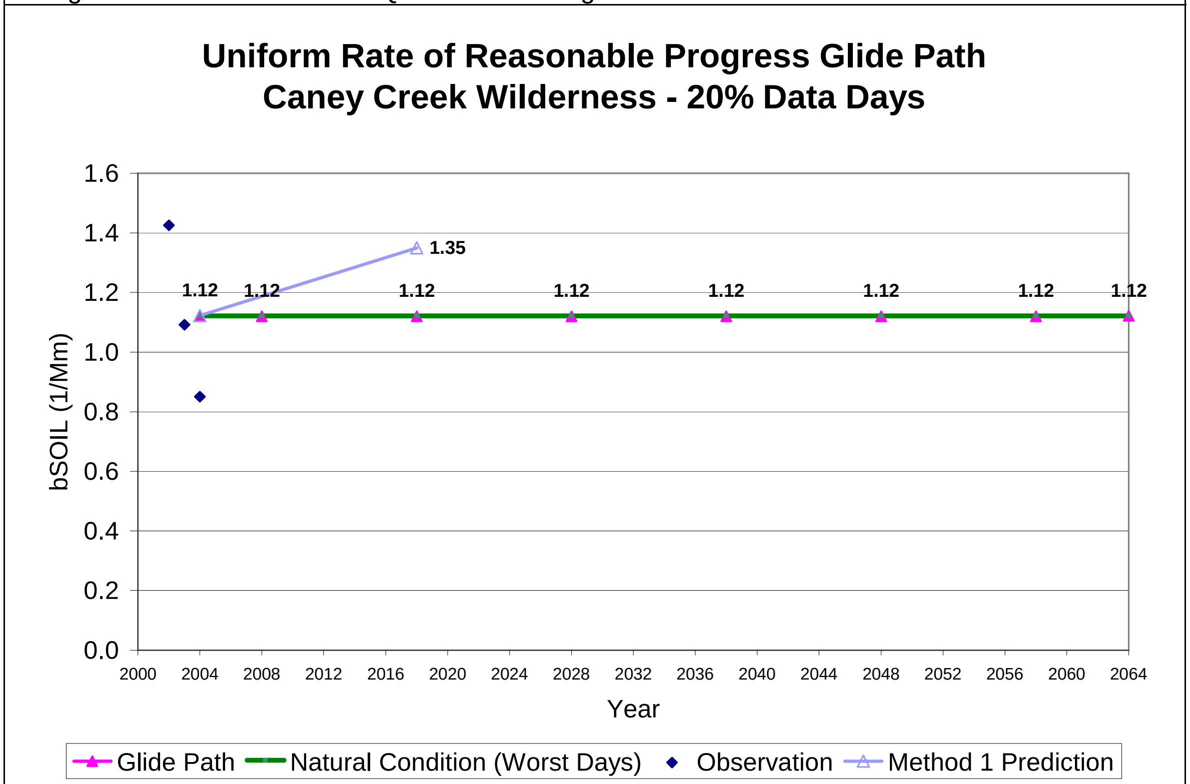


Figure F-1f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

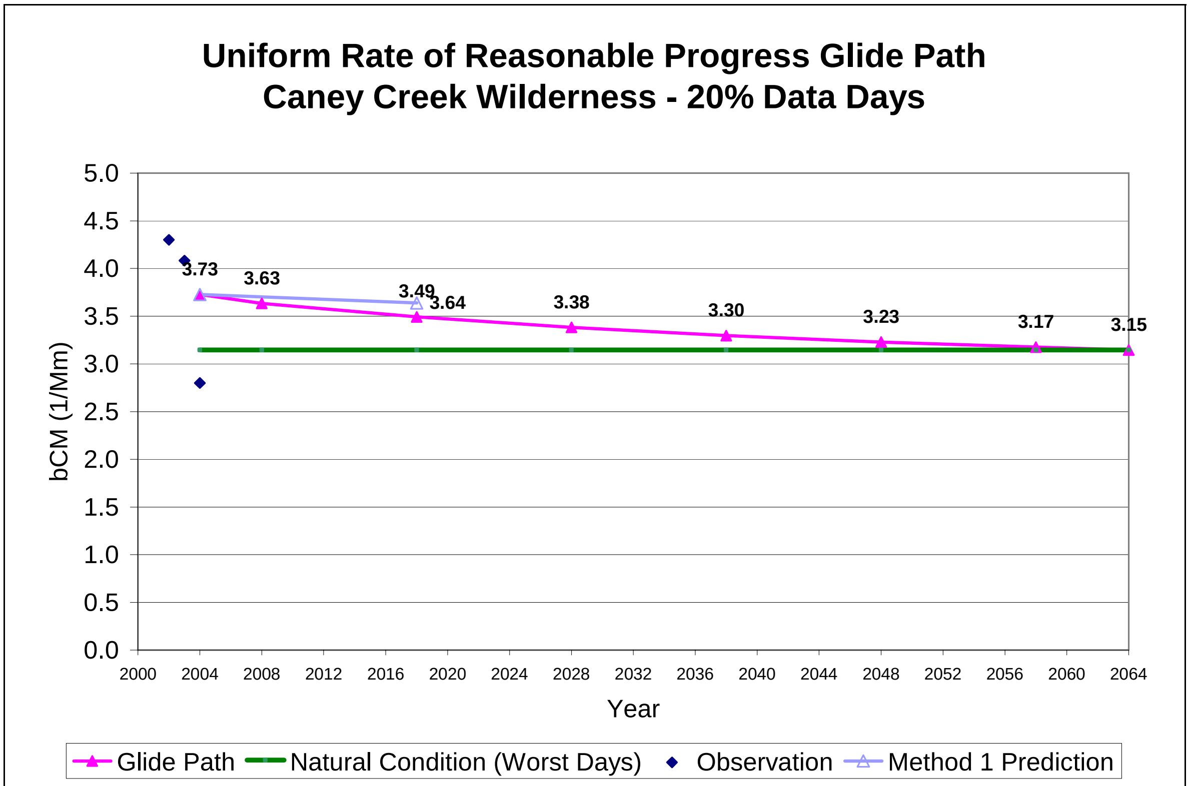


Figure F-1g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

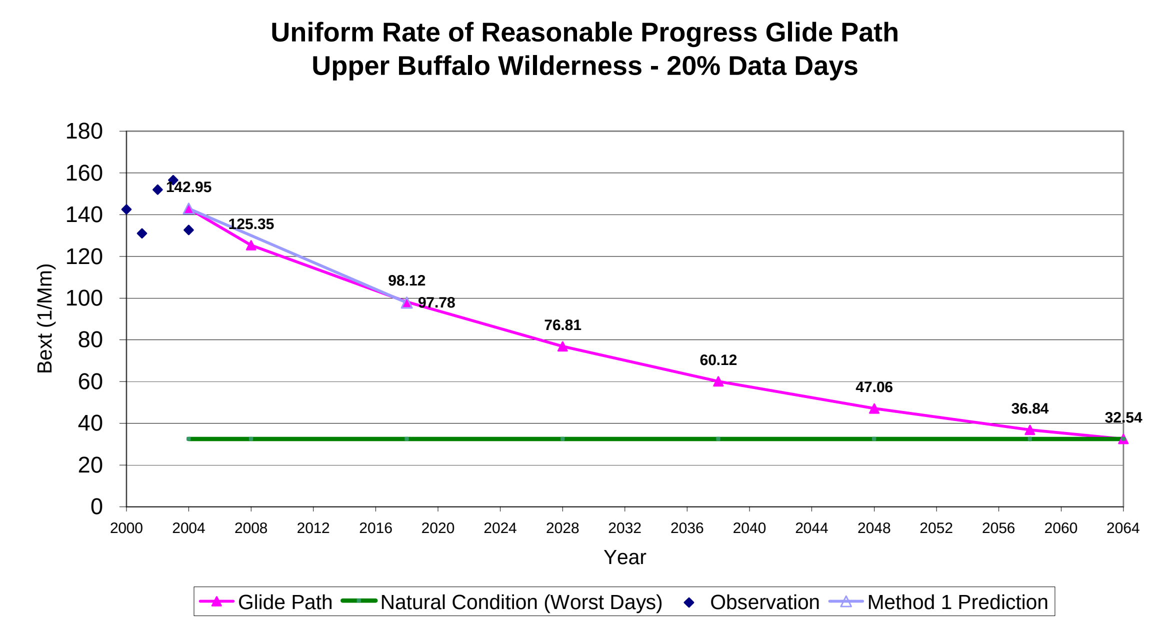


Figure F-2a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

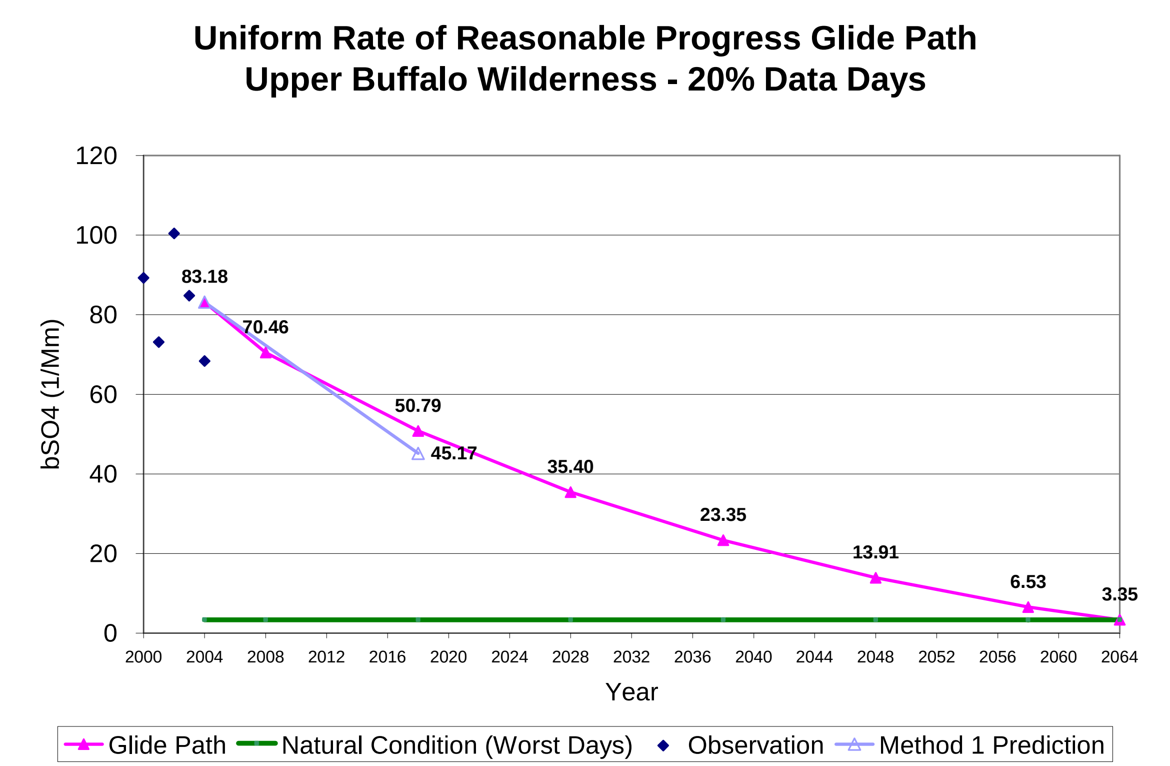


Figure F-2b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO4) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

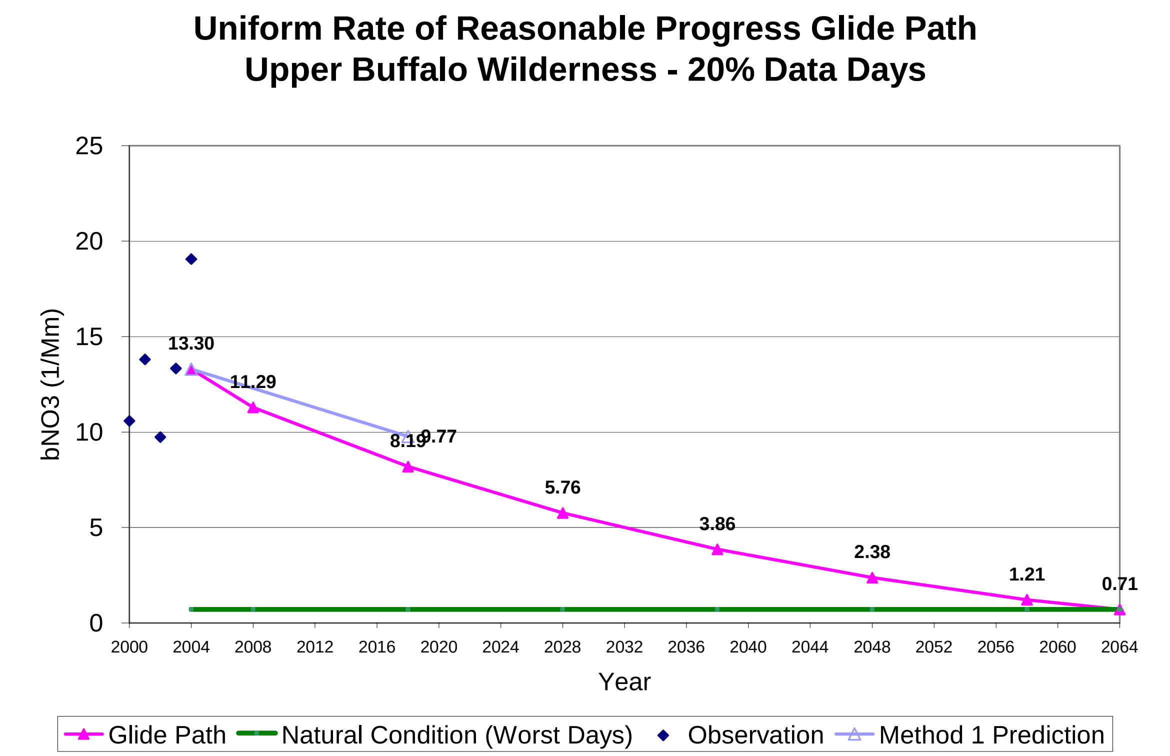


Figure F-2c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO3) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

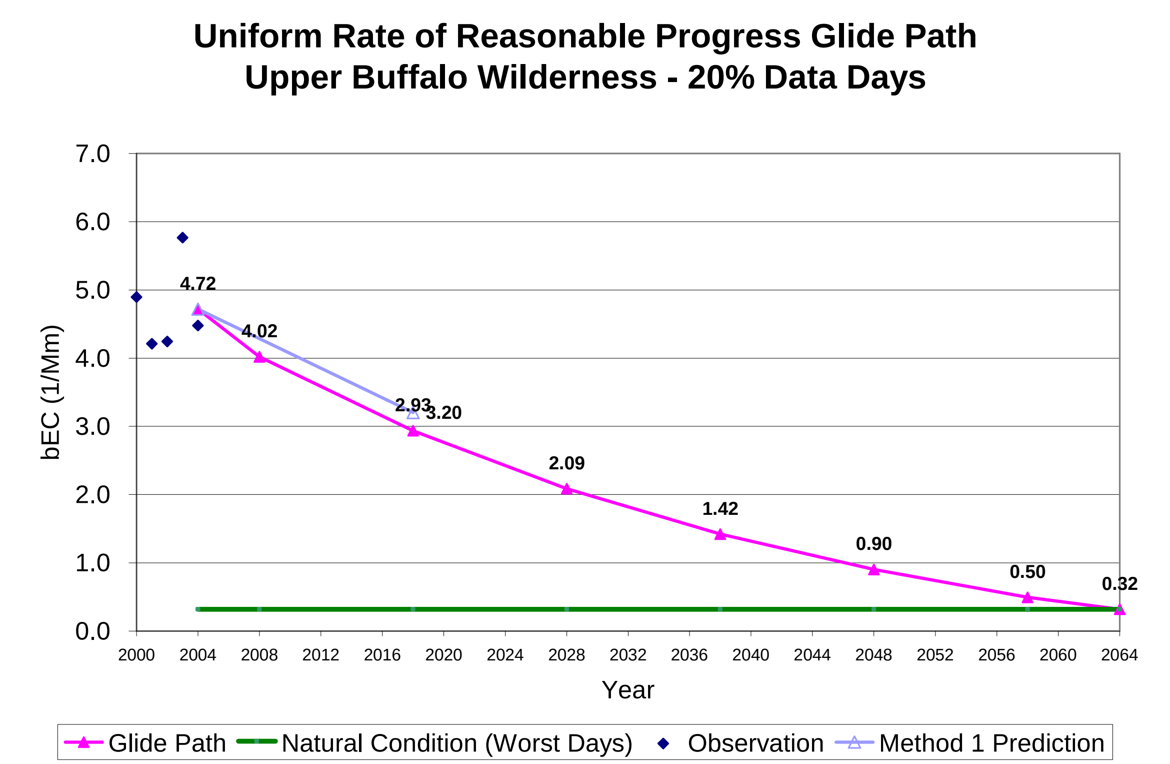


Figure F-2d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

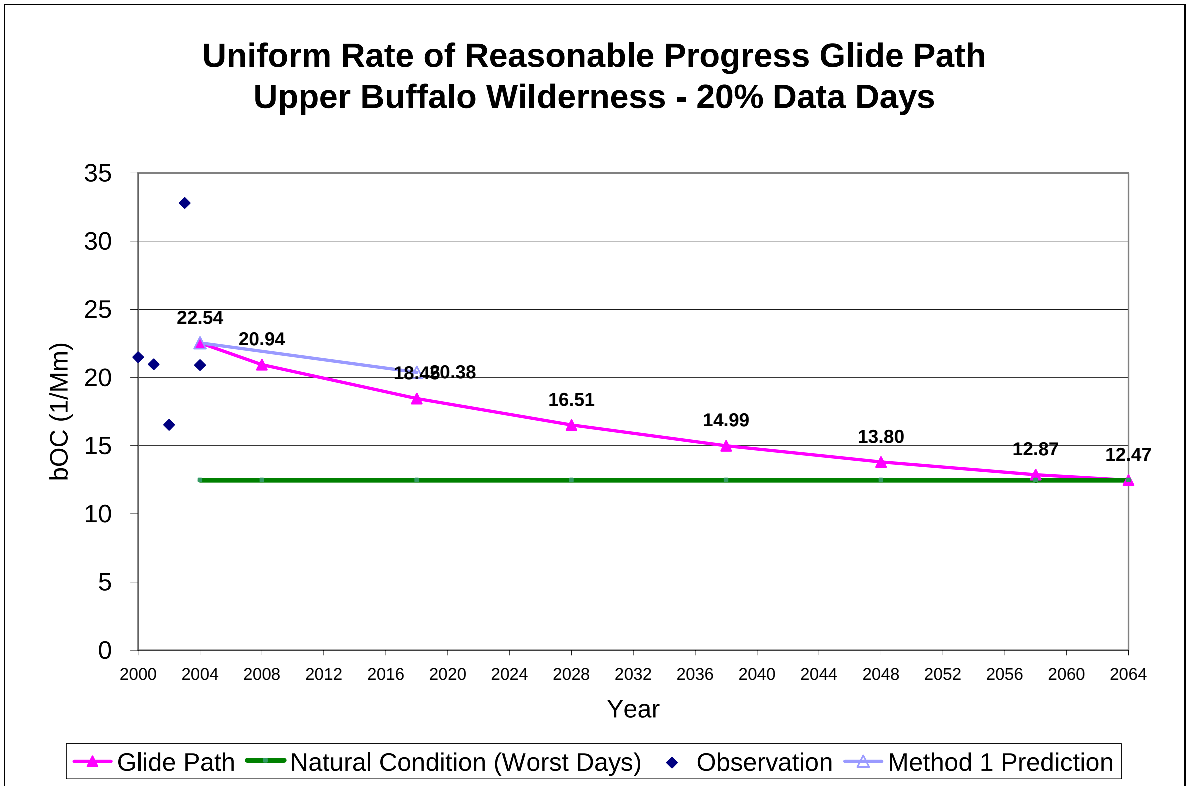


Figure F-2e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

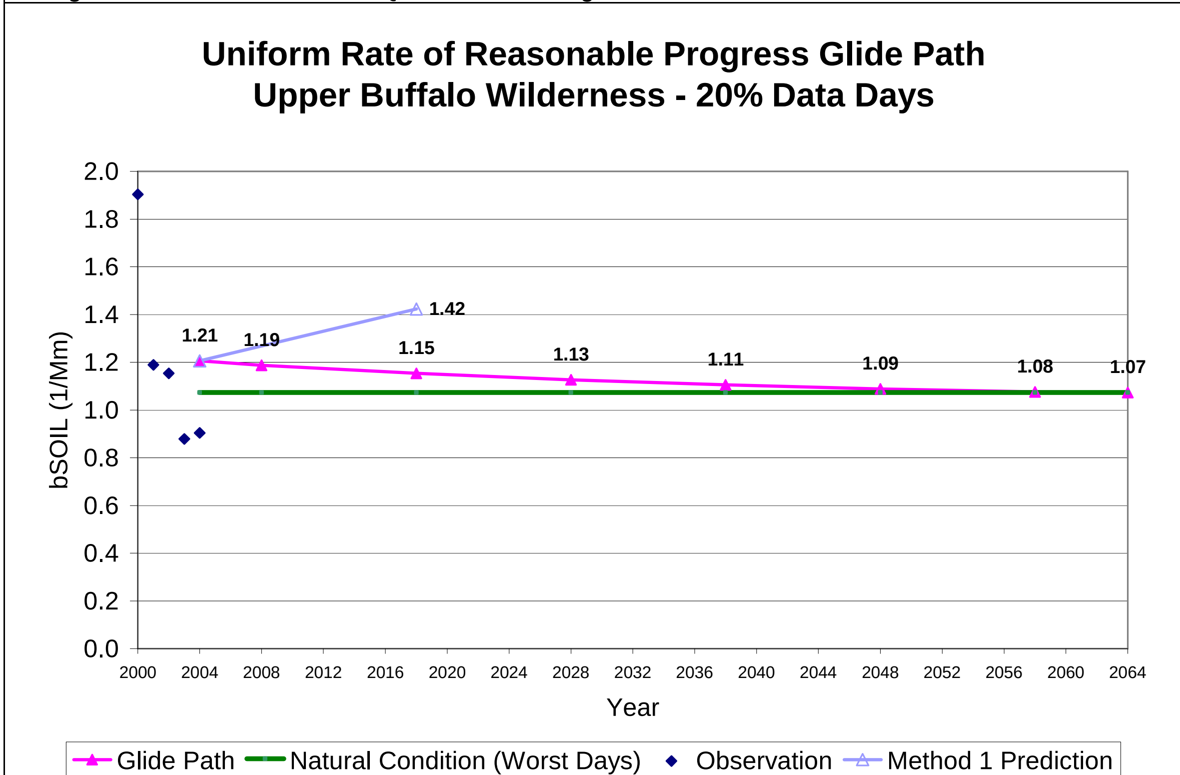


Figure F-2f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

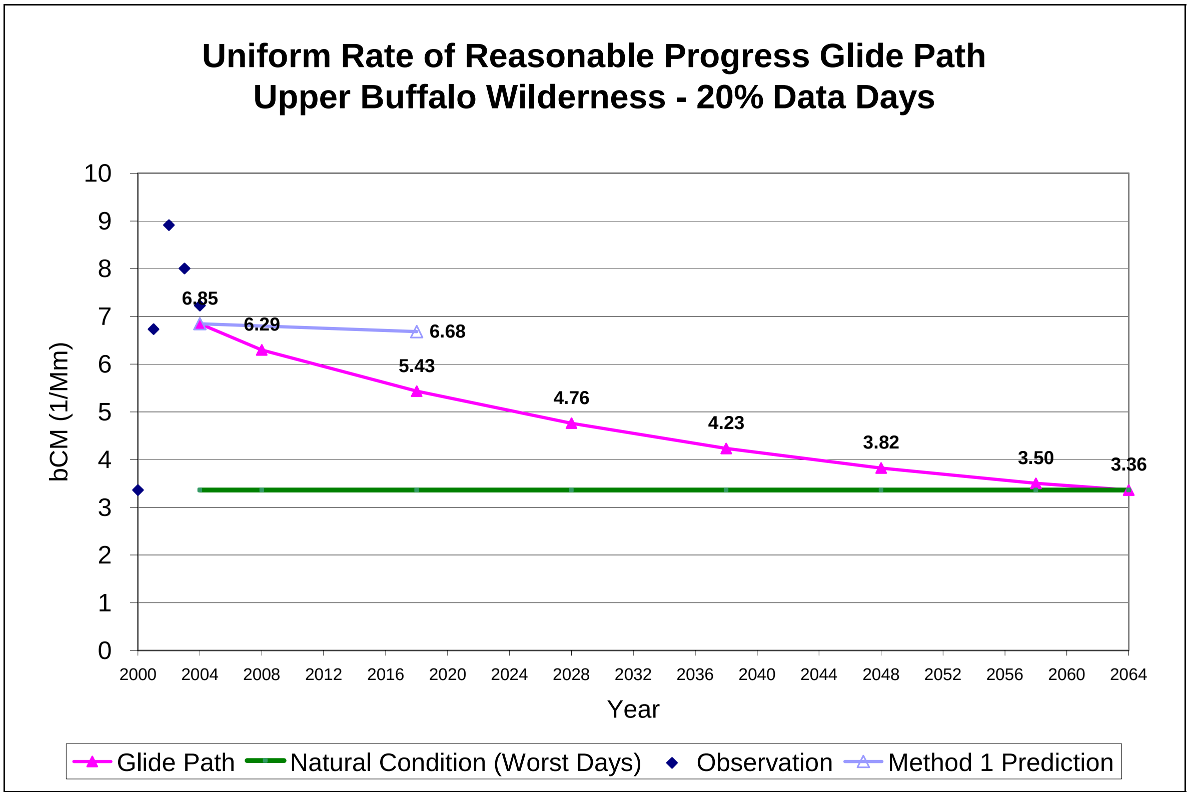


Figure F-2g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

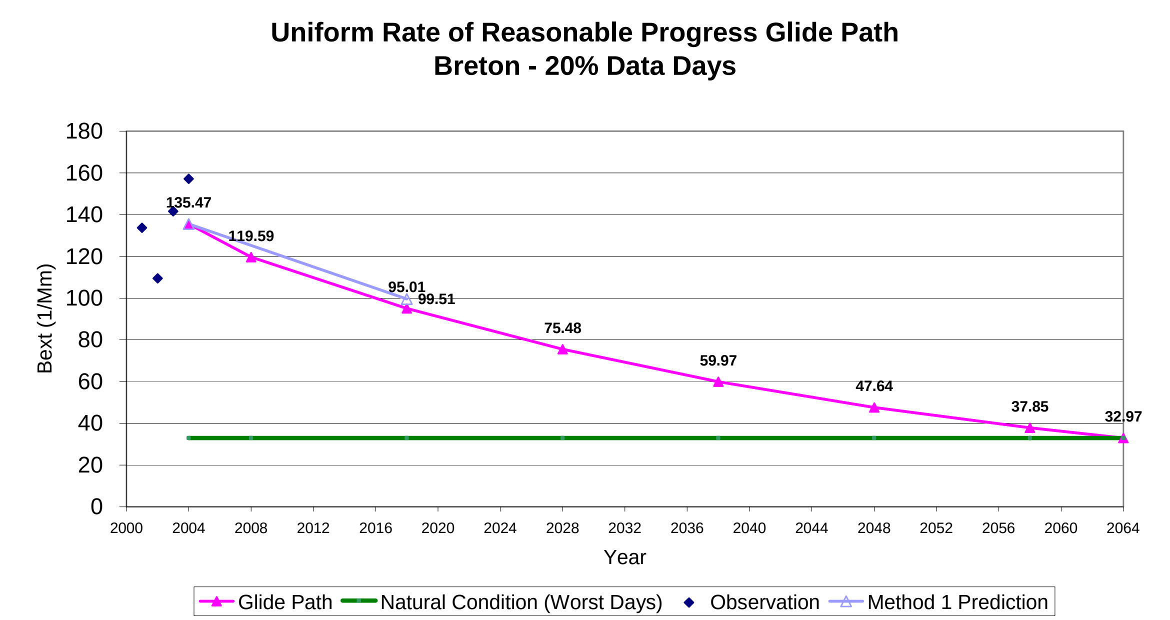


Figure F-3a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

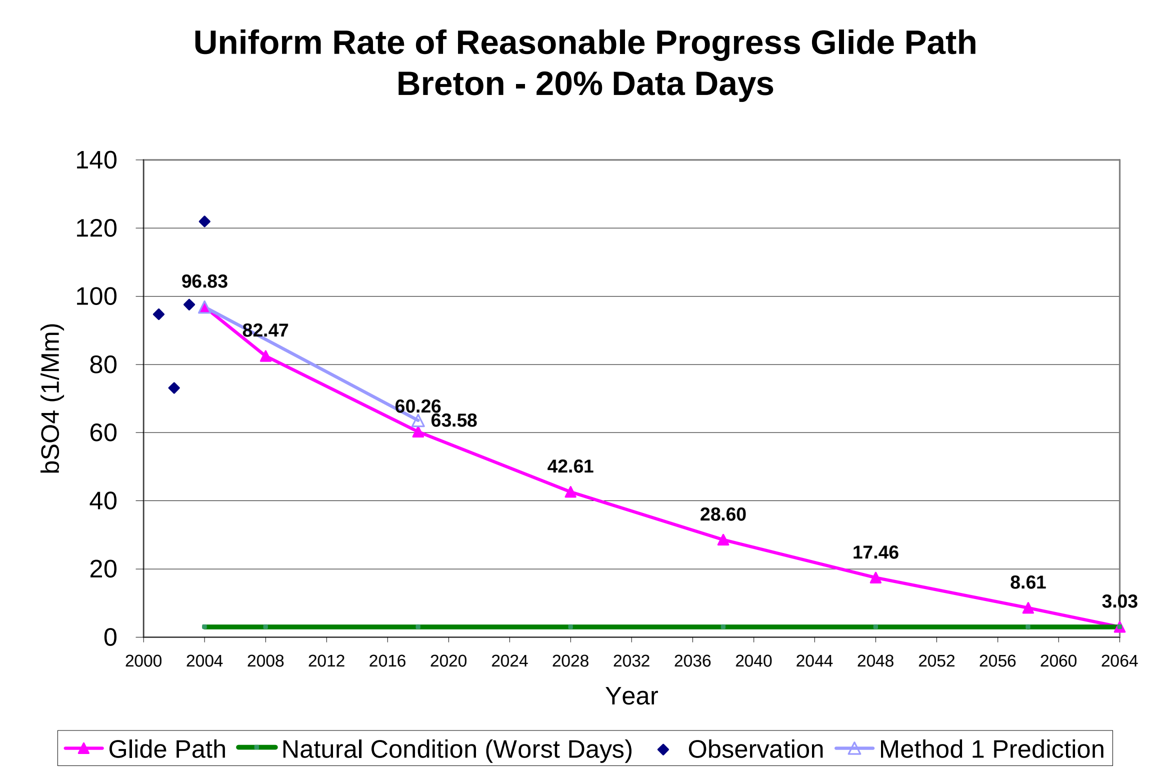


Figure F-3b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO4) in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

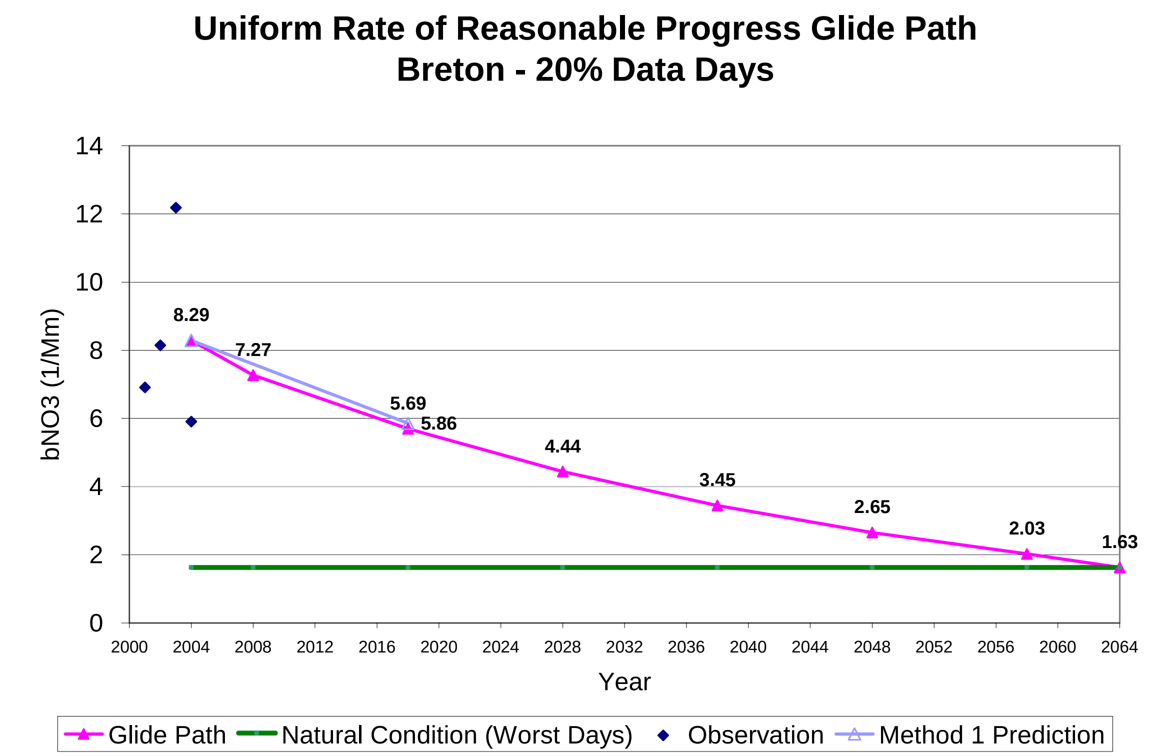


Figure F-3c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO3) in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

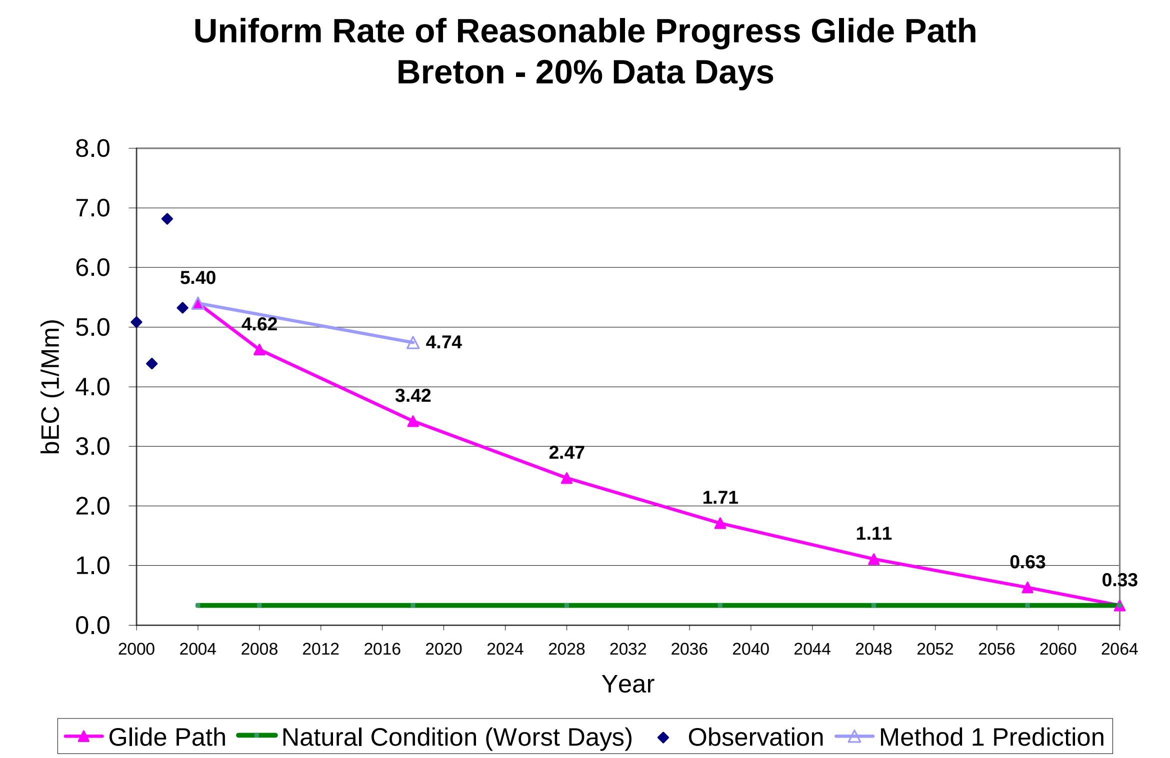


Figure F-3d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

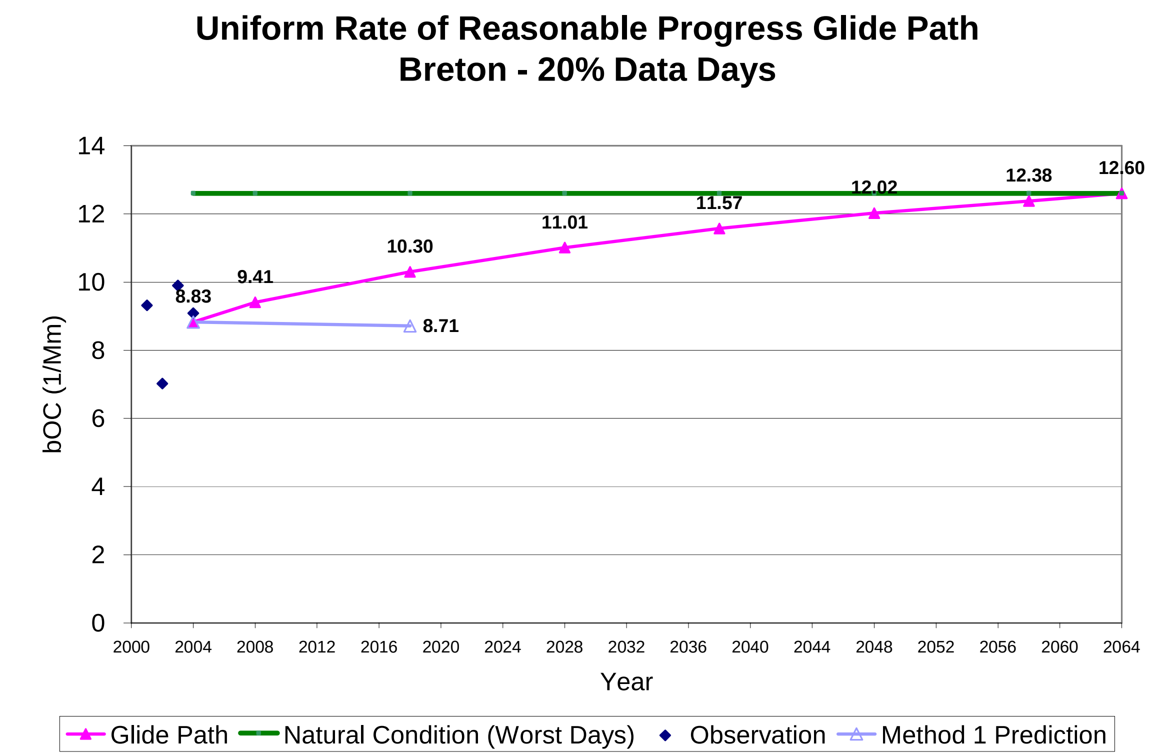


Figure F-3e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

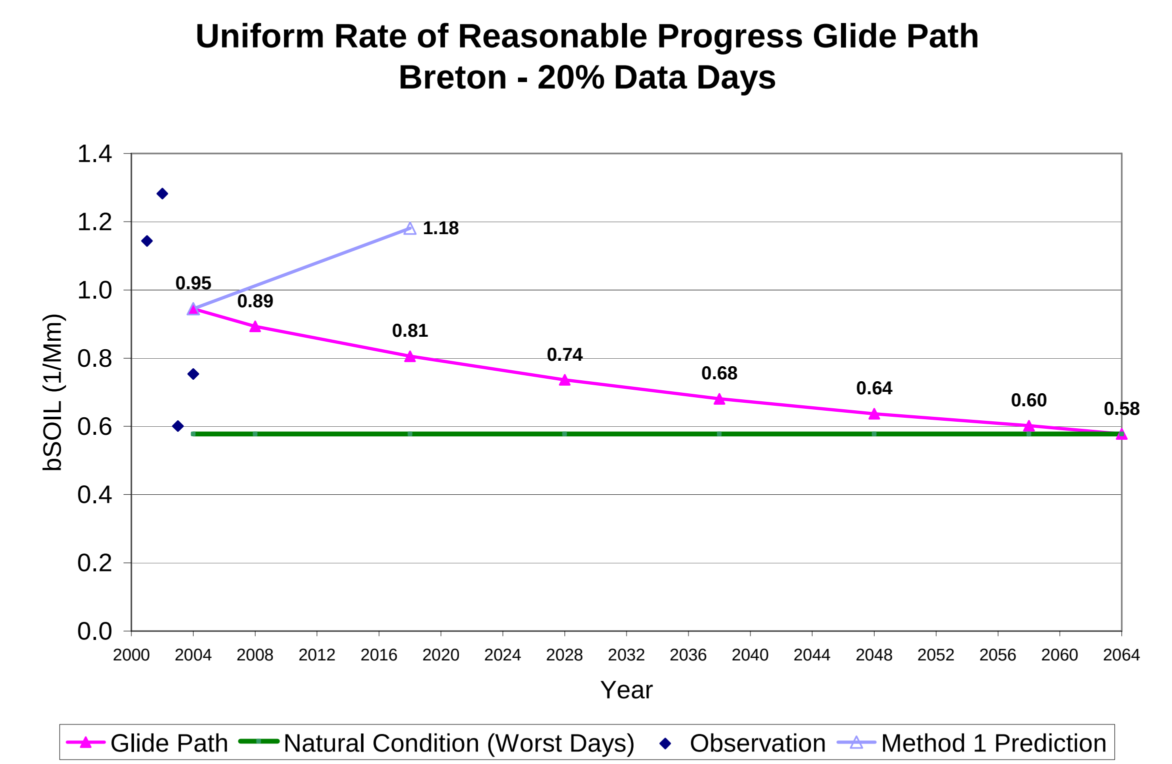


Figure F-3f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

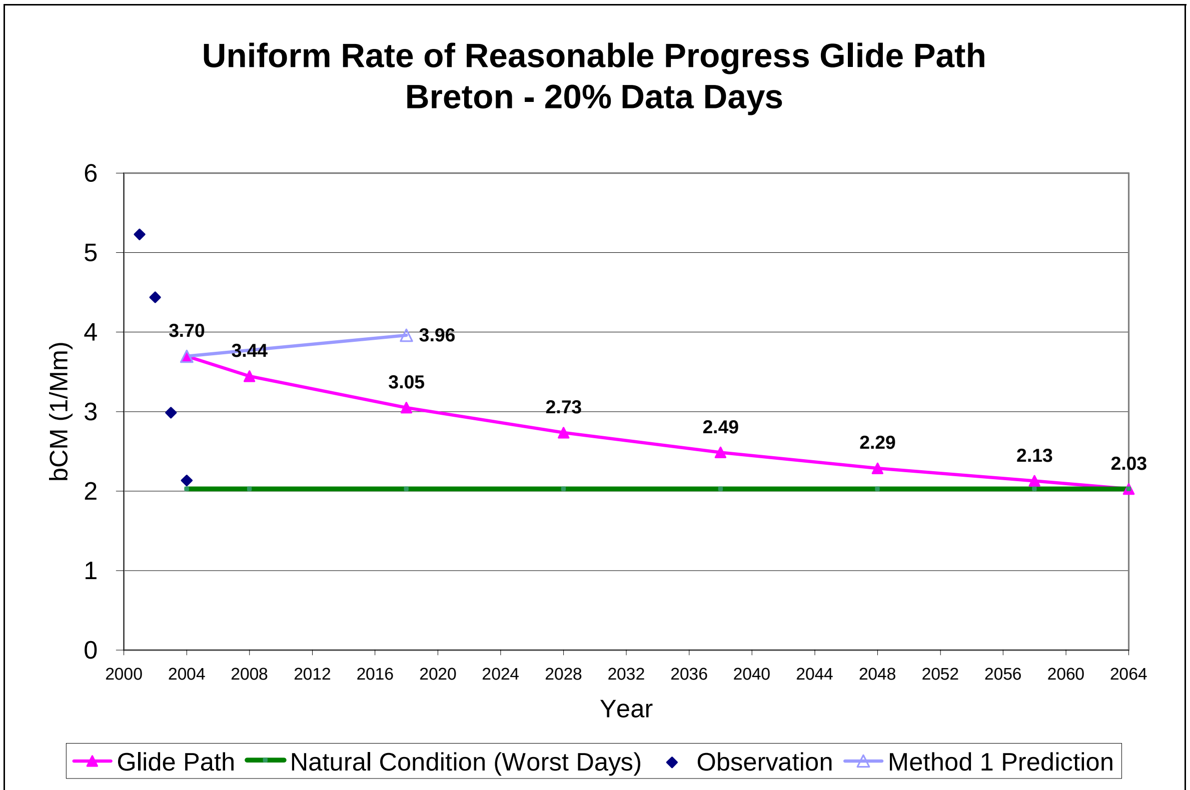


Figure F-3g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

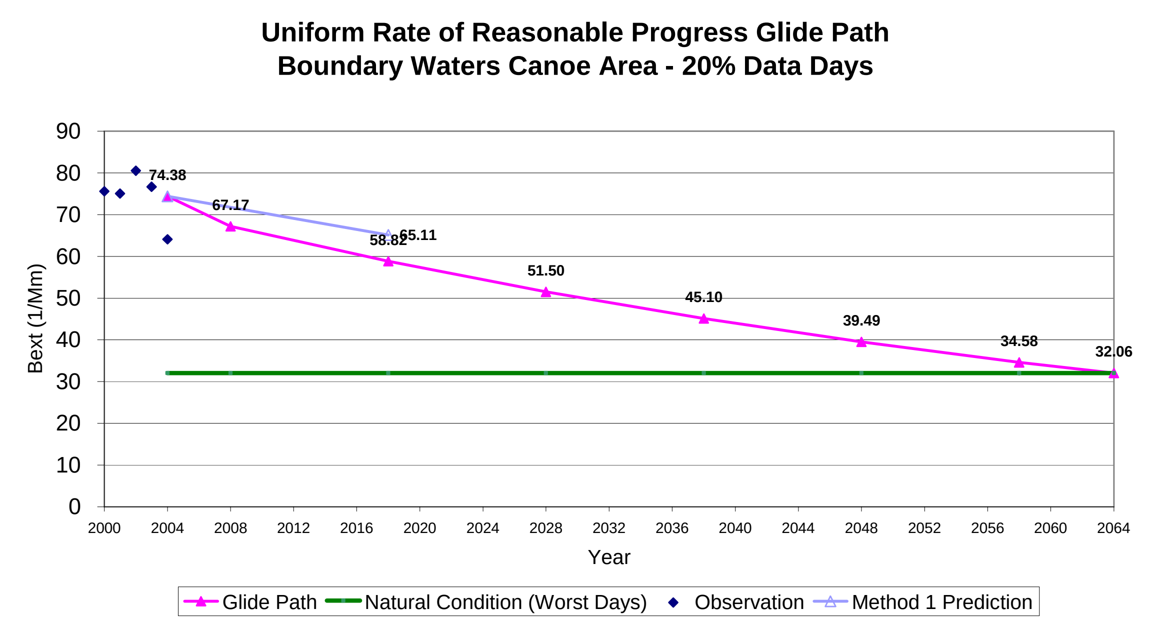


Figure F-4a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

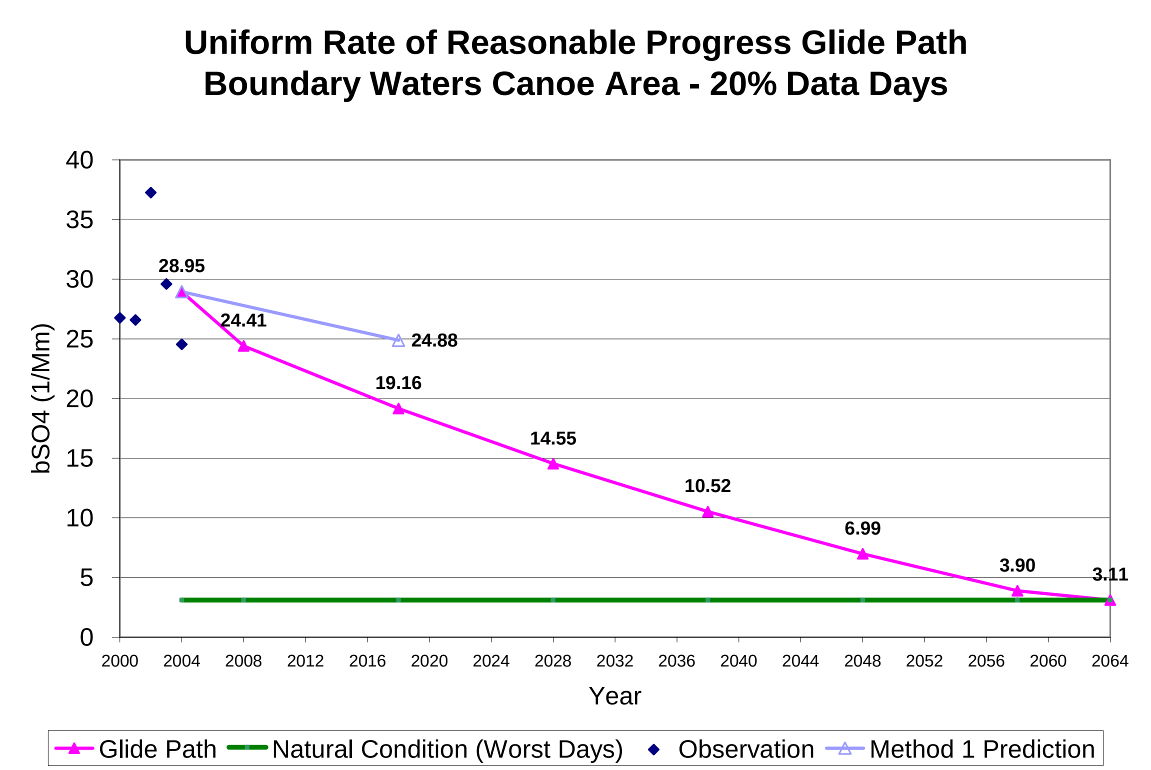


Figure F-4b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO4) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

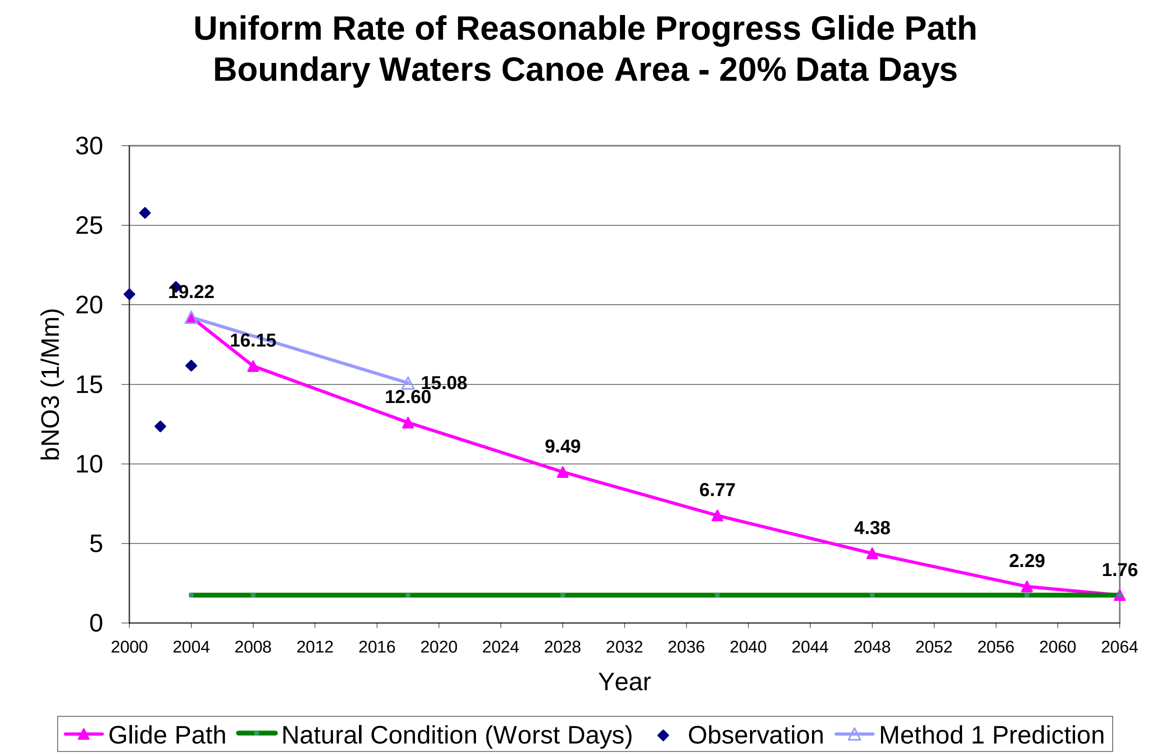


Figure F-4c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO3) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

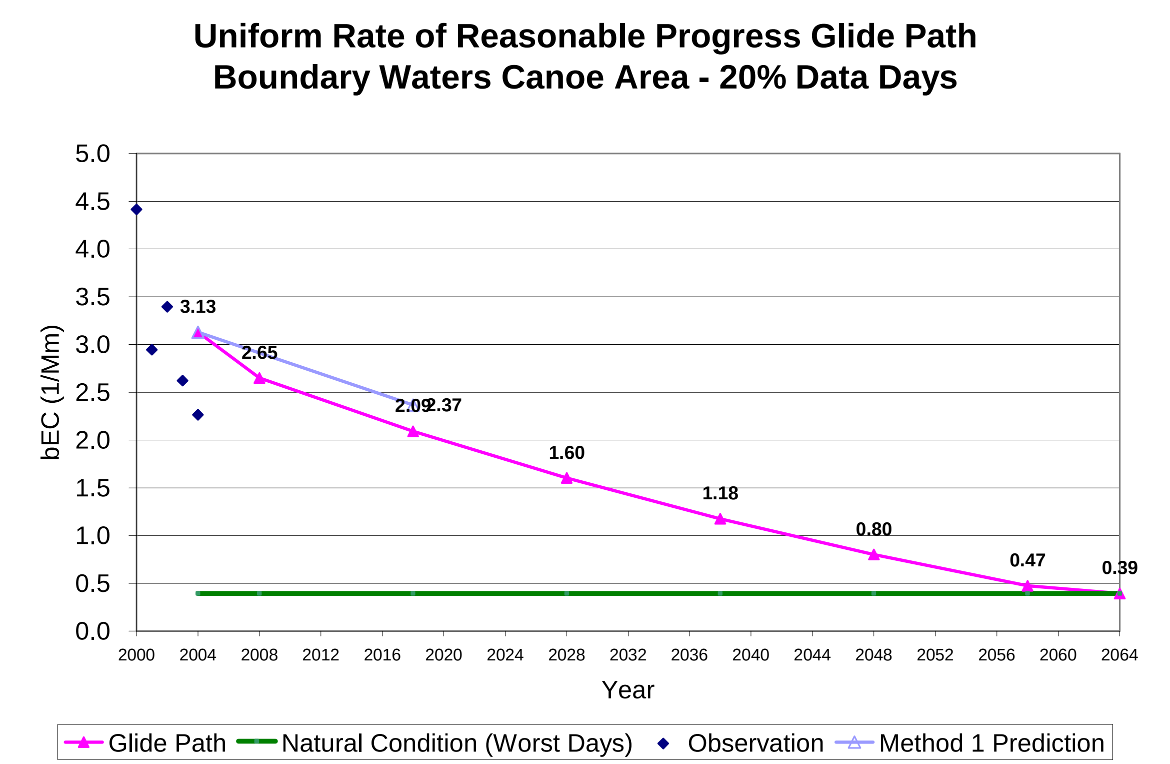


Figure F-4d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

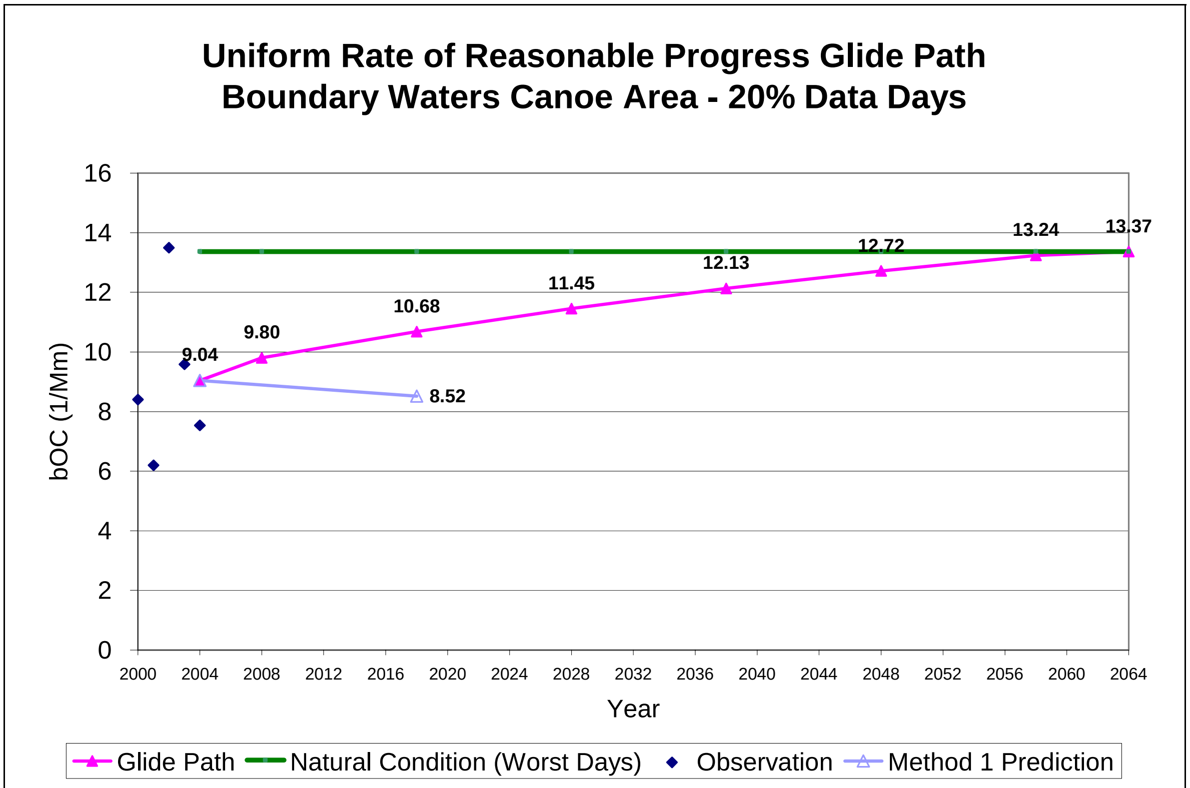


Figure F-4e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

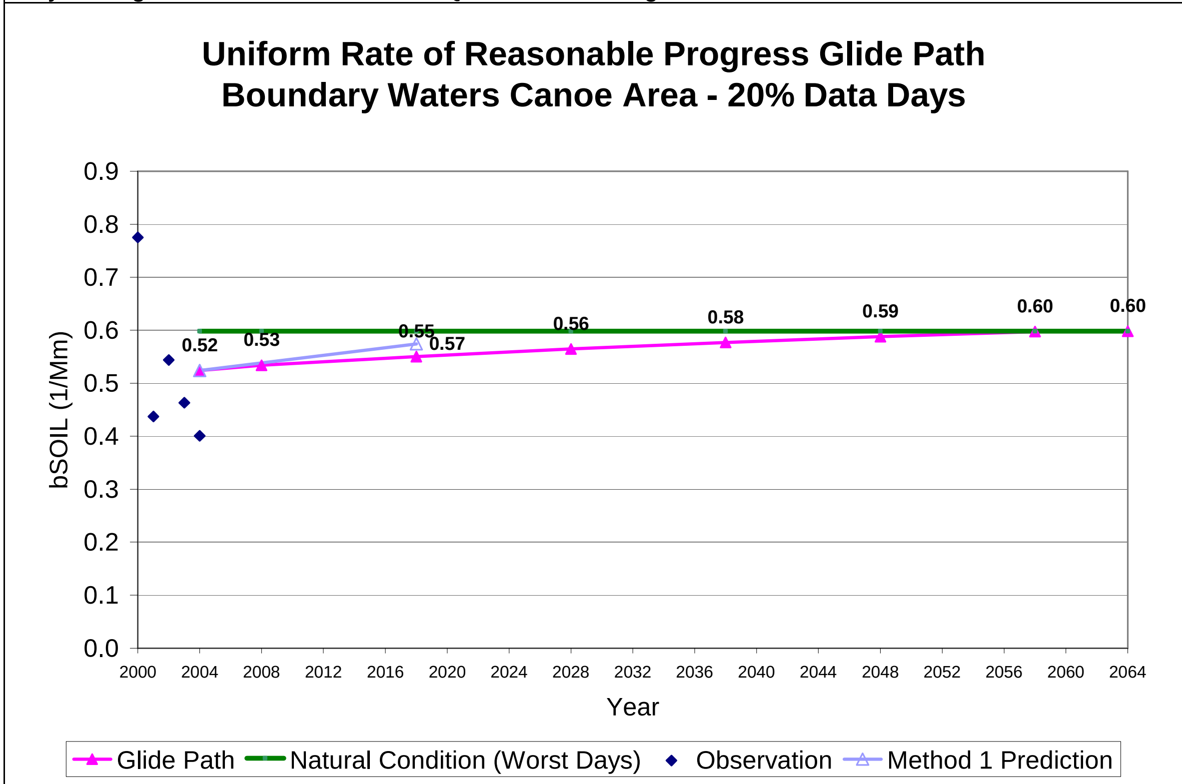


Figure F-4f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

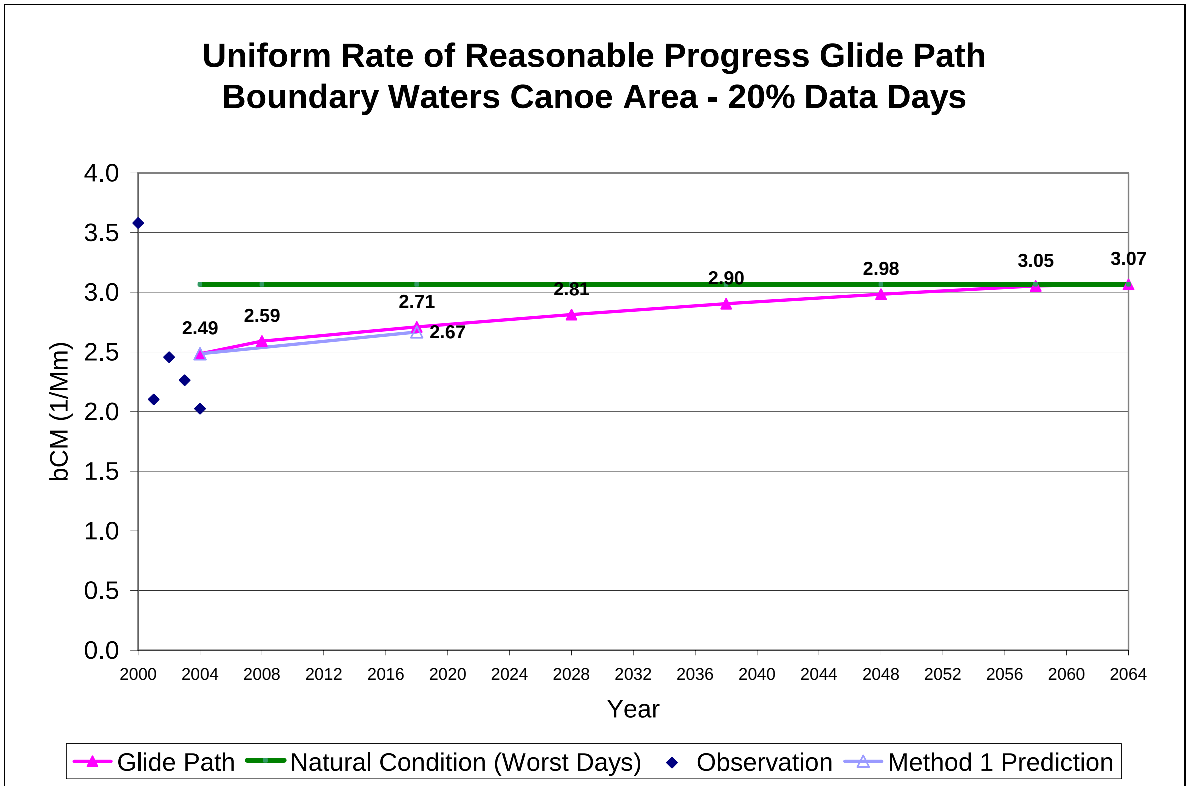


Figure F-4g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

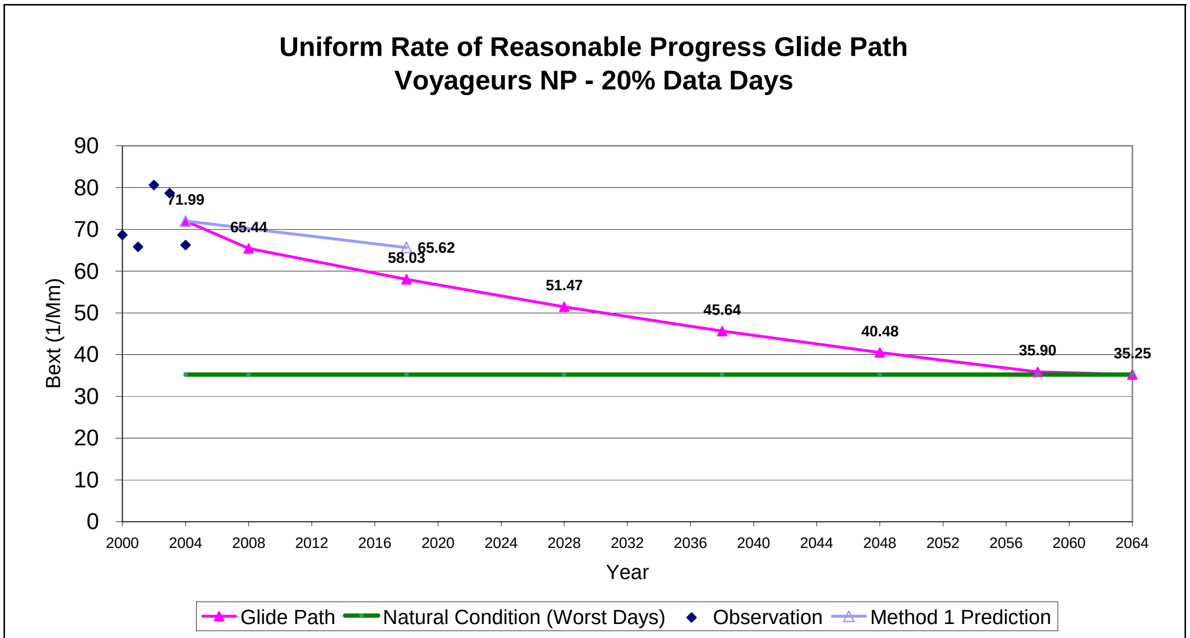


Figure F-5a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

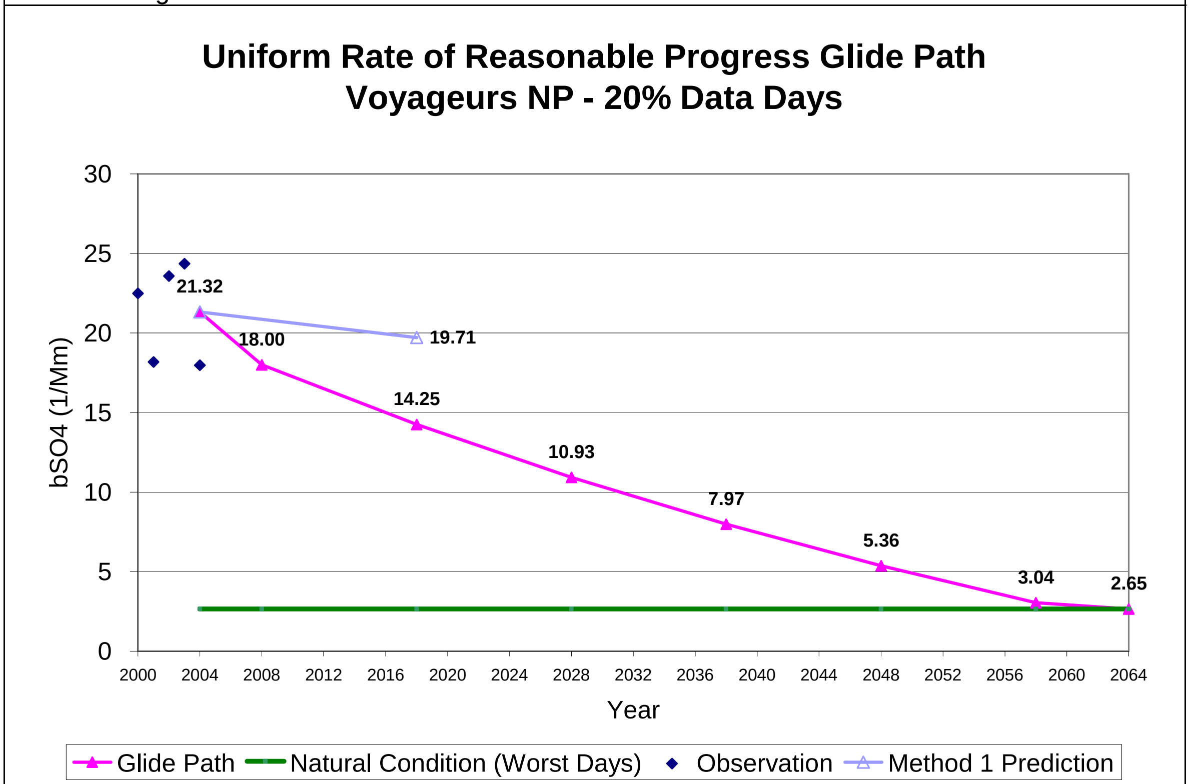


Figure F-5b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO4) in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

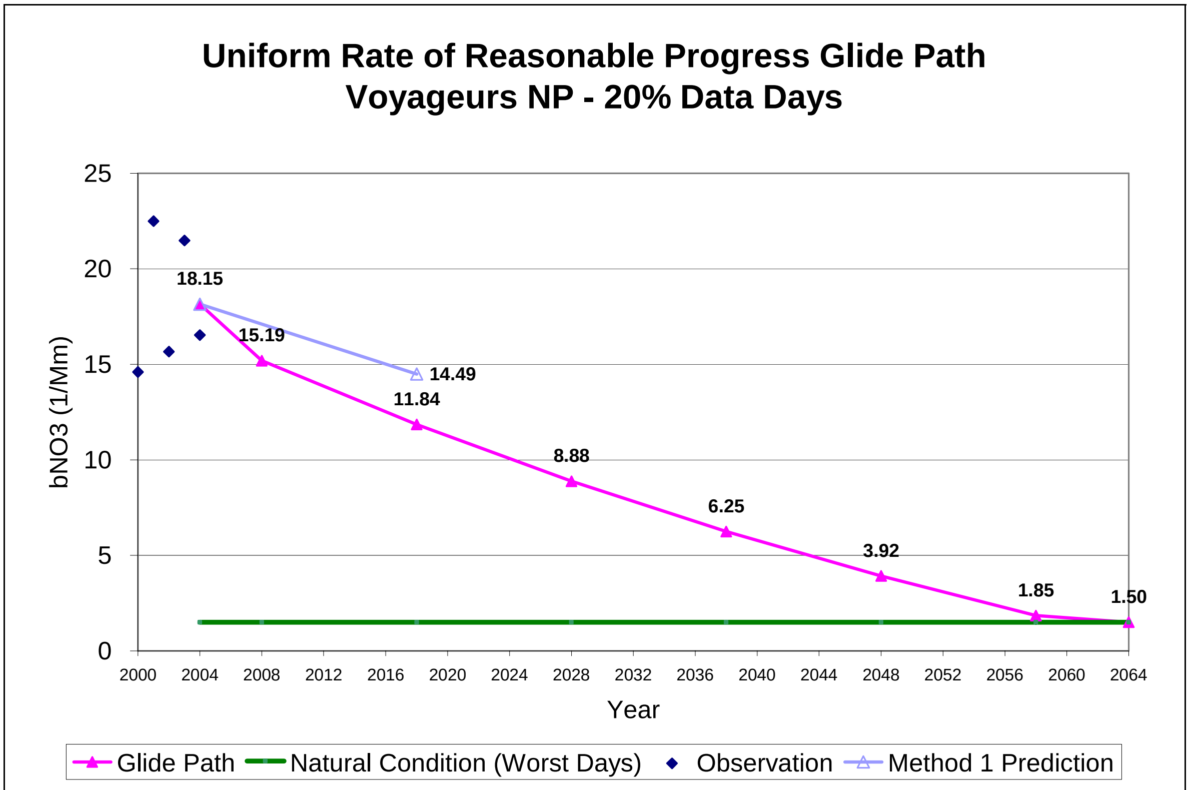


Figure F-5c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO3) in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

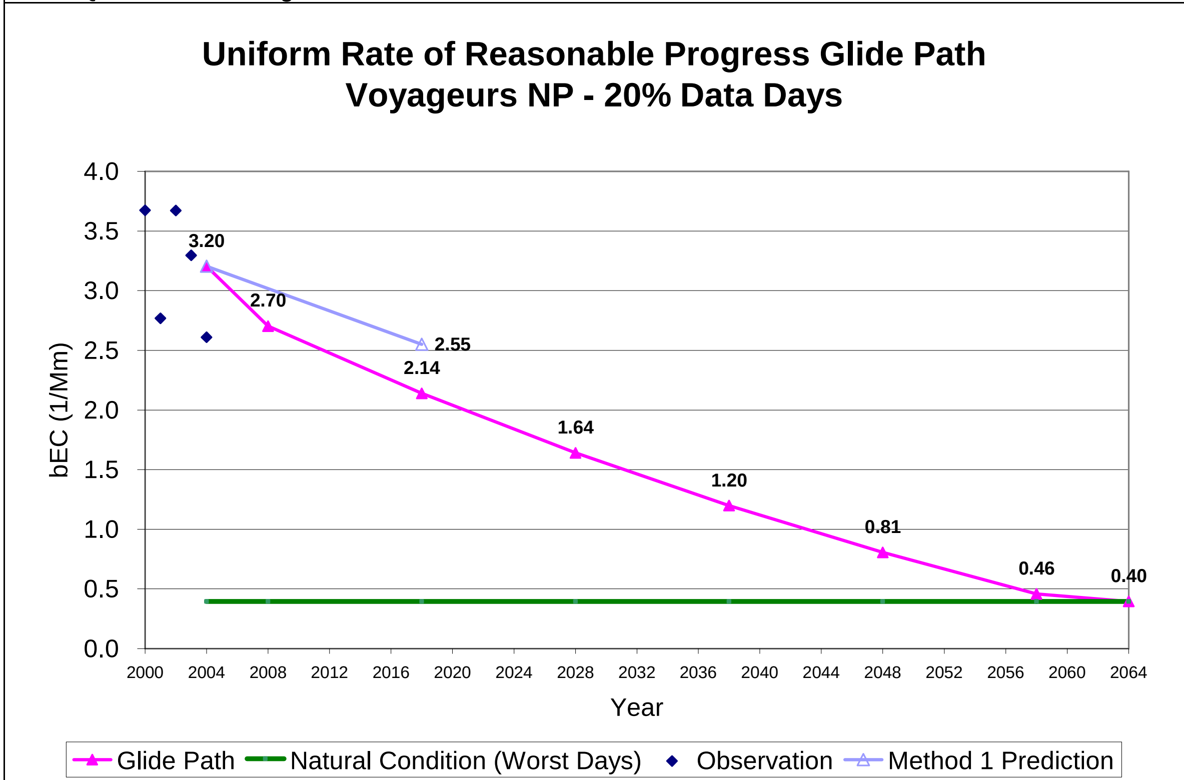


Figure F-5d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

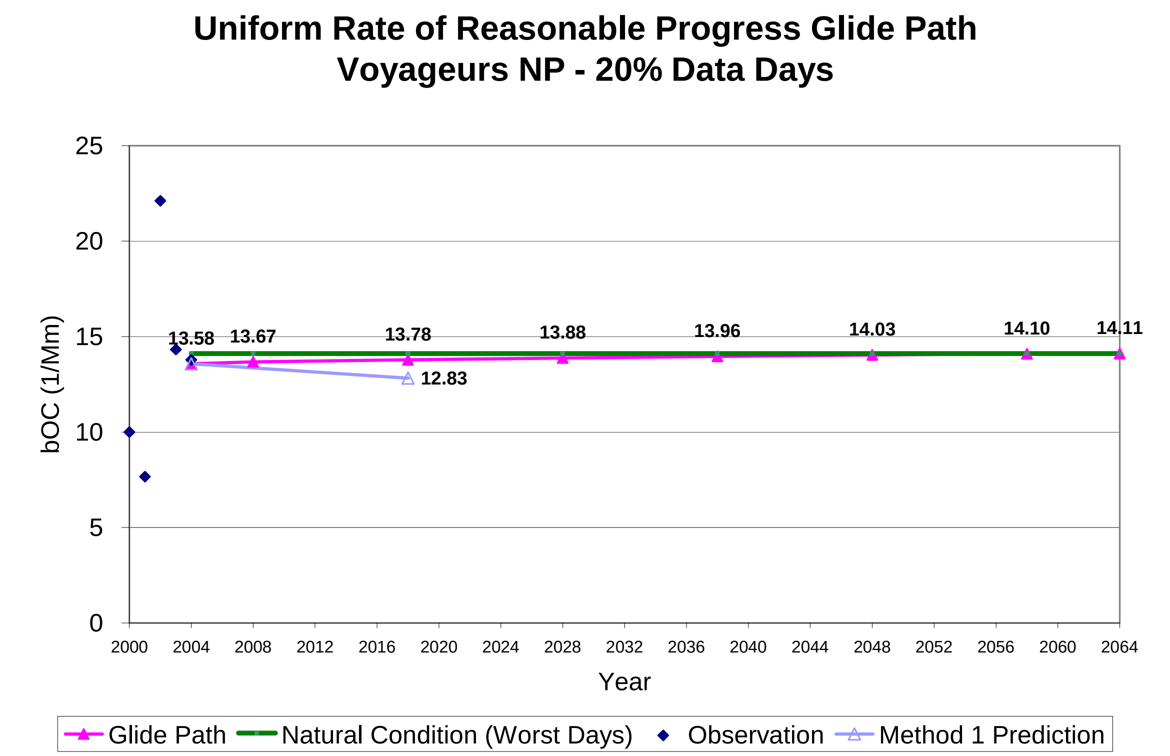


Figure F-5e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

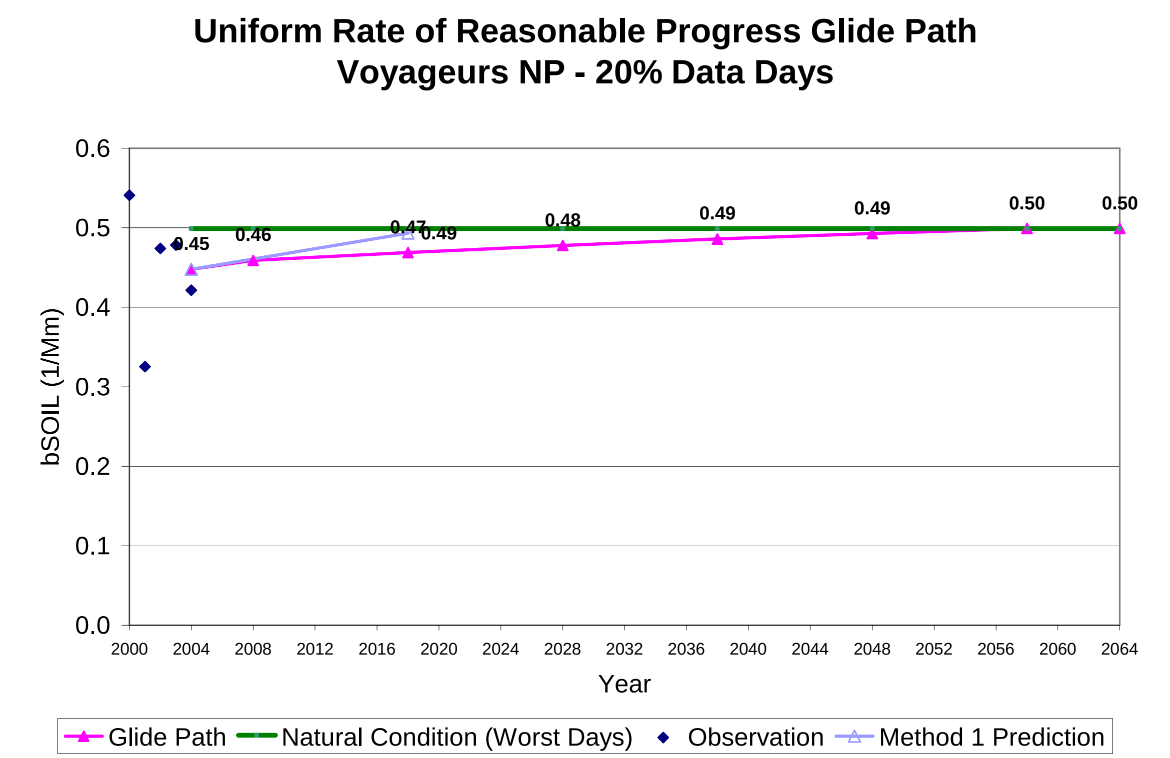


Figure F-5f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

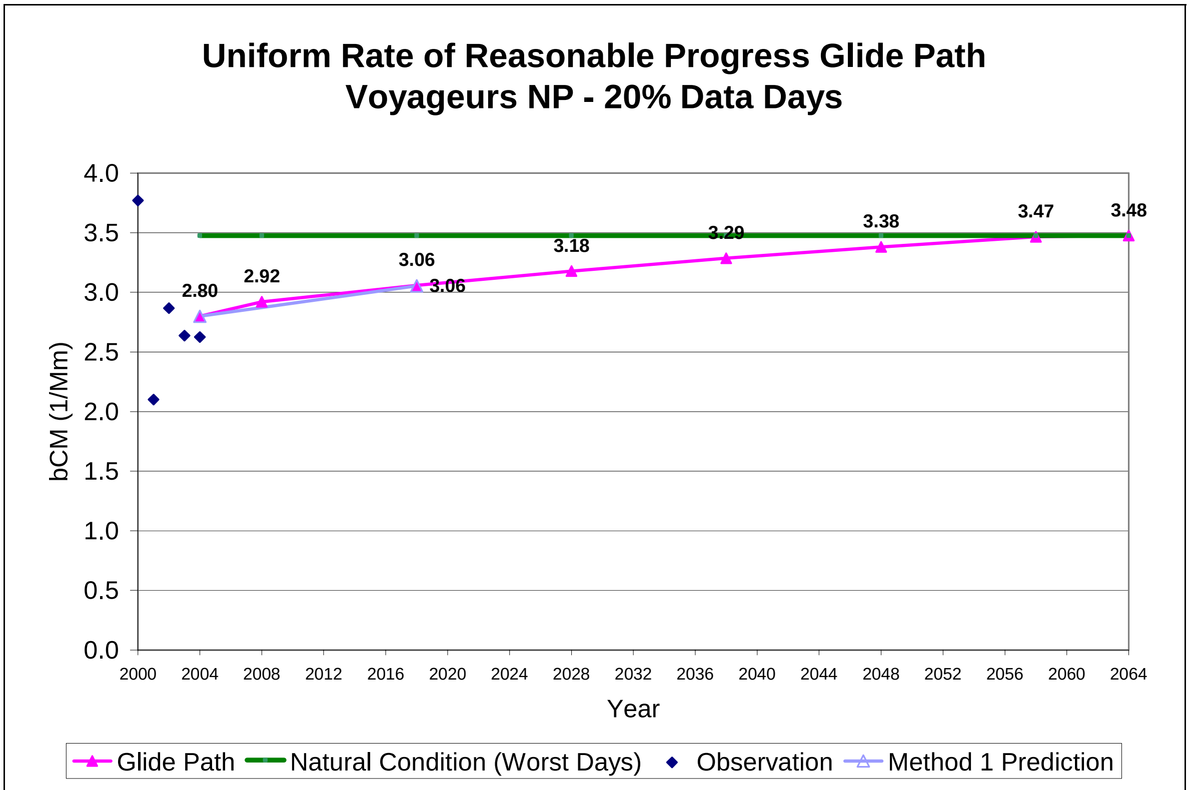


Figure F-5g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

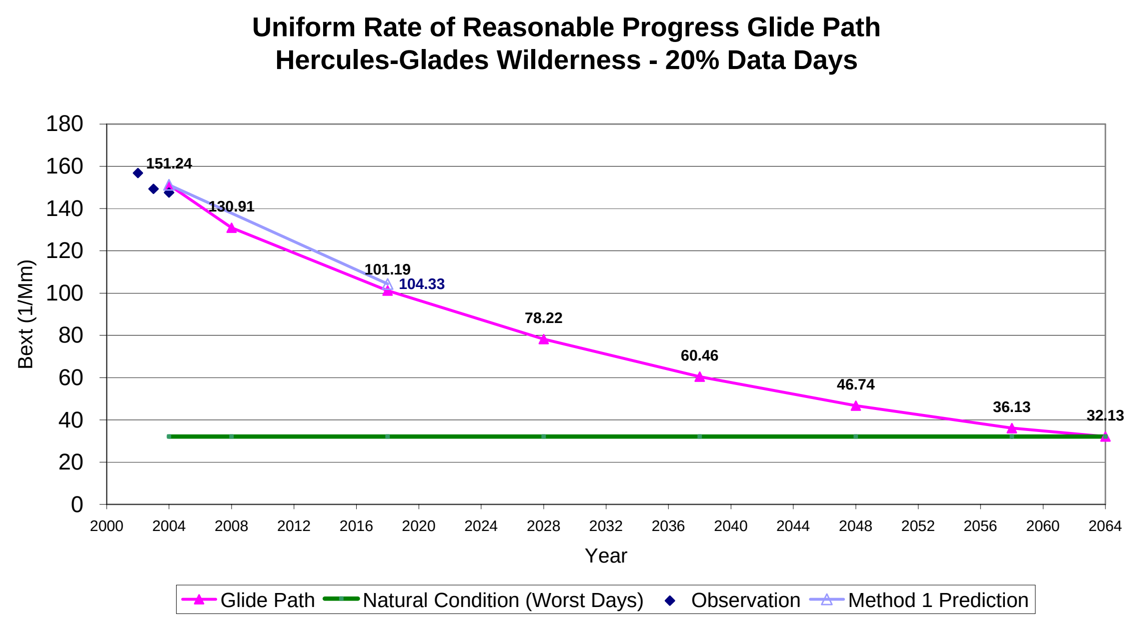


Figure F-6a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

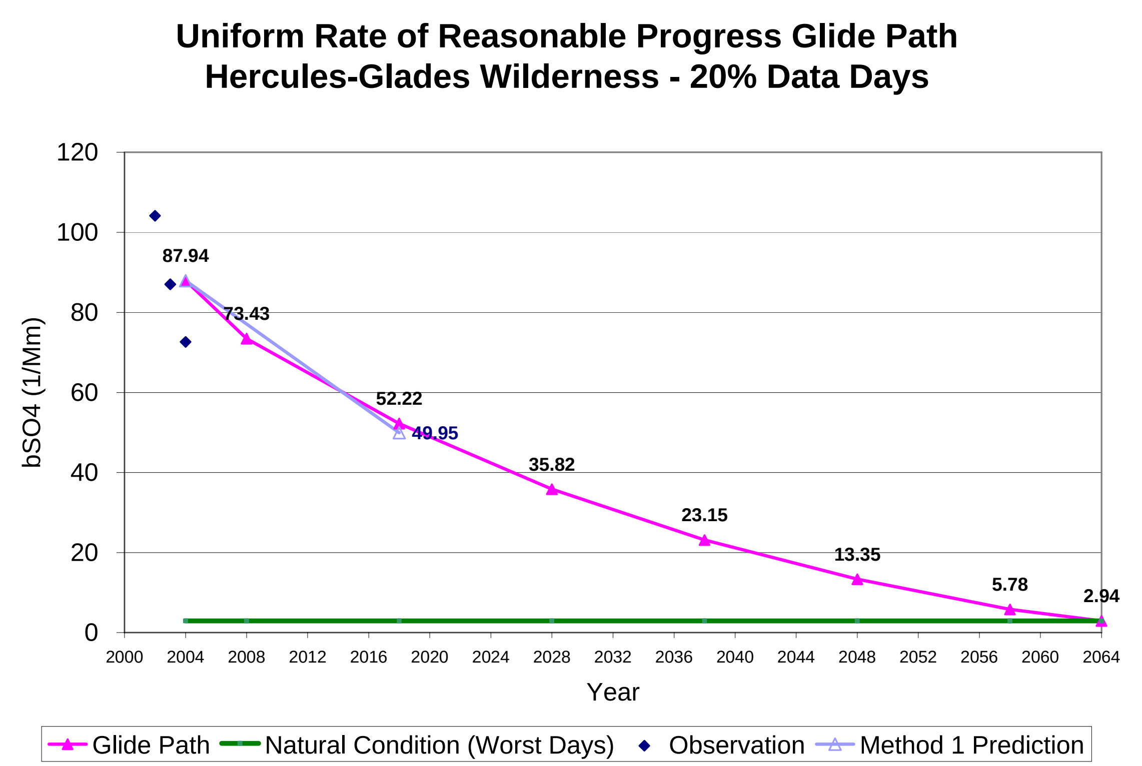


Figure F-6b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO4) in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

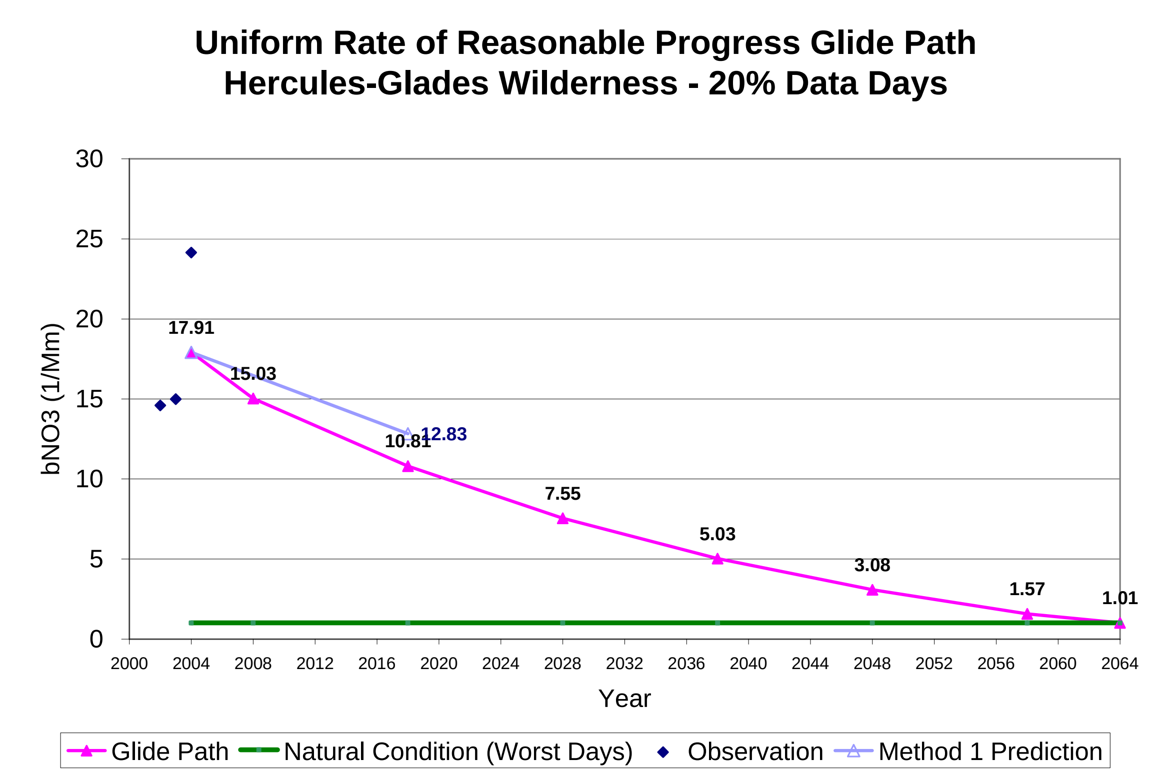


Figure F-6c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO3) in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

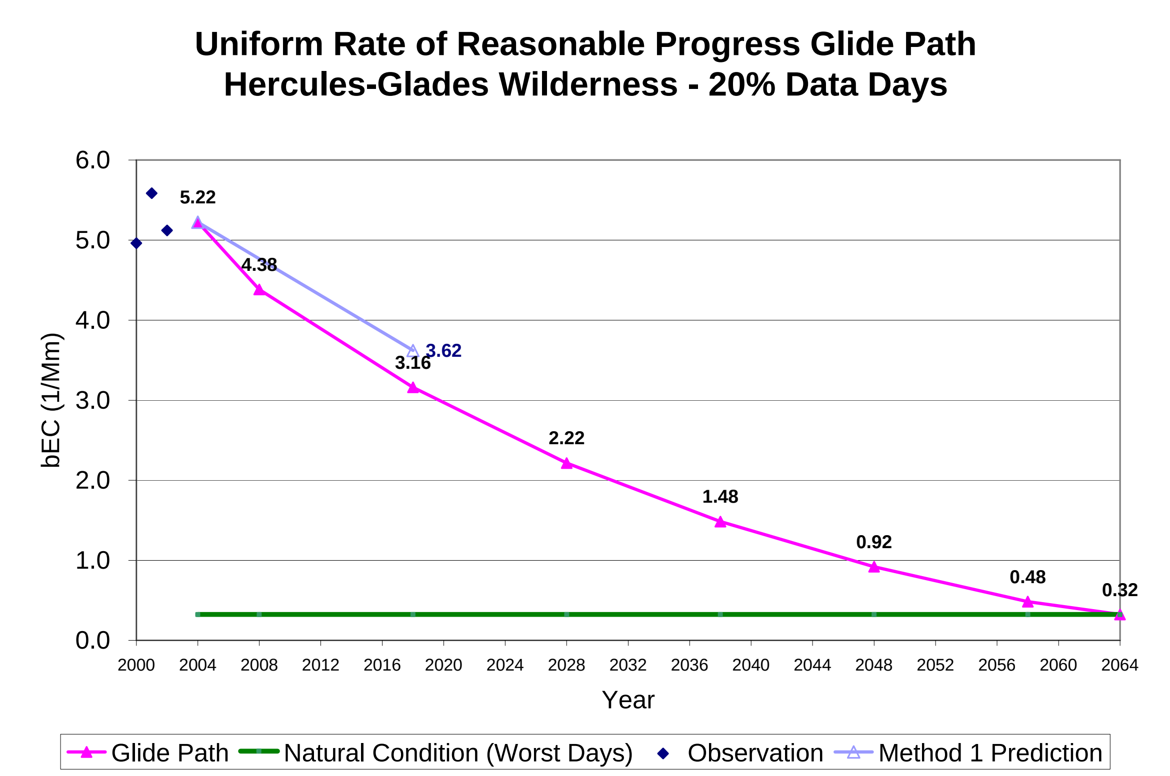


Figure F-6d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

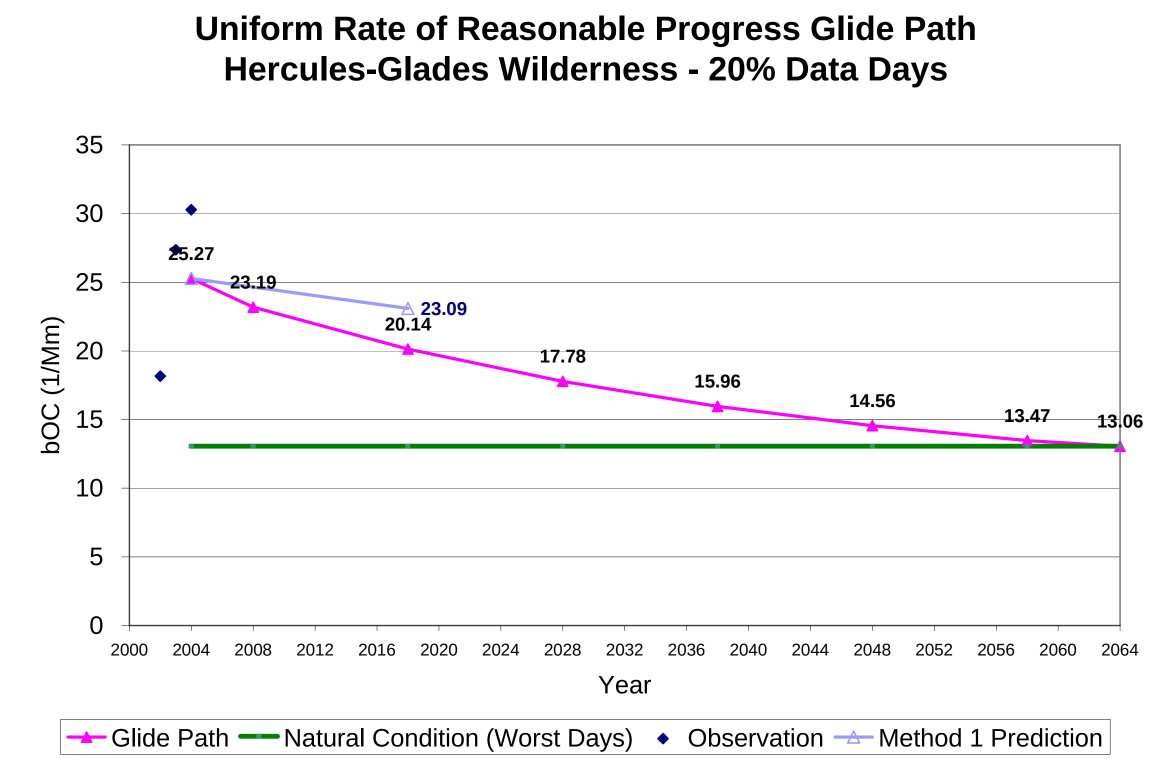


Figure F-6e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

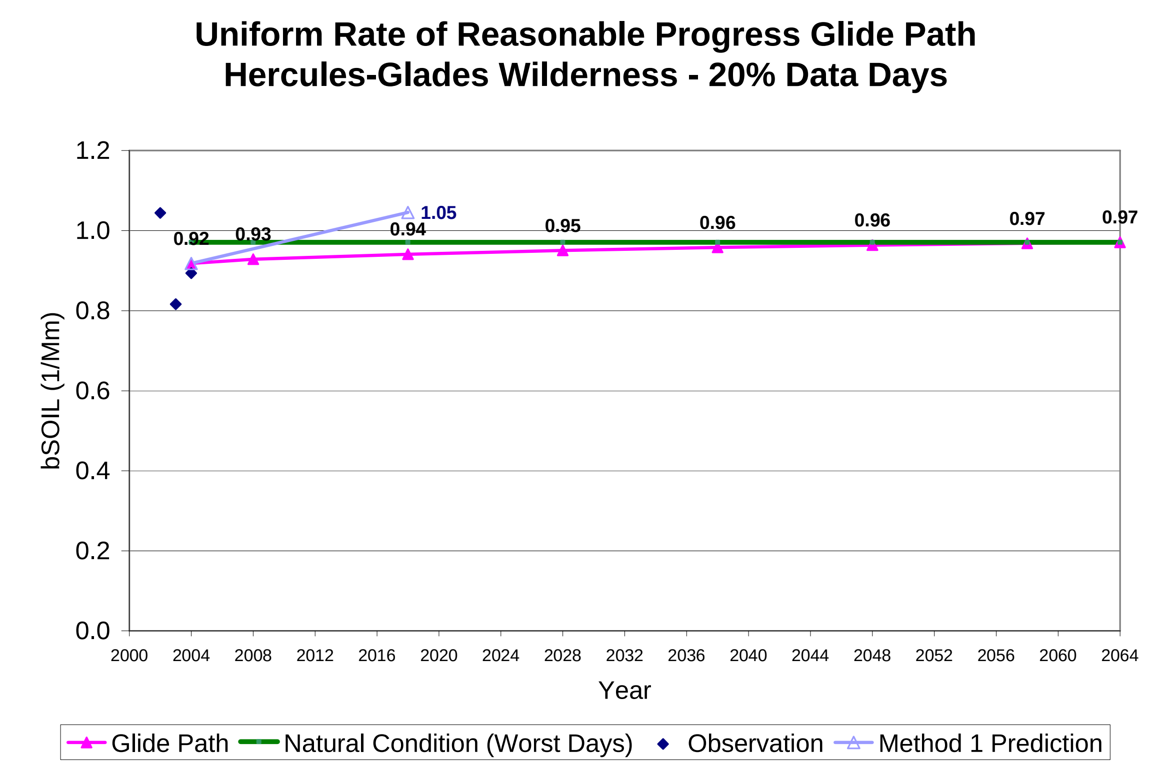


Figure F-6f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

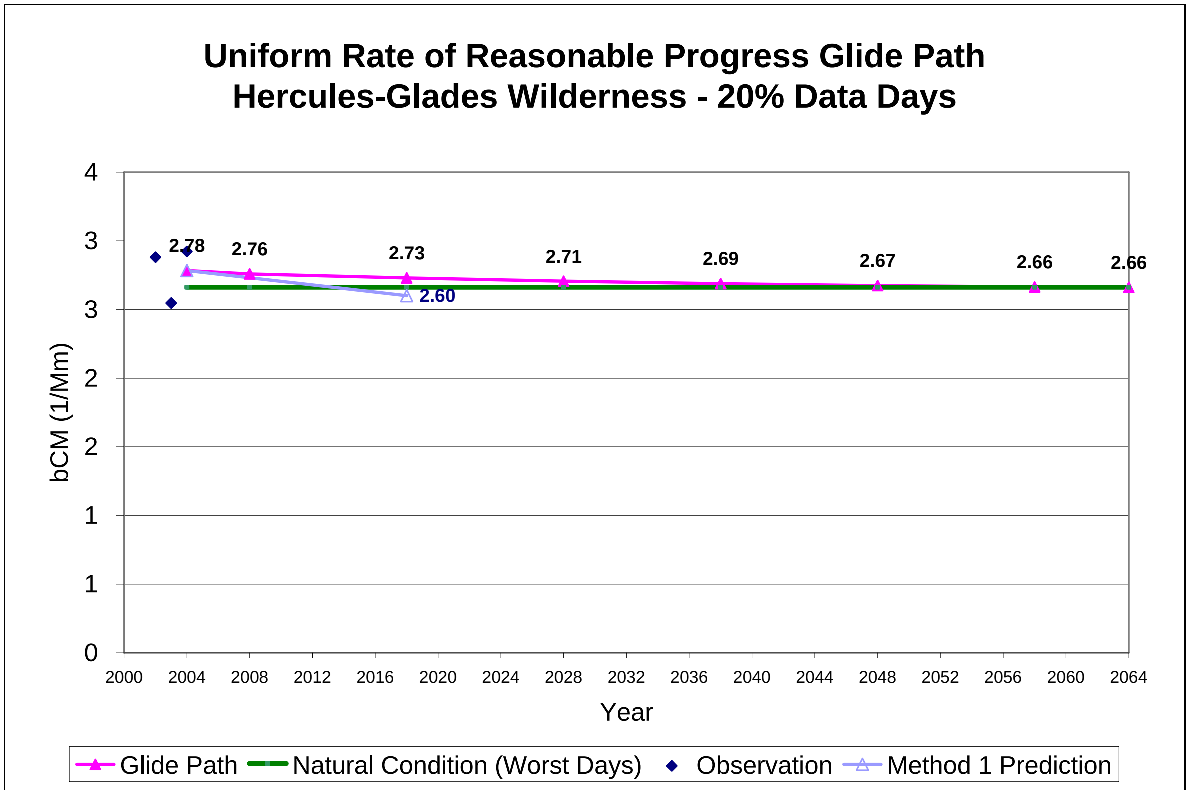


Figure F-6g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

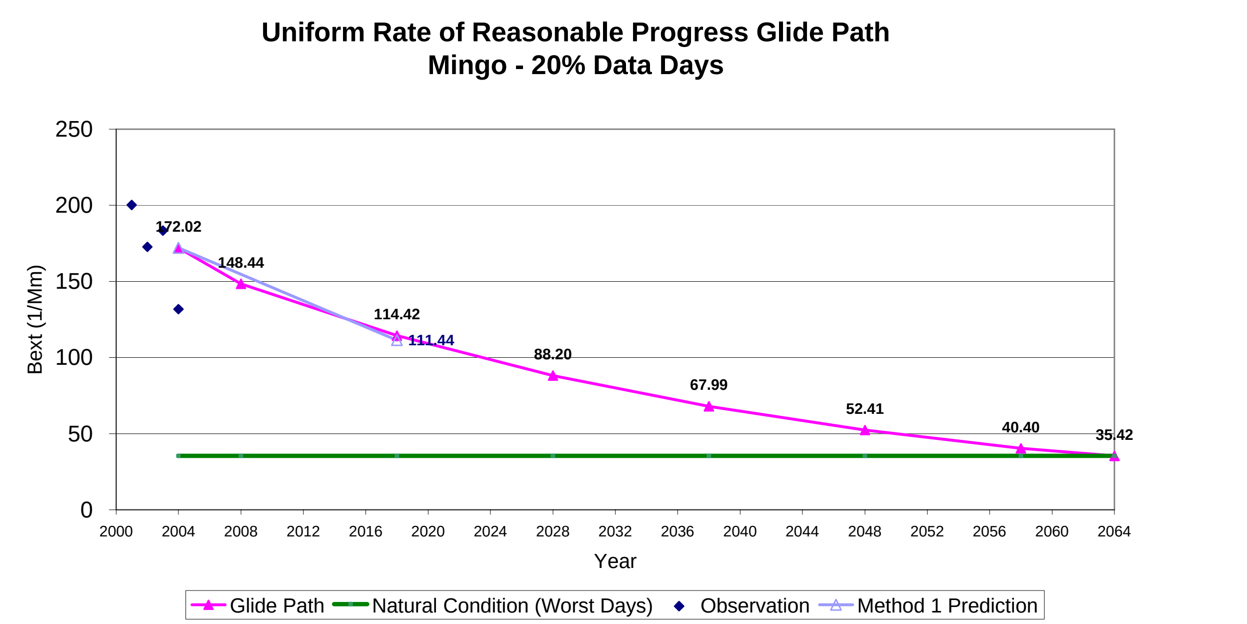


Figure F-7a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

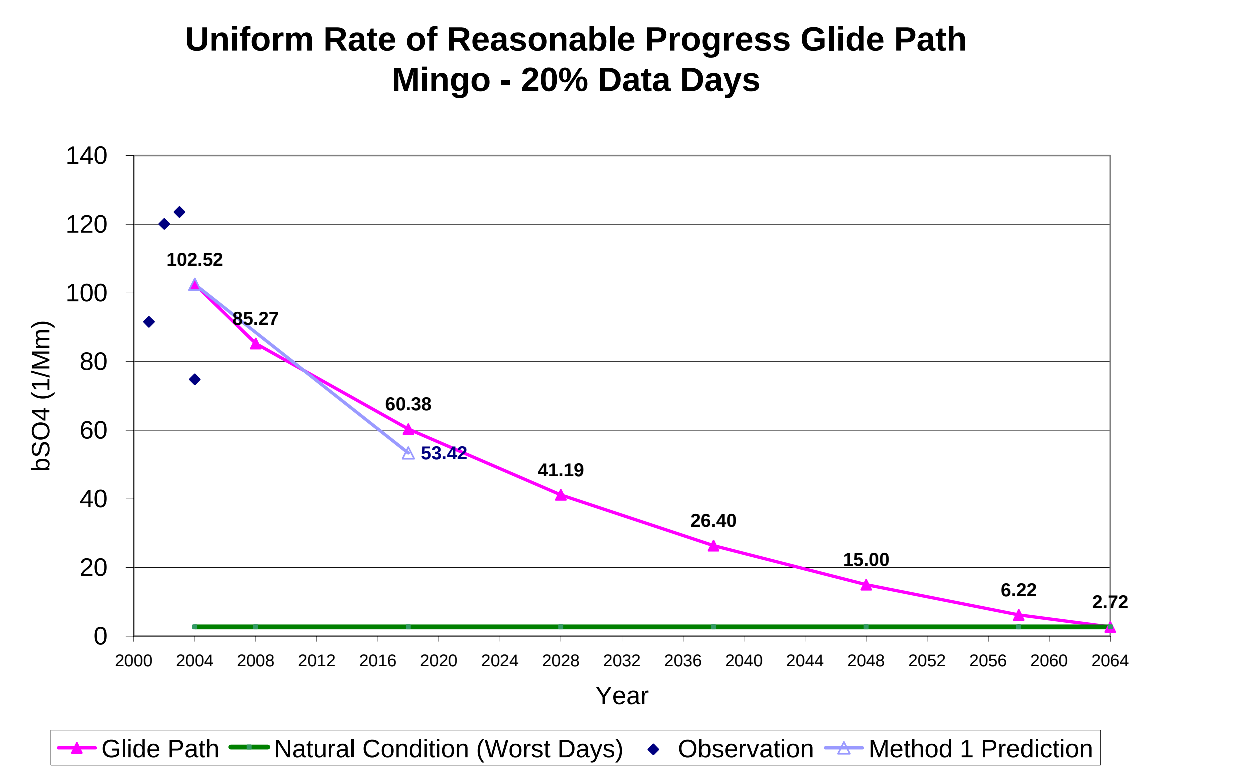


Figure F-7b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO4) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

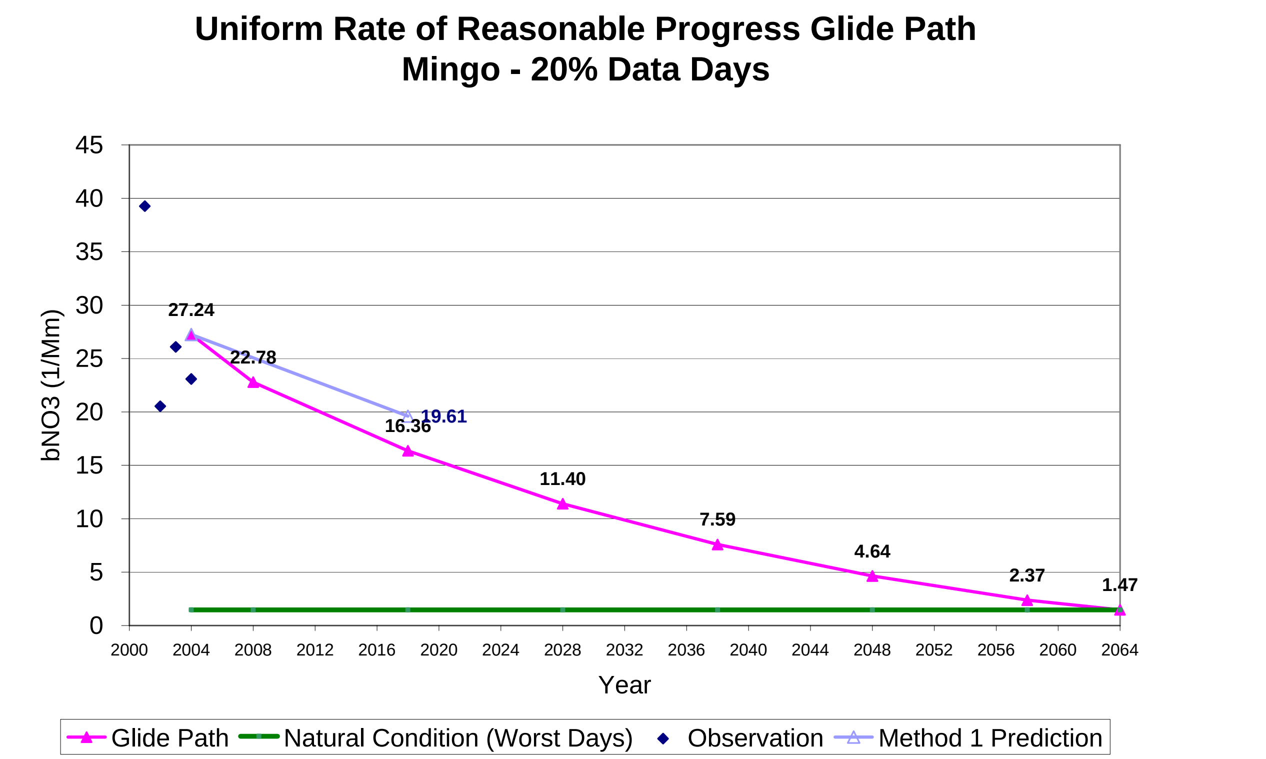


Figure F-7c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO3) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

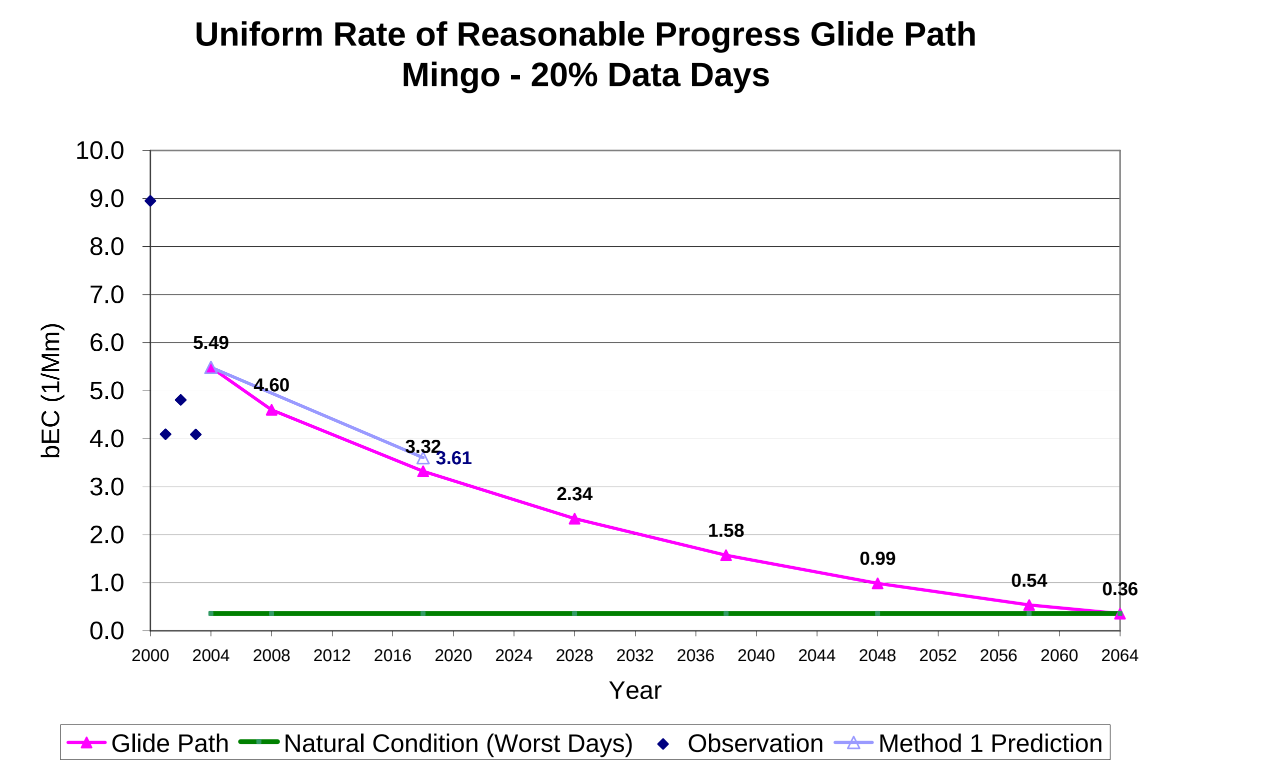


Figure F-7d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

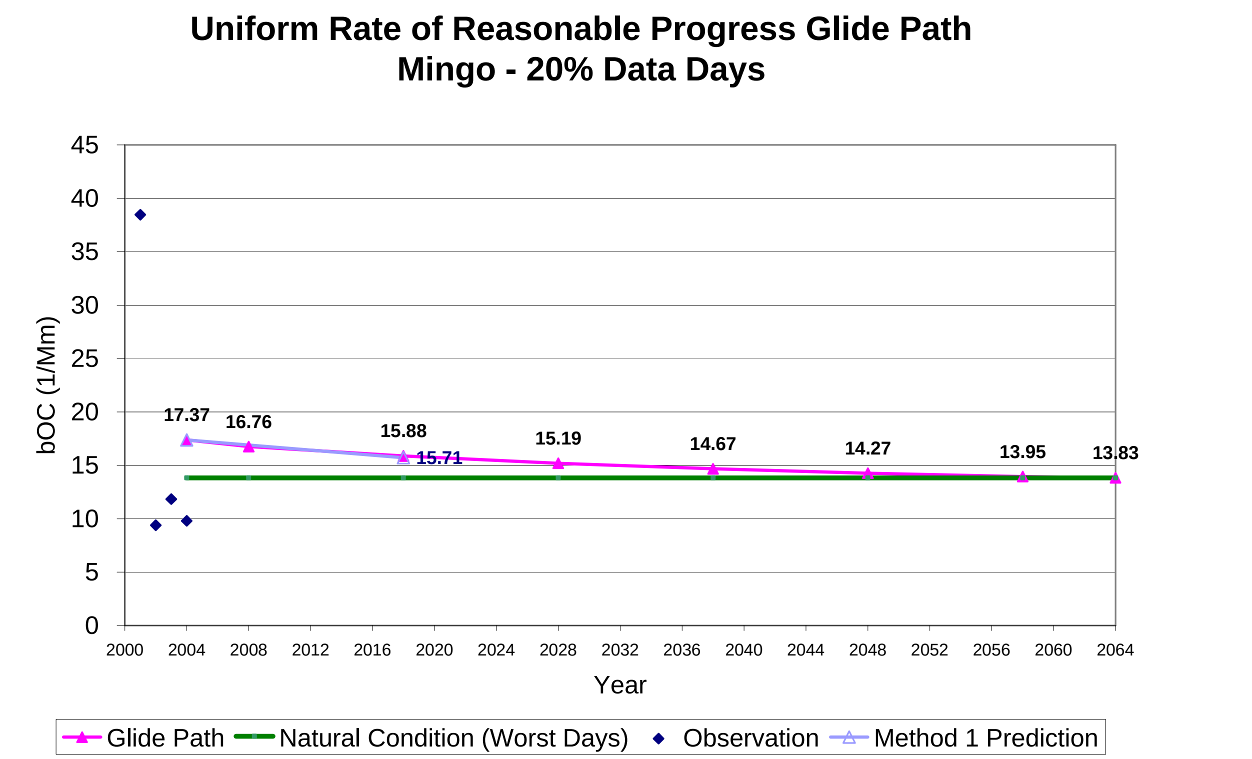


Figure F-7e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

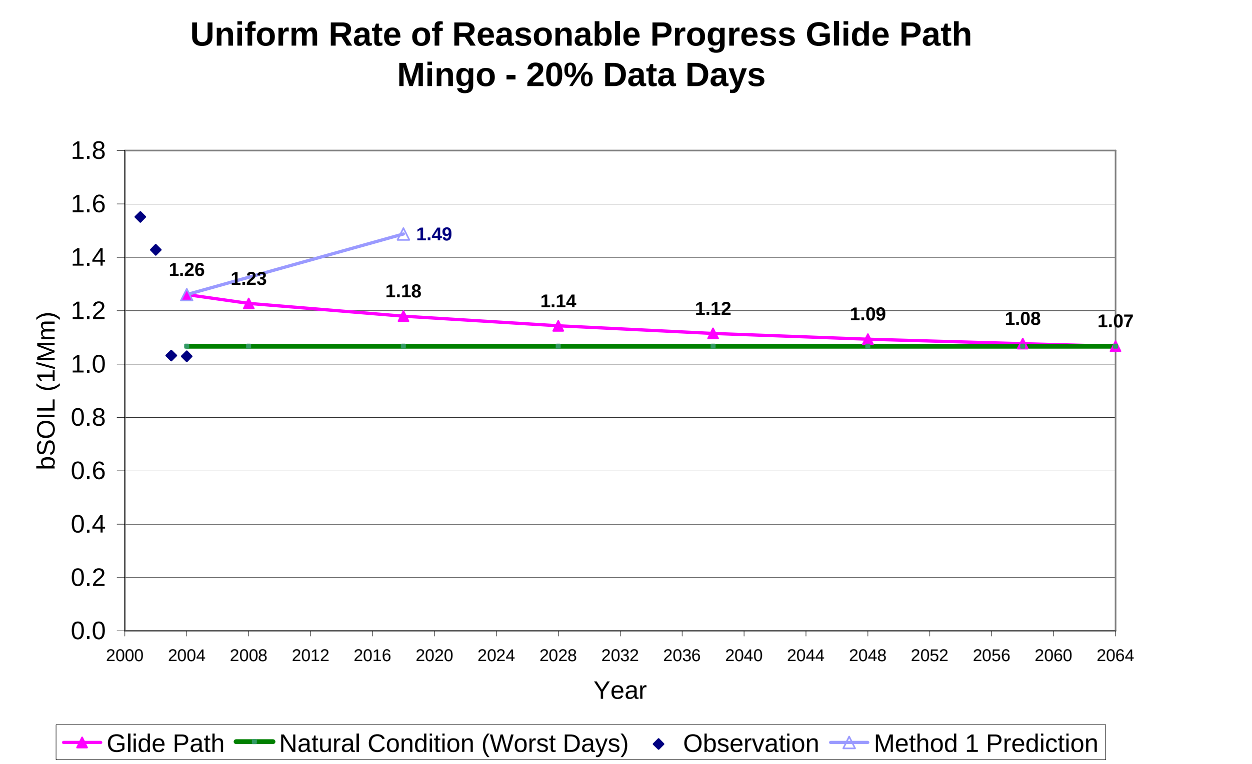


Figure F-7f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

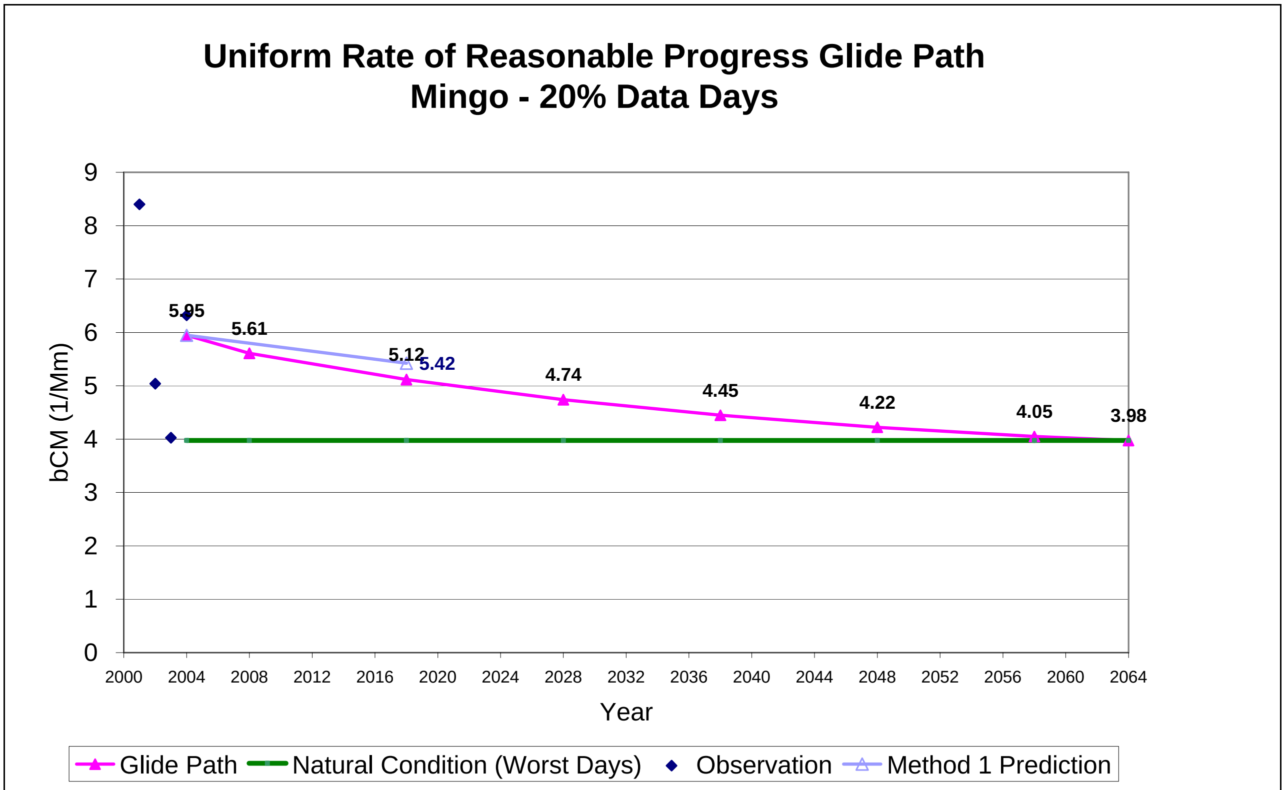


Figure F-7g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

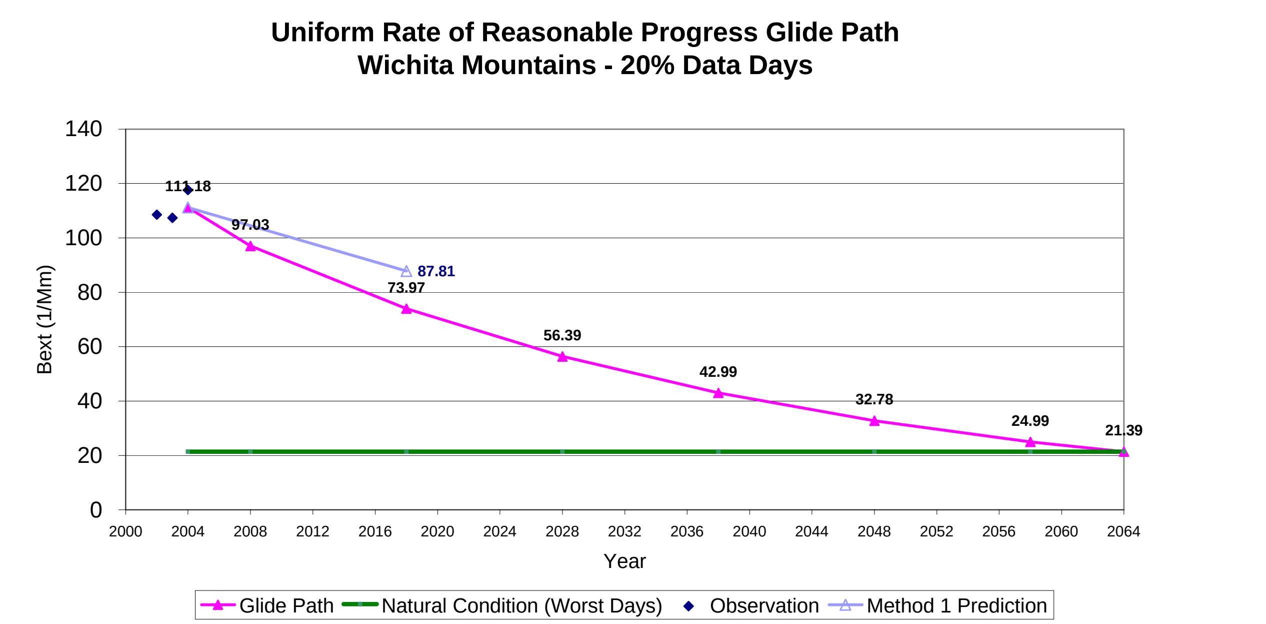


Figure F-8a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

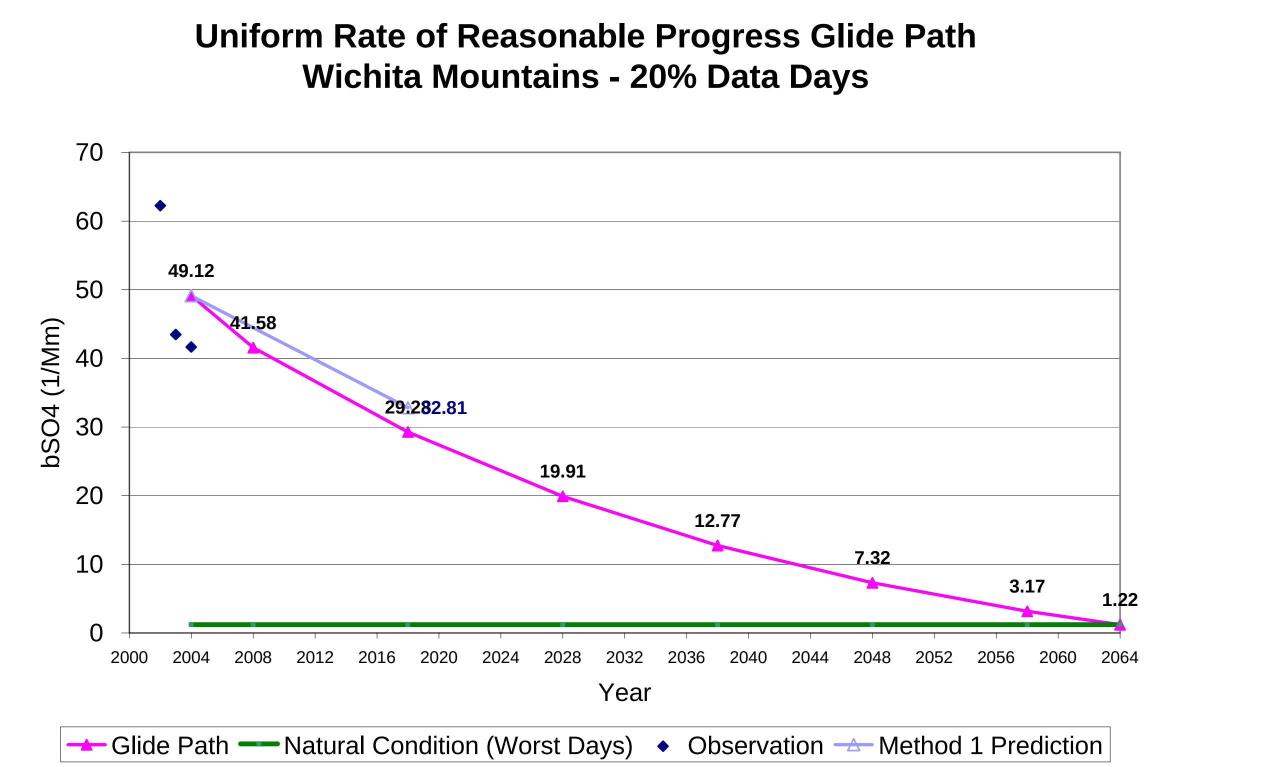


Figure F-8b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO4) in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

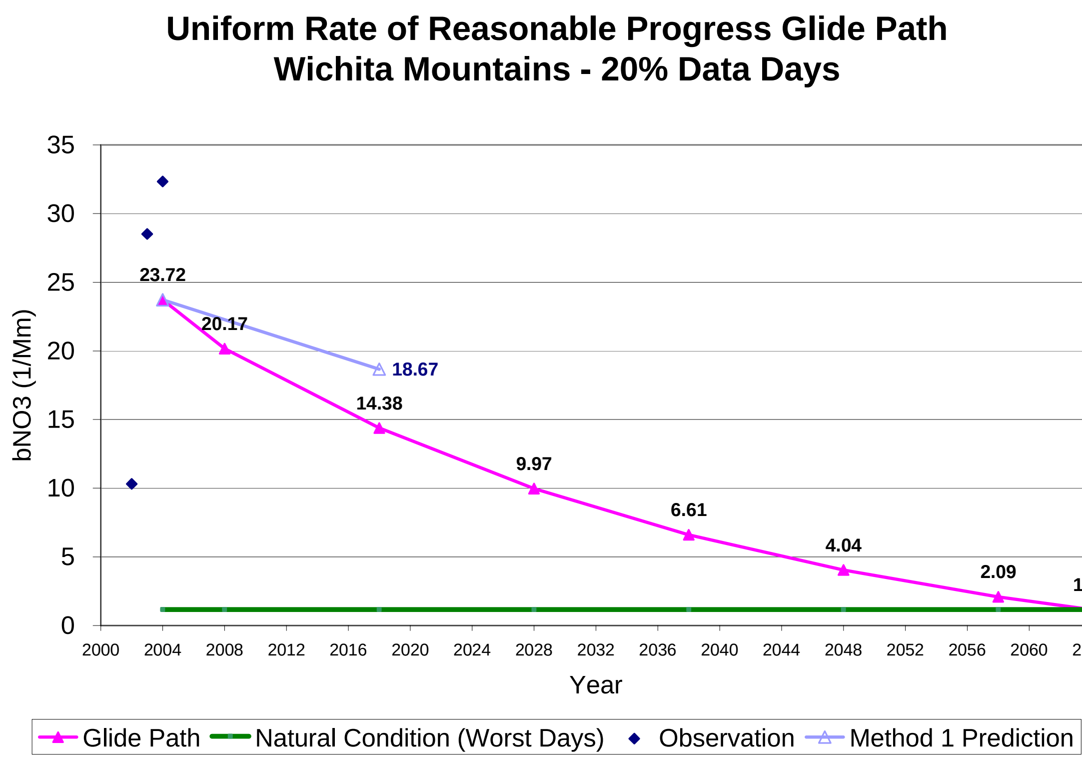


Figure F-8c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO3) in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

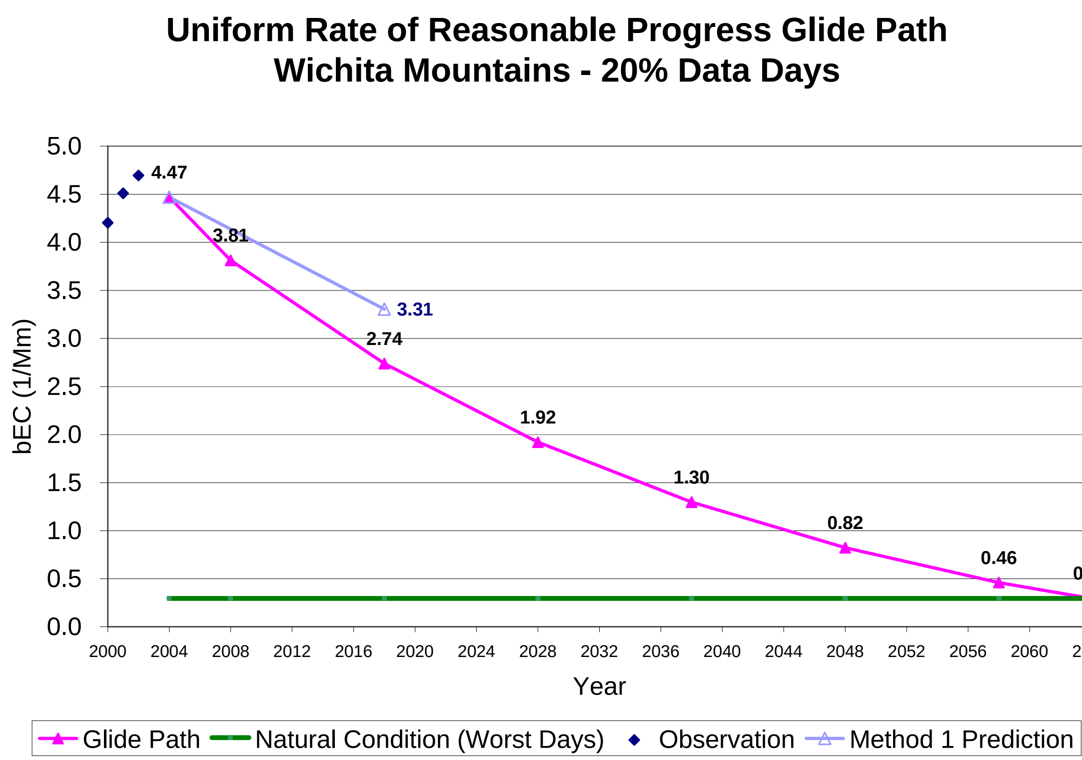


Figure F-8d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

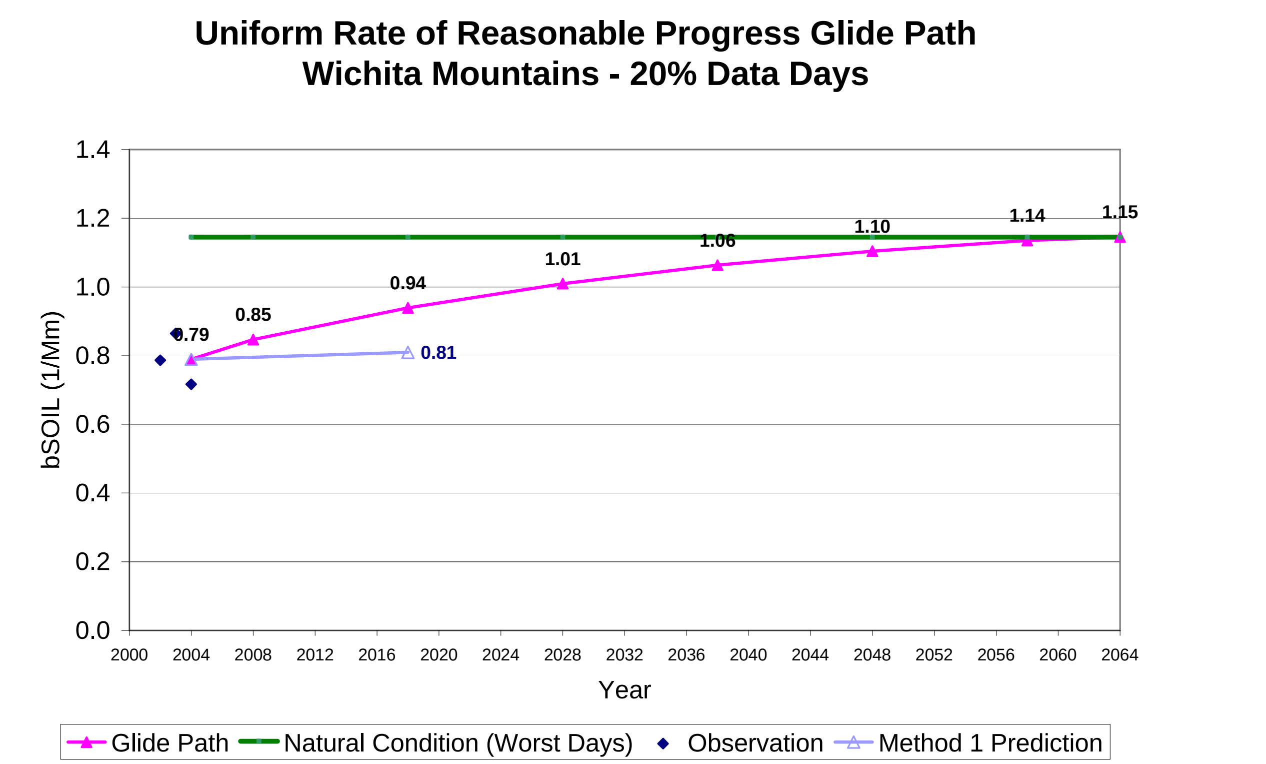


Figure F-8e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

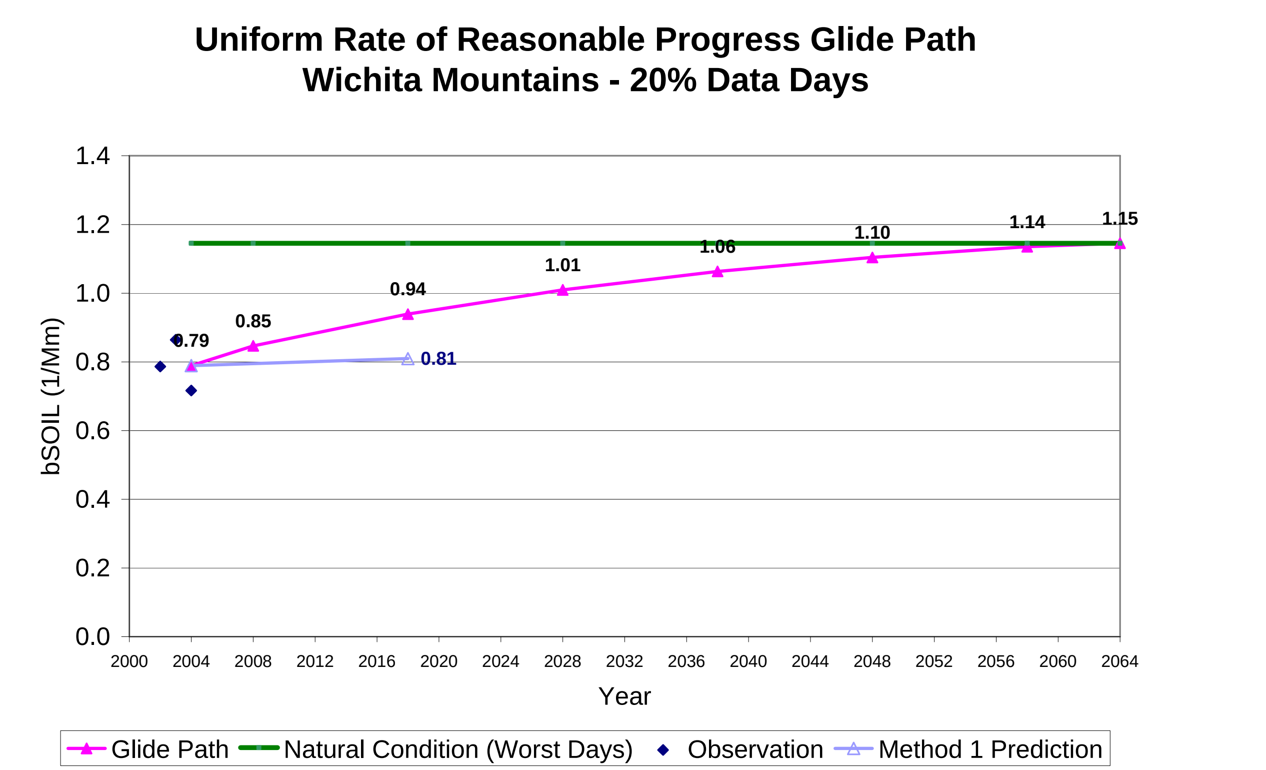


Figure F-8f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

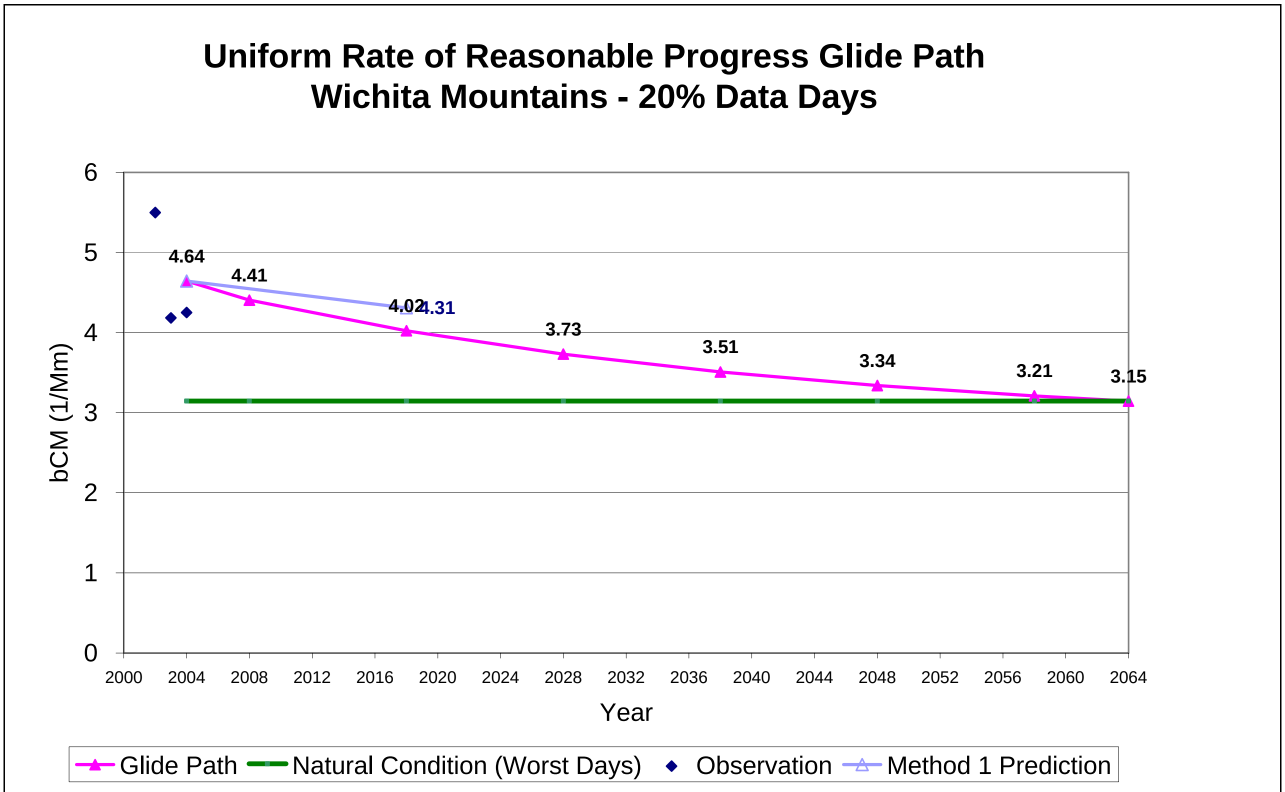


Figure F-8g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

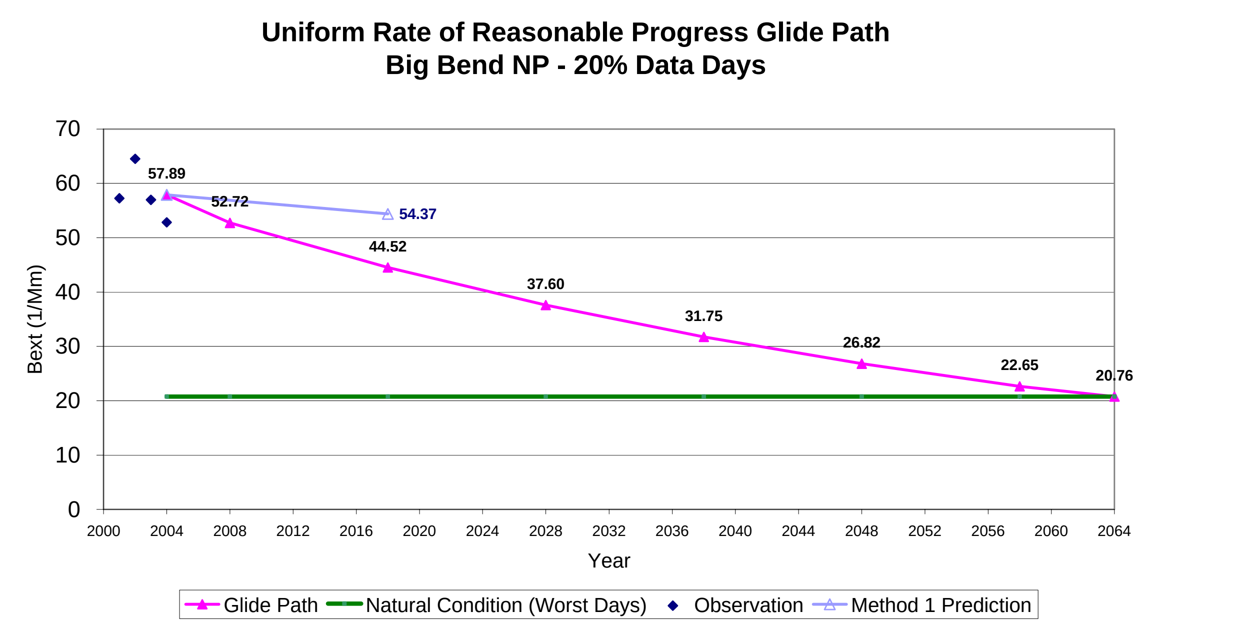


Figure F-9a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

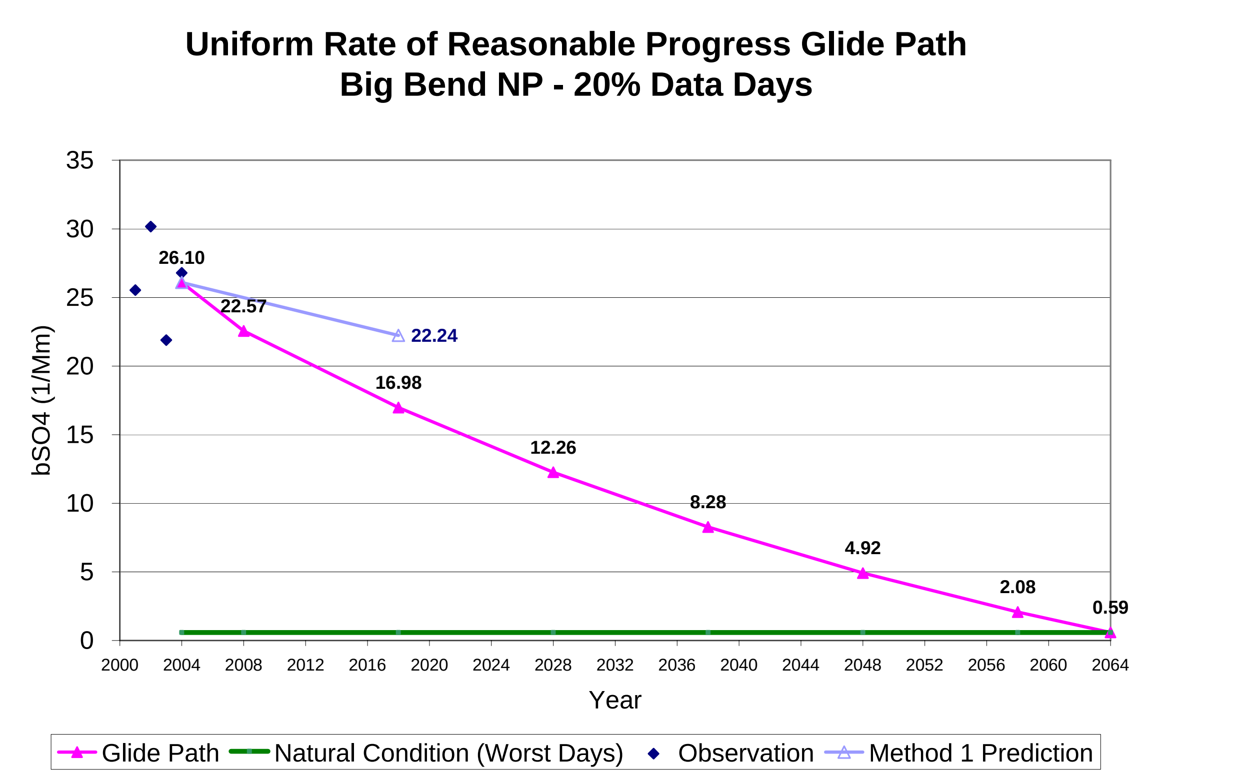


Figure F-9b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO4) in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

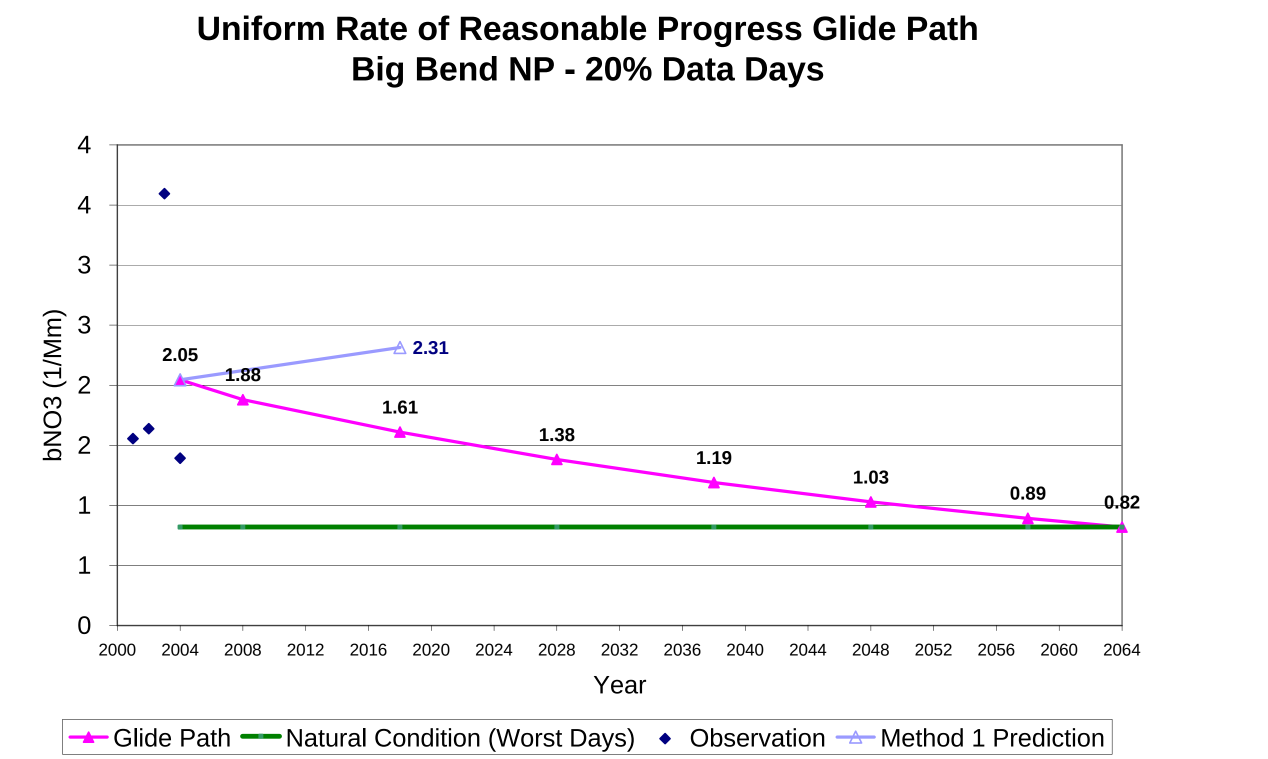


Figure F-9c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO3) in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

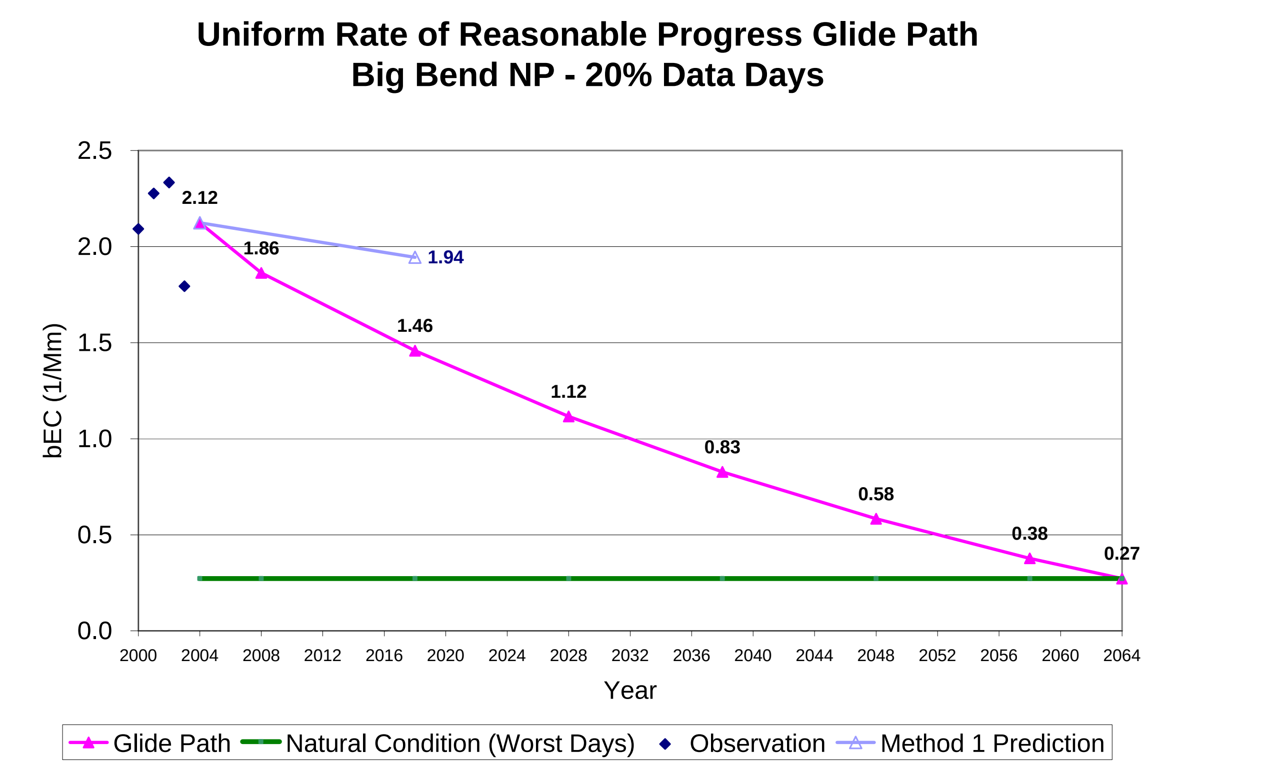


Figure F-9d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

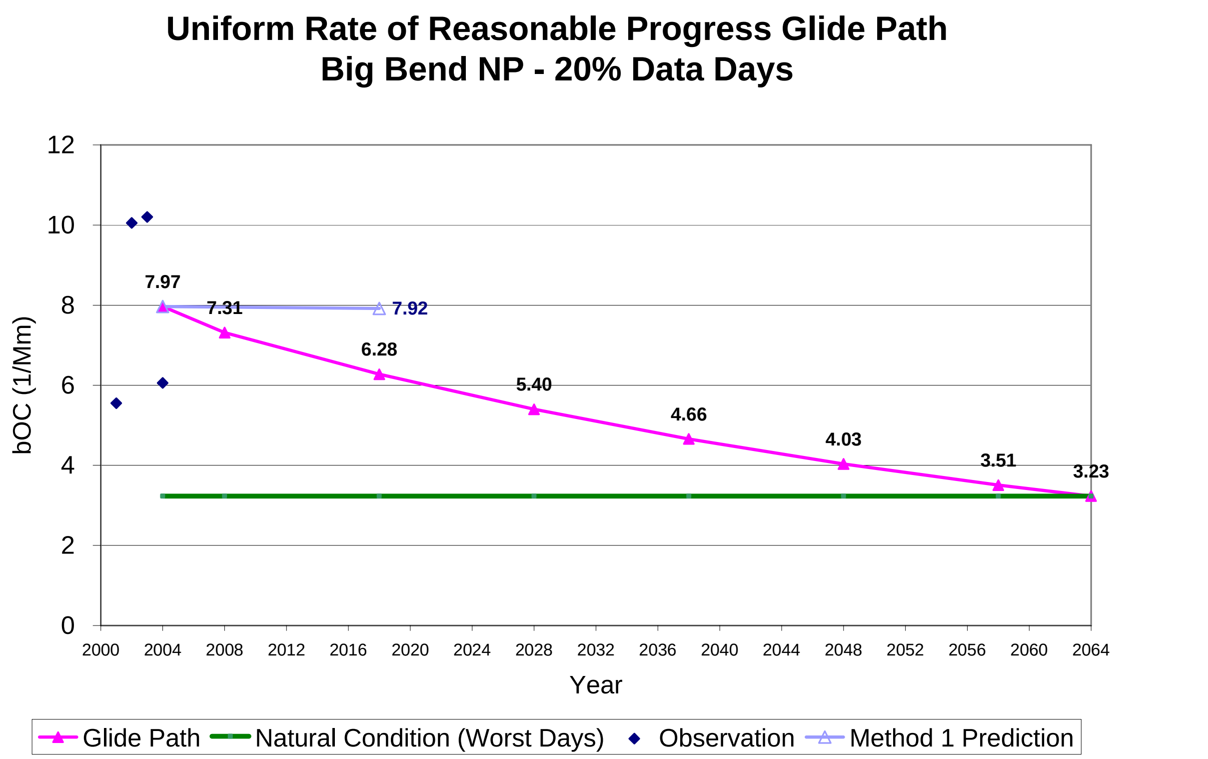


Figure F-9e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

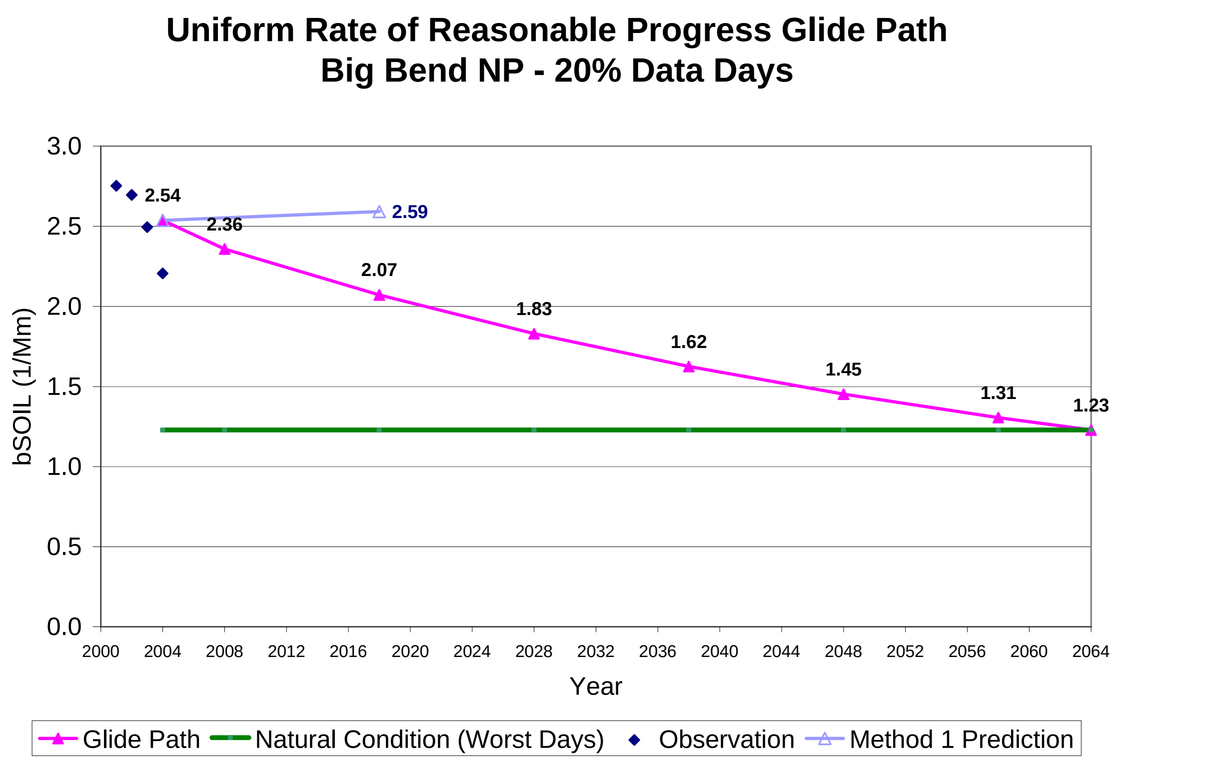


Figure F-9f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

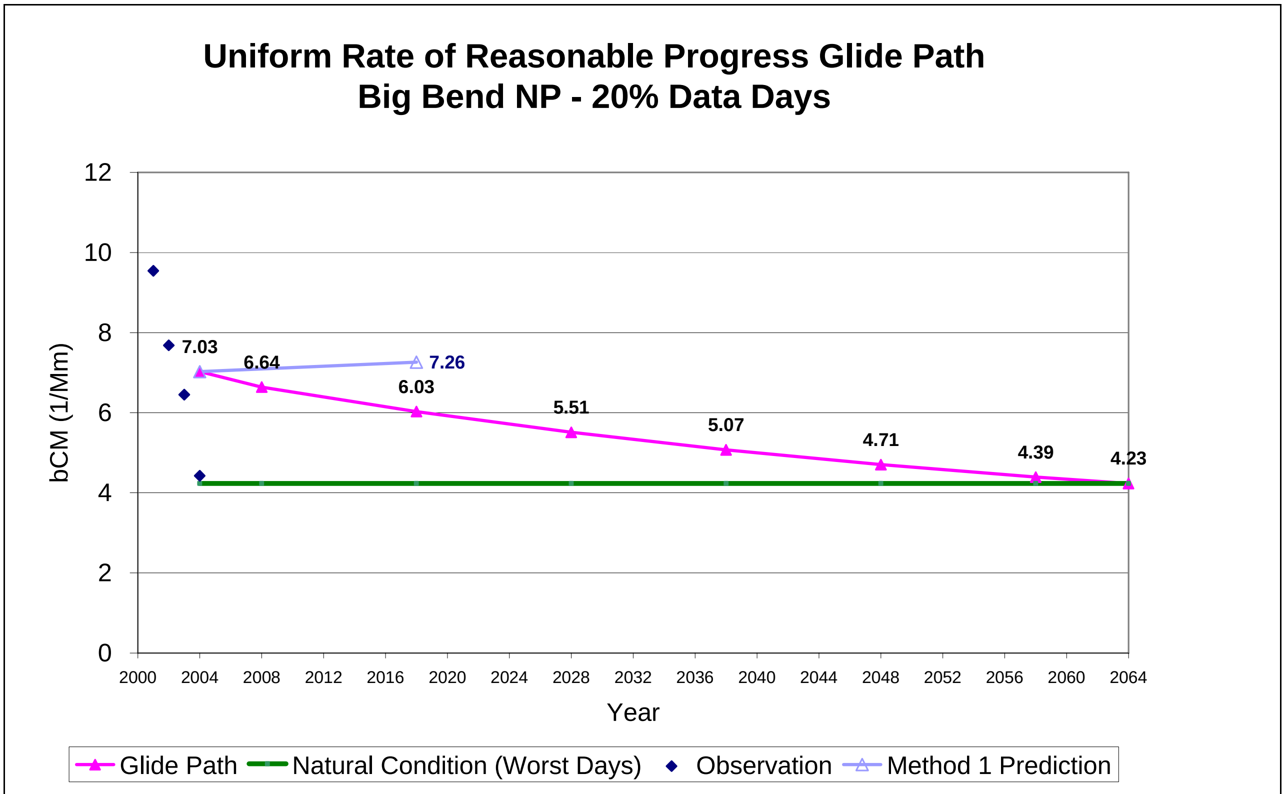


Figure F-9g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

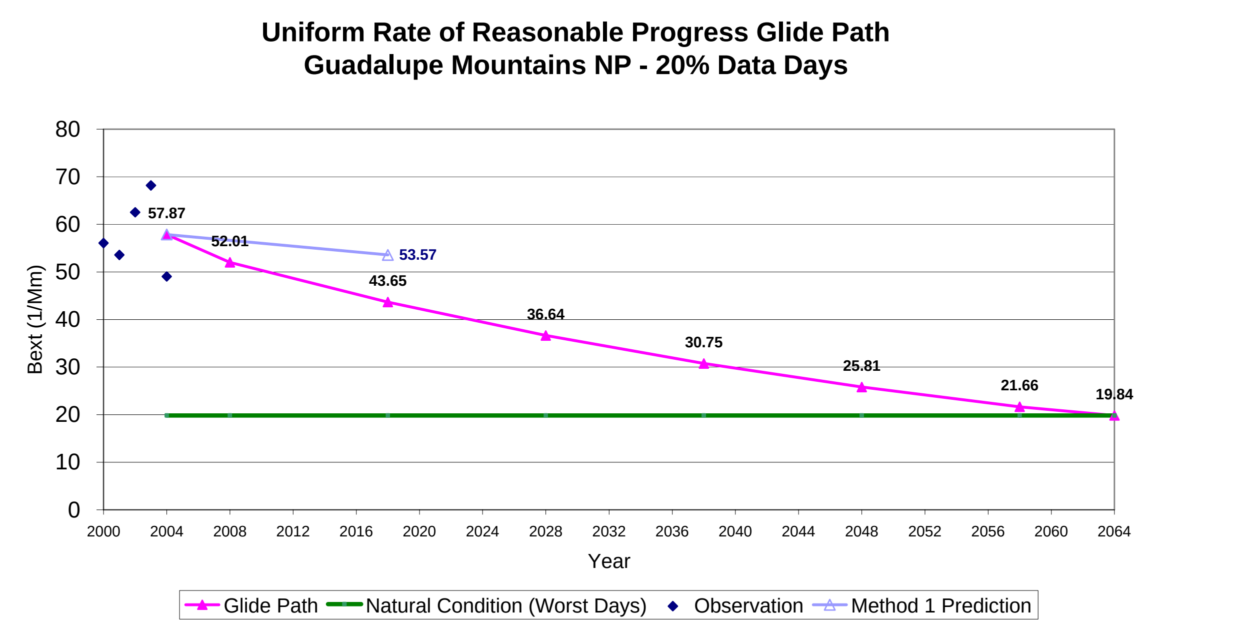


Figure F-10a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

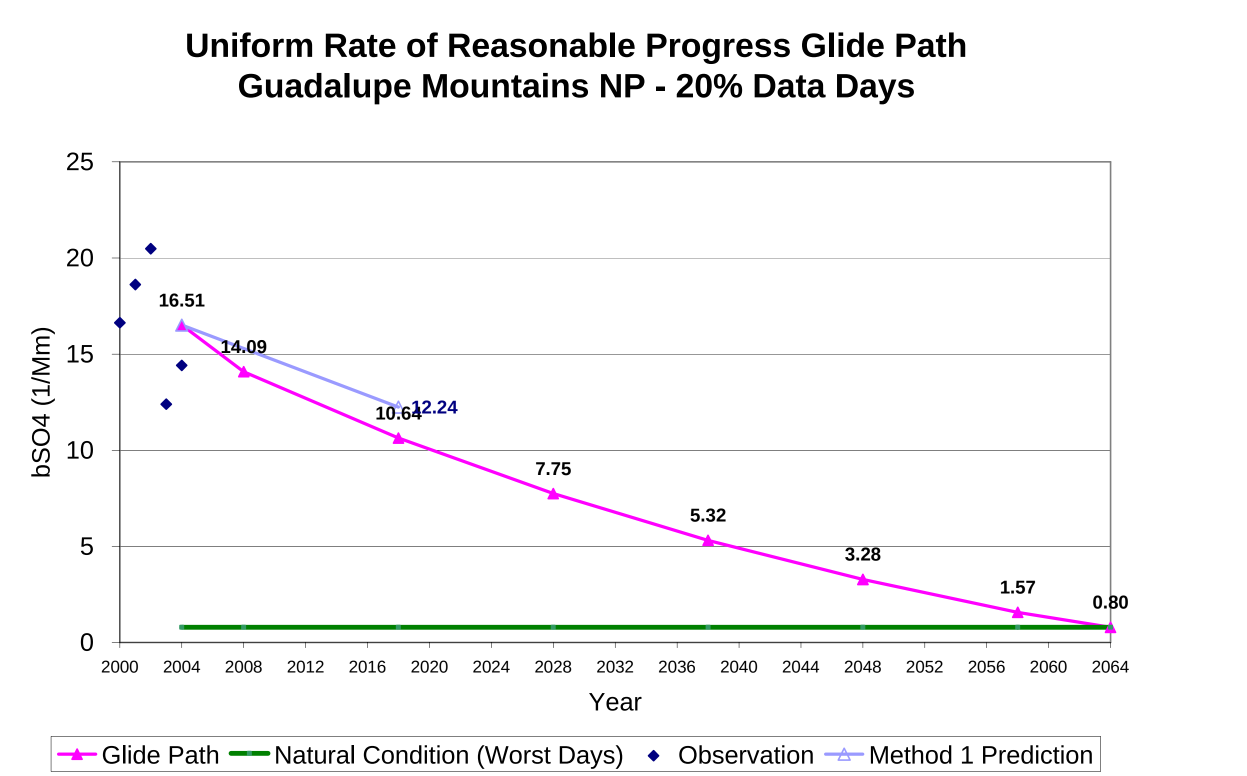


Figure F-10b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO4) in extinction (Mm^{-1}) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

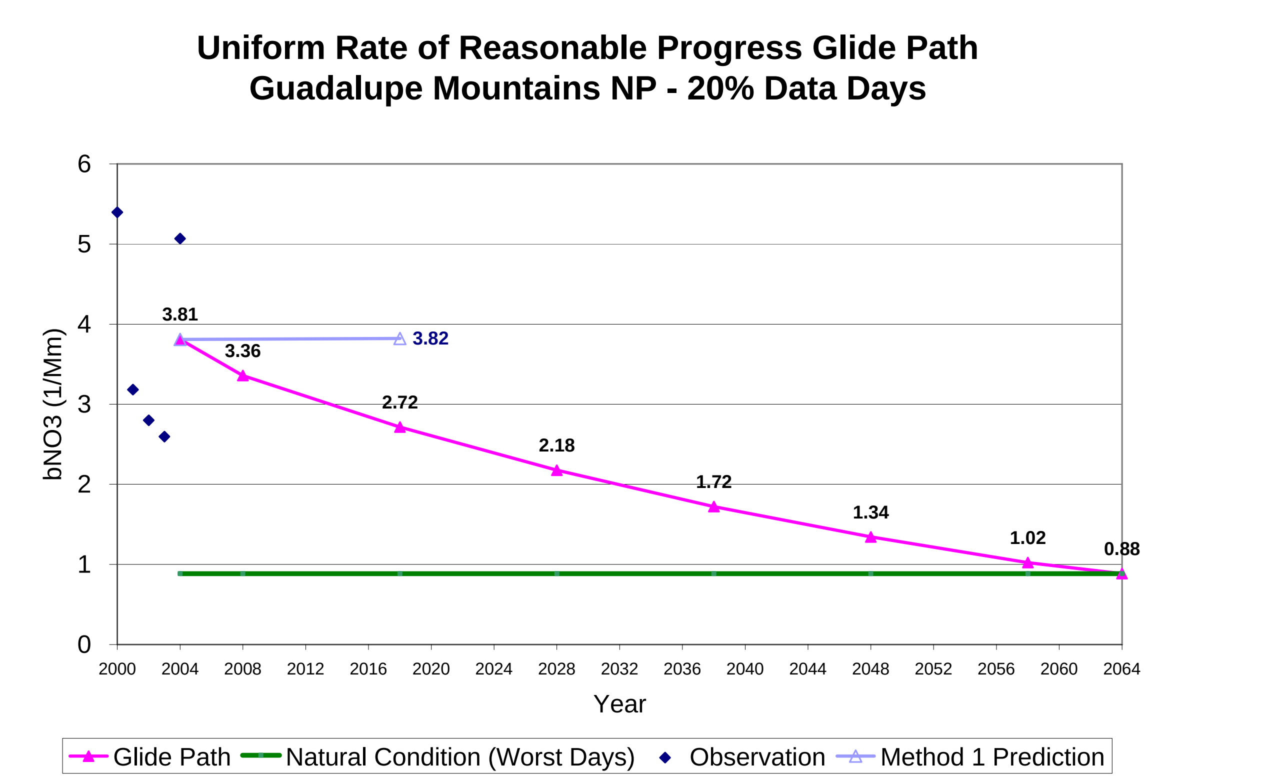


Figure F-10c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO3) in extinction (Mm^{-1}) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

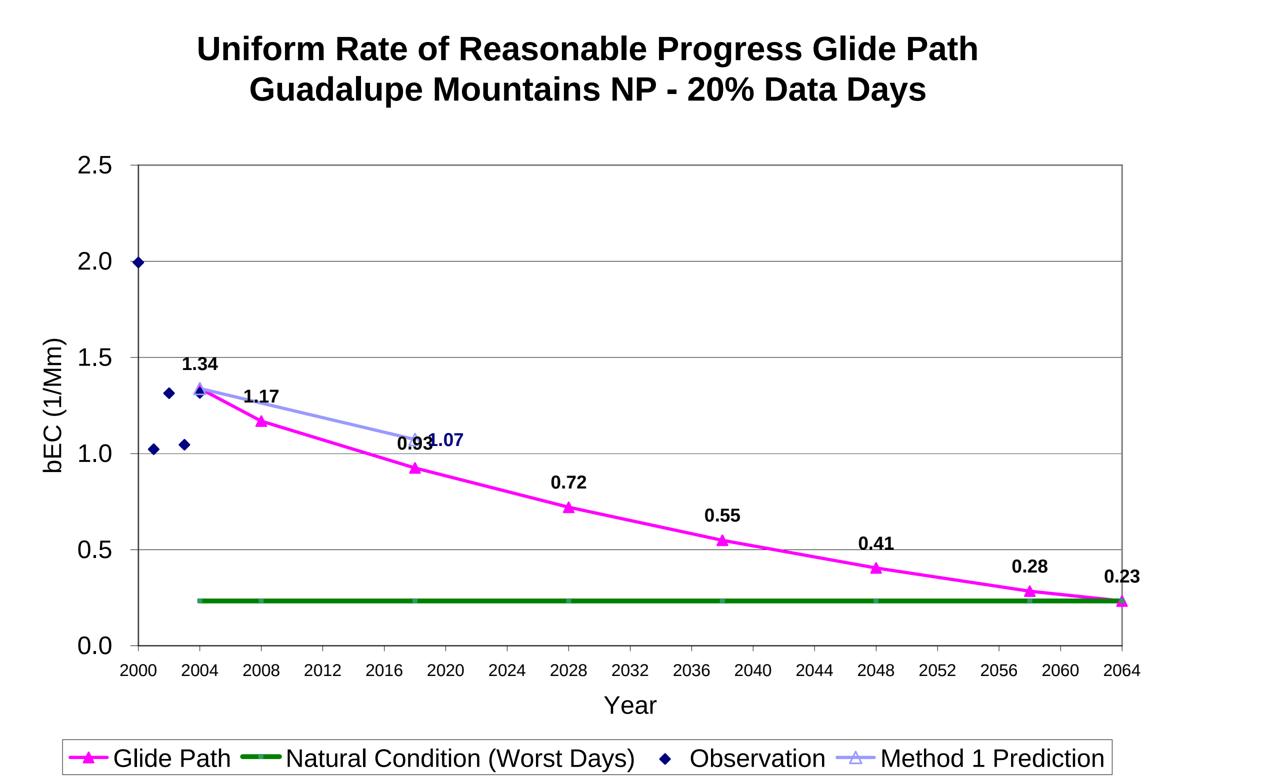


Figure F-10d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

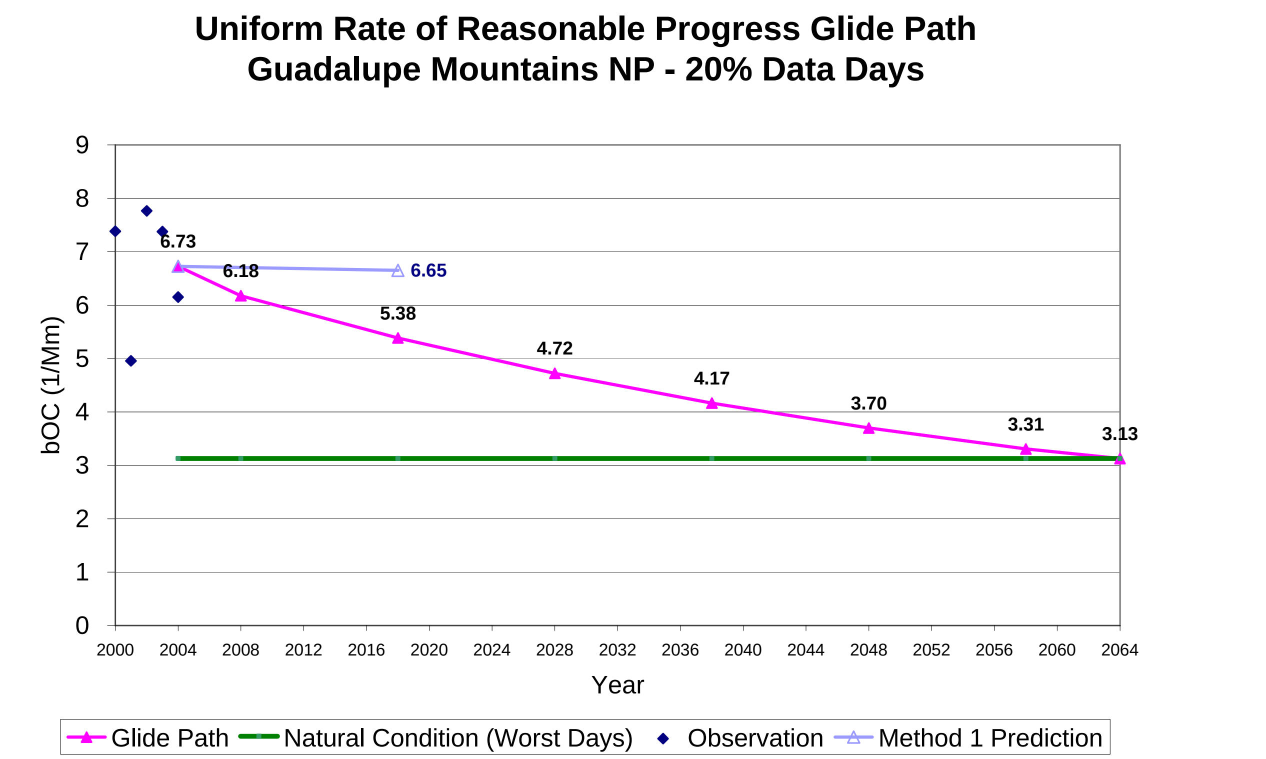


Figure F-10e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

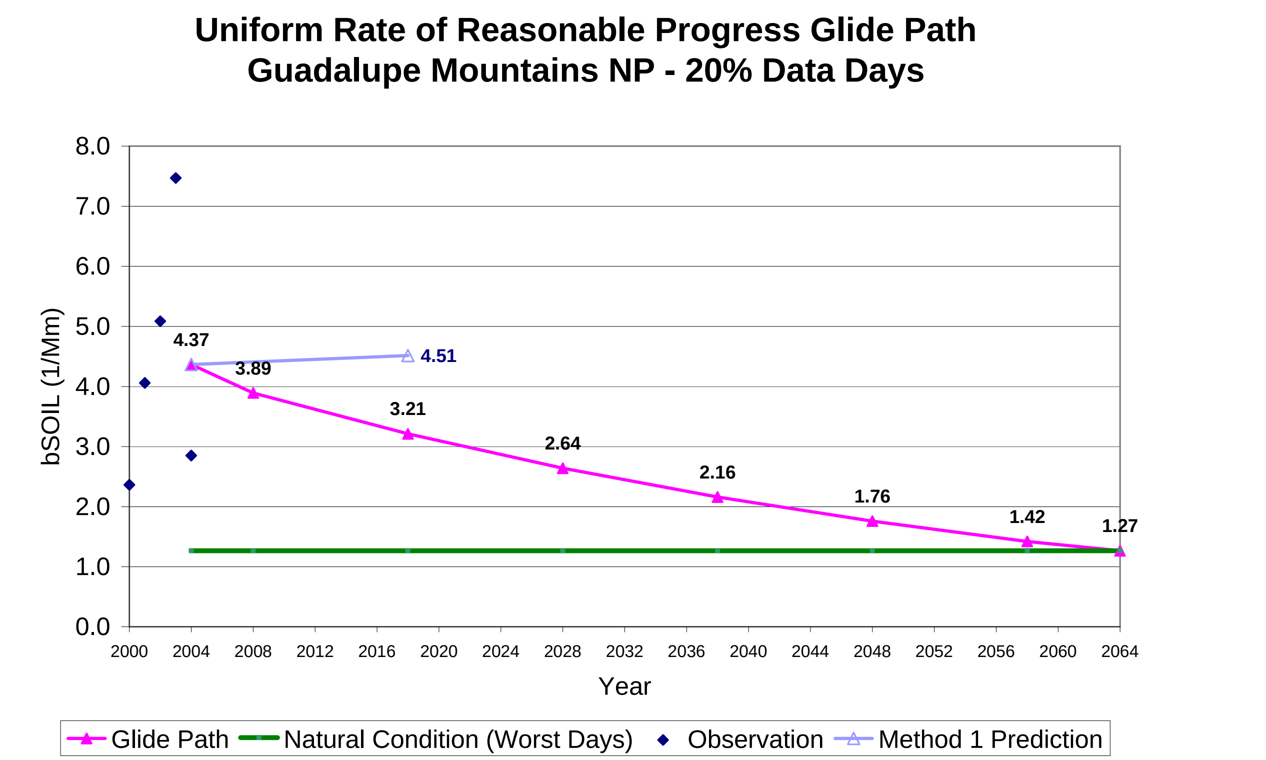


Figure F-10f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

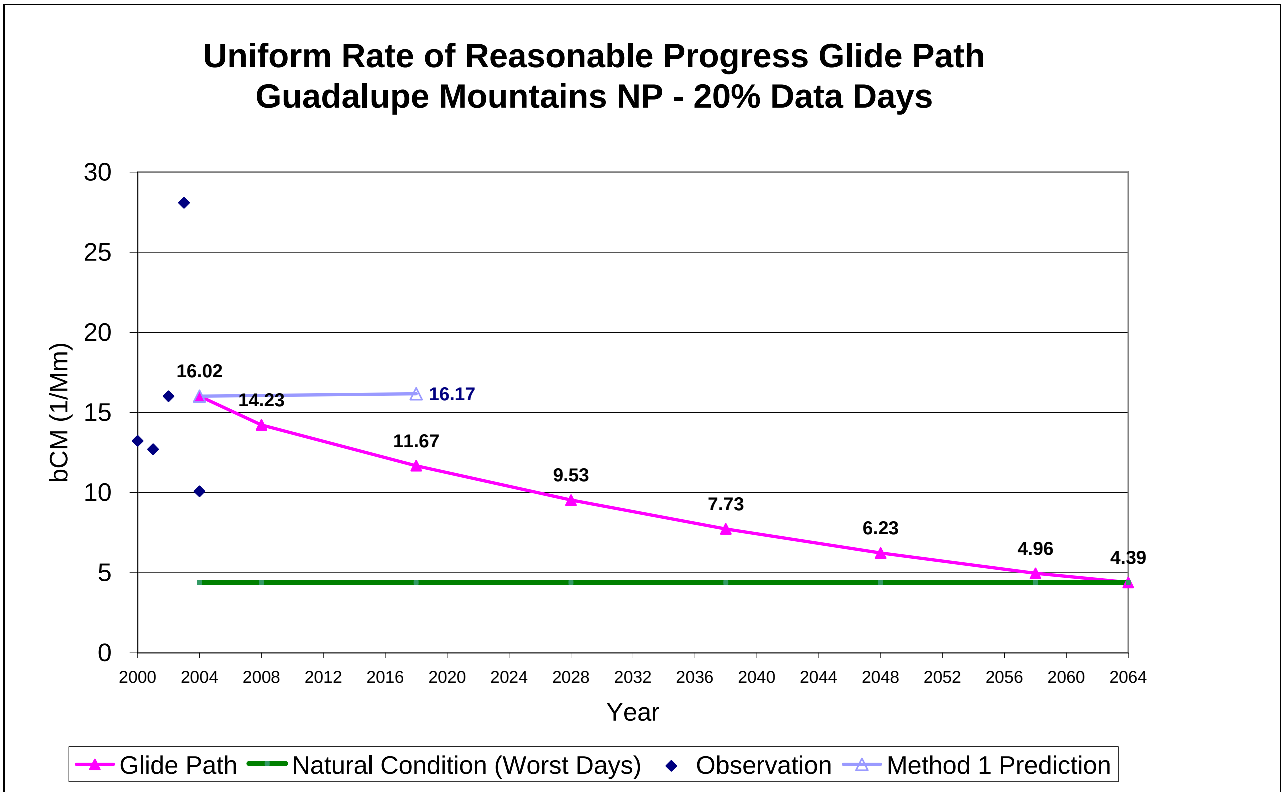


Figure F-10g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Appendix G

Revised IMPROVE Algorithm for Estimating Light Extinction from Particle Speciation Data

Revised IMPROVE Algorithm for Estimating Light Extinction from Particle Speciation Data

Section II. Overview of the Revised Algorithm

(IMPROVE technical subcommittee for algorithm review)

The recommended revised algorithm is shown in the equation below with revised terms in bold font. The total sulfate, nitrate and organic carbon compound concentrations are each split into two fractions, representing small and large size distributions of those components. Though not explicitly shown in the equation, the organic mass concentration used in this new algorithm is 1.8 times the organic carbon mass concentration, changed from 1.4 times carbon mass concentration as used for input for the current IMPROVE algorithm. New terms have been added for sea salt (important for coastal locations) and for absorption by NO_2 (only used where NO_2 data are available). Site-specific Rayleigh scattering is calculated for the elevation and annual average temperature of each of the IMPROVE monitoring sites as shown in the Table A at the end of the document.

$$\begin{aligned} b_{ext} \approx\ & \quad \times \quad \times [\quad] + \quad \times \quad \times [\quad] \\ & + \quad \times \quad \times [\quad] + \quad \times \quad \times [\quad] \\ & + \quad \times [\quad] + \quad \times [\quad] \\ & + 10 \times [Elemental\ \ Carbon] \\ & + 1 \times [Fine\ \ Soil] \\ & + \quad \times \quad \times [\quad] \\ & + 0.6 \times [Coarse\ \ Mass] \\ & + \\ & + \quad \times [\quad] \end{aligned}$$

The apportionment of the total concentration of sulfate compounds into the concentrations of the small and large size fractions is accomplished using the following equations.

$$[Large\ \ Sulfate] = \frac{[Total\ \ Sulfate]}{20 \mu g / m^3} \times [Total\ \ Sulfate], \ \ for\ [Total\ \ Sulfate] < 20 \mu g / m^3$$

$$[Large\ \ Sultate] = [Total\ \ Sulfate]\ \ for\ [Total\ \ Sulfate] \geq 20\ \mu g\ /\ m^3$$

$$[Small\ Sulfate] = [Total\ Sulfate] - [Large\ \ Sulfate]$$

The same equations are used to apportion total nitrate and total organic mass concentrations into the small and large size fractions.

Sea salt is calculated as 1.8 x [***Chloride***], or 1.8 x [***Chlorine***] if the chloride measurement is below detection limits, missing or invalid. The algorithm uses three water growth adjustment term as shown in the Figure 2 and Table 1. They are for use with the small size distribution and the large size distribution sulfate and nitrate compounds and for sea salt (***f_S(RH), f_L(RH)*** and ***f_{SS}(RH)*** respectively).

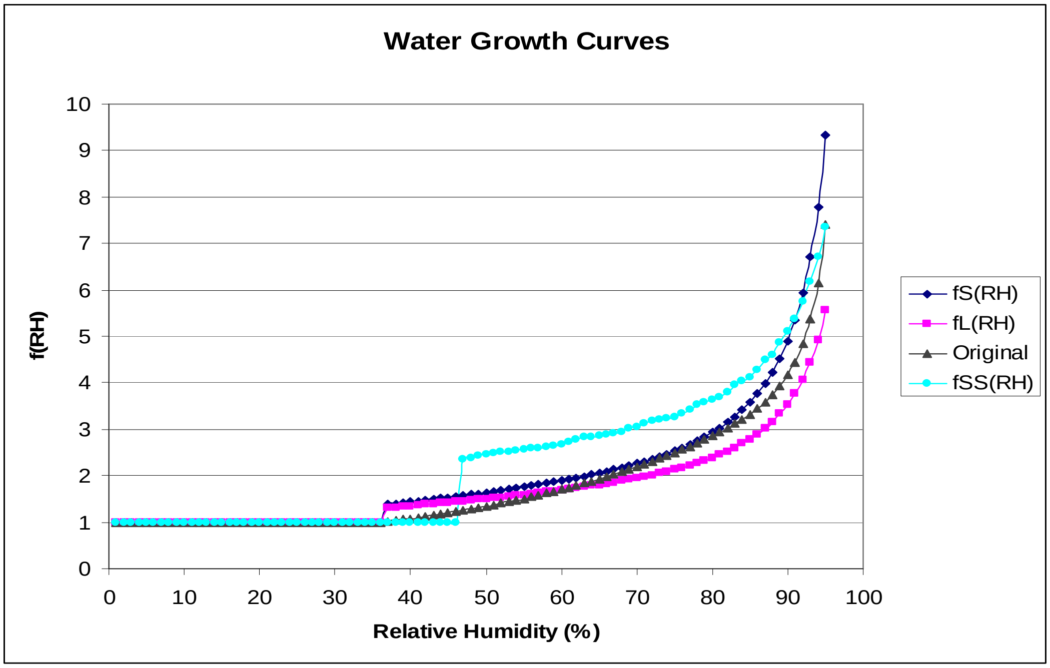


Figure 1. Water growth curves for small and large size distribution sulfate and nitrate, sea salt and the original IMPROVE algorithm sulfate and nitrate.

Table 1. f(RH) for small and large size distribution sulfate and nitrate, an sea salt.

RH (%)	f_S(RH)	f_L(RH)	f_{SS}(RH)	RH (%)	f_S(RH)	f_L(RH)	f_{SS}(RH)	RH (%)	f_S(RH)	f_L(RH)	f_{SS}(RH)
0 to 36	1.00	1.00	1.00	**56**	1.78	1.61	2.58	**76**	2.60	2.18	3.35
37	1.38	1.31	1.00	**57**	1.81	1.63	2.59	**77**	2.67	2.22	3.42
38	1.40	1.32	1.00	**58**	1.83	1.65	2.62	**78**	2.75	2.27	3.52
39	1.42	1.34	1.00	**59**	1.86	1.67	2.66	**79**	2.84	2.33	3.57
40	1.44	1.35	1.00	**60**	1.89	1.69	2.69	**80**	2.93	2.39	3.63
41	1.46	1.36	1.00	**61**	1.92	1.71	2.73	**81**	3.03	2.45	3.69
42	1.48	1.38	1.00	**62**	1.95	1.73	2.78	**82**	3.15	2.52	3.81
43	1.49	1.39	1.00	**63**	1.99	1.75	2.83	**83**	3.27	2.60	3.95
44	1.51	1.41	1.00	**64**	2.02	1.78	2.83	**84**	3.42	2.69	4.04
45	1.53	1.42	1.00	**65**	2.06	1.80	2.86	**85**	3.58	2.79	4.11
46	1.55	1.44	1.00	**66**	2.09	1.83	2.89	**86**	3.76	2.90	4.28
47	1.57	1.45	2.36	**67**	2.13	1.86	2.91	**87**	3.98	3.02	4.49
48	1.59	1.47	2.38	**68**	2.17	1.89	2.95	**88**	4.23	3.16	4.61
49	1.62	1.49	2.42	**69**	2.22	1.92	3.01	**89**	4.53	3.33	4.86
50	1.64	1.50	2.45	**70**	2.26	1.95	3.05	**90**	4.90	3.53	5.12
51	1.66	1.52	2.48	**71**	2.31	1.98	3.13	**91**	5.35	3.77	5.38
52	1.68	1.54	2.50	**72**	2.36	2.01	3.17	**92**	5.93	4.06	5.75
53	1.71	1.55	2.51	**73**	2.41	2.05	3.21	**93**	6.71	4.43	6.17

54	1.73	1.57	2.53	**74**	2.47	2.09	3.25	**94**	7.78	4.92	6.72
55	1.76	1.59	2.56	**75**	2.54	2.13	3.27	**95**	9.34	5.57	7.35

Algorithm Performance Evaluation

Performance of the current and proposed new algorithm for estimating extinction can be assessed in a number of ways each of which serves to answer different questions. Reduction of the biases in light scattering estimates at the extremes (i.e. underestimation of the high values and over estimation of the low values) when compared to nephelometer measurements was one of the most compelling reasons for development of a new algorithm, so comparisons of bias for the current and proposed new algorithm are one way to evaluate performance.

The fractional bias for each sample period was calculated as the difference in light scattering (i.e. estimated b_{sp} minus the measured b_{sp}) divided by the measured light scattering. These biases were then averaged in each quintile to indicate the bias in those five subsets of the data from the lowest to the highest light scattering values. Two different approaches to this grouping by quintiles were performed, referred to as criteria 1 and 2.

Criterion 1 used the measured light scattering to determine which sample periods were in each quintile. Since we think of the nephelometer as the better measure of light scattering, bias by this criterion better addresses the question of algorithm performance with regards to the haze conditions. Criterion 2 uses the algorithm-estimated light extinction to determine which sample periods were in each quintile. The Regional Haze Rule index is based on the highest and lowest haze levels as determined by the algorithm, so criterion 2 better addresses the haze rule application of the algorithm. Tables 2 through 5 show the bias results by both criteria for the current and new algorithm for sites averaged by RPO.

Table 2. Averaged fractional bias by RPO for the current IMPROVE algorithm with quintiles based on measured light scattering (criterion 1). Bold font highlights the bias values that are lower than corresponding values in Table 3.

RPO	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Average
CEN	0.67	0.18	0.10	**0.02**	-0.11	0.17
MANE	0.93	0.27	0.19	0.10	**0.01**	0.28
VISTAS	0.59	0.21	0.11	**0.02**	-0.13	0.16
WRAP	1.07	0.37	0.18	0.07	**-0.08**	0.32

Table 3. Averaged fractional bias by RPO for the current new proposed algorithm with quintiles based on measured light scattering (criterion 1). Bold font highlights the bias values that are lower than corresponding values in Table 2.

RPO	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Average
CEN	**0.51**	**0.08**	**0.02**	-0.03	**-0.08**	**0.10**
MANE	**0.74**	**0.14**	**0.06**	**0.01**	-0.02	**0.17**
VISTAS	**0.50**	**0.16**	0.11	0.06	**-0.01**	0.16
WRAP	**0.84**	**0.25**	**0.08**	**0.01**	-0.10	**0.21**

Table 4. Averaged fractional bias by RPO for the current IMPROVE algorithm with quintiles based on estimated light scattering (criterion 2). Bold font highlights the bias values that are lower than corresponding values in Table 5.

RPO	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Average
CEN	0.42	0.19	0.18	0.09	**-0.01**	0.17
MANE	0.35	0.27	0.30	0.33	**0.15**	0.28
VISTAS	0.38	0.19	0.14	**0.08**	**0.01**	0.16
WRAP	0.58	0.37	0.26	0.25	**0.15**	0.32

Table 5. Averaged fractional bias by RPO for the current new proposed algorithm with quintiles based on estimated light scattering (criterion 2). Bold font highlights the bias values that are lower than corresponding values in Table 4.

RPO	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Average
CEN	**0.23**	**0.11**	**0.08**	**0.06**	0.02	**0.10**
MANE	**0.15**	**0.14**	**0.15**	**0.19**	0.21	**0.17**
VISTAS	**0.25**	**0.14**	**0.08**	0.13	0.21	0.16
WRAP	**0.37**	**0.19**	**0.19**	**0.16**	0.17	**0.21**

These tables show that the new algorithm has lower fractional bias than the current IMPROVE algorithm in all but the haziest conditions (i.e. quintile 5) regardless of the criterion used to sort the data into quintiles. By criterion 1, the two algorithms perform about the same for haziest days except for the sites in the southeastern U.S. (i.e. the VISTA RPO), where the new algorithm has much lower bias (1% compared to 13%). Using criterion 2, the current algorithm has consistently lower bias compared with the new algorithm for the haziest days (i.e. quintile 5) for each of the RPOs. This seeming paradox is the result of the somewhat greater imprecision of the new algorithm compared to the current algorithm, which results in somewhat larger errors in selecting worst haze sample periods for the new algorithm compared with the current algorithm.

Scatter plots (Figures 1 and 3) of light scattering estimates from the current and new proposed algorithms versus nephelometer data for all available data at 21 monitoring sites are one way to view the overall performance differences between the two. These figures show that the bias at the extremes is reduced using the new algorithm compared to the original IMPROVE algorithm (i.e. the points tend to be better centered on the one-to-one line). They also show that the somewhat reduced precision of the new algorithm compared to the original IMPROVE algorithm (i.e. points are more broadly scattered).

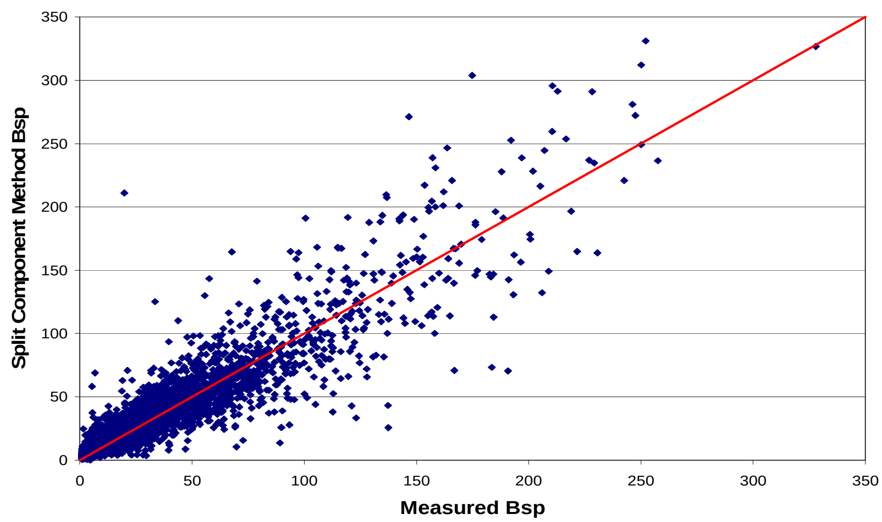


Figure 2. Scatter plot of the recommended revised algorithm estimates of light scattering versus measured light scattering.

Similar pairs of scatter plots were prepared for each individual monitoring site (available in the appendix). Figures 4 and 5 are example plots for Shenandoah and Grand Canyon National Parks. The logarithmic scales on these plots exaggerate the scatter for low values compared to high values. The individual-site scatter plots have the 80th percentile values indicated on the graphs for the predicted and measured values by horizontal and vertical lines respectively. Points that are to the right of the vertical line have nephelometer values that are among the 20% worst light scattering for that monitoring sites. Points that are above the horizontal line have algorithm determined values that are among the 20% worst estimated light scattering for that monitoring site.

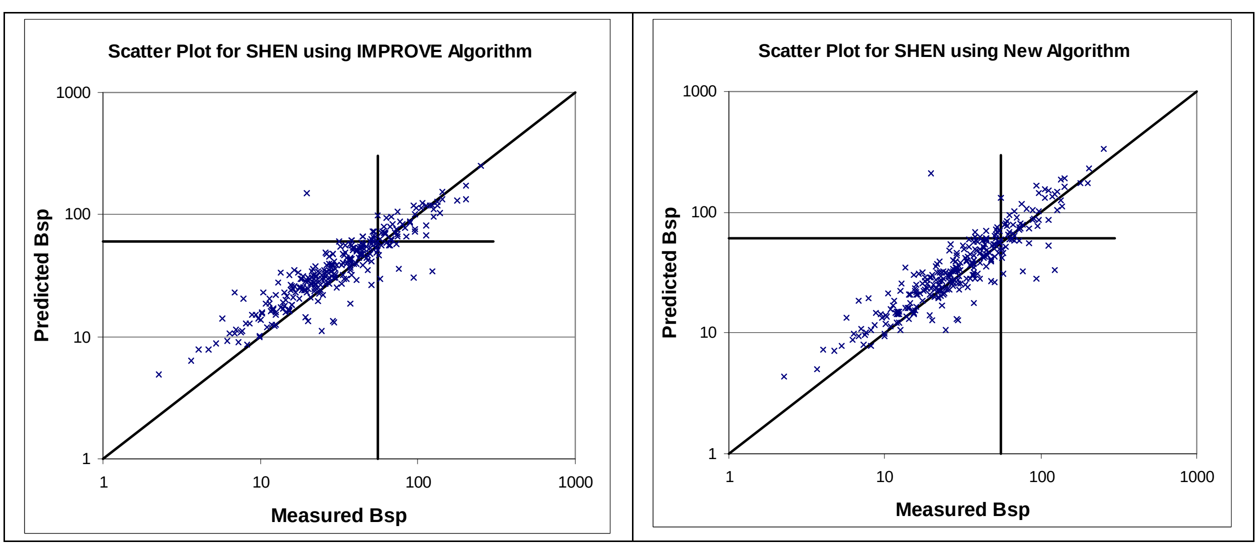


Figure 4. Scatter plots of the current IMPROVE and new recommended algorithm estimates of light scattering versus measured light scattering for Shenandoah National Park. Horizontal and vertical lines are at the 80th percentile for estimated and measured light scattering.

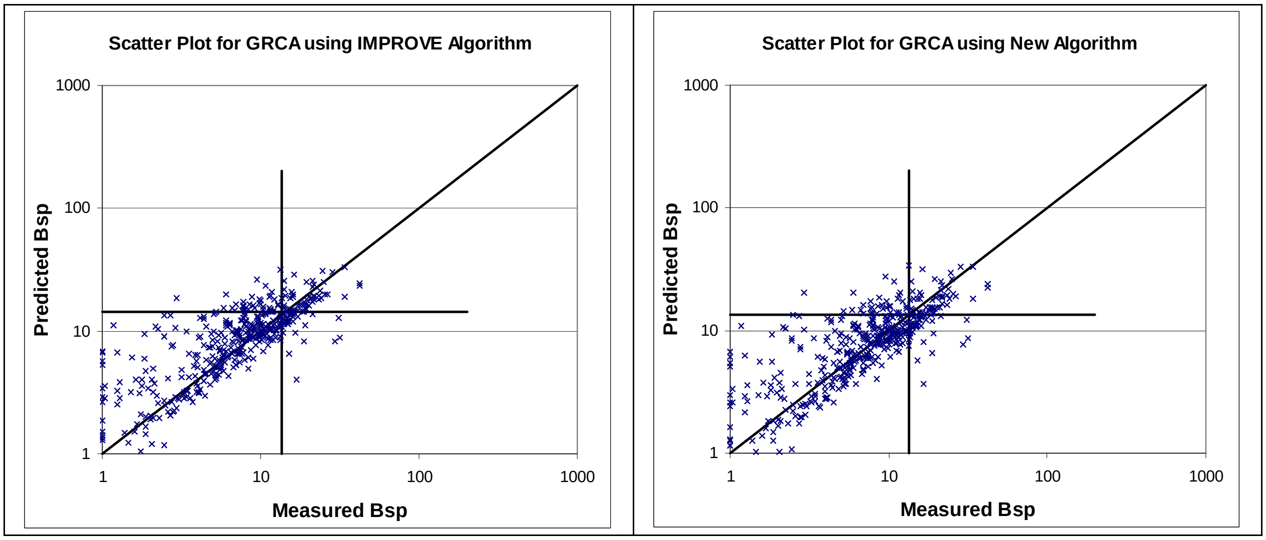


Figure 5. Scatter plots of the current IMPROVE and new recommended algorithm estimates of light scattering versus measured light scattering for Grand Canyon National Park. Horizontal and vertical lines are at the 80th percentile for estimated and measured light scattering.

The proposed new algorithm performs noticeably better with respect to having data points more centered on the one-to-one line at the high and low haze level extremes than the current IMPROVE algorithm for Shenandoah National Park, which is typical for the high haze level locations in the southeast U.S. A large number of the measured worst haze sample periods are correctly identified by both algorithms (these are the points above and to the right of the two 80th percentile lines). The differences between the two algorithms for Grand Canyon National Park and most of the other less hazy locations are not apparent in these scatter plots.

The final approach for evaluating the relative performance of the two algorithms is to compare the average composition of the best haze days and the worst haze days as selected using each algorithm and using the measured light scattering. Table 6 and 7 contain the average composition by RPO for days selected as best and worst by these three methods. Similar results for each of the 21 nephelometer monitoring locations are shown in tables in the appendix.

Table 6. Mean light scattering and percent $PM_{2.5}$ composition for the five major components for 20% best days as determined by measurement, the current IMPROVE algorithm and the proposed new algorithm.

RPO		Mean Bsp (Mm-1)	Percent Ammonium Sulfate	Percent Ammonium Nitrate	Percent OCM	Percent Soil	Percent Coarse	Percent EC
CENRAP	Measured	6.8	19	2	15	8	54	2
	IMPROVE	9.1	20	2	15	7	53	2
	NEW	8.1	21	3	16	7	51	2
MANEVU	Measured	6.1	22	3	22	4	47	3
	IMPROVE	8.4	21	3	22	4	47	3
	NEW	7.4	22	4	22	4	45	3
VISTAS	Measured	13.8	25	7	21	4	40	3
	IMPROVE	18.4	25	7	21	4	40	3
	NEW	17.0	25	8	21	4	39	3

	Measured	3.4	13	3	18	8	55	3
WRAP	IMPROVE	5.2	14	3	19	8	53	3
	NEW	4.5	15	3	19	8	52	3

Table 7. Mean light scattering and percent $PM_{2.5}$ composition for the five major components for 20% worst days as determined by measurement, the current IMPROVE algorithm and the proposed new algorithm.

RPO		Mean Bsp (Mm-1)	Percent Ammonium Sulfate	Percent Ammonium Nitrate	Percent OCM	Percent Soil	Percent Coarse	Percent EC
	Measured	76	34	6	19	5	34	2
CENRAP	IMPROVE	67	34	6	19	5	33	2
	NEW	72	34	6	19	6	34	2
	Measured	61	36	6	23	3	30	3
MANEVU	IMPROVE	61	36	6	22	3	30	3
	NEW	63	35	6	23	3	31	3
	Measured	120	46	5	21	3	22	2
VISTAS	IMPROVE	106	47	4	21	3	23	2
	NEW	127	47	3	22	3	22	2
	Measured	36	15	6	27	7	42	3
WRAP	IMPROVE	33	14	6	27	6	44	3
	NEW	33	13	6	27	6	44	3

These tables demonstrate that the composition associated with the best and worst haze days are not very sensitive to the method of identifying the sample periods that fit in best and worst categories. Some of the individual sites (e.g. Grand Canyon) have somewhat larger variations in the composition between measurement-selected days compared to algorithm-selected days, though there's little difference between the average composition comparing the two algorithms on the best and worst days. The contributions to light extinction by the various components were not explicitly calculated, but are inherently somewhat different because of the explicit differences in the two algorithms.

In summary, the proposed new algorithm for estimating haze reduces the biases compared to measurements at the high and low extremes. This is most apparent for the hazier eastern sites. The composition of days selected as best and worst by the current and the new algorithm are very similar, and similar to days selected by measurements. Most of the reduction of bias associated with the new algorithm is attributed to the use of the split component extinction efficiency method for sulfate, nitrate and organic components that permitted variable extinction efficiency depending on the component mass concentration. Though not subject to explicit performance testing, the proposed new algorithm also contains specific changes from the current algorithm that reflect a better understanding of the atmosphere as reflected in the more recent scientific literature (e.g. change to 1.8 from 1.4 for organic compound mass to carbon mass ratio) and a more complete accounting for contributors to haze (e.g. sea salt and NO_2 terms), and use of site specific Rayleigh scattering terms to reduce elevation-related bias.

APPENDIX H INDEX

Appendix H.1: Emission Inventory Tables

<u>Documentation of 2002 and 2018 Emissions Inventories</u>

Appendix H.1

Tables H.1 – H.10: Emission Inventory Tables

Table H.1: 2002 and 2018 Emissions for Missouri Point Sources by Facility

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
001-0003	TRUMAN STATE UNIVERSITY-KIRKSVILLE	8221	6.7	7.2	0.1	0.0	1.2	1.3	1.2	1.3	2.9	3.0	1.4	1.7	0.0	0.0
001-0006	AMERENUE-KIRKSVILLE COMBUSTION TURB	4911	0.5	2.0	0.0	0.0	0.0	0.2	0.0	0.2	0.1	2.2	0.1	0.2	0.0	0.2
001-0015	HOLLISTER INC-DIV OF SCHNEIDER INC	3089	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.7	2.6	3.9	0.0	0.0
001-0016	MFA BULK FERTILIZER-KIRKSVILLE	5191	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
001-0030	KRAFT FOODS-KIRKSVILLE	2013	4.4	5.6	0.0	0.0	2.9	3.7	2.9	3.7	3.2	4.1	3.3	4.2	0.0	0.0
001-0036	KIRKSVILLE COLLEGE OF OSTEOPATHIC M	8221	2.5	2.7	0.0	0.0	0.2	0.2	0.2	0.2	2.1	2.3	0.3	0.3	0.0	0.0
001-49530127	Rye Creek SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	4.9
001-ORIS700129	GENERIC UNIT	4911	0.0	95.2	0.0	0.0	0.0	31.4	0.0	31.4	0.0	389.9	0.0	33.3	0.0	30.5
003-0002	NORRIS ASPHALT PAVING CO-BREIT QUAR	1422	2.4	2.2	0.2	0.1	17.1	23.6	2.5	3.3	0.5	0.6	0.2	0.3	0.0	0.0
003-0014	HERZOG CONTRACTING CORPORATION-AMAZ	2951	0.0	0.0	0.0	0.0	2.9	4.0	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
003-0015	UNITED COOPERATIVE INC-SAVANNAH PLA	5191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	4.2	0.0	0.0
003-49530128	Savannah SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.6
003-P011	KELLER CONSTRUCTION COMPANY-KELLER	2951	0.7	1.5	0.1	0.2	3.1	4.6	0.4	0.6	9.7	16.0	0.2	0.3	0.0	0.0
005-0001	AG PARTNERS COOPERATIVE INC-AG PART	2048	0.1	0.1	0.0	0.0	4.6	6.3	2.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0
005-49530130	Atchison County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.7
005-ORIS6594	ROCKPORT	4911	0.0	2.6	0.0	0.0	0.0	0.2	0.0	0.2	0.0	2.2	0.0	0.2	0.0	0.2
005-ORIS700229	GENERIC UNIT	4911	0.0	95.2	0.0	0.0	0.0	31.4	0.0	31.4	0.0	389.9	0.0	33.3	0.0	30.5
007-0001	A. P. GREEN INDUSTRIES INC-MEXICO P	3255	2.9	3.9	4.9	6.9	8.3	12.5	2.6	3.9	8.1	11.3	1.5	2.3	0.0	0.0
007-0002	ARCHER DANIELS MIDLAND CO-MEXICO PL	2075	20.5	27.0	0.1	0.2	43.8	54.9	19.0	23.9	17.2	22.6	133.0	124.7	0.5	0.6
007-0003	HARBISON-WALKER REFRACTORIES-VANDAL	3255	4.9	6.4	7.0	9.9	8.6	12.3	1.7	2.6	10.8	15.2	0.9	1.1	0.0	0.0
007-0009	MFA FEED MILL-MEXICO	2875	0.2	0.3	0.0	0.0	2.6	3.3	0.6	0.8	0.2	0.2	0.0	0.0	0.0	0.0
007-0012	AMERENUE-MEXICO COMBUSTION TURBINE	4911	4.4		3.2		0.2		0.2		0.3		0.1		0.0	
007-0032	MFA AGRI SERVICES-LADDONIA	5153	0.0	0.0	0.0	0.0	3.7	5.2	3.3	4.6	0.0	0.0	0.0	0.0	0.0	0.0
007-0033	MARTINSBURG FARMERS ELEVATOR-MARTIN	5153	0.0	0.0	0.0	0.0	6.3	8.8	4.6	6.4	0.0	0.0	0.0	0.0	0.0	0.0
007-0038	NEXANS MAGNET WIRE USA-MEXICO	3351	2.5	3.3	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3	27.2	53.0	0.0	0.0
007-0040	TEVA PHARMACEUTICALS USA INC-MEXICO	2834	6.6	8.6	0.1	0.2	0.8	1.1	0.5	0.6	3.6	4.8	166.5	274.6	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
007-0041	VANDALIA	4911	0.0	1.9	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.7	0.0	0.1	0.0	0.1
007-0047	CERRO COPPER CASTING COMPANY-CERRO	3366	7.9	12.1	1.1	2.4	19.5	41.7	17.2	36.8	84.8	181.2	4.2	8.5	0.0	0.0
007-0051	MEXICO PLASTIC COMPANY-MEXICO	2673	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	209.2	274.5	0.0	0.0
007-0053	AUDRAIN GENERATING LLC-AUDRAIN GENE	4911	9.2	40.8	1.2	0.0	2.1	7.1	2.1	7.1	11.3	88.5	1.3	2.3	0.0	6.9
007-49530131	National Refactories & Mining SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5
007-49530132	Mexico SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	12.0
007-ORIS800129	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
007-ORIS800229	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
007-ORIS800329	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
009-0003	EFCO CORPORATION-EFCO CORPORATION	3442	5.1	6.7	0.0	0.0	0.6	0.8	0.6	0.8	4.0	5.3	224.4	462.2	0.0	0.0
009-0005	HYDRO ALUMINUM WELLS-MONETT	3351	62.8	124.7	0.2	0.5	6.6	5.7	5.6	4.9	22.5	42.0	143.1	295.4	0.0	0.0
009-0009	HOUSE HANDLE COMPANY-CASSVILLE	2426	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
009-0030	DAIRY FARMERS OF AMERICA INC-MONETT	2023	11.4	15.0	0.3	0.4	0.3	0.5	0.3	0.5	9.6	12.6	1.4	1.9	0.0	0.0
009-0031	TYSON FOODS INC-MONETT	2015	6.3	8.3	0.0	0.0	0.5	0.6	0.5	0.6	5.3	7.0	0.8	1.0	0.0	0.0
009-0037	FASCO INDUSTRIES INC-CASSVILLE PLAN	3621	1.8	2.4	0.0	0.0	0.3	0.3	0.3	0.2	0.4	0.4	31.9	64.0	0.0	0.0
009-0038	BARRY COUNTY READY MIX LLC-CASSVILL	3273	0.0	0.0	0.0	0.0	2.6	3.7	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
009-0039	MIRACLE RECREATION EQUIPMENT CO-HWY	3949	3.4	4.7	0.0	0.0	0.1	0.2	0.1	0.2	0.4	0.6	7.9	14.8	0.0	0.0
009-0044	BARRY COUNTY READY MIX LLC-SHELL KN	3273	0.0	0.0	0.0	0.0	1.0	1.4	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
009-0052	JUSTIN BOOT COMPANY-CASSVILLE (PLAN	3143	0.2	0.1	0.0	0.0	1.2	1.9	0.0	0.0	0.1	0.1	18.6	14.0	0.0	0.0
009-0055	INTERNATIONAL INGREDIENT CORP-MONET	2048	4.0	5.2	0.0	0.0	24.9	29.5	9.0	10.7	3.3	4.4	0.5	0.7	0.0	0.0
009-0059	FULP DRY CLEANERS-MONETT	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.7	0.0	0.0
009-0060	MONETT METALS INC-MONETT STEEL CAST	3325	2.8	5.7	0.0	0.0	3.8	7.5	3.5	6.9	0.3	0.3	0.4	0.8	0.0	0.0
009-447	DILBECK, LYNN	241	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011-0003	O'SULLIVAN INDUSTRIES INC-O'SULLIVA	2517	1.8	2.4	0.0	0.0	1.1	1.5	0.2	0.2	1.5	2.0	5.7	8.4	0.0	0.0
011-0006	THORCO INDUSTRIES INC-LAMAR #2	3471	5.9	13.9	0.1	0.3	0.1	0.3	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0
011-0010	COX & SON LUMBER CO-LAMAR	2448	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011-0016	GOLDEN CITY FOUNDRY INC-GOLDEN CITY	3341	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
011-0031	LAMAR CITY ELECTRICAL	4911	2.6	5.1	0.0	0.1	0.1	0.1	0.0	0.1	0.2	0.4	0.1	0.2	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	GENERATION-LA															
011-0036	TAYLOR QUARRIES INC-GOLDEN CITY QUA	1422	4.1	3.9	0.3	0.3	5.6	7.7	0.8	1.0	2.4	3.1	0.4	0.3	0.0	0.0
011-0038	MFA GRAIN-LAMAR	4221	0.0	0.0	0.0	0.0	7.0	9.7	5.7	8.0	0.0	0.0	0.0	0.0	0.0	0.0
011-0039	BFI WASTE SYSTEMS OF NORTH AMERICA	4953	0.0	0.0	0.0	0.0	10.6	14.3	5.0	6.8	0.0	0.0	9.1	12.2	0.0	0.0
011-49530135	Prairieview Landfill	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	105.1	157.4
013-9	DIAMOND O ENTERPRISES	211	0.0	0.0	0.0	0.0	13.1	14.2	2.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0
013-10	GM FEEDLOT, INC	211	0.0	0.0	0.0	0.0	21.1	22.8	3.2	3.4	0.0	0.0	0.0	0.0	0.0	0.0
013-11	SHANNON'S CIRCLE S RANCH	211	0.0	0.0	0.0	0.0	3.9	4.3	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0
013-0016	WEST CENTRAL AGRISERVICE LLC-BUTLER	5191	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
013-0017	WEST CENTRAL AGRISERVICE LLC-ADRIAN	5153	0.0	0.0	0.0	0.0	4.0	5.6	3.5	4.9	0.0	0.0	3.5	4.2	0.0	0.0
013-0023	DOANE PET CARE-BUTLER	2048	1.0	1.3	0.0	0.0	5.4	6.9	1.5	2.0	0.9	1.1	0.1	0.1	0.0	0.0
013-0029	BUTLER MUNICIPAL POWER PLANT-BUTLER	4911	9.4	12.6	1.4	0.0	0.1	0.4	0.1	0.4	0.7	4.6	0.2	0.4	0.0	0.4
013-0030	OSWEGO COAL COMPANY-HUME - HWY V	1221	0.6	0.7	0.0	0.0	1.2	1.6	0.3	0.3	0.1	0.1	0.1	0.0	0.0	0.0
013-0033	ADRIAN QUARRY-ADRIAN	1422	3.4	3.1	0.2	0.3	5.0	6.8	1.2	1.7	0.7	0.8	0.3	0.3	0.0	0.0
013-44	STEELE, ED & KING, JERRY	241	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
013-49530136	Welston SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	4.9
013-ORIS800429	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
015-12	SPINAR, HAROLD	211	0.0	0.0	0.0	0.0	2.2	2.4	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
015-0013	WARSAW READY-MIX-WARSAW	3273	0.0	0.0	0.0	0.0	2.3	3.3	0.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0
015-0019	WILDCAT READY MIX-WARSAW PLANT	3273	0.1	0.1	0.0	0.0	2.0	2.8	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
015-0020	PRODUCERS EXCHANGE-IONIA	5153	0.0	0.0	0.0	0.0	0.8	1.2	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0
015-0021	MFA BULK PLANT-COLE CAMP	5191	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
015-0023	SMASAL AGGREGATES ASPHALT-COLE CAMP	2951	0.1	0.1	1.8	2.7	3.3	5.0	0.8	1.2	0.0	0.1	0.0	0.0	0.0	0.0
015-P011	HILTY QUARRIES INC-WARSAW SOUTH QUA	1422	0.0	0.0	0.0	0.0	5.8	7.9	1.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0
017-0019	NATURAL GAS PIPELINE COMPANY-MARBLE	4922	969.6	1,274.1	0.1	0.2	8.0	10.6	7.5	9.9	58.6	77.0	25.3	33.1	0.0	0.0
017-0020	ARAB STONE INC-ARAB STONE INC	1422	23.5	46.2	1.6	3.4	15.5	22.6	1.7	3.6	5.1	11.1	1.9	3.8	0.0	0.0
019-0002	COLUMBIA MUNICIPAL POWER PLANT-COLU	4911	319.3	1,547.2	936.0	5,918.0	3.4	141.1	1.1	130.5	110.1	628.4	1.6	7.3	0.1	4.0
019-0004	UNIVERSITY OF MISSOURI - COLUMBIA-P	4911	742.5	954.2	9,948.8	13,305.1	34.2	43.1	8.5	10.3	411.1	551.6	5.8	5.6	0.0	0.3
019-0005	MAGELLAN PIPELINE COMPANY LLC-COLUM	4613	3.1	3.1	0.0	0.0	0.0	0.0	0.0	0.0	7.7	7.7	22.0	27.1	0.0	0.0
019-0007	BOONE QUARRIES - EAST-	1422	0.0	0.0	0.0	0.0	34.3	47.5	5.4	7.5	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	COLUMBIA															
019-0008	BOONE QUARRIES - WEST-BOONE QUARRIE	1422	0.0	0.0	0.0	0.0	15.7	21.7	2.9	4.1	0.0	0.0	0.1	0.1	0.0	0.0
019-0009	UNIVERSITY OF MISSOURI - COLUMBIA-E	8069	9.0	9.9	0.2	0.3	0.3	0.3	0.3	0.3	1.8	2.0	1.1	1.1	0.0	0.0
019-0012	COLUMBIA SAND CO-ROCHEPORT	1442	0.0	0.0	0.0	0.0	1.6	2.2	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
019-0038	A. B. CHANCE CO-PLASTICS PLANT	3546	0.5	0.7	0.0	0.0	0.1	0.2	0.1	0.1	0.4	0.5	10.9	19.5	0.0	0.0
019-0039	A. B. CHANCE CO-ALLEN STREET COMPLE	3613	5.7	7.3	0.1	0.1	3.3	5.5	0.9	1.4	4.6	6.0	19.1	39.0	0.0	0.0
019-0040	MFA INC-CENTRALIA PLANT	2048	0.6	0.8	0.0	0.0	7.2	9.2	0.7	0.9	0.5	0.6	0.1	0.2	0.0	0.0
019-0042	MFA AGRI SERVICES-COLUMBIA	5191	0.0	0.0	0.0	0.0	0.7	1.0	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0
019-0045	CHRISTIAN HEALTH SYSTEMS-BOONE HOSP	8062	3.4	3.8	0.0	0.1	0.3	0.3	0.3	0.3	3.0	3.3	0.5	0.5	0.0	0.0
019-0047	UNIVERSITY OF MISSOURI - COLUMBIA-M	8062	4.0	5.4	0.3	0.5	0.4	0.6	0.4	0.5	1.5	2.1	10.0	12.9	0.0	0.0
019-0053	KRAFT FOODS NORTH AMERICA INC-COLUM	2013	16.2	21.0	0.3	0.4	4.1	5.2	3.8	4.9	37.0	47.7	11.1	14.2	0.0	0.0
019-0055	3M COMPANY-COLUMBIA	3674	6.3	6.7	0.0	0.0	0.5	0.5	0.5	0.5	5.3	5.6	5.4	9.7	0.0	0.0
019-0061	W. B. SMITH FEED MILL-W. B. SMITH F	2048	1.1	1.5	0.2	0.3	12.3	15.4	2.7	3.5	0.0	0.0	0.0	0.0	0.0	0.0
019-0062	COLLINS & AIKMAN-COLUMBIA OPERATION	3714	2.3	3.0	0.0	0.0	0.2	0.2	0.2	0.2	1.9	2.5	19.5	38.1	0.0	0.0
019-0065	APAC MISSOURI-CENTRAL MISSOURI DIVI	2951	6.9	11.0	2.2	2.0	3.1	4.4	0.7	1.0	3.2	5.3	6.1	10.1	0.0	0.0
019-0066	TORQUE TRACTION INTEGRATION TECHNOL	3714	0.5	0.6	0.0	0.0	0.0	0.1	0.0	0.1	0.4	0.5	6.5	11.4	0.0	0.0
019-0069	FRITO-LAY INC-COLUMBIA - ROUTE B	2099	19.7	25.9	0.1	0.2	6.2	8.2	1.6	2.1	16.5	21.7	2.5	3.3	0.0	0.0
019-0070	SUMMIT POLYMERS INC-SUMMIT POLYMERS	3089	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.7	28.3	0.0	0.0
019-0071	BOONE QUARRIES - NORTH-PRATHERSVILL	1422	0.0	0.0	0.0	0.0	4.7	6.5	1.4	1.9	0.0	0.0	0.0	0.0	0.0	0.0
019-0077	PANHANDLE EASTERN PIPELINE-CENTRALI	4922	2,020.7	2,655.3	0.4	0.5	6.0	7.9	5.7	7.5	219.8	288.8	72.2	94.6	0.0	0.0
019-0079	MID-MISSOURI LIMESTONE INC-RIGGS QU	1422	12.5	16.6	1.2	1.9	7.5	10.5	2.2	3.1	8.4	13.4	1.6	2.2	0.0	0.0
019-0091	COLUMBIA SANITARY LANDFILL-COLUMBIA	4953	0.6	0.5	0.2	0.2	14.3	19.2	4.7	6.2	10.5	10.5	9.5	12.8	0.0	0.0
019-0095	SOUTHERN STAR CENTRAL GAS PIPELINE-	4922	13.3	17.5	0.1	0.2	0.3	0.4	0.3	0.4	3.5	4.6	0.3	0.4	0.0	0.0
019-0105	AMEREN ENERGY GENERATING COMPANY-CO	4911	4.0	2.7	1.3	1.5	2.4	1.7	2.2	1.5	6.6	5.9	3.3	2.0	0.0	0.0
019-0109	COLUMBIA VETERINARY HOSPITAL-COLUMB	742	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.0	0.0
019-4009	TIGER CLEANERS-COLUMBIA	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	4.5	0.0	0.0
019-6007	PW EAGLE INC-COLUMBIA	3084	1.2	1.6	0.0	0.0	27.3	50.2	9.8	18.0	1.0	1.4	2.8	5.1	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
019-49530137	Centralia SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	3.8
019-49530138	City of Columbia SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.0	67.3
019-ORIS800529	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
019-ORIS800629	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
019-ORIS800729	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
021-0004	AQUILA INC-LAKE ROAD PLANT	4911	4,164.7	2,547.9	3,643.3	4,407.4	33.9	77.2	20.2	66.1	160.9	126.0	29.8	24.0	2.2	9.3
021-0005	MISSOURI AIR NATIONAL GUARD-ROSECRA	9711	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	2.9	0.0	0.0
021-0009	JOHNSON CONTROLS BATTERY GROUP INC-	3691	7.1	9.4	0.0	0.0	7.8	16.9	6.9	15.0	1.4	1.9	1.0	1.5	0.0	0.0
021-0016	LIFE LINE FOODS-ST. JOSEPH	2041	3.1	4.1	0.0	0.0	15.2	19.5	5.5	6.9	2.6	3.4	0.4	0.5	0.2	0.3
021-0017	NESTLE FOOD COMPANY USA-FRISKIES PE	2047	3.3	4.3	0.5	0.7	15.3	20.9	1.1	1.5	1.2	1.6	20.1	40.3	0.0	0.0
021-0018	AMERICAN WALNUT COMPANY-ST. JOSEPH	2426	3.2	4.6	0.2	0.2	16.1	23.3	12.2	17.6	28.8	41.5	5.2	7.6	0.0	0.0
021-0019	PURINA MILLS ILLC-ST. JOSEPH	2048	7.0	9.2	0.0	0.1	7.6	9.6	3.3	4.2	5.9	7.7	0.9	1.3	0.0	0.0
021-0026	HEARTLAND REGIONAL MEDICAL CENTER W	8062	3.2	3.5	0.1	0.1	0.2	0.3	0.2	0.3	2.6	2.8	0.4	0.4	0.0	0.0
021-0027	MISSOURI DEPT OF CORRECTIONS-WESTER	9223	1.8	2.0	1.1	1.7	0.1	0.2	0.1	0.2	1.4	1.5	0.2	0.2	0.0	0.0
021-0029	WIRE ROPE CORPORATION OF AMERICA-ST	3496	4.4	5.6	0.0	0.0	1.0	1.7	0.7	1.2	0.6	0.7	19.3	34.6	0.0	0.0
021-0037	ALBAUGH INC-ALBAUGH INC	2879	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	12.2	0.0	0.0
021-0038	PRIME TANNING CORP-ST. JOSEPH	3111	4.9	6.5	0.0	0.0	1.8	2.7	0.4	0.5	6.2	8.5	5.4	8.8	0.0	0.0
021-0045	OMNIUM LLC-ST. JOSEPH	2879	0.0	0.0	0.0	0.0	2.4	3.4	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0
021-0046	WEYERHAEUSER-ST. JOSEPH	2653	4.2	5.5	0.0	0.0	6.6	9.4	2.1	3.0	3.5	4.6	14.5	23.2	0.0	0.0
021-0052	HERZOG CONTRACTING CORPORATION-HERZ	3273	0.1	0.1	0.0	0.0	10.1	14.1	3.0	4.3	0.1	0.1	0.4	0.5	0.0	0.0
021-0056	BARTLETT GRAIN COMPANY LP-ST. JOSEP	5153	0.0	0.0	0.0	0.0	22.6	31.5	14.7	20.4	0.0	0.0	0.0	0.0	0.0	0.0
021-0060	AG PROCESSING INC-ST. JOSEPH - LOWE	2075	4.0	5.3	0.0	0.0	60.3	74.8	31.2	38.6	3.4	4.4	413.0	384.3	0.1	0.1
021-0063	HEARTLAND REGIONAL MEDICAL CENTER E	8062	4.6	4.9	0.1	0.1	0.3	0.4	0.3	0.4	3.8	4.1	0.6	0.6	0.0	0.0
021-0064	SILGAN CONTAINERS CORP-SILGAN CONTA	3411	11.8	15.5	0.1	0.1	0.9	1.2	0.7	0.9	9.9	13.1	232.1	119.2	0.0	0.0
021-0065	ST. JOSEPH FUEL OIL CO-ST. JOSEPH F	2951	0.2	0.2	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	5.1	6.6	0.0	0.0
021-0078	ALTEC INDUSTRIES INC-ALTEC INDUSTRI	3531	1.5	2.3	0.0	0.0	1.3	2.4	0.2	0.3	3.5	4.4	14.7	20.1	0.0	0.0
021-0082	SEALED AIR CORPORATION-CRYOVAC DIVI	3081	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	10.0	0.0	0.0
021-0086	PAYLESS CONCRETE-ATCHISON ST	3273	0.0	0.0	0.0	0.0	4.7	6.6	1.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
021-0095	VARCO-PRUDEN BUILDINGS-ST. JOSEPH	3448	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	112.4	231.9	0.0	0.0
021-0105	ST. JOSEPH LANDFILL-ST. JOSEPH LAND	4953	0.0	0.0	0.0	0.0	8.5	11.5	2.6	3.5	0.0	0.0	3.7	5.5	0.0	0.0
021-0109	HILLSHIRE FARM & KAHNS-ST. JOSEPH	2013	10.5	22.7	0.1	0.2	12.3	16.8	10.1	13.5	13.4	24.9	14.3	27.0	0.0	0.0
021-49530139	St. Joseph City SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	64.5	96.6
021-ORIS800829	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
023-0003	WILLIAMSVILLE MATERIALS-POPLAR BLUF	1442	1.7	1.5	0.1	0.1	5.9	8.0	1.5	2.0	0.4	0.4	0.2	0.2	0.0	0.0
023-0011	ROWE FURNITURE CORP-POPLAR BLUFF	2512	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	49.1	100.8	0.0	0.0
023-0021	PACE CONSTRUCTION CO-POPLAR BLUFF P	2951	9.5	14.6	7.7	5.4	5.2	7.5	1.1	1.5	29.8	48.8	8.9	13.9	0.0	0.0
023-0027	JOHN J. PERSHING VA MEDICAL CENTER-	8062	4.1	8.9	0.7	1.5	0.1	0.2	0.1	0.2	1.2	2.6	0.2	0.3	0.0	0.0
023-0032	GATES RUBBER COMPANY-POPLAR BLUFF D	3052	6.7	8.8	0.0	0.0	0.5	0.7	0.5	0.7	5.6	7.4	120.3	211.2	0.0	0.0
023-0038	BRIGGS & STRATTON CORP-POPLAR BLUFF	3519	12.5	16.3	0.4	0.9	14.2	18.1	11.9	15.2	31.3	78.1	53.9	113.5	0.0	0.0
023-0040	BUNGE NORTH AMERICA INC-POPLAR BLUF	5153	0.0	0.0	0.0	0.0	1.2	1.6	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
023-0042	CENTERPOINT ENERGY-POPLAR BLUFF COM	4922	113.1	148.6	0.0	0.0	0.9	1.2	0.9	1.1	120.3	158.1	11.3	14.4	0.0	0.0
023-0050	POPLAR BLUFF MUNICIPAL UTILITIES-GE	4911	51.6	104.5	1.9	3.7	2.1	4.6	2.1	4.5	9.4	24.3	9.9	17.9	0.0	0.5
023-0052	SCHALLER HARDWOOD LUMBER CO-YARD 2	2421	0.7	0.9	0.0	0.0	4.0	5.8	3.1	4.5	6.1	8.8	1.1	1.6	0.0	0.0
023-0058	BUTLER COUNTY SANITARY LANDFILL-ALL	4953	0.0	0.0	0.0	0.0	2.3	3.1	0.2	0.3	0.0	0.0	5.5	7.5	0.0	0.0
023-0062	NORDYNE-POPLAR BLUFF	3585	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.2	43.7	0.0	0.0
023-49530140	Butler County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.9	74.7
023-ORIS800929	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
023-P041	PORTER DEWITT READY MIX CO-SOUTH PL	3273	0.0	0.0	0.0	0.0	0.3	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
025-0008	CONSUMERS OIL AND SUPPLY COMPANY-BR	5153	0.0	0.0	0.0	0.0	1.1	1.5	0.9	1.3	0.0	0.0	2.2	2.9	0.0	0.0
025-P001	HUNT MIDWEST MINING-BRAYMER QUARRY	1422	0.0	0.0	0.0	0.0	0.6	0.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
027-0001	HARBISON-WALKER REFRACTORIES-HARBIS	3255	79.5	112.8	190.2	270.0	27.5	37.3	6.8	9.4	56.8	80.5	2.7	3.8	0.0	0.0
027-0003	OVID BELL PRESS INC-FULTON	2752	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	28.1	34.6	0.0	0.0
027-0004	MO-CON INC-MO-CON INC	3273	0.0	0.0	0.0	0.0	3.8	5.3	0.8	1.2	0.0	0.0	0.0	0.0	0.0	0.0
027-0005	MERTENS CONSTRUCTION CO INC-MID-MO	1422	0.0	0.0	0.0	0.0	14.9	20.6	3.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0
027-0006	MERTENS CONSTRUCTION CO INC-AUXVASS	1422	0.0	0.0	0.0	0.0	9.7	13.4	1.6	2.3	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
027-0007	FULTON POWER PLANT-FULTON	4911	9.8	2.9	0.4	0.0	0.6	0.2	0.5	0.2	3.8	2.3	13.3	0.4	0.0	0.2
027-0008	MIDWEST PREMIX-JEFFERSON CITY	3273	0.0	0.0	0.0	0.0	1.8	2.6	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
027-0010	A. P. GREEN INDUSTRIES INC-FULTON P	3255	12.0	16.8	23.2	32.9	19.7	28.4	8.1	11.6	36.5	51.6	5.1	7.0	0.0	0.0
027-0019	ABB INC-JEFFERSON CITY PLANT	3612	6.6	8.7	0.0	0.0	4.1	7.4	2.9	5.3	5.3	6.9	32.8	66.9	0.0	0.0
027-0021	FULTON STATE HOSPITAL-FULTON	8063	7.8	8.3	0.0	0.1	0.6	0.6	0.6	0.6	6.6	7.0	1.4	1.7	0.0	0.0
027-0023	MERTENS CONSTRUCTION CO INC-REFORM	1422	0.0	0.0	0.0	0.0	5.8	8.0	1.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0
027-0026	AMERENUE-CALLAWAY NUCLEAR POWER PLA	4911	22.0	26.2	3.3	3.6	0.8	1.0	0.8	1.0	5.0	6.0	0.8	1.0	0.0	0.0
027-0033	MERTENS CONSTRUCTION CO INC-AUXVASS	1422	0.0	0.0	0.0	0.0	11.2	15.5	3.3	4.6	0.0	0.0	0.0	0.0	0.0	0.0
027-0044	FULTON SANITARY LANDFILL-FULTON SAN	4953	0.2	0.2	0.2	0.2	0.7	0.9	0.2	0.3	3.2	3.2	0.9	1.2	0.0	0.0
027-45	ECHELMEIER FARMS	241	0.0	0.0	0.0	0.0	0.5	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
027-0047	MO-CON INC-MILLERSBURG	3273	0.0	0.0	0.0	0.0	1.0	1.4	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
027-0048	CHILES WORKS LLC-FULTON	3295	0.0	0.0	0.0	0.0	54.9	79.7	18.3	25.4	0.0	0.0	0.0	0.0	0.0	0.0
027-0052	CENTRAL MISSOURI VAULT COMPANY INC-	7261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
027-0053	MID AMERICA PRECAST INC-FULTON	3273	0.1	0.1	0.0	0.0	0.7	1.1	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0
027-49530141	Fulton SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	10.2
027-ORIS801029	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
027-P028	APAC MISSOURI-MILLERSBURG - CENTRAL	2951	4.8	7.7	3.1	4.2	2.0	2.8	0.5	0.7	1.9	3.1	1.3	2.1	0.0	0.0
029-0002	BLAIR CEDAR & NOVELTY WORKS INC-CAM	2499	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8	22.6	11.5	0.0	0.0
029-0009	MODINE MANUFACTURING CO-MODINE MANU	3585	12.0	14.8	0.1	0.1	0.9	1.1	0.9	1.1	10.1	12.5	9.9	16.3	0.0	0.0
029-0016	APAC MISSOURI-CENTRAL MISSOURI DIVI	3273	0.0	0.0	0.0	0.0	5.2	7.2	1.3	1.9	0.0	0.0	0.0	0.0	0.0	0.0
029-0024	DAMSEL DRYCLEANERS-OSAGE BEACH	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.1	0.0	0.0
029-26	LANE, ALFRED	241	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
029-0028	B & M MANUFACTURING-CAMDENTON	3799	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	21.5	0.0	0.0
029-0029	OZARK READY MIX CO INC-PLANT #2 OSA	3273	0.1	0.1	0.0	0.0	1.7	2.4	0.5	0.7	0.0	0.0	0.2	0.3	0.0	0.0
029-0043	IMPERIAL FOAM-CAMDENTON	3086	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.2	33.5	0.0	0.0
029-49530142	Edward Mehl SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	2.5
029-49530143	Northwest SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	4.3
029-49530144	Modern Sanitation SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	5.4

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
031-0002	DELTA ASPHALT INC-CAPE GIRARDEAU	2951	1.0	1.7	0.1	0.1	2.9	4.4	0.4	0.7	16.4	27.1	0.3	0.5	0.0	0.0
031-0003	SOUTHEAST MISSOURI STONE CO INC-CAP	1422	0.6	0.5	0.0	0.0	17.6	24.3	4.4	6.0	0.1	0.1	0.1	0.0	0.0	0.0
031-0006	KASTEN CLAY PRODUCTS CO-JACKSON	3251	4.6	6.5	9.5	13.4	15.9	22.6	9.9	14.1	19.5	27.6	0.6	0.8	0.0	0.0
031-0008	MARTIN MARIETTA MATERIALS-APPLETON	1422	10.0	9.1	0.7	0.7	6.1	8.1	2.1	2.6	2.2	2.4	0.8	0.8	0.0	0.0
031-0009	BOWMAN MILLING CO INC-BOWMAN MILLIN	5153	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
031-0010	SOUTHEAST MISSOURI STATE UNIVERSITY	8221	41.7	43.0	284.7	290.5	3.2	3.3	1.7	1.7	32.5	33.3	0.4	0.5	0.0	0.0
031-0012	CERAMO CO INC-JACKSON	3269	9.9	11.9	4.4	6.2	43.6	61.5	33.3	47.0	8.9	12.3	200.8	404.3	0.0	0.0
031-0021	LONE STAR INDUSTRIES INC-CAPE GIRAR	3241	1,611.0	1,611.0	1,362.5	1,362.5	380.9	483.9	14.7	20.4	8,271.9	8,271.8	58.8	65.9	0.1	0.1
031-0031	RUBBERMAID-DIVISION OF NEWELL RUBBE	2514	0.9	1.2	0.0	0.0	0.5	0.8	0.5	0.7	0.2	0.2	1.1	1.7	0.0	0.0
031-46	SCHWARTZ DAIRY	241	0.0	0.0	0.0	0.0	0.5	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
031-47	SIEMERS, ARTHUR AND JERRY	241	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
031-0053	PROCTER & GAMBLE PAPER PRODUCTS CO-	2676	128.6	151.3	0.8	0.9	72.0	98.0	38.4	50.2	205.0	242.9	267.6	344.8	0.0	0.0
031-0054	FOAMEX L.P.-FOAMEX L.P.	3069	2.4	3.2	0.0	0.0	32.4	56.1	10.2	18.5	2.1	2.7	3.6	6.5	0.0	0.0
031-0058	ST. FRANCIS MEDICAL CENTER-CAPE GIR	8062	5.0	5.4	0.0	0.0	0.1	0.1	0.1	0.1	1.2	1.3	0.2	0.3	0.0	0.0
031-0061	JACKSON MUNICIPAL UTILITIES-JACKSON	4911	12.5	3.4	0.2	0.0	0.2	0.1	0.2	0.1	3.3	1.2	0.5	0.1	0.0	0.1
031-0064	BIOKYOWA INC-NASH ROAD SITE	2833	22.7	29.8	0.2	0.3	6.2	8.0	2.8	3.6	25.8	33.9	17.4	23.2	0.0	0.0
031-0066	DEER RIDGE ANIMAL HOSPITAL-DEER RID	7261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
031-0068	MIDWEST STERILIZATION CORP-JACKSON	3842	1.6	2.1	0.0	0.0	0.4	0.6	0.1	0.1	1.3	1.8	6.2	6.6	0.0	0.0
031-0072	NORDENIA U.S.A. INC-NEELY'S LANDING	2085	4.0	4.1	0.0	0.0	1.2	2.2	1.1	2.0	0.7	0.7	146.0	181.4	0.0	0.0
031-0075	TORQUE-TRACTION MANUFACTURING TECH-	3714	10.8	16.8	0.0	0.0	0.2	0.2	0.2	0.2	17.5	33.2	3.6	6.2	0.0	0.0
031-0076	SEMO READY MIX INC-CAPE GIRARDEAU	3273	0.0	0.0	0.0	0.0	3.1	4.3	0.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0
031-0081	CONSOLIDATED GRAIN AND BARGE CO-CAP	5153	0.0	0.0	0.0	0.0	1.7	2.4	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
031-0082	CO-OP SERVICE CENTER-JACKSON FACILI	2048	0.0	0.0	0.0	0.0	0.9	1.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
031-0083	TRANS MONTAIGNE PRODUCT SERVICES IN	5171	2.1	2.1	0.0	0.0	0.0	0.0	0.0	0.0	5.3	5.3	20.6	24.8	0.0	0.0
031-0090	AMERENUE-VIADUCT COMBUSTION TURBINE	4911	1.2	4.0	0.0	0.0	0.1	0.4	0.1	0.4	0.3	4.4	0.2	0.4	0.0	0.3
031-0099	SPARTECH POLYCOM-CAPE GIRARDEAU PLA	3087	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	5.9	10.6	0.0	0.0
031-0104	STRACK EXCAVATING LLC-	1429	0.0	0.0	0.0	0.0	6.4	8.9	1.7	2.4	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	CAPE GIRARDEA															
031-0105	BURFORDVILLE STONE LLC-BURFORDVILLE	1422	0.0	0.0	0.0	0.0	3.5	4.8	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0
031-49530145	Cape Girardeau SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	2.7
031-49530146	Jackson SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	6.5
031-ORIS801129	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
031-ORIS801229	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
033-0001	SINCLAIR OIL CORP-CARROLLTON STATIO	4613	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.5	79.9	103.1	0.0	0.0
033-0002	RAY CARROLL COUNTY GRAIN GROWERS-NO	5191	0.1	0.1	0.0	0.0	3.6	4.8	1.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0
033-0013	AGRISERVICES OF BRUNSWICK LLC-BRUNS	5153	0.4	0.5	0.0	0.0	15.1	20.9	7.1	9.8	0.1	0.1	0.2	0.3	0.0	0.0
033-0018	BARTLETT & COMPANY GRAIN-CARROLLTON	5153	0.0	0.0	0.0	0.0	4.3	5.9	0.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0
033-0022	CARROLLTON MUNICIPAL UTILITIES-CARR	4911	24.2	7.5	0.5	0.0	0.6	0.5	0.6	0.5	1.7	5.9	1.9	2.1	0.0	0.5
033-0023	RAY-CARROLL COUNTY GRAIN GROWERS IN	5153	0.1	0.1	0.6	0.5	4.7	6.6	1.5	2.2	0.0	0.0	0.0	0.0	0.0	0.0
033-0026	FULLER MARKETING INC-CARROLLTON	2421	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.2	0.2	7.9	16.3	0.0	0.0
033-ORIS801329	GENERIC UNIT	4911	0.0	50.9	0.0	0.0	0.0	4.2	0.0	4.2	0.0	52.1	0.0	4.4	0.0	4.1
035-0001	BEAMER HANDLE COMPANY INC-BEAMER HA	2426	0.1	0.1	0.0	0.0	2.0	3.0	1.0	1.6	0.0	0.0	6.0	12.4	0.0	0.0
035-0004	ROYAL OAK ENTERPRISES-ELLSINORE DIV	2861	58.6	71.1	0.0	0.0	717.5	866.6	697.5	842.0	3,398.1	4,101.4	2,123.7	2,562.8	0.0	0.0
035-0020	CRIDER BROTHERS QUARRY-CRIDER BROTH	1422	0.0	0.0	0.0	0.0	1.8	2.5	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
035-0021	ROYAL OAK ENTERPRISES INC-ELLSINORE	2861	0.2	0.2	0.0	0.0	11.7	14.2	6.1	7.3	0.0	0.0	0.0	0.0	0.0	0.0
037-0001	MARTIN MARIETTA-GREENWOOD QUARRY #5	1422	0.0	0.0	0.0	0.0	41.4	57.2	4.9	6.8	0.0	0.0	0.0	0.0	0.0	0.0
037-0002	MARTIN MARIETTA-PECULIAR QUARRY #52	1422	0.0	0.0	0.0	0.0	21.1	29.1	3.8	5.3	0.0	0.0	0.0	0.0	0.0	0.0
037-0003	AQUILA INC-RALPH GREEN GENERATING P	4911	13.9		0.1		2.2		2.2		3.2		0.7		0.0	
037-0006	LONE WOLF ENTERPRISES-HARRISONVILLE	3273	0.1	0.1	0.0	0.0	10.0	14.2	3.0	4.2	0.1	0.1	0.0	0.0	0.0	0.0
037-0007	LIMPUS QUARRIES INC-HARRISONVILLE	1422	21.1	65.2	1.4	4.4	64.6	91.8	6.1	10.9	4.5	14.0	2.0	6.2	0.0	0.0
037-0025	PLEASANT HILL VENEER CORP-PLEASANT	2435	12.7	18.3	0.9	1.3	7.2	10.5	4.8	6.9	21.3	30.7	5.4	5.3	0.0	0.0
037-0031	BP PIPELINES NORTH AMERICA INC-FREE	4612	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.8	27.5	0.0	0.0
037-0032	APAC KANSAS INC-HARRISONVILLE ASPHA	2951	6.8	11.1	5.2	8.5	23.5	37.8	10.4	17.1	3.2	5.3	2.5	4.1	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
037-0040	CENTURY CONCRETE-BELTON PLANT	3273	0.1	0.1	0.0	0.0	5.3	7.5	1.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0
037-0047	WHISTLE REDI-MIX INC-PLEASANT HILL	3273	0.1	0.1	0.0	0.0	13.1	18.6	4.3	6.1	0.1	0.1	0.0	0.0	0.0	0.0
037-0048	SOUTHERN STAR CENTRAL GAS PIPELINE-	4922	33.1	43.5	0.0	0.0	0.4	0.5	0.4	0.5	4.2	5.5	1.2	1.6	0.0	0.0
037-0050	SCOULAR COMPANY (THE)-HARRISONVILLE	5153	0.0	0.0	0.0	0.0	6.3	8.6	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
037-0053	BEYER CRUSHED ROCK CO-BEYER CRUSHED	1422	20.0	18.1	1.3	1.4	12.5	16.9	2.8	3.5	4.3	4.7	1.9	1.8	0.0	0.0
037-0054	CHURCH AND DWIGHT-HARRISONVILLE	2841	0.0	0.0	0.0	0.0	2.5	3.9	1.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0
037-0056	ARIES POWER PLANT-PLEASANT HILL	4911	66.5	128.6	2.3	0.0	15.0	34.6	13.9	32.8	25.7	303.5	8.7	26.0	0.0	23.7
037-0058	ONEILL MORTUARY & LIVERY-PECULIAR	7261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
037-0059	AMERICAN U.S. AGGREGATE-CLEVELAND S	1422	0.0	0.0	0.0	0.0	0.7	0.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
037-0060	CRESCENT CLEANERS-HARRISONVILLE	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.2	14.5	0.0	0.0
037-0061	ROM CORPORATION-BELTON	3714	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	7.0	0.0	0.0
037-4005	SHIRLEY'S ONE HOUR CLEANERS-SHIRLEY	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	4.0	0.0	0.0
037-49530149	A & M SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.6
039-0003	DAIRICONCEPTS-EL DORADO SPRINGS	2023	4.0	5.2	0.0	0.1	14.7	17.4	8.4	9.9	4.6	6.0	0.7	0.9	0.0	0.0
039-0012	FOAM FABRICATORS INC-FOAM FABRICATO	3086	1.5	3.4	0.0	0.0	0.1	0.3	0.1	0.3	1.3	2.8	27.9	51.5	0.0	0.0
039-0021	EWING READY MIX LLC-STOCKTON	3273	0.0	0.0	0.0	0.0	1.8	2.6	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0
041-0002	SALISBURY AG CENTER INC-SALISBURY A	2048	0.0	0.0	0.0	0.0	1.3	1.8	1.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0
041-0013	SALISBURY STATION PLATTE PIPE LINE	5172	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	21.8	0.0	0.0
041-13	HAMPTON FEEDLOT, INC.	211	0.0	0.0	0.0	0.0	24.0	26.0	3.6	3.9	0.0	0.0	0.0	0.0	0.0	0.0
041-14	MANKEN CATTLE CO.	211	0.0	0.0	0.0	0.0	11.0	11.8	1.6	1.8	0.0	0.0	0.0	0.0	0.0	0.0
041-0015	BP PIPELINES NORTH AMERICA INC-KEY	4613	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5	62.5	0.0	0.0
041-0020	DALTON ELEVATOR-DALTON	5153	0.0	0.0	0.0	0.0	1.1	1.6	1.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0
041-0032	SALISBURY MUNICIPAL UTILITIES-BOARD	4911	0.4	9.5	0.0	0.0	0.0	0.3	0.0	0.3	0.1	3.5	0.0	0.1	0.0	0.3
043-0002	CLEVER STONE COMPANY INC-CLEVER	1422	0.0	0.0	0.0	0.0	53.9	74.5	6.4	8.9	0.0	0.0	0.3	0.5	0.0	0.0
043-0003	FASCO INDUSTRIES INC-OZARK PLANT	3621	1.7	2.5	0.4	0.9	0.4	0.3	0.3	0.3	0.6	0.9	6.7	13.7	0.0	0.0
043-0004	VERMILLION INC-BILLINGS	2499	0.8	1.1	0.1	0.2	2.7	4.0	1.7	2.5	4.0	5.7	2.4	3.6	0.0	0.0
043-0005	LEO JOURNAGAN CONSTRUCTION CO-OZARK	1422	0.0	0.0	0.0	0.0	10.5	14.6	2.7	3.8	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
043-0019	DIVERSIFIED PLASTICS INC-DIVERSIFIE	2821	9.6	10.3	0.1	0.1	0.2	0.2	0.2	0.2	2.4	2.6	4.9	8.1	0.0	0.0
043-0021	KAY CONCRETE MATERIALS CO-BILLINGS	3273	0.0	0.1	0.2	0.3	3.9	5.5	1.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0
043-0028	MR. DRY CLEANERS-OZARK	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.1	0.0	0.0
043-0031	CITY WIDE CONSTRUCTION PRODUCTS INC	3273	0.0	0.0	0.1	0.2	4.1	5.8	1.2	1.8	0.0	0.0	0.1	0.2	0.0	0.0
043-0033	MFA BULK PLANT-OZARK	5191	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
045-0001	GABE LOGSDON & SONS INC-GREGORY LAN	4221	0.0	0.0	0.0	0.0	1.3	1.8	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0
045-0015	IDEAL READY MIX CO INC-KAHOKA	3273	0.0	0.0	0.0	0.0	0.6	0.9	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
045-0026	KAHOKA ELECTRIC GENERATING PLANT-KA	4911	8.7	2.4	2.4	0.0	0.4	0.1	0.3	0.1	2.3	1.2	0.4	0.0	0.0	0.1
047-0002	NATIONAL STARCH & CHEMICAL CO-NATIO	2046	43.0	56.4	105.0	130.1	141.1	174.1	7.2	8.8	36.1	47.5	115.9	146.9	0.0	0.0
047-0007	U. S. GYPSUM CO-NORTH KANSAS CITY	2631	17.3	22.7	0.1	0.1	1.5	2.0	1.4	1.9	14.5	19.1	2.3	3.1	0.0	0.0
047-0009	ARCHER DANIELS MIDLAND CO-ADM MILLI	2041	0.0	0.0	0.0	0.0	15.0	18.9	5.2	6.5	0.0	0.0	0.0	0.0	0.0	0.0
047-0011	JEFFERSON SMURFIT CORP-NORTH KANSAS	2657	0.5	0.5	0.0	0.0	0.1	0.1	0.0	0.1	0.4	0.4	30.1	38.0	0.0	0.0
047-0012	COOK COMPOSITES AND POLYMERS CO-NOR	2851	8.0	10.3	0.0	0.1	6.0	10.2	3.1	5.2	5.3	6.8	18.5	30.3	0.0	0.0
047-0019	FORD MOTOR CO-KANSAS CITY ASSEMBLY	3711	96.2	126.8	5.8	9.8	82.9	144.1	75.9	132.3	80.2	105.4	2,328.7	2,488.3	0.9	1.1
047-0025	BARTLETT GRAIN COMPANY-BIRMINGHAM	5153	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
047-0027	CARGILL INC-CHOUTEAU ELEVATOR	5153	0.0	0.0	0.0	0.0	0.2	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
047-0031	NORTHLAND READY-MIX INC-NORTHLAND R	3273	0.1	0.1	0.0	0.0	2.9	4.0	0.9	1.2	0.0	0.0	0.0	0.0	0.0	0.0
047-0032	HENRY WURST INC-NORTH KANSAS CITY	2752	1.9	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	22.7	32.2	0.0	0.0
047-0033	MIDLAND LITHOGRAPHY CO-NORTH KANSAS	2752	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	19.1	25.0	0.0	0.0
047-0040	DAVIS PAINT CO-DAVIS PAINT CO	2851	0.1	0.1	0.0	0.0	6.7	10.6	2.3	3.7	0.0	0.1	11.3	17.9	0.0	0.0
047-0042	ADM PROCESSING-NORTH KANSAS CITY	2075	36.2	47.6	0.2	0.3	19.9	25.2	11.8	14.9	30.4	40.0	290.6	272.0	0.3	0.4
047-0045	TOWNSEND COMMUNICATIONS-TOWNSEND CO	2711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	12.7	0.0	0.0
047-0046	BRENNTAG MID-SOUTH INC-BRENNTAG MID	5169	3.7	4.8	0.0	0.0	0.1	0.1	0.1	0.1	0.7	0.9	0.4	0.6	0.0	0.0
047-0052	JESCO RESOURCES INC-JESCO RESOURCES	2992	0.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.5	0.0	0.0
047-0059	HALLMARK CARDS INC-DISTRIBUTION CEN	2771	1.8	2.4	0.0	0.0	0.1	0.2	0.1	0.2	1.5	1.9	0.4	0.4	0.0	0.0
047-0070	GILMOUR HOSE COMPANY-EXCELSIOR SPRI	3052	0.2	0.3	0.0	0.0	3.5	6.5	1.4	2.6	0.1	0.0	8.8	16.2	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
047-0075	TNEMEC COMPANY INC-TNEMEC COMPANY I	2851	0.5	0.6	0.0	0.0	3.4	5.3	1.2	1.9	0.1	0.1	25.7	41.2	0.0	0.0
047-0079	CAMPBELL EARL MFG CO-CAMPBELL EARL	2851	0.0	0.0	0.0	0.0	1.4	2.2	0.5	0.8	0.0	0.0	8.3	13.2	0.0	0.0
047-0096	INDEPENDENCE POWER AND LIGHT-MISSOU	4911	259.3	838.7	1,261.6	9,292.3	11.3	760.2	2.2	744.7	4.0	39.8	0.3	4.8	0.1	2.4
047-0098	HUNT MIDWEST MINING-RANDOLPH MINE	1422	0.0	0.0	0.0	0.0	42.2	58.2	3.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0
047-0109	HOLCIM (US) INC-HOLCIM (US) INC - K	5039	0.0	0.0	0.0	0.0	1.4	2.0	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
047-0114	GREEN REDI-MIX-EXCELSIOR MIX	3273	0.0	0.0	0.0	0.0	4.2	6.0	1.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0
047-0122	BANTA PUBLICATIONS-KANSAS CITY	3714	1.8	2.4	0.0	0.0	0.1	0.2	0.1	0.2	1.5	2.0	27.2	34.3	0.0	0.0
047-0126	AMERICAN RAILCAR INDUSTRIES-FLEET S	4789	1.7	2.0	0.0	0.0	0.4	0.6	0.3	0.4	0.9	1.1	26.6	44.6	0.0	0.0
047-0132	AMERICAN ITALIAN PASTA COMPANY-AMER	2098	14.0	18.4	0.1	0.1	68.6	85.1	16.9	21.0	12.3	16.2	3.2	4.3	0.0	0.0
047-0136	O'DELL PUBLISHING CO INC-O'DELL PUB	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
047-0141	SERICOL INC-SERICOL INC	2893	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	55.2	72.3	0.0	0.0
047-0148	STAR BOARDS INC.-STAR BOARDS INC.	3089	0.1	0.2	0.0	0.0	1.7	3.0	0.0	0.1	0.1	0.1	3.6	2.2	0.0	0.0
047-0163	BINGHAM COMPANY-NORTH KANSAS CITY	3069	0.0	0.0	0.0	0.0	0.5	1.0	0.3	0.5	0.0	0.0	0.8	1.6	0.0	0.0
047-0175	VERTEX PLASTICS INC-KEARNEY	3088	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	3.8	0.0	0.0
047-0177	ARISTOCRAT MARBLE INC-BURLINGTON ST	3281	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	13.7	0.0	0.0
047-0178	HOLLAND NAMEPLATE-NORTH KANSAS CITY	3479	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0	0.0
047-2201	GEORGIA PACIFIC CORP-PACKAGING DIV	2652	3.0	3.9	0.0	0.0	0.4	0.6	0.3	0.4	2.5	3.3	2.5	3.2	0.0	0.0
047-2203	LAFARGE NORTH AMERICA INC-ARLINGTON	3273	0.3	0.3	0.0	0.0	5.2	7.3	1.9	2.7	0.1	0.1	0.0	0.0	0.0	0.0
047-2206	MASTER PITCHING MACHINE INC-MASTER	3949	0.0	0.0	0.0	0.0	3.7	6.3	1.1	1.9	0.0	0.0	6.8	14.0	0.0	0.0
047-2209	KANSAS CITY AUTO AUCTION-KANSAS CIT	5012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.4	19.7	0.0	0.0
047-2210	FORDYCE CONCRETE CO-SKILES ROAD	3273	0.2	0.3	0.0	0.0	7.1	9.9	2.1	3.0	0.1	0.0	0.0	0.0	0.0	0.0
047-2219	SUPERIOR ASPHALT COMPANY INC-KANSAS	2951	6.0	9.5	0.7	1.1	19.2	28.1	3.7	5.7	25.6	42.2	8.2	13.4	0.0	0.0
047-2221	CARTER-WATERS CORPORATION-SKILES FA	2951	0.1	0.1	0.0	0.0	3.4	5.1	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
047-2222	HERITAGE ENVIRONMENTAL SERVICES INC	5093	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
047-2224	PENNY'S CONCRETE INC-KANSAS CITY	3273	0.0	0.0	0.0	0.0	6.9	9.6	1.7	2.3	0.0	0.0	0.0	0.0	0.0	0.0
047-2227	WATER SUPPLY DIVISION-KANSAS CITY	4941	31.8	38.3	0.0	0.0	0.6	0.7	0.4	0.5	4.3	5.7	9.4	11.4	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
047-2228	AMERISTAR CASINO KANSAS CITY INC-AM	7999	8.8	9.4	0.1	0.1	0.2	0.2	0.2	0.2	2.2	2.4	0.4	0.4	0.0	0.0
047-6005	TECHNICAL COMMUNICATION SERVICES-N.	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3	13.9	0.0	0.0
049-0002	E & M READY MIX INC-E & M READY MIX	3273	0.0	0.0	0.0	0.0	2.0	2.8	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
049-0010	CAMERON CONCRETE-CAMERON	3273	0.0	0.0	0.0	0.0	4.2	5.8	1.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0
049-0011	CAMERON COOP ELEVATOR ASSN-CAMERON	5153	0.0	0.0	0.0	0.0	0.5	0.7	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0
049-0016	UNITED COOPERATIVE INC-PLATTSBURG E	5172	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	1.4	1.8	0.0	0.0
049-0025	MID-AMERICA FRAME CO INC-PLATTSBURG	2499	0.0	0.0	0.0	0.0	0.7	1.5	0.7	1.4	0.0	0.0	20.0	41.1	0.0	0.0
051-0006	LINCOLN UNIVERSITY-LINCOLN UNIVERSI	8221	1.9	2.2	0.1	0.1	0.1	0.2	0.1	0.2	1.6	1.7	0.3	0.4	0.0	0.0
051-0008	AMERENUE-MOREAU COMBUSTION TURBINE	4911	7.3		5.3		0.4		0.4		0.5		0.2		0.0	
051-0009	UNILEVER HPC USA-JEFFERSON CITY PLA	2844	4.4	5.7	2.0	2.2	1.2	2.0	0.8	1.4	3.5	4.6	18.0	36.2	0.0	0.0
051-0010	MIDWEST BLOCK & BRICK-JEFFERSON CIT	3271	0.5	0.6	0.0	0.0	3.3	4.6	1.0	1.4	0.1	0.1	0.1	0.2	0.0	0.0
051-0027	MISSOURI DEPT OF CORRECTIONS-ALGOA	9223	10.3	14.0	1.1	1.7	0.7	1.0	0.7	0.9	7.6	10.1	1.1	1.5	0.0	0.0
051-0028	VON HOFFMAN PRESS INC-JEFFERSON CIT	2732	8.0	8.5	0.0	0.0	0.2	0.3	0.2	0.3	0.0	0.0	47.0	58.7	0.0	0.0
051-0032	MODINE MANUFACTURING COMPANY-JEFFER	3714	3.9	5.1	0.0	0.0	2.9	5.1	1.7	2.9	3.2	4.3	20.0	36.4	0.0	0.0
051-0034	CAPITAL QUARRIES CO INC-JEFFERSON C	1422	0.0	0.0	0.0	0.0	10.4	14.4	3.1	4.3	0.0	0.0	0.0	0.0	0.0	0.0
051-0037	JOHNSON CONTROLS HOOVER AUTO-JOHNSO	3086	1.4	1.8	0.0	0.0	6.3	10.9	1.6	2.8	0.0	0.0	173.7	298.1	0.0	0.0
051-0040	ASPHALT PRODUCTS INC-JEFFERSON CITY	2951	3.3	5.4	0.2	0.3	22.5	37.1	4.6	7.5	6.1	10.0	2.6	4.3	0.0	0.0
051-0042	PHILLIPS PIPELINE COMPANY-JEFFERSON	5171	14.0	17.1	0.0	0.0	0.0	0.0	0.0	0.0	25.2	30.9	83.9	110.3	0.0	0.0
051-0043	COMMAND WEB OFFSET MISSOURI INC-JEF	2752	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	39.1	51.3	0.0	0.0
051-0046	CULTURED MARBLE PRODUCTS-CULTURED M	3088	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	5.8	0.0	0.0
051-0049	AMERENUE-FAIRGROUNDS COMBUSTION TUR	4911	8.5		6.2		0.5		0.5		0.6		0.2		0.0	
051-0051	DELONGS INC-DELONGS INC	3444	1.1	1.5	1.0	1.4	5.1	8.0	2.1	3.2	0.0	0.1	16.7	20.9	0.0	0.0
051-0055	MISSOURI FACILITIES MANAGEMENT DIV-	9199	4.0	5.2	0.0	0.1	0.4	0.5	0.4	0.5	1.0	1.3	0.4	0.5	0.0	0.0
051-0058	JEFFERSON CITY LANDFILL-LAIDLAW WAS	4953	10.1	10.1	3.1	3.1	13.7	17.2	8.3	9.9	90.9	91.0	3.9	4.7	0.0	0.0
051-0060	JEFFERSON CITY ANIMAL SHELTER-MILLE	752	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.2	0.0	0.0
051-0061	JEFFERSON CLEANERS-HIGH STREET	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	5.1	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
051-0063	MUENKS BROTHERS QUARRY INC-JEFFERSO	1422	1.7	1.9	0.0	0.0	6.4	8.9	1.2	1.7	0.5	0.5	0.1	0.1	0.0	0.0
051-49530152	Jefferson City Sanitary Landfill	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.0	67.3
053-0002	APAC MISSOURI-BOONVILLE ASPHALT PLA	2951	3.0	4.8	1.5	1.8	2.6	3.7	0.7	1.0	1.4	2.3	3.0	4.9	0.0	0.0
053-0003	W. R. MEADOWS, INC-BOONVILLE	2493	16.4	23.6	1.8	2.7	13.0	18.6	10.0	14.4	44.3	63.9	5.0	7.2	0.0	0.0
053-0004	APAC MISSOURI-BOONVILLE PLANT	1422	0.0	0.0	0.0	0.0	9.6	13.3	1.7	2.4	0.0	0.0	0.0	0.0	0.0	0.0
053-0011	BUTTERNUTT BREAD-INTERSTATE BRANDS	2051	1.1	1.4	0.0	0.0	0.3	0.4	0.1	0.1	0.9	1.2	34.2	41.0	0.0	0.0
053-15	NIEBRUEGGE, HILLARD	211	0.0	0.0	0.0	0.0	5.3	5.7	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0
053-0019	CATERPILLAR INC-CATERPILLAR INC	3061	2.0	2.8	0.0	0.0	2.7	4.9	1.2	2.2	1.4	1.9	25.1	50.9	0.0	0.0
053-0021	NORDYNE INC-BOONVILLE PLANT	3634	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.5	56.3	0.0	0.0
053-0024	PILOT GROVE COOP ELEVATOR-PILOT GRO	5153	0.0	0.0	0.0	0.0	4.7	6.5	1.4	1.9	0.0	0.0	0.0	0.0	0.0	0.0
053-0026	PRESTAGE QUARRIES INC-TIPTON PLANT	1422	0.0	0.0	0.0	0.0	6.0	8.4	1.6	2.2	0.0	0.0	0.0	0.0	0.0	0.0
053-0027	MISSOURI DEPT OF CORRECTIONS-BOONVI	9223	3.5	3.8	0.1	0.1	0.3	0.3	0.3	0.3	2.9	3.1	0.5	0.7	0.0	0.0
053-27	LENZ, RICHARD	241	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
053-49530153	Boonville SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	9.2
055-0002	STRUEMPH CHARCOAL-STEELVILLE PLANT	2861	3.6	4.4	0.0	0.0	0.1	0.1	0.0	0.0	1.0	1.3	0.0	0.0	0.0	0.0
055-0004	MCGINNIS WOOD PRODUCTS INC-MCGINNIS	2429	0.1	0.1	0.2	0.3	1.0	1.4	0.4	0.6	0.6	0.8	0.1	0.1	0.0	0.0
055-0005	GEORGIA PACIFIC CORPORATION-GEORGIA	3292	8.1	14.9	0.1	0.3	23.6	42.4	5.4	16.3	1.5	2.7	5.4	8.9	0.0	0.0
055-0020	WATERLAC COATING INC-WATERLAC - CUB	2851	0.1	0.0	0.4	0.4	0.3	0.4	0.0	0.0	0.0	0.0	6.6	10.5	0.0	0.0
055-0036	ENNIS PAINT INC-ENNIS PAINT INC	2851	0.0	0.0	0.0	0.0	0.3	0.4	0.1	0.2	0.0	0.0	13.3	21.1	0.0	0.0
055-0043	PARAMOUNT METALIZING CO-SULLIVAN	3052	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.4	18.2	0.0	0.0
055-5003	CRAWFORD LIME AND MATERIAL-VOSS QUA	1422	0.0	0.0	0.0	0.0	2.1	2.9	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
055-49530154	Crawford County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	3.0
055-P027	N. B. WEST CONTRACTING CO INC-BOURB	2951	2.1	1.0	0.3	0.2	15.1	24.9	4.7	7.8	8.1	13.4	0.9	1.5	0.0	0.0
057-0002	ALLEN QUARRIES INC-LOCKWOOD	1422	2.3	2.0	0.0	0.0	8.7	12.0	1.1	1.4	0.5	0.5	0.2	0.2	0.0	0.0
057-0005	MFA BULK PLANT-LOCKWOOD	2875	0.0	0.0	0.0	0.0	0.4	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
059-0005	DALLAS COUNTY FARMERS EXCHANGE-URBA	5153	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
059-0009	NEMO SAND & GRAVEL QUARRY-BUFFALO	1422	4.2	3.8	0.3	0.3	11.9	16.4	2.5	3.4	0.9	1.0	0.4	0.4	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
061-0003	NORRIS ASPHALT PAVING CO-GALLATIN	1422	0.0	0.0	0.0	0.0	2.0	2.8	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
061-0010	LANDMARK MFG CORP-LANDMARK MFG CORP	3443	1.8	2.3	1.0	1.2	1.8	2.7	0.6	1.0	0.6	0.7	12.0	24.4	0.0	0.0
061-0012	MFA AGRI SERVICES-PATTONSBURG	5153	0.0	0.0	0.1	0.1	0.7	1.0	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
061-0016	NORRIS ASPHALT PAVING CO-ROUTE C QU	1422	0.0	0.0	0.0	0.0	0.8	1.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
061-0023	GALLATIN POWER PLANT-GALLATIN	4911	0.0	3.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	1.1	0.0	0.1	0.0	0.1
061-0026	PREMIUM STANDARD FARMS-PATTONSBURG	2048	0.8	1.1	0.0	0.0	7.1	8.9	0.9	1.2	0.7	0.9	0.1	0.2	0.0	0.0
061-ORIS8017	GALLATIN #2	4911	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
063-0009	MAGELLAN PIPELINE COMPANY LLC-OSBOR	4613	65.6	79.0	0.5	0.6	2.6	3.0	2.2	2.6	27.3	32.9	4.8	5.8	0.0	0.0
063-0013	UNITED COOPERATIVE INC-OSBORN ELEVA	5153	0.0	0.0	0.0	0.0	0.4	0.5	0.1	0.1	0.0	0.0	0.9	1.2	0.0	0.0
063-0014	CAMERON MUNICIPAL WATER TREATMENT-C	4952	3.2	4.2	0.2	0.3	0.2	0.4	0.2	0.3	0.7	1.1	0.3	0.4	0.0	0.0
063-0015	MISSOURI DEPT OF CORRECTIONS-CROSSR	9223	1.1	1.2	0.0	0.0	0.2	0.2	0.2	0.2	1.9	2.0	0.3	0.3	0.0	0.0
065-0021	SALEM MEMORIAL HOSPITAL-SALEM MEMOR	8062	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
065-0034	PERSONAL TOUCH CLEANERS-SALEM	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	4.6	0.0	0.0
065-0038	ROYAL OAK ENTERPRISES INC-SALEM BRI	2861	34.4	49.4	1.7	2.5	57.3	78.1	34.3	47.3	41.2	59.4	8.9	14.1	0.0	0.0
065-0039	SALEM WOOD PRODUCTS-SALEM	2429	0.2	0.3	0.0	0.0	12.0	17.5	4.8	7.0	0.6	0.8	0.0	0.0	0.0	0.0
065-49530156	Salem SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	3.1
069-0002	FEDERAL MOGUL CORPORATION-FEDERAL M	3365	1.4	1.8	0.1	0.2	2.1	1.9	1.6	1.4	1.1	1.4	3.8	7.3	0.0	0.0
069-0007	EDMONSTON GIN COMPANY-HORNERSVILLE	724	0.0	0.0	0.0	0.0	7.7	10.7	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
069-0009	EMERSON ELECTRIC COMPANY-KENNETT PL	3621	1.3	1.4	0.6	0.6	8.1	13.5	6.7	11.2	0.5	0.6	31.2	63.9	0.0	0.0
069-0010	WHITE OAK GIN COMPANY INC-WHITE OAK	724	0.0	0.0	0.0	0.0	8.8	12.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
069-0014	GRAVES KENNETT GIN-KENNETT	724	0.2	0.2	0.0	0.0	5.1	7.1	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0
069-0016	STEPHENS GIN CO INC-STEPHENS GIN CO	724	0.0	0.0	0.0	0.0	6.5	9.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
069-0018	FARMERS UNION GIN-FARMERS UNION GIN	724	0.0	0.0	0.0	0.0	25.8	35.8	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
069-0022	PARKER HANNIFIN CORPORATION-PARKER	3052	1.2	1.6	0.0	0.0	0.1	0.1	0.1	0.1	0.7	1.0	6.8	12.6	0.0	0.0
069-0025	MISSOURI MOTE COTTON LLC-MISSOURI M	724	0.2	0.3	0.0	0.0	3.7	5.2	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
069-0027	FOUR WAY GIN COMPANY-FOUR WAY GIN C	724	0.1	0.1	0.0	0.0	6.4	8.9	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
069-0029	CARDWELL COOPERATIVE INC-CARDWELL C	724	0.0	0.0	0.0	0.0	5.5	7.7	2.4	3.4	0.0	0.0	0.0	0.0	0.0	0.0
069-0032	STOKES MAYBERRY GIN COMPANY-STOKES	724	0.0	0.0	0.0	0.0	3.3	4.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
069-0034	MALDEN MUNICIPAL POWER & LIGHT-MALD	4911	4.0	13.8	0.3	0.0	0.3	0.8	0.3	0.8	0.8	9.9	0.3	0.3	0.0	0.8
069-0063	KENNETT GENERATING PLANT-KENNETT GE	4911	12.4	29.5	0.2	0.2	0.2	1.2	0.2	1.2	1.7	14.3	9.7	18.0	0.0	1.0
069-0064	CAMPBELL MUNICIPAL POWER PLANT-CAMP	4911	5.3	0.0	0.3	0.0	0.4	0.0	0.3	0.0	1.1	0.0	0.5	0.0	0.0	0.0
069-0066	ASSOCIATED ELECTRIC COOPERATIVE INC	4911	70.6	309.1	1.3	1.9	8.8	45.2	7.7	43.3	32.2	438.4	12.8	40.9	0.0	30.0
069-0068	DALTON COTTON COMPANY INC-SENATH PL	724	0.0	0.0	0.0	0.0	12.4	17.3	0.8	1.2	0.0	0.0	0.0	0.0	0.0	0.0
071-0003	AMERENUE-LABADIE PLANT	4911	7,820.9	10,806.6	48,774.5	69,489.8	1,001.0	1,962.4	671.1	1,625.8	2,102.0	2,078.1	257.6	255.1	0.0	124.7
071-0007	SPORLAN VALVE COMPANY-PLANT #1 - EA	3494	0.4	0.4	0.8	0.9	0.0	0.0	0.0	0.0	0.1	0.1	6.4	16.4	0.0	0.0
071-0013	JEFFERSON PRODUCTS CO-WASHINGTON	3585	0.3	0.3	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	6.0	11.8	0.0	0.0
071-0014	CANAM STEEL CORP-CANAM STEEL CORP	3441	3.9	9.8	0.1	0.1	1.9	3.0	1.1	2.0	0.0	0.0	88.5	366.0	0.0	0.0
071-0015	HAVIN MATERIAL SERVICE-ST. CLAIR PL	3273	0.0	0.0	0.0	0.0	1.9	2.6	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
071-0019	FASCO INDUSTRIES INC-VON WEISE GEAR	3621	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	2.6	5.0	0.0	0.0
071-0020	STEELWELD EQUIPMENT CO-ST. CLAIR	3713	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.6	32.8	0.0	0.0
071-0022	WILLIAM D DAWSON INC-DAWSON QUARRY	1422	0.0	0.0	0.0	0.0	4.6	6.4	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0
071-28	KLOPPE, LEE	241	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
071-29	RIEGEL FARMS INCORPORATED	241	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
071-0030	MFA FEEDS-GERALD	2048	0.2	0.3	0.1	0.1	4.3	5.5	2.0	2.7	0.1	0.1	0.0	0.0	0.0	0.0
071-0031	JEFFERSON SMURFIT CORP-PACIFIC	2657	0.2	0.2	0.0	0.0	0.4	0.6	0.1	0.0	0.1	0.0	29.8	39.4	0.0	0.0
071-0048	ST. CLAIR DIE CASTING LLC-ST. CLAIR	3369	3.5	3.7	0.0	0.0	1.4	1.2	1.2	1.0	2.7	2.9	2.9	5.1	0.0	0.0
071-48	SCHEER'S DAIRY FARM, LLC	241	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
071-0050	RIVERSTONE QUARRY INC-RIVERSTONE QU	1422	0.7	1.0	0.1	0.1	6.2	8.6	1.5	2.0	2.8	3.8	0.0	0.0	0.0	0.0
071-0068	MERAMEC INDUSTRIES INC-RAMSEY ST PL	3089	0.4	0.3	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	85.6	244.9	0.0	0.0
071-0071	REXHAM CONTAINERS-REXHAM CONTAINERS	3089	0.0	0.0	0.0	0.0	2.3	4.0	1.6	2.7	0.0	0.0	4.2	5.4	0.0	0.0
071-0080	SPARTAN SHOWCASE INC-UNION	2541	0.5	0.5	0.0	0.0	1.9	2.9	1.0	1.5	0.0	0.0	15.6	32.1	0.0	0.0
071-0087	BULL MOOSE TUBE COMPANY-BULL MOOSE	3317	0.9	1.0	0.0	0.0	0.9	1.2	0.0	0.0	0.1	0.1	11.3	33.4	0.0	0.0
071-0114	MERTENS CONSTRUCTION CO INC-NEW HAV	1422	0.0	0.0	0.0	0.0	5.4	7.5	0.7	0.9	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
071-0117	PRECISION REBUILDERS INC-PRECISION	7539	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	3.7	6.8	0.0	0.0
071-0128	FRED WEBER INC-FRANKLIN COUNTY ASPH	2951	1.6	3.5	0.1	0.2	1.3	1.9	0.3	0.4	2.2	3.9	1.2	1.9	0.0	0.0
071-0129	GDX AUTOMOTIVE - BERGER-BERGER	3999	2.1	2.7	0.0	0.0	0.2	0.2	0.1	0.2	1.7	2.3	20.9	48.4	0.0	0.0
071-0130	LITTLE CREEK FARM-LITTLE CREEK FARM	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
071-0131	SULLIVAN PRECISION METAL FINISHING	3471	1.2	1.6	0.0	0.0	0.2	0.2	0.2	0.2	1.0	1.4	12.5	33.1	0.0	0.0
071-0132	SPORLAN VALVE COMPANY-PLANT #2 - WE	3491	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.8	47.2	0.0	0.0
071-0137	BARRETT MATERIALS INC-NEW HAVEN	1422	4.2	3.8	0.3	0.3	4.1	5.6	1.2	1.6	0.9	1.0	0.4	0.4	0.0	0.0
071-0144	INTEGRAM - ST LOUIS SEATING-PACIFIC	2531	0.7	1.1	0.0	0.0	0.1	0.0	0.0	0.0	0.6	0.8	35.0	78.9	0.0	0.0
071-0151	AEROFIL TECHNOLOGY INC-AEROFIL TECH	2899	2.1	2.7	0.0	0.0	6.6	10.9	6.1	10.0	0.4	0.5	77.3	109.4	0.0	0.0
071-0153	MAGNET LLC-WASHINGTON	3993	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6	21.1	0.0	0.0
071-0154	MARBLE DECOR INC-MARBLE DECOR INC	3089	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	34.5	0.0	0.0
071-0156	NORTHSIDE LANDFILL INC-NORTHSIDE LA	4953	0.0	0.0	0.0	0.0	5.3	7.1	1.6	2.1	0.2	0.3	4.4	6.6	0.0	0.0
071-0157	PLAZE INCORPORATED-PLAZE INCORPORAT	2899	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.9	1,273.7	0.0	0.0
071-0166	STILLWATER SUPPLY COMPANY-SULLIVAN	3792	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0	0.0
071-0173	GDX AUTOMOTIVE - DANNY SCOTT DRIVE-	3069	0.9	1.2	0.0	0.0	0.1	0.1	0.1	0.1	0.8	1.1	37.9	72.2	0.0	0.0
071-0178	SPORLAN VALVE COMPANY-PLANT #3 - LA	3494	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	40.7	0.0	0.0
071-0181	PAUWELS TRANSFORMERS-PAUWELS DRIVE	3612	5.4	2.6	0.0	0.0	0.2	0.2	0.2	0.2	1.1	0.5	16.5	38.5	0.0	0.0
071-0192	CDEX INC-CDEX INC	3541	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	3.9	0.0	0.0
071-0201	RAWLINGS SPORTING GOODS CO-WASHINGT	3949	0.1	0.1	0.0	0.0	4.0	7.4	1.4	2.6	0.0	0.0	30.4	60.3	0.0	0.0
071-4002	HAZEL PROMOTIONAL PRODUCTS-WASHINGT	2771	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.5	0.0	0.0
071-49530158	Washington SW Municipal Stuetterman	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
071-49530159	Generally Hauling SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	7.3
071-49530160	Midwest SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	25.4
071-49530161	Northside SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
071-49530162	Hunter SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	11.4
071-0003N	AMERENUE	4911	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	3.2
071-P123	N. B. WEST CONTRACTING CO INC-PACIF	2951	1.2	1.8	0.5	0.1	1.7	2.4	0.4	0.6	2.0	3.4	0.0	0.0	0.0	0.0
073-0008	VON HOFFMANN GRAPHICS	2752	1.7	2.2	0.0	0.0	0.5	0.7	0.3	0.4	1.4	1.9	83.7	102.5	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	INC-OWENSVILL															
073-0011	EMHART GLASS/LACLEDE CHRISTY CLAY P	3255	0.4	0.7	0.0	0.0	2.0	2.9	0.1	0.1	0.2	0.3	0.4	0.7	0.0	0.0
073-0014	TWO RIVERS SAND & GRAVEL CO INC-TWO	1442	0.5	1.1	0.0	0.1	1.1	1.6	0.3	0.4	0.1	0.3	0.1	0.1	0.0	0.0
073-0029	AMF BILLIARDS & GAMES-MAIN PLANT	3949	0.0	0.0	0.0	0.0	3.0	4.5	1.7	2.5	0.0	0.0	21.5	44.4	0.0	0.0
073-0031	HOUSE OF METAL ENCLOSURES INC-HOUSE	3444	0.5	0.9	0.0	0.1	0.2	0.4	0.0	0.0	0.0	0.0	15.9	14.8	0.0	0.0
073-0043	OWENSVILLE POWER PLANT-OWENSVILLE P	4911	0.2	4.8	0.0	0.0	0.0	0.1	0.0	0.1	0.1	1.7	0.0	0.1	0.0	0.1
073-49530163	Gasconade-Morrison SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.1
073-49530164	Hermann SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	14.1
073-49530165	Kahle SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	73.0	109.3
075-0014	PIERCE CONCRETE-STANBERRY PLANT	3273	0.0	0.0	0.0	0.0	1.6	2.4	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
075-0023	ALBANY MUNICIPAL POWER PLANT-ALBANY	4911	0.0	7.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	2.6	0.0	0.1	0.0	0.2
075-0024	STANBERRY	4911	0.0		0.0		0.0		0.0		0.0		0.0		0.0	
077-0001	MISSISSIPPI LIME CO-MISSISSIPPI LIM	3274	15.8	22.4	1.0	1.3	52.7	65.0	9.7	12.0	11.4	13.5	9.3	11.9	0.0	0.0
077-0004	CARLISLE POWER TRANSMISSION PRODUCT	3052	37.0	61.9	156.6	261.6	11.9	20.4	6.2	10.4	3.6	6.0	94.2	191.8	0.0	0.0
077-0005	CITY UTILITIES OF SPRINGFIELD MISSO	4911	5,346.1	5,104.5	5,790.1	7,042.2	291.4	1,582.1	181.3	1,151.8	249.2	235.8	30.6	28.9	1.4	14.1
077-0006	SPRINGFIELD UNDERGROUND INC-SPRINGF	1422	0.0	0.0	0.0	0.0	14.4	19.9	4.1	5.6	0.0	0.0	0.0	0.0	0.0	0.0
077-0008	BRISTOL MANUFACTURING CORP-BRISTOL	2022	1.8	2.6	0.0	0.0	0.6	1.0	0.1	0.2	1.2	1.6	86.0	66.1	0.0	0.0
077-0009	SPRINGFIELD READY MIX-SPRINGFIELD R	3273	0.1	0.1	0.0	0.0	2.1	2.9	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
077-0010	AARONS AUTOMOTIVE PRODUCTS INC-WEST	3714	1.4	2.3	0.9	1.1	0.5	0.6	0.4	0.5	14.1	43.0	43.7	77.4	0.0	0.0
077-0011	INTERSTATE BRANDS CORPORATION-BUTTE	2051	1.4	1.8	0.0	0.0	0.1	0.1	0.1	0.1	1.1	1.4	15.1	17.2	0.0	0.0
077-0013	VERMILLION CO INC-VERMILLION CO INC	2431	0.6	0.9	0.1	0.1	4.1	5.9	2.0	2.8	3.0	4.3	7.8	12.5	0.0	0.0
077-0014	RECKITT BENCKISER-SPRINGFIELD	2099	3.9	5.0	0.0	0.0	0.4	0.5	0.3	0.4	1.0	1.3	1.2	1.4	0.0	0.0
077-0015	CONCRETE CO OF SPRINGFIELD (CONCO)-	3273	0.1	0.1	0.0	0.0	3.2	4.5	0.6	0.9	0.0	0.0	0.0	0.1	0.0	0.0
077-0017	CLARIANT LIFE SCIENCE MOLECULES-CLA	2833	12.1	14.8	0.1	0.2	3.8	6.6	2.1	3.2	3.0	3.7	12.8	23.8	0.0	0.0
077-0018	RICH MIX PRODUCTS INC-RICH MIX PROD	2899	0.4	0.5	1.6	2.2	1.0	1.4	0.2	0.3	0.9	1.3	0.1	0.2	0.0	0.0
077-0021	SWEETHEART CUP-SWEETHEART CUP	2656	8.0	9.1	0.0	0.0	0.2	0.2	0.1	0.2	1.8	2.0	4.2	5.6	0.0	0.0
077-0025	NORTHRUP GRUMMAN COMPONENT-NORTHRUP	3679	4.9	6.4	0.0	0.0	0.2	0.3	0.2	0.3	4.1	5.4	0.6	0.7	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
077-0026	KRAFT FOODS NORTH AMERICA INC-KRAFT	2022	14.1	18.4	0.1	0.1	11.0	13.2	7.2	8.6	11.9	15.5	5.8	7.2	0.0	0.0
077-0027	BASS PRO SPORTSMANS PARK-BASS PRO S	3949	3.6	4.8	0.0	0.0	2.4	4.5	2.1	3.9	3.0	3.9	4.8	8.6	0.0	0.0
077-0028	ST. JOHN'S REGIONAL HEALTH CENTER-S	8062	19.2	26.2	0.2	0.3	1.2	1.6	1.1	1.6	15.1	20.2	2.4	3.3	0.0	0.0
077-30	DAVIS BROS. DAIRY MILKING	241	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
077-0031	PURINA MILLS-PURINA MILLS	2048	0.5	0.7	0.0	0.0	2.0	2.5	0.2	0.2	0.4	0.6	0.1	0.1	0.0	0.0
077-0034	LESTER E COX MEDICAL CENTER-NORTH	8062	2.9	4.1	0.0	0.0	0.1	0.2	0.1	0.2	0.7	1.0	0.2	0.3	0.0	0.0
077-0035	US MEDICAL CENTER FOR FEDERAL PRISO	8062	10.3	13.6	0.2	0.3	0.2	0.4	0.2	0.3	2.6	3.4	0.5	0.7	0.0	0.0
077-0036	DAIRY FARMERS OF AMERICA INC-SPRING	2023	7.0	9.3	2.4	4.1	0.5	0.7	0.5	0.7	5.5	7.3	2.1	2.7	0.0	0.0
077-0037	ADM ALLIANCE NUTRITION INC-ADM ALLI	2048	1.7	2.2	0.0	0.0	2.3	2.8	0.2	0.2	0.4	0.5	0.1	0.1	0.0	0.0
077-0039	CITY UTILITIES OF SPRINGFIELD MISSO	4911	2,004.7	1,568.5	3,439.3	2,111.3	253.9	347.3	106.8	241.0	181.7	210.6	19.5	29.6	0.9	12.1
077-0040	CONCO QUARRIES INC-CONCO QUARRIES I	1422	0.0	0.0	0.0	0.0	26.2	36.3	4.6	6.3	0.0	0.0	0.0	0.0	0.0	0.0
077-0043	KERR-MCGEE CHEMICAL-SPRINGFIELD	2491	0.0	0.0	0.0	0.0	16.1	24.0	8.8	13.1	0.0	0.0	0.0	0.0	0.0	0.0
077-0045	STANDARD ELECTRIC STEEL CASTING CO-	3325	1.1	2.0	5.0	9.7	0.7	1.4	0.3	0.6	0.0	0.0	0.0	0.1	0.0	0.0
077-0046	GENERAL COUNCIL OF THE ASSEMBLIES O	2721	1.6	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	4.1	5.9	0.0	0.0
077-0047	SOUTHWEST MO STATE UNIV-PHYSICAL PL	8221	21.0	22.4	0.1	0.1	0.5	0.5	0.5	0.5	5.2	5.5	1.1	1.1	0.0	0.0
077-0050	HUDSON FOODS INC-SPRINGFIELD PLANT	2015	9.8	12.8	0.1	0.1	0.6	0.8	0.6	0.8	8.2	10.8	1.2	1.6	0.0	0.0
077-0051	3M COMPANY-SPRINGFIELD ITSD/TMD	2891	8.7	11.3	0.0	0.0	17.9	31.0	16.1	28.0	2.2	2.8	108.2	198.3	0.0	0.0
077-0052	PAUL MUELLER-PAUL MUELLER	3443	2.4	3.1	0.0	0.0	5.0	8.7	1.4	2.3	0.8	1.1	8.2	16.5	0.0	0.0
077-0055	HCI CHEMTECH DISTRIBUTORS INC - SPF	5169	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0
077-0056	GENERAL ELECTRIC-SPRINGFIELD	3621	9.9	13.0	0.1	0.2	18.0	28.1	8.2	11.1	8.3	10.8	27.8	49.2	0.1	0.2
077-0058	ADM ALLIANCE NUTRITION-SPRINGFIELD	2048	0.6	0.7	0.0	0.0	3.9	4.8	0.3	0.3	0.1	0.2	0.0	0.1	0.0	0.0
077-0059	EVANGEL UNIVERSITY-EVANGEL UNIVERSI	8221	1.9	2.1	0.1	0.1	0.1	0.1	0.1	0.1	1.5	1.6	0.2	0.3	0.0	0.0
077-0069	LOREN COOK CO-DALE ST PLANT	3444	1.3	1.7	0.0	0.0	1.0	1.9	0.6	1.1	0.1	0.2	15.8	30.6	0.0	0.0
077-0083	GLENSTONE BLOCK CO-GLENSTONE BLOCK	3271	0.1	0.1	0.0	0.0	4.0	5.7	1.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0
077-0116	MAGELLAN PIPELINE COMPANY LLC-SPRIN	4613	6.5	6.5	0.0	0.0	0.0	0.0	0.0	0.0	16.3	16.4	47.0	52.7	0.0	0.0
077-0131	APAC MISSOURI-WILLARD PLANT 2	2951	14.0	22.6	2.7	4.2	6.8	9.6	2.4	3.5	6.6	10.9	12.6	20.8	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
077-0142	CONCRETE COMPANY OF SPRINGFIELD-BRO	3273	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
077-0145	CITY UTILITIES OF SPRINGFIELD-MAIN	4911	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
077-0153	GREENLAWN FUNERAL HOME-GREENLAWN FU	7261	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
077-0161	SPRINGFIELD SANITARY LANDFILL-WILLA	4953	2.7	2.7	1.1	1.1	17.7	23.9	0.9	1.0	53.8	55.0	8.5	11.5	0.0	0.0
077-0163	CITY UTILITIES OF SPRINGFIELD-FULBR	9631	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
077-0164	CITY UTILITIES OF SPRINGFIELD-N L M	4911	35.8	64.3	0.1	0.2	0.8	1.3	0.8	1.3	64.7	116.6	1.7	1.1	0.0	0.0
077-0165	FAMILY DRY CLEANERS-REPUBLIC	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	3.4	0.0	0.0
077-0166	RIDEWELL CORPORATION-SPRINGFIELD	3714	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.5	31.9	0.0	0.0
077-0167	SRC AUTOMOTIVE-SPRINGFIELD - CALHOU	3714	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.1	8.0	16.4	0.0	0.0
077-0200	TRINITY INDUSTRIES INC-TRINITY INDU	4789	0.0	0.0	0.0	0.0	0.4	0.8	0.4	0.7	0.0	0.0	15.3	27.4	0.0	0.0
077-0201	EARTHGRAINS CO OF SPRINGFIELD-EARTH	2045	1.6	1.9	0.0	0.0	0.3	0.3	0.2	0.3	1.3	1.7	42.7	50.3	0.0	0.0
077-0202	EARL SCHEIB AUTOMOTIVE PAINT FINISH	2851	0.1	0.2	0.0	0.0	1.6	2.6	0.6	0.9	0.0	0.0	14.2	22.6	0.0	0.0
077-0203	CRESCENT FEED CO INC-CRESCENT FEED	2048	0.4	0.5	0.0	0.0	5.5	6.8	0.4	0.5	0.1	0.1	0.0	0.1	0.0	0.0
077-0204	PRESTRESSED CASTING CO-PRESTRESSED	3272	0.6	0.8	0.0	0.0	1.1	1.8	0.5	0.8	0.1	0.1	0.1	0.1	0.0	0.0
077-0205	STONE CONTAINER CORPORATION-STONE C	2653	2.8	3.7	0.0	0.0	2.0	2.8	1.2	1.7	2.3	3.0	3.0	4.1	0.0	0.0
077-0209	LESTER E COX MEDICAL CENTER-SOUTH	8062	13.1	17.6	0.3	0.3	0.3	0.5	0.3	0.5	4.0	5.4	0.7	1.1	0.0	0.0
077-0216	OZARKS CULTURED MARBLE-OZARKS CULTU	3281	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	4.3	0.0	0.0
077-0219	KOCH MATERIALS COMPANY-SPRINGFIELD	2951	0.4	0.5	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.4	0.1	0.1	0.0	0.0
077-0220	MISSOURI NATIONAL GUARD-AVIATION RE	3999	0.9	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.9	6.4	14.5	0.0	0.0
077-0222	SPRINGGREENE CREMATORY-SPRINGGREENE	7261	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.0	0.0
077-0225	PROFORMANCE POWERTRAIN PRODUCTS-ENG	3714	1.0	1.6	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.3	0.2	0.3	0.0	0.0
077-0226	LEONS WOODWORKS LTD-SPRINGFIELD	2434	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	5.1	0.0	0.0
077-0227	SCURLOCK INDUSTRIES OF SPRINGFIELD-	3272	0.1	0.1	0.0	0.0	0.7	1.0	0.2	0.3	0.1	0.1	2.1	4.3	0.0	0.0
077-0228	SUPERIOR SOLVENTS & CHEMICALS-SUPER	5169	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.0	0.0
077-0229	LOREN COOK CO-BARNES ST PLANT	3564	1.0	1.4	0.0	0.0	0.2	0.3	0.2	0.3	0.0	0.0	6.2	7.8	0.0	0.0
077-0231	LAFARGE BUILDING MATERIALS	3273	0.0	0.0	0.0	0.0	0.7	1.0	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	INC-SPRI															
077-0232	TRACKER MARINE-SPRINGFIELD PLANT	3732	0.2	0.2	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.2	8.7	18.0	0.0	0.0
077-0233	SPRINGFIELD COACH BUILDERS-SPRINGFI	3711	0.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	7.5	0.0	0.0
077-0234	NORTH STAR BATTERY CO LLC-SPRINGFIE	3691	0.5	0.6	0.0	0.0	0.1	0.1	0.1	0.1	0.4	0.5	0.1	0.1	0.0	0.0
077-0235	MAIMAN COMPANY (THE)-SPRINGFIELD	2431	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	9.3	19.1	0.0	0.0
077-0236	POSITRONIC INDUSTRIES INC-SPRINGFIE	3678	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.2	0.0	0.0
077-0240	WEBCO INC-SPRINGFIELD	3585	4.2	6.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	33.0	43.4	0.0	0.0
077-0304	LLOYDS DRYCLEANING-LLOYDS DRYCLEANI	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	12.3	0.0	0.0
077-0321	GOODALE'S CLEANERS-GOODALE'S CLEANE	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	10.7	0.0	0.0
077-0326	GLO DRY CLEANING SPECIALISTS-CENTRA	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	5.4	0.0	0.0
077-0327	GLO DRY CLEANING SPECIALISTS-ATLANT	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.7	0.0	0.0
077-0328	GLO DRY CLEANING SPECIALISTS-WEDGEW	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.1	0.0	0.0
077-0329	GLO DRY CLEANING SPECIALISTS-UNIVER	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	5.2	0.0	0.0
077-0330	GLO DRY CLEANING SPECIALISTS-PLAZA	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	5.1	0.0	0.0
077-6012	MCCANN SOUTHWORTH PRINTING-MCCANN S	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7	13.3	0.0	0.0
077-49530166	Springfield SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	11.1
077-0004N	DAYCO PRODUCTS INC	9999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5
079-0004	MODINE MANUFACTURING COMPANY-TRENTO	3714	3.1	4.3	0.0	0.0	3.6	6.8	2.0	3.7	2.7	3.5	15.2	30.4	0.0	0.0
079-0005	CONAGRA FOOD PRODUCTS-TRENTON	2011	18.8	24.7	0.6	0.7	1.4	1.8	1.4	1.8	15.3	20.0	32.0	64.3	0.0	0.0
079-0010	TRENTON MUNICIPAL UTILITIES-TRENTON	4911	0.0	5.4	0.0	0.0	0.0	0.2	0.0	0.2	0.0	2.0	0.0	0.1	0.0	0.2
079-0016	NORRIS ASPHALT PAVING CO-TRENTON QU	1422	0.0	0.0	0.0	0.0	1.8	2.4	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
079-0027	TRENTON MUNICIPAL UTILITIES-TRENTON	4911	1.2	14.8	0.0	0.0	0.0	0.4	0.0	0.4	0.3	5.4	0.1	0.5	0.0	0.4
079-ORIS7935	TRENTON SOUTH	4911	0.0	8.9	0.0	0.0	0.0	0.3	0.0	0.3	0.0	3.3	0.0	0.3	0.0	0.3
081-0010	MAGELLAN PIPELINE COMPANY LLC-RIDGE	4613	102.2	123.0	0.8	0.9	4.0	4.8	3.7	4.5	42.6	51.3	7.5	9.1	0.0	0.0
081-0015	BETHANY MUNICIPAL POWER PLANT-PLANT	4911	0.8	3.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	1.1	0.1	0.0	0.0	0.1
081-0017	NORRIS ASPHALT PAVING CO-NORTH BETH	1422	0.0	0.0	0.0	0.0	2.9	3.9	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0
081-0018	NORRIS ASPHALT PAVING CO-	1422	0.0	0.0	0.0	0.0	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	JEFFRIES Q															
081-0020	WAHOO CONCRETE-BETHANY	3272	0.0	0.0	0.0	0.0	1.2	1.7	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
081-0021	KOCH PIPELINE COMPANY LP-EAGLEVILLE	4612	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.2	15.9	0.0	0.0
083-0001	KANSAS CITY POWER & LIGHT CO-MONTRO	4911	5,630.4	6,645.2	16,213.0	21,756.6	285.1	580.8	159.8	423.3	429.5	593.6	52.6	73.0	0.8	35.6
083-0011	HILTY QUARRIES INC-TIGHTWAD (LEESVI	1422	0.0	0.0	0.0	0.0	11.6	16.0	1.6	2.3	0.0	0.0	0.0	0.0	0.0	0.0
083-0030	CLINTON READY MIX-CLINTON	3273	0.0	0.0	0.0	0.0	2.2	3.1	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
083-0031	TRACKER MARINE-CLINTON PLANT	3732	1.2	1.5	0.0	0.0	0.2	0.4	0.1	0.1	0.2	0.3	102.6	190.0	0.0	0.0
083-0033	SCHREIBER FOODS INC-PACKAGING CONVE	2671	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	31.2	39.3	0.0	0.0
083-0040	WINDSOR CONCRETE CO-WINDSOR CONCRET	3273	0.0	0.0	0.0	0.0	0.2	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
083-49530169	Henry County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	5.4
083-49530170	Ellis Scott SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	3.7
083-49530171	Clinton SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	12.8
083-P025	HILTY QUARRIES INC-CREIGHTON (URICH	1422	0.0	0.0	0.0	0.0	2.8	3.8	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0
085-31	MARTIN, FREDDIE	241	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
087-0001	EXIDE TECHNOLOGIES-CANON HOLLOW	3341	6.3	10.3	323.5	705.1	16.0	34.8	0.1	0.2	2.9	3.7	94.6	206.0	0.0	0.0
087-0002	NORRIS ASPHALT PAVING CO-MAITLAND Q	1422	0.0	0.0	0.0	0.0	4.1	5.7	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
087-0016	GOLDEN TRIANGLE ENERGY-CRAIG	2869	32.9	71.8	0.2	0.4	27.9	35.2	10.6	14.8	28.1	60.8	68.3	82.5	0.0	0.0
087-64437-GLDNT-150	GOLDEN TRIANGLE ENERGY	2869	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
089-0002	CENTRAL METHODIST COLLEGE-CENTRAL M	8221	1.3	1.4	0.0	0.0	0.1	0.1	0.1	0.1	1.1	1.1	0.2	0.2	0.0	0.0
089-0004	BOB MONNIG INDUSTRIES INC-BOB MONNI	3441	1.7	2.2	0.0	0.0	3.1	5.4	2.7	4.8	1.4	1.8	0.2	0.3	0.0	0.0
089-0006	MISSOURI-PACIFIC LUMBER CO INC-MISS	2421	0.9	1.3	0.0	0.1	2.9	4.3	1.4	2.1	8.1	11.6	1.5	2.1	0.0	0.0
089-0015	MFA GLASGOW - ARMSTRONG-ARMSTRONG P	5153	0.0	0.0	0.0	0.0	0.7	1.0	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0
089-0018	MFA COOP - GLASGOW-GLASGOW FACILITY	5153	0.0	0.0	0.0	0.0	4.6	6.4	4.1	5.7	0.0	0.0	0.0	0.0	0.0	0.0
089-0023	GLASGOW QUARRIES INC-GLASGOW	1422	4.9	9.5	0.4	0.8	6.4	9.3	0.9	1.6	1.3	2.7	0.6	1.1	0.0	0.0
089-0026	MFA GLASGOW - GLASGOW EAST AGRONOMY	5191	0.0	0.0	0.0	0.0	0.3	0.4	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
091-0005	SMITH FLOORING COMPANY-MOUNTAIN VIE	2426	21.1	30.4	1.1	1.6	9.4	13.6	5.4	7.7	25.9	37.3	2.9	4.2	0.0	0.0
091-0009	AMYX INDUSTRIES INC-PLANT 1	2499	0.8	1.2	0.0	0.1	4.4	6.4	3.7	5.4	7.5	10.8	3.2	5.0	0.0	0.0
091-0010	GARNETT WOOD PRODUCTS-PALLET PLANT	2421	0.0	0.0	0.0	0.0	0.6	0.9	0.2	0.4	0.0	0.0	0.1	0.1	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
091-0011	SYSTEMS & ELECTRONICS INC-WEST PLAI	3715	2.7	3.5	0.0	0.0	0.6	1.2	0.6	1.2	0.5	0.7	37.2	76.3	0.0	0.0
091-0012	ROYAL OAK ENTERPRISES INC-MOUNTAIN	2861	0.0	0.0	0.0	0.0	1.8	2.5	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
091-0013	MIDWEST WALNUT CO-MIDWEST WALNUT CO	2421	0.4	0.5	0.0	0.0	2.2	3.4	1.2	1.8	4.3	6.8	0.2	0.3	0.0	0.0
091-0014	PEACE VALLEY CHARCOAL INC-PEACE VAL	2861	7.2	8.7	0.0	0.0	87.5	105.7	85.3	103.0	416.2	502.3	260.1	314.0	0.0	0.0
091-0015	DOSS & HARPER STONE CO INC-WEST PLA	1422	0.0	0.0	0.0	0.0	8.6	11.9	0.9	1.3	0.0	0.0	0.0	0.1	0.0	0.0
091-16	SPEARS, BILL	211	0.0	0.0	0.0	0.0	2.2	2.4	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
091-0033	MARATHON ELECTRIC CO-MARATHON ELECT	3621	0.8	1.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	10.7	22.0	0.0	0.0
091-0037	ROYAL OAK ENTERPRISES INC-WEST PLAI	2861	26.2	37.7	1.3	1.9	37.4	52.0	26.0	36.6	31.8	45.8	3.7	5.0	0.0	0.0
091-0038	GARNETT WOOD PRODUCTS-CHARCOAL PLAN	2861	97.4	117.6	0.0	0.0	72.9	90.8	25.5	31.7	1,645.9	1,986.5	713.7	861.4	0.0	0.0
091-0046	BRUCE HARDWOOD FLOORS-BRUCE HARDWOO	2426	3.6	5.1	2.4	3.0	9.5	13.7	7.0	10.0	20.2	29.1	82.8	98.6	0.0	0.0
091-0053	MOUNTAIN VIEW FABRICATING-MOUNTAIN	3578	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
091-0062	GABEL STONE CO INC-WILLOW SPRINGS	1422	4.2	3.8	0.3	0.3	4.3	5.8	0.7	0.8	0.9	1.0	0.4	0.4	0.0	0.0
091-0063	AMYX INDUSTRIES INC-PLANT 2	2499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.7	48.9	0.0	0.0
091-0066	ROBERTSON - DRAGO FUNERAL HOME-ROBE	7261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.0	0.0
091-0068	WEST PLAINS CITY POWER STATION-WEST	4911	0.1	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0
091-0071	LUNAS IMPERIAL CLEANERS & RENTAL SE	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	3.2	0.0	0.0
091-49530172	West Plains City SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	5.8
091-49530173	Willow Springs SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.7
093-0005	DOE RUN COMPANY-BUICK MILL	1031	3.5	4.2	0.1	0.1	42.9	63.1	7.6	12.0	4.7	6.3	2.1	2.5	0.0	0.0
093-0007	INTERNATIONAL SPECIALITY PRODUCTS I	3295	19.4	25.6	0.2	0.2	28.8	39.8	12.7	17.6	3.7	4.9	3.4	4.6	0.0	0.0
093-0008	DOE RUN COMPANY-GLOVER SMELTER	3339	230.8		43,340.1		26.7		19.1		14.7		8.4		0.0	
093-0009	DOE RUN COMPANY-BUICK SMELTER	3339	56.7	73.8	4,185.2	9,123.7	52.9	110.5	31.8	65.6	5,780.4	12,578.9	10.4	16.2	0.0	0.0
093-0017	DOE RUN COMPANY-VIBURNUM DIVISION (	1031	1.5	1.9	0.1	0.1	19.7	27.2	5.2	7.2	3.5	4.9	0.0	0.0	0.0	0.0
093-0022	WEST LIMESTONE QUARRY-WEST LIMESTON	1422	0.0	0.0	0.0	0.0	3.6	5.0	0.8	1.0	0.0	0.0	0.0	0.0	0.0	0.0
093-0023	DOE RUN COMPANY-CASTEEL MINE	1031	0.5	0.7	0.1	0.1	2.3	3.1	0.1	0.1	2.9	4.1	0.0	0.0	0.0	0.0
093-0026	MISSOURI RED QUARRIES INC-GRANITEVI	1422	0.6	0.6	0.0	0.0	0.4	0.6	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0
093-0028	POLITTE READY MIX-VIBURNUM	3273	0.0	0.0	0.0	0.0	1.4	2.0	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
093-0029	POLITTE READY MIX-ARCADIA	3273	0.0	0.0	0.0	0.0	1.4	2.0	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
093-49530174	Viburnum City SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	4.0
095-0002	BP PRODUCTS NORTH AMERICA INC-SUGAR	5171	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.4	36.8	0.0	0.0
095-0003	J. M. FAHEY CONSTRUCTION COMPANY-TR	2951	11.7	16.5	1.4	2.3	4.9	8.0	1.0	1.6	17.3	27.6	4.4	7.1	0.0	0.0
095-0005	U. S. DEPT OF ENERGY-KANSAS CITY PL	3679	29.6	38.8	0.2	0.3	1.0	1.4	1.0	1.4	16.3	21.4	11.1	17.0	1.4	1.9
095-0006	DAMON PURSELL CONSTRUCTION COMPANY-	1422	0.4	0.5	0.0	0.0	12.6	17.5	2.8	3.9	0.1	0.1	0.0	0.0	0.0	0.0
095-0007	CTB GRAIN SYSTEMS-CTB GRAIN SYSTEMS	3443	1.3	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.6	0.7	0.0	0.0
095-0011	BAYER CROPSCIENCE-KANSAS CITY	2879	34.6	46.7	1.4	1.9	7.9	11.2	6.7	9.4	23.4	30.8	10.7	15.9	0.0	0.0
095-0012	CLAY & BAILEY MFG CO-CLAY & BAILEY	3321	0.7	1.2	0.3	0.6	4.0	7.6	3.0	5.8	0.0	0.0	2.1	4.1	0.0	0.0
095-0016	ALLIED LITHOGRAPHING CO-ALLIED LITH	2752	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.4	20.1	0.0	0.0
095-0017	FOLGERS COFFEE CO-FOLGERS COFFEE CO	2095	8.5	10.0	0.9	1.1	8.1	9.5	2.1	2.5	47.9	55.2	7.8	9.0	0.0	0.0
095-0019	GENERAL MILLS INC-GENERAL MILLS INC	2041	1.8	2.4	0.0	0.0	27.1	33.8	13.9	17.2	1.5	2.0	0.2	0.3	0.0	0.0
095-0021	TRIGEN ENERGY CORPORATION-GRAND AVE	4911	498.8	441.9	3,873.7	3,333.7	24.0	21.0	17.8	15.4	20.0	18.9	2.8	3.3	0.0	0.0
095-0022	KANSAS CITY POWER & LIGHT CO-HAWTHO	4911	2,380.3	2,085.2	3,844.4	2,050.9	369.1	595.6	163.1	521.8	469.6	825.8	20.6	95.3	0.1	52.0
095-0023	KANSAS CITY POWER & LIGHT CO-NORTHE	4911	92.3	2.4	29.4	0.0	1.3	0.1	1.3	0.1	0.6	0.9	1.3	1.6	0.0	0.1
095-0024	KANSAS CITY STAR (THE)-KANSAS CITY	2711	1.0	1.1	0.0	0.0	0.7	1.2	0.1	0.1	0.2	0.2	83.4	113.0	0.0	0.0
095-0026	WOLCOTT & LINCOLN JACKSON LLC-KANSA	5153	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
095-0030	LAFARGE NORTH AMERICA INC-INDEPENDE	3241	1,049.9	1,673.5	677.8	1,080.4	20.4	30.8	6.2	9.6	447.0	712.6	58.9	93.1	0.2	0.3
095-0031	AQUILA INC-SIBLEY GENERATING STATIO	4911	12,326.6	3,716.4	12,071.0	13,665.1	36.6	236.4	28.6	214.8	405.6	403.8	91.0	90.6	0.0	24.2
095-0036	PURINA MILLS-PURINA MILLS	2048	0.4	0.5	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.4	0.0	0.1	0.0	0.0
095-0037	VANCE BROTHERS INC-VANCE BROTHERS I	2951	13.7	18.2	13.1	22.0	22.9	37.2	6.2	10.3	1.2	1.9	5.7	7.9	0.0	0.0
095-0039	BLUE RIVER TREATMENT PLANT-BLUE RIV	4953	27.0	41.1	2.0	3.9	1.8	2.4	0.6	0.9	15.5	31.9	36.3	55.7	0.0	0.0
095-0040	HAVENS STEEL CO-HAVENS STEEL CO	3441	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.3	39.3	0.0	0.0
095-0043	AMERICAN BODY COMPANY-AMERICAN BODY	3713	0.1	0.1	0.0	0.0	0.1	0.2	0.1	0.2	0.0	0.0	1.4	2.9	0.0	0.0
095-0044	QUEBECOR WORLD EAGLE INC-QUEBECOR W	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.3	0.0	0.0
095-0046	ALLIANT LLC-LAKE CITY ARMY AMMUNITI	3482	37.3	56.0	0.7	1.2	5.5	8.6	3.6	5.6	13.1	18.6	56.7	101.5	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
095-0048	LIMPUS QUARRIES INC-SUGAR CREEK	1422	11.3	34.8	0.7	2.3	11.5	17.3	3.5	6.1	2.4	7.5	0.7	2.2	0.0	0.0
095-0050	INDEPENDENCE POWER AND LIGHT-BLUE V	4911	567.0	1,577.0	4,678.2	4,296.7	56.3	1,251.3	23.1	1,184.3	29.7	89.7	4.2	12.5	0.5	5.4
095-0055	BARTLETT & COMPANY GRAIN-KANSAS CIT	5153	0.0	0.0	0.0	0.0	1.0	1.4	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
095-0057	PFIZER INC-LEE'S SUMMIT	2048	2.7	3.5	0.0	0.0	0.2	0.3	0.2	0.3	2.1	2.7	0.7	0.9	0.0	0.0
095-0062	MEDICAL CENTER OF INDEPENDENCE-INDE	8062	1.2	1.5	0.0	0.0	0.1	0.1	0.1	0.1	0.9	1.0	0.2	0.2	0.0	0.0
095-0063	AVENTIS PHARMACEUTICALS INC-HOECHST	2834	17.5	19.8	0.2	0.2	3.0	4.5	1.9	2.4	18.9	21.1	21.1	37.9	0.0	0.0
095-0064	KOCH MATERIALS COMPANY-KOCH MATERIA	2951	2.0	2.5	0.0	0.0	0.4	0.5	0.1	0.2	1.7	2.1	0.8	0.9	0.0	0.0
095-0065	GATEWAY PACKAGING OF MISSOURI INC-K	2674	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	18.1	23.6	0.0	0.0
095-0067	TENSION ENVELOPE CORPORATION-KANSAS	2677	1.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	26.5	47.3	0.0	0.0
095-0068	BRENNTAG MID-SOUTH INC-KANSAS CITY	5169	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.6	0.0	0.0
095-0071	STONE CONTAINER CORPORATION-GARDNER	2674	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.7	32.0	41.6	0.0	0.0
095-0074	SOUTHERN STAR CENTRAL GAS PIPELINE-	4922	10.3	13.5	0.1	0.1	0.2	0.3	0.2	0.3	2.6	3.5	0.2	0.2	0.0	0.0
095-0075	PETERSON MFG CO-GRANDVIEW	3647	0.5	0.6	0.0	0.0	0.1	0.2	0.0	0.1	0.4	0.5	1.5	2.9	0.0	0.0
095-0076	BARBER & SONS AGGREGATES-BARBER & S	1422	35.9	40.0	10.7	11.8	19.6	27.0	3.9	5.2	20.1	25.2	1.1	1.2	0.0	0.0
095-0078	TOWNSEND SUMMIT LLC-TOWNSEND SUMMIT	3678	9.5	12.4	0.1	0.1	0.7	0.9	0.7	0.9	8.0	10.5	1.2	1.6	1.1	1.4
095-0088	LAFARGE NORTH AMERICA INC-BLUE SPRI	3273	0.6	0.7	0.0	0.0	16.6	23.3	7.7	10.6	0.2	0.2	0.0	0.0	0.0	0.0
095-0089	SUPERIOR ASPHALT INC-LEE'S SUMMIT P	2951	3.3	5.3	0.4	0.7	10.5	15.6	2.8	4.2	15.1	24.8	4.8	8.0	0.0	0.0
095-0098	APAC MISSOURI-APAC - MISSOURI MATER	3273	0.1	0.1	0.0	0.0	4.2	5.8	1.0	1.5	0.0	0.1	0.0	0.0	0.0	0.0
095-0114	HALLMARK CARDS-HALLMARK CARDS	2771	5.5	9.0	0.0	0.0	0.3	0.3	0.3	0.3	2.9	3.8	29.4	37.2	0.2	0.3
095-0115	GALAMET INC-GALAMET INC	5093	0.0	0.0	0.0	0.0	4.3	6.4	2.5	3.6	0.0	0.0	0.0	0.0	0.0	0.0
095-0118	LEE'S SUMMIT HOSPITAL-LEE'S SUMMIT	8062	0.8	1.0	0.0	0.0	0.1	0.1	0.1	0.1	0.6	0.7	0.1	0.1	0.0	0.0
095-0119	COMMERCIAL LITHOGRAPHING CO-COMMERC	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.2	42.4	0.0	0.0
095-0126	AMERICAN INGREDIENTS COMPANY-AMERIC	2099	8.2	10.8	0.1	0.1	5.9	7.5	2.5	3.3	6.9	9.1	1.9	2.8	0.0	0.0
095-0139	AQUILA INC-GREENWOOD ENERGY CENTER	4911	236.4	0.0	0.5	0.0	14.6	0.0	14.6	0.0	60.3	0.0	5.3	0.4	0.0	0.0
095-0150	ROCK CREEK TREATMENT PLANT-ROCK CRE	4952	1.2	1.6	0.5	0.8	0.4	0.5	0.2	0.4	1.1	1.5	39.6	53.7	0.0	0.0
095-0173	MIDWEST HANGER CO-KANSAS CITY PLANT	3496	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	16.5	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
095-0175	BALL METAL BEVERAGE CONTAINER CO.-K	3411	7.7	8.2	0.0	0.1	0.7	0.8	0.3	0.3	6.5	6.9	76.1	38.9	0.0	0.0
095-0176	SUPERIOR BOWEN ASPHALT CO LLC-MANCH	2951	5.7	9.1	0.6	1.1	9.3	14.4	2.8	4.3	24.6	40.6	7.8	12.9	0.0	0.0
095-0177	PERFORMANCE ROOF SYSTEMS INC-PERFOR	2952	2.6	2.8	0.0	0.0	14.6	24.0	11.2	18.4	28.2	45.5	6.2	10.1	0.0	0.0
095-0178	UNILEVER BESTFOODS NORTH AMERICA-UN	2035	5.9	7.7	0.0	0.0	9.3	11.1	4.8	5.8	4.9	6.5	3.5	5.5	0.0	0.0
095-0186	LITTLE BLUE VALLEY SEWER DISTRICT-A	4953	0.7	0.9	0.0	0.0	0.1	0.1	0.1	0.1	0.3	0.4	157.5	212.7	0.0	0.0
095-0191	AERO TRANSPORTATION PRODUCTS INC-IN	3713	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
095-0192	SUPERIOR BOWEN ASPHALT COMPANY LLC-	2951	3.7	5.7	0.4	0.6	9.6	14.1	2.5	3.8	14.8	24.5	4.7	7.8	0.0	0.0
095-0196	SEXTON METALCRAFT INC-RAYTOWN	2499	0.4	0.4	0.0	0.0	1.0	1.6	0.2	0.2	0.3	0.3	7.1	11.7	0.0	0.0
095-0197	BURD & FLETCHER-INDEPENDENCE PLANT	2652	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.6	74.1	0.0	0.0
095-0203	SHAMROCK CABINET & APPLIANCES-RAYTO	2434	0.0	0.0	0.0	0.0	1.4	2.0	0.2	0.3	0.0	0.0	4.0	6.6	0.0	0.0
095-0219	INDEPENDENCE ANIMAL SHELTER-INDEPEN	7261	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.4	1.5	0.0	0.0
095-0222	INDEPENDENCE POWER AND LIGHT-SUB ST	4911	6.1	8.4	0.4	0.6	0.5	0.7	0.5	0.7	0.4	0.6	0.2	0.0	0.0	0.0
095-0223	INDEPENDENCE POWER AND LIGHT-SUB ST	4911	4.6		0.0		0.4		0.4		1.2		0.0		0.0	
095-0224	INDEPENDENCE POWER AND LIGHT-SUB ST	4911	1.8		0.1		0.2		0.2		0.1		0.0		0.0	
095-0233	MR LONGARM INC-MR LONGARM INC	3089	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	3.1	0.0	0.0
095-0240	KOCH MATERIALS COMPANY-SUGAR CREEK	5171	1.7	2.1	0.0	0.0	0.1	0.1	0.1	0.1	1.4	1.8	1.5	1.9	0.0	0.0
095-0244	TIFFANY MARBLE INC-LEE'S SUMMIT	3089	0.0	0.0	0.0	0.0	0.5	0.8	0.2	0.4	0.0	0.0	7.6	14.0	0.0	0.0
095-0256	PLAZA FORD IDEAL DRY CLEANERS-BROAD	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	6.6	0.0	0.0
095-0260	LEES SUMMIT CLEANERS INC-LEES SUMMI	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.4	0.0	0.0
095-0267	COURTNEY RIDGE LANDFILL LLC-COURTNE	4953	0.2	0.2	0.1	0.1	14.2	19.5	1.3	1.7	3.8	3.8	8.8	11.8	0.0	0.0
095-0272	LEE'S SUMMIT SANITARY LANDFILL-LEE'	4953	0.0	0.0	0.0	0.0	4.4	6.0	2.3	3.2	0.0	0.0	4.5	6.8	0.0	0.0
095-0273	RUMBLE RECYCLING AND DISPOSAL-SANIT	4953	18.0	23.9	5.7	7.4	0.4	0.5	0.3	0.5	22.6	29.9	347.1	454.3	0.0	0.0
095-0280	PAVESTONE COMPANY-LEE'S SUMMIT	3271	0.1	0.1	0.0	0.0	8.0	11.3	2.4	3.4	0.1	0.1	0.0	0.0	0.0	0.0
095-0285	LAFARGE NORTH AMERICA INC-INDEPENDE	1422	15.8	17.2	0.2	0.3	6.6	9.0	1.7	2.2	4.2	4.6	0.6	0.6	0.0	0.0
095-0286	CRYSLER ANIMAL HOSPITAL-INDEPENDENC	742	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0
095-2001	CARGILL INC-KANSAS CITY	2075	33.9	44.5	0.2	0.3	40.4	50.4	23.1	28.8	28.5	37.4	372.0	461.6	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
095-2002	COOK FAMILY FOODS-KANSAS CITY	2013	14.7	19.1	2.3	2.8	0.0	0.0	0.0	0.0	10.4	13.2	0.2	0.3	0.0	0.0
095-2005	NAZARENE PUBLISHING HOUSE-NAZARENE	2721	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	4.8	6.3	0.0	0.0
095-2006	WIRE ROPE CORPORATION OF AMERICA-KA	3496	1.4	1.8	0.0	0.0	0.1	0.2	0.1	0.2	0.2	0.3	2.8	4.9	0.0	0.0
095-2007	CROWN CENTER REDEVELOPMENT CORPORAT	7011	10.7	14.0	0.1	0.1	0.8	1.1	0.8	1.1	8.9	11.6	1.3	1.8	0.0	0.0
095-2010	LAFARGE NORTH AMERICA INC-85TH STRE	3273	0.2	0.2	0.0	0.0	4.8	6.8	1.8	2.4	0.0	0.0	0.0	0.0	0.0	0.0
095-2012	KANSAS CITY POWER & LIGHT CO-FRONT	4911	1.4	1.9	0.0	0.0	0.1	0.2	0.1	0.2	2.4	2.7	1.6	1.6	0.0	0.0
095-2014	UNIVERSAL MANUFACTURING CO-UNIVERSA	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	6.3	0.0	0.0
095-2015	MID-AMERICA CAR INC-MID-AMERICA CAR	2851	0.1	0.1	0.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	5.2	9.5	0.0	0.0
095-2018	RICHARDSON PRINTING INC-RICHARDSON	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	11.9	0.0	0.0
095-2019	WESTERN CONTAINER CO-WESTERN CONTAI	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.1	38.3	0.0	0.0
095-2022	FORDYCE CONCRETE CO INC-63RD STREET	3273	1.3	1.4	0.0	0.0	5.0	7.0	2.1	3.0	1.1	1.1	0.2	0.2	0.0	0.0
095-2023	MATERIALS PACKAGING CORP-MATERIALS	3273	2.3	3.2	0.0	0.0	4.1	5.7	0.4	0.5	0.4	0.5	0.0	0.0	0.0	0.0
095-2027	CHEMETRON RAILWAY PRODUCTS INC-TRUE	3398	2.9	3.0	0.0	0.0	0.1	0.1	0.1	0.1	0.6	0.6	2.4	5.0	0.0	0.0
095-2029	PERMACEL KANSAS CITY INC-KANSAS CIT	3061	0.8	1.0	0.0	0.0	1.9	3.1	0.3	0.5	0.6	0.8	1.0	1.8	0.0	0.0
095-2031	NORTH AMERICAN GALVANIZING CO-KANSA	3479	1.5	2.0	0.0	0.0	1.8	3.1	1.6	2.7	1.3	1.7	0.2	0.2	0.0	0.0
095-2032	PENNYS CONCRETE INC-MARTIN CITY PLA	3273	0.0	0.0	0.0	0.0	8.0	11.1	1.3	1.8	0.0	0.0	0.0	0.0	0.0	0.0
095-2034	BRATTON CORPORATION (THE)-BRATTON C	3441	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3	15.0	0.0	0.0
095-2044	BARTON NELSON INC-BARTON NELSON INC	2678	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.8	28.2	0.0	0.0
095-2045	HOLLAND NAMEPLATE & ENGRAVING CO-HO	3479	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	10.6	0.0	0.0
095-2046	TRABON PARIS PRINTING CO.-TRABON PA	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	22.5	0.0	0.0
095-2047	LABCONCO CORPORATION-LABCONCO CORPO	3829	1.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.9	3.4	0.0	0.0
095-2050	JAMES PRINTING COMPANY-JAMES PRINTI	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	5.1	0.0	0.0
095-2051	BUILDERS READY MIX-	3273	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
095-2052	SUPERIOR ASPHALT PORTABLE PLANT-KAN	2951	2.6	4.1	0.3	0.5	9.7	14.1	1.7	2.6	11.2	18.5	3.6	5.9	0.0	0.0
095-2054	RESEARCH MEDICAL CENTER-RESEARCH ME	8062	9.6	10.5	0.7	1.1	0.2	0.2	0.2	0.2	2.4	2.6	1.6	1.7	0.0	0.0
095-2055	TRUMAN MEDICAL CENTER - WEST-TRUMAN	8062	16.6	17.7	0.1	0.1	1.2	1.3	1.2	1.3	13.5	14.4	2.3	2.4	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
095-2056	VA MEDICAL CENTER-VA MEDICAL CENTER	8062	5.5	6.1	0.1	0.1	0.1	0.2	0.1	0.2	1.4	1.5	0.5	0.6	0.0	0.0
095-2057	ST. LUKES HOSPITAL OF KANSAS CITY-K	8062	12.8	14.3	0.1	0.2	0.3	0.3	0.3	0.3	3.1	3.5	0.7	0.9	0.0	0.0
095-2058	COOK BROTHERS INSULATION INC-COOK B	3086	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	9.2	1.9	3.7	0.0	0.0
095-2063	FRONTIER BAG INC-FRONTIER BAG INC	2673	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.4	12.8	0.0	0.0
095-2064	PAULO PRODUCTS COMPANY-PAULO PRODUC	3398	2.6	3.3	0.0	0.0	0.2	0.3	0.1	0.2	2.2	2.8	0.3	0.3	0.0	0.0
095-2065	QUALITY WOOD PRODUCTS-QUALITY WOOD	2434	0.7	0.9	0.0	0.0	1.5	2.2	0.5	0.7	0.6	0.8	5.8	11.7	0.0	0.0
095-2067	KANSAS CITY ANIMAL CONTROL DIVISION	752	0.6	0.6	1.6	1.7	1.2	1.2	1.0	1.0	0.0	0.0	3.4	3.5	0.0	0.0
095-2069	NEWCOMERS D. W. & SONS-KANSAS CITY	7261	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	1.4	1.5	0.0	0.0
095-2074	KANSAS CITY ZOOLOGICAL GARDENS-KANS	8422	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
095-2075	MOUNT MORIAH-MOUNT MORIAH	7261	0.1	0.2	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.2	0.3	0.0	0.0
095-2079	PARK LAWN FUNERAL HOME-KANSAS CITY	7261	0.1	0.1	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	2.0	2.2	0.0	0.0
095-2082	SMALL ANIMAL HOSPITAL INC-SMALL ANI	742	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
095-2083	ST. JOSEPH HOSPITAL-KANSAS CITY	8062	7.5	9.3	0.1	0.2	0.2	0.4	0.2	0.4	1.8	2.2	1.1	1.3	0.0	0.0
095-2087	BAPTIST MEDICAL CENTER-BAPTIST MEDI	8062	4.5	5.9	0.0	0.0	0.1	0.1	0.1	0.1	1.1	1.5	0.2	0.2	0.0	0.0
095-2088	TRINITY LUTHERAN HOSPITAL-BALTIMORE	8062	4.0	4.3	0.0	0.0	0.1	0.1	0.1	0.1	1.0	1.0	0.2	0.2	0.0	0.0
095-2089	STOWERS INSTITUTE FOR MEDICAL RESEA	8062	5.7	6.0	0.0	0.0	0.1	0.1	0.1	0.1	1.4	1.5	0.3	0.3	0.0	0.0
095-2090	UNIVERSITY OF MISSOURI - KANSAS CIT	8221	14.0	15.3	0.2	0.3	1.1	1.1	1.1	1.1	11.4	12.3	1.7	1.8	0.0	0.0
095-2091	UNIVERSITY OF MISSOURI - KANSAS CIT	8221	2.8	3.2	0.1	0.1	0.2	0.3	0.2	0.3	1.9	2.0	0.3	0.3	0.0	0.0
095-2094	FAULTLESS STARCH/BON AMI COMPANY-FA	2842	0.7	0.8	0.0	0.0	0.6	0.8	0.1	0.1	0.6	0.7	27.5	46.0	0.0	0.0
095-2095	SWYDEN CLEANERS-SWYDEN CLEANERS	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	6.0	0.0	0.0
095-2096	KENT CLEANING COMPANY-KENT CLEANING	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	9.5	0.0	0.0
095-2099	PLAZA FORD IDEAL DRY CLEANERS-VIRGI	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	29.8	0.0	0.0
095-2100	ARROW FABRICARE-ARROW FABRICARE	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.6	27.0	0.0	0.0
095-2101	ALLIED WASTE INDUSTRIES SANITARY LA	4953	5.9	7.7	2.0	2.6	12.2	16.2	10.9	14.3	7.9	10.3	83.8	109.2	0.0	0.0
095-2103	COLORIFIC PRODUCTION-COLORIFIC PROD	3479	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	0.0	0.0
095-2110	TOWER CLEANERS & LAUNDRY-	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	WESTPORT R															
095-2115	MAYFAIR CLEANERS & LAUNDRY-MAYFAIR	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	5.5	0.0	0.0
095-2123	7 REDI-MIX CONCRETE CO, INC-85TH ST	3273	0.1	0.1	0.1	0.2	0.3	0.5	0.1	0.1	0.6	1.0	0.1	0.2	0.0	0.0
095-2128	MIDWEST BLOCK & BRICK-KANSAS CITY P	3271	0.8	1.1	0.0	0.0	5.8	8.2	1.7	2.3	0.2	0.2	0.4	0.5	0.0	0.0
095-2147	MISSISSIPPI LIME CO-KANSAS CITY TER	1422	0.0	0.0	0.0	0.0	6.1	8.4	2.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0
095-2152	MISSOURI PLATING COMPANY-MISSOURI P	3469	1.1	1.5	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.3	0.1	0.2	0.0	0.0
095-2154	TRUMAN MEDICAL CENTER - EAST-TRUMAN	8062	5.9	6.4	0.0	0.1	0.1	0.2	0.1	0.2	0.9	0.9	0.5	0.5	0.0	0.0
095-2161	NAKANO FOODS INC-NAKANO FOODS INC	2099	10.1	13.2	0.1	0.1	2.0	3.0	1.6	2.4	8.4	11.1	28.5	32.8	0.0	0.0
095-2162	SOLVENT RECOVERY CORP-KANSAS CITY	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0
095-2163	CHILDRENS MERCY HOSPITAL-CHILDRENS	8062	10.1	11.1	0.1	0.2	0.8	0.8	0.8	0.8	7.6	8.2	2.8	3.2	0.0	0.0
095-2172	MARTEC SCIENTIFIC-MARTEC SCIENTIFIC	2834	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	3.6	0.0	0.0
095-2174	FIXTURE MANUFACTURING CORP-WINNER R	2511	0.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	9.3	0.0	0.0
095-2177	INTERNATIONAL PAPER COMPANY-INTERNA	2653	2.0	2.2	0.0	0.0	2.4	3.2	1.4	1.9	1.7	1.8	1.6	2.0	0.0	0.0
095-2184	WELD RACING INC-WELD RACING INC	3714	0.7	0.9	0.0	0.0	0.8	1.4	0.4	0.7	0.0	0.0	8.5	15.0	0.0	0.0
095-2186	UNITED STATES POSTAL SERVICE-KANSAS	4311	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.1	0.1	0.0	0.0
095-2187	A T & T-COMPUTER CENTER	4813	9.6	11.2	0.9	1.0	0.3	0.3	0.2	0.3	2.9	3.8	0.0	0.0	0.0	0.0
095-2188	OUTPUT TECHNOLOGIES GRAPHICS RESOUR	2752	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	8.9	11.6	0.0	0.0
095-2196	CHEMCENTRAL/KANSAS CITY-CHEMCENTRAL	5191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	2.2	0.0	0.0
095-2199	ADVANCED COATINGS INC-BENNINGTON	3479	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.3	0.0	0.0
095-2200	FC INDUSTRIES-FC INDUSTRIES	1799	0.4	0.6	0.4	0.6	0.7	1.0	0.5	0.8	1.4	2.1	2.5	3.7	0.0	0.0
095-2201	MID-WEST TERMINAL WAREHOUSE COMPANY	5191	0.0	0.0	0.0	0.0	7.8	10.8	2.3	3.1	0.0	0.0	0.0	0.0	0.0	0.0
095-2202	QUINTILES INC-QUINTILES INC	8731	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0
095-2207	UNITED STATES POSTAL SERVICE-KCMO P	4311	2.9	3.1	0.0	0.0	0.2	0.2	0.2	0.2	2.5	2.6	0.4	0.4	0.0	0.0
095-2208	LONE WOLF ENTERPRISES-LONE WOLF ENT	3273	0.0	0.0	0.0	0.0	4.0	5.7	1.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0
095-2209	GED INC-GED INC	3479	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	6.4	0.0	0.0
095-2222	CLARKSON CONSTRUCTION CO-KANSAS CIT	3273	0.8	1.0	0.1	0.1	1.0	1.4	0.2	0.3	0.2	0.3	0.1	0.1	0.0	0.0
095-2223	CLARKSON CONSTRUCTION CO-KANSAS CIT	3253	0.5	0.6	0.0	0.0	0.7	0.9	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
095-2224	NEW SURFACE LLC-EAST 12TH	3281	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.0	7.8	7.2	0.0	0.0
095-2226	SPRINT COMMUNICATIONS-HOLMES	4813	1.4	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
095-2229	AT & T CORPORATION-OAK	4813	2.2	2.5	0.3	0.4	0.1	0.1	0.1	0.1	0.8	0.8	0.0	0.0	0.0	0.0
095-2424	FINAL FINISH-KANSAS CITY	3479	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	3.4	0.0	0.0
095-8002	ENGLEWOOD CLEANERS-ENGLEWOOD CLEANE	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	4.2	0.0	0.0
095-8004	PRECISION MARBLE-GRANDVIEW	2821	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	13.0	13.1	0.0	0.0
095-49530175	Lake City Army Ammun Plant SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.5	63.6
095-49530176	Centropolis SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3
095-49530178	Woods Chapel SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.1	61.5
095-49530179	Rumble SLF II	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	135.6	203.2
095-49530180	Southeast SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.6	66.9
095-49530181	Nelanco Limited SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.0	112.4
095-0031N	MISSOURI PUBLIC SERVICE CO	4911	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
095-64120-HWTHR-870	HAWTHORN GENERATING FACILITY	4911	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.5	24.2
095-64120-MBYCR-840	BAYER CROPSCIENCE	2879	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
095-64130-PLPRD-482	PAULO PRODS. CO.	3398	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.4
097-0001	EMPIRE DISTRICT ELECTRIC CO-ASBURY	4911	6,077.6	662.0	4,455.9	4,927.1	126.0	639.6	26.9	476.9	177.8	196.2	26.5	46.0	0.3	11.8
097-0002	JOPLIN MANUFACTURING INC	2819	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	186.2	198.4
097-0003	DOANE PRODUCTS CO-JOPLIN	2047	13.7	30.3	0.1	0.2	10.0	12.9	3.7	5.1	11.5	24.9	1.7	3.9	0.0	0.0
097-0004	JOPLIN STONE COMPANY-JOPLIN	1422	0.0	0.0	0.0	0.0	10.1	14.0	2.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0
097-0005	PCS PHOSPHATE COMPANY INC-JOPLIN PL	2874	63.8	102.1	34.5	57.1	51.3	81.4	22.4	35.7	7.9	10.3	3.4	5.2	0.0	0.0
097-0007	DYNO NOBEL INC-CARTHAGE PLANT	2892	14.3	19.3	0.4	0.9	4.8	7.8	3.0	4.5	3.3	4.4	1.8	2.4	0.0	0.0
097-0008	MISSOURI STEEL CASTINGS CO-JOPLIN	3325	1.8	2.5	0.3	0.7	7.4	14.0	3.5	6.5	0.8	1.1	13.6	18.6	0.0	0.0
097-0009	INTERNATIONAL PAPER CO-INTERNATIONA	2491	2.4	2.5	0.0	0.0	1.8	2.4	0.2	0.3	0.6	0.6	38.4	51.5	0.0	0.0
097-0010	CARDINAL SCALE MANUFACTURING COMPAN	3596	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	21.7	0.0	0.0
097-0011	ADM MILLING COMPANY-CARTHAGE FLOUR	2041	0.1	0.1	0.0	0.0	5.5	6.8	2.6	3.3	0.1	0.1	0.0	0.0	0.0	0.0
097-0013	TAMKO ROOFING PRODUCTS INC-HIGH ST	2952	12.5	15.3	0.1	0.1	1.2	1.6	1.1	1.4	11.3	14.0	6.7	10.6	0.0	0.0
097-0015	LOZIER CORP-AFI DIVISION	2542	2.9	5.8	0.0	0.0	0.1	0.1	0.1	0.1	0.5	0.8	3.9	9.2	0.0	0.0
097-0017	VC MISSOURI HOLDINGS LLC-CARTHAGE C	1422	4.2	7.0	0.6	0.9	35.4	50.0	8.5	12.7	2.1	3.5	5.4	8.9	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
097-0020	EAGLE-PICHER INDUSTRIES INC-CHEMICA	2819	1.4	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.1	0.1	0.0	0.0
097-0021	ST. JOHN'S REGIONAL MEDICAL CENTER-	8062	5.9	6.3	0.4	0.4	0.4	0.4	0.4	0.4	4.3	4.6	0.7	0.7	0.0	0.0
097-32	HYLTON, DANNY	241	0.0	0.0	0.0	0.0	0.6	0.7	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
097-0049	BUTTERBALL TURKEY COMPANY-DIV ARMOU	2015	4.8	6.3	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.5	0.4	0.5	0.0	0.0
097-0055	MID AMERICA HARDWOODS-MID AMERICA H	2421	0.0	0.0	0.0	0.0	7.9	11.2	2.5	3.6	0.0	0.0	0.0	0.0	0.0	0.0
097-0058	JUSTIN BOOT COMPANY-CARTHAGE (PLANT	3149	0.0	0.0	0.0	0.0	1.2	1.8	0.0	0.0	0.0	0.0	13.2	9.9	0.0	0.0
097-0062	EMPIRE DISTRICT ELECTRIC CO-EMPIRE	4911	23.6	0.0	0.1	0.0	1.0	0.0	1.0	0.0	4.7	0.0	4.8	1.7	0.0	0.0
097-0065	MODINE MANUFACTURING COMPANY-JOPLIN	3443	1.0	1.1	0.4	0.4	0.5	0.9	0.2	0.3	0.2	0.2	5.2	9.8	0.0	0.0
097-0070	MORTON BOOTH CO-CARTERVILLE	2542	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.7	100.4	0.0	0.0
097-0071	GENERAL MILLS BAKERIES & FOODSERVIC	2038	4.5	5.7	0.0	0.0	6.7	9.4	0.3	0.5	1.5	2.0	0.5	0.6	0.0	0.0
097-0079	MAGELLAN PIPELINE COMPANY-CARTHAGE	4613	0.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.9	415.2	419.1	0.0	0.0
097-0088	COMMERCIAL METALS CO-COMMERCIAL MET	5093	3.4	4.5	0.0	0.0	20.0	18.0	17.8	16.0	2.8	3.7	0.7	1.2	0.0	0.0
097-0089	ABLE MANUFACTURING & ASSEMBLY L.L.C	3713	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	64.5	123.1	0.0	0.0
097-0094	TAMKO ROOFING PRODUCTS INC-RANGELIN	2952	50.4	72.9	69.4	114.5	15.2	24.7	13.7	22.2	65.6	100.0	45.4	66.1	0.0	0.0
097-0095	ABLE MANUFACTURING CORPORATION-7TH	3089	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.5	63.7	0.0	0.0
097-0104	EMPIRE DISTRICT ELECTRIC CO-STATE L	4911	160.4	231.3	3.1	3.4	34.6	56.7	34.6	56.7	429.3	703.2	141.2	105.7	0.0	18.1
097-0110	CARTHAGE WATER & ELECTRIC-CARTHAGE	4911	110.4	25.6	1.4	0.0	1.7	2.2	1.6	2.2	11.3	26.9	25.6	1.3	0.0	2.1
097-0112	MID-AMERICA PRECISION PRODUCTS LLC-	3499	1.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	6.6	13.6	0.0	0.0
097-0114	EAGLE-PICHER INDUSTRIES INC-SPECIAL	3691	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
097-0117	EAGLE-PICHER TECHNOLOGIES LLC-FEDER	3691	1.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	15.4	31.4	0.0	0.0
097-0119	MIDCON CABLES COMPANY-MIDCON CABLES	3694	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	3.7	0.0	0.0
097-0120	ANCHOR STONE COMPANY-JASPER COUNTY	3295	0.0	0.0	0.0	0.0	11.6	16.0	2.1	2.9	0.0	0.0	0.0	0.0	0.0	0.0
097-0125	OWENS CORNING VINYL OPERATIONS-JOPL	3089	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.1	0.0	0.0	0.2	0.4	0.0	0.0
097-0127	SHERWOOD CLEANERS-SHERWOOD CLEANERS	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	4.5	0.0	0.0
097-0132	PECHINEY PLASTIC PACKAGING INC-JOPL	2759	2.0	2.1	0.0	0.0	0.2	0.1	0.2	0.1	1.6	1.8	103.6	125.0	0.0	0.0
097-0138	ICI EXPLOSIVES ENVIRONMENTAL CO-JOP	4953	4.6	8.7	0.7	1.3	0.1	0.3	0.1	0.2	0.2	0.3	0.1	0.2	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
097-0139	SWIFT CONSTRUCTION COMPANY INC-JOPL	2951	2.5	3.3	2.1	3.5	1.7	2.6	0.4	0.6	1.6	2.7	2.6	3.6	0.0	0.0
097-0143	LEGGETT & PLATT-WIRE MILL - CARTHAG	3315	13.8	18.1	0.1	0.1	13.2	23.2	6.2	10.7	11.6	15.3	2.6	3.4	0.0	0.0
097-0146	BLEVINS ASPHALT CONSTRUCTION CO INC	2951	3.0	4.9	0.3	0.5	3.2	4.7	0.9	1.2	5.2	8.5	3.0	4.9	0.0	0.0
097-0147	MAIN STREET PET CARE INC-JOPLIN	742	0.2	0.2	0.1	0.1	0.3	0.3	0.2	0.3	0.1	0.1	2.7	2.8	0.0	0.0
097-0148	SYD-REN INDUSTRIES-DIV OF LEGGETT &	3535	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.1	0.1	0.0	0.0
097-0150	PARKWAY CLEANERS-WEBB CITY	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.2	0.0	0.0
097-49530182	Joplin Sanitary Landfill	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.6	75.7
097-64802-FRMRS-STA	FARMLAND JOPLIN PLANT	2048	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.2
097-64836-FRDSF-HIG	SPECIALTY BRANDS INC.	2038	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	10.0
097-64836-RCNCR-ROU	DYNO NOBEL INC. CARTHAGE PLANT	2892	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	13.1
099-0002	RC CEMENT COMPANY INC-RIVER CEMENT	3241	4,954.6	5,131.8	555.3	552.6	725.0	919.2	55.3	77.8	847.0	877.3	335.7	353.8	0.0	0.0
099-0003	DOE RUN COMPANY-HERCULANEUM SMELTER	3339	21.4	26.1	15,223.8	15,224.7	86.6	86.9	6.1	6.4	21.1	25.3	11.5	13.3	0.0	0.0
099-0006	CRYSTAL CITY NITROGREN COMPANY	2873	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,750.1	4,927.6
099-0007	FRED WEBER INC-FESTUS ASPHALT PLANT	2951	1.5	10.0	0.1	0.2	1.3	1.8	0.2	0.3	1.3	123.1	0.2	1.8	0.0	0.0
099-0008	FRED WEBER INC-FESTUS STONE PLANT	1422	0.0	0.0	0.0	0.0	30.8	42.5	3.2	4.4	0.0	0.0	0.0	0.0	0.0	0.0
099-0011	UNION PACIFIC RAILROAD CO-DESOTO CA	3743	2.2	5.1	0.0	0.0	0.8	1.3	0.2	0.4	0.2	0.5	10.4	36.7	0.0	0.0
099-0012	TRAUTMAN QUARRY-PEVELY	1422	0.0	0.0	0.0	0.0	10.3	14.3	1.4	1.9	0.0	0.0	0.0	0.0	0.0	0.0
099-0013	UNIMIN CORPORATION-PEVELY	1446	1.8	2.3	0.0	0.0	3.4	4.7	0.9	1.2	1.5	2.0	0.2	0.3	0.0	0.0
099-0014	DOW CHEMICAL COMPANY THE-RIVERSIDE	2821	3.4	4.8	0.0	0.0	1.5	2.5	0.7	1.1	2.2	3.1	1.7	2.5	0.0	0.0
099-0016	AMERENUE-RUSH ISLAND PLANT	4911	3,997.3	5,085.5	23,827.2	32,203.7	528.0	1,058.4	352.1	858.2	1,126.6	1,323.3	137.7	162.0	1.5	79.4
099-0018	HOME SERVICE OIL COMPANY INC-BARNHA	5171	0.0	0.0	0.0	0.0	0.4	0.5	0.0	0.0	0.0	0.0	5.6	7.1	0.0	0.0
099-0031	WESTINGHOUSE ELECTRIC COMPANY LLC-J	2819	1.6	2.2	0.0	0.0	0.3	0.5	0.2	0.4	0.8	1.3	0.9	1.8	0.0	0.0
099-33	BONACKER, ALVIN	241	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
099-0044	METAL CONTAINER CORPORATION-ARNOLD	3411	10.4	12.3	0.1	0.1	2.4	3.9	1.1	1.9	8.7	10.3	127.4	79.1	0.0	0.0
099-0046	JEFFERSON MEMORIAL HOSPITAL-JEFFERS	8062	3.9	5.7	0.0	0.1	0.3	0.5	0.3	0.5	2.5	3.4	0.6	0.8	0.0	0.0
099-0052	ENGINEERED COIL COMPANY-D.B.A. MARL	3731	0.2	0.2	0.0	0.0	1.0	1.8	0.7	1.3	0.1	0.1	20.6	61.6	0.0	0.0
099-0060	CONCRETE RESOURCES INC-	3273	0.1	0.1	0.0	0.0	2.5	3.5	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
	HALLMARK CON															
099-0068	SAINT-GOBAIN CONTAINERS LLC-PEVELY	3221	187.5	329.7	242.8	410.5	71.5	121.5	68.2	115.9	33.5	55.8	32.8	58.0	0.0	0.0
099-0083	ANIMAL CARE SERVICES-IMPERIAL	7261	0.2	0.3	0.2	0.2	0.4	0.4	0.3	0.4	0.2	0.2	3.9	4.1	0.0	0.0
099-0087	CENTRAL STONE COMPANY-ANTONIA CS56	1422	0.0	0.0	0.0	0.0	9.7	13.4	2.7	3.8	0.0	0.0	0.0	0.0	0.0	0.0
099-0092	MASTERCHEM INDUSTIRES INC-IMPERIAL	3651	0.1	0.1	0.0	0.0	6.0	9.6	2.1	3.4	0.0	0.0	3.3	5.1	0.0	0.0
099-0098	FRED WEBER INC-TRAUTMAN ASPHALT PLA	2951	1.3	9.2	0.2	0.3	0.7	1.1	0.2	0.3	12.0	102.8	0.4	3.5	0.0	0.0
099-0101	ARNOLD READY MIX CORP-CEDAR HILL SI	3273	0.0	0.0	0.0	0.0	0.2	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
099-0103	BUSSEN QUARRIES INC-ANTIRE QUARRY	1422	0.0	0.0	0.0	0.0	32.9	45.5	6.6	9.0	0.0	0.0	0.1	0.1	0.0	0.0
099-0108	HOUSE SPRINGS QUARRY & MATERIALS CO	1422	0.0	0.0	0.0	0.0	17.7	24.5	2.3	3.2	0.0	0.0	0.0	0.0	0.0	0.0
099-0111	CARONDELET CORPORATION-CARONDELET C	3325	7.0	11.0	0.3	0.6	39.4	76.0	7.8	15.1	3.2	6.6	53.7	146.8	0.0	0.0
099-0114	AERO METAL FINISHING-AERO METAL FIN	3471	2.5	5.5	0.3	0.8	0.2	0.4	0.1	0.2	0.4	0.5	2.0	3.0	0.0	0.0
099-0116	SINCLAIR & RUSH-ARNOLD PLANT	3089	0.2	0.3	0.0	0.0	2.4	4.4	1.4	2.6	0.2	0.3	28.9	65.2	0.0	0.0
099-0121	MIDWEST GRAPHIC FINISHERS-FENTON PL	3953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.0	0.0	0.0
099-0125	NATIONAL GEOSPATIAL INTELLIGENCE AG	2741	1.5	2.1	0.2	0.4	0.1	0.2	0.1	0.2	0.8	1.0	7.6	10.1	0.0	0.0
099-0126	CLASSIC MARBLE CONCEPTS-CLASSIC MAR	3281	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	3.4	0.0	0.0
099-0134	SCORE-SCORE	3544	0.1	0.4	0.0	0.0	0.8	1.6	0.5	0.9	0.0	0.1	20.2	57.0	0.0	0.0
099-0137	DRY CREEK MATERIALS INC-HILLSBORO	1422	1.4	1.3	0.0	0.0	11.8	16.3	2.9	4.0	0.3	0.3	0.1	0.1	0.0	0.0
099-0145	ARCH JOHNSTON PAVING & QUARRY CO IN	1429	0.0	0.0	0.0	0.0	8.8	12.2	2.7	3.8	0.0	0.0	0.0	0.0	0.0	0.0
099-0146	PACE CONSTRUCTION CO-ANTONIA ASPHAL	2951	1.5	2.2	1.0	0.8	4.4	6.2	0.8	1.2	1.0	1.6	2.8	4.7	0.0	0.0
099-0147	BRECKENRIDGE MATERIALS-JEFFCO PLANT	3273	0.1	0.1	0.0	0.0	0.8	1.1	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
099-0149	WIL-MIX CONCRETE PRODUCTS INC-FESTU	3273	0.0	0.0	0.0	0.0	4.7	6.7	1.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0
099-4002	ARNOLD PROFESSIONAL CLEANERS-ARNOLD	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	3.8	0.0	0.0
099-49530183	Redbird SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.1	159.0
099-63047-CMBST-HIG	WESTINGHOUSE ELECTRIC CO. L.L.C.	2819	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	4.6
099-P094	N. B. WEST CONTRACTING CO INC-HOUSE	2951	0.3	0.1	0.8	1.0	7.4	10.3	3.9	5.4	1.6	2.6	0.0	0.0	0.0	0.0
101-0002	CENTRAL MISSOURI STATE UNIVERSITY-P	8221	8.6	9.2	0.0	0.0	0.6	0.8	0.6	0.8	7.2	7.8	2.7	3.5	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
101-0003	STAHL SPECIALTY CO-KINGSVILLE PLANT	3365	13.7	18.0	1.0	2.1	1.2	1.1	1.2	1.1	11.7	15.3	3.3	4.9	0.0	0.0
101-0004	STAHL SPECIALTY CO-WARRENSBURG PLAN	3365	11.3	14.9	0.1	0.1	1.2	1.1	1.2	1.1	9.5	12.4	1.5	2.1	0.0	0.0
101-0009	WHITEMAN AIR FORCE BASE-WHITEMAN	9711	21.3	23.9	4.8	14.1	3.9	4.7	3.8	4.6	16.6	19.0	35.2	55.2	0.0	0.0
101-0021	KEYSTONE QUARRY-WARRENSBURG QUARRY	1422	0.0	0.0	0.0	0.0	2.1	3.0	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
101-0023	HAWKER ENERGY PRODUCTS INC-WARRENSB	3692	2.9	3.8	0.0	0.0	0.5	1.0	0.4	0.9	0.7	1.0	14.9	33.3	0.0	0.0
101-0030	LAFARGE CONSTRUCTION MATERIALS-WARR	3273	0.2	0.2	0.0	0.0	1.5	2.2	0.7	0.9	0.1	0.1	0.0	0.0	0.0	0.0
101-0035	WHISTLE REDI MIX INC-HOLDEN SITE	3273	0.1	0.1	0.0	0.0	5.7	8.1	1.7	2.4	0.0	0.0	0.0	0.0	0.0	0.0
101-0046	SHOW-ME REGIONAL LANDFILL-SHOW-ME R	4953	0.0	0.0	0.0	0.0	3.6	4.9	1.5	2.1	0.0	0.0	7.1	9.5	0.0	0.0
101-0047	SOUTHERN STAR CENTRAL GAS PIPELINE-	4922	3.7	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.9	0.1	0.2	0.0	0.0
101-0051	ASSOCIATED ELECTRIC COOPERATIVE INC	4911	17.3	29.1	1.8	3.4	2.3	3.7	2.3	3.7	0.1	0.1	4.1	3.4	0.0	0.0
101-0054	MASTER MARBLE INC-HOLDEN	3089	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	6.2	0.0	0.0
101-682	KINGSVILLE LIVESTOCK AUCT	211	0.0	0.0	0.0	0.0	5.3	5.7	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0
101-49530184	Show Me Regional SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	18.7
101-49530185	Autoshred Incorporated SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.2	28.8
103-0002	CENTRAL STONE COMPANY-KNOX COUNTY S	1422	0.0	0.0	0.0	0.0	10.3	14.2	1.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0
103-0003	KELLY LIMESTONE LLC-NEWARK PLANT	1422	8.3	9.2	0.1	0.1	11.2	15.4	1.5	2.0	2.0	2.3	0.3	0.3	0.0	0.0
105-0001	INDEPENDENT STAVE CO INC-LEBANON PL	2429	46.4	66.6	2.3	3.4	15.5	22.5	11.7	17.1	55.8	80.3	6.3	9.1	0.0	0.0
105-0004	MFA FEED MILL-LEBANON	2048	0.4	0.4	1.0	1.1	4.4	5.5	1.3	1.6	0.1	0.1	0.0	0.0	0.0	0.0
105-0006	LOWE BOATS-OMC ALUMINUM BOAT GROUP	3732	1.5	1.7	10.2	11.8	0.3	0.5	0.2	0.3	0.4	0.4	104.0	214.5	0.0	0.0
105-0013	DETROIT TOOL & ENGINEERING-LEBANON	3545	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	2.8	0.0	0.0
105-0027	WILLARD QUARRIES INC-SLEEPER QUARRY	1422	0.0	0.0	0.0	0.0	3.7	5.1	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
105-0028	WILLARD ASPHALT PAVING INC-LEBANON	2951	1.8	3.0	0.4	0.6	1.1	1.8	0.3	0.5	4.3	7.1	1.3	2.2	0.0	0.0
105-0031	DETROIT TOOL METAL PRODUCTS-LEBANON	3545	2.8	3.0	0.0	0.0	1.7	5.2	1.0	3.8	0.4	0.4	5.5	3.4	0.0	0.0
105-0032	COPELAND CORPORATION-LEBANON	3585	7.1	8.3	0.0	0.1	0.2	0.3	0.2	0.3	1.2	1.4	0.1	0.2	0.0	0.0
105-0033	MARATHON ELECTRIC MFG CORP-LEBANON	3621	3.9	4.6	0.0	0.0	0.1	0.2	0.1	0.2	0.5	0.6	12.3	23.2	0.0	0.0
105-0035	LANDAU BOATS LLC-LEBANON	3732	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	9.2	0.0	0.0
105-0036	LEBANON CITY ANIMAL SHELTER-LEBANON	752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
105-0038	G3 BOATS-LEBANON	3732	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.2	39.7	0.0	0.0
105-0044	OZARK READY MIX CO INC-PLANT #5	3273	0.0	0.0	0.1	0.1	1.6	2.2	0.5	0.6	0.0	0.0	0.2	0.2	0.0	0.0
105-0046	TRACKER MARINE-LEBANON PLANT	3732	1.2	1.4	0.0	0.0	3.1	5.4	0.9	1.6	0.2	0.2	28.8	59.3	0.0	0.0
107-0003	ACTION PRODUCTS-ODESSA	3089	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	3.7	7.7	0.0	0.0
107-0004	S & K INDUSTRIES INC-S & K INDUSTRI	2511	0.6	0.8	0.0	0.0	5.2	7.5	3.1	4.5	5.1	7.3	33.8	55.5	0.0	0.0
107-0005	ADM ALLIANCE NUTRITION INC-HIGGINSV	2048	0.1	0.2	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
107-0007	MID-MISORI ENVIRO AGRI SERVICE-EMMA	2048	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
107-0010	WINCUP-HIGGINSVILLE PLANT	2821	7.6	10.0	0.1	0.1	0.6	0.8	0.6	0.8	6.4	8.4	90.6	166.5	0.0	0.0
107-0012	MFA AGRI SERVICES-ALMA PLANT	2048	0.1	0.1	0.0	0.0	2.5	3.4	2.0	2.9	0.1	0.1	0.0	0.0	0.0	0.0
107-0013	MID-MISSOURI AGRI SERVICE-CONCORDIA	2048	0.4	0.6	0.0	0.0	2.2	3.0	2.0	2.8	0.4	0.5	0.1	0.1	0.0	0.0
107-0018	MFA AGRI SERVICES-HIGGINSVILLE	5191	0.1	0.1	0.0	0.0	4.2	5.9	3.0	4.3	0.1	0.1	0.0	0.0	0.0	0.0
107-24	LIMBACK, CLARENCE	211	0.0	0.0	0.0	0.0	1.8	1.9	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
107-0027	MID-MISSOURI COOPERATIVE-EMMA CO-OP	2048	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
107-0029	S & K INDUSTRIES INC-S & K INDUSTRI	2426	13.7	14.6	0.1	0.1	14.6	21.5	0.5	0.6	2.7	2.9	22.6	36.1	0.0	0.0
107-0037	KITCO INC-KITCO INC	3089	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	18.5	0.0	0.0
107-0038	HIGGINSVILLE MUNICIPAL POWER FACILI	4911	5.1	9.2	0.0	0.0	0.2	0.4	0.2	0.4	12.4	15.0	3.1	1.9	0.0	0.1
107-0039	MFA AGRI SERVICES-LEXINGTON RIVER G	5153	0.0	0.0	0.0	0.0	1.0	1.4	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
107-0042	LIMPUS QUARRIES INC-BATES CITY	1422	0.0	0.0	0.0	0.0	9.2	12.8	1.8	2.4	0.0	0.0	0.0	0.0	0.0	0.0
107-0043	RAY-CARROLL COUNTY GRAIN GROWERS IN	5191	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
107-0044	GREEN READY MIX OF MISSOURI INC-CON	3273	0.0	0.0	0.0	0.0	1.8	2.5	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
107-0046	GREEN READY MIX OF MISSOURI INC-LEX	3273	0.0	0.0	0.0	0.0	0.7	1.1	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
107-0047	ODESSA MUNICIPAL POWER PLANT-ODESSA	4911	7.6	7.9	0.5	0.0	0.5	0.2	0.5	0.2	1.6	2.9	0.7	0.3	0.0	0.2
107-49	NIERMAN, ED	241	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
107-0050	BARTLETT GRAIN COMPANY LP-WAVERLY	5153	0.0	0.0	0.0	0.0	3.0	4.2	0.9	1.4	0.0	0.0	0.0	0.0	0.0	0.0
107-64020-CNCRD-SOU	CONTINENTAL DELI FOODS	2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	12.6
109-0002	RAZORBACK PIPELINE COMPANY-TRANSMON	4226	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3	7.6	9.9	0.0	0.0
109-0003	MFA FEED MILL-AURORA	2048	0.7	0.9	0.0	0.0	8.3	10.5	2.1	2.8	0.6	0.8	0.1	0.1	0.0	0.0
109-0004	BCP INGREDIENTS-VERONA	2833	4.3	5.8	0.0	0.0	3.5	5.4	1.1	1.9	1.1	1.5	60.1	87.1	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	PLANT															
109-0007	BAILEY QUARRIES INC-CHESAPEAKE QUAR	1422	0.0	0.0	0.0	0.0	10.3	14.3	1.8	2.5	0.0	0.0	0.0	0.0	0.0	0.0
109-0008	MO REHABILITATION CENTER-MO REHABIL	8069	4.4	5.8	0.0	0.0	0.1	0.1	0.1	0.1	0.9	1.1	0.2	0.2	0.0	0.0
109-0010	SILGAN CONTAINERS-SILGAN CONTAINERS	3411	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	23.9	12.0	0.0	0.0
109-34	MISEMER, SCOTT	241	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
109-0036	CONOCOPHILLIPS CO-MOUNT VERNON PROD	5171	4.9	6.5	0.0	0.0	0.0	0.0	0.0	0.0	11.8	15.5	40.4	53.2	0.0	0.0
109-0048	TYSON FOODS INC-AURORA FEED MILL	2048	2.5	3.3	0.0	0.0	11.7	14.6	1.7	2.1	2.1	2.8	1.2	1.5	0.0	0.0
109-0051	E. F. MARSH ENGINEERING COMPANY-MT.	3535	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	14.5	0.0	0.0
109-0053	MFA BULK PLANT-AURORA	5191	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
109-0057	MAGELLAN PIPELINE COMPANY LLC-MT. V	4613	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	10.5	0.0	0.0
109-49530186	T&C Disposal Incorporated SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.8	25.1
109-P038	FALL VALLEY STONE-FALL VALLEY (ROSE	1422	0.0	0.0	0.0	0.0	6.0	8.2	0.9	1.2	0.0	0.0	0.0	0.0	0.0	0.0
109-P041	BLEVINS ASPHALT CONSTRUCTION CO-CHE	2951	1.3	2.2	2.3	3.8	4.1	6.0	0.9	1.2	2.5	4.1	1.4	2.3	0.0	0.0
111-0006	BUNGE NORTH AMERICA INC-LA GRANGE P	5153	0.0	0.0	0.0	0.0	3.5	4.9	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
111-0012	IDEAL READY MIX CO INC-CANTON	3273	0.0	0.0	0.0	0.0	0.6	0.8	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
111-0025	BFI BACKRIDGE LANDFILL-LAGRANGE	4953	0.0	0.0	0.0	0.0	2.3	3.1	0.7	1.0	0.0	0.0	5.0	6.8	0.0	0.0
111-25	SHARPE LAND & CATTLE CO	241	0.0	0.0	0.0	0.0	2.1	2.5	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
111-49530188	ML&S Waste Service Incorporated SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	12.2
113-0003	OLD MONROE ELEVATOR & SUPPLIES-OLD	2048	0.0	0.0	0.0	0.0	0.8	1.1	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
113-0009	LINCOLN COUNTY CONCRETE-TROY PLANT	3273	0.1	0.1	0.3	0.3	0.8	1.1	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
113-0019	WINFIELD GRAIN COMPANY-WINFIELD ELE	5153	0.0	0.0	0.0	0.0	11.6	16.2	1.7	2.4	0.0	0.0	0.0	0.0	0.0	0.0
113-0029	TOYOTA MOTOR CORPORATE SERVICES-BOD	3365	68.0	119.5	8.5	18.4	54.3	61.3	20.1	21.3	3.1	4.1	97.3	180.1	0.0	0.0
113-0031	MAGRUDER LIMESTONE CO INC-TROY QUAR	1422	0.0	0.0	0.0	0.0	13.9	19.2	4.8	6.6	0.0	0.0	0.0	0.0	0.0	0.0
113-0032	G & M CONCRETE AND ASPHALT CO INC-T	2951	5.6	9.2	4.1	6.8	1.5	2.2	0.7	0.9	2.7	4.4	4.1	6.8	0.0	0.0
113-0042	FARMERS ELEVATOR & SUPPLY CO-HAWK P	5191	0.0	0.1	0.0	0.0	1.0	1.4	0.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0
113-0046	MOST INC-TROY	3341	39.6	79.6	0.1	0.1	6.4	6.5	1.1	1.2	1.5	2.0	8.4	17.6	0.0	0.0
113-0054	BIG CREEK QUARRY INC-MOSCOW MILLS	1422	0.0	0.0	0.0	0.0	19.4	26.9	3.3	4.5	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
113-0055	ONE STOP READY MIX-TROY	3273	0.0	0.0	0.0	0.0	6.0	8.4	1.3	1.8	0.0	0.0	0.0	0.0	0.0	0.0
113-0056	DAVIS REDI-MIX-ELSBERRY	3273	0.0	0.0	0.0	0.0	1.9	2.6	0.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0
113-P035	FRED WEBER INC-TROY QUARRY	1422	0.3	0.5	0.3	0.3	2.2	3.2	0.4	0.6	0.6	0.9	0.3	0.5	0.0	0.0
113-P048	FRED WEBER INC-AUBURN QUARRY	1422	0.0	0.0	0.0	0.0	8.1	11.1	1.7	2.4	0.0	0.0	0.0	0.0	0.0	0.0
113-P049	FRED WEBER INC-FOLEY QUARRY	1422	0.0	0.0	0.0	0.0	22.7	31.3	2.8	3.9	0.0	0.0	0.0	0.0	0.0	0.0
115-0001	WALSWORTH PUBLISHING COMPANY-MARCEL	2752	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	43.8	53.9	0.0	0.0
115-0005	MOORE COMPANY-MOORE COMPANY	3564	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	3.5	0.0	0.0
115-0021	CITY OF MARCELINE	4911	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
115-0030	LEO O'LAUGHLIN INC-MARCELINE	3273	0.0	0.0	0.0	0.0	1.3	1.8	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
115-0031	WALSWORTH PUBLISHING COMPANY-PRE-PR	2732	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	3.8	0.0	0.0
117-0002	CHILLICOTHE MUNICIPAL UTILITIES-CHI	4911	6.2	269.2	3.5	3,025.7	1.2	103.2	0.8	100.4	1.4	13.4	0.2	1.7	0.0	0.8
117-0007	GLEN GERY CORPORATION-GLEN GERY COR	3251	12.5	17.6	84.7	120.2	36.1	51.2	13.3	19.0	40.4	57.3	3.2	4.5	0.0	0.0
117-0012	DONALDSON CO INC-DONALDSON CO INC	3714	2.1	2.7	0.0	0.0	4.1	7.4	3.5	6.4	0.4	0.5	12.6	25.8	0.0	0.0
117-17	DAVIS, DICK	211	0.0	0.0	0.0	0.0	1.3	1.4	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
117-0021	HUNT MIDWEST MINING/GREEN QUARRIES-	1422	0.0	0.0	0.0	0.0	16.0	22.1	2.6	3.7	0.0	0.0	0.0	0.0	0.0	0.0
117-0031	CHULA FARMERS COOPERATIVE-CHULA PLA	5153	0.0	0.1	0.0	0.0	1.3	1.8	1.1	1.6	0.0	0.1	0.0	0.0	0.0	0.0
117-0036	ENTERPRISE NGL PIPELINES LLC-CHILLI	4619	16.3	21.4	0.0	0.0	0.6	0.8	0.6	0.8	19.8	26.1	0.3	0.2	0.0	0.0
117-0038	SEMCO INCORPORATED-CHILLICOTHE	3444	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.3	0.0	0.0
117-0039	WIRE ROPE CORPORATION OF AMERICA-CH	3315	7.3	9.8	0.0	0.0	3.9	6.7	2.9	4.9	1.0	1.2	0.5	0.7	0.0	0.0
117-0041	GREEN READY MIX-CHILLICOTHE PLANT	3273	0.0	0.0	0.0	0.0	0.9	1.2	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
117-0045	ASSOCIATED PACKAGING TECHNOLOGIES-C	3086	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
117-P026	APAC MISSOURI-BLUE MOUND AT GREEN Q	2951	1.8	2.7	0.7	0.3	2.4	3.4	0.5	0.7	1.1	1.8	0.9	1.6	0.0	0.0
119-0017	SIMMONS FOODS INC-SOUTHWEST CITY	2015	40.7	53.5	0.3	0.4	20.5	26.4	13.8	17.8	37.6	49.5	5.6	7.5	0.0	0.0
119-0023	TYSON FOODS INC-NOEL PROCESSING CEN	2077	22.4	29.0	0.2	0.3	8.0	10.3	8.0	10.3	18.9	24.4	2.9	3.7	0.0	0.0
119-0024	HUTCHENS CONSTRUCTION COMPANY-BELLA	2951	3.2	5.2	0.8	1.0	1.8	2.5	0.3	0.5	7.5	12.3	2.2	3.6	0.0	0.0
119-0026	APAC ARKANSAS-JANE QUARRY	1422	0.0	0.0	0.0	0.0	12.0	16.5	2.9	3.9	0.0	0.0	0.0	0.0	0.0	0.0
119-64854-HDSNF-HIG	TYSON FOODS INC.	2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	15.7

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
119-64863-SMMNS-HIG	SIMMONS FOODS INC.	2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	11.2
121-0003	CONAGRA FROZEN FOODS-MACON PLANT	2038	8.4	10.4	0.0	0.1	8.3	9.6	5.9	6.7	2.7	3.6	1.0	1.3	0.0	0.0
121-0004	MACON MUNICIPAL UTILITIES-MACON MUN	4911	0.3	4.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	1.5	0.0	0.1	0.0	0.1
121-0005	MFA AGRI SERVICES-MACON	5191	0.0	0.0	0.0	0.0	1.9	2.7	1.4	1.9	0.0	0.0	0.0	0.0	0.0	0.0
121-0006	LA PLATA	4911	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
121-0015	LEO O'LAUGHLIN INC-MACON	3273	0.0	0.0	0.0	0.0	3.4	4.7	0.9	1.2	0.0	0.0	0.0	0.0	0.0	0.0
121-0019	MFA FERTILIZER-LA PLATA	5153	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121-0027	SUPERIOR MAPLE HILL LANDFILL-MACON	4953	0.0	0.0	0.0	0.0	2.0	2.6	1.4	1.9	0.3	0.4	5.2	7.7	0.0	0.0
121-0028	NORTHEAST MISSOURI GRAIN LLC-MACON	2869	34.2	44.8	0.2	0.3	18.9	24.5	4.1	5.1	28.4	37.3	94.0	106.6	0.0	0.0
121-0034	MODERN CLEANERS-MACON	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	3.7	0.0	0.0
121-49530190	Superior Maple Hill Landfill	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.2
121-49530191	Brown SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7	23.5
121-63552-CNGRF-216	CONAGRA FROZEN FOODS	2038	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.6
123-0018	CENTERPOINT ENERGY-TWELVE MILE COMP	4922	152.5	200.4	0.0	0.1	0.6	0.8	0.6	0.8	235.9	309.9	7.5	9.4	0.0	0.0
123-0022	VERSA-TECH INC-FREDERICKTOWN	3086	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.1	83.0	0.0	0.0
123-0023	C R CLEANERS INC-FREDERICKTOWN	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.9	0.0	0.0
123-49530192	Fredericktown City SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	5.0
125-0001	KINGSFORD MANUFACTURING CO-BRIQUETT	2861	145.7	179.4	41.3	48.7	111.2	140.2	64.4	79.7	10.9	15.1	60.5	37.4	0.0	0.0
125-0008	CONOCOPHILLIPS CO-BELLE PRODUCTS TE	5172	1.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	4.6	14.5	19.1	0.0	0.0
125-0012	STRUEMPH CHARCOAL-STRUEMPH CHARCOAL	2861	6.8	8.2	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.3	0.1	0.1	0.0	0.0
125-49530193	Wat-Park SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	10.8
127-0001	BASF AGRI CHEMICALS-HANNIBAL PLANT	2879	413.4	580.4	1,873.2	1,819.8	110.9	154.4	47.0	64.6	152.7	178.0	43.7	65.8	0.0	0.0
127-0002	MAGELLAN PIPELINE COMPANY LLC-PALMY	4613	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	507.5	511.4	0.0	0.0
127-0005	MFA PLANT FOODS-PALMYRA	2875	0.0	0.0	0.0	0.0	5.5	7.7	1.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0
127-0013	BLEIGH READY MIX CO-HANNIBAL (B-1)	3273	0.0	0.0	0.0	0.0	5.1	7.1	1.6	2.2	0.0	0.0	0.0	0.0	0.0	0.0
127-0016	CENTRAL STONE COMPANY-TAYLOR QUARR	1422	0.0	0.0	0.0	0.0	0.8	1.1	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
127-0037	KNAPHEIDE MANUFACTURING COMPANY-KNA	3713	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.6	0.0	0.0
127-0053	PALMYRA BOARD OF PUBLIC WORKS-PALMY	4911	2.8	5.3	0.0	0.0	0.3	0.4	0.2	0.3	0.7	1.6	0.2	0.3	0.0	0.1

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
127-0054	DIVERSIFIED DIEMAKERS INC-PALMYRA P	3364	3.1	4.0	0.0	0.0	1.2	2.1	0.8	1.4	0.0	0.0	0.4	0.5	0.0	0.0
127-0058	DIVERSIFIED DIEMAKERS INC-HANNIBAL	3364	0.4	0.5	0.0	0.0	1.6	2.7	1.2	2.1	0.0	0.0	0.3	0.5	0.0	0.0
127-0062	ALPHARMA INC-PALMYRA	2833	0.0	0.0	0.0	0.0	14.6	18.1	2.8	3.5	0.0	0.0	0.0	0.0	0.0	0.0
127-0063	NEMO CLEANERS-NEMO CLEANERS	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.8	0.0	0.0
127-63461-HFFMN-315	ALPHARMA	2833	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	5.6
127-63461-MRCNC-STA	BASF CORP. HANNIBAL PLANT	2879	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5
127-ORIS7304	PALMYRA MUNICIPAL 2	4911	0.0	3.2	0.0	0.0	0.0	0.1	0.0	0.1	0.0	1.2	0.0	0.1	0.0	0.1
129-0003	NORRIS ASPHALT PAVING CO-PRINCETON	1422	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
129-0008	PREMIUM STANDARD FARMS-PRINCETON FE	2048	0.8	1.1	0.0	0.0	9.6	12.4	1.4	1.8	0.7	0.9	0.1	0.2	0.0	0.0
129-P005	NORRIS ASPHALT PAVING CO-MERCER QUA	1422	0.0	0.0	0.0	0.0	1.7	2.4	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
131-0006	APAC MISSOURI-RICHARDSON & BASS DIV	1442	5.9	7.8	0.2	0.3	11.4	15.8	2.3	3.2	1.3	2.0	0.6	0.8	0.0	0.0
131-0007	STANTON MANUFACTURING CO INC-LAKE O	2499	0.2	0.3	0.0	0.0	9.5	14.1	5.3	7.9	1.8	2.6	10.5	21.5	0.0	0.0
131-0026	OZARK READY MIX CO INC-ELDON - PLAN	3273	0.0	0.0	0.0	0.0	0.8	1.1	0.2	0.3	0.0	0.0	0.5	0.7	0.0	0.0
131-0029	APAC MISSOURI-CENTRAL MISSOURI DIVI	1422	0.0	0.0	0.0	0.0	3.4	4.6	1.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0
131-0030	DREDGING INC DBA SCOTT'S CONCRETE-D	3273	0.0	0.0	0.0	0.0	2.1	3.0	0.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0
131-0032	FASCO INDUSTRIES INC-ELDON PLANT	3621	1.7	3.0	1.3	2.7	0.9	0.7	0.8	0.7	0.0	0.0	26.8	55.4	0.0	0.0
133-0014	GATES RUBBER COMPANY-GATES RUBBER C	3052	2.6	3.4	0.0	0.0	0.3	0.3	0.3	0.3	0.6	0.8	3.8	6.2	0.0	0.0
133-0016	CONSOLIDATED GRAIN AND BARGE CO-DOR	4221	0.2	0.3	0.0	0.0	4.5	6.2	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
133-0019	CHARLESTON READY MIX INC-CHARLESTON	3273	0.0	0.0	0.0	0.0	2.1	2.8	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
133-0023	MISSOURI DEPT OF CORRECTIONS-SOUTHE	9223	2.9	3.1	0.0	0.0	0.2	0.2	0.2	0.2	2.4	2.5	0.6	0.9	0.0	0.0
133-0025	DRINKWATER PUMPING STATION-LEVEE DI	9511	4.5	14.0	0.3	0.9	0.3	1.0	0.3	0.9	1.0	3.1	0.4	1.3	0.0	0.0
135-0004	CARGILL INC-CALIFORNIA FEED MILL	2077	3.0	4.0	0.0	0.0	35.2	44.2	8.1	10.6	2.6	3.4	0.4	0.5	0.0	0.0
135-0011	CARGILL INC-POULTRY PRODUCTS DIVISI	2015	5.7	7.4	0.0	0.0	2.6	3.4	0.7	0.9	4.8	6.2	1.3	1.6	0.0	0.0
135-0026	MFA SEED PROCESSING-CALIFORNIA	5191	0.0	0.0	0.0	0.0	0.6	0.9	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
137-0001	CENTRAL STONE COMPANY-PARIS (CS04)	1422	0.0	0.0	0.0	0.0	1.4	1.9	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
137-0002	PACE INDUSTRIES INC-MONROE CITY	3363	1.3	2.1	0.0	0.1	2.3	2.1	1.9	1.7	0.8	1.1	2.9	5.1	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
137-0004	DIVERSIFIED DIEMAKERS INC-MONROE CI	3369	5.0	6.4	0.1	0.1	1.0	1.8	0.4	0.6	0.1	0.1	0.4	0.7	0.0	0.0
137-0018	WILKERSON BROTHERS QUARRY INC-WILKE	1422	0.0	0.0	0.0	0.0	7.0	9.7	1.6	2.3	0.0	0.0	0.0	0.0	0.0	0.0
137-0028	MONROE CITY POWER PLANT-MONROE CITY	4911	2.7	10.6	0.2	0.0	0.2	0.4	0.2	0.4	0.6	5.6	0.2	0.1	0.0	0.4
139-0001	MID-MISSOURI LIMESTONE INC-BIG SPRI	1422	0.0	0.0	0.0	0.0	1.1	1.5	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
139-0003	CARGILL NUTRENA FEEDS-MONTGOMERY CI	2048	0.2	0.3	0.0	0.0	2.1	2.7	0.5	0.7	0.2	0.3	0.0	0.0	0.0	0.0
139-0004	PURINA MILLS LLC-PURINA MILLS - MON	2048	0.9	1.2	0.0	0.0	4.1	5.1	0.9	1.1	0.8	1.1	0.1	0.2	0.0	0.0
139-0005	PACE CONSTRUCTION CO-DANVILLE QUARR	1422	0.0	0.0	0.0	0.0	9.6	13.3	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
139-0008	CHRISTY MINERALS CO-HIGH HILL	3295	94.1	133.4	225.4	319.7	70.1	102.6	23.4	35.2	68.5	97.2	0.0	0.0	0.0	0.0
139-0016	NEW FLORENCE WOOD PRODUCTS-NEW FLOR	2429	0.7	1.0	0.2	0.2	17.0	24.9	8.3	12.3	1.9	2.8	0.1	0.1	0.0	0.0
139-0032	STEEL & PIPE SUPPLY CO INC-STEEL &	5051	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
139-0040	COUNTY LINE QUARRY-WELLSVILLE	1422	1.6	1.5	0.0	0.0	2.9	4.0	0.6	0.8	0.3	0.4	0.2	0.1	0.0	0.0
139-0043	MFA AGRI SERVICES-MONTGOMERY CITY	5191	0.0	0.0	0.0	0.0	2.4	3.4	2.3	3.2	0.0	0.0	0.0	0.0	0.0	0.0
139-0044	HERMANN SAND AND GRAVEL INC-HERMANN	1442	0.5	1.1	0.0	0.1	1.2	1.8	0.4	0.5	0.1	0.3	0.1	0.1	0.0	0.0
141-0009	VERSAILLES READY MIX-VERSAILLES REA	3273	0.0	0.0	0.0	0.0	2.6	3.7	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
141-0013	LAURIE READY MIX-LAURIE READY MIX	3273	0.0	0.0	0.0	0.0	2.7	3.7	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
141-0019	B.E. CLEANERS-B.E. CLEANERS	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	3.9	0.0	0.0
141-0028	DIXON TICONDEROGA COMPANY-DIXON TIC	3952	1.6	2.1	0.0	0.0	0.1	0.2	0.1	0.2	1.3	1.8	30.9	15.5	0.0	0.0
141-49530195	Morgan County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	15.4
143-0003	DELTA ASPHALT INC-NEW MADRID PLANT	2951	0.4	0.7	0.0	0.1	1.5	2.3	0.4	0.5	6.9	11.4	0.1	0.2	0.0	0.0
143-0004	ASSOCIATED ELECTRIC COOPERATIVE INC	4911	36,882.7	5,639.2	16,154.4	19,056.2	238.4	5,734.4	108.2	5,564.8	1,101.6	970.5	247.3	218.1	1.3	58.2
143-0007	NOVA BRIK MIDAMERICA LLC-SIKESTON	3273	0.0	0.0	0.0	0.0	0.6	0.8	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
143-0008	NORANDA ALUMINUM INC-NORANDA ALUMIN	3334	45.3	57.8	5,279.5	9,296.9	608.1	1,060.0	310.7	539.6	56,727.2	99,878.8	222.1	387.5	0.0	0.0
143-0010	HIMMELBERGER - HARRISON MFG CO-HIMM	2511	4.4	6.4	0.2	0.3	6.3	9.7	0.3	0.5	5.4	7.8	0.6	0.9	0.0	0.0
143-0012	MAHAN GIN CO-MAHAN GIN CO	724	0.1	0.1	0.0	0.0	4.7	6.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
143-0013	PORTAGEVILLE FARMERS GIN INC-PORTAG	724	0.1	0.2	0.0	0.0	7.1	9.9	1.6	2.2	0.1	0.1	0.0	0.0	0.0	0.0
143-0015	PLASTENE SUPPLY COMPANY-DIV SIEGEL-	3089	7.3	10.5	0.0	0.1	0.5	0.8	0.1	0.1	0.6	0.8	125.0	46.7	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
143-0023	MCCORD GIN COMPANY-GIDEON	724	0.0	0.0	0.0	0.0	10.4	14.5	0.7	0.9	0.0	0.0	0.0	0.0	0.0	0.0
143-0025	KOCH MATERIALS-KOCH MATERIALS	2951	1.3	1.5	0.1	0.1	0.7	0.9	0.1	0.1	1.0	1.2	2.4	3.0	0.0	0.0
143-0027	CARGILL INC-NEW MADRID	2875	0.6	0.7	0.0	0.0	15.8	22.0	2.9	4.0	0.5	0.6	0.1	0.1	0.0	0.0
143-0034	FLETCHERS GIN INC-FLETCHERS GIN I	724	0.1	0.1	0.0	0.0	2.3	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
143-0046	A. C. RILEY COTTON COMPANY-NEW MADR	724	0.0	0.0	0.0	0.0	9.1	12.7	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
143-0047	BOOTHEEL COTTON COMPANY INC-MATTHEW	724	0.1	0.1	0.0	0.0	2.1	2.9	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
143-0050	RICHARDSON GIN INC-RICHARDSON GIN I	724	0.0	0.0	0.0	0.0	8.2	11.4	0.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0
143-0055	SPECIALLOY METALS INC-SPECIALLOY ME	3331	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
143-0059	S-R FINISHING-DIV SIEGEL-ROBERT INC	3089	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
143-0062	BUNGE NORTH AMERICA INC-LINDA ELEVA	5153	0.2	0.3	0.5	0.6	4.1	5.7	1.5	2.1	0.1	0.1	0.0	0.0	0.0	0.0
143-0065	RIVER BEND AG-NEW MADRID	5191	0.0	0.0	0.0	0.0	3.7	5.2	1.1	1.4	0.0	0.0	0.0	0.0	0.0	0.0
143-0066	RICELAND FOODS INC-MARSTON	2044	0.0	0.0	0.0	0.0	10.9	14.4	2.4	3.2	0.0	0.0	0.0	0.0	0.0	0.0
143-49530196	St. Jude Industrial Park SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	25.4
143-49530197	New Madrid County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
143-63869-NWMDR-STJ	NEW MADRID POWER PLANT	4911	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.5	22.6
145-0005	LA-Z-BOY CHAIR COMPANY-LA-Z-BOY MID	2512	11.5	16.0	0.4	0.5	7.8	11.2	0.8	1.3	65.2	93.8	18.8	37.3	0.0	0.0
145-0007	FAG BEARINGS CORPORATION-JOPLIN	3562	4.1	8.3	0.1	0.1	1.3	2.4	0.2	0.4	13.5	14.9	24.0	48.3	0.0	0.0
145-0008	NEOSHO CONCRETE PRODUCTS INC-NEOSHO	3273	0.0	0.0	0.0	0.0	5.5	7.6	1.6	2.3	0.0	0.0	0.0	0.0	0.0	0.0
145-0014	MFA AGRI SERVICES-NEOSHO	2875	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
145-0025	TALBOT INDUSTRIES-TALBOT INDUSTRIES	3479	5.6	7.3	0.0	0.0	22.1	52.5	6.9	15.9	3.6	4.7	0.6	0.8	0.0	0.0
145-0035	EAGLE-PICHER INDUSTRIES INC-STELLA	3444	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
145-35	CARTER, BOB	241	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
145-0036	GULF STATES PAPER CORP-GULF STATES	2653	0.0	0.0	0.0	0.0	0.3	0.4	0.2	0.3	0.0	0.0	54.1	67.1	0.0	0.0
145-0038	SUNBEAM PRODUCTS INC-PLANT I - NEOS	3631	6.6	8.7	0.0	0.1	0.6	1.2	0.6	1.1	2.2	2.7	1.5	2.0	0.0	0.0
145-0044	PREMIER TURBINES-NEOSHO PLANT	3724	2.9	5.1	0.0	0.0	0.9	2.3	0.8	2.1	3.5	7.6	8.2	16.9	0.0	0.0
145-0049	SOUTHERN STAR CENTRAL GAS PIPELINE-	4922	61.5	80.8	0.0	0.0	0.8	1.0	0.7	0.9	7.5	9.8	2.3	3.1	0.0	0.0
145-52	MOGER, ROBERT	241	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
145-0054	STANPHIL QUARRY-PIERCE	1422	1.2	2.4	0.1	0.2	0.8	1.1	0.2	0.3	0.3	0.5	0.1	0.3	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	CITY															
145-0055	NEWTON-MCDONALD COUNTY LANDFILL-NEW	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.9	0.1	0.2	0.0	0.0
145-4002	HOWARD JOHNSON'S ENTERPRISES INC-NE	2875	0.0	0.0	0.0	0.0	0.6	0.8	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0
145-7001	MFA BULK PLANT-NEOSHO	5191	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
145-49530198	Newton-McDonald County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	16.8
145-P032	FULLERTON STONE CO INC-FULLERTON ST	1422	0.2	0.3	0.2	0.4	3.4	4.7	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0
147-0004	MFA AGRI SERVICES-BURLINGTON JUNCTI	5191	0.0	0.0	0.0	0.0	1.8	2.5	1.7	2.3	0.0	0.0	0.0	0.0	0.0	0.0
147-0005	NORTHWEST MISSOURI STATE UNIVERSITY	8221	29.1	29.5	2.2	3.2	3.8	4.1	3.2	3.5	59.7	59.9	9.8	9.8	0.0	0.0
147-0008	EVEREADY BATTERY CO INC-MARYVILLE P	3692	5.1	6.2	0.1	0.1	1.7	2.4	0.6	0.8	2.9	3.7	36.6	48.5	0.0	0.0
147-0013	LOCH SAND & CONSTRUCTION CO-MARYVIL	3273	0.0	0.0	0.0	0.0	6.1	8.5	0.8	1.2	0.0	0.0	0.0	0.0	0.0	0.0
147-0017	NORRIS ASPHALT PAVING CO-GOODEN QUA	1422	0.0	0.0	0.0	0.0	1.9	2.7	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
147-0018	MFA AGRI SERVICES-MARYVILLE	5153	0.0	0.0	0.0	0.0	0.7	1.0	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
147-0021	MFA AGRI SERVICES-CONCEPTION JUNCTI	5153	0.0	0.0	0.0	0.0	0.3	0.3	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
147-0023	KAWASAKI MOTORS MFG CORP-KAWASAKI M	3519	8.0	12.3	0.7	1.6	2.5	2.6	2.0	2.2	21.6	64.7	15.4	26.8	0.0	0.0
147-0024	ANR PIPELINE COMPANY-MAITLAND COMPR	4922	981.5	1,172.0	0.3	0.4	13.9	18.3	13.9	18.3	243.2	319.5	881.7	1,077.3	0.0	0.0
147-0027	CONSUMERS OIL CO INC-MARYVILLE PLAN	5153	0.0	0.0	0.0	0.0	0.5	0.6	0.4	0.5	0.0	0.0	2.4	3.2	0.0	0.0
147-0029	NORRIS ASPHALT PAVING CO-BARNARD QU	1422	0.0	0.0	0.0	0.0	3.1	4.2	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0
147-0032	ASSOCIATED ELECTRIC COOPERATIVE INC	4911	16.3	52.1	0.1	0.0	1.0	5.2	1.0	5.2	15.7	64.8	0.7	5.5	0.0	5.1
147-49530199	Maryville SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	6.1
147-P034	HERZOG CONTRACTING CORP-MARYVILLE S	2951	0.0	0.0	0.0	0.0	3.5	4.8	1.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0
149-0014	MCCLAIN FOREST PRODUCTS-ALTON	2421	1.5	2.2	0.2	0.3	3.3	4.8	0.9	1.3	4.1	5.9	0.5	0.6	0.0	0.0
149-0020	OZARK MOUNTAIN HARDWOOD INC-OZARK M	2421	5.7	5.7	0.6	0.5	9.5	9.5	4.8	4.8	0.3	0.3	6.4	6.4	0.0	0.0
149-0022	KING QUARRY INC-THAYER	1422	5.9	8.1	0.4	0.5	1.3	2.0	0.2	0.2	17.0	23.5	0.0	0.0	0.0	0.0
149-P016	DOSS & HARPER STONE-COUCH	1422	1.5	1.4	0.1	0.1	0.5	0.6	0.2	0.3	0.3	0.4	0.1	0.1	0.0	0.0
151-0002	CENTRAL ELECTRIC POWER COOPERATIVE-	4911	2,567.6	1,934.2	4,236.8	2,384.2	12.3	251.1	9.9	242.7	76.2	71.0	15.6	15.9	0.0	4.3
151-0015	CHAMOIS MFA-CHAMOIS MFA	2048	0.0	0.0	0.0	0.0	1.2	1.6	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
151-0028	MUENKS BROTHERS QUARRY INC-LOOSE CR	1422	2.8	3.1	0.0	0.0	4.3	5.9	0.7	0.9	0.7	0.8	0.1	0.1	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
151-0030	DIAMOND PET FOODS-META	2047	20.0	23.2	0.1	0.1	8.5	11.2	1.9	2.4	3.4	3.9	0.6	0.7	0.0	0.0
151-0034	MERTENS CONSTRUCTION CO INC-OSAGE Q	1422	0.0	0.0	0.0	0.0	1.7	2.3	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
151-0044	WIEBERG RED-E-MIX INC-META	3273	0.0	0.0	0.0	0.0	5.1	7.1	1.5	2.2	0.0	0.0	0.0	0.0	0.0	0.0
151-0045	OSAGE COUNTY INDUSTRIES INC-LINN	3273	0.0	0.0	0.0	0.0	2.4	3.4	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0
151-0049	ROYAL OAK ENTERPRISES INC-META INDU	2861	0.0	0.0	0.0	0.0	1.0	1.2	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
151-0050	QUAKER WINDOW PRODUCTS COMPANY-QUAK	3442	1.2	1.6	0.0	0.0	1.4	2.4	0.2	0.3	0.1	0.2	55.9	68.3	0.0	0.0
153-0017	HODGSON MILL-GAINESVILLE	2041	0.0	0.0	0.0	0.0	3.0	3.7	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
153-18	BLACKBURN FEEDLOT	211	0.0	0.0	0.0	0.0	1.3	1.4	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
153-36	TABOR, CURTIS	241	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
155-0002	CITIZENS GIN INC-CITIZENS GIN INC	724	0.0	0.0	0.0	0.0	3.8	5.3	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
155-0004	COOTER COTTON GIN INC-COOTER COTTON	724	0.0	0.0	0.0	0.0	5.6	7.8	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
155-0010	PEACH ORCHARD GIN COMPANY-PEACH ORC	724	0.2	0.2	0.0	0.0	9.9	13.7	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
155-0021	L. BERRY GIN COMPANY-L. BERRY GIN C	724	0.0	0.0	0.0	0.0	13.8	19.2	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
155-0024	STILL GIN & GRAIN INC-STEELE	724	0.1	0.1	0.0	0.0	7.6	10.5	0.3	0.4	0.1	0.1	0.0	0.0	0.0	0.0
155-0025	COPPAGE LONG GIN COMPANY-COPPAGE LO	724	0.0	0.0	0.0	0.0	5.2	7.3	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
155-0030	TRINITY MARINE PRODUCTS INC-CARUTHE	3731	1.1	1.4	0.0	0.0	13.9	23.4	3.4	5.9	0.2	0.3	41.3	85.1	0.0	0.0
155-0041	CONSOLIDATED GRAIN AND BARGE CO-PEM	4221	0.7	0.9	0.0	0.0	7.9	11.0	1.6	2.2	0.6	0.7	0.1	0.1	0.0	0.0
155-0043	MFA PLANT FOODS-CARUTHERSVILLE	5191	0.0	0.0	0.0	0.0	4.7	6.5	1.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0
155-0045	LOXCREEN COMPANY INC-HAYTI	3354	8.8	12.2	0.1	0.1	5.3	5.7	4.1	4.2	7.2	9.7	9.1	8.4	0.0	0.0
155-0049	TRINITY MARINE PRODUCTS INC-CARUTHE	3089	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	158.1	291.2	0.0	0.0
155-0062	CARUTHERSVILLE GIN CO-CARUTHERSVILL	724	0.2	0.2	0.0	0.0	8.1	11.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
155-0063	BUNGE NORTH AMERICA INC-CARUTHERSVI	5153	0.5	1.1	0.0	0.0	5.4	7.5	3.0	4.2	0.4	0.9	0.1	0.2	0.0	0.0
155-0066	MFA PLANT FOODS-HAYTI	2875	0.0	0.0	0.0	0.0	2.0	2.8	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
155-0067	CHEMICAL LIME COMPANY-HOLLAND TERMI	5032	0.0	0.0	0.0	0.0	1.7	1.9	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0
155-0068	LOUIS DREYFUS CORP-CARUTHERSVILLE S	5153	0.0	0.0	0.0	0.0	2.0	2.7	1.8	2.5	0.0	0.0	0.0	0.0	0.0	0.0
155-49530200	Pemiscot County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	12.0
157-0002	SABRELINER CORPORATION-PERRYVILLE P	3724	0.3	0.8	0.2	0.7	0.4	0.8	0.3	0.7	0.6	1.7	6.2	11.4	0.0	0.0
157-0019	TG MISSOURI-PERRYVILLE	3714	13.6	19.1	0.1	0.1	4.6	7.3	3.9	6.1	3.6	4.7	374.1	197.2	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
157-0020	FALCON FOAM-FALCON FOAM	3089	2.9	4.2	0.1	0.2	7.0	10.0	6.2	8.9	2.6	3.7	81.3	139.1	0.0	0.0
157-0022	H & G MARINE SERVICE INC-PERRYVILLE	3429	0.0	0.0	0.0	0.0	0.5	0.8	0.1	0.2	0.0	0.0	9.0	11.3	0.0	0.0
157-0024	ALTENBURG HARDWOOD LUMBER CO-ALTENB	2421	1.0	1.5	0.1	0.1	3.4	5.0	2.3	3.4	9.4	13.6	1.7	2.5	0.0	0.0
157-0025	STE. GENEVIEVE READY MIX CONCRETE I	3273	0.0	0.0	0.0	0.0	6.3	8.9	1.9	2.6	0.0	0.0	0.0	0.0	0.0	0.0
157-0027	TNT PLASTICS INC-PERRYVILLE	3081	1.3	1.4	0.0	0.0	2.1	3.8	0.9	1.4	0.3	0.3	16.9	22.1	0.0	0.0
157-0032	MARTIN MARIETTA MATERIALS-CAROLINA	2951	1.8	2.5	0.5	0.8	2.2	3.5	0.4	0.5	0.5	0.8	0.4	0.4	0.0	0.0
157-49530201	Perry County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.4	63.5
157-P023	MARTIN MARIETTA MATERIALS INC-PERRY	1422	0.0	0.0	0.0	0.0	12.5	17.2	2.3	3.2	0.0	0.0	0.0	0.0	0.0	0.0
159-0002	LAFARGE NORTH AMERICA INC.-SEDALIA	1422	6.7	10.3	4.7	7.5	6.0	8.6	2.2	3.5	21.0	34.4	1.3	2.0	0.0	0.0
159-0004	ADCO INC-SEDALIA	2842	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	3.1	4.9	0.0	0.0
159-0009	PITTSBURGH-CORNING CORP-PITTSBURGH-	3296	204.3	339.2	80.7	136.3	42.0	68.7	27.6	44.5	19.6	25.8	7.3	6.7	0.0	0.0
159-0012	WATERLOO INDUSTRIES INC-WATERLOO IN	3499	6.1	8.0	0.0	0.0	10.3	24.4	0.6	1.1	5.1	6.8	147.0	185.2	0.0	0.0
159-19	J.C. RANCH, INC.	211	0.0	0.0	0.0	0.0	6.6	7.1	1.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0
159-0021	PARKHURST MANUFACTURING CO INC-PARK	3713	1.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
159-0022	ALCAN CABLE-DIV OF ALCAN PRODUCTS C	3355	2.7	3.7	0.0	0.0	0.2	0.2	0.2	0.2	2.0	2.7	12.4	24.8	0.0	0.0
159-0025	WIRE ROPE CORPORATION OF AMERICA IN	3496	0.2	0.3	0.0	0.0	0.9	1.4	0.3	0.6	0.1	0.1	5.4	10.1	0.0	0.0
159-0027	HAYES LEMMERZ INTERNATIONAL INC-SED	3714	10.1	15.3	0.2	0.3	1.0	1.7	0.9	1.6	7.7	11.8	63.1	79.7	0.0	0.0
159-0030	BOTHWELL REGIONAL HEALTH CENTER-BOT	8062	4.3	4.6	0.0	0.1	0.2	0.3	0.2	0.3	2.2	2.4	0.4	0.4	0.0	0.0
159-0032	TYSON FOODS INC-SEDALIA COMPLEX (FE	2048	2.2	2.9	0.0	0.0	3.8	4.8	1.9	2.4	1.9	2.4	0.3	0.3	0.0	0.0
159-0033	AMERICAN COMPRESSED STEEL INC-AMERI	3341	0.8	0.9	0.0	0.0	2.8	2.4	2.5	2.2	0.0	0.0	1.7	2.0	0.0	0.0
159-0037	TYSON FOODS INC-SEDALIA PROCESSING	2015	41.9	58.1	0.2	0.3	24.8	30.4	16.7	21.0	35.2	48.8	4.7	6.9	0.0	0.0
159-0038	MID-MISSOURI LIMESTONE INC-HOUSTONI	1422	0.0	0.0	0.0	0.0	2.1	2.9	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
159-0039	GARDNER DENVER INC-SEDALIA PLANT	3563	0.5	0.6	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	3.3	6.5	0.0	0.0
159-0041	MISSOURI PRESSED METALS INC-SEDALIA	3499	0.5	0.7	0.0	0.0	0.4	0.6	0.2	0.3	0.1	0.1	57.1	100.4	0.0	0.0
159-0047	PANHANDLE EASTERN PIPE LINE CO-HOUS	4922	1,477.5	1,941.5	0.4	0.5	23.6	31.1	22.1	29.1	318.1	417.9	80.4	104.9	0.0	0.0
159-51	REINE, ALBERT	241	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
159-0055	CENTRAL MISSOURI SANITARY LANDFILL-	4953	0.0	0.0	0.0	0.0	16.9	22.8	5.4	7.2	1.7	2.2	4.1	5.5	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
159-0056	EDWARDS FIBERGLASS INC-SEDALIA	3089	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.6	43.4	0.0	0.0
159-49530203	Sedalia SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	8.2
159-65301-TYSNF-195	TYSON FOODS INC. SEDALIA COMPLEX	2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.6
161-0003	MISSOURI HARDWOOD CHARCOAL-ROLLA PL	2861	7.3	8.8	0.0	0.0	88.8	107.1	86.6	104.5	422.1	509.4	263.8	318.4	0.0	0.0
161-0006	UNIVERSITY OF MO - ROLLA-ROLLA POWE	8221	54.4	54.9	501.0	511.2	13.2	17.2	5.7	7.0	95.8	96.4	2.7	2.9	0.0	0.0
161-0009	ASPHALT PRODUCTS INC-ROLLA PLANT	2951	2.5	4.2	0.1	0.2	10.7	17.5	3.2	5.3	4.5	7.5	4.0	6.7	0.0	0.0
161-0015	CAPITAL SAND COMPANY-NEWBURG SAND A	1442	0.0	0.0	0.0	0.0	1.7	2.3	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
161-0025	ROYAL CANIN USA INC-ROLLA	2047	2.8	3.7	0.0	0.0	3.4	4.4	0.6	0.8	2.3	3.1	0.7	1.1	0.0	0.0
161-0032	BRIGGS & STRATTON CORP-ROLLA	3519	7.1	11.0	0.2	0.4	4.1	3.5	3.4	3.0	13.6	39.3	26.1	56.5	0.0	0.0
161-0039	MANCHESTER PACKAGING COMPANY-MANCHE	3089	0.1	0.1	0.0	0.0	0.4	0.8	0.0	0.0	0.0	0.1	51.2	67.1	0.0	0.0
161-0050	ROLLA READY MIX CONCRETE LLC-ROLLA	1422	0.0	0.0	0.0	0.0	3.5	4.9	0.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0
161-0051	ROLLA POLICE DEPARTMENT ANIMAL SHEL	752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0
161-0054	ROLLA MUNICIPAL UTILITIES-MULTIPLE	4911	2.1	4.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.0
161-49530204	Phelps County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	3.0
163-0001	HOLCIM (US) INC-CLARKSVILLE	3241	6,026.7	6,026.7	7,408.0	7,408.0	170.6	229.6	63.0	75.1	2,636.6	2,636.6	1,960.2	1,960.2	0.0	0.0
163-0002	AQUALON DIV OF HERCULES INC-MISSOUR	2869	1,008.2	1,214.4	6,223.8	7,475.7	143.4	182.8	22.2	35.2	55.4	67.2	307.7	431.2	0.1	0.1
163-0008	WAYNE B SMITH INC-WAYNE B SMITH INC	1422	1.6	1.7	1.2	1.3	4.7	6.4	1.1	1.6	0.4	0.4	0.2	0.2	0.0	0.0
163-0022	MAGRUDER LIMESTONE CO INC-ASHLEY QU	1422	0.0	0.0	0.0	0.0	6.5	9.0	1.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0
163-0025	BUNGE NORTH AMERICA INC-LOUISIANA P	4221	0.0	0.0	0.0	0.0	4.8	6.6	1.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0
163-0027	CENTRAL STONE COMPANY-CURRYVILLE (C	1422	0.0	0.0	0.0	0.0	2.8	3.9	1.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0
163-0031	DYNO NOBEL INC-LOMO PLANT	2873	765.4	1,266.8	0.0	0.0	150.4	248.9	112.4	186.0	0.0	0.0	0.0	0.0	0.0	0.0
163-0036	ANNADA ELEVATOR-ANNADA ELEVATOR	5153	0.0	0.0	0.0	0.0	2.8	3.9	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
163-0038	MARK TWAIN REDI-MIX-BOWLING GREEN P	3273	0.0	0.0	0.0	0.0	1.5	2.1	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
163-0040	EAGLE RIDGE LANDFILL-BOWLING GREEN	4953	0.0	0.0	0.0	0.0	3.6	5.0	0.0	0.0	0.3	0.5	1.3	1.9	0.0	0.0
163-0047	AMERENUE-PENO CREEK ENERGY CENTER	4911	31.1	28.9	0.3	0.0	4.9	2.4	4.9	2.4	2.4	29.5	13.5	2.5	0.0	2.3
163-49530205	Sutton & Sons SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	5.1
163-63353-RCNCR-HIG	DYNO NOBEL INC. LOMO PLANT	2873	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	61.5	102.8

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
165-0001	MACKIE-CLEMENS FUEL CO-BUILDEX INC	3295	24.1	31.6	0.0	0.0	29.4	40.9	12.4	17.4	6.0	7.9	1.1	1.4	0.0	0.0
165-0005	AMERICAN AIRLINES-MCI MAINTENANCE A	4581	45.0	62.3	1.8	5.2	2.2	5.5	2.1	5.2	17.1	29.8	38.0	59.8	0.0	0.0
165-0007	KANSAS CITY POWER & LIGHT CO-IATAN	4911	7,350.4	5,624.8	15,216.8	16,933.2	304.6	631.7	188.6	498.9	575.0	745.2	70.5	91.6	1.0	44.7
165-0009	AQUILA INC-KCI ENERGY CENTER	4911	4.7		0.0		0.3		0.3		1.2		0.1		0.0	
165-0010	MARTIN MARIETTA MATERIALS-PARKVILLE	1422	0.0	0.0	0.0	0.0	10.4	14.3	2.3	3.2	0.0	0.0	0.0	0.0	0.0	0.0
165-0015	CONOCOPHILLIPS CO-RIVERSIDE PRODUCT	5171	7.5	9.8	0.0	0.0	0.0	0.0	0.0	0.0	18.6	24.5	49.2	64.7	0.0	0.0
165-0021	PACKAGE SERVICE CO LLC-PACKAGE SERV	2759	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.9	92.1	0.0	0.0
165-0024	PLATTE COUNTY READY MIX-PLATTE COUN	3273	0.0	0.0	0.0	0.0	12.7	18.0	3.6	5.1	0.0	0.0	0.0	0.0	0.0	0.0
165-0028	WOODBRIDGE CORPORATION-KANSAS CITY	3086	1.2	1.2	0.0	0.0	0.1	0.1	0.1	0.1	1.0	1.0	91.4	167.2	0.0	0.0
165-2225	LAFARGE CONSTRUCTION MATERIALS-KANS	3273	0.2	0.2	0.0	0.0	2.1	3.0	0.8	1.1	0.1	0.0	0.0	0.0	0.0	0.0
165-2401	MICHELIN AIRCRAFT TIRE CORPORATION-	7534	1.3	1.4	0.0	0.0	5.8	10.0	3.3	5.8	1.1	1.1	9.5	8.5	0.0	0.0
165-2402	SUPERIOR BOWEN ASPHALT CO LLC-144TH	2951	4.0	6.2	0.4	0.7	6.5	10.0	1.2	1.8	16.4	27.0	5.1	8.3	0.0	0.0
165-2403	HUNT MIDWEST MINING-STAMPER QUARRY	1422	3.3	6.5	0.2	0.5	13.1	18.3	2.0	3.0	0.7	1.5	0.3	0.6	0.0	0.0
165-2404	KCI AIRPORT - KCMO AVIATION DEPT-KC	4581	5.1	6.0	0.2	0.3	0.4	0.6	0.4	0.5	2.9	3.3	4.4	8.4	0.0	0.0
165-2414	ST. LUKES NORTHLAND HOSPITAL-ST. LU	7374	3.6	4.6	0.2	0.3	0.3	0.3	0.3	0.3	2.1	2.5	0.4	0.6	0.0	0.0
165-2415	HARLEY DAVIDSON MOTOR COMPANY-KANSA	3751	6.5	8.7	0.1	0.1	0.5	0.7	0.5	0.7	9.8	11.7	13.7	15.6	0.0	0.0
165-2416	LIBERTY MUTUAL DATA CENTER-LIBERTY	7374	4.6	6.1	0.3	0.5	0.3	0.5	0.3	0.5	1.0	1.6	0.4	0.5	0.0	0.0
165-2418	ALLIED AVIATION.SERVICE CO OF KC IN	5172	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.0	0.0
165-2420	AMERITRADE-KANSAS CITY DATA CENTER	7374	0.4	0.8	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
165-2421	LIFETOUCH PUBLICATIONS-AMBASSADOR D	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.6	40.2	0.0	0.0
165-0005N	T.W.A. OVERHAUL OPERATIONS	4581	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	3.0
167-0006	H & H FARM PRODUCTS MFG INC-BOLIVAR	3523	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	18.3	0.0	0.0
167-0023	MISSOURI OAK FLOORING-BRIGHTON	2421	0.1	0.1	0.0	0.0	4.4	6.4	1.3	1.9	0.5	0.8	0.3	0.5	0.0	0.0
167-0028	TRACKER MARINE-BOLIVAR PLANT	3732	0.9	1.1	0.0	0.0	2.1	3.8	1.0	1.9	0.1	0.1	38.4	79.1	0.0	0.0
167-37	FRANCKA, BERNARD	241	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
167-38	FRANCKA, DARRELL	241	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
167-39	GALLIVAN FARM INC.	241	0.0	0.0	0.0	0.0	0.4	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
167-40	HENSLEY, JOHN	241	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
167-41	SAMEK, FRANK	241	0.0	0.0	0.0	0.0	0.4	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
167-42	SAMEK, FRANK	241	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
169-0004	MANSCEN AND FORT LEONARD WOOD-MANSC	9711	94.4	121.7	3.5	3.9	29.4	39.6	22.7	30.5	168.6	229.9	146.3	180.5	0.9	1.1
169-0024	OZARK READY MIX-WAYNESVILLE	3273	0.1	0.1	0.0	0.0	2.6	3.7	0.8	1.2	0.0	0.0	0.1	0.2	0.0	0.0
169-0027	WILLARD QUARRIES COMPANY INC-ST. RO	1422	2.3	3.8	0.5	0.8	5.7	8.1	1.0	1.5	5.6	9.2	1.7	2.8	0.0	0.0
169-0029	CAVE SAND & GRAVEL-WAYNESVILLE	1422	0.0	0.0	0.0	0.0	10.9	15.1	1.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0
169-0031	PULASKI VETERINARY CLINIC-ST. ROBER	742	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0
169-49530206	Ziegenbein SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	11.5
169-49530207	Fort Leonard Wood SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	2.7
171-0002	IDEAL READY MIX INC-UNIONVILLE	3273	0.0	0.0	0.0	0.0	0.7	1.1	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
171-0005	UNIONVILLE POWER & LIGHT-UNIONVILLE	4911	2.0	5.6	0.1	0.0	0.2	0.2	0.1	0.2	0.4	2.0	0.2	0.2	0.0	0.2
171-0006	PREMIUM STANDARD FARMS-LUCERNE FEED	2048	6.8	7.9	0.0	0.1	27.2	34.0	4.3	5.2	1.1	1.3	0.2	0.2	0.0	0.0
171-0015	ASSOCIATED ELECTRIC COOPERATIVE INC	4911	1.4	0.0	0.6	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.3	0.3	0.0	0.0
173-0001	CONTINENTAL CEMENT COMPANY INC-ILAS	3241	1,863.5	1,863.6	530.8	530.8	271.7	358.6	35.2	43.1	47.2	47.2	10.3	13.4	0.0	0.0
173-0003	CENTRAL STONE COMPANY-HANNIBAL (CS0	1422	0.0	0.0	0.0	0.0	19.0	26.3	5.1	7.0	0.0	0.0	0.0	0.0	0.0	0.0
173-0016	CENTRAL STONE COMPANY-NEW LONDON (C	1422	0.0	0.0	0.0	0.0	3.0	4.2	1.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0
173-0019	C. B. ASPHALT INC-HUNTINGTON PLANT	2951	13.0	19.0	16.6	23.3	11.6	18.7	2.4	3.9	3.3	5.1	2.1	3.3	0.0	0.0
173-0020	GENERAL MILLS INC-HANNIBAL	2013	8.9	11.6	0.0	0.1	0.7	0.8	0.7	0.8	7.5	9.7	1.1	1.4	0.0	0.0
173-0024	ENDURO INDUSTRIES INC-HANNIBAL PLAN	3471	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0
173-0036	DURA AUTOMOTIVE SYSTEMS INC-HANNIBA	3714	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	18.4	37.7	0.0	0.0
173-0037	BUCKHORN RUBBER PRODUCTS INC-BUCKHO	3052	0.9	1.1	0.0	0.0	22.4	41.2	10.7	19.6	0.2	0.3	61.5	125.0	0.0	0.0
173-49530208	Hannibal SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	12.6
175-0001	ASSOCIATED ELECTRIC COOPERATIVE INC	4911	18,023.1	7,764.5	15,593.9	18,679.9	288.8	883.0	171.6	616.7	1,012.0	1,228.9	172.0	202.2	1.7	73.6
175-0003	CONSOLIDATED NUTRITION L.C.-MASTER	2048	0.2	0.3	0.0	0.0	2.4	3.2	0.3	0.3	0.0	0.1	0.0	0.0	0.0	0.0
175-0010	AMERENUE-MOBERLY COMBUSTION TURBINE	4911	5.9		4.2		0.3		0.3		0.4		0.2		0.0	
175-0011	KOCH MATERIALS CO-KOCH MATERIALS CO	2951	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
175-20	BRITT, RANDY	211	0.0	0.0	0.0	0.0	1.3	1.4	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
175-21	ORSCHELN-DEEDS FEEDLOT	211	0.0	0.0	0.0	0.0	2.8	3.1	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
175-0047	NORRIS AGGREGATE PRODUCTS CO (EAST)	1422	43.7	39.7	2.9	3.2	22.2	29.8	11.9	15.6	10.9	12.3	4.1	3.9	0.0	0.0
175-0049	APAC MISSOURI-PLANT #5 RICHARDSON B	2951	6.7	10.9	2.8	3.9	2.8	3.9	0.6	0.8	2.7	4.4	1.8	3.0	0.0	0.0
175-0061	WILSON TRAILER SALES INC-MOBERLY	3715	0.2	0.3	0.0	0.0	0.2	0.3	0.2	0.3	0.2	0.1	7.4	14.1	0.0	0.0
175-0064	MOBERLY READY MIX COMPANY LLC-MOBER	3273	0.0	0.0	0.1	0.1	1.7	2.3	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
175-0065	MARK TWAIN REDI-MIX-MOBERLY HWY 63	3273	0.0	0.0	0.0	0.0	3.0	4.2	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
175-0066	MOBERLY CLEANERS-MOBERLY	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	5.0	0.0	0.0
175-0067	MOBERLY MUNICIPAL SANITARY LANDFILL	4953	0.0	0.0	0.0	0.0	0.7	1.0	0.2	0.3	0.0	0.0	2.4	3.2	0.0	0.0
175-0068	CUSTOM COMPOSITES CO INC (CCCO)-CUS	3089	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	6.9	0.0	0.0
175-0071	FUSSELMAN SALVAGE COMPANY-MOBERLY	5093	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
175-49530209	Moberly Municipal SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.6
177-0002	HUNT MIDWEST MINING/GREEN QUARRIES-	1422	0.0	0.0	0.0	0.0	13.8	19.1	1.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0
177-0004	ORRICK FARM SERVICE-ORRICK FARM SER	5191	0.1	0.1	0.0	0.0	10.2	14.1	2.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0
177-0006	U.S. GRANULES CORPORATION-ALMEG DIV	3341	28.4	37.3	1.7	2.2	7.4	12.8	1.6	2.8	3.6	4.8	4.4	5.8	0.0	0.0
177-0022	HUNT MIDWEST MINING/GREEN QUARRIES-	1422	0.0	0.0	0.0	0.0	7.2	10.0	1.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0
177-0029	CAPITAL SAND COMPANY-LEXINGTON SAND	1442	0.0	0.0	0.0	0.0	0.5	0.7	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
177-0030	W. A. ELLIS CONSTRUCTION CO-MISSOUR	1422	7.0	9.3	0.5	0.8	12.6	17.6	1.2	1.7	1.5	2.4	0.6	0.8	0.0	0.0
177-0033	RAY-CARROLL CO GRAIN GROWERS INC-RI	5541	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	4.5	0.0	0.0
177-0037	ORBSEAL LLC-RICHMOND	2891	0.3	0.3	0.0	0.0	0.5	0.8	0.1	0.2	0.3	0.3	5.5	9.0	0.0	0.0
177-0041	RAY COUNTY STONE PRODUCERS LLC-MADD	1422	0.0	0.0	0.0	0.0	0.6	0.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
179-0002	MISSOURI HARDWOOD CHARCOAL-REYNOLDS	2861	10.2	12.4	0.0	0.0	20.4	24.7	19.8	24.0	89.4	108.1	54.6	65.9	0.0	0.0
179-0004	DOE RUN COMPANY-SWEETWATER MINE/MIL	1031	1.7	2.4	0.2	0.3	31.6	44.4	7.7	11.1	8.4	11.6	2.2	2.7	0.0	0.0
179-0005	DOE RUN COMPANY-VIBURNUM (BRUSHY CR	1031	1.6	2.0	0.1	0.1	29.6	43.6	3.9	6.4	12.5	17.2	2.3	3.1	0.0	0.0
179-0006	DOE RUN COMPANY-BUNKER (FLETCHER MI	1031	1.9	2.3	0.1	0.1	25.0	36.1	2.6	4.2	16.2	22.3	2.0	2.4	0.0	0.0
179-0025	BUNKER WOOD PRODUCTS-BUNKER	2429	0.2	0.3	0.0	0.0	5.6	8.2	2.2	3.2	0.5	0.8	0.0	0.0	0.0	0.0
179-0030	MISSOURI TIE & TIMBER INC-REYNOLDS	2491	6.6	9.5	0.8	1.1	19.7	28.9	5.3	7.8	25.3	36.4	7.2	10.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
179-49530210	Warren SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7
181-49530211	Doniphan Municipal SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	10.6
183-0001	AMERENUE-SIOUX PLANT	4911	14,122.6	7,245.8	47,083.3	1,660.3	166.1	1,494.9	147.4	1,469.9	841.2	718.6	216.4	161.2	0.8	43.1
183-0004	FRED WEBER INC-O'FALLON ASPHALT PLA	2951	6.0	22.2	0.6	1.0	3.1	4.7	0.4	0.6	40.9	279.8	2.4	4.6	0.0	0.0
183-0007	FRED WEBER INC-O'FALLON STONE PLANT	1422	0.0	0.0	0.0	0.0	30.2	41.7	6.5	9.0	0.0	0.0	0.0	0.0	0.0	0.0
183-0008	LAFARGE NORTH AMERICA INC-ST. CHARL	1422	13.3	15.3	0.7	0.9	10.6	14.4	3.0	4.1	18.1	24.5	0.6	0.6	0.0	0.0
183-0009	FRED WEBER INC-NEW MELLE QUARRY	1422	28.7	25.9	1.9	2.0	20.7	28.0	5.3	6.8	6.2	6.7	2.7	2.6	0.0	0.0
183-0010	MCDONNELL DOUGLAS CORP-BOEING COMPA	3674	2.9	4.0	0.0	0.0	1.8	3.0	1.5	2.5	2.2	3.0	11.8	21.3	0.0	0.0
183-0011	DIDION & SONS FOUNDRY CO-DIDION & S	3321	0.1	0.1	0.1	0.2	5.2	10.1	0.1	0.2	0.0	0.0	7.4	14.3	0.0	0.0
183-0015	LAFARGE NORTH AMERICA INC-DEFIANCE	1422	20.1	22.1	1.1	1.4	13.2	18.1	4.0	5.3	22.9	30.9	1.1	1.1	0.0	0.0
183-0019	ST. JOSEPH HEALTH CENTER-ST. JOSEPH	8062	3.6	4.0	0.1	0.1	2.0	3.2	1.7	2.7	2.6	2.8	2.3	2.9	0.0	0.0
183-0023	MAGELLAN TERMINAL HOLDINGS LP-ST. C	5171	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	3.4	3.4	15.8	26.6	0.0	0.0
183-0027	MEMC ELECTRONIC MATERIALS INC-ST. P	3677	50.1	96.1	0.1	0.2	48.4	81.2	40.0	67.0	10.3	13.5	30.4	53.2	0.0	0.0
183-0029	RECKITT BENCKISER-ST. PETERS	2842	0.3	0.4	0.0	0.0	1.7	2.8	1.4	2.3	0.3	0.4	36.5	73.5	0.0	0.0
183-0038	LEONARDS METAL INC-HWY 94 PLANT	3469	1.2	1.9	0.0	0.0	0.4	0.7	0.2	0.3	0.7	1.1	2.4	4.1	0.0	0.0
183-0041	CRAFTSMEN INDUSTRIES INC-CLAY ST PL	3444	0.1	0.2	0.0	0.0	0.2	0.3	0.1	0.2	0.1	0.1	4.6	9.1	0.0	0.0
183-0045	MAIL WELL ENVELOPE CO-O'FALLON PLAN	2677	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	3.5	0.0	0.0
183-0053	BRAKING TECHNOLOGIES INC-BRAKING TE	3714	1.4	7.1	0.0	0.0	2.4	4.3	0.8	1.4	0.5	2.2	24.8	35.5	0.0	0.0
183-0059	WILSON TOOL & DIE-ST. CHARLES	3545	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
183-0076	GENERAL MOTORS-WENTZVILLE CENTER	3711	301.1	225.3	695.2	659.1	9.7	13.7	7.1	10.9	112.3	85.3	992.5	1,366.6	0.0	0.0
183-0077	O"FALLON CASTING LLC-O"FALLON	3324	5.0	6.6	0.1	0.2	0.4	0.4	0.3	0.3	1.0	1.3	61.5	112.6	0.0	0.0
183-0096	PACE CONSTRUCTION CO-ST. CHARLES PL	2951	3.1	5.1	0.3	0.5	18.4	25.7	3.9	5.4	8.7	14.4	1.1	1.8	0.0	0.0
183-0098	STAR CONCRETE CO-STAR CONCRETE CO	3273	0.0	0.0	0.0	0.0	10.7	14.9	4.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0
183-0110	ZOLTEK CORPORATION-ZOLTEK CORPORATI	2299	19.8	37.4	0.0	0.0	0.6	0.8	0.5	0.7	5.8	6.5	1.0	1.9	0.0	0.0
183-0119	K & R WOOD PRODUCTS INC-O'FALLON	2511	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	23.0	66.7	0.0	0.0
183-0122	KIT MIX-STAR CONCRETE COMPANY	3273	0.0	0.0	0.0	0.0	9.1	12.7	2.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
183-0129	WOODBRIDGE CORPORATION-ST. PETERS	3086	1.0	1.6	0.0	0.0	0.1	0.1	0.1	0.1	0.9	1.4	83.5	214.2	0.0	0.0
183-0130	BLASTCO INC-BLASTCO INC	3479	0.2	0.3	0.2	0.2	4.8	8.2	1.4	2.4	0.1	0.0	1.8	3.6	0.0	0.0
183-0131	SUPERIOR HOME PRODUCTS INC-SUPERIOR	3089	0.0	0.0	0.0	0.0	0.2	0.5	0.1	0.1	0.0	0.0	16.3	14.6	0.0	0.0
183-0135	BAUE FUNERAL AND MEMORIAL CENTER-BA	7261	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
183-0136	FARMERS CO-OP-ST. PETERS	5153	0.0	0.0	0.0	0.0	0.5	0.6	0.5	0.6	0.0	0.0	1.8	2.4	0.0	0.0
183-0184	TRUE MANUFACTURING CO-O'FALLON	3585	4.3	63.4	0.0	0.0	0.5	0.7	0.4	0.6	3.6	53.3	51.3	118.6	0.0	0.0
183-0188	COMPONENT BAR PRODUCTS INC-ST. CHAR	3451	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.9	31.5	0.0	0.0
183-0201	T & J REALTY LLC-FORISTELL	3273	0.0	0.0	0.0	0.0	1.9	2.7	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
183-0204	LEONARDS METAL INC-MUELLER ROAD PLA	3444	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.7	0.0	0.0
183-0206	DIAGRAPH LABELING-ST. CHARLES	2759	0.0	0.0	0.0	0.0	4.9	5.9	4.0	5.0	0.0	0.0	0.4	0.5	0.0	0.0
183-0207	HUSTLER CONVEYOR CO-ST. CHARLES	3535	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	3.3	0.0	0.0
183-0210	HOPE READIMIX LLC-ST. CHARLES	3273	0.0	0.0	0.0	0.0	0.5	0.7	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
183-0214	MEXICAN CONNECTION-ST. CHARLES	5023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.0
183-5015	NIKE IHM INC-ST. CHARLES	3081	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
183-6003	LAMI WOOD PRODUCTS-LAMI WOOD PRODUC	2511	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.1	27.7	0.0	0.0
183-9001	CONCRETE RESOURCES INC-WENTZVILLE	3273	0.2	0.2	0.0	0.0	5.8	8.1	2.2	3.1	0.1	0.1	0.0	0.0	0.0	0.0
183-63304-ZLTKC-11M	ZOLTEK CORP.	3624	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	2.9
183-63366-HTCHN-CAN	HITCHINER MFG. CO. INC.	3365	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.4	22.4
186-0001	MISSISSIPPI LIME COMPANY-MISSISSIPP	3274	2,764.3	3,921.5	6,001.4	8,515.5	1,378.9	1,595.4	869.0	978.9	13,016.0	18,466.6	89.9	125.2	0.5	0.8
186-0003	BILTBEST WINDOWS CORP-STE. GENEVIEV	2431	0.5	0.7	0.0	0.0	1.1	1.6	0.6	0.9	0.5	0.6	82.2	169.6	0.0	0.0
186-0006	READY MIX CONCRETE INC-STE. GENEVIE	3273	0.0	0.0	0.0	0.0	4.7	6.7	1.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0
186-0021	APAC MEMPHIS DIVISION-BRICKEYS STON	1422	38.0	38.7	6.2	6.8	22.2	30.5	6.0	8.1	9.9	10.8	2.4	2.8	0.0	0.0
186-0022	TOWER ROCK STONE CO-STE. GENEVIEVE	1422	0.0	0.0	0.0	0.0	64.2	88.7	8.4	11.6	0.0	0.0	0.0	0.0	0.0	0.0
186-0024	CENTERPOINT ENERGY-STE. GENEVIEVE C	4922	6.7	8.8	0.0	0.0	0.1	0.2	0.1	0.2	1.3	1.7	7.3	8.9	0.0	0.0
186-0026	MISSISSIPPI LIME COMPANY-BARGE LOAD	4449	0.0	0.0	0.0	0.0	4.5	6.2	0.9	1.2	0.0	0.0	0.0	0.0	0.0	0.0
186-0028	BASE ROCK MATERIALS-BASE ROCK MATER	1442	0.0	0.0	0.0	0.0	5.5	7.6	1.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0
186-0035	CHEMICAL LIME COMPANY-STE.	3274	1,669.3	2,368.7	72.1	102.4	141.9	167.7	25.3	30.6	33.3	47.2	15.4	21.9	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	GENEVIEV															
186-0037	WEST COUNTY QUARRY LC-STE. GENEVIEV	1422	0.0	0.0	0.0	0.0	1.3	1.8	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
186-0042	SABRELINER CORPORATION-STE. GENEVIE	3724	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	2.8	0.0	0.0
186-0044	HOLCIM - LEE ISLAND	3241	0.0	5,828.7	0.0	0.0	0.0	3,042.0	0.0	683.5	0.0	14,485.6	0.0	805.1	0.0	0.0
187-0001	LEAD BELT MATERIALS CO INC-PARK HIL	1422	5.4	5.7	0.3	0.3	13.9	20.3	3.3	4.9	19.6	31.8	1.3	1.8	0.0	0.0
187-0002	VESSELL MINERAL PRODUCTS-VESSELL MI	3255	13.1	18.6	3.5	4.9	11.8	13.1	3.6	3.9	6.4	9.0	0.0	0.0	0.0	0.0
187-0006	IRON MOUNTAIN TRAP ROCK CO-IRON MOU	3295	0.0	0.0	0.0	0.0	6.1	8.4	1.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0
187-0017	FLAT RIVER GLASS CO-PARK HILLS	3211	209.8	348.9	27.3	46.2	66.3	111.8	44.0	74.1	5.7	8.4	8.7	15.0	0.0	0.0
187-0041	PLAYPOWER LT FARMINGTON INC-IRON MO	2514	5.5	7.3	0.0	0.0	2.7	4.8	1.0	1.5	4.7	6.1	34.7	70.7	0.0	0.0
187-0045	POLITTE READY MIX-FARMINGTON	3273	0.1	0.0	0.0	0.0	8.4	11.7	1.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0
187-0048	S-R PRODUCTS-FARMINGTON	3471	2.5	3.7	0.0	0.0	0.3	0.5	0.0	0.0	0.2	0.2	88.6	32.8	0.0	0.0
187-0054	LEAD BELT MATERIALS CO INC-BONNE TE	2951	5.9	9.7	4.3	7.1	13.6	19.1	2.4	3.3	19.6	32.3	0.4	0.7	0.0	0.0
187-0058	MORGAN AND WHITE QUARRIES INC-PARK	1422	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
187-0063	CENTRAL STONE COMPANY-ST FRANCOIS C	1422	0.0	0.0	0.0	0.0	4.0	5.6	1.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0
187-0071	ST. FRANCOIS COUNTY ENVIRONMENTAL C	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.9	1.3	1.9	0.0	0.0
187-0072	BASE ROCK MINERALS INC-BONNE TERRE	1422	12.6	12.9	0.7	0.8	24.8	34.0	1.6	2.1	8.8	11.7	0.9	0.8	0.0	0.0
187-0074	PACOM LLC-FARMINGTON	3069	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
187-0076	MISSOURI DEPT OF CORRECTIONS-EASTER	9223	2.9	4.5	1.0	1.6	0.5	0.7	0.4	0.6	0.7	1.2	0.4	0.5	0.0	0.0
187-0077	HILLVIEW MEMORIAL CREMATORY-FARMING	7261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
187-49530214	St. Francois County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	98.3	147.2
189-0002	CHRYSLER ASSEMBLY PLANT 1-FENTON	3711	38.6	82.7	0.2	0.3	3.0	3.9	3.0	3.9	32.6	69.8	673.2	1,204.7	0.0	0.0
189-0003	ENGINEERED AIR SYSTEMS INC-PRICE	3499	1.2	1.7	0.0	0.0	0.1	0.1	0.1	0.1	1.0	1.4	5.9	14.8	0.0	0.0
189-0004	BECO CONCRETE COMPANY-NEW BAUMGARTN	3273	0.0	0.0	0.0	0.0	2.2	3.1	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
189-0010	AMERENUE-MERAMEC PLANT	4911	9,480.9	6,355.9	16,850.4	23,129.5	346.3	710.0	172.5	583.3	715.2	750.5	91.2	91.9	1.6	45.0
189-0012	INLAND PAPERBOARD & PACKAGING INC-F	2653	2.8	3.6	0.0	0.1	0.2	0.3	0.2	0.3	2.3	3.0	2.4	3.0	0.0	0.0
189-0013	MISSOURI BAPTIST MEDICAL CENTER-NOR	8062	6.3	6.6	0.0	0.1	3.0	4.7	2.5	3.9	5.0	5.3	3.4	4.0	0.0	0.0
189-0015	FORD MOTOR CO-HAZELWOOD	3711	37.8	49.7	0.2	0.3	2.6	3.5	2.3	3.1	27.9	36.8	947.2	1,084.3	0.3	0.4
189-0017	FRED WEBER INC-NORTH	2951	0.0	0.0	0.0	0.0	88.1	121.8	8.1	11.2	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
	STONE															
189-0019	FRED WEBER INC-SOUTH STONE	2951	0.0	0.0	0.0	0.0	31.4	43.5	3.3	4.6	0.0	0.0	0.0	0.0	0.0	0.0
189-0020	MONSANTO WORLD HEADQUARTERS-LINDBER	2869	16.5	8.8	0.1	0.2	1.3	1.6	1.3	1.6	13.8	7.4	2.3	1.7	0.0	0.0
189-0021	U. S. SILICA COMPANY-PACIFIC	1446	3.8	4.9	0.0	0.0	40.9	56.5	16.9	23.4	3.2	4.1	0.5	0.6	0.0	0.0
189-0022	ST. JOHNS MERCY MEDICAL CENTER-NEW	8062	10.3	7.6	0.5	0.8	0.8	0.8	0.8	0.8	8.6	6.3	2.3	2.0	0.0	0.0
189-0023	AMERENUE-HOWARD BEND COMBUSTION TUR	4911	8.0		5.8		0.4		0.4		0.6		0.2		0.0	
189-0025	DANA CORPORATION-PERFECT CIRCLE DIV	3592	1.4	1.5	0.0	0.0	1.1	4.1	0.9	3.4	1.2	1.2	80.7	169.0	0.0	0.0
189-0028	AMERICAN READY MIX-GUMBO	3273	0.0	0.0	0.0	0.0	3.0	4.2	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0
189-0032	PHARMACIA-CHESTERFIELD VILLAGE	2869	11.9	8.0	0.1	0.1	0.9	1.2	0.9	1.2	10.0	6.7	1.8	1.7	0.0	0.0
189-0035	ROCKWOOD PIGMENTS NA INC-E HOFFMEIS	2816	17.1	22.9	8.6	10.4	6.0	7.4	2.8	3.6	12.1	16.4	2.1	2.9	0.0	0.0
189-0040	PACE CONSTRUCTION CO-PACE CONSTRUCT	2951	5.4	8.8	0.5	0.8	7.5	10.8	1.7	2.5	85.9	141.8	4.9	8.1	0.0	0.0
189-0041	GENERAL MATERIAL COMPANY-GRAVOIS RO	1442	0.7	0.8	0.0	0.0	0.8	1.1	0.3	0.5	0.6	0.7	0.1	0.1	0.0	0.0
189-0042	WASHINGTON UNIVERSITY-MILLBROOK BLV	8221	19.0	7.0	0.4	0.6	8.5	13.7	7.3	11.7	15.9	5.9	2.3	0.8	0.1	0.1
189-0057	ST. LOUIS POST-DISPATCH-DUNLAP IND	2711	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	25.5	34.7	0.0	0.0
189-0061	CARAUSTAR PACKAGING-BAUR BLVD	2752	0.2	0.3	0.0	0.0	0.2	0.3	0.2	0.3	0.0	0.0	19.2	34.0	0.0	0.0
189-0064	SUNNEN PRODUCTS COMPANY-MAPLEWOOD	3541	3.6	6.7	0.0	0.0	0.3	0.4	0.3	0.4	3.0	5.7	14.7	43.8	0.0	0.0
189-0065	ST. LOUIS AIRPORT AUTHORITY-LAMBERT	3715	12.7	11.8	0.6	0.7	9.3	15.1	7.9	12.6	9.0	5.6	5.3	32.4	0.0	0.0
189-0066	CRANE MERCHANDISING SYSTEMS-BRIDGET	3581	2.7	3.5	0.0	0.0	0.2	0.3	0.2	0.3	2.2	2.9	1.3	2.5	0.0	0.0
189-0069	SIMPSON MATERIALS CO-VALLEY PARK	5032	0.0	0.0	0.0	0.0	0.5	0.7	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
189-0101	BRECKENRIDGE MATERIAL CO-ST. LOUIS	3273	0.0	0.0	0.0	0.0	1.4	1.9	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0
189-0102	BRECKENRIDGE MATERIALS-EUREKA PLANT	3273	0.0	0.0	0.0	0.0	1.2	1.7	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
189-0103	LANDVATTER READY MIX-BARRETT STATIO	3273	0.0	0.0	0.0	0.0	9.0	12.8	2.7	3.8	0.0	0.0	0.0	0.0	0.0	0.0
189-0104	BRECKENRIDGE MATERIAL CO-CHESTERFIE	3273	0.0	0.0	0.0	0.0	2.7	3.8	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
189-0106	BRECKENRIDGE MATERIAL CO-BRECKENRID	3273	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
189-0110	KIENSTRA CONCRETE (MO BOTTOM)-MO.	3273	0.0	0.0	0.0	0.0	3.4	4.9	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
189-0111	SIMPSON CONSTRUCTION MATERIALS LLC-	1422	0.3	0.5	0.0	0.0	1.0	1.7	0.4	0.7	5.2	8.6	0.2	0.4	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
189-0112	FIVE STAR READY MIX CONCRETE CO-MAR	3273	0.0	0.0	0.0	0.0	2.2	3.2	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
189-0113	GATEWAY READY MIX INC-MARYLAND HEIG	3273	0.0	0.0	0.0	0.0	2.7	3.9	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
189-0114	KIENSTRA SUPPLY CO-MARYLAND HEIGHTS	3273	0.0	0.0	0.0	0.0	1.0	1.4	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
189-0117	AMERICAN READY MIX-FENTON	3273	0.0	0.0	0.0	0.0	2.1	3.0	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
189-0118	VALLEY MATERIAL COMPANY-VALLEY PARK	3273	0.0	0.0	0.0	0.0	5.5	7.7	1.7	2.4	0.0	0.0	0.0	0.0	0.0	0.0
189-0121	METRO MATERIALS (VALLEY PARK PLANT)	3273	0.0	0.0	0.0	0.0	0.9	1.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
189-0122	BRECKENRIDGE MATERIAL CO-MATTIS ROA	3273	0.0	0.0	0.0	0.0	1.1	1.6	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
189-0124	AMERICAN READY MIX-BUSSEN ROAD	3273	0.0	0.0	0.0	0.0	1.3	1.8	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
189-0129	BANGERT BROTHERS (MILLSTONE BANGERT	3273	0.0	0.0	0.0	0.0	3.6	5.0	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
189-0137	FLEMING PRINTING-FENTON	2752	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	21.3	34.5	0.0	0.0
189-0140	STOUT INDUSTRIES INC-JENNINGS	2759	1.1	2.1	0.0	0.0	0.1	0.1	0.1	0.1	0.9	1.7	11.2	29.2	0.0	0.0
189-0141	ENERGY PETROLEUM COMPANY-KIENLEN	5171	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	7.7	0.0	0.0
189-0201	PACE CONSTRUCTION CO-ANTIRE QUARRY	2951	6.3	10.4	3.3	5.5	5.7	8.4	0.8	1.2	15.1	25.0	10.2	16.9	0.0	0.0
189-0205	C. F. INDUSTRIES-KOCH ROAD	5191	0.0	0.0	0.0	0.0	0.7	0.9	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
189-0208	PRINTPACK INC-HAZELWOOD PLANT	2671	5.1	6.1	0.0	0.0	0.4	0.5	0.4	0.5	4.2	5.2	288.7	429.0	0.0	0.0
189-0213	PORTA-FAB-CHESTERFIELD AIRPORT RD	2542	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	2.3	4.8	0.0	0.0
189-0217	METROPOLITAN ST. LOUIS SEWER DISTRI	4952	52.4	70.2	2.1	2.8	4.4	6.5	1.4	2.1	320.4	430.4	102.5	137.5	0.0	0.0
189-0221	PM RESOURCES-PURINA MILLS INC	2834	0.0	0.0	0.0	0.0	0.9	1.3	0.2	0.3	0.0	0.0	1.1	2.1	0.0	0.0
189-0226	NESCO CONTAINER CORP-FENTON	3412	1.5	2.3	0.0	0.0	0.1	0.2	0.1	0.2	0.9	1.2	59.9	207.6	0.0	0.0
189-0230	MCDONNELL DOUGLAS CORP./BOEING COMP	3721	142.8	96.4	138.7	131.6	28.7	45.6	21.7	35.5	38.1	38.9	113.2	179.3	0.0	0.0
189-0231	CHRYSLER CORP-NORTH PLANT	3711	104.8	199.2	0.6	0.7	7.1	8.4	7.1	8.4	41.2	79.5	758.8	1,183.7	0.0	0.0
189-0235	HUSSMAN CORPORATION-BRIDGETON	3585	4.9	6.4	0.0	0.1	0.4	0.5	0.4	0.5	4.1	5.4	6.7	13.9	0.0	0.0
189-0238	ST. LOUIS LITHOGRAPHING COMPANY-HEE	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.4	100.7	0.0	0.0
189-0242	MULTIPLEX DISPLAY FIXTURE-FENTON	2542	0.7	1.1	0.0	0.0	0.1	0.1	0.1	0.1	0.6	0.9	15.8	43.8	0.0	0.0
189-0252	STANDARD MACHINE AND MFG COMPANY-BI	3499	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	13.1	0.0	0.0
189-0263	WOHL COATINGS CO-MAPLE AVE	2851	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.4	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
189-0275	BUSSEN QUARRIES INC-BUSSEN ROAD	1422	0.0	0.0	0.0	0.0	20.2	27.8	2.6	3.6	0.0	0.0	0.0	0.0	0.0	0.0
189-0276	RUPRECHT QUARRY-PAULE RD	1422	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
189-0281	BFI MISSOURI PASS LANDFILL-MARYLAND	4953	6.4	6.4	4.5	4.5	4.0	4.4	2.9	3.0	119.9	119.9	7.9	10.5	0.0	0.0
189-0282	COLOR ART INC-CRESTWOOD	2752	0.6	1.1	0.0	0.0	0.0	0.1	0.0	0.1	0.5	0.9	85.3	147.5	0.0	0.0
189-0283	WESTAR CONCRETE COMPANY-ANTIRE QUAR	3273	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
189-0284	SPIRIT ASPHALT INC-HAZELWOOD	2952	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.3	0.0	0.0	0.1	0.0	0.0	0.0
189-0287	VANGUARD PLASTICS INC-BELTWAY	2752	0.7	0.9	0.0	0.0	0.1	0.1	0.1	0.1	14.6	24.9	14.0	23.3	0.0	0.0
189-0288	METRO MATERIALS INC-CHESTERFIELD	3273	0.0	0.0	0.0	0.0	2.0	2.9	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0
189-0294	CENTRAL STONE COMPANY-FLORISSANT (#	1422	0.0	0.0	0.0	0.0	15.3	21.1	3.7	5.1	0.0	0.0	0.0	0.0	0.0	0.0
189-0303	POHLMAN INC-POHLMAN INC	3489	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.1	0.0	0.0
189-0306	PACE CONSTRUCTION CO-FORT BELLE QUA	2951	6.6	10.1	7.8	10.1	14.9	21.5	3.1	4.9	15.2	24.9	12.9	21.2	0.0	0.0
189-0308	FRED WEBER INC SANITARY LANDFILL-ST	4953	11.1	11.1	7.8	7.8	12.1	14.7	6.8	7.6	208.7	208.1	8.5	11.4	0.0	0.0
189-0310	ONYX OAK RIDGE LANDFILL INC-(WEST C	4953	3.4	3.7	2.4	2.4	5.2	8.1	3.5	5.1	64.1	68.4	9.2	12.5	0.0	0.0
189-0312	BRIDGETON LANDFILL AUTHORITY-BRIDGE	4953	23.1	23.0	8.0	8.0	12.2	13.0	10.3	10.7	432.3	432.3	60.9	81.9	0.0	0.0
189-0313	FRED WEBER INC-CONCRETE PLANT #5-PO	3273	0.0	0.0	0.0	0.0	1.0	1.5	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
189-0315	FLEX-O-LITE INC-FENTON	3231	0.7	1.2	0.0	0.0	0.7	1.0	0.3	0.4	0.6	1.0	27.0	79.6	0.0	0.0
189-0316	GOLD STAR PAVING-WENTZVILLE	3273	0.0	0.0	0.0	0.0	2.1	3.0	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
189-0317	PRO-TECT MFG INC-FERGUSON AVE	3086	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.4	9.8	0.0	0.0
189-0318	ST. MARYS HEALTH CENTER-RICHMOND HE	8062	7.5	8.0	0.1	0.1	0.6	0.6	0.6	0.6	6.3	6.7	1.1	1.1	0.0	0.0
189-0321	LHB INDUSTRIES-BERKELEY	2851	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	8.5	19.9	0.0	0.0
189-0322	RED BIRD PRE-MIX COMPANY-BRIDGETON	3273	0.0	0.0	0.0	0.0	1.5	2.1	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
189-0326	PERMEA INC-DIV OF AIR PRODUCTS AND	3559	0.8	0.8	0.0	0.0	0.1	0.1	0.1	0.1	0.7	0.7	26.7	77.1	0.0	0.0
189-0327	CAMIE-CAMPBELL INC-WATSON INDUSTRIA	2891	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	7.6	0.0	0.0
189-0328	CHEMCENTRAL INC-MARYLAND HEIGHTS	5169	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	3.9	0.0	0.0
189-0332	MISSOURI ROLLING MILL-HAZELWOOD	3499	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	10.3	0.0	0.0
189-1012	BELT SERVICE CORP-EARTH CITY	3052	0.4	0.5	0.0	0.0	0.3	0.6	0.1	0.1	0.3	0.4	28.7	79.1	0.0	0.0
189-1015	KV PHARMACEUTICAL COMPANY-BRENTWOOD	2834	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	89.9	248.7	0.0	0.0

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189-1017	OAK GROVE CHAPEL-ST. LOUIS	7261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
189-1029	DEPAUL HEALTH CENTER-BRIDGETON	8062	31.9	38.0	1.7	2.6	3.6	3.8	3.5	3.8	26.0	28.8	3.9	4.3	0.0	0.0
189-1040	VALHALLA CEMETERY CREMATORY & MAUSO	7261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
189-1047	KV PHARMACEUTICAL COMPANY-SCHUETZ R	2834	1.1	2.0	0.0	0.0	0.1	0.1	0.1	0.1	0.9	1.6	2.8	7.0	0.0	0.0
189-1052	VETERANS ADMIN MEDICAL CENTER-JEFFE	8062	6.6	7.1	0.1	0.1	1.7	2.6	1.5	2.2	5.3	5.7	1.0	1.1	0.0	0.0
189-1059	CHRISTIAN HOSPITAL NORTHEAST-DUNN R	8062	5.6	6.4	0.1	0.1	0.4	0.5	0.4	0.5	4.4	4.8	0.7	0.7	0.0	0.0
189-1065	MISSOURI AIR NATIONAL GUARD-BRIDGET	9711	11.4	24.1	1.8	3.0	0.5	1.0	0.5	1.0	3.4	8.4	9.9	16.8	0.0	0.0
189-1071	ALVEY SYSTEMS INC-ST. LOUIS	3535	1.6	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	14.6	0.0	0.0
189-1091	GENERAL MILLS-HAZELWOOD	2051	1.7	3.2	0.0	0.0	0.5	0.6	0.3	0.4	1.4	2.6	20.0	33.0	0.0	0.0
189-1093	BODINE ALUMINUM INC-WALTON ROAD	3363	10.6	25.4	6.5	14.0	30.5	32.8	21.8	23.0	5.3	10.2	7.3	20.8	0.0	0.0
189-1097	REICHHOLD CHEMICALS INC-VALLEY PARK	2821	4.5	5.4	0.0	0.1	1.1	1.7	0.3	0.5	3.7	4.5	36.0	58.4	0.0	0.0
189-1101	ST. LUKE'S HOSPITAL-WOODS MILL ROAD	8062	5.7	6.1	0.0	0.0	0.4	0.5	0.4	0.5	4.8	5.1	0.7	0.7	0.0	0.0
189-1108	GE LIGHTING-ST. LOUIS LAMP PLANT	3641	4.9	9.0	7.7	14.5	4.6	8.9	1.1	1.8	4.1	7.6	15.3	44.0	0.0	0.0
189-1114	LOGAN COLLEGE OF CHIROPRACTIC-CHEST	7261	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.1	0.1	0.0	0.0
189-1133	MEMORIAL PARK CREMATORY-JENNINGS	7261	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0
189-1147	THERMO SCIENCE INC-FENTON	3569	0.3	0.4	0.0	0.0	2.7	4.2	0.1	0.1	0.2	0.3	16.9	43.6	0.0	0.0
189-1155	ST. ANTHONY'S MEDICAL CENTER-KENNER	8062	2.6	1.1	0.4	0.7	0.2	0.2	0.2	0.2	2.1	0.8	0.4	0.2	0.0	0.0
189-1156	ST. JOSEPH HOSPITAL-KIRKWOOD	8062	4.1	4.4	0.0	0.0	5.3	8.7	4.5	7.3	3.4	3.7	2.8	3.3	0.0	0.0
189-1167	BELLERIVE CEMETERY-CREVE COEUR	7261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
189-1170	HUMANE SOCIETY OF MISSOURI-MARYLAND	752	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
189-1172	MOUNT HOPE CEMETERY & MAUSOLEUM CO-	7261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
189-1173	AMERICAN AIRLINES INC-OLD NATURAL B	4581	4.4	0.2	0.0	0.0	0.6	0.8	0.5	0.8	3.7	0.1	8.4	13.1	0.0	0.0
189-1175	NEW ST MARCUS CEMETERY-GRAVOIS	7261	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
189-1192	PAN-GLO ST. LOUIS-TRENTON AVENUE	3469	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3	13.9	0.0	0.0
189-1199	BERNADETTE BUSINESS FORMS INC-HAZEL	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.9	0.0	0.0
189-1201	FUTURA COATINGS INC-FUTURA COATINGS	2851	0.4	0.5	0.0	0.0	3.4	5.4	0.0	0.1	0.4	0.4	7.0	17.2	0.0	0.0
189-1204	WHITMIRE MICROGEN	2879	0.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6	8.0	46.5	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	RESEARCH LABORATO															
189-1205	METROPOLITAN ST. LOUIS SEWER DISTRI	4952	88.2	92.3	1.8	1.8	0.3	0.3	0.2	0.3	6.9	7.2	19.2	23.6	0.0	0.0
189-1206	METROPOLITAN ST. LOUIS SEWER DISTRI	4952	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.0	0.0	0.0
189-1207	METROPOLITAN ST. LOUIS SEWER DISTRI	4952	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	11.7	0.0	0.0
189-1210	METROPOLITAN ST. LOUIS SEWER DISTRI	4952	78.4	85.2	3.2	3.2	0.5	0.6	0.5	0.5	86.2	95.3	16.7	19.2	0.0	0.0
189-1216	BECO CONCRETE PRODUCTS-BAUMGARTNER	3273	0.0	0.0	0.0	0.0	0.3	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
189-1221	CENTAUR CONCRETE CO-CHESTERFIELD	3273	0.0	0.0	0.0	0.0	2.2	3.1	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
189-1223	J. H. BERRA CONSTRUCTION-BAUMGARTNE	3273	0.0	0.0	0.0	0.0	0.7	1.1	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
189-1226	SIMPSON CONSTRUCTION MATERIALS LLC-	2951	16.7	32.0	12.5	20.1	12.0	18.0	2.3	3.7	55.9	107.9	5.5	10.2	0.0	0.0
189-1227	GATEWAY COMPANY-GRAHAM	1721	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	11.5	0.0	0.0
189-1228	FINDLAY INDUSTRIES INC-CHESTERFIELD	3714	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	24.5	0.0	0.0
189-1229	OPTIMA GRAPHICS-FENTON	2399	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.4	0.0	0.0
189-1230	SKINNER & KENNEDY-NATURAL BRIDGE RO	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	6.0	0.0	0.0
189-1232	ARCADE PRINTING-DELPORT DRIVE	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	6.7	0.0	0.0
189-1234	COMPTON & SONS INC-BAUR BLVD	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	6.6	0.0	0.0
189-1235	GANNETT OFFSET - ST LOUIS-DIELMAN I	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	5.5	0.0	0.0
189-1236	JOHN STARK PRINTING COMPANY-MANCHES	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.2	11.5	0.0	0.0
189-1241	GARLICH PRINTING COMPANY-FENTON	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	11.4	0.0	0.0
189-1242	KOHLER & SONS INC-PAGE AVE	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	16.0	0.0	0.0
189-1244	REPCO PRINTERS INC-ST. CHARLES ROCK	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	5.5	0.0	0.0
189-1247	QUEST LITHOGRAPHICS LTD-NORTHLINE I	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.8	19.3	0.0	0.0
189-1248	FRED WEBER INC-SOUTH ASPHALT	2951	3.9	7.6	0.8	1.4	1.3	2.1	0.7	1.1	57.1	94.6	5.7	9.5	0.0	0.0
189-1249	FRED WEBER INC-NORTH ASPHALT H & B	2951	6.3	9.5	0.8	1.3	1.5	2.4	1.0	1.6	41.2	67.2	2.0	3.1	0.0	0.0
189-1250	FRED WEBER INC-NORTH ASPHALT B & G	2951	2.3	3.9	0.6	0.9	0.7	1.2	0.4	0.7	39.8	65.7	4.0	6.5	0.0	0.0
189-1251	MARK ANDY INC-CHESTERFIELD	2759	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	4.7	12.1	0.0	0.0
189-1252	RAINERI BUILDING MATERIALS-EUREKA	3273	0.0	0.0	0.0	0.0	3.4	4.7	1.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0
189-1255	BRIDGESTONE/FIRESTONE-HAZELWOOD	7534	0.8	0.8	0.0	0.0	0.8	1.4	0.4	0.7	0.6	0.7	15.1	43.3	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
189-1268	BRECKENRIDGE MATERIAL CO-PLANT 6B	3273	0.0	0.0	0.0	0.0	1.3	2.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
189-1269	FREDMAN BROTHERS INC - GLIDEAWAY MF	2514	0.5	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	24.2	70.1	0.0	0.0
189-1270	METRO MATERIALS - HANLEY PLANT-KINL	3273	0.0	0.0	0.0	0.0	2.2	3.0	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
189-1273	JOHN FABICK TRACTOR CO-FENTON	3714	3.1	13.2	0.2	0.6	0.2	0.7	0.2	0.7	0.7	2.8	12.8	32.0	0.0	0.0
189-1278	MAGNETIC POWER SYSTEMS INC-MANUFACT	3625	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.8	0.0	0.0
189-1279	ARTISTIC WOOD FINISHING INC-LINCOLN	2521	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.8	34.3	0.0	0.0
189-1280	GRIMCO INC-FENTON	3993	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.4	0.0	0.0
189-1282	KELLER CRESCENT COMPANY-KELLER CRES	2759	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	3.1	0.0	0.0
189-1283	ROTO-DIE COMPANY INC-HOWERTON LN	3471	0.6	0.6	0.1	0.1	0.3	0.5	0.1	0.2	0.1	0.1	4.3	8.8	0.0	0.0
189-1293	WILSON MANUFACTURING-GREEN PARK ROA	3544	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
189-1297	HEIMBURGER INC-CASSENS DRIVE	7532	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	5.1	0.0	0.0
189-1298	BUSSEN TERMINAL-KOCH ROAD	5191	0.0	0.0	0.0	0.0	1.8	2.5	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
189-1299	I B M GLOBAL SERVICES-HAZELWOOD	3519	7.4	61.0	1.2	1.3	4.4	7.3	3.7	6.1	2.0	16.2	0.2	1.8	0.0	0.0
189-1301	RELIABLE BIOPHARMACEUTICAL-WALTON R	2841	0.8	0.3	0.0	0.0	0.1	0.1	0.1	0.1	0.7	0.3	16.6	26.0	0.0	0.0
189-1304	ALLIED AVIATION FUELING CO OF ST. L	4619	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	5.3	0.0	0.0
189-1305	LAFARGE NORTH AMERICA INC-PAGE PLAN	3273	0.0	0.0	0.0	0.0	1.7	2.4	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
189-1321	FRED WEBER INC-CRUSHING PLANT #5	1422	23.8	21.5	1.6	1.7	13.4	18.1	2.0	2.2	5.1	5.6	2.3	2.1	0.0	0.0
189-1465	FLEMING & CO-FENTON	2834	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.7	1.2	0.0	0.0
189-1467	KUPFERER BROTHERS-ST. LOUIS	3449	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	17.3	0.0	0.0
189-1471	AMERICAN READY MIX-GUMBO	3273	0.0	0.0	0.0	0.0	1.1	1.6	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
189-1474	LACLEDE GAS COMPANY-ST. LOUIS - SIN	4922	8.2	18.5	0.0	0.0	0.1	0.2	0.1	0.1	12.9	17.3	14.7	22.8	0.0	0.0
189-1481	MANOR CHEMICAL COMPANY INC-ST. LOUI	5169	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.3	36.0	0.0	0.0
189-1486	PETROFSKYS BAKERY PRODUCTS-MARYLAND	2051	0.5	0.6	0.0	0.0	0.1	0.1	0.1	0.1	0.4	0.5	5.0	5.8	0.0	0.0
189-1487	KIENSTRA MATERIALS COMPANY-OVERLAND	3273	0.0	0.0	0.0	0.0	0.7	0.9	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
189-1489	GKN AEROSPACE SERVICES INC-BERKELEY	3728	4.5	5.8	0.0	0.0	12.1	20.3	9.8	16.4	1.8	0.1	41.0	122.9	0.0	0.0
189-1492	COBITCO INC-CHESTERFIELD	2842	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	33.8	0.0	0.0
189-1495	MILLSTONE BANGERT INC-	3273	0.0	0.0	0.0	0.0	10.6	15.0	3.1	4.5	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	CHESTERFIELD															
189-1499	DONALD DANFORTH PLANT SCIENCE CTR-S	8733	2.8	3.0	0.2	0.2	0.1	0.2	0.1	0.2	1.7	1.8	0.2	0.3	0.0	0.0
189-1501	PEERLESS PARK LANDFILL-VALLEY PARK	4953	0.7	0.7	0.5	0.5	6.2	8.5	0.3	0.3	12.6	12.6	0.8	0.8	0.0	0.0
189-1502	PACE CONSTRUCTION CO-CHESTERFIELD	2951	4.3	6.9	2.7	3.7	9.7	14.8	1.0	1.4	9.9	16.4	2.9	4.8	0.0	0.0
189-1515	FRED WEBER INC-	1422	0.9	0.8	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.0
189-1516	J D STREETT & COMPANY INC-LEMAY	5171	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.4	26.0	0.0	0.0
189-1520	F & S REAL EASTATE INC-ST. LOUIS	2759	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	85.4	107.8	0.0	0.0
189-49530215	Fred Weber SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	98.3	147.2
189-49530216	Fred Weber SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	189.9	284.4
189-49530217	Superior Oak Ridge LF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	158.4	237.2
189-49530219	Missouri Pass SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	134.6	201.7
189-0230N	BOEING CO (THE)	3721	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5
189-63042-HRTLN-604	MID STATES DAIRY	2026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	9.6
195-0001	MID-MISSOURI AGRI SERVICE-SWEET SPR	5191	0.0	0.0	0.0	0.0	2.2	3.0	2.2	3.0	0.0	0.0	0.0	0.0	0.0	0.0
195-0002	GLASGOW QUARRIES INC-GILLIAM PLANT	1422	0.1	0.1	0.0	0.0	9.4	13.1	1.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0
195-0004	CONAGRA FOODS-MARSHALL PLANT	2038	6.0	7.7	0.0	0.1	8.9	10.3	8.8	10.1	4.2	5.5	1.6	2.0	0.0	0.0
195-0005	APAC MISSOURI-MARSHALL PLANT	1422	0.0	0.0	0.0	0.0	9.3	12.9	2.5	3.5	0.0	0.0	0.3	0.4	0.0	0.0
195-0007	LAFARGE CONSTRUCTION MATERIALS-QUAR	1422	2.2	3.0	0.1	0.1	3.5	4.9	0.9	1.3	5.2	7.2	0.0	0.0	0.0	0.0
195-0010	MARSHALL MUNICIPAL UTILITIES-MARSHA	4911	295.7	141.7	1,482.7	1,431.8	6.5	91.1	4.4	88.2	25.6	22.6	1.8	2.2	0.2	1.6
195-0012	CENTRAL MISSOURI AGRISERVICE LLC-MA	5191	0.3	0.4	0.0	0.0	5.0	6.6	2.6	3.6	0.3	0.3	0.0	0.1	0.0	0.0
195-0028	CENTRAL MISSOURI AGRISERVICE LLC-MA	5153	0.1	0.1	0.0	0.0	6.8	9.4	5.7	8.0	0.1	0.1	0.0	0.0	0.0	0.0
195-0029	CENTRAL MISSOURI AGRISERVICE LLC-MA	5153	0.2	0.2	0.0	0.0	4.6	6.3	3.6	5.0	0.0	0.0	0.0	0.0	0.0	0.0
195-0031	CENTRAL MISSOURI AGRISERVICE LLC-SL	5153	0.0	0.0	0.0	0.0	1.5	2.0	1.3	1.8	0.0	0.0	0.0	0.0	0.0	0.0
195-0040	FARMERS GRAIN TERMINAL LLC-SLATER	5153	1.1	1.2	0.0	0.0	3.8	5.3	2.3	3.2	1.0	1.0	0.2	0.2	0.0	0.0
195-65340-CNGRF-253	CONAGRA FROZEN FOODS INC.	2038	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	26.8
195-65340-TYSNF-HWY	EXCEL CORP.	2011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	17.2
195-P030	MARSHALL PAVING INC-MARSHALL PAVING	2951	1.5	2.0	0.2	0.3	2.4	4.0	0.8	1.3	0.2	0.4	0.1	0.2	0.0	0.0
197-0005	GLENWOOD ELEVATOR-	5153	0.0	0.0	0.0	0.0	0.5	0.7	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	GLENWOOD ELEVATOR															
197-0006	MID-AMERICA PIPELINE COMPANY-GREENT	4619	11.4	15.0	0.0	0.0	0.4	0.5	0.4	0.5	13.9	18.2	0.2	0.2	0.0	0.0
199-0020	MEMPHIS POWER PLANT-MEMPHIS POWER P	4911	0.7	2.4	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.9	0.1	0.2	0.0	0.1
201-0003	TETRA PAK MATERIALS-SIKESTON	2631	0.4	0.5	0.0	0.0	0.1	0.1	0.0	0.0	0.4	0.4	15.4	31.8	0.0	0.0
201-0007	CARGILL INC-SIKESTON	2048	0.0	0.0	0.0	0.0	1.0	1.3	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
201-0017	SIKESTON POWER STATION-SIKESTON POW	4911	2,205.6	1,957.7	6,389.0	1,645.4	134.6	250.4	90.7	225.1	265.8	190.8	5.1	23.4	0.3	11.4
201-0018	TEPPCO-CAPE GIRARDEAU TERMINAL	4613	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.9	32.6	0.0	0.0
201-0021	HAVCO WOOD PRODUCTS INC-HAVCO WOOD	2426	9.1	13.0	0.4	0.6	19.2	27.4	8.6	12.4	80.3	115.7	7.1	5.8	0.0	0.0
201-0022	CARGILL INC-BUFFALO ISLAND	4221	0.8	0.9	0.0	0.0	29.0	40.4	7.8	10.8	0.1	0.1	0.0	0.0	0.0	0.0
201-22	SCHWARTZ AND SONS	211	0.0	0.0	0.0	0.0	3.9	4.3	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0
201-0073	CROWDER GIN COMPANY INC-SIKESTON	724	0.2	0.3	0.0	0.0	6.1	8.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
201-0078	CARGILL INC-BUFFALO ISLAND B	5153	0.0	0.0	0.0	0.0	5.0	6.9	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0
201-0089	S & W CABINETS INC-HIGHWAY M PLANT	2434	0.1	0.1	0.0	0.0	1.0	1.5	0.4	0.5	0.0	0.0	8.8	18.2	0.0	0.0
201-0095	WHEELER TRUCK TRAILER EQUIPMENT CO-	3713	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.1	33.2	0.0	0.0
201-0098	TOWER ROCK STONE CO-SCOTT CITY	1422	0.0	0.0	0.0	0.0	7.2	10.0	2.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0
201-0099	TEXAS EASTERN TRANSMISSION CORPORAT	4922	315.4	414.4	0.1	0.1	1.4	1.8	1.3	1.6	531.0	697.7	4.2	5.6	0.0	0.0
201-0102	MANAC TRAILERS USA INC-ORAN	3556	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.1	0.0	0.0
201-0115	S & W CABINETS INC-CUMMINS DRIVE PL	2434	0.0	0.0	0.0	0.0	4.5	6.4	1.6	2.2	0.0	0.0	6.7	13.8	0.0	0.0
201-49530213	Mississippi County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.9	25.3
201-ORIS2158	COLEMAN	4911	0.0		0.0		0.0		0.0		0.0		0.0		0.0	
201-ORIS6597	PEAKING	4911	0.0		0.0		0.0		0.0		0.0		0.0		0.0	
203-0002	TIMBER CHARCOAL-PLANT #1	2861	2.5	3.0	0.0	0.0	30.8	37.3	29.4	35.6	142.2	171.6	88.9	107.3	0.0	0.0
203-0003	SMITH FLOORING INC-SMITH FLOORING I	2421	0.0	0.0	0.0	0.0	2.7	4.0	0.8	1.2	0.0	0.0	0.0	0.0	0.0	0.0
203-0005	MISSOURI HARDWOOD FLOORING CO-MISSO	2426	6.1	8.8	0.7	1.0	15.6	22.8	3.9	5.7	16.7	24.1	1.9	2.7	0.0	0.0
203-0006	CRAIG INDUSTRIES INC-SUMMERSVILLE P	2861	50.4	61.4	0.0	0.0	630.0	764.1	604.2	730.3	2,925.8	3,531.7	1,828.7	2,207.3	0.0	0.0
203-0009	J&P WOOD PRODUCT-J&P WOOD PRODUCT	2421	0.0	0.0	0.0	0.0	0.7	1.0	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0
203-0020	TIMBER CHARCOAL CO-TIMBER CHARCOAL	2861	1.0	1.2	0.0	0.0	12.4	15.0	11.9	14.5	58.0	70.0	36.3	43.8	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
205-0001	CENTRAL STONE COMPANY-BETHEL (CS02)	1422	0.0	0.0	0.0	0.0	1.1	1.6	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
205-0005	MFA AGRI SERVICES-SHELBINA	5191	0.0	0.0	0.0	0.0	1.5	2.1	1.4	1.9	0.0	0.0	0.0	0.0	0.0	0.0
205-0008	LEO O'LAUGHLIN INC-LEO O'LAUGHLIN I	3273	0.0	0.0	0.0	0.0	2.0	2.9	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0
205-0010	CERRO COPPER TUBE COMPANY-CERRO COP	3351	4.3	5.7	0.0	0.0	0.3	0.4	0.3	0.3	3.6	4.8	11.0	19.1	0.0	0.0
205-0011	SHELBINA POWER PLANT-SHELBINA POWER	4911	1.1	6.4	0.0	0.0	0.0	0.2	0.0	0.2	0.2	2.2	0.0	0.2	0.0	0.1
205-0021	LEO O'LAUGHLIN INC-LEO O'LAUGHLIN I	1422	5.1	4.6	0.3	0.4	5.2	7.1	1.2	1.5	1.1	1.2	0.5	0.5	0.0	0.0
205-ORIS7406	SHELBINA POWER #2	4911	0.0	8.8	0.0	0.0	0.0	0.3	0.0	0.3	0.0	3.2	0.0	0.3	0.0	0.3
207-0001	ASA ASPHALT INC-ASA ASPHALT INC	2951	4.4	7.3	3.2	5.3	2.1	3.3	0.7	1.1	14.7	24.3	2.0	2.7	0.0	0.0
207-0006	DOANE PET CARE COMPANY-DEXTER FACIL	2048	3.0	5.1	0.0	0.0	6.6	8.6	2.2	2.9	2.5	4.3	0.4	0.7	0.0	0.0
207-0007	AMES TRUE TEMPER INC-BERNIE NORTH P	2499	0.0	0.0	0.0	0.0	3.1	4.7	1.6	2.3	0.0	0.0	1.1	1.8	0.0	0.0
207-0008	J. P. ROSS COTTON CO INC-J. P. ROSS	724	0.3	0.4	0.0	0.0	8.5	11.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
207-0012	BROWN SAND & GRAVEL CO INC-BROWN SA	1442	0.0	0.0	0.0	0.0	5.2	7.3	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
207-0014	NESTLE PURINA PETCARE COMPANY-BLOOM	3295	46.9	61.6	0.2	0.3	37.2	51.6	15.6	21.7	28.4	37.2	4.2	5.5	0.0	0.0
207-0015	MFA AGRI SERVICES-BERNIE	2875	0.3	0.4	0.0	0.0	3.6	5.0	2.0	2.8	0.2	0.3	0.0	0.1	0.0	0.0
207-0016	IXL MANUFACTURING COMPANY-BERNIE SO	2499	0.0	0.0	0.0	0.0	2.6	3.9	1.4	2.1	0.0	0.0	0.0	0.0	0.0	0.0
207-0017	DELTA ASPHALT INC-DEXTER PLANT	2951	1.1	1.9	0.4	0.7	0.9	1.3	0.2	0.3	3.8	6.2	0.1	0.1	0.0	0.0
207-0018	STODDARD COUNTY COTTON CO-BERNIE	724	0.2	0.2	0.0	0.0	9.1	12.6	0.1	0.2	0.1	0.2	0.0	0.0	0.0	0.0
207-0019	W. W. WOOD PRODUCTS-DUDLEY	2426	1.3	1.5	0.0	0.0	21.4	31.5	5.8	8.6	2.1	2.1	97.2	200.1	0.0	0.0
207-0032	IXL MANUFACTURING COMPANY-DEXTER PL	2499	0.0	0.0	0.0	0.0	2.5	3.7	1.4	2.1	0.0	0.0	0.3	0.4	0.0	0.0
207-0040	RICELAND FOODS-DUDLEY PLANT	5153	1.1	1.1	0.1	0.1	3.3	4.6	2.9	4.0	0.8	0.8	0.1	0.2	0.0	0.0
207-0041	ARVINMERITOR-DEXTER	3714	0.1	0.1	0.0	0.0	1.9	3.3	1.9	3.3	0.0	0.0	2.2	4.4	0.0	0.0
207-0048	D. G. & G. INC-D. G. & G. INC	724	0.8	0.9	0.0	0.0	19.2	26.8	0.3	0.4	0.1	0.1	0.1	0.1	0.0	0.0
207-0051	SOUTHEAST COOP SERVICE CO-DEXTER FA	5191	0.0	0.0	0.0	0.0	0.2	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
207-0052	SOUTHEAST COOP SERVICE CO-MESLER FA	5191	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
207-0057	TYSON FOODS INC-DEXTER FEED MILL	2048	2.1	2.5	0.2	0.3	9.3	11.8	0.8	1.0	0.3	0.3	0.1	0.1	0.0	0.0
207-0059	MIRACLE RECREATION EQUIPMENT CO-ADV	3949	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.1	0.0	0.0
207-0062	LEMONS SANITARY LANDFILL-	4953	2.8	3.7	0.6	0.8	10.2	14.1	1.5	2.1	5.9	7.8	21.8	29.8	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	LEMONS SAN															
207-0063	HARRIS-DEXTER READY MIX-DEXTER	3273	0.0	0.0	0.0	0.0	1.8	2.5	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
207-0064	ASSOCIATED ELECTRIC COOPERATIVE INC	4911	4.5		0.0		0.7		0.7		0.1		0.2		0.0	
207-0065	DEXTER DRY CLEANERS-DEXTER	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	2.1	0.0	0.0
207-0066	DOUGLAS CLEANERS-ADVANCE	7216	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0
207-49530220	Lemons SLF, Incorporated	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	14.1
207-49530221	Lemons SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.3	58.9
207-49530222	Bernie SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.9	73.3
209-0007	TABLE ROCK ASPHALT CONSTR CO INC-QU	1422	0.0	0.0	0.0	0.0	11.5	15.9	2.7	3.8	0.0	0.0	0.0	0.0	0.0	0.0
209-49530223	Renfro's SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	2.8
211-0011	BP PIPELINES NORTH AMERICA INC-OSGO	4619	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	5.1	0.0	0.0
211-0014	PREMIUM STANDARD FARMS-MILAN PORK P	2011	25.7	33.8	0.2	0.3	2.4	3.1	2.2	2.9	31.8	41.8	8.7	11.2	0.0	0.0
211-23	MESEKE, DENNIS	211	0.0	0.0	0.0	0.0	2.2	2.4	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
211-63556-CNGRF-832	CONAGRA FOODS INC.	2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	5.0
211-63556-PRMMS-RUR	PREMIUM STANDARD FARMS MILAN	2011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
213-0002	HORNER CHARCOAL CO INC-HORNER CHARC	2861	9.1	11.0	0.0	0.0	113.1	137.0	108.6	131.3	525.7	634.5	328.6	396.6	0.0	0.0
213-0003	TABLE ROCK ASPHALT CONSTR CO INC-HW	1422	0.6	0.7	1.3	1.1	9.0	12.5	3.9	5.5	0.7	1.1	0.9	1.4	0.0	0.0
213-0007	ROYAL OAK ENTERPRISES-ROYAL OAK ENT	2861	11.5	16.5	1.3	1.9	26.6	33.7	15.9	20.1	31.0	44.8	8.5	11.1	0.0	0.0
213-0022	76 QUARRY-76 QUARRY	1422	4.4	8.7	0.3	0.6	3.6	5.2	0.6	1.0	0.9	2.0	0.4	0.9	0.0	0.0
213-0048	COLLEGE OF THE OZARKS-BRANSON	8221	20.1	34.5	128.9	221.8	10.3	17.6	6.3	10.9	1.8	3.2	1.9	2.7	0.0	0.0
215-0003	THOMASON CHARCOAL COMPANY-THOMASON	2861	19.5	23.6	0.0	0.0	235.8	284.7	229.5	277.1	189.0	228.1	698.7	843.3	0.0	0.0
215-0026	DAIRY FARMERS OF AMERICA INC-CABOOL	2023	11.2	14.7	0.1	0.1	1.8	2.2	1.4	1.8	9.4	12.3	1.4	1.8	0.0	0.0
215-0045	H & K CHARCOAL-H & K CHARCOAL	2861	11.2	13.5	0.0	0.0	120.5	145.5	117.5	141.8	573.2	691.9	358.1	432.2	0.0	0.0
215-0060	WOODPRO CABINETRY INC-CABOOL	2434	1.0	1.0	0.0	0.0	1.8	1.8	1.7	1.7	8.9	8.9	38.1	76.8	0.0	0.0
215-0063	COURTNEY EXCAVATION-COURTNEY EXCAVA	1422	2.2	4.4	0.1	0.3	6.2	8.7	1.7	2.5	0.5	1.0	0.2	0.4	0.0	0.0
215-P053	DOSS & HARPER STONE CO INC-HOUSTON	3274	2.9	2.6	0.2	0.2	3.1	4.3	0.7	1.0	0.6	0.7	0.3	0.3	0.0	0.0
217-0004	3M COMPANY-NEVADA - COMMERCIAL GRAP	3089	31.5	41.4	0.2	0.3	2.4	3.1	2.3	2.9	26.5	34.8	622.0	454.2	0.0	0.0
217-0023	PRODUCERS GRAIN CO-BRONAUGH	5153	0.0	0.0	0.0	0.0	0.3	0.4	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
217-0024	NEVADA HABILITATION CENTER-NEVADA	8063	1.9	2.1	0.1	0.1	0.1	0.2	0.1	0.2	1.5	1.6	0.2	0.4	0.0	0.0
217-0029	HILLIER ASPHALT-NEVADA	2951	0.1	0.1	0.1	0.1	0.6	0.9	0.4	0.7	0.1	0.2	0.0	0.0	0.0	0.0
217-0030	VERNON COUNTY READY MIX-NEVADA PLAN	3273	0.0	0.0	0.0	0.0	3.3	4.6	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0
217-0033	PRODUCERS GRAIN COMPANY-WALKER	5191	0.0	0.0	0.0	0.0	1.0	1.4	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0
217-0034	AQUILA INC-NEVADA GAS TURBINE	4911	0.3		0.0		0.0		0.0		0.0		0.0		0.0	
217-0036	MURPHY FARMS LLC-NEVADA	2048	0.4	0.5	0.0	0.0	4.9	6.2	2.0	2.6	0.4	0.5	0.1	0.1	0.0	0.0
217-49530224	3M Company Nevada Missouri Plant SL	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	9.5
217-49530225	Nevada SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	5.7
219-0013	HOLLAND USA-WARRENTON FACILITY	3499	0.0	0.0	0.0	0.0	0.7	1.2	0.7	1.2	0.0	0.0	62.2	127.9	0.0	0.0
219-0025	LAFARGE NORTH AMERICA INC-WARRENTON	1422	22.0	23.3	1.3	1.5	13.3	18.1	3.7	4.9	20.6	27.6	1.4	1.3	0.0	0.0
219-0026	PACE CONSTRUCTION CO-WARRENTON PLAN	2951	4.1	6.4	3.2	2.3	1.3	2.1	0.2	0.3	12.9	21.2	3.3	5.2	0.0	0.0
219-0028	WARRENTON COPPER LLC-WARRENTON	3341	3.5	4.6	0.0	0.0	27.1	58.0	23.4	50.6	2.9	3.8	2.1	4.3	0.0	0.0
219-0032	CASPERS HIGH HILL QUARRY-HIGH HILL	1422	7.6	6.9	0.5	0.5	4.6	6.1	0.8	1.0	1.6	1.8	0.7	0.7	0.0	0.0
219-0036	GREIF INC-WRIGHT CITY	2655	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	8.7	18.0	0.0	0.0
219-0038	CASCADES PLASTICS INC-WARRENTON	3086	0.0	0.0	0.0	0.0	9.8	18.0	6.1	11.3	0.0	0.0	65.2	120.1	0.0	0.0
219-0040	ROCK-TENN COMPANY-WRIGHT CITY	2672	0.0	0.0	0.0	0.0	2.7	3.7	0.9	1.2	0.0	0.0	3.6	1.3	0.0	0.0
219-49530226	J-Z Disposal SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.6	30.8
221-0001	REED LUMBER CO INC-POTOSI	2421	0.1	0.1	0.0	0.0	9.7	14.4	4.1	6.1	1.0	1.4	0.2	0.3	0.0	0.0
221-0005	BAROID DRILLING FLUIDS INC-POTOSI P	1479	0.2	0.2	0.0	0.0	3.9	5.4	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0
221-0008	RED WING SHOE COMPANY INC-POTOSI	3144	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	7.0	0.0	0.0
221-0009	WOODRIDGE RESOURCES CORP	1011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
221-0018	BUCKMAN LABORATORIES INC-CADET	2899	3.2	4.2	0.0	0.0	0.3	0.4	0.3	0.4	2.7	3.5	0.4	0.6	0.0	0.0
221-0022	PURCELL TIRE-PURCELL TIRE	5999	2.0	2.6	0.0	0.0	0.9	1.5	0.4	0.7	1.7	2.2	19.0	16.0	0.0	0.0
221-0029	MISSOURI DEPT OF CORRECTIONS-POTOSI	9223	2.3	3.1	0.1	0.1	0.2	0.3	0.2	0.3	1.5	1.8	0.4	0.5	0.0	0.0
221-0030	POLITTE READY MIX-POTOSI	3273	0.3	0.3	0.0	0.0	4.7	6.5	0.9	1.3	0.2	0.2	0.0	0.0	0.0	0.0
221-0035	LAFARGE NORTH AMERICA INC-PEA RIDGE	1422	3.3	3.0	0.2	0.3	5.6	7.6	0.9	1.2	0.7	0.8	0.3	0.3	0.0	0.0
221-0036	WASHINGTON COUNTY AGGREGATES INC-WA	1411	0.0	0.0	0.0	0.0	2.4	3.3	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
221-49530227	Washington County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.2

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
223-0017	G.S. ROOFING PRODUCTS CO-GADS HILL	1423	11.9	12.7	0.1	0.1	46.3	64.2	9.9	13.8	10.0	10.7	2.2	2.6	0.0	0.0
223-0019	HICKORY SPECIALTIES INC-DIV OF BOB	2099	4.5	7.1	1.8	3.0	3.5	4.9	1.3	1.7	0.8	1.0	0.3	0.4	0.0	0.0
223-0022	RUBLE ROCK & LIME CO-RUBLE ROCK & L	3274	0.0	0.0	0.0	0.0	32.6	45.0	2.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0
223-0023	SEMINOLE STONE INC-SHOOK	1422	0.0	0.0	0.0	0.0	4.5	6.3	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
225-0025	YORK CASKETS - MISSOURI-MARSHFIELD	3995	0.8	1.1	0.0	0.0	10.1	22.3	6.2	13.2	0.7	0.9	105.6	203.9	0.0	0.0
225-0026	STEEL PROCESSORS-STEEL PROCESSORS	3715	0.7	0.9	0.0	0.0	1.2	2.1	1.2	2.1	0.3	0.4	2.6	5.4	0.0	0.0
225-0029	LILE QUARRIES INC-LILE QUARRIES INC	1422	0.0	0.0	0.0	0.0	1.1	1.5	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
225-0036	CBS REDI-MIX INC-CBS REDI-MIX INC	3273	0.0	0.1	0.1	0.2	3.9	5.4	1.3	1.7	0.0	0.0	0.0	0.0	0.0	0.0
225-43	OAK BROOK FARMS INC.	241	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
225-50	HAMILTON FARMS	241	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
225-49530229	Webster County SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.5	75.6
227-0007	S & A CONSTRUCTION LTD-ALLENDALE QU	1422	0.0	0.0	0.0	0.0	6.1	8.4	0.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0
229-0001	HUTCHENS INDUSTRIES-MANSFIELD STEEL	3715	2.0	3.0	0.5	1.0	16.8	32.2	14.1	27.0	0.3	0.4	46.7	93.4	0.0	0.0
229-0002	HARRIS LUMBER CO-HARRIS LUMBER CO	2421	0.0	0.0	0.0	0.0	1.9	2.8	1.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0
229-0009	PETERSON GRAVEL AND READY MIX-MOUNT	3273	0.0	0.0	0.0	0.0	6.2	8.7	1.4	1.9	0.0	0.0	0.0	0.0	0.0	0.0
229-0022	BLACK OAK RECYCLING & DISPOSAL FACI	4953	1.0	1.3	0.7	0.9	29.8	40.8	9.4	12.9	9.2	12.2	35.8	46.5	0.0	0.0
229-0028	MANSFIELD LIME & STONE QUARRY-MANSF	1422	4.4	4.0	0.3	0.3	2.0	2.7	0.6	0.7	1.0	1.0	0.4	0.4	0.0	0.0
229-49530230	Black Oak Recycling & Disposal SLF	4953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	8.2
510-0003	ANHEUSER-BUSCH INC-ST. LOUIS	2082	848.4	714.1	6,383.4	6,140.7	57.8	57.5	21.3	21.7	172.0	231.7	282.5	322.4	0.0	0.0
510-0016	J. D. STREETT-BULK TERMINAL	5092	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.0	44.0	0.0	0.0
510-0017	MALLINCKRODT INC.-MALLINCKRODT INC.	2869	135.7	174.0	283.2	269.3	23.4	36.6	15.5	25.5	93.3	110.5	193.8	353.5	0.0	0.0
510-0023	SOLUTIA INC-JOHN F. QUEENY PLANT	2869	35.2	28.2	0.1	0.1	3.6	5.7	3.1	4.9	10.6	8.4	27.3	43.5	0.0	0.0
510-0024	RHODIA INC-RHODIA INC	2834	0.4	0.6	0.4	0.6	1.5	2.9	0.7	1.4	0.1	0.1	17.0	30.3	0.0	0.0
510-0027	PRECOAT METALS-PRECOAT METALS	3479	11.2	25.7	0.1	0.1	0.8	1.1	0.7	1.0	9.4	21.7	94.3	162.7	0.0	0.0
510-0031	ADM GROMARK RIVER SYSTEMS-ST. LOUIS	2041	2.0	2.3	0.0	0.0	7.3	10.0	1.4	1.8	0.3	0.4	0.1	0.1	0.0	0.0
510-0035	EQUILON ENTERPRISES LLC - ST. LOUIS	5092	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.8	23.5	0.0	0.0
510-0036	EQUILON ENTERPRISES LLC - ST. LOUIS	5092	2.4	3.2	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.9	12.3	18.9	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
510-0038	TRIGEN-ST. LOUIS ENERGY CORP-ASHLEY	4911	178.6	237.2	60.7	79.9	9.6	17.6	8.6	16.2	31.6	44.9	8.1	8.6	0.0	0.0
510-0040	WASHINGTON UNIV MEDICAL SCHOOL-BOIL	8062	15.8	17.0	50.7	51.7	116.6	194.4	96.2	160.7	8.1	16.4	1.4	2.2	0.2	0.3
510-0047	FRED WEBER INC-ASPHALT PLANT	2951	1.3	7.7	0.2	0.4	1.0	1.5	0.3	0.4	15.4	102.4	0.5	3.4	0.0	0.0
510-0053	METROPOLITAN ST. LOUIS SEWER DISTRI	9511	78.3	196.1	25.4	34.3	42.4	64.2	20.5	31.8	467.0	1,231.5	297.1	643.0	0.0	0.0
510-0054	NATIONAL GRAPHICS-NATIONAL GRAPHICS	3861	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.2	0.2	0.0	0.0
510-0056	VETERANS ADMIN MEDICAL CENTER-JOHN	8062	3.8	4.1	0.1	0.1	1.0	1.6	0.9	1.4	2.9	3.2	2.5	3.0	0.0	0.0
510-0057	PROCTER & GAMBLE-PROCTER & GAMBLE	2841	8.1	10.6	0.0	0.1	35.6	53.3	9.1	13.5	6.8	8.9	11.7	14.9	0.0	0.0
510-0063	DIAL CORP-DIAL CORP	2841	12.1	21.0	0.4	0.5	19.3	29.7	9.5	14.2	10.2	17.6	3.8	7.9	0.0	0.0
510-0066	ELEMENTIS SPECIALTIES INC-ELEMENTIS	2816	8.1	12.8	0.0	0.1	14.3	17.4	6.8	8.2	1.9	3.1	122.8	185.3	0.0	0.0
510-0070	ASTARIS LLC-CARONDELET PLANT	2819	11.3	19.8	19.7	32.6	35.5	59.2	28.8	47.9	16.2	22.9	2.2	3.3	0.0	0.0
510-0071	MOZEL INC-MOZEL INC	2899	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.0	41.3	0.0	0.0
510-0072	FEDERAL-MOGUL FRICTION PRODUCTS-FED	3321	2.5	3.4	0.3	0.7	55.4	107.4	33.3	64.6	11.3	21.6	29.7	59.4	0.0	0.0
510-0073	CONTINENTAL CEMENT COMPANY INC-CONT	3241	0.0	0.0	0.0	0.0	2.9	4.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
510-0088	RILEY READY MIX & MATERIALS INC-RIL	3273	0.0	0.0	0.0	0.0	4.6	6.5	0.8	1.2	0.0	0.0	0.0	0.0	0.0	0.0
510-0096	P D GEORGE CO (THE)-P D GEORGE CO (	2851	4.3	5.0	0.0	0.1	1.2	1.9	0.8	1.2	3.2	3.5	54.5	136.5	0.0	0.0
510-0097	U S PAINT DIV OF GROW GROUP-U S PAI	2851	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.1	155.2	0.0	0.0
510-0098	STERLING LACQUER MFG-STERLING LACQU	2851	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	12.0	0.0	0.0
510-0105	UNIVERSAL PRINTING CO INC-MACKLIND	2752	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	10.5	13.7	0.0	0.0
510-0106	UNIVERSAL PRINTING CO INC-KINSHIGHW	2752	1.1	1.5	0.0	0.0	0.1	0.1	0.1	0.1	0.9	1.3	7.2	9.2	0.0	0.0
510-0112	NORDYNE INC-GRAND PLANT	3433	0.6	1.0	0.0	0.0	0.0	0.1	0.0	0.1	0.5	0.9	42.7	180.2	0.0	0.0
510-0118	ALUMAX FOILS INC-ALCOA FOIL PRODUCT	3497	27.9	36.1	1.3	2.0	61.9	53.8	51.0	44.2	15.7	19.9	2,238.4	2,862.7	0.0	0.0
510-0144	HOLCIM (US) INC-ST. LOUIS TERMINAL	3241	0.0	0.0	0.0	0.0	0.9	1.3	0.3	0.4	0.0	0.0	0.1	0.1	0.0	0.0
510-0156	AMERICAN COMMERCIAL TERMINALS-AMERI	1221	0.0	0.0	0.0	0.0	219.7	303.6	116.6	161.1	0.0	0.0	0.0	0.0	0.0	0.0
510-0159	ADM/TPC MILLING CO-PILLSBURY COMPAN	2041	1.1	2.3	0.0	0.0	16.1	20.1	8.4	10.4	0.9	1.9	0.1	0.2	0.0	0.0
510-0161	POLY ONE CORPORATION-ST. LOUIS	2851	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.1	19.1	0.0	0.0
510-0162	MARQUETTE TOOL & DIE-MARQUETTE TOOL	3569	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.5	43.1	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
510-0166	KOCH MATERIALS CO-ST. LOUIS (ELF AS	2951	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0
510-0171	INTERCON CHEMICAL CO-INTERCON CHEMI	2759	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	4.1	0.0	0.0
510-0174	KELLER MFG-KELLER MFG	3425	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	8.7	0.0	0.0
510-0175	ST. LOUIS METALLIZING-ST LOUIS	3479	0.4	0.5	0.0	0.0	0.7	1.2	0.6	1.1	0.1	0.2	1.2	2.6	0.0	0.0
510-0179	ITALGRANI ELEVATOR-ITALGRANI ELEVAT	5153	0.3	0.4	0.0	0.0	23.5	28.8	10.5	12.6	0.3	0.3	0.6	0.9	0.0	0.0
510-0200	ST. ALEXIUS HOSPITAL-ST. LOUIS	8062	1.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.9	1.1	0.0	0.0
510-0204	BJC HEALTH SYSTEM-PAVILLION	8062	7.3	11.0	0.1	0.3	0.3	0.7	0.3	0.7	1.7	2.6	0.5	0.8	0.0	0.0
510-0262	FOREST PARK HOSPITAL-TENET	8062	4.2	4.5	0.0	0.1	6.6	10.9	5.5	9.1	3.4	3.7	0.8	0.9	0.0	0.0
510-0269	SENSIENT COLORS INC-BALDWIN PLANT	2087	3.6	5.7	0.1	0.1	2.4	2.9	1.0	1.2	0.9	1.4	2.5	2.3	0.0	0.0
510-0280	LONE STAR INDUSTRIES-LONE STAR INDU	3241	0.0	0.0	0.0	0.0	5.3	7.6	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0
510-0283	OTTEN SCREW PRODUCTS CO-OTTEN SCREW	3599	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.2	0.0	0.0
510-0295	FOUR STAR FINISHING CO INC-FOUR STA	3471	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.0	0.0
510-0391	HERMANN OAK LEATHER CO-HERMANN OAK	3111	1.0	88.2	0.0	0.0	0.1	0.1	0.1	0.1	0.8	46.2	8.5	34.4	0.0	0.0
510-0468	LANGE-STEGMANN CO-LANGE-STEGMANN CO	5191	0.0	0.0	0.0	0.0	11.5	16.0	3.9	5.4	0.0	0.0	0.0	0.0	0.0	0.0
510-0561	DRUMTECH-DRUMTECH	5085	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	12.3	0.0	0.0
510-0570	SWING-A-WAY MFG-SWING-A-WAY MFG	3423	0.8	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	1.8	3.6	0.0	0.0
510-0671	HAMMERTS IRON WORKS-HAMMERTS IRON W	3441	0.2	0.2	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.2	3.0	6.1	0.0	0.0
510-0697	SIGMA - ALDRICH CO-SIGMA - ALDRICH	2869	3.4	6.4	0.0	0.1	0.3	0.5	0.2	0.3	2.8	5.4	19.4	49.5	0.0	0.0
510-0700	LEMAY CONCRETE BLOCK-LEMAY CONCRETE	3273	0.0	0.0	0.0	0.0	1.2	1.7	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
510-0704	BULK SERVICE OF TYLER STREET LLC-ST	4789	0.0	0.0	0.0	0.0	11.4	15.8	2.8	3.9	0.0	0.0	0.0	0.0	0.0	0.0
510-0734	PACKAGING CONCEPTS INC-PACKAGING CO	2759	1.0	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.9	0.2	12.4	15.3	0.0	0.0
510-0754	UNITED BUMPER INC-UNITED BUMPER INC	3714	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0
510-0766	PEVELY DAIRY-PEVELY DAIRY	5043	5.3	6.9	0.0	0.0	0.2	0.3	0.2	0.3	2.3	3.1	3.0	4.7	0.0	0.0
510-0807	FIVE STAR CONCRETE-FIVE STAR CONCRE	3273	0.0	0.0	0.0	0.0	3.1	4.3	0.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0
510-0809	PQ CORPORATION (THE)-ST. LOUIS	2819	181.1	303.3	74.7	126.3	58.6	97.0	46.9	78.4	8.9	13.4	6.2	10.2	0.0	0.0
510-0814	SIEGEL ROBERT PLATING-SIEGEL ROBERT	3471	2.3	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	45.9	23.9	0.0	0.0
510-0868	ADVANTAGE CREMATORY-ST.	7261	37.0	38.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	LOUIS															
510-0910	KOKEN-KOKEN	3341	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.4	0.0	0.0
510-0938	INTERSTATE BRANDS CORP-INTERSTATE B	2051	10.1	26.0	0.0	0.0	1.2	1.3	1.1	1.3	2.4	6.1	66.6	121.9	0.0	0.0
510-0947	LOOSE LEAF HARDWARE MFG CO-QUICK AC	2782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.9	0.0	0.0
510-0953	BAYER CROPSCIENCE-KRAUSS PLANT	2879	0.0	0.0	0.0	0.0	0.5	0.9	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
510-0982	HANNEKE HARDWARE-HANNEKE HARDWARE	5251	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0
510-1011	IPC ST LOUIS-IPC ST LOUIS	3471	3.2	22.8	0.0	0.0	0.6	0.7	0.6	0.7	3.5	4.0	4.4	2.9	0.0	0.0
510-1055	GOODWIN PRINTING CO.-ST. LOUIS	2752	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.2	22.2	0.0	0.0
510-1073	ST. LOUIS CONNECT CARE-ST. LOUIS CO	8062	2.2	2.4	0.0	0.0	0.9	1.4	0.8	1.2	1.7	1.9	2.2	2.7	0.0	0.0
510-1077	MID-WEST INDUSTRIAL CHEMICAL-MID-WE	2891	0.1	0.2	0.0	0.0	0.8	1.4	0.3	0.5	0.0	0.0	8.6	13.6	0.0	0.0
510-1088	SCHAEFFER MFG-SCHAEFFER MFG	2992	0.7	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	61.7	81.1	0.0	0.0
510-1093	BRENNTAG MID-SOUTH INC-BRENNTAG MID	5092	0.6	0.8	0.0	0.0	0.1	0.1	0.1	0.1	0.5	0.7	7.9	26.2	0.0	0.0
510-1104	RIVER CEMENT-RIVER CEMENT	3241	0.0	0.0	0.0	0.0	1.2	1.7	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
510-1123	U. S. RINGBINDER CORP-LOOSE LEAF ME	2782	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	11.9	20.9	0.0	0.0
510-1204	BI-STATE DEVELOPMENT AGENCY (BSDA)-	4111	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	14.0	0.0	0.0
510-1216	U S POLYMERS-U S POLYMERS	2851	0.8	1.0	0.0	0.0	0.9	1.5	0.5	0.8	0.5	0.6	2.7	4.6	0.0	0.0
510-1235	MERIT SPECIALITIES-MERIT SPECIALITI	3599	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	7.7	0.0	0.0
510-1270	HUMANE SOCIETY OF MISSOURI-ST. LOUI	7261	0.3	0.4	0.2	0.2	0.3	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
510-1280	ST. LOUIS POST DISPATCH-ST LOUIS PO	2711	0.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	7.4	10.3	0.0	0.0
510-1349	ST. LOUIS UNIV HEALTH SCIENCES CENT	8733	0.2	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
510-1357	WILLERT HOME PRODUCTS-WILLERT HOME	2879	0.9	1.2	0.0	0.0	0.2	0.3	0.1	0.1	0.2	0.3	0.4	0.6	0.0	0.0
510-1363	NATIONAL LINEN SERVICE-NATIONAL LIN	7213	4.6	6.1	0.0	0.0	0.1	0.1	0.1	0.1	1.2	1.5	0.2	0.3	0.0	0.0
510-1370	NATIONAL GEOSPATIAL-INTELLIGENCE AG	9711	2.8	4.3	0.6	0.9	0.3	0.4	0.3	0.4	1.7	2.3	0.4	0.6	0.0	0.0
510-1387	ST. ALEXIUS HOSPITAL-ST. ALEXIUS HO	8062	2.1	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.1	0.1	0.0	0.0
510-1390	ARTCO ST. LOUIS-ARTCO ST. LOUIS	2911	2.4	3.2	1.1	1.4	0.7	1.0	0.6	0.8	0.6	0.8	0.1	0.1	0.0	0.0
510-1396	SIGMA - ALDRICH CO-SIGMA CHEMICAL C	2836	5.5	8.7	0.0	0.0	0.4	0.5	0.4	0.5	4.6	7.3	127.1	258.7	0.0	0.0
510-1407	SOUTHERN METAL PROCESSING-SOUTHERN	3433	60.0	55.0	7.6	16.6	0.1	0.2	0.1	0.2	0.6	0.8	3.0	2.9	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
510-1416	DAZOR MANUFACTURING CORP-DAZOR MANU	3641	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	10.2	0.0	0.0
510-1421	MCKINLEY IRON-ST. LOUIS	3399	0.0	0.0	0.0	0.0	1.3	2.0	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0
510-1423	ASHLAND DISTRIBUTION COMPANY-ST. LO	2899	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	8.2	11.6	0.0	0.0
510-1460	ALLIED HEALTH CARE PRODUCTS-ALLIED	3494	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	5.6	11.7	0.0	0.0
510-1505	ENERGY CENTER (THE)-ST. LOUIS UNIV	8011	17.5	14.8	0.1	0.1	0.4	0.4	0.4	0.4	4.4	3.8	0.8	0.7	0.0	0.0
510-1518	NIES/ARTCRAFT-NIES/ARTCRAFT	2721	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	9.2	12.9	0.0	0.0
510-1519	PERMACEL ST. LOUIS INC-PERMACEL ST.	3069	5.7	8.5	0.3	0.5	1.7	2.8	1.0	1.6	6.4	10.2	6.0	10.4	0.0	0.0
510-1521	RONNOCO COFFEE-RONNOCO COFFEE	2095	0.0	0.0	0.2	0.2	0.9	1.0	0.0	0.0	0.0	0.0	1.0	1.2	0.0	0.0
510-1556	CONNECTOR CASTINGS-CONNECTOR CASTIN	3341	0.6	0.7	0.1	0.1	7.5	14.6	3.0	5.7	0.0	0.0	1.5	3.0	0.0	0.0
510-1601	H & R PLATING CO-H & R PLATING CO	3471	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0
510-1620	APEX METAL FINISHING-APEX METAL FIN	3479	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0
510-1642	J S ALBERICI CONSTRUCTION-J S ALBER	1542	0.7	1.0	0.6	0.8	0.5	0.8	0.2	0.3	0.6	0.7	18.2	61.4	0.0	0.0
510-1671	RAINERI BUILDING MATERIALS-RAINERI	3273	0.2	0.3	0.0	0.0	6.4	8.8	3.0	4.2	0.1	0.1	0.0	0.0	0.0	0.0
510-1740	RAY-CARROLL COUNTY GRAIN GROWERS IN	5153	0.0	0.0	0.0	0.0	5.4	7.4	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
510-1761	NESTLE PURINA PETCARE COMPANY-ST. L	6719	4.6	5.0	0.1	0.1	0.3	0.4	0.3	0.4	3.6	3.9	0.7	0.9	0.0	0.0
510-1769	SALUS CENTER-SALUS CENTER	8062	0.8	1.2	0.0	0.1	0.1	0.1	0.1	0.1	0.6	0.8	0.1	0.2	0.0	0.0
510-1790	ASSOCIATED EQUIPMENT-ASSOCIATED EQU	3612	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.9	4.0	0.0	0.0
510-1849	STERICYCLE-STERICYCLE	4953	0.1	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.9	0.4	0.1	0.0	0.0
510-1860	BRECKENRIDGE MATERIAL CO-ST. LOUIS	3273	0.0	0.0	0.0	0.0	0.8	1.1	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
510-2300	SUPERIOR SOLVENT & CHEMICAL-ST. LOU	4226	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	4.9	0.0	0.0
510-2378	LACLEDE TOWER ASSOCIATES LLC-LACLED	4911	218.2	314.2	0.1	0.1	3.9	6.1	3.3	5.2	337.4	485.9	2.9	4.2	0.0	0.0
510-2428	OMEGA PROTEIN INC-OMEGA PROTEIN INC	2875	0.0	0.0	0.0	0.0	1.3	2.1	1.1	1.8	0.0	0.0	0.0	0.0	0.0	0.0
510-2433	NEW WORLD PASTA- MARCEAU FACILITY-N	2098	5.5	7.3	0.0	0.0	1.1	1.4	0.7	0.9	4.7	6.1	0.8	1.2	0.0	0.0
510-2500	HILLCREST ABBEY CREMATORY-ST. LOUIS	7261	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
510-2545	SOUTHWESTERN BELL TELEPHONE COMPANY	4813	1.3	1.5	0.1	0.1	0.0	0.0	0.0	0.0	0.5	0.6	0.1	0.1	0.0	0.0
510-2565	BEELMAN RIVER TERMINALS INC-BEELMAN	4449	0.2	0.2	0.0	0.0	34.5	47.7	6.8	9.4	0.1	0.2	0.1	0.1	0.0	0.0

Cnty-Plant ID	Name	SIC	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
			TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
510-2660	ST. LOUIS CREMATION SERVICE-ST. LOU	7261	0.1	0.1	0.3	0.4	0.3	0.3	0.2	0.2	0.0	0.0	0.8	0.9	0.0	0.0
510-2664	TRIAD MANUFACTURING-TRIAD MANUFACTU	2541	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.1	29.1	0.0	0.0
510-2684	PIONEER PRINTING-PIONEER PRINTING	3555	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.6	0.0	0.0
510-2707	UNITED MATERIALS COMPANY-ST. LOUIS	3273	0.0	0.0	0.0	0.0	1.0	1.4	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
510-2711	ST. LOUIS UNIVERSITY-FACILITIES SVC	2752	0.4	0.8	0.1	0.1	0.7	0.8	0.7	0.8	7.7	8.3	1.5	1.7	0.0	0.0
510-63104-SLTNC-201	SOLUTIA INC. JOHN F. QUEENY PLANT	2869	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	3.5
510-63110-PLPRD-571	PAULO PRODS. CO.	3398	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4
510-63118-NHSRB-ONE	ANHEUSER-BUSCH INC.	2082	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
510-63118-SGMCH-330	SIGMA-ALDRICH CO.	2869	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4
510-63118-SGMCH-350	SIGMA-ALDRICH CO.	2869	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4
510-63125-CLMBN-303	ROCKWOOD PIGMENTS N.A. INC.	2816	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.7
510-63134-VNWTR-892	VOPAK USA INC. ST. LOUIS	5169	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7
510-63147-LNDBR-650	BODYCOTE THERMAL PROCESSING	3398	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.7
510-63147-MLLNC-360	MALLINCKRODT INC.	2833	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	2.6
510-63147-THPRC-169	PROCTER & GAMBLE MFG. CO.	2841	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.2
MISSOURI POINT SOURCE TOTALS			181,581.7	133,910.6	369,245.1	356,061.2	19,185.3	42,557.1	9,568.5	27,208.2	119,113.3	200,103.6	40,270.0	56,989.1	6,253.1	9,474.6

Table H.2: 2002 and 2018 Emissions for Missouri Area Sources by SCC

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
2102002000	Stationary Source Fuel Combustion-Industrial-Bituminous/Subbituminous Coal-Total: All Boiler Types	4,729.5	4,483.7	33,414.2	31,676.8	4,301.9	4,078.4	1,378.2	1,306.5	107.5	101.9	15.7	15.2	0.0	0.0
2102004000	Stationary Source Fuel Combustion-Industrial-Distillate Oil-Total: Boilers and IC Engines	1,454.8	1,584.2	31.5	34.4	167.3	182.2	112.7	122.9	363.7	396.0	14.5	15.8	0.0	0.0
2102005000	Stationary Source Fuel Combustion-Industrial-Residual Oil-Total: All Boiler Types	427.6	714.0	3,776.3	6,306.2	163.1	272.4	75.4	126.0	45.5	76.1	56.2	93.8	9.4	15.7
2102006000	Stationary Source Fuel Combustion-Industrial-Natural Gas-Total: Boilers and	3,295.2	4,329.8	19.8	26.2	250.4	329.0	250.4	329.0	2,767.9	3,637.2	411.4	540.9	0.0	0.0

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	IC Engines														
2102007000	Stationary Source Fuel Combustion-Industrial-Liquified Petroleum Gas (LPG)-Total: All Boiler Types	1,435.9	1,671.4	1.2	1.5	574.4	668.6	574.4	668.6	241.8	281.5	85.8	100.0	0.0	0.0
2102008000	Stationary Source Fuel Combustion-Industrial-Wood-Total: All Boiler Types	0.3	0.4	17.2	24.8	0.3	0.4	0.3	0.4	0.3	0.4	0.0	0.0	0.0	0.0
2103002000	Stationary Source Fuel Combustion-Commercial/Institutional-Bituminous/Subbituminous Coal-Total: All Boiler Types	702.0	716.1	9,370.1	9,557.3	523.7	534.2	346.4	353.2	812.9	829.2	98.0	99.9	0.0	0.0
2103004000	Stationary Source Fuel Combustion-Commercial/Institutional-Distillate Oil-Total: Boilers and IC Engines	443.7	710.7	9.6	15.6	52.8	84.7	47.3	75.8	110.9	177.8	7.5	12.3	0.0	0.0
2103005000	Stationary Source Fuel Combustion-Commercial/Institutional-Residual Oil-Total: All Boiler Types	43.6	75.0	414.6	712.7	18.1	31.4	8.6	14.9	3.3	5.7	13.9	23.9	0.9	1.6
2103006000	Stationary Source Fuel Combustion-Commercial/Institutional-Natural Gas-Total: Boilers and IC Engines	3,235.1	3,448.5	19.4	21.0	245.9	262.1	245.9	262.1	2,717.5	2,896.8	403.9	430.3	0.0	0.0
2103007000	Stationary Source Fuel Combustion-Commercial/Institutional-Liquified Petroleum Gas (LPG)-Total: All Combustor Types	310.2	312.1	0.4	0.4	168.4	169.3	168.4	169.3	42.1	42.4	25.2	25.8	0.0	0.0
2104001000	Stationary Source Fuel Combustion-Residential-Anthracite Coal-Total: All Combustor Types	0.6	0.7	7.4	7.0	28.8	27.0	1.9	1.8	58.9	55.1	2.6	2.5	0.0	0.0
2104002000	Stationary Source Fuel Combustion-Residential-Bituminous/Subbituminous Coal-Total: All Combustor Types	86.5	80.8	1,204.6	1,127.4	67.3	63.0	44.5	41.7	2,612.5	2,445.4	115.9	108.5	0.0	0.0
2104004000	Stationary Source Fuel Combustion-Residential-Distillate Oil-Total: All Combustor Types	141.4	124.4	3.4	3.2	18.7	16.6	16.7	14.8	39.3	34.6	5.6	5.2	0.0	0.0
2104006000	Stationary Source Fuel Combustion-Residential-Natural Gas-Total: All Combustor Types	5,438.9	5,792.4	34.7	37.1	439.7	468.5	439.7	468.5	2,314.4	2,465.0	318.2	338.9	0.0	0.0
2104007000	Stationary Source Fuel Combustion-Residential-Liquified Petroleum Gas (LPG)-Total: All Combustor Types	1,759.9	1,745.9	2.0	2.4	955.4	947.9	955.4	947.9	238.8	236.9	142.7	141.8	0.0	0.0
2104008001	Stationary Source Fuel Combustion-Residential-Wood-Fireplaces: General	78.8	91.4	12.1	14.2	714.9	829.2	714.9	829.2	3,883.7	4,505.0	6,937.3	8,047.2	0.0	0.0
2104008002	Stationary Source Fuel Combustion-Residential-Wood-Fireplaces: Insert; non-EPA certified	115.7	78.7	16.5	11.5	1,264.1	859.7	1,264.1	859.7	9,534.8	6,483.8	2,189.5	1,488.8	0.0	0.0
2104008010	Stationary Source Fuel Combustion-Residential-Wood-Woodstoves: General	831.6	565.5	118.8	80.8	9,088.7	6,180.4	9,088.7	6,180.4	68,551.5	46,615.0	15,741.9	10,704.4	0.0	0.0
2104008030	Stationary Source Fuel Combustion-Residential-Wood-Catalytic Woodstoves: General	14.9	19.6	3.0	3.9	151.5	199.9	151.5	199.9	775.2	1,023.1	111.4	147.1	0.0	0.0
2104008050	Stationary Source Fuel Combustion-Residential-Wood-Non-catalytic Woodstoves: EPA certified	0.0	0.0	7.4	10.1	360.7	476.1	360.7	476.1	2,591.0	3,420.2	220.8	291.4	0.0	0.0

SCC	Description	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
2302002100	Industrial Processes-Food and Kindred Products: SIC 20-Commercial Cooking - Charbroiling-Conveyorized Charbroiling	0.0	0.0	0.0	0.0	172.1	196.8	166.8	190.9	143.8	164.5	43.1	49.5	0.0	0.0
2302002200	Industrial Processes-Food and Kindred Products: SIC 20-Commercial Cooking - Charbroiling-Under-fired Charbroiling	0.0	0.0	0.0	0.0	1,153.3	1,319.1	1,114.9	1,275.5	452.5	517.6	138.3	158.3	0.0	0.0
2302003000	Industrial Processes-Food and Kindred Products: SIC 20-Commercial Cooking - Frying-Deep Fat Fying	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.9	26.5	0.0	0.0
2302003100	Industrial Processes-Food and Kindred Products: SIC 20-Commercial Cooking - Frying-Flat Griddle Frying	0.0	0.0	0.0	0.0	299.5	343.0	227.6	260.5	37.1	42.5	18.0	20.8	0.0	0.0
2302003200	Industrial Processes-Food and Kindred Products: SIC 20-Commercial Cooking - Frying-Clamshell Griddle Frying	0.0	0.0	0.0	0.0	20.5	23.7	17.4	20.3	0.0	0.0	0.7	0.9	0.0	0.0
2302050000	Industrial Processes-Food and Kindred Products: SIC 20-Bakery Products-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	499.2	581.9	0.0	0.0
2310000000	Industrial Processes-Oil and Gas Production: SIC 13-All Processes-Total: All Processes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	111.1	121.2	0.0	0.0
2399000000	Industrial Processes-Industrial Processes: NEC-Industrial Processes: NEC-Total	33.4	64.7	26.3	51.0	464.1	899.8	321.7	623.9	8.3	16.0	304.8	591.0	2,266.4	4,394.5
2401001000	Solvent Utilization-Surface Coating-Architectural Coatings-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8,854.3	9,509.6	0.0	0.0
2401005000	Solvent Utilization-Surface Coating-Auto Refinishing: SIC 7532-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,827.8	2,692.4	0.0	0.0
2401008000	Solvent Utilization-Surface Coating-Traffic Markings-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	465.6	472.2	0.0	0.0
2401015000	Solvent Utilization-Surface Coating-Factory Finished Wood: SIC 2426 thru 242-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	693.6	1,032.7	0.0	0.0
2401020000	Solvent Utilization-Surface Coating-Wood Furniture: SIC 25-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	999.6	1,643.3	0.0	0.0
2401025000	Solvent Utilization-Surface Coating-Metal Furniture: SIC 25-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,004.8	1,651.9	0.0	0.0
2401030000	Solvent Utilization-Surface Coating-Paper: SIC 26-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	315.1	444.0	0.0	0.0
2401040000	Solvent Utilization-Surface Coating-Metal Cans: SIC 341-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,384.4	10,693.9	0.0	0.0
2401045000	Solvent Utilization-Surface Coating-Metal Coils: SIC 3498-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	792.6	1,420.4	0.0	0.0
2401050000	Solvent Utilization-Surface Coating-Miscellaneous Finished Metals: SIC 34 - (341 + 3498)-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,046.6	5,252.3	0.0	0.0
2401055000	Solvent Utilization-Surface Coating-Machinery and Equipment: SIC 35-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	81.5	303.6	0.0	0.0
2401060000	Solvent Utilization-Surface Coating-Large Appliances: SIC 363-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	797.4	1,360.3	0.0	0.0

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
2401065000	Solvent Utilization-Surface Coating-Electronic and Other Electrical: SIC 36 - 363-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	307.1	62.0	0.0	0.0
2401070000	Solvent Utilization-Surface Coating-Motor Vehicles: SIC 371-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,026.1	1,825.4	0.0	0.0
2401075000	Solvent Utilization-Surface Coating-Aircraft: SIC 372-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	3.3	0.0	0.0
2401080000	Solvent Utilization-Surface Coating-Marine: SIC 373-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	326.2	418.5	0.0	0.0
2401090000	Solvent Utilization-Surface Coating-Miscellaneous Manufacturing-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,630.9	1,281.9	0.0	0.0
2401100000	Solvent Utilization-Surface Coating-Industrial Maintenance Coatings-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,174.6	4,216.7	0.0	0.0
2401200000	Solvent Utilization-Surface Coating-Other Special Purpose Coatings-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,174.6	3,451.3	0.0	0.0
2415000000	Solvent Utilization-Degreasing-All Processes/All Industries-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14,529.1	25,542.1	0.0	0.0
2420010000	Solvent Utilization-Dry Cleaning-Commercial/Industrial Cleaners-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	599.7	714.7	0.0	0.0
2425000000	Solvent Utilization-Graphic Arts-All Processes-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,709.1	3,554.5	0.0	0.0
2430000000	Solvent Utilization-Rubber/Plastics-All Processes-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	660.9	1,202.1	0.0	0.0
2440020000	Solvent Utilization-Miscellaneous Industrial-Adhesive (Industrial) Application-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,207.5	4,280.3	0.0	0.0
2460000000	Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial-All Processes-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13,749.0	14,848.1	0.0	0.0
2461021000	Solvent Utilization-Miscellaneous Non-industrial: Commercial-Cutback Asphalt-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	342.5	512.9	0.0	0.0
2461022000	Solvent Utilization-Miscellaneous Non-industrial: Commercial-Emulsified Asphalt-Total: All Solvent Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	928.0	1,390.1	0.0	0.0
2461850000	Solvent Utilization-Miscellaneous Non-industrial: Commercial-Pesticide Application: Agricultural-All Processes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,938.4	8,836.3	0.0	0.0
2461870999	Solvent Utilization-Miscellaneous Non-industrial: Commercial-Pesticide Application: Non-Agricultural-Not Elsewhere Classified	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,048.6	5,452.2	0.0	0.0
2501050120	Storage and Transport-Petroleum and Petroleum Product Storage-Bulk Stations/Terminals: Breathing Loss-Gasoline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9,398.6	9,408.0	0.0	0.0

SCC	Description	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
2501060000	Storage and Transport-Petroleum and Petroleum Product Storage-Gasoline Service Stations-Total: All Gasoline/All Processes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	471.9	472.4	0.0	0.0
2501060050	Storage and Transport-Petroleum and Petroleum Product Storage-Gasoline Service Stations-Stage 1: Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.4	34.8	0.0	0.0
2501060201	Storage and Transport-Petroleum and Petroleum Product Storage-Gasoline Service Stations-Underground Tank: Breathing and Emptying	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	4.8	0.0	0.0
2501080050	Storage and Transport-Petroleum and Petroleum Product Storage-Airports : Aviation Gasoline-Stage 1: Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,822.2	4,761.2	0.0	0.0
2501080100	Storage and Transport-Petroleum and Petroleum Product Storage-Airports : Aviation Gasoline-Stage 2: Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	171.5	289.5	0.0	0.0
2505020000	Storage and Transport-Petroleum and Petroleum Product Transport-Marine Vessel-Total: All Products	4,940.6	6,496.9	0.0	0.0	387.1	509.0	387.1	509.0	0.0	0.0	168.0	221.0	0.0	0.0
2601000000	Waste Disposal, Treatment, and Recovery-On-site Incineration-All Categories-Total	314.8	340.0	0.0	0.0	0.0	0.0	0.0	0.0	1,049.4	1,133.4	1,230.1	1,328.9	0.0	0.0
2601020000	Waste Disposal, Treatment, and Recovery-On-site Incineration-Commercial/Institutional-Total	0.7	1.1	0.5	0.7	0.6	0.9	0.5	0.7	2.5	3.8	2.1	3.2	0.0	0.0
2610000100	Waste Disposal, Treatment, and Recovery-Open Burning-All Categories-Yard Waste - Leaf Species Unspecified	0.0	0.0	0.0	0.0	167.8	195.5	167.8	195.5	494.6	576.2	123.6	143.8	0.0	0.0
2610000400	Waste Disposal, Treatment, and Recovery-Open Burning-All Categories-Yard Waste - Brush Species Unspecified	0.0	0.0	0.0	0.0	75.1	87.3	75.1	87.3	618.2	719.8	83.9	97.6	0.0	0.0
2610000500	Waste Disposal, Treatment, and Recovery-Open Burning-All Categories-Land Clearing Debris (use 28-10-005-000 for Logging Debris Burning)	662.4	803.7	0.0	0.0	2,252.2	2,732.7	2,252.2	2,732.7	22,389.5	27,167.5	1,536.8	1,864.7	0.0	0.0
2610030000	Waste Disposal, Treatment, and Recovery-Open Burning-Residential-Household Waste (use 26-10-000-xxx for Yard Wastes)	824.1	943.6	0.0	0.0	5,219.1	5,975.2	5,219.1	5,975.2	11,674.3	13,366.2	4,120.3	4,717.4	0.0	0.0
2620030000	Waste Disposal, Treatment, and Recovery-Landfills-Municipal-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	76,928.7	103,935.3	0.0	0.0
2640000000	Waste Disposal, Treatment, and Recovery-TSDFs-All TSDF Types-Total: All Processes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.3	76.1	0.0	0.0
2660000000	Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks-Leaking Underground Storage Tanks-Total: All Storage Types	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5	9.9	0.0	0.0
2810030000	Miscellaneous Area Sources-Other Combustion-Structure Fires-Total	10.5	11.9	0.0	0.0	81.0	91.2	73.7	82.9	450.1	506.4	103.2	116.1	0.0	0.0
2810050000	Miscellaneous Area Sources-Other	5.1	5.7	0.0	0.0	127.3	137.9	115.8	125.3	159.1	172.1	0.0	0.0	0.0	0.0

SCC	Description	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
	Combustion-Motor Vehicle Fires-Total														
MISSOURI AREA SOURCE EMISSIONS TOTALS		31,337.8	35,212.8	48,510.9	49,726.1	29,975.9	29,193.0	26,385.8	25,528.5	135,292.9	120,114.9	204,940.2	265,737.4	2,276.7	4,411.8

Table H.3: 2002 and 2018 Emissions for Missouri Offroad Mobile Sources by Source Classification Code

SCC	Description	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
2260001010	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Recreational Equipment-Motorcycles: Off-road	8.4	24.0	1.7	0.4	107.7	104.8	98.8	96.4	3,042.2	3,999.3	3,659.9	3,251.2	0.2	0.4
2260001030	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Recreational Equipment-All Terrain Vehicles	8.8	3.6	1.1	0.1	108.3	2.8	99.8	2.6	3,048.2	600.6	3,661.0	94.8	0.2	0.0
2260001060	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Recreational Equipment-Specialty Vehicles/Carts	10.5	7.4	0.5	0.1	0.4	0.3	0.2	0.3	1,506.3	1,628.9	48.3	29.1	0.0	0.0
2260002006	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Construction and Mining Equipment-Tampers/Rammers	1.8	1.0	0.1	0.0	8.8	8.4	8.1	7.7	365.1	285.9	140.5	56.6	0.0	0.0
2260002009	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Construction and Mining Equipment-Plate Compactors	0.0	0.1	0.0	0.0	0.3	0.3	0.3	0.3	17.0	10.6	8.3	1.9	0.0	0.0
2260002021	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Construction and Mining Equipment-Paving Equipment	0.0	0.1	0.0	0.0	0.4	0.4	0.4	0.3	19.4	12.8	9.7	2.3	0.0	0.0
2260002027	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Construction and Mining Equipment-Signal Boards/Light Plants	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
2260002039	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Construction and Mining Equipment-Concrete/Industrial Saws	4.5	2.6	0.3	0.0	21.7	22.4	19.9	20.6	990.0	757.8	383.8	149.1	0.0	0.0
2260002054	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Construction and Mining Equipment-Crushing/Processing Equipment	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	4.3	2.7	1.9	0.5	0.0	0.0
2260003030	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Industrial Equipment-Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.0	13.7	2.0	6.3	0.4	0.0	0.0
2260003040	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Industrial Equipment-Other General Industrial Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.2	0.4	0.0	0.0	0.0
2260004015	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Lawn and Garden Equipment-Rotary Tillers < 6 HP (Residential)	0.1	0.4	0.0	0.0	2.0	1.8	1.8	1.7	99.9	62.7	56.5	15.3	0.0	0.0
2260004016	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Lawn and Garden	0.4	1.3	0.1	0.0	5.5	5.4	5.1	4.9	285.7	179.4	135.6	36.3	0.0	0.0

SCC	Description	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
	Equipment-Rotary Tillers < 6 HP (Commercial)														
2260004020	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Lawn and Garden Equipment-Chain Saws < 6 HP (Residential)	1.6	5.7	0.3	0.1	23.5	25.0	21.6	23.0	1,147.2	889.5	722.5	278.0	0.0	0.1
2260004021	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Lawn and Garden Equipment-Chain Saws < 6 HP (Commercial)	16.2	14.6	1.3	0.2	83.0	113.3	76.4	104.2	3,981.5	3,726.6	1,659.9	877.6	0.1	0.1
2260004025	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Lawn and Garden Equipment-Trimmers/Edgers/Brush Cutters (Residential)	3.0	7.9	0.5	0.1	36.7	35.4	33.7	32.6	1,879.2	1,120.6	1,067.9	309.9	0.0	0.1
2260004026	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Lawn and Garden Equipment-Trimmers/Edgers/Brush Cutters (Commercial)	5.9	12.5	1.1	0.1	57.8	56.5	53.2	51.9	2,931.5	1,941.3	1,360.0	420.8	0.1	0.1
2260004030	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Lawn and Garden Equipment-Leafblowers/Vacuums (Residential)	1.7	5.1	0.3	0.1	23.7	22.2	21.8	20.4	1,168.2	764.7	665.1	200.0	0.0	0.0
2260004031	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Lawn and Garden Equipment-Leafblowers/Vacuums (Commercial)	8.4	11.6	1.1	0.1	62.1	64.2	57.2	59.1	2,964.0	2,168.3	1,246.3	421.6	0.1	0.1
2260004035	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Lawn and Garden Equipment-Snowblowers (Residential)	0.5	1.1	0.1	0.0	17.6	27.2	16.2	25.0	1,065.8	1,597.6	584.8	893.3	0.0	0.1
2260004036	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Lawn and Garden Equipment-Snowblowers (Commercial)	1.2	2.1	0.3	0.1	30.3	48.8	27.9	44.9	2,009.3	2,797.7	927.5	1,399.7	0.0	0.1
2260004071	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Lawn and Garden Equipment-Turf Equipment (Commercial)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.8	0.5	0.1	0.0	0.0
2260005035	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Agricultural Equipment-Sprayers	0.0	0.3	0.0	0.0	1.8	1.7	1.7	1.6	92.7	53.9	45.4	10.5	0.0	0.0
2260005050	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Agricultural Equipment-Hydro-power Units	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.2	13.2	9.6	5.9	1.7	0.0	0.0
2260006005	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Commercial Equipment-Generator Sets	0.2	0.9	0.0	0.0	3.1	4.0	2.9	3.7	142.0	141.6	72.3	29.4	0.0	0.0
2260006010	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Commercial Equipment-Pumps	2.0	6.4	0.3	0.1	22.0	31.1	20.2	28.6	1,050.5	956.3	531.5	225.0	0.0	0.1
2260006015	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Commercial Equipment-Air Compressors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.1	0.1	0.0	0.0
2260007005	Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke-Logging Equipment-	0.2	0.2	0.0	0.0	1.0	1.6	0.9	1.5	37.2	57.4	13.9	12.0	0.0	0.0

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	Chain Saws > 6 HP														
2265001010	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Recreational Equipment-Motorcycles: Off-road	11.9	17.1	1.1	0.2	1.7	2.9	1.6	2.7	1,334.6	1,486.8	106.4	138.9	0.0	0.1
2265001030	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Recreational Equipment-All Terrain Vehicles	96.6	130.2	9.4	1.9	15.5	28.4	14.3	26.1	12,499.4	19,857.8	903.9	1,128.4	0.6	1.4
2265001050	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Recreational Equipment-Golf Carts	66.3	63.0	3.5	0.4	3.0	2.4	2.5	2.2	14,891.3	14,715.8	226.1	186.9	0.1	0.3
2265001060	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Recreational Equipment-Specialty Vehicles/Carts	9.0	8.1	0.5	0.0	0.2	0.3	0.2	0.2	1,304.1	1,325.2	50.4	24.2	0.0	0.0
2265002003	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Pavers	3.3	1.7	0.1	0.0	0.0	0.1	0.0	0.1	326.5	304.1	7.5	3.9	0.0	0.0
2265002006	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Tampers/Rammers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.7	0.0	0.0	0.0	0.0
2265002009	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Plate Compactors	4.0	2.5	0.1	0.0	0.1	0.1	0.1	0.1	602.2	588.6	27.4	11.4	0.0	0.0
2265002015	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Rollers	5.8	2.9	0.1	0.0	0.1	0.1	0.1	0.1	616.3	580.0	12.1	6.9	0.0	0.0
2265002021	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Paving Equipment	8.6	5.8	0.3	0.0	0.3	0.2	0.2	0.2	1,174.7	1,179.2	38.2	18.2	0.0	0.0
2265002024	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Surfacing Equipment	3.5	2.5	0.1	0.0	0.1	0.1	0.1	0.1	535.7	527.0	14.8	7.5	0.0	0.0
2265002027	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Signal Boards/Light Plants	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	27.9	26.8	0.9	0.4	0.0	0.0
2265002030	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Trenchers	10.3	4.8	0.3	0.0	0.2	0.2	0.2	0.2	993.7	924.7	29.5	13.8	0.0	0.0
2265002033	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Bore/Drill Rigs	3.3	1.8	0.1	0.0	0.1	0.1	0.1	0.1	293.8	268.3	16.4	6.7	0.0	0.0
2265002039	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Concrete/Industrial Saws	17.6	11.3	0.6	0.1	0.5	0.4	0.4	0.4	2,573.1	2,458.3	43.9	28.7	0.0	0.0
2265002042	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Cement and Mortar Mixers	6.9	5.0	0.3	0.0	0.2	0.2	0.2	0.2	1,041.4	1,024.9	40.3	18.1	0.0	0.0
2265002045	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Cranes	1.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	44.3	20.2	1.6	0.5	0.0	0.0

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
2265002054	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Crushing/Processing Equipment	1.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	147.1	140.6	3.9	2.0	0.0	0.0
2265002057	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Rough Terrain Forklifts	2.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	57.4	9.9	2.5	0.4	0.0	0.0
2265002060	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Rubber Tire Loaders	7.3	0.7	0.1	0.0	0.0	0.0	0.0	0.0	132.4	11.2	6.3	0.6	0.0	0.0
2265002066	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Tractors/Loaders/Backhoes	5.3	3.8	0.2	0.0	0.1	0.1	0.1	0.1	783.3	762.7	13.2	9.0	0.0	0.0
2265002072	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Skid Steer Loaders	7.8	2.7	0.1	0.0	0.1	0.1	0.0	0.1	348.9	271.4	10.7	4.3	0.0	0.0
2265002078	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Dumpers/Tenders	1.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	161.7	160.1	5.5	2.6	0.0	0.0
2265002081	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Construction and Mining Equipment-Other Construction Equipment	2.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	47.6	14.3	2.2	0.7	0.0	0.0
2265003010	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Industrial Equipment-Aerial Lifts	39.4	4.2	0.6	0.0	0.3	0.1	0.3	0.1	1,235.1	208.9	45.4	4.0	0.0	0.0
2265003020	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Industrial Equipment-Forklifts	156.2	2.7	2.3	0.0	1.0	0.2	0.9	0.1	2,774.8	37.9	126.3	1.4	0.1	0.0
2265003030	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Industrial Equipment-Sweepers/Scrubbers	30.6	1.5	0.5	0.0	0.3	0.1	0.3	0.1	1,210.8	189.7	40.1	2.8	0.0	0.0
2265003040	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Industrial Equipment-Other General Industrial Equipment	26.8	3.2	0.9	0.0	1.0	0.1	0.9	0.1	3,106.5	663.8	132.3	12.4	0.0	0.0
2265003050	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Industrial Equipment-Other Material Handling Equipment	3.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	102.0	17.2	3.6	0.3	0.0	0.0
2265003060	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Industrial Equipment-AC\Refrigeration	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	62.3	14.6	1.2	0.2	0.0	0.0
2265003070	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Industrial Equipment-Terminal Tractors	17.7	0.4	0.2	0.0	0.1	0.0	0.1	0.0	290.3	5.0	13.6	0.2	0.0	0.0
2265004010	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Lawn Mowers (Residential)	118.2	80.3	7.1	0.8	9.4	5.1	8.7	4.7	21,295.2	21,999.8	1,663.6	882.1	0.4	0.6
2265004011	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Lawn Mowers (Commercial)	59.3	40.0	3.3	0.4	4.6	2.6	4.2	2.4	10,770.2	10,773.4	689.3	335.6	0.2	0.3
2265004015	Mobile Sources-Off-highway Vehicle	10.7	6.8	0.4	0.1	0.6	0.4	0.5	0.4	1,716.7	1,873.8	148.0	79.3	0.0	0.0

SCC	Description	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
	Gasoline, 4-Stroke-Lawn and Garden Equipment-Rotary Tillers < 6 HP (Residential)														
2265004016	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Rotary Tillers < 6 HP (Commercial)	29.9	20.9	1.7	0.2	2.4	1.3	2.2	1.2	5,290.4	5,384.5	349.1	182.7	0.1	0.1
2265004025	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Trimmers/Edgers/Brush Cutters (Residential)	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	111.3	123.5	10.9	5.9	0.0	0.0
2265004026	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Trimmers/Edgers/Brush Cutters (Commercial)	1.6	1.2	0.1	0.0	0.1	0.1	0.1	0.1	248.1	279.5	14.7	9.0	0.0	0.0
2265004030	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Leafblowers/Vacuums (Residential)	1.3	0.8	0.0	0.0	0.0	0.1	0.0	0.1	213.0	235.8	18.4	9.4	0.0	0.0
2265004031	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Leafblowers/Vacuums (Commercial)	92.6	60.9	3.6	0.4	2.4	2.2	2.2	2.1	10,846.3	10,821.9	246.2	180.1	0.2	0.3
2265004035	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Snowblowers (Residential)	23.1	40.3	1.1	0.2	0.4	0.8	0.4	0.8	3,140.0	4,578.9	106.4	154.7	0.0	0.1
2265004036	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Snowblowers (Commercial)	42.0	75.0	2.1	0.3	1.0	1.5	0.9	1.4	5,741.2	8,024.2	138.2	207.7	0.1	0.2
2265004040	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Rear Engine Riding Mowers (Residential)	32.3	28.5	1.5	0.2	0.9	1.0	0.8	0.9	4,855.2	5,726.7	143.7	116.2	0.0	0.1
2265004041	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Rear Engine Riding Mowers (Commercial)	8.2	8.0	0.4	0.0	0.2	0.3	0.2	0.2	1,357.1	1,520.1	21.9	19.2	0.0	0.0
2265004046	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Front Mowers (Commercial)	9.1	9.1	0.5	0.1	0.3	0.3	0.3	0.3	1,474.3	1,650.2	33.3	22.4	0.0	0.0
2265004051	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Shredders < 6 HP (Commercial)	3.6	2.4	0.2	0.0	0.3	0.1	0.2	0.1	588.0	618.3	39.8	21.1	0.0	0.0
2265004055	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Lawn and Garden Tractors (Residential)	424.7	382.6	20.8	2.3	14.3	12.8	13.1	11.8	67,085.9	76,820.3	1,677.3	1,327.0	1.6	1.7
2265004056	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Lawn and Garden Tractors (Commercial)	105.9	108.2	5.6	0.6	3.8	3.5	3.5	3.3	18,892.2	20,666.2	315.1	256.5	0.4	0.4

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
2265004066	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Chippers/Stump Grinders (Commercial)	33.7	13.6	0.9	0.1	0.5	0.6	0.5	0.5	2,449.1	2,187.5	52.1	28.0	0.1	0.1
2265004071	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Turf Equipment (Commercial)	380.5	305.1	16.2	1.9	12.5	11.7	11.4	10.8	58,352.7	59,755.7	1,208.4	833.8	1.3	1.4
2265004075	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Other Lawn and Garden Equipment (Residential)	12.6	10.4	0.5	0.1	0.6	0.5	0.6	0.4	2,049.7	2,364.4	114.9	63.8	0.0	0.1
2265004076	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Lawn and Garden Equipment-Other Lawn and Garden Equipment (Commercial)	9.6	8.3	0.5	0.1	0.6	0.4	0.5	0.3	1,605.8	1,724.0	75.1	40.0	0.0	0.0
2265005010	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Agricultural Equipment-2-Wheel Tractors	1.9	1.7	0.0	0.0	0.0	0.1	0.0	0.1	303.4	391.4	5.7	4.5	0.0	0.0
2265005015	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Agricultural Equipment-Agricultural Tractors	22.8	3.6	0.3	0.0	0.0	0.2	0.0	0.2	604.1	353.4	22.8	5.5	0.0	0.0
2265005020	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Agricultural Equipment-Combines	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.2	1.8	0.0	0.1	0.0	0.0
2265005025	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Agricultural Equipment-Balers	16.3	8.5	0.1	0.0	0.0	0.1	0.0	0.1	297.8	176.6	20.0	11.6	0.0	0.0
2265005030	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Agricultural Equipment-Agricultural Mowers	1.7	1.4	0.0	0.0	0.0	0.0	0.0	0.0	244.6	305.5	5.9	3.7	0.0	0.0
2265005035	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Agricultural Equipment-Sprayers	26.8	17.2	0.8	0.1	0.6	0.5	0.6	0.5	2,008.1	2,349.8	92.8	46.9	0.0	0.1
2265005040	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Agricultural Equipment-Tillers > 6 HP	24.7	31.2	1.9	0.2	0.9	1.1	0.9	1.0	5,746.0	6,257.5	179.5	121.7	0.0	0.1
2265005045	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Agricultural Equipment-Swathers	25.8	13.5	0.3	0.0	0.0	0.2	0.0	0.2	433.6	279.2	28.4	15.7	0.0	0.0
2265005050	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Agricultural Equipment-Hydro-power Units	12.4	9.6	0.5	0.1	0.4	0.4	0.3	0.4	1,793.0	2,312.4	48.9	31.1	0.0	0.0
2265005055	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Agricultural Equipment-Other Agricultural Equipment	30.9	17.1	0.6	0.1	0.1	0.3	0.1	0.3	930.3	867.4	39.2	21.0	0.0	0.0
2265005060	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Agricultural Equipment-Irrigation Sets	44.7	4.7	0.7	0.1	0.2	0.4	0.2	0.4	851.7	177.2	41.7	5.9	0.0	0.1
2265006005	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Commercial Equipment-Generator Sets	329.7	427.0	14.8	2.2	10.6	12.4	9.8	11.4	44,813.6	68,573.5	1,391.3	1,215.8	1.0	1.6
2265006010	Mobile Sources-Off-highway Vehicle	97.7	92.2	3.5	0.5	3.5	3.3	3.2	3.1	10,036.0	14,935.3	463.9	339.3	0.2	0.4

SCC	Description	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
	Gasoline, 4-Stroke-Commercial Equipment-Pumps														
2265006015	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Commercial Equipment-Air Compressors	69.3	45.7	1.8	0.3	1.5	1.8	1.3	1.6	4,944.9	7,150.6	188.9	142.6	0.1	0.2
2265006025	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Commercial Equipment-Welders	118.2	117.9	4.1	0.6	2.8	3.7	2.6	3.4	12,636.4	18,631.5	280.0	294.7	0.2	0.4
2265006030	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Commercial Equipment-Pressure Washers	141.3	167.1	6.3	0.9	6.0	5.9	5.5	5.4	19,256.5	29,551.9	805.6	639.5	0.4	0.7
2265007010	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Logging Equipment-Shredders > 6 HP	0.7	0.9	0.0	0.0	0.0	0.0	0.0	0.0	87.1	155.6	4.1	4.1	0.0	0.0
2265007015	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Logging Equipment-Forest Eqp - Feller/Bunch/Skidder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.7	0.1	0.0	0.0	0.0
2265008005	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Airport Ground Support Equipment-Airport Ground Support Equipment	5.6	1.2	0.1	0.0	0.1	0.1	0.1	0.1	157.7	107.4	7.1	1.9	0.0	0.0
2265010010	Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke-Industrial Equipment-Other Oil Field Equipment	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	85.8	98.6	1.6	1.1	0.0	0.0
2267001060	Mobile Sources-LPG-Recreational Equipment-Specialty Vehicles/Carts	3.3	1.7	0.0	0.0	0.0	0.0	0.0	0.0	13.7	8.1	1.1	0.4	0.0	0.0
2267002003	Mobile Sources-LPG-Construction and Mining Equipment-Pavers	2.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	8.4	1.4	0.5	0.0	0.0	0.0
2267002015	Mobile Sources-LPG-Construction and Mining Equipment-Rollers	3.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	14.0	1.8	0.8	0.0	0.0	0.0
2267002021	Mobile Sources-LPG-Construction and Mining Equipment-Paving Equipment	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.8	0.1	0.0	0.0	0.0
2267002024	Mobile Sources-LPG-Construction and Mining Equipment-Surfacing Equipment	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.2	0.1	0.0	0.0	0.0
2267002030	Mobile Sources-LPG-Construction and Mining Equipment-Trenchers	6.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	23.9	4.4	1.7	0.1	0.0	0.0
2267002033	Mobile Sources-LPG-Construction and Mining Equipment-Bore/Drill Rigs	2.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	8.4	5.5	0.5	0.3	0.0	0.0
2267002039	Mobile Sources-LPG-Construction and Mining Equipment-Concrete/Industrial Saws	6.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	23.0	2.8	1.6	0.1	0.0	0.0
2267002045	Mobile Sources-LPG-Construction and Mining Equipment-Cranes	2.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	9.0	3.3	0.5	0.1	0.0	0.0
2267002054	Mobile Sources-LPG-Construction and Mining Equipment-Crushing/Processing Equipment	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.5	0.1	0.0	0.0	0.0
2267002057	Mobile Sources-LPG-Construction and Mining Equipment-Rough Terrain Forklifts	4.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	15.6	3.1	1.0	0.1	0.0	0.0
2267002060	Mobile Sources-LPG-Construction and Mining Equipment-Rubber Tire Loaders	9.9	1.0	0.0	0.0	0.0	0.1	0.0	0.1	38.4	5.5	2.7	0.2	0.0	0.0
2267002066	Mobile Sources-LPG-Construction and Mining Equipment-	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.5	0.2	0.0	0.0	0.0

SCC	Description	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
	Tractors/Loaders/Backhoes														
2267002072	Mobile Sources-LPG-Construction and Mining Equipment-Skid Steer Loaders	7.3	1.6	0.0	0.0	0.0	0.0	0.0	0.0	27.2	9.5	1.9	0.3	0.0	0.0
2267002081	Mobile Sources-LPG-Construction and Mining Equipment-Other Construction Equipment	3.4	1.0	0.0	0.0	0.0	0.0	0.0	0.0	12.4	5.8	0.8	0.2	0.0	0.0
2267003010	Mobile Sources-LPG-Industrial Equipment-Aerial Lifts	51.6	18.8	0.0	0.0	0.2	0.4	0.2	0.4	210.1	108.3	15.4	4.2	0.0	0.0
2267003020	Mobile Sources-LPG-Industrial Equipment-Forklifts	4,982.4	583.8	1.2	1.5	24.6	34.3	24.6	34.3	20,473.0	3,180.3	1,313.2	90.6	0.0	0.0
2267003030	Mobile Sources-LPG-Industrial Equipment-Sweepers/Scrubbers	40.0	4.5	0.0	0.0	0.1	0.3	0.1	0.3	154.4	23.8	11.1	0.7	0.0	0.0
2267003040	Mobile Sources-LPG-Industrial Equipment-Other General Industrial Equipment	12.6	1.4	0.0	0.0	0.0	0.1	0.0	0.1	48.7	7.4	3.4	0.2	0.0	0.0
2267003050	Mobile Sources-LPG-Industrial Equipment-Other Material Handling Equipment	3.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	11.9	4.4	0.7	0.1	0.0	0.0
2267003070	Mobile Sources-LPG-Industrial Equipment-Terminal Tractors	25.0	2.8	0.0	0.0	0.1	0.2	0.1	0.2	93.4	14.1	6.9	0.4	0.0	0.0
2267004066	Mobile Sources-LPG-Lawn and Garden Equipment-Chippers/Stump Grinders (Commercial)	33.9	3.3	0.0	0.0	0.1	0.2	0.1	0.2	134.6	18.1	9.8	0.5	0.0	0.0
2267005050	Mobile Sources-LPG-Agricultural Equipment-Hydro-power Units	1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.7	0.2	0.0	0.0	0.0
2267005055	Mobile Sources-LPG-Agricultural Equipment-Other Agricultural Equipment	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.1	0.0	0.1	0.0	0.0
2267005060	Mobile Sources-LPG-Agricultural Equipment-Irrigation Sets	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0
2267006005	Mobile Sources-LPG-Commercial Equipment-Generator Sets	145.7	117.3	0.0	0.1	0.6	1.4	0.6	1.4	401.7	444.3	32.7	20.1	0.0	0.0
2267006010	Mobile Sources-LPG-Commercial Equipment-Pumps	37.0	14.7	0.0	0.0	0.1	0.4	0.1	0.4	94.0	65.3	8.2	2.4	0.0	0.0
2267006015	Mobile Sources-LPG-Commercial Equipment-Air Compressors	43.9	8.6	0.0	0.0	0.1	0.4	0.1	0.4	125.4	44.2	9.8	1.3	0.0	0.0
2267006025	Mobile Sources-LPG-Commercial Equipment-Welders	55.5	11.0	0.0	0.0	0.2	0.6	0.2	0.6	232.6	61.4	16.5	1.9	0.0	0.0
2267006030	Mobile Sources-LPG-Commercial Equipment-Pressure Washers	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	3.1	1.8	0.1	0.1	0.0	0.0
2267008005	Mobile Sources-LPG-Airport Ground Support Equipment-Airport Ground Support Equipment	6.9	0.9	0.0	0.0	0.0	0.1	0.0	0.1	22.5	4.9	0.0	0.1	0.0	0.0
2268002081	Mobile Sources-CNG-Construction and Mining Equipment-Other Construction Equipment	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.0	0.0	0.0	0.0
2268003020	Mobile Sources-CNG-Industrial Equipment-Forklifts	366.2	44.4	0.0	0.1	1.8	2.5	1.8	2.5	1,476.8	234.9	5.9	0.4	0.0	0.0
2268003030	Mobile Sources-CNG-Industrial Equipment-Sweepers/Scrubbers	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.3	0.0	0.0	0.0	0.0
2268003040	Mobile Sources-CNG-Industrial Equipment-Other General Industrial	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.2	0.0	0.0	0.0	0.0

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	Equipment														
2268003060	Mobile Sources-CNG-Industrial Equipment-AC\Refrigeration	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.4	0.0	0.0	0.0	0.0
2268003070	Mobile Sources-CNG-Industrial Equipment-Terminal Tractors	1.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	7.5	1.0	0.0	0.0	0.0	0.0
2268005055	Mobile Sources-CNG-Agricultural Equipment-Other Agricultural Equipment	0.3		0.0		0.0		0.0		1.7		0.0		0.0	
2268005060	Mobile Sources-CNG-Agricultural Equipment-Irrigation Sets	49.2		0.0		0.1		0.1		190.0		0.7		0.0	
2268006005	Mobile Sources-CNG-Commercial Equipment-Generator Sets	53.0	37.3	0.0	0.0	0.2	0.4	0.2	0.4	144.0	134.7	0.5	0.4	0.0	0.0
2268006010	Mobile Sources-CNG-Commercial Equipment-Pumps	2.7	1.1	0.0	0.0	0.0	0.0	0.0	0.0	7.3	4.5	0.0	0.0	0.0	0.0
2268006015	Mobile Sources-CNG-Commercial Equipment-Air Compressors	4.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	10.9	3.2	0.0	0.0	0.0	0.0
2268006020	Mobile Sources-CNG-Commercial Equipment-Gas Compressors	129.0	18.0	0.0	0.0	0.5	1.1	0.5	1.1	589.9	93.7	2.2	0.2	0.0	0.0
2268010010	Mobile Sources-CNG-Industrial Equipment-Other Oil Field Equipment	2.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	9.4	0.9	9.8	0.0	1.3	0.0
2270001060	Mobile Sources-Off-highway Vehicle Diesel-Recreational Equipment-Specialty Vehicles/Carts	36.9	33.9	3.5	0.0	8.4	5.9	7.9	5.4	51.4	37.7	13.0	9.0	0.0	0.0
2270002003	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Pavers	152.7	49.9	21.9	0.1	16.8	3.1	15.4	2.8	73.7	20.3	15.5	5.6	0.1	0.2
2270002006	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Tampers/Rammers	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0
2270002009	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Plate Compactors	5.8	3.9	0.3	0.0	0.7	0.3	0.6	0.3	3.4	3.3	0.9	0.5	0.0	0.0
2270002015	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Rollers	384.0	145.5	55.8	0.4	45.2	10.7	41.6	9.8	219.7	70.9	42.9	15.0	0.2	0.4
2270002018	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Scrapers	440.3	134.1	60.6	0.4	36.7	8.0	33.7	7.3	202.4	62.6	31.1	15.0	0.3	0.4
2270002021	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Paving Equipment	25.9	10.5	3.0	0.0	2.9	0.8	2.6	0.8	15.5	5.4	2.8	1.1	0.0	0.0
2270002024	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Surfacing Equipment	18.1	9.6	1.7	0.0	2.1	0.6	1.9	0.6	12.1	4.5	2.0	0.8	0.0	0.0
2270002027	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Signal Boards/Light Plants	47.5	37.5	5.4	0.0	6.6	2.5	6.1	2.3	29.7	17.2	9.9	3.6	0.0	0.0
2270002030	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Trenchers	181.1	106.4	26.0	0.2	27.2	6.5	25.0	5.9	138.2	50.7	26.8	8.1	0.1	0.2
2270002033	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining	229.9	155.7	22.6	0.2	22.9	9.3	21.1	8.6	93.9	50.9	23.7	13.0	0.1	0.2

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	Equipment-Bore/Drill Rigs														
2270002036	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Excavators	1,523.5	327.6	215.9	1.3	135.0	15.4	124.1	14.2	563.7	108.1	117.2	53.0	1.1	1.6
2270002039	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Concrete/Industrial Saws	13.0	7.7	1.3	0.0	2.0	0.5	1.8	0.4	11.2	3.9	2.1	0.6	0.0	0.0
2270002042	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Cement and Mortar Mixers	9.8	7.9	0.5	0.0	0.9	0.7	0.8	0.6	4.5	3.9	1.0	0.8	0.0	0.0
2270002045	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Cranes	419.2	137.9	51.3	0.3	31.4	6.3	28.9	5.8	118.3	36.7	33.0	14.0	0.2	0.4
2270002048	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Graders	389.5	80.7	56.3	0.3	32.0	4.3	29.4	4.0	133.1	27.1	30.0	13.3	0.2	0.4
2270002051	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Off-highway Trucks	1,434.8	535.3	191.5	1.1	108.1	14.3	99.5	13.2	600.7	64.4	100.7	54.2	0.9	1.3
2270002054	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Crushing/Processing Equipment	76.0	31.3	8.4	0.1	6.6	1.4	5.9	1.3	27.6	10.0	6.9	2.6	0.0	0.1
2270002057	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Rough Terrain Forklifts	491.5	200.3	72.6	0.5	67.2	19.3	61.9	17.8	334.7	131.7	62.7	20.5	0.3	0.5
2270002060	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Rubber Tire Loaders	1,895.0	706.3	236.0	1.6	168.8	42.4	155.2	39.0	867.2	268.4	156.9	68.7	1.2	1.7
2270002066	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Tractors/Loaders/Backhoes	1,180.4	670.0	143.8	1.0	192.6	96.3	177.2	88.6	1,105.6	625.7	270.1	120.1	0.7	1.0
2270002069	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Crawler Tractor/Dozers	1,646.9	500.1	224.2	1.4	141.2	27.1	129.9	25.0	712.1	186.1	128.2	57.7	1.1	1.6
2270002072	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Skid Steer Loaders	765.2	607.7	102.5	0.7	171.3	94.4	157.5	86.8	986.1	617.9	273.8	126.0	0.5	0.7
2270002075	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Off-highway Tractors	199.9	91.5	23.9	0.2	18.9	4.2	17.4	3.8	110.4	30.3	18.8	7.4	0.1	0.2
2270002078	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Dumpers/Tenders	2.7	2.2	0.1	0.0	0.6	0.4	0.5	0.3	2.8	2.0	0.7	0.5	0.0	0.0
2270002081	Mobile Sources-Off-highway Vehicle Diesel-Construction and Mining Equipment-Other Construction Equipment	201.9	90.6	23.1	0.2	20.2	5.5	18.6	5.1	110.3	39.6	18.2	7.3	0.1	0.2
2270003010	Mobile Sources-Off-highway Vehicle Diesel-Industrial Equipment-Aerial Lifts	69.0	73.5	5.9	0.1	13.5	11.8	12.4	10.9	61.5	63.4	19.3	16.9	0.0	0.1
2270003020	Mobile Sources-Off-highway Vehicle Diesel-Industrial Equipment-Forklifts	570.7	178.0	97.3	0.6	71.0	3.5	65.4	3.2	328.0	55.0	57.1	22.9	0.4	0.8

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2270003030	Mobile Sources-Off-highway Vehicle Diesel-Industrial Equipment-Sweepers/Scrubbers	299.9	96.1	42.5	0.3	27.8	4.6	25.5	4.2	98.2	29.7	29.6	11.6	0.2	0.3
2270003040	Mobile Sources-Off-highway Vehicle Diesel-Industrial Equipment-Other General Industrial Equipment	345.8	134.4	43.0	0.3	30.7	8.4	28.2	7.8	110.8	48.4	33.8	14.0	0.2	0.3
2270003050	Mobile Sources-Off-highway Vehicle Diesel-Industrial Equipment-Other Material Handling Equipment	22.2	20.9	1.1	0.0	3.4	2.9	3.1	2.7	13.3	13.2	4.1	3.8	0.0	0.0
2270003060	Mobile Sources-Off-highway Vehicle Diesel-Industrial Equipment-AC\Refrigeration	737.2	605.3	117.6	0.8	89.9	17.8	82.8	16.4	373.3	160.8	93.7	34.0	0.5	0.9
2270003070	Mobile Sources-Off-highway Vehicle Diesel-Industrial Equipment-Terminal Tractors	387.0	69.4	61.6	0.4	37.3	2.7	34.3	2.5	126.9	23.9	31.0	15.4	0.3	0.5
2270004031	Mobile Sources-Off-highway Vehicle Diesel-Lawn and Garden Equipment-Leafblowers/Vacuums (Commercial)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2270004036	Mobile Sources-Off-highway Vehicle Diesel-Lawn and Garden Equipment-Snowblowers (Commercial)	12.5	17.7	1.3	0.0	1.6	1.3	1.5	1.2	6.7	6.8	1.7	1.7	0.0	0.0
2270004046	Mobile Sources-Off-highway Vehicle Diesel-Lawn and Garden Equipment-Front Mowers (Commercial)	159.3	158.5	21.5	0.2	21.2	10.2	19.5	9.4	99.2	66.0	32.0	14.0	0.1	0.2
2270004056	Mobile Sources-Off-highway Vehicle Diesel-Lawn and Garden Equipment-Lawn and Garden Tractors (Commercial)	34.4	34.4	4.2	0.0	4.9	2.6	4.5	2.4	21.5	17.6	6.7	3.6	0.0	0.0
2270004066	Mobile Sources-Off-highway Vehicle Diesel-Lawn and Garden Equipment-Chippers/Stump Grinders (Commercial)	240.2	216.6	29.4	0.3	30.0	15.6	27.6	14.3	124.2	86.6	31.1	20.8	0.1	0.2
2270004071	Mobile Sources-Off-highway Vehicle Diesel-Lawn and Garden Equipment-Turf Equipment (Commercial)	22.6	14.0	3.2	0.0	2.6	0.6	2.4	0.6	11.0	4.1	3.1	1.2	0.0	0.0
2270004076	Mobile Sources-Off-highway Vehicle Diesel-Lawn and Garden Equipment-Other Lawn and Garden Equipment (Commercial)	0.7	0.6	0.1	0.0	0.1	0.1	0.1	0.0	0.4	0.3	0.1	0.1	0.0	0.0
2270005010	Mobile Sources-Off-highway Vehicle Diesel-Agricultural Equipment-2-Wheel Tractors	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.0	0.0	0.0
2270005015	Mobile Sources-Off-highway Vehicle Diesel-Agricultural Equipment-Agricultural Tractors	19,536.3	9,538.4	2,232.6	15.0	2,298.9	683.4	2,115.0	628.8	11,500.8	4,274.9	2,221.2	854.8	12.4	15.2
2270005020	Mobile Sources-Off-highway Vehicle Diesel-Agricultural Equipment-Combines	2,235.2	2,003.2	206.5	1.5	392.2	298.3	360.9	274.5	736.5	748.7	216.7	185.8	1.1	1.4
2270005025	Mobile Sources-Off-highway Vehicle Diesel-Agricultural Equipment-Balers	9.4	9.1	0.1	0.0	2.3	1.7	2.1	1.5	7.4	6.8	2.6	2.0	0.0	0.0
2270005030	Mobile Sources-Off-highway Vehicle Diesel-Agricultural Equipment-Agricultural Mowers	1.9	1.1	0.0	0.0	0.1	0.1	0.1	0.1	1.5	0.9	0.1	0.1	0.0	0.0
2270005035	Mobile Sources-Off-highway Vehicle Diesel-Agricultural Equipment-Sprayers	154.4	142.1	17.4	0.1	35.4	24.3	32.6	22.4	112.0	92.1	41.4	30.6	0.0	0.1

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2270005040	Mobile Sources-Off-highway Vehicle Diesel-Agricultural Equipment-Tillers > 6 HP	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
2270005045	Mobile Sources-Off-highway Vehicle Diesel-Agricultural Equipment-Swathers	168.0	150.6	15.8	0.1	33.2	24.3	30.5	22.3	70.4	74.5	18.0	16.1	0.0	0.1
2270005050	Mobile Sources-Off-highway Vehicle Diesel-Agricultural Equipment-Hydro-power Units	39.3	19.2	4.9	0.0	4.8	1.2	4.4	1.1	18.8	8.3	5.6	1.6	0.0	0.0
2270005055	Mobile Sources-Off-highway Vehicle Diesel-Agricultural Equipment-Other Agricultural Equipment	411.0	226.9	44.9	0.3	67.6	19.3	62.1	17.8	256.6	104.4	60.7	22.4	0.1	0.3
2270005060	Mobile Sources-Off-highway Vehicle Diesel-Agricultural Equipment-Irrigation Sets	260.9	108.6	33.5	0.2	29.1	7.3	26.8	6.7	108.9	44.9	33.3	10.6	0.0	0.2
2270006005	Mobile Sources-Off-highway Vehicle Diesel-Commercial Equipment-Generator Sets	698.4	759.3	88.3	0.8	100.3	63.6	92.3	58.6	410.4	350.4	121.6	83.0	0.4	0.8
2270006010	Mobile Sources-Off-highway Vehicle Diesel-Commercial Equipment-Pumps	170.0	163.1	20.8	0.2	23.6	13.2	21.7	12.2	96.6	75.9	26.5	17.2	0.1	0.2
2270006015	Mobile Sources-Off-highway Vehicle Diesel-Commercial Equipment-Air Compressors	413.4	254.3	57.8	0.5	48.2	15.5	44.5	14.3	190.4	112.1	52.2	21.9	0.2	0.5
2270006025	Mobile Sources-Off-highway Vehicle Diesel-Commercial Equipment-Welders	203.4	225.6	29.2	0.3	54.4	34.6	50.0	31.9	314.9	221.6	85.8	47.0	0.1	0.3
2270006030	Mobile Sources-Off-highway Vehicle Diesel-Commercial Equipment-Pressure Washers	26.2	31.3	2.2	0.0	3.3	3.1	3.1	2.8	15.5	16.5	4.3	4.5	0.0	0.0
2270007015	Mobile Sources-Off-highway Vehicle Diesel-Logging Equipment-Forest Eqp - Feller/Bunch/Skidder	34.5	4.5	5.2	0.0	3.2	0.3	3.0	0.2	12.9	1.7	2.7	0.8	0.0	0.0
2270008005	Mobile Sources-Off-highway Vehicle Diesel-Airport Ground Support Equipment-Airport Ground Support Equipment	243.7	114.7	31.9	0.3	22.8	8.0	21.0	7.3	111.5	51.7	21.1	11.8	0.2	0.3
2270010010	Mobile Sources-Off-highway Vehicle Diesel-Industrial Equipment-Other Oil Field Equipment	6.5	1.9	0.8	0.0	0.5	0.1	0.4	0.1	2.1	0.4	0.5	0.2	0.0	0.0
2275001000	Mobile Sources-Aircraft-Military Aircraft-Total	1.1	1.5	0.1	0.1	4.1	5.8	2.9	4.0	197.2	274.5	10.5	14.8	0.0	0.0
2275020000	Mobile Sources-Aircraft-Commercial Aircraft-Total: All Types	2,473.2	4,172.3	236.3	398.6	0.0	0.0	0.0	0.0	2,874.0	4,848.4	499.4	842.5	0.0	0.0
2275050000	Mobile Sources-Aircraft-General Aviation-Total	4.5	7.5	0.7	1.1	16.9	28.6	11.6	19.6	870.5	1,468.6	31.3	52.7	0.0	0.0
2275060000	Mobile Sources-Aircraft-Air Taxi-Total	8.9	15.0	0.8	1.4	34.4	58.1	23.7	39.9	1,612.0	2,719.5	78.3	132.1	0.0	0.0
2280002100	Mobile Sources-Marine Vessels, Commercial-Diesel-Port emissions	4,281.1	4,076.4	443.0	12.7	91.4	96.2	84.1	88.5	584.9	700.0	169.9	203.4	1.9	2.3
2280002200	Mobile Sources-Marine Vessels, Commercial-Diesel-Underway emissions	7,655.6	7,801.9	733.8	21.2	176.7	186.0	162.6	171.0	1,472.2	1,762.2	159.0	190.3	3.2	3.8
2282005010	Mobile Sources-Pleasure Craft-Gasoline 2-Stroke-Outboard	2,677.2	3,518.3	189.0	21.8	5,615.8	5,041.1	5,166.6	4,637.8	220,877.6	195,458.1	88,260.9	45,420.0	18.1	17.1
2282005015	Mobile Sources-Pleasure Craft-Gasoline	274.2	576.0	22.5	1.9	502.5	39.1	462.3	36.0	27,416.0	25,398.3	11,473.4	2,449.4	2.2	1.4

SCC	Description	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
	2-Stroke-Personal Water Craft														
2282010005	Mobile Sources-Pleasure Craft-Gasoline 4-Stroke-Inboard/Sterndrive	1,871.2	2,347.9	47.8	5.2	20.1	19.6	18.4	18.0	47,322.0	28,402.3	3,032.6	2,191.4	2.9	3.7
2282020005	Mobile Sources-Pleasure Craft-Diesel-Inboard/Sterndrive	1,299.6	1,394.9	182.6	1.2	57.7	22.1	53.0	20.3	204.3	267.3	50.9	47.2	0.8	1.1
2282020010	Mobile Sources-Pleasure Craft-Diesel-Outboard	4.4	4.1	0.2	0.0	0.6	0.3	0.5	0.3	3.2	1.7	1.1	0.4	0.0	0.0
2285002006	Mobile Sources-Railroad Equipment-Diesel-Line Haul Locomotives: Class I Operations	26,218.5	9,925.7	2,241.0	42.1	921.7	401.5	829.5	361.4	3,648.6	2,878.8	1,376.1	792.9	11.2	8.4
2285002007	Mobile Sources-Railroad Equipment-Diesel-Line Haul Locomotives: Class II / III Operations	705.8	484.4	60.1	1.1	24.8	15.2	22.3	13.7	98.3	77.5	36.9	29.1	0.2	0.1
2285002008	Mobile Sources-Railroad Equipment-Diesel-Line Haul Locomotives: Passenger Trains (Amtrak)	504.0	195.2	42.0	1.0	16.8	7.2	15.1	7.2	70.0	55.2	25.2	14.3	0.0	0.0
2285002010	Mobile Sources-Railroad Equipment-Diesel-Yard Locomotives	2,880.1	1,568.2	238.5	4.7	96.0	51.9	86.4	47.1	397.7	313.9	219.7	155.9	0.3	0.2
2285002015	Mobile Sources-Railroad Equipment-Diesel-Railway Maintenance	59.9	43.9	5.5	0.1	10.2	5.2	9.3	4.7	52.3	29.5	11.0	7.1	0.0	0.1
2285004015	Mobile Sources-Railroad Equipment-Gasoline, 4-Stroke-Railway Maintenance	1.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	124.8	154.0	3.7	2.3	0.0	0.0
2285006015	Mobile Sources-Railroad Equipment-LPG-Railway Maintenance	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.0
MISSOURI OFFROAD MOBILE SOURCE TOTALS		99,305.6	59,624.9	9,350.5	565.2	13,063.5	8,371.3	11,985.3	7,675.0	754,272.8	739,932.9	141,183.3	72,794.1	73.9	84.8

Table H.4: 2002 and 2018 Emissions for Missouri Onroad Mobile Sources by SCC

SCC	Description	2002 NOx TPY	2018 NOx TPY	2002 SO2 TPY	2018 SO2 TPY	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY	2002 CO TPY	2018 CO TPY	2002 VOC TPY	2018 VOC TPY	2002 NH3 TPY	2018 NH3 TPY
2201001110	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Vehicles (LDGV)-Rural Interstate: Total	4,294.2	1,440.3	150.1	23.3	71.5	25.1	37.0	25.1	75,513.7	45,588.3	4,312.7	1,689.8	254.6	348.1
2201001130	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Vehicles (LDGV)-Rural Other Principal Arterial: Total	5,979.9	2,040.8	216.7	32.5	100.5	34.9	52.3	34.9	101,611.9	61,840.5	6,461.3	2,635.2	354.2	484.5
2201001150	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Vehicles (LDGV)-Rural Minor Arterial: Total	2,662.8	919.0	96.7	14.4	44.6	15.5	23.3	15.5	44,789.0	27,349.5	2,942.3	1,227.7	156.8	214.7
2201001170	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Vehicles (LDGV)-Rural Major Collector: Total	3,190.7	1,099.5	116.5	17.2	53.5	18.5	27.9	18.5	53,793.2	32,746.3	3,528.6	1,451.7	188.0	257.2
2201001190	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Vehicles (LDGV)-Rural Minor Collector: Total	575.6	198.9	20.9	3.1	9.5	3.3	5.0	3.3	9,726.8	5,927.6	630.5	260.0	33.6	45.9
2201001210	Mobile Sources-Highway Vehicles -	247.8	72.2	6.3	1.9	5.7	2.1	2.9	2.1	3,044.4	2,287.0	340.7	158.9	21.1	29.1

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	Gasoline-Light Duty Gasoline Vehicles (LDGV)-Rural Local: Total														
2201001230	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Vehicles (LDGV)-Urban Interstate: Total	10,952.5	3,010.7	346.6	72.6	212.2	78.1	105.7	78.1	184,635.6	113,688.0	9,802.6	3,717.1	789.6	1,083.3
2201001250	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Vehicles (LDGV)-Urban Other Freeways and Expressways: Total	3,193.2	868.8	104.0	21.4	62.5	23.0	31.2	23.0	54,372.5	33,538.6	2,856.4	1,079.3	232.8	319.1
2201001270	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Vehicles (LDGV)-Urban Other Principal Arterial: Total	7,305.8	2,137.5	258.6	48.7	144.6	52.4	72.9	52.4	116,600.7	72,200.8	7,728.1	2,976.8	530.7	727.2
2201001290	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Vehicles (LDGV)-Urban Minor Arterial: Total	2,839.4	785.5	92.2	19.6	57.6	21.1	28.8	21.1	41,604.1	25,596.3	3,194.7	1,265.4	212.9	292.7
2201001310	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Vehicles (LDGV)-Urban Collector: Total	2,001.9	645.4	77.7	12.2	37.6	13.1	19.5	13.1	30,726.1	18,793.3	2,469.9	997.2	133.4	182.3
2201001330	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Vehicles (LDGV)-Urban Local: Total	1,810.0	420.2	49.7	15.7	46.4	17.1	23.2	17.1	22,572.0	17,132.5	2,467.2	1,094.8	172.3	237.8
2201020110	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Rural Interstate: Total	2,967.0	1,089.6	114.6	18.5	47.6	15.4	26.2	15.4	54,191.6	28,185.1	2,733.7	1,047.7	153.0	213.6
2201020130	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Rural Other Principal Arterial: Total	4,054.4	1,542.3	164.3	25.5	66.4	21.2	36.8	21.2	73,353.8	38,192.1	4,105.1	1,619.7	209.9	293.8
2201020150	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Rural Minor Arterial: Total	1,796.1	695.0	73.2	11.3	29.5	9.4	16.4	9.4	32,449.0	16,923.9	1,878.1	754.6	92.6	129.9
2201020170	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Rural Major Collector: Total	2,153.0	832.4	88.1	13.5	35.3	11.2	19.6	11.2	38,971.7	20,255.6	2,257.6	898.4	110.8	155.3
2201020190	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Rural Minor Collector: Total	387.1	149.5	15.8	2.4	6.2	2.0	3.5	2.0	7,000.4	3,649.1	399.7	159.0	19.8	27.7
2201020210	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Rural Local: Total	200.3	63.5	5.6	1.8	4.2	1.5	2.2	1.5	2,651.9	1,584.9	236.5	92.2	14.8	20.7
2201020230	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Urban Interstate: Total	8,251.9	2,365.4	281.4	62.4	149.1	51.8	77.9	51.8	136,635.0	72,128.0	6,046.5	2,255.9	518.1	719.0
2201020250	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Urban Other	2,413.3	682.8	84.1	18.3	43.8	15.2	22.9	15.2	39,989.9	21,134.5	1,755.0	651.8	152.3	211.0

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	Freeways and Expressways: Total														
2201020270	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Urban Other Principal Arterial: Total	5,323.5	1,647.6	205.1	40.9	99.8	34.0	53.0	34.0	85,995.5	44,949.5	4,832.2	1,781.7	339.0	470.9
2201020290	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Urban Minor Arterial: Total	2,108.5	613.3	75.0	16.9	40.7	14.1	21.4	14.1	31,806.0	16,311.6	2,019.8	738.1	139.8	194.9
2201020310	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Urban Collector: Total	1,386.4	490.8	59.5	9.7	25.0	8.1	13.7	8.1	22,495.2	11,545.8	1,576.7	589.8	80.5	112.2
2201020330	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)-Urban Local: Total	1,475.4	363.1	45.2	14.6	34.1	12.2	17.4	12.2	18,935.8	11,454.6	1,597.5	597.9	122.0	169.6
2201040110	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Rural Interstate: Total	1,228.4	540.7	52.6	8.5	20.0	5.4	11.4	5.4	23,404.7	11,414.5	1,252.5	537.0	52.6	75.1
2201040130	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Rural Other Principal Arterial: Total	1,682.7	754.1	75.2	11.6	28.6	7.4	16.6	7.4	32,966.7	15,495.6	1,921.9	858.5	71.1	102.3
2201040150	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Rural Minor Arterial: Total	747.8	343.4	33.5	5.1	12.8	3.3	7.4	3.3	14,736.1	6,918.1	884.7	404.9	31.3	45.1
2201040170	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Rural Major Collector: Total	895.2	407.7	40.3	6.1	15.4	3.9	8.9	3.9	17,707.7	8,247.5	1,060.6	479.3	37.4	53.9
2201040190	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Rural Minor Collector: Total	161.5	74.2	7.2	1.1	2.7	0.7	1.6	0.7	3,217.6	1,499.2	191.3	86.8	6.6	9.6
2201040210	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Rural Local: Total	95.8	36.4	2.9	0.9	1.8	0.6	0.9	0.6	1,227.4	702.4	113.9	51.0	5.7	8.1
2201040230	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Urban Interstate: Total	3,598.7	1,273.0	134.1	30.4	59.7	19.3	31.8	19.3	55,834.5	29,554.0	2,687.9	1,107.5	191.2	267.8
2201040250	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Urban Other Freeways and Expressways: Total	1,048.8	362.9	40.0	8.9	17.4	5.6	9.2	5.6	16,211.8	8,578.7	773.9	316.1	56.1	78.4
2201040270	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Urban Other Principal Arterial: Total	2,294.2	849.6	96.4	19.6	40.4	12.4	22.0	12.4	36,283.2	18,154.3	2,148.2	887.6	122.7	172.4

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
2201040290	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Urban Minor Arterial: Total	936.1	342.2	35.9	8.3	16.8	5.2	9.1	5.2	13,842.9	6,819.2	930.1	390.2	51.5	72.8
2201040310	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Urban Collector: Total	572.3	236.7	27.3	4.5	10.2	2.9	5.8	2.9	9,674.4	4,522.3	680.2	287.4	28.0	39.5
2201040330	Mobile Sources-Highway Vehicles - Gasoline-Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)-Urban Local: Total	710.5	222.9	23.1	7.5	13.9	4.8	7.3	4.8	8,274.1	4,983.5	757.0	313.0	47.3	66.2
2201070110	Mobile Sources-Highway Vehicles - Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Rural Interstate: Total	1,116.6	242.7	29.4	4.7	20.6	2.1	15.2	2.1	3,502.7	1,793.0	282.9	114.7	8.9	12.8
2201070130	Mobile Sources-Highway Vehicles - Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Rural Other Principal Arterial: Total	1,485.8	321.9	42.4	6.5	28.7	3.0	21.1	3.0	4,615.4	2,351.1	422.7	171.4	12.4	17.8
2201070150	Mobile Sources-Highway Vehicles - Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Rural Minor Arterial: Total	659.0	142.6	18.9	2.9	12.6	1.3	9.3	1.3	2,043.3	1,042.0	186.9	77.3	5.5	7.9
2201070170	Mobile Sources-Highway Vehicles - Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Rural Major Collector: Total	793.4	171.8	22.7	3.4	15.2	1.6	11.2	1.6	2,446.6	1,244.8	222.6	90.1	6.6	9.4
2201070190	Mobile Sources-Highway Vehicles - Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Rural Minor Collector: Total	139.9	30.3	4.1	0.6	2.5	0.3	1.9	0.3	440.3	223.9	40.7	16.3	1.2	1.7
2201070210	Mobile Sources-Highway Vehicles - Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Rural Local: Total	70.7	16.0	1.3	0.4	1.7	0.2	1.2	0.2	758.3	418.8	62.7	22.9	0.8	1.1
2201070230	Mobile Sources-Highway Vehicles - Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Urban Interstate: Total	3,609.1	796.4	70.1	15.0	64.7	6.9	47.3	6.9	11,093.2	5,829.5	780.5	350.4	28.5	41.3
2201070250	Mobile Sources-Highway Vehicles - Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Urban Other Freeways and Expressways: Total	1,063.8	234.5	21.0	4.4	19.1	2.0	13.9	2.0	3,279.9	1,723.4	230.7	104.5	8.4	12.1
2201070270	Mobile Sources-Highway Vehicles - Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Urban Other Principal Arterial: Total	2,179.8	477.8	51.8	10.0	43.4	4.6	31.8	4.6	6,977.7	3,627.1	636.3	269.8	19.0	27.4
2201070290	Mobile Sources-Highway Vehicles - Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Urban Minor Arterial: Total	850.0	187.0	18.7	4.1	17.4	1.9	12.7	1.9	2,984.7	1,572.4	273.1	120.7	7.7	11.2
2201070310	Mobile Sources-Highway Vehicles -	495.8	107.1	15.4	2.5	10.8	1.1	7.9	1.1	2,391.3	1,217.5	222.3	84.0	4.7	6.7

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Urban Collector: Total														
2201070330	Mobile Sources-Highway Vehicles - Gasoline-Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)-Urban Local: Total	580.2	130.5	10.7	3.4	14.1	1.5	10.2	1.5	6,247.2	3,414.2	516.2	186.3	6.4	9.3
2201080110	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Rural Interstate: Total	60.5	77.9	0.8	0.1	1.0	0.2	0.6	0.2	614.6	797.8	64.9	93.3	0.3	0.4
2201080130	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Rural Other Principal Arterial: Total	72.4	92.6	1.1	0.2	1.2	0.3	0.7	0.3	414.7	516.6	69.5	107.0	0.4	0.6
2201080150	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Rural Minor Arterial: Total	30.5	38.8	0.5	0.0	0.4	0.1	0.2	0.1	168.3	209.6	29.9	47.7	0.2	0.2
2201080170	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Rural Major Collector: Total	36.5	46.6	0.6	0.0	0.4	0.1	0.3	0.1	202.1	250.3	35.9	56.0	0.2	0.3
2201080190	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Rural Minor Collector: Total	6.6	8.5	0.0	0.0	0.0	0.0	0.0	0.0	36.1	44.7	6.4	9.9	0.0	0.0
2201080210	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Rural Local: Total	3.6	4.5	0.0	0.0	0.1	0.0	0.1	0.0	64.9	85.6	8.1	11.2	0.0	0.0
2201080230	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Urban Interstate: Total	208.0	270.2	1.9	0.4	3.5	0.8	2.0	0.8	2,018.5	2,603.3	217.8	308.7	1.1	1.5
2201080250	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Urban Other Freeways and Expressways: Total	61.3	79.6	0.6	0.1	1.0	0.2	0.6	0.2	595.4	767.8	64.2	92.0	0.3	0.4
2201080270	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Urban Other Principal Arterial: Total	102.6	130.2	1.4	0.3	2.2	0.5	1.2	0.5	620.1	757.1	110.0	164.8	0.7	1.0
2201080290	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Urban Minor Arterial: Total	40.5	50.3	0.5	0.1	0.8	0.2	0.5	0.2	300.3	371.6	49.5	74.4	0.3	0.4
2201080310	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Urban Collector: Total	22.4	28.1	0.4	0.0	0.4	0.1	0.2	0.1	184.9	230.3	29.1	43.3	0.1	0.2
2201080330	Mobile Sources-Highway Vehicles - Gasoline-Motorcycles (MC)-Urban Local: Total	29.3	36.7	0.3	0.1	0.9	0.2	0.5	0.2	538.4	699.8	66.8	90.9	0.3	0.4
2230001110	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Rural Interstate: Total	6.2	0.4	0.2	0.0	0.5	0.0	0.5	0.0	4.5	2.0	1.5	0.1	0.0	0.0
2230001130	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Rural Other Principal Arterial: Total	6.4	0.3	0.2	0.0	0.7	0.0	0.7	0.0	5.8	2.5	2.1	0.1	0.0	0.0
2230001150	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Rural Minor Arterial: Total	2.6	0.1	0.1	0.0	0.2	0.0	0.2	0.0	2.5	1.1	0.9	0.0	0.0	0.0

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
2230001170	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Rural Major Collector: Total	3.1	0.1	0.1	0.0	0.3	0.0	0.3	0.0	3.0	1.3	1.1	0.0	0.0	0.0
2230001190	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Rural Minor Collector: Total	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.1	0.0	0.0	0.0
2230001210	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Rural Local: Total	0.5	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.9	0.5	0.3	0.0	0.0	0.0
2230001230	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Urban Interstate: Total	22.3	1.3	0.8	0.0	2.0	0.1	1.8	0.1	16.0	7.8	4.8	0.5	0.1	0.1
2230001250	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Urban Other Freeways and Expressways: Total	6.3	0.3	0.2	0.0	0.6	0.0	0.5	0.0	4.6	2.2	1.4	0.1	0.0	0.0
2230001270	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Urban Other Principal Arterial: Total	8.5	0.4	0.5	0.0	1.2	0.0	1.1	0.0	9.4	4.3	3.3	0.3	0.0	0.0
2230001290	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Urban Minor Arterial: Total	3.5	0.2	0.2	0.0	0.5	0.0	0.5	0.0	4.5	2.1	1.7	0.1	0.0	0.0
2230001310	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Urban Collector: Total	1.7	0.0	0.1	0.0	0.2	0.0	0.2	0.0	2.3	1.1	0.9	0.0	0.0	0.0
2230001330	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Vehicles (LDDV)-Urban Local: Total	4.1	0.2	0.2	0.0	0.5	0.0	0.5	0.0	6.8	3.8	2.2	0.3	0.0	0.0
2230060110	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)-Rural Interstate: Total	23.2	3.4	0.8	0.0	2.2	0.1	2.0	0.1	18.3	4.6	8.6	1.5	0.0	0.1
2230060130	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)-Rural Other Principal Arterial: Total	23.8	3.8	1.1	0.0	2.8	0.0	2.7	0.0	23.8	6.1	11.9	2.2	0.0	0.0
2230060150	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)-Rural Minor Arterial: Total	9.9	1.6	0.5	0.0	1.2	0.0	1.2	0.0	10.5	2.7	5.3	0.8	0.0	0.0
2230060170	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)-Rural Major Collector: Total	11.8	1.9	0.6	0.0	1.4	0.0	1.4	0.0	12.6	3.3	6.4	1.0	0.0	0.0
2230060190	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)-Rural Minor Collector: Total	2.1	0.3	0.0	0.0	0.1	0.0	0.1	0.0	2.2	0.6	1.1	0.1	0.0	0.0
2230060210	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)-Rural Local: Total	1.9	0.2	0.1	0.0	0.3	0.0	0.2	0.0	3.1	0.8	1.6	0.2	0.0	0.0
2230060230	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)-Urban Interstate: Total	80.6	8.7	3.2	0.2	8.0	0.3	7.1	0.3	58.5	13.1	26.9	3.5	0.2	0.3
2230060250	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4	23.1	2.4	0.9	0.0	2.3	0.1	2.0	0.1	16.9	3.7	7.7	0.9	0.1	0.1

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
	(M6) (LDDT)-Urban Other Freeways and Expressways: Total														
2230060270	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)-Urban Other Principal Arterial: Total	31.1	3.6	2.0	0.1	5.0	0.2	4.5	0.2	35.7	7.9	18.6	2.6	0.1	0.1
2230060290	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)-Urban Minor Arterial: Total	12.6	1.5	0.9	0.0	2.2	0.1	2.0	0.1	16.9	3.8	9.2	1.2	0.0	0.1
2230060310	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)-Urban Collector: Total	6.6	0.9	0.4	0.0	1.0	0.0	1.0	0.0	9.4	2.2	5.1	0.7	0.0	0.0
2230060330	Mobile Sources-Highway Vehicles - Diesel-Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)-Urban Local: Total	14.9	1.4	0.9	0.0	2.1	0.1	1.8	0.1	23.3	6.0	11.9	1.5	0.1	0.1
2230070110	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Rural Interstate: Total	7,629.6	1,488.1	134.2	8.4	198.0	7.5	173.0	7.5	1,030.9	244.8	189.9	96.9	11.4	17.2
2230070130	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Rural Other Principal Arterial: Total	7,875.9	1,681.0	184.8	11.5	272.6	10.3	238.1	10.3	1,407.1	333.6	279.7	142.6	15.7	23.7
2230070150	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Rural Minor Arterial: Total	3,488.9	744.7	81.7	5.1	120.5	4.6	105.3	4.6	620.9	147.2	123.3	62.8	6.9	10.5
2230070170	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Rural Major Collector: Total	4,205.8	898.8	97.7	6.1	144.1	5.5	125.9	5.5	737.3	174.7	145.5	74.2	8.3	12.5
2230070190	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Rural Minor Collector: Total	736.5	156.8	17.4	1.1	25.7	1.0	22.5	1.0	133.9	31.7	26.8	13.6	1.5	2.2
2230070210	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Rural Local: Total	570.9	142.4	12.9	0.8	18.9	0.7	16.5	0.7	301.6	72.8	49.5	25.6	1.1	1.7
2230070230	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Urban Interstate: Total	27,206.1	5,410.8	451.7	28.2	666.3	25.3	582.0	25.3	3,548.8	845.2	622.1	318.6	38.4	58.1
2230070250	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Urban Other Freeways and Expressways: Total	8,000.1	1,591.1	132.6	8.3	195.6	7.4	170.8	7.4	1,042.4	248.1	182.5	93.4	11.3	17.0
2230070270	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Urban Other Principal Arterial: Total	12,058.8	2,555.7	296.5	18.5	437.3	16.6	381.9	16.6	2,407.8	571.8	493.8	252.2	25.2	38.0

SCC	Description	2002 NOx	2018 NOx	2002 SO2	2018 SO2	2002 PM10	2018 PM10	2002 PM25	2018 PM25	2002 CO	2018 CO	2002 VOC	2018 VOC	2002 NH3	2018 NH3
		TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY	TPY
2230070290	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Urban Minor Arterial: Total	4,899.6	1,038.4	122.4	7.7	180.6	6.9	157.7	6.9	1,093.0	260.4	225.8	115.7	10.4	15.7
2230070310	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Urban Collector: Total	2,907.7	613.6	70.9	4.4	104.6	3.9	91.4	3.9	791.1	186.8	158.7	80.6	6.0	9.0
2230070330	Mobile Sources-Highway Vehicles - Diesel-All HDDV including Buses (use subdivisions -071 thru -075 if possible)-Urban Local: Total	4,703.8	1,166.3	106.0	6.7	156.3	6.0	136.5	6.0	2,484.7	596.2	407.8	210.4	9.0	13.7
MISSOURI ONROAD MOBILE SOURCE TOTALS		189,852.3	50,860.9	5,353.5	797.4	4,486.6	697.7	3,297.4	697.7	1,585,277.1	895,481.6	97,245.6	39,672.3	5,993.5	8,316.0

Table H.5: 2002 Emissions for Missouri Fires by SCC

Note: Fire emissions were held constant at 2002 levels in 2018, i.e., 2018 fire emissions were set equal to 2002 emissions.

SCC	Description	2002 NOx TPY	2002 SO2 TPY	2002 PM10 TPY	2002 PM25 TPY	2002 CO TPY	2002 VOC TPY	2002 NH3 TPY
2801500100	Miscellaneous Area Sources-Agriculture Production - Crops-Agricultural Field Burning - whole field set on fire-Field Crops Unspecified	2.6	0.4	13.0	12.4	91.6	10.4	1.8
2801500150	Miscellaneous Area Sources-Agriculture Production - Crops-Agricultural Field Burning - whole field set on fire-Field Crop is Corn: Burning Techniques Not Important	61.2	7.4	211.6	202.3	1,315.8	122.5	26.0
2801500170	Miscellaneous Area Sources-Agriculture Production - Crops-Agricultural Field Burning - whole field set on fire-Field Crop is Grasses: Burning Techniques Not Important	1,182.2	414.8	2,281.4	1,762.9	15,244.2	1,182.2	228.1
2801500181	Miscellaneous Area Sources-Agriculture Production - Crops-Agricultural Field Burning - whole field set on fire-Field Crop is Hay (wild): Headfire Burning	143.0	19.1	767.2	732.2	4,590.0	353.0	101.6
2801500191	Miscellaneous Area Sources-Agriculture Production - Crops-Agricultural Field Burning - whole field set on fire-Field Crop is Oats: Headfire Burning	0.0	0.0	0.2	0.2	0.7	0.1	0.0
2801500220	Miscellaneous Area Sources-Agriculture Production - Crops-Agricultural Field Burning - whole field set on fire-Field Crop is Rice: Burning Techniques Not Significant	114.5	24.2	138.7	129.9	1,263.4	103.4	48.4
2801500240	Miscellaneous Area Sources-Agriculture Production - Crops-Agricultural Field Burning - whole field set on fire-Field Crop is Sorghum: Burning Techniques Not Significant	0.1	0.0	0.5	0.5	2.2	0.2	0.1
2801500261	Miscellaneous Area Sources-Agriculture Production - Crops-Agricultural Field Burning - whole field set on fire-Field Crop is Wheat: Headfire Burning	393.3	52.5	1,518.2	1,447.5	10,346.9	713.5	279.7
2801500262	Miscellaneous Area Sources-Agriculture Production - Crops-Agricultural Field Burning - whole field set on fire-Field Crop is Wheat: Backfire Burning	9.8	1.3	27.7	26.4	233.9	14.3	6.9
2810001000	Miscellaneous Area Sources-Other Combustion-Forest Wildfires-Total	1,097.4	0.0	0.0	0.0	38,407.6	5,486.8	0.0
2810015000	Miscellaneous Area Sources-Other Combustion-Prescribed Burning for Forest Management-Total	406.1	321.1	5,793.4	4,923.8	62,214.9	3,600.3	574.2
2810015000	Miscellaneous Area Sources-Other Combustion-Prescribed Burning for Forest Management-Total	128.2	95.2	1,654.2	1,403.4	17,675.9	1,280.8	180.2

2810020000	Miscellaneous Area Sources-Other Combustion-Prescribed Burning of Rangeland-Total	1.2	0.3	1.2	0.9	2.5	0.6	0.1
MISSOURI FIRE EMISSIONS TOTALS		3,539.6	936.2	12,407.2	10,642.3	151,389.6	12,867.9	1,447.2

Table H.6: 2002 and 2018 Emissions for Missouri Agricultural and Soil Ammonia Sources by SCC

SCC	Description	2002 NH3 TPY	2018 NH3 TPY
30202000	No Description Available	15,736.8	23,417.0
30202001	Industrial Processes-Food and Agriculture-Beef Cattle Feedlots-Feedlots: General	248.5	268.2
30202101	Industrial Processes-Food and Agriculture-Eggs and Poultry Production-Manure Handling: Dry	8,366.4	12,448.3
30203099	Industrial Processes-Food and Agriculture-Dairy Products-Other Not Classified	333.6	394.3
2630020000	Waste Disposal, Treatment, and Recovery-Wastewater Treatment-Public Owned-Total Processed	14.9	18.5
2701405000	Natural Sources-Biogenic-Unknown Land Use (Anderson Land Use Code 0)-Total	0.1	0.1
2701411000	Natural Sources-Biogenic-Urban or Built-Up Land/Residential (Anderson Land Use Code 11)-Total	22.9	20.9
2701412000	Natural Sources-Biogenic-Urban or Built-Up Land/Commercial Services (Anderson Land Use Code 12)-Total	6.4	5.8
2701413000	Natural Sources-Biogenic-Urban or Built-Up Land/Industrial (Anderson Land Use Code 13)-Total	1.6	1.4
2701414000	Natural Sources-Biogenic-Urban or Built-Up Land/Transportation, Communications (Anderson LUC14)-Total	4.9	4.5
2701415000	Natural Sources-Biogenic-Urban or Built-Up Land/Industrial and Commercial (Anderson LUC 15)-Total	0.2	0.2
2701416000	Natural Sources-Biogenic-Urban or Built-Up Land/Mixed Urban or Build-Up Land (Anderson LUC 16)-Total	2.4	2.2
2701417000	Natural Sources-Biogenic-Urban or Built-Up Land/Other Urban or Built-Up Land (Anderson LUC 17)-Total	3.2	2.9
2701421000	Natural Sources-Biogenic-Agricultural Land/Cropland and Pasture (Anderson Land Use Code 21)-Total	3,758.1	3,445.0
2701422000	Natural Sources-Biogenic-Agricultural Land/Orchards, Groves, Vineyards, Nurseries (AndrsnLUC22)-Total	1.2	1.1
2701424000	Natural Sources-Biogenic-Agricultural Land/Other Agricultural Land (Anderson Land Use Code 24)-Total	2.9	2.7
2701431000	Natural Sources-Biogenic-Rangeland/Herbaceous Rangeland (Anderson Land Use Code 31)-Total	0.3	0.3
2701432000	Natural Sources-Biogenic-Rangeland/Shrub and Brush Rangeland (Anderson Land Use Code 32)-Total	2.1	1.9
2701433000	Natural Sources-Biogenic-Rangeland/Mixed Rangeland (Anderson Land Use Code 33)-Total	0.1	0.1
2701441000	Natural Sources-Biogenic-Forest Land/Deciduous Forest Land (Anderson Land Use Code 41)-Total	7,048.7	6,461.3
2701442000	Natural Sources-Biogenic-Forest Land/Evergreen Forest Land (Anderson Land Use Code 42)-Total	161.7	148.2
2701443000	Natural Sources-Biogenic-Forest Land/Mixed Forest Land (Anderson Land Use Code 43)-Total	799.4	732.8
2701461000	Natural Sources-Biogenic-Wetlands/Forested Wetlands (Anderson Land Use Code 61)-Total	33.0	30.2
2701462000	Natural Sources-Biogenic-Wetlands/Nonforested Wetlands (Anderson Land Use Code 62)-Total	10.4	9.5
2701472000	Natural Sources-Biogenic-Barren Land/Beaches (Anderson Land Use Code 72)-Total	0.0	0.0
2701473000	Natural Sources-Biogenic-Barren Land/Sandy Areas Other than Beaches (Anderson Land Use Code 73)-Total	0.2	0.2
2701476000	Natural Sources-Biogenic-Barren Land/Transitional Areas (Anderson Land Use Code 76)-Total	2.1	2.0
2801700001	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-Anhydrous Ammonia	6,606.4	8,869.9
2801700003	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-Nitrogen Solutions	7,099.9	9,298.0
2801700004	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-Urea	17,139.3	22,379.7
2801700005	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-Ammonium Nitrate	1,231.0	1,659.6
2801700006	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-Ammonium Sulfate	238.8	303.5

SCC	Description	2002 NH3 TPY	2018 NH3 TPY
2801700007	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-Ammonium Thiosulfate	33.6	44.5
2801700010	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-N-P-K (multi-grade nutrient fertilizers)	188.0	251.4
2801700012	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-Potassium Nitrate	0.2	0.2
2801700013	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-Diammonium Phosphate	3,264.8	4,384.8
2801700014	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-Monoammonium Phosphate	494.7	664.3
2801700015	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-Liquid Ammonium Polyphosphate	75.3	100.6
2801700099	Miscellaneous Area Sources-Agriculture Production - Crops-Fertilizer Application-Miscellaneous Fertilizers	73.8	97.1
2805020001	Miscellaneous Area Sources-Agriculture Production - Livestock-Cattle and Calves Waste Emissions-Milk Cows	3,394.8	4,536.4
2805020002	Miscellaneous Area Sources-Agriculture Production - Livestock-Cattle and Calves Waste Emissions-Beef Cows	20,289.3	20,067.8
2805020003	Miscellaneous Area Sources-Agriculture Production - Livestock-Cattle and Calves Waste Emissions-Heifers and Heifer Calves	10,187.3	13,895.5
2805020004	Miscellaneous Area Sources-Agriculture Production - Livestock-Cattle and Calves Waste Emissions-Steers, Steer Calves, Bulls, and Bull Calves	11,023.0	10,690.5
2805025000	Miscellaneous Area Sources-Agriculture Production - Livestock-Swine production composite-Not Elsewhere Classified (see also 28-05-039, -047, -053)	17,420.9	18,316.6
2805030001	Miscellaneous Area Sources-Agriculture Production - Livestock-Poultry Waste Emissions-Pullet Chicks and Pullets less than 13 weeks old	168.3	229.5
2805030002	Miscellaneous Area Sources-Agriculture Production - Livestock-Poultry Waste Emissions-Pullets 13 weeks old and older but less than 20 weeks old	180.5	246.3
2805030003	Miscellaneous Area Sources-Agriculture Production - Livestock-Poultry Waste Emissions-Layers	600.9	819.7
2805030004	Miscellaneous Area Sources-Agriculture Production - Livestock-Poultry Waste Emissions-Broilers	634.7	865.8
2805030007	Miscellaneous Area Sources-Agriculture Production - Livestock-Poultry Waste Emissions-Ducks	12.0	16.4
2805030008	Miscellaneous Area Sources-Agriculture Production - Livestock-Poultry Waste Emissions-Geese	5.0	6.8
2805030009	Miscellaneous Area Sources-Agriculture Production - Livestock-Poultry Waste Emissions-Turkeys	3,932.9	5,364.4
2805035000	Miscellaneous Area Sources-Agriculture Production - Livestock-Horses and Ponies Waste Emissions-Not Elsewhere Classified	859.2	1,172.0
2805040000	Miscellaneous Area Sources-Agriculture Production - Livestock-Sheep and Lambs Waste Emissions-Total	66.0	90.0
2805045002	Miscellaneous Area Sources-Agriculture Production - Livestock-Goats Waste Emissions-Angora Goats	3.5	4.8
2805045003	Miscellaneous Area Sources-Agriculture Production - Livestock-Goats Waste Emissions-Milk Goats	3.1	4.3
2806010000	Miscellaneous Area Sources-Domestic Animals Waste Emissions-Cats-Total	1,042.9	1,025.7
2806015000	Miscellaneous Area Sources-Domestic Animals Waste Emissions-Dogs-Total	3,284.6	3,230.2
2807020001	Miscellaneous Area Sources-Wild Animals Waste Emissions-Bears-Black Bears	0.9	0.8
2807030000	Miscellaneous Area Sources-Wild Animals Waste Emissions-Deer-Total	3,811.4	3,493.8
2810001000	Miscellaneous Area Sources-Other Combustion-Forest Wildfires-Total	366.0	335.5
2810010000	Miscellaneous Area Sources-Other Combustion-Human Perspiration and Respiration-Total	2,608.8	2,565.7
MISSOURI AGRICULTURAL AND SOIL AMMONIA EMISSIONS TOTALS		152,904.1	182,451.5

Table H.7: 2002 and 2018 Emissions for Missouri Fugitive Dust Sources by Source Classification Code

SCC	Description	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY
2311010000	Industrial Processes-Construction: SIC 15 - 17-Residential-Total	841.8	1,143.1	168.4	228.5
2311020000	Industrial Processes-Construction: SIC 15 - 17-Industrial/Commercial/Institutional-Total	6,064.8	8,236.0	1,212.9	1,647.1
2311030000	Industrial Processes-Construction: SIC 15 - 17-Road Construction-Total	19,841.7	26,944.8	3,968.3	5,389.0
2325000000	Industrial Processes-Mining and Quarrying: SIC 14-All Processes-Total	4,255.9	5,881.6	851.0	1,175.9
2801000000	Miscellaneous Area Sources-Agriculture Production - Crops-Agriculture - Crops-Total	237.1	352.9	6.3	9.3
2801000003	Miscellaneous Area Sources-Agriculture Production - Crops-Agriculture - Crops-Tilling	63,998.6	63,486.9	12,799.9	12,697.4
MISSOURI FUGITIVE DUST SOURCE EMISSIONS TOTALS		95,240.0	106,045.3	19,006.9	21,147.2

Table H.8: 2002 and 2018 Emissions for Missouri Road Dust by Source Classification Code

SCC	Description	2002 PM10 TPY	2018 PM10 TPY	2002 PM25 TPY	2018 PM25 TPY
2294000000	Mobile Sources-Paved Roads-All Paved Roads-Total: Fugitives	27,025.0	36,859.7	4,057.0	5,532.1
2296000000	Mobile Sources-Unpaved Roads-All Unpaved Roads-Total: Fugitives	340,365.4	276,716.8	50,954.5	41,425.8
MISSOURI ROAD DUST EMISSIONS TOTALS		367,390.3	313,576.4	55,011.6	46,958.0

Table H.9: Source of Emissions Estimates for Each SCC Included in the 2002 Area Source Inventories

SCC	SCC Description	Source of Emissions Estimate				
		MDNR 2002	CENRAP 2002	EPA 2002	EPA 2000	EPA 1999
2102002000	Stationary Source Fuel Combustion; Industrial; Bituminous/Subbituminous Coal; Total: All Boiler Types	X				
2102004000	Stationary Source Fuel Combustion; Industrial; Distillate Oil; Total: Boilers and IC Engines	X				
2102005000	Stationary Source Fuel Combustion; Industrial; Residual Oil; Total: All Boiler Types					X
2102006000	Stationary Source Fuel Combustion; Industrial; Natural Gas; Total: Boilers and IC Engines	X				
2102007000	Stationary Source Fuel Combustion; Industrial; Liquified Petroleum Gas (LPG); Total: All Boiler Types	X				
2103002000	Stationary Source Fuel Combustion; Commercial/Institutional; Bituminous/Subbituminous Coal; Total: All Boiler Types	X				
2103004000	Stationary Source Fuel Combustion; Commercial/Institutional; Distillate Oil; Total: Boilers and IC Engines	X				
2103005000	Stationary Source Fuel Combustion; Commercial/Institutional; Residual Oil; Total: All Boiler Types					X
2103006000	Stationary Source Fuel Combustion; Commercial/Institutional; Natural Gas; Total: Boilers and IC Engines	X				
2103007000	Stationary Source Fuel Combustion; Commercial/Institutional; Liquified Petroleum Gas (LPG); Total: All Combustor Types	X				
2104001000	Stationary Source Fuel Combustion; Residential; Anthracite Coal; Total: All Combustor Types				X	
2104002000	Stationary Source Fuel Combustion; Residential; Bituminous/Subbituminous Coal; Total: All Combustor Types	X				
2104004000	Stationary Source Fuel Combustion; Residential; Distillate Oil; Total: All Combustor Types	X				
2104006000	Stationary Source Fuel Combustion; Residential; Natural Gas; Total: All Combustor Types	X				

SCC	SCC Description	Source of Emissions Estimate				
		MDNR 2002	CENRAP 2002	EPA 2002	EPA 2000	EPA 1999
2104007000	Stationary Source Fuel Combustion; Residential; Liquified Petroleum Gas (LPG); Total: All Combustor Types	X				
2104008001	Stationary Source Fuel Combustion; Residential; Wood; Fireplaces: General	X				
2104008002	Stationary Source Fuel Combustion; Residential; Wood; Fireplaces: Insert; non-EPA certified	X				
2104008010	Stationary Source Fuel Combustion; Residential; Wood; Woodstoves: General	X				
2104008030	Stationary Source Fuel Combustion; Residential; Wood; Catalytic Woodstoves: General	X				
2104008050	Stationary Source Fuel Combustion; Residential; Wood; Non-catalytic Woodstoves: EPA certified	X				
2302002100	Industrial Processes; Food and Kindred Products: SIC 20; Commercial Cooking - Charbroiling; Conveyorized Charbroiling			X		
2302002200	Industrial Processes; Food and Kindred Products: SIC 20; Commercial Cooking - Charbroiling; Under-fired Charbroiling			X		
2302003000	Industrial Processes; Food and Kindred Products: SIC 20; Commercial Cooking - Frying; Deep Fat Frying			X		
2302003100	Industrial Processes; Food and Kindred Products: SIC 20; Commercial Cooking - Frying; Flat Griddle Frying			X		
2302003200	Industrial Processes; Food and Kindred Products: SIC 20; Commercial Cooking - Frying; Clamshell Griddle Frying			X		
2302050000	Industrial Processes; Food and Kindred Products: SIC 20; Bakery Products; Total	X				
2302080002	Industrial Processes; Food and Kindred Products: SIC 20; Miscellaneous Food and Kindred Products; Refrigeration					
2401001000	Solvent Utilization; Surface Coating; Architectural Coatings; Total: All Solvent Types	X				
2401005000	Solvent Utilization; Surface Coating; Auto Refinishing: SIC 7532; Total: All Solvent Types	X				
2401008000	Solvent Utilization; Surface Coating; Traffic Markings; Total: All Solvent Types	X				
2401015000	Solvent Utilization; Surface Coating; Factory Finished Wood: SIC 2426 thru 242; Total: All Solvent Types	X				
2401020000	Solvent Utilization; Surface Coating; Wood Furniture: SIC 25; Total: All Solvent Types	X				
2401040000	Solvent Utilization; Surface Coating; Metal Cans: SIC 341; Total: All Solvent Types	X				
2401050000	Solvent Utilization; Surface Coating; Miscellaneous Finished Metals: SIC 34 - (341 + 3498); Total: All Solvent Types	X				
2401055000	Solvent Utilization; Surface Coating; Machinery and Equipment: SIC 35; Total: All Solvent Types	X				
2401060000	Solvent Utilization; Surface Coating; Large Appliances: SIC 363; Total: All Solvent Types	X				
2401065000	Solvent Utilization; Surface Coating; Electronic and Other Electrical: SIC 36 - 363; Total: All Solvent Types	X				
2401070000	Solvent Utilization; Surface Coating; Motor Vehicles: SIC 371; Total: All Solvent Types	X				
2401080000	Solvent Utilization; Surface Coating; Marine: SIC 373; Total: All Solvent Types	X				
2401090000	Solvent Utilization; Surface Coating; Miscellaneous Manufacturing; Total: All Solvent Types	X				
2401100000	Solvent Utilization; Surface Coating; Industrial Maintenance Coatings; Total: All Solvent Types	X				
2401200000	Solvent Utilization; Surface Coating; Other Special Purpose Coatings; Total: All Solvent Types	X				
2415000000	Solvent Utilization; Degreasing; All Processes/All Industries; Total: All Solvent Types	X				
2420010000	Solvent Utilization; Dry Cleaning; Commercial/Industrial Cleaners; Total: All Solvent Types	X				
2425000000	Solvent Utilization; Graphic Arts; All Processes; Total: All Solvent Types	X				

SCC	SCC Description	Source of Emissions Estimate				
		MDNR 2002	CENRAP 2002	EPA 2002	EPA 2000	EPA 1999
2460000000	Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Processes; Total: All Solvent Types	X				
2461021000	Solvent Utilization; Miscellaneous Non-industrial: Commercial; Cutback Asphalt; Total: All Solvent Types	X				
2461022000	Solvent Utilization; Miscellaneous Non-industrial: Commercial; Emulsified Asphalt; Total: All Solvent Types	X				
2461850000	Solvent Utilization; Miscellaneous Non-industrial: Commercial; Pesticide Application: Agricultural; All Processes	X				
2461870999	Solvent Utilization; Miscellaneous Non-industrial: Commercial; Pesticide Application: Non-Agricultural; Not Elsewhere Classified	X				
2501060000	Storage and Transport; Petroleum and Petroleum Product Storage; Gasoline Service Stations; Total: All Gasoline/All Processes					X
2501060050	Storage and Transport; Petroleum and Petroleum Product Storage; Gasoline Service Stations; Stage 1: Total	X				
2501060100	Storage and Transport; Petroleum and Petroleum Product Storage; Gasoline Service Stations; Stage 2: Total	X				
2501060201	Storage and Transport; Petroleum and Petroleum Product Storage; Gasoline Service Stations; Underground Tank: Breathing and Emptying	X				
2501080050	Storage and Transport; Petroleum and Petroleum Product Storage; Airports : Aviation Gasoline; Stage 1: Total			X		
2501080100	Storage and Transport; Petroleum and Petroleum Product Storage; Airports : Aviation Gasoline; Stage 2: Total			X		
2505020000	Storage and Transport; Petroleum and Petroleum Product Transport; Marine Vessel; Total: All Products	X				
2601000000	Waste Disposal, Treatment, and Recovery; On-site Incineration; All Categories; Total	X				
2610000100	Waste Disposal, Treatment, and Recovery; Open Burning; All Categories; Yard Waste - Leaf Species Unspecified			X		
2610000400	Waste Disposal, Treatment, and Recovery; Open Burning; All Categories; Yard Waste - Brush Species Unspecified			X		
2610000500	Waste Disposal, Treatment, and Recovery; Open Burning; All Categories; Land Clearing Debris (use 28-10-005-000 for Logging Debris Burning)			X		
2610030000	Waste Disposal, Treatment, and Recovery; Open Burning; Residential; Household Waste (use 26-10-000-xxx for Yard Wastes)	X				
2620030000	Waste Disposal, Treatment, and Recovery; Landfills; Municipal; Total	X				
2660000000	Waste Disposal, Treatment, and Recovery; Leaking Underground Storage Tanks; Leaking Underground Storage Tanks; Total: All Storage Types	X				
2810030000	Miscellaneous Area Sources; Other Combustion; Structure Fires; Total	X				
2810050000	Miscellaneous Area Sources; Other Combustion; Motor Vehicle Fires; Total	X				

Table H.10: Source of Emissions Estimates for Each SCC Included in the 2002 Offroad Mobile Source Inventory

SCC	SCC Description	Source of Emissions Estimate	
		CENRAP 2002	EPA 2002
2260001010	Off-highway Vehicle Gasoline, 2-Stroke; Recreational Equipment; Motorcycles: Off-road	X	
2260001030	Off-highway Vehicle Gasoline, 2-Stroke; Recreational Equipment; All Terrain Vehicles	X	
2260001060	Off-highway Vehicle Gasoline, 2-Stroke; Recreational Equipment; Specialty Vehicles/Carts	X	
2260002006	Off-highway Vehicle Gasoline, 2-Stroke; Construction and Mining Equipment; Tampers/Rammers	X	
2260002009	Off-highway Vehicle Gasoline, 2-Stroke; Construction and Mining Equipment; Plate Compactors	X	
2260002021	Off-highway Vehicle Gasoline, 2-Stroke; Construction and Mining Equipment; Paving Equipment	X	
2260002027	Off-highway Vehicle Gasoline, 2-Stroke; Construction and Mining Equipment; Signal Boards/Light Plants	X	
2260002039	Off-highway Vehicle Gasoline, 2-Stroke; Construction and Mining Equipment; Concrete/Industrial Saws	X	
2260002054	Off-highway Vehicle Gasoline, 2-Stroke; Construction and Mining Equipment; Crushing/Processing Equipment	X	
2260003030	Off-highway Vehicle Gasoline, 2-Stroke; Industrial Equipment; Sweepers/Scrubbers	X	
2260003040	Off-highway Vehicle Gasoline, 2-Stroke; Industrial Equipment; Other General Industrial Equipment	X	
2260004015	Off-highway Vehicle Gasoline, 2-Stroke; Lawn and Garden Equipment; Rotary Tillers < 6 HP (Residential)	X	
2260004016	Off-highway Vehicle Gasoline, 2-Stroke; Lawn and Garden Equipment; Rotary Tillers < 6 HP (Commercial)	X	
2260004020	Off-highway Vehicle Gasoline, 2-Stroke; Lawn and Garden Equipment; Chain Saws < 6 HP (Residential)	X	
2260004021	Off-highway Vehicle Gasoline, 2-Stroke; Lawn and Garden Equipment; Chain Saws < 6 HP (Commercial)	X	
2260004025	Off-highway Vehicle Gasoline, 2-Stroke; Lawn and Garden Equipment; Trimmers/Edgers/Brush Cutters (Residential)	X	
2260004026	Off-highway Vehicle Gasoline, 2-Stroke; Lawn and Garden Equipment; Trimmers/Edgers/Brush Cutters (Commercial)	X	
2260004030	Off-highway Vehicle Gasoline, 2-Stroke; Lawn and Garden Equipment; Leafblowers/Vacuums (Residential)	X	
2260004031	Off-highway Vehicle Gasoline, 2-Stroke; Lawn and Garden Equipment; Leafblowers/Vacuums (Commercial)	X	
2260004035	Off-highway Vehicle Gasoline, 2-Stroke; Lawn and Garden Equipment; Snowblowers (Residential)	X	
2260004036	Off-highway Vehicle Gasoline, 2-Stroke; Lawn and Garden Equipment; Snowblowers (Commercial)	X	
2260004071	Off-highway Vehicle Gasoline, 2-Stroke; Lawn and Garden Equipment; Turf Equipment (Commercial)	X	
2260005035	Off-highway Vehicle Gasoline, 2-Stroke; Agricultural Equipment; Sprayers	X	
2260005050	Off-highway Vehicle Gasoline, 2-Stroke; Agricultural Equipment; Hydro-power Units	X	
2260006005	Off-highway Vehicle Gasoline, 2-Stroke; Commercial Equipment; Generator Sets	X	
2260006010	Off-highway Vehicle Gasoline, 2-Stroke; Commercial Equipment; Pumps	X	
2260006015	Off-highway Vehicle Gasoline, 2-Stroke; Commercial Equipment; Air Compressors	X	
2265001010	Off-highway Vehicle Gasoline, 4-Stroke; Recreational Equipment; Motorcycles: Off-road	X	
2265001030	Off-highway Vehicle Gasoline, 4-Stroke; Recreational Equipment; All Terrain Vehicles	X	
2265001050	Off-highway Vehicle Gasoline, 4-Stroke; Recreational Equipment; Golf Carts	X	
2265001060	Off-highway Vehicle Gasoline, 4-Stroke; Recreational Equipment; Specialty Vehicles/Carts	X	
2265002003	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Pavers	X	
2265002006	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Tampers/Rammers	X	
2265002009	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Plate Compactors	X	
2265002015	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Rollers	X	
2265002021	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Paving Equipment	X	
2265002024	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Surfacing Equipment	X	
2265002027	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Signal Boards/Light Plants	X	
2265002030	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Trenchers	X	

SCC	SCC Description	Source of Emissions Estimate	
		CENRAP 2002	EPA 2002
2265002033	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Bore/Drill Rigs	X	
2265002039	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Concrete/Industrial Saws	X	
2265002042	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Cement and Mortar Mixers	X	
2265002045	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Cranes	X	
2265002054	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Crushing/Processing Equipment	X	
2265002057	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Rough Terrain Forklifts	X	
2265002060	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Rubber Tire Loaders	X	
2265002066	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Tractors/Loaders/Backhoes	X	
2265002072	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Skid Steer Loaders	X	
2265002078	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Dumpers/Tenders	X	
2265002081	Off-highway Vehicle Gasoline, 4-Stroke; Construction and Mining Equipment; Other Construction Equipment	X	
2265003010	Off-highway Vehicle Gasoline, 4-Stroke; Industrial Equipment; Aerial Lifts	X	
2265003020	Off-highway Vehicle Gasoline, 4-Stroke; Industrial Equipment; Forklifts	X	
2265003030	Off-highway Vehicle Gasoline, 4-Stroke; Industrial Equipment; Sweepers/Scrubbers	X	
2265003040	Off-highway Vehicle Gasoline, 4-Stroke; Industrial Equipment; Other General Industrial Equipment	X	
2265003050	Off-highway Vehicle Gasoline, 4-Stroke; Industrial Equipment; Other Material Handling Equipment	X	
2265003060	Off-highway Vehicle Gasoline, 4-Stroke; Industrial Equipment; AC\Refrigeration	X	
2265003070	Off-highway Vehicle Gasoline, 4-Stroke; Industrial Equipment; Terminal Tractors	X	
2265004010	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Lawn Mowers (Residential)	X	
2265004011	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Lawn Mowers (Commercial)	X	
2265004015	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Rotary Tillers < 6 HP (Residential)	X	
2265004016	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Rotary Tillers < 6 HP (Commercial)	X	
2265004025	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Trimmers/Edgers/Brush Cutters (Residential)	X	
2265004026	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Trimmers/Edgers/Brush Cutters (Commercial)	X	
2265004030	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Leafblowers/Vacuums (Residential)	X	
2265004031	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Leafblowers/Vacuums (Commercial)	X	
2265004035	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Snowblowers (Residential)	X	
2265004036	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Snowblowers (Commercial)	X	
2265004040	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Rear Engine Riding Mowers (Residential)	X	
2265004041	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Rear Engine Riding Mowers (Commercial)	X	
2265004046	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Front Mowers (Commercial)	X	
2265004051	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Shredders < 6 HP (Commercial)	X	
2265004055	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Lawn and Garden Tractors (Residential)	X	
2265004056	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Lawn and Garden Tractors (Commercial)	X	
2265004066	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Chippers/Stump Grinders (Commercial)	X	
2265004071	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Turf Equipment (Commercial)	X	
2265004075	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Other Lawn and Garden Equipment (Residential)	X	
2265004076	Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Other Lawn and Garden Equipment (Commercial)	X	
2265005010	Off-highway Vehicle Gasoline, 4-Stroke; Agricultural Equipment; 2-Wheel Tractors	X	
2265005015	Off-highway Vehicle Gasoline, 4-Stroke; Agricultural Equipment; Agricultural Tractors	X	
2265005020	Off-highway Vehicle Gasoline, 4-Stroke; Agricultural Equipment; Combines	X	

SCC	SCC Description	Source of Emissions Estimate	
		CENRAP 2002	EPA 2002
2265005025	Off-highway Vehicle Gasoline, 4-Stroke; Agricultural Equipment; Balers	X	
2265005030	Off-highway Vehicle Gasoline, 4-Stroke; Agricultural Equipment; Agricultural Mowers	X	
2265005035	Off-highway Vehicle Gasoline, 4-Stroke; Agricultural Equipment; Sprayers	X	
2265005040	Off-highway Vehicle Gasoline, 4-Stroke; Agricultural Equipment; Tillers > 6 HP	X	
2265005045	Off-highway Vehicle Gasoline, 4-Stroke; Agricultural Equipment; Swathers	X	
2265005050	Off-highway Vehicle Gasoline, 4-Stroke; Agricultural Equipment; Hydro-power Units	X	
2265005055	Off-highway Vehicle Gasoline, 4-Stroke; Agricultural Equipment; Other Agricultural Equipment	X	
2265005060	Off-highway Vehicle Gasoline, 4-Stroke; Agricultural Equipment; Irrigation Sets	X	
2265006005	Off-highway Vehicle Gasoline, 4-Stroke; Commercial Equipment; Generator Sets	X	
2265006010	Off-highway Vehicle Gasoline, 4-Stroke; Commercial Equipment; Pumps	X	
2265006015	Off-highway Vehicle Gasoline, 4-Stroke; Commercial Equipment; Air Compressors	X	
2265006025	Off-highway Vehicle Gasoline, 4-Stroke; Commercial Equipment; Welders	X	
2265006030	Off-highway Vehicle Gasoline, 4-Stroke; Commercial Equipment; Pressure Washers	X	
2265008005	Off-highway Vehicle Gasoline, 4-Stroke; Airport Ground Support Equipment; Airport Ground Support Equipment	X	
2267001060	LPG; Recreational Equipment; Specialty Vehicles/Carts	X	
2267002003	LPG; Construction and Mining Equipment; Pavers	X	
2267002015	LPG; Construction and Mining Equipment; Rollers	X	
2267002021	LPG; Construction and Mining Equipment; Paving Equipment	X	
2267002024	LPG; Construction and Mining Equipment; Surfacing Equipment	X	
2267002030	LPG; Construction and Mining Equipment; Trenchers	X	
2267002033	LPG; Construction and Mining Equipment; Bore/Drill Rigs	X	
2267002039	LPG; Construction and Mining Equipment; Concrete/Industrial Saws	X	
2267002045	LPG; Construction and Mining Equipment; Cranes	X	
2267002054	LPG; Construction and Mining Equipment; Crushing/Processing Equipment	X	
2267002057	LPG; Construction and Mining Equipment; Rough Terrain Forklifts	X	
2267002060	LPG; Construction and Mining Equipment; Rubber Tire Loaders	X	
2267002066	LPG; Construction and Mining Equipment; Tractors/Loaders/Backhoes	X	
2267002072	LPG; Construction and Mining Equipment; Skid Steer Loaders	X	
2267002081	LPG; Construction and Mining Equipment; Other Construction Equipment	X	
2267003010	LPG; Industrial Equipment; Aerial Lifts	X	
2267003020	LPG; Industrial Equipment; Forklifts	X	
2267003030	LPG; Industrial Equipment; Sweepers/Scrubbers	X	
2267003040	LPG; Industrial Equipment; Other General Industrial Equipment	X	
2267003050	LPG; Industrial Equipment; Other Material Handling Equipment	X	
2267003070	LPG; Industrial Equipment; Terminal Tractors	X	
2267004066	LPG; Lawn and Garden Equipment; Chippers/Stump Grinders (Commercial)	X	
2267005050	LPG; Agricultural Equipment; Hydro-power Units	X	
2267005055	LPG; Agricultural Equipment; Other Agricultural Equipment	X	
2267005060	LPG; Agricultural Equipment; Irrigation Sets	X	
2267006005	LPG; Commercial Equipment; Generator Sets	X	

SCC	SCC Description	Source of Emissions Estimate	
		CENRAP 2002	EPA 2002
2267006010	LPG; Commercial Equipment; Pumps	X	
2267006015	LPG; Commercial Equipment; Air Compressors	X	
2267006025	LPG; Commercial Equipment; Welders	X	
2267006030	LPG; Commercial Equipment; Pressure Washers	X	
2267008005	LPG; Airport Ground Support Equipment; Airport Ground Support Equipment	X	
2268002081	CNG; Construction and Mining Equipment; Other Construction Equipment	X	
2268003020	CNG; Industrial Equipment; Forklifts	X	
2268003030	CNG; Industrial Equipment; Sweepers/Scrubbers	X	
2268003040	CNG; Industrial Equipment; Other General Industrial Equipment	X	
2268003060	CNG; Industrial Equipment; AC\Refrigeration	X	
2268003070	CNG; Industrial Equipment; Terminal Tractors	X	
2268005055	CNG; Agricultural Equipment; Other Agricultural Equipment	X	
2268005060	CNG; Agricultural Equipment; Irrigation Sets	X	
2268006005	CNG; Commercial Equipment; Generator Sets	X	
2268006010	CNG; Commercial Equipment; Pumps	X	
2268006015	CNG; Commercial Equipment; Air Compressors	X	
2268006020	CNG; Commercial Equipment; Gas Compressors	X	
2270001060	Off-highway Vehicle Diesel; Recreational Equipment; Specialty Vehicles/Carts	X	
2270002003	Off-highway Vehicle Diesel; Construction and Mining Equipment; Pavers	X	
2270002006	Off-highway Vehicle Diesel; Construction and Mining Equipment; Tampers/Rammers	X	
2270002009	Off-highway Vehicle Diesel; Construction and Mining Equipment; Plate Compactors	X	
2270002015	Off-highway Vehicle Diesel; Construction and Mining Equipment; Rollers	X	
2270002018	Off-highway Vehicle Diesel; Construction and Mining Equipment; Scrapers	X	
2270002021	Off-highway Vehicle Diesel; Construction and Mining Equipment; Paving Equipment	X	
2270002024	Off-highway Vehicle Diesel; Construction and Mining Equipment; Surfacing Equipment	X	
2270002027	Off-highway Vehicle Diesel; Construction and Mining Equipment; Signal Boards/Light Plants	X	
2270002030	Off-highway Vehicle Diesel; Construction and Mining Equipment; Trenchers	X	
2270002033	Off-highway Vehicle Diesel; Construction and Mining Equipment; Bore/Drill Rigs	X	
2270002036	Off-highway Vehicle Diesel; Construction and Mining Equipment; Excavators	X	
2270002039	Off-highway Vehicle Diesel; Construction and Mining Equipment; Concrete/Industrial Saws	X	
2270002042	Off-highway Vehicle Diesel; Construction and Mining Equipment; Cement and Mortar Mixers	X	
2270002045	Off-highway Vehicle Diesel; Construction and Mining Equipment; Cranes	X	
2270002048	Off-highway Vehicle Diesel; Construction and Mining Equipment; Graders	X	
2270002051	Off-highway Vehicle Diesel; Construction and Mining Equipment; Off-highway Trucks	X	
2270002054	Off-highway Vehicle Diesel; Construction and Mining Equipment; Crushing/Processing Equipment	X	
2270002057	Off-highway Vehicle Diesel; Construction and Mining Equipment; Rough Terrain Forklifts	X	
2270002060	Off-highway Vehicle Diesel; Construction and Mining Equipment; Rubber Tire Loaders	X	
2270002066	Off-highway Vehicle Diesel; Construction and Mining Equipment; Tractors/Loaders/Backhoes	X	
2270002069	Off-highway Vehicle Diesel; Construction and Mining Equipment; Crawler Tractor/Dozers	X	

SCC	SCC Description	Source of Emissions Estimate	
		CENRAP 2002	EPA 2002
2270002072	Off-highway Vehicle Diesel; Construction and Mining Equipment; Skid Steer Loaders	X	
2270002075	Off-highway Vehicle Diesel; Construction and Mining Equipment; Off-highway Tractors	X	
2270002078	Off-highway Vehicle Diesel; Construction and Mining Equipment; Dumpers/Tenders	X	
2270002081	Off-highway Vehicle Diesel; Construction and Mining Equipment; Other Construction Equipment	X	
2270003010	Off-highway Vehicle Diesel; Industrial Equipment; Aerial Lifts	X	
2270003020	Off-highway Vehicle Diesel; Industrial Equipment; Forklifts	X	
2270003030	Off-highway Vehicle Diesel; Industrial Equipment; Sweepers/Scrubbers	X	
2270003040	Off-highway Vehicle Diesel; Industrial Equipment; Other General Industrial Equipment	X	
2270003050	Off-highway Vehicle Diesel; Industrial Equipment; Other Material Handling Equipment	X	
2270003060	Off-highway Vehicle Diesel; Industrial Equipment; AC\Refrigeration	X	
2270003070	Off-highway Vehicle Diesel; Industrial Equipment; Terminal Tractors	X	
2270004031	Off-highway Vehicle Diesel; Lawn and Garden Equipment; Leafblowers/Vacuums (Commercial)	X	
2270004036	Off-highway Vehicle Diesel; Lawn and Garden Equipment; Snowblowers (Commercial)	X	
2270004046	Off-highway Vehicle Diesel; Lawn and Garden Equipment; Front Mowers (Commercial)	X	
2270004056	Off-highway Vehicle Diesel; Lawn and Garden Equipment; Lawn and Garden Tractors (Commercial)	X	
2270004066	Off-highway Vehicle Diesel; Lawn and Garden Equipment; Chippers/Stump Grinders (Commercial)	X	
2270004071	Off-highway Vehicle Diesel; Lawn and Garden Equipment; Turf Equipment (Commercial)	X	
2270004076	Off-highway Vehicle Diesel; Lawn and Garden Equipment; Other Lawn and Garden Equipment (Commercial)	X	
2270005010	Off-highway Vehicle Diesel; Agricultural Equipment; 2-Wheel Tractors	X	
2270005015	Off-highway Vehicle Diesel; Agricultural Equipment; Agricultural Tractors	X	
2270005020	Off-highway Vehicle Diesel; Agricultural Equipment; Combines	X	
2270005025	Off-highway Vehicle Diesel; Agricultural Equipment; Balers	X	
2270005030	Off-highway Vehicle Diesel; Agricultural Equipment; Agricultural Mowers	X	
2270005035	Off-highway Vehicle Diesel; Agricultural Equipment; Sprayers	X	
2270005045	Off-highway Vehicle Diesel; Agricultural Equipment; Swathers	X	
2270005050	Off-highway Vehicle Diesel; Agricultural Equipment; Hydro-power Units	X	
2270005055	Off-highway Vehicle Diesel; Agricultural Equipment; Other Agricultural Equipment	X	
2270005060	Off-highway Vehicle Diesel; Agricultural Equipment; Irrigation Sets	X	
2270006005	Off-highway Vehicle Diesel; Commercial Equipment; Generator Sets	X	
2270006010	Off-highway Vehicle Diesel; Commercial Equipment; Pumps	X	
2270006015	Off-highway Vehicle Diesel; Commercial Equipment; Air Compressors	X	
2270006025	Off-highway Vehicle Diesel; Commercial Equipment; Welders	X	
2270006030	Off-highway Vehicle Diesel; Commercial Equipment; Pressure Washers	X	
2270008005	Off-highway Vehicle Diesel; Airport Ground Support Equipment; Airport Ground Support Equipment	X	
2275001000	Aircraft; Military Aircraft; Total		X
2275020000	Aircraft; Commercial Aircraft; Total: All Types		X
2275050000	Aircraft; General Aviation; Total		X
2275060000	Aircraft; Air Taxi; Total		X
2280002100	Marine Vessels, Commercial; Diesel; Port emissions	X	

SCC	SCC Description	Source of Emissions Estimate	
		CENRAP 2002	EPA 2002
2280002200	Marine Vessels, Commercial; Diesel; Underway emissions	X	
2282005010	Pleasure Craft; Gasoline 2-Stroke; Outboard	X	
2282005015	Pleasure Craft; Gasoline 2-Stroke; Personal Water Craft	X	
2282010005	Pleasure Craft; Gasoline 4-Stroke; Inboard/Sterndrive	X	
2282020005	Pleasure Craft; Diesel; Inboard/Sterndrive	X	
2282020010	Pleasure Craft; Diesel; Outboard	X	
2285002006	Railroad Equipment; Diesel; Line Haul Locomotives: Class I Operations	X	
2285002007	Railroad Equipment; Diesel; Line Haul Locomotives: Class II / III Operations	X	
2285002008	Railroad Equipment; Diesel; Line Haul Locomotives: Passenger Trains (Amtrak)	X	
2285002010	Railroad Equipment; Diesel; Yard Locomotives	X	
2285002015	Railroad Equipment; Diesel; Railway Maintenance	X	
2285006015	Railroad Equipment; LPG; Railway Maintenance	X	

Appendix H.2

Pechan, *The Consolidation of Emissions Inventories* (April 28, 2005)

CONSOLIDATION OF EMISSIONS INVENTORIES (SCHEDULE 9; WORK ITEM 3)

FINAL

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April 28, 2005

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Pechan Report No. 05.03.002/9500.003

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CONTENTS

TABLES

FIGURES

ACRONYMS AND ABBREVIATIONS

BRAVO	Big Bend Regional Aerosol and Visibility Observational
CAFO	Concentrated Animal Feeding Operations
CAP	criteria air pollutant
CE	Control Equipment (NIF 3.0 table)
CEM	Continuous Emissions Monitoring
CENRAP	Central Regional Air Planning Association
CERR	Consolidated Emissions Reporting Rule
CMU	Carnegie Mellon University
CO	carbon monoxide
CO_2	carbon dioxide
CH_4	methane
CMV	commercial marine vessel
CVS	Concurrent Versions System
EC	elemental carbon
EFIG	Emission Factor and Inventory Group
EI	Emission Inventory
EM	Emission (NIF 3.0 table)
EP	Emission Process (NIF 3.0 table)
EPA	U.S. Environmental Protection Agency
EPS	Emissions Preprocessor System
ER	Emission Release Point (NIF 3.0 table)
ERG	Eastern Research Group
ERP	Emission Release Point (NIF 3.0 field in ER table)
EU	Emission Unit (NIF 3.0 table)
FIPS	Federal Information Processing Standard
FIRE	Factor Information and REtrieval
GIS	geographic information system
GWEI	Gulfwide Emissions Inventory
HAP	hazardous air pollutant
ID	identification
IDA	Inventory Data Analyzer format
LPG	liquefied petroleum gas
MACT	maximum achievable control technology
MANE-VU	Mid-Atlantic/Northeast Visibility Union
MMS	Minerals Management Services
NAAQS	National Ambient Air Quality Standard
NAICS	North American Industrial Classification System
NEI	National Emissions Inventory
NH_3	ammonia
NIF 3.0	NEI Input Format Version 3.0
NO_x	oxides of nitrogen
OC	organic carbon
ORIS	Office of Regulatory Information Systems
PD	primary device
PE	Emission Period (NIF 3.0 table)
Pechan	E.H. Pechan & Associates, Inc.

PM	total particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PM10-FIL	filterable PM_{10}
PM10-PRI	primary PM_{10}
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM25-FIL	filterable $PM_{2.5}$
PM25-PRI	primary $PM_{2.5}$
PM-CON	condensible PM
QA	quality assurance
QAPP	Quality Assurance Project Plan
RPO	Regional Planning Organization
SCC	Source Classification Code
SD	secondary device
SI	Site (NIF 3.0 table)
SIC	Standard Industrial Classification
SIP	State Implementation Plan
S/L/T	State, Local, and Tribal
SMOKE	Sparse Matrix Operator Kernel Emissions
SO_2	sulfur dioxide
TCEQ	Texas Commission on Environmental Quality
TR	Transmittal (NIF 3.0 table)
UCAR	University of California, Riverside
UNC-CEP	University of North Carolina, Chapel Hill – Carolina Environmental Program
U.S.	United States
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VOC	volatile organic compound
WRAP	Western Regional Air Partnership

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I. INTRODUCTION

A. Overview

This report documents the data sources, methods, and results for preparing the 2002 base year criteria air pollutant (CAP) and ammonia (NH_3) emissions inventories for point, area, and nonroad sources for the Central Regional Air Planning Association (CENRAP) Regional Planning Organization (RPO). The CENRAP region includes the states and tribal jurisdictions of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma, and Texas. CENRAP (and other RPOs) will use these inventories to support air quality modeling, State Implementation Plan (SIP) development, and implementation activities for the regional haze rule and fine PM and ozone National Ambient Air Quality Standards (NAAQS).

The inventories and supporting data prepared include the following:

(1) Comprehensive, county-level, mass emissions and modeling inventories for point, area, and nonroad sources of 2002 emissions for the CAPs and NH_3 for the State, Local, and Tribal (S/L/T) agencies included in the CENRAP region;
(2) The temporal, speciation, and spatial allocation profiles for the CENRAP region inventories; and
(3) Inventories for other RPOs, Canada, and Mexico.

The mass emissions inventory files were prepared in the National Emissions Inventory (NEI) Input Format Version 3.0 (NIF 3.0). The modeling inventory files were prepared in the Sparse Matrix Operator Kernel Emissions/Inventory Data Analyzer (SMOKE/IDA) format. Ancillary files (holding spatial, temporal, and speciation profile data) were prepared in SMOKE/IDA compatible format.

The inventories include annual emissions for sulfur dioxide (SO_2), oxides of nitrogen (NO_x), volatile organic compounds (VOC), carbon monoxide (CO), NH_3, and particles with an aerodynamic diameter less than or equal to a nominal 10 and 2.5 micrometers (i.e., primary PM_{10} and $PM_{2.5}$). The inventories included summer day, winter day, and average day emissions. However, not all agencies included daily emissions in their inventories, and, for the agencies that did, the temporal basis for the daily emissions varied between agencies. Consequently, the inventories did not contain a complete and consistent set of daily emissions for all source categories and pollutants. Therefore, daily emissions prepared by S/L/T agencies were maintained in the NIF files if they met quality assurance (QA) review requirements. However, CENRAP requested that the daily emissions not be included in the SMOKE input files. The temporal profiles prepared for this project will be used to calculate daily emissions. If needed, the daily emissions prepared by the agencies may be retrieved from the NIF database files.

The consolidated inventories were prepared using the inventories that S/L/T agencies submitted to the United States (U.S.) Environmental Protection Agency (EPA) from May through July of 2004 as a requirement of the Consolidated Emissions Reporting Rule (CERR). The EPA's format and content QA programs (and other QA checks not included in EPA's QA software) were run on each inventory to identify format and/or data content issues (EPA, 2004a).

E.H. Pechan & Associates, Inc. (Pechan) and the University of North Carolina, Chapel Hill – Carolina Environmental Program (UNC-CEP) worked with the CENRAP's Emission Inventory (EI) Workgroup and the S/L/T agencies to resolve QA issues and augment the inventories to fill data gaps in accordance with the Methods Plan and Quality Assurance Project Plan (QAPP) prepared for this project (CENRAP, 2004a; CENRAP, 2004b). The EI Workgroup and S/L/T agencies reviewed the draft inventory and ancillary files from December 2004 through February 2005. The inventories and SMOKE input files were revised to incorporate the review comments.

B. Summary of the 2002 Base Year Inventories

This section of the report provides a brief summary of the consolidated 2002 base year inventories for the CENRAP region. Table 1 shows total annual emissions for CAPs and NH_3 for point, area, nonroad, and onroad sources. The sector contributing the highest emissions varies by pollutant. Point sources account for the highest percentage of total NO_x (36%) and SO_2 (87%) emissions. Area sources account for the highest percentage of total VOC (50%), primary PM_{10} (PM10-PRI (93%)), primary $PM_{2.5}$ (PM25-PRI (81%)), and NH_3 (86%) emissions. Onroad sources account for the highest percentage of CO (53%) emissions. Onroad and nonroad sources each account for 18% of total VOC emissions. Onroad sources account for 29% and nonroad sources account for 19% of total NO_x emissions.

Table 2a shows total annual emissions by state/tribe and pollutant for all four sectors combined. Tables 2b through 2e show total annual emissions by state/tribe and pollutant for area, point, nonroad, and onroad sources, respectively. Tables A-1 through A-6 in Appendix A provide summaries of annual emissions by source category and sector for VOC, NO_x, CO, SO_2, PM10-PRI and PM25-PRI, and NH_3, respectively. The emissions in each table are sorted in descending order with the highest emitting categories listed at the top of the table. The tables also show annual emissions as a percentage of total emissions from all sectors, and the cumulative percentage contribution. Chapter III of this report identifies additional summaries of emissions, including county-level summaries that contain the data source codes that identify the origin and year of emissions data.

In addition to the CAPs and NH_3, emissions for carbon dioxide (CO_2), methane (CH_4), elemental carbon (EC), organic carbon (OC), total primary and filterable particulate matter (PM-PRI/-FIL), filterable PM-10 (PM10-FIL), and filterable $PM_{2.5}$ (PM25-FIL) were carried in the mass emissions inventory files. However, these pollutants are not included in the summaries since the emissions for these pollutants were not consistently reported by all S/L/T agencies for a given sector. In addition, AR included wind-blown fugitive dust emissions in its area source inventory, and some but not all S/L/T agencies included NH_3 emissions associated with natural sources (e.g., domestic and wild animals) in their area source inventories. These emissions were kept in the area miscellaneous sources inventory, and are included in the sector-level summaries (as geogenic and natural/biogenic sources) described in Chapter III of this report.

C. Organization of the Report

In Chapter II of this report, section A provides an introduction to the chapter and sections B through D present the data sources and methods applied to prepare the mass emissions inventory and SMOKE input files for point, area, and nonroad sources within the CENRAP region.

Section E explains the data sources and methods applied to prepare 2002 Continuous Emissions Monitoring (CEM) data for the entire CENRAP modeling domain in the SMOKE and the RPO data exchange protocol formats. Section F explains the data sources and methods for developing temporal, speciation, and spatial allocation profiles for the point, area, and nonroad source categories included in the CENRAP region inventories. Section G provides documentation of the SMOKE and RPO data exchange protocol files prepared under this project.

Chapter III and Appendix A provide summaries of the 2002 emissions inventories for point, area, nonroad, and onroad sources within the CENRAP region. Chapter IV identifies the inventory and supporting data files compiled for areas outside of the CENRAP region, and Chapter V provides the references for this report.

Table 1. Summary of Annual Emissions for the CENRAP Region by Sector and Pollutant

Sector	VOC		NO_x		CO		SO_2		PM10-PRI		PM25-PRI		NH_3	
	Tons/Year	Percent of Total	Tons/Year	Percent of Total	Tons/Year	Percent of Total	Tons/Year	Percent of Total	Tons/Year	Percent of Total	Tons/Year	Percent of Total	Tons/Year	Percent of Total
Point	618,130	14	1,835,970	36	1,891,315	8	2,198,712	87	396,154	5	248,416	13	197,771	12
Area	2,167,263	50	850,491	16	3,778,511	17	218,259	9	6,923,304	93	1,486,600	81	1,468,741	86
Nonroad	806,173	18	982,061	19	4,933,745	22	65,812	3	90,721	1	83,964	5	1,335	0
Onroad	792,310	18	1,483,668	29	11,834,984	53	44,678	2	33,066	0	23,529	1	47,869	3
Totals	**4,383,876**	**100**	**5,152,190**	**100**	**22,438,555**	**100**	**2,527,461**	**100**	**7,443,244**	**100**	**1,842,509**	**100**	**1,715,717**	**100**
Dominant Sector[1]	**Area**		**Point**		**Onroad**		**Point**		**Area**		**Area**		**Area**	

[1] Identifies the sector accounting for the majority of the emissions for each pollutant.

Table 2a. Summary of All Sector Source Emissions by State and Pollutant

State FIPS/ Tribal Code	State/Tribal Name	VOC		NO_x		CO		SO_2		PM10-PRI		PM25-PRI		NH_3	
		Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total
05	Arkansas	342,534	7.8	285,782	5.6	1,630,938	7.3	127,291	5.0	328,922	4.4	134,913	7.3	138,272	8.1
19	Iowa	283,064	6.5	325,187	6.3	1,579,578	7.0	166,914	6.6	517,816	7.0	122,174	6.6	253,441	14.8
20	Kansas	264,217	6.0	376,362	7.3	2,191,899	9.8	161,064	6.4	783,946	10.5	227,427	12.3	183,539	10.7
22	Louisiana	387,577	8.8	680,322	13.2	2,263,916	10.1	388,280	15.4	332,720	4.5	157,447	8.6	88,930	5.2
27	Minnesota	540,978	12.3	463,302	9.0	2,800,101	12.5	153,978	6.1	833,308	11.2	202,666	11.0	183,354	10.7
29	Missouri	381,944	8.7	476,260	9.2	2,614,860	11.7	419,985	16.6	1,000,506	13.4	207,942	11.3	157,100	9.2
31	Nebraska	145,701	3.3	250,823	4.9	905,317	4.0	90,954	3.6	469,741	6.3	96,356	5.2	169,847	9.9
40	Oklahoma	386,157	8.8	445,487	8.7	2,118,993	9.4	167,292	6.6	740,852	10.0	174,007	9.4	133,245	7.8
48	Texas	1,651,699	37.7	1,848,165	35.9	6,332,252	28.2	851,703	33.7	2,423,179	32.6	517,686	28.1	407,989	23.8
405	Fond du Lac Tribe	3	0.0	501	0.0	700	0.0	0	0.0	12,254	0.2	1,892	0.1	0	0.0
	Totals	4,383,876	100	5,152,190	100	22,438,555	100	2,527,461	100	7,443,244	100	1,842,509	100	1,715,717	100

Table 2b. Summary of Area Source Emissions by State and Pollutant

State FIPS/ Tribal Code	State/Tribal Name	VOC		NO_x		CO		SO_2		PM10-PRI		PM25-PRI		NH_3	
		Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total
05	Arkansas	92,676	4.3	27,552	3.2	379,881	10.1	27,236	12.5	273,217	4.0	91,735	6.2	130,773	8.9
19	Iowa	111,851	5.2	6,920	0.8	102,183	2.7	3,290	1.5	477,093	6.9	97,987	6.6	247,156	16.8
20	Kansas	143,905	6.6	43,114	5.1	875,433	23.2	14,084	6.5	728,377	10.5	194,959	13.1	116,884	8.0
22	Louisiana	124,311	5.7	99,060	11.7	530,135	14.0	83,253	38.1	245,162	3.5	84,068	5.7	75,382	5.1
27	Minnesota	176,118	8.1	56,740	6.7	146,623	3.9	14,783	6.8	749,605	10.8	146,883	9.9	148,588	10.1
29	Missouri	133,818	6.2	34,749	4.1	269,007	7.1	48,317	22.1	962,807	13.9	182,266	12.3	120,341	8.2
31	Nebraska	69,986	3.2	15,023	1.8	81,169	2.2	7,748	3.6	447,703	6.5	83,852	5.6	137,406	9.4
40	Oklahoma	212,669	9.8	115,788	13.6	465,631	12.3	11,779	5.4	714,805	10.3	157,444	10.6	104,587	7.1
48	Texas	1,101,929	50.8	451,545	53.1	927,878	24.6	7,769	3.6	2,312,288	33.4	445,522	30.0	387,626	26.4
405	Fond du Lac Tribe	0	0.0	0	0.0	571	0.02	0	0.0	12,246	0.18	1,883	0.13	0	0.0
	Totals	2,167,263	100	850,491	100	3,778,511	100	218,259	100	6,923,304	100	1,486,600	100	1,468,741	100

Table 2c. Summary of Point Source Emissions by State and Pollutant

State FIPS/ Tribal Code	State/Tribal Name	VOC		NO_x		CO		SO_2		PM10-PRI		PM25-PRI		NH_3	
		Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total
05	Arkansas	158,982	25.7	75,925	4.1	360,537	19.1	93,210	4.2	46,882	11.8	35,484	14.3	5,166	2.6
19	Iowa	39,156	6.3	122,124	6.7	51,236	2.7	156,706	7.1	28,788	7.3	13,650	5.5	3,366	1.7
20	Kansas	27,458	4.4	165,284	9.0	83,307	4.4	140,371	6.4	47,081	11.9	25,073	10.1	63,914	32.3
22	Louisiana	89,025	14.4	312,634	17.0	285,395	15.1	286,050	13.0	73,333	18.5	60,899	24.5	9,237	4.7
27	Minnesota	70,415	11.4	159,324	8.7	361,952	19.1	132,773	6.0	64,645	16.3	38,954	15.7	29,726	15.0
29	Missouri	36,109	5.8	181,675	9.9	136,914	7.2	361,548	16.4	20,949	5.3	11,079	4.5	31,120	15.7
31	Nebraska	7,274	1.2	58,619	3.2	11,008	0.6	73,487	3.3	13,105	3.3	4,638	1.9	30,731	15.5
40	Oklahoma	36,987	6.0	158,972	8.7	78,430	4.2	148,852	6.8	18,009	4.6	9,776	3.9	24,256	12.3
48	Texas	152,720	24.7	600,912	32.7	522,407	27.6	805,714	36.6	83,354	21.0	48,855	19.7	255	0.1
405	Fond du Lac Tribe	3	0.00	501	0.03	129	0.01	0	0.00	8	0.00	8	0.00	0	0
	Totals	618,130	100	1,835,970	100	1,891,315	100	2,198,712	100	396,154	100	248,416	100	197,771	100

Table 2d. Summary of Nonroad Source Emissions by State and Pollutant

State FIPS/ Tribal Code	State/Tribal Name	VOC		NO_x		CO		SO_2		PM10-PRI		PM25-PRI		NH_3	
		Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total
05	Arkansas	51,339	6.4	64,336	6.6	285,282	5.8	3,299	5.0	5,850	6.5	5,382	6.4	49	3.7
19	Iowa	61,562	7.6	97,835	10.0	421,453	8.5	3,921	6.0	10,056	11.1	9,225	11.0	57	4.3
20	Kansas	28,009	3.5	85,234	8.7	273,433	5.5	3,913	6.0	6,770	7.5	6,196	7.4	115	8.6
22	Louisiana	109,598	13.6	117,250	11.9	549,031	11.1	14,324	21.8	10,663	11.8	9,791	11.7	563	42.2
27	Minnesota	213,527	26.5	108,293	11.0	963,290	19.5	3,834	5.8	15,946	17.6	14,657	17.5	87	6.5
29	Missouri	130,522	16.2	102,312	10.4	781,749	15.8	5,214	7.9	13,162	14.5	12,076	14.4	74	5.5
31	Nebraska	27,540	3.4	121,496	12.4	213,112	4.3	7,900	12.0	7,721	8.5	6,997	8.3	59	4.4
40	Oklahoma	49,763	6.2	51,410	5.2	331,901	6.7	2,407	3.7	5,405	6.0	4,946	5.9	280	21.0
48	Texas	134,314	16.7	233,896	23.8	1,114,495	22.6	20,999	31.9	15,149	16.7	14,695	17.5	52	3.9
405	Fond du Lac Tribe	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0
	Totals	806,173	100	982,061	100	4,933,745	100	65,812	100	90,721	100	83,964	100	1,335	100

Table 2e. Summary of Onroad Source Emissions by State and Pollutant

State FIPS/ Tribal Code	State/Tribal Name	VOC		NO_x		CO		SO_2		PM10-PRI		PM25-PRI		NH_3	
		Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total	Tons/ Year	Percent of Total
05	Arkansas	39,537	5.0	117,969	8.0	605,238	5.1	3,545	7.9	2,973	9.0	2,311	9.8	2,284	4.8
19	Iowa	70,494	8.9	98,308	6.6	1,004,707	8.5	2,997	6.7	1,879	5.7	1,312	5.6	2,863	6.0
20	Kansas	64,846	8.2	82,730	5.6	959,725	8.1	2,695	6.0	1,718	5.2	1,200	5.1	2,626	5.5
22	Louisiana	64,643	8.2	151,378	10.2	899,355	7.6	4,653	10.4	3,563	10.8	2,689	11.4	3,748	7.8
27	Minnesota	80,918	10.2	138,946	9.4	1,328,236	11.2	2,588	5.8	3,111	9.4	2,172	9.2	4,953	10.4
29	Missouri	81,495	10.3	157,523	10.6	1,427,190	12.1	4,907	11.0	3,589	10.9	2,521	10.7	5,565	11.6
31	Nebraska	40,902	5.2	55,685	3.8	600,028	5.1	1,818	4.1	1,212	3.7	869	3.7	1,651	3.5
40	Oklahoma	86,738	11.0	119,317	8.0	1,243,031	10.5	4,253	9.5	2,633	8.0	1,840	7.8	4,122	8.6
48	Texas	262,737	33.2	561,811	37.9	3,767,472	31.8	17,222	38.6	12,388	37.5	8,615	36.6	20,057	41.9
405	Fond du Lac Tribe	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0
	Totals	792,310	100	1,483,668	100	11,834,984	100	44,678	100	33,066	100	23,529	100	47,869	100

II. CRITERIA AIR POLLUTANT AND NH_3 INVENTORIES FOR THE CENRAP REGION

A. Introduction

The inventory data were taken from the following sources in priority order:

a. The inventories that S/L/T agencies submitted to EPA from May through July 2004;
b. Supplemental data supplied by the S/L/T agencies (e.g., data that have been finalized or revised after an agency submitted its inventory to EPA);
c. Inventories developed by CENRAP; and
d. The 2002 preliminary NEI.

Table 3 provides a summary of the S/L/T point, area, and nonroad source inventories that the S/L/T agencies submitted to EPA. The EPA performed some limited QA review of the S/L/T inventories to identify format, referential integrity, and duplicate record issues. The EPA revised the inventories to address these issues and made the files available to the S/L/T agencies on August 6, 2004. These inventory files were used as the starting point for the CENRAP inventory. Pechan then performed QA review of the inventories to identify (1) remaining QA issues that needed to be resolved through consultation with the EI Workgroup, and (2) missing data that needed to be added to the inventories to support air quality modeling studies.

Table 3. Summary of 2002 Inventories that S/L/T Agencies Submitted to EPA [1]

State/Local/Tribal Agency	Point	Area	Commercial Marine Vessels	Railroad Locomotives	Aircraft
AR	x	x	x	x	x
IA	x	x[3]			
KS	x[2]	x[3]		x[3]	
LA	x	x[3]		x[3]	
MN	x[2]	x		x	x[4]
Fond du Lac Band of the Minnesota Chippewa Tribe	x	x			
MO	x[2]	x[3]		x[3]	
NE-State	x	x			
NE-Lincoln (Lancaster County)	x	x			
NE-Omaha (Douglas County)	x				
OK	x	x			
TX	x	x	x	x	x

[1] An “x” identifies the sector for which a S/L/T agency submitted a CAP inventory to EPA.
[2] State submitted separate inventories for the criteria air pollutants and NH_3.
[3] State submitted only an NH_3 inventory.
[4] State included its inventory for commercial and military aircraft and auxiliary power units in its point source inventory.

After resolving the QA issues, the files were updated to revise or add data provided by the S/L/T agencies. Inventories developed by CENRAP were added to the inventories as directed by the S/L/T agencies. Then, the inventories were compared to the 2002 preliminary NEI to identify

categories that existed in the NEI but not the S/L/T inventories. The NEI data were added to the S/L/T inventories as directed by the EI Workgroup.

The following sections B, C, and D provide the methods for preparing the consolidated emissions inventories for point, area, and nonroad sources, respectively. Each section discusses the QA review that was conducted on the S/L/T inventories to identify QA issues that were corrected to support air quality modeling. Then, each section discusses the augmentation procedures that were applied to fill in missing data. These procedures identify supplemental data that S/L/T agencies provided to add to or replace data in their inventories, the CENRAP-sponsored inventories that were added to the inventories as approved by the S/L/T agencies, and the 2002 NEI categories that S/L/T agencies requested to be added to their inventories. The augmentation procedures also explain how missing PM emissions were estimated and added to the inventories after incorporating inventory data supplied by S/L/T agencies, the CENRAP-sponsored inventory data, and data from the 2002 NEI.

For point sources that are subject to CEM requirements, section E discusses the data sources and procedures for preparing the 2002 CEM data and temporal profiles to support air quality modeling. For point, area, and the non-NONROAD model source categories, Section F discusses the data sources and procedures for preparing temporal, speciation, and spatial allocation profiles needed to support air quality modeling. Section G discusses the formats in which the final emissions, temporal, speciation, and allocation data were prepared.

B. Point Source Inventory Methods

1. Data Sources

For each S/L/T inventory submitted to EPA, Table 4 provides a summary of the pollutants included in each inventory, and compares the number of counties in the inventory to the number of counties in the 2002 preliminary NEI and in each S/L/T agency. The table also compares the number of facilities in the S/L/T inventory to the number of facilities in the 2002 preliminary NEI.

The inventories obtained from EPA are in Access 2000 databases in NIF 3.0. Each inventory was loaded into an Oracle database in NIF 3.0 to combine the inventories into a single data set. Then, after loading the inventories into Oracle in NIF 3.0, the following updates were performed on the consolidated data set, if necessary:

Table 4. Summary of Pollutants, Number of Counties, and Number of Facilities in Point Source Inventories

State/Local/ Tribal Agency	CO	NH_3	NO_x	PM-PRI	PM10-PRI	PM25-PRI	PM10-FIL	PM25-FIL	PM-CON	SO_2	VOC	Number of Counties in 2002 S/L/T Inventory	Number of Counties in 2002 Preliminary NEI	Number of Counties in State	Number of Facilities in 2002 S/L/T Inventory	Number of Facilities in 2002 Preliminary NEI
AR	x	x	x							x	x	57	60	75	227	324
IA	x	x	x	x	x	x				x	x	74	26	99	270	67
KS[1]	x	x	x		x	x	x	x		x	x	97	96	105	708	705
		x										104	16	105	3,319	20
LA	x	x	x				x	x		x	x	59	60	64	906	1,033
MN[1]	x	x	x		x	x		x		x	x	87	82	87	2,628	836
		x										77	13	87	542	14
Fond du Lac Band of the Minnesota Chippewa Tribe	x		x	x	x					x	x	NA[2]	NA	NA	5	NA
MO[1,3]	x	x	x		x					x	x	109	103	115	1,646	720
		x										105	16	115	1,181	20
NE-State	x		x			x				x	x	27	72	93	36	634
NE-Lincoln (Lancaster County)	x		x		x					x	x	1	1	93	17	100
NE-Omaha (Douglas County)	x	x	x	x	x	x				x	x	1	1	93	68	87
OK	x	x	x	x	x	x				x	x	66	69	77	397	1,046
TX	x		x		x	x				x	x	201	203	254	1,914	3,268

[1]State submitted separate inventories for the criteria pollutants and NH_3. The NH_3 inventory was prepared under a CENRAP-sponsored project. The number of counties and facilities in the 2002 preliminary NEI are for facilities with annual NH_3 emissions. Note that the number of counties and facilities with annual NH_3 emissions in KS and MO in the 2002 preliminary NEI are the same.

[2] NA = Not Applicable.

[3] The data for MO are from its original inventory submittal to EPA.

- Hazardous air pollutant (HAP) records were removed since the inventory will support regional haze, fine PM, and ozone modeling.

- Pollutant codes were corrected to make them NIF 3.0 compliant (e.g., update PMPRI pollutant code to PM-PRI). Additionally, other codes were identified for remediation on a case-by-case basis.

- Records with a submittal flag indicating deletions (submittal_flag = 'D' or 'RD') were removed from the inventory.

- Null values in the tribal code field were updated to '000' since this field is a part of the data key that defines records as unique in all eight NIF tables.

- The following NIF plus fields were added to the Transmittal (TR), Site (SI), Emission Unit (EU), Emission Release Point (ER), Emission Process (EP), Emission Period (PE), Emission (EM), and Control Equipment (CE) tables:

  - Data Source Codes:

Code	**Description**
S	State agency-supplied data.
L	Local agency-supplied data.
R	Tribal agency-supplied data.
P	Regional Planning Organization.
SC	S/L/T agency Corrected.
AUG-A	PM Augmentation: ad-hoc change.
AUG-C	PM Augmentation: standard augmentation method.
AUG-O	PM Augmentation: set PMxx-FIL = PMxx-PRI where for SCCs starting with 10 (external fuel combustion) and 20 (internal fuel combustion). Note: emission factors and particle-size data for estimating condensible emissions for fuel combustion SCCs starting with 30 were not available; therefore, condensible emissions were not estimated for these processes if an agency provided filterable and not primary emissions for these processes.
AUG-Z	PM Augmentation: automated fill-in of zero values where all PM for a particular process is zero.
GENPARENT	Data source where a parent record was system generated.

  - Revision Date: This field indicates the month and year during which the last revision was made to a record.

  - State Federal Information Processing Standard (FIPS): This field indicates the state FIPS code of the submittal.

  - County FIPS: This field indicates the county FIPS code of the submittal.

- The following NIF plus fields were added to the EM table:

    - Emission Ton Value: This field indicates the values of the emissions in tons. This field was used to prepare summaries of emissions on a consistent emission unit basis.

    - Emission Type Period: This field indicates the period of the Emission Type – either ANNUAL or NONANNUAL. This field was used to prepare summaries of annual emissions.

    - CAP_HAP: This field identifies records for CAP versus records for HAPs. For the CENRAP inventory, the flag is CAP for all records.

    - Year: This field indicates the year of the data; for this inventory, it is 2002.

2. QA Review

QA review on the inventories was conducted in accordance with the QA procedures specified in the QAPP for this project (CENRAP, 2004b). The following discusses the QA diagnoses that were run on the consolidated point source inventory data set. The QA issues identified were communicated to the S/L/T agencies through a set of QA Summary Reports in Excel Workbook files. The agencies provided corrections to the data in the Excel files and the inventory was updated with the corrections.

a. County and Facility Coverage

S/L/T agencies for which the number of counties in their point source inventory submittal to EPA declined relative to the number of counties in the NEI include AR (-3 counties), LA (-1 parish), OK (-3 counties), TX (-2 counties), and NE (-45 counties) (see Table 2). NE moved its small point sources from its area source inventory to its point source inventory; therefore, this increased the county coverage in its point source inventory. States for which the number of counties in their point source inventory submittal to EPA increased relative to the number of counties in the NEI included IA (+48 counties), MO (+6 counties), MN (+5 counties), and KS (+1 county). The NEI did not contain any tribal data for the CENRAP region.

As shown in Table 4, the number of facilities included in the inventories for AR, LA, NE, NE – Omaha, NE – Lincoln, OK, and TX is lower than the number of facilities included in the 2002 preliminary NEI. An electronic match was conducted on the state and county FIPS and facility identification (ID) code between the two inventories to identify facilities and their emissions in the 2002 preliminary NEI but not in the S/L/T agency inventories. However, due to changes that S/L/T agencies made to facility ID codes in their inventories, the electronic matching did not work well as this procedure identified facilities that are in both inventories but with different facility ID codes. The results of this comparison were provided to the agencies for review and all of the agencies confirmed that there were no missing facilities in the point source inventories they submitted to EPA.

b. Pollutant Coverage

As shown in Table 4, all of the S/L/T inventories contain emissions for CO, NO_x, SO_2, and VOC. The inventories for TX; NE state; Lancaster County, NE; and the Fond du Lac Band of the Minnesota Chippewa Tribe did not include NH_3 emissions. KS, MN, and MO submitted NH_3 inventories prepared under a CENRAP-sponsored project. These NH_3 inventories were merged with the CAP inventories for these three states. Pechan worked with these three agencies to resolve facility matching and duplicate records that occurred in the Transmittal (TR), Site (SI), Emission Release Point (ER), Emission Unit (EU), and EP tables.

Except for AR, all S/L/T agencies included one or more forms of PM, PM_{10}, and/or $PM_{2.5}$ in their inventories. AR subsequently provided a new inventory that included PM_{10} and $PM_{2.5}$ emissions data. The modeling inventory needs to include a complete set of PM10-PRI and PM25-PRI pollutants for all sources of PM_{10} and $PM_{2.5}$. Therefore, based on the data the S/L/T agencies included in their inventories, procedures were developed and applied to fill in missing pollutant data needed to prepare a complete PM10-PRI and PM25-PRI inventory. The QA review of the PM data is discussed further in the following section, and the augmentation procedure is discussed in section II.B.4.

c. Particulate Matter (PM) Emissions Consistency and Completeness Review

The following consistency checks were performed at the EM table data key level (for annual emissions) to compare PM emissions:

- If a process was associated with a PM emission record, but was missing one or more of the following (as appropriate for the Source Classification Code [SCC] [i.e., condensible PM (PM-CON) is associated with fuel combustion only]): PM10-FIL, PM10-PRI, PM25-FIL, PM25-PRI, or PM-CON, the record was flagged for review.

- The following equations were used to determine consistency:

  PM10-FIL + PM-CON = PM10-PRI
  PM25-FIL + PM-CON = PM25-PRI
  PM-FIL + PM-CON = PM-PRI (as appropriate)

- The following comparisons were applied to determine consistency:

  PM10-PRI >= PM10-FIL
  PM25-PRI >= PM25-FIL
  PM10-PRI >= PM-CON
  PM25-PRI >= PM-CON
  PM10-FIL >= PM25-FIL
  PM10-PRI >= PM25-PRI
  PM-PRI >= PM10-PRI (as appropriate)
  PM-PRI >= PM25-PRI (as appropriate)

PM-FIL >= PM10-FIL (as appropriate)
PM-FIL >= PM25-FIL (as appropriate)

If the data failed one of these checks it was diagnosed as an error. If a S/L/T agency did not provide corrections to these errors, the errors were corrected/filled in according to the augmentation procedure discussed in section II.B.4.

d. Emission Release Point (ERP) Coordinate Review

Location coordinates for point sources were evaluated using geographic information system (GIS) mapping to determine if the coordinates were within 0.5-kilometers of the boundary of the county in which the source was located. If not, the S/L/T agency was asked to review the coordinates and provide corrections to either the coordinates or the state and county FIPS codes. The 0.5-kilometer test resulted in a large number of ERPs for review by the agencies. Therefore, to assist S/L/T agencies in prioritizing their review of coordinates, ERP records with coordinates located more than 0.5, 1, 2, 3, 5, 7, and 10 or more kilometers from their county boundary, and coordinates that mapped outside of their state boundary were identified. Annual emissions summed to the ERP level were included in the QA Summary Report to identify records with zero emissions for all pollutants and to identify the highest emitting stacks.

e. ERP Parameter Review

The EPA's QA guidance for diagnosing ERP issues for the point source NEI (EPA, 2004b) was applied to identify QA issues in the S/L/T point source inventories. The QA guidance involved diagnosing the correct assignment of the ERP type (i.e., stack or fugitive), parameters with zero values, parameters not within the range of values specified in the EPA's QA procedures, and consistency checks (i.e., comparing calculated values against expected values). In many cases errors were due to defaulted zeros, and submitting agencies were requested to provide the value. In other cases, out-of-range errors were caused by unit conversion issues (e.g., stack parameters were in ft, ft/sec, cu ft/sec or degrees Fahrenheit). The agencies were asked to provide corrections or additions to ERP parameters, or note in the QA Summary Report that records flagged with potential QA issues were corrected. If an agency did not provide corrections for out-of-range or missing values, the data were corrected or filled in according to the ERP augmentation procedure discussed in section II.B.4.

f. Control Device Type and Control Efficiency Data Review

The CE codes in the "Primary Device Type Code" and "Secondary Device Type Code" fields were reviewed to identify invalid codes (i.e., codes that did not exist in the NIF 3.0 reference table) and missing codes (e.g., records with a null or uncontrolled code of 000 but with control efficiency data).

QA review of control efficiency data involved diagnosis of two types of errors. First, records were reviewed to identify control efficiency values that were reported as a decimal rather than as a percent value. Records with control efficiencies with decimal values were flagged as a

potential error (although not necessarily an error, since the real control efficiency may be less than 1 percent).

The second check identified records where 100% control was reported in the CE table, but the emissions in the EM table were greater than zero and the rule effectiveness value in the EM table was null, zero, or 100% (implying 100 percent control of emissions). Because many agencies did not populate the rule effectiveness field or a default value of zero was assigned, records with null or zero rule effectiveness values were included where the CE was 100% and emissions were greater than zero. For records that met these criteria, the records were reviewed by the S/L/T agency to provide corrections, if necessary.

g. Start and End Date Checks

QA review was conducted to identify start date and end date values in the PE and EM tables to confirm consistency with the inventory year in the transmittal table, and to confirm that the end date reported is greater than the start date reported.

h. Annual and Daily Emissions Comparison

The following QA checks were conducted to identify potential errors associated with the incorrect reporting of daily and/or annual emissions:

- Any "DAILY" type record that is greater than its associated "ANNUAL". Only TX and MO sent DAILY records. While TX did have DAILY records greater than annual (due to the TX original database rounding of TON vs. LB records). For the CENRAP point source inventory it was determined that the most efficient approach was to use only the ANNUAL records.

3. Responses from S/L/T Agencies

The point source inventories were revised to incorporate the corrections that the S/L/T agencies provided in response to the QA issues identified in their inventories. Where responses from the S/L/T agencies were not provided, standard procedures were used to default or augment the data. Section II.4 describes in more detail the gap filling and augmentation procedures. Additionally, included with this report is a set of S/L/T-specific files indicating responses to specific QA issues and defaults that were implemented with remaining QA issues. An example of a default implemented would be the correction of TONS to TON in a unit field. Each S/L/T set of files is accompanied by a Read_me.txt file that describes the files in further detail. The files included with each S/L/T documentation set (if the QA issue existed) are the following (based on the QA Issues discussed above):

- PM Augmentation QA Summary
- PM Augmentation Preliminary Review
- Stack Parameter QA Summary
- Stack Coordinates QA Summary
- Stack Parameter and Coordinate Augmentation

- SCC QA Summary
- Control Device/Efficiency Summary

In addition, the listing of state QA files also includes the output of the EPA QA checker as run on the final CENRAP inventory, and the PM ratio factor table (as described in section II.B.4.b) as developed for the CENRAP SCC and control devices.

4. Gap Filling and Augmentation

The following discusses the augmentation procedures that were used to fill in missing data that were not supplied by the S/L/T agencies.

a. CENRAP Sponsored Inventories

The CENRAP inventory includes data generated from CENRAP sponsored source type oriented inventories. The following inventories (and the relevant S/L/T agencies) were included with the CENRAP inventory:

- CENRAP NH_3 Inventory (IA, KS, MO, MN, NE, OK)
- MN Fires Inventory (MN)
- CENRAP Prescribed Burning Inventory (all states)
- CENRAP Concentrated Animal Feeding Operations (CAFO) Dust Inventory (all states)

b. PM Augmentation

The PM augmentations process gap-fills missing PM pollutant complements. For example, if a S/L/T agency provided only PM10-PRI pollutants the PM augmentation process filled in the PM25-PRI pollutants. The steps in the PM augmentation process were as follows:

- Initial QA and remediation of S/L/T provided PM pollutants;
- Development of PM factor ratios based on factors from FIRE (Factor Information REtrieval) version 6.2 and the PM Calculator (EPA, 2003; EPA, 2004c);
- Implementation of the ratios developed in step 2.; and
- Presentation of PM augmentation results to S/L/T agencies for review and comment

Note: There are two Access databases that accompany this documentation. The first database is the *Reference Tables for PM Augmentation*. This database contains the SCC Control Device Ratio table, the Emission Factors table and Emission Factors Crosstab table discussed in Step 2. The PM Calculator ratio table can be provided upon request – it contains all possible combinations for SCC and Control Device types that are available in the PM Calculator.

An additional database (*PM Augmentation Draft*) that contains the PM crosstab table with the preliminary PM Augmentation results and a QA table (which may be empty) was provided. This database will be discussed in Step 3 and Step 4.

These steps are further detailed below.

1. Initial QA and Remediation of PM Pollutants

S/L/T agencies were initially presented with files that detailed potential inconsistencies and missing information in their PM pollutant inventory. Inconsistencies in PM pollutants include the following:

- PM-PRI less than PM10-PRI, PM25-PRI, PM10-FIL, PM25-FIL, or PM-CON
- PM-FIL less than PM10-FIL, PM25-FIL
- PM10-PRI less than PM25-PRI, PM10-FIL, PM25-FIL or PM-CON
- PM10-FIL less than PM25-FIL
- PM25-PRI less than PM25-FIL or PM-CON
- The sum of PM10-FIL and PM-CON not equal to PM10-PRI
- The sum of PM25-FIL and PM-CON not equal to PM25-PRI

Potential missing information was summarized in a table which detailed the variety of cases provided by the S/L/T agency. For example, a S/L/T agency might have provided PM10-FIL and PM25-FIL for some processes, but for other processes only PM10-FIL was provided.

S/L/T agencies were asked to review this information and provide corrections where possible. In general, corrections (or general directions) were provided in the case of the potential inconsistency issues. An example of a general direction provided by a S/L/T agency was to remove PM25-FIL where greater than PM10-FIL because the PM10-FIL was (in their particular case) known to be more reliable. In other cases, the agency-provided specific process level pollutant corrections. In general, if specific direction was not provided by the agency, priority was given to the PM_{10} number.

2. Development of PM Factor Ratio

The primary deliverable of this step of the process was the development of a table keyed by SCC, primary control device, and secondary control device. This table is called the SCC Control Device Ratios table. The table structure follows the discussion below.

This table was filled according to the following steps:

- Ratios (both condensible and noncondensible) were added from FIRE for SCCs starting with 10* (external fuel combustion) and 20* (internal fuel combustion) where there was a direct match between the provided SCC, and primary and secondary control devices.
- Ratios (non-condensable) were added from the PM Calculator for SCCs starting with 10* and 20* where there was not a direct match between the provided SCC, and primary and secondary control devices. Condensible ratios were added from the PM Calculator based on the uncontrolled SCC for these SCCs. In some cases, it was necessary to map the SCC and control devices to the PM calculator to find a match

for the noncondensible ratios. In some cases, it was necessary to map the SCC to FIRE to find a match for condensible ratios.

Table 5. Description of the Field Names and Descriptions for the SCC Ratio Table

Field Name	Field Description
PM Calculator	A “Yes” in this field indicates that at least some of the information was retrieved from the PM Calculator
FIRE	A “Yes” in this field indicates that at least some of the information was retrieved from the Emission Factors table. A “Condensible Ratios” in this field indicates that the condensible ratios factors were retrieved from this table.
Other	A field to indicate other sources as necessary.
SCC	Source category code from the S/L/T agency-provided data.
SCC_DESC	Description of source category code from the S/L/T agency-provided data.
maptoSCC	This field equals SCC unless the SCC provided was not found in the appropriate source table. In that case, the SCC was mapped using the closest available appropriate mapping choice.
maptoSCC_DESC	Description of the maptoSCC.
mapSCCNote	Any notes related to the mapping of the SCC. A “Yes” in this field indicates that the SCC was mapped.
PD	Primary device type from the S/L/T agency provided data.
PD_DESC	Description of the primary device (PD).
maptoPD	This field equals PD unless the PD provided was not found in the appropriate source table. In that case, the PD was mapped using the closest available appropriate mapping choice.
maptoPD_DESC	Description of the maptoPD.
mapPDNote	Any notes related to the mapping of the PD. A “Yes” in this field indicates that the PD was mapped.
SD	Secondary device type from the S/L/T agency provided data.
SD_DESC	Description of the secondary device (SD).
maptoSD	This field equals SD unless the SD provided was not found in the appropriate source table. In that case, the SD was mapped using the closest available appropriate mapping choice.
maptoSD_DESC	Description of the maptoSD.
mapSDNote	Any notes related to the mapping of the SD. A “Yes” in this field indicates that the SD was mapped.
PM-FIL/PM10-FIL	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM-FIL/PM25-FIL	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM-FIL/PM-PRI	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM-PRI/PM10-PRI	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM-PRI/PM25-PRI	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM10-FIL/PM25-FIL	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM10-PRI/PM25-PRI	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM-CON/PM10-FIL	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
PM-CON/PM10-PRI	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
PM-CON/PM25-FIL	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
PM-CON/PM25-PRI	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
PM-CON/PM-FIL	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
PM-CON/PM-PRI	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
RPO Specific Note	Indicates SCC and control device combinations are in the RPO inventory.
Additional Notes	Any notes regarding assumptions about ratios.

- For natural gas, process gas and liquefied petroleum gas SCCs starting with 10* and 20*, it was assumed (based on FIRE emission factors trend) that the PM-PRI/PM10-PRI/PM25-PRI ratio was equal to 1. It was also assumed that the PM-FIL/PM10-FIL /PM25- FIL was equal to 1. Condensible ratios were calculated from uncontrolled FIRE emission factors based for these SCCs. In some cases it was necessary to map the SCC to FIRE to find a match for condensible ratios.
- Ratios for SCCs not like 10* and 20* were obtained from the PM Calculator. It was assumed that the condensible component was zero.

Accompanying this document is a database containing the SCC Control Device Ratios table. Additionally, the Emission Factors and Emission Factors Crosstab table (which are derived from FIRE) are provided. The Emission Factors Crosstab table contains the ratios developed from the Emission Factors table. The Emission Factors table contains detailed information on the emission factors used to develop the ratios.

Note: Ratios from the PM calculator were developed using a standard input of 100 TONS of uncontrolled PM-FIL emissions.

3. Implementation of the QA Ratios

In order to calculate the additional PM pollutants based on the SCC Control Device ratio table developed in the above step, a crosstab table was created from the EM table based on the following fields:

- State FIPS
- County FIPS
- Tribal Code
- Emission Unit ID
- Process ID
- Start Date
- End Date
- Emission Type
- SCC
- Primary Device Type
- Secondary Device Type

The primary and secondary device type fields were added based on information from the CE table. If control equipment information was not available these fields were defaulted to 000 ("UNCONTROLLED"). In the few cases where there was a conflict between the control devices reported for the same process for PM pollutants (for example, a PM10-PRI is listed as controlled, but PM-PRI did not have control information), the control device type was selected based on the controlled pollutant.

In addition to the fields listed above, the crosstab included the PM emission amounts for the particular process and a field that indicated whether those emissions existed in the inventory. These fields are as follows:

- PM_PRI
- PM_FIL
- PM10_PRI
- PM10_FIL
- PM25_PRI
- PM25_FIL
- PM_CON
- PM_PRI_EXISTS
- PM_FIL_EXISTS
- PM10_PRI_EXISTS
- PM10_FIL_EXISTS
- PM25_PRI_EXISTS
- PM25_FIL_EXISTS
- PM_CON_EXISTS

The emission values are in the PM_PRI, PM_FIL, PM10_PRI, PM10_FIL, PM25_PRI, PM25_FIL, PM_CON fields. The _EXISTS field indicates whether the pollutant was provided by the S/L/T agency. A zero indicates that the pollutant was not provided; a number greater than zero (usually one) indicates that it was provided by the S/L/T agency.

Prior to the development of this crosstab, the EM table was filled in as much as possible using basic assumptions. For example, if the S/L/T agency provided emissions that were equal to zero for PMs for a particular process, it was assumed that all PMs for that process were zero and they were filled in accordingly. Since that assumption was that for non 10* and 20* SCCs, the condensible value was zero – that would lead to PM10-FIL = PM10-PRI and PM25-FIL = PM25-PRI and PM-FIL = PM-PRI. Given that assumption, values for these pollutants were also filled in. After this data insertion, a subset of the crosstab was created. This subset only contained processes that required additional augmentation. The SCC control device type ratio table described in step 2 was based on only those SCC and control device types that required augmentation.

The next step was to fill in the missing information in this crosstab using the information found in the SCC Control Device Ratio table.

In calculating PM complement pollutants, priority was given to calculating –PRI and –CON pollutants. FIL pollutants were only calculated if necessary to calculate other pollutants or if it was a by-product of this calculation.

In augmenting the PM pollutants the non 10* and 20* SCCs were augmented first, with order given to augmenting based on PM_{10} where available, PM_{25} where available, and then PM .

Augmenting the PM pollutants for the 10* and 20* SCCs is more complicated, but the basic approach was to augment based on PM_{10} (FIL or PRI) where available, $PM_{2.5}$ (FIL or PRI) where available, and then PM (FIL or PRI) if PM_{10} or $PM_{2.5}$ variations were not available. Where both PM_{10} (FIL or PRI) and $PM_{2.5}$ (FIL or PRI) variations were both available, the calculation for

PM-CON was generally driven from the PM_{10} number and the complements as necessary were back calculated. Where a –PRI emission factor ratio was required and was not available the –FIL emission factor ratio was used.

After calculations, the data was QA checked to ensure that the calculations resulted in consistent values for the PM complement. On a few occasions, the mix of ratio value and the pollutants and values provided by the S/L/T agency resulted in negative values when –FIL was back-calculated. In this case the negative –FIL value was set to zero and the –PRI value was readjusted.

The resultant PM table has the format described in Table 6.

4. Presentation of PM Augmentation for S/L/T Agencies to Review and Comment

The table described in Step 3 was provided for the S/L/T agency to review in the *PM Augmentation Draft*) . In addition to this table, if there were any remaining QA issues these were listed in the QA table in this database.

Note: There are some high condensible ratios that were calculated for some SCC device type combinations. In most cases these high condensible ratios were the result of the back calculation of PM-CON from PM10-PRI or PM25-PRI records. Since the state had already provided the PMxx-PRI records, these PM-CON values were not added to the inventory.

The data source code field was used to identify records that were added to the inventory to complete the set of PM10-PRI and PM25-PRI emissions.

c. ERP Coordinates

If a S/L/T agency did not provide corrections for ERP coordinates that map more than 5 kilometers outside of the county boundary, or provide coordinates for ERP records that did not have any coordinates in the S/L/T inventory, the following procedures were applied to replace the coordinates:

- Coordinates for other ERPs at the same facility, if available, that map within the county;
- Coordinates for the centroid of the zip code for a facility if a valid zip code is provided or can be obtained from the agency if it is not valid; or
- County centroid coordinates.

Table 6. Description of the Field Names and Descriptions for the Resulting PM Augmentation Table

Field Name	Field Description
Augment	A "Yes" in this field indicates that the process PM was augmented.
Condensible Note	If condensible information was added this field will note that.
STATE_FIPS	State FIPS
COUNTY_FIPS	County FIPS
STATE_FACILITY_IDENTIFIER	Site ID
EMISSION_UNIT_ID	Emission Unit
PROCESS_ID	Process
START_DATE	Start Date
END_DATE	End Date
EMISSION_TYPE	Emission type
SCC	Source Category Code
SCC_DESC	SCC description
PRIMARY_DEVICE_TYPE	Primary Device Type
PRIMARY_DEVICE_TYPE_DESC	PDT description
SECONDARY_DEVICE_TYPE	Secondary Device Type
SECONDARY_DEVICE_TYPE_DESC	SDT description
EMISSION_TYPE_PERIOD	Emission Type Period
EMISSION_RELEASE_POINT_ID	Emission Release Point ID
FACILITY_NAME	Facility Name
ORIS_FACILITY_CODE	ORIS facility Code
SIC_PRIMARY	SIC
ACTUAL_THROUGHPUT	Actual Throughput
THROUGHPUT_UNIT_NUMERATOR	Throughput Unit Numerator
PM_PRI	Emission ton value for PM-PRI
PM_FIL	Emission ton value for PM-FIL
PM10_PRI	Emission ton value for PM10-PRI
PM25_PRI	Emission ton value for PM25-PRI
PM10_FIL	Emission ton value for PM10-FIL
PM25_FIL	Emission ton value for PM25-FIL
PM_CON	Emission ton value for PM-CON
PM_PRI_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM_FIL_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM10_PRI_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM25_PRI_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM10_FIL_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM25_FIL_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM_CON_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
RECORD_COUNT	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
System Update Note	This field contains system codes related to the update queries used to calculate the record.

The zip code was taken from the SI NIF 3.0 table. The zip code was compared to a reference table of valid zip codes to verify that it is an active zip code and exists in the state and county reported in the inventory. If a valid zip code for a facility was not identified, the centroid for the facility's county was used as a last resort. In some cases, the S/L/T agency provided confirmation that the S/L/T coordinates were correct even if the analysis indicated that the coordinates were outside of the county boundary (generally in the case of offshore facilities). These coordinates were not changed. Additionally, all coordinates were converted to latitude/longitude measurements.

d. ERP Parameters

If valid ERP parameters were not provided by the S/L/T agency, Pechan applied the ERP augmentation procedures for the 2002 point source NEI (EPA, 2004b). It has been determined that the augmentation procedures in this document regarding SCC-specific ERP types and temperatures may be difficult to resolve. When this situation occurred, preference was given to the S/L/T agency-supplied ERP type and SCC. For example, the procedures did not account for cases where an emission unit had two processes with one defined as a stack source and the other as a fugitive source. Therefore, the S/L/T-supplied ERP type was used when this situation occurred. If the ERP type was null, and information was not available from the S/L/T agency, the stack height information was used as a guide. If stack height information was available, the ERP was treated as a stack, or, if stack height information was not available, the ERP type was treated as a fugitive. Additionally, there were occasional typographical errors resolved where the ERP type digits were transposed '20' instead of '02'; these were resolved. An additional modification to the augmentation procedure was also implemented. Since, in many cases, null values were filled in with zeros by S/L/T agency databases when comparing out-of-range velocities and flows (after it was determined that the stack and diameter information was correct) – null and zero values were treated in the same manner to prevent inappropriate replacement of stack parameter values. Additionally, stack parameter values were rounded to 1 decimal place when compared to range values (just for the purposes of comparison) to prevent replacement of S/L/T parameter values based on negligible decimal differences.

e. Control Device Type and Control Efficiency Data

Control efficiency values of 100% and rule effectiveness values of 100% with non-zero emissions were diagnosed as potential errors and sent to the S/L/T agencies. Where possible the data were updated with S/L/T corrections. Decimal control efficiencies were also diagnosed and sent to the S/L/T agencies. A decimal control efficiency value usually indicated that the control efficiency was not entered as a percentage value as is required by NIF 3.0. Where possible the data were updated with S/L/T corrections (See Section II.B.2 above).

f. SCC Data

S/L/T agencies were provided with lists of invalid or inactive SCCs. Where the S/L/T agencies were able to provide valid SCC information this was updated with S/L/T agency information. Where S/L/T agencies were unable to provide valid SCC information, the proposed mapping information provided was used to update the S/L/T agency information.

In some cases, the SCC issues were not forthcoming until further into the processing than the initial QA stages. This occurred in cases of late data submissions, and the generation of parent EP records for EM records. In this case, SCCs were replace with the following approach:

- Where the SCC was invalid and mapping was available the SCC was changed to the mapping SCC;
- Where the mapping SCC was not available a more generic code was selected;
- Where the SCC was truncated a generic code was selected;

- Where the SCC was still unavailable the NEI 1999 Version 3 was used as a source;
- Where still unavailable – the most generic of the existing SCCs for the emission unit was used; or
- Where still unavailable – the most generic of the existing SCCs for the facility was used.

This second approach affected 529 records.

g. SIC Data

There were some overall changes made to SIC data – for SICs that had been provided as 0200 these were changed to 02 which is considered a valid SIC by the EPA QA program. Also, in order to provide a better basis for the stack augmentation procedure, missing SIC codes were filled in using the lowest numerical value based on the NAICS to SIC code crosswalk.

5. Revisions to Address Comments

The following items were revised per state instruction during S/L/T agency review of the draft point source inventory:

a. Missouri

Missouri supplied new stack parameter information. Their stack parameters were updated and the stack augmentation procedure was reapplied. The Access database "Missouri_Stack_Updates_200501.mdb" contains the changes.

b. Nebraska-Omaha

NH_3 emissions were revised from 584.78 tons per year to 1.57 tons per year for Nebraska-Omaha facility 0002 - the Omaha Public Power District - North Omaha Power Station.

c. Minnesota

Per Minnesota's request, SCC 30302301 (- crushing) was changed to SCC 30302312 (-pellet induration) for the following facility, emission unit, and processes:

Facility Name: Ispat Inland Mining Company
State Facility ID: 2713700062
Emission Unit ID: EU026
Process IDs: 001, 004, 007, and 010

d. Texas and Missouri Daily Emissions

State daily emissions data for Texas and Missouri are included in the SMOKE input files for the CENRAP inventory. For the NIF 3.0 files, the daily emissions are provided in a file called "CENRAP_Point_Daily_Missouri_Texas_20050216.mdb." A daily emissions record **was**

included in the file only if it had an associated annual emissions record. In addition to the Daily EM and PE records, a table called "Daily Values GT Accompanying Annual Values" was included in the database that lists records with a daily emission value that is greater than the annual emission value. In the overwhelming majority of cases this situation occurred when the daily emission value was very small and recorded in pounds and the annual value was zero and recorded in tons. In many cases, in the originating emission inventory application, emission values are rounded. Therefore, the annual ton value was rounded to zero.

6. QA Review of Final Inventory

Final QA checks were run on the revised point source inventory data set to ensure that all corrections provided by the S/L/T agencies were incorporated into the S/L/T inventories and that there were no remaining QA issues that could be addressed during the duration of the project. After exporting the inventory in Oracle to an Access database in NIF 3.0, the EPA QA program was run on the Access database and the QA output was reviewed to verify that all QA issues that could be addressed were resolved (EPA, 2004a)

This file accompanies this documentation with the specific details included. The following summarizes the remaining QA issues that could not be addressed during the duration of this project (listed by table):

CE

Primary device type codes were not provided by all of the modeled inventories, specifically CAFOs and prescribed burning; it should be determined if there is an appropriate generic primary device type to be used or whether the CE records should be removed.

In the MN prescribed burning inventory, a NIF 3.0 formatting error resulting in a shift of the data which place the submittal flag of A in the third primary device column (as well as other shifts). This has no effect on the data performance, but it is noted as a potential cleanup issue.

EM

The EPA QA checker indicated that some emissions were outside the normal expected range. While this is a guideline and not a specific fault, this listing could be reviewed for specifically high values.

CH_4, EC, and OC were flagged as errors since these values are not in the EPA pollutant code table.

PE

There are a few records with the units M2 and MASS that were not in the EPA QA checker table. It could be determined if these values should be added, or whether there are appropriate substitutes.

There are a few remaining records with operating times outside the EPA QA Checker ranges.

<u>EP</u>

There are a few remaining records with operating parameters and seasonal sums outside the normal expected range.

The SCC 30202000 has not yet been added to the EPA QA Checker SCC database.

<u>ER</u>

A significant number of records are missing the supplementary coordinate reference information (Horizontal data measure, horizontal data accuracy, horizontal collection method code).

A number of records indicate coordinates outside of county boundaries – the reasons why this may occur were explained in the coordinate augmentation section earlier in this document.

A number of records also indicate stack parameters outside of ranges expected by the EPA QA checker. This is due either to the S/L/T agency specifically requesting not to change the values or to default values in the EPA table which fall outside of the EPA QA Checker ranges.

<u>EU</u>

SIC code 3041 is not in the SIC codes table.

<u>SI</u>

The modeled inventories (particularly the NH_3 and CAFO inventories) did not provide zip code information with the site data. This accounts for a tremendous number of the invalid zip code errors found when running the EPA QA checker. There are other records with zip code errors in addition to these; however, these inventories are the source of the majority of these errors.

NAICs codes are missing on some records.

<u>TR</u>

REPORT_CERTIFIER should be corrected to REPORT CERTIFIER.

Some records are missing the transaction creation date information.

C. Area Source Inventory Methods

1. Data Sources

For each S/L/T inventory submitted to EPA, Table 7 provides a summary of the number of counties and the pollutants included in each S/L/T inventory. For comparison purposes, the table shows the number of counties in each area source inventory included in the 2002 preliminary NEI and the number of counties in each state.

The states of IA and LA did not submit an area source inventory for the CAPs. For the state of NE, the data shown in Table 7 are from its area source inventory submittal to EPA. However, NE's area source inventory contained emissions for small point sources and NE subsequently moved the small point sources to the its point source inventory. IA, LA, NE, and OK requested that the 2002 preliminary NEI be used for their area source inventory for the CAPs except for categories (i.e., prescribed burning, agricultural burning, and agricultural dust) for which they requested that the CENRAP-sponsored inventory be used instead of the NEI. The NH_3 inventories that IA and LA submitted to EPA were maintained in the CENRAP inventory. In addition, Omaha did not submit an area source inventory; therefore, the 2002 preliminary NEI was used as the area source data for the CENRAP inventory for Omaha. OK's original inventory submittal to EPA was a copy of the 2002 preliminary NEI, but the emission values were rounded to two decimal places. OK's inventory was updated with the unrounded emission values in the 2002 preliminary NEI (February 2004 version).

The area source inventories obtained from EPA were loaded into Oracle in NIF 3.0 into one data set. Then, the following updates were performed on the consolidated data set, if necessary:

- HAP records were removed since the inventory will support regional haze, fine PM, and ozone modeling.

- Pollutant codes were corrected to make them NIF 3.0 compliant (e.g., update PMPRI pollutant code to PM-PRI). Additionally, other codes were identified for remediation on a case-by-case basis.

- Records with a submittal flag indicating deletions (submittal_flag = 'D' or 'RD') were removed from the inventories.

- Null values in the tribal code field were updated to '000' since this field is a part of the data key that defines records as unique in all five NIF tables.

Table 7. Summary of Pollutants and Number of Counties Included in Area Source Inventories

State/Local/Tribal Agency	CO	NH_3	NO_x	PM-PRI	PM10-PRI	PM25-PRI	PM10-FIL	PM25-FIL	PM-CON	SO_2	VOC	Number of Counties in 2002 S/L/T Inventory	Number of Counties in 2002 Preliminary NEI	Number of Counties in State
AR	x	x	x		x	x				x	x	75	75	75
IA		x										99	99	99
KS	x	x	x		x	x				x	x	105	105	105
LA		x										64	64	64
MN	x	x	x		x					x	x	87	87	87
Fond du Lac Band of the Minnesota Chippewa Tribe	x		x	x	x					x	x	NA[1]	NA	NA
MO	x	x	x		x	x				x	x	115	115	115
NE-State	x	x	x		x		x			x	x	79	93	93
NE-Lincoln (Lancaster County)	x	x	x		x	x				x	x	1	1	93
NE-Omaha (Douglas County)[2]												1	1	93
OK	x	x	x		x	x	x	x	x	x	x	77	77	77
TX	x	x	x		x	x	x	x	x	x	x	254	254	254

[1] NA = Not Applicable.

[2] Omaha's area source inventory is included in the state of NE's inventory submittal. Omaha did not submit its own area source inventory to EPA.

The following NIF plus fields were added to the EP, PE, EM, and CE tables:

- Data Source Codes:

For the area and nonroad inventory data, the data source codes were based on the following 9-character format:

[Data Origin]-[Year]-[Grown/Not Grown/Carried Forward]-[PM Augmentation Code]

Code	**Field Length**
Data Origin	1
Year	3 (including leading hyphen)
Grown/Not Grown/Carried Forward	2 (including leading hyphen)
PM Augmentation	3 (including leading hyphen)

Data Origin Codes

Code	**Description**
S	State agency-supplied data
L	Local agency-supplied data
R	Tribal agency-supplied data
P	Regional Planning Organization-generated data
E	EPA/Emission Factor and Inventory Group (EFIG)-generated data

Year Codes

Year for which data were supplied (e.g., Year = -02 for 2002), or from which prior year data were taken (e.g., Year = -99 for 1999; -01=2001).

Grown/Carried Forward/Not Grown Codes

Code	**Description**
-G	Used when emissions in a pre-2002 inventory were grown to represent 2002 emissions.
-F	Used when emissions in a pre-2002 inventory were carried forward and included in the 2002 inventory without adjustment for growth.
-X	Used when the emissions were not grown or were not carried forward. For example, X was used when emissions were calculated for the 2002 inventory using 2002 activity, or when data were replaced with 2002 S/L/T data.

PM Augmentation Codes

-PA	PM Augmented Emissions: Record for PM_{10}/$PM_{2.5}$ emissions that were updated or added using ad-hoc updates.

-PC PM Augmented Emissions: Record added for PM_{10}/$PM_{2.5}$ emissions estimated using the PM Calculator.

-PR PM Augmented Emissions: Record added for PM_{10}/$PM_{2.5}$ emissions estimated using ratios of PM_{10}-to-PM or $PM_{2.5}$-to-PM_{10}. If PM_{10} and $PM_{2.5}$ emissions were equal and one of the pollutants was assigned this code, the ratio was assumed to be 1.

2 QA Review

QA review was conducted on the S/L/T area source inventories in accordance with the QA procedures specified in the QAPP for this project (CENRAP, 2004b). The following discusses the QA checks that were completed during preparation of the consolidated data set.

a. County and SCC Coverage

The county coverage in the state inventories appeared to be reasonable for all states. The SCC coverage was difficult to evaluate simply by showing a count of the number of SCCs by state. Each S/L/T inventory was compared to the preliminary 2002 NEI, and area source categories in the NEI but not in a S/L/T inventory was sent to each agency for review. Each S/L/T agency then selected the NEI categories that were then added to the CENRAP inventory.

b. Pollutant Coverage

The pollutant coverage in the S/L/T inventories was complete for all pollutants except for PM_{10} and $PM_{2.5}$. Diagnosis and resolution of PM_{10} and $PM_{2.5}$ pollutant emissions is discussed later in section II.C.4.

c. EPA QA Summaries Sent to S/L/T Agencies

Under a separate project with EPA, Pechan performed QA review of the S/L/T area source inventories. This QA review involved running EPA's QA program on each data set to identify and resolve QA issues. Using the results of this QA work, Pechan prepared two sets of QA summaries that EPA sent to the S/L/T agencies. Pechan contacted each S/L/T agency with QA issues. The following explains these two summaries:

<u>High-level Summary of S/L/T Inventories Submitted to EPA</u>:

The first summary was an Excel workbook file with four spreadsheets that provided the following information:

- 2002 Nonpoint File Names: This spreadsheet documented names and formats of the files that EPA received from the S/L/T agencies and the dates on which they were transferred to Pechan.

- 2002 Nonpoint Summary: This spreadsheet documented the jurisdiction of the submitting agency (i.e., S/L/T agency), type of inventory (i.e., criteria, HAP, or

both), a comparison of the number of the counties in the inventory to the total number of counties in the state to identify the geographic coverage of the inventory, a unique list of CAP codes, and the total number of area source SCCs. This spreadsheet also indicated if any nonroad or onroad emissions data were moved from the agency's area source inventory to its nonroad or onroad inventory).

- 2002 Nonpoint Emission Sums: This spreadsheet summarized emissions by start date, end date, and emission type and assigned the appropriate code to the emission type period NIF plus field.

- 2002 Nonpoint Error Summary: This spreadsheet provided a copy of the "SummaryStats" table from the EPA QA program (EPA, 2004a). This table provided the count of records for each NIF 3.0 table and identified the number of records with errors by type of error.

Detailed Summary of QA Issues:

This summary (sent to S/L/T agencies on August 11) was prepared in a text file that listed by state and NIF table the number of records with errors, and provided corrections for the errors. To support documentation of corrections to some of the errors in the text file, Pechan prepared an Excel workbook file that summarized the following errors and corrections by state: invalid pollutants codes; invalid units; invalid maximum achievable control technology (MACT) codes; and invalid and inactive SCCs. A spreadsheet was also included to show the mapping of Standard Industrial Classification (SIC) codes to North American Industrial Classification System (NAICS) codes. This crosswalk was used to correct invalid NAICS codes if a valid SIC code was available in the S/L/T inventories and vice versa.

d. Additional QA for the CENRAP Area Source Inventory

The following explains additional QA and data tracking that was performed for the CENRAP inventory. The following data elements were reviewed to identify QA issues:

- Range Errors;
- PM Emissions Consistency and Completeness;
- Control Device Codes and Control Efficiency Values;
- Start and End Dates;
- Annual and Daily Emissions Comparison; and
- Comparison of S/L/T Inventories to the 2002 Preliminary NEI.

For each S/L/T inventory for which QA issues were identified, a separate QA Summary Report was prepared in an Excel Workbook file, and sent to each S/L/T agency for review. The S/L/T agencies provided directions in the Excel Workbook file, via e-mail, or by submitting revised records in NIF 3.0 in an Access database to correct the inventories. The QA reports are discussed under section II.C.3.

Range Errors

The EPA's QA program contains routines that compare annual emission values, numeric fields in the PE and EP tables, and other temporal numeric fields against a range of values. The QA program flags records that are less than or greater than the range of values for review. Pechan summarized the range errors for the S/L/T agencies to review and provide corrections. According to EPA, the ranges to which values in inventories are compared represent "normal" ranges that are based on percentiles from previous inventories. The range values are conservative in that EPA wants to identify suspicious values even though the values may be real (Thompson, 2002).

PM Emissions Consistency and Completeness Review

The following consistency checks were performed at the EM table data key level (for annual emissions) to compare PM emissions:

- If an SCC was associated with a PM emission record, but was missing one or more of the following (as appropriate for the SCC [i.e., PM-CON is associated with fuel combustion only]): PM10-FIL, PM10-PRI, PM25-FIL, PM25-PRI, or PM-CON, the record was flagged for review.

- The following equations were used to determine consistency:

  PM10-FIL + PM-CON = PM10-PRI
  PM25-FIL + PM-CON = PM25-PRI

- The following comparisons were made to determine consistency:

  PM10-PRI >= PM10-FIL
  PM25-PRI >= PM25-FIL
  PM10-PRI >= PM-CON
  PM25-PRI >= PM-CON
  PM10-FIL >= PM25-FIL
  PM10-PRI >= PM25-PRI

If the data failed one of these checks it was diagnosed as an error. If a S/L/T agency did not provide corrections to these errors, the errors were corrected/filled in according to an augmentation procedure explained in section II.C.4.

For information purposes, all PM-PRI and PM-FIL records were flagged to indicate that these pollutants were included instead of, or in addition to, the standard PM_{10}, $PM_{2.5}$, and PM-CON pollutants.

Control Device Type and Control Efficiency Data Review

The control equipment codes in the “Primary Device Type Code” and “Secondary Device Type Code” fields were reviewed to identify invalid codes (i.e., codes that did not exist in the NIF 3.0 reference table) and missing codes (e.g., records with a null or uncontrolled code of 000 but with control efficiency data).

QA review of control efficiency data involved diagnosis of two types of errors. First, records were reviewed to identify control efficiency values that were reported as a decimal rather than as a percent value. Records with control efficiencies with decimal values were flagged as a potential error (although not necessarily an error, since the real control efficiency may be less than 1 percent). Records with a 1% control efficiency value were also identified for review by the S/L/T agency to determine if the value was reported as a decimal in its internal data system but rounded to 1% when the data were converted to NIF 3.0.

The second check identified records where 100% control was reported in the CE table, but the emissions in the EM table were greater than zero and the rule effectiveness value in the EM table was null, zero, or 100% (implying 100 percent control of emissions). Because many agencies did not populate the rule effectiveness field or a default value of zero was assigned, records with null or zero rule effectiveness values were included where the CE was 100% and emissions were greater than zero. For records that met these criteria, Pechan consulted with the S/L/T agency to determine if corrections were needed to any of the fields.

Start and End Date Checks

QA review was conducted to identify start and end date values in the PE and EM tables to confirm consistency with the inventory year in the transmittal table, and to confirm that the end date reported was greater than the start date reported.

Annual and Daily Emissions Comparison

The S/L/T inventories were reviewed to determine if any of the following conditions existed:

- Multiple records coded at the SCC level as emission type 30, but with different start and end dates. While not a true duplicate, this may indicate an error or inclusion of both annual and seasonal values.

- Multiple records coded at the SCC level as a daily emission type (27, 29, etc.) but with different start and end dates. While not a true duplicate, this may indicate an error or just inclusion of additional types of daily emissions.

- Multiple records coded at the SCC level with the same start and end date, but different emission types. While not a true duplicate, this may indicate an error or just inclusion of additional types of daily emissions.

- Any “DAILY” type record that was missing its associated “ANNUAL” record was flagged for review.

- Any “DAILY” type record that was greater than its associated “ANNUAL” record was flagged for review.

3. Responses from State, Local, and Tribal (S/L/T) Agencies

QA Summary Reports were sent to the S/L/T agencies to review the QA issues identified. The S/L/T agencies were asked to return these reports to CENRAP with their corrections documented in the reports. These reports were then used to document revisions to the S/L/T inventories. The QA Summary Reports containing the revisions provided by the S/L/T agencies are provided in Excel Workbook files with this report. The names of the files are provided in Table 8. Note that a QA Summary Report was not prepared for NE and OK since the area source inventory for these two states is a copy of the 2002 NEI. OK provided an inventory for SCC 2310000000 (Industrial Processes / Oil and Gas Production: SIC 13 / All Processes / Total: All Processes) for VOC, NO_x, and CO that was incorporated into the CENRAP inventory.

Table 8. QA Summary Reports for S/L/T Area Source Inventories

S/L/T Agency	Excel Workbook File Name of QA Summary Report
AR	AR_NP_QA_Report_092404.xls
Fond du Lac Band of the Minnesota Chippewa Tribe	Fonddulac_NP_QA_Report_083004.xls
IA	IA_NP_QA_Report_090204.xls
KS	KS_NP_QA_Report_090104.xls
LA	LA_NP_QA_Report_090304.xls
MN	MN_NP_QA_Report_092304.xls
MO	MO_NP_QA_Report_091704.xls
NE - Lancaster County (Lincoln)	NE_Lancaster_NP_QA_Report_082704-approved.xls
TX	TX_NP_QA_Report_090904_v3.xls

The first spreadsheet in each QA Summary Report defines the remaining spreadsheets in the Excel Workbook file and provides instructions for communicating revisions. Table 9 provides a list of the QA summaries (note that a spreadsheet was not included in an agencies report if there were no QA issues).

Table 9. Summary of Spreadsheets Provided in QA Summary Reports for Area Source Inventories

Name of Spreadsheet	Content/Instructions
Summary Stats	This spreadsheet is a copy of the “SummaryStats” table generated by the EPA’s QA program. This shows the results of running the QA program on the August 6 version of the area source inventory files EPA provided to the S/L/T agencies after correcting referential integrity and duplicate record issues.
Lookup Errors	This spreadsheet provides a unique list of NIF 3.0 reference table “Lookup Errors” identified by the EPA’s QA program. The S/L/T agency should provide corrections to the lookup errors or indicate in the “Approved” column in this spreadsheet if it accepts the correction provided in the “Correction” Column.
Range Errors	This spreadsheet details the range errors identified by the EPA’s QA program.
Emission Type Period	This spreadsheet identifies EM table records as containing annual, seasonal, or daily emissions in the NIF plus field named “Emission Type Period.” This NIF plus field, once populated, will be used to prepare emissions summaries on a consistent temporal basis.
PMx Issues1	This spreadsheet documents the results of QA review conducted on PM10 and PM2.5 emissions as required by the Quality Assurance Project Plan (QAPP) and Draft Methods Document for this project.
PMx Issues2	This spreadsheet provides additional details regarding PM10 and PM2.5 QA issues referred to in the “PMx Issues1” spreadsheet.
NEI Categories not in State EI	The spreadsheet provides a unique list of the SCCs in the preliminary 2002 NEI that did not appear in the agency’s inventory submittal to EPA. The spreadsheet shows the number of counties in which the SCC appears in the NEI, and provides the NEI annual emissions in tons. See the “State to NEI Comparison” spreadsheet for detailed comparison at state level to help identify the NEI categories to add or exclude from your inventory in this “NEI Categories not in State EI” spreadsheet. This spreadsheet does not include: 1. SCCs in the NEI that electronically match on the state and county FIPS and SCC in the agency’s inventory; and 2. SCCs in the NEI that are different than the agency’s SCC but for the same category. For example, if an agency uses a general SCC for a category and the NEI uses SCCs that provide more detail, the SCCs in the NEI are not included in this spreadsheet. The agency should review the spreadsheet to make sure that all double counting of emissions between the agency’s inventory and the NEI has been eliminated.
State to NEI Comparison (provides additional data to supplement the data in the “NEI Categories not in State EI” spreadsheet)	This spreadsheet compares the SCCs in the S/L/T inventory to the SCCs in the 2002 preliminary NEI at the state-level. The number of counties that appear for each SCC in your state is also provided. This spreadsheet should be used to help make decisions on the NEI categories you want added and excluded from the list provided in the “NEI Categories not in State EI” spreadsheet.

4. Gap Filling and Augmentation

The following discusses the augmentation procedures that were applied to the S/L/T inventories to improve the inventories or to fill in missing data not supplied by the S/L/T agencies.

a. CENRAP-Sponsored Inventories

CENRAP sponsored inventory development for source categories of NH_3 and planned burning (i.e., prescribed burning, rangeland burning, and agricultural field burning) and agricultural dust area source categories. For each of these categories, each S/L/T agency was requested to complete a table to indicate if it (1) included the CENRAP-sponsored inventory in the inventory it submitted to EPA; (2) included its own estimates for a category in the inventory it submitted to EPA; or (3) if it did not include a category in its inventory, if the CENRAP-sponsored inventory or the 2002 preliminary NEI should be used as the source of data for the category. The results of this request are summarized in Table 10.

Table 10. Summary of CENRAP-Sponsored Inventories Included in the Area Source Consolidated Emissions Inventory

Area Source Category	SCCs	CENRAP Inventory Included in S/LT Inventory Submitted to EPA	S/L/T Inventory Used Instead of CENRAP Inventory			CENRAP Inventory Added to S/L/T Inventory	Preliminary NEI Used Instead of CENRAP Inventory
		Monthly	**Annual**	**Summer Day**	**Winter Day**	**Annual**	**Annual**
Planned Burning Inventories (pollutants included in S/L/T inventories are listed at the bottom of this table)[1]							
Prescribed Burning for Forest Management	2810015000		AR; TX; Lancaster County, NE; Tribal	AR, TX	AR, TX	IA, KS, LA, MN, MO, NE (state), OK	
Prescribed Burning of Rangeland	2810020000		TX; Lancaster County, NE	TX		IA, KS, LA, MN, MO, NE (state), OK	
Agricultural Field Burning	28015001xx; 28015002xx		AR; TX; Lancaster County, NE	TX		IA, KS, LA, MN, MO, NE (state), OK	
Fugitive Dust Inventories For PM10-PRI and PM25-PRI							
Agricultural Crop Tilling, Harvesting, and Other Activities	2801000003		AR	AR	AR	IA, KS, LA, MN, MO, NE (state), OK, TX	
NH_3 Inventories[2]							
Animal Husbandry (Livestock)	28050xxxxx	IA, KS, LA, MO	AR, TX	TX	TX	MN; NE (state); Lancaster County, NE; OK	
Agriculture Fertilizer Application	28017000xx	IA, KS, LA, MO	AR, TX			MN; NE (state); Lancaster County, NE; OK	
Food and Kindred Products - Refrigeration	2302080002	IA, KS, LA, MO	AR			MN, NE (state), OK	
Municipal Landfills	2620030000	IA					
Public Owned Treatment Works	2630020000	KS, MO	TX	TX		MN; NE (state); Lancaster County, NE; OK	IA, LA
Other Combustion - Forest Wildfires	2810001000	MO	KS, TX	KS, TX		MN	IA; LA; NE (state); Lancaster County, NE; OK

Table 10 (continued)

Area Source Category	SCCs	CENRAP Inventory Included in S/LT Inventory Submitted to EPA	S/L/T Inventory Used Instead of CENRAP Inventory			CENRAP Inventory Added to S/L/T Inventory	Preliminary NEI Used Instead of CENRAP Inventory
		Monthly	Annual	Summer Day	Winter Day	Annual	Annual
Other Combustion - Human Perspiration and Respiration	2810010000	IA, KS, LA, MO	AR, TX	AR, TX	AR	MN; NE (state); Lancaster County, NE; OK	
Domestic Animals Waste	280601xxxx	IA, KS, LA, MO	TX	TX		MN; NE (state); Lancaster County, NE; OK	
Wild Animals Waste	28070xxxxx	IA, KS, LA, MO	TX	TX		MN; NE (state); Lancaster County, NE; OK	
Natural Sources/Biogenic (Vegetation/Forests /Land Use)	2701xxxxxx	IA, KS, LA	TX	TX		NE (state), OK	
Light Duty Gasoline Vehicles	2201001000	IA, KS, LA					
Light Duty Diesel Vehicles	2230001000	IA, KS, LA					

[1] The following identifies the pollutants included in the planned burning inventories by S/L/T agency:

Prescribed Burning for Forest Management
AR: CO, NO_x, VOC, PM10-PRI, PM25-PRI
Fond du Lac Band of the MN Chippewa Tribe: CO, PM-PRI, PM10-PRI, PM25-PRI
IA, KS, LA, MN, MO, OK; NE (state); Lancaster County, NE: CO, NO_x, NH_3, SO_2, VOC, PM10-PRI, PM25-PRI
TX: CO, NO_x, NH_3, SO_2, VOC, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL

Prescribed Burning of Rangeland
IA: CO, NO_x, SO_2, VOC, PM10-PRI, PM25-PRI
KS; LA; MN; MO; OK; NE (state); Lancaster County, NE: CO, NO_x, NH_3, SO_2, VOC, PM10-PRI, PM25-PRI
Lancaster County, NE: CO, NO_x, PM10-PRI, PM25-PRI
TX: CO, NO_x, NH_3, VOC, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL

Agricultural Field Burning
AR: CO, VOC, PM10-PRI, PM25-PRI
IA, KS, LA, MN, MO, OK; NE (state); Lancaster County, NE: CO, NO_x, NH_3, SO_2, VOC, PM10-PRI, PM25-PRI
TX: CO, NO_x, NH_3, VOC, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL

[2] The CENRAP-sponsored NH_3 inventories were prepared for monthly emissions. The monthly emissions were summed to calculate annual emissions. The annual emission records were added to the area source inventory to support preparation of emission summaries.

b. PM Augmentation

Procedures were developed to estimate missing pollutant data from data provided by the S/L/T agencies in order to develop a complete set of PM10-PRI and PM25-PRI emissions to support air quality modeling. The following discusses the procedures for fossil fuel combustion and residential wood combustion sources first followed by the procedures for all other area sources of PM emissions.

Fossil Fuel Combustion Sources

Fossil fuel combustion sources include industrial, commercial/institutional, and residential anthracite coal, bituminous/subbituminous coal, distillate oil and kerosene, residual oil, natural gas, and liquefied petroleum gas (LPG). All of these sources emit both filterable and condensible emissions. The QA review of the PM emissions data for these sources focused on verifying that the emissions reported in the S/L/T inventories included both filterable and condensible emissions. The emissions for these pollutants can be reported individually (i.e., as filterable and condensible separately) or as primary emissions (i.e., the sum of the filterable and condensible emissions). The QA review also focused on evaluating the emission factors reported in the S/L/T inventories to determine if they were reasonable.

To support the QA review effort, the uncontrolled PM emission factors shown in Table 11 were compiled from AP-42. The emission factors reported in the S/L/T inventories were compared to the emission factors in this table. Emission factors that appeared too high or too low were flagged for review by the S/L/T agency. In addition, inventory data were flagged for review by the S/L/T agency if the emissions were reported under the primary PM pollutant codes but the emission factors matched with the emission factors for filterable PM in Table 11. Finally, if emission factors were not reported in the S/L/T agency inventory, the emission factors were back-calculated using the throughput data (if available), emissions, rule effectiveness values, and control efficiency data (if available). The back-calculated emission factors were compared to the factors in Table 11 to identify data with major difference between the factors. It is emphasized that the uncontrolled emission factors in Table 11 were used as a reference for reviewing S/L/T inventory data. The emission factors in this table should not be construed to be the best available for all S/L/T agencies since the emission factors will vary depending on the composition of the boiler population in an agency’s area source inventory.

The states of IA, KS, LA, NE, and OK used the fossil fuel combustion inventory in the preliminary 2002 NEI for the CENRAP inventory. Revisions to the NEI for residential LPG and kerosene were completed after the preliminary 2002 NEI was released in February 2004; the revised inventories for these two categories were included in the CENRAP inventory for IA, KS, LA, NE, and OK.

AR, MN, and TX provided their own inventory for all fossil fuel combustion categories. AR’s inventory reported filterable emissions under the primary pollutant code, but AR corrected its inventory and provided updates to the CENRAP inventory.

Table 11. Area Source Industrial, Commercial/Institutional, and Residential Fossil Fuel Combustion Uncontrolled Emission Factors for PM10-PRI/FIL, PM25-PRI/FIL, and PM-CON

Pollutant[1]	Uncontrolled Emission Factor (EF)	EF Numerator	EF Denominator	Calculated Uncontrolled EF	Reference
Industrial Boilers: Anthracite Coal (SCC 2102001000)					
PM10-FIL	2.3	LB	TON	30.77	AP-42 Table 1.2-4 EF calculated from formula of 2.3 * % Ash Content (13.38%). Reference for ash content is EPA, 2002.
PM25-FIL	0.6	LB	TON	8.03	AP-42 Table 1.2-4 EF calculated from formula of 0.6 * % Ash Content (13.38%) (used Commercial/Institutional emission factors). Reference for ash content is EPA, 2002.
PM-CON	0.08	LB	TON	1.07	AP-42 Table 1.2-3 Used formula for SCC 10300101, EF calculated from formula of .08 * % Ash Content (13.38%). Reference for ash content is EPA, 2002.
PM10-PRI		LB	TON	31.84	
PM25-PRI		LB	TON	9.10	
Industrial Boilers: Bituminous/Subbituminous Coal (SCC 2102002000)					
PM10-FIL	13.2	LB	TON	13.2	AP-42 Table 1.1-9 EF (used Commercial/Institutional emission factors)
PM25-FIL	4.6	LB	TON	4.6	AP-42 Table 1.1-9 EF (used Commercial/Institutional emission factors)
PM-CON	1.04	LB	TON	1.04	AP-42 Table 1.1-5 (used Commercial/Institutional emission factors)
PM10-PRI		LB	TON	14.24	
PM25-PRI		LB	TON	5.64	
Industrial Boilers and IC Engines: Distillate Oil (SCC 2102004000)					
PM10-FIL	1	LB	E3GAL	1	AP-42 Table 1.3-6
PM25-FIL	0.25	LB	E3GAL	0.25	AP-42 Table 1.3-6
PM-CON	1.3	LB	E3GAL	1.3	AP-42 Table 1.3-2
PM10-PRI		LB	E3GAL	2.30	
PM25-PRI		LB	E3GAL	1.55	
Industrial Boilers: Residual Oil (SCC 2102005000)					
PM10-FIL	7.17	LB	E3GAL	10.683	AP-42 Table 1.3-5. EF calculated from formula of 7.17(A); where A=1.12(S)+0.37; Assumed S=1% for purpose of calculating EF ratios.
PM25-FIL	4.67	LB	E3GAL	6.958	AP-42 Table 1.3-5. EF calculated from formula of 7.17(A); where A=1.12(S)+0.37; Assumed S=1% for purpose of calculating EF ratios.
PM-CON	1.5	LB	E3GAL	1.5	AP-42 Table 1.3-2
PM10-PRI		LB	E3GAL	12.18	
PM25-PRI		LB	E3GAL	8.46	
Industrial Boilers and IC Engines: Natural Gas (SCC 2102006000)					
PM10-FIL	1.9	LB	E6FT3	1.9	AP-42 Table 1.4-2
PM25-FIL	1.9	LB	E6FT3	1.9	AP-42 Table 1.4-2
PM-CON	5.7	LB	E6FT3	5.7	AP-42 Table 1.4-2
PM10-PRI	7.6	LB	E6FT3	7.60	
PM25-PRI	7.6	LB	E6FT3	7.60	

Table 11 (continued)

Pollutant[1]	Uncontrolled Emission Factor (EF)	EF Numerator	EF Denominator	Calculated Uncontrolled EF	Reference
Industrial Boilers - Liquified Petroleum Gas (SCC 2102007000)					
PM10-FIL	0.6	LB	E3GAL	0.6	AP-42 Table 1.5-1
PM25-FIL	0.6	LB	E3GAL	0.6	AP-42 Table 1.5-1
PM-CON	0.506	LB	E3GAL	0.506	Used natural gas PM-CON emission factor of 5.7 lb/Million Cubic Feet (for all PM controls and uncontrolled). Used factor of 0.0887 to convert emission factor from lb/Million Cubic Feet of natural gas to lb/1,000 gallons of propane. Reference: AP-42, Table 1.4-2. Conversion factor assumes 1020 Btu/scf for natural gas (AP-42, Table 1.4-2) and 90,500 Btu/gallon for propane (AP-42, Appendix A, page A-5).
PM10-PRI		LB	E3GAL	1.11	
PM25-PRI		LB	E3GAL	1.11	
Industrial Boilers: Kerosene (SCC 2102011000)					
PM10-FIL	1	LB	E3GAL	1	AP-42 Table 1.3-6
PM25-FIL	0.25	LB	E3GAL	0.25	AP-42 Table 1.3-6
PM-CON	1.3	LB	E3GAL	1.3	AP-42 Table 1.3-6
PM10-PRI		LB	E3GAL	2.30	
PM25-PRI		LB	E3GAL	1.55	
Commercial/Institutional Heating: Anthracite Coal (SCC 2103001000)					
PM10-FIL	2.3	LB	TON	30.77	AP-42 Table 1.2-4 EF calculated from formula of 2.3 * % Ash Content (13.38%). Reference for ash content is EPA, 2002.
PM25-FIL	0.6	LB	TON	8.03	AP-42 Table 1.2-4 EF calculated from formula of 0.6 * % Ash Content (13.38%). Reference for ash content is EPA, 2002.
PM-CON	0.08	LB	TON	1.07	AP-42 Table 1.2-3 Used formula for SCC 10300101, EF calculated from formula of 0.08 * % Ash Content (13.38%). Reference for ash content is EPA, 2002.
PM10-PRI		LB	TON	31.84	
PM25-PRI		LB	TON	9.10	
Commercial/Institutional Heating: Bituminous and Lignite (SCC 2103002000)					
PM10-FIL	13.2	LB	TON	13.2	AP-42 Table 1.1-9 EF
PM25-FIL	4.6	LB	TON	4.6	AP-42 Table 1.1-9 EF
PM-CON	1.04	LB	TON	1.04	AP-42 Table 1.1-5 (0.04 lb/MMBtu * 26MMBtu/ton=1.04)
PM10-PRI		LB	TON	14.24	
PM25-PRI		LB	TON	5.64	
Commercial/Institutional Heating: Distillate Oil (SCC 2103004000)					
PM10-FIL	1.08	LB	E3GAL	1.08	AP-42 Table 1.3-7
PM25-FIL	0.83	LB	E3GAL	0.83	AP-42 Table 1.3-7
PM-CON	1.3	LB	E3GAL	1.3	AP-42 Table 1.3-2
PM10-PRI		LB	E3GAL	2.38	
PM25-PRI		LB	E3GAL	2.13	

Table 11 (continued)

Pollutant[1]	Uncontrolled Emission Factor (EF)	EF Numerator	EF Denominator	Calculated Uncontrolled EF	Reference
Commercial/Institutional Heating: Residual Oil (SCC 2103005000)					
PM10-FIL	5.17	LB	E3GAL	7.703	AP-42 Table 1.3-7. EF calculated from formula of 5.17(A); where A=1.12(S)+0.37; Assumed S=1% for purpose of calculating EF ratios.
PM25-FIL	1.92	LB	E3GAL	2.861	AP-42 Table 1.3-7. EF calculated from formula of 5.17(A); where A=1.12(S)+0.37; Assumed S=1% for purpose of calculating EF ratios.
PM-CON	1.5	LB	E3GAL	1.5	AP-42, Table 1.3-2
PM10-PRI		LB	E3GAL	9.20	
PM25-PRI		LB	E3GAL	4.36	
Commercial/Institutional Heating: Natural Gas (SCC 2103006000)					
PM10-FIL	1.9	LB	E6FT3	1.9	AP-42 Table 1.4-2
PM25-FIL	1.9	LB	E6FT3	1.9	AP-42 Table 1.4-2
PM-CON	5.7	LB	E6FT3	5.7	AP-42 Table 1.4-2
PM10-PRI		LB	E6FT3	7.60	
PM25-PRI		LB	E6FT3	7.60	
Commercial/Institutional Heating: Liquified Petroleum Gas (SCC 2103007000)					
PM10-FIL	0.4	LB	E3GAL	0.4	AP-42 Table 1.5-1 (Propane for Commercial Boilers)
PM25-FIL	0.4	LB	E3GAL	0.4	AP-42 Table 1.5-1 (Propane for Commercial Boilers)
PM-CON	0.506	LB	E3GAL	0.506	Used natural gas PM-CON emission factor of 5.7 lb/Million Cubic Feet (for all PM controls and uncontrolled). Used factor of 0.0887 to convert emission factor from lb/Million Cubic Feet of natural gas to lb/1,000 gallons of propane. Reference: AP-42, Table 1.4-2. Conversion factor assumes 1020 Btu/scf for natural gas (AP-42, Table 1.4-2) and 90,500 Btu/gallon for propane (AP-42, Appendix A, page A-5).
PM10-PRI		LB	E3GAL	0.91	
PM25-PRI		LB	E3GAL	0.91	
Commercial/Institutional Heating: Kerosene (SCC 2103011000)					
PM10-FIL	1.08	LB	E3GAL	1.08	AP-42 Table 1.3-7 Used EF for Distillate Oil (per EIIP)
PM25-FIL	0.83	LB	E3GAL	0.83	AP-42 Table 1.3-7 Used EF for Distillate Oil (per EIIP)
PM-CON	1.3	LB	E3GAL	1.3	AP-42 Table 1.3-2 Used EF for Distillate Oil (per EIIP)
PM10-PRI		LB	E3GAL	2.38	
PM25-PRI		LB	E3GAL	2.13	
Residential Heating: Anthracite Coal (SCC 2104001000)					
PM10-FIL	10	LB	TON	10	EPA, 2002.
PM25-FIL	0.6	LB	TON	8.03	EF calculated from formula of 0.6 * % Ash Content (13.38%). Reference for EF and ash content is EPA, 2002.
PM-CON	0.08	LB	TON	1.07	EF calculated from formula of 0.08 * % Ash Content (13.38%). Reference for EF and ash content is EPA, 2002.
PM10-PRI		LB	TON	11.07	
PM25-PRI		LB	TON	9.10	

Table 11 (continued)

Pollutant[1]	Uncontrolled Emission Factor (EF)	EF Numerator	EF Denominator	Calculated Uncontrolled EF	Reference
Residential Heating: Bituminous and Lignite Coal (SCC 2104002000)					
PM10-FIL	6.2	LB	TON	6.2	AP-42 Table 1.1-11
PM25-FIL	3.8	LB	TON	3.8	AP-42 Table 1.1-11
PM-CON	1.04	LB	TON	1.04	AP-42 Table 1.1-5 (0.04 lb/MMBtu * 26 MMBtu/ton=1.04)
PM10-PRI		LB	TON	7.24	
PM25-PRI		LB	TON	4.84	
Residential Heating: Distillate Oil (SCC 2104004000)					
PM10-FIL	1.08	LB	E3GAL	1.08	AP-42 Table 1.3-7 (Commercial/Institutional EF)
PM25-FIL	0.83	LB	E3GAL	0.83	AP-42 Table 1.3-7 (Commercial/Institutional EF)
PM-CON	1.3	LB	E3GAL	1.3	AP-42 Table 1.3-2
PM10-PRI		LB	E3GAL	2.38	
PM25-PRI		LB	E3GAL	2.13	
Residential Heating: Natural Gas - All types (SCC 2104006000)					
PM10-FIL	1.9	LB	E6FT3	1.9	AP-42 Table 1.4.2
PM25-FIL	1.9	LB	E6FT3	1.9	AP-42 Table 1.4.2
PM-CON	5.7	LB	E6FT3	5.7	AP-42 Table 1.4.2
PM10-PRI		LB	E6FT3	7.60	
PM25-PRI		LB	E6FT3	7.60	
Residential Heating: Liquefied Petroleum Gas (SCC 2104007000)					
PM10-FIL	0.4	LB	E3GAL	0.4	AP-42 Table 1.5-1 (Same factor used for Propane for Commercial Boilers; based on EIIP)
PM25-FIL	0.4	LB	E3GAL	0.4	AP-42 Table 1.5-1 (Same factor used for Propane for Commercial Boilers; based on EIIP)
PM-CON	0.506	LB	E3GAL	0.506	Used natural gas PM-CON emission factor of 5.7 lb/Million Cubic Feet (for all PM controls and uncontrolled). Used factor of 0.0887 to convert emission factor from lb/Million Cubic Feet of natural gas to lb/1,000 gallons of propane. Reference: AP-42, Table 1.4-2. Conversion factor assumes 1020 Btu/scf for natural gas (AP-42, Table 1.4-2) and 90,500 Btu/gallon for propane (AP-42, Appendix A, page A-5).
PM10-PRI		LB	E3GAL	0.91	
PM25-PRI		LB	E3GAL	0.91	
Residential Heating: Kerosene (SCC 2104011000)					
PM10-FIL	1.08	LB	E3GAL	1.08	AP-42 Table 1.3-7 Used EF for Distillate Oil (per EIIP)
PM25-FIL	0.83	LB	E3GAL	0.83	AP-42 Table 1.3-7 Used EF for Distillate Oil (per EIIP)
PM-CON	1.3	LB	E3GAL	1.3	AP-42 Table 1.3-2 Used EF for Distillate Oil (per EIIP)
PM10-PRI		LB	E3GAL	2.38	
PM25-PRI		LB	E3GAL	2.13	

[1] PM10-PRI EF = sum of PM10-FIL and PM-CON EFs; PM25-PRI EF = sum of PM25-FIL and PM-CON EFs.

MO used the NEI data for industrial residual oil combustion, commercial/institutional residual oil combustion, and residential anthracite coal combustion. MO's inventory contained several PM QA issues, and MO provided corrections (using AP-42 emission factors) that were incorporated into the CENRAP inventory. MO did not provide any PM_{10} or $PM_{2.5}$ emissions data for forest wildfires (SCC 2810001000).

MN provided corrections to PM QA issues that were incorporated into the CENRAP inventory. Lancaster County, NE provided its own inventory for residential natural gas fired furnaces, and requested that no other industrial, commercial/institutional, or residential fossil fuel combustion categories in the NEI be added to its inventory. The tribal inventory did not contain any fossil fuel combustion inventory data.

TX's inventory was revised to address the PMx QA issues listed in the QA Summary Report (TX_NP_QA_Report_090904_v3.xls). Most of the QA issues in TX's inventory were associated with the sum of the filterable and condensible emissions not equaling the primary emissions. This issue was corrected by replacing the primary emissions with the sum of the filterable and condensible emissions. Many of the QA issues were associated with daily emissions. Since daily emissions are not needed to support regional haze air quality modeling, TX and CENRAP agreed to remove the daily PMx emissions from TX's inventory.

Residential Wood Combustion

The states of IA, LA, NE, and OK (including Lancaster County) used the residential wood combustion inventory in the preliminary 2002 NEI for the CENRAP inventory. Revisions to the NEI for residential wood combustion were completed after the preliminary 2002 NEI was released in February 2004; the revised inventories for this category was were included in the CENRAP inventory for IA, LA, NE, and OK.

The states of AR, KS, MN, MO, and TX prepared their own residential wood combustion inventories. KS and MO provided replacement inventories that disaggregated the emissions in more detail (i.e., by separate SCCs for fireplaces and woodstoves) than provided in their original inventory submittal to EPA. In addition, KS, MO, and MN revised the emission factors and provided updated emissions for CO and PM10-PRI and PM25-PRI that originate from the NEI method for this category to address a unit conversion issue identified with the NEI emission factors.

Other Sources of PM Emissions

For states that provided only PM10-FIL and PM25-FIL emissions, PM10-PRI emissions were set equal to PM10-FIL emissions and PM25-PRI emissions were set equal to PM25-FIL emissions. The PM10-PRI and PM25-PRI emissions that were added to the inventory were assigned a data source code of S-02-X-PR where S-02-X code represents the code assigned to the PM10-FIL and PM25-FIL emissions provided by the S/L/T agency and the "-PR" indicates that the ratio was applied to estimate the primary emissions (in this case, the ratio of primary to filterable emissions is "1").

PM25-PRI emissions missing from S/L/T inventories were estimated by applying a ratio of PM25-PRI to PM10-PRI emissions to the PM10-PRI emissions provided by the S/L/T agency. Table 12 identifies the agencies with SCCs for which ratios were applied to estimate PM25-PRI emissions. This table also shows the ratios and the reference for the ratios.

TX's inventory for agricultural tilling (SCC 2801000000) contained records where the filterable emissions exceeded the primary emissions. These emissions were grown from Version 3 of the 1999 NEI. This issue was corrected by setting the PM10-PRI and PM25-PRI emissions equal to the PM10-FIL and PM25-FIL emissions.

Table 12. SCCs for which PM25-PRI Emissions were Estimated by Applying a Ratio to the PM10-PRI Emissions in the S/L/T inventory

SCC	SCC Description	Agency	Ratio of PM25-PRI to PM10-PRI	Reference
2294000000	Mobile Sources : Paved Roads : All Paved Roads : Total: Fugitives	Fond du Lac Band of the Minnesota Chippewa Tribe	0.25	NEI Method
2296000000	Mobile Sources : Unpaved Roads : All Unpaved Roads : Total: Fugitives	Fond du Lac Band of the Minnesota Chippewa Tribe	0.15	NEI Method
2505020000	Storage and Transport : Petroleum and Petroleum Product Transport : Marine Vessel : Total: All Products	MO	1	No data available; assumed PM25-PRI equals PM10-PRI
2535010000	Storage and Transport : Bulk Materials Transport : Rail Car : Total: All Products	Lancaster County, NE	1	No data available; assumed PM25-PRI equals PM10-PRI
2810015000	Miscellaneous Area Sources : Other Combustion : Prescribed Burning for Forest Management : Total	Fond du Lac Band of the Minnesota Chippewa Tribe	1	No data available; assumed PM25-PRI equals PM10-PRI
2810020000	Miscellaneous Area Sources : Other Combustion : Prescribed Burning of Rangeland : Total	KS, LA, and NE	0.8	Based on average ratio of PM25-PRI to PM10-PRI for emissions data provided by other CENRAP states
2810030000	Miscellaneous Area Sources : Other Combustion : Structure Fires : Total	MO	0.91	NEI Method
2810050000	Miscellaneous Area Sources : Other Combustion : Motor Vehicle Fires : Total	MO, TX	0.91	NEI Method

c. 2002 NEI

Merging of NEI Data into S/L Inventories

The area source inventory provided by each S/L agency was compared to the 2002 NEI to identify categories in the NEI that were not in each S/L inventory. The list of categories identified was provided to each S/L agency and each agency then selected the NEI categories to be added to their inventory. Identification of categories included in the 2002 NEI but not in a S/L inventory involved a two-step process. First, Pechan identified the categories in the NEI that did not have an electronic match on the data key of the EM table between the S/L inventory and the NEI. Then, Pechan manually compared the NEI categories without an electronic match to

the S/L inventory to identify and eliminate NEI categories that were in the S/L inventory but had a different SCC. For example, a state inventory may use a general SCC for a category while the NEI may use different SCCs to breakout emissions at a finer detail. Examples of categories where this typically occurred include residential wood combustion, open burning of land clearing debris, solvent utilization, and petroleum marketing and transportation categories. In addition, if a S/L agency requested that a CENRAP-sponsored inventory be added to its inventory, the NEI categories that overlapped with the CENRAP-sponsored categories were removed from the list of NEI categories considered for incorporation into a S/L inventory.

Note that the preliminary 2002 NEI did not contain any data for the Fond du Lac Band of the Minnesota Chippewa Tribe. Therefore, a comparison of the tribal inventory to the NEI was not made.

The source categories in the 2002 NEI that were added to a S/L/T inventory can be identified where the data source code starts with “E”. These categories can be identified using the data source code field in the NIF 3.0 files or in the summary of area source emissions that contains the data source code.

Revisions to the Preliminary 2002 NEI

During preparation of the CENRAP inventory, EPA completed revisions to the emissions for six categories in the preliminary 2002 NEI released in February 2004. As agreed to with each S/L agency, the revised emissions were used in the CENRAP inventory in lieu of the preliminary 2002 NEI emissions if the agency requested that the category be included.

1. Non-Residential Construction (SCC 2311020000): 2002 emissions data replaced data in preliminary 2002 NEI that were carried forward from 1999 NEI.

2. Highway Construction (SCC 2311030000): 2002 emissions data replaced data in preliminary 2002 NEI that were carried forward from 1999 NEI.

3. Open Burning of Land Clearing Debris (SCC 2610000500): 2002 emissions data replaced data in preliminary 2002 NEI that were carried forward from 1999 NEI. The activity for this category was based on activity prepared for the non-residential and highway construction categories. For 2002, emissions were set to zero for counties with a population that was 80% urban or more based on 2000 Census data. This was not done for the 1999 NEI. For the NEI method, it was assumed that highly urban counties do not allow this activity to take place. Note that 2002 emissions data were already included in the preliminary 2002 NEI for the open burning of residential municipal solid waste, open burning of yard waste, and the residential construction categories.

4. Residential LPG Combustion (SCC 2104007000): 2000 emissions data replaced data in the preliminary 2002 NEI that were carried forward from 1999 NEI.

5. Residential Kerosene Combustion (SCC 2104011000): 2000 emissions data replaced data in the preliminary 2002 NEI that were carried forward from 1999 NEI.

6. Residential Wood Combustion (SCCs starting with 2104008xxx; 4 SCCs for fireplaces and 3 SCCs for woodstoves): The preliminary 2002 NEI emissions were revised to:
   (a) correct the CO, PM10-PRI, and PM25-PRI emission factors for fireplaces without inserts (this change doubled the emission factors associated with correcting an error in converting the values from g/kg to lb/ton);
   (b) correct the climate zone map for allocating national activity to states;
   (c) replace 1997 total residential wood consumption with 2001 estimates (this change reduced wood consumption for fireplaces with inserts and woodstoves);
   (d) update urban/rural population data to reflect 2002 estimates based on year 2002 total county population and year 2000 county ratios of urban/rural population to total population; and
   (e) change the data source code from E-02-X (this was incorrect) to E-01-X to reflect 2001 activity data adjusted to 2002.

5. Revisions to Address Comments

The following items were revised per state instruction during S/L/T agency review of the draft area source inventory:

a. Missouri

Missouri provided revisions to annual VOC emissions for the following surface coating categories to correct for double-counting of emissions in the draft inventory.

SCC	SCC Description
2401015000	Solvent Utilization : Surface Coating : Factory Finished Wood: SIC 2426 thru 242 : Total: All Solvent Types
2401020000	Solvent Utilization : Surface Coating : Wood Furniture: SIC 25 : Total: All Solvent Types
2401040000	Solvent Utilization : Surface Coating : Metal Cans: SIC 341 : Total: All Solvent Types
2401050000	Solvent Utilization : Surface Coating : Miscellaneous Finished Metals: SIC 34 - (341 + 3498) : Total: All Solvent Types
2401055000	Solvent Utilization : Surface Coating : Machinery and Equipment: SIC 35 : Total: All Solvent Types
2401060000	Solvent Utilization : Surface Coating : Large Appliances: SIC 363 : Total: All Solvent Types
2401065000	Solvent Utilization : Surface Coating : Electronic and Other Electrical: SIC 36 - 363 : Total: All Solvent Types
2401070000	Solvent Utilization : Surface Coating : Motor Vehicles: SIC 371 : Total: All Solvent Types

2401080000	Solvent Utilization : Surface Coating : Marine: SIC 373 : Total: All Solvent Types

For these SCCs, MO did not provide any daily emissions. The daily emissions in the draft inventory originated from the 1999 NEI. The daily emissions for some of the SCCs were greater than the annual emissions after incorporating the revised inventory supplied by MO. After discussing this issue with Missouri, the following revisions were made to the daily emissions:

(1) For records where Missouri's revised annual emissions were zero, the daily emissions were set to zero and the data source code was set to S-02-X; and

(2) For records where Missouri's revised annual emissions were greater than zero, the daily emissions were removed from the CENRAP inventory.

b. Minnesota

Minnesota provided a new inventory of annual VOC emissions for asphalt paving (SCC 2461021000) that was added to the final inventory. Minnesota provided revisions to annual CO, NH_3, NOX, PM10-PRI, PM25-PRI, SO_2, and VOC for the following commercial/institutional fossil fuel and wood combustion categories:

SCC	SCC Description
2103002000	Stationary Source Fuel Combustion : Commercial/Institutional : Bituminous/Subbituminous Coal : Total: All Boiler Types
2103004000	Stationary Source Fuel Combustion : Commercial/Institutional : Distillate Oil : Total: Boilers and IC Engines
2103005000	Stationary Source Fuel Combustion : Commercial/Institutional : Residual Oil : Total: All Boiler Types
2103006000	Stationary Source Fuel Combustion : Commercial/Institutional : Natural Gas : Total: Boilers and IC Engines
2103007000	Stationary Source Fuel Combustion : Commercial/Institutional : Liquified Petroleum Gas (LPG) : Total: All Combustor Types
2103008000	Stationary Source Fuel Combustion : Commercial/Institutional : Wood : Total: All Boiler Types
2103011000	Stationary Source Fuel Combustion : Commercial/Institutional : Kerosene : Total: All Combustor Types

c. Oklahoma

Daily VOC emissions for oil and gas exploration were removed. Oklahoma's area source inventory was taken from the preliminary 2002 NEI except that Oklahoma provided an inventory of annual VOC, NOX, and CO emissions for natural gas exploration that replaced the annual emissions from the preliminary NEI (that originated from Version 3 of the 1999 NEI). Oklahoma did not provide revisions to the old daily emissions. Given that the old daily emissions were not calculated from the new annual emissions supplied by Oklahoma, the daily emissions were removed from the CENRAP inventory.

d. Texas

Replaced emissions with more recent emissions estimates from the 2002 NEI for the following categories:

SCC	SCC Description
Residential Stationary Source Fuel Combustion	
2104002000	Bituminous/Subbituminous Coal / Total: All Combustor Types
2104004000	Distillate Oil / Total: All Combustor Types
2104006000	Natural Gas / Total: All Combustor Types
2104007000	Liquified Petroleum Gas (LPG) / Total: All Combustor Types
2104008001	Wood / Fireplaces: General
2104008002	Fireplaces: Insert; non-EPA certified
2104008003	Fireplaces: Insert; EPA certified; non-catalytic
2104008004	Fireplaces: Insert; EPA certified; catalytic
2104008010	Woodstoves: General
2104008030	Catalytic Woodstoves: General
2104008050	Non-catalytic Woodstoves: EPA certified
2104011000	Kerosene Combustion
Fugitive Dust from Roads	
2294000000	All Paved Roads / Total: Fugitives
2296000000	All Unpaved Roads / Total: Fugitives
Fugitive Dust from Construction	
2311010000	Residential / Total
2311020000	Industrial/Commercial/Institutional / Total
2311030000	Highway Construction
Storage and Transport / Petroleum and Petroleum Product Storage	
2501000000	All Storage Types: Breathing Loss / Total: All Products
2501080050	Airports : Aviation Gasoline / Stage 1: Total
2501080100	Airports : Aviation Gasoline / Stage 2: Total
Open Burning	
2610000100	Yard Waste - Leaf Species Unspecified
2610000400	Yard Waste - Brush Species Unspecified
2610000500	Land Clearing Debris
2610030000	Residential / Household Waste
Miscellaneous Area Sources / Agriculture Production - Crops	
2801000000	Cotton Ginning

e. Agricultural Tilling

The CENRAP-sponsored inventory for fugitive dust emissions from agricultural tilling (SCC 2801000003 - Miscellaneous Area Sources : Agriculture Production - Crops : Agriculture - Crops : Tilling) was updated on October 27, 2004. However, the timing of the revision was too late to incorporate into the December 8, 2004 draft CENRAP inventory. Therefore, the agricultural tilling emissions were updated to match those in the revised CENRAP-sponsored inventory for the states that elected to use the CENRAP-sponsored inventory.

f. Open Burning Categories

For the following open burning emissions categories that originate from the 2002 NEI (Data Source Code = E-02-X), removed CE records where the primary device type for miscellaneous controls (code 099) were associated with uncontrolled emissions in the emission table.

SCC	SCC Description
2610000100	Yard Waste - Leaf Species Unspecified
2610000400	Yard Waste - Brush Species Unspecified
2610000500	Land Clearing Debris
2610030000	Residential / Household Waste

6. QA Review of Final Inventory

Final QA checks were run on the revised data set to ensure that all corrections provided by the S/L/T agencies were incorporated into the S/L/T inventories and that there were no remaining QA issues that could be addressed during the duration of the project. After exporting the inventory in Oracle to an Access database in NIF 3.0, the EPA's QA program was run on the Access database and the QA output was reviewed to verify that all QA issues that could be addressed were resolved (EPA, 2004a).

One remaining issue that was not addressed concerns double counting of NH_3 emissions in the onroad inventory. The area miscellaneous source inventory for Iowa, Kansas, and Louisiana include NH_3 emissions for the following two SCCs that originate from the CENRAP-sponsored NH_3 inventory:

SCC	SCC Description
2201001000	Mobile Sources / Highway Vehicles - Gasoline / Light Duty Gasoline Vehicles (LDGV) / Total: All Road Types)
2230001000	Mobile Sources / Highway Vehicles - Diesel / Light Duty Diesel Vehicles (LDDV) / Total: All Road Types)

The onroad inventory includes NH_3 emissions for these source categories as well. Thus, if the area source inventory is revised in the future, these two SCCs should be removed from the area source inventory. For all three states and the two SCCs combined, the NH_3 emissions total to 8,735 annual tons. In each of the three states, the light-duty gasoline vehicles category accounts for 24 to 31 percent of the total area miscellaneous inventory for the state, but only 1 to 4 percent

when compared to total NH_3 emissions in the area and area miscellaneous inventories combined. At the CENRAP-region level, the percentages are less than 1 percent of total NH_3 emissions from all sources.

The output file from the EPA's QA program run on the area source inventory and the area miscellaneous source inventory is provided in an Access 2000 database along with the Access database containing the area and area miscellaneous inventory in NIF 3.0. The following lists the remaining QA issues that were not addressed during the duration of this project:

Area Source Inventory

Range Errors: There are 1,418 records in the EM table with emissions that exceed the maximum emissions in the QA program for the specified pollutant.

Lookup Errors: There are 333 records in the PE table and 6,548 records in the EM table with lookup errors. The look-up errors in both the PE and EM tables are associated with units that are not in the NIF 3.0 reference table, but EPA has indicated that the units will be added to the NIF 3.0 reference table.

Area Miscellaneous Source Inventory

Lookup Errors: There are 216,372 records in the PE table and 199,728 records in the EM table with lookup errors. The look-up errors in both the PE and EM tables are associated with units that are not in the NIF 3.0 reference table, but EPA has indicated that the units will be added to the NIF 3.0 reference table.

D. Nonroad Source Inventory Methods

Initially, work on the nonroad inventory was to be limited to the non-NONROAD Model categories for commercial and military aircraft, commercial marine vessel, and railroad locomotives. The CENRAP-sponsored inventory for the NONROAD Model categories was to be used to support air quality modeling and planning. However, during the project TX updated its inventory for the NONROAD Model categories and requested that this inventory be used instead of the CENRAP-sponsored inventory for the NONROAD Model categories. Since Pechan obtained the CENRAP-sponsored inventory for the NONROAD Model categories to support the preparation of emissions summaries, the CENRAP-sponsored inventory for the NONROAD Model categories in TX was replaced with TX's NONROAD Model inventory. Then, the inventories for aircraft, commercial marine vessel, and railroad locomotives were added to the NONROAD Model inventory for all S/L agencies to create a consolidated nonroad inventory for CENRAP.

The following discusses the QA that was completed on the inventories for aircraft, commercial marine vessel, and railroad locomotives and explains the data sources used to compile the inventories for these non-NONRAOD Model categories. QA review of the NONROAD Model inventory was completed under a separate CENRAP-sponsored project.

1. Data Sources

For each S/L/T inventory submitted to EPA, Table 13 provides a summary of the pollutants included in each inventory, and the number of counties for which data were provided for the aircraft, commercial marine vessel, and railroad locomotive categories. The table also shows the number of counties in the 2002 preliminary NEI for the aircraft, commercial marine vessel, and railroad locomotive categories and the number of counties in each state.

AR and TX provided emissions data for all three of the non-NONROAD Model categories. For the railroad locomotive category, KS, LA, MN, and MO included NH_3 emissions based on Carnegie Mellon University (CMU) model estimates in their inventories. MN also included CAP emissions in the inventory it submitted to EPA.

- The nonroad source inventories obtained from EPA were loaded into Oracle in NIF 3.0 into one data set. Then, the following updates were performed on the consolidated data set, if necessary:

- HAP records were removed since the inventory will support regional haze, fine PM, and ozone modeling.

- Pollutant codes were corrected to make them NIF 3.0 compliant (e.g., update PMPRI pollutant code to PM-PRI). Additionally, other codes were identified for remediation on a case-by-case basis.

- Records with a submittal flag indicating deletions (submittal_flag = 'D' or 'RD') were removed from the inventory.

- Null values in the tribal code field were updated to '000' since this field is a part of the data key that defines records as unique in all eight NIF tables.
- Added and populated the NIF plus fields listed in the previous discussion for the area source inventory.

- The CENRAP-sponsored inventory did not contain S/L agency contact information in the TR table. In addition, the TR table for the data taken from the preliminary 2002 NEI contained the contact information for EPA. Therefore, the TR table was updated to include the contact information that S/L agencies provided in their area source inventories.

Table 13. Summary of Pollutants and Number of Counties Included in Nonroad Source Inventories

State/Local/Tribal Agency	Sector	CO	NH_3	NO_x	PM10-PRI	PM25-PRI	PM10-FIL	PM25-FIL	PM-CON	SO_2	VOC	Number of Counties in 2002 S/L/T Inventory	Number of Counties in 2002 Preliminary NEI	Number of Counties in State
AR	Commercial Marine Vessels (CMV)	x	x	x	x	x				x	x	27	25	75
	Railroad Locomotives	x	x	x	x	x				x	x	75	75	75
	Aircraft	x	x	x	x	x				x	x	68	41	75
KS	Railroad Locomotives		x									2	105	105
LA	Railroad Locomotives		x									3	64	64
MN	Railroad Locomotives	x	x	x	x					x	x	81	87	97
MO	Railroad Locomotives		x									2	115	115
TX	CMV	x		x	x	x	x	x		x	x	19	19	254
	Railroad Locomotives	x	x	x	x	x				x	x	254	254	254
	Aircraft	x		x	x	x	x			x	x	167	124	254

2. QA Review

QA review was conducted on the inventories in accordance with the QA procedures specified in the QAPP for this project (CENRAP, 2004b). The following discusses the QA checks that were completed during preparation of the consolidated data set.

a. County and SCC Coverage

For the agencies that submitted inventories to EPA, the county coverage in the inventories appeared to be reasonable. However, the NH_3 inventories for KS, LA, MN, and MO covered significantly fewer counties than what the preliminary 2002 NEI covered. The differences in the county coverage for NH_3 emissions were due to differences in the methods used to prepare the state NH_3 inventory and the NEI.

b. Pollutant Coverage

The pollutant coverage in the S/L/T inventories was complete for all pollutants except that MN did not include PM25-PRI emissions for railroad locomotives in its inventory, and TX did not provide NH_3 emissions for commercial marine vessels and aircraft in its inventory. MN provided PM25-PRI emissions to fill this data gap. TX did not provide any NH_3 emissions for commercial marine vessels or aircraft.

c. Additional QA for the CENRAP Area Source Inventory

The QA procedures discussed previously for the S/L/T area source inventories were applied to the S/L inventories for aircraft, commercial marine vessels, and railroad locomotives.

3. Responses from S/L/T Agencies

The nonroad source inventories were revised to incorporate updates from MN and to incorporate TX's NONROAD Model inventory. No other QA issues were identified in the state inventories for the non-NONROAD Model categories.

4. Gap Filling and Augmentation

Table 14 provides a summary of the sources of data used to prepare the consolidated inventory for aircraft, commercial marine vessels, and railroad locomotives. For commercial marine vessels and railroad locomotives, the CENRAP-sponsored inventory was used for all states except for AR, MN, and TX who provided their own inventories. Note that the CMU Model NH_3 emissions that KS, LA, and MO included in their inventory submittals to EPA for railroads were replaced with NH_3 emissions in the CENRAP-sponsored inventory.

Table 14. Summary of Data Sources Used to Prepare the Consolidated Nonroad Inventory for Aircraft, Commercial Marine Vessels, and Railroad Locomotives

State/Local Agency	Source of Inventory Data	Notes
Commercial and Military Aircraft (SCC 227500xxxx - 227507xxxx)		
AR	State	
IA	2002 NEI	
KS	State	State inventory is based on the 2002 NEI
LA	2002 NEI	
MN	State	Included in point source inventory
MO	2002 NEI	
NE - Lancaster County	2002 NEI	
NE - State	2002 NEI	
OK	2002 NEI	
TX	State	
Commercial Marine Vessels (SCC 228000xxxx)		
AR	State	
IA	CENRAP Inventory	
KS	CENRAP Inventory	
LA	CENRAP Inventory	
MN	State	
MO	CENRAP Inventory	
NE - Lancaster County	CENRAP Inventory	
NE - State	CENRAP Inventory	
OK	CENRAP Inventory	
TX	State	
Railroad Locomotives (SCC 2285002006 - 2285002010)		
AR	State	
IA	CENRAP Inventory	
KS	CENRAP Inventory	
LA	CENRAP Inventory	
MN	State	
MO	CENRAP Inventory	
NE - Lancaster County	CENRAP Inventory	
NE - State	CENRAP Inventory	
OK	CENRAP Inventory	
TX	State	

AR, KS, MN, and TX included aircraft emissions in the inventories they submitted to EPA. However, MN included aircraft emissions in its point source inventory that were included in the point source inventory for CENRAP. KS' inventory was based on the aircraft inventory included in the preliminary 2002 NEI. CENRAP did not sponsor development of an inventory for commercial and military aircraft. Therefore, the 2002 NEI was used as the source of aircraft inventory data for the states that did not provide an inventory for this source category. QA review of PM emissions did not find any missing data after updating MN's inventory for railroad locomotives. Therefore, no PM augmentation was performed on the nonroad inventories.

5. Revisions to Address Comments

The nonroad inventory was revised for Minnesota to remove double-counting of emissions for SCC 2265008005 (Mobile Sources / Off-highway Vehicle Gasoline, 4-Stroke / Airport Ground Support Equipment / Airport Ground Support Equipment). Minnesota included emissions for this SCC in its point source inventory. The nonroad inventory contained only annual emissions for this SCC, which came from the CENRAP-sponsored nonroad inventory. The annual emissions removed from the nonroad inventory are as follows:

Pollutant	Annual Emissions (tons/year)	Counties Affected (State and County FIPS code)
VOC	8.65	27007, 27037, 27041, 27053, 27091, 27109, 27123, 27137, 27145, 27163
NOX	7.6	27007, 27037, 27041, 27053, 27091, 27109, 27123, 27137, 27145, 27163
CO	212.7	27007, 27037, 27041, 27053, 27091, 27109, 27123, 27137, 27145, 27163
SO_2	0.04	27053
PM10-PRI	0.07	27053
PM25-PRI	0.06	27053
NH_3	0.01	27053

6. QA Review of Final Inventory

Final QA checks were run on the revised data set to ensure that all corrections provided by the S/L/T agencies were incorporated into the S/L/T inventories and that there were no remaining QA issues that could be addressed during the duration of the project. After exporting the inventory in Oracle to an Access database in NIF 3.0, the EPA's QA program was run on the Access database and the QA output was reviewed to verify that all QA issues that could be addressed were resolved. The QA output is provided in an Access 2000 database along with the Access database containing the inventory in NIF 3.0.

The following lists the remaining QA issues that were not addressed during the duration of this project:

Range Errors: There are 260 records in the EM table with emissions that exceed the maximum emissions in the QA program for the specified pollutant.

Lookup Errors: There are 105,667 records in the EM table with CO_2 emissions that caused this error. CO_2 is not included in the reference table for valid NIF 3.0 pollutant codes. At the request of CENRAP, CO_2 emissions were kept in the inventory.

E. 2002 CEM Data Methods and Results

1. Introduction

The 2002 CEM data for the entire CENRAP modeling domain were collected and converted to SMOKE and the RPO data exchange protocol formats. A crosswalk file was developed in order to process CEM data for all four quarters of 2002 into the formats required by CENRAP.

CEM data were also compiled for the CENRAP Region for the years 2000, 2001, and 2003. The data for these years were combined with the 2002 CEM data to develop three (3) sets of temporal profiles. The sets of profiles generated include seasonal profiles, daily profiles by season, and hourly profiles by season. National Weather Service temperature data that were readily available were analyzed. Recommendations were made on whether or not to generate temporal profiles based on these parameters. Additional recommendations were made on the best approaches for assigning temporal profiles to individual units.

2. Data Sources

The data source for the CEM data for the years 2000 through 2003 is the EPA's website, specifically the following websites were used for acquiring raw data and reports to QA the CEM data:

- http://www.epa.gov/airmarkets/emissions/raw/index.html (Clean Air Markets data)
- http://cfpub.epa.gov/gdm/index.cfm?fuseaction=prepackaged.select (Emissions data and reports)
- http://www.epa.gov/airmarkets/emissions/prelimarp/ (more emissions reports)

The CEM units in the raw data sets were mapped to the appropriate source(s) in the consolidated 2002 point source inventory. We worked together with Pechan and the CENRAP states by soliciting feedback on the CEM units that we were not able to initially match up with the 2002 inventory. The mapping entailed matching a CEM unit (Office of Regulatory Information Systems [ORIS] ID and unit ID) to the state and county FIPS, Plant, Stack, and Segment identifier. The data were formatted into hour-specific emissions that are readable by the SMOKE modeling system and also in the RPO data exchange format.

CEM data for year 2002 for areas outside of the CENRAP were obtained from RPOs and EPA when the data were available. CEM data for the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) states were obtained from the VISTAS RPO via the Alpine Geophysics ftp site (ftp agftp.com). The data consisted of hour-specific CEM data for the year 2002. The other RPOs (Midwest, Western Regional Air Partnership [WRAP] and Mid-Atlantic/Northeast Visibility Union [MANE-VU]) did not have CEM data readily available and/or correct and updated crosswalks for the CEM units for a current year 2002 inventory for their particular region. Only VISTAS met these requirements. The Midwest and MANE-VU RPOs are still generating their updated year 2002 point source inventories (September-November 2004), therefore updated crosswalks had not been generated. Several RPOs (e.g., Midwest) indicated that they may rely on EPA to create the CEM crosswalk data for their

particular region. We acquired the raw CEM data for the year 2002 for the entire United States region from EPA (Marc Houyoux). If and when the crosswalks become available for the other RPOs regions, CENRAP can then use these crosswalk data along with the raw data for the United States to implement hour-specific CEM data throughout their entire modeling domain.

Software was generated to process the CEM data for years 2000 through 2003 and generate monthly, weekly, and hourly profiles for each of the four seasons in SMOKE-ready format. National Weather Service temperature data were obtained from the University of California, Riverside (UCAR) website at http://dss.ucar.edu/datasets/ds472.0. Meteorological data from years 2000-2002 were obtained from UCAR. Plants subject to EPA CEM requirements are not required to report hourly stack flow rates to EPA. We were unable to find a reliable, consistent source of stack flow data that could be used in generating recommendation for temporal profiles for the year 2002.

Table 15 provides a summary of the CEM crosswalk files and documentation acquired for this project.

Table 15. CEM Crosswalk Files and Documentation

Data	Source	Date acquired or generated	Time Period of Data	Known deficiencies
Year 2000-2003 CEM data for CENRAP states	EPA website	27-Aug-04	Year 2000 thru 2003	None known at time of analysis
Year 2000-2003 CEM reports for CENRAP states	EPA website	15-Sep-04	Year 2000 thru 2004	None known at time of analysis
2002 point source inventory data in draft format	Pechan	19-Aug-04	Year 2002	Updates were received up through the month of Sept 2004.
CEM crosswalk for CENRAP states (final version)	UNC-CEP	27-Oct-04	Year 2002	Missing crosswalk data for some CEM units. Used 2002 point source inventory data for mapping information instead of final SMOKE IDA or inventory file used in emissions modeling
VISTAS RPO CEM data	Alpine Geophysics	24-Aug-04	Year 2002	None known at time of analysis
Year 2002 CEM data for all United States	EPA (Marc Houyoux)	03-Sep-04	Year 2002	None known at time of analysis
NWS 2000-2002 temperature data	UCAR	17-Sep-02	Year 2000 thru 2002	None known at time of analysis

3. QA Review

Carolina Environmental Program (CEP) analyzed the CEM crosswalk generated to match up CEM units with a source in the 2002 point source inventory along with the raw CEM databases to determine which units/sources were not being used due to the lack of crosswalk data and/or

bad or no CEM data. There were data for a total of 775 CEM units in the CENRAP states. We informed CENRAP of all CEM units where we lacked sufficient crosswalk data that emitted over 40 tons per year of NO_x or SO_2. It was also recommended to CENRAP that those units that, (1) emitted less than 40 tons per year, and (2) for which no crosswalk record was available, be omitted. A total of 293 units emitted less than less than 40 tons of NO_x in year 2002. A total of 570 units emitted less than 40 tons of SO_2 in year 2002. Some crosswalk data for these "minor-emitting" units were easily obtainable from the 2002 point source inventory. Initial QA review revealed that CEP would most likely be able to map about 500 CEM units (64% of the total number of the units or about 90% of the total emissions) to the inventory data.

We also compared the CEM data in these raw datasets and versus the reports available at (http://cfpub.epa.gov/gdm/index.cfm?fuseaction=prepackaged.select and http://www.epa.gov/airmarkets/emissions/prelimarp/) to ensure that the data we were going to use to create hour-specific emissions were consistent with these reporting tools.

Software was developed to process the CEM data for years 2000 through 2003 to generate monthly, weekly, and hourly profiles for each of the four seasons in SMOKE-ready format. CEP used the same CEM crosswalk created for the 2002 inventory for these years. If the 2002 CEM crosswalk was not able to match up a major-emitting unit from any of the other three years, this unit would have been flagged and been brought to CENRAP's attention. None of these instances were found. It should be noted that this was a temporal profile analysis task and not a task where SMOKE-ready hour-specific emissions data needed to be created. We spot-checked some of the profiles generated from these raw datasets versus the reports available at EPA websites to ensure that the data reformat process had not introduced any errors.

4. Supplemental Data/Augmentation Procedures

UNC-CEP examined the crosswalks generated at CEP and the raw CEM databases acquired from EPA and determined no changes/augmentations to the raw CEM databases were necessary. We did however inform CENRAP via email on October 12, 2004 of the CEM units we were unable to match to the CENRAP 2002 inventory. We did receive feedback from IA, TX, and MN and were able to create crosswalk records to enable more CEM data to be used for these particular states. If we did not enough information to map a CEM unit to a particular source and we did not receive feedback from CENRAP states, then the emissions data for these CEM units were not used to generate hour-specific emissions data for SMOKE. To help keep track of the changes to the CEM crosswalks and other ancillary data used for the processing of the CEM data, these data were checked into Concurrent Versions System (CVS).

The year 2000, 2001 and 2003 CEM data were also examined and spot-check comparisons were carried out using the CEM unit reports also available on the EPA website. It was determined that the CEM data did not need any changes/augmentations in order to perform the temporal profile analysis.

5. QA Review of Final Data Set

CEP analyzed the CEM crosswalk generated after receiving feedback from the CENRAP states to ensure that only changes made were due to new information received. We also determined again which units/sources were not being used due to the lack of crosswalk data and/or bad or no CEM data. Table 16 lists the CEM units that emitted over 40 tons per year of NO_x or SO_2 that could not be identified in the 2002 point source inventory.

Table 16. CEM Units for which Matches to Emission Units could not be Identified in State Inventories

ORISPL ID	Plant Name	STATE	REGION	UNITID	2002 SO_2	2002 NOx
000202	Carl Bailey	AR	6	01	380.3	147.8
000170	Lake Catherine	AR	6	1	0.1	43.5
000170	Lake Catherine	AR	6	2	0.1	53.1
000170	Lake Catherine	AR	6	3	0.2	52.4
000170	Lake Catherine	AR	6	4	3.8	1421.0
055075	Pine Bluff Energy Ce	AR	6	CT-1	11.1	228.0
001175	Pella	IA	7	CS67	413.7	281.7
055117	R S Cogen	LA	6	RS-5	0.7	53.5
055117	R S Cogen	LA	6	RS-6	0.6	48.8
002241	C W Burdick	NE	7	B-3	0.2	76.3
002291	North Omaha	NE	7	CS000A	5,030.0	2661.3
002291	North Omaha	NE	7	4	2,604.8	1,530.4
002291	North Omaha	NE	7	5	3,874.4	1,916.3
055098	Frontera Power Facil	TX	6	1	1.6	87.8
055098	Frontera Power Facil	TX	6	2	1.4	76.2
	Total				**12,323.0**	**8,678.1**

The CEM data associated with the CEM units in the table above could not be used due to insufficient mapping information. This represents a very small portion of the total emissions emitted in year 2002 by the units in the CENRAP states. According to EPA CEM emissions reports, about 1.50 million tons of SO_2 and 0.90 million tons of NO_x were emitted by the CEM units in the CENRAP states. In summary, CEP was able to map 567 of the total 775 units (or 73%) to the inventory data. This translated to successfully mapping 1.49 millions tons of SO_2 emissions (or 99.3% of the total SO_2 emissions) and 0.89 million tons of NOx emissions (or 98.9% of the total NO_x emissions). However, it should be noted that the initial mapping was carried out using the draft point source inventory. During December 2004, the SMOKE IDA inventory files became available to CENRAP. The CENRAP Emissions Modeling contractors began using the SMOKE IDA point source inventory with the SMOKE-formatted hour-specific data created at UNC-CEP. A few CEM (hour-specific) sources were found to be incorrectly mapped during SMOKE processing and, therefore, the hour-specific data could not be used. UNC-CEP corrected the identification information in the hour-specific data so these sources will be correctly mapped to the SMOKE IDA point source inventory. UNC-CEP delivered a new version of the SMOKE hour-specific files to CENRAP on January 27, 2005.

We also carried out spot-checks of the CEM data in the raw datasets and the hourly-emissions files generated (SMOKE hour-specific and RPO formatted files) versus the reports available at (http://cfpub.epa.gov/gdm/index.cfm?fuseaction=prepackaged.select and http://www.epa.gov/airmarkets/emissions/prelimarp/) to ensure that the data created were consistent with these reporting tools.

The final version of the SMOKE-ready and RPO formatted hour-specific files for all days in the year 2002 were sent and received at CENRAP on October 28, 2004. The data were sent via CD and also included the VISTAS RPO and EPA CEM data for the year 2002.

6. Temporal Profile Analysis

UNC-CEP obtained year 2000, 2001 and 2003 CEM data from USEPA (http://cfpub.epa.gov/gdm/index.cfm?fuseaction=prepackaged.select) and also used the year 2002 CEM data mentioned in section E-1 to develop three (3) sets of temporal profiles for each individual unit. The sets of profiles are seasonal profiles, daily profiles by season, and hourly profiles by season. This analysis was performed for units in the CENRAP region that includes the following states: AR, IA, KS, LA, MN, MO, NE, OK, and TX. These profiles could then be used by CENRAP in future emission inventory/modeling applications.

Since emissions preprocessors can now support many thousand different temporal profiles (e.g., SMOKE can handle 99999 different profiles), we prepared individual boiler emission profiles for each of the CEM units in the states listed above. A total of 568 units were included in the preliminary analysis. At CENRAP's request, these individual unit emission profiles were prepared based on combined CEM data from years 2000, 2001 and 2002. We also included year 2003 CEM data to add more relevant and recent data to the analysis. The emission profiles were all based on the NO_x emissions only. There was little difference between the NO_x and SO_2 profiles, with the exception that a good percentage of number of the units had zero SO_2 emissions. We also targeted the analysis on the major-emitting units which was defined as units emitting at least 1 ton of NO_x per average day. This limitation allowed us to focus the analysis on the 344 "major-emitting" units (see Table 17). Three sets of individual unit profiles were prepared: emission fractions by month, emission fractions by day of the week, and emission fractions by hour of the day for a weekday, Saturday, Sunday, and weekend (Saturday and Sunday combined). Software was created to generate these profiles for each of the four seasons in SMOKE-ready format.

Table 17. Number of Units In Each State Where Temporal Profiles Were Generated

State	CEM units
Arkansas	12
Iowa	30
Kansas	21
Louisiana	30
Minnesota	26
Missouri	36
Nebraska	13
Oklahoma	30
Texas	146
Total	**344**

For the monthly emission profiles, the NO_x emissions were totaled by unit and month. The NO_x emissions from each unit for a given month were then divided by the total of the year 2000-2003 NO_x emissions from that unit. For the day of week profiles, the Gregorian date for each hourly CEM data record was converted to the corresponding Julian date. Then, I/OAPI libraries were used to assign day of the week (Monday, Tuesday, etc.) based on the Julian date. Next, NO_x emissions were totaled by day of the week for each unit. The NO_x emission totals at a given unit for each day of the week were normalized by dividing by the sum of the year 2000 through 2003 NO_x emission total for that unit. Similarly, NO_x emissions were totaled by hour and unit for all weekdays, Saturdays, Sundays and weekend days. The hourly profiles were also normalized by dividing by the sum of each hour for each particular day of interest for the 4-year CEM dataset. All profiles were based on local standard time data. This normalization technique was carried out for each of the four seasons (winter, spring, summer and fall) were the seasons were defined as follows:

- Winter–January, February; and March
- Spring–April, May and June
- Summer–July, August and September
- Fall– October, November and December

Previous CEM/temporal analysis studies (Pechan, 2003) have strived to generate a small set of temporal profiles to use for all units over a certain geographical area. While this is possible for this task, we recommend the profiles for the individual units be used. Each unit has many factors that effect temporal allocation of emissions including geographical region, seasonal demands and controls, population and technology changes, costs, and variations in weather from year to year. Emissions preprocessors can handle thousands of different profiles, therefore we recommend that these various factors be captured using the profiles for the individual units.

Figures 1 and 2 give examples of the monthly profiles generated from the 2000-2003 CEM data for the states of AR and NE. Figure 3 is an example of the weekly profiles generated for Arkansas for all four seasons. Figures 4 and 5 give example hourly profiles for Big Brown unit #1, TX and Dolet Hills unit #1, LA respectively. These are just samples of the numerous profiles

generated. All profiles delivered to CENRAP can easily be displayed by importing to MS Excel or other spreadsheet software.

National Weather Service temperature data were also obtained from UCAR (http://dss.ucar.edu/datasets/ds472.0/) for the time period of year 2000-2003. UNC-CEP continues to carry out the analysis of this data in order to determine its usefulness and/or its ability to provide better profile data than the individual unit profiles. We will provide our feedback on this analysis in the next version of this report. UNC-CEP also searched for reliable hourly stack flow databases. Hourly stack flow is not a required element to be reported to USEPA. Therefore, we did not find it on USEPA websites. We were also unable to find an hourly stack flow database that covered the desired years and region of interest.

F. Temporal, Speciation, and Spatial Allocation Profiles

1. Temporal Profiles for Point, Area, and Nonroad Sources

a. Data Sources (e.g., CEM)

CEP obtained the best available temporal profile data for emissions modeling from EPA (see also http://www.epa.gov/ttn/chief/emch/temporal/index.html), RPOs (e.g., MANE-VU), and other source-specific reports/databases (e.g., CEM data). A similar review of temporal profiles for the MANE-VU RPO and the EPA yielded the temporal profiles to be used in the review of the CENRAP emissions inventory dataset. This subsection describes the profile databases used for each component of the CENRAP emission inventory.

Point Sources

A similar review was carried out using the latest temporal profile dataset acquired from EPA on the MANE-VU inventory. Additional profiles were added during this review to support MANE-VU state- or county-specific point sources. We began the CENRAP review using the product (temporal profiles) of this MANE-VU EI review.

Additionally, the CEM data for the years 2000, 2001, 2002 and 2003 were used to come up with 4-year average temporal profiles for each major emitting unit (see also section E of this report). The CEM data were acquired from the following EPA website: http://cfpub.epa.gov/gdm/index.cfm?fuseaction=prepackaged.select.

The CENRAP emissions inventory was provided to us by Pechan in NIF 3.0. Additional data acquired from Pechan included periodic updates to the CENRAP inventory and complete listing of the SCCs in the inventory databases.

Figure 1. Arkansas CEM unit monthly profiles based on year 2000-2003 data.

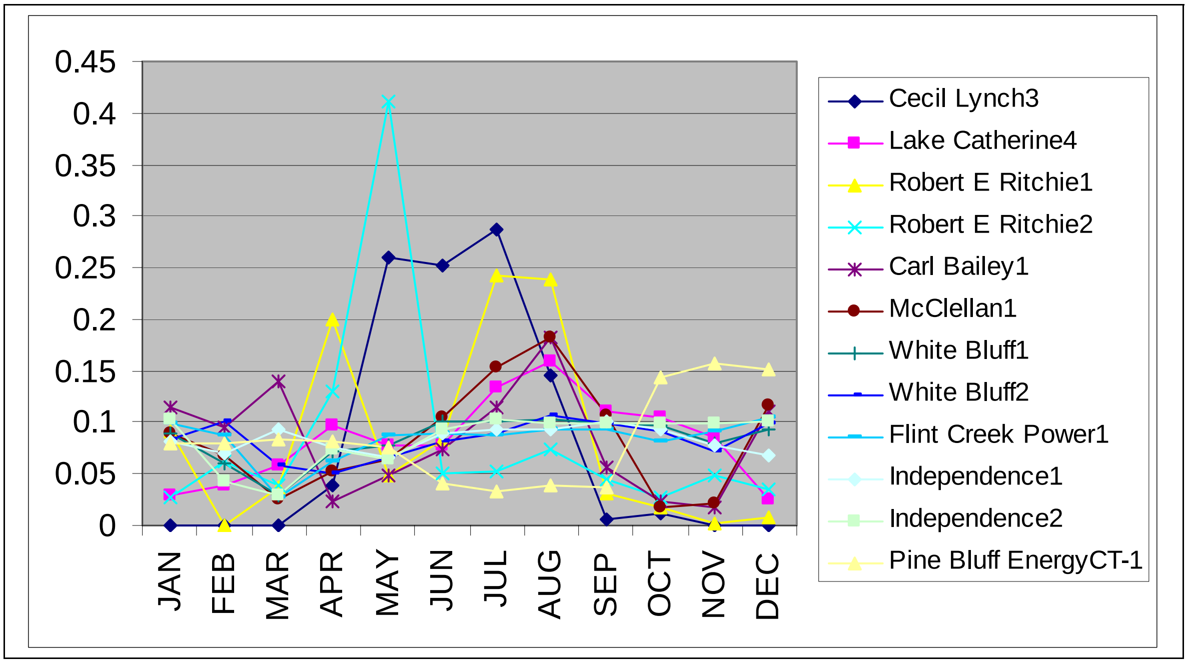


Figure 2. Nebraska CEM unit monthly profiles based on year 2000-2003 data.

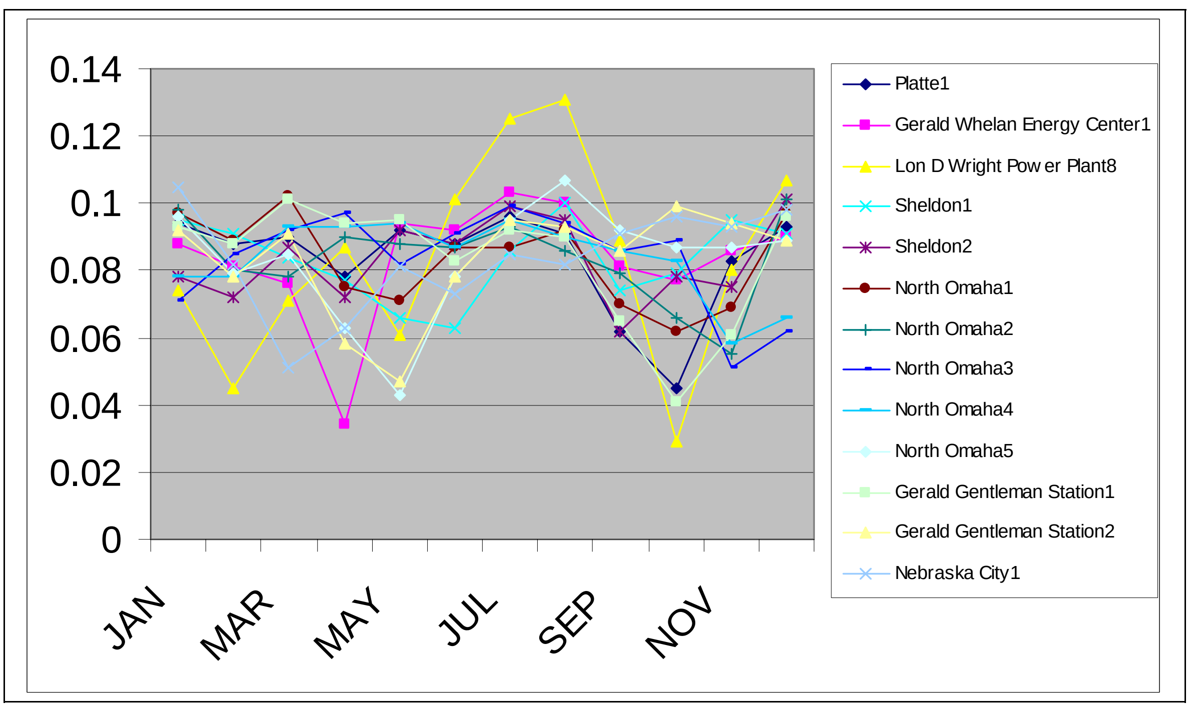
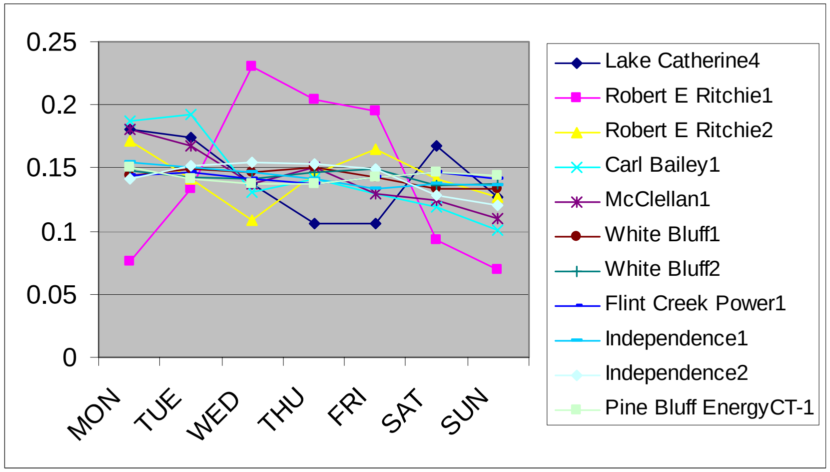
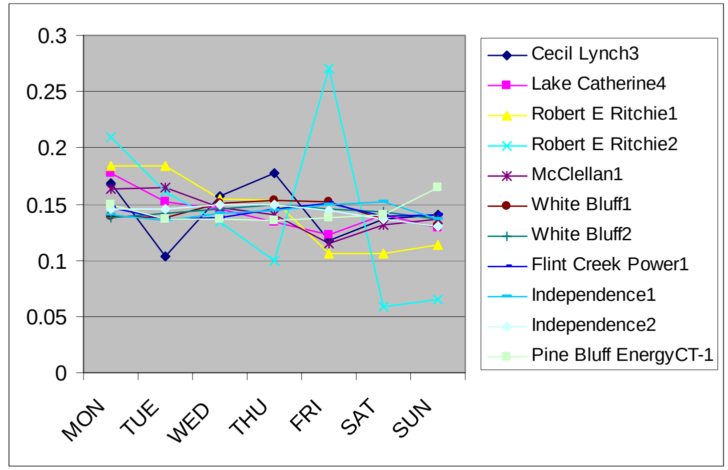


Figure 3. Arkansas weekly profiles for (a) winter, (b) spring, (c) summer and (d) autumn using the 2000-2003 data.

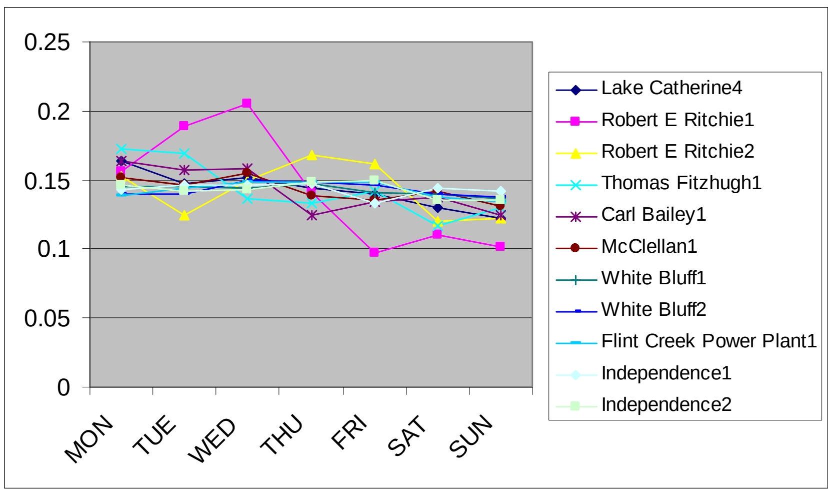
(a)



(b)



(c)



(d)

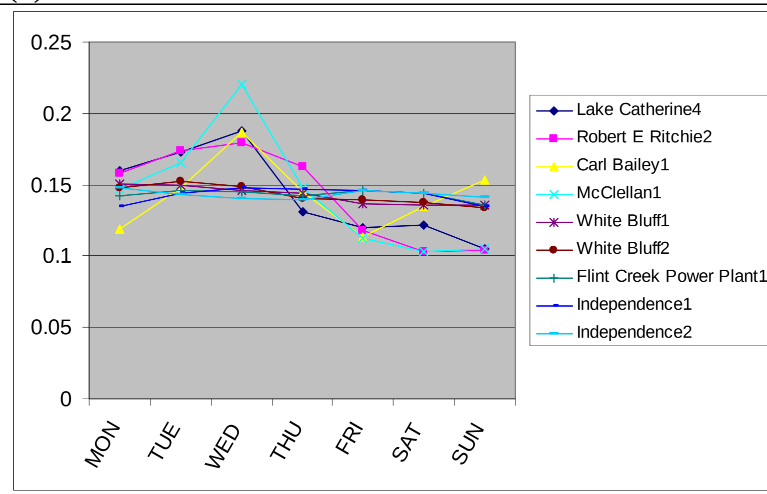


Figure 4. Big Brown Unit 1, Texas hourly profiles for winter for 2000-2003 data.

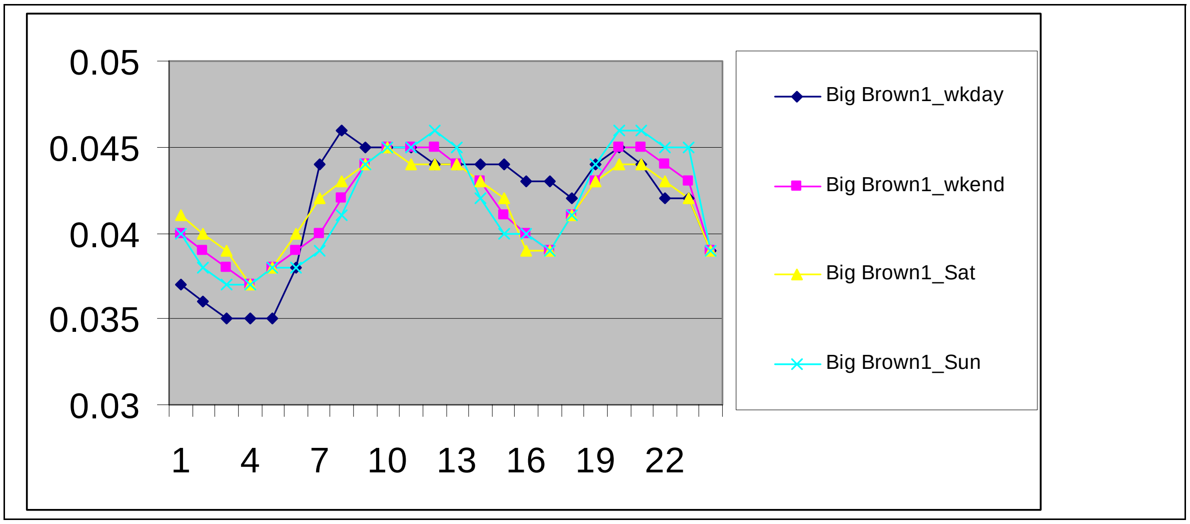
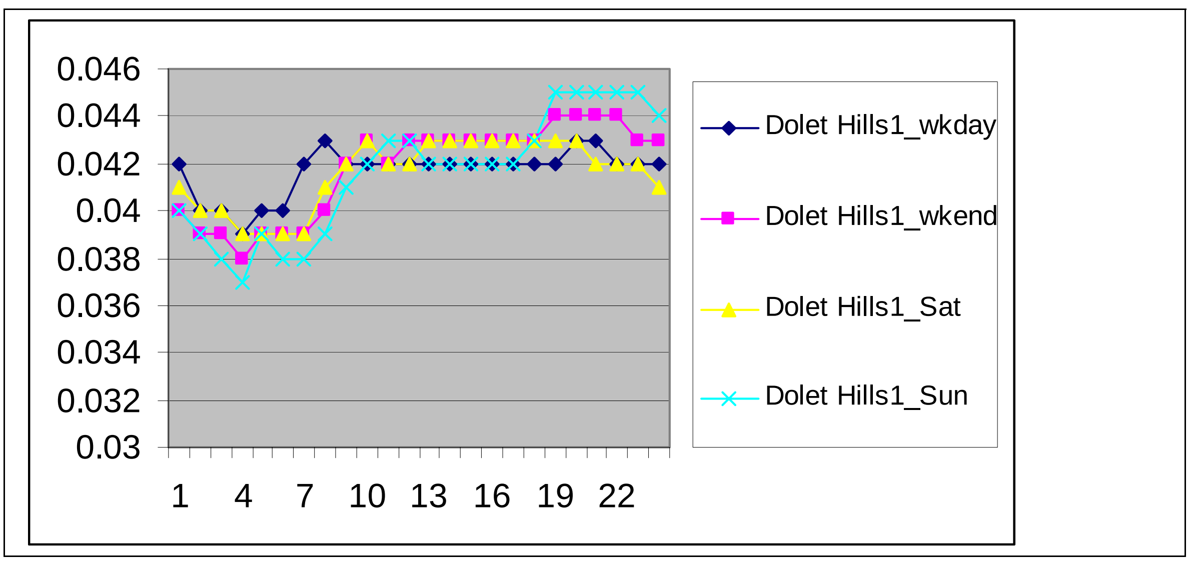


Figure 5. Dolet Hills Unit 1, Louisiana hourly profiles for autumn for 2000-2003 data.



Area and Nonroad Sources

A similar review was carried out using the latest temporal profile dataset acquired from EPA on the MANE-VU inventory. Additional profiles were added during this review to support MANE-VU state- or county-specific area and nonroad sources. We began the CENRAP review using the product (temporal profiles) of this MANE-VU EI review.

Additionally, we used the final report (STI, 2003) generated for NH_3 emissions inventories to aide in the coming up with applicable temporal profiles for use with the CENRAP emissions inventory.

b. Supplemental Data/Augmentation Procedures

A cross-reference table is necessary in order to appropriately apply the desired temporal profile to a certain emission source. This assignment or cross-reference is typically made by SCC, but can also be made for a specific FIPS-SCC combination or all SCCs in a FIPS region combination. For point sources, emissions modelers can also assign a specific temporal profile by a specific unit, stack, and/or facility identification. We conducted the review of CENRAP emissions inventory using the most recent temporal cross-reference table available that was the table generated during the MANE-VU review.

CEP identified SCCs that did not have a specific temporal profile assigned in the temporal cross-references file used in recent EPA and RPO applications. CEP created a new temporal cross-reference to an existing profile in the default SMOKE profiles for SCCs in the CENRAP; the cross-reference did not previously exist in the cross-reference file used at the beginning of the review (see Data Sources section) but the profile did exist.

All of the improvements to the SMOKE temporal cross-reference file and profiles that are summarized in this memo are included in the files *amptref.m3.cenrap.102804.txt* and *amptpro.m3.us+can.cenrap.102804.txt*, which were included as an electronic docket and delivered on October 28, 2004.

Table 18 summarizes the updates to entries in the default SMOKE cross-reference file for point sources and Table 19 for area/nonroad sources. The commonly assigned monthly profile is monthly profiles is 262 = uniform monthly. The most common weekly profiles are 7 = 'uniform emissions throughout the week' weekly and 5 = 'emit weekdays only' profile. The most common diurnal profiles are 12 = 12 hours per day during daylight hours and 26= maximum middle of the day; minimum early in morning. See the *amptpro.m3.us+can.cenrap.102804.txt file* for specific definitions of each profile.

These changes to the temporal cross-reference file have allowed us to apply a non-flat temporal profile (262= uniform monthly, 7=uniform weekly and 24=uniform diurnal) to ~90% of the SCCs in the point source inventory and ~95% of the SCCs in the area/nonroad source inventory. This is the best we could do with the information available to us at the time of the analysis.

Table 18. New Temporal Profile Assignments for CENRAP Point Source SCCs

State	SCC	Recommended Monthly, Weekly, and Diurnal Profiles			Method of Assignment	SCC Description
MN	30500245	262	7	6	30500242	Industrial Processes;Mineral Products;Asphalt Concrete;Mixers: Drum Mix Process ** (use 3-05-002-005 and subtypes)
MN	30500246	262	7	6	30500242	Industrial Processes;Mineral Products;Asphalt Concrete;Mixers: Drum Mix Process ** (use 3-05-002-005 and subtypes)
MN	30500247	262	7	6	30500242	Industrial Processes;Mineral Products;Asphalt Concrete;Mixers: Drum Mix Process ** (use 3-05-002-005 and subtypes)

Table 19. New Temporal Profile Assignments for CENRAP Area Source SCCs

SCC	Description	Month	Week	Diurnal	Recommendation Based on Profile Data for SCC	Description of Similar SCC used to Recommend Profiles
2310001000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes : On-shore;Total: All Processes	262	7	26	2310000000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes;Total: All Processes
2310002000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes : Off-shore;Total: All Processes	262	7	26	2310000000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes;Total: All Processes
2461870999	Solvent Utilization;Miscellaneous Non-industrial: Commercial;Pesticide Application: Non-Agricultural;Not Elsewhere Classified	258	7	26	2461800000	Solvent Utilization;Miscellaneous Non-industrial: Commercial;Pesticide Application: All Processes;Total: All Solvent Types
2805009200	Miscellaneous Area Sources;Agriculture Production - Livestock;Poultry production - broilers;Manure handling and storage	1500	7	26	2805009300	Miscellaneous Area Sources;Agriculture Production - Livestock;Poultry production - broilers;Land application of manure
2805021100	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Confinement	1500	7	26	2805021300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Land application of manure
2805021200	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Manure handling and storage	1500	7	26	2805021300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Land application of manure
2805023100	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Confinement	1500	7	26	2805023300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Land application of manure
2805023200	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Manure handling and storage	1500	7	26	2805023300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Land application of manure
2810020000	Miscellaneous Area Sources;Other Combustion;Prescribed Burning of Rangeland;Total	3	11	13	2810015000	Miscellaneous Area Sources;Other Combustion;Prescribed Burning for Forest Management;Total

We will augment the temporal profiles and cross-references delivered on Oct 28, 2004 with NH_3-specific temporal profiles using the STI final report on NH_3 sources. This will include monthly profiles for Texas and Arkansas and diurnal profiles for all states for applicable SCCs. The delivery of these profiles/cross-references is scheduled for early January 2005. The temporal profiles for each major emitting CEM unit based on a 4-year average (data from 2000 through 2003) were also delivered to CENRAP in January 2005.

2. Speciation Profiles for Point, Area, and Nonroad Sources

a. Data Sources

CEP obtained the best available speciation profile data for emissions modeling from EPA for the CB-IV with PM mechanism (see also http://www.epa.gov/ttn/chief/emch/speciation/index.html). The CENRAP emissions inventory was provided to us by Pechan in the NIF 3.0. Additional data acquired from Pechan included periodic updates to the CENRAP EI and complete listing of the SCCs in the inventory databases.

b. Supplemental Data/Augmentation Procedures

A cross-reference table is necessary in order to appropriately apply the desired speciation profile to a certain emission source. This assignment or cross-reference is typically made by SCC, but can also be made for a specific FIPS-SCC combination or all SCCs in a FIPS region combination. For point sources, emissions modelers can also assign a specific temporal profile by a specific unit, stack, and/or facility identification. We conducted the review of CENRAP emissions inventory using the most recent speciation cross-reference table available which was the table generated during the MANE-VU review.

Several SCCs in the CENRAP EI did not have chemical speciation profile assignments for the CB-IV with PM mechanism in the default SMOKE chemical cross-reference file. CEP added assignments for VOC speciation for the SCCs listed in Table 20 (area/nonroad sources) and Table 21 (point sources) to the speciation cross-reference file for compatibility with the CENRAP EI. The recommendations for these assignments are based on the speciation profile codes assigned to similar SCCs. We attempted to match the SCCs as accurately as possible, i.e. we looked for the closest SCC possible to supplement the missing assignment. The new chemical profile assignments were added to the file *gsref.cmaq.cb4p25.cenrap.102804.txt.* We did not make any changes to the speciation profiles file.

Please note that we understand that Pechan will soon be delivering some new PM and VOC profiles to EPA that are being incorporated into SPECIATE. Since some of these will have important implications for regional haze modeling, CENRAP may want to consider having these included in the modeling inventory. These profiles would take additional effort not already in the planned scope of work to implement. Some of the more important profiles will cover:

- Commercial Cooking (PM and VOC);
- Distillate and Natural Gas Fired Boilers (PM);
- Paved and Unpaved Road Dust;

- Motor Vehicle Exhaust/Tire Wear/Brake Wear; and
- Wildfires/Prescribed Burns.

Table 20. VOC Speciation Profiles Assigned to Area Source SCCs

SCC	Description	VOC	Recommendation Based on Profile Data for SCC	Description of Similar SCCs used to Recommend Profiles
2310001000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes : On-shore;Total: All Processes	9015	2310000000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes;Total: All Processes
2310002000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes : Off-shore;Total: All Processes	9015	2310000000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes;Total: All Processes
2461870999	Solvent Utilization;Miscellaneous Non-industrial: Commercial;Pesticide Application: Non-Agricultural;Not Elsewhere Classified	0076	2461850000	Solvent Utilization;Miscellaneous Non-industrial: Commercial;Pesticide Application: Agricultural;All Processes
2810020000	Miscellaneous Area Sources;Other Combustion;Prescribed Burning of Rangeland;Total	0307	2810015000	Miscellaneous Area Sources;Other Combustion;Prescribed Burning for Forest Management;Total

Table 21. VOC Speciation Profiles Assigned to Point Source SCCs

State	SCC	Recommended Profiles VOC	Method of Assignment	SCC Description (Complete Description not Always Available)
MN	30500245	0025	Use SCC=3050024X profiles	Industrial Processes;Mineral Products;Asphalt Concrete;Batch Mix Plant: Hot Elevators, Screens, Bins, Mixer & NG Rot Dryer
MN	30500246	0025	Use SCC=3050024X profiles	Industrial Processes;Mineral Products;Asphalt Concrete;Batch Mix Plant: Hot Elevators, Screens, Bins, Mixer& #2 Oil Rot Dryer
MN	30500247	0025	Use SCC=3050024X profiles	Industrial Processes;Mineral Products;Asphalt Concrete;Batch Mix Plant: Hot Elevs, Scrns, Bins, Mixer& Waste/Drain/#6 Oil Rot

3. Spatial Allocation Profiles for Area and Nonroad Sources

a. Data Sources

CEP obtained the best available spatial profile data for emissions modeling from EPA for the geographical area covered by the CENRAP 36-kilometer modeling domain (http://www.epa.gov/ttn/chief/emch/spatial/newsurrogate.html). A detailed description of this surrogate dataset is available at: http://www.epa.gov/ttn/chief/emch/spatial/new/surrogate_documentation_workbook052804.xls.

The CENRAP emissions inventory was provided to us by Pechan in the NIF 3.0. Additional data acquired from Pechan included periodic updates to the CENRAP EI and complete listing of the SCCs in the inventory databases.

b. *Supplemental Data/Augmentation Procedures*

A cross-reference table is necessary in order to appropriately apply the desired spatial allocation profile to a certain emission source. This assignment or cross-reference is typically made by SCC, but can also be made for a specific FIPS-SCC combination or all SCCs in a FIPS region combination. We conducted the review of CENRAP emissions inventory using the most recent speciation cross-reference table available which was the table generated during the MANE-VU review.

Several SCCs in the CENRAP area source EI did not have surrogate assignments in the default SMOKE gridding cross-reference file. These SCCs would be assigned the default surrogate which is population when spatially allocating emissions in emissions processing applications. CEP added spatial profile assignments for the SCCs listed in Table 22 to the gridding cross-reference file for compatibility with the CENRAP EI. The recommendations for these assignments are based on matching surrogate descriptions from the EPA surrogate data descriptions (see http://www.epa.gov/ttn/chief/emch/spatial/new/surrogate_documentation_workbook052804.xls) with the SCC descriptions. The new surrogate assignments were added to the file *amgref.m3.us+can+mex.cenrap.102804.txt* and included as part of the electronic docket delivered on October 28, 2004. CENRAP contractors already have a surrogate dataset for the 36-kilometer modeling domain using the EPA surrogate database. We are awaiting final definition of the CENRAP 12-kilometer domain(s) before delivering spatial surrogates to CENRAP.

Table 22. Surrogate profiles assigned to SCCs to support CENRAP EI

SCC	Description	Surrogate profile	Surrogate Description
2310001000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes : On-shore;Total: All Processes	585	Metals and Minerals Industrial (IND4)
2310002000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes : Off-shore;Total: All Processes	585	Metals and Minerals Industrial (IND4)
2311000000	Industrial Processes;Construction: SIC 15 - 17;All Processes;Total	140	Housing Change and Population
2461022999	Solvent Utilization;Miscellaneous Non-industrial: Commercial;Emulsified Asphalt;Solvents: NEC	140	Housing Change and Population
2461870999	Solvent Utilization;Miscellaneous Non-industrial: Commercial;Pesticide Application: Non-Agricultural;Not Elsewhere Classified	515	Commercial plus Institutional Land
2535010000	Storage and Transport;Bulk Materials Transport;Rail Car;Total: All Products	260	Total Railroad Miles
2810040000	Miscellaneous Area Sources;Other Combustion;Aircraft/Rocket Engine Firing and Testing;Total	700	Airport Area

4. QA Review of Final Data Sets

Table 23 lists the spatial, temporal and speciation allocation profiles and cross-reference tables, technical memoranda and other ancillary data delivered to CENRAP on October 28, 2004. Table 24 lists the sources and other attributes of the ancillary data collected and reviewed including the temporal profiles generated using the CEM data for years 2000-2003. All of the data files were QA reviewed twice by ensuring that no default profiles are being used and the data are in the correct format for use in the emissions models. The following data may be updated in early 2005 to incorporate more recent information:

- NH_3 temporal profile updates
- Spatial surrogates for the 12- kilometer modeling domain(s) once defined by CENRAP
- 4-year average temporal profiles for each major emitting CEM unit

These data will also be quality assured in a similar manner (no default profiles being used, correct format, etc.). Most of the data presented in this section have been delivered with a few additional data sets to be delivered in January 2005. These additional data sets are mentioned in this section. The next version of this report will include any necessary documentation associated with the supplemental deliverables.

Table 23. Spatial, Temporal and Speciation Allocation Data and Memos

Bytes	Date Created	Time Created	Filename
90209	10/28/2004	10:55	task8_final/amgref.m3.us+can+mex.cenrap.102804.txt
115493	10/28/2004	10:55	task8_final/amptpro.m3.us+can.cenrap.102804.txt
650073	10/28/2004	10:55	task8_final/amptref.m3.cenrap.102804.txt
75776	10/28/2004	10:54	task8_final/CENRAP_AreaEI_profile_review_task8_final.doc
135810	10/28/2004	10:55	task8_final/CENRAP_AreaEI_profile_review_task8_final.pdf
48640	10/28/2004	10:54	task8_final/CENRAP_PointEI_profile_review_task8_final.doc
146830	10/28/2004	10:55	task8_final/CENRAP_PointEI_profile_review_task8_final.pdf
142013	9/16/2004	18:14	task8_final/gspro.cmaq.cb4p25.txt
754816	10/28/2004	10:55	task8_final/gsref.cmaq.cb4p25.cenrap.102804.txt
501	10/28/2004	10:56	task8_final/README.txt
1324273	9/16/2004	18:13	task8_final/scc_desc.txt

Table 24. Ancillary Data Descriptions

File Name	Purpose	Format	Source	Possible Deficiencies	Date Delivered
amgref.m3.us+can+mex.cenrap.102804.txt	Spatial profile cross-reference	SMOKE	USEPA, MANE-VU and other reviews/applications	NH3 specific surrogates could be developed using landuse databases like BELD3	28-Oct-04
amptpro.m3.us+can.cenrap.102804.txt	Temporal profiles	SMOKE	USEPA, MANE-VU and other reviews/applications.	NH3 specific temporal profiles will be added soon	28-Oct-04
amptref.m3.cenrap.102804.txt	Temporal profile cross-reference	SMOKE	USEPA, MANE-VU and other reviews/applications	NH3 specific temporal profiles will be added soon	28-Oct-04
gspro.cmaq.cb4p25.txt	Speciation profiles for CB-IV with PM	SMOKE	USEPA: SMOKE v2 release	SPECIATE 4 data could be available soon	28-Oct-04
gsref.cmaq.cb4p25.cenrap.102804.txt	Speciation cross-references for CB-IV with PM	SMOKE	USEPA, MANE-VU and other reviews/applications	SPECIATE 4 data could be available soon	28-Oct-04
scc_desc.txt	SCC description	SMOKE	USEPA: SMOKE v2 release	Could be missing some SCC descriptions	28-Oct-04
amgref.m3.us+can+mex.cenrap.102804.rpo	Spatial profile cross-reference	RPO	USEPA, MANE-VU and other reviews/applications	NH3 specific surrogates could be developed using landuse databases like BELD3	Coming soon
amptpro.m3.us+can.cenrap.102804.rpo	Temporal profiles	RPO	USEPA, MANE-VU and other reviews/applications.	NH3 specific temporal profiles will be added soon	Coming soon
amptref.m3.cenrap.102804.rpo	Temporal profile cross-reference	RPO	USEPA, MANE-VU and other reviews/applications	NH3 specific temporal profiles will be added soon	Coming soon
gspro.cmaq.cb4p25.rpo	Speciation profiles for CB-IV with PM	RPO	USEPA: SMOKE v2 release	SPECIATE 4 data could be available soon	Coming soon
gsref.cmaq.cb4p25.cenrap.102804.rpo	Speciation cross-references for CB-IV with PM	RPO	USEPA, MANE-VU and other reviews/applications	SPECIATE 4 data could be available soon	Coming soon
ptpro.cem_winter.cenrap.2000-03.txt	Temporal profiles for CEM units	SMOKE	http://cfpub.epa.gov/gdm/index.cfm?fuseaction=prepackaged.select	Based on 4 yr (2000-2003) average profiles	Coming soon
ptpro.cem_spring.cenrap.2000-03.txt	Temporal profiles for CEM units	SMOKE	http://cfpub.epa.gov/gdm/index.cfm?fuseaction=prepackaged.select	Based on 4 yr (2000-2003) average profiles	Coming soon
ptpro.cem_summer.cenrap.2000-03.txt	Temporal profiles for CEM units	SMOKE	http://cfpub.epa.gov/gdm/index.cfm?fuseaction=prepackaged.select	Based on 4 yr (2000-2003) average profiles	Coming soon
ptpro.cem_autumn.cenrap.2000-03.txt	Temporal profiles for CEM units	SMOKE	http://cfpub.epa.gov/gdm/index.cfm?fuseaction=prepackaged.select	Based on 4 yr (2000-2003) average profiles	Coming soon

G. Preparation of SMOKE/IDA and RPO Data Exchange Protocol (NIF 3.0) Formats

This section describes the inventory and SMOKE emission processor files prepared under this project. The Excel Workbook file named "CENRAP Inventory File Documentation _030405.xls" provides the names of the files delivered, as well as other file information useful for transferring data to air quality modeling centers. This Excel Workbook file is provided along with this report. The following Table 25 provides a summary of the files delivered.

The ancillary data (described in section F) that are necessary input for emissions preprocessors have been formatted for use in SMOKE and in the RPO Data Exchange Protocol format. Table 26 lists the profiles, cross-reference tables, and other ancillary data (SCC descriptions) that have been provided to CENRAP. The data have undergone a review which is described in section F and in technical memoranda sent to CENRAP on October 28, 2004.

Table 25. Summary of Mass Emissions and SMOKE Input Files

S/L/T Agencies Included in Files	NIF 3.0 File Name Containing Mass Emissions Inventory (Access 2000 Database Files)	Temporal Period of Mass Emissions Inventory	SMOKE/IDA File Name	Temporal Period of Emissions in SMOKE/IDA File	Notes
Point Source Inventory					
AR, IA, KS, LA, MN, MO, NE, OK, TX, Local, and Tribal	CENRAP_2002_Point_021605.mdb	Annual	CENRAP_POINT_SMOKE_INPUT_ANNUAL_DAILY_021805.txt	Annual for all agencies; Daily for MO and TX	Includes all sectors supplied by S/L/T agencies. Tribal inventory is for Fond du Lac Band of the Minnesota Chippewa Tribe. Local inventories include Lancaster County (Lincoln) and Douglas County (Omaha), NE
MO and TX	CENRAP_2002_Point_Daily_Missouri_Texas_20050216.mdb	Daily	CENRAP_POINT_SMOKE_INPUT_ANNUAL_DAILY_021805.txt	"	Daily emissions for MO and TX are included in the SMOKE/IDA file containing annual emissions for all CENRAP agencies, but placed in a NIF 3.0 file separate from the NIF 3.0 file containing the annual emissions.
Nonroad Source Inventory					
AR, IA, KS, LA, MN, MO, NE, OK, TX	CENRAP_2002_Nonroad_030305.mdb	Annual and Daily	CENRAP_NONROAD_SMOKE_INPUT_ANN_STATE_030405.txt	Annual	Includes NONROAD Model Categories and Aircraft, Commercial Marine Vessels, and Railroad Locomotives. NONROAD Model inventory is from CENRAP-sponsored inventory except for TX who supplied its own NONROAD Model Inventory. MN included commercial and military aircraft and auxiliary power units in its point source inventory; therefore, the nonroad inventory does not contain emissions for these categories in MN.
Area Source Inventory					
AR, IA, KS, LA, MN, MO, NE, OK, TX	CENRAP_2002_Area_022205.mdb	Annual, Daily, and Monthly	CENRAP_AREA_SMOKE_INPUT_ANN_STATE_022205.txt	Annual	Includes all sectors except for those included in the Area Misc files. Planned burning emissions from CENRAP-sponsored area source inventory are excluded for IA, KS, LA, MN, MO, OK, and NE (except for Lancaster County [FIPS 31109]); the SMOKE files for the CENRAP planned burning inventory will be used for these states.
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_JAN_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_FEB_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_MAR_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).

Table 25 (continued)

S/L/T Agencies Included in Files	NIF 3.0 File Name Containing Mass Emissions Inventory (Access 2000 Database Files)	Temporal Period of Mass Emissions Inventory	SMOKE/IDA File Name	Temporal Period of Emissions in SMOKE/IDA File	Notes
Area Source Inventory (continued)					
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_APR_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_MAY_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_JUN_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_JUL_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_AUG_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_SEP_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_OCT_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_NOV_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_DEC_120304.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
Fond du Lac Band of the Minnesota Chippewa Tribe	"	"	CENRAP_AREA_SMOKE_INPUT_ANN_TRIBE_120704.txt	Annual	Includes emissions for the paved and unpaved road and prescribed burning area source categories.
AR, TX, and Lancaster County, NE	"	"	CENRAP_AREA_BURNING_SMOKE_ INPUT_ANN_TX_AR_NELI_120704.txt	Annual	Includes state and local prepared planned burning emissions. SMOKE input files for area source planned burning emissions for all other states are available from CENRAP-sponsored inventory.

Table 25 (continued)

S/L/T Agencies Included in Files	NIF 3.0 File Name Containing Mass Emissions Inventory (Access 2000 Database Files)	Temporal Period of Mass Emissions Inventory	SMOKE/IDA File Name	Temporal Period of Emissions in SMOKE/IDA File	Notes
Area Miscellaneous Source Inventory					
AR, IA, KS, LA, MN, MO, NE, OK, TX	CENRAP_2002_Area_Misc_120804.mdb	Annual, Daily, and Monthly	CENRAP_AREA_MISC_SMOKE_INPUT_ANN_STATE_120704.txt	Annual	Natural Sources and Two On-road Mobile SCCs from CMU Model
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_JAN_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_FEB_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_MAR_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_APR_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_MAY_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_JUN_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_JUL_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_AUG_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_SEP_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_OCT_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_NOV_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_DEC_120304.txt	Monthly Emissions x 12	Natural Sources and Two On-road Mobile SCCs from CMU Model. Monthly emissions are multiplied by 12 (months).

Table 26. Profiles, Cross-Reference Tables, and Other Ancillary Data Provided to CENRAP that can be used with Emissions Preprocessors/Models (e.g. SMOKE, CONCEPT)

Filename	Purpose	Format[1]
amgref.m3.us+can+mex.cenrap.102804.txt	Spatial profile cross-reference	SMOKE
amptpro.m3.us+can.cenrap.102804.txt	Temporal profiles	SMOKE
amptref.m3.cenrap.102804.txt	Temporal profile cross-reference	SMOKE
gspro.cmaq.cb4p25.txt	Speciation profiles for CB-IV with PM	SMOKE
gsref.cmaq.cb4p25.cenrap.102804.txt	Speciation cross-references for CB-IV with PM	SMOKE
scc_desc.txt	SCC description	SMOKE
amgref.m3.us+can+mex.cenrap.102804.rpo	Spatial profile cross-reference	RPO
amptpro.m3.us+can.cenrap.102804.rpo	Temporal profiles	RPO
amptref.m3.cenrap.102804.rpo	Temporal profile cross-reference	RPO
gspro.cmaq.cb4p25.rpo	Speciation profiles for CB-IV with PM	RPO
gsref.cmaq.cb4p25.cenrap.102804.rpo	Speciation cross-references for CB-IV with PM	RPO

[1] RPO = Regional Planning Organization (PRO) Data Exchange Protocol.

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III. SUMMARIES OF EMISSIONS INVENTORIES FOR THE CENRAP REGION

Summaries of emissions were prepared from the emission inventory files for each sector and for all sectors combined. The summaries are provided in an Access 2000 database named "CENRAP Emission Summaries_030805.mdb". Table 27 identifies and briefly describes the contents of the emissions summary tables included in the database. The nonroad source sector summaries include emissions for aircraft, commercial marine vessels, and locomotives as well as the emissions from the NONROAD model categories. The onroad summaries were prepared from the CENRAP-sponsored inventory for onroad sources. Tables 1G, 2C, 3C, 4C, and 5C include the data source code for the area, point, nonroad, and onroad sectors to assist in identifying the origin and year of emissions inventory data. The data source codes were defined previously in Chapter II of this report.

The summaries in Appendix A of this report are taken from the emissions summary Table 2D. However, emissions summary Table 2D includes natural sources/biogenic NH_3 emissions and geogenic PM10-PRI and PM25-PRI emissions. The biogenic and geogenic emissions were excluded from the summary tables included in Chapter I of the report. Thus, the biogenic and geogenic emissions were excluded from the NH_3 and PM10-PRI and PM25-PRI summaries in Appendix A so that the total emissions in the Appendix A summaries match the total emissions in the summaries in Chapter I of the report.

Table 27. Emissions Summaries

Summary Table Name	Description
All Sector Summaries	
Table 1A_All Sectors	Summary of Annual Emissions by Pollutant and Sector for the CENRAP Region
Table 1B_All Sectors	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/Pollutant and Sector
Table 1C_All Sectors	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name/Pollutant and Sector
Table 1D_All Sectors	Summary of Annual Emissions by Category/Sector and Pollutant for the CENRAP Region
Table 1E_All Sectors	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/ Source Category Name and Number/Sector and Pollutant
Table 1F_All Sectors	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name/Source Category Name and Number/Sector and Pollutant
Table 1G_All Sectors	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name/SCC and SCC Description/Source Category Name and Number/ Sector/Pollutant and Data Source Code

Table 27 (continued)

Summary Table Name	Description
Area Source and Biogenic/Natural Source Sector Summaries	
Table 2A_Area Sources	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name and Pollutant
Table 2B_Area Sources	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name and Pollutant
Table 2C_Area Sources	Summary of Annual Emissions and Data Source Codes by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name/SCC/SCC Description and Pollutant
Table 2D_Area Sources	Summary of Annual Emissions by SCC/SCC Description/Pollutant and State/Tribe
Table 2E_Area Sources	Summary of Annual Emissions by Pollutant and State/Tribe
Point Source Sector Summaries	
Table 3A_Point Sources	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name and Pollutant
Table 3B_Point Sources	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name and Pollutant
Table 3C_Point Sources	Summary of Annual Emissions and Data Source Codes by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name/SCC/SCC Description and Pollutant
Table 3D_Point Sources	Summary of Annual Emissions by SCC/SCC Description/Pollutant and State/Tribe
Table 3E_Point Sources	Summary of Annual Emissions by Pollutant and State/Tribe
Table 3F_Point Sources	Facility-level Summary
Nonroad Source Sector Summaries	
Table 4A_Nonroad Sources	Summary of Annual Emissions by State FIPS/State Name and Pollutant
Table 4B_Nonroad Sources	Summary of Annual Emissions by State FIPS/State Name/County FIPS/County Name and Pollutant
Table 4C_Nonroad Sources	Summary of Annual Emissions and Data Source Codes by State FIPS/State Name/County FIPS/County Name/SCC/SCC Description and Pollutant
Table 4D_Nonroad Sources	Summary of Annual Emissions by SCC/SCC Description/Pollutant and State
Table 4E_Nonroad Sources	Summary of Annual Emissions by Pollutant and State
Onroad Source Sector Summaries	
Table 5A_Onroad Sources	Summary of Annual Emissions by State FIPS/State Name and Pollutant
Table 5B_Onroad Sources	Summary of Annual Emissions by State FIPS/State Name/County FIPS/County Name and Pollutant
Table 5C_Onroad Sources	Summary of Annual Emissions and Data Source Codes by State FIPS/State Name/County FIPS/County Name/SCC/SCC Description and Pollutant
Table 5D_Onroad Sources	Summary of Annual Emissions by SCC/SCC Description/Pollutant and State
Table 5E_Onroad Sources	Summary of Annual Emissions by Pollutant and State

IV. METHODS FOR AREAS OUTSIDE OF THE CENRAP REGION

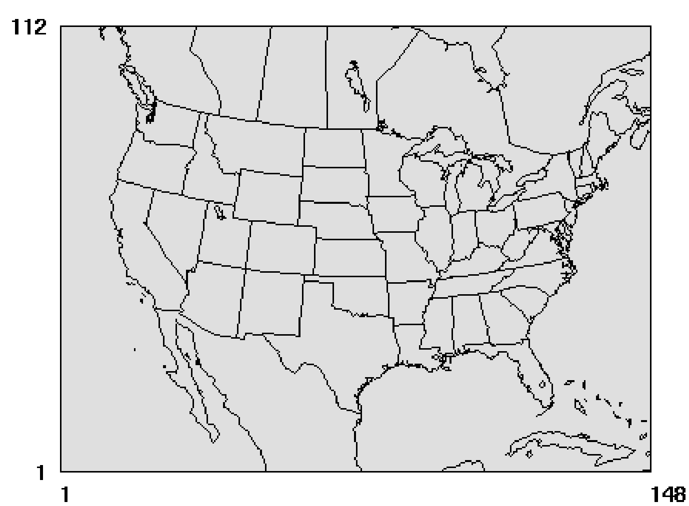
A. Data Sources

This task involved gathering and consolidating point and area source emissions data for areas outside the CENRAP region. The sources of data included emissions inventories compiled by the other RPOs, the EPA, Environment Canada, Texas Commission on Environmental Quality (TCEQ), and other applications (e.g., Big Bend Regional Aerosol and Visibility Observational (BRAVO)). CENRAP indicated to UNC-CEP the definition of the 36-kilometer modeling domain would have the following definition:

NCOLS = 148
NROWS = 112
GDTYP = 2 (Lambert conformal)
P_ALP = 33.
P_BET = 45.
P_GAM = -97.
XCENT = -97.
YCENT = 40.
XORIG = -2736000.
YORIG = -2088000.
XCELL = 36000.
YCELL = 36000.

This modeling domain definition is also illustrated in Figure 6.

Figure 6. The CENRAP 36-kilometer modeling domain.



We used this 36-kilometer domain definition to come up with the geographical areas outside of the CENRAP states where inventory data are needed for CENRAP modeling applications.

We contacted the VISTAS and WRAP RPOs and were able to acquire year 2002 point, area and nonroad inventory data for their respective states. The data acquired was being used in their most recent modeling applications, however they did inform us that updates to the 2002 inventory are likely in near future. As of late December 2004, the Midwest RPO did not have a "final" version of their 2002 inventory to release for use by other RPOs. MANE-VU RPO's point, area, onroad, and nonroad inventories were finalized at the end of January 2005 and made available to other RPOs in February 2005.

The Mexican inventory databases available were the 1999 inventory used in the BRAVO modeling application and an updated inventory being developed by another contractor (Eastern Research Group [ERG]). We were not able to obtain the updated inventory from ERG. Moreover, the point source inventory will most likely be proprietary and could require a non-discloser agreement. Since we could not obtain this data, we recommend using the BRAVO inventories for the areas of the CENRAP modeling domain(s) that includes regions of Mexico.

The Canadian inventory databases from Environment Canada available are a 1995 inventory and a recently release year 2000 inventory. The point source data are proprietary, therefore, the data for year 2000 were not immediately available and the 1995 point source inventory can't be used by CENRAP unless their contractors get permission from Environment Canada to do so. However, we were able to obtain the area, nonroad, and mobile source inventories for the year 2000 from Environment Canada. We were able to reformat the data for use in SMOKEv2 and produce emissions total reports. These reports did not match up with the emission inventory totals Environment Canada provided with the data. The EPA and UNC-CEP found many problems with the year 2000 data including a lack of subprovince codes for better spatial allocation of emissions and different set of SCCs in the ASCII version of the inventory vs. the Microsoft Access version of the inventory. We reported these issues to Environment Canada and very recently (late December 2004) received another version of this inventory. We are now beginning to QA this new version. However, we recommend using the year 1995 area, nonroad and mobile source inventories until confidence in the year 2000 data can be acquired.

The Minerals Management Services (MMS) recently released a year 2000 Gulfwide Emissions Inventory (GWEI) which is available at the following website:

http://www.gomr.mms.gov/homepg/regulate/environ/airquality/gulfwide_emission_inventory/2000GulfwideEmissionInventory.html

This inventory dataset includes platform (treated as point sources) and non-platform (treated as area sources) sources for most of the Gulf of Mexico. TCEQ and other contractors (Environ and ERG) provided UNC-CEP with ancillary and sample MMS inventories for an average August 2000 day in Emissions Preprocessor System version 3 (EPS3) format. UNC-CEP was able to use these ancillary data and the raw MMS data to create annual inventory in SMOKE IDA format for the non-platform sources and an average August 2000 inventory in SMOKE IDA format for the platform sources. Generating an annual platform inventory will require additional

ancillary data to be acquired from TCEQ. TCEQ is working on providing this data. UNC-CEP will generate the year 2000 annual inventory for platform sources as soon as this ancillary data are acquired. Additional ancillary data necessary in order to use the MMS SMOKE IDA inventories in emissions modeling were also generated. This ancillary data includes spatial surrogates for the CENRAP 36-kilometer grid (Figure 6), temporal profiles, and spatial and temporal cross-references. These data have been provided to CENRAP for use in emissions modeling applications for both the non-platform and platform inventories. Additional technical details about these MMS inventories were provided with the data to help emissions modelers understand and properly apply the inventory and ancillary data.

All of the data and associated emissions summaries described in this section were delivered to CENRAP on December 27, 2004. Table 28 provides a list of the deliverables, the date acquired, the sources used to assemble the data, the contractor(s) and/or organizations that assembled the data, possible deficiencies of the data, time period of the data (e.g., year 2002), and other necessary information needed to enable CENRAP to best understand the databases that are available. Draft summaries of point and area source emissions data for these data obtained for areas outside of CENRAP were generated and provided with the December 27, 2004 deliverables.

B. Supplemental Data/Augmentation Procedures

The supplemental data needed to run SMOKE were provided to CENRAP and described in detail in section F of this report. Additional ancillary data to support the data sets described in the previous section (IV.A) were provided to CENRAP on December 27, 2004. This mainly included specific spatial profile and cross-references and temporal cross-references for the Minerals Management Service (MMS) inventories, but also included better default stack parameters for Mexican point sources. Table 29 includes a listing of all files provided to CENRAP on December 27, 2004.

Table 28. Description of Inventory Data Provided to CENRAP

Geographic Region/RPO	Raw Data	Time Period	Raw Data Format	Date Received	Source of Data	Source of Ancillary Data	Possible Deficiencies	Date Data and Summaries Delivered to CENRAP
VISTAS	Point, area and nonroad	2002	SMOKE IDA	24-Aug-04	Gregory Stella, Alpine Geophysics	Gregory Stella, Alpine Geophysics	Possibly updated inventory coming soon	27-Dec-04
WRAP	Point, area and nonroad	2002	SMOKE IDA	1-Dec-04	Tom Moore, Colorado St and Zac Adelman, UNC-CEP	Tom Moore, Colorado St and Zac Adelman, UNC-CEP	Possibly updated inventory coming soon	27-Dec-04
Mexico	Point, area, nonroad and mobile	1999	SMOKE IDA	Early 2002	Hampden Kuhns, Desert Research Institute	Jeff Vukovich, UNC-CEP	1999 specific; updated Mexican inventory available from ERG soon?	27-Dec-04
Canada	Area, nonroad and mobile	2000	SMOKE IDA	Jan 12, 2005	ftp://ftp.epa.gov/pub/EmisInventory/canada_2000inventory/. USEPA via Env. Canada	UNC-CEP	New inventory; not well tested in AQ modeling applications.	12-Jan-05
Gulf of Mexico	Point, area and nonroad	2000	MS Access	18-Oct-04	MMS website: http://www.gomr.mms.gov/homepg/regulate/environ/airquality/gulfwide_emission_inventory/2000GulfwideEmissionInventory.html	Jim MacKay and Ron Thomas, TCEQ and Richard Billings, ERG	2000 specific; platform inventory is based on average August day	27-Dec-04
MARAMA	Area, nonroad and point	2002	SMOKE IDA	Last updated Feb 15, 2005	http://www.marama.org/visibility/Inventory%20Summary/2002EmissionsInventory.htm	MARAMA website/ EH Pechan	Unknown since updated recently.	15-Feb-05

Table 29. Listing of Supplemental Data Files

Bytes	Date created	Time created	File Name
506780	12/6/2004	13:41:58	task4b/CN/arinv.ca95_v3_nrd+stat+onrd.ida.gz
991	12/6/2004	13:41:08	task4b/CN/summaries/a.county.can95.rpt.gz
7201	12/6/2004	13:41:08	task4b/CN/summaries/a.scc.can95.rpt.gz
878	12/6/2004	13:41:08	task4b/CN/summaries/a.state.can95.rpt.gz
34248	12/6/2004	13:41:08	task4b/CN/summaries/a.state_scc.can95.rpt.gz
125146	12/17/2004	18:47:50	task4b/MMS/ge_dat/agpro.nonplatform.US36_148X112.txt.gz
143	12/17/2004	18:47:51	task4b/MMS/ge_dat/amgref.m3.nonplatform.goads.txt.gz
540	12/17/2004	18:47:51	task4b/MMS/ge_dat/amptpro.m3.goads.txt.gz
261	12/17/2004	18:47:51	task4b/MMS/ge_dat/amptref.m3.goads.txt.gz
90692	12/17/2004	18:47:51	task4b/MMS/ge_dat/costcy.goads.txt.gz
1125	12/17/2004	18:48:46	task4b/MMS/ge_dat/GRIDDESC
20783	12/17/2004	18:47:51	task4b/MMS/ge_dat/gspro.cmaq.cb4p25.txt.gz
329	12/17/2004	18:47:51	task4b/MMS/ge_dat/gsref.goads.cmaq.cb4p25.txt.gz
122488	12/17/2004	18:47:52	task4b/MMS/ge_dat/scc_desc.goads.txt.gz
449	12/20/2004	15:47:12	task4b/MMS/non-platform/arinv.goads.lst
156569	12/20/2004	15:47:12	task4b/MMS/non-platform/CO.nonplatform_2000EI.ida.sort.gz
172086	12/20/2004	15:47:13	task4b/MMS/non-platform/NOX.nonplatform_2000EI.ida.sort.gz
200071	12/20/2004	15:47:13	task4b/MMS/non-platform/PM.nonplatform_2000EI.ida.sort.gz
160729	12/20/2004	15:47:13	task4b/MMS/non-platform/SO2.nonplatform_2000EI.ida.sort.gz
258715	12/20/2004	15:47:39	task4b/MMS/non-platform/summaries/a.county.goads.rpt.gz
1101	12/20/2004	15:47:40	task4b/MMS/non-platform/summaries/a.scc.goads.rpt.gz
2245	12/20/2004	15:47:40	task4b/MMS/non-platform/summaries/a.state.goads.rpt.gz
13071	12/20/2004	15:47:40	task4b/MMS/non-platform/summaries/a.state_scc.goads.rpt.gz
1123	12/20/2004	15:47:40	task4b/MMS/non-platform/summaries/ag.scc.us36.goads.rpt.gz
2267	12/20/2004	15:47:40	task4b/MMS/non-platform/summaries/ag.state.us36.goads.rpt.gz
13095	12/20/2004	15:47:40	task4b/MMS/non-platform/summaries/ag.state_scc.us36.goads.rpt.gz
476760	12/20/2004	15:47:40	task4b/MMS/non-platform/summaries/ag.us36.goads.ncf
201639	12/20/2004	15:47:14	task4b/MMS/non-platform/VOC.nonplatform_2000EI.ida.sort.gz
120226	12/20/2004	15:46:35	task4b/MMS/platform/CO.afs.gwei2000.20000801.latlong.ida.gz
122429	12/20/2004	15:46:35	task4b/MMS/platform/NOX.afs.gwei2000.20000801.latlong.ida.gz
100504	12/20/2004	15:46:36	task4b/MMS/platform/PM10.afs.gwei2000.20000801.latlong.ida.gz
99235	12/20/2004	15:46:36	task4b/MMS/platform/PM2_5.afs.gwei2000.20000801.latlong.ida.gz
584	12/20/2004	15:46:37	task4b/MMS/platform/ptinv.goads.lst
1052	12/20/2004	15:46:37	task4b/MMS/platform/SO2.afs.gwei2000.20000801.latlong.ida.gz
891	12/20/2004	15:47:56	task4b/MMS/platform/summaries/p.county.goads.rpt
9566	12/20/2004	15:47:56	task4b/MMS/platform/summaries/p.scc.goads.rpt
811	12/20/2004	15:47:57	task4b/MMS/platform/summaries/p.state.goads.rpt
10358	12/20/2004	15:47:57	task4b/MMS/platform/summaries/p.state_scc.goads.rpt

Table 29 (continued)

Bytes	Date created	Time created	File Name
500856	12/20/2004	15:46:39	task4b/MMS/platform/VOC.afs.gwei2000.20000801.latlong.ida.gz
12093	12/20/2004	16:11:18	task4b/MMS/README.04dec20.mms
281244	12/6/2004	13:43:49	task4b/MX/arinv.mx.ver7.txt.gz
412	12/6/2004	13:44:42	task4b/MX/pstk.mx.m3.txt.gz
8219	12/6/2004	13:44:14	task4b/MX/ptinv_mx_dat.txt.dos.gz
19497	12/6/2004	13:45:45	task4b/MX/summaries/a.county.mexico.rpt.gz
3313	12/6/2004	13:45:45	task4b/MX/summaries/a.scc.mexico.rpt.gz
750	12/6/2004	13:45:46	task4b/MX/summaries/a.state.mexico.rpt.gz
11251	12/6/2004	13:45:46	task4b/MX/summaries/a.state_scc.mexico.rpt.gz
1896	12/6/2004	13:45:53	task4b/MX/summaries/p.county.mexico.rpt.gz
1136	12/6/2004	13:45:53	task4b/MX/summaries/p.scc.mexico.rpt.gz
793	12/6/2004	13:45:53	task4b/MX/summaries/p.state.mexico.rpt.gz
2595	12/6/2004	13:45:53	task4b/MX/summaries/p.state_scc.mexico.rpt.gz
1543109	12/1/2004	16:06:30	task4b/VISTAS/ida_ar_2002_24mar04.emis.onlyVISTAS.cep.gz
5653943	12/1/2004	16:06:30	task4b/VISTAS/ida_nr_2002_23mar04.emis.onlyVISTAS.cep.gz
2963335	12/1/2004	16:06:31	task4b/VISTAS/ptinv_vistas_2002_041504.ida.onlyVISTAS.cep.gz
36041	12/1/2004	15:34:56	task4b/VISTAS/summaries/a.county.onlyvistas.rpt.gz
6836	12/1/2004	15:34:56	task4b/VISTAS/summaries/a.scc.onlyvistas.rpt.gz
773	12/1/2004	15:34:56	task4b/VISTAS/summaries/a.state.onlyvistas.rpt.gz
38118	12/1/2004	15:34:56	task4b/VISTAS/summaries/a.state_scc.onlyvistas.rpt.gz
38973	12/1/2004	15:47:05	task4b/VISTAS/summaries/n.county.onlyvistas.rpt.gz
11112	12/1/2004	15:47:05	task4b/VISTAS/summaries/n.scc.onlyvistas.rpt.gz
766	12/1/2004	15:47:05	task4b/VISTAS/summaries/n.state.onlyvistas.rpt.gz
92264	12/1/2004	15:47:05	task4b/VISTAS/summaries/n.state_scc.onlyvistas.rpt.gz
30334	12/1/2004	15:23:06	task4b/VISTAS/summaries/p.county.onlyvistas.rpt.gz
95552	12/1/2004	15:23:06	task4b/VISTAS/summaries/p.scc.onlyvistas.rpt.gz
739	12/1/2004	15:23:06	task4b/VISTAS/summaries/p.state.onlyvistas.rpt.gz
265922	12/1/2004	15:23:06	task4b/VISTAS/summaries/p.state_scc.onlyvistas.rpt.gz
493742	12/2/2004	17:27:40	task4b/WRAP/area/arinv.WRAP2002_v3_ida.txt.onlyWRAP.cep.gz
564251	12/2/2004	17:26:16	task4b/WRAP/nonroad/nrinv.Environ_WRAP_aut03_v2_ida.txt.gz
564198	12/2/2004	17:26:17	task4b/WRAP/nonroad/nrinv.Environ_WRAP_spr03_v2_ida.txt.gz
579653	12/2/2004	17:26:19	task4b/WRAP/nonroad/nrinv.Environ_WRAP_sum03_v2_ida.txt.gz
539663	12/2/2004	17:26:21	task4b/WRAP/nonroad/nrinv.Environ_WRAP_win03_v2_ida.txt.gz
5111	12/2/2004	17:26:22	task4b/WRAP/nonroad/nrinv.WRAP_shipping03_v1_ida.txt.gz
3135152	12/2/2004	17:26:52	task4b/WRAP/point/ptinv.WRAP2002_v1_WRAPonly_ida.txt.gz
21717	12/2/2004	11:10:58	task4b/WRAP/summaries/a.county.onlywrap.rpt.gz
8872	12/2/2004	11:10:58	task4b/WRAP/summaries/a.scc.onlywrap.rpt.gz
887	12/2/2004	11:10:58	task4b/WRAP/summaries/a.state.onlywrap.rpt.gz
28653	12/2/2004	11:10:58	task4b/WRAP/summaries/a.state_scc.onlywrap.rpt.gz
24690	12/2/2004	17:17:02	task4b/WRAP/summaries/n.county.aut_wrap.rpt.gz
2768	12/2/2004	17:19:44	task4b/WRAP/summaries/n.county.shp_wrap.rpt.gz
24725	12/2/2004	17:13:30	task4b/WRAP/summaries/n.county.spr_wrap.rpt.gz
25009	12/2/2004	17:15:16	task4b/WRAP/summaries/n.county.sum_wrap.rpt.gz
24516	12/2/2004	17:10:29	task4b/WRAP/summaries/n.county.win_wrap.rpt.gz
1900	12/2/2004	17:17:02	task4b/WRAP/summaries/n.scc.aut_wrap.rpt.gz
462	12/2/2004	17:19:44	task4b/WRAP/summaries/n.scc.shp_wrap.rpt.gz
1922	12/2/2004	17:13:30	task4b/WRAP/summaries/n.scc.spr_wrap.rpt.gz
1909	12/2/2004	17:15:16	task4b/WRAP/summaries/n.scc.sum_wrap.rpt.gz
1893	12/2/2004	17:10:29	task4b/WRAP/summaries/n.scc.win_wrap.rpt.gz
952	12/2/2004	17:17:02	task4b/WRAP/summaries/n.state.aut_wrap.rpt.gz
453	12/2/2004	17:19:44	task4b/WRAP/summaries/n.state.shp_wrap.rpt.gz
964	12/2/2004	17:13:30	task4b/WRAP/summaries/n.state.spr_wrap.rpt.gz
956	12/2/2004	17:15:16	task4b/WRAP/summaries/n.state.sum_wrap.rpt.gz
958	12/2/2004	17:10:29	task4b/WRAP/summaries/n.state.win_wrap.rpt.gz

Table 29 (continued)

Bytes	Date created	Time created	File Name
12790	12/2/2004	17:17:02	task4b/WRAP/summaries/n.state_scc.aut_wrap.rpt.gz
706	12/2/2004	17:19:44	task4b/WRAP/summaries/n.state_scc.shp_wrap.rpt.gz
12857	12/2/2004	17:13:30	task4b/WRAP/summaries/n.state_scc.spr_wrap.rpt.gz
12913	12/2/2004	17:15:16	task4b/WRAP/summaries/n.state_scc.sum_wrap.rpt.gz
12480	12/2/2004	17:10:29	task4b/WRAP/summaries/n.state_scc.win_wrap.rpt.gz
15361	12/2/2004	11:03:55	task4b/WRAP/summaries/p.county.onlywrap.rpt.gz
70477	12/2/2004	11:03:55	task4b/WRAP/summaries/p.scc.onlywrap.rpt.gz
879	12/2/2004	11:03:55	task4b/WRAP/summaries/p.state.onlywrap.rpt.gz
161640	12/2/2004	11:03:55	task4b/WRAP/summaries/p.state_scc.onlywrap.rpt.gz

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V. REFERENCES

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APPENDIX A

SUMMARIES OF ANNUAL EMISSIONS BY SOURCE CATEGORY, SECTOR, AND POLLUTANT

Table A-1. Summary of Annual VOC Emissions for the CENRAP Region by Category, Sector, and Pollutant

Category	Category Number	Sector	VOC Tons/Year	VOC Percent of Total	VOC Cumulative Percent
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	765,838	17.47	17.47
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA	731,153	16.68	34.15
Mobile Sources-Pleasure Craft	2282	NONROAD	418,585	9.55	43.7
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	208,980	4.77	48.47
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA	189,313	4.32	52.79
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA	167,832	3.83	56.62
Industrial Surface Coating	2401015000	AREA	153,472	3.5	60.12
Stationary Source Fuel Combustion-Residential	2104	AREA	143,710	3.28	63.4
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA	128,915	2.94	66.34
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	102,575	2.34	68.68
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	101,968	2.33	71.01
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	95,121	2.17	73.18
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	87,696	2	75.18
Architectural Coatings	2401001000	AREA	78,767	1.8	76.98
Gas Marketing Stage II	25010601	AREA	74,667	1.7	78.68
Miscellaneous Area Sources-Other Combustion	2810	POINT	69,037	1.57	80.25
Miscellaneous Area Sources-Other Combustion	2810	AREA	68,527	1.56	81.81
Industrial Processes-Chemical Manufacturing	301	POINT	68,030	1.55	83.36
Industrial Processes-Petroleum Industry	306	POINT	65,784	1.5	84.86
Degreasing	2415	AREA	58,013	1.32	86.18
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	48,208	1.1	87.28
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA	45,775	1.04	88.32
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA	40,923	0.93	89.25
Gas Marketing Stage I	25010600	AREA	39,759	0.91	90.16
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	29,257	0.67	90.83
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	26,471	0.6	91.43
Industrial Processes-Oil and Gas Production	310	POINT	25,917	0.59	92.02
Internal Combustion Engines-Industrial	2020	POINT	25,671	0.59	92.61
Graphic Arts	2425	AREA	21,610	0.49	93.1
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	21,313	0.49	93.59
Industrial Processes-Food and Agriculture	302	POINT	19,039	0.43	94.02
Solvent Utilization-Dry Cleaning	2420	AREA	18,967	0.43	94.45
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA	17,119	0.39	94.84
Mobile Sources-Railroad Equipment	2285	NONROAD	16,523	0.38	95.22
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT	15,417	0.35	95.57
Auto Refinishing	2401005000	AREA	12,277	0.28	95.85
External Combustion Boilers-Electric Generation	1010	POINT	11,693	0.27	96.12
Mobile Sources-LPG	2267	NONROAD	11,266	0.26	96.38
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA	9,790	0.22	96.60
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	8,855	0.2	96.80
Traffic Markings	2401008000	AREA	8,694	0.2	97.00
External Combustion Boilers-Industrial	1020	POINT	8,680	0.2	97.20
Industrial Processes-Mineral Products	305	POINT	8,366	0.19	97.39
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	8,203	0.19	97.58
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	8,167	0.19	97.77

Table A-1 (continued)

Category	Category Number	Sector	VOC		
			Tons/Year	Percent of Total	Cumulative Percent
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	7,998	0.18	97.95
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	7,394	0.17	98.12
Mobile Sources-CNG	2268	NONROAD	6,458	0.15	98.27
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA	6,215	0.14	98.41
Industrial Processes-Secondary Metal Production	304	POINT	5,912	0.13	98.54
Stationary Source Fuel Combustion-Industrial	2102	AREA	5,408	0.12	98.66
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA	5,347	0.12	98.78
Mobile Sources-Aircraft	2275	NONROAD	5,337	0.12	98.90
Industrial Processes-Cooling Tower	3850	POINT	4,751	0.11	99.01
Rubber/Plastics	2430000000	AREA	4,256	0.1	99.11
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA	3,605	0.08	99.19
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	3,120	0.07	99.26
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	2,996	0.07	99.33
Industrial Processes-Primary Metal Production	303	POINT	2,625	0.06	99.39
Internal Combustion Engines-Commercial/Institutional	2030	POINT	2,349	0.05	99.44
Industrial Processes-Industrial Processes: NEC	2399	AREA	2,097	0.05	99.49
Waste Disposal-Solid Waste Disposal-Government	501	POINT	2,076	0.05	99.54
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	1,684	0.04	99.58
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA	1,678	0.04	99.62
Internal Combustion Engines-Electric Generation	2010	POINT	1,576	0.04	99.66
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	1,531	0.03	99.69
Industrial Processes-Fabricated Metal Products	309	POINT	1,528	0.03	99.72
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA	1,254	0.03	99.75
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	1,146	0.03	99.78
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA	1,009	0.02	99.80
Industrial Processes-In-process Fuel Use	390	POINT	742	0.02	99.82
External Combustion Boilers-Commercial/Institutional	1030	POINT	682	0.02	99.84
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA	650	0.01	99.85
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	606	0.01	99.86
Mobile Sources-Aircraft	2275	POINT	599	0.01	99.87
Industrial Processes-Textile Products	330	POINT	567	0.01	99.88
Internal Combustion Engines-Fugitive Emissions	2888	POINT	508	0.01	99.89
Industrial Processes-Electrical Equipment	313	POINT	502	0.01	99.90
Internal Combustion Engines-Engine Testing	2040	POINT	455	0.01	99.91
Industrial Processes-Machinery, Miscellaneous	3129	POINT	455	0.01	99.92
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA	450	0.01	99.93
Industrial Processes-Transportation Equipment	314	POINT	378	0.01	99.94
Mobile Sources-Aircraft	2275	AREA	285	0.01	99.95
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT	283	0.01	99.96
MACT Source Categories : Vinyl-based Resins	6463	POINT	256	0.01	99.97
MACT Source Categories : Cellulose-based Resins	644	POINT	221	0.01	99.98
External Combustion Boilers-Space Heaters	1050	POINT	207	0	99.98
Industrial Processes-Leather and Leather Products	3209	POINT	130	0.00	99.98
Bulk Materials Transport & Transport	253	AREA	108	0.00	99.99
Petroleum and Solvent Evaporation-	4250	POINT	101	0.00	99.99
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	79	0.00	99.99
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT	67	0.00	99.99
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT	51	0.00	99.99
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA	45	0.00	99.99
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT	39	0.00	99.99

Table A-1 (continued)

Category	Category Number	Sector	VOC		
			Tons/Year	Percent of Total	Cumulative Percent
Waste Disposal-Site Remediation	504	POINT	35	0.00	100.0
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT	20	0.00	100.0
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT	16	0.00	100.0
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT	16	0.00	100.0
MACT Source Categories-Miscellaneous Resins	6452	POINT	12	0.00	100.0
Industrial Processes-Building Construction	3110	POINT	11	0.00	100.0
MACT Source Categories : Agricultural Chemicals Production	631	POINT	3.1	0.00	100.0
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT	2.1	0.00	100.0
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT	1.0	0.00	100.0
MACT Source Categories : Food and Agricultural Processes	6258	POINT	0.7	0.00	100.0
Miscellaneous Area Sources-Agricultural Production-Crops	2801	POINT	0.5	0.00	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT	0.0	0.00	100.0
Mobile Sources-Unpaved Roads	2296	POINT		0.00	100.0
Mobile Sources-Paved Roads	2294	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6824	POINT		0	100.0
Mobile Sources-Unpaved Roads	2296	AREA		0	100.0
Industrial Processes-Construction: SIC 15-17	2311	AREA		0	100.0
Mobile Sources-Paved Roads	2294	AREA		0	100.0
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA		0	100.0
Industrial Processes-Printing and Publishing	3600	POINT		0	100.0
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT		0	100.0
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA		0	100.0
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA		0	100.0
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA		0	100.0
Mobile Sources-Highway Vehicles-Gasoline	2201	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA		0	100.0
Mobile Sources-Highway Vehicles-Diesel	2230	AREA		0	100.0
Inorganic Chemical Storage & Transport	252	AREA		0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA		0	100.0
Totals for All Categories			4,383,876	100	

Table A-2. Summary of Annual NOx Emissions for the CENRAP Region by Category, Sector, and Pollutant

Category	Category Number	Sector	NOx Tons/Year	NOx Percent of Total	NOx Cumulative Percent
External Combustion Boilers-Electric Generation	1010	POINT	895,606	17.38	17.38
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	746,948	14.5	31.88
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	736,720	14.3	46.18
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA	476,029	9.24	55.42
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	407,557	7.91	63.33
Internal Combustion Engines-Industrial	2020	POINT	380,352	7.38	70.71
Mobile Sources-Railroad Equipment	2285	NONROAD	331,556	6.44	77.15
Stationary Source Fuel Combustion-Industrial	2102	AREA	194,842	3.78	80.93
External Combustion Boilers-Industrial	1020	POINT	184,597	3.58	84.51
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	123,773	2.4	86.91
Industrial Processes-Mineral Products	305	POINT	91,544	1.78	88.69
Industrial Processes-Petroleum Industry	306	POINT	69,805	1.35	90.04
Industrial Processes-Chemical Manufacturing	301	POINT	60,933	1.18	91.22
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	54,497	1.06	92.28
Stationary Source Fuel Combustion-Residential	2104	AREA	50,950	0.99	93.27
Mobile Sources-LPG	2267	NONROAD	42,269	0.82	94.09
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	33,852	0.66	94.75
Internal Combustion Engines-Electric Generation	2010	POINT	33,598	0.65	95.4
Industrial Processes-In-process Fuel Use	390	POINT	31,703	0.62	96.02
Mobile Sources-Pleasure Craft	2282	NONROAD	30,029	0.58	96.6
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	22,128	0.43	97.03
Industrial Processes-Oil and Gas Production	310	POINT	16,082	0.31	97.34
Mobile Sources-Aircraft	2275	NONROAD	15,299	0.3	97.64
Miscellaneous Area Sources-Other Combustion	2810	AREA	14,089	0.27	97.91
Industrial Processes-Primary Metal Production	303	POINT	13,450	0.26	98.17
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	11,920	0.23	98.4
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA	10,482	0.2	98.6
Miscellaneous Area Sources-Other Combustion	2810	POINT	8,248	0.16	98.76
Internal Combustion Engines-Commercial/Institutional	2030	POINT	7,898	0.15	98.91
External Combustion Boilers-Commercial/Institutional	1030	POINT	7,260	0.14	99.05
Mobile Sources-CNG	2268	NONROAD	6,468	0.13	99.18
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA	4,941	0.1	99.28
Industrial Processes-Secondary Metal Production	304	POINT	3,897	0.08	99.36
Waste Disposal-Solid Waste Disposal-Government	501	POINT	3,717	0.07	99.43
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	3,697	0.07	99.5
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	3,563	0.07	99.57
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	2,981	0.06	99.63
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA	2,758	0.05	99.68
Bulk Materials Transport & Transport	253	AREA	2,354	0.05	99.73
Industrial Processes-Food and Agriculture	302	POINT	2,267	0.04	99.77
Mobile Sources-Aircraft	2275	POINT	1,825	0.04	99.81
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	1,725	0.03	99.84
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA	1,289	0.03	99.87
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	1,227	0.02	99.89
Internal Combustion Engines-Engine Testing	2040	POINT	868	0.02	99.91
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	627	0.01	99.92
Industrial Processes-Industrial Processes: NEC	2399	AREA	616	0.01	99.93

Table A-2 (continued)

Category	Category Number	Sector	NOx Tons/Year	NOx Percent of Total	NOx Cumulative Percent
External Combustion Boilers-Space Heaters	1050	POINT	586	0.01	99.94
Waste Disposal-Site Remediation	504	POINT	535	0.01	99.95
Industrial Processes-Fabricated Metal Products	309	POINT	480	0.01	99.96
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA	219	0.00	99.96
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	209	0.00	99.96
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT	208	0.00	99.96
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT	188	0.00	99.96
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	187	0.00	99.96
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	157	0.00	99.96
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	111	0.00	99.96
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT	97	0.00	99.96
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	90	0.00	99.96
Industrial Processes-Electrical Equipment	313	POINT	82	0.00	99.96
Industrial Processes-Machinery, Miscellaneous	3129	POINT	68	0.00	99.96
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	48	0.00	99.96
Internal Combustion Engines-Fugitive Emissions	2888	POINT	26	0.00	99.96
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	18	0.00	99.96
MACT Source Categories : Vinyl-based Resins	6463	POINT	11	0.00	99.96
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA	10	0.00	99.96
Petroleum and Solvent Evaporation-	4250	POINT	6	0.00	99.96
Industrial Processes-Transportation Equipment	314	POINT	5	0.00	99.96
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT	4	0.00	99.96
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	4	0.00	99.96
Industrial Processes-Textile Products	330	POINT	3	0.00	99.96
Miscellaneous Area Sources-Agricultural Production-Crops	2801	POINT	2	0.00	99.96
Industrial Processes-Building Construction	3110	POINT	1	0.00	99.96
MACT Source Categories : Cellulose-based Resins	644	POINT	0	0.00	99.96
Industrial Processes-Cooling Tower	3850	POINT	0	0.00	99.96
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT	0	0.00	99.96
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT	0	0.00	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT		0	100.0
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT		0	100.0
Mobile Sources-Unpaved Roads	2296	POINT		0	100.0
Mobile Sources-Paved Roads	2294	POINT		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA		0	100.0
Industrial Surface Coating	2401015000	AREA		0	100.0
Architectural Coatings	2401001000	AREA		0	100.0
Gas Marketing Stage II	25010601	AREA		0	100.0
Degreasing	2415	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA		0	100.0
Gas Marketing Stage I	25010600	AREA		0	100.0
Graphic Arts	2425	AREA		0	100.0
Solvent Utilization-Dry Cleaning	2420	AREA		0	100.0

Table A-2 (continued)

Category	Category Number	Sector	NOx		
			Tons/Year	Percent of Total	Cumulative Percent
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA		0	100.0
Auto Refinishing	2401005000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA		0	100.0
Traffic Markings	2401008000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA		0	100.0
Rubber/Plastics	2430000000	AREA		0	100.0
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA		0	100.0
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA		0	100.0
Mobile Sources-Aircraft	2275	AREA		0	100.0
Industrial Processes-Leather and Leather Products	3209	POINT		0	100.0
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT		0	100.0
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT		0	100.0
MACT Source Categories-Miscellaneous Resins	6452	POINT		0	100.0
MACT Source Categories : Agricultural Chemicals Production	631	POINT		0	100.0
MACT Source Categories : Food and Agricultural Processes	6258	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6824	POINT		0	100.0
Mobile Sources-Unpaved Roads	2296	AREA		0	100.0
Industrial Processes-Construction: SIC 15-17	2311	AREA		0	100.0
Mobile Sources-Paved Roads	2294	AREA		0	100.0
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA		0	100.0
Industrial Processes-Printing and Publishing	3600	POINT		0	100.0
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA		0	100.0
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA		0	100.0
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA		0	100.0
Mobile Sources-Highway Vehicles-Gasoline	2201	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA		0	100.0
Mobile Sources-Highway Vehicles-Diesel	2230	AREA		0	100.0
Inorganic Chemical Storage & Transport	252	AREA		0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA		0	100.0
Totals for All Categories			5,152,190	100	

Table A-3. Summary of Annual CO Emissions for the CENRAP Region by Category, Sector, and Pollutant

Category	Category Number	Sector	CO Tons/Year	CO Percent of Total	CO Cumulative Percent
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	11,701,959	52.15	52.15
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	2,603,360	11.6	63.75
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	1,401,805	6.25	70
Mobile Sources-Pleasure Craft	2282	NONROAD	1,325,323	5.91	75.91
Miscellaneous Area Sources-Other Combustion	2810	AREA	1,024,320	4.57	80.48
Miscellaneous Area Sources-Other Combustion	2810	POINT	815,770	3.64	84.12
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	445,995	1.99	86.11
Stationary Source Fuel Combustion-Residential	2104	AREA	399,828	1.78	87.89
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	324,217	1.44	89.33
External Combustion Boilers-Electric Generation	1010	POINT	275,840	1.23	90.56
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA	250,117	1.11	91.67
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA	247,871	1.1	92.77
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	247,141	1.1	93.87
Industrial Processes-Chemical Manufacturing	301	POINT	169,464	0.76	94.63
Mobile Sources-LPG	2267	NONROAD	165,799	0.74	95.37
Internal Combustion Engines-Industrial	2020	POINT	153,390	0.68	96.05
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	133,025	0.59	96.64
External Combustion Boilers-Industrial	1020	POINT	121,221	0.54	97.18
Industrial Processes-Primary Metal Production	303	POINT	96,722	0.43	97.61
Industrial Processes-Mineral Products	305	POINT	63,534	0.28	97.89
Mobile Sources-Aircraft	2275	NONROAD	58,554	0.26	98.15
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA	55,100	0.25	98.4
Industrial Processes-Petroleum Industry	306	POINT	52,513	0.23	98.63
Stationary Source Fuel Combustion-Industrial	2102	AREA	44,836	0.2	98.83
Mobile Sources-Railroad Equipment	2285	NONROAD	43,426	0.19	99.02
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	39,842	0.18	99.2
Mobile Sources-CNG	2268	NONROAD	26,035	0.12	99.32
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	19,902	0.09	99.41
Industrial Processes-Secondary Metal Production	304	POINT	19,676	0.09	99.5
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	18,111	0.08	99.58
Industrial Processes-Food and Agriculture	302	POINT	13,602	0.06	99.64
Industrial Processes-Oil and Gas Production	310	POINT	10,021	0.04	99.68
Internal Combustion Engines-Electric Generation	2010	POINT	10,003	0.04	99.72
Mobile Sources-Aircraft	2275	POINT	9,552	0.04	99.76
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT	7,992	0.04	99.8
Industrial Processes-In-process Fuel Use	390	POINT	6,917	0.03	99.83
External Combustion Boilers-Commercial/Institutional	1030	POINT	6,566	0.03	99.86
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA	5,540	0.02	99.88
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	4,282	0.02	99.9
Waste Disposal-Solid Waste Disposal-Government	501	POINT	4,094	0.02	99.92
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA	3,687	0.02	99.94
Internal Combustion Engines-Commercial/Institutional	2030	POINT	3,660	0.02	99.96
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	1,368	0.01	99.97
Internal Combustion Engines-Engine Testing	2040	POINT	1,325	0.01	99.98
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA	842	0	99.98
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	733	0	99.98

Table A-3 (continued)

Category	Category Number	Sector	CO		
			Tons/Year	Percent of Total	Cumulative Percent
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	540	0	99.98
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	390	0	99.98
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	340	0	99.98
Bulk Materials Transport & Transport	253	AREA	305	0	99.98
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	279	0	99.98
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT	277	0	99.98
External Combustion Boilers-Space Heaters	1050	POINT	258	0	99.98
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	204	0	99.98
Industrial Processes-Fabricated Metal Products	309	POINT	191	0	99.98
Industrial Processes-Industrial Processes: NEC	2399	AREA	140	0	99.98
Internal Combustion Engines-Fugitive Emissions	2888	POINT	134	0	99.98
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	128	0	99.98
Waste Disposal-Site Remediation	504	POINT	116	0	99.98
Industrial Processes-Machinery, Miscellaneous	3129	POINT	72	0	99.98
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	66	0	99.98
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT	56	0	99.98
Industrial Processes-Electrical Equipment	313	POINT	51	0	99.98
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	48	0	99.98
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	31	0	99.98
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT	20	0	99.98
Petroleum and Solvent Evaporation-	4250	POINT	9	0	99.98
MACT Source Categories : Vinyl-based Resins	6463	POINT	9	0	99.98
Industrial Processes-Transportation Equipment	314	POINT	2	0	99.98
Industrial Processes-Leather and Leather Products	3209	POINT	2	0	99.98
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT	2	0	99.98
Industrial Processes-Textile Products	330	POINT	2	0	99.98
Miscellaneous Area Sources-Agricultural Production-Crops	2801	POINT	2	0	99.98
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT	1	0	99.98
Industrial Processes-Cooling Tower	3850	POINT	0	0	99.98
MACT Source Categories : Cellulose-based Resins	644	POINT	0	0	99.98
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT	0	0	100.0
Industrial Processes-Building Construction	3110	POINT		0	100.0
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT		0	100.0
Mobile Sources-Unpaved Roads	2296	POINT		0	100.0
Mobile Sources-Paved Roads	2294	POINT		0	100.0
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA		0	100.0
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA		0	100.0
Industrial Surface Coating	2401015000	AREA		0	100.0
Architectural Coatings	2401001000	AREA		0	100.0
Gas Marketing Stage II	25010601	AREA		0	100.0
Degreasing	2415	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA		0	100.0
Gas Marketing Stage I	25010600	AREA		0	100.0

Table A-3 (continued)

Category	Category Number	Sector	CO Tons/Year	CO Percent of Total	CO Cumulative Percent
Graphic Arts	2425	AREA		0	100.0
Solvent Utilization-Dry Cleaning	2420	AREA		0	100.0
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA		0	100.0
Auto Refinishing	2401005000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA		0	100.0
Traffic Markings	2401008000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA		0	100.0
Rubber/Plastics	2430000000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA		0	100.0
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA		0	100.0
Mobile Sources-Aircraft	2275	AREA		0	100.0
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT		0	100.0
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT		0	100.0
MACT Source Categories-Miscellaneous Resins	6452	POINT		0	100.0
MACT Source Categories : Agricultural Chemicals Production	631	POINT		0	100.0
MACT Source Categories : Food and Agricultural Processes	6258	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6824	POINT		0	100.0
Mobile Sources-Unpaved Roads	2296	AREA		0	100.0
Industrial Processes-Construction: SIC 15-17	2311	AREA		0	100.0
Mobile Sources-Paved Roads	2294	AREA		0	100.0
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA		0	100.0
Industrial Processes-Printing and Publishing	3600	POINT		0	100.0
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA		0	100.0
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA		0	100.0
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA		0	100.0
Mobile Sources-Highway Vehicles-Gasoline	2201	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA		0	100.0
Mobile Sources-Highway Vehicles-Diesel	2230	AREA		0	100.0
Inorganic Chemical Storage & Transport	252	AREA		0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA		0	100.0
Totals for All Categories			22,438,555	100	

Table A-4. Summary of Annual SO2 Emissions for the CENRAP Region by Category, Sector, and Pollutant

Category	Category Number	Sector	SO_2 Tons/Year	SO_2 Percent of Total	SO_2 Cumulative Percent
External Combustion Boilers-Electric Generation	1010	POINT	1,494,256	59.12	59.12
External Combustion Boilers-Industrial	1020	POINT	206,419	8.17	67.29
Stationary Source Fuel Combustion-Industrial	2102	AREA	167,312	6.62	73.91
Industrial Processes-Chemical Manufacturing	301	POINT	144,828	5.73	79.64
Industrial Processes-Petroleum Industry	306	POINT	109,937	4.35	83.99
Industrial Processes-Mineral Products	305	POINT	76,034	3.01	87
Industrial Processes-Primary Metal Production	303	POINT	67,869	2.69	89.69
Industrial Processes-Oil and Gas Production	310	POINT	30,484	1.21	90.9
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	29,525	1.17	92.07
Mobile Sources-Railroad Equipment	2285	NONROAD	21,802	0.86	92.93
Industrial Processes-Secondary Metal Production	304	POINT	21,051	0.83	93.76
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	20,861	0.83	94.59
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	19,342	0.77	95.36
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	19,033	0.75	96.11
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	18,473	0.73	96.84
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	15,153	0.6	97.44
Industrial Processes-In-process Fuel Use	390	POINT	11,995	0.47	97.91
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	8,586	0.34	98.25
Stationary Source Fuel Combustion-Residential	2104	AREA	7,063	0.28	98.53
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	6,439	0.25	98.78
External Combustion Boilers-Commercial/Institutional	1030	POINT	5,781	0.23	99.01
Miscellaneous Area Sources-Other Combustion	2810	POINT	4,699	0.19	99.2
Miscellaneous Area Sources-Other Combustion	2810	AREA	4,287	0.17	99.37
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	1,589	0.06	99.43
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	1,585	0.06	99.49
Industrial Processes-Food and Agriculture	302	POINT	1,558	0.06	99.55
Mobile Sources-Aircraft	2275	NONROAD	1,511	0.06	99.61
Mobile Sources-Pleasure Craft	2282	NONROAD	1,180	0.05	99.66
Internal Combustion Engines-Industrial	2020	POINT	1,176	0.05	99.71
Waste Disposal-Solid Waste Disposal-Government	501	POINT	1,164	0.05	99.76
Internal Combustion Engines-Electric Generation	2010	POINT	994	0.04	99.8
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA	821	0.03	99.83
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	749	0.03	99.86
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	711	0.03	99.89
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA	680	0.03	99.92
Waste Disposal-Site Remediation	504	POINT	635	0.03	99.95
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	328	0.01	99.96
Industrial Processes-Industrial Processes: NEC	2399	AREA	307	0.01	99.97
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	204	0.01	99.98
Mobile Sources-Aircraft	2275	POINT	183	0.01	99.99
Bulk Materials Transport & Transport	253	AREA	172	0.01	100.0
Internal Combustion Engines-Commercial/Institutional	2030	POINT	151	0.01	100.0
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	99	0	100.0
Mobile Sources-LPG	2267	NONROAD	71	0	100.0
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	62	0	100.0
Internal Combustion Engines-Engine Testing	2040	POINT	53	0	100.0
Industrial Processes-Fabricated Metal Products	309	POINT	52	0	100.0

Table A-4 (continued)

Category	Category Number	Sector	SO₂ Tons/Year	Percent of Total	Cumulative Percent
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	48	0	100.0
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	47	0	100.0
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT	30	0	100.0
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	13	0	100.0
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA	13	0	100.0
External Combustion Boilers-Space Heaters	1050	POINT	12	0	100.0
Industrial Processes-Electrical Equipment	313	POINT	9	0	100.0
Mobile Sources-CNG	2268	NONROAD	7	0	100.0
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	5	0	100.0
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT	5	0	100.0
Industrial Processes-Transportation Equipment	314	POINT	4	0	100.0
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	4	0	100.0
Industrial Processes-Machinery, Miscellaneous	3129	POINT	3	0	100.0
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT	1	0	100.0
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	1	0	100.0
Internal Combustion Engines-Fugitive Emissions	2888	POINT	1	0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops	2801	POINT	0	0	100.0
MACT Source Categories : Vinyl-based Resins	6463	POINT	0	0	100.0
Industrial Processes-Cooling Tower	3850	POINT	0	0	100.0
Petroleum and Solvent Evaporation-	4250	POINT	0	0	100.0
MACT Source Categories : Cellulose-based Resins	644	POINT	0	0	100.0
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT		0	100.0
Industrial Processes-Textile Products	330	POINT		0	100.0
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT		0	100.0
Industrial Processes-Building Construction	3110	POINT		0	100.0
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT		0	100.0
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA		0	100.0
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA		0	100.0
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT		0	100.0
Industrial Processes-Leather and Leather Products	3209	POINT		0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT		0	100.0
Mobile Sources-Unpaved Roads	2296	POINT		0	100.0
Mobile Sources-Paved Roads	2294	POINT		0	100.0
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA		0	100.0
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA		0	100.0
Industrial Surface Coating	2401015000	AREA		0	100.0
Architectural Coatings	2401001000	AREA		0	100.0
Gas Marketing Stage II	25010601	AREA		0	100.0
Degreasing	2415	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA		0	100.0
Gas Marketing Stage I	25010600	AREA		0	100.0

Table A-4 (continued)

Category	Category Number	Sector	SO_2 Tons/Year	SO_2 Percent of Total	SO_2 Cumulative Percent
Graphic Arts	2425	AREA		0	100.0
Solvent Utilization-Dry Cleaning	2420	AREA		0	100.0
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA		0	100.0
Auto Refinishing	2401005000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA		0	100.0
Traffic Markings	2401008000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA		0	100.0
Rubber/Plastics	2430000000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA		0	100.0
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA		0	100.0
Mobile Sources-Aircraft	2275	AREA		0	100.0
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT		0	100.0
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT		0	100.0
MACT Source Categories-Miscellaneous Resins	6452	POINT		0	100.0
MACT Source Categories : Agricultural Chemicals Production	631	POINT		0	100.0
MACT Source Categories : Food and Agricultural Processes	6258	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6824	POINT		0	100.0
Mobile Sources-Unpaved Roads	2296	AREA		0	100.0
Industrial Processes-Construction: SIC 15-17	2311	AREA		0	100.0
Mobile Sources-Paved Roads	2294	AREA		0	100.0
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA		0	100.0
Industrial Processes-Printing and Publishing	3600	POINT		0	100.0
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA		0	100.0
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA		0	100.0
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA		0	100.0
Mobile Sources-Highway Vehicles-Gasoline	2201	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA		0	100.0
Mobile Sources-Highway Vehicles-Diesel	2230	AREA		0	100.0
Inorganic Chemical Storage & Transport	252	AREA		0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA		0	100.0
Totals for All Categories			2,527,461	100	

Table A-5. Summary of Annual PM10-PRI and PM25-PRI Emissions for the CENRAP Region by Category, Sector, and Pollutant

Category	Category Number	Sector	PM10-PRI Tons/Year	PM10-PRI Percent of Total	PM10-PRI Cumulative Percent	PM25-PRI Tons/Year	PM25-PRI Percent of Total	PM25-PRI Cumulative Percent
Mobile Sources-Unpaved Roads	2296	AREA	3,882,376	52.16	52.16	580,684	31.52	31.52
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA	1,296,636	17.42	69.58	264,667	14.36	45.88
Industrial Processes-Construction: SIC 15-17	2311	AREA	514,614	6.91	76.49	102,936	5.59	51.47
Mobile Sources-Paved Roads	2294	AREA	474,749	6.38	82.87	76,386	4.15	55.62
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	177,533	2.39	85.26	141,020	7.65	63.27
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA	175,633	2.36	87.62	35,123	1.91	65.18
Miscellaneous Area Sources-Other Combustion	2810	AREA	112,081	1.51	89.13	99,695	5.41	70.59
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA	96,895	1.3	90.43	14,534	0.79	71.38
Miscellaneous Area Sources-Other Combustion	2810	POINT	77,277	1.04	91.47	65,532	3.56	74.94
External Combustion Boilers-Electric Generation	1010	POINT	72,073	0.97	92.44	47,444	2.57	77.51
Industrial Processes-Food and Agriculture	302	POINT	61,143	0.82	93.26	11,534	0.63	78.14
Stationary Source Fuel Combustion-Residential	2104	AREA	56,646	0.76	94.02	56,465	3.06	81.2
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA	53,903	0.72	94.74	51,277	2.78	83.98
External Combustion Boilers-Industrial	1020	POINT	48,724	0.65	95.39	41,768	2.27	86.25
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	43,537	0.58	95.97	40,617	2.2	88.45
Industrial Processes-Mineral Products	305	POINT	36,258	0.49	96.46	14,499	0.79	89.24
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	32,949	0.44	96.9	27,910	1.51	90.75
Mobile Sources-Pleasure Craft	2282	NONROAD	26,735	0.36	97.26	24,696	1.34	92.09
Stationary Source Fuel Combustion-Industrial	2102	AREA	19,639	0.26	97.52	12,136	0.66	92.75
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	19,429	0.26	97.78	16,766	0.91	93.66
Industrial Processes-Chemical Manufacturing	301	POINT	16,165	0.22	98	11,402	0.62	94.28
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA	15,078	0.2	98.2	14,041	0.76	95.04
Industrial Processes-Primary Metal Production	303	POINT	13,927	0.19	98.39	3,318	0.18	95.22
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	13,637	0.18	98.57	6,763	0.37	95.59
Internal Combustion Engines-Industrial	2020	POINT	13,364	0.18	98.75	13,054	0.71	96.3
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	13,155	0.18	98.93	7,724	0.42	96.72
Industrial Processes-Petroleum Industry	306	POINT	12,654	0.17	99.1	10,403	0.56	97.28
Mobile Sources-Railroad Equipment	2285	NONROAD	8,989	0.12	99.22	8,108	0.44	97.72
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	7,247	0.1	99.32	6,699	0.36	98.08
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	6,923	0.09	99.41	6,529	0.35	98.43

Table A-5 (continued)

Category	Category Number	Sector	PM10-PRI Tons/Year	PM10-PRI Percent of Total	PM10-PRI Cumulative Percent	PM25-PRI Tons/Year	PM25-PRI Percent of Total	PM25-PRI Cumulative Percent
Industrial Processes-Cooling Tower	3850	POINT	6,403	0.09	99.5	5,470	0.3	98.73
Industrial Processes-Secondary Metal Production	304	POINT	6,101	0.08	99.58	3,787	0.21	98.94
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA	3,465	0.05	99.63	92	0	98.94
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	3,310	0.04	99.67	1,921	0.1	99.04
Industrial Processes-In-process Fuel Use	390	POINT	3,264	0.04	99.71	1,187	0.06	99.1
Internal Combustion Engines-Electric Generation	2010	POINT	3,262	0.04	99.75	3,176	0.17	99.27
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	2,798	0.04	99.79	2,574	0.14	99.41
Industrial Processes-Industrial Processes: NEC	2399	AREA	2,637	0.04	99.83	1,827	0.1	99.51
External Combustion Boilers-Commercial/Institutional	1030	POINT	1,587	0.02	99.85	1,183	0.06	99.57
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	1,454	0.02	99.87	1,200	0.07	99.64
Industrial Processes-Fabricated Metal Products	309	POINT	1,254	0.02	99.89	501	0.03	99.67
Waste Disposal-Solid Waste Disposal-Government	501	POINT	976	0.01	99.9	508	0.03	99.7
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA	854	0.01	99.91	609	0.03	99.73
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	753	0.01	99.92	703	0.04	99.77
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	636	0.01	99.93	264	0.01	99.78
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	568	0.01	99.94	471	0.03	99.81
Mobile Sources-Aircraft	2275	NONROAD	441	0.01	99.95	349	0.02	99.83
Industrial Processes-Oil and Gas Production	310	POINT	440	0.01	99.96	419	0.02	99.85
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	436	0.01	99.97	301	0.02	99.87
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA	387	0.01	99.98	387	0.02	99.89
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	276	0	99.98	174	0.01	99.9
Internal Combustion Engines-Commercial/Institutional	2030	POINT	220	0	99.98	219	0.01	99.91
Mobile Sources-LPG	2267	NONROAD	192	0	99.98	190	0.01	99.92
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	185	0	99.98	151	0.01	99.93
Mobile Sources-Aircraft	2275	POINT	160	0	99.98	113	0.01	99.94
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	158	0	99.98	126	0.01	99.95
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA	131	0	99.98	131	0.01	99.96
MACT Source Categories : Vinyl-based Resins	6463	POINT	118	0	99.98	77	0	99.96
Waste Disposal-Site Remediation	504	POINT	102	0	99.98	65	0	99.96
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA	91	0	99.98	91	0	99.96
Internal Combustion Engines-Fugitive Emissions	2888	POINT	84	0	99.98	80	0	99.96
Industrial Processes-Machinery, Miscellaneous	3129	POINT	64	0	99.98	54	0	99.96

Table A-5 (continued)

Category	Category Number	Sector	PM10-PRI			PM25-PRI		
			Tons/Year	Percent of Total	Cumulative Percent	Tons/Year	Percent of Total	Cumulative Percent
Internal Combustion Engines-Engine Testing	2040	POINT	60	0	99.98	54	0	99.96
Bulk Materials Transport & Transport	253	AREA	56	0	99.98	56	0	99.96
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	53	0	99.98	44	0	99.96
Industrial Processes-Transportation Equipment	314	POINT	51	0	99.98	31	0	99.96
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	41	0	99.98	34	0	99.96
External Combustion Boilers-Space Heaters	1050	POINT	36	0	99.98	35	0	99.96
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	30	0	99.98	25	0	99.96
Mobile Sources-CNG	2268	NONROAD	28	0	99.98	27	0	99.96
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA	26	0	99.98	3	0	99.96
Industrial Processes-Electrical Equipment	313	POINT	23	0	99.98	21	0	99.96
Mobile Sources-Unpaved Roads	2296	POINT	21	0	99.98	21	0	99.96
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT	12	0	99.98	11	0	99.96
Industrial Processes-Leather and Leather Products	3209	POINT	6	0	99.98	1	0	99.96
Industrial Processes-Building Construction	3110	POINT	5	0	99.98	1	0	99.96
MACT Source Categories-Miscellaneous Processes	6824	POINT	4	0	99.98	1	0	99.96
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	3	0	99.98	2	0	99.96
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT	2	0	99.98	2	0	99.96
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT	2	0	99.98	1	0	99.96
Industrial Processes-Textile Products	330	POINT	2	0	99.98	2	0	99.96
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT	2	0	99.98	2	0	99.96
Mobile Sources-Paved Roads	2294	POINT	1	0	99.98	1	0	99.96
Miscellaneous Area Sources-Agricultural Production-Crops	2801	POINT	1	0	99.98	1	0	99.96
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA	1	0	99.98	0	0	99.96
MACT Source Categories : Agricultural Chemicals Production	631	POINT	0	0	100.0	0	0	99.96
Industrial Processes-Printing and Publishing	3600	POINT	0	0	100.0	0	0	99.96
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT	0	0	100.0	0	0	99.96
Petroleum and Solvent Evaporation-	4250	POINT	0	0	100.0	0	0	99.96
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT	0	0	100.0	0	0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT		0	100.0		0	100.0

Table A-5 (continued)

Category	Category Number	Sector	PM10-PRI			PM25-PRI		
			Tons/Year	Percent of Total	Cumulative Percent	Tons/Year	Percent of Total	Cumulative Percent
MACT Source Categories : Cellulose-based Resins	644	POINT		0	100.0		0	100.0
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT		0	100.0		0	100.0
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT		0	100.0		0	100.0
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT		0	100.0		0	100.0
MACT Source Categories-Miscellaneous Resins	6452	POINT		0	100.0		0	100.0
MACT Source Categories : Food and Agricultural Processes	6258	POINT		0	100.0		0	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT		0	100.0		0	100.0
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA		0	100.0		0	100.0
Mobile Sources-Highway Vehicles-Gasoline	2201	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA		0	100.0		0	100.0
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA		0	100.0		0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA		0	100.0		0	100.0
Mobile Sources-Highway Vehicles-Diesel	2230	AREA		0	100.0		0	100.0
Inorganic Chemical Storage & Transport	252	AREA		0	100.0		0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA		0	100.0		0	100.0
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA		0	100.0		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA		0	100.0		0	100.0
Industrial Surface Coating	2401015000	AREA		0	100.0		0	100.0
Architectural Coatings	2401001000	AREA		0	100.0		0	100.0
Gas Marketing Stage II	25010601	AREA		0	100.0		0	100.0
Degreasing	2415	AREA		0	100.0		0	100.0

Table A-5 (continued)

Category	Category Number	Sector	PM10-PRI			PM25-PRI		
			Tons/Year	Percent of Total	Cumulative Percent	Tons/Year	Percent of Total	Cumulative Percent
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA		0	100.0		0	100.0
Gas Marketing Stage I	25010600	AREA		0	100.0		0	100.0
Graphic Arts	2425	AREA		0	100.0		0	100.0
Solvent Utilization-Dry Cleaning	2420	AREA		0	100.0		0	100.0
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA		0	100.0		0	100.0
Auto Refinishing	2401005000	AREA		0	100.0		0	100.0
Traffic Markings	2401008000	AREA		0	100.0		0	100.0
Rubber/Plastics	2430000000	AREA		0	100.0		0	100.0
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA		0	100.0		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA		0	100.0		0	100.0
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA		0	100.0		0	100.0
Mobile Sources-Aircraft	2275	AREA		0	100.0		0	100.0
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT		0	100.0		0	100.0
Totals for All Categories			7,443,244	100		1,842,509	100	

Table A-6. Summary of Annual NH3 Emissions for the CENRAP Region by Category, Sector, and Pollutant

Category	Category Number	Sector	NH_3		
			Tons/Year	Percent of Total	Cumulative Percent
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA	564,046	32.88	32.88
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA	243,489	14.19	47.07
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA	187,598	10.93	58
Industrial Processes-Food and Agriculture	302	POINT	157,951	9.21	67.21
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA	138,222	8.06	75.27
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA	118,941	6.93	82.2
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	46,621	2.72	84.92
Industrial Processes-Industrial Processes: NEC	2399	AREA	33,960	1.98	86.9
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA	33,663	1.96	88.86
Miscellaneous Area Sources-Other Combustion	2810	AREA	32,201	1.88	90.74
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA	22,407	1.31	92.05
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	20,511	1.2	93.25
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA	19,428	1.13	94.38
Industrial Processes-Chemical Manufacturing	301	POINT	14,199	0.83	95.21
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA	12,727	0.74	95.95
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA	10,750	0.63	96.58
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA	8,483	0.49	97.07
Mobile Sources-Highway Vehicles-Gasoline	2201	AREA	8,295	0.48	97.55
Miscellaneous Area Sources-Other Combustion	2810	POINT	7,907	0.46	98.01
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	4,521	0.26	98.27
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA	4,247	0.25	98.52
External Combustion Boilers-Electric Generation	1010	POINT	4,126	0.24	98.76
External Combustion Boilers-Space Heaters	1050	POINT	3,752	0.22	98.98
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	3,343	0.19	99.17
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA	3,211	0.19	99.36
Stationary Source Fuel Combustion-Industrial	2102	AREA	1,824	0.11	99.47
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	1,249	0.07	99.54
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	1,188	0.07	99.61
Industrial Processes-Petroleum Industry	306	POINT	1,062	0.06	99.67
Waste Disposal-Solid Waste Disposal-Government	501	POINT	974	0.06	99.73
Mobile Sources-CNG	2268	NONROAD	838	0.05	99.78
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA	587	0.03	99.81
Industrial Processes-Primary Metal Production	303	POINT	539	0.03	99.84
Mobile Sources-Highway Vehicles-Diesel	2230	AREA	443	0.03	99.87
External Combustion Boilers-Industrial	1020	POINT	376	0.02	99.89
Internal Combustion Engines-Electric Generation	2010	POINT	323	0.02	99.91
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	258	0.02	99.93
Industrial Processes-Mineral Products	305	POINT	215	0.01	99.94
External Combustion Boilers-Commercial/Institutional	1030	POINT	197	0.01	99.95
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	168	0.01	99.96
Mobile Sources-Railroad Equipment	2285	NONROAD	147	0.01	99.97

Table A-6 (continued)

Category	Category Number	Sector	NH3 Tons/Year	Percent of Total	Cumulative Percent
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	126	0.01	99.98
Mobile Sources-Pleasure Craft	2282	NONROAD	96	0.01	99.99
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	93	0.01	100.0
Stationary Source Fuel Combustion-Residential	2104	AREA	86	0	100.0
Internal Combustion Engines-Industrial	2020	POINT	77	0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT	36	0	100.0
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	33	0	100.0
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	32	0	100.0
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	28	0	100.0
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	25	0	100.0
Inorganic Chemical Storage & Transport	252	AREA	22	0	100.0
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	19	0	100.0
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	17	0	100.0
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	16	0	100.0
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	14	0	100.0
Industrial Processes-Secondary Metal Production	304	POINT	4	0	100.0
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	3	0	100.0
Industrial Processes-In-process Fuel Use	390	POINT	2	0	100.0
MACT Source Categories : Vinyl-based Resins	6463	POINT	1	0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA	1	0	100.0
Industrial Processes-Oil and Gas Production	310	POINT	0	0	100.0
Mobile Sources-Aircraft	2275	NONROAD	0	0	100.0
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	0	0	100.0
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	0	0	100.0
Industrial Processes-Fabricated Metal Products	309	POINT	0	0	100.0
Industrial Processes-Electrical Equipment	313	POINT	0	0	100.0
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	0	0	100.0
Industrial Processes-Leather and Leather Products	3209	POINT	0	0	100.0
Internal Combustion Engines-Engine Testing	2040	POINT	0	0	100.0
Internal Combustion Engines-Commercial/Institutional	2030	POINT	0	0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops	2801	POINT	0	0	100.0
Internal Combustion Engines-Fugitive Emissions	2888	POINT		0	100.0
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT		0	100.0
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA		0	100.0
Waste Disposal-Site Remediation	504	POINT		0	100.0
Mobile Sources-Aircraft	2275	POINT		0	100.0
Bulk Materials Transport & Transport	253	AREA		0	100.0
Mobile Sources-LPG	2267	NONROAD		0	100.0
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT		0	100.0
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA		0	100.0
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT		0	100.0
Industrial Processes-Transportation Equipment	314	POINT		0	100.0
Industrial Processes-Machinery, Miscellaneous	3129	POINT		0	100.0
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT		0	100.0
Industrial Processes-Cooling Tower	3850	POINT		0	100.0

Table A-6 (continued)

Category	Category Number	Sector	NH$_3$ Tons/Year	NH$_3$ Percent of Total	NH$_3$ Cumulative Percent
Petroleum and Solvent Evaporation-	4250	POINT		0	100.0
MACT Source Categories : Cellulose-based Resins	644	POINT		0	100.0
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT		0	100.0
Industrial Processes-Textile Products	330	POINT		0	100.0
Industrial Processes-Building Construction	3110	POINT		0	100.0
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT		0	100.0
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA		0	100.0
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT		0	100.0
Mobile Sources-Unpaved Roads	2296	POINT		0	100.0
Mobile Sources-Paved Roads	2294	POINT		0	100.0
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA		0	100.0
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA		0	100.0
Industrial Surface Coating	2401015000	AREA		0	100.0
Architectural Coatings	2401001000	AREA		0	100.0
Gas Marketing Stage II	25010601	AREA		0	100.0
Degreasing	2415	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA		0	100.0
Gas Marketing Stage I	25010600	AREA		0	100.0
Graphic Arts	2425	AREA		0	100.0
Solvent Utilization-Dry Cleaning	2420	AREA		0	100.0
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA		0	100.0
Auto Refinishing	2401005000	AREA		0	100.0
Traffic Markings	2401008000	AREA		0	100.0
Rubber/Plastics	2430000000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA		0	100.0
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA		0	100.0
Mobile Sources-Aircraft	2275	AREA		0	100.0
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT		0	100.0
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT		0	100.0
MACT Source Categories-Miscellaneous Resins	6452	POINT		0	100.0
MACT Source Categories : Agricultural Chemicals Production	631	POINT		0	100.0
MACT Source Categories : Food and Agricultural Processes	6258	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6824	POINT		0	100.0
Mobile Sources-Unpaved Roads	2296	AREA		0	100.0
Industrial Processes-Construction: SIC 15-17	2311	AREA		0	100.0
Mobile Sources-Paved Roads	2294	AREA		0	100.0
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA		0	100.0
Industrial Processes-Printing and Publishing	3600	POINT		0	100.0
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT		0	100.0
Totals for All Categories			1,715,717	100	

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Appendix H.3

Pechan, *Refinement of CENRAP's 2002 Emissions Inventories* (August 31, 2005)

REFINEMENT OF
CENRAP'S 2002 EMISSIONS INVENTORIES
(SCHEDULE 9; WORK ITEM 3)

FINAL

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Pechan Report No. 05.08.005/9500-004

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CONTENTS

TABLES

ACRONYMS AND ABBREVIATIONS

CAP	criteria air pollutant
CE	Control Equipment (NIF 3.0 table)
CENRAP	Central Regional Air Planning Association
CMU	Carnegie Mellon University
CO	carbon monoxide
CO_2	carbon dioxide
EF	emission factor
EFIG	Emission Factor and Inventory Group
EI	Emission Inventory
EM	Emission (NIF 3.0 table)
EP	Emission Process (NIF 3.0 table)
EPM	Emission Production Model
EPA	U.S. Environmental Protection Agency
ER	Emission Release Point (NIF 3.0 table)
ERP	Emission Release Point (NIF 3.0 field in ER table)
EU	Emission Unit (NIF 3.0 table)
FIPS	Federal Information Processing Standard
FIRE	Factor Information and REtrieval
GIS	geographic information system
HAP	hazardous air pollutant
ID	identification
IDA	Inventory Data Analyzer format
IPM	Integrated Planning Model
LPG	liquefied petroleum gas
MACT	maximum achievable control technology
NAAQS	National Ambient Air Quality Standard
NEI	National Emissions Inventory
NH_3	ammonia
NIF 3.0	NEI Input Format Version 3.0
NO_x	oxides of nitrogen
ORIS	Office of Regulatory Information Systems
PD	primary device
PE	Emission Period (NIF 3.0 table)
Pechan	E.H. Pechan & Associates, Inc.
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PM10-FIL	filterable PM_{10}
PM10-PRI	primary PM_{10}
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM25-FIL	filterable $PM_{2.5}$
PM25-PRI	primary $PM_{2.5}$
PMC	coarse PM
PM-CON	condensible PM
ppm	parts per million
QA	quality assurance
QAPP	Quality Assurance Project Plan

RPO	Regional Planning Organization
SCC	Source Classification Code
SD	secondary device
SI	Site (NIF 3.0 table)
SIC	Standard Industrial Classification
SIP	State Implementation Plan
S/L/T	State, Local, and Tribal
SMOKE	Sparse Matrix Operator Kernel Emissions
SO_2	sulfur dioxide
TOG	total organic gases
TR	Transmittal (NIF 3.0 table)
U.S.	United States
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VOC	volatile organic compound

I. INTRODUCTION

A. Overview

This report documents the data sources, methods, and results for updating the 2002 base year criteria air pollutant (CAP) and ammonia (NH_3) emissions inventories for point, area, and nonroad sources for the Central Regional Air Planning Association (CENRAP) Regional Planning Organization (RPO). The "Base A" 2002 inventory files completed during February 2005 were updated to incorporate comments provided by the CENRAP State, Local, and Tribal (S/L/T) agencies and the Emissions Inventory (EI) and Modeling Workgroups. As a result of the updates, the new inventory files are termed "Base B". Additional work completed under this work order include the development of Sparse Matrix Operator Kernel Emissions/Inventory Data Analyzer (SMOKE/IDA) input files for a 2018 projection year inventory for electricity generating units (EGUs) and for fires that occurred in Ontario during 2002.

The CENRAP region includes the states and tribal jurisdictions of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma, and Texas. CENRAP (and other RPOs) will use these inventories to support air quality modeling, State Implementation Plan (SIP) development, and implementation activities for the regional haze rule and fine particulate matter (PM) and ozone National Ambient Air Quality Standards (NAAQS).

The inventories and supporting data prepared include the following:

(1) Comprehensive, county-level, mass emissions and modeling inventories for point, area, and nonroad sources of 2002 emissions for the CAPs and NH_3 for the S/L/T agencies included in the CENRAP region;
(2) Modeling inventory files containing 2018 projection year emissions for EGUs; and
(3) A modeling inventory for Ontario fires during 2002.

The mass emissions inventory files were prepared in the National Emissions Inventory (NEI) Input Format Version 3.0 (NIF 3.0). The modeling inventory files were prepared in the SMOKE/IDA format. The revisions to the Base A point, area, and nonroad inventories did not result in adding any new SCCs that were not already included in the temporal, speciation, and spatial allocation profiles for the CENRAP inventories. Therefore, there were no revisions to the ancillary files containing the spatial, temporal, and speciation profile data.

The inventories include annual emissions for sulfur dioxide (SO_2), oxides of nitrogen (NO_x), volatile organic compounds (VOC), carbon monoxide (CO), NH_3, and particles with an aerodynamic diameter less than or equal to a nominal 10 and 2.5 micrometers (i.e., primary PM_{10} and $PM_{2.5}$). The inventories included summer day, winter day, and average day emissions. However, not all agencies included daily emissions in their inventories, and, for the agencies that did, the temporal basis for the daily emissions varied between agencies. Consequently, the inventories did not contain a complete and consistent set of daily emissions for all source categories and pollutants. Therefore, daily emissions prepared by S/L/T agencies were maintained in the NIF files if they met quality assurance (QA) review requirements. However, CENRAP requested that the daily emissions not be included in the SMOKE input files. The

temporal profiles prepared for this project will be used to calculate daily emissions. If needed, the daily emissions prepared by the agencies may be retrieved from the NIF database files.

The following data sources were used to update CENRAP's Base A inventories:

(1) S/L/T agency comments on the "Base A" inventories;
(2) S/L/T agency comments on the draft 2002 NEI;
(3) Revisions to CENRAP-sponsored inventories; and
(4) Comments from CENRAP's EI and Modeling Workgroups.

The United States (U.S.) Environmental Protection Agency's (EPA's) format and content QA programs (and other QA checks not included in EPA's QA software) were run on each inventory to identify format and/or data content issues (EPA, 2004a). E.H. Pechan & Associates, Inc. (Pechan) worked with the CENRAP's EI and Modeling Workgroups and the S/L/T agencies to resolve QA issues and augment the inventories to fill data gaps in accordance with the Methods Plan and Quality Assurance Project Plan (QAPP) prepared for this project (CENRAP, 2005a; CENRAP, 2005b). The EI Workgroup and S/L/T agencies reviewed the draft inventory files after updating the inventories, and the files were updated to address their comments.

B. Summary of the 2002 Base Year Inventories

This section of the report provides a brief summary of the consolidated 2002 Base B inventories for the CENRAP region. Table 1 shows total annual emissions for CAPs and NH_3 for point, area, nonroad, and onroad sources. The sector contributing the highest emissions varies by pollutant. Point sources account for the highest percentage of total NO_x (35 percent) and SO_2 (83 percent) emissions. Area sources account for the highest percentage of total VOC (44 percent), primary PM_{10} (PM10-PRI (93 percent)), primary $PM_{2.5}$ (PM25-PRI (81 percent)), and NH_3 (83.5 percent) emissions. Onroad sources account for the highest percentage of CO (57 percent) emissions. Onroad sources account for 24.5 percent and nonroad sources account for 17 percent of total VOC emissions. Onroad sources account for 33 percent and nonroad sources account for 18.5 percent of total NO_x emissions.

Table 2a shows total annual emissions by state and pollutant for all four sectors combined. Tables 2b through 2e show total annual emissions by state and pollutant for area, point, nonroad, and onroad sources, respectively. Tables A-1 through A-6 in Appendix A provide summaries of annual emissions by source category and sector for VOC, NO_x, CO, SO_2, PM10-PRI and PM25-PRI, and NH_3, respectively. The emissions in each table are sorted in descending order with the highest emitting categories listed at the top of the table. The tables also show annual emissions as a percentage of total emissions from all sectors, and the cumulative percentage contribution. Chapter III of this report identifies additional summaries of emissions, including county-level summaries that contain the data source codes that identify the origin and year of emissions data.

The Fond du Lac Band of the Minnesota Chippewa Tribe and the Leech Lake Band of Ojibwe Tribe each provided point and area source inventories. The point source inventories are included in the Base B inventory; however, the area source inventories are not because SMOKE is not currently programmed to process tribal area source data. Thus, the tribal area source inventories

are included in a separate NIF 3.0 database and the area source emissions are summarized in Table 2f (note that these area source emissions are not included in Tables 1, 2a, and 2b).

The nonroad Base B inventory includes carbon dioxide (CO_2) emissions, the point source inventory includes total primary and filterable particulate matter (PM-PRI/-FIL) emissions, and the point and area source inventories include filterable PM_{10} (PM10-FIL), filterable $PM_{2.5}$ (PM25-FIL), and condensible PM (PM-CON) emissions. The emissions for these pollutants were carried in the mass emissions inventory files. However, these pollutants are not included in the summaries since the emissions for these pollutants were not consistently reported by all S/L/T agencies for a given sector. In addition, AR is the only state that included PM10-PRI and PM25-PRI emissions for fugitive wind-blown dust emissions in its area source inventory. The wind-blown dust emissions are stored in the area miscellaneous sources inventory, and are included in the sector-level summaries (as geogenic and natural/biogenic sources) described in Chapter III of this report.

C. Organization of the Report

In Chapter II of this report, section A provides an introduction to the chapter and sections B through D present the data sources and methods applied to prepare the mass emissions inventory and SMOKE input files for point, area, and nonroad sources within the CENRAP region. Section E explains the data sources and methods applied to prepare SMOKE IDA files for a 2018 projection year inventory for electricity generating units (EGUs) in the CENRAP region. Section F provides documentation of the SMOKE and RPO data exchange protocol files prepared under this project.

Chapter III and Appendix A provide summaries of the 2002 emissions inventories for point, area, nonroad, and onroad sources within the CENRAP region. Chapter IV presents the data sources and methods applied to prepare SMOKE input files for 2002 fires in Ontario, Canada. Chapter V provides the references for this report.

D. Project Work Plan and Methods Document

At the beginning of this project, a draft work plan and methods document was prepared and reviewed by the CENRAP EI and Modeling Workgroups (CENRAP, 2005a; CENRAP, 2005c). The Workgroups did not provide any comments on these two deliverables. Thus, the draft work plan and methods document was not revised. However, during the duration of the project, the Workgroups requested additional revisions to the Base A point, area, and nonroad inventories after the draft work plan and methods document was prepared and reviewed by the Workgroups. This final report for the Base B inventory details all of the updates and refinements completed on the Base A inventory. However, due to time and resource constraints, the draft work plan and methods document was not revised to reflect this additional work.

Table 1. Summary of Annual Emissions for the CENRAP Region by Sector and Pollutant

Sector	VOC Tons/Year	VOC Percent of Total	NO_x Tons/Year	NO_x Percent of Total	CO Tons/Year	CO Percent of Total	SO_2 Tons/Year	SO_2 Percent of Total	PM10-PRI Tons/Year	PM10-PRI Percent of Total	PM25-PRI Tons/Year	PM25-PRI Percent of Total	NH_3 Tons/Year	NH_3 Percent of Total
Point	532,229	14.0	1,825,128	35.1	1,761,327	7.8	2,222,998	82.7	375,842	4.9	233,070	12.7	194,467	11.1
Area	1,680,228	44.2	679,931	13.1	3,617,995	16.1	321,222	12.0	7,100,109	93.1	1,498,076	81.3	1,466,292	83.5
Nonroad	659,316	17.3	964,071	18.5	4,340,598	19.3	95,304	3.6	82,916	1.1	76,798	4.2	1,365	0.1
Onroad	930,704	24.5	1,735,738	33.4	12,782,810	56.8	47,644	1.8	37,649	0.5	27,231	1.5	50,317	2.9
Natural Sources	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	44,688	2.5
Geogenic	0	0.0	0	0.0	0	0.0	0	0.0	32,164	0.4	7,076	0.4	0	0.0
Totals	3,802,477	100	5,204,868	100	22,502,730	100	2,687,169	100	7,628,680	100	1,842,252	100	1,757,129	100
Dominant Sector[1]	Area		Point		Onroad		Point		Area		Area		Area	

[1] Identifies the sector accounting for the majority of the emissions for each pollutant.

Table 2a. Summary of All Sector Source Emissions by State and Pollutant

State FIPS/ Tribal Code	State/Tribal Name	VOC Tons/ Year	VOC Percent of Total	NO_x Tons/ Year	NO_x Percent of Total	CO Tons/ Year	CO Percent of Total	SO_2 Tons/ Year	SO_2 Percent of Total	PM10-PRI Tons/ Year	PM10-PRI Percent of Total	PM25-PRI Tons/ Year	PM25-PRI Percent of Total	NH_3 Tons/ Year	NH_3 Percent of Total
05	Arkansas	272,607	7.2	298,625	5.7	1,445,276	6.4	128,033	4.8	292,586	3.9	100,826	5.5	145,323	8.5
19	Iowa	284,276	7.5	331,391	6.4	1,613,636	7.2	199,941	7.4	517,601	6.8	121,979	6.7	250,688	14.6
20	Kansas	261,263	6.9	381,986	7.3	2,176,490	9.7	165,373	6.2	783,815	10.3	227,308	12.4	181,081	10.6
22	Louisiana	385,686	10.1	707,068	13.6	2,330,169	10.4	391,312	14.6	333,116	4.4	157,745	8.6	85,593	5.0
27	Minnesota	396,648	10.4	487,033	9.4	2,531,648	11.3	158,555	5.9	826,338	10.9	196,427	10.7	179,814	10.5
29	Missouri	387,390	10.2	488,085	9.4	2,607,987	11.6	424,088	15.8	1,000,608	13.2	208,035	11.3	157,003	9.2
31	Nebraska	142,037	3.7	255,060	4.9	870,962	3.9	94,069	3.5	469,576	6.2	96,205	5.2	169,810	9.9
40	Oklahoma	388,347	10.2	466,748	9.0	2,222,719	9.9	170,113	6.3	740,953	9.8	174,044	9.5	133,558	7.8
48	Texas	1,284,200	33.8	1,787,975	34.4	6,702,571	29.8	955,686	35.6	2,631,794	34.6	552,511	30.1	409,564	23.9
405	Fond du Lac Tribe	3	0.0	501	0.0	129	0.0	0	0.0	8	0.0	8	0.0	0	0.0
407	Leech Lake Band of Ojibwe	18	0.0	397	0.0	1,145	0.0	0	0.0	121	0.0	88	0.0	4	0.0
	Totals[1]	3,802,477	100	5,204,868	100	22,502,730	100	2,687,169	100	7,596,517	100	1,835,175	100	1,712,437	100

[1] PM10-PRI and PM25-PRI emissions from biogenic sources and NH_3 emissions from natural sources are not included in the area source emissions totals shown in this table.

Table 2b. Summary of Area Source Emissions by State and Pollutant

State FIPS/ Tribal Code	State/Tribal Name	VOC Tons/ Year	VOC Percent of Total	NO_x Tons/ Year	NO_x Percent of Total	CO Tons/ Year	CO Percent of Total	SO_2 Tons/ Year	SO_2 Percent of Total	PM10-PRI Tons/ Year	PM10-PRI Percent of Total	PM25-PRI Tons/ Year	PM25-PRI Percent of Total	NH_3 Tons/ Year	NH_3 Percent of Total
05	Arkansas	71,371	4.3	25,392	3.7	145,859	4.0	27,873	8.7	243,378	3.4	61,352	4.1	139,882	9.5
19	Iowa	105,563	6.3	6,920	1.0	102,183	2.8	3,290	1.0	477,093	6.7	97,987	6.5	244,446	16.7
20	Kansas	137,821	8.2	43,114	6.3	875,433	24.2	14,084	4.4	728,377	10.3	194,959	13.0	114,482	7.8
22	Louisiana	113,241	6.7	99,060	14.6	530,135	14.7	83,253	25.9	245,162	3.5	84,068	5.6	71,756	4.9
27	Minnesota	169,918	10.1	59,536	8.8	276,964	7.7	15,550	4.8	762,279	10.7	157,752	10.5	145,736	9.9
29	Missouri	133,784	8.0	34,749	5.1	269,007	7.4	48,317	15.0	962,807	13.6	182,266	12.2	120,341	8.2
31	Nebraska	66,769	4.0	15,023	2.2	81,169	2.2	7,748	2.4	447,703	6.3	83,852	5.6	137,406	9.4
40	Oklahoma	201,758	12.0	115,788	17.0	465,631	12.9	11,779	3.7	714,805	10.1	157,444	10.5	104,587	7.1
48	Texas	680,004	40.5	280,349	41.2	871,616	24.1	109,329	34.0	2,518,505	35.5	478,396	31.9	387,657	26.4
	Totals[1]	1,680,228	100	679,931	100	3,617,995	100	321,222	100	7,100,109	100	1,498,076	100	1,466,292	100

[1] PM10-PRI and PM25-PRI emissions from biogenic sources and NH_3 emissions from natural sources are not included in the area source emissions totals shown in this table.

Table 2c. Summary of Point Source Emissions by State and Pollutant

State FIPS/ Tribal Code	State/Tribal Name	VOC Tons/ Year	VOC Percent of Total	NO_x Tons/ Year	NO_x Percent of Total	CO Tons/ Year	CO Percent of Total	SO_2 Tons/ Year	SO_2 Percent of Total	PM10-PRI Tons/ Year	PM10-PRI Percent of Total	PM25-PRI Tons/ Year	PM25-PRI Percent of Total	NH_3 Tons/ Year	NH_3 Percent of Total
05	Arkansas	102,508	19.3	68,867	3.8	357,578	20.3	90,769	4.1	39,983	10.6	31,467	13.5	2,911	1.5
19	Iowa	39,156	7.4	122,124	6.7	51,236	2.9	184,664	8.3	28,788	7.7	13,650	5.9	3,366	1.7
20	Kansas	27,458	5.2	165,284	9.1	83,307	4.7	140,371	6.3	47,081	12.5	25,073	10.8	63,914	32.9
22	Louisiana	89,025	16.7	312,634	17.1	285,395	16.2	286,050	12.9	73,333	19.5	60,899	26.1	9,237	4.8
27	Minnesota	40,970	7.7	155,143	8.5	233,778	13.3	131,542	5.9	51,111	13.6	27,537	11.8	28,673	14.7
29	Missouri	36,109	6.8	181,675	10.0	136,914	7.8	361,548	16.3	20,949	5.6	11,079	4.8	31,120	16.0
31	Nebraska	7,274	1.4	58,619	3.2	11,008	0.6	73,487	3.3	13,105	3.5	4,638	2.0	30,731	15.8
40	Oklahoma	36,987	7.0	158,972	8.7	78,430	4.5	148,852	6.7	18,009	4.8	9,776	4.2	24,256	12.5
48	Texas	152,720	28.7	600,912	32.9	522,407	29.7	805,714	36.2	83,354	22.2	48,855	21.0	255	0.1
405	Fond du Lac Tribe	3	0.0	501	0.0	129	0.0	0	0.0	8	0.0	8	0.0		0.0
407	Leech Lake Band of Ojibwe	18	0.0	397	0.0	1,145	0.1		0.0	121	0.0	88	0.0	4	0.0
	Totals	532,229	100	1,825,128	100	1,761,327	100	2,222,998	100	375,842	100	233,070	100	194,467	100

Table 2d. Summary of Nonroad Source Emissions by State and Pollutant

State FIPS/ Tribal Code	State/Tribal Name	VOC Tons/ Year	VOC Percent of Total	NO_x Tons/ Year	NO_x Percent of Total	CO Tons/ Year	CO Percent of Total	SO_2 Tons/ Year	SO_2 Percent of Total	PM10-PRI Tons/ Year	PM10-PRI Percent of Total	PM25-PRI Tons/ Year	PM25-PRI Percent of Total	NH_3 Tons/ Year	NH_3 Percent of Total
05	Arkansas	49,246	7.5	62,472	6.5	272,626	6.3	5,490	5.8	5,673	6.8	5,220	6.8	49	3.6
19	Iowa	58,021	8.8	92,893	9.6	363,341	8.4	9,070	9.5	9,746	11.8	8,939	11.6	80	5.9
20	Kansas	26,400	4.0	82,697	8.6	261,770	6.0	8,101	8.5	6,549	7.9	5,993	7.8	115	8.4
22	Louisiana	106,422	16.1	114,710	11.9	531,424	12.2	16,961	17.8	10,410	12.6	9,558	12.5	563	41.4
27	Minnesota	83,419	12.7	100,479	10.4	446,922	10.3	8,719	9.2	9,343	11.3	8,576	11.2	90	6.6
29	Missouri	126,923	19.3	99,306	10.3	754,272	17.4	9,351	9.8	13,064	15.8	11,985	15.6	74	5.4
31	Nebraska	24,882	3.8	119,568	12.4	175,694	4.1	11,011	11.6	7,491	9.0	6,785	8.8	59	4.3
40	Oklahoma	47,863	7.3	49,396	5.1	324,391	7.5	4,773	5.0	5,085	6.1	4,652	6.1	280	20.6
48	Texas	136,139	20.7	242,551	25.2	1,210,158	27.9	21,828	22.9	15,556	18.8	15,090	19.7	52	3.8
	Totals	659,316	100	964,071	100	4,340,598	100	95,304	100	82,916	100	76,798	100	1,361	100

Table 2e. Summary of Onroad Source Emissions by State and Pollutant

State FIPS/ Tribal Code	State/Tribal Name	VOC Tons/ Year	VOC Percent of Total	NO_x Tons/ Year	NO_x Percent of Total	CO Tons/ Year	CO Percent of Total	SO_2 Tons/ Year	SO_2 Percent of Total	PM10-PRI Tons/ Year	PM10-PRI Percent of Total	PM25-PRI Tons/ Year	PM25-PRI Percent of Total	NH_3 Tons/ Year	NH_3 Percent of Total
05	Arkansas	49,483	5.3	141,894	8.2	669,213	5.2	3,902	8.2	3,551	9.4	2,786	10.2	2,480	4.9
19	Iowa	81,535	8.8	109,454	6.3	1,096,877	8.6	2,916	6.1	1,975	5.2	1,403	5.2	2,797	5.6
20	Kansas	69,584	7.5	90,891	5.2	955,979	7.5	2,816	5.9	1,808	4.8	1,284	4.7	2,570	5.1
22	Louisiana	76,998	8.3	180,664	10.4	983,215	7.7	5,047	10.6	4,212	11.2	3,219	11.8	4,037	8.0
27	Minnesota	102,342	11.0	171,875	9.9	1,573,984	12.3	2,744	5.8	3,605	9.6	2,562	9.4	5,315	10.6
29	Missouri	90,574	9.7	172,355	9.9	1,447,795	11.3	4,873	10.2	3,789	10.1	2,704	9.9	5,469	10.9
31	Nebraska	43,113	4.6	61,850	3.6	603,091	4.7	1,822	3.8	1,277	3.4	930	3.4	1,614	3.2
40	Oklahoma	101,740	10.9	142,592	8.2	1,354,266	10.6	4,708	9.9	3,054	8.1	2,171	8.0	4,434	8.8
48	Texas	315,337	33.9	664,163	38.3	4,098,390	32.1	18,815	39.5	14,379	38.2	10,171	37.4	21,601	42.9
	Totals	930,704	100	1,735,738	100	12,782,810	100	47,644	100	37,649	100	27,231	100	50,317	100

Table 2f. Summary of Tribal Area Source Emissions

Tribal Code	Tribal Name	VOC Tons/ Year	NO_x Tons/ Year	CO Tons/ Year	SO_2 Tons/ Year	PM-PRI Tons/ Year	PM10-PRI Tons/ Year	PM25-PRI Tons/ Year	NH_3 Tons/ Year
405	Fond du Lac Band of the Minnesota Chippewa Tribe	0	0	571	0	1,883	12,246	1,883	0
407	Leech Lake Band of Ojibwe	22	8.2	105	1	20	0	0	0.95
	Totals	22	8	676	1	1,903	12,246	1,883	1

II. REFINEMENT OF THE CRITERIA AIR POLLUTANT AND NH_3 INVENTORIES FOR THE CENRAP REGION

A. Introduction

The following data sources were used to update CENRAP's 2002 Base A inventories:

(5) S/L/T agency comments on the "Base A" inventories;
(6) S/L/T agency comments on the draft 2002 NEI;
(7) Revisions to CENRAP-sponsored inventories; and
(8) Comments from CENRAP's EI and Modeling Workgroups.

Table 3 provides a summary of the S/L/T agency data received for updating CENRAP's Base A inventories. Prior to using the data to update the Base A inventories, Pechan performed QA review of the inventories to identify (1) remaining QA issues that needed to be resolved through consultation with the agency and/or the EI and Modeling Workgroups, and (2) missing data that needed to be added to the inventories to support air quality modeling studies. As a result of the QA review, and after consulting with KS and MO, it was agreed that the point source inventory data they provided would not be used in the Base B point source inventory (see section II.B for additional details).

Table 3. Summary of S/L/T Agencies that Provided Data for Updating CENRAP's Inventories [1]

State/Local/Tribal Agency	Point	Area	Nonroad
AR	x[2]	x[3]	
Fond du Lac Band of the Minnesota Chippewa Tribe			
IA	x[4]		
KS	x[4,5]		
LA			
Leech Lake Band of Ojibwe Tribe	x[6]	x[6]	
MN	x[4]	x[3]	
MO	x[4,5]		
NE-State			
NE-Lincoln (Lancaster County)			
NE-Omaha (Douglas County)			
OK			
TX		x[4]	x[3]

1 An "x" identifies the sector for which a S/L/T agency provided data to revise the Base A inventory.
2 Agency provided inventory that completely replaced its Base A inventory data.
3 Agency provided comments on CENRAP's Base A inventory.
4 Agency provided comments on draft 2002 NEI that were used to update the Base A inventory.
5 Agency provided comments but comments not used per agreement with the agency.
6 Agency provided a new inventory not included in the Base A inventory.

After resolving the QA issues, the files were updated to revise or add data provided by the S/L/T agencies. In addition, the CENRAP's Base A NONROAD model inventory was revised to correct input data for the oxygen content of fuels and the SO_2 content of diesel fuel. Thus, the nonroad inventory for the NONROAD model categories was updated for all states that elected to use this inventory in the CENRAP inventory. Also, revisions were completed on all sectors to address comments from the EI and Modeling Workgroups.

The following sections B, C, and D provide the methods for updating CENRAP's 2002 Base A inventories for point, area, and nonroad sources, respectively. Each section discusses the QA review that was conducted on the S/L/T inventories to identify QA issues that were corrected to support air quality modeling. Then, each section discusses the augmentation procedures that were applied to fill in missing data. These procedures identify supplemental data that S/L/T agencies provided to add to or replace data in their inventories, the CENRAP-sponsored inventories that were added to the inventories as approved by the S/L/T agencies, and the 2002 NEI categories that S/L/T agencies requested to be added to their inventories. The augmentation procedures also explain how missing PM emissions were estimated and added to the inventories after incorporating inventory data supplied by S/L/T agencies, the CENRAP-sponsored inventory data, and data from the 2002 NEI.

Section E presents the data sources and methods for preparing the 2018 projection year inventory for EGUs. Section F documents the SMOKE and RPO data exchange protocol files prepared under this project.

B. Point Source Inventory Methods

1. Data Sources

For each S/L/T inventory that provided updates, Table 4 provides a summary of the pollutants included in each inventory, and compares the number of counties in the inventory to the number of counties in the 2002 preliminary NEI and in each S/L/T agency. The table also compares the number of facilities in the S/L/T inventory to the number of facilities in the 2002 preliminary NEI.

The inventories obtained from EPA are in Access 2000 databases in NIF 3.0. Each inventory was loaded into an Oracle database in NIF 3.0 to combine the inventories into a single data set. Then, after loading the inventories into Oracle in NIF 3.0, the following updates were performed on the consolidated data set, if necessary:

Table 4. Summary of Pollutants, Number of Counties, and Number of Facilities in Point Source Inventories

State/Local/ Tribal Agency	CO	NH_3	NO_x	PM-PRI	PM10-PRI	PM25-PRI	PM10-FIL	PM25-FIL	PM-CON	SO_2	VOC	Number of Counties in 2002 S/L/T Inventory Comments	Number of Counties in 2002 CENRAP Inventory[2]	Number of Counties in State	Number of Facilities in 2002 S/L/T Inventory Comments	Number of Facilities in 2002 CENRAP Inventory[2]
AR	x	x	x	x	x	x				x	x	57	70	75	231	1281
IA[1]										x		5	99	99	7	1871
KS[1]	x	x	x				x	x		x	x	4	105	105	4	5046
MN[1]	x	x	x		x	x		x		x	x	72	87	87	542	6095
Leech Lake Band of the Minnesota Ojibwe Tribe	x	x	x	x	x						x	-[3]	-[3]	-[3]	2	0

[1] State submitted comment records ("A" and "D" submittal flags). Therefore, entries will refer only to the "A" (Add) or "RA" (Revise Add) records. Note, ultimately KS inventory comments were not used to update the Base A inventory.

[2] Refers to the counties in the 2002 CENRAP modeling inventory which could include CENRAP-sponsored inventories for NH_3, fires, and confined animal feeding operations.

[3] NA = Not Applicable.

- Hazardous air pollutant (HAP) records were removed since the inventory will support regional haze, fine PM, and ozone modeling.

- Pollutant codes were corrected to make them NIF 3.0 compliant (e.g., update PMPRI pollutant code to PM-PRI). Additionally, other codes were identified for remediation on a case-by-case basis.

- The NIF 3.0 submittal flag field, when populated by an agency, provides the directions needed to determine how to revise the 2002 inventory. For this project, comment files obtained from EPA reflected comments on the draft NEI and not on CENRAP's 2002 inventory. Therefore, Pechan reviewed the submittal flag codes, compared the comment file to the CENRAP inventory, and consulted with the S/L/T agency to verify what records in the comment file were to be used to revise the CENRAP inventory. Pechan adjusted the submittal flags as necessary to document the records in the comment file that replaced records in CENRAP's 2002 inventory.

- Null values in the tribal code field were updated to '000' since this field is a part of the data key that defines records as unique in all eight NIF tables.

- The following NIF plus fields were added to the Transmittal (TR), Site (SI), Emission Unit (EU), Emission Release Point (ER), Emission Process (EP), Emission Period (PE), Emission (EM), and Control Equipment (CE) tables:

  - Data Source Codes:

Code	**Description**
S	State agency-supplied data.
L	Local agency-supplied data.
R	Tribal agency-supplied data.
P	Regional Planning Organization.
SC	S/L/T agency Corrected.
AUG-A	PM Augmentation: ad-hoc change.
AUG-C	PM Augmentation: standard augmentation method.
AUG-O	PM Augmentation: set PMxx-FIL = PMxx-PRI where for SCCs starting with 10 (external fuel combustion) and 20 (internal fuel combustion). Note: emission factors and particle-size data for estimating condensible emissions for fuel combustion SCCs starting with 30 were not available; therefore, condensible emissions were not estimated for these processes if an agency provided filterable and not primary emissions for these processes.
AUG-Z	PM Augmentation: automated fill-in of zero values where all PM for a particular process is zero.
GENPARENT	Data source where a parent record was system generated.

- Revision Date: This field indicates the month and year during which the last revision was made to a record. For the Base B inventory, for new or updated records, it is 0705.

- State Federal Information Processing Standard (FIPS): This field indicates the state FIPS code of the submittal.

- County FIPS: This field indicates the county FIPS code of the submittal.

- The following NIF plus fields were added to the EM table:

  - Emission Ton Value: This field indicates the values of the emissions in tons. This field was used to prepare summaries of emissions on a consistent emission unit basis.

  - Emission Type Period: This field indicates the period of the Emission Type – either ANNUAL or NONANNUAL. This field was used to prepare summaries of annual emissions.

  - CAP_HAP: This field identifies records for CAP versus records for HAPs. For the CENRAP inventory, the flag is CAP for all records.

  - Year: This field indicates the year of the data; for this inventory, it is 2002.

2. QA Review

QA review on the inventories was conducted in accordance with the QA procedures specified in the QAPP for this project (CENRAP, 2005b).

The following data elements were reviewed to identify QA issues:

- Emission Release Point (ERP) or Stack Coordinates;
- ERP (Stack) Parameters;
- PM Emissions Consistency and Completeness;
- Control Devices and Efficiencies;
- Start and End Dates; and
- Annual and Daily Emissions Comparison.

As appropriate, individual S/L/T agencies were contacted with QA questions in order to receive direction on corrections.

a. County and Facility Coverage

S/L/T agencies which submitted complete replacement inventories or replacement facility information (Arkansas, Leech Lake) were compared to their previous year’s submittal as

appropriate to determine if there is a significant change in county coverage, facility coverage, or emissions.

b. Pollutant Coverage

S/L/T agencies which submitted complete replacement inventories (Arkansas, Leech Lake) were reviewed for pollutant coverage and other potential issues. Arkansas' Base A inventory included emission data from the CENRAP-sponsored inventories for confined animal feeding operations and planned burning. The CENRAP-sponsored emissions data were merged with Arkansas' new inventory.

Arkansas, Minnesota, and Leech Lake include replacements and/or revisions to their PM data. On processes where the PM data were replaced or revised with new data, the PM augmentation routine was applied. The QA review of the PM data is discussed further in the following section, and the augmentation procedures are discussed in section II.B.4.

c. Particulate Matter (PM) Emissions Consistency and Completeness Review

The following consistency checks were performed at the EM table data key level (for annual emissions) to compare PM emissions:

- If a process was associated with a PM emission record, but was missing one or more of the following (as appropriate for the Source Classification Code [SCC] [i.e., condensible PM (PM-CON) is associated with fuel combustion only]): PM10-FIL, PM10-PRI, PM25-FIL, PM25-PRI, or PM-CON, the record was flagged for review.

- The following equations were used to determine consistency:

  PM10-FIL + PM-CON = PM10-PRI
  PM25-FIL + PM-CON = PM25-PRI
  PM-FIL + PM-CON = PM-PRI (as appropriate)

- The following comparisons were applied to determine consistency:

  PM10-PRI >= PM10-FIL
  PM25-PRI >= PM25-FIL
  PM10-PRI >= PM-CON
  PM25-PRI >= PM-CON
  PM10-FIL >= PM25-FIL
  PM10-PRI >= PM25-PRI
  PM-PRI >= PM10-PRI (as appropriate)
  PM-PRI >= PM25-PRI (as appropriate)
  PM-FIL >= PM10-FIL (as appropriate)
  PM-FIL >= PM25-FIL (as appropriate)

If the data failed one of these checks it was diagnosed as an error. If a S/L/T agency did not provide corrections to these errors, the errors were corrected/filled in according to the augmentation procedure discussed in section II.B.4.

d. Emission Release Point (ERP) Coordinate Review

Location coordinates for new point sources were evaluated using geographic information system (GIS) mapping to determine if the coordinates were within 0.5-kilometers of the boundary of the county in which the source was located. ERP records with coordinates located more than 0.5, 1, 2, 3, 5, 7, and 10 or more kilometers from their county boundary, and coordinates that mapped outside of their state boundary were identified. Arkansas' new point source inventory contained what appeared to be new coordinates not included in its Base A inventory. However, Arkansas indicated that the ERP information had not changed significantly since the original submittal was submitted for ERP coordinate review. Coordinates for the Leech Lake submittal were manually reviewed and it was verified that the coordinates fell within the tribal area boundaries.

e. ERP Parameter Review

The EPA's QA guidance for diagnosing ERP issues for the point source NEI (EPA, 2004b) was applied to identify QA issues in the S/L/T point source inventories. The QA guidance involved diagnosing the correct assignment of the ERP type (i.e., stack or fugitive), parameters with zero values, parameters not within the range of values specified in the EPA's QA procedures, and consistency checks (i.e., comparing calculated values against expected values). In many cases errors were due to defaulted zeros, and submitting agencies were requested to provide the value. In other cases, out-of-range errors were caused by unit conversion issues (e.g., stack parameters were in ft, ft/sec, cu ft/sec or degrees Fahrenheit). The data were corrected or filled in according to the ERP parameter augmentation procedure discussed in section II.B.4.

f. Control Device Type and Control Efficiency Data Review

The CE codes in the "Primary Device Type Code" and "Secondary Device Type Code" fields were reviewed to identify invalid codes (i.e., codes that did not exist in the NIF 3.0 reference table) and missing codes (e.g., records with a null or uncontrolled code of 000 but with control efficiency data).

QA review of control efficiency data involved diagnosis of two types of errors. First, records were reviewed to identify control efficiency values that were reported as a decimal rather than as a percent value. Records with control efficiencies with decimal values were flagged as a potential error (although not necessarily an error, since the real control efficiency may be less than 1 percent).

The second check identified records where 100 percent control was reported in the CE table, but the emissions in the EM table were greater than zero and the rule effectiveness value in the EM table was null, zero, or 100 percent (implying 100 percent control of emissions). Because many agencies did not populate the rule effectiveness field or a default value of zero was assigned, records with null or zero rule effectiveness values were included where the CE was 100 percent

and emissions were greater than zero. All new data submitted for updating CENRAP's point source inventory passed these QA checks.

g. Start and End Date Checks

QA review was conducted to identify start date and end date values in the PE and EM tables to confirm consistency with the inventory year in the transmittal table, and to confirm that the end date reported is greater than the start date reported. This check did not identify any QA issues with the data used to update the Base A inventory.

h. Annual and Daily Emissions Comparison

The following QA checks were conducted to identify potential errors associated with the incorrect reporting of daily and/or annual emissions:

- Multiple records coded at the process level as emission type 30, but with different start and end dates. While not a true duplicate, this may indicate an error or an inclusion of both annual and seasonal values. Only one record can be identified as the "ANNUAL" record.

- Multiple records coded at the process level (or SCC, in the case of area) as a daily emission type (27, 29, etc.) but with different start and end dates. While not a true duplicate, this may indicate an error or just an inclusion of additional types of daily emissions.

- Multiple records coded at the process level (or SCC, in the case of area) with the same start and end date, but different emission types. While not a true duplicate, this may indicate an error or just an inclusion of additional types of daily emissions.

All new data submitted for updating CENRAP's point source inventory passed these QA checks.

3. Responses from S/L/T Agencies

The S/L/T agencies provided responses to questions about their data. When necessary, QA issues were summarized in Excel spreadsheets and sent to the agencies and the EI and Modeling Workgroups for review. The agencies or the Workgroups then provided direction for correcting the issues either by telephone or by e-mail.

4. Gap Filling and Augmentation

The following discusses the augmentation procedures that were used to fill in missing data that were not supplied by the S/L/T agencies.

a. PM Augmentation

Pechan implemented procedures to estimate missing pollutant data from data provided by the S/L/T agencies in order to develop a complete set of PM10-PRI and PM25-PRI emissions to support air quality modeling.

The PM augmentation process gap-filled missing PM pollutant complements. For example, if a S/L/T agency provided only PM10-PRI pollutants the PM augmentation process filled in the PM25-PRI pollutants. The steps in the PM augmentation process were as follows:

- Initial QA and remediation of S/L/T provided PM pollutants;
- Development of PM factor ratios based on factors from the Factor Information and REtrieval (FIRE) Data System (Version 6.2) and the PM Calculator (EPA, 2003; EPA, 2004c);
- Implementation of the ratios; and
- Presentation of PM augmentation results to S/L/T agencies for review and comment.

Note: An Access database accompanies this documentation - *Reference Tables for PM Augmentation*. This database contains the SCC Control Device Ratio table, the Emission Factors table and Emission Factors Crosstab table discussed in Step 2. The PM Calculator ratio table can be provided upon request – it contains all possible combinations for SCC and Control Device types that are available in the PM Calculator.

These steps are further detailed below.

1. Initial QA and Remediation of PM Pollutants

S/L/T agencies were initially presented with files that detailed potential inconsistencies and missing information in their PM pollutant inventory. Inconsistencies in PM pollutants include the following:

- PM-PRI less than PM10-PRI, PM25-PRI, PM10-FIL, PM25-FIL, or PM-CON
- PM-FIL less than PM10-FIL, PM25-FIL
- PM10-PRI less than PM25-PRI, PM10-FIL, PM25-FIL or PM-CON
- PM10-FIL less than PM25-FIL
- PM25-PRI less than PM25-FIL or PM-CON
- The sum of PM10-FIL and PM-CON not equal to PM10-PRI
- The sum of PM25-FIL and PM-CON not equal to PM25-PRI

Potential missing information was summarized in a table which detailed the variety of cases provided by the S/L/T agency. For example, a S/L/T agency might have provided PM10-FIL and PM25-FIL for some processes, but for other processes only PM10-FIL was provided.

S/L/T agencies were asked to review this information and provide corrections where possible. In general, corrections (or general directions) were provided in the case of the potential inconsistency issues. An example of a general direction provided by a S/L/T agency was to

remove PM25-FIL where greater than PM10-FIL because the PM10-FIL was (in their particular case) known to be more reliable. In other cases, the agency-provided specific process level pollutant corrections. In general, if specific direction was not provided by the agency, priority was given to the PM_{10} number.

2. Development of PM Factor Ratio

The primary deliverable of this step of the process was the development of a table keyed by SCC, primary control device, and secondary control device. This table is called the SCC Control Device Ratios table. The table structure is shown in Table 5 which follows the discussion below.

This table was filled according to the following steps:

- Ratios (both condensible and noncondensible) were added from FIRE for SCCs starting with 10* (external fuel combustion) and 20* (internal fuel combustion) where there was a direct match between the provided SCC, and primary and secondary control devices.
- Ratios (non-condensable) were added from the PM Calculator for SCCs starting with 10* and 20* where there was not a direct match between the provided SCC, and primary and secondary control devices. Condensible ratios were added from the PM Calculator based on the uncontrolled SCC for these SCCs. In some cases, it was necessary to map the SCC and control devices to the PM calculator to find a match for the noncondensible ratios. In some cases, it was necessary to map the SCC to FIRE to find a match for condensible ratios.
- For natural gas, process gas and liquefied petroleum gas SCCs starting with 10* and 20*, it was assumed (based on FIRE emission factors trend) that the PM-PRI/PM10-PRI/PM25-PRI ratio was equal to 1. It was also assumed that the PM-FIL/PM10-FIL /PM25- FIL was equal to 1. Condensible ratios were calculated from uncontrolled FIRE emission factors based for these SCCs. In some cases it was necessary to map the SCC to FIRE to find a match for condensible ratios.
- Ratios for SCCs not like 10* and 20* were obtained from the PM Calculator. It was assumed that the condensible component was zero.

Accompanying this document is a database containing the SCC Control Device Ratios table. Additionally, the Emission Factors and Emission Factors Crosstab table (which are derived from FIRE) are provided. The Emission Factors Crosstab table contains the ratios developed from the Emission Factors table. The Emission Factors table contains detailed information on the emission factors used to develop the ratios.

Note: Ratios from the PM calculator were developed using a standard input of 100 TONS of uncontrolled PM-FIL emissions.

Table 5. Description of the Field Names and Descriptions for the SCC Ratio Table

Field Name	Field Description
PM Calculator	A “Yes” in this field indicates that at least some of the information was retrieved from the PM Calculator
FIRE	A “Yes” in this field indicates that at least some of the information was retrieved from the Emission Factors table. A “Condensible Ratios” in this field indicates that the condensible ratios factors were retrieved from this table.
Other	A field to indicate other sources as necessary.
SCC	Source category code from the S/L/T agency-provided data.
SCC_DESC	Description of source category code from the S/L/T agency-provided data.
maptoSCC	This field equals SCC unless the SCC provided was not found in the appropriate source table. In that case, the SCC was mapped using the closest available appropriate mapping choice.
maptoSCC_DESC	Description of the maptoSCC.
mapSCCNote	Any notes related to the mapping of the SCC. A “Yes” in this field indicates that the SCC was mapped.
PD	Primary device type from the S/L/T agency provided data.
PD_DESC	Description of the primary device (PD).
maptoPD	This field equals PD unless the PD provided was not found in the appropriate source table. In that case, the PD was mapped using the closest available appropriate mapping choice.
maptoPD_DESC	Description of the maptoPD.
mapPDNote	Any notes related to the mapping of the PD. A “Yes” in this field indicates that the PD was mapped.
SD	Secondary device type from the S/L/T agency provided data.
SD_DESC	Description of the secondary device (SD).
maptoSD	This field equals SD unless the SD provided was not found in the appropriate source table. In that case, the SD was mapped using the closest available appropriate mapping choice.
maptoSD_DESC	Description of the maptoSD.
mapSDNote	Any notes related to the mapping of the SD. A “Yes” in this field indicates that the SD was mapped.
PM-FIL/PM10-FIL	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM-FIL/PM25-FIL	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM-FIL/PM-PRI	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM-PRI/PM10-PRI	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM-PRI/PM25-PRI	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM10-FIL/PM25-FIL	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM10-PRI/PM25-PRI	This field and the following are ratios calculated from emission factors found either in FIRE or the PM calculator.
PM-CON/PM10-FIL	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
PM-CON/PM10-PRI	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
PM-CON/PM25-FIL	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
PM-CON/PM25-PRI	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
PM-CON/PM-FIL	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
PM-CON/PM-PRI	Condensible ratios were calculate from FIRE if available for 10* and 20* SCCs. If condensible ratios were not found in FIRE for 10* and 20* these ratios were set to zero.
RPO Specific Note	Indicates SCC and control device combinations are in the RPO inventory.
Additional Notes	Any notes regarding assumptions about ratios.

3. *Implementation of the QA Ratios*

In order to calculate the additional PM pollutants based on the SCC Control Device ratio table developed in the above step, a crosstab table was created from the EM table based on the following fields:

- State FIPS
- County FIPS
- Tribal Code
- Emission Unit identification (ID)
- Process ID
- Start Date
- End Date
- Emission Type
- SCC
- Primary Device Type
- Secondary Device Type

The primary and secondary device type fields were added based on information from the CE table. If control equipment information was not available these fields were defaulted to 000 ("UNCONTROLLED"). In the few cases where there was a conflict between the control devices reported for the same process for PM pollutants (for example, a PM10-PRI is listed as controlled, but PM-PRI did not have control information), the control device type was selected based on the controlled pollutant.

In addition to the fields listed above, the crosstab included the PM emission amounts for the particular process and a field that indicated whether those emissions existed in the inventory. These fields are as follows:

- PM_PRI
- PM_FIL
- PM10_PRI
- PM10_FIL
- PM25_PRI
- PM25_FIL
- PM_CON
- PM_PRI_EXISTS
- PM_FIL_EXISTS
- PM10_PRI_EXISTS
- PM10_FIL_EXISTS
- PM25_PRI_EXISTS
- PM25_FIL_EXISTS
- PM_CON_EXISTS

The emission values are in the PM_PRI, PM_FIL, PM10_PRI, PM10_FIL, PM25_PRI, PM25_FIL, PM_CON fields. The _EXISTS field indicates whether the pollutant was provided by the S/L/T agency. A zero indicates that the pollutant was not provided; a number greater than zero (usually one) indicates that it was provided by the S/L/T agency.

Prior to the development of this crosstab, the EM table was filled in as much as possible using basic assumptions. For example, if the S/L/T agency provided emissions that were equal to zero for PMs for a particular process, it was assumed that all PMs for that process were zero and they were filled in accordingly. Since the assumption was that for non 10* and 20* SCCs, the condensible value was zero – that would lead to PM10-FIL = PM10-PRI and PM25-FIL = PM25-PRI and PM-FIL = PM-PRI. Given that assumption, values for these pollutants were also filled in. After this data insertion, a subset of the crosstab was created. This subset only contained processes that required additional augmentation. The SCC control device type ratio table described in step 2 was based on only those SCC and control device types that required augmentation.

The next step was to fill in the missing information in this crosstab using the information found in the SCC Control Device Ratio table.

In calculating PM complement pollutants, priority was given to calculating –PRI and –CON pollutants. FIL pollutants were only calculated if necessary to calculate other pollutants or if it was a by-product of this calculation.

In augmenting the PM pollutants the non 10* and 20* SCCs were augmented first, with order given to augmenting based on PM_{10} where available, PM_{25} where available, and then PM .

Augmenting the PM pollutants for the 10* and 20* SCCs is more complicated, but the basic approach was to augment based on PM_{10} (FIL or PRI) where available, $PM_{2.5}$ (FIL or PRI) where available, and then PM (FIL or PRI) if PM_{10} or $PM_{2.5}$ variations were not available. Where both PM_{10} (FIL or PRI) and $PM_{2.5}$ (FIL or PRI) variations were both available, the calculation for PM-CON was generally driven from the PM_{10} number and the complements as necessary were back calculated. Where a –PRI emission factor ratio was required and was not available the –FIL emission factor ratio was used.

After calculations, the data was QA checked to ensure that the calculations resulted in consistent values for the PM complement. On a few occasions, the mix of ratio value and the pollutants and values provided by the S/L/T agency resulted in negative values when –FIL was back-calculated. In this case the negative –FIL value was set to zero and the –PRI value was readjusted.

The resultant PM table has the format described in Table 6.

Note: **There are some high condensible ratios that were calculated for some SCC device type combinations. In most cases these high condensible ratios were the result of the back calculation of PM-CON from PM10-PRI or PM25-PRI records. Since the state had**

already provided the PMxx-PRI records, these PM-CON values were not added to the inventory.

Table 6. Description of the Field Names and Descriptions for the Resulting PM Augmentation Table

Field Name	Field Description
Augment	A "Yes" in this field indicates that the process PM was augmented.
Condensible Note	If condensible information was added this field will note that.
STATE_FIPS	State FIPS
COUNTY_FIPS	County FIPS
STATE_FACILITY_IDENTIFIER	Site ID
EMISSION_UNIT_ID	Emission Unit
PROCESS_ID	Process
START_DATE	Start Date
END_DATE	End Date
EMISSION_TYPE	Emission type
SCC	Source Category Code
SCC_DESC	SCC description
PRIMARY_DEVICE_TYPE	Primary Device Type
PRIMARY_DEVICE_TYPE_DESC	PDT description
SECONDARY_DEVICE_TYPE	Secondary Device Type
SECONDARY_DEVICE_TYPE_DESC	SDT description
EMISSION_TYPE_PERIOD	Emission Type Period
EMISSION_RELEASE_POINT_ID	Emission Release Point ID
FACILITY_NAME	Facility Name
ORIS_FACILITY_CODE	ORIS facility Code
SIC_PRIMARY	SIC
ACTUAL_THROUGHPUT	Actual Throughput
THROUGHPUT_UNIT_NUMERATOR	Throughput Unit Numerator
PM_PRI	Emission ton value for PM-PRI
PM_FIL	Emission ton value for PM-FIL
PM10_PRI	Emission ton value for PM10-PRI
PM25_PRI	Emission ton value for PM25-PRI
PM10_FIL	Emission ton value for PM10-FIL
PM25_FIL	Emission ton value for PM25-FIL
PM_CON	Emission ton value for PM-CON
PM_PRI_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM_FIL_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM10_PRI_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM25_PRI_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM10_FIL_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM25_FIL_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
PM_CON_EXISTS	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
RECORD_COUNT	0 if the S/L/T agency did not provide, > 0 if S/L/T agency did provide
System Update Note	This field contains system codes related to the update queries used to calculate the record.

The data source code field is used to identify records that are added to the inventory to complete the set of PM10-PRI and PM25-PRI emissions needed to support modeling.

b. ERP Coordinates

If a S/L/T agency did not provide corrections for ERP coordinates that map more than 5 km outside of the county boundary, or provide coordinates for ERP records that did not have any coordinates in the S/L/T inventory, the following procedures were applied to replace the coordinates:

- Coordinates for other ERPs at the same facility, if available, that map within the county;
- Coordinates for the centroid of the zip code for a facility if a valid zip code is provided or can be obtained from the agency if it is not valid; or
- County centroid coordinates.

The zip code was taken from the SI NIF 3.0 table. The zip code was compared to a reference table of valid zip codes to verify that it is an active zip code and exists in the state and county reported in the inventory. For example, a zip code may be invalid if it is for the mailing address or address of a facility's parent company rather than the address of the facility's location. If a valid zip code for a facility was not identified, Pechan used the centroid for the facility's county as a last resort.

c. ERP Parameters

If valid ERP parameters were not provided by the S/L/T agency, Pechan applied the ERP augmentation procedures for the 2002 point source NEI (EPA, 2004b). It has been determined that the augmentation procedures in this document regarding SCC-specific ERP types and temperatures are difficult to resolve. When this situation occurs, preference was given to the state-supplied ERP type and SCC. For example, the procedures do not account for cases where an emission unit has two processes with one defined as a stack source and the other as a fugitive source. Therefore, the S/L/T-supplied ERP type was used when this situation occurred.

d. Control Device Type and Control Efficiency Data

If a S/L/T agency did provide valid control device type codes to replace invalid codes identified in the inventory, Pechan changed the valid NIF 3.0 code of 099 for miscellaneous control devices. In the case of modeled data where no control device information was provided, the records were left unchanged.

Pechan expected that control equipment data issues would be resolved through consultation with the S/LT Agencies. Default augmentation procedures were developed and applied to resolve control efficiency issues. In the event that control efficiency issues were not resolved, Pechan documented the QA issues in the final report.

5. Revisions to Address Comments

The following items were revised per S/L/T agency instructions:

a. Arkansas

Arkansas sent a complete replacement inventory. Arkansas confirmed that they revised the SCCs and emissions in this new inventory. Therefore, the previous Base A inventory was used as a guide for correcting ER coordinates and stacks and other QA issues.

County 777 information was removed from the entire inventory (4 facilities with 34 emission records).

CE

It was noted by Arkansas that they had not sent any CE records. They confirmed this as intentional.

EM

Removed PM-PRI and PM-FIL with emission numeric values of 0 (2,437 records) and 8 PM10-FIL/PRI records where the remaining PMxx-FIL/PRI information was non-zero.

Updated emission calculation method code from 4 to 04 (1,706 records).

Material codes of "0" were nulled out (44 records).

Material IO codes of "U" were nulled out (44 records).

Nulled out the invalid factor unit denominator value of "UNK", or nulled out the factor unit denominator value if the factor unit numerator was null (44 records).

Where PM25-PRI values were greater than PM10-PRI values, the PM25-PRI values were set equal to PM10-PRI values per instruction from the state.

Note: The NH_3 emissions in Arkansas' new inventory decreased considerably from the emissions in the Base A inventory. A comparison of the emissions was provided to Arkansas for review and confirmation that the revised emissions are correct.

PE

Material codes of "0" were nulled out (6 records).

Material IO codes of "U" were nulled out (6 records).

Nulled out throughput unit numerator where noted as "UNK" (6 records).

EP

The Arkansas inventory contained six inactive SCCs (i.e., SCCs in EPA's February 2004 master list that are identified as no longer used by EPA) that were changed to active SCCs as follows:

- 28888802 was replaced by 28888801
- 30800197 was replaced by 30800199
- 30703096 was replaced by 3070399
- 30703098 was replaced by 3070399
- 30699998 was replaced by 30699999
- 30700798 was replaced by 30700799

Updated one EP record to reset its operating percentages for the 4 seasons from all 24s to all 25s in order to make the sum of activity consistent.

ER

Where EP was parentless, ER records were added to the inventory. The ERP type was set to "01" if total stack emissions for all pollutants combined was less than or equal to 100 tons per year, or to "02" if total stack emissions for all pollutants combined was more than 100 tons per year.

21 invalid ER types were updated based on the Base A inventory.

Updated 107 of Arkansas coordinates based on Base A inventory.

Stack augmentation and coordinate augmentation was implemented on any remaining missing or invalid values.

EU

One emission unit record was generated in order to maintain referential integrity.

SI

Two site records were generated in order to maintain referential integrity.

TR

The affiliation type "report_certifier" was changed to "Report Certifier".

b. Iowa

Iowa provided additions and revisions to their SO_2 emissions. These revisions were applied to their submittal.

EM

Emission revisions were made to records where the data keys in the comments matched those in the inventory. Emission records were added to the Base B inventory where there was no data key match. In order to maintain referential integrity, records in the comment file were added to the ER, EU, EP, and PE tables. In addition, a correction was made to the start and end dates to ensure that they all started with 2002, in some cases, 2003 was used.

c. Kansas

Kansas provided comments to the EPA; however, after an initial incorporation of emission comments into the inventory – it was determined through state review that the comments did not apply to the CENRAP inventory. These emissions were restored to their original values. Essentially, the Kansas inventory remained unchanged.

d. Minnesota

Minnesota submitted new information for municipal airport emissions as well as revisions to their PM data.

ER

When inserting the new municipal airport emissions, 236 fugitive records were defaulted to the fugitive defaults. Eight records noted as stacks were defaulted to stack defaults. Coordinates were compared manually either to the previous Minnesota submittal which had been QA checked or manually compared to known county boundaries.

EM

When incorporating the new municipal airport information, it was determined that there were 13 duplicate records and one inconsistent ER-EU combination for NH_3. The new information submitted was selected over the previous information.

Minnesota included updates to their PM information. Where the PM values were new, they were added to the inventory (after removing previously augmented data). Where the PM values were revisions, the records were revised (after removing previously augmented data). When the PM QA check indicated that there were significant discrepancies between the relative values of PM10-PRI and PM25-PRI, it was determined through consultation with the state there was a problem in the export program that the state used to create the NIF 3.0 text file. Essentially, it was truncating the exponential part of the emission numeric value in the file. Minnesota provided a corrected file. This corrected file was used to update the PM25-FIL/PRI values. After these values were incorporated, there were still several comparative problems. Upon review, it was determined that a number of these comparative problems were due to rounding –

essentially comparing numbers in this fashion - PM10-PRI = 0.01999 and PM25-PRI = 0.02. The program would flag an error, even though it was a result of rounding. In these cases, the values were rounded appropriately. For 55 records, the PM25-PRI values were set to the calculated value in order to resolve this type of issue. After resolving these values, the PM augmentation procedure was run.

Wildfires and Agricultural Field Burning

For the Base A modeling effort, the Midwest RPO's point source inventory for wildfires (SCC 2810001000) and agricultural field burning (SCC 2801500000) was to be used for Minnesota. The point source inventory was included in the NIF 3.0 file for Minnesota to support development of emissions summaries (the Midwest RPO provided the inventory in point source SMOKE input format). However, it was learned that the Midwest RPO point source inventory was not being used for modeling so the 2002 point source wildfire and agricultural field burning emissions data were removed from the Base B point source inventory and restored to the Base B area source inventory.

e. Leech Lake

Leech Lake provided a new inventory that was not included in the Base A inventory.

ER

Leech Lake did not provide stack information for a fugitive ERP. This was defaulted to the stated default fugitive ERP values.

Leech Lake did not provide exit velocity and exit flow information for two ERPs. These were defaulted according to the methods document.

EM

Leech Lake did not provide PM25-PRI emissions. For the point source SCCs, PM25-PRI emissions were estimated based on the PM augmentation methods. For the single area source SCC for prescribed burning, the PM25-PRI emissions were estimated by dividing the PM10-PRI emissions by a ratio of 1.14. This ratio is the lower of two values (1.18 and 1.14) most commonly used by the Midwest RPOduring the development of the Minnesota prescribed burning inventory.

An examination of duplicates between tribal information and state information yielded one potential site duplicate – the Cloquet County municipal airport is listed in both the Minnesota (27017-000-27017XCOQ) and Leech Lake (00000-407- 05) inventories. The airport emissions in the two inventories are significantly different (29 tons of CO for Minnesota and .04 tons of CO for the tribe – the largest emission set) and there was insufficient information to determine if the emissions were duplicated when combined into the Base B inventory. The prescribed burning emissions for Leech Lake were also compared to the Minnesota prescribed burning inventory, and it was determined that there were no common ERP coordinates or other

information to indicate duplication of data. Thus, the airport emissions and prescribed burning emissions in Leech Lake's inventory were included in the Base B point source inventory.

f. Missouri

Missouri provided a complete replacement inventory; however, upon further discussion and agreement with Missouri, the replacement inventory was not use to update the Base A inventory.

g. All CENRAP S/L/T agencies - Office of Regulatory Information Systems (ORIS) and ORIS Boiler ID Updates

The ORIS identifiers in the SI and EU table were updated based on the crosswalk entitled CENRAPxwalk051005.mdb with modifications made for some emission unit identifier changes made by Arkansas. The revised crosswalk including the Arkansas changes was delivered to CENRAP on August 11, 2005.

h. Stack Parameter updates per CENRAP instructions

In addition to individual state submittals of data, stack parameter corrections were supplied to Pechan through CENRAP. These stack parameter comments affected 20 ERP records (4 in Iowa, 6 in Kansas, 5 in Louisiana, and 5 in Oklahoma) in one set of comments, and 15 records for Arkansas in another set of comments. There were some initial QA issues with the flow rate calculation; however, these issues were resolved by CENRAP and the revised comments were used to update the Base A inventory.

6. QA Review of Final Inventory

Final QA checks were run on the revised point source inventory data set to ensure that all corrections provided by the S/L/T agencies were incorporated into the Base B inventory and that there were no remaining QA issues that could be addressed during the duration of the project. After exporting the inventory in Oracle to an Access database in NIF 3.0, the EPA QA program was run on the Access database and the QA output was reviewed to verify that all QA issues that could be addressed were resolved (EPA, 2004a)

This file accompanies this documentation with the specific details included. The following summarizes the remaining QA issues that could not be addressed during the duration of this project (listed by table):

<u>CE</u>

Primary device type codes are null for the confined animal feeding operations and planned burning (forest and rangeland). The data originates from the CENRAP-sponsored inventories for these categories. Missouri also has null primary device types for the majority of the CE records it provided for NH_3 emissions.

<u>EM</u>

The EPA QA program indicated that some emissions were outside the expected range. While this is a guideline and not a specific error, this listing could be reviewed for high values.

PE

There are a few (32) records with the units M2 and MASS that were not yet in the EPA QA program units reference table.

There are a few (8) remaining records with operating times outside the EPA QA program ranges.

EP

There are a few (9) remaining records with operating parameters and seasonal sums outside the expected range.

The SCC 30202000 has not yet been added to the EPA QA program SCC reference table.

ER

A significant number of records are missing the supplementary coordinate reference information (Horizontal data measure, horizontal data accuracy, horizontal collection method code).

Several records indicate coordinates outside of county boundaries – the reasons why this may occur were explained in the coordinate augmentation section earlier in this document.

Several records also indicate stack parameters outside of ranges expected by the EPA QA program. This is due either to the S/L/T agency specifically requesting not to change the values or to default values in the EPA table which fall outside of the EPA QA program ranges.

EU

Standard industrial classification (SIC) code 3041 is not in the SIC code table.

SI

The inventories (particularly the NH_3 inventory for confined animal feeding operations) did not provide zip code information with the site data. This accounts for a tremendous number of the invalid zip code errors found when running the EPA QA program. There are other records with zip code errors in addition to these; however, these inventories are the source of the majority of these errors.

NAICs codes are missing or invalid on some records (470), primarily in Nebraska and Oklahoma which did not provide comments during this time. The location address is missing for some records in Minnesota and Nebraska.

TR

Some records are missing the transaction creation date information.

C. Area Source Inventory Methods

1. Data Sources

The states of AR, TX, and MN provided comments for updating the Base A inventory. AR and MN provided comments on the Base A inventory, and TX provided comments on the draft 2002 nonpoint NEI that were applied to update the Base A inventory. The Leech Lake Band of Ojibwe Tribe provided a new area source inventory. In addition, the EI and Modeling Workgroups provided several comments resulting in revisions to the area source inventory. Documentation of the revisions made to the Base A inventory are provided in section II.C.5.

The data files that the states provided for updating the Base A inventory were loaded into Oracle in NIF 3.0 into one data set. Then, the following updates were performed on the consolidated data set, if necessary:

- HAP records were removed since the inventory will support regional haze, fine PM, and ozone modeling.

- Pollutant codes were corrected to make them NIF 3.0 compliant (e.g., update PMPRI pollutant code to PM-PRI). Additionally, other codes were identified for remediation on a case-by-case basis.

- The NIF 3.0 submittal flag field, when populated by an agency, provides the directions needed to determine how to revise the 2002 inventory. TX's comment file reflected comments on the draft NEI and not on CENRAP's 2002 inventory. Therefore, Pechan reviewed the submittal flag codes, compared the comment file to the CENRAP inventory, and consulted with TX to verify what records in the comment file were to be used to revise the CENRAP inventory. Pechan adjusted the submittal flags as necessary to document the records in the comment file that replaced records in CENRAP's 2002 inventory.

- Null values in the tribal code field were updated to '000' since this field is a part of the data key that defines records as unique in all five NIF tables.

The following NIF plus fields were added to the EP, PE, EM, and CE tables:

- Data Source Codes:

For the area and nonroad inventory data, the data source codes were based on the following 9-character format:

[Data Origin]-[Year]-[Grown/Not Grown/Carried Forward]-[PM Augmentation Code]

Code	Field Length
Data Origin	1
Year	3 (including leading hyphen)
Grown/Not Grown/Carried Forward	2 (including leading hyphen)
PM Augmentation	3 (including leading hyphen)

Data Origin Codes

Code	Description
S	State agency-supplied data
L	Local agency-supplied data
R	Tribal agency-supplied data
P	Regional Planning Organization-generated data
E	EPA/Emission Factor and Inventory Group (EFIG)-generated data

Year Codes

Year for which data were supplied (e.g., Year = -02 for 2002), or from which prior year data were taken (e.g., Year = -99 for 1999; -01=2001).

Grown/Carried Forward/Not Grown Codes

Code	Description
-G	Used when emissions in a pre-2002 inventory were grown to represent 2002 emissions.
-F	Used when emissions in a pre-2002 inventory were carried forward and included in the 2002 inventory without adjustment for growth.
-X	Used when the emissions were not grown or were not carried forward. For example, X was used when emissions were calculated for the 2002 inventory using 2002 activity, or when data were replaced with 2002 S/L/T data.

PM Augmentation Codes

-PA	PM Augmented Emissions: Record for PM_{10}/$PM_{2.5}$ emissions that were updated or added using ad-hoc updates.
-PC	PM Augmented Emissions: Record added for PM_{10}/$PM_{2.5}$ emissions estimated using the PM Calculator.
-PR	PM Augmented Emissions: Record added for PM_{10}/$PM_{2.5}$ emissions estimated using ratios of PM_{10}-to-PM or $PM_{2.5}$-to-PM_{10}. If PM_{10} and $PM_{2.5}$ emissions were equal and one of the pollutants was assigned this code, the ratio was assumed to be 1.
-VR	Missing pollutant estimated by multiplying the ratio of the missing pollutant emission factor to the VOC emission factor by the VOC emissions supplied by the S/L/T agency. This method was applied to estimate missing pollutant emissions in the 2002 NEI only. Records with this data source code in

CENRAP's Base B inventory indicate that the data were copied from the NEI as directed by CENRAP agency comments.

-NR Missing pollutant estimated by multiplying the ratio of the missing pollutant emission factor to the NO_x emission factor by the NO_x emissions supplied by the S/L/T agency. This method was applied to estimate missing pollutant emissions in the 2002 NEI only. Records with this data source code in CENRAP's Base B inventory indicate that the data were copied from the NEI as directed by CENRAP agency comments.

2 QA Review

QA review was conducted on the S/L/T area source inventories in accordance with the QA procedures specified in the QAPP for this project (CENRAP, 2005b). The following discusses the QA checks that were completed during preparation of the Base B inventory.

a. County and SCC Coverage

The county coverage in the state inventories appeared to be reasonable for all states. The SCC coverage was difficult to evaluate simply by showing a count of the number of SCCs by state. The EI and Modeling Workgroups reviewed summaries comparing the Base B to the Base A inventory and provided comments that are explained under section II.C.5.

b. Pollutant Coverage

The pollutant coverage in the S/L/T inventories was complete for all pollutants except for PM_{10} and $PM_{2.5}$. Diagnosis and resolution of PM_{10} and $PM_{2.5}$ pollutant emissions is discussed later in section II.C.5.

d. Additional QA for the CENRAP Area Source Inventory

The following explains additional QA that was performed for the CENRAP inventory. The following data elements were reviewed to identify QA issues:

- Range Errors;
- PM Emissions Consistency and Completeness;
- Control Device Codes and Control Efficiency Values;
- Start and End Dates;
- Annual and Daily Emissions Comparison; and
- Comparison of Base B to the Base A inventory.

As appropriate, individual S/L/T agencies were contacted with QA questions in order to receive direction on corrections.

Range Errors

The EPA's QA program was run on MN's and TX's comment files. The range errors identified by the QA program were deemed acceptable. Note that according to EPA, the ranges to which values in inventories are compared represent "normal" ranges that are based on percentiles from previous inventories. The range values are conservative in that EPA wants to identify suspicious values even though the values may be real (Thompson, 2002).

PM Emissions Consistency and Completeness Review

The following consistency checks were performed at the EM table data key level (for annual emissions) to compare PM emissions:

- If an SCC was associated with a PM emission record, but was missing one or more of the following (as appropriate for the SCC [i.e., PM-CON is associated with fuel combustion only]): PM10-FIL, PM10-PRI, PM25-FIL, PM25-PRI, or PM-CON, the record was flagged for review.

- The following equations were used to determine consistency:

  PM10-FIL + PM-CON = PM10-PRI
  PM25-FIL + PM-CON = PM25-PRI

- The following comparisons were made to determine consistency:

  PM10-PRI >= PM10-FIL
  PM25-PRI >= PM25-FIL
  PM10-PRI >= PM-CON
  PM25-PRI >= PM-CON
  PM10-FIL >= PM25-FIL
  PM10-PRI >= PM25-PRI

If the data failed one of these checks it was diagnosed as an error. If a S/L/T agency did not provide corrections to these errors, the errors were corrected/filled according to an augmentation procedure explained in sections II.C.4 and II.C.5.

For information purposes, all PM-PRI and PM-FIL records were flagged to indicate that these pollutants were included instead of, or in addition to, the standard PM_{10}, $PM_{2.5}$, and PM-CON pollutants.

TX's area source inventory had many records that did not meet the PM consistency and completeness. Many of the errors occurred as a result of TX providing revisions on filterable emissions and not revising the primary emissions. Also, TX added daily filterable emissions for many categories but did not provide daily primary emissions. TX was consulted on how to resolve the PM issues and TX provided directions on how to correct the issues.

Control Device Type and Control Efficiency Data Review

The control equipment codes in the "Primary Device Type Code" and "Secondary Device Type Code" fields were reviewed to identify invalid codes (i.e., codes that did not exist in the NIF 3.0 reference table) and missing codes (e.g., records with a null or uncontrolled code of 000 but with control efficiency data).

QA review of control efficiency data involved diagnosis of two types of errors. First, records were reviewed to identify control efficiency values that were reported as a decimal rather than as a percent value. Records with control efficiencies with decimal values were flagged as a potential error (although not necessarily an error, since the real control efficiency may be less than 1 percent). Records with a 1 percent control efficiency value were also identified for review by the S/L/T agency to determine if the value was reported as a decimal in its internal data system but rounded to 1 percent when the data were converted to NIF 3.0.

The second check identified records where 100 percent control was reported in the CE table, but the emissions in the EM table were greater than zero and the rule effectiveness value in the EM table was null, zero, or 100 percent (implying 100 percent control of emissions). Because many agencies did not populate the rule effectiveness field or a default value of zero was assigned, records with null or zero rule effectiveness values were included where the CE was 100 percent and emissions were greater than zero. For records that met these criteria, Pechan consulted with the S/L/T agency to determine if corrections were needed to any of the fields.

Start and End Date Checks

The year in the start and end date values in the PE and EM tables were reviewed to confirm consistency with the inventory year in the transmittal table, and to confirm that the end date reported was greater than the start date reported.

Annual and Daily Emissions Comparison

The S/L/T inventories were reviewed to determine if any of the following conditions existed:

- Multiple records coded at the SCC level as emission type 30, but with different start and end dates. While not a true duplicate, this may indicate an error or inclusion of both annual and seasonal values.

- Multiple records coded at the SCC level as a daily emission type (27, 29, etc.) but with different start and end dates. While not a true duplicate, this may indicate an error or just inclusion of additional types of daily emissions.

- Multiple records coded at the SCC level with the same start and end date, but different emission types. While not a true duplicate, this may indicate an error or just inclusion of additional types of daily emissions.

- Any "DAILY" type record that was missing its associated "ANNUAL" record was flagged for review.

- Any "DAILY" type record that was greater than its associated "ANNUAL" record was flagged for review.

3. Responses from S/L/T Agencies

The S/L/T agencies provided responses to questions about their data. The agencies or the Workgroups then provided direction for correcting the issues either by telephone or by e-mail. For AR and TX, QA issues were summarized in Excel spreadsheets and sent to the agencies, and the agencies provided their responses to the issues in the Excel spreadsheets. Table 7 identifies the files that document the QA issues and agency responses. The first spreadsheet in each QA Summary Report defines the remaining spreadsheets in the Excel Workbook file and provides instructions for communicating revisions.

Table 7. QA Summary Reports for S/L/T Area Source Inventories

S/L/T Agency	Excel Workbook File Name of QA Summary Report
AR	AR_QA_Report_060705.xls
TX	TX_QA_Report_071405.xls

4. Gap Filling and Augmentation

CENRAP-sponsored inventory data were added to the inventories as requested either by the S/L agencies or by the EI and Modeling Workgroups. Procedures for resolving issues with PM emissions in the comment files or to add PM emissions missing from the comment and Base A inventory files were resolved through consultation with the S/L agencies.

5. Revisions to Address Comments

The following details the revisions made to the Base A inventory:

a. Arkansas

NH_3 Emissions

To be consistent with the NH_3 categories included for the other CENRAP states, the following NH_3 categories in the CENRAP-sponsored area source inventory were added to the 2002 Base B inventory for AR:

SCC	SCC Description
2630020000	Wastewater Treatment : Public Owned : Total Processed;
2620030000	Landfills : Municipal : Total;
2806010000	Domestic Animals Waste Emissions : Cats;
2806015000	Domestic Animals Waste Emissions : Dogs;
2807020001	Wild Animals Waste Emissions : Bears : Black Bears;

2807020002 Wild Animals Waste Emissions : Bears : Grizzly Bears;
2807025000 Wild Animals Waste Emissions : Elk; and
2807030000 Wild Animals Waste Emissions : Deer.

Emissions for grizzly bears are zero; but were included in the inventory for completeness.

Agricultural Field Burning (SCCs starting with 2801500xxx)

The Base A inventory contained VOC, CO, PM10-PRI, and PM25-PRI emissions provided by AR. At AR's request, AR's state inventory was replaced with the CENRAP-sponsored inventory. The activity data for the CENRAP-sponsored inventory were developed by surveying local agricultural extension service agents which are believed to provide better spatial and temporal resolution of agricultural field burning activity than the methods that were used for AR's inventory. This change provided data for SO_2, NO_x, and NH_3 not included in AR's inventory, but removed emissions from two counties (05017 and 05125) that had emissions in AR's inventory.

Prescribed Burning for Forest Management (SCC 2810015000)

The Base A inventory contained VOC, CO, PM10-PRI, and PM25-PRI emissions for this category. At AR's request, AR's state inventory was removed from the Base B area source inventory and replaced with the point source inventory developed by CENRAP. The CENRAP-sponsored planned burning inventory did not include any emissions for area sources. This change provided data for SO_2, NO_x, and NH_3 not included in AR's inventory

Prescribed Burning of Rangeland (SCC 2810020000)

The CENRAP-sponsored planned burning inventory contains point source emissions for VOC, CO, SO_2, NO_x, NH_3, PM10-PRI, and PM25-PRI for 17 counties. This inventory was added to the Base B point source inventory.

Wildfires (SCC 2810001000)

The Base A inventory contained VOC, NO_x, CO, PM10-PRI, and PM25-PRI emissions provided by AR, and NH_3 emissions estimated using a separate methodology based on the Carnegie Mellon University (CMU) Model (Version 6.1) defaults. AR decided to remove the NH_3 emissions from the area source inventory since the NH_3 emissions were not based on their state methodology.

b. Minnesota

MN provided an area source inventory on June 3, 2005. This inventory was used to update the Base A inventory for records where there was a match on the data key between the Base A inventory and MN's June 3 file.

In addition, for the Base A modeling effort, the Midwest RPO point source inventory for wildfires (SCC 2810001000) and agricultural field burning (SCC 2801500000) was to be used for MN, and, therefore, the area source emissions data for these two categories were removed. However, it was learned that the Midwest RPO point source inventory was not being used for modeling so the 2002 area source wildfire and agricultural field burning inventories were restored to the Base B inventory. The wildfire inventory included in the Base B area source inventory originates from the 2002 NEI. The agricultural field burning inventory included in the Base B area source inventory originates from the CENRAP-sponsored planned burning inventory.

c. Texas

TX provided comments on the draft 2002 NEI and requested that this comment file be used to update the CENRAP inventory. The comment file was obtained from EPA. The comment file was compared to both the CENRAP Base A inventory and the draft 2002 NEI. As a result, there were many issues identified for which TX provided clarification on how to resolve. The QA issues, comparison of the comments to the Base A inventory and the NEI, and TX's directions for resolving the QA issues are provided is several spreadsheets in the Excel workbook file (named TX_QA_Report_071405.xls) provided with this report. After receiving TX's direction for resolving the QA issues, the submittal flags in the comments file were adjusted in order to apply the comments to the CENRAP's Base A inventory. The following provides a summary of the effects of TX's comments on the area source inventory:

- TX's comments file requested that the categories for unpaved roads (SCC 2296000000) and human perspiration (SCC 2810010000) be removed from the Base A inventory. However, since all of the other states include emissions for these categories, TX agreed that the categories should be kept in the inventory so these categories were removed from TX's comments file. The exception is that the area source inventory contained CO and VOC emissions for human perspiration for three counties that originated from the 1999 NEI. The NH_3 emissions for human perspiration are from the CENRAP-sponsored inventory and occur in all of TX's 254 counties. Therefore, per TX's request, the CO and VOC emissions were removed from the three counties.

- TX provided emissions for Mobile Sources : Highway Vehicles - Diesel : All HDDV including Buses (use subdivisions -071 thru -075 if possible) : Total: All Road Types (SCC 2230070000) that were not in the Base A inventory. The emissions for this category were added to the Base B inventory. It is not clear if the emissions for this category represent idling emissions or not. If they represent idiling emissions, these emissions are not accounted for in the nonroad inventory, thus, there would be no double counting of emissions.

- For the Base A inventory, daily PM emissions were excluded from the area source inventory because of many PM consistency issues with the daily emissions. TX provided revisions to the daily emissions; however, after adding the daily emissions to the CENRAP inventory, many PM consistency issues were identified. In addition,

for several categories it was discovered that TX revised the annual and/or daily filterable emissions but not the primary emissions resulting in the primary emissions being less than the filterable emissions. A separate Excel workbook file is provided with this report that details the issues identified and explains how TX's PM emissions were adjusted to correct for inconsistencies in the reporting of PM emissions.

d. EI and Modeling Workgroup Comments

The EI and Modeling Workgroups requested the following revisions to the area source inventory:

Natural Sources of NH_3 Emissions (SCCs starting with 27014xxxxx)

To provide consistent source category coverage across the CENRAP states for natural sources of NH_3, the emissions in the CENRAP-sponsored inventory for natural sources of NH_3 were added to the Base B inventory for AR, MN, and MO. The monthly emissions were summed to calculate annual emissions that were also added to the inventory for these three states. The emissions for these categories were already included in the area source inventory for the other CENRAP states.

Onroad NH_3 Emissions

Onroad NH_3 emissions for SCCs 2201001000 (Light Duty Gasoline Vehicles) and 2230001000 (Light Duty Diesel Vehicles) for IA, KS, and LA were removed from the area source inventory because the emissions for this category are included in CENRAP's onroad inventory.

Stage II Refueling Emissions

CENRAP revised the onroad inventory to include VOC emissions associated with Stage II refueling. Therefore, these emissions were removed from the area source inventory to avoid double-counting of emissions. The Stage II emissions removed from the area source inventory were classified under the following SCCs:

SCC	SCC Description
2501060100	Storage and Transport : Petroleum and Petroleum Product Storage : Gasoline Service Stations : Stage 2: Total
2501060101	Storage and Transport : Petroleum and Petroleum Product Storage : Gasoline Service Stations : Stage 2: Displacement Loss/Uncontrolled
2501060102	Storage and Transport : Petroleum and Petroleum Product Storage : Gasoline Service Stations : Stage 2: Displacement Loss/Controlled
2501060103	Storage and Transport : Petroleum and Petroleum Product Storage : Gasoline Service Stations : Stage 2: Spillage

PM Consistency Issues

It was discovered that the Oracle scripts run on the Base A area source inventory to identify cases where the PM10-PRI (PM25-PRI) emissions were less than the PM10-FIL (PM25-FIL) emissions did not work correctly. The scripts were corrected and tested and run on the Base B inventory. As a result, for the agricultural tilling emissions (SCC 2801000003) originating from the CENRAP-sponsored inventory, it was learned that when the Base A inventory was updated with the revised CENRAP-sponsored agricultural tilling inventory, the primary emissions got revised but the filterable emissions did not. Thus, in the Base B inventory, the filterable emissions have been revised to match the primary emissions.

6. QA Review of Final Inventory

Final QA checks were run on the revised data set to ensure that all corrections provided by the S/L/T agencies were incorporated into the S/L/T inventories and that there were no remaining QA issues that could be addressed during the duration of the project. After exporting the inventory in Oracle to an Access database in NIF 3.0, the EPA's QA program was run on the Access database and the QA output was reviewed to verify that all QA issues that could be addressed were resolved (EPA, 2004a).

The output file from the EPA's QA program run on the area source inventory and the area miscellaneous source inventory is provided in an Access 2000 database along with the Access database containing the area and area miscellaneous inventory in NIF 3.0. The following lists the remaining QA issues that were not addressed during the duration of this project:

<u>Area Source Inventory</u>

Range Errors: There are 1,408 records in the EM table with emissions that exceed the maximum emissions in the QA program for the specified pollutant.

<u>Area Miscellaneous Source Inventory</u>

Range Errors: There is one EM record in MN for SCC 2701443000 with NH3 emissions that are significantly higher than the expected maximum emissions.

D. Nonroad Source Inventory Methods

1. Data Sources

CENRAP revised its Base A inventory for the NONROAD model categories to correct the oxygen content model inputs as well as the default values used for the sulfur content of diesel. In addition, MN requested that the Midwest RPO Base J inventory be used in the revised CENRAP inventory. IA also requested that the Midwest RPO Base J inventory be used for agricultural equipment categories instead of the revised CENRAP inventory. TX, who is using its own inventory for both the Base A and B inventories, added emissions for oil field equipment. The inventories for the categories not included in the NONROAD model (i.e., aircraft,

commercial marine vessels, and locomotives) remained essentially unchanged from the Base A to the Base B inventory except for some revisions provided by TX.

The data files that the states provided for updating the Base A inventory were loaded into Oracle in NIF 3.0 into one data set. Then, the following updates were performed on the consolidated data set, if necessary:

- HAP records were removed since the inventory will support regional haze, fine PM, and ozone modeling.

- Pollutant codes were corrected to make them NIF 3.0 compliant (e.g., update PMPRI pollutant code to PM-PRI). Additionally, other codes were identified for remediation on a case-by-case basis.

- Records with a submittal flag indicating deletions (submittal_flag = 'D' or 'RD') were removed from the inventory.

- Null values in the tribal code field were updated to '000' since this field is a part of the data key that defines records as unique in all eight NIF tables.

- Added and populated the NIF plus fields listed in the previous discussion for the area source inventory.

- The CENRAP-sponsored inventory did not contain S/L agency contact information in the TR table. Therefore, the TR table was updated to include the contact information that S/L agencies provided in their area source inventories.

2. QA Review

QA review was conducted on the inventories in accordance with the QA procedures specified in the QAPP for this project (CENRAP, 2005b). The following discusses the QA checks that were completed during preparation of the consolidated data set.

a. County and SCC Coverage

The county coverage in the state inventories appeared to be reasonable for all states. The SCC coverage was difficult to evaluate simply by showing a count of the number of SCCs by state. The EI and Modeling Workgroups reviewed summaries comparing the Base B to the Base A inventory.

b. Pollutant Coverage

The pollutant coverage in the S/L/T inventories was complete for all pollutants after incorporating S/L comments.

c. Additional QA for the CENRAP Nonroad Source Inventory

The QA procedures discussed previously for the S/L/T area source inventories were applied to the nonroad inventory.

3. Responses from S/L/T Agencies

The S/L/T agencies provided responses to questions about their data. The agencies or the Workgroups then provided direction for correcting the issues either by telephone or by e-mail.

4. Gap Filling and Augmentation

CENRAP-sponsored inventory data were added to the inventories as requested either by the S/L agencies or by the EI and Modeling Workgroups.

5. Revisions to Address Comments

The following discusses the revisions made to the Base A nonroad inventory:

a. Minnesota

For the NONROAD model categories, MN elected to use the Base J inventory prepared by the Midwest RPO. This inventory includes monthly emissions. The monthly emissions were summed to calculate annual emissions, and records were added to the inventory to hold the annual emissions for supporting the development of emission summaries. The monthly emissions are used in the SMOKE IDA files for modeling.

The Midwest RPO Base J NONROAD model inventory was prepared by the state of WI. As a result, MN requested that the contact information for WI be listed in the TR table for MN.

b. Iowa

IA elected to use the CENRAP-sponsored inventory for all of the nonroad categories except for the following agricultural equipment categories:

SCC	SCC Description
22600050xx	Off-highway Vehicle Gasoline, 2-Stroke : Agricultural Equipment (2 SCCs);
22650050xx	Off-highway Vehicle Gasoline, 4-Stroke : Agricultural Equipment (11 SCCs);
22670050xx	LPG : Agricultural Equipment (3 SCCs);
22680050xx	CNG : Agricultural Equipment (3 SCCs); and
22700050xx	Off-highway Vehicle Diesel : Agricultural Equipment (11 SCCs).

For the agricultural equipment categories, IA elected to use the Midwest RPO Base J inventory because this inventory provided improvements to the temporal allocation of emissions for the agricultural sector. The Base J inventory includes monthly emissions. The monthly emissions were summed to calculate annual emissions, and records were added to the inventory to hold the

annual emissions for supporting the development of emission summaries. The monthly emissions are used in the SMOKE IDA files for modeling.

c. Texas

Oil Field Equipment Emissions

TX provided annual and daily emissions for CO, CO_2, NO_x, VOC, SO_2, PM10-FIL, and PM25-FIL for the following oil field equipment categories:

SCC	SCC Description
2265010010	Off-highway Vehicle Gasoline, 4-Stroke : Industrial Equipment : Other Oil Field Equipment;
2268010010	CNG : Industrial Equipment : Other Oil Field Equipment; and
2270010010	Off-highway Vehicle Diesel : Industrial Equipment : Other Oil Field Equipment

These emissions were added to the Base B inventory. However, primary PM emissions are needed for the inventory. TX provided authorization to change the pollutant codes from PM10-FIL to PM10-PRI and PM25-FIL to PM25-PRI.

Commercial Marine Vessels (SCC 2280000000)

TX provided revisions to the NH_3 emissions for commercial marine vessels for 17 counties and the inventory was updated with the revised emissions.

Railroad Locomotive Emissions (SCC 2285000000)

The Base A inventory did not contain NH_3 emissions for this category in TX. TX provided the NH_3 emissions that were added to the Base B inventory.

d. EI and Modeling Workgroup Comments

Correction for Double Counting of Emissions in Lancaster County, Nebraska

Lancaster County provided its own nonroad inventory for SCC 2260000000 (Off-highway Vehicle Gasoline, 2-Stroke : 2-Stroke Gasoline except Rail and Marine: All). In the Base A inventory, the CENRAP-sponsored inventory provided emissions for the more detailed SCCs and were included in the Base A inventory. After reviewing the data and consulting with the local agency, the Workgroups decided to remove the CENRAP-sponsored inventory for SCCs starting with 226 in Lancaster County to remove double-counting of emissions.

Revisions to the CENRAP-Sponsored Inventory

For the categories included in the NONROAD model, all of the states elected to use the CENRAP-sponsored inventory in the Base B inventory except for MN and TX; IA for

agricultural equipment; and Lancaster County, NE for 2-stroke gasoline vehicles. The following discusses the changes made to the CENRAP-sponsored inventory.

Revisions to Oxygen Content

The CENRAP-sponsored inventory for the NONROAD model categories was updated during March 2005 to correct the fuel oxygenate content from decimal fraction to percentage values. As a result, the NONROAD model inventory for the states that elected to use the CENRAP-sponsored inventory was replaced with the new inventory.

Revisions to Diesel Sulfur Content

The input values used for the sulfur content of diesel fuel used in the revised CENRAP NONROAD model inventory were determined to be too low and the Workgroups decided to revise the input values for this parameter to be based on the default values used by the NONROAD model. The following explains the methods applied to adjust the SO_2, PM10-PRI, and PM25-PRI emissions in the CENRAP-sponsored inventory based on adjustments to the sulfur content in diesel fuel.

The SO_2 emissions were adjusted by using the ratio of the new versus the original diesel sulfur content values, since the relationship of SO_2 to diesel fuel sulfur levels is linear. However, for PM10-PRI and PM25-PRI emissions, the adjustment is not a linear relationship. To estimate the impact of higher diesel fuel sulfur levels on PM10-PRI and PM25-PRI emissions for each state, national runs of the NONROAD model were performed using the original and new diesel fuel sulfur input values for each state.

Table 8 provides the original diesel fuel sulfur content values for seven of the CENRAP states. The NONROAD inventories for Minnesota and Texas and the agricultural equipment categories for IA were not revised because these States based their nonroad inventories on model runs that include the NONROAD model default sulfur values. The new diesel sulfur values are based on the NONROAD model default values. For diesel recreational marine engines (SCC 2282020005 and 2282020010), the NONROAD model uses a diesel sulfur content of 2,765 parts per million (ppm). For all other land-based diesel equipment, NONROAD incorporates a default diesel sulfur content of 2,457 ppm.

Table 8. Original Diesel Fuel Content

State	Original DIESEL SULFUR content, ppm
KS	330.0
AR	360.0
IA	360.0
NE	360.0
OK	360.0
LA	380.0
MO	390.0

National NONROAD model runs were performed using the four unique sulfur levels in Table 8 (i.e., 330, 360, 380, and 390), and then two national NONROAD runs were performed using the default diesel fuel sulfur content values. The results of these runs were used to develop state-specific SCC-level ratios based on the resulting PM10-PRI and PM25-PRI emissions. The SCCs to which these ratios were applied to adjust emissions are shown in Table 9.

6. QA Review of Final Inventory

Final QA checks were run on the revised data set to ensure that all corrections provided by the S/L/T agencies were incorporated into the S/L/T inventories and that there were no remaining QA issues that could be addressed during the duration of the project. After exporting the inventory in Oracle to an Access database in NIF 3.0, the EPA's QA program was run on the Access database and the QA output was reviewed to verify that all QA issues that could be addressed were resolved. The QA output is provided in an Access 2000 database along with the Access database containing the inventory in NIF 3.0.

The following lists the remaining QA issues that were not addressed during the duration of this project:

Range Errors: There are 230 records in the EM table with emissions that exceed the maximum emissions in the QA program for the specified pollutant.

Lookup Errors: There are 106,472 records in the EM table with CO_2 emissions that caused this error. CO_2 is not included in the reference table for valid NIF 3.0 pollutant codes. At the request of CENRAP, CO_2 emissions were kept in the inventory.

E. EGU 2018 Projection Year Inventory

1. Introduction

Pechan received from the Midwest RPO the 2018 IPM scenario file and extracted the data for each of the nine CENRAP states to post-process. Pechan post-processed the 2018 Integrated Planning Model (IPM) scenario data to create the mass emissions inventory for the SMOKE/IDA files. The post-processing procedure includes estimating emissions for CO, VOC, NH_3, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, and PM-CON. Emissions for 21 temporal-pollutant combinations are estimated since there are seven pollutants and three temporal periods (summer season, winter season, July day). Note that annual SO_2 and annual, summer season, and July day NO_x emission values are provided in the initial IPM scenario file. First, annual emission are estimated by applying an SCC-based pollutant-specific uncontrolled emission factor (that may include sulfur and/or ash content factor) to fuel quantity (that is obtained from the annual heat input provided in the IPM run and default fuel-based heat contents), control removal efficiency, and a units conversion factor.

Table 9. NONROAD Diesel SCCs in the CENRAP-Sponsored Inventory for which the Sulfur Value will be adjusted to the NONROAD Model Default Value

SCC*	SCC Description	NONROAD Model Default Diesel Fuel S level, ppm**
2270001060	Mobile Sources : Off-highway Vehicle Diesel : Recreational Equipment : Specialty Vehicles/Carts	2457
2270002003	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Pavers	2457
2270002006	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Tampers/Rammers	2457
2270002009	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Plate Compactors	2457
2270002015	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Rollers	2457
2270002018	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Scrapers	2457
2270002021	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Paving Equipment	2457
2270002024	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Surfacing Equipment	2457
2270002027	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Signal Boards/Light Plants	2457
2270002030	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Trenchers	2457
2270002033	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Bore/Drill Rigs	2457
2270002036	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Excavators	2457
2270002039	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Concrete/Industrial Saws	2457
2270002042	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Cement and Mortar Mixers	2457
2270002045	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Cranes	2457
2270002048	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Graders	2457
2270002051	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Off-highway Trucks	2457
2270002054	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Crushing/Processing Equipment	2457
2270002057	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Rough Terrain Forklifts	2457
2270002060	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Rubber Tire Loaders	2457
2270002066	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Tractors/Loaders/Backhoes	2457
2270002069	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Crawler Tractor/Dozers	2457
2270002072	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Skid Steer Loaders	2457
2270002075	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Off-highway Tractors	2457
2270002078	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Dumpers/Tenders	2457
2270002081	Mobile Sources : Off-highway Vehicle Diesel : Construction and Mining Equipment : Other Construction Equipment	2457
2270003010	Mobile Sources : Off-highway Vehicle Diesel : Industrial Equipment : Aerial Lifts	2457
2270003020	Mobile Sources : Off-highway Vehicle Diesel : Industrial Equipment : Forklifts	2457
2270003030	Mobile Sources : Off-highway Vehicle Diesel : Industrial Equipment : Sweepers/Scrubbers	2457
2270003040	Mobile Sources : Off-highway Vehicle Diesel : Industrial Equipment : Other General Industrial Equipment	2457
2270003050	Mobile Sources : Off-highway Vehicle Diesel : Industrial Equipment : Other Material Handling Equipment	2457
2270003060	Mobile Sources : Off-highway Vehicle Diesel : Industrial Equipment : AC\Refrigeration	2457

Table 9 (continued)

SCC*	SCC Description	NONROAD Model Default Diesel Fuel S level, ppm**
2270003070	Mobile Sources : Off-highway Vehicle Diesel : Industrial Equipment : Terminal Tractors	2457
2270004031	Mobile Sources : Off-highway Vehicle Diesel : Lawn and Garden Equipment : Leafblowers/Vacuums (Commercial)	2457
2270004036	Mobile Sources : Off-highway Vehicle Diesel : Lawn and Garden Equipment : Snowblowers (Commercial)	2457
2270004046	Mobile Sources : Off-highway Vehicle Diesel : Lawn and Garden Equipment : Front Mowers (Commercial)	2457
2270004056	Mobile Sources : Off-highway Vehicle Diesel : Lawn and Garden Equipment : Lawn and Garden Tractors (Commercial)	2457
2270004066	Mobile Sources : Off-highway Vehicle Diesel : Lawn and Garden Equipment : Chippers/Stump Grinders (Commercial)	2457
2270004071	Mobile Sources : Off-highway Vehicle Diesel : Lawn and Garden Equipment : Turf Equipment (Commercial)	2457
2270004076	Mobile Sources : Off-highway Vehicle Diesel : Lawn and Garden Equipment : Other Lawn and Garden Equipment (Commercial)	2457
2270005010	Mobile Sources : Off-highway Vehicle Diesel : Agricultural Equipment : 2-Wheel Tractors	2457
2270005015	Mobile Sources : Off-highway Vehicle Diesel : Agricultural Equipment : Agricultural Tractors	2457
2270005020	Mobile Sources : Off-highway Vehicle Diesel : Agricultural Equipment : Combines	2457
2270005025	Mobile Sources : Off-highway Vehicle Diesel : Agricultural Equipment : Balers	2457
2270005030	Mobile Sources : Off-highway Vehicle Diesel : Agricultural Equipment : Agricultural Mowers	2457
2270005035	Mobile Sources : Off-highway Vehicle Diesel : Agricultural Equipment : Sprayers	2457
2270005040	Mobile Sources : Off-highway Vehicle Diesel : Agricultural Equipment : Tillers > 6 HP	2457
2270005045	Mobile Sources : Off-highway Vehicle Diesel : Agricultural Equipment : Swathers	2457
2270005050	Mobile Sources : Off-highway Vehicle Diesel : Agricultural Equipment : Hydro-power Units	2457
2270005055	Mobile Sources : Off-highway Vehicle Diesel : Agricultural Equipment : Other Agricultural Equipment	2457
2270005060	Mobile Sources : Off-highway Vehicle Diesel : Agricultural Equipment : Irrigation Sets	2457
2270006005	Mobile Sources : Off-highway Vehicle Diesel : Commercial Equipment : Generator Sets	2457
2270006010	Mobile Sources : Off-highway Vehicle Diesel : Commercial Equipment : Pumps	2457
2270006015	Mobile Sources : Off-highway Vehicle Diesel : Commercial Equipment : Air Compressors	2457
2270006025	Mobile Sources : Off-highway Vehicle Diesel : Commercial Equipment : Welders	2457
2270006030	Mobile Sources : Off-highway Vehicle Diesel : Commercial Equipment : Pressure Washers	2457
2270007015	Mobile Sources : Off-highway Vehicle Diesel : Logging Equipment : Forest Eqp - Feller/Bunch/Skidder	2457
2270008005	Mobile Sources : Off-highway Vehicle Diesel : Airport Ground Support Equipment : Airport Ground Support Equipment	2457
2270009010	Mobile Sources : Off-highway Vehicle Diesel : Underground Mining Equipment : Other Underground Mining Equipment	2457
2270010010	Mobile Sources : Off-highway Vehicle Diesel : Industrial Equipment : Other Oil Field Equipment	2457
2282020005	Mobile Sources : Pleasure Craft : Diesel : Inboard/Sterndrive	2765
2282020010	Mobile Sources : Pleasure Craft : Diesel : Outboard	2765
2285002015	Mobile Sources : Railroad Equipment : Diesel : Railway Maintenance	2457

* Unique list of SCCs is from CENRAP-sponsored inventory for all States except MN and TX.
** Marine diesel fuel S level assumed higher than land-based diesel fuel.

To obtain the needed temporal emissions, summer season emissions are estimated by multiplying the annual emissions by a ratio of the summer season to annual heat input; winter season emissions are estimated by subtracting the summer season emissions from the annual emissions; and summer day emissions are estimated by multiplying the annual emissions by a ratio of the July day to annual heat input.

Table 10 presents the CO, VOC, NH_3, PM10-FIL, and PM25-FIL emission factors by SCC. Table 11 presents the PM-CON emission factors by SCC. For PM10-FIL and PM25-FIL, control efficiencies (that are obtained using an EPA-approved method) are applied to the uncontrolled emissions. PM-CON is estimated using heat input (included in the IPM run) and emissions factors. PM10-PRI (and PM25-PRI) are obtained by summing PM-CON and PM10-FIL (PM-CON and PM25-FIL) emissions.

The post-processing methodology also includes the following steps:

Step 1: Adding data for all units.

SCCs were assigned for all units; unit/fuel/firing/bottom type data were used for existing units' assignments, while only unit and fuel type were used for generic units' assignments. Latitude-longitude coordinates were assigned, first using the EPA-provided data files, secondly using the September 17, 2004 Pechan in-house latitude-longitude file, and lastly using county centroids. These data were only used when the data were not provided in the 2002 NIF files. Stack parameters were attached, first using the EPA-provided data files, secondly using a March 9, 2004 Pechan in-house stack parameter file based on previous EIA-767 data, and lastly using an EPA June 2003 SCC-based default stack parameter file. These data were only used when the data were not provided in the 2002 NIF files. Plant ID (within State and county), point ID, process ID, and stack ID were then attached, first using the EPA-provided data files, or secondly using Pechan-generated defaults: the point ID is assigned the value of the given boiler ID preceded by '#', unless the boiler ID has a length of six [the length for the point ID], in which case the left-most character is replaced with '#'); and the default Pechan process ID is '01'. Default stack IDs within a plant are assigned for each unique stack height-diameter combination; the default Pechan stack ID is of the form '4N'. The process ID and stack ID default data were only used when the data were not provided.

Table 10. SCC-Based Uncontrolled Emission Factors (EF) for Electricity Generating Units

SCC	CO EF	VOC EF	NH3 EF	PM10-FIL EF	PM25-FIL EF	PM FLAG[1]
10100101	0.6000	0.0700	0.030000	2.3000	0.6000	A
10100102	0.6000	0.0700	0.030000	4.8000	2.5000	
10100201	0.5000	0.0400	0.030000	2.6000	1.4800	A
10100202	0.5000	0.0600	0.030000	2.3000	0.6000	A
10100203	0.5000	0.1100	0.030000	0.2600	0.1100	A
10100204	5.0000	0.0500	0.030000	13.2000	4.6000	
10100205	6.0000	0.0500	0.030000	6.0000	2.2000	
10100211	0.5000	0.0400	0.030000	2.6000	1.4800	A
10100212	0.5000	0.0600	0.030000	2.3000	0.6000	A
10100215	0.5000	0.0600	0.030000	2.3000	0.6000	A
10100217	18.0000	0.0500	0.030000	12.4000	1.3640	
10100218	18.0000	0.0500	0.030000	12.4000	1.3640	
10100221	0.5000	0.0400	0.030000	2.6000	1.4800	A
10100222	0.5000	0.0600	0.030000	2.3000	0.6000	A
10100223	0.5000	0.1100	0.030000	0.2600	0.1100	A
10100224	5.0000	0.0500	0.030000	13.2000	4.6000	
10100225	6.0000	0.0500	0.030000	6.0000	2.2000	
10100226	0.5000	0.0600	0.030000	2.3000	0.6000	A
10100235	0.5000	0.0600	0.030000	2.3000	0.6000	A
10100237	18.0000	0.0500	0.030000	16.1000	4.2000	
10100238	18.0000	0.0500	0.030000	16.1000	4.2000	
10100300	-9.0000	-9.0000	0.030000	-9.0000	-9.0000	
10100301	0.2500	0.0700	0.030000	1.8170	0.5214	A
10100302	0.6000	0.0700	0.030000	2.3000	0.6600	A
10100303	0.6000	0.0700	0.030000	0.8710	0.3690	A
10100304	6.0000	0.0700	0.030000	1.0700	0.4066	A
10100306	5.0000	0.0700	0.030000	1.6000	0.5600	A
10100316	0.1500	0.0300	0.030000	12.0000	1.4000	
10100317	0.1500	0.0300	0.030000	12.0000	1.4000	
10100318	0.1500	0.0300	0.030000	12.0000	1.4000	
10100401	5.0000	0.7600	0.800000	See Footnote 2	See Footnote 3	
10100404	5.0000	0.7600	0.800000	See Footnote 2	See Footnote 3	
10100405	5.0000	0.7600	0.800000	5.9000	4.3000	A
10100406	5.0000	0.7600	0.800000	5.9000	4.3000	A
10100501	5.0000	0.2000	0.800000	1.0000	0.2500	
10100504	5.0000	0.7600	0.800000	5.9000	4.3000	A
10100505	5.0000	0.7600	0.800000	5.0000	3.6000	
10100601	84.0000	5.5000	3.200000	1.9000	1.9000	
10100602	84.0000	5.5000	3.200000	1.9000	1.9000	
10100604	24.0000	5.5000	3.200000	1.9000	1.9000	
10100602	81.0400	5.3062	3.200000	1.8330	1.8330	
10100701	6.5718	0.4303	1.200000	0.1486	0.1486	
10100702	6.5718	0.4303	1.200000	0.1486	0.1486	
10100702	67.5644	4.4239	1.200000	1.5282	1.5282	
10100703	66.9620	4.3844	1.200000	1.5146	1.5146	
10100704	6.8064	0.4457	1.200000	0.1540	0.1540	
10100707	41.0024	2.6847	1.200000	0.9274	0.9274	
10100711	32.0274	2.0970	1.200000	0.7244	0.7244	
10100712	49.8809	3.2660	1.200000	1.1283	1.1283	

Table 10 (continued)

SCC	CO EF	VOC EF	NH3 EF	PM10-FIL EF	PM25-FIL EF	PM FLAG[1]
10100801	0.6000	0.0700	0.397000	7.9000	4.5000	A
10100818	18.0000	0.0500	0.397000	12.4000	1.3640	
10100901	6.8459	0.1940	0.086000	5.7049	4.9062	
10100902	6.8459	0.1940	0.086000	5.7049	4.9062	
10100903	6.8459	0.1940	0.086000	4.1075	3.5370	
10100911	13.6000	0.1940	0.086000	5.7049	4.9062	
10100912	1.4000	0.1940	0.086000	5.7049	4.9062	
10101001	3.6000	0.2600	-9.000000	0.6000	0.6000	
10101001	269.6000	17.6524	-9.000000	6.0981	6.0981	
10101002	67.5644	4.4239	-9.000000	4.6867	4.6867	
10101002	207.2000	13.5667	-9.000000	0.1636	0.1636	
10101101	2.0000	2.0000	-9.000000	12.3200	7.0200	
10101201	1.2992	0.7218	1.190000	22.8089	12.9924	
10101201	0.0165	2.0000	1.190000	11.4000	7.8000	
10101202	3.6000	2.0000	1.190000	63.2000	36.0000	
10101204	0.5000	0.0600	1.190000	2.3000	0.6000	A
10101205	0.3958	0.2199	1.190000	6.9484	3.9580	
10101206	0.6000	0.1700	1.190000	15.6000	15.6000	
10101207	0.8741	0.4856	1.190000	15.3452	8.7408	
10101208	6.8459	0.1940	1.190000	5.7049	4.9062	
10101301	3.7232	0.1489	-9.000000	0.7446	0.1862	
10101301	5.0000	1.0000	-9.000000	51.0000	13.0000	A
10101301	0.2857	0.0114	-9.000000	0.0571	0.0143	
10101302	5.0000	1.0000	-9.000000	33.1500	18.7200	
10101304	0.7627	0.4237	-9.000000	13.3898	7.6271	
10101305	1.1179	0.0447	-9.000000	0.2236	0.0559	
10101306	1.6071	0.0643	-9.000000	0.3214	0.0804	
10101307	4.4571	0.1783	-9.000000	0.8914	0.2229	
10101308	1.1316	0.0453	-9.000000	0.2263	0.0566	
10101601	0.3464	0.0139	-9.000000	0.0693	0.0173	
10101801	0.0000	0.0000	-9.000000	0.0000	0.0000	
10101901	0.5000	0.0600	0.030000	2.3000	0.6000	A
10102001	0.2500	0.0700	0.030000	1.8170	0.5214	A
10102018	0.1500	0.0300	0.030000	12.0000	1.4000	
10102101	5.0000	0.2000	-9.000000	1.0000	0.2500	
20100101	0.4598	0.0571	6.620000	0.6020	0.6020	
20100102	130.0000	0.0570	6.620000	6.8000	6.5500	
20100201	83.8628	2.1477	6.560000	1.9380	1.9380	
20100202	399.0000	116.0000	0.600000	10.0000	10.0000	
20100301	34.6500	2.2050	6.560000	11.5500	11.5500	
20100901	0.4455	2.3800	-9.000000	8.5400	8.5400	
20100902	128.2500	49.3000	-9.000000	41.8500	41.8500	

[1] A means the ash content (percentage value) of the fuel is multiplied by the emission factor value shown in this table.

[2] From Factor Information and REtrieval (FIRE) 6.24, the equation for this PM10-FIL EF is [5.9*(1.12*S+0.37)].

[3] From FIRE 6.24, the equation for this PM25-FIL EF is [4.3*(1.12*S+0.37)].

Note that (1) -9 indicates that an emission factor is not available for the SCC and pollutant combination; and (2) for SCCs beginning with 101001, 101002, or 101003 (coal), 101008 (coke), 101009 (wood), 101011 (bagasse), 101012 (solid waste), 101019 (synfuel), 101020 (waste coal), or 101012 (agr. byproduct), emission factors are in pounds per ton; for SCCs beginning with 101004, 101005, and 201001 (oil), 101010 (propane/butane), 101013 (liquid waste), 101016 (methanol), 101021 (other oil), or 201009 (kerosene/jet fuel), emission factors are in pounds per thousand gallons; for SCCs beginning with 101006 or 201002 (natural gas), 101007 (process gas), 101018 (hydrogen), or 201003 (IGCC) emission factors are in pounds per million cubic feet.

Table 11. PM Condensable Emissions Factors (EF) for Electricity Generating Units

Fuel	Applicable Source Classification Codes	PM Condensable Emission Factor (PMCDEF) in lb/MMBtu
Coal (including waste coal and syn coal)*	10100204, 10100205, 10100224, 10100225, 10100304, 10100306	0.0400
	10100217, 10100218, 10100237,10100238, 10100317, 10100318, 10102018	0.0100
	10100201, 10100202, 10100203, 10100212, 10100221, 10100222, 10100223, 10100226, 10100301, 10100302, 10100303, 10101901, 10102001	0.02**
	10100201, 10100202, 10100203,10100212, 10100221, 10100222,10100223, 10100226, 10100301, 10100302, 10100303, 10101901, 10102001	(0.1 * sulfur content [as a decimal] - .03)***
Light Oil (Distillate, Diesel)	10100401 - 10100499	0.0100
Heavy Oil (Residual)	10100501 - 10100599	0.0090
Natural Gas	10100601 - 10100699	0.0057
Other Process Gases	10100701 - 10100799	0.0056
Petroleum Coke	10100801 - 10100899	0.0100
Wood, Biomass (including Black Liquor), Waste/Refuse	10100901 - 10100999, 10101201 - 10101299, 10101304	0.0170
LPG (Propane, Butane)	10101001 - 10101099	0.0056
Other Liquid Waste/Oil, Methanol	10101301, 10101302, 10101305, 10101306, 0101307, 10101308, 10102101, 10101601	0.0090

* If the emission factor is less than 0.01, then it is set equal to 0.01.
** AND there is either an SO2 FGD or a PM wet scrubber.
*** And there is any PM control other than a wet scrubber and there is no SO_2 control, OR SCC = 10100222 and there is no PM control.
Note that PM10-PRI = PM10-FIL + PM-CON and PM25-PRI = PM25-FIL + PM-CON.

Step 2: Siting generic units using an EPA-approved electronic method.

Generic aggregates, which consist of IPM-designated "planned/committed" units as well as "new" units produced by the IPM model are transformed into units similar to the existing units in terms of the available data. The generic aggregates are split into smaller generic units based on their unit types and capacity, are provided a dummy ORIS unique plant and boiler ID, and are given a county FIPS code based on an algorithm that sites each generic by assigning a sister plant that is in a county based on its attainment/nonattainment status. Within a state, plants (in county then ORIS plant code order) in attainment counties are used first as sister sites to generic units, followed by plants in PM nonattainment counties (as of January 2004), followed by plants in 8-hour ozone nonattainment counties (as of April 2004).

Step 3: Deriving defaults using the same methodology previously approved by the Midwest RPO and Visibility Improvement State and Tribal Association of the Southeast (VISTAS).

Additional data were required for estimating VOC, CO, PM10-FIL, PM25-FIL, PM-CON, and NH_3 emissions for all units. Thus, ash and sulfur contents were assigned by first using 2002 EIA-767 values for existing units or SCC-based defaults; PM10-FIL and PM25-FIL efficiencies were obtained from the 2002 EGU NEI that were based on 2002 EIA-767 control data and the PM Calculator program (a default of 99.2 percent is used for coal units if necessary); fuel use was back calculated from the given heat input and a default SCC-based heat content; and emission factors were obtained from an EPA-approved October 7, 2004 Pechan emission factor file based on AP-42 emission factors. Note that this updated file is not the one used for estimating emissions for previous EPA post-processed IPM files.

Step 4: Adding in S/L agency emissions inventory identifiers from the updated CENRAP crosswalk.

The previous crosswalk file was compared to the Base B point source inventory and updated to as needed to ensure correct matching of the codes in the IPM file to state IDs in the NIF 3.0 inventory file. The revised crosswalk file was then used to obtain state and county FIPS codes, plant IDs (within State and county), and point IDs. If the state and county FIPS codes, plant IDs and point IDs were in the 2002 NIF tables, then the process IDs and stack IDs were obtained from the NIF; otherwise, defaults, described above, were used.

Step 5: Transforming the data into annual SMOKE/IDA formatted text files for use by the modelers (see section II.E.4).

2. Data Sources

There are several data sources used during the post-processing procedure. These include the following:

- Records from the nine CENRAP states from one Midwest RPO/VISTAS IPM "second round" parsed file, VISTASII_PC_1f_FossilUnits_2018 (To Client).xls

$	The updated CENRAP crosswalk

$	Two EPA-approved emissions factor in-house file (Tables 10 and 11) for estimating annual VOC, CO, NH_3, PM10-PRI, PM10-FIL, PM25-PRI, PM25-FIL, and PM-CON emissions

$	Other files used in previous IPM run post-processing (e.g., power plant latitude-longitude file, SCC assignment file, fuel-based heat content file, EIA-767-based stack parameters file, and EPA-approved default stack parameters file).

### 3.	QA Review

Pechan performed QA of the inventory by extracting the records for the CENRAP states from the 2018 IPM run and then checking to verify that all of the records are included in the CENRAP crosswalk and, if not, flagging them so that they are properly accounted for in the post-processing. After the post-processing was completed, and the data were transformed into their proper format, Pechan compared the initial (from the IPM file) and final (from the SMOKE/IDA files) NO_x emission tons -- annual [summer plus winter season], summer season, summer day -- and SO_2 annual [summer plus winter season] emission tons -- for each State and for the nine State total to ascertain that they did not change values; they did not.

### 4.	SMOKE/IDA Files

The 2018 inventory was formatted as SMOKE/IDA summer and winter files. The file structures are delineated in Tables 12 and 13.

### 5.	Emissions Summary

Table 14 provides a summary of the summer season, summer day, and winter season emissions calculated for the 2018 EGU inventory and included in the SMOKE IDA files.

Table 12. CENRAP SMOKE/IDA Summer Season File Structure

Position	Name	Type	Description	Width	Max Decimals	Blanked
1-2	STID	Int	State Code	2		
3-5	CYID	Int	County Code	3		
6-20	PLANTID	Char	Plant Identification Code (default value = "ORIS" + value of ORISID)	15		
21-35	POINTID	Char	Point Identification Code (default value = "#" + value of BLRID)	15		
36-47	STACKID	Char	Stack Identification Code[1]	12		
48-53	ORISID	Char	DOE Plant ID	6		
54-59	BLRID	Char	Boiler Identification Code	6		
60-61	SEGMENT	Char	DOE ID[2]	2		
62-101	PLANT	Char	Plant Name	40		
102-111	SCC	Char	SCC (SCC used in IPM to calculate emissions)	10		If summed units
112-115	BEGYR	Int	Beginning Year of Unit Operation	4		Y
116-119	ENDYR	Int	Ending Year of Unit Operation	4		Y
120-123	STKHGT	Real	Stack Height (ft)	4	3	
124-129	STKDIAM	Real	Stack Diameter (ft)	6	5	
130-133	STKTEMP	Real	Stack Gas Exit Temperature (degree F)	4	3	
134-143	STKFLOW	Real	Stack Gas Flow Rate (ft^3/s)	10	9	
144-152	STKVEL	Real	Stack Gas Exit Velocity (ft/s)	9	8	
153-160	BOILCAP	Real	Design Capacity (MMBtu/hr)	8	0	Y
161-161	CAPUNITS	Char	Capacity Unit Code	1		Y
162-163	WINTHRU	Real	Winter throughput (% of Annual)	2	0	Y
164-165	SPRTHRU	Real	Spring throughput (% of Annual)	2	0	Y
166-167	SUMTHRU	Real	Summer throughput (% of Annual)	2	0	Y
168-169	FALTHRU	Real	Fall throughput (% of Annual)	2	0	Y
170-171	HOURS	Int	Normal Operating Time (hr/day)	2		Y
172-173	START	Int	Normal Operation Start Time	2		Y
174-174	DAYS	Int	Normal Operating Time (days/wk)	1		Y
175-176	WEEKS	Int	Normal Operating Time (wk/yr)	2		Y
177-187	THRUPUT	Real	Throughput Rate (SCC units/yr)	11	0	Y
188-199	MAXRATE	Real	Maximum O_3 Season Rate (units/day)	12	0	Y
200-207	HEATCON	Real	Heat Content (MMBtu/SCC unit)	8	0	Y
208-212	SULFCON	Real	Sulfur Content (mass percent)	5	0	Y
213-217	ASHCON	Real	Ash Content (mass percent)	5	0	Y
218-226	NETDC	Real	Maximum Nameplate Capacity (MW)	9	0	Y
227-230	SIC	Int	Standard Industrial Classification Code (SIC)[3]	4		
231-239	LATC	Real	Latitude (decimal degrees)	9	4	
240-248	LONC	Real	Longitude (decimal degrees)	9	4	
249-249	OFFSHORE	Char	Offshore Flag	1		Y
250-262	SUMCO	Real	CO Summer Season Emissions (short tons/season)	13	12	
263-275	AVDCO	Real	CO Average Summer Day Emissions (short tons/average season day)	13	12	
276-282	CE1	Real	CO Control Efficiency	7	0	Y
283-285	RE1	Real	CO Rule Effectiveness	3	0	Y
286-295	EMF1	Real	CO Emission Factors (SCC units)	10	0	Y
296-298	CPRI1	Int	CO Primary Control Equipment Code	3		Y
299-301	CSEC1	Int	CO Secondary Control Equipment Code	3		Y
302-314	SUMNH3	Real	NH_3 Summer Season Emissions (short tons/season)	13	12	
315-327	AVDNH3	Real	NH_3 Average Summer Day Emissions (short tons/average season day)	13	12	
328-334	CE2	Real	NH_3 Control Efficiency	7	0	Y
335-337	RE2	Real	NH_3 Rule Effectiveness	3	0	Y
338-347	EMF2	Real	NH_3 Emission Factors (SCC units)	10	0	Y
348-350	CPRI2	Int	NH_3 Primary Control Equipment Code	3		Y
351-353	CSEC2	Int	NH_3 Secondary Control Equipment Code	3		Y
354-366	SUMNOX	Real	NO_x Summer Season Emissions (short tons/season)	13	12	

Table 12 (continued)

Position	Name	Type	Description	Width	Max Decimals	Blanked
367-379	AVDNOX	Real	NO_x Average Summer Day Emissions (short tons/average season day)	13	12	
380-386	CE3	Real	NO_x Control Efficiency	7	0	Y
387-389	RE3	Real	NO_x Rule Effectiveness	3	0	Y
390-399	EMF3	Real	NO_x Emission Factors (SCC units)	10	0	Y
400-402	CPRI3	Int	NO_x Primary Control Equipment Code	3		Y
403-405	CSEC3	Int	NO_x Secondary Control Equipment Code	3		Y
406-418	SUMPM10	Real	Primary PM_{10} Summer Season Emissions (short tons/season)	13	12	
419-431	AVDPM10	Real	Primary PM_{10} Average Summer Day Emissions (short tons/average season day)	13	12	
432-438	CE4	Real	Primary PM_{10} Control Efficiency	7	0	Y
439-441	RE4	Real	Primary PM_{10} Rule Effectiveness	3	0	Y
442-451	EMF4	Real	Primary PM_{10} Emission Factors (SCC units)	10	0	Y
452-454	CPRI4	Int	Primary PM_{10} Primary Control Equipment Code	3		Y
455-457	CSEC4	Int	Primary PM_{10} Secondary Control Equipment Code	3		Y
458-470	SUMPM25	Real	Primary $PM_{2.5}$ Summer Season Emissions (short tons/season)	13	12	
471-483	AVDPM25	Real	Primary $PM_{2.5}$ Average Summer Day Emissions (short tons/average season day)	13	12	
484-490	CE5	Real	Primary $PM_{2.5}$ Control Efficiency	7	0	Y
491-493	RE5	Real	Primary $PM_{2.5}$ Rule Effectiveness	3	0	Y
494-503	EMF5	Real	Primary $PM_{2.5}$ Emission Factors (SCC units)	10	0	Y
504-506	CPRI5	Int	Primary $PM_{2.5}$ Primary Control Equipment Code	3		Y
507-509	CSEC5	Int	Primary $PM_{2.5}$ Secondary Control Equipment Code	3		Y
510-522	SUMSO2	Real	SO_2 Summer Season Emissions (short tons/season)	13	12	
523-535	AVDSO2	Real	SO_2 Average Summer Day Emissions (short tons/average season day)	13	12	
536-542	CE6	Real	SO_2 Control Efficiency	7	0	Y
543-545	RE6	Real	SO_2 Rule Effectiveness	3	0	Y
546-555	EMF6	Real	SO_2 Emission Factors (SCC units)	10	0	Y
556-558	CPRI6	Int	SO_2 Primary Control Equipment Code	3		Y
559-561	CSEC6	Int	SO_2 Secondary Control Equipment Code	3		Y
562-574	SUMVOC	Real	VOC Summer Season Emissions (short tons/season)	13	12	
575-587	AVDVOC	Real	VOC Average Summer Day Emissions (short tons/average season day)	13	12	
588-594	CE7	Real	VOC Control Efficiency	7	0	Y
595-597	RE7	Real	VOC Rule Effectiveness	3	0	Y
598-607	EMF7	Real	VOC Emission Factors (SCC units)	10	0	Y
608-610	CPRI7	Int	VOC Primary Control Equipment Code	3		Y
611-613	CSEC7	Int	VOC Secondary Control Equipment Code	3		Y

1. Selected from the NIF EM table using corresponding segment ID from using the segment ID selection process. Defaults taken from IPM process and are either from EPA approved files or are Pechan defaults (41, 42, 43, etc).
2. Segment ID selection process used to determine which ID is used. Process consists of taken the segment ID from the NIF EM table with the highest emissions. Only the seven relevant pollutants are used and follow a hierarchy of NO_x+SO_2 first, Primary PM_{10}+Primary $PM_{2.5}$ second, and CO+NH_3+VOC last.
3. Selected from the NIF SI table using a plant's STID+CYID+PLANTID or a default of 4911.

Table 13. CENRAP SMOKE/IDA Winter Season File Structure

Position	Name	Type	Description	Width	Max Decimals	Blanked
1-2	STID	Int	State Code	2		
3-5	CYID	Int	County Code	3		
6-20	PLANTID	Char	Plant Identification Code (default value = "ORIS" + value of ORISID)	15		
21-35	POINTID	Char	Point Identification Code (default value = "#" + value of BLRID)	15		
36-47	STACKID	Char	Stack Identification Code[1]	12		
48-53	ORISID	Char	DOE Plant ID	6		
54-59	BLRID	Char	Boiler Identification Code	6		
60-61	SEGMENT	Char	DOE ID[2]	2		
62-101	PLANT	Char	Plant Name	40		
102-111	SCC	Char	SCC (SCC used in IPM to calculate emissions)	10		If summed units
112-115	BEGYR	Int	Beginning Year of Unit Operation	4		Y
116-119	ENDYR	Int	Ending Year of Unit Operation	4		Y
120-123	STKHGT	Real	Stack Height (ft)	4	3	
124-129	STKDIAM	Real	Stack Diameter (ft)	6	5	
130-133	STKTEMP	Real	Stack Gas Exit Temperature (1F)	4	3	
134-143	STKFLOW	Real	Stack Gas Flow Rate (ft^3/s)	10	9	
144-152	STKVEL	Real	Stack Gas Exit Velocity (ft/s)	9	8	
153-160	BOILCAP	Real	Design Capacity (MMBtu/hr)	8	0	Y
161-161	CAPUNITS	Char	Capacity Unit Code	1		Y
162-163	WINTHRU	Real	Winter throughput (% of Annual)	2	0	Y
164-165	SPRTHRU	Real	Spring throughput (% of Annual)	2	0	Y
166-167	SUMTHRU	Real	Summer throughput (% of Annual)	2	0	Y
168-169	FALTHRU	Real	Fall throughput (% of Annual)	2	0	Y
170-171	HOURS	Int	Normal Operating Time (hr/day)	2		Y
172-173	START	Int	Normal Operation Start Time	2		Y
174-174	DAYS	Int	Normal Operating Time (days/wk)	1		Y
175-176	WEEKS	Int	Normal Operating Time (wk/yr)	2		Y
177-187	THRUPUT	Real	Throughput Rate (SCC units/yr)	11	0	Y
188-199	MAXRATE	Real	Maximum O_3 Season Rate (units/day)	12	0	Y
200-207	HEATCON	Real	Heat Content (MMBtu/SCC unit)	8	0	Y
208-212	SULFCON	Real	Sulfur Content (mass percent)	5	0	Y
213-217	ASHCON	Real	Ash Content (mass percent)	5	0	Y
218-226	NETDC	Real	Maximum Nameplate Capacity (MW)	9	0	Y
227-230	SIC	Int	Standard Industrial Classification Code (SIC)[3]	4		
231-239	LATC	Real	Latitude (decimal degrees)	9	4	
240-248	LONC	Real	Longitude (decimal degrees)	9	4	
249-249	OFFSHORE	Char	Offshore Flag	1		Y
250-262	WINCO	Real	CO Winter Season Emissions (short tons/season)	13	12	
263-275	AVDCO	Real	CO Average Winter Day Emissions (short tons/average season day) (zero per EPA)	13	0	Y
276-282	CE1	Real	CO Control Efficiency	7	0	Y
283-285	RE1	Real	CO Rule Effectiveness	3	0	Y
286-295	EMF1	Real	CO Emission Factors (SCC units)	10	0	Y
296-298	CPRI1	Int	CO Primary Control Equipment Code	3		Y
299-301	CSEC1	Int	CO Secondary Control Equipment Code	3		Y

Table 13 (continued)

Position	Name	Type	Description	Width	Max Decimals	Blanked
302-314	WINNH3	Real	NH_3 Winter Season Emissions (short tons/season)	13	12	
315-327	AVDNH3	Real	NH_3 Average Winter Day Emissions (short tons/average season day) (zero per EPA)	13	0	Y
328-334	CE2	Real	NH_3 Control Efficiency	7	0	Y
335-337	RE2	Real	NH_3 Rule Effectiveness	3	0	Y
338-347	EMF2	Real	NH_3 Emission Factors (SCC units)	10	0	Y
348-350	CPRI2	Int	NH_3 Primary Control Equipment Code	3		Y
351-353	CSEC2	Int	NH_3 Secondary Control Equipment Code	3		Y
354-366	WINNOX	Real	NO_x Winter Season Emissions (short tons/season)	13	12	
367-379	AVDNOX	Real	NO_x Average Winter Day Emissions (short tons/average season day) (zero per EPA)	13	0	Y
380-386	CE3	Real	NO_x Control Efficiency	7	0	Y
387-389	RE3	Real	NO_x Rule Effectiveness	3	0	Y
390-399	EMF3	Real	NO_x Emission Factors (SCC units)	10	0	Y
400-402	CPRI3	Int	NO_x Primary Control Equipment Code	3		Y
403-405	CSEC3	Int	NO_x Secondary Control Equipment Code	3		Y
406-418	WINPM10	Real	Primary PM_{10} Winter Season Emissions (short tons/season)	13	12	
419-431	AVDPM10	Real	Primary PM_{10} Average Winter Day Emissions (short tons/average season day) (zero per EPA)	13	0	Y
432-438	CE4	Real	Primary PM_{10} Control Efficiency	7	0	Y
439-441	RE4	Real	Primary PM_{10} Rule Effectiveness	3	0	Y
442-451	EMF4	Real	Primary PM_{10} Emission Factors (SCC	10	0	Y
452-454	CPRI4	Int	Primary PM_{10} Primary Control Equipment Code	3		Y
455-457	CSEC4	Int	Primary PM_{10} Secondary Control Equipment Code	3		Y
458-470	WINPM25	Real	Primary $PM_{2.5}$ Winter Season Emissions (short tons/season)	13	12	
471-483	AVDPM25	Real	Primary $PM_{2.5}$ Average Winter Day Emissions (short tons/average season day) (zero per EPA)	13	0	Y
484-490	CE5	Real	Primary $PM_{2.5}$ Control Efficiency	7	0	Y
491-493	RE5	Real	Primary $PM_{2.5}$ Rule Effectiveness	3	0	Y
494-503	EMF5	Real	Primary $PM_{2.5}$ Emission Factors (SCC	10	0	Y
504-506	CPRI5	Int	Primary $PM_{2.5}$ Primary Control Equipment Code	3		Y
507-509	CSEC5	Int	Primary $PM_{2.5}$ Secondary Control Equipment Code	3		Y
510-522	WINSO2	Real	SO_2 Winter Season Emissions (short tons/season)	13	12	
523-535	AVDSO2	Real	SO_2 Average Winter Day Emissions (short tons/average season day) (zero per EPA)	13	0	Y
536-542	CE6	Real	SO_2 Control Efficiency	7	0	Y
543-545	RE6	Real	SO_2 Rule Effectiveness	3	0	Y
546-555	EMF6	Real	SO_2 Emission Factors (SCC units)	10	0	Y
556-558	CPRI6	Int	SO_2 Primary Control Equipment Code	3		Y
559-561	CSEC6	Int	SO_2 Secondary Control Equipment Code	3		Y

Table 13 (continued)

Position	Name	Type	Description	Width	Max Decimals	Blanked
562-574	WINVOC	Real	VOC Winter Season Emissions (short tons/season)	13	12	
575-587	AVDVOC	Real	VOC Average Winter Day Emissions (short tons/average season day) (zero per EPA)	13	0	Y
588-594	CE7	Real	VOC Control Efficiency	7	0	Y
595-597	RE7	Real	VOC Rule Effectiveness	3	0	Y
598-607	EMF7	Real	VOC Emission Factors (SCC units)	10	0	Y
608-610	CPRI7	Int	VOC Primary Control Equipment Code	3		Y
611-613	CSEC7	Int	VOC Secondary Control Equipment Code	3		Y

1. Selected from the NIF EM table using corresponding segment ID from using the segment ID selection process. Defaults taken from IPM process and are either from EPA approved files or are Pechan defaults (41, 42, 43, etc).
2. Segment ID selection process used to determine which ID is used. Process consists of taken the segment ID from the NIF EM table with the highest emissions. Only the seven relevant pollutants are used and follow a hierarchy of NO_x+SO_2 first, Primary PM_{10}+Primary $PM_{2.5}$ second, and CO+NH_3+VOC last.
3. Selected from the NIF SI table using a plant's STID+CYID+PLANTID or a default of 4911.

Table 14. Summary of Summer Season, Summer Day, and Winter Season Emissions for 2018 EGU Inventory

State FIPS	State Name	CO	NH_3	NO_x	PM10-PRI	PM25-PRI	SO_2	VOC
Summer Season (Tons)								
5	Arkansas	5,052	359	14,836	1,725	1,472	36,566	309
19	Iowa	3,776	244	22,252	4,370	3,757	64,384	335
20	Kansas	3,484	227	37,207	3,795	3,037	36,070	361
22	Louisiana	5,396	438	14,240	1,798	1,631	32,873	313
27	Minnesota	2,648	166	17,940	3,562	3,086	36,647	302
29	Missouri	6,289	392	34,350	8,182	7,440	123,128	707
31	Nebraska	1,622	98	22,524	1,019	850	32,592	200
40	Oklahoma	13,611	664	36,695	2,559	2,240	50,321	500
48	Texas	56,832	3,574	79,449	18,154	14,916	150,220	2,661
	Totals	98,710	6,163	279,493	45,164	38,430	562,802	5,688
Winter Season (Tons)								
5	Arkansas	6,377	456	18,261	2,172	1,854	46,039	387
19	Iowa	4,982	324	28,867	5,663	4,859	82,921	435
20	Kansas	3,719	234	46,126	4,725	3,770	45,416	437
22	Louisiana	5,648	481	16,192	2,169	1,958	41,390	347
27	Minnesota	2,916	176	23,089	4,599	3,948	49,200	372
29	Missouri	6,876	407	43,310	10,274	9,330	157,759	871
31	Nebraska	1,968	118	28,256	1,277	1,064	41,037	250
40	Oklahoma	14,571	691	39,353	3,001	2,600	63,359	508
48	Texas	45,750	2,849	74,388	20,798	16,714	189,213	2,326
	Totals	92,807	5,738	317,843	54,678	46,098	716,333	5,935
Summer Day (Tons)								
5	Arkansas	36	3	107	12	11	262	2
19	Iowa	37	3	167	33	28	472	3
20	Kansas	27	2	268	27	22	257	3
22	Louisiana	38	3	93	13	11	235	2
27	Minnesota	20	1	128	25	22	259	2
29	Missouri	51	3	249	59	53	874	5
31	Nebraska	12	1	166	8	6	240	1
40	Oklahoma	100	5	264	18	16	353	4
48	Texas	409	26	559	125	103	1,034	19
	Totals	731	46	2,001	320	273	3,987	41

F. Preparation of SMOKE/IDA and RPO Data Exchange Protocol (NIF 3.0) Formats

This section describes the inventory and SMOKE emission processor files prepared under this project. The Excel Workbook file named "CENRAP Inventory File Documentation 08225.xls" provides the names of the files delivered, as well as other file information useful for transferring data to air quality modeling centers. This Excel Workbook file is provided along with this report. Table 15 provides a summary of the files delivered.

Table 15. Summary of Mass Emissions and SMOKE Input Files

S/L/T Agencies Included in Files	NIF 3.0 File Name Containing Mass Emissions Inventory (Access 2000 Database Files)	Temporal Period of Mass Emissions Inventory	SMOKE/IDA File Name	Temporal Period of Emissions in SMOKE/IDA File	Notes
Point Source Inventory for 2002					
AR, IA, KS, LA, MN, MO, NE, OK, TX, Fond du Lac Band of the Minnesota Chippewa Tribe (Tribal Code 405), and the Leech Lake Band of the Ojibwe Tribe (407)	CENRAP_2002_Point_082205.mdb	Annual	CENRAP_POINT_SMOKE_INPUT_ANNUAL_DAILY_072505.txt	Annual for all agencies; Daily for MO and TX	Includes all sectors supplied by S/L/T agencies. Tribal inventories include Fond du Lac Band of the Minnesota Chippewa and the Leech Lake Band of the Ojibwe. Local inventories include Lancaster County (Lincoln) and Douglas County (Omaha), NE.
MO and TX	CENRAP_2002_Point_Daily_Missouri_Texas_071405.mdb	Daily	CENRAP_POINT_SMOKE_INPUT_ANNUAL_DAILY_072505.txt	"	Daily emissions for MO and TX are included in the SMOKE/IDA file containing annual emissions for all CENRAP agencies, but placed in a NIF 3.0 file separate from the NIF 3.0 file containing the annual emissions.
Point Source Inventory for 2108					
AR, IA, KS, LA, MN, MO, NE, OK, TX	None		CENRAP_2018_Summer_081105.txt, CENRAP_2018_Winter_081105.txt	Summer season, Winter season	2018 EGU summer season and winter season emissions.
Nonroad Source Inventory for 2002					
AR, IA, KS, LA, MN, MO, NE, OK, TX	CENRAP_2002_Nonroad_071305.mdb	Annual, Monthly, and Daily	CENRAP_NONROAD_SMOKE_INPUT_ANN_071305.txt	Annual	Includes NONROAD Model Categories and Aircraft, Commercial Marine Vessels, and Railroad Locomotives. NONROAD Model inventory is from revised CENRAP-sponsored inventory except for TX (who supplied its own NONROAD Model Inventory), MN (who used the Midwest RPO Base J inventory for all NONROAD Model categories), and IA (who used the Midwest RPO Base J inventory for agricultural equipment). MN included commercial and military aircraft and auxiliary power units in its point source inventory; therefore, the nonroad inventory does not contain emissions for these categories in MN.
MN and IA	"	"	CENRAP_NONROAD_SMOKE_INPUT_MONTH_JAN_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
Nonroad Source Inventory for 2002 (continued)					

Table 15 (continued)

S/L/T Agencies Included in Files	NIF 3.0 File Name Containing Mass Emissions Inventory (Access 2000 Database Files)	Temporal Period of Mass Emissions Inventory	SMOKE/IDA File Name	Temporal Period of Emissions in SMOKE/IDA File	Notes
MN and IA	“	“	CENRAP_NONROAD_SMOKE_INPUT_MONTH_FEB_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
MN and IA	“	“	CENRAP_NONROAD_SMOKE_INPUT_MONTH_MAR_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
MN and IA	“	“	CENRAP_NONROAD_SMOKE_INPUT_MONTH_APR_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
MN and IA	“	“	CENRAP_NONROAD_SMOKE_INPUT_MONTH_MAY_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
MN and IA	“	“	CENRAP_NONROAD_SMOKE_INPUT_MONTH_JUN_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
MN and IA	“	“	CENRAP_NONROAD_SMOKE_INPUT_MONTH_JUL_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
MN and IA	“	“	CENRAP_NONROAD_SMOKE_INPUT_MONTH_AUG_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
MN and IA	“	“	CENRAP_NONROAD_SMOKE_INPUT_MONTH_SEP_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
Nonroad Source Inventory for 2002 (continued)					

Table 15 (continued)

S/L/T Agencies Included in Files	NIF 3.0 File Name Containing Mass Emissions Inventory (Access 2000 Database Files)	Temporal Period of Mass Emissions Inventory	SMOKE/IDA File Name	Temporal Period of Emissions in SMOKE/IDA File	Notes
MN and IA	“	“	CENRAP_NONROAD_SMOKE_INPUT_MONTH_OCT_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
MN and IA	“	“	CENRAP_NONROAD_SMOKE_INPUT_MONTH_NOV_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
MN and IA	“	“	CENRAP_NONROAD_SMOKE_INPUT_MONTH_DEC_071305.txt	Monthly Emissions x 12	Includes monthly emissions for MN (all NONROAD Model categories) and IA (agricultural equipment categories) from the Midwest RPO Base J inventory. Monthly emissions are multiplied by 12 (months).
Area Source Inventory for 2002					
AR, IA, KS, LA, MN, MO, NE, OK, TX	CENRAP_2002_Area_082205.mdb	Annual, Daily, and Monthly	CENRAP_AREA_SMOKE_INPUT_ANN_STATE_081705.txt	Annual	Includes all sectors except for those included in the Area Misc files. Planned burning emissions from CENRAP-sponsored area source inventory are excluded for AR, IA, KS, LA, MN, MO, OK, and NE (except for Lancaster County [FIPS 31109]); the SMOKE files for the CENRAP planned burning inventory will be used for these states.
AR, IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_JAN_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
AR, IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_FEB_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
AR, IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_MAR_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).

Table 15 (continued)

S/L/T Agencies Included in Files	NIF 3.0 File Name Containing Mass Emissions Inventory (Access 2000 Database Files)	Temporal Period of Mass Emissions Inventory	SMOKE/IDA File Name	Temporal Period of Emissions in SMOKE/IDA File	Notes
Area Source Inventory for 2002 (continued)					
AR, IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_APR_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
AR, IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_MAY_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
AR, IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_JUN_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
AR, IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_JUL_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
AR, IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_AUG_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
AR, IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_SEP_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
AR, IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_OCT_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
AR, IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_NOV_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
AR, IA, KS, LA, MN, MO, NE, OK	"	"	CENRAP_AREA_SMOKE_INPUT_NH3_MONTH_DEC_071905.txt	Monthly Emissions x 12	All sectors except for those included in the Area Misc files. Monthly emissions are multiplied by 12 (months).
TX and Lancaster County, NE	"	"	CENRAP_AREA_BURNING_SMOKE_INPUT_ANN_TX_NELI_071905.txt	Annual	Includes state and local prepared planned burning emissions. SMOKE input files for area source planned burning emissions for all other states are available from CENRAP-sponsored inventory.
Fond du Lac Band of the Minnesota Chippewa Tribe	CENRAP Area Tribal Inventories_082205.mdb	Annual	CENRAP_AREA_SMOKE_INPUT_ANN_TRIBE_120704.txt	Annual	The NIF file includes the data provided by both tribes. The SMOKE file Includes emissions for the paved and unpaved road and prescribed burning area source categories provided by the Fond du Lac Tribe. The SMOKE file was not revised to add the data provided by the Leech Lake Tribe since SMOKE is not programmed to process tribal area source inventory data.

Table 15 (continued)

S/L/T Agencies Included in Files	NIF 3.0 File Name Containing Mass Emissions Inventory (Access 2000 Database Files)	Temporal Period of Mass Emissions Inventory	SMOKE/IDA File Name	Temporal Period of Emissions in SMOKE/IDA File	Notes
Area Miscellaneous Source Inventory for 2002					
AR, IA, KS, LA, MN, MO, NE, OK, TX	CENRAP_2002_Area_Misc_082205.mdb	Annual, Daily, and Monthly	CENRAP_AREA_MISC_SMOKE_INPUT_ANN_STATE_071905.txt	Annual	NH_3 emissions from natural sources for all states, and PM10-PRI and PM25-PRI emissions for geogenic wind erosion for AR.
IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_JAN_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_FEB_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_MAR_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_APR_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_MAY_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_JUN_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_JUL_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_AUG_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_SEP_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_OCT_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	“	“	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_NOV_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).
IA, KS, LA, MN, MO, NE, OK	“	”	CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_DEC_072805.txt	Monthly Emissions x 12	NH_3 emissions from natural sources. Monthly emissions are multiplied by 12 (months).

III. SUMMARIES OF EMISSIONS INVENTORIES FOR THE CENRAP REGION

Summaries of emissions were prepared from the emission inventory files for each sector and for all sectors combined. The summaries are provided in an Access 2000 database named "CENRAP Base B Emission Summaries_082205.mdb". The same summaries are also provided in an Access 97 database named "CENRAP Base B Emission Summaries_082205_Acc97.mdb".

Table 16 identifies and briefly describes the contents of the emissions summary tables included in the database. The nonroad source sector summaries include emissions for aircraft, commercial marine vessels, and locomotives as well as the emissions from the NONROAD model categories. The onroad summaries were prepared from the revised CENRAP-sponsored inventory for onroad sources. Tables 1G, 2C, 3C, 4C, and 5C include the data source code for the area, point, nonroad, and onroad sectors to assist in identifying the origin and year of emissions inventory data. The data source codes were defined previously in Chapter II of this report.

The summaries in Appendix A of this report are taken from the emissions summary Table 1D. These summaries include natural sources NH_3 emissions and the biogenic wind erosion PM10-PRI and PM25-PRI emissions; thus, the emission totals in Appendix A match the totals in Chapter I, Table 1 of this report. Note, however, that the emissions for natural sources and wind erosion are excluded from Tables 2a through 2e of Chapter I.

A second Access 2000 database named "CENRAP Emission Summaries_Compare Base B to A_082205.mdb" provides summaries that compare the emissions in the Base B inventory to the Base A inventory. These summaries are provided for the "All Sector" Tables 1A through 1F series of summaries. These summaries are useful for identifying the states and sectors where annual emissions changed significantly as a result of the comments received on the Base A inventories for all of the sectors. This database is also provided in Access 97 format (named "CENRAP Emission Summaries_Compare Base B to A_082205_Acc97.mdb").

Table 16. Emissions Summaries

Summary Table Name	Description
All Sector Summaries	
Table 1A_All Sectors	Summary of Annual Emissions by Pollutant and Sector for the CENRAP Region
Table 1B_All Sectors	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/Pollutant and Sector
Table 1C_All Sectors	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name/Pollutant and Sector
Table 1D_All Sectors	Summary of Annual Emissions by Category/Sector and Pollutant for the CENRAP Region
Table 1E_All Sectors	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/ Source Category Name and Number/Sector and Pollutant

Table 16 (continued)

Summary Table Name	Description
Area Source and Biogenic/Natural Source Sector Summaries	
Table 1F_All Sectors	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name/Source Category Name and Number/Sector and Pollutant
Table 1G_All Sectors	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name/SCC and SCC Description/Source Category Name and Number/ Sector/Pollutant and Data Source Code
Table 2A_Area Sources	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name and Pollutant
Table 2B_Area Sources	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name and Pollutant
Table 2C_Area Sources	Summary of Annual Emissions and Data Source Codes by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name/SCC/SCC Description and Pollutant
Table 2D_Area Sources	Summary of Annual Emissions by SCC/SCC Description/Pollutant and State/Tribe
Table 2E_Area Sources	Summary of Annual Emissions by Pollutant and State/Tribe
Point Source Sector Summaries	
Table 3A_Point Sources	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name and Pollutant
Table 3B_Point Sources	Summary of Annual Emissions by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name and Pollutant
Table 3C_Point Sources	Summary of Annual Emissions and Data Source Codes by State FIPS/Tribal Code/State Name/Tribal Name/County FIPS/County Name/SCC/SCC Description and Pollutant
Table 3D_Point Sources	Summary of Annual Emissions by SCC/SCC Description/Pollutant and State/Tribe
Table 3E_Point Sources	Summary of Annual Emissions by Pollutant and State/Tribe
Table 3F_Point Sources	Facility-level Summary
Nonroad Source Sector Summaries	
Table 4A_Nonroad Sources	Summary of Annual Emissions by State FIPS/State Name and Pollutant
Table 4B_Nonroad Sources	Summary of Annual Emissions by State FIPS/State Name/County FIPS/County Name and Pollutant
Table 4C_Nonroad Sources	Summary of Annual Emissions and Data Source Codes by State FIPS/State Name/County FIPS/County Name/SCC/SCC Description and Pollutant
Table 4D_Nonroad Sources	Summary of Annual Emissions by SCC/SCC Description/Pollutant and State
Table 4E_Nonroad Sources	Summary of Annual Emissions by Pollutant and State
Onroad Source Sector Summaries	
Table 5A_Onroad Sources	Summary of Annual Emissions by State FIPS/State Name and Pollutant
Table 5B_Onroad Sources	Summary of Annual Emissions by State FIPS/State Name/County FIPS/County Name and Pollutant
Table 5C_Onroad Sources	Summary of Annual Emissions and Data Source Codes by State FIPS/State Name/County FIPS/County Name/SCC/SCC Description and Pollutant
Table 5D_Onroad Sources	Summary of Annual Emissions by SCC/SCC Description/Pollutant and State
Table 5E_Onroad Sources	Summary of Annual Emissions by Pollutant and State

IV. METHODS FOR AREAS OUTSIDE OF THE CENRAP REGION

A. Data Sources and Augmentation Procedures

This task involved calculating fire emissions and source parameters given fuel, location, and time period information for the Province of Ontario, Canada. CENRAP made the "raw" data for these fires available at http://www.cenrap.org/emission_document.asp. The names of the specific files made available include the following:

"Ontario Fires over 100 ha 1992- 2002 WFR.xls"
"Ontario Fires over 100 ha 1992 -2002 WFR-EXPLAIN.xls"

The files contain data for 54 fires that occurred in Ontario during the year 2002. Information on the data code abbreviations, data definitions, and data units used in the raw data files was obtained from Mr. Rob Luik (Data Management Specialist) at the Ontario Ministry of Natural Resources (Rob.Luik@MNR. gov.on.ca). Tables 17 and 18 provide definitions of the fuel types and other data provided in the raw data files.

B. Development of BlueSky Inputs

Emissions for each fire were estimated using the Emission Production Model (EPM)/CONSUME within the BlueSky framework. To run EPM/CONSUME, the following information was needed for each fire:

- Fire identification code;
- Latitude and longitude of the fire;
- Start and end dates of the fire;
- Daily size of the fire; and
- Fuel loading information.

A fire identification code is needed to track individual fires throughout the processing. The unique fire identification code was created for each fire by concatenating the FIRE_NUMBER and CUR_DIST fields of the original data. The fire identification code also contains the FIPS code of the fire; this information is not used by BlueSky but is needed by BlueSky2Inv, the utility program that converts the BlueSky output to the SMOKE inventory format. The FIPS code 135000 was used for all fires with longitudes east of –90°, and FIPS code 135059 was used for fires west of –90°. These FIPS codes were used to ensure that the fires would be assigned the correct time zones in later SMOKE processing.

The DISC_DATE field (discovery date) was used as the start date for each fire. While the original data did provide start dates earlier than the discovery date for some fires, the discovery date was used for all fires for consistency. Similarly, the OUT_DATE field was used from the original data as the end date for each fire. Some of the dates provided in the original data included hourly information. In all cases, the hourly information was not used leaving all data at a daily resolution.

Table 17. Fuel Type Definitions Provided by the Ontario Ministry of Natural Resources

FUEL_TYPE	CODEDESC
C1	C1 Spruce Lichen Woodland
C2	C2 Boreal Spruce
C3	C3 Mature Jack Pine
C4	C4 Immature Jackpine
C5	C5 Red and White Pine
C6	C6 Conifer Plantation
M125	M1 Boreal Mixedwood Leafless 25% Conifer
M150	M1 Boreal Mixedwood Leafless 50% Conifer
M175	M1 Boreal Mixedwood Leafless 75% Conifer
M225	M2 Boreal Mixedwood Green 25% Conifer
M250	M2 Boreal Mixedwood Green 50% Conifer
M275	M2 Boreal Mixedwood Green 75% Conifer
M325	M3 Dead Balsam Fir/Mixed Wood Leafless 30% Dead Balsam
M350	M3 Dead Balsam Fir/Mixed Wood Leafless 60% Dead Balsam
M375	M3 Dead Balsam Fir/Mixed Wood Leafless 100% Dead Balsam
M425	M4 Dead Balsam Fir/Mixedwood Green 30% Dead Balsam
M450	M4 Dead Balsam Fir/Mixedwood Green 60% Dead Balsam
M475	M4 Dead Balsam Fir/Mixedwood Green 100% Dead Balsam
O1A100	O1a Matted Grass 100% cured
O1A50	O1a Matted Grass 50% cured
O1A75	O1a Matted Grass 75% cured
O1B100	O1b Standing Grass 100% cured
O1B50	O1b Standing Grass 50% cured
O1B75	O1b Standing Grass 75% cured
S1	S1 Jackpine Slash
S2	S2 White Spruce Balsam Slash
S3	S3 Coastal Cedar/Hemlock/Douglas-fir slash
GRA	Grass
SLA	Slash
SHR	Shrubs, Hwd Brush
CON	Conifer
IKC	Insect Killed Conifer
MIX	Mixed Wood
HAR	Hard Wood
BLO	Blowdown
PLA	Plantation
OTH	Other

Table 18. Other Data Definitions Provided by the Ontario Ministry of Natural Resources

START_DATE	Start Date
DISC_DATE	Discovered date
F_REP_DATE	First Reported date
S_REP_DATE	Second Reported date
GETAWAY_DATE	Getaway date
ATTACK_DATE	Attack date
BHE_DATE	Being Held date
UCO_DATE	Under Control date
OUT_DATE	Out date

The total number of days each fire burned was determined using the start and end date for each fire. For each fire, the size of the area burned each day was estimated. The original data included the final size of each fire which was used to determine the total area burned by each fire. Rather than introduce additional assumptions about the daily fire size, it was assumed that the area burned each day was constant over all days. Therefore, the total size of the fire was divided by the total days the fire burned to get an estimate of the daily fire size. The area burned by each fire was converted from hectares to acres as needed by EPM/CONSUME.

For each fire, fuel loading data must be provided to indicate the type of fuels available for burning so that the emissions can be estimated. The original data included fuel type information for each fire using the Canadian Forest Fire Danger Rating System (CFFDRS) fuel types. Descriptions of each fuel type are available at http://fire.cfs.nrcan.gc.ca/research/environment/ cffdrs/fbpfuels_e.htm. Detailed fuel information for these types could not be identified; therefore, the CFFDRS types were mapped to the types used by the National Fire Danger Rating System (NFDRS). Information about these fuel types is available at http://www.fs.fed.us/fire/planning/ nist/nfdr.htm. Table 19 shows how the CFFDRS fuel types in the original data were mapped to the NFDRS fuel types, and shows the total number of fires for each fuel type. Table 20 shows the default fuel loading factors included in BlueSky for each NFDRS fuel type.

Table 19. Mapping of Canadian to National Fire Danger Rating System Fuel Types

Canadian Forest Fire Danger Rating System	National Fire Danger Rating System	Number of Fires
C2: Boreal Spruce	Q: Dense Alaskan black spruce and shrubs	36
C3: Mature Jack Pine	C: Open pine perennial grass understory	4
C4: Immature Jack Pine	G: Dense conifer with heavy downed and duff	1
C6: Conifer Plantation	U: Closed western long-needled pines	4
M2: Boreal Mixedwood – Green	R: Hardwoods after leafout	2
M3: Dead Balsam Fir Mixedwood – Leafless	G: Dense conifer with heavy downed and duff	1
M4: Dead Balsam Fir Mixedwood - Green	G: Dense conifer with heavy downed and duff	1

Table 20. Default Fuel Loading Factors Associated with National Fire Danger Rating System Fuel Types

	Tons/Acre of Fuel by Fuel Size in Inches					
Type	0 – 0.25	0.25 – 1	1 – 3	3 – 9	9 – 20	20+
C: Open pine	1.0	2.2	0.0	0.0	0.0	0.0
G: Dense conifer	2.9	2.3	5.6	13.2	0.0	0.0
Q: Dense spruce	3.0	3.5	3.0	1.0	0.0	0.0
R: Hardwoods	0.6	0.6	0.6	0.0	0.0	0.0
U: Closed pines	1.5	1.5	1.0	0.0	0.0	0.0

Three of the 54 fires in the raw data files did not have any latitude and longitude coordinates or any fuel type data. Therefore, the three fires were excluded from the inventory. The three fires combined accounted for less than 1 percent of the total area burned by all 54 fires. The raw data files did not contain any fuel type data for two other fires. The coordinates provided for these two fires were matched with the BELD3 database to determine the dominant vegetation type at the location of each fire. In both cases, the vegetation type was USGS conifer, which was mapped to NFDRS Type U (closed western long-needled pines).

All other inputs to EPM/CONSUME including meteorology-based parameters used the BlueSky defaults.

C. Development of SMOKE Inventory Files

After running BlueSky with the prepared inputs, the SMOKE utility program "BlueSky2Inv" was used to convert the EPM/CONSUME output to the inventory files needed by SMOKE. Since the EPM/CONSUME output is daily, BlueSky2Inv creates a PTHOUR file containing the daily emissions for each fire. The data included in the PTHOUR file are daily values for the fire's area (AREA), heat flux (HFLUX), $PM_{2.5}$, PMC (calculated as $PM_{10} - PM_{2.5}$), CO, and total organic gases (TOG) (calculated as methane + non-methane hydrocarbons).

BlueSky2Inv also creates an annual IDA inventory file. This file does not contain any emissions data but serves as a master list of sources. The annual inventory also contains the latitude and longitude of each fire. For all sources, BlueSky2Inv assigned the SCC 2810001000 (Miscellaneous Area Sources; Other Combustion; Forest Wildfires; Total).

Since BlueSky2Inv was developed for US inventories; therefore, the "#COUNTRY" headers in both output inventories were changed to CANADA.

D. SMOKE Input Files

The draft inventory files were provided to CENRAP via email on July 19, 2005. The following files were delivered:

- ptinv.ontario_fires.2002.txt: annual fire event inventory in IDA format
- ptday.ontario_fires.2002.txt: daily fire emissions inventory
- monthly.ontario.2002.txt: a report file summarizes the emissions by fire and by month. This report could be used to build monthly or annual fire emissions inventories if needed.

E. Emissions Summary

Table 21 provides a summary of monthly emissions calculated for 2002 Ontario fires. Emissions were estimated for CO, $PM_{2.5}$, coarse PM (PMC) and TOG. Note that the modeling framework selected for estimating emissions does not include factors for estimating NO_x, SO_2, and NH_3.

Table 21. Summary of 2002 Ontario Fire Emissions by Month

Month	Number of Fires	Area Burned (Acres)	CO (tons)	$PM_{2.5}$ (Tons)	PMC (Tons)	TOG (Tons)
May	2	247	41.5	4.3	0.5	3.7
June	9	13,436	12,368.8	1,140.8	118.3	743.6
July	51	209,954	183,407.5	16,807.9	1,734.3	10,810.4
August	39	170,831	146,623.3	13,445.3	1,386.7	8,649.9
September	10	27,950	23,709.5	2,169.1	223.2	1,397.8
October	1	993	878.3	80.0	8.2	51.5
Totals		423,411	367,028.8	33,647.4	3,471.3	21,656.8

V. REFERENCES

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APPENDIX A

SUMMARIES OF ANNUAL EMISSIONS BY SOURCE CATEGORY, SECTOR, AND POLLUTANT

Table A-1. Summary of Annual VOC Emissions for the CENRAP Region by Category, Sector, and Pollutant: Base B Inventory

Category	Category Number	Sector	VOC Tons/Year	VOC Percent of Total	VOC Cumulative Percent
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	900,621	23.69	23.69
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA	413,569	10.88	34.57
Mobile Sources-Pleasure Craft	2282	NONROAD	342,086	9	43.57
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA	165,299	4.35	47.92
Industrial Surface Coating	2401015000	AREA	160,593	4.22	52.14
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	146,802	3.86	56
Stationary Source Fuel Combustion-Residential	2104	AREA	144,946	3.81	59.81
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA	126,217	3.32	63.13
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	98,828	2.6	65.73
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA	96,513	2.54	68.27
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	95,174	2.5	70.77
Architectural Coatings	2401001000	AREA	82,943	2.18	72.95
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	82,678	2.17	75.12
Industrial Processes-Chemical Manufacturing	301	POINT	67,995	1.79	76.91
Industrial Processes-Petroleum Industry	306	POINT	65,746	1.73	78.64
Degreasing	2415	AREA	63,065	1.66	80.3
Miscellaneous Area Sources-Other Combustion	2810	AREA	54,195	1.43	81.73
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	49,880	1.31	83.04
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	45,829	1.21	84.25
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA	45,538	1.2	85.45
Gas Marketing Stage I	25010600	AREA	41,726	1.1	86.55
Miscellaneous Area Sources-Other Combustion	2810	POINT	39,592	1.04	87.59
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA	33,986	0.89	88.48
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	30,083	0.79	89.27
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	27,726	0.73	90
Industrial Processes-Oil and Gas Production	310	POINT	25,924	0.68	90.68
Internal Combustion Engines-Industrial	2020	POINT	25,559	0.67	91.35
Graphic Arts	2425	AREA	22,948	0.6	91.95
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA	21,400	0.56	92.51
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	21,313	0.56	93.07
Solvent Utilization-Dry Cleaning	2420	AREA	19,075	0.5	93.57
Industrial Processes-Food and Agriculture	302	POINT	18,378	0.48	94.05
Mobile Sources-Railroad Equipment	2285	NONROAD	16,523	0.43	94.48
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT	15,379	0.4	94.88
Auto Refinishing	2401005000	AREA	12,437	0.33	95.21
External Combustion Boilers-Electric Generation	1010	POINT	11,695	0.31	95.52
Mobile Sources-LPG	2267	NONROAD	10,752	0.28	95.8
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	9,097	0.24	96.04
External Combustion Boilers-Industrial	1020	POINT	8,994	0.24	96.28
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA	8,985	0.24	96.52
Traffic Markings	2401008000	AREA	8,631	0.23	96.75
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	8,499	0.22	96.97
Industrial Processes-Mineral Products	305	POINT	8,280	0.22	97.19
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	8,228	0.22	97.41

Table A-1 (continued)

Category	Category Number	Sector	VOC		
			Tons/Year	Percent of Total	Cumulative Percent
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	8,144	0.21	97.62
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	7,325	0.19	97.81
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA	6,452	0.17	97.98
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA	6,215	0.16	98.14
Mobile Sources-CNG	2268	NONROAD	6,189	0.16	98.3
Industrial Processes-Secondary Metal Production	304	POINT	5,912	0.16	98.46
Stationary Source Fuel Combustion-Industrial	2102	AREA	5,610	0.15	98.61
Mobile Sources-Aircraft	2275	NONROAD	5,337	0.14	98.75
Rubber/Plastics	2430000000	AREA	5,200	0.14	98.89
Industrial Processes-Cooling Tower	3850	POINT	4,751	0.12	99.01
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA	3,974	0.1	99.11
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	3,120	0.08	99.19
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	2,830	0.07	99.26
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA	2,733	0.07	99.33
Industrial Processes-Primary Metal Production	303	POINT	2,490	0.07	99.4
Industrial Processes-Industrial Processes: NEC	2399	AREA	2,097	0.06	99.46
Waste Disposal-Solid Waste Disposal-Government	501	POINT	2,073	0.05	99.51
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	1,685	0.04	99.55
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA	1,678	0.04	99.59
Internal Combustion Engines-Electric Generation	2010	POINT	1,602	0.04	99.63
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	1,529	0.04	99.67
Industrial Processes-Fabricated Metal Products	309	POINT	1,483	0.04	99.71
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA	1,057	0.03	99.74
Industrial Processes-In-process Fuel Use	390	POINT	742	0.02	99.76
External Combustion Boilers-Commercial/Institutional	1030	POINT	653	0.02	99.78
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA	650	0.02	99.80
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	634	0.02	99.82
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	606	0.02	99.82
Mobile Sources-Aircraft	2275	POINT	599	0.02	99.84
Industrial Processes-Textile Products	330	POINT	567	0.01	99.85
Industrial Processes-Machinery, Miscellaneous	3129	POINT	529	0.01	99.86
Internal Combustion Engines-Fugitive Emissions	2888	POINT	508	0.01	99.87
Industrial Processes-Electrical Equipment	313	POINT	495	0.01	99.88
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA	459	0.01	99.89
Internal Combustion Engines-Engine Testing	2040	POINT	455	0.01	99.90
Industrial Processes-Transportation Equipment	314	POINT	379	0.01	99.91
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT	283	0.01	99.92
MACT Source Categories : Vinyl-based Resins	6463	POINT	256	0.01	99.93
Internal Combustion Engines-Commercial/Institutional	2030	POINT	230	0.01	99.94
MACT Source Categories : Cellulose-based Resins	644	POINT	221	0.01	99.95
External Combustion Boilers-Space Heaters	1050	POINT	207	0.01	99.96
Industrial Processes-Leather and Leather Products	3209	POINT	128	0	99.96
Bulk Materials Transport & Transport	253	AREA	108	0	99.96
Petroleum and Solvent Evaporation-	4250	POINT	104	0	99.96
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	79	0.00	99.96
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT	67	0.00	99.96
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA	66	0.00	99.97
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT	51	0.00	99.97

Table A-1 (continued)

Category	Category Number	Sector	VOC Tons/Year	VOC Percent of Total	VOC Cumulative Percent
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT	39	0.00	99.97
Mobile Sources-Highway Vehicles-Diesel	2230	AREA	38	0.00	99.97
Waste Disposal-Site Remediation	504	POINT	35	0.00	99.97
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT	18	0.00	99.97
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT	16	0.00	100.0
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT	16	0.00	100.0
MACT Source Categories-Miscellaneous Resins	6452	POINT	12	0.00	100.0
Industrial Processes-Building Construction	3110	POINT	11	0.00	100.0
MACT Source Categories : Agricultural Chemicals Production	631	POINT	3	0.00	100.0
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT	2	0.00	100.0
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT	1.0	0.00	100.0
MACT Source Categories : Food and Agricultural Processes	6258	POINT	0.7	0.00	100.0
Mobile Sources-Aircraft	2275	AREA	0.1	0.00	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT	0.0	0.00	100.0
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT	0.0	0.00	100.0
MACT Source Categories-Miscellaneous Processes	6824	POINT	0.0	0.00	100.0
Mobile Sources-Paved Roads	2294	POINT	0.00	0.00	100.0
Mobile Sources-Unpaved Roads	2296	POINT	0.0	0	100.0
Industrial Processes-Construction: SIC 15-17	2311	AREA		0	100.0
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA		0	100.0
Industrial Processes-Printing and Publishing	3600	POINT		0	100.0
Inorganic Chemical Storage & Transport	252	AREA		0	100.0
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA		0	100.0
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA		0	100.0
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA		0	100.0
Mobile Sources-Paved Roads	2294	AREA		0	100.0
Mobile Sources-Unpaved Roads	2296	AREA		0	100.0
Natural Sources, Biogenic	2701	BIOGENIC		0	100.0
Natural Sources, Geogenic	2730	GEOGENIC		0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA		0	100.0
Totals for All Categories			3,802,477	100	

Table A-2. Summary of Annual NO_x Emissions for the CENRAP Region by Category, Sector, and Pollutant: Base B Inventory

Category	Category Number	Sector	NO_x Tons/Year	Percent of Total	Cumulative Percent
External Combustion Boilers-Electric Generation	1010	POINT	895,567	17.21	17.21
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	890,699	17.11	34.32
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	845,039	16.24	50.56
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	392,833	7.55	58.11
Internal Combustion Engines-Industrial	2020	POINT	378,374	7.27	65.38
Mobile Sources-Railroad Equipment	2285	NONROAD	331,552	6.37	71.75
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA	277,190	5.33	77.08
Stationary Source Fuel Combustion-Industrial	2102	AREA	222,299	4.27	81.35
External Combustion Boilers-Industrial	1020	POINT	182,295	3.5	84.85
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	123,773	2.38	87.23
Industrial Processes-Mineral Products	305	POINT	91,145	1.75	88.98
Industrial Processes-Petroleum Industry	306	POINT	69,932	1.34	90.32
Industrial Processes-Chemical Manufacturing	301	POINT	60,691	1.17	91.49
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	58,189	1.12	92.61
Stationary Source Fuel Combustion-Residential	2104	AREA	50,497	0.97	93.58
Mobile Sources-LPG	2267	NONROAD	40,521	0.78	94.36
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	33,940	0.65	95.01
Internal Combustion Engines-Electric Generation	2010	POINT	33,854	0.65	95.66
Industrial Processes-In-process Fuel Use	390	POINT	31,703	0.61	96.27
Mobile Sources-Pleasure Craft	2282	NONROAD	25,375	0.49	96.76
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	23,558	0.45	97.21
Industrial Processes-Oil and Gas Production	310	POINT	16,172	0.31	97.52
Mobile Sources-Aircraft	2275	NONROAD	15,299	0.29	97.81
Industrial Processes-Primary Metal Production	303	POINT	13,009	0.25	98.06
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	12,342	0.24	98.3
Miscellaneous Area Sources-Other Combustion	2810	AREA	10,653	0.2	98.5
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA	9,875	0.19	98.69
Mobile Sources-CNG	2268	NONROAD	8,392	0.16	98.85
External Combustion Boilers-Commercial/Institutional	1030	POINT	7,118	0.14	98.99
Internal Combustion Engines-Commercial/Institutional	2030	POINT	5,919	0.11	99.1
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA	4,941	0.09	99.19
Miscellaneous Area Sources-Other Combustion	2810	POINT	4,068	0.08	99.27
Industrial Processes-Secondary Metal Production	304	POINT	3,867	0.07	99.34
Waste Disposal-Solid Waste Disposal-Government	501	POINT	3,717	0.07	99.41
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	3,702	0.07	99.48
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	3,563	0.07	99.55
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	2,767	0.05	99.6
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA	2,758	0.05	99.65
Bulk Materials Transport & Transport	253	AREA	2,354	0.05	99.7
Industrial Processes-Food and Agriculture	302	POINT	2,057	0.04	99.74
Mobile Sources-Aircraft	2275	POINT	1,825	0.04	99.78
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	1,743	0.03	99.81
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	1,386	0.03	99.84
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA	1,289	0.02	99.86
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA	1,190	0.02	99.88
Internal Combustion Engines-Engine Testing	2040	POINT	863	0.02	99.9

Table A-2 (continued)

Category	Category Number	Sector	NOx Tons/Year	NOx Percent of Total	NOx Cumulative Percent
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	691	0.01	99.91
Industrial Processes-Industrial Processes: NEC	2399	AREA	616	0.01	99.92
External Combustion Boilers-Space Heaters	1050	POINT	586	0.01	99.93
Waste Disposal-Site Remediation	504	POINT	535	0.01	99.94
Industrial Processes-Fabricated Metal Products	309	POINT	480	0.01	99.95
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA	285	0.01	99.96
Mobile Sources-Highway Vehicles-Diesel	2230	AREA	283	0.01	99.97
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	209	0.00	99.97
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT	208	0.00	99.97
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT	188	0.00	99.97
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	157	0.00	99.97
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	152	0.00	99.97
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	109	0.00	99.97
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT	98	0.00	99.97
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	90	0.00	99.97
Industrial Processes-Electrical Equipment	313	POINT	82	0.00	99.97
Industrial Processes-Machinery, Miscellaneous	3129	POINT	66	0.00	99.97
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	48	0.00	99.97
Internal Combustion Engines-Fugitive Emissions	2888	POINT	26	0.00	99.97
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	18	0.00	99.97
MACT Source Categories : Vinyl-based Resins	6463	POINT	11	0.00	99.97
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA	10	0.00	99.97
Industrial Processes-Transportation Equipment	314	POINT	6	0.00	99.97
Petroleum and Solvent Evaporation-	4250	POINT	4	0.00	99.97
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT	4	0.00	99.97
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	4	0.00	99.97
Industrial Processes-Textile Products	330	POINT	3	0.00	99.97
Industrial Processes-Building Construction	3110	POINT	1	0.00	99.97
Industrial Processes-Cooling Tower	3850	POINT	1	0.00	99.97
MACT Source Categories : Cellulose-based Resins	644	POINT	0	0.00	99.97
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT	0	0.00	100.0
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA	0	0	100.0
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT	0	0	100.0
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT	0	0	100.0
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT	0	0	100.0
Mobile Sources-Paved Roads	2294	POINT	0	0	100.0
Mobile Sources-Unpaved Roads	2296	POINT	0	0	100.0
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT	0	0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT	0	0	100.0
Architectural Coatings	2401001000	AREA		0	100.0
Auto Refinishing	2401005000	AREA		0	100.0
Degreasing	2415	AREA		0	100.0
Gas Marketing Stage I	25010600	AREA		0	100.0
Graphic Arts	2425	AREA		0	100.0
Industrial Processes-Construction: SIC 15-17	2311	AREA		0	100.0

Table A-2 (continued)

Category	Category Number	Sector	NOx Tons/Year	Percent of Total	Cumulative Percent
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA		0	100.0
Industrial Processes-Leather and Leather Products	3209	POINT		0	100.0
Industrial Processes-Printing and Publishing	3600	POINT		0	100.0
Industrial Surface Coating	2401015000	AREA		0	100.0
Inorganic Chemical Storage & Transport	252	AREA		0	100.0
MACT Source Categories : Agricultural Chemicals Production	631	POINT		0	100.0
MACT Source Categories : Food and Agricultural Processes	6258	POINT		0	100.0
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6824	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT		0	100.0
MACT Source Categories-Miscellaneous Resins	6452	POINT		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA		0	100.0
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA		0	100.0
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA		0	100.0
Mobile Sources-Aircraft	2275	AREA		0	100.0
Mobile Sources-Paved Roads	2294	AREA		0	100.0
Mobile Sources-Unpaved Roads	2296	AREA		0	100.0
Natural Sources, Biogenic	2701	BIOGENIC		0	100.0
Natural Sources, Geogenic	2730	GEOGENIC		0	100.0
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT		0	100.0
Rubber/Plastics	2430000000	AREA		0	100.0
Solvent Utilization-Dry Cleaning	2420	AREA		0	100.0
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA		0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA		0	100.0
Traffic Markings	2401008000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA		0	100.0
Totals for All Categories			5,204,868	100	

Table A-3. Summary of Annual CO Emissions for the CENRAP Region by Category, Sector, and Pollutant: Base B Inventory

Category	Category Number	Sector	CO Tons/Year	CO Percent of Total	CO Cumulative Percent
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	12,622,725	56.09	56.09
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	2,488,595	11.06	67.15
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	1,363,848	6.06	73.21
Mobile Sources-Pleasure Craft	2282	NONROAD	1,030,752	4.58	77.79
Miscellaneous Area Sources-Other Combustion	2810	AREA	904,171	4.02	81.81
Miscellaneous Area Sources-Other Combustion	2810	POINT	688,449	3.06	84.87
Stationary Source Fuel Combustion-Residential	2104	AREA	404,209	1.8	86.67
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	324,217	1.44	88.11
External Combustion Boilers-Electric Generation	1010	POINT	275,860	1.23	89.34
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	268,369	1.19	90.53
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA	240,677	1.07	91.6
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA	238,628	1.06	92.66
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	236,540	1.05	93.71
Industrial Processes-Chemical Manufacturing	301	POINT	169,431	0.75	94.46
Mobile Sources-LPG	2267	NONROAD	162,171	0.72	95.18
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	160,085	0.71	95.89
Internal Combustion Engines-Industrial	2020	POINT	152,398	0.68	96.57
External Combustion Boilers-Industrial	1020	POINT	120,770	0.54	97.11
Industrial Processes-Primary Metal Production	303	POINT	97,211	0.43	97.54
Industrial Processes-Mineral Products	305	POINT	63,408	0.28	97.82
Mobile Sources-Aircraft	2275	NONROAD	58,554	0.26	98.08
Stationary Source Fuel Combustion-Industrial	2102	AREA	56,095	0.25	98.33
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA	55,100	0.24	98.57
Industrial Processes-Petroleum Industry	306	POINT	52,733	0.23	98.8
Mobile Sources-Railroad Equipment	2285	NONROAD	43,352	0.19	98.99
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	38,549	0.17	99.16
Mobile Sources-CNG	2268	NONROAD	34,154	0.15	99.31
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	19,925	0.09	99.4
Industrial Processes-Secondary Metal Production	304	POINT	19,360	0.09	99.49
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	18,111	0.08	99.57
Industrial Processes-Food and Agriculture	302	POINT	13,552	0.06	99.63
Industrial Processes-Oil and Gas Production	310	POINT	10,508	0.05	99.68
Internal Combustion Engines-Electric Generation	2010	POINT	10,049	0.04	99.72
Mobile Sources-Aircraft	2275	POINT	9,552	0.04	99.76
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT	7,992	0.04	99.8
Industrial Processes-In-process Fuel Use	390	POINT	6,918	0.03	99.83
External Combustion Boilers-Commercial/Institutional	1030	POINT	6,390	0.03	99.86
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA	5,540	0.02	99.88
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	4,292	0.02	99.9
Waste Disposal-Solid Waste Disposal-Government	501	POINT	4,096	0.02	99.92
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA	3,687	0.02	99.94
Internal Combustion Engines-Commercial/Institutional	2030	POINT	3,243	0.01	99.95
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	1,367	0.01	99.96
Internal Combustion Engines-Engine Testing	2040	POINT	1,306	0.01	99.97
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA	999	0	99.97

Table A-3 (continued)

Category	Category Number	Sector	CO		
			Tons/Year	Percent of Total	Cumulative Percent
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	733	0	99.97
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	510	0	99.97
Mobile Sources-Highway Vehicles-Diesel	2230	AREA	454	0	99.97
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	386	0	99.97
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	340	0	99.97
Bulk Materials Transport & Transport	253	AREA	305	0	99.97
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	278	0	99.97
External Combustion Boilers-Space Heaters	1050	POINT	258	0	99.97
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT	237	0	99.97
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	213	0	99.97
Industrial Processes-Fabricated Metal Products	309	POINT	191	0	99.97
Industrial Processes-Industrial Processes: NEC	2399	AREA	140	0	99.97
Internal Combustion Engines-Fugitive Emissions	2888	POINT	135	0	99.97
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	128	0	99.97
Waste Disposal-Site Remediation	504	POINT	116	0	99.97
Industrial Processes-Machinery, Miscellaneous	3129	POINT	72	0	99.97
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	66	0	99.97
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT	56	0	99.97
Industrial Processes-Electrical Equipment	313	POINT	51	0	99.97
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	48	0	99.97
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	30	0	99.97
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT	20	0	99.97
Petroleum and Solvent Evaporation-	4250	POINT	9	0	99.97
MACT Source Categories : Vinyl-based Resins	6463	POINT	9	0	99.97
Industrial Processes-Transportation Equipment	314	POINT	3	0	99.97
Industrial Processes-Leather and Leather Products	3209	POINT	2	0	99.97
Industrial Processes-Textile Products	330	POINT	2	0	99.97
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT	2	0	99.97
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT	1	0	99.97
Industrial Processes-Cooling Tower	3850	POINT	1	0	99.97
MACT Source Categories : Cellulose-based Resins	644	POINT	0	0	99.97
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT	0	0	100.0
Industrial Processes-Building Construction	3110	POINT	0	0	100.0
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT	0	0	100.0
Mobile Sources-Paved Roads	2294	POINT	0	0	100.0
Mobile Sources-Unpaved Roads	2296	POINT	0	0	100.0
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT	0	0	100.0
Architectural Coatings	2401001000	AREA		0	100.0
Auto Refinishing	2401005000	AREA		0	100.0
Degreasing	2415	AREA		0	100.0
Gas Marketing Stage I	25010600	AREA		0	100.0
Graphic Arts	2425	AREA		0	100.0
Industrial Processes-Construction: SIC 15-17	2311	AREA		0	100.0
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA		0	100.0
Industrial Processes-Printing and Publishing	3600	POINT		0	100.0
Industrial Surface Coating	2401015000	AREA		0	100.0
Inorganic Chemical Storage & Transport	252	AREA		0	100.0
MACT Source Categories : Agricultural Chemicals Production	631	POINT		0	100.0

Table A-3 (continued)

Category	Category Number	Sector	CO Tons/Year	CO Percent of Total	CO Cumulative Percent
MACT Source Categories : Food and Agricultural Processes	6258	POINT		0	100.0
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT		0	100.0
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6824	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT		0	100.0
MACT Source Categories-Miscellaneous Resins	6452	POINT		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA		0	100.0
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA		0	100.0
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA		0	100.0
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA		0	100.0
Mobile Sources-Aircraft	2275	AREA		0	100.0
Mobile Sources-Paved Roads	2294	AREA		0	100.0
Mobile Sources-Unpaved Roads	2296	AREA		0	100.0
Natural Sources, Biogenic	2701	BIOGENIC		0	100.0
Natural Sources, Geogenic	2730	GEOGENIC		0	100.0
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA		0	100.0
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT		0	100.0
Rubber/Plastics	2430000000	AREA		0	100.0
Solvent Utilization-Dry Cleaning	2420	AREA		0	100.0
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA		0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA		0	100.0
Traffic Markings	2401008000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA		0	100.0
Totals for All Categories			22,502,730	100	

Table A-4. Summary of Annual SO_2 Emissions for the CENRAP Region by Category, Sector, and Pollutant: Base B Inventory

Category	Category Number	Sector	SO_2 Tons/Year	SO_2 Percent of Total	SO_2 Cumulative Percent
External Combustion Boilers-Electric Generation	1010	POINT	1,507,468	56.1	56.1
Stationary Source Fuel Combustion-Industrial	2102	AREA	268,450	9.99	66.09
External Combustion Boilers-Industrial	1020	POINT	213,271	7.94	74.03
Industrial Processes-Chemical Manufacturing	301	POINT	144,912	5.39	79.42
Industrial Processes-Petroleum Industry	306	POINT	109,962	4.09	83.51
Industrial Processes-Mineral Products	305	POINT	79,767	2.97	86.48
Industrial Processes-Primary Metal Production	303	POINT	67,735	2.52	89
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	49,754	1.85	90.85
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	31,090	1.16	92.01
Industrial Processes-Oil and Gas Production	310	POINT	30,483	1.13	93.14
Mobile Sources-Railroad Equipment	2285	NONROAD	21,825	0.81	93.95
Industrial Processes-Secondary Metal Production	304	POINT	20,993	0.78	94.73
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	19,669	0.73	95.46
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	19,342	0.72	96.18
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	18,546	0.69	96.87
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	16,555	0.62	97.49
Industrial Processes-In-process Fuel Use	390	POINT	11,995	0.45	97.94
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	8,586	0.32	98.26
Stationary Source Fuel Combustion-Residential	2104	AREA	7,817	0.29	98.55
External Combustion Boilers-Commercial/Institutional	1030	POINT	7,470	0.28	98.83
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	6,432	0.24	99.07
Miscellaneous Area Sources-Other Combustion	2810	AREA	4,776	0.18	99.25
Miscellaneous Area Sources-Other Combustion	2810	POINT	3,468	0.13	99.38
Mobile Sources-Pleasure Craft	2282	NONROAD	1,773	0.07	99.45
Industrial Processes-Food and Agriculture	302	POINT	1,673	0.06	99.51
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	1,595	0.06	99.57
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	1,589	0.06	99.63
Mobile Sources-Aircraft	2275	NONROAD	1,511	0.06	99.69
Waste Disposal-Solid Waste Disposal-Government	501	POINT	1,164	0.04	99.73
Internal Combustion Engines-Industrial	2020	POINT	1,163	0.04	99.77
Internal Combustion Engines-Electric Generation	2010	POINT	1,004	0.04	99.81
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	748	0.03	99.84
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	731	0.03	99.87
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA	694	0.03	99.9
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA	680	0.03	99.93
Waste Disposal-Site Remediation	504	POINT	635	0.02	99.95
Industrial Processes-Industrial Processes: NEC	2399	AREA	307	0.01	99.96
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	277	0.01	99.97
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	204	0.01	99.98
Mobile Sources-Aircraft	2275	POINT	183	0.01	99.99
Bulk Materials Transport & Transport	253	AREA	172	0.01	100.0
Internal Combustion Engines-Commercial/Institutional	2030	POINT	150	0.01	100.0
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	99	0	100.0
Mobile Sources-LPG	2267	NONROAD	76	0	100.0
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	61	0	100.0
Internal Combustion Engines-Engine Testing	2040	POINT	53	0	100.0

Table A-4 (continued)

Category	Category Number	Sector	SO$_2$ Tons/Year	SO$_2$ Percent of Total	SO$_2$ Cumulative Percent
Industrial Processes-Fabricated Metal Products	309	POINT	52	0	100.0
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	48	0	100.0
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	47	0	100.0
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT	30	0	100.0
Mobile Sources-CNG	2268	NONROAD	16	0	100.0
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	13	0	100.0
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA	13	0	100.0
External Combustion Boilers-Space Heaters	1050	POINT	12	0	100.0
Industrial Processes-Electrical Equipment	313	POINT	9	0	100.0
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	5	0	100.0
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT	5	0	100.0
Industrial Processes-Transportation Equipment	314	POINT	4	0	100.0
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	4	0	100.0
Industrial Processes-Machinery, Miscellaneous	3129	POINT	3	0	100.0
Industrial Processes-Cooling Tower	3850	POINT	2	0	100.0
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT	1	0	100.0
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	1	0	100.0
Internal Combustion Engines-Fugitive Emissions	2888	POINT	1	0	100.0
MACT Source Categories : Vinyl-based Resins	6463	POINT	0	0	100.0
MACT Source Categories : Cellulose-based Resins	644	POINT	0	0	100.0
Industrial Processes-Building Construction	3110	POINT	0	0	100.0
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT	0	0	100.0
Industrial Processes-Textile Products	330	POINT	0	0	100.0
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT	0	0	100.0
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT	0	0	100.0
Petroleum and Solvent Evaporation-	4250	POINT	0	0	100.0
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT	0	0	100.0
Architectural Coatings	2401001000	AREA		0	100.0
Auto Refinishing	2401005000	AREA		0	100.0
Degreasing	2415	AREA		0	100.0
Gas Marketing Stage I	25010600	AREA		0	100.0
Graphic Arts	2425	AREA		0	100.0
Industrial Processes-Construction: SIC 15-17	2311	AREA		0	100.0
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA		0	100.0
Industrial Processes-Leather and Leather Products	3209	POINT		0	100.0
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA		0	100.0
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA		0	100.0
Industrial Processes-Printing and Publishing	3600	POINT		0	100.0
Industrial Surface Coating	2401015000	AREA		0	100.0
Inorganic Chemical Storage & Transport	252	AREA		0	100.0
MACT Source Categories : Agricultural Chemicals Production	631	POINT		0	100.0
MACT Source Categories : Food and Agricultural Processes	6258	POINT		0	100.0
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT		0	100.0
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6824	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT		0	100.0

Table A-4 (continued)

Category	Category Number	Sector	SO_2 Tons/Year	Percent of Total	Cumulative Percent
MACT Source Categories-Miscellaneous Resins	6452	POINT		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA		0	100.0
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA		0	100.0
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA		0	100.0
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA		0	100.0
Mobile Sources-Aircraft	2275	AREA		0	100.0
Mobile Sources-Highway Vehicles-Diesel	2230	AREA		0	100.0
Mobile Sources-Paved Roads	2294	AREA		0	100.0
Mobile Sources-Paved Roads	2294	POINT		0	100.0
Mobile Sources-Unpaved Roads	2296	AREA		0	100.0
Mobile Sources-Unpaved Roads	2296	POINT		0	100.0
Natural Sources, Biogenic	2701	BIOGENIC		0	100.0
Natural Sources, Geogenic	2730	GEOGENIC		0	100.0
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA		0	100.0
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT		0	100.0
Rubber/Plastics	2430000000	AREA		0	100.0
Solvent Utilization-Dry Cleaning	2420	AREA		0	100.0
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA		0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA		0	100.0
Traffic Markings	2401008000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT		0	100.0
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA		0	100.0
Totals for All Categories			2,687,169	100	

Table A-5. Summary of Annual PM10-PRI and PM25-PRI Emissions for the CENRAP Region by Category, Sector, and Pollutant: Base B Inventory

Category	Category Number	Sector	PM10-PRI Tons/Year	PM10-PRI Percent of Total	PM10-PRI Cumulative Percent	PM25-PRI Tons/Year	PM25-PRI Percent of Total	PM25-PRI Cumulative Percent
Mobile Sources-Unpaved Roads	2296	AREA	3,870,203	50.73	50.73	578,858	31.42	31.42
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA	1,465,743	19.21	69.94	298,347	16.19	47.61
Industrial Processes-Construction: SIC 15-17	2311	AREA	528,340	6.93	76.87	105,681	5.74	53.35
Mobile Sources-Paved Roads	2294	AREA	474,726	6.22	83.09	76,380	4.15	57.5
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA	183,304	2.4	85.49	36,660	1.99	59.49
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	175,202	2.3	87.79	138,145	7.5	66.99
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA	96,895	1.27	89.06	14,534	0.79	67.78
Miscellaneous Area Sources-Other Combustion	2810	AREA	83,356	1.09	90.15	71,092	3.86	71.64
External Combustion Boilers-Electric Generation	1010	POINT	72,057	0.94	91.09	47,369	2.57	74.21
Miscellaneous Area Sources-Other Combustion	2810	POINT	63,909	0.84	91.93	54,160	2.94	77.15
Industrial Processes-Food and Agriculture	302	POINT	60,785	0.8	92.73	11,460	0.62	77.77
Stationary Source Fuel Combustion-Residential	2104	AREA	57,225	0.75	93.48	57,036	3.1	80.87
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA	54,806	0.72	94.2	52,111	2.83	83.7
External Combustion Boilers-Industrial	1020	POINT	47,521	0.62	94.82	40,584	2.2	85.9
Stationary Source Fuel Combustion-Industrial	2102	AREA	47,280	0.62	95.44	17,361	0.94	86.84
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	43,478	0.57	96.01	40,576	2.2	89.04
Industrial Processes-Mineral Products	305	POINT	35,961	0.47	96.48	14,426	0.78	89.82
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	32,949	0.43	96.91	27,910	1.51	91.33
Natural Sources, Geogenic	2730	GEOGENIC	32,164	0.42	97.33	7,076	0.38	91.71
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	23,157	0.3	97.63	19,984	1.08	92.79
Mobile Sources-Pleasure Craft	2282	NONROAD	20,637	0.27	97.9	19,085	1.04	93.83
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA	15,078	0.2	98.1	14,041	0.76	94.59
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	14,492	0.19	98.29	7,247	0.39	94.98
Industrial Processes-Primary Metal Production	303	POINT	13,492	0.18	98.47	3,183	0.17	95.15
Internal Combustion Engines-Industrial	2020	POINT	13,373	0.18	98.65	13,064	0.71	95.86
Industrial Processes-Chemical Manufacturing	301	POINT	13,220	0.17	98.82	10,340	0.56	96.42
Industrial Processes-Petroleum Industry	306	POINT	12,597	0.17	98.99	10,358	0.56	96.98
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	12,382	0.16	99.15	7,219	0.39	97.37
Mobile Sources-Railroad Equipment	2285	NONROAD	8,991	0.12	99.27	8,110	0.44	97.81
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	6,937	0.09	99.36	6,543	0.36	98.17
Industrial Processes-Cooling Tower	3850	POINT	6,403	0.08	99.44	5,469	0.3	98.47

Table A-5 (continued)

Category	Category Number	Sector	PM10-PRI Tons/Year	PM10-PRI Percent of Total	PM10-PRI Cumulative Percent	PM25-PRI Tons/Year	PM25-PRI Percent of Total	PM25-PRI Cumulative Percent
Industrial Processes-Secondary Metal Production	304	POINT	6,103	0.08	99.52	3,804	0.21	98.68
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	5,586	0.07	99.59	5,171	0.28	98.96
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA	3,626	0.05	99.64	96	0.01	98.97
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	3,310	0.04	99.68	1,922	0.1	99.07
Internal Combustion Engines-Electric Generation	2010	POINT	3,271	0.04	99.72	3,177	0.17	99.24
Industrial Processes-In-process Fuel Use	390	POINT	3,264	0.04	99.76	1,187	0.06	99.3
Industrial Processes-Industrial Processes: NEC	2399	AREA	2,815	0.04	99.8	1,950	0.11	99.41
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	2,798	0.04	99.84	2,574	0.14	99.55
External Combustion Boilers-Commercial/Institutional	1030	POINT	1,587	0.02	99.86	1,048	0.06	99.61
Industrial Processes-Fabricated Metal Products	309	POINT	1,235	0.02	99.88	490	0.03	99.64
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	1,186	0.02	99.9	978	0.05	99.69
Waste Disposal-Solid Waste Disposal-Government	501	POINT	976	0.01	99.91	507	0.03	99.72
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA	935	0.01	99.92	664	0.04	99.76
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	756	0.01	99.93	707	0.04	99.8
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	604	0.01	99.94	254	0.01	99.81
Mobile Sources-Aircraft	2275	NONROAD	441	0.01	99.95	349	0.02	99.83
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	438	0.01	99.96	302	0.02	99.85
Industrial Processes-Oil and Gas Production	310	POINT	433	0.01	99.97	413	0.02	99.87
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA	387	0.01	99.98	387	0.02	99.89
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	275	0	99.98	173	0.01	99.9
Industrial Processes-Machinery, Miscellaneous	3129	POINT	258	0	99.98	215	0.01	99.91
Internal Combustion Engines-Commercial/Institutional	2030	POINT	214	0	99.98	214	0.01	99.92
Mobile Sources-LPG	2267	NONROAD	190	0	99.98	188	0.01	99.93
Mobile Sources-Aircraft	2275	POINT	160	0	99.98	113	0.01	99.94
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	158	0	99.98	126	0.01	99.95
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA	131	0	99.98	131	0.01	99.96
MACT Source Categories : Vinyl-based Resins	6463	POINT	118	0	99.98	77	0	99.96
Waste Disposal-Site Remediation	504	POINT	102	0	99.98	65	0	99.96
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA	91	0	99.98	91	0	99.96
Internal Combustion Engines-Engine Testing	2040	POINT	61	0	99.98	55	0	99.96
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	57	0	99.98	40	0	99.96
Bulk Materials Transport & Transport	253	AREA	56	0	99.98	56	0	99.96
Internal Combustion Engines-Fugitive Emissions	2888	POINT	49	0	99.98	47	0	99.96

Table A-5 (continued)

Category	Category Number	Sector	PM10-PRI Tons/Year	PM10-PRI Percent of Total	PM10-PRI Cumulative Percent	PM25-PRI Tons/Year	PM25-PRI Percent of Total	PM25-PRI Cumulative Percent
Industrial Processes-Transportation Equipment	314	POINT	46	0	99.98	28	0	99.96
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	41	0	99.98	34	0	99.96
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	40	0	99.98	33	0	99.96
Mobile Sources-CNG	2268	NONROAD	39	0	99.98	38	0	99.96
External Combustion Boilers-Space Heaters	1050	POINT	36	0	99.98	35	0	99.96
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	30	0	99.98	25	0	99.96
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA	26	0	99.98	3	0	99.96
Industrial Processes-Electrical Equipment	313	POINT	23	0	99.98	21	0	99.96
Mobile Sources-Unpaved Roads	2296	POINT	21	0	99.98	21	0	99.96
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT	12	0	99.98	11	0	99.96
Industrial Processes-Leather and Leather Products	3209	POINT	7	0	99.98	2	0	99.96
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	7	0	99.98	6	0	99.96
Industrial Processes-Building Construction	3110	POINT	5	0	99.98	1	0	99.96
MACT Source Categories-Miscellaneous Processes	6824	POINT	4	0	99.98	1	0	99.96
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT	3	0	99.98	3	0	99.96
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	3	0	99.98	2	0	99.96
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT	2	0	99.98	1	0	99.96
Industrial Processes-Textile Products	330	POINT	2	0	99.98	2	0	99.96
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT	2	0	99.98	2	0	99.96
Mobile Sources-Paved Roads	2294	POINT	1	0	99.98	1	0	99.96
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA	1	0	99.98		0	99.96
MACT Source Categories : Agricultural Chemicals Production	631	POINT	0	0	100.0	0	0	99.96
Industrial Processes-Printing and Publishing	3600	POINT	0	0	100.0	0	0	99.96
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT	0	0	100.0	0	0	99.96
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT	0	0	100.0	0	0	99.96
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT	0	0	100.0	0	0	100.0
MACT Source Categories : Cellulose-based Resins	644	POINT	0	0	100.0	0	0	100.0
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT	0	0	100.0	0	0	100.0
MACT Source Categories : Food and Agricultural Processes	6258	POINT	0	0	100.0	0	0	100.0

Table A-5 (continued)

Category	Category Number	Sector	PM10-PRI Tons/Year	PM10-PRI Percent of Total	PM10-PRI Cumulative Percent	PM25-PRI Tons/Year	PM25-PRI Percent of Total	PM25-PRI Cumulative Percent
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT	0	0	100.0	0	0	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT	0	0	100.0	0	0	100.0
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT	0	0	100.0	0	0	100.0
MACT Source Categories-Miscellaneous Resins	6452	POINT	0	0	100.0	0	0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT	0	0	100.0	0	0	100.0
Architectural Coatings	2401001000	AREA		0	100.0		0	100.0
Auto Refinishing	2401005000	AREA		0	100.0		0	100.0
Degreasing	2415	AREA		0	100.0		0	100.0
Gas Marketing Stage I	25010600	AREA		0	100.0		0	100.0
Graphic Arts	2425	AREA		0	100.0		0	100.0
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA		0	100.0		0	100.0
Industrial Surface Coating	2401015000	AREA		0	100.0		0	100.0
Inorganic Chemical Storage & Transport	252	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA		0	100.0		0	100.0
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA		0	100.0		0	100.0
Mobile Sources-Aircraft	2275	AREA		0	100.0		0	100.0
Mobile Sources-Highway Vehicles-Diesel	2230	AREA		0	100.0		0	100.0
Natural Sources, Biogenic	2701	BIOGENIC		0	100.0		0	100.0
Petroleum and Solvent Evaporation-	4250	POINT		0	100.0		0	100.0
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT		0	100.0		0	100.0
Rubber/Plastics	2430000000	AREA		0	100.0		0	100.0
Solvent Utilization-Dry Cleaning	2420	AREA		0	100.0		0	100.0
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA		0	100.0		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA		0	100.0		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA		0	100.0		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA		0	100.0		0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA		0	100.0		0	100.0

Table A-5 (continued)

Category	Category Number	Sector	PM10-PRI Tons/Year	PM10-PRI Percent of Total	PM10-PRI Cumulative Percent	PM25-PRI Tons/Year	PM25-PRI Percent of Total	PM25-PRI Cumulative Percent
Traffic Markings	2401008000	AREA		0	100.0		0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA		0	100.0		0	100.0
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA		0	100.0		0	100.0
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA		0	100.0		0	100.0
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA		0	100.0		0	100.0
Totals for All Categories			7,628,680	100		1,842,252	100	

Table A-6. Summary of Annual NH_3 Emissions for the CENRAP Region by Category, Sector, and Pollutant: Base B Inventory

Category	Category Number	Sector	NH_3 Tons/Year	NH_3 Percent of Total	NH_3 Cumulative Percent
Miscellaneous Area Sources-Agricultural Production-Crops	2801	AREA	561,194	31.94	31.94
Miscellaneous Area Sources-Agriculture Production-Livestock-Cattle and Calves Waste Emissions	280502	AREA	243,489	13.86	45.8
Miscellaneous Area Sources-Agriculture Production-Livestock-Swine	2805025	AREA	187,598	10.68	56.48
Industrial Processes-Food and Agriculture	302	POINT	158,370	9.01	65.49
Miscellaneous Area Sources-Agriculture Production-Livestock-Poultry	2805030	AREA	138,222	7.87	73.36
Miscellaneous Area Sources-Agriculture Production-Livestock-Beef Cattle	280500	AREA	118,941	6.77	80.13
Mobile Sources-Highway Vehicles-Gasoline	2201	ON-ROAD	48,820	2.78	82.91
Natural Sources, Biogenic	2701	BIOGENIC	44,688	2.54	85.45
Miscellaneous Area Sources-Domestic Animals Waste Emissions	2806	AREA	36,178	2.06	87.51
Industrial Processes-Industrial Processes: NEC	2399	AREA	33,960	1.93	89.44
Miscellaneous Area Sources-Other Combustion	2810	AREA	32,051	1.82	91.26
Miscellaneous Area Sources-Wild Animals Waste Emissions	2807	AREA	23,443	1.33	92.59
Miscellaneous Area Sources-Agricultural Production-Crops-Field Burning	28015	AREA	22,612	1.29	93.88
Miscellaneous Area Sources-Agriculture Production-Livestock-Dairy Cattle	280501	AREA	22,407	1.28	95.16
Industrial Processes-Chemical Manufacturing	301	POINT	13,390	0.76	95.92
Industrial Processes-Food and Kindred Products: SIC 20	2302	AREA	12,727	0.72	96.64
Miscellaneous Area Sources-Agriculture Production-Livestock-Horses and Ponies	2805035	AREA	10,750	0.61	97.25
Miscellaneous Area Sources-Agriculture Production-Livestock-Goats	2805045	AREA	8,483	0.48	97.73
Miscellaneous Area Sources-Other Combustion	2810	POINT	6,116	0.35	98.08
Waste Disposal-Solid Waste Disposal-Commercial/Institutional	502	POINT	4,521	0.26	98.34
Miscellaneous Area Sources-Agriculture Production-Livestock-Sheep and Lambs	2805040	AREA	4,247	0.24	98.58
External Combustion Boilers-Electric Generation	1010	POINT	4,172	0.24	98.82
External Combustion Boilers-Space Heaters	1050	POINT	3,752	0.21	99.03
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	AREA	3,343	0.19	99.22
Waste Disposal, Treatment, and Recovery-Wastewater Treatment	2630	AREA	3,216	0.18	99.4
Stationary Source Fuel Combustion-Industrial	2102	AREA	1,951	0.11	99.51
Mobile Sources-Highway Vehicles-Diesel	2230	ON-ROAD	1,497	0.09	99.6
Waste Disposal, Treatment, and Recovery-Landfills	2620	AREA	1,061	0.06	99.66
Industrial Processes-Pulp and Paper and Wood Products	307	POINT	1,015	0.06	99.72
Industrial Processes-Petroleum Industry	306	POINT	1,003	0.06	99.78
Waste Disposal-Solid Waste Disposal-Government	501	POINT	974	0.06	99.84
Mobile Sources-CNG	2268	NONROAD	838	0.05	99.89
Stationary Source Fuel Combustion-Commercial/Institutional	2103	AREA	307	0.02	99.91
Industrial Processes-Mineral Products	305	POINT	249	0.01	99.92
Mobile Sources-Off-highway Vehicle Diesel	2270	NONROAD	217	0.01	99.93
External Combustion Boilers-Commercial/Institutional	1030	POINT	209	0.01	99.94
Internal Combustion Engines-Electric Generation	2010	POINT	164	0.01	99.95
Mobile Sources-Railroad Equipment	2285	NONROAD	147	0.01	99.96
External Combustion Boilers-Industrial	1020	POINT	142	0.01	99.97
Petroleum and Solvent Evaporation-Organic Chemical Storage	407	POINT	126	0.01	99.98
Stationary Source Fuel Combustion-Residential	2104	AREA	91	0.01	99.99
Waste Disposal-Solid Waste Disposal-Industrial	503	POINT	87	0	99.99

Table A-6 (continued)

Category	Category Number	Sector	NH3 Tons/Year	NH3 Percent of Total	NH3 Cumulative Percent
Mobile Sources-Pleasure Craft	2282	NONROAD	79	0	99.99
Internal Combustion Engines-Industrial	2020	POINT	62	0	100.0
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	NONROAD	37	0	100.0
Waste Disposal, Treatment, and Recovery-Landfills	2620	POINT	36	0	100.0
Mobile Sources-Marine Vessels, Commercial	2280	NONROAD	32	0	100.0
Inorganic Chemical Storage & Transport	252	AREA	22	0	100.0
Industrial Processes-Miscellaneous Manufacturing Industries	399	POINT	19	0	100.0
Petroleum and Solvent Evaporation-Surface Coating Operations	402	POINT	16	0	100.0
Miscellaneous Area Sources-Prescribed Rangeland Burning	2810020	POINT	16	0	100.0
Mobile Sources-Off-highway Vehicle Gasoline, 2-Stroke	2260	NONROAD	15	0	100.0
Industrial Processes-Rubber and Miscellaneous Plastics Products	308	POINT	14	0	100.0
Industrial Processes-Secondary Metal Production	304	POINT	4	0	100.0
Petroleum and Solvent Evaporation-Petroleum Product Storage at Refineries	403	POINT	3	0	100.0
Industrial Processes-In-process Fuel Use	390	POINT	2	0	100.0
Petroleum and Solvent Evaporation-Organic Solvent Evaporation	401	POINT	1	0	100.0
Industrial Processes-Electrical Equipment	313	POINT	1	0	100.0
MACT Source Categories : Vinyl-based Resins	6463	POINT	1	0	100.0
Stationary Source Fuel Combustion-Electric Utility	2101	AREA	1	0	100.0
Industrial Processes-Oil and Gas Production	310	POINT	0	0	100.0
Mobile Sources-Aircraft	2275	NONROAD	0	0	100.0
Petroleum and Solvent Evaporation-Organic Chemical Transportation	4089	POINT	0	0	100.0
Petroleum and Solvent Evaporation-Transportation and Marketing of Petroleum Products	406	POINT	0	0	100.0
Industrial Processes-Fabricated Metal Products	309	POINT	0	0	100.0
Petroleum and Solvent Evaporation-Printing/Publishing	405	POINT	0	0	100.0
Internal Combustion Engines-Engine Testing	2040	POINT	0	0	100.0
Internal Combustion Engines-Commercial/Institutional	2030	POINT	0	0	100.0
Industrial Processes-Photo Equip/Health Care/Labs/Air Condit/SwimPools	3150	POINT	0	0	100.0
Industrial Processes-Primary Metal Production	303	POINT	0	0	100.0
Internal Combustion Engines-Fugitive Emissions	2888	POINT	0	0	100.0
Mobile Sources-LPG	2267	NONROAD	0	0	100.0
Architectural Coatings	2401001000	AREA		0	100.0
Auto Refinishing	2401005000	AREA		0	100.0
Bulk Materials Transport & Transport	253	AREA		0	100.0
Degreasing	2415	AREA		0	100.0
Gas Marketing Stage I	25010600	AREA		0	100.0
Graphic Arts	2425	AREA		0	100.0
Industrial Processes-Building Construction	3110	POINT		0	100.0
Industrial Processes-Construction: SIC 15-17	2311	AREA		0	100.0
Industrial Processes-Cooling Tower	3850	POINT		0	100.0
Industrial Processes-Leather and Leather Products	3209	POINT		0	100.0
Industrial Processes-Machinery, Miscellaneous	3129	POINT		0	100.0
Industrial Processes-Mining and Quarrying: SIC 14	2325	AREA		0	100.0
Industrial Processes-Oil and Gas Production: SIC 13	2310	AREA		0	100.0
Industrial Processes-Printing and Publishing	3600	POINT		0	100.0
Industrial Processes-Textile Products	330	POINT		0	100.0
Industrial Processes-Transportation Equipment	314	POINT		0	100.0
Industrial Surface Coating	2401015000	AREA		0	100.0
Internal Combustion Engines-Off-highway Diesel Engines	2700	POINT		0	100.0
MACT Source Categories : Agricultural Chemicals Production	631	POINT		0	100.0
MACT Source Categories : Cellulose-based Resins	644	POINT		0	100.0

Table A-6 (continued)

Category	Category Number	Sector	NH_3 Tons/Year	NH_3 Percent of Total	NH_3 Cumulative Percent
MACT Source Categories : Consumer Product Manufacturing Facilities	6818	POINT		0	100.0
MACT Source Categories : Food and Agricultural Processes	6258	POINT		0	100.0
MACT Source Categories : Styrene or Methacrylate Based Resins	6413	POINT		0	100.0
MACT Source Categories-Inorganic Chemicals Manufacturing	6513	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6824	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes	6828	POINT		0	100.0
MACT Source Categories-Miscellaneous Processes (Chemicals)	6848	POINT		0	100.0
MACT Source Categories-Miscellaneous Resins	6452	POINT		0	100.0
Miscellaneous Area Sources-Agricultural Production-Crops-Tilling & Harvesting	28010	AREA		0	100.0
Miscellaneous Area Sources-Aircraft/Rocket Engine Firing and Testing	2810040	AREA		0	100.0
Miscellaneous Area Sources-Catastrophic/Accidental Releases	2830	AREA		0	100.0
Mobile Sources-Aircraft	2275	AREA		0	100.0
Mobile Sources-Aircraft	2275	POINT		0	100.0
Mobile Sources-Highway Vehicles-Diesel	2230	AREA		0	100.0
Mobile Sources-Off-highway Vehicle Diesel	2270	POINT		0	100.0
Mobile Sources-Off-highway Vehicle Gasoline, 4-Stroke	2265	POINT		0	100.0
Mobile Sources-Paved Roads	2294	AREA		0	100.0
Mobile Sources-Paved Roads	2294	POINT		0	100.0
Mobile Sources-Unpaved Roads	2296	AREA		0	100.0
Mobile Sources-Unpaved Roads	2296	POINT		0	100.0
Natural Sources, Geogenic	2730	GEOGENIC		0	100.0
Open Burning-Waste Disposal, Treatment, and Recovery	261	AREA		0	100.0
Petroleum and Petroleum Product Storage & Transport-Other	250	AREA		0	100.0
Petroleum and Solvent Evaporation-	4250	POINT		0	100.0
Petroleum and Solvent Evaporation : Dry Cleaning	410	POINT		0	100.0
Petroleum and Solvent Evaporation : Organic Chemical Transportation	4088	POINT		0	100.0
Petroleum and Solvent Evaporation-Petroleum Liquids Storage (non-Refinery)	4040	POINT		0	100.0
Rubber/Plastics	2430000000	AREA		0	100.0
Solvent Utilization-Dry Cleaning	2420	AREA		0	100.0
Solvent Utilization-Miscellaneous Industrial	2440020000	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Commercial	24610 - 24	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer	2465000000	AREA		0	100.0
Solvent Utilization-Miscellaneous Non-industrial: Consumer and Commercial	24600 - 24	AREA		0	100.0
Traffic Markings	2401008000	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-Leaking Underground Storage Tanks	2660	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-On-site Incineration	2601	AREA		0	100.0
Waste Disposal, Treatment, and Recovery-TSDFs	2640	AREA		0	100.0
Waste Disposal-Site Remediation	504	POINT		0	100.0
Totals for All Categories			1,757,129	100	

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Appendix H.4

Pechan, *Development of Growth and Control Inputs for CENRAP 2018 Emissions Draft Technical Support Document* (May 2005).

DEVELOPMENT OF GROWTH AND CONTROL INPUTS FOR CENRAP 2018 EMISSIONS DRAFT TECHNICAL SUPPORT DOCUMENT

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CONTENTS

TABLES AND FIGURES

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ACRONYMS AND ABBREVIATIONS

AEO	*Annual Energy Outlook*
AIM	architectural and industrial maintenance
BPA	Beaumont/Port Arthur
CENRAP	Central Regional Air Planning Association
CO	carbon monoxide
CTG	control techniques guideline
DFW	Dallas/Ft. Worth
DOE	U.S. Department of Energy
EGAS	Economic Growth Analysis System
EGUs	electricity generating units
FIFRA	Federal Insecticide Fungicide and Rodenticide Act
HAPs	hazardous air pollutants
HGA	Houston/Galveston Area
IPM	Integrated Planning Model
MERR	mobile equipment repair and refinishing
NAAQS	National Ambient Air Quality Standards
NH_3	ammonia
NO_x	oxides of nitrogen
NSPS	New Source Performance Standards
O_2	oxygen
OSD	ozone season daily
Pechan	E.H. Pechan & Associates, Inc.
PM	particulate matter
PM_{10}	particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
REMI	Regional Economic Models, Inc.
RIA	Regulatory Impact Analysis
RPOs	Regional Planning Organizations
RVP	Reid vapor pressure
SCCs	source classification codes
SIP	State Implementation Plan
SO_x	sulfur oxides
STI	Sonoma Technology, Inc.
TCEQ	Texas Commission on Environmental Quality
TSD	Technical Support Document
USDA	U.S. Department of Agriculture
VMT	vehicle miles traveled
VOC	volatile organic compound

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CHAPTER I. INTRODUCTION

The purpose of this project was to prepare emission growth and control factors that can be applied to the Central Regional Air Planning Association (CENRAP) 2002 base year emission inventory to obtain a 2018 emissions inventory for the CENRAP region. The CENRAP region includes the States and Tribal areas of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma, and Texas. In addition to the CENRAP States, additional factors were compiled under this project to include the entire CENRAP modeling domain. This includes projected emissions data or projection year growth and control factor data from the other Regional Planning Organizations (RPOs), Canada, and Mexico. All data products were prepared in SMOKE-compatible format.

These projection year growth and control factor data will be used to support air quality modeling and State Implementation Plan (SIP) development and implementation activities for the regional haze rule and fine particulate matter (PM) and ozone National Ambient Air Quality Standards (NAAQS). The data are applicable to all source categories and pollutants included in the CENRAP 2002 emission inventory. This includes the following pollutants: sulfur oxides (SO_x), oxides of nitrogen (NO_x), volatile organic compounds (VOC), carbon monoxide (CO), ammonia (NH_3), and particles with an aerodynamic diameter less than or equal to a nominal 10 and 2.5 micrometers (i.e., primary PM_{10} and $PM_{2.5}$).

This Technical Support Document (TSD) explains the data sources that E.H. Pechan & Associates, Inc. (Pechan) used and the procedures Pechan followed in developing the necessary growth and control data for this project. Appendix A of this document contains the Methods Document that was prepared under this project. The purpose of this TSD is not to duplicate the information contained in that document, but to supplement it with the actual data obtained under this project and to note areas where the methods were modified from those included in the Methods Document. Chapter II of this document presents information on the control factors and growth factors that Pechan developed for the CENRAP States. The methods are presented separately for each of the major source categories. Chapter III of this document presents the data sources and methods that Pechan used to compile the data for areas outside of the CENRAP States, including other RPOs and Canada and Mexico. Issues of concern are discussed in Chapter IV and references are included in Chapter V. Appendix A contains the Methods document prepared for this project and Appendix B contains the Quality Assurance Project Plan for this work.

This TSD is accompanied by a set of SMOKE-formatted modeling files, as well as a set of State-level Excel spreadsheets. The State spreadsheets are included for area source controls, point source controls, VMT growth, area and point source growth factors, and nonroad emissions. These spreadsheets summarize data contained in the modeling files, in a more readable format. The control files also contain 2002 emissions, in most cases, so that the effects of the controls can be estimated, using the 2002 emissions as a base (e.g., without the growth factors applied). These spreadsheets can be used by the States to review the inputs to the SMOKE modeling in more detail and can be used to help in quality assuring the emissions calculated by the SMOKE model.

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CHAPTER II. DEVELOPMENT OF GROWTH AND CONTROL FACTORS FOR THE CENRAP STATES

A. DEVELOPMENT OF GROWTH FACTORS FOR NON-EGU POINT AND AREA SOURCES

This chapter identifies the data sources and methods that Pechan used to develop point and area source emission activity growth factors to support 2018 emission projections for CENRAP. Table II-1 identifies the Regions and States for which Pechan developed emission activity growth factors. It is important to note that this section describes the development of growth factors for all point and area sources in the CENRAP base year inventory. For the EGU sector, CENRAP will be using emission data projected by the Integrated Planning Model (IPM). These IPM projections are not expected to be completed until late in the summer of 2005. Because these data were not available at the time Pechan prepared the point source growth factors, the growth factors Pechan prepared included growth factors for all EGU source classification codes (SCCs) that were included in the base year inventory as described in this section. When the IPM model runs are completed, the IPM-based emissions should overwrite EGU emissions projected with these growth factors. As such, these EGU growth factors should be considered as temporary placeholders.

Table II-1. Regions and States Included in Emission Activity Growth Factor Files

Region	States	Region	States	Region	States
CENRAP	Arkansas	MANE_VU	Connecticut	Midwest RPO	Indiana
	Iowa		District of Columbia		Illinois
	Kansas		Delaware		Michigan
	Louisiana		Massachusetts		Ohio
	Minnesota		Maryland		Wisconsin
	Missouri		Maine		
	Nebraska		New Hampshire		
	Oklahoma		New Jersey		
	Texas		New York		
			Pennsylvania		
			Rhode Island		
			Vermont		

NOTE: growth factors are also included for offshore emission source categories located in the Gulf of Mexico.

In addition to all point and area source categories, it was necessary to develop growth factors for the following nonroad source categories because they are not included in EPA's NONROAD model: railroads, commercial marine vessels, and aircraft.

To identify the State/County/SCC combinations for which growth factors are required, Pechan summarized the CENRAP 2002 base year inventory (Pechan and CEP, 2005) and the base year inventories for MANE-VU and Midwest RPO available from CENRAP's visibility modeling

website (CENRAP, 2005).[1] A zip file containing all of the data files titled “NonCENRAP States Inventory SMOKE Input Files” was available at CENRAP’s website (see Table II-2 for list of files contained in the zip file). Because some of these files provide information for States outside of the geographic area of interest, the State/County/SCC summary did not include all of the States reported in these non-CENRAP State files.

Table II-2. Base Year Inventory Files for Non-CENRAP States

File Name	Contents
arinv_nei02_032404_MW_MVU_NOnh3.ida.txt	Midwest RPO and MANE-VU area sources excluding agriculture-related ammonia SCCs and fugitive dust emissions
ar_dust_phaseii_22mar04_USnoCENRAP.ida	U.S. fugitive dust inventory (excluding road dust)
nr_2002_23mar04_MW_MVU.ida	CENRAP, Midwest RPO, and MANE-VU 2002 nonroad mobile inventory
rdinv.pvd_US_${season}02_ida.txt	U.S. annual 2002 paved road dust inventory
rdinv.unp_US_${season}02_ida.txt	U.S. seasonal 2002 unpaved road dust inventory
ptinv_2002NEI_041504_MW_MVU.ida.txt	CENRAP, Midwest RPO, & MANE-VU point source inventory

In addition to the CENRAP web-site files noted above, Pechan was supplied with a separate file that listed SCCs used to report agriculture-related ammonia emissions in the non-CENRAP States (Omary, 2005). Because this file did not contain any geographic identifiers, Pechan developed a comprehensive list of MANE-VU and Midwest RPO State/SCC combinations that may exist in each region’s base year inventory.[2]

The following sections describe the data and methods that were used to prepare emission activity growth factors for the State/County/SCC combinations of interest.

1. Overview

For most source categories, Pechan developed default emission activity growth factors utilizing data and methods that are expected to be incorporated into the final Economic Growth Analysis System (EGAS) Version 5.0. CENRAP selected EGAS 5.0-based growth factors over the growth factors available from EGAS 4.0 because the EGAS 5.0 growth factors will be based on the latest set of economic/demographic projections developed by Regional Economic Models, Inc. (REMI) and the latest energy forecasts prepared by the U.S. Department of Energy (DOE) (Houyoux, 2004; DOE, 2004). In addition, the crosswalk between SCCs and emission activity

[1]Note that projections/growth factors for the following regions were not developed because they were available from other studies: Visibility Improvement State and Tribal Association of the Southeast (VISTAS) and Western Regional Air Partnership (WRAP).

[2]Except for oil and gas production, Pechan did not have access to offshore-specific projections data. Therefore, Pechan assumed that Texas area growth factors could be used to represent growth in all offshore non-oil and gas production SCCs.

growth indicators and the regression equations relating socioeconomic indicators to emission activity levels will both be refined in EGAS 5.0. Furthermore, the REMI economic models in EGAS 5.0 allocate national economic activity based on relative production costs at the 53-sector level rather than the 14-sector level used in EGAS 4.0. Local relative factor costs may be substantially different for a given detailed industry within one of the 14-sectors included in the REMI models in EGAS Version 4.0. However, the 14-sector models cannot model this distinction, since they are constrained by data specified at this level of detail. More accurate regional forecasts result from the more detailed representation of relative cost competitiveness that is available from the EGAS 5.0 REMI models.

Because EGAS represents a default set of growth factors, Pechan investigated alternatives to the EGAS default indicators for the highest-emitting point, nonpoint, and nonroad SCCs in the base year inventory for the CENRAP States.[3] Based on this review, Pechan identified a number of alternatives that were deemed preferable to the EGAS defaults, including:

- Use of regression equations developed for EGAS 5.0, but not incorporated into the beta version (for architectural coating and commercial pesticide application SCCs);[4]
- Replacement of suspect beta EGAS 5.0 growth factors with values deemed to be more reasonable;[5]
- Use of county-level population projections available from each State in the CENRAP region;
- Use of *Annual Energy Outlook* (AEO) projections (for oil and gas production SCCs);
- Use of average historical values (for prescribed burning SCCs);
- Extrapolation of historical trend (for unpaved road SCCs);
- Use of United States Department of Agriculture (USDA) projections of planted acreage for major crops (for crop tilling SCCs);
- Use of onroad vehicle miles traveled projections (for paved road SCCs); and
- Use of USDA livestock projections (for swine, cattle and calves, and poultry SCCs).

[3]Note that this discussion only applies to nonroad SCCs that are not included in the NONROAD model. A separate Pechan memorandum addressed refinements to the NONROAD model default growth information.

[4]The current EGAS 5.0 design does not support incorporation of some of the emission activity forecasting equations that Pechan developed for use in EGAS 5.0.

[5]The beta version of EGAS 5.0 has not yet undergone beta testing to identify/fix suspect values.

Further details on these emission activity growth surrogates are provided in the following section.

2. Alternative Forecast

There are a number of problems and shortcomings of the beta version of EGAS 5.0 that was available during this project's period of performance. Although some of these limitations were known at the time the beta version was released in November 2004 (see http://www.epa.gov/ttn/ecas/EGAS5limitations.pdf), a number of additional problems have since been identified. Therefore, except as noted below, point and non-point source emission projections rely on the methods and data that are expected to be incorporated into the final version of EGAS 5.0 rather than the information in the beta version. The following subsections summarize differences between the information developed for this effort and the EGAS 5.0 beta version.

a. Use of Regression Equations Not Yet Incorporated into EGAS

For certain sectors, Pechan utilized regression equations developed for EGAS 5.0, but not incorporated into the beta version. For the SCCs displayed in Table II-3, Pechan replaced the beta EGAS 5.0 growth factors based on REMI socioeconomic data with growth factors derived from the emission estimation approaches developed for EGAS 5.0 that have yet to be incorporated. The following sections identify the emission activity forecasting methods that were applied to these SCCs.[6]

Table II-3. Additional Source Categories Utilizing Regression Equation Approach

SCC	SCC Description
2401001000	Solvent Utilization; Surface Coating; Architectural Coatings; Total: All Solvent Types
2461800000	Solvent Utilization; Miscellaneous Non-industrial: Commercial; Pesticide Application: All Processes; Total: All Solvent Types
2810030000	Miscellaneous Area Sources; Other Combustion; Structure Fires; Total

i. Architectural Coating

To estimate growth factors representing the future year to base year change in volume of architectural coatings consumed, Pechan developed the following equation by regressing national coating shipments over the period 1981-2001 against data for a number of potential explanatory variables:

$$y = b_0 + b_1 * x + b_2 * LAG(y) \quad \text{(Eq. 1)}$$

[6] Note that there may be other SCCs for which the final version of EGAS 5.0 will incorporate additional regression equations. Pechan will update the growth factor files to reflect the latest available information as to the list of SCCs for which the final EGAS 5.0 will utilize the approaches identified in this section.

where:

y	=	ratio of current year architectural coating shipments to base year shipments
b_0	=	-0.017
b_1	=	0.614
b_2	=	0.437
x	=	current year housing expenditures
$LAG(y)$	=	ratio of previous year's architectural coating shipments to base year shipments.

This equation is not incorporated into the beta EGAS 5.0 because the program currently does not support equations with lagged variables. In addition to the total volume of coatings used, it is important to reflect any projected change in the solvent content of these coatings because the emission activity for these SCCs is the amount of solvent emitted from these coatings. Therefore, Pechan recommended that EPA incorporate factors into EGAS 5.0 that reflect the projected future year architectural coating solvent content relative to base year solvent content (Pechan, 2004). Although these factors are not incorporated into the beta EGAS 5.0, they are expected to be included in the final EGAS 5.0. Therefore, Pechan obtained data representing the proportion of forecast year total and 2002 total architectural paints shipments that are solvent-based from the Freedonia Group, Inc. (Freedonia, 2002). Based on the available forecast information, Pechan applied a factor of 0.729 to the 2018 growth factor developed from the output of equation 1 for each State. The Freedonia data were reported for 1992 and each fifth year over the period 1996 to 2011. Pechan interpolated between the 2001 and 2006 values to obtain a 2002 value and used the 2011 value for 2018 in lieu of any forecast information beyond 2011.

ii. Commercial Pesticide Application

To estimate the amount of commercial pesticides applied, Pechan computed the following equation by regressing the national volume of active pesticide ingredients applied over the period 1980-1999 against data for a number of potential explanatory variables:

$$LOG(y) = b_0 + b_1 * LAG\,(LOG(y)) + b_2 * LOG(x) \quad \text{(Eq. 2)}$$

where:

$LOG(y)$	=	ratio of current year log of volume of active pesticide ingredients to base year log of volume of ingredients
b_0	=	-0.003
b_1	=	0.480
b_2	=	0.334
x	=	current year Agricultural Chemicals sector (SIC code 287) employment
$LAG(LOG(y))$	=	ratio of previous year's log of volume of active pesticide ingredients to base year's log of volume of ingredients.

This equation is not incorporated into the beta EGAS 5.0 because the program currently does not support equations with lagged variables. It is important to reflect any projected change in the solvent content of the pesticides. Therefore, Pechan recommended that EPA incorporate factors into EGAS 5.0 that reflect the ratio of future year volume of solvents per dollar of Agricultural Chemical sector shipments to base year volume of solvents for these shipments (Pechan, 2004). Although these factors are not incorporated into the beta EGAS 5.0, they are expected to be included in the final EGAS 5.0. Therefore, Pechan obtained data representing the proportion of forecast year and 2002 volume of solvents per dollar of Agricultural Chemicals sector shipments from the Freedonia Group, Inc. (Freedonia, 2003). Based on the available forecast information, Pechan applied a factor of 1.048 to the 2018 growth factor developed from the output of equation 2 for each State. Freedonia's solvent content data were reported for each fifth year over the period 1992 to 2012, including 2002. In lieu of any forecast information beyond 2012, Pechan used the 2012 value to represent 2018.

iii. Structure Fires

EPA acknowledges that the structure fires forecast methodology/data were not properly incorporated into the beta version of EGAS 5.0. Therefore, Pechan replaced the beta EGAS 5.0 structure fire growth factors to follow the two-step approach that Pechan developed for use in EGAS 5.0, and, which is expected to be incorporated into the final EGAS 5.0 (Pechan, 2004). This approach relies on an equation that relates the number of housing units to housing expenditures and factors representing the projected change in the number of structure fires per 10,000 housing units. For this study, Pechan applied a factor of 0.905 to the housing unit projections that represents the change in structure fires per 10,000 housing units between 2002 and 2018.

b. Revisions To Beta EGAS 5.0 Regression-Based Growth Factors

Because the EGAS 5.0 emission activity projection equations were developed using national historical data, it is unclear if the EGAS 5.0 equation growth rates will appear reasonable when incorporating State-level values into each equation. Therefore, Pechan reviewed the output for each State to identify potentially anomalous growth factors. Pechan selected growth factors of 2 and 0.2 to represent thresholds in determining suspect values. In cases where State-level values were deemed to be questionable, Pechan implemented one of two types of refinements, depending on the number of States for which the equation-based approach resulted in suspect growth rates. The following summarizes the two types of refinements that were applied.

The first refinement, which was used when the equation output appeared questionable for many States, was to use a combination of national and State REMI data. This approach first projects national growth factors up through 2009 by inputting <u>national</u> values of the independent variable in the emission activity equation. The 2009-2018 national growth rates were estimated using methods that were unique for each source category.[7] Pechan developed State-level growth factors by multiplying the national equation-based factors by ratios representing each State's

[7] Post-2009 growth factors were not projected using the equation-based approach because of concerns that the estimated national post-2009 growth rates appear to be unsustainable.

growth relative to National growth for the REMI indicator used in the regression equation. Section a below provides further details on this projection approach.

The second refinement, which was applied to a few specific States when the State-level equation output appeared reasonable in most cases, was to use the State-level output of the equation only up through either 2007 or 2009. The 2018 growth factors were estimated for these States by extrapolating each State's projected growth over the 2002 to 2007/9 timeframe using an exponential curve fitted to the data for this period. Further details on this refinement are provided in Section ii below.

i. National Equation-Based Growth Factors

For three source categories – Consumer/Commercial Solvents: All Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Related Products; Surface Coating: Miscellaneous Manufacturing; and Consumer/Commercial Solvents: All Coatings and Related Products, the use of State-level REMI forecasts in the nationally-derived emission activity estimation equations results in numerous anomalous growth rates. For these source categories, Pechan first utilized national REMI projections in the emission activity equations. Because of the dramatically higher growth/decline predicted after 2009, Pechan used the regression equation to directly develop national growth factors only through 2009.

Consumer/Commercial Solvents: All FIFRA Products

The 2009 national growth factor was held constant through 2018 for this category because the emission activity equation first predicted a continuation of the historical decline in activity for this category through 2009, then forecasted an increase in activity that was uncharacteristically large by 2018. Because of the uncertainty of the predicted post-2009 trend, Pechan held the 2018 national growth factor constant at 2009 levels. Pechan developed State-level growth factors for this category by multiplying the national growth factors by State/National growth factor ratios. These ratios were determined using State/National projections for the REMI indicator (population) that was included in the emission activity equation.

Surface Coating: Miscellaneous Manufacturing and Consumer/Commercial Solvents: All Coatings

To estimate national 2018 growth factors for each of these two categories, Pechan reduced each national post-2009 annual growth rate, as estimated by each emission estimation equation, by one-half. This adjustment factor was used because it resulted in post-2009 growth rates that approximated those predicted over the 2002-2009 period. Pechan developed State-level growth factors by multiplying the national growth factors by State/National growth factor ratios. These ratios were determined using State/National projections for the REMI indicators that were included in each regression equation (value added in Miscellaneous Manufacturing Industries sector and value added in Chemicals and Allied Products sector).

ii. State Equation-Based Growth Factor Changes

Sulfite Pulping

The use of State-level REMI forecasts in the nationally-derived Sulfite Pulping emission activity equation resulted in uncharacteristically large post-2009 growth rate changes in the District of Columbia. For DC, Pechan used the output of the regression equations up through 2009; 2018 growth factors were developed by extrapolation using an exponential curve fitted to the 2002-2009 growth factor projections.

Electronic and Other Electrical Surface Coating

For Iowa, the use of State-level REMI forecasts in the nationally-derived Electronic and Other Electrical emission activity equation resulted in unusually large post-2007 growth rate changes. For this State, Pechan utilized the State-level equation output to develop growth factors through 2007. The 2018 growth factor was developed for Iowa via extrapolation using an exponential curve fitted to the projected 2002-2007 Iowa growth factors.

c. Non-EGAS Data Sources

Because EGAS provides a *default* set of emission activity growth indicators, Pechan reviewed the availability of better projections sources where time and resources permitted. The following two sections describe specific areas where EGAS default information was replaced with projections from alternative data sources.

i. Population

EGAS is geographically defined by State, and so differences in growth within a State are not reflected in the EGAS default growth factors. Therefore, to account for differences in population projections within a State, Pechan obtained county-level population projections from each State in the CENRAP region and replaced the State-level EGAS population projections with these county-level population projections (Kansas, 2004; LPDC, 2003; MNPLAN, 2002; MO, 1999; ODOC, 2002; SLI, 2004; TXCDS, 2004; UALR, 2003; and UNE, 2002). Appendix Table C-1 presents the population projections complied for this effort.

ii. Other Data

Because of resource constraints, Pechan's research into potential alternative data sources focused on the EGAS growth surrogates that are applied to the highest-emitting point, nonpoint, and nonroad SCCs in the base year inventory for the CENRAP States.[8] Tables III-1 through III-5 in an earlier Pechan report present the top 10 SCCs responsible for the highest 2002 emissions in the CENRAP States for each of the following pollutants: NO_x, PM25-PRI, NH_3, SO_2, and VOC (Pechan, 2005). Based on this review, Pechan was able to identify alternative data sources that

[8]Note that this discussion only applies to nonroad SCCs that not included in the NONROAD model. Refinements to the NONROAD model default growth information are addressed in Section D.1.

were deemed to provide better emission activity surrogates for many of these SCCs. These surrogates are summarized in Table II-4. The following sections describe the rationale for the use of these non-EGAS growth surrogates for projecting emissions in the CENRAP States.

Oil and Gas Production Forecasts

Pechan used DOE's *Annual Energy Outlook* 2004 regional forecasts of onshore and offshore oil and gasoline production (DOE, 2004). From maps of the regions, the production values were allocated to the lower 48 continental States. New Mexico and Texas were the only States to belong to multiple onshore production regions. For these States, Pechan calculated the total production from all regions associated with each State. For SCC 2310000000, on and offshore drilling, the offshore area of the Pacific was added the onshore West Coast region and the offshore area of the Gulf was added to the on-shore region the Gulf Coast to develop growth factors for the States within the overlapping regions.

Historical Average Acres Prescribed Burned

Historical prescribed burning acreage data indicate that 2002 represented a year with uncharacteristically high levels of burning activity. Therefore, Pechan computed the average acreage burned in each State from data available over the period 1996 through 2003 (EPA, 2005). The 2018 growth factors were then developed for each State by computing the ratio of 2002 acreage to the average acreage over the 1996 to 2003 period.

Planted Crop Acreage Forecasts

Pechan obtained 2002 through 2013 national planted acreage projections for major crops from the USDA (ERS, 2004). Pechan then developed an estimated national 2018 planted acreage value via linear extrapolation of the 2002 through 2013 trend.

USDA Livestock Projections

Pechan obtained national livestock projections from USDA's "February 2004 Agricultural Baseline, Projection Tables to 2013" for beef cows, cattle, young chickens and turkeys (ERS, 2004). The USDA's 2002 to 2013 estimates were projected to 2018 using linear extrapolation. The USDA data for young chickens and turkey data were combined for use in projecting poultry SCC emissions activity.

Table II-4. Summary of Non-EGAS Growth Indicators Used For Highest-Emitting SCCs in CENRAP Region

SCC	SCC Description	Growth Indicator	
		EGAS5	This Study
2294000000	Mobile Sources; Paved Roads; All Paved Roads; Total: Fugitives	Population	Onroad VMT
2296000000	Mobile Sources; Unpaved Roads; All Unpaved Roads; Total: Fugitives	Population	Extrapolation of regional historical trend
2310000000	Industrial Processes; Oil and Gas Production: SIC 13; All Processes; Total: All Processes	SIC 13 constant $ output	AEO regional production forecast
2310001000	Industrial Processes; Oil and Gas Production: SIC 13; All Processes; On-shore; Total: All Processes	SIC 13 constant $ output	AEO regional production forecast
2310002000	Industrial Processes; Oil and Gas Production: SIC 13; All Processes; Off-shore; Total: All Processes	SIC 13 constant $ output	AEO regional production forecast
2801000003	Miscellaneous Area Sources; Agriculture Production - Crops; Agriculture - Crops; Tilling	Farm sector constant $ value added	USDA national crop projections
2810015000	Miscellaneous Area Sources; Other Combustion; Prescribed Burning for Forest Management; Total	No growth	Historical average (2002 levels were greater than average)
2805020002	Miscellaneous Area Sources; Agriculture Production - Livestock; Cattle and Calves Waste Emissions; Beef Cows	Farm sector constant $ value added	USDA national beef cow inventory projection
2805020004	Miscellaneous Area Sources; Agriculture Production - Livestock; Cattle and Calves Waste Emissions; Steers, Steer Calves, Bulls, and Bull Calves	Farm sector constant $ value added	USDA national cattle inventory projection
2805025000	Miscellaneous Area Sources; Agriculture Production - Livestock; Swine production composite; Not Elsewhere Classified (see also 28-05-039, -047, -053)	Farm sector constant $ value added	USDA national hog inventory projection
2805030000	Miscellaneous Area Sources; Agriculture Production - Livestock; Poultry Waste Emissions; Not Elsewhere Classified (see also 28-05-007, -008, -009)	Farm sector constant $ value added	USDA national turkey plus young chicken inventory projection
2805047100	Miscellaneous Area Sources; Agriculture Production - Livestock; Swine production - deep-pit house operations (unspecified animal age); Confinement	Farm sector constant $ value added	USDA national hog inventory projection
30202001	Industrial Processes; Food and Agriculture; Beef Cattle Feedlots; Feedlots: General	Farm sector constant $ value added	USDA national beef cow inventory projection

Onroad Vehicle Miles Traveled Projections

Pechan used onroad VMT projections to forecast paved road fugitive dust emissions activity. The VMT projections are discussed in Section E.1 of this report.

Extrapolation of Historical Unpaved Road VMT Trend

Unpaved road VMT for 1990 to 2002 were compiled for each of the CENRAP States, based on data used in EPA's National Emission Inventory. A review of the data indicated a disconnect between the 1995 and 1996 values and questionable State-level unpaved road VMT trends. In addition, data for Arkansas and Minnesota appeared questionable for multiple years. Therefore, Pechan concluded that the most reasonable approach would be to develop a single regional growth factor based on post-1995 unpaved road VMT data excluding data for Arkansas and Minnesota. First, Pechan summed the VMT estimates for each year across CENRAP States (excluding Arkansas, and Minnesota). Next, Pechan identified a best fit linear function from the 1996 to 2002 regional data and used that function to estimate 2018 unpaved road VMT in the CENRAP region. The 2002 to 2018 regional growth factor (0.813) was then applied to all of the CENRAP States.

Point Source NOx Cap in Texas Ozone Nonattainment Areas

To account for a point source NO_x emissions cap in certain Texas ozone nonattainment area counties, Pechan applied a no growth assumption (growth factor of 1.0) to all NO_x point sources in the following Texas counties: Brazoria, Chambers, Collin, Dallas, Denton, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Montgomery, Orange, Tarrant, and Waller.

Integrated Planning Model

Pechan compiled a comprehensive set of growth factors for all base year EGU SCC records using EGAS 5.0. The EGAS 5.0 defaults are based on DOE's *Annual Energy Outlook* electric generation sector energy forecasts (DOE, 2004). For the final CENRAP modeling, it is anticipated that some, but not all, base year EGU SCC records will be projected using forecast information from IPM runs.

B. DEVELOPMENT OF CONTROL FACTORS FOR NON-EGU POINT SOURCES

This section describes control factor development for non-EGU point sources. This analysis focused on Federal, State, and local rules and regulations that are expected to reduce emissions or emission rates for criteria pollutants in the CENRAP States post-2002. After the control factor development is described, some examples of resulting emissions are provided as a point of reference.

1. State Controls

a. Texas

For developing control factors (expected emission reductions) for the non-EGU point source categories in Texas, it was recommended by Texas Commission on Environmental Quality (TCEQ) staff that the most recent Houston/Galveston Area (HGA) ozone episode modeling files be reviewed. Appropriate data are those listed in Chapter 3: Photochemical Modeling 2007 Future Base Case Summary of Controls Applied found on the TCEQ website (TCEQ, 2004). Separate files are posted according to the geographic area covered, and the applicable control programs. The non-EGU portion of this table is summarized below:

Geographic Area	Base Inventory	Controls Applied	File Name
Beaumont/Port Arthur	NEGU	Ch. 117 controls via Emission Factor Survey; assuming no VOC controls	control.2007.BPA.NEGU
Houston/Galveston	NEGU HRVOC Cap	2007 NO_x Cap Revised Speciation and Cap Cutoff Levels	control.HG_07NOxCap_NEGU control.new_hga_hrvoc_cap.to2n2_negu and then apply control.new_hga_hrvoc_cap.less20inharris
Dallas/Ft. Worth	NEGU	Ch. 117 controls via Emission Factor Survey; assuming no VOC controls	control.2007.dfw.negu
East Texas	Cement Kiln NO_x	Permit modifications	Already applied permit modifications to afs.MidloKilns._v5 via ellis_kilns.TIPI.00-07
	Agreed Orders and Consent Decree for East Texas	Specific reductions at ALCOA and Eastman	AgreedOrdersControlFactors00to07
West Texas	NEGU	None	None

i. Beaumont/Port Arthur (BPA)

The Beaumont/Port Arthur ozone nonattainment area includes Hardin, Jefferson, and Orange counties. TCEQ (2000a) expects that Tier 1 reductions in NO_x emissions from these three counties will be enough for Beaumont/Port Arthur to attain the 1-hour ozone standard.

The BPA.NEGU file lists the point sources in the Beaumont-Port Arthur ozone nonattainment area that have control factors applied for NO_x. Control factors were developed by facility and unit by the TCEQ by comparing survey results that established base year NO_x emission factors with Chapter 117 NO_x emission limits (which are by source category). The survey included all BPA NO_x sources with 25 tons per year or more of NO_x. Source-specific NO_x control factors range from 0.16 to 1.00 for affected sources.

ii. Houston/Galveston (HGA)

The Houston/Galveston ozone nonattainment area includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties. On December 6, 2000, the TCEQ adopted a program for the trading of NO_x allowances in the HGA nonattainment area. The

trading of these allowances takes place under an area-wide cap. The program requires incremental reductions beginning in 2003 and continuing through 2007, when the full reductions of the program are to be achieved. The trading program is expected to provide as much flexibility in meeting these limits as possible.

The most recent HGA SIP revision is based on analysis to date showing that limiting emissions of ethylene, propylene, 1,3-butadiene, and butanes in conjunction with an 80 percent reduction in NO_x is equivalent in terms of air quality benefit to that resulting from a 90 percent point source NO_x reduction requirement.

The Control.HG_NOxCap_NEGU files for 2007 and 2010, when applied to estimate a control factor for 2018, yield a control factor of 0.45 (a 55 percent reduction). The control factor affects all non-EGU point source NO_x emissions in this nonattainment area.

There are also requirements for additional fugitive VOC emission reductions in Houston-Galveston. These include new rules to reduce emissions of highly reactive VOCs from four key industrial sources: fugitives, flares, process vents, and cooling towers. The highly reactive VOC rules are performance-based, emphasizing monitoring, record keeping, reporting, and enforcement, rather than establishing individual unit emission rates. After evaluation of how these rules were applied in the Houston SIP analysis, which involved adding highly reactive VOCs to the 2000 emission inventory and removing those HRVOC emissions in the future case, it was decided to not apply any VOC control factors to the 2002 VOC emissions in the 2018 emission projections.

iii. Dallas/Fort Worth

Appendix F of the Dallas/Fort Worth ozone nonattainment demonstration (TNRCC, 1999a) identifies NO_x control factors proposed for specific industrial boilers and engines and EGUs in that area. These unit-specific reductions will be applied to estimate 2018 NO_x emissions.

30 TAC 117, Subchapter 13 limits NO_x emissions from cement kilns in the Dallas/Fort Worth area. This rule establishes emission limits on the basis of pounds of NO_x per ton of clinker produced. These limits are based on the NO_x emissions averaged over each 30 consecutive day period (later changed to a 365 day period), and vary depending on the type of cement kiln. These NO_x emission limits by kiln type are as follows:

1. For each long wet kiln:
    a. In Bexar, Comal, Hays, and McLennan Counties, 6.0 lbs/ton of clinker produced
    b. In Ellis County, 4.0 lbs/ton
2. For each long dry kiln, 5.1 lbs/ton
3. For each preheater kiln, 3.8 lbs/ton
4. For each preheater-precalciner or precalciner kiln, 2.8 lbs/ton

These emission limits are expected to achieve a 30 percent reduction in cement kiln NO_x emissions.

Appendix F of the Dallas/Fort Worth ozone nonattainment demonstration (TNRCC, 1999a) identifies eleven cement kilns modeled as part of the proposed Dallas/Fort Worth NO_x emission reduction strategy. The level of NO_x controls required by TNRCC ranged by unit from 6 percent to 66 percent. These controls were applied on a unit-by-unit basis.

The DFW.NEGU file lists the point sources in the Dallas-Ft. Worth area that have control factors applied for NO_x. Control factors were developed by facility and unit by the TCEQ using the same emission factor survey and comparison with NO_x emission limit technique that was described above for Beaumont-Port Arthur. The survey included all DFW NO_x sources that reported 2 tons per year or more of NO_x. Source-specific control factors range from 0.13 to 1.00 for affected sources.

Agreed order control factors from the TCEQ were applied to simulate the effects of such orders on two facilities. A control factor of zero is applied to the Eastman plant (482030019), simulating the shutdown of this facility. NO_x control factors are applied to three boilers at the Alcoa (483310001) aluminum production facility.

Another TCEQ control factor file contains information about the future year criteria pollutant emissions for the cement kilns in Ellis County. These emission estimates were used to estimate appropriate growth and control factors for the 2018 emission forecasts for this area/source category.

b. Missouri

The fine grid counties in eastern Missouri are affected by EPA NO_x SIP Call requirements. The State of Missouri supplied information about unit-specific NO_x emission reductions for affected facilities. For non-EGUs, this included an 8 ton per ozone season NO_x emission limit applied to Anheuser Busch-Unit 6, a 9 ton per ozone season limit applied to Trigen-Unit 5, and a 36 ton per ozone season limit applied to Trigen-Unit 6.

c. Kansas

Rule 28-19-717 requires control of VOC emissions from commercial bakery ovens in Johnson and Wyandotte counties. This rule applies to bakery ovens with a potential to emit VOCs equal to or greater than 100 tons per year. Each commercial bakery oven subject to this regulation shall install and operate VOC emissions control devices for each bakery oven to achieve at least an 80 percent total removal efficiency on the combined VOC emissions of all baking ovens, calculated as the capture efficiency times the control device efficiency. Each bakery oven (Keebler Company) in these two counties with more than 100 tons per year of VOC emissions in 2002 had an 80 percent VOC control efficiency applied in the 2018 projections.

d. Louisiana

Point sources in the Baton Rouge nonattainment area and the nearby region of influence are affected by Chapter 22 NO_x control provisions. The provisions of this chapter apply to any

affected facility in the Baton Rouge nonattainment area (the entire parishes of Ascension, East Baton Rouge, Iberville, Livingston, and West Baton Rouge) and the Region of Influence (affected facilities in the attainment parishes of East Feliciana, Pointe Coupee, St. Helena, and West Feliciana). The provisions of this chapter apply during the ozone season (May 1 to September 30) of each year. Compliance is expected to occur as expeditiously as possible, but no later than May 1, 2005.

The effects of this NO_x regulation were included in the analysis by applying a 34 percent NO_x emission reduction to the 2002 non-EGU point source emissions in the greater Baton Rouge area. This control factor application is consistent with what was included in the most recent Houston-Galveston area modeling domain assessments by the TCEQ.

2. Federal Maximum Achievable Control Technology (MACT) Standards

Numerous MACT standards have been promulgated pursuant to Section 112 of Title I of the Clean Air Act, and are controlling emissions of hazardous air pollutants (HAPs) from stationary sources of air pollution. Many of the MACT standards are expected to produce associated VOC reductions, since many HAPs are also VOCs, so the emission projections need to capture the expected effects of post-2002 MACT standards.

Pechan performed the following steps to determine the MACT standards expected to have the greatest impact of VOC, NO_x, and PM emissions for the forecast year:

1. Identified the source categories and associated SCCs for each MACT standard having a post-2002 compliance date for existing sources.
2. Eliminated MACT categories that do not achieve significant VOC emission reductions.
3. VOC emission reduction estimates for the reciprocating internal combustion engine MACT category are based on information from EPA's Clean Air Interstate Rule technical support document (Alpine, 2004).
4. VOC emission reduction estimates for all other MACT categories are based on information found in the preamble to the final rule of each MACT Subpart as published in the *Federal Register*. Table II-5 lists those MACT categories for which VOC, NO_x, and/or PM emission reduction percentages could be estimated based on emission reduction information found in the preamble to each respective final rule.

3. Non-EGU Point Source Analysis Results

a. Houston Galveston Area (HGA)

Pechan's modeling of the NO_x emissions cap in the 8-county HGA applies a 55 percent NO_x emission reduction to the 2002 NO_x point source emissions. NO_x emissions in the HGA are expressed in annual tons. These annual tons and the equivalent ozone season daily (OSD) tons are listed below. Then, the right-most column below shows the comparable values from the TCEQ analysis for HGA.

Table II-5. Post-2002 MACT Standards and Expected VOC, NO_x, and PM Reductions

MACT Standard - Source Category	Code of Federal Regulations Subpart	Compliance Date (existing sources)	VOC (% Reduction)	NO_x (% Reduction)	Total PM (% Reduction)	Affected SCCs
Asphalt		5/1/2006	85			305001XX, 305002XX, 305050XX, 306011XX
Auto and Light Duty Trucks	IIII	4/26/2007	40			40201601 to 40201632; 40201699
Coke Ovens: Pushing, Quenching and Battery Stacks	CCCCC	4/14/2006	43			30300304; 30300303
Fabric Printing, Coating & Dyeing	OOOO	5/29/2006	60			40201101 to 40201199; 40201201; 40201210
Friction Products Manufacturing	QQQQQ	10/18/2005	44			30111103; 30111199; 31401001; 31401002
Integrated Iron and Steel	FFFFF	5/20/2006	20		20	30301501 to 30301596
Large Appliances	NNNN	7/23/2005	45			40201401 to 40201499
Leather Finishing Operations	TTTT	2/27/2005	51			32099997; 32099998; 32099999
Lime Manufacturing	AAAAA	1/5/2007			23	305016XX
Manufacturing Nutritional Yeast	CCCC	5/21/2004	10			30203404 to 30203424; 30203504 to 30203540
Metal Can	KKKK	6/10/2005	70			40201702; 40201703 to 40201799
Metal Coil	SSSS	6/10/2005	53			402018XX
Metal Furniture	RRRR	5/23/2006	73			402020XX
Misc. Coating Manufacturing	HHHHH	12/11/2006	64			402026XX
Misc. Metal Parts and Products	MMMM	1/2/2007	48			402025XX
Misc. Organic Chemical Production and Processes (MON)	FFFF	11/10/2006	66			645200XX; 30113001 to 30113007; 684300XX; 30101005 to 30101099; 68445001; 68445010; 68445013; 68445020; 68445022; 68445101; 68445201; 30110002 to 30110099; 64820001; 64820010; 64821001; 64821010; 64822001; 64822010; 64823001; 64823010; 64823001; 64823010; 64880001; 64882001; 64882002; 64882599; 30105001; 30105101 to 30105130; 30801001; 31604001; 31604002; 31600403; 68510001; 68510010; 68510011; 68580001; 68582001; 68582002; 68582599; 30101837; 64610301 to 64610350; 64610001 to 64610050; 64610101 to 64610150; 64610201 to 64610250; 64615001 to 64615030; 64620001 to 64620038; 64630001 to 64630083; 64631001 to 64631083; 64632001 to 64632083; 64680001; 64682001; 64682002; 64682501; 64682502; 64682599; 64130001 to 64130025; 64130101 to 64130125; 64130201 to 64130225; 64131010 to 64131030; 64132001 to 64132030; 64133001 to 64133030; 64180001; 64182001; 64182002; 64182599; 64615001; 64620001; 65135001

Table II-5 (continued)

MACT Standard - Source Category	Code of Federal Regulations Subpart	Compliance Date (existing sources)	VOC (% Reduction)	NO_x (% Reduction)	Total PM (% Reduction)	Affected SCCs
Paper and Other Web	JJJJ	12/4/2005	80			30701199; 402013XX
Pesticide Active Ingredient Production	MMM	12//23/2003	65			30103301
Petroleum Refineries	UUU	4/11/2005	55			Catalytic cracking: 30600201; 30600202; 30600301 Catalytic reforming: 30601601; 30601602; 30601603; 30601604
Plastic Parts	PPPP	4/19/2007	80			402022XX
Plywood and Composite Wood Products	DDDD	9/28/2007	54			307007XX; 30700921 to 30700971; 30701001 to 30701057; 30700602 to 30700661
Polymers and Resins III	OOO	1/20/2003	51			Phenolic resins: 30101805; "polyamide" resins: 30101827
Reciprocating Internal Combustion Engines (RICE)	ZZZZ	6/15/2007	13	17		20100102; 20100202; 20100702; 20100802; 20100902; 20200102; 20200104; 20200202; 20200204; 20200301; 20201001; 20201002; 20201012, 20201014; 20201602; 20201702, 20200501; 20200702; 20200706; 20200902; 20300101; 20300201; 20300301
Rubber Tire Manufacturing	XXXX	7/11/2005	52			308001XX
Secondary Aluminum Production	RRR	3/24/2003			61	30400101 to 30400199
Site Remediation	GGGGG	10/8/2006	50			504001XX; 50400201, 50400202; 504002XX; 504100XX; 504101XX; 504102XX; 504103XX; 504102XX; 504103XX; 504104XX; 504105XX; 504106XX; 504107XX; 50480001; 50482001; 50482002; 50482599; 50480004
Solvent Extraction for Vegetable Oil Production	GGGG	4/12/2004	25			302019XX
Stationary Combustion Turbines	YYYY	3/5/2007	90			20100101, 20100201, 20200101, 20200103, 20200201, 20200203, 20200901, 20300102, 20300202, 20300203
Taconite Iron Ore Processing	RRRRR	10/30/2006			62	32302371 to 32302399
Wet Formed Fiberglass Mat Production	HHHH	4/11/2005	74			30501201 to 30501299
Wood Building Products	QQQQ	5/28/2006	63			40202101 to 40202199

NOTE: **Based on organic HAP emission reductions

	HGA Non-EGU NO_x Emissions		
	Annual Tons	**Daily Tons**	**TCEQ Analysis OSD Tons**
2002 Point Source NO_x	113,109	309.9	283
Post-cap NO_x	50,899	139.4	135

The TCEQ analysis OSD NO_x cap summary values above are for non-EGU 2000 NO_x and 2007 modeled NO_x (see Table 3.5-16 in their report). The above comparison indicates that the CENRAP NO_x modeling for HGA will be consistent with prior analyses by TCEQ for this area.

b. Beaumont-Port Arthur (BPA)

Pechan's modeling of the NO_x emissions cap in the 3-county BPA area applies NO_x control efficiencies based on an emission factor survey for the area. These results are summarized below.

	BPA Area Non-EGU NO_x Emissions		
	Annual Tons	**Daily Tons**	**TCEQ Analysis Daily Tons**
2002 Point Source NO_x	35,441	97.0	96.6
Post-cap NO_x	28,254	77.4	81.9

The TCEQ analysis OSD NO_x cap summary values above are for non-EGU 2000 NO_x OSD and 2007 modeled NO_x with growth and controls. The CENRAP non-EGU NO_x emissions in the 2002 point source file are about the same as the 2000 estimates on an OSD basis. However, the expected emission benefit of the non-EGU NO_x controls is greater than that modeled by TCEQ on both a percentage and an absolute tonnage basis.

c. Dallas Fort Worth (DFW)

Pechan's modeling of the NO_x emissions cap in the 4-county DFW area applies NO_x control efficiencies to certain sources based on an emission factor survey for the area. These results are summarized below.

	DFW Area Non-EGU NO_x Emissions		
	Annual Tons	**Daily Tons**	**TCEQ Analysis Daily Tons**
2002 Point Source NO_x	846	2.3	6.9
Post-cap NO_x	647	1.8	13.1

The TCEQ analysis OSD NO_x ton values listed above are for non-EGU 2000 NO_x OSD and 2007 modeled NO_x with growth and controls. The 2002 and post-cap NO_x tons listed for the DFW area only include sources affected by the NO_x control program, so these values are much lower than the TCEQ emissions, which include all non-EGU point source emissions in the area.

d. Baton Rouge

Pechan's modeling of the NO_x emissions cap in the greater Baton Rouge area applies a 34 percent NO_x emissions reduction to the 2002 NO_x point source emissions. These results are summarized below.

	Baton Rouge 9-Parish Area Non-EGU NO_x Emissions		
	Annual Tons	**Daily Tons**	**TCEQ Analysis Daily Tons**
2002 Point Source NO_x	74,847	205	630.9
Post-cap NO_x	49,399	135	586.2

The TCEQ analysis daily tons summary values above are for the entire State of Louisiana, and are for non-EGU 2000 NO_x and 2007 NO_x with growth and LDEQ SIP controls. Because the TCEQ summaries are for the entire State, the values are necessarily higher than those for the 9-parish area. Pechan estimates a 70 tpd NO_x reduction for the 9-parish NO_x control program. TCEQ estimates that the Statewide emission benefit of the LDEQ SIP controls is a 45 tpd reduction from 2000 levels, or a 61 tpd reduction from what the 2007 NO_x emissions would be expected to be without the Baton Rouge SIP controls.

C. DEVELOPMENT OF CONTROL FACTORS FOR AREA SOURCES

1. State Controls

Table II-6 summarizes regulations in the CENRAP States for which more stringent State requirements relative to Federal rules are in place for the mobile equipment repair and refinishing (MERR), architectural and industrial maintenance (AIM) coatings, consumer products and solvent cleaning area source VOC emission categories. For categories where more stringent rules for these categories are not found in the State regulations, “National Rule” is stated to refer to the applicable Federal requirements. The sections below describe how the information from these rules were used to develop control efficiencies. Table II-7 summarizes the final control efficiencies that were used to model these rules, and the counties and SCCs where these rules were applied.

Stage II, or at-the-pump, refueling control programs are in place in three States in the CENRAP region—Louisiana, Missouri, and Texas. Although these programs may have been in place prior to 2002, these controls are included here because the phase-in of the onboard vapor recovery systems controls changes the overall refueling control efficiency of Stage II programs.

Table II-6. VOC Solvent Rule Summary

SCCs	2465000000	2401001000	2415360000, 2415300000, 2415230000, 2415200000	2401005000	
State	**Consumer Products**	**AIM Coating**	**Solvent Cleaning Operations**	**Mobile Equipment Repair and Refinishing**	**State Contact, e-mail**
Arkansas	National Rule	National Rule	National Rule	National Rule	
Iowa	National Rule	National Rule	National Rule	National Rule	Marnie Stein Marnie.stein@dnr.state.ia.us
Kansas	National Rule	National Rule	28-19-714 The provisions of this regulation apply to cold cleaning, open-top vapor degreasing, and conveyorized degreasing operations located in Johnson and Wyandotte counties, and to the sale of cold cleaner solvents for use within either county. These requirements apply after August 31, 2002. Only cold cleaning solvents with a vapor pressure less than 1.0 mm Hg at 68F shall be used. Only cold cleaning solvents with a vapor pressure less than 5.0 mm Hg at 68F shall be used for each cold cleaning operation that is used for cleaning carburetors. Each cold solvent cleaner shall be equipped with a cover. Open-top vapor degreasers shall be equipped with a cover. Conveyorized degreasers shall have a processing system with an overall VOC control efficiency of 65 percent or greater.	National Rule	
Louisiana	National Rule	National Rule	Title 33, Part III Subchapter C, Section 2125 (Vapor Degreasers) These requirements were last amended April 2004. Open-top vapor degreasers shall achieve an overall VOC control efficiency of 85 percent or greater.	National Rule	
Minnesota	National Rule	National Rule	National Rule	National Rule	Paul Kim Paul.kim@state.mn.us
Missouri - Statewide (metro and outstate areas)	National Rule	National Rule	National Rule	National Rule	
Missouri - St. Louis metro area only (city of St. Louis, and St. Louis, St. Charles, Jefferson & Franklin counties)	National Rule	National Rule	- 10 CSR 10-5.300 (degreasing operations) - 10 CSR 10-5.455 (solvent cleanup operations not subject to degreasing operations) - Effective 2001 - Rule covers entire areas of counties specified - Cold cleaners, open-top vapor degreasers and conveyorized cleaner requirements modeled after 1977 CTG - Restrictions on cold cleaning more stringent than CTG in some cases - EPA NESHAP Subpart T requirements override some solvent cleaning requirements - Degreasers meeting certain size/solvent criteria required to meet minimum 65% VOC reduction efficiency	National Rule	

Table II-6 (continued)

SCCs	2465000000	2401001000	2415360000, 2415300000, 2415230000, 2415200000	2401005000	
State	**Consumer Products**	**AIM Coating**	**Solvent Cleaning Operations**	**Mobile Equipment Repair and Refinishing**	**State Contact, e-mail**
Missouri - Kansas City metro area only (Clay, Jackson, Platte counties)	National Rule	National Rule	- 10 CSR 10-2.210 (degreasing operations) - 10 CSR 10-2.215 (solvent cleanup operations not subject to degreasing operations) - Effective 2001 - Rule covers entire areas of counties specified - Cold cleaners, open-top vapor degreasers and conveyorized cleaner requirements modeled after 1977 CTG - Restrictions on cold cleaning more stringent than CTG in some cases - EPA NESHAP Subpart T requirements override some solvent cleaning requirements - Degreasers meeting certain size/solvent criteria required to meet minimum 65% VOC reduction efficiency	National Rule	
Nebraska	National Rule	National Rule	National Rule	National Rule	David Brown David.brown@ndeq.state.ne.us
Oklahoma	National Rule	National Rule	National Rule	National Rule	Ray Bishop Ray.bishop@deq.state.ok.us
Texas	Chapter 115.612 establishes control requirements effective in February 2004 for automotive windshield washer fluid. No person shall sell, supply, offer for sale, distribute, or manufacture for use in Texas any automotive windshield washer fluid containing VOCs in excess of 23.5% by weight.	Rule 115.420 applies to surface coating processes.	Degreasing processes in the Beaumont/Port Arthur, Dallas/Ft. Worth, and Houston/Galveston areas and in Gregg, Nueces, Victoria, Bexar, Comal, Guadalupe, Wilson, Bastrop, Caldwell, Hays, Travis, and Williamson counties have VOC control requirements via Chapter 115.412 for cold solvent cleaning and open-top vapor or conveyorized degreasers. The cold solvent cleaner requirement is equivalent to a VOC reduction efficiency of 65 percent or greater. The open-top vapor or conveyorized degreaser requirement is equivalent to a VOC reduction efficiency of 85 percent or greater.	Rule 115.422 control requirements apply in Beaumont/Port Arthur, Dallas/Fort Worth, El Paso, and Houston/Galveston. Vehicle refinishing operations shall minimize VOC emissions during equipment cleanup via enclosed containers for washing, rinsing, and draining, keeping wash solvents in an enclosed reservoir, and waste solvents and other cleaning materials in closed containers. Coating application equipment shall have a transfer efficiency of at least 65 percent.	

Table II-7. VOC Solvent Controls As Modeled

Counties	Pollutant	Control Efficiency* (%)	SCC	Description
KS: Johnson, Wyandotte	VOC	66	2415000000	Solvent Utilization: Degreasing: All Processes/All Industries
TX: Dallas, El Paso, Galveston, Hardin, Harris, Jefferson, Tarrant	VOC	35	2401005000	Auto Refinishing: SIC 7532
TX: Bastrop, Bexar, Caldwell, Comal, Gregg, Guadalupe, Hays, Nueces, Travis, Victoria, Williamson, Wilson	VOC	83	2415105000	Furniture and Fixtures (SIC 25): Open Top Degreasing
			2415110000	Primary Metal Industries (SIC 33): Open Top Degreasing
			2415120000	Fabricated Metal Products (SIC 34): Open Top Degreasing
			2415125000	Industrial Machinery and Equipment (SIC 35): Open Top Degreasing
			2415130000	Electronic and Other Elec. (SIC 36): Open Top Degreasing
			2415135000	Transportation Equipment (SIC 37): Open Top Degreasing
			2415140000	Instruments and Related Products (SIC 38): Open Top Degreasing
			2415145000	Miscellaneous Manufacturing (SIC 39): Open Top Degreasing
TX: Statewide	VOC	17	2460400000	Solvent Utilization: Miscellaneous Non-industrial: Consumer and Commercial: All Automotive Aftermarket Products

*These control efficiencies are all applied with a rule penetration of 100 percent and a rule effectiveness of 100 percent.

a. Kansas

i. Solvent Cleaning Operations

Kansas Rule 28-19-714 contains a 1.0 mm Hg maximum vapor pressure requirement for solvent cleaning operations, effective September 2002. Based on an evaluation of the Ozone Transport Commission (OTC) model rule for this source category, a 1.0 mm Hg at 68°F maximum VOC vapor pressure requirement leads to an estimated 66 percent reduction in VOC emissions relative to the national rule for cold cleaners and vapor degreasers (Pechan, 2001). The Kansas rule also includes a higher (5.0 mm Hg at 68°F) maximum vapor pressure requirement for the cleaning of carburetors, but this difference may not be significant relative to the OTC rule. Conveyorized degreasers are required to achieve an overall VOC control efficiency of 65 percent or greater; however, the Kansas rule does not appear to include any additional requirements relative to the national rule (other than the maximum vapor pressure requirements). Therefore, a 66 percent post-2002 VOC control efficiency was applied in Johnson and Wyandotte Counties, based on data from the OTC model rule.

b. Missouri

i. Solvent Cleaning Operations

Based on Pechan's review of Missouri's regulations, solvent cleaning regulations applicable to the Kansas City and St. Louis metropolitan areas appear to be more stringent than the national rule; however, these rules became effective before 2002. Therefore, no additional solvent controls were applied in Missouri.

ii. Stage II Refueling Controls

Stage II controls are required in the city of St. Louis and the following St. Louis area counties: Franklin County, Jefferson County, St. Charles County, and St. Louis County. This is required under 10 CSR 10-5.220 "Control of Petroleum Liquid Storage, Loading and Transfer." This regulation requires that gasoline stations with a minimum monthly throughput of 10,000 gallons of gasoline are required to maintain a 95 percent efficiency of total capture and emission reduction. These gasoline station owners are required to comply with the Missouri Performance Evaluation Test Procedures beginning in 1998.

c. Louisiana

i. Solvent Cleaning Operations

Title 33, Part III, Section 2125 specifies additional operational requirements for open top vapor degreasers not found in EPA's 1977 control techniques guideline (CTG). One requirement of the Louisiana Code specifies a minimum 85 percent VOC reduction efficiency for open top vapor degreasers not found in the CTG. Section 2125 was last amended in April 2004.

ii. Stage II Refueling Controls

A Stage II control program is in place in the following parishes in Louisiana: Ascension, East Baton Rouge, Iberville, Livingston, Pointe Coupee, and West Baton Rouge. The Stage II controls are required to attain a minimum of 95 percent gasoline vapor control efficiency at stations with a minimum throughput of 10,000 gallons of gasoline per month. This rule is under Title 33, Part III, Section 2132 "Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities." Compliance with these regulations was first required in 1993.

d. Texas

i. Cold Cleaners

The 1977 CTG for cold solvent cleaners is estimated to achieve VOC emission reductions of between 55 and 69 percent relative to 1977 baseline (uncontrolled) levels (Pechan, 2002). Texas rule 115.412 is equivalent to VOC emission reductions of at least 65 percent relative to uncontrolled levels. There do not appear to be any significant differences between the Texas rule

and the CTG, and therefore no additional VOC reductions were applied to the 2002 Texas inventory for cold cleaners.

ii. Open-top Vapor or Conveyorized Degreasers

The national rule for vapor degreasing is estimated to achieve VOC emission reductions of between 10 and 15 percent (Pechan, 2002). The Texas rule 115.412 requires VOC emission reductions of at least 85 percent from these sources for the following counties: Bastrop, Bexar, Caldwell, Comal, Gregg, Guadalupe, Hays, Nueces, Travis, Victoria, Williamson, and Wilson. Assuming that the baseline 2002 vapor degreasing emissions include a 10 percent reduction from the national rule and that a total control of 85 percent would be applied to comply with the Texas rule, the incremental reduction from the Texas rule, relative to the 2002 emissions, would be 83 percent. This rule became effective in December 2004.

iii. Mobile Equipment Repair and Refinishing

Texas rule 115.422 requires that coating application equipment shall have a transfer efficiency of at least 65 percent and requires the use of high volume low pressure (HVLP) spray guns. This rule applies in the following counties: Dallas, El Paso, Galveston, Hardin, Harris, Jefferson, and Tarrant. Based on an evaluation of the OTC model rule for this source category, the use of "high transfer efficiency" HVLP guns is estimated to achieve a 35 percent VOC emission reduction relative to the national rule (Pechan, 2001). Spray gun controls are estimated to contribute an additional 3 percent VOC emission reduction. However, the Texas rule contains a less stringent requirement for the enclosure of spray guns and related parts. Therefore, a 35 percent post-2002 VOC control efficiency incremental to the national rule was applied in the counties listed above to account for this rule. This rule became effective in May 2002.

iv. Consumer Products

The national rule limits the VOC content of windshield wiper fluid to 35 percent by weight (effective December 1998). The Texas rule 115.612 limits the VOC content to 23.5 percent by weight. This represents a 33 percent reduction in the VOC content (and as a result, emissions) from the 2002 baseline. A single SCC includes all "auto aftermarket products". Therefore, an assumption must be made as to what fraction of emissions from auto aftermarket products can be attributed to auto wiper fluid. An engineering estimate of 50 percent was applied, based on the assumption that the other major VOC-emitting auto aftermarket products (waxes, polishes and cleaning products) are likely consumed in lesser quantities by volume than windshield wiper fluid. Thus, the reduction applied to VOC emissions from the SCC representing auto aftermarket products was 17 percent. This rule became effective in February 2004.

v. Portable Fuel Containers

Texas has a portable fuel container rule (Statewide). In TCEQ analyses, this has been modeled as a reduction in evaporative VOC emissions using lawn and garden equipment SCCs within EPA's NONROAD model. See the Nonroad section of this chapter for information about how the rule effects were incorporated in the analysis.

vi. Stage II Refueling Controls

Stage II refueling controls are required in the following Texas counties: Brazoria, Chambers, Collin, Dallas, Denton, El Paso, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Montgomery, Orange, Tarrant, and Waller. This is regulated by the TCEQ Chapter 115, Sections 240 through 249 "Control of Vehicle Refueling Emissions (Stage II) at Motor Vehicle Fuel Dispensing Facilities." This regulation requires that gasoline stations with a minimum monthly throughput of 10,000 gallons of gasoline are required to have installed an approved Stage II vapor recovery system which is certified to reduce VOC emissions to the atmosphere by at least 95 percent. Annual inspections are required and the program began in 1992.

vii. Gas-fired Water Heaters, Small Boilers, and Process Heaters

A Statewide rule, adopted as part of the April 2000 Dallas/Forth Worth SIP revision, reduces NO_x emissions from new natural gas-fired water heaters, small boilers, and process heaters sold and installed in Texas beginning in 2002. The rule applies to each new water heater, boiler, or process heater with a maximum rated capacity of up to 2.0 million British thermal units per hour. This is Rule 117.461. It should be noted that this control on natural gas-fired water heaters may be overturned by the SB 473 prohibition on regulating water heater emissions.

To simulate the effects of this rule in 2018, the following factors were applied Statewide in Texas.

SCC	NO_x Control Efficiency	Rule Penetration	Rule Effectiveness
2103006000	75%	80%	100%
2104006000	75%	80%	100%

2. Federal Controls

a. Residential Wood Combustion

For this analysis, a 20 year estimated lifetime for woodstoves and fireplace inserts was used along with the SCC-specific growth factors, and emission factor ratios by SCC, to account for the replacement of retired woodstoves that emit at pre-new source performance standard (NSPS) levels, with new catalyst-equipped wood burning equipment. This was done using an equation to estimate equipment turnover for a situation with a 4 percent per year retirement rate, and the SCC-specific growth factors. Emission factor ratios are pollutant-specific. The growth and retirement equation was used to estimate the relationship between base year (2002) emissions and 2018 emissions by SCC and pollutant.

Then, this relationship was used to estimate the control efficiency that would have to be applied along with the growth factor to yield the appropriate future year emission value. SCCs for controlled woodstoves and fireplace inserts have no control efficiency applied. Their 2018 emissions will change in proportion to the growth rate. Table II-8 displays the various residential woodstove and fireplace area source SCCs that are used in the CENRAP State emission inventories and the associated 2018 control factors used in this analysis.

Table II-8. Residential Wood Combustion Control Factors for CENRAP States

SCC	Description	Growth Factor 2002 to 2018	Pollutant	CF*	2018 Ratio of Controlled/ Uncontrolled Emissions	2018 Control Factor (Emission Reduc. %)
States: AR, LA, OK, TX						
2104008000	Total Woodstoves and Fireplaces	1.034	VOC	0.28	0.664	35.8
		1.034	CO	0.45	0.751	27.3
		1.034	NOx	0.71	0.885	14.4
		1.034	PM	0.67	0.864	16.4
2104008002	Fireplace inserts	1.034	VOC	0.28	0.664	35.8
		1.034	CO	0.45	0.751	27.3
		1.034	NOx	0.71	0.885	14.4
		1.034	PM	0.67	0.864	16.4
2104008010	Woodstoves-general	1.034	VOC	0.28	0.654	34.6
		1.034	CO	0.45	0.736	26.4
		1.034	NOx	0.71	0.861	13.9
		1.034	PM	0.67	0.842	15.8
2104008001	Fireplaces	1.034			1.034	0
2104008003	Fireplace inserts-certified-non-catalytic	1.034			1.034	0
2104008004	Fireplace inserts-certified-catalytic	1.034			1.034	0
2104008030	Woodstoves-certified-catalytic	1.034			1.034	0
2104008050	Woodstoves-certified-non-catalytic	1.034			1.034	0
States: IA, KS, NE, MO, MN						
2104008000	Total Woodstoves and Fireplaces	0.986	VOC	0.28	0.65	34
		0.986	CO	0.45	0.73	26
		0.986	NOx	0.71	0.851	13.7
		0.986	PM	0.67	0.832	15.6
2104008002	Fireplace inserts	0.986	VOC	0.28	0.65	34
		0.986	CO	0.45	0.73	26
		0.986	NOx	0.71	0.851	13.7
		0.986	PM	0.67	0.832	15.6
2104008010	Woodstoves-general	0.986	VOC	0.28	0.654	34.6
		0.986	CO	0.45	0.736	26.4
		0.986	NOx	0.71	0.861	13.9
		0.986	PM	0.67	0.842	15.8
2104008001	Fireplaces	0.986			0.986	0
2104008003	Fireplace inserts-certified-non-catalytic	0.986			0.986	0
2104008004	Fireplace inserts-certified-catalytic	0.986			0.986	0
2104008030	Woodstoves-certified-catalytic	0.986			0.986	0
2104008050	Woodstoves-certified-non-catalytic	0.986			0.986	0

NOTE: *The ratio between the emission factor for a certified-catalyst equipped woodstove/fireplace insert and for an uncontrolled unit.

b. Onboard Vapor Recovery Systems

The control efficiency from refueling onroad vehicles will be greater in 2018 than in 2002 due to vehicle turnover and the Federal requirement for onboard vapor recovery systems in onroad vehicles. Percentage reductions in VOC emissions from this control measure in 2018, relative to 2002, were calculated using a sampling of MOBILE6 runs, including the effect of Stage II programs where they are in place. These resulting reduction factors were included in the area source sector control files.

D. DEVELOPMENT OF NONROAD 2018 EMISSION INVENTORY

Pechan estimated NONROAD model mass emissions for 2018 for all CENRAP States using EPA's NONROAD2004 model (EPA, 2004a). Pechan developed nonroad option files to reflect season-specific inputs that applied to an entire State or group of counties. These runs also incorporated revised activity, seasonal allocation, and county allocation files developed by Sonoma Technology, Inc. (STI) to improve the recreational marine component of the 2002 base year NONROAD inventory (STI, 2004).

Pechan ran NONROAD for four scenarios: 1) typical January weekday (JanWD); 2) typical January weekend day (JanWE); 3) typical July weekday (JulWD); and 4) typical July weekend day (JulWE). The January runs represented average daily emissions for the time period October 1 through April 30, and the July runs represented average daily emissions for the time period May 1 through September 30. Annual emissions were estimated using these daily results as input to the formula below:

(JanWD x 152 days) + (JanWE x 60 days) + (JulWD x 109 days) + (JulWE x 44 days) = Annual Average Emissions

In Table II-9, the default Statewide temperatures and Reid vapor pressure (RVP) values used are listed for each model scenario. Pechan also accounted for local fuel-related programs that would affect NONROAD model engine emissions. A listing of the areas with county-specific fuel programs are presented in Tables II-10 through II-13. In addition, the characteristics or input values needed to model these programs in NONROAD are presented. Table II-10 provides a list of those areas that have year-round Stage II programs in place. Tables II-11 and II-12 show the summer season RVP values assumed for areas with reformulated gasoline and low RVP programs, as well as year-round oxygenated fuel programs that are part of RFG programs. Table II-13 presents the weight percent oxygen (O_2) levels used for the 2018 runs. Iowa, Minnesota, and El Paso County, Texas are the only areas with official oxygenated fuel programs. For the remaining areas, it was established that some blending of ethanol into their fuel is occurring, even though no regulatory requirement is in effect (STI, 2004). The 2018 diesel fuel sulfur values reflect the requirements of the Clean Air Diesel Rule that all nonroad diesel fuel meet 15 parts per million sulfur content by the year 2015. Per the requirements of the Tier 2 and gasoline sulfur rulemaking, the gasoline sulfur levels were also revised to 30 parts per million.

Table II-9. Statewide Temperature and RVP Inputs for 2018 NONROAD Model Runs

State FIPS	State	Typical Day	Minimum Temperature, ºF	Maximum Temperature, ºF	Average Temperature, ºF	RVP, psi
5	Arkansas	July	72	93	82	9
		January	31	50	40	13
19	Iowa	July	66	86	76	8.3
		January	12	29	20	13.2
20	Kansas	July	68	89	78	8.2
		January	17	37	27	13.2
22	Louisiana	July	73	91	82	9
		January	40	60	50	13
27	Minnesota	July	63	83	73	8.7
		January	4	22	13	13.4
29	Missouri	July	67	90	78	8.4
		January	22	42	32	13.2
31	Nebraska	July	66	88	77	8.3
		January	13	33	23	13.2
40	Oklahoma	July	71	93	82	9
		January	26	47	36	13
48	Texas	July	77	96	86	9
		January	36	55	45	13

Table II-10. CENRAP Stage II Refueling Programs

FIPS State Code	State Name	FIPS County Code	County Name	Effectiveness
22	LOUISIANA	5	Ascension Parish	95
22	LOUISIANA	33	East Baton Rouge Parish	95
22	LOUISIANA	47	Iberville Parish	95
22	LOUISIANA	63	Livingston Parish	95
22	LOUISIANA	77	Pointe Coupee Parish	95
22	LOUISIANA	121	West Baton Rouge Parish	95
29	MISSOURI	71	Franklin County	95
29	MISSOURI	99	Jefferson County	95
29	MISSOURI	183	St. Charles County	95
29	MISSOURI	189	St. Louis County	95
29	MISSOURI	510	St. Louis city	95
48	TEXAS	39	Brazoria County	95
48	TEXAS	71	Chambers County	95
48	TEXAS	85	Collin County	95
48	TEXAS	113	Dallas County	95
48	TEXAS	121	Denton County	95
48	TEXAS	141	El Paso County	95
48	TEXAS	157	Fort Bend County	95
48	TEXAS	167	Galveston County	95
48	TEXAS	199	Hardin County	95
48	TEXAS	201	Harris County	95
48	TEXAS	245	Jefferson County	95
48	TEXAS	291	Liberty County	95
48	TEXAS	339	Montgomery County	95
48	TEXAS	361	Orange County	95
48	TEXAS	439	Tarrant County	95
48	TEXAS	473	Waller County	95

Table II-11. CENRAP Reformulated Gasoline Programs

FIPS State Code	State Name	FIPS County Code	County Name	RVP	O2, wt %
29	MISSOURI	71	Franklin County	6.8	2.1
29	MISSOURI	99	Jefferson County	6.8	2.1
29	MISSOURI	183	St. Charles County	6.8	2.1
29	MISSOURI	189	St. Louis County	6.8	2.1
29	MISSOURI	510	St. Louis city	6.8	2.1
48	TEXAS	39	Brazoria County	6.7	2.1
48	TEXAS	71	Chambers County	6.7	2.1
48	TEXAS	85	Collin County	6.7	2.1
48	TEXAS	113	Dallas County	6.7	2.1
48	TEXAS	121	Denton County	6.7	2.1
48	TEXAS	157	Fort Bend County	6.7	2.1
48	TEXAS	167	Galveston County	6.7	2.1
48	TEXAS	201	Harris County	6.7	2.1
48	TEXAS	291	Liberty County	6.7	2.1
48	TEXAS	339	Montgomery County	6.7	2.1
48	TEXAS	439	Tarrant County	6.7	2.1
48	TEXAS	473	Waller County	6.7	2.1

Table II-12. CENRAP Low RVP Programs

FIPS State Code	State Name	FIPS County Code	County Name	RVP
20	KANSAS	091	JOHNSON	7.0
20	KANSAS	209	WYANDOTTE	7.0
22	LOUISIANA	005	ASCENSION PARISH	7.8
22	LOUISIANA	033	EAST BATON ROUGE PARISH	7.8
22	LOUISIANA	047	IBERVILLE PARISH	7.8
22	LOUISIANA	063	LIVINGSTON PARISH	7.8
22	LOUISIANA	077	POINTE COUPEE PARISH	7.8
22	LOUISIANA	121	WEST BATON ROUGE PARISH	7.8
29	MISSOURI	047	CLAY	7.0
29	MISSOURI	095	JACKSON	7.0
29	MISSOURI	165	PLATTE	7.0
48	TEXAS	001	ANDERSON	7.5
48	TEXAS	005	ANGELINA	7.5
48	TEXAS	007	ARANSAS	7.5
48	TEXAS	013	ATASCOSA	7.5
48	TEXAS	015	AUSTIN	7.5
48	TEXAS	021	BASTROP	7.5
48	TEXAS	025	BEE	7.5
48	TEXAS	027	BELL	7.5
48	TEXAS	029	BEXAR	7.5
48	TEXAS	035	BOSQUE	7.5
48	TEXAS	037	BOWIE	7.5
48	TEXAS	041	BRAZOS	7.5
48	TEXAS	051	BURLESON	7.5
48	TEXAS	055	CALDWELL	7.5
48	TEXAS	057	CALHOUN	7.5
48	TEXAS	063	CAMP	7.5
48	TEXAS	067	CASS	7.5
48	TEXAS	073	CHEROKEE	7.5
48	TEXAS	089	COLORADO	7.5
48	TEXAS	091	COMAL	7.5
48	TEXAS	097	COOKE	7.5
48	TEXAS	099	CORYELL	7.5
48	TEXAS	119	DELTA	7.5
48	TEXAS	123	DEWITT	7.5
48	TEXAS	139	ELLIS	7.5
48	TEXAS	141	EL PASO	7.0
48	TEXAS	145	FALLS	7.5
48	TEXAS	147	FANNIN	7.5
48	TEXAS	149	FAYETTE	7.5
48	TEXAS	159	FRANKLIN	7.5
48	TEXAS	161	FREESTONE	7.5

Table II-12 (continued)

FIPS State Code	State Name	FIPS County Code	County Name	RVP
48	TEXAS	175	GOLIAD	7.5
48	TEXAS	177	GONZALES	7.5
48	TEXAS	181	GRAYSON	7.5
48	TEXAS	183	GREGG	7.5
48	TEXAS	185	GRIMES	7.5
48	TEXAS	187	GUADALUPE	7.5
48	TEXAS	199	HARDIN	7.5
48	TEXAS	203	HARRISON	7.5
48	TEXAS	209	HAYS	7.5
48	TEXAS	213	HENDERSON	7.5
48	TEXAS	217	HILL	7.5
48	TEXAS	221	HOOD	7.5
48	TEXAS	223	HOPKINS	7.5
48	TEXAS	225	HOUSTON	7.5
48	TEXAS	231	HUNT	7.5
48	TEXAS	239	JACKSON	7.5
48	TEXAS	241	JASPER	7.5
48	TEXAS	245	JEFFERSON	7.5
48	TEXAS	251	JOHNSON	7.5
48	TEXAS	255	KARNES	7.5
48	TEXAS	257	KAUFMAN	7.5
48	TEXAS	277	LAMAR	7.5
48	TEXAS	285	LAVACA	7.5
48	TEXAS	287	LEE	7.5
48	TEXAS	289	LEON	7.5
48	TEXAS	293	LIMESTONE	7.5
48	TEXAS	297	LIVE OAK	7.5
48	TEXAS	309	MCLENNAN	7.5
48	TEXAS	313	MADISON	7.5
48	TEXAS	315	MARION	7.5
48	TEXAS	321	MATAGORDA	7.5
48	TEXAS	331	MILAM	7.5
48	TEXAS	343	MORRIS	7.5
48	TEXAS	347	NACOGDOCHES	7.5
48	TEXAS	349	NAVARRO	7.5
48	TEXAS	351	NEWTON	7.5
48	TEXAS	355	NUECES	7.5
48	TEXAS	361	ORANGE	7.5
48	TEXAS	365	PANOLA	7.5
48	TEXAS	367	PARKER	7.5
48	TEXAS	373	POLK	7.5
48	TEXAS	379	RAINS	7.5

Table II-12 (continued)

FIPS State Code	State Name	FIPS County Code	County Name	RVP
48	TEXAS	387	RED RIVER	7.5
48	TEXAS	391	REFUGIO	7.5
48	TEXAS	395	ROBERTSON	7.5
48	TEXAS	397	ROCKWALL	7.5
48	TEXAS	401	RUSK	7.5
48	TEXAS	403	SABINE	7.5
48	TEXAS	405	SAN AUGUSTINE	7.5
48	TEXAS	407	SAN JACINTO	7.5
48	TEXAS	409	SAN PATRICIO	7.5
48	TEXAS	419	SHELBY	7.5
48	TEXAS	423	SMITH	7.5
48	TEXAS	425	SOMERVELL	7.5
48	TEXAS	449	TITUS	7.5
48	TEXAS	453	TRAVIS	7.5
48	TEXAS	455	TRINITY	7.5
48	TEXAS	457	TYLER	7.5
48	TEXAS	459	UPSHUR	7.5
48	TEXAS	467	VAN ZANDT	7.5
48	TEXAS	469	VICTORIA	7.5
48	TEXAS	471	WALKER	7.5
48	TEXAS	477	WASHINGTON	7.5
48	TEXAS	481	WHARTON	7.5
48	TEXAS	491	WILLIAMSON	7.5
48	TEXAS	493	WILSON	7.5
48	TEXAS	497	WISE	7.5
48	TEXAS	499	WOOD	7.5

Table II-13. CENRAP Oxygenated Fuel Inputs

FIPS State Code	State Name	Area/County	O2, wt %
05	ARKANSAS	Statewide	0.30
19	IOWA	Statewide	1.94
20	KANSAS	Statewide	0.14
22	LOUISIANA	Statewide	0.27
27	MINNESOTA	Statewide	3.32
29	MISSOURI	Statewide	0.32
31	NEBRASKA	Statewide	1.47
40	OKLAHOMA	Statewide	0.0
48	TEXAS	El Paso County	2.7

1. Growth

Growth factors in NONROAD2004 are based on national, historical changes in fuel-specific equipment populations. Pechan has concerns about using growth rates that vary significantly from the model growth rates without fully evaluating the impact the revised growth rates may have on other related activity variables such as median life and scrappage rates. Pechan did, however, reflect State differences in growth rates by adjusting the NONROAD model growth rates for several significant nonroad categories, as identified in CENRAP's 2002 base year NONROAD model inventory (STI, 2004). These adjustments were made using State-level growth rates based on surrogate socioeconomic indicators believed to correlate with activity for each category. These data are available from the REMI model, and are incorporated into EGAS (Houyoux, 2004). The proposed methodology for making these adjustments was first documented in a technical memorandum prepared for CENRAP (Pechan, 2005). The NONROAD priority categories, along with the socioeconomic indicator used to adjust the national growth rate for each category, are listed in Table II-14. Note that employment and value added data are available from REMI for the Agricultural Production sector (SIC 01, 02). This is expected to be a suitable surrogate for the growth in farm equipment, but growth rates for these variables were not calculated separately in REMI for each State, and are reported as the same value for all States. As such, Pechan used *Output in Agricultural Services* (SIC 07) as a surrogate indicator for farm equipment growth.

Table II-15 lists the NONROAD national growth factor value for 2018 (relative to 2002 base year) for each of the priority categories. Unlike other nonroad categories, separate growth rates are included in NONROAD for some of the specific recreational equipment applications, such as ATVs and Off-Highway Motorcycles. Table II-16 lists the 2018 growth factors for each chosen REMI surrogate indicator. Values are presented for each CENRAP State, as well as the nation. The general equation used to make this adjustment is shown below, along with an example of this calculation for gasoline lawn and garden equipment:

$$NRDGR_{ST} = NRDGR_{NAT} \times (REMIGR_{ST}/REMIGR_{NAT})$$

Table II-14. NONROAD Model Priority Growth Categories and REMI Data for Adjusting National NONROAD Growth Rates

SCC	SCC Description	NONROAD Model Growth Indicator Code	REMI Code	REMI Code Description
2270002000	Diesel Construction	21	604	Construction Employment - SIC 15, 16, 17
2270005000	Diesel Farm	31	165	Agricultural Services Output - SIC 07
2260004000 2265004000	2-Stroke Gasoline Lawn and Garden 4-Stroke Gasoline Lawn and Garden	52	901	Population (Thousands)
2282005000 2282010000	2-Stroke Gasoline Recreational Marine 4-Stroke Gasoline Recreational Marine	92	903	Real Disposable Personal Income
2260001030 2265001030	2-Stroke Gasoline ATVs 4-Stroke Gasoline ATVs	95 96	903	Real Disposable Personal Income
2260001010 2265001010	2-Stroke Gasoline Off-Highway Motorcycles 4-Stroke Gasoline Off-Highway Motorcycles	97	903	Real Disposable Personal Income
2260001020	2-Stroke Gasoline Snowmobiles	98	903	Real Disposable Personal Income
2282005015	2-Stroke Gasoline Recreational Marine - Personal Watercraft	99	903	Real Disposable Personal Income

Table II-15. NONROAD Model Category Growth Factors for 2018

Category	Indicator Code	Growth Factor[1]
Diesel Construction	21	1.432
Diesel Farm	31	1.389
2 and 4-stroke Gasoline Lawn and Garden	52	1.337
2 and 4-stroke Gasoline Recreational Marine	92	1.146
2-stroke Gasoline ATVs	95	2.756
4-stroke Gasoline ATVs	96	2.105
2 and 4-stroke Gasoline Off-Highway Motorcycles	97	1.925
2-Stroke Gasoline Snowmobiles	98	1.705
2-Stroke Gasoline Recreational Marine - Personal Watercraft	99	1.146

NOTE: [1]Growth factor values calculated relative to base year 2002.

Table II-16. REMI State and National Growth Factors for 2018

REMI CODE	CODEDESC	STFIPS	Geographic Area	Growth Factor[1]
604	Construction - SIC 15, 16, 17	05	Arkansas	1.035
604	Construction - SIC 15, 16, 17	19	Iowa	1.049
604	Construction - SIC 15, 16, 17	20	Kansas	1.016
604	Construction - SIC 15, 16, 17	22	Louisiana	1.120
604	Construction - SIC 15, 16, 17	27	Minnesota	1.005
604	Construction - SIC 15, 16, 17	29	Missouri	1.023
604	Construction - SIC 15, 16, 17	31	Nebraska	1.011
604	Construction - SIC 15, 16, 17	40	Oklahoma	1.098
604	Construction - SIC 15, 16, 17	48	Texas	1.011
604	Construction - SIC 15, 16, 17	NA	National	1.025
165	Agricultural Services	05	Arkansas	1.117
165	Agricultural Services	19	Iowa	1.301
165	Agricultural Services	20	Kansas	1.329
165	Agricultural Services	22	Louisiana	1.330
165	Agricultural Services	27	Minnesota	1.334
165	Agricultural Services	29	Missouri	1.391
165	Agricultural Services	31	Nebraska	1.281
165	Agricultural Services	40	Oklahoma	1.358
165	Agricultural Services	48	Texas	1.400
165	Agricultural Services	NA	National	1.376
901	Population (Thousands)	05	Arkansas	1.173
901	Population (Thousands)	19	Iowa	1.126
901	Population (Thousands)	20	Kansas	1.160
901	Population (Thousands)	22	Louisiana	1.138
901	Population (Thousands)	27	Minnesota	1.171
901	Population (Thousands)	29	Missouri	1.150
901	Population (Thousands)	31	Nebraska	1.144
901	Population (Thousands)	40	Oklahoma	1.253
901	Population (Thousands)	48	Texas	1.299
901	Population (Thousands)	NA	National	1.218
903	Real Disposable Personal Income	05	Arkansas	1.561
903	Real Disposable Personal Income	19	Iowa	1.519
903	Real Disposable Personal Income	20	Kansas	1.550
903	Real Disposable Personal Income	22	Louisiana	1.588
903	Real Disposable Personal Income	27	Minnesota	1.576
903	Real Disposable Personal Income	29	Missouri	1.540
903	Real Disposable Personal Income	31	Nebraska	1.530
903	Real Disposable Personal Income	40	Oklahoma	1.621
903	Real Disposable Personal Income	48	Texas	1.665
903	Real Disposable Personal Income	NA	National	1.596

NOTE: [1]Growth factor values calculated relative to base year 2002.

where:

$NRDGR_{ST}$	=	Revised NONROAD State-level Growth Rate
$NRDGR_{NAT}$	=	Base NONROAD National Growth Rate
$REMIGR_{ST}$	=	State REMI Growth Rate
$REMIGR_{NAT}$	=	National REMI Growth Rate

The revised growth rate for gasoline lawn and garden equipment in Oklahoma is calculated as follows:

$$NRDGR_{ST} = 1.337 \times (1.253 \div 1.218)$$
$$= 1.374$$

Table II-17 shows the adjusted 2018 growth factors calculated for all CENRAP States for all priority equipment categories, and compares these values to the NONROAD model default growth factor values.

Pechan prepared a revised NATION.GRW file for use in the NONROAD model. Once 2002-based growth rates were calculated, Pechan normalized these rates to reflect the 2002 year value in the NATION.GRW file. Since this year was not reported for most category codes, these 2002 data were calculated using linear interpolation of values reported for the most recent prior year and closest future year. Pechan then incorporated 2018 data for each of the appropriate indicator codes for all CENRAP States. State-specific records for historic years prior to 2002 were also added (since base year population values for most equipment types are for 1996 or 1998) using the same values as the national-level indicators.

2. Controls

EPA's NONROAD2004 model incorporates the effects of most final Federal standards, including the Tier 4 diesel engine standards and the exhaust emission standards for large spark-ignition (S-I) engines, diesel marine, and land-based recreational engines. The only remaining federal standards not modeled by NONROAD2004 include permeation and evaporative emission standards for gasoline recreational and large S-I engines, respectively. The evaporative standards for recreational equipment only affect permeation emissions, which are not currently included in NONROAD2004. These standards do not affect any other evaporative emission components in the model (i.e., diurnal or refueling). Therefore, Pechan did not model the recreational equipment permeation emission standards. Pechan developed an estimate of the emission reductions due to the large S-I standard to apply to the affected SCCs as a post-processing adjustment, which is discussed below.

For the large S-I evaporative standards, Pechan obtained overall emission reduction information from the Large S-I Regulatory Support Document (EPA, 2002). Using large S-I evaporative base and control case future year inventories, emission reductions were estimated for 2018. These emission reductions vary by evaporative component, but for this analysis Pechan summed the emissions across all components to estimate emission reductions for all evaporative

Table II-17. Adjusted 2018 Growth Factors for Nonroad Priority Equipment Categories

State FIPS	State Name	NONROAD Growth Factor[1]	Adjusted Growth Factor[1]	Percent Difference
2 and 4-stroke Gasoline Lawn and Garden - Indicator Code 52				
5	Arkansas	1.337	1.287	-3.9
19	Iowa	1.337	1.235	-8.3
20	Kansas	1.337	1.273	-5
22	Louisiana	1.337	1.249	-7
27	Minnesota	1.337	1.284	-4.1
29	Missouri	1.337	1.261	-6
31	Nebraska	1.337	1.255	-6.5
40	Oklahoma	1.337	1.374	2.7
48	Texas	1.337	1.424	6.1
Diesel Construction - Indicator Code 21				
5	Arkansas	1.432	1.446	1
19	Iowa	1.432	1.466	2.3
20	Kansas	1.432	1.419	-0.9
22	Louisiana	1.432	1.565	8.5
27	Minnesota	1.432	1.404	-2
29	Missouri	1.432	1.429	-0.2
31	Nebraska	1.432	1.412	-1.4
40	Oklahoma	1.432	1.534	6.6
48	Texas	1.432	1.412	-1.4
Diesel Farm - Indicator Code 31				
5	Arkansas	1.389	1.127	-23.2
19	Iowa	1.389	1.314	-5.7
20	Kansas	1.389	1.342	-3.5
22	Louisiana	1.389	1.343	-3.4
27	Minnesota	1.389	1.346	-3.2
29	Missouri	1.389	1.404	1.1
31	Nebraska	1.389	1.293	-7.4
40	Oklahoma	1.389	1.37	-1.4
48	Texas	1.389	1.413	1.7
2 and 4-stroke Gasoline Recreational Marine - Indicator Code 92				
5	Arkansas	1.146	1.121	-2.2
19	Iowa	1.146	1.091	-5
20	Kansas	1.146	1.113	-3
22	Louisiana	1.146	1.141	-0.4
27	Minnesota	1.146	1.132	-1.2
29	Missouri	1.146	1.106	-3.6
31	Nebraska	1.146	1.099	-4.3
40	Oklahoma	1.146	1.165	1.6
48	Texas	1.146	1.196	4.2
2-stroke Gasoline ATVs - Indicator Code 95				
5	Arkansas	2.756	2.696	-2.2
19	Iowa	2.756	2.623	-5.1
20	Kansas	2.756	2.677	-3
22	Louisiana	2.756	2.742	-0.5

Table II-17 (continued)

State FIPS	State Name	NONROAD Growth Factor[1]	Adjusted Growth Factor[1]	Percent Difference
27	Minnesota	2.756	2.721	-1.3
29	Missouri	2.756	2.659	-3.6
31	Nebraska	2.756	2.642	-4.3
40	Oklahoma	2.756	2.8	1.6
48	Texas	2.756	2.875	4.1
4-stroke Gasoline ATVs - Indicator Code 96				
5	Arkansas	2.105	2.059	-2.2
19	Iowa	2.105	2.003	-5.1
20	Kansas	2.105	2.045	-2.9
22	Louisiana	2.105	2.095	-0.5
27	Minnesota	2.105	2.078	-1.3
29	Missouri	2.105	2.031	-3.6
31	Nebraska	2.105	2.018	-4.3
40	Oklahoma	2.105	2.139	1.6
48	Texas	2.105	2.196	4.1
2 and 4-stroke Gasoline Off-Highway Motorcycles - Indicator Code 97				
5	Arkansas	1.925	1.884	-2.2
19	Iowa	1.925	1.832	-5.1
20	Kansas	1.925	1.87	-2.9
22	Louisiana	1.925	1.916	-0.5
27	Minnesota	1.925	1.901	-1.3
29	Missouri	1.925	1.858	-3.6
31	Nebraska	1.925	1.846	-4.3
40	Oklahoma	1.925	1.956	1.6
48	Texas	1.925	2.009	4.2
2-Stroke Gasoline Snowmobiles - Indicator Code 98				
5	Arkansas	1.705	1.669	-2.2
19	Iowa	1.705	1.623	-5.1
20	Kansas	1.705	1.657	-2.9
22	Louisiana	1.705	1.697	-0.5
27	Minnesota	1.705	1.684	-1.2
29	Missouri	1.705	1.646	-3.6
31	Nebraska	1.705	1.635	-4.3
40	Oklahoma	1.705	1.733	1.6
48	Texas	1.705	1.779	4.2
2-Stroke Gasoline Recreational Marine - Personal Watercraft - Indicator Code 99				
5	Arkansas	1.146	1.121	-2.2
19	Iowa	1.146	1.091	-5
20	Kansas	1.146	1.113	-3
22	Louisiana	1.146	1.141	-0.4
27	Minnesota	1.146	1.132	-1.2
29	Missouri	1.146	1.106	-3.6
31	Nebraska	1.146	1.099	-4.3
40	Oklahoma	1.146	1.165	1.6
48	Texas	1.146	1.196	4.2

NOTE: [1]Growth factor values calculated relative to base year 2002.

emissions combined, as well as crankcase emissions. Large S-I evaporative emission reductions for 2018 were estimated to be 78.1 percent.

Pechan calculated two rule penetration adjustments to account for the fraction of the SCC-level emissions that are affected by the rule. Since the rule only affects large S-I engines greater than 25 horsepower, the first adjustment was developed to reflect that fraction of the activity associated with these larger engines. This was estimated using 2002 national gasoline consumption results by horsepower and equipment category from NONROAD2004. As a simplifying assumption, we used the 2002 rule penetration value for 2018 and for all applications within a category, though this is likely to vary by year and application. Table II-18 provides a summary of the horsepower-related rule penetration values by equipment category. A second rule penetration adjustment by SCC was also developed to account for that fraction of the SCC-level emissions associated with evaporative VOC relative to the total VOC emissions (i.e., exhaust plus evaporative). Final emission reductions by SCC are presented in Table II-19. These emission reductions were applied directly to the SCC-level output from the NONROAD model as a post-processing step.

The following equation shows an example of how overall adjusted emission reductions were estimated for 4-stroke industrial forklifts in 2018:

$$ER_{ADJ} = RP_{hp} \ x \ RP_{evap} \ x \ ER$$

Table II-18. Horsepower-Related Rule Penetration Values by Category for Large S-I Evaporative Standards

Fuel Type	Classification	Rule Penetration
Gasoline	Agricultural Equipment	0.40
Gasoline	Airport Equipment	0.74
Gasoline	Commercial Equipment	0.05
Gasoline	Construction and Mining Equipment	0.14
Gasoline	Industrial Equipment	0.59
Gasoline	Commercial Lawn and Garden Equipment	0.07
Gasoline	Railroad Equipment	0.04
Gasoline	Recreational Equipment[1]	0.43
CNG	All Classifications	1.0
LPG	All Classifications	1.0

NOTE: [1]Applies to specialty vehicle carts only; other recreational equipment covered by recreational standards.

Table II-19. Control Effectiveness Values by SCC for Large S-I Evaporative Standards in 2018

SCC	Percent Control Effectiveness
2260001060	11.2
2260002006	0.3
2260002009	0.6
2260002021	0.6
2260002027	0.3
2260002039	0.1
2260002054	0.3
2260003030	3.8
2260003040	2.7
2260004016	0.9
2260004021	1
2260004026	1.1
2260004031	0.4
2260004036	0.2
2260004071	0.2
2260005035	3.7
2260005050	1.6
2260006005	0.4
2260006010	0.3
2260006015	0.2
2265001060	7.3
2265002003	1.4
2265002006	1.5
2265002009	1.1
2265002015	1.2
2265002021	1.7
2265002024	1.1
2265002027	1
2265002030	1.2
2265002033	2
2265002039	1
2265002042	2.8
2265002045	4.1
2265002054	1.3
2265002057	5.7
2265002060	6.5
2265002066	1
2265002072	2.7
2265002078	2.9
2265002081	5
2265003010	14.5
2265003020	24.4
2265003030	9
2265003040	5
2265003050	13.1
2265003060	5
2265003070	25.8

Table II-19 (continued)

SCC	Percent Control Effectiveness
2265004011	1.5
2265004016	1.9
2265004026	2.6
2265004031	1.8
2265004036	1.8
2265004041	0.9
2265004046	1.2
2265004051	1.9
2265004056	0.8
2265004066	0.9
2265004071	0.6
2265004076	1.9
2265005010	3.4
2265005015	8.3
2265005020	18.4
2265005025	20.4
2265005030	4.7
2265005035	9.5
2265005040	7.2
2265005045	18.3
2265005050	3.6
2265005055	11.6
2265005060	14.5
2265006005	1
2265006010	0.8
2265006015	0.6
2265006025	0.7
2265006030	0.8
2265008005	11.5
2265010010	3
2267001060	17.5
2267002003	6.6
2267002021	12.6
2267002024	6.1
2267002030	6.3
2267002033	17
2267002045	10.9
2267002054	10.4
2267002057	7.7
2267002060	1
2267002072	11.7
2267002081	13.1
2267003010	13.7
2267003020	0.8
2267003030	0.1
2267003050	9.6
2267005050	8
2267005055	17.6

Table II-19 (continued)

SCC	Percent Control Effectiveness
2267006005	17.2
2267006010	13.8
2267006015	4.7
2267006025	4.3
2267006030	11.5
2268002081	12.9
2268003020	0.9
2268003030	0.3
2268003060	2.7
2268006005	17.6
2268006010	15.3
2268006015	5.8
2285004015	0.6
2285006015	9.8

where:

ER_{ADJ} = adjusted emission reduction accounting for rule penetration
RP_{hp} = rule penetration for affected horsepower fraction
RP_{evap} = rule penetration for evaporative fraction of total VOC emissions
ER = evaporative emission reduction for affected engines

$$\begin{aligned} ER_{ADJ} &= 0.590 \times 0.529 \times 0.781 \\ &= 0.244 \\ &= 24.4 \text{ percent} \end{aligned}$$

a. State Controls

In addition to Federal controls, Pechan accounted for regulations in Texas that control nonroad refueling spillage emissions from use of portable fuel containers. Similar to the large S-I evaporative standard modeling discussed above, Pechan calculated two rule penetration adjustments accounting for the appropriate fraction of the SCC-level emissions affected by the rule. The first adjustment was developed to reflect that fraction of the SCC emissions associated with equipment fueled with a portable fuel container. Nonroad equipment refueled by a portable container are generally smaller horsepower engines than those refueled at service stations. A second rule penetration adjustment by SCC was also developed to account for that fraction of the SCC-level emissions associated with evaporative spillage VOC relative to the total VOC emissions (i.e., exhaust plus evaporative). These adjustments were both estimated using 2002 national evaporative VOC emissions data by horsepower, equipment category, and evaporative component, from NONROAD2004. Control efficiency was assumed to be 100 percent, and full equipment turnover of gas cans should be achieved by 2018.

The final emission reductions by SCC are presented in Table II-20. These emission reductions were applied directly to the appropriate SCCs as a post-processing step for all counties in Texas.

3. Non-NONROAD Model

Pechan compiled control information for commercial marine vessels and locomotives. Standards affecting these categories are Federal standards that affect all areas of the nation. No additional local controls were modeled in the CENRAP region for these categories.

In 2003, EPA proposed aircraft engine NO_x emission standards that will bring U.S. aircraft standards into alignment with standards developed by the International Civil Aviation Organization. EPA did not prepare emission reduction estimates for these standards because any such reductions would be modest (e.g., 94 percent of aircraft engines are currently meeting or exceeding these standards). Therefore, Pechan did not account for emission reductions from these standards for this analysis.

Table II-20. 2018 VOC Emission Reductions by SCC for Texas Portable Container Rule

SCC	Percent VOC Reduction
2260001010	0.8%
2260001030	2.7%
2260003030	6.6%
2260003040	4.2%
2260004015	14.3%
2260004016	15.7%
2260004020	39.1%
2260004021	17.7%
2260004025	19.9%
2260004026	19.7%
2260004030	5.5%
2260004031	5.4%
2260004035	3.2%
2260004071	2.1%
2260006005	6.1%
2260006010	5.4%
2260006015	4.0%
2260007005	9.1%
2265001010	5.5%
2265001030	7.0%
2265001060	0.1%
2265003010	0.3%
2265003030	2.3%
2265003040	4.3%
2265003050	0.0%
2265004010	23.5%
2265004011	25.7%
2265004015	29.9%
2265004016	33.0%
2265004025	39.4%
2265004026	46.7%
2265004030	13.0%
2265004031	28.7%
2265004035	15.6%
2265004040	6.3%
2265004041	9.1%
2265004046	8.8%
2265004051	31.8%
2265004055	7.0%
2265004056	8.7%
2265004066	3.1%
2265004071	4.2%
2265004075	3.8%
2265004076	3.8%
2265006005	4.6%
2265006010	9.7%
2265006015	6.4%
2265006025	10.2%
2265006030	9.6%
2265007010	52.4%

a. Locomotives

Emission reduction impacts of the Federal locomotive engine standards are available in an EPA Regulatory Support Document (EPA, 1998). This document contains emission reduction information specific to Class I Operations, Class II/III Operations, Passenger Trains (Amtrak and Commuter Lines), and Switch (Yard) Locomotives. Year-specific percentage reduction estimates for select pollutants are available for each locomotive sector for each year over the 1999-2040 period. These emission reductions reflect the control technology efficiencies, as well as the expected rule penetration for the years of interest. Rule effectiveness was assumed to be 100 percent.

In addition, overall SO_2, PM_{10}, and $PM_{2.5}$ emission reductions associated with decreases in the diesel fuel sulfur content were also included. These were estimated from future base case and control case locomotive emission inventories prepared for EPA's regulatory impact analysis (RIA) for the Clean Air Diesel Rule (EPA, 2004). In the case of PM, since exhaust PM standards already apply to locomotives, a combined emission reduction was calculated for each future year that accounted for both the exhaust standards and reductions in PM sulfate due to the fuel sulfur limits. Table II-21 presents the 2018 emission reductions that apply to locomotive SCC emissions.

b. Commercial Marine Vessels

EPA has promulgated two sets of commercial marine vessel regulations: a regulation setting Category 1 and 2 marine diesel engine standards and a regulation setting Category 3 marine diesel engine standards. Category 1 marine diesel engines are defined as engines of greater than 37 kilowatts but with a per-cylinder displacement of 5 liters/cylinder or less. Category 2 marine diesel engines cover engines of 5 to 30 liters/cylinder, and Category 3 marine diesel engines include the remaining, very large, engines. For this analysis, overall emission reductions were estimated for each projection year of interest using information from the regulatory support documents prepared for these rulemakings (EPA, 1999; EPA, 2003). In addition to the EPA standards, beginning in 2000, marine diesel engines greater than or equal to 130 kilowatts are subject to an international NO_x emissions treaty (MARPOL) developed by the International Maritime Organization. The emission reductions reflect both the MARPOL and EPA standards.

Because the reductions vary by category of vessel, assumptions were made concerning the characterization of engines associated with diesel commercial marine vessel SCCs included in the base year inventory. For SCC 2280002100 (Marine Vessels, Commercial Diesel Port emissions), Category 2 engines were assumed. For SCC 2280002200 (Marine Vessels, Commercial Diesel Underway emissions), Category 3 engines were assumed.

Table II-21. 2018 Emission Reductions and Control Information for Federal Rail Standards[1]

SCC	SCC Description	Pollutant	2018 Emission Reduction, %	2018 Control Efficiency	2018 Rule Effectiveness	2018 Rule Penetration
2285000000	Railroad Equipment All Fuels Total	NOX	47.7	62	100	76.9
2285002000	Railroad Equipment Diesel Total	NOX	47.7	62	100	76.9
2285002006	Railroad Equipment Diesel Line Haul Locomotives: Class I Operations	NOX	52	62	100	83.9
2285002007	Railroad Equipment Diesel Line Haul Locomotives: Class II / III Operations	NOX	13	62	100	21
2285002008	Railroad Equipment Diesel Line Haul Locomotives: Passenger Trains (Amtrak)	NOX	51	62	100	82.3
2285002009	Railroad Equipment Diesel Line Haul Locomotives: Commuter Lines	NOX	51	62	100	82.3
2285002010	Railroad Equipment Diesel Yard Locomotives	NOX	31	58	100	53.4
2285000000	Railroad Equipment All Fuels Total	PM10-PRI	42.31			
2285002000	Railroad Equipment Diesel Total	PM10-PRI	42.31			
2285002006	Railroad Equipment Diesel Line Haul Locomotives: Class I Operations	PM10-PRI	44.8			
2285002007	Railroad Equipment Diesel Line Haul Locomotives: Class II / III Operations	PM10-PRI	22.25	22.3	100	99.8
2285002008	Railroad Equipment Diesel Line Haul Locomotives: Passenger Trains (Amtrak)	PM10-PRI	43.24			
2285002009	Railroad Equipment Diesel Line Haul Locomotives: Commuter Lines	PM10-PRI	43.24			
2285002010	Railroad Equipment Diesel Yard Locomotives	PM10-PRI	30.8			
2285000000	Railroad Equipment All Fuels Total	PM25-PRI	42.31			
2285002000	Railroad Equipment Diesel Total	PM25-PRI	42.31			
2285002006	Railroad Equipment Diesel Line Haul Locomotives: Class I Operations	PM25-PRI	44.8			
2285002007	Railroad Equipment Diesel Line Haul Locomotives: Class II / III Operations	PM25-PRI	22.25	22.3	100	99.8
2285002008	Railroad Equipment Diesel Line Haul Locomotives: Passenger Trains (Amtrak)	PM25-PRI	43.24			
2285002009	Railroad Equipment Diesel Line Haul Locomotives: Commuter Lines	PM25-PRI	43.24			
2285002010	Railroad Equipment Diesel Yard Locomotives	PM25-PRI	30.8			

Table II-21 (continued)

SCC	SCC Description	Pollutant	2018 Emission Reduction, %	2018 Control Efficiency	2018 Rule Effectiveness	2018 Rule Penetration
2285000000	Railroad Equipment All Fuels Total	SO2	97.58	97.6	100	100
2285002000	Railroad Equipment Diesel Total	SO2	97.58	97.6	100	100
2285002006	Railroad Equipment Diesel Line Haul Locomotives: Class I Operations	SO2	97.58	97.6	100	100
2285002007	Railroad Equipment Diesel Line Haul Locomotives: Class II / III Operations	SO2	97.58	97.6	100	100
2285002008	Railroad Equipment Diesel Line Haul Locomotives: Passenger Trains (Amtrak)	SO2	97.58	97.6	100	100
2285002009	Railroad Equipment Diesel Line Haul Locomotives: Commuter Lines	SO2	97.58	97.6	100	100
2285002010	Railroad Equipment Diesel Yard Locomotives	SO2	97.58	97.6	100	100
2285000000	Railroad Equipment All Fuels Total	VOC	23.6	47	100	50.2
2285002000	Railroad Equipment Diesel Total	VOC	23.6	47	100	50.2
2285002006	Railroad Equipment Diesel Line Haul Locomotives: Class I Operations	VOC	27	47	100	57.4
2285002008	Railroad Equipment Diesel Line Haul Locomotives: Passenger Trains (Amtrak)	VOC	26	47	100	55.3
2285002009	Railroad Equipment Diesel Line Haul Locomotives: Commuter Lines	VOC	26	47	100	55.3
2285002010	Railroad Equipment Diesel Yard Locomotives	VOC	10	50	100	20

NOTE: [1]Values for CE, RE, and RP for PM10 and PM25 were not estimated since these values account for PM reductions due to both exhaust and fuel sulfur standards.

Similar to locomotives, overall SO_2, PM_{10} and $PM_{2.5}$ emission reductions associated with decreases in the diesel fuel sulfur content were also included based on information in EPA's RIA for the Clean Air Diesel Rule (EPA, 2004b). See Table II-22 for the 2018 emission reductions that apply to commercial marine vessel SCC emissions.

E. DEVELOPMENT OF ONROAD DATA

For the onroad projections in the CENRAP air quality modeling, Pechan provided a set of VMT growth factors in SMOKE format, along with SMOKE-formatted MOBILE6 input files. The MOBILE6 input files incorporate any Federal, State, or local control program information. Thus, control factors or emission reduction percentages are not explicitly provided for this sector, but rather are incorporated in the MOBILE6 modeling. The development of the VMT growth factors and the MOBILE6 input files are discussed below. Once VMT growth factors were calculated for all of the CENRAP States, the growth factors were multiplied by the CENRAP base year 2002 VMT data to calculate 2018 VMT. The projected 2018 VMT by county and SCC (vehicle type and roadway type) were then provided in a SMOKE-formatted file, along with the corresponding average vehicle speed for that county/SCC combination. These speed inputs are the same as those used in the 2002 CENRAP base case—no updates were made to the modeled speeds.

1. VMT Growth

a. Default VMT Growth Methodology

As indicated in the Methods Document, Pechan's proposed default VMT growth methodology was to use EGAS VMT growth factors when more specific data were not supplied by the State or local agencies. However, when attempting to prepare the EGAS VMT growth factors using the beta version of EGAS 5, Pechan encountered a bug in the EGAS code that prevented data from being output for the onroad mobile SCCs. As an alternative (but similar) methodology, Pechan developed a set of 2002 to 2018 VMT growth factors using the same methodology used by EPA in their CAIR rule analysis that had originally been developed for EPA's draft Section 812 second prospective analysis (Mullen and Neumann, 2004).

The VMT projections account for vehicle class-specific growth factors and population growth factors. The data used for the vehicle class-specific growth factors are vehicle category-specific 2002 VMT and VMT projections to 2018, both at the national level, for the following three vehicle classes: 1) Light-duty vehicles (under 8,500 lbs); 2) Commercial light trucks (between 8,500 and 10,000 lbs); and 3) Freight trucks (greater than 10,000 lbs). These national VMT projections were obtained from the 2005 Annual Energy Outlook (DOE, 2005).

The national 2002 VMT and the 2018 VMT projections were allocated to the MOBILE6 vehicle categories using the default MOBILE6 VMT fractions by vehicle type in 2002 and 2018. Overall vehicle-specific growth factors were then calculated by multiplying the ratio of the 2018 to 2002 VMT at the MOBILE6 vehicle type level.

Table II-22. 2018 Emission Reductions and Control Information for Federal Diesel Commercial Marine Standards

SCC	SCC Description	Pollutant	2018 Emission Reduction, %	2018 Control Efficiency	2018 Rule Effectiveness	2018 Rule Penetration
2280002100	Marine Vessels, Commercial Diesel Port emissions	PM25-PRI	12.14	12.1	100	100
2280002100	Marine Vessels, Commercial Diesel Port emissions	PM10-PRI	12.14	12.1	100	100
2280002100	Marine Vessels, Commercial Diesel Port emissions	SO2	97.58	97.6	100	100
2280002100	Marine Vessels, Commercial Diesel Port emissions	NOX	20.46	43.7	100	46.8
2280002200	Marine Vessels, Commercial Diesel Underway emissions	PM25-PRI	12.14	12.1	100	100
2280002200	Marine Vessels, Commercial Diesel Underway emissions	PM10-PRI	12.14	12.1	100	100
2280002200	Marine Vessels, Commercial Diesel Underway emissions	SO2	97.58	97.6	100	100
2280002200	Marine Vessels, Commercial Diesel Underway emissions	NOX	14.88	43.2	100	34.4

Different levels of population growth throughout the CENRAP States were accounted for by calculating the ratio of county level population growth to national population growth. The population estimates used in these calculations were the EGAS population projections derived from Census population estimates and the REMI demographic/migration module which forecasts regional population change (REMI, 1997).

These resulting growth factors were then multiplied by the CENRAP 2002 VMT data at the county/roadway type/vehicle type level of detail to obtain projected 2018 VMT data. This is illustrated in the following equation:

$$VMT18_{C,V,R} = VMT02_{,C,V,R} * (VMT_{EIA18,V} / VMT_{EIA02,V}) * [(POP_{18,C}/POP02_{,C})/(POP_{18,US}/POP_{02,US})]$$

where:

$VMT18_{C,V,R}$	=	2018 projected VMT for county *C*, vehicle type *V*, road type *R* (million miles)
$VMT02_{C,V,R}$	=	2002 CENRAP VMT for county *C*, vehicle type *V*, road type *R* (million miles)
$VMT_{EIA20,\ \ V}$	=	2020 EIA-based VMT projection for vehicle type *V* (billion miles)
$VMT_{EIA99,V}$	=	1999 EIA-based VMT for vehicle type *V* (billion miles)
$POP_{20,C}$	=	2020 EGAS 4.0 population of county *C*
$POP_{99,C}$	=	1999 EGAS 4.0 population of county *C*
$POP_{20,US}$	=	2020 EGAS 4.0 population of *US*
$POP_{99,US}$	=	1999 EGAS 4.0 population of *US*

It should be noted that this equation does not specifically account for varying growth rates by functional roadway class. Our research in 2003 did not reveal a consistent national basis on which to make roadway-class-specific projections.

b. State or Local VMT Growth Methodology

Several State and local agencies within the CENRAP States provided data to be used in projecting VMT growth for that State or local area. Early in this project, Pechan asked the CENRAP emission inventory contacts for information on appropriate contacts from their State Departments of Transportation and from the major metropolitan planning organizations in their State. Pechan then inquired of these contacts whether they had developed their own VMT growth projections, and if so, the VMT growth data and will request any available documentation on the development of these growth factors and the growth factors themselves so that these growth factors would be applied correctly in the CENRAP projections. Responses to this request were provided by Arkansas, Iowa, Minnesota, Missouri, Nebraksa, and Oklahoma. However, the VMT projection data provided by Arkansas and Missouri were for 2003 only, and the VMT projection data provided by Nebraska were to 2009 only. Neither of these projections were considered sufficient for use in projecting VMT to 2018, so these data were discarded. Within the resources available, Pechan also attempted to locate publicly available projected VMT data for major cities within the CENRAP States that were not included in the State-

provided VMT projection data and was able to obtain projected VMT information for several cities in Texas. The non-default VMT projection data used are described below.

i. Iowa

The Des Moines Area Metropolitan Planning Organization (MPO) provided projected VMT data for four counties in the Des Moines area: Dallas, Madison, Polk, and Warren. For each of these counties, daily link-level VMT data were provided for the years 2000, 2005, 2010, 2020, and 2030. For each of these years, Pechan summed the total VMT for each county and then performed a linear interpolation between the 2000 and 2005 county-level VMT totals to estimate county-level 2002 VMT. Similarly, Pechan linearly interpolated the county-level VMT totals from 2010 and 2020 to obtain an estimate of the 2018 county-level VMT totals. Finally, for each of these four counties, Pechan divided the interpolated 2018 county-level VMT by the interpolated 2002 county-level VMT to calculate a 2002 to 2018 VMT growth factor. These county-level VMT growth factors were then applied to all road types and vehicle types within the corresponding county. These growth factors are as follows: 2.09 for Dallas County, 1.64 for Madison County, 1.48 for Polk County, and 1.64 for Warren County. Default VMT growth factors were used in all other Iowa counties.

ii. Minnesota

The Minnesota Department of Transportation (MnDOT) provided a series of historical annual VMT data from 1983 to 2003. From these data, Pechan conducted a set of regression analyses with the Minnesota historical VMT as the dependent variable, and historical Minnesota values (from REMI model incorporated into EGAS 5) for the following potential independent variables: year, driving age population, gasoline and oil expenditures, real disposable per capita income, and total output. Although population came in a close second, the variable with the best statistical fit was year. Pechan solved the resulting equation with values for year of 2002 and 2018 and computed the ratio of the 2018 equation value to the 2002 equation value. This resulted in 2002 to 2018 VMT growth factor of 1.37 that was applied Statewide to all road types and vehicle types.

iii. Oklahoma

The Oklahoma DEQ provided a spreadsheet containing State total VMT from 1983 through 2020. The VMT from 1983 through 2003 were daily Highway Performance Modeling System (HPMS) actual VMT totals. The 2004 through 2020 daily VMT totals were estimated by Oklahoma DEQ using linear regression based on the actual VMT data. From these data, Pechan estimated a 2002 to 2018 State-level VMT growth factor by dividing the projected 2018 daily VMT value by the 2002 Oklahoma HPMS daily VMT value. This resulted in a growth factor of 1.2754 and was applied Statewide to all road types and vehicle types.

iv. Texas

Pechan estimated VMT growth factors for the counties in the Austin and Dallas areas, based on publicly available data.

Pechan obtained VMT for the Austin area from August 2003 TCEQ-sponsored on-road mobile source emission inventories for the Austin/San Marcos Metropolitan Statistical Area. The following counties were included in these inventories: Bastrop, Caldwell, Hays, Travis, and Caldwell. For each of these counties, daily September VMT were provided for 1995, 1999, 2002, 2005, 2007, and 2012, with separate values for Monday through Thursday, Friday, Saturday, and Sunday. Pechan summed the VMT by county in each year to obtain total VMT for a week in September. Using the 2007 and 2012 weekly September VMT data, Pechan performed a linear extrapolation to estimate 2018 weekly September VMT. County-level VMT growth factors from 2002 to 2018 were then calculated by dividing the 2018 weekly September VMT by the 2002 weekly September VMT.

Pechan obtained VMT projection data for the Dallas area from the 2004 update to the Metropolitan Transportation Plan, prepared by the North Central Texas Council of Governments. This document included 1999 and 2025 VMT data for five individual counties (Dallas, Tarrant, Denton, Collin, and Rockwall) plus two additional area groups including two counties each (Ellis and Kaufman in one group and Johnson and Parker in another group). Pechan used linear interpolation to estimate 2002 and 2018 VMT data for each of these counties or county groups and then calculated the 2002 to 2018 VMT growth factors by dividing the estimated 2018 VMT by the estimated 2002 VMT.

Table II-23 summarizes the non-default VMT growth factors applied in the CENRAP States. All of these non-default growth factors were applied to all road types and vehicle types in that county.

Table II-23. 2002 to 2018 Non-Default VMT Growth Factors Applied in CENRAP States

State	County	2002 to 2018 VMT Growth Factor
Iowa	Dallas	2.09
	Madison	1.64
	Polk	1.48
	Warren	1.64
Minnesota	All	1.37
Oklahoma	All	1.28
Texas	Bastrop	1.62
	Caldwell	1.43
	Collin	1.85
	Dallas	1.32
	Denton	1.99
	Ellis	1.79
	Hays	1.44
	Johnson	1.75
	Kaufman	1.79
	Parker	1.75
	Rockwall	1.70
	Tarrant	1.47
	Travis	1.75
	Williamson	2.18

2. SMOKE MOBILE6 Inputs

Each SMOKE-formatted MOBILE6 input file represents a single representative MOBILE6 scenario for a specific county or group of counties. For each county or group of counties modeled, two SMOKE-formatted MOBILE6 files were prepared: one representing July conditions and one representing January conditions. Within SMOKE, the July input files will be used to model the ozone season months (i.e., May through September) and the January input files will be used to represent all other months. For counties with no State or local control programs and no locally-provided inputs, these MOBILE6 inputs primarily contain the calendar year being modeled (2018) and fuel input parameters for the season being modeled. Temperature data are also provided, but these are overridden in SMOKE by temperatures specific to the month being modeled. A simple SMOKE-formatted MOBILE6 input file for a county with no local inputs is shown below:

```
SCENARIO RECORD    : ARKANSAS COUNTY, AR - WINTER
CALENDAR YEAR      : 2018
EVALUATION MONTH   : 1
ALTITUDE           : 1
MIN/MAX TEMPERATURE: 50.0 70.0
FUEL RVP           : 13.0
FUEL PROGRAM       : 1
DIESEL SULFUR      : 15.0
OXYGENATED FUELS   : 0.500  0.001  0.006  0.001  1
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
```

Note that no speed information is included in this input file. The speed information is provided in the projected VMT files at the county/roadway type level of detail. In all cases, CALENDAR YEAR was set to 2018, ALTITUDE was set to "1" (i.e., low altitude), MIN/MAX TEMPERATURE was set as shown above (as dummy temperature values), DIESEL SULFUR was set to 15.0 (i.e., 15 ppm sulfur in the diesel fuel), and the PARTICULATE EF command was set using the files listed in the example above. The EVALUATION MONTH command was set to "1" for the January input files and to "2" for the July input files. The remaining commands listed in the example above (FUEL RVP, FUEL PROGRAM, ands OXYGENATED FUELS), as well as any additional commands needed, were set according to the specifics of the county or counties being modeled.

Note that the diesel sulfur input of 15 ppm sulfur in the diesel fuel represents the expected national diesel sulfur content in 2018. This reflects the requirements of the Federal heavy-duty vehicle/low sulfur diesel rulemaking. Other Federal control programs are included in the MOBILE6 defaults, with no additional inputs needed. This includes the emission standards associated with the heavy-duty vehicle rulemaking, the Tier 2 emission standards for light-duty vehicles and trucks, as well as all prior emission standards.

Optional local inputs that were included in the MOBILE6 files that are not related to control programs are the registration distributions and diesel sales fractions. The registration distributions (a distribution of registered vehicles by age for 16 vehicle types) used in the CENRAP 2002 base year modeling were used without change in the 2018 modeling. All CENRAP States except Arkansas has included registration distributions in the 2002 modeling.

The diesel sales fractions (the fraction of vehicles sales by model year that are diesel-fueled for 14 weight categories of vehicles) from 2002 were projected forward to 2018. To do this, the vehicles sales fractions listed for the 2002 model year were carried forward to all model years from 2003 to 2018. The diesel sales fractions values from the 1994 through 2002 model years, as listed in the 2002 diesel sales fractions files, were not changed. The diesel sales fractions from model years 1978 were removed from the files, as these model years are not needed in the 2018 calendar year modeling. Diesel sales fractions were provided in the 2002 CENRAP base year modeling for all CENRAP States except Arkansas and Texas.

A set of January and July SMOKE MOBILE6 input files were created for each group of counties with a unique combination of local inputs, fuels, and control programs. Thus, since Arkansas had supplied no local inputs, and there are no county-specific control programs in the State, a single set of MOBILE6 input files is used to model the entire State of Arkansas. In most of the other States, a single set of input files models a single county since most States provided county-specific registration distributions or diesel sales fraction data.

Area-specific control programs modeled in each State are described below.

a. Inspection and Maintenance and Anti-tampering Programs

Onroad vehicle inspection and maintenance (I/M) programs and/or anti-tampering programs (ATPs) are required in specific counties in Louisiana, Missouri, and Texas. Changes to these programs have occurred or will occur such that the versions needed for the 2002 modeling were updated to best reflect the programs expected to be in place in 2018.

i. Louisiana

The Louisiana I/M program applies to the 5-parish Baton Rouge ozone nonattainment area (Ascension Parish, East Baton Rouge Parish, Iberville Parish, Livingston Parish, and West Baton Rouge Parish). The specifics of this program, in MOBILE6 format, are shown in Figure II-1.

ii. Missouri

Missouri includes a basic I/M program in Franklin County, per State regulation 11 CSR 50-2.400 “Emission Test Procedures” and an enhanced I/M program in the remainder of the St. Louis area (St. Louis City, Jefferson County, St. Charles County, and St. Louis County), per State regulation 10 CSR10-5.380 “Motor Vehicle Emissions Inspection.” The specifics of the Franklin County program, in MOBILE6 format, are shown in Figure II-2. The St. Louis enhanced program is shown in Figure II-3.

Figure II-1. Baton Rouge I/M Program and ATP Characteristics

```
I/M GRACE PERIOD   : 1 2
I/M PROGRAM        : 1 2002 2050 1 TRC OBD I/M
I/M MODEL YEARS    : 1 1996 2050
I/M VEHICLES       : 1 22222 21111111 1
I/M STRINGENCY     : 1 20.0
I/M EFFECTIVENESS  : 0.75 0.75 0.75
I/M COMPLIANCE     : 1 96
I/M WAIVER RATES   : 1 0.0 0.0

I/M PROGRAM        : 2 2000 2001 1 TRC GC
I/M MODEL YEARS    : 2 1980 2001
I/M VEHICLES       : 2 22222 21111111 1
I/M COMPLIANCE     : 2 96.0

I/M PROGRAM        : 3 2002 2006 1 TRC GC
I/M MODEL YEARS    : 3 1980 2006
I/M VEHICLES       : 3 11111 21111111 1
I/M COMPLIANCE     : 3 96.0

I/M PROGRAM        : 4 2002 2050 1 TRC EVAP OBD & GC
I/M MODEL YEARS    : 4 1996 2050
I/M VEHICLES       : 4 22222 21111111 1
I/M STRINGENCY     : 4 20.0
I/M COMPLIANCE     : 4 96.0

I/M PROGRAM        : 5 2007 2050 1 TRC EVAP OBD & GC
I/M MODEL YEARS    : 5 2007 2050
I/M VEHICLES       : 5 11111 21111111 1
I/M STRINGENCY     : 5 20.0
I/M COMPLIANCE     : 5 96.0

ANTI-TAMP PROG     :
00 80 50 22222 21111111 1 11 072. 22212222
```

Figure II-2. Franklin County I/M Program and ATP Characteristics

```
I/M PROGRAM        : 1 2000 2050 2 T/O IDLE
I/M MODEL YEARS    : 1 1971 2050
I/M VEHICLES       : 1 22222 11111111 1
I/M STRINGENCY     : 1 15.2
I/M COMPLIANCE     : 1 96.0
I/M WAIVER RATES   : 1 10.9 9.9
I/M GRACE PERIOD   : 1 2

I/M PROGRAM        : 2 2000 2050 2 T/O GC
I/M MODEL YEARS    : 2 1981 2050
I/M VEHICLES       : 2 22222 11111111 1
I/M COMPLIANCE     : 2 96.0
I/M GRACE PERIOD   : 2 2

ANTI-TAMP PROG     :
00 71 50 22222 11111111 1 12 096. 12212122
```

Figure II-3. St. Louis Enhanced I/M Program Characteristics

```
I/M PROGRAM        : 1 2003 2050 2 T/O OBD I/M
I/M MODEL YEARS    : 1 1996 2050
I/M VEHICLES       : 1 22222 11111111 1
I/M STRINGENCY     : 1 20.0
I/M COMPLIANCE     : 1 96.0
I/M WAIVER RATES   : 1 3.0 3.0
I/M GRACE PERIOD   : 1 2

I/M PROGRAM        : 2 1990 2002 2 T/O IDLE
I/M MODEL YEARS    : 2 1971 1980
I/M VEHICLES       : 2 22222 11111111 1
I/M STRINGENCY     : 2 18.0
I/M COMPLIANCE     : 2 96.0
I/M WAIVER RATES   : 2 25.3 25.3
I/M GRACE PERIOD   : 2 2

I/M PROGRAM        : 3 1990 2002 2 T/O IM240
I/M MODEL YEARS    : 3 1981 2050
I/M VEHICLES       : 3 22222 11111111 1
I/M STRINGENCY     : 3 18.0
I/M COMPLIANCE     : 3 96.0
I/M WAIVER RATES   : 3 25.3 25.3
I/M CUTPOINTS      : 3 MO_IM240.cut
I/M GRACE PERIOD   : 3 2

I/M PROGRAM        : 4 2003 2050 2 T/O OBD & GC
I/M MODEL YEARS    : 4 1996 2050
I/M VEHICLES       : 4 22222 11111111 1
I/M COMPLIANCE     : 4 96.0
I/M GRACE PERIOD   : 4 2

I/M PROGRAM        : 5 2000 2002 2 T/O GC
I/M MODEL YEARS    : 5 1981 2050
I/M VEHICLES       : 5 22222 11111111 1
I/M COMPLIANCE     : 5 96.0
I/M GRACE PERIOD   : 5 2
```

iii. Texas

The Texas I/M program and ATP differ by the start date of the program in various county groups. In addition, the El Paso program is different from that in the other parts of the State. The Texas I/M program is defined in State regulation section 114.50 "Vehicle Emissions Inspection Requirements. The specifics of the Texas program, in MOBILE6 format, are shown in Figure II-4 for Harris, Dallas, and Tarrant Counties. The El Paso program is shown in Figure II-5. I/M inspections began in Collin and Denton Counties in 2002. This program is shown in Figure II-6. Testing began in 2003 for Brazoria, Ellis, Fort Bend, Galveston, Johnson, Kaufman, Montgomery, Parker, and Rockwall Counties. This program is shown in Figure II-7. Finally, testing is scheduled to begin in 2005 for the Austin area counties of Travis and Williamson. The characteristics of this program are shown in Figure II-8.

Figure II-4. Harris, Dallas, and Tarrant Counties I/M Program Characteristics

```
I/M GRACE PERIOD   : 1 2
I/M EXEMPTION AGE  : 1 25
I/M PROGRAM        : 1 1996 2001 1 TRC 2500/IDLE
I/M MODEL YEARS    : 1 1978 2050
I/M VEHICLES       : 1 22222 22222222 2
I/M STRINGENCY     : 1 20
I/M COMPLIANCE     : 1 96
I/M WAIVER RATES   : 1 3.0 3.0

I/M GRACE PERIOD   : 2 2
I/M EXEMPTION AGE  : 2 25
I/M PROGRAM        : 2 2002 2050 1 TRC OBD I/M
I/M MODEL YEARS    : 2 1996 2050
I/M VEHICLES       : 2 22222 11111111 1
I/M STRINGENCY     : 2 20
I/M COMPLIANCE     : 2 96
I/M WAIVER RATES   : 2 3.0 3.0

I/M GRACE PERIOD   : 3 2
I/M EXEMPTION AGE  : 3 25
I/M PROGRAM        : 3 2002 2050 1 TRC ASM 2525/5015 FINAL
I/M MODEL YEARS    : 3 1978 1995
I/M VEHICLES       : 3 22222 22222222 2
I/M STRINGENCY     : 3 20
I/M COMPLIANCE     : 3 96
I/M WAIVER RATES   : 3 3.0 3.0

I/M GRACE PERIOD   : 4 2
I/M EXEMPTION AGE  : 4 25
I/M PROGRAM        : 4 2002 2050 1 TRC ASM 2525/5015 FINAL
I/M MODEL YEARS    : 4 1996 2050
I/M VEHICLES       : 4 11111 22222222 2
I/M STRINGENCY     : 3 20
I/M COMPLIANCE     : 4 96
I/M WAIVER RATES   : 4 3.0 3.0

I/M GRACE PERIOD   : 5 2
I/M EXEMPTION AGE  : 5 25
I/M PROGRAM        : 5 2002 2050 1 TRC EVAP OBD & GC
I/M MODEL YEARS    : 5 1996 2050
I/M VEHICLES       : 5 22222 11111111 1
I/M COMPLIANCE     : 4 96

I/M GRACE PERIOD   : 6 2
I/M EXEMPTION AGE  : 625
I/M PROGRAM        : 6 2002 2050 1 TRC GC
I/M MODEL YEARS    : 6 1978 1995
I/M VEHICLES       : 6 22222 22222222 2
I/M COMPLIANCE     : 6 96
```

Figure II-4 (continued)

```
I/M GRACE PERIOD   : 7 2
I/M EXEMPTION AGE  : 7 25
I/M PROGRAM        : 7 2002 2050 1 TRC GC
I/M MODEL YEARS    : 7 1996 2050
I/M VEHICLES       : 7 11111 22222222 2
I/M COMPLIANCE     : 7 96

ANTI-TAMP PROG     :
84 78 16 22222 22222222 2 11 096. 22112222
```

Figure II-5. El Paso County I/M Program Characteristics

```
I/M GRACE PERIOD   : 1 2
I/M EXEMPTION AGE  : 1 25
I/M PROGRAM        : 1 1996 2050 1 TRC 2500/IDLE
I/M MODEL YEARS    : 1 1978 2050
I/M VEHICLES       : 1 22222 22222222 2
I/M STRINGENCY     : 1 20
I/M COMPLIANCE     : 1 96
I/M WAIVER RATES   : 1 3.0 3.0

I/M GRACE PERIOD   : 2 2
I/M EXEMPTION AGE  : 2 25
I/M PROGRAM        : 2 1996 2050 1 TRC GC
I/M MODEL YEARS    : 2 1978 2050
I/M VEHICLES       : 2 22222 22222222 2
I/M COMPLIANCE     : 2 96

ANTI-TAMP PROG     :
86 78 16 22222 22222222 2 11 096. 22112222
```

Figure II-6. Collin and Denton Counties I/M Program Characteristics

```
I/M GRACE PERIOD   : 1 2
I/M EXEMPTION AGE  : 1 25
I/M PROGRAM        : 1 2002 2050 1 TRC OBD I/M
I/M MODEL YEARS    : 1 1996 2050
I/M VEHICLES       : 1 22222 11111111 1
I/M STRINGENCY     : 1 20
I/M COMPLIANCE     : 1 96
I/M WAIVER RATES   : 1 3.0 3.0

I/M GRACE PERIOD   : 2 2
I/M EXEMPTION AGE  : 2 25
I/M PROGRAM        : 2 2002 2050 1 TRC ASM 2525/5015 FINAL
I/M MODEL YEARS    : 2 1978 1995
I/M VEHICLES       : 2 22222 22222222 2
I/M STRINGENCY     : 2 20
I/M COMPLIANCE     : 2 96
I/M WAIVER RATES   : 2 3.0 3.0

I/M GRACE PERIOD   : 3 2
I/M EXEMPTION AGE  : 3 25
I/M PROGRAM        : 3 2002 2050 1 TRC ASM 2525/5015 FINAL
I/M MODEL YEARS    : 3 1996 2050
I/M VEHICLES       : 3 11111 22222222 2
I/M STRINGENCY     : 3 20
I/M COMPLIANCE     : 3 96
I/M WAIVER RATES   : 3 3.0 3.0

I/M GRACE PERIOD   : 4 2
I/M EXEMPTION AGE  : 4 25
I/M PROGRAM        : 4 2002 2050 1 TRC EVAP OBD & GC
I/M MODEL YEARS    : 4 1996 2050
I/M VEHICLES       : 4 22222 11111111 1
I/M COMPLIANCE     : 4 96

I/M GRACE PERIOD   : 5 2
I/M EXEMPTION AGE  : 5 25
I/M PROGRAM        : 5 2002 2050 1 TRC GC
I/M MODEL YEARS    : 5 1978 1995
I/M VEHICLES       : 5 22222 22222222 2
I/M COMPLIANCE     : 5 96

I/M GRACE PERIOD   : 5 2
I/M EXEMPTION AGE  : 5 25
I/M PROGRAM        : 5 2002 2050 1 TRC GC
I/M MODEL YEARS    : 5 1996 2050
I/M VEHICLES       : 5 11111 22222222 2
I/M COMPLIANCE     : 5 96

ANTI-TAMP PROG     :
84 78 16 22222 22222222 2 11 096. 22112222
```

Figure II-7. 9-County Texas, 2003 Start Year, I/M Program Characteristics

```
I/M GRACE PERIOD   : 1 2
I/M EXEMPTION AGE  : 1 25
I/M PROGRAM        : 1 2003 2050 1 TRC OBD I/M
I/M MODEL YEARS    : 1 1996 2050
I/M VEHICLES       : 1 22222 11111111 1
I/M STRINGENCY     : 1 20
I/M COMPLIANCE     : 1 96
I/M WAIVER RATES   : 1 3.0 3.0

I/M GRACE PERIOD   : 2 2
I/M EXEMPTION AGE  : 2 25
I/M PROGRAM        : 2 2003 2050 1 TRC ASM 2525/5015 FINAL
I/M MODEL YEARS    : 2 1978 1995
I/M VEHICLES       : 2 22222 22222222 2
I/M STRINGENCY     : 2 20
I/M COMPLIANCE     : 2 96
I/M WAIVER RATES   : 2 3.0 3.0

I/M GRACE PERIOD   : 3 2
I/M EXEMPTION AGE  : 3 25
I/M PROGRAM        : 3 2003 2050 1 TRC ASM 2525/5015 FINAL
I/M MODEL YEARS    : 3 1996 2050
I/M VEHICLES       : 3 11111 22222222 2
I/M STRINGENCY     : 3 20
I/M COMPLIANCE     : 3 96
I/M WAIVER RATES   : 3 3.0 3.0

I/M GRACE PERIOD   : 4 2
I/M EXEMPTION AGE  : 4 25
I/M PROGRAM        : 4 2003 2050 1 TRC EVAP OBD & GC
I/M MODEL YEARS    : 4 1996 2050
I/M VEHICLES       : 4 22222 11111111 1
I/M COMPLIANCE     : 4 96

I/M GRACE PERIOD   : 5 2
I/M EXEMPTION AGE  : 5 25
I/M PROGRAM        : 5 2003 2050 1 TRC GC
I/M MODEL YEARS    : 5 1978 1995
I/M VEHICLES       : 5 22222 22222222 2
I/M COMPLIANCE     : 5 96

I/M GRACE PERIOD   : 6 2
I/M EXEMPTION AGE  : 6 25
I/M PROGRAM        : 6 2003 2050 1 TRC GC
I/M MODEL YEARS    : 6 1996 2050
I/M VEHICLES       : 6 11111 22222222 2
I/M COMPLIANCE     : 6 96

ANTI-TAMP PROG     :
84 78 16 22222 22222222 2 11 096. 22112222
```

Figure II-8. Austin Area I/M Program Characteristics

```
I/M GRACE PERIOD   : 1 2
I/M EXEMPTION AGE  : 1 25
I/M PROGRAM        : 1 2005 2050 1 TRC OBD I/M
I/M MODEL YEARS    : 1 1996 2050
I/M VEHICLES       : 1 22222 11111111 1
I/M STRINGENCY     : 1 20
I/M COMPLIANCE     : 1 96
I/M WAIVER RATES   : 1 3.0 3.0

I/M GRACE PERIOD   : 2 2
I/M EXEMPTION AGE  : 2 25
I/M PROGRAM        : 2 2005 2050 1 TRC 2500/IDLE
I/M MODEL YEARS    : 2 1978 1995
I/M VEHICLES       : 2 22222 22222222 2
I/M STRINGENCY     : 2 20
I/M COMPLIANCE     : 2 96
I/M WAIVER RATES   : 2 3.0 3.0

I/M GRACE PERIOD   : 3 2
I/M EXEMPTION AGE  : 3 25
I/M PROGRAM        : 3 2005 2050 1 TRC 2500/IDLE
I/M MODEL YEARS    : 3 1996 2050
I/M VEHICLES       : 3 11111 22222222 2
I/M STRINGENCY     : 3 20
I/M COMPLIANCE     : 3 96
I/M WAIVER RATES   : 3 3.0 3.0

I/M GRACE PERIOD   : 4 2
I/M EXEMPTION AGE  : 4 25
I/M PROGRAM        : 4 2005 2050 1 TRC EVAP OBD & GC
I/M MODEL YEARS    : 4 1996 2050
I/M VEHICLES       : 4 22222 11111111 1
I/M COMPLIANCE     : 4 96

I/M GRACE PERIOD   : 5 2
I/M EXEMPTION AGE  : 5 25
I/M PROGRAM        : 5 2005 2050 1 TRC GC
I/M MODEL YEARS    : 5 1978 1995
I/M VEHICLES       : 5 22222 22222222 2
I/M COMPLIANCE     : 5 96

I/M GRACE PERIOD   : 6 2
I/M EXEMPTION AGE  : 6 25
I/M PROGRAM        : 6 2005 2050 1 TRC GC
I/M MODEL YEARS    : 6 1996 2050
I/M VEHICLES       : 6 11111 22222222 2
I/M COMPLIANCE     : 6 96

ANTI-TAMP PROG     :
84 78 16 22222 22222222 2 11 096. 22112222
```

b. Gasoline Programs

The control programs modeled in the SMOKE MOBILE6 input files included the effects of several gasoline programs. Reformulated gasoline was modeled in the St. Louis, Missouri; Houston, Texas; and Dallas, Texas ozone nonattainment areas. The specific counties modeled with Federal reformulated gasoline are the same as those modeled with this program in the NONROAD model runs, as shown in Table II-11. No changes were expected in oxygenated fuel programs or inputs. Therefore, the MOBILE6 oxygenated fuel input parameters did not change from the 2002 base year modeling.

State-run low RVP gasoline control programs are in place in three of the CENRAP States: Kansas, Missouri, and Texas. These low RVP programs are not statewide, but are in specific counties. The Kansas and Missouri programs are in 1-hour ozone maintenance areas. The Texas program covers a broader area of the State. In addition to these State low RVP programs, the six-parish Baton Rouge ozone nonattainment area is subject to a 7.8 psi RVP maximum during the ozone season months, as regulated by the Federal RVP program for southern ozone nonattainment areas. Descriptions of the individual State low RVP programs are given below. Note that these RVP limits were applied to the nonroad gasoline engines covered in the NONROAD model, as well as onroad vehicles, for the counties and months discussed below, and this information was summarized in Table II-12.

i. Kansas

The Kansas low RVP program is specified under Section 28-19-719 “Fuel Volatility” of the Kansas Air Quality Regulations and applies in Johnson and Wyandotte Counties. These two counties are part of the Kansas City ozone maintenance area. This regulation specifies that gasoline dispensed for use in motor vehicles in Johnson and Wyandotte Counties not exceed an RVP of 7.0 pounds per square inch (psi). Gasoline containing between 9 and 10 percent ethanol by volume is limited to an RVP of 8.0 psi. These regulations are in effect from June 1 through September 15 of each year, starting in 2001. To account for the time needed for individual gasoline stations to comply with these limits, the low RVP program is modeled from May through September in the MOBILE6 SMOKE input files.

ii. Missouri

The Missouri low RVP program is specified under Section 10-2.330 “Control of Gasoline Reid Vapor Pressure” of the Missouri Code of State Regulations for the Air Conservation Commission and applies in Clay, Platte, and Jackson Counties. These counties are part of the Kansas City ozone maintenance area. This regulation specifies that gasoline dispensed for use in motor vehicles in Clay, Platte, and Jackson Counties not exceed an RVP of 7.0 psi. Gasoline containing between 9 and 10 percent ethanol by volume is limited to an RVP of 8.0 psi. These regulations are in effect from June 1 through September 15 of each year, starting in 2001. To account for the time needed for individual gasoline stations to comply with these limits, the low RVP program is modeled from May through September in the MOBILE6 SMOKE input files.

iii. Texas

The Texas low RVP program is specified under Section 114.301 through 114.309 “Low Emission Fuels, Division 1: Gasoline Volatility” of the Texas Natural Resource Conservation Commission regulations and applies in a 95-county area of eastern Texas. This area excludes the eastern Texas counties in the Dallas and Houston area that are included in the Federal reformulated gasoline program. This regulation specifies that gasoline dispensed for use in the 95 affected counties not exceed an RVP of 7.8 psi. These regulations are in effect at gasoline dispensing facilities from June 1 through October 1 of each year, beginning in 2001. To account for the time needed for individual gasoline stations to comply with these limits, the low RVP program is modeled from May through September in the MOBILE6 SMOKE input files.

A separate low RVP program is in place in El Paso County. Under this program, gasoline dispensed in El Paso County is limited to an RVP of 7.0 psi from June 1 through September 16. This program began in 1996. To account for the time needed for individual gasoline stations to comply with these limits, the low RVP program is modeled from May through September in the MOBILE6 SMOKE input files.

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CHAPTER III. DEVELOPMENT OF DATA FOR AREAS OUTSIDE OF THE CENRAP STATES

A. WRAP

The Western Regional Air Partnership (WRAP) includes all of the States west of the CENRAP region. WRAP's current schedule for preparing new emission projections for its States did not include any new information by March 2005, so the previous WRAP 2018 emission forecasts will be used as the basis for CENRAP's projection year emissions modeling. The existing WRAP 2018 emission forecasts are made from a 1996 base year. The CENRAP emission modelers already have access to these WRAP emission inventory projection files, so Pechan did not expend any further effort in preparing or modifying the WRAP emission projection data.

B. VISTAS

The Visibility Improvement State and Tribal Association of the Southeast (VISTAS) includes the States of Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. VISTAS had recently completed 2018 emission projections for its States in March 2005. VISTAS agreed that CENRAP may use the 2018 SMOKE-ready emission modeling files that VISTAS developed for its States once all QA has been completed on these files. Because the CENRAP emission modelers are the same as those performing the emission modeling for VISTAS, Pechan did not expend any further effort in preparing or modifying the VISTAS emission inventory.

For the EGU sector, CENRAP determined that it would be best to use a consistent IPM data set for all of the non-WRAP States. Therefore, for the EGU sector, the VISTAS EGU data will be replaced by the EGU data from the summer 2005 IPM projections.

C. MRPO

The Midwest Regional Planning Organization (MRPO) includes the States of Illinois, Indiana, Michigan, Ohio, and Wisconsin. Pechan developed growth factors for the point and area source emissions for the MRPO States as discussed in section II.A of this document. Pechan obtained the mobile source inputs for the MRPO States from 2018 modeling prepared by VISTAS, with the permission of both VISTAS and MRPO. These are the inputs that were used in VISTAS 2018 modeling for these States, with inputs provided by MRPO States. Pechan prepared point and area source control factors, based on projection year modeling we had prepared earlier for MRPO. The emission inventory file for 2018 for the NONROAD model categories was based on interpolating the 2015 and 2020 nonroad emission inventories prepared by EPA in support of the Clean Air Interstate Rule in 2004 (EPA, 2004c). Emissions from the MRPO States for the EGU sector will be obtained by CENRAP from the summer 2005 IPM runs.

D. MANE-VU

The Mid-Atlantic/Northeast Visibility Union (MANE-VU) MRPO includes the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont, and the District of Columbia. For the MANE-VU States, Pechan used the point and area source growth factors developed for the MRPO States as discussed in section II.A of this document. Pechan obtained the mobile source inputs for the MANE-VU States from the 2018 modeling prepared by VISTAS, as discussed above for MRPO. These are the inputs that were used in VISTAS 2018 modeling for the MANE-VU States. Pechan prepared point and area source control factors, based on projection year modeling we had prepared earlier for MRPO that include the MANE-VU States. The emission inventory file for 2018 for the NONROAD model categories was based on interpolating the 2015 and 2020 nonroad emission inventories prepared by EPA in support of the Clean Air Interstate Rule in 2004 (EPA, 2004c). Emissions from the MRPO States for the EGU sector will be obtained by CENRAP from the summer 2005 IPM runs.

E. CANADA

Available emission data sets for Canada are currently limited to historical emission years--1995 and 2000. EPA and LADCO/MRPO are using these inventories to estimate current and future year emissions for these provinces. It is our understanding that LADCO is using/planning to use 1995 point source emission estimates and 2000 onroad/off-road/area source emission estimates to estimate Canadian emissions for their modeling domain. (The 2000 point source emissions data are not being used because of confidentiality limitations.) The 2000 Canadian emission data sets for the three nonproprietary sectors (non-point/area, nonroad mobile, and onroad mobile) are available at: http://www.epa.gov/ttn/chief/net/canada.html#data. This file contains information in both dBaseIV and SMOKE IDA format.

While we know that Environment Canada compiles emission projections on a regular basis to support the development of Federal and provincial emission control strategies, it is not expected that Environment Canada would be able to provide growth and control factors on a timely basis for this CENRAP project. Pechan recommended that CENRAP use the base year 1995 and 2000 Canadian emissions data without adjustments for all future year model simulations. The CENRAP emission modelers already have access to these Canadian emission inventory files, so Pechan did not expend any further effort in preparing or modifying the Canadian emission inventory.

F. MEXICO

The emissions inventory base year for Mexico is for 1999, from the BRAVO study. Inventories for the years 2002 and 2012 were also estimated in order to understand how growth and existing control strategies may impact future emissions. Currently, the 1999 emission inventory is available, but the emission databases for the other years are not. Moreover, the point source database will most likely be proprietary, and could require signing a non-disclosure agreement for access. Pechan has recommended, and CENRAP has agreed, that the 1999 Mexican emission database be used as is for the CENRAP 2018 modeling, due to the uncertainty inherent

in applying growth and control factors to this inventory. The CENRAP emission modelers already have access to these Mexican emission inventory files, so Pechan did not expend any further effort in preparing or modifying the 1999 Mexican emission inventory.

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CHAPTER IV. ISSUES OF CONCERN

Due to the timing of the growth and control factor development under this project, some adjustments may need to be made in the future to the factors developed under this project. As the CENRAP 2002 emission inventory continues to be revised, as well as the base year inventories for the other RPOs, issues may arise related to matching the growth and control factors to a revised base year inventory. In cases where SCCs are changed, added to, or deleted from the base year inventory, the growth and control factors may no longer match correctly to the base year inventory. In these cases, the projection year inventories will be incorrect.

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APPENDIX A
METHODS FOR DEVELOPMENT OF GROWTH AND CONTROL INPUTS FOR 2018 EMISSIONS (SCHEDULES 3 AND 9)

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CHAPTER I. INTRODUCTION

The purpose of this project is to prepare emission growth and control factors that can be applied to the Central Regional Air Planning Association (CENRAP) 2002 base year emission inventory to obtain a 2018 emissions inventory for the CENRAP region. The CENRAP region includes the States and Tribal areas of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma, and Texas. In addition to the CENRAP States, additional factors will be compiled under this project to include the entire CENRAP modeling domain. This will include projected emissions data or projection year growth and control factor data from the other Regional Planning Organizations (RPOs), Canada, and Mexico. All data products will be prepared in SMOKE-compatible format.

These projection year growth and control factor data will be used to support air quality modeling and State Implementation Plan (SIP) development and implementation activities for the regional haze rule and fine particulate matter (PM) and ozone National Ambient Air Quality Standards (NAAQS). The data will be applicable to all source categories and pollutants included in the CENRAP 2002 emission inventory. This includes the following pollutants: sulfur oxides (SO_x), oxides of nitrogen (NO_x), volatile organic compounds (VOC), carbon monoxide (CO), ammonia (NH_3), and particles with an aerodynamic diameter less than or equal to a nominal 10 and 2.5 micrometers (i.e., primary PM_{10} and $PM_{2.5}$).

This Methods Document explains the data sources that E.H. Pechan & Associates, Inc. (Pechan) plans to use and the procedures Pechan will follow in developing the necessary growth and control data for this project. Chapter II of this document presents Pechan's planned methods for developing control factors and growth factors for the CENRAP States. The methods are presented separately for each of the major source categories. Chapter III of this document presents the data sources and methods that Pechan will use for developing the data for areas outside of the CENRAP States, including other RPOs and Canada and Mexico. References are included in Chapter IV.

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CHAPTER II. METHODS FOR THE CENRAP REGION

A. CONTROL FACTOR DEVELOPMENT METHODS AND DATA SOURCES

1. Non-EGU Point Sources

a. Federal Controls

For non-electricity generating unit (EGU) point sources, the analysis of Federal controls will focus on maximum achievable control technology (MACT) standards. Numerous MACT emission standards have been promulgated since 1990, and are designed to control emissions of hazardous air pollutants (HAPs) from stationary sources. Many of the MACT standards are expected to produce associated VOC emission reductions, so the 2018 control factors need to capture the expected effects of post-2002 MACT standards.

Pechan prepared criteria pollutant-specific emission control factors for various projection years (including 2018) for the Lake Michigan Air Directors Consortium (LADCO) during late 2004. The procedure for developing the MACT standard-associated control factors included identifying source categories and associated Source Classification Codes (SCCs) for each MACT standard having a post-2002 compliance date for existing sources. The control factors for most MACT categories are based on information found in the preamble to the final rule of each MACT subpart as published in the *Federal Register*. Pechan plans to circulate this table of control factors to the CENRAP States for review before using this table to develop non-EGU point source control factors for the CENRAP States.

b. State/Local Controls

CENRAP States will be surveyed to gather information on control programs for the 2018 inventory. The general approach is to use State contacts and information for 1-hour ozone and PM_{10} SIPs to determine where post-2002 emission reductions are expected. Two States where we expect there to be post-2002 non-EGU point source emission reductions include Texas and Missouri. For Texas, it is expected that control factors will be based on the control factor file developed by Pechan during 2001 for the prior Western Regional Air Partnership (WRAP) emission forecast to 2018, with updates to a 2002 base year and to reflect recent SIP updates (Houston-Galveston area). Another possible way to approach this is to obtain the most recent Texas control factor file from the Texas Commission on Environmental Quality (CEQ) and incorporate it into the CENRAP State control factor database. Key issues in determining whether using any new Texas CEQ control factor files in this analysis is advisable include whether this file is for a 2002 base year inventory, and how the reductions in highly reactive VOCs that are required in the Houston-Galveston area SIP are treated in 2002 and any forecast years.

The portion of eastern Missouri that is within the fine grid is affected by the NO_x SIP Call, so controls would be expected to be added in those counties to reduce point source NO_x emissions

between 2002 and 2018. It appears to us that the associated Missouri rule affects NO_x emissions from EGUs but not some of the non-EGU source categories like industrial boilers/turbines, stationary internal combustion engines, and cement kilns that are regulated in other NO_x SIP Call affected States. Rules that potentially affect the non-EGU source categories appear to be under development. Pechan plans to inquire with the Missouri Department of Natural Resources to determine whether control factors for these non-EGU categories should be included in the 2018 control factor file. The number of affected sources appears to be small enough that source-specific control factors can be developed.

We can also survey the other CENRAP States (besides Texas and Missouri) to determine whether these are State/local regulations that would be expected to provide post-2002 emissions reductions. If there are, pollutant-specific control factors will be developed for those geographic areas by SCC.

2. Area Sources

For the CENRAP States, Pechan will contact each State to obtain information for any on-the-books controls affecting non-EGU point and area sources from 2002 to 2018. Pechan will also compile information for national controls affecting these sources from EPA regulatory support documents. Based on the analyses performed by Pechan for other RPOs, the Federal controls for which area source control factors are expected to be developed is limited to residential wood combustion. For this analysis, a 20-year estimated lifetime for woodstoves and fireplace inserts will be used along with the SCC-specific growth factors, and emission factor ratios by SCC, to account for the replacement of retired woodstoves that emit at pre-new source performance standard levels, with new wood burning equipment, that would be catalyst-equipped. Emission factor ratios will be pollutant-specific.

Federal rules affecting VOC solvent emissions such as those from consumer products and architectural and industrial maintenance coatings are expected to be incorporated in the 2002 emission databases, so no post-2002 emission rate reductions are expected for these categories.

3. EGU Point Sources

Data sources to be used for developing EGU control factors include CENRAP's 2002 nine State point source National Emissions Inventory (NEI) input format (NIF) data files (prepared by Pechan and Carolina Environmental Program and delivered on December 10, 2004), the Workgroup-selected growth factors, and the U.S. Environmental Protection Agency's (EPA's) 2020 Integrated Planning Model (IPM) Base and Clean Air Interstate Rule (CAIR) Control post-processed scenario data files (developed by Pechan for EPA from IPM parsed output files). Because 2018 IPM data from two RPOs are unavailable, 2020 data will be used as a surrogate (with CENRAP's agreement). This should pose no significant problem since no known pollutant regulations are in effect in 2020 and not 2018. The 2020 Base and Control (CAIR) post-processed IPM scenario data files include annual emission values for seven pollutants – sulfur dioxide (SO_2), NO_x, CO, VOC, NH_3, primary PM_{10}, and primary $PM_{2.5}$ – as well as annual heat input; only SO_2, NO_x, and heat input are provided in the initial IPM files; the other emissions, along with throughput, were developed during the post-processing phase. Because EPA required

that Pechan use an older emission factor file from 2003, and new NH_3 emissions factors for EGUs were developed in Spring 2004, the post-processed files delivered to EPA included ammonia emissions developed using the old emission factors; as agreed to in a January 10th conference call, Pechan will recalculate these emissions using the new NH_3 emissions factors.

For EGUs in the CENRAP States and in the 2020 IPM Base Case and CAIR post-processed data files, Pechan will provide growth and control factors in SMOKE format. The control factors will be provided in SMOKE CONTROL (Table 8.66 in the SMOKE v2.1 User's Manual) formatted files.

Each EGU record in both the 2020 Base and Control Cases will be ORISPL-BLRID matched into the EGU extract of the CENRAP NIF files (if at all possible) to obtain the FIPS State and county, plant ID, and point ID (where a point is generally equivalent to a boiler) as needed. Since the IPM scenarios only have one SCC per boiler, the emissions for all SCCs at a given point in CENRAP will be assigned to the SCC with the largest emissions.

The control factor (cf) for each 2020 Base and Control Case EGU unit will be calculated as follows for each of the seven pollutant emissions:

2020 EGU pollutant's emissions cf = (2020 pollutant's emissions) / (2002 EGU's State-SCC gf ∗ 2002 CENRAP pollutant's emissions summed to the point-level and assigned to the SCC with the largest emissions).

The IPM units that operate in 2020 but either are not in the 2002 CENRAP data (i.e., generic or committed/planned units) or could not be matched, will not be included in the SMOKE CONTROL formatted files because no control factors can be calculated. Yet, they have emissions that need to be accounted for. Based on a conversation with EPA's Marc Houyoux, a principal developer of SMOKE, it would be best for Pechan to provide the projected emissions for those units in either an Excel file or a SMOKE IDA (Table 8.45 in the SMOKE v2.1 User's Manual) point source formatted file.

4. Nonroad Sources

Pechan will contact CENRAP States to determine whether each State has specific nonroad equipment regulations beyond the Federal engine standards that are expected to be in place by 2018. In cases where State regulations do exist, Pechan will determine the affected SCCs and pollutants, and will compile or develop estimates of the percent emission reduction of the rule in 2018. To date, Pechan has determined that the States of Iowa, Kansas, Minnesota, Nebraska, and Oklahoma do not have additional air requirements for nonroad sources.

Pechan has compiled estimates of control effectiveness for 2018 for Federal regulations affecting diesel locomotives and commercial marine engines. This information is available from the relevant Regulatory Support Documents prepared by EPA (EPA, 1998; EPA, 1999; EPA, 2003). These regulations include engine exhaust standards, as well as diesel fuel sulfur limits that will reduce SO_2 and PM emissions. For their 2003 aircraft engine NO_x emission standards, EPA did not prepare emission reduction estimates because any such reductions were believed to be

modest (e.g., 94 percent of aircraft engines are currently meeting or exceeding these standards). Therefore, Pechan does not propose to account for aircraft emission reductions from these standards for this analysis.

In running the NONROAD2004 model, all Federal engine standards are accounted for, with the exception of evaporative emission standards for large spark-ignition and land-based recreational gasoline equipment. The evaporative standards for recreational equipment only affect permeation emissions, which are not currently included in NONROAD2004. As such, baseline emissions and reductions will not be modeled. The large spark ignition standards affect a subset of evaporative emissions for engines of a specified horsepower (EPA, 2002). Under contract to LADCO, Pechan has developed estimates of SCC-specific emission reductions for this standard, which can be applied to the NONROAD model output as a post-processing step.

5. Onroad Sources

For the onroad sources, control measures are defined in terms of inputs to the SMOKE MOBILE6 files rather than a control factors file. These input files will incorporate all promulgated Federal control programs, including the heavy-duty diesel (2007) engine standard and low sulfur diesel fuel as well as the Tier 2 emission standards and low sulfur gasoline program. Federal control programs are generally modeled through the MOBILE6 defaults, with no specific user input commands necessary. Reformulated gasoline will be modeled in the following nonattainment areas: St. Louis (4 Missouri counties plus St. Louis City), Dallas-Fort Worth (4 counties), and Houston-Galveston (8 counties).

Pechan will contact each of the CENRAP State contacts to determine whether any changes in fuel programs or inspection and maintenance (I/M) programs, from those modeled in the CENRAP 2002 emission inventory, are expected to take place by 2018. Pechan will also determine from these contacts whether any other area-specific control programs are planned. If any programs are planned that cannot be modeled with MOBILE6 (e.g., transportation control measures), Pechan either will develop control factors that can be applied by the emission modelers to the resulting onroad emissions or will adjust the vehicle miles traveled (VMT) growth factors to account for the control measure, depending upon which approach is appropriate for the specific measure.

B. GROWTH FACTOR DEVELOPMENT METHODS AND DATA SOURCES

1. Non-EGU Point Sources and Area Sources (EGAS)

Pechan will develop emission activity growth data for the CENRAP States using a combination of approaches/data sources. For the most part, Pechan will rely on growth factors that are produced by EPA's Economic Growth Analysis System (EGAS). Under Task 5, Pechan prepared a Technical Memorandum comparing EGAS Versions 4.0 and 5.0 (Pechan, 2005).

In preparing the Task 5 memorandum, Pechan reviewed the indicators selected as default emission activity growth surrogates in EGAS 4.0 and 5.0 for the highest-emitting point and

nonpoint SCCs in the CENRAP base year inventory. Pechan then reviewed alternative data sources for the availability of better growth surrogates. Based on this review, Pechan identified alternative growth indicator recommendations for a number of important CENRAP source categories (e.g., use of *Annual Energy Outlook* projections for oil and gas production SCCs). In addition, Pechan identified alternatives to the State-level population projections from EGAS (i.e., county-level population projections prepared by government agencies/universities in each CENRAP State).

Chapter III of the Task 5 memorandum details Pechan's recommendations for the methods and data sources to use in developing stationary point and nonpoint (area) source growth factors for the CENRAP States. Pechan will prepare emission activity growth data for the stationary source emission sources in the CENRAP States that reflects CENRAP feedback on the recommended methods and data sources that are outlined in this chapter.

2. EGU Point Sources

a. Data Sources/Quality Assurance Issues

Data sources to be used to calculate EGU growth factors include EPA’s 2020 IPM Base post-processed scenario data file (developed by Pechan for EPA from IPM parsed output files), EPA’s 2002 EGU inventory, and EGAS 5 EGU 2020 growth factors. Reasons for these choices are explained below.

Pechan will compare the CENRAP nine State-SCC level (2002 to 2020) EGAS 5 growth factors with growth factors calculated as throughput (fuel consumption) ratios derived from EPA’s 2020 Base Case Scenario and the 2002 EGU inventory developed for EPA (and based on the Department of Energy’s Energy Information Administration (EIA) Form EIA-767 and EPA’s Clean Air Markets Division (CAMD)’s Emission Tracking System/ Continuous Emissions Monitoring (ETS/CEM) reported data).

For the IPM-based growth factor development, Pechan originally planned to use the EGUs extracted from the CENRAP data files for the 2002 throughput, but found that several States did not report throughput. We tried to fill in missing values by back calculating throughput using CENRAP reported CO emissions (which would be uncontrolled, unlike SO_2 and NO_x; and larger in magnitude than VOC) and its emissions factor (or the SCC-based EPA-approved uncontrolled emission factor for CO if no emission factor was included in the CENRAP files). However, from a check of some CENRAP records with both throughput and CO reported, it was found that the back-calculated throughput was frequently different from the reported throughput (i.e., had a greater than ten percent difference).

An additional issue with using the CENRAP data files is that we first broadly defined EGUs as those records with a positive ORISPL or SIC=4911, 4932, or 4939, and SCCs beginning with 101 or 201. However, we found several plants “missing” from the CENRAP EGU data that were in either the EIA-767 or ETS/CEM data files; these plants may be in the CENRAP data files, but not in our EGU extract. Also, some sets of records with ORISPLs and SCCs beginning with 101 or 201 did not have any boiler IDs included in the data files and/or some had some

boiler IDs identified and some not (and some seemingly duplicated). Additionally, we found some discrepant ORISPLs.

Pechan also compared total SO_2, NO_x, and CO emissions for each of the nine CENRAP States from the 2002 Inventory and the all inclusive CENRAP EGU extract. In most cases, the 2002 EGU inventory emission totals were greater. All three pollutant emissions are within a 10 percent difference for three States (Kansas, Missouri, and Nebraska); NO_x is within a 10 percent difference for five more States (Iowa, Louisiana, Minnesota, Oklahoma, and Texas); and SO_2 is within an 11 percent difference for three more States (Minnesota, Oklahoma, and Texas); Arkansas' emissions for all three pollutants were not close, perhaps because some plant data in the CENRAP files were missing, some emissions may be reversed, etc.

Pechan had not anticipated nor allotted hours for performing quality assurance (QA) on the CENRAP data, but found it necessary to do so to some extent to determine whether the data could be used for throughput. To avoid further expenditure of hours, we determined that it would be best to use the 2002 EPA EGU Inventory for the 2002 throughput data, rather than the CENRAP data files. Please note that we are not stating that all nine of the CENRAP States have all or any of the issues addressed above, but that enough of them did that we were not able to either use the reported throughput or calculated throughput at the State-SCC level with a high degree of confidence.

b. Growth Factor Calculation

The growth factor (gf) for each State-SCC will be calculated as follows:

gf = (2020 IPM Base Case throughput aggregate) / (2002 EGU inventory throughput aggregate),

where:

the 2020 IPM Base Case throughput is derived from the given heat input and a default fuel heat content; and

the 2002 EGU inventory throughput is reported data if the boiler is included in the EIA-767, and is derived from the given heat input and a default fuel heat content if it is not in the EIA-767 but is in the ETS/CEM data file.

Pechan will provide an Excel data file which will include the nine State-SCC level records and their EGAS 5 and IPM-based growth factors for 2020 as well as a Technical Memorandum that includes a recommendation and rationale for the proposed growth factor methodology.

A summary report of the changes in 2018 IPM inputs requested by the Visibility Improvement – State and Tribal Association of the Southeast (VISTAS) and the Midwest Regional Planning Organization (MRPO) was provided to Pechan, along with a response to a follow-up question. If VISTAS and MRPO approve the release of this information, with CENRAP's agreement, it will be included in the final report and will serve as the part of the deliverable Technical Memorandum that presents a summary of the changes made to IPM inputs by the other RPOs.

The growth factors (whose methodology will be determined by the CENRAP Workgroup) from Task 6 will be provided in SMOKE PROJECTION format (Table 8.70 in the SMOKE v2.1 User's Manual).

3. Nonroad Sources

For the aircraft, commercial marine vessel and locomotive categories, Pechan will develop emission activity growth data for the CENRAP States using EGAS. Pechan's recommendations for developing growth factors for these categories were outlined in a Task 5 Technical Memorandum, and the final methods will reflect any additional feedback from CENRAP.

Also as part of Task 5, Pechan will prepare a separate Technical Memorandum to describe the proposed adjustments to the NONROAD model national growth rates to reflect State data for significant categories. The data to regionalize the NONROAD model growth factors will be obtained from REMI, as incorporated into EGAS (Houyoux, 2004).

4. VMT for Onroad Sources

To estimate growth in onroad VMT, Pechan will first ask CENRAP for appropriate contacts from their State Departments of Transportation and from the major metropolitan planning organizations (MPOs) in their State. Pechan will then inquire of these contacts whether they have developed their own growth projections, and if so, will request any available documentation on the development of these growth factors and the growth factors themselves. The documentation will be important in understanding the geographic area covered by the growth factors, the base and projection years of the growth factors, and the sources of data driving the projections. The documentation should also provide information on the level of detail at which the growth factors were developed (e.g., do the factors vary by interstates vs. arterials, by rural area vs. urban area, by vehicle type, etc.). Any growth factor data will need to be provided electronically in database (Access, DBF, or MySQL), spreadsheet (Excel), or text file format for processing under this project. When VMT growth factors are provided for a different base and projection year, Pechan will consult with the agency supplying the data to determine the best method for converting the growth factors to a 2002 to 2018 projection. For areas with no local VMT growth factor information available, or those for which growth factors cannot be appropriately calculated within the time and resources available under this contract, Pechan will use EGAS VMT growth factors.

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CHAPTER III. METHODS FOR AREAS OUTSIDE OF THE CENRAP REGION

A. CANADIAN EMISSION ESTIMATES

Pechan expects to provide emission estimates for Canada to CENRAP using data and methods that are consistent with those being used by LADCO/MRPO and EPA to estimate current and future year emissions for these provinces. These data sets are currently limited to historical emission years (1995 and 2000). It is our understanding that LADCO is using/planning to use 1995 point source emission estimates and 2000 onroad/off-road/area source emission estimates to estimate Canadian emissions for their modeling domain. (The 2000 point source emissions data is not being used because of confidentiality limitations.) The 2000 Canadian emission data sets for the three sectors (non-point/area, nonroad mobile, and onroad mobile) are available at: http://www.epa.gov/ttn/chief/net/canada.html#data. This file contains information in both dBaseIV and SMOKE IDA format.

While we know that Environment Canada compiles emission projections on a regular basis to support the development of Federal and provincial emission control strategies, it is not clear whether Environment Canada would be able to provide growth and control factors on a timely basis for this CENRAP project. Pechan will contact Marc Deslauriers of Environment Canada on this issue. In short, though, Pechan expects that its recommendation will be that CENRAP use the base year Canadian emissions data without adjustments for all future year model simulations. If we want to pursue the course of developing our own growth and control factors to apply to Canadian base year emissions to estimate 2018 emissions, some information on the forecasting methods that Environment Canada uses is available from a draft NARSTO report. However, the description in the NARSTO report is less detailed than is needed to develop source category-specific growth and control factors. This alternative is probably best pursued by our contacting Marc Deslauriers to determine that organization's willingness/ability to provide us with either the data or the methods that they have developed to prepare emission forecasts to a year close to 2018.

B. MEXICAN EMISSION ESTIMATES

The baseline emissions inventory base year for Mexico is for 1999. Inventories for the years 2002 and 2012 were also estimated in order to understand how growth and existing control strategies may impact future emissions. Currently, the 1999 emission inventory is available, but the emission databases for the other years are not. Moreover, the point source database will most likely be proprietary, and could require signing a non-disclosure agreement for access. Therefore, the three alternatives for estimating 2018 emissions for Mexico for this CENRAP project appear to be:

1. Use the available 1999 emission databases as is.
2. Pursue obtaining the 2012 Mexican emissions database via Leonora Rojas to see if it might be available on a timely basis.

3. Develop growth and control factors to apply to the 1999 emissions data to better estimate 2018 emissions. We have a summary description of how Mexico performs its own projections to use as a guide for doing this. In general, growth factors are applied to all sectors, but control factors are only applied for onroad vehicles.

C. WRAP EMISSION ESTIMATES

WRAP's current schedule for preparing any new emission projections for its States will not provide any new information by March 2005, so Pechan expects to use the previous WRAP 2018 emission forecasts as the basis for what it provides to CENRAP. The existing WRAP 2018 emission forecasts are made from a 1996 base year. One potential update to the previous non-EGU point and area source forecasts is adapting the previous projections (which were prepared by Pechan) to incorporate updated growth factors, and to use the 2002 emissions data set as the new base year. However, these updates may be difficult to accomplish within the project constraints.

D. VISTAS EMISSION ESTIMATES

Pechan has contacted the VISTAS Technical Coordinator, Pat Brewer, to determine the availability of emission projection data for this project. VISTAS has recently completed 2018 emission projections for its States. These projection data are now being reviewed by the States. VISTAS will need to get permission from the States in order to release the data to CENRAP. It is expected that this would occur during February. SMOKE-ready modeling files for VISTAS are expected to be completed in January. Pechan will have further conversations with VISTAS to determine whether the mass emissions files or SMOKE files are more appropriate for CENRAP's purposes. It may be preferable to obtain the annual mass emission files, as the SMOKE modeling files were set up to model specific episodes that may not be consistent with the modeling that CENRAP will do. If CENRAP determines that it is preferable to use the emissions, Pechan will format the emissions in SMOKE/IDA format.

E. MRPO PROJECTIONS

For these five States, Pechan has developed 2018 (and other year) growth and control factors for LADCO for all man-made emission sectors, except on-road vehicles. Therefore, we expect that these same growth and control factors will be delivered to CENRAP. Because LADCO is performing the emissions processing of these files, Pechan plans to check with Mark Janssen to determine whether LADCO made any revisions to these files during its processing steps. If so, the revised files will be obtained from LADCO. We will also check with LADCO about the status and availability of their on-road vehicle emission files.

CHAPTER IV. REFERENCES

EPA, 1998: U.S. Environmental Protection Agency, "Locomotive Emission Standards, Regulatory Support Document," Office of Mobile Sources, Ann Arbor, MI, April 1998.

EPA, 1999: U.S. Environmental Protection Agency, "Final Regulatory Impact Analysis: Control of Emissions from Marine Diesel Engines," EPA420-R-99-026, Office of Mobile Sources, Ann Arbor, MI, November 1999.

EPA, 2002: U.S. Environmental Protection Agency, "Final Regulatory Support Document: Control of Emissions from Unregulated Nonroad Engines," EPA420-R-02-022, Office of Mobile Sources, Ann Arbor, MI, September 2002.

EPA, 2003: U.S. Environmental Protection Agency, "Final Regulatory Support Document: Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder," EPA420-R-03-004, Office of Mobile Sources, Ann Arbor, MI, January 2003.

Houyoux, 2004: Houyoux, M., U.S. Environmental Protection Agency, REMI ver 5.5 baseline.zip [Electronic File], Emission Factor and Inventory Group, Emissions, Monitoring, and Analysis Division, Office of Air Quality Planning and Standards. Research Triangle Park, NC. March 2, 2004.

NARSTO, 2005: "Improving Emission Inventories for Effective Air Quality Management Across North America: A NARSTO Assessment," January 2005.

Pechan, 2005: E.H. Pechan & Associates, Inc. "Background Information on Versions 4.0 and 5.0 of The Economic Growth Analysis System (EGAS), Technical Memorandum," prepared for Central Regional Air Planning Association (CENRAP), January 3, 2005.

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APPENDIX B
QUALITY ASSURANCE PROJECT PLAN FOR DEVELOPMENT OF GROWTH AND CONTROL INPUTS FOR 2018 EMISSIONS MODELING (SCHEDULES 3 AND 9)

DRAFT

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January 6, 2005

for the
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10005 S. Pennsylvania, Suite C
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____ Date ____________________
Ms. Kathy Pendleton, CENRAP Project Manager

____ Date ____________________
Ms. Lisa Brenneman, CENRAP Project Manager

____ Date ____________________
Ms. Annette Sharp, CENRAP Quality Assurance Officer

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INTRODUCTION

The purpose of this project is to prepare emission growth and control factors that can be applied to the Central Regional Air Planning Association (CENRAP) 2002 base year emission inventory to obtain a 2018 emission inventory for the CENRAP region. The CENRAP region includes the States and Tribal areas of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma, and Texas. In addition to the CENRAP States, additional factors will be compiled under this project to include the entire CENRAP modeling domain. This will include projected emissions data or projection year growth and control factor data from the other Regional Planning Organizations (RPOs), Canada, and Mexico. All data products will be prepared in SMOKE-compatible format.

These projection year growth and control factor data will be used to support air quality modeling and State Implementation Plan (SIP) development and implementation activities for the regional haze rule and fine PM and ozone National Ambient Air Quality Standards (NAAQS). The data will be applicable to all source categories and pollutants included in the CENRAP 2002 emission inventory. This includes the following pollutants: sulfur oxides (SO_x), oxides of nitrogen (NO_x), volatile organic compounds (VOC), carbon monoxide (CO), ammonia (NH_3), and particles with an aerodynamic diameter less than or equal to a nominal 10 and 2.5 micrometers (i.e., primary PM_{10} and $PM_{2.5}$).

This Quality Assurance Project Plan (QAPP) specifies how data quality objectives of accuracy, completeness, and representativeness will be met in compiling the growth and control factor data to be used as inputs to 2018 projection year regional emissions modeling for the CENRAP region for air quality modeling purposes.

A series of checklists will be prepared to implement the quality assurance (QA) steps. The QA checklists will include information on the specific QA item, the date that the QA check was performed, and the person who performed the QA check.

II. QA PLAN FOR CONSOLIDATION OF EMISSIONS INVENTORIES

A. Project Management

Specific project management elements are discussed below.

1. Distribution List

Ms. Kathy Pendleton, CENRAP Project Manager
Ms. Lisa Brenneman, CENRAP Project Manager
Ms. Annette Sharp, CENRAP Technical Director and Quality Assurance Officer
Mr. James H. Wilson, E.H. Pechan & Associates, Inc. (Pechan) Corporate QA/QC Coordinator
Ms. Maureen Mullen, Pechan Project Manager

Mr. Steve Roe, Pechan QA Reviewer

2. Project / Task Organization

Ms. Kathy Pendleton of CENRAP will be the primary technical contact and Project Manager. She will be assisted by Ms. Lisa Brenneman. Ms. Annette Sharp, will be the Technical Director and Quality Assurance Manager (QAM). Ms. Sharp will be involved in all quality assurance/quality control (QA/QC) activities.

Pechan's QA/QC policy requires that all work be documented, defensible, of known and acceptable quality, and consistent with all contract requirements. This policy is implemented through an integrated three-tiered approach that includes corporate, department, and program elements. At the corporate level, Pechan management provides oversight of the QA/QC program and approves and enforces the overall program. To assist in implementing these functions, Pechan maintains a corporate QA/QC unit that monitors the program, prepares guidelines, and conducts independent program audits.

The Pechan Corporate QA/QC Program is implemented through the Corporate QA/QC Plan and corporate guidelines. The Corporate Plan is an internal document that states the corporate policy and the requirements for department and project plans. The plan is supplemented by guidelines that are used to develop or update department plans and standard operating procedures (SOPs). Department management ensures the technical and fiscal quality of work through management oversight of projects assigned to the department and work performed by department staff; establishes and enforces department plans; approves project plans, budgets and schedules; and ensures a thorough technical and department management review of work.

The Pechan Corporate QA/QC Coordinator, Mr. James H. Wilson, is responsible for QA/QC functions throughout the firm, and has the necessary authority and independence to identify, report, and correct any existing quality problems. The Pechan QA reviewer for this project will be Mr. Steve Roe. Mr. Roe will conduct QA review on each of the SMOKE files developed under this project, on the data and methods used to develop growth and control factors in the SMOKE files, and on the final documentation.

Pechan's Project Manager, Ms. Maureen Mullen, will direct all work to be completed for this project. Ms. Mullen will ensure that all support staff are familiar with and understand the data quality objectives, and the procedures to be followed for meeting the objectives, as well as the requirements of the QA plan (e.g., completion of QA/QC forms).

3. Problem Definition / Background

SIPs for regional haze mitigation must contain emission inventories. Related emission inventories are needed for air quality modeling of regional haze. Inventories prepared for the SIP submittal and for use in modeling are prepared in different formats, but both should be derived from the same or comparable input data. Furthermore, regional modeling will encompass States outside the CENRAP region, so inventory methods should be coordinated with

other regions to the extent possible. The eastern RPOs (including CENRAP) have selected 2002 as the baseline year for regional haze modeling. Also, in order to demonstrate progress in improving visibility, it will be necessary to forecast emissions for future years. This project will result in a set of growth and control factors that can be used in SMOKE emissions modeling to project the CENRAP 2002 base year emission inventory to 2018.

4. Project / Task Description

The description of this project by task can be found in Pechan's response (dated November 18, 2004) to the Request for Quotes (RFQ) for "Schedules 3 and 9 - Development of Growth and Control Inputs for 2018 Emissions Modeling" and the "Award of Work and Notice to Proceed" that CENRAP issued to Pechan (Contract Number 04-0628-RPO-018) on December 1, 2004.

5. Data Quality Objectives

The main data quality objectives that Pechan will work to fulfill include:

- Accuracy – Pechan's QA Reviewer will ensure that 100 percent of the procedures/calculations that a Pechan staff member develops and applies to develop growth or control factors will be checked for accuracy and completeness. The procedures/calculations will first be tested on a data sample and the results will be reviewed to ensure that the procedures/calculations are applied as intended and that the results make sense. Adjustments to the procedures/calculations will be made if the results indicate flaws in the initial procedures/calculations. The procedures/calculations will be applied to the entire data set after the procedures/calculations have been tested for accuracy. Sample calculations will be documented covering all procedures.

- Completeness – As part of the quality control (QC) process, review by Pechan, as well as State/local/Tribal (S/L/T) agencies, may indicate missing growth or control factors for certain sources and/or pollutants for a particular county or jurisdiction. Pechan will compare the growth and control factor files to the CENRAP 2002 base year emission inventory to identify source category/county combinations that may be missing growth factors and source category/county/pollutant combinations that should be controlled but that have no control factors in the control factor database.

- Representativeness –Representative growth and control factors will be compiled that can be used by CENRAP to develop a representative 2018 emission inventory. The QA checks on data content discussed in section D of this QAP will be used to identify missing data or data that exceed typical ranges for review with CENRAP and the S/L/T agencies. These factors will be corrected or revised as approved by CENRAP.

- Comparability – The CENRAP 2018 growth and control factors will be compared to those used by the U.S. Environmental Protection Agency (EPA) in its Clean Air Interstate Rule (CAIR) modeling as well as those used by other RPOs for similar projection year emission inventories. Significant differences between these growth and control factor data will be evaluated and any necessary corrections to the data will be made.

6. Documents and Records

Pechan maintains a records management system to ensure that completed work meets EPA documentation requirements. Pechan also maintains a record-keeping plan to identify and file information. The company assigns unique control numbers to all documents and records prepared for and delivered to all clients. These numbers link the materials to the correct contract and work assignment and are used to store the materials in hard copy and electronically in chronological order. The records management coordinator at each Pechan office location assigns the control numbers and maintains these files. Pechan's Contracts Administrator also stores hard copy or electronic versions of all documents and records submitted as contract deliverables as part of the company's contract files.

The Pechan Project Manager will be responsible for the following document and records management activities:

- Determining all deliverables under a project, including work plans, progress reports, and all technical products;
- Determining the time lines for various stages of the document (that is, outline, draft, and final);
- Determining the appropriate review cycle (internal versus external review);
- Determining the appropriate reviewers; and
- Ensuring that all documents and records are incorporated into Pechan's filing system and are distributed to the appropriate recipients.

B. Data Generation and Acquisition

The following explains how data will be acquired or generated for each task of the project:

Task 1. Develop a Quality Assurance Project Plan (QAPP) and Work Plan

This QAPP is being prepared under this task. The following discussion explains the data sources that will be acquired and data that will be generated during preparation of the draft and final deliverables for Tasks 2 through 10. Section D of this QAPP explains the data review and

validation procedures that will be applied during preparation of the draft and final deliverables for Tasks 2 through 10.

Pechan has also prepared a draft work plan for the project. The work plan includes the tasks, budgets, and schedules specified in Pechan's response (dated November 18, 2004) to the RFQ for "Schedules 3 and 9 - Development of Growth and Control Inputs for 2018 Emissions Modeling" and the "Award of Work and Notice to Proceed" that CENRAP issued to Pechan (Contract Number 04-0628-RPO-018) on December 1, 2004.

Task 2. Develop a Methods Document

In the Methods Document, Pechan will explain the data sources to be used and the procedures to be followed for developing the necessary growth and control data for this project. Through this task, Pechan will determine the appropriate contacts and data sources to be used to obtain and develop the growth and control data for the CENRAP States, control data sources for Federal control measures, and vehicle miles traveled (VMT) projection data and sources. Pechan will also determine the available sources for obtaining projection year inventory data for other RPOs, Canada, and Mexico. The methods document will also explain the procedures to be followed when data are not available for a specific source category or geographic area.

Task 3. Identify State Controls

Pechan will query the CENRAP State contacts on State control programs expected to be in place in 2018. In addition, Pechan will use information from 1-hour ozone and PM_{10} SIPs to determine where post-2002 emission reductions are expected. For Texas, Pechan will base the control factors on the control factor file developed by Pechan during 2001 for the prior Western Regional Air Partnership (WRAP) emission forecast to 2018, and update this information to a 2002 base year and to reflect recent SIP updates (Houston-Galveston area). Pechan will account for NO_x emission changes for Missouri counties affected by the NO_x SIP Call. This may include using future year NO_x allowances by unit to estimate unit-specific control factors. Where necessary, Pechan will convert the emission reductions to the control efficiency, rule effectiveness, and rule penetration rates needed for the SMOKE modeling. All rule citations will be fully documented.

For the onroad sources, Pechan will start with the 2002 SMOKE-formatted MOBILE6 files developed for the 2002 CENRAP emission inventory. Pechan will query the State contacts provided by CENRAP for expected changes in emission control programs, such as inspection and maintenance programs, and fuel properties or programs between 2002 and 2018. Local data on fleet information, such as vehicle age distributions, will be kept the same as in 2002. Federal control programs, such as the Tier 2 emission standards, will be accounted for by using the MOBILE6 defaults for such programs.

Task 4. Identify Federal Controls

Pechan will compile information on Federal control measures that will be in place in 2018. Pechan's initial source of information will be the work conducted by Pechan to develop

2018 emission inventory control factors for the Midwest RPO (MRPO). Pechan will review documentation from other RPOs (e.g., VISTAS) and the analysis performed by EPA for the CAIR (this had a 2001 base year), as well as any new information on Federal rules. Pechan will focus its primary efforts for this task on maximum achievable control technology (MACT) standards with post-2002 effects. Where necessary, Pechan will convert the emission reductions from the identified Federal control measures to the control efficiency, rule effectiveness, and rule penetration rates needed for the SMOKE modeling. All rule citations will be fully documented.

Task 5. Compare and Provide a Written Summary of Differences Between the Economic Growth Analysis System (EGAS) 4 and EGAS 5 Models

Pechan will use EPA's EGAS 4 and EGAS 5 data and models to compile 2002 to 2018 State- Standard Industrial Classification (SIC) growth factors for the CENRAP States. These data are available in internal Pechan databases which house the Regional Economic Models, Inc. (REMI) data used in EGAS 4 and EGAS 5. Within each State, the comparisons will be developed at the 3-digit SIC code level with a crosswalk between REMI sectors and SCCs.

For the NONROAD model source categories, Pechan will compile data to develop regional growth factors to reflect relative growth rates in the CENRAP States. These will be used to regionalize the default growth factors in NONROAD that use national historic trends by fuel type to project equipment populations and emissions nationwide.

Task 6. Isolate and Examine Emission Growth Factors for CENRAP Electricity Generating Units (EGUs) using the Integrated Planning Model (IPM) and the EGAS 5 Model

Pechan will obtain the EGU EGAS growth factors from the Task 5 output. Pechan has obtained the IPM 2018 Base Case and IPM 2018 CAIR Case outputs from VISTAS/MRPO. Pechan has also obtained generalized information about the changes made by VISTAS/MRPO to the IPM inputs for this data set. However, MRPO has requested that Pechan not use any of these data until they have been reviewed and approved by the MRPO/VISTAS States. If approval of these files does not come in the timeframe needed for completion of this task, Pechan will use the Base Case and CAIR Case outputs from IPM prepared for EPA during August through November 2004. Pechan has these data in-house for projection years of 2010, 2015, and 2020. Pechan developed the final CENRAP 2002 base year emissions inventory for CENRAP that will be used in this task. Pechan will generate State-SCC growth factors for the EGU sector in the CENRAP States from the heat input or throughput data in the 2002 CENRAP emissions inventory and the IPM outputs.

Task 7. Develop Onroad Growth Factors and Nonroad Emissions Inventory for the Future Case CENRAP Emissions Inventory

To prepare the 2018 NONROAD2004 model inputs, Pechan will first acquire from CENRAP the activity inputs that were used to develop the 2002 base year nonroad emissions inventory. Pechan will adjust the growth rates and fuel program inputs with data obtained or generated under Task 5. These data will then be input to EPA's NONROAD2004 model to

generate a 2018 nonroad emission inventory for the CENRAP States, for all nonroad categories except locomotives, aircraft, and commercial marine vessels. Growth and control factors for these three nonroad categories will be developed under Tasks 3, 4, and 5 with other area sources.

To develop VMT growth rates, Pechan will first develop a list of contacts in the following priority order: (1) major Metropolitan Planning Organizations, (2) State Departments of Transportation, and (3) State air agencies. Pechan will then contact these agencies to obtain available data for projecting VMT from 2002 to 2018. If the data from these agencies are for a different base or projection year, Pechan will inquire as to whether the average annual growth rate over the period projected by that agency can be applied to the period from 2002 to 2018. If it cannot, Pechan will not use that data source (in these instances, data from the next contact based on the above priority will be used). For QA and tracking purposes, Pechan will log the contact information, data file names and date, geographic coverage of data, level of detail of data (e.g., by vehicle type or road type), and base and projection years of data. Pechan will provide this information to the CENRAP QAM before proceeding to incorporate VMT projection data. For counties or States with no VMT projection data available, Pechan will use EGAS VMT growth factors as the defaults.

Task 8. Develop Future Case Inventory of Areas Outside the CENRAP Region

This task will involve gathering and consolidating projection year emissions data or growth and control data for areas outside the CENRAP region. The sources of data include emissions inventories compiled by the other RPOs, the EPA, and the most currently available Mexican and Canadian emissions inventories.

Pechan will generate a list of organizations (e.g., EPA, RPOs, Environment Canada) and contact information for each organization that potentially has data that can be used to develop a 2018 emissions inventory for CENRAP air quality applications. This list will then be provided to the Workgroup for any feedback.

Once the data acquisition contact list has been finalized, Pechan will contact each organization to identify the projection year emissions data or growth and control data available, determine the quality and format of each available data set, and help facilitate the best mode of data transfer of the desired data sets for use in this task.

Modeling inventory databases or growth and control files acquired during this task will be summarized in tabular form so that CENRAP will know the date acquired, the sources used to assemble the data, the contractor(s) and/or organizations that assembled the data, possible deficiencies of the data, time period of the data (e.g., base year and projection year), and other necessary information needed to enable CENRAP to best understand the databases that are available.

Task 9. Prepare Future Case Growth and Control Summary

Pechan will develop the EGU growth factors at the point level of detail based on either IPM or EGAS model outputs, as determined by the Workgroups in Task 6. This will involve

matching the EGU identifiers from the CENRAP 2002 emission inventory to the IPM data. IPM uses unique plant codes (ORISPL) and boiler IDs while the CENRAP inventory uses Federal Information Processing Standard State and county identifiers, plant IDs, and point IDs. From the matched data set, Pechan will develop EGU-specific control factors for all relevant pollutants, based on 2018 IPM emissions data and the 2002 CENRAP EGU data.

For all source sectors covered by this contract, Pechan will develop Excel summary workbooks for each CENRAP State and Tribal area at the SCC level for all relevant source categories and pollutants. The data used in these summaries will be obtained from data generated in Tasks 3 through 7.

Task 10. Prepare a Technical Support Document (TSD)

The Task 2 Methods Document will be used as the starting point for the TSD. Information from the technical memoranda developed under Tasks 5, 6, and 8 and the State and Federal control measure lists from Tasks 3 and 4 will also be included in the TSD. The TSD will document the methods and data sources used in preparing the SMOKE-ready growth and control factors, the nonroad emissions inventory, and the MOBILE6 SMOKE inputs. The Excel workbooks summarizing the growth and control factors for the CENRAP States will be either included in or referenced in the TSD.

C. Assessment and Oversight

Pechan uses assessments to evaluate and improve the quality of environmental data operations. The assessments are an independent process of evaluating the project to ensure that specified requirements of the project are being fulfilled. Pechan will perform periodic audits of data quality and will coordinate with CENRAP's QAM to allow for ongoing oversight of project quality. For this project, QA Summary Reports will be prepared in Excel spreadsheets under Task 9, along with the growth and control factor summaries, to document any QA issues in the growth and control factors. The reports will be sent to each S/L/T agency to review. Each agency will be asked to provide corrections for the QA issues in the spreadsheets, or provide Pechan and CENRAP with directions in supplemental files or by e-mail. Each agency will then return the QA Summary Reports to Pechan. Pechan will then use directions provided in the reports to revise the appropriate growth and control factor files, and will update the reports to log directions that S/L/T agencies provide via e-mail and data provided in supplemental files. A Pechan staff member will then note the date on which revisions are made to the growth and control factor files as specified in the QA reports. Mr. Steve Roe will manage the audit function, which will involve comparing the directions provided in the QA reports to the revised growth and control factor files to ensure that the directions are interpreted correctly, and the files are revised correctly. The auditor will then note in the QA report when corrections have been completed. If corrections are not implemented correctly, the auditor will note this in the QA Summary Report file and will provide follow-up to ensure that the Pechan staff member corrects the issue. Thus, each QA Summary Report file will be used as a chain-of-custody form to document QA issues, S/L/T agency approval for resolution of the issues, and corrections to growth and control factor files.

D. Data Review and Validation

Task 1. Develop a QAPP and Work Plan

Pechan will prepare a draft QAPP and work plan that will undergo review by Pechan internally, and then be submitted to the CENRAP's Workgroups for review and comment. Pechan will revise the QAPP and work plan to address comments provided by the Workgroups. The final QAPP and work plan will be submitted to CENRAP for final approval and signature. The draft and final QAPP and work plan will be submitted in Microsoft Word format.

Task 2. Develop a Methods Document

Pechan will prepare a draft Methods Document that will undergo review by Pechan internally, and then will be submitted to the CENRAP's Workgroups for review and comment. Pechan will revise the Methods Document to address comments provided by CENRAP. The final Methods Document will be submitted to CENRAP for final approval. The draft and final Methods Document will be submitted in Microsoft Word format.

Task 3. Identify State Controls

Pechan will conduct a QA review of the SMOKE control factor files. Range checks will be performed on all values including control efficiency, rule effectiveness, and rule penetration to make sure that all values are valid and reasonable. Comparisons of the control efficiencies will be made with the 2002 CENRAP emissions inventory files to ensure that controls included in the 2002 emission inventory are not double-counted for the projection year. Any point-specific control information will be matched to the 2002 CENRAP emissions inventory to ensure that the correct point identifiers have been used. A QA summary will be developed listing State/SCC combinations in the 2002 CENRAP base year emissions inventory with no control efficiency listed in the State controls file to ensure that all source categories that should have controls applied contain the necessary information in the SMOKE control factor file. Pechan will ensure that the format of the control factor databases are correct based on the SMOKE2.1 User's Guide documentation.

Pechan has developed programs to review MOBILE6 input files. These programs will be modified to perform QA on the SMOKE-formatted MOBILE6 input files to insure that all appropriate control measure commands and input data are included in the appropriate MOBILE6 input files.

Each database in text or database format, as well as each set of MOBILE6 input files, developed during this task will be assigned a version control ID, so that any future modifications of these data sets can be tracked. The version control ID will contain the date that the file was revised, as well as a version number, if more than one revision occurred on the same date (e.g. mobilexxx 2-15-05v2).

Task 4. Identify Federal Controls

Pechan will conduct a QA review of the SMOKE control factor files for the Federal controls as listed above for the State controls. Range checks will be performed on all values including control efficiency, rule effectiveness, and rule penetration to make sure that all values are valid and reasonable. Comparisons of the control efficiencies will be made with the 2002 CENRAP emission inventory files to ensure that controls included in the 2002 emission inventory are not double-counted for the projection year. In addition, checks will be made to verify that source categories with both State and Federal control measures have been given the appropriate controls and that sources are not inappropriately over-controlled. Any point-specific control information will be matched to the 2002 CENRAP emission inventory to ensure that the correct point identifiers have been used. A QA summary will be developed listing State/SCC combinations in the 2002 CENRAP base year emission inventory with no control efficiency listed in either the State controls file or the Federal controls file to ensure that all source categories that should have controls applied contain the necessary information in the SMOKE control factor file. Pechan will ensure that the format of the control factor databases are correct based on documentation in the SMOKE2.1 User's Guide. Each database developed during this task will be assigned a version control ID as described under Task 4, so that any future modifications of these data sets can be tracked.

Task 5. Compare and Provide a Written Summary of Differences Between the Economic Growth Analysis System (EGAS) 4 and EGAS 5 Models

Pechan will conduct a QA review of the SMOKE growth factor files prepared under this task. This will include range checks on all growth factors. Any growth factors above or below the expected range of growth factors will be reviewed for reasonableness. Significant variations in growth factors for the same source categories across States will also be reviewed for reasonableness. The growth factor data will be cross-checked with the CENRAP 2002 emissions inventory to ensure that all State/SCC combinations present in the 2002 inventory have corresponding growth factors (with the exception of onroad and NONROAD model source categories which will be handled in Task 7). Pechan will ensure that the format of the growth factor databases are correct based on the SMOKE2.1 User's Guide. Each database developed during this task will be assigned a version control ID as described under Task 4, so that any future modifications of these data sets can be tracked.

Task 6. Isolate and Examine Emission Growth Factors for CENRAP Electricity Generating Units (EGUs) using the Integrated Planning Model (IPM) and the EGAS 5 Model

The EGAS EGU growth factors to be used in this task will have undergone QA review under Task 5. In developing the IPM EGU growth factors, Pechan will review State/SCC combinations that are present either in the base year or projection year data, but not both. These cases, and Pechan's proposed approach for dealing with these cases for the development of growth factors, will be documented in the Technical Memorandum to be prepared under this task for CENRAP's review. In addition, cases with insufficient data in the CENRAP base year inventory to calculate growth factors will be documented for CENRAP review. The remaining

IPM EGU growth factors by State/SCC will be carefully reviewed. Growth factors that are outside of the expected range of factors will be reviewed for reasonableness and accuracy. If all calculations have been performed correctly, but the data seem unreasonable, these factors will be documented for CENRAP to review and provide corrections or comments on.

Task 7. Develop Onroad Growth Factors and Nonroad Emissions Inventory for the Future Case CENRAP Emissions Inventory

Pechan will use EPA's NIF Format and Content Check QA tool to perform initial QA on the NONROAD2004 NIF output file. Any errors flagged by this tool will be reviewed and corrected as necessary. After the nonroad inventory data are converted into SMOKE format, QA checks will be performed to ensure that the SMOKE-formatted emissions are the same as the emissions in the NIF files. Cross-checks will be performed to ensure that all State/SCC combinations included in the 2002 emission inventory for the source categories included in the NONROAD2004 model are also included in the SMOKE emission files.

Pechan will QA the VMT growth factors prepared in SMOKE format. Range checks will be performed on all VMT growth factors to make sure that all values are valid and reasonable. Any growth factors above or below the expected range of growth factors will be reviewed for reasonableness. Significant variations in growth factors for the same source categories across States will also be reviewed for reasonableness. The growth factor data will be cross-checked with the CENRAP 2002 onroad VMT data to ensure that all onroad State/SCC combinations present in the 2002 inventory have corresponding VMT growth factors. Pechan will ensure that the format of the VMT growth factor databases are correct based on the SMOKE2.1 User's Guide.

Each database developed during this task will be assigned a version control ID as described under Task 4, so that any future modifications of these data sets can be tracked.

Task 8. Develop Future Case Inventory of Areas Outside the CENRAP Region

Each projection year emission inventory or set of growth and control factors for the areas outside the CENRAP region will be assigned a version control ID as described under Task 4 and tracked accordingly. Pechan will ensure the data acquired are formatted correctly for use in SMOKE modeling based on the SMOKE2.1 User's Guide and will document any deficiencies for each inventory database. Pechan will prepare draft summaries for each database indicating the source of the data, base and projection years of the original data, and any data conversions needed from the original base and projection years to the CENRAP base and projection years of 2002 and 2018 for review by CENRAP. Final revisions to the data will be made based on the feedback received.

Task 9. Prepare Future Case Growth and Control Summary

Growth and control factors developed in tasks 3 through 7, as well as the EGU control factors to be developed under this task, will be summarized in Excel spreadsheets by State or Tribal area and SCC. These reports will provide the States and Tribal agencies with an

opportunity to review the growth and control data developed under this project and to provide corrections or comments where the data do not correspond with the agencies' expectations. As discussed in Section C, above, Pechan will also provide QA Summary Reports that show concerns that Pechan or the States might have with some of the growth or control factors that should be given additional review by the agency. These QA Summary Reports will be used to track revisions that need to be made to the draft SMOKE growth and control factor files.

Once the State and Tribal agencies have documented the need for any revisions to the growth and control factors, Pechan will prepare final growth and control factor files in SMOKE format. These files will undergo the same QA checks described in the tasks above, along with the final QA audit ensuring that the requested revisions to the growth and control factors have been appropriately implemented in the final SMOKE-formatted files. Each database revised or developed during this task will be assigned a version control ID as described under Task 4, so that any future modifications of these data sets can be tracked.

Task 10. Prepare a TSD

The TSD will undergo QA review to ensure that all methods and data sources are accurately documented and data are reported correctly. Pechan will revise the TSD to incorporate comments provided by the CENRAP Workgroups.

APPENDIX C
CENRAP STATE POPULATION PROJECTIONS

Table C-1. CENRAP State Population Projections

FIPS Code	County	2002	2018	2018GF
ARKANSAS				
05001	Arkansas	20,355	17,110	0.841
05003	Ashley	23,875	22,294	0.934
05005	Baxter	38,672	42,580	1.101
05007	Benton	165,500	257,479	1.556
05009	Boone	34,713	39,145	1.128
05011	Bradley	12,531	12,357	0.986
05013	Calhoun	5,681	5,430	0.956
05015	Carroll	26,166	32,181	1.23
05017	Chicot	13,623	10,529	0.773
05019	Clark	23,535	23,535	1
05021	Clay	17,127	14,968	0.874
05023	Cleburne	24,570	28,788	1.172
05025	Cleveland	8,541	8,541	1
05027	Columbia	25,343	25,343	1
05029	Conway	20,411	20,411	1
05031	Craighead	84,074	97,527	1.16
05033	Crawford	54,973	67,511	1.228
05035	Crittenden	51,291	51,291	1
05037	Cross	19,343	17,697	0.915
05039	Dallas	8,785	5,322	0.606
05041	Desha	14,805	10,730	0.725
05043	Drew	18,639	18,639	1
05045	Faulkner	89,590	110,979	1.239
05047	Franklin	17,868	18,213	1.019
05049	Fulton	11,527	10,893	0.945
05051	Garland	90,059	104,079	1.156
05053	Grant	16,848	19,377	1.15
05055	Greene	38,038	41,968	1.103
05057	Hempstead	23,492	23,492	1
05059	Hot Spring	30,558	31,999	1.047
05061	Howard	14,251	14,251	1
05063	Independence	34,431	37,350	1.085
05065	Izard	13,192	12,567	0.953
05067	Jackson	17,802	15,475	0.869
05069	Jefferson	83,374	78,668	0.944
05071	Johnson	23,148	26,711	1.154
05073	Lafayette	8,382	6,755	0.806
05075	Lawrence	17,587	17,597	1.001
05077	Lee	12,217	9,790	0.801
05079	Lincoln	14,247	14,247	1
05081	Little River	13,474	13,472	1
05083	Logan	22,394	23,965	1.07
05085	Lonoke	55,302	73,873	1.336

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
05087	Madison	14,345	15,785	1.1
05089	Marion	16,259	16,202	0.996
05091	Miller	41,133	43,426	1.056
05093	Mississippi	50,380	44,719	0.888
05095	Monroe	9,689	5,310	0.548
05097	Montgomery	9,243	9,699	1.049
05099	Nevada	9,742	8,052	0.827
05101	Newton	8,506	8,506	1
05103	Ouachita	27,868	22,234	0.798
05105	Perry	10,436	12,221	1.171
05107	Phillips	25,001	14,105	0.564
05109	Pike	11,137	10,278	0.923
05111	Poinsett	25,401	24,555	0.967
05113	Polk	20,200	20,785	1.029
05115	Pope	55,223	66,020	1.196
05117	Prairie	9,440	8,499	0.9
05119	Pulaski	364,381	379,945	1.043
05121	Randolph	18,102	17,701	0.978
05123	St. Francis	28,773	26,036	0.905
05125	Saline	86,290	107,280	1.243
05127	Scott	11,004	11,787	1.071
05129	Searcy	8,039	5,953	0.741
05131	Sebastian	117,220	136,374	1.163
05133	Sevier	15,811	16,804	1.063
05135	Sharp	17,270	18,451	1.068
05137	Stone	11,518	12,558	1.09
05139	Union	45,279	43,122	0.952
05141	Van Buren	16,314	16,865	1.034
05143	Washington	166,511	219,999	1.321
05145	White	69,354	83,925	1.21
05147	Woodruff	8,466	6,644	0.785
05149	Yell	21,410	24,162	1.129
		IOWA		
19001	Adair	8	8	0.962
19003	Adams	4	4	0.919
19005	Allamakee	15	15	1.046
19007	Appanoose	14	13	0.969
19009	Audubon	7	6	0.943
19011	Benton	26	30	1.153
19013	Black Hawk	128	131	1.022
19015	Boone	26	27	1.013
19017	Bremer	23	24	1.021
19019	Buchanan	21	21	1.005
19021	Buena Vista	20	21	1.031
19023	Butler	15	15	0.975
19025	Calhoun	11	10	0.927
19027	Carroll	21	21	0.983
19029	Cass	14	14	0.958

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
19031	Cedar	18	19	1.048
19033	Cerro Gordo	46	45	0.977
19035	Cherokee	13	12	0.962
19037	Chickasaw	13	13	0.972
19039	Clarke	9	10	1.085
19041	Clay	17	17	0.981
19043	Clayton	18	18	0.978
19045	Clinton	50	49	0.979
19047	Crawford	17	17	0.981
19049	Dallas	43	56	1.291
19051	Davis	9	9	1.029
19053	Decatur	9	9	1.007
19055	Delaware	18	19	1.053
19057	Des Moines	42	41	0.968
19059	Dickinson	17	18	1.097
19061	Dubuque	90	95	1.055
19063	Emmet	11	10	0.937
19065	Fayette	22	22	0.992
19067	Floyd	17	16	0.966
19069	Franklin	11	10	0.963
19071	Fremont	8	7	0.944
19073	Greene	10	10	0.987
19075	Grundy	12	13	1.016
19077	Guthrie	11	12	1.05
19079	Hamilton	16	16	0.99
19081	Hancock	12	12	0.978
19083	Hardin	19	18	0.955
19085	Harrison	16	16	1.038
19087	Henry	20	22	1.061
19089	Howard	10	10	0.975
19091	Humboldt	10	10	0.95
19093	Ida	8	8	0.987
19095	Iowa	16	17	1.058
19097	Jackson	20	21	1.041
19099	Jasper	37	39	1.047
19101	Jefferson	16	16	1.011
19103	Johnson	115	143	1.248
19105	Jones	20	21	1.011
19107	Keokuk	11	11	0.958
19109	Kossuth	17	16	0.922
19111	Lee	37	36	0.959
19113	Linn	196	229	1.17
19115	Louisa	12	13	1.066
19117	Lucas	9	10	1.045
19119	Lyon	12	11	0.966
19121	Madison	14	16	1.112
19123	Mahaska	22	23	1.012
19125	Marion	33	35	1.086

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
19127	Marshall	39	40	1.022
19129	Mills	15	16	1.115
19131	Mitchell	11	10	0.95
19133	Monona	10	10	0.98
19135	Monroe	8	8	0.959
19137	Montgomery	12	11	0.961
19139	Muscatine	42	45	1.062
19141	O'Brien	15	15	0.989
19143	Osceola	7	6	0.931
19145	Page	17	17	0.992
19147	Palo Alto	10	9	0.929
19149	Plymouth	25	26	1.038
19151	Pocahontas	8	8	0.899
19153	Polk	384	443	1.154
19155	Pottawattamie	88	92	1.04
19157	Poweshiek	19	19	1.016
19159	Ringgold	5	5	0.942
19161	Sac	11	10	0.916
19163	Scott	160	172	1.078
19165	Shelby	13	12	0.962
19167	Sioux	32	34	1.073
19169	Story	81	89	1.105
19171	Tama	18	18	1.023
19173	Taylor	7	7	0.942
19175	Union	12	12	0.974
19177	Van Buren	8	8	1.031
19179	Wapello	36	36	1.006
19181	Warren	42	49	1.183
19183	Washington	21	23	1.087
19185	Wayne	7	6	0.946
19187	Webster	40	38	0.961
19189	Winnebago	12	11	0.971
19191	Winneshiek	21	22	1.024
19193	Woodbury	104	108	1.038
19195	Worth	8	8	0.969
19197	Wright	14	13	0.946
KANSAS				
20001	Allen	14,229	13,001	0.914
20003	Anderson	8,142	8,071	0.991
20005	Atchison	16,679	15,072	0.904
20007	Barber	5,084	4,563	0.898
20009	Barton	27,736	24,532	0.884
20011	Bourbon	15,167	15,043	0.992
20013	Brown	10,499	11,492	1.095
20015	Butler	60,536	82,104	1.356
20017	Chase	2,929	2,751	0.939
20019	Chautauqua	4,210	3,994	0.949

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
20021	Cherokee	21,947	20,693	0.943
20023	Cheyenne	3,122	3,084	0.988
20025	Clark	2,382	2,480	1.041
20027	Clay	8,702	7,681	0.883
20029	Cloud	9,931	8,625	0.868
20031	Coffey	8,899	8,832	0.992
20033	Comanche	1,984	1,711	0.862
20035	Cowley	36,416	34,277	0.941
20037	Crawford	38,041	38,870	1.022
20039	Decatur	3,406	2,952	0.867
20041	Dickinson	19,139	21,077	1.101
20043	Doniphan	8,211	7,982	0.972
20045	Douglas	102,290	112,566	1.1
20047	Edwards	3,339	2,406	0.721
20049	Elk	3,137	3,041	0.969
20051	Ellis	27,266	26,864	0.985
20053	Ellsworth	6,417	5,784	0.901
20055	Finney	39,720	42,589	1.072
20057	Ford	32,652	33,945	1.04
20059	Franklin	25,314	24,041	0.95
20061	Geary	26,403	25,905	0.981
20063	Gove	2,991	2,807	0.938
20065	Graham	2,845	2,479	0.871
20067	Grant	7,892	7,078	0.897
20069	Gray	6,044	7,510	1.243
20071	Greeley	1,472	1,338	0.909
20073	Greenwood	7,651	7,681	1.004
20075	Hamilton	2,656	2,423	0.912
20077	Harper	6,274	5,471	0.872
20079	Harvey	33,423	35,899	1.074
20081	Haskell	4,292	4,624	1.077
20083	Hodgeman	2,148	2,467	1.149
20085	Jackson	12,738	20,837	1.636
20087	Jefferson	18,659	17,896	0.959
20089	Jewell	3,495	3,125	0.894
20091	Johnson	476,642	604,251	1.268
20093	Kearny	4,543	4,367	0.961
20095	Kingman	8,424	8,187	0.972
20097	Kiowa	3,106	3,146	1.013
20099	Labette	22,273	21,940	0.985
20101	Lane	2,000	1,907	0.954
20103	Leavenworth	70,805	78,196	1.104
20105	Lincoln	3,542	3,458	0.976
20107	Linn	9,672	9,204	0.952
20109	Logan	2,997	2,918	0.974
20111	Lyon	35,893	34,835	0.971
20113	McPherson	29,404	29,217	0.994

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
20115	Marion	13,244	12,953	0.978
20117	Marshall	10,580	11,483	1.085
20119	Meade	4,619	4,423	0.958
20121	Miami	28,910	35,458	1.226
20123	Mitchell	6,691	6,096	0.911
20125	Montgomery	35,296	31,308	0.887
20127	Morris	6,082	6,213	1.022
20129	Morton	3,359	3,151	0.938
20131	Nemaha	10,459	10,064	0.962
20133	Neosho	16,634	15,009	0.902
20135	Ness	3,316	3,011	0.908
20137	Norton	5,877	5,860	0.997
20139	Osage	16,924	21,237	1.255
20141	Osborne	4,237	3,731	0.881
20143	Ottawa	6,287	6,183	0.983
20145	Pawnee	6,944	6,715	0.967
20147	Phillips	5,869	6,096	1.039
20149	Pottawatomie	18,485	19,005	1.028
20151	Pratt	9,540	8,741	0.916
20153	Rawlins	2,887	2,885	0.999
20155	Reno	63,771	55,264	0.867
20157	Republic	5,468	4,928	0.901
20159	Rice	10,500	10,053	0.957
20161	Riley	61,463	62,795	1.022
20163	Rooks	5,489	5,602	1.021
20165	Rush	3,492	3,252	0.931
20167	Russell	7,053	6,436	0.913
20169	Saline	53,897	54,778	1.016
20171	Scott	4,921	4,772	0.97
20173	Sedgwick	461,943	508,467	1.101
20175	Seward	23,065	22,499	0.975
20177	Shawnee	170,703	170,471	0.999
20179	Sheridan	2,641	2,405	0.911
20181	Sherman	6,396	7,428	1.161
20183	Smith	4,363	3,942	0.904
20185	Stafford	4,662	4,474	0.96
20187	Stanton	2,409	2,396	0.995
20189	Stevens	5,331	5,062	0.95
20191	Sumner	25,526	24,678	0.967
20193	Thomas	8,090	8,008	0.99
20195	Trego	3,141	2,940	0.936
20197	Wabaunsee	6,713	7,171	1.068
20199	Wallace	1,691	1,583	0.936
20201	Washington	6,268	5,917	0.944
20203	Wichita	2,502	2,743	1.096
20205	Wilson	10,141	10,612	1.046
20207	Woodson	3,668	3,261	0.889
20209	Wyandotte	158,366	153,806	0.971

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
		LOUISIANA		
22001	Acadia	59,246	64,410	1.087
22003	Allen	26,248	31,234	1.19
22005	Ascension	71,326	83,180	1.166
22007	Assumption	22,740	24,412	1.074
22009	Avoyelles	40,928	45,028	1.1
22011	Beauregard	33,124	36,678	1.107
22013	Bienville	16,368	18,256	1.115
22015	Bossier	93,962	103,806	1.105
22017	Caddo	247,834	268,132	1.082
22019	Calcasieu	180,196	197,882	1.098
22021	Caldwell	11,058	12,550	1.135
22023	Cameron	8,506	8,580	1.009
22025	Catahoula	11,572	12,702	1.098
22027	Claiborne	17,600	19,458	1.106
22029	Concordia	20,996	22,658	1.079
22031	De Soto	24,966	26,984	1.081
22033	East Baton Rouge	419,394	471,404	1.124
22035	East Carroll	9,340	10,110	1.082
22037	East Feliciana	22,278	25,978	1.166
22039	Evangeline	34,952	38,332	1.097
22041	Franklin	22,580	24,498	1.085
22043	Grant	18,108	19,564	1.08
22045	Iberia	74,270	82,838	1.115
22047	Iberville	31,382	34,130	1.088
22049	Jackson	15,740	17,088	1.086
22051	Jefferson	468,032	505,370	1.08
22053	Jefferson Davis	32,264	35,156	1.09
22055	Lafayette	191,976	219,210	1.142
22057	Lafourche	88,170	94,076	1.067
22059	La Salle	13,978	15,048	1.077
22061	Lincoln	45,514	51,604	1.134
22063	Livingston	86,918	100,042	1.151
22065	Madison	12,642	13,980	1.106
22067	Morehouse	32,456	35,486	1.093
22069	Natchitoches	38,372	42,554	1.109
22071	Orleans	478,430	517,570	1.082
22073	Ouachita	152,474	168,980	1.108
22075	Plaquemines	25,464	26,914	1.057
22077	Pointe Coupee	23,848	26,562	1.114
22079	Rapides	121,182	124,696	1.029
22081	Red River	9,354	10,186	1.089
22083	Richland	20,694	22,542	1.089
22085	Sabine	24,762	27,930	1.128
22087	St. Bernard	67,156	70,540	1.05
22089	St. Charles	50,146	57,400	1.145
22091	St. Helena	9,978	10,912	1.094

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
22093	St. James	21,418	23,470	1.096
22095	St. John the Baptist	44,126	49,278	1.117
22097	St. Landry	85,284	94,860	1.112
22099	St. Martin	48,066	53,584	1.115
22101	St. Mary	56,430	59,374	1.052
22103	St. Tammany	198,430	242,360	1.221
22105	Tangipahoa	98,780	113,228	1.146
22107	Tensas	6,784	7,332	1.081
22109	Terrebonne	104,530	114,252	1.093
22111	Union	22,490	25,262	1.123
22113	Vermilion	51,776	55,980	1.081
22115	Vernon	51,726	50,504	0.976
22117	Washington	42,826	45,868	1.071
22119	Webster	42,862	46,920	1.095
22121	West Baton Rouge	21,034	23,428	1.114
22123	West Carroll	11,920	12,612	1.058
22125	West Feliciana	13,792	15,426	1.118
22127	Winn	18,032	20,514	1.138
MINNESOTA				
27001	Aitkin	15,937	21,444	1.346
27003	Anoka	308,230	372,816	1.21
27005	Becker	30,520	34,878	1.143
27007	Beltrami	40,790	48,980	1.201
27009	Benton	35,228	41,944	1.191
27011	Big Stone	5,752	5,484	0.953
27013	Blue Earth	56,601	59,804	1.057
27015	Brown	26,939	28,232	1.048
27017	Carlton	32,291	37,004	1.146
27019	Carver	74,807	108,532	1.451
27021	Cass	28,450	38,826	1.365
27023	Chippewa	13,041	13,250	1.016
27025	Chisago	43,321	59,310	1.369
27027	Clay	51,629	52,780	1.022
27029	Clearwater	8,494	9,130	1.075
27031	Cook	5,385	7,134	1.325
27033	Cottonwood	12,092	12,026	0.995
27035	Crow Wing	57,491	77,012	1.34
27037	Dakota	370,438	461,880	1.247
27039	Dodge	18,155	21,778	1.2
27041	Douglas	33,629	40,776	1.213
27043	Faribault	16,037	15,834	0.987
27045	Fillmore	21,241	22,692	1.068
27047	Freeborn	32,806	34,524	1.052
27049	Goodhue	44,692	49,786	1.114
27051	Grant	6,293	6,620	1.052
27053	Hennepin	1,133,884	1,249,232	1.102
27055	Houston	19,923	21,808	1.095

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
27057	Hubbard	19,090	24,854	1.302
27059	Isanti	32,264	38,986	1.208
27061	Itasca	44,703	50,370	1.127
27063	Jackson	11,213	11,300	1.008
27065	Kanabec	15,786	19,388	1.228
27067	Kandiyohi	41,706	45,540	1.092
27069	Kittson	5,231	5,154	0.985
27071	Koochiching	14,177	13,244	0.934
27073	Lac qui Parle	7,924	7,324	0.924
27075	Lake	11,199	12,450	1.112
27077	Lake of the Woods	4,589	5,100	1.111
27079	Le Sueur	25,820	28,608	1.108
27081	Lincoln	6,385	6,392	1.001
27083	Lyon	25,503	26,226	1.028
27085	McLeod	35,447	39,344	1.11
27087	Mahnomen	5,222	5,472	1.048
27089	Marshall	10,001	9,258	0.926
27091	Martin	21,617	21,104	0.976
27093	Meeker	22,994	26,098	1.135
27095	Mille Lacs	23,102	29,500	1.277
27097	Morrison	32,067	35,198	1.098
27099	Mower	38,834	41,278	1.063
27101	Murray	9,051	8,638	0.954
27103	Nicollet	30,199	32,966	1.092
27105	Nobles	20,887	21,702	1.039
27107	Norman	7,377	7,140	0.968
27109	Olmsted	127,654	153,218	1.2
27111	Otter Tail	58,307	69,350	1.189
27113	Pennington	13,670	14,260	1.043
27115	Pine	27,302	33,588	1.23
27117	Pipestone	9,789	9,290	0.949
27119	Polk	31,177	31,122	0.998
27121	Pope	11,282	12,000	1.064
27123	Ramsey	516,633	552,076	1.069
27125	Red Lake	4,295	4,396	1.023
27127	Redwood	16,733	16,946	1.013
27129	Renville	17,104	17,220	1.007
27131	Rice	58,271	70,890	1.217
27133	Rock	9,689	9,826	1.014
27135	Roseau	16,543	18,200	1.1
27137	St. Louis	201,457	211,366	1.049
27139	Scott	96,259	147,138	1.529
27141	Sherburne	69,006	101,934	1.477
27143	Sibley	15,566	17,390	1.117
27145	Stearns	136,352	160,364	1.176
27147	Steele	34,256	38,210	1.115
27149	Stevens	10,060	10,112	1.005

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
27151	Swift	11,994	12,784	1.066
27153	Todd	24,620	26,798	1.088
27155	Traverse	4,052	3,744	0.924
27157	Wabasha	21,938	24,614	1.122
27159	Wadena	13,872	15,082	1.087
27161	Waseca	19,716	21,184	1.074
27163	Washington	211,906	286,342	1.351
27165	Watonwan	11,906	12,250	1.029
27167	Wilkin	7,083	6,986	0.986
27169	Winona	50,491	54,190	1.073
27171	Wright	94,096	123,258	1.31
27173	Yellow Medicine	11,000	10,826	0.984
MISSOURI				
29001	Adair	23,945	22,652	0.946
29003	Andrew	15,808	17,000	1.075
29005	Atchison	6,733	5,873	0.872
29007	Audrain	24,287	24,807	1.021
29009	Barry	36,132	46,461	1.286
29011	Barton	12,300	13,717	1.115
29013	Bates	16,176	17,637	1.09
29015	Benton	17,773	21,214	1.194
29017	Bollinger	12,027	13,823	1.149
29019	Boone	137,011	168,775	1.232
29021	Buchanan	82,652	80,828	0.978
29023	Butler	41,397	43,463	1.05
29025	Caldwell	8,817	9,554	1.084
29027	Callaway	39,168	45,700	1.167
29029	Camden	36,567	45,152	1.235
29031	Cape Girardeau	68,404	75,037	1.097
29033	Carroll	9,858	8,889	0.902
29035	Carter	6,753	8,226	1.218
29037	Cass	86,299	112,085	1.299
29039	Cedar	13,700	15,350	1.12
29041	Chariton	8,477	7,884	0.93
29043	Christian	56,199	86,229	1.534
29045	Clark	7,480	7,549	1.009
29047	Clay	183,989	216,063	1.174
29049	Clinton	19,590	23,030	1.176
29051	Cole	70,819	76,706	1.083
29053	Cooper	16,849	18,354	1.089
29055	Crawford	23,944	29,357	1.226
29057	Dade	8,365	9,348	1.117
29059	Dallas	16,983	22,566	1.329
29061	Daviess	7,940	8,189	1.031
29063	DeKalb	13,482	14,488	1.075
29065	Dent	14,332	14,662	1.023
29067	Douglas	12,541	13,246	1.056

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
29069	Dunklin	32,627	31,891	0.977
29071	Franklin	96,978	116,194	1.198
29073	Gasconade	15,267	17,259	1.13
29075	Gentry	6,884	7,200	1.046
29077	Greene	237,440	260,399	1.097
29079	Grundy	10,141	9,592	0.946
29081	Harrison	8,181	7,931	0.969
29083	Henry	21,840	23,383	1.071
29085	Hickory	9,360	10,807	1.155
29087	Holt	5,398	4,903	0.908
29089	Howard	9,725	9,906	1.019
29091	Howell	38,114	45,840	1.203
29093	Iron	11,154	11,721	1.051
29095	Jackson	653,141	668,410	1.023
29097	Jasper	103,291	118,819	1.15
29099	Jefferson	205,743	247,773	1.204
29101	Johnson	50,194	59,158	1.179
29103	Knox	4,271	4,074	0.954
29105	Laclede	32,042	38,311	1.196
29107	Lafayette	33,443	36,866	1.102
29109	Lawrence	34,399	40,134	1.167
29111	Lewis	10,023	9,700	0.968
29113	Lincoln	38,970	53,491	1.373
29115	Linn	14,060	14,681	1.044
29117	Livingston	14,385	14,000	0.973
29119	McDonald	21,109	26,954	1.277
29121	Macon	15,088	14,876	0.986
29123	Madison	11,734	12,819	1.092
29125	Maries	8,496	9,169	1.079
29127	Marion	28,015	28,953	1.033
29129	Mercer	4,325	4,859	1.123
29131	Miller	23,815	28,155	1.182
29133	Mississippi	12,979	11,247	0.867
29135	Moniteau	14,560	16,349	1.123
29137	Monroe	8,847	8,904	1.006
29139	Montgomery	12,067	13,007	1.078
29141	Morgan	19,328	23,273	1.204
29143	New Madrid	20,428	19,695	0.964
29145	Newton	50,569	58,237	1.152
29147	Nodaway	20,521	18,673	0.91
29149	Oregon	10,506	11,236	1.069
29151	Osage	12,751	13,503	1.059
29153	Ozark	10,322	11,596	1.123
29155	Pemiscot	21,471	21,369	0.995
29157	Perry	18,005	19,443	1.08
29159	Pettis	38,000	40,961	1.078
29161	Phelps	39,610	42,920	1.084

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
29163	Pike	16,780	16,719	0.996
29165	Platte	75,949	95,760	1.261
29167	Polk	27,597	34,199	1.239
29169	Pulaski	41,942	37,494	0.894
29171	Putnam	4,934	4,625	0.937
29173	Ralls	9,112	9,811	1.077
29175	Randolph	23,863	23,397	0.98
29177	Ray	23,519	26,189	1.114
29179	Reynolds	6,722	6,536	0.972
29181	Ripley	14,997	18,480	1.232
29183	St. Charles	295,337	399,603	1.353
29185	St. Clair	9,375	10,254	1.094
29186	Ste. Genevieve	17,581	19,427	1.105
29187	St. Francois	57,936	66,648	1.15
29189	St. Louis	1,000,468	972,728	0.972
29195	Saline	22,426	21,654	0.966
29197	Schuyler	4,517	4,845	1.073
29199	Scotland	4,795	4,756	0.992
29201	Scott	40,920	42,065	1.028
29203	Shannon	8,500	9,450	1.112
29205	Shelby	6,747	6,682	0.99
29207	Stoddard	29,132	28,107	0.965
29209	Stone	31,887	44,919	1.409
29211	Sullivan	6,770	7,288	1.077
29213	Taney	39,389	53,373	1.355
29215	Texas	24,647	26,637	1.081
29217	Vernon	19,555	20,427	1.045
29219	Warren	26,349	35,226	1.337
29221	Washington	23,758	27,109	1.141
29223	Wayne	13,715	15,786	1.151
29225	Webster	31,186	40,596	1.302
29227	Worth	2,277	2,102	0.923
29229	Wright	21,191	26,671	1.259
29510	St. Louis City	308,084	203,291	0.66
NEBRASKA				
31001	Adams	31,573	35,093	1.111
31003	Antelope	7,325	6,432	0.878
31005	Arthur	438	390	0.891
31007	Banner	810	743	0.918
31009	Blaine	561	410	0.731
31011	Boone	6,135	5,419	0.883
31013	Box Butte	11,998	10,816	0.901
31015	Boyd	2,352	1,760	0.748
31017	Brown	3,475	3,135	0.902
31019	Buffalo	43,358	52,767	1.217
31021	Burt	7,786	7,703	0.989
31023	Butler	8,807	9,355	1.062

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
31025	Cass	24,932	30,776	1.234
31027	Cedar	9,453	8,445	0.893
31029	Chase	3,996	3,496	0.875
31031	Cherry	6,086	5,570	0.915
31033	Cheyenne	9,915	10,650	1.074
31035	Clay	7,015	6,887	0.982
31037	Colfax	10,650	12,812	1.203
31039	Cuming	10,186	10,564	1.037
31041	Custer	11,637	10,555	0.907
31043	Dakota	21,004	28,123	1.339
31045	Dawes	9,103	9,356	1.028
31047	Dawson	25,038	31,659	1.264
31049	Deuel	2,069	1,900	0.918
31051	Dixon	6,354	6,581	1.036
31053	Dodge	36,719	42,744	1.164
31055	Douglas	475,053	575,897	1.212
31057	Dundy	2,236	1,815	0.812
31059	Fillmore	6,547	6,018	0.919
31061	Franklin	3,513	3,113	0.886
31063	Frontier	3,098	3,105	1.002
31065	Furnas	5,275	4,970	0.942
31067	Gage	23,078	24,509	1.062
31069	Garden	2,259	2,034	0.9
31071	Garfield	1,848	1,487	0.804
31073	Gosper	2,143	2,160	1.008
31075	Grant	732	625	0.854
31077	Greeley	2,639	2,097	0.795
31079	Hall	54,710	66,217	1.21
31081	Hamilton	9,510	10,598	1.114
31083	Harlan	3,755	3,627	0.966
31085	Hayes	1,032	767	0.743
31087	Hitchcock	3,002	2,232	0.743
31089	Holt	11,289	9,473	0.839
31091	Hooker	769	740	0.962
31093	Howard	6,640	7,321	1.102
31095	Jefferson	8,233	7,519	0.913
31097	Johnson	4,484	4,561	1.017
31099	Kearney	6,933	7,415	1.07
31101	Keith	8,947	9,453	1.056
31103	Keya Paha	960	778	0.811
31105	Kimball	4,078	4,021	0.986
31107	Knox	9,293	8,699	0.936
31109	Lancaster	259,022	339,780	1.312
31111	Lincoln	35,207	40,975	1.164
31113	Logan	754	619	0.821
31115	Loup	703	651	0.926
31117	McPherson	526	499	0.948

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
31119	Madison	35,797	41,896	1.17
31121	Merrick	8,221	8,511	1.035
31123	Morrill	5,464	5,720	1.047
31125	Nance	3,984	3,608	0.906
31127	Nemaha	7,518	7,029	0.935
31129	Nuckolls	4,923	3,939	0.8
31131	Otoe	15,678	18,653	1.19
31133	Pawnee	3,036	2,760	0.909
31135	Perkins	3,163	2,934	0.928
31137	Phelps	9,734	9,705	0.997
31139	Pierce	7,868	7,975	1.014
31141	Platte	32,052	36,498	1.139
31143	Polk	5,621	5,569	0.991
31145	Red Willow	11,389	11,002	0.966
31147	Richardson	9,450	8,973	0.95
31149	Rock	1,700	1,292	0.76
31151	Saline	14,109	16,745	1.187
31153	Sarpy	127,219	167,476	1.316
31155	Saunders	20,130	23,249	1.155
31157	Scotts Bluff	37,472	43,116	1.151
31159	Seward	16,635	18,095	1.088
31161	Sheridan	6,104	5,437	0.891
31163	Sherman	3,233	2,620	0.81
31165	Sioux	1,455	1,247	0.857
31167	Stanton	6,481	6,728	1.038
31169	Thayer	5,928	5,042	0.85
31171	Thomas	704	527	0.749
31173	Thurston	7,271	8,147	1.12
31175	Valley	4,545	3,835	0.844
31177	Washington	19,312	24,628	1.275
31179	Wayne	9,973	11,028	1.106
31181	Webster	4,007	3,726	0.93
31183	Wheeler	861	703	0.817
31185	York	14,660	15,532	1.06
	OKLAHOMA			
40001	Adair	21,743	27,960	1.286
40003	Alfalfa	6,063	5,900	0.973
40005	Atoka	14,167	17,040	1.203
40007	Beaver	5,834	5,960	1.022
40009	Beckham	20,039	22,800	1.138
40011	Blaine	12,066	13,500	1.119
40013	Bryan	37,360	44,060	1.179
40015	Caddo	30,210	31,820	1.053
40017	Canadian	89,538	104,960	1.172
40019	Carter	45,893	49,600	1.081
40021	Cherokee	44,073	56,420	1.28
40023	Choctaw	15,365	15,920	1.036

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
40025	Cimarron	3,169	3,360	1.06
40027	Cleveland	212,930	245,480	1.153
40029	Coal	6,139	7,400	1.205
40031	Comanche	116,758	130,360	1.117
40033	Cotton	6,568	6,660	1.014
40035	Craig	15,250	17,940	1.176
40037	Creek	68,220	76,040	1.115
40039	Custer	26,445	28,800	1.089
40041	Delaware	38,326	48,620	1.269
40043	Dewey	4,686	4,500	0.96
40045	Ellis	4,005	3,740	0.934
40047	Garfield	58,048	60,640	1.045
40049	Garvin	27,246	28,080	1.031
40051	Grady	46,110	51,620	1.12
40053	Grant	5,126	5,160	1.007
40055	Greer	5,997	5,900	0.984
40057	Harmon	3,250	3,300	1.015
40059	Harper	3,537	3,400	0.961
40061	Haskell	12,115	14,940	1.233
40063	Hughes	14,412	17,100	1.186
40065	Jackson	28,743	31,540	1.097
40067	Jefferson	6,731	6,660	0.989
40069	Johnston	10,708	12,720	1.188
40071	Kay	48,248	50,480	1.046
40073	Kingfisher	14,156	16,740	1.183
40075	Kiowa	10,136	9,900	0.977
40077	Latimer	10,735	11,380	1.06
40079	Le Flore	48,505	54,700	1.128
40081	Lincoln	32,568	37,200	1.142
40083	Logan	34,874	42,540	1.22
40085	Love	9,139	11,940	1.307
40087	McClain	28,764	37,320	1.297
40089	McCurtain	34,601	36,880	1.066
40091	McIntosh	19,874	23,780	1.197
40093	Major	7,527	7,500	0.996
40095	Marshall	13,910	20,040	1.441
40097	Mayes	39,061	45,460	1.164
40099	Murray	12,854	14,760	1.148
40101	Muskogee	69,671	72,820	1.045
40103	Noble	11,527	12,480	1.083
40105	Nowata	10,821	13,340	1.233
40107	Okfuskee	11,808	12,120	1.026
40109	Oklahoma	668,989	728,840	1.089
40111	Okmulgee	40,091	44,560	1.111
40113	Osage	45,022	50,260	1.116
40115	Ottawa	33,516	36,820	1.099
40117	Pawnee	16,887	19,800	1.172

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
40119	Payne	70,194	82,360	1.173
40121	Pittsburg	44,172	46,960	1.063
40123	Pontotoc	35,326	37,420	1.059
40125	Pottawatomie	66,393	73,880	1.113
40127	Pushmataha	11,920	14,380	1.206
40129	Roger Mills	3,422	3,400	0.994
40131	Rogers	72,465	88,040	1.215
40133	Seminole	24,896	25,840	1.038
40135	Sequoyah	39,863	47,280	1.186
40137	Stephens	43,069	43,280	1.005
40139	Texas	21,344	31,420	1.472
40141	Tillman	9,252	9,360	1.012
40143	Tulsa	570,659	625,040	1.095
40145	Wagoner	59,285	71,220	1.201
40147	Washington	49,118	50,600	1.03
40149	Washita	11,585	12,220	1.055
40151	Woods	9,093	9,200	1.012
40153	Woodward	18,612	19,840	1.066
	TEXAS			
48001	Anderson	55,825	62,092	1.112
48003	Andrews	13,238	15,107	1.141
48005	Angelina	81,575	94,579	1.159
48007	Aransas	22,934	26,209	1.143
48009	Archer	9,024	10,468	1.16
48011	Armstrong	2,158	2,290	1.061
48013	Atascosa	40,167	53,775	1.339
48015	Austin	24,077	28,473	1.183
48017	Bailey	6,735	8,082	1.2
48019	Bandera	18,390	25,243	1.373
48021	Bastrop	61,069	94,372	1.545
48023	Baylor	4,055	3,877	0.956
48025	Bee	32,849	36,562	1.113
48027	Bell	246,823	314,037	1.272
48029	Bexar	1,427,012	1,671,927	1.172
48031	Blanco	8,718	11,557	1.326
48033	Borden	733	781	1.065
48035	Bosque	17,437	20,107	1.153
48037	Bowie	89,580	91,580	1.022
48039	Brazoria	250,581	326,663	1.304
48041	Brazos	156,104	186,034	1.192
48043	Brewster	8,926	10,029	1.124
48045	Briscoe	1,804	1,932	1.071
48047	Brooks	8,144	9,519	1.169
48049	Brown	38,032	41,331	1.087
48051	Burleson	16,885	20,825	1.233
48053	Burnet	35,695	50,786	1.423
48055	Caldwell	33,656	48,066	1.428

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
48057	Calhoun	21,104	24,148	1.144
48059	Callahan	13,015	14,012	1.077
48061	Cameron	350,379	483,238	1.379
48063	Camp	11,822	14,014	1.185
48065	Carson	6,549	6,818	1.041
48067	Cass	30,445	30,639	1.006
48069	Castro	8,485	10,065	1.186
48071	Chambers	27,049	36,395	1.346
48073	Cherokee	47,518	55,687	1.172
48075	Childress	7,756	8,283	1.068
48077	Clay	11,083	11,653	1.051
48079	Cochran	3,801	4,447	1.17
48081	Coke	3,842	3,837	0.999
48083	Coleman	9,219	9,345	1.014
48085	Collin	526,153	822,200	1.563
48087	Collingsworth	3,184	3,160	0.992
48089	Colorado	20,586	22,907	1.113
48091	Comal	81,730	116,670	1.428
48093	Comanche	14,078	14,909	1.059
48095	Concho	4,005	4,113	1.027
48097	Cooke	36,899	42,123	1.142
48099	Coryell	77,652	101,132	1.302
48101	Cottle	1,892	1,928	1.019
48103	Crane	4,076	4,674	1.147
48105	Crockett	4,171	4,720	1.132
48107	Crosby	7,195	8,188	1.138
48109	Culberson	3,050	3,524	1.155
48111	Dallam	6,367	7,305	1.147
48113	Dallas	2,284,143	2,865,380	1.254
48115	Dawson	15,188	16,641	1.096
48117	Deaf Smith	19,054	22,958	1.205
48119	Delta	5,331	5,362	1.006
48121	Denton	465,947	753,768	1.618
48123	DeWitt	20,169	21,436	1.063
48125	Dickens	2,749	2,689	0.978
48127	Dimmit	10,495	12,165	1.159
48129	Donley	3,826	3,776	0.987
48131	Duval	13,353	14,883	1.115
48133	Eastland	18,293	18,668	1.02
48135	Ector	123,150	142,079	1.154
48137	Edwards	2,185	2,331	1.067
48139	Ellis	115,879	159,805	1.379
48141	El Paso	703,516	904,018	1.285
48143	Erath	34,293	41,401	1.207
48145	Falls	18,747	20,606	1.099
48147	Fannin	31,641	35,727	1.129
48149	Fayette	22,019	25,273	1.148

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
48151	Fisher	4,308	4,070	0.945
48153	Floyd	7,874	8,875	1.127
48155	Foard	1,618	1,618	1
48157	Fort Bend	373,357	540,789	1.448
48159	Franklin	9,552	10,277	1.076
48161	Freestone	18,062	20,161	1.116
48163	Frio	16,725	20,219	1.209
48165	Gaines	14,799	17,918	1.211
48167	Galveston	253,900	283,666	1.117
48169	Garza	4,942	5,472	1.107
48171	Gillespie	21,030	23,313	1.109
48173	Glasscock	1,425	1,654	1.161
48175	Goliad	7,036	7,739	1.1
48177	Gonzales	18,950	21,801	1.15
48179	Gray	22,624	22,406	0.99
48181	Grayson	111,888	123,924	1.108
48183	Gregg	112,696	125,782	1.116
48185	Grimes	24,203	30,486	1.26
48187	Guadalupe	92,465	123,890	1.34
48189	Hale	37,285	42,886	1.15
48191	Hall	3,799	3,951	1.04
48193	Hamilton	8,252	8,873	1.075
48195	Hansford	5,440	6,269	1.152
48197	Hardeman	4,720	4,746	1.006
48199	Hardin	48,944	55,591	1.136
48201	Harris	3,503,977	4,416,624	1.26
48203	Harrison	63,224	73,646	1.165
48205	Hartley	5,629	6,275	1.115
48207	Haskell	6,056	6,000	0.991
48209	Hays	106,152	174,701	1.646
48211	Hemphill	3,384	3,668	1.084
48213	Henderson	75,340	94,009	1.248
48215	Hidalgo	603,081	911,390	1.511
48217	Hill	33,057	40,340	1.22
48219	Hockley	23,092	25,645	1.111
48221	Hood	42,466	55,163	1.299
48223	Hopkins	32,358	36,114	1.116
48225	Houston	23,266	24,481	1.052
48227	Howard	33,901	36,108	1.065
48229	Hudspeth	3,417	3,945	1.155
48231	Hunt	80,012	105,234	1.315
48233	Hutchinson	23,974	25,212	1.052
48235	Irion	1,783	1,810	1.015
48237	Jack	8,840	9,508	1.076
48239	Jackson	14,622	16,558	1.132
48241	Jasper	36,303	42,026	1.158
48243	Jeff Davis	2,229	2,312	1.037

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
48245	Jefferson	254,598	273,841	1.076
48247	Jim Hogg	5,377	6,197	1.153
48249	Jim Wells	40,067	45,874	1.145
48251	Johnson	131,417	175,962	1.339
48253	Jones	20,871	22,002	1.054
48255	Karnes	15,785	18,764	1.189
48257	Kaufman	74,604	107,395	1.44
48259	Kendall	24,885	35,870	1.441
48261	Kenedy	424	499	1.177
48263	Kent	848	823	0.971
48265	Kerr	44,086	48,298	1.096
48267	Kimble	4,487	4,585	1.022
48269	King	359	401	1.117
48271	Kinney	3,403	3,513	1.032
48273	Kleberg	33,117	41,183	1.244
48275	Knox	4,238	4,340	1.024
48277	Lamar	48,834	51,485	1.054
48279	Lamb	14,911	16,850	1.13
48281	Lampasas	18,234	22,529	1.236
48283	La Salle	6,050	7,479	1.236
48285	Lavaca	19,194	19,632	1.023
48287	Lee	16,086	20,471	1.273
48289	Leon	15,593	17,889	1.147
48291	Liberty	72,445	93,467	1.29
48293	Limestone	22,368	25,486	1.139
48295	Lipscomb	3,065	3,215	1.049
48297	Live Oak	12,488	13,788	1.104
48299	Llano	16,945	16,260	0.96
48301	Loving	67	63	0.94
48303	Lubbock	249,130	278,019	1.116
48305	Lynn	6,648	7,364	1.108
48307	McCulloch	8,244	8,680	1.053
48309	McLennan	216,167	247,741	1.146
48311	McMullen	852	877	1.029
48313	Madison	13,176	15,081	1.145
48315	Marion	11,091	12,025	1.084
48317	Martin	4,847	5,700	1.176
48319	Mason	3,725	3,609	0.969
48321	Matagorda	38,580	44,184	1.145
48323	Maverick	49,212	65,897	1.339
48325	Medina	40,817	54,778	1.342
48327	Menard	2,363	2,442	1.033
48329	Midland	117,378	132,227	1.127
48331	Milam	24,569	27,688	1.127
48333	Mills	5,170	5,589	1.081
48335	Mitchell	9,723	9,930	1.021
48337	Montague	19,275	20,913	1.085

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
48339	Montgomery	309,930	461,971	1.491
48341	Moore	20,762	26,367	1.27
48343	Morris	13,099	13,530	1.033
48345	Motley	1,425	1,367	0.959
48347	Nacogdoches	59,776	67,457	1.128
48349	Navarro	46,048	55,397	1.203
48351	Newton	15,325	17,183	1.121
48353	Nolan	15,989	17,389	1.088
48355	Nueces	321,277	384,672	1.197
48357	Ochiltree	9,198	10,968	1.192
48359	Oldham	2,214	2,423	1.094
48361	Orange	85,840	91,950	1.071
48363	Palo Pinto	27,446	31,612	1.152
48365	Panola	22,978	24,587	1.07
48367	Parker	91,640	119,974	1.309
48369	Parmer	10,208	12,008	1.176
48371	Pecos	17,083	19,202	1.124
48373	Polk	42,165	51,096	1.212
48375	Potter	116,392	142,151	1.221
48377	Presidio	7,584	9,955	1.313
48379	Rains	9,402	11,529	1.226
48381	Randall	106,619	125,769	1.18
48383	Reagan	3,405	4,101	1.204
48385	Real	3,051	3,040	0.996
48387	Red River	14,351	14,641	1.02
48389	Reeves	13,369	14,786	1.106
48391	Refugio	7,943	8,652	1.089
48393	Roberts	897	998	1.113
48395	Robertson	16,287	19,279	1.184
48397	Rockwall	45,533	67,942	1.492
48399	Runnels	11,577	12,475	1.078
48401	Rusk	47,780	51,956	1.087
48403	Sabine	10,523	10,716	1.018
48405	San Augustine	9,069	9,770	1.077
48407	San Jacinto	22,977	29,104	1.267
48409	San Patricio	69,800	93,570	1.341
48411	San Saba	6,222	6,843	1.1
48413	Schleicher	2,970	3,342	1.125
48415	Scurry	16,476	17,562	1.066
48417	Shackelford	3,337	3,574	1.071
48419	Shelby	25,639	29,603	1.155
48421	Sherman	3,237	3,594	1.11
48423	Smith	177,083	201,037	1.135
48425	Somervell	6,979	8,490	1.217
48427	Starr	56,216	79,415	1.413
48429	Stephens	9,731	10,457	1.075
48431	Sterling	1,402	1,543	1.101

Table C-1 (continued)

FIPS Code	County	2002	2018	2018GF
48433	Stonewall	1,694	1,695	1.001
48435	Sutton	4,181	4,814	1.151
48437	Swisher	8,496	9,523	1.121
48439	Tarrant	1,489,319	1,847,868	1.241
48441	Taylor	128,262	141,533	1.103
48443	Terrell	1,081	1,095	1.013
48445	Terry	12,997	14,910	1.147
48447	Throckmorton	1,860	1,866	1.003
48449	Titus	28,786	34,989	1.215
48451	Tom Green	105,294	116,825	1.11
48453	Travis	845,053	1,080,424	1.279
48455	Trinity	13,942	15,034	1.078
48457	Tyler	21,250	24,626	1.159
48459	Upshur	35,908	41,645	1.16
48461	Upton	3,461	3,902	1.127
48463	Uvalde	26,616	32,217	1.21
48465	Val Verde	46,318	57,703	1.246
48467	Van Zandt	49,269	59,968	1.217
48469	Victoria	86,205	102,198	1.186
48471	Walker	63,272	72,115	1.14
48473	Waller	34,583	49,277	1.425
48475	Ward	11,060	12,051	1.09
48477	Washington	30,752	35,292	1.148
48479	Webb	206,306	325,594	1.578
48481	Wharton	41,738	46,881	1.123
48483	Wheeler	5,231	4,997	0.955
48485	Wichita	133,000	143,299	1.077
48487	Wilbarger	14,793	16,126	1.09
48489	Willacy	20,651	25,372	1.229
48491	Williamson	267,736	434,237	1.622
48493	Wilson	33,943	48,616	1.432
48495	Winkler	7,273	7,999	1.1
48497	Wise	50,769	68,763	1.354
48499	Wood	37,500	43,929	1.171
48501	Yoakum	7,488	8,997	1.202
48503	Young	17,982	18,841	1.048
48505	Zapata	12,587	16,344	1.298
48507	Zavala	11,887	14,101	1.186

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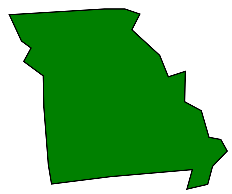
Appendix H.5

MDNR Air Pollution Control Program, *Missouri Statewide Estimates for the 2002 National Emissions Inventory (NEI): Area Sources*

Missouri Department of Natural Resources

Division of Environmental Quality
Air Pollution Control Program



DRAFT

Revised January 8, 2007

Missouri Statewide Estimates for the 2002 National Emissions Inventory (NEI)

Area Sources

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Mollie Freebairn
Carlton Flowers

Table of Contents

1.0 INTRODUCTION

1.1 Purpose of Study

The objective of this report is to document the 2002 Area Source Inventory for the National Emissions Inventory due to EPA every three years. Included are emissions from numerous source categories in each county in the state of Missouri.

1.2 Sources of Emissions

For this inventory, emissions from area sources are estimated collectively for those sources and activities that are too small or too numerous to be handled individually in the point source inventory. Area sources of all criteria pollutant emissions and PM2.5 to be included in this inventory are shown in the following table:

Source Categories	SCCs	PM10	PM2.5	CO	VOC	NOX	SOX
Asphalt Paving	2461021000 2461022000				X		
Dry Cleaning	2420010999				X		
Architectural Surface Coating	2401001000				X		
Autobody Refinishing	2401005000				X		
Consumer/Commercial Solvent Use	2460000000				X		
Bakeries	2302050000				X		
Graphic Arts	2425000000				X		
Solvent Cleaning	2415000000				X		
Leaking USTs	2660000000				X		
Industrial Surface Coating	2401020000				X		
Vehicle Fires	2810050000	X		X	X	X	
Structure Fires	2810030000	X		X	X	X	
Pesticides	2461850000 2461870999				X		
Open Burning	2610030000 2610020000	X		X	X	X	
Wildfires	2810001000	X		X	X	X	
Gasoline Marketing	2501060050 2501060100 2501060201				X		
Landfills	2620030000				X		
Commercial/Marine Vessels	2505020000	X			X	X	
Coal Combustion	2104002000	X	X	X	X	X	X

Source Categories	SCCs	PM10	PM2.5	CO	VOC	NOX	SOX
	2103002000 2102002000						
Natural Gas Combustion	2104006000 2103006000 2102006000	X	X	X	X	X	X
LPG Combustion	2104007000 2103007000 2102007000	X	X	X	X	X	X
Fuel Oil Combustion	2104004000 2103004000 2102004000	X	X	X	X	X	X
Residential Wood Burning	2104008000	X	X	X	X	X	X

1.3 Area Source Estimation Methodologies

Several methodologies were available for estimating the area source activity and emissions: (1) apportioning national or state activity totals to local inventory area; (2) using per capita emission factors; (3) using emissions-per-employee factors; (4) surveying local activity levels; and (5) treating area sources as point sources. Following the methodologies outlined in the Emission Inventory Improvement Program's (EIIP) guidance, appropriate data were collected for each source.

1.4 Allocating Missouri Employees to the Commercial and Industrial Sectors

The North American Industry Classification System (NAICS) is in the process of replacing the Standard Industrial Classification (SIC). Commercial/Institutional sources which were previously designated to be SIC categories 50 through 99, are now designated as NAICS categories 11, and 42-92, as shown in the table below. Industrial sector employment is aggregated for those Missouri employees found working in the NAICS categories 21-33 by the U.S. Census Bureau at http://quickfacts.census.gov/qfd/states/29000.html.
Missouri Department of Economic Development / Economic Research and Information Center employment data for 2002 is at http://www.ded.mo.gov/cgi-bin/meric/es202.pl.

SIC / NAICS Commercial/Institutional & Industrial Categories:
SIC to NAICS Correspondence:

SIC	NAICS	Category	NAICS 11, 42-92 Commercial/Institutional	NAICS 21-33 Industrial
01-09	11	Agriculture, Forestry, Fishing, & Hunting	X	
10-14	21	Mining		X
49	22	Utilities		X
15-17	23	Construction		X

20-39	31-33	Manufacturing		X
50-51	42	Wholesale Trade	X	
52-59	44-45	Retail Trade	X	
41-47	48-49	Transportation and Warehousing	X	
48	51	Information	X	
60-64	52	Finance and Insurance	X	
65-67	53	Real Estate and Rental and Leasing	X	
73,87	54	Professional, Scientific and Technical Services	X	
67	55	Management of Companies and Enterprises	X	
87,78	56	Administrative and Support and Waste Management and Remediation Services	X	
82	61	Educational Services	X	
80	62	Health Care and Social Assistance	X	
79	71	Arts, Entertainment and Recreation	X	
70	72	Accommodation and Food Services	X	
75	81	Other Services (except Public Administration)	X	
91-97	92	Public Administration	X	

1.5 Rule Effectiveness

A rule effectiveness (RE) factor was applied to base year emissions for counties where regulations were in place. RE is a measure of the ability of a regulatory program to achieve all emissions reductions that could be achieved by full compliance with the applicable regulations at all sources at all times. It reflects the assumption that regulations are not 100% effective.

1.6 Double Counting of Emissions

A major concern in the development of an area source inventory is the possibility of double counting emissions. Because some area source methodologies estimate emissions from all sources within a category, emissions already listed in the point source inventory may also be included in the area source inventory. In developing the Missouri area source inventory, possible double counting of emissions was avoided by subtracting emissions appearing in the Missouri state point source inventory from the area source totals for that category (*e.g.,* large dry cleaning facilities, large graphic arts facilities, *etc.*).

1.7 Quality Assurance

To ensure that this emissions inventory if of high quality, certain quality assurance (QA) procedures were implemented at various points in the inventory process. The following quality assurance techniques were used:

- Each algorithm used to calculate emissions was reviewed to ensure its appropriateness and adherence to EIIP guidance.

- Each spreadsheet was reviewed to ensure the proper data, emission factors and algorithms were used.
- Peer review was an essential part of the QA
- All emissions estimates were checked for reasonableness.
- All emissions estimation methods, data collected and emissions calculations were reviewed again during the reporting stage.
- The final data was run through the EPA quality assurance software to identify any errors that occurred as the data was put into NIF format before submission.

The emissions estimates were compared to emissions calculated in 1999 for any large increases or decreases. If there were significant differences in the three-year period the data was subjected to further investigation to ensure accuracy.

1.8 Federal, State and Local Regulations

Federal, State of Missouri and St. Louis area air pollution regulations were reviewed for application to specific area source categories. As shown in the following sections, these regulations have contributed a lot to emission reductions. Categories addressed by these regulations include:

- Commercial and Consumer Products Solvent
- Auto Body Refinishing
- Underground Storage Tanks
- Vehicle Fueling
- Tank Truck Unloading
- Solvent Metal Cleaning
- Dry Cleaning
- Cutback Asphalt Paving
- Open Burning
- Bakery Ovens
- Traffic Coatings

2.0 EMISSIONS ESTIMATES

2.1 Asphalt Paving

2.1.1 Source Description and Emission Controls

Asphalt paving is used to pave, seal, and repair surfaces such as roads, parking lots, drives, walkways, and airport runways. Asphalt concrete used in paving is a mixture of asphalt cement, which is a binder, and an aggregate. Asphalt cement is the semi-solid residual material left from petroleum refining after the lighter and more volatile fractions have been distilled out. Hot-mix asphalt is a mixture of heated asphalt cement and aggregate. Asphalt cutbacks are asphalt cements thinned with petroleum distillates (diluents). Asphalt emulsions are mixtures of asphalt cement with water and emulsifiers. Aggregates used in asphalt cements are typically rock gravel or recycled asphalt pavement, but can also be byproducts from metal ore refining processes.

Aggregate may constitute up to 95 percent by weight of the total mixture. Mixture characteristics for asphalt concrete are determined by the amount and grade of asphalt cement used, the addition of solvent- or soap-based liquefying agents, and the relative amount and types of aggregate used.

Recycled asphalt pavement (RAP) is being used more frequently, partly as a move to reduce solid waste. One source estimates that 90 percent of asphalt processed is RAP. To reuse the asphalt, the RAP is typically pulverized; sorted; mixed with recycling agents such as lime or calcium chloride, or additional aggregate; then applied. The five methods of recycling are: cold planing, hot recycling, hot in-place recycling, cold in-place recycling, and full depth reclamation. All except hot recycling occur at the location where paving is to be done, although material removed during cold planing may be processed at an asphalt plant.

Asphalt concrete is grouped into three general categories: hot-mix, cutback, and emulsified. Each is discussed below.

Hot-Mix Asphalt:

Hot-mix asphalt is the most commonly used paving asphalt for surfaces of 2 to 6 inches thick. Hot-mix asphalt is prepared at a hot-mix asphalt plant by heating asphalt cement before adding the aggregate. To maintain a liquid mixture, these plants must be near to the paving site. In some cases, mobile facilities are used.

Cutback Asphalt:

Cutback asphalt is used in tack and seal operations, in priming roadbeds for hot-mix application, and for paving operations for pavements up to several inches thick. In preparing cutback asphalt, asphalt cement is blended or "cut back" with a diluent, typically from 25 to 45 percent by volume of petroleum distillates, depending on the desired viscosity. Cutback asphalt is prepared at an asphalt plant. There are three types of cutback asphalt cement:

- Rapid Cure (RC) which uses gasoline or naphthas as diluents;
- Medium Cure (MC) which uses kerosene as a diluent; and
- Slow Cure (SC) which uses low volatility fuel solvents as diluents.

Emulsified Asphalt:

Emulsified asphalt is used in most of the same applications as cutback asphalt but is a lower emitting, energy saving, and safer alternative to the cutback asphalt. Instead of blending asphalt cement with petroleum distillates, emulsified asphalt uses a blend of asphalt cement, water and an emulsifying agent, such as soap. Such blends typically contain one-third water, two-thirds asphalt cement and minor amounts of an emulsifier. Some emulsified asphalt may contain up to 12 percent organic solvents by volume. Emulsification is done at an asphalt plant. Emulsified asphalt cures by two methods: water evaporation and, in the case of cationic and anionic emulsions, ionic bonding.

2.1.2 Emission Estimation Methodology

Activity Level

The Missouri Department of Transportation (MODOT) keeps records of amount cutback and emulsified asphalt used in 10 Districts. Since MODOT does not keep records for each county, population figures were used to estimate how much asphalt was used for each county.

Emission Factors

Missouri Department provided all Safety Material Data Sheets (MSDSs) for all types of asphalt used in 2002. Alternative Method 1 of EIIP volume III, Asphalt Paving, was used to come up with emission factors for cutback asphalt. Due to lack of data available for emulsified asphalt an emission factor of 9.2 lb VOC/barrel asphalt used (9.2 lb VOC/350 lb asphalt) was used to calculate VOC emissions from the use of emulsified asphalt in paving activities which was obtained from EIIP volume III.

Assumptions

It was assumed that 5% of asphalt paving was conducted by agencies other than the state's Department of Transportation. After some search on asphalt application practices, it was determined that cutback asphalt is typically applied during November through March. Moreover, emulsified asphalt is typically applied only in warm weather. This corresponds to the months of May through September. Since there is a rule that bans applying cutback asphalt during ozone season in St. Louis Area, it was assumed that there is 80% compliance with this rule.

Sample Calculation (Cole County)

<u>Cutback Asphalt:</u>

VOC Emissions (tons/year) = amount of cutback asphalt (gallons) X population of county / population of district X volume % of diluent X density of diluent X weight % of diluent evaporated / (2000 lb/ton)

Population of Cole County: 71894

Population of Central District: 461578

Types of Asphalt Used in Central District : MC-250 & MC-30

Amount of MC-250 & MC-30 Used in Central District: 64659 gallons

Volume Percent of Diluent: 19%

MC Diluent Density: 6.6755 lb/gallon

Weight Percent Diluent Evaporated: 70%

Activity Days Per Week: 5

Weeks Per Year Used (November to March): 39

VOC Emissions (tons/year) = 64659 gallons X 71894 / 461578 X 0.19 X 6.6755 lb/gallon *.7 / 2000lb/ton = 4.47 tons/year

Emulsified Asphalt:

VOC Emissions (tons/year) = amount of emulsified asphalt (gallons) X density of asphalt (lb/gallon) X Emission Factor (lb/lb) / 2000

Population of Cole County: 71894

Population of Central District: 461578

Amount of Emulsified Asphalt Used in Central District: 7,001,817 lb

VOC Emission Factor = 9.2 lb VOC/350 lb emulsified asphalt

Activity Days Per Week: 7

VOC Emissions (tons/year) = 7001817 X 71894/461578 X 9.2 lb/350 lb / 2000 lb/ton = 14.33 tons/year

2.1.3 Results

The total VOC emissions from asphalt paving for the State of Missouri is 1270.4 tons/year.

2.1.4 References

- *Asphalt Paving*, Volume III: Chapter 17, Final Report, Area Sources Committee EIIP, October 1998.
- *Introduction to Area Source Emission Inventory Development*, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.
- *Compilation of Air Pollution Emission Factors*. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.
- Customer Service Center, Department of Transportation, Jefferson City, MO.
- East-West Gateway Coordinating Council, St. Louis City, MO.

2.2 Dry Cleaning

2.2.1 Source Description and Emission Control

Dry cleaning is considered a solvent evaporation emission source of VOC. It involves the cleaning of fabrics with non-aqueous organic solvent. The industry is divided into three sectors: coin-operated facilities; commercial operations; and industrial cleaners. Volatile organic solvents that are used as cleaning solvents are emitted during the dry cleaning process. The petroleum solvents most commonly used in dry cleaning are Stoddard solvent (mineral spirit) and 140-F. The synthetic solvents that are used in dry cleaning, PERC, TCA, and CFC-113, are not considered photochemically reactive and should not be included as a source of VOC emissions; PERC and TCA, however, are hazardous air pollutants that should be included in an air toxic inventory. TCA and CFC-113 are ozone-depleting substances, and CFC-113 may be listed in some state regulation as a toxic air pollutant. It is estimated that 82% of all dry cleaning facilities use PERC, 15% use petroleum solvents, 3% use CFC-113, and less than 1% use TCA. However, based on study of national solvent use, 57% of al dry cleaning solvents are petroleum solvents, 39% of the solvents are PERC, and 3 and 1% are TCA and CFC-113, respectively, with a minor amount of unspecified solvents. Small dry cleaning facilities, such as coin-operated sites use PERC exclusively, and larger facilities, such as commercial facilities use petroleum solvents, resulting in this disparity.

2.2.2 Emission Estimation Methodology

Activity Level

The number of employees in dry cleaning facilities with SIC 7216 was used to estimate VOC emissions. The number of employees was obtained from the U.S. Bureau of Census.[1]

Emission Factors

The Emission factor (1800 lb/employee/year) was obtained from EIIP, Dry Cleaning. This emission factor excludes emissions of PERC, TCA, and CFC 113.

Assumptions

It was assumed that coin-operated dry cleaners use PERC exclusively and 15 percent of the remaining dry cleaners use petroleum solvents. According to EIIP volume III[2], there is no seasonal adjustment factor for dry cleaning. In addition, the activity days per week are 5 days.

Sample Calculation (Cole County)

VOC Emissions (tons/year) = [(# of employees) X (percent of facilities using petroleum solvents) X (emission factor) / (2000 lb/ton)

Emission Factor: 1800 lb VOC/employee/yr

Number of Employees with SIC 7216 in Cole County: 59

Percent of Facilities with SIC 7216 that use Petroleum Solvents: 15%

Activity Days Per Week: 5

VOC Emissions (tons/year) = 59 employees X 0.15 X (1800 lb/employee/yr) / (2000 lb/ton) = 7.97 tons/year

2.2.3 Results

Total VOC emissions from dry cleaners for the State of Missouri is 582.26 tons/year.

2.2.4 References

- *U.S. Census Bureau, Department of Commerce, Washington, D.C.*
- *Dry Cleaning, Volume III: Chapter 5, Final Report, Area Sources Committee EIIP, May 1996*

2.3 Architectural Surface Coating

2.3.1 Source Description and Emission Control

Architectural surface coating is considered a solvent evaporation emission of volatile organic compounds (VOC) and is categorized as non-industrial surface coating. Architectural surface coatings, trade paints, are used primarily by homeowners and painting contractors to coat the interior and exterior of houses and buildings and the surfaces of other structures such as pavements, curbs and signs. Volatile organic compounds that are used as solvents in the coatings are emitted during the application of the coating and as the coating dries. The amount of coating used and the VOC content of the coating are the factors that primarily determine emissions from architectural surface coating operations. Secondary sources of VOC emissions are from the solvents used to clean the architectural coating application equipment and VOC released as reaction byproducts while the coating dries and hardens. The resins used in a particular coating determine VOC emitted from this chemical reaction. Since the use of organic solvents in architectural surface coatings is the primary source of emissions, control techniques for this source category involve either product substitution or product reformulation.

2.3.2 Emission Estimation Methodology

Activity Level

The Activity level is based on population and estimated gallons of paint (solvent and water based) used nation wide.[1]

Emission Factors

Emission factors for solvent based and water based paints are 3.87 lb/gallon and 0.74 lb/gallon respectively. All emission factors were obtained from EIIP volume III.[2]

Assumptions

A per capita emission factor was used to calculate emissions from this source category. This per capita usage factor is calculated by dividing the total usage of surface coating materials by the United States population. Activity was also assumed to be uniform 365 days per year.

Sample Calculation (Cole County)

Using the alternative method from the EIIP Volume III, Chapter3[3], the estimated ozone season daily VOC emissions from Cole County can be illustrated as follows:

VOC Emissions (tons/year) = population of county X [(per capita water based factor X water based emission factor) + (population of county X per capita solvent based factor X solvent based emission factor)] / (2000 lbs/ton)

US Population: 288,368,698

Total Paint-water based (gallons): 589,527,000

Total Paint-solvent based (gallons): 119,914,000

Per Capita-water based factor = 589527000 / 288368698 = 2.044 gallons/person

Per Capita-water based factor = 119914000 / 288368698 = 0.416 gallons/person

Paint-water based Emission Factor: 0.74 lb/gallon

Paint-solvent based Emission factor: 3.87 lb/gallon

Population of Cole County, 2002: 71,894

Activity Days per Week: 7

VOC Emissions (ton/year) = 71894 persons X (2.044 gal/person/yr X 0.74 lb/gal + 0.416 gal/person/yr X 3.87 lb/gal) / (2000 lbs/ton) = 112.23 tons/year

2.3.3 Results

Total VOC emissions from architectural surface coating for the State of Missouri is 8855.2 tons/year.

2.3.4 References

- *U.S. Census Bureau, Department of Commerce, Washington D.C.*
- *Architectural Surface Coating, Volume III: Chapter 5, Final Report, Area Sources Committee EIIP, August 1996.*

2.4 Auto Body Refinishing

2.4.1 Source Description and Emission Control

Auto body refinishing operations consist of four steps: (1) vehicle preparation, (2) primer application, (3) topcoat application, and (4) spray equipment cleaning. VOC emissions from automobile refinishing are influenced by several factors. Emissions from surface preparation and coating applications are a function of VOC content of the product used. Emissions are also a function of the transfer efficiency of the spray equipment. Transfer efficiency is the percent of paint solids that actually adheres to the surface being painted. Equipment with lower transfer efficiency would require more material to be sprayed, thus, increasing VOC emissions. Emissions from cleaning operations are dependent on the type of cleanup and housekeeping practices used. There are six main approaches for reducing VOC emissions from auto-body refinishing shops: use of lower-VOC coatings, use of enclosed cleaning devices, increased transfer efficiency, use of lower-VOC primers, use of solvent recovery system, and use of add-on controls for their spray booths such as thermal incineration, catalytic incineration, and carbon absorption. Other housekeeping activities can also be used to reduce emissions from auto body refinishing operations. These activities include tight fitting containers, reducing spills, mixing paint to need, providing training, maintaining rigid control of inventory, etc.

2.4.2 Emission Estimation Methodology

Activity level

The estimated national VOC emissions from auto body refinishing was apportioned to inventory area using employment data with 7532 SIC obtained from Department of Commerce. Data for 2002 was not available therefore data from 1999 was used for purposes of calculation an emission factor only.

Emission Factors

The emission factor is the number of employees in the inventory area divided by the number of employees nationwide with 7532 SIC.

Assumptions

It was assumed that the National VOC emissions from auto body refinishing are directly proportional to employment. It was assumed that the national EPA regulation promulgated on

September 11, 1998 to control VOC emissions from the use of Automobile refinishing coatings would reduce emission by 37%.

Sample Calculation

VOC Emissions (tons/year) = [(# employees in inventory area) / (# employees nation wide) X (national VOC emissions from auto body refinishing) X percent reduction from regulation] / (2000 lb/ton)

Estimated National VOC emissions: 79429.39 tons

Number of Employees Nationwide: 205172

Number of Employees in Cole County: 60

Activity Days Per Week: 5

Percent Emissions Reduction from Regulation: 37%

VOC Emissions (tons/year) = National VOC Emissions / Number of Employees Nationwide X Number of Employees in Cole County = 79429.39 / 205172 X 60 = 23.23 tons/year.

2.4.3 Results

The total VOC emissions from auto-body refinishing in the State of Missouri for 2002 is 1827.0 tons.

2.4.4 References

- *Auto Body Refinishing*, Volume III: Chapter 13, External Draft, Area Sources Committee EIIP, January 1997.
- *Introduction to Area Source Emission Inventory Development*, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.
- U.S. Census Bureau, Department of Commerce, Washington, D.C.

2.5 Commercial/Consumer Solvent Use

2.5.1 Source Description and Emission Control

Solvents contained in consumer and commercial products are primarily released during product use. Commercial and consumer products included in this category are:

- Household products
- Toiletries
- Aerosol products
- Rubbing compounds

- Windshield washing fluids
- Polishes and waxes
- Non-industrial adhesive
- Space deodorants
- Moth control
- Laundry detergents and treatment

Organic compounds in these products may act either as the carrier for the active product ingredients or as the active ingredients themselves. The organic compounds may be released to the atmosphere through immediate evaporation of an aerosol spray, evaporation after application or direct release in the gaseous phase.

Potential control strategies for VOC emissions from consumer and commercial products include a change in the application method, product substitution, product reformulation, and directions for use, storage, and disposal.

2.5.2 Emission Estimation Methodology

Activity Level

Emissions from consumer and commercial products were estimated using a single per capita emission factor from EIIP volume III, Chapter 5 and population data obtained from the United States Bureau of Census.

Emission Factor

The per capita emission factor for commercial and consumer solvent use is 6.06 lbs./capita/yr. The emission factor was adjusted from 7.84 to 6.06 to avoid double counting with pesticide applications.

Assumption

VOC emissions are proportional to population. It was assumed that the EPA consumer and commercial products regulation finalized on March, 1996 would reduce emissions by 20%.

Sample Calculation (Cole County)

VOC Emissions (tons/year) = population X emission factor X Percent Reduction from Regulation

VOC Emission Factor: 6.06 lb/person/yr

Population of Cole County: 71,894

Percent Reduction of Emission from EPA Regulation: 20%

Activity Days Per Week: 7

Percent Emissions Reduction from Regulation: 20%

VOC Emissions (tons/year) = 71894 persons X 6.06 lb/person/y) X (1 – 0.20) / (2000 lb/ton) = 174.271 tons/year.

2.5.3 Results

The total VOC Emissions from Consumer/Commercial Solvent Use for the State of Missouri is 13750.3 tons/year.

2.5.4 References

- *Consumer and Commercial Solvent Use*, Volume III: Chapter 5, Final Report, Area Sources Committee EIIP, August 1996.
- *Introduction to Area Source Emission Inventory Development*, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.
- *Compilation of Air Pollution Emission Factors*, Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.
- U.S. Bureau of Census, Department of Commerce, Washington, D.C.
- East-West Gateway Coordinating Council, St. Louis City, MO.

2.6 Bakeries

2.6.1 Source Description and Emission Control

The major pollutants emitted from bread baking are VOC emissions, chiefly the ethanol produced as a byproduct of the leavening process. Commercial bread bakeries use four basic dough processes: sponge and dough, straight dough, liquid ferment methods, and no-time dough. Bread in its simplest form requires four ingredients: flour, water, yeast, and salt. The primary emission source at a bakery is the oven. Because the ethanol produced by yeast metabolism is generally liquid at temperature below 77 ^{o}C or 170 ^{o}F, it is not emitted in appreciable amounts until the dough is exposed to high temperature in the oven. Bakery products that are not leavened with yeast do not produce ethanol and should not be considered for the VOC inventory.

2.6.2 Emission Estimation Methodology

Activity Level

VOC emissions from bakeries in Missouri counties were estimated using an employment based emission factor. This emission factor encompasses emissions from liquid ferment, sponge and dough methods. The total amount of VOC emitted by each county was calculated by multiplying the emission factor with the number of employees. The employees for each county were based on the NAICS numbers 3188 obtained from the U.S. Census Bureau.

Emission Factor

The emission factor of 220 tons VOC per employee-year was derived by Radian Corporation in the 1980's.

Assumption

It was assumed that bakery production does not vary from season to season and that the activity days per week are 6 days.

Sample Calculation (Boone County)

VOC Emissions (tons/year) = (# employees - # point source employees) X (emission factor) / 2000 lbs/ton.

Bakeries Employment in Boone County: 59 employees

Bakeries Point Source Employment in Boone County: 0

Emission Factor: 220 lb/employee/yr

Activity Days Per Week: 6

VOC Emissions (tons/year) = (59 – 0) employees X (220 lb/employee/yr) / (2000 lb/ton) = 6.49 tons/year.

2.6.3 Results

The total VOC emissions from bakeries for the State of Missouri is 499.18 tons/year.

2.6.4 References

- *Baked Goods at Commercial/Retail Bakeries*, Volume III: Area Source Method Abstracts, Area Sources Committee EIIP, July1999.
- U.S. Bureau of Census, Department of Commerce, Washington, D.C.
- Compilation of Air Pollution Emission Factors. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.

2.7 Graphic Arts

2.7.1 Source Description and Emission Control

Graphic arts is considered a solvent evaporation source of VOC emissions and includes the printing of news letters, books, magazines, fabric, wall covering and other materials. Graphic arts

operations are performed on printing presses that are made up of one or more "units". Each unit can print only one color. The substrate in graphic arts operations is either continuous and called a "web," or individual pieces of substrate called "sheets." The pattern that is printed on the substrate is called the "image." Five basic processes are used in the printing industry, including flexography, letterpress, lithography, rotogravure, and screen process printing. Considerable emissions originate from minor graphic arts applications, including in-house services in nonprinting industries. The predominant emissions from graphic arts printing are VOC contained in the printing inks, fountain solutions and cleaning solutions. Emissions from proofing presses, cleaning operations, ink storage tanks, and ink mixing operations are relatively minor compared to the emissions during the printing process, but they do contribute to overall emissions.

Afterburners, both thermal and catalytic, can be used to control VOC emissions from the heatset web offset lithography, rotogravure printing, and flexography. Refrigeration of the dampening solution is a process change that can achieve approximately 40 percent reduction of the VOC emissions. The use of lower- VOC-containing cleaning solutions can reduce VOC and hazardous air pollutants (HAP) emissions from cleaning operations in all types of printing. Storing cleaning rags in closed containers can control some of the fugitive emissions from cleaning.

2.7.2 Emissions Estimation Methodology

Activity Level

Ink sales nationwide were used to estimate emission from this source category. Ink sales in pounds were obtained from the U.S. Bureau of Census web site. The procedure to estimate emissions from this source category is outlined in EIIP, volume III, Graphic Arts. Given the time limitation and available resources, the first alternative method was used.

Emission Factors

The following emission factors were obtained from EIIP, volume III, Graphic Arts.

Printing Type	% Printing Type	Component Emission Factors Pound VOC Emitted per Pound of Ink Used		
		Ink	Fountain Solution	Cleaning Solution
Rotogravure	22	0.70	NA	0.03
Flexography	16	0.60	NA	0.04
Offset Lithography	35	0.38	2.75	1.23
Letter Press	8	0.24	NA	0.07
Screen	19	0.12	NA	

Assumptions

Number of employees was assumed to be proportional to ink sales.

Sample Calculation

OSD VOC (lb) = (# employees in county – county point source # employees) / total area source # employees X (Total area source ink usage) X ((% rotogravure ink solvent X rotogravure emission factor) + ((% flexography ink solvent X flexography emission factor) + …) / (activity days per week) X (1 yr / 52 week) X (seasonal activity factor) / 0.25

Total Ink Sales in US: 1642500000 lb

Printing Employment in US: 1501714

Printing Employment in State: 43952

Total Ink Sales in State: 48072509.15 lb

Point Source Ink Usage: 45122344.60 lb

Total Area Source Ink Usage: 2950164.54lb

Total Area Source Printing Employment: 21585

Franklin County Printing Employment: 999

Franklin County Point Source Printing Employment: 231

Activity Days Per Week: 5

Seasonal Activity Factor: 0.25

OSD VOC = (999 – 231) / 21585 X 2950164.54 lb X ((0.22 X 0.73) + (0.16 X 0.64) + (0.35 X 4.36) + (0.08 X 0.31) + (0.19 X 0.12)) / (5 days / week) X (1 yr / 52 week) X 0.25 / 0.25 = 741.48 lb/day

2.7.3 References

- *Graphic Arts*, Volume III: Chapter 7, Final Report, Area Sources Committee EIIP, November 1996.
- *Introduction to Area Source Emission Inventory Development*, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.
- *Compilation of Air Pollution Emission Factors*. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.
- U.S. Bureau of Census, Department of Commerce, Washington, D.C.

2.8 Solvent Cleaning

2.8.1 Source Description and Emission Control

Degreasing operations are considered solvent evaporation emission sources of VOC and employ non-aqueous solvents to remove grease, fats, oil, wax or soil from the surface of metal, glass or plastic articles which are to be electroplated, painted, repaired, inspected, assembled or machined. Degreasing is not associated with any particular industry, but is used in a variety of industries. There are three types of degreasers: small cold cleaners; open top vapor degreasers; and conveyorized degreasers. Open top vapor degreasers and conveyorized degreasers are usually large enough to be considered as point sources of emissions; therefore, only cold cleaners were evaluated for this area source report.
Design features that control solvent emissions from batch cold cleaning machines include increased freeboard ration, covers, internal drainage rack, and visible fill line.

2.8.2 Emission Estimation Methodology

Activity Level

EIIP Volume III, Chapter 6 discusses several methods that can be used to estimate emissions. Given the available data and time limits, the emission factor alternative method was used.

Emission Factor

A per employee emission factor, 87 lb/employee, for total solvent cleaning was used to estimate VOC emissions from solvent cleaning operations.

Sample Calculation

VOC Emissions ton/year = (population of county / population of State X # of Employees in State) X (emission factor)

Population of Cole County: 71894

Population of State of Missouri: 5,672,579

# of Employees in State for Solvent Cleaning: 268,228

Emission Factor: 87 lb/employee/yr

VOC Emissions ton/year = (71894 / 5672579 X 268228) employees X (87 lb/employees/yr) / (2000 lb/ton) = 147.88 tons/year.

2.8.3 Results

The total VOC emissions from solvent cleaning in the State of Missouri is 11667.92 tons/year.

2.8.4 References

- *Solvent Cleaning Use*, Volume III: Chapter 6, Final Report, Area Sources Committee EIIP, September 1997.
- *Introduction to Area Source Emission Inventory Development*, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.
- *Compilation of Air Pollution Emission Factors*. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.
- United States Bureau of Census, Department of Commerce, Washington, D.C.

2.9 Leaking Underground Storage Tank Removal

2.9.1 Source Description and Emission Control

Leaking underground storage tanks are typically not considered a quantifiable source of emissions until excavation and remediation efforts begin. The majority of air emissions from leaking UST site remediations occur during initial site action, which is typically tank removal. During tank removal, the leaking tank and the surrounding soil are removed and the soil is either treated on-site or transported off site for treatment or disposal in a landfill. Emissions from the soil occur as the tank is being removed and when soil is deposited on the ground before treatment/disposal occurs. The magnitude of VOC emissions during remediation events depends on several factors, most of all which are specific to each site. For this reason, determining emissions for this activity is difficult. Factors influencing VOC emissions from soils include type, concentration, and distribution of contaminants in the soil, the porosity and moisture content of the soil, temperature, wind, shape, and surface area of the soil piles, the type of soil handling equipment used and the duration of the operation.

2.9.2 Emission Estimation Methodology

Activity Level

The number of leaking storage tanks removed in each county in 2002 was obtained from the Missouri Hazardous Waste Program Tanks Section.

Emission Factors

Alternative Method 1 of EIIP, Leaking Underground Storage Tanks was used to determine VOC emissions. An emission factor of 28 lb/day of remediation event was used in calculations.

Sample Calculation

VOC Emissions in tons/year = # of leaking USTs removed X 28 lb/day X # of days per removal / (2000 lb/ton)

Emission Factor: 28 lb/day

# of leaking USTs removed in Cole County: 3

Average # of days to remove tanks: 1

VOC Emissions tons/year = (3 tanks removed) X (28 lb/day/tank removed) X (1 day to remove) = .042 tons/year

2.9.3 Results

The total VOC emissions from the removal leaking underground storage tanks in the State of Missouri is 9.53 tons/year.

2.9.4 References

- U.S. Census Bureau, Department of Commerce, Washington, D.C.
- *Leaking Underground Storage Tanks,* Volume III: Final Report, Area Sources Committee EIIP, December 2000
- State of Missouri Hazardous Waste Management Program- Tanks Section records for 2002.

2.10 Industrial Surface Coating

2.10.1 Source Description and Emission Control

"Surface coating operations involve applying a thin layer of coating (e.g., paint, lacquer, enamel, varnish, etc.) to an object for decorative or protective purposes. The surface coating products include either a water-based or solvent-based liquid carrier that generally evaporates in the drying or curing process.

The use of surface coatings by manufacturing industries and other sectors of the economy is pervasive. Applications include: (1) coatings that are applied during the manufacture of a wide variety of products by Original Equipment Manufacturers (OEMs) including furniture, cans, automobiles, other transportation equipment, machinery, appliances, metal coils, flat wood, wire, and other miscellaneous products, (2) architectural coatings, and (3) special purpose coatings used for applications such as maintenance operations at industrial and other facilities, auto refinishing, traffic paints, marine finishes, and aerosol sprays. For area source purposes, the small industrial surface coating category includes OEM applications, some marine coatings, and maintenance coatings. This category does not include architectural surface coatings, traffic markings, automobile refinishing, or aerosols.

The main approaches for reducing VOC emissions from small industrial surface coating operations are (1) use of lower-VOC coatings, (2) use of enclosed cleaning devices, and (3) increased transfer efficiency. Other housekeeping activities can also be used to reduce emissions from small industrial surface coating operations. These activities include using tight-fitting containers, reducing spills, mixing paint to need, providing operator training, maintaining rigid control of inventory, using proper cleanup methods, etc.

2.10.2 Emission Estimation Methodology

Activity Level

Alternative Method 1 of EIIP volume III, Industrial Surface Coating, was used to estimate VOC emissions. This method is based on the national default per employee emission factors presented in Table 8.5-1 of EIIP volume III, Industrial Surface Coating.

Emission Factors

The following table represents emission factors based on SIC:

Category	SIC Code	Per Employee VOC Emission Factor (lb/yr)
Furniture and Fixtures	25	944
Metal Containers	341	6,029
Automobiles (new)	3711	794
Machinery and Equipment	35	77
Appliances	363	463
Other Transportation Equipment	37, except 3711 and 373	35
Sheet, Strip, and Coil	3479	2,877
Factory Finished Wood	2426-9, 243-245, 2493, 2499	131
Electrical Insulation	3357, 3612	290
Other Product Coatings	NA[a]	NA
High-Performance Maintenance Coatings	NA	NA
Marine Coatings	373	308
Other Special Purpose Coatings	NA	NA

[a]NA = not available, use per capita emission factors from Table 8.5-2

Assumptions

All industrial surface coatings are accounted for in the point source inventory.

2.10.3 Results

Since all emissions of VOC from industrial surface coating are accounted for in the point source inventory the amount of emissions for industrial surface coating in the area source inventory for the State of Missouri is zero.

2.10.4 References

- *Industrial Surface Coating*, Volume III: Chapter 15, Final Report, Area Sources Committee EIIP, September 1997.
- *Introduction to Area Source Emission Inventory Development*, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.
- *Compilation of Air Pollution Emission Factors.* Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.

2.11 Vehicle Fires

2.11.1 Source Description and Emission Control

This emissions source category covers emissions from accidental vehicle fires. Vehicles included are any commercial or private mode of transportation that are authorized for use on public roads. Non-roadway fires such as rail, water, and air transportation are not included. The pollutants emitted that are emitted from vehicle fires that are included in this inventory are PM, CO, and Nox.

2.11.2 Emission Estimation Methodology

Activity Level

Emissions from vehicle fires were calculated using the method suggested in the EIIP guidance document for vehicle fires. First the number of vehicle fires for each county was determined by apportioning national data locally using vehicle miles traveled. An emission factor was then used to determine the amount of pollutants emitted.

Emission Factors

Structural Fire Pollutants	Emission Factor (lbs./ton Material)
PM	100
CO	125
NOx	4

Assumptions

It was assumed that each vehicle has 500 pounds of components that can burn in a fire and that fires occur 7 days a week, 52 weeks a year.

Sample Calculation – Cole County

PM emissions (tons/year) = # of vehicle fires in US X (MO VMT/US VMT) X % of state VMT in Cole County/100 X 500 lb/fire / 2000 lb/ton X emission factor

Number of Vehicle Fires in US: 421440

National VMT: 2,799,258 million

Missouri VMT : 67,632 million

% State VMT in Cole County: 0.907%

PM Emission Factor: 100 lb/ton

Activity Days Per Week: 7

PM Emissions (tons/year) = 421440 Vehicle Fires in US X (67,632 million/2,799,258 million) X 0.907/100 X 500 lb/fire / 2000 lb/ton X 100 lb/ton / 2000 lb/ton = 1.15 tons PM

2.11.3 Results

The emissions from structural fires for the State of Missouri are as follows:

Table 1: Emissions from Structural Fires tons/year

PM	127.28
CO	159.2
NOX	5.09

2.11.4 References

- *Vehicle Fires*, Area Source Method Abstracts, Final Report, Area Sources Committee EIIP, May 2000.
- *Introduction to Area Source Emission Inventory Development, Volume III: Chapter 1*, Area Sources Committee EIIP, August 1996
- *United States Federal Highway Administration web-site.*

2.12 Open Burning - Structure Fires

2.12.1 Source Description and Emission Control

Structural fires or building fires are considered a combustion source of VOC, NOx, CO, and PM emissions. Like forest wildfires, they can produce large amounts of emissions over a short period of time.

2.12.2 Emission Estimation Methodology

Activity Level

Emissions from structural fires were calculated using the second alternative method in *Procedures for the Preparation of Emission Inventories for Precursors of Ozone: Volume I* where an emission factor is applied to an estimate of the number of fires per county and a fuel loading factor (1.15 tons/fire). The number of fires per county was estimated by assuming that an average of 2.3 fires occur per 1,000 people.

Emission Factors

Structural Fire Pollutants	Emission Factor (lbs./ton Material)
VOC	11
CO	60
NOx	1.4
PM10	10.8

Assumptions

The number of fires per county was estimated by assuming that 2.3 fires occur per 1,000 people.

Sample Calculation – Cole County

VOC Emissions (tons/year) = population X # fires per 1000 people X emission factor X fuel loading factor / 2000 lb/ton

Population of Franklin County: 71894

Number of Fires: 0.0023 fire/person/yr

VOC Emission Factor: 11 lb/ton

Fuel Loading Factor: 1.15 tons/fire

Activity Days Per Week: 7

VOC Emissions (tons/year) = 71849 persons X 0.0023 fire/person/yr X 11 lb/ton X 1.15 tons/fire / 2000lb/ton= 1.046 ton/year

2.12.3 Results

The emissions from structural fires for the State of Missouri are as follows:

Table1: Emissions from Structural Fires tons/year

VOC	82.5
CO	450.1
NOX	10.5
PM10	81.0

2.12.4 References

- *Structure Fires*, Volume III: Chapter 18, Final Report, Area Sources Committee EIIP, July 1999.
- *Introduction to Area Source Emission Inventory Development, Volume III: Chapter 1*, Area Sources Committee EIIP, August 1996
- *U.S. Bureau of Census, Department of Commerce, Washington, D.C.*

2.13 Pesticide Application

2.13.1 Source Description and Emission Control

Pesticides are considered an evaporated source of VOC emission and are defined as any substance used to kill or retard the growth of insects, rodents, fungi, weeds or microorganism. Pesticides can be broken down into three chemical categories: synthetics, non-synthetics (petroleum products), and inorganic. Formulations of pesticides are made through the combination of the pest-killing material referred to as the active ingredient, and various solvents, which act as carriers for the pest-killing material, referred to as the inert ingredient. Both types of ingredients contain volatile organic compounds (VOC) that can potentially be emitted to the air either during application or as result of evaporation. The VOC emission rate is influenced by the formulation (solid or solution) and method of application. Pesticide application can be broken down into two users categories: Agricultural and non-agricultural, which includes municipal, commercial, and consumer.

2.13.2 Emission Estimation Methodology

Activity Level

Non-agricultural Pesticides:

Due to difficulties in obtaining accurate information related to non-agricultural pesticides, this category was not separated into municipal, commercial, and consumer subcategories. Emissions were estimated using alternative method 1 given in EIIP, volume III, chapter 9. The method is based on population.

Agricultural Pesticides:

The preferred method was used to estimate emissions form agricultural pesticide. The method is based on pesticide applied, the formulation of the pesticide, and the total acres to which the pesticide was applied. The acreage devoted to crops (alfalfa, corn, cotton, pasture, rice, sorghum, soybeans, tobacco, and wheat) for all counties in 2002 was determined from the state Department of Agricultural (State Crop Statistics, 2002). Pesticide usage data was obtained from the National Center for Food and Agriculture Policy (NCFAP) via the Internet. The data included the pesticide used for each crop, the number of acres treated, and the amount of active ingredient in each pesticide for 1992. Percent active ingredients and VOC contents ware obtained from Chemical & Pharmaceutical Press, Inc. via the Internet.

Emission Factors

Non-agricultural Pesticides:

The emission factor for non-agricultural pesticides is 1.78 pound per person. This emission factor encompasses emissions from municipal, commercial, and consumer pesticide use and was taken from Table 5.4-1 of Chapter 5 (Consumer Solvent Use) of EIIP volume III.

Agricultural Pesticides:

Emission factors are functions of application method and vapor pressure of pesticide active ingredients. Emission factors and typical vapor pressures for some of the active ingredients are given in tables 9.4-4 and 9.4-2 of EIIP, volume III, Pesticide – Agricultural and Non-agricultural, respectively.

Assumptions

It was assumed that the same kinds of pesticides used in 1992 were also used in 2002. It was also assumed that the difference in the amount of pesticide used in 2002 from 1992 is proportional to the difference in acres of crops harvested between 1992 and 2002. Missing active ingredients and VOC contents for some the pesticides were assumed to be 50% each.

Sample Calculation (Cole County)

VOC Emissions (tons/year) = non-agricultural VOC Emissions + agricultural VOC Emissions

Non-agricultural Pesticides:

Population of Cole County: 71894 persons

Emission Factor: 1.78 lb/person/yr

Activity Days Per Week: 6 days

VOC Emissions (ton/year) = population X emission factor = 71894 X 1.78 / 2000 = 63.99 tons/year

Agricultural Pesticides:

Total Pesticides Applied for Sorghum in Missouri

Pesticide	Acres treated	Pounds of active ingredient
2,4-D	43200	27648
ALACHLOR	122400	210528
ATRAZINE	619200	780192
BROMOXYNIL	7200	2376
GLYPHOSATE	14400	10224
METHOLACHLOR	237600	358776
PROPACHLOR	79200	250272
CARBARYL	36000	36000
CARBOFURAN	28800	24192
CHLORPYRIFOS	14400	10224
DIAZINON	14400	7200
MALATHION	21600	21600
METHOMYL	7200	3600
PHORATE	7200	8064
TERBUFOS	7200	5760
Total	1 260 000 Acres	1 756 656 lbs. AI.

Vapor Pressure of 2,4-D: 8.0×10^{-6}

Application Method: Soil Incorporation

Emission Factor: 5.4 lb/ton

Percent Active Ingredient (%A.I.): 47.9

Percent Inert Ingredient: 52.1

Pesticide Applied: 27648 lb /0.479 X 1.13 = 16450 lb

Inert Ingredient VOC Content: 21%

Activity Days Per Week: 6 days

VOC Emissions ton/year = Sum[pesticide applied (lb) X [fraction active ingredient X emission factor/2000 + fraction inert ingredient X fraction VOC in formulation]/2000

VOC Emissions from 2,4-D (tons/year) = 16540 lb/year X [0.479 X 5.4 lb/ton / 2000 + 0.521 X 0.21] / = .9 tons/year

VOC Emissions (lb/ozone season day) from 2,4-D = .9 tons/year X (.233/.25) / (6*52) = 7.732 lb/osd

Total VOC Emissions (tons/year) from all pesticide applied to Sorghum = 102.7 tons/year

Total VOC Emissions (tons/year) from all pesticide applied to Sorghum in Cole County = Total VOC Emissions X Total Harvested Sorghum Acres in Franklin County / Total Harvested Sorghum Acres in Missouri

Total Harvested Sorghum Acres in Cole County: 180

Total Harvested Sorghum Acres in Missouri: 153985

VOC Emissions for Cole County for all pesticide applied to Sorghum ton/year = 102.7 ton/year X 180/153985 = .12 tons/year

Total VOC Emissions from all pesticide applied to all crops in Cole County = 10.11 ton/day.

Total VOC Emissions from Agricultural and Non-agricultural pesticide applied in Cole County = 10.11 tons/year + 63.99 ton/year = 74.1 lb/day.

2.13.3 Results

The total VOC emissions from pesticide application for the State of Missouri is 10997.4 ton/year.

2.13.4 References

- *Pesticides- Agricultural & Nonagricultural*, Volume III: Chapter 9, Final Report, Area Sources Committee EIIP, December 1997.
- *Introduction to Area Source Emission Inventory Development*, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.

- *Compilation of Air Pollution Emission Factors*, Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.
- United States Bureau of Census, Department of Commerce, Washington, D.C.
- East-West Gateway Coordinating Council, St. Louis City, MO.

2.14 Open Burning- Residential Solid Waste

2.14.1 Source Description And Emission Control

Open burning is considered a combustion source of VOC, NOx and CO emissions. Open burning may be done in open drums or baskets, yards or dumps. The most effective control technique of open burning emissions is to ban open burning and require management of these wastes by other methods.

2.14.2 Emission Estimation Methodology

Activity Level

Residential Municipal Solid Waste (MSW) Burning

Emission estimates for residential MSW burning were developed by first estimating the amount of waste generated for each county in the United States. The amount of waste generated was estimated using a national average per capita waste generation factor, which is 3.31 lbs/person/day (.6 tons/person/year). To better reflect the actual amount of household residential waste subject to being burned, non-combustibles (glass and metals) and yard waste generation were subtracted out. This factor was then applied to the portion of the county's total population that is considered rural based on 1990 Census data on rural and urban population, since open burning is generally not practiced in urban areas.

For rural populations, it is estimated that 25 to 32 percent of the municipal waste generated is burned. A median value of 28 percent was assumed for the nation, and this correction factor was applied to the total amount of waste generated.

Controls (or burning bans) were accounted for by assuming that no burning takes place in counties where the urban population exceeds 80 percent of the total population (i.e., urban plus rural). Zero open burning emissions were attributed to these counties.

Residential Yard Waste Burning

A national per capita waste generation average daily value of 0.117 tons yard waste/person/year was used as the basis for yard waste open burning emissions. It was assumed that 28 percent of the total yard waste generated is burned and that burning occurs primarily in rural areas.

Controls (or burning bans) were accounted for by assuming that no burning takes place in counties where the urban population exceeds 80 percent of the total population (i.e., urban plus rural). Zero open burning emissions were attributed to these counties.

Emission Factors

Emissions factors for VOC, NOx, CO, and PM10 were obtained from AP- 42 (Table 2.5-1).

	VOC	NOx	CO	PM10
MSW	30	6	85	38
Yard Waste	28	4	140	38

Sample Calculation (Cole County)

Waste Generation Factor (MSW) = .604 tons/person/year

Waste Generation Factor (Yard Waste) = .117 tons/person/year

Population = 71,894

% Rural = 31%

% Waste Generated that is Burned (MSW and Yard Waste) = 28%

MSW Burning PM10 Emissions (tons/year) = Population X % Rural X Waste Generation Factor X % Waste that is Burned X PM10 Emission Factor / 2000

MSW Burning PM10 Emissions (tons/year) = (71894) X (.31) X (.604) X (.28) X (38) / 2000 = 71.26 tons/year

Yard Waste Burning PM10 Emissions (tons/year) = Population X Yard Waste Generation Factor X % Rural X % of Waste that is Burned X PM10 EF /2000

Yard Waste Burning PM10 Emissions (tons/year) = (71894) X (.31) X (.117) X (.28) X (38) / 2000= 13.87 tons/year

2.14.3 Results

Total emissions from open burning of municipal solid waste and yard waste for the State of Missouri are as follows:

	VOC (ton/yr)	Nox (ton/yr)	CO (ton/yr)	PM10 (ton/yr)
MSW	4120.34	6824.07	11674.29	5219.09
Yard Waste	748.65	106.95	3743.27	1016.03

2.14.4 References

- *Open Burning*, Volume III: Chapter 16, Revised Final, Area Sources Committee EIIP, January 2001.
- *Introduction to Area Source Emission Inventory Development*, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.
- *Compilation of Air Pollution Emission Factors*. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.
- *Procedures for the Preparation of Emission Inventories for Precursors of Ozone:* Volume I, Draft Report, EPA-450/4-91-016, EPA, Research Triangle Park, NC, May 1991.
- *Documentation for the Draft 1999 National Emissions Inventory For Criteria Air Pollutants,* Area Sources, E.H. Pechan & Associates, Inc., NC, September 2001.

2.15 Open Burning-Forest/Wild Fires

2.15.1 Source Description and Emission Control

A wildfire is a large-scale natural combustion process that consumes various ages, sizes, and types of flora growing outdoors in a geographical area. Consequently, wildfires are potential sources of large amounts of air pollutants that should be considered when trying to relate emissions to air quality.

The size and intensity, even the occurrence, of a wildfire depend directly on such variables as meteorological conditions, the species of vegetation involved and their moisture content, and the weight of consumable fuel per acre (available fuel loading). Once a fire begins, the dry combustible material is consumed first. If the energy release is large and of sufficient duration, the drying of green, live material occurs, with subsequent burning of this material as well. Under proper environmental and fuel conditions, this process may initiate a chain reaction that results in a widespread conflagration.

The complete combustion of wildland fuels (forests, grasslands, wetlands) require a heat flux (temperature gradient), adequate oxygen supply, and sufficient burning time. The size and quantity of wildland fuels, meteorological conditions, and topographic features interact to modify the burning behavior as the fire spreads, and the wildfire will attain different degrees of combustion efficiency during its lifetime.

This area source inventory will describe the procedures and applied approach for estimating emissions from this area source of forest fires.

2.15.2 Emission Estimation Methodology

Activity Level

An alternative method was used rather than the two methods provided in the Wildfires and prescribed Burning, EIIP volume III. County emissions from wildfires were calculated based on

an annual report, submitted to the Missouri Department of Conservation, from each county reporting the number of acreage burned.

Emission Factors

The following table lists emission factors from the EPA AP-42

Pollutant	Emission Factor (Lbs./ton)	Fuel Loading Factor (tons/acre)
VOC	16	11
NOx	4	11
CO	140	11

Sample Calculation (Cole County)

VOC Emissions (tons/year) = # acres burned X fuel loading factor X Emission Factor / 2000.

Acres Burned in Cole County: 35 acres

VOC Emission Factor: 16 lb/ton

Fuel Loading Factor: 11 tons/acre

VOC Emissions (tons/year) = 35 acres X 11 ton/acre X 16 lb/ton / 2000 lb/ton = 3.1 ton/year.

2.15.3 Results

The emissions from forest fires for the State of Missouri are as follows:

VOC	4389.4 tons/year
CO	38407.6 tons/year
NOX	1097.4 tons/year

2.15.4 References

- “Assessment of Biomass Burning in the United States”, Bill Leenhouts, U.S. Fish and Wildlife Service, 1998.
- Compilation of Air Pollution Emission Factors, Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.

2.16 Gas Distribution

2.16.1 Source Description and Emission Control

This area source category estimates the volatile organic compound (VOC) emissions resulting from the storage and transfer operations at gasoline dispensing facilities. Emissions from storage and transfer operations include the working losses and breathing losses from underground tanks, vapors displaced through vehicle refueling and spillage.

The area sources of evaporative VOC emissions from the distribution of gasoline that are covered in this category include the following:

- Truck in transit:

  Evaporation of gasoline vapor from loaded tank trucks during transportation of gasoline from the bulk plant/terminal to the service station or other dispensing outlet, and from empty tank trucks returning from service stations to bulk plant/terminals.

  - Stage I:

    Displacement of gasoline vapors from the storage tanks during the transfer of gasoline from tank trucks to storage tanks at the service station.

- Stage II:

  Displacement of gasoline vapors from vehicle gasoline tanks during vehicle refueling. Spillage of gasoline during either delivery activity above may also include. This loss includes prefill and postfill nozzle drip and spitback and overflow from the filler pipe of the vehicle's fuel tank during filling.

  - Storage tank working losses:

    Evaporation of gasoline vapors from the storage tank and from the lines going to the pumps during transfer of gasoline.

VOC emissions from this area source category are influenced by several factors. Fuel volatility measured as Reid vapor pressure (RVP) affects the evaporation rate of gasoline. The technology for loading tank trucks and tanks (splash loading, submerged loading, vapor balance, etc.) affects the release of displacement emissions. Tank characteristics (color and design) affect working losses from aboveground storage tanks.

Emissions from underground tank filling operations at service stations (stage I emissions) can be reduced by the use of a vapor balance system, which consists of a hose that returns gasoline vapors displaced from the underground tanks during filling back to the tank truck, as well as measures to ensure tightness of the truck. The control efficiency of the balance system can range from 93 to 100 percent.

Emissions from vehicle refueling (stage II emissions) also can be reduced by a vapor balance system. During refueling, the vapors displaced from the vehicle fuel tanks are returned to the underground tanks through the use of a special nozzle. Stage 1 controls have been implemented in attainment (Only in Kansas City) and five nonattainment areas. Stage II controls are required in five St. Louis ozone nonattainment areas.

2.16.2 Emission Estimation Methodology

Activity Level

Since volume of gasoline distribution at the county level and information such as sales tax data, gasoline sales data from fuel distributors and retailers are not available, vehicles miles travel (VMT) provided by the Missouri Department of Transportation is the only available information can be used to determine gasoline consumption. It should be noted that the disadvantage of using VMT is that it is a measure of vehicle activity in the area, not a measure of the fuel dispensed in the inventory area. VMT produced by vehicles simply passing through the area that did not refuel in the inventory region would tend to overstate the vehicle refueling activity level.

The VMT used for this inventory was taken from The Missouri Department of Transportation. This 2002 VMT count only takes into account state routes. In order to account for the off-system routes, an additional 30% was added to the state route VMT in order to produce an estimated total VMT for both state routes and off-system routes.

For the St. Louis Non-Attainment area, a much more reliable VMT was used. The East-West Gateway Coordinating Council sponsored a VMT study for the model year 2004. This study was completed by the East-West Gateway Council
of Governments travel demand model, which is currently maintained within CUBE VOYAGER modeling software. The method used is much more accurate and in-depth than the method used by MoDOT in estimating VMT. Therefore, it was used in-place of the MoDOT-generated VMT for the following counties:

- St. Louis City
- St. Louis County
- St. Charles County
- Jefferson County
- Franklin County

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Emission Factors

- Gasoline truck in transit, fuel delivery to outlets and storage tank Breathing Emission Factors

Emission Source	lb/1000 gal. Throughput
Empty Tank Trucks[b] Full Tank Trucks[c]	0.005 0.005
Filling Underground Tank (Stage I) Submerged Filling Splash Filling Balanced Submerged Filling Underground Tank Breathing	 7.3 11.5 0.3 1.0

Source : AP-42 Tables 5.2-5, 5.2-7
b & c , Midpoint to typical range provided in AP-42

- Vehicle refueling emission factors

The MOBILE 6 model was used to generate refueling emission factors for gasoline and diesel-fueled vehicles, and emission factors for tailpipe emissions and refueling activities.

The emissions estimation methodologies for this area source category have the following relationship:

$$\text{Emission} = \text{Emission Factor} \times \text{Activity Level}$$

Where Activity level is total gasoline consumption. The Federal Highway Administration (FHWA) annually publishes Highway Statistics, which contains gasoline consumption data for each state.

Another approach can be used is to use information on annual emissions and fuel consumption for an "Average Passenger Car and Light Truck" published by the U.S. Environmental Protection Agency National Vehicle and Fuel Emissions Laboratory. Since MOBILE 6 is available, this approach was not considered in this study.

Assumptions

The report "1996 Daily Vehicle Miles of Travel Classified by District, County and System" provided by the Missouri Department of Highway Transportation and the "1995 Relationships – Population, Drivers, Vehicles, Fuel, and Travel " was used to derive the gasoline consumption distributed at each county of study in Missouri.

The effective emission reduction for Stage I and II vapor recovery systems is 95% control efficiency.

The average miles-per-gallon fuel efficiency of the gasoline-powered motor fleet. This value, 16.73 miles per gallon, taken from the 1995 Relationships table 5.1. Published by the Missouri Department of Highway and Transportation.

Using EIIP Volume III- Chapter 11 "Gasoline Marketing (Stage I and Stage II)" as a guide to estimate evaporative VOC emissions from the distribution of gasoline that are covered in this chapter.

Gasoline consumption is proportional to gasoline station sales.

There are approximately 1050 gasoline station outlets in five nonattainment areas that implement either Stage I and Stage II; and about 250 gasoline station outlets in Platte, Clay, and Jackson counties that implement Stage I.

Sample Calculation (St. Louis County)

To estimate ozone emissions from gasoline marketing in St. Louis County, the total gasoline distributed (TGD) in this inventory region is

TGD = Vehicle Miles Traveled (VMT) X Average Miles per gallon (EF)
= 47,955,115 miles X 16.73 gallons per mile
= 802,958,274.53 gallons.

a. Emissions from Gasoline Trucks in transit assuming that gasoline consumption is proportional to gasoline station sales.

TTE = TGD X LEF X GTA)/ (TGD X UEF X GTA)

Where:

TTE = Total gasoline emissions from tank trucks in transit (tons per year)
LEF = Loaded tank truck in-transit emission factor from Table 11.3.1 (0.055 lb/1000 gal)
UEF = Unloaded tank truck in-transit emission factor from Table 11.3.1 (0.005 lb/1000 gal)
GTA = 1.25, a national default rate as gasoline transportation adjustment factor.
TTE = ((802,958,274.53 X 0.055 X 1.25) + (802,958,274.53 X 0.005 X 1.25))/ (2000 X 1000)
= 30.11 tpy

b. Emissions from Fuel Delivery to Outlets

FDO = (TGD X FDOE)/ (2000 X 1000)

Where:

FDO = Emissions from Fuel Delivery to Outlets in tons per year (tpy)
FDOE = Uncontrolled gasoline emission factor (27 lbs/1000 gals) X Stage 1 control (90 %) which is 27 lbs/1000 gals X 0.1 = 0.3 lbs/1000 gals

FDO = (802,958,274.53 X 0.3) / (2000 X 1000) = 120.44 tpy

c. <u>Emissions from Storage Tank Breathing</u>

STB = (TGD X STBE)/ (2000 X 1000)

Where:

STB = Emissions from Storage Tank Breathing in ton per year (tpy)
STBE = 1.0lb/1000 gallons taken from Table 11.3-1, EIIP Volume III
STB = (802,958,274.53 X 1.0)/ (2000 X 1000)
= 401.48 tpy

2.16.3 Results

The emissions from Gasoline Distribution for the state of Missouri are as follows:

2.16.4 References

- AP-42 Tables 5.2-5, 5.2-7 b & c , Midpoint to typical range provided in AP-42
- EIIP Volume III- Chapter 11 “Gasoline Marketing (Stage I and Stage II)”
- “2002 Daily Vehicle Miles of Travel Classified by District, County and System”
- Missouri Department of Highway Transportation
- “1995 Relationships – Population, Drivers, Vehicles, Fuel, and Travel”

2.17 Landfills

2.17.1 Source Description and Emission Control

This section covers the estimation of non-point source landfill emission sources. These are generally old, unpermitted landfills and closed landfills not reporting yearly emissions as point sources. A municipal solid waste landfill (MSW) unit is a discrete area of land or an excavation that receives household waste and other types of wastes such as commercial solid waste, nonhazardous sludge, and industrial solid waste. This emission estimation method presented below is not suitable for treatment, storage and disposal facilities (TSDFs) or open dumps.

Landfills are significant sources of methane (CH4) and carbon dioxide (CO2). In addition to CH4 and CO2 a small amount of nonmethane organic compounds (NMOCs) are produced. NMOCs include reactive volatile organic compound (VOCs) and hazardous air pollutants (HAPs). Unlike other area sources that may be small sources individually but numerous within the inventory area, only a few landfills may be found within a county area. However, each landfill may emit significant amounts of pollutants. Landfills differ from sources typically

categorized as point or major sources in that pollutants are emitted over the area of the landfill, not at a specific point. For those reasons, landfills have been treated as area sources in the past. Recently, air-operating permits have been required for landfills, so that inventory prepares have begun to address them as point sources.

Landfill emissions are collected through either active or passive collection systems. The combustion or purification of the landfill gas can accomplish disposal or treatment of the collected gases.

As mentioned above, this area source category covers emissions from non-point source landfills. Since the method of estimating emissions utilized by this method is based on the average amount of refuse generated per capita, the known gaseous emissions generated by waste disposed of in permitted sanitary landfills must be removed from the totals. This was done by subtracting the reported point source VOC totals for each county from the total estimated by the population method. In certain counties, large regional waste facilities generate VOC emissions which are greater than the area source total. This results in a net negative VOC emissions value for those particular counties. However, negative values cannot be reported on the NIF tables. Only a "zero" value can be reported. To solve this, the negative emissions value was applied to bordering counties in order to balance out the known point-source VOC emissions without creating a negative number for the county in which the point source landfill resides.

2.17.2 Emission Estimation Methodology

Activity Level

The emissions from municipal landfills were calculated by using the population-based waste generation factor. Although landfills can generate emissions for many years, the greatest emissions were assumed to be emitted from waste 25 years old.

Emission Factors

The per capita waste generation factor is from the U.S. EPA Office of Solid Waste and Emergency Response annual publication, Characterization of Municipal Solid Waste in the United States: 1995 Update. The projection data was obtained from the United States Census Bureau.

Assumptions

- Population figures for the inventory year and 24 previous years for a total of 25 years of population data were collected from the U.S. Census Bureau 2000 Census.
- The waste generation factor of 0.69 tons/person/year was multiplied by the population of each year.
- 0.9072 to get megagrams multiplied tons.
- The average annual wastes were calculated and the values were used in the following equation:

$$Q_{CH4} = L_o R (e^{-kc} - e^{-kt})$$

Where:

Q_{CH4} = Methane generation rate at time t, m^3/yr;

L_o = Methane generation potential, m^3 CH4/Mg refuse;

R = Average annual refuse acceptance rate during active life, Mg/yr;

E = Base log, unitless;

k = Methane generation rate constant, yr^{-1};

c = time since landfill closure, years (c=0 for active landfills); and

t = Time since the initial refuse placement, years.

According to EIIP volume III there is a 0.25 seasonal activity factor.

Sample Calculations (Franklin County)

Using the per capita waste generation factor from the U.S. EPA Office of Solid Waste and Emergency Response annual publication, *Characterization of Municipal Solid Waste in the United States: 1995 Update and the* population data obtained from the United States Census Bureau.
The estimated emissions from the Franklin County inventory area can be illustrated, as follows:

Waste Generation Factor: 0.69 tons/person/yr

Franklin's Average Annual Refuse Acceptance Rate during Active Life: 46730 Mg/yr.

Assuming that c = 0, and t = 6

Methane generation rate at time t, m^3/yr:

$$Q_{CH4} = 125*46730*(1 - e^{-0.04*6}) = 1246373$$

Non-methanogenic organic compound emission rate (Q_{NMOC}), m^3/yr

$$Q_{NMOC} = 2*Q_{CH4}*C_{NMOC}/(1*10^6)$$

Where;

C_{NMOC} = Total NMOC concentration in landfill gas, ppmv as hexane = 1170

$Q_{NMOC} = 2*1246373*1170/(1*10^6) = 2917\ m^3/yr$

The mass emission per year of total NMOCs, kg/yr

$M_{NMOC} = Q_{NMOC}*1050.2/(273+T)$

Where;
T = Temperature of landfill gas (^oC)
$M_{NMOC} = 2917*1050.2/(273+25) = 22648$ kg/yr

Franklin's Uncontrolled NMOC emission Reported as HAPs – H_{NMOC}: 1150 lbs./day

VOC Emission Factor = $[M_{NMOC} - H_{NMOC}]/R = [22648 – 1150]/ 46730 = 0.46$

VOC Emissions = R * 0.46/365 = 46730 * 0.46/ 365 = 59 lbs./day

VOC Actual Emissions = VOC Emissions Area Source – VOC Emission Point Source

VOC Actual Emissions = 59 – 20 = 39 lbs./day

2.17.3 Results

The total VOC emissions from area source landfills in the state of Missouri is 455.38 tons/year.

2.17.4 References

- Missouri Solid Waste Diversion and Recycling
- Status Report For Calendar Year – 2001
- The U.S. EPA Office of Solid Waste and Emergency Response annual publication, Characterization of Municipal Solid Waste in the United States: 1995 Update. EPA 530-R-95-001 PB96-152 160. March
- Landfills, Volume III: Chapter 15, Final Report, Area Sources Committee EIIP, September 1997
- Introduction to Area Source Emission Inventory Development, Volume III: Chapter 1, Area Sources Committee EIIP, 2002
- Compilation of Air Pollution Emission Factors. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995
- United States Bureau of Census

2.18 Liquefied Petroleum Gas (LPG) Combustion

2.18.1 Fuel Description

This source category covers air emissions from liquefied petroleum gas (LPG) combustion in the residential, commercial/institutional, and small industrial sectors for space heating, water

heating, or cooking. This category includes small boilers, furnaces, heaters and other heating units that are not inventoried as point sources. Residential and commercial sectors comprise housing units; wholesale and retail businesses; health institutions; social and educational institutions; and federal, state and local government institutions (e.g., military installations, prisons, office buildings).

LPG consists of propane, propylene, butane, and butylenes; the products used for domestic heating are composed primarily of propane. The largest market for LPG is the domestic/commercial market. There are three grades of LPG available as heating fuels: commercial-grade propane, engine fuel-grade propane, and commercial-grade butane. The second largest use of LPG is by the chemical industry, where it is used as a petrochemical feedstock, and the agriculture industry. Propane is also used as an engine fuel as an alternative to gasoline and as a standby fuel for facilities that have interruptible LPG service contracts.

2.18.2 Emission Estimation Methodology

The combustion processes that use LPG are very similar to those that use natural gas. LPG is considered a "clean" fuel because it does not produce visible emissions. The criteria pollutants emitted, VOC, NOx, CO, SO2, and PM, are produced in small amounts.

Activity

Residential Sources:

The 2000 Census Bureau data contains information on the primary fuel combusted by houses by county. *Census 2000 – American Fact Finder - Summary File 3, Table H40. House Heating Fuel* provides data on the number of occupied housing units in each county using the following categories of fuels: Utility gas (assumed to be natural gas), bottled, tank, or LP gas, electricity, fuel oil, kerosene, etc., coal or coke, wood, solar energy, other fuel, or no fuel used.

The LPG burned at the state level is apportioned to the county level using U.S. Census data on households that use LPG as a primary fuel. The Department of Energy (DOE) Energy Information Administration (EIA) provides state-level fuel consumption for residential, commercial, and industrial sectors. The equation is:

$$\text{County LPG use} = \text{Statewide LPG use} \times \frac{\text{County LPG burning households}}{\text{State LPG burning households}}$$

Commercial/Institutional Sources:

2002 employment data was obtained from the Missouri Economic Research and Information Center (MERIC). Commercial/Institutional and Industrial sector employment was aggregated for Missouri employees working in the NAICS categories as outlined in Section 1.3.1.

The LPG burned at the state level is apportioned to the county level using 2002 MERIC employment data in NAICS categories 11, and 42-92. The equation is:

$$\text{County LPG Use} = \text{Statewide LPG use X } \frac{\text{NAICS 11, 42-92 employees by county}}{\text{NAICS 11, 42-92 employees by state}}$$

Industrial sources:

The LPG burned at the state level is apportioned to the county level using 2002 MERIC employment data in NAICS categories 21-33. The equation is:

$$\text{County LPG use} = \text{Statewide LPG use X } \frac{\text{NAICS 21-33 employees by county}}{\text{NAICS 21-33 employees by state}}$$

LPG Emission Factors

Emission factors for combustion of LPG in commercial boilers are presented in Table 1.5-1 of Section 1.5 of *AP-42* (EPA, 1998a). Because no emission factors were located for the combustion of LPG for residential consumption, emission factors for commercial boilers are used for residential emissions.

Table 2.18-1. LPG Combustion Emission Factors

Point SCC:	n/a	10301002	10201002
Area SCC:	2104007000	2103007000	2102007000
Pollutant	Residential	Commercial	Industrial
	EF (lb/1000 Gallons)	EF (lb/1000 Gallons)	EF (lb/1000 Gallons)
VOC	0.5	0.5	0.5
NOX	14	14	19
CO	1.9	1.9	3.2
SO2	0.016	0.016	0.016
PM10 & 2.5 PRI	7.6	7.6	7.6
PM10 & 2.5 (Filterable)	1.9	1.9	1.9
PM10 & 2.5 (Condensable)	5.7	5.7	5.7

The emission factor for SO2 requires knowledge of the sulfur content of the LPG. The sulfur content of LPG is very low. EPA's SO2 emissions estimate is derived from the sulfur content of the propane fuel. With 90% of LPG comprised of propane, the EPA's propane emissions factor is a reasonable value for LPG emissions rates. The obtained estimates range from approximately 0.0185% sulfur by weight to 0.060125% sulfur by weight. The statistical average or arithmetic mean of these four estimates is 0.0333% sulfur by weight. The wide range of emissions factors for SO2 makes it difficult to determine a representative estimate for the emissions factor and the very small net effect of any energy-efficiency standard argue against making a significant

research effort. Therefore, the AP-42 emission factor used in the example of 0.016 lb of SO2/1000 gallon will be used.

Temporal Adjustments for Ozone

For the 8-hour ozone NAAQS emission inventory, EPA guidance calls for CO, NOx, and VOC emissions to be reported as actual annual and actual summer weekday. Summer weekday emissions are defined as an average day's emissions for a typical summer day during the ozone season, typically defined as the months of June, July, and August. Fossil fuel consumption drops substantially during the summer months when the need for space heating is virtually zero. A seasonal activity factor is therefore needed to reflect the proportion of fuel consumption that takes place in June-August relative to annual consumption and emissions.

The best way to determine the seasonal activity factor is to obtain activity data that are specific for the location and season of interest. The most specific activity data available is Missouri monthly natural gas consumption data for 2002 for the residential, commercial, and industrial sectors obtained from the EIA. This same activity data was used to derive a residential, commercial/institutional, and industrial seasonal activity factor (SAF) for all the area source fossil fuel combustion calculations, which should have very close to the same proportion of fuel consumed in June-August. Monthly natural gas consumption data for 2002 for the residential, commercial, and industrial sectors were obtained from the EIA table, *Natural Gas Production & Use by Missouri*.

Residential:

Average ozone summer day (OSD) emission estimates were calculated using the equation:

$$\text{Ave. emissions per summer day} = \frac{\text{Annual emissions} \times \dfrac{\text{LPG use in June-August}}{\text{LPG use in 2002}}}{(\text{Operating days/season} = 92)}$$

(LPG used in June-August)/(LPG used in 2002) is the Seasonal Activity Factor SAF=0.0655.

The number of activity days per week for residential activities are 7.

Commercial/Institutional:

Average ozone summer day (OSD) emission estimates were calculated using the equation:

$$\text{Ave. emissions per summer day} = \frac{\text{Annual emissions} \times \dfrac{\text{LPG use in June-August}}{\text{LPG use in 2002}}}{(\text{Operating days/season} = 79)}$$

(LPG used in June-August)/(LPG used in 2002) is the Seasonal Activity Factor SAF=0.0950.

The number activity days per week for commercial/industrial activities are considered to be 6, although this would not hold true for hospitals, nursing homes, and most stores would be 7, while most schools would be 5.

Industrial:

Average ozone summer day (OSD) emission estimates were calculated using the equation:

$$\text{Ave. emissions per summer day} = \frac{\text{Annual emissions} \times \dfrac{\text{LPG use in June-August}}{\text{LPG use in 2002}}}{\text{(Operating days/season = 79)}}$$

(LPG used in June-August)/(LPG used in 2002) is the Seasonal Activity Factor SAF=0.2010.

The number of activity days per week for industrial activities are considered to be an average of about 6.

Sample Calculations (Cole County)

Residential LPG:

Annual VOC (tons/year) = (amount of LPG used in Missouri per yr) X ((# houses using LPG in county) / (# houses using LPG in Missouri)) X (VOC emission factor(lb/1000 Gallons)) / (2000 lb/ton)

OSD VOC (lb/day) = Annual VOC (tons/year) X 2000 lb/ton X SAF / (Operating days/season)

Amount of LPG Used in Missouri: 251,412 1000 Gallons

Number of Houses Using LPG in Missouri: 293,603

Number of Houses Using LPG in Cole County: 2,977

VOC Emission Factor: 0.5 lb/1000 Gallons

Residential Seasonal Activity Factor (SAF): = 0.0655

Operating days/season: 92

Annual VOC (tons/year) = 251,412 1000 Gallons/year X 2,977 houses / 293,603 houses X 0.5 lb/1000 Gallons / 2000 lb/ton = 0.64 tons /year

OSD VOC (lb/day) = 0.64 tons /year X 2000 lb/ton X 0.0655 / 92 = 0.91 lb/day

Commercial/Institutional LPG:

Annual VOC (tons/year) = (amount of LPG used in Missouri per yr) X (# employees using LPG in county) / (# employees using LPG in Missouri) X (VOC emission factor(lb/1000 Gallons)) / (2000 lb/ton)

OSD VOC (lb/day) = Annual VOC (tons/year) X 2000 lb/ton X SAF / Operating days/season

Amount of LPG Used in Missouri: 44,318 1000 Gallons

Number of Comm./Inst. Employees in Missouri: 2,063,988

Number of Comm./Inst. Employees in Cole County: 46,695

VOC Emission Factor: 0.5 lb/1000 Gallons

Activity Days Per Week: 6

Active Days During Ozone Season (June-August): 79

Commercial/Industrial Seasonal Activity Factor (SAF): 0.0950

Annual VOC (tons/year) = 44,318 1000 Gallons X (46,695 / 2,063,988) X (0.5 lb/1000 Gallons) / (2000 lb/ton) = 0.25 tons/year

OSD VOC (lb/day) = 0.25 tons/year X 2000 lb/ton X 0.0950 / 79 = 0.60 lb/day

Industrial LPG:

Annual VOC (tons/year) = (amount of LPG used in Missouri per yr) X (# employees using LPG in county) / (# employees using LPG in Missouri) X (VOC emission factor (lb/1000 Gallons)) / (2000 lb/ton)

OSD VOC (lb/day) = Annual VOC (tons/year) X 2000 lb/ton X SAF / Operating days/season

Amount of LPG Used in Missouri: 151,152 1000 Gallons

Number of Employees in Industrial Sector in Missouri: 462,567

Number of Employees in Industrial Sector in Cole County: 5,621

VOC Emission Factor: 0.5 lb/1000 Gallons

Industrial Seasonal Activity Factor (SAF) = 0.2010

Activity Days Per Week: 6

Active Days During Ozone Season (June-August): 79

Annual VOC (tons/year) = 151,152 1000 Gallons X (5,621 / 462,567) X (0.5 lb/1000 Gallons) / (2000 lb/ton) = 0.46 tons/year

OSD VOC (lb/day) = 0.46 tons/year X 2000 lb/ton X 0.2010 / 79 = 2.34 lb/day

2.18.3 Results

The emissions from LPG Combustion for the State of Missouri are as follows:

2002 Emissions from LPG Combustion in Missouri (Tons/Year)

	VOC	NOx	CO	SO2	PM10	PM2.5
Residential	62.8530	1,759.884	238.8414	2.0113	955.3656	955.3656
Commercial	11.08	310.23	42.10	0.35	168.41	168.41
Industrial	37.7879	1,435.94	241.84	1.21	574.38	574.38

2.18.4 References

Energy Information Administration (EIA), U.S. Department of Energy, Washington, D.C.
http://www.eia.doe.gov/emeu/states/sep_use/total/pdf/use_mo.pdf
http://www.eia.doe.gov/emeu/states/_use_multistate.html#use_technotes
LPG Sulfur content discussed in
http://www.eere.energy.gov/buildings/appliance_standards/residential/pdfs/K-2.pdf

The U.S Bureau of Census, Department of Commerce, Washington, D.C.
Residential Commercial/Institutional Natural Gas and Liquefied Petroleum Gas (LPG) Combustion, Volume III: Area Source Method Abstracts, Area Sources Committee EIIP, July 1999.

Introduction to Area Source Emission Inventory Development, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.

Compilation of Air Pollution Emission Factors. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.
East-West Gateway Coordinating Council, St. Louis City, MO.

2.19 Natural Gas Combustion

2.19.1 Source Description and Emission Control

Natural gas is one of the major combustion fuels used throughout the country. It is used to generate industrial and utility electrical power, produce industrial process steam, for residential and commercial space heating, water heating, and cooking. Natural gas consists of a high percentage of methane (generally above 85 percent) and varying amounts of ethane, propane, butane, and inerts (typically nitrogen, carbon dioxide, and helium). Air pollutants emitted from natural gas-fired combustion (e.g., boilers, furnaces, etc.) include carbon monoxide ($CO2$), nitrogen oxides (NOx), sulfur oxides (SOx), volatile organic compounds (VOCs), and particulate matter ($PM10$ and $PM2.5$). Residential and commercial sectors comprise housing units; wholesale and retail businesses; health institutions; social and educational institutions; and federal, state and local government institutions (e.g., military installations, prisons, office buildings). In addition, the commercial/institutional sector includes agriculture, forestry, and fishing.

2.19.2 Emission Estimation Methodology

Activity

The Department of Energy (DOE) Energy Information Administration (EIA) provides state-level fuel consumption for residential, commercial, and industrial sectors. The *Natural Gas Production & Use by Missouri* table summarizes both monthly and annual natural gas consumption. EIA does not collect the information necessary to separate natural gas combustion into residential and commercial/institutional consumption, but disaggregates the data based on assumptions and statistical methods applicable to the national level that may not be correct for the inventory area.

Residential Sources:

The 2000 Census Bureau data contains information on the primary fuel combusted by houses by county. *Census 2000 – American Fact Finder - Summary File 3, Table H40. House Heating Fuel* provides data on the number of occupied housing units in each county using the following categories of fuels: Utility gas (assumed to be natural gas), bottled, tank, or LP gas, electricity, fuel oil, kerosene, etc., coal or coke, wood, solar energy, other fuel, or no fuel used.

The natural gas burned at the state level is apportioned to the county level using U.S. Census data on households that use natural gas as a primary fuel. The equation is:

$$\text{County Natural Gas use} = \text{Statewide N. Gas use} \times \frac{\text{County N. Gas burning households}}{\text{State N. Gas burning households}}$$

Commercial/Institutional Sources:

2002 employment data was obtained from the Missouri Economic Research and Information Center (MERIC). Commercial/Institutional and Industrial sector employment was aggregated for Missouri employees working in the NAICS categories as outlined in Section 1.3.1.

The natural gas burned at the state level is apportioned to the county level using 2002 MERIC employment data in NAICS categories 11, and 42-92. The equation is:

$$\text{County Natural Gas Use} = \text{Statewide Nat. Gas use} \times \frac{\text{NAICS 11, 42-92 employees by county}}{\text{NAICS 11, 42-92 employees by state}}$$

Industrial sources:

The natural gas burned at the state level is apportioned to the county level using 2002 MERIC employment data in NAICS categories 21-33. The equation is:

$$\text{County Natural Gas use} = \text{Statewide N. Gas use} \times \frac{\text{NAICS 21-33 employees by county}}{\text{NAICS 21-33 employees by state}}$$

Emission Factors

Natural gas combustion emission factors for VOC, NOx, CO, SO2, and PM are shown in Table 2.15-1. These were obtained from AP-42/FIRE where provided. Those emission factors not in AP-42 were determined in discussions with Pechan Associates, who is verifying and consolidating all the CenRAP states 2002 NEI submittals.

Table 2.19-1. Natural Gas Combustion Emission Factors

Point SCC:	n/a	10300603	10200602
Area SCC:	2104006000	2103006000	2102006000
Pollutant	Residential EF (lb/MMCF)	Commercial EF (lb/MMCF)	Industrial EF (lb/MMCF)
CO	40	84	84
NOX	94	100	100
SO2	0.6	0.6	0.6
VOC	5.5	5.5	5.5
PM10 & 2.5 PRI (Total)	7.6	7.6	7.6
PM10 & 2.5 (Filterable)	1.9	1.9	1.9
PM10 & 2.5 (Condensable)	5.7	5.7	5.7

The SO_2 emission factor assumes that the sulfur content of natural gas is 2,000 grains/$10^6 ft^3$. The filterable PM10 and PM2.5 emission factors are identical as all PM (from natural gas combustion) are assumed to be less than 1.0 micrometers in diameter.

Temporal Adjustments for Ozone

For the 8-hour ozone NAAQS emission inventory, EPA guidance calls for CO, NOx, and VOC emissions to be reported as actual annual and actual summer weekday. Summer weekday emissions are defined as an average day's emissions for a typical summer day during the ozone season, typically defined as the months of June, July, and August. Fossil fuel consumption drops

substantially during the summer months when the need for space heating is virtually zero. A seasonal activity factor is therefore needed to reflect the proportion of fuel consumption that takes place in June-August relative to annual consumption and emissions.

The best way to determine the seasonal activity factor is to obtain activity data that are specific for the location and season of interest. The most specific activity data available is Missouri monthly natural gas consumption data for 2002 for the residential, commercial, and industrial sectors obtained from the EIA. This same activity data was used to derive a residential, commercial/institutional, and industrial seasonal activity factor (SAF) for all the area source fossil fuel combustion calculations, which should have very close to the same proportion of fuel consumed in June-August. Monthly natural gas consumption data for 2002 for the residential, commercial, and industrial sectors were obtained from the EIA table, *Natural Gas Production & Use by Missouri*.

<u>Residential</u>:

Average ozone summer day (OSD) emission estimates were calculated using the equation:

$$\text{Ave. emissions per summer day} = \frac{\text{Annual emissions} \times \dfrac{\text{Gas use in June-August}}{\text{Gas use in 2002}}}{(\text{Operating days/season} = 92)}$$

(Gas used in June-August)/(Gas used in 2002) is the Seasonal Activity Factor (SAF)=0.0655.

The number of activity days per week for residential activities are 7.

<u>Commercial/Institutional</u>:

Average ozone summer day (OSD) emission estimates were calculated using the equation:

$$\text{Ave. emissions per summer day} = \frac{\text{Annual emissions} \times \dfrac{\text{Gas use in June-August}}{\text{Gas use in 2002}}}{(\text{Operating days/season} = 79)}$$

(Gas used in June-August)/(Gas used in 2002) is the Seasonal Activity Factor (SAF)=0.0950.

The number activity days per week for commercial/industrial activities are considered to be 6, although this would not hold true for hospitals, nursing homes, and most stores would be 7, while most schools would be 5.

<u>Industrial</u>:

Average ozone summer day (OSD) emission estimates were calculated using the equation:

$$\text{Ave. emissions per} = \text{Annual emissions} \times \frac{\text{Gas use in June-August}}{\text{Gas use in 2002}}$$

summer day (Operating days/season = 79)

(Gas used in June-August)/(Gas used in 2002) is the Seasonal Activity Factor (SAF)=0.2010.

The number of activity days per week for industrial activities are considered to be an average of about 6.

Sample Calculations (Cole County)

Residential Natural Gas:

Annual VOC (tons/year) = (amount of N. Gas used in Missouri per yr) X ((# houses using N. Gas in county) / (# houses using N. Gas in Missouri)) X (VOC emission factor) / 2000 lb/ton

OSD VOC (lb/day) = Annual VOC (tons/year) X 2000 lb/ton X SAF / (Operating days/season)

Amount of N. Gas Used in Missouri: 115,721 MMCF

Amount of N. Gas Used in Missouri in June-Aug.: 7,576 MMCF

Residential Seasonal Activity Factor (SAF): 7,576 / 115,721 = 0.0655

Number of Houses Using N. Gas in Missouri: 1,261,397

Number of Houses Using N. Gas in Cole County: 11,822

VOC Emission Factor: 5.5 lb/MMCF

Operating days/season: 92

Annual VOC (tons/year) = 115,721 MMCF/year X 11,822 houses / 1,261,397 houses X 5.5 lb/MMCF / 2000 lb/ton = 2.98 tons /year

OSD VOC (lb/day) = 2.98 tons /year X 2000 lb/ton X 0.0655 / 92 = 4.25 lb/day

Commercial/Institutional Natural Gas:

Annual VOC (tons/year) = (amount of N. Gas used in Missouri per yr) X (# employees using N. Gas in county) / (# employees using N. Gas in Missouri) X (VOC emission factor(lb/MMCF)) / (2000 lb/ton)

OSD VOC (lb/day) = Annual VOC (tons/year) X 2000 lb/ton X SAF / Operating days/season

Amount of N. Gas Used in Missouri: 64,703 MMCF

Number of Comm./Inst. Employees Using N. Gas in Missouri: 2,063,988

Number of Comm./Inst. Employees Using N. Gas in Cole County: 46,695

VOC Emission Factor: 5.5 lb/MMCF

Activity Days Per Week: 6

Active Days During Ozone Season (June-August): 79

Commercial/Industrial Seasonal Activity Factor (SAF): 0.0950

Annual VOC (tons/year) = 64,703 MMCF X (46,695 / 2,063,988) X (5.5 lb/MMCF) / (2000 lb/ton) = 4.03 tons/year

OSD VOC = 64,703 MMCF X (46,695 / 2,063,988) X (5.5 lb/MMCF) X 0.0950 / 79
= 9.68 lb/day

Industrial Natural Gas:

Annual VOC (tons/year) = (amount of N. Gas used in Missouri per yr) X (# employees using N. Gas in county) / (# employees using N. Gas in Missouri) X (VOC emission factor (lb/MMCF)) / (2000 lb/ton)

OSD VOC (lb/day) = Annual VOC (tons/year) X 2000 lb/ton X SAF / Operating days/season

Amount of N. Gas Used in Missouri: 65,903 MMCF

Number of Employees in Industrial Sector in Missouri: 462,567

Number of Employees in Industrial Sector in Cole County: 5,621

VOC Emission Factor: 5.5 lb/MMCF

Industrial Seasonal Activity Factor (SAF) = 0.2010

Activity Days Per Week: 6

Active Days During Ozone Season (June-August): 79

Annual VOC (tons/year) = 65,903 MMCF X (5,621 / 462,567) X (5.5 lb/MMCF) / (2000 lb/ton) = 2.20 tons/year

OSD VOC (lb/day) = 2.20 tons/year X 2000 lb/ton X 0.2010 / 79 = 11.21 lb/day

2.19.3 Results

The emissions from Natural Gas Combustion for the State of Missouri are as follows:

2002 Emissions from Natural Gas Combustion in Missouri (Tons/Year)

	VOC	NOx	CO	SO2	PM10	PM2.5
Residential	318.23	5438.89	2314.42	34.72	439.74	439.74
Commercial	177.93	3235.15	2717.53	19.41	245.87	245.87
Industrial	181.23	3295.15	2,767.93	19.77	250.43	250.43

2.19.4 References

1999 National Emission Inventory (NEI) version 3.0 Draft National Criteria Inventory for Residential Fossil Fuel Combustion, Area Source Method Abstracts, Area Sources Committee EIIP, April 2003. http://www.epa.gov/ttn/chief/eiip/techreport/volume03/index.html.

Residential and Commercial/Institutional Natural Gas and Liquefied Petroleum Gas Combustion, Volume III: Area Source Method Abstracts, Area Sources Committee EIIP, July 1999. http://www.epa.gov/ttn/chief/eiip/techreport/volume03/ng.pdf.

Energy Information Administration (EIA), U.S. Department of Energy, Washington, D.C. *Natural Gas Production & Use by Missouri* table:
http://www.eia.doe.gov/emeu/states/ngsales/ngsales_mo.html
The U.S Bureau of Census, Department of Commerce, Washington, D.C. U.S Bureau of Census American Factfinder site for residential fuel statistics:
http://factfinder.census.gov/home/saff/main.html?_lang=en. Go to Data Sets; select Census 2000 Summary File 3 (SF 3) - Sample Data and within this selection click on List all tables; scroll all the way to Table H40. House Heating Fuel. Follow the arrows, select Counties; All Counties; MA; at the top of the table is a button to Print/ Download into Excel.

EIIP Document Series – Volume III Area Sources - *Chapter 1. Introduction to Area Source Emission Inventory Development,* August 1996.
http://www.epa.gov/ttn/chief/eiip/techreport/volume03/index.html

Compilation of Air Pollution Emission Factors. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.

2.20 Distillate Fuel Oil and Kerosene Combustion

2.20.1 Source Description and Emission Controls

This emission source covers air emissions from the combustion of distillate fuel oils and kerosene by the residential, commercial/institutional and industrial sectors for space heating, water heating or process heating. This source category includes small boilers, furnaces, heaters, and other heating units that are not inventoried as point sources. Residential and commercial

fuel oil and kerosene combustion sectors include housing units; wholesale and retail businesses; health institutions; social and educational institutions; and federal, state and local government institutions (e.g., military installations, prisons, office buildings).

Two major categories of fuel oil are burned by combustion sources: distillate oils and residual oils. These oils are further distinguished by grade numbers, with Nos. 1 and 2 being distillate oils; Nos. 5 and 6 being residual oils; and No. 4 being either distillate oil or a mixture of distillate and residual oils. No. 6 fuel oil is sometimes referred to as Bunker C. Distillate oils are more volatile and less viscous than residual oils. They have negligible nitrogen and ash contents and usually contain less than 0.3 percent sulfur (by weight). Distillate oils are used mainly in domestic and small commercial applications, and include kerosene and diesel fuels. Being more viscous and less volatile than distillate oils, the heavier residual oils (Nos. 5 and 6) may need to be heated for ease of handling and to facilitate proper atomization. Because residual oils are produced from the residue remaining after the lighter fractions (gasoline, kerosene, and distillate oils) have been removed from the crude oil, they contain significant quantities of ash, nitrogen, and sulfur. Residual oils are used mainly in utility, industrial, and large commercial applications.

2.20.2 Emission Estimation Methodology

Activity

The area source method given in EIIP volume III was used to estimate emissions from residential, commercial/institutional, and industrial distillate fuel oil and kerosene combustion. This method relies on the number of households burning distillate fuel oil and kerosene per county, and county employment figures in the commercial/institutional and industrial sectors. The quantity of distillate fuel oil and kerosene used by the residential, commercial, and industrial sectors in Missouri was obtained from the Energy Information Administration (EIA) at the U.S. Department of Energy.

Residential Sources:

The sum of distillate fuel oil and kerosene burned at the state level is apportioned to the county level using U.S. Census data on households that use fuel oil or kerosene as a primary fuel. The equation is:

$$\text{County Fuel Oil use} = \text{Statewide Fuel Oil use} \times \frac{\text{County Fuel Oil burning households}}{\text{State Fuel Oil burning households}}$$

Commercial/Institutional Sources:

The fuel oil burned at the state level is apportioned to the county level using 2002 MERIC employment data in NAICS categories 11, and 42-92 as outlined in Section 1.3.1. The equation is:

$$\text{County Fuel Oil Use} = \text{Statewide Fuel Oil use} \times \frac{\text{NAICS 11, 42-92 employees by county}}{\text{NAICS 11, 42-92 employees by state}}$$

Industrial Sources:

The fuel oil and kerosene burned at the state level is apportioned to the county level using 2002 MERIC employment data in NAICS categories 21-33. The equation is:

$$\text{County Fuel Oil use} = \text{Statewide Fuel Oil use} \times \frac{\text{NAICS 21-33 employees by county}}{\text{NAICS 21-33 employees by state}}$$

Emission Factors

Fuel oil and kerosene combustion emission factors for VOC, NOx, CO, SO2, and PM are shown in Table 2.18-1. These were obtained from AP-42/FIRE where provided. Those emission factors not in AP-42 were determined in discussions with Pechan Associates, who is verifying and consolidating all the CenRAP states 2002 NEI submittals.

Table 2.20-1. Fuel Oil / Kerosene Combustion Emission Factors

Point SCC:		10300501/02/03	10200501/02/03
Area SCC:	2104004000	2103004000	2102004000
Pollutant	Residential EF (lb/1000 Gallons)	Commercial EF (lb/1000Gallons)	Industrial EF (lb/1000 Gallons)
VOC	0.713	0.34	0.2
NOX	18	20	20
CO	5	5	5
SO2	0.426	0.426	0.426
PM10 PRI (Total)	2.38	2.38	2.3
PM2.5 PRI (Total)	2.13	2.13	1.55
PM10 (Filterable)	1.08	1.08	1
PM2.5 (Filterable)	0.83	0.83	0.25
PM10 & 2.5 (Condensable)	1.3	1.3	1.3

The emission factor for SO2 is 142S where S = sulfur content, said to be less than 0.3% for distillate oils, is assumed to be 0.3% to be conservative.

It was assumed that kerosene emission factors are similar to distillate oil emission factors.

Temporal Adjustments for Ozone

For the 8-hour ozone NAAQS emission inventory, EPA guidance calls for CO, NOx, and VOC emissions to be reported as actual annual and actual summer weekday. Summer weekday emissions are defined as an average day's emissions for a typical summer day during the ozone season, typically defined as the months of June, July, and August. Fossil fuel consumption drops

substantially during the summer months when the need for space heating is virtually zero. A seasonal activity factor is therefore needed to reflect the proportion of fuel consumption that takes place in June-August relative to annual consumption and emissions.

The best way to determine the seasonal activity factor is to obtain activity data that are specific for the location and season of interest. The most specific activity data available is Missouri monthly natural gas consumption data for 2002 for the residential, commercial, and industrial sectors obtained from the EIA and described in the *Natural Gas Combustion Section 2.17.3 Temporal Adjustments*. This same activity data was used to derive a residential, commercial/institutional, and industrial seasonal activity factor (SAF) for all the area source fossil fuel combustion calculations, which should have very close to the same proportion of fuel consumed in June-August,

Sample Calculations (Cole County)

<u>Residential Fuel Oil and Kerosene:</u>

Annual VOC (tons/year) = (amount of fuel oil used in Missouri per yr) X (# houses using fuel oil in county) / (# houses using fuel oil in Missouri) X (VOC emission factor) / (2000 lb/ton)

OSD VOC (lb/day) = Annual VOC (tons/year) X 2000 lb/ton X Seasonal Activity Factor / Active Days per Season

Amount of Fuel Oil Used in Missouri: 15,708 tons

Number of Houses Using Fuel Oil in Missouri: 13,893

Number of Houses Using Fuel Oil in Cole County: 40

VOC Emission Factor: 0.713 lb/ton

Activity Days Per Week: 7

Residential Seasonal Activity Factor (SAF) = 0.0655

Active Days During Ozone Season (June-August): 92

Annual VOC (tons/year) = 15,708 1000 Gallons X (40 houses/ 13,893 houses) X (0.713 lb/1000 Gallons) / 2000 lb/ton = 0.016 tons/year

OSD VOC (lb/day) = 0.016 X 2000 lb/ton X 0.0655 / 92 days = 0.023 lb/day

<u>Commercial / Institutional Fuel Oil and Kerosene:</u>

Annual VOC (tons/year) = (amount of Fuel Oil used in Missouri per yr) X (# Comm./Inst. employees in county) / (# Comm./Inst. employees using Fuel Oil in Missouri) X (VOC emission factor(lb/1000 Gallons)) / (2000 lb/ton)

OSD VOC (lb/day) = Annual VOC (tons/year) X 2000 lb/ton X SAF / Operating days/season

Amount of Fuel Oil Used in Missouri: 44,368 1000 Gallons

Number of Comm./Inst. Employees in Missouri: 2,063,988

Number of Comm./Inst. Employees in Cole County: 46,695

VOC Emission Factor: 0.34 lb/1000 Gallons

Activity Days Per Week: 6

Active Days During Ozone Season (June-August): 79

Commercial/Industrial Seasonal Activity Factor (SAF): 0.0950

Annual VOC (tons/year) = 44,368 1000 Gallons X (46,695 / 2,063,988) X (0.34 lb/1000 Gallons) / (2000 lb/ton) = 0.17 tons/year

OSD VOC (lb/day) = 0.17 tons/year X 2000 lb/ton X 0.0950 / 79 = 0.41 lb/day

<u>Industrial Fuel Oil and Kerosene:</u>

Annual VOC (tons/year) = (amount of Fuel Oil used in Missouri per yr) X (# Industrial employees Cole County) / (# Industrial employees in Missouri) X (VOC emission factor (lb/1000 Gallons)) / (2000 lb/ton)

OSD VOC (lb/day) = Annual VOC (tons/year) X 2000 lb/ton X SAF / Operating days/season

Amount of Fuel Oil Used in Missouri: 145,476 1000 Gallons

Number of Employees in Industrial Sector in Missouri: 462,567

Number of Employees in Industrial Sector in Cole County: 5,621

VOC Emission Factor: 0.2 lb/1000 Gallons

Industrial Seasonal Activity Factor (SAF) = 0.2010

Activity Days Per Week: 6

Active Days During Ozone Season (June-August): 79

Annual VOC (tons/year) = 145,476 1000 Gallons X (5,621 / 462,567) X (0.2 lb/1000 Gallons) / (2000 lb/ton) = 0.177 tons/year

OSD VOC (lb/day) = 0.177 tons/year X 2000 lb/ton X 0.2010 / 79 = 0.90 lb/day

2.20.3 Results

The emissions from Fuel Oil and Kerosene Combustion for the State of Missouri are as follows:

2002 Emissions from Fuel Oil and Kerosene Combustion in Missouri (Tons/Year)

	VOC	NOx	CO	SO2	PM10	PM2.5
Residential	5.5999	141.3720	39.2700	3.3458	18.6925	16.7290
Commercial	7.5425	443.6777	110.9194	9.4503	52.7976	47.2517
Industrial	14.5476	1,454.7625	363.6906	30.9864	167.2977	112.7441

Note how high the SO2 emissions are, based on the average sulfur content of 4% in Missouri coal. However, much of the coal burned in Missouri is from other states such as Wyoming, which is low sulfur coal. The average sulfur content of coal burned in Missouri should therefore be determined with greater accuracy and these emissions revised. Revised emissions should be sent to the EPA in the next round of revisions.

2.20.4 References

Energy Information Administration (EIA), U.S. Department of Energy, Washington, D.C. EIA Fuel Oil and Kerosene Sales 2002
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/current/pdf/foksall.pdf

Residential Commercial/Institutional Fuel Oil Combustion, Volume III: Area Source Method Abstracts, Area Sources Committee EIIP, April 1999.

Introduction to Area Source Emission Inventory Development, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.

Compilation of Air Pollution Emission Factors. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.

2.21 COAL COMBUSTION

2.21.1 Source Description and Emission Control

Coal is a complex combination of organic matter and inorganic mineral matter formed over eons from successive layers of fallen vegetation. Bituminous coals are by far the largest group and are characterized as having lower fixed carbon and higher volatile matter. This source category

covers air emissions from coal combustion in the residential and commercial sectors for space heating or water heating. This category includes small boilers, furnaces, heaters, and other heating units that are not inventoried as point sources. Residential and commercial coal combustion sectors comprise housing units; wholesale and retail businesses; health institutions; social and educational institutions; and federal, state, and local government institutions. Major emissions from coal combustion are volatile organic compounds (VOC), nitrogen oxides (NOx), carbon monoxide (CO), sulfur oxides (SOx), and particulate matter (PM_{10} and $PM_{2.5}$).

2.21.2 Emission Estimation Methodology

Activity

The area source method given in EIIP volume III was used to estimate emissions from residential, commercial/institutional, and industrial coal combustion. This method relies on the number of households burning coal per county, and county employment figures in the commercial/institutional and industrial sectors. The quantity of coal used by the residential, commercial, and industrial sectors in Missouri was obtained from the Energy Information Administration (EIA) at the U.S. Department of Energy.

Residential Sources:

The coal burned at the state level is apportioned to the county level using U.S. Census data on households that use coal as a primary fuel. The equation is:

$$\text{County coal use} = \text{Statewide coal use} \times \frac{\text{County coal-burning households}}{\text{State coal-burning households}}$$

Commercial/Institutional Sources:

The coal burned at the state level is apportioned to the county level using 2002 MERIC employment data in NAICS categories 11, and 42-92 as outlined in Section 1.3.1. The equation is:

$$\text{County coal Use} = \text{Statewide coal use} \times \frac{\text{NAICS 11, 42-92 employees by county}}{\text{NAICS 11, 42-92 employees by state}}$$

Industrial Sources:

The coal burned at the state level is apportioned to the county level using 2002 MERIC employment data in NAICS categories 21-33. The equation is:

$$\text{County coal use} = \text{Statewide coal use} \times \frac{\text{NAICS 21-33 employees by county}}{\text{NAICS 21-33 employees by state}}$$

Emission Factors

Coal combustion emission factors for VOC, NOx, CO, SO2, and PM are shown in Table 2.15-1. These were obtained from AP-42/FIRE where provided. Those emission factors not in AP-42 were determined in discussions with Pechan Associates, who is verifying and consolidating all the CenRAP states 2002 NEI submittals.

Table 2.21-1. Coal Combustion Emission Factors

Point SCC:	10300214	10300208	10200202
Area SCC:	2104002000	2103002000	2102002000
Pollutant	Residential EF (lb/ton)	Commercial EF (lb/ton)	Industrial EF (lb/ton)
VOC (TNMOC)	10	1.3	0.06
NOX	9.1	9.5	22
CO	275	11	0.5
SO2	124	124	152
PM10 PRI (Total)	7.24	7.24	20.22
PM2.5 PRI (Total)	4.84	4.84	6.62
PM10 (Filterable)	6.2	6.2	18.4
PM2.5 (Filterable)	3.8	3.8	4.8
PM10 & 2.5 (Condensible)	1.04	1.04	1.82

AP-42's emission factor for sulfur is 31 S (S= Sulfur content) = 124 lb/ton (residential and commercial/institutional); and 38 S (S= Sulfur content) = 152 lb/ton (industrial). SO2 Sulfur content in Missouri averages about 4%.
http://www.eia.doe.gov/cneaf/coal/st_coal_pdf/0576q.pdf

8% Ash content is assumed based upon AP-42 and January 2000 *Mercury Speciation Stack Sampling Test Report: Meramec Unit 4* that was conducted for the EPA's Information Collection Request (ICR) to characterize mercury emissions from coal-fired power plants in the United States.

Temporal Adjustments for Ozone

For the 8-hour ozone NAAQS emission inventory, EPA guidance calls for CO, NOx, and VOC emissions to be reported as actual annual and actual summer weekday. Summer weekday emissions are defined as an average day's emissions for a typical summer day during the ozone season, typically defined as the months of June, July, and August. Fossil fuel consumption drops substantially during the summer months when the need for space heating is virtually zero. A seasonal activity factor is therefore needed to reflect the proportion of fuel consumption that takes place in June-August relative to annual consumption and emissions.

The best way to determine the seasonal activity factor is to obtain activity data that are specific for the location and season of interest. The most specific activity data available is Missouri monthly natural gas consumption data for 2002 for the residential, commercial, and industrial

sectors obtained from the EIA and described in the *Natural Gas Combustion Section 2.17.3 Temporal Adjustments*. This same activity data was used to derive a residential, commercial/institutional, and industrial seasonal activity factor (SAF) for all the area source fossil fuel combustion calculations, which should have very close to the same proportion of fuel consumed in June-August.

Sample Calculations – Cole County

Residential Coal:

Annual VOC (tons/year) = (amount of coal used in Missouri per yr) X ((# houses using coal in county) / (# houses using coal in Missouri)) X (VOC emission factor(lb/ton)) / (2000 lb/ton)

OSD VOC (lb) = (amount of coal used in Missouri per yr) X (# houses using coal in county) / (# houses using coal in Missouri) X (VOC emission factor) X Seasonal Activity Factor / Active Days per Season

Amount of Coal Used in Missouri: 19,000 tons

Number of Houses Using Coal in Missouri: 170

Number of Houses Using Coal in Cole County: 0

VOC Emission Factor: 10 lb/ton

Activity Days Per Week: 7

Residential Seasonal Activity Factor (SAF) = 0.0655

Active Days During Ozone Season (June-August): 92

Annual VOC = 19,000 tons X (0 houses/ 170 houses) X (10 lb/ton) / (2000 lb/ton)
= 0 tons/year

OSD VOC = 19,000 tons X (0 houses/ 170 houses) X (10 lb/ton) X 0.0655 (proportion of fuel consumed in June-August) / 92 days = 0 lb/day

Commercial / Institutional Coal:

Annual VOC (tons/year) = (amount of coal used in Missouri per yr) X (# employees using coal in county) / (# employees using coal in Missouri) X (VOC emission factor(lb/ton)) / (2000 lb/ton)

OSD VOC (lb) = (amount of coal used in Missouri per yr) X (# employees using coal in county) / (# employees using coal in Missouri) X (VOC emission factor) X (seasonal activity factor) / (active days during June – August)

Amount of Coal Used in Missouri: 147,794.07

Number of Employees in Commercial/Institutional Sector in Missouri: 2,063,988

Number of Employees in Commercial/Institutional Sector in Cole County: 46,695

VOC Emission Factor: 1.3 lb/ton

Commercial/Institutional Seasonal Activity Factor (SAF) = 0.0950

Activity Days Per Week: 6

Active Days During Ozone Season (June-August): 79

Annual VOC = 147,794.07 tons X (46,695 / 2,063,988) X (1.3 lb/ton) / (2000 lb/ton)
= 2.17 tons/year

OSD VOC = Annual VOC X 2000 lb/ton X (0.0950 (proportion of fuel consumed in June-August)) / 79 days = 5.23 lb/day

<u>Industrial Coal:</u>

Annual VOC (tons/year) = (amount of coal used in Missouri per yr) X (# employees using coal in county) / (# employees using coal in Missouri) X (VOC emission factor(lb/ton)) / (2000 lb/ton)

OSD VOC (lb) = (amount of coal used in Missouri per yr) X (# employees using coal in county) / (# employees using coal in Missouri) X (VOC emission factor) X (seasonal activity factor) / (active days during June – August)

Amount of Coal Used in Missouri: 429,959 tons

Number of Employees in Industrial Sector in Missouri: 462,567

Number of Employees in Industrial Sector in Cole County: 5,621

VOC Emission Factor: 0.06 lb/ton

Industrial Seasonal Activity Factor (SAF) = 0.2010

Activity Days Per Week: 6

Active Days During Ozone Season (June-August): 79

Annual VOC = 429,959 tons X (5,621 / 462,567) X (0.06 lb/ton) / 2000 lb/ton

= 0.16 tons/year

OSD VOC = 429,959 tons X (5,621 / 462,567) X (0.06 lb/ton) / X (0.2010) / 79
= 0.80 lb/day

2.21.3 Results

The emissions from Coal Combustion for the State of Missouri are as follows:

2002 Emissions from Coal Combustion in Missouri (Tons/Year)

	VOC	NOx	CO	SO2	PM10	PM2.5
Residential	95.00	86.45	2,612.5	1,178.0	68.78	45.98
Commercial	96.07	702.02	812.87	9,163.2	535.01	357.66
Industrial	12.90	4,729.55	107.49	32,676.87	4,346.88	1,423.16

Note how high the SO2 emissions are, based on the average sulfur content of 4% in Missouri coal. However, much of the coal burned in Missouri is from other states such as Wyoming, which is low sulfur coal. The average sulfur content of coal burned in Missouri should therefore be determined with greater accuracy and these emissions revised. Revised emissions should be sent to the EPA in the next round of revisions.

2.21.4 References

Energy Information Administration (EIA), U.S. Department of Energy, Washington, D.C.
EIA 2002 Coal Consumption: http://www.eia.doe.gov/cneaf/coal/page/acr/acr.pdf

The U.S Bureau of Census, Department of Commerce, Washington, D.C.

P:\APCP\Tech Support\Users\Mollie Freebairn\NEI\2002 NEI Residential Energy Consumption in Missouri.xls

National Oceanographic and Atmospheric Administration (NOAA).

Residential Commercial/Institutional Coal Combustion, Volume III: Area Source Method Abstracts, Area Sources Committee EIIP, April 1999.

Introduction to Area Source Emission Inventory Development, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.

Compilation of Air Pollution Emission Factors. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.

East-West Gateway Coordinating Council, St. Louis City, MO.

The 2002 NEI Area Source Fuel Combustion spreadsheets containing the final revised emission factors and other parameters agreed to with Pechan are located on the APCP P:/Drive at 2002 NEI Area Source Fuel Combustion_RevPMData.xls

Emission factor revisions were discussed at length in e-mail correspondence between Mollie Freebairn, APCP and Randy Strait, Pechan Associates, on 9/13, 9/14, 9/16, 9/17, and 9/18/2004 and are on file at the APCP.

EIA State Coal Profile: Missouri http://www.eia.doe.gov/cneaf/coal/st_coal_pdf/0576q.pdf

2.22 Wood Combustion – Residential

In the 1999 NEI for Missouri, Residential Wood Burning was the second highest area source category for criteria pollutant emissions overall, primarily CO, VOC, and PM10 and PM2.5, second only to unpaved road fugitive dust emissions. Its ranking was similar in other states. These findings have led to a number of studies and surveys around the United States to improve and update activity data and emission factors for residential wood burning. While it was not possible to conduct a statewide survey here in Missouri to determine residential wood burning usage patterns, there is good information available from the Energy Information Administration, 2000 U.S. Census, and other studies referenced below, that was carefully reviewed and incorporated into the somewhat complex method described below.

2.22.1 Source Description and Emission Controls

This area source category of residential wood combustion is defined as wood burning that takes place primarily in woodstoves and fireplaces. Residential wood burning takes place either as a necessary source of heat or for aesthetics. Fireplaces can be divided into 2 broad categories: (1) masonry (generally brick and/or stone, assembled on site, and integral to a structure) and (2) factory-built (usually metal, installed on site as a package with appropriate ductwork). Woodstoves are commonly used in residences as space heaters. They are used both as the primary source of residential heat and to supplement conventional heating systems. There are seven different residential wood combustion source categories:

y **FIREPLACES**
x 2104008001 Without Inserts
x 2104008002 With Inserts; Non-EPA Certified
x 2104008003 With Inserts; Non-Catalytic, EPA Certified
x 2104008004 With Inserts; Catalytic, EPA Certified
y **WOODSTOVES**
x 2104008010 Non-EPA Certified
x 2104008030 Catalytic, EPA Certified
x 2104008050 Non-Catalytic, EPA Certified

Pollutants emitted from residential wood combustion include particulate mater (PM), volatile organic compounds (VOC), nitrogen oxides (NOx), carbon monoxide (CO), and hazardous air pollutants (HAP). Controls for this category may use new technology woodstoves,

improvements in wood burning performance, use of "no burn" periods, public awareness and educational programs, replacement or installation of gas-burning equipment in fireplaces, and total banning of burning.

2.22.2 Emission Estimation Methodology

Activity

The Energy Information Administration (EIA) reports Residential Wood Consumption in Missouri for 1960 to 2000. According to the EIA, in 1987 a total of 907,000 cords was burned in Missouri. The U.S. Forest Service study reports that in 1987, a total of 924,154 cords of wood were produced in Missouri. These figures agree well, since somewhat more wood should have been produced than was consumed.

The EIA estimate for 2000 residential wood consumption in Missouri is 484,000 cords, the latest year for which figures are available. To project an estimate for 2002 residential wood consumption, the EIA data for natural gas consumption in Missouri's residential sector for 2000, 2001, and 2002 are employed. Residential wood consumption was projected by assuming that it was proportional to that of natural gas in Missouri:

Year	Residential Natural Gas (Million Cu. Ft.)	Residential Fuelwood (Cords)
2000	115,353	484,000
2001	116,188	487,504
2002	115,721	485,544

Census 2000 provides a table of number of occupied housing units and house heating fuels for each county in Missouri for 2000. Across Missouri overall about 4% of households used wood, in some counties the average was as high as 34%.

Separate wood consumption estimates for fireplaces with inserts, fireplaces without inserts, non-EPA certified woodstoves, catalytic & noncatalytic EPA-certified woodstoves are made to account for different usage patterns (climate zones; urban vs. rural), and different emission factors, which were obtained from US Census, EIA, and EPA. Primary Wood-Burning Heating Equipment from *American Housing Survey for the United States in 2001* is as follows:

Stoves	1,131,000	84.4%
Fireplaces with inserts	145,000	10.8
Fireplaces without inserts	64,000	4.8
Total	1,340,000	100.0

These proportions were applied to the total number of households burning wood as their main house heating fuel to obtain the number of stoves and fireplaces in each Missouri county. Similar proportions are given in the *EIA 2001 Residential Energy Consumption Survey, Table HC3-1b. Space Heating by Climate Zone, Percent of U.S. Households*, where for Missouri's climate zone, heating stoves comprise 78% of main wood-burning heating equipment and 22% is classified as "other".

92% of the woodstoves are non-EPA certified, 5.7% are EPA certified non-catalytic, and 2.3 percent are EPA-certified catalytic according to *Documentation for Version 2 of the 1999 NEI for Criteria Pollutants- Area Sources*. These figures were used to allocate primary heating with wood to fireplaces and stoves.

The average number of cords burned per main wood-burning unit per year is:

485,544 cords / 77,666 units = 6.25 cords/unit/year

Consulting with people who have used wood as a primary source of fuel, 4 to 6 cords is in fact about what it takes to heat a home for the winter, more for a larger home.

10.1% of all households burn wood as a secondary source of fuel (from Missouri's climate zone in the *EIA 2001 Residential Energy Consumption Survey* cited above.) These households range from those who burn a substantial quantity of wood to those who use it for aesthetic purposes. 10% will be assumed to be the households that burn purely for aesthetic purposes, until more guidance becomes available. The amount burned for aesthetics is estimated over and above that obtained from the EIA, as described in *Documentation for Version 2 of the 1999 NEI for Criteria Pollutants- Area Sources*, cited above: "We have the total cords of wood consumed by the residential section for 1997 from the EIA. This figure does not include consumption for aesthetics…." The average number of cords burned in fireplaces for aesthetic purposes is 0.069 cords/unit/year.

The U.S. Forest Service's 1987 study found that oak and hickory were the principal fuelwood species in Missouri, accounting for 60% and 9% of the total harvested, respectively. Both oak and hickory hardwoods have a density conversion factor of 39.9. One cord of wood is equal to about 79 cubic feet of solid wood.

Emission Factors

Residential wood combustion emission factors are given in *DOCUMENTATION FOR THE FINAL 1999 NATIONAL EMISSIONS INVENTORY (VERSION 3.0) FOR CRITERIA AIR POLLUTANTS AND AMMONIA AREA SOURCES*, Appendix B.

Table B-1. Criteria Pollutant Emission Factors For Residential Wood Combustion, lb/ton

SCC		VOC	NOX	CO	SO2	PM10	PM2.5
2104008001	Fireplaces	229	2.6	64.1	0.4	11.8	11.8
2104008002	Fireplaces: Inserts; non-EPA certified	53	2.8	230.8	0.4	30.6	30.6
2104008003	Fireplaces: Inserts; non-catalytic, EPA certified	12		140.8	0.4	19.6	19.6
2104008004	Fireplaces: Inserts; catalytic, EPA certified	15	2	104.4	0.4	20.4	20.4
2104008010	Woodstoves: General	53	2.8	230.8	0.4	30.6	30.6
2104008030	Catalytic Woodstoves: General	15	2	104.4	0.4	20.4	20.4
2104008050	Non-catalytic Woodstoves: General	12		140.8	0.4	19.6	19.6

Assumptions

It was assumed that there was not significant industrial and commercial wood combustion. The calculations were based strictly on residential consumption data. Temporal adjustments for the ozone season were not made although they perhaps should be since VOC emissions are so high. This would entail a revision to our 2002 NEI submittal to the EPA.

Sample Calculation (Cole County)

SCC - 2104008010 Woodstoves: General - Annual VOC (tons/year) = (number of households in Cole Country heating with wood) X (% of households using woodstoves) X (% of wood stoves that are non-EPA certified) X (average number of cords/household/year) X (volume of a cord of wood) X (density of a cord of wood) / (2000 lb wood/ton) X (VOC emission factor) / (2000 lb emissions/ton)

Number of Houses Burning Wood in Cole County: 335

% of Households Burning Wood that have Woodstoves: 84%

% of Woodstoves that are non-EPA Certified: 92%

Average number of cords/household/year: 6.25

Volume of a cord of wood: 79 cu. ft./cord

Density of a cord of wood: 39.9 lb/cu.ft

VOC Emission Factor: 53 lb/ton

Woodstoves: General - Annual VOC (tons/year) =
335 households X 0.844 X 0.92 X 6.25 cords/household/year X 79 cu. ft./cord X 39.9 lb/cu.ft / 2000 lb/ton X 53 lb VOC/ton / 2000 lb/ton = 68 tons VOC/year

2.22.3 Results

The emissions from Residential Wood Combustion for the State of Missouri are as follows:

2002 Emissions from Residential Wood Combustion in Missouri (Tons/Year)

	VOC	NOx	CO	SO2	PM10	PM2.5
2104008001 Fireplaces	6,938	79	3,884	12	715	715
2104008002 Fireplaces: Inserts; non-EPA certified	2,190	116	9,537	17	1,264	1,264
2104008010 Woodstoves: General	15,746	832	68,570	119	9,091	9,091
2104008030 Catalytic Woodstoves: General	111	15	775	3	152	152

2104008050 Non-catalytic Woodstoves: General	221	0	2,592	7	361	361
2002 EMISSIONS - TOTAL ALL POLLUTANTS – 123,347 TONS	**25,206**	**1,042**	**85,358**	**158**	**11,583**	**11,583**
1999 EMISSIONS – TOTAL ALL POLLUTANTS – 206,454 TONS	**93,211**	**1,058**	**102,817**	**137**	**9,231**	**9,231**

2.22.4 References

- EIIP Document Series – Volume III Area Sources - Chapter 1. Introduction to Area Source Emission Inventory Development, August 1996. http://www.epa.gov/ttn/chief/eiip/techreport/volume03/index.html
- Emission Inventory Improvement Program (EIIP), Document Series - Volume III, Area Sources, Chapter 2 - Residential Wood Combustion, April 2001. http://www.epa.gov/ttn/chief/eiip/techreport/volume03/index.html.
- Energy Information Administration (EIA), U.S. Department of Energy, Washington, D.C. http://www.eia.doe.gov/emeu/states/sep_use/res/use_res_mo.html, also in our spreadsheets at ..\Excell\EIA Residential Energy Consumption in Missouri.xls. Natural gas consumption: http://www.eia.doe.gov/emeu/states/ngsales/ngsales_mo.html.
- EIA 2001 Residential Energy Consumption Survey, Table HC3-1b. Space Heating by Climate Zone, Percent of U.S. Households, 2001 – Preliminary Data http://www.eia.doe.gov/emeu/recs/recs2001/detail_tables.html
- USDA Forest Service Residential Fuelwood Production and Sources from Roundwood in Missouri, 1987. http://www.ncrs.fs.fed.us/pubs/rb/rb_nc132.pdf.)
- The U.S Bureau of Census, Department of Commerce, Washington, D.C. U.S Bureau of Census American Factfinder site for residential fuel statistics is at http://factfinder.census.gov/servlet/BasicFactsServlet, also see http://factfinder.census.gov/home/saff/main.html?_lang=en. Go to Data Sets; select Census 2000 Summary File 3 (SF 3) - Sample Data and within this selection click on List all tables; scroll all the way to Table H40. House Heating Fuel. Follow the arrows, select Counties; All Counties; MA; Print/ Download into Excel.
- American Housing Survey for the United States in 2001 Table 2-21 Housing Costs by Selected Characteristics – Occupied Units - Consistent with the 1990 Census.
- Four Winters' Worth of Residential Fuelwood Use 1979-80 1981-82 1984-85 1987-88, Missouri Department of Conservation, 1988.
- USDA Forest Service Residential Fuelwood Production and Sources from Roundwood in Missouri, 1987. http://www.ncrs.fs.fed.us/pubs/rb/rb_nc132.pdf
- Compilation of Air Pollution Emission Factors. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.

2.23 Traffic Markings

2.23.1 Source Description and Emissions Control

Traffic marking operation consists of marking of highway center, edge stripes, and directional markings and painting on other paved and unpaved surfaces, such as markings in parking lots. Materials used for traffic markings include solvent-based paints, water-bared paints, thermoplastics, preformed tapes, field-reacted materials, and permanent markers. Solvent-based formulations of alkyd resins or chlorinated rubber resins are the most commonly used traffic paints. This inventory report focuses on applications of traffic paints that emit a significant quantity of volatile organic compounds (VOC).

VOC emissions result from the evaporation of organic solvents during and shortly after the application of the marking paint. Three types emit VOC in appreciable amount are: (a) Non-aerosol traffic paint, (b) Aerosol marking paint, and (c) Performed tapes applied to adhesive primer. VOC emissions can also result from cleaning the striping equipment. Because the use of organic solvents in traffic marking is the primary source of emissions, control techniques for this source category involve either product substitution or product reformulation. Alternative formulations include low-solvent-content coatings, water-based coatings, and plastic-based coatings.

2.23.2 Emission Estimation Methodology

Activity Level

The Missouri Department of Transportation (MODOT) keeps records of amount of paint used for traffic coatings in 10 Districts. Since MODOT does not keep records of paint for each county, population figures were used to estimate how much paint was used for each county.

Emission Factor

Based on MODOT information the VOC emission factors for the paint used in 2002 are as follows:

TYPE of Paint	VOC Content (lb/gallon)
White Waterborne	.81
Yellow Waterborne	.81
White Acrylic Copolymer	1.11
Yellow Acrylic Copolymer	1.05
White Epoxy	0
Yellow Epoxy	0

Assumptions

According to a national-level survey of traffic coating end users, it was assumed that 5% of traffic coatings in Missouri was done by agencies other than the Department of Transportation.

Sample Calculation (Cole County)

VOC Emissions (tons/year) = (Population Cole County/Population of District 5) X(VOC emissions for District 5) / 2000 lb/ton

VOC Emissions for District 5 (lb)= Amount of Paint Used (gallons) X VOC Content of Paint (lb/gal) X 1.05 (to account for 5% paint used by other agencies)

Population of Cole County: 71894

Population of District 5: 461578

Gallons of White Waterborne Paint Used in District 5: 37931 gal.

Gallons of Yellow Waterborne Paint Used in District 5: 69653 gal.

Gallons of White Acrylic Copolymer Paint Used in District 5: 102 gal.

Gallons of Yellow Acrylic Copolymer Paint Used in District 5: 106 gal.

Gallons of White Epoxy Paint Used in District 5: 0 gal.

Gallons of Yellow Epoxy Paint Used in District 5: 0 gal.

Activity Days Per Week: 5

VOC Emissions (ton/year) = (71894/461578) X [(37931 X .81) + (69653 X .81) + (102 X 1.11) + (106 X 1.05) + (0 X 0) + (0 X 0)] X 1.05 / 2000 (lb/ton) = 7.144 ton/year

2.23.3 Results

Total VOC emissions from traffic marking for the State of Missouri is 465.7 tons/year.

2.23.4 References

- *Traffic Markings*, Volume III: Chapter 14, Final Report, Area Sources Committee EIIP, May1997.
- *Introduction to Area Source Emission Inventory Development*, Volume III: Chapter 1, Area Sources Committee EIIP, August 1996.
- *Compilation of Air Pollution Emission Factors*. Volume I: Stationary Point and Area Sources. AP-42 (Fifth Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, January 1995.

- United States Bureau of Census, Department of Commerce, Washington, D.C.
- Customer Service Center, Department of Transportation, Jefferson City, MO.

2.24 Commercial Marine Vessels

2.24.1 Source Description and Emission Control

Emissions from commercial marine vessels were calculated based on the tonnage of cargo moved by ships along the Missouri and Mississippi Rivers through the port of Fort Benton (Kansas City area) and the port of Metropolitan St. Louis in Missouri. This tonnage was taken from the "Waterborne Commerce of the United States - Part 2, Waterways & Harbors, Gulf Coast, Mississippi River System and Antilles" pages 17 & 38 (1).

2.24.2 Emission Estimation Methodology

Activity Level

The most recent figures for tonnage totals are from the year 2001. For the purposes of this report it was assumed that the tonnage for inventory year 2002 would be the same.

The equations used in the calculations were taken from Commercial Marine Emissions Inventory for EPA Category 2 and 3 Compression Ignition Marine Engines in the United States Continental and Inland Waterways (2). The equations are summarized below.

First, annual cargo movement in ton-miles was calculated by multiplying the number of tons shipped in 2001 along the Mississippi River and Missouri River through ports of Fort Benton and St. Louis City, Missouri, by the length of the portion of the Mississippi River and Missouri Rivers running through each individual county.

$$C = L \times T$$

Where:

C = Annual cargo movement (ton-miles)
L = Length of Mississippi & Missouri rivers through each county (miles)
T = Total amount of cargo shipped through each county (short tons)

Emissions per ton-mile were calculated by dividing the product of the deadweight tonnage, cargo capacity factor, and average vehicle speed. Deadweight tonnage is a measurement of the total contents of a ship, including cargo, fuel, crew, passengers, food, and water aside from boiler water. The cargo capacity factor is applied as a correction because ships do not typically operate fully loaded with cargo.

$$E_{TM} = E_{\mathbf{d}} \div (DWT \times CCF \times V \times 24)$$

Where:

E_{TM} = Emissions per ton-mile (lbs/ton-mile)
E_d = Emissions per day per ship from Method A (lbs/day/ship)
DWT = Average dead weight tonnage per ship (tons/ship)
CCF = Cargo capacity factor
V = Average speed of vessel across duty cycle adjusted for max. BHP (miles/hour)
24 = Hours per day to convert ship speed to ship miles per day

Emissions per year were calculated by multiplying the results from the previous equations.

$$E_Y = E_{TM} \times C$$

Where:

E_Y = Emissions per year (lb/year)
E_{TM} = Emissions per ton-mile (lbs/ton-mile)
C = Annual cargo movement (ton-miles)

The total tonnage of cargo shipped along the Mississippi River through the port of St. Louis City, Missouri, in 2001 was **34,432,000** tons. The total tonnage of cargo shipped along the Missouri River through the port of Fort Benton was **9,295,000** tons. As previously mentioned, it was assumed that the tonnages for the year 2002 would be the same. This data was obtained from the U.S. Army Corps of Engineers Waterborne Commerce Statistics Center (1).

Emission Factors

From reference 1, the following values were obtained:

Emission Factors
Avg NOx emissions per day per ship on inland rivers: 641.92 lbs per day-cargo-ship
Avg VOC , 21.70 lbs per day-cargo-ship
Cargo capacity of ships on inland rivers: 0.6
Avg deadweight tonnage per ship: 15,454 short tons
Avg speed of vessels on inland rivers: 8.18 mph

Assumptions

Emissions were apportioned to the county level based on the percent of the Mississippi River and Missouri River flowing adjacent to/through each county. It was assumed that 50% of emissions from Mississippi River would be accounted for in Illinois' inventory and the other 50% of emissions would go to Missouri's inventory (the same holds true for Platte County, whereas 50% of emissions are assumed to be accounted for in Kansas). Using the USGS National Map Viewer, the length of the Missouri & Mississippi Rivers running through the entire state was measured and recorded along with the individual lengths within each county. Maps of each county river length are attached to this report.

There is no reference that asserts the seasonal or temporal variation for this activity. Therefore, it was assumed that activity does not vary throughout the year and occurs seven days per week.

Sample Calculation (Jefferson County)

2002 NOx Emissions from Commercial Marine Vessels in Jefferson County

Cargo movement in 2002 = (Length of river through Jefferson County) x (Total tons shipped through Port of St. Louis in 2001)
= (**21.32** miles) x (**34,432,000** tons)
= **734,090,240** ton-miles

Emissions per ton-mile = (Emissions/day-ship)/[(Avg. deadweight tonnage) x (cargo capacity factor) x (Avg. speed)]
= (**641.92** lbs/NOx/day-ship) / [(**15,454** tons/ship) x (**0.6**) x (**8.18** miles/hr) x (24 hrs/1 day)]
= **3.53×10^{-4}** lbs NOx/ton-mile

2002 annual emissions for both sides of the Mississippi River running through Jefferson County
= (Ton-miles per year) x (Emissions per ton-mile)
= (**734,090,240** ton-miles) x (**3.53×10^{-4}** lbs/ton-mile) x (1 ton/2,000 lbs)
= **129.43** tons NOx/yr

2002 Jefferson Co. emissions = (total Mississippi River emissions) x (Percent of emissions occurring on Missouri side)
= **129.43** tons NOx/yr) x 0.50
= **64.72** tons NOx/yr

2.24.3 Results

The emissions for the State of Missouri from Commercial Marine Vessels are 74.6 ton/year VOC, 1979.2 tons/year NOx, and 184.48 tons/year PM10.

2.24.4 References

- *"Tonnage for Selected U.S. Ports in 1999" table from U.S. Army Corps of Engineers Waterborne Commerce Statistics Center, "Waterborne Commerce of the United States - Part 2, Waterways & Harbors, Gulf Coast, Mississippi River System and Antilles". (http://www.wrsc.usace.army.mil/ndc/portsname.htm)*
- *"Commercial Marine Emissions Inventory for EPA Category 2 and 3 Compression Ignition Marine Engines in the United States Continental and Inland Waterways," US EPA, EPA 420-R-98-020, August 1998. (http://www.epa.gov/otaq/regs/nonroad/marine/ci/fr/r98020.pdf)*
- *USGS National Map Viewer (http://nmviewogc.cr.usgs.gov/viewer.htm)*

1. “Tonnage for Selected U.S. Ports in 1999” table from U.S. Army Corps of Engineers Waterborne Commerce Statistics Center, *“Waterborne Commerce of the United States - Part 2, Waterways & Harbors, Gulf Coast, Mississippi River System and Antilles”*. (http://www.wrsc.usace.army.mil/ndc/portsname.htm)

2. *“Commercial Marine Emissions Inventory for EPA Category 2 and 3 Compression Ignition Marine Engines in the United States Continental and Inland Waterways*,” US EPA, EPA 420-R-98-020, August 1998. (http://www.epa.gov/otaq/regs/nonroad/marine/ci/fr/r98020.pdf)

3. USGS National Map Viewer (http://nmviewogc.cr.usgs.gov/viewer.htm)

Appendix H.6

Sonoma Technology, *Research and Development of Planned Burning Emission Inventories for the Central States Regional Air Planning Association* (July 30, 2004)

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RESEARCH AND DEVELOPMENT OF PLANNED BURNING EMISSION INVENTORIES FOR THE CENTRAL STATES REGIONAL AIR PLANNING ASSOCIATION

FINAL REPORT
STI-902514-2516-FR

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July 30, 2004

QUALITY ASSURANCE STATEMENT

This report was reviewed and approved by the project Quality Assurance (QA) Officer or his delegated representatives, as provided in the project QA Plan (Coe, 2003a).

Lyle R. Chinkin
Project QA Officer

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EXECUTIVE SUMMARY

The Central States Regional Air Planning Association (CENRAP) is researching visibility-related issues for its region and is developing a regional haze plan in response to the U.S. Environmental Protection Agency's (EPA) mandate to protect visibility in Class I areas. Agricultural and prescribed burning activities ("planned burning") contribute to episodes of impaired visibility in the CENRAP region-phenomena that the CENRAP seeks to better understand. Therefore, support of the CENRAP's need to develop a regional haze plan, Sonoma Technology, Inc. (STI) developed planned burning emission inventories for the region.

As detailed in the Methods Document, presented in Appendix A, Emission Estimation Methods for the CENRAP Planned Burning Emission Inventories (Methods Document), emissions estimates were prepared for prescribed and agricultural burning activities on federal, state, tribal, and private lands in the CENRAP region. These "bottom up" estimates were prepared by using the First-Order Fire Effects Model (FOFEM), emission factors and fuel loadings gathered from published literature, geographic information systems (GIS) databases of land cover and vegetation, and activity data gathered through telephone surveys.

Year-2002 $PM_{2.5}$ emissions of particulate matter of less than 2.5 µm aerodynamic diameter ($PM_{2.5}$) from planned burning activities in the CENRAP states were estimated to be 317,000 tons (see **Figure ES-1**)—almost 300% higher than the estimate of 110,000 tons of $PM_{2.5}$ prepared by the EPA for the 1999 National Emission Inventory (NEI). In addition, planned burning activities emitted precursors to chemically formed $PM_{2.5}$, including approximately 239,000 tons per year volatile organic compounds (VOC), 80,000 tons per year nitrogen oxides (NO_x), 47,000 tons per year ammonia (NH_3), and 35,000 tons per year sulfur oxides (SO_x). The most significant source of these emissions was the burning of private rangelands, which accounted for 50% of the annual planned burning $PM_{2.5}$ emissions in the CENRAP region. This source category was especially significant in the states of Texas, Oklahoma, and Kansas. Prescribed burning on publicly managed forest and grasslands was the second most significant source of planned burning emissions in the region, accounting for 32% of the annual planned burning $PM_{2.5}$ emissions (see **Figure ES-2**). This source category was especially important in the states of Arkansas, Louisiana, and Minnesota. (Emission estimates by source category and state are tabulated in Appendix B.)

Planned burning emissions peak in the spring. More than 25% of annual activity occurs during the month of March. A smaller peak in emissions occurs during the months of September and October (see **Figure ES-3**). Spring and fall provide the most advantageous climatological and biological conditions for prescribed burning, while agricultural burns tend to occur before spring planting or after fall harvesting.

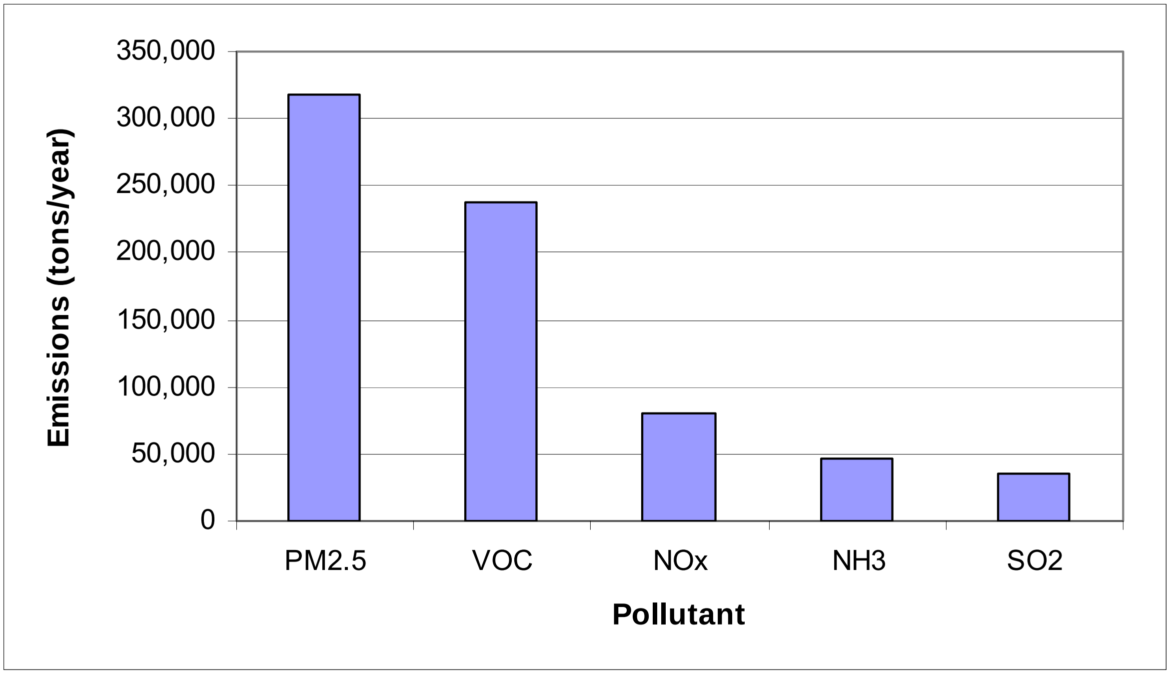

Figure ES-1. CENRAP annual planned burning emissions by pollutant.

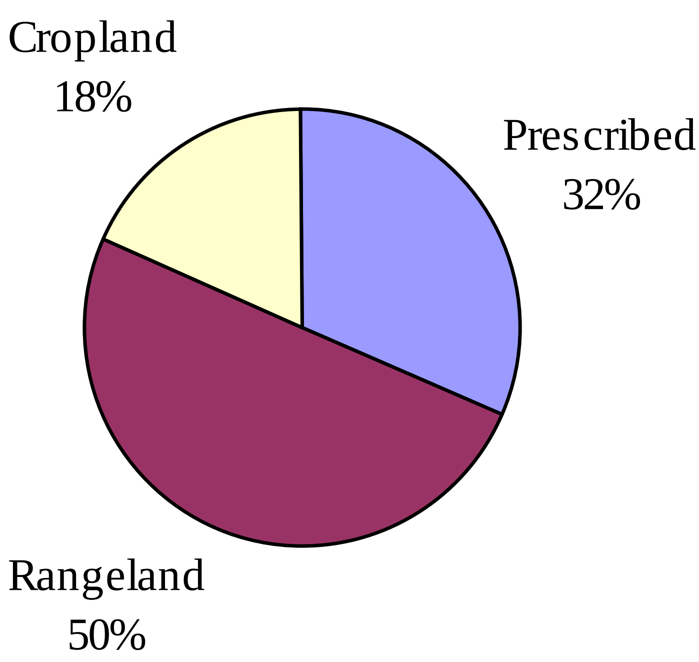

Figure ES-2. CENRAP annual planned burning $PM_{2.5}$ emissions by source category.

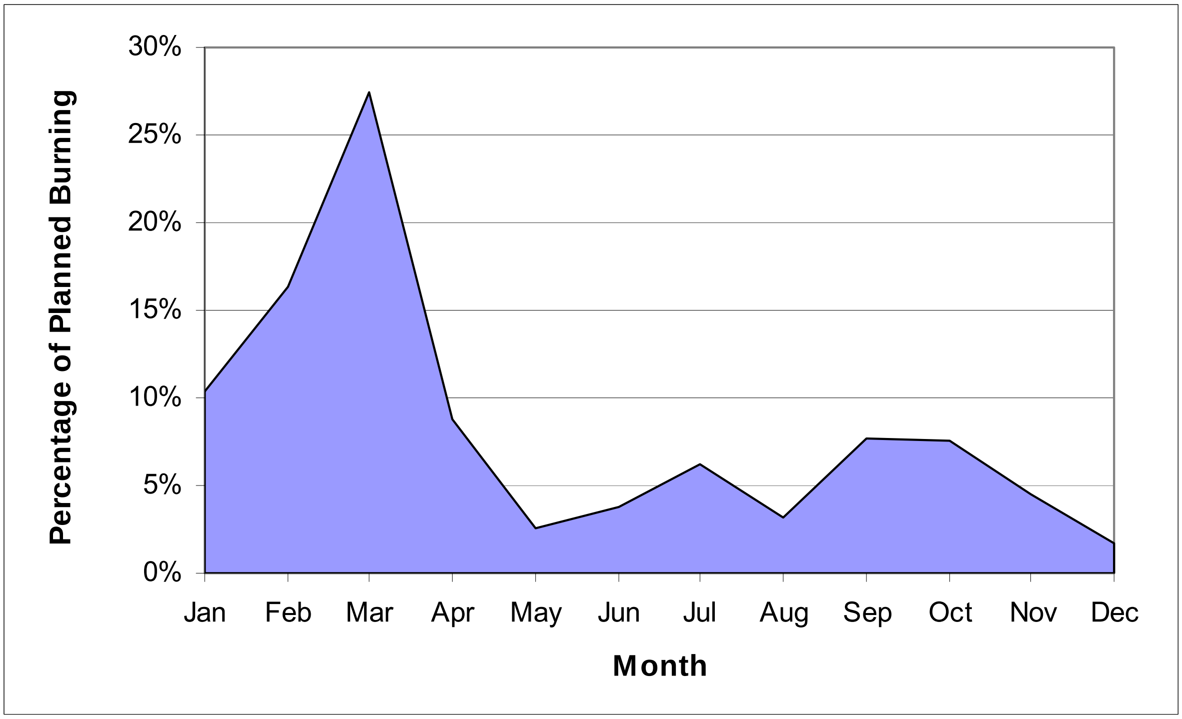

Figure ES-3. Monthly variability in total emissions for the CENRAP region.

The planned burning emission inventory and speciated $PM_{2.5}$ data from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network stations located in Class I areas in the CENRAP region were used to investigate the influence of smoke on ambient $PM_{2.5}$ concentrations and whether individual burns can be detected in the air quality data of Class I areas. The emission inventory and IMPROVE data were utilized to better understand the extent to which prescribed burning affects visibility in the CENRAP region. This preliminary analysis showed that, while influence from specific burns could be seen in the monitoring data on select days when the meteorology was conducive, ammonium sulfate (a species that does not result from burning) was the dominant constituent of the $PM_{2.5}$ mass and visibility reduction, particularly on the 20% worst visibility days of the year, for the sites analyzed.

1. INTRODUCTION

The Central States Regional Air Planning Association (CENRAP) is researching visibility-related issues for its region, which includes the states of Texas, Oklahoma, Louisiana, Arkansas, Kansas, Missouri, Nebraska, Iowa, and Minnesota, and is developing a regional haze plan in response to the U.S. Environmental Protection Agency's (EPA) mandate to protect visibility in Class I areas.[1] In order to develop an effective regional haze plan, the CENRAP ultimately must develop a conceptual model of the phenomena that lead to episodes of low visibility in the CENRAP region. Episodic combustion events (such as agricultural burning, prescribed burning, open burning of wastes, structural fires, and wildfires) sometimes contribute to regional or local haze events in the CENRAP region. Therefore, it is important to develop the emissions data necessary to assess the impacts of these events on visibility in the CENRAP region.

In support of the CENRAP's need to develop a regional haze plan, Sonoma Technology, Inc. (STI) conducted CENRAP Work Assignment Number 02-0214-RP-003-002 "Research and Development of Emission Inventories for Planned Burning Activities for the Central States Regional Air Planning Association". Consistent with the project goals presented in the Work Plan (Coe, 2003b), emissions were calculated for agricultural and prescribed burning on federal, state, tribal, and private lands.

1.1 BACKGROUND AND KEY ISSUES

1.1.1 Fine Particulate Matter Concentrations and Impaired Visibility in Class I Areas

Regional haze is visibility impairment caused mainly by particles of less than 2.5 microns in diameter ($PM_{2.5}$). $PM_{2.5}$ may be directly emitted from emissions sources, such as sources of fugitive dust and combustion soot, which are termed sources of "primary $PM_{2.5}$". Additional mechanisms also occur allowing $PM_{2.5}$ to be formed in the atmosphere, and this phenomenon is termed "secondary formation". Examples include condensable organic aerosols which can form from air emissions of semi-volatile and heavy organic compounds and $PM_{2.5}$ that can form from photochemical reactions of gaseous precursors, including sulfur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOC), and ammonia (NH_3).

Analyses of speciated $PM_{2.5}$ samples provide an understanding of the types of emission sources that contribute to regional haze issues in different areas, as depicted in **Figure 1-1**. In urban and ammonia-depleted areas of the eastern United States, secondary sulfate contributes a more significant amount of $PM_{2.5}$ than it does in the western United States. Conversely, secondary nitrate is more important in urban and ammonia-rich areas of the western United States than it is in eastern areas. In both the eastern and western United States, the carbonaceous fraction of $PM_{2.5}$ is significant in urban areas. In rural areas, geologic dust can also be an important contributor to $PM_{2.5}$.

[1] Class I lands include areas such as national parks, wilderness areas, and national monuments. These areas have been granted special air quality protections under the Federal Clean Air Act.

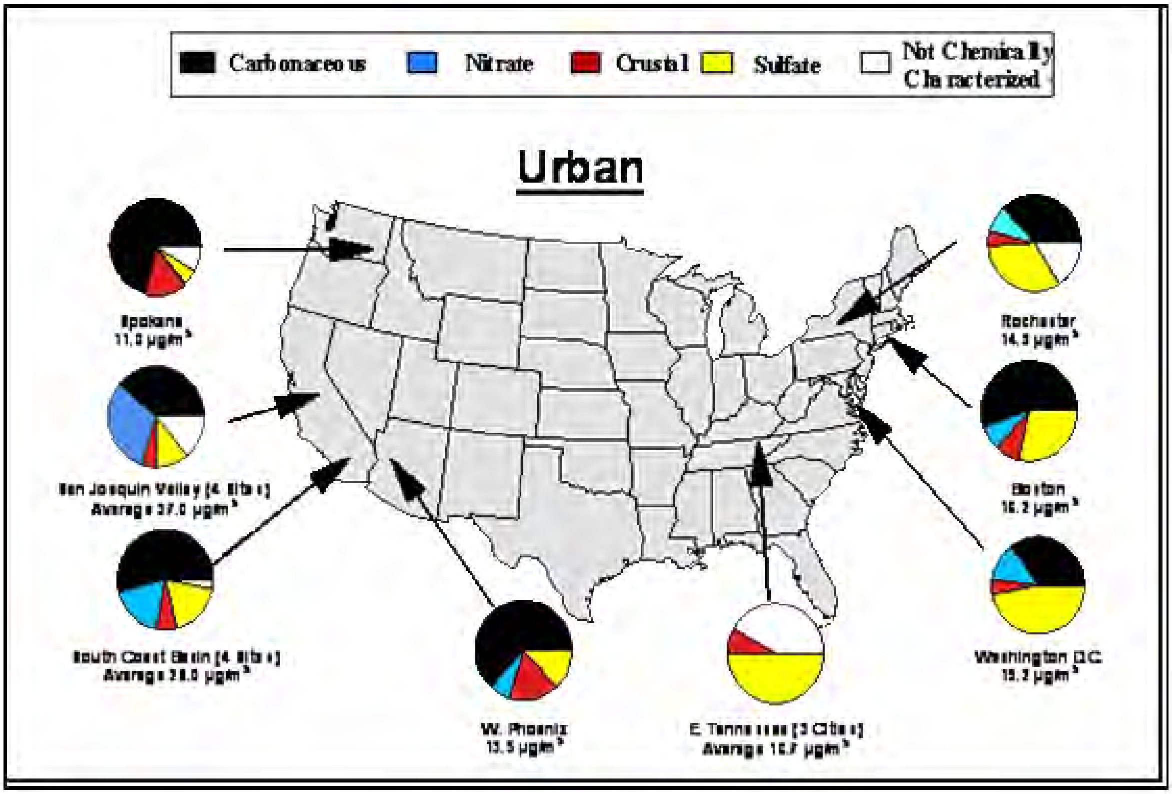

Figure 1-1. Compositions of annual average concentrations of $PM_{2.5}$ observations in urban locations (U.S. Environmental Protection Agency, 1998).

Of particular interest in the CENRAP region is the contribution of $PM_{2.5}$ from wood and grassland burning to visibility impairment in Class I areas. Smoke from these fires emit organic carbon (OC) and elemental carbon (EC); the latter is sometimes referred to as soot or black carbon (BC). OC comes from many sources, both combustion and evaporative, while EC only originates from combustion sources, such as fossil fuel combustion (power plants, car exhaust, etc.) or woodland or grassland burning. Potassium (K) is also emitted during burning of natural materials and can be used as a marker for woodland or grassland burning.

1.1.2 Status of Existing Planned Burning Inventories

Historically, few areas of the CENRAP region have experienced significant air quality problems and, therefore, have not been required to perform air quality monitoring or develop emission inventories. The most comprehensive source of emissions estimates currently available for the region is the EPA's National Emissions Inventory (NEI), which is used as the basis of the EPA's National Emission Trends (NET) document series and analyses. On a state level, emission inventories of burning activities have been prepared by Dennis et al. (2002) for Texas. In the NEI, estimates of $PM_{2.5}$ emissions from planned burning activities in the CENRAP region amount to 110,000 tons per year, or about 9% of the total $PM_{2.5}$ inventory for the region (see **Table 1-1**). The NEI indicates that planned burning emissions are particularly significant in the states of Louisiana and Texas.

Table 1-1. 1999 NEI estimates of $PM_{2.5}$ emissions in the CENRAP region.

State	$PM_{2.5}$ (tons)		Percent
	All Sources	Planned Burning	
Arkansas	91,294	6,735	7.4%
Iowa	108,641	402	0.4%
Kansas	158,521	9,502	6.0%
Louisiana	94,522	34,099	36.1%
Minnesota	163,542	2,874	1.8%
Missouri	183,245	1,147	0.6%
Nebraska	131,486	2,576	2.0%
Oklahoma	149,015	7,137	4.8%
Texas	223,427	45,748	20.5%
Total	1,303,694	110,220	8.5%

As part of its research into regional haze, CENRAP has decided to conduct comprehensive air quality modeling of visibility in 2002. To support this modeling, a bottom-up planned burning emission inventory, which incorporated year-2002-specific fire history data and addressed the uncertainties of the NEI (see below) is required.

Some uncertainties are inherent to the NEI:

- Prescribed burning activities fluctuate dramatically from year to year. Fluctuations are due to policy decisions about the need for wildfire risk management, current climate conditions (drought versus wet conditions), and densities of undergrowth and fuel. Because of these wide fluctuations, emission inventories of prescribed burning are nearly impossible to predict or project on the basis of historical inventories or trends.
- The NEI is estimated on an annual average basis. Regional haze has a seasonal character and is partly driven by photochemical processes. Adjustments are necessary to develop seasonal, diurnal, and, possibly, day-of-week emission estimates.

To support modeling sensitivity runs, measures of uncertainty for all emission estimates are highly valuable for policy decisions and prioritization of future research efforts. To the extent possible, we provide estimates of uncertainty for emissions associated with planned burning activity data that were gathered for this project.

1.2 CURRENT STATUS OF THE CENRAP EMISSION INVENTORY

As detailed in the attached Methods Document (Appendix A), emissions estimates were prepared for prescribed and agricultural burning activities on federal, state, tribal, and private lands in the CENRAP region. These “bottom up” estimates were prepared by using the First-Order Fire Effects Model (FOFEM), emission factors and fuel loadings gathered from published literature, geographic information systems (GIS) databases of land cover and vegetation, and activity data gathered through telephone surveys.

The FOFEM model, a computing tool developed through the Joint Fire Science Program (JFSP), was used to generate estimates of fuel loadings and emission rates for prescribed burns. FOFEM was run for local vegetation types using fuel moisture inputs from the Weather Information Management System (WIMS), a database of daily weather observations gathered from about 1500 fire weather stations throughout the United States. Outputs from FOFEM were then used in conjunction with prescribed burning history information to calculate emissions.

For agricultural burning, emission factors and fuel-loading factors for a variety of crop types are available in the EPA's guidance document, "Compilation of Air Pollutant Emission Factors (AP-42)" (U.S. Environmental Protection Agency, 2003) and from Jenkins et al. (1996). From these sources, we identified fuel loading factors and emission factors for a wide variety crop types and applied these factors to county-specific agricultural burning activity data to generate emissions estimates. The activity data were obtained through systematic telephone surveys of county agricultural extension services (AES).

For both prescribed and agricultural burning activities, the EPA's Biogenic Emissions Landcover Database (BELD) Version 3 (U.S. Environmental Protection Agency, 2001) was used to generate spatial distributions of vegetation types, which in turn were used to select vegetation-specific fuel loading factors output by FOFEM. To do this, cross-walks were established to link the vegetation types in the BELD database with (a) vegetation types in FOFEM and (b) crop types for which emissions factors and fuel loadings are available.

Once a map of vegetation and crop types was developed, we overlaid histories of planned fires, identified the vegetation types associated with each fire occurrence, and applied emission factors generated through FOFEM or acquired from literature to produce county-level emission inventories of agricultural and prescribed burning.

The resulting emission inventory is illustrated in **Figures 1-2 and 1-3** and tabulated in Appendix B. In all cases, we applied generally accepted emission factors and the most complete and up-to-date activity data sets that could be identified and acquired. However, we acknowledge that available emission factors are uncertain and they continue to be the subject of research.

The emission source type in the inventory that we qualitatively consider to contribute the greatest degrees of uncertainty to the total estimated emissions is prescribed burning on privately-held lands performed by the forestry industry. Since new information will be needed to reduce uncertainties in the future, we have provided the CENRAP with an inventory and system of data files that can be updated with revised emission factors and activity data as new information becomes available (see Appendix D).

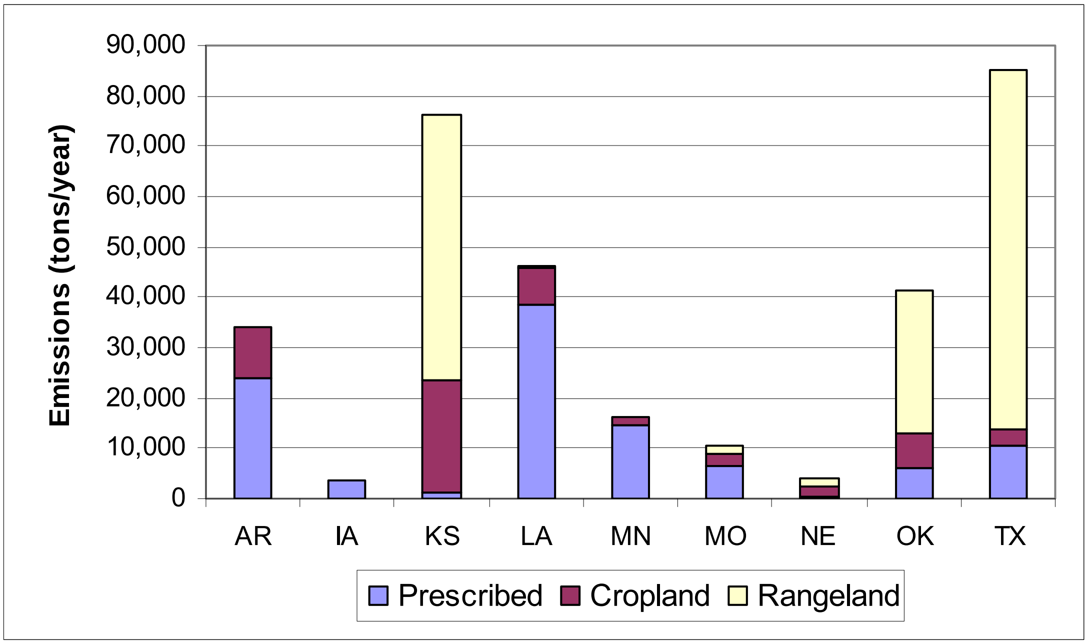

Figure 1-2. Total annual $PM_{2.5}$ emissions by type of planned burning for each state in the CENRAP region.

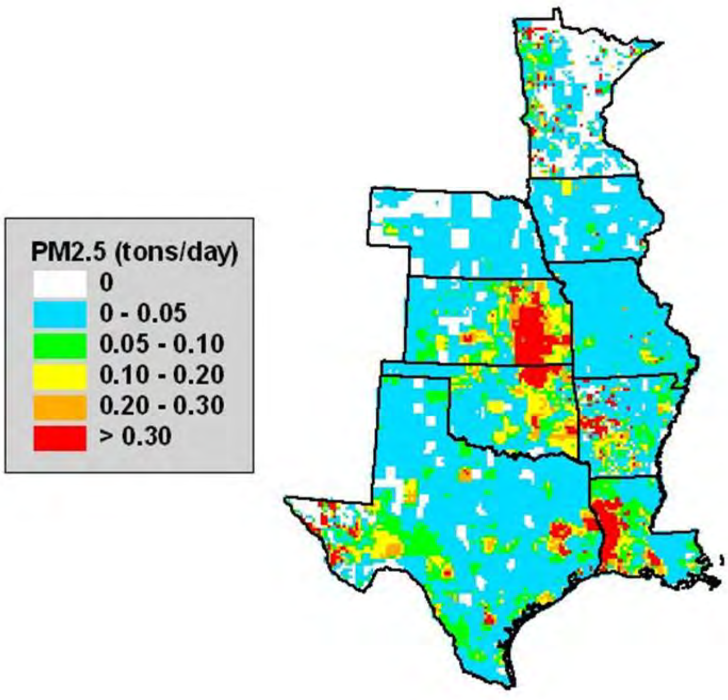

Figure 1-3. Example map of daily emission densities for the CENRAP region (for April 10, 2002).

2. SUMMARY AND ASSESSMENT OF THE INVENTORY

STI calculated emissions as detailed in Appendix A, Emission Estimation Methods for the CENRAP Planned Burning Emission Inventories, with results tabulated in Appendix B, Tabulation of Planned Burning Emissions Estimates for the CENRAP Region. In addition, STI carried out quality assurance procedures as provided in the Quality Assurance Plan and as detailed in this section. In summary, the most important source categories are estimated to be rangeland burning and prescribed burning on publicly managed lands. Total emissions vary seasonally by a factor of three, with peaks occurring in the spring and fall. Prescribed burning performed on privately held lands by the forestry industry is considered to be the greatest source of uncertainty in the overall inventory.

2.1 EMISSIONS FROM PRESCRIBED BURNING

2.1.1 Summary of Emissions from Prescribed Burning

Emission estimates were generated for prescribed burning activities on federal, state, tribal, and private lands. Over one million acres were burned in prescribed fires in 2002 in the CENRAP region, with consequent $PM_{2.5}$ emissions of over 100,000 tons and emissions of precursors as shown in **Table 2-1** and **Figure 2-1**.

Table 2-1. 2002 acres burned and emissions (tons) for prescribed burning in CENRAP states.

STATE	Acres Burned	PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2	NH_3	VOC
Arkansas	244,146	28,130	23,838	302,219	1,961	1,577	2,910	17,444
Iowa	21,449	4,072	3,457	44,542	166	195	257	2,547
Kansas	38,106	1,450	1,226	14,424	228	114	143	881
Louisiana	350,353	45,288	38,376	486,668	3,125	2,531	4,671	28,060
Minnesota	86,642	17,222	14,609	187,853	742	836	1,150	10,740
Missouri	64,781	7,460	6,338	80,019	536	417	756	4,633
Nebraska	6,127	410	347	4,316	36	24	27	254
Oklahoma	104,749	7,322	6,196	76,615	750	479	769	4,507
Texas	137,310	12,669	10,732	134,423	1,071	757	1,427	7,824
Total	1,053,663	124,023	105,119	1,331,080	8,615	6,929	12,111	76,889

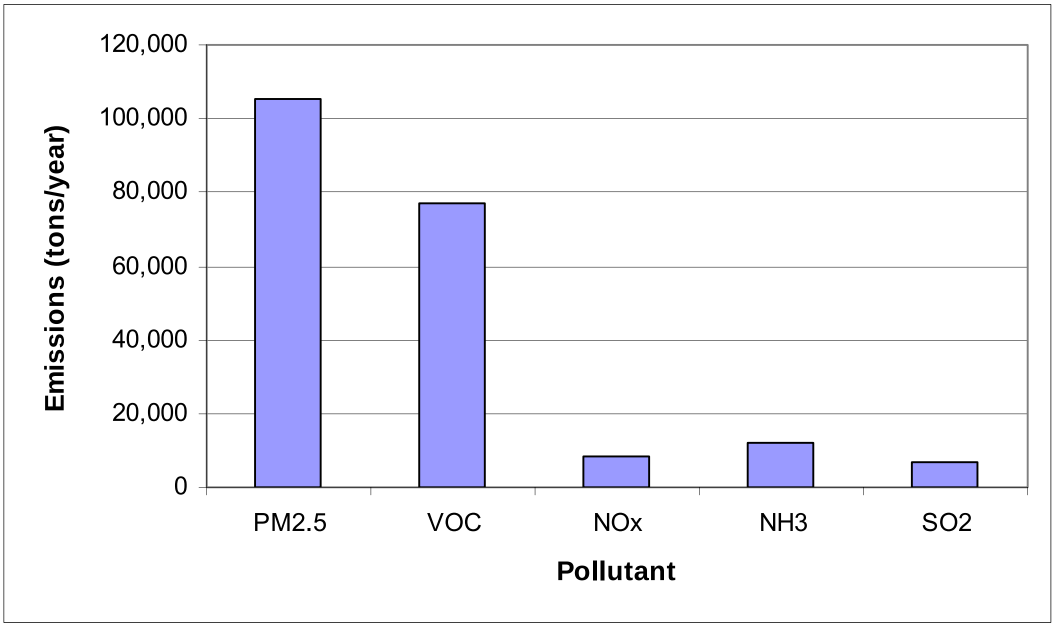

Figure 2-1. Annual prescribed burning emissions by pollutant.

Whenever possible, the exact location, start date, duration of burn, and size of burn incidents were acquired so that emissions from these incidents could be allocated spatially and temporally. The areas and locations of prescribed burn incidents were assigned to their individual centroids.[2] Prescribed burn activities that were reported as incidents (with date, duration, and area) were treated as point sources. Approximately 40% of the prescribed burning inventory was allocated spatially and temporally as point sources. Emissions from the remaining prescribed burning activities were treated as area sources. States that were able to provide "incident-level" databases of prescribed burn activity included Arkansas, Minnesota, and eastern Oklahoma.

The level of prescribed burning activities varied from state to state, as illustrated in **Figures 2-2 and 2-3**. Land managers in Arkansas and Louisiana conducted the most planned burning, and land managers in Minnesota and Texas were the second most active; only limited prescribed burning activity occurred in the states of Iowa, Kansas, and Nebraska.

The seasonal variability of prescribed burning emissions follows a bimodal pattern, with a large peak in spring and a smaller peak in fall. Factors that influence the seasonal variability of burning include weather conditions, fuel moisture content, and the intended environmental consequences of the burn (Dixon et al., 1989). Analysis of fire history records showed that all CENRAP states except Minnesota followed a similar seasonal pattern for prescribed burning. The longer winters in Minnesota delay the spring peak from March to May, while fall-season prescribed burns in Minnesota occur primarily in September rather than being spread evenly over the later summer and fall months as they are in the other states (see **Figure 2-4**).

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[2] Use of centroids to allocate burns was considered acceptable because the burn areas are typically much smaller in size than the grid resolution of the CENRAP's modeling grid.

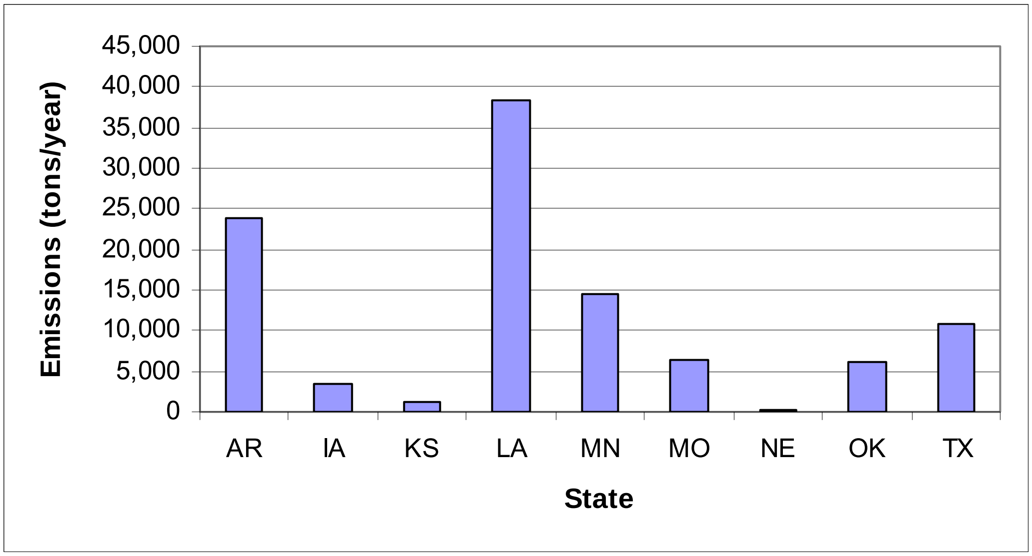

Figure 2-2. Annual prescribed burning $PM_{2.5}$ emissions by state.

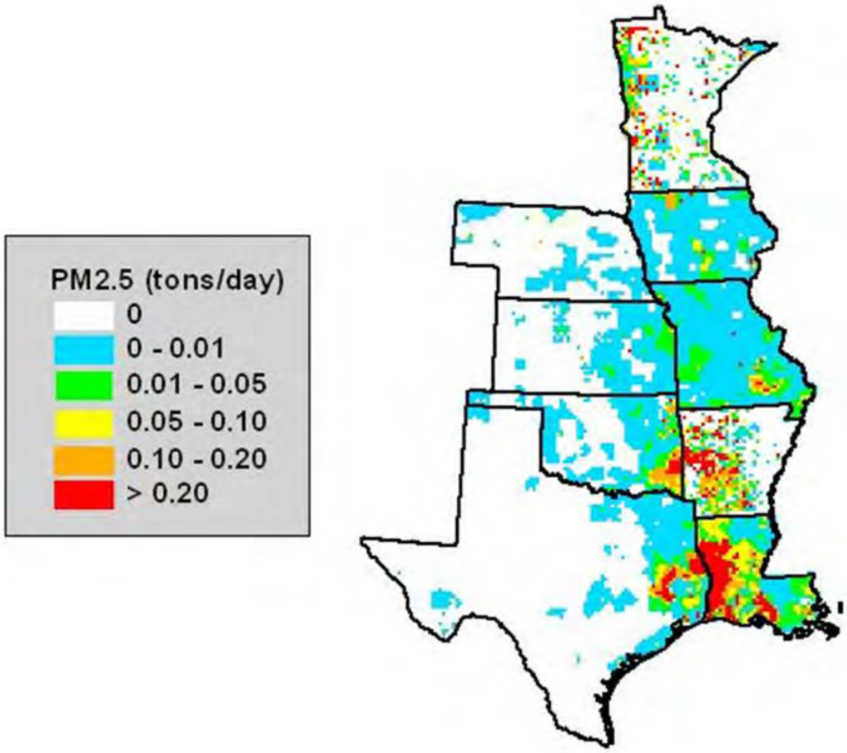

Figure 2-3. Example map of daily $PM_{2.5}$ emissions from prescribed burning (for April 10, 2002).

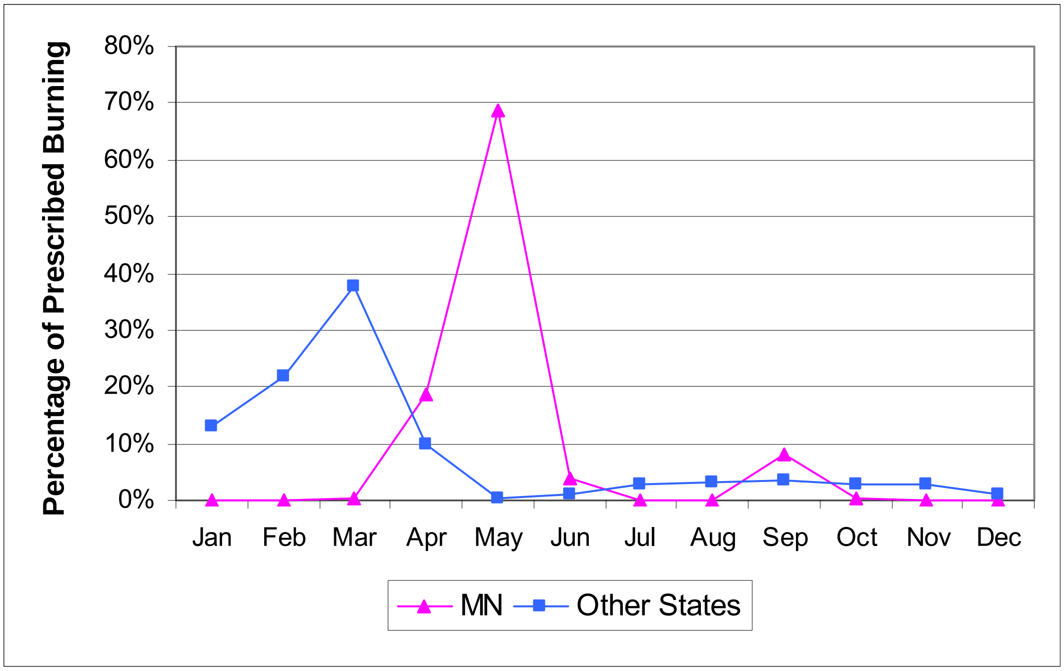

Figure 2-4. Monthly variation in emissions from prescribed burning.

2.1.2 Assessment of Prescribed Burning Emissions

The "bottom up" activity data gathered for the prescribed burning portion of this inventory improved the reliability of the emissions estimates. Virtually all of the burn records for federal lands (and some state burns) include fire date and location information that allows for the use of day-specific fuel moisture settings in calculating emission factors. Location information also enabled these burns to be treated as point sources for spatial allocation purposes.

As shown in Figure 2-3, emissions from prescribed burning are most significant in the region from western Arkansas/Louisiana to eastern Texas/Oklahoma. This is to be expected because prescribed burning is more widely practiced in the southern United States than in other areas (Cleaves et al., 1998). Moreover, the estimate of 137,310 acres burned on wildlands in Texas is within the range of prescribed burning estimates made for that state in 1996 and 1997, when 63,790 acres and 160,890 acres were burned, respectively (Dennis et al., 2002).

Prescribed burning accounts for about 30% of the annual planned burning $PM_{2.5}$ emissions in the CENRAP region. However, emissions from this source category actually exceed those from agricultural burning for five states: Arkansas, Iowa, Louisiana, Minnesota, and Missouri. When only those states are considered, prescribed burning accounts for about 80% of the annual planned burning $PM_{2.5}$ emissions.

Areas of uncertainty related to prescribed burning emissions estimates arise from differences in how fire activity is tracked and reported in each state. For example, for Arkansas, Minnesota, and the northeastern portion of Oklahoma, fire data is available at an "incident

level," meaning a fire's date and location were listed in each fire history record. However, other states did not track this level of detail, instead reporting fire data by region and month, for example. In these cases, individual fire events could not be treated as point sources, and the geographic and temporal resolution of the final inventory was limited as a result.

Differences from state to state are even more pronounced for burns occurring on privately held lands. Such burns are performed by individuals, private companies, and organizations such as TNC and the Audubon Society. However, permitting or reporting requirements are not consistent among the nine CENRAP states, and few stable were able to provide us with reliable data on these burns.[3] Persistent attempts were made to contact private companies and organizations, but only TNC was able to provide burn data within the time limits of this project. It should be noted, though, that most burns on private lands are likely to be related to agriculture or waste management (such as the burning of logging residue by forestry companies or pile burns by land developers) (Altman, 2004; Miedtke, 2004). The former types of burns are covered by the agricultural survey, while the latter burns are not included in the scope of this project.

2.2 EMISSIONS FROM AGRICULTURAL BURNING

2.2.1 Summary of Emissions from Agricultural Burning

Emission estimates were generated for agricultural burning activities on private rangeland and cropland in each of the CENRAP states. It was determined that agricultural burning resulted in the burning of about 13 million acres in 2002 in the CENRAP region, with consequent $PM_{2.5}$ emissions of over 200,000 tons (see **Table 2-2**).

Table 2-2. 2002 acres burned and emissions (tons) for agricultural burning in CENRAP states.

STATE	Acres Burned	PM_{10}	$PM_{2.5}$	NO_x	SO_2	NH_3	VOC
Arkansas	655,307	10,771	10,227	3,692	637	2,100	6,254
Iowa	2,247	44	42	5	1	4	20
Kansas	5,015,790	99,170	75,057	29,094	10,937	11,436	54,884
Louisiana	486,441	8,384	7,888	3,845	609	2,453	7,066
Minnesota	101,925	1,944	1,729	358	69	248	1,155
Missouri	290,978	4,958	4,314	1,907	520	693	2,500
Nebraska	215,526	4,647	3,609	643	244	553	2,950
Oklahoma	2,303,359	45,231	35,228	18,645	6,653	5,124	23,992
Texas	3,798,581	104,709	74,393	13,647	8,725	12,573	63,396
Total	12,870,154	279,858	212,486	71,836	28,395	35,185	162,218

[3] Exceptions include the state of Arkansas, which was able to provide a database of virtually all burns in the state larger than 5 acres, including those occurring on private lands. The same was true for a 15-county region of Oklahoma that requires burn permits. The state of Minnesota also requires permits for all prescribed burning activities (including private burns), but does not keep centralized records of these burns.

Emissions from agricultural burning contribute 70% to total planned burning estimated $PM_{2.5}$ emissions for the CENRAP region, ranging from 1% to 99% of total planned burning emissions from state to state. The most important crop/land use types are rangeland (especially in the states of Texas, Oklahoma, and Kansas) and wheat (especially in the states of Kansas, Oklahoma, and Arkansas), although sugarcane burning is significant in the state of Louisiana. **Figures 2-5 and 2-6** illustrate the overall emission levels by state and the relative importance of each crop type in each state, and **Figure 2-7** shows the geographic allocation of agricultural burning emissions throughout the CENRAP region.

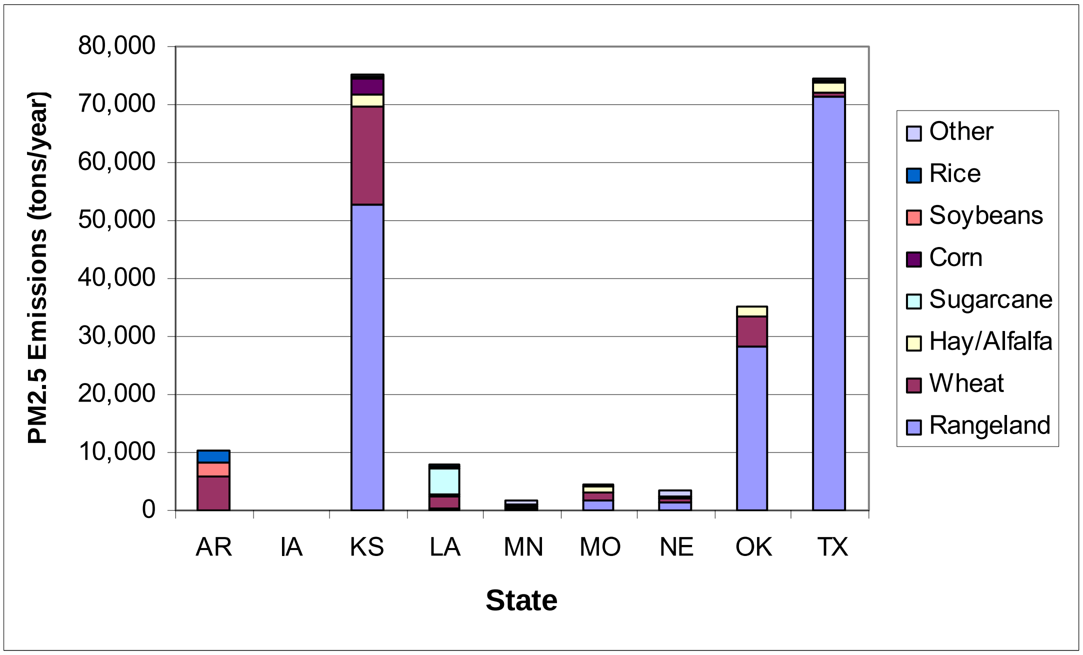

Figure 2-5. $PM_{2.5}$ emissions from agricultural burning by state.

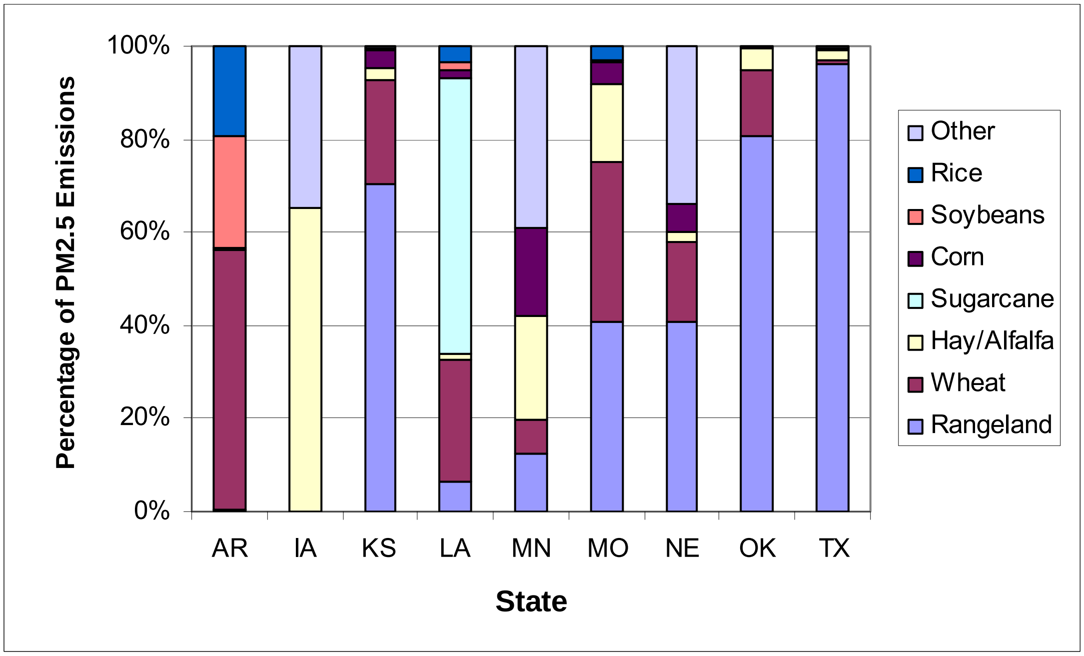

Figure 2-6. Percent contribution by crop type to state $PM_{2.5}$ emissions from agricultural burning.

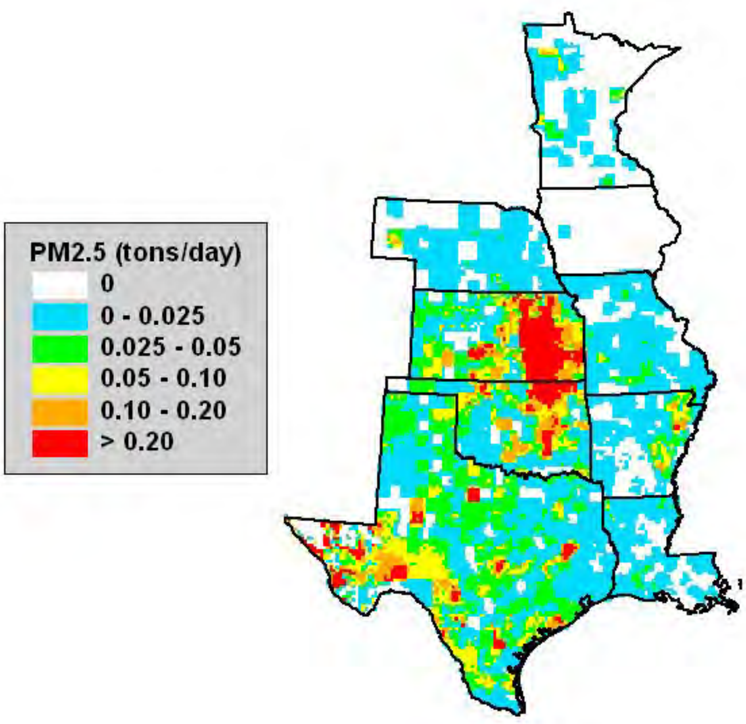

Figure 2-7. Example map of daily agricultural burning emissions (for April 10, 2002).

Emissions from agricultural burning tend to follow a bimodal pattern of seasonal variability, with large peaks in the spring and smaller peaks in the fall (see **Figure 2-8**). For most states, the month with the highest emissions from agricultural burning is March, although northern states like Minnesota and Iowa show a spring peak in May. For Arkansas and Louisiana, the highest emissions occur in September and October, respectively, which is due to the large acreages of winter wheat (Arkansas) and sugarcane (Louisiana) burned in those states.

2.2.2 Assessment of Emissions from Agricultural Burning

The "bottom up" survey data gathered for the agricultural burning portion of this inventory made it possible to generate emissions estimates that take into account county-level burn practices for each CENRAP state, including information on the timing of burns and the techniques used to burn individual crops.

This study indicates that agricultural burning practices vary widely from state to state and even county to county. For example, 54 of the 56 counties surveyed in Iowa reported no agricultural burning, as did 50 of the 77 counties surveyed in Minnesota. Among states that do burn extensively, practices vary by crop type. The survey indicates that burning is widely used to destroy wheat stubble in Arkansas, as over 40% of that crop is burned each year. By contrast, no other state that grows significant amounts of wheat burns more than 15% of the crop annually.

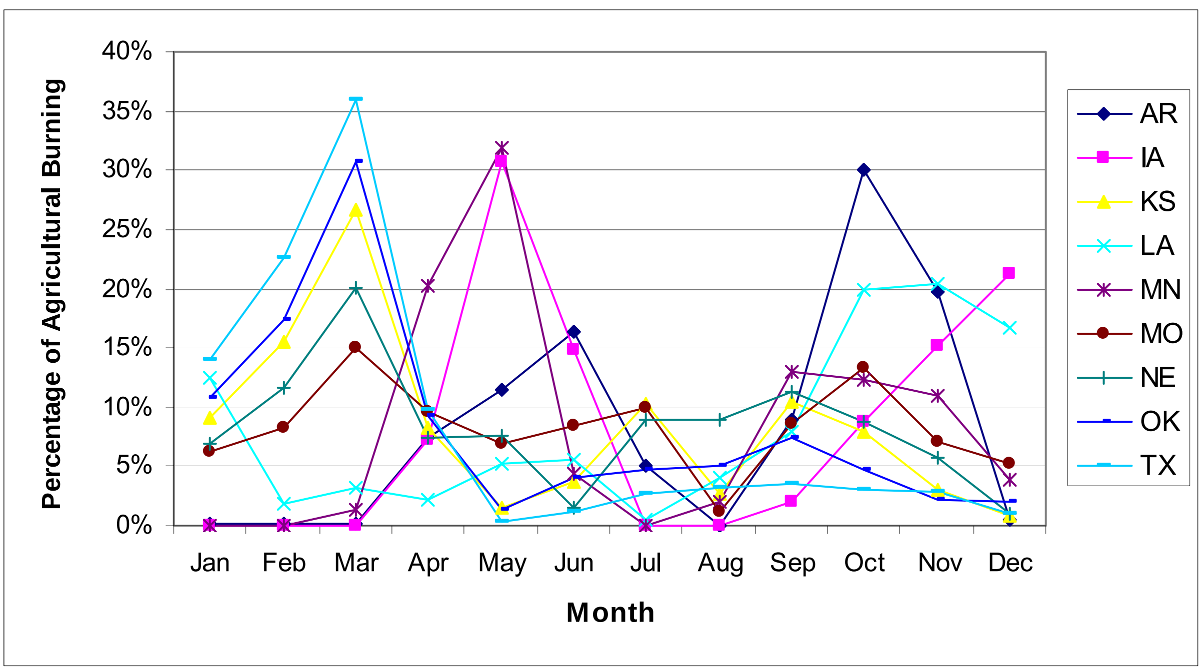

Figure 2-8. Monthly variation in emissions from agricultural burning by state.

It is also important to note that while agricultural burning accounts for about 70% of the annual $PM_{2.5}$ emissions from planned burning activity for the CENRAP region as a whole, almost 90% of the agricultural burning emissions occur in three states: Texas, Oklahoma, and Kansas. Moreover, about 70% of all agricultural burning emissions in the CENRAP states result from the burning of rangeland in these three states.

Uncertainties related to agricultural burning emissions result largely from an incomplete understanding of local regulations pertaining to such burning. For example, several states with a significant number of counties including Iowa, Minnesota, Nebraska, and Missouri reported no agricultural burning. These reports of no burning may be due to local restrictions on agricultural burning or other factors. Also, survey responses for each state were extrapolated to generate a statewide burn profile by crop type, and these profiles were used to represent all counties for which no survey data were available. However, further investigation is necessary to determine if burn practices vary within individual states enough to warrant subdividing certain states into regions.[4]

2.3 MISCELLANEOUS BURNING SOURCE CATEGORIES

Several subcategories of miscellaneous prescribed burning occur within the CENRAP region. Most of these burn types relate to the disposal of waste materials and, therefore, were not included in the final emissions inventory. However, some information on these burns was gathered during the course of the project and is summarized below.

<u>Slash and Site Preparation Burning</u>

Slash burning is typically used to dispose of logging residue produced by the harvesting or trees and, as such, is most often practiced by private timber companies. Based on employment estimates for the logging industry (U.S. Census Bureau, 2003), states in the CENRAP domain that produce significant amounts of timber are Arkansas, Louisiana, Minnesota, and Texas (see **Table 2-3**).

Table 2-3. 2001 logging industry employment by state.

State	Number of employees
Arkansas	2,914
Iowa	175
Kansas	65
Louisiana	3,325
Minnesota	1,019
Missouri	378
Nebraska	65
Oklahoma	281
Texas	2,227

[4] A subregional approach was used for wheat and rangeland burning in the state of Kansas, and such an approach may be applicable to other states/crop types.

To illustrate the relative significance of slash burning, Allen & Dennis (2000) report 55,000 acres of logging-related slash burning in Texas during 1997, about 3% of the total planned burning acreage for that year. In the fire history data obtained by STI (which mostly pertains to burning on publicly-managed lands), very few burns were identified as slash burns—amounting to 400 acres in Minnesota and less than 5 acres in Oklahoma and Iowa (no other states identified burns as slash).

Additionally, the state of Arkansas reports 50,000 acres of "site preparation burning," which are burns largely conducted by the timber industry to prepare lands for reforestation. It is likely that some of these burns involve slash fuels, though fuel model information was not tracked in the Arkansas database. Similarly, significant numbers of site preparation burns were included in the data we received from the state of Minnesota, though these burns were not identified as such (Miedtke, 2004).[5] Note for both Arkansas and Minnesota, these burns were included in the inventory but not assigned the higher fuel loadings that would be associated with slash fuels.

Pile Burning

As the name suggests, "pile" burning involves disposing of waste material by gathering the material into piles and burning it. Types of waste material include leaves and yard waste, logging residue, and brush or trees cleared from land for development purposes. With the exception of the state of Oklahoma, very few pile burns were included in the data provided to STI. For Oklahoma, a 15-county region in the northeastern part of the state that requires burn permits reported 180 incidents of leaf burning and 570 incidents of brush pile burning for 2002 (750 total). However, no data were provided on the sizes of these burns. The state of Minnesota also requires permits for private burns, and approximately 60,000 such permits were issued in 2002. It was estimated that 65% (39,000) of these permits would correspond to either pile burns or ditch/fencerow burns (covered in the next section), with the remaining 35% largely represented by burns on open land and rangeland that would be captured by the agricultural survey (Meadows, 2004).

To roughly estimate the possible emissions resulting from pile burns in Oklahoma and Minnesota, a fuel loading for a sizeable[6] pile burn published by the California Air Resources Board (2003) and emission factors published by the U.S. Environmental Protection Agency (2003) were applied to the number of pile burns in those states. (It was assumed that half of the 39,000 permits referenced above were for pile burns, and the 750 pile burns in Oklahoma were multiplied by 5 to extrapolate from 15 counties to all 77 counties in the state). $PM_{2.5}$ emissions were estimated as follows:

$$\text{OK: } PM_{2.5} = (750 \text{ x } 5) \text{ piles x } \frac{1.36 \text{ tons}}{\text{pile}} \text{ x } \frac{14 \text{ lbs - } PM_{2.5}}{\text{ton}} \text{ x } \frac{\text{ton}}{2000 \text{ lbs}} = 36 \text{ tons}$$

[5] Personnel at the Minnesota Dispatch of the National Interagency Fire Center estimated that 75% of the site preparation burning in Minnesota was included in the data provided to STI. Site preparation burns not included in the data set would be those conducted by private landowners or companies.
[6] Fuel loadings for a burn 12 feet in diameter and 8 feet high were used.

$$\text{MN: } PM_{2.5} = (39{,}000 / 2)\text{ piles x } \frac{1.36\text{ tons}}{\text{pile}} \text{ x } \frac{14\text{ lbs - }PM_{2.5}}{\text{ton}} \text{ x } \frac{\text{ton}}{2000\text{ lbs}} = 186\text{ tons}$$

For Oklahoma and Minnesota, these pile burns represent only 0.1% and 1.1%, respectively, of the $PM_{2.5}$ emissions already included in the planned burning inventory for these states. Pile burns in other states cannot be characterized with the data currently available.

Ditch and Fencerow Burning

Fires are sometimes used for weed abatement purposes along roadsides and fencerows. In the data obtained by STI, no individual fires were identified as ditch or fencerow burns, and because such fires are generally small in scale and practiced by private parties, it is likely that few such burns are included.

The only state where some assessment of these burns appears to be possible is Minnesota. As previously stated, approximately 39,000 of the 60,000 burn permits issued in that state each year are for pile burns and ditch/fencerow burns. To provide a rough estimate of emissions from this source, it was assumed that half these 39,000 burns were ditch burns, and that each burn covered 0.25 acres (Meadows, 2004). Using emission factors published by the U.S. Environmental Protection Agency (2003), $PM_{2.5}$ emissions were estimated as follows:

$$PM_{2.5} = (39{,}000 / 2)\text{ burns x } \frac{0.25\text{ acres}}{\text{burn}} \text{ x } \frac{1\text{ ton}}{\text{acre}} \text{ x } \frac{15\text{ lbs - }PM_{2.5}}{\text{ton}} \text{ x } \frac{\text{ton}}{2000\text{ lbs}} = 37\text{ tons}$$

This estimate amounts to only 0.2% of the 16,000 tons of $PM_{2.5}$ already included in the planned burning inventory for Minnesota. Ditch and fencerow burns in other states cannot be characterized with the data currently available.

3. SUMMARY AND ASSESSMENT OF THE AIR QUALITY DATA ANALYSIS

3.1 OBJECTIVE AND APPROACH

The objective of this analysis was to use ambient speciated $PM_{2.5}$ data from Class I areas (from the Interagency Monitoring of Protected Visual Environments [IMPROVE] network) in the CENRAP states along with the planned burning emissions estimated in this study to assess whether ambient data can be used to identify planned burning contributions to visibility events in Class I areas, and to perform a preliminary assessment of the impact of planned burns on $PM_{2.5}$ and visibility at a few monitoring sites. The following approach was employed:

- Assess the seasonal chemical compositions of $PM_{2.5}$ mass and aerosol light extinction to determine what individual species are important to the mass and visibility extinction in the area.
- Determine seasonal concentrations of and ratios between selected species, such as OC, EC, and K, to establish a "baseline" average seasonal composition for comparison to days of poor visibility and days potentially influenced by prescribed burning.
- Assess chemical compositions of $PM_{2.5}$ and aerosol light extinction on the 20% best and 20% worst visibility days to determine what species have a large impact on visibility (i.e., are species from burning typically important in visibility reduction?).
- Analyze IMPROVE data, specifically OC, EC, and K concentrations, on dates when extensive burning occurred near a monitoring site in order to assess whether wood smoke influences are seen in the ambient measurements and significantly impact visibility.
- Analyze emissions data on days when elevated OC, EC, and K concentrations occurred at IMPROVE sites to determine whether days of elevated concentrations corresponded to known burns in the emission inventory data.
- Analyze air mass trajectories on selected days to determine whether meteorology (i.e., transport) explains the observed effects and to determine the extent to which meteorology affects haze.

3.2 SUMMARY OF FINDINGS

Details on data, methodology, and results from this analysis are provided in Appendix C. This work yielded the following findings:

- Speciated $PM_{2.5}$ data can be used to determine influence from planned burns when the meteorology is conducive to transport from the burn area to a Class I site.
- Smoke constituents, specifically EC and K, were not a significant fraction of the $PM_{2.5}$ mass and light extinction, even on days when there was evidence of planned burning influence, at the sites examined in this preliminary study.
- Ammonium sulfate, which is not generated from burning, is the dominant constituent of the $PM_{2.5}$ mass and light extinction, especially on the 20% worst visibility days. This

finding is consistent with other work in the Midwest and CENRAP regions including studies of Big Bend National Park and Seney Wildlife Refuge.

- On some days, influences from known prescribed burns were seen, though they were generally less than 10% of the $PM_{2.5}$ mass and light extinction. Improved spatially and temporally resolved emission inventories and additional case studies may show different results.
- The specific influence of smoke on $PM_{2.5}$ mass and light extinction could be better quantified using additional analyses, including source apportionment.

4. RECOMMENDATIONS FOR FURTHER RESEARCH

This study provided an improved and updated emission inventory for planned burning in the CENRAP states for year 2002. Preliminary examination of ambient measurements along with the inventory generated in this study suggests that planned burning may contribute to visibility impairment at Class I sites in the CENRAP states. As noted in previous sections of this report, we identified the following significant sources of uncertainty (roughly in order of importance): (1) the extent of fires performed by the USFS on publicly managed lands, (2) the extent of prescribed burning on privately held lands performed by the forestry industry and organizations such as TNC, (3) a need to better understand county-level open burning regulations, and (4) the fuel loadings and emission factors used for planned burning emissions estimates—particularly for prescribed burning in the state of Minnesota. In this section, we provide recommendations for improving each of these aspects of the inventory and describe additional analyses that could be conducted to better quantify the influence of planned burning on visibility impairment.

4.1 RECOMMENDATIONS FOR IMPROVING PRESCRIBED BURNING ACTIVITY DATA

As discussed in Section 2.1.2, significant differences exist in the way fire activity data is tracked and reported in each state; some states (such as Arkansas and Minnesota) capture a fire's exact date and location coordinates, and other states track fires only by region and month. Encouraging individual states to maintain "incident level" databases of fire activity would allow all prescribed fires to be treated as discrete point sources and improve the geographic and temporal resolution of the inventory.

Also, differences from state to state are even more pronounced for burns performed on privately held lands by individuals, private companies, and organizations such as TNC and the Audubon Society. However, permitting or reporting requirements are not consistent among the nine CENRAP states, and few states were able to provide us with reliable data on these burns.[7] Persistent attempts were made to contact private companies and organizations, but only TNC was able to provide burn data within the time limits of this project. It is recommended that further efforts be made to survey private parties regarding their burn activities, especially in the Piney Woods region of eastern Texas, where private timber companies have conducted significant amounts of prescribed burning in past years (Allen & Dennis, 2000)[8].

It should be noted, though, that most burns on private lands are likely to be related to agriculture or waste management (such as the burning of logging residue by forestry companies

[7] Exceptions include the state of Arkansas, which was able to provide a database of virtually all burns in the state larger than 5 acres,--including those occurring on private lands. The same was true for a 15-county region of Oklahoma that requires burn permits. The state of Minnesota also requires permits for all prescribed burning activities (including private burns), but does not keep centralized records of these burns.

[8] For purposes of this inventory, acres burned in 1996 and 1997 by private timber companies in the Piney Woods region were averaged to produce an estimate of 20,000 acres per year.

or pile burns by land developers) (Altman, 2004; Miedtke, 2004). The former burns are covered by the agricultural survey, and the latter burns are not included in the scope of this project.

Finally, alternative and newly emerging data sources such as satellite data and related products recently developed by the National Oceanic and Atmospheric Administration (NOAA) should be explored to help characterize fire locations and day-specific activity levels.

4.2 RECOMMENDATIONS FOR IMPROVING AGRICULTURAL BURNING ACTIVITY DATA

As stated in Section 2.2.2 of this report, uncertainties related to agricultural burning emissions result largely from an incomplete understanding of local regulations pertaining to such burning. Several states, including Iowa, Minnesota, Nebraska, and Missouri, had significant numbers of counties that reported no agricultural burning. It is recommended that further investigation be undertaken to gain a fuller understanding of county-level open burning restrictions, as well as an estimate of how such restrictions are enforced. Further discussions with county AES, as well as with individual farmers, could be used to acquire this information.

Also, survey responses for each state were extrapolated to generate a statewide burn profile by crop type, and these profiles were used to represent all counties for which no survey data were available. For the state of Kansas, however, subregional burn profiles were developed for wheat and rangeland burning, and further investigation is needed to determine if burn practices across other states vary enough to warrant subdividing these states into regions for certain crop types.

4.3 RECOMMENDATIONS FOR IMPROVED FUEL LOADINGS AND EMISSION FACTORS

Emission factors are often a subject of research, and it is recommended that efforts be made to identify and incorporate improved emission factors related to prescribed and agricultural burning that are published in the future. Also, although the default fuel loading values by vegetation type contained in the FOFEM model were judged to be sufficiently representative of conditions in the CENRAP region, some effort should be made to study these fuel loadings further. During the course of this project, personnel at the USFS in Minnesota indicated that the default fuel loadings in FOFEM are regularly updated during the analysis of burns in that state. STI was provided with adjusted fuel loadings for several vegetation and fuel types, most of which were related to “blowdown” burns (the burning of vegetation after storms to reduce fire hazard). These altered fuel loadings resulted in $PM_{2.5}$ emission factors up to 70% higher than those calculated with FOFEM default loadings. When these adjusted emission factors were applied to 3700 acres of burns identified by USFS personnel as blowdown, the prescribed burning portion of the $PM_{2.5}$ inventory for Minnesota increased by about 5%.

4.4 RECOMMENDATIONS FOR ADDITIONAL AMBIENT DATA ANALYSIS

In addition to improvements to the emission inventory, additional analyses could be conducted to better quantify the influence of burns on visibility impairment:

- Apply similar analyses to additional IMPROVE sites, such as these in Kansas or Minnesota, to investigate whether results of this task are indicative of the influence of burns throughout the CENRAP region.
- Utilize continuous $PM_{2.5}$ in conjunction with meteorological data to determine what meteorological conditions may be responsible for changes in $PM_{2.5}$ concentrations.
- Apply source apportionment tools such as UNMIX or Positive Matrix Factorization (PMF) to quantify influence of specific source types at a site using 24-hr (i.e., IMPROVE, Speciated Trends Network [STN], etc.) or continuous speciated data (such as at Bondville or St. Louis). These tools can be used to identify individual sources such as diesel, wood burning, etc.

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APPENDIX A

EMISSION ESTIMATION METHODS FOR THE CENRAP PLANNED BURNING EMISSION INVENTORIES

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EMISSION ESTIMATION METHODS FOR THE CENRAP PLANNED BURNING EMISSION INVENTORIES

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QUALITY ASSURANCE STATEMENT

This report was reviewed and approved by the project Quality Assurance (QA) Officer or his delegated representative, as provided in the project QA plan.

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Project QA Officer

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1. INTRODUCTION

The Central States Regional Air Planning Association (CENRAP) is researching visibility-related issues for its region, which includes the states of Texas, Oklahoma, Louisiana, Arkansas, Kansas, Missouri, Nebraska, Iowa, and Minnesota, and is developing a regional haze plan in response to the U.S. Environmental Protection Agency's (EPA) mandate to protect visibility in Class I areas. In order to develop an effective regional haze plan, the CENRAP ultimately must develop a conceptual model of the phenomena that lead to episodes of low visibility in the CENRAP region. It is recognized that episodic combustion events (such as agricultural burning, prescribed burning, open burning of wastes, structural fires, and wildfires) sometimes contribute to regional or local haze events in the CENRAP region. Therefore, it is important to develop the emissions data necessary to assess the impacts of these events on visibility in the CENRAP region.

In support of the CENRAP's need to develop a regional haze plan, Sonoma Technology, Inc. (STI) developed emission inventories of episodic combustion events for the CENRAP region. Consistent with the project goals presented in the Work Plan (Coe, 2003), the scope of the inventories will be limited to agricultural and prescribed burning. Wildfires, structural fires and waste burning (such as the "slash" burning of logging residue) were not considered in the development of these inventories.

1.1 SUMMARY OF RECOMMENDED METHODS

To develop emission inventories of planned burning activities for the CENRAP region, we employed existing models and information: the First-Order Fire Effects Model (FOFEM), emission factors gathered from published literature, and Geographic Information Systems (GIS) databases of land cover and vegetation. In addition, we gathered new information through telephone and mail surveys.

FOFEM, a computing tool developed through the Joint Fire Science Program (JFSP), can be used to predict a variety of effects from fires on forested lands and rangelands, including air pollutant emissions, fuel consumption, tree mortality, and soil heating (Reinhardt et al., 2003; Reinhardt et al., 1997). For this project, the FOFEM model was used to generate estimates of fuel loadings and emission rates for prescribed burns. This data was then used in conjunction with prescribed burning history information (detailing the location, land type, season, and size of burn incidents) to calculate emissions from this source. Fire history data for prescribed burning on wildlands, publicly managed lands, tribal lands, and private lands were gathered from federal and state agencies, as well as some private organizations.

For agricultural burning, emission factors and fuel-loading factors for a variety of crop types have been published in the EPA's guidance document, "Compilation of Air Pollutant Emission Factors (AP-42)" (U.S. Environmental Protection Agency, 2003) and by Jenkins et al. (1996). From these sources, we identified fuel loading factors and emission factors for a wide variety crop types. These factors were applied to county-specific agricultural burning activity data to generate emissions estimates. This activity data was obtained through systematic telephone and mail surveys of county Agricultural Extension Services (AES).

For both prescribed and agricultural burning activities, the EPA's Biogenic Emissions Landcover Database (BELD) Version 3 (U.S. Environmental Protection Agency, 2001) was used to generate spatial distributions of vegetation types, which in turn were used to select vegetation-specific fuel loading factors output by FOFEM. To do this, cross-walks were established to link the vegetation types in the BELD database with (a) vegetation types in FOFEM and (b) crop types for which emissions factors and fuel loadings are available.

Once a map of vegetation and crop types was developed, we overlaid histories of planned fires, identified the vegetation types associated with each fire occurrence, and applied emission factors generated through FOFEM or acquired from the sources described above to produce county-level emission inventories of agricultural and prescribed burning. **Table 1-1** summarizes sources of emission factors, activity data, and land cover data.

Table 1-1. Summary of approaches to estimate planned-burning emissions.

	Prescribed Burning	Agricultural and Rangeland Burning
Emission factors	FOFEM Model	AP-42; (Jenkins et al., 1996)
Fire history data	Federal and state agencies; telephone contacts with tribes and private owners of large land tracts	Telephone and mail surveys of County Agricultural Extension Services
Land cover data	EPA's BELD3 database	EPA's BELD3 database

1.2 IMPORTANT ASSUMPTIONS

The methods that we selected for use were based on several important assumptions:

- Default fuel loading values by vegetation type contained in the FOFEM model are sufficiently representative of conditions in the CENRAP region[1].
- The land cover/vegetation types used by the FOFEM model and those in the BELD database are similar enough to allow a reasonable cross-walk to be established between the two data sets.
- The crop types in the BELD database are similar enough to crop varieties for which emission factors and fuel loadings are available to allow a reasonable cross-walk to be established between the two data sets.
- County AES will be capable of providing responses that reasonably represent agricultural and rangeland burning activities in the CENRAP region.

[1] Personnel at the U.S. Forest Service in Minnesota provided updated fuel loadings for 3,700 acres of grassland burns and "blowdown" burns (the burning of vegetation after storms to reduce fire hazard) occurring in the Superior National Forest in 2002. Default fuel loadings were used in all other cases.

2. AGRICULTURAL BURNING

2.1 OVERVIEW

Agricultural burning is primarily a means of clearing harvested lands. Because the CENRAP region is largely agricultural, such activity is likely to be a source of significant episodic combustion emissions in most counties. Allen and Dennis (Allen and Dennis, 2000; Dennis et al., 2002) recently completed a study of emissions from fires in Texas, which included agricultural and rangeland burning in 1996 and 1997. According to their assessments, these types of agricultural activities emitted over 66,000 tons of particulate matter of less than 2.5 μm aerodynamic diameter ($PM_{2.5}$) and accounted for 84% of over 3.3 million acres of vegetation burned in Texas during those two years.

2.2 AGRICULTURAL BURNING EMISSION FACTORS AND FUEL LOADINGS

Emissions from agricultural burning activities are dependent on the types of vegetation burned and the manner of combustion, and can be estimated using the following equation:

*Emissions (lb) = Fuel loading (ton/acre) * Emission factor (lb/ton) * Acres burned*

In its Compendium of Air Pollutant Emission Factors, (AP-42) (U.S. Environmental Protection Agency, 2003), the EPA provides fuel loadings and emission factors for particulate matter (PM), carbon monoxide (CO), methane (CH_4), and non-methane hydrocarbons (NMHC) for a variety of field and orchard crops. In some cases, AP-42 emission factors are provided for two different burning techniques: headfire burning (when a fire is started on the upwind side of a field) and backfire burning (when a fire is started downwind). In addition, a more recent study at the University of California at Davis derived emission factors for the combustion of barley straw, corn stover, rice straw, wheat straw, and almond tree prunings (Jenkins et al., 1996). In this study, emission factors for CO, total hydrocarbons (THC), nitrogen oxides (NO_x), sulfur dioxide (SO_2), and PM were based on measurements collected during wind tunnel tests.

Fuel loadings and emission factors are provided in **Table 2-1**. For barley, corn, rice, wheat, and almonds, emission factors were derived entirely from Jenkins' (1996) study using average emission rates and moisture contents from two wind tunnel configurations. An emission factor for volatile organic compounds (VOC) was derived from Jenkins' THC values by using the fraction of reactive gases equal to 0.5698 that was published in a California Air Resources Board (CARB) guidance document (Gaffney, 2000). For the remaining crops, emission factors for NO_x and SO_2 were set equal to Jenkins's average values for field or orchard crops, and emissions factors for VOC were calculated from the CH_4 and NMHC values reported in AP-42, again by using the CARB fraction of reactive gases. The emission factors for CO were taken directly from AP-42, and particulate matter of less than 10 μm aerodynamic diameter (PM_{10}) and $PM_{2.5}$ were calculated from the PM values in AP-42 by using fractions of 0.9835 for PM_{10} and 0.9379 for $PM_{2.5}$ for field crops and fractions of 0.9814 for PM_{10} and 0.9252 for $PM_{2.5}$ for orchard crops based on CARB's guidance (Gaffney, 2000). Fuel loadings were taken from AP-42 for all crop types. (For grasses and wild reeds, which were not reported in AP-42, the value for wild hay was used.)

Table 2-1. Fuel loadings and emission factors for agricultural burning.

(Page 1 of 2)

Crop Type	Fuel Loading (tons/acre)	Emission Factors (lbs/ton) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2
Field Crops							
Asparagus	1.5	39.3	37.5	150.0	49.0	4.5	0.6
Barley	1.7	14.3	13.8	183.7	15.0	5.1	0.1
Corn	4.2	11.4	10.9	70.9	6.6	3.3	0.4
Cotton	1.7	7.9	7.5	176.0	3.6	4.5	0.6
Grasses	1.0	15.7	15.0	101.0	11.1	4.5	0.6
Pineapple		7.9	7.5	112.0	4.6	4.5	0.6
Rice	3.0	6.3	5.9	57.4	4.7	5.2	1.1
Safflower	1.3	17.7	16.9	144.0	14.8	4.5	0.6
Sorghum	2.9	17.7	16.9	77.0	5.1	4.5	0.6
Sugar cane	4.0	8.3	7.9	81.0	9.0	4.5	0.6
Wheat	1.9	10.6	10.1	123.6	7.6	4.3	0.9
Unspecified	2.0	20.7	19.7	117.0	13.3	4.5	0.6
Alfalfa - Headfire	0.8	44.3	42.2	106.0	20.8	4.5	0.6
Alfalfa - Backfire	0.8	28.5	27.2	119.0	21.7	4.5	0.6
Bean (red) - Headfire	2.5	42.3	40.3	186.0	26.8	4.5	0.6
Bean (red) - Backfire	2.5	13.8	13.1	148.0	14.2	4.5	0.6
Hay (wild) - Headfire	1.0	31.5	30.0	139.0	12.5	4.5	0.6
Hay (wild) - Backfire	1.0	16.7	15.9	150.0	9.7	4.5	0.6
Oats - Headfire	1.6	43.3	41.3	137.0	19.3	4.5	0.6
Oats - Backfire	1.6	20.7	19.7	136.0	10.3	4.5	0.6
Pea - Headfire	2.5	30.5	29.1	147.0	21.7	4.5	0.6
Wheat - Headfire	1.9	21.6	20.6	128.0	9.7	4.5	0.6
Wheat - Backfire	1.9	12.8	12.2	108.0	6.6	4.5	0.6
Orchard Crops							
Almond	1.6	7.0	6.7	52.2	5.2	5.9	0.1
Apple	2.3	3.9	3.7	42.0	2.3	5.2	0.1
Apricot	1.8	5.9	5.6	49.0	4.6	5.2	0.1
Avocado	1.5	20.6	19.4	116.0	18.5	5.2	0.1
Cherry	1.0	7.9	7.4	44.0	6.0	5.2	0.1
Citrus (orange, lemon)	1.0	5.9	5.6	81.0	6.8	5.2	0.1
Date palm	1.0	9.8	9.3	56.0	3.8	5.2	0.1
Fig	2.2	6.9	6.5	57.0	6.0	5.2	0.1
Nectarine	2.0	3.9	3.7	33.0	2.3	5.2	0.1
Olive	1.2	11.8	11.1	114.0	10.3	5.2	0.1
Peach	2.5	5.9	5.6	42.0	3.0	5.2	0.1
Pear	2.6	8.8	8.3	57.0	5.1	5.2	0.1
Prune	1.2	2.9	2.8	47.0	4.6	5.2	0.1
Walnut	1.2	4.2	4.0	67.0	4.8	4.2	0.2
Unspecified	1.6	5.9	5.6	52.0	6.0	5.2	0.1

Table 2-1. Fuel loadings and emission factors for agricultural burning.

(Page 2 of 2)

Crop Type	Fuel Loading (tons/acre)	Emission Factors (lbs/ton) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2
Vine Crops							
Unspecified	2.5	4.9	4.7	51.0	3.8	5.2	0.1
Weeds							
Russian thistle, or tumbleweed	0.1	21.6	20.6	309.0	1.1	4.5	0.6
Tales, or wild reeds	1.0	4.9	4.7	34.0	15.7	4.5	0.6
Unspecified	3.2	14.8	14.1	85.0	6.8	4.5	0.6

2.3 AGRICULTURAL BURNING ACTIVITY DATA

To obtain activity data for agricultural burning events in the CENRAP region, STI's subcontractor, Population Research Systems (PRS), conducted systematic telephone and mail surveys of county AES offices. PRS attempted to contact each AES office in all 969 counties of the CENRAP region in order to recruit AES personnel to complete a telephone survey. This survey was designed to determine the fraction of each county's acreage typically burned each year by crop type, the timing of such burn events, and the burn methods employed. Data collected through the survey was then applied to National Agricultural Statistics Service (NASS) county-level estimates of acreages grown by crop type for 2002.

This data collection effort had a target response rate of 25% to 50%. Ultimately, 549 contacts were made, for a response rate of 56% (ranging from 36% to 93% from state to state). By including such large proportions of the available respondent pool and the total geographic area of the CENRAP region, the achievable representativeness of the study was maximized and the potential uncertainties minimized. Survey responses were used to generate profiles of agricultural burning practices by geographic region and crop type. In general, profiling was done on a statewide basis for each crop: a regional average burn profile was used to represent all counties for which no survey data are available. However, personnel at the Kansas Department of Health and Environment divided the state of Kansas into three subregions for wheat burning and four subregions for rangeland burning. Separate burn profiles for the burning of wheat and rangeland were produced for each of these subregions and applied to counties within those subregions for which no survey data were available.

The proposed survey questionnaire is provided in Appendix A, and maps displaying Kansas subregions for wheat and rangeland burning are provided in Appendix C.

2.4 SPATIAL ALLOCATION OF AGRICULTURAL BURNING

Agricultural burning was spatially allocated by using the BELD GIS database. The BELD database includes spatial distributions of crops (by crop type) at the county (and sub-county) level gridded to 1 km^2. Activity data obtained through the agricultural survey questionnaires about the types of crops burned at the county level was spatially allocated by matching the reported crop types from the questionnaire to the crop types in the BELD database by county. The fire activity data was applied to the area (acreage) of crops by county for the purposes of calculating countywide emissions. Gridded surrogate data, or spatial allocation factors, were developed by gridding the agricultural burn activity data and corresponding crop types to the 12-km $\times$ 12-km national Regional Planning Organization (RPO) grid domain.

2.5 TEMPORAL ALLOCATION OF AGRICULTURAL BURNING

Agricultural burning, like other agricultural activities, has a distinct seasonal pattern, although this pattern tends to vary by crop type and region. To identify such seasonal patterns in the CENRAP region, the survey of agricultural experts contained questions designed to identify times of the year when agricultural burning takes place for the various crops grown in each of the CENRAP states. Survey responses were used to design seasonal profiles that characterize agricultural burning activities by state and crop type.

The survey also contained questions related to weekly and diurnal variations in agricultural burning activities. These questions were designed to identify the fraction of agricultural burning that takes place on weekdays versus weekend days, as well as the fraction of burning that takes place during daylight hours versus nighttime hours.

2.6 CHEMICAL SPECIATION OF AGRICULTURAL BURNING

PM and VOC emissions were chemically speciated according to profiles published by the EPA and the CARB. **Table 2-2** summarizes the profile references and the individual compounds included in the profiles. Using these references, we created speciation profiles and cross-reference files according to SMOKE speciation schemes.

Table 2-2. Chemical speciation of agricultural burning: profile information.

Profile Name	Profile Number	Profile Source	Source Category SCC Code	SCC Description	Reference	Proposed Classification Schemes	Individual Compounds
PM							
Agricultural Burning – Field Crops	430	ARB	CARB SCC Code 67066202620000 (assumed to correspond to EPA SCC Code 2801500000)	Waste Burning – Agricultural Debris – Field Crops	(Jenkins et al., 1996)	Default SMOKE classification scheme and individual compounds	Aluminum, Ammonia, Antimony, Arsenic, Barium, Bromine, Cadmium, Calcium, Elemental Carbon, Organic Carbon, Chlorine, Chromium, Cobalt, Copper, Gallium, Gold, Indium, Iron, Lanthanum, Lead, Manganese, Mercury, Molybdenum, Nickel, Nitrates, Palladium, Phosphorous, Potassium, Rubidium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Uranium, Vanadium, Yttrium, Zinc, Zirconium, Unidentified
VOC							
Miscellaneous Burning – Forest Fires	0307	EPA	2801500000	Miscellaneous Area Sources – Agriculture Production – Crops – Agricultural Field Burning – Whole Field Set on Fire – Total, all crop types	(Sandberg et al., 1975)	Default SMOKE classification scheme (Carbon Bond IV) and individual compounds	Acetylene, 1,3-Butadiene, N-Butane, 1-Butene,Isomers of Butene, Ethane, Ethylene, Isobutane, 3-Methyl-1-Butene, Propyne, Isomers of Pentane, Propane, Propylene, Unidentified

3. PRESCRIBED BURNING

3.1 OVERVIEW

The purpose of prescribed burning is commonly believed to the clearing of undergrowth in timberlands or grasslands to prevent wildfires or make various types of land improvements. For example, planned burns are used for timber stand improvement (site preparation fires for reforestation projects; removal of diseased trees), range improvement and wildlife habitat improvement. The types and amounts of such burning vary regionally both due to local weather and to local forest/land types.

As with agricultural burning, emission rates are specific to materials burned and burn management practices. Some degree of reporting and record-keeping is required of wildfire prevention efforts by state, federal, and tribal agencies. However, access and interpretation of these records is difficult. Even less information is available for planned burning of undergrowth for private land improvement. As with agricultural burning, significant effort is necessary to develop activity data sets that can be used for regional-scale emissions assessments.

3.2 PRESCRIBED BURNING EMISSION FACTORS AND FUEL LOADINGS

For this project, the FOFEM model was used to generate estimates of fuel loadings and emission rates for prescribed fires which were then applied to estimates of acres burned acquired from fire history data. This model was developed based on research findings gathered from peer-reviewed literature sources, internal agency reports, and other "gray literature" sources. The accuracy and certainty of FOFEM results are consistent with the current status of scientific measurements of fuel consumptions and air emissions for prescribed burning and wildfires. Although measurement data are limited and uncertain, the FOFEM model generally represents a synthesis of the most up-to-date information available.

Required inputs to FOFEM 5.0 include the following:

- Vegetation land cover type
- Season of the year (spring, summer, fall, or winter)
- Moisture conditions (including the moisture content of various fuel types)
- Configuration of the burn (natural conditions, piled fuel, or slash fuel)
- Percent of the tree canopy crown expected to burn (0% for a well-executed prescribed burn)
- Percent of fallen logs that are rotten (default equals 10%)
- Size distribution of fallen logs of 3 in. or greater diameter
  - Even distribution across the size range, from 3 in. to 20+ in.
  - A distribution that tends toward the larger logs
  - A distribution that tends toward the smaller logs
  - A distribution that tends toward the center of the size range
  - A distribution that tends toward the endpoints of the size range.

FOFEM calculates emission factors for PM_{10}, $PM_{2.5}$, CH_4, carbon dioxide (CO_2), CO, NO_x, and SO_2. For ammonia (NH_3) and NMHC, we applied the approximations that were employed by Allen and Dennis (2000), which assumed NMHC and NH_3 emission factors that vary as follows:

$$EF_{NH_3} = EF_{NO_x} \times 14 \times \left(1 - \frac{EF_{CO_2}}{EF_{CO_2} + EF_{CO}}\right) \quad \textbf{(3-1)}$$

$$EF_{NMHC} = 1.52 + (EF_{CH_4} \times 1.232) \quad \textbf{(3-2)}$$

Before FOFEM could be applied to the CENRAP region, it was necessary to determine which of the model's vegetation types are found in the region, and what the moisture contents of various fuel types were at the times and places in which prescribed burning events occurred. (For the remaining FOFEM inputs, such as burn configuration, log-size distributions, and the percentage of fallen logs that are rotten, default settings were used).

FOFEM allows users to choose between two main vegetation cover classifications: the National Vegetation Classification System (NVCS) and the Society of American Foresters/Society for Range Management (SAF/SRM) cover types. (A third option, the Fuel Characteristic Classification [FCC], does not yet cover all regions of the country.) The NVCS uses a classification hierarchy which emphasizes differences in both vegetation structure and floristics[2], and the system is periodically updated to include new information on natural community classifications developed at the state level. Such natural communities are based on all species of vegetation. SAF forest cover types, on the other hand, are based primarily on dominant tree species. While trees can be indicators of their environments, some trees are so broadly adapted that their presence indicates little about the conditions of the surrounding natural community. Thus, SAF cover types are less useful than those found in the NVCS (New Hampshire Division of Forests and Lands, 2002). To determine which of the NVCS or SAF cover types are found in the CENRAP region, a cross-walk was developed between the FOFEM and BELD databases. In developing this cross-walk, BELD vegetation types were matched to NVCS coverage types wherever possible; SAF data was used only when clear matches could not be made to NVCS coverages. The cross-walks used are presented in Appendix B.

Fuel moisture content is the quantity of water in a fuel particle expressed as a percentage of the oven-dry weight of the fuel (National Weather Service, 1998). FOFEM requires settings for three fuel classifications[3]: 10-hour, 1000-hour, and duff[4]. Fuel moisture data are available

[2] Floristics is the study of the number, distribution, and relationships of plant species in one or more areas.
[3] The rate of change of the moisture content is dependent on the diameter of the woody fuel, various diameter ranges are classified according to their "time lag." Time lag refers to the length of time it takes a fuel to respond to changes in environmental moisture conditions: larger diameter fuels generally have longer time lags. The time lag categories typically used for fire behavior and fire danger rating are specified as 1-hr (0-¼"), 10-hr (¼"-1"), 100-hr (1"-3"), and 1000-hr (3" or greater).
[4] Duff is partially decomposed organic matter, leaf litter, or organic soils (such as humus or peat), which accumulates in layers on the forest floor.

from the Wildland Fire Assessment System (WFAS)—a database of the National Interagency Fire Center (NIFC) in Boise, Idaho. WFAS is based on daily weather observations taken at about 1500 fire weather stations throughout the United States and entered into the Weather Information Management System (WIMS). These weather observations are used to calculate fuel moisture levels for 1-hr, 10-hr, 100-hr, and 1000-hr fuel types. WIMS data for the CENRAP region was acquired and used to determine a range of 10-hr, 1000-hr and duff moisture levels for the CENRAP region for 2002. The 100-hr moisture values were used as a surrogate for duff moisture, following the approach of Harrington (2003).

Once vegetation types and fuel moisture levels present in the CENRAP region were determined, FOFEM was run for each unique combination of vegetation type-moisture level to generate emission rates in pounds per acre burned. Outputs from these FOFEM runs were used to produce a look-up table of emission factors by vegetation type and moisture condition. For each prescribed burning event, we were able to use WIMS data from the nearest fire weather station to determine fuel moisture contents for that event and BELD data to determine the type of vegetation burned. This information was used to select and apply an appropriate emission factor from the FOFEM look-up table.

3.3 PRESCRIBED BURNING ACTIVITY DATA

In summary, the prescribed burn activity data for state and private lands from the CENRAP states will consist of detailed data obtained from smoke management programs, state fire marshals, or state forest services; summary data obtained from state agencies and allocated by county; summary data estimated by applying federal surrogates to state lands and allocated by county; and county level data based on the results of the rangeland burning survey questions.

3.3.1 Activity Data for Federal Lands

The National Interagency Fire Management Integrated Database (NIFMID) was the source of data used for prescribed fires occurring on Department of the Interior (DOI) lands (U.S. Fish and Wildlife Service, National Park Service, and Bureau of Indian Affairs [http://famweb.nwcg.gov/weatherfirecd/]). This database contains fire type (prescribed, wildfire, etc.), start and end dates, extent (acres), and location (geographic coordinates and township/range/section).

The National Fire Plan Operations and Reporting System (NFPORS), contains year 2002 fire occurrence data for the U.S. Forest Service (USFS). NFPORS data were used to characterize prescribed fires on USFS lands in the six states with land managed by that agency: Arkansas, Louisiana, Minnesota, Missouri, Oklahoma, and Texas.

Additional prescribed burn data on federally managed lands were included in data acquired from state smoke management programs (this data was cross-checked against NIFMID and NFPORS data to prevent double-counting). For example, some DOI data was included among the state reports that did not appear in the NIFMID final report for 2002, and some USFS burns appeared in these reports as well.

3.3.2 Activity Data for State, Tribal, and Private Lands

Each of the CENRAP states has unique regulations regarding prescribed burning on state and private lands. Records of prescribed burns are compiled at different levels within each state. Consequently, several sources of information contributed to the prescribed burn activity data for state, private, and tribal lands.

In cases where we could not acquire good-quality information about prescribed burns on state lands, the percentage of federal lands that were burned within the state in the year 2002 was used as a surrogate for the percentage of state lands that were burned that year. The total acreage of burned state lands were allocated according to the proportion of state lands within each county. In addition, the temporal profile of the burns that occurred on federal lands within these states was applied to the burns that were estimated for their state lands.

Minnesota, Arkansas and Louisiana have voluntary or mandatory smoke management programs for which records of prescribed burns on state and private lands are kept. Records including the scheduled date, extent (acres), and location (geographic coordinates or township/range/section) of large scale prescribed burns that occurred during the year 2002 on state and private lands in Minnesota and Arkansas were obtained from the Minnesota Interagency Fire Center and the Arkansas Forestry Commission, respectively. Also, the Louisiana Forestry Division provided summary data describing the dates and acreages of prescribed burns that occurred on Louisiana's state and private lands during the year 2002. This summary data listed burns by district and had to be allocated to the county level using the acreage of forested land within each county.

A statewide permitting system exists for all other planned burns in Minnesota, including small scale residential or agricultural burns. The permits are issued by local fire wardens, and an estimated 60,000 burn permits were issued in the state in 2002. Records of these permitted burns are not compiled above a county level and are not in electronic format. Of the 60,000 permits, roughly 65% are estimated to be issued for "ditch burns" (fires set alongside roads or fencerows for weed abatement purposes) or "pile burns" (fires used to dispose of piles of waste material). Ditch burns are generally less than one quarter mile in length and were not considered in the inventory due to their small size and the lack of specific data. Also, since pile burns are used for waste management purposes, they fall beyond the scope this inventory. The remaining 35% of the permitted burns are performed on open land and range and are likely to be captured by the agricultural survey (Meadows, 2004).

In Oklahoma, a 15-county area in the eastern portion of the state has a controlled burn authorization system for open burning on private lands and lands managed by the state forest service. Records containing the date, type (grassland, woodland, brush pile, etc.), extent (acres), and location (address) of prescribed burns that occurred in that region of Oklahoma during 2002 were obtained from the Oklahoma Forestry Service[5]. Oklahoma's Department of Wildlife Conservation (DWC) estimated the total number of acres burned on lands managed by the DWC in 2002, which accounted for the remainder of the state lands in Oklahoma that undergo substantial prescribed burning.

[5] About one-third of these records was provided in hard-copy format and were not included in the final inventory.

The Kansas State Fire Marshal's office keeps a database of fire incidents in Kansas as reported by local fire departments (although prescribed burns in Kansas may or may not be reported to the local fire departments, depending on the specific regulations within each township). The dates and locations (counties) of the controlled burns that were reported to the local fire departments in Kansas during 2002 were obtained from the Kansas State Fire Marshal's database.

In Texas, virtually all of the burning on state lands is conducted by the Texas Parks and Wildlife Department (TPWD) in state parks and Wildlife Management Areas (WMA). TPWD was able to provide data on burns occurring in state parks, but WMA burns are not tracked in a central database. Attempts to gather data from individual WMA managers were not successful, so the number of WMA acres burned in 2002 was estimated from data published by Allen and Dennis (2000) for 1996 and 1997.

Missouri, Iowa, and Nebraska have neither smoke management programs nor prescribed burn records compiled above the county level. The Forestry Section of the Missouri Department of Conservation summarized the number of acres burned by The Nature Conservancy, the Missouri Department of Natural Resources, and the Missouri Department of Conservation on state and private lands in Missouri during the year 2002. In the state of Iowa, the Bureau of Wildlife performs a large portion of the state's prescribed burns on public grasslands. However, records of the prescribed burns that occur on Iowa's conservation lands are not compiled by the Bureau of Wildlife above the dispatch level. Therefore, the percentage of federal lands burned in the state of Iowa during 2002 was used as a surrogate in order to estimate the total number of acres burned on Iowa's state lands. In Nebraska, a statewide burn ban requires prescribed burns to be permitted, but records of prescribed burn permits are not compiled above the county level. Therefore, the percentage of federal lands burned in the state of Nebraska in 2002 was used as a surrogate to estimate the total number of acres burned on state lands. The estimated acreage of state lands burned in Missouri, Iowa, and Nebraska will be allocated by county using the percentage of state lands in each county within each state.

To ensure that burning on tribal lands was captured in the data sources listed above; contacts were made to tribes that collectively hold over 95% of the tribal lands in the CENRAP region. It was confirmed that these tribes report their burns to either the BIA or the Minnesota Interagency Fire Center.

For burning on private land, it was assumed that burns by individual parties would be related to agricultural practices (and, therefore, captured in the agricultural survey data) or the burning of waste (and, therefore, not considered under the scope of this project). Significant burns on private lands are most likely to be conducted by the forest industry, or by organizations such as the Nature Conservancy (TNC), The Prairie Plains Institute, or the Platte River Whooping Crane Maintenance Trust (Whitney, 2003). We did not obtain specific data from all the aforementioned organizations due to time constraints, though the TNC provided a database of all burns conducted by that agency in 2002.

Planned burns by private forestry companies in Louisiana and Arkansas are largely included in the data received from the Louisiana Forestry Division and the Arkansas Forestry

Commission. Forestry companies also perform planned burns in the Piney Woods region of east Texas. However, records of the planned burns that occurred during 2002 were not available from the Texas Forest Service. Traditionally, the Texas Forest Service reported planned burning information in the Harvest Trends Report; yet, after 1999, the Harvest Trends Report ceased to include information about planned burning because the practice of planned burning for forest management has diminished in recent years due to liability concerns (Xu, 2004). In the absence of other information, data reported by Allen & Dennis (2000) on acres burned by private timber companies in the Piney Woods region for 1996 and 1997 were averaged to produce an estimate of 20,000 acres burned per year. These acres were allocated to the county level based on the forested acreage in each county that makes up the Piney Woods region.

3.3.3 Activity Data for Rangelands

Rangeland burning occurs extensively on private lands throughout the CENRAP states, particularly in Kansas, Nebraska, Oklahoma, and central and west Texas. To obtain activity data for rangeland burning events in the CENRAP region, the agricultural burning survey given to county AES offices included rangeland burning questions designed to determine the fraction of rangeland acreage typically burned each year and the timing of such burn events. The survey results (discussed in Section 2) yielded activity data for private lands for all of the CENRAP states. We obtained additional prescribed burning information for private lands in some of the CENRAP states, as previously discussed in Section 3.3.2.

3.4 SPATIAL ALLOCATION OF PRESCRIBED BURNING

Fire occurrence locations for prescribed burns were typically provided as point coordinates (i.e., latitude and longitude values), township/range assignments, or county name. While the size of the fire was typically provided (in acres), the actual boundaries of the prescribed burns were not usually provided. To represent the location and approximate size of each burn, the reported location of each burn was assumed to be the centroid of the burn and was mapped as a point using the latitude/longitude coordinates. County-specific vegetation profiles from the BELD data were then matched to each fire location to determine the vegetation types associated with each fire. The vegetation data (used by the FOFEM model), fire size, occurrence date, and associated fuel moisture data were used to calculate emissions for each fire.

While many of the prescribed burns were large, there were no fires larger than the 12-km x 12-km grid cell resolution. Therefore, when the locations of prescribed burns were known, they were treated as point sources in the emission inventory. Approximately 40% of the prescribed burning inventory was allocated spatially and temporally as a point source inventory. (States that were able to provide “incident-level” databases of prescribed burn activity included Arkansas, Minnesota, and Oklahoma.) When the locations of fires were not reported, a spatial surrogate approach was used to develop gridded spatial allocation factors.

Spatial allocation factors were used to spatially distribute emissions at the sub-county level (by grid cell). To develop gridded surrogate data, a surrogate data source is used to represent the locations of fire activity. Prescribed burns were spatially distributed on rural grasslands and forested lands, while agricultural burns were spatially distributed on agricultural

land by crop type based on data obtained from the agricultural burning surveys. The spatial allocation factors were developed for the 12-km $\times$ 12-km National RPO grid.

3.5 TEMPORAL ALLOCATION OF PRESCRIBED BURNING

Fire history data collected for prescribed burns on federal lands specifies the dates on which the burns began and ended. These data were used to generate state-specific temporal profiles to allocate emissions from prescribed burning to the proper months of the year and days of the week. Also, by examining the number of burns completed in one day versus those spanning multiple days (and therefore continuing through the night), it was possible to estimate the fraction of prescribed burning that takes place in daylight hours versus nighttime hours.

In the absence of date-specific information for prescribed burns on state lands, temporal profiles derived from federal prescribed burns were applied to burns on state lands.

3.6 CHEMICAL SPECIATION OF PRESCRIBED BURNING

PM and VOC emissions were chemically speciated according to profiles developed by the EPA and the CARB. **Tables 3-1 and 3-2** summarize the profile references and the individual compounds included in two profiles: (1) prescribed burning of grasslands and (2) prescribed burning of woodlands. Using these references, we created speciation profiles and cross-reference files according to SMOKE speciation schemes.

Table 3-1. Chemical speciation of prescribed burns: profile information for grasslands.

Profile Name	Profile Number	Profile Source	Source Category SCC Code	SCC Description	Reference	Proposed Classification Schemes	Individual Compounds
PM							
Range Improvement Burning	441	ARB	CARB SCC Code 67066402000000 (assumed to correspond to EPA SCC Code 2810020000)	Waste Burning – Range Management – Range Improvement	(Jenkins et al., 1996)	Default SMOKE classification scheme and individual compounds	Aluminum, Ammonia, Antimony, Arsenic, Barium, Bromine, Cadmium, Calcium, Elemental Carbon, Organic Carbon, Chlorine, Chromium, Cobalt, Copper, Gallium, Gold, Indium, Iron, Lanthanum, Lead, Manganese, Mercury, Molybdenum, Nickel, Nitrates, Palladium, Phosphorous, Potassium, Rubidium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Uranium, Vanadium, Yttrium, Zinc, Zirconium, Unidentified
NMHC							
Miscellaneous Burning – Forest Fires	0307	EPA	2810020000	Miscellaneous Area Sources – Other Combustion – Prescribed Burning of Rangeland – Total	(Sandberg et al., 1975)	Default SMOKE classification scheme (Carbon Bond IV) and individual compounds	Acetylene, 1,3-Butadiene, N-Butane, 1-Butene,Isomers of Butene, Ethane, Ethylene, Isobutane, 3-Methyl-1-Butene, Propyne, Isomers of Pentane, Propane, Propylene, Unidentified

Table 3-2. Chemical speciation of prescribed burns: profile information for forestlands.

Profile Name	Profile Number	Profile Source	Source Category SCC Code	SCC Description	Reference	Proposed Classification Schemes	Individual Compounds
PM							
Forest Management Burning	463	ARB	CARB SCC Code 67066602000000 (assumed to correspond to EPA SCC Code 2810015000)	Waste Burning – Forest Management – Forest Management	(Jenkins et al., 1996)	Default SMOKE classification scheme and individual compounds	Aluminum, Ammonia, Antimony, Arsenic, Barium, Bromine, Cadmium, Calcium, Elemental Carbon, Organic Carbon, Chlorine, Chromium, Cobalt, Copper, Gallium, Gold, Indium, Iron, Lanthanum, Lead, Manganese, Mercury, Molybdenum, Nickel, Nitrates, Palladium, Phosphorous, Potassium, Rubidium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Uranium, Vanadium, Yttrium, Zinc, Zirconium, Unidentified
NMHC							
Miscellaneous Burning – Forest Fires	0307	EPA	2810015000	Miscellaneous Area Sources – Other Combustion – Prescribed Burning for Forest Management – Total	(Sandberg et al., 1975)	Default SMOKE classification scheme (Carbon Bond IV) and individual compounds	Acetylene, 1,3-Butadiene, N-Butane, 1-Butene,Isomers of Butene, Ethane, Ethylene, Isobutane, 3-Methyl-1-Butene, Propyne, Isomers of Pentane, Propane, Propylene, Unidentified

4. AIR QUALITY DATA ANALYSIS

The objective of data analysis for this project was to preliminarily assess whether planned burning appears to contribute to impaired visibility events in Class I areas. We used existing ambient pollutant data from Class I areas in conjunction with the planned burn emission inventories developed through this project. To meet this objective, we performed the following steps:

- Summarized 2002 air quality data available for Class I areas in the CENRAP region (e.g., IMPROVE[f] speciated $PM_{2.5}$ data). Smoke components that contribute to visibility impairment include organic carbon (OC) and elemental carbon (EC).
- Identified where and when planned, prescribed, and/or agricultural burns occurred near and/or upwind of Class I areas in 2002 by using the Task 1 emission inventory.
- Characterized the ambient data for the 20% best and 20% worst visibility days at the Class I areas, including the average composition of the $PM_{2.5}$ and the average contribution of pollutants to light extinction. Determined whether any of these days coincide with burns included in the inventory.
- Investigated the ambient data for days with high concentrations of or contributions from EC and non-soil potassium (associated with biomass burning). Investigated seasonal patterns and whether any of these days coincide with burns listed in the inventory.
- Analyzed days of interest in more detail by performing trajectory analyses, inspecting satellite photos, and investigating existing hourly pollutant data (e.g., whether nephelometer measurements indicate the impact of air parcels with increased $PM_{2.5}$ concentrations).

The deliverable for this task is a technical memorandum describing the analyses and summarizing analysis results. A discussion of the analysis and results is also included in the project Final Report.

[f] IMPROVE = Interagency Monitoring of Protected Visual Environments

5. PREPARATION OF DIGITAL EMISSION INVENTORY FILE SYSTEMS

The following files will be delivered by STI upon completion of the planned burning emission inventory with accompanying documentation:

- Emission data files in latest NIF format
- Emission data files converted to IDA format and ready for input to SMOKE 1.5
- Temporal profile and cross-reference files for use by SMOKE
- Spatial surrogate and cross-reference files for use by SMOKE
- Chemical speciation profiles and cross-reference files for use by SMOKE

6. REFERENCES

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APPENDIX A

PROPOSED SURVEY QUESTIONNAIRE

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Central States Regional Air Planning Association (CENRAP)
Telephone Interview
Project #1002

INTRO1: Hello, my name is __________. I'm calling on behalf of the Central States Regional Air Planning Association or CENRAP. CENRAP is an organization of states, tribes, federal agencies, and other interested parties that studies and addresses regional haze and visibility issues. Your state is participating in CENRAP and as such, your county has been randomly selected to participate in an important air quality study.

Q1a. Our records show that this is a cooperative agricultural extension office in _________ county in the state of ________. Is that correct?

[1] Yes	(Go to Qa2)
[2] No	(Go to Q1b)
[8] DON'T KNOW	(Terminate)
[9] REFUSED	(Terminate)

Q1b. What office have I called? ____ (Go to Q2a)

Q2a. I would like to speak with the person who would be most knowledgeable about your county's tilling practices and agricultural burning practices.

[1] I am that person	(Go to INTRO3a)
[2] I am that person, but I only know tilling	(Go to INTRO3a)
[3] I am that person, but I only know about burning	(Go to Q3a)
[4] I'll get him/her	(Go to INTRO2)
[5] No one is available now	(Go to CALLBACK)
[6] No such person	(Terminate)
[8] DON'T KNOW	(Terminate)
[9] REFUSED	(Terminate)

INTRO2: Hello, my name is __________. I'm calling on behalf of the Central States Regional Air Planning Association or CENRAP. CENRAP is an organization of states, tribes, federal agencies, and other interested parties that studies and addresses regional haze and visibility issues. Your state is participating in CENRAP and as such, your county has been randomly selected to participate in an important air quality study (Go to Q2b).

Q2b. Are you the person who is most knowledgeable about your county's tilling practices and agricultural burning practices.

[1] I am that person	(Go to INTRO3a)
[2] I am that person, but I only know tilling	(Go to INTRO3a)
[3] I am that person, but I only know about burning	(Go to Q3a)
[8] DON'T KNOW	(Terminate)
[9] REFUSED	(Terminate)

INTRO3a: The interview will take about 10 minutes. Your responses will be kept confidential and will not be connected to your name. Can I begin the interview? <Go to Q3a1>

Q3a. What agency or agencies would have information about tilling practices in your county? (Probe: Is that a state or county agency?) Can I get their telephone number as well?

1. ____
2. ____

777 = NOT APPLICABLE
888 = DON'T KNOW
999 = REFUSED

<Go to INTRO3b>

INTRO3b: The interview will take about 10 minutes. Your responses will be kept confidential and will not be connected to your name. Can I begin the interview? <Go to Q3a1>

CALLBACK: When would be a good time for us to call back to talk with someone about agricultural burning in your county? Who should we ask for? <Interviewer Note: If told you have reached the incorrect agency, ask for correct agency name and telephone number>

TERMINATE: Thank you for your time. Goodbye.

<If Q1a Eq 2, go to Q3a2. If Q1a Eq 1, go to Q3a1>

Q3a1. What is the name of this office? ______________________________

88888 = DON'T KNOW
9999 = REFUSED

Q3a2. What is your name? ______________________________

8888 = DON'T KNOW
9999 = REFUSED

Q3a3. What is your telephone number beginning with the area code? ( ) __________

8888888 = DON'T KNOW
9999999 = REFUSED

Q3b. I'm now going to read you a list of crops and I'd like you to tell me whether these crops are grown in your county? (Programmer note: 1 data output column only; Yes=1, No=2)

1. Corn _____
2. Wheat _____
3. Sorghum _____
4. Rice _____
5. Other cereal crops _____
6. Soybeans _____
7. Sugarcane _____
8. Hay or alfalfa _____
9. Cotton _____
10. Other crops not previously mentioned _____
11. Grazed rangelands _____

8 = DON'T KNOW
9 = REFUSED

<If Q2a or Q2b Eq 1 or 2, go to Q4. If Q2a or Q2b Eq 3, go to Q14>

Agricultural Dust Questions

<Note: Show selected crop names from Q3b for Questions #4 through #12 with the exception of showing Q3b11. Only show Q3b11 for questions #14 through #19>

Q4. How many plantings of each crop type are normally completed during a year? Let's start with (name of 1st crop). Typically, how many plantings per year are made for (name of 1st crop)? How about for (name of 2nd crop)? For (name of 3rd crop)? Read list of remaining selected crops.

a. Corn _____
b. Wheat _____
c. Sorghum _____
d. Rice _____
e. Other cereal crops _____
f. Soybeans _____
g. Sugarcane _____
h. Hay or alfalfa _____
i. Cotton _____
j. Other crops not previously mentioned _____

88 = DON'T KNOW
99 = REFUSED

Q5. In your county, are tilling passes typically made on each crop before planting and after harvesting or are harvesting and planting completed in one pass? Let's start with (name of 1st crop). Typically, when are tilling passes made for (name of 1st crop)? Is it before planting and after harvesting or is tilling completed in one pass? How about for (name of 2nd crop)? Read list of remaining selected crops.

1 = Yes, passes are made before planting and after harvesting
2 = Tilling passes are completed at the same time
88 = DON'T KNOW
99 = REFUSED

	Passes
a. Corn	_____
b. Wheat	_____
c. Sorghum	_____
d. Rice	_____
e. Other cereal crops	_____
f. Soybeans	_____
g. Sugarcane	_____
h. Hay or alfalfa	_____
i. Cotton	_____
j. Other crops not previously mentioned	_____

<If Q5a through Q5j Eq 2, 8, or 9, go to Q6. If Q5a through Q5j Eq 1, go to Q7>

Q6. How many tilling passes are typically made on each crop in your county? Let's start with (name of 1st crop). Typically, how many tilling passes are made for (name of 1st crop)? How about for (name of 2nd crop)? Read list of remaining selected crops.

	Passes
a. Corn	_____
b. Wheat	_____
c. Sorghum	_____
d. Rice	_____
e. Other cereal crops	_____
f. Soybeans	_____
g. Sugarcane	_____
h. Hay or alfalfa	_____
i. Cotton	_____
j. Other crops not previously mentioned	_____

88 = DON'T KNOW
99 = REFUSED

<Go to Q8>

Q7. How many tilling passes are typically made on each crop before planting and after harvesting in your county? Let's start with (name of 1st crop). Typically, how many passes are made for (name of 1st crop) before planting? How about for (name of 2nd crop)? Read list of remaining selected crops.

Let's now turn to harvesting. Typically, how many passes are made for (name of 1st crop) after harvesting? For (name of 2nd crop)? Read list of remaining selected crops.

	1. Planting	2. Harvesting
a. Corn	_____	_____
b. Wheat	_____	_____
c. Sorghum	_____	_____
d. Rice	_____	_____
e. Other cereal crops	_____	_____
f. Soybeans	_____	_____
g. Sugarcane	_____	_____
h. Hay or alfalfa	_____	_____
i. Cotton	_____	_____
j. Other crops not previously mentioned	_____	_____

88 = DON'T KNOW
99 = REFUSED

Q8. Do farmers use any special tilling practices such a no-till, low-till, ridge-till, or mulch-till farming in your county? Let's start with (name of 1st crop), are no-till, low-till, ridge-till, or mulch-till tilling practices typically used for this crop?

What about for (name of 2nd crop)? Are no-till, low-till, ridge-till, or mulch-till practices typically used for this crop? Read list of remaining selected crops.

(Yes=1, No=2)

	1. No-till	2. Low-till	3. Ridge-till	4. Mulch-till
a. Corn	_____	_____	_____	_____
b. Wheat	_____	_____	_____	_____
c. Sorghum	_____	_____	_____	_____
d. Rice	_____	_____	_____	_____
e. Other cereal crops	_____	_____	_____	_____
f. Soybeans	_____	_____	_____	_____
g. Sugarcane	_____	_____	_____	_____
h. Hay or alfalfa	_____	_____	_____	_____
i. Cotton	_____	_____	_____	_____
j. Other types of crop not previously mentioned	_____	_____	_____	_____

8 = DON'T KNOW
9 = REFUSED

<If Q5a through Q5j Eq 2, 8, or 9, go to Q10. If Q5a through Q5j Eq 1, go to Q9>

Q9. For each crop, please tell me how many days before planting and after harvesting does tilling typically occur in your county. Let's start with (name of 1st crop). Typically, how many days before planting does tilling occur for (name of 1st crop)? How about for (name of 2nd crop)? Read list of remaining selected crops.

Let's now turn to harvesting. Typically, how many days after harvesting does tilling occur for (name of 1st crop)? For (name of 2rd crop)? Read list of remaining selected crops.

	1. Before Planting	2. After Harvesting
a. Corn	_____	_____
b. Wheat	_____	_____
c. Sorghum	_____	_____
d. Rice	_____	_____
e. Other cereal crops	_____	_____
f. Soybeans	_____	_____
g. Sugarcane	_____	_____
h. Hay or alfalfa	_____	_____
i. Cotton	_____	_____
j. Other crops not previously mentioned	_____	_____

888 = DON'T KNOW
999 = REFUSED

Q10. For each crop, please tell me whether tilling usually occurs on weekdays, weekends, or both weekdays and weekends? (Programmer note: 1 data output column only; Weekdays=1, Weekends=2, Both=3)

a. Corn	_____
b. Wheat	_____
c. Sorghum	_____
d. Rice	_____
e. Other cereal crops	_____
f. Soybeans	_____
g. Sugarcane	_____
h. Hay or alfalfa	_____
i. Cotton	_____
j. Other crops not previously mentioned	_____

8 = DON'T KNOW
9 = REFUSED

Q11. For each crop, please tell me whether tilling usually occurs during daytime, nightime, or both daytime and nighttime hours? (Programmer note: 1 data output column only; Daytime=1, Nightime=2, Both=3)

a.	Corn	_____
b.	Wheat	_____
c.	Sorghum	_____
d.	Rice	_____
e.	Other cereal crops	_____
f.	Soybeans	_____
g.	Sugarcane	_____
h.	Hay or alfalfa	_____
i.	Cotton	_____
j.	Other crops not previously mentioned	_____

8 = DON'T KNOW
9 = REFUSED

<If Q11a through Q11j Eq 3 go to Q12. If Q11a through Q11j Eq 1, 2, 8, or, 9 go to Q13>

Q12. For each crop, please tell me what percent of tilling occurs during daytime and nighttime hours? Let's start with (name of first crop). What percent of tilling for this crop occurs in the daytime and what percent occurs in the nighttime?

		1. % Daytime	2. % Nighttime
a.	Corn	_____	_____
b.	Wheat	_____	_____
c.	Sorghum	_____	_____
d.	Rice	_____	_____
e.	Other cereal crops	_____	_____
f.	Soybeans	_____	_____
g.	Sugarcane	_____	_____
h.	Hay or alfalfa	_____	_____
i.	Cotton	_____	_____
j.	Other crops not previously mentioned	_____	_____

888 = DON'T KNOW
999 = REFUSED

<NOTE: For Q12a1 through Q12j2, daytime % and nighttime % must add to 100% or question must be re-asked>

<If Q2a or Q2b Eq 2, go to Q13>
<If Q2a or Q2b Eq 1, go to Q14>

Q13. What agency should I contact concerning agricultural burning in your county? (Probe: Is that a state or county agency?) Can I get the telephone number as well?

a. ____
b. ____

888 = DON'T KNOW
999 = REFUSED

<Go to THANK YOU>

Agricultural Burning Questions

<Note: Show selected crop names from Q3b for Questions #14 through #19>

Q14. For each crop, what percent of the total acreage is typically burned each year in your county? Let's start with (name of 1st crop). What percent of (name of 1st crop) is burned each year? Read list of remaining selected crops.

a.	Corn	_____ %
b.	Wheat	_____ %
c.	Sorghum	_____ %
d.	Rice	_____ %
e.	Other cereal crops	_____ %
f.	Soybeans	_____ %
g.	Sugarcane	_____ %
h.	Hay or alfalfa	_____ %
i.	Cotton	_____ %
j.	Other crops not previously mentioned	_____ %
k.	Grazed rangelands	_____ %

888 = DON'T KNOW
999 = REFUSED

Q15. For each crop, please tell me how many days before planting and after harvesting does agricultural burning typically occur in your county. Let's start with (name of 1st crop). Typically, how many days before planting does agricultural burning occur for (name of 1st crop)? How about for (name of 2nd crop)? Read list of remaining selected crops.

Let's now turn to harvesting. Typically, how many days after harvesting does agricultural burning occur for (name of 1st crop)? For (name of 2rd crop)? Read list of remaining selected crops.

		1. Before Planting	2. After Harvesting
a.	Corn	_____	_____
b.	Wheat	_____	_____
c.	Sorghum	_____	_____
d.	Rice	_____	_____
e.	Other cereal crops	_____	_____
f.	Soybeans	_____	_____
g.	Sugarcane	_____	_____
h.	Hay or alfalfa	_____	_____
i.	Cotton	_____	_____
j.	Other crops not previously mentioned	_____	_____
k.	Grazed rangelands	_____	_____

888 = DON'T KNOW
999 = REFUSED

Q16. For each crop, please tell me whether agricultural burning usually occurs during weekdays, weekends, or both weekdays and weekends? (Programmer note: 1 data output column only; Weekdays=1, Weekends=2, Both=3)

a. Corn	_____
b. Wheat	_____
c. Sorghum	_____
d. Rice	_____
e. Other cereal crops	_____
f. Soybeans	_____
g. Sugarcane	_____
h. Hay or alfalfa	_____
i. Cotton	_____
j. Other crops not previously mentioned	_____
k. Grazed rangelands	_____

8 = DON'T KNOW
9 = REFUSED

Q17. For each crop, please tell me whether crop residue is typically burned in your county during daytime, nightime, or both daytime and nighttime hours? (Programmer note: 1 data output column only; Daytime=1, Nightime=2, Both=3)

a. Corn	_____
b. Wheat	_____
c. Sorghum	_____
d. Rice	_____
e. Other cereal crops	_____
f. Soybeans	_____
g. Sugarcane	_____
h. Hay or alfalfa	_____
i. Cotton	_____
j. Other crops not previously mentioned	_____
k. Grazed rangelands	_____

8 = DON'T KNOW
9 = REFUSED

<If Q17 Eq 3, go to Q18. If Q17 Eq 1, 2, 8, or 9, go to Q19>

Q18. For each crop, please tell me what percent of crop residue is burned during daytime and nighttime hours?   Let's start with (name of first crop). What percent of crop residue burning for this crop occurs in the daytime and what percent occurs in the nighttime?

	1. % Daytime	2. % Nighttime
a. Corn	_____	_____
b. Wheat	_____	_____
c. Sorghum	_____	_____
d. Rice	_____	_____
e. Other cereal crops	_____	_____
f. Soybeans	_____	_____
g. Sugarcane	_____	_____
h. Hay or alfalfa	_____	_____
i. Cotton	_____	_____
j. Other crops not previously mentioned	_____	_____
k. Grazed rangelands	_____	_____

888 = DON'T KNOW
999 = REFUSED

<NOTE: For Q18a1 through Q18k2, daytime % and nighttime % must add to 100% or question must be re-asked>

Q19. For the following crops, please tell me whether headfires, backfires, or both types of fires are used. Headfires are burning in the direction of the wind and backfires are burning in a direction opposite to the wind. (Programmer note: 1 data output column only; Headfire=1, Backfire=2, Both=3)

a. Hay or alfalfa _____
b. Soybeans _____
c. Wheat _____

8 = DON'T KNOW
9 = REFUSED

Q20. What agency or agencies regulate agricultural burning in your county? (Probe: Is that a state or county agency?) Can I get the telephone number as well?

a. ____
b. ____

888 = DON'T KNOW
999 = REFUSED

<Go to THANK YOU>

<u>THANK YOU</u>: Those are all the questions. Thank you for your time. Goodbye.

APPENDIX B

VEGETATION CROSS-WALKS

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List of Crops included in the BELD Database for each CENRAP State

STATE	ST_NAME	INDEX	GENUS
05	ARKANSAS	24	CORN
05	ARKANSAS	25	COTTON
05	ARKANSAS	27	HAY
05	ARKANSAS	28	MISC_CROP
05	ARKANSAS	29	OATS
05	ARKANSAS	31	PEANUTS
05	ARKANSAS	32	POTATOES
05	ARKANSAS	33	RICE
05	ARKANSAS	35	SORGHUM
05	ARKANSAS	36	SOYBEANS
05	ARKANSAS	38	WHEAT
19	IOWA	23	BARLEY
19	IOWA	24	CORN
19	IOWA	27	HAY
19	IOWA	28	MISC_CROP
19	IOWA	29	OATS
19	IOWA	32	POTATOES
19	IOWA	34	RYE
19	IOWA	35	SORGHUM
19	IOWA	36	SOYBEANS
19	IOWA	38	WHEAT
20	KANSAS	22	ALFALFA
20	KANSAS	23	BARLEY
20	KANSAS	24	CORN
20	KANSAS	27	HAY
20	KANSAS	28	MISC_CROP
20	KANSAS	29	OATS
20	KANSAS	34	RYE
20	KANSAS	35	SORGHUM
20	KANSAS	36	SOYBEANS
20	KANSAS	37	TOBACCO
20	KANSAS	38	WHEAT
22	LOUISIANA	24	CORN
22	LOUISIANA	25	COTTON
22	LOUISIANA	27	HAY
22	LOUISIANA	28	MISC_CROP
22	LOUISIANA	29	OATS
22	LOUISIANA	31	PEANUTS
22	LOUISIANA	32	POTATOES
22	LOUISIANA	33	RICE
22	LOUISIANA	35	SORGHUM
22	LOUISIANA	36	SOYBEANS
22	LOUISIANA	38	WHEAT
27	MINNESOTA	22	ALFALFA
27	MINNESOTA	23	BARLEY
27	MINNESOTA	24	CORN
27	MINNESOTA	27	HAY
27	MINNESOTA	28	MISC_CROP
27	MINNESOTA	29	OATS
27	MINNESOTA	32	POTATOES
27	MINNESOTA	33	RICE
27	MINNESOTA	34	RYE
27	MINNESOTA	36	SOYBEANS
27	MINNESOTA	38	WHEAT

Unique Crops
ALFALFA
BARLEY
CORN
COTTON
HAY
MISC_CROP
OATS
PEANUTS
POTATOES
RICE
RYE
SORGHUM
SOYBEANS
TOBACCO
WHEAT

List of Crops included in the BELD Database for each CENRAP State

STATE	ST_NAME	INDEX	GENUS
29	MISSOURI	23	BARLEY
29	MISSOURI	24	CORN
29	MISSOURI	25	COTTON
29	MISSOURI	27	HAY
29	MISSOURI	28	MISC_CROP
29	MISSOURI	29	OATS
29	MISSOURI	31	PEANUTS
29	MISSOURI	32	POTATOES
29	MISSOURI	33	RICE
29	MISSOURI	34	RYE
29	MISSOURI	35	SORGHUM
29	MISSOURI	36	SOYBEANS
29	MISSOURI	37	TOBACCO
29	MISSOURI	38	WHEAT
31	NEBRASKA	22	ALFALFA
31	NEBRASKA	23	BARLEY
31	NEBRASKA	24	CORN
31	NEBRASKA	27	HAY
31	NEBRASKA	28	MISC_CROP
31	NEBRASKA	29	OATS
31	NEBRASKA	32	POTATOES
31	NEBRASKA	34	RYE
31	NEBRASKA	35	SORGHUM
31	NEBRASKA	36	SOYBEANS
31	NEBRASKA	38	WHEAT
40	OKLAHOMA	22	ALFALFA
40	OKLAHOMA	23	BARLEY
40	OKLAHOMA	24	CORN
40	OKLAHOMA	25	COTTON
40	OKLAHOMA	27	HAY
40	OKLAHOMA	28	MISC_CROP
40	OKLAHOMA	29	OATS
40	OKLAHOMA	31	PEANUTS
40	OKLAHOMA	32	POTATOES
40	OKLAHOMA	34	RYE
40	OKLAHOMA	35	SORGHUM
40	OKLAHOMA	36	SOYBEANS
40	OKLAHOMA	38	WHEAT
48	TEXAS	22	ALFALFA
48	TEXAS	23	BARLEY
48	TEXAS	24	CORN
48	TEXAS	25	COTTON
48	TEXAS	27	HAY
48	TEXAS	28	MISC_CROP
48	TEXAS	29	OATS
48	TEXAS	31	PEANUTS
48	TEXAS	32	POTATOES
48	TEXAS	33	RICE
48	TEXAS	34	RYE
48	TEXAS	35	SORGHUM
48	TEXAS	36	SOYBEANS
48	TEXAS	38	WHEAT

Unique Crops

Cross-walk of BELD Vegetation Types to FOFEM Forest Classification Types

BELD	Genus	Species	FOFEM ID	FOFEM Cover Description
26	GRASSLAND	----	SRM 215	Valley Grassland (Annual Grassland)
30	RANGELAND	----	SRM 215	Valley Grassland (Annual Grassland)
39	ACACIA	----	SAF 70	Longleaf Pine - rough age 3
40	AILANTHUS	ALTISSIMA	SAF 70	Longleaf Pine - rough age 3
41	ALNUS	RUBRA	NVCS 1371	Alnus rubra Forest
42	MALUS	----	SAF 70	Longleaf Pine - rough age 3
43	FRAXINUS	AMERICANA	NVCS 2030	Acer saccharinum - Fraxinus americana - Tilia americana Forest
44	TILIA	AMERICANA	NVCS 1360	Acer saccharum - Tilia americana - (Quercus rubra) Forest
45	FAGUS	GRANDIFOLIA	NVCS 1420	Fagus grandifolia - Acer saccharum - (Liriodendron tulipifera) Forest
46	BETULA	NIGRA	SAF 70	Longleaf Pine - rough age 3
47	BUMELIA	LANUGINOSA	SAF 70	Longleaf Pine - rough age 3
48	MELALEUCA	QUINQUENERVIA	SAF 70	Longleaf Pine - rough age 3
49	UMBELLULARIA	CALIFORNICA	SAF 70	Longleaf Pine - rough age 3
51	CASTANEA	DENTATA	SAF 70	Longleaf Pine - rough age 3
52	CATALPA	----	SAF 70	Longleaf Pine - rough age 3
53	CHAMAECYPARIS	NOOTKATENSIS	NVCS 660	Chamaecyparis nootkatensis Forest
54	THUJA	OCCIDENTALIS	SAF 83	Longleaf Pine - Slash Pine - rough age 3
55	AESCULUS	OCTANDRA	SAF 70	Longleaf Pine - rough age 3
56	MELIA	AZEDARACH	SAF 70	Longleaf Pine - rough age 3
58	TAXODIUM	MUCRONATUM	SAF 70	Longleaf Pine - rough age 3
59	CORNUS	FLORIDA	SAF 70	Longleaf Pine - rough age 3
60	PSEUSOTSUGA	MENZIESII	SAF 70	Longleaf Pine - rough age 3
61	OSTRYA	VIRGINIANA	NVCS 5370	Juniperus virginiana - (Fraxinus americana, ostrya virginiana) Woodland
63	ULMUS	AMERICANA	NVCS 2310	Quercus texana,Celtis laevigata,Ulmus(americana,crassifolia),Gleditsia tricanthos)
64	EUCALYPTUS	----	SAF 70	Longleaf Pine - rough age 3
65	ABIES	BALSAMEA	SAF 51	White Pine - Chestnut Oak
66	ABIES	MAGNIFICA	NVCS 631	Abies magnifica Forest
67	ABIES	LASIOCARPA	NVCS 881	Abies lasiocarpa Forest
69	ABIES	GRANDIS	NVCS 621	Abies grandis Forest
70	ABIES	PROCERA	SAF 70	Longleaf Pine - rough age 3
71	ABIES	AMABILIS	NVCS 570	Abies amabilis - Abies concolor Forest
73	ABIES	MAGNIFICA SHASTENSIS	SAF 70	Longleaf Pine - rough age 3
74	ABIES	----	SAF 70	Longleaf Pine - rough age 3
75	ABIES	LASIOCARPA ARIZONICA	SAF 70	Longleaf Pine - rough age 3
76	ABIES	CONCOLOR	NVCS 570	Abies amabilis - Abies concolor Forest
77	GLEDITSIA	TRIACANTHOS	SAF 70	Longleaf Pine - rough age 3
78	CELTIS	OCCIDENTALIS	SRM 604	Bluestem - Grama Prairie
79	CRATAEGUS	----	SAF 70	Longleaf Pine - rough age 3

Cross-walk of BELD Vegetation Types to FOFEM Forest Classification Types

BELD	Genus	Species	FOFEM ID	FOFEM Cover Description
80	TSUGA	----	SAF 70	Longleaf Pine - rough age 3
81	CARYA	OVATA	NVCS 1380	Carya (glabra, ovata) - Fraxinus americana - Quercus (alba, rubra) Forest
82	ILEX	OPACO	SAF 70	Longleaf Pine - rough age 3
83	CARPINUS	CAROLINIANA	SAF 70	Longleaf Pine - rough age 3
84	CALOCEDRUS	DECURRENS	NVCS 650	Calocedrus decurrens - Pseudotsuga menziesii Forest
85	JUNIPERUS	VIRGINIANA	NVCS 5370	Juniperus virginiana - (Fraxinus americana, ostrya virginiana) Woodland
86	GYMNOCLADUS	DIOICUS	SAF 70	Longleaf Pine - rough age 3
87	LARIX	LARICINA	SAF 98	Pond Pine
88	GORDONIA	LASIANTHUS	SAF 70	Longleaf Pine - rough age 3
89	ARBUTUS	MENZIESII	NVCS 790	Pseudotsuga menziesii - Arbutus menziesii Forest
90	MAGNOLIA	GRANDIFLORA	SRM 910	Hairgrass
91	CERCOCARPUS	LEDIFOLIUS	NVCS 6461	Cercocarpus ledifolius Shrubland
92	ACER	GRANDIDENTATUM	NVCS 1301	Acer grandidentatum Lowland Forest
93	ACER	MACROPHYLLUM	NVCS 3350	Pseudotsuga menziesii - Acer macrophyllum Forest
94	ACER	NIGRUM	SAF 27	Sugar Maple
95	ACER	NEGUNDO	SRM 404	Threetip Sagebrush
96	ACER	BARBATUM	SAF 70	Longleaf Pine - rough age 3
97	ACER	SPICATUM	SAF 70	Longleaf Pine - rough age 3
98	ACER	PLATANOIDES	SAF 70	Longleaf Pine - rough age 3
99	ACER	RUBRUM	NVCS 5270	Acer rubrum Saturated Woodland
100	ACER	GLABRUM	SAF 70	Longleaf Pine - rough age 3
101	ACER	SACCHARINUM	NVCS 2030	Acer saccharinum - Fraxinus americana - Tilia americana Forest
103	ACER	PENSYLVANICUM	SAF 70	Longleaf Pine - rough age 3
104	ACER	SACCHARUM	NVCS 1320	Acer saccharum - Betula alleghaniensis - (Fagus grandifolia) Forest
105	PROSOPIS	----	SAF 70	Longleaf Pine - rough age 3
106	MISCELLANEOUS	HD SPP	SAF 70	Longleaf Pine - rough age 3
108	SORBUS	AMERICANA	SAF 70	Longleaf Pine - rough age 3
109	MORUS	RUBRA	SAF 70	Longleaf Pine - rough age 3
110	NYSSA	SYLVATICA	SAF 70	Longleaf Pine - rough age 3
111	QUERCUS	ARIZONICA	SAF 70	Longleaf Pine - rough age 3
112	QUERCUS	ILICIFOLIA	NVCS 7200	Quercus ilicifolia Shrubland
113	QUERCUS	VELUTINA	NVCS 3320	Pinus virginiana - Quercus (alba, stellata, falcata, velutina) Forest
114	QUERCUS	MARILANDICA	NVCS 3000	Juniperus virginiana - Quercus (stellata, velutina, marilandica) Forest
115	QUERCUS	DOUGLASII	SAF 70	Longleaf Pine - rough age 3
116	QUERCUS	INCANA	NVCS 5320	Quercus hemisphaerica - Quercus margarettiae - Quercus incana Woodland
117	QUERCUS	MACROCARPA	NVCS 11951	Quercus macrocarpa - (Quercus alba) Wooded Herbland
118	QUERCUS	KELLOGGII	NVCS 5130	Quercus kelloggii Temporarily Flooded Woodland
119	QUERCUS	AGRIFOLIA	SAF 70	Longleaf Pine - rough age 3

Cross-walk of BELD Vegetation Types to FOFEM Forest Classification Types

BELD	Genus	Species	FOFEM ID	FOFEM Cover Description
120	QUERCUS	LOBATA	NVCS 4940	Quercus lobata Woodland
121	QUERCUS	CHRYSOLEPIS	SAF 59	Yellow Poplar - White Oak - Northern Red Oak
122	QUERCUS	PRINUS	NVCS 3330	Pinus virginiana - Quercus (coccinea, prinus) Forest
123	QUERCUS	MUEHLENBERGII	NVCS 2990	Juniperus virginiana - Quercus (muehlenbergii, stellata) Forest
124	QUERCUS	STELLATA	NVCS 2990	Juniperus virginiana - Quercus (muehlenbergii, stellata) Forest
125	QUERCUS	DURANDII	SAF 70	Longleaf Pine - rough age 3
126	QUERCUS	EMORYI	SAF 70	Longleaf Pine - rough age 3
127	QUERCUS	ENGELMANNII	SAF 70	Longleaf Pine - rough age 3
128	QUERCUS	----	SAF 70	Longleaf Pine - rough age 3
129	QUERCUS	GAMBELII	NVCS 7181	Quercus gambelii Shrubland
130	QUERCUS	WISLIZENNI	SAF 70	Longleaf Pine - rough age 3
131	QUERCUS	LAURIFOLIA	NVCS 3460	Pinus taeda - Quercus (phellos, nigra, laurifolia)
132	QUERCUS	VIRGINIANA	SAF 22	White Pine - Hemlock
133	QUERCUS	OBLONGIFOLIA	SAF 70	Longleaf Pine - rough age 3
134	QUERCUS	ELLIPSOIDALIS	NVCS 11960	Quercus velutina - (Quercus ellipsoidalis) Wooded Herbland
135	QUERCUS	RUBRA	NVCS 1360	Acer saccharum - Tilia americana - (Quercus rubra) Forest
136	QUERCUS	NUTTALLII	SAF 70	Longleaf Pine - rough age 3
137	QUERCUS	GARRYANA	NVCS 5510	Pseudotsuga menziesii - Quercus garryana Woodland
138	QUERCUS	LYRATA	NVCS 2550	Quercus lyrata - (Carya aquatica) Seasonally Flooded Forest
139	QUERCUS	PALUSTRIS	NVCS 2560	Quercus palustris - (Quercus bicolor) Seasonally Flooded Forest
140	QUERCUS	STELLATA	NVCS 1570	Quercus alba - Quercus (falcata, stellata) Forest
141	QUERCUS	COCCINEA	NVCS 1590	Quercus coccinea - Quercus falcata Forest
142	QUERCUS	----	SAF 70	Longleaf Pine - rough age 3
143	QUERCUS	IMBRICARIA	SAF 70	Longleaf Pine - rough age 3
144	QUERCUS	SHUMARDII	NVCS 3450	Pinus taeda - Quercus (pagoda, michauxii, shumardii)
145	QUERCUS	HYPOLEUCOIDES	SAF 70	Longleaf Pine - rough age 3
146	QUERCUS	FALCATA	NVCS 3280	Pinus taeda - Quercus (alba, falcata, stellata) Forest
147	QUERCUS	----	SAF 70	Longleaf Pine - rough age 3
148	QUERCUS	MICHAUXII	NVCS 2760	Quercus michauxii - Quercus pagoda Saturated Forest
149	QUERCUS	FALCATA	NVCS 3200	Pinus palustris,Pinus(echinata,taeda),Quercus(incana,margarettiae,falcata,laevis
150	QUERCUS	BICOLOR	NVCS 2260	Quercus macrocarpa - Quercus bicolor - (Carya laciniosa)
151	QUERCUS	LAEVIS	NVCS 1610	Quercus laevis Forest
152	QUERCUS	NIGRA	NVCS 3460	Pinus taeda - Quercus (phellos, nigra, laurifolia)
153	QUERCUS	ALBA	NVCS 1540	Quercus alba - (Quercus nigra) Forest
154	QUERCUS	PHELLOS	NVCS 2300	Quercus phellos - Ulmus crassifolia
155	MACLURA	POMIFERA	SAF 70	Longleaf Pine - rough age 3
156	PAULOWNIA	TOMENTOSA	SAF 70	Longleaf Pine - rough age 3
157	ASIMINA	TRILOBA	SAF 70	Longleaf Pine - rough age 3

Cross-walk of BELD Vegetation Types to FOFEM Forest Classification Types

BELD	Genus	Species	FOFEM ID	FOFEM Cover Description
158	DIASPYROS	VIRGINIANA	SAF 70	Longleaf Pine - rough age 3
162	PINUS	MURICATA	SAF 70	Longleaf Pine - rough age 3
164	PINUS	ARISTATA	NVCS 3931	Pinus aristata Woodland
165	PINUS	LEIOPHYLLA	SAF 70	Longleaf Pine - rough age 3
166	PINUS	COULTERI	SAF 70	Longleaf Pine - rough age 3
167	PINUS	SABINIANA	SAF 70	Longleaf Pine - rough age 3
168	PINUS	STROBUS	NVCS 530	Pinus strobus Forest
169	PINUS	BALFOURIANA	SAF 70	Longleaf Pine - rough age 3
170	PINUS	BANKSIANA	NVCS 390	Pinus banksiana Forest
171	PINUS	JEFFERYI	SAF 70	Longleaf Pine - rough age 3
172	PINUS	ATTENUATA	NVCS 3940	Pinus attenuata Woodland
173	PINUS	FLEXILIS	NVCS 4051	Pinus flexilis Woodland
174	PINUS	TAEDA	NVCS 550	Pinus taeda Forest
175	PINUS	CONTORTA	NVCS 411	Pinus contorta Forest
176	PINUS	PALUSTRIS	NVCS 3200	Pinus palustris,Pinus(echinata,taeda),Quercus(incana,margarettiae,falcata,laevis
177	PINUS	RADIATA	SAF 84	Slash Pine - rough age 3
178	PINUS	MONOPHYLLA	NVCS 4091	Pinus monophylla Woodland
179	PINUS	DISCOLOR	NVCS 4011	Pinus discolor Woodland
180	PINUS	EDULIS	NVCS 431	Pinus edulis Forest
181	PINUS	RIGIDA	NVCS 4230	Pinus virginiana - Pinus rigida Woodland
182	PINUS	SEROTINA	NVCS 4620	Pinus palustris - Pinus serotina Saturated Woodland
183	PINUS	PONDEROSA	NVCS 481	Pinus ponderosa - Pseudotsuga menziesii Forest
184	PINUS	RESINOSA	NVCS 510	Pinus resinosa Forest
185	PINUS	CLAUSA	NVCS 400	Pinus clausa Forest
186	PINUS	SYLVESTRIS	SAF 70	Longleaf Pine - rough age 3
187	PINUS	ECHINATA	NVCS 420	Pinus echinata Forest
188	PINUS	ELLIOTTII	NVCS 250	Pinus elliottii Tropical Forest
189	PINUS	GLABRA	SAF 70	Longleaf Pine - rough age 3
190	PINUS	LAMBERTIANA	SAF 70	Longleaf Pine - rough age 3
191	PINUS	STROBIFORMIS	SAF 70	Longleaf Pine - rough age 3
192	PINUS	PUNGENS	SAF 70	Longleaf Pine - rough age 3
193	PINUS	VIRGINIANA	NVCS 3310	Pinus virginiana - Liquidambar styraciflua - Liriodendron tulipifera Forest
195	PINUS	ALBICAULIS	NVCS 381	Pinus albicaulis Forest
196	PINUS	MONTICOLA	NVCS 451	Pinus monticola Forest
198	POPULUS	GRANDIDENTATA	SAF 70	Longleaf Pine - rough age 3
199	PRUNUS	----	SAF 70	Longleaf Pine - rough age 3
200	CERCIS	CANADENSIS	SAF 70	Longleaf Pine - rough age 3
201	ROBINIA	PSEUDOACACIA	SAF 70	Longleaf Pine - rough age 3

Cross-walk of BELD Vegetation Types to FOFEM Forest Classification Types

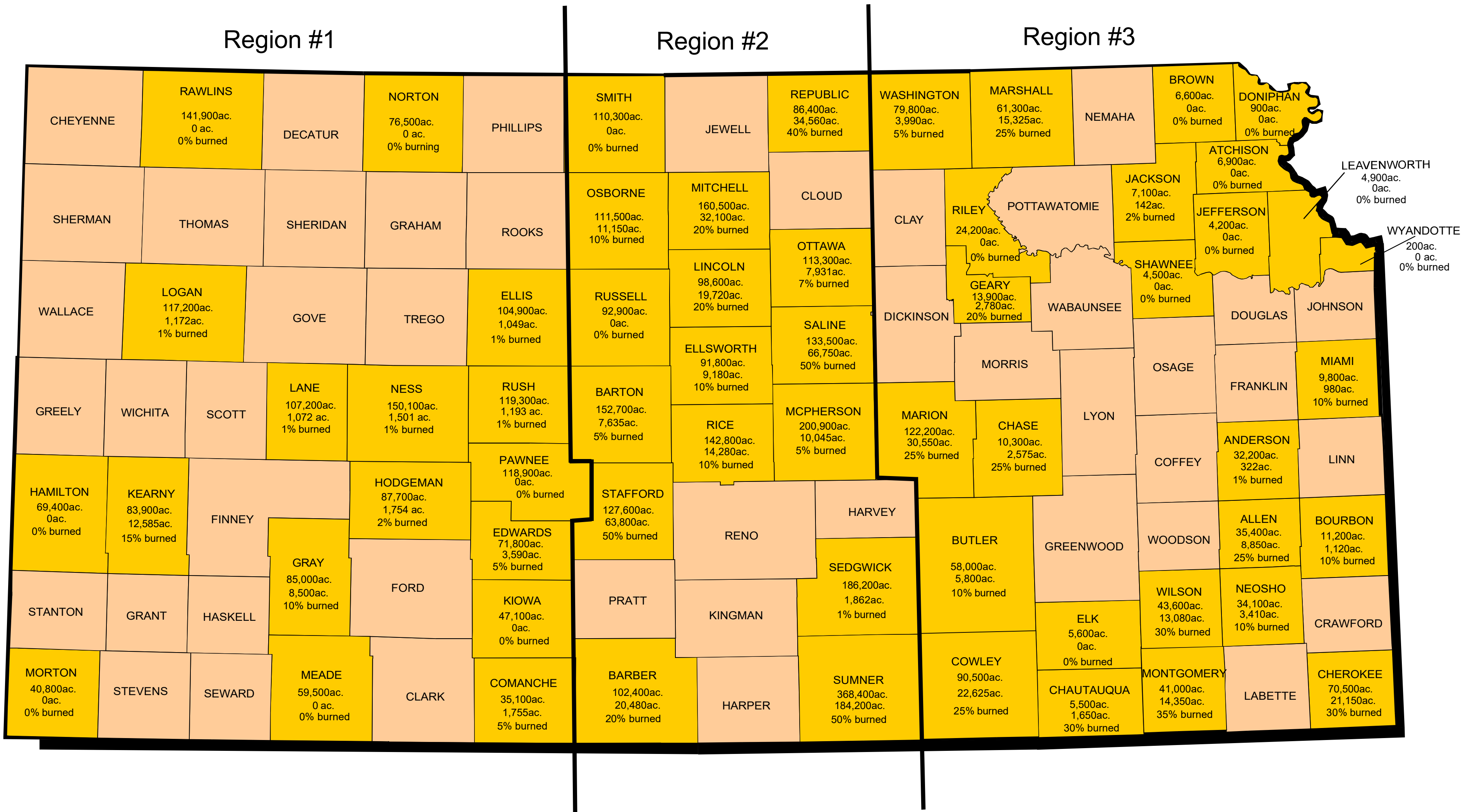
BELD	Genus	Species	FOFEM ID	FOFEM Cover Description
202	SASSAFRAS	ALBIDUM	SAF 70	Longleaf Pine - rough age 3
203	SEQUOIA	SEMPERVIRENS	NVCS 310	Sequoia sempervirens - Tsuga heterophylla Forest
204	AMELANCHIER	ARBOREA	SAF 70	Longleaf Pine - rough age 3
205	HALESIA	----	SAF 70	Longleaf Pine - rough age 3
206	COTINUS	OBOVATUS	SAF 70	Longleaf Pine - rough age 3
207	SAPINDUS	DRUMMONDII	SAF 70	Longleaf Pine - rough age 3
208	OXYDENDRUM	ARBORETUM	SAF 70	Longleaf Pine - rough age 3
209	VACCINIUM	ARBOREUM	SAF 70	Longleaf Pine - rough age 3
210	PICEA	MARIANNA	SAF 70	Longleaf Pine - rough age 3
211	PICEA	PUNGENS	NVCS 731	Picea pungens Forest
212	PICEA	BREWERIANA	SAF 70	Longleaf Pine - rough age 3
213	PICEA	ENGELMANNII	NVCS 691	Picea engelmannii Forest
214	PICEA	ABIES	SAF 70	Longleaf Pine - rough age 3
215	PICEA	RUBENS	SAF 84	Slash Pine - rough age 3
216	PICEA	SITCHENSIS	NVCS 760	Picea sitchensis Forest
217	PICEA	----	SAF 70	Longleaf Pine - rough age 3
218	PICEA	GLAUCA	NVCS 711	Picea glauca Forest
219	LIQUIDAMBAR	STYRACIFLUA	NVCS 3270	Pinus taeda - (Liquidambar styraciflua - Liriodendron tulipifera) Forest
220	PLATANUS	OCCIDENTALIS	NVCS 3440	Pinus taeda - Platanus occidentalis - Acer negundo Temporarily Flooded Forest
221	SAPIUM	SEBIFERUM	SAF 70	Longleaf Pine - rough age 3
222	TAMARIX	CHINENSIS	SAF 70	Longleaf Pine - rough age 3
223	LITHOCARPUS	DENSIFLORUS	SAF 70	Longleaf Pine - rough age 3
224	TORREYA	CALIFORNICA	SAF 70	Longleaf Pine - rough age 3
225	ALEURITES	FORDII	SAF 70	Longleaf Pine - rough age 3
226	UNKNOWN	----	SAF 70	Longleaf Pine - rough age 3
227	JUGLANS	NIGRA	SAF 70	Longleaf Pine - rough age 3
228	PLANERA	AQUATICA	SRM 723	Sea Oats
229	SALIX	NIGRA	SAF 104	Sweetbay - Swamp Tupelo - Redbay
230	LIRIODENDRON	TULIPIFERA	NVCS 1420	Tamarack
231	CLADRASTIS	LUTEA	SAF 70	Longleaf Pine - rough age 3

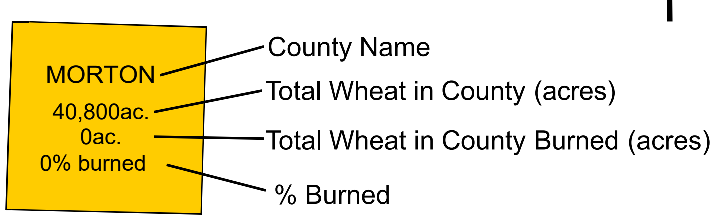
APPENDIX C

MAPS OF KANSAS AGRICULTURAL SUBREGIONS

KANSAS

Acres of Wheat Burned/Year



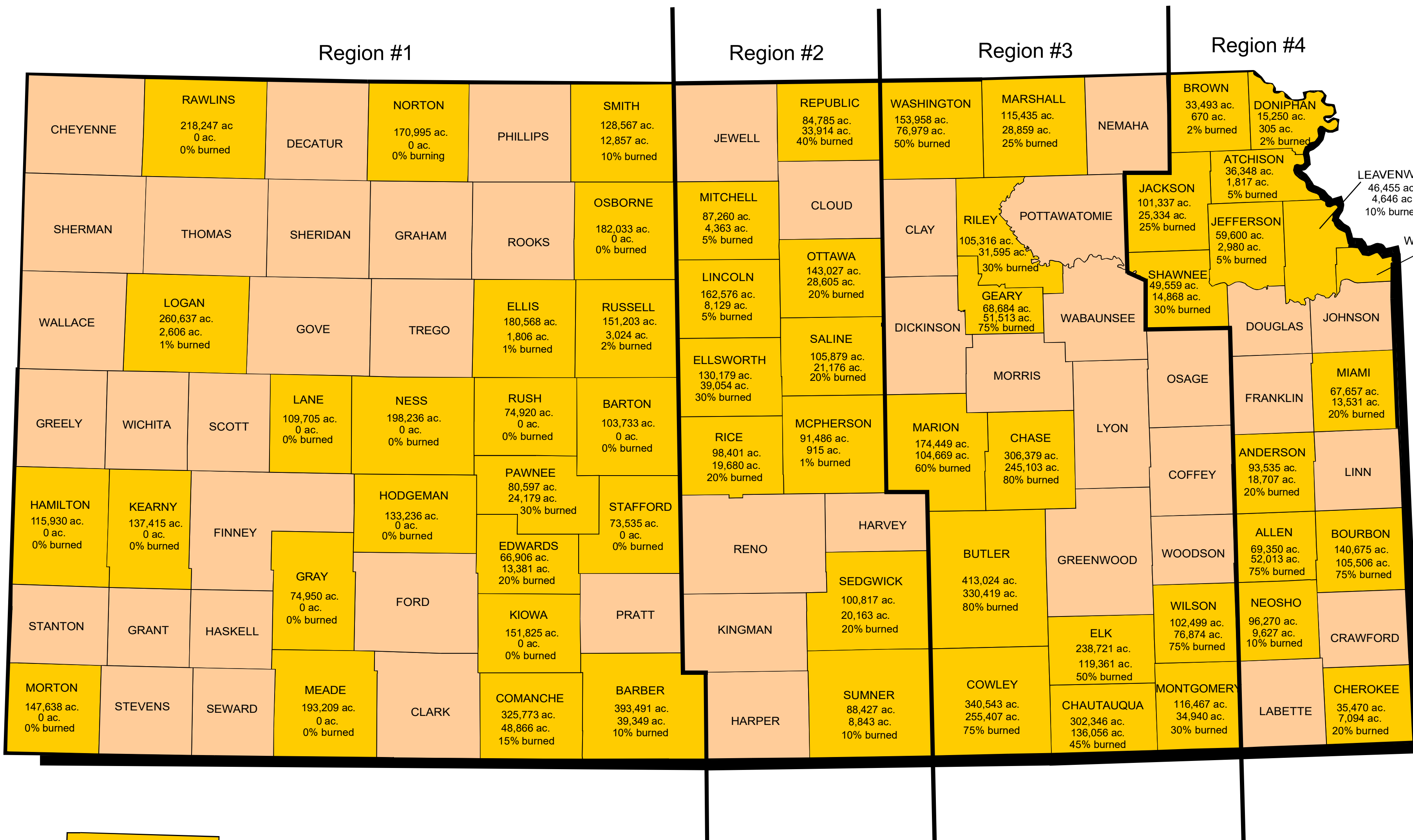


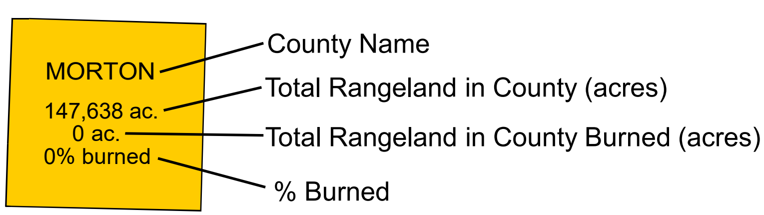
*Note - Data supplied by Sonoma Technology, Inc. April 2004

*Note - Wheat regions verified by Bill Hargrove at Kansas State University Agriculture Extension Office

KANSAS

Acres of Rangeland Burned/Year





*Note - Data supplied by Sonoma Technology, Inc
April 2004
Appendix A of Final Report (STI-902514-2516-FR)

APPENDIX B

TABULATION OF EMISSIONS ESTIMATES FOR THE CENRAP REGION

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Table B-1. Annual emissions by state and source category.

State	Burn Type	Acres Burned	Emissions (tons/year)						
			PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2	NH_3	VOC
Arkansas	Prescribed Burning	244,146	28,130	23,838	302,219	1,961	1,577	2,910	17,444
	Rangeland Burning	3,061	62	52	307	44	15	7	29
	Cropland Burning	652,246	10,709	10,175	74,223	3,648	622	2,094	6,225
	Wheat	*354,209*	*5,968*	*5,691*	*40,116*	*1,514*	*202*	*1,077*	*2,798*
	Hay/Alfalfa	*8,050*	*73*	*70*	*599*	*18*	*2*	*13*	*40*
	Sugarcane	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Corn	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Soybeans	*67,398*	*2,564*	*2,445*	*14,342*	*379*	*51*	*270*	*1,818*
	Rice	*222,589*	*2,104*	*1,970*	*19,165*	*1,736*	*367*	*735*	*1,569*
	Other	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Total	899,453	38,901	34,065	376,749	5,653	2,214	5,011	23,698
Iowa	Prescribed Burning	21,449	4,072	3,457	44,542	166	195	257	2,547
	Rangeland Burning	0	0	0	0	0	0	0	0
	Cropland Burning	2,247	44	42	145	5	1	4	20
	Wheat	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Hay/Alfalfa	*1,660*	*29*	*27*	*81*	*3*	*0*	*2*	*13*
	Sugarcane		*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Corn		*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Soybeans		*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Rice		*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Other	*587*	*15*	*14*	*64*	*2*	*0*	*2*	*7*
	Total	23,696	4,116	3,498	44,688	171	195	261	2,567
Kansas	Prescribed Burning	38,106	1,450	1,226	14,424	228	114	143	881
	Rangeland Burning	3,625,270	75,943	52,901	652,250	23,185	10,160	7,487	43,483
	Cropland Burning	1,390,520	23,227	22,156	153,313	5,909	777	3,950	11,401
	Wheat	*1,058,014*	*17,420*	*16,610*	*118,902*	*4,523*	*603*	*3,216*	*8,194*
	Hay/Alfalfa	*189,085*	*2,252*	*2,148*	*12,701*	*408*	*54*	*290*	*1,143*
	Sugarcane	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Corn	*126,956*	*3,039*	*2,906*	*18,902*	*880*	*107*	*373*	*1,760*
	Soybeans	*9,996*	*210*	*200*	*1,252*	*34*	*5*	*24*	*154*
	Rice	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Other	*6,469*	*306*	*292*	*1,557*	*65*	*9*	*46*	*150*
	Total	5,053,896	100,620	76,283	819,987	29,322	11,052	11,579	55,765
Louisiana	Prescribed Burning	350,353	45,288	38,376	486,668	3,125	2,531	4,671	28,060
	Rangeland Burning	29,540	613	491	3,597	372	128	65	305
	Cropland Burning	456,901	7,771	7,397	66,203	3,474	482	2,388	6,762
	Wheat	*114,661*	*2,189*	*2,087*	*13,570*	*490*	*65*	*349*	*998*
	Hay/Alfalfa	*5,763*	*90*	*85*	*401*	*13*	*2*	*9*	*36*
	Sugarcane	*296,994*	*4,930*	*4,693*	*48,113*	*2,673*	*356*	*1,901*	*5,346*
	Corn	*5,817*	*139*	*133*	*866*	*40*	*5*	*17*	*81*

Table B-1. Annual emissions by state and source category.

State	Burn Type	Acres Burned	PM10	PM2.5	CO	NO_x	SO2	NH3	VOC
			Emissions (tons/year)						
	Soybeans	*2,418*	*128*	*122*	*562*	*14*	*2*	*10*	*81*
	Rice	*31,248*	*295*	*277*	*2,691*	*244*	*52*	*103*	*220*
	Other	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Total	836,794	53,672	46,264	556,468	6,970	3,140	7,124	35,126
Minnesota	Prescribed Burning	86,642	17,222	14,609	187,853	742	836	1,150	10,740
	Rangeland Burning	17,314	358	216	3,904	16	25	33	228
	Cropland Burning	84,611	1,587	1,513	8,621	341	44	215	928
	Wheat	*7,962*	*132*	*126*	*897*	*34*	*5*	*24*	*62*
	Hay/Alfalfa	*28,503*	*402*	*383*	*1,565*	*56*	*8*	*40*	*211*
	Sugarcane	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Corn	*14,223*	*341*	*326*	*2,118*	*99*	*12*	*42*	*197*
	Soybeans	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Rice	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Other	*33,923*	*712*	*678*	*4,041*	*153*	*20*	*109*	*458*
	Total	188,567	19,167	16,338	200,378	1,100	905	1,398	11,895
Missouri	Prescribed Burning	64,781	7,460	6,338	80,019	536	417	756	4,633
	Rangeland Burning	109,160	2,281	1,763	15,244	1,182	415	228	1,182
	Cropland Burning	181,818	2,677	2,551	17,845	725	105	465	1,317
	Wheat	*94,279*	*1,546*	*1,474*	*10,581*	*403*	*54*	*287*	*728*
	Hay/Alfalfa	*63,545*	*767*	*732*	*4,590*	*143*	*19*	*102*	*353*
	Sugarcane	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Corn	*8,837*	*212*	*202*	*1,316*	*61*	*7*	*26*	*123*
	Soybeans	*458*	*13*	*12*	*92*	*3*	*0*	*2*	*10*
	Rice	*14,673*	*139*	*130*	*1,263*	*114*	*24*	*48*	*103*
	Other	*26*	*1*	*1*	*3*	*0*	*0*	*0*	*0*
	Total	355,759	12,419	10,652	113,107	2,443	937	1,448	7,132
Nebraska	Prescribed Burning	6,127	410	347	4,316	36	24	27	254
	Rangeland Burning	114,807	2,403	1,468	25,863	152	179	223	1,520
	Cropland Burning	100,719	2,244	2,140	14,439	491	65	330	1,430
	Wheat	*47,336*	*656*	*625*	*5,039*	*202*	*27*	*144*	*324*
	Hay/Alfalfa	*5,430*	*72*	*68*	*323*	*11*	*1*	*8*	*38*
	Sugarcane	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Corn	*9,430*	*226*	*216*	*1,404*	*65*	*8*	*28*	*131*
	Soybeans	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Rice	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Other	38,523	1,291	1,231	7,673	212	28	151	938
	Total	221,653	5,057	3,956	44,619	679	268	580	3,205
Oklahoma	Prescribed Burning	104,749	7,322	6,196	76,615	750	479	769	4,507
	Rangeland Burning	1,830,017	38,117	28,443	280,780	16,885	6,419	3,890	20,578

Table B-1. Annual emissions by state and source category.

State	Burn Type	Acres Burned	Emissions (tons/year) PM10	PM2.5	CO	NO_x	SO2	NH3	VOC
	Cropland Burning	473,342	7,114	6,785	47,157	1,760	234	1,234	3,414
	Wheat	*325,838*	*5,197*	*4,955*	*36,238*	*1,393*	*186*	*991*	*2,465*
	Hay/Alfalfa	*137,707*	*1,690*	*1,612*	*9,464*	*302*	*40*	*214*	*815*
	Sugarcane	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Corn	*8,879*	*213*	*203*	*1,322*	*62*	*7*	*26*	*123*
	Soybeans	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Rice	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Other	*918*	*15*	*14*	*133*	*4*	*0*	*3*	*11*
	Total	2,408,108	52,552	41,424	404,551	19,395	7,131	5,893	28,499
Texas	Prescribed Burning	137,310	12,669	10,732	134,423	1,071	757	1,427	7,824
	Rangeland Burning	3,576,810	101,580	71,407	1,033,500	12,979	8,637	12,114	61,961
	Cropland Burning	221,771	3,129	2,986	18,929	668	89	459	1,435
	Wheat	*39,472*	*729*	*695*	*4,615*	*169*	*22*	*120*	*334*
	Hay/Alfalfa	*161,566*	*1,895*	*1,808*	*11,711*	*364*	*49*	*258*	*887*
	Sugarcane	*501*	*8*	*8*	*81*	*5*	*1*	*3*	*9*
	Corn	*7,481*	*179*	*171*	*1,114*	*52*	*6*	*22*	*104*
	Soybeans	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Rice	*640*	*6*	*6*	*55*	*5*	*1*	*2*	*5*
	Other	*12,111*	*312*	*298*	*1,352*	*75*	*10*	*53*	*97*
	Total	3,935,891	117,378	85,125	1,186,851	14,718	9,482	14,000	71,220
All States	Prescribed Burning	1,053,663	124,023	105,119	1,331,080	8,615	6,929	12,111	76,889
	Rangeland Burning	9,305,979	221,357	156,742	2,015,445	54,815	25,977	24,046	129,287
	Cropland Burning	3,564,175	58,501	55,744	400,874	17,021	2,418	11,139	32,931
	Wheat	*2,041,771*	*33,836*	*32,263*	*229,956*	*8,729*	*1,164*	*6,207*	*15,903*
	Hay/Alfalfa	*601,309*	*7,269*	*6,934*	*41,436*	*1,318*	*176*	*937*	*3,535*
	Sugarcane	*297,495*	*4,938*	*4,700*	*48,194*	*2,678*	*357*	*1,904*	*5,355*
	Corn	*181,623*	*4,348*	*4,157*	*27,041*	*1,259*	*152*	*534*	*2,517*
	Soybeans	*80,270*	*2,915*	*2,779*	*16,248*	*429*	*57*	*305*	*2,062*
	Rice	*269,150*	*2,544*	*2,382*	*23,174*	*2,099*	*444*	*888*	*1,898*
	Other	*92,557*	*2,652*	*2,528*	*14,824*	*510*	*67*	*364*	*1,661*
	Total	13,923,817	403,882	317,605	3,747,399	80,451	35,324	47,295	239,107

APPENDIX C

ASSESSMENT OF INFLUENCE FROM PRESCRIBED BURNING ON CLASS I SITES USING AMBIENT SPECIATED $PM_{2.5}$ DATA

C.1 OBJECTIVE AND APPROACH

The objective of this task was to use ambient speciated $PM_{2.5}$ data from Class I areas (from the IMPROVE network) in the CENRAP states along with the planned burning emissions estimated in this study to assess whether ambient data can be used to identify planned burning contributions to visibility events in Class I areas, and to perform a preliminary assessment of the impact of planned burns on $PM_{2.5}$ and visibility The following approach was employed:

- Assess the seasonal chemical compositions of $PM_{2.5}$ mass and aerosol light extinction in order to determine what individual species are important to the mass and visibility extinction in the area.
- Determine seasonal concentrations of and ratios between selected species, such as OC, EC and K, to establish a "baseline" average seasonal composition for comparison to days of poor visibility and days potentially influenced by prescribed burning.
- Assess chemical compositions of $PM_{2.5}$ and aerosol light extinction on the 20% best and 20% worst visibility days to determine what species have a large impact on visibility (i.e., are species from burning typically important in visibility reduction?).
- Analyze IMPROVE data, specifically OC, EC, and K concentrations, on dates when extensive burning occurred nearby a monitoring site in order to assess whether wood smoke influences are seen in the ambient measurements and significantly impacts visibility.
- Analyze emissions data on days when elevated OC, EC and K concentrations occurred at IMPROVE sites in order to determine whether days of elevated concentrations corresponded to known burns in the emission inventory data.
- Analyze air mass trajectories on selected days to determine whether meteorology (i.e., transport) explains the observed effects and to determine the extent to which meteorology affects haze

C.2 AMBIENT MONITORING DATA

We analyzed ambient monitoring data from IMPROVE stations in order to assess the potential effect of prescribed burning emissions on visibility in the CENRAP region. We used ambient data from two IMPROVE stations located in Arkansas, Caney Creek (CACR1) and Upper Buffalo Wilderness (UPBU1). At the time of analysis, these sites were located in the area with the highest resolved fire histories, which would allow the best chance of showing direct influence between prescribed burning and ambient Class 1 data. **Figure C-1** shows the locations of IMPROVE stations in the CENRAP region, along with the point locations of prescribed burns that were available from the 2002 emissions inventory.

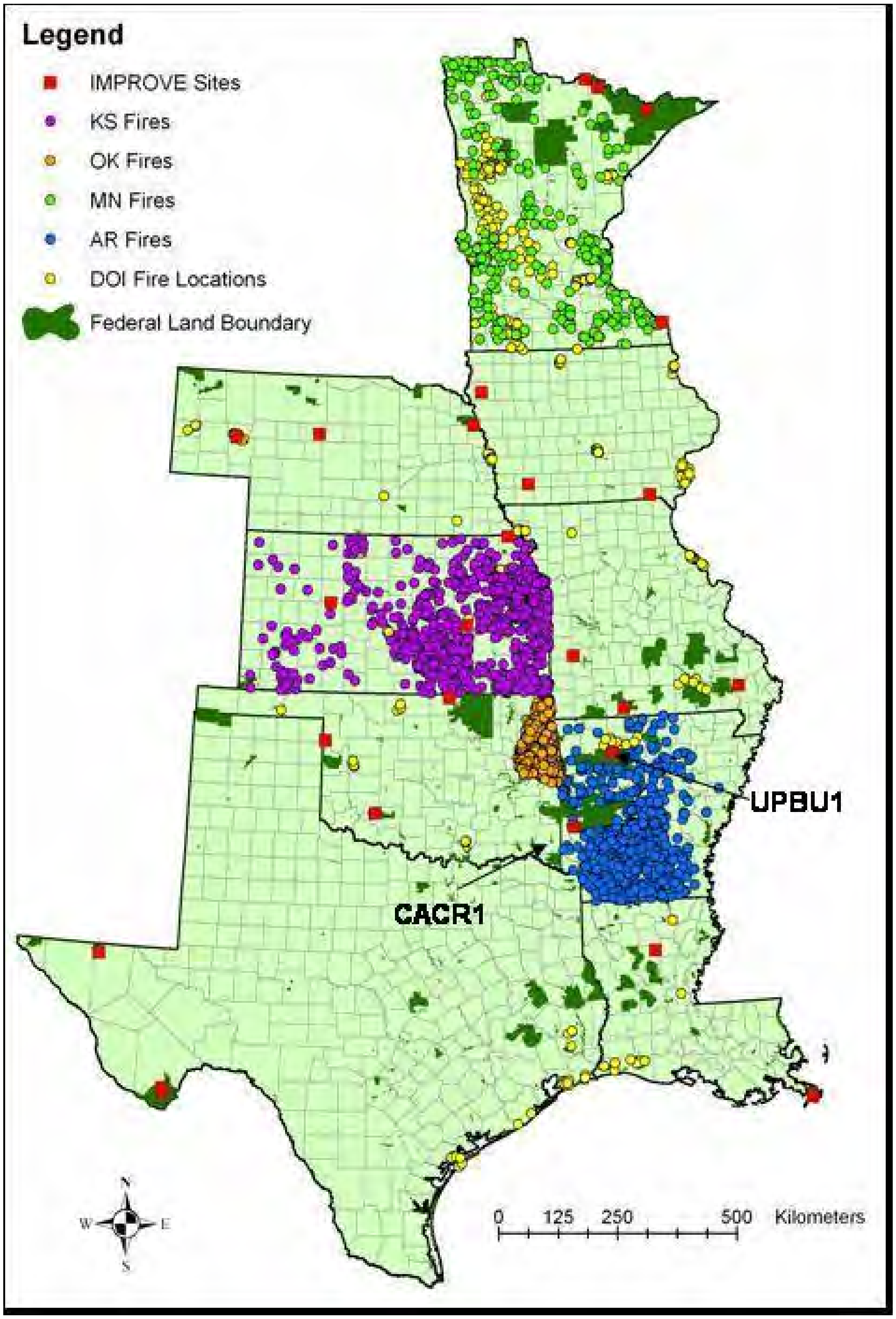


Figure C-1. IMPROVE station and fire locations.

We acquired data from the two ambient monitoring stations from the online IMPROVE database (http://vista.cira.colostate.edu/improve/). Specifically, we obtained values of all available parameters for the years 2000, 2001, and 2002, during which years the IMPROVE network collected 24-hr samples once every three days. Although the emissions inventory included fires only from 2002, IMPROVE data from all three years were used to ensure a robust

statistical analysis of seasonal and annual aerosol compositions and species ratios. **Table C-1** summarizes the number of complete samples that we obtained from the IMPROVE database for 2000 through 2002 and for 2002 alone. The complete samples were cases in which all key species in our analysis were available: elemental carbon (EC), organic carbon (OC), potassium (K), ammonium nitrate (NH_4NO_3), and ammonium sulfate ($(NH_4)_2SO_4$).

Table C-1. Number of complete samples available from 2000–2002 and from 2002 at Caney Creek and Upper Buffalo Wilderness.

Site	N samples (2000 – 2002)	N samples (2002)
Caney Creek	254	110
Upper Buffalo Wilderness	318	117

In analyzing the ambient monitoring data with respect to fire activity data, we focused on species that generally characterize fine particulate aerosols and species that derive from wood smoke: elemental carbon (EC), organic carbon mass (OCM), ammonium nitrate (NH_4NO_3), ammonium sulfate ($(NH_4)_2SO_4$), potassium (K), non-soil potassium (KNS), and a composite of species that derive from soils (GEO). Several of the parameters were calculated from measured values according to IMPROVE protocol, as summarized in **Table C-2**.

Table C-2. IMPROVE algorithms for mass concentrations of fine aerosol species.

Species	Abbreviation	IMPROVE Calculation
Organic Carbon Mass	OCM	1.4*[organic carbon]
Ammonium Nitrate	NH_4NO_3	1.29*[nitrate]
Ammonium Sulfate	$(NH_4)_2SO_4$	4.125*[sulfur]
Non-soil Potassium	KNS	[potassium]-0.6*[iron]
Soil Elements	Soil	2.20*[aluminum]+2.49*[silicon]+1.63*[calcium] +2.42*[iron]+1.94*[titanium]

The IMPROVE algorithm for OCM adjusts the measured OC value for other elements associated with carbon molecules, such as oxygen and hydrogen, and it relies on the assumption that the average organic molecule contains 70% carbon. The ammonium nitrate and ammonium sulfate algorithms assume that nitrate and sulfate ions are fully neutralized by NH_4^+. The ammonium sulfate algorithm also assumes that all elemental sulfur is in the form of sulfate, and it converts the mass of elemental sulfur to ammonium sulfate using 4.125, which is the ratio of the molecular weight of ammonium sulfate (132 g/mol) to the molecular weight of elemental sulfur (32 g/mol). Similarly, the ammonium nitrate algorithm multiplies the nitrate concentration by the ratio (1.29) of the molecular weight of ammonium nitrate (80 g/mol) to the molecular weight of nitrate (62 g/mol). The non-soil potassium (KNS) algorithm results from the observed ratio (0.6) of potassium to iron in soils. The residual, non-soil potassium (KNS) is assumed to derive from smoke. Lastly, the soil algorithm includes the sum of soil-derived elements, adjusted by coefficients that account for their normal oxides.

The IMPROVE network utilizes the measured mass concentrations of OCM, EC, $(NH_4)_2SO_4$, NH_4NO_3, and soil components to estimate the light extinction resulting from each species. Light extinction values associated with the individual species are summed to reconstruct an overall aerosol extinction parameter (b_{ext}). The IMPROVE extinction calculations account for scattering, absorption, and the effects of relative humidity, as illustrated by equations listed in **Table C-3**. The coefficients represent the dry scattering efficiencies of the compounds, except the coefficient for the EC algorithm, which represents the light absorbing efficiency of EC. $F_T(RH)$ equals an empirically determined relative humidity correction factor that accounts for the hygroscopic nature of the ionic aerosol species.

Table C-3. IMPROVE algorithms for light extinctions of fine aerosol species.

Species	Abbreviation	IMPROVE Calculation
Organic Carbon Mass	OCM Extinction	4*[organic carbon]
Ammonium Nitrate	NH_4NO_3 Extinction	3*F_T(RH)*[nitrate]
Ammonium Sulfate	$(NH_4)_2SO_4$ Extinction	3*F_T(RH)*[sulfur]
Elemental Carbon	EC Extinction	10*[elemental carbon]
Soil Elements	Soil Extinction	1*[Soil]

C.3 DATA VALIDATION

Data validation helps to prevent serious errors in data analysis and modeling results by identifying erroneous individual data values. The $PM_{2.5}$ Data Analysis Workbook contains the guidelines that we employ for PM data validation (Main and Roberts, 2001). The validation incorporates internal consistency checks of ambient monitoring data, such as the comparison of species concentrations using scatter plots, the calculation of reconstructed particulate mass, and the preparation of material balances. Scatter plots that illustrate the relationships between well characterized species enable data analysts to quickly inspect data and identify any suspect points that may require further attention. Scatter plots also provide a general overview of a data set and preliminary data analysis. Plots that compare species from common sources, such as soil, or from different analytical techniques, such as ion chromatography (IC) or x-ray fluorescence (XRF), can target outlying data points that may indicate an unusual event or an equipment problem. Plots between reconstructed mass and measured mass or between cations and anions help the analyst to visually assess data completeness and to validate data resulting from different measurement techniques. We generated a number of scatter plots using SYSTAT statistical software in an effort to validate the IMPROVE data before performing the comparative analysis. **Table C-4** summarizes the species we inspected using scatter plots, along with their expected relationships and typical sources.

The data quality was good, as IMPROVE data is quality controlled prior to being incorporated into the database; thus, minimal effort was required. The data validation plots explored include 2000 through 2002 data for both Caney Creek and Upper Buffalo Wilderness. The data from both sites exhibit similar relationships between measured species. **Figure C-2** illustrates the comparison between sulfur (S) and sulfate (SO_4^{-2}) for the data set from Upper Buffalo Wilderness. A relatively tight correlation and a slope of roughly three indicate a good

Table C-4. Scatter plot species and expected relationships.

Species	Species	Expected Relationship	Source or Reason
S	SO_4^{-2}	$3*S \sim SO_4^{-2}$	IC vs. XRF
Cl ion	Cl	~ 1:1	IC vs. XRF
Na ion	Na	~ 1:1	IC vs. XRF
K ion	K	~ 1:1	IC vs. XRF
Na	Cl	Correlation	Sea salt
Ca	Si	Correlation	Soil
Al	Si	Correlation	Soil
Fe	Si	Correlation	Soil
Fe	K	Correlation	Soil
OC	Total Carbon (TC)	Correlation	OC large part of TC
EC	TC	Some Correlation	EC part of TC
Se	SO_4^{-2}	Some Correlation	Coal Emissions
Fe	Zn	Some Correlation	Smelter Emissions
Ni	V	Some Correlation	Oil Combustion
K	EC	Some Correlation	Wood Smoke
b_{abs}	EC	Correlation	EC absorbs most light
Cations	Anions	Near 1:1	Neutralized Aerosol
$PM_{2.5}$	Reconstructed Mass	Good Correlation	Should be equal

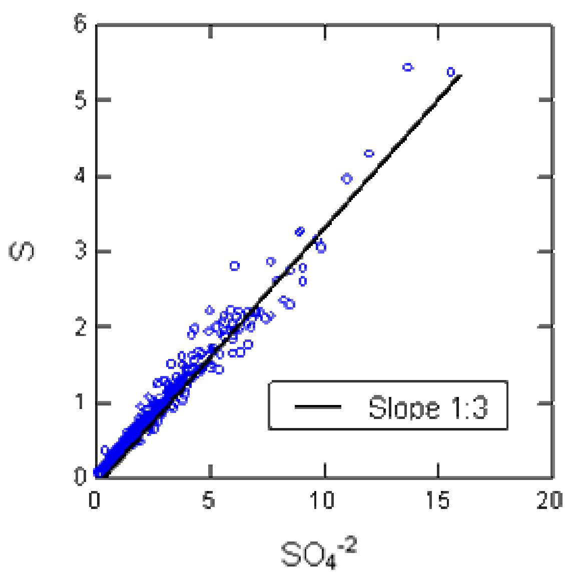
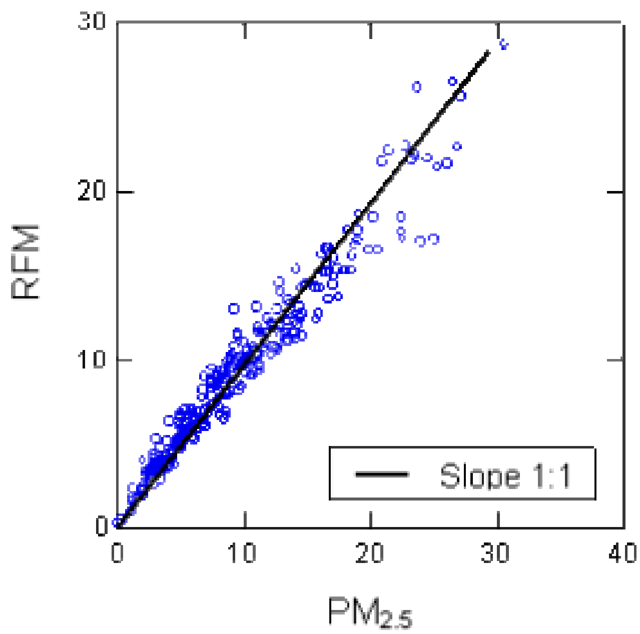


Figure C-2. Concentrations of XRF sulfur (S) versus IC sulfate (SO_4^{-2}) from the Upper Buffalo Wilderness IMPROVE station (µg/m^3). The line has a slope of one third, representing the expected 1:3 ratio between sulfur and sulfate.

comparison between the data obtained from the XRF and IC analyses. The slope equals 3 because the molecular mass of sulfate (96 g/mol) is three times the molecular mass of sulfur (32 g/mol). **Figure C-3** highlights the good correlation between the measured fine particulate mass ($PM_{2.5}$) and the reconstructed fine particulate mass (RFM). According to IMPROVE protocol, RFM equals the sum of SO_4^{-2}, NO_3^-, EC, OCM, and soil components. The good correlation between $PM_{2.5}$ and RFM indicates the overall reliability of the data sets and measurement techniques. The correlation exhibited between iron (Fe) and potassium (K) in **Figure C-4** is confounded by several data points of high K and low Fe, which suggests an additional source of K, possibly wood smoke, since both species commonly derive from soils. Overall this indicates that most K is from soil, which suggests influence from the non-soil sources is infrequent and contributes only a small amount of the



K.

Figure C-3. Concentrations of reconstructed fine mass (RFM) versus fine particulate mass ($PM_{2.5}$) from the Caney Creek IMPROVE station ($\mu g/m^3$). The line has a slope of one, representing a one to one ratio between RFM and $PM_{2.5}$.

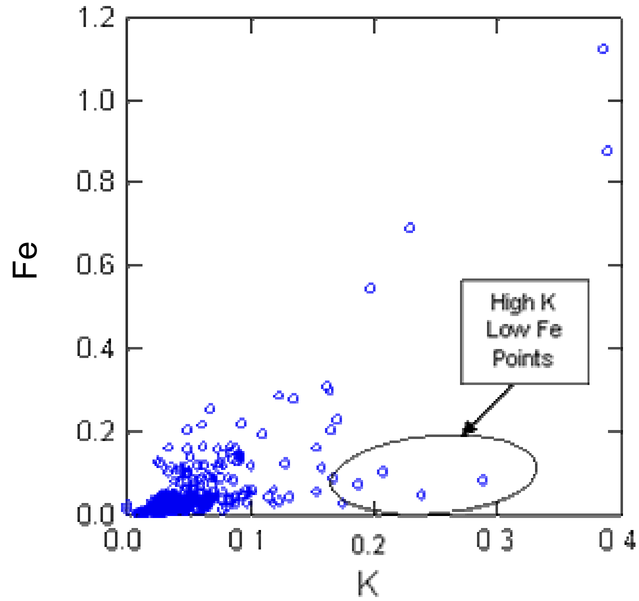


Figure C-4. Concentrations of iron (Fe) versus potassium (K) from the Upper Buffalo Wilderness IMPROVE station (µg/m^3). Points that exhibit higher than normal K to Fe ratios are highlighted.

C.4 CHARACTERIZING $PM_{2.5}$ DATA

It is important to first characterize the typical seasonal concentrations of and ratios between species to understand what comprises the "normal" composition of $PM_{2.5}$ before identifying whether specific source influences such as prescribed burning can be determined. **Figure C-5** depicts seasonal proportions of the median mass concentrations of OCM, EC, NH_4NO_3, $(NH_4)_2SO_4$, and soil influences for Caney Creek; Upper Buffalo Wilderness showed similar results. Summary statistics are given in Appendix A. At both sites, $(NH_4)_2SO_4$ and OCM comprise the dominant fractions of $PM_{2.5}$ in all seasons except winter, when NH_4NO_3 also contributes a significant fraction. The larger fraction of NH_4NO_3 in winter is consistent with nitrate formation mechanisms which favor cold, wet conditions, and the dominant fractions of $(NH_4)_2SO_4$ are consistent with observations made at other eastern IMPROVE sites (Malm, 1999). EC is a small component of the mass in all seasons.

Figure C-6 illustrates the proportions of light extinction attributed to OCM, EC, NH_4NO_3, $(NH_4)_2SO_4$, and soil for each season at Caney Creek; Upper Buffalo Wilderness showed similar results. Summary statistics are given in Appendix A. The dominant portion of light extinction derives from $(NH_4)_2SO_4$ in all seasons except winter, when NH_4NO_3 also contributes significantly. This is consistent with other analyses of $PM_{2.5}$ aerosol in the Midwest and CENRAP region (http://www2.nature.nps.gov/air/studies/bravo/bravo2003factsheet.htm)

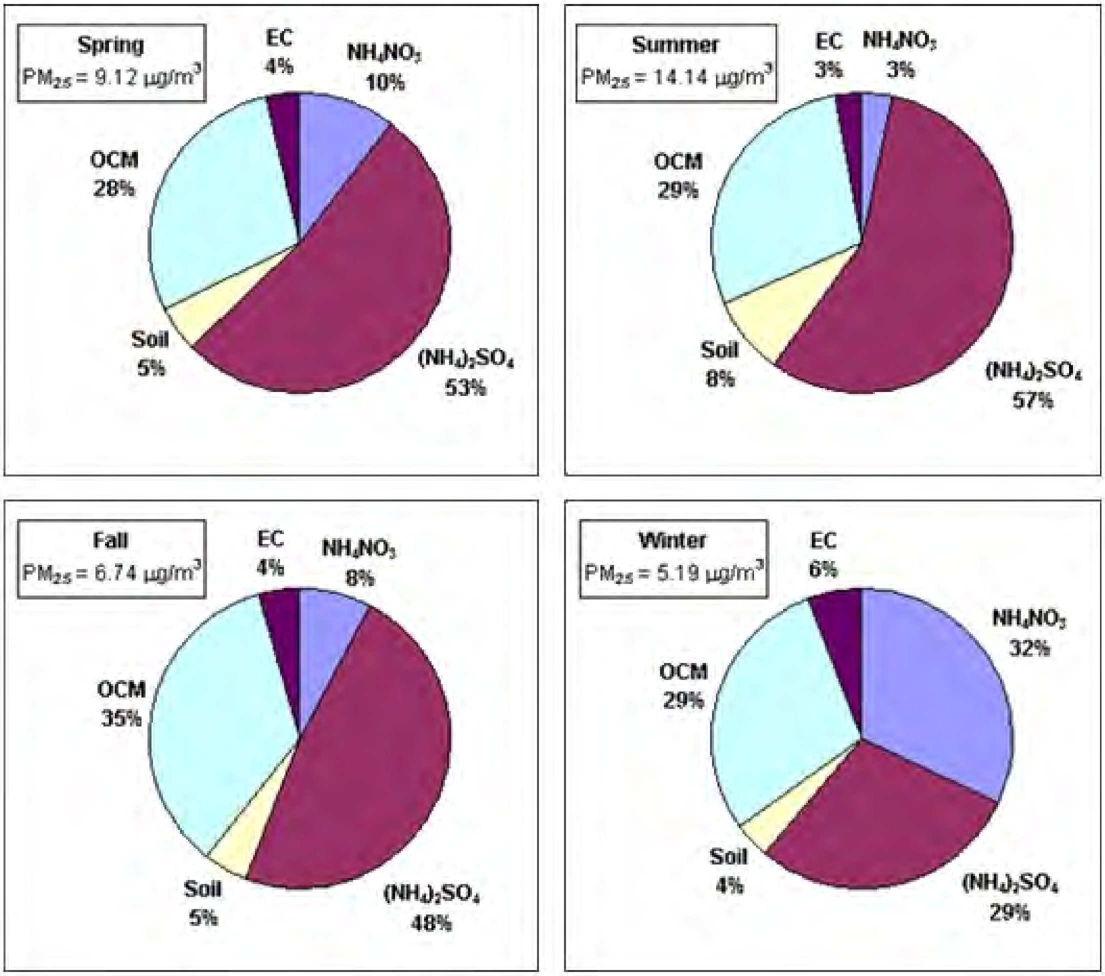


Figure C-5. Median mass and composition of $PM_{2.5}$ by season (spring is March to May, summer is June to August, fall is September to November, and winter is December to February) at Caney Creek for 2000 through 2002.

(Coutant et al., 2003; Coutant et al., 2002; Georgoulias and Dattner, 2002; Sisler and Malm, 2000; Malm, 1999). $PM_{2.5}$ composition at other Class 1 areas in the CENRAP region will likely be similar. The light extinction proportions resemble the mass concentration proportions, because the extinction calculations directly depend on mass concentrations. $(NH_4)_2SO_4$ has a large effect on visibility due to its extremely hygroscopic nature and large contribution to the overall mass. The effect of EC on visibility is most pronounced during the winter months when the effect of $(NH_4)_2SO_4$ is at a minimum, though it only accounts for about 5% of the total extinction.

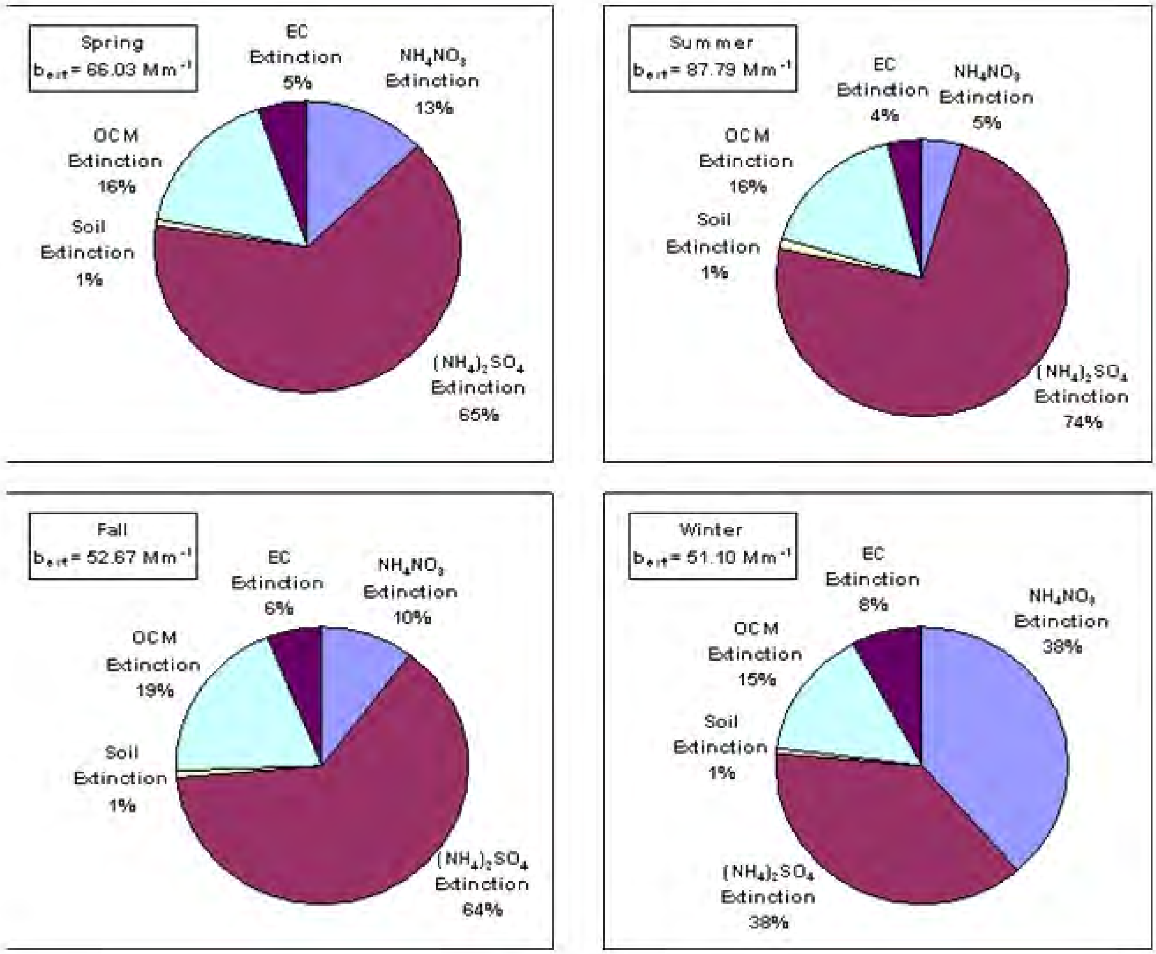


Figure C-6. Median extinction and composition of extinction by season (spring is March to May, summer is June to August, fall is September to November, and winter is December to February) at Caney Creek for 2000 through 2002.

C.5 CHARACTERIZATION OF VISIBILITY

In order to determine which species are most responsible for poor visibility, we isolated the top and bottom 20% visibility days in 2000 through 2002 by aerosol extinction at each site. Summary statistics of the best visibility data, worst visibility data, and overall data for Caney Creek and Upper Buffalo Wilderness were calculated. The median mass compositions for the best and worst visibility days, as well as the annual median from Caney Creek are depicted in **Figure C-7**; results for Upper Buffalo Wilderness are similar to those for Caney Creek. At both sites, days with poor visibility are dominated by $(NH_4)_2SO_4$ and show a decrease in the fractions of the other species, especially OCM and NH_4NO_3. The fractions of EC and Soil components vary to a lesser extent between the good visibility and poor visibility days and are minor contributors to mass and extinction.

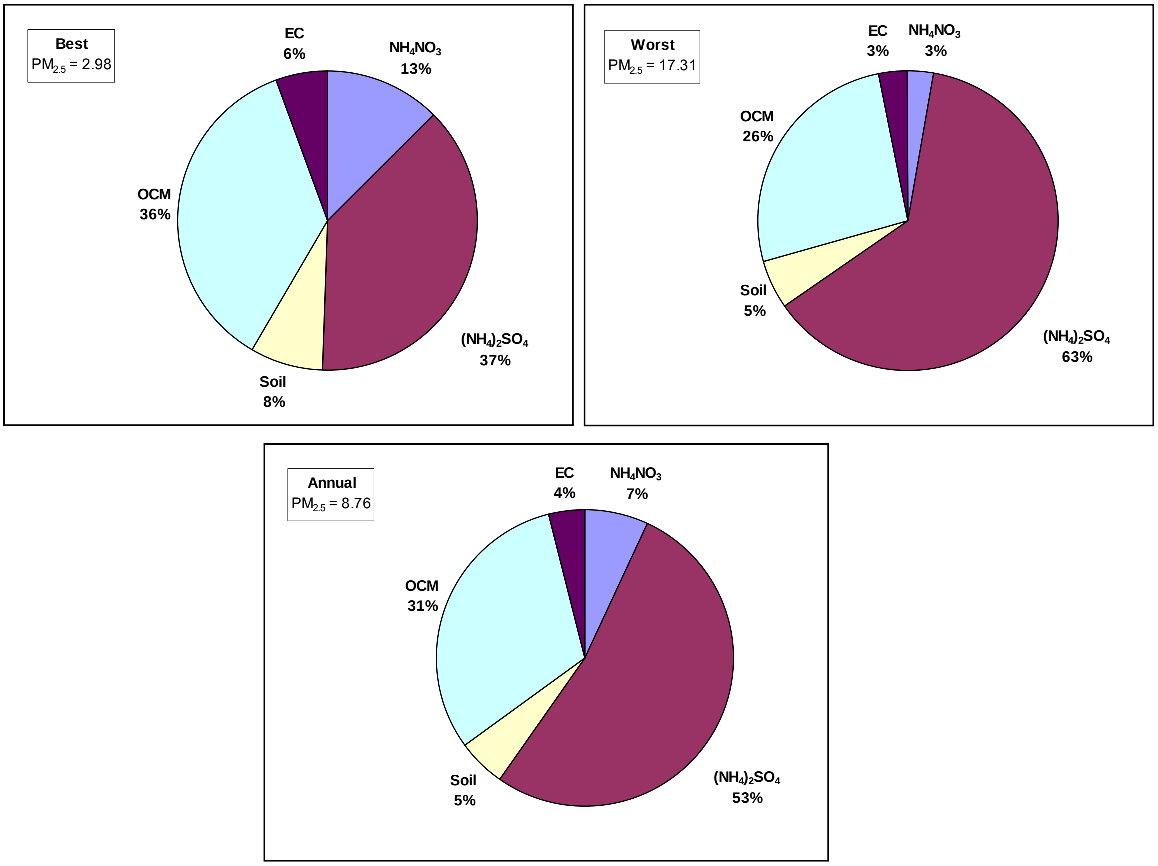


Figure C-7. Median $PM_{2.5}$ composition for the 20% best and worst aerosol extinction days and the median annual composition at Caney Creek from 2000 to 2002.

C.6 FIRE HISTORY DATA

In order to evaluate the effect of prescribed fires on visibility, we analyzed fire history data with the 2002 IMPROVE data for Caney Creek and Upper Buffalo Wilderness. We isolated the dates with IMPROVE data that corresponded to the day of or the day after prescribed burning occurred within a specific radius (i.e., range of influence) of each site. The range of influence around each site was established by using data from nearby meteorological stations: the radius around each site was calculated as the sum of the 24 hourly averaged wind speeds for each date, which represented an estimate of the distance that a parcel of air could have traveled on a given day. Theoretically, emissions from fires located within the range of influence could have been detected by the IMPROVE station if transport conditions were conducive. We then analyzed dates when the most extensive burning (with respect to acreage) occurred.

Due to the proximity of the two IMPROVE sites, several of the dates selected for each site overlap. The OCM, EC, K and KNS mass concentrations from overlapping dates that correspond to the day of or the day after extensive burning within the vicinity of both sites are compared to the springtime and annual mean concentrations from 2000 to 2002 for each site in **Figures C-8** and **C-9**. Error bars representing the 95% confidence limits for the mean concentrations of EC and KNS for the springtime and annual data sets are also plotted. In

Appendix A, mass concentrations of EC, KNS and the other key species for the selected dates and whether the EC and KNS concentrations significantly exceed the springtime are presented.

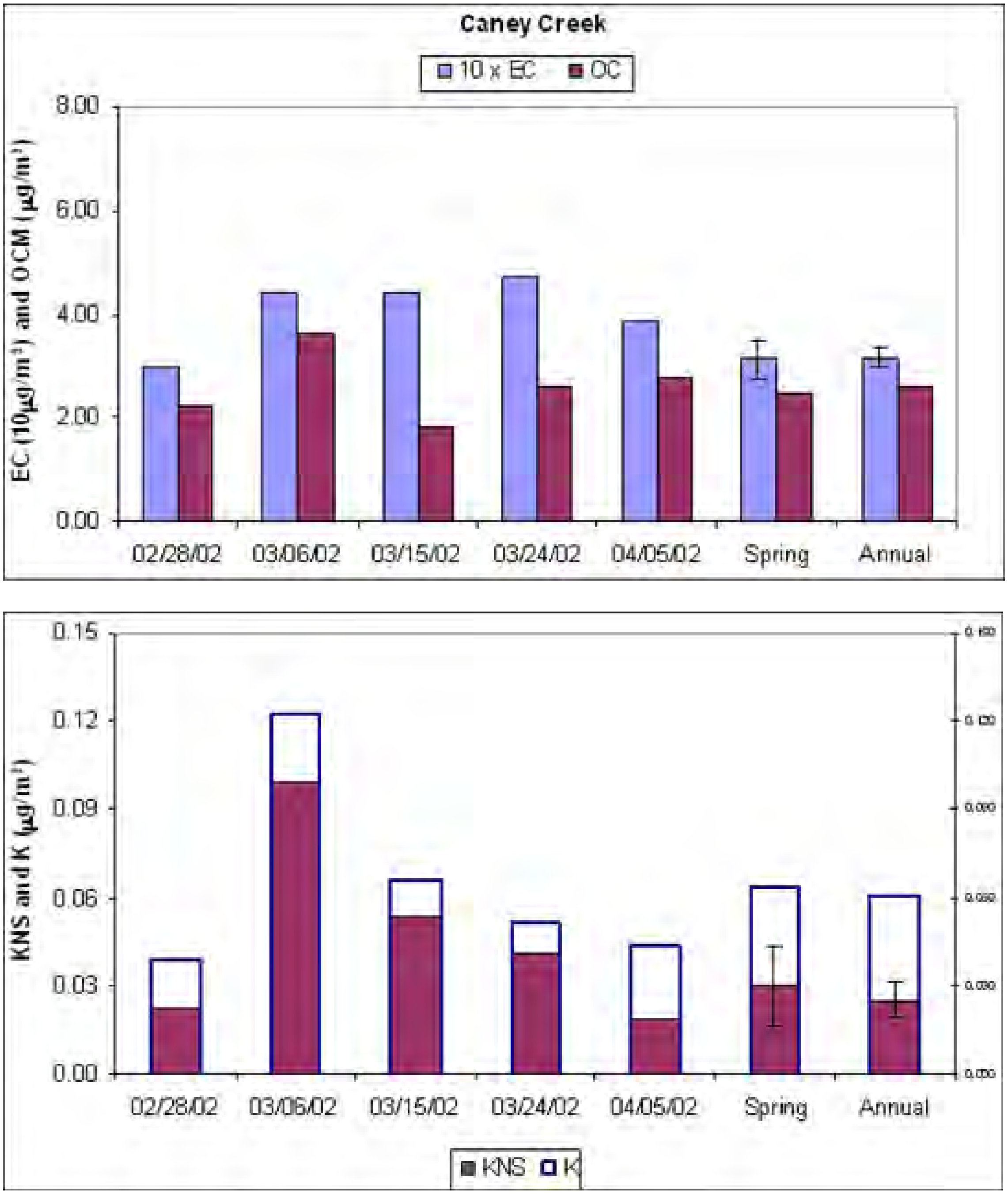


Figure C-8. EC, OCM, K and KNS mass concentrations (μg/m^3) for select dates compared to the spring and annual means for Caney Creek.

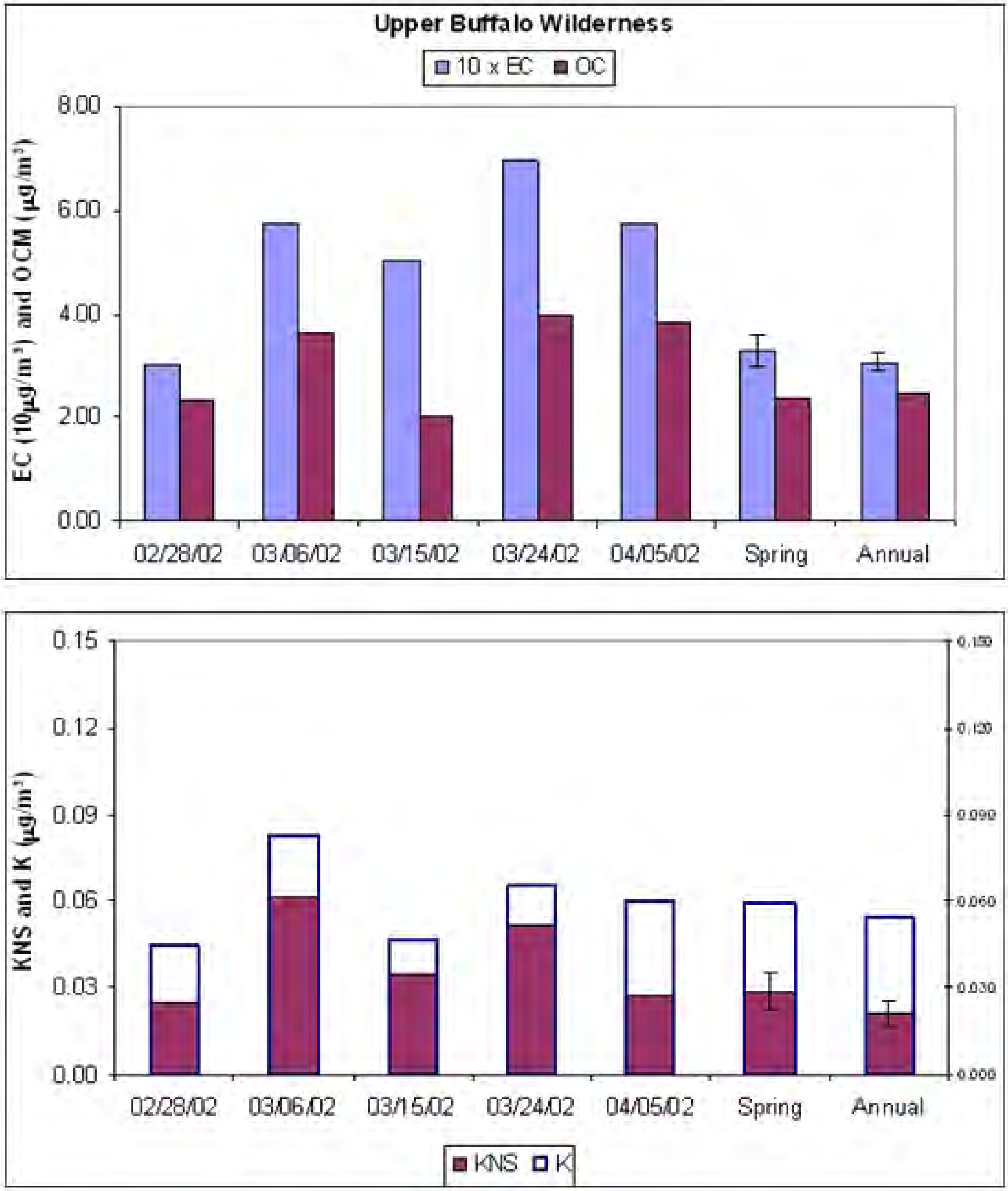


Figure C-9. EC and KNS mass concentrations (μg/m^3) for select dates compared to the spring and annual means for Upper Buffalo Wilderness.

Extensive burns occurred on the days before March 6, 15, 24, and April 5. On these dates, the measured EC significantly (at a 95% confidence level) exceeds the springtime and annual means for both sites. On March 15 and 24, the contributions of EC in relation to OC are significantly higher than the springtime and annual average EC contributions for both sites. The elevated EC emissions observed on March 6, 15, 24, and April 5 could derive from the extensive

burning that occurred on the previous days, if transport conditions were correct. Extensive burning occurred on February 28, but the EC measurements fell below the springtime and annual means at both sites, although not statistically significant at a 95% confidence level. On March 6, 15, and 24, the KNS mass concentrations exceeded the mean springtime and annual KNS concentrations for both sites, and the relative contribution of KNS in comparison to K is also higher on these dates. The elevated KNS also suggests influence from wood burning on these days. Air mass trajectories were run to further investigate the potential influence of prescribed burns on ambient measurements, as discussed in Section C.9.

Figure C-10 compares the mass concentration ratios of EC to OCM and of KNS to K for the selected dates to the annual median ratios. The KNS to K ratios from March 6, 15, and 24 clearly exceed the annual ratio, indicating a relatively large contribution of KNS during these dates. Since KNS largely derives from wood smoke, emissions from nearby burns likely influenced the IMPROVE sites. The EC to OCM ratio from March 15 also clearly exceeds the annual ratio, further suggesting fire influence on this day.

C.7 DO HIGH CONCENTRATIONS OCCUR ON DAYS OF PRESCRIBED BURNS?

In addition to isolating the dates associated with extensive burning from the fire history data and analyzing corresponding ambient measurements, we also isolated the dates with high mass concentrations from the ambient measurements and analyzed corresponding fire history data. For each site, we ranked the 2002 IMPROVE data by the mass concentrations of EC, OCM, KNS, and K. We summarized the selected dates, ranks of each compound, whether a fire occurred, and the total acres burned within the sphere of influence of each site in **Tables C-5** and **C-6**.

At both sites, the dates of higher EC and OCM mass concentrations overlap more with each other than with the dates of higher K mass concentrations, as EC and OCM both commonly derive from combustion sources and K derives largely from soils. At Upper Buffalo Wilderness, three of the five highest EC mass concentrations were measured on the dates that we had isolated during the previous analysis of fire occurrence, namely March 6, 24, and April 5. Since EC partly derives from wood smoke and extensive burns occurred on the day of and the day before these dates, the elevated EC emissions could derive from nearby prescribed burns. We further analyze the potential connection between elevated emissions of key species and fire occurrence in the next section, utilizing air mass trajectories for select dates.

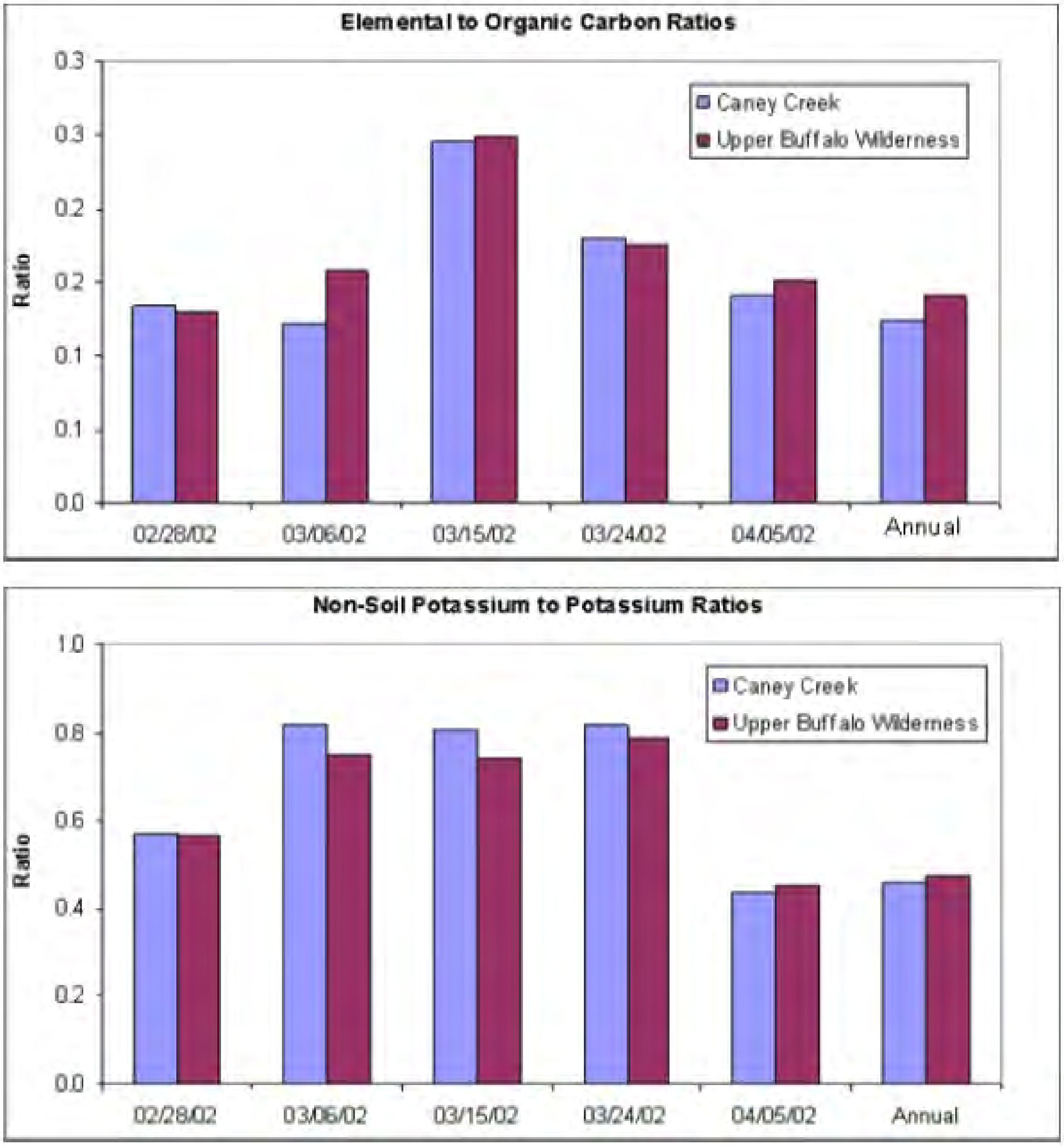


Figure C-10. EC to OCM and KNS to K mass concentration ratios for select dates compared to the annual median ratios for both sites

Table C-5. Dates with high measured EC, OCM, KNS and K mass concentrations and total acres burned within the sphere of influence of Caney Creek. The ranks order the days according to the five highest measured mass concentrations of each species.

Date	EC Rank	OCM Rank	KNS Rank	K Rank	Day of or before fires?	Total Acres
01/17/02	2				Of and Before	4,618
03/06/02			5		Of and Before	19,509
05/02/02			3		No Fires	0
05/08/02			2	4	Of and Before	N/A
06/22/02	5	5			Day Before	107
07/01/02				1	Day Of	41
07/04/02				5	No Fires	0
07/31/02				2	Of and Before	1,157
08/06/02		3			Of and Before	1,727
08/09/02	3	4			Of and Before	388
08/30/02	4				Of and Before	476
09/05/02		2	4		Of and Before	1,973
09/14/02	1	1	1	3	Of and Before	135

Table C-6. Dates with high measured EC, OCM, KNS, and K mass concentrations and total acres burned within the sphere of influence of Caney Creek. The ranks order the days according to the five highest measured mass concentrations of each species.

Date	EC Rank	OCM Rank	KNS Rank	K Rank	Day of or before fires?	Total Acres
03/06/02	5				Of and Before	20771
03/24/02	2				Of and Before	28567
04/05/02	4				Of and Before	8190
05/08/02			2	4	Of and Before	N/A
06/19/02	3	3	3		Of and Before	661
06/22/02	1	4	4		Day Before	356
07/01/02				1	Day Of	41
07/10/02		2			Of and Before	2114
07/31/02				3	Of and Before	927
08/03/02				5	Of and Before	189
08/06/02		5			Of and Before	1729
09/14/02		1	1	2	Of and Before	253
11/25/02			5		Of and Before	208

C.8 AIR MASS TRAJECTORIES

Back trajectories of air masses for the selected dates were created using the National Oceanic and Atmospheric Administration (NOAA) Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model. The NOAA HYSPLIT model is a three-dimensional air mass trajectory model based on weather model data and can be obtained from the NOAA web site at http://www.arl.noaa.gov/ready/hysplit4.html. The final (FNL) product of the Global Data Assimilation System (GDAS) that uses the Global Spectral Medium Range Forecast (MRF) model provides the weather data for the HYSPLIT model. The HYSPLIT model uses National Weather Service soundings and other diagnostic parameters such as temperature, relative humidity and radiative and momentum fluxes. It uses a 129 x 129 polar stereograph (three-dimensional) grid, with approximately 190 km resolution and 12 vertical layers, and is run at 6-hour increments. Back trajectories were run from 1800 CST with ending heights of 1000 and 500 meters in order to capture short-range transport in the lower boundary layer.

We ran trajectories for March 6, 15, and 24 and plotted them along with fires that occurred the day of and the day before the selected dates. **Figures C-11 through C-13** show the maps for March 6, 15, and 24. On these dates, the EC and KNS mass concentrations exceeded the annual means for each site, as summarized in Figure C-9.

Air mass trajectories demonstrated no influence from known burns at the Caney Creek site on March 6. However, the inventory does not include detailed fire history data for the southeastern corner of Oklahoma or for the eastern portion of Texas, over which the air mass advected before reaching the site. On approach to the Upper Buffalo Wilderness site, the air did pass directly over extensive fires that occurred on March 5. Therefore, the elevated EC and KNS emissions measured at Upper Buffalo Wilderness on March 6 could derive from wood smoke emissions from the previous day that influenced the site over a 24 hour period. Additionally, there were numerous nearby fires to Caney Creek on March 5 and 6 that would have affected the site via flow below 500 meters.

Similar to the situation on March 6, the air flowed directly over burns reported in the emissions inventory before reaching Upper Buffalo Wilderness on March 15, but the air did not flow over the reported burns when approaching Caney Creek. The elevated EC and KNS emissions measured at Upper Buffalo Wilderness on March 15 could be attributed to the wood smoke emissions from the extensive March 14 burns, and detailed fire history data from neighboring states would allow more definitive conclusions to be drawn about the measurements from Caney Creek. Also, the similarity in $PM_{2.5}$ composition at the two sites on this day indicates they were influenced from similar sources, again suggesting local low level flow advecting smoke to Caney Creek that is not shown by the trajectories.

Finally, on March 24, the air approaching Caney Creek circumvented the extensive fires reported by the inventory, while the air approaching Upper Buffalo Wilderness passed directly over them. Once again, the higher than average EC and KNS mass concentrations observed on March 24 at Upper Buffalo Wilderness could have originated from prescribed burning emissions, while more information would support definitive conclusions as to the Caney Creek emissions. Overall, the $PM_{2.5}$ composition and air mass trajectories show that fire influence from large-scale burns can be seen in the ambient data at Caney Creek and Upper Buffalo Wilderness. More

extensive emission inventory data is needed to better assess the impact of prescribed burn emissions in the CENRAP region.

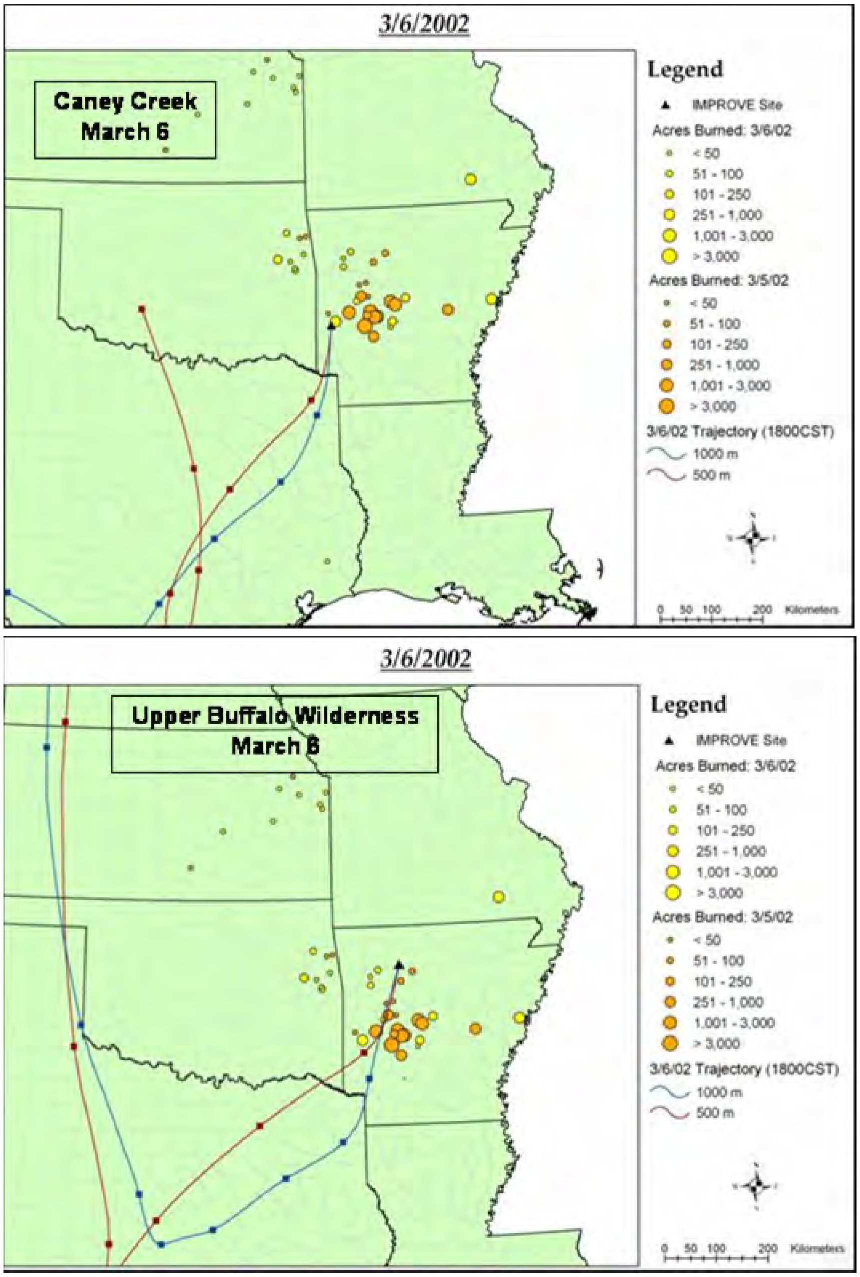


Figure C-11. Air mass trajectories and associated fires for March 6. Squares along each trajectory are placed every 6 hours.

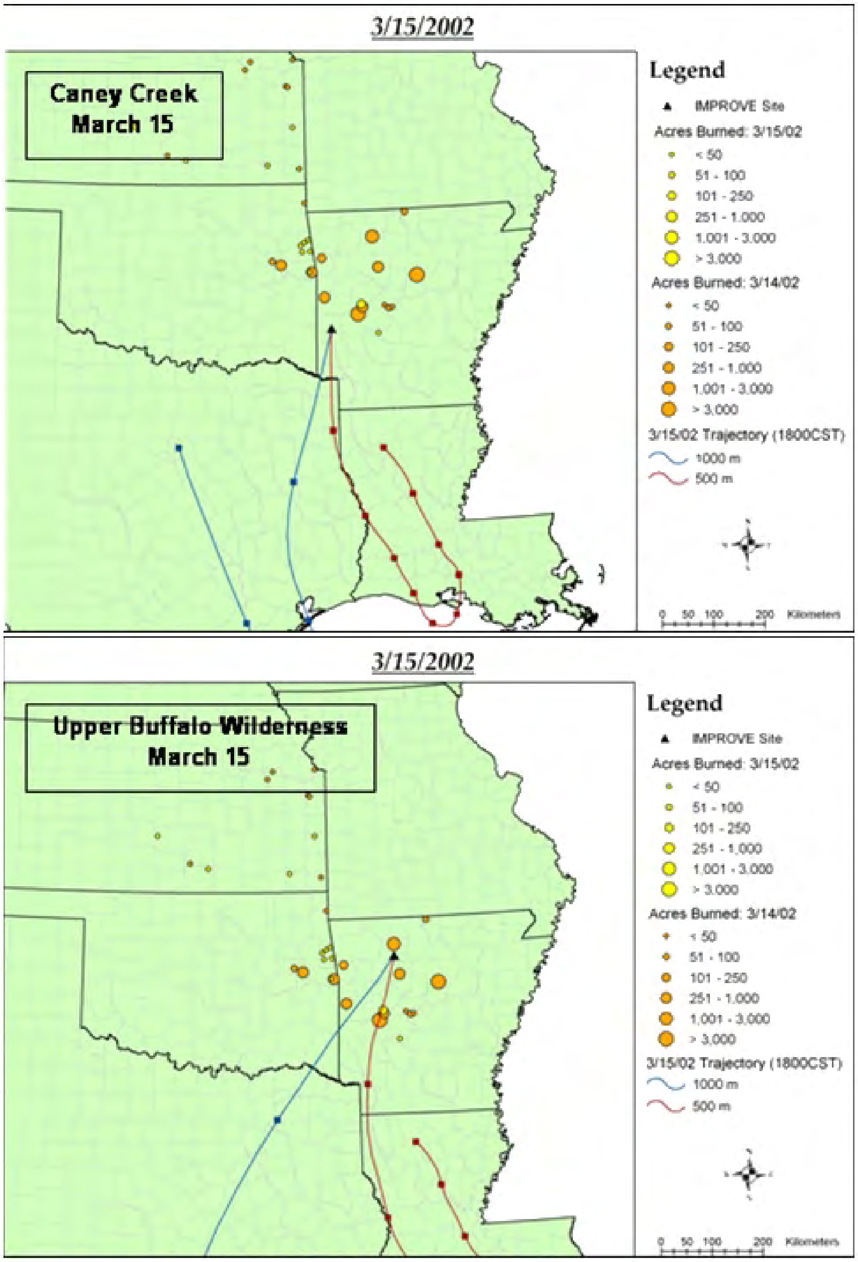


Figure C-12. Air mass trajectories and associated fires for March 15. Squares along each trajectory are placed every 6 hours.

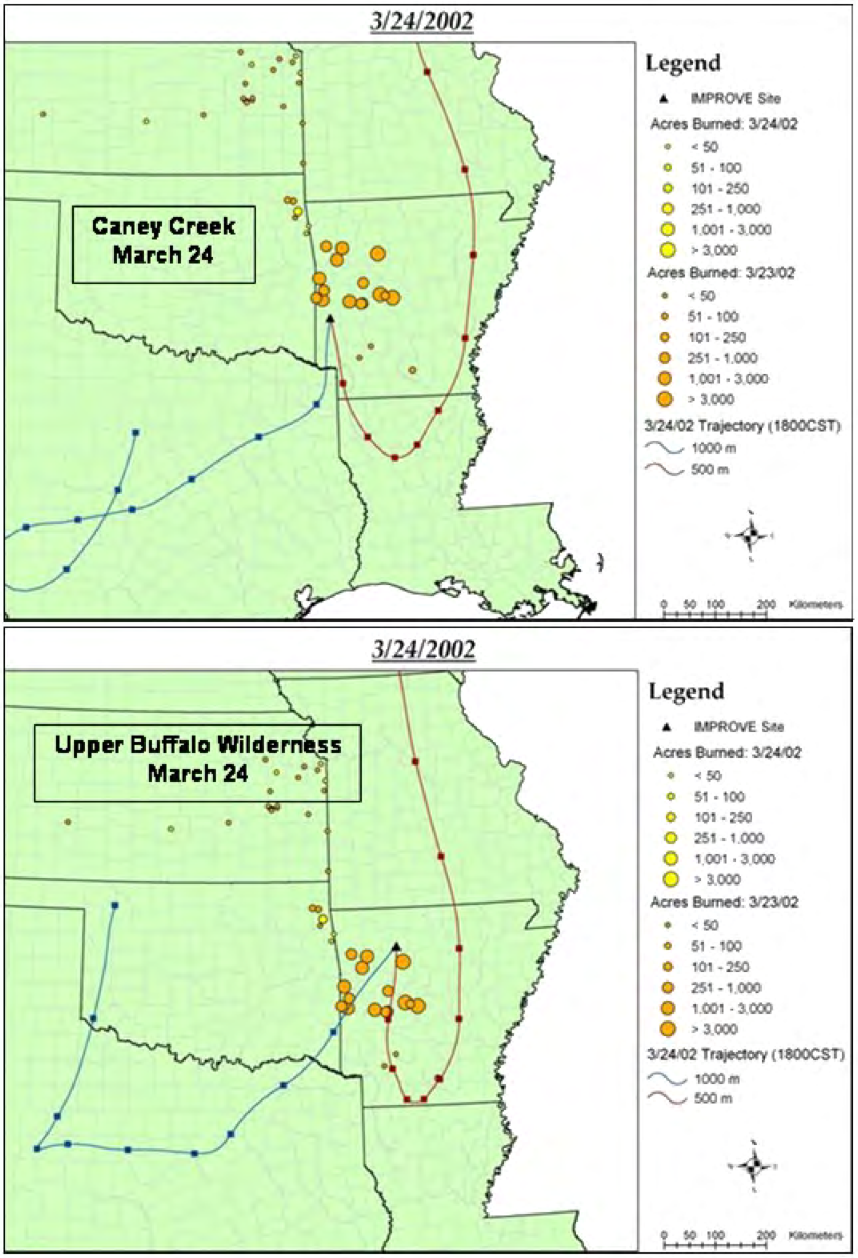


Figure C-13. Air mass trajectories and associated fires for March 15. Squares along each trajectory are placed every 6 hours.

C.9 EFFECTS ON VISIBILITY

We have demonstrated a potential connection between prescribed burn occurrence and elevated EC and KNS emissions at Upper Buffalo Wilderness via comparative analyses of ambient data and fire history data and air mass trajectories. In order to assess the impact that the elevated emissions have on visibility, we plotted the median $PM_{2.5}$ mass compositions of the annual, best visibility, and worst visibility data sets from Upper Buffalo Wilderness in order to

compare them to the mass and visibility compositions measured on the select dates March 6, 15, and 24, as illustrated in **Figure C-14**. The $PM_{2.5}$ mass compositions consist of the measured NH_4NO_3, $(NH_4)_2SO_4$, soil elements, OCM, and EC mass concentrations. The worst visibility data set is characterized by high $(NH_4)_2SO_4$ and OCM measurements, while the best visibility data set is characterized by relatively low concentrations of all the species. Since $(NH_4)_2SO_4$ does not derive from wood smoke, and OCM can derive from other sources, the species that dominate poor visibility conditions are not necessarily connected with emissions from wood smoke.

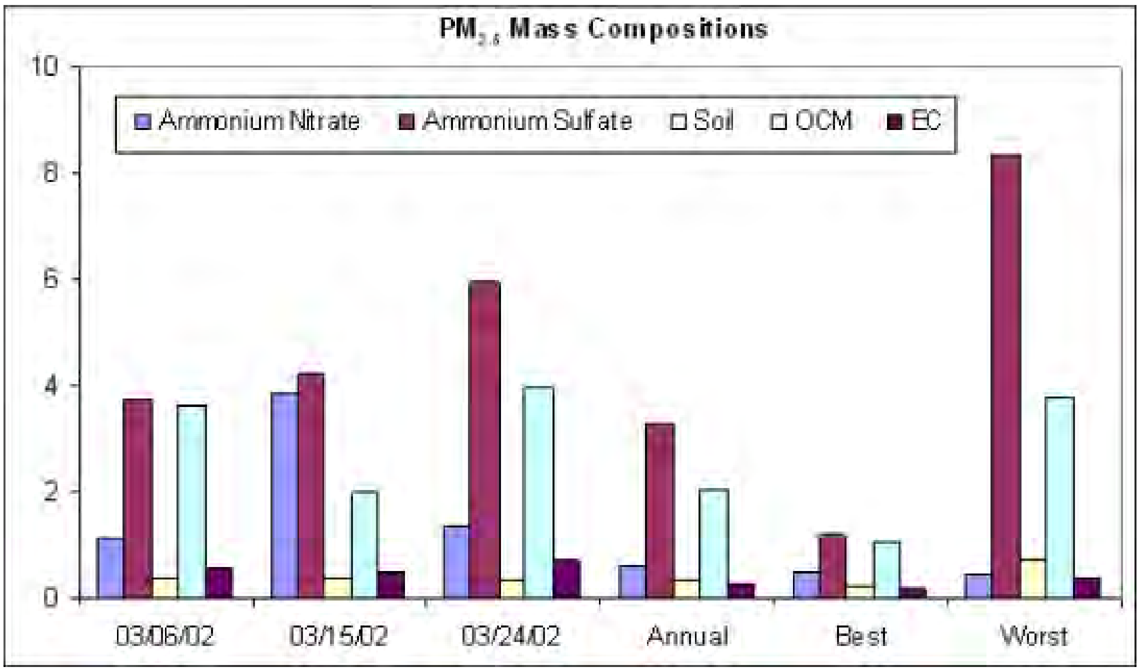


Figure C-14. $PM_{2.5}$ mass compositions for select dates and for the annual, best visibility, and worst visibility data sets.

C.10 CONCLUSIONS

Speciated $PM_{2.5}$ data collected at IMPROVE sites in Class 1 areas in Arkansas were used to determine whether such data can help to examine the influence of prescribed burning and determine if burns in the emission inventory significantly impact the $PM_{2.5}$ composition and visibility reduction. Overall conclusions include:

- Speciated $PM_{2.5}$ data at IMPROVE sites are useful for characterizing sources impacting $PM_{2.5}$ and visibility reduction, including burns.
- Influence from specific known burns (as seen by elevated concentrations of EC or K) can be seen on select days when the meteorology is conducive for transport.
- Days when high OC or EC concentrations are observed at the sites do not always coincide with known burns; however, the emission inventory is not complete and may be

missing burns in the areas of influence on these days, such as southern Oklahoma and eastern Texas.

- Meteorology plays an important role in determining the areas impacted by prescribed burns.
- EC, the primary marker of smoke, is a relatively small part of both the $PM_{2.5}$ mass and light extinction.
- Ammonium sulfate is generally the largest contributor to the $PM_{2.5}$ mass and light extinction; this component does not originate from burns. This finding is consistent with other work in the Midwest and CENRAP region including Big Bend National Park and Seney Wildlife Refuge.

C.11 RECOMMENDATIONS FOR FUTURE WORK

Additional analyses could be conducted to better quantify the influence of burns on visibility impairment. Such analyses could include:

- Apply analyses conducted in this task to additional IMPROVE sites, such as in Kansas or Minnesota to investigate whether results in this task are indicative of trends throughout the CENRAP region
- Utilize continuous $PM_{2.5}$ in conjunction with meteorological data to determine what meteorological conditions may be responsible for changes in $PM_{2.5}$ concentrations.
- Apply source apportionment tools such as UNMIX or Positive Matrix Factorization (PMF) to quantify influence of specific source types at a site using 24-hour (i.e., IMPROVE, STN, etc) or continuous speciated data (such as at Bondville or St. Louis). These tools can be used to identify individual sources such as diesel, wood burning, etc.
- Develop a better conceptual model of $PM_{2.5}$ in the CENRAP region:

  – *Are there differences in $PM_{2.5}$ composition and meteorology among different locations in the CENRAP region?* Significant differences in $PM_{2.5}$ concentrations and composition among sites in different geographic locations within the CENRAP region may provide insight into $PM_{2.5}$ transport and formation. For example, a surface high pressure system located over the Upper Midwest will often drive southeasterly winds across the CENRAP region, which can transport higher levels of $PM_{2.5}$ from upwind sources within major population centers.

  – *How are $PM_{2.5}$ concentrations and visibility dependent on large-scale meteorological patterns?* The effect of large-scale synoptic patterns on $PM_{2.5}$ concentrations and regional haze is a critical issue because synoptic patterns affect transport, vertical and horizontal dispersion, formation, and the impact of local emissions on an area. For example, transport of warm, moist air from the Gulf of Mexico may result in secondary particle formation within the CENRAP region, reducing visibility.

– *What are the compositional and meteorological differences between days of high and low $PM_{2.5}$ concentrations?* Differences in $PM_{2.5}$ composition may indicate different transport regimes, and might identify which species are dominant on high $PM_{2.5}$ days, both of which would assist forecasters. One useful way of examining the meteorology on these days is to perform several case study analyses of high and low $PM_{2.5}$ concentration episodes. A typical case study analysis would examine:

  - *Upper-air and surface synoptic patterns for each day*. These patterns assist meteorologists in determining the extent to which particles may be allowed to mix, or disperse. For example, an upper-level high pressure system is typically associated with sinking air, which will help to trap particles near the surface.
  - *Vertical temperature soundings whenever available*. Vertical temperature soundings give meteorologists the ability to assess the vertical structure of the atmosphere, in particular, how much vertical mixing can occur. Typically, a strong surface-based inversion will trap particles near the surface, allowing $PM_{2.5}$ levels to be high.
  - *Back-trajectories for each day*. Back-trajectories provide meteorologists with a tool for assessing whether transport of particles could have occurred within a region or from another region.

Appendix H.7

Sonoma Technology, *Emission Inventory Development for Mobile Sources and Agricultural Dust Sources for the Central States* (October 28, 2004)

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EMISSION INVENTORY DEVELOPMENT FOR MOBILE SOURCES AND AGRICULTURAL DUST SOURCES FOR THE CENTRAL STATES

DRAFT FINAL REPORT
STI-903574-2611-DFR

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October 28, 2004

QUALITY ASSURANCE STATEMENT

This report was reviewed and approved by the project Quality Assurance (QA) Officer or his delegated representatives, as provided in the project QA Plan (Sullivan, 2004).

Lyle R. Chinkin
Project QA Officer

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EXECUTIVE SUMMARY

The Central States Regional Air Planning Association (CENRAP) is researching visibility-related issues for its region and is developing a regional haze plan in response to the U.S. Environmental Protection Agency's (EPA) mandate to protect visibility in Class I areas. Mobile sources (both on- and off-road) and agricultural dust sources contribute to episodes of impaired visibility in the CENRAP region. Therefore, in support of the CENRAP's need to develop a regional haze plan, Sonoma Technology, Inc. (STI) developed emission inventories for on-road and off-road mobile sources and agricultural fugitive dust.

Appendix A, Emission Estimation Methods for Mobile Sources and Agricultural Dust Sources in the Central States, details the methods used throughout inventory development. Methods were based on EPA-accepted emissions models (e.g., NONROAD, SMOKE, and MOBILE6), emission factors gathered from EPA guidance documents or published literature, and geographic information systems (GIS) databases. Activity data sets were prepared using bottom-up methods or region-specific information whenever possible. Examples of bottom-up and region-specific data include the following:

- Facility-level estimates of cattle populations for confined animal feeding operations (CAFOs)
- Activity data gathered through telephone surveys to describe recreational boating and agricultural tilling activities
- Local activity data for commercial marine vessels and locomotives gathered directly from local agencies and industry sources, such as individual port operators and rail lines
- MOBILE6 inputs and vehicle activity data acquired from state and local information sources, including vehicle miles traveled (VMT), fleet characteristics, regulatory controls, and fuels characteristics (see Appendix C)
- Fuels characteristics acquired from state and local information sources and used as inputs for NONROAD 2004 when appropriate (see Appendix C)

Figures ES-1 and ES-2 illustrate highlights of the resultant emission inventories for on-road mobile sources, non-road mobile sources, and agricultural fugitive dust. The inventories are also tabulated in Appendix B, provided in electronic form in Appendix D, and illustrated in greater detail throughout the body of the report. In many respects, the CENRAP inventories represent substantial improvements and differ significantly from existing inventories, such as the 1999 National Emissions Inventory (NEI) and preliminary 2002 NEI, which were prepared with default guidance, national average activity data, or top-down disaggregation techniques. Some of the most important improvements include the spatial and temporal allocations of the CENRAP inventories, which are more representative and could significantly enhance efforts to perform photochemical modeling. In addition, the use of bottom-up data will lend credibility to any scientific conclusions that may be based on the CENRAP's emission inventories.

Figure ES-1 compares the CENRAP inventory to the preliminary 2002 NEI. Emissions totals of selected pollutants are plotted for the entire CENRAP region. Large revisions to the region-wide annual emissions for specific source categories produced only minor *apparent*

changes in the region-wide annual totals for all source categories. However, the use of region-wide annual totals as the basis of comparison masks the importance of large changes in state-level inventories and spatial and temporal distributions. It also underrates the disproportionate influences of certain source types on visibility in Class I areas. Class I areas are often remote and far removed from the urban areas that contribute most to region-wide inventories. Sources that tend to concentrate away from urban areas—e.g., recreational boating, agricultural activities, etc.—are likely to affect visibility in Class I areas to a greater degree than might be expected if only the relative magnitudes of their emissions are considered.

The most significant revision to the $PM_{2.5}$ emission inventory—a 22% reduction in estimated annual emissions for agricultural fugitive dust sources—was due mostly to improvements in the activity data for tilling operations. As a result of this and other more modest revisions, total $PM_{2.5}$ emissions in the CENRAP inventory are 4% less than those estimated for the preliminary 2002 NEI. Annual NO_x emissions from commercial marine vessels were estimated to be 69% less than those estimated for the preliminary 2002 NEI; and primarily as a result of this, total NO_x emissions estimated for the CENRAP are 4% less than those recorded in the preliminary 2002 NEI. Annual VOC emissions estimated for the CENRAP were 8% greater than those estimated for the preliminary 2002 NEI—a difference mostly due to improved activity data for recreational boating. The CENRAP's VOC inventory for recreational boating is more than a factor of two larger than that incorporated in the preliminary 2002 NEI. Total SO_x emissions estimated for the CENRAP are 2% less than those estimated for the preliminary 2002 NEI. This difference was due to the use of region-specific measurements of fuel sulfur contents rather than default guidance assumptions, and it corresponds primarily to 42% and 85% reductions in SO_x emissions from commercial marine vessels and "other" non-road mobile sources, respectively.[1]

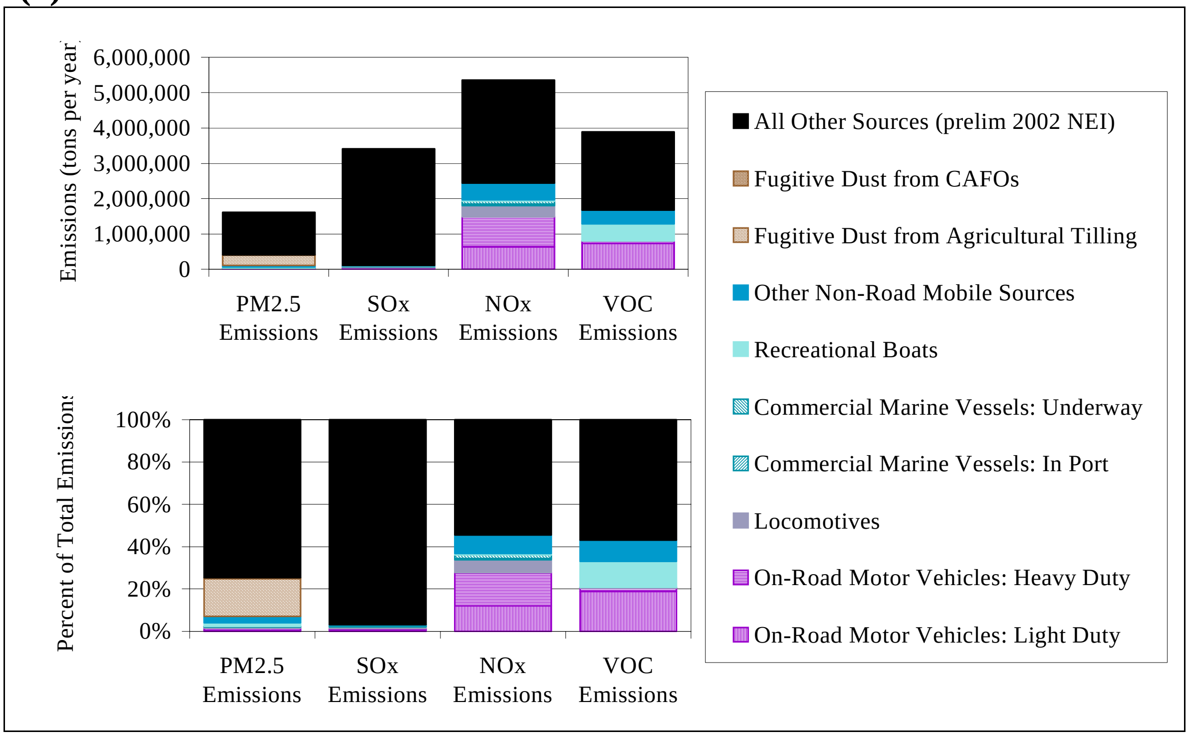
Figure ES-2 illustrates selected temporal profiles developed for or applied to the CENRAP inventories. Recent research has demonstrated that emissions from on-road mobile sources follow dramatically different patterns on weekend days than on weekdays, that patterns for light-duty vehicles are unique compared to those of heavy-duty vehicles, and that activities in rural areas differ from those in urban areas (Chinkin et al., 2003; Lawson, 2003; Croes et al., 2003). The CENRAP inventories reflect this latest understanding of weekday-weekend activity patterns for on-road mobile sources. The weekday-weekend activity patterns for recreational boating, which were based on surveys of representative groups of recreational boat owners in the CENRAP region, are even more dramatic than those of on-road mobile sources. Recreational boating activities tend to be extremely concentrated on weekends (whereas the reverse is true for on-road mobile sources and to a more moderate degree) and to vary diurnally and seasonally by type of boat and geographic area. Seasonal patterns for commercial marine vessels and agricultural tilling operations—also based on bottom-up data collection efforts—are related to the climates and crop types prevalent in different geographic areas.

In summary, the CENRAP inventories of mobile sources and agricultural fugitive dust are highly region-specific, or even county-specific, and adhere closely to EPA's recommended guidance for inventory development. Additional refinements and improvements should be

[1] "Other" non-road mobile sources include all non-road mobiles sources other than locomotives, commercial marine vessels, recreational boats, and aircraft.

incorporated as better information become available. Recommended areas for future efforts and further research include (1) development of information to support day-of-week inventories (i.e., Sunday, Monday, Tuesday, etc.), rather than weekday-weekend inventories; (2) development and/or acquisition of local data as they become available (e.g., metropolitan VMT data, fuels testing programs); (3) investigation of state motor vehicle departments' records of vehicle registrations, including duplicate records and unusual age distributions; (4) use of vehicle registration records to adjust and refine VMT distributions by vehicle type; (5) continuation of bottom-up activity data acquisition for additional types of non-road mobile sources and sources of agricultural fugitive dust (such as agricultural equipment, construction and mining equipment, recreational all-terrain vehicles (ATVs), lawn and garden equipment, cotton ginning operations, and/or crop transport); and (6) development of process-based methods or emission factors to improve inventories of agricultural fugitive dust emissions.

(a)



(b)

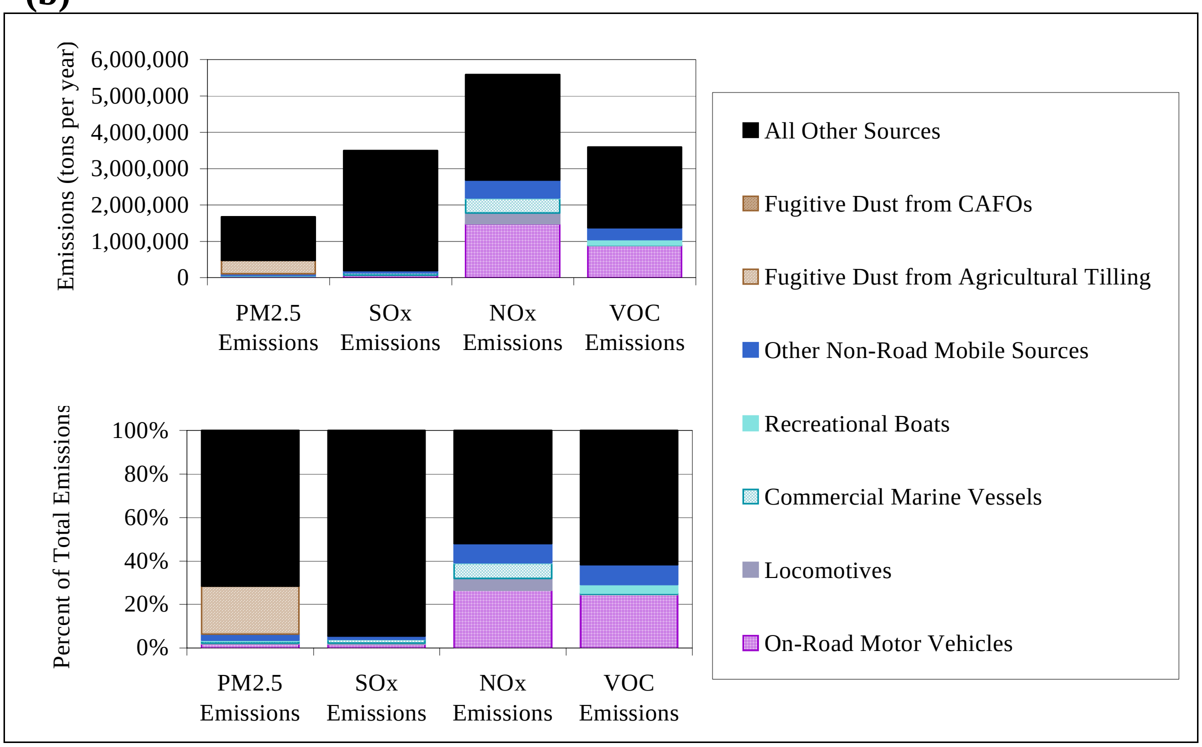


Figure ES-1. Annual emissions in the CENRAP region of selected pollutants as (a) calculated for the CENRAP for year 2002, and (b) recorded in the 1999 NEI or 2002 preliminary NEI.

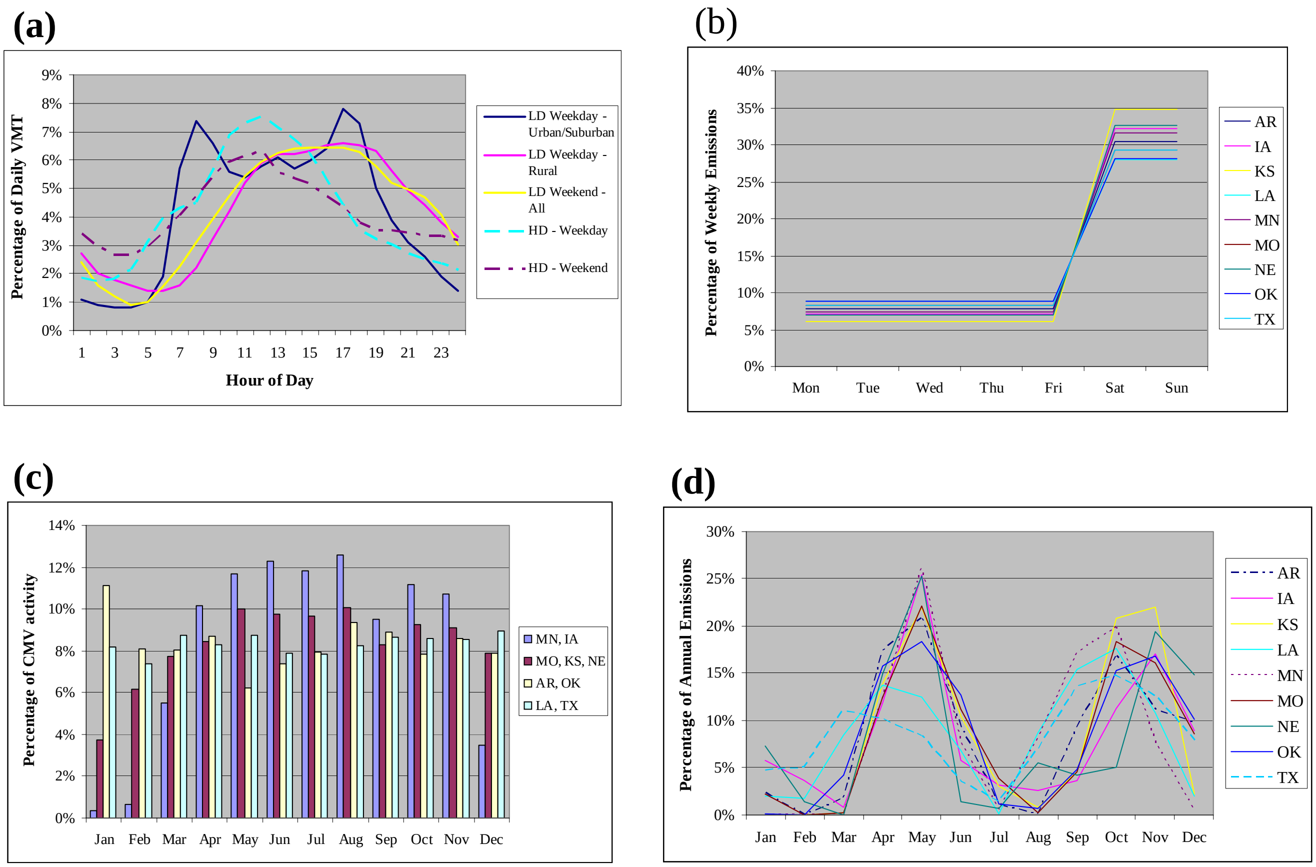


Figure ES-2. Selected temporal patterns, including (a) diurnal patterns for on-road mobile sources, (b) day-of-week patterns for recreational boats, (c) monthly patterns for commercial marine vessels by state, and (d) monthly patterns for agricultural tilling dust.

1. INTRODUCTION

The Central States Regional Air Planning Association (CENRAP) is developing a regional haze plan in response to the U.S. Environmental Protection Agency's (EPA) mandate to protect visibility in Class I areas.[2] To develop an effective regional haze plan, the CENRAP ultimately must develop a conceptual model of the phenomena that lead to episodes of low visibility in the CENRAP region. Thus, the CENRAP is researching visibility-related issues for its region, which includes Texas, Oklahoma, Louisiana, Arkansas, Kansas, Missouri, Nebraska, Iowa, and Minnesota. Both primary particulate matter (which is emitted directly to the atmosphere in particulate form) and the formation of secondary particulate matter (which is generated from chemical transformations in the atmosphere of gaseous precursor species such as ammonia, nitrogen oxides, sulfur oxides, and volatile organic compounds) contribute to regional haze issues in the CENRAP region. In recognition of these issues, the CENRAP sponsored the development of improved emission inventories for mobile sources and sources of agricultural dust.

In support of the CENRAP's need to develop a regional haze plan, Sonoma Technology, Inc. (STI) conducted CENRAP Work Assignment Number 03-0214-RP-003-004, "Mobile Source and Agricultural Dust Emission Inventory Development for the Central States." Consistent with the project goals presented in the Work Plan and Methods Document (Sullivan, 2004; Reid et al., 2004b), emissions were calculated for on-road mobile sources, off-road mobile sources, and sources of fugitive agricultural dust throughout the CENRAP region. Bottom-up or region-specific activity data were developed to model emissions from these source categories. These data were developed for compatibility with the MOBILE6 and NONROAD models; SMOKE 1.5 (which runs MOBILE6 internally); and the latest version of the National Emission Inventory Input Format (NIF).

1.1 BACKGROUND AND KEY ISSUES

1.1.1 Prior Status of the Emission Inventories

As a whole, few areas of the CENRAP region have experienced significant air quality problems in the past. Therefore, emission inventories and regionally representative activity data are relatively incomplete or scarce. In most areas of the CENRAP, existing emission inventories are based on the EPA's nationally representative defaults, which could be greatly improved with local or region-specific data, such as region-specific or state-specific fleet characteristics and improved vehicle miles traveled (VMT) estimates for rural areas. Prior to the completion of this project, the most comprehensive source of emissions estimates available for the CENRAP region was the EPA's National Emissions Inventory (NEI), which is used as the basis of the EPA's National Emission Trends (NET) document series and analyses (U.S. Environmental Protection Agency, 2003a, 2004a). In the NEI, estimates of emissions from mobile sources and sources of agricultural dust in the CENRAP region amount to 4% to 49% of the total inventories of nitrogen

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[2] Class I areas include national parks, wilderness areas, and national monuments. These areas have been granted special air quality protections under the federal Clean Air Act.

oxides (NO_x), volatile organic compounds (VOC), particulate matter of 2.5 microns aerodynamic diameter or less ($PM_{2.5}$), sulfur dioxide (SO_2), and ammonia (NH_3) for the region (see **Table 1-1**). The NEI indicates that fugitive dust from agricultural tilling operations is a significant $PM_{2.5}$ source, particularly in of Iowa, Kansas, and Nebraska. Mobile sources are a significant source of NO_x and VOC, particularly in Minnesota and Missouri.

The most significant sources of uncertainties in the NEI are associated with the national-scale representativeness and top-down methods that were applied to generate the inventory (approaches that were dictated by resource constraints). The results of this project substantially address these weaknesses of the NEI for the CENRAP region. As a result, the emission inventories produced through this project differ significantly from the emissions estimates in the NEI in a number of areas.

Table 1-1. Estimates of emissions in the CENRAP region from the preliminary 2002 NEI (U.S. Environmental Protection Agency, 2004a).

Page 1 of 2

	NO_x		VOC		PM_{25}		SO_2		NH_3	
State	tons/year	percent	tons/year	percent	tons/year	percent	tons/year	percent	tons/year	percent
Arkansas										
On-road Mobile	88,781	38%	49,525	9%	1,869	2%	3,610	2%	3,005	2%
Non-road Mobile	63,117	27%	30,343	5%	4,068	5%	6,665	3%	41	0%
Ag Dust (Tilling)	0	0%	0	0%	26,577	32%	0	0%	0	0%
Stationary Sources	83,253	35%	484,229	86%	50,494	61%	201,450	95%	129,188	98%
All Sources	235,151	100%	564,098	100%	83,008	100%	211,725	100%	132,234	100%
Iowa										
On-road Mobile	91,840	29%	50,816	23%	1,894	2%	3,520	1%	3,065	1%
Non-road Mobile	85,277	27%	34,771	16%	7,125	6%	8,735	4%	77	0%
Ag Dust (Tilling)	0	0%	0	0%	53,054	44%	0	0%	0	0%
Stationary Sources	135,678	43%	135,757	61%	57,649	48%	233,916	95%	223,502	99%
All Sources	312,796	100%	221,344	100%	119,722	100%	246,171	100%	226,644	100%
Kansas										
On-road Mobile	82,475	23%	48,692	25%	1,680	1%	3,192	2%	2,889	2%
Non-road Mobile	81,868	23%	24,426	13%	6,048	4%	7,598	5%	65	0%
Ag Dust (Tilling)	0	0%	0	0%	67,217	42%	0	0%	0	0%
Stationary Sources	198,667	55%	120,478	62%	85,377	53%	146,752	93%	135,475	98%
All Sources	363,010	100%	193,595	100%	160,322	100%	157,542	100%	138,429	100%
Louisiana										
On-road Mobile	119,067	16%	72,130	22%	2,488	2%	4,868	1%	4,220	6%
Non-road Mobile	230,407	31%	55,827	17%	11,342	10%	33,028	9%	52	0%
Ag Dust (Tilling)	0	0%	0	0%	12,649	11%	0	0%	0	0%
Stationary Sources	398,375	53%	193,623	60%	87,899	77%	347,159	90%	61,320	93%
All Sources	747,849	100%	321,581	100%	114,379	100%	385,054	100%	65,591	100%
Minnesota										
On-road Mobile	153,145	35%	87,926	23%	3,010	2%	4,168	3%	5,482	3%
Non-road Mobile	113,288	26%	97,023	25%	9,469	5%	12,395	8%	99	0%
Ag Dust (Tilling)	0	0%	0	0%	50,009	25%	0	0%	0	0%
Stationary Sources	171,536	39%	196,362	51%	136,045	69%	135,908	89%	160,447	97%
All Sources	437,969	100%	381,311	100%	198,534	100%	152,471	100%	166,028	100%

Table 1-1. Estimates of emissions in the CENRAP region from the preliminary 2002 NEI (U.S. Environmental Protection Agency, 2004a).

	NO_x		VOC		PM_{25}		SO_2		NH_3	
State	tons/year	percent	tons/year	percent	tons/year	percent	tons/year	percent	tons/year	percent
Missouri										
On-road Mobile	188,404	36%	109,927	31%	3,877	2%	6,845	2%	6,958	6%
Non-road Mobile	117,011	22%	55,279	15%	7,363	4%	12,034	3%	71	0%
Ag Dust (Tilling)	0	0%	0	0%	27,251	14%	0	0%	0	0%
Stationary Sources	216,722	42%	193,867	54%	163,294	81%	353,408	95%	112,354	94%
All Sources	522,137	100%	359,073	100%	201,784	100%	372,287	100%	119,383	100%
Nebraska										
On-road Mobile	55,284	25%	31,291	24%	1,131	1%	2,094	2%	1,850	1%
Non-road Mobile	89,946	41%	18,882	15%	5,323	5%	7,394	8%	49	0%
Ag Dust (Tilling)	0	0%	0	0%	38,068	38%	0	0%	0	0%
Stationary Sources	73,046	33%	77,809	61%	55,683	56%	83,563	90%	133,536	99%
All Sources	218,276	100%	127,982	100%	100,204	100%	93,051	100%	135,435	100%
Oklahoma										
On-road Mobile	126,710	30%	77,579	30%	2,615	2%	5,756	3%	4,468	4%
Non-road Mobile	51,962	12%	30,513	12%	3,940	3%	4,736	2%	45	0%
Ag Dust (Tilling)	0	0%	0	0%	27,732	19%	0	0%	0	0%
Stationary Sources	242,264	58%	150,107	58%	111,473	76%	182,502	95%	110,303	96%
All Sources	420,937	100%	258,199	100%	145,759	100%	192,994	100%	114,815	100%
Texas										
On-road Mobile	577,082	25%	349,211	30%	11,778	2%	23,343	1%	22,340	7%
Non-road Mobile	377,155	16%	153,570	13%	21,998	4%	42,373	3%	210	0%
Ag Dust (Tilling)	0	0%	0	0%	67,342	12%	0	0%	0	0%
Stationary Sources	1,377,264	59%	661,726	57%	453,992	82%	1,622,787	96%	278,886	93%
All Sources	2,331,502	100%	1,164,507	100%	555,111	100%	1,688,503	100%	301,436	100%
All States										
On-road Mobile	1,482,789	27%	877,097	24%	30,342	2%	57,397	2%	54,277	4%
Non-road Mobile	1,210,032	22%	500,634	14%	76,677	5%	134,957	4%	708	0%
Ag Dust (Tilling)	0	0%	0	0%	369,899	22%	0	0%	0	0%
Stationary Sources	2,896,806	52%	2,213,958	62%	1,201,905	72%	3,307,446	95%	1,345,010	96%
All Sources	5,589,626	100%	3,591,689	100%	1,678,823	100%	3,499,799	100%	1,399,995	100%

1.1.2 Current Status of the CENRAP Emission Inventories

As detailed in the attached Methods Document (Appendix A), emissions estimates were prepared for mobile sources and sources of agricultural dust throughout the CENRAP region. These emission inventories were prepared with EPA-accepted emissions models (e.g., NONROAD, SMOKE, and MOBILE6), emission factors gathered from EPA guidance documents or published literature, and geographic information systems (GIS) databases of land cover. All activity data sets were prepared using bottom-up methods or region-specific information whenever possible.

The MOBILE6 emissions model, the EPA's approved emission factor model for on-road mobile sources, was operated within SMOKE 1.5 to produce emission factors for January and July at the county level. Spatially and temporally distributed MM5 temperature fields for each day in January and July 2002 were averaged and used as inputs for these MOBILE6 runs so that outputs would represent an entire month rather than a specific episode date. The MOBILE6 outputs were matched with region-specific, county-level estimates of VMT, which also were distributed seasonally and by day of week according to temporal profiles, to estimate county-level emissions for the winter and summer runs. January and July emissions were averaged to estimate annual emissions at the county level. MOBILE6 inputs were prepared at the county level to represent region-specific fleet distributions, fuels characteristics (which can also vary by season), and local regulations (e.g., inspection and maintenance programs, etc.).

The latest version of the NONROAD emissions model (NONROAD 2004), the EPA's approved emission factor model for most off-road mobile sources, was used to produce emissions estimates at the county level for most off-road sources. In addition, EPA guidance documents were consulted for emissions estimation methods for locomotives and commercial marine vessels (U.S. Environmental Protection Agency, 1999c, 1998b, 2000, 2003b, 1999a, 1997, 1992). Bottom-up activity data were gathered for recreational boats, locomotives, and commercial marine vessels—considered to be the most important or uncertain off-road mobile sources affecting regional haze in the CENRAP region. For other source categories, NONROAD default activity data were used in conjunction with region-specific fuels information to estimate emissions. Emissions from aircraft were considered to be a lower priority than other nonroad mobile sources and were not included in the scope of this project.

The Emission Inventory Improvement Program and recent research findings from the University of California at Davis and Texas A&M University were consulted for emission factors and emissions estimation methods for agricultural fugitive dust sources (U.S. Environmental Protection Agency, 2004b; Goodrich et al., 2002; Flocchini and James, 2001). County-level annual emission inventories were prepared for agricultural tilling operations and confined animal feeding operations (CAFOs). Bottom-up activity data included facility-specific animal populations developed for CAFOs in the CENRAP region (Coe and Reid, 2003), agricultural tilling activity information developed through systematic telephone surveys of county agricultural extension services (AES) throughout the CENRAP region (Reid et al., 2004a), and county-level estimates of crop-acreages in 2002 from the National Agricultural Statistics Service (NASS).

The resulting emission inventories are illustrated in **Figures 1-1 through 1-6** and tabulated in Appendix B. In all cases, the inventories were based on generally accepted emission factors and the most complete and up-to-date activity data sets that could be identified and acquired. However, we recognize that available emission factors are uncertain and continue to be the subject of research. In anticipation of future efforts to improve emissions estimation techniques and to further develop or improve the CENRAP's inventories, the deliverables of this project include systems of data files that can be updated with revised emission factors, activity data, and/or emissions estimates as new information becomes available (see Appendix D).

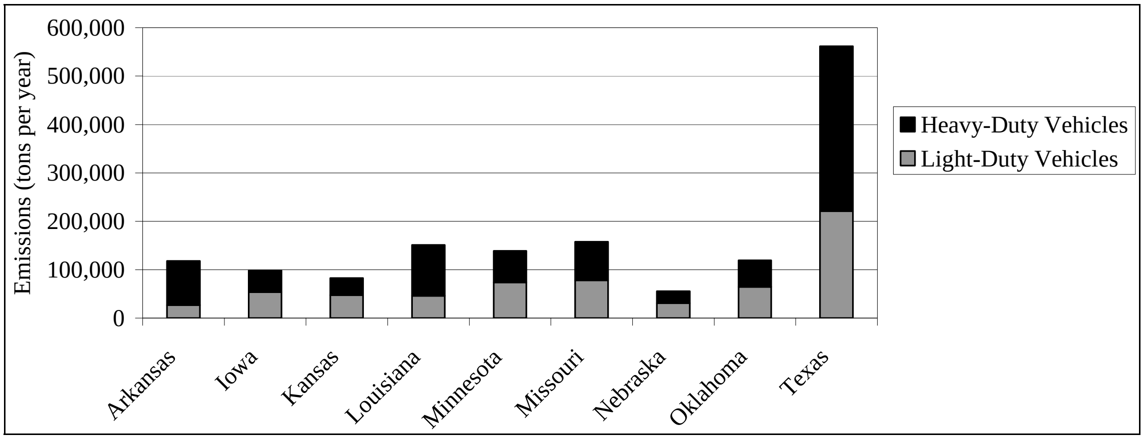


Figure 1-1. Year-2002 emissions of NO_x from on-road mobile sources in the CENRAP region.

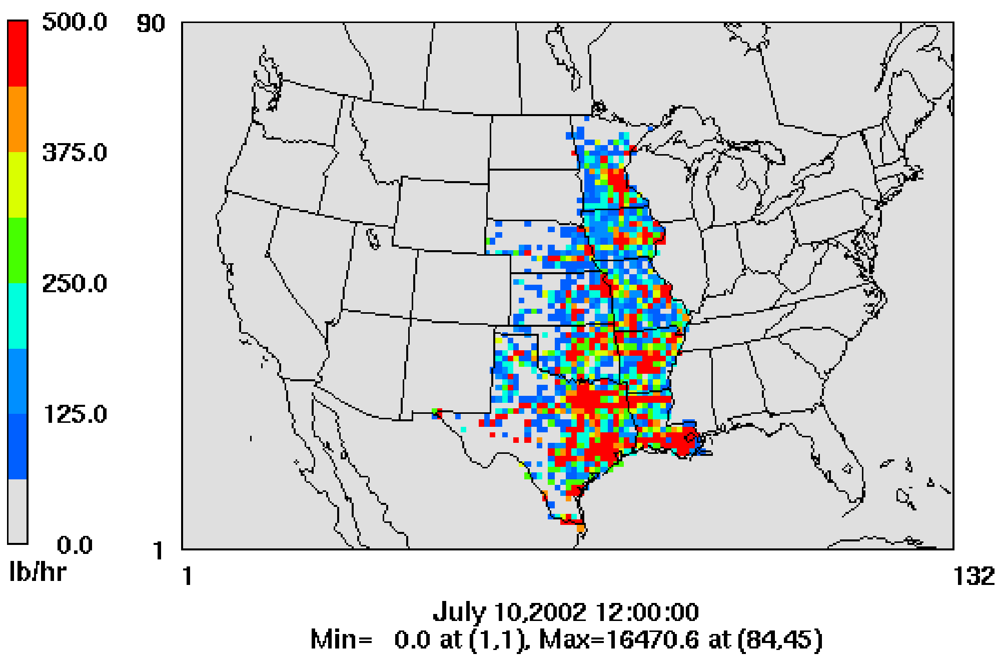


Figure 1-2. Geographic distribution of on-road mobile source emissions of NO_x in the CENRAP states on July 10, 2002.

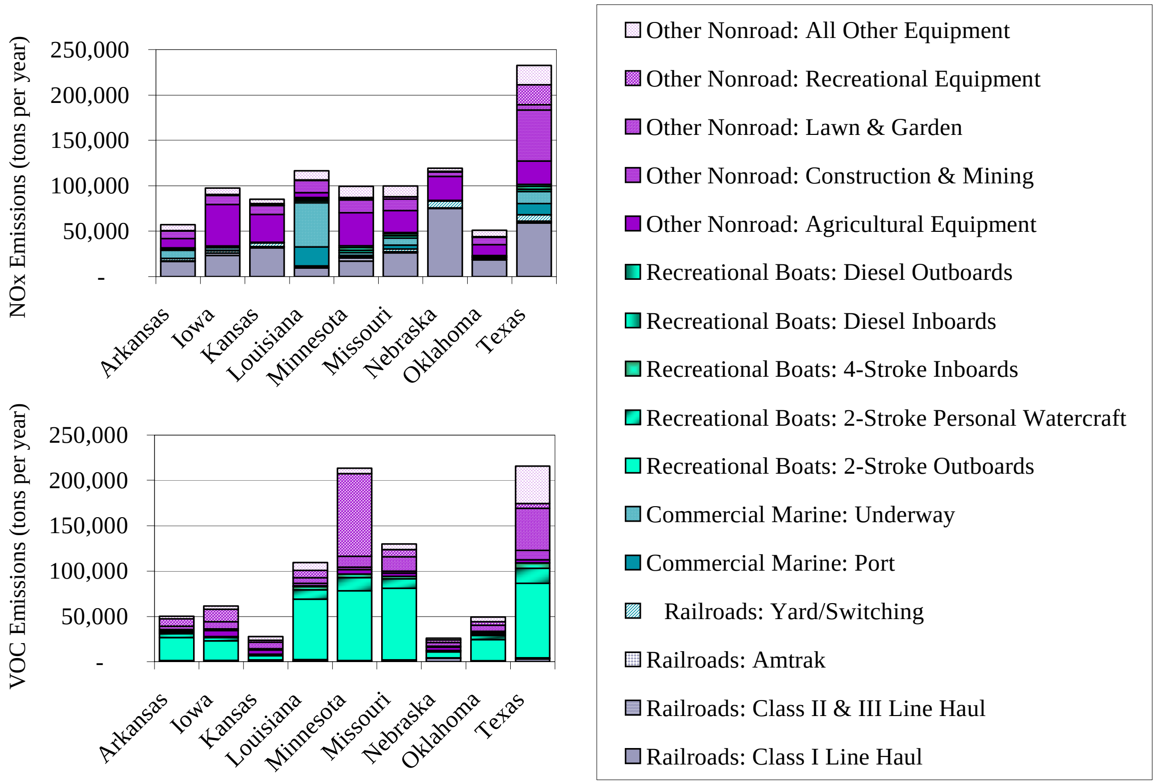


Figure 1-3. Year-2002 emissions of NO_x and VOC from non-road mobile sources in the CENRAP region.

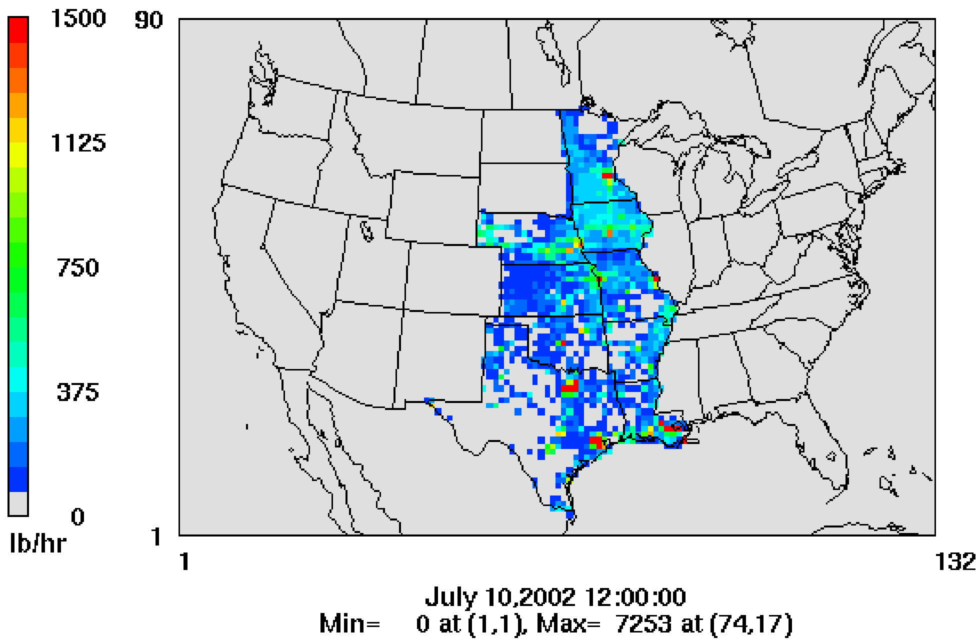


Figure 1-4. Geographic distribution of non-road mobile source NO_x in the CENRAP states on July 10, 2002.

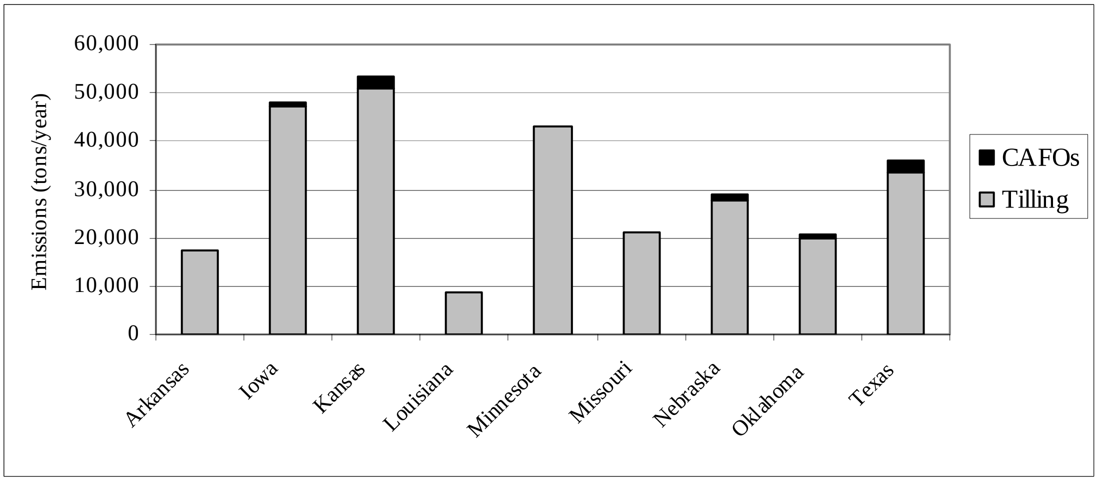


Figure 1-5. Year-2002 emissions of $PM_{2.5}$ from sources of fugitive agricultural dust in the CENRAP region.

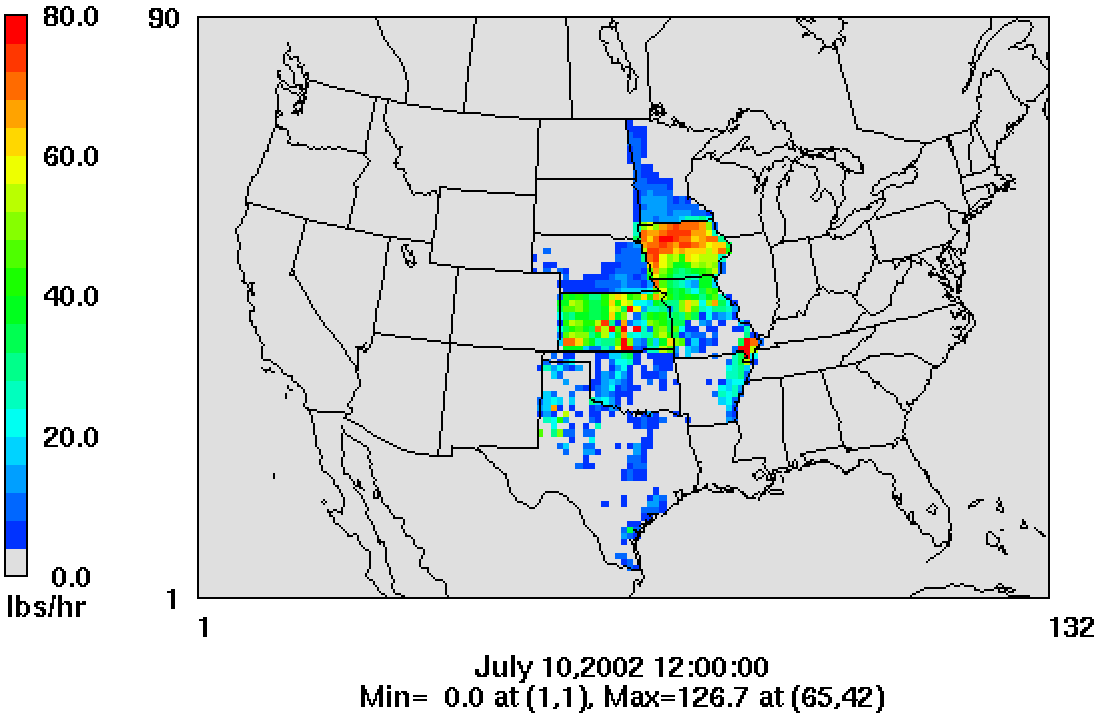


Figure 1-6. Geographic distribution of $PM_{2.5}$ emissions from sources of agricultural fugitive dust in the CENRAP states on July 10, 2002.

Of the mobile and agricultural fugitive dust sources discussed throughout this report, those that we qualitatively consider to contribute the greatest degrees of uncertainty to the emissions for the CENRAP region are agricultural fugitive dust sources and “other” non-road mobile sources.[3] The most effective strategies to improve these components of the inventory in the future would be to develop process-based emissions estimation techniques for agricultural fugitive dust sources and to prioritize and gather bottom-up activity data for “other” non-road mobile sources (as was done through this project for recreational boating). These recommendations are discussed in more detail in Section 3.

[3] “Other” non-road mobile sources include all non-road mobiles sources other than locomotives, commercial marine vessels, recreational boats, and aircraft.

2. SUMMARY AND ASSESSMENT OF THE INVENTORIES

STI calculated emissions as detailed in Appendix A, Emission Estimation Methods for Mobile Sources and Agricultural Dust Sources in the Central States, with results tabulated in Appendix B, Annual Emissions by State and Source Category. In addition, STI carried out quality assurance procedures as provided in the Quality Assurance Project Plan (QAPP) (Sullivan, 2004) and as detailed in this section. In summary, emissions from on-road mobile sources were estimated to contribute 20% and 28% of total annual emissions of VOCs and NO_x in the CENRAP region, while non-road mobile sources were estimated to contribute 23% and 18%, respectively. Agricultural dust sources were estimated to contribute 17% of total annual $PM_{2.5}$ emissions. Emissions for many of these source categories vary seasonally, daily, and hourly. Emissions of NO_x and VOC from on-road mobile sources peak in the summer with somewhat increased vehicle activity (VMT); however, emissions of CO from on-road mobile sources peak in the winter due to colder ambient temperatures. In addition, diurnal and day-of-week patterns of emissions from on-road mobile sources vary. On-road mobile emissions are generally greater on weekdays than on weekend days; and weekday driving activities track the morning and afternoon commute patterns, while weekend driving activities do not. The variation of seasonal, diurnal, and day-of-week patterns for recreational boats is even more pronounced than that for on-road mobile sources. Emissions from recreational boats are highly concentrated in the summer months (except in the warmest, most southern states) and on weekend days. Recreational boating activities peak sharply between 0700 and 1000 and decline gradually throughout the day. Emissions from commercial marine vessels also follow a seasonal pattern (except in the warmest, most southern states). Emissions from locomotives vary minimally or negligibly by season, day of week, and hour of day. Emissions from agricultural tilling operations follow seasonal patterns that are unique to each state and dependent on the climatic conditions and types of crops grown in each state.

2.1 EMISSIONS FROM ON-ROAD MOBILE SOURCES

2.1.1 Summary of Emissions from On-Road Mobile Sources

Over 525 billion VMT were estimated to have occurred in 2002 in the CENRAP region, with consequent emissions as shown in **Table 2-1** and **Figure 2-1**. **Figure 2-2** illustrates the geographic distribution of on-road mobile source emissions for a selected date.

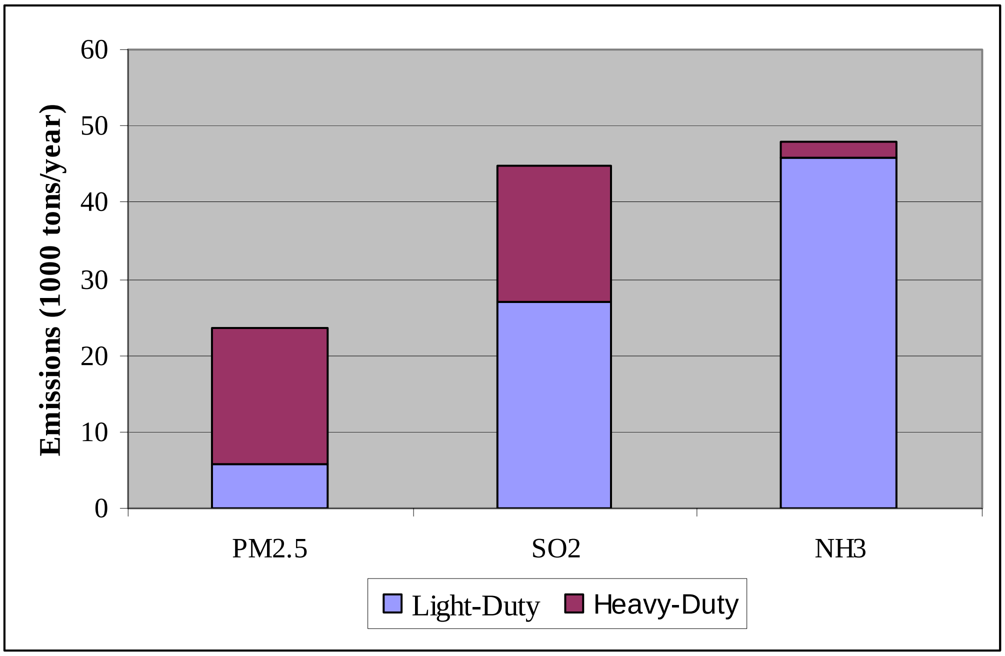
Appendix C provides graphical and tabular summaries of the activity data that were prepared for the emission inventories of on-road mobile sources, including VMT, fleet distributions, fuels characteristics, and regulatory controls. Whenever possible, VMT were acquired from local air quality agencies or metropolitan planning organizations and HPMS data were used as defaults for areas without local VMT estimates. VMT data were provided by local agencies for approximately 25% of the counties in the CENRAP region, while the remainder are from the HPMS data. Areas that were able to provide local estimates of VMT included Houston/Galveston, Texas; Beaumont/Port Arthur, Texas; Dallas-Ft. Worth, Texas; Baton Rouge, Louisiana; New Orleans, Louisiana; St. Louis, Missouri; and Lincoln, Nebraska. Metropolitan areas that have recently produced local estimates of VMT (or will do so very

shortly) include Kansas City, Minneapolis-St. Paul, and Little Rock. In the future, these locally generated VMT estimates should be used to improve the emission inventories for the CENRAP region.

Fleet distributions were developed by acquiring records of vehicle registrations from the departments of motor vehicles in each CENRAP state. These records were decoded using the Eastern Research Group (ERG) Vehicle Identification Number (VIN) Decoder program. Fleet distributions by vehicle type, vehicle age, and fuel type were calculated on the basis of the ERG VIN Decoder outputs. In several states, the fleet distributions differed significantly from national average distributions, which correspond to MOBILE6 model defaults.

Table 2-1. 2002 VMT and emissions (tons) for on-road mobile sources in CENRAP states.

State	Annual VMT (10^6 miles)	$PM_{2.5}$	CO	NO_x	SO_2	NH_3	VOC
Arkansas							
Light-Duty	19,224	235	502,991	27,137	1,383	1,971	29,752
Heavy-Duty	9,955	2,076	102,247	90,833	2,163	313	9,786
Iowa							
Light-Duty	27,664	381	973,854	53,702	2,113	2,755	67,501
Heavy-Duty	3,701	931	30,853	44,607	884	107	2,993
Kansas							
Light-Duty	25,424	345	930,039	47,210	1,938	2,528	61,867
Heavy-Duty	3,401	855	29,686	35,520	758	98	2,979
Louisiana							
Light-Duty	34,246	416	824,585	45,929	2,396	3,485	57,283
Heavy-Duty	9,049	2,272	74,770	105,449	2,257	263	7,361
Minnesota							
Light-Duty	46,880	595	1,285,076	73,656	1,274	4,771	75,663
Heavy-Duty	6,271	1,577	43,160	65,290	1,314	182	5,255
Missouri							
Light-Duty	53,030	680	1,375,126	77,916	3,120	5,356	76,004
Heavy-Duty	7,238	1,841	52,065	79,607	1,787	209	5,491
Nebraska							
Light-Duty	15,957	246	581,402	30,649	1,229	1,581	38,788
Heavy-Duty	2,449	624	18,626	25,037	589	71	2,115
Oklahoma							
Light-Duty	39,569	509	1,194,649	64,504	2,989	3,968	81,676
Heavy-Duty	5,293	1,331	48,382	54,812	1,265	154	5,062
Texas							
Light-Duty	190,132	2,339	3,653,523	220,819	10,555	19,365	248,680
Heavy-Duty	25,989	6,276	113,949	340,992	6,667	692	14,057
Total	525,473	23,529	11,834,984	1,483,668	44,678	47,870	792,310



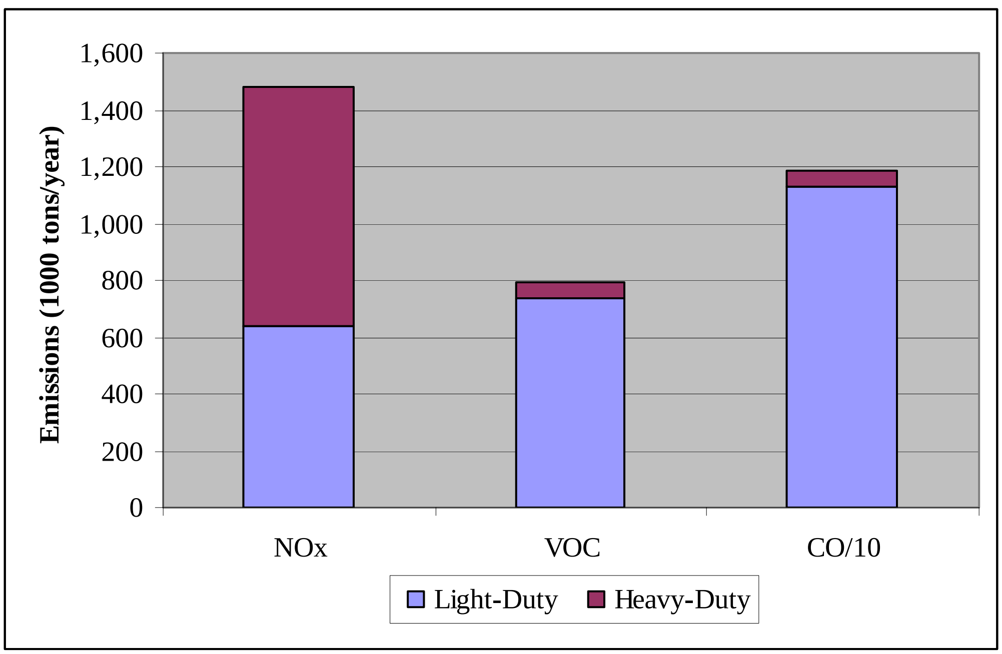


Figure 2-1. Annual on-road mobile emissions by pollutant and vehicle type (note: CO emissions have been divided by 10 for scaling purposes).

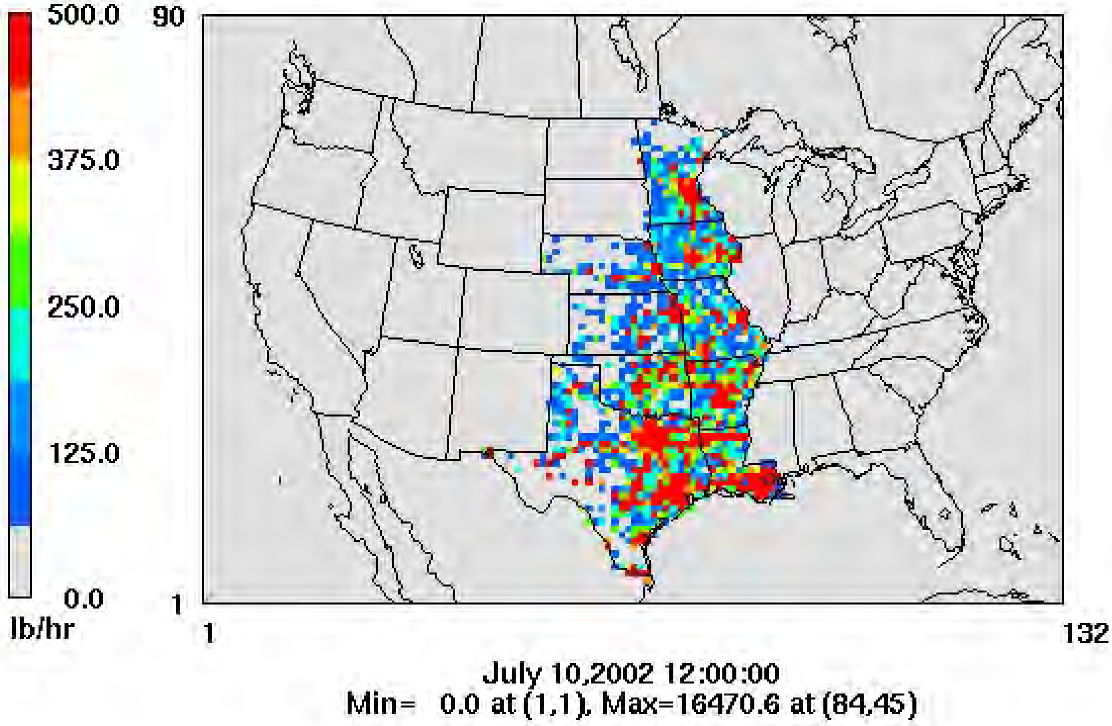


Figure 2-2. Geographic distribution of on-road mobile source emissions of NO_x in the CENRAP states on July 10, 2002.

Fuels characteristics (e.g., sulfur content, volatility, and oxygenate content) required by MOBILE6 were acquired for most CENRAP states from Northrop Grumman. However, for Kansas, Minnesota, and Missouri, data from state departments of agriculture were used because they proved to be more extensive than the Northrop Grumman data. Information on regulatory programs (such as inspection and maintenance programs) was acquired by contacting the state and local personnel involved with these programs.

MOBILE6 was run in SMOKE using gridded, hourly temperature data from meteorological files created by the Meteorology Chemistry Interface Processor (MCIP), a mesoscale model (MM5) post-processing program. Meteorological data files for all of January and July, 2002 were provided by the CENRAP Modeling Work Group, and these files were used to derive monthly average temperatures by hour so that MOBILE6 runs would be representative of entire months rather than specific episode dates.

On-road mobile source emissions were temporally allocated using temporal profiles derived from a variety of sources (see **Figures 2-3 through 2-5**). The monthly profiles for light-duty vehicles and heavy-duty vehicles were derived from national-level sales of gasoline and diesel fuels during 2002 (Energy Information Administration, 2003). SMOKE default weekly temporal profiles were used for light-duty vehicles because they were considered to be consistent with the latest research on weekday-weekend activity patterns. The weekly profile for heavy-duty vehicles was derived from traffic counts conducted in California's South Coast Air Basin

(Coe et al., 2004). County-specific data obtained from the Texas Transportation Institute and the East-West Gateway Coordinating Council were used to develop diurnal profiles for light-duty vehicles in Texas and five counties in the St. Louis area of Missouri. For the remainder of Missouri and all other states, a default SMOKE/EPA diurnal profile for weekdays was used for light-duty vehicles in urban and suburban areas, and a weekday rural profile was developed from the Texas data and applied to counties not associated with a Metropolitan Statistical Area (MSA). A weekend diurnal profile for light-duty vehicles and both a weekend and weekday profile for heavy-duty vehicles were derived from traffic counts conducted in California's South Coast Air Basin (Coe et al., 2004) and used for all CENRAP states. **Figure 2-5** shows all diurnal profiles used except county-specific profiles used for Texas and Missouri, which are detailed in Appendix C.

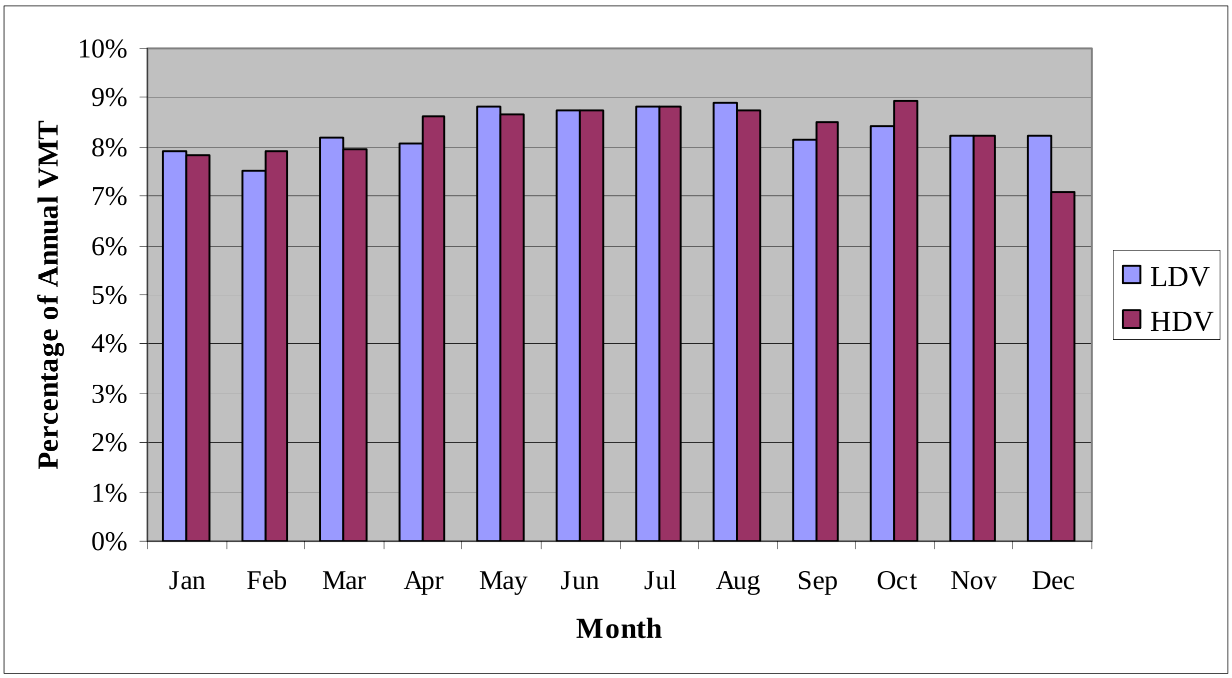


Figure 2-3. Monthly variation in on-road mobile source activity by vehicle type.

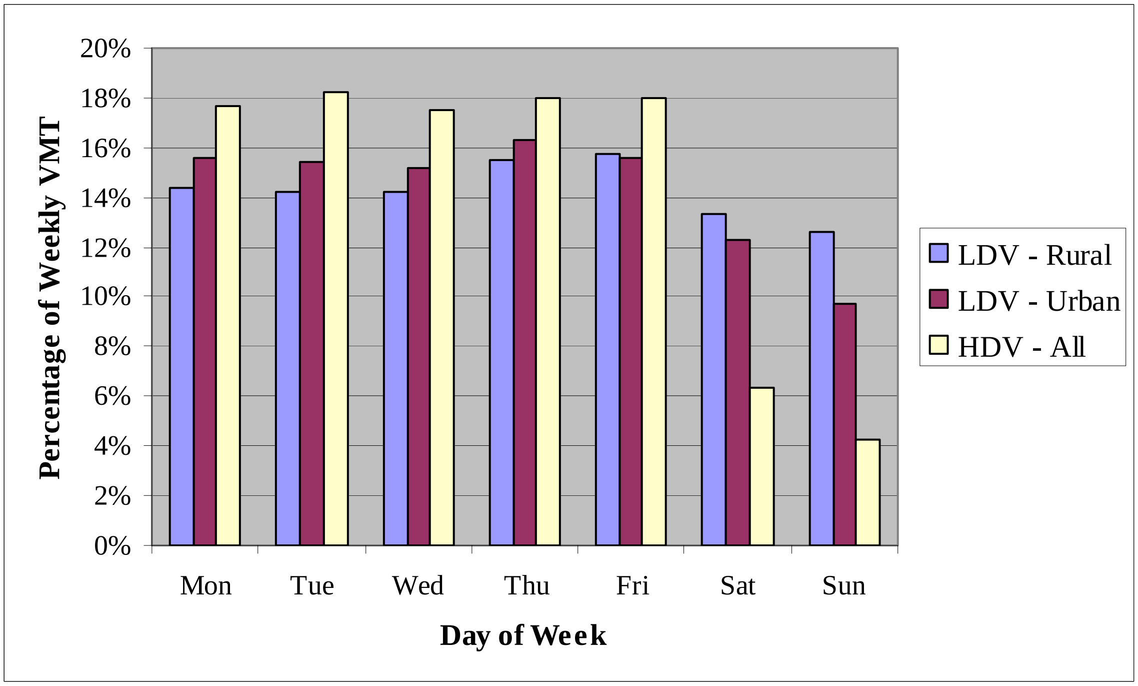


Figure 2-4. Weekly variation in on-road mobile source activity by vehicle type.

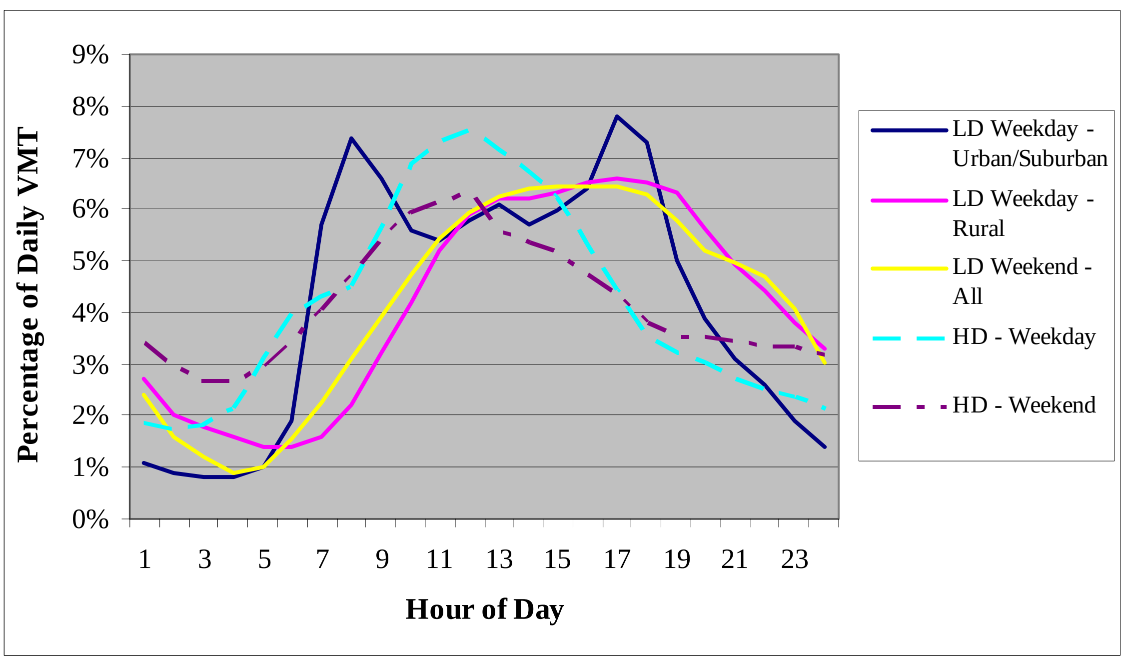


Figure 2-5. Diurnal variation in on-road mobile source emissions by vehicle type.

2.1.2 Assessment of On-Road Mobile Source Emissions

The emission inventories for on-road mobile sources are based on extensive region-specific information, including VMT data, fleet characteristics, temporal distributions, and regulatory program descriptions. These estimates were also strengthened by the use of gridded, hourly temperature data. The importance of using state and county-specific data can be seen in a comparison of the CENRAP's inventory with the preliminary 2002 NEI. As **Figure 2-6** shows, both inventories estimate 1.5 million tons of NO_x from on-road mobile sources for the CENRAP region as a whole. However, significant differences exist at the state level. For example, Louisiana's NO_x emissions are 27% higher than the estimates from the NEI, while Missouri's NO_x emissions are 16% lower. Differences are apparent at the CENRAP region-wide scale for VOC emissions, which are about 10% lower than those in the NEI, while region-wide $PM_{2.5}$ and SO_2 estimates are about 20% lower. These differences seem to arise primarily from the use of more localized temperature data, fuel volatility data, and fuel sulfur contents. For example, the 2002 NEI assumes an across-the-board diesel sulfur content of 500 ppmw (the regulatory limit), whereas the state-specific data used in this inventory ranged from 330-390 ppmw for the various CENRAP states. Further improvements could be made by continuing to acquire and incorporate local data. For example, improved VMT data are now available for the Kansas City metropolitan area and should be incorporated into future inventory efforts.

Further improvements to the VMT distributions for light-duty vehicle types may be feasible by applying vehicle registration data in novel ways. Many light-duty and/or diesel trucks (e.g., SUVs) are driven for similar purposes as passenger vehicles—a trend that was established in the 1990s and that continues to strengthen. Therefore, the ratio of registered SUVs to registered light-duty autos is likely to be proportional to the VMT traveled by these vehicle types. Alternatively, the VMT mix could be calculated from registration data using vehicle type-specific assumptions about annual mileage accumulation rates (AMAR), which are inherent to the MOBILE6 model. Such adjustments to the VMT distributions may be beneficial because emission factors vary significantly by light-duty vehicle class and fuel type and because MOBILE6 default VMT distributions may be out-of-date due to the rapidly increasing popularity of SUVs and light trucks.

Finally, it should be noted that an "annualized" on-road mobile source inventory was assembled as an average of SMOKE/MOBILE6 runs performed for January and July—a necessity given the current availability of meteorological data. The inventory could be improved by performing runs for all 12 months of the year as new meteorological inputs become available. However, this would likely produce only minor or insignificant changes in annual total emissions.

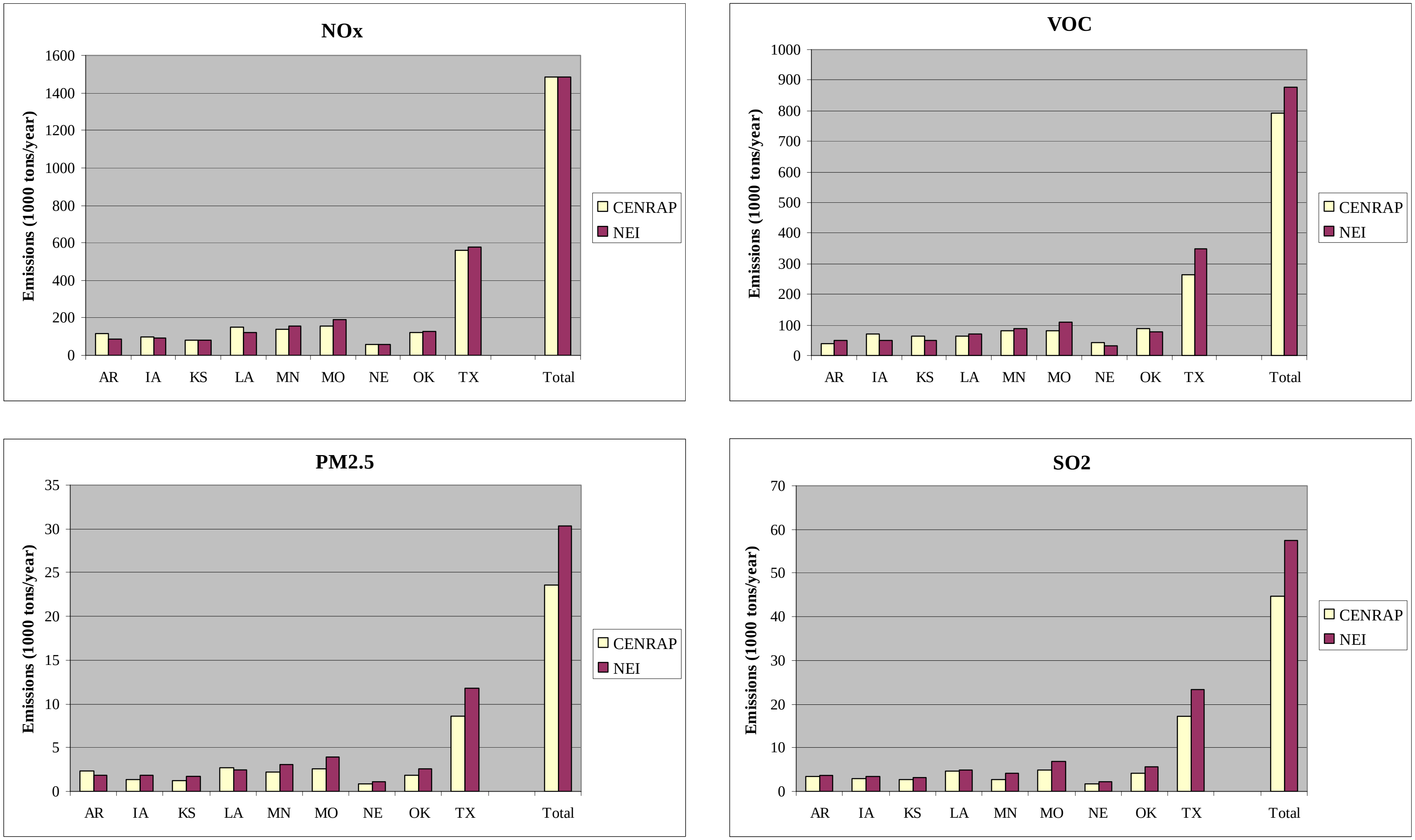


Figure 2-6. Comparison of CENRAP's emission inventories for on-road mobile source to the 2002 preliminary NEI.

2.2 EMISSIONS FROM NON-ROAD MOBILE SOURCES

2.2.1 Summary of Emissions from Locomotives

Emission estimates were generated for Class I line haul, Class II and III[4] line haul, and yard (or switching) locomotives throughout the CENRAP region using fuel consumption and traffic density data obtained from individual railroads, federal agencies, and other sources. Almost 1.5 billion gallons of diesel fuel were estimated to have been consumed by locomotives in the CENRAP region in 2002, with consequent emissions as shown in **Table 2-2** and **Figure 2-7**. **Figure 2-8** illustrates the geographic distribution of locomotive emissions for a selected date, and **Figure 2-9** shows the monthly variability in locomotive activity, which is based on weekly summaries of carloads of freight moved nationally during 2002.

Table 2-2. 2002 fuel consumption and emissions (tons) for locomotives in CENRAP states.

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State	Fuel Consumption (1000 gallons)	$PM_{2.5}$	CO	NO_x	SO_2	VOC	NH_3
Arkansas							
Class I Line Haul	79,645	530	2,334	16,769	1,434	880	7
Class II & III Line Haul	2,058	14	60	433	37	23	0
Amtrak	1,050	7	32	221	20	12	0
Yard/Switching	7,912	73	333	2,408	200	184	0
Iowa							
Class I Line Haul	110,685	738	3,243	23,304	1,992	1,224	10
Class II & III Line Haul	11,186	74	328	2,355	201	124	1
Amtrak	1,050	7	31	221	20	12	0
Yard/Switching	9,283	86	389	2,825	235	216	0
Kansas							
Class I Line Haul	150,063	1,000	4,397	31,596	2,702	1,659	14
Class II & III Line Haul	6,518	43	191	1,372	117	72	1
Amtrak	1,050	6	31	221	20	11	0
Yard/Switching	12,594	115	529	3,832	318	293	0
Louisiana							
Class I Line Haul	45,878	305	1,345	9,659	826	507	4
Class II & III Line Haul	576	4	17	121	10	6	0
Amtrak	1,500	10	43	315	27	16	0
Yard/Switching	5,556	50	233	1,691	139	129	0
Minnesota							
Class I Line Haul	80,483	536	2,358	16,946	1,449	890	7
Class II & III Line Haul	17,646	118	517	3,715	318	195	2
Amtrak	1,050	8	31	221	19	12	0
Yard/Switching	3,499	31	147	1,065	87	82	0

[4] Class I railroads operate over large areas of the country, serving many states. Class II railroads are regional in scope and serve only a few states, while Class III railroads are local and typically operate in only one state.

Table 2-2. 2002 fuel consumption and emissions (tons) for locomotives in CENRAP states.

Page 2 of 2

State	Fuel Consumption (1000 gallons)	$PM_{2.5}$	CO	NO_x	SO_2	VOC	NH_3
Missouri							
Class I Line Haul	124,524	830	3,649	26,218	2,241	1,376	11
Class II & III Line Haul	3,352	22	98	706	60	37	0
Amtrak	2,400	15	70	504	42	25	0
Yard/Switching	9,463	86	398	2,880	239	220	0
Nebraska							
Class I Line Haul	357,167	2,379	10,465	75,201	6,429	3,948	33
Class II & III Line Haul	1,379	9	40	290	25	15	0
Amtrak	750	4	22	158	13	8	0
Yard/Switching	24,553	225	1,032	7,471	618	572	1
Oklahoma							
Class I Line Haul	86,879	578	2,545	18,293	1,564	961	8
Class II & III Line Haul	1,826	12	54	384	34	20	0
Amtrak	1,050	7	31	221	19	12	0
Yard/Switching	5,276	48	222	1,606	134	123	0
Texas							
Class I Line Haul	279,022	1,858	8,176	58,748	5,023	3,084	25
Class II & III Line Haul	5,539	37	162	1,166	100	61	1
Amtrak	5,250	34	155	1,105	94	57	0
Yard/Switching	23,723	220	996	7,217	600	551	1
Total	1,481,435	10,118	44,703	321,460	27,402	17,616	126

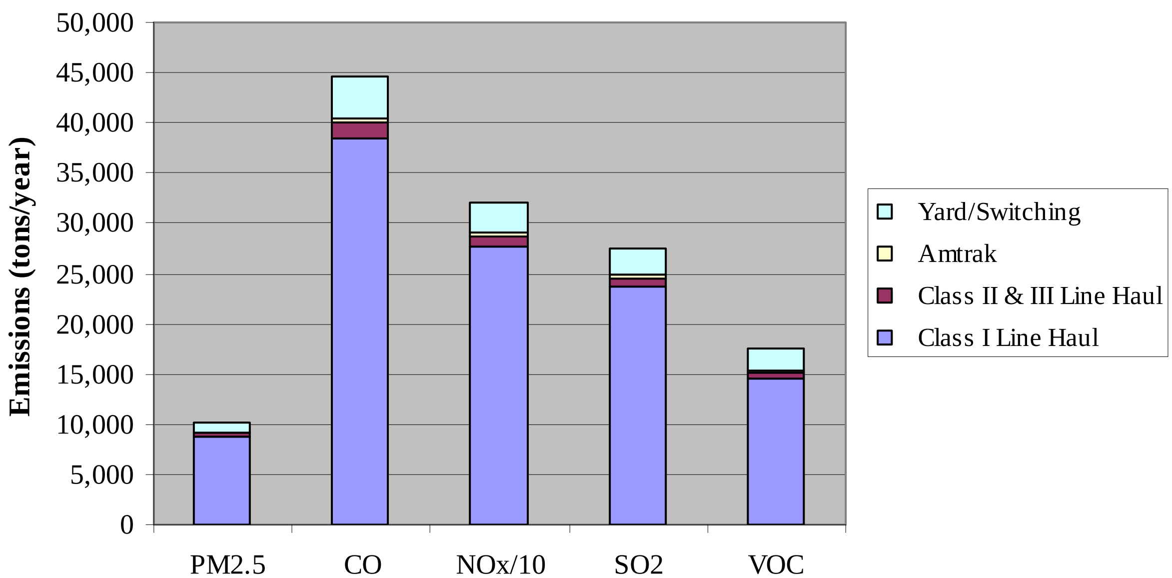


Figure 2-7. Annual locomotive emissions by pollutant and locomotive type for the CENRAP region (note: NO_x emissions have been divided by 10 for scaling purposes).

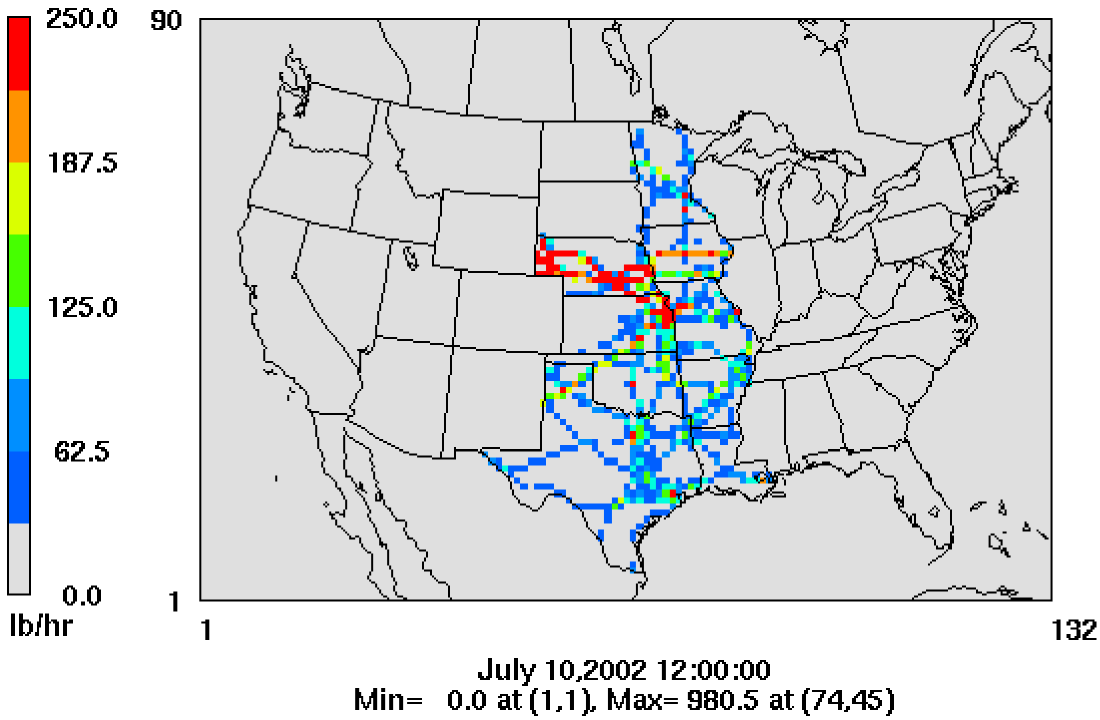


Figure 2-8. Geographic distribution of locomotive emissions of NO_x on July 10, 2002.

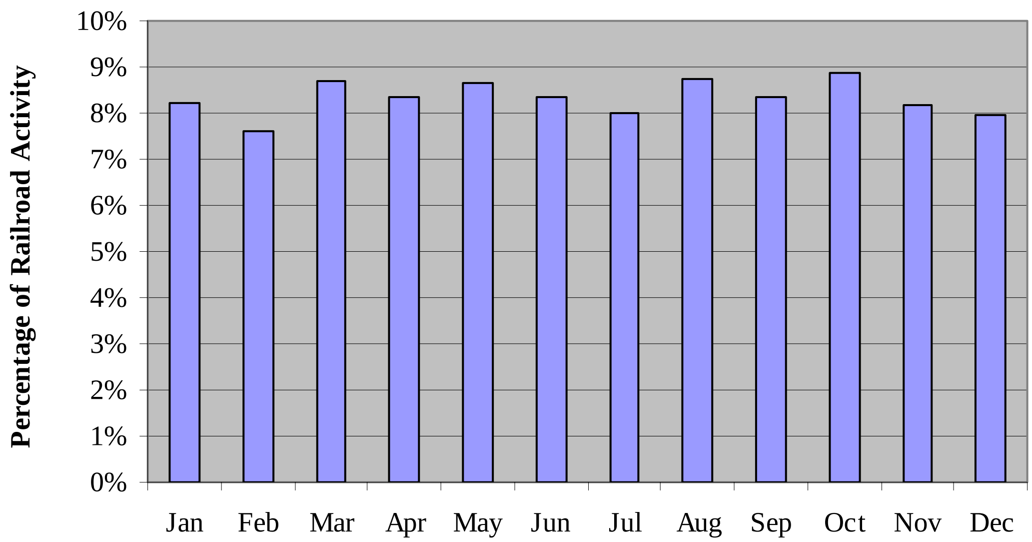


Figure 2-9. Monthly variability in locomotive activity.

2.2.2 Assessment of Emissions from Locomotives

Most of the effort of emission inventory development for locomotives was directed toward Class I railroads, which, though small in number, typically account for over 90% of the annual fuel consumption by railroads in the United States (U.S. Environmental Protection Agency, 1998a). Fuel consumption and traffic density data for 2002 were obtained for all eight Class I railroads operating in the CENRAP states, and this information was used to generate county-level emission estimates. Although less effort was expended on smaller railroads, representative bottom-up data sets were collected, including 2002 fuel consumption data for six of the 14 Class II railroads, and either fuel consumption data or yard locomotive fleet sizes for 35 of the 113 Class III and switching railroads that operate in the CENRAP region. Overall, of 1.48 billion gallons of fuel consumed by railroads in the CENRAP region for 2002, 1.44 billion gallons (or 97%) were directly reported by individual railroads, while the remainder were extrapolated from activity patterns. Therefore, the vast majority of the emission inventory for locomotives is based on directly reported, bottom-up activity data.

Figure 2-10 compares the CENRAP's inventory with the 2002 preliminary NEI inventory. CENRAP's emission estimates for most pollutants are about 50% higher than those in the NEI with the exception of NO_x, for which the CENRAP and NEI emission estimates are roughly equal. "Uncontrolled" emission factors were applied across the board for the 2002 NEI, which offset a corresponding underestimate of locomotive activity levels in the CENRAP area. CENRAP's NO_x inventory for locomotives reflects existing federal emission standards for locomotives. These emission standards, which took effect with the 1973 model year, predominately affect NO_x emissions. Therefore, although activity levels estimated for the CENRAP inventory were higher than those estimated for the NEI, the resultant NO_x emissions are about the same.

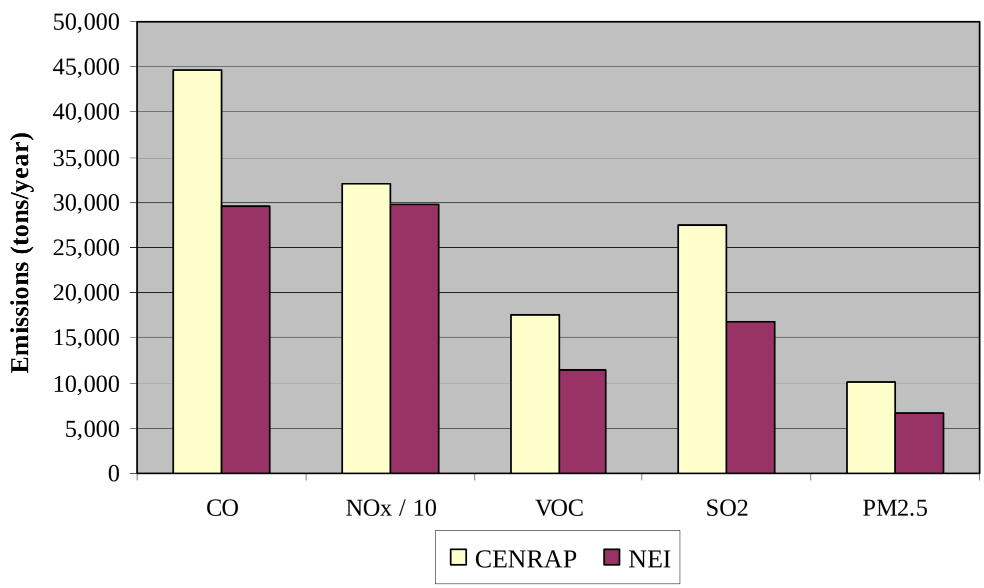


Figure 2-10. Comparison of locomotive emissions estimates with results from the 2002 preliminary NEI (note: NO_x emissions have been divided by 10 for scaling purposes).

Use of 2002 railroad-specific fuel consumption estimates and emission factors reflective of existing emissions standards greatly improved the degree of certainty in the CENRAP region-wide emission inventory above that associated with the preliminary 2002 NEI. Additional survey work could improve the accuracy of the inventory, but this improvement would likely be significant only at county or metropolitan scales where railroad activities are dominated by Class II or III railroads. In addition, local data would likely be more representative of variances in local activity patterns than the national-level data that were used to create a monthly temporal profile.

2.2.3 Summary of Emissions from Commercial Marine Vessels

Emission estimates were generated for commercial marine vessels operating in commercially active waterways in the CENRAP region, including inland river systems, Lake Superior, and the Gulf Intracoastal Waterway (GIWW). County-level emissions were designated as either “in-port” or “underway”, as shown in **Table 2-3** and **Figure 2-11**. **Figure 2-12** illustrates the geographic distribution of commercial marine emissions for a selected date, and **Figure 2-13** shows the monthly variability in commercial marine activity by state, with profiles based on monthly summaries of freight movements through selected locks and ports for 2002.

Table 2-3. 2002 commercial marine vessel emissions (tons) in CENRAP states.

State	Type	CO	NOx	VOC	SO2	PM2.5	NH_3
Arkansas	Port	13	68	1	6	1	0
	Underway	1,783	9,274	193	889	197	4
Iowa	Port	55	286	6	27	6	0
	Underway	534	2,776	58	266	59	1
Kansas	Port	2	9	0	1	0	0
	Underway	4	22	0	2	0	0
Louisiana	Port	2,719	20,772	739	5,369	693	6
	Underway	6,912	48,574	999	7,082	1,221	7
Minnesota	Port	211	1,533	57	230	37	1
	Underway	492	2,822	65	484	79	1
Missouri	Port	585	4,281	170	443	84	2
	Underway	1,472	7,656	159	734	163	3
Nebraska	Port	1	3	0	0	0	0
	Underway	5	27	1	3	1	0
Oklahoma	Port	1	5	0	0	0	0
	Underway	97	505	10	48	11	0
Texas	Port	1,613	12,300	423	4,315	526	3
	Underway	1,882	13,009	300	5,778	686	3
Total		18,381	123,922	3,182	25,677	3,764	32

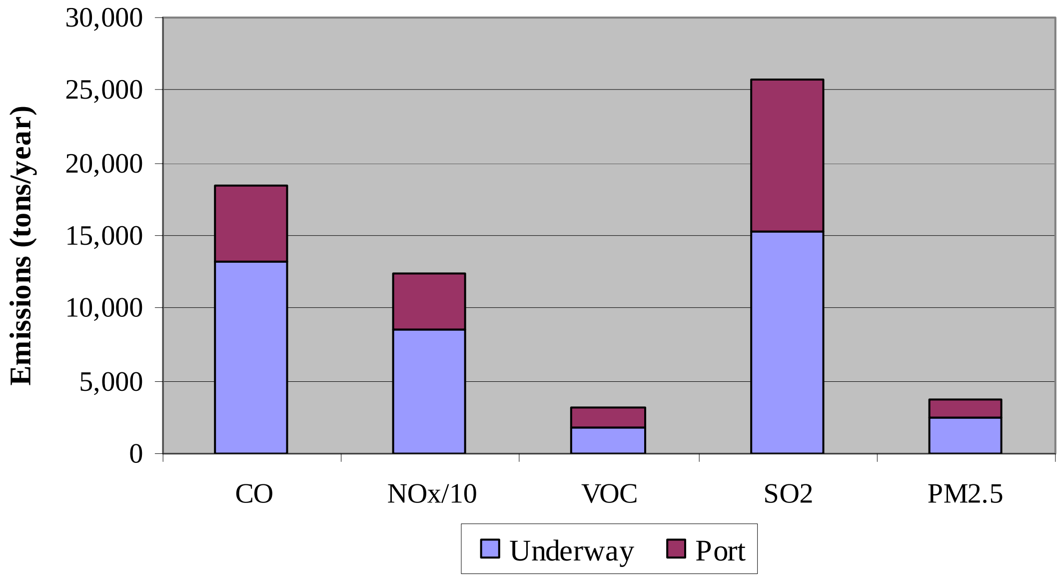


Figure 2-11. Annual commercial marine vessel emissions by pollutant and source type for the CENRAP region (note: NO_x emissions have been divided by 10 for scaling purposes).

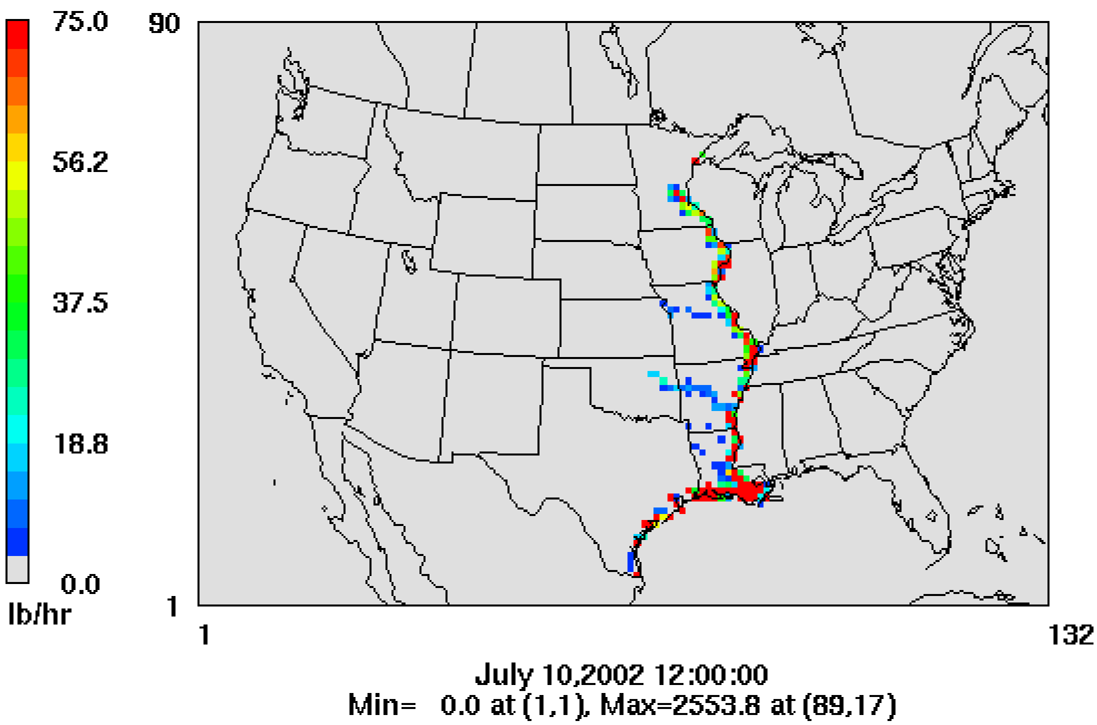


Figure 2-12. Geographic distribution of commercial marine emissions of NO_x in the CENRAP states on July 10, 2002.

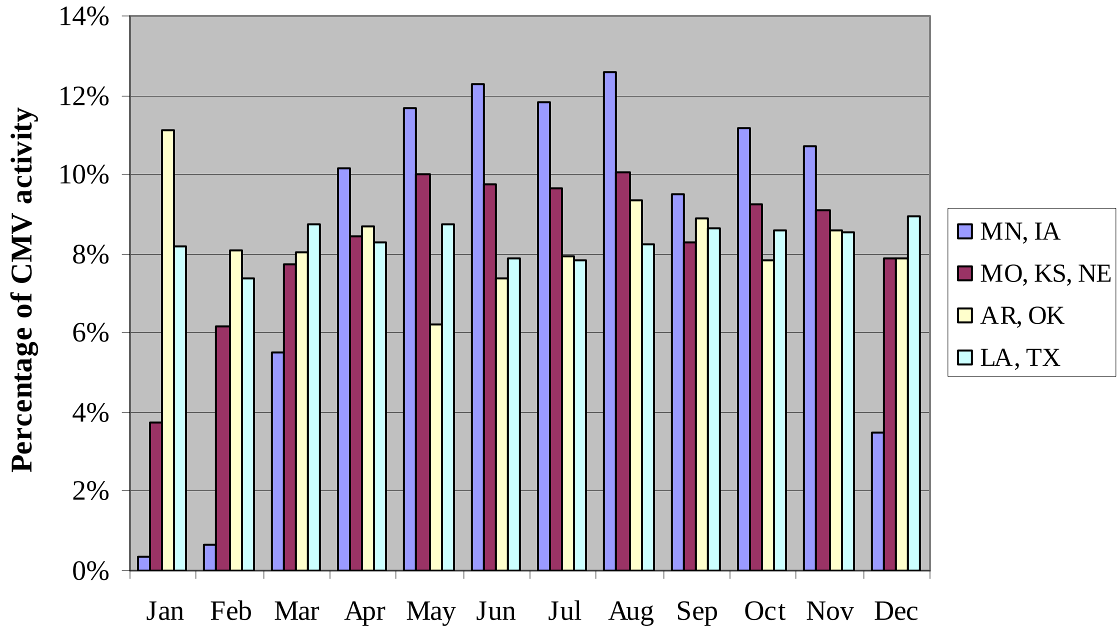


Figure 2-13. Monthly variability in commercial marine vessel activity.

2.2.4 Assessment of Emissions from Commercial Marine Vessels

Emission estimates for this inventory differ significantly from those found in the preliminary 2002 NEI. CENRAP's emissions are lower by approximately a factor of 3 for all pollutants (see **Figure 2-14**). Emissions in Louisiana and Texas account for most of the emissions and much of the overall difference, as seen in **Figure 2-15**.

For inland river systems in the CENRAP region, emission estimates were based on bottom-up fuel consumption data derived from the Tennessee Valley Authority (TVA) Barge Costing Model. This model was developed to estimate fuel usage by inland river segment for fuel tax purposes, and annual model results have varied from actual tax receipts by an average of only 1.5% since 1996. The results indicate that the activity data used to estimate emissions for most of the CENRAP region (including all of Arkansas, Iowa, Kansas, Missouri, Nebraska, and Oklahoma) have a high degree of certainty.

However, the TVA model does not cover fuel consumption by "deep-draft" (oceangoing) vessels, harbor tugs, and other vessels that operate around ports in the Great Lakes or the Gulf Inland Waterway of Louisiana and Texas. In these cases, emission estimates were prepared using work-based (rather than fuel-based) emission factors and a complex array of activity data, including the number of vessel calls at specific ports, vessel speeds, and vessel characteristics (such as engine horsepower, load factors, etc.). Although detailed information was available for several important ports in the CENRAP region, including St. Louis, Baton Rouge, New Orleans, South Louisiana, and Corpus Christi, a complete survey of ports in Louisiana, Texas, and Minnesota was not possible within the scope of this project. Therefore, data from "known" ports were extrapolated to "unknown" ports using techniques outlined in a two-volume report produced by ARCADIS on behalf of the EPA (U.S. Environmental Protection Agency, 1999a).

Improvements to the inventory could be made at local scales by gathering more detailed data on individual ports within a county or region.

The difference between the CENRAP inventory and the preliminary 2002 NEI is most likely due to the use of top-down methods to develop the 2002 NEI, for which national-level emissions were calculated from estimated annual hours of operation and fuel consumption for the U.S. commercial marine fleet, then disaggregated to port and underway emissions based on the simplifying assumption that 75% of distillate fuel and 25% of residual fuel is consumed “in-port”. National-scale, in-port emissions were then assigned to the largest 150 ports in the country based on the amount of freight handled by each, and the remaining “underway” emissions were assigned to active shipping lanes based on traffic density patterns (U.S. Environmental Protection Agency, 1999b). These methods seem to have resulted in significantly overestimated emissions at large ports, as seen in **Table 2-4**, which compares “in-port” emissions from the 2002 NEI for the counties containing the Port of Baton Rouge and the Houston-Galveston Port with other estimates of emissions for these same ports. CENRAP’s emission inventories for these ports are more closely aligned with previous estimates prepared by Booz Allen Hamilton (1991) and Eastern Research Group & Starcrest (2003), both of whom also applied bottom-up activity data to prepare their inventories.

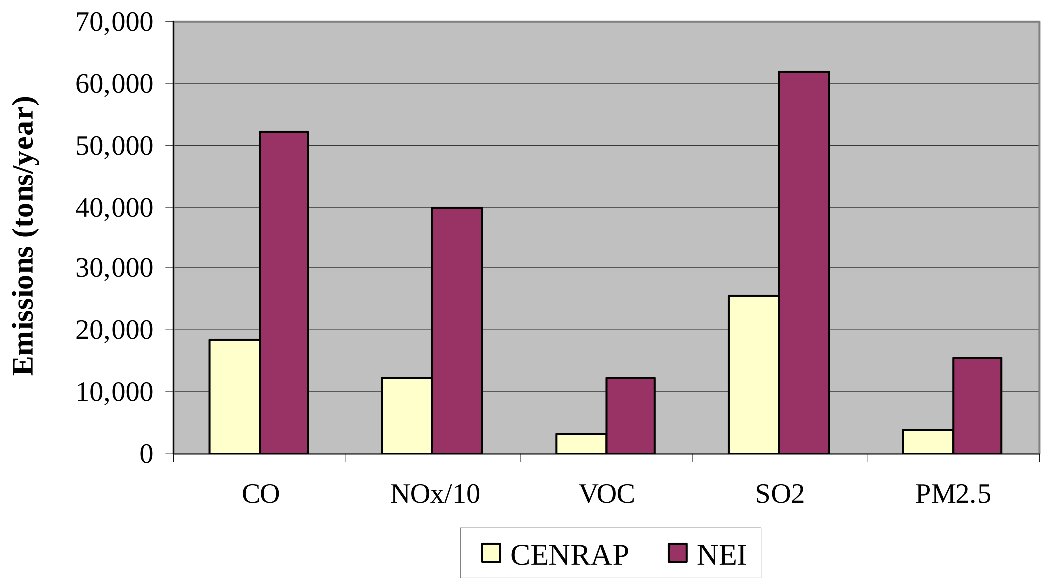


Figure 2-14. Comparison of commercial marine emissions estimates with results from the 2002 preliminary NEI (note: NO_x emissions have been divided by 10 for scaling purposes).

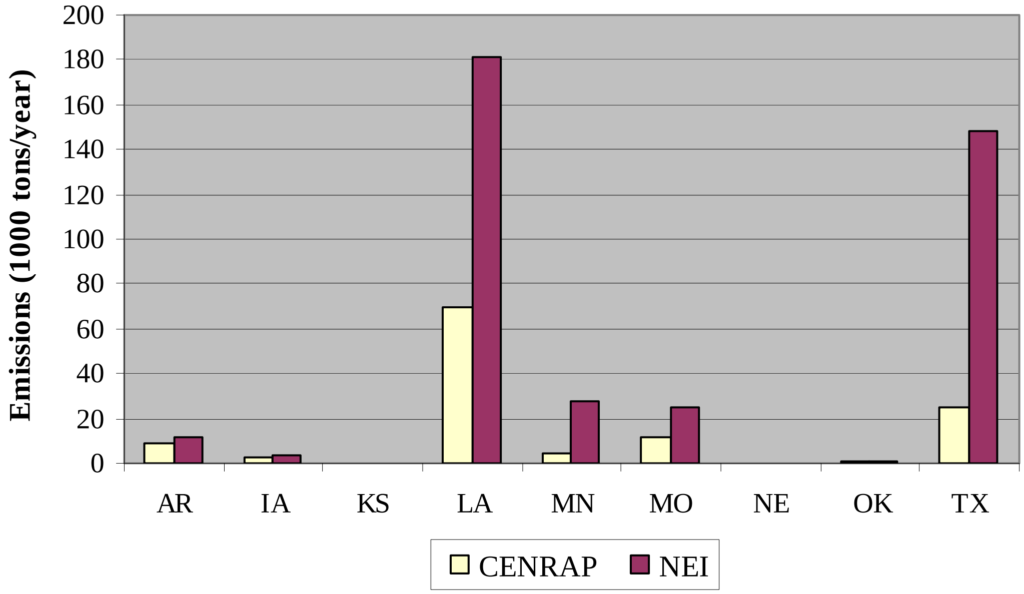


Figure 2-15. State-by-state comparison of commercial marine NOx emissions.

Table 2-4. Comparison of inventories for selected ports in the CENRAP region (emissions in tons/year).

Port	Inventory	$PM_{2.5}$	NO_x	CO	VOC	SO_2
Baton Rouge	1991 Booz-Allen Hamilton	129	2,187	449	203	928
	2002 CENRAP	196	5,355	737	170	1,562
	2002 NEI	1,407	36,088	4,756	1,128	5,291
Houston-Galveston	1991 Booz-Allen Hamilton	887	14,977	2,131	1,391	6,554
	2000 Starcrest	-----	7,336	1,022	219	-----
	2002 CENRAP	318	7,232	943	245	2,610
	2002 NEI	2,955	75,787	9,989	2,370	11,111

2.2.5 Summary of Emissions from Recreational Boats

Emissions from recreational boats were calculated with the latest version of the EPA's NONROAD model (NONROAD 2004). NONROAD produces county-level emission estimates for several categories of recreational boats using national equipment populations, which are disaggregated to the county level on the basis of the total water surface area in a given county. NONROAD also relies on broad assumptions related to boating activity (such as annual hours of operation, engine load factors, and temporal variations in activity). These assumptions vary by equipment type but not geographic area. The activity data files used by the NONROAD model were updated for the CENRAP inventory with information gathered through a bottom-up survey of representative groups of recreational boat owners. The survey was designed to gather data on vessel characteristics, hours of use, fuel consumption, engine loads, and temporal and geographic

usage patterns in each of the CENRAP states. Data assembled through this survey were then incorporated into the NONROAD model, along with state-specific data on temperatures and fuels characteristics.[5] The more significant survey results showed that boating activities varied substantially by state in most respects, including types of boats used, diurnal patterns of boating, seasonal patterns of boating, and hours of boat use.

One of the challenges associated with conducting the recreational boating survey and analyzing results was the tendency of survey respondents to generally over-report their use of recreational boats. This phenomenon, called "reporting bias", often occurs when survey respondents have non-neutral attitudes about the behaviors they report. Under-reporting of illicit behaviors (such as use of illegal drugs or driving above posted speed limits) and over-reporting of positive behaviors (such as exercising regularly or volunteering for charity) are commonly observed, unless surveys are designed to control or eliminate these biases. The CENRAP recreational boating survey was designed to control for reporting bias. Respondents were asked about their "typical" usage pattern, but they were also asked about their specific usage pattern for the preceding week—information that is much more likely to be reported accurately. The average usage pattern for the preceding week was used to adjust reported "typical" usage patterns, which greatly reduced the effects of over-reporting by factors of 1.5 to 2.0. In addition, respondents were asked about the quantities of fuel purchased for their recreational boats—information that could be used as a second check of reporting bias. On the basis of reported fuel consumptions, recreational boating usage was further reduced for over-reporting bias by a factor of 0.3 (with a range of uncertainty from 0.0 to 0.5). The resulting database of activity levels in the CENRAP region indicates greater usage of recreational boats than the NONROAD 2004 defaults by a factor of approximately 2. In spite of this large difference, the uncertainty in the overall survey results is judged to be approximately only ±25%. Notably, geographic areas in which subsistence fishing is prevalent exhibited the least evidence of over-reporting bias, while owners of personal watercraft over-reported usage to a greater extent than owners of other types of watercraft. This is consistent with the theory that recreational activities tend to be over-reported more often than non-recreational activities.

Emission estimates for recreational boating vary widely from state to state, as shown in **Table 2-5** and **Figures 2-16 and 2-17**. Louisiana, Minnesota, Missouri, and Texas account for almost 80% of the annual NO_x emissions from recreational boating in the CENRAP region, while Nebraska and Kansas combined contribute less than 4% of the total NO_x emissions. Emissions also vary widely across the months of the year, days of the week, and hours of the day, as shown in **Figures 2-18 through 2-20**. Recreational boating activity peaks during the summer months for each state, and this peak is more pronounced for the four northern states of Minnesota, Nebraska, Kansas, and Iowa. Activity peaks also occur on the weekends and during morning to midday hours.

[5] See Section 2.1.1 for a discussion of sources of information on fuels characteristics.

Table 2-5. Recreational boating emissions (tons) by state and boat type.

State	Category	PM2.5	NOx	VOC	SO2	CO	NH3
Arkansas	2-Stroke Outboards	1,662	803	25,604	63	69,155	6
	2-Stroke Personal Watercraft	204	115	4,253	10	11,469	1
	4-Stroke Inboards	8	785	1,430	21	19,809	1
	Diesel Inboards	10	570	21	10	90	0
	Diesel Outboards	0	2	0	0	1	0
	Total	1,884	2,274	31,309	103	100,524	8
Iowa	2-Stroke Outboards	1,418	682	21,346	54	58,835	5
	2-Stroke Personal Watercraft	192	108	3,944	9	10,777	1
	4-Stroke Inboards	7	738	1,000	20	18,380	1
	Diesel Inboards	9	536	20	9	85	0
	Diesel Outboards	0	2	0	0	1	0
	Total	1,626	2,066	26,310	92	88,079	7
Kansas	2-Stroke Outboards	266	123	4,581	10	10,940	1
	2-Stroke Personal Watercraft	72	41	1,495	3	4,069	0
	4-Stroke Inboards	3	293	431	7	6,919	0
	Diesel Inboards	3	202	8	3	32	0
	Diesel Outboards	0	1	0	0	0	0
	Total	345	660	6,515	24	21,962	2
Louisiana	2-Stroke Outboards	4,341	2,107	66,542	165	180,909	15
	2-Stroke Personal Watercraft	509	286	10,608	24	28,589	2
	4-Stroke Inboards	20	1,928	3,598	52	49,469	3
	Diesel Inboards	25	1,420	53	26	225	1
	Diesel Outboards	0	5	1	0	3	0
	Total	4,895	5,746	80,803	267	259,196	21
Minnesota	2-Stroke Outboards	5,113	2,462	77,086	69	211,905	17
	2-Stroke Personal Watercraft	710	402	14,580	12	39,829	3
	4-Stroke Inboards	27	2,807	3,666	26	67,462	4
	Diesel Inboards	34	1,982	74	34	314	1
	Diesel Outboards	1	6	2	0	5	0
	Total	5,886	7,659	95,409	142	319,514	26
Missouri	2-Stroke Outboards	5,397	2,671	79,005	207	226,163	18
	2-Stroke Personal Watercraft	502	283	10,360	23	28,213	2
	4-Stroke Inboards	19	1,892	2,899	51	48,478	3
	Diesel Inboards	25	1,401	52	26	222	1
	Diesel Outboards	0	4	1	0	3	0
	Total	5,943	6,251	92,318	308	303,079	24

Table 2-5. Recreational boating emissions (tons) by state and boat type.

Page 2 of 2

State	Category	PM2.5	NOx	VOC	SO2	CO	NH3
Nebraska	2-Stroke Outboards	414	198	6,366	16	17,146	1
	2-Stroke Personal Watercraft	60	34	1,243	3	3,382	0
	4-Stroke Inboards	2	247	355	6	5,727	0
	Diesel Inboards	3	168	6	3	27	0
	Diesel Outboards	0	1	0	0	0	0
	Total	479	648	7,971	28	26,282	2
Oklahoma	2-Stroke Outboards	1,462	695	23,269	55	60,589	5
	2-Stroke Personal Watercraft	226	127	4,709	11	12,702	1
	4-Stroke Inboards	9	874	1,588	23	21,922	1
	Diesel Inboards	11	631	24	11	100	0
	Diesel Outboards	0	2	0	0	1	0
	Total	1,708	2,330	29,590	100	95,314	7
Texas	2-Stroke Outboards	5,095	2,422	81,866	192	211,147	17
	2-Stroke Personal Watercraft	795	447	16,620	37	44,684	3
	4-Stroke Inboards	31	2,947	5,890	81	78,276	5
	Diesel Inboards	39	2,219	83	39	352	1
	Diesel Outboards	1	7	2	0	5	0
	Total	5,960	8,043	104,461	350	334,464	26
All States	2-Stroke Outboards	25,167	12,166	385,666	832	1,046,790	84
	2-Stroke Personal Watercraft	3,270	1,843	67,812	131	183,714	14
	4-Stroke Inboards	126	12,511	20,858	288	316,441	19
	Diesel Inboards	159	9,128	342	162	1,447	6
	Diesel Outboards	3	29	7	0	21	0
	Total	28,725	35,676	474,685	1,413	1,548,413	122

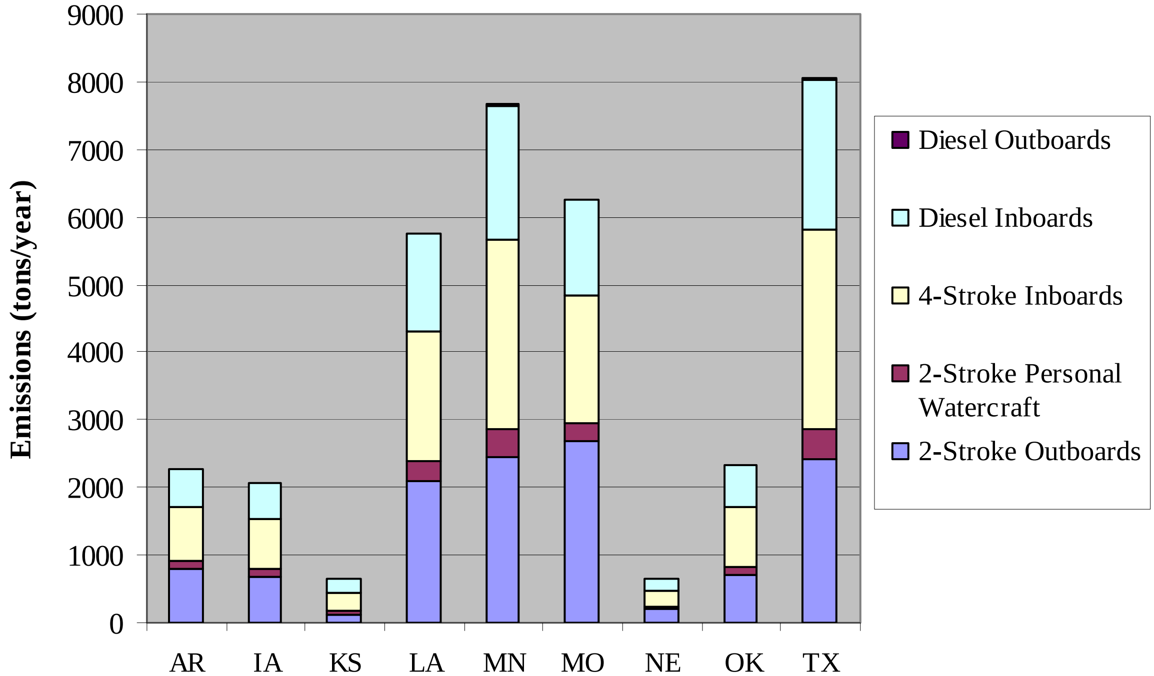


Figure 2-16. Annual NO_x emissions from recreational boating activities by state and boat type.

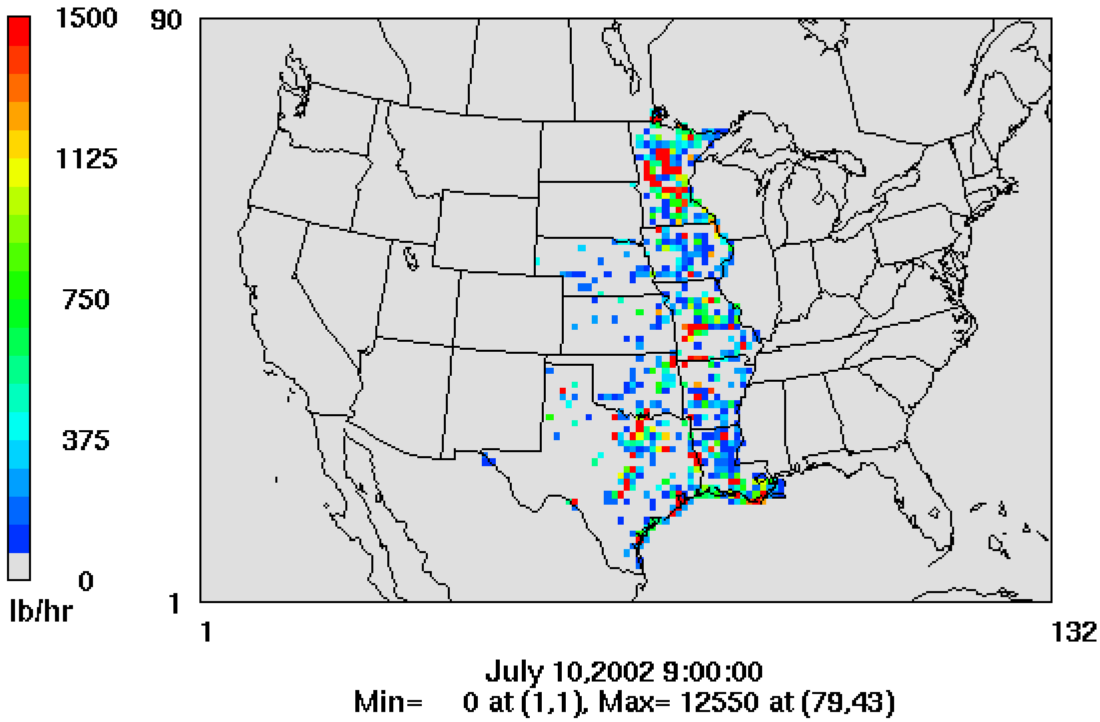


Figure 2-17. Geographic distribution of recreational boating emissions of NO_x in the CENRAP states on July 10, 2002.

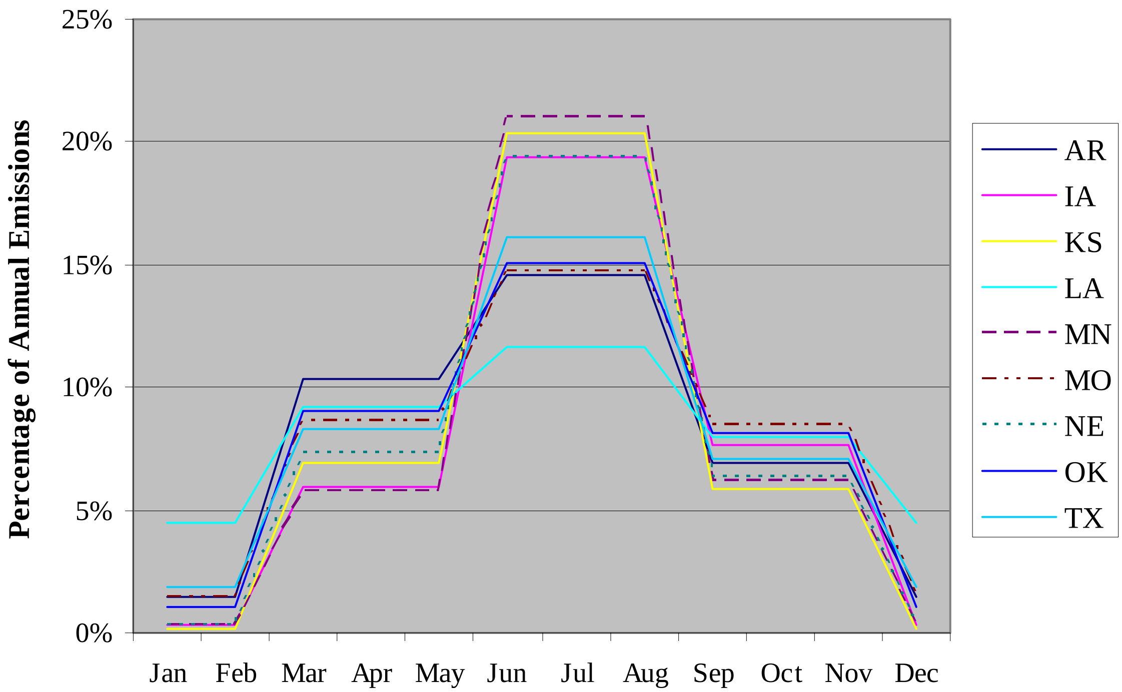


Figure 2-18. Monthly variability in recreational boating emissions by state.

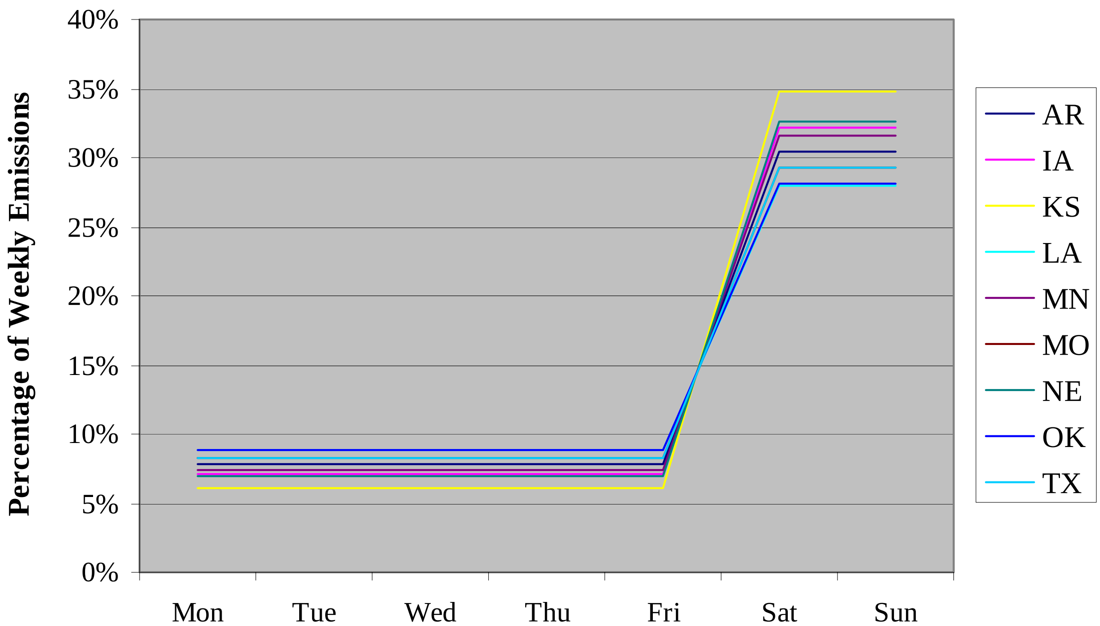


Figure 2-19. Day-of-week variability in recreational boating emissions by state.

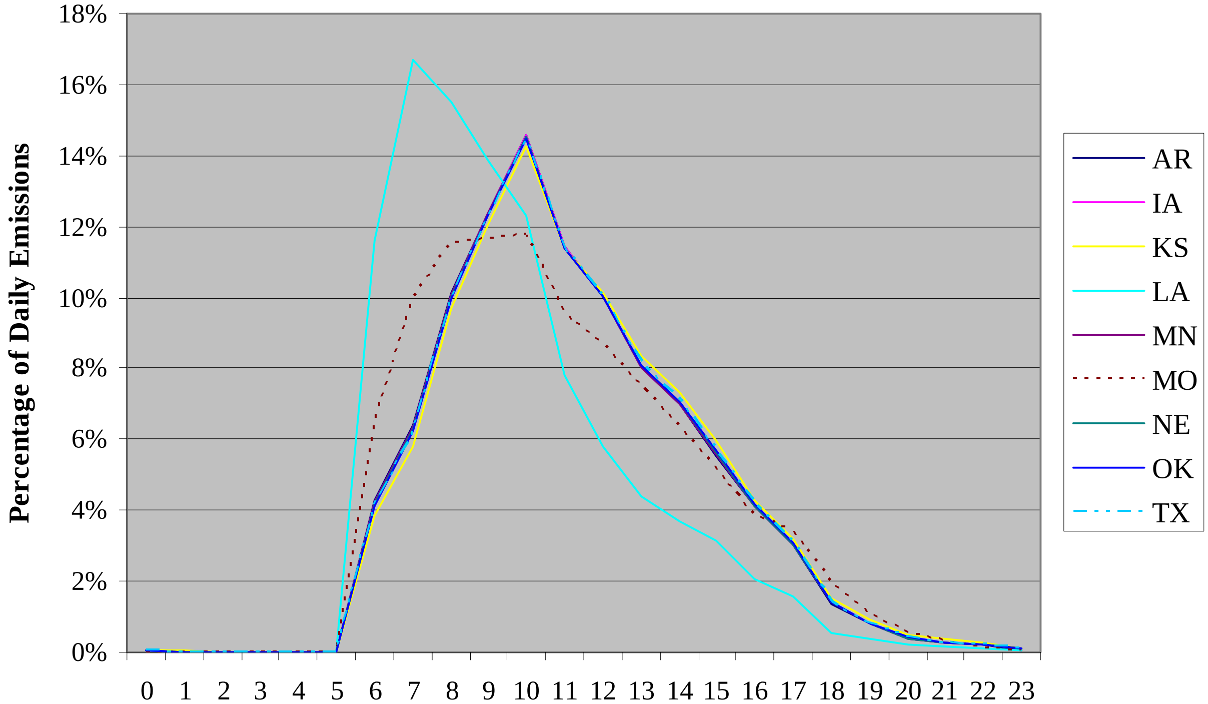


Figure 2-20. Diurnal variability in recreational boating emissions by state.

2.2.6 Assessment of Emissions from Recreational Boats

The CENRAP's emission inventory for recreational boating represents a significant improvement over existing inventories and NONROAD default activity data. Surveys of representative groups of boat owners in each of the CENRAP states made possible the replacement of NONROAD default data with state-specific information that more accurately represents recreational boating activity in the CENRAP region. The improved activity data resulted in emission estimates 2 to 4 times greater than estimates from the preliminary 2002 NEI (see **Figure 2-21**). The scale of the differences may seem surprising; however, we believe that they are reasonably accurate and reliable because care was taken to control over-reporting bias (as discussed in Section 2.2.5) and to ensure the representativeness of the survey results.

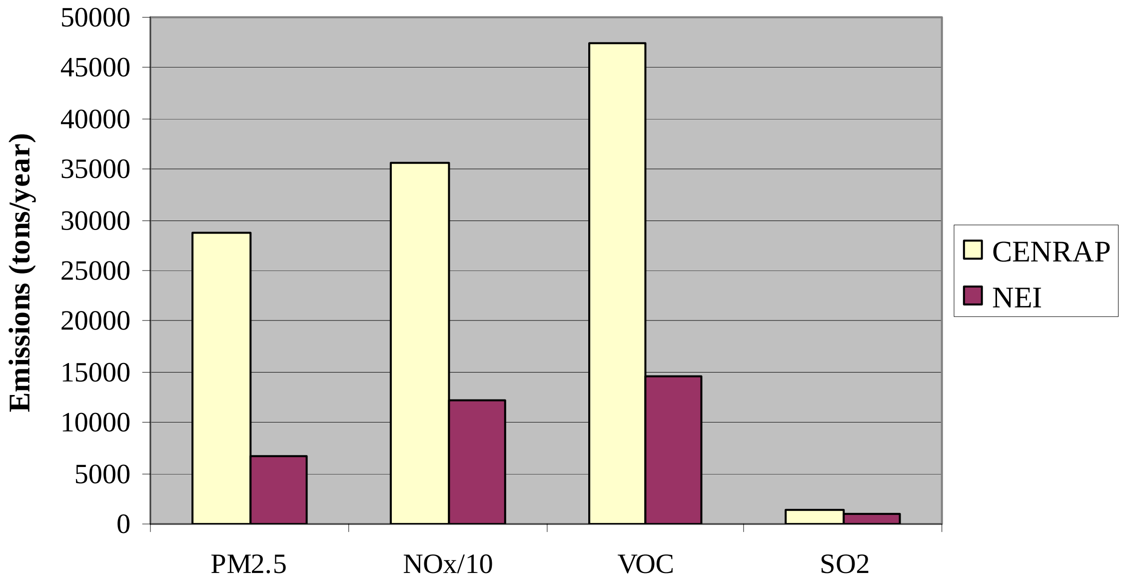


Figure 2-21. Comparison of recreational boating emissions estimates with results from the 2002 preliminary NEI (note: NO_x emissions have been divided by 10 for scaling purposes).

Figure 2-22 illustrates a county-by-county comparison of the CENRAP emission inventory with an inventory produced by running NONROAD 2004 with default inputs. The inventories differ significantly throughout the CENRAP region with respect to quantities of pollutants emitted and spatial distributions of emissions. The differences are due to the improved activity data, which were more representative of the scale and geographic distribution of recreational boating activities than NONROAD 2004 defaults. **Figure 2-23** provides a side-by-side comparison of the spatial distributions that resulted from NONROAD 2004 defaults and from the CENRAP recreational boating survey results. The CENRAP spatial allocation represents the usage patterns reported by survey respondents and is, therefore, highly representative of real-world behavior. The NONROAD spatial allocation was achieved by allocating statewide emissions proportionally to each county's water surface area. This technique overallocates emissions to areas that are unpopular with recreational boaters due to boating restrictions, remoteness from population centers, or other reasons.

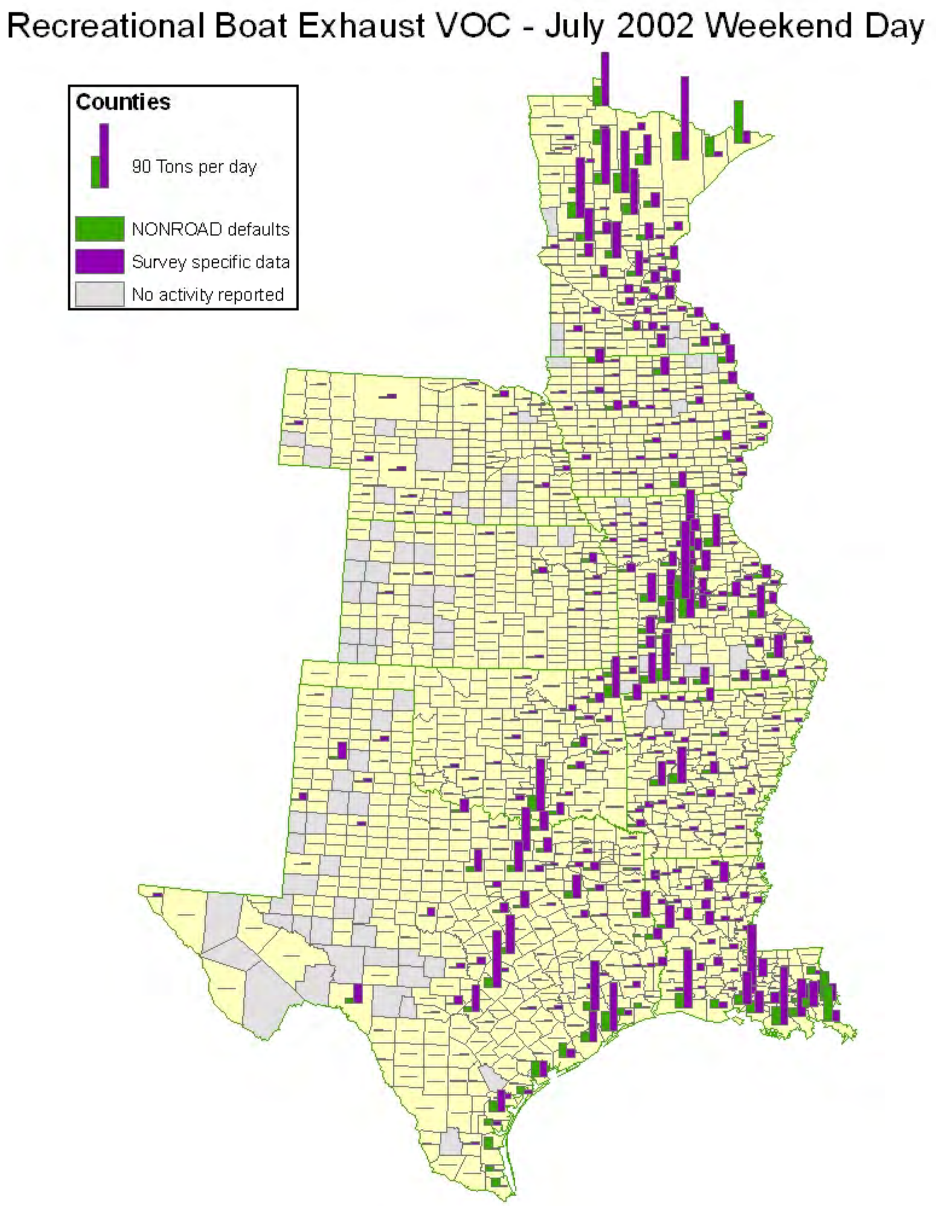


Figure 2-22. Comparison of county-level exhaust VOC emissions estimates with results obtained using NONROAD model defaults.

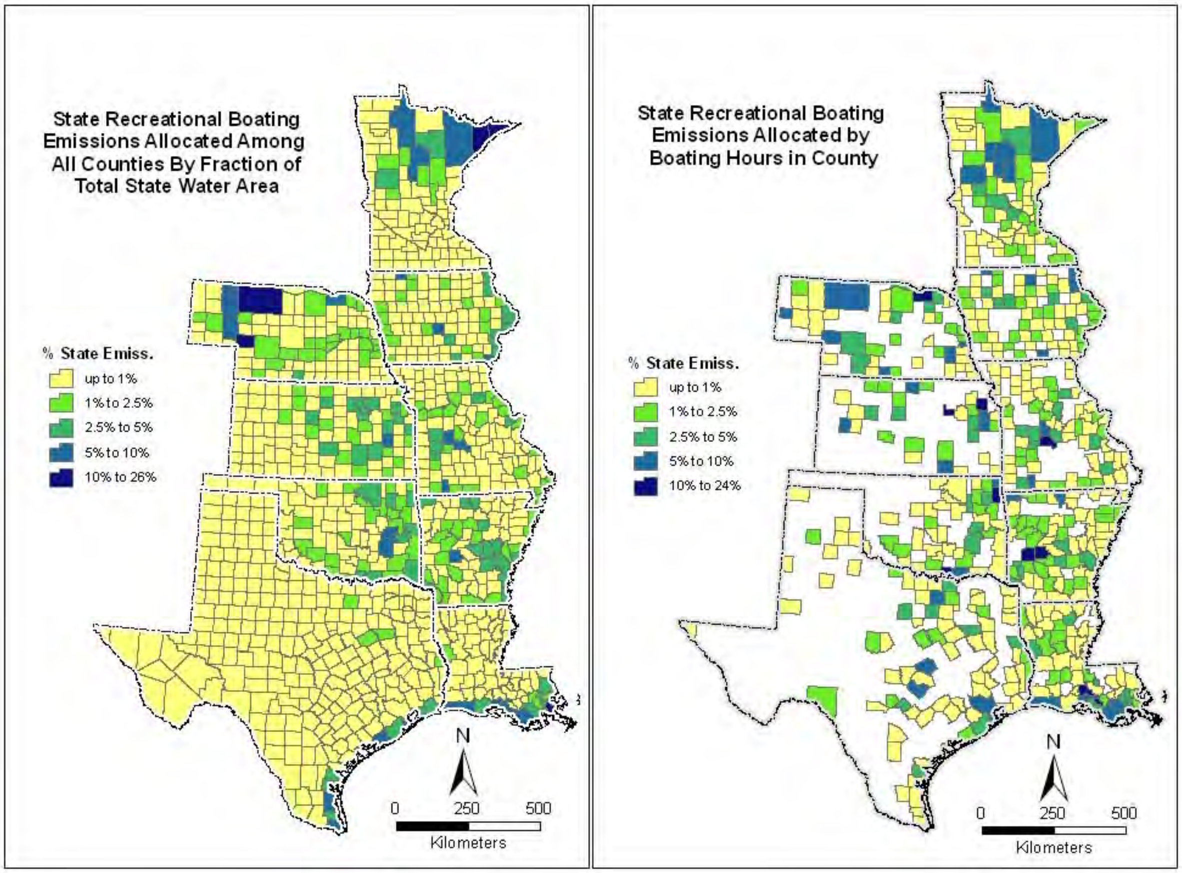


Figure 2-23. Comparison of county-level spatial allocation factors with NONROAD model defaults.

2.2.7 Summary of Emissions from Other Non-Road Mobile Sources

An initial prioritization of efforts related to non-road mobile sources indicated that commercial marine vessels, locomotives, and recreational boats represent at least two-thirds of the non-road primary and precursor emissions in counties containing or adjacent to Class I areas in the CENRAP region.[6] Therefore, these source categories were selected for bottom-up treatment, and emissions from remaining non-road mobile sources were estimated with the best available top-down methods. The EPA's NONROAD model is the approved method for estimating emissions from these sources, and the latest version of the model was run with default activity data, but with region-specific fuels characteristics and temperatures as appropriate.

Table 2-6 lists emissions for non-road mobile source categories not previously treated in earlier sections of this report—i.e., excluding emissions from locomotives, commercial marine vessels, recreational boats, and aircraft. The table lists the five largest $PM_{2.5}$ sources in each state. Agricultural equipment and construction and mining equipment, which are largely fueled

[6] The final CENRAP inventory indicates that these sources are even more substantial contributors to emissions in these areas than the initial prioritization first indicated.

by diesel fuel, tend to be the largest sources of NO_x, SO_2, and $PM_{2.5}$ for the CENRAP states, whereas recreational and lawn and garden equipment (predominantly gasoline-powered) are the largest sources of VOC. A geographic distribution of emissions for a selected date can be seen in **Figure 2-24**.

Table 2-6. "Other" non-road mobile source emissions (tons) by state and equipment type (not including emissions for locomotives, commercial marine vessels, recreational boats, and aircraft).

Page 1 of 2

State	Category	$PM_{2.5}$	NO_x	VOC	SO_2	CO	NH_3
Arkansas	Agricultural Equipment	1,127	10,344	1,480	166	12,372	6
	Construction & Mining	677	8,285	1,508	152	12,639	5
	Recreational Equipment	253	177	8,041	15	26,894	1
	Industrial Equipment	132	4,954	1,222	33	19,657	1
	Lawn & Garden	92	426	3,713	18	57,637	1
	Other	135	1,666	1,866	34	41,660	9
	Total	2,415	25,852	17,830	418	170,860	22
Iowa	Agricultural Equipment	4,961	45,544	6,428	731	53,863	26
	Construction & Mining	808	9,893	1,789	181	15,007	5
	Recreational Equipment	322	227	13,516	36	51,872	3
	Lawn & Garden	229	1,088	8,190	42	127,060	2
	Commercial Equipment	142	1,775	2,314	36	58,916	1
	Other	145	5,198	1,270	35	20,234	1
	Total	6,607	63,725	33,506	1,062	326,950	38
Kansas	Agricultural Equipment	3,337	30,673	4,346	452	36,410	17
	Construction & Mining	785	9,622	1,744	161	14,608	5
	Lawn & Garden	206	909	7,155	35	106,296	2
	Commercial Equipment	124	1,535	2,033	30	52,119	1
	Industrial Equipment	112	4,024	977	26	15,550	1
	Other	101	618	3,125	13	19,689	72
	Total	4,665	47,382	19,381	716	244,673	98
Louisiana	Construction & Mining	1,095	13,383	2,436	260	20,482	8
	Agricultural Equipment	589	5,402	773	91	6,469	3
	Recreational Equipment	261	170	8,285	15	26,223	1
	Lawn & Garden	158	713	6,177	31	95,753	2
	Commercial Equipment	156	1,854	2,564	40	66,691	2
	Other	320	8,128	5,939	98	59,742	508
	Total	2,579	29,650	26,173	536	275,361	525
Minnesota	Agricultural Equipment	3,954	36,320	5,125	577	42,761	21
	Recreational Equipment	2,024	924	91,180	87	262,747	21
	Construction & Mining	1,161	14,209	2,571	259	21,446	8
	Lawn & Garden	329	1,613	11,938	26	184,758	4
	Industrial Equipment	236	8,807	2,152	55	34,390	2
	Other	275	3,492	3,880	49	94,248	4
	Total	7,979	65,365	116,847	1,052	640,351	59

Table 2-6. “Other” non-road mobile source emissions (tons) by state and equipment type (not including emissions for locomotives, commercial marine vessels, recreational boats, and aircraft).

Page 2 of 2

State	Category	$PM_{2.5}$	NO_x	VOC	SO_2	CO	NH_3
Missouri	Agricultural Equipment	2,643	24,252	3,435	421	28,831	14
	Construction & Mining	1,045	12,766	2,314	254	19,485	7
	Lawn & Garden	439	2,031	15,731	83	244,136	5
	Recreational Equipment	256	259	8,067	18	39,236	1
	Industrial Equipment	242	8,701	2,120	64	33,917	2
	Other	270	3,319	3,997	69	101,239	4
	Total	4,895	51,328	35,664	909	466,845	33
Nebraska	Agricultural Equipment	2,870	26,356	3,733	423	31,201	15
	Construction & Mining	417	5,107	924	93	7,728	2
	Lawn & Garden	120	533	4,219	20	62,304	1
	Recreational Equipment	83	99	2,824	8	17,152	0
	Commercial Equipment	82	1,020	1,342	20	34,191	1
	Other	73	2,441	607	18	9,401	3
	Total	3,644	35,556	13,650	582	161,977	23
Oklahoma	Agricultural Equipment	1,277	11,731	1,679	188	14,025	6
	Construction & Mining	655	8,016	1,459	147	12,213	4
	Lawn & Garden	172	776	6,348	32	97,477	2
	Recreational Equipment	129	124	4,106	9	18,720	1
	Commercial Equipment	126	1,532	2,097	31	53,592	1
	Other	184	5,383	3,157	53	34,267	250
	Total	2,543	27,563	18,846	460	230,294	265
Texas	Construction & Mining	4,610	56,355	10,274	1,049	86,597	36
	Agricultural Equipment	2,791	25,621	3,676	414	30,877	14
	Lawn & Garden	1,393	5,908	46,403	240	708,712	16
	Commercial Equipment	794	9,459	13,202	199	340,914	10
	Industrial Equipment	671	21,938	5,264	167	82,994	5
	Other	983	11,728	28,062	201	190,438	1,362
	Total	11,241	131,009	106,881	2,271	1,440,533	1,444
Total – All States and Sources		46,568	477,429	388,778	8,006	3,957,843	2,507

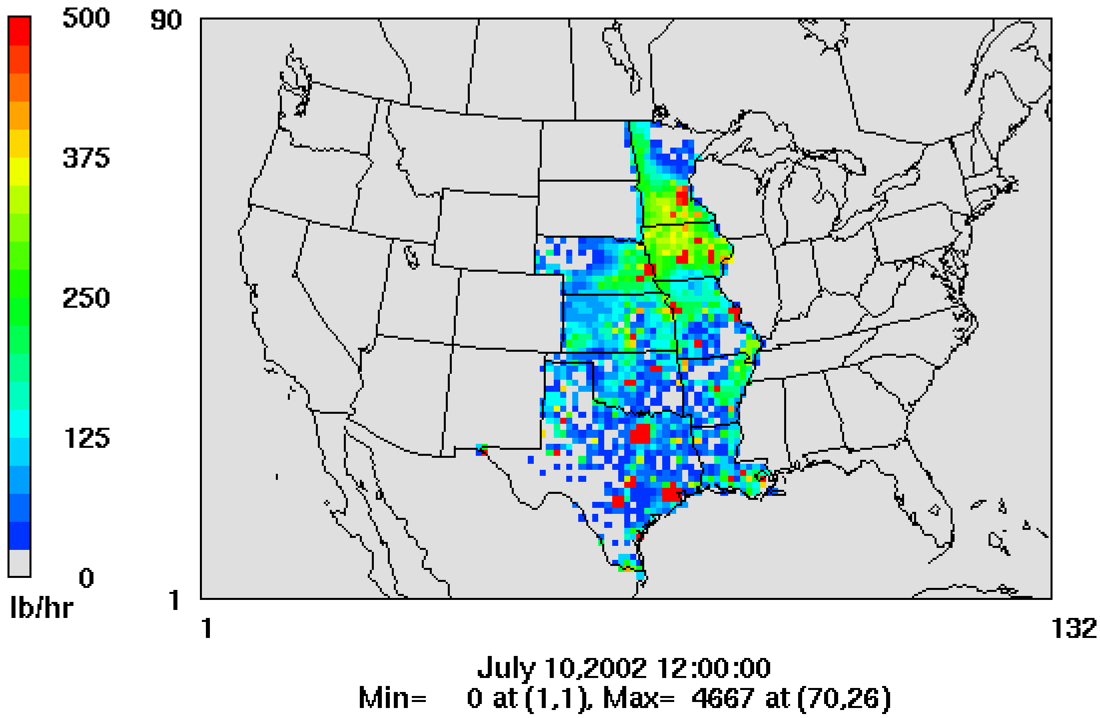


Figure 2-24. Geographic distribution of "other" non-road mobile source emissions of NO_x in CENRAP states on July 10, 2002.

2.2.8 Assessment of Emissions from Non-Road Mobile Sources

Emissions estimates for non-road mobile sources represent an improvement over existing inventories due to the use of region-specific fuels characteristics. **Figure 2-25** shows a comparison of the CENRAP inventory and the preliminary 2002 NEI. A significant difference in SO_2 emissions and a modest difference in VOC emissions are apparent. These differences are due to the use of state-specific diesel sulfur contents and gasoline volatilities for the CENRAP inventory. However, further improvements could be made by gathering bottom-up activity data (as was done for recreational boating). Based on a review of the emissions totals, the priority categories for further study are agricultural equipment and construction and mining equipment, which account for 75% of the total NO_x, $PM_{2.5}$, and SO_2 emissions from "other" non-road mobile sources and/or recreational or lawn and garden equipment, which dominate VOC emissions.

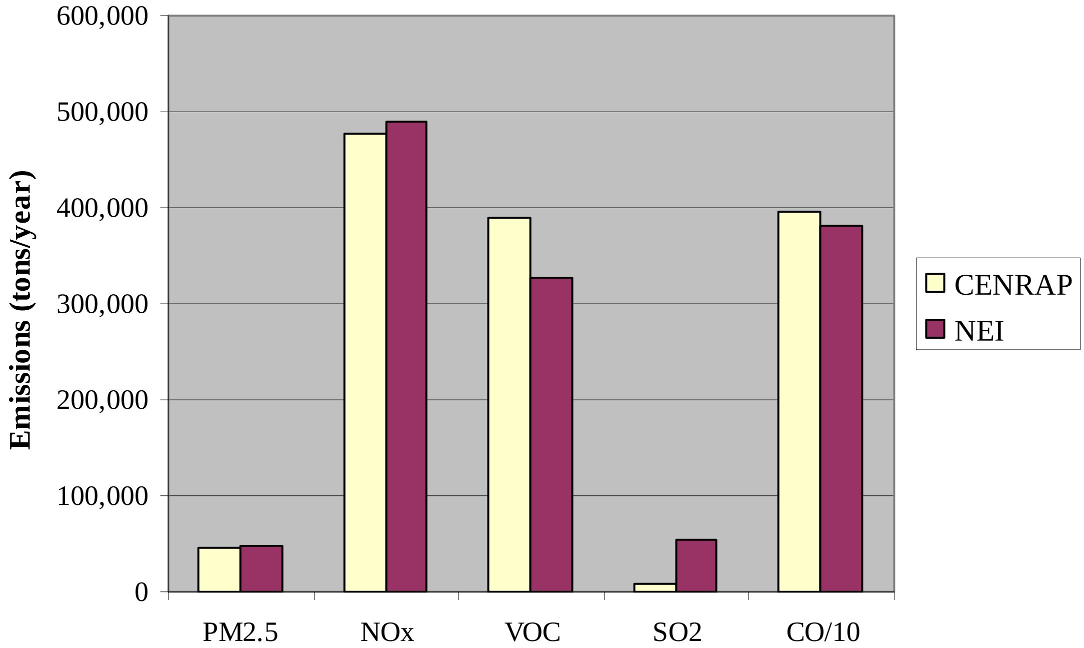


Figure 2-25. Comparison of non-road mobile source emissions with results from the preliminary 2002 NEI (note: CO emissions have been divided by 10 for scaling purposes).

2.3 EMISSIONS FROM SOURCES OF AGRICULTURAL DUST

2.3.1 Summary of Emissions from Agricultural Tilling Operations

Particulate matter (PM) emissions from agricultural tilling operations in the CENRAP region were estimated combining a constant emission factor with county-level activity data, including the silt content of surface soils, the number of tillings performed in a year for each crop type, the acres of each crop type, and information about conservational tillage practices. (Conservational tilling practices, such as no-till, mulch-till, and ridge-till, reduce the number of tilling passes performed in a year.) Total PM_{10} emissions from agricultural tilling operations in the CENRAP region were estimated to be over 1.3 million tons per year, with $PM_{2.5}$ emissions contributing about 270,000 tons to this total (see **Table 2-7** and **Figure 2-26**). A geographic distribution of county-level $PM_{2.5}$ emissions appears in **Figure 2-27**. Temporal variations in $PM_{2.5}$ emissions by month, day-of-week, and hour-of-day appear in **Figures 2-28 through 2-30**.

Table 2-7. Particulate matter emissions (tons) from agricultural tilling operations by state.

State	PM_{10}	$PM_{2.5}$
Arkansas	87,895	17,579
Iowa	236,520	47,304
Kansas	253,850	50,769
Louisiana	42,443	8,489
Minnesota	215,070	43,013
Missouri	104,530	20,905
Nebraska	138,850	27,770
Oklahoma	100,160	20,033
Texas	167,420	33,484
Total	1,346,738	269,346

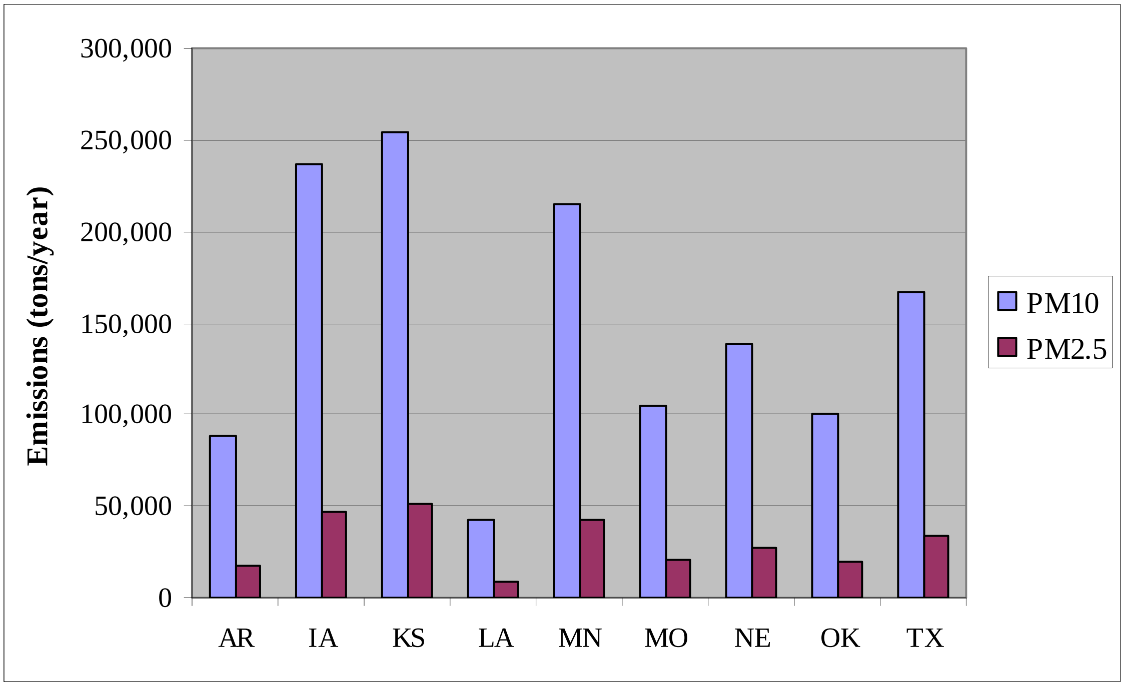


Figure 2-26. Particulate matter emissions from agricultural tilling operations by state.

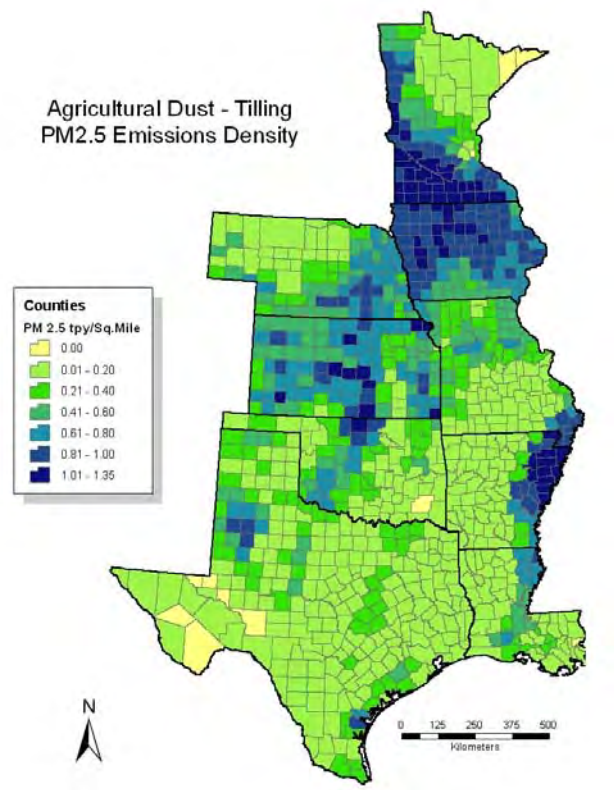


Figure 2-27. County-level $PM_{2.5}$ emission estimates for agricultural tilling operations.

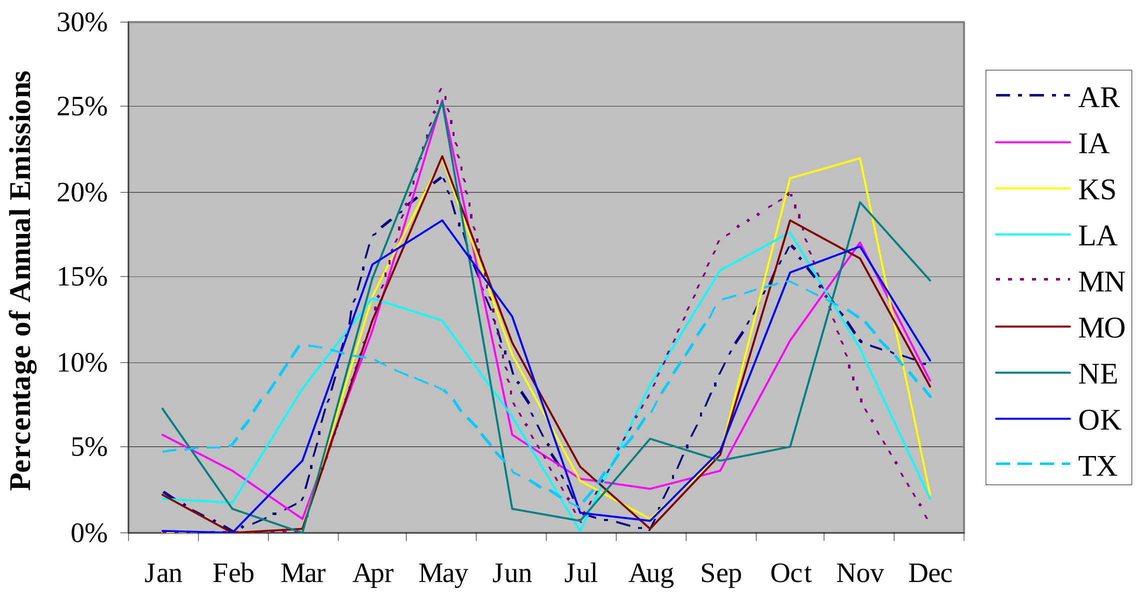


Figure 2-28. Monthly variability in agricultural tilling emissions by state.

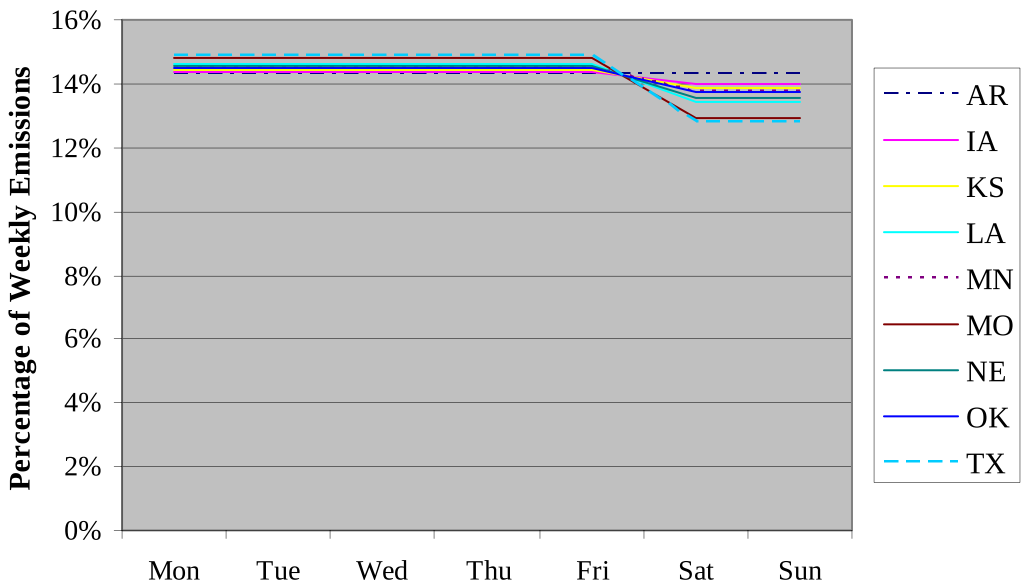


Figure 2-29. Day-of-week variability in agricultural tilling emissions by state.

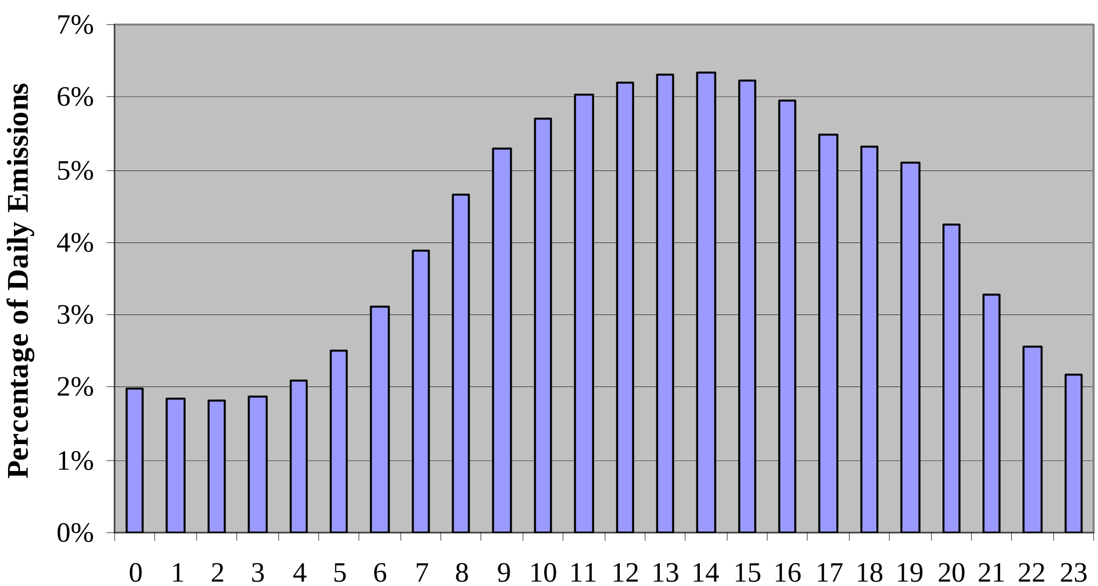


Figure 2-30. Diurnal variability in agricultural tilling emissions (same for all states).

2.3.2 Assessment of Emissions from Agricultural Tilling Operations

The use of locally representative activity information in the development of emission inventories for agricultural tilling operations permitted a significant improvement over the inventory compiled for the preliminary 2002 NEI. The most significant improvements included county-level soil silt contents and locally reported tilling practices (reported as the number of

tilling passes completed for each crop type), which were found to correlate with the actual prevalence of conservational tilling practices. Emission estimates from this inventory are generally about 25% to 30% lower than corresponding estimates from the preliminary 2002 NEI, although the comparison varies from state-to-state (see **Figure 2-31**). These reductions seem primarily due to the incorporation of local information on tilling practices because the reported number of tilling passes for each crop type was often less than indicated by EPA guidance. A likely explanation is that conservational tilling practices have become more prevalent in recent years, particularly in Texas, where the most dramatic differences between the preliminary 2002 NEI and the CENRAP inventory are apparent.

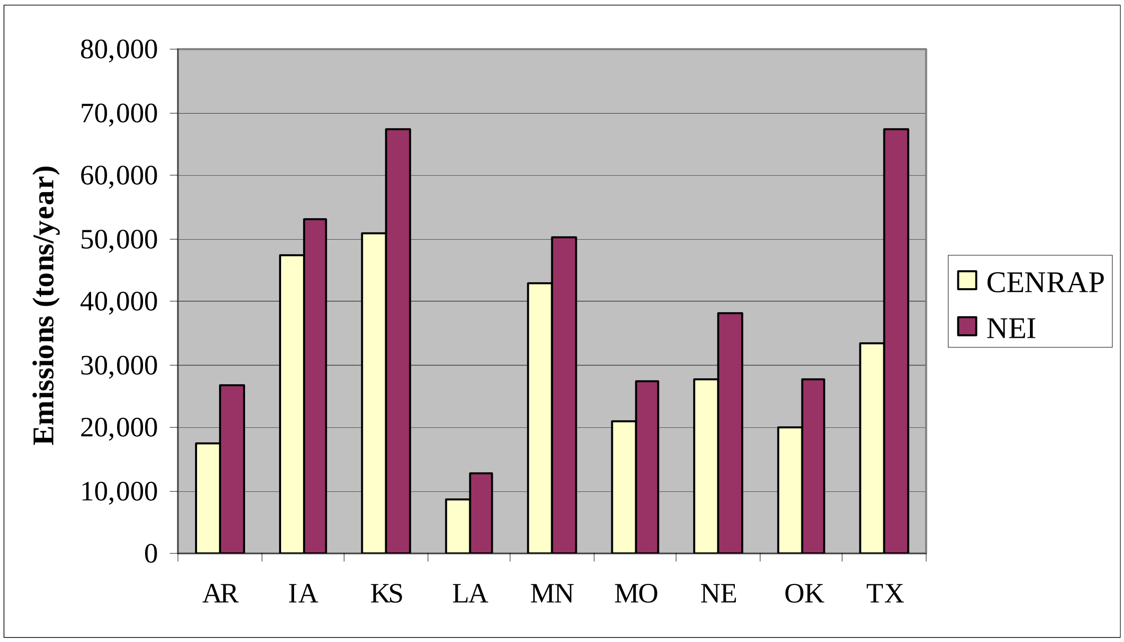


Figure 2-31. State-by-state comparison of $PM_{2.5}$ emissions from agricultural tilling operations.

2.3.3 Summary of Emissions from Livestock Operations

PM emissions from livestock operations in the CENRAP region were estimated using a PM_{10} emission factor and a $PM_{2.5}$ size fraction selected after a literature review. These factors were applied to facility-specific annual populations for beef cattle feedlots and dairies. Because facility locations were also acquired, emissions from livestock operations were treated as point sources and assigned to the specific location coordinates of each facility. Total PM_{10} emissions from livestock operations in the CENRAP region were estimated to be 51,000 tons per year, with $PM_{2.5}$ emissions contributing about 7,700 tons to this total (see **Table 2-8** and **Figure 2-32**). A geographic distribution of county-level PM_{10} emissions appears in **Figure 2-33**.

Table 2-8. Particulate matter emissions (tons) from livestock operations by state.

State	Facility Type	PM_{10}	$PM_{2.5}$
Arkansas	Beef Cattle Feedlot	0.0	0.0
	Dairy	3.9	0.6
Iowa	Beef Cattle Feedlot	4,314.0	647.1
	Dairy	40.8	6.1
Kansas	Beef Cattle Feedlot	18,378.5	2,756.8
	Dairy	142.7	21.4
Louisiana	Beef Cattle Feedlot	15.9	2.4
	Dairy	0.0	0.0
Minnesota	Beef Cattle Feedlot	252.6	37.9
	Dairy	35.6	5.3
Missouri	Beef Cattle Feedlot	109.3	16.4
	Dairy	9.7	1.5
Nebraska	Beef Cattle Feedlot	8,732.9	1,309.9
	Dairy	15.4	2.3
Oklahoma	Beef Cattle Feedlot	3,390.4	508.6
	Dairy	22.5	3.4
Texas	Beef Cattle Feedlot	15,673.8	2,351.1
	Dairy	152.2	22.8
Total		51,290.2	7,693.6

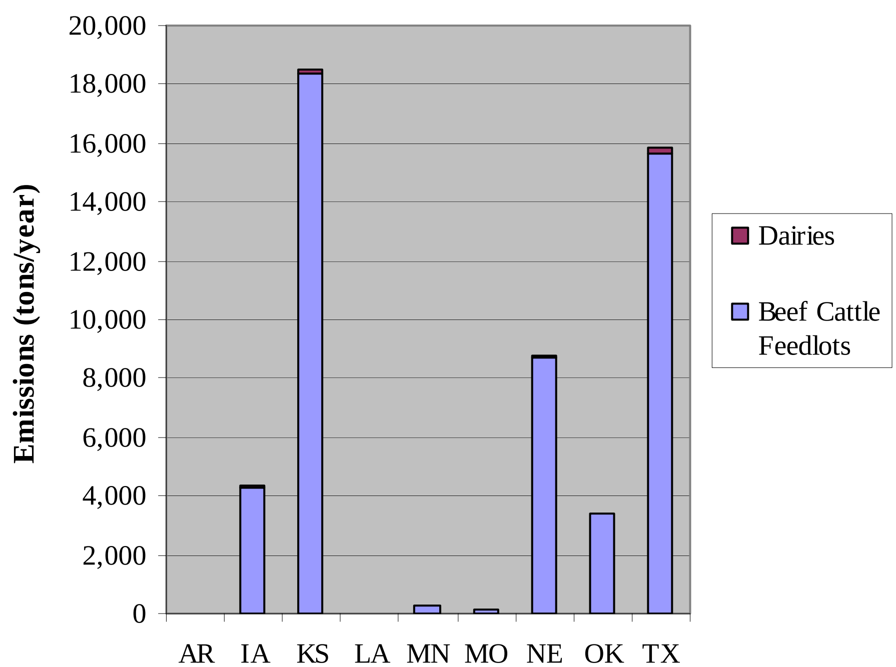


Figure 2-32. PM_{10} emissions from livestock operations by state and facility type.

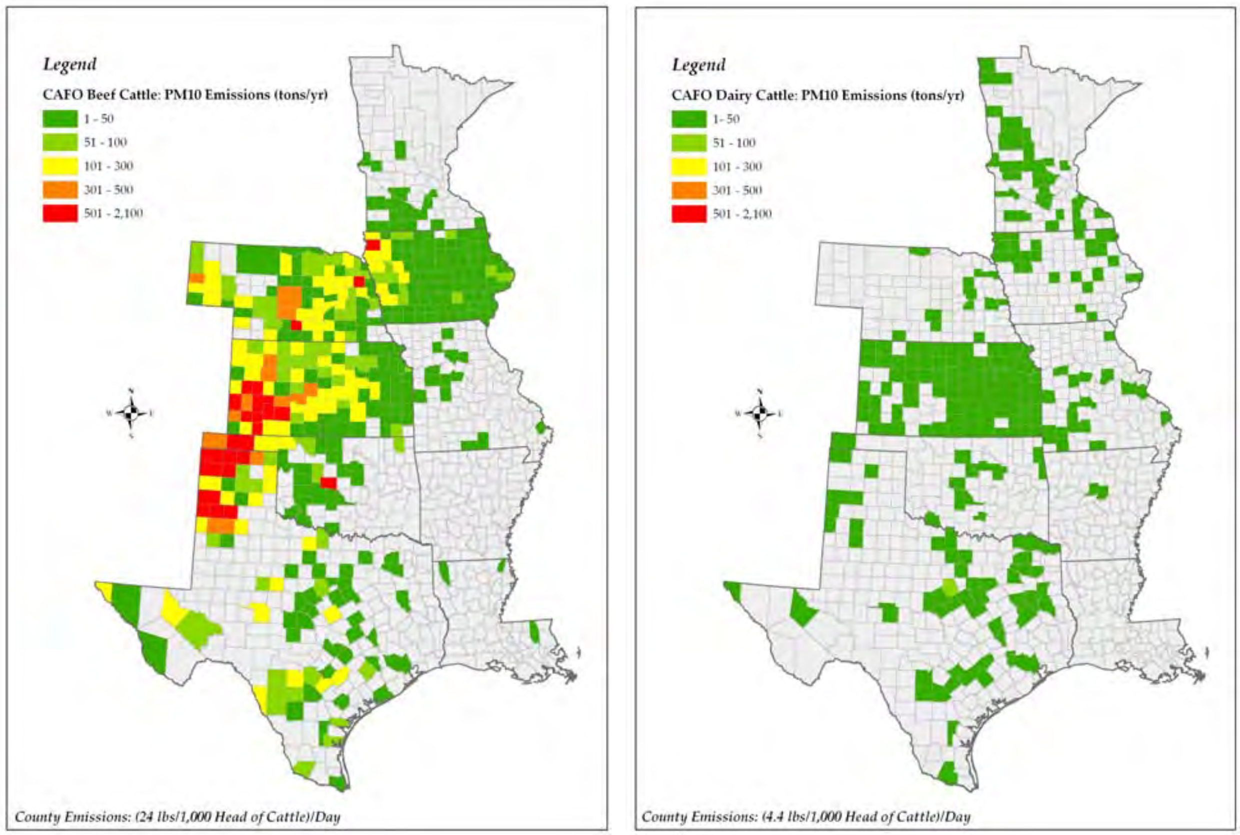


Figure 2-33. County-level PM_{10} emission estimates for beef cattle feedlots (left) and dairies (right).

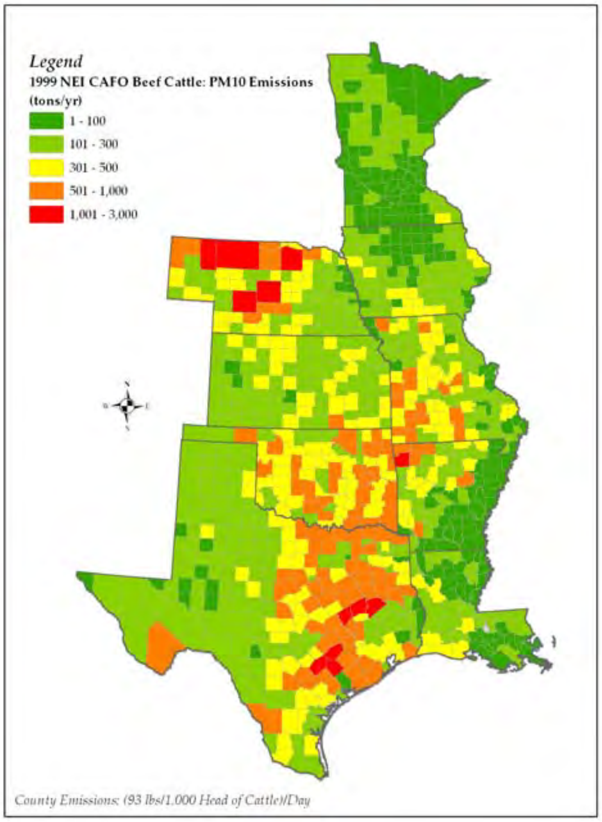
2.3.4 Assessment of Emissions from Livestock Operations

The methods used to develop emission inventories for livestock operations represent a significant improvement over existing inventories, both in terms of the total annual emissions calculated and the geographic distribution of those emissions. The 1999 NEI[7] included an estimated 270,000 tons per year of PM_{10} emissions from CAFOs in the CENRAP region—a figure more than five times higher than that estimated for the CENRAP inventory. A literature search indicated that the emission factor of 17 tons per 1000 animals per year, which was used during development of the 1999 NEI, was too high for this source category. Ultimately, an emission factor of 4.4 tons per 1000 animals per year was selected for beef cattle and an emission factor of 0.8 tons per 1000 animals per year was used for dairy cows.

In addition, the use of facility coordinates greatly enhanced the spatial distribution of emissions. For the 1999 NEI, a simplifying assumption was used that the number of cattle housed at CAFOs is approximately 10% of the total number of beef cattle in each county, regardless of feedlot locations or local animal husbandry practices. As a result, emissions were assigned to many counties in which no feedlots operate, as illustrated by **Figure 2-34**, which

[7] Particulate emissions from animal feedlots are not yet included in the 2002 version of the NEI.

contrasts the geographic distribution of emissions in the 1999 NEI with known feedlot locations and animal populations. Side-by-side comparison of these figures shows that the 1999 NEI registers high emissions densities in eastern Texas, Oklahoma, western Missouri, and northwestern Nebraska—areas where very few CAFOs exist. In reality, most CAFOs in the CENRAP region accumulate in a band that reaches from the Texas panhandle, across Kansas and southeastern Nebraska, and across the state of Iowa.



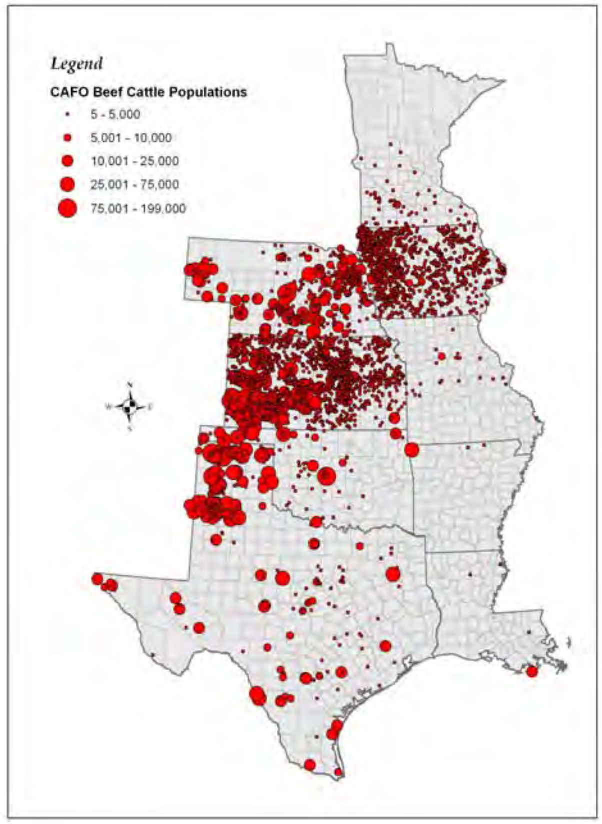


Figure 2-34. NEI county-level PM_{10} emissions for beef cattle feedlots vs. actual beef cattle feedlot locations and populations.

3. RECOMMENDATIONS FOR FURTHER RESEARCH

This study resulted in significant improvements to the 2002 emission inventories for on-road and off-road mobile sources and for sources of agricultural fugitive dust in the CENRAP region. Emission inventories were prepared on highly region-specific or even county-specific bases and adhered closely to EPA's recommended guidance for inventory development. Additional refinements and improvements should be incorporated as the products of ongoing research into emission factors and updates to activity data sets become available. Additionally, we identified the following potential sources of uncertainty in the inventories (roughly in order of importance):

1. Unusual vehicle age distributions and duplicate VIN records were observed in DMV databases of vehicle registrations.
2. The inventories of non-road mobile sources could benefit from additional bottom-up data collection efforts.
3. Existing VMT distributions could be refined to better represent the increasing popularity of SUVs and light trucks.
4. Fuels testing programs could be deployed or improved to better represent fuels characteristics.
5. VIN decoding yielded too few records corresponding to alternative-fueled vehicles to allow improvements to this component of the inventory (though this affects future-year projections more than the 2002 inventory).
6. Day-specific inventories (e.g., Monday, Tuesday, etc.) may be superior to assuming all weekdays are the same and both weekend days are the same for photochemical modeling purposes.
7. The inventories of agricultural fugitive dust sources could benefit from additional bottom-up data collection efforts.

This section briefly discusses recommendations for addressing these issues.

3.1 RECOMMENDATIONS FOR IMPROVING INVENTORIES OF ON-ROAD MOBILE SOURCES

3.1.1 Incorporate New Data and Information as They Become Available

Emission inventories operate best as dynamic databases—subject to continuous refinements, additions, and improvements as research develops and activity data are updated. The electronic file systems of the activity data and emission inventories developed for the CENRAP, which were delivered as products of this project, are likely to be revised and improved as new information becomes available. Examples of recently developed or soon-to-be-available data sets that could be incorporated to further improve the CENRAP's inventories include (1) locally generated VMT estimates for Kansas City, Minneapolis-St. Paul, and Little

Rock; (2) results of the fuels testing program of the Texas Department of Agriculture; and (3) reports of fuels sulfur contents that refiners will be submitting to EPA beginning in February 2005 for diesel and February 2007 for gasoline. In addition, we recommend encouraging fuel testing programs in states where they are not yet planned—Louisiana, Arkansas, Iowa, and Nebraska—and encouraging the Oklahoma Department of Agriculture to archive and maintain records of their existing fuels testing program.

3.1.2 Investigate Databases of Vehicle Registrations

Unusual features in several states' databases of vehicle registrations were noted, including (roughly in order of importance) unexpected numbers of duplicate VINs, unusually large proportions of old light-duty vehicles, and unexpectedly small numbers of light-duty vehicles less than 2-3 years in age. High frequencies of duplicate VINs are sources of error in fleet distributions in and of themselves—particularly in Iowa, where the frequency of duplicates could only be reduced to 6%. However, high frequencies of duplicate records may only be one symptom of general database maintenance problems—such as retention of outdated records, mis-assignment of records, etc.—that cannot be easily recognized and remedied without in-depth review and diagnosis. The possibility that unidentified errors in the vehicle registration databases are related to unusual vehicle age distributions in some states is a cause for concern. MOBILE6 models older vehicles with higher emission rates due to their levels of deterioration and outdated emissions control technologies. Therefore, errors in this component of the vehicle population distributions exert significant impacts on the emission inventories of on-road mobile sources. In addition, errors across all age ranges can significantly impact projections of emission inventories to future years.

3.1.3 Use Fleet Distributions to Refine VMT Distributions

Patterns of SUVs and light-duty-truck use have been shifting rapidly in recent years. However, for this study, VMT distributions by vehicle type for many areas of the CENRAP were based on EPA defaults, which are based on predictions and data from a number of years ago. Errors in the VMT distributions by vehicle type can be significant because emissions standards vary across the classes of light-duty vehicles, and emissions from gasoline-fueled vehicles differ considerably from those of diesel-fueled vehicles. VMT distributions could be refined or adjusted by using vehicle registration data. This approach is based on an assumption, which we believe is well-founded, that due to recent trends in vehicle ownership and driver behavior, many light-duty trucks (e.g., SUVs) are now driven very similarly like passenger vehicles. Thus, the proportions of VMT that should be assigned to each vehicle type and fuel type are approximately equal to the proportions of vehicles registered in each vehicle- and fuel-type category. (Note that this assumption has already been applied in EPA Region I.) Alternatively, the VMT mix could be calculated from registration data using the vehicle type-specific assumptions about annual mileage accumulation rates that are part of the MOBILE6 model.

3.1.4 Prepare Inventories Specific to the Days of the Week

Driving activities for on-road motor vehicles appear to vary with each day of the week. Therefore, a day-specific approach may be preferable to a simple weekday-weekend approach for some photochemical modeling applications. In general, urban VMT declines on Sundays below average weekday levels to an even greater extent than on Saturdays. Friday evening VMT is somewhat higher than on other weekday evenings, and daily total VMT on Mondays is usually somewhat below average for weekdays in urban areas. Day-specific patterns are also likely to occur in rural areas. The 2002 CENRAP inventories reflect the most significant weekday-weekend patterns supported by research results from other areas of the United States. However, further improvements could be made by investing in research projects that investigate region-specific, day-of-week patterns for both rural and urban areas.

3.1.5 Improve Inventories for Alternative-Fueled Vehicles

VIN decoding yielded too little information to support improvements to the inventory of alternative-fueled vehicles. In addition, fuels characteristics of alternative fuels are rarely tested, and no region-specific data were identified. While these uncertainties have little effect on the 2002 inventory, they may become more important when future-year emission inventories are projected to 2018 and beyond. Alternative-fueled vehicles may compose significantly larger proportions of vehicle fleets in the future and trace levels of sulfur in alternative fuels may become more important as sulfur levels in diesel and gasoline fuels continue to decline as a result of existing regulations.

3.2 RECOMMENDATIONS FOR IMPROVING INVENTORIES OF NON-ROAD MOBILE SOURCES

A survey of representative groups of recreational boat owners in the CENRAP region produced dramatic revisions to the emission inventories for this source category. Emissions estimates were revised by factors of 3 or more, on average. Further improvements in the non-road component of the inventory could be made by gathering bottom-up activity data for the next-largest non-road mobile source categories, including agricultural equipment and construction and mining equipment (which are significant sources of NO_x, $PM_{2.5}$, and SO_2 emissions) and/or recreational or lawn and garden equipment (which are important sources of VOC emissions).

3.3 RECOMMENDATIONS FOR IMPROVING INVENTORIES OF SOURCES OF AGRICULTURAL DUST

3.3.1 Research and Develop Process-Based Emissions Estimation Methods

The limited body of research into emission factors and emission processes represents the most significant weakness in the emission inventories of sources agricultural fugitive dust. Investment in the development of emissions measurement programs and process-based

approaches that account for soil moisture, meteorological conditions, and agricultural practices would produce substantial improvements to the accuracy and certainty of this component of the inventory.

3.3.2 Prepare Bottom-Up Inventories for Additional Source Categories

A survey of agricultural extension offices and the use of bottom-up animal population data produced significantly altered spatial allocations and emissions estimates for sources of agricultural fugitive dust. State-level emissions estimates were revised by 25% to 50%, and CAFO emissions were displaced to entirely different geographic areas of the CENRAP. Further modest improvements could be made by gathering bottom-up activity data for the next-largest sources of agricultural fugitive dust, including cotton ginning operations and/or crop transport. However, emissions from these types of sources are likely to be dwarfed by emissions from agricultural tilling dust and are likely to be of significance in only a few areas of the CENRAP where cotton ginning occurs.

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APPENDIX A

EMISSION ESTIMATION METHODS FOR MOBILE SOURCES AND AGRICULTURAL DUST SOURCES IN THE CENTRAL STATES (STI-903574-2610-MD)

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EMISSION ESTIMATION METHODS FOR MOBILE SOURCES AND AGRICULTURAL DUST SOURCES IN THE CENTRAL STATES

METHODS DOCUMENT
STI-903574-2610-MD

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QUALITY ASSURANCE STATEMENT

This report was reviewed and approved by the project Quality Assurance (QA) Officer or his delegated representatives, as provided in the project QA Plan (Sullivan, 2004).

Lyle R. Chinkin
Project QA Officer

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1. INTRODUCTION

The Central States Regional Air Planning Association (CENRAP) is developing a regional haze plan in response to the U.S. Environmental Protection Agency's (EPA) mandate to protect visibility in Class I areas. To develop an effective regional haze plan, the CENRAP ultimately must develop a conceptual model of the phenomena that lead to episodes of low visibility in the CENRAP region. Thus, the CENRAP is researching visibility-related issues for its region, which includes the states of Texas, Oklahoma, Louisiana, Arkansas, Kansas, Missouri, Nebraska, Iowa, and Minnesota. Both primary particulate matter (which is emitted directly to the atmosphere in particulate form) and the formation of secondary particulate matter (which is generated from chemical transformations in the atmosphere of gaseous precursor species such as ammonia, nitrogen oxides, sulfur oxides, and volatile organic compounds [VOCs]) contribute to episodes of regional haze and low visibility in the CENRAP region. Mobile sources and sources of agricultural fugitive dust are thought to be significant sources of these pollutants (as illustrated in **Figure 1-1**). In recognition of these issues, the CENRAP sponsored the development of improved emission inventories for mobile sources and sources of agricultural dust. The project objectives were to improve or develop activity data for off- and on-road mobile sources and sources of agricultural dust throughout the nine CENRAP states; to prepare the activity data in formats compatible for reprocessing and use with MOBILE6, NONROAD, and SMOKE 1.5 (which runs MOBILE6 internally); and/or to prepare the emission inventories in the latest version of the National Emission Inventory Input Format (NIF).

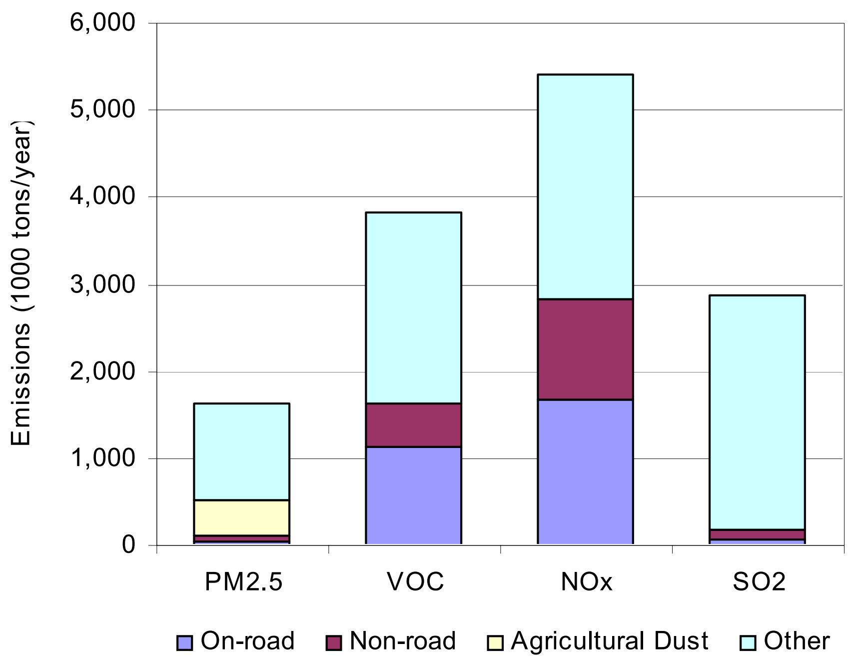

Figure 1-1. Estimated emissions for the CENRAP region. Source: 1999 NEI (U.S. Environmental Protection Agency, 1999c).

1.1 BRIEF OVERVIEWS OF EMISSIONS MODELING METHODS

1.1.1 Overview of Methods to Prepare Emission Inventories of On-Road Mobile Sources

The EPA's MOBILE6 model—an emission factor model that estimates emission factors for on-road mobile sources—and SMOKE were used to generate and prepare emission inventories of on-road mobile sources for photochemical modeling. SMOKE processes and prepares on-road mobile source emission inventories for photochemical air quality modeling by applying temporal profiles, speciation profiles, and gridding surrogates to county-level emissions estimates. In addition, SMOKE self-contains MOBILE6. Thus, SMOKE has the added capability of generating county-level emission inventories for on-road mobile sources by estimating MOBILE6 emission factors and matching these to county-level activity data. MOBILE6 requires a variety of inputs, including temperatures, fleet distributions, vehicle speeds, regulatory controls settings, and fuels characteristics. **Figure 1-2** illustrates the general processes of using MOBILE6 within SMOKE to generate on-road mobile source emission inventories. Figure 1-2 also illustrates the MOBILE6/SMOKE activity data, input files, and outputs that were prepared as products of this project. The products of these inventory development efforts are highly region-specific, or even county-specific, emission inventories that adhere to EPA's recommended guidance for the development of emission inventories for on-road mobile sources.

1.1.2 Overview of Methods to Prepare Emission Inventories of Non-Road Mobile Sources

The EPA's NONROAD model was used to estimate emissions for most non-road mobile sources. The NONROAD model applies equipment populations, activity data (e.g., hours of operation, load factors, etc.), emission factors, and growth factors to estimate emissions for non-road mobile sources. Default input files accompany the model, which are sufficient to estimate emissions for the entire United States at the county level. However, many of the default values are based on national defaults or general assumptions and can be improved with region-specific data, if available. Improved activity data were collected throughout the CENRAP region for recreational boating, which is considered to be one of the most important non-road mobile source categories in the region. These efforts resulted in emission inventories that are much improved over those generated by using the national default values. The most significant improvements included the hours of operation, load factors, spatial distributions, and temporal patterns of recreational boating.

Emissions from locomotives and commercial marine vessels, which are excluded from the NONROAD model, were estimated according to EPA guidance documents and using bottom-up activity data to the extent available. Aircraft emissions, which are also excluded from the NONROAD project, were considered to be a lower priority and were not included in the scope of this project.

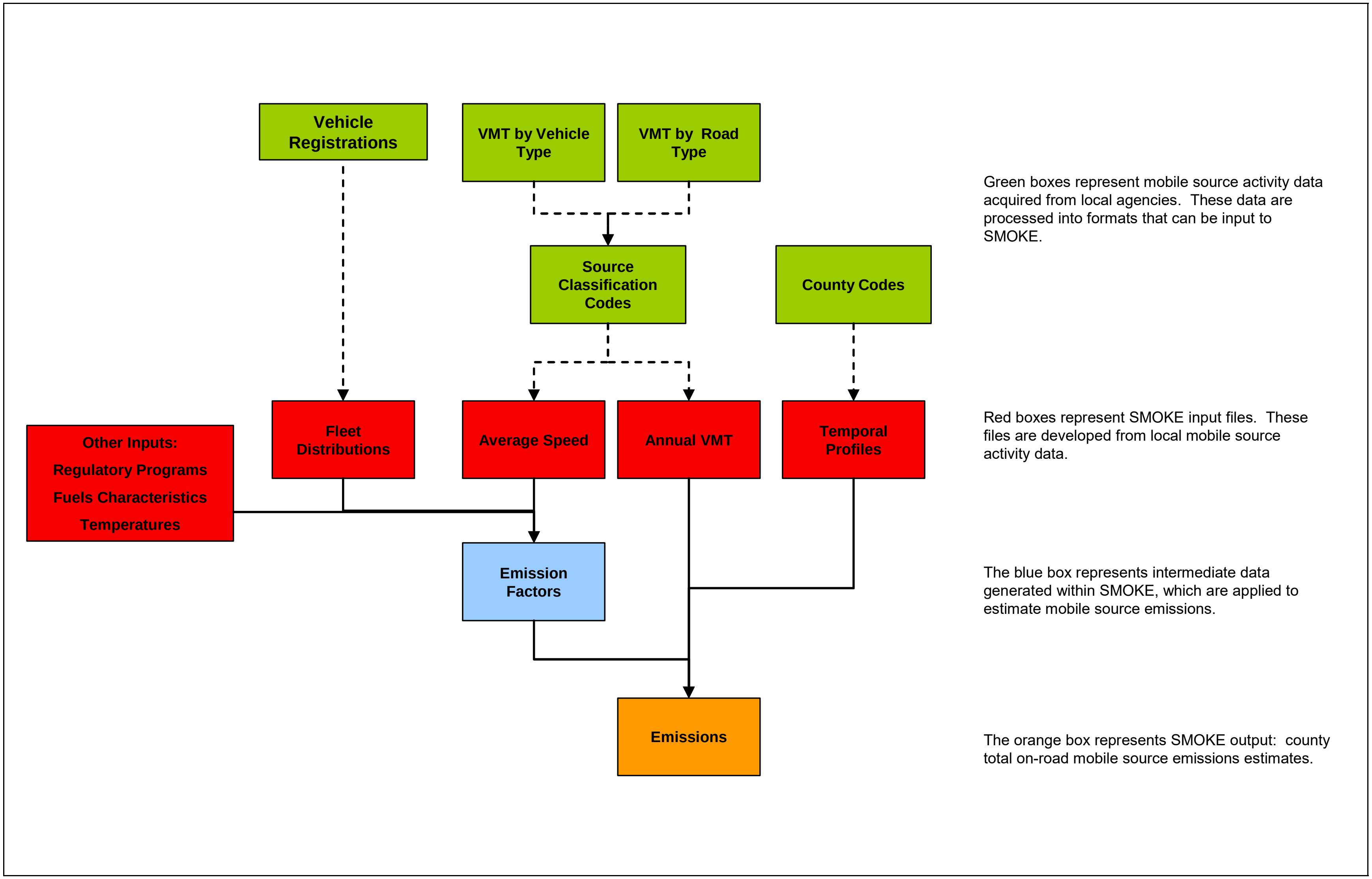

Figure 1-2. General illustration of the overall process and files used by SMOKE to generate on-road mobile source emissions output files.

1.1.3 Overview of Methods to Prepare Emission Inventories for Sources of Agricultural Dust

Emissions from agricultural fugitive dust sources were estimated according to EPA guidance documents or published literature. Bottom-up activity data were used to the extent available, including facility-specific animal populations for confined animal feeding operations (CAFOs) and activity data to describe agricultural tilling operations. Up-to-date GIS databases of soil characteristics and crop types were also used to improve the inventories. These activity data represent a significant improvement over inventories developed by applying national default assumptions. The most significant improvements include the CAFO animal populations, the geographic distributions of CAFO populations, the estimates of the number of tilling passes completed for each crop type, the representative soil silt content for each county, and the temporal patterns of agricultural tilling activities.

1.2 IMPORTANT ASSUMPTIONS

The methods employed to estimate emissions relied on several fundamental assumptions:

- Monthly fuel consumption data from the Federal Highway Administration (FHWA) and Energy Information Administration are representative of monthly patterns of on-road motor vehicle activity.
- Day-of-week and diurnal patterns of on-road motor vehicle activities observed in rural and urban geographic areas of the United States (such as Texas, California, or the national average) are reasonably representative of urban and rural areas of the CENRAP region.
- Rail link-specific traffic density data (ton-miles of cargo moved) is a reasonable surrogate for allocating locomotive fuel usage to the county level.
- The characteristics and speeds of marine vessels at key ports in the CENRAP region can be extrapolated to other ports for which detailed vessel data are not available.

Surveys were conducted to collect bottom-up information for recreational boating and agricultural dust source categories. In those cases, it was assumed that

- Recreational boat owners were capable of providing survey responses that could be interpreted to reasonably represent recreational boating activities across the CENRAP region. Techniques to eliminate or minimize the effects of over-reporting biases were sufficient.
- County agricultural extension service agents were capable of providing survey responses that reasonably represent agricultural tilling activities in the CENRAP region.
- In some cases, incomplete data were recovered. Thus, extrapolation or aggregation of bottom-up observations was assumed to produce reasonably representative results when data were missing, incomplete, or uncertain. A few examples of affected data sets include age distributions for vehicle types that appear with very low frequencies in the vehicle population, reported numbers of tilling passes for rarely grown crop types,

reported hours of use for recreational boats with inboard motors, and others as discussed in the main body of the Final Report.

- Lastly, we relied on state motor vehicle departments' databases of vehicle registrations to represent the 2002 vehicle populations in each county. In some cases, unusual features in vehicle distributions appeared (e.g., larger than expected populations of old vehicles), but no reasons to discount these phenomena could be determined.

2. METHODS TO PREPARE ACTIVITY DATA FOR ON-ROAD MOBILE SOURCES

This section describes the information sources used and the data processing steps followed to prepare activity data for on-road mobile sources, including vehicle miles traveled (VMT), speed distributions, and temporal distributions. VMT, speed distributions of VMT, and temporal distributions of VMT are critical input variables for emission inventories of on-road mobile sources and photochemical air quality models. VMT is a measure of on-road vehicle activity, which is often used as the foundation of emission inventories of on-road mobile sources, including those prepared with MOBILE6. Speed distributions of VMT significantly affect emission rates, while the timing of vehicle activities by season, day, or hour also significantly influences emissions (which vary with temperature).

The SMOKE emissions processor uses VMT, distributions of VMT by speed bin, and temporal distributions of VMT to estimate on-road motor vehicle emissions and to prepare emission inventories for use with photochemical air quality models. The objective of this task was to develop the SMOKE inputs for the CENRAP domain, including county-level VMT, speed distributions, and temporal profiles, which were used to model and prepare emission inventories of on-road mobile sources for the year 2002 (as discussed in Section 8).

2.1 BACKGROUND AND TECHNICAL ISSUES

The FHWA maintains the Highway Performance Monitoring System (HPMS) database, which contains estimates of VMT for all U.S. states and counties. The HPMS database is updated periodically with VMT data submitted by states. However, VMT data developed at the local or state level are preferable because they generally better represent regional or local conditions, are often more current than the data in the HPMS database, and, therefore, result in better quality emissions inventories. Therefore, locally or regionally developed mobile source activity data were given preference, were acquired whenever available from state and local transportation or air quality management agencies, and were used preferentially over the national default VMT estimates.

The availability of local- or state-level data varied geographically within the CENRAP domain and depended on the area's attainment status and level of urbanization. **Figure 2-1** depicts non-attainment areas, urban attainment areas, Class I areas, and tribal lands in the CENRAP region. Areas for which data existed at the local level included five non-attainment areas, which had previously performed emissions modeling with MOBILE6 or MOBILE5, as well as some urban attainment areas. Although none of the urban attainment areas had prepared VMT for emissions modeling, most had VMT data for transportation planning purposes. Thus, for all non-attainment and most urban attainment areas, locally developed VMT, speed distributions, and temporal distributions were acquired. For all other areas (i.e., rural attainment areas and some urban attainment areas), data that had been developed at the state level were acquired.

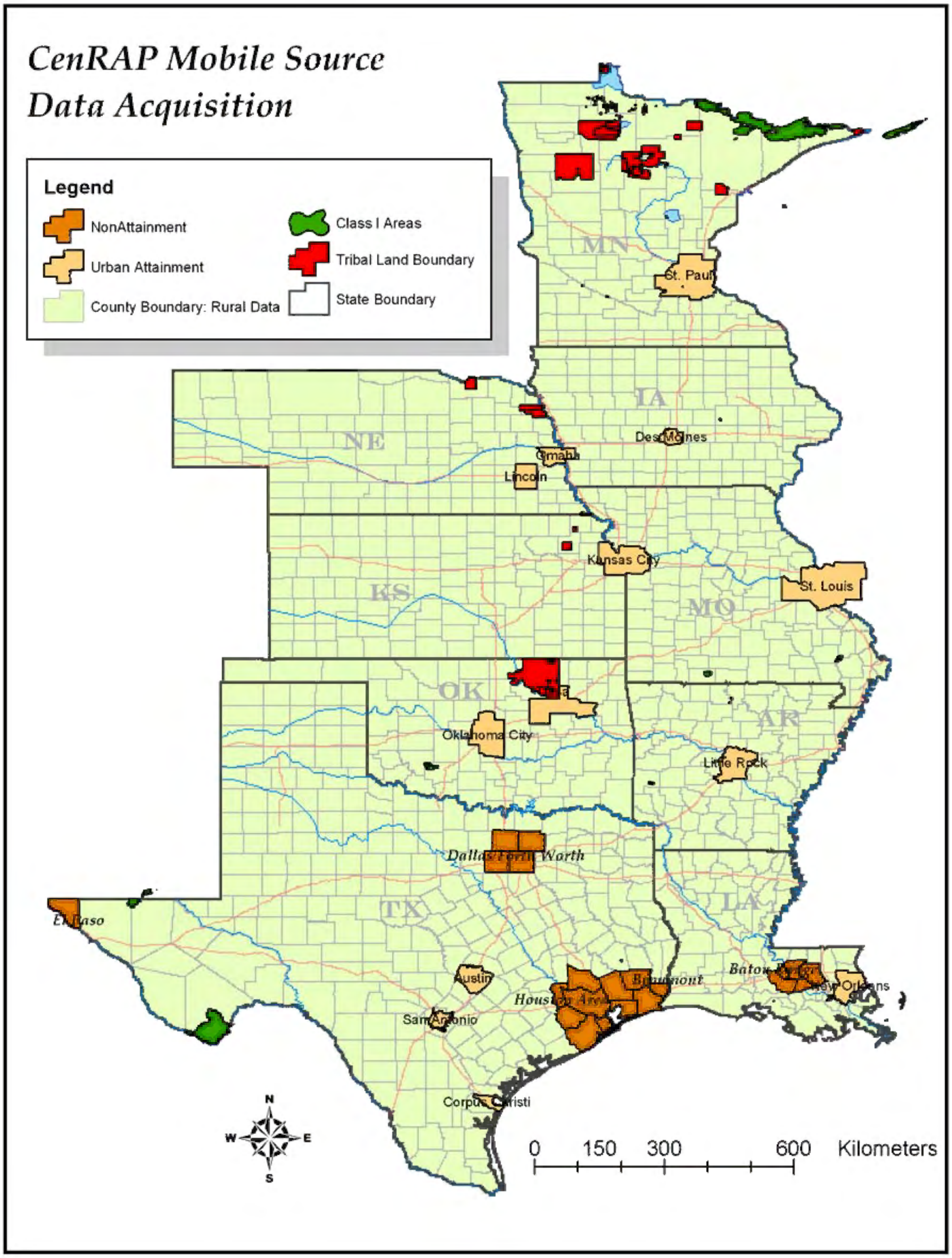

Figure 2-1. Non-attainment areas, urban attainment areas, Class I areas, and tribal lands in the CENRAP region.

To ensure effective use of project resources, we identified areas to be given highest priority according to the following criteria:

1. Magnitude of each region's VMT, population, and proximity to Class I areas.
2. Availability of MOBILE input data.
3. Availability of state or local mobile source activity data to represent the year 2002.

2.2 DATA ACQUISITION

Urban areas often maintain state-generated or locally generated VMT and speed or temporal distributions for the purposes of emissions assessments, air quality modeling, or transportation planning. In addition, the FHWA maintains the national Highway Performance Monitoring System (HPMS) database of VMT on major U.S. roadways. The HPMS data are reported at the county or sub-county level by road type (i.e., freeway, highway, major arterial).

Sonoma Technology, Inc. (STI) requested locally developed on-road mobile source activity data for all non-attainment areas in the CENRAP region and for urban attainment areas located near Class I areas. When locally developed mobile source activity data were not available, Metropolitan Planning Organizations (MPOs) and state departments of transportation (DOTs) were contacted with requests for data. For all other areas, state DOTs were contacted for the most up-to-date HPMS data. **Table 2-1** summarizes the mobile source activity data acquired for each area of the CENRAP domain.

Table 2-1. Summary of the on-road mobile source activity data acquired for each area of the CENRAP domain.

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Area	Data Acquired	Year	Source of Data
Non-Attainment Areas			
Houston/Galveston, Beaumont/Port Arthur, and El Paso, Texas	MOBILE6 input files, VMT by vehicle/road type, temporal/speed distributions	2002	Texas Transportation Institute (TTI)
Dallas/Forth Worth, Texas	VMT by vehicle/road type, temporal/speed distributions	1999	Texas Commission on Environmental Quality (TCEQ)
Baton Rouge, Louisiana	MOBILE6 input files, VMT by road type	2002	Louisiana Department of Environmental Quality (LDEQ)

Table 2-1. Summary of the on-road mobile source activity data acquired for each area of the CENRAP domain.

Urban Attainment Areas – Within 500 km of a Class I Area			
Attainment counties, Dallas/Ft. Worth, Texas	VMT by vehicle/road type, temporal/speed distributions	1999	TCEQ
New Orleans, Louisiana	MOBILE6 input files, VMT by road type	2002	LDEQ
St. Louis, Missouri	VMT by vehicle/road type, temporal distributions	2004	East-West Gateway Coordinating Council
Kansas City, Missouri -Kansas	VMT by road type	2002	Kansas Highway Department (KHD) and Missouri Department of Transportation (MoDOT)
Topeka and Wichita, Kansas	VMT by road type	2002	KHD
Little Rock, Arkansas	VMT by road type	2002	Arkansas Highways and Transportation Department (AHTD)
Minneapolis/St. Paul, Duluth, and St. Cloud, Minnesota	VMT by road type	2002	Minnesota Department of Transportation (MnDOT)
Lincoln, Nebraska	VMT by road/vehicle type and speed	2002	Lincoln-Lancaster Metropolitan Planning Organization
Oklahoma City and Tulsa, Oklahoma	VMT by road type	2002	Oklahoma State Highway Department (OSHD)

Table 2-1. Summary of the on-road mobile source activity data acquired for each area of the CENRAP domain.

All Other Areas			
Texas	MOBILE6 input files, VMT by vehicle/road type, temporal/speed distributions	2002	TTI
Louisiana	MOBILE6 input files, VMT by road type	2002	LDEQ
Arkansas	VMT by road type	2002	AHTD
Iowa	VMT by road type	2002	Iowa Department of Transportation
Kansas	VMT by road type	2002	KHD
Minnesota	VMT by road type	2002	MnDOT
Missouri	VMT by road type	2002	MoDOT
Nebraska	VMT by road type	2002	Nebraska Department of Transportation
Oklahoma	VMT by road type	2002	OSHD

2.2.1 Details of Data Acquisition for Non-attainment Areas

The CENRAP region currently has five non-attainment areas: four in Texas and one in Louisiana. The El Paso, Texas, non-attainment area (designated as serious) consists of El Paso County and is within about 150 km of the Guadalupe Mountains and Carlsbad Caverns National Parks and within about 400 km of Big Bend National Park. The Dallas-Ft. Worth and Baton Rouge non-attainment areas are located within about 300 kilometers of Class I areas. Houston-Galveston and Beaumont-Port Arthur are at least 500 km distant from any Class I area.

For the non-attainment areas in Texas, MOBILE6-compatible files were acquired from the TTI and the TCEQ. TTI provided hourly and annual VMT and average speed distributions for 2002 by road type and vehicle type. The TCEQ provided MOBILE6-compatible files for 1999, which were grown to 2002 based on additional information provided by the TCEQ. For Baton Rouge, the LDEQ supplied 2002 MOBILE6 input files, as well as 2002 VMT data from the Louisiana Department of Transportation Development (LDOTD).

2.2.2 Details of Data Acquisition for Urban Attainment Areas within 500 km of Class I Areas

Several urban attainment areas in the CENRAP domain are within 500 km of Class I areas (identified in Table 2-1). Of these, three provided locally developed activity data for mobile sources: (1) New Orleans, Louisiana; (2) St. Louis, Missouri; and (3) Lincoln, Nebraska. Other urban areas were unable to provide locally developed activity data within the time available for data acquisition; therefore, VMT data were acquired for these areas from state DOTs. Activity data for a few urban attainment areas have become available very recently or will become available soon (e.g., Kansas City, Missouri-Kansas; Minneapolis-St. Paul, Minnesota). These locally developed data are recommended for use during future inventory development projects.

2.2.3 Details of Data Acquisition for All Other Areas

Texas and Louisiana provided MOBILE6 inputs and activity data for all counties or parishes within those states. Mobile source activity data for 2002 were acquired from the state DOTs in Arkansas, Missouri, Iowa, Minnesota, Oklahoma, Nebraska, and Kansas. In all cases, the data acquired from the state DOTs contain the same type of information as the national HPMS database. However, in some cases, the data supplied by states were more up to date than the latest version of the national HPMS database.

2.3 DATA PREPARATION

A broad array of data types and formats were acquired for this task, which necessitated a strategic data processing scheme to assemble, process, and format the data for use with SMOKE/MOBILE6. The processing scheme was carried out for the following data types:

1. Data acquired for non-attainment areas (MOBILE-compatible inputs)
2. Data acquired for urban attainment areas (MOBILE-compatible inputs or transportation model data)
3. Data acquired for all other areas (HPMS)

Two standardized data processing algorithms were developed to process (1) MOBILE-compatible inputs and transportation demand model data or (2) national HPMS data. **Figure 2-2** illustrates the processing scheme applied to the MOBILE-compatible input data and transportation model data. **Figure 2-3** illustrates the processing scheme applied to the HPMS data. These algorithms included functions to process VMT data into the formats required by SMOKE and to process and calculate average speed distributions and temporal profiles. The outputs of the data processing schemes were SMOKE-ready input files suitable for use with MOBILE6 running within the SMOKE emissions processor.

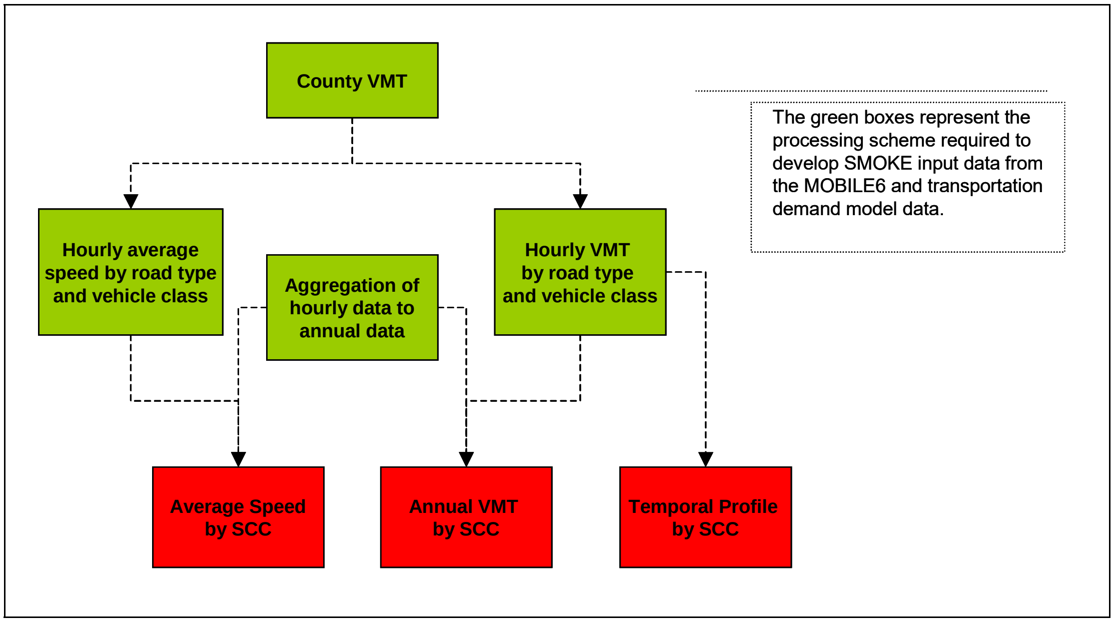

Figure 2-2. Illustration of the processing scheme applied to the MOBILE-compatible input data and transportation model data to develop SMOKE input files.

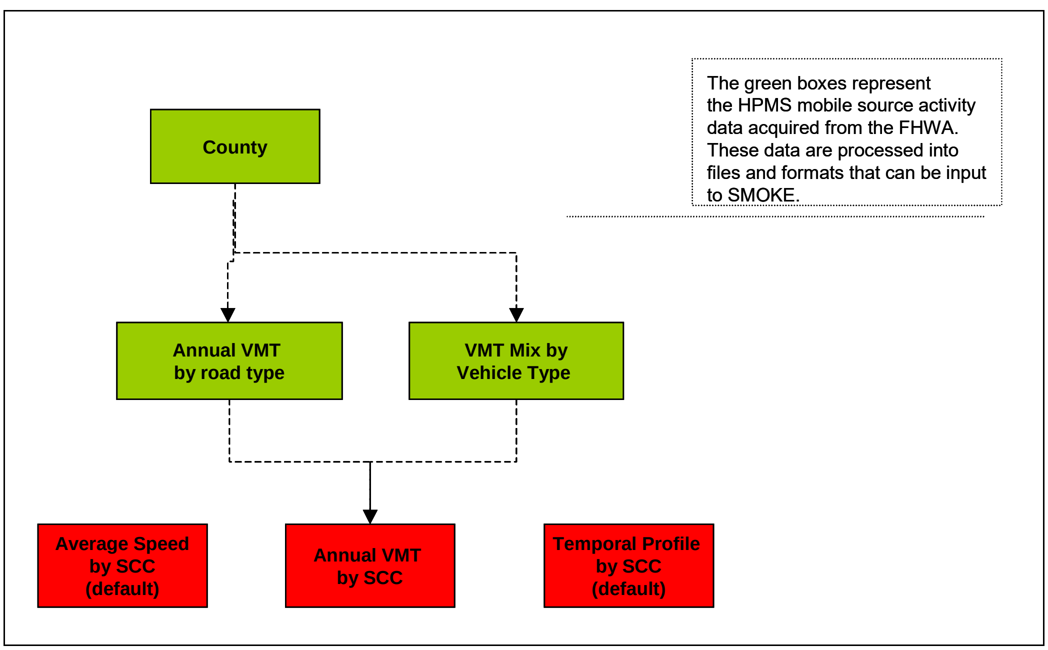

Figure 2-3. Illustration of the processing scheme applied to the national HPMS data.

2.3.1 Details of Data Preparation for Mobile Source Activity Data

SMOKE requires VMT data distributed by 96 standard source classification codes (SCC). Each SCC denotes a vehicle type and a road type combination of those listed in **Table 2-2**. For each state in the CENRAP domain, STI compiled SMOKE inputs for the 96 SCCs using the data sets discussed in Section 2-2.

Table 2-2. Definitions of the 8 vehicle types and 12 road types used by SMOKE.

Vehicle Types	Road Types
LDGV - Light Duty Gasoline Vehicles	Rural Interstate
LDGT1 - Light Duty Gasoline Trucks 1	Rural Principal Arterial
LDGT2 - Light Duty Gasoline Trucks 2	Rural Minor Arterial
HDGV - Heavy Duty Gasoline Vehicles	Rural Major Collector
LDDV - Light Duty Diesel Vehicles	Rural Minor Collector
LDDT - Light Duty Diesel Trucks	Rural Local
HDDV - Heavy Duty Diesel Vehicles	Urban Interstate
MC - Motorcycles	Urban Freeway
	Urban Principal Arterial
	Urban Minor Arterial
	Urban Collector
	Urban Local

2.3.2 Details of Data Preparation for Temporal Profiles

SMOKE uses a default library (data file) of monthly, weekly, and diurnal temporal profiles for all emissions source categories. STI reviewed and revised the default SMOKE/EPA profiles to better represent the temporal patterns of on-road mobile emissions in the CENRAP domain. For Texas and parts of Missouri, where locally developed temporal data were available, local temporal profiles were added to the SMOKE profile library. For other areas, representative temporal profiles were selected. Day-of-week temporal profiles were adopted from a recent study of traffic activity patterns (Coe et al., 2004). Monthly temporal profiles were based on the 1995 National Personal Transportation Survey (Federal Highway Administration, 1995). Diurnal profiles were based on the SMOKE/EPA default profiles for counties inside metropolitan statistical areas (MSAs) and other relatively urbanized counties. For other counties, where population densities or urban populations fell below established thresholds, diurnal profiles were based on Texas' profiles for groups of counties sharing similar population characteristics. (Population demographics were acquired from the U.S. Census Bureau.)

2.4 QUALITY ASSURANCE

On completion of the development of the VMT data, speed distribution data, and temporal profiles, the following quality assurance/quality control (QA/QC) reviews were

conducted, and graphical illustrations were included as an appendix to the Final Report. In addition, the procedures outlined in the project Quality Assurance Project Plan (QAPP) were followed (Sullivan, 2004).

- Examine county-level total VMT estimates and their relative magnitudes and distributions throughout the domain.
- Examine VMT fractions by road type and vehicle type.
- Examine maps, plots, and graphs of VMT by county, road type, and vehicle type.
- Examine graphs of speed distributions by road type and region.
- Examine graphs of temporal profiles for each region.

3. METHODS TO PREPARE FLEET CHARACTERISTICS FOR ON-ROAD MOBILE SOURCES

Emission factors for on-road mobile sources vary with the following fleet characteristics, which are derived from state transportation departments' vehicle registration records.

- *The vehicle age distribution* determines (1) the estimated proportion of the fleet that has been designed to meet certain emissions standards, and (2) the estimated average deterioration level of on-board emissions control devices. Vehicle design standard and deterioration level, in turn, are variables that govern the choice of emission factor.
- The *fractions of the vehicle fleet that are powered by different fuels* (e.g., gasoline or diesel) affect the choice of appropriate emission factors.

Registration distributions vary widely across regions, and Giannelli et al. (2002) indicated that registration distributions exert a major influence (i.e., potentially more than a 20% change) on MOBILE6-modeled emission factors. Therefore, the application of county-specific registration distributions is essential to the development of accurate emission inventories for on-road mobile sources. This section describes the information sources used and the data processing steps followed to prepare fleet characteristics, including vehicle age distributions and vehicle fuel fractions.

3.1 DATA ACQUISITION

Seven state DOTs in the CENRAP region provided extracts of their vehicle registration databases, which were decoded and processed to prepare MOBILE6-ready fleet-age distributions and fuel fractions for light-duty vehicles. The DOTs provided vehicle identification numbers (VIN) and county codes for every vehicle registered in their states on a specified date. The VIN records were decoded to yield vehicle ages and fuel types, which were used to calculate county-specific fleet characteristics. **Table 3-1** provides details about each of the acquired vehicle registration databases.

Texas provided ready-made MOBILE6 inputs, including fleet characteristics, for use in this project. Arkansas was excluded from development of fleet characteristics because the state is currently developing an on-road mobile source inventory, which is expected to be available in 2004. Instead, MOBILE6 default fleet characteristics were used for the state of Arkansas. Fleet characteristics were developed for light-duty vehicles only because heavy-duty vehicles are often used for interstate travel; therefore, national average fleet distributions (i.e., MOBILE6 defaults) are reasonably representative.

Table 3-1. Descriptions of acquired vehicle registration databases and related information.

State	Vehicle Registration Database Characteristics		Contact Information	Comments
	Number of Records	Date Represented		
Texas	n/a	n/a	Mary McGarry-Barber and Chris Kite, Texas Commission on Environmental Quality	Texas provided ready-made fleet characteristics.
Louisiana	2,941,066	July 1, 2002	Cecile Bush and Ray Thomas, Louisiana Department of Public Service	
Arkansas	n/a	n/a	Mary Pettyjohn, Arkansas Department of Environmental Quality and Charles Beaver, Arkansas Department of Revenue	Arkansas is currently funding a separate project to process VINs and estimate emissions from on-road mobile sources. Results will be made available to CENRAP in 2004.
Oklahoma	5,703,980	January 9, 2004	Ray Bishop, Oklahoma Department of Environmental Quality and Chuck Dusenbery, Oklahoma Tax Commission	Oklahoma's database included registrations of non-road vehicles, such as recreational boats, which were eliminated after the automated VIN decoding process.
Kansas	2,568,781	January 21, 2004	Donnita Thomas and Leonard Corkill, Kansas Department of Revenue	
Missouri	5,069,888	February 1, 2004	John Rustige and Fonda Thomas, Missouri Department of Natural Resources and	
Iowa	2,880,936	October 31, 2003	Chad Daniel and Priyanka Painuly, Iowa Department of Natural Resources	
Nebraska	1,850,509	December 11, 2003	David Brown, Nebraska Department of Environmental Quality and Deric Bloom, Nebraska Department of Motor Vehicles	Nebraska uses a state-specific system of county identification codes.
Minnesota	4,606,640	February 1, 2004	Innocent Eyoh and Chun-Yi Wu, Minnesota Pollution Control Agency and Judith Franklin, Minnesota Department of Public Safety	

3.2 DATA PREPARATION, QUALITY ASSURANCE, AND QUALITY CONTROL

The following steps were carried out to prepare, error-check, and correct the vehicle registration databases as needed before carrying out the process of VIN decoding.

- Load records into a unified database for processing.
- Translate county codes if necessary.
- Eliminate null VIN and county federal information processing standard (FIPS) codes.
- Identify and eliminate duplicate VINs.
- Independently verify the number of records.
- Export files for VIN decoding.

Load records into a unified database for processing. All vehicle registration records, including VINs and county FIPs codes, were unified into a structured query language (SQL) database. The unified SQL database supported more efficient preliminary data processing, quality assurance, and quality control procedures and permitted a running record of any changes made to the data sets. Copies of the original data sets from the states were archived before loading them into the unified database.

Translate county codes. Each state provided county information for registration records. Iowa's and Louisiana's databases included FIPS county codes. Kansas', Minnesota's, Missouri's, Nebraska's, and Oklahoma's databases contained county names or county codes that were translated to conform to the standard 5-digit FIPS format, "SSCCC", where SS are 2 integers that identify the state and CCC are 3 integers that identify the county or parish. VIN records without valid county names or codes were eliminated. For example, some of the VIN records were classified as state vehicles and were not assigned to any county. Less than one percent of the VIN records received from each state were eliminated due to unavailable county codes.

Eliminate null VIN and FIPS records. Null VIN and FIPS entries were identified, and records that contained null entries were eliminated. Less than one percent of the records from each state contained null entries. An additional 6% of the Kansas records were eliminated because they were flagged as representing trailers or mobile homes rather than on-road vehicles.

Identify and eliminate duplicate VINs. Each state's database was examined for duplicate VINs. Theoretically, no duplicates should exist because each VIN uniquely identifies a single vehicle. However, duplicate VINs may appear in a vehicle registration database for a variety of administrative reasons, such as failure to update vehicle information associated with changes of owner address or transfers of vehicle ownership. Each state DOT was contacted to discuss any duplicates in their registration databases. Duplicates that occurred within the same county were simply deleted, but cross-county duplicates were retained in most cases. The State of Missouri identified the most recent database entry associated with each duplicate VIN. Therefore, cross-county duplicates were eliminated from Missouri's database by retaining only the most recent duplicate record. The frequencies of duplicate records in the final databases were small for most of the states (i.e., less than one in ten thousand for the Kansas, Louisiana, Minnesota, Nebraska, and Oklahoma data sets). Thus, the potential errors in the vehicle age and fuel type distributions

are expected to be small or negligible. However, a significant number of duplicate records could not be eliminated from Iowa's databases and may represent a source of error in the fleet characteristics for that state. **Table 3-2** summarizes the numbers of duplicate records existing in the vehicle registration databases for each state.

Table 3-2. Summary of null and duplicate VIN record identification and elimination.

State	Original Database (as received)		Final Database	
	Total No. Records	% Duplicates	Total No. Records	% Duplicates
Texas	n/a	n/a	n/a	n/a
Louisiana	2,941,090	0.004	2,941,066	0.004
Arkansas	n/a	n/a	n/a	n/a
Oklahoma	5,704,139	0.000	5,703,980	0.000
Kansas	2,782,208	0.002	2,568,781	0.002
Missouri	5,230,782	2.960	5,069,888	3.053
Iowa	3,111,046	19.016	2,880,936	5.939
Nebraska	1,863,340	0.002	1,850,509	0.002
Minnesota	4,611,407	0.005	4,606,640	0.005

Verify the number of records. The final number of records in each state's database was compared to the number of registered vehicles reported by the FHWA (Federal Highway Administration, 2004) and the state's population as reported for the 2000 Census (U.S. Census Bureau, 2004). The population comparison was performed at a county level to ensure that the most populated counties in each state had the highest numbers of registered vehicles. When large discrepancies were observed, the appropriate state agencies were contacted to resolve the differences. For example, Oklahoma's vehicle registration database includes off-road vehicles. VINs for off-road vehicles were eliminated following VIN decoding, at which time the numbers of records compared better with the figures reported by the FHWA and the 2000 Census. Louisiana's vehicle registration database contained a relatively low number of vehicles (given the state's population and FHWA's reported number of registered vehicles); however, the Louisiana Department of Public Safety confirmed that the number of records in their database was correct.

Export files for VIN decoding. The final VIN data sets for each state were exported into separate ASCII text files and formatted for VIN decoding.

3.3 VIN DECODING

Eastern Research Group (ERG) developed and maintains VIN decoding software that returns model year, series, gross vehicle weight rating, fuel type, and other vehicle specifications

for all domestic and foreign light duty vehicles sold in the United States from 1972 to 2002.[1] Version 2000.01 of the ERG VIN Decoder was used to decode the VINs received from state registration databases. Before proceeding with VIN decoding, the accuracy of the VIN decoder software was validated by decoding several known VINs and verifying the results and by comparing results to the outputs of other VIN decoders.

After the VINs from each state were decoded, the age of each decoded vehicle was determined by subtracting the model year from the current year, where the current year was defined for each state as the year represented by its VIN data set (see Table 3-1). For each county and each vehicle type, the fractions of vehicles aged <1 through 24 years were calculated. Vehicles of ages greater than 24 years were assigned to age 24. The products of these calculations were county-specific fractional age distributions for light-duty vehicle classes.

In addition, the ERG VIN Decoder returned the type of fuel utilized by each decoded vehicle. The fractions of diesel-fueled vehicles in each county, vehicle class, and age group, from age <1 through 24 or greater were calculated. In some cases, vehicle populations were very small and required extrapolation or aggregation across geographic areas or vehicle classes to calculate representative diesel fractions. The results of these calculations are diesel fractions for each county, light-duty vehicle type, and age group. Too few natural-gas powered vehicles were identified to produce meaningful distributions; therefore, MOBILE6 defaults were used for this fuel type (unless locally developed MOBILE6 inputs were provided).

3.4 FINAL QUALITY ASSURANCE, QUALITY CONTROL, AND DATA PREPARATION

On completion of VIN decoding, the following QA/QC reviews and processing steps were conducted to prepare the MOBILE6-ready inputs, and graphical illustrations were included in an appendix to the Final Report. In addition, the procedures outlined in the project QAPP were followed (Sullivan, 2004):

- Verify the number of decoded VIN records.
- Examine the vehicle age fractions and fuel type fractions for reasonableness.
- Independently calculate and verify a vehicle age fraction and a fuel type fraction.
- Parse the vehicle age distributions and fuel type fractions into MOBILE6-ready inputs.
- Verify correct parsing and formatting of the final deliverables.
- Test the use of these files with the SMOKE emissions processor.

Verify the number of decoded VIN records. The ERG VIN Decoder appended several fields containing vehicle information and error codes to the original data records containing the VINs and FIPS codes. The number of records contained within each decoded file was verified to be equal to the number of records originally submitted for decoding. The decoded VIN files were loaded into the unified SQL database for the final QA/QC procedures. VINs that were not

[1] A listing of the vehicle manufacturers treated by the software and more information is available online at http://www.ergweb2.com/vindecoder/index.cfm.

decoded by the software remained in the output files and were flagged with error codes for explanation.

Examine the vehicle age fractions and fuel type fractions for reasonableness. Two separate files, one containing the age distributions for all vehicle classes and counties and another containing the diesel fractions for all vehicle classes and counties, were loaded into the SQL database in order to examine the calculated fractions. The 25 vehicle fractions for each vehicle class and each county were verified to sum to one. The minimum, maximum, mean, and median fractions for each age class from all the age distributions were examined in order to identify any outlier values and assess their effects. Similarly, the minimum, maximum, mean, and median diesel fractions for each age class from all the vehicle classes and counties were examined. Pivot tables and corresponding pivot charts were also created for the default and calculated age distributions and diesel fractions in order to facilitate quick visual examinations.

Parse the vehicle age distributions and fuel type fractions into MOBILE6-ready inputs. The calculated age distributions for each vehicle class and county were contained within a single table in the SQL database that had variable character fields of character length 50 for the FIPS codes and the vehicle classes and 25 numeric fields of precision 0.0001 for the calculated age fractions. The calculated diesel fractions for each vehicle class and county were contained in a similar table in the SQL database. A separate ASCII text file containing 25 age fractions for each of the 5 decoded vehicle classes was exported from the SQL database. The space-delimited text files contained the header REG DIST on the first line followed by rows of 26 fields containing the vehicle class code and the age fractions from zero to age 24. The diesel fractions were exported into similar ASCII text files for each county. The files contained sets of 25 diesel fractions for 14 of the 16 combined MOBILE6 vehicle classes, for a total of 350 fractions. For the remaining 2 vehicle classes, MOBILE6 assumes that all motorcycles (MC) are gasoline-fueled and all urban/transit buses (HDBT) are diesel-fueled. The age distribution files were prepared as external inputs for the MOBILE6 runs, while the diesel fractions were incorporated into the MOBILE6 input files.

Verify correct parsing and formatting of the final deliverables. A random sample of registration distribution files and diesel fraction files were examined to ensure that the files were properly exported from the SQL database. The selected registration distribution files were verified to contain the appropriate heading and 25 age fractions for each of the 5 vehicle classes. The selected diesel fraction files were verified to contain 5 sets of 25 fractions with 10 fractions in the first row of each set, 10 fractions in the second row of each set, and 5 fractions in the third row of each set.

Test the use of these files with the SMOKE emissions processor. The selected registration distribution files were run through the SMOKE emissions processor using a test MOBILE6 input file with default values to ensure that the files ran properly within the framework of MOBILE6 operating within SMOKE. Similarly, the selected diesel fractions were verified with a test MOBILE6 input file. The diesel fractions were incorporated into the test input file, each in turn, and the files were run through SMOKE to ensure that the diesel fractions were formatted properly to run within the framework of SMOKE.

4. METHODS TO PREPARE FUELS CHARACTERISTICS AND IMPACTS OF REGULATORY CONTROLS FOR ON-ROAD AND OFF-ROAD MOBILE SOURCES

Fuel parameters and regulatory controls can significantly impact emission factors predicted by the MOBILE6 model (for on-road sources) and the NONROAD model (for off-road sources). This section describes the information sources used and the data processing steps followed to prepare fuels characteristics and regulatory control settings for use in MOBILE6. When appropriate, fuels characteristics were also prepared for the NONROAD model.

4.1 FUELS CHARACTERISTICS

Three characteristics of fuels significantly affect criteria pollutant emission predictions from the MOBILE6 and NONROAD models:

1. Sulfur content
2. Fuel volatility
3. Oxygenate content

Fuel sulfur content directly affects emissions of sulfates (particulate matter) and SO_2 from combustion of all fuels. In addition, sulfur's adverse effects on catalytic converters indirectly affect emissions of VOCs, CO, and NO_x from gasoline-fueled vehicles. Fuel volatility and oxygenate content are only necessary for gasoline-fueled vehicles.

EPA found that gasoline volatility can have a major effect on MOBILE6 estimates of VOC and CO emissions (Giannelli et al., 2002), although the influence diminishes at lower temperatures and has no effect at temperatures below 45^{o}F (Tang et al., 2003). Oxygenates for gasoline fall into two classes: alcohols and ethers (see **Table 4-1)**. All are assumed to reduce emissions of CO, but ethanol can also increase the gasoline volatility.

Table 4-1. Common types of oxygenates (listed in approximate order of decreasing prevalence).

Alcohols	Ethers
Ethanol	Methyl tert-butyl ether (MTBE)
Methanol	Tert-amyl methyl ether (TAME)
Butanol	Ethyl tert-butyl ether (ETBE)
	Diisopropyl ether (DIPE)

Both MOBILE6 and NONROAD accept sulfur content information on a weight basis. MOBILE6 requires that sulfur content be specified in parts per million by weight (ppmw or sometimes just ppm), and NONROAD requires that sulfur content be expressed as a percentage by weight (wt. %). Gasoline volatility is expressed in terms of Reid Vapor Pressure (RVP), or pounds per square inch (psi). The extent to which oxygenates are present can be defined either

as the percentage of a specific oxygenate blended by volume (% vol.), or the total weight percentage (% wt.) of oxygen atoms in the blended fuel.

4.1.1 Data Acquisition

For gasoline and diesel fuel, a number of information sources exist, including EPA, commercial data sources, state departments of agriculture, and fuel associations. In addition, the American Society for Testing and Materials (ASTM) standards can be used as guidelines for areas where information is missing or incomplete. Each of these sources of information is discussed in greater detail below.

For compressed natural gas (CNG) and liquefied petroleum gas (LPG), only the NONROAD model requires fuels characteristics, and the only information required is the sulfur content. NONROAD only allows entry of a single sulfur content to describe both fuels, although CNG and LPG sulfur contents sometimes differ. However, for both fuels, the sulfur content is very low (often well below specifications), is rarely tested, and currently has a negligible impact on the overall inventory (although it may become more important in the future as sulfur levels in gasoline and diesel fuel drop). Therefore, for NONROAD, a CNG/LPG sulfur content of approximately 0.0007 wt. % was used, which is consistent with the CNG sulfur content assumed by EPA's AP-42 publication for stationary sources (U.S. Environmental Protection Agency, 1998a).[2]

U.S. Environmental Protection Agency

EPA maintains a database of reformulated gasoline (RFG) data for those areas that utilize RFG. Also, MOBILE6 allows RFG to be modeled explicitly (i.e., the model chooses appropriate values for sulfur content, volatility, and oxygen content). For future inventories, information for fuels sold in other areas may be available from EPA. Specifically, federal regulations (40 CFR 80.370 and 40 CFR 80.593) will require refiners to submit annual reports of sulfur content to EPA by February 2005 and February 2007 for gasoline and diesel fuel, respectively.

Commercially available data

Information about gasoline and diesel fuel compositions is available for purchase from Northrop Grumman and the American Association of Automobile Manufacturers (AAM). These data are the basis for fuel data estimated in EPA's National Emission Inventory (NEI) (E.H. Pechan and Associates, 2004). However, each of these data sets consists of a relatively small number of samples from relatively few areas (e.g., 1-6 cities per state, 1-20 samples per city, and 1-3 locations per city). Data are collected by these entities for winter and summer months only.

AAM can identify specific laboratories and analytical methodologies used, whereas Northrup Grumman's data are reported by a number of private companies and laboratory information cannot be readily tracked down. However, the AAM data are less extensive than the

[2] A sulfur content of 0.0007% (wt.) corresponds to 2000 gr/MMscf = 0.2 gr/100 scf. This factor includes sulfur that is added for safety purposes (odorant).

Northrop Grumman data, and costs are significantly higher. Therefore, Northrup Grumman's data were used rather than AAM's data.

State departments of agriculture

Some weights and measures divisions of state departments of agriculture test gasoline and/or diesel fuel on a regular basis and are able to provide these data electronically. These data are often far more extensive (e.g., hundreds or thousands of samples taken, throughout the entire year and the entire state) than the data available from commercial surveys. Thus, they represent a significant improvement over the commercially available data when available.

For 2002, data were available from three of the CENRAP states (Kansas, Minnesota, and Missouri), and it is likely that Texas will have data for future calendar years. Oklahoma conducts tests but currently does not maintain a database of results.[3] Other CENRAP states do not currently test for fuel parameters relevant to mobile source emissions modeling.

Oxygenated fuel and octane grade data

In several CENRAP states, blending ethanol into fuel is prevalent, even though no regulatory requirements are in effect. The U.S. Department of Energy's Energy Information Administration (EIA) tracks sales volumes of gasoline and oxygenated gasoline by state; however, these data are tracked at the refinery, whereas blending of ethanol is more likely to occur downstream of the refineries at bulk terminals (due to difficulties associated with sending ethanol-blended fuel through pipelines). For states known to blend significant amounts of ethanol, oxygenated fuel associations were contacted to determine the extent of blending.

EIA data were also collected for the purposes of obtaining information about relative sales of regular and premium gasoline. This information was used to estimate the weighted average sulfur content because sulfur contents are significantly higher for regular gasoline than premium gasoline.

Standards and existing assumptions

ASTM standards provide volatility guidelines for every part of the country and every month. ASTM standards, regulations, and assumptions made by state and local agencies/MPOs were collected for the purposes of filling in gaps in fuel sampling data, quality assurance, and consistency with current inventories. However, it should be noted that average values are often below regulatory limits to allow a margin of compliance. In addition, ASTM standards are not regulatory limits, and EPA has found that RVP values can often exceed the ASTM standards (U.S. Environmental Protection Agency, 1992, pp. 25-26).

[3] Oklahoma's Department of Agriculture deferred to the Oklahoma Corporation Commission, which is the lead agency for fuel testing in that state.

4.1.2 Data Processing and Quality Assurance

In general, fuels characteristics were defined for various geographic subregions of the CENRAP region, various fuel types, and for on-road or non-road sources. Fuels characteristics were then organized and prepared for use with MOBILE6 and NONROAD. The discussions below provide the relevant factors that were considered when calculating or preparing the fuels characteristics for diesel fuel and gasoline.

Diesel fuel

As stated previously, sulfur content is the only parameter of interest for diesel fuel. In 2002, transportation-grade diesel fuel was required to have a sulfur content of no more than 500 ppmw = 0.05 wt. %, and for the 2002 NEI, EPA assumed that sulfur content was approximately 500 ppm for all areas of the United States from 1994 through 2002 (E.H. Pechan and Associates, 2004). However, average sulfur content is likely to be lower than the regulatory standard. Furthermore, EPA regulations require sulfur content to be less than 15 ppmw = 0.0015 wt. % by September 1, 2006. Thus, refineries are likely to be lowering the sulfur content of their diesel fuel already. Therefore, available diesel fuel sulfur content information for 2002 was inspected for statistically significant seasonal or regional differences, and for differences between on-road and off-road fuels.

Reformulated Gasoline (RFG)

For areas utilizing RFG (covered areas), little data processing was required because RFG can be modeled explicitly by MOBILE6 with command “FUEL PROGRAM : 2”. The only areas of the CENRAP currently utilizing RFG are listed in **Table 4-2**. When RFG is modeled explicitly, user inputs for sulfur content and RVP are overridden by the program. User-supplied oxygenate levels are also overridden, with the exception of user-specified wintertime oxygen contents greater than 2.1 wt. % (U.S. Environmental Protection Agency, 2003a, 2002d). Therefore, in each covered area, the extents to which wintertime oxygen contents are above this level were examined.

Table 4-2. Listing of CENRAP areas utilizing RFG.

Metropolitan Area	Specific Counties
St. Louis, Missouri	Franklin, Jefferson, St. Charles, St. Louis
Dallas/Fort Worth, Texas	Collin, Dallas, Denton, Tarrant
Houston/Galveston, Texas	Brazoria, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller, Chambers

Source: 40 CFR 80.70.

When the “FUEL PROGRAM : 2” command is used, the user must also specify whether the RFG is being used in a southern or northern area. These are referred to as “VOC-Control Region 1” and “VOC-Control Region 2”, respectively, by federal regulations (40 CFR 80.71); both Missouri and Texas are in VOC-Control Region 1, which corresponds to a MOBILE6 input of “S” (for southern).

Areas not using RFG – spatial variability and local requirements

Historically, regional differences in gasoline were modeled by dividing the country into districts on the bases of pipelines and other distribution channels. Northrop Grumman still organizes its gasoline data by these districts. Although the continued appropriateness of these divisions has not been verified (and does not account for RFG usage, localized regulations in metropolitan areas, and regional ethanol blending), the district divisions were utilized to investigate spatial differences among areas that do not have localized requirements. The five districts for various metropolitan areas within CENRAP are identified in **Table 4-3**.

Table 4-3. Gasoline distribution districts identified by Northrop Grumman.

District	CENRAP Metropolitan Areas
3 (Southeast)	Little Rock, Arkansas New Orleans, Louisiana
5 (North Central)	Minneapolis-St. Paul, Minnesota
7 (Central and Upper Plains)	Kansas City (Kansas/Missouri) Davenport, Iowa Des Moines, Iowa St. Louis, Missouri Omaha, Nebraska
8 (Oklahoma and East Texas)	Tulsa, Oklahoma Dallas-Ft. Worth, Texas Houston, Texas San Antonio, Texas
11 (New Mexico and West Texas)	Amarillo, Texas El Paso, Texas

Localized regulations restrict summertime fuel volatility, and include requirements and restrictions for oxygenate usage; but currently, there are no localized controls on gasoline sulfur content in the CENRAP region.

Sulfur content of gasoline (non-RFG)

MOBILE6 incorporates two elements of gasoline sulfur content data: (1) information about the average sulfur content existing during the calendar year of interest (for purposes of determining SO_2 and PM emissions), and (2) information about the maximum sulfur content ever experienced by vehicles in a given model year (for purposes of determining deterioration of catalysts). Available fuel data can only be utilized to modify sulfur contents for the calendar year of interest, not the lifetime maxima of fuel contents ever experienced. Data for regular and premium gasolines were averaged separately, and weighted average sulfur contents were determined based upon relative sales volumes of different grades of gasoline. Given the limited availability of data, the calculated weighted average sulfur contents were only added to MOBILE6 input files if they differed significantly from the MOBILE6 default values.

Default sulfur content data can be different for "western" areas due to a geographic phase-in of gasoline sulfur regulations. However, this only affects Nebraska (of the CENRAP states) and calendar year 2003 and later. A full listing of MOBILE6 default sulfur contents is shown in **Table 4-4**.

Table 4-4. MOBILE6 default sulfur content data for conventional gasoline (i.e., non-RFG).

Calendar Year	Average Fuel Sulfur Content (ppmw)		Vehicle Model Year	Maximum Fuel Sulfur Content Experienced (ppmw)	
	Eastern Areas[a]	Western Areas[b]		Eastern Areas[a]	Western Areas[b]
2000	300	300	2000[c]	1000	1000
2001	299	299	2001	1000	1000
2002	279	279	2002	1000	1000
2003	259	263	2003	1000	1000
2004	121	160	2004	303	325
2005	92	160	2005	303	325
2006	33	160	2006	87	325
2007	33	60	2007	87	142
2008+	30	30	2008+	80	80

[a] Within CENRAP, this includes all counties except those specifically identified as western areas.
[b] Within CENRAP, this only includes the following counties, all of which are located in western Nebraska: Banner, Box Butte, Cheyenne, Dawes, Deuel, Garden, Keith, Kimball, Morrill, Scotts Bluff, Sheridan, and Sioux (Source: 40 CFR 80.215(a)(2)(i)).
[c] Within MOBILE6, maximum sulfur content does not affect emissions from vehicles of model year 1999 and older.

RVP and oxygenate content of gasoline (non-RFG) – agriculture department data

For RVP and oxygenate, the data obtained from state departments of agriculture were analyzed. For regions where data were available, temporal variations in volatilities over the course of the year were compared with the variations in the corresponding ASTM standards for those regions. Within each state, areas known to have local regulatory requirements were examined separately from areas without such requirements, and gasoline blended with ethanol was examined separately from other gasoline. (Methodology documentation for the 2002 NEI indicates that, aside from areas with local requirements, RVP was assumed to be uniform across each state [E.H. Pechan and Associates, 2004].) The limited data obtained from Northrop Grumman were compared to the agriculture departments' data for purposes of gauging the extent to which the Northrop Grumman data are representative.

EPA and local regulations restrict the maximum RVP of some summertime gasolines. For purposes of quality assurance, summertime RVP data were compared to these requirements. However, it should be noted that EPA and many local governments grant a waiver of 1.0 psi to ethanol blends (i.e., the blends are allowed to have RVP values that are 1.0 psi higher than regulatory limits[4]), and in such cases MOBILE6 assumes that the RVP of the ethanol-blended gasoline is 1.0 psi higher than the RVP specified in the model input file. Available data from

[4] EPA's waiver (40 CFR 80.27(d)) only applies if a sufficient quantity of ethanol is used (9-10% vol.)

state agricultural departments were utilized to investigate the extent to which the RVP of ethanol blends is higher than the RVP of conventional gasoline. If differences were found to be considerably smaller than 1.0 psi, the area was modeled as one without a waiver (even if a waiver exists) to prevent MOBILE6 from increasing the RVP of the ethanol blends.

The extent to which a fuel is characterized as an "ethanol blend" depends on how this term is defined. In some cases, the blend is mandated. For example, the State of Minnesota requires that ethanol be blended into all gasoline sold in the state, year-round, to reach a level of 2.7-3.5 wt. % oxygen in the blend.[5] However, in other areas, a variety of levels of oxygenate are in use, and oxygenate analyses show a variety of oxygenate concentrations, which in some cases contain both alcohols and ethers in the same sample. Because MOBILE6 only models one oxygenate type or the other and assumes a single average oxygenate concentration, frequency plots were generated to determine the extent to which different oxygenate concentrations were present, and analytical data were screened to eliminate low data (e.g., near detection limits). It is worth noting that volatility increases due to ethanol tend to be somewhat independent of concentration above approximately 3%. This is important in areas modeled with RVP waivers, for which MOBILE6 will increase RVP by 1.0 psi for all ethanol blends, regardless of the ethanol concentration.

RVP and oxygenate content of gasoline (non-RFG) – other data

For states in which agriculture department data were not available, RVP estimates were based primarily on data obtained from Northrop Grumman in the summer and winter. These data were interpolated to different months using ASTM standards—similar to the procedure applied for the 2002 NEI (E.H. Pechan and Associates, 2004). Spatial and temporal variations were also compared to publicly available RVP data from the 1999 NEI (which was generated based upon data from Northrop Grumman and AAM). Areas with specific RVP or oxygenate restrictions were modeled to reflect those restrictions, even if no sampling data were available for those areas.

Although gasoline volatilities are highest in the winter, the extent of wintertime data analysis was tempered by two factors: (1) the effects of volatility are lessened at colder temperatures, and (2) MOBILE6 models any RVP higher than 11.7 psi as equal to 11.7 psi (U.S. Environmental Protection Agency, 2003a, 2002d).

General quality assurance

Given the recent court cases involving environmental laboratory fraud (Bureau of National Affairs, 2002a, b), particularly with respect to testing vehicle fuels (McCarthy, 2001; Bureau of National Affairs, 2002c; U.S. Department of Justice, 2002), an effort was made to determine the source of the data collected. Data from fuel testing sources known to have been indicted and/or convicted of laboratory fraud were discarded when appropriate. The methodologies utilized were also examined. For example, it is known that RVP measurements using Grabner equipment are adjusted using a variety of formulas (sometimes season-

[5] The 2.7% minimum oxygen content is identified by Section 239.791 of the Minnesota Statutes, and ethers are specifically excluded from meeting that requirement; Section 239.761 bans the use of ethers (above approximately 0.33%) and limits the maximum ethanol content to 10% vol., which corresponds to approximately 3.5 wt. % oxygen.

dependent), and gas chromatography (GC) results for oxygenates can differ from Fourier-transform infrared (FTIR) results. In addition, the procedures outlined in the project QAPP were followed (Sullivan, 2004).

4.1.3 Data Preparation

Fuels characteristics were prepared as a summary data table listing gasoline volatilities as a function of county and month, and the extent to which oxygenated fuel information and fuel sulfur contents differ from MOBILE6 defaults. The tables, which are included in an appendix to the Final Report, show the appropriate MOBILE6 inputs with respect to the commands shown in **Table 4-5**. These command lines were inserted into the SMOKE input files for the complete set of geographic areas within the CENRAP and time periods within calendar year 2002.

Table 4-5. MOBILE6 input commands relevant to fuel composition.

Command	Meaning	Data
FUEL PROGRAM[a]	Identifies gasoline sulfur content, and whether RFG is being used	1 = eastern default sulfur values, 2 = RFG, 3 = western default sulfur values, 4 = user-supplied sulfur data
DIESEL SULFUR	Diesel sulfur content	Average diesel sulfur content, in ppmw
OXYGENATED FUELS[b]	Extent of oxygenate usage	% of gasoline sold that is blended with alcohols, and that is blended with ethers; average oxygen wt. % in each of those blends
FUEL RVP	Gasoline RVP (prior to ethanol addition, if any)	Average RVP, in psi
SEASON	For RFG, an identifier of which season's requirements are in effect	1 = summertime RFG, 2 = wintertime RFG

[a]Optional command; MOBILE6 default is FUEL PROGRAM = 1.
[b]Optional command; MOBILE6 default is no oxygenate.

4.2 REGULATORY CONTROLS

Regulatory controls that affect engine emissions and are modeled by MOBILE6 and/or NONROAD include the following:

- Anti-Tampering Programs (ATPs)
- Inspection & Maintenance (I/M) Programs
- Stage II Refueling Controls

Stage II refueling emissions are typically excluded from mobile source emission inventories developed using MOBILE6 because they are considered to be stationary area source

emissions. Thus, refueling emissions were excluded from the CENRAP emission inventory of on-road mobile sources, and associated MOBILE6 settings were not prepared. However, the appropriate MOBILE6 commands were prepared as a table and included in an appendix to the Final Report.

4.2.1 Data Acquisition

Environmental regulatory agencies in each of the CENRAP states were contacted for information regarding ATPs, I/M programs, and Stage II controls. These agencies provided the relevant information in the form of MOBILE6 input files.

4.2.2 Data Processing and Quality Assurance

Data processing consisted primarily of quality assurance, based in part on EPA technical guidance. Information provided by regulatory agencies was reviewed for consistency with EPA guidance and for reasonableness, and was investigated further if warranted. For example, I/M program compliance rates are often assumed to be 96% prior to implementation (U.S. Environmental Protection Agency, 2002d) but should be based on operating program data after they have been implemented. In addition, if a customized I/M program effectiveness is identified (using the I/M EFFECTIVENESS command), EPA requires that the state or local agency consult with the EPA first (U.S. Environmental Protection Agency, 2002d). For Stage II vapor recovery systems, a working system is assumed to be 95% effective. However, a 95% in-use effectiveness should not be input into MOBILE6 because this does not reflect rule penetration or rule effectiveness (U.S. Environmental Protection Agency, 1991b). Appropriate values for program compliance rates and in-use effectivenesses were selected and reported in a summary data table included in an appendix to the Final Report. In addition, the procedures outlined in the project QAPP were followed (Sullivan, 2004).

4.2.3 Data Preparation

Regulatory controls were prepared as a summary data table listing the counties that have ATPs, I/M programs, and/or Stage II vapor recovery, and as an electronic file with the associated MOBILE6 command lines. The tables, which are included in an appendix to the Final Report, show the appropriate MOBILE6 inputs with respect to the commands shown in **Table 4-6**. Command lines were inserted into the SMOKE input files for the geographic areas within the entire CENRAP region. (Note that the I/M commands are provided in external files that will be referenced by MOBILE6 through the "I/M DESC FILE" command.)

Table 4-6. MOBILE6 input commands relevant to non-fuel-related regulatory programs. (Command lines are needed only if programs are in place; some input files may require information for multiple ATPs and I/M programs.)

Command	Data
ANTI-TAMP PROG	Calendar years applied, vehicle model years affected, vehicle types affected, inspection frequency, compliance rate, types of components inspected
I/M PROGRAM I/M MODEL YEARS I/M VEHICLES I/M STRINGENCY[a] I/M COMPLIANCE[b] I/M WAIVER RATES[b] I/M CUTPOINTS[c] I/M EXEMPTION AGE[d] I/M GRACE PERIOD[d] NO I/M TTC CREDITS[e] I/M EFFECTIVENESS[f]	Calendar years applied, test frequency, program type, inspection test type, model years affected, vehicle types affected, failure rate, percentage of vehicles that get inspected and either comply or are waived, extent to which inspected vehicles are waived rather than being modified to comply, exempted vehicle ages, number of years that new vehicles are exempted, extent of technician training, customized program effectiveness values (pollutant-specific)
STAGE II REFUELING	Calendar year that Stage II program begins to be phased in, number of years of phase-in, in-use efficiency for light-duty vehicles, in-use efficiency for heavy-duty vehicles

[a] This command is only used for (and required for) exhaust I/M programs.
[b] This command is required for exhaust I/M programs and highly recommended for evaporative I/M programs.
[c] This command is only used (and is required) if I/M PROGRAM is IM240.
[d] This command is optional for exhaust I/M programs and highly recommended for evaporative I/M programs.
[e] This command is optional for exhaust I/M programs and is not used for evaporative I/M programs.
[f] This command is optional.

5. ADDITIONAL PARAMETERS FOR ON-ROAD MOBILE SOURCES

Additional optional inputs to MOBILE6 were prepared when readily available. These parameters are of lesser significance than VMT, fleet characteristics, fuels characteristics, or regulatory controls. However, they do have some effects and should be prepared when resources permit. In addition, consistency between the states' and the CENRAP's MOBILE6 inputs is desirable.

Examples included customized annual mileage accumulation rates, relative humidities, and/or natural gas vehicle (NGV) fractions that were provided by environmental regulatory agencies within the CENRAP region in response to other data requests. These data generally were provided in the form of MOBILE5 or MOBILE6 input files. Other inputs were relatively easy to determine. Altitude, which has been identified as having an "intermediate" (5-20%) effect upon VOC and NO_x emissions by EPA (Giannelli et al., 2002, p. iii), is easily determined from regulatory guidance and readily available geographic information systems (GIS) tools.

5.1 DATA ACQUISITION

MOBILE input files were requested from environmental regulatory agencies and/or MPOs in each of the CENRAP states, and optional input commands were reviewed and used if appropriate. Topographical GIS databases were used to determine altitudes.

5.2 DATA PROCESSING AND QUALITY ASSURANCE

Relatively little data processing was necessary, because data were in MOBILE5 or MOBILE6 format. However, consistency with applicable EPA guidance was checked.

In the case of altitude, MOBILE6 only allows the selection of "high" or "low" altitude. ("Low" is the default setting.) High altitude model outputs are based on conditions representative of approximately 5,500 feet above mean sea level (msl), and low altitude model outputs are based on conditions representative of approximately 500 feet msl (U.S. Environmental Protection Agency, 2003a, 2002d). EPA refers users to 40 CFR 86.091-30(a)(5)(ii) and (iv) for guidance. However, Section (a)(5)(ii) lists no CENRAP areas as "designated high-altitude locations" and Section (a)(5)(iv) names four counties in Nebraska (Banner, Cheyenne, Kimball, and Sioux) as specifically not "designated low-altitude locations." STI utilized GIS tools to determine that substantial portions of these counties are above 4,000 feet msl (see **Figure 5-1**) and that, therefore, they should be modeled as "high" altitude.

5.3 DATA PREPARATION

A summary data table listing the additional MOBILE6 input commands was included with an appendix to the Final Report. Command lines were inserted into the MOBILE6/SMOKE input files.

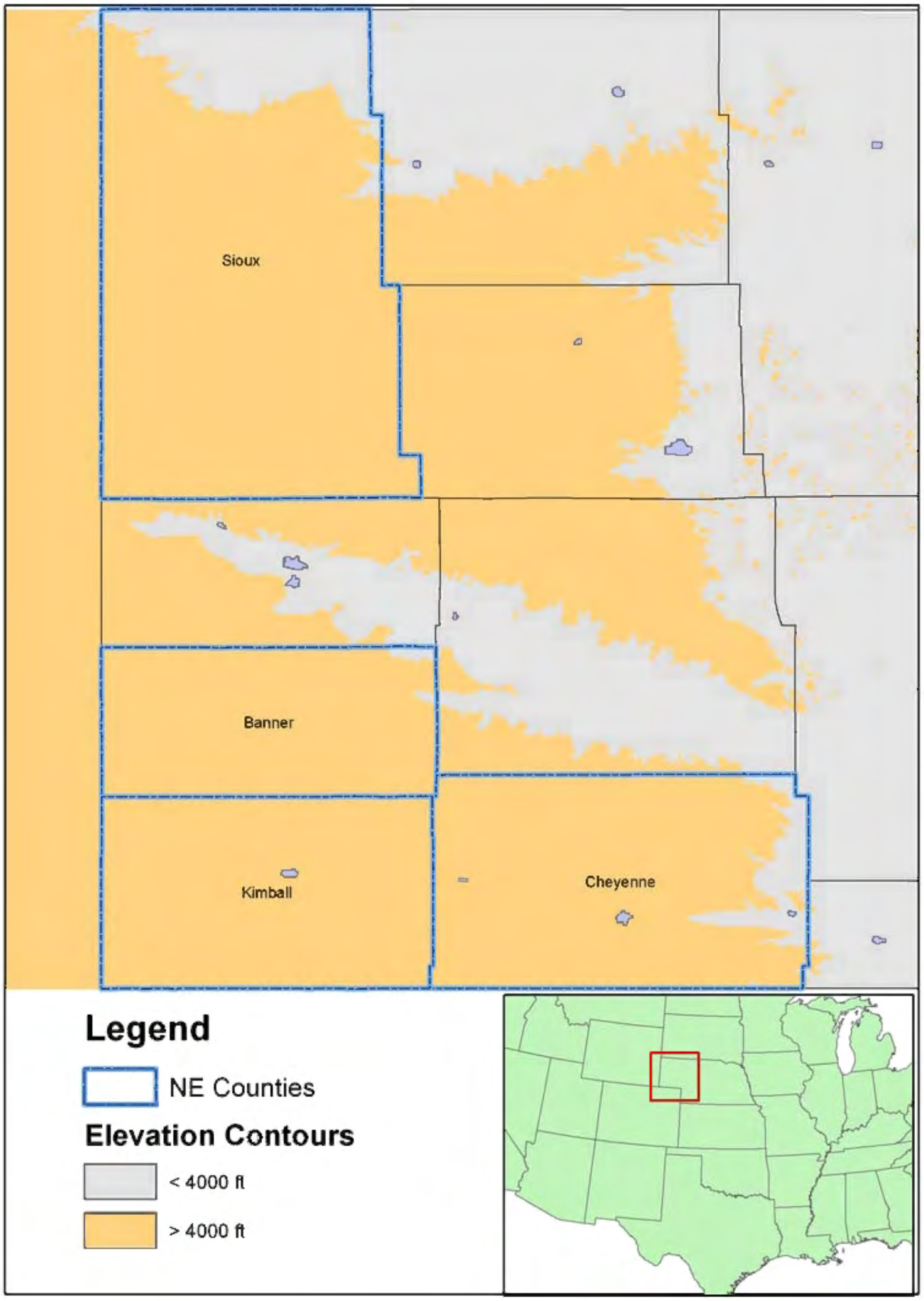

Figure 5-1. Extent to which western Nebraska counties are “high altitude” (above 4000 ft msl).

6. METHODS TO ESTIMATE EMISSIONS FOR NON-ROAD MOBILE SOURCES

Non-road mobile sources include equipment and vehicles that have internal combustion engines and are used off-road. Examples include ships, locomotives, aircraft, industrial equipment, recreational boats, and many others. This section describes information sources and methods used to prioritize efforts, gather activity data, and estimate emissions for non-road mobile sources.

6.1 PRIORITIZATION

STI reviewed the EPA's 1999 NEI (U.S. Environmental Protection Agency, 1999c) to assess the likely importance of various non-road sources to visibility in Class I areas. **Table 6-1** shows the top five non-road emitters of primary particulates and particulate precursors for counties in the CENRAP region containing or adjoining a Class I area. This review illustrated the likelihood that commercial marine vessels and railroad equipment impact visibility in the CENRAP's Class I areas more than most other non-road mobile sources. However, it also indicated that pleasure craft (recreational boats) are a much more significant source of particulates and particulate precursors than other types of recreational vehicles. It also demonstrated the importance of agricultural equipment, especially in Oklahoma and Missouri. Based on this analysis, an assessment of available resources, and consultation with the CENRAP's Emission Inventory Work Group, a decision was made to give bottom-up treatment to commercial marine vessels, locomotives, and recreational boats. These categories represent at least two-thirds of the non-road primary and precursor emissions in counties containing or adjacent to Class I areas in the CENRAP region.

Table 6-1. 1999 non-road emissions (tons/year) by state and source category for counties in the CENRAP region containing or adjoining a Class I area (U.S. Environmental Protection Agency, 2004b).

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Poll.	Source Category	AR	LA	MN	MO	OK	TX	Total
$PM_{2.5}$	Pleasure Craft	52.3	403.5	700.3	150.4	31.1	3.2	1,340.8
	Commercial Marine Vessels	0.0	151.6	771.6	151.3	0.0	0.0	1,074.5
	Agricultural Equipment	71.4	1.0	27.3	404.5	280.2	8.8	793.2
	Construction & Mining Eq.	49.3	45.0	56.5	73.1	58.1	16.6	298.6
	Railroad Equipment	24.4	0.5	5.1	57.2	9.3	127.2	223.7
	Other Sources	52.2	9.0	144.9	56.0	32.0	2.9	297.0
	Total – All Sources	249.6	610.6	1,705.7	892.5	410.7	158.7	4,027.8
VOC	Pleasure Craft	1,197.9	9,434.0	15,418.6	3,338.8	707.9	74.7	30,171.9
	Recreational Equipment	1,102.7	250.7	5,448.3	1,603.8	154.5	94.4	8,654.4
	Lawn & Garden Equipment	319.8	91.5	463.5	660.3	341.9	48.1	1,925.1
	Agricultural Equipment	89.9	1.2	34.4	507.5	352.3	11.1	996.4
	Commercial Marine Vessels	0.0	114.5	615.9	114.2	0.0	0.0	844.6
	Other Sources	440.0	161.8	405.4	592.9	309.9	264.7	2,174.7
	Total – All Sources	3,150.3	10,053.7	22,386.1	6,817.5	1,866.5	493.0	44,767.1

Table 6-1. 1999 non-road emissions (tons/year) by state and source category for counties in the CENRAP region containing or adjoining a Class I area (U.S. Environmental Protection Agency, 2004b).

NO_x	Commercial Marine Vessels	0.0	3,665.1	19,700.1	3,657.6	0.0	0.0	27,022.8
	Railroad Equipment	1,074.9	14.0	212.5	2,533.2	399.1	5,694.0	9,927.7
	Agricultural Equipment	557.7	7.5	213.8	3,160.6	2,188.3	69.1	6,197.0
	Construction & Mining Eq.	531.5	483.4	607.9	786.6	625.1	179.0	3,213.5
	Pleasure Craft	79.4	634.9	1,119.2	229.0	47.6	4.0	2,114.1
	Other Sources	885.5	135.5	610.9	850.9	341.6	25.4	2,849.8
	Total – All Sources	3,129.0	4,940.4	22,464.4	11,217.9	3,601.7	5,971.5	51,324.9
SO_2	Commercial Marine Vessels	0.0	714.6	2,978.5	713.1	0.0	0.0	4,406.2
	Agricultural Equipment	62.5	0.8	23.9	353.8	245.4	7.7	694.1
	Construction & Mining Eq.	71.1	64.9	80.7	104.5	83.8	24.0	429.0
	Railroad Equipment	32.1	0.5	6.5	75.2	12.1	168.6	295.0
	Pleasure Craft	7.5	61.0	103.1	21.7	4.5	0.4	198.2
	Other Sources	66.9	10.5	70.5	59.8	25.7	2.7	236.1
	Total – All Sources	240.1	852.3	3,263.2	1,328.1	371.5	203.4	6,258.6

6.2 RECREATIONAL BOATS

6.2.1 Emissions Modeling with NONROAD

Emissions from recreational boats were modeled with the latest version of the EPA's NONROAD model. NONROAD categorizes equipment types by SCC code, and the codes pertaining to recreational boats are listed in **Table 6-2**.

Table 6-2. NONROAD source categories related to recreational boats.

SCC code[a]	Equipment Description
22-82-yyy-005	Pleasure Craft: Inboard Engine
22-82-yyy-010	Pleasure Craft: Outboard Engine
22-82-yyy-015	Pleasure Craft: Personal Watercraft
22-82-yyy-025	Pleasure Craft: Sailboat Auxiliary Engine

[a] In each code, the letters "yyy" refer to fuel type: 2-stroke gasoline (005), 4-stroke gasoline (010), or diesel (020).

For each of these source categories, the NONROAD model provides exhaust emission factors in units of grams of emissions per horsepower-hour (g/hp-hr) that are a function of engine types and sizes. Activity data include size-dependent engine populations, the load on the engines (hp) while they are in use, and the number of hours that the engines are in use per year. (These data are in turn utilized to calculate fuel consumption, which is needed for the calculation of

evaporative emissions.) Sources of these model inputs are primarily activity data collected by Power Systems Research, Inc. (PSR) and methodological information from a previous EPA non-road engine and vehicle study (U.S. Environmental Protection Agency, 1991a).

NONROAD includes the following default databases of recreational boating activity. Each may be updated with bottom-up or region-specific activity data, if available.

- NONROAD's default engine populations are based on 1998 PSR national surveys of engine manufacturer sales. The national population estimate was disaggregated to the state level by using a fuel consumption distribution developed by the Oak Ridge National Laboratory (ORNL). State-level populations were further disaggregated to the county level by using the total water surface area contained in each county (U.S. Environmental Protection Agency, 2002a).
- Default temporal profiles are based on two sources of information. Monthly allocation factors are derived from a boat usage survey done for the National Marine Manufacturers Association (NMMA) (U.S. Environmental Protection Agency, 2002c). Weekday-weekend allocation factors were derived from a survey of recreational marine use conducted in California during 1993 and 1994. These weekday-weekend factors are specific to equipment type only and do not vary geographically (U.S. Environmental Protection Agency, 1999b).
- Annual equipment usages (hours of use) are based on a 1998 PSR equipment activity database. The application-specific estimates in this database were based on several yearly surveys of equipment owners conducted by PSR (U.S. Environmental Protection Agency, 2002b).
- Default engine load factors were based on a simplifying assumption that the EPA's recreational marine engine test cycle is representative of load factors for engines in use. Although PSR survey results for load factors exist, they are not represented in the NONROAD model because the EPA considered them to be insufficiently documented (U.S. Environmental Protection Agency, 2002b).

Because NONROAD relies primarily on national-level activity data, some regional and/or local equipment population and usage characteristics are likely not properly represented in the model. Moreover, the use of water surface area as a geographic allocation surrogate does not account for the navigability of a given body of water or its popularity. Improving the various types of activity data utilized by NONROAD required gathering additional information about the ownership and use of recreational boats within the CENRAP region.

6.2.2 Acquisition of Activity Data

The activity data needed to update the NONROAD inputs for recreational boats were gathered through a bottom-up survey of representative groups of recreational boat owners. The survey was designed to gather data on vessel characteristics, hours of use, fuel consumptions, engine loads, and temporal and geographic usage patterns in each CENRAP state. A representative pool of nearly 1,400 registered boat owners was recruited by telephone to participate in the study. A survey questionnaire and an incentive for participation was mailed to

each participant, followed one week later by a reminder postcard. For the purposes of study design, a 50% return rate was anticipated for the mail survey; however, a significantly better response rate—more than 70%—was actually achieved. Geographic coverage and representativeness of the survey results were considered to be excellent for all states of the CENRAP region. Survey results were analyzed and used to estimate annual hours of use and engine load factors for each state and each type of boat. Survey questionnaires, results, and raw data files are included as an appendix to the Final Report.

6.2.3 Spatial Allocation

In order to spatially allocate emissions, the counties where recreational boats are used should be determined (i.e., the county where the boat is registered is not a good spatial surrogate). The survey questionnaire included one or more maps detailing the navigable waterways in the respondents' region, which allowed respondents to easily identify the counties in which they typically operate their boats. (Participants indicated their regions during telephone recruitment.) These responses were converted and used to calculate county-level activity for recreational boats.

6.2.4 Temporal Allocation

The survey questionnaire also queried how recreational boat activity is distributed across the months of the year, the days of the week, and the hours of the day. Large variances in climate and boating habits throughout the CENRAP region meant that these temporal patterns were likely to vary greatly from state to state. Responses to these questions were analyzed and used to calculate seasonal, day-of-week, and diurnal temporal profiles for each state and type of boat.

6.2.5 Data Preparation

Deliverables for this source category included the updated input files used to run the NONROAD model, as well as county-level emission estimates derived from outputs of the latest version of NONROAD (NONROAD 2004). These emission estimates were provided in both NIF 3.0 format and the IDA format used by the SMOKE emissions model. The temporal allocation profiles and cross-reference files used by SMOKE were also provided.

6.3 MARINE VESSELS

Emissions estimates were prepared for commercial marine vessels operating in commercially active waterways in the CENRAP region. This inventory included river barges and other commercial vessels operating in inland waterways, as well as ocean-going ships, harbor tugboats, and other commercial vessels operating in the Gulf Intracoastal Waterway (GIWW). These waterways can be seen in **Figure 6-1** (U.S. Army Corps of Engineers, 1997).

Figure 6-1. Map of commercially active inland and intracoastal waterways in the United States.

6.3.1 Emission Factors

In 1999, the EPA released a Regulatory Impact Analysis (RIA) on commercial marine vessel emissions (U.S. Environmental Protection Agency, 1999e). This report estimated emissions for the three categories of marine engines shown in **Table 6-3**:

Table 6-3. EPA marine engine categories.

Category	Displacement per Cylinder	Description
1	disp. < 5 liters power ≥ 37 kW	Similar to land-based non-road engines. Used in smaller tugboats, ferries, fishing vessels, and dredges. Fueled by marine diesel oil.
2	5 ≤ disp. < 30 liters	Similar to engines used in locomotives. Used in smaller ocean-going vessels, as well as large tugboats, towboats, ferries, and fishing vessels. Fueled by marine diesel oil.
3	disp. ≥ 30 liters	Used primarily for propulsion in large, ocean-going vessels. Usually fueled by residual oil, which has a higher sulfur content than diesel oil.

In addition to the uses cited in Table 6-3, all three categories of engines can be used for "auxiliary" purposes (such as electrical generation) on larger vessels, though Category 2 engines are used in this way more often than the other types. The EPA RIA estimated emission factors for Category 1 marine engines and cited emission factors for Category 2 and 3 marine engines from a previous EPA report (U.S. Environmental Protection Agency, 1998c). **Tables 6-4 and 6-5** show the emission factors for marine engines in each category.

Table 6-4. Emission factors for Category 1 marine engines.

Power Range (kW)	HC (g/kW-hr)	NO_x (g/kW-hr)	CO (g/kW-hr)	PM (g/kW-hr)
37 – 75	0.27	11	2.0	0.9
75 – 130	0.27	10	1.7	0.4
130 – 225	0.27	10	1.5	0.4
225 – 450	0.27	10	1.5	0.3
450 – 560	0.27	10	1.5	0.3
560 – 1000	0.27	10	1.5	0.3
1000+	0.27	13	2.5	0.3

Table 6-5. Emission factors for Category 2 and 3 marine engines.

Engine Speed[1]	HC (g/kW-hr)[2]	NO_x (g/kW-hr)	CO (g/kW-hr)	PM (g/kW-hr)
Medium[2]	0.5	12	1.6	0.25
Slow[2]	0.5	17	1.4	1.48

[1] Category 2 and smaller Category 3 engines are medium speed (2-stroke). Larger Category 3 engines are slow speed (4-stroke).
[2] Emission factors converted from kilograms per ton of fuel consumed to gram per kilowatt-hour using fuel consumption estimates of 195 g/kW-hr for slow speed engines and 210 g/kW-hr for medium speed engines (Pollack et al., 2004).

Emission factors for SO_2 were calculated using Equation 6-1, an algorithm that is based on fuel sulfur content (U.S. Environmental Protection Agency, 2000). **Table 6-6** lists the assumed fuel sulfur content (U.S. Environmental Protection Agency, 2003b) for marine diesel oil and residual oil, as well as the SO_2 emission factors calculated for each engine type.

Emission rate (g/kW-hr) =
2.3735* [Fuel Consumption (in g/kW-hr) * Fractional Fuel Sulfur content] **(6-1)**

Table 6-6. SO_2 emission factors for marine engines.

Engine Type	Fuel Sulfur Content	SO^2 (g/kW-hr)
Category 1		
<1000 hp	0.25%	1.29
>1000 hp	0.25%	1.25
Category 2 and 3		
Medium speed	0.25%/2.70%[a]	1.25/13.46[a]
Slow speed	2.70%	12.5

[a] The first value is for marine diesel oil, which is used in Category 2 engines, and the second value is for residual oil, which is used in Category 3 engines.

These emission factors can also be converted to fuel-based factors by dividing them by the fuel consumption rate for a given engine type. For example, the SO_2 emission factor for slow-speed Category 3 engines can be converted to a fuel basis as follows:

Fuel-based emission rate = (12.5 g/kW-hr / 195 g/kW-hr) * 1000 g/kg = 64.1 g/kg of fuel **(6-2)**

6.3.2 Acquisition of Activity Data

Emissions estimates were based primarily on bottom-up fuel usage data for inland river systems in the CENRAP region derived from the Tennessee Valley Authority (TVA) Barge Costing Model. This model was developed to estimate fuel usage by inland river segment for fuel tax purposes.[6] Inputs to the model include engine horsepower and trip characteristics for each vessel that travels on a given waterway segment in a given year. These data are used to estimate fuel consumption for each significant inland waterway segment in the United States.[7] The model uses these data to estimate total fuel consumption, total cargo transported, and average vessel horsepower by waterway segment. Each year, fuel consumption estimates are compared to actual tax receipts, and model errors have averaged only 1.5% per year since 1996.

For the GIWW, however, the TVA model does not provide a complete picture of fuel consumption, as “deep-draft” (oceangoing), harbor tugs, and other vessels not bound for an inland river system are not considered. For these vessels, emission estimates were prepared with work-based emission factors and the following types of activity data (U.S. Environmental Protection Agency, 1999a):

- The number of total trips to and from each port
- The total number of trips passing (but not stopping at) each port

[6] Some “segments” consist of an entire river, such as the Atchafalaya River in Louisiana. Longer rivers, such as the Mississippi, are broken up into multiple segments.
[7] The small rivers and tributaries not considered by the model account for only 1-3% of the total tonnage moved over inland waterways each year (Dager, 2004).

- Vessel characteristics for tugboats and transport ships operating in and through each port
- Speed and time-in-mode data for four operational modes: cruise, slow cruise, maneuvering, and hoteling (or docking)
- Engine load factors for each of the four operational modes listed above

Much of the necessary data on vessel trips can be obtained from the U.S. Army Corps of Engineers (USACE) Waterborne Commerce Statistics Center, which tracks vessel movements and characteristics, as well as barge trips and tonnage. The Maritime Administration of the Department of Transportation also maintains a U.S. waterway database that includes vessel names and ports/waterways visited.

Vessel characteristics, speeds, times-in-mode, and engine load data have been modeled for deep sea, river, and Great Lake ports in the United States in a two-volume report produced by ARCADIS on behalf of the EPA (U.S. Environmental Protection Agency, 1999a, d). These documents provide a detailed analysis of selected ports, as well as a method for extrapolating activity data from these "known" ports to other ports with similar characteristics. Several of the ports chosen for detailed analysis are located within the CENRAP region, including St. Louis, Baton Rouge, New Orleans, Plaquemines, South Louisiana, and Corpus Christi. The techniques described in these reports were used to produce a profile of vessel characteristics and operations for all ports in the CENRAP states. Also, some bottom-up surveys of selected port authorities and/or vessel operators were done to verify the assumptions made in creating these profiles.

6.3.3 Spatial Allocation

Emissions occurring in and around a deep sea or Great Lake port area were assigned to the county in which the port is located. If a port spanned multiple counties, the number of port terminals in each county was used to allocate maneuvering and hoteling emissions, and the length of the port area in each county was used to allocate emissions from cruise mode. Data on port terminals and their waterway locations are available from the USACE (2003a).

However, for inland river systems, fuel consumption must first be disaggregated into "in-port" and "underway" components. To accomplish this, fuel consumption at river ports in the CENRAP states was estimated with fuel-based emission factors described in Section 6.3.1 and port-specific data on vessel trips; and characteristics (as outlined in Section 6.3.2) were obtained from USACE data, EPA guidance documents, and surveys of port authorities. Once in-port fuel consumption was estimated, the values were subtracted from Barge Costing Model fuel consumption estimates for the river segment in question. The remaining fuel consumption was considered "underway" and allocated to counties based on the fraction of a river segment's length passing through each county. These county-level river segment fractions were derived from the GIS-based National Waterway Network database produced by the Bureau of Transportation Statistics (BTS).

6.3.4 Temporal Allocation

Monthly variations in vessel activity and fuel usage are significant (Dager, 2004). These seasonal variations are influenced by climate (the upper Mississippi is closed during winter) and by the types of commodity being moved (grain shipments, for example, primarily occur in April/May and September/October).

Fuel usage estimates produced by the Barge Costing Model are not currently available on a monthly basis. Therefore, monthly activity patterns were determined from the Lock Performance Monitoring System (LPMS) maintained by the USACE. This database provides USACE operators, planners, and managers with information on the use, performance, and characteristics of the USACE's national system of locks. The LPMS consists of data collected at most USACE-owned and/or -operated locks, including the number of vessels and barges locked, dates of lockages, and the type and tonnage of commodity carried (U.S. Army Corps of Engineers, 2003b). Statistics are published monthly for selected key locks, and these monthly data were used to generate a monthly activity profile for each inland river system, as well as the GIWW.

6.3.5 Data Preparation

Deliverables for this source category include the county-level emission estimates in both NIF 3.0 format and the IDA format used by the SMOKE emissions model. The temporal allocation profiles and cross-reference files used by SMOKE were also provided.

6.4 LOCOMOTIVES

Railroads can be separated into three class sizes. Class I railroads operate over a large geographic area, serve many states, and maintain fleets of locomotives that number from several hundred to several thousand. These railroads, while few in number, are responsible for about 93% of the annual fuel consumption of all railroads nationwide (U.S. Environmental Protection Agency, 1998d). Class II (or regional) railroads serve only a few states and typically operate about 30 to 200 locomotives. Class III (or local) railroads usually serve only one state and operate only a handful of locomotives. Locomotives in each of these classifications can be used for two types of operation: line haul and yard (or switching) activities. Line haul locomotives generally travel long distances, whereas yard locomotives only move railcars within a local railway yard. Some local railroads do not operate any line haul locomotives, but only provide switching services to other railroads. These "Switching and Terminal" railroads were treated as a fourth classification for emission estimation purposes.

Table 6-7 shows the total number of railroads operating in the entire CENRAP region by class (Association of American Railroads, 2004). Using the emission factors and activity data described in the following sections, emissions were estimated for all line haul and yard locomotives operated by one of these railroads.

Table 6-7. Railroads operating in the CENRAP region by class.

Railroad Class	Number of Railroads	Railroad Names
Class I	8	Amtrak Burlington Northern & Sante Fe Kansas City Southern Union Pacific Norfolk Southern CSX Transportation Canadian National Canadian Pacific/Soo Line
Class II	14	Chicago, Central & Pacific Dakota, Minnesota & Eastern Duluth, Missabe & Iron Range I & M Rail Link Iowa Interstate Kansas City & Oklahoma Kyle Missouri & Northern Arkansas Nebraska, Kansas & Colorado Northern Plains Red River Valley & Western South Kansas & Oklahoma Texas Mexican Texas Pacifico
Class III	80	Numerous
Switching & Terminal	33	Numerous

6.4.1 Emission Factors

Emissions from locomotives are calculated based on fuel consumption. The EPA has estimated average emissions rates for locomotives as grams of pollutant emitted per gallon of fuel consumed (g/gal) (U.S. Environmental Protection Agency, 1997). These emission factors vary by the age of the locomotive, as three separate sets of emissions standards have been adopted by the EPA (see **Table 6-8**).

Table 6-8. Locomotive emission factors by model year.

Locomotive Type	Model Year	Controls	Emission factors (g/gal)			
			HC	CO	NO^x	PM
Line haul	<1973	Uncontrolled	10	26.6	270	6.7
	1973-2001	Tier 0	10	26.6	178	6.7
	2002-2004	Tier 1	9.8	26.6	139	6.7
	>2004	Tier 2	5.4	26.6	103	3.6
Switch	<1973	Uncontrolled	21	38.1	362	9.2
	1973-2001	Tier 0	21	38.1	262	9.2
	2002-2004	Tier 1	21	38.1	202	9.2
	>2004	Tier 2	11	38.1	152	4.3

For Class I railroads, weighted emission factors were calculated based on locomotive fleet age distribution data available from the Bureau of Transportation Statistics (Bureau of Transportation Statistics, 2003a). The latest BTS locomotive fleet information indicates that 14% of Class I locomotives were built prior to 1973 and 86% were built from 1973 to 2001 (and are, therefore, subject to Tier 1 controls). At the time of data acquisition, no information was available on the number of locomotives built in 2002 that have entered the fleet; so for purposes of the 2002 inventory, it was assumed that the impact of Tier 1 controls is negligible. The weighted emission factors shown in **Table 6-9** were calculated based on the BTS fractions listed above.[8]

Table 6-9. Weighted emission factors for Class I locomotives.

Locomotive Type	Emission factors (g/gal)			
	HC	CO	NO_x	PM
Line haul	10	26.6	191	6.7
Switch	21	38.1	273	9.2

For Class II, Class III, and switching railroads, no specific information on fleet age distributions is readily available, and since these railroads use only about 5% of the fuel consumed by all railroads nationwide (U.S. Environmental Protection Agency, 1998d), a simple, conservative approach was applied. Because it is known that these smaller railroads tend to have an older fleet mix than Class I railroads (U.S. Environmental Protection Agency, 1992), uncontrolled emission factors were applied to all Class I, Class II, and switching railroads.

[8] For purposes of this calculation, it was assumed that fuel usage per locomotive does not vary with age, either due to fuel economy changes or the reduced usage of older locomotives.

6.4.2 Acquisition of Activity Data

Class I Railroads

Class I line haul locomotives, which operate over large geographic regions, do not burn all their fuel in the same area where the fuel was pumped. Therefore, total annual fuel consumption for each Class I railroad must be estimated at the state (or county) level in order to determine the amount of fuel consumed within the inventory area. Such estimates were made by calculating a system-wide fuel consumption index (expressed in gross ton-miles[9] per gallon or GTM/gal) for each railroad and applying that index to state-level traffic density data (U.S. Environmental Protection Agency, 1992). As a quality assurance check, Class I railroads were contacted individually to see if they track state or county-level fuel consumption data that could be compared to the estimated values.

The data needed to calculate a fuel consumption index can be obtained from the "R-1" reports all Class I railroads are required to file with the Surface Transportation Board (STB) each year. Schedule 755 of this report lists the annual traffic density in gross ton-miles for a given railroad, and Schedule 750 lists the total fuel consumption for line haul operations and switching operations. Copies of these schedules for all Class I railroads were obtained from the STB, and **Table 6-10** lists the 2002 traffic density and fuel consumption data for each Class I railroad operating in the CENRAP region.

Table 6-10. 2002 system-wide activity data for Class I railroads.

Railroad Name	Traffic Density (1000 ton-miles)	Fuel Consumption (gal)	
		Line Haul	Switching
Amtrak[a]	N/A	75,000,000	N/A
Burlington Northern and Sante Fe	958,862,994	1,091,248,247	57,434,118
Kansas City Southern	37,563,933	51,256,604	4,057,180
Union Pacific	1,085,700,525	1,176,963,998	137,902,327
Norfolk Southern	373,281,203	433,678,710	38,810,939
CSX Transportation	469,392,729	514,107,567	56,172,596
Canadian National	104,578,305	108,013,647	15,135,382
Canadian Pacific/Soo Line	45,426,616	42,198,000	3,060,000

[a] Amtrak does not file reports with the STB, so fuel consumption data for that railroad was obtained from the BTS (2003b).

Using these data, a fuel consumption index for each railroad was calculated by dividing the system-wide traffic density by the system-wide fuel usage. For example, the fuel consumption index for the Burlington Northern & Sante Fe (BNSF) railroad was calculated as follows:

$$FCI_{BNSF} = 958{,}862{,}994 \times 10^3 \text{ ton-miles} / 1{,}091{,}248{,}247 \text{ gal} = 878.7 \text{ ton-miles/gal} \qquad \textbf{(6-3)}$$

[9] Gross ton-miles include the weight of locomotives, freight cars, etc. rather than the weight of freight only.

State-level traffic density data were obtained from the Federal Railroad Administration (FRA), as Class I railroads are only required to report their traffic density to the STB on an aggregate (or national) basis. The FRA has a rail network model which is used to estimate traffic flows on specific rail lines, and the agency provided state-level traffic density data for all Class I railroads (Kedar, 2004). These data can be used in conjunction with the fuel consumption index calculations described above to estimate fuel usage by state for each Class I railroad. For example, FRA data show that the 2002 gross traffic density for the BNSF Railroad in Arkansas was 8090.66 million ton-miles. Fuel usage for this railroad in Arkansas can then be calculated as follows:

$$\text{Fuel Consumption} = 8090.66 \times 10^{6} \text{ ton-miles} / 878.7 \text{ ton-miles/gal} = 9{,}207{,}696 \text{ gal} \qquad \textbf{(6-4)}$$

Class I switching emissions were also calculated based on fuel usage data gathered from Class I railroads or taken from R-1 reports. These data were disaggregated to the state level using procedures similar to those outlined above, with a fuel consumption index generated for each railroad by dividing the railroad's system-wide traffic density by the system-wide fuel usage for switching operations.

Class II and Class III Railroads

Emissions from Class II and III locomotives were calculated based on the amount of fuel consumed in the inventory area. However, these smaller railroad companies are not required to file R-1 reports with the STB, so the only source of fuel consumption information is the railroads themselves. Because there are only 14 Class II (regional) railroads operating in the CENRAP states, each one was surveyed to determine fuel usage by state. In cases where Class II railroads are unable or unwilling to provide data, an average fuel consumption index was calculated for railroads that did supply information and extrapolated to railroads with missing data. This fuel consumption index was based on the total miles of track operated by a railroad and the total carloads of freight transported each year—information gathered through annual surveys conducted by the Association of American Railroads (AAR).

A similar approach was used for Class III railroads. Surveying each of the 80 local railroads in the CENRAP states individually was not feasible within the scope of this project, so a sample of such railroads was contacted in each state. Again, a fuel consumption index was calculated from available data and used to estimate fuel usage for railroads that were not surveyed.

Switching and Terminal Railroads

For yard (or switching) locomotives, the EPA recommends an emission estimation method based on the number of yard locomotives operating within an inventory area. The EPA estimates that the average yard locomotive operates 24 hours per day, 365 days per year, and consumes 228 gallons of diesel fuel per day (U.S. Environmental Protection Agency, 1992). Yard locomotive emissions can be derived by multiplying the number of yard locomotives within the inventory area by this fuel usage factor and applying the switch locomotive emission factors previously cited. However, these assumptions indicate that the typical yard locomotive consumes over 80,000 gallons of fuel per year, and, while this figure may be appropriate for

busy Class I yard locomotives, it is almost certainly too high for local switching operations.[10] Therefore, fuel usage for switching railroads was calculated in a manner similar to that carried out for other Class III railroads. A sample of switching railroads was contacted to obtain annual fuel usage data, and a fuel consumption index was derived and applied to other railroads. This fuel consumption index was based on the number of yard locomotives and total miles of track operated, as well as the number of carloads of freight handled each year—information available from the AAR.

6.4.3 Spatial Allocation

For Class I railroads, emissions were apportioned to the county level by using the GIS-based National Rail Network produced by BTS. This network contains traffic density data[11] by railway segment and railroad classification, and the network can be overlaid with county boundaries to estimate the fraction of a given state's Class I rail traffic that passes through each county in that state. These fractions were used to disaggregate emissions from the state to the county level. Similarly, state-level emissions from switching operations were assigned to individual counties based on the number of railroad terminals[12] in a given county.

For Class II and III railroads, emission factors for line haul locomotives[13] were applied to statewide fuel usage estimates for Class II and III railroads, and emissions were apportioned to the county level using the Class II and III traffic density data contained in the National Rail Network. For Class III switching operations, emission factors for switching locomotives were applied to fuel usage estimates, and the emissions were apportioned to the county in which each railroad's yard is located.

6.4.4 Temporal Allocation

Movements of freight by rail occur 24 hours per day, 7 days per week, though there are slight variations across the months of the year (Kedar, 2004). The AAR produces an annual report that summarizes weekly carloads of freight shipped in the United States, and these weekly data were used to model monthly variations in locomotive activity (American Association of Railroads, 2003).

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[10] Preliminary data collected for Iowa show that two local switching railroads consume less than 10,000 gallons of diesel fuel per year each.

[11] Each rail segment is assigned to one of seven density groupings (for example, Group 2 represents densities ranging from 5.0 to 9.9 million GTM/mile). The average of each range will be used when apportioning traffic density to the county level.

[12] The BTS National Rail Network contains data on the locations of railroad terminals and junctions in each state.

[13] Class II and III railroads are not as likely as Class I railroads to operate their own switching engines or to track fuel by locomotive type. This assumption was also made by the EPA in a regulatory support document (U.S. Environmental Protection Agency, 1998d).

6.4.5 Quality Assurance

For Class I railroads, fuel consumption estimates by state from the FRA rail network model were cross-checked with other readily available estimates of railroad activity as a quality assurance check. For example, the state-level data published by the AAR list the total tons of freight transported through each state annually (Association of American Railroads, 2004). These data show that freight traffic in Nebraska is significantly higher in than any of the other CENRAP states, which corroborates initial fuel estimates performed for Class I railroads from available STB data.

For Class II and III railroads, survey data gathered in 2001 by the American Shortline and Regional Railroad Association (ASRRA) were used as a quality assurance check. This survey included questions related to fuel consumption; and while confidentiality concerns prevent the release of the actual database, a researcher with ASRRA provided an aggregate estimate of fuel consumed by all Class II and III railroads headquartered in CENRAP states for 2001 (Benson, 2004). This estimate of 50,000,000 gallons matches up very well with the results of the CENRAP inventory.

In addition, the procedures outlined in the project QAPP were followed (Sullivan, 2004).

6.4.6 Data Preparation

Deliverables for this source category include the county-level emission estimates in both NIF 3.0 format and the IDA format used by the SMOKE emissions model. The temporal allocation profiles and cross-reference files used by SMOKE were also provided.

7. METHODS TO ESTIMATE EMISSIONS FOR SOURCES OF AGRICULTURAL FUGITIVE DUST

Agricultural operations, such as crop tilling, crop harvesting, or confined animal feeding operations (CAFOs), release emissions of geologic fugitive dust. This section describes the information sources and methods used to calculate county-level emissions of agricultural fugitive dust for the CENRAP region for calendar year 2002.

7.1 PRIORITIZATION

Emissions estimation methodologies and existing emission inventories for the CENRAP region and for other regions of the country were reviewed. The EPA's 1999 NEI includes particulate matter (PM) emissions for the CENRAP region for the following agricultural source categories, as illustrated in **Figure 7-1**: tilling, beef cattle feedlots, cotton ginning, and agricultural crop burning (U.S. Environmental Protection Agency, 2004b). The Western Regional Air Partnership (WRAP) projected emissions from the 1999 NEI to estimate 2002 agricultural PM emissions for the WRAP region (E.H. Pechan and Associates, 2004). The WRAP region's inventories indicated that agricultural tilling and beef cattle feedlots were the largest contributors to agricultural fugitive dust, followed by crop transport and cotton ginning, as illustrated in **Figure 7-2**. Other sources of agricultural PM emissions in the WRAP region included harvesting, crop burning, and other combustion sources.

In the NEI and WRAP inventories, agricultural tilling and CAFOs encompass more than 90% of the PM emissions from agricultural sources. Therefore, agricultural tilling and CAFOs were selected for bottom-up treatment. Emissions of PM_{10} and $PM_{2.5}$[14] for these source categories were estimated by acquiring bottom-up activity data and applying emission factors from EPA guidance or other literature. Activity data for agricultural tilling operations were gathered through a survey of county agricultural extension offices (Reid et al., 2004). Facility-specific population estimates for beef cattle feedlots and dairies were prepared previously (Coe and Reid, 2003).

[14] PM_{10} is PM of less than or equal to 10 microns (μm) aerodynamic matter. $PM_{2.5}$ is PM of less than or equal to 2.5 microns (μm) aerodynamic matter

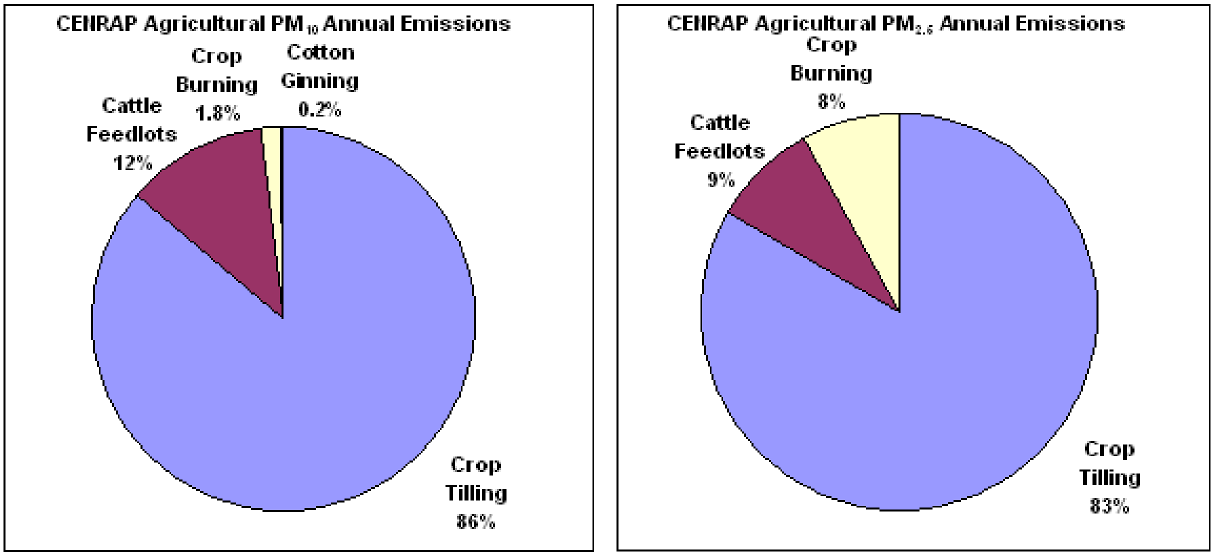

Figure 7-1. 1999 agricultural PM emissions for the CENRAP region.

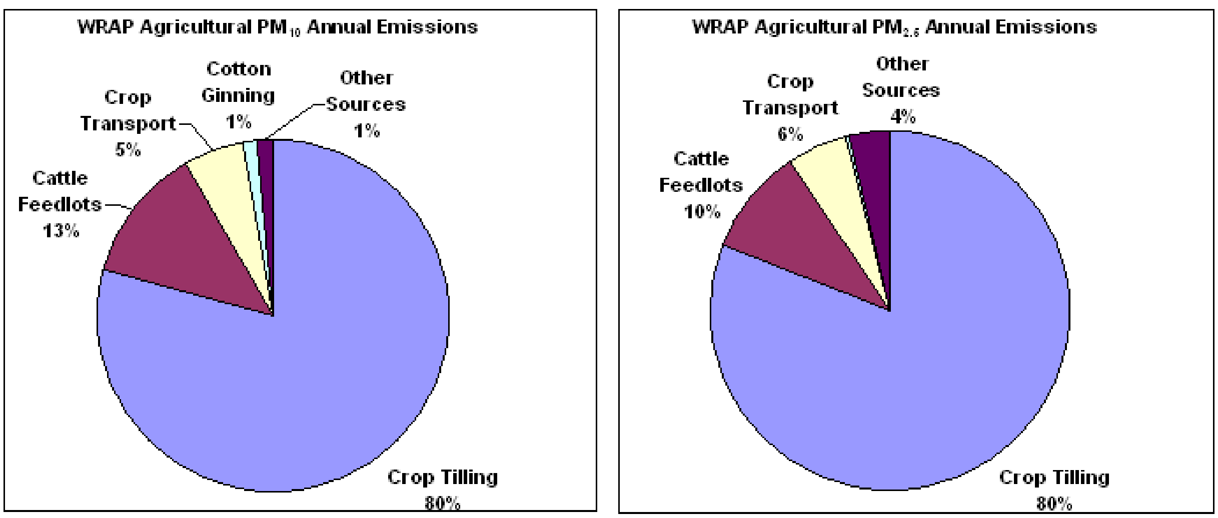

Figure 7-2. Projected 2002 agricultural PM emissions for the WRAP region.

7.2 AGRICULTURAL CROP TILLING

EPA's guidance for estimating PM emissions from agricultural crop tilling involves combining a constant emission factor with county-level activity data, including the silt content of surface soils, the number of tillings performed in a year for each crop type, and the acres of each crop type (U.S. Environmental Protection Agency, 2001, 2004c). For conservational tillage practices, such as no till, mulch till, and ridge till, the number of tillings performed in a year is reduced proportionally according to information provided by the Conservation Information

Technology Center (CTIC) (U.S. Environmental Protection Agency, 2004c; Conservation Technology Information Center, 2004). Emissions from agricultural crop tilling are calculated according to Equation 6-1.

$$E = c \times k \times s^{0.6} \times p \times a \qquad \textbf{(6-1)}$$

E represents the PM emissions in units of pounds per year, and *c* equals the constant emission factor of 4.8 lbs/acre-tilling. A dimensionless particle size multiplier, *k*, is applied to calculate either PM_{10} (k=0.21) or $PM_{2.5}$ (k=0.042). The silt content of the soil, *s*, is defined as the mass fraction of particles smaller than 0.75 µm diameter found in soil to a depth of 10 cm, expressed as a percent. The other activity data include *p*, which represents the number of tillings or passes that are performed in a year for each crop type, and *a*, which represents the acres of land tilled for each crop type. In summary, the methodology requires the following information, at county level, as activity data:

- The number of tillings per year by crop.
- The conservational tilling practices.
- The silt content of soils.
- The acres of land planted by crop type .

The EPA's Emissions Inventory Improvement Program suggests that local data for the number of tillings per year for each crop type and the temporal distribution of tilling activities are desirable (U.S. Environmental Protection Agency, 2004c). A survey of tilling practices was conducted by contacting county agricultural extension offices throughout the CENRAP region (Reid et al., 2004). Questionnaires were designed to elicit information about the types of crops in each respondent's county and the tilling practices for each crop type. The survey results were analyzed and extrapolated for each of the CENRAP states to estimate the number of tillings per year by crop type, the temporal distributions of temporal tilling activities, and the prevalences of conservational tilling practices.

The EPA National Air Pollutant Emission Trends Procedures Document provides a cross-reference table with silt contents for various soil types (U.S. Environmental Protection Agency, 1998b). The State Soil Survey Geographic Database (STATSGO) produced by the Natural Resources Conservation Service of the United States Department of Agriculture was used to determine soil types at the county level (National Resources Conservation Service, 1994). County-level silt contents were determined by using the EPA Procedures Document to cross-reference silt contents with STATSGO soil types.

County-level acreages of grown crops were prepared previously (Reid et al., 2004). These acreages were based on 2002 National Agricultural Statistics Service (NASS) data.

7.3 CATTLE FEEDLOTS AND DAIRIES

The open surfaces of the pens and/or the manure pack are sources of fugitive dust at cattle feedlots and dairies. The major difference between cattle feedlots and dairies is the proportion of time that herds are in contact with the manure pack, which tends to limit fugitive

dust emissions at dairies to levels much lower than those of beef cattle feedlots (Goodrich et al., 2002).

EPA guidance specifies an emission factor equal to 17 tons of PM_{10} per thousand head of feeding cattle per year (or 93 lbs PM_{10} per thousand head per day), and an assumption that 15% of PM_{10} is emitted as $PM_{2.5}$ (U.S. Environmental Protection Agency, 2004a). However, a literature review indicated that the EPA's guidance results in greatly overestimated emission inventories (Flocchini and James, 2001; Goodrich et al., 2002). Two recent studies performed by the University of California at Davis and Texas A&M University yielded emission factors of 28.9 lbs PM_{10} per thousand head per day (Flocchini and James, 2001) and 19 lbs PM_{10} per thousand head per day (Goodrich et al., 2002) for beef cattle at feedlots. The midpoint—24 lbs PM_{10} per thousand head per day—was selected and used to estimate emissions of PM_{10} for beef cattle feedlots in the CENRAP region. In addition, an emission factor of 4.4 lbs PM_{10} per thousand head per day was selected for use in estimating emissions for dairies. This emission factor is based on sampling conducted at a single central Texas dairy in the summer of 2002 (Goodrich et al., 2002), and is therefore highly uncertain. However, it is the best and most reasonable emission rate that could be identified at this time.

Facility-specific population estimates for beef cattle feedlots and dairies were prepared previously (Coe and Reid, 2003). These population estimates were based primarily on facility-specific animal populations and species available from National Pollutant Discharge Elimination System (NPDES).

No information was identified that could be used to develop temporal patterns for this source category. However, emissions are likely to vary because climate conditions and animal husbandry practices vary seasonally and diurnally.

7.4 DATA PREPARATION

Deliverables for this source category include the county-level emission estimates in both NIF 3.0 format and the IDA format used by the SMOKE emissions model. The temporal allocation profiles and cross-reference files used by SMOKE were also provided.

8. PREPARATION OF INVENTORIES AND DATA FILE SYSTEMS FOR DELIVERY

8.1 ON-ROAD MOBILE SOURCES

Activity data, MOBILE6-ready input files, temporal profiles and cross-references used by SMOKE, and MOBILE6 command files were prepared to allow an independent third party to run MOBILE6 within SMOKE. These deliverables permitted CENRAP to prepare hourly meteorological inputs, estimate emissions, and prepare gridded emission inventories for any 2002 time period. In addition, STI ran MOBILE6 within SMOKE, estimated annual emissions for on-road mobile sources, and prepared NIF 3.0 emission inventories for the entire CENRAP region.

To estimate annual emissions, CENRAP's MM5 meteorological inputs for the months of January and July 2002 were used. Annual emissions were estimated from the average of the emission inventories for January and July 2002.[15] In addition, although SMOKE/MOBILE6 can be used to calculate emissions from refueling, these emissions are better allocated spatially and temporally if they are calculated separately from MOBILE6 runs. Therefore, refueling emissions were not included in the CENRAP emission inventory.

8.2 NON-ROAD MOBILE SOURCES

Revised activity data files and fuels characteristics, formatted for use with NONROAD, were prepared to allow an independent third party to run NONROAD and estimate emissions. In addition, STI ran the latest version of NONROAD (NONROAD 2004), estimated annual emissions for non-road mobile sources, and prepared NIF 3.0 and IDA-formatted emission inventories for the entire CENRAP region. The temporal allocation profiles and cross-reference files used by SMOKE were also provided. Emissions for locomotives and commercial marine vessels were estimated externally to the NONROAD model, which does not treat these sources, and were prepared in NIF 3.0 and IDA formats.

8.3 SOURCES OF AGRICULTURAL FUGITIVE DUST

STI estimated annual emissions for sources of agricultural fugitive dust, and prepared NIF 3.0 and IDA-formatted emission inventories for the entire CENRAP region. For agricultural tilling dust, the temporal allocation profiles and cross-reference files used by SMOKE were also provided.

[15] Test runs were also completed using representative temperatures for April and October to determine the potential effects on the annual average; however, the effects of including four months in the annual average were negligible.

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APPENDIX A

CENTRAL STATES REGIONAL AIR PLANNING ASSOCIATION (CENRAP) PLEASURE CRAFT STUDY

Central States Regional
Air Planning Association (CENRAP)
Pleasure Craft Study

Final Report

Prepared for

Sonoma Technology, Inc.

Project 1031

July 2004

Prepared by

Population Research Systems
A Subsidiary of Freeman, Sullivan & Co.
100 Spear Street, 17th floor
San Francisco, CA 94105
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Final Report

Overview

Population Research Systems (PRS), LLC, a subsidiary of Freeman, Sullivan & Co., conducted the Pleasure Craft Survey for the Central States Regional Air Planning Association (CENRAP) Study in July 2004 on behalf of Sonoma Technologies, Inc. The project, which was sponsored by CENRAP, was designed to quantify air pollutant emissions from pleasure craft activities in the states of Nebraska, Kansas, Oklahoma, Arkansas, Texas, Iowa, Minnesota, Missouri and Louisiana.

Sonoma Technology, Inc. and PRS collaborated closely on the development of the mail survey instrument (Appendix B) used for this project. PRS was responsible for printing and mailing of the mail survey, the personalized cover letter (Appendix C), four-color state waterway maps as well as for programming of the telephone recruitment screener used by the PRS computer-assisted telephone interviewing (CATI) laboratory.

All project files and an electronic copy of this report can be found on the enclosed CD-Rom in Appendix D.

Methods

A. Sample

PRS purchased commercially available sample of registered boat owners in the target states from Dunhill International. Altogether 17,454 records of boat owners were loaded into the CATI system, 2,000 randomly drawn records per state. The only exception was Oklahoma, were the total number of available and loaded sample points was 1,454 records. Out of all records, 16,878 records were attempted, and 577 were not attempted, since some state quota cells were filled

without calling all available records. Table 1. shows the number of sample points available per state.

Table 1. Number of loaded sample points per CENRAP state

STATE	Frequency
AR	2,000
IA	2,000
KS	2,000
LA	2,000
MN	2,000
MO	2,000
NE	2,000
OK	1,454
TX	2,000
Total	17,454

B. Telephone Recruit and Survey Package Mailing

Potential participants for the Pleasure Craft Study were recruited over the phone in a brief 10 minute interview (Appendix A).

Respondents were recruited from May 20, 2004 through June 10, 2004. All recruits were conducted by trained PRS CATI laboratory interviewers on weekdays between 5:00 PM and 9:00 PM Central Standard Time. At a respondent's request, PRS also scheduled callback appointments outside of these interviewing hours.

A maximum of four call attempts were made to each sample point and no refusal conversions were used to convince eligible respondents to participate in the study.

Once a respondent agreed to participate, a survey package containing a personalized letter, a pen-and-paper survey, waterway map(s) for the state respondent is using motorized watercraft, a business reply envelope and a safety whistle on a floating lanyard as incentive were mailed.

About two weeks after the initial survey mailing, a reminder postcard was sent to respondents who had not yet returned their surveys.

C. Results

PRS recruited 1,387 respondents for the mail survey, and 979 completed surveys were returned. Table 2 shows the distribution of recruits and returned surveys per state, as well as the respective

percentage of response rate per state. The response rate varied between 67.4% and 77.1% and averaged at a return rate of 70.6%.

Table 2. Number of recruits and completed interviews per state

STATE	recruited	returned	%
AR	158	111	70.3%
IA	153	118	77.1%
KS	160	107	66.9%
LA	153	105	68.6%
MN	160	115	71.9%
MO	157	113	72.0%
NE	152	110	72.4%
OK	135	91	67.4%
TX	159	109	68.6%
Totals	**1387**	**979**	**70.6%**

APPENDIX A

TELEPHONE RECRUIT SCREENER

CENRAP Boating Study, Project 1031
Telephone Recruitment Script

INTRO1
Hello, my name is <interviewer>, may I speak with <insert fname, lname>?
1. On the phone (skpto INTRO3)
2. No, respondent is coming to the phone (skpto INTRO2)
3. No, respondent is not at home (schedule callback)
4. No such person (skpto TERM1)

INTRO2
Hello, my name is <interviewer> and I'm calling on behalf of CENRAP, the Central States Regional Air Planning Association. CENRAP is an organization of states, tribes, federal agencies, and other interested parties that studies and addresses air pollution, regional haze and visibility issues. Your state is participating in CENRAP and as such, you have been randomly selected to participate in an important air quality study. (Skpto INTRO4)

INTRO3
Hi, I'm calling on behalf of CENRAP, the Central States Regional Air Planning Association. CENRAP is an organization of states, tribes, federal agencies, and other interested parties that studies and addresses air pollution, regional haze and visibility issues. Your state is participating in CENRAP and as such, you have been randomly selected to participate in this important air quality study.

INTRO4
This telephone interview will take only a few minutes and I can assure you that I am not selling anything. We are conducting a study about recreational boating activities and are interested in learning more about how people use their watercrafts. All of your answers will be confidential and not used for any purpose other than this research.

Q1
Do you own a motorized sailboat, a personal watercraft such as a Jet-Ski or Waverunner or a power boat?
1. Yes
2. No (skpto TERM1)
8. Don't know/Refused (skpto TERM1)

Q2
Do you own more than one watercraft?
1. Yes
2. No (skpto Q5)
8. Don't know/Refused

Q3
What types of watercrafts do you own? Do you own… *(multiple choice, click all that apply)*
1. Powerboats
2. Motorized sail boats
3. Personal watercrafts
8. Don't know/Refused

Q4
Which of your watercrafts do you use the most?
1. Powerboat
2. Motorized sail boat
3. Personal watercraft
8. Don't know/Refused

Q5
Did you use your (primary) watercraft in the past year?
1. Yes
2. No
8. Don't know/Refused (IF answers = 2 skpto TERM1)

Q6
In which states did you use your <Insert Answer from Q4 here> in the past year?
(multiple choice, click all that apply)
1. Arkansas
2. Iowa
3. Kansas
4. Louisiana
5. Minnesota
6. Missouri
7. Nebraska
8. Oklahoma
9. Texas
10. Don't know/Refused

Q7

We would like to invite you to fill out a short paper survey regarding your boating activities with your watercraft you have used most in the past year, the <Insert Answer from Q5 here>. We would mail you the survey with a business reply envelope, and as a Thank-you gift you will also receive a Kwik Tex Safety whistle with floating Lanyard for your watercraft keys. May I have your address to send you the brief mail survey?
1. Yes
2. No, not interested (skpto TERM1)
3. Not sure (call back)

Q8

What is your mailing address?
Name:
Address:
City: / State: / Zip:

END1

Thank you very much for your participation in this important air quality study. You will receive the survey together with a business reply envelope and the boating key chain in the next 1-2 weeks in the mail. Please use the provided return envelope to send us back the filled out survey. You do not have to pay for postage. Do you have any other questions about this?

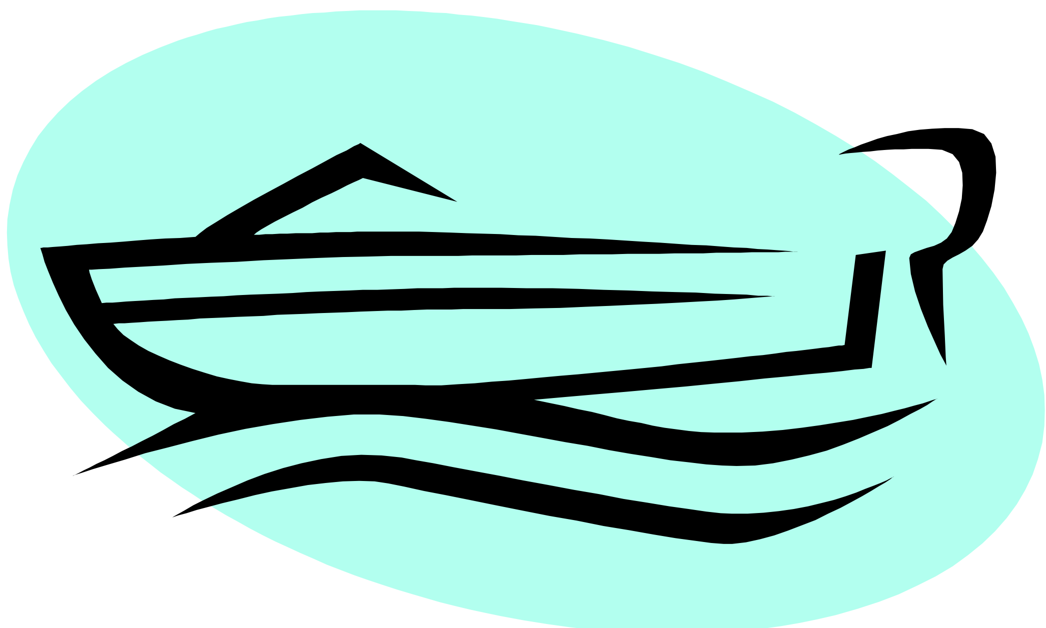
TERM1
Then these are all the questions I have for you. Thank you for your time. Good bye.

APPENDIX B

MAIL SURVEY INSTRUMENT

put sticker w/ boat type here
fscid

PLEASURE CRAFT SURVEY



1. **Check the one category, which best describes your registered boat.**

- ❑1 Sailboat with engine
- ❑2 Personal Water Craft (Jetski, Waverunner, etc.)
- ❑3 Power boat (bassboat, speedboat, houseboat, etc.)

2. **Which category below describes your primary propulsion engine?**

(*Do not describe any secondary propulsion used for low speed trolling and fishing.)*

- ❑1 Two-Stroke Gasoline Engine (requires gasoline and oil fuel mixture)
- ❑2 Four-Stroke Gasoline Engine (has an oil sump and dipstick)
- ❑3 Diesel (either 2 or 4 Stroke; requires diesel fuel)

3. **Which one of the following is the primary propulsion type for your boat?**
(Include auxiliary motors for sailboats, but do not include secondary motors for low speed trolling or fishing.)

- ❑1 Outboard
- ❑2 Inboard
- ❑3 Personal Water Craft Jet (Jetski engine, Waverunner engine, etc.)
- ❑4 Other (please specify): ____

4. **What is the horsepower for this boat's primary engine?**
(If unsure, you might want to check the specifications in the owner's manual. Otherwise, give your best estimate.)

_______________ hp

5. **What year was your engine manufactured?**
(If unsure, you might want to find the model year in the owner's manual.)

_______________A (enter year)

- ❑1 Not sure, but probably before 1997
- ❑2 Not sure, but probably 1997 or later
- ❑3 Don't know

6a. **Typically, how often do you use your boat during the following seasons?**
(Please choose the answer that best matches your boat usage.)

Winter (Dec - Feb):

- ❑1` Practically never
- ❑2 1 time per week or less
- ❑3 2-3 times per week
- ❑4 4-5 times per week
- ❑5 6 times per week
- ❑6 Practically every day

Spring (Mar – May):

- ❑7 Practically never
- ❑8 1 time per week or less
- ❑9 2-3 times per week
- ❑10 4-5 times per week
- ❑11 6 times per week
- ❑12 Practically every day

6b. **Summer (Jun - Aug):**

- ❑1` Practically never
- ❑2 1 time per week or less
- ❑3 2-3 times per week
- ❑4 4-5 times per week
- ❑5 6 times per week
- ❑6 Practically every day

Fall (Sep – Nov):

- ❑7 Practically never
- ❑8 1 time per week or less
- ❑9 2-3 times per week
- ❑10 4-5 times per week
- ❑11 6 times per week
- ❑12 Practically every day

7. **How often did you use your boat <u>during the past week</u>?**

- ❑1` Never
- ❑2 1 time
- ❑3 2 times
- ❑4 3 times
- ❑5 4 or more times

8a. **During each of the following seasons, what percentage of your boat trips occur on weekdays vs. weekends?**
(Please choose the answer that best matches your boat usage.)

Winter (Dec - Feb):

	Weekday	Weekend
❑ 1	0%	100%
❑ 2	25%	75%
❑ 3	50%	50%
❑ 4	75%	25%
❑ 5	100%	0%

Spring (Mar – May):

	Weekday	Weekend
❑ 6	0%	100%
❑ 7	25%	75%
❑ 8	50%	50%
❑ 9	75%	25%
❑ 10	100%	0%

8b. **Summer (Jun - Aug):**

	Weekday	Weekend
❑ 1	0%	100%
❑ 2	25%	75%
❑ 3	50%	50%
❑ 4	75%	25%
❑ 5	100%	0%

Fall (Sep – Nov):

	Weekday	Weekend
❑ 6	0%	100%
❑ 7	25%	75%
❑ 8	50%	50%
❑ 9	75%	25%
❑ 10	100%	0%

9a. **Typically, how many hours is the engine operating <u>per trip</u> when you use your boat during the following seasons?**
(Please choose the answer that best matches your boat usage.)

Winter (Dec - Feb):

- ❑ 1` More than 8 hours
- ❑ 2 6 – 8 hours
- ❑ 3 4 – 6 hours
- ❑ 4 2 – 4 hours
- ❑ 5 0 – 2 hours

Spring (Mar – May):

- ❑ 6 More than 8 hours
- ❑ 7 6 – 8 hours
- ❑ 8 4 – 6 hours
- ❑ 9 2 – 4 hours
- ❑ 10 0 – 2 hours

9b. **Summer (Jun - Aug):**

- ❑ 1` More than 8 hours
- ❑ 2 6 – 8 hours
- ❑ 3 4 – 6 hours
- ❑ 4 2 – 4 hours
- ❑ 5 0 – 2 hours

Fall (Sep – Nov):

- ❑ 6 More than 8 hours
- ❑ 7 6 – 8 hours
- ❑ 8 4 – 6 hours
- ❑ 9 2 – 4 hours
- ❑ 10 0 – 2 hours

10a. At what time do you typically launch your boat during the following seasons?

Winter (Dec - Feb):

- ❑ 1` Before 8:00 AM
- ❑ 2 8:00 AM – 11:00 AM
- ❑ 3 11:00 AM – 1:00 PM
- ❑ 4 1:00 PM – 4:00 PM
- ❑ 5 After 4:00 PM

Spring (Mar – May):

- ❑ 6` Before 8:00 AM
- ❑ 7 8:00 AM – 11:00 AM
- ❑ 8 11:00 AM – 1:00 PM
- ❑ 9 1:00 PM – 4:00 PM
- ❑ 10 After 4:00 PM

10b. Summer (Jun - Aug):

- ❑ 1` Before 8:00 AM
- ❑ 2 8:00 AM – 11:00 AM
- ❑ 3 11:00 AM – 1:00 PM
- ❑ 4 1:00 PM – 4:00 PM
- ❑ 5 After 4:00 PM

Fall (Sep – Nov):

- ❑ 6` Before 8:00 AM
- ❑ 7 8:00 AM – 11:00 AM
- ❑ 8 11:00 AM – 1:00 PM
- ❑ 9 1:00 PM – 4:00 PM
- ❑ 10 After 4:00 PM

11. When your boat engine is in operation, what percentage of time is typically spent at the following power settings? (Please circle an answer for each setting; answers should sum to 100%).

Example: 30
\+ 60
\+ 10 = **100%**

Near Idle/Low Throttle →	0	10	20	30	40	50	60	70	80	90	100 %	
Mid-throttle →	0	10	20	30	40	50	60	70	80	90	100 %	
Full throttle →		0	10	20	30	40	50	60	70	80	90	100 %
Total:				**100%** (of time when engine is in operation)								

12. Please estimate the amount of fuel you use in your boat each year.

Number of gallons purchased:

- ❑ 1` More than 300 gallons
- ❑ 2 200 – 300 gallons
- ❑ 3 100 – 200 gallons
- ❑ 4 50 – 100 gallons
- ❑ 5 Less than 50 gallons

13. In which counties do you typically operate your boat? (Use the county codes printed on the enclosed Waterways Map and choose up to three counties.)

County Code 1: ____________

County Code 2: ____________

County Code 3: ____________

Thank you for your cooperation.
Please use the provided business reply envelope to mail back the survey to

Population Research Systems
100 Spear St., 17th Floor
San Francisco, CA 94105

No postage necessary!

APPENDIX C

PERSONALIZED COVER LETTER

Population Research Systems

A Member of the FSC Group

May 2004

«fscid»:

Dear «q8»,

Thank you for agreeing to participate in the Central States Regional Air Planning Association (CENRAP) Pleasure Craft Study. CENRAP is an organization of states, tribes, federal agencies, and other interested parties that studies and addresses air pollution, regional haze and visibility issues. Through your participation, you will help CENRAP learn about factors that affect air quality in your state.

Please complete the enclosed questionnaire about your boat and your boating activities. We have provided a pre-paid business reply envelope to make it simple for you to send back the completed questionnaire. It should only take a few minutes of your time. In appreciation, we are including a safety whistle with floating lanyard for your watercraft keys.

The Central States Regional Air Planning Association has contracted with Population Research Systems (PRS), a research company, to collect this information. Please be assured that your responses and personal information will be kept confidential and will not be used for any purpose other than this study. PRS will combine your responses with hundreds of others and will report only group results, and only to the study sponsors.

If you have any questions about the study, please call Dr. Katrin Ewald of PRS, toll-free at (800) 777-0737. If you are interested in learning more about CENRAP, please visit their website at http://www.cenrap.org.

Thank you once again for participating in this important research.

Sincerely,

Katrin Ewald, Ph.D.
Director

Enclosures:
Waterways Maps

APPENDIX D

WATERWAY MAPS

Nebraska Counties

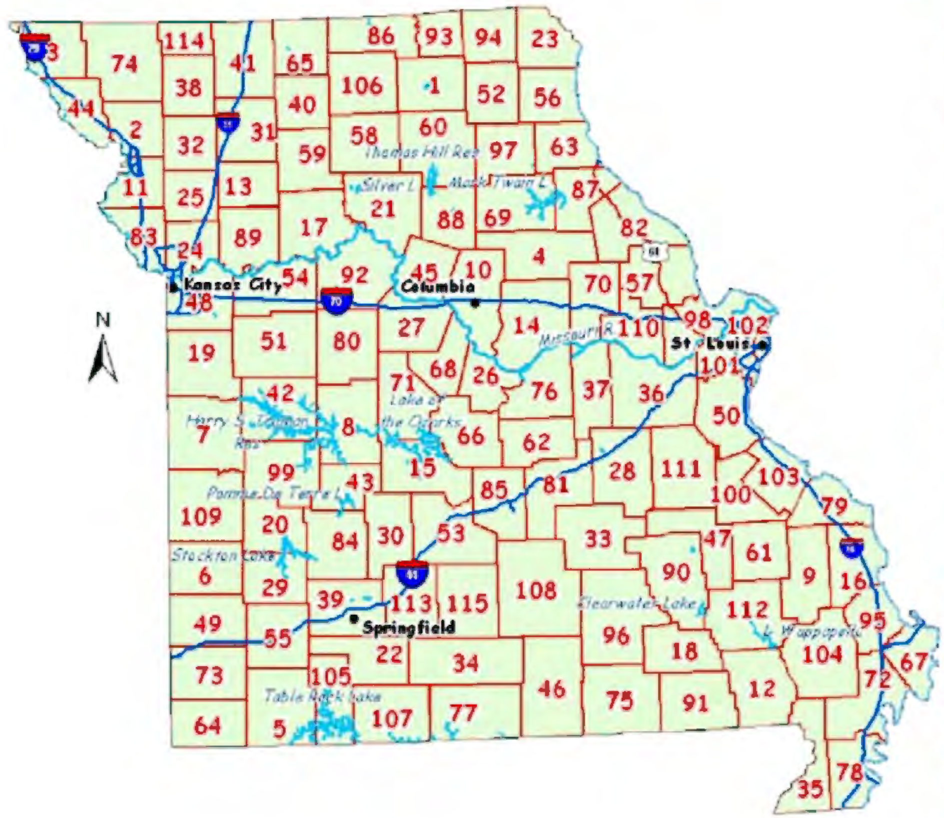
Number	County Name	Number	County Name	Number	County Name
1	Adams	32	Frontier	63	Nance
2	Antelope	33	Furnas	64	Nemaha
3	Arthur	34	Gage	65	Nuckolls
4	Banner	35	Garden	66	Otoe
5	Blaine	36	Garfield	67	Pawnee
6	Boone	37	Gosper	68	Perkins
7	Box Butte	38	Grant	69	Phelps
8	Boyd	39	Greeley	70	Pierce
9	Brown	40	Hall	71	Platte
10	Buffalo	41	Hamilton	72	Polk
11	Burt	42	Harlan	73	Red Willow
12	Butler	43	Hayes	74	Richardson
13	Cass	44	Hitchcock	75	Rock
14	Cedar	45	Holt	76	Saline
15	Chase	46	Hooker	77	Sarpy
16	Cherry	47	Howard	78	Saunders
17	Cheyenne	48	Jefferson	79	Scotts Bluff
18	Clay	49	Johnson	80	Seward
19	Colfax	50	Kearney	81	Sheridan
20	Cuming	51	Keith	82	Sherman
21	Custer	52	Keya Paha	83	Sioux
22	Dakota	53	Kimball	84	Stanton
23	Dawes	54	Knox	85	Thayer
24	Dawson	55	Lancaster	86	Thomas
25	Deuel	56	Lincoln	87	Thurston
26	Dixon	57	Logan	88	Valley
27	Dodge	58	Loup	89	Washington
28	Douglas	59	Madison	90	Wayne
29	Dundy	60	McPherson	91	Webster
30	Fillmore	61	Merrick	92	Wheeler
31	Franklin	62	Morrill	93	York

Oklahoma Waterways

Oklahoma Counties

Number	County Name	Number	County Name	Number	County Name
1	Adair	27	Grant	53	Nowata
2	Alfalfa	28	Greer	54	Okfuskee
3	Atoka	29	Harmon	55	Oklahoma
4	Beaver	30	Harper	56	Okmulgee
5	Beckham	31	Haskell	57	Osage
6	Blaine	32	Hughes	58	Ottawa
7	Bryan	33	Jackson	59	Pawnee
8	Caddo	34	Jefferson	60	Payne
9	Canadian	35	Johnston	61	Pittsburg
10	Carter	36	Kay	62	Pontotoc
11	Cherokee	37	Kingfisher	63	Pottawatomie
12	Choctaw	38	Kiowa	64	Pushmataha
13	Cimarron	39	Latimer	65	Roger Mills
14	Cleveland	40	Le Flore	66	Rogers
15	Coal	41	Lincoln	67	Seminole
16	Comanche	42	Logan	68	Sequoyah
17	Cotton	43	Love	69	Stephens
18	Craig	44	Major	70	Texas
19	Creek	45	Marshall	71	Tillman
20	Custer	46	Mayes	72	Tulsa
21	Delaware	47	McClain	73	Wagoner
22	Dewey	48	McCurtain	74	Washington
23	Ellis	49	McIntosh	75	Washita
24	Garfield	50	Murray	76	Woods
25	Garvin	51	Muskogee	77	Woodward
26	Grady	52	Noble		

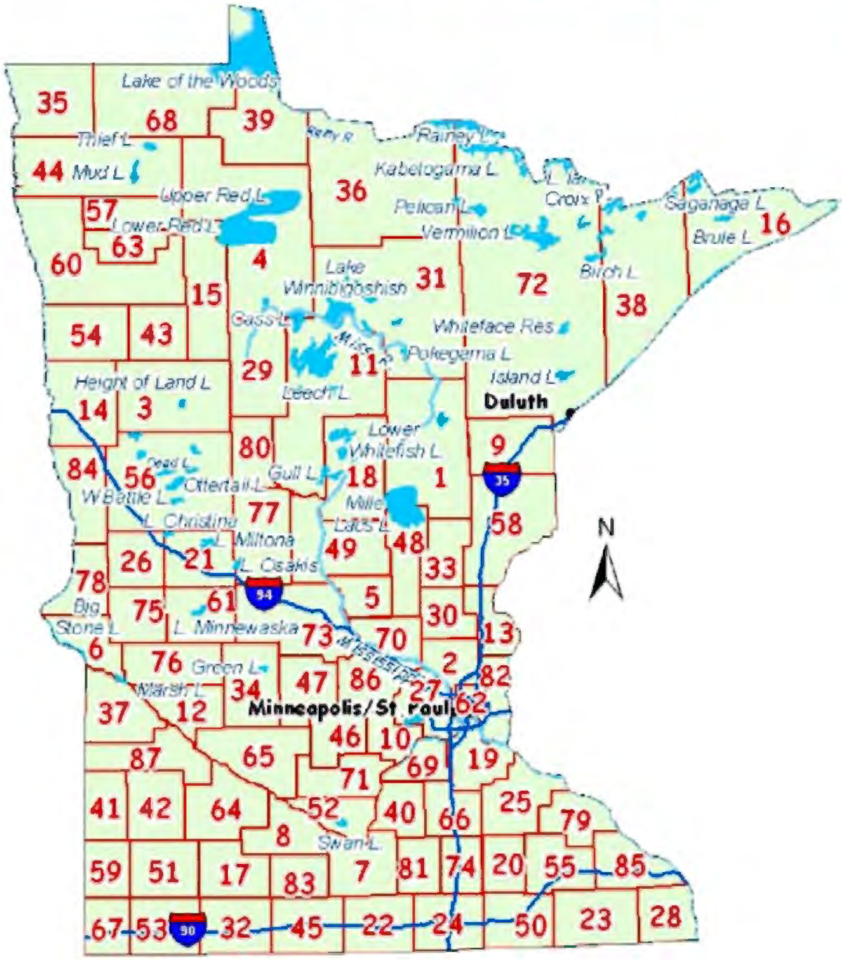
Missouri Waterways



Missouri Counties

Number	County Name	Number	County Name	Number	County Name	Number	County Name
1	Adair	30	Dallas	59	Livingston	88	Randolph
2	Andrew	31	Daviess	60	Macon	89	Ray
3	Atchison	32	DeKalb	61	Madison	90	Reynolds
4	Audrain	33	Dent	62	Maries	91	Ripley
5	Barry	34	Douglas	63	Marion	92	Saline
6	Barton	35	Dunklin	64	McDonald	93	Schuyler
7	Bates	36	Franklin	65	Mercer	94	Scotland
8	Benton	37	Gasconade	66	Miller	95	Scott
9	Bollinger	38	Gentry	67	Mississippi	96	Shannon
10	Boone	39	Greene	68	Moniteau	97	Shelby
11	Buchanan	40	Grundy	69	Monroe	98	St. Charles
12	Butler	41	Harrison	70	Montgomery	99	St. Clair
13	Caldwell	42	Henry	71	Morgan	100	St. Francois
14	Callaway	43	Hickory	72	New Madrid	101	St. Louis
15	Camden	44	Holt	73	Newton	102	St. Louis City
16	Cape Girardeau	45	Howard	74	Nodaway	103	Ste. Genevieve
17	Carroll	46	Howell	75	Oregon	104	Stoddard
18	Carter	47	Iron	76	Osage	105	Stone
19	Cass	48	Jackson	77	Ozark	106	Sullivan
20	Cedar	49	Jasper	78	Pemiscot	107	Taney
21	Chariton	50	Jefferson	79	Perry	108	Texas
22	Christian	51	Johnson	80	Pettis	109	Vernon
23	Clark	52	Knox	81	Phelps	110	Warren
24	Clay	53	Laclede	82	Pike	111	Washington
25	Clinton	54	Lafayette	83	Platte	112	Wayne
26	Cole	55	Lawrence	84	Polk	113	Webster
27	Cooper	56	Lewis	85	Pulaski	114	Worth
28	Crawford	57	Lincoln	86	Putnam	115	Wright
29	Dade	58	Linn	87	Ralls		

Minnesota Waterways



Minnesota Counties

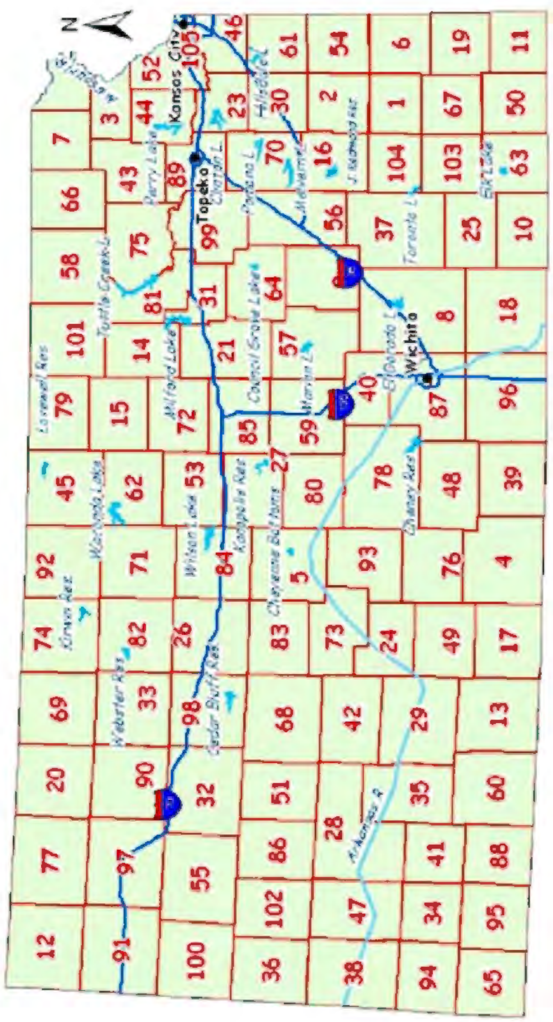
Number	County Name	Number	County Name	Number	County Name
1	Aitkin	30	Isanti	59	Pipestone
2	Anoka	31	Itasca	60	Polk
3	Becker	32	Jackson	61	Pope
4	Beltrami	33	Kanabec	62	Ramsey
5	Benton	34	Kandiyohi	63	Red Lake
6	Big Stone	35	Kittson	64	Redwood
7	Blue Earth	36	Koochiching	65	Renville
8	Brown	37	Lac Qui Parle	66	Rice
9	Carlton	38	Lake	67	Rock
10	Carver	39	Lake of the Woods	68	Roseau
11	Cass	40	Le Sueur	69	Scott
12	Chippewa	41	Lincoln	70	Sherburne
13	Chisago	42	Lyon	71	Sibley
14	Clay	43	Mahnomen	72	St. Louis
15	Clearwater	44	Marshall	73	Stearns
16	Cook	45	Martin	74	Steele
17	Cottonwood	46	McLeod	75	Stevens
18	Crow Wing	47	Meeker	76	Swift
19	Dakota	48	Mille Lacs	77	Todd
20	Dodge	49	Morrison	78	Traverse
21	Douglas	50	Mower	79	Wabasha
22	Faribault	51	Murray	80	Wadena
23	Fillmore	52	Nicollet	81	Waseca
24	Freeborn	53	Nobles	82	Washington
25	Goodhue	54	Norman	83	Watonwan
26	Grant	55	Olmsted	84	Wilkin
27	Hennepin	56	Otter Tail	85	Winona
28	Houston	57	Pennington	86	Wright
29	Hubbard	58	Pine	87	Yellow Medicine

Louisiana Waterways

Louisiana Parishes

Number	County Name	Number	County Name	Number	County Name
1	Acadia	22	Grant	43	Sabine
2	Allen	23	Iberia	44	St. Bernard
3	Ascension	24	Iberville	45	St. Charles
4	Assumption	25	Jackson	46	St. Helena
5	Avoyelles	26	Jefferson	47	St. James
6	Beauregard	27	Jefferson Davis	48	St. John the Baptist
7	Bienville	28	La Salle	49	St. Landry
8	Bossier	29	Lafayette	50	St. Martin
9	Caddo	30	LaFourche	51	St. Mary
10	Calcasieu	31	Lincoln	52	St. Tammany
11	Caldwell	32	Livingston	53	Tangipahoa
12	Cameron	33	Madison	54	Tensas
13	Catahoula	34	Morehouse	55	Terrebonne
14	Claiborne	35	Natchitoches	56	Union
15	Concordia	36	Orleans	57	Vermilion
16	De Soto	37	Ouachita	58	Vernon
17	East Baton Rouge	38	Plaquemines	59	Washington
18	East Carroll	39	Pointe Coupee	60	Webster
19	East Feliciana	40	Rapides	61	West Baton Rouge
20	Evangeline	41	Red River	62	West Carroll
21	Franklin	42	Richland	63	West Feliciana
				64	Winn

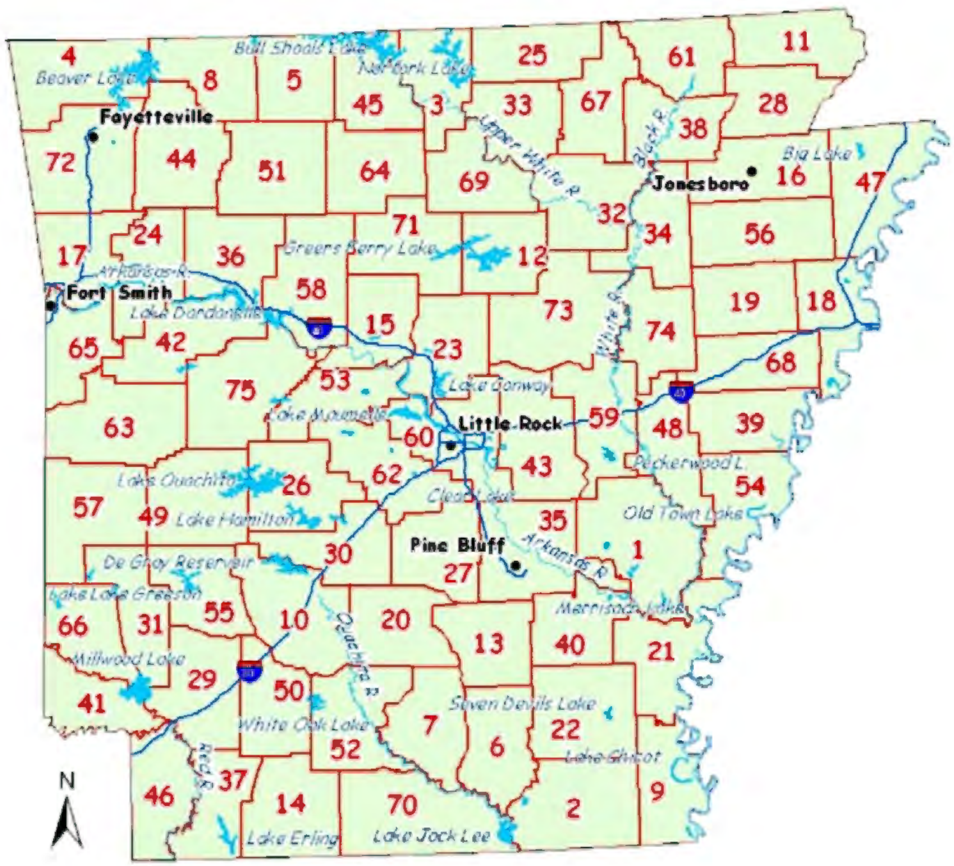
Kansas Waterways



Kansas Counties

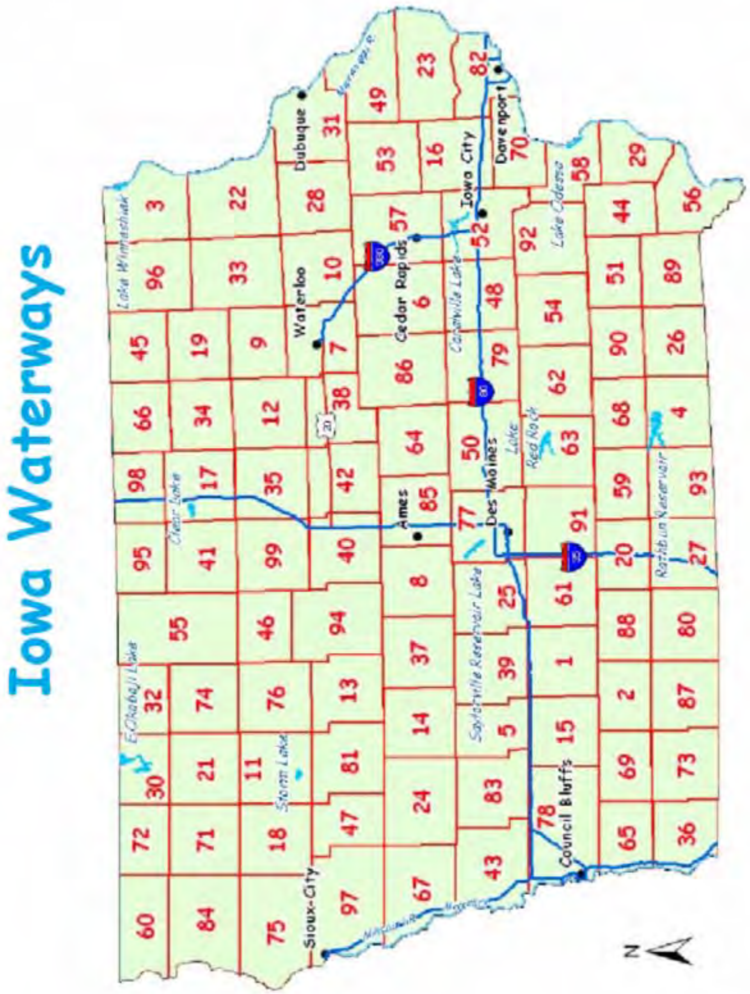
Number	County Name	Number	County Name	Number	County Name
1	Allen	27	Ellsworth	53	Lincoln
2	Anderson	28	Finney	54	Linn
3	Atchison	29	Ford	55	Logan
4	Barber	30	Franklin	56	Lyon
5	Barton	31	Geary	57	Marion
6	Bourbon	32	Gove	58	Marshall
7	Brown	33	Graham	59	McPherson
8	Butler	34	Grant	60	Meade
9	Chase	35	Gray	61	Miami
10	Chautauqua	36	Greeley	62	Mitchell
11	Cherokee	37	Greenwood	63	Montgomery
12	Cheyenne	38	Hamilton	64	Morris
13	Clark	39	Harper	65	Morton
14	Clay	40	Harvey	66	Nemaha
15	Cloud	41	Haskell	67	Neosho
16	Coffey	42	Hodgeman	68	Ness
17	Comanche	43	Jackson	69	Norton
18	Cowley	44	Jefferson	70	Osage
19	Crawford	45	Jewell	71	Osborne
20	Decatur	46	Johnson	72	Ottawa
21	Dickinson	47	Kearny	73	Pawnee
22	Doniphan	48	Kingman	74	Phillips
23	Douglas	49	Kiowa	75	Pottawatomie
24	Edwards	50	Labette	76	Pratt
25	Elk	51	Lane	77	Rawlins
26	Ellis	52	Leavenworth	78	Reno

Arkansas Waterways



Arkansas Counties

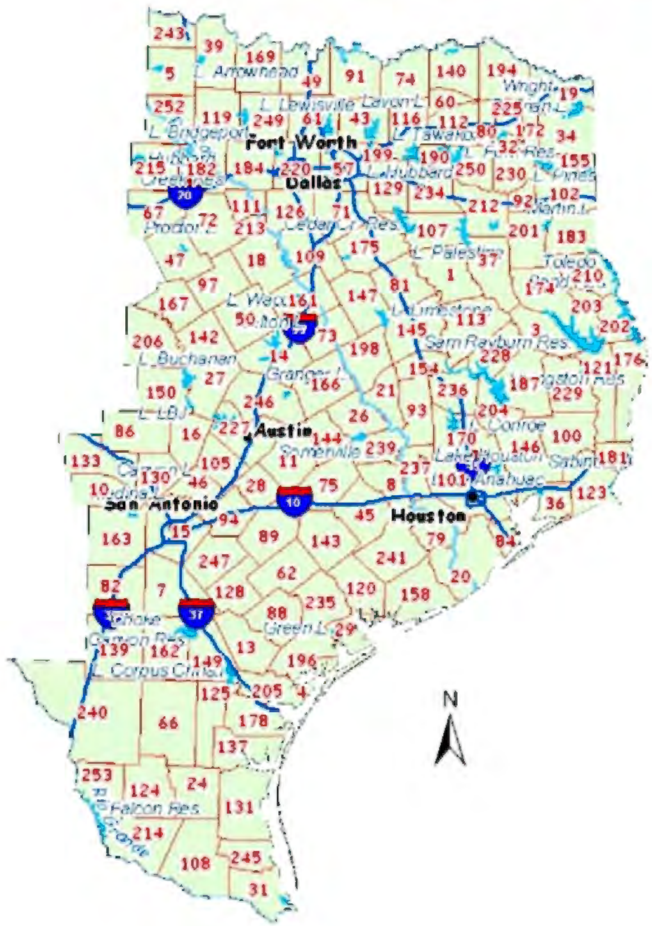
Number	County Name	Number	County Name	Number	County Name
1	Arkansas	26	Garland	51	Newton
2	Ashley	27	Grant	52	Ouachita
3	Baxter	28	Greene	53	Perry
4	Benton	29	Hempstead	54	Phillips
5	Boone	30	Hot Spring	55	Pike
6	Bradley	31	Howard	56	Poinsett
7	Calhoun	32	Independence	57	Polk
8	Carroll	33	Izard	58	Pope
9	Chicot	34	Jackson	59	Prairie
10	Clark	35	Jefferson	60	Pulaski
11	Clay	36	Johnson	61	Randolph
12	Cleburne	37	Lafayette	62	Saline
13	Cleveland	38	Lawrence	63	Scott
14	Columbia	39	Lee	64	Searcy
15	Conway	40	Lincoln	65	Sebastian
16	Craighead	41	Little River	66	Sevier
17	Crawford	42	Logan	67	Sharp
18	Crittenden	43	Lonoke	68	St. Francis
19	Cross	44	Madison	69	Stone
20	Dallas	45	Marion	70	Union
21	Desha	46	Miller	71	Van Buren
22	Drew	47	Mississippi	72	Washington
23	Faulkner	48	Monroe	73	White
24	Franklin	49	Montgomery	74	Woodruff
25	Fulton	50	Nevada	75	Yell



Iowa Counties

Number	County Name	Number	County Name	Number	County Name	Number	County Name
1	Adair	26	Davis	51	Jefferson	76	Pocahontas
2	Adams	27	Decatur	52	Johnson	77	Polk
3	Allamakee	28	Delaware	53	Jones	78	Pottawattamie
4	Appanoose	29	Des Moines	54	Keokuk	79	Poweshiek
5	Audubon	30	Dickinson	55	Kossuth	80	Ringgold
6	Benton	31	Dubuque	56	Lee	81	Sac
7	Black Hawk	32	Emmet	57	Linn	82	Scott
8	Boone	33	Fayette	58	Louisa	83	Shelby
9	Bremer	34	Floyd	59	Lucas	84	Sioux
10	Buchanan	35	Franklin	60	Lyon	85	Story
11	Buena Vista	36	Fremont	61	Madison	86	Tama
12	Butler	37	Greene	62	Mahaska	87	Taylor
13	Calhoun	38	Grundy	63	Marion	88	Union
14	Carroll	39	Guthrie	64	Marshall	89	Van Buren
15	Cass	40	Hamilton	65	Mills	90	Wapello
16	Cedar	41	Hancock	66	Mitchell	91	Warren
17	Cerro Gordo	42	Hardin	67	Monona	92	Washington
18	Cherokee	43	Harrison	68	Monroe	93	Wayne
19	Chickasaw	44	Henry	69	Montgomery	94	Webster
20	Clarke	45	Howard	70	Muscatine	95	Winnebago
21	Clay	46	Humboldt	71	O'Brien	96	Winneshiek
22	Clayton	47	Ida	72	Osceola	97	Woodbury
23	Clinton	48	Iowa	73	Page	98	Worth
24	Crawford	49	Jackson	74	Palo Alto	99	Wright
25	Dallas	50	Jasper	75	Plymouth		

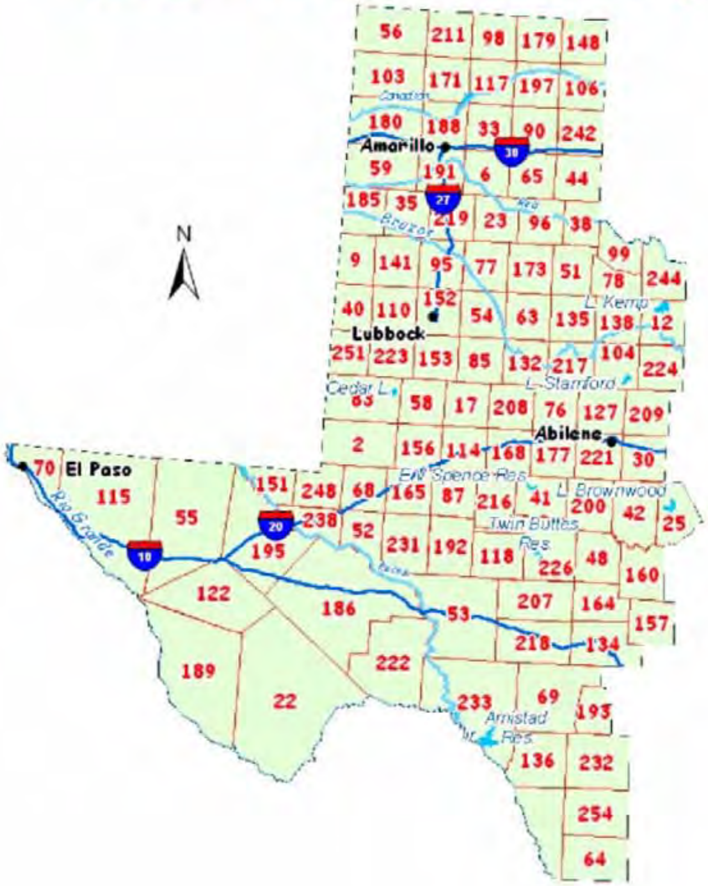
East Texas Waterways



East Texas Counties

Number	County Name	Number	County Name	Number	County Name	Number	County Name	Number	County Name
1	Anderson	47	Comanche	105	Hays	150	Llano	205	San Patricio
3	Angelina	49	Cooke	107	Henderson	154	Madison	206	San Saba
4	Aransas	50	Coryell	108	Hidalgo	155	Marion	210	Shelby
5	Archer	57	Dallas	109	Hill	158	Matagorda	212	Smith
7	Atascosa	60	Delta	111	Hood	161	McLennan	213	Somervell
8	Austin	61	Denton	112	Hopkins	162	McMullen	214	Starr
10	Bandera	62	DeWitt	113	Houston	163	Medina	215	Stephens
11	Bastrop	66	Duval	116	Hunt	166	Milam	220	Tarrant
13	Bee	67	Eastland	119	Jack	167	Mills	225	Titus
14	Bell	71	Ellis	120	Jackson	169	Montague	227	Travis
15	Bexar	72	Erath	121	Jasper	170	Montgomery	228	Trinity
16	Blanco	73	Falls	123	Jefferson	172	Morris	229	Tyler
18	Bosque	74	Fannin	124	Jim Hogg	174	Nacogdoches	230	Upshur
19	Bowie	75	Fayette	125	Jim Wells	175	Navarro	234	Van Zandt
20	Brazoria	79	Fort Bend	126	Johnson	176	Newton	235	Victoria
21	Brazos	80	Franklin	128	Karnes	178	Nueces	236	Walker
24	Brooks	81	Freestone	129	Kaufman	181	Orange	237	Waller
26	Burleson	82	Frio	130	Kendall	182	Palo Pinto	239	Washington
27	Burnet	84	Galveston	131	Kenedy	183	Panola	240	Webb
28	Caldwell	86	Gillespie	133	Kerr	184	Parker	241	Wharton
29	Calhoun	88	Goliad	137	Kleberg	187	Polk	243	Wichita
31	Cameron	89	Gonzales	139	La Salle	190	Rains	245	Willacy
32	Camp	91	Grayson	140	Lamar	194	Red River	246	Williamson
34	Cass	92	Gregg	142	Lampasas	196	Refugio	247	Wilson
36	Chambers	93	Grimes	143	Lavaca	198	Robertson	249	Wise
37	Cherokee	94	Guadalupe	144	Lee	199	Rockwall	250	Wood
39	Clay	97	Hamilton	145	Leon	201	Rusk	252	Young
43	Collin	100	Hardin	146	Liberty	202	Sabine	253	Zapata
45	Colorado	101	Harris	147	Limestone	203	San Augustine		
46	Comal	102	Harrison	149	Live Oak	204	San Jacinto		

West Texas Waterways



West Texas Counties

Number	County Name	Number	County Name	Number	County Name	Number	County Name
2	Andrews	65	Donley	135	King	195	Reeves
6	Armstrong	68	Ector	136	Kinney	197	Roberts
9	Bailey	69	Edwards	138	Knox	200	Runnels
12	Baylor	70	El Paso	141	Lamb	207	Schleicher
17	Borden	76	Fisher	148	Lipscomb	208	Scurry
22	Brewster	77	Floyd	151	Loving	209	Shackelford
23	Briscoe	78	Foard	152	Lubbock	211	Sherman
25	Brown	83	Gaines	153	Lynn	216	Sterling
30	Callahan	85	Garza	156	Martin	217	Stonewall
33	Carson	87	Glasscock	157	Mason	218	Sutton
35	Castro	90	Gray	159	Maverick	219	Swisher
38	Childress	95	Hale	160	McCulloch	221	Taylor
40	Cochran	96	Hall	164	Menard	222	Terrell
41	Coke	98	Hansford	165	Midland	223	Terry
42	Coleman	99	Hardeman	168	Mitchell	224	Throckmorton
44	Collingsworth	103	Hartley	171	Moore	226	Tom Green
48	Concho	104	Haskell	173	Motley	231	Upton
51	Cottle	106	Hemphill	177	Nolan	232	Uvalde
52	Crane	110	Hockley	179	Ochiltree	233	Val Verde
53	Crockett	114	Howard	180	Oldham	238	Ward
54	Crosby	115	Hudspeth	185	Parmer	242	Wheeler
55	Culberson	117	Hutchinson	186	Pecos	244	Wilbarger
56	Dallam	118	Irion	188	Potter	248	Winkler
58	Dawson	122	Jeff Davis	189	Presidio	251	Yoakum
59	Deaf Smith	127	Jones	191	Randall	254	Zavala
63	Dickens	132	Kent	192	Reagan		
64	Dimmit	134	Kimble	193	Real		

APPENDIX E

DATA FILES (CD-ROM)

APPENDIX B

ANNUAL EMISSIONS BY STATE AND SOURCE CATEGORY FOR THE CENRAP REGION

B-1. Annual emissions (tons) by state and source category for the CENRAP region.

State	Source Category	$PM_{2.5}$	CO	NO_x	SO_2	VOC	NH_3
Arkansas	On-road Mobile						
	Light-Duty	*235*	*502,991*	*27,137*	*1,383*	*29,752*	*1,971*
	Heavy-Duty	*2,076*	*102,247*	*90,833*	*2,163*	*9,786*	*313*
	Total On-road	2,311	605,238	117,970	3,545	39,537	2,284
	Non-road Mobile						
	Locomotives	*624*	*2,759*	*19,831*	*1,690*	*1,099*	*7*
	Commercial Marine	*198*	*1,796*	*9,341*	*895*	*194*	*4*
	Recreational Boats	*1,884*	*100,524*	*2,274*	*103*	*31,309*	*8*
	Other Non-road	*2,415*	*170,860*	*25,852*	*418*	*17,830*	*22*
	Total Non-road	5,121	275,939	57,298	3,107	50,432	41
	Agricultural Dust						
	Animal Feedlots	*1*	*0*	*0*	*0*	*0*	*0*
	Tilling Operations	*17,579*	*0*	*0*	*0*	*0*	*0*
	Total Ag Dust	17,580	0	0	0	0	0
	Arkansas Total	25,012	881,177	175,267	6,652	89,969	2,326
Iowa	On-road Mobile						
	Light-Duty	*381*	*973,854*	*53,702*	*2,113*	*67,501*	*2,755*
	Heavy-Duty	*931*	*30,853*	*44,607*	*884*	*2,993*	*107*
	Total On-road	1,312	1,004,707	98,308	2,997	70,494	2,863
	Non-road Mobile						
	Locomotives	*905*	*3,992*	*28,705*	*2,447*	*1,575*	*11*
	Commercial Marine	65	589	3,062	294	64	1
	Recreational Boats	*1,626*	*88,079*	*2,066*	*92*	*26,310*	*7*
	Other Non-road	*6,607*	*326,950*	*63,725*	*1,062*	*33,506*	*38*
	Total Non-road	9,203	419,610	97,558	3,895	61,455	57
	Agricultural Dust						
	Animal Feedlots	*653*	*0*	*0*	*0*	*0*	*0*
	Tilling Operations	*47,304*	*0*	*0*	*0*	*0*	*0*
	Total Ag Dust	47,957	0	0	0	0	0
	Iowa Total	58,472	1,424,317	195,866	6,891	131,949	2,920

B-1. Annual emissions (tons) by state and source category for the CENRAP region.

State	Source Category	$PM_{2.5}$	CO	NO_x	SO_2	VOC	NH_3
Kansas	On-road Mobile						
	Light-Duty	*345*	*930,039*	*47,210*	*1,938*	*61,867*	*2,528*
	Heavy-Duty	*855*	*29,686*	*35,520*	*758*	*2,979*	*98*
	Total On-road	1,200	959,725	82,730	2,696	64,846	2,626
	Non-road Mobile						
	Locomotives	*1,164*	*5,147*	*37,022*	*3,157*	*2,035*	*15*
	Commercial Marine	*1*	*6*	*32*	*3*	*1*	*0*
	Recreational Boats	*345*	*21,962*	*660*	*24*	*6,515*	*2*
	Other Non-road	*4,665*	*244,673*	*47,382*	*716*	*19,381*	*98*
	Total Non-road	6,175	271,788	85,096	3,900	27,931	115
	Agricultural Dust						
	Animal Feedlots	*2,778*	*0*	*0*	*0*	*0*	*0*
	Tilling Operations	*50,769*	*0*	*0*	*0*	*0*	*0*
	Total Ag Dust	53,547	0	0	0	0	0
	Kansas Total	60,923	1,231,513	167,825	6,595	92,777	2,740
Louisiana	On-road Mobile						
	Light-Duty	*416*	*824,585*	*45,929*	*2,396*	*57,283*	*3,485*
	Heavy-Duty	*2,272*	*74,770*	*105,449*	*2,257*	*7,361*	*263*
	Total On-road	2,689	899,355	151,378	4,653	64,643	3,748
	Non-road Mobile						
	Locomotives	*370*	*1,638*	*11,787*	*1,003*	*658*	*4*
	Commercial Marine	*1,914*	*9,631*	*69,345*	*12,450*	*1,739*	*14*
	Recreational Boats	*4,895*	*259,196*	*5,746*	*267*	*80,803*	*21*
	Other Non-road	*2,579*	*275,361*	*29,650*	*536*	*26,173*	*525*
	Total Non-road	9,757	545,825	116,528	14,256	109,373	563
	Agricultural Dust						
	Animal Feedlots	*2*	*0*	*0*	*0*	*0*	*0*
	Tilling Operations	*8,489*	*0*	*0*	*0*	*0*	*0*
	Total Ag Dust	8,491	0	0	0	0	0
	Louisiana Total	20,936	1,445,180	267,906	18,908	174,016	4,311

B-1. Annual emissions (tons) by state and source category for the CENRAP region.

State	Source Category	$PM_{2.5}$	CO	NO_x	SO_2	VOC	NH_3
Minnesota	On-road Mobile						
	Light-Duty	*595*	*1,285,076*	*73,656*	*1,274*	*75,663*	*4,771*
	Heavy-Duty	*1,577*	*43,160*	*65,290*	*1,314*	*5,255*	*182*
	Total On-road	2,172	1,328,236	138,946	2,588	80,918	4,954
	Non-road Mobile						
	Locomotives	*693*	*3,053*	*21,947*	*1,873*	*1,179*	*9*
	Commercial Marine	*116*	*703*	*4,355*	*714*	*122*	*2*
	Recreational Boats	*5,886*	*319,514*	*7,659*	*142*	*95,409*	*26*
	Other Non-road	*7,979*	*640,351*	*65,365*	*1,052*	*116,847*	*59*
	Total Non-road	14,673	963,621	99,327	3,781	213,557	96
	Agricultural Dust						
	Animal Feedlots	*43*	*0*	*0*	*0*	*0*	*0*
	Tilling Operations	*43,013*	*0*	*0*	*0*	*0*	*0*
	Total Ag Dust	43,056	0	0	0	0	0
	Minnesota Total	59,901	2,291,857	238,272	6,369	294,474	5,049
Missouri	On-road Mobile						
	Light-Duty	*680*	*1,375,126*	*77,916*	*3,120*	*76,004*	*5,356*
	Heavy-Duty	*1,841*	*52,065*	*79,607*	*1,787*	*5,491*	*209*
	Total On-road	2,521	1,427,190	157,523	4,907	81,495	5,565
	Non-road Mobile						
	Locomotives	*953*	*4,215*	*30,308*	*2,582*	*1,658*	*12*
	Commercial Marine	*247*	*2,057*	*11,937*	*1,177*	*329*	*5*
	Recreational Boats	*5,943*	*303,079*	*6,251*	*308*	*92,318*	*24*
	Other Non-road	*4,895*	*466,845*	*51,328*	*909*	*35,664*	*33*
	Total Non-road	12,038	776,195	99,823	4,976	129,969	74
	Agricultural Dust						
	Animal Feedlots	*18*	*0*	*0*	*0*	*0*	*0*
	Tilling Operations	*20,905*	*0*	*0*	*0*	*0*	*0*
	Total Ag Dust	20,923	0	0	0	0	0
	Missouri Total	35,481	2,203,386	257,347	9,883	211,464	5,639

B-1. Annual emissions (tons) by state and source category for the CENRAP region.

State	Source Category	$PM_{2.5}$	CO	NO_x	SO_2	VOC	NH_3
Nebraska	On-road Mobile						
	Light-Duty	*246*	*581,402*	*30,649*	*1,229*	*38,788*	*1,581*
	Heavy-Duty	*624*	*18,626*	*25,037*	*589*	*2,115*	*71*
	Total On-road	870	600,028	55,685	1,819	40,902	1,652
	Non-road Mobile						
	Locomotives	*2,617*	*11,559*	*83,121*	*7,085*	*4,543*	*34*
	Commercial Marine	*1*	*6*	*31*	*3*	*1*	*0*
	Recreational Boats	*479*	*26,282*	*648*	*28*	*7,971*	*2*
	Other Non-road	*3,644*	*161,977*	*35,556*	*582*	*13,650*	*23*
	Total Non-road	6,740	199,824	119,355	7,697	26,165	59
	Agricultural Dust						
	Animal Feedlots	*1,312*	*0*	*0*	*0*	*0*	*0*
	Tilling Operations	*27,770*	*0*	*0*	*0*	*0*	*0*
	Total Ag Dust	29,082	0	0	0	0	0
	Nebraska Total	36,692	799,852	175,041	9,516	67,067	1,711
Oklahoma	On-road Mobile						
	Light-Duty	*509*	*1,194,649*	*64,504*	*2,989*	*81,676*	*3,968*
	Heavy-Duty	*1,331*	*48,382*	*54,812*	*1,265*	*5,062*	*154*
	Total On-road	1,840	1,243,032	119,317	4,253	86,738	4,122
	Non-road Mobile						
	Locomotives	*645*	*2,853*	*20,505*	*1,750*	*1,116*	*8*
	Commercial Marine	*11*	*98*	*509*	*49*	*11*	*0*
	Recreational Boats	*1,708*	*95,314*	*2,330*	*100*	*29,590*	*7*
	Other Non-road	*2,543*	*230,294*	*27,563*	*460*	*18,846*	*265*
	Total Non-road	4,907	328,559	50,906	2,359	49,562	280
	Agricultural Dust						
	Animal Feedlots	*512*	*0*	*0*	*0*	*0*	*0*
	Tilling Operations	*20,033*	*0*	*0*	*0*	*0*	*0*
	Total Ag Dust	20,545	0	0	0	0	0
	Oklahoma Total	27,292	1,571,590	170,223	6,612	136,300	4,402

B-1. Annual emissions (tons) by state and source category for the CENRAP region.

State	Source Category	$PM_{2.5}$	CO	NO_x	SO_2	VOC	NH_3
Texas	On-road Mobile						
	Light-Duty	*2,339*	*3,653,523*	*220,819*	*10,555*	*248,680*	*19,365*
	Heavy-Duty	*6,276*	*113,949*	*340,992*	*6,667*	*14,057*	*692*
	Total On-road	8,615	3,767,472	561,811	17,222	262,737	20,057
	Non-road Mobile						
	Locomotives	*2,148*	*9,488*	*68,236*	*5,816*	*3,753*	*26*
	Commercial Marine	*1,212*	*3,495*	*25,310*	*10,092*	*723*	*6*
	Recreational Boats	*5,960*	*334,464*	*8,043*	*350*	*104,461*	*26*
	Other Non-road	*11,241*	*1,440,533*	*131,009*	*2,271*	*106,881*	*1,444*
	Total Non-road	20,561	1,787,980	232,597	18,529	215,819	1,502
	Agricultural Dust						
	Animal Feedlots	*2,374*	*0*	*0*	*0*	*0*	*0*
	Tilling Operations	*33,484*	*0*	*0*	*0*	*0*	*0*
	Total Ag Dust	35,858	0	0	0	0	0
	Texas Total	65,034	5,555,452	794,408	35,750	478,555	21,559
All States	All Sources	389,744	17,404,324	2,442,155	107,177	1,676,572	50,657

APPENDIX C

SUMMARIES OF ACTIVITY DATA AND EMISSIONS MODELING INPUTS PREPARED FOR ON-ROAD EMISISON INVENTORIES:

VEHICLE-MILES OF TRAVEL,
FLEET DISTRIBUTIONS,
FUELS CHARACTERISTICS,
AND
REGULATORY CONTROLS

Pages C-3 through C-14 (12 pages) illustrate vehicle-miles of travel (VMT) compiled for each CENRAP state. One- to two-page data summary sheets were prepared for each state. Each data summary sheet includes the following elements of information. (The page position of each element is indicated relative to landscape orientation.)

<u>Element of Information (Page Position)</u>

- Sources of information—i.e., specific state agencies or "default", which indicates EPA guidance defaults (page header)
- CENRAP overview map identifying location of the state of interest (upper left)
- State overview map with interstate freeways (upper center)
- County-specific total annual VMT for 2002 (upper right)
- Distribution of total annual VMT by road type (lower left)
- Distribution of total annual VMT by vehicle type (lower center)
- Average speed by road type (most states: center right; Texas and Louisiana: lower right)
- Weekday diurnal pattern of VMT (most states: lower right; Texas, Louisiana, and St. Louis, Missouri, area: second page of data summary sheet for each state)

Box whisker plots were prepared as follows. The box centerline indicates the median, and the box extents represent the 25th and 75th percentiles with "outliers" plotted above the whiskers.

The whiskers have a maximum length equal to 1.5 times the length of the box (interquartile range). If there are data outside this range, the points are shown on the plot and the whisker ends on the highest or lowest data point within the range of the whisker. The outliers are further identified with asterisks representing the points that fall within 3 times the interquartile range from the end of the box and with squares representing points beyond this range.

Pages C-15 through C-18 (4 pages) illustrate the inputs that were compiled for MOBILE6 and NONROAD 2004 to describe fuel characteristics (such as sulfur content) for areas throughout the CENRAP.

Pages C-19 through C-21 (3 pages) illustrate the inputs that were compiled for MOBILE6 to describe regulatory programs (such as inspection and maintenance, or I/M) for areas throughout the CENRAP.

Pages C-22 through C-24 (3 pages) illustrate the inputs that were compiled for MOBILE6 to describe the IM 240 program of St. Louis, Missouri.

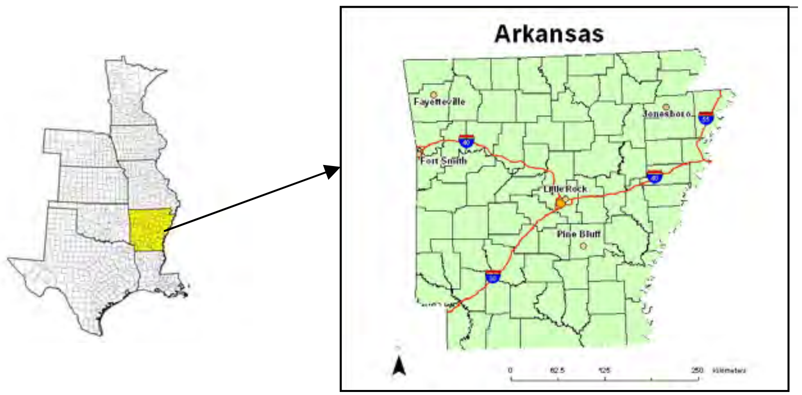
Pages C-25 through C-32 (8 pages) illustrate the MOBILE6 default age distribution of the vehicle fleet (for comparison purposes) and the weighted-average age distribution of the vehicle fleets for each of the CENRAP states. The weighted averages were calculated as the averages of county-level age distributions, weighted by the number of vehicles in each county. Thus, counties with more registered vehicles were weighted proportionally more heavily.

Pages C-33 through C-35 (3 pages) illustrate the fractions of the light-duty vehicle and light-duty truck fleets that are diesel-powered.

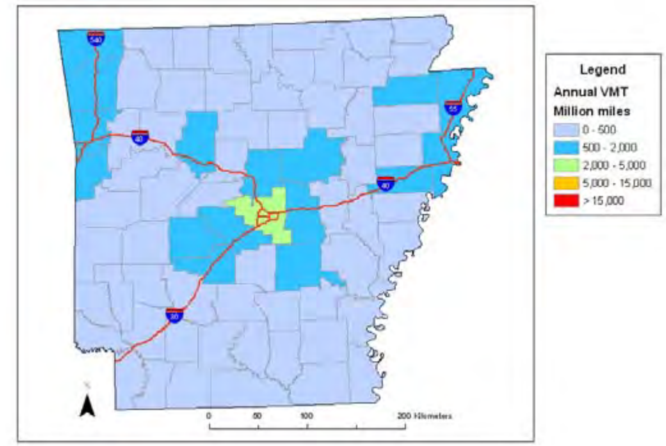
Data Summary Sheet: Arkansas

Data Source: [1] Arkansas Dept. of Transportation & Highways

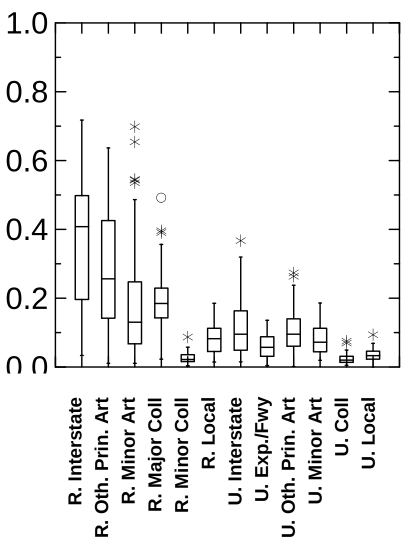
[2] Default Data



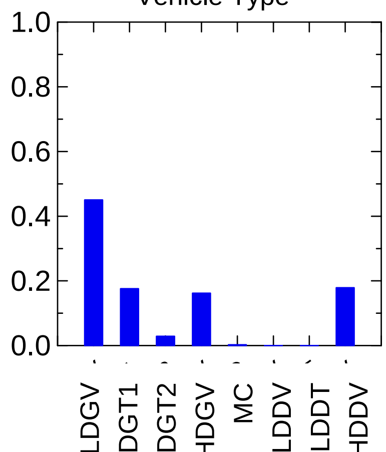
2002 Countywide VMT [1]



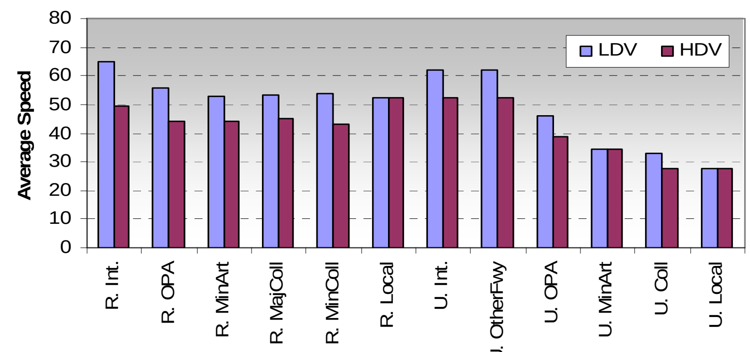
VMT Distribution by Road Type [1]



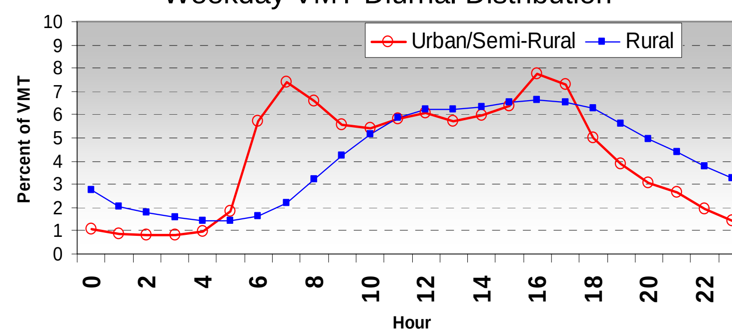
VMT Distribution by Vehicle Type [1]



Average Speed by Road Type [2]



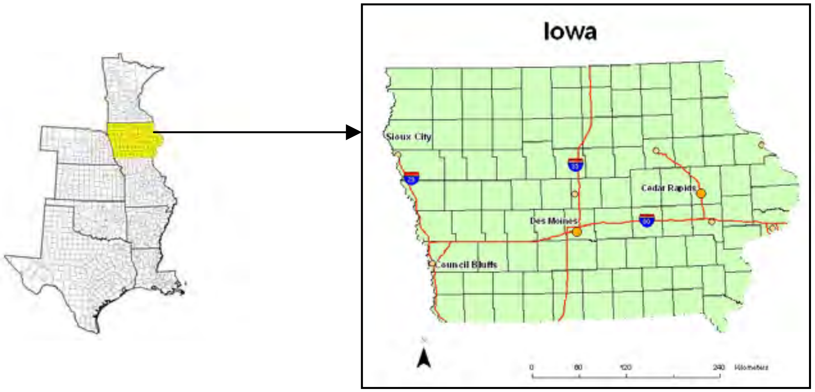
Weekday VMT Diurnal Distribution [2]



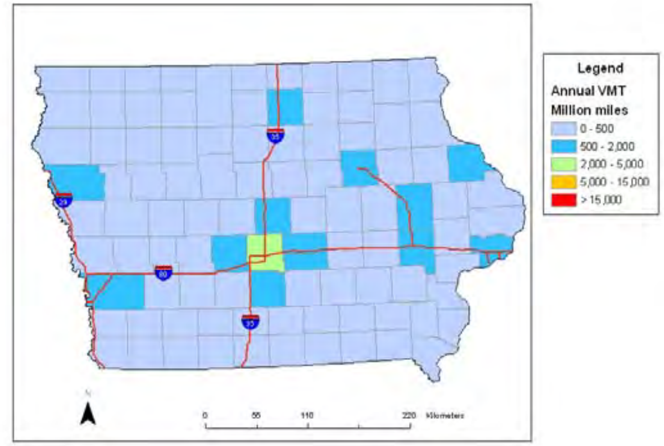
Data Summary Sheet: Iowa

Data Source: [1] **Iowa Dept. of Transportation**

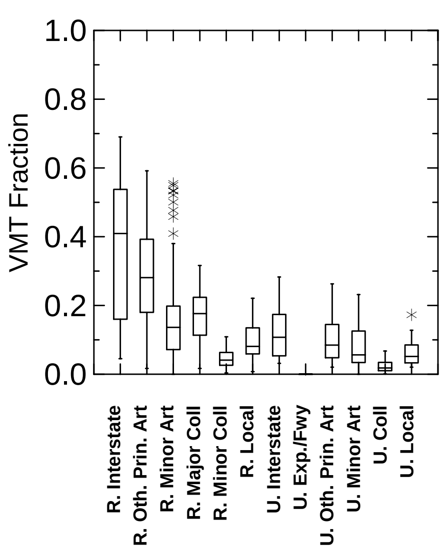
[2] **Default Data**



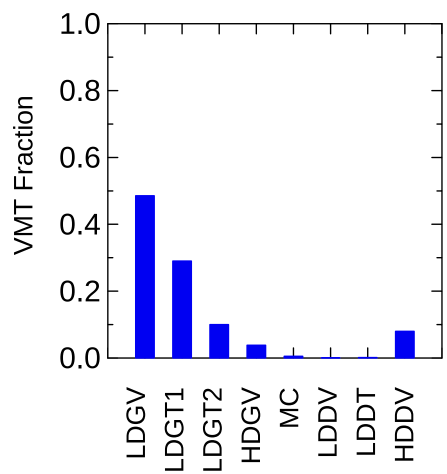
2002 Countywide VMT [1]



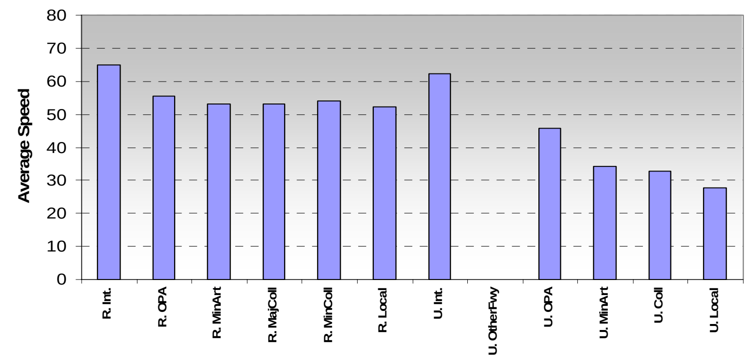
VMT Distribution by Road Type [1]



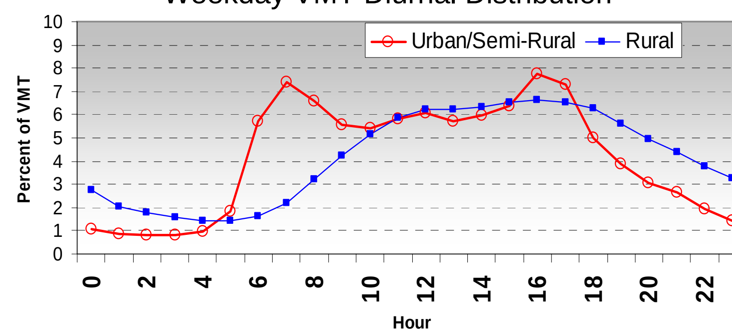
VMT Distribution by Vehicle Type [2]



Average Speed by Road Type [1]



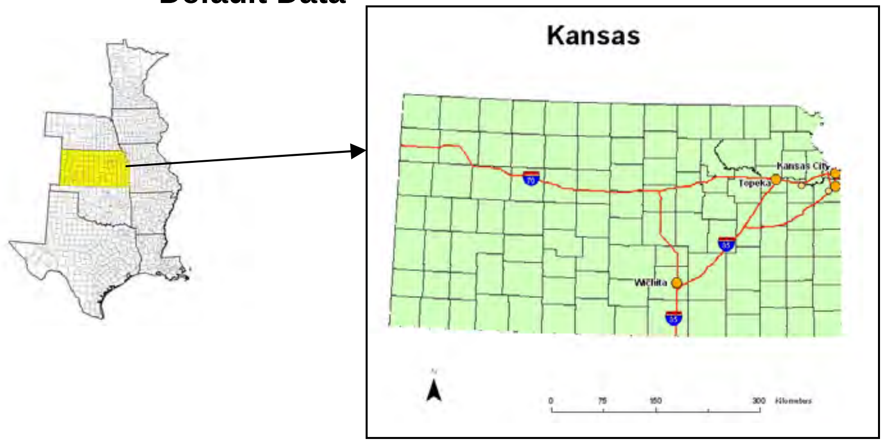
Weekday VMT Diurnal Distribution [2]



Data Summary Sheet: Kansas

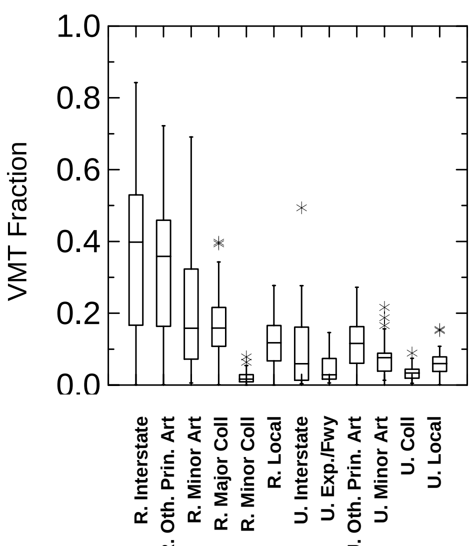
Data Source: [1] **Kansas Highway Dept.**

[2] **Default Data**

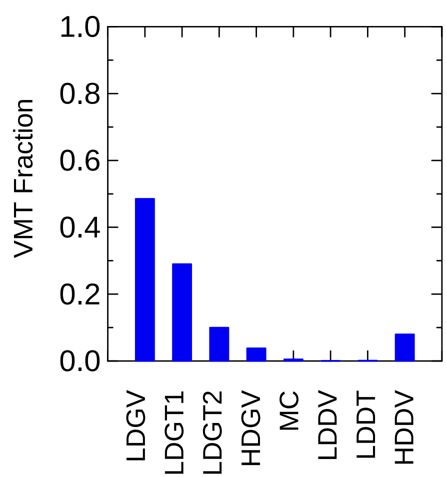


2002 Countywide VMT [1]

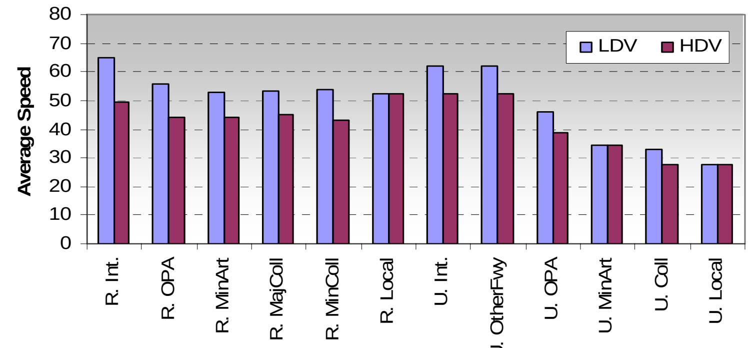
VMT Distribution by Road Type [1]



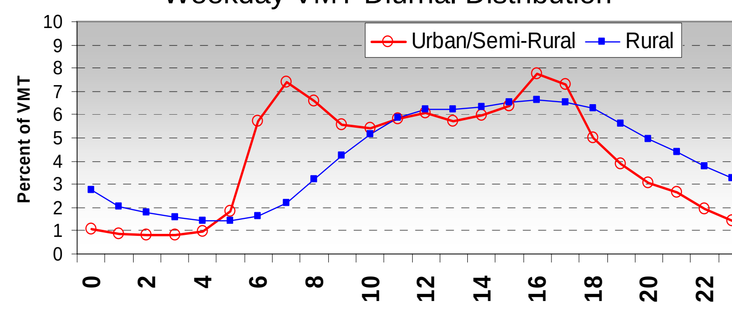
VMT Distribution by Vehicle Type [2]



Average Speed by Road Type [2]



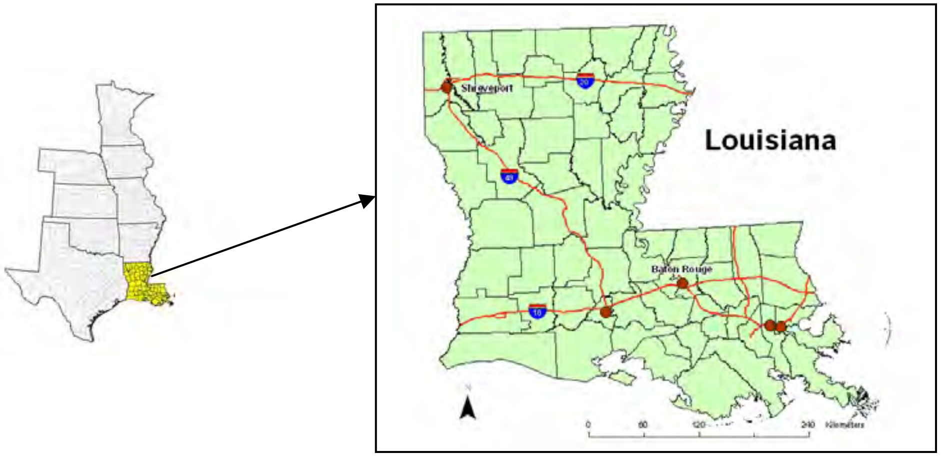
Weekday VMT Diurnal Distribution [2]



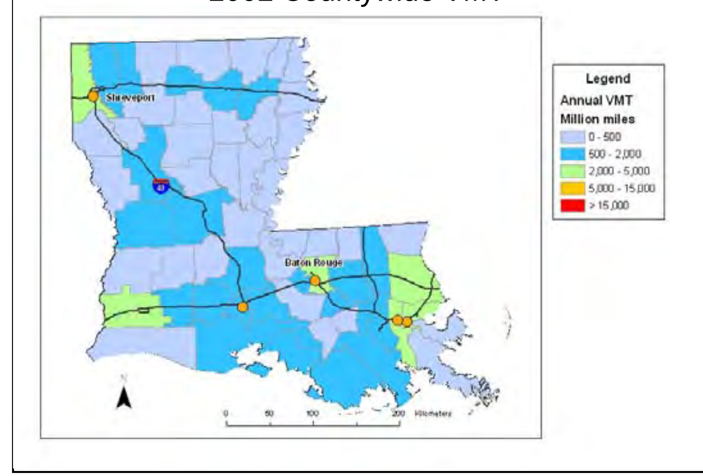
Data Summary Sheet: Louisiana

Data Source: [1] Louisiana Dept. of Environmental Quality

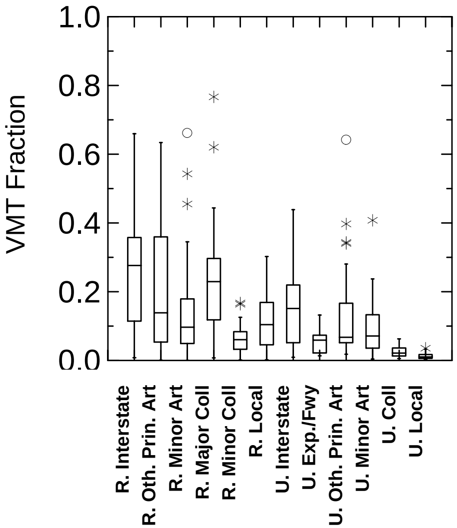
[2] Default Data



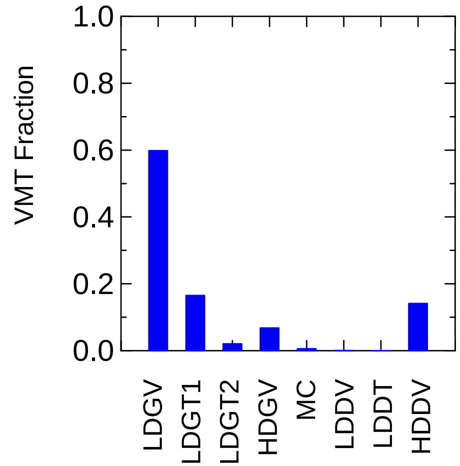
2002 Countywide VMT [1]



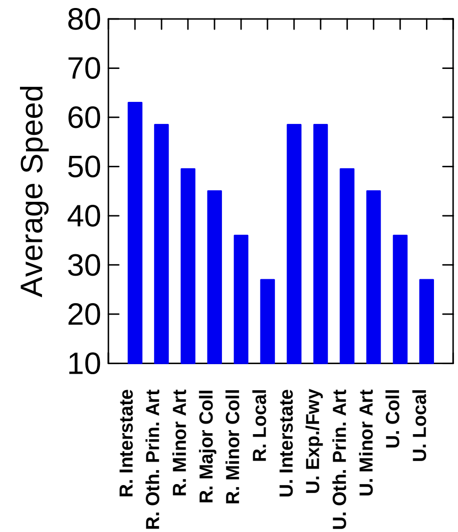
VMT Distribution by Road Type [1]

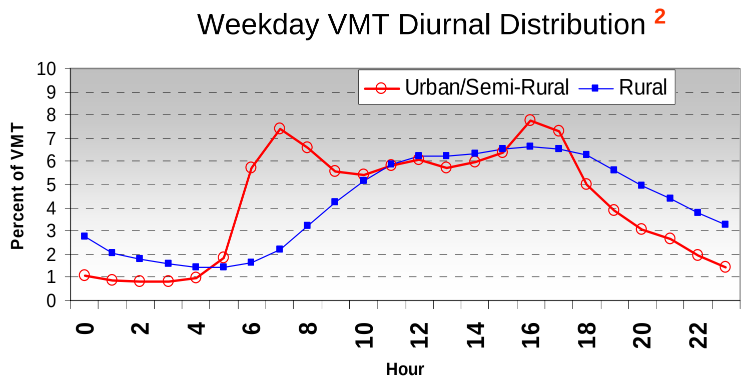


VMT Distribution by Vehicle Type [1]



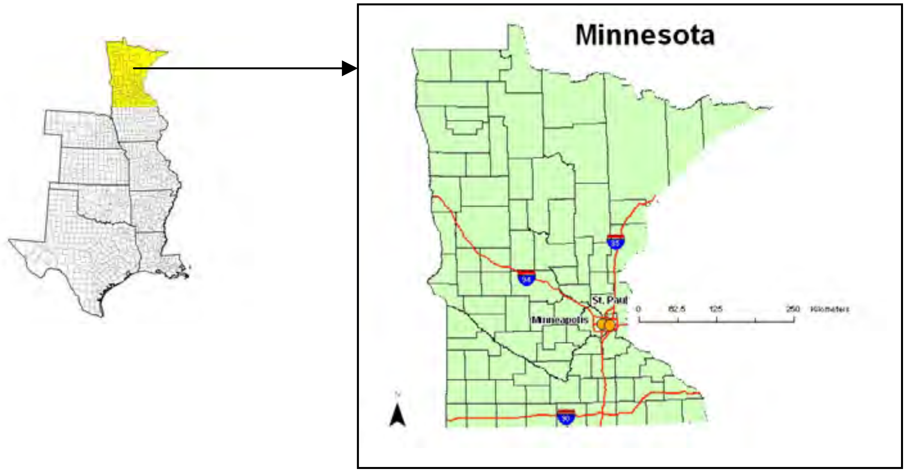
Average Speed by Road Type [1]



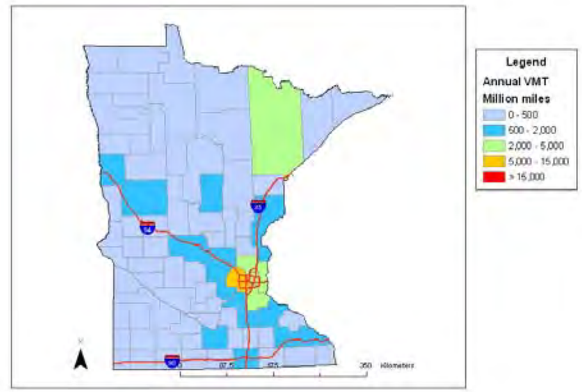

Weekday VMT Diurnal Distribution 2
Urban/Semi-Rural
Rural
Percent of VMT
0
1
2
3
4
5
6
7
8
9
10
0
2
4
6
8
10
12
14
16
18
20
22
Hour

Data Summary Sheet: Minnesota

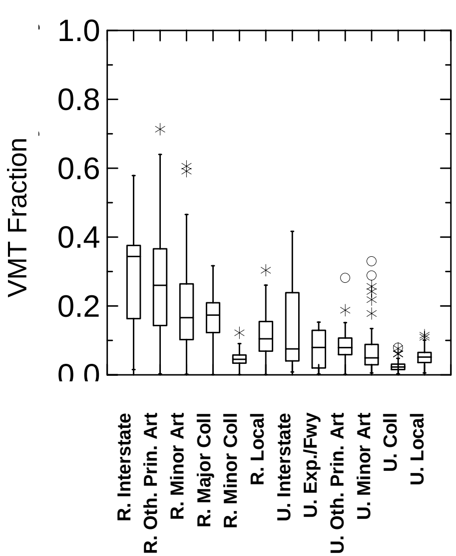
Data Source: [1] Minnesota Dept. of Transportation
[2] Default Data



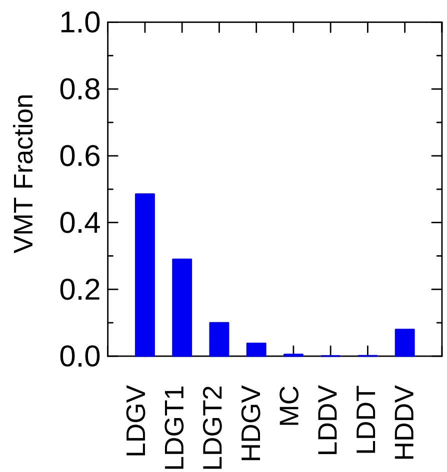
2002 Countywide VMT [1]



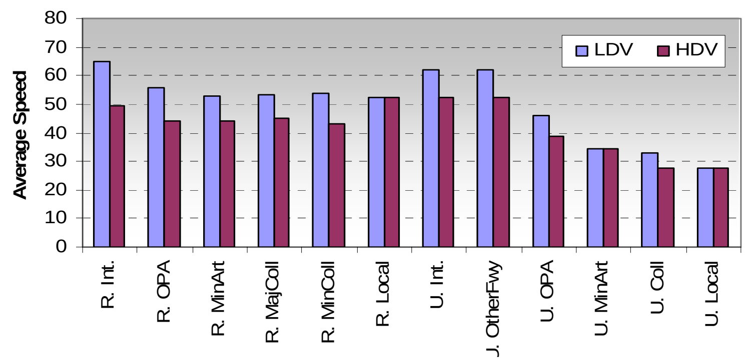
VMT Distribution by Road Type [1]



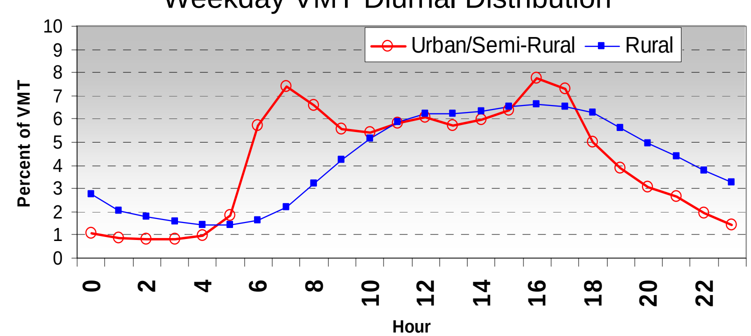
VMT Distribution by Vehicle Type [2]



Average Speed by Road Type [2]



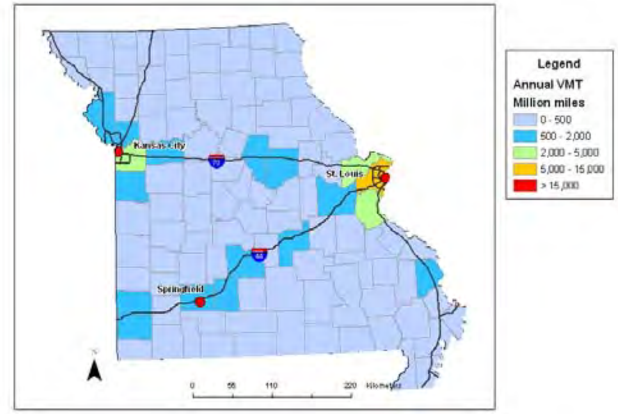
Weekday VMT Diurnal Distribution [2]



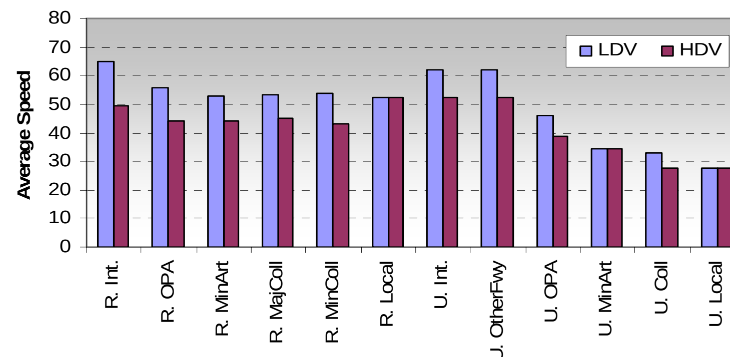
Data Summary Sheet: Missouri

Data Source: [1] **Missouri Dept. of Transportation &**
[2] **East-West Gateway Coordinating Council**
[3] **Default Data**

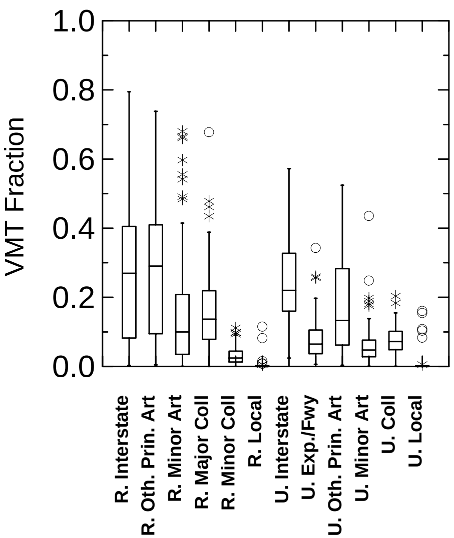
2002 Countywide VMT [1,2]



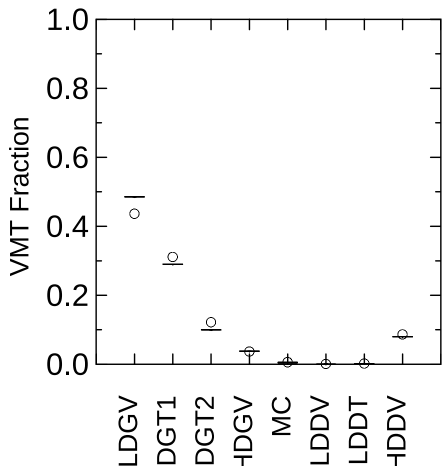
Average Speed by Road Type [3]



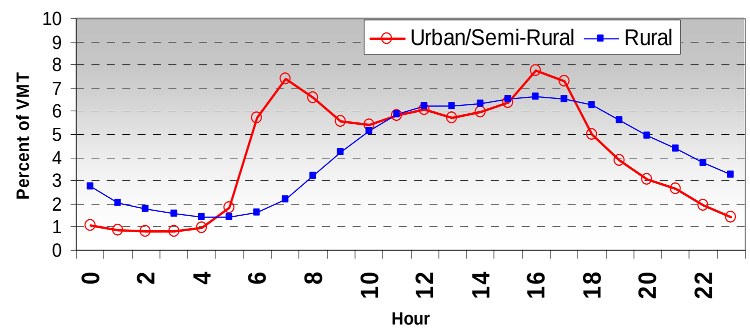
VMT Distribution by Road Type
MoDOT [1] & EWGCC Data [2]



VMT Distribution by Vehicle Type
EWGCC Data [2] & Default Data [3]

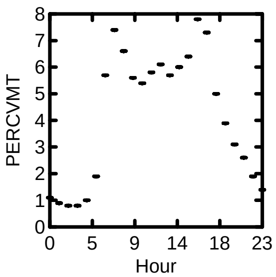


Weekday VMT Diurnal Distribution Outside of St. Louis Area [3]

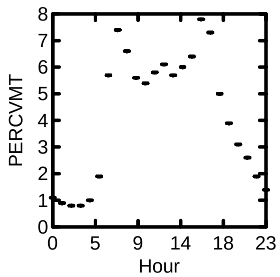


Average of hourly VMT distributions by road type, St. Louis Area**

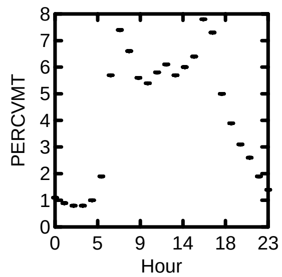
R. Intst



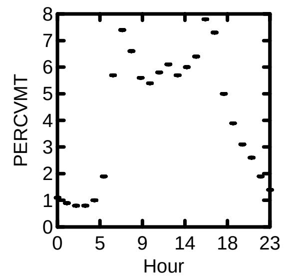
R. OPrArt



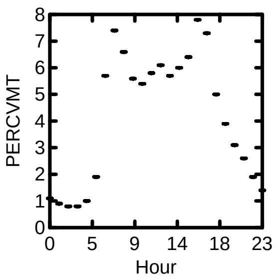
R. MinArt



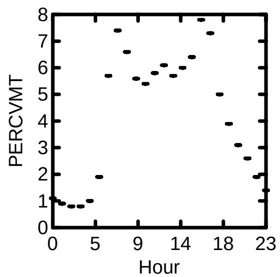
R. MajCol



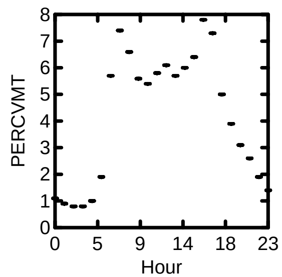
R. MinCol



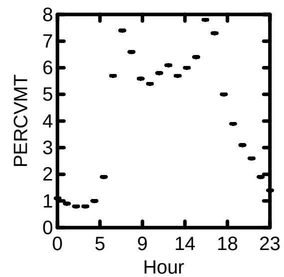
R. Local



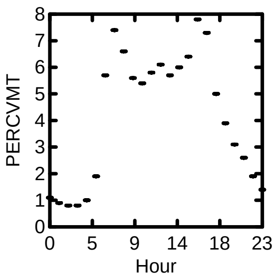
U. Intst



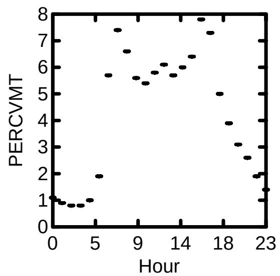
U. ExpFwy



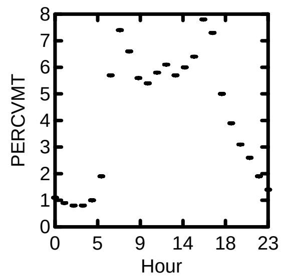
U. OPrArt



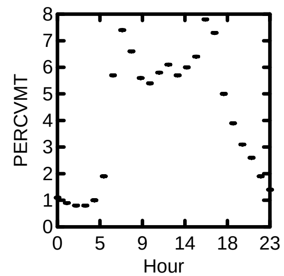
U. MinArt



U. Coll



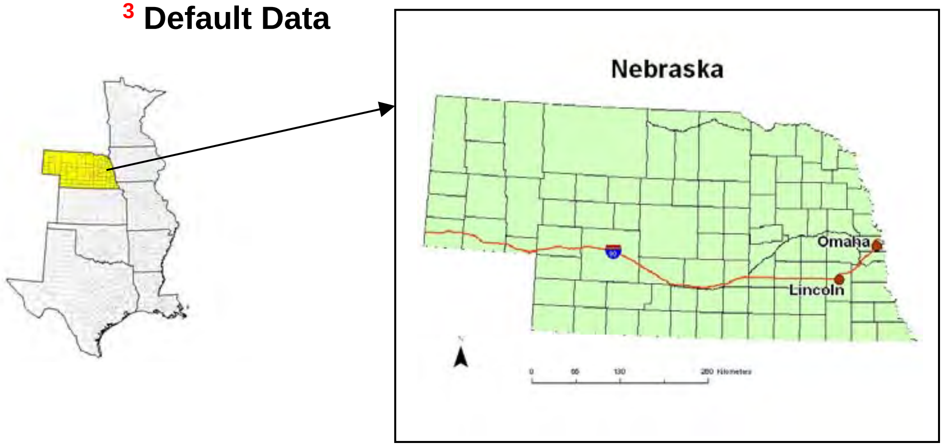
U. Local



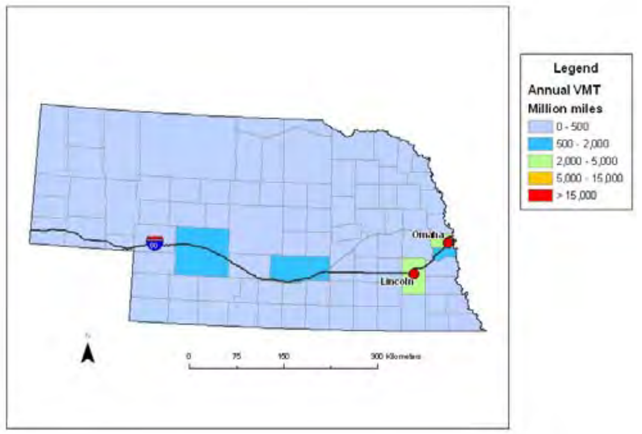
Note that box-whisker plots appear as points because only a small number of counties with negligible variability are plotted.

Data Summary Sheet: Nebraska

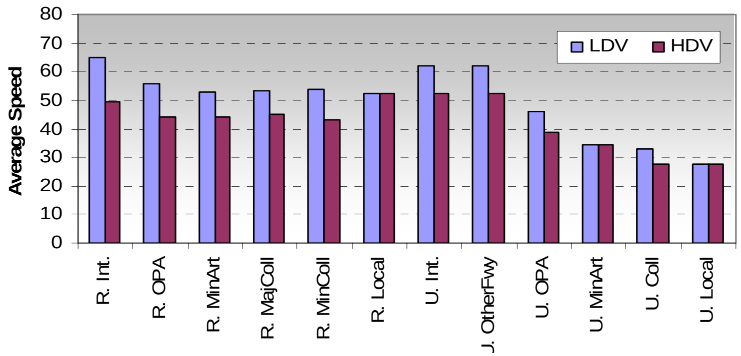
Data Source: [1] Nebraska Dept. of Transportation &
[2] Lincoln-Lancaster MPO
[3] Default Data



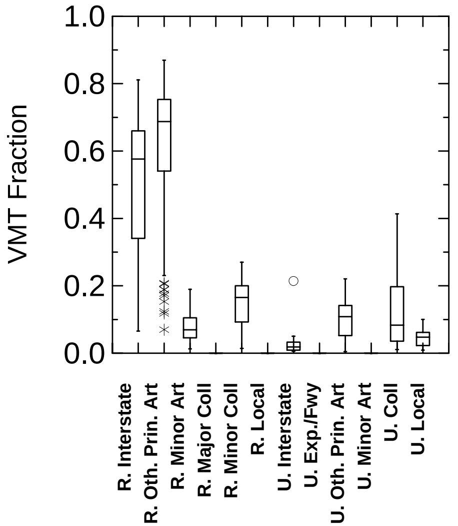
2002 Countywide VMT [1]



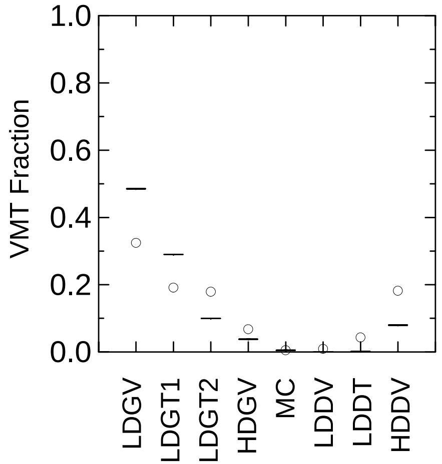
Average Speed by Road Type [3]



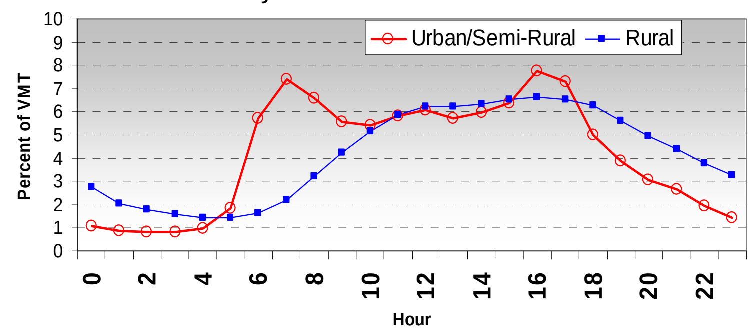
VMT Distribution by Road Type
NeDOT [1] & LLMPO Data [2]



VMT Distribution by Vehicle Type
LLMPO Data [2] & Default Data [3]



Weekday VMT Diurnal Distribution [3]

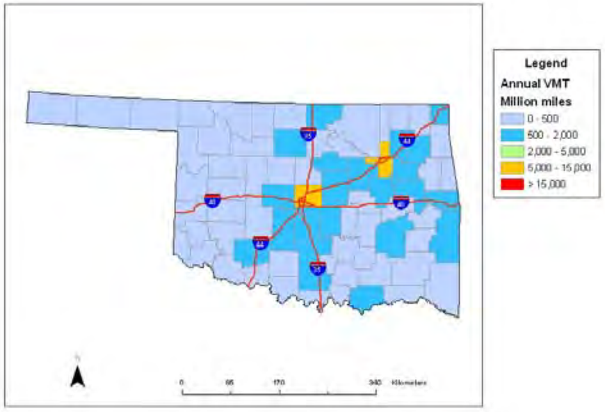


Data Summary Sheet: Oklahoma

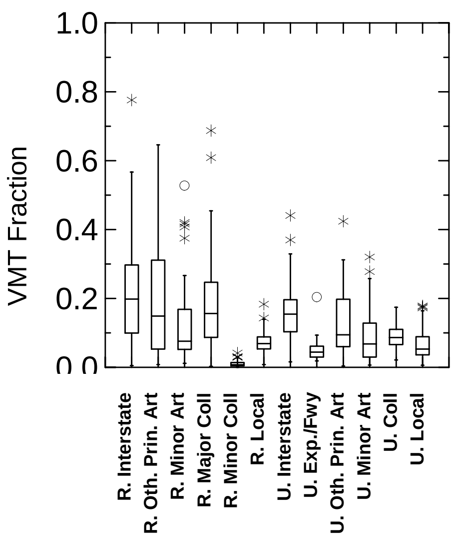
Data Source: [1] Oklahoma State Highway Dept.

[2] Default Data

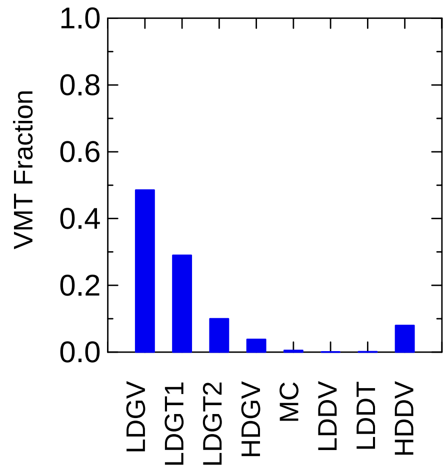
2002 Countywide VMT [1]



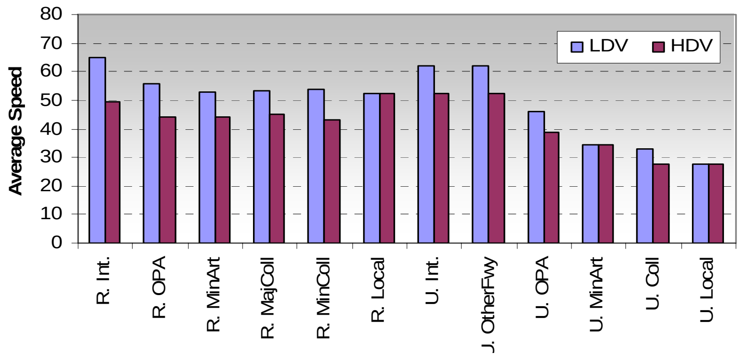
VMT Distribution by Road Type [1]



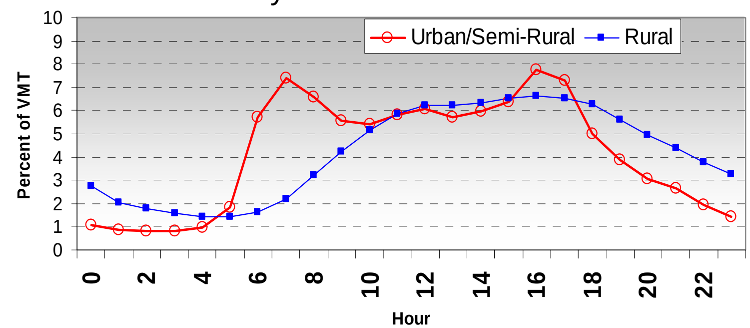
VMT Distribution by Vehicle Type [2]



Average Speed by Road Type [2]

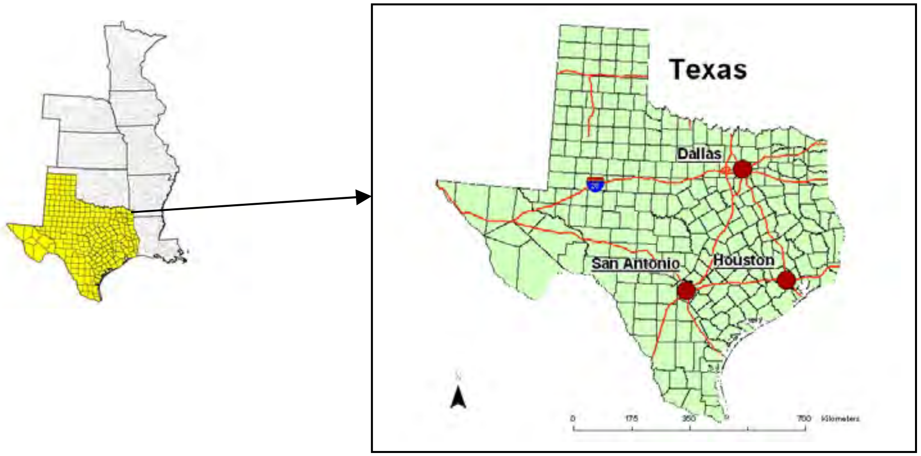


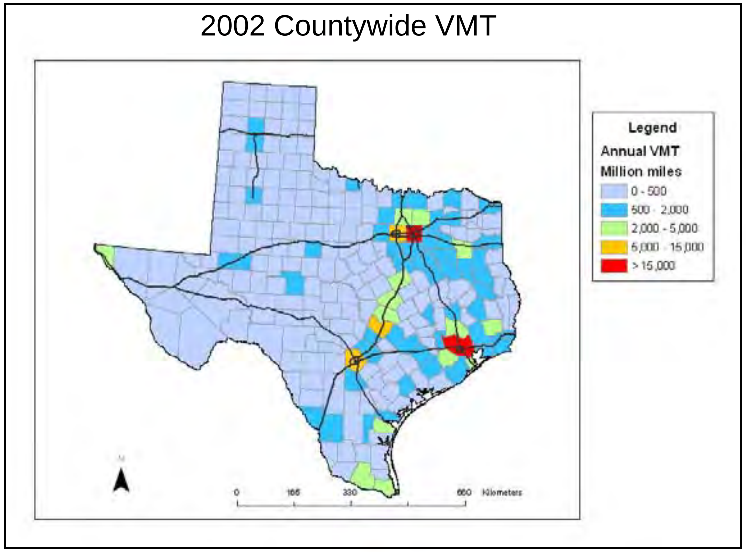
Weekday VMT Diurnal Distribution [2]



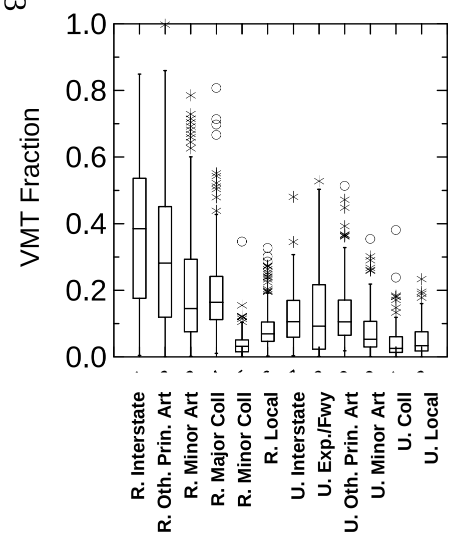
Data Summary Sheet: Texas

Data Source: Texas Transportation Institute & TCEQ.

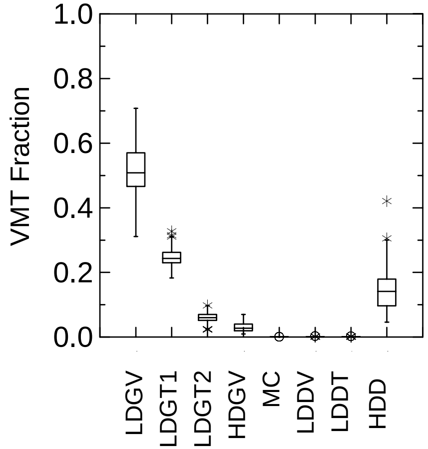




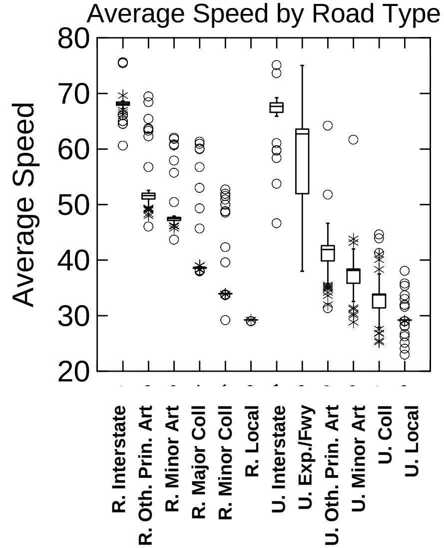
VMT Distribution by Road Type



VMT Distribution by Vehicle Type



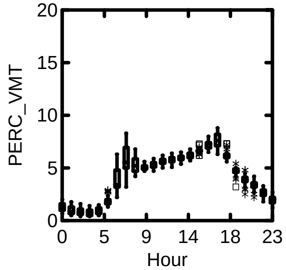
Average Speed by Road Type



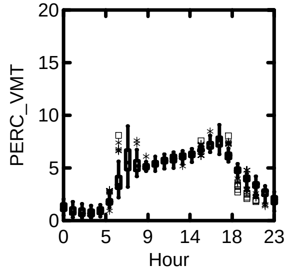
Average of hourly VMT distributions by road type.

(range limited to 20%, 1 outlier was excluded)

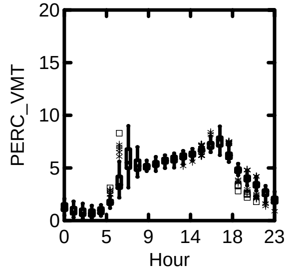
R. Intst



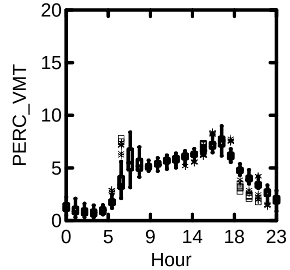
R. OPrArt



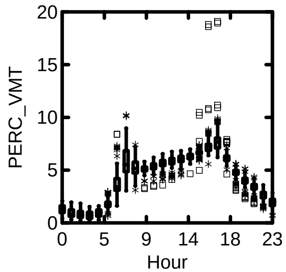
R. MinArt



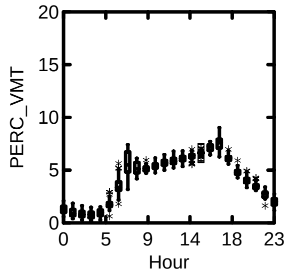
R. MajCol



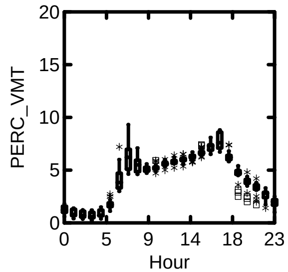
R. MinCol



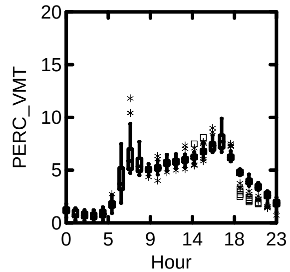
R. Local



U. Intst



U. ExpFwy



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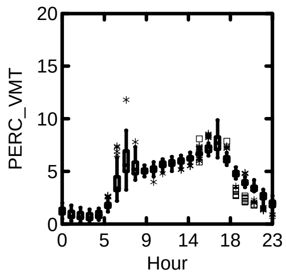

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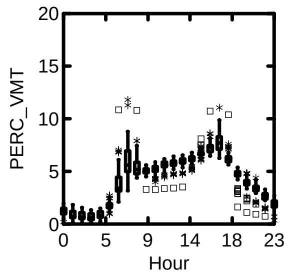
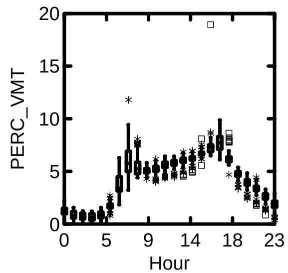
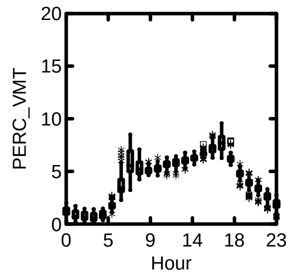


U. Coll



U. Local



Summary of MOBILE6 Inputs for Fuels Characteristics

<table>
<tr><th>State</th><th>County</th><th colspan="8">FUEL PROGRAM command[a]</th></tr>
<tr><td>AR</td><td>All counties</td><td colspan="8">FUEL PROGRAM : 1</td></tr>
<tr><td>IA</td><td>All counties</td><td colspan="8">FUEL PROGRAM : 1</td></tr>
<tr><td>KS</td><td>All counties</td><td colspan="8">FUEL PROGRAM : 1</td></tr>
<tr><td>LA</td><td>All counties</td><td colspan="8">FUEL PROGRAM : 1</td></tr>
<tr><td rowspan="5">MN</td><td rowspan="5">All counties</td><td colspan="8">FUEL PROGRAM : 4</td></tr>
<tr><td>300.0</td><td>299.0</td><td>100.0</td><td>100.0</td><td>100.0</td><td>92.0</td><td>33.0</td><td>33.0</td></tr>
<tr><td>30.0</td><td>30.0</td><td>30.0</td><td>30.0</td><td>30.0</td><td>30.0</td><td>30.0</td><td>30.0</td></tr>
<tr><td>1000.0</td><td>1000.0</td><td>1000.0</td><td>1000.0</td><td>303.0</td><td>303.0</td><td>87.0</td><td>87.0</td></tr>
<tr><td>80.0</td><td>80.0</td><td>80.0</td><td>80.0</td><td>80.0</td><td>80.0</td><td>80.0</td><td>80.0</td></tr>
<tr><td>MO</td><td>St. Louis area[b,c]</td><td colspan="8">FUEL PROGRAM : 2 S</td></tr>
<tr><td rowspan="2">NE</td><td>Western counties[d]</td><td colspan="8">FUEL PROGRAM : 3</td></tr>
<tr><td>All other counties</td><td colspan="8">FUEL PROGRAM : 1</td></tr>
<tr><td>OK</td><td>All counties</td><td colspan="8">FUEL PROGRAM : 1</td></tr>
<tr><td rowspan="3">TX</td><td>Dallas/Fort Worth counties[c,e]</td><td colspan="8">FUEL PROGRAM : 2 S</td></tr>
<tr><td>Houston/Galveston counties[c,f]</td><td colspan="8">FUEL PROGRAM : 2 S</td></tr>
<tr><td>All other counties</td><td colspan="8">FUEL PROGRAM : 1</td></tr>
</table>

[a] If not specified, MOBILE6 assumes FUEL PROGRAM : 1, which corresponds to "Conventional Gasoline East": i.e., an average 2002 fuel sulfur content of 279 ppm and a maximum 2002 fuel sulfur content of 1000 ppm. For areas using Federal Reformulated Gasoline (RFG), the designation "S" or "N" is based upon the classification of regions in 40 CFR 80.71.

[b] Includes Franklin, Jefferson, St. Charles, and St. Louis Counties, and St. Louis City.

[c] All FUEL PROGRAM : 2 S areas should also use the SEASON command. SEASON : 1 applies May 1 through September 15; SEASON : 2 applies for the rest of the calendar year.

[d] Includes the following counties: Banner, Box Butte, Cheyenne, Dawes, Deuel, Garden, Keith, Kimball, Morrill, Scotts Bluff, Sheridan, and Sioux (40 CFR 80.215(a)(2)(i). Although this is the program recommended by EPA for these counties, use of this fuel program command in 2002 is optional, since the 2002 sulfur contents for FUEL PROGRAM : 3 are the same as those for FUEL PROGRAM : 1.

[e] Includes the following counties: Collin, Dallas, Denton, Tarrant.

[f] Includes the following counties: Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller.

Summary of MOBILE6 Inputs for Sulfur Contents of Diesel Fuels

State	DIESEL SULFUR command[a]
AR	DIESEL SULFUR : 360.0
IA	DIESEL SULFUR : 360.0
KS	DIESEL SULFUR : 330.0
LA	DIESEL SULFUR : 380.0
MN	DIESEL SULFUR : 360.0
MO	DIESEL SULFUR : 390.0
NE	DIESEL SULFUR : 360.0
OK	DIESEL SULFUR : 360.0
TX	DIESEL SULFUR : 364.0

[a] Value is sulfur content in units of parts per million by weight (ppmw); regulatory limit is 500 ppmw in 2002.

Summary of MOBILE6 Inputs for Oxygenated Fuels Specifications

State	Area	Period	Command	Ethers market share (fraction)	Alcohols market share (fraction)	Avg. wt. frac. Oxygen in Ether Blends	Avg. wt. frac. Oxygen in Alcohol Blends	RVP Waiver for Alcohol Blends
AR	All areas	All Months	OXYGENATED FUELS :	0.500	0.000	0.006	0.000	2
IA	All areas	All Months	OXYGENATED FUELS :	0.000	0.555	0.000	0.035	2
KS	All areas	All Months	OXYGENATED FUELS :	0.000	0.040	0.000	0.035	2
LA	All areas	All Months	OXYGENATED FUELS :	0.300	0.000	0.009	0.000	2
MN	All areas	All Months	OXYGENATED FUELS :	0.000	0.977	0.000	0.034	2
MO	St. Louis area[a]	All Months	(N/A)[b]					
	All other areas	All Months	OXYGENATED FUELS :	0.000	0.095	0.000	0.033	2
NE	All areas	All Months	OXYGENATED FUELS :	0.000	0.420	0.000	0.035	2
OK	All areas	All Months	OXYGENATED FUELS :	0.000	0.000	0.000	0.000	2
TX	Dallas/Fort Worth area[c]	All Months	(N/A)[b]					
	Houston/Galveston area[d]	All Months	(N/A)[b]					
		All Months	(N/A)[b]					
	El Paso County	Oct to Mar	OXYGENATED FUELS :	0.000	1.000	0.000	0.027	2
		Apr to Sep	OXYGENATED FUELS :	0.000	0.000	0.000	0.000	2
	All other areas	All Months	OXYGENATED FUELS :	0.000	0.000	0.000	0.000	2

[a] Includes Franklin, Jefferson, St. Charles, and St. Louis Counties, and St. Louis City.
[b] The OXYGENATED FUELS command is not specified for these areas (overridden by FUEL PROGRAM : 2 S command).
[c] Includes the following counties: Collin, Dallas, Denton, Tarrant.
[d] Includes the following counties: Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller.

Summary of MOBILE6 Inputs for Fuel Volatilities

State	Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep 1-15	Sep 16-30	Oct	Nov	Dec
AR	All areas	13.0	13.0	12.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.5	11.0	12.0
IA	All areas	13.2	12.8	11.8	10.3	9.0	8.7	8.3	8.4	8.4	8.3	9.4	11.2	12.0
KS	Kansas City area[a]	13.2	12.4	11.3	10.3	7.3	7.0	7.0	7.0	7.0	8.4	9.4	11.2	12.0
	All other areas	13.2	12.8	11.8	10.4	9.1	8.9	8.2	8.5	8.4	8.4	9.1	11.0	11.5
LA	Baton Rouge area[b]	13.0	13.0	12.0	10.0	9.0	7.8	7.8	7.8	7.8	9.0	9.5	11.0	12.0
	Beauregard, Calcasieu, Grant, Lafayette, Lafourche, Pointe Coupee, St. James, and St. Mary Parishes	13.0	13.0	12.0	10.0	9.0	7.8	7.8	7.8	7.8	9.0	9.5	11.0	12.0
	New Orleans area[c]	13.0	13.0	12.0	10.0	9.0	7.8	7.8	7.8	7.8	9.0	9.5	11.0	12.0
	All other areas	13.0	13.0	12.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.5	11.0	12.0
MN	All areas	13.4	13.6	12.8	10.4	9.2	8.8	8.7	8.6	8.5	8.5	9.6	10.1	12.4
MO	Kansas City[a]	13.1	12.4	11.3	10.3	7.3	7.0	7.0	7.0	7.0	8.4	9.4	11.2	12.0
	St. Louis[d,e]	13.1	12.8	11.0	7.4	6.0	6.7	6.7	6.7	6.7	6.8	9.1	10.3	12.6
	All other areas	13.2	12.8	11.8	10.1	8.8	8.5	8.4	8.4	8.4	8.2	9.7	11.5	12.4
NE	All areas	13.2	12.8	11.8	10.3	9.0	8.7	8.3	8.4	8.4	8.3	9.4	11.2	12.0
OK	Tulsa area[f]	13.0	13.0	12.0	10.0	9.0	7.8	7.8	7.8	7.8	9.0	9.5	11.0	12.0
	All other areas	13.0	13.0	12.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.5	11.0	12.0
TX	Beaumont/Port Arthur area[g]	13.0	13.0	12.0	10.0	9.0	7.5	7.5	7.5	7.5	9.0	9.5	11.0	12.0
	Dallas/Fort Worth area[e,h]	13.1	12.8	11.0	7.4	6.0	6.7	6.7	6.7	6.7	6.8	9.1	10.3	12.6
	Houston/Galveston area[e,i]	13.1	12.8	11.0	7.4	6.0	6.7	6.7	6.7	6.7	6.8	9.1	10.3	12.6
	Other East Texas counties[j]	13.0	13.0	12.0	10.0	7.8	7.5	7.5	7.5	7.5	9.0	9.5	11.0	12.0
	El Paso County	12.3	13.0	12.0	10.0	9.0	6.8	6.8	6.8	6.8	9.0	9.5	11.0	12.0
	All other areas	13.0	13.0	12.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.5	11.0	12.0

[a] Includes the following counties: Johnson (KS), Wyandotte (KS), Clay (MO), Jackson (MO), Platte (MO).
[b] Includes the following parishes: Ascension, East Baton Rouge, Iberville, Livingston, West Baton Rouge.
[c] Includes the following parishes: Jefferson, Orleans, St. Bernard, St. Charles.
[d] Includes Franklin, Jefferson, St. Charles, and St. Louis counties, and St. Louis City.
[e] Although the FUEL RVP command must be used, input data will be overridden by the FUEL PROGRAM : 2 S command during May 1 through September 15.
[f] Includes the following counties: Creek, Osage, Rogers, Tulsa, Wagoner.
[g] Includes the following counties: Jefferson, Hardin, Orange.
[h] Includes the following counties: Collin, Dallas, Denton, Tarrant.
[I] Includes the following counties: Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller.
[j] Includes the following counties: Anderson, Angelina, Aransas, Atascosa, Austin, Bastrop, Bee, Bell, Bexar, Bosque, Bowie, Brazos, Burleson, Caldwell, Calhoun, Camp, Cass, Cherokee, Colorado, Comal, Cooke, Coryell, De Witt, Delta, Ellis, Falls, Fannin, Fayeete, Franklin, Freestone, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Harrison, Hays, Henderson, Hill, Hood, Hopkins, Houston, Hunt, Jackson, Jasper, Johnson, Karnes, Kaufman, Lamar, Lavaca, Lee, Leon, Limestone, Live Oak, Madison, Marion, Matagorda, McLennan, Milam, Morris, Nacogdoches, Navarro, Newton, Nueces, Panola, Parker, Polk, Rains, Red River, Refugio, Robertson, Rockwall, Rusk, Sabine, San Jacinto, San Patricio, San Augustine, Shelby, Smith, Somervell, Titus, Travis, Trinity, Tyler, Upshur, VanZandt, Victoria, Walker, Washington, Wharton, Williamson, Wilson, Wise, Wood.

Summary of MOBILE6 Inputs for Anti-tampering Programs

State	County					Vehicles types covered (1 = exempt, 2 = covered)														Inspection Frequency (11 = annual, 12 = biennial)	Program Compliance Rate (%)	Inspections (1 = no, 2 = yes)							
			Start Year	Earliest MY	Final MY	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGVB	GAS BUS			Air pump	Catalyst	Inlet	Lead deposit	EGR system	Evap system	PCV system	Gas cap
Louisiana	All		00	80	50	2	2	2	2	2	2	1	1	1	1	1	1	1	1	11	072.	2	2	2	2	2	2	2	2
Texas	Harris	Program A	84	78	83	2	2	2	2	2	2	2	2	2	2	2	2	2	2	11	096.	2	1	1	1	2	2	2	2
		Program B	84	84	00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	11	096.	2	2	1	1	2	2	2	2
		As modeled	84	78	00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	11	096.	2	2	1	1	2	2	2	2
Texas	El Paso	Program A	86	81	83	2	2	2	2	2	2	2	2	2	2	2	2	2	2	11	096.	2	1	1	1	2	2	2	2
		Program B	86	84	00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	11	096.	2	2	1	1	2	2	2	2
		As modeled	86	81	00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	11	096.	2	2	1	1	2	2	2	2
Texas	Dallas, Tarrant	Program A	86	76	83	2	2	2	2	2	2	2	2	2	2	2	2	2	2	11	096.	2	1	1	1	2	2	2	2
		Program B	86	84	00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	11	096.	2	2	1	1	2	2	2	2
		As modeled	86	76	00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	11	096.	2	2	1	1	2	2	2	2

Summary of MOBILE6 Inputs for Inspection and Maintenance Programs

State	Counties	Start Year	End Year	Inspection Frequency (1 = annual, 2 = biennial)	Inspection Facility Type[a]	Inspection Test Type[b]	Vehicle Model Years, Types, and Ages Covered																	Compliance Rate	Waiver Rate		Exhaust I/M Parameters				
							Model Years (MY)		Vehicles types covered (1 = exempt, 2 = covered)																				TR Effectiveness		
							Earliest	Final	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B	GAS BUS	EXEMPTION AGE	GRACE PERIOD		MY 1980 and older	MY 1981 and newer	Stringency (Failure Rate for MY 1980 and older)	Tech. Training?	HC	CO	NOx
Louisiana	Ascension, East Baton Rouge, Iberville, Livingston, West Baton Rouge	2000	(current)	1	TRC	GC	1980	(current)	2	2	2	2	2	2	1	1	1	1	1	1	1	1	(N/A)	1	96.0%	0%	0%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
Missouri	Jefferson, St. Charles, St. Louis, St. Louis City	1990	(current)	2	T/O	IDLE	1971	1980	2	2	2	2	2	1	1	1	1	1	1	1	1	1	(N/A)	2	96.0%	25.3%	(N/A)	18.0%	Yes	(N/A)	(N/A)	(N/A)
		2000	(current)	2	T/O	IM240	1981	(current)	2	2	2	2	2	1	1	1	1	1	1	1	1	1	(N/A)	2	96.0%	(N/A)	25.3%	(N/A)	Yes	(N/A)	(N/A)	(N/A)
		2000	(current)	2	T/O	GC	1981	(current)	2	2	2	2	2	1	1	1	1	1	1	1	1	1	(N/A)	2	96.0%	(N/A)	0.0%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
	Franklin	2000	(current)	1	T/O	IDLE	1971	(current)	2	2	2	2	2	1	1	1	1	1	1	1	1	1	(N/A)	2	96.0%	10.9%	9.9%	15.2%	Yes	(N/A)	(N/A)	(N/A)
		2000	(current)	1	T/O	GC	1981	(current)	2	2	2	2	2	1	1	1	1	1	1	1	1	1	(N/A)	2	96.0%	(N/A)	0.0%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
Texas	Harris	1997	Apr. 2002	1	TRC	2500/IDLE	1978	2000	2	2	2	2	2	2	2	2	2	2	2	2	2	2	(N/A)	2	96.0%	0.0%	0.0%	10.0%	Yes	(N/A)	(N/A)	(N/A)
		May 2002	(current)	1	TRC	2500/IDLE	1978	2000	1	1	1	1	1	2	2	2	2	2	2	2	2	2	(N/A)	2	96.0%	2.1%	4.4%	14.2%	Yes	100%	100%	100%
		May 2002	(current)	1	TRC	ASM 2525/5015 PHASE-IN	1978	1995	2	2	2	2	2	1	1	1	1	1	1	1	1	1	(N/A)	2	96.0%	1.1%	0.7%	27.4%	Yes	100%	100%	100%
		May 2002	(current)	1	TRC	OBD I/M	1996	2000	2	2	2	2	2	1	1	1	1	1	1	1	1	1	(N/A)	2	96.0%	(N/A)	0.2%	(N/A)	Yes	100%	100%	100%
		1997	(current)	1	TRC	GC	1978	2000	2	2	2	2	2	2	2	2	2	2	2	2	2	2	(N/A)	2	96.0%	0.0%	0.0%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
Texas	Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, Waller	2000	(current)	1	TRC	GC	1978	2000	2	2	2	2	2	2	2	2	2	2	2	2	2	2	(N/A)	2	96.0%	0.0%	0.0%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
Texas	Dallas, Tarrant	1990	Apr. 2002	1	TRC	2500/IDLE	1975	2000	2	2	2	2	2	2	2	2	2	2	2	2	2	2	(N/A)	2	96.0%	0.3%	0.0%	10.0%	Yes	100%	100%	100%
Texas	Collin, Denton, Dallas, Tarrant	May 2002	(current)	1	TRC	2500/IDLE	1978	2000	1	1	1	1	1	2	2	2	2	2	2	2	2	2	(N/A)	2	96.0%	0.8%	1.5%	15.3%	Yes	100%	100%	100%
		May 2002	(current)	1	TRC	ASM 2525/5015 PHASE-IN	1978	1995	2	2	2	2	2	1	1	1	1	1	1	1	1	1	(N/A)	2	96.0%	2.7%	1.9%	28.7%	Yes	100%	100%	100%
		May 2002	(current)	1	TRC	OBD I/M	1996	2000	2	2	2	2	2	1	1	1	1	1	1	1	1	1	(N/A)	2	96.0%	(N/A)	0.3%	(N/A)	Yes	100%	100%	100%
Texas	Collin, Denton	May 2002	(current)	1	TRC	GC	1975	2000	2	2	2	2	2	2	2	2	2	2	2	2	2	2	(N/A)	2	96.0%	0.0%	0.0%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
Texas	Dallas, Tarrant	1996	(current)	1	TRC	GC	1975	2000	2	2	2	2	2	2	2	2	2	2	2	2	2	2	(N/A)	2	96.0%	0.0%	0.0%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
Texas	El Paso	1987	(current)	1	TRC	2500/IDLE	1950	(current)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	(N/A)	2	96.0%	0.0%	0.0%	10.0%	Yes	(N/A)	(N/A)	(N/A)
		1997	(current)	1	TRC	GC	1950	(current)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	(N/A)	2	96.0%	0.0%	0.0%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

[a] TRC = Test and Repair program, computerized; T/O = Test Only program

[b] GC = gas cap check (evaporative emissions); IDLE = idling only test; 2500/IDLE = idling and 2500 rpm test; ASM 2525/5015 PHASE-IN = testing at 25 mph/25% load and 15 mph/50% load, phased-in cutpoints; OBD I/M = check of malfunction indicator lights; IM240 = transient 240-second test

[c] Default Waiver Rate is 5.0% for evaporative programs, except where an exhaust I/M program is also applicable, in which case the waiver rate for the evaporative program is the same as that for the exhaust program.

Summary of MOBILE6 Inputs for Stage II Vapor Recovery Programs

State	MSA/CMSA	County	Start Year	Phase In Period (Years)	In-use control efficiency (%)	
					LDGV/ LDGT	HDGV
Louisiana	Baton Rouge	Ascension	93	2	77.	77.
Louisiana	Baton Rouge	East Baton Rouge	93	2	77.	77.
Louisiana	Baton Rouge	Iberville	93	2	77.	77.
Louisiana	Baton Rouge	Livingston	93	2	77.	77.
Louisiana	Baton Rouge	West Baton Rouge	93	2	77.	77.
Louisiana	Pointe Coupee	Pointe Coupee	93	2	77.	77.
Missouri	St. Louis	St. Louis City	87	2	89.	89.
Missouri	St. Louis	Jefferson County	87	2	89.	89.
Missouri	St. Louis	St. Charles County	87	2	89.	89.
Missouri	St. Louis	Franklin County	87	2	89.	89.
Missouri	St. Louis	St. Louis County	87	2	89.	89.
Texas	Beaumont-Port Arthur	Hardin	92	2	84.	84.
Texas	Beaumont-Port Arthur	Jefferson	92	2	84.	84.
Texas	Beaumont-Port Arthur	Orange	92	2	84.	84.
Texas	Dallas-Ft. Worth	Collin	92	2	84.	84.
Texas	Dallas-Ft. Worth	Dallas	92	2	84.	84.
Texas	Dallas-Ft. Worth	Denton	92	2	84.	84.
Texas	Dallas-Ft. Worth	Tarrant	92	2	84.	84.
Texas	El Paso	El Paso	92	2	84.	84.
Texas	Houston-Galveston	Brazoria	92	2	84.	84.
Texas	Houston-Galveston	Chambers	92	2	84.	84.
Texas	Houston-Galveston	Fort Bend	92	2	84.	84.
Texas	Houston-Galveston	Galveston	92	2	84.	84.
Texas	Houston-Galveston	Harris	92	2	84.	84.
Texas	Houston-Galveston	Liberty	92	2	84.	84.
Texas	Houston-Galveston	Montgomery	92	2	84.	84.
Texas	Houston-Galveston	Waller	92	2	84.	84.

Summary of MOBILE6 Inputs for the IM240 Program in St. Louis, Missouri (Page 1 of 3)

Approx. VMT Mix				
LDGV	LDGT1	LDGT2	LDGT3	LDGT4
0.46	0.071	0.24	0.073	0.033

Calendar Year
2002

% Final
25%

HC Cutpoints

	LDGV		LDGT1 & LDGT2		LDGT3 & LDGT4	
Model Year	Phase-In	Final	Phase-In	Final	Phase-In	Final
1981	2.0	0.8	7.5	3.4	7.5	3.4
1982	2.0	0.8	7.5	3.4	7.5	3.4
1983	2.0	0.8	7.5	3.4	7.5	3.4
1984	2.0	0.8	3.2	1.6	3.2	1.6
1985	2.0	0.8	3.2	1.6	3.2	1.6
1986	2.0	0.8	3.2	1.6	3.2	1.6
1987	2.0	0.8	3.2	1.6	3.2	1.6
1988	2.0	0.8	3.2	1.6	3.2	1.6
1989	2.0	0.8	3.2	1.6	3.2	1.6
1990	2.0	0.8	3.2	1.6	3.2	1.6
1991	1.2	0.8	2.4	1.6	2.4	1.6
1992	1.2	0.8	2.4	1.6	2.4	1.6
1993	1.2	0.8	2.4	1.6	2.4	1.6
1994	1.2	0.8	2.4	1.6	2.4	1.6
1995	1.2	0.8	2.4	1.6	2.4	1.6
1996	0.8	0.6	1.0	0.8	2.4	0.8
1997+	same as 1996		same as 1996		same as 1996	

Allowable range in model

Min	Max
0.80	5.0

MOBILE6 ages

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24					

Model year standards applicable to each MOBILE6 age

1996	1996	1996	1996	1996	1996	1996	1995	1994	1993
1992	1991	1990	1989	1988	1987	1986	1985	1984	1983
1982	1981	1981	1981	1981					

MOBILE6 Block 1 (LDGV & LDGT1)

0.800	0.800	0.800	0.800	0.800	0.800	0.800	1.247	1.247	1.247
1.247	1.247	1.847	1.847	1.847	1.847	1.847	1.847	1.847	2.338
2.338	2.338	2.338	2.338	2.338					

MOBILE6 Block 2 (LDGT2 & LDGT3)

1.195	1.195	1.195	1.195	1.195	1.195	1.195	2.200	2.200	2.200
2.200	2.200	2.800	2.800	2.800	2.800	2.800	2.800	2.800	5.000
5.000	5.000	5.000	5.000	5.000					

MOBILE6 Block 3 (LDGT4)

2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.200	2.200	2.200
2.200	2.200	2.800	2.800	2.800	2.800	2.800	2.800	2.800	5.000
5.000	5.000	5.000	5.000	5.000					

Approx. VMT Mix				
LDGV	LDGT1	LDGT2	LDGT3	LDGT4
0.46	0.071	0.24	0.073	0.033

Calendar Year
2002

% Final
25%

CO Cutpoints

	LDGV		LDGT1 & LDGT2		LDGT3 & LDGT4	
Model Year	Phase-In	Final	Phase-In	Final	Phase-In	Final
1981	60.0	30.0	100.0	70.0	100.0	70.0
1982	60.0	30.0	100.0	70.0	100.0	70.0
1983	30.0	15.0	100.0	70.0	100.0	70.0
1984	30.0	15.0	80.0	40.0	80.0	40.0
1985	30.0	15.0	80.0	40.0	80.0	40.0
1986	30.0	15.0	80.0	40.0	80.0	40.0
1987	30.0	15.0	80.0	40.0	80.0	40.0
1988	30.0	15.0	80.0	40.0	80.0	40.0
1989	30.0	15.0	80.0	40.0	80.0	40.0
1990	30.0	15.0	80.0	40.0	80.0	40.0
1991	20.0	15.0	60.0	40.0	60.0	40.0
1992	20.0	15.0	60.0	40.0	60.0	40.0
1993	20.0	15.0	60.0	40.0	60.0	40.0
1994	20.0	15.0	60.0	40.0	60.0	40.0
1995	20.0	15.0	60.0	40.0	60.0	40.0
1996	15.0	10.0	20.0	13.0	60.0	15.0
1997+	same as 1996		same as 1996		same as 1996	

Allowable range in model

Min	Max
15.00	100.0

MOBILE6 ages

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24					

Model year standards applicable to each MOBILE6 age

1996	1996	1996	1996	1996	1996	1996	1995	1994	1993
1992	1991	1990	1989	1988	1987	1986	1985	1984	1983
1982	1981	1981	1981	1981					

MOBILE6 Block 1 (LDGV & LDGT1)

15.000	15.000	15.000	15.000	15.000	15.000	15.000	23.597	23.597	23.597
23.597	23.597	32.100	32.100	32.100	32.100	32.100	32.100	32.100	35.108
57.848	57.848	57.848	57.848	57.848					

MOBILE6 Block 2 (LDGT2 & LDGT3)

25.363	25.363	25.363	25.363	25.363	25.363	25.363	55.000	55.000	55.000
55.000	55.000	70.000	70.000	70.000	70.000	70.000	70.000	70.000	92.500
92.500	92.500	92.500	92.500	92.500					

MOBILE6 Block 3 (LDGT4)

48.750	48.750	48.750	48.750	48.750	48.750	48.750	55.000	55.000	55.000
55.000	55.000	70.000	70.000	70.000	70.000	70.000	70.000	70.000	92.500
92.500	92.500	92.500	92.500	92.500					

Approx. VMT Mix				
LDGV	LDGT1	LDGT2	LDGT3	LDGT4
0.46	0.071	0.24	0.073	0.033

Calendar Year
2002

% Final
25%

NO_x Cutpoints

Model Year	LDGV		LDGT1 & LDGT2		LDGT3 & LDGT4	
	Phase-In	Final	Phase-In	Final	Phase-In	Final
1981	3.0	2.0	7.0	4.5	7.0	4.5
1982	3.0	2.0	7.0	4.5	7.0	4.5
1983	3.0	2.0	7.0	4.5	7.0	4.5
1984	3.0	2.0	7.0	4.5	7.0	4.5
1985	3.0	2.0	7.0	4.5	7.0	4.5
1986	3.0	2.0	7.0	4.5	7.0	4.5
1987	3.0	2.0	7.0	4.5	7.0	4.5
1988	3.0	2.0	3.5	2.5	5.0	3.5
1989	3.0	2.0	3.5	2.5	5.0	3.5
1990	3.0	2.0	3.5	2.5	5.0	3.5
1991	2.5	2.0	3.0	2.5	4.5	3.5
1992	2.5	2.0	3.0	2.5	4.5	3.5
1993	2.5	2.0	3.0	2.5	4.5	3.5
1994	2.5	2.0	3.0	2.5	4.5	3.5
1995	2.5	2.0	3.0	2.5	4.5	3.5
1996	2.0	1.5	2.5	1.8	4.0	2.0
1997+	same as 1996		same as 1996		same as 1996	

Allowable range in model	
Min	Max
2.00	4.5

MOBILE6 ages

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24					

Model year standards applicable to each MOBILE6 age

1996	1996	1996	1996	1996	1996	1996	1995	1994	1993
1992	1991	1990	1989	1988	1987	1986	1985	1984	1983
1982	1981	1981	1981	1981					

MOBILE6 Block 1 (LDGV & LDGT1)

2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.442	2.442	2.442
2.442	2.442	2.817	2.817	2.817	3.235	3.235	3.235	3.235	3.235
3.235	3.235	3.235	3.235	3.235					

MOBILE6 Block 2 (LDGT2 & LDGT3)

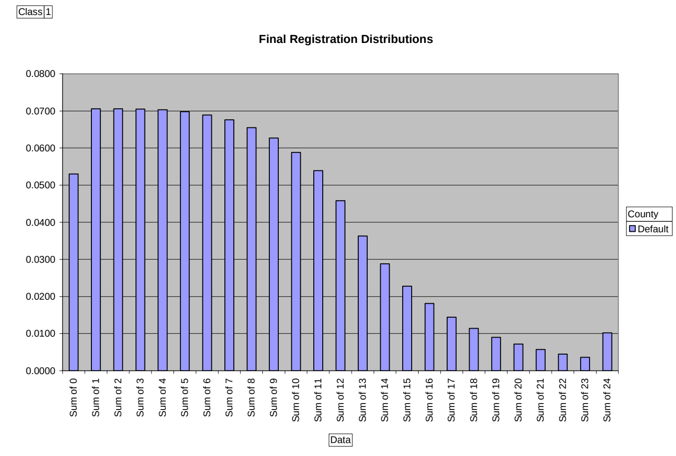
2.599	2.599	2.599	2.599	2.599	2.599	2.599	3.196	3.196	3.196
3.196	3.196	3.571	3.571	3.571	4.500	4.500	4.500	4.500	4.500
4.500	4.500	4.500	4.500	4.500					

MOBILE6 Block 3 (LDGT4)

3.500	3.500	3.500	3.500	3.500	3.500	3.500	4.250	4.250	4.250
4.250	4.250	4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500
4.500	4.500	4.500	4.500	4.500					

Key to Figures
Y-axis: Fraction of total fleet in the indicated age bin
X-axis: Vehicle age from <1 year to ≥ 24 years

Gross vehicle weight rating (GVWR) equals the total weight of the vehicle including its curb (empty) weight, fluids, driver and the maximum recommended payload. **Adjusted loaded vehicle weight (ALVW)** is the numerical average of the vehicle curb weight and the gross vehicle weight rating (GVWR). **Loaded vehicle weight (LVW)** is the curb weight of the vehicle plus 300 lbs., which is intended to correspond to the weight of a driver plus incidental payload.



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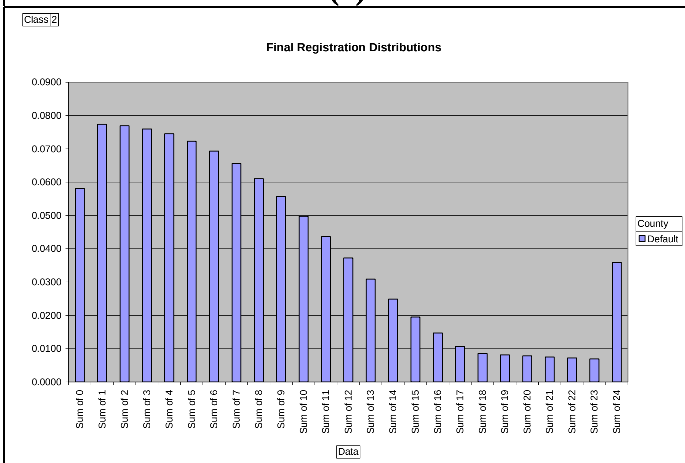

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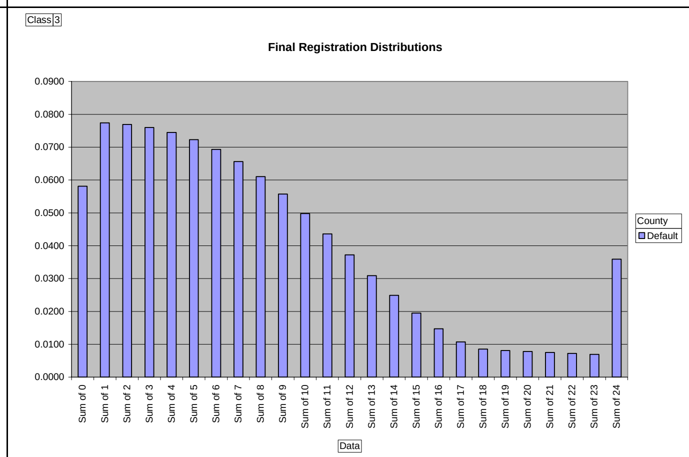

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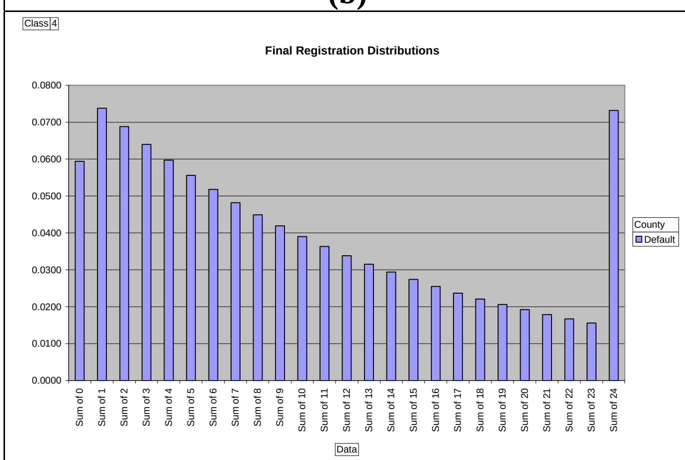

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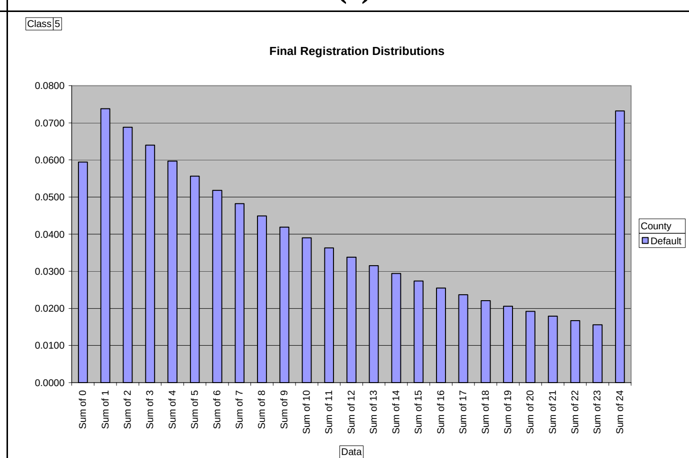
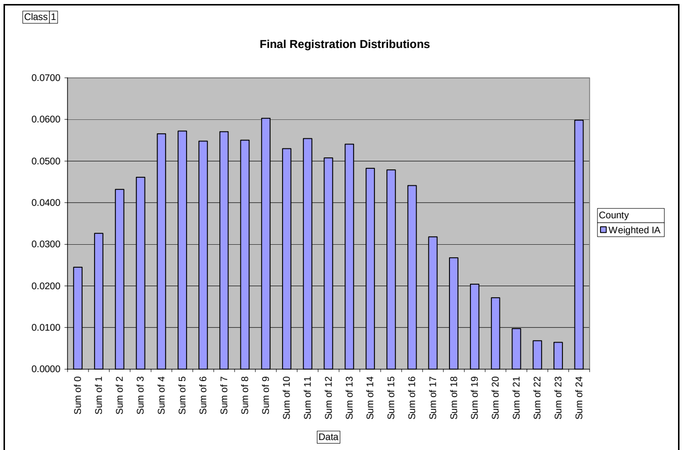


(e)

Age distributions of vehicle fleets corresponding to the **MOBILE6 defaults** for:

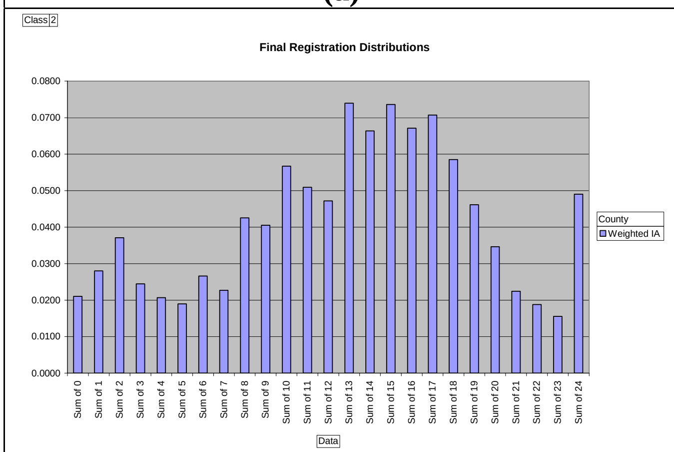
(a) Light-Duty Vehicles (Passenger Cars)
(b) Light-Duty Trucks, Class 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
(c) Light Duty Trucks, Class 2 (0-6,001 lbs. GVWR, 3751-5750 lbs. LVW)
(d) Light Duty Trucks, Class 3 (6,001-8500 lbs. GVWR, 0-5750 lbs. ALVW)
(e) Light Duty Trucks, Class 4 (6,001-8500 lbs. GVWR, >5750 lbs. ALVW)



(a)

<u>Key to Figures</u>
Y-axis: Fraction of total fleet in the indicated age bin
X-axis: Vehicle age from <1 year to ≥ 24 years

Gross vehicle weight rating (GVWR) equals the total weight of the vehicle including its curb (empty) weight, fluids, driver and the maximum recommended payload. **Adjusted loaded vehicle weight (ALVW)** is the numerical average of the vehicle curb weight and the gross vehicle weight rating (GVWR). **Loaded vehicle weight (LVW)** is the curb weight of the vehicle plus 300 lbs., which is intended to correspond to the weight of a driver plus incidental payload.



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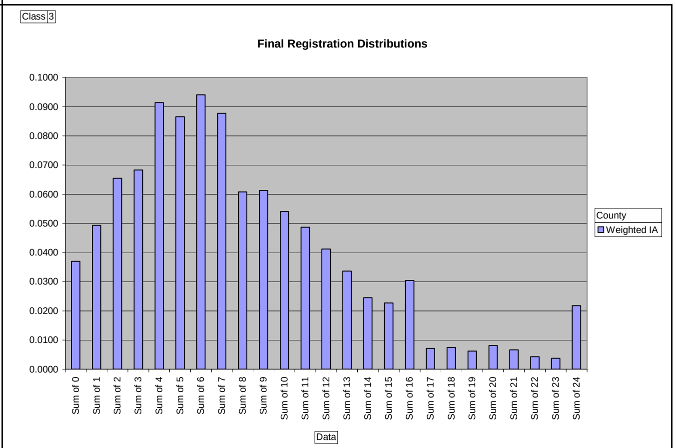

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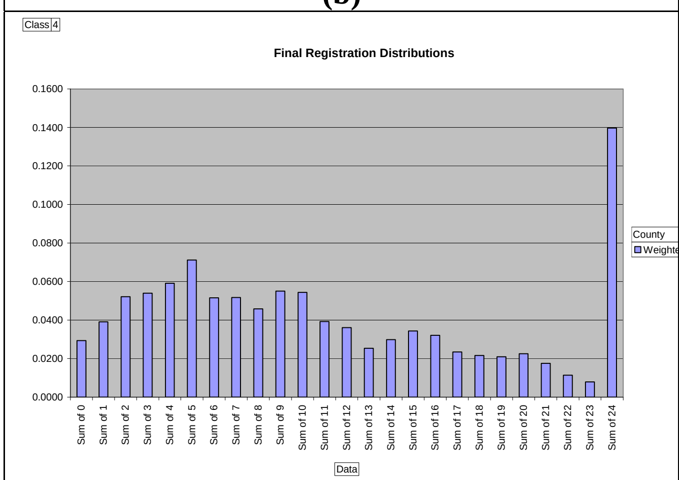

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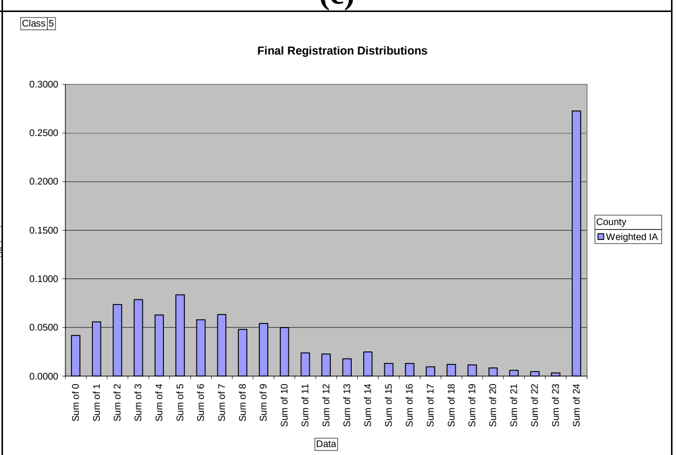
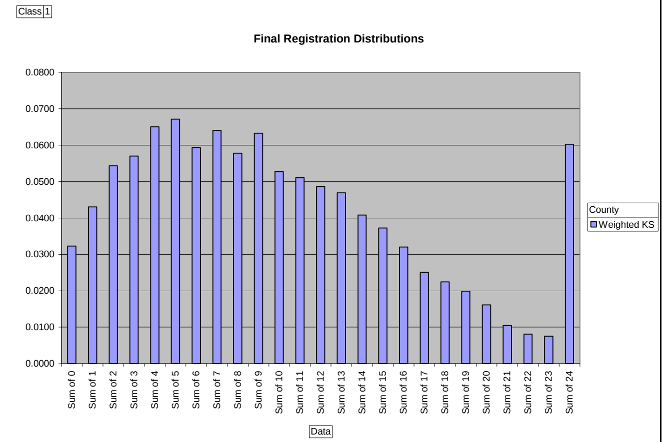


(e)

Weighted-average age distributions of vehicle fleets for <u>**Iowa**</u> and for the following vehicle classes:

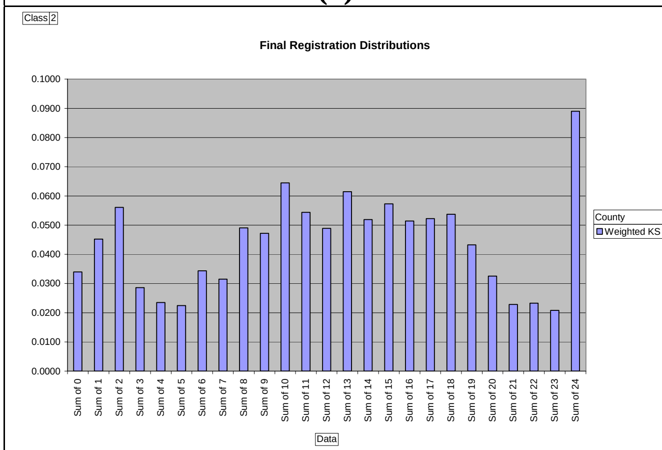
(a) Light-Duty Vehicles (Passenger Cars)
(b) Light-Duty Trucks, Class 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
(c) Light Duty Trucks, Class 2 (0-6,001 lbs. GVWR, 3751-5750 lbs. LVW)
(d) Light Duty Trucks, Class 3 (6,001-8500 lbs. GVWR, 0-5750 lbs. ALVW)
(e) Light Duty Trucks, Class 4 (6,001-8500 lbs. GVWR, >5750 lbs. ALVW)



(a)

Key to Figures
Y-axis: Fraction of total fleet in the indicated age bin
X-axis: Vehicle age from <1 year to ≥ 24 years

Gross vehicle weight rating (GVWR) equals the total weight of the vehicle including its curb (empty) weight, fluids, driver and the maximum recommended payload.
Adjusted loaded vehicle weight (ALVW) is the numerical average of the vehicle curb weight and the gross vehicle weight rating (GVWR).
Loaded vehicle weight (LVW) is the curb weight of the vehicle plus 300 lbs., which is intended to correspond to the weight of a driver plus incidental payload.



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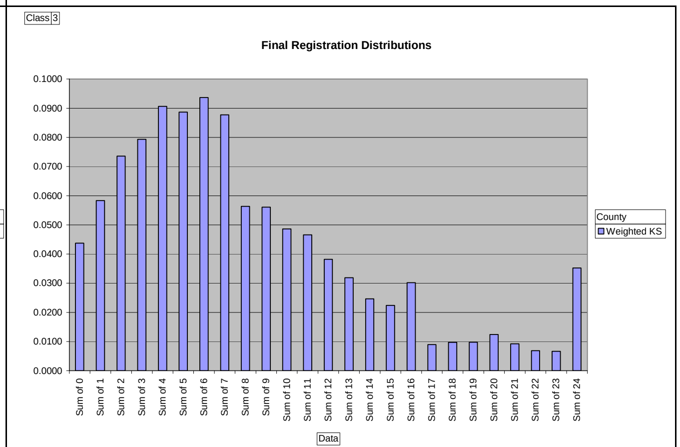

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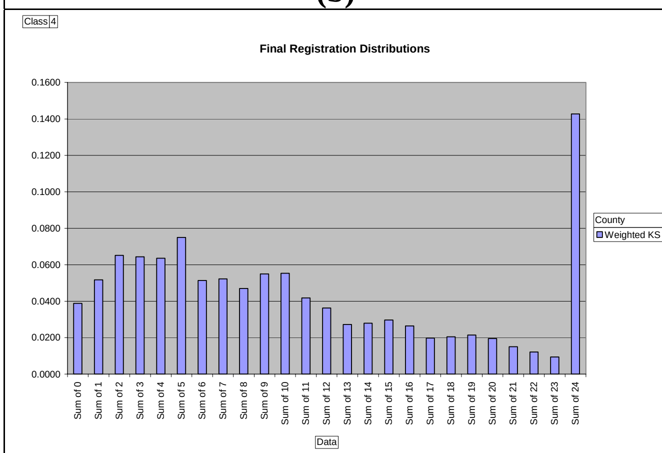

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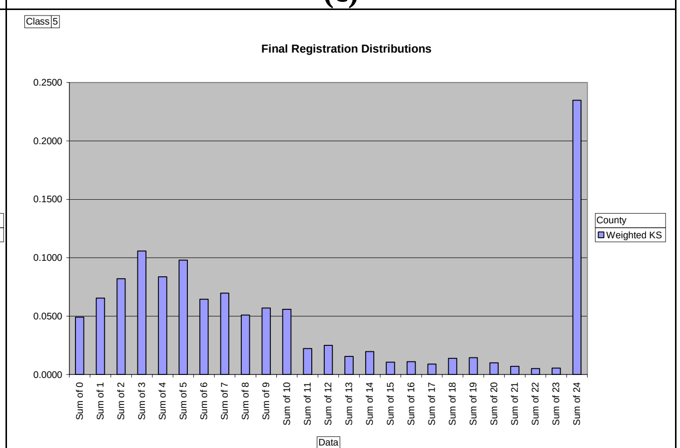

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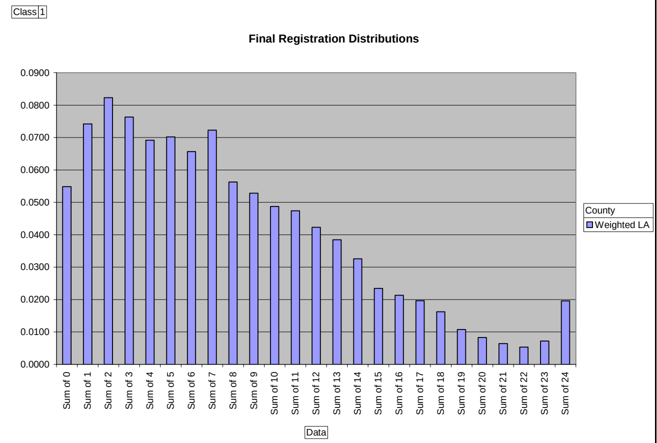
Weighted-average age distributions of vehicle fleets for **Kansas** and for the following vehicle classes:
(a) Light-Duty Vehicles (Passenger Cars)
(b) Light-Duty Trucks, Class 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
(c) Light Duty Trucks, Class 2 (0-6,001 lbs. GVWR, 3751-5750 lbs. LVW)
(d) Light Duty Trucks, Class 3 (6,001-8500 lbs. GVWR, 0-5750 lbs. ALVW)
(e) Light Duty Trucks, Class 4 (6,001-8500 lbs. GVWR, >5750 lbs. ALVW)

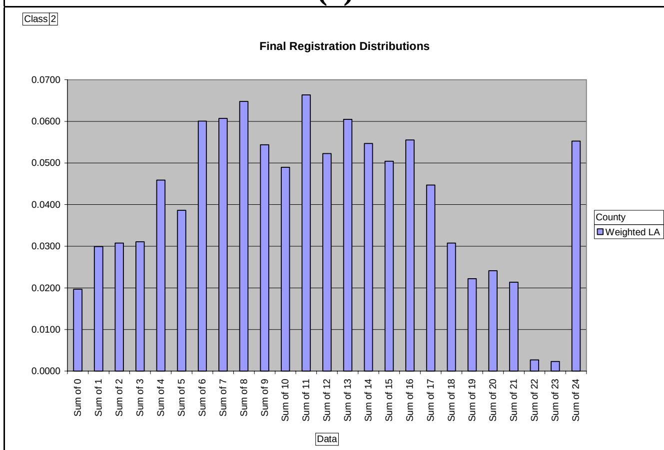


(a)

Key to Figures

Y-axis: Fraction of total fleet in the indicated age bin
X-axis: Vehicle age from <1 year to ≥ 24 years

Gross vehicle weight rating (GVWR) equals the total weight of the vehicle including its curb (empty) weight, fluids, driver and the maximum recommended payload. **Adjusted loaded vehicle weight (ALVW)** is the numerical average of the vehicle curb weight and the gross vehicle weight rating (GVWR). **Loaded vehicle weight (LVW)** is the curb weight of the vehicle plus 300 lbs., which is intended to correspond to the weight of a driver plus incidental payload.



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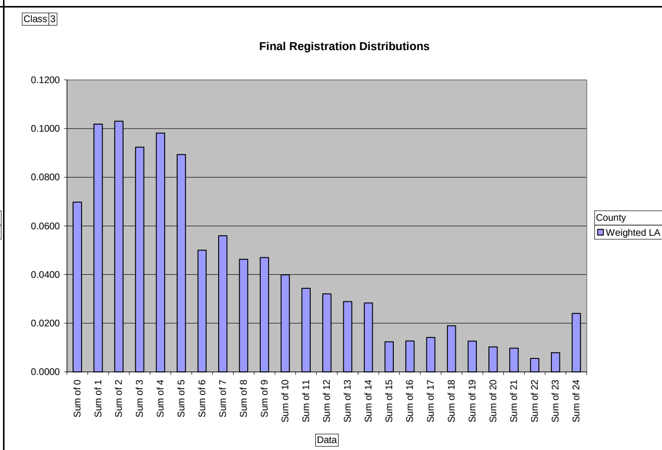

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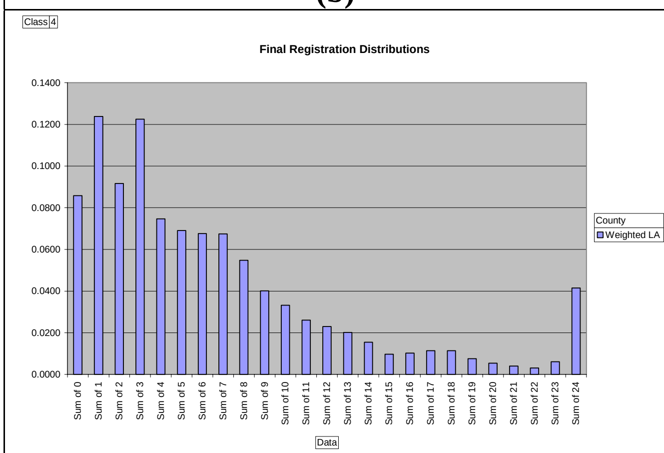

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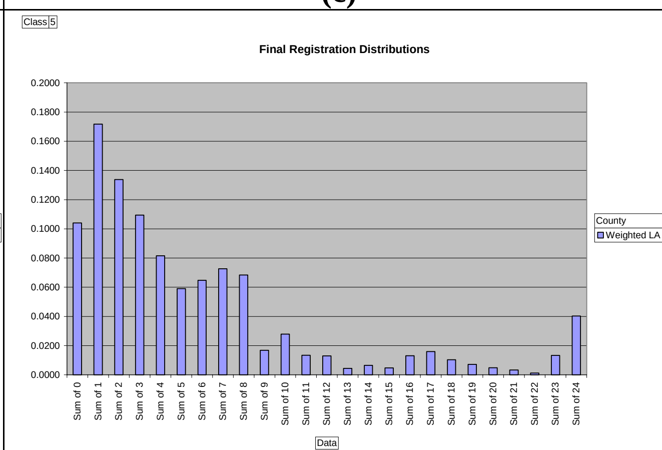

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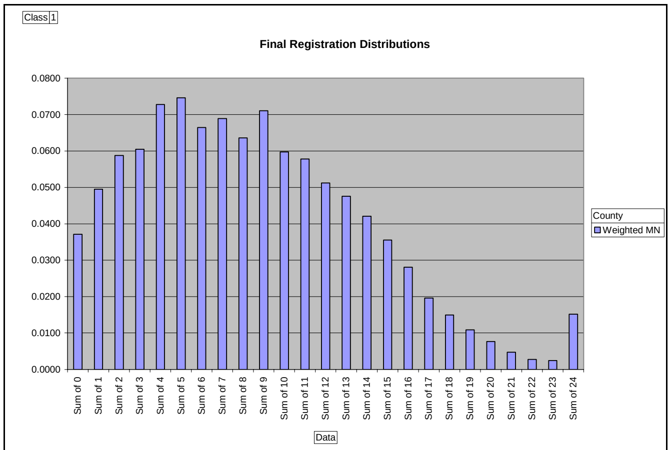
Weighted-average age distributions of vehicle fleets for **Louisiana** and for the following vehicle classes:

(a) Light-Duty Vehicles (Passenger Cars)
(b) Light-Duty Trucks, Class 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
(c) Light Duty Trucks, Class 2 (0-6,001 lbs. GVWR, 3751-5750 lbs. LVW)
(d) Light Duty Trucks, Class 3 (6,001-8500 lbs. GVWR, 0-5750 lbs. ALVW)
(e) Light Duty Trucks, Class 4 (6,001-8500 lbs. GVWR, >5750 lbs. ALVW)



(a)

Key to Figures

Y-axis: Fraction of total fleet in the indicated age bin
X-axis: Vehicle age from <1 year to ≥ 24 years

Gross vehicle weight rating (GVWR) equals the total weight of the vehicle including its curb (empty) weight, fluids, driver and the maximum recommended payload.
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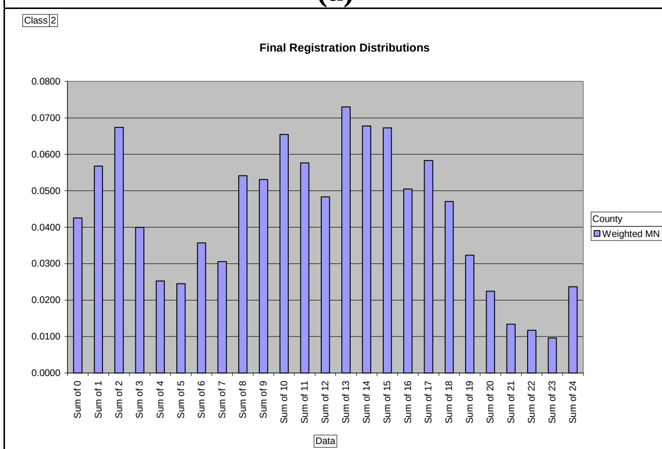

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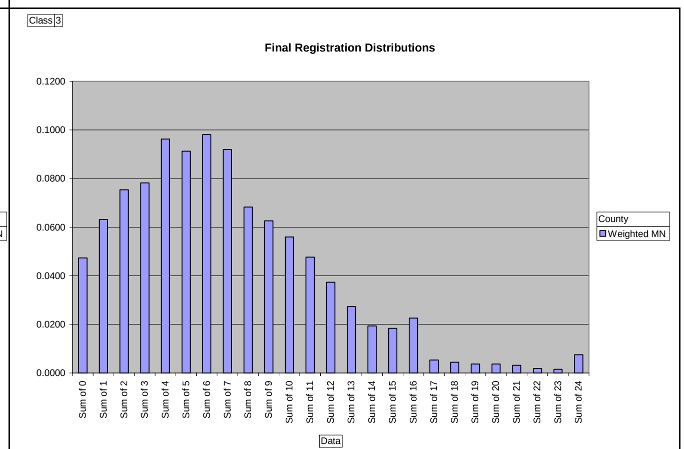

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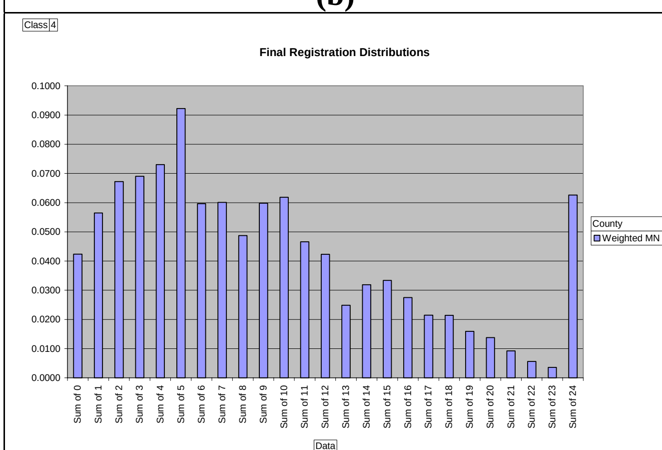

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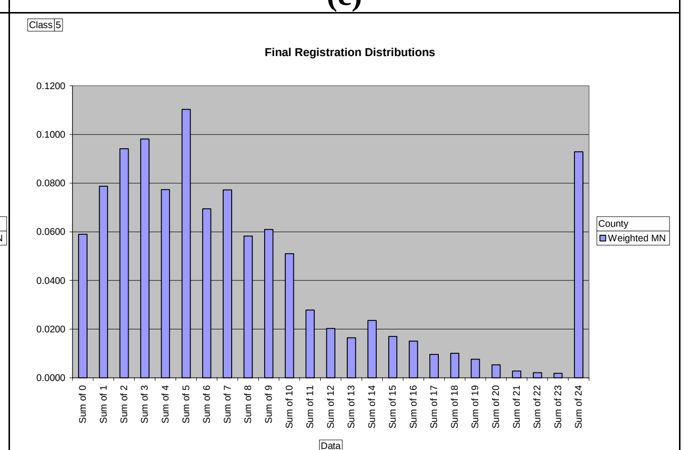

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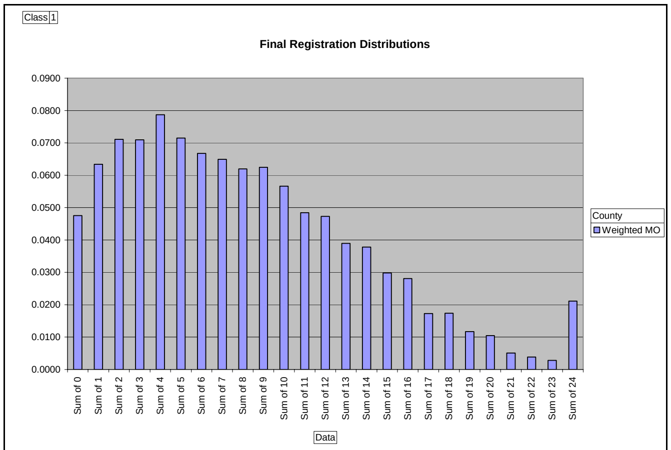
Weighted-average age distributions of vehicle fleets for **Minnesota** and for the following vehicle classes:

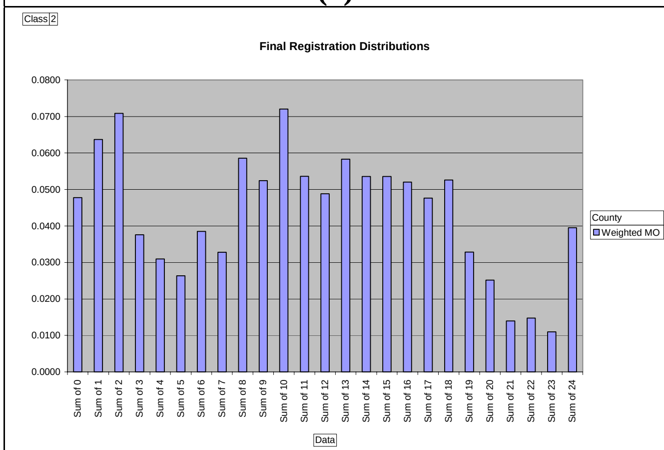
(a) Light-Duty Vehicles (Passenger Cars)
(b) Light-Duty Trucks, Class 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
(c) Light Duty Trucks, Class 2 (0-6,001 lbs. GVWR, 3751-5750 lbs. LVW)
(d) Light Duty Trucks, Class 3 (6,001-8500 lbs. GVWR, 0-5750 lbs. ALVW)
(e) Light Duty Trucks, Class 4 (6,001-8500 lbs. GVWR, >5750 lbs. ALVW)



(a)

<u>Key to Figures</u>
Y-axis: Fraction of total fleet in the indicated age bin
X-axis: Vehicle age from <1 year to ≥ 24 years

Gross vehicle weight rating (GVWR) equals the total weight of the vehicle including its curb (empty) weight, fluids, driver and the maximum recommended payload. **Adjusted loaded vehicle weight (ALVW)** is the numerical average of the vehicle curb weight and the gross vehicle weight rating (GVWR). **Loaded vehicle weight (LVW)** is the curb weight of the vehicle plus 300 lbs., which is intended to correspond to the weight of a driver plus incidental payload.



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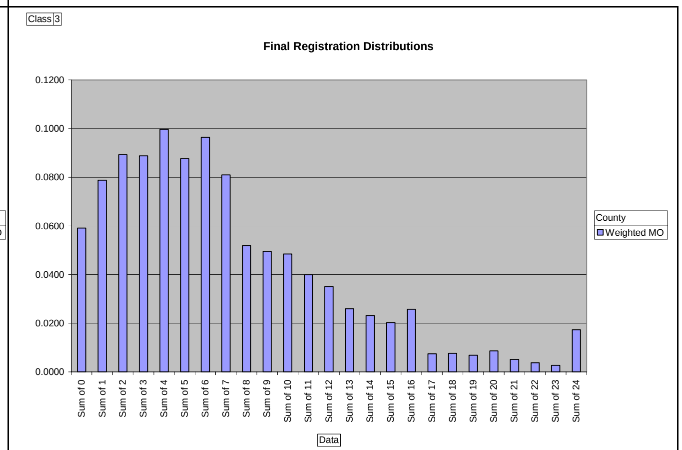

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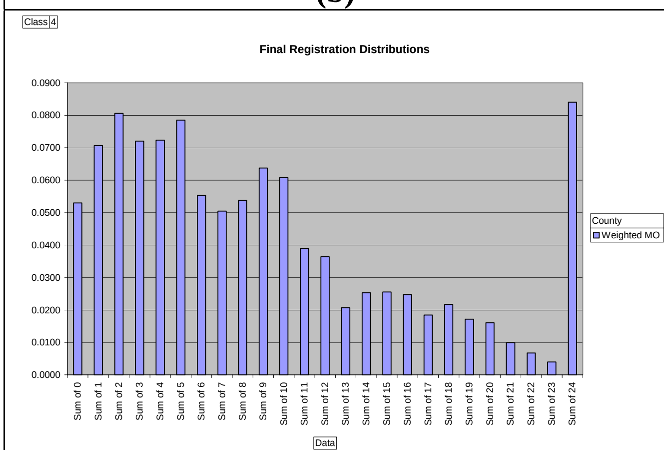

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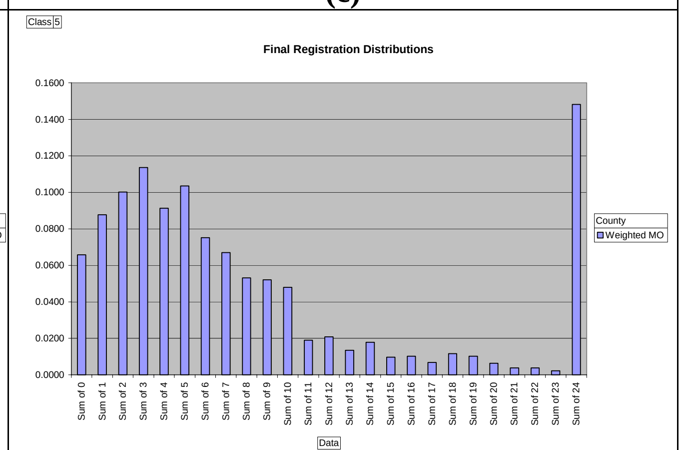

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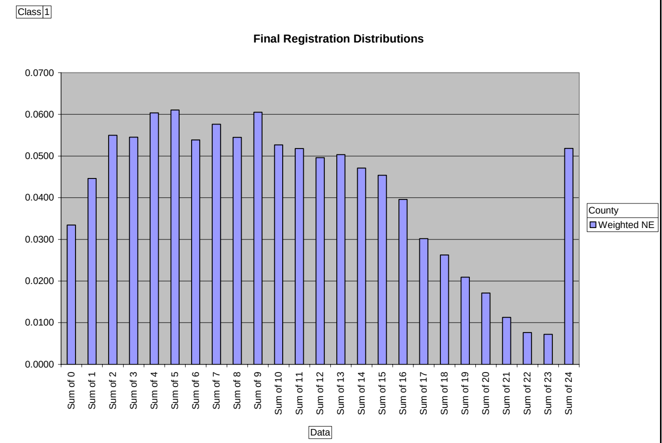
Weighted-average age distributions of vehicle fleets for **<u>Missouri</u>** and for the following vehicle classes:
(a) Light-Duty Vehicles (Passenger Cars)
(b) Light-Duty Trucks, Class 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
(c) Light Duty Trucks, Class 2 (0-6,001 lbs. GVWR, 3751-5750 lbs. LVW)
(d) Light Duty Trucks, Class 3 (6,001-8500 lbs. GVWR, 0-5750 lbs. ALVW)
(e) Light Duty Trucks, Class 4 (6,001-8500 lbs. GVWR, >5750 lbs. ALVW)

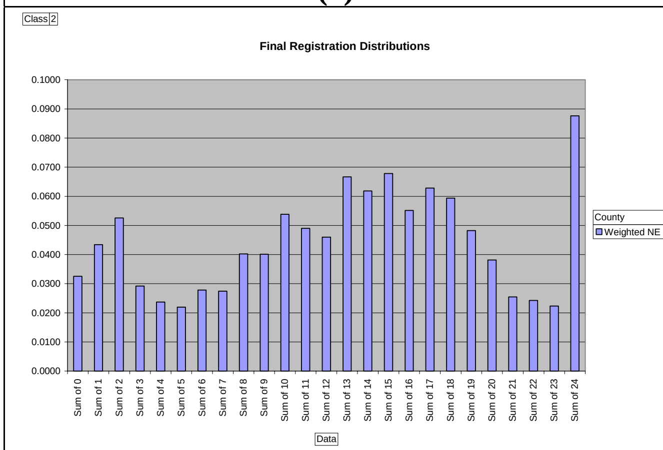


(a)

Key to Figures

Y-axis: Fraction of total fleet in the indicated age bin
X-axis: Vehicle age from <1 year to ≥ 24 years

Gross vehicle weight rating (GVWR) equals the total weight of the vehicle including its curb (empty) weight, fluids, driver and the maximum recommended payload.
Adjusted loaded vehicle weight (ALVW) is the numerical average of the vehicle curb weight and the gross vehicle weight rating (GVWR).
Loaded vehicle weight (LVW) is the curb weight of the vehicle plus 300 lbs., which is intended to correspond to the weight of a driver plus incidental payload.



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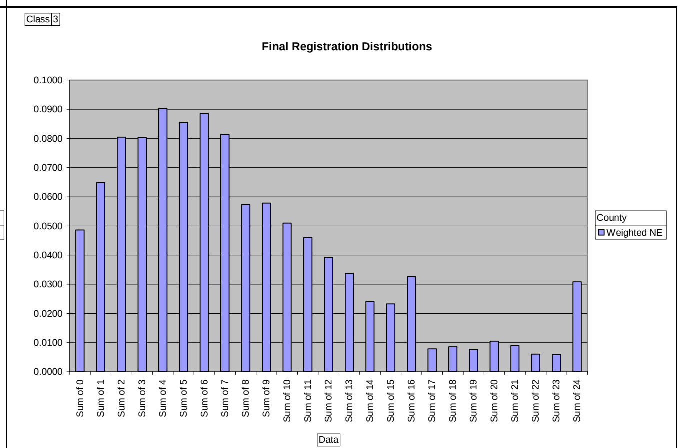

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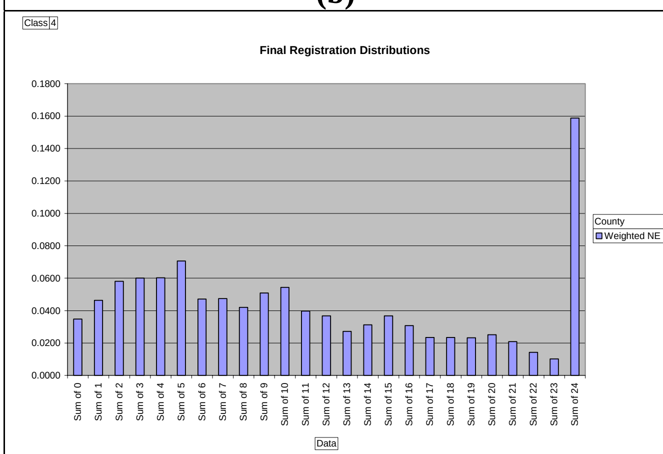

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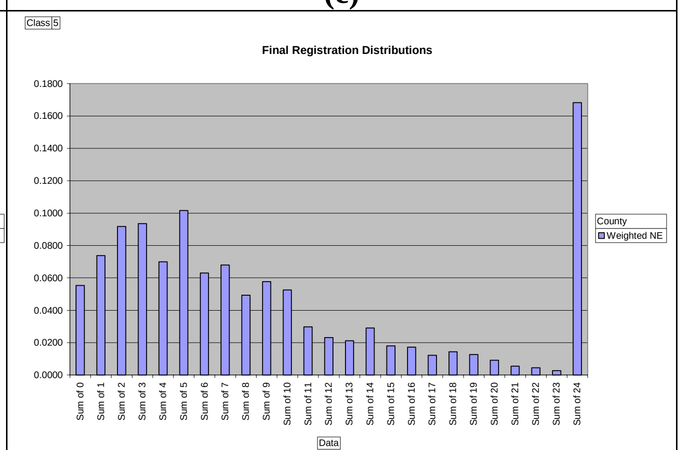

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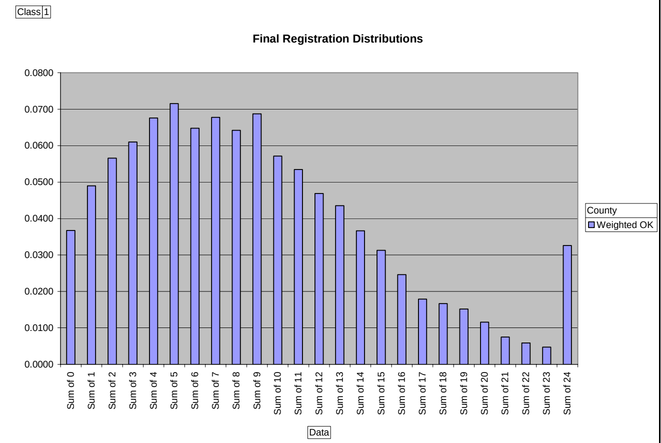
Weighted-average age distributions of vehicle fleets for **Nebraska** and for the following vehicle classes:
(a) Light-Duty Vehicles (Passenger Cars)
(b) Light-Duty Trucks, Class 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
(c) Light Duty Trucks, Class 2 (0-6,001 lbs. GVWR, 3751-5750 lbs. LVW)
(d) Light Duty Trucks, Class 3 (6,001-8500 lbs. GVWR, 0-5750 lbs. ALVW)
(e) Light Duty Trucks, Class 4 (6,001-8500 lbs. GVWR, >5750 lbs. ALVW)

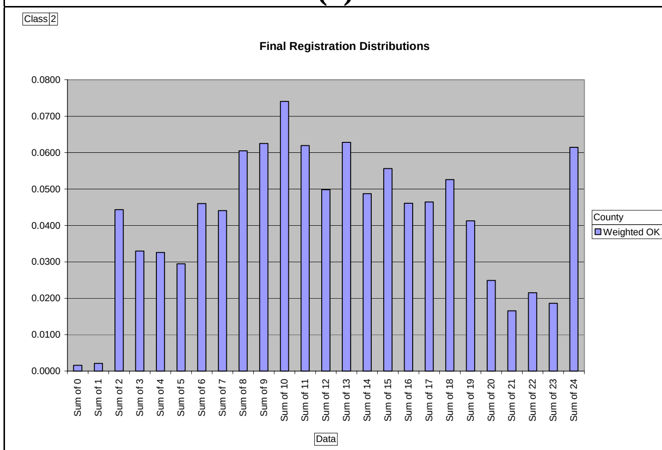


(a)

Key to Figures

Y-axis: Fraction of total fleet in the indicated age bin
X-axis: Vehicle age from <1 year to ≥ 24 years

Gross vehicle weight rating (GVWR) equals the total weight of the vehicle including its curb (empty) weight, fluids, driver and the maximum recommended payload. **Adjusted loaded vehicle weight (ALVW)** is the numerical average of the vehicle curb weight and the gross vehicle weight rating (GVWR). **Loaded vehicle weight (LVW)** is the curb weight of the vehicle plus 300 lbs., which is intended to correspond to the weight of a driver plus incidental payload.



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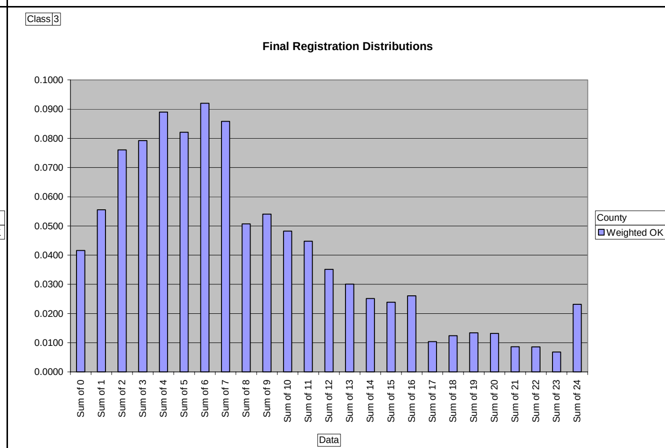

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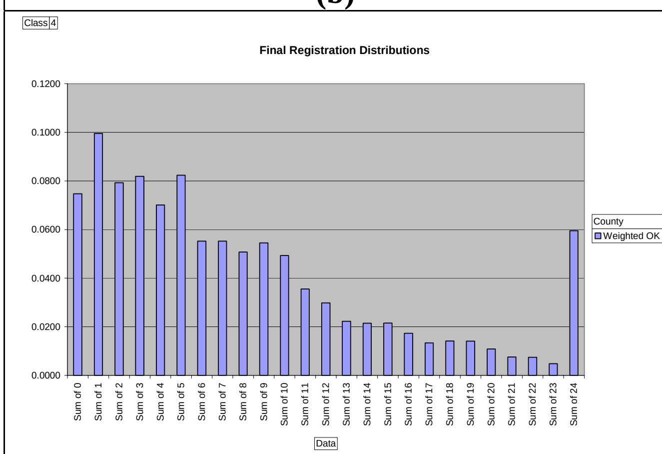

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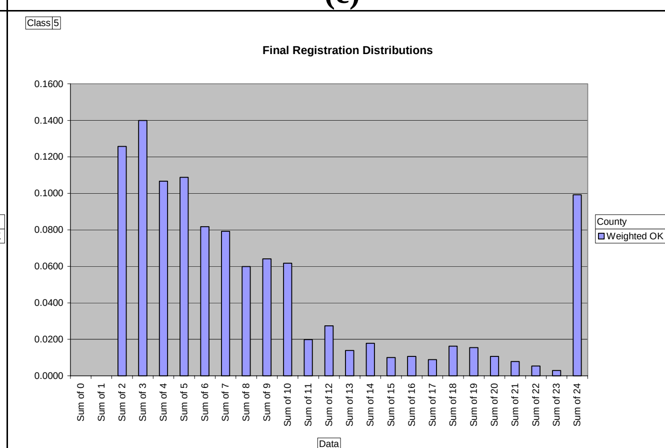

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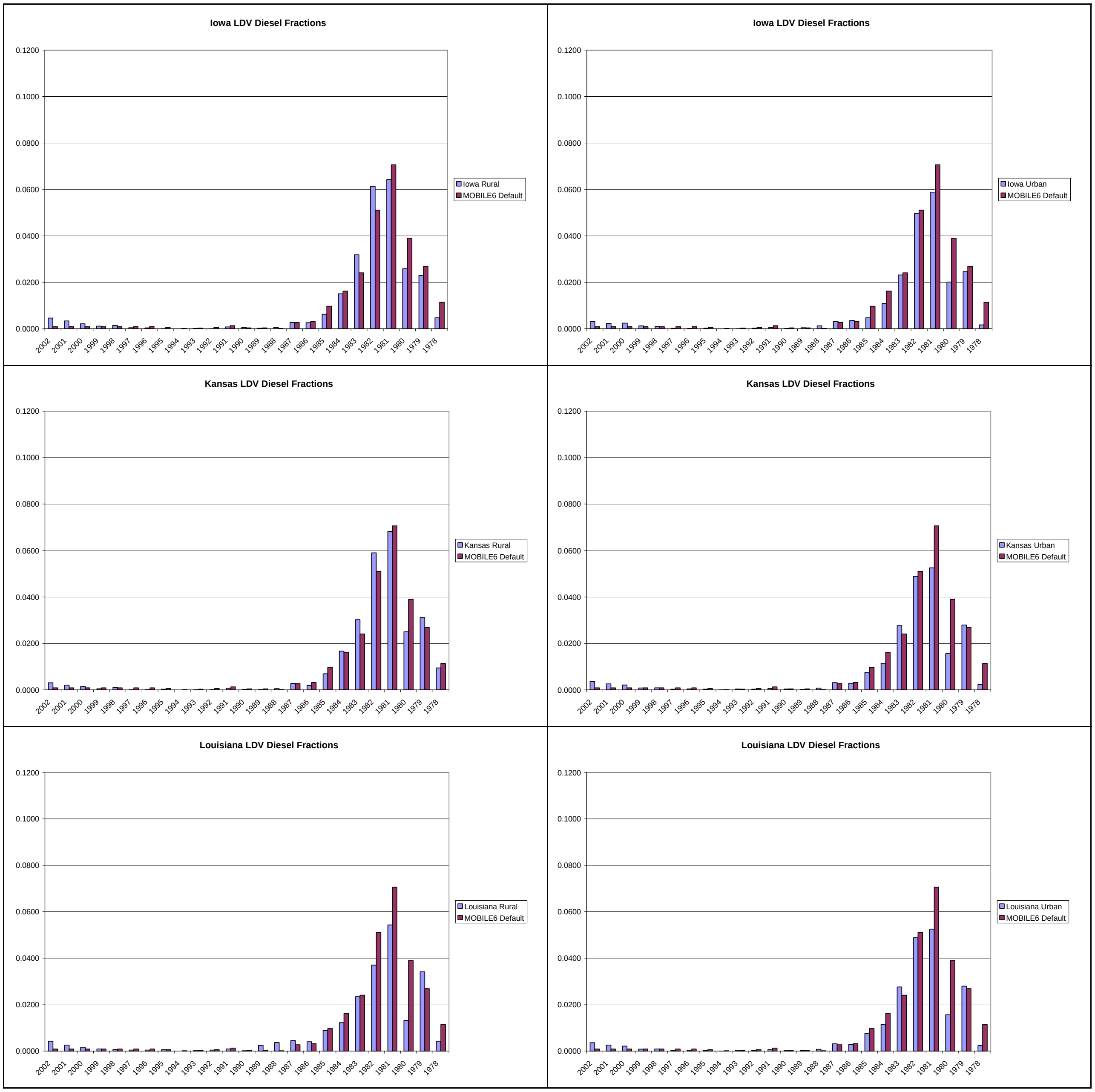
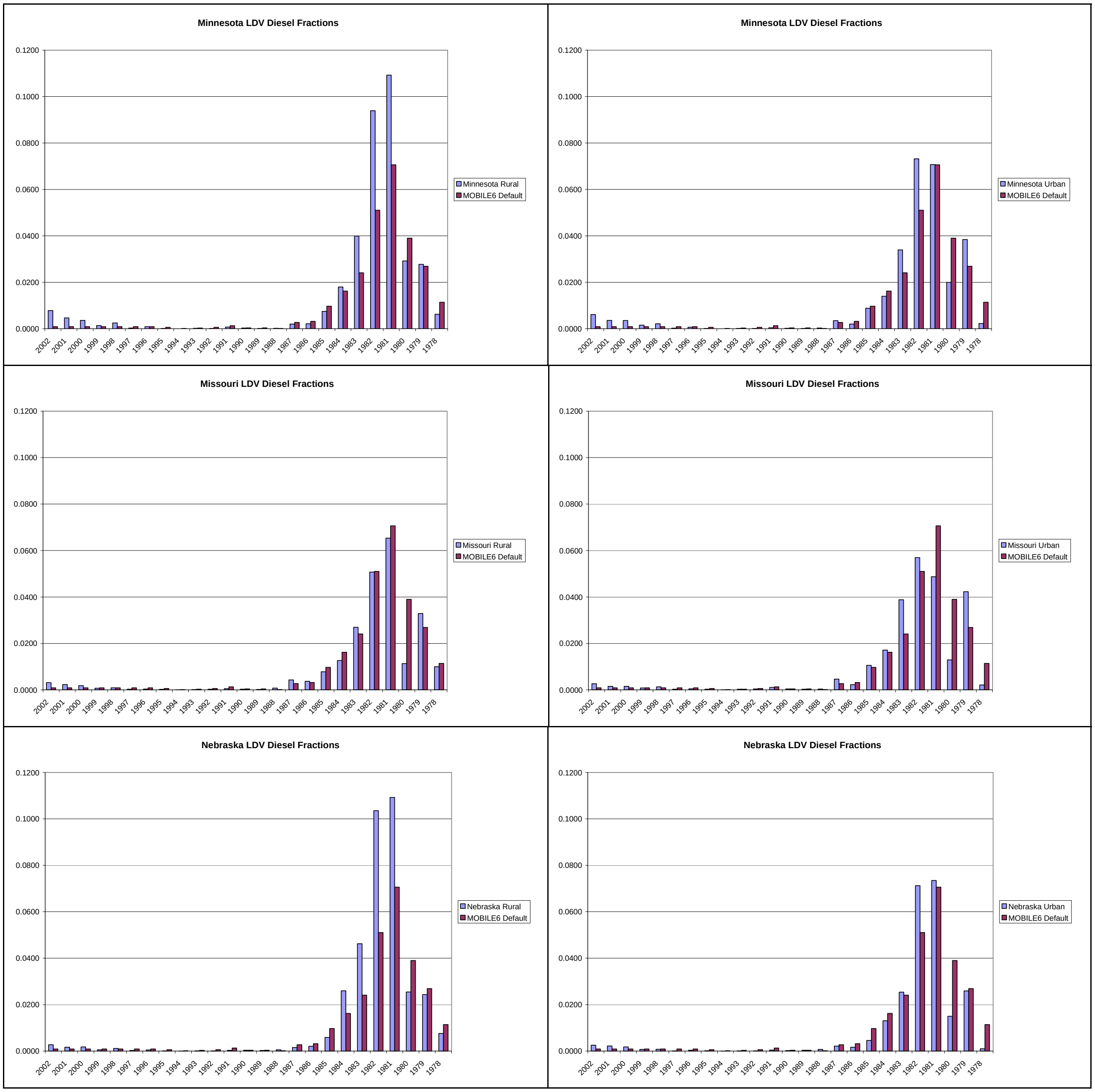
Weighted-average age distributions of vehicle fleets for **Oklahoma** and for the following vehicle classes:

(a) Light-Duty Vehicles (Passenger Cars)
(b) Light-Duty Trucks, Class 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
(c) Light Duty Trucks, Class 2 (0-6,001 lbs. GVWR, 3751-5750 lbs. LVW)
(d) Light Duty Trucks, Class 3 (6,001-8500 lbs. GVWR, 0-5750 lbs. ALVW)
(e) Light Duty Trucks, Class 4 (6,001-8500 lbs. GVWR, >5750 lbs. ALVW)



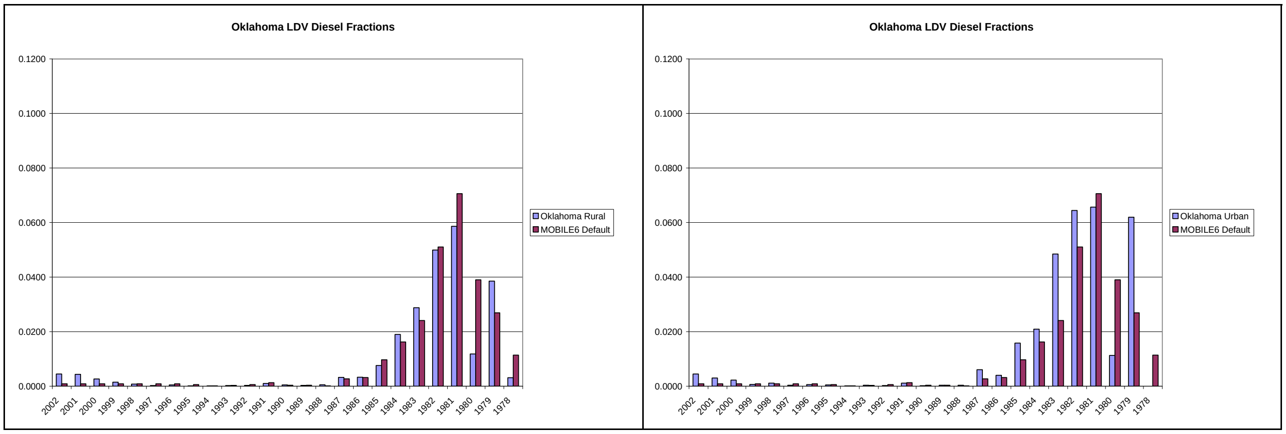
Fractions of the light-duty vehicle fleet that are diesel-powered vehicles for the rural (left) and urban (right) areas of the states of Iowa, Kansas, and Louisiana. The diesel fractions corresponding to MOBILE6 defaults are plotted for comparison on each chart.

<u>Key to Figures:</u>
Y-axis: Fraction of the total fleet that is comprised of diesel-powered vehicles
X-axis: Vehicle age from <1 to ≥24 years

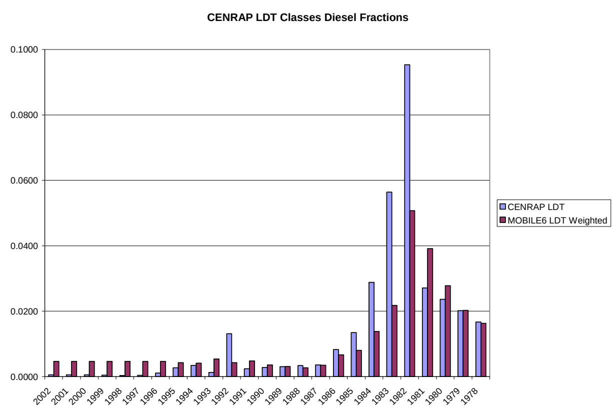


Fractions of the light-duty vehicle fleet that are diesel-powered vehicles for the rural (left) and urban (right) areas of the states of Minnesota, Missouri, and Nebraska. The diesel fractions corresponding to MOBILE6 defaults are plotted for comparison on each chart.

Key to Figures:
Y-axis: Fraction of the total fleet that is comprised of diesel-powered vehicles
X-axis: Vehicle age from <1 to ≥24 years



Fractions of the light-duty vehicle fleet that are diesel-powered vehicles for the rural (left) and urban (right) areas of the state of Oklahoma. The diesel fractions corresponding to MOBILE6 defaults are plotted for comparison on each chart.



Fractions of the light-duty truck fleet that are diesel powered in the CENRAP region. The diesel fractions corresponding to MOBILE6 defaults are plotted for comparison.

Key to Figures:
Y-axis: Fraction of the total fleet that is comprised of diesel-powered vehicles
X-axis: Vehicle age from <1 to ≥24 years

Appendix H.8

Sonoma Technology, ***Research and Development of Ammonia Emission Inventories for the Central States Regional Air Planning Association (October 30, 2003)***

Sonoma Technology, Inc.
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Petaluma, CA 94954-1169
707/665-9900
FAX 707/665-9800
www.sonomatech.com

RESEARCH AND DEVELOPMENT OF AMMONIA EMISSION INVENTORIES FOR THE CENTRAL STATES REGIONAL AIR PLANNING ASSOCIATION

FINAL REPORT
STI-902501-2241-FR

By:
Dana L. Coe
Stephen B. Reid
Sonoma Technology, Inc.
1360 Redwood Way, Suite C
Petaluma, CA 94954-1169

Prepared for:
The Central States Air Resource Agencies and
The Central Regional Air Planning Association
10005 South Pennsylvania Avenue, Suite C
Oklahoma City, Oklahoma 73159

October 30, 2003

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QUALITY ASSURANCE STATEMENT

This report was reviewed and approved by the project Quality Assurance (QA) Officer or his delegated representatives, as provided in the project QA Plan (Coe, 2003).

Lyle R. Chinkin
Project QA Officer

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EXECUTIVE SUMMARY

The Central States Regional Air Planning Association (CENRAP) is researching visibility-related issues for its region and is developing a regional haze plan in response to the U.S. Environmental Protection Agency's (EPA) mandate to protect visibility in Class I areas. In support of the CENRAP's need to develop a regional haze plan, Sonoma Technology, Inc. (STI) developed a 2002 ammonia emission inventory for the region in keeping with the emissions estimation techniques presented in Appendix A—Ammonia Emission Estimation Methods for the CENRAP Ammonia Emission Inventory (Methods Document).

Consistent with the Methods Document, ammonia emissions were estimated for 13 source categories using the Carnegie Mellon University (CMU) model and supplemental technical work; 80% of technical work was dedicated to improving emissions estimates for two source categories—livestock production and fertilizer use. For these two categories, as well as biogenic sources, improvements were made to the activity data and/or emission factors used by the CMU model. For four other source categories (industrial point sources, landfills, ammonia refrigeration, and non-road mobile sources), emissions estimates were prepared independently of the CMU model, and for the remaining six source categories (publicly owned treatment works, wildfires, domestic animals, wild animals, human respiration, and on-road mobile sources), emissions estimates were derived by running the CMU model with no alterations.

In the resulting inventory, the most important source categories are estimated to be livestock and poultry, fertilizers, and biogenics. When combined, these three sources account for 87% of the annual ammonia emissions in the CENRAP region (see **Figure ES-1**). Seasonally, peaks in emission levels occur in spring and fall (especially during the months of April and October), times when manure and fertilizer are typically applied to croplands (see **Figure ES-2**).

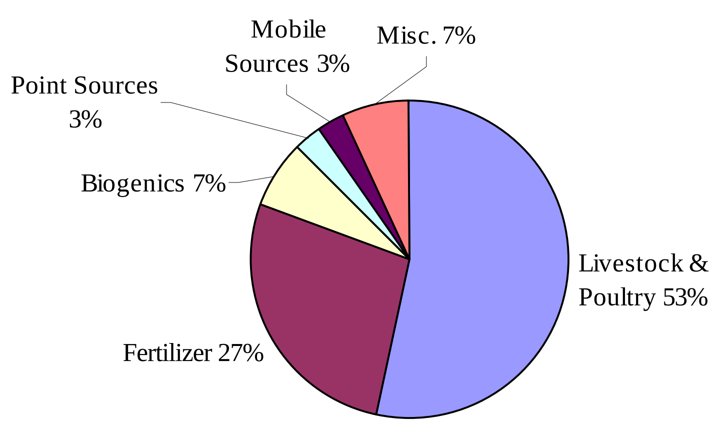

Figure ES-1. CENRAP 2002 ammonia emissions by source category.

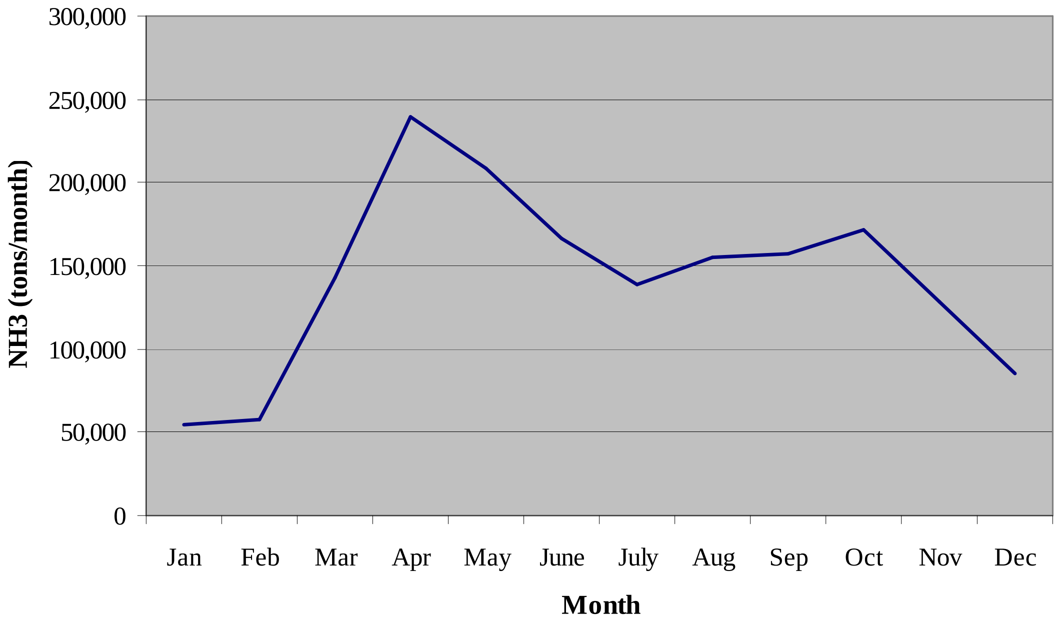

Figure ES-2. Monthly variability in total 2002 emissions for the CENRAP region.

As anticipated, emissions from livestock and poultry made the largest contribution to total estimated emissions for the CENRAP region and for each individual state (with the exception of Louisiana). This source category was especially significant in the states of Iowa and Oklahoma, where emissions from livestock and poultry accounted for over 60% of the total inventory (see **Table 2-1**). Fertilizer application was the second most significant source of ammonia emissions in the region, and this source category was especially important in Kansas and Nebraska, accounting for about 36% of the total inventory in those states. (Actual emissions estimates by source category and state are tabulated in Appendix B.)

The source with the greatest uncertainty in the inventory is biogenic emissions, because the emission rates and character of the natural environment as a source or a sink of ammonia are not studied as extensively as they are for other source categories. Significant uncertainties also exist in the available ammonia emission factors for agricultural activities, as they fail to adequately consider some important governing principles (such as climate, manure management, and animal diet). In addition, two source categories that may be significant at local geographic scales were necessarily omitted from the inventory due to lack of information: ammonia injection for NO_x controls and biosolids (or sewage sludges).

In order to improve the CENRAP's emission inventory in the future, we recommend research efforts, such as studies of activity data, which will allow the CENRAP to take advantage of next-generation emissions models that are currently under development for biogenics, livestock, and fertilizers. In addition, we recommend a survey of power plants in the CENRAP states to assess the emissions from ammonia-injection control technologies. Lastly, recognizing that a viable emissions model for sewage sludges may not be available for a long time, we recommend that an emissions inventory be developed for this source category through the initiation of emissions measurement programs and systems to gather or track pertinent activity data.

1. INTRODUCTION

The Central States Regional Air Planning Association (CENRAP) is researching visibility-related issues for its region, which includes the states of Texas, Oklahoma, Louisiana, Arkansas, Kansas, Missouri, Nebraska, Iowa, and Minnesota, and is developing a regional haze plan in response to the U.S. Environmental Protection Agency's (EPA) mandate to protect visibility in Class I areas. To develop an effective regional haze plan, the CENRAP must develop a conceptual model of the phenomena that lead to episodes of low visibility in the CENRAP region. It is widely recognized that the formation of secondary particulate matter—which is generated from chemical transformations in the atmosphere of gaseous precursor species such as ammonia, nitrogen oxides, sulfur oxides, and volatile organic compounds—contributes significantly to regional haze issues in the CENRAP region. Therefore, development of accurate and comprehensive emission inventories of these precursor species is important.

In support of the CENRAP's need to develop a regional haze plan, Sonoma Technology, Inc. (STI) responded to the CENRAP Work Assignment Number 02-0214-RP-003-001, "Research and Development of Ammonia Emission Inventories for the Central States Regional Air Planning Association." The project objectives were to identify and evaluate information resources that may be immediately applied to mitigate known weaknesses in the Carnegie Mellon University (CMU) model—an ammonia emissions modeling tool and database system that was developed by CMU and recently evaluated by STI—and to apply the findings to improve the CMU ammonia emission inventories for the CENRAP region. As directed by the CENRAP Emissions Work Group, STI dedicated at least 80% of its technical effort to improving emission estimates for two types of emissions sources—livestock production and fertilizer use—while the remainder of the work was directed toward improving emission estimates for other types of emissions sources (such as wastewater treatment plants, biogenics, or on- and off-road mobile sources).

1.1 BACKGROUND AND KEY ISSUES

1.1.1 Secondary Formation of Fine Particulate Matter in the CENRAP Region

Visibility impairment is primarily caused by particulate matter of aerodynamic diameter less than 2.5 microns ($PM_{2.5}$). $PM_{2.5}$ may be directly emitted from sources such as fugitive dust and combustion soot, which are termed sources of "primary $PM_{2.5}$". Condensable organic aerosols form from air emissions of semi-volatile and heavy organic compounds. In addition, $PM_{2.5}$ forms from photochemical reactions of gaseous precursors, including sulfur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOC), and ammonia (NH_3). This mechanism of $PM_{2.5}$ formation is termed "secondary formation".

The chemical composition of ambient $PM_{2.5}$ provides an understanding of the types of emissions sources that contribute to regional haze issues in different regions (see **Figure 1-1**). Ammonium sulfate, ammonium bisulfate, and ammonium nitrate are important secondary $PM_{2.5}$ constituents. In urban and ammonia-depleted areas of the eastern United States, sulfate is relatively a more significant contributor to $PM_{2.5}$ than it is in the western United States.

Conversely, nitrate is more important in urban and ammonia-rich areas of the western United States than it is in eastern areas. In both the eastern and western United States, the carbonaceous fraction of $PM_{2.5}$ is significant in urban areas. However, in more pristine areas, the contribution of geologic dust to ambient $PM_{2.5}$ becomes more important and may contribute up to 50% of observed $PM_{2.5}$ concentrations. Areas with abundant gaseous NH_3 experience rapid transformation of the atmospheric oxidation products of SO_x and NO_x emissions into fine aerosols of ammonium sulfate and ammonium nitrate.

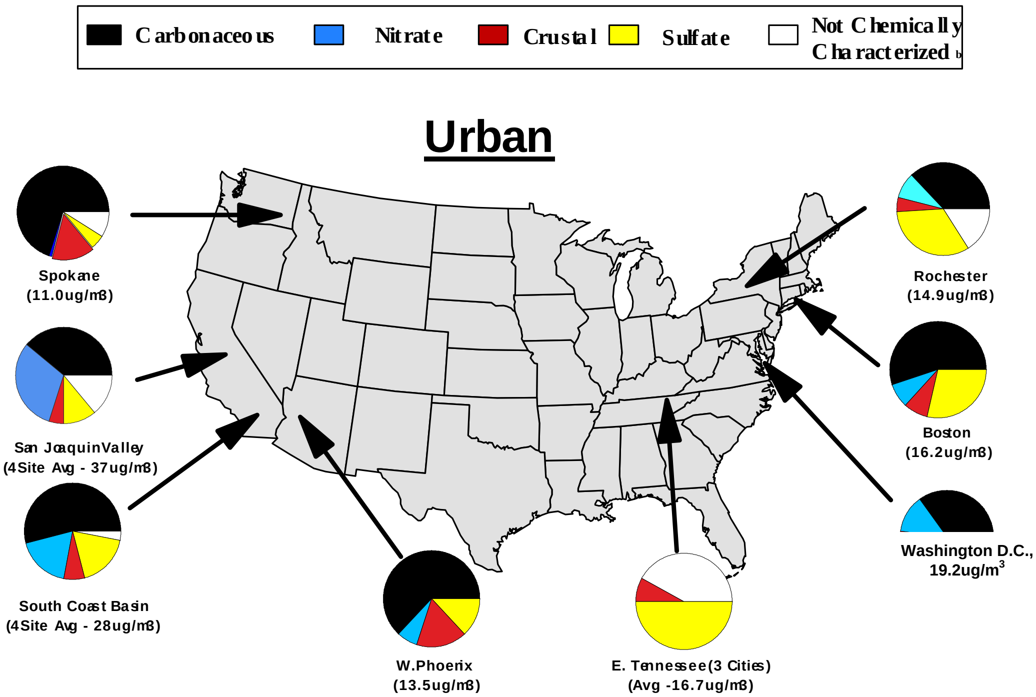

Figure 1-1. Compositions of annual average concentrations of $PM_{2.5}$ observations in urban locations (U.S. Environmental Protection Agency, 1998).

In order to develop a preliminary[1] understanding of the components that contribute to ambient levels of $PM_{2.5}$ in the CENRAP region, STI analyzed a data set of speciated $PM_{2.5}$ data for the region that was compiled by researchers at the Center for Air Pollution Impact and Trend Analysis at Washington University (Schichtel et al., 1999). The data were collected during various time periods and using various analytical sampling techniques; thus, the results should be considered uncertain until a more rigorous evaluation can be completed. Nevertheless, the data indicated several important characteristics. The preliminary data summaries shown in **Figures 1-2 and 1-3** indicate that at sites where sulfates and nitrates were measured, these secondary compounds together comprised approximately 30% to 60% of $PM_{2.5}$. In addition, sulfate concentrations are 2 to 10 times larger than nitrate concentrations. Furthermore, the

[1] It is recognized that more-recent monitoring data have become available since this preliminary analysis was done. While the data sources cited provide the level of understanding needed for this background discussion, it is recommended that future efforts include analysis of the most recent monitoring data.

highest ratios of sulfates to nitrates and the highest average concentrations of $PM_{2.5}$ were observed in the southeastern portions of the CENRAP region. This is consistent with observations presented by Falke (1999) shown in **Figure 1-4**. However, it is important to note that Falke's analyses also indicated relatively high levels of uncertainty in the western portion of the CENRAP region (**Figure 1-5**). Other potential uncertainties in the monitoring data also can affect analyses of $PM_{2.5}$ data. For example, Malm et al. (2000) reported differences as large as a factor of two between IMPROVE and CastNet (CDN) observations at Big Bend National Park, Texas, (the only CENRAP Class I site studied) (see **Figure 1-6**). Examination of estimated SO_2 emission rates and population densities across the United States (**Figures 1-7 and 1-8**) helps explain why $PM_{2.5}$ concentrations are somewhat higher and sulfates are so important in the southeast portion of the CENRAP region.

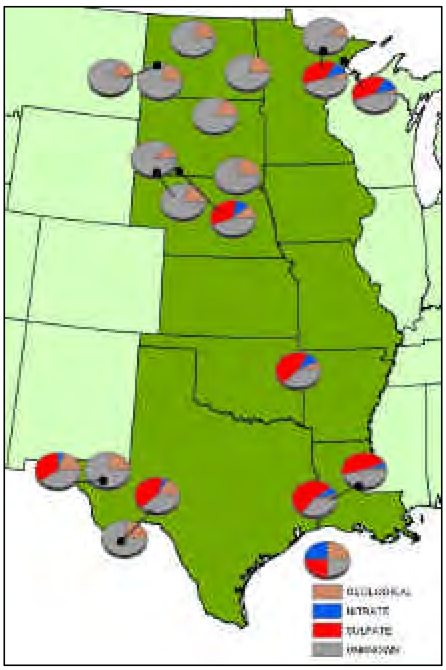

Figure 1-2. Contributions of chemical components to observed $PM_{2.5}$ concentrations in the CENRAP region.

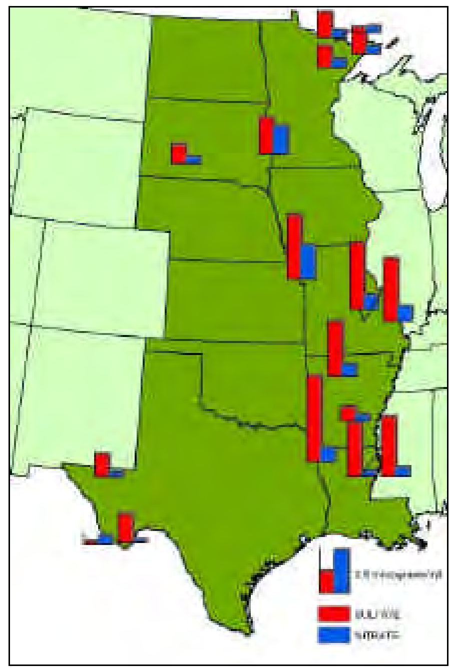

Figure 1-3. Concentrations of particulate sulfates and nitrates observed in the CENRAP region.

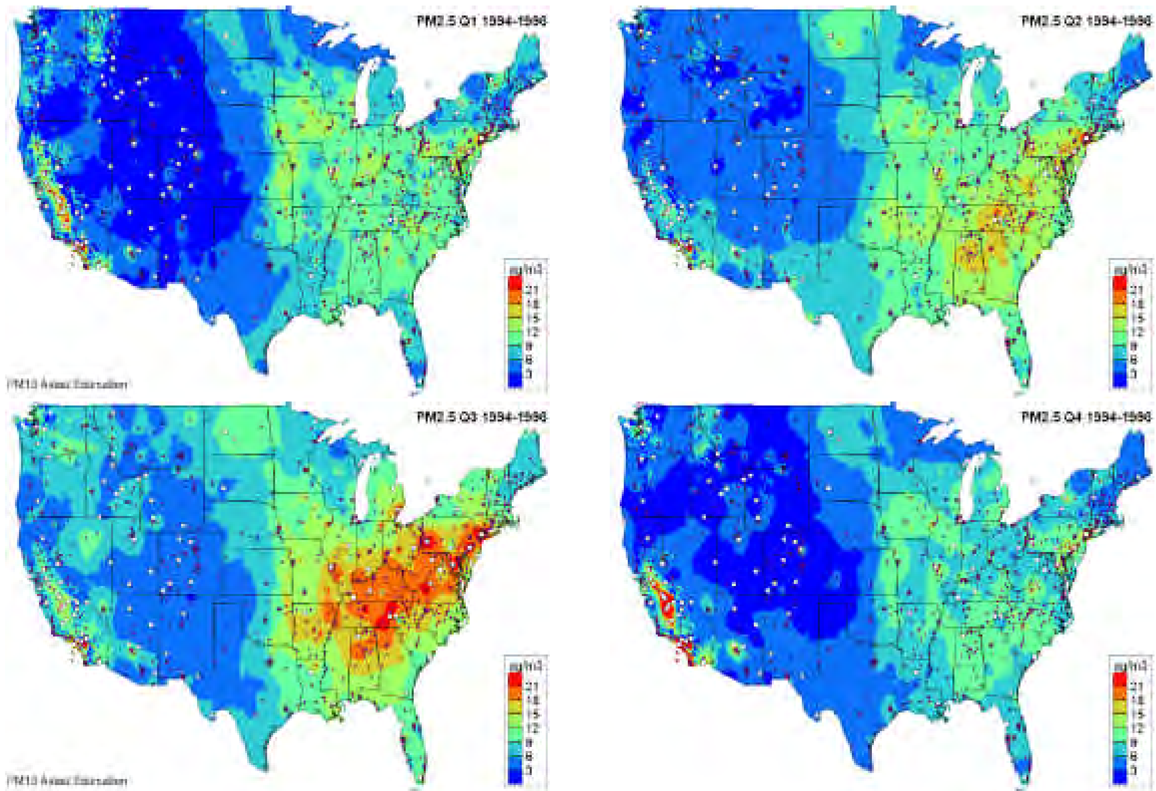

Figure 1-4. Estimated seasonal average concentrations of $PM_{2.5}$ (1994-1996) (Falke, 1999).

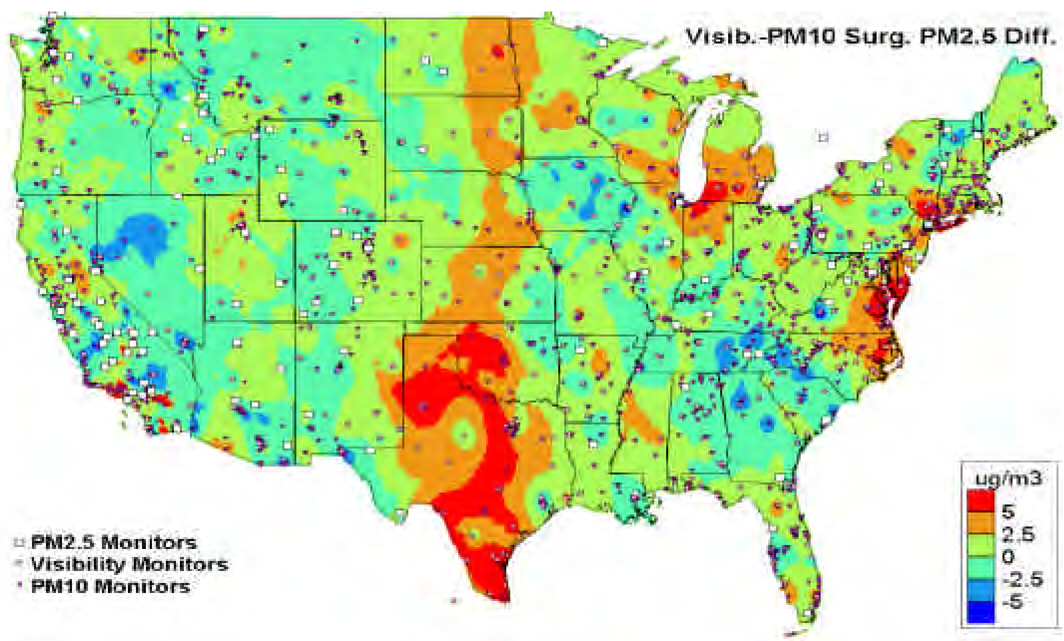

Figure 1-5. Uncertainty in estimated seasonal average $PM_{2.5}$ concentrations (Falke, 1999).

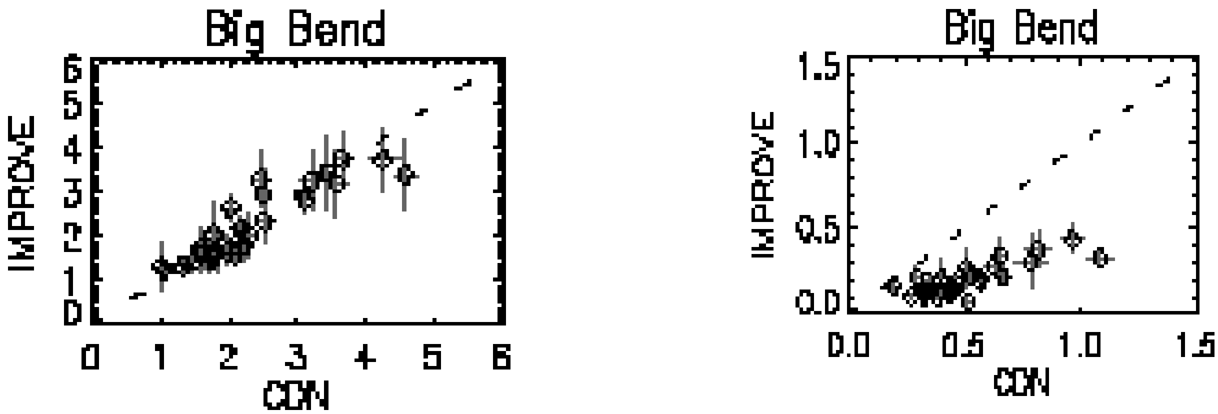

Figure 1-6. Comparison of IMPROVE and CDN measurements of sulfate (right) and nitrate (left) at Big Bend National Park, Texas (Malm et al., 2000).

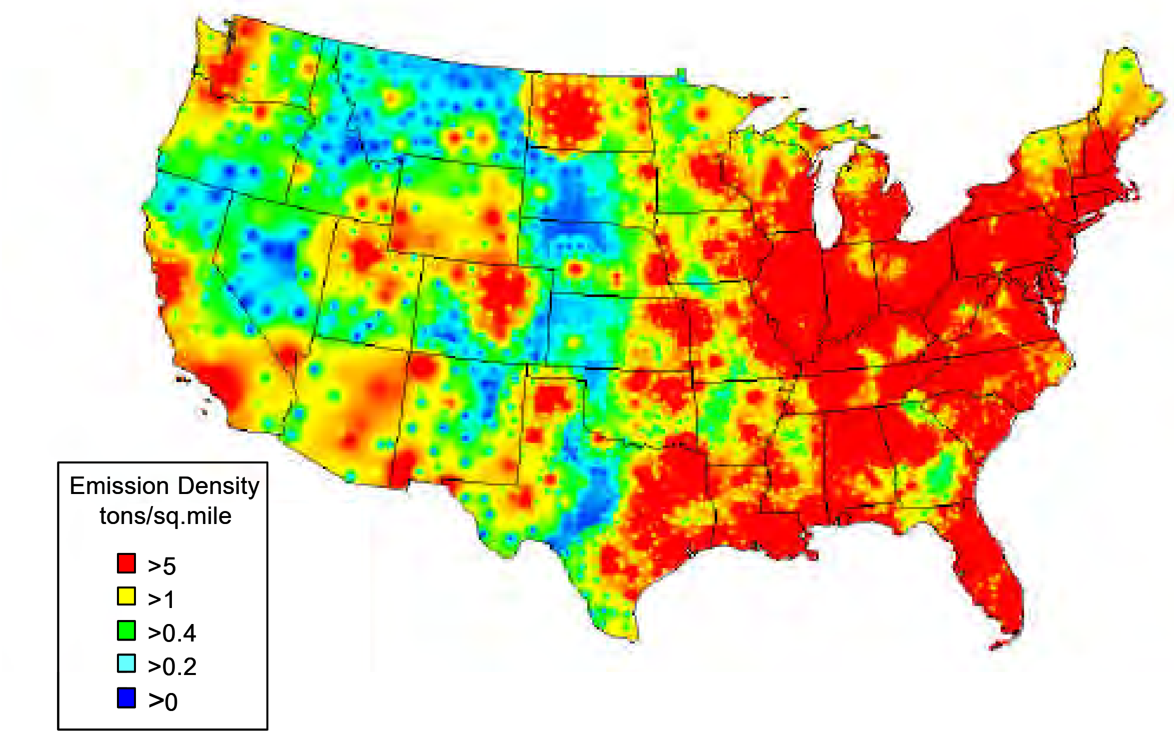

Figure 1-7. Annual SO_2 emissions in 1998 (U.S. Environmental Protection Agency, 2000).

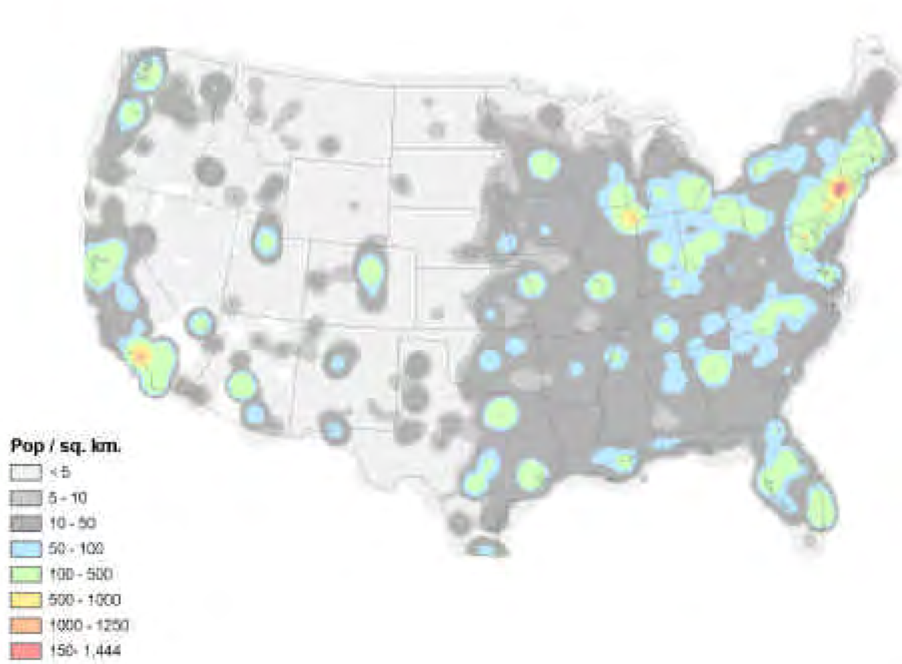

Figure 1-8. Population density in the United States in 2000 (U.S. Census Bureau, 2001).

1.1.2 Prior Statuses of Ammonia Emission Inventories

As a whole, few areas of the CENRAP region historically have experienced significant air quality problems and, therefore, monitoring and emissions estimates were relatively scarce. The most comprehensive sources of emissions estimates were the EPA's National Emissions Inventory (NEI), which is used as the basis of the EPA's National Emission Trends (NET) document series and analyses, and the CMU ammonia modeling tool and database system. Through previous studies, STI identified the following weaknesses and areas needing improvement in the NEI and CMU databases.

- Potentially important anthropogenic sources of ammonia include agricultural sources (animal husbandry and fertilizer application), mobile sources, natural (or "biogenic") sources, ammonia injection for NO_x control at power plants, and wastewater treatment plants. In many cases, the associated emission factors, activity parameters, seasonal profiles, and spatial patterns are highly uncertain and in need of improvement. The CMU model provides a framework for the development of county-level ammonia inventories, but it required significant improvements in its emission factors and activity data in order to represent the most up-to-date and geographically specific information possible.
- The NEI is estimated on an annual average basis. As Figure 1-4 illustrates, regional haze has a seasonal character and is partly driven by photochemical processes. Adjustments were necessary to develop seasonal, diurnal, and, possibly, day-of-week emission estimates.

- For mobile sources, improved activity inputs would be helpful, such as region-specific or state-specific fleet characteristics and improved vehicle miles traveled (VMT) estimates for rural areas. (Note that this improvement will be completed through a separate work assignment with the CENRAP.)
- For smaller point sources, STI found that the NET inventory can be highly inaccurate. For example, in the region surrounding Memphis, Tennessee, STI found that the 1996 NET inventory underestimated emissions of VOCs and NO_x by factors of 10 or more.
- To support modeling sensitivity runs, measures of uncertainty for all emission estimates are highly valuable for policy decisions and prioritization of future research efforts. Because the CENRAP ammonia inventory was compiled entirely from pre-existing emission factors and data, which lacked associated quantitative uncertainties, we are limited to providing only qualitative assessments of the emissions estimates. These are discussed in the Executive Summary and in Section 3, Recommendations for Further Research.

1.1.3 Project Priorities

To meet the CENRAP's primary goals, STI balanced the immediate need for a practical and cost-effective ammonia emission inventory with the need to incorporate the latest research and best available information. Thus, STI dedicated the majority of its resources to areas that the CENRAP has indicated are the highest priority: emissions from livestock management and fertilizer application. In addition, STI provided technology transfer services and documentation so that the work products of this project may be easily modified or applied by third parties, such as the CENRAP's Modeling Work Group or the CENRAP States' emissions and air quality specialists.

1.2 CURRENT STATUS OF THE CENRAP EMISSION INVENTORY

The resultant emission inventory produced through this work assignment is illustrated in **Figures 1-9, and 1-10** and tabulated in Appendix B. In all cases, we have applied generally accepted emission factors and the most complete and up-to-date activity data sets that could be identified and acquired. However, we also understand that available ammonia emission factors are uncertain, that they fail to adequately consider some important governing principles (such as climate, manure management, and animal diet), and that they continue to be the subject of research. These considerations are especially important for those areas of the inventory that we qualitatively consider to contribute the greatest degrees of uncertainty to the total estimated emissions: biogenic emissions (often called "natural soils"), livestock emissions, and fertilizer emissions. To help mitigate the effects of these uncertainties in the future, we have provided the CENRAP with an inventory and system of data files that can be updated with revised emission factors and activity data as new information become available (see Appendix D).

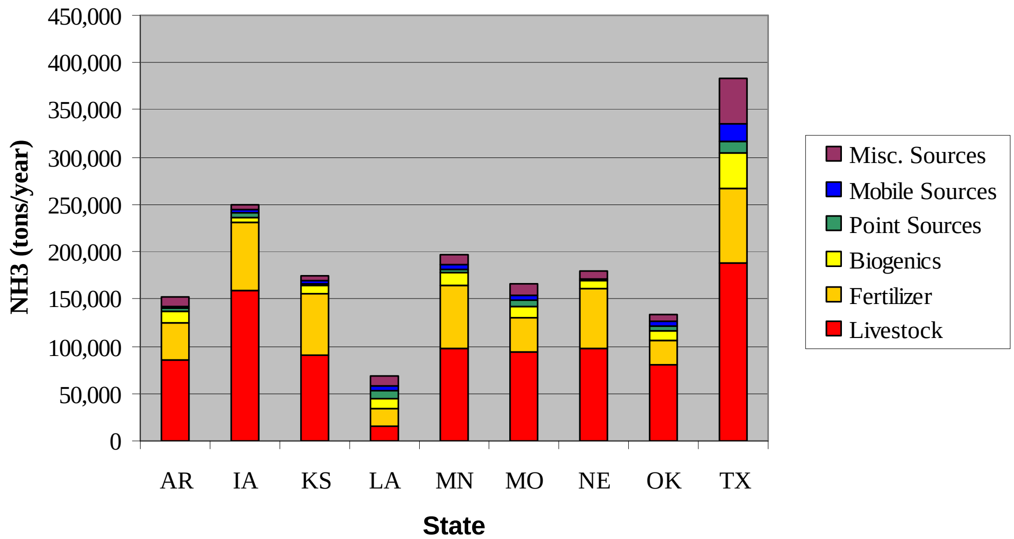

Figure 1-9. Total annual ammonia emissions by source category for each state of the CENRAP region.

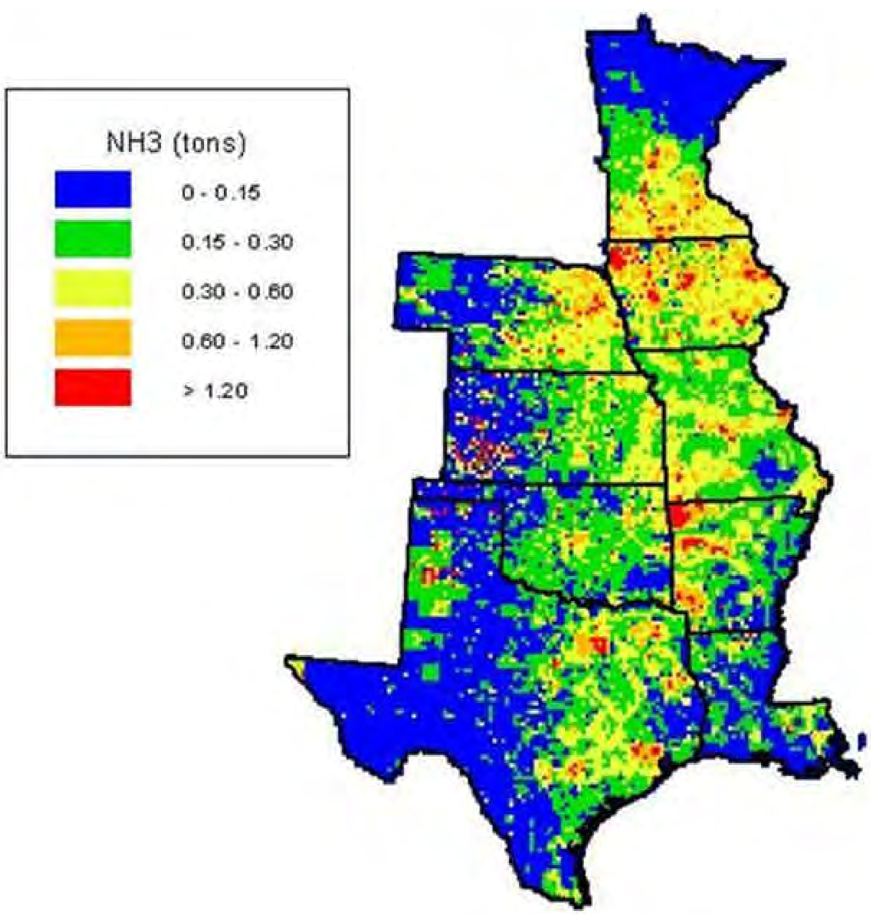

Figure 1-10. Geographic map of emissions densities for the CENRAP region, July 10, 2002.

2. SUMMARY AND ASSESSMENT OF THE INVENTORY

STI calculated emissions as detailed in Appendix A—Ammonia Emission Estimation Methods for the CENRAP Ammonia Emission Inventory. (Results are tabulated in Appendix B—Tabulation of Ammonia Emissions Estimates for the CENRAP Region.) In addition, STI carried out quality assurance procedures as provided in the Quality Assurance Plan and as detailed in this section. In summary, the most important source categories are estimated to be livestock and poultry, fertilizers, and biogenics, all three of which are also considered to contribute the greatest sources of uncertainty in the overall inventory. Total emissions vary seasonally by a factor of 3 to 8, with peaks occurring in the spring or fall. Total emissions vary geographically across the CENRAP region from <0.0.003 to >2 metric tons per day per square kilometer.

2.1 EMISSIONS FROM LIVESTOCK AND POULTRY

2.1.1 Summary of Emissions from Livestock and Poultry

Emissions estimates were generated for several types of livestock and poultry, including beef cattle, milk cows, hogs/pigs, sheep, goats, horses, broilers, layers, pullets, turkeys, geese, and ducks. The population of each of these animal types housed in concentrated animal feeding operations (CAFOs) was determined so that emissions from these facilities could be treated as point sources, with emissions from the remaining "free range" animals being treated as area sources. It was determined that emissions from livestock and poultry contribute 53% to total estimated emissions for the CENRAP region, ranging from 23% to 63% of total emissions from state to state (see **Table 2-1**). Emissions associated with concentrated animal feeding operations (CAFOs) were especially high for Iowa and Kansas, exceeding emissions associated with "free range" livestock for those two states. **Figure 2-1** shows the relative importance of each animal type in each state. The most important animal types are beef cattle (especially in the states of Texas, Kansas, and Nebraska), hogs and pigs (especially in the states of Iowa and Minnesota), and poultry (especially in the state of Arkansas).

The seasonal variability of livestock emissions follows a bimodal pattern, with peaks in spring and fall when manure is typically applied on croplands as fertilizer. **Figure 2-2** illustrates the seasonal variability in livestock emissions for each state.

Table 2-1. Livestock and poultry emissions by state.

	NH_3 Emissions (tons/year)			% of State
State	CAFOs[1]	Free range[2]	Total	Inventory
Arkansas	4,096.0	81,978.6	86,074.6	56.5%
Iowa	88,722.5	69,713.6	158,436.1	63.3%
Kansas	57,611.1	33,455.9	91,067.0	52.1%
Louisiana	82.4	15,837.5	15,919.9	23.1%
Minnesota	25,518.0	72,562.1	98,080.1	49.8%
Missouri	24,685.5	68,925.6	93,611.1	56.6%
Nebraska	30,240.0	66,743.0	96,983.0	53.9%
Oklahoma	19,864.6	60,016.8	79,881.4	60.1%
Texas	45,650.0	143,115.0	188,765.0	49.2%

[1]Includes emissions from all animal types housed at CAFOs in each state.
[2]Includes emissions from all non-CAFO animals in each state.

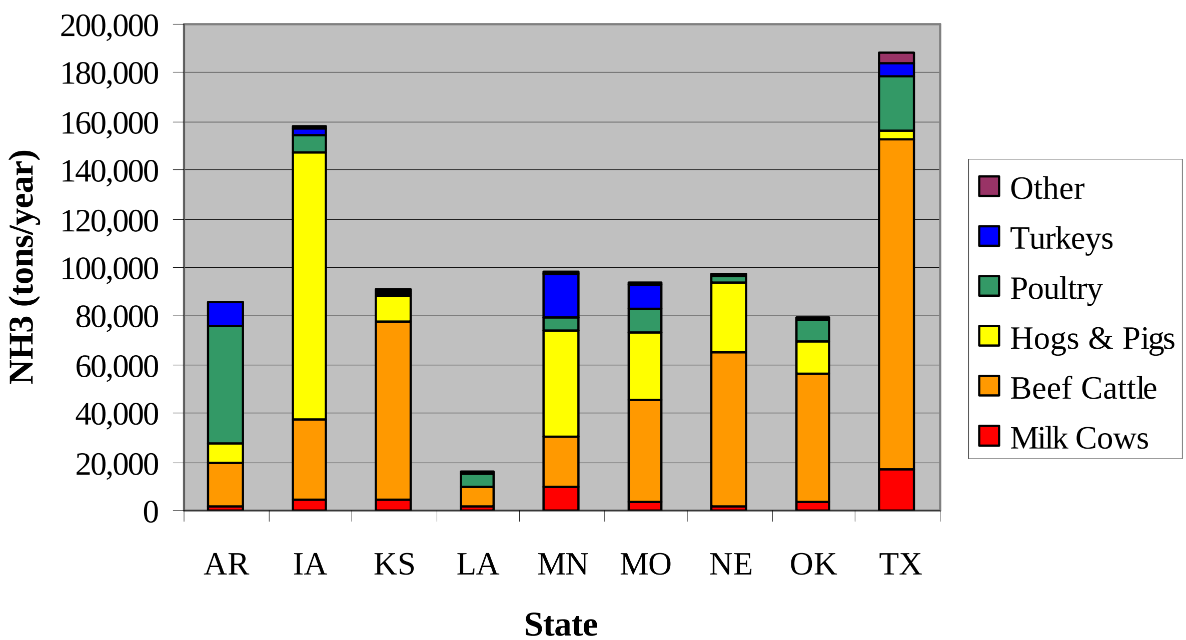

Figure 2-1. Livestock and poultry emissions by state and animal type.

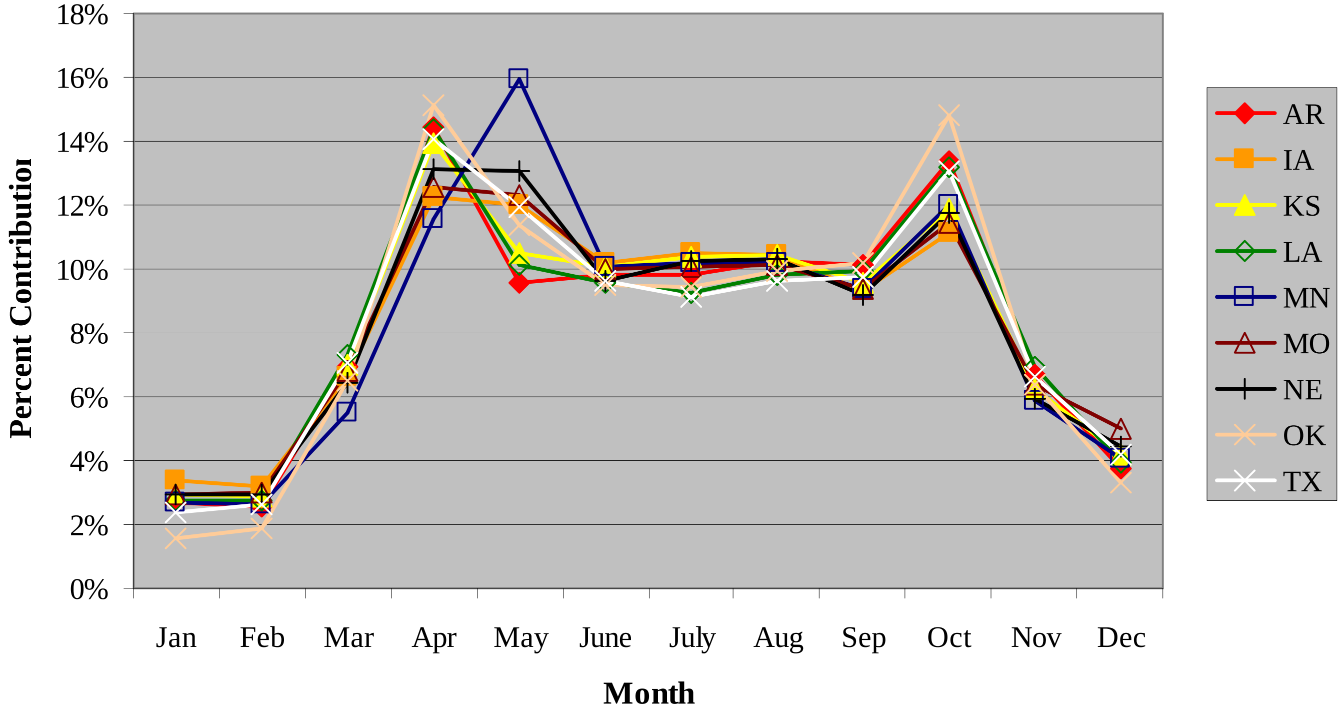

Figure 2-2. Seasonal variabilities in emissions from livestock and poultry by state.

2.1.2 Assessment of Emissions from Livestock and Poultry

This category (livestock and poultry) was the largest source of ammonia emissions in the inventory, which is to be expected for large Midwestern states recognized for their livestock production. (Louisiana is an exception.) To check the reasonableness of the emissions presented above, state totals were compared with results obtained by running the CMU model with no alteration in livestock population estimates (see **Figure 2-3** and Appendix C). Each state's total was within 5% of the CMU result with the exception of Kansas, where our emissions estimate was 14% higher. This difference is due to the fact that we estimate a greater population of beef cattle in Kansas based on National Agricultural Statistics Service (NASS) and CAFO data than is reported in the 1997 Census of Agriculture.

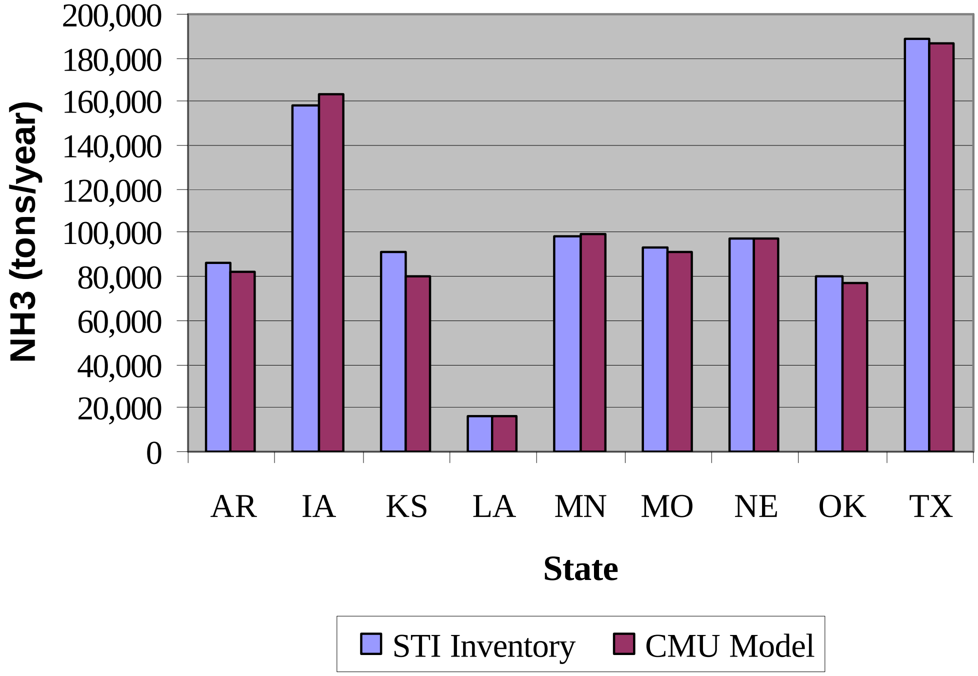

Figure 2-3. Comparison of livestock emission totals.

A second quality assurance step taken was the production of an emissions density plot showing only the point source portion of the inventory, which largely consists of CAFOs (14,000 point sources were included in the inventory, of which 80% were CAFOs). **Figure 2-4** shows a band of sources across northern Texas, western Kansas, central Nebraska, all of Iowa, and southern Minnesota, a distribution that can also be seen in an animal population density map for confined livestock produced by the U.S. Department of Agriculture for 1997 (see **Figure 2-5)**.

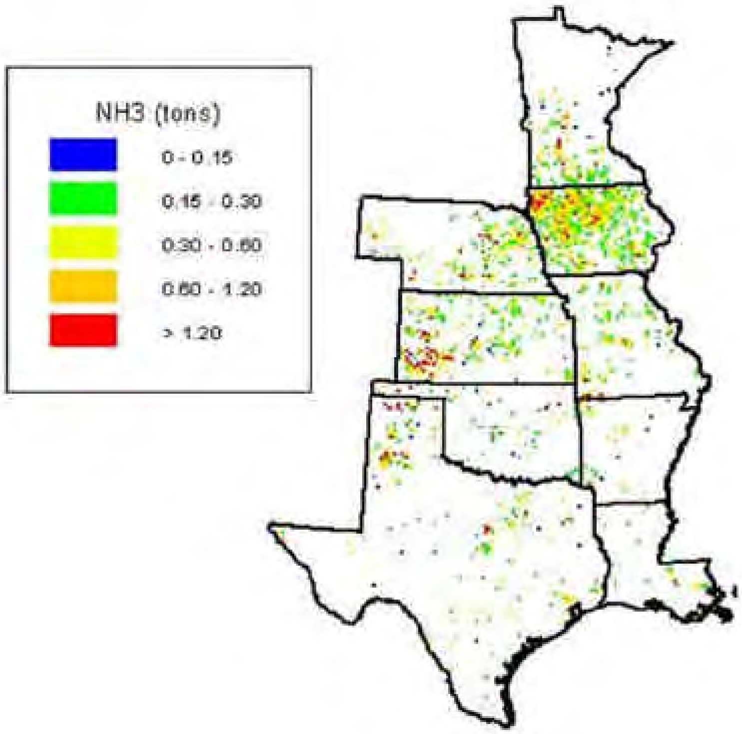

Figure 2-4. Point source emissions for July 10, 2002.

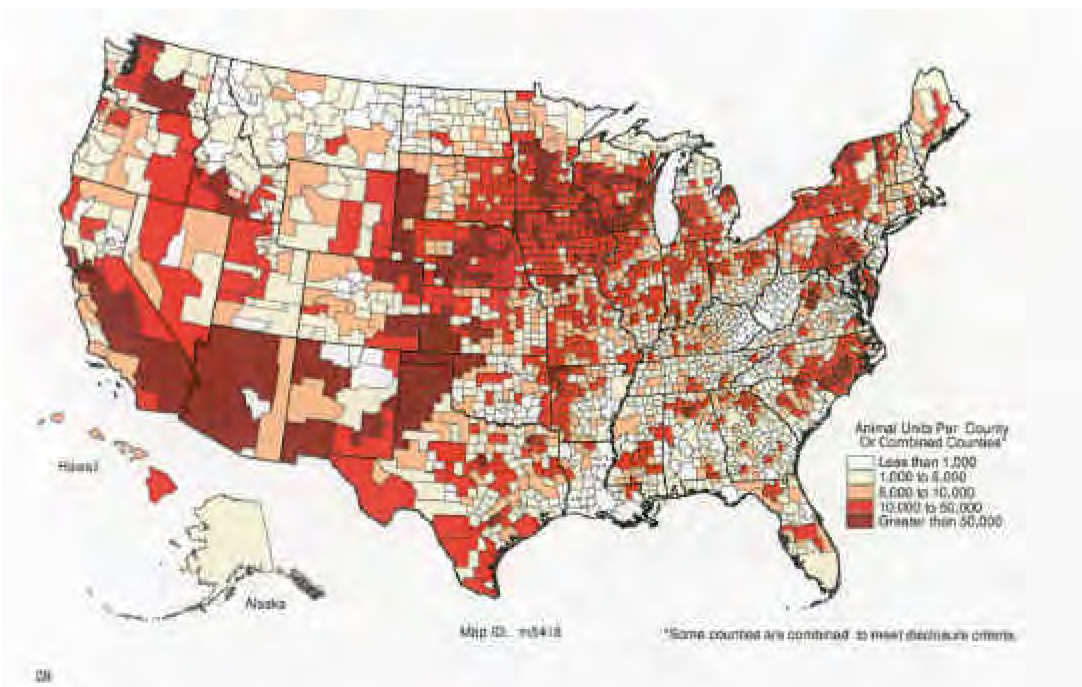

Figure 2-5. Animal population density map for confined livestock, 1997 (Kellogg et al., 2000).

2.2 EMISSIONS FROM FERTILIZER APPLICATION

2.2.1 Summary of Emissions from Fertilizer Application

Emissions from fertilizer application contribute 27% to total estimated emissions for the CENRAP region, ranging from 20% to 37% of total emissions from state to state. The most important fertilizer types are urea (especially in the states of Minnesota, Texas, and Arkansas), nitrogen solutions (especially in the states of Texas, Nebraska, and Iowa), and anhydrous ammonia (especially in the states of Iowa, Nebraska, and Kansas). **Figure 2-6** illustrates the relative importance of each fertilizer type in each state.

Similar to emissions from livestock and poultry, emissions from fertilizer application follow a bimodal pattern of seasonal variability, with peaks in the spring and fall (see **Figure 2-7**). Some states exhibit particularly pronounced emission spikes in certain months due to the types of crops that dominate in the state. Iowa, for example, is dominated by corn growers and does not produce as wide a variety of crops as other CENRAP states. Thus, in Iowa 40% of all emissions from fertilizer application occur in the month of April. Oklahoma and Kansas, on the other hand, produce a great deal of winter wheat and, therefore, have unusually high emission rates in August and September.

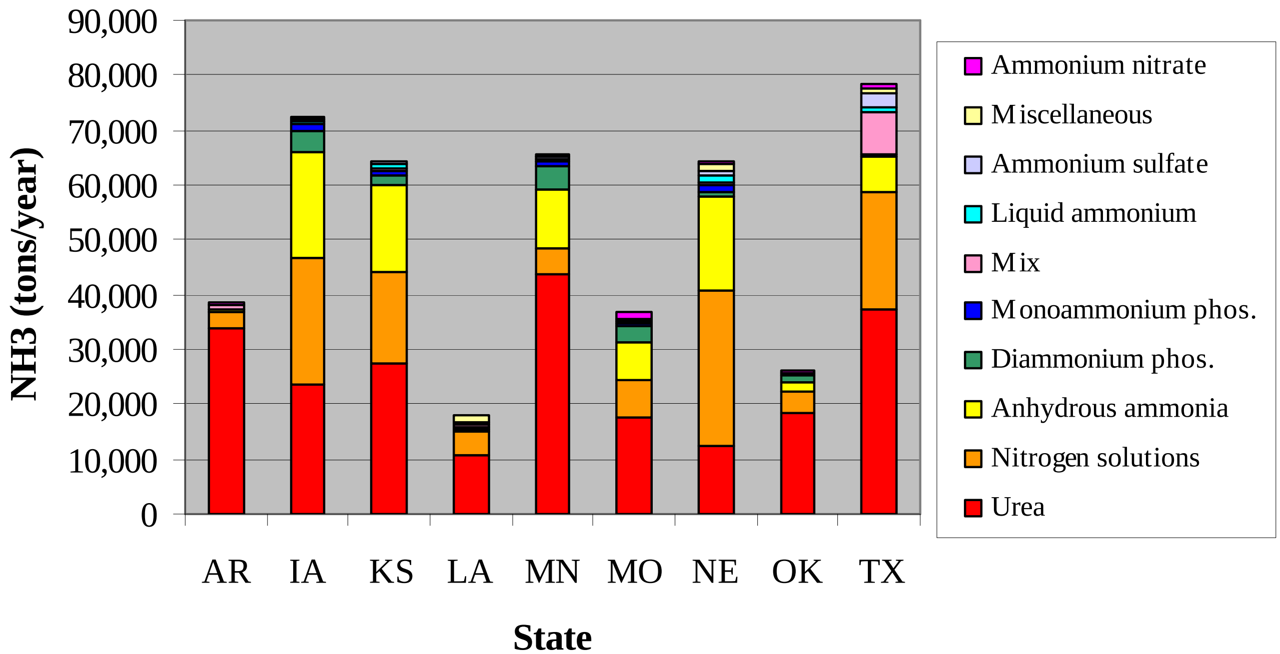

Figure 2-6. Emissions by fertilizer type for each state of the CENRAP region.

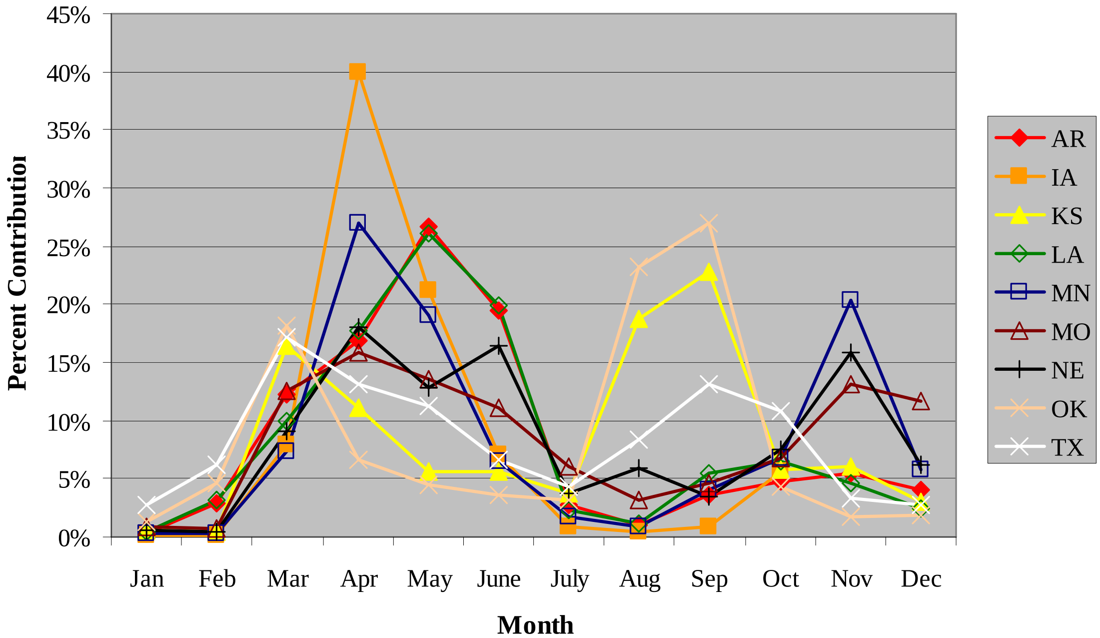

Figure 2-7. Seasonal variabilities in emissions from fertilizer application for each state of the CENRAP region.

2.2.2 Assessment of Emissions from Fertilizer Application

As expected, this category was the second largest source of ammonia emissions in the inventory. To check the reasonableness of the emissions presented above, state totals were again compared with results obtained by running the CMU model with no alteration in fertilizer activity data or emission factors (see **Figure 2-8** and Appendix C). The emissions totals for five states were within 5% of the CMU result, while the emissions for three states (Nebraska, Missouri and Louisiana) were 10% - 27% higher than the totals produced by the CMU model. Only one state, Kansas, proved to have significantly lower emissions (-8%) than those predicted by the CMU model.

These differences are largely due to changes in activity data and emission factors. First, we replaced the 1995 Association of American Plant Food Control Officials (AAPFCO) fertilizer usage data used in the CMU model with 2002 AAPFCO data, resulting in significant changes in activity data for some states. For example, total fertilizer usage in Kansas dropped 25% from 1995 to 2002, resulting in a significant emission reduction. On the other hand, fertilizer usage in Nebraska increased by 15% over the same time period, resulting in a 27% increase in emissions.

Additionally, we updated the emission factors used by the model. These emission factors were developed by the European Environment Agency (2001) and are dependent on soil type and climate. The European factors can be grouped according to the following classification system:

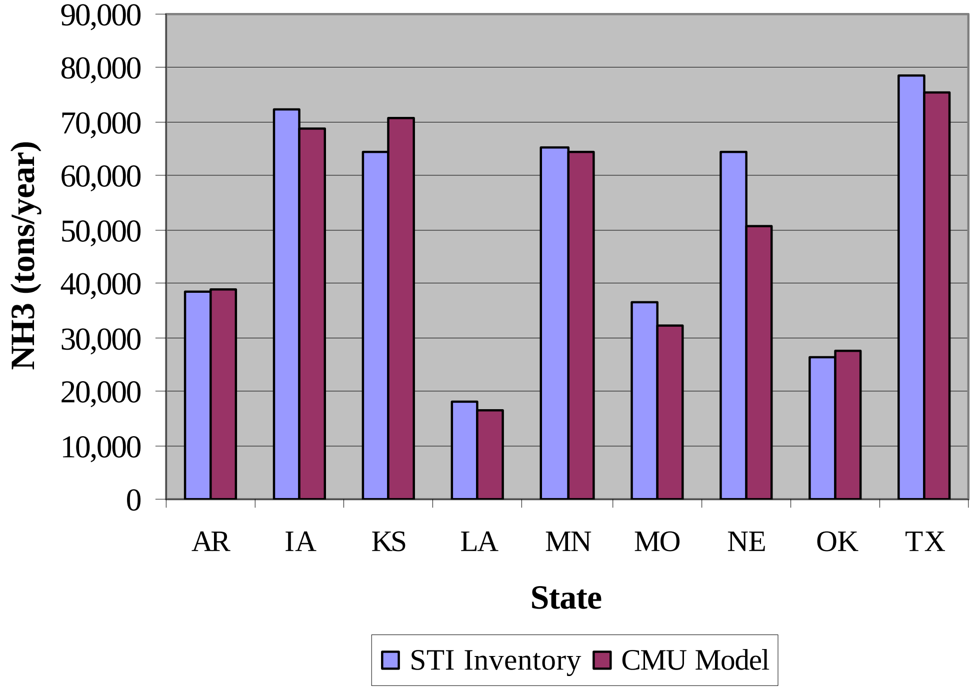

Figure 2-8. Comparison of emission totals from fertilizer application.

- Group I – Warm, temperate areas with a large proportion of calcareous soils.
- Group II – Temperate and warm-temperate areas with some calcareous soils (or managed with soil pH>7), but with large areas of acidic soils.
- Group III – Temperate and cool-temperate areas with largely acidic soils.

While the CMU model assigns whole states to one of the groupings listed above, we made these assignments at the county level based on the average soil pH in a given county (as reported by the National Resources Conservation Service (1994). Thus, for example, while the CMU model assigns all Nebraska counties to Group III, we assigned the majority of the state's counties to Group II, a classification with higher emission factors than Group III.

2.3 BIOGENIC EMISSIONS

2.3.1 Summary of Biogenic Emissions

Biogenic emissions (often called "natural soil" emissions) are especially uncertain because emission rates and the character of the natural environment as a source or a sink of ammonia are not studied as extensively as they are for other source categories. We estimated that biogenic emissions contribute 7% to total estimated emissions for the CENRAP region, ranging from 2% to 15% of total emissions from state to state. The most important land cover

types are croplands and pasture (especially in the states of Texas, Iowa, and Kansas), deciduous forests (especially in the states of Missouri, Oklahoma, and Texas), and mixed forests (especially in the states of Texas, Minnesota, and Arkansas). **Figure 2-9** illustrates the relative importance of each land cover type in each state. No information about seasonal variabilities was available; therefore, no monthly temporal profiles have been assigned.

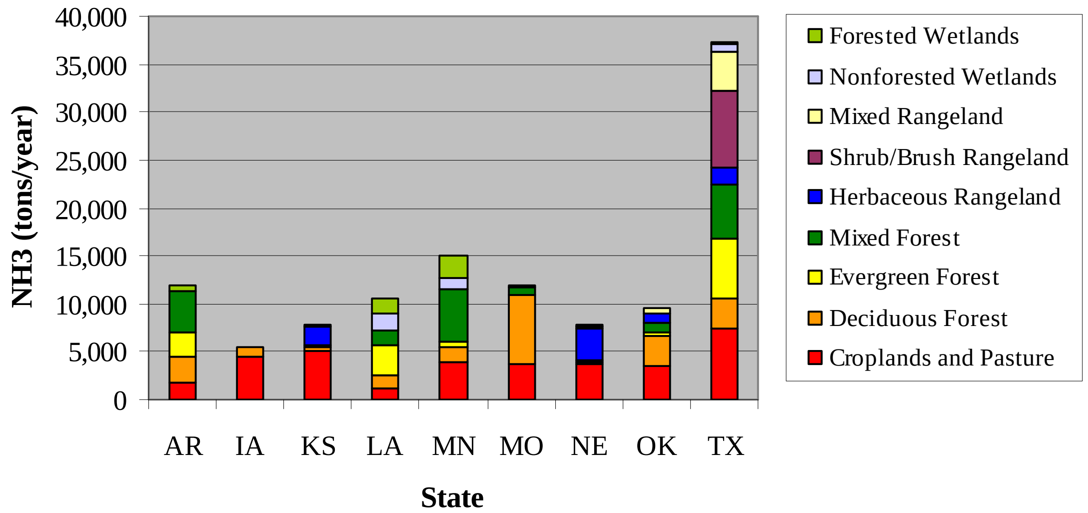

Figure 2-9. Biogenic emissions by land cover type for each state of the CENRAP region.

2.3.2 Assessment of Biogenic Emissions

Emissions estimates for this source category are *highly uncertain*. Initial estimates calculated using the CMU model's activity data and emission factors resulted in biogenic emission totals that accounted for half the total ammonia inventory in the CENRAP region. After a literature search, we chose to apply emission factors that were selected for use by Battye et al. (2003), which were based on factors reviewed or published by Schlesinger and Hartley (1992), Buowman et al. (1997), Kinnee et al (1997), and Van Der Hoek (1998). Use of these emission factors reduced biogenic emissions by 93% overall (see **Figure 2-10**), with the result that biogenic emissions accounted for 7% of the total CENRAP ammonia inventory. Battye et al. (2003) calculated similar percent contributions—about 6.6% and 6.3%—for emission inventories in North Carolina and California's San Joaquin Valley. When the CENRAP inventory is used for modeling sensitivity runs, it will be important to consider a wide range of uncertainty in the estimates of biogenic emissions.

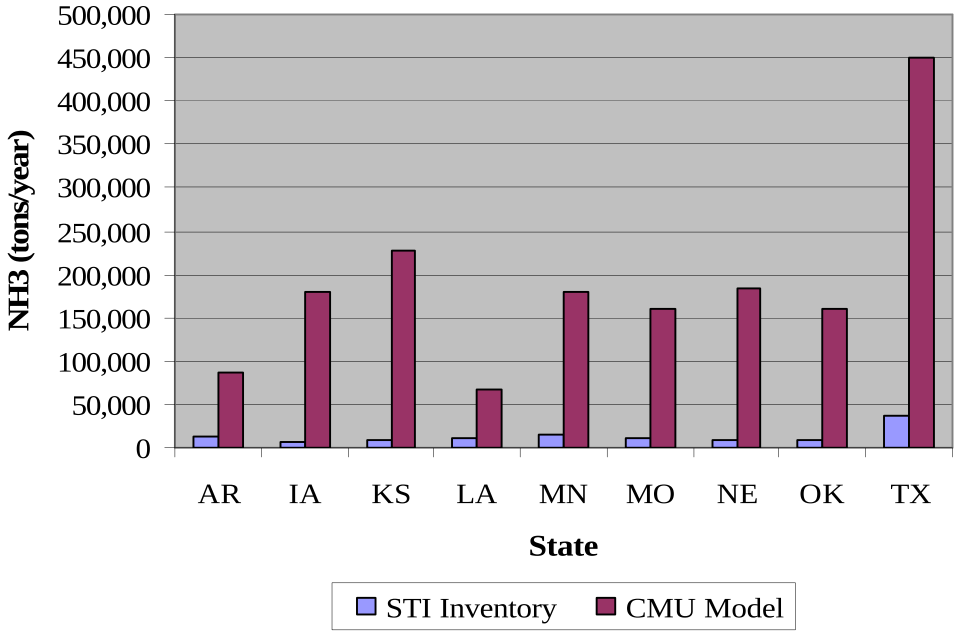

Figure 2-10. Comparison of biogenic emission totals.

2.4 EMISSIONS FROM OTHER SOURCE CATEGORIES

2.4.1 Summary of Emissions from Other Source Categories

All other source categories contributed 13% to total estimated emissions for the CENRAP region, ranging from 5% to 35% of total emissions from state to state. These included publicly owned treatment works (POTWs), wildfires, on-road mobile sources, non-road mobile sources, industrial point sources, landfills, ammonia refrigeration, and miscellaneous sources (domestic animals, human respiration, and wild animals). The most important of these source types are wild animals (especially in the states of Texas, Louisiana, and Arkansas), domestic animals (especially in the states of Texas, Missouri, and Oklahoma), and on-road mobile sources (especially in the states of Texas, Minnesota, and Missouri).

2.4.2 Assessment of Emissions from Other Source Categories

Because these source categories were relatively unimportant in comparison with livestock and fertilizer application, simple methods were employed to estimate the ammonia emissions associated with them. Emissions from six of these source categories (POTWs, wildfires, on-road mobile sources, domestic animals, wild animals, and human respiration) were taken directly from the CMU model with no updated activity data or emission factors.

Three other source categories (non-road mobile sources, landfills, and ammonia refrigeration) were omitted from the CMU model, so we independently prepared emissions estimates for these categories. Emissions from non-road mobile sources were taken directly

from the 1999 NEI, emissions from landfills were calculated from facility-specific, waste-in-place estimates, and emissions from ammonia refrigeration were estimated on an employment-based emission factor of 187 kg NH_3/employee reported by Battye et al. (1994). As the latter estimate is the most uncertain, we verified the scale of the emission factor by determining that annual production of ammonia for refrigeration uses in the United States is between 270,000 Mg and 350,000 Mg (Battye et al., 1994; International Institute of Ammonia Refrigeration, 2003). For the food-production industries that commonly use ammonia refrigeration, total United States employment equals approximately 1 million employees (U.S. Census Bureau, 2003). Thus, these figures yield a factor of 270 to 350 kg NH_3/employee-yr, which is on the same order of magnitude as the factor estimated by Battye et al. (1994), although it is 44% to 87% larger.

Finally, for industrial point sources, county-level emissions data from the EPA's 1995 Toxics Release Inventory (TRI), which was loaded into the CMU model, were replaced with data from the 2001 TRI and 1999 NEI point source inventory. Emissions reported in the more recent TRI data were selected for facilities with emissions records in both data sets, and emissions for several "supersized" ammonia sources (those with emissions greater than 5 tons/summer day) in the 1999 NEI were altered or eliminated based on guidance received from individual states (Sabo, 2003).

2.5 SOURCE CATEGORIES OMITTED FROM THE INVENTORY

We considered, but omitted, several source categories from the final inventory, including biomass burning, composting, geothermal emissions, ammonia injection for NO_x control, and biosolids (sewage sludges). These categories were excluded for the following reasons:

- *Biomass Burning.* The CMU model estimates ammonia emissions from wildfires, but not planned burning. However, because a planned burning emissions inventory, which will include ammonia, is being developed by STI under a different work assignment, this source category will be addressed through that separate project.
- *Composting*. Ammonia is released during the degradation of organic waste at composting operations. A 2000 inventory of ammonia emissions prepared by AVES for California's South Coast Air Basin (Botsford et al., 1999) utilized an emission factor of 2.755 pounds of ammonia per ton of material processed to estimate emissions from this source. In that inventory, composting operations accounted for 5.25% of the total inventory. However, this estimate was based on an annual throughput of 2,445,600 tons of waste in the South Coast Air Basin alone. By comparison, the only CENRAP states for which composting activity data were readily available—Iowa and Minnesota—report statewide annual throughputs of only 628,000 tons and 462,000 tons, respectively. Based on this indication that composting efforts are not likely to be widespread in the CENRAP region and a lack of easily accessible data for the seven other states, we excluded this source category.
- *Geothermal Emissions.* Geothermal power-generation facilities release significant ammonia emissions from cooling towers. However, the *Renewable Energy Annual 1996* (Energy Information Administration, 1997) indicates that "known geothermal resource

areas in the United States with resource conditions sufficient to generate electricity are rare, occurring domestically only in the Western United States and Hawaii."

- *Ammonia Injection for NO_x Control.* One technology for controlling NO_x emissions from stack gases is the injection of ammonia into the exhaust of boilers or gas turbines—an approach that is primarily used at power generation facilities. Excess ammonia that does not react with NO_x is emitted to the atmosphere and is referred to as "ammonia slip."

  In an attempt to determine whether any facilities in the CENRAP states use this technology, we searched control codes contained in the 1999 NEI database. No facilities reported the use of ammonia injection in the NEI. A telephone survey of power generation facilities would be necessary to confirm the absence of these controls. However, such a survey was beyond the scope of the current project; therefore, this source category was omitted.

- *Biosolids.* Our recent review of the CMU Ammonia Model identified biosolids (or sewage sludges) as a source of potentially significant emissions on local scales, but also a source for which emission factors and activity data were insufficient to generate an emission inventory (Chinkin et al., 2003). The effort required to develop the necessary information through measurement programs and facility surveys is beyond the scope of the current project; therefore, this source category was omitted.

3. RECOMMENDATIONS FOR FURTHER RESEARCH

In this report, we have identified the following significant sources of uncertainty (roughly in order of importance): emission factors and temporal profiles for biogenic emissions, livestock emissions, and fertilizer emissions. Research is currently progressing into improved emissions models in each of these three areas. In general, we recommend keeping current with the latest published findings as they are released; from these, identifying the governing parameters that influence emission rates; and setting goals and planning research efforts to gather and track the activity data that will be needed as inputs for the next generations of emissions models. In addition, we have identified two source categories that lack sufficient information to generate emissions estimates for the CENRAP region: ammonia injection for NO_x control and biosolids.

3.1 RECOMMENDATIONS FOR BIOGENIC SOURCES

The largest degree of uncertainty in total emissions is associated with the biogenic source category. Depending on the choice of currently available emission factors, biogenics may be estimated to contribute more than 50% of total annual emissions in the CENRAP region (10 to 15 times more than we estimated), or plant-soil systems may be considered to behave as a net sink of ambient ammonia. In addition, ammonia fluxes for plant-soil systems have been shown to change direction—from net source to net sink—at different times of the year and at different times of the day (Sutton et al., 2002). However, we were unable to identify information that would readily translate into seasonal or diurnal temporal profiles.

Additionally, a lack of clarity currently exists regarding assignment of ammonia emissions to the biogenics category versus the livestock or fertilizer categories. Application of fertilizers or manures to grasslands and cutting of grass have been shown to greatly increase the release of ammonia from living plants (Sutton et al., 2002). However, an argument can be made that because the excess emissions are driven by anthropogenic processes, they are more appropriately assigned to an anthropogenic source category (such as fertilizer use, livestock, or land management).

At this time, the best prospect for improving biogenic emissions estimates for the CENRAP region is the application of research findings from recent and ongoing projects that focus on measurements and modeling of ammonia fluxes from European grasslands: the GRassland-AMmonia INteractions Across Europe (GRAMINAE) and the Emissions and Deposition programs, which have been conducted in partnership with the Coordinated Ammonia Research Activities (CARA) program of the Centre for Ecology and Hydrology (CEH), Edinburgh Research Station, United Kingdom. (Information about CARA, GRAMINAE, and the Emissions and Deposition research programs may be found at http://www.nbu.ac.uk/cara/nh3home.htm.) Recent publications have presented models of ammonia exchange with grassland ecosystems (Flechard et al., 1999; Nemitz et al., 2001; Spindler et al., 2001). In order to apply these models and generate improved estimates of biogenic emissions for the CENRAP region, research should be undertaken to validate their applicability to the CENRAP region, to acquire activity data that the models use as inputs (such as land use information, climatological data, and levels of agricultural nitrogen inputs), and to

modify the models for application to the CENRAP region. Such a research effort would be significant in scope; however, the payoff is likely to be worth the expense.

3.2 RECOMMENDATIONS FOR LIVESTOCK

3.2.1 Address Next-Generation Emissions Models

The degree of uncertainty in livestock emissions is also large. Battye et al. (2003), who applied methods similar to ours, recently estimated uncertainties of roughly ±35% for annual emission inventories that were prepared for regions of North Carolina and California. Emission factors and models for livestock and poultry are an area of active research. Researchers are developing emission factors and models that take into account weather and soil conditions, manure management practices, animal diets, and animal housing configurations. Recent peer-reviewed publications include Huijsmans et al. (2003), Battye et al. (2003), Mathur and Dennis (2003), Gilliland et al. (2003), and Riedo et al. (2002). Journals in which research is often published include *Environmental Pollution*; *Atmospheric Environment*; *Water, Air, and Soil Pollution*; *Journal of Agricultural Engineering Research*; *Nutrient Cycling in Agroecosystems*; *Agriculture, Ecosystems and Environment*; and *Plant and Soil*.

In order to take advantage of the research results that have been recently published and will be published over the next few years, productive research efforts could be directed toward the study and acquisition of the activity parameters that are likely to be needed for the emission models under development, such as thorough surveys of manure management practices, manure disposal methods, land application methods, and typical weather conditions experienced at various stages of the manure handling cycle.

3.2.2 Refine Animal Population Estimates

Though the 1997 Census of Agriculture livestock population data used by the CMU model was updated with more current NASS data and state-provided CAFO population data, some uncertainties still exist, particularly in reference to the CAFO data. During this process of updating livestock populations, it was noticed that for several counties the CAFO-reported animal populations greatly exceeded the county totals found in the NASS and/or Census data. For example, the 1997 Census of Agriculture reports 8.3 million broilers (a type of poultry) in Barry County, Missouri, whereas the CAFO data received from the Missouri Department of Natural Resources shows 12 million broilers in the county.

Investigation revealed that for CAFO permitting purposes, facilities report maximum capacities rather than actual animal populations. While it can be assumed that most CAFOs attempt to operate near their capacity, there are situations where this does not appear to be the case, or where facilities are reporting an annual throughput rather than a one-time population figure (we discovered the latter to be the case with a large livestock auction yard in Canadian County, Oklahoma, for example). Because of such anomalies, CAFO data for some counties were scaled down to ensure that total animal population counts remained comparable with data reported in NASS estimates and the 1997 Agricultural Census. For future efforts, uncertainties

could be reduced by conducting a survey of large CAFOs in selected counties to determine how closely they operate to their reported maximum capacities.

3.3 RECOMMENDATIONS FOR FERTILIZERS

Uncertainties in the emissions estimates for fertilizers carry similar significance for the CENRAP inventory as the uncertainties for livestock emissions—roughly 20% or so of the total inventory. As is the case for livestock, emission factors and models for fertilizers are an area of active research. Researchers are developing emissions models that take into account weather and soil conditions, land application methods, and fertilizer quality. Research is frequently published in the same journals listed for livestock: *Environmental Pollution*; *Atmospheric Environment*; *Water, Air, and Soil Pollution*; *Journal of Agricultural Engineering Research*; *Nutrient Cycling in Agroecosystems*; *Agriculture, Ecosystems and Environment*; and *Plant and Soil*. In order to apply the next-generation models that are likely to become available over the next several years, it would be useful to develop research strategies to acquire the activity data that will be needed to support emissions modeling, such as thorough surveys of application practices, typical weather conditions, and fertilizer quality.

3.4 RECOMMENDATIONS OTHER SOURCE CATEGORIES

Information was insufficient to develop emissions estimates for ammonia injection for NO_x control and biosolids, sources which may be significant on local geographic scales. We recommend a survey of power plants in the CENRAP region in order to identify facilities that use the ammonia-injection control technology and to assess the potential importance of this source category for the CENRAP inventory.

Development of an inventory for biosolids is more complicated. Suitable emission factors and models are currently unavailable for use, and we have not identified any ongoing research projects related to this area. Should an emissions model be developed at a future date, it will likely be necessary to gather activity data that are not currently tracked: facility-specific estimates of sludge quantities produced, sludge management and disposal practices, ammoniacal contents of produced sludges, and weather conditions.

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APPENDIX A

AMMONIA EMISSION ESTIMATION METHODS FOR THE CENRAP AMMONIA EMISSION INVENTORY

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AMMONIA EMISSION ESTIMATION METHODS FOR THE CENRAP AMMONIA EMISSION INVENTORY

Methods Document
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QUALITY ASSURANCE STATEMENT

This report was reviewed and approved by the project Quality Assurance (QA) Officer or his delegated representative, as provided in the project QA plan.

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1. INTRODUCTION

In support of the Central States Regional Air Planning Association's (CENRAP) need to develop a regional haze plan, Sonoma Technology, Inc. (STI) developed an ammonia emission inventory for the region. This Methods Document presents the techniques applied to develop the inventory. In summary, we used the Carnegie Mellon University (CMU) model—an ammonia emissions modeling tool—and supplemental emissions estimation techniques for miscellaneous source categories that were omitted from the CMU model.

Inventory development began with the identification and evaluation of information resources to enhance version 3.0 of the CMU model. STI previously evaluated an earlier version (2.0) of the CMU model as part of a study for the Lake Michigan Air Directors Consortium (LADCO) (Chinkin et al., 2003), and CMU incorporated many of STI's recommendations in the most recent version of the model (version 3.0), which was released in April 2003. This Methods Document identifies further revisions that were made to improve the CMU model outputs for the CENRAP region, including revisions to the emission factors and updates of the activity data.

Consistent with the project goals presented in the Work Plan (Coe, 2003), this Methods Document primarily discusses emission estimation techniques for two source categories: livestock production and fertilizer use. In addition, it provides a cursory treatment of emissions sources that are omitted from version 3.0 of the CMU model, such as landfills, non-road mobile sources, and ammonia refrigeration.

1.1 SUMMARY OF RECOMMENDED METHODS

We estimated ammonia emissions for thirteen source categories listed in **Table 1-1**. For livestock production, fertilizer application, and biogenic sources (soil), we used the CMU model to estimate emissions, but only after the model's emission factors and activity data were revised and/or updated as summarized in **Table 1-2**. We also used the CMU model to estimate emissions for six other categories, including publicly owned treatment works (POTWs) and on-road mobile sources. For these categories, we simply used the version 3.0 model outputs without modification. In addition, we adopted existing emission inventories for point sources. Lastly, we estimated emissions for three source categories omitted from the CMU model: landfills, non-road mobile sources, and ammonia refrigeration.

Table 1-2 briefly identifies recommended sources of emission factors and activity data. **Tables 1-3 and 1-4** list recommended temporal profiles and spatial allocation surrogates by source category. The diurnal profile for livestock house at feedlots was derived from a study of ammonia emissions from swine operations (Aarnink, 1997). The diurnal profile for fertilizer application and free-range livestock was based on a study of nitric oxide fluxes from soil (Anderson and Levine, 1987). The diurnal profile for emissions from soil was derived from a recent European research project conducted on grasslands (Sutton et al., 2002). Diurnal allocations for other categories were based on default profiles assigned by the Sparse Matrix Operator Kernal Emissions Modeling System (SMOKE). The subsequent chapters of this Methods Document provide many more details about the information summarized in Tables 1-2 through 1-4.

Table 1-1. Summary of approaches to estimate ammonia emissions.

Source Category	Emissions Estimation Approach: Use CMU Model, Without Revisions	Emissions Estimation Approach: Use CMU Model, With Revisions	Emissions Estimation Approach: Generate or Adopt Estimates Independently from CMU Model
Included in CMU model:			
Livestock		✓	
Fertilizer		✓	
POTWs	✓		
Human perspiration and respiration	✓		
Domestic animals	✓		
Wild animals	✓		
Wildfires	✓		
On-road mobile sources	✓		
Industrial point sources			✓
Biogenic sources ("soil")		✓	
Not included in CMU model:			
Landfills			✓
Ammonia refrigeration			✓
Non-road mobile sources			✓

Table 1-2. Summary of emission factors and activity data sources.

Source Category	Emission Factor(s)	Activity Data	Comments
Livestock production	Retain factors from CMU Model 3.0 (Region-specific characteristics will be applied through temporal and spatial allocations).	Existing 1997 USDA Agricultural Census data will be improved with 2002 NASS population data and data for confined animal feeding operations (CAFO), which will be obtained from individual states.	Emissions from CAFOs will be treated as point sources.
Fertilizer application	Refine factors from CMU model to make them more specific to climate and soil types in the CENRAP.	2002 fertilizer usage data from the Association of American Plant Food Control Officials (AAPFCO) will be used with additional data from state agencies.	The CMU model currently uses 1995 AAPFCO data.
Landfills	Use equations published in the Emission Inventory Improvement Plan (EIIP) Volume VIII and a published ratio of methane to ammonia emissions.	Obtain waste in place (WIP) data from EPA's Landfill Methane Outreach Program (LMOP) database and use with additional data from state agencies.	The EIIP methodology generates methane emissions, which are then converted to ammonia.
Ammonia refrigeration	Apply an employment-based emission factor.	Use county-level employment data published by the U.S. Census Bureau.	Emissions estimates are based on employment in specific food processing industries.
Non-road mobile sources	N/A	N/A	Emissions will be taken directly from the 1999 National Emission Inventory (NEI) non-road inventory.
Point sources	N/A	N/A	Emissions will be taken directly from the 2001 Toxics Release Inventory (TRI) and 1999 NEI inventories.
Biogenic sources (soil)	Replace factors used in the CMU model with those recently published by Battye et al. (2003).	Use soil-type data from the CMU model with no revisions.	Emissions estimates from this source category are highly uncertain.

Table 1-3. Summary of seasonal profiles and spatial surrogates.

Source Category	Source of Information for Seasonal Profiles	Source of Information for Spatial Surrogates
Livestock Production	Use monthly allocation factors published by Pinder et al (2003).	Rangeland landuse category from the EPA's Biogenic Emissions Landcover Database (BELD).
Fertilizer Application	Develop new seasonal profiles.	Cropland landuse category from the EPA's BELD data.
Landfills	Use SMOKE default temporal profiles assigned by Source Category Code (SCC).	Facility-reported coordinates, addresses, or centroid of zip codes.
Point Sources		
Ammonia Refrigeration	Use SMOKE default temporal profiles assigned by Source Category Code (SCC).	County area.
Non-road Mobile Sources		
Biogenics (soil)	Use diurnal profile from recent European study (Sutton et al., 2002).	County area.

Table 1-4. Summary of diurnal profiles.

Hour of Day	Proportion of Total Daily Emissions (%)		
	Livestock Housed at Feedlots	Fertilizer/Free-range Livestock	Soil
Midnight-1 a.m.	3.9%	2.0%	3.9%
1-2 a.m.	4.0%	2.0%	3.1%
2-3 a.m.	4.0%	2.0%	2.3%
3-4 a.m.	4.1%	2.0%	1.6%
4-5 a.m.	4.1%	2.0%	1.1%
5-6 a.m.	4.2%	2.1%	0.8%
6-7 a.m.	4.2%	2.8%	0.7%
7-8 a.m.	4.2%	4.1%	0.9%
8-9 a.m.	4.2%	7.0%	1.5%
9-10 a.m.	4.3%	7.4%	2.3%
10-11 a.m.	4.3%	8.2%	3.4%
11 a.m.-Noon	4.3%	8.2%	4.5%
Noon-1 p.m.	4.3%	8.1%	5.5%
1-2 p.m.	4.3%	7.8%	6.4%
2-3 p.m.	4.3%	6.5%	6.9%
3-4 p.m.	4.3%	4.1%	7.1%
4-5 p.m.	4.2%	4.1%	7.1%
5-6 p.m.	4.2%	3.1%	6.9%
6-7 p.m.	4.2%	2.9%	6.7%
7-8 p.m.	4.2%	2.9%	6.4%
8-9 p.m.	4.1%	2.9%	6.0%
9-10 p.m.	4.1%	2.9%	5.5%
10-11 p.m.	4.0%	2.9%	5.0%
11 p.m.-Midnight	4.0%	2.0%	4.5%

1.2 IMPORTANT PREMISES AND ASSUMPTIONS

The methods that we selected for use were based on several important premises or assumptions:

- For livestock populations, the grounds for selecting 2002 county-level National Agricultural Statistics Service (NASS) data—which are based on local surveys—is that we gauged them to be an improvement over the older population data reported in the 1997 USDA Agricultural Census (which is the latest version of the Agricultural Census available).
- We assumed that temporal allocation factors for dairy cows (seasonal) and swine (diurnal) are reasonably similar to those of other types of livestock.
- For fertilizer application, emission factors developed by the European Environment Agency (2001) for similar climate zones and similar types of fertilizers were presumed to be applicable to fertilizers used in the United States.
- Natural Resources Conservation Service (NRCS) classifications of soil types were presumed to be representative and indicative of the fertilizer emission factors that are most applicable to each county in the CENRAP region.
- We assumed that diurnal patterns of nitric oxide flux from soil emissions observed by Anderson and Levine (1987) can be used to approximate diurnal patterns of ammonia emissions from fertilizer application (Chinkin et al., 2003).
- For landfills, the U.S. Environmental Protection Agency's (EPA) Landfill Methane Outreach Program (LMOP) is assumed to be sufficiently complete for those states where other data is unavailable.
- For point sources, a combination of ammonia emissions data contained in the 2001 Toxics Release Inventory (TRI) and 1999 National Emissions Inventory (NEI) are expected to be sufficiently complete for the purposes of this inventory.
- We expected that the emission factors and activity data contained in version 3.0 of the CMU model were sufficient to characterize ammonia emissions from POTWs, human beings, domestic animals, wild animals, wildfires, and on-road mobile sources. In addition, we assumed that the hidden algorithms in version 3.0 of the CMU model function correctly and as reported in the model documentation for these sources.

2. LIVESTOCK PRODUCTION

2.1 OVERVIEW

For other inventories, livestock and poultry operations have been estimated to be the most significant sources of ammonia emissions nationwide (U.S. Environmental Protection Agency, 2000). Nationally, the EPA estimated that ammonia emissions from commercial animal husbandry in the United States were dominated by calves and cattle (78%), followed by hogs and pigs (19%). The other 3% of emissions came from chickens (2%) and sheep (1%).

In order to estimate the magnitude of livestock and poultry emissions for a given state or county, local animal populations are needed, as well as emission factors that quantify pounds of ammonia emissions per head of livestock. Ideally, emission factors also should vary with weather conditions, animal management practices, and manure management practices. However, emission factors with this level of detail generally are unavailable. To compensate, we used a new study recently published by Pinder et al. (2003) and discussed in Section 2.4 to generate an inventory for livestock that reasonably represents region-specific temporal patterns.

2.2 LIVESTOCK AND POULTRY EMISSION FACTORS

A wide variation in livestock emissions is reported in different studies in the United States and Europe. Version 2.0 of the CMU model—previously evaluated by STI for the LADCO project—made use of composite emission factors compiled by Battye et al. (1994) for each U.S. Department of Agriculture (USDA) category. The Battye report recommended European animal waste ammonia factors, which were developed by Asman (1992) on the basis of measurements collected in the 1980s in Europe, for use in the United States. However, STI concluded that these factors might not be well-suited for estimating emissions in the United States because of differences in both animal waste management practices and animal husbandry practices between Europe and the United States. For example, animal waste in the United States is commonly stored in lagoons, and ranches are generally larger in size and enable wider cattle grazing activity. Confined cattle with diets high in nitrogen, as are more common in Europe, tend to emit more ammonia so that European emission factors may over-represent cattle emissions in the United States.

Version 3.0 of the CMU model utilizes emission factors recommended by the EPA's Office of Research and Development (ORD) (U.S. Environmental Protection Agency, 2002b). The original source of the ORD factors were Bouwman and Van der Hoek (1997). Although these, too, are European emission factors, the ORD considered them to be more representative of U.S. agricultural practices on the basis of a detailed mass balance. In addition, these emission factors equate to roughly 25% of excreted nitrogen, which is more in line with current thinking. Therefore, we used the ORD-recommended emission factors as they exist in version 3.0 of the CMU ammonia model.

2.3 LIVESTOCK AND POULTRY ACTIVITY DATA

Version 3.0 of the CMU model, like its predecessor, relies exclusively on the 1997 USDA Agricultural Census as its source of livestock and poultry activity data. This census is conducted every five years, and data for the 2002 study will not be released until spring of 2004. Therefore, STI will supplement the 1997 data with estimates from the NASS, which are generated annually. Each January and July, the NASS conducts surveys of a sample group of livestock producers, taking steps to ensure statistically representative coverage of all livestock operations in each state. These surveys are then used to produce an estimated livestock inventory by county. The vintages of the NASS agricultural surveys vary somewhat by state, so we will use the most current estimates available for each. **Table 2-1** shows the vintages of all available NASS estimates more current than 1997.

Table 2-1. Vintages of most current NASS estimates by state.

State	NASS Livestock Types			
	Beef Cattle	Milk Cows	Hogs & Pigs	Sheep/ Goats
Arkansas	2002	2000	2000	N/A
Iowa	2002	2002	N/A	N/A
Kansas	2002	2002	N/A	2001
Louisiana	2002	2002	N/A	N/A
Minnesota	2002	2002	N/A	2002
Missouri	2002	2002	N/A	2002
Nebraska	2002	2001	N/A	2002
Oklahoma	2002	2002	1999	2002
Texas	2002	2002	N/A	2000

Note: N/A indicates none available from NASS or that data pre-date the 1997 Agricultural Census. For these cases, 1997 Agricultural Census data will be used.

Some limitations are associated with the 1997 USDA Agricultural Census and the NASS data. First, these estimates do not reflect some factors that affect actual state cattle populations, such as seasonal import and export of animals to other states. Also, these data sources do not contain any information on the locations of concentrated animal feeding operations (CAFOs). Feedlots service thousands of animals in fairly confined spaces, such that emissions from the facilities are better treated as point sources. To address these limitations, we contacted agricultural and environmental agencies or departments in each state to request information about livestock populations and seasonal movements of herds, as well as data on CAFO animal populations which might be available from National Pollutant Discharge Elimination System (NPDES) records or other sources. Though no useful data was available on herd movements, we were able to obtain current permit data on CAFO locations and animal populations from all nine CENRAP states. This allowed us to subtract livestock populations at the various CAFOs from the CMU model's county-wide totals so that emissions from those facilities could be treated as point sources and allocated to specific CAFO locations.

During this process of updating livestock populations, it was noticed that for several counties the reported CAFO animal populations greatly exceeded the county totals found in the NASS and/or census data. Investigation revealed that for CAFO permitting purposes, facilities report maximum capacities rather than actual animal populations. While it can be assumed that most CAFOs attempt to operate near their capacity, there are situations where this does not appear to be the case, or where facilities are reporting an annual throughput rather than a one-time population figure. For example, an auction yard named OKC West Livestock Market in Canadian County, Oklahoma, reports a beef cattle population of 198,797 head, which turned out to be the total number of animals moved through the facility in one year (for comparison, the 1997 Agricultural Census identifies only 25,700 head of beef cattle in the entire county). Because of such anomalies, CAFO data for some counties were scaled down to ensure that total animal population counts remained comparable with data reported in NASS estimates and the 1997 Agricultural Census.

Finally, we utilized recent estimates of ammonia emissions from dairy farms published by Pinder et al. (2003) instead of estimates produced by the CMU model for this category. The estimates calculated by Pinder et al. (2003) were derived using a model that considers manure management practices and climatic conditions and, from these, calculates month-specific and region-specific emission factors for dairy cows. Pinder et al. (2003) applied these emission factors to dairy cow populations from the 1997 USDA Agricultural Census to produce a county-level emissions inventory for the entire United States.

2.4 LIVESTOCK AND POULTRY TEMPORAL ALLOCATION

2.4.1 Seasonal Allocation

The CMU model assumes a flat, unvarying rate for livestock emissions. Earlier, STI recommended (Chinkin et al., 2003) the use of a seasonal distribution proposed by Gilliland et al. (2002), which is based on modeled results. While there were concerns about the use of modeled outputs to adjust emission rates, a non-varying seasonal distribution seemed even less likely to reflect real-world conditions.

However, the recent dairy farm model developed by Pinder et al. (2003) is a new source of county-specific seasonal allocation factors that seem more representative of emissions from livestock. Side-by-side comparison shows that the seasonal variability in Pinder et al.'s aggregate national-scale inventory matches up somewhat comparably with the monthly allocation factors proposed by Gilliland et al. (see **Table 2-2 and Figure 2-1**), with some differences.

Table 2-2. Side-by-side comparison of monthly seasonal allocation factors (Proportions are relative to annual average emission rates).

Month	Gilliland Seasonal Allocation Factors	Pinder Seasonal Allocation Factors
January	67%	33%
February	75%	36%
March	75%	78%
April	82%	161%
May	126%	139%
June	164%	122%
July	183%	116%
August	154%	119%
September	115%	120%
October	73%	150%
November	51%	78%
December	51%	50%

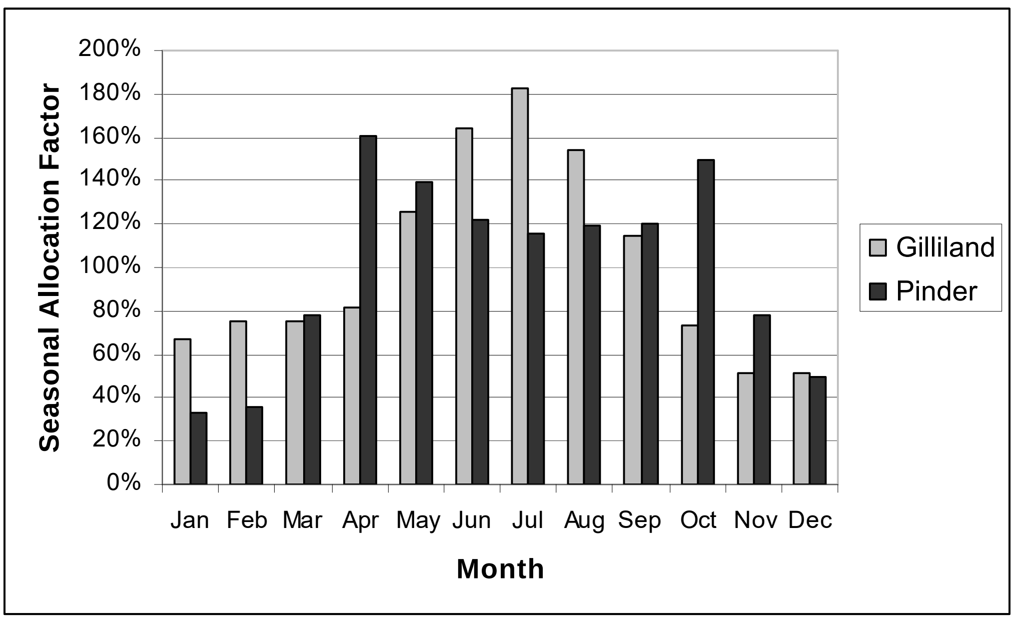


Figure 2-1. Graphical comparison of monthly seasonal allocation factors.

Though the Pinder et al. study was specifically related to dairy cattle, we expect that the allocation factors derived from this study are more representative of real-world conditions than Gilliland's reverse-modeling approach. Therefore, we will use Pinder et al.'s profiles to seasonally allocate emissions from all livestock. Because the Pinder et al. model takes local conditions into account (emission factors are generated for each county in the United States based on climate, husbandry practices, etc.), this approach will result in the development of

county-specific seasonal allocation factors for this source category. (It should be noted that the national-level seasonal allocation shown in Table 2-2 is almost certainly weighted toward the colder northern states, which have the most dairies and would not be suitable for the entire CENRAP domain).

2.4.2 Diurnal Allocation

Aarnink (1997) reported that ammonia emissions from houses with rearing and fattening pigs had higher emissions during the day than during the night: +10% for rearing pigs and +7% for fattening pigs. For rearing pigs, emissions peaked in the morning, but for fattening pigs, they peaked in the afternoon. We used this information to develop the diurnal profile for ammonia emissions from pigs shown in Table 1-3 (Chinkin et al., 2003). Because information is currently unavailable to determine a diurnal profile of emissions from other types of livestock, we applied the swine diurnal profile to feedlot cattle, poultry, and other livestock that tend to be housed at close quarters.

For rangeland cattle, manure and urine depositions are spread out over a much larger area than would be the case with cattle housed at feedlots. It is our judgment that diurnal emissions patterns for such cattle are more likely to be consistent with emissions from fertilizer application than with emissions from housed swine. Therefore, we used a diurnal profile developed from nitric oxide fluxes from soil (Anderson and Levine, 1987) that is also being applied to emissions from fertilizer application (see Section 3.4.2).

2.5 LIVESTOCK AND POULTRY SPATIAL ALLOCATION

CAFOs were treated as point sources, with emissions from those facilities allocated according to specific reported coordinates. Other emissions from livestock and poultry will be spatially allocated according to the "rangeland" land type category, an aggregate of the "pasture" and "grassland" landuse categories available from the EPA's Biogenic Emissions Landcover Database (BELD).

3. FERTILIZER APPLICATION

3.1 OVERVIEW

In other inventories, fertilizer application has been estimated as the second most abundant source of ammonia emissions nationwide (U.S. Environmental Protection Agency, 2000). Emissions from this source can be calculated by applying an appropriate emission factor to the amount of fertilizer applied. Emission factors vary by fertilizer type, application method, soil type, and climate.

3.2 FERTILIZER EMISSION FACTORS

Historically, the EPA recommended the use of Battye et al. (1994) emission factors—in part, because they were accompanied by supporting data and an explanation of factor development. These emission factors range from 24 lb to 264 lb of NH_3 emitted per ton of fertilizer nitrogen applied (or equivalently, 1% to 5% of NH_3 as nitrogen emitted per ton of fertilizer nitrogen applied). The emission factors in version 2.0 of the CMU model were similar to those recommended by EPA and reported by Battye et al. (1994)

Because ammonia emissions from fertilizer are a function not only of fertilizer type but also soil type and climate, STI recommended (Chinkin et al., 2003) the use of emission factors from the European Environment Agency (2001) which are fertilizer type-, soil type-, and climate-dependent. The European factors were developed according to the following classification system:

- Group I – Warm, temperate areas with a large proportion of calcareous soils.
- Group II – Temperate and warm-temperate areas with some calcareous soils (or managed with soil pH>7), but with large areas of acidic soils.
- Group III – Temperate and cool-temperate areas with largely acidic soils.

Version 3.0 of the CMU model makes use of these European emission factors, assigning whole states to one of the groupings listed above:

- Group I: Texas
- Group II: Arkansas, Kansas, Louisiana, and Missouri
- Group III: Iowa, Minnesota, and Nebraska

While this approach is an improvement over that used in the previous version of the CMU model, greater refinement of emission factors by geography is possible and preferable. As **Table 3-1** shows, emission factors for some fertilizer types vary widely among classifications. For ammonium sulfate-based fertilizers, for example, the Group I emission factor is 200% higher than the Group III factor and 50% higher than the Group II factor.

Table 3-1. Fertilizer emission factors used in CMU model version 3.0 (%N volatilized as NH_3).

State	EEA Group	Mix/ Ammonium Nitrate	Ammonium Sulfate	Calcium Ammonium Nitrate	Urea	Misc.
Texas	I	3	15	3	20	8
Arkansas	II	2	10	2	15	6
Kansas	II	2	10	2	15	6
Louisiana	II	2	10	2	15	6
Missouri	II	2	10	2	15	6
Oklahoma	II	2	10	2	15	6
Iowa	III	1	5	1	15	7
Minnesota	III	1	5	1	15	7
Nebraska	III	1	5	1	15	7

Because of these large differences, we more fully implemented the European approach through the use of an integrated geographic information system (GIS). The NRCS State Soil Geographic database (STATSGO) was used to identify the dominant soil type (calcareous or acidic) in each county so that the best possible emission factors could be applied. The emission factors in the CMU model were updated as necessary.

3.3 FERTILIZER ACTIVITY DATA

National fertilizer use data are available from the Association of American Plant Food Control Officials (AAPFCO). These data contain semi-annual sales distributions at a county-level for over 100 different types of fertilizers, including those that emit ammonia. Version 3.0 of the CMU model uses AAPFCO data from 1995; therefore, we prepared an updated fertilizer sales database from the 2002 AAPFCO data. State agricultural experts were contacted for further information on fertilization consumption, but no improvements to the AAPFCO data proved to be available.

3.4 FERTILIZER TEMPORAL ALLOCATION

3.4.1 Seasonal Allocation

In version 3.0 of the CMU model, six-month sales data from AAPFCO was broken down into a monthly resolution via an algorithm that incorporated fertilizer timing based on crop calendars and application rates. This algorithm operates on separate six-month intervals—first distributing spring sales data over the first six months of the year, then fall data over the second half of the year. Such a method assumes, of course, that all fertilizer purchased in a given semi-annual period is completely consumed during that time frame.

However, a survey of the AAPFCO data showed that a significant number of records report zero or negative values for fertilizer shipped during the fall cycle (second half of the year). This anomaly is due to returns of unused fertilizer in the fall to fertilizer sellers. While these anomalies tend to occur in counties with relatively small fertilizer sales, they do indicate that fertilizer is not always consumed in the season during which it was purchased. Therefore, they may be indicative of a larger scale, systematic bias throughout the inventory.

Furthermore, the CMU model calculates a single temporal distribution for each state based on the total acreage of various crop types within the state. This approach does not take into account local variations in crop types, which can be considerable across the large states found within the CENRAP region.

To address these concerns, we generated revised temporal algorithms that summed the semi-annual sales data for each county and redistributed the annual total over the twelve months of the year by using county-specific crop acreages published by NASS and the crop calendars and fertilizer timing rates currently employed by the CMU model.

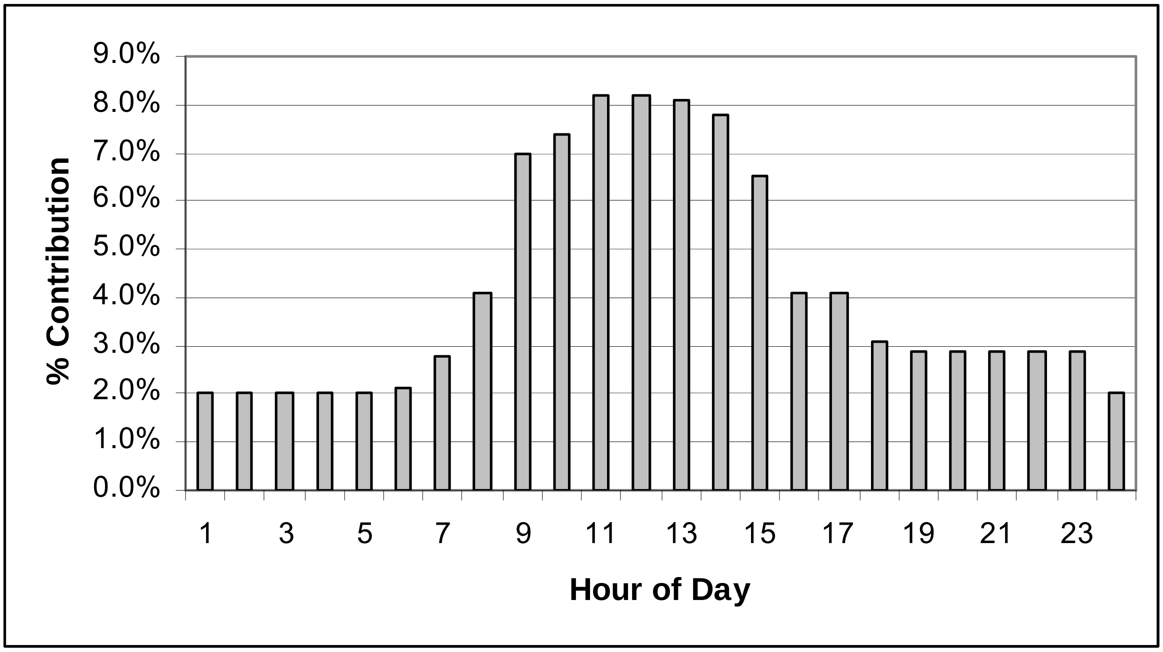
3.4.2 Diurnal Allocation

Midwest Research Institute (1998) found that hourly emission rates of ammonia from fertilizer applications exhibit diurnal patterns that follow temperature fluctuations. Anderson and Levine (1987) found a similar pattern in diurnal nitric oxide fluxes from soil. Because nitric oxide flux profiles are better quantified than ammonia flux profiles, we used them to create the diurnal profile shown in **Figure 3-1**. Although a profile that is directly based on good-quality ammonia emissions measurements would be preferable, we believe that, at present, the better quality of the nitrogen oxides data is a good rationale for its use (Chinkin et al., 2003).

3.5 FERTILIZER SPATIAL ALLOCATION

Emissions from fertilizer application will be spatially allocated to cropland areas available from EPA's BELD.

Figure 3-1. Diurnal ammonia emissions profile for fertilizer application (% of total daily emissions).



4. OTHER SOURCE CATEGORIES

4.1 OVERVIEW

Emissions from other source categories omitted from the CMU model were estimated in order to compile a complete inventory. However, because these sources were assigned a lesser priority than livestock and fertilizer application, we derived emissions estimates by using simple methods.

We considered several source categories for possible inclusion in the final inventory, including landfills, biomass burning, composting, ammonia refrigeration, non-road mobile sources, geothermal emissions, and ammonia injection for NO_x control. We concluded that emissions should be estimated for all of these except biomass burning, composting, geothermal sources, and ammonia injection for NO_x control. These categories were excluded for the following reasons:

- Biomass Burning. The CMU model estimates ammonia emissions from wildfires, but not planned burning. However, because a planned burning emissions inventory, which will include ammonia, is being developed by STI under a different work assignment, this source category will be addressed through that separate project.
- Composting. Ammonia is released during the degradation of organic waste at composting operations. A 2000 inventory of ammonia emissions prepared by AVES for California's South Coast Air Basin (Botsford et al., 1999) utilized an emission factor of 2.755 pounds of ammonia per ton of material processed to estimate emissions from this source. In that inventory, composting operations accounted for 9.7 tons per day of ammonia emissions, or 5.25% of the total inventory. However, this estimate was based on an annual throughput of 2,445,600 tons of waste in the South Coast Air Basin alone. By comparison, the only CENRAP states for which composting activity data were readily available—Iowa and Minnesota—report statewide annual throughputs of 628,000 tons and 462,000 tons, respectively. Based on this indication that composting efforts are not likely to be widespread in the CENRAP region and a lack of easily accessible data for seven states, it is recommended that this source category be excluded from the current inventory effort.
- Geothermal Emissions. Geothermal power-generation facilities release significant ammonia emissions from cooling towers. However, the *Renewable Energy Annual 1996* (Energy Information Administration, 1997) indicates that "known geothermal resource areas in the United States with resource conditions sufficient to generate electricity are rare, occurring domestically only in the Western United States and Hawaii."
- Ammonia Injection for NO_x Control. One technology for controlling NO_x emissions from stack gases is the injection of ammonia into the exhaust of boilers or gas turbines—an approach that is primarily used at power generation facilities. Excess ammonia that does not react with NO_x is emitted to the atmosphere and is referred to as "ammonia slip."

In an attempt to determine if any facilities in the CENRAP states use this technology, we searched control codes contained in the 1999 NEI database. No facilities reported the use of ammonia injection in the NEI. A telephone survey of power generation facilities would be necessary to confirm the absence of these controls. However, such a survey is beyond the scope of the current project.

The remainder of this chapter highlights emissions estimations methodologies for the new categories that were included in the final inventory, as well as two other source categories (point and biogenic sources) for which improvements were made to the CMU approach.

4.2 LANDFILLS

According to *EIIP Volume VIII: Estimating Greenhouse Gas Emissions* (Emission Inventory Improvement Program, 1999), methane emissions from landfills depend on three key factors: (1) total "waste in place" (WIP), which is defined as the sum of waste disposal over a 30-year period; (2) landfill size; and (3) location in an arid or non-arid climate. When WIP data is available for specific landfills within a state, the following equations can be used to estimate methane emissions:

<u>Small Landfills (less than 1.1 millions tons of waste in place)</u>

- Arid climate (less than 25 inches of rainfall per year):

$$CH_4\ (\text{tons/year}) = WIP_{tons} \times \frac{0.27\ \text{ft}^3/\text{day}}{\text{ton}} \times \frac{0.0077\ \text{tons}\ CH_4/\text{yr}}{\text{ft}^3/\text{day}} \qquad \textbf{(4-1)}$$

- Non-arid climate (25 inches or more of rainfall per year):

$$CH_4\ (\text{tons/year}) = WIP_{tons} \times \frac{0.35\ \text{ft}^3/\text{day}}{\text{ton}} \times \frac{0.0077\ \text{tons}\ CH_4/\text{yr}}{\text{ft}^3/\text{day}} \qquad \textbf{(4-2)}$$

<u>Large Landfills (over 1.1 millions tons of waste in place)</u>

- Arid climate (less than 25 inches of rainfall per year):

$$CH_4\ (\text{tons/year}) = [417{,}957\ \text{ft}^3/\text{day} + \frac{0.16\ \text{ft}^3/\text{day}}{\text{ton}} \times (WIP_{tons})] \times \frac{0.0077\ \text{tons}\ CH_4/\text{yr}}{\text{ft}^3/\text{day}} \qquad \textbf{(4-3)}$$

- Non-arid climate (25 inches or more of rainfall per year):

$$CH_4\ (\text{tons/year}) = [417{,}957\ \text{ft}^3/\text{day} + \frac{0.26\ \text{ft}^3/\text{day}}{\text{ton}} \times (WIP_{tons})] \times \frac{0.0077\ \text{tons}\ CH_4/\text{yr}}{\text{ft}^3/\text{day}} \qquad \textbf{(4-4)}$$

We have contacted state agencies to obtain landfill WIP estimates, and data has been obtained from Iowa, Kansas, Texas, and Minnesota. For the remaining CENRAP states, we utilized data available through EPA's LMOP database. This program is voluntary, and the

LMOP database only includes data for landfills that use gas recovery systems or have the potential to employ such systems in the future. Though the database is not likely to be exhaustive for any of the CENRAP states, it does contain records for 372 landfills within the CENRAP region, and only Arkansas appears to have data that are severely incomplete (with only three data records for that state).

We used the equations above to estimate methane emissions for each landfill for which we have WIP data, then calculated ammonia emissions by using a published ratio of 0.7% ammonia to methane (Eggleston, 1992). We apportioned landfill emissions to the best spatial data available—either the facility latitude/longitude (for state-specific data) or the centroid of the postal code area (ZIP) where each landfill is located (for facilities in the LMOP database).

For Arkansas, landfill emissions were treated as an area source, and a statewide estimate of ammonia emissions was calculated based on an alternative population-based method described in the EIIP documentation. This statewide emissions total was then disaggregated to the county level based on population.

4.3 AMMONIA REFRIGERATION

Ammonia is commonly used as a refrigerant at food processing facilities. The Occupational Safety & Healthy Administration (OSHA) of the U.S. Department of Labor has identified common industries that use ammonia refrigeration systems (Occupational Safety & Health Administration, 2002). These industries and their corresponding NAICS (North American Industry Classification System) number appear in **Table 4-1**.

Table 4-1. List of industries that use ammonia refrigeration.

Industry	NAICs
Meat, poultry, and fish processing facilities	31161, 31171
Dairy and ice cream plants	31151, 31152
Wineries and breweries	31212, 31213
Juice and soft drink processing facilities	31211
Cold storage warehouses	49312

To estimate emissions from this source, we applied an emission factor that was reported by Battye et al. (1994): 187 kg NH_3/employee. This factor is based on the assumption that annual production levels of ammonia refrigerants are roughly in material balance with fugitive losses from refrigeration systems. If a significant fraction of ammonia refrigerants is recovered for disposal, stabilization, or re-use in non-refrigeration applications, or if the demand for new refrigeration systems outstrips the demand for system recharges, then this emission factor should represent a conservatively high estimate.

We contacted the International Institute of Ammonia Refrigeration to determine the relative market demands for ammonia refrigerants (manufactures of new systems versus

recharges of old systems) and to determine the likely environmental fates of manufactured ammonia refrigerants (fugitive losses, recovery, etc.). However, we were unable to acquire definitive information from this resource. Additionally, we are currently locating the latest issue of the serial, *Chemical Economics Handbook* by Stanford Research Institute, which includes a chapter of statistics and discussions about the ammonia manufacturing industry. Given the scheduled delivery of the ammonia emission inventory files, we were unable to review this resource in time for delivery. However, if the *Chemical Economics Handbook* contains relevant and useful information, then we will (at a later time) issue a revision memorandum to the CENRAP with simple instructions for updating the emissions estimates for ammonia refrigeration.

In order to verify the scale of the emission factor, we determined that annual production of ammonia for refrigeration uses in the United States is between 270,000 Mg and 350,000 Mg (Battye et al., 1994; International Institute of Ammonia Refrigeration, 2003). To prevent the possibility of significant double-counting, we confirmed that this figure is much larger than total air releases of ammonia reported by United States facilities in the food products industry (SIC 20) for the 2001 TRI (approximately 7400 Mg). For the industries listed in Table 4-1, total United States employment equals approximately 1 million employees (U.S. Census Bureau, 2003). Thus, these figures yield a factor of 270 to 350 kg NH_3/employee-yr, which is on the same order of magnitude as the factor estimated by Battye et al. (1994), although it is 44% to 87% larger.

4.4 NON-ROAD MOBILE SOURCES

NEI contains ammonia emissions from non-road mobile sources. These data will be extracted and incorporated into the final inventory. It should be noted that the most current NEI data are for 1999, or three years out of date. Because this is a minor category, we will consider 1999 emissions to be reasonably representative of 2002 emissions.

4.5 POINT SOURCES

To quantify ammonia emissions from industrial/point sources, the CMU model takes county-level emissions from the EPA’s 1995 TRI and distributes these totals evenly over 12 months of the year for each county. It should be noted that the CMU model does not contain any location information on these sources, meaning that they cannot be treated as true “point sources”.

However, we have evaluated the TRI to be incomplete for several types of point sources, such as power generation facilities. Reporting requirements for the TRI limit the inventory to specific industrial sectors such as manufacturing, mining, and petroleum processing (U.S. Environmental Protection Agency, 2002c). Our preliminary investigation showed that a number of ammonia sources included in the 1999 NEI do not appear in the TRI data, and there appears to be little overlap between these two inventories. For example, the 2001 TRI contains ammonia emissions data for 211 facilities in the state of Texas, which emit 2,603 tons per year of ammonia. The NEI contains emissions data for 87 facilities—mostly power generation plants, none of which are listed in the TRI—that emit 1,834 tons per year of ammonia.

In order to improve upon the CMU model output for point sources, we downloaded the most current TRI data available (year 2001), and we located the emissions as point sources according to the reported coordinates of each facility. In addition, we augmented the TRI point source inventory with point source emissions estimates and facility locations reported in the 1999 NEI.

To check this approach, we verified that emissions from an important source of ammonia emissions—fertilizer manufacturing—are adequately represented in the point source inventory. Kansas was examined as a sample state, and ammonia emissions in the NEI and TRI inventories from fertilizer manufacturing amounted to 12,400 tons. Using emission factors from AP-42 (U.S. Environmental Protection Agency, 2002a) and fertilizer sales data for Kansas contained in the CMU model, an emissions estimate of 14,650 tons of ammonia from fertilizer manufacturing was calculated. Though this calculation was crude, it does indicate that the data contained in the NEI and TRI inventories will provide a reasonable representation of emissions from this source.

4.6 BIOGENIC SOURCES

As the documentation provided with the CMU emissions model states, biogenic (or "soil") emissions estimates are highly uncertain. Literature sources indicate that the soil-plant canopy system can be a source of ammonia emissions under some conditions and a sink under other conditions (Strader et al., 2001; Sutton et al., 2002). The emission factors used in Version 3.0 of the CMU model were derived from a variety of sources, and activity data on soil types was obtained from the EPA's GIRAS land-use data set.

Preliminary CMU model runs indicated that emissions from soil accounted for 50% of the total annual ammonia inventory. This result seemed unlikely; therefore, we performed a literature search to seek improved emission factors. We chose to apply emission factors that were selected for use by Battye et al. (2003), which were based on factors reviewed or published by Schlesinger and Hartley (1992), Buowman et al. (1997), Kinnee et al (1997), and Van Der Hoek (1998). **Table 4-2** shows a comparison between the CMU model's emission factors and those selected for use.

The result of altering the CMU model's emission factors was a 93% reduction in biogenic emissions across the CENRAP domain. Thus, we estimated that biogenic emissions account for 7% of the total CENRAP ammonia inventory. Battye et al. (2003) calculated similar percent contributions—about 6.6% and 6.3%—for emission inventories in North Carolina and California's San Joaquin Valley.

However, it is important to note that these results are *highly uncertain*. Based on very recent research projects conducted on grasslands in Europe (Sutton et al., 2002), results continue to demonstrate that relatively undisturbed environments with low nitrogen inputs tend to absorb ammonia from the atmosphere, while lands with high nitrogen inputs—from fertilizer, decomposing plant matter, manure, large herds or flocks of wild animals, acid rain deposition, or other sources—tend to emit ammonia. Reported emission rates range from –590 kg/km^2/yr to +2600 kg/km^2/yr and areas may act as net sinks or net sources of ammonia at different times of the year and at different times of the day (Sutton et al., 2002). It will be very important to

consider the uncertainties in the biogenic emissions estimates when evaluating air quality modeling sensitivities and uncertainties.

Table 4-2. Comparison of soil emission factors.

Soil Type	Emission Factor (kg/km^2/yr)	
	CMU Model	STI Update
Residential, Commercial, Industrial, Urban	160	10
Cropland, Pasture, Other Agricultural Land	1200	30
Orchards, Groves, Vineyards	1296	30
Rangeland	370	40
Forests	140	120
Wetlands	370	120
Dry Salt Flats	6.7	10
Transitional Areas	370	10
Mixed Barren Land	60	10
Unknown	370	10

5. PREPARATION OF DIGITAL FILE SYSTEMS

5.1 NATIONAL EMISSIONS INVENTORY INPUT FORMAT FILE CONVERSION

The CMU model creates output files in version 2.0 of the National Emissions Inventory Input Format (NIF), with the NIF 2.0 records containing ammonia emissions by county, source category code (SCC), and month. These output files were updated to the latest version of NIF (version 3.0).

5.2 SMOKE-COMPATIBLE FILE SYSTEMS

In order to process these emissions data through SMOKE, the NIF files were converted to Inventory Data Analyzer (IDA) format, which contains data fields for annual or average ozone season emissions data. A simple utility was written in FORTRAN to perform this conversion.

Also, seasonal and diurnal temporal profiles were created as necessary in order to apply the allocation factors recommended in earlier sections of this document. SMOKE cross-reference files were updated to access these new profiles for the appropriate source categories.

STI created all input files and scripts so that they are compatible with the most recent version of SMOKE (version 1.5), as we have been advised that CENRAP plans to use version 1.5 for its January and July 2002 modeling efforts.

5.3 DELIVERABLE FILES

The following files were delivered by STI upon completion of the ammonia emission inventory with accompanying documentation:

- Activity data files used as inputs to the CMU model
- Emission factor files used as inputs to the CMU model
- CMU output emission data files in latest NIF format
- Emission data files converted to IDA format and ready for input to SMOKE 1.5
- Temporal profile and cross-reference files for use by SMOKE
- Spatial surrogate and cross-reference files for use by SMOKE

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APPENDIX B

TABULATION OF AMMONIA EMISSIONS ESTIMATES FOR THE CENRAP REGION

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Table B-1. Annual ammonia emissions by state and source category.

Source Category	Ammonia Emissions by State (tons/year) AR	IA	KS	LA	MN	MO	NE	OK	TX	Total
Livestock										
CAFOs	*4096.0*	*88722.5*	*57611.1*	*82.4*	*25518.0*	*24685.5*	*30240.0*	*19864.6*	*45650.0*	*296470.0*
Free-Range	*81978.6*	*69713.6*	*33455.9*	*15837.5*	*72562.1*	*68925.6*	*66743.0*	*60016.8*	*143115.0*	*612348.0*
Total Livestock:	86074.6	158436.1	91067.0	15919.9	98080.1	93611.1	96983.0	79881.4	188765.0	908818.0
Fertilizer Application	38547.1	72258.7	64577.0	18113.5	65407.0	36742.9	64442.5	26209.4	78665.2	464963.4
Biogenics (Soil)	11971.1	5574.4	7802.6	10645.6	14977.6	11886.7	7829.2	9643.0	37511.2	117841.3
Point Sources										
Industrial	*2845.2*	*3700.7*	*1882.7*	*7727.9*	*1362.2*	*4237.7*	*421.9*	*4599.9*	*4429.7*	*31207.8*
Landfills	*140.6*	*848.4*	*812.3*	*1165.2*	*959.7*	*2096.1*	*378.2*	*1181.2*	*7959.0*	*15540.8*
Total Point Sources:	2985.8	4549.1	2694.9	8893.1	2321.9	6333.8	800.1	5781.1	12388.7	46748.6
Mobile Sources										
On-road	*2557.5*	*2715.7*	*2407.3*	*3633.8*	*4898.4*	*4414.3*	*1520.8*	*3628.7*	*14104.9*	*39881.3*
Off-road	*389.9*	*578.1*	*577.1*	*1256.8*	*810.8*	*755.3*	*320.1*	*773.7*	*4330.7*	*9792.4*
Total Mobile Sources:	2947.3	3293.8	2984.4	4890.6	5709.2	5169.6	1840.9	4402.4	18435.6	49673.7
Misc. Sources										
Ammonia Refrigeration	*1799.7*	*1274.1*	*300.8*	*288.2*	*721.1*	*440.3*	*2440.0*	*90.7*	*4022.7*	*11377.5*
POTWs	*5.3*	*6.8*	*5.2*	*9.3*	*11.0*	*15.0*	*4.3*	*5.2*	*60.9*	*122.9*
Domestic Animals	*2520.1*	*2014.1*	*1998.2*	*2853.5*	*2599.6*	*4336.6*	*1296.7*	*3235.2*	*15940.5*	*36794.3*
Wild Animals	*4022.9*	*1499.9*	*747.8*	*5000.0*	*4587.1*	*3820.2*	*1255.1*	*1651.2*	*18014.3*	*40598.7*
Humans	*1229.3*	*1388.4*	*1253.9*	*2120.2*	*2277.1*	*2614.2*	*806.2*	*1611.5*	*9409.2*	*22710.0*
Wildfire	*260.5*	*25.0*	*1347.2*	*203.6*	*182.2*	*366.8*	*2109.5*	*428.8*	*176.7*	*5100.2*
Total Misc. Sources:	9837.8	6208.3	5653.0	10474.7	10378.0	11593.0	7911.8	7022.5	47624.4	116703.6
Total Emissions:	**152363.8**	**250320.4**	**174778.8**	**68937.4**	**196873.8**	**165337.1**	**179807.5**	**132939.8**	**383390.1**	**1704748.7**

APPENDIX C

TABULATION OF DIFFERENCES BETWEEN THE STI INVENTORY AND CMU MODEL OUTPUTS

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Table C-1. Comparison between the STI inventory and CMU model outputs for key sources.

Ammonia Emissions (tons/year)									
	Livestock & Poultry			Fertilizer			Biogenics		
State	STI	CMU	% Difference	STI	CMU	% Difference	STI	CMU	% Difference
AR	86,074.6	82,657.0	4.1%	38,547.1	38,877.8	-0.9%	11,971.1	86,009.7	-86.1%
IA	158,436.1	163,651.4	-3.2%	72,258.7	68,756.6	5.1%	5,574.4	178,752.5	-96.9%
KS	91,067.0	80,178.7	13.6%	64,577.0	70,575.3	-8.5%	7,802.6	227,338.2	-96.6%
LA	15,919.9	15,918.9	0.0%	18,113.5	16,402.3	10.4%	10,645.6	66,879.7	-84.1%
MN	98,080.1	99,245.3	-1.2%	65,407.0	64,604.6	1.2%	14,977.6	179,269.6	-91.6%
MO	93,611.1	91,717.7	2.1%	36,742.9	32,264.0	13.9%	11,886.7	160,992.1	-92.6%
NE	96,983.0	97,833.8	-0.9%	64,442.5	50,822.8	26.8%	7,829.2	184,292.2	-95.8%
OK	79,881.4	77,359.0	3.3%	26,209.4	27,506.2	-4.7%	9,643.0	160,003.9	-94.0%
TX	188,765.0	186,762.5	1.1%	78,665.2	75,327.6	4.4%	37,511.2	450,664.0	-91.7%
Total:	908,818.0	895,324.2	1.5%	464,963.4	445,137.2	4.5%	117,841.3	1,694,201.8	-93.0%

Appendix I

BART-Eligible Emission Point Information

Appendix I
BART Tabular Response

Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
1	290190002	COLUMBIA MUNICIPAL POWER PLANT	EP01	BOILER UNIT #6	X	X						4911	10100204	1
2	290190002	COLUMBIA MUNICIPAL POWER PLANT	EP02	BOILER UNIT #7					X			4911	10100204	1
3	290190004	UNIVERSITY OF MISSOURI - COLUMBIA	EP10	BOILER 10					X			4911	10100204	1
4	290190004	UNIVERSITY OF MISSOURI - COLUMBIA	EP20	BOILER 12	X							4911	10100601	1
5	290190004	UNIVERSITY OF MISSOURI - COLUMBIA	EP11	BOILER 11	X							4911	10100218	1
6	290190004	UNIVERSITY OF MISSOURI - COLUMBIA	EP09	BOILER 9		X						4911	10100204	1
7	290190004	UNIVERSITY OF MISSOURI - COLUMBIA	EP08	BOILER 8	X							4911	10100205	1
8	290190004	UNIVERSITY OF MISSOURI - COLUMBIA	EP07	BOILER 7	X							4911	10100205	1
9	290210004	AQUILA INC	01	BOILER #1 & #1 STACK	X							4911	10100601	1
10	290210004	AQUILA INC	02	BOILER #2 & #2 STACK	X							4911	10100601	1
11	290210004	AQUILA INC	03	BOILER #3 & #3 STACK	X							4911	10100601	1
12	290210004	AQUILA INC	04	BOILER #4 & #4 STACK	X							4911	10100601	1
13	290210004	AQUILA INC	06	BOILER #6, ESP & STACK					X			4911	10100203	1
14	290210004	AQUILA INC	05	BOILER #5, ESP & STACK	X							4911	10100202	1
15	290370056	ARIES POWER PLANT	EP1	Combustion Turbine / HRSG #1 (with Duct Burner)	X							4911	10100601	1
16	290370056	ARIES POWER PLANT	EP2	Combustion Turbine / HRSG #2 (with Duct Burner)	X							4911	10100601	1
17	290370056	ARIES POWER PLANT	EP4	Wastewater Boiler				X				4911	10100602	1
18	290470096	INDEPENDENCE POWER AND LIGHT	EP5	#1 & #2 BOILERS	X							4911	10100201	1
19	290690063	KENNETT GENERATING PLANT	13-14	Burnham Boilers	X							4911	10100602	1
20	290690066	ASSOCIATED ELECTRIC COOPERATIVE INC	EP-04	AUXILIARY BOILER	X							4911	10100602	1
21	290710003	AMERENUE	B1	BOILER 1					X			4911	10100226	1
22	290710003	AMERENUE	B2	BOILER 2					X			4911	10100226	1
23	290710003	AMERENUE	B3	BOILER 3					X			4911	10100226	1
24	290710003	AMERENUE	B4	BOILER 4					X			4911	10100226	1
25	290770005	CITY UTILITIES OF SPRINGFIELD MISSOURI	E08	UTILITY BOILER #5					X			4911	10100222	1
26	290770005	CITY UTILITIES OF SPRINGFIELD MISSOURI	E07	UTILITY BOILER #4					X			4911	10100222	1
27	290770005	CITY UTILITIES OF SPRINGFIELD MISSOURI	E06	UTILITY BOILER #3	X							4911	10100222	1
28	290770005	CITY UTILITIES OF SPRINGFIELD MISSOURI	E05	UTILITY BOILER #2	X							4911	10100226	1
29	290770005	CITY UTILITIES OF SPRINGFIELD MISSOURI	E04	UTILITY BOILER #1	X							4911	10100226	1
30	290770039	CITY UTILITIES OF SPRINGFIELD MISSOURI	E09	STEAM GENERATOR					X			4911	10100222	1
31	290770039	CITY UTILITIES OF SPRINGFIELD MISSOURI	E16	BUILDING HEAT BOILER	X							4911	10100602	1
32	290830001	KANSAS CITY POWER & LIGHT CO	EP08	BOILER-UNIT 3					X			4911	10100226	1
33	290830001	KANSAS CITY POWER & LIGHT CO	EP07	BOILER-UNIT 2	X							4911	10100226	1
34	290830001	KANSAS CITY POWER & LIGHT CO	EP06	BOILER-UNIT 1	X							4911	10100226	1
35	290950021	TRIGEN ENERGY CORPORATION	EP1	Boiler 1A, Distillate Oil 1 and 2					X			4911	10100601	1
36	290950021	TRIGEN ENERGY CORPORATION	EP-2	Boiler 6, Coal	X							4911	10100604	1
37	290950021	TRIGEN ENERGY CORPORATION	EP-3	Boiler 8, Distillate Oil 1&2	X							4911	10100604	1

Appendix I
BART Tabular Response

Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
38	290950022	KANSAS CITY POWER & LIGHT CO	EP901	Unit #9 HRSG/Duct Burners				X				4911	10100601	1
39	290950022	KANSAS CITY POWER & LIGHT CO	EP06	Utility Boiler-Coal	X							4911	10100226	1
40	290950031	AQUILA INC	5C	BOILER #3					X			4911	10100203	1
41	290950031	AQUILA INC	5B	BOILER #2	X							4911	10100203	1
42	290950031	AQUILA INC	5A	BOILER #1	X							4911	10100203	1
43	290950050	INDEPENDENCE POWER AND LIGHT	EP05	UNIT 3 STACK					X			4911	10100212	1
44	290950050	INDEPENDENCE POWER AND LIGHT	EP04	UNIT 2 STACK	X							4911	10100212	1
45	290950050	INDEPENDENCE POWER AND LIGHT	EP03	UNIT 1 STACK	X							4911	10100212	1
46	290970001	EMPIRE DISTRICT ELECTRIC CO	7	BOILER EXHAUST STACK					X			4911	10100223	1
47	290990016	AMERENUE-RUSH ISLAND	B-1	BOILER 1					X			4911	10100226	1
48	290990016	AMERENUE-RUSH ISLAND	B-2	BOILER 2					X			4911	10100226	1
49	291170002	CHILLICOTHE MUNICIPAL UTILITIES	E06	BOILER #6 - COAL/PAPER MIX				X				4911	10100204	1
50	291430004	ASSOCIATED ELECTRIC COOPERATIVE INC	EP-02	BOILER #2 - BITUMINOUS COAL					X			4911	10100223	1
51	291430004	ASSOCIATED ELECTRIC COOPERATIVE INC	EP-01	BOILER #1 - BITUMINOUS COAL					X			4911	10100223	1
52	291510002	CENTRAL ELECTRIC POWER COOPERATIVE	EP-04	#2 Boiler	X							4911	10100223	1
53	291510002	CENTRAL ELECTRIC POWER COOPERATIVE	EP-03	#1 Boiler	X							4911	10100202	1
54	291650007	KANSAS CITY POWER & LIGHT CO-IATAN	EP06	BOILER - FUEL OIL	X							4911	10100222	1
55	291750001	ASSOCIATED ELECTRIC COOPERATIVE INC	EP01	UNIT #1 BOILER STACK					X			4911	10100223	1
56	291750001	ASSOCIATED ELECTRIC COOPERATIVE INC	EP02	UNIT #2 BOILER STACK					X			4911	10100223	1
57	291750001	ASSOCIATED ELECTRIC COOPERATIVE INC	EP03	UNIT #3 BOILER STACK	X							4911	10100222	1
58	291830001	AMERENUE - SIOUX	B-1	BOILER 1					X			4911	10100801	1
59	291830001	AMERENUE - SIOUX	B-2	BOILER 2					X			4911	10100801	1
60	291890010	AMERENUE	001	BOILER 1, COAL	X							4911	10100226	1
61	291890010	AMERENUE	002	BOILER #2 COAL 4567	X							4911	10100226	1
62	291890010	AMERENUE	003	BOILER #3, COAL	X							4911	10100226	1
63	291890010	AMERENUE	004	BOILER #4 COAL FIRED	X							4911	10100226	1
64	291950010	MARSHALL MUNICIPAL UTILITIES	EP05	EP05, COAL OR NATURAL GAS FIRED					X			4911	10100202	1
65	291950010	MARSHALL MUNICIPAL UTILITIES	EP04	EP04: NATURAL GAS, COAL OR REFUSE DERIVED WASTE FIRED	X							4911	10100204	1
66	292010017	SIKESTON POWER STATION	01	DRY STACK	X							4911	10100222	1
67	295100038	TRIGEN-ST. LOUIS ENERGY CORP	EP1.1	#1 HEAT RECOVERY BOILER	X							4911	10100604	1
68	295100038	TRIGEN-ST. LOUIS ENERGY CORP	EP2.1	2 HEAT RECOVERY STEAM GENERATOR	X							4911	10100604	1
69	295100038	TRIGEN-ST. LOUIS ENERGY CORP	EP6	NO. 6 BOILER	X							4911	10100601	1
70	295100038	TRIGEN-ST. LOUIS ENERGY CORP	EP5	NO. 5 BOILER	X							4911	10100401	1
71	295100038	TRIGEN-ST. LOUIS ENERGY CORP	EP3.1	#3PACKAGE BOILER	X							4911	10100601	1
72	295100156	AMERICAN COMMERCIAL TERMINALS	1	ROTARY CAR DUMPER				X				1221	30501008	2
73	295100156	AMERICAN COMMERCIAL TERMINALS	2	TRANSFER CHUTE FEEDER TO CIA CONVEYOR				X				1221	30501011	2
74	295100156	AMERICAN COMMERCIAL TERMINALS	3	TRANSFER CHUTE C1A TO C1B CONVEYER				X				1221	30501011	2
75	295100156	AMERICAN COMMERCIAL TERMINALS	4	TRANSFER CHUTE C1B TO C2				X				1221	30501011	2
76	295100156	AMERICAN COMMERCIAL TERMINALS	5	TRANSFER CHUTE C2 TO C3 CONVEYOR				X				1221	30501011	2

Appendix I
BART Tabular Response

Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
77	295100156	AMERICAN COMMERCIAL TERMINALS	7	TRANSFER CHUTE C3 TO C6 CONVEYOR				X				1221	30501011	2
78	295100156	AMERICAN COMMERCIAL TERMINALS	10	TRANSFER CHUTE C1B TO C6 CONVEYOR				X				1221	30501011	2
79	295100156	AMERICAN COMMERCIAL TERMINALS	11	transfer chute tripper to elevating conveyor				X				1221	30501011	2
80	295100156	AMERICAN COMMERCIAL TERMINALS	12	ELVATING TRANSFER CHUTE TO BOOM CONVEYOR				X				1221	30501011	2
81	295100156	AMERICAN COMMERCIAL TERMINALS	13	TRAN. BOOM CONV TO STORAGE PILE				X				1221	30501011	2
82	295100156	AMERICAN COMMERCIAL TERMINALS	14	BUCKET WHEEL RECLAIMER				X				1221	30501011	2
83	295100156	AMERICAN COMMERCIAL TERMINALS	15	TRANSFER CHUTE BOOM CONVEYER TO C3 CONVEYER				X				1221	30501011	2
84	295100156	AMERICAN COMMERCIAL TERMINALS	16	TRAN CHUTE C6 TO LOADOUT CONVEYER				X				1221	30501011	2
85	295100156	AMERICAN COMMERCIAL TERMINALS	17	TRANSFER CHUTE LOADOUT CONVEYOR TO BARGE				X				1221	30501011	2
86	295100156	AMERICAN COMMERCIAL TERMINALS	9	RADIAL STACKER TO EMERGENCY STORAGE PILE				X				1221	30501011	2
87	297770132	CONTINENTAL COAL INC	03	COAL CRUSHING		X						1221	30501060	2
88	297770132	CONTINENTAL COAL INC	06	UNPAVED ROAD		X						1221	30501024	2
89	297770132	CONTINENTAL COAL INC	07	UNPAVED ROAD, HAULING		X						1221	30501024	2
90	297770132	CONTINENTAL COAL INC	08	OPEN STORAGE PILE		X						1221	30501051	2
91	290310021	LONE STAR INDUSTRIES INC	RM31	HOPPER WEIGHT BELT (R-3202)	X							3241	30500612	4
92	290310021	LONE STAR INDUSTRIES INC	RM30	RAW METERIAL STORAGE SILO (W-4505; W-4506)(FLY ASH)	X							3241	30500612	4
93	290310021	LONE STAR INDUSTRIES INC	RM29A	RAW MATERIAL STORAGE SILOS (W-4501)(LIMESTONE)	X							3241	30500612	4
94	290310021	LONE STAR INDUSTRIES INC	RM21	BARGE UNLOADING TO TRUCKS	X							3241	30500607	4
95	290310021	LONE STAR INDUSTRIES INC	RM19	TRANSFER BELTS (W-4900; W-5000)	X							3241	30500612	4
96	290310021	LONE STAR INDUSTRIES INC	KP17A	STORAGE SILOS (W-4508) (CLINKER #4)	X							3241	30500616	4
97	290310021	LONE STAR INDUSTRIES INC	KP15B	TRANSFER BELT (W-7900)	X							3241	30500616	4
98	290310021	LONE STAR INDUSTRIES INC	KP15A	HOPPER LOADING (W-8200)	X							3241	30500616	4
99	290310021	LONE STAR INDUSTRIES INC	KP11A	ELEVATOR (KC-0601)	X							3241	30500616	4
100	290310021	LONE STAR INDUSTRIES INC	KP 7B	CKD STORAGE SILO (KB-3800)	X							3241	30500612	4
101	290310021	LONE STAR INDUSTRIES INC	KP 7A	TRUCK LOADING (KB-3821)	X							3241	30500612	4
102	290310021	LONE STAR INDUSTRIES INC	KP 4A	RAW BLEND ELEVATOR (KB-1600)	X							3241	30500612	4
103	290310021	LONE STAR INDUSTRIES INC	KP 3A	RAW BLEND SILOS (B-0701; B-0702; B-0703; B-0704)	X							3241	30500612	4
104	290310021	LONE STAR INDUSTRIES INC	KP 2A	KILN (KB-5100)	X							3241	30500623	4
105	290310021	LONE STAR INDUSTRIES INC	KP 1A	TRANSFER BELTS (R-3803; R-3700)	X							3241	30500612	4
106	290310021	LONE STAR INDUSTRIES INC	FM12	TRUCK/RAIL LOADING	X							3241	30500619	4
107	290310021	LONE STAR INDUSTRIES INC	FM11	CEMENT BINS (TRUCK)	X							3241	30500618	4
108	290310021	LONE STAR INDUSTRIES INC	FM10	BARGE LOADING (TL-0800)	X							3241	30500619	4
109	290310021	LONE STAR INDUSTRIES INC	FM 9	RIVER CEMENT SILOS (47-48)	X							3241	30500618	4
110	290310021	LONE STAR INDUSTRIES INC	FM 8A	DISTRIBUTION BOX (D-6900)	X							3241	30500619	4
111	290310021	LONE STAR INDUSTRIES INC	FM 7	TRANSFER BELTS (D-4100)	X							3241	30500619	4
112	290310021	LONE STAR INDUSTRIES INC	FM 6	OLD CEMENT SILOS (21-36)	X							3241	30500618	4
113	290310021	LONE STAR INDUSTRIES INC	FM 5A	CEMENT TRANSFER BELT (D-)	X							3241	30500619	4
114	290310021	LONE STAR INDUSTRIES INC	FM 5	CEMENT TRANSFER BELT (D-4800)	X							3241	30500619	4
115	290310021	LONE STAR INDUSTRIES INC	FM 4A	MASONRY SILOS (37-46)	X							3241	30500618	4
116	290310021	LONE STAR INDUSTRIES INC	FM 3A2	SEPARATOR (F-9500)	X							3241	30500629	4
117	290310021	LONE STAR INDUSTRIES INC	FM 3A1	SEPARATOR (F-13500)	X							3241	30500629	4
118	290310021	LONE STAR INDUSTRIES INC	FM 2A	FINISH MILL#4 (F-8900)	X							3241	30500617	4
119	290310021	LONE STAR INDUSTRIES INC	FM 2	FINISH MILL #5 (F-12900)	X							3241	30500617	4

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120	290310021	LONE STAR INDUSTRIES INC	KP18A	TRANSFER BELTS (KC-2600, KC-2620, KC-2630)	X							3241	30500616	4
121	290310021	LONE STAR INDUSTRIES INC	KP19A	TRANSFER EBLT (KC-3200)	X							3241	30500616	4
122	290310021	LONE STAR INDUSTRIES INC	KP20	TRANSFER BELT (KC-3600)	X							3241	30500616	4
123	290310021	LONE STAR INDUSTRIES INC	KP21	BUCKET ELEVATOR (KC-2550)	X							3241	30500616	4
124	290310021	LONE STAR INDUSTRIES INC	FM 4B	NEW CEMENT SILOS (37-46)	X							3241	30500618	4
125	290310021	LONE STAR INDUSTRIES INC	FM13	PLASTICIZER BIN	X							3241	30500618	4
126	290950030	LAFARGE NORTH AMERICA INC	EP35	FINISH MILL #2				X				3241	30500617	4
127	290950030	LAFARGE NORTH AMERICA INC	EP34	FINISH MILL #1				X				3241	30500617	4
128	290950030	LAFARGE NORTH AMERICA INC	EP27A	CLINKER RECLAIM STATION	X			X				3241	30500616	4
129	290950030	LAFARGE NORTH AMERICA INC	EP77	IN-LINE RAW MILL & PREHEATER/PRECALCINER ROTARY KILN; SOLID FUEL GRINDING	X							3241	30500623	4
130	290950030	LAFARGE NORTH AMERICA INC	EP86	FINISH MILL WEIGH HOPPERS	X			X				3241	30500628	4
131	290950030	LAFARGE NORTH AMERICA INC	EP87	FINISH MILL	X			X				3241	30500627	4
132	290950030	LAFARGE NORTH AMERICA INC	EP88	FINISH MILL ELEVATOR	X			X				3241	30500627	4
133	290950030	LAFARGE NORTH AMERICA INC	EP89	CEMENT TRANSFER TO HEADHOUSE	X			X				3241	30500618	4
134	290950030	LAFARGE NORTH AMERICA INC	EP90	CEMENT SILO HEADHOUSE AND INTERSTICE	X			X				3241	30500618	4
135	290950030	LAFARGE NORTH AMERICA INC	EP93	CEMENT TRUCK DISTRIBUTION BOX	X			X				3241	30500619	4
136	290950030	LAFARGE NORTH AMERICA INC	EP96	CEMENT TRUCK LOADOUT #1	X			X				3241	30500619	4
137	290950030	LAFARGE NORTH AMERICA INC	EP97	CEMENT TRUCK LOADOUT #2	X			X				3241	30500619	4
138	290990002	RC CEMENT COMPANY INC	4-K-02	CEMENT KILNS (4001/4002)					X			3241	30500606	4
139	290990002	RC CEMENT COMPANY INC	7-C-08	TRUCK LOADING SPOUT				X				3241	30500619	4
140	290990002	RC CEMENT COMPANY INC	7-C-07	BARGE LOADING SURGE BIN & AIR SLIDES/LOADING BOOM				X				3241	30500619	4
141	290990002	RC CEMENT COMPANY INC	7-C-06	TO:CEMENT FROM BELT 1719 TO BELT 1720				X				3241	30500619	4
142	290990002	RC CEMENT COMPANY INC	7-C-05	TP:CEMENT STORAGE DOME LOADOUT:FEEDERS-BELT 1719				X				3241	30500619	4
143	290990002	RC CEMENT COMPANY INC	7-C-04	FILLING OF CEMENT STORAGE DOME				X				3241	30500619	4
144	290990002	RC CEMENT COMPANY INC	7-C-03	BARGE LOADING SPOUTS				X				3241	30500619	4
145	290990002	RC CEMENT COMPANY INC	7-C-02	CEMENT PUMPS				X				3241	30500619	4
146	290990002	RC CEMENT COMPANY INC	7-C-01	CEMENT STORAGE SILOS				X				3241	30500618	4
147	290990002	RC CEMENT COMPANY INC	6-F-06	F-K PUMP (#1 FINISH MILL ONLY)				X				3241	30500699	4
148	290990002	RC CEMENT COMPANY INC	6-F-05	#2 FINISH MILL AIR SEPARATORS (2905/2906)				X				3241	30500699	4
149	290990002	RC CEMENT COMPANY INC	6-F-04	#1 FINISH MILL AIR SEPARATORS(2903/2904)				X				3241	30500699	4
150	290990002	RC CEMENT COMPANY INC	6-F-03	FINISH MILLS ELEVATORS (2818/2818)				X				3241	30500699	4
151	290990002	RC CEMENT COMPANY INC	6-F-02	FINISH MILLS (3102/3103)				X				3241	30500617	4
152	290990002	RC CEMENT COMPANY INC	6-F-01	TP:CLINKER & GYPSUM FEEDERS TO BELTS 1717-8 & 1740				X				3241	30500616	4
153	290990002	RC CEMENT COMPANY INC	5-L-08	CLINKER STOCKPILE				X				3241	30500615	4
154	290990002	RC CEMENT COMPANY INC	5-L-06	CLINKER DRAG CONVEYORS-DISCHARGE IN STORAGE SILOS				X				3241	30500616	4
155	290990002	RC CEMENT COMPANY INC	5-L-05	CLINKER ELEVATORS (2810/2811)				X				3241	30500616	4
156	290990002	RC CEMENT COMPANY INC	5-L-04	TP:CLINKER FROM EL 2807/2808 TO EL 2810/2811				X				3241	30500616	4
157	290990002	RC CEMENT COMPANY INC	5-L-03A	TP:CLINKER FROM CONVEYOR TO ELEVATORS(2807/2808)				X				3241	30500616	4
158	290990002	RC CEMENT COMPANY INC	5-L-02	CLINKER CONVEYORS (3 TRANFER POINTS)				X				3241	30500616	4
159	290990002	RC CEMENT COMPANY INC	5-L-01	CLINKER COOLERS (4101/4104)				X				3241	30500614	4
160	290990002	RC CEMENT COMPANY INC	4-K-06	WASTE DUST PELLETIZER				X				3241	30500699	4
161	290990002	RC CEMENT COMPANY INC	4-K-05	WASTE DUST STORAGE TANK				X				3241	30500699	4
162	290990002	RC CEMENT COMPANY INC	4-K-04	WASTE DUST TRUCK LOAD SPOUT				X				3241	30500699	4
163	290990002	RC CEMENT COMPANY INC	4-K-03	EAST CKD TANK				X				3241	30500699	4
164	290990002	RC CEMENT COMPANY INC	4-K-01	KILN FEED ALLEVIATORS (2512/2544)				X				3241	30500612	4
165	290990002	RC CEMENT COMPANY INC	3-G-10	RAW MEAL BLENDING AND STORAGE SILOS(4)				X				3241	30500612	4

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166	290990002	RC CEMENT COMPANY INC	3-G-09	SEPARATOR AIR SLIDE DISCHARGE TO F-K PUMPS				X				3241	30500612	4
167	290990002	RC CEMENT COMPANY INC	3-G-08	RAW MILL #2 (3104)				X				3241	30500613	4
168	290990002	RC CEMENT COMPANY INC	3-G-07	RAW MILL #2 AIR SEPARATOR (2907)				X				3241	30500626	4
169	290990002	RC CEMENT COMPANY INC	3-G-06	TP:RAW MILL BIN FEEDERS ONTO BELT 1742 (2 PTS)				X				3241	30500612	4
170	290990002	RC CEMENT COMPANY INC	3-G-04	RAW MILL #1 (3101)				X				3241	30500613	4
171	290990002	RC CEMENT COMPANY INC	3-G-02B	AIR SLIDE(3204)&BELT DISCHARGE N2 ELEV.2803 & 2804				X				3241	30500612	4
172	290990002	RC CEMENT COMPANY INC	3-G-02A	RAW MILL #1 AIR SEPARATORS (2901/2902)				X				3241	30500626	4
173	290990002	RC CEMENT COMPANY INC	3-G-01	RAW MILL BIN FEEDERS TO BELTS 1711 & 1712; 3 PTS				X				3241	30500612	4
174	290990002	RC CEMENT COMPANY INC	2-R-12	TP:TRIPPERS DISCHARGE INTO RAW FEED BINS				X				3241	30500612	4
175	290990002	RC CEMENT COMPANY INC	2-R-11	TP:BELT 1703 TO BELT CONV&TRIP(1710/1732)				X				3241	30500612	4
176	290990002	RC CEMENT COMPANY INC	2-R-09A	SAND/BOTTOM ASH SCREENING				X				3241	30500611	4
177	290990002	RC CEMENT COMPANY INC	2-R-04D	SCREEN 1601 DISCHARGE ONTO BELTS 1703 & 1704				X				3241	30500612	4
178	290990002	RC CEMENT COMPANY INC	2-R-04C	SCREEN 1607 DISCHARGE ONTO BELTS 1703 & 1744				X				3241	30500612	4
179	290990002	RC CEMENT COMPANY INC	2-R-04B	SCREEN(1601)				X				3241	30500611	4
180	290990002	RC CEMENT COMPANY INC	2-R-03C	SECONDARY CRUSHERS DISCHARGE ONTO BELTS 1702&1743				X				3241	30500612	4
181	290990002	RC CEMENT COMPANY INC	2-R-03B	SECONDARY CRUSHERS(1402/1409)				X				3241	30500610	4
182	290990002	RC CEMENT COMPANY INC	2-R-03A	SURGE BIN FEEDERS				X				3241	30500612	4
183	290990002	RC CEMENT COMPANY INC	2-R-02	BELTS 1701&1704 DISCHARGE IN SURG BIN;1704 TO 1705				X				3241	30500612	4
184	290990002	RC CEMENT COMPANY INC	2-R-01	TP:PRIMARY CRUSHER SURGE BIN DISCHARGE-BELT 1701				X				3241	30500612	4
185	290990002	RC CEMENT COMPANY INC	1-Q-10	PRIMARY CRUSHER(1401)				X				3241	30500609	4
186	290990002	RC CEMENT COMPANY INC	4-K-07B	WASTE DUST TRANSFER POINT				X				3241	30500612	4
187	291630001	HOLCIM (US) INC	3	QUARRY - LOADING		X						3241	30500799	4
188	291630001	HOLCIM (US) INC	60	DOME CONVEYOR BELT				X				3241	30500719	4
189	291630001	HOLCIM (US) INC	57	CONVEYOR TRANSPORT SYSTEM				X				3241	30500712	4
190	291630001	HOLCIM (US) INC	49	BARGE LOADING/WEST TOWER				X				3241	30500719	4
191	291630001	HOLCIM (US) INC	48	BARGE LOADING/EAST TOWER				X				3241	30500719	4
192	291630001	HOLCIM (US) INC	47.1	BARGE LOADING STORAGE BIN BAGHOUSE				X				3241	30500719	4
193	291630001	HOLCIM (US) INC	45	TRUCK STORAGE BIN & LOADING BAGHOUSE				X				3241	30500718	4
194	291630001	HOLCIM (US) INC	44	60" BELT BAGHOUSE				X				3241	30500719	4
195	291630001	HOLCIM (US) INC	43	36" BELT BAGHOUSE				X				3241	30500719	4
196	291630001	HOLCIM (US) INC	42	SHIPPING SILO BAGHOUSE				X				3241	30500718	4
197	291630001	HOLCIM (US) INC	41	SHIPPING SILO BAGHOUSE				X				3241	30500718	4
198	291630001	HOLCIM (US) INC	40	SHIPPING SILO BAGHOUSE				X				3241	30500718	4
199	291630001	HOLCIM (US) INC	39	SHIPPING SILO BAGHOUSE				X				3241	30500718	4
200	291630001	HOLCIM (US) INC	28	DOME CLINKER RECLAIM HOPPER				X				3241	30500716	4
201	291630001	HOLCIM (US) INC	26	CLINKER RECLAIM HOPPER				X				3241	30500716	4
202	291630001	HOLCIM (US) INC	21	COOLER EXHAUST FAN STACK				X				3241	30500714	4
203	291630001	HOLCIM (US) INC	17	BEARDSLEY & PIPER MIXER				X				3241	30500799	4
204	291630001	HOLCIM (US) INC	16	WASTE DUST DISPOSAL SILO BAGHOUSE				X				3241	30500718	4
205	291630001	HOLCIM (US) INC	15	WASTE DUST STORAGE SILO BAGHOUSE				X				3241	30500718	4
206	291630001	HOLCIM (US) INC	14	MAIN STACK					X			3241	30500706	4
207	291630001	HOLCIM (US) INC	9.1	TRANSFER POINT				X				3241	30500710	4
208	291630001	HOLCIM (US) INC	8	CONVEYOR TRANSPORT				X				3241	30500712	4
209	291630001	HOLCIM (US) INC	6.1	STORAGE PILE - LIMESTONE - ACTIVITY PM10		X						3241	30500708	4
210	291630001	HOLCIM (US) INC	5	RAW MATERIAL UNLOADING		X						3241	30500707	4

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211	291630001	HOLCIM (US) INC	6.3	STORAGE PILE - SHALE - ACTIVITY PM10		X						3241	30500708	4
212	291630001	HOLCIM (US) INC	9.2	TRANSFER POINT				X				3241	30500710	4
213	291630001	HOLCIM (US) INC	47.2	BARGE LOADIGN STORAGE BIN BAGHOUSE				X				3241	30500719	4
214	291630001	HOLCIM (US) INC	48.1	BARGE LOADING TOWER/EAST-EAST SPOUT				X				3241	30500719	4
215	291630001	HOLCIM (US) INC	48.2	BARGE LOADING TOWER/EAST - WEST SPOUT				X				3241	30500719	4
216	291630001	HOLCIM (US) INC	49.1	BARGE LOADING TOWER/WEST - EAST SPOUT				X				3241	30500719	4
217	291630001	HOLCIM (US) INC	49.2	BARGE LOADING TOWER/WEST - WEST SPOUT				X				3241	30500719	4
218	291630001	HOLCIM (US) INC	54-MGB	RAIL UNLOADING				X				3241	30500799	4
219	291730001	CONTINENTAL CEMENT COMPANY INC	RM21A	CLAY STORAGE PILE - UNDERGROUND MINE (ACTIVITY)		X		X				3241	30500708	4
220	291730001	CONTINENTAL CEMENT COMPANY INC	RM22A	CLAY STORAGE PILE _ OUTDOORS (ACTIVITY)		X		X				3241	30500708	4
221	291730001	CONTINENTAL CEMENT COMPANY INC	KP01	CEMENT KILN					X			3241	30500706	4
222	291730001	CONTINENTAL CEMENT COMPANY INC	CM05A	CLINKER STORAGE PILE IN STOCKHOUSE 5 (ACTIVITY)		X		X				3241	30500715	4
223	291730001	CONTINENTAL CEMENT COMPANY INC	CM01	CLINKER COOLER		X		X				3241	30500714	4
224	291730001	CONTINENTAL CEMENT COMPANY INC	CG19A	SYNTHETIC GYPSUM STORAGE PILE - OUTDOORS (ACTIVITY)		X		X				3241	30500708	4
225	291730001	CONTINENTAL CEMENT COMPANY INC	CG07A	GYPSUM STORAGE PILE - ACTIVITY		X		X				3241	30500708	4
226	295100073	CONTINENTAL CEMENT COMPANY INC	EP06	BULK LOADING TO TRUCKS		X		X				3241	30500619	4
227	295100073	CONTINENTAL CEMENT COMPANY INC	EP07	BULK LOADING OF CEMENT TRUCKS		X		X				3241	30500619	4
228	291430008	NORANDA ALUMINUM INC	EP-99	CARBON BAKE 2 STACKS (64 TOTAL)					X			3334	30300105	7
229	291430008	NORANDA ALUMINUM INC	EP-98	CARBON BAKE 1 STACKS (64 TOTAL)					X			3334	30300105	7
230	291430008	NORANDA ALUMINUM INC	EP-61	POTLINE I & II STACK					X			3334	30300101	7
231	291430008	NORANDA ALUMINUM INC	EP-60	POTLINE 2 ROOF VENT - FUGITIVE EMISSIONS					X			3334	30300108	7
232	291430008	NORANDA ALUMINUM INC	EP-59	POTLINE 1 ROOF VENT - FUGITIVE EMISSIONS					X			3334	30300108	7
233	291430008	NORANDA ALUMINUM INC	EP-AA	CARBON BAKE 3 STACK	X							3334	30300105	7
234	291430008	NORANDA ALUMINUM INC	EP-91	VENT FOR PITCH DAY TANK				X				3334	30300107	7
235	291430008	NORANDA ALUMINUM INC	EP-79	ANODE CLEANING STATION				X				3334	30300104	7
236	291430008	NORANDA ALUMINUM INC	EP-64	POTLINE 3 ROOF VENT - FUGITIVE EMISSIONS	X							3334	30300108	7
237	291430008	NORANDA ALUMINUM INC	EP-63	162 UNIT STACK	X							3334	30300101	7
238	291430008	NORANDA ALUMINUM INC	EP-62	161 UNIT STACK	X							3334	30300101	7
239	291430008	NORANDA ALUMINUM INC	EP-58	ELECTROLYTE RECOVERY	X							3334	30300104	7
240	291430008	NORANDA ALUMINUM INC	EP-50	ELECTROLYTE RECOVERY	X							3334	30300104	7
241	291430008	NORANDA ALUMINUM INC	EP-48	ELECTROLYTE RECOVERY	X							3334	30300104	7
242	291430008	NORANDA ALUMINUM INC	EP-46	ELECTROLYTE RECOVERY	X							3334	30300104	7
243	291430008	NORANDA ALUMINUM INC	EP-47	ELECTROLYTE RECOVERY	X							3334	30300104	7
244	290930009	DOE RUN COMPANY	EP-20	NA2CO3 SILO BAGHOUSE				X				3339	30107002	10
245	290952172	MARTEC SCIENTIFIC	EP5	Lab	X			X				2834	30107001	10
246	290990003	DOE RUN COMPANY	EP020	ACID PLANT PROCESS EQUIPMENT				X				3339	30102399	10
247	290990003	DOE RUN COMPANY	EP199	PLANTWIDE RESUSPENSION/LOADING				X				3339	30102320	10
248	291270001	BASF AGRI CHEMICALS	PR-51	SAR STACK				X				2879	30102304	10
249	291630031	DYNO NOBEL INC	E01	AMMONIA OXIDATION PROCESS					X			2873	30101301	10
250	291630031	DYNO NOBEL INC	E14	NITRIC ACID CONCENTRATOR				X				2873	30101304	10
251	291630031	DYNO NOBEL INC	E02	NITRIC ACID STORAGE/BLEND				X				2873	30101399	10

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252	295100809	PQ CORPORATION (THE)	EP102	MILL HEATER	X							2819	30107002	10
253	295100809	PQ CORPORATION (THE)	EP104	SILO/CYCLONE	X							2819	30107002	10
254	290270001	HARBISON-WALKER REFRACTORIES	E-0001	CALCINING OPERATION: ROTARY KILN STACK		X						3255	30501604	12
255	290310054	FOAMEX L.P.	04B	BANBURY NO. 2 MIXER		X		X				3069	30501615	12
256	290310054	FOAMEX L.P.	04A	BANBURY NO. 1 MIXER		X		X				3069	30501615	12
257	290470002	NATIONAL STARCH & CHEMICAL CO	EP40	SODIUM SULFATE UNLOADING	X							2046	30501608	12
258	290472227	WATER SUPPLY DIVISION	EP-7	Lime Handling & Transfer (2 drops)		X						4941	30501615	12
259	290650038	ROYAL OAK ENTERPRISES INC	EP10	TRANSFER MATERIAL MIXTURE	X			X				2861	30501607	12
260	290770001	MISSISSIPPI LIME CO	13-02	PARSONS VERTICAL KILN			X					3274	30501603	12
261	290770001	MISSISSIPPI LIME CO	13-04	LIME MATERIAL TRANSFER			X					3274	30501607	12
262	290770001	MISSISSIPPI LIME CO	17-01	LIME HYDRATION			X					3274	30501609	12
263	290770001	MISSISSIPPI LIME CO	17-02	HYDRATE MATERIAL HANDLING			X					3274	30501607	12
264	290770001	MISSISSIPPI LIME CO	17-03	HYDRATE MAT. HANDLING/CONVEYOR			X					3274	30501607	12
265	290770001	MISSISSIPPI LIME CO	18-02	LIME PACKAGING			X					3274	30501614	12
266	290770001	MISSISSIPPI LIME CO	27-01	LIME TRANSFER			X					3274	30501607	12
267	290770001	MISSISSIPPI LIME CO	27-04	LIME CRUSHING			X					3274	30501607	12
268	290770001	MISSISSIPPI LIME CO	27-05	LIME TRANSFER			X					3274	30501607	12
269	290770001	MISSISSIPPI LIME CO	27-01C	LIME TRANSFER			X					3274	30501607	12
270	290970005	PCS PHOSPHATE COMPANY INC	EP-008	SLURRY MIXER PCS #3083			X					2874	30501609	12
271	291030003	KELLY LIMESTONE LLC	PP9	PELLET DRYER #2				X				1422	30501606	12
272	291250001	KINGSFORD MANUFACTURING CO	27	DUST COLLECTOR - BRIQUET PACKAGING				X				2861	30501607	12
273	291250001	KINGSFORD MANUFACTURING CO	24	DUST COLLECTOR - BRIQUET TRANSFER				X				2861	30501607	12
274	291250001	KINGSFORD MANUFACTURING CO	11	LIME UNLOADING, STORAGE & HANDLING				X				2861	30501608	12
275	291250001	KINGSFORD MANUFACTURING CO	7	DUST COLLECTOR - RAW MATERIAL INFEED				X				2861	30501607	12
276	291270062	ALPHARMA INC	AFI-11	LIME STORAGE SILO BAGHOUSE			X					2833	30501626	12
277	291270062	ALPHARMA INC	AFI-12	LIME HOPPER			X					2833	30501626	12
278	291270062	ALPHARMA INC	AFI-13	DICALITE/LIME/RAW MATERIAL SLURRY TANK BAGHOUSE			X					2833	30501626	12
279	291390008	CHRISTY MINERALS CO	1012CH	COAL FIRED ROTARY CALCINER - HIGH BURN	X	X						3295	30501604	12
280	291550067	CHEMICAL LIME COMPANY	EP-8	Belt Conveyor	X							5032	30501615	12
281	291550067	CHEMICAL LIME COMPANY	EP-9	Bucket Elevator	X							5032	30501615	12
282	291550067	CHEMICAL LIME COMPANY	EP-10A	Truck Loadout (enclosed truck)	X							5032	30501626	12
283	291770037	ORBSEAL LLC	EP10	SEALANT AND ADHESIVE BATCH MIXERS				X				2891	30501615	12
284	291860001	MISSISSIPPI LIME COMPANY	EP-068	PEERLESS ROTARTY - KILN #3					X			3274	30501621	12
285	291860001	MISSISSIPPI LIME COMPANY	EP-069	PEERLESS ROTARTY - KILN #4					X			3274	30501621	12
286	291860001	MISSISSIPPI LIME COMPANY	EP-070	PEERLESS ROTARTY - KILN #5					X			3274	30501621	12
287	291860001	MISSISSIPPI LIME COMPANY	EP-071	PEERLESS ROTARY - KILN #6					X			3274	30501621	12
288	291860001	MISSISSIPPI LIME COMPANY	EP-153B	MVPCC DOUBLE SPOUT BAGGER	X							3274	30501614	12
289	291860001	MISSISSIPPI LIME COMPANY	EP-153J	BAGGER BIN	X							3274	30501613	12
290	291860001	MISSISSIPPI LIME COMPANY	EP-065	PEERLESS ROTARTY - KILN #2	X							3274	30501621	12
291	291860001	MISSISSIPPI LIME COMPANY	EP-067	PEERLESS ROTARY COOLER - PCR#2	X							3274	30501611	12
292	291860001	MISSISSIPPI LIME COMPANY	EP-070A	SPALL CONVEYOR				X				3274	30501699	12
293	291860001	MISSISSIPPI LIME COMPANY	EP-070B	SPALL HOPPER TRUCK LOADOUT				X				3274	30501699	12
294	291860001	MISSISSIPPI LIME COMPANY	EP-070C	DOC LOADOUTS				X				3274	30501699	12
295	291860001	MISSISSIPPI LIME COMPANY	EP-101F	SCREEN	X							3274	30501630	12
296	291860001	MISSISSIPPI LIME COMPANY	EP-072	PEERLESS ROTARY COOLER PRC#3				X				3274	30501611	12
297	291860001	MISSISSIPPI LIME COMPANY	EP-073	PEERLESS ROTARY COOLER PRC#4				X				3274	30501611	12
298	291860001	MISSISSIPPI LIME COMPANY	EP-074	PEERLESS ROTARY COOLER PRC#5				X				3274	30501611	12
299	291860001	MISSISSIPPI LIME COMPANY	EP-075	PEERLESS ROTARY COOLER PRC#6				X				3274	30501611	12
300	291860001	MISSISSIPPI LIME COMPANY	EP-083A	PEERLESS PRODUCT HANDLING CONVEYORS				X				3274	30501615	12
301	291860001	MISSISSIPPI LIME COMPANY	EP-083	PEERLESS LIME ELEVATOR #1				X				3274	30501615	12
302	291860001	MISSISSIPPI LIME COMPANY	EP-084	PEERLESS LIME ELEVATOR #2				X				3274	30501615	12
303	291860001	MISSISSIPPI LIME COMPANY	EP-085	PEERLESS LIME ELEVATOR #3				X				3274	30501615	12

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Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
304	291860001	MISSISSIPPI LIME COMPANY	EP-086	PEERLESS LIME SCREEN #1				X				3274	30501630	12
305	291860001	MISSISSIPPI LIME COMPANY	EP-087	PEERLESS LIME SCREEN #2				X				3274	30501630	12
306	291860001	MISSISSIPPI LIME COMPANY	EP-088	PEERLESS LIME SCREEN #3				X				3274	30501630	12
307	291860001	MISSISSIPPI LIME COMPANY	EP-088A	PEERLESS LIME TRUCK/RAIL LOADOUT BINS (15)				X				3274	30501613	12
308	291860001	MISSISSIPPI LIME COMPANY	EP-088C	PEERLESS HAMMERMILL CRUSHER	X							3274	30501631	12
309	291860001	MISSISSIPPI LIME COMPANY	EP-088D	PEERLESS LIME MILL FEED BIN	X							3274	30501613	12
310	291860001	MISSISSIPPI LIME COMPANY	EP-089	PEERLESS PQL ROLLER MILL	X							3274	30501632	12
311	291860001	MISSISSIPPI LIME COMPANY	EP-090A	PEERLESS PQL LIME SILO	X							3274	30501613	12
312	291860001	MISSISSIPPI LIME COMPANY	EP-090B	PEERLESS FK PUMP	X							3274	30501613	12
313	291860001	MISSISSIPPI LIME COMPANY	EP-091	PEERLESS LIME LOADOUTS (3) TRUCK/RAIL	X							3274	30501626	12
314	291860001	MISSISSIPPI LIME COMPANY	EP-106	MISSISSIPPI VERTICAL - KILN #2	X							3274	30501603	12
315	291860001	MISSISSIPPI LIME COMPANY	EP-107	MISSISSIPPI VERTICAL - KILN #3	X							3274	30501603	12
316	291860001	MISSISSIPPI LIME COMPANY	EP-108	MISSISSIPPI VERTICAL - KILN #4	X							3274	30501603	12
317	291860001	MISSISSIPPI LIME COMPANY	EP-109	MISSISSIPPI VERTICAL - KILN #5	X							3274	30501603	12
318	291860001	MISSISSIPPI LIME COMPANY	EP-111	MISSISSIPPI VERTICAL - KILN #7	X							3274	30501603	12
319	291860001	MISSISSIPPI LIME COMPANY	EP-112	MISSISSIPPI VERTICAL - KILN #8	X							3274	30501603	12
320	291860001	MISSISSIPPI LIME COMPANY	EP-115	MISSISSIPPI VERTICAL - KILN #11	X							3274	30501603	12
321	291860001	MISSISSIPPI LIME COMPANY	EP-116	MISSISSIPPI VERTICAL - KILN #12	X							3274	30501603	12
322	291860001	MISSISSIPPI LIME COMPANY	EP-117	MISSISSIPPI VERTICAL - KILN #13	X							3274	30501603	12
323	291860001	MISSISSIPPI LIME COMPANY	EP-118	MISSISSIPPI VERTICAL - KILN #14	X							3274	30501603	12
324	291860001	MISSISSIPPI LIME COMPANY	EP-119	MISSISSIPPI VERTICAL - KILN #15	X							3274	30501603	12
325	291860001	MISSISSIPPI LIME COMPANY	EP-120	MISSISSIPPI VERTICAL - KILN #16	X							3274	30501603	12
326	291860001	MISSISSIPPI LIME COMPANY	EP-124A	FORKINGS BUCKET ELEVATOR	X							3274	30501615	12
327	291860001	MISSISSIPPI LIME COMPANY	EP-124B	FORKINGS HOPPER	X							3274	30501615	12
328	291860001	MISSISSIPPI LIME COMPANY	EP-125A	MVK LIME HOPPERS FOR KILNS NO. 1-20	X							3274	30501613	12
329	291860001	MISSISSIPPI LIME COMPANY	EP-125B	MV LIME DUMP HOPPER	X							3274	30501613	12
330	291860001	MISSISSIPPI LIME COMPANY	EP-125C	MV LIME PAN CONVEYOR	X							3274	30501615	12
331	291860001	MISSISSIPPI LIME COMPANY	EP-126A	MV LIME BUCKET ELEVATOR	X							3274	30501615	12
332	291860001	MISSISSIPPI LIME COMPANY	EP-126B	MV LIME HAMMERMILL CRUSHER	X							3274	30501631	12
333	291860001	MISSISSIPPI LIME COMPANY	EP-127A	MVPQL TRACK BIN NO.6	X							3274	30501613	12
334	291860001	MISSISSIPPI LIME COMPANY	EP-128	MVPQL BAGGING OPERATION	X							3274	30501614	12
335	291860001	MISSISSIPPI LIME COMPANY	EP-129B	MVPQL RAIL LOADOUT	X							3274	30501626	12
336	291860001	MISSISSIPPI LIME COMPANY	EP-130	LIME SILO NO.1	X							3274	30501613	12
337	291860001	MISSISSIPPI LIME COMPANY	EP-132	LIME SILO NO.3	X							3274	30501613	12
338	291860001	MISSISSIPPI LIME COMPANY	EP-133C	RAIL LOADOUT	X							3274	30501626	12
339	291860001	MISSISSIPPI LIME COMPANY	EP-135A	LIME FEED BIN - MVH #1	X							3274	30501613	12
340	291860001	MISSISSIPPI LIME COMPANY	EP-135	HYDRATOR EXHAUST - MVH #1	X							3274	30501609	12
341	291860001	MISSISSIPPI LIME COMPANY	EP-137A	SOUTH BULK LOADOUT	X							3274	30501613	12
342	291860001	MISSISSIPPI LIME COMPANY	EP-139A	LIME FEED BINS (2) - MVH #2	X							3274	30501613	12
343	291860001	MISSISSIPPI LIME COMPANY	EP-139	HYDRATOR EXHAUST - MVH #2	X							3274	30501609	12
344	291860001	MISSISSIPPI LIME COMPANY	EP-141B	STORAGE BINS NOS. 1 THROUGH 6	X							3274	30501613	12
345	291860001	MISSISSIPPI LIME COMPANY	EP-141D	4-SPOUT BAGGER	X							3274	30501614	12
346	291860001	MISSISSIPPI LIME COMPANY	EP-153A	MVPCC FINISH BINS (NOS. 1 THROUGH 4)	X							3274	30501613	12
347	291860001	MISSISSIPPI LIME COMPANY	EP-180H	MISSISSIPPI ROTARY KILN#5 (MRK-5)	X							3274	30501621	12
348	291860001	MISSISSIPPI LIME COMPANY	EP-181H	MISSISSIPPI ROTARY KILN#6 (MRK-6)	X							3274	30501621	12
349	291860001	MISSISSIPPI LIME COMPANY	EP-182H	MISSISSIPPI KILN#7 (MRK-7)	X							3274	30501621	12
350	291860001	MISSISSIPPI LIME COMPANY	EP-183H	MISSISSIPPI ROTARY KILN #8 (MRK-8)	X							3274	30501621	12
351	291860001	MISSISSIPPI LIME COMPANY	EP-183I	DROP OUT CHAMBER LOADOUTS (6)	X							3274	30501699	12
352	291860001	MISSISSIPPI LIME COMPANY	EP-184A	MRK CONVEYOR NO.1A	X							3274	30501615	12
353	291860001	MISSISSIPPI LIME COMPANY	EP-184B	MRK CONVEYOR NO.2A	X							3274	30501615	12
354	291860001	MISSISSIPPI LIME COMPANY	EP-184C	MRK CONVEYOR NO.3A	X							3274	30501615	12
355	291860001	MISSISSIPPI LIME COMPANY	EP-184D	WEST BUCKET ELEVATOR	X							3274	30501615	12
356	291860001	MISSISSIPPI LIME COMPANY	EP-184E	WEST SCREEN	X							3274	30501630	12
357	291860001	MISSISSIPPI LIME COMPANY	EP-184F	MRK CONVEYOR NO.4A	X							3274	30501615	12
358	291860001	MISSISSIPPI LIME COMPANY	EP-186N	MISSISSIPPI ROTARY KILN #9 (MRK-9)	X							3274	30501621	12

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Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
359	291860001	MISSISSIPPI LIME COMPANY	EP-187N	MISSISSIPPI ROTARTY KILN #10 (MRK-10)	X							3274	30501621	12
360	291860001	MISSISSIPPI LIME COMPANY	EP-188A	WEST CONVEYOR	X							3274	30501615	12
361	291860001	MISSISSIPPI LIME COMPANY	EP-188B	NORTH CONVEYOR	X							3274	30501615	12
362	291860001	MISSISSIPPI LIME COMPANY	EP-188C	CRUSHER (IMPACT)	X							3274	30501631	12
363	291860001	MISSISSIPPI LIME COMPANY	EP-188D	CRUSHER FEEDER	X							3274	30501615	12
364	291860001	MISSISSIPPI LIME COMPANY	EP-203A	1" PEBBLE LIME BIN	X							3274	30501613	12
365	291860001	MISSISSIPPI LIME COMPANY	EP-203AA	SOUTH 1" CONVEYOR	X							3274	30501615	12
366	291860001	MISSISSIPPI LIME COMPANY	EP-203AB	NORTH 1" CONVEYOR	X							3274	30501615	12
367	291860001	MISSISSIPPI LIME COMPANY	EP-203B	2" PEBBLE LIME BIN	X							3274	30501613	12
368	291860001	MISSISSIPPI LIME COMPANY	EP-203C	1/2" PEBBLE LIME BIN	X							3274	30501613	12
369	291860001	MISSISSIPPI LIME COMPANY	EP-203E	FINES LIME BIN	X							3274	30501613	12
370	291860001	MISSISSIPPI LIME COMPANY	EP-203G	FINES RAIL TRUCK LOADOUT SOUTH (ONLY)	X							3274	30501626	12
371	291860001	MISSISSIPPI LIME COMPANY	EP-204A	1" RAIL TRUCK LOADOUT NORTH & SOUTH	X							3274	30501626	12
372	291860001	MISSISSIPPI LIME COMPANY	EP-204B	2" RAIL TRUCK LOADOUT NORTH & SOUTH	X							3274	30501626	12
373	291860001	MISSISSIPPI LIME COMPANY	EP-204C	1/2" RAIL TRUCK LOADOUT NORTH & SOUTH	X							3274	30501626	12
374	291860001	MISSISSIPPI LIME COMPANY	EP-205	LIME STORAGE BIN (NORTH & SOUTH) - MRH#2 & MRH#3	X							3274	30501613	12
375	291860001	MISSISSIPPI LIME COMPANY	EP-205C	RAILCAR UNLOADING - MRH#2 & MRH#3	X							3274	30501626	12
376	291860001	MISSISSIPPI LIME COMPANY	EP-205D	LIME CRUSHER - MRH#2 & MRH#3	X							3274	30501631	12
377	291860001	MISSISSIPPI LIME COMPANY	EP-206	HYDRATOR EXHAUST - MRH#1	X							3274	30501609	12
378	291860001	MISSISSIPPI LIME COMPANY	EP-209	HYDRATOR EXHAUST - MRH#2	X							3274	30501609	12
379	291860001	MISSISSIPPI LIME COMPANY	EP-212	HYDRATOR EXHAUST - MRH#3	X							3274	30501609	12
380	291860001	MISSISSIPPI LIME COMPANY	EP-215	HYDRATE SILO (SOUTH) - MRH#2 & MRH#3	X							3274	30501613	12
381	291860001	MISSISSIPPI LIME COMPANY	EP-216	HYDRATE SILO (NORTH) - MRH#2 & MRH#3	X							3274	30501613	12
382	291860001	MISSISSIPPI LIME COMPANY	EP-217	HYDRATE TRUCK AND RAIL LOADOUT - MRH#2 & MRH#3	X							3274	30501626	12
383	291860001	MISSISSIPPI LIME COMPANY	EP-218	HYDRATE SILO (EAST & WEST) - MRH#2 & MRH#3	X							3274	30501613	12
384	291860001	MISSISSIPPI LIME COMPANY	EP-220	HYDRATE TRUCK LOADOUT - MRH#2 & MRH#3	X							3274	30501626	12
385	291860001	MISSISSIPPI LIME COMPANY	EP-221A	FK FEED BIN - MRH#1	X							3274	30501613	12
386	291860001	MISSISSIPPI LIME COMPANY	EP-223	HYDRATE TRUCK AND RAIL LOADOUT - MRH#1	X							3274	30501626	12
387	291860001	MISSISSIPPI LIME COMPANY	EP-227	PCC TRUCK AND RAIL LOADOUT - MRPCC#1	X							3274	30501626	12
388	291860001	MISSISSIPPI LIME COMPANY	EP-228	WEIGH HOPPER -MRPCC#2	X							3274	30501613	12
389	291860001	MISSISSIPPI LIME COMPANY	EP-230B	PRODUCT SILO - MPRCC#2	X							3274	30501613	12
390	291860001	MISSISSIPPI LIME COMPANY	EP-289	MAERZ VERTICAL KILN	X							3274	30501623	12
391	291860001	MISSISSIPPI LIME COMPANY	EP-127C	MVPQL TRACK BINS NOS. 1-5	X							3274	30501613	12
392	291860001	MISSISSIPPI LIME COMPANY	EP-380	SS VERTICAL KILN	X							3274	30501623	12
393	291860001	MISSISSIPPI LIME COMPANY	EP-460	FEED TO 100 TON HYDRATE SILOS #1 & 2	X							3274	30501613	12
394	291860001	MISSISSIPPI LIME COMPANY	EP-464	HYDRATE 25 TON SURGE HOPPER	X							3274	30501613	12
395	291860001	MISSISSIPPI LIME COMPANY	EP-465	HYDRATE BAGGING SYSTEM	X							3274	30501613	12
396	291860035	CHEMICAL LIME COMPANY	8	TP8-BC-308-N.PILE	X							3274	30501607	12
397	291860035	CHEMICAL LIME COMPANY	77B	K2-KILN #2 (NATURAL GAS)	X							3274	30501604	12
398	291860035	CHEMICAL LIME COMPANY	77	K2-KILN #2 (COAL/COKE)	X							3274	30501604	12
399	291860035	CHEMICAL LIME COMPANY	76B	K1-KILN #1 (NATURAL GAS)	X							3274	30501604	12
400	291860035	CHEMICAL LIME COMPANY	76	K1-KILN #1 (COAL/COKE)	X							3274	30501604	12
401	291860035	CHEMICAL LIME COMPANY	7	TP7-BC-307-S.PILE	X							3274	30501607	12
402	291860035	CHEMICAL LIME COMPANY	4	TRANSFER POINT (TP4):BC305 TO DG306	X							3274	30501607	12
403	291860035	CHEMICAL LIME COMPANY	5	TRANSFER POINT (TP5): DG306 TO BC307	X							3274	30501607	12
404	291860035	CHEMICAL LIME COMPANY	6	TRANSFER POINT (TP6): DG306 TO BC308	X							3274	30501607	12
405	291860035	CHEMICAL LIME COMPANY	15	TP15:CHAT BIN - LOADOUT	X							3274	30501607	12
406	291860035	CHEMICAL LIME COMPANY	41	TP41:REJECT BIN - LOADOUT	X							3274	30501607	12
407	291860035	CHEMICAL LIME COMPANY	48	TP46:BC538 - LOADOUT	X							3274	30501607	12
408	291860035	CHEMICAL LIME COMPANY	87	CHAT BIN SCREEN	X							3274	30501602	12
409	291860035	CHEMICAL LIME COMPANY	88	LIME SILO SCREEN	X							3274	30501602	12

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410	291860035	CHEMICAL LIME COMPANY	90	TP67: T.R. HOPPER - BC305	X							3274	30501607	12
411	291860035	CHEMICAL LIME COMPANY	92	TP69:BC461-LIME SCREEN	X							3274	30501607	12
412	291860035	CHEMICAL LIME COMPANY	47A	TRANSFER POINT (TP47): BC535 TO BC538	X							3274	30501607	12
413	291860035	CHEMICAL LIME COMPANY	58	TRANSFER POINT (TP56): RAIL HOPPER TO BV603	X							3274	30501607	12
414	291870002	VESSELL MINERAL PRODUCTS	015	SPAR-LIME STORAGE AND HANDLING				X				3255	30501610	12
415	291870002	VESSELL MINERAL PRODUCTS	010	ROTARY KILN				X				3255	30501618	12
416	292130007	ROYAL OAK ENTERPRISES	EP-34	BRIQUETTING	X							2861	30501602	12
417	292130007	ROYAL OAK ENTERPRISES	EP-30	CONVEYING (STARCH/LIME)	X							2861	30501607	12
418	292130007	ROYAL OAK ENTERPRISES	EP-29	HOPPER LOADOUT (STARCH/LIME)	X							2861	30501607	12
419	292130007	ROYAL OAK ENTERPRISES	EP-26	CONVEYING (SAWDUST/COAL/LIME)	X							2861	30501607	12
420	292130007	ROYAL OAK ENTERPRISES	EP-25	BIN LOADOUT (SAWDUST/COAL/LIME)	X							2861	30501607	12
421	292130007	ROYAL OAK ENTERPRISES	EP-23	CONVEYING (SAWDUST/COAL/LIME)	X							2861	30501607	12
422	292130007	ROYAL OAK ENTERPRISES	EP-22	PULVERIZING (SAWDUST/COAL/LIME)	X							2861	30501602	12
423	292130007	ROYAL OAK ENTERPRISES	EP-21	CONVEYING (SAWDUST/COAL/LIME)	X							2861	30501607	12
424	292130007	ROYAL OAK ENTERPRISES	EP-20	HOPPER LOADOUT (SAWDUST/COAL/LIME)	X							2861	30501607	12
425	292130007	ROYAL OAK ENTERPRISES	EP-17	CONVEYING (SAWDUST/COAL/LIME)	X							2861	30501607	12
426	292130007	ROYAL OAK ENTERPRISES	EP-11	CONVEYING	X							2861	30501607	12
427	292130007	ROYAL OAK ENTERPRISES	EP-10	BIN LOADOUT (CHARCOAL)	X							2861	30501607	12
428	292130007	ROYAL OAK ENTERPRISES	EP-09	BUCKET ELEVATOR (CHARCOAL)	X							2861	30501607	12
429	292130007	ROYAL OAK ENTERPRISES	EP-06	PULVERIZING (CHARCOAL)				X				2861	30501602	12
430	292130007	ROYAL OAK ENTERPRISES	EP-05	CONVEYING CHARCOAL	X							2861	30501607	12
431	292130007	ROYAL OAK ENTERPRISES	EP-04	HOPPER LOADOUT	X							2861	30501607	12
432	292130007	ROYAL OAK ENTERPRISES	EP-07,08	CONVEYING (CHAROCOAL)	X							2861	30501607	12
433	291430008	NORANDA ALUMINUM INC	EP-75	ANODE PASTE MIXER EXHAUST	X							3334	30300312	14
434	290930008	DOE RUN COMPANY	28	IN PLANT VEHICLE TRAFFIC			X					3339	30301005	17
435	290930008	DOE RUN COMPANY	27	SINTER PLANT VENTILATION BAGHOUSE STACK			X					3339	30301001	17
436	290930008	DOE RUN COMPANY	20	UNLOADING BUILDING FUGITIVES			X					3339	30301005	17
437	290930008	DOE RUN COMPANY	15	BLAST FURNACE BAGHOUSE CELLAR CLEANOUT (FUGITIVES)			X					3339	30301099	17
438	290930008	DOE RUN COMPANY	14	BLAST FURNACE BAGHOUSE SPRAY CHAMBER CLEANOUT			X					3339	30301099	17
439	290930008	DOE RUN COMPANY	11	REFINERY BUILDING FUGITIVES (LEAD REFINING)			X					3339	30301022	17
440	290930008	DOE RUN COMPANY	10	REFINERY KETTLE COMBUSTION STACK			X					3339	30301022	17
441	290930008	DOE RUN COMPANY	9	HOT SLAG DUMPING FUGITIVE EMISSIONS			X					3339	30301021	17
442	290930008	DOE RUN COMPANY	8	BLAST FURNACE DROSS KETTLE COMBUSTION STACK			X					3339	30301009	17
443	290930008	DOE RUN COMPANY	7	BLAST FURNACE PROCESS BUILDING FUGITIVES			X					3339	30301019	17
444	290930008	DOE RUN COMPANY	4	BLAST FURNACE BAGHOUSE STACK (PARTICULATES)			X					3339	30301002	17
445	290930008	DOE RUN COMPANY	1	SINTER PLANT - BAGHOUSE STACK (PARTICULATES)			X					3339	30301001	17
446	290930009	DOE RUN COMPANY	EP-32	LABORATORY BAGHOUSE				X				3339	30301099	17
447	290930009	DOE RUN COMPANY	EP-13	OPEN STORAGE FUGITIVES				X				3339	30301012	17
448	290930009	DOE RUN COMPANY	EP-12	REFINERY FUGITIVES				X				3339	30301022	17
449	290930009	DOE RUN COMPANY	EP-11	DROSS PLANT FUGITIVES				X				3339	30301009	17
450	290930009	DOE RUN COMPANY	EP-10	BLAST FURNACE FUGITIVES				X				3339	30301019	17
451	290990003	DOE RUN COMPANY	EP059	BLAST FURNACE OPERATION					X			3339	30301002	17
452	290990003	DOE RUN COMPANY	EP058	DROSS TRANSFER/STORAGE				X				3339	30301012	17
453	290990003	DOE RUN COMPANY	EP056	BLAST FURNACE SLAG UNLOADING				X				3339	30301099	17
454	290990003	DOE RUN COMPANY	EP055	SECONDARIES UNLOADING				X				3339	30301012	17
455	290990003	DOE RUN COMPANY	EP015	BLAST FURNACE ROOF MONITOR				X				3339	30301018	17
456	290990003	DOE RUN COMPANY	EP001B	RAILCAR UNLOADING - FUME				X				3339	30301011	17

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Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
457	290990003	DOE RUN COMPANY	EP029B-36B	REFINERY KETTLE HEAT STACKS 1-8				X				3339	30301022	17
458	290990003	DOE RUN COMPANY	EP061	SINTER PLANT MIX ROOM - UNLOADING				X				3339	30301026	17
459	290990003	DOE RUN COMPANY	EP062	SECONDARIES RAIL LOADING				X				3339	30301016	17
460	290270010	A. P. GREEN INDUSTRIES INC	P-09B					X				3255	30500904	19
461	290270048	CHILES WORKS LLC	EP04	Crusher	X							3295	30500904	19
462	290270048	CHILES WORKS LLC	EP10	CRUSHER	X							3295	30500904	19
463	291650001	MACKIE-CLEMENS FUEL CO	EP4	SCRUBBER/STACK - KILN		X						3295	30500915	19
464	291650001	MACKIE-CLEMENS FUEL CO	EP5	MULTI-CONE STACK-COOLER		X						3295	30500909	19
465	292070014	NESTLE PURINA PETCARE COMPANY	EP14	CLUMPING PROCESSING (BAGHOUSE 07-09)	X							3295	30500999	19
466	292070014	NESTLE PURINA PETCARE COMPANY	EP06	CLAY PROCESSING (BAGHOUSES 7-03 & 7-04)	X							3295	30500999	19
467	292070014	NESTLE PURINA PETCARE COMPANY	EP17	SILICA GEL PKG LINE	X							3295	30500999	19
468	290070047	CERRO COPPER CASTING COMPANY	EP19	BURNING BAR ADMISSIONS	X							3366	30400299	20
469	290070047	CERRO COPPER CASTING COMPANY	EP17	HAND GRINDING	X							3366	30400209	20
470	290070047	CERRO COPPER CASTING COMPANY	EP-3	ELECTRIC HOLDING FURNANCE - METAL CHARGED	X							3366	30400238	20
471	290070047	CERRO COPPER CASTING COMPANY	EP-1	VERTICAL COPPER MELTING FURNANCE-METAL CHARGED	X							3366	30400214	20
472	290090005	HYDRO ALUMINUM WELLS	EP-29	CASTING PIT FUGITIVES				X				3351	30400114	20
473	290090005	HYDRO ALUMINUM WELLS	EP-11	EAST AGE OVEN-EXTRUSION				X				3351	30400150	20
474	290090005	HYDRO ALUMINUM WELLS	EP-10	WEST AGE OVEN-EXTRUSION				X				3351	30400150	20
475	290090005	HYDRO ALUMINUM WELLS	EP-09	NORTH BILLET HEATER-EXTRUSION				X				3351	30400150	20
476	290090005	HYDRO ALUMINUM WELLS	EP-08	MIDDLE BILLET HEATER-EXTRUSION	X			X				3351	30400150	20
477	290090005	HYDRO ALUMINUM WELLS	EP-07	SOUTH BILLET HEATER-EXTRUSION				X				3351	30400150	20
478	290090005	HYDRO ALUMINUM WELLS	EP-06	DROSS ROOM				X				3351	30400107	20
479	290090005	HYDRO ALUMINUM WELLS	EP-02	ALUMINUM MELTING FURNACE	X			X				3351	30400103	20
480	290090005	HYDRO ALUMINUM WELLS	EP-01	ALUMINUM MELTING FURNACE				X				3351	30400103	20
481	290090060	MONETT METALS INC	FML-1	Sand System				X				3325	30400706	20
482	290090060	MONETT METALS INC	HT#1	Heat Treat Furnace				X				3325	30402201	20
483	290090060	MONETT METALS INC	INDUCTO-2	Induction Furnace (Bronze)				X				3325	30400224	20
484	290090060	MONETT METALS INC	PL-1	Pouring/Cooling Line (Steel)				X				3325	30400713	20
485	290090060	MONETT METALS INC	SCL#1	Shell Core Machine				X				3325	30400730	20
486	290090060	MONETT METALS INC	SO-1	Shake Out/Knock Out				X				3325	30400710	20
487	290090060	MONETT METALS INC	HT#2	HEAT TREAT OVEN				X				3325	30402201	20
488	290690002	FEDERAL MOGUL CORPORATION	A1R1	BARREL MELT & HOLD FURN.	X							3365	30400103	20
489	290690002	FEDERAL MOGUL CORPORATION	C1-C11	PERMANENT MOLD CASTING	X							3365	30400114	20
490	290690002	FEDERAL MOGUL CORPORATION	B11	ALUM. ALLOY FLUXING	X							3365	30400105	20
491	290690002	FEDERAL MOGUL CORPORATION	B05	ALUM. ALLOY FLUXING	X							3365	30400105	20
492	290690002	FEDERAL MOGUL CORPORATION	A8R3	BARREL MELT. & HOLD. FURN.	X							3365	30400103	20
493	290690002	FEDERAL MOGUL CORPORATION	A4R2	BARREL MELT & HOLD FURN	X							3365	30400103	20
494	290690002	FEDERAL MOGUL CORPORATION	A3R2	BARREL MELT & HOLD FURN	X							3365	30400103	20
495	290710048	ST. CLAIR DIE CASTING LLC	EP1	#2Z ZINC FURNACE				x				3369	30400868	20
496	290710048	ST. CLAIR DIE CASTING LLC	EP2	#3Z ZINC MELTING FURNACE	X							3369	30400868	20
497	290710048	ST. CLAIR DIE CASTING LLC	EP5	#20A ALUMINUM MELT FURNACE	X							3369	30400103	20
498	290710048	ST. CLAIR DIE CASTING LLC	EP6	#32A ALUMINUM MELT FURNACE	X							3369	30400103	20
499	290710048	ST. CLAIR DIE CASTING LLC	EP9	MPH WHT. LINE ALUMINUM MELT FURNACE	X							3369	30400103	20
500	290710048	ST. CLAIR DIE CASTING LLC	EP10	MPH WHT. LINE ALUMINUM FURNACE MELT	X							3369	30400103	20
501	290770045	STANDARD ELECTRIC STEEL CASTING CO	02	LADLE HEATERS			X					3325	30490003	20
502	290770045	STANDARD ELECTRIC STEEL CASTING CO	04	ARC FURNACE/POURING FLOOR			X					3325	30400708	20

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503	290770045	STANDARD ELECTRIC STEEL CASTING CO	05	CASTING CUTOFF			X					3325	30400799	20
504	290770045	STANDARD ELECTRIC STEEL CASTING CO	06	HEAT TREATMENT			X					3325	30400704	20
505	290770045	STANDARD ELECTRIC STEEL CASTING CO	08	CLEANING STEEL BY SHOT BLASTING BOOTH #1			X					3325	30400711	20
506	290870001	EXIDE TECHNOLOGIES	EP001	MAIN STACK					X			3341	30400403	20
507	290870001	EXIDE TECHNOLOGIES	EP002	RECEIVING KETTLE: NATURAL GAS BURNER STACK		X		X				3341	30400407	20
508	290870001	EXIDE TECHNOLOGIES	EP003	REFINING KETTLE #1: NATURAL GAS BURNER STACK		X		X				3341	30400407	20
509	290870001	EXIDE TECHNOLOGIES	EP004	REFINING KETTLE #2: NATURAL GAS BURNER		X		X				3341	30400407	20
510	290870001	EXIDE TECHNOLOGIES	EP005	REFINING KETTLE #3: NATURAL GAS BURNER STACK		X		X				3341	30400407	20
511	290930009	DOE RUN COMPANY	EP-43	SECONDARY SO2 FUGITIVES				X				3339	30400499	20
512	290930009	DOE RUN COMPANY	EP-39	SWEAT FURNACE - FUEL				X				3339	30400405	20
513	290930009	DOE RUN COMPANY	EP-31	SHREDDER BAGHOUSE				X				3339	30400499	20
514	290930009	DOE RUN COMPANY	EP-08	MAIN STACK - BLAST FURNACE AND PROCESSES					X			3339	30400403	20
515	290930009	DOE RUN COMPANY	EP-64	Sweat Furnace				X				3339	30400412	20
516	290950012	CLAY & BAILEY MFG CO	3	Iron Pouring	X							3321	30400320	20
517	290950012	CLAY & BAILEY MFG CO	4	Casting Shake Out	X							3321	30400331	20
518	290950012	CLAY & BAILEY MFG CO	7	Millroom Grinding	X							3321	30400340	20
519	290950012	CLAY & BAILEY MFG CO	9	Core Oven	X							3321	30400353	20
520	290950012	CLAY & BAILEY MFG CO	12	Ladle Heating	X							3321	30400315	20
521	290950012	CLAY & BAILEY MFG CO	20	Scrap Handling	X							3321	30400315	20
522	290950012	CLAY & BAILEY MFG CO	22	Electric Melt Induction Furnace	X							3321	30400303	20
523	290952027	CHEMETRON RAILWAY PRODUCTS INC	EP2	Natural Gas Usage				X				3398	30402211	20
524	290970008	MISSOURI STEEL CASTINGS CO	EP8	SAND RECLAIM	X							3325	30400331	20
525	290970008	MISSOURI STEEL CASTINGS CO	EP6	CASTING POUR FLOOR	X							3325	30400708	20
526	290970008	MISSOURI STEEL CASTINGS CO	EP5	ARC FURNACE	X							3325	30400701	20
527	290970008	MISSOURI STEEL CASTINGS CO	EP4	LADLE HEATERS - METAL	X							3325	30402201	20
528	290970008	MISSOURI STEEL CASTINGS CO	EP29	MOLD PREP	X							3325	30400799	20
529	290970008	MISSOURI STEEL CASTINGS CO	EP2	FURNACE CHARGING	X							3325	30400712	20
530	290970008	MISSOURI STEEL CASTINGS CO	EP18	REPLICAST SLURRY	X							3325	30400799	20
531	290970008	MISSOURI STEEL CASTINGS CO	EP15	METAL GRINDING	X							3325	30400711	20
532	290970143	LEGGETT & PLATT	19	Zinc Galvanizing	X			X				3315	30400805	20
533	290990111	CARONDELET CORPORATION	EP-34	SAND SILO - MECH. RECLAIMED SAND.	X							3325	30400721	20
534	290990111	CARONDELET CORPORATION	EP-33	AOD VESSEL	X							3325	30400703	20
535	290990111	CARONDELET CORPORATION	EP-29 (B)	HEAT TREAT FURNACE	X							3325	30490003	20
536	290990111	CARONDELET CORPORATION	EP-29 (A)	HEAT TREAT FURNACE	X							3325	30402201	20
537	290990111	CARONDELET CORPORATION	EP-27	GRINDERS IN FINE CLEANING AREA	X							3325	30400711	20
538	290990111	CARONDELET CORPORATION	EP-26	GRINDERS/CHIPPERS IN ROUGH CLEANING AREA	X							3325	30400711	20
539	290990111	CARONDELET CORPORATION	EP-24	RISER CUTTING / ARC-OFF	X							3325	30400711	20
540	290990111	CARONDELET CORPORATION	EP-23 (B)	CASTING SHAKEOUT	X							3325	30400799	20
541	290990111	CARONDELET CORPORATION	EP-23 (A)	CASTING SHAKEOUT (AUTOMATIC AND MANUAL)	X							3325	30400709	20
542	290990111	CARONDELET CORPORATION	EP-22 (B)	CASTING COOLING	X							3325	30400799	20
543	290990111	CARONDELET CORPORATION	EP-22 (A)	CASTING COOLING	X							3325	30400713	20
544	290990111	CARONDELET CORPORATION	EP-21 (B)	METAL POURING	X							3325	30400799	20
545	290990111	CARONDELET CORPORATION	EP-21 (A)	METAL POURING	X							3325	30400708	20
546	290990111	CARONDELET CORPORATION	EP-20	INDUCTION FURNACE	X							3325	30400705	20
547	290990111	CARONDELET CORPORATION	EP-19	LADLE/FURNACE PREHEAT	X							3325	30490003	20

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548	290990111	CARONDELET CORPORATION	EP-17	MOLD/CORE CURING (ISOCURE CATALYST)	X							3325	30400799	20
549	290990111	CARONDELET CORPORATION	EP-16	MODL/CORE CURING	X							3325	30400799	20
550	290990111	CARONDELET CORPORATION	EP-15	MOLDBOX/COREBOX FILLING	X							3325	30400799	20
551	290990111	CARONDELET CORPORATION	EP-13 (B)	MOLD/CORE MIXERS (7)	X							3325	30400799	20
552	290990111	CARONDELET CORPORATION	EP-11	SAND DAY SILOS (5)	X							3325	30400721	20
553	290990111	CARONDELET CORPORATION	EP-10	BLENDED SAND RECEIVER (2)	X							3325	30400721	20
554	290990111	CARONDELET CORPORATION	EP-09	SAND BLENDER	X							3325	30400706	20
555	290990111	CARONDELET CORPORATION	EP-08 (A)	THERMAL RECLAMATION/COOLER-CLASSIFIER UNIT	X							3325	30400799	20
556	290990111	CARONDELET CORPORATION	EP-07	MAGNETIC SEPERATOR, SCREEN AND HOPPER	X							3325	30400724	20
557	290990111	CARONDELET CORPORATION	EP-06	SAND CONVEYOR	X							3325	30400723	20
558	290990111	CARONDELET CORPORATION	EP-05	RECLAIMED SAND TO SILO (1)	X							3325	30400721	20
559	290990111	CARONDELET CORPORATION	EP-04	RECLAIMED SAND TO SILO (1)	X							3325	30400706	20
560	290990111	CARONDELET CORPORATION	EP-01	METAL HANDLING - STORAGE	X							3325	30400712	20
561	290990111	CARONDELET CORPORATION	EP44	DRYING BURNER FOR WATER BASED PAINTS	X							3325	30490003	20
562	291010003	STAHL SPECIALTY CO	EP-01	MELT FURNACE #1 (DEPT. 01-S)	X							3365	30400113	20
563	291010003	STAHL SPECIALTY CO	EP-54	SAND CORE CURING PROCESS				x				3365	30400199	20
564	291010004	STAHL SPECIALTY CO	EP-01	MELT FURNACE #1	X							3365	30400113	20
565	291130029	TOYOTA MOTOR CORPORATE SERVICES	P15	ALUMINUM MELTING (MELTER'S 1 & 2)	X							3365	30400103	20
566	291130029	TOYOTA MOTOR CORPORATE SERVICES	OA2	CORE MOLDING MACHINES	X							3365	30400114	20
567	291130029	TOYOTA MOTOR CORPORATE SERVICES	O3	INTAKE MANIFOLD CASTING	X							3365	30400371	20
568	291130029	TOYOTA MOTOR CORPORATE SERVICES	O2	CYLINDER HEAD CASTING	X							3365	30400114	20
569	291130029	TOYOTA MOTOR CORPORATE SERVICES	G1	GENERAL PLANT EXHAUST	X							3365	30400199	20
570	291130029	TOYOTA MOTOR CORPORATE SERVICES	O5	CYLINDER HEAD CORE MOLDING	X							3365	30400371	20
571	291130029	TOYOTA MOTOR CORPORATE SERVICES	O6	BLOCK CASTING	X							3365	30400114	20
572	291130029	TOYOTA MOTOR CORPORATE SERVICES	OA7	1 MZ CYLINDER HEAD SOLUTION HEAT TREAT FURNACE	X							3365	30400112	20
573	291130029	TOYOTA MOTOR CORPORATE SERVICES	OA10	1 MZ CYLINDER BLOCK SOLUTION HEAT TREAT FURNACE	X							3365	30400112	20
574	291130029	TOYOTA MOTOR CORPORATE SERVICES	P27	BLOCK/LOWER CASE FINISHING	X							3365	30400331	20
575	291130029	TOYOTA MOTOR CORPORATE SERVICES	P30	CASTING CYLINDER HEAD #2	X							3365	30400320	20
576	291130046	MOST INC	E1	Scrap Dryer	X			X				3341	30400109	20
577	291130046	MOST INC	E2	Crushing	X			X				3341	30400812	20
578	291130046	MOST INC	E3	Melt Furnaces	X			X				3341	30400103	20
579	291170039	WIRE ROPE CORPORATION OF AMERICA	EP-12	GALVANIZER ZINC POT ALTERATE FUEL				X				3315	30490003	20
580	291170039	WIRE ROPE CORPORATION OF AMERICA	EP-11	IN-LINE COATING DRYER TO BE INSTALLED 1997 ALT FUE				X				3315	30490003	20
581	291170039	WIRE ROPE CORPORATION OF AMERICA	EP-09	FLUIDIZED BED ALTERNATE FUEL				X				3315	30490003	20
582	291170039	WIRE ROPE CORPORATION OF AMERICA	EP-08	PATENTING FURNACE ALTERNATE FUEL				X				3315	30490003	20
583	291270054	DIVERSIFIED DIEMAKERS INC	055	EXP PERMIT #0492-010 MAG METAL MELT/9 DIECAST MAC				X				3364	30400601	20
584	291270054	DIVERSIFIED DIEMAKERS INC	052	FUGITIVE EMIS/12 MAG DIECAST MACHINES	X							3364	30400601	20
585	291270058	DIVERSIFIED DIEMAKERS INC	62	MAGNESIUM DIECAST MACHINES	X							3364	30400601	20

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586	291370002	PACE INDUSTRIES INC	EP50	FURNACE #9	X							3363	30400103	20
587	291370002	PACE INDUSTRIES INC	EP49	FURNACE #8							X	3363	30400103	20
588	291370002	PACE INDUSTRIES INC	EP06	FURNACE #6, Aluminum Melting							X	3363	30400103	20
589	291370002	PACE INDUSTRIES INC	EP63	Furnace #10 - Aluminum Melting	X							3363	30400103	20
590	291370004	DIVERSIFIED DIEMAKERS INC	72	ALUMINUM DIECASTING MACHINES	X							3369	30400114	20
591	291430008	NORANDA ALUMINUM INC	EP-BH	#5 ROD MILL HOLDER	X							3334	30400103	20
592	291430008	NORANDA ALUMINUM INC	EP-BD	STACK FOR ROD MILL #2 HOLDER				X				3334	30400103	20
593	291430008	NORANDA ALUMINUM INC	EP-BC	STACK FOR ROD MILL #2 MELTER				X				3334	30400103	20
594	291430008	NORANDA ALUMINUM INC	EP-BB	STACK FOR ROD MILL #1 HOLDER				X				3334	30400103	20
595	291430008	NORANDA ALUMINUM INC	EP-BA	STACK FOR ROD MILL #1 MELTER				X				3334	30400103	20
596	291430008	NORANDA ALUMINUM INC	EP-AI	STACK FOR #4 HOLDER	X							3334	30400103	20
597	291430008	NORANDA ALUMINUM INC	EP-AH	STACK FOR #4 MELTER	X							3334	30400103	20
598	291430008	NORANDA ALUMINUM INC	EP-AG	STACK FOR #2 HOLDER				X				3334	30400103	20
599	291430008	NORANDA ALUMINUM INC	EP-AF	STACK FOR #2 MELTER				X				3334	30400103	20
600	291430008	NORANDA ALUMINUM INC	EP-AE	STACK FOR #1 HOLDER				X				3334	30400103	20
601	291550045	LOXCREEN COMPANY INC	FUGITIVE 1	DROSS COOLING				X				3354	30400107	20
602	291550045	LOXCREEN COMPANY INC	EP-01	REMELT FURNACE				X				3354	30400103	20
603	291830011	DIDION & SONS FOUNDRY CO	04	GRINDING				X				3321	30400340	20
604	291830011	DIDION & SONS FOUNDRY CO	03	ROTO BLAST 2				X				3321	30400340	20
605	291830011	DIDION & SONS FOUNDRY CO	02	ROTO BLAST 1				X				3321	30400340	20
606	291830011	DIDION & SONS FOUNDRY CO	01	PRE HEAT MELT				X				3321	30400331	20
607	291830011	DIDION & SONS FOUNDRY CO	05	SAND COOLER, MUELLER, MOLDING				X				3321	30400350	20
608	291830011	DIDION & SONS FOUNDRY CO	07	MATERIALS HANDLING				X				3321	30400350	20
609	291830077	O"FALLON CASTING LLC	EP-12	ALUMINUM MELTING FURNACE/REVERBERATORY		X						3324	30400103	20
610	292190028	WARRENTON COPPER LLC	EP-05	FUGITIVE EMISSIONS				X				3341	30400235	20
611	292190028	WARRENTON COPPER LLC	EP-02	REVERBERATORY FURNACE #2				X				3341	30400214	20
612	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP02	""Q""FURNACE			X					3321	30400304	20
613	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP03	'15' TON ARC FURNACE			X					3321	30400304	20
614	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP04	METAL TRANSFER	X							3321	30400320	20
615	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP06	CLAY STORAGE HOPPER VENT	X							3321	30400350	20
616	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP08	SAND STORAGE AND HANDLING	X							3321	30400350	20
617	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP09	CASTING MACHINE CELLS				X				3321	30400360	20
618	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP10	25 TON INDUCTION FURN. (2)				X				3321	30400303	20
619	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP11	LINE #1 THRU #5 SHAKEOUT AND TRANSFER POINTS	X							3321	30400331	20
620	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP14	BLOW OFF BOOTH,SAND TRANS POINTS	X							3321	30400325	20
621	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP15	CASTING CLEANING,GRINDING	X							3321	30400340	20
622	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP16	CASTING MACHINING CELLS				X				3321	30400360	20
623	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP17	CASTING MACHINING CELLS				X				3321	30400360	20
624	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP18	CASTING MACHINING				X				3321	30400360	20
625	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP19	CORE ROOM CATALYST	X							3321	30400398	20

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626	295100072	FEDERAL-MOGUL FRICTION PRODUCTS	EP27	LINE #6 SHAKE OUT AND TRANSFER POINTS	X							3321	30400331	20
627	295101556	CONNECTOR CASTINGS	EP-11	BRASS MULLER AND SAND HANDLING CONVEYOR		X						3341	30400352	20
628	295101556	CONNECTOR CASTINGS	EP-12	BRASS MELTING		X						3341	30400224	20
629	295101556	CONNECTOR CASTINGS	EP-13	BRASS POURING		X						3341	30400320	20
630	295101556	CONNECTOR CASTINGS	EP-14	BRASS SHAKEOUT		X						3341	30400331	20
631	295101556	CONNECTOR CASTINGS	EP-02	ALUMINUM MULLER AND SAND HANDLING CONVEYOR		X						3341	30400352	20
632	295101556	CONNECTOR CASTINGS	EP-03	ALUMINUM MELTING STAHL 4500 FURNACE		X						3341	30400103	20
633	295101556	CONNECTOR CASTINGS	EP-32	BRASS CASTING COOLING		X						3341	30400325	20
634	295101556	CONNECTOR CASTINGS	EP-06	ALUMINUM SHAKEOUT		X						3341	30400331	20
635	290070040	TEVA PHARMACEUTICALS USA INC	EP-T315	METHANOL CRUD TANK T-315 (300 PROCESS)				X				2834	30106010	21
636	290070040	TEVA PHARMACEUTICALS USA INC	EP-862M	SOLVENT RECOVERY PROCESS-METHYL ALCOHOL DISTILLATION				X				2834	30125003	21
637	290070040	TEVA PHARMACEUTICALS USA INC	EP-500A	7ADCA - 500 PROCESS REACTORS				X				2834	30106002	21
638	290070040	TEVA PHARMACEUTICALS USA INC	EP-400A	7ADCA PROCESS (PROCESS VENT) REACTORS				X				2834	30106002	21
639	290070040	TEVA PHARMACEUTICALS USA INC	EP-3001	CEPHALOSPORIN-G 300 PROCESS REACTORS				X				2834	30106002	21
640	290070040	TEVA PHARMACEUTICALS USA INC	EP-3002	CEPHALOSPORIN-G 300 PROCESS (EXPANSION) REACTORS				X				2834	30106002	21
641	290070040	TEVA PHARMACEUTICALS USA INC	EP-3003	CEPHALOSPORIN-G 300 PROCESS (PROCESS VENT) REACTORS				X				2834	30106002	21
642	290070040	TEVA PHARMACEUTICALS USA INC	EP-T319	METHANOL CRUD TANK T-319 (300 PROCESS)				X				2834	30106010	21
643	290070040	TEVA PHARMACEUTICALS USA INC	EP-PENB	PEN BLDG. AIR HANDLING EXHAUST				X				2834	30106008	21
644	290070040	TEVA PHARMACEUTICALS USA INC	EP-CEPHG	CEPHALOSPORIN-G BLDG. AIR HANDLING				X				2834	30106008	21
645	290070040	TEVA PHARMACEUTICALS USA INC	EP400	7ADCA PROCESS VENT STACK				X				2834	30106002	21
646	290070040	TEVA PHARMACEUTICALS USA INC	EP500	7ADCA PROCESS VENT 500 PROCESS				X				2834	30106002	21
647	290070040	TEVA PHARMACEUTICALS USA INC	EP-6002	CEPHALEXIN - 600 PROCESS REACTORS				X				2834	30106002	21
648	290070040	TEVA PHARMACEUTICALS USA INC	EP-600D	CEPHALEXIN DRYER - 600 PROCESS AIR DRYER				X				2834	30106009	21
649	290070040	TEVA PHARMACEUTICALS USA INC	EP-CEPHB	CEPHALEXIN BLDG. AIR HANDLING				X				2834	30106008	21
650	290070040	TEVA PHARMACEUTICALS USA INC	EP-SRT	SOLVENT RECOVERY - TOLUENE DISTILLATION				X				2834	30125807	21
651	290070040	TEVA PHARMACEUTICALS USA INC	EP-R325-26	BIS - TRIMETHYLSIYLUREA (BSU) REACTOR				X				2834	30106002	21
652	290210029	WIRE ROPE CORPORATION OF AMERICA	EP-25	Tuff-Coating (Extruded Plastic Coating)				X				3496	30101809	21
653	290210037	ALBAUGH INC	070	ORGANIC LIQUID VESSEL R-2401 (GLYPHOSATE SALT MIXING)	X							2879	30103399	21
654	290210037	ALBAUGH INC	071	ORGANIC LIQUID R-2402 (GLYPHOSATE SALT MIXING)	X							2879	30103399	21
655	290210037	ALBAUGH INC	088	TRIFLURALIN PRODUCTION TANKS R-401, T-407, T-401	X							2879	30199998	21
656	290210037	ALBAUGH INC	100	ORGANIC LIQUID VESSEL T-603 HERBICIDE MIXING -BROMOXYNIL	X							2879	30199998	21
657	290210037	ALBAUGH INC	104	ORGANIC LIQUID VESSEL T-607 HERBICIDE MIXING (2, 4 DB DMA)	X							2879	30103399	21
658	290210037	ALBAUGH INC	105	ORGANIC LIQUID VESSEL T-608 HERBICIDE MIXING (2, 4 DB DMA)	X							2879	30103399	21
659	290210038	PRIME TANNING CORP	EP41	WASTEWATER PRETREATMENT BASIN	X							3111	30182002	21
660	290210082	SEALED AIR CORPORATION	EP-02	ADHESIVE/MIX ROOM EXHAUST (FLAMMABLE LIQUID STORAGE ROOM EXHAUST)			X					3081	30101894	21
661	290210082	SEALED AIR CORPORATION	EP-01	ADHESIVE COATER/LAMINATOR			X					3081	30101817	21

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Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
662	290370054	CHURCH AND DWIGHT	001	SODA ASH BIN VENT				X				2841	30100901	21
663	290370054	CHURCH AND DWIGHT	002	SALT BIN VENT				X				2841	30100901	21
664	290370054	CHURCH AND DWIGHT	003	SODA ASH FILTER RECEIVER				X				2841	30100901	21
665	290370054	CHURCH AND DWIGHT	004	SALT FILTER RECEIVER				X				2841	30100901	21
666	290430019	DIVERSIFIED PLASTICS INC	EP-3	OVEN CURE				X				2821	30101820	21
667	290430019	DIVERSIFIED PLASTICS INC	EP-2	RAW MATERIAL INJECTED INTO MOLD				X				2821	30101817	21
668	290430019	DIVERSIFIED PLASTICS INC	EP-1	RAW MATERIAL IS PRE-EXPANDED				X				2821	30101817	21
669	290430021	KAY CONCRETE MATERIALS CO	EP11	OIL FIRED HEATER		X						3273	30190001	21
670	290470002	NATIONAL STARCH & CHEMICAL CO	EP70	PIPING LOSSES, FUGITIVE	X							2046	30188801	21
671	290470012	COOK COMPOSITES AND POLYMERS CO	EP18-A	RESIN PRODUCTION (GELCOAT BIG BATCH BLENDING/TINTING) KETTLE				X				2851	30101838	21
672	290470012	COOK COMPOSITES AND POLYMERS CO	EP17	BIG BATCH GEL COAT				X				2851	30101837	21
673	290470012	COOK COMPOSITES AND POLYMERS CO	EP15B	GEL COAT BLENDING (SMALL BATCH, WITH DUST COLLECTOR)				X				2851	30101837	21
674	290470012	COOK COMPOSITES AND POLYMERS CO	EP08	FINISHED RESIN TANKS				X				2851	30101840	21
675	290470012	COOK COMPOSITES AND POLYMERS CO	EP02	KETTLE FURNACE - 86				X				2851	30190003	21
676	290470012	COOK COMPOSITES AND POLYMERS CO	EP01	KETTLE FURNACE - 84				X				2851	30190003	21
677	290470012	COOK COMPOSITES AND POLYMERS CO	EP18-B	RESIN PRODUCTION (RESIN THINNING TANK)				X				2851	30101839	21
678	290470012	COOK COMPOSITES AND POLYMERS CO	EP15A	GEL COAT BLENDING (SMALL BATCH, NO CONTROL)				X				2851	30101837	21
679	290470040	DAVIS PAINT CO	03	PRODUCT FILLING				X				2851	30101401	21
680	290470040	DAVIS PAINT CO	02B	PIGMENT DISPERSION				X				2851	30101402	21
681	290470040	DAVIS PAINT CO	02A	PIGMENT DISPERSION				X				2851	30101402	21
682	290470075	TNEMEC COMPANY INC	08	ROOF VENTILATOR - MAIN VENT				X				2851	30101401	21
683	290470079	CAMPBELL EARL MFG CO	1	PAINT PLANT PROD. AREA				X				2851	30101401	21
684	290470141	SERICOL INC	EP01	INK MANUFACTURING	X							2893	30102001	21
685	290510037	JOHNSON CONTROLS HOOVER AUTO	EP08	SPRAY MRA APPLICATION (LINES 1 & 2)	X			X				3086	30101885	21
686	290510037	JOHNSON CONTROLS HOOVER AUTO	EP07	PASTE MRA APPLICATION (LINES 1 & 2)	X			X				3086	30101885	21
687	290510037	JOHNSON CONTROLS HOOVER AUTO	EP06	FOAM PRODUCTION LINES 1 & 2	X			X				3086	30125101	21
688	290510037	JOHNSON CONTROLS HOOVER AUTO	EP10	FOAM REPAIR - VOIDS (COLD FOAM)	X			X				3086	30101885	21
689	290510037	JOHNSON CONTROLS HOOVER AUTO	EP17	COLD JET CLEANING PROCESS	X			X				3086	30101885	21
690	290550005	GEORGIA PACIFIC CORPORATION	P03	PERLITE EXPANDER	X			X				3292	30116799	21
691	290550020	WATERLAC COATING INC	1	CENTRAL EXHAUST-MANUF. (MIXING) AREA				X				2851	30101401	21
692	290550036	ENNIS PAINT INC	EP-1	PAINT PRODUCTION, MIXING & HANDLING (WATERBORNE WHITE PAINT)				X				2851	30101401	21
693	290550036	ENNIS PAINT INC	EP-2	Pigment Handling				X				2851	30101402	21
694	290550036	ENNIS PAINT INC	EP-3	Solvent Tanks				X				2851	30101404	21
695	290650038	ROYAL OAK ENTERPRISES INC	EP34	DIP TANK	X			X				2861	30102612	21
696	290650038	ROYAL OAK ENTERPRISES INC	EP25A	BAGGING - CHARCOAL BRIQUETS	X			X				2861	30100508	21
697	290710071	REXHAM CONTAINERS	EP1	PLASTIC EXTRUSION		X		X				3089	30101814	21
698	290710151	AEROFIL TECHNOLOGY INC	EP-08-D	BLENDING OF DRY PRODUCTS INTO LIQUID SOLUTION	X							2899	30103312	21
699	290710151	AEROFIL TECHNOLOGY INC	EP-03-A	TRANSFERRING VOC MATERIAL(MIXTANKSTOFINISHEDCONTAI	X							2899	30183001	21
700	290710151	AEROFIL TECHNOLOGY INC	EP-02-E	BLENDING OF DRY PRODUCTS INTO LIQUID SOLUTIONS	X							2899	30103312	21

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701	290710151	AEROFIL TECHNOLOGY INC	EP-10-A	DRY BLENDING/PAKAGING	X							2899	30103312	21
702	290710151	AEROFIL TECHNOLOGY INC	EP-08-B	MIXING OPERATIONS FOR MALATHION	X							2899	30103301	21
703	290710151	AEROFIL TECHNOLOGY INC	EP-08-A	TRANSFERING VOC MATERIAL INTO MIXING TANKS	X							2899	30183001	21
704	290710151	AEROFIL TECHNOLOGY INC	EP-04	QC SPRAYING OF AEROSOL CANS (FINISHED PRODUCT)	X							2899	30199999	21
705	290710151	AEROFIL TECHNOLOGY INC	EP-02-A	TRANSFERING VOC MATERIAL INTO MIXING TANKS	X							2899	30183001	21
706	290710151	AEROFIL TECHNOLOGY INC	EP-09-A	TRANSFERING VOC MAT'L FROM MIX TANKS TO FIN CONTAINERS	X							2899	30183001	21
707	290710151	AEROFIL TECHNOLOGY INC	EP-16	PROPELLANT FILLING-AEROSOL CANS	X							2899	30199999	21
708	290710151	AEROFIL TECHNOLOGY INC	EP-14	AEROSOL CAN REWORK	X							2899	30199999	21
709	290710151	AEROFIL TECHNOLOGY INC	EP-17	DRY PACKAGING	X							2899	30103312	21
710	290710151	AEROFIL TECHNOLOGY INC	EP-18-A	TRANSFER VOC MATERIAL - FROM MIXING TANKS TO CONTAINERS	X							2899	30183001	21
711	290710151	AEROFIL TECHNOLOGY INC	EP-19-A	PROPELLANT FILLING - AEROSOL CANS	X							2899	30199999	21
712	290710157	PLAZE INCORPORATED	E2	EMISSIONS FROM GASSING AEROSOLS	X							2899	30188805	21
713	290770017	CLARIANT LIFE SCIENCE MOLECULES	04C	S-4 VENTILATION ROOF VENTS FUGITIVES FROM BPA	X							2833	30106099	21
714	290770017	CLARIANT LIFE SCIENCE MOLECULES	13A	S-13 STACK-DRUM WASHER EXHST	X							2833	30106008	21
715	290770017	CLARIANT LIFE SCIENCE MOLECULES	14A	S-14 SCRUBBER/REACTORS	X							2833	30106002	21
716	290770017	CLARIANT LIFE SCIENCE MOLECULES	14K	S-14 ROOF VENTS FUGITIVES	X							2833	30106099	21
717	290770017	CLARIANT LIFE SCIENCE MOLECULES	19A	S-19A&B EMISSIONS TO HEIL SCRUBBER				X				2833	30106008	21
718	290770017	CLARIANT LIFE SCIENCE MOLECULES	19B	S-19A&B ROOF VENTS FUGITIVES				X				2833	30106099	21
719	290770017	CLARIANT LIFE SCIENCE MOLECULES	19C	S-19A&B BUILDING FUGITIVE EMISSIONS				X				2833	30106099	21
720	290770017	CLARIANT LIFE SCIENCE MOLECULES	28A	S-28 ROOF VENTS (FUGITIVES)	X							2833	30106099	21
721	290770017	CLARIANT LIFE SCIENCE MOLECULES	28B	S-28 FUGITIVE EMISSIONS	X							2833	30106099	21
722	290770017	CLARIANT LIFE SCIENCE MOLECULES	28C	S-28 TANK FUGITIVES (SS12001)	X							2833	30106099	21
723	290770017	CLARIANT LIFE SCIENCE MOLECULES	28D	S-28 IPA TANK FUGITIVES (SS12002)	X							2833	30106099	21
724	290770017	CLARIANT LIFE SCIENCE MOLECULES	28E	S-28 RECOVERED IPA (CS 12001)	X							2833	30106099	21
725	290770017	CLARIANT LIFE SCIENCE MOLECULES	28F	S-28 ROSEMUND LIQUORS (SS20000) TANK FUGITIVES	X							2833	30106099	21
726	290770017	CLARIANT LIFE SCIENCE MOLECULES	RTO1A	REECO THERMAL OXIDIZER NAT.GAS.FIRED	X							2833	30190013	21
727	290770017	CLARIANT LIFE SCIENCE MOLECULES	RTO1B	RTO (S19 A&B) PROCESS EMISSIONS	X							2833	30106099	21
728	290770017	CLARIANT LIFE SCIENCE MOLECULES	RTO2	S-14 RTO BYPASS EMISSIONS	X							2833	30106099	21
729	290770017	CLARIANT LIFE SCIENCE MOLECULES	RTO1C	GABAPENTIN-4 S19C PROCESS EMISSIONS	X							2833	30106099	21
730	290770017	CLARIANT LIFE SCIENCE MOLECULES	19S	S19C BUILDING FUGITIVES	X							2833	30106099	21
731	290770051	3M COMPANY	0136	TALC STORAGE SILO TANK	X							2891	30102699	21
732	290770051	3M COMPANY	02-12	84" RUBBER MILL #1	X							2891	30102699	21
733	290770051	3M COMPANY	02-14	84" RUBBER MILL #2	X							2891	30102699	21

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734	290770051	3M COMPANY	03-02	#20 MOGUL HOOD EPOXY RESINS	X							2891	30101847	21
735	290770051	3M COMPANY	03-05	#15 MOGUL MIXER EXHST EPOXY RESINS	X							2891	30101847	21
736	290770051	3M COMPANY	03-06	80 GAL MYERS MIXER EXHST	X							2891	30101847	21
737	290770051	3M COMPANY	03-09	#18 MOGUL MIXER EXHST - RM 3	X							2891	30101847	21
738	290770051	3M COMPANY	03-11	#18 MOGUL MIXER EXHST - RM 4	X							2891	30101847	21
739	290770051	3M COMPANY	03-14	URETHANE REACTOR/MIXER (2000 GAL)	X							2891	30101891	21
740	290770051	3M COMPANY	03-34	1000 GAL MYERS MIXER VENT EPOXY RESINS and HAPs reported on EU for 3-01 thru 12-11 for air toxics	X							2891	30101847	21
741	290770051	3M COMPANY	11-11	500 KADY MILL	X							2891	30102614	21
742	290770051	3M COMPANY	11-13	STRONG SCOTT BLENDER EXHST	X							2891	30102617	21
743	290770051	3M COMPANY	11-16	URETHANE LINE 1 POWDER RECEIVER	X							2891	30102699	21
744	290770051	3M COMPANY	11-17	URETHANE LINE 2: POWDER RECEIVER	X							2891	30102699	21
745	290770051	3M COMPANY	11-18	URETHANE LINE 1 LITTLEFORD BLENDER	X							2891	30102614	21
746	290770051	3M COMPANY	11-21	URETHANE LINE 2: LITTLEFORD BLENDER	X							2891	30102614	21
747	290770051	3M COMPANY	11-23	URETHANE LINE 1 RIBBON BLENDER	X							2891	30102614	21
748	290770051	3M COMPANY	11-24	URETHANE LINE 1 2000 GAL CHEMINEER MIXER	X							2891	30102614	21
749	290770051	3M COMPANY	11-25	URETHANE LINE 1: 1000 GAL NOLTE MIXER	X							2891	30102614	21
750	290770051	3M COMPANY	11-33	HOLD TANK FOR 2200 GAL HIGH SHEAR	X							2891	30102614	21
751	290770051	3M COMPANY	11-34	HOLD TANK FOR 1000 GAL HIGH SHEAR	X							2891	30102614	21
752	290770051	3M COMPANY	11-37	1000 GAL HIGH SHEAR	X							2891	30102614	21
753	290770051	3M COMPANY	11-39	2200 GAL HIGH SHEAR	X							2891	30102614	21
754	290770051	3M COMPANY	12-11	600 GAL MYERS MIXER VENT	X							2891	30101847	21
755	290770051	3M COMPANY	12-25	600 GAL MYERS MIXER local exhaust	X							2891	30101847	21
756	290770202	EARL SCHEIB AUTOMOTIVE PAINT FINISHES	4	PAINT MIXING AND HANDLING OF PIGMENTED PAINTS				X				2851	30101401	21
757	290770202	EARL SCHEIB AUTOMOTIVE PAINT FINISHES	5	PAINT MIXING AND HANDLING OF NON-PIGMENTED PAINTS				X				2851	30101401	21
758	290930009	DOE RUN COMPANY	EP-18	NA2SO4 CRYSTALLIZER				X				3339	30199999	21
759	290950005	U. S. DEPT OF ENERGY	EP27	Depotting and Potting Solvents		X						3679	30101819	21
760	290950011	BAYER CROPSCIENCE	EP4	Carbon Furnace				X				2879	30100701	21
761	290950011	BAYER CROPSCIENCE	4.1-X1	Di-Syston Common Header				X				2879	30103399	21
762	290950011	BAYER CROPSCIENCE	5.0-B2COM	TDA/FOE Combined Processes				X				2879	30103399	21
763	290950011	BAYER CROPSCIENCE	5.0-B4 FOE	FOE Process				X				2879	30103399	21
764	290950011	BAYER CROPSCIENCE	4.0-K2 FOL	Folicur Process				X				2879	30103399	21
765	290950011	BAYER CROPSCIENCE	EP3-TO2TK	WTP Tank Farm Vent				X				2879	30199998	21
766	290950011	BAYER CROPSCIENCE	3.0-K2 PIN	Pina-Mix Process				X				2879	30103399	21
767	290950011	BAYER CROPSCIENCE	2.3-K6 EPX	Epoxide Process				X				2879	30103399	21
768	290950011	BAYER CROPSCIENCE	4.0-K1 BUT	Butylthion Process				X				2879	30103399	21
769	290950011	BAYER CROPSCIENCE	4.0-K2 SEN	Sencor Process				X				2879	30103399	21
770	290950011	BAYER CROPSCIENCE	3.0-K1 PIN	Pinacolone Process				X				2879	30103399	21
771	290950011	BAYER CROPSCIENCE	5.0-K2 H61	MKH 6561 Process				X				2879	30103399	21
772	290950046	ALLIANT LLC	EP21	BALLISTICS TESTING	X							3482	30101030	21
773	290950063	AVENTIS PHARMACEUTICALS INC	EP-05	Ovents, Tablet Production				X				2834	30106009	21
774	290950063	AVENTIS PHARMACEUTICALS INC	EP-06	Tablets Presses and Encapsulation				X				2834	30106099	21
775	290950063	AVENTIS PHARMACEUTICALS INC	EP-07	Coating-Tablet Production				X				2834	30106011	21
776	290950063	AVENTIS PHARMACEUTICALS INC	EP-12	Coating Process-High Efficiency Filter				X				2834	30106011	21
777	290950063	AVENTIS PHARMACEUTICALS INC	EP-18	Liquid Creams Production				X				2834	30106008	21
778	290950063	AVENTIS PHARMACEUTICALS INC	EP-08	Packaging-Tablet Production				X				2834	30106099	21
779	290950063	AVENTIS PHARMACEUTICALS INC	EP-11	Bead Coating-Capsule Production				X				2834	30106011	21
780	290950063	AVENTIS PHARMACEUTICALS INC	EP-21	QA Laboratory Hoods				X				2834	30106008	21
781	290950063	AVENTIS PHARMACEUTICALS INC	EP-36	Glatt,T-3,Tablet/Capsule Production				X				2834	30106010	21
782	290950063	AVENTIS PHARMACEUTICALS INC	EP-04C	Tablet Production (Alcohol)				X				2834	30106011	21
783	290950063	AVENTIS PHARMACEUTICALS INC	EP-04A	Tablet/Preparations-Blending				X				2834	30106010	21
784	290950063	AVENTIS PHARMACEUTICALS INC	EP-04B	Tablet Coating Process-Tablet Production				X				2834	30106011	21

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785	290950063	AVENTIS PHARMACEUTICALS INC	EP-38	Aeromatic,T-4,Tablet/Capsule Production				X				2834	30106010	21
786	290950126	AMERICAN INGREDIENTS COMPANY	EP-002-402	GENERAL MIXING & HANDLING-5" VENTURI SCRUBBER VENT				X				2099	30101401	21
787	290950126	AMERICAN INGREDIENTS COMPANY	EP-003-735	6" SCRUBBER BOX VENT (RT-403)				X				2099	30117634	21
788	290950233	MR LONGARM INC	EP1	PULTRUSION MACHINE DIE	X							3089	30101837	21
789	290952006	WIRE ROPE CORPORATION OF AMERICA	EP-24	Tuff-Coating-Extruded Plastic Coating				X				3496	30101809	21
790	290952029	PERMACEL KANSAS CITY INC	8	#5 Baghouse				X				3061	30102601	21
791	290952094	FAULTLESS STARCH/BON AMI COMPANY	EP08	Aerosol Packaging Line				X				2842	30199999	21
792	290952094	FAULTLESS STARCH/BON AMI COMPANY	EP09	Returned Can Venting for Recycling	X							2842	30199999	21
793	290952172	MARTEC SCIENTIFIC	EP1	Pilot Plant Coating	X			X				2834	30106011	21
794	290952172	MARTEC SCIENTIFIC	EP4	Production Scle-Mfg. 1-Drying	X			X				2834	30106009	21
795	290952172	MARTEC SCIENTIFIC	EP7	Production Scale-Mfg 2-Drying	X			X				2834	30106009	21
796	290952202	QUINTILES INC	EP-24B	R&D Pilot Plant-Alcohol Fugatives				X				8731	30106008	21
797	290952224	NEW SURFACE LLC	EP2	Mix/Pour		X							30120601	21
798	290958004	PRECISION MARBLE	1	RESIN & MARBLE MITE MIXER	X								30101816	21
799	290970005	PCS PHOSPHATE COMPANY INC	EP-015	DICAL BUCKET ELEVATOR PCS #3023	X	X						2874	30103003	21
800	290970005	PCS PHOSPHATE COMPANY INC	EP-058	CONVEYOR PCS #4006		X						2874	30103003	21
801	290970005	PCS PHOSPHATE COMPANY INC	EP-057	SECONDARY SCREEN PCS #6098			X					2874	30103003	21
802	290970005	PCS PHOSPHATE COMPANY INC	EP-054	COOLER PCS #6019			X					2874	30103001	21
803	290970005	PCS PHOSPHATE COMPANY INC	EP-051	MILL PCS #6015			X					2874	30102801	21
804	290970005	PCS PHOSPHATE COMPANY INC	EP-049	BUCKET ELEVATOR PCS #6009			X					2874	30103003	21
805	290970005	PCS PHOSPHATE COMPANY INC	EP-048	CONVEYOR PCS #6005			X					2874	30103003	21
806	290970005	PCS PHOSPHATE COMPANY INC	EP-047	DRYER PCS #6004			X					2874	30103001	21
807	290970005	PCS PHOSPHATE COMPANY INC	EP-046	GRANULATOR PCS #6003			X					2874	30103002	21
808	290970005	PCS PHOSPHATE COMPANY INC	EP-023	DICAL CONVEYOR PCS #4008		X						2874	30103003	21
809	290970005	PCS PHOSPHATE COMPANY INC	EP-022	DICAL SCREEN PCS #3034		X						2874	30103003	21
810	290970005	PCS PHOSPHATE COMPANY INC	EP-021	DICAL BUCKET ELEVATOR PCS #3033		X						2874	30103003	21
811	290970005	PCS PHOSPHATE COMPANY INC	EP-020	DICAL CONVEYOR PCS #3031		X						2874	30103003	21
812	290970005	PCS PHOSPHATE COMPANY INC	EP-019	DICAL BUCKET ELEVATOR PCS #3039		X						2874	30103003	21
813	290970005	PCS PHOSPHATE COMPANY INC	EP-018	DICAL CONVEYOR PCS #3038		X						2874	30103003	21
814	290970005	PCS PHOSPHATE COMPANY INC	EP-017	DICAL MILLS PCS #3030		X						2874	30102801	21
815	290970005	PCS PHOSPHATE COMPANY INC	EP-016	DICAL SCREEN PCS #3025		X						2874	30103003	21
816	290970005	PCS PHOSPHATE COMPANY INC	EP-014	DICAL CONVEYOR PCS #3022	X							2874	30103003	21
817	290970005	PCS PHOSPHATE COMPANY INC	EP-013	DICAL DRYER PCS #3020		X						2874	30103001	21
818	290970005	PCS PHOSPHATE COMPANY INC	EP-012	DICAL MIXER PCS #3018		X						2874	30102906	21
819	290970005	PCS PHOSPHATE COMPANY INC	EP-109	BUCKET ELEVATOR PCS #4012B		X						2874	30103003	21
820	290970005	PCS PHOSPHATE COMPANY INC	EP-112	DICAL CONVEYOR PCS #4018B		X						2874	30103003	21
821	290970005	PCS PHOSPHATE COMPANY INC	EP-118	KICE ASPERATOR		X						2874	30103003	21
822	290970005	PCS PHOSPHATE COMPANY INC	EP-121	Conveyor PCS # 4032		X						2874	30103003	21
823	290970005	PCS PHOSPHATE COMPANY INC	EP-145	Conveyor PCS # 4007A		X						2874	30103003	21
824	290970005	PCS PHOSPHATE COMPANY INC	EP-146	Conveyor PCS # 4007B		X						2874	30103003	21
825	290970005	PCS PHOSPHATE COMPANY INC	EP-068	PRODUCT BULK TRUCK BUCKET ELEVATOR PCS #4034		X						2874	30103003	21
826	290970005	PCS PHOSPHATE COMPANY INC	EP-069	PRODUCT BULK TRUCK SCREEN PCS #4035		X						2874	30103003	21
827	290970005	PCS PHOSPHATE COMPANY INC	EP-070	PRODUCT BULK TRUCK CONVEYOR PCS #4036		X						2874	30103003	21
828	290970007	DYNO NOBEL INC	EP6	NITRIC ACID RECOVERY BATCH	X			X				2892	30101022	21
829	290970007	DYNO NOBEL INC	EP5	10-KETTLE CRYSTALLIZER				X				2892	30102705	21
830	290970007	DYNO NOBEL INC	EP4	EVAPORATOR W/DEMISTER				X				2892	30102717	21
831	290970007	DYNO NOBEL INC	EP17	PETN PLANT	X			X				2892	30104101	21
832	290970007	DYNO NOBEL INC	EP18	AMMONIUM NITRATE PLANT (NAL)	X			X				2892	30102704	21
833	290990014	DOW CHEMICAL COMPANY THE	04	EXTRUDED POLYSTYRENE; M/L BAGHOUSE	X							2821	30101811	21

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Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
834	290990014	DOW CHEMICAL COMPANY THE	05	EXTRUDED POLYSTYRENE: 48" LINE BAGHOUSE	X							2821	30101811	21
835	290990014	DOW CHEMICAL COMPANY THE	31	POLYSTYRENE: DIE VENT				X				2821	30101899	21
836	290990014	DOW CHEMICAL COMPANY THE	33	POLYSTYRENE: POLYSTYRENE STORAGE SILO				X				2821	30101811	21
837	290990014	DOW CHEMICAL COMPANY THE	36	POLYSTYRENE: POLYSTYRENE HOPPERS				X				2821	30101811	21
838	290990014	DOW CHEMICAL COMPANY THE	37	POLYSTYRENE: RAILCAR AND HOPPER TRUCKS				X				2821	30101811	21
839	290990092	MASTERCHEM INDUSTIRES INC	WBP3	WATER BASED PRIMER PRODUCTION PROCESS				X				3651	30101401	21
840	290990092	MASTERCHEM INDUSTIRES INC	OBP3	OIL BASED PRIMER PRODUCTION PROCESS				X				3651	30101401	21
841	291010054	MASTER MARBLE INC	EP01	SPRAY SYSTEM #1 GELCOAT BOOTH	X			X				3089	30101861	21
842	291010054	MASTER MARBLE INC	EP03	SPRAY SYSTEM #2 RESIN	X			X				3089	30101861	21
843	291010054	MASTER MARBLE INC	EP04	MIXING VESSEL RESIN	X			X				3089	30101861	21
844	291090004	BCP INGREDIENTS	EP 20-3	AERATED LAGOON (WASTEWATER TREATMENT)		X		X				2833	30182002	21
845	291090004	BCP INGREDIENTS	EP 20-1	SETTLING TANK #1 (WASTEWATER TREATMENT)		X		X				2833	30182002	21
846	291090004	BCP INGREDIENTS	EP 14-1	METHANOL RECOVERY STILL VENT		X		X				2833	30106003	21
847	291090004	BCP INGREDIENTS	EP 13-3	V-13 BUILDING FUGITIVES (CHOLINE SALTS PACKAGING)		X		X				2833	30106099	21
848	291090004	BCP INGREDIENTS	EP 13-1	V-13 VACUUM VENT (CHOLINE SALTS VACUUM DRYING)		X		X				2833	30106001	21
849	291270001	BASF AGRI CHEMICALS	UTIL-04	ASH HANDLING SYSTEM BAGHOUSE VENT	X							2879	30103399	21
850	291270001	BASF AGRI CHEMICALS	TC-05	SODA ASH HANDLING - UNLOADING	X							2879	30103399	21
851	291270001	BASF AGRI CHEMICALS	PR-88	O-XYLENE RAILCAR UNLOADING				X				2879	30103311	21
852	291270001	BASF AGRI CHEMICALS	PR-87	DIETHYL KETONE RAILCAR UNLOADING				X				2879	30103311	21
853	291270001	BASF AGRI CHEMICALS	PR-86	ETHYLENE DICHLORIDE RAILCAR UNLOADING				X				2879	30103311	21
854	291270001	BASF AGRI CHEMICALS	PR-59	DISTILLATION SEAL POT (140-012) VENT				X				2879	30190099	21
855	291270001	BASF AGRI CHEMICALS	PR-56	LOCAL VENTILATION				X				2879	30103311	21
856	291270001	BASF AGRI CHEMICALS	PR-55	PLANT FUME SYSTEM (VENT TO ATMOS)				X				2879	30103311	21
857	291270001	BASF AGRI CHEMICALS	PR-52	COMBUSTION AIR PREHEATER (NATURAL GAS)	X							2879	30190003	21
858	291270001	BASF AGRI CHEMICALS	PR-35	NITRATION SEAL POT VENT (003-055)	X							2879	30190099	21
859	291270001	BASF AGRI CHEMICALS	PR-30	SEAL POT (150-018) VENT	X							2879	30190099	21
860	291270001	BASF AGRI CHEMICALS	PR-22	ALKYL SEPARATOR (150-011) & FILTRATION HOLD TANK (150-100) VENT				X				2879	30103311	21
861	291270001	BASF AGRI CHEMICALS	PR-21	ALKYLATION CATCH TANK (150-030) VENT				X				2879	30103311	21
862	291270001	BASF AGRI CHEMICALS	PR-20	ALKYL SEAL POT VENT (150-004), REACTORS 150-002A/B				X				2879	30103311	21
863	291270001	BASF AGRI CHEMICALS	IMI2-09A	COMBUSTER BYPASS	X							2879	30103311	21
864	291270001	BASF AGRI CHEMICALS	CPC-29	FILLERS & MINIBULK FILLER	X							2879	30199998	21
865	291270001	BASF AGRI CHEMICALS	CPC-24	DRUM FILLER	X							2879	30199998	21
866	291270001	BASF AGRI CHEMICALS	CPC-18	TRUCK LOADING	X							2879	30103399	21
867	291270001	BASF AGRI CHEMICALS	IMI2-09	COMBUSTOR STACK	X							2879	30103311	21
868	291270001	BASF AGRI CHEMICALS	PR-08	NITRIC ACID STORAGE TANK (S) VENT					X			2879	30187006	21
869	291270001	BASF AGRI CHEMICALS	PR-44	A AQUEOUS WASTE TANK (633-003) FLARE				X				2879	30190099	21
870	291270001	BASF AGRI CHEMICALS	PR-47	C INCINERATOR STACK (633-205)	X							2879	30103399	21
871	291270001	BASF AGRI CHEMICALS	PR-53	A INCINERATOR (633-005A)					X			2879	30103399	21
872	291270001	BASF AGRI CHEMICALS	PR-54	B INCINERATOR (633-005B)					X			2879	30103399	21
873	291270001	BASF AGRI CHEMICALS	TC-01	THERMAL OXIDATION SYSTEM STACK					X			2879	30103399	21
874	291270001	BASF AGRI CHEMICALS	PY-06	THERMAL OXIDIZER/SCRUBBER DISCHARGE	X							2879	30103311	21
875	291270001	BASF AGRI CHEMICALS	PY-07	SCRUBBER SYSTEM DISCHARGE				X				2879	30103311	21
876	291270001	BASF AGRI CHEMICALS	PY-13	WASTE TANK ACID-ODOR CONTROL SCRUBBER	X							2879	30103311	21

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877	291270001	BASF AGRI CHEMICALS	SV-01	56% NITRIC ACID STORAGE TANK VENT	X							2879	30187005	21
878	291270001	BASF AGRI CHEMICALS	TC-03	STANDBY FLARE STACK	X							2879	30190023	21
879	291270001	BASF AGRI CHEMICALS	TC-03A	OPEN FLARE	X							2879	30190023	21
880	291270001	BASF AGRI CHEMICALS	PY-04	BUILDING VENT	X							2879	30103311	21
881	291330014	GATES RUBBER COMPANY	10-10B	TACKIFIER UNIT	X			X				3041	30101899	21
882	291330014	GATES RUBBER COMPANY	2A,B	10' HORIZONTAL VULCANIZER	X			X				3041	30101899	21
883	291330014	GATES RUBBER COMPANY	4-4L	RUBBER EXTRUDERS	X			X				3041	30101809	21
884	291330014	GATES RUBBER COMPANY	26	PARTS WASHER (SOLVENT TANKS)	X			X				3041	30101403	21
885	291470023	KAWASAKI MOTORS MFG CORP	IM2	PLASTIC INJECTION MOLDING PROCESS - PE	X							3519	30101807	21
886	291470023	KAWASAKI MOTORS MFG CORP	IM1	PLASTIC INJECTION MOLDING PROCESS - PP	X							3519	30101802	21
887	291570020	FALCON FOAM	2-3-4-24	PRE-EXPANDING	X			X				3089	30101817	21
888	291570020	FALCON FOAM	05-25	CURE AREA	X			X				3089	30101817	21
889	291590004	ADCO INC	EP-01	UTILITY TANK U-1				X				2842	30199999	21
890	291590004	ADCO INC	EP-02	UTILITY TANK U-2				X				2842	30199999	21
891	291590004	ADCO INC	EP-03	BLENDING & UTILITY TANKS				X				2842	30199999	21
892	291590004	ADCO INC	EP-04	MANUFACTURING PLANT				X				2842	30199999	21
893	291590004	ADCO INC	EP-09	MANUFACTURING PLANT				X				2842	30199999	21
894	291590025	WIRE ROPE CORPORATION OF AMERICA INC	EP-04	TUFF-COATER PRE-HEATER				X				3496	30101809	21
895	291610039	MANCHESTER PACKAGING COMPANY	EP-11	HOPPER LOADER TRANSFER SYSTEM	X			X				3089	30101865	21
896	291610039	MANCHESTER PACKAGING COMPANY	EP-10	RAILCAR UNLOADER TRANSFER SYSTEM	X			X				3089	30101865	21
897	291630002	AQUALON DIV OF HERCULES INC	EP076	WASTEWATER TREATMENT VOC FUGITIVES				X				2869	30182002	21
898	291630002	AQUALON DIV OF HERCULES INC	EP070	FULLER DRYER DUST COLLETOR DISCHARGE				X				2869	30104010	21
899	291630002	AQUALON DIV OF HERCULES INC	EP069	SARGENT DRYER SOUTH EXHAUST				X				2869	30101832	21
900	291630002	AQUALON DIV OF HERCULES INC	EP068	SARGENT DRYER NORTH EXHAUST				X				2869	30101832	21
901	291630002	AQUALON DIV OF HERCULES INC	EP066	NITROFORM REACTOR VENT				X				2869	30101832	21
902	291630002	AQUALON DIV OF HERCULES INC	EP065	DOWTHERM A FUGITIVE EMISSIONS	X							2869	30199998	21
903	291630002	AQUALON DIV OF HERCULES INC	EP062-1	ESTER PRODUCTION AND SEPARATION PROCESS	X							2869	30113710	21
904	291630002	AQUALON DIV OF HERCULES INC	EP061	DI PE DRYER VENT STACK	X							2869	30199999	21
905	291630002	AQUALON DIV OF HERCULES INC	EP060	MONO PE DRYER ROTOCLONE STACK	X							2869	30199999	21
906	291630002	AQUALON DIV OF HERCULES INC	EP059	SODIUM FORMATE ROTOCLONE				X				2869	30199999	21
907	291630002	AQUALON DIV OF HERCULES INC	EP058	OSLO CRYSTALLIZER CONDENSER				X				2869	30183001	21
908	291630002	AQUALON DIV OF HERCULES INC	EP050	TECH DRYER BAGGER CYCLONE SEPARATOR				X				2869	30199999	21
909	291630002	AQUALON DIV OF HERCULES INC	EP049	TECH PE ELEVATOR/SILO FUGITIVE				X				2869	30199999	21
910	291630002	AQUALON DIV OF HERCULES INC	EP048	TECH DRYER BAGHOUSE EXHAUST(PENTACRYTHRITOL)				X				2869	30199999	21
911	291630002	AQUALON DIV OF HERCULES INC	EP047	SOUTH CRUDE BELT FILTER VENT	X							2869	30199999	21
912	291630002	AQUALON DIV OF HERCULES INC	EP046	NORTH CRUDE BELT FILTER VENT	X							2869	30199999	21
913	291630002	AQUALON DIV OF HERCULES INC	EP026	METHANOL FUGITIVE EMISSIONS	X							2869	30125004	21
914	291630002	AQUALON DIV OF HERCULES INC	EP016	FORMALDEHYDE ABSORBER VENT	X							2869	30112005	21
915	291630002	AQUALON DIV OF HERCULES INC	EP090	3 EE CONDENSERS (2)	X							2869	30199998	21
916	291630002	AQUALON DIV OF HERCULES INC	EP092	DI PE TRANSFERS (3)	X							2869	30199999	21
917	291630002	AQUALON DIV OF HERCULES INC	EP094	MONO PE BAGGING	X							2869	30199999	21
918	291630002	AQUALON DIV OF HERCULES INC	EP096	UREA SILO	X							2869	30104007	21
919	291630002	AQUALON DIV OF HERCULES INC	EP097	UREA SCALE TANK	X							2869	30104007	21
920	291630031	DYNO NOBEL INC	E13	PRILL BULK LOADOUT				X				2873	30102709	21
921	291630031	DYNO NOBEL INC	E12	PRILL REMELT EVAPORATOR				X				2873	30102727	21
922	291630031	DYNO NOBEL INC	E11	#2 PRILL COOLER				X				2873	30102724	21
923	291630031	DYNO NOBEL INC	E10	#2 PRILL DRYER				X				2873	30102725	21
924	291630031	DYNO NOBEL INC	E09	#2 PRILL PREDRYER				X				2873	30102725	21
925	291630031	DYNO NOBEL INC	E08	#1 PRILL COOLER				X				2873	30102724	21

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926	291630031	DYNO NOBEL INC	E07	#1 PRILL DRYER				X				2873	30102725	21
927	291630031	DYNO NOBEL INC	E06	#1 PRILL PREDRYER				X				2873	30102725	21
928	291630031	DYNO NOBEL INC	E05	PRILLING TOWER				X				2873	30102722	21
929	291630031	DYNO NOBEL INC	E04	PRILL EVAPORATOR				X				2873	30102727	21
930	291630031	DYNO NOBEL INC	E03	AMMONIUM NITRATE NEUT.				X				2873	30102704	21
931	291650028	WOODBRIDGE CORPORATION	EP-16	SOLVENT RELEASE AGENT (APPLICATION AND STORAGE) FOR MDI LINE	X			X				3086	30102699	21
932	291770037	ORBSEAL LLC	EP9	SEALANT AND ADHESIVE EXTRUDERS				X				2891	30101821	21
933	291830029	RECKITT BENCKISER	04	MIXING TANKS-FRAGRANCE OILS		X						2842	30188801	21
934	291830029	RECKITT BENCKISER	06	CRYSTAL AIR FRESHENER PROCESS	X							2842	30188801	21
935	291830029	RECKITT BENCKISER	07	TRANSFER PROCESS		X						2842	30188801	21
936	291830029	RECKITT BENCKISER	08	TRI SODIUM CITRATE VACUUM TRANSFER	X							2842	30188801	21
937	291830029	RECKITT BENCKISER	09	POTASSIUM TRIPOLYPHOSPHATE VAC TRANSFER	X							2842	30188801	21
938	291830029	RECKITT BENCKISER	11	MERLIN PROCESS - MIXING EMISSIONS	X							2842	30188801	21
939	291830110	ZOLTEK CORPORATION	EP08	CCL OX THERMAL OXIDIZER	X							2299	30102432	21
940	291830110	ZOLTEK CORPORATION	EP09	INTERNAL ROLL OXIDIZERS	X							2299	30102499	21
941	291830129	WOODBRIDGE CORPORATION	16	SOLVENT RELEASE AGENT	X			X				3086	30102699	21
942	291830129	WOODBRIDGE CORPORATION	19	ANTI-FLAME RETARDANT	X			X				3086	30102614	21
943	291890020	MONSANTO WORLD HEADQUARTERS	002	RESEARCH FACILITY OPERATIONS	X			X				2869	30188805	21
944	291890032	PHARMACIA	002	RESEARCH FACILITY OPERATIONS		X		X				2869	30188805	21
945	291890035	ROCKWOOD PIGMENTS NA INC	003	CALCINERS				X				2816	30103599	21
946	291890035	ROCKWOOD PIGMENTS NA INC	004	YMA				X				2816	30103552	21
947	291890035	ROCKWOOD PIGMENTS NA INC	006	REACTORS/STORAGE TANKS				X				2816	30103599	21
948	291890035	ROCKWOOD PIGMENTS NA INC	007	DRYERS				X				2816	30103553	21
949	291890035	ROCKWOOD PIGMENTS NA INC	017	TMA				X				2816	30103552	21
950	291890221	PM RESOURCES	007	LIQUID PESTICIDE FORMULATION PROCESS				x				2834	30103399	21
951	291890221	PM RESOURCES	008	LIQUID PHARMACEUTICAL FORMULATION PROCESS				x				2834	30106022	21
952	291890221	PM RESOURCES	009	LIQUID CUPRIC BROMIDE PRODUCTION PROCESS				x				2834	30101010	21
953	291890263	WOHL COATINGS CO	001	PAINT MIXING				X				2851	30101401	21
954	291890287	VANGUARD PLASTICS INC	002	BUBBLE EXTRUSION VENTS				X				2751	30101899	21
955	291890315	FLEX-O-LITE INC	001	PAINT MIXING				X				3231	30101401	21
956	291890321	LHB INDUSTRIES	004	BATCHING				X				2851	30101401	21
957	291890321	LHB INDUSTRIES	005	DRUM MIXING				X				2851	30101401	21
958	291890321	LHB INDUSTRIES	006	FILLING LIQUID				X				2851	30101460	21
959	291890321	LHB INDUSTRIES	007	FILLING PROPELLANT				X				2851	30101499	21
960	291890321	LHB INDUSTRIES	009	DISTILLATION				X				2851	30101499	21
961	291890321	LHB INDUSTRIES	012	TESTING				X				2851	30101499	21
962	291890321	LHB INDUSTRIES	014	LIQUID MIXING AND FILLING				X				2851	30101460	21
963	291890327	CAMIE-CAMPBELL INC	E1	ADHESIVE MIXING	X			X					30101499	21
964	291890327	CAMIE-CAMPBELL INC	E2	LUBRICANTS AND CLEANERS	X			X					30101499	21
965	291890327	CAMIE-CAMPBELL INC	E3	SPRAY BOOTH FOR QC	X			X					30101499	21
966	291891015	KV PHARMACEUTICAL COMPANY	1	BEAD COATING	X							2834	30106011	21
967	291891047	KV PHARMACEUTICAL COMPANY	1	GRAN. & BLENDING	X							2834	30106012	21
968	291891047	KV PHARMACEUTICAL COMPANY	2	TABLET COATING	X							2834	30106011	21
969	291891097	REICHHOLD CHEMICALS INC	FP5	DRIP AND FILTER PRESS PANS	X							2821	30188801	21
970	291891097	REICHHOLD CHEMICALS INC	FP7	DUST FROM SOLID RAW MATERIALS, BAGGED	X							2821	30183001	21
971	291891097	REICHHOLD CHEMICALS INC	RL2	RESIN PRODUCT BULK LOADOUT	X							2821	30199999	21
972	291891097	REICHHOLD CHEMICALS INC	RP-1	RESIN PRODUCTION, REACTORS	X							2821	30101818	21
973	291891097	REICHHOLD CHEMICALS INC	RP-2	RESIN PRODUCTION, THIN TANKS				X				2821	30101839	21
974	291891097	REICHHOLD CHEMICALS INC	WW-1	WASTEWATER STREAM STRIPPING	X							2821	30101899	21

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BART Tabular Response

Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
975	291891097	REICHHOLD CHEMICALS INC	RP-4	RESIN PRODUCTION - REACTORS WITHOUT SCRUBBERS	X							2821	30101819	21
976	291891097	REICHHOLD CHEMICALS INC	RP1A	RESIN PROD-REACTORS W/SCRUBBER, T.O.DOWN	X							2821	30101820	21
977	291891097	REICHHOLD CHEMICALS INC	RP2A	RESIN PROD - THIN TANKS T.O. DOWN	X							2821	30101840	21
978	291891097	REICHHOLD CHEMICALS INC	RP4A	RESIN PROD, REACTORS W/O SCRUBBERS - T.O. DOWN	X							2821	30101821	21
979	291891097	REICHHOLD CHEMICALS INC	WW-4	WASTE WATER OPEN SUMP	X							2821	30182011	21
980	291891147	THERMO SCIENCE INC	001	MIXING LOSS				X				3569	30101401	21
981	291891201	FUTURA COATINGS INC	001	POLYURETHANE PAINT PRODUCTION				X				2851	30101401	21
982	291891201	FUTURA COATINGS INC	006	CLEAN UP SOLVENTS				X				2851	30101470	21
983	291891201	FUTURA COATINGS INC	004	SILICONE PRODUCTION				X				2851	30102630	21
984	291891204	WHITMIRE MICROGEN RESEARCH LABORATORY	013-A	BLENDING LOSS (VOC)				X				2879	30103399	21
985	291891204	WHITMIRE MICROGEN RESEARCH LABORATORY	014-A	PROPELLANT FILL LOSS (VOC), LINE 1				X				2879	30103311	21
986	291891204	WHITMIRE MICROGEN RESEARCH LABORATORY	014-C	PROPELLANT VENTING LOSS (VOC), LINE 1				X				2879	30103311	21
987	291891204	WHITMIRE MICROGEN RESEARCH LABORATORY	015-A	PROPELLANT FILLING LOSS (VOC), LINE 2				X				2879	30103311	21
988	291891204	WHITMIRE MICROGEN RESEARCH LABORATORY	015-B	PROPELLANT VENT LOSS (VOC), LINE 2				X				2879	30103311	21
989	291891204	WHITMIRE MICROGEN RESEARCH LABORATORY	022-A	EMISSIONS FROM LEAKING CANS (VOC)				X				2879	30103311	21
990	291891204	WHITMIRE MICROGEN RESEARCH LABORATORY	023-A	PUNCTURING OF SCRAP CANS (VOC)				X				2879	30103311	21
991	291891204	WHITMIRE MICROGEN RESEARCH LABORATORY	029-A	GAS HOUSE VACUUM PUMP EMISSIONS				X				2879	30103311	21
992	291891301	RELIABLE BIOPHARMACEUTICAL	001	REACTION/STIRRING BINS	X								30106002	21
993	291891301	RELIABLE BIOPHARMACEUTICAL	004	BUECHNER FUNNEL FILTERS	X								30106004	21
994	291891301	RELIABLE BIOPHARMACEUTICAL	005	CONE/SHELF DRYERS	X								30106001	21
995	291891301	RELIABLE BIOPHARMACEUTICAL	006	CHARGING BINS, NUCLEOSIDES	X								30106010	21
996	291891301	RELIABLE BIOPHARMACEUTICAL	007	DISSOLUTION/PRECIPITATION	X								30106002	21
997	291891301	RELIABLE BIOPHARMACEUTICAL	008	WATER VACUUM DRYER/LYOPHILIZER	X								30106001	21
998	291891301	RELIABLE BIOPHARMACEUTICAL	009	ORGANIC REACTORS	X								30106002	21
999	291891301	RELIABLE BIOPHARMACEUTICAL	010	ROTARY EVAPORATOR/DISTILLATION UNITS	X								30106003	21
1000	291891301	RELIABLE BIOPHARMACEUTICAL	011	CRYSTALLIZATION/PRECIPITATION	X								30106007	21
1001	291891301	RELIABLE BIOPHARMACEUTICAL	013	ELUANT BINS, SILICA	X								30106010	21
1002	291891301	RELIABLE BIOPHARMACEUTICAL	014	SOLVENT DISPENSING	X								30106021	21
1003	291891301	RELIABLE BIOPHARMACEUTICAL	016	GLASSWARE RINSING	X								30106022	21
1004	291891465	FLEMING & CO	001	TIME-RELEASE CAPSULE MANUFACTURING	X								30106011	21
1005	291891492	COBITCO INC	001	PKG. LIQUIDS & AEROSOLS				X				2842	30199998	21
1006	292070007	AMES TRUE TEMPER INC	EP9	PULTRUSION LINE	X							2499	30101837	21
1007	292130007	ROYAL OAK ENTERPRISES	EP-54	BAGGING BRIQUETTES	X							2861	30100508	21
1008	292250025	YORK CASKETS - MISSOURI	EP-2D	PAINT & DYE MIXING AREA				X				3995	30101401	21
1009	295100017	MALLINCKRODT INC.	EP 0281	Plant 6; RESIDUAL FUEL OIL #6 T-601 FUGITIVES				X				2869	30188805	21
1010	295100017	MALLINCKRODT INC.	EP 0411	BLDG. 505; IOVERSOL; D-300 SPRAY DRYER				X				2869	30199999	21
1011	295100017	MALLINCKRODT INC.	EP 0422	BLDG. 505; IOVERSOL; PIPING (FUGITIVE)				X				2869	30199999	21
1012	295100017	MALLINCKRODT INC.	EP 0426	BLDG. 505; IOVERSOL; T-860 MeOH Still				X				2869	30199999	21
1013	295100017	MALLINCKRODT INC.	EP 0905	Bldg 200W; DIESTER; T-6 DIESTER SLURRY TANK				X				2869	30199999	21
1014	295100017	MALLINCKRODT INC.	EP 0917	Bldg 200W; TRIIODOAMIDE PAN DRYER				X				2869	30199999	21
1015	295100017	MALLINCKRODT INC.	EP 0936	Bldg 200W; TRIIODOAMIDE; GRANULATOR				X				2869	30199999	21
1016	295100017	MALLINCKRODT INC.	EP 0940	Bldg 200W; DIESTER PIPING FUGITIVES				X				2869	30199999	21
1017	295100017	MALLINCKRODT INC.	EP 1003	Bldg 235; PRODUCT O; T-303 VENT				X				2869	30199999	21

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Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
1018	295100017	MALLINCKRODT INC.	EP 1004	Bldg 235; PRODUCT B; RECEIVER T-304				X				2869	30199999	21
1019	295100017	MALLINCKRODT INC.	EP 1005	Bldg 235; PRODUCT B; REACTOR T-305				X				2869	30199999	21
1020	295100017	MALLINCKRODT INC.	EP 1007	Bldg 235; PRODUCT B; REACTOR T-306				X				2869	30199999	21
1021	295100017	MALLINCKRODT INC.	EP 1008	Bldg 235; PRODUCT B;REACTOR T-307				X				2869	30199999	21
1022	295100017	MALLINCKRODT INC.	EP 1011	Bldg 235; PRODUCT J; SOLIDS HANDLING				X				2869	30199999	21
1023	295100017	MALLINCKRODT INC.	EP 1012	Bldg 235; PRODUCT B; LIQUID HANDLING				X				2869	30199999	21
1024	295100017	MALLINCKRODT INC.	EP 1111	Process Sewers				X				2869	30182002	21
1025	295100017	MALLINCKRODT INC.	EP 1116	Plant 1 COOLING TOWER - Bldg 27				X				2869	30199998	21
1026	295100017	MALLINCKRODT INC.	EP 1117	Plant 2 COOLING TOWER - Bldg 504 & 505				X				2869	30199998	21
1027	295100017	MALLINCKRODT INC.	EP 1118	Plant 5 COOLING TOWER - Bldg 213				X				2869	30199998	21
1028	295100017	MALLINCKRODT INC.	EP 1157	Maintenance; Plant-WIDE GLYCOL CHILLER LOOP				X				2869	30180001	21
1029	295100017	MALLINCKRODT INC.	EP 1620	Bldg 10; POTASSIUM IODIDE; COMPACTOR/SIFTER				X				2869	30199999	21
1030	295100017	MALLINCKRODT INC.	EP 1925	Bldg 222S; MAKEUP TANK T-300				X				2869	30199999	21
1031	295100017	MALLINCKRODT INC.	EP 1938	Bldg 222S; SIFTER				X				2869	30199999	21
1032	295100017	MALLINCKRODT INC.	EP 1807	BLDG. 260; PRODUCT E; T-369				X				2869	30199999	21
1033	295100017	MALLINCKRODT INC.	EP 1947	Bldg 222S; CENTRIFUGE				X				2869	30199999	21
1034	295100017	MALLINCKRODT INC.	EP 2400	Bldg 250; PRODUCT YQ-3-E; EFR DRYER				X				2869	30199999	21
1035	295100017	MALLINCKRODT INC.	EP 2406	Bldg 250; PRODUCT YQ-2-E; TANK 4 VENT				X				2869	30199999	21
1036	295100017	MALLINCKRODT INC.	EP 2415A/B	Bldg 250; PRODUCT ZN - M;DRYER 4/5				X				2869	30199999	21
1037	295100017	MALLINCKRODT INC.	EP 2415C	Bldg 250; PRODUCT ZI - M;DRYER				X				2869	30199999	21
1038	295100017	MALLINCKRODT INC.	EP 2419	Bldg 250; PRODUCT ZN - M;TANK 307				X				2869	30199999	21
1039	295100017	MALLINCKRODT INC.	EP 2424	Bldg 250; PRODUCT ZN - M;TANK 320-2 VENT				X				2869	30199999	21
1040	295100017	MALLINCKRODT INC.	EP 2425	Bldg 250; PRODUCT ZN - M;TANK 302-3 VENT				X				2869	30199999	21
1041	295100017	MALLINCKRODT INC.	EP 2427	Bldg 250; PRODUCT M - L;T-353				X				2869	30199999	21
1042	295100017	MALLINCKRODT INC.	EP 2428	Bldg 250; PRODUCT M - L;LARGE LINE CENTRIFUGE				X				2869	30199999	21
1043	295100017	MALLINCKRODT INC.	EP 2437	Bldg 250; PRODUCT ZN - M;TANK 301 VENT				X				2869	30199999	21
1044	295100017	MALLINCKRODT INC.	EP 2438	Bldg 250; PRODUCT ZN -M;T-302				X				2869	30199999	21
1045	295100017	MALLINCKRODT INC.	EP 2443	Bldg 250; PRODUCTYQ-4-E;TANK 6 VENT				X				2869	30199999	21
1046	295100017	MALLINCKRODT INC.	EP 2444	Bldg 250; PRODUCT M - L;TANK 318				X				2869	30199999	21
1047	295100017	MALLINCKRODT INC.	EP 2445	Bldg 250; PRODUCT C - M; T-311				X				2869	30199999	21
1048	295100017	MALLINCKRODT INC.	EP 2447	Bldg 250; PRODUCT M - L;T-351				X				2869	30199999	21
1049	295100017	MALLINCKRODT INC.	EP 2448	Bldg 250; PRODUCT M - L;TANK 352 CONDENSER VENT				X				2869	30199999	21
1050	295100017	MALLINCKRODT INC.	EP 2471	Bldg 250; PRODUCT C - M;CENTRIFUGE				X				2869	30199999	21
1051	295100017	MALLINCKRODT INC.	EP 2482	Bldg 250; PRODUCT M - L;DRUMS				X				2869	30199999	21
1052	295100017	MALLINCKRODT INC.	EP 2484	Bldg 250; PRODUCT M - L;FUG.LARGE LINE DRUMS				X				2869	30199999	21
1053	295100017	MALLINCKRODT INC.	EP 2486	Bldg 250; PRODUCT ZN - M;FFUG MAIN LINE DRUMS				X				2869	30199999	21
1054	295100017	MALLINCKRODT INC.	EP 2488	Bldg 250; PRODUCT ZN - M;T-301 FUGITIVES FROM DRU				X				2869	30199999	21
1055	295100017	MALLINCKRODT INC.	EP 2490	Bldg 250; PRODUCT YQ-2-E;FUGITIVE PIPING COMPONENT				X				2869	30199999	21
1056	295100017	MALLINCKRODT INC.	EP 2492	Bldg 250; PRODUCT F - L;FUG,PIPING COMPONENTS				X				2869	30182002	21
1057	295100017	MALLINCKRODT INC.	EP 2497	Bldg 250; MILLING; FITZ MILL				X				2869	30199999	21
1058	295100017	MALLINCKRODT INC.	EP 2502	Bldg 504; IOVERSOL; REACTOR RX-100				X				2869	30199999	21
1059	295100017	MALLINCKRODT INC.	EP 2505	Bldg 504; IOVERSOL; REACTOR RX-154				X				2869	30199999	21
1060	295100017	MALLINCKRODT INC.	EP 2550	Bldg 504; IOVERSOL; SUM OF FUGITIVE EMISSIONS				X				2869	30199999	21
1061	295100017	MALLINCKRODT INC.	EP 2704	BLDG. 507; MP-104; HYDROGENATOR RX-230				X				2869	30199999	21
1062	295100017	MALLINCKRODT INC.	EP 2705	BLDG. 507; MP-104; T-234 RDA HOLD TANK				X				2869	30199999	21
1063	295100017	MALLINCKRODT INC.	EP 2711	BLDG. 507; MP-104; RX-320 NO.1 IODINATOR				X				2869	30199999	21

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1064	295100017	MALLINCKRODT INC.	EP 2712	BLDG. 507; MP-104; RX-330 NO.2 IODINATOR				X				2869	30199999	21
1065	295100017	MALLINCKRODT INC.	EP 2713	BLDG. 507; MP-104; RX-340 NO.3 IODINATOR				X				2869	30199999	21
1066	295100017	MALLINCKRODT INC.	EP 2722	BLDG. 507; MP-104; FUG. EMISS. FROM PIPING				X				2869	30199999	21
1067	295100017	MALLINCKRODT INC.	EP 2723	BLDG. 507; MP-104; D-440 DRYER				X				2869	30199999	21
1068	295100017	MALLINCKRODT INC.	EP 2728	BLDG. 507; MP-104; FUGITIVES CF410/420 DIG.				X				2869	30199999	21
1069	295100017	MALLINCKRODT INC.	EP 2729	BLDG. 507; MP-104; FUGITIVE D-440 DRYER CHARGER				X				2869	30199999	21
1070	295100017	MALLINCKRODT INC.	EP 2801	Bldg 97; Reactor T3001; Product B				X				2869	30199999	21
1071	295100017	MALLINCKRODT INC.	EP 2802	Bldg 97; Feed Tank T3002; Product B				X				2869	30199999	21
1072	295100017	MALLINCKRODT INC.	EP 2803	Bldg 97; Receiver T3003; Product B				X				2869	30199999	21
1073	295100017	MALLINCKRODT INC.	EP 2809	Bldg 97; Reactor/Still T3012; Product F				X				2869	30199999	21
1074	295100017	MALLINCKRODT INC.	EP 2813	Bldg 97; Tray Dryer; Product F				X				2869	30199999	21
1075	295100017	MALLINCKRODT INC.	EP 2901	Bldg 223; BLENDING/PACKAGING				X				2869	30199999	21
1076	295100017	MALLINCKRODT INC.	EP 2911	Bldg 223; MILLING/PACKAGING				X				2869	30199999	21
1077	295100017	MALLINCKRODT INC.	EP 2915	Bldg 223; CRUSHER				X				2869	30199999	21
1078	295100017	MALLINCKRODT INC.	EP 2919	Bldg 223; STEAM TRAY DRYER 1				X				2869	30199999	21
1079	295100017	MALLINCKRODT INC.	EP 2921	Bldg 223; MILL LOW SPEED				X				2869	30199999	21
1080	295100017	MALLINCKRODT INC.	EP 2925	Bldg 223; SIFTER				X				2869	30199999	21
1081	295100017	MALLINCKRODT INC.	EP 6050	Bldg 6&7; SOLV EXTRACT;T-360				X				2869	30199999	21
1082	295100017	MALLINCKRODT INC.	EP 6059	Bldg 6&7; SOLV EXTRACT;T-366				X				2869	30199999	21
1083	295100017	MALLINCKRODT INC.	EP 6061	Bldg 6&7; SOLV EXTRACT;T-367				X				2869	30199999	21
1084	295100017	MALLINCKRODT INC.	EP 6062	Bldg 6&7; SOLV EXTRACT;T-365				X				2869	30199999	21
1085	295100017	MALLINCKRODT INC.	EP 6064	Bldg 6&7; SOLV EXTRACT;T-357				X				2869	30199999	21
1086	295100017	MALLINCKRODT INC.	EP 6065	Bldg 6&7; SOLV EXTRACT;T-358				X				2869	30199999	21
1087	295100017	MALLINCKRODT INC.	EP 6070	Bldg 6&7; SOLV EXTRACT;T-359				X				2869	30199999	21
1088	295100017	MALLINCKRODT INC.	EP 6102	Bldg 6&7; NAT EXTRACT SOLV; T-226				X				2869	30199999	21
1089	295100017	MALLINCKRODT INC.	EP 6103	Bldg 6&7; NAT EXTRACT SOLV; T-227				X				2869	30199999	21
1090	295100017	MALLINCKRODT INC.	EP 6104	Bldg 6&7; NAT EXT SOLV;FUG. PUMPS, VALVES, FLANGE				X				2869	30199999	21
1091	295100017	MALLINCKRODT INC.	EP 6150	Bldg 6&7; EAST FINISH;CENTIFUGE 6-4-E				X				2869	30199999	21
1092	295100017	MALLINCKRODT INC.	EP 6152	Bldg 6&7; WEST FINISH;DRYER-N 6-4-W				X				2869	30199999	21
1093	295100017	MALLINCKRODT INC.	EP 6153	Bldg 6&7; WEST FINISH;DRYER-S 6-4-W				X				2869	30199999	21
1094	295100017	MALLINCKRODT INC.	EP 6156	Bldg 6&7; EAST FINISH;DRYER 6-4-E				X				2869	30199999	21
1095	295100017	MALLINCKRODT INC.	EP 6157	Bldg 6&7; EAST FINISH;DRYER 6-4-E				X				2869	30199999	21
1096	295100017	MALLINCKRODT INC.	EP 6158	Bldg 6&7; EAST FINISH;DRYER 6-4-E				X				2869	30199999	21
1097	295100017	MALLINCKRODT INC.	EP 6160	Bldg 6&7; EAST FINISH;T-387				X				2869	30199999	21
1098	295100017	MALLINCKRODT INC.	EP 6162	Bldg 6&7; WEST FINISH;T-396				X				2869	30199999	21
1099	295100017	MALLINCKRODT INC.	EP 6164	Bldg 6&7; EAST FINISH;T-379				X				2869	30199999	21
1100	295100017	MALLINCKRODT INC.	EP 6201	Bldg 6&7; SOLV EXTRACT;T-317				X				2869	30199999	21
1101	295100017	MALLINCKRODT INC.	EP 6202	Bldg 6&7; SOLV EXTRACT;T-340				X				2869	30199999	21
1102	295100017	MALLINCKRODT INC.	EP 6205	Bldg 6&7; SOLV EXTRACT;T-363				X				2869	30199999	21
1103	295100017	MALLINCKRODT INC.	EP 6206	Bldg 6&7; SOLV EXTRACT;T-314				X				2869	30199999	21
1104	295100017	MALLINCKRODT INC.	EP 6207	Bldg 6&7; SOLV EXTRACT;T-318				X				2869	30199999	21
1105	295100017	MALLINCKRODT INC.	EP 6210	Bldg 6&7; SOLV EXTRACT;T-312				X				2869	30199999	21
1106	295100017	MALLINCKRODT INC.	EP 6251	Bldg 6&7; ;T-335				X				2869	30199999	21
1107	295100017	MALLINCKRODT INC.	EP 6253	Bldg 6&7; ;T-369				X				2869	30199999	21
1108	295100017	MALLINCKRODT INC.	EP 6264	Bldg 6&7;DRUM LOADING				X				2869	30199999	21
1109	295100017	MALLINCKRODT INC.	EP 6303	Bldg 6&7; LIME TREAT;T-309				X				2869	30199999	21
1110	295100017	MALLINCKRODT INC.	EP 6360	Bldg 6&7;PRECIP; DRYER				X				2869	30199999	21
1111	295100017	MALLINCKRODT INC.	EP 6400	Bldg 6&7; CONVERSION;T-400				X				2869	30199999	21
1112	295100017	MALLINCKRODT INC.	EP 6401	Bldg 6&7; CONVERSION;T-401				X				2869	30199999	21
1113	295100017	MALLINCKRODT INC.	EP 6402	Bldg 6&7; CONVERSION;T-402				X				2869	30199999	21
1114	295100017	MALLINCKRODT INC.	EP 6403	Bldg 6&7; CONVERSION;T-403				X				2869	30199999	21
1115	295100017	MALLINCKRODT INC.	EP 6461	Bldg 6&7; ALCOHOL RECOV;T-651				X				2869	30199999	21

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1116	295100017	MALLINCKRODT INC.	EP 1812	BLDG. 260; PRODUCT E; CENTRIFUGE CF-001				X				2869	30199999	21
1117	295100017	MALLINCKRODT INC.	EP 0975	Plant 5; ACETIC ANHYDRIDE STORAGE TANK T 050 FUGIT				X				2869	30188805	21
1118	295100017	MALLINCKRODT INC.	EP 1816	BLDG. 260; PRODUCT E; PIPING FUGITIVES				X				2869	30199999	21
1119	295100017	MALLINCKRODT INC.	EP 1002	Bldg 235; PRODUCT J; RECEIVER T-302				X				2869	30199999	21
1120	295100017	MALLINCKRODT INC.	EP 2857	Bldg 97; Drum Fugitives; Product F				X				2869	30199999	21
1121	295100017	MALLINCKRODT INC.	EP 1024	Bldg 235; PRODUCT M; REACTOR T-324				X				2869	30199999	21
1122	295100017	MALLINCKRODT INC.	EP 2859	Bldg 97; Reactor T3052; Product R				X				2869	30199999	21
1123	295100017	MALLINCKRODT INC.	EP 1027	Bldg 235; PRODUCT H; REACTOR T-328				X				2869	30199999	21
1124	295100017	MALLINCKRODT INC.	EP 1031	Bldg 235; PRODUCT H; VACUUM DRYER				X				2869	30199999	21
1125	295100017	MALLINCKRODT INC.	EP 1091	Bldg 235; PRODUCT O; DESPATCH DRYER				X				2869	30199999	21
1126	295100017	MALLINCKRODT INC.	EP 1093	Bldg 235; PRODUCT H; T-322				X				2869	30199999	21
1127	295100017	MALLINCKRODT INC.	EP 2416A/B	Bldg 250; PRODUCT R - M;DRYER D-950D-951				X				2869	30199999	21
1128	295100017	MALLINCKRODT INC.	EP 0214	Plant 1; ETHYL ALCOHOL STORAGE TK T-111 FUGITIVES				X				2869	30188805	21
1129	295100017	MALLINCKRODT INC.	EP 0216	Plant 1; TOLUENE STORAGE TANK T-112 FUGITIVES				X				2869	30188805	21
1130	295100017	MALLINCKRODT INC.	EP 1123	Bldg 512; Wastewater Hazardous Waste Tank, T-1336				X				2869	30199998	21
1131	295100017	MALLINCKRODT INC.	EP 0054	Bldg 512; Steam Stripper, Cond & Scrubber -CL-1315				X				2869	30182002	21
1132	295100017	MALLINCKRODT INC.	EP 2463	BLDG. 250; ALL PRODUCTS; T-355 REACTOR				X				2869	30199999	21
1133	295100017	MALLINCKRODT INC.	EP 2464	BLDG. 250; ALL PRODUCTS; T-354 REACTOR				X				2869	30199999	21
1134	295100017	MALLINCKRODT INC.	EP 1970	BLDG. 222 A-TANK 12 (SO2)				X				2869	30199999	21
1135	295100017	MALLINCKRODT INC.	EP 0924	BLDG. 200W; T-11				X				2869	30199999	21
1136	295100017	MALLINCKRODT INC.	EP 1972	BLDG 222A- TANK 14				X				2869	30199999	21
1137	295100017	MALLINCKRODT INC.	EP 2503	ASI; BLDG. 504; IOVERSOL RX-103				X				2869	30199999	21
1138	295100017	MALLINCKRODT INC.	EP 2514	ASI; Bldg 504; IOVERSOL; REACTOR RX-285				X				2869	30199999	21
1139	295100017	MALLINCKRODT INC.	EP 2516	ASI; Bldg 504; IOVERSOL; RX-259				X				2869	30199999	21
1140	295100017	MALLINCKRODT INC.	EP 2535	ASI; Bldg 504; IOVERSOL; CL-430-A				X				2869	30199999	21
1141	295100017	MALLINCKRODT INC.	EP 6482	Bldg 6/7; Wastewater Decanter Tank, T-5004				X				2869	30182002	21
1142	295100017	MALLINCKRODT INC.	EP 0134	BLDG X; SIFTER 137				X				2869	30199999	21
1143	295100017	MALLINCKRODT INC.	EP 6107	BLDG. 6&7; EXTRACTION COLUMN				X				2869	30199999	21
1144	295100017	MALLINCKRODT INC.	EP 6109	BLDG. 6&7; T-252 CHLOROFORM SETTLING TANK				X				2869	30199999	21
1145	295100017	MALLINCKRODT INC.	EP 6454	BLDG. 6&7; T-323				X				2869	30199999	21
1146	295100017	MALLINCKRODT INC.	EP 2550	ROSEMUND BAY; PIPING FUGITIVES				X				2869	30199999	21
1147	295100017	MALLINCKRODT INC.	EP 0101	Bldg X; MILL #1 COMBUSTION PRODUCTS				X				2869	30199999	21
1148	295100017	MALLINCKRODT INC.	EP 0102	Bldg X; MILL #2 NATURAL GAS COMBUSTION				X				2869	30199999	21
1149	295100017	MALLINCKRODT INC.	EP 0103	Bldg X; MILL #3 NATURAL GAS COMBUSTION				X				2869	30199999	21
1150	295100017	MALLINCKRODT INC.	EP 0104	Bldg X; PRODUCT HOPPER/COLLECTOR				X				2869	30199999	21
1151	295100017	MALLINCKRODT INC.	EP 0107	BLDG X; TANK EXHAUST (PM)				X				2869	30199999	21
1152	295100017	MALLINCKRODT INC.	EP 0108	BLDG X; TANK 2 EXHAUST (PM)				X				2869	30199999	21
1153	295100017	MALLINCKRODT INC.	EP 0109	Bldg X; TANK 3 EXHAUST				X				2869	30199999	21
1154	295100017	MALLINCKRODT INC.	EP 0908	BLDG. 200W; T-8				X				2869	30199999	21
1155	295100017	MALLINCKRODT INC.	EP 0400	BLDG. 505; IOVERSOL; T-850 METHANOL STILL				X				2869	30199999	21
1156	295100017	MALLINCKRODT INC.	EP 0406	BLDG. 505; IOVERSOL; D-800 SPRAY DRYER				X				2869	30199999	21
1157	295100017	MALLINCKRODT INC.	EP 1082	Bldg 235; Wastewater Decanter Tank, T-5003				X				2869	30182002	21
1158	295100017	MALLINCKRODT INC.	EP 2734	BLDG. 507; MP-104; FUGITIVE (SALT CHARGING)				X				2869	30199999	21
1159	295100023	SOLUTIA INC	D25	SKYDROL TM LD-4 (WEST BLEND TANK, IT 1600 BLENDING				X				2869	30199998	21
1160	295100023	SOLUTIA INC	D26	SKYDROL TM 500G-4(EAST BLEND TANK,IT-1640) BLENDIN				X				2869	30199998	21

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1161	295100023	SOLUTIA INC	M05	BRIQUETTER/SIFTER				X				2869	30110004	21
1162	295100023	SOLUTIA INC	M06	MALAEIC ANDHYDRIDE BAGGER EXHAUSE				X				2869	30110099	21
1163	295100023	SOLUTIA INC	M09	FUGITIVE EMISSIONS - MALAIC ANHYDRIDE				X				2869	30110080	21
1164	295100023	SOLUTIA INC	Y02	MALEIC ANHYDRIDE FUGITIVE EMISSIONS				X				2869	30188805	21
1165	295100023	SOLUTIA INC	P29	FUGITIVE EMISSIONS - METHANOL				X				2869	30110080	21
1166	295100023	SOLUTIA INC	P07	METHANOL STILL COLUNM				X				2869	30183001	21
1167	295100024	RHODIA INC	EP0000	ASPIRIN VACUUM SYSTEM			X					2834	30106099	21
1168	295100024	RHODIA INC	EP1400	ASPIRIN FUME SCRUBBER			X					2834	30106008	21
1169	295100024	RHODIA INC	EP1500	AREA DUST COLLECTOR (305)			X					2834	30106010	21
1170	295100024	RHODIA INC	EP1510	DRY STORAGE BLENDER (#317)			X					2834	30106010	21
1171	295100024	RHODIA INC	EP2000	PACKAGING DUST COLLECTOR (#1705)			X					2834	30106099	21
1172	295100024	RHODIA INC	EP3000	DUST COLLECTOR (#1435)			X					2834	30106010	21
1173	295100024	RHODIA INC	EP3100	ASPIRIN STORAGE BIN DUST COLLECTOR (#101/104)			X					2834	30106010	21
1174	295100024	RHODIA INC	EP9100	ASPIRIN FUGITIVE EMISSIONS			X					2834	30188805	21
1175	295100024	RHODIA INC	EP9800	TANK FARM FUGITIVE EMISSIONS			X					2834	30188805	21
1176	295100057	PROCTER & GAMBLE	128	Baghouse/Fluid Bed Dryer	X			X				2841	30100999	21
1177	295100057	PROCTER & GAMBLE	146	North Perborate Admix Receiver Use Bin	X			X				2841	30100999	21
1178	295100057	PROCTER & GAMBLE	151	Tub Dump				X				2841	30100999	21
1179	295100057	PROCTER & GAMBLE	152	North Making Filter				X				2841	30100999	21
1180	295100057	PROCTER & GAMBLE	153	South Making Filter				X				2841	30100999	21
1181	295100057	PROCTER & GAMBLE	157	Carton Riddling				X				2841	30100999	21
1182	295100057	PROCTER & GAMBLE	218	Dust Control for all MKg. & Pkg.				X				2841	30100999	21
1183	295100057	PROCTER & GAMBLE	502	Phosphate Use Bin				X				2841	30100999	21
1184	295100063	DIAL CORP	10A	Spray Drying Tower Baghouse	X							2841	30100901	21
1185	295100063	DIAL CORP	10B	SPRAY DRYING TOWER	X							2841	30190003	21
1186	295100063	DIAL CORP	1B	West Railcar unloading, soda ash, silo bin	X							2841	30102122	21
1187	295100063	DIAL CORP	1C	RAILCAR UNLOADING NACO3	X							2841	30102122	21
1188	295100063	DIAL CORP	25	DRY PACKAGING LINES L6&7	X							2841	30100910	21
1189	295100063	DIAL CORP	26	DRY PACKAGING LINES L8&9	X							2841	30100910	21
1190	295100063	DIAL CORP	27	DRY PACKAGING LINES 10 AND 11	X							2841	30100910	21
1191	295100063	DIAL CORP	28	Process Dust Collector	X							2841	30100910	21
1192	295100063	DIAL CORP	29	PRODUCT COOLER DUST COLL.	X							2841	30100910	21
1193	295100063	DIAL CORP	2A	RAILCAR UNLOADING OF SODIUM CHLORIDE	X							2841	30100910	21
1194	295100063	DIAL CORP	2C	Salt Transfer Silo to Run Bin (Rotary)	X							2841	30100910	21
1195	295100063	DIAL CORP	3B	DOSEX AREA NACL TO RUNNING BIN	X							2841	30100999	21
1196	295100063	DIAL CORP	7	DOSEX AREA 5 WEIGHT BINS	X							2841	30100910	21
1197	295100063	DIAL CORP	9	SULFONATION REACTORS	X							2841	30113210	21
1198	295100066	ELEMENTIS SPECIALTIES INC	1	CLAY STORAGE SILOS				X				2816	30103554	21
1199	295100066	ELEMENTIS SPECIALTIES INC	10	FLASH DRYER #2 - COMBUSTION				X				2816	30103553	21
1200	295100066	ELEMENTIS SPECIALTIES INC	12	BENTONE PNEUMATIC TRANSFER				X				2816	30103554	21
1201	295100066	ELEMENTIS SPECIALTIES INC	13	BENTONE PACKING BAGHOUSE				X				2816	30103554	21
1202	295100066	ELEMENTIS SPECIALTIES INC	2	DAY SILO				X				2816	30103554	21
1203	295100066	ELEMENTIS SPECIALTIES INC	27	PASTE DRUMMING STATION: XYLENE PRODUCTS				X				2816	30112199	21
1204	295100066	ELEMENTIS SPECIALTIES INC	29	BENTONE GEL REACTOR - PM10 EMISSION				X				2816	30101401	21
1205	295100066	ELEMENTIS SPECIALTIES INC	45	BENTONE DISPERSION TANKS				X				2816	30103554	21
1206	295100066	ELEMENTIS SPECIALTIES INC	47	BENTONE PACKING SYSTEM				X				2816	30103554	21
1207	295100066	ELEMENTIS SPECIALTIES INC	51	P & G DRUM LIQUID PUMP ROOM VENT				X				2816	30112199	21
1208	295100066	ELEMENTIS SPECIALTIES INC	61	BENTONE BAG DUMP STATION				X				2816	30103554	21
1209	295100066	ELEMENTIS SPECIALTIES INC	62	RECEIVING HOPPER/PACKER - NORTH BAGHOUSE				X				2816	30103554	21
1210	295100066	ELEMENTIS SPECIALTIES INC	63	RECEIVING HOPPER/PACKER - SOUTH BAGHOUSE				X				2816	30103554	21
1211	295100066	ELEMENTIS SPECIALTIES INC	9	FLASH DRYER #1 - COMBUSTION				X				2816	30103553	21
1212	295100066	ELEMENTIS SPECIALTIES INC	11	BENTONE MILLING				X				2816	30103552	21

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1213	295100066	ELEMENTIS SPECIALTIES INC	36	BENTONE SEAL WATER/HOT WATER TANK				X				2816	30112199	21
1214	295100066	ELEMENTIS SPECIALTIES INC	37	AMETEK VACUUM PUMP EXHAUST GAS				X				2816	30112199	21
1215	295100066	ELEMENTIS SPECIALTIES INC	38	EIMCO VACUUM PUMP EXHAUST GAS				X				2816	30112199	21
1216	295100066	ELEMENTIS SPECIALTIES INC	39	PARKSON FILTER EXHAUST GAS VENT				X				2816	30112199	21
1217	295100066	ELEMENTIS SPECIALTIES INC	55	BENTONE REACTION TANKS EXHAUST GAS VENT				X				2816	30112199	21
1218	295100070	ASTARIS LLC	EP-03	ACID PLANT ABSORBER	X							2819	30101705	21
1219	295100070	ASTARIS LLC	EP-17	NO. 7,8 STP DRYERS	X							2819	30199999	21
1220	295100070	ASTARIS LLC	EP-18	STP BRINKS				X				2819	30199999	21
1221	295100070	ASTARIS LLC	EP-19	STP GRANULAR	X							2819	30199999	21
1222	295100070	ASTARIS LLC	EP-28	MCP REACTOR				X				2819	30199999	21
1223	295100070	ASTARIS LLC	EP-31	MCP SEPARATOR				X				2819	30199999	21
1224	295100070	ASTARIS LLC	EP-35	DCP MILL				X				2819	30199999	21
1225	295100070	ASTARIS LLC	EP-36	TCP/TMP WET MIX TANK				X				2819	30199999	21
1226	295100070	ASTARIS LLC	EP-39	NO. 1+2 TCP DRYER				X				2819	30199999	21
1227	295100070	ASTARIS LLC	EP-40	NO. 3&4 TCP DRYER				X				2819	30199999	21
1228	295100070	ASTARIS LLC	EP-41	NUMBER 5 TCP DRYER				X				2819	30199999	21
1229	295100070	ASTARIS LLC	EP-42	TCP IMP MILL				X				2819	30199999	21
1230	295100070	ASTARIS LLC	EP-43	TCP BLENDERS & PACKERS	X							2819	30199999	21
1231	295100070	ASTARIS LLC	EP-49	MCPA/SALP MIXER	X							2819	30199999	21
1232	295100070	ASTARIS LLC	EP-50	MCPA/SALP CONVEYOR				X				2819	30199999	21
1233	295100070	ASTARIS LLC	EP-52	MCPA/SALP FLUIDIZER	X							2819	30199999	21
1234	295100070	ASTARIS LLC	EP-54	CALCIUM PHOSPHATE BAGS	X							2819	30199999	21
1235	295100070	ASTARIS LLC	EP-63	STP PACKING DUST COLLECTOR	X							2819	30199999	21
1236	295100070	ASTARIS LLC	EP-73	DCP WET MIX TANKS	X							2819	30199999	21
1237	295100070	ASTARIS LLC	EP-87	SODA ASH UNLOADING	X							2819	30199999	21
1238	295100070	ASTARIS LLC	EP-88	LIME UNLOADING	X							2819	30199999	21
1239	295100070	ASTARIS LLC	EP-09	ADJUSTING TANKS	X							2819	30101799	21
1240	295100070	ASTARIS LLC	EP-14	STP REACTOR	X							2819	30199999	21
1241	295100070	ASTARIS LLC	EP-15	NO. 1,2,3 STP DRYERS	X							2819	30199999	21
1242	295100070	ASTARIS LLC	EP-16	NO. 4,5,6 STP DRYERS	X							2819	30199999	21
1243	295100070	ASTARIS LLC	EP-04	CRUDE ACID TANK	X							2819	30101799	21
1244	295100070	ASTARIS LLC	EP-93	D20 SOUTH MIXER	X							2819	30199999	21
1245	295100070	ASTARIS LLC	EP-94	D20 SOUTH MILL	X							2819	30199999	21
1246	295100071	MOZEL INC	EP-101	FILLER 1			X					2899	30101499	21
1247	295100071	MOZEL INC	EP-104	FILLER #4			X					2899	30101499	21
1248	295100071	MOZEL INC	EP-105	FILLER #5			X					2899	30101499	21
1249	295100071	MOZEL INC	EP-106	FILLER #6			X					2899	30101499	21
1250	295100071	MOZEL INC	EP-107	FILLER #7			X					2899	30101499	21
1251	295100071	MOZEL INC	EP-108	FILLER #8			X					2899	30101499	21
1252	295100071	MOZEL INC	EP-110	FILLER # 10			X					2899	30101499	21
1253	295100071	MOZEL INC	EP-112	FILLER #12			X					2899	30101499	21
1254	295100071	MOZEL INC	EP-16	MIXING TANK 16			X					2899	30101499	21
1255	295100071	MOZEL INC	EP-17	MIXING TANK #17			X					2899	30101499	21
1256	295100071	MOZEL INC	EP-22	MIXING TANK 22			X					2899	30101499	21
1257	295100071	MOZEL INC	EP-6	MIXING TANK #6			X					2899	30101499	21
1258	295100071	MOZEL INC	EP-7	MIXING TANK #7			X					2899	30101499	21
1259	295100071	MOZEL INC	EP-27	MIXING TANK #27			X					2899	30101499	21
1260	295100071	MOZEL INC	EP-28	MIXING TANK #28			X					2899	30101499	21
1261	295100071	MOZEL INC	EP-500	REMEDIATION EQUIPMENT			X					2899	30101499	21
1262	295100096	P D GEORGE CO (THE)	1	EPOXY BLENDING - FUGITIVE EMISSIONS				X				2851	30101401	21
1263	295100096	P D GEORGE CO (THE)	10	SHIPPING CONTAINER FILLING				X				2851	30199998	21
1264	295100096	P D GEORGE CO (THE)	6	VESSEL CLEANING-FUGITIVE EMISSIONS				X				2851	30199999	21
1265	295100096	P D GEORGE CO (THE)	7	REACTOR: CONDENSER VENT (8 REACTORS GROUPED)				X				2851	30101827	21
1266	295100096	P D GEORGE CO (THE)	8	THINNING TANKS				X				2851	30101839	21

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1267	295100096	P D GEORGE CO (THE)	2	VARNISH BLENDING-FUGITIVE EMISSIONS				X				2851	30101599	21
1268	295100097	U S PAINT DIV OF GROW GROUP	EP 2	FUGITIVE EMISSIONS FROM GENERAL MIXING AND HANDLIN				X				2851	30101401	21
1269	295100098	STERLING LACQUER MFG	E17 - 20	STEEL DRUMS				X				2851	30101401	21
1270	295100098	STERLING LACQUER MFG	E11	MIXING AND BLENDING TANKS (FIXED AND PORTABLE)				X				2851	30101401	21
1271	295100098	STERLING LACQUER MFG	E13	TOTE TANKS, STEEL DRUMS AND CAN FILLING				X				2851	30101401	21
1272	295100161	POLY ONE CORPORATION	EP106	LACQUER dept. reactors-fugitive emissions	X			X				2851	30101401	21
1273	295100161	POLY ONE CORPORATION	EP 104	LACQUER DEPT MIXING HANDLING FUGITIVE	X			X				2851	30101403	21
1274	295100161	POLY ONE CORPORATION	EP 105	BALL & SAND MILLS-FUGITIVE EMISSIONS	X			X				2851	30101432	21
1275	295100269	SENSIENT COLORS INC	EP 20	SULFONATION REACTORS AND TANKS	X			X				2087	30112199	21
1276	295100269	SENSIENT COLORS INC	EP 24	LAKE NIRO 1 SPRAY DRYER	X			X				2087	30112199	21
1277	295100269	SENSIENT COLORS INC	EP 29	LAKE NIRO 11 SPRAY DRYER	X			X				2087	30112199	21
1278	295100269	SENSIENT COLORS INC	EP 30	NIRO II SPRAY DRYER	X			X				2087	30112199	21
1279	295100269	SENSIENT COLORS INC	EP 05	NIRO I SPRAY DRYER				X				2087	30112199	21
1280	295100269	SENSIENT COLORS INC	EP 09	BEPEX DRYER	X			X				2087	30112199	21
1281	295100269	SENSIENT COLORS INC	EP 14	RED #3 PLANT BUTANOL VACUUM DISTILLATION/CONDENSAT	X			X				2087	30112199	21
1282	295100953	BAYER CROPSCIENCE	EP07	SPRAY DRYER EXHAUST				X				2879	30103399	21
1283	295100953	BAYER CROPSCIENCE	EP08	FLUID BED DRYER EXHAUST				X				2879	30103399	21
1284	295101077	MID-WEST INDUSTRIAL CHEMICAL	EP9	9 SOLVENT ADHESIVE MIXTURES				X				2891	30101401	21
1285	295101216	U S POLYMERS	EP1	VARNISH COOKING (2)				X				2851	30101502	21
1286	295101216	U S POLYMERS	EP 49	PROCESS TANK, PT 3				X				2851	30101839	21
1287	295101216	U S POLYMERS	EP-4	ALKYD BATCH REACTOR, R-1				X				2851	30101838	21
1288	295101216	U S POLYMERS	EP-5	RESIN THINNING TANK TT1				X				2851	30101839	21
1289	295101216	U S POLYMERS	EP-6	RESIN THINNING TANK, TT2				X				2851	30101839	21
1290	295101216	U S POLYMERS	EP-46	FUGITIVE EQUIPMENT LEAK				X				2851	30101899	21
1291	295101216	U S POLYMERS	EP-47	FUGITIVE MATERIAL HANDLING SOLIDS				X				2851	30101899	21
1292	295101357	WILLERT HOME PRODUCTS	EP-07	SOLID STORAGE IN DRUMS, MIX FOR PROCESSING				X					30130108	21
1293	295101519	PERMACEL ST. LOUIS INC	EP-02	RUBBER MIXING #15				X				3293	30102614	21
1294	295101519	PERMACEL ST. LOUIS INC	EP-03	RUBBER MIXING #6				X				3293	30102614	21
1295	295101519	PERMACEL ST. LOUIS INC	EP-21	MIXERS #1-7				X				3293	30102614	21
1296	295102428	OMEGA PROTEIN INC	EP-1	TRUCK LOADING SPOUT				X				2875	30188801	21
1297	295102428	OMEGA PROTEIN INC	EP-3	FISH MEAL HANDLING INSIDE OF BUILDING				X				2875	30188801	21
1298	295102428	OMEGA PROTEIN INC	EP-4	FISH MEAL BAGGING				X				2875	30188801	21
1299	295100003	ANHEUSER-BUSCH INC	B08 Biogas	BOILER #8 BIOGAS FIRED 99MM BTU/HR	X			X				2082	10200799	22
1300	295100003	ANHEUSER-BUSCH INC	B09 Biogas	BOILER #9 BIOGAS FIRED 99MM BTU/HR	X							2082	10200799	22
1301	290190005	MAGELLAN PIPELINE COMPANY LLC	09	TANK #1444	X	X						4613	40301021	23
1302	290190005	MAGELLAN PIPELINE COMPANY LLC	08	TANK #1421		X						4613	40400111	23
1303	290190005	MAGELLAN PIPELINE COMPANY LLC	07	TANK #843		X						4613	40400111	23
1304	290190005	MAGELLAN PIPELINE COMPANY LLC	05	TANK #786		X						4613	40400111	23
1305	290190005	MAGELLAN PIPELINE COMPANY LLC	04	TANK #785		X						4613	40400111	23
1306	290190005	MAGELLAN PIPELINE COMPANY LLC	02	TANK #191		X						4613	40400108	23
1307	290310083	TRANS MONTAIGNE PRODUCT SERVICES INC	5	INTERNAL FLOATING ROOF STORAGE TANK - GASOLINE		X				X		5171	40301151	23
1308	290310083	TRANS MONTAIGNE PRODUCT SERVICES INC	4	FIXED ROOF STORAGE TANK - #2 DIESEL FUEL		X				X		5171	40301021	23
1309	290310083	TRANS MONTAIGNE PRODUCT SERVICES INC	3	FIXED ROOF STORAGE TANK - #2 DIESEL FUEL		X				X		5171	40301021	23
1310	290310083	TRANS MONTAIGNE PRODUCT SERVICES INC	2	INTERNAL FLOATING ROOF STORAGE TANK - GASOLINE		X				X		5171	40301151	23
1311	290310083	TRANS MONTAIGNE PRODUCT SERVICES INC	1	INTERNAL FLOATING ROOF STORAGE TANK - GASOLINE		X				X		5171	40301151	23

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BART Tabular Response

Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
1312	290310083	TRANS MONTAIGNE PRODUCT SERVICES INC	FUG	FUGITIVE SOURCES		X				X		5171	40400151	23
1313	290330001	SINCLAIR OIL CORP	EP01	TANK 3201- BREATHING & WORKING LOSS	X							4613	40400111	23
1314	290330001	SINCLAIR OIL CORP	EP09	TANK 3240-- WORKING & BREATHING LOSS	X							4613	40301099	23
1315	290330001	SINCLAIR OIL CORP	EP08	TANK 3239 -WORKING & BREATHING LOSS	X							4613	40301099	23
1316	290330001	SINCLAIR OIL CORP	EP06	TANK 3212 - ORGANIC LIQUID STORAGE	X							4613	40400111	23
1317	290330001	SINCLAIR OIL CORP	EP05	TANK 3209 - BREATHING & WORKING LOSS	X							4613	40400205	23
1318	290330001	SINCLAIR OIL CORP	EP04	TANK 3204-ORGANIC LIQUID STORAGE	X							4613	40400111	23
1319	290330001	SINCLAIR OIL CORP	EP03	TANK 3203 - BREATHING & WORKING LOSS	X							4613	40301019	23
1320	290330001	SINCLAIR OIL CORP	EP02	TANK 3202-BREATHING & WORKING LOSS	X							4613	40301021	23
1321	290370031	BP PIPELINES NORTH AMERICA INC	6698	EXTERNAL FLOATING ROOF TANK	X							4612	40301117	23
1322	290370031	BP PIPELINES NORTH AMERICA INC	6699	EXTERNAL FLOATING ROOF TANK	X							4612	40301117	23
1323	290370031	BP PIPELINES NORTH AMERICA INC	6733	EXTERNAL FLOATING ROOF TANK	X							4612	40301117	23
1324	290370031	BP PIPELINES NORTH AMERICA INC	6735	EXTERNAL FLOATING ROOF TANK	X							4612	40301117	23
1325	290370031	BP PIPELINES NORTH AMERICA INC	6931	EXTERNAL FLOATING ROOF TANK	X							4612	40301117	23
1326	290370031	BP PIPELINES NORTH AMERICA INC	6936	EXTERNAL FLOATING ROOF TANK	X							4612	40301117	23
1327	290370031	BP PIPELINES NORTH AMERICA INC	6952	EXTERNAL FLOATING ROOF TANK	X							4612	40301117	23
1328	290370031	BP PIPELINES NORTH AMERICA INC	7079	EXTERNAL FLOATING ROOF TANK	X							4612	40301117	23
1329	290370031	BP PIPELINES NORTH AMERICA INC	7080	EXTERNAL FLOATING ROOF TANK	X							4612	40301117	23
1330	290410013	SALISBURY STATION PLATTE PIPE LINE CO	807	CRUDE OIL STORAGE TANK-EXT.	X							5172	40301132	23
1331	290410013	SALISBURY STATION PLATTE PIPE LINE CO	806	CRUDE OIL STORAGE TANK-EXT.	X							5172	40301132	23
1332	290410013	SALISBURY STATION PLATTE PIPE LINE CO	805	CRUDE OIL STORAGE TANK-EXT.	X							5172	40301132	23
1333	290410013	SALISBURY STATION PLATTE PIPE LINE CO	804	CRUDE OIL STORAGE TANK-EXT.	X							5172	40301132	23
1334	290410013	SALISBURY STATION PLATTE PIPE LINE CO	803	CRUDE OIL STORAGE TANK-EXT.	X							5172	40301132	23
1335	290410013	SALISBURY STATION PLATTE PIPE LINE CO	802	CRUDE OIL STORAGE TANK-EXT.	X							5172	40301132	23
1336	290410013	SALISBURY STATION PLATTE PIPE LINE CO	801	CRUDE OIL STORAGE TANK-EXT.	X							5172	40301132	23
1337	290410015	BP PIPELINES NORTH AMERICA INC	1310	EXT. FLOATING ROOF TANK WITH PRIMARY SEAL				X				4613	40301117	23
1338	290410015	BP PIPELINES NORTH AMERICA INC	1309	EXT. FLOATING ROOF TANK WITH PRIMARY SEAL				X				4613	40301117	23
1339	290410015	BP PIPELINES NORTH AMERICA INC	1308	EXT. FLOATING ROOF TANK WITH PRIMARY SEAL	X							4613	40301132	23
1340	290410015	BP PIPELINES NORTH AMERICA INC	1307	EXT. FLOATING ROOF TANK WITH PRIMARY SEAL	X							4613	40301132	23
1341	290410015	BP PIPELINES NORTH AMERICA INC	1306	EXT. FLOATING ROOF TANK WITH PRIMARY SEAL	X							4613	40301132	23
1342	290410015	BP PIPELINES NORTH AMERICA INC	1305	EXT. FLOATING ROOF TANK WITH PRIMARY SEAL	X							4613	40301132	23
1343	290410015	BP PIPELINES NORTH AMERICA INC	1304	EXT. FLOATING ROOF TANK WITH PRIMARY SEAL	X							4613	40301132	23
1344	290410015	BP PIPELINES NORTH AMERICA INC	1302	EXT. FLOATING ROOF TANK WITH PRIMARY SEAL	X							4613	40301132	23
1345	290490016	UNITED COOPERATIVE INC	EP-03	GASOLINE (AST) - ETHANOL				X				5172	40400107	23
1346	290490016	UNITED COOPERATIVE INC	EP-02	GASOLINE (AST)				X				5172	40400108	23
1347	290510042	PHILLIPS PIPELINE COMPANY	EP09	TANK 4203 (GASOLINE)	X			X		X		5171	40400111	23
1348	290510042	PHILLIPS PIPELINE COMPANY	EP08	TANK 4202 (GASOLINE)	X			X		X		5171	40400111	23
1349	290510042	PHILLIPS PIPELINE COMPANY	EP07	TANK 4101 (KEROSENE)	X			X		X		5171	40301018	23
1350	290510042	PHILLIPS PIPELINE COMPANY	EP06	TANK 4010 (GASOLINE)	X			X		X		5171	40400111	23

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Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
1351	290510042	PHILLIPS PIPELINE COMPANY	EP05	TANK 4009 (GASOLINE)	X			X		X		5171	40400111	23
1352	290510042	PHILLIPS PIPELINE COMPANY	EP03	TANK 4005 (GASOLINE)	X			X		X		5171	40400132	23
1353	290510042	PHILLIPS PIPELINE COMPANY	EP02	PROPANE LOADING RACK	X			X				5171	40400250	23
1354	290510042	PHILLIPS PIPELINE COMPANY	EP01	PETROLEUM LIQUID LOADING RACK	X			X				5171	40400250	23
1355	290510042	PHILLIPS PIPELINE COMPANY	EP22	VAPOR COMBUSTOR UNIT	X			X				5171	40400250	23
1356	290510042	PHILLIPS PIPELINE COMPANY	EP29	VENTING PROPANE FOR MISCELLANEOUS MAINTENANCE EVENTS				X				5171	40400199	23
1357	290770116	MAGELLAN PIPELINE COMPANY LLC	010	TANK #1510	X	X						4613	40400111	23
1358	290770116	MAGELLAN PIPELINE COMPANY LLC	008	TANK #121		X						4613	40400108	23
1359	290770116	MAGELLAN PIPELINE COMPANY LLC	007	TANK #6017		X						4613	40400111	23
1360	290770116	MAGELLAN PIPELINE COMPANY LLC	006	TANK #6016		X						4613	40301021	23
1361	290770116	MAGELLAN PIPELINE COMPANY LLC	005	TANK #4003		X						4613	40400111	23
1362	290770116	MAGELLAN PIPELINE COMPANY LLC	004	TANK #4002		X						4613	40400111	23
1363	290770116	MAGELLAN PIPELINE COMPANY LLC	003	TANK #4001		X						4613	40400111	23
1364	290770116	MAGELLAN PIPELINE COMPANY LLC	002	TANK #796		X						4613	40301021	23
1365	290770116	MAGELLAN PIPELINE COMPANY LLC	011	TANK #1511	X	X						4613	40301019	23
1366	290810021	KOCH PIPELINE COMPANY LP	TK4	TANK #330 CRUDE OIL BREAK-OUT STORAGE - WORKING AND BREATHING LOSSES.				X				4612	40301142	23
1367	290810021	KOCH PIPELINE COMPANY LP	TK3	TANK #320 CRUDE OIL BREAK-OUT STORAGE - WORKING AND BREATHING LOSSES.				X				4612	40301142	23
1368	290810021	KOCH PIPELINE COMPANY LP	TK2	TANK #310 CRUDE OIL BREAK-OUT STORAGE - WORKING AND BREATHING LOSSES				X				4612	40301142	23
1369	290810021	KOCH PIPELINE COMPANY LP	TK1	TANK #300 CRUDE OIL BREAK-OUT STORAGE - WORKING AND BREATHING LOSSES				X				4612	40301142	23
1370	290950002	BP PRODUCTS NORTH AMERICA INC	115	FLOATING ROOF TANK				X				5171	40301105	23
1371	290950002	BP PRODUCTS NORTH AMERICA INC	330	FIXED ROOF TANK				X				5171	40301020	23
1372	290950002	BP PRODUCTS NORTH AMERICA INC	331	FIXED ROOF TANK				X				5171	40301020	23
1373	290950002	BP PRODUCTS NORTH AMERICA INC	333	FLOATING ROOF TANK				X				5171	40301105	23
1374	290950002	BP PRODUCTS NORTH AMERICA INC	334	FIXED ROOF TANK				X				5171	40301017	23
1375	290950002	BP PRODUCTS NORTH AMERICA INC	351	FLOATING ROOF TANK				X				5171	40301198	23
1376	290950002	BP PRODUCTS NORTH AMERICA INC	340	FLOATING ROOF TANK				X				5171	40301108	23
1377	290950002	BP PRODUCTS NORTH AMERICA INC	339	FIXED ROOF TANK				X				5171	40301019	23
1378	290950002	BP PRODUCTS NORTH AMERICA INC	338	FLOATING ROOF TANK				X				5171	40301105	23
1379	290950002	BP PRODUCTS NORTH AMERICA INC	337	FLOATING ROOF TANK				X				5171	40301108	23
1380	290950002	BP PRODUCTS NORTH AMERICA INC	336	FLOATING ROOF TANK				X				5171	40301105	23
1381	290950002	BP PRODUCTS NORTH AMERICA INC	335	FIXED ROOF TANK				X				5171	40301020	23
1382	290950240	KOCH MATERIALS COMPANY	EP-06	LOADING RACKS				X				5171	40400250	23
1383	290950240	KOCH MATERIALS COMPANY	EP-07	ASPHALT OIL STORAGE TANK				X				5171	40301022	23
1384	290950240	KOCH MATERIALS COMPANY	EP-08	ASPHALT OIL STORAGE TANK				X				5171	40301022	23
1385	290970079	MAGELLAN PIPELINE COMPANY	006	Tank 6019		X						4613	40301021	23

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1386	290970079	MAGELLAN PIPELINE COMPANY	005	Tank 6018		X						4613	40301021	23
1387	290970079	MAGELLAN PIPELINE COMPANY	004	Tank 1427		X						4613	40400111	23
1388	290970079	MAGELLAN PIPELINE COMPANY	003	Tank 797		X						4613	40400111	23
1389	290990018	HOME SERVICE OIL COMPANY INC	EP2	STORAGE TANKS				X				5171	40301019	23
1390	291090036	CONOCOPHILLIPS CO	GR	GENERAL PRODUCT LOADING RACK	X							5171	40400150	23
1391	291090036	CONOCOPHILLIPS CO	FUG	PLANT FUGITIVE EMISSIONS	X							5171	40400151	23
1392	291090036	CONOCOPHILLIPS CO	314	GASOLINE (RVP 9: RVP 15)				X				5171	40400117	23
1393	291090036	CONOCOPHILLIPS CO	311	GASOLINE (RVP 9:RVP 15)	X							5171	40400160	23
1394	291090036	CONOCOPHILLIPS CO	310	TRANSMIX STORAGE TANK	X							5171	40400160	23
1395	291090036	CONOCOPHILLIPS CO	303	GASOLINE (RVP 13)	X							5171	40400160	23
1396	291090036	CONOCOPHILLIPS CO	302	TRANSMIX STORAGE TANK	X							5171	40400160	23
1397	291090036	CONOCOPHILLIPS CO	301	Distillate Fuel Oil No. 2	X							5171	40400179	23
1398	291090036	CONOCOPHILLIPS CO	FLARE 1	LOADING RACK FLARE	X							5171	40400153	23
1399	291090036	CONOCOPHILLIPS CO	LPG FLARE	LPG Loading Operation	X							5171	40400153	23
1400	291250008	CONOCOPHILLIPS CO	GR	GASOLINE LOADING RACK				X				5172	40400150	23
1401	291250008	CONOCOPHILLIPS CO	FUG	PLANT FUGITIVE EMISSIONS	X							5172	40400151	23
1402	291250008	CONOCOPHILLIPS CO	521	MIDGRADE UNLEADED STORAGE TANK				X				5172	40400160	23
1403	291250008	CONOCOPHILLIPS CO	512	NO. 2 DIESEL FUEL STORAGE TANK				X				5172	40400122	23
1404	291250008	CONOCOPHILLIPS CO	511	REGULAR UNLEADED STORAGE TANK	X							5172	40400160	23
1405	291250008	CONOCOPHILLIPS CO	504	REGULAR UNLEADED STORAGE TANK-RVP10	X							5172	40400160	23
1406	291250008	CONOCOPHILLIPS CO	502	TRANSMIX STORAGE TANK	X							5172	40400160	23
1407	291250008	CONOCOPHILLIPS CO	FLARE 1	LOADING OPERATIONS	X							5172	40400153	23
1408	291250008	CONOCOPHILLIPS CO	LPG FLARE	LPG LOADING OPERATIONS				X				5172	40400153	23
1409	291270002	MAGELLAN PIPELINE COMPANY LLC	8	TANK #1395		X						4613	40301021	23
1410	291270002	MAGELLAN PIPELINE COMPANY LLC	6	TANK #1394		X						4613	40400111	23
1411	291270002	MAGELLAN PIPELINE COMPANY LLC	5	TANK #1396		X						4613	40400111	23
1412	291270002	MAGELLAN PIPELINE COMPANY LLC	4	TANK #699		X						4613	40400111	23
1413	291270002	MAGELLAN PIPELINE COMPANY LLC	3	TANK #194		X						4613	40400108	23
1414	291650015	CONOCOPHILLIPS CO	GAS RACK	GASOLINE LOADING RACK	X	X	X	X				5171	40400150	23
1415	291650015	CONOCOPHILLIPS CO	FUG	PLANT FUGITIVE EMISSIONS	X	X	X	X				5171	40400151	23
1416	291650015	CONOCOPHILLIPS CO	T6	TRANSMIX STORAGE TANK	X	X	X	X				5171	40400160	23
1417	291650015	CONOCOPHILLIPS CO	T4	DISTILLATE FUEL OIL NO. 2	X	X	X	X				5171	40400179	23
1418	291650015	CONOCOPHILLIPS CO	T3	GASOLINE (RVP9:RVP15)	X	X	X	X				5171	40400160	23
1419	291650015	CONOCOPHILLIPS CO	T2	GASOLINE (RVP9:RVP15)	X	X	X	X				5171	40400160	23
1420	291650015	CONOCOPHILLIPS CO	T1	GASOLINE (RVP9:RVP15)	X	X	X	X				5171	40400160	23
1421	291650015	CONOCOPHILLIPS CO	FLARE 1	LOADING RACK FLARE	X	X	X	X				5171	40400153	23
1422	291650015	CONOCOPHILLIPS CO	T10	DISTILLATE FUEL OIL NO. 1 GASOLINE (RVP9:RVP15)	X	X	X	X				5171	40400160	23
1423	291650015	CONOCOPHILLIPS CO	TRL	TANK ROOF LANDING	X	X	X	X				5171	40400107	23
1424	291652418	ALLIED AVIATION.SERVICE CO OF KC INC	C-1,C-2	(2) 336,000 gallon jet fuel AST				X		X		5172	40301113	23
1425	291652418	ALLIED AVIATION.SERVICE CO OF KC INC	A,B,D,E	210,000gal Jet Fuel ASTS				X		X		5172	40301113	23
1426	291830023	MAGELLAN TERMINAL HOLDINGS LP	007	TANK #124		X		X				5171	40301115	23
1427	291830023	MAGELLAN TERMINAL HOLDINGS LP	004	TANK #123		X		X				5171	40400111	23
1428	291830023	MAGELLAN TERMINAL HOLDINGS LP	003	TANK #791		X		X				5171	40400111	23
1429	291830023	MAGELLAN TERMINAL HOLDINGS LP	002	TANK #1422		X		X				5171	40400111	23
1430	291890141	ENERGY PETROLEUM COMPANY	10	GASOLINE WORKING LOSS				X				5171	40400108	23
1431	291890141	ENERGY PETROLEUM COMPANY	12	GASOLINE BREATHING LOSS				X				5171	40400102	23
1432	292010018	TEPPCO	EP5	FUGITIVE EMISSIONS	X							4613	40400251	23
1433	291590009	PITTSBURGH-CORNING CORP	S-32	UNLOADING DUST COLLECTORS	X							3296	30501222	25

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Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
1434	291590009	PITTSBURGH-CORNING CORP	S-24	ANNEALING ROOF EXHAUSTERS				X				3296	30501214	25
1435	291590009	PITTSBURGH-CORNING CORP	S-16	SCRAP HAUL ROUTES	X							3296	30501222	25
1436	291590009	PITTSBURGH-CORNING CORP	S-13C	TAR POTS	X							3296	30501299	25
1437	291590009	PITTSBURGH-CORNING CORP	S-13	DUST COLLECTORS #1 & 13, POINT SOURCE, C-13A & B	X							3296	30501299	25
1438	291590009	PITTSBURGH-CORNING CORP	S-12	DC #14 & DC #19	X							3296	30501299	25
1439	291590009	PITTSBURGH-CORNING CORP	S-11	CELLULATING ROOF VENTS				X				3296	30501299	25
1440	291590009	PITTSBURGH-CORNING CORP	S-10	FURNACE STACKS, POINT SOURCE				X				3296	30501214	25
1441	291590009	PITTSBURGH-CORNING CORP	S-09	DC #4	X							3296	30501221	25
1442	291590009	PITTSBURGH-CORNING CORP	S-06A	TANK #4 STACK	X							3296	30501211	25
1443	291590009	PITTSBURGH-CORNING CORP	S-04	BATCH HAUL ROUTE (BINS)	X							3296	30501222	25
1444	291590009	PITTSBURGH-CORNING CORP	S-01A	SAND TRUCK UNLOADING FUGITIVES	X							3296	30501221	25
1445	290350004	ROYAL OAK ENTERPRISES	EP02	UNLOAD KILN/LOAD TRUCKS				X				2861	30100606	26
1446	290350004	ROYAL OAK ENTERPRISES	EP01-1	CHARCOAL KILNS				X				2861	30100603	26
1447	290350004	ROYAL OAK ENTERPRISES	EP01-2	CHARCOAL KILNS				X				2861	30100603	26
1448	290350004	ROYAL OAK ENTERPRISES	EP01-3	CHARCOAL KILNS				X				2861	30100603	26
1449	290350004	ROYAL OAK ENTERPRISES	EP01-4	CHARCOAL KILNS				X				2861	30100603	26
1450	290350004	ROYAL OAK ENTERPRISES	EP01-5	CHARCOAL KILNS				X				2861	30100603	26
1451	290350004	ROYAL OAK ENTERPRISES	EP01-6	CHARCOAL KILNS				X				2861	30100603	26
1452	290350004	ROYAL OAK ENTERPRISES	EP01-7	CHARCOAL KILNS				X				2861	30100603	26
1453	290350004	ROYAL OAK ENTERPRISES	EP01-8	CHARCOAL KILNS				X				2861	30100603	26
1454	290350004	ROYAL OAK ENTERPRISES	EP01-9	CHARCOAL KILNS				X				2861	30100603	26
1455	290350004	ROYAL OAK ENTERPRISES	EP01-10	CHARCOAL KILNS				X				2861	30100603	26
1456	290350004	ROYAL OAK ENTERPRISES	EP01-11	CHARCOAL KILNS				X				2861	30100603	26
1457	290350004	ROYAL OAK ENTERPRISES	EP01-12	CHARCOAL KILNS				X				2861	30100603	26
1458	290350004	ROYAL OAK ENTERPRISES	EP01-13	CHARCOAL KILNS				X				2861	30100603	26
1459	290350004	ROYAL OAK ENTERPRISES	EP01-14	CHARCOAL KILNS				X				2861	30100603	26
1460	290350004	ROYAL OAK ENTERPRISES	EP01-15	CHARCOAL KILNS				X				2861	30100603	26
1461	290350004	ROYAL OAK ENTERPRISES	EP01-16	CHARCOAL KILNS				X				2861	30100603	26
1462	290350004	ROYAL OAK ENTERPRISES	EP01-17	CHARCOAL KILNS				X				2861	30100603	26
1463	290350004	ROYAL OAK ENTERPRISES	EP01-18	CHARCOAL KILNS				X				2861	30100603	26
1464	290350004	ROYAL OAK ENTERPRISES	EP01-19	CHARCOAL KILNS				X				2861	30100603	26
1465	290350004	ROYAL OAK ENTERPRISES	EP01-28	CHARCOAL KILNS				X				2861	30100603	26
1466	290350004	ROYAL OAK ENTERPRISES	EP01-30	CHARCOAL KILNS				X				2861	30100603	26
1467	290350004	ROYAL OAK ENTERPRISES	EP01-31	CHARCOAL KILNS				X				2861	30100603	26
1468	290350004	ROYAL OAK ENTERPRISES	EP01-32	CHARCOAL KILNS				X				2861	30100603	26
1469	290350004	ROYAL OAK ENTERPRISES	EP01-33	CHARCOAL KILNS				X				2861	30100603	26
1470	290350004	ROYAL OAK ENTERPRISES	EP01-34	CHARCOAL KILNS				X				2861	30100603	26
1471	290350004	ROYAL OAK ENTERPRISES	EP01-35	CHARCOAL KILNS				X				2861	30100603	26
1472	290350004	ROYAL OAK ENTERPRISES	EP01-36	CHARCOAL KILNS				X				2861	30100603	26
1473	290350004	ROYAL OAK ENTERPRISES	EP01-37	CHARCOAL KILNS				X				2861	30100603	26
1474	290350004	ROYAL OAK ENTERPRISES	EP01-38	CHARCOAL KILNS				X				2861	30100603	26
1475	290350004	ROYAL OAK ENTERPRISES	EP01-39	CHARCOAL KILNS				X				2861	30100603	26
1476	290350004	ROYAL OAK ENTERPRISES	EP03	RAW CHARCOAL STORAGE				X				2861	30100699	26
1477	290350021	ROYAL OAK ENTERPRISES INC	EP-06	TRANSFER FINES TO TRUCK	X			X				2861	30100606	26
1478	290350021	ROYAL OAK ENTERPRISES INC	EP-04	TRANSFER LUMP CHARCOAL	X			X				2861	30100606	26
1479	290350021	ROYAL OAK ENTERPRISES INC	EP-03	SCREENING	X			X				2861	30100699	26
1480	290350021	ROYAL OAK ENTERPRISES INC	EP-02	TRANSFER CHARCOAL TO SCREEN	X			X				2861	30100606	26
1481	290350021	ROYAL OAK ENTERPRISES INC	EP-01	RAW CHARCOAL STORAGE - ACTIVITY	X			X				2861	30100699	26
1482	290550002	STRUEMPH CHARCOAL	EP01-1	Charcoal Kiln #1				X				2861	30100603	26
1483	290550002	STRUEMPH CHARCOAL	EP01-2	Charcoal Kiln #2				X				2861	30100603	26
1484	290550002	STRUEMPH CHARCOAL	EP01-3	Charcoal Kiln #3				X				2861	30100603	26
1485	290550002	STRUEMPH CHARCOAL	EP01-4	Charcoal Kiln #4				X				2861	30100603	26
1486	290550002	STRUEMPH CHARCOAL	EP01-5	Charcoal Kiln #5				X				2861	30100603	26
1487	290650038	ROYAL OAK ENTERPRISES INC	EP32	ROLL PRESS BRIQUETS	X			X				2861	30100605	26

Appendix I
BART Tabular Response

Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
1488	290650038	ROYAL OAK ENTERPRISES INC	EP24C	COOLER #2 CHARCOAL BRQTS - PROCESS EMISSIONS	X			X				2861	30100699	26
1489	290650038	ROYAL OAK ENTERPRISES INC	EP24A	BRIQUET DRYER #2-LPG	X			X				2861	30100699	26
1490	290650038	ROYAL OAK ENTERPRISES INC	EP20	LOAD MATERIALS MIXER #1 & #2 (2 POINTS)	X			X				2861	30100606	26
1491	290650038	ROYAL OAK ENTERPRISES INC	EP19	TRANSFER MATERIAL TO MIXER #1 OR #2	X			X				2861	30100606	26
1492	290650038	ROYAL OAK ENTERPRISES INC	EP13	LOAD STARCH MIXING TRUCK	X			X				2861	30100606	26
1493	290650038	ROYAL OAK ENTERPRISES INC	EP09	LIME TRANSFER	X			X				2861	30100606	26
1494	290650038	ROYAL OAK ENTERPRISES INC	EP08	HAMMERMILL CRUSHER	X			X				2861	30100607	26
1495	290650038	ROYAL OAK ENTERPRISES INC	EP07	TRANSFER MIXTURE TO HAMMERMILL, CONVEYOR #1	X			X				2861	30100606	26
1496	290650038	ROYAL OAK ENTERPRISES INC	EP06	LOAD COAL/COKE HOPPER	X			X				2861	30100606	26
1497	290650038	ROYAL OAK ENTERPRISES INC	EP05	LOAD SAWDUST HOPPER	X			X				2861	30100606	26
1498	290650038	ROYAL OAK ENTERPRISES INC	EP04	LOAD RAW CHARCOAL HOPPER	X			X				2861	30100606	26
1499	290650038	ROYAL OAK ENTERPRISES INC	EP01	RAW CHARCOAL STORAGE	X			X				2861	30100699	26
1500	290910012	ROYAL OAK ENTERPRISES INC	EP02	RAW CHARCOAL STORAGE - ACTIVITY AND WIND	X			X				2861	30100699	26
1501	290910014	PEACE VALLEY CHARCOAL INC	EP01-5	CHARCOAL KILN #5			X					2861	30100603	26
1502	290910037	ROYAL OAK ENTERPRISES INC	EP-37	INSTANT LITE DIP TANK	X			X				2861	30100699	26
1503	290910037	ROYAL OAK ENTERPRISES INC	EP-36	CONVEYING (6)	X			X				2861	30100608	26
1504	290910037	ROYAL OAK ENTERPRISES INC	EP-33	CONVEYING (4)	X			X				2861	30100608	26
1505	290910037	ROYAL OAK ENTERPRISES INC	EP-31	BRIQUETTE DRYER/COOLER	X			X				2861	30100699	26
1506	290910037	ROYAL OAK ENTERPRISES INC	EP-29	PRESS	X			X				2861	30100605	26
1507	290910037	ROYAL OAK ENTERPRISES INC	EP-28	CONVEYING-MIXTURE (3)	X			X				2861	30100606	26
1508	290910037	ROYAL OAK ENTERPRISES INC	EP-27	PADDLE MIXER	X			X				2861	30100606	26
1509	290910037	ROYAL OAK ENTERPRISES INC	EP-22	CONVEYING (4)	X			X				2861	30100606	26
1510	290910037	ROYAL OAK ENTERPRISES INC	EP-12	BUCKET ELEVATOR	X			X				2861	30100606	26
1511	290910037	ROYAL OAK ENTERPRISES INC	EP-11	CONVEYING RAW MATERIAL	X			X				2861	30100606	26
1512	290910037	ROYAL OAK ENTERPRISES INC	EP-09	HAMMERMILL - CHARCOAL AND COAL	X			X				2861	30100607	26
1513	290910037	ROYAL OAK ENTERPRISES INC	EP-06	LOAD HOPPER - CHARCOAL AND COAL	X			X				2861	30100606	26
1514	290910037	ROYAL OAK ENTERPRISES INC	EP-04	CHARCOAL STORAGE	X			X				2861	30100699	26
1515	290910038	GARNETT WOOD PRODUCTS	EP1	CHARCOAL FURNACE	X							2861	30100699	26
1516	291250001	KINGSFORD MANUFACTURING CO	6	CHARCOAL UNLOADING, STORAGE & HANDLING				X				2861	30100608	26
1517	291250001	KINGSFORD MANUFACTURING CO	4	AFTER COMBUSTION CHAMBER				X				2861	30100604	26
1518	291250012	STRUEMPH CHARCOAL	EP01-1	Charcoal Kiln #1				X				2861	30100603	26
1519	291510049	ROYAL OAK ENTERPRISES INC	EP-12	PULVERIZING CHARCOAL				X				2861	30100607	26
1520	291510049	ROYAL OAK ENTERPRISES INC	EP-11	RAW CHARCOAL LOADING INTO BIN/HOPPER				X				2861	30100606	26
1521	291510049	ROYAL OAK ENTERPRISES INC	EP-05	TRANSFER RAW CHARCOAL TO PLANT - LOADER				X				2861	30100606	26
1522	291610003	MISSOURI HARDWOOD CHARCOAL	EP01-01	Charcoal Kiln #1				X				2861	30100603	26
1523	291610003	MISSOURI HARDWOOD CHARCOAL	EP01-02	Charcoal Kiln #2				X				2861	30100603	26
1524	291610003	MISSOURI HARDWOOD CHARCOAL	EP01-07	Charcoal Kiln #7				X				2861	30100603	26
1525	291610003	MISSOURI HARDWOOD CHARCOAL	EP01-10	Charcoal Kiln #10				X				2861	30100603	26
1526	291610003	MISSOURI HARDWOOD CHARCOAL	EP01-11	Charcoal Kiln #11				X				2861	30100603	26
1527	291610003	MISSOURI HARDWOOD CHARCOAL	EP01-12	Charcoal Kiln #12				X				2861	30100603	26
1528	291790002	MISSOURI HARDWOOD CHARCOAL	EP-01-01	Charcoal Kiln #1				X				2861	30100603	26
1529	291790002	MISSOURI HARDWOOD CHARCOAL	EP-01-02	Charcoal Kiln #2				X				2861	30100603	26
1530	291790002	MISSOURI HARDWOOD CHARCOAL	EP-01-03	Charcoal Kiln #3				X				2861	30100603	26
1531	291790002	MISSOURI HARDWOOD CHARCOAL	EP-01-04	Charcoal Kiln #4				X				2861	30100603	26
1532	291790002	MISSOURI HARDWOOD CHARCOAL	EP-01-05	Charcoal Kiln #5				X				2861	30100603	26
1533	291790002	MISSOURI HARDWOOD CHARCOAL	EP-01-06	Charcoal Kiln #6				X				2861	30100603	26
1534	291790002	MISSOURI HARDWOOD CHARCOAL	EP-11	Old Charcoal Kiln #11				X				2861	30100603	26
1535	291790002	MISSOURI HARDWOOD CHARCOAL	EP-04-15	Charcoal Kiln #15				X				2861	30100603	26
1536	291790002	MISSOURI HARDWOOD CHARCOAL	EP-04-16	Charcoal Kiln #16				X				2861	30100603	26
1537	291790002	MISSOURI HARDWOOD CHARCOAL	EP-04-17	Charcoal Kiln #17				X				2861	30100603	26
1538	291790002	MISSOURI HARDWOOD CHARCOAL	EP-04-18	Charcoal Kiln #18				X				2861	30100603	26

Appendix I
BART Tabular Response

Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
1539	291790002	MISSOURI HARDWOOD CHARCOAL	EP-03-11	Charcoal Kiln #11				X				2861	30100603	26
1540	291790002	MISSOURI HARDWOOD CHARCOAL	EP-03-12	Charcoal Kiln #12				X				2861	30100603	26
1541	291790002	MISSOURI HARDWOOD CHARCOAL	EP-03-13	Charcoal Kiln #13				X				2861	30100603	26
1542	291790002	MISSOURI HARDWOOD CHARCOAL	EP-03-14	Charcoal Kiln #14				X				2861	30100603	26
1543	292030002	TIMBER CHARCOAL	EP01-2	Charcoal Kiln No. 2				X				2861	30100603	26
1544	292030002	TIMBER CHARCOAL	EP01-5	Charcoal Kiln No. 5				X				2861	30100603	26
1545	292030006	CRAIG INDUSTRIES INC	EP-01	Kiln #1				X				2861	30100603	26
1546	292030006	CRAIG INDUSTRIES INC	EP-50	RAW MATERIAL STORAGE				X				2861	30100699	26
1547	292030006	CRAIG INDUSTRIES INC	EP-02	Kiln #2				X				2861	30100603	26
1548	292030006	CRAIG INDUSTRIES INC	EP-03	Kiln #3				X				2861	30100603	26
1549	292030006	CRAIG INDUSTRIES INC	EP-04	Kiln #4				X				2861	30100603	26
1550	292030006	CRAIG INDUSTRIES INC	EP-05	Kiln #5				X				2861	30100603	26
1551	292030006	CRAIG INDUSTRIES INC	EP-06	Kiln #6				X				2861	30100603	26
1552	292030006	CRAIG INDUSTRIES INC	EP-07	Kiln #7				X				2861	30100603	26
1553	292030006	CRAIG INDUSTRIES INC	EP-08	Kiln #8				X				2861	30100603	26
1554	292030006	CRAIG INDUSTRIES INC	EP-09	Kiln #9				X				2861	30100603	26
1555	292030006	CRAIG INDUSTRIES INC	EP-10	Kiln #10				X				2861	30100603	26
1556	292030006	CRAIG INDUSTRIES INC	EP-11	Kiln #11				X				2861	30100603	26
1557	292030006	CRAIG INDUSTRIES INC	EP-12	Kiln #12				X				2861	30100603	26
1558	292030006	CRAIG INDUSTRIES INC	EP-13	Kiln #13				X				2861	30100603	26
1559	292030006	CRAIG INDUSTRIES INC	EP-14	Kiln #14				X				2861	30100603	26
1560	292030006	CRAIG INDUSTRIES INC	EP-15	Kiln #15				X				2861	30100603	26
1561	292030006	CRAIG INDUSTRIES INC	EP-16	Kiln #16				X				2861	30100603	26
1562	292030006	CRAIG INDUSTRIES INC	EP-17	Kiln #17				X				2861	30100603	26
1563	292030006	CRAIG INDUSTRIES INC	EP-18	Kiln #18				X				2861	30100603	26
1564	292030006	CRAIG INDUSTRIES INC	EP-19	Kiln #19				X				2861	30100603	26
1565	292030006	CRAIG INDUSTRIES INC	EP-20	Kiln #20				X				2861	30100603	26
1566	292030006	CRAIG INDUSTRIES INC	EP-21	Kiln #21				X				2861	30100603	26
1567	292030006	CRAIG INDUSTRIES INC	EP-22	Kiln #22				X				2861	30100603	26
1568	292030006	CRAIG INDUSTRIES INC	EP-23	Kiln #23				X				2861	30100603	26
1569	292030006	CRAIG INDUSTRIES INC	EP-24	Kiln #24				X				2861	30100603	26
1570	292030006	CRAIG INDUSTRIES INC	EP-25	Kiln #25				X				2861	30100603	26
1571	292030006	CRAIG INDUSTRIES INC	EP-26	Kiln #26				X				2861	30100603	26
1572	292030006	CRAIG INDUSTRIES INC	EP-27	Kiln #27				X				2861	30100603	26
1573	292030006	CRAIG INDUSTRIES INC	EP-28	Kiln #28				X				2861	30100603	26
1574	292030006	CRAIG INDUSTRIES INC	EP-29	Kiln #29				X				2861	30100603	26
1575	292030006	CRAIG INDUSTRIES INC	EP-30	Kiln #30				X				2861	30100603	26
1576	292030006	CRAIG INDUSTRIES INC	EP-31	Kiln #31				X				2861	30100603	26
1577	292030006	CRAIG INDUSTRIES INC	EP-32	Kiln #32				X				2861	30100603	26
1578	292030006	CRAIG INDUSTRIES INC	EP-33	Kiln #33				X				2861	30100603	26
1579	292030006	CRAIG INDUSTRIES INC	EP-34	Kiln #34				X				2861	30100603	26
1580	292030006	CRAIG INDUSTRIES INC	EP-35	Kiln #35				X				2861	30100603	26
1581	292030006	CRAIG INDUSTRIES INC	EP-36	Kiln #36				X				2861	30100603	26
1582	292030006	CRAIG INDUSTRIES INC	EP-37	Kiln #37				X				2861	30100603	26
1583	292030006	CRAIG INDUSTRIES INC	EP-38	Kiln #38				X				2861	30100603	26
1584	292030006	CRAIG INDUSTRIES INC	EP-39	Kiln #39				X				2861	30100603	26
1585	292030006	CRAIG INDUSTRIES INC	EP-40	Kiln #40				X				2861	30100603	26
1586	292030006	CRAIG INDUSTRIES INC	EP-41	Kiln #41				X				2861	30100603	26
1587	292030006	CRAIG INDUSTRIES INC	EP-42	Kiln #42				X				2861	30100603	26
1588	292030006	CRAIG INDUSTRIES INC	EP-43	Kiln #43				X				2861	30100603	26
1589	292030006	CRAIG INDUSTRIES INC	EP-44	Kiln #44				X				2861	30100603	26
1590	292030006	CRAIG INDUSTRIES INC	EP-45	Kiln #45				X				2861	30100603	26
1591	292030006	CRAIG INDUSTRIES INC	EP-46	Kiln #46				X				2861	30100603	26
1592	292030006	CRAIG INDUSTRIES INC	EP-47	Kiln #47				X				2861	30100603	26
1593	292030006	CRAIG INDUSTRIES INC	EP-48	Kiln #48				X				2861	30100603	26
1594	292030020	TIMBER CHARCOAL CO	EP01-04	Charcoal Kiln No. 4				X				2861	30100603	26

Appendix I
BART Tabular Response

Row #	Facility ID	Company	Point ID	Imported Unit Description	Exempted by Date	Exempted by Category	No longer in Operation	Potential Below 250 TPY	BART Eligible	Tank Capacity	Removed from Service	SIC	SCC	BART Category
1595	292030020	TIMBER CHARCOAL CO	EP01-05	Charcoal Kiln No. 5				X				2861	30100603	26
1596	292030020	TIMBER CHARCOAL CO	EP01-06	Charcoal Kiln No. 6				X				2861	30100603	26
1597	292030020	TIMBER CHARCOAL CO	EP01-07	Charcoal Kiln No. 7				X				2861	30100603	26
1598	292030020	TIMBER CHARCOAL CO	EP01-08	Charcoal Kiln No. 8				X				2861	30100603	26
1599	292130002	HORNER CHARCOAL CO INC	EP01-2	CHARCOAL KILNS				X				2861	30100603	26
1600	292130002	HORNER CHARCOAL CO INC	EP01-3	CHARCOAL KILNS				X				2861	30100603	26
1601	292130002	HORNER CHARCOAL CO INC	EP01-7	CHARCOAL KILNS				X				2861	30100603	26
1602	292130002	HORNER CHARCOAL CO INC	EP01-10	CHARCOAL KILNS				X				2861	30100603	26
1603	292130002	HORNER CHARCOAL CO INC	EP03	RAW CHARCOAL STORAGE				X				2861	30100699	26
1604	292130007	ROYAL OAK ENTERPRISES	EP-51	DIP TANK	X			X				2861	30100699	26
1605	292130007	ROYAL OAK ENTERPRISES	EP-35	DRYER	X			X				2861	30100699	26
1606	292130007	ROYAL OAK ENTERPRISES	EP-02	CHARCOAL STORAGE	X			X				2861	30100699	26
1607	292150003	THOMASON CHARCOAL COMPANY	EP03	RAW CHARCOAL STORAGE				X				2861	30100699	26
1608	292150003	THOMASON CHARCOAL COMPANY	EP01-01	Kiln No. 1				X				2861	30100603	26
1609	292150003	THOMASON CHARCOAL COMPANY	EP01-02	Kiln No. 2				X				2861	30100603	26
1610	292150003	THOMASON CHARCOAL COMPANY	EP01-03	Kiln No. 3				X				2861	30100603	26
1611	292150003	THOMASON CHARCOAL COMPANY	EP01-04	Kiln No. 4				X				2861	30100603	26
1612	292150003	THOMASON CHARCOAL COMPANY	EP01-05	Kiln No. 5				X				2861	30100603	26
1613	292150003	THOMASON CHARCOAL COMPANY	EP01-06	Kiln No. 6				X				2861	30100603	26
1614	292150003	THOMASON CHARCOAL COMPANY	EP01-07	Kiln No. 7				X				2861	30100603	26
1615	292150003	THOMASON CHARCOAL COMPANY	EP01-08	Kiln No. 8				X				2861	30100603	26
1616	292150003	THOMASON CHARCOAL COMPANY	EP01-09	Kiln No. 9				X				2861	30100603	26
1617	292150003	THOMASON CHARCOAL COMPANY	EP01-10	Kiln No. 10				X				2861	30100603	26
1618	292150003	THOMASON CHARCOAL COMPANY	EP01-11	Kiln No. 11				X				2861	30100603	26
1619	292150003	THOMASON CHARCOAL COMPANY	EP01-12	Kiln No. 12				X				2861	30100603	26
1620	292150003	THOMASON CHARCOAL COMPANY	EP01-11A	Kiln No. 11A				X				2861	30100603	26
1621	292150045	H & K CHARCOAL	EP01-01	Kiln No. 1	X							2861	30100603	26
1622	292150045	H & K CHARCOAL	EP01-02	Kiln No. 2	X							2861	30100603	26

Appendix J

BART Survey and Supplemental Information

November 11, 2004

Contact
Facility Name
Facility Street Address
Facility City, State, ZIP

Dear Contact:

I would like to request your assistance in gathering information needed about your facility related to the federal regional haze program. In 1999, the Environmental Protection Agency (EPA) issued regulations for the protection of visibility in our Natural Parks and Wilderness Areas (See http://www.epa.gov/ttn/oarpg/t1/fr_notices/rhfedreg.pdf). These regulations require states to establish goals for improving visibility by developing long-term strategies for reducing emissions of air pollutants that cause visibility impairment. The State of Missouri is working as a member of the Central States Regional Air Planning Association (CENRAP) to meet these requirements. CENRAP is an association of states, tribes, federal agencies, and other interested parties organized for the purpose of studying visibility impairment and of assisting individual states and tribes in preparing plans to address the problem. CENRAP includes the states and tribal areas of Minnesota, Nebraska, Iowa, Kansas, Missouri, Oklahoma, Arkansas, Texas, and Louisiana.

Missouri has been working jointly with these states and tribes to locate and operate air monitors, to develop and share emission inventories, and to conduct regional computer modeling to help identify potential strategies to reduce haze. Each state will use this information to develop individual state implementation plans (SIPs) to meet each states' obligation under the federal regulations. Missouri is required to submit a SIP to EPA by December 31, 2007. While three years seems like a long period of time, the state rulemaking timelines have grown to the point that we need to begin now to consider potential regulations in place by then. One of the first steps is to determine which air pollution units will be subject to the federal Best Available Retrofit Technology (BART) regulations.

BART applies to emission units in existence on August 7, 1977, that had begun operation after August 7, 1962, and that, individually or in combination with other such units, have the potential to emit 250 tons per year or more of any visibility-impairing pollutant. Having commenced construction on or before August 7, 1977, BART-eligible sources were in existence prior to the Prevention of Significant Deterioration (PSD) permitting requirements of the 1977 Clean Air Act Amendments.

Visibility impairing pollutants include: ammonia (NH_3), nitrogen oxides (NO_x), particulate matter less than ten microns (PM_{10}), sulfur dioxide (SOx), and volatile organic compounds (VOCs). Affected emission units must also fall into one of 26 source categories, including electric generating units, industrial boilers, and other large industrial operations. Attachment A is a list of the 26 source categories.

It is important that we ensure the accuracy of Missouri's final list of BART-eligible sources. To that end, we are asking for your participation in this process. We have queried our Emission Inventory Questionnaire (EIQ) database using the Standard Industrial Classification and Source Classification Codes to identify sources that correspond to the 26 BART source categories listed in Attachment A. We then attempted to eliminate sources that we knew had been constructed after August 7, 1977, and sources that have basic or intermediate Operating Permits (who therefore have facility-wide emissions of less than 100 tons per year). Certain units at your facility were not eliminated, so you are still on our list of potentially BART-eligible sources. Your assistance is needed to confirm our finding and help us further determine if your facility should remain on the list.

The enclosed questionnaire summarizes information related to your emission unit(s) and requests additional data. The questionnaire lists information for each unit of interest at your facility and includes blanks for you to insert the following information:

1) The "In existence date", or indication (yes/no) that the unit was in existence on August 7. 1977,
2) The "Began operation date", or indication (yes/no) that the unit began operation after August 7, 1962,
3&4) Confirmation of the industrial classification of your facility,
5) Potential emissions of the five pollutants (NH_3, NO_x, PM_{10}, SO_x, & VOCs),
6) Maximum heat input rate (million BTU/hr) if the unit is a fossil-fuel boiler,
7) Storage capacity (barrels) if the unit is a petroleum storage tank, and
8) Your conclusion summarizing your determination of whether your unit is BART-eligible or not.

In completing the questionnaire I ask that you follow the enclosed "Instructions for BART Information Request Form" for each unit, insert the requested information, and provide your own evaluation of whether you believe the unit falls within the construction time span that would identify your unit as a BART-eligible source. I also ask that you identify any additional

emission units at your facility that we have failed to identify, but that you believe meet the BART-eligible requirements.

Please complete the questionnaire and return it to the department at the following address:

Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102
Attn: John Rustige, P.E.

To assist you in completing this questionnaire we have included definitions and guidance material in a Frequently Asked Questions (FAQs) attachment to this letter. The *Proposed Guidelines for Best Available Retrofit Technology (BART) Determinations Under the Regional Haze Regulations* is also available at EPA's website at http://www.epa.gov/ttn/oarpg/t1/fr_notices/bart6-21.pdf

How will this data be used?

This is just the initial step in determining BART sources. After Missouri has compiled a list of BART-eligible sources, there are several additional steps that have to be taken in the BART process. The following is a brief summary of those steps:

1) *Identification of sources subject to BART controls*. Sources subject to BART controls are those BART-eligible sources which "emit a pollutant which may reasonably be anticipated to cause or contribute to any impairment in any Class I area." This will require air pollution modeling studies to determine each individual sources' contribution to see what impact each source has on visibility in the Class I area.
2) *Engineering analysis*. For each source that is subject to BART controls an engineering analysis of emission control alternatives will be required. This process will be similar to the Best Available Control Technology (BACT) process that new major sources undergo during construction permit review. This step requires the identification of available, technically feasible, retrofit emission controls. For each technology identified, an analysis must be made of the cost of compliance, and the energy and non-air quality environmental impacts, taking into account the remaining useful life and existing control technology operated at the source. For each source, a "best system of continuous emission reduction" is selected based on this engineering analysis.
3) *Enforceable limits*. Considering the engineering analysis, states must establish enforceable emission limits, including a deadline for compliance, for each source subject to BART.

We appreciate your assistance in completing the questionnaire to assist us in determining if your facility is or is not subject to BART. Please respond even if you believe that your units do not

meet the BART-eligible criteria so that we can eliminate them from our list. We request that you return your questionnaire to us no later than December 17, 2004.

If you have any questions about the questionnaire, regional haze, or the BART process, please contact John Rustige at P.O. Box 176, Jefferson City, MO 65102 or by phone at (573) 751-4817. Thank you for your assistance.

Sincerely,
AIR POLLUTION CONTROL PROGRAM

Leanne Tippett Mosby

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Director

LJT:jrl

Attachment

Attachment A

Source Categories Eligible for BART:

1. Fossil-fuel fired steam electric plants of more than 250 million Btu/hr heat input
2. Coal cleaning plants (with thermal dryers)
3. Kraft pulp mills
4. Portland cement plants
5. Primary zinc smelters
6. Iron and steel mill plants
7. Primary aluminum ore reduction plants
8. Primary copper smelters
9. Municipal incinerators capable of charging more than 250 tons of refuse per day
10. Hydrofluoric, sulfuric, and nitric acid plants
11. Petroleum refineries
12. Lime plants
13. Phosphate rock processing plants
14. Coke oven batteries
15. Sulfur recovery plants
16. Carbon black plants (furnace plants)
17. Primary lead smelters
18. Fuel conversion plants
19. Sintering plants
20. Secondary metal production plants
21. Chemical process plants
22. Fossil-fuel boilers (or combinations thereof) totaling more than 250 million Btu/hr heat input
23. Petroleum storage and transfer facilities with a total storage capacity exceeding 300,000 barrels
24. Taconite ore processing facilities
25. Glass fiber processing plants
26. Charcoal production facilities.

Frequently Asked Questions (FAQ's)

Q. What is regional haze?

Haze obscures the clarity, color, texture, and form of what we see. Some haze-causing pollutants (mostly fine particles) are directly emitted to the atmosphere by a number of activities (such as electric power generation, various industrial and manufacturing processes, truck and auto emissions, burning related to forestry and agriculture, construction activities, etc.). Others are formed when gases emitted to the air form particles as they are carried downwind. Examples include sulfate, formed from sulfur dioxide, and nitrates, formed from nitrogen oxides. The Regional Haze Rule was issued by the Environmental Protection Agency (EPA) to improve visibility, or visual air quality, in 156 Class I areas across the country.

Q. What is a Class I area?

The Clean Air Act defines mandatory Class I Federal areas as certain national parks (over 6000 acres), wilderness areas (over 5000 acres), national memorial parks (over 5000 acres), and international parks that were in existence as of August 1977. There are currently 156 Class I areas listed in the United States. These areas include many of our best known and most treasured natural areas, such as the Grand Canyon, Mt. Rushmore, Yosemite, Yellowstone, Mount Rainier, Shenandoah, the Great Smokies, Acadia, and the Everglades. Two class I areas are located in Missouri. Hercules Glade Wilderness Area (12,300 acres) is located approximately 35 miles southeast of Springfield, Missouri and the Mingo Wilderness Area (7,700 acres) is located approximately 20 miles southwest of Poplar Bluff, Missouri.

Q. Why is Missouri actively participating with other Midwestern states in the regional haze planning efforts of the Central Regional Air Planning Association

Recent research has clearly shown that particulate matter and other haze producing precursors can generally span broad geographic areas and can be transported great distances, sometimes hundreds or thousands of miles. Consequently, haze occurs regionally throughout the nation. Pollutants produced in other states may affect Missouri's Class I areas, and Missouri sources may affect Class I areas located outside our borders. Also, by joining with other states, Missouri is able to share the planning and the rigorous and intensive computer modeling necessary to understand haze formation and its causes.

Q. What does BART stand for?

Best Available Retrofit Technology.

Q. What are the steps in identifying BART-eligible sources?

Step 1: Evaluate emission unit's construction/reconstruction dates.
Step 2: Verify BART category.

Step 3: Determine potential emissions.
Step 4: Provide additional information (boilers & storage tanks only).

Q. What does "in existence on August 7, 1977" mean?

The regulation defines "in existence" to mean that:
The owner or operator has obtained all necessary preconstruction approvals or permits required by Federal, State, or local air pollution emissions and air quality laws or regulations and either has (1) begun, or caused to begin, a continuous program of physical on-site construction of the facility or (2) entered into binding agreements or contractual obligations, which cannot be canceled or modified without substantial lose to the owner or operator, to undertake a program of construction of the facility to be completed in a reasonable time. See 40 CFR 51.301.

Example: The owner or operator obtained necessary permits in early 1977 and entered into binding construction agreements in June 1977. Actual on-site construction began in late 1978, and construction was completed in mid-1979. The source began operating in September of 1979. The emission unit was "in existence" as of August 7, 1977.

Q. What does "in operation before August 7, 1962" mean?

An emissions unit that meets the August 7, 1977 "in existence" test is not BART-eligible if it was in operation before August 7, 1962. "In operation" is defined as "engaged in activity related to the primary design function of the source." This means that a source must have begun actual operations by August 7, 1962 to satisfy this test.

Example: The owner or operator entered into binding agreements in 1960. Actual on-site construction began in 1961, and construction was completed in mid-1962. The source began operating in September of 1962. The emissions unit was not "in operation" before August 7, 1962 and is therefore subject to BART.

Q. What is a "reconstructed source?"

Under a number of CAA programs, an existing source which is completely or substantially rebuilt is treated as a new source. Such "reconstructed" sources are treated as new sources as of the time of the reconstruction. Consistent with this overall approach to reconstructions, the definition of BART-eligible facility (reflected in detail in the definition of "existing stationary facility") includes consideration of sources that were in operation before August 7, 1962, but were reconstructed during the August 7, 1962 to August 7, 1977 time period. Under the regulation, a reconstruction has taken place if "the fixed capital cost of the new component exceeds 50 percent of the fixed capital cost of a comparable entirely new source." The rule also states that "Any final decision as to whether reconstruction has occurred must be made in accordance with the provisions of Secs. 60.15 (f)(1) through (3) of this title." [40 CFR 51.301] "Secs. 60.15(f)(1) through (3)" refer to the general provisions for New Source Performance Standards (NSPS). Thus, the same policies and procedures for identifying reconstructed "affected facilities" under the NSPS program must also be used to identify

reconstructed "stationary sources" for purposes of the BART requirement. You should identify reconstructions on an emissions unit basis, rather than on a plantwide basis. That is, you need to identify only the reconstructed emission units meeting the 50 percent cost criterion. You should include reconstructed emission units in the list of emission units you identified in Step 1. The "in operation" and "in existence" tests apply to reconstructed sources. If an emissions unit was reconstructed and began actual operation before August 7, 1962, it is not BART-eligible. Similarly, any emissions unit for which a reconstruction "commenced" after August 7, 1977, is not BART-eligible.

Q. How are modifications treated under the BART provision?

In general, the term "modification" refers to any physical change or change in the method of operation of an emissions unit that leads to an increase in emissions. The EPA believes that the best interpretation for purposes of the visibility provisions is that modified emissions units are still "existing". The BART requirements in the CAA do not appear to provide any exemption for sources which were modified since 1977. Accordingly, if an emissions unit began operation before 1962, it is not BART-eligible if it is modified at a later date, so long as the modification is not also a "reconstruction." Similarly, an emissions unit which began operation within the 1962-1977 time window, but was modified after August 7, 1977, is BART-eligible.

Q. What pollutants should I address?

Visibility-impairing pollutants include the following:

1. Sulfur oxides (SO_x),
2. Nitrogen oxides (NO_X),
3. Particulate matter. (Please use PM_{10} as the indicator for particulate matter. PM_{10} emissions include the components of $PM_{2.5}$ as a subset. There is no need to have separate 250 ton thresholds for PM_{10} and $PM_{2.5}$, because 250 tons of PM_{10} represents at most 250 tons of $PM_{2.5}$, and at most 250 tons of any individual particulate species such as elemental carbon, crystal material, etc).
4. Volatile organic compounds (VOC), and
5. Ammonia (NH_3).

Q. What does the term "potential" emissions mean?

The regional haze rule defines potential to emit as follows:
"Potential to emit" means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable. Secondary emissions do not count in determining the potential to emit of a stationary source.

Q. How do I calculate "potential emissions?"

Your facility may have already gone through the potential to emit calculations when applying for your operating permit. Please refer to the potential to emit calculations performed for your operating permit. Potential emissions are the emission rates of any pollutant at maximum design capacity. Annual potential shall be based on the maximum annual rated capacity of the installation assuming continuous year-round, around-the-clock operation. Federally enforceable permit conditions on the type of material combusted or processed, operating rates, hours of operation or the application of air pollution control equipment shall be used in determining the annual potential. Secondary emissions (emissions which occur or would occur as a result of the construction or operation of the installation or major modification but do not come from the installation or modification itself) do not count in determining annual potential.

Q. How do I determine the BART category status of steam electric plants?

"Steam electric plants of more than 250 million BTU/hr heat input." Because the category refers to "plants," boiler capacities must be aggregated to determine whether the 250 million BTU/hr threshold is reached.

Example: A stationary source includes a steam electric plant with three 100 million BTU/hr boilers. Because the aggregate capacity exceeds 250 million BTU/hr for the "plant," these boilers would be identified as BART-eligible.

Q. How do I determine the BART category status of fossil-fuel boilers?

"Fossil-fuel boilers of more than 250 million BTU/hr heat input." The EPA has proposed two options for interpreting this source category title. The first option would be to aggregate all boiler capacities to determine whether the 250 million BTU/hr threshold is reached. Under the second option, this category would be interpreted to cover only those boilers that are individually greater than 250 million BTU/hr. Until the rule and guidance is finalized, Missouri is collecting information assuming that all boiler capacities will need to be aggregated. If EPA decides to make BART applicable to boilers that are individually greater than 250 million BTU/hr, the surveys collected will provide the information needed to exempt the appropriate units.

Q. How do I determine the BART category status of petroleum storage and transfer facilities with a capacity exceeding 300,000 barrels?

The 300,000 barrel cutoff refers to the total facility wide tank capacity for tanks that were put in place within the 1962-1977 time period, and includes gasoline and other petroleum derived liquids.

Additional Definitions and Guidance

Stationary source means all of the pollutant emitting activities which belong to the same industrial grouping (i.e., have the same two-digit SIC code), are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). [40CFR51.301].

In existence means that the owner or operator has obtained all necessary preconstruction approvals or permits required by Federal, State, or local air pollution emissions and air quality laws or regulations and either has (1) begun, or caused to begin, a continuous program of physical on-site construction of the facility or (2) entered into binding agreements or contractual obligations, which cannot be cancelled or modified without substantial loss to the owner or operator, to undertake a program of construction of the facility to be completed in a reasonable time [40CFR51.301]. The potential emissions of all emission units falling within the 15-year BART window and within any of the 26 source categories (they don't all have to be in the same category) must be aggregated for comparison to the 250-ton/year threshold. For the two source categories, fossil fuel fired steam electric plants of 250 million Btu/hr heat input and fossil fuel boilers (or combinations thereof) totaling more than 250 million Btu/hr heat input, the proposed rule (subject to change) requires that the maximum heat input rates of all individual emission units falling within the BART window first be aggregated for comparison to the 250-million Btu/hr threshold. For petroleum storage and transfer facilities, the capacities of all storage tanks falling within the BART window must first be aggregated for comparison to the 300,000-barrel threshold. The total potential emissions of these such units or tanks, along with all other emission units falling within the BART window and within any of the 26 source categories, must then be compared to the 250-ton/year threshold to determine BART eligibility. Note, in the final rule EPA may choose not to aggregate boilers on the basis of heat input rate but, instead, apply the 250-million Btu/hr threshold to individual fossil-fuel boilers. Therefore, all boilers should be listed individually for purposes of this preliminary assessment.

Note: The BART requirements are a core component of the federal regional haze program and are likely to provide the primary basis for implementing substantial pollution reductions to advance visibility goals over the next decade. The BART requirements were outlined in the Clean Air Act Amendments of 1977 and subsequently updated in the regional haze rule of 1999 and in more recent guidance published on July 20, 2001 (Federal Register [66 Fed. Reg., 38108 (July20,2001)] as a proposed rule.

INSTRUCTIONS FOR BART INFORMATION REQUEST FORM

Work through these steps sequentially for each emissions unit (EU) listed on each form. If we have missed any EUs that meet the BART criteria, please add them to the blank form. Make copies of the blank form as needed.

STEP A. "Dates": Evaluate EU construction/reconstruction dates.

1. Enter "yes" if EU was in existence on August 7, 1977; otherwise enter "no."

2. Enter "yes" if EU began operation after August 7, 1962; otherwise enter "no."

If 1. and 2. are both "yes", move to Step B.

If 1a and 1b are "yes" and "no" or "no and "yes,"respectively, skip Steps B through D for this EU, move to Step E and complete the form by answering "no, outside date range" to question 8.

STEP B. "BART Category": Verify BART category.

3. This question contains a number corresponding to the list of BART categories from Attachment A. Review this number and determine whether it is appropriate for this EU, and enter "yes" or "no" as appropriate. If you answered "yes", continue to Step C.

4. If you answered "no" in number 3, please enter the correct number corresponding to the BART categories listed on <u>Attachment A</u> and continue to Step C. If this EU doesn't fall within one of the 26 BART categories, enter "none". If you entered "none" skip Steps C and D for this EU, move to Step E and complete the form by answering "no, source is not a BART category" to question 8.

STEP C. "Emissions": Enter potential emissions.

5. The actual emissions that you reported to us for calendar year 2002 for each emission unit are summed and provided in table form. Ammonia (NH4) emissions have not been included because Missouri facilities were not required to report ammonia emissions in 2002. If you see any errors, please bring them to our attention, by noting this on the form.

   Enter the current potential emissions for each pollutant for this unit in tons/year. Enter "0" if your potential emissions for that pollutant is "0". You may have conducted this calculation when preparing your operating permit, and it is suggested that you use these figures when or if they are available.

   Potential emissions for this unit shall be calculated in a manner similar to how actual emissions are calculated for your annual EIQ, except that your emissions must be calculated based on the maximum annual-rated capacity of the installation, assuming

continuous year-round around-the-clock operation. Federally enforceable permit conditions limiting the type of materials combusted, or processed, operating rates, hours of operation or the application of air pollution control equipment shall be used in determining the annual potential.

A federally enforceable condition is any limitation or condition that is enforceable by the EPA Administrator. It includes all New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAPs), and Hazardous Air Pollutant (HAP) requirements, requirements within the state implementation plan (SIP), any Prevention of Significant Deterioration (PSD) or non-attainment review permits, and any existing construction or operating permits.

Since the construction permit rule is approved by the EPA as part of the Missouri SIP, construction or operating permit limitations are federally enforceable and should be considered in your calculations. These limits can take the form of limits on emissions, production, or even other operational limitations.

In calculating potential emissions, the installation may also consider “inherent physical limitations” in potential to emit calculations. In other words, emissions which are constrained by process limitations external to the unit rather than “maximum capacity” of the unit are process bottlenecks and are considered as a “physical limitations” when calculating potential to emit.

If this EU includes fossil-fuel boilers or petroleum storage tanks, move on to Step D. Otherwise, skip Step D and move to Step E.

STEP D. Additional information (boilers & storage tanks only):

6. Enter the maximum heat input capacity of the boiler in million British thermal units per hour (MMBtu/hr). If there are multiple boilers within this EU, enter the sum of the heat input capacities for all boilers put in place within the 1962-1977 time period. Continue to Step E.

7. Enter the capacity of the petroleum storage tank in barrels. If there are multiple tanks within this EU, enter the sum of the capacities for all tanks put in place within the 1962-1977. Continue to Step E.

STEP E. “Conclusion”: Provide conclusion or notes about this EU.

8. If you have already entered a “no” answer to this question already, then continue with Step A on the next form for your facility (if any).

   If your potential emissions is below 250 tons per year for each individual pollutant enter “No. PTE<250 for each individual pollutant for this EU”, then continue with Step A on the next form for your facility (if any).

If your potential emissions is above 250 tons per year for any one or more pollutants enter “yes”. By entering yes you are determining that this unit will be preliminarily classified as “BART-eligible” and staff will be further reviewing this preliminary determination. Please continue with Step A on the next form for your facility (if any).

This question also provides a few lines for you to add any comments or a brief explanation that might help staff understand your conclusion about whether this unit is or is not “BART-eligible”.

NOTE: *The 250 ton per year threshold applies to the* <u>*sum*</u> *of emissions from all units at the facility that meet the construction/reconstruction date test and the BART category test. If you have multiple units at your facility that meet these tests, staff will use the figures reported on this questionnaire and sum each pollutant to determine the overall potential of each pollutant at your facility.*

Please sign and date the forms and return to the following address no later than December 17, 2004.

Missouri Department of Natural Resources
Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102
Attn: John Rustige, P.E.

STATE OF MISSOURI
Matt Blunt, Governor • Doyle Childers, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

NOV 1 2 2007

Mr. Aaron Miller
Doe Run Company
881 Main Street
Herculaneum, MO 63048

RE: Control Requirements and Permit Status
Doe Run – Glover Plant

Dear Mr. Miller:

As we understand, your facility is in care/maintenance status and it is unlikely you will operate anytime in the near future. Currently no smelter operations or production of refined lead is occurring and the only activity at the facility is rail transfer that occurs about twice per week. The facility has been allowed to suspend all State Implementation Plans (SIP) and Maximum Achievable Control Technology (MACT) required compliance testing and reporting requirements until the facility resumes operations. Doe Run – Glover is still required to conduct air monitoring at several locations and maintains those records electronically. In addition, your operating permit application has been on hold for an extended period of time. Our goal is to better understand the plans for your operation at Glover and detail those in the operating permit for this facility.

If operations commence to produce refined lead, Doe Run - Glover will be subject to additional federal requirements beyond the current lead SIP. These include a detailed Best Available Retrofit Technology (BART) evaluation and potential additional control under the federal regional haze rule. Also, Doe Run Glover might be subject to control requirements for the St. Louis $PM_{2.5}$ SIP that is currently under development.

According to the U.S. Environmental Protection Agency's (EPA) final rule published on July 6, 2005, BART applies only to a major stationary source which "was in existence on August 7, 1977, but which has not been in operation for more than 15 years as of such date". Based on survey data submitted by Doe Run and a cursory review of Emission Inventory Questionnaire/construction permit data, the blast furnace and sinter plant were designated as BART-eligible.

Mr. Aaron Miller
Page Two

According to 10 CSR 10-6.060 (1)(C), no owner or operator shall begin operation of any installation, which has been shut down for longer than five years without obtaining a permit from the permitting authority. Therefore, if each individual emission unit is not operated within five years of its last operation (currently understood to be in 2003) without clear indication of intent to operate by having an operating permit, new construction permits must be acquired from the Missouri Department of Natural Resources' Air Pollution Control Program before you commence operation.

We intend to issue your operating permit or terminate your application. To accomplish this, please confirm the last operating date of each major process unit and the future plans for each unit at Glover. Please provide this information within 30 days of receipt of this letter. If you request termination, or we do not hear from you at the end of that time, we will terminate your operating permit application.

If you have any questions regarding permit issues, please contact me. Questions regarding BART, regional haze, or the St. Louis $PM_{2.5}$ SIP should be directed to Mr. Jeff Bennett or Mr. John Rustige. All contacts may be reached at (573) 751-4817. Thank you for your time and attention.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Michael Stansfield

Michael J. Stansfield, P.E.
Operating Permits Unit Chief

MJS:jdn

c: PAMS File: 2200-0008-020

Appendix K

CALPUFF/CALPOST Modeling Input Files

```
DYNO NOBEL BART CLASS I ANALYSIS (MINGO)
MDNR RUNS
CENRAP - 6KM CALMET CENTRAL METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =            *
   or
ISCMET.DAT    input    * ISCDAT =            *
   or
PLMMET.DAT    input    * PLMDAT =            *
   or
PROFILE.DAT   input    * PRFDAT =            *
SURFACE.DAT   input    * SFCDAT =            *
RESTARTB.DAT  input    * RSTARTB=            *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =DYN2002Q2.LST     !
CONC.DAT      output   ! CONDAT =DYN2002Q2.CON     !
DFLX.DAT      output   ! DFDAT  =DYN2002Q2.DRY     !
WFLX.DAT      output   ! WFDAT  =DYN2002Q2.WET     !

VISB.DAT      output   ! VISDAT =DYN2003Q2.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2002.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =            *
VOLEMARB.DAT  input    * VOLDAT =            *
BAEMARB.DAT   input    * ARDAT  =            *
LNEMARB.DAT   input    * LNDAT  =            *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =            *
CHEM.DAT      input    * CHEMDAT=            *
H2O2.DAT      input    * H2O2DAT=            *
HILL.DAT      input    * HILDAT=            *
HILLRCT.DAT   input    * RCTDAT=            *
COASTLN.DAT   input    * CSTDAT=            *
FLUXBDY.DAT   input    * BDYDAT=            *
BCON.DAT      input    * BCNDAT=            *
DEBUG.DAT     output   * DEBUG =            *
MASSFLX.DAT   output   * FLXDAT=            *
MASSBAL.DAT   output   * BALDAT=            *
FOG.DAT       output   * FOGDAT=            *
--------------------------------------------------------------------------------
```

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
T = lower case ! LCFILES = T !
F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length

Provision for multiple input files

Number of CALMET.DAT files for run (NMETDAT)
Default: 1 ! NMETDAT = 4 !

Number of PTEMARB.DAT files for run (NPTDAT)
Default: 0 ! NPTDAT = 0 !

Number of BAEMARB.DAT files for run (NARDAT)
Default: 0 ! NARDAT = 0 !

Number of VOLEMARB.DAT files for run (NVOLDAT)
Default: 0 ! NVOLDAT = 0 !

!END!

Subgroup (0a)

The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

```
Default Name  Type         File Name
------------  ----         ---------
none          input    *METDAT=/mnt/usb/calmet.6km.central/2002/cmet.2002.01.central.dat     *  *END*
none          input    *METDAT=/mnt/usb/calmet.6km.central/2002/cmet.2002.02.central.dat     *  *END*
none          input    !METDAT=/mnt/usb/calmet.6km.central/2002/cmet.2002.03.central.dat     !  !END!
none          input    !METDAT=/raidlocal/cmet.2002.04.central.dat                           !  !END!
none          input    !METDAT=/raidlocal/cmet.2002.05.central.dat                           !  !END!
none          input    !METDAT=/raidlocal/cmet.2002.06.central.dat                           !  !END!
none          input    *METDAT=/raidlocal/cmet.2002.07.central.dat                           *  *END*
none          input    *METDAT=/raidlocal/cmet.2002.08.central.dat                           *  *END*
none          input    *METDAT=/raidlocal/cmet.2002.09.central.dat                           *  *END*
none          input    *METDAT=/raidlocal/cmet.2002.10.central.dat                           *  *END*
none          input    *METDAT=/raidlocal/cmet.2002.11.central.dat                           *  *END*
none          input    *METDAT=/raidlocal/cmet.2002.12.central.dat                           *  *END*
```

INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file (METRUN) Default: 0 ! METRUN = 0 !

METRUN = 0 - Run period explicitly defined below
METRUN = 1 - Run all periods in met. file

```
Starting date:   Year (IBYR) -- No default       ! IBYR =  2002 !
(used only if   Month (IBMO) -- No default       ! IBMO =   3 !
 METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   27 !
                 Hour (IBHR) -- No default       ! IBHR =   0 !

Base time zone        (XBTZ) -- No default       ! XBTZ = 0.0  !
  PST = 8., MST = 7.
  CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default       ! IRLG =  2280 !

Number of chemical species (NSPEC)
                         Default: 5       ! NSPEC =  6   !

Number of chemical species
to be emitted  (NSE)           Default: 3       ! NSE =  3   !

Flag to stop run after
SETUP phase (ITEST)            Default: 2       ! ITEST =  2   !
(Used to allow checking
of the model inputs, files, etc.)
     ITEST = 1 - STOPS program after SETUP phase
     ITEST = 2 - Continues with execution of program
              after SETUP

Restart Configuration:

  Control flag (MRESTART)      Default: 0       ! MRESTART =  0   !

     0 = Do not read or write a restart file
     1 = Read a restart file at the beginning of
        the run
     2 = Write a restart file during run
     3 = Read a restart file at beginning of run
        and write a restart file during run

  Number of periods in Restart
  output cycle (NRESPD)       Default: 0       ! NRESPD =  0   !

     0 = File written only at last period
    >0 = File updated every NRESPD periods

Meteorological Data Format (METFM)
                         Default: 1       ! METFM =  1   !

     METFM = 1 - CALMET binary file (CALMET.MET)
     METFM = 2 - ISC ASCII file (ISCMET.MET)
     METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
     METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
              surface parameters file (SURFACE.DAT)

Meteorological Profile Data Format (MPRFFM)
       (used only for METFM = 1, 2, 3)
                         Default: 1       ! MPRFFM =  1   !

     MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
```

MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
Averaging Time (minutes) (AVET)
Default: 60.0 ! AVET = 60. !
PG Averaging Time (minutes) (PGTIME)
Default: 60.0 ! PGTIME = 60. !

!END!

INPUT GROUP: 2 -- Technical options

Vertical distribution used in the
near field (MGAUSS) Default: 1 ! MGAUSS = 1 !
0 = uniform
1 = Gaussian

Terrain adjustment method
(MCTADJ) Default: 3 ! MCTADJ = 3 !
0 = no adjustment
1 = ISC-type of terrain adjustment
2 = simple, CALPUFF-type of terrain
adjustment
3 = partial plume path adjustment

Subgrid-scale complex terrain
flag (MCTSG) Default: 0 ! MCTSG = 0 !
0 = not modeled
1 = modeled

Near-field puffs modeled as
elongated 0 (MSLUG) Default: 0 ! MSLUG = 0 !
0 = no
1 = yes (slug model used)

Transitional plume rise modeled ?
(MTRANS) Default: 1 ! MTRANS = 1 !
0 = no (i.e., final rise only)
1 = yes (i.e., transitional rise computed)

Stack tip downwash? (MTIP) Default: 1 ! MTIP = 1 !
0 = no (i.e., no stack tip downwash)
1 = yes (i.e., use stack tip downwash)

Method used to simulate building
downwash? (MBDW) Default: 1 ! MBDW = 1 !
1 = ISC method
2 = PRIME method

Vertical wind shear modeled above

stack top? (MSHEAR) Default: 0 ! MSHEAR = 0 !
  0 = no (i.e., vertical wind shear not modeled)
  1 = yes (i.e., vertical wind shear modeled)

Puff splitting allowed? (MSPLIT) Default: 0 ! MSPLIT = 0 !
  0 = no (i.e., puffs not split)
  1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM) Default: 1 ! MCHEM = 1 !
  0 = chemical transformation not
     modeled
  1 = transformation rates computed
     internally (MESOPUFF II scheme)
  2 = user-specified transformation
     rates used
  3 = transformation rates computed
     internally (RIVAD/ARM3 scheme)
  4 = secondary organic aerosol formation
     computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3) Default: 0 ! MAQCHEM = 0 !
  0 = aqueous phase transformation

     not modeled
  1 = transformation rates adjusted
     for aqueous phase reactions

Wet removal modeled ? (MWET) Default: 1 ! MWET = 1 !
  0 = no
  1 = yes

Dry deposition modeled ? (MDRY) Default: 1 ! MDRY = 1 !
  0 = no
  1 = yes
  (dry deposition method specified
   for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP) Default: 3 ! MDISP = 3 !

  1 = dispersion coefficients computed from measured values
     of turbulence, sigma v, sigma w
  2 = dispersion coefficients from internally calculated
     sigma v, sigma w using micrometeorological variables
     (u*, w*, L, etc.)
  3 = PG dispersion coefficients for RURAL areas (computed using
     the ISCST multi-segment approximation) and MP coefficients in
     urban areas
  4 = same as 3 except PG coefficients computed using
     the MESOPUFF II eqns.
  5 = CTDM sigmas used for stable and neutral conditions.
     For unstable conditions, sigmas are computed as in
     MDISP = 3, described above. MDISP = 5 assumes that
     measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5)   Default: 3   ! MTURBVW = 3 !
  1 = use sigma-v or sigma-theta measurements
      from PROFILE.DAT to compute sigma-y
      (valid for METFM = 1, 2, 3, 4)
  2 = use sigma-w measurements
      from PROFILE.DAT to compute sigma-z
      (valid for METFM = 1, 2, 3, 4)
  3 = use both sigma-(v/theta) and sigma-w
      from PROFILE.DAT to compute sigma-y and sigma-z
      (valid for METFM = 1, 2, 3, 4)
  4 = use sigma-theta measurements
      from PLMMET.DAT to compute sigma-y
      (valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2)   Default: 3   ! MDISP2 = 3 !
(used only if MDISP = 1 or 5)
  2 = dispersion coefficients from internally calculated
      sigma v, sigma w using micrometeorological variables
      (u*, w*, L, etc.)
  3 = PG dispersion coefficients for RURAL areas (computed using
      the ISCST multi-segment approximation) and MP coefficients in
      urban areas
  4 = same as 3 except PG coefficients computed using
      the MESOPUFF II eqns.

[DIAGNOSTIC FEATURE]
Method used for Lagrangian timescale for Sigma-y
(used only if MDISP=1,2 or MDISP2=1,2)
(MTAULY)   Default: 0   ! MTAULY = 0 !
  0 = Draxler default 617.284 (s)
  1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
  10 < Direct user input (s)   -- e.g., 306.9

[DIAGNOSTIC FEATURE]
Method used for Advective-Decay timescale for Turbulence
(used only if MDISP=2 or MDISP2=2)
(MTAUADV)   Default: 0   ! MTAUADV = 0 !
  0 = No turbulence advection
  1 = Computed (OPTION NOT IMPLEMENTED)
  10 < Direct user input (s)   -- e.g., 300

Method used to compute turbulence sigma-v &
sigma-w using micrometeorological variables
(Used only if MDISP = 2 or MDISP2 = 2)
(MCTURB)   Default: 1   ! MCTURB = 1 !
  1 = Standard CALPUFF subroutines
  2 = AERMOD subroutines

PG sigma-y,z adj. for roughness?   Default: 0   ! MROUGH = 0 !
(MROUGH)
  0 = no

1 = yes

Partial plume penetration of elevated inversion? (MPARTL)   Default: 1   ! MPARTL = 1 !
0 = no
1 = yes

Strength of temperature inversion provided in PROFILE.DAT extended records? (MTINV)   Default: 0   ! MTINV = 0 !
0 = no (computed from measured/default gradients)
1 = yes

PDF used for dispersion under convective conditions? (MPDF)   Default: 0   ! MPDF = 0 !
0 = no
1 = yes

Sub-Grid TIBL module used for shore line? (MSGTIBL)   Default: 0   ! MSGTIBL = 0 !
0 = no
1 = yes

Boundary conditions (concentration) modeled? (MBCON)   Default: 0   ! MBCON = 0 !
0 = no
1 = yes, using formatted BCON.DAT file
2 = yes, using unformatted CONC.DAT file

Analyses of fogging and icing impacts due to emissions from arrays of mechanically-forced cooling towers can be performed using CALPUFF in conjunction with a cooling tower emissions processor (CTEMISS) and its associated postprocessors. Hourly emissions of water vapor and temperature from each cooling tower cell are computed for the current cell configuration and ambient conditions by CTEMISS. CALPUFF models the dispersion of these emissions and provides cloud information in a specialized format for further analysis. Output to FOG.DAT is provided in either 'plume mode' or 'receptor mode' format.

Configure for FOG Model output? (MFOG)   Default: 0   ! MFOG = 0 !
0 = no
1 = yes - report results in PLUME Mode format
2 = yes - report results in RECEPTOR Mode format

Test options specified to see if they conform to regulatory values? (MREG)   Default: 1   ! MREG = 1 !

```
        0 = NO checks are made
        1 = Technical options must conform to USEPA
            Long Range Transport (LRT) guidance
                        METFM    1 or 2
                        AVET     60. (min)
                        PGTIME   60. (min)
                        MGAUSS   1
                        MCTADJ   3
                        MTRANS   1
                        MTIP     1
                        MCHEM    1 or 3 (if modeling SOx, NOx)
                        MWET     1
                        MDRY     1
                        MDISP    2 or 3
                        MPDF     0 if MDISP=3
                                 1 if MDISP=2
                        MROUGH   0
                        MPARTL   1
                        SYTDEP   550. (m)
                        MHFTSZ   0


!END!


-------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =         SO2 !         !END!
! CSPEC =         SO4 !         !END!
! CSPEC =         NOX !         !END!
! CSPEC =        HNO3 !         !END!
! CSPEC =         NO3 !         !END!
! CSPEC =        PM10 !         !END!

                                                    Dry               OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED               NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,                (0=NONE,
   (Limit: 12                                     1=COMPUTED-GAS        1=1st CGRUP,
    Characters                                      2=COMPUTED-PARTICLE   2=2nd CGRUP,
    in length)                                    3=USER-SPECIFIED)     3= etc.)

!          SO2  =         1,              1,           1,                0   !
!          SO4  =         1,              0,           2,                0   !
!          NOX  =         1,              1,           1,                0   !
!         HNO3  =         1,              0,           1,                0   !
!          NO3  =         1,              0,           2,                0   !
!         PM10  =         1,              1,           2,                0   !
```

!END!

Subgroup (3b)

The following names are used for Species-Groups in which results for certain species are combined (added) prior to output. The CGRUP name will be used as the species name in output files. Use this feature to model specific particle-size distributions by treating each size-range as a separate species. Order must be consistent with 3(a) above.

INPUT GROUP: 4 -- Map Projection and Grid control parameters

Projection for all (X,Y):

Map projection
(PMAP) Default: UTM ! PMAP = LCC !

UTM : Universal Transverse Mercator
TTM : Tangential Transverse Mercator
LCC : Lambert Conformal Conic
PS : Polar Stereographic
EM : Equatorial Mercator
LAZA : Lambert Azimuthal Equal Area

False Easting and Northing (km) at the projection origin
(Used only if PMAP= TTM, LCC, or LAZA)
(FEAST) Default=0.0 ! FEAST = 0.000 !
(FNORTH) Default=0.0 ! FNORTH = 0.000 !

UTM zone (1 to 60)
(Used only if PMAP=UTM)
(IUTMZN) No Default ! IUTMZN = 15 !

Hemisphere for UTM projection?
(Used only if PMAP=UTM)
(UTMHEM) Default: N ! UTMHEM = N !
N : Northern hemisphere projection
S : Southern hemisphere projection

Latitude and Longitude (decimal degrees) of projection origin
(Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
(RLAT0) No Default ! RLAT0 = 40N !
(RLON0) No Default ! RLON0 = 97W !

TTM : RLON0 identifies central (true N/S) meridian of projection
RLAT0 selected for convenience
LCC : RLON0 identifies central (true N/S) meridian of projection

RLAT0 selected for convenience
PS : RLON0 identifies central (grid N/S) meridian of projection
RLAT0 selected for convenience
EM : RLON0 identifies central meridian of projection
RLAT0 is REPLACED by 0.0N (Equator)
LAZA: RLON0 identifies longitude of tangent-point of mapping plane
RLAT0 identifies latitude of tangent-point of mapping plane

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1) No Default ! XLAT1 = 33N !
(XLAT2) No Default ! XLAT2 = 45N !

LCC : Projection cone slices through Earth's surface at XLAT1 and XLAT2
PS : Projection plane slices through Earth at XLAT1
(XLAT2 is not used)

Note: Latitudes and longitudes should be positive, and include a
letter N,S,E, or W indicating north or south latitude, and
east or west longitude. For example,
35.9 N Latitude = 35.9N
118.7 E Longitude = 118.7E

Datum-region

The Datum-Region for the coordinates is identified by a character string. Many mapping products currently available use the model of the Earth known as the World Geodetic System 1984 (WGS-G). Other local models may be in use, and their selection in CALMET will make its output consistent with local mapping products. The list of Datum-Regions with official transformation parameters is provided by the National Imagery and Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)

WGS-G WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
NAS-C NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
NWS-27 NWS 6370KM Radius, Sphere
NWS-84 NWS 6370KM Radius, Sphere
ESR-S ESRI REFERENCE 6371KM Radius, Sphere

Datum-region for output coordinates
(DATUM) Default: WGS-G ! DATUM = WGS-G !

METEOROLOGICAL Grid:

Rectangular grid defined for projection PMAP,
with X the Easting and Y the Northing coordinate

No. X grid cells (NX) No default ! NX = 366 !
No. Y grid cells (NY) No default ! NY = 234 !
No. vertical layers (NZ) No default ! NZ = 10 !

Grid spacing (DGRIDKM) No default ! DGRIDKM = 6 !
Units: km

Cell face heights
(ZFACE(nz+1)) No defaults
Units: m
! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
4000. !

Reference Coordinates
of SOUTHWEST corner of
grid cell(1, 1):

X-coordinate (XORIGKM) No default ! XORIGKM = -1008. !
Y coordinate (YORIGKM) No default ! YORIGKM = -864. !
Units: km

COMPUTATIONAL Grid:

The computational grid is identical to or a subset of the MET. grid.
The lower left (LL) corner of the computational grid is at grid point
(IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the
computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
The grid spacing of the computational grid is the same as the MET. grid.

X index of LL corner (IBCOMP) No default ! IBCOMP = 200 !
(1 <= IBCOMP <= NX)

Y index of LL corner (JBCOMP) No default ! JBCOMP = 50 !
(1 <= JBCOMP <= NY)

X index of UR corner (IECOMP) No default ! IECOMP = 320 !
(1 <= IECOMP <= NX)

Y index of UR corner (JECOMP) No default ! JECOMP = 160 !
(1 <= JECOMP <= NY)

SAMPLING Grid (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point
(IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the
sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
The sampling grid must be identical to or a subset of the computational
grid. It may be a nested grid inside the computational grid.
The grid spacing of the sampling grid is DGRIDKM/MESHDN.

Logical flag indicating if gridded
receptors are used (LSAMP) Default: T ! LSAMP = F !
(T=yes, F=no)

X index of LL corner (IBSAMP) No default ! IBSAMP = 1 !
(IBCOMP <= IBSAMP <= IECOMP)

Y index of LL corner (JBSAMP)   No default   ! JBSAMP = 1   !
(JBCOMP <= JBSAMP <= JECOMP)

X index of UR corner (IESAMP)   No default   ! IESAMP = 251   !
(IBCOMP <= IESAMP <= IECOMP)

Y index of UR corner (JESAMP)   No default   ! JESAMP = 246   !
(JBCOMP <= JESAMP <= JECOMP)

Nesting factor of the sampling
grid (MESHDN)   Default: 1   ! MESHDN = 1 !
(MESHDN is an integer >= 1)

!END!

INPUT GROUP: 5 -- Output Options

FILE	* DEFAULT VALUE	* VALUE THIS RUN
----	-------------	--------------
Concentrations (ICON)	1	! ICON = 1 !
Dry Fluxes (IDRY)	1	! IDRY = 1 !
Wet Fluxes (IWET)	1	! IWET = 1 !
Relative Humidity (IVIS) (relative humidity file is required for visibility analysis)	1	! IVIS = 1 !
Use data compression option in output file? (LCOMPRS)	Default: T	! LCOMPRS = T !

*
0 = Do not create file, 1 = create file

DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

Mass flux across specified boundaries
for selected species reported hourly?
(IMFLX)   Default: 0   ! IMFLX = 0 !
0 = no
1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
are specified in Input Group 0)

Mass balance for each species
reported hourly?
(IMBAL)   Default: 0   ! IMBAL = 0 !
0 = no
1 = yes (MASSBAL.DAT filename is
specified in Input Group 0)

LINE PRINTER OUTPUT OPTIONS:

Print concentrations (ICPRT) Default: 0 ! ICPRT = 0 !
Print dry fluxes (IDPRT) Default: 0 ! IDPRT = 0 !
Print wet fluxes (IWPRT) Default: 0 ! IWPRT = 0 !
(0 = Do not print, 1 = Print)

Concentration print interval
(ICFRQ) in hours Default: 1 ! ICFRQ = 1 !
Dry flux print interval
(IDFRQ) in hours Default: 1 ! IDFRQ = 1 !
Wet flux print interval
(IWFRQ) in hours Default: 1 ! IWFRQ = 1 !

Units for Line Printer Output
(IPRTU) Default: 1 ! IPRTU = 3 !

	for Concentration	for Deposition
1 =	g/m**3	g/m**2/s
2 =	mg/m**3	mg/m**2/s
3 =	ug/m**3	ug/m**2/s
4 =	ng/m**3	ng/m**2/s
5 =	Odour Units	

Messages tracking progress of run
written to the screen ?
(IMESG) Default: 2 ! IMESG = 2 !
0 = no
1 = yes (advection step, puff ID)
2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)

SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

	SPECIES /GROUP	---- CONCENTRATIONS ---- PRINTED?	SAVED ON DISK?	------ DRY FLUXES ------ PRINTED?	SAVED ON DISK?	------ WET FLUXES ------ PRINTED?	SAVED ON DISK?	-- MASS FLUX -- SAVED ON DISK?	
!	SO2 =	0,	1,	0,	1,	0,	1,	0	!
!	SO4 =	0,	1,	0,	1,	0,	1,	0	!
!	NOX =	0,	1,	0,	1,	0,	1,	0	!
!	HNO3 =	0,	1,	0,	1,	0,	1,	0	!
!	NO3 =	0,	1,	0,	1,	0,	1,	0	!
!	PM10 =	0,	1,	0,	1,	0,	1,	0	!

OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

Logical for debug output
(LDEBUG) Default: F ! LDEBUG = F !

First puff to track
(IPFDEB) Default: 1 ! IPFDEB = 1 !

```
      Number of puffs to track
      (NPFDEB)                          Default: 1     ! NPFDEB =  1  !

      Met. period to start output
      (NN1)                             Default: 1     ! NN1 =  1   !

      Met. period to end output
      (NN2)                             Default: 10    ! NN2 =  10  !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
      Number of terrain features (NHILL)       Default: 0     ! NHILL =  0   !

      Number of special complex terrain
      receptors  (NCTREC)                   Default: 0     ! NCTREC =  0   !

      Terrain and CTSG Receptor data for
      CTSG hills input in CTDM format ?
      (MHILL)                              No Default     ! MHILL =  2   !
      1 = Hill and Receptor data created
         by CTDM processors & read from
         HILL.DAT and HILLRCT.DAT files
      2 = Hill data created by OPTHILL &
         input below in Subgroup (6b);
         Receptor data in Subgroup (6c)

      Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1. !
      to meters (MHILL=1)

      Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1. !
      to meters (MHILL=1)

      X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

      Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information
```

```
HILL         XC       YC       THETAH  ZGRID  RELIEF    EXPO 1    EXPO 2   SCALE 1    SCALE 2
AMAX1    AMAX2
 NO.        (km)      (km)      (deg.)   (m)     (m)      (m)       (m)       (m)        (m)       (m)       (m)
----        ----      ----      ------  -----  ------    ------    ------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------

   COMPLEX TERRAIN RECEPTOR INFORMATION

                  XRCT        YRCT       ZRCT         XHH
                  (km)        (km)        (m)
                 ------       -----      ------        ----


-------------------
1
    Description of Complex Terrain Variables:
        XC, YC  = Coordinates of center of hill
        THETAH  = Orientation of major axis of hill (clockwise from
                North)
        ZGRID   = Height of the  0  of the grid above mean sea
                level
        RELIEF  = Height of the crest of the hill above the grid elevation
        EXPO 1  = Hill-shape exponent for the major axis
        EXPO 2  = Hill-shape exponent for the major axis
        SCALE 1 = Horizontal length scale along the major axis
        SCALE 2 = Horizontal length scale along the minor axis
        AMAX    = Maximum allowed axis length for the major axis
        BMAX    = Maximum allowed axis length for the major axis

        XRCT, YRCT = Coordinates of the complex terrain receptors
        ZRCT    = Height of the ground (MSL) at the complex terrain
                Receptor
        XHH     = Hill number associated with each complex terrain receptor
                (NOTE: MUST BE ENTERED AS A REAL NUMBER)

  **
    NOTE: DATA for each hill and CTSG receptor are treated as a separate
         input subgroup and therefore must end with an input group terminator.

-------------------------------------------------------------------------------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

     SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY    MESOPHYLL RESISTANCE
HENRY'S LAW COEFFICIENT
      NAME       (cm**2/s)                                  (s/cm)             (dimensionless)
     -------     -----------      ----------      ----------    --------------------     -----------------------

!        SO2 =     0.1509,        1000.,          8.,              0.,                0.04 !
!        NOX =     0.1656,           1.,          8.,              5.,                3.5 !
```

```
!        HNO3 =     0.1628,          1.,          18.,              0.,           0.00000008 !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

    For SINGLE SPECIES, the mean and standard deviation are used to
    compute a deposition velocity for NINT (see group 9) size-ranges,
    and these are then averaged to obtain a mean deposition velocity.

    For GROUPED SPECIES, the size distribution should be explicitly
    specified (by the 'species' in the group), and the standard deviation
    for each should be entered as 0.  The model will then use the
    deposition velocity for the stated mean diameter.

     SPECIES     GEOMETRIC MASS MEAN       GEOMETRIC STANDARD
      NAME           DIAMETER                  DEVIATION
                    (microns)               (microns)
     -------      -------------------       ------------------
!         SO4 =         0.48,                  2.   !
!         NO3 =         0.48,                  2.   !
!        PM10 =           2.,                  2.   !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

    Reference cuticle resistance (s/cm)
    (RCUTR)                       Default: 30    !  RCUTR = 30.0 !
    Reference ground resistance  (s/cm)
    (RGR)                         Default: 10    !    RGR = 10.0 !
    Reference pollutant reactivity
    (REACTR)                      Default: 8     ! REACTR = 8.0 !

    Number of particle-size intervals used to
    evaluate effective particle deposition velocity
    (NINT)                        Default: 9     !   NINT =  9  !

    Vegetation state in unirrigated areas
    (IVEG)                        Default: 1     !   IVEG =  1   !
      IVEG=1 for active and unstressed vegetation
      IVEG=2 for active and stressed vegetation
      IVEG=3 for inactive vegetation

!END!
```

INPUT GROUP: 10 -- Wet Deposition Parameters

```
                 Scavenging Coefficient -- Units: (sec)**(-1)

      Pollutant      Liquid Precip.       Frozen Precip.
      ---------      --------------       --------------
!         SO2 =        3.0E-05,            0.0E00 !
!         SO4 =        1.0E-04,            3.0E-05 !
!        HNO3 =        6.0E-05,            0.0E00 !
!         NO3 =        1.0E-04,            3.0E-05 !
!        PM10 =        1.0E-04,            3.0E-05 !

!END!
```

INPUT GROUP: 11 -- Chemistry Parameters

```
    Ozone data input option (MOZ)     Default: 1           ! MOZ =  0   !
    (Used only if MCHEM = 1, 3, or 4)
       0 = use a monthly background ozone value
       1 = read hourly ozone concentrations from
           the OZONE.DAT data file

    Monthly ozone concentrations
    (Used only if MCHEM = 1, 3, or 4 and
     MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
    (BCKO3) in ppb                    Default: 12*80.
    !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00, 65.00, 65.00, 26.00, 26.00 !

    Monthly ammonia concentrations
    (Used only if MCHEM = 1, or 3)
    (BCKNH3) in ppb                   Default: 12*10.
    !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50 !

    Nighttime SO2 loss rate (RNITE1)
    in percent/hour                   Default: 0.2         ! RNITE1 = .2 !

    Nighttime NOx loss rate (RNITE2)
    in percent/hour                   Default: 2.0         ! RNITE2 = 2.0 !

    Nighttime HNO3 formation rate (RNITE3)
    in percent/hour                   Default: 2.0         ! RNITE3 = 2.0 !

    H2O2 data input option (MH2O2)    Default: 1           ! MH2O2 =  0   !
    (Used only if MAQCHEM = 1)
       0 = use a monthly background H2O2 value
       1 = read hourly H2O2 concentrations from
```

```
        the H2O2.DAT data file

    Monthly H2O2 concentrations
    (Used only if MQACHEM = 1 and
     MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
    (BCKH2O2) in ppb                  Default: 12*1.
    !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !


--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
    (used only if MCHEM = 4)

    The SOA module uses monthly values of:
         Fine particulate concentration in ug/m^3 (BCKPMF)
         Organic fraction of fine particulate     (OFRAC)
         VOC / NOX ratio (after reaction)         (VCNX)
    to characterize the air mass when computing
    the formation of SOA from VOC emissions.
    Typical values for several distinct air mass types are:

      Month    1    2    3    4    5    6    7    8    9   10   11   12
              Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

    Clean Continental
      BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
      OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
      VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

    Clean Marine (surface)
      BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
      OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
      VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

    Urban - low biogenic (controls present)
      BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
      OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
      VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

    Urban - high biogenic (controls present)
      BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
      OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
      VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

    Regional Plume
      BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
      OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
      VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

    Urban - no controls present
      BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
      OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
      VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

    Default: Clean Continental
    !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
    !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
```

```
    !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

    Horizontal size of puff (m) beyond which
    time-dependent dispersion equations (Heffter)
    are used to determine sigma-y and
    sigma-z (SYTDEP)                           Default: 550.   ! SYTDEP = 5.5E02 !

    Switch for using Heffter equation for sigma z
    as above (0 = Not use Heffter; 1 = use Heffter
    (MHFTSZ)                                   Default: 0      ! MHFTSZ =  0   !

    Stability class used to determine plume
    growth rates for puffs above the boundary
    layer (JSUP)                               Default: 5      ! JSUP =  5   !

    Vertical dispersion constant for stable
    conditions (k1 in Eqn. 2.7-3)  (CONK1)     Default: 0.01   ! CONK1 = .01 !

    Vertical dispersion constant for neutral/
    unstable conditions (k2 in Eqn. 2.7-4)
    (CONK2)                                    Default: 0.1    ! CONK2 = .1 !

    Factor for determining Transition-point from
    Schulman-Scire to Huber-Snyder Building Downwash
    scheme (SS used for Hs < Hb + TBD * HL)
    (TBD)                                      Default: 0.5    ! TBD = .5 !
      TBD < 0   ==> always use Huber-Snyder
      TBD = 1.5 ==> always use Schulman-Scire
      TBD = 0.5 ==> ISC Transition-point

    Range of land use categories for which
    urban dispersion is assumed
    (IURB1, IURB2)                             Default: 10     ! IURB1 =  10  !
                                               19     ! IURB2 =  19  !

    Site characterization parameters for single-point Met data files ---------
    (needed for METFM = 2,3,4)

      Land use category for modeling domain
      (ILANDUIN)                               Default: 20     ! ILANDUIN =  20  !

      Roughness length (m) for modeling domain
      (Z0IN)                                   Default: 0.25   ! Z0IN = .25 !

      Leaf area index for modeling domain
      (XLAIIN)                                 Default: 3.0    ! XLAIIN = 3.0 !
```

Elevation above sea level (m)
(ELEVIN) Default: 0.0 ! ELEVIN = .0 !

Latitude (degrees) for met location
(XLATIN) Default: -999. ! XLATIN = -999.0 !

Longitude (degrees) for met location
(XLONIN) Default: -999. ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

Anemometer height (m) (Used only if METFM = 2,3)
(ANEMHT) Default: 10. ! ANEMHT = 10.0 !

Form of lateral turbulance data in PROFILE.DAT file
(Used only if METFM = 4 or MTURBVW = 1 or 3)
(ISIGMAV) Default: 1 ! ISIGMAV = 1 !
0 = read sigma-theta
1 = read sigma-v

Choice of mixing heights (Used only if METFM = 4)
(IMIXCTDM) Default: 0 ! IMIXCTDM = 0 !
0 = read PREDICTED mixing heights
1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN) Default: 1.0 ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN) Default: 1.0 ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW) Default: 99 ! MXNEW = 99 !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM) Default: 99 ! MXSAM = 99 !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT) Default: 2 ! NCOUNT = 2 !

Minimum sigma y for a new puff/slug (m)
(SYMIN) Default: 1.0 ! SYMIN = 1.0 !

Minimum sigma z for a new puff/slug (m)
(SZMIN) Default: 1.0 ! SZMIN = 1.0 !

Default minimum turbulence velocities sigma-v and sigma-w
for each stability class over land and over water (m/s)
(SVMIN(12) and SWMIN(12))

```
            ----------  LAND  ----------        ---------  WATER  ----------
   Stab Class :  A    B    C    D    E    F         A    B    C    D    E    F
                --- --- --- --- --- ---        --- --- --- --- --- ---
Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37, .37, .37, .37
Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08, .06, .03, .016

   ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370, 0.370, 0.370!
   ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!


Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))                         Default: 0.0,0.0  ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                          Default: 0.5    ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)                          Default: 3000.  ! XMAXZI = 4000.0 !

Minimum mixing height (m)
(XMINZI)                          Default: 50.    ! XMINZI = 20.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))                  Default   :
                      ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

                  Wind Speed Class :  1     2     3     4     5
                                     ---   ---   ---   ---   ---
                        ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))                  Default   : ISC RURAL values
                      ISC RURAL : .07, .07, .10, .15, .35, .55
                      ISC URBAN : .15, .15, .20, .25, .30, .30

                  Stability Class :  A     B     C     D     E     F
                                    ---   ---   ---   ---   ---   ---
                        ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))                  Default: 0.020, 0.035
                        ! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
```

```
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))             Stability Class :  A     B     C     D     E     F
                    Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                                   ---   ---   ---   ---   ---   ---
                        !  PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)                  Default: 10.       ! SL2PF = 10.0 !

Puff-splitting control variables ------------------------

 VERTICAL SPLIT
 --------------

 Number of puffs that result every time a puff
 is split - nsplit=2 means that 1 puff splits
 into 2
 (NSPLIT)                Default:   3       ! NSPLIT =  3  !

 Time(s) of a day when split puffs are eligible to
 be split once again; this is typically set once
 per day, around sunset before nocturnal shear develops.
 24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
 0=do not re-split    1=eligible for re-split
 (IRESPLIT(24))              Default:  Hour 17 = 1
 !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

 Split is allowed only if last hour's mixing
 height (m) exceeds a minimum value
 (ZISPLIT)               Default: 100.      ! ZISPLIT = 100.0 !

 Split is allowed only if ratio of last hour's
 mixing ht to the maximum mixing ht experienced
 by the puff is less than a maximum value (this
 postpones a split until a nocturnal layer develops)
 (ROLDMAX)                   Default: 0.25      ! ROLDMAX = 0.25 !


 HORIZONTAL SPLIT
 ----------------

 Number of puffs that result every time a puff
 is split - nsplith=5 means that 1 puff splits
 into 5
 (NSPLITH)               Default:   5       ! NSPLITH =  5  !

 Minimum sigma-y (Grid Cells Units) of puff
 before it may be split
 (SYSPLITH)               Default:  1.0      ! SYSPLITH = 1.0 !

 Minimum puff elongation rate (SYSPLITH/hr) due to
 wind shear, before it may be split
 (SHSPLITH)               Default:  2.       ! SHSPLITH = 2.0 !
```

Minimum concentration (g/m^3) of each
species in puff before it may be split
Enter array of NSPEC values; if a single value is
entered, it will be used for ALL species
(CNSPLITH) Default: 1.0E-07 ! CNSPLITH = 1.0E-07 !

Integration control variables ------------------------

Fractional convergence criterion for numerical SLUG
sampling integration
(EPSSLUG) Default: 1.0e-04 ! EPSSLUG = 1.0E-04 !

Fractional convergence criterion for numerical AREA
source integration
(EPSAREA) Default: 1.0e-06 ! EPSAREA = 1.0E-06 !

Trajectory step-length (m) used for numerical rise
integration
(DSRISE) Default: 1.0 ! DSRISE = 1.0 !

Boundary Condition (BC) Puff control variables ------------------------

Minimum height (m) to which BC puffs are mixed as they are emitted
(MBCON=2 ONLY). Actual height is reset to the current mixing height
at the release point if greater than this minimum.
(HTMINBC) Default: 500. ! HTMINBC = 500.0 !

Search radius (in BC segment lengths) about a receptor for sampling
nearest BC puff. BC puffs are emitted with a spacing of one segment
length, so the search radius should be greater than 1.
(RSAMPBC) Default: 4. ! RSAMPBC = 10.0 !

Near-Surface depletion adjustment to concentration profile used when
sampling BC puffs?
(MDEPBC) Default: 1 ! MDEPBC = 1 !
0 = Concentration is NOT adjusted for depletion
1 = Adjust Concentration for depletion

!END!

INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters

Subgroup (13a)

Number of point sources with
parameters provided below (NPT1) No default ! NPT1 = 1 !

Units used for point source
emissions below (IPTU) Default: 1 ! IPTU = 1 !

```
        1 =       g/s
        2 =      kg/hr
        3 =      lb/hr
        4 =    tons/yr
        5 =    Odour Unit * m**3/s  (vol. flux of odour compound)
        6 =    Odour Unit * m**3/min
        7 =    metric tons/yr

   Number of source-species
   combinations with variable
   emissions scaling factors
   provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

   Number of point sources with
   variable emission parameters
   provided in external file      (NPT2)  No default  !  NPT2 =  0  !

   (If NPT2 > 0, these point
   source emissions are read from
   the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                               a
       POINT SOURCE: CONSTANT DATA
       -----------------------------
                                                          b        c
 Source      X         Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
  No.    Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
           (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
 ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
  1 ! SRCNAM = E01 !
  1 ! X =  510.1438,  -46.6207,   32.92, 153.0,    2.13,  8.86, 477.59,  0.0, 0.00E00,  0.0E00,  2.36551E01,
      0.0E00,  0.0E00, 0.00E00 !
  1 ! FMFAC  =      1.0 !   !END!
--------

  a
   Data for each source are treated as a separate input subgroup
   and therefore must end with an input group terminator.

   SRCNAM  is a 12-character name for a source
           (No default)
   X       is an array holding the source data listed by the column headings
           (No default)
   SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
           (Default: 0.,0.)
   FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
           the effect of rain-caps or other physical configurations that
           reduce momentum rise associated with the actual exit velocity.
           (Default: 1.0  -- full momentum used)

  b
```

0. = No building downwash modeled, 1. = downwash modeled
NOTE: must be entered as a REAL number (i.e., with decimal point)

c
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by IPTU
(e.g. 1 for g/s).

Subgroup (13c)

BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

Source a
No. Effective building height, width, length and X/Y offset (in meters)
every 10 degrees. LENGTH, XBADJ, and YBADJ are only needed for
MBDW=2 (PRIME downwash option)
------ --

----

a
Building height, width, length, and X/Y offset from the source are treated
as a separate input subgroup for each source and therefore must end with
an input group terminator. The X/Y offset is the position, relative to the
stack, of the center of the upwind face of the projected building, with the
x-axis pointing along the flow direction.

Subgroup (13d)
----

a
POINT SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission
rates given in 13b. Factors entered multiply the rates in 13b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0
0 = Constant
1 = Diurnal cycle (24 scaling factors: hours 1-24)
2 = Monthly cycle (12 scaling factors: months 1-12)
3 = Hour & Season (4 groups of 24 hourly scaling factors,
where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where
first group is Stability Class A,
and the speed classes have upper
bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,

45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

Number of polygon area sources with
parameters specified below (NAR1)   No default ! NAR1 = 0   !

Units used for area source
emissions below   (IARU)   Default: 1 ! IARU =   1 !
1 =   g/m**2/s
2 =   kg/m**2/hr
3 =   lb/m**2/hr
4 =   tons/m**2/yr
5 =   Odour Unit * m/s (vol. flux/m**2 of odour compound)
6 =   Odour Unit * m/min
7 =   metric tons/m**2/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (14d)   (NSAR1) Default: 0 ! NSAR1 = 0 !

Number of buoyant polygon area sources
with variable location and emission
parameters (NAR2)   No default ! NAR2 = 0   !
(If NAR2 > 0, ALL parameter data for
these sources are read from the file: BAEMARB.DAT)

!END!

Subgroup (14b)
----
a
AREA SOURCE: CONSTANT DATA

Source No.	Effect. Height (m)	Base Elevation (m)	Initial Sigma z[b] (m)	Emission Rates
-------	------	------	--------	---------

----
a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.
b
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IARU (e.g. 1 for g/m**2/s).

Subgroup (14c)

COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON

```
Source                                                        a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------
```

----
a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (14d)

```
                                    a
        AREA SOURCE: VARIABLE EMISSIONS DATA
        --------------------------------------
```

Use this subgroup to describe temporal variations in the emission rates given in 14b. Factors entered multiply the rates in 14b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY)   Default: 0
- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

```
--------
   a
    Data for each species are treated as a separate input subgroup
    and therefore must end with an input group terminator.


--------------------------------------------------------------------------------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

    Number of buoyant line sources
    with variable location and emission
    parameters (NLN2)                          No default  !  NLN2 =  0   !

    (If NLN2 > 0, ALL parameter data for
     these sources are read from the file: LNEMARB.DAT)

    Number of buoyant line sources (NLINES)       No default   ! NLINES =  0  !

    Units used for line source
    emissions below               (ILNU)         Default: 1  !  ILNU =   1  !
         1 =        g/s
         2 =       kg/hr
         3 =       lb/hr
         4 =     tons/yr
         5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
         6 =     Odour Unit * m**3/min
         7 =     metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (15c)       (NSLN1) Default: 0  !  NSLN1 =  0  !

    Maximum number of segments used to model
    each line (MXNSEG)                         Default: 7   ! MXNSEG =  7  !

    The following variables are required only if NLINES > 0.  They are
    used in the buoyant line source plume rise calculations.

       Number of distances at which              Default: 6   ! NLRISE =  6  !
       transitional rise is computed

       Average building length (XL)              No default   ! XL = .0 !
                                           (in meters)

       Average building height (HBL)             No default   ! HBL = .0 !
                                           (in meters)

       Average building width (WBL)              No default   ! WBL = .0 !
```

```
                                   (in meters)

    Average line source width (WML)          No default   ! WML = .0 !
                                   (in meters)

    Average separation between buildings (DXL)  No default   ! DXL = .0 !
                                   (in meters)

    Average buoyancy parameter (FPRIMEL)       No default   ! FPRIMEL = .0 !
                                   (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

     BUOYANT LINE SOURCE: CONSTANT DATA
     ----------------------------------
                                                                  a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base       Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height    Elevation      Rates
          (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------   ---------    ---------

--------

  a
   Data for each source are treated as a separate input subgroup
   and therefore must end with an input group terminator.

  b
   An emission rate must be entered for every pollutant modeled.
   Enter emission rate of zero for secondary pollutants that are
   modeled, but not emitted.  Units are specified by ILNTU
   (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                         a
     BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
     ----------------------------------------------

   Use this subgroup to describe temporal variations in the emission
   rates given in 15b.  Factors entered multiply the rates in 15b.
   Skip sources here that have constant emissions.

   IVARY determines the type of variation, and is source-specific:
   (IVARY)                          Default: 0
        0 =       Constant
        1 =       Diurnal cycle (24 scaling factors: hours 1-24)
        2 =       Monthly cycle (12 scaling factors: months 1-12)
        3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                           where first group is DEC-JAN-FEB)
        4 =       Speed & Stab. (6 groups of 6 scaling factors, where
```

first group is Stability Class A,
and the speed classes have upper
bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

```
Number of volume sources with
parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !

Units used for volume source
emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1  !
     1 =        g/s
     2 =       kg/hr
     3 =       lb/hr
     4 =     tons/yr
     5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
     6 =     Odour Unit * m**3/min
     7 =     metric tons/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

Number of volume sources with
variable location and emission
parameters                   (NVL2)     No default  !  NVL2 =   0   !

(If NVL2 > 0, ALL parameter data for
 these sources are read from the VOLEMARB.DAT file(s) )
```

!END!

Subgroup (16b)
----

a
VOLUME SOURCE: CONSTANT DATA

X Coordinate (km)	Y Coordinate (km)	Effect. Height (m)	Base Elevation (m)	Initial Sigma y (m)	Initial Sigma z (m)	Emission Rates [b]
----------	----------	------	------	--------	--------	--------

----

a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IVLU (e.g. 1 for g/s).

Subgroup (16c)
----

a
VOLUME SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 16b. Factors entered multiply the rates in 16b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0
0 = Constant
1 = Diurnal cycle (24 scaling factors: hours 1-24)
2 = Monthly cycle (12 scaling factors: months 1-12)
3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

Number of non-gridded receptors (NREC) No default ! NREC = 698 !

!END!

Subgroup (17b)
----

a

NON-GRIDDED (DISCRETE) RECEPTOR DATA

Receptor No.	X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height b Above Ground (m)
1 ! X =	596.5576895,	-316.1011881,	106,	0.000! !END!
2 ! X =	596.538613,	-315.8526241,	108,	0.000! !END!
3 ! X =	596.5194378,	-315.6040651,	108,	0.000! !END!
4 ! X =	596.500263,	-315.3555064,	106,	0.000! !END!
5 ! X =	596.4812331,	-315.1079393,	115,	0.000! !END!
6 ! X =	596.4620591,	-314.8593815,	121,	0.000! !END!
7 ! X =	596.8061573,	-316.0819418,	104,	0.000! !END!
8 ! X =	596.7869813,	-315.8333827,	105,	0.000! !END!
9 ! X =	596.7678057,	-315.584824,	106,	0.000! !END!
10 ! X =	596.7487751,	-315.3372569,	106,	0.000! !END!
11 ! X =	596.7296004,	-315.0886991,	110,	0.000! !END!
12 ! X =	596.7104261,	-314.8401416,	116,	0.000! !END!
13 ! X =	596.6912521,	-314.5915846,	121,	0.000! !END!
14 ! X =	597.0545255,	-316.0626996,	103,	0.000! !END!
15 ! X =	597.0353492,	-315.814141,	104,	0.000! !END!
16 ! X =	597.0162725,	-315.5655782,	105,	0.000! !END!
17 ! X =	596.9971423,	-315.318016,	105,	0.000! !END!
18 ! X =	596.9779672,	-315.0694586,	106,	0.000! !END!
19 ! X =	596.9588917,	-314.820897,	109,	0.000! !END!
20 ! X =	596.9397174,	-314.5723404,	113,	0.000! !END!
21 ! X =	596.9205436,	-314.3237842,	117,	0.000! !END!
22 ! X =	597.2264328,	-315.0502132,	105,	0.000! !END!
23 ! X =	597.2072578,	-314.8016566,	105,	0.000! !END!
24 ! X =	597.1880832,	-314.5531004,	106,	0.000! !END!
25 ! X =	597.168909,	-314.3045446,	112,	0.000! !END!
26 ! X =	597.1498343,	-314.0559848,	118,	0.000! !END!
27 ! X =	597.55136,	-316.02421,	102,	0.000! !END!
28 ! X =	597.5322284,	-315.7766477,	102,	0.000! !END!
29 ! X =	597.5130518,	-315.5280903,	102,	0.000! !END!
30 ! X =	597.4939747,	-315.2795288,	103,	0.000! !END!
31 ! X =	597.4747989,	-315.0309721,	104,	0.000! !END!
32 ! X =	597.4556235,	-314.7824159,	104,	0.000! !END!
33 ! X =	597.4364486,	-314.5338601,	105,	0.000! !END!
34 ! X =	597.4173732,	-314.2853002,	106,	0.000! !END!
35 ! X =	597.3982444,	-314.0377409,	112,	0.000! !END!
36 ! X =	597.3790706,	-313.7891863,	116,	0.000! !END!
37 ! X =	597.3598973,	-313.5406322,	117,	0.000! !END!
38 ! X =	597.799727,	-316.0049669,	102,	0.000! !END!
39 ! X =	597.7805951,	-315.7574051,	102,	0.000! !END!
40 ! X =	597.7615172,	-315.5088436,	102,	0.000! !END!
41 ! X =	597.7423407,	-315.2602869,	102,	0.000! !END!
42 ! X =	597.7231646,	-315.0117307,	103,	0.000! !END!
43 ! X =	597.704088,	-314.7631704,	103,	0.000! !END!
44 ! X =	597.6849127,	-314.514615,	104,	0.000! !END!
45 ! X =	597.6657831,	-314.2670557,	105,	0.000! !END!
46 ! X =	597.6466086,	-314.0185011,	105,	0.000! !END!
47 ! X =	597.6275337,	-313.7699425,	106,	0.000! !END!
48 ! X =	597.60836,	-313.5213887,	110,	0.000! !END!

49 ! X = 597.5891868, -313.2728354, 119, 0.000! !END!
50 ! X = 598.0482382, -315.9867148, 102, 0.000! !END!
51 ! X = 598.0290605, -315.7381577, 102, 0.000! !END!
52 ! X = 598.0098832, -315.4896011, 102, 0.000! !END!
53 ! X = 597.9907063, -315.2410448, 102, 0.000! !END!
54 ! X = 597.971629, -314.9924845, 102, 0.000! !END!
55 ! X = 597.9524529, -314.7439291, 102, 0.000! !END!
56 ! X = 597.9332772, -314.4953741, 102, 0.000! !END!
57 ! X = 597.9141473, -314.2478152, 103, 0.000! !END!
58 ! X = 597.8950716, -313.9992566, 104, 0.000! !END!
59 ! X = 597.8758972, -313.7507028, 105, 0.000! !END!
60 ! X = 597.8567232, -313.5021495, 106, 0.000! !END!
61 ! X = 597.8375496, -313.2535965, 110, 0.000! !END!
62 ! X = 597.8184755, -313.0050395, 117, 0.000! !END!
63 ! X = 598.2966045, -315.9674711, 102, 0.000! !END!
64 ! X = 598.2774264, -315.7189145, 102, 0.000! !END!
65 ! X = 598.2582487, -315.4703582, 102, 0.000! !END!
66 ! X = 598.2391706, -315.2217979, 102, 0.000! !END!
67 ! X = 598.2199938, -314.9732425, 102, 0.000! !END!
68 ! X = 598.2008174, -314.7246875, 102, 0.000! !END!
69 ! X = 598.1817859, -314.4771241, 102, 0.000! !END!
70 ! X = 598.1626103, -314.2285699, 102, 0.000! !END!
71 ! X = 598.1434351, -313.9800162, 102, 0.000! !END!
72 ! X = 598.1242603, -313.7314628, 103, 0.000! !END!
73 ! X = 598.1051851, -313.4829054, 104, 0.000! !END!
74 ! X = 598.0860111, -313.2343529, 106, 0.000! !END!
75 ! X = 598.0668376, -312.9858008, 106, 0.000! !END!
76 ! X = 598.0477098, -312.7382447, 108, 0.000! !END!
77 ! X = 598.0285371, -312.4896934, 121, 0.000! !END!
78 ! X = 598.5641491, -316.1967839, 102, 0.000! !END!
79 ! X = 598.5449703, -315.9482272, 102, 0.000! !END!
80 ! X = 598.525891, -315.6996665, 102, 0.000! !END!
81 ! X = 598.506713, -315.4511106, 102, 0.000! !END!
82 ! X = 598.4875354, -315.2025552, 102, 0.000! !END!
83 ! X = 598.4683582, -314.9540002, 102, 0.000! !END!
84 ! X = 598.449326, -314.7064368, 102, 0.000! !END!
85 ! X = 598.4301496, -314.4578826, 102, 0.000! !END!
86 ! X = 598.4109737, -314.2093289, 102, 0.000! !END!
87 ! X = 598.3917981, -313.9607755, 102, 0.000! !END!
88 ! X = 598.3727221, -313.7122181, 102, 0.000! !END!
89 ! X = 598.3535474, -313.4636656, 103, 0.000! !END!
90 ! X = 598.3343731, -313.2151135, 104, 0.000! !END!
91 ! X = 598.3152446, -312.9675574, 105, 0.000! !END!
92 ! X = 598.2961702, -312.7190016, 106, 0.000! !END!
93 ! X = 598.2769972, -312.4704507, 116, 0.000! !END!
94 ! X = 598.2578245, -312.2219003, 121, 0.000! !END!
95 ! X = 598.7168214, -314.9347532, 102, 0.000! !END!
96 ! X = 598.6976897, -314.6871946, 102, 0.000! !END!
97 ! X = 598.678513, -314.4386409, 102, 0.000! !END!
98 ! X = 598.6594358, -314.190083, 102, 0.000! !END!
99 ! X = 598.6402599, -313.9415301, 102, 0.000! !END!
100 ! X = 598.6210844, -313.6929775, 102, 0.000! !END!
101 ! X = 598.6019094, -313.4444254, 102, 0.000! !END!
102 ! X = 598.5827347, -313.1958737, 103, 0.000! !END!
103 ! X = 598.563705, -312.9483136, 104, 0.000! !END!
104 ! X = 598.5445312, -312.6997627, 106, 0.000! !END!

105 ! X = 598.5253577, -312.4512122, 111, 0.000! !END!
106 ! X = 598.5061847, -312.2026621, 118, 0.000! !END!
107 ! X = 598.4871113, -311.954108, 121, 0.000! !END!
108 ! X = 598.4679391, -311.7055588, 121, 0.000! !END!
109 ! X = 598.946053, -314.6679521, 102, 0.000! !END!
110 ! X = 598.926975, -314.4193943, 102, 0.000! !END!
111 ! X = 598.9077984, -314.1708414, 102, 0.000! !END!
112 ! X = 598.8886222, -313.9222888, 102, 0.000! !END!
113 ! X = 598.8694463, -313.6737367, 102, 0.000! !END!
114 ! X = 598.8503701, -313.4251805, 102, 0.000! !END!
115 ! X = 598.8312404, -313.1776248, 102, 0.000! !END!
116 ! X = 598.8120658, -312.9290739, 103, 0.000! !END!
117 ! X = 598.7928917, -312.6805235, 105, 0.000! !END!
118 ! X = 598.773817, -312.4319689, 105, 0.000! !END!
119 ! X = 598.7546437, -312.1834193, 110, 0.000! !END!
120 ! X = 598.7354707, -311.93487, 117, 0.000! !END!
121 ! X = 598.7162982, -311.6863212, 121, 0.000! !END!
122 ! X = 599.2135936, -314.8972627, 102, 0.000! !END!
123 ! X = 599.194515, -314.6487049, 102, 0.000! !END!
124 ! X = 599.1753376, -314.4001519, 102, 0.000! !END!
125 ! X = 599.1561606, -314.1515994, 102, 0.000! !END!
126 ! X = 599.1370831, -313.9030428, 102, 0.000! !END!
127 ! X = 599.1179069, -313.6544911, 102, 0.000! !END!
128 ! X = 599.0987766, -313.4069354, 102, 0.000! !END!
129 ! X = 599.0796012, -313.1583845, 102, 0.000! !END!
130 ! X = 599.0604263, -312.909834, 102, 0.000! !END!
131 ! X = 599.0413509, -312.6612795, 103, 0.000! !END!
132 ! X = 599.0221768, -312.4127298, 104, 0.000! !END!
133 ! X = 599.0030031, -312.1641806, 106, 0.000! !END!
134 ! X = 598.9838298, -311.9156317, 108, 0.000! !END!
135 ! X = 598.9648014, -311.6680744, 121, 0.000! !END!
136 ! X = 598.945629, -311.4195264, 121, 0.000! !END!
137 ! X = 599.4620556, -314.8780148, 102, 0.000! !END!
138 ! X = 599.4428774, -314.6294618, 102, 0.000! !END!
139 ! X = 599.4236997, -314.3809093, 102, 0.000! !END!
140 ! X = 599.4046215, -314.1323527, 102, 0.000! !END!
141 ! X = 599.3854445, -313.8838009, 102, 0.000! !END!
142 ! X = 599.366268, -313.6352496, 102, 0.000! !END!
143 ! X = 599.3471373, -313.3876944, 102, 0.000! !END!
144 ! X = 599.3280607, -313.1391394, 102, 0.000! !END!
145 ! X = 599.3088855, -312.8905893, 102, 0.000! !END!
146 ! X = 599.2897106, -312.6420397, 102, 0.000! !END!
147 ! X = 599.2705361, -312.3934904, 103, 0.000! !END!
148 ! X = 599.2514612, -312.1449371, 103, 0.000! !END!
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150 ! X = 599.2131597, -311.6488363, 109, 0.000! !END!
151 ! X = 599.1939869, -311.4002886, 119, 0.000! !END!
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154 ! X = 599.6721605, -314.3616618, 102, 0.000! !END!
155 ! X = 599.6529828, -314.1131101, 102, 0.000! !END!
156 ! X = 599.6338056, -313.8645588, 102, 0.000! !END!
157 ! X = 599.6147732, -313.6169991, 102, 0.000! !END!
158 ! X = 599.5955967, -313.3684486, 102, 0.000! !END!
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160 ! X = 599.5572451, -312.8713488, 102, 0.000! !END!

161 ! X = 599.5380699, -312.6227996, 102, 0.000! !END!
162 ! X = 599.5189942, -312.3742463, 102, 0.000! !END!
163 ! X = 599.4998198, -312.1256978, 102, 0.000! !END!
164 ! X = 599.4806912, -311.8781454, 104, 0.000! !END!
165 ! X = 599.4615176, -311.6295978, 104, 0.000! !END!
166 ! X = 599.4424436, -311.3810461, 105, 0.000! !END!
167 ! X = 599.4232709, -311.1324993, 106, 0.000! !END!
168 ! X = 599.4040986, -310.8839529, 112, 0.000! !END!
169 ! X = 599.3849266, -310.6354069, 121, 0.000! !END!
170 ! X = 599.9013438, -314.0938673, 102, 0.000! !END!
171 ! X = 599.8823107, -313.8463075, 102, 0.000! !END!
172 ! X = 599.8631335, -313.597757, 102, 0.000! !END!
173 ! X = 599.8439567, -313.349207, 102, 0.000! !END!
174 ! X = 599.8247803, -313.1006573, 102, 0.000! !END!
175 ! X = 599.8057034, -312.8521036, 102, 0.000! !END!
176 ! X = 599.7865279, -312.6035547, 102, 0.000! !END!
177 ! X = 599.7673527, -312.3550063, 102, 0.000! !END!
178 ! X = 599.7482234, -312.1074539, 102, 0.000! !END!
179 ! X = 599.7291482, -311.8589018, 102, 0.000! !END!
180 ! X = 599.7099743, -311.6103546, 103, 0.000! !END!
181 ! X = 599.6908008, -311.3618078, 104, 0.000! !END!
182 ! X = 599.6716277, -311.1132614, 105, 0.000! !END!
183 ! X = 599.652455, -310.8647154, 107, 0.000! !END!
184 ! X = 599.6333819, -310.6161653, 118, 0.000! !END!
185 ! X = 599.6142554, -310.3686158, 121, 0.000! !END!
186 ! X = 600.1498035, -314.0746197, 102, 0.000! !END!
187 ! X = 600.1306709, -313.8270648, 102, 0.000! !END!
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189 ! X = 600.0924153, -313.3299606, 102, 0.000! !END!
190 ! X = 600.0732386, -313.0814113, 102, 0.000! !END!
191 ! X = 600.0540623, -312.8328625, 102, 0.000! !END!
192 ! X = 600.0348863, -312.5843141, 102, 0.000! !END!
193 ! X = 600.0157109, -312.335766, 102, 0.000! !END!
194 ! X = 599.9966803, -312.0882095, 102, 0.000! !END!
195 ! X = 599.9775056, -311.8396623, 102, 0.000! !END!
196 ! X = 599.9583314, -311.5911155, 102, 0.000! !END!
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199 ! X = 599.9009102, -310.8454731, 105, 0.000! !END!
200 ! X = 599.881783, -310.5979236, 108, 0.000! !END!
201 ! X = 599.8626108, -310.3493788, 115, 0.000! !END!
202 ! X = 599.843439, -310.1008344, 119, 0.000! !END!
203 ! X = 599.8243668, -309.852286, 121, 0.000! !END!
204 ! X = 600.3790307, -313.8078218, 104, 0.000! !END!
205 ! X = 600.3599519, -313.5592676, 102, 0.000! !END!
206 ! X = 600.3407744, -313.3107184, 102, 0.000! !END!
207 ! X = 600.3215973, -313.0621695, 102, 0.000! !END!
208 ! X = 600.3024207, -312.8136211, 102, 0.000! !END!
209 ! X = 600.2833435, -312.5650686, 102, 0.000! !END!
210 ! X = 600.2642131, -312.3175166, 102, 0.000! !END!
211 ! X = 600.2450377, -312.0689694, 102, 0.000! !END!
212 ! X = 600.2258626, -311.8204226, 102, 0.000! !END!
213 ! X = 600.2067872, -311.5718717, 102, 0.000! !END!
214 ! X = 600.187613, -311.3233258, 102, 0.000! !END!
215 ! X = 600.1684392, -311.0747802, 103, 0.000! !END!
216 ! X = 600.1492659, -310.826235, 104, 0.000! !END!

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218 ! X = 600.1110649, -310.330137, 108, 0.000! !END!
219 ! X = 600.0918928, -310.0815931, 114, 0.000! !END!
220 ! X = 600.0727211, -309.8330496, 116, 0.000! !END!
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222 ! X = 600.0343789, -309.3359637, 122, 0.000! !END!
223 ! X = 600.6083109, -313.5400247, 104, 0.000! !END!
224 ! X = 600.5891331, -313.2914759, 102, 0.000! !END!
225 ! X = 600.5700548, -313.042923, 102, 0.000! !END!
226 ! X = 600.5508778, -312.794375, 102, 0.000! !END!
227 ! X = 600.5317466, -312.546823, 102, 0.000! !END!
228 ! X = 600.5125704, -312.2982758, 102, 0.000! !END!
229 ! X = 600.4933946, -312.049729, 102, 0.000! !END!
230 ! X = 600.4743184, -311.8011781, 102, 0.000! !END!
231 ! X = 600.4551435, -311.5526321, 102, 0.000! !END!
232 ! X = 600.4359689, -311.3040865, 102, 0.000! !END!
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239 ! X = 600.3020024, -309.5652656, 113, 0.000! !END!
240 ! X = 600.2828312, -309.3167233, 115, 0.000! !END!
241 ! X = 600.8566696, -313.5207815, 114, 0.000! !END!
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243 ! X = 600.8184127, -313.0236806, 103, 0.000! !END!
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245 ! X = 600.7801038, -312.5275814, 102, 0.000! !END!
246 ! X = 600.7610264, -312.2790301, 102, 0.000! !END!
247 ! X = 600.7418503, -312.0304837, 102, 0.000! !END!
248 ! X = 600.7226746, -311.7819378, 102, 0.000! !END!
249 ! X = 600.7034993, -311.5333922, 102, 0.000! !END!
250 ! X = 600.6844236, -311.2848426, 102, 0.000! !END!
251 ! X = 600.6652491, -311.0362978, 102, 0.000! !END!
252 ! X = 600.6461204, -310.7887491, 103, 0.000! !END!
253 ! X = 600.6269468, -310.5402051, 103, 0.000! !END!
254 ! X = 600.6077736, -310.2916616, 104, 0.000! !END!
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256 ! X = 600.5695275, -309.7945713, 104, 0.000! !END!
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258 ! X = 600.531184, -309.2974871, 107, 0.000! !END!
259 ! X = 600.5120582, -309.0499412, 107, 0.000! !END!
260 ! X = 600.4928875, -308.8014001, 115, 0.000! !END!
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262 ! X = 601.0667703, -313.0044379, 104, 0.000! !END!
263 ! X = 601.0477371, -312.7568819, 102, 0.000! !END!
264 ! X = 601.0285598, -312.5083351, 102, 0.000! !END!
265 ! X = 601.0093829, -312.2597887, 102, 0.000! !END!
266 ! X = 600.9902064, -312.0112427, 102, 0.000! !END!
267 ! X = 600.9711295, -311.7626927, 102, 0.000! !END!
268 ! X = 600.9519539, -311.5141475, 102, 0.000! !END!
269 ! X = 600.9327787, -311.2656028, 102, 0.000! !END!
270 ! X = 600.9136493, -311.018054, 102, 0.000! !END!
271 ! X = 600.8944749, -310.7695101, 102, 0.000! !END!
272 ! X = 600.8754, -310.5209621, 102, 0.000! !END!

273 ! X = 600.8562265, -310.272419, 103, 0.000! !END!
274 ! X = 600.8370533, -310.0238763, 103, 0.000! !END!
275 ! X = 600.8178806, -309.775334, 103, 0.000! !END!
276 ! X = 600.7987083, -309.5267921, 101, 0.000! !END!
277 ! X = 600.7796809, -309.2792417, 104, 0.000! !END!
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279 ! X = 600.7413383, -308.7821599, 106, 0.000! !END!
280 ! X = 600.7221677, -308.5336196, 114, 0.000! !END!
281 ! X = 600.7029974, -308.2850797, 119, 0.000! !END!
282 ! X = 601.334405, -313.2337377, 113, 0.000! !END!
283 ! X = 601.3152719, -312.9861861, 104, 0.000! !END!
284 ! X = 601.2960938, -312.7376393, 102, 0.000! !END!
285 ! X = 601.2769162, -312.4890929, 102, 0.000! !END!
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336 ! X = 601.6779861, -311.2088728, 102, 0.000! !END!
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339 ! X = 601.620559, -310.4632402, 102, 0.000! !END!
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575 ! X = 599.4545214, -314.6299315, 102, 0.000! !END!
576 ! X = 599.5498947, -314.6475561, 102, 0.000! !END!
577 ! X = 599.5974942, -314.6653514, 102, 0.000! !END!
578 ! X = 599.6708075, -314.7438375, 102, 0.000! !END!
579 ! X = 599.6664995, -314.8258434, 102, 0.000! !END!
580 ! X = 599.7233543, -314.8701567, 102, 0.000! !END!
581 ! X = 599.6667709, -314.9385701, 102, 0.000! !END!
582 ! X = 599.6490382, -315.0311618, 102, 0.000! !END!
583 ! X = 599.6205608, -315.0623839, 102, 0.000! !END!
584 ! X = 599.5999026, -315.0014638, 102, 0.000! !END!
585 ! X = 599.5416695, -315.0140814, 102, 0.000! !END!
586 ! X = 599.3532575, -315.1194014, 102, 0.000! !END!
587 ! X = 599.2206656, -315.1373862, 102, 0.000! !END!
588 ! X = 599.2142482, -315.1077464, 102, 0.000! !END!
589 ! X = 599.2627735, -315.0347097, 102, 0.000! !END!
590 ! X = 599.2560706, -314.9312536, 102, 0.000! !END!
591 ! X = 599.1798428, -314.8977954, 102, 0.000! !END!
592 ! X = 599.0137917, -314.8704055, 102, 0.000! !END!
593 ! X = 598.8477404, -314.8430153, 102, 0.000! !END!
594 ! X = 598.8008344, -314.9079969, 102, 0.000! !END!
595 ! X = 598.7908516, -314.972302, 102, 0.000! !END!
596 ! X = 598.8088532, -315.0403268, 102, 0.000! !END!
597 ! X = 598.7755691, -315.1186586, 102, 0.000! !END!
598 ! X = 598.6269578, -315.0685282, 102, 0.000! !END!
599 ! X = 598.6376147, -315.3044995, 102, 0.000! !END!
600 ! X = 598.6483257, -315.539471, 102, 0.000! !END!
601 ! X = 598.659037, -315.7744428, 102, 0.000! !END!
602 ! X = 598.6696495, -316.0094196, 102, 0.000! !END!
603 ! X = 598.6803615, -316.2443923, 102, 0.000! !END!
604 ! X = 598.5987819, -316.2460964, 102, 0.000! !END!
605 ! X = 598.4286163, -316.1829758, 102, 0.000! !END!
606 ! X = 598.2584053, -316.1188593, 102, 0.000! !END!
607 ! X = 598.0570909, -316.1329764, 102, 0.000! !END!
608 ! X = 597.8559207, -316.1480845, 102, 0.000! !END!

609 ! X = 597.6546057, -316.1622013, 102, 0.000! !END!
610 ! X = 597.4533359, -316.1773134, 102, 0.000! !END!
611 ! X = 597.4417085, -315.9483671, 102, 0.000! !END!
612 ! X = 597.4300814, -315.7194211, 102, 0.000! !END!
613 ! X = 597.4184547, -315.4904754, 103, 0.000! !END!
614 ! X = 597.4068736, -315.2625258, 104, 0.000! !END!
615 ! X = 597.2116232, -315.2723752, 104, 0.000! !END!
616 ! X = 597.0163726, -315.2822245, 105, 0.000! !END!
617 ! X = 597.0301173, -315.5140674, 105, 0.000! !END!
618 ! X = 597.0439078, -315.7469063, 104, 0.000! !END!
619 ! X = 597.0577523, -315.9787454, 103, 0.000! !END!
620 ! X = 597.0715435, -316.2115851, 103, 0.000! !END!
621 ! X = 596.88454, -316.2280453, 104, 0.000! !END!
622 ! X = 596.6975364, -316.2445054, 104, 0.000! !END!
623 ! X = 596.510677, -316.2619565, 106, 0.000! !END!
624 ! X = 596.3236729, -316.2784162, 106, 0.000! !END!
625 ! X = 596.311128, -316.0794413, 111, 0.000! !END!
626 ! X = 596.2985835, -315.8804667, 115, 0.000! !END!
627 ! X = 596.4136062, -315.869266, 111, 0.000! !END!
628 ! X = 596.457343, -315.7804821, 110, 0.000! !END!
629 ! X = 596.4486656, -315.6990629, 110, 0.000! !END!
630 ! X = 596.4420411, -315.5536971, 110, 0.000! !END!
631 ! X = 596.2756344, -315.5512635, 119, 0.000! !END!
632 ! X = 596.2696908, -315.4208325, 121, 0.000! !END!
633 ! X = 596.4923492, -315.4107392, 106, 0.000! !END!
634 ! X = 596.488158, -315.2642658, 110, 0.000! !END!
635 ! X = 596.4839215, -315.1167968, 115, 0.000! !END!
636 ! X = 596.4366792, -315.0610712, 118, 0.000! !END!
637 ! X = 596.266526, -315.0657909, 120, 0.000! !END!
638 ! X = 596.4054177, -314.8938755, 121, 0.000! !END!
639 ! X = 596.54421, -314.7219651, 121, 0.000! !END!
640 ! X = 596.683002, -314.550055, 121, 0.000! !END!
641 ! X = 596.821893, -314.3781409, 120, 0.000! !END!
642 ! X = 596.9140526, -314.1704327, 120, 0.000! !END!
643 ! X = 596.972757, -314.1049168, 120, 0.000! !END!
644 ! X = 597.1703434, -314.0460759, 118, 0.000! !END!
645 ! X = 597.2532999, -313.8347949, 121, 0.000! !END!
646 ! X = 597.257361, -313.7059083, 121, 0.000! !END!
647 ! X = 597.2340863, -313.6311385, 121, 0.000! !END!
648 ! X = 597.3320911, -313.5299202, 117, 0.000! !END!
649 ! X = 597.4300958, -313.4287021, 118, 0.000! !END!
650 ! X = 597.498693, -313.2968908, 121, 0.000! !END!
651 ! X = 597.5875385, -313.158176, 121, 0.000! !END!
652 ! X = 597.6763386, -313.0184657, 121, 0.000! !END!
653 ! X = 597.7654848, -312.8318488, 117, 0.000! !END!
654 ! X = 597.8545318, -312.6452368, 116, 0.000! !END!
655 ! X = 597.9436778, -312.4586207, 121, 0.000! !END!
656 ! X = 597.9709431, -312.2917702, 121, 0.000! !END!
657 ! X = 598.0769296, -312.2131384, 121, 0.000! !END!
658 ! X = 598.2887709, -312.0987811, 121, 0.000! !END!
659 ! X = 598.3073809, -312.0690051, 121, 0.000! !END!
660 ! X = 598.3155824, -311.9219752, 121, 0.000! !END!
661 ! X = 598.3959356, -311.7168034, 121, 0.000! !END!
662 ! X = 598.4043065, -311.6825032, 121, 0.000! !END!
663 ! X = 598.5315769, -311.6567817, 121, 0.000! !END!
664 ! X = 598.640219, -311.5710465, 121, 0.000! !END!

```
665 ! X =   598.7488609,   -311.4853115,   121,  0.000!  !END!
666 ! X =   598.8775628,   -311.3078796,   121,  0.000!  !END!
667 ! X =   599.0061654,   -311.1304527,   111,  0.000!  !END!
668 ! X =   599.1348131,   -310.9540218,   113,  0.000!  !END!
669 ! X =   599.2634152,   -310.7765956,   121,  0.000!  !END!
670 ! X =   599.3793269,   -310.564827,    121,  0.000!  !END!
671 ! X =   599.4951392,   -310.3530634,   121,  0.000!  !END!
672 ! X =   599.6110506,   -310.1412958,   121,  0.000!  !END!
673 ! X =   599.7268627,   -309.9295333,   121,  0.000!  !END!
674 ! X =   599.7768136,   -309.7417066,   121,  0.000!  !END!
675 ! X =   599.8266654,   -309.5538848,   121,  0.000!  !END!
676 ! X =   599.8764719,   -309.3650677,   122,  0.000!  !END!
677 ! X =   600.0501914,   -309.2644143,   122,  0.000!  !END!
678 ! X =   600.1948339,   -309.1491165,   119,  0.000!  !END!
679 ! X =   600.3394223,   -309.0348188,   113,  0.000!  !END!
680 ! X =   600.4349036,   -308.8259757,   119,  0.000!  !END!
681 ! X =   600.5302857,   -308.6171376,   122,  0.000!  !END!
682 ! X =   600.6257214,   -308.4072999,   121,  0.000!  !END!
683 ! X =   600.7377771,   -308.2046907,   114,  0.000!  !END!
684 ! X =   600.8499318,   -308.0020775,   106,  0.000!  !END!
685 ! X =   600.9620863,   -307.7994647,   104,  0.000!  !END!
686 ! X =   601.0741416,   -307.596857,    103,  0.000!  !END!
687 ! X =   601.1862505,   -307.3932496,   103,  0.000!  !END!
688 ! X =   601.2984047,   -307.1906384,   103,  0.000!  !END!
689 ! X =   601.4352985,   -306.9968828,   104,  0.000!  !END!
690 ! X =   601.5723365,   -306.8041188,   104,  0.000!  !END!
691 ! X =   601.7092298,   -306.6103642,   104,  0.000!  !END!
692 ! X =   601.846222,    -306.4166056,   105,  0.000!  !END!
693 ! X =   601.9831149,   -306.222852,    107,  0.000!  !END!
694 ! X =   602.1201066,   -306.0290943,   107,  0.000!  !END!
695 ! X =   602.2571435,   -305.8363327,   105,  0.000!  !END!
696 ! X =   602.3940357,   -305.6425805,   104,  0.000!  !END!
697 ! X =   602.5310267,   -305.4488242,   104,  0.000!  !END!
698 ! X =   602.6679185,   -305.255073,    104,  0.000!  !END!
```

----

a

Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b

Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
MLC BART CLASS I ANALYSIS (MINGO)
MDNR RUNS
CENRAP - 6KM CALMET CENTRAL METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =            *
   or
ISCMET.DAT    input    * ISCDAT =            *
   or
PLMMET.DAT    input    * PLMDAT =            *
   or
PROFILE.DAT   input    * PRFDAT =            *
SURFACE.DAT   input    * SFCDAT =            *
RESTARTB.DAT  input    * RSTARTB=            *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =MLC2001Q4.LST     !
CONC.DAT      output   ! CONDAT =MLC2001Q4.CON     !
DFLX.DAT      output   ! DFDAT  =MLC2001Q4.DRY     !
WFLX.DAT      output   ! WFDAT  =MLC2001Q4.WET     !

VISB.DAT      output   ! VISDAT =MLC2001Q4.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2001.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =            *
VOLEMARB.DAT  input    * VOLDAT =            *
BAEMARB.DAT   input    * ARDAT  =            *
LNEMARB.DAT   input    * LNDAT  =            *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =            *
CHEM.DAT      input    * CHEMDAT=            *
H2O2.DAT      input    * H2O2DAT=            *
HILL.DAT      input    * HILDAT=             *
HILLRCT.DAT   input    * RCTDAT=             *
COASTLN.DAT   input    * CSTDAT=             *
FLUXBDY.DAT   input    * BDYDAT=             *

BCON.DAT      input    * BCNDAT=             *
DEBUG.DAT     output   * DEBUG =             *
MASSFLX.DAT   output   * FLXDAT=             *
MASSBAL.DAT   output   * BALDAT=             *
FOG.DAT       output   * FOGDAT=             *
```

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
T = lower case   ! LCFILES = T !
F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length

Provision for multiple input files

Number of CALMET.DAT files for run (NMETDAT)
Default: 1   ! NMETDAT = 10   !

Number of PTEMARB.DAT files for run (NPTDAT)
Default: 0   ! NPTDAT = 0 !

Number of BAEMARB.DAT files for run (NARDAT)
Default: 0   ! NARDAT = 0 !

Number of VOLEMARB.DAT files for run (NVOLDAT)
Default: 0   ! NVOLDAT = 0 !

!END!

Subgroup (0a)

The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name Type   File Name
------------ ----   ---------
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0101-0110.central.dat *
END
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0111-0120.central.dat *
END
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0121-0131.central.dat *
END
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0201-0210.central.dat *
END
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0211-0220.central.dat *
END
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0221-0228.central.dat *
END
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0301-0310.central.dat *
END
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0311-0320.central.dat *
END
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0321-0331.central.dat *
END
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0401-0410.central.dat *
END
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0411-0420.central.dat *
END
none   input   *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0421-0430.central.dat *

```
*END*
none        input    *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0501-0510.central.dat *
*END*
none        input    *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0511-0520.central.dat *
*END*
none        input    *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0521-0531.central.dat *
*END*
none        input    *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0601-0610.central.dat *
*END*
none        input    *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0611-0620.central.dat *
*END*
none        input    *METDAT=/mnt/usb/calmet.6km.central/2001/cmet.2001.0621-0630.central.dat *
*END*
none        input    *METDAT=/raidlocal/cmet.2001.0701-0710.central.dat *            *END*
none        input    *METDAT=/raidlocal/cmet.2001.0711-0720.central.dat *            *END*
none        input    *METDAT=/raidlocal/cmet.2001.0721-0731.central.dat *            *END*
none        input    *METDAT=/raidlocal/cmet.2001.0801-0810.central.dat *            *END*
none        input    *METDAT=/raidlocal/cmet.2001.0811-0820.central.dat *            *END*
none        input    *METDAT=/raidlocal/cmet.2001.0821-0831.central.dat *            *END*
none        input    *METDAT=/raidlocal/cmet.2001.0901-0910.central.dat *            *END*
none        input    *METDAT=/raidlocal/cmet.2001.0911-0920.central.dat *            *END*
none        input    !METDAT=/raidlocal/cmet.2001.0921-0930.central.dat !            !END!
none        input    !METDAT=/raidlocal/cmet.2001.1001-1010.central.dat !            !END!
none        input    !METDAT=/raidlocal/cmet.2001.1011-1020.central.dat !            !END!
none        input    !METDAT=/raidlocal/cmet.2001.1021-1031.central.dat !            !END!
none        input    !METDAT=/raidlocal/cmet.2001.1101-1110.central.dat !            !END!
none        input    !METDAT=/raidlocal/cmet.2001.1111-1120.central.dat !            !END!
none        input    !METDAT=/raidlocal/cmet.2001.1121-1130.central.dat !            !END!
none        input    !METDAT=/raidlocal/cmet.2001.1201-1210.central.dat !            !END!
none        input    !METDAT=/raidlocal/cmet.2001.1211-1220.central.dat !            !END!
none        input    !METDAT=/raidlocal/cmet.2001.1221-1231.central.dat !            !END!


-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

   Option to run all periods found
   in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

        METRUN = 0 - Run period explicitly defined below
        METRUN = 1 - Run all periods in met. file

    Starting date:   Year (IBYR) -- No default       ! IBYR =  2001  !
    (used only if   Month (IBMO) -- No default       ! IBMO =  9  !
     METRUN = 0)      Day (IBDY) -- No default       ! IBDY =  27 !
                     Hour (IBHR) -- No default       ! IBHR =  0  !

    Base time zone        (XBTZ) -- No default       ! XBTZ = 0.0  !
       PST = 8., MST = 7.
       CST = 6., EST = 5.

    Length of run (hours) (IRLG) -- No default       ! IRLG =  2304 !

    Number of chemical species (NSPEC)
```

```
                     Default: 5      ! NSPEC =  6   !

  Number of chemical species
  to be emitted  (NSE)          Default: 3      ! NSE =  3   !

  Flag to stop run after
  SETUP phase (ITEST)           Default: 2      ! ITEST =  2   !
  (Used to allow checking
  of the model inputs, files, etc.)
      ITEST = 1 - STOPS program after SETUP phase
      ITEST = 2 - Continues with execution of program
              after SETUP

  Restart Configuration:

    Control flag (MRESTART)      Default: 0      ! MRESTART =  0   !

      0 = Do not read or write a restart file
      1 = Read a restart file at the beginning of
          the run
      2 = Write a restart file during run
      3 = Read a restart file at beginning of run
          and write a restart file during run

    Number of periods in Restart
    output cycle (NRESPD)       Default: 0      ! NRESPD =  0   !

      0 = File written only at last period
     >0 = File updated every NRESPD periods

  Meteorological Data Format (METFM)
                     Default: 1      ! METFM =  1   !

      METFM = 1 - CALMET binary file (CALMET.MET)
      METFM = 2 - ISC ASCII file (ISCMET.MET)
      METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
      METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
              surface parameters file (SURFACE.DAT)

 Meteorological Profile Data Format (MPRFFM)
        (used only for METFM = 1, 2, 3)
                     Default: 1      ! MPRFFM =  1   !

      MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
      MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

  PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
  Averaging Time (minutes) (AVET)
                     Default: 60.0    ! AVET = 60. !
  PG Averaging Time (minutes) (PGTIME)
                     Default: 60.0    ! PGTIME = 60. !


!END!
```

```
-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


    Vertical distribution used in the
    near field (MGAUSS)                 Default: 1     ! MGAUSS =  1   !
      0 = uniform
      1 = Gaussian

    Terrain adjustment method
    (MCTADJ)                            Default: 3     ! MCTADJ =  3   !
      0 = no adjustment
      1 = ISC-type of terrain adjustment
      2 = simple, CALPUFF-type of terrain
          adjustment
      3 = partial plume path adjustment

    Subgrid-scale complex terrain
    flag (MCTSG)                        Default: 0     ! MCTSG =  0   !
      0 = not modeled
      1 = modeled

    Near-field puffs modeled as
    elongated 0 (MSLUG)                 Default: 0     ! MSLUG =  0   !
      0 = no
      1 = yes (slug model used)

    Transitional plume rise modeled ?
    (MTRANS)                            Default: 1     ! MTRANS =  1   !
      0 = no  (i.e., final rise only)
      1 = yes (i.e., transitional rise computed)

    Stack tip downwash? (MTIP)          Default: 1     ! MTIP =  1  !
      0 = no  (i.e., no stack tip downwash)
      1 = yes (i.e., use stack tip downwash)

    Method used to simulate building
    downwash? (MBDW)                    Default: 1     ! MBDW =   1  !
      1 = ISC method
      2 = PRIME method

    Vertical wind shear modeled above
    stack top? (MSHEAR)                 Default: 0     ! MSHEAR =  0  !
      0 = no  (i.e., vertical wind shear not modeled)
      1 = yes (i.e., vertical wind shear modeled)

    Puff splitting allowed? (MSPLIT)    Default: 0     ! MSPLIT =  0  !
      0 = no (i.e., puffs not split)
      1 = yes (i.e., puffs are split)

    Chemical mechanism flag (MCHEM)     Default: 1     ! MCHEM =  1   !
      0 = chemical transformation not
          modeled
      1 = transformation rates computed
```

internally (MESOPUFF II scheme)
2 = user-specified transformation
rates used
3 = transformation rates computed
internally (RIVAD/ARM3 scheme)
4 = secondary organic aerosol formation
computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3)   Default: 0   ! MAQCHEM = 0   !
0 = aqueous phase transformation
not modeled
1 = transformation rates adjusted
for aqueous phase reactions

Wet removal modeled ? (MWET)   Default: 1   ! MWET = 1   !
0 = no
1 = yes

Dry deposition modeled ? (MDRY)   Default: 1   ! MDRY = 1   !
0 = no
1 = yes
(dry deposition method specified
for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP)   Default: 3   ! MDISP = 3   !

1 = dispersion coefficients computed from measured values
of turbulence, sigma v, sigma w
2 = dispersion coefficients from internally calculated
sigma v, sigma w using micrometeorological variables
(u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using
the ISCST multi-segment approximation) and MP coefficients in
urban areas
4 = same as 3 except PG coefficients computed using
the MESOPUFF II eqns.
5 = CTDM sigmas used for stable and neutral conditions.
For unstable conditions, sigmas are computed as in
MDISP = 3, described above. MDISP = 5 assumes that
measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5)   Default: 3   ! MTURBVW = 3 !
1 = use sigma-v or sigma-theta measurements
from PROFILE.DAT to compute sigma-y
(valid for METFM = 1, 2, 3, 4)
2 = use sigma-w measurements
from PROFILE.DAT to compute sigma-z
(valid for METFM = 1, 2, 3, 4)
3 = use both sigma-(v/theta) and sigma-w
from PROFILE.DAT to compute sigma-y and sigma-z
(valid for METFM = 1, 2, 3, 4)
4 = use sigma-theta measurements
from PLMMET.DAT to compute sigma-y

(valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2)   Default: 3   ! MDISP2 = 3 !
(used only if MDISP = 1 or 5)
  2 = dispersion coefficients from internally calculated
      sigma v, sigma w using micrometeorological variables
      (u*, w*, L, etc.)
  3 = PG dispersion coefficients for RURAL areas (computed using
      the ISCST multi-segment approximation) and MP coefficients in
      urban areas
  4 = same as 3 except PG coefficients computed using
      the MESOPUFF II eqns.

[DIAGNOSTIC FEATURE]
Method used for Lagrangian timescale for Sigma-y
(used only if MDISP=1,2 or MDISP2=1,2)
(MTAULY)   Default: 0   ! MTAULY = 0 !
  0 = Draxler default 617.284 (s)
  1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
  10 < Direct user input (s)   -- e.g., 306.9

[DIAGNOSTIC FEATURE]
Method used for Advective-Decay timescale for Turbulence
(used only if MDISP=2 or MDISP2=2)
(MTAUADV)   Default: 0   ! MTAUADV = 0 !
  0 = No turbulence advection
  1 = Computed (OPTION NOT IMPLEMENTED)
  10 < Direct user input (s)   -- e.g., 300

Method used to compute turbulence sigma-v &
sigma-w using micrometeorological variables
(Used only if MDISP = 2 or MDISP2 = 2)
(MCTURB)   Default: 1   ! MCTURB = 1 !
  1 = Standard CALPUFF subroutines
  2 = AERMOD subroutines

PG sigma-y,z adj. for roughness?   Default: 0   ! MROUGH = 0 !
(MROUGH)
  0 = no
  1 = yes

Partial plume penetration of   Default: 1   ! MPARTL = 1 !
elevated inversion?
(MPARTL)
  0 = no
  1 = yes

Strength of temperature inversion   Default: 0   ! MTINV = 0 !
provided in PROFILE.DAT extended records?
(MTINV)
  0 = no (computed from measured/default gradients)
  1 = yes

PDF used for dispersion under convective conditions?
Default: 0 ! MPDF = 0 !
(MPDF)
0 = no
1 = yes

Sub-Grid TIBL module used for shore line?
Default: 0 ! MSGTIBL = 0 !
(MSGTIBL)
0 = no
1 = yes

Boundary conditions (concentration) modeled?
Default: 0 ! MBCON = 0 !
(MBCON)
0 = no
1 = yes, using formatted BCON.DAT file
2 = yes, using unformatted CONC.DAT file

Analyses of fogging and icing impacts due to emissions from arrays of mechanically-forced cooling towers can be performed using CALPUFF in conjunction with a cooling tower emissions processor (CTEMISS) and its associated postprocessors. Hourly emissions of water vapor and temperature from each cooling tower cell are computed for the current cell configuration and ambient conditions by CTEMISS. CALPUFF models the dispersion of these emissions and provides cloud information in a specialized format for further analysis. Output to FOG.DAT is provided in either 'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
Default: 0 ! MFOG = 0 !
(MFOG)
0 = no
1 = yes - report results in PLUME Mode format
2 = yes - report results in RECEPTOR Mode format

Test options specified to see if
they conform to regulatory
values? (MREG) Default: 1 ! MREG = 1 !

0 = NO checks are made
1 = Technical options must conform to USEPA
Long Range Transport (LRT) guidance
METFM 1 or 2
AVET 60. (min)
PGTIME 60. (min)
MGAUSS 1
MCTADJ 3
MTRANS 1
MTIP 1
MCHEM 1 or 3 (if modeling SOx, NOx)
MWET 1
MDRY 1

MDISP 2 or 3
MPDF 0 if MDISP=3
1 if MDISP=2
MROUGH 0
MPARTL 1
SYTDEP 550. (m)
MHFTSZ 0

!END!

INPUT GROUP: 3a, 3b -- Species list

Subgroup (3a)

The following species are modeled:

! CSPEC = SO2 ! !END!
! CSPEC = SO4 ! !END!
! CSPEC = NOX ! !END!
! CSPEC = HNO3 ! !END!
! CSPEC = NO3 ! !END!
! CSPEC = PM10 ! !END!

```
                                    Dry            OUTPUT GROUP
  SPECIES        MODELED        EMITTED      DEPOSITED            NUMBER
   NAME       (0=NO, 1=YES)   (0=NO, 1=YES)   (0=NO,            (0=NONE,
 (Limit: 12                          1=COMPUTED-GAS       1=1st CGRUP,
  Characters                           2=COMPUTED-PARTICLE   2=2nd CGRUP,
  in length)                         3=USER-SPECIFIED)     3= etc.)

!      SO2  =       1,           1,         1,            0   !
!      SO4  =       1,           0,         2,            0   !
!      NOX  =       1,           1,         1,            0   !
!     HNO3  =       1,           0,         1,            0   !
!      NO3  =       1,           0,         2,            0   !
!     PM10  =       1,           1,         2,            0   !
```

!END!

Subgroup (3b)

The following names are used for Species-Groups in which results
for certain species are combined (added) prior to output. The
CGRUP name will be used as the species name in output files.
Use this feature to model specific particle-size distributions
by treating each size-range as a separate species.
Order must be consistent with 3(a) above.

```
-------------------------------------------------------------------------------

INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

        UTM :  Universal Transverse Mercator
        TTM :  Tangential Transverse Mercator
        LCC :  Lambert Conformal Conic
         PS :  Polar Stereographic
         EM :  Equatorial Mercator
       LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
        N   :  Northern hemisphere projection
        S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 40N  !
     (RLON0)                    No Default      ! RLON0 = 97W  !

        TTM :  RLON0 identifies central (true N/S) meridian of projection
               RLAT0 selected for convenience
        LCC :  RLON0 identifies central (true N/S) meridian of projection
               RLAT0 selected for convenience
        PS  :  RLON0 identifies central (grid N/S) meridian of projection
               RLAT0 selected for convenience
        EM  :  RLON0 identifies central meridian of projection
               RLAT0 is REPLACED by 0.0N (Equator)
        LAZA:  RLON0 identifies longitude of tangent-point of mapping plane
               RLAT0 identifies latitude of tangent-point of mapping plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                    No Default      ! XLAT1 = 33N  !
     (XLAT2)                    No Default      ! XLAT2 = 45N  !
```

LCC : Projection cone slices through Earth's surface at XLAT1 and XLAT2
PS : Projection plane slices through Earth at XLAT1
(XLAT2 is not used)

Note: Latitudes and longitudes should be positive, and include a
letter N,S,E, or W indicating north or south latitude, and
east or west longitude. For example,
35.9 N Latitude = 35.9N
118.7 E Longitude = 118.7E

Datum-region

The Datum-Region for the coordinates is identified by a character string. Many mapping products currently available use the model of the Earth known as the World Geodetic System 1984 (WGS-G). Other local models may be in use, and their selection in CALMET will make its output consistent with local mapping products. The list of Datum-Regions with official transformation parameters is provided by the National Imagery and Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)

WGS-G   WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
NAS-C   NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
NWS-27   NWS 6370KM Radius, Sphere
NWS-84   NWS 6370KM Radius, Sphere
ESR-S   ESRI REFERENCE 6371KM Radius, Sphere

Datum-region for output coordinates
(DATUM)   Default: WGS-G   ! DATUM = WGS-G !

METEOROLOGICAL Grid:

Rectangular grid defined for projection PMAP,
with X the Easting and Y the Northing coordinate

No. X grid cells (NX)   No default   ! NX = 366   !
No. Y grid cells (NY)   No default   ! NY = 234   !
No. vertical layers (NZ)   No default   ! NZ = 10   !

Grid spacing (DGRIDKM)   No default   ! DGRIDKM = 6 !
Units: km

Cell face heights
(ZFACE(nz+1))   No defaults
Units: m
! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
4000. !

Reference Coordinates
of SOUTHWEST corner of
grid cell(1, 1):

X-coordinate (XORIGKM)   No default   ! XORIGKM = -1008. !
Y coordinate (YORIGKM)   No default   ! YORIGKM = -864. !
Units: km

COMPUTATIONAL Grid:

The computational grid is identical to or a subset of the MET. grid. The lower left (LL) corner of the computational grid is at grid point (IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the computational grid is at grid point (IECOMP, JECOMP) of the MET. grid. The grid spacing of the computational grid is the same as the MET. grid.

X index of LL corner (IBCOMP)   No default   ! IBCOMP = 200   !
(1 <= IBCOMP <= NX)

Y index of LL corner (JBCOMP)   No default   ! JBCOMP = 50   !
(1 <= JBCOMP <= NY)

X index of UR corner (IECOMP)   No default   ! IECOMP = 320   !
(1 <= IECOMP <= NX)

Y index of UR corner (JECOMP)   No default   ! JECOMP = 160   !
(1 <= JECOMP <= NY)

SAMPLING Grid (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point (IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid. The sampling grid must be identical to or a subset of the computational grid. It may be a nested grid inside the computational grid. The grid spacing of the sampling grid is DGRIDKM/MESHDN.

Logical flag indicating if gridded
receptors are used (LSAMP)   Default: T   ! LSAMP = F !
(T=yes, F=no)

X index of LL corner (IBSAMP)   No default   ! IBSAMP = 1   !
(IBCOMP <= IBSAMP <= IECOMP)

Y index of LL corner (JBSAMP)   No default   ! JBSAMP = 1   !
(JBCOMP <= JBSAMP <= JECOMP)

X index of UR corner (IESAMP)   No default   ! IESAMP = 251   !
(IBCOMP <= IESAMP <= IECOMP)

Y index of UR corner (JESAMP)   No default   ! JESAMP = 246   !
(JBCOMP <= JESAMP <= JECOMP)

Nesting factor of the sampling

```
      grid (MESHDN)                    Default: 1     ! MESHDN =  1  !
      (MESHDN is an integer >= 1)

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------
                                  *                    *
   FILE                    DEFAULT VALUE          VALUE THIS RUN

   ----                   -------------          --------------

  Concentrations (ICON)            1                 !  ICON =  1   !
  Dry Fluxes (IDRY)              1                 !  IDRY =  1   !
  Wet Fluxes (IWET)               1                 !  IWET =  1   !
  Relative Humidity (IVIS)         1                 !  IVIS =  1   !
   (relative humidity file is
    required for visibility
    analysis)
  Use data compression option in output file?
  (LCOMPRS)                        Default: T        ! LCOMPRS = T !

  *
   0 = Do not create file, 1 = create file


   DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

     Mass flux across specified boundaries
     for selected species reported hourly?
     (IMFLX)                       Default: 0        ! IMFLX =  0  !
       0 = no
       1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
            are specified in Input Group 0)

     Mass balance for each species
     reported hourly?
     (IMBAL)                       Default: 0        ! IMBAL =  0  !
       0 = no
       1 = yes (MASSBAL.DAT filename is
           specified in Input Group 0)


   LINE PRINTER OUTPUT OPTIONS:

     Print concentrations (ICPRT)    Default: 0        ! ICPRT =  0   !
     Print dry fluxes (IDPRT)        Default: 0        ! IDPRT =  0   !
     Print wet fluxes (IWPRT)        Default: 0        ! IWPRT =  0   !
     (0 = Do not print, 1 = Print)

     Concentration print interval
     (ICFRQ) in hours              Default: 1        ! ICFRQ =  1   !
```

Dry flux print interval
(IDFRQ) in hours Default: 1 ! IDFRQ = 1 !
Wet flux print interval
(IWFRQ) in hours Default: 1 ! IWFRQ = 1 !

Units for Line Printer Output
(IPRTU) Default: 1 ! IPRTU = 3 !

	for Concentration	for Deposition
1 =	g/m**3	g/m**2/s
2 =	mg/m**3	mg/m**2/s
3 =	ug/m**3	ug/m**2/s
4 =	ng/m**3	ng/m**2/s
5 =	Odour Units	

Messages tracking progress of run
written to the screen ?
(IMESG) Default: 2 ! IMESG = 2 !
0 = no
1 = yes (advection step, puff ID)
2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)

SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

---- CONCENTRATIONS ---- ------ DRY FLUXES ------ ------ WET FLUXES ------ -- MASS FLUX --
SPECIES
/GROUP PRINTED? SAVED ON DISK? PRINTED? SAVED ON DISK? PRINTED? SAVED ON DISK? SAVED ON DISK?
------- ------------------------ ------------------------ ------------------------ ---------------
! SO2 = 0, 1, 0, 1, 0, 1, 0 !
! SO4 = 0, 1, 0, 1, 0, 1, 0 !
! NOX = 0, 1, 0, 1, 0, 1, 0 !
! HNO3 = 0, 1, 0, 1, 0, 1, 0 !
! NO3 = 0, 1, 0, 1, 0, 1, 0 !
! PM10 = 0, 1, 0, 1, 0, 1, 0 !

OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

Logical for debug output
(LDEBUG) Default: F ! LDEBUG = F !

First puff to track
(IPFDEB) Default: 1 ! IPFDEB = 1 !

Number of puffs to track
(NPFDEB) Default: 1 ! NPFDEB = 1 !

Met. period to start output
(NN1) Default: 1 ! NN1 = 1 !

Met. period to end output
(NN2) Default: 10 ! NN2 = 10 !

!END!

INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
----

Subgroup (6a)

Number of terrain features (NHILL) Default: 0 ! NHILL = 0 !

Number of special complex terrain
receptors (NCTREC) Default: 0 ! NCTREC = 0 !

Terrain and CTSG Receptor data for
CTSG hills input in CTDM format ?
(MHILL) No Default ! MHILL = 2 !
1 = Hill and Receptor data created
by CTDM processors & read from
HILL.DAT and HILLRCT.DAT files
2 = Hill data created by OPTHILL &
input below in Subgroup (6b);
Receptor data in Subgroup (6c)

Factor to convert horizontal dimensions Default: 1.0 ! XHILL2M = 1. !
to meters (MHILL=1)

Factor to convert vertical dimensions Default: 1.0 ! ZHILL2M = 1. !
to meters (MHILL=1)

X-origin of CTDM system relative to No Default ! XCTDMKM = 0.0E00 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

Y-origin of CTDM system relative to No Default ! YCTDMKM = 0.0E00 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

Subgroup (6b)
----

1 **
HILL information

HILL NO.	XC (km)	YC (km)	THETAH (deg.)	ZGRID (m)	RELIEF (m)	EXPO 1 (m)	EXPO 2 (m)	SCALE 1 (m)	SCALE 2 (m)	AMAX1 (m)	AMAX2 (m)
----	----	----	------	-----	------	------	------	-------	-------	-----	-----

----
Subgroup (6c)

COMPLEX TERRAIN RECEPTOR INFORMATION

```
              XRCT       YRCT      ZRCT        XHH
              (km)       (km)       (m)
             ------      -----     ------       ----
```

1

Description of Complex Terrain Variables:
- XC, YC = Coordinates of center of hill
- THETAH = Orientation of major axis of hill (clockwise from North)
- ZGRID = Height of the 0 of the grid above mean sea level
- RELIEF = Height of the crest of the hill above the grid elevation
- EXPO 1 = Hill-shape exponent for the major axis
- EXPO 2 = Hill-shape exponent for the major axis
- SCALE 1 = Horizontal length scale along the major axis
- SCALE 2 = Horizontal length scale along the minor axis
- AMAX = Maximum allowed axis length for the major axis
- BMAX = Maximum allowed axis length for the major axis

- XRCT, YRCT = Coordinates of the complex terrain receptors
- ZRCT = Height of the ground (MSL) at the complex terrain Receptor
- XHH = Hill number associated with each complex terrain receptor (NOTE: MUST BE ENTERED AS A REAL NUMBER)

**

NOTE: DATA for each hill and CTSG receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases

----

SPECIES NAME	DIFFUSIVITY (cm**2/s)	ALPHA STAR	REACTIVITY	MESOPHYLL RESISTANCE (s/cm)	HENRY'S LAW COEFFICIENT (dimensionless)
! SO2 =	0.1509,	1000.,	8.,	0.,	0.04 !
! NOX =	0.1656,	1.,	8.,	5.,	3.5 !
! HNO3 =	0.1628,	1.,	18.,	0.,	0.00000008 !

!END!

INPUT GROUP: 8 -- Size parameters for dry deposition of particles

----

For SINGLE SPECIES, the mean and standard deviation are used to compute a deposition velocity for NINT (see group 9) size-ranges, and these are then averaged to obtain a mean deposition velocity.

For GROUPED SPECIES, the size distribution should be explicitly specified (by the 'species' in the group), and the standard deviation for each should be entered as 0. The model will then use the deposition velocity for the stated mean diameter.

	SPECIES NAME	GEOMETRIC MASS MEAN DIAMETER (microns)	GEOMETRIC STANDARD DEVIATION (microns)	
	-------	-------------------	------------------	
!	SO4 =	0.48,	2.	!
!	NO3 =	0.48,	2.	!
!	PM10 =	2.,	2.	!

!END!

INPUT GROUP: 9 -- Miscellaneous dry deposition parameters

Reference cuticle resistance (s/cm)
(RCUTR) Default: 30 ! RCUTR = 30.0 !
Reference ground resistance (s/cm)
(RGR) Default: 10 ! RGR = 10.0 !
Reference pollutant reactivity
(REACTR) Default: 8 ! REACTR = 8.0 !

Number of particle-size intervals used to
evaluate effective particle deposition velocity
(NINT) Default: 9 ! NINT = 9 !

Vegetation state in unirrigated areas
(IVEG) Default: 1 ! IVEG = 1 !
IVEG=1 for active and unstressed vegetation
IVEG=2 for active and stressed vegetation
IVEG=3 for inactive vegetation

!END!

INPUT GROUP: 10 -- Wet Deposition Parameters

Scavenging Coefficient -- Units: (sec)**(-1)

Pollutant Liquid Precip. Frozen Precip.

```
      ---------      --------------      --------------
!         SO2 =        3.0E-05,             0.0E00 !
!         SO4 =        1.0E-04,            3.0E-05 !
!        HNO3 =        6.0E-05,             0.0E00 !
!         NO3 =        1.0E-04,            3.0E-05 !
!        PM10 =        1.0E-04,            3.0E-05 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1           ! MOZ =  0   !
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                  Default: 12*80.
     !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00, 65.00, 65.00, 26.00, 26.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                 Default: 12*10.
     !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                 Default: 0.2         ! RNITE1 = .2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                 Default: 2.0         ! RNITE2 = 2.0 !

     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                 Default: 2.0         ! RNITE3 = 2.0 !

     H2O2 data input option (MH2O2)    Default: 1           ! MH2O2 =  0   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb                Default: 12*1.
     !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
```

```
(used only if MCHEM = 4)

The SOA module uses monthly values of:
   Fine particulate concentration in ug/m^3 (BCKPMF)
   Organic fraction of fine particulate     (OFRAC)
   VOC / NOX ratio (after reaction)         (VCNX)
to characterize the air mass when computing
the formation of SOA from VOC emissions.
Typical values for several distinct air mass types are:

  Month    1    2    3    4    5    6    7    8    9   10   11   12
          Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

Clean Continental
  BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
  OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
  VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

Clean Marine (surface)
  BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
  OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
  VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

Urban - low biogenic (controls present)
  BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
  OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
  VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

Urban - high biogenic (controls present)
  BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
  OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
  VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

Regional Plume
  BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
  OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
  VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

Urban - no controls present
  BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
  OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
  VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

Default: Clean Continental
!  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
!  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
!  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !


!END!
```

INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters

----

Horizontal size of puff (m) beyond which
time-dependent dispersion equations (Heffter)
are used to determine sigma-y and
sigma-z (SYTDEP)   Default: 550.   ! SYTDEP = 5.5E02 !

Switch for using Heffter equation for sigma z
as above (0 = Not use Heffter; 1 = use Heffter
(MHFTSZ)   Default: 0   ! MHFTSZ = 0   !

Stability class used to determine plume
growth rates for puffs above the boundary
layer (JSUP)   Default: 5   ! JSUP = 5   !

Vertical dispersion constant for stable
conditions (k1 in Eqn. 2.7-3) (CONK1)   Default: 0.01   ! CONK1 = .01 !

Vertical dispersion constant for neutral/
unstable conditions (k2 in Eqn. 2.7-4)
(CONK2)   Default: 0.1   ! CONK2 = .1 !

Factor for determining Transition-point from
Schulman-Scire to Huber-Snyder Building Downwash
scheme (SS used for Hs < Hb + TBD * HL)
(TBD)   Default: 0.5   ! TBD = .5 !
TBD < 0   ==> always use Huber-Snyder
TBD = 1.5 ==> always use Schulman-Scire
TBD = 0.5 ==> ISC Transition-point

Range of land use categories for which
urban dispersion is assumed
(IURB1, IURB2)   Default: 10   ! IURB1 = 10 !
19   ! IURB2 = 19 !

Site characterization parameters for single-point Met data files ---------
(needed for METFM = 2,3,4)

Land use category for modeling domain
(ILANDUIN)   Default: 20   ! ILANDUIN = 20 !

Roughness length (m) for modeling domain
(Z0IN)   Default: 0.25   ! Z0IN = .25 !

Leaf area index for modeling domain
(XLAIIN)   Default: 3.0   ! XLAIIN = 3.0 !

Elevation above sea level (m)
(ELEVIN)   Default: 0.0   ! ELEVIN = .0 !

Latitude (degrees) for met location
(XLATIN)   Default: -999. ! XLATIN = -999.0 !

Longitude (degrees) for met location
(XLONIN)   Default: -999. ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

Anemometer height (m) (Used only if METFM = 2,3)
(ANEMHT) Default: 10. ! ANEMHT = 10.0 !

Form of lateral turbulance data in PROFILE.DAT file
(Used only if METFM = 4 or MTURBVW = 1 or 3)
(ISIGMAV) Default: 1 ! ISIGMAV = 1 !
0 = read sigma-theta
1 = read sigma-v

Choice of mixing heights (Used only if METFM = 4)
(IMIXCTDM) Default: 0 ! IMIXCTDM = 0 !
0 = read PREDICTED mixing heights
1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN) Default: 1.0 ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN) Default: 1.0 ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW) Default: 99 ! MXNEW = 99 !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM) Default: 99 ! MXSAM = 99 !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT) Default: 2 ! NCOUNT = 2 !

Minimum sigma y for a new puff/slug (m)
(SYMIN) Default: 1.0 ! SYMIN = 1.0 !

Minimum sigma z for a new puff/slug (m)
(SZMIN) Default: 1.0 ! SZMIN = 1.0 !

Default minimum turbulence velocities sigma-v and sigma-w
for each stability class over land and over water (m/s)
(SVMIN(12) and SWMIN(12))

```
              ---------- LAND ----------       --------- WATER ----------
  Stab Class :  A    B    C    D    E    F        A    B    C    D    E    F
               ---  ---  ---  ---  ---  ---      ---  ---  ---  ---  ---  ---
Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37, .37, .37, .37
Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08, .06, .03, .016
```

! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370, 0.370, 0.370!
! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))   Default: 0.0,0.0 ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)   Default: 0.5   ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)   Default: 3000. ! XMAXZI = 4000.0 !

Minimum mixing height (m)
(XMINZI)   Default: 50.   ! XMINZI = 20.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))   Default   :
ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

Wind Speed Class : 1   2   3   4   5
--- --- --- --- ---
! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))   Default   : ISC RURAL values
ISC RURAL : .07, .07, .10, .15, .35, .55
ISC URBAN : .15, .15, .20, .25, .30, .30

Stability Class : A   B   C   D   E   F
--- --- --- --- --- ---
! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))   Default: 0.020, 0.035
! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))   Stability Class : A   B   C   D   E   F
Default PPC : .50, .50, .50, .50, .35, .35
--- --- --- --- --- ---
! PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)   Default: 10.   ! SL2PF = 10.0 !

Puff-splitting control variables ------------------------

VERTICAL SPLIT

Number of puffs that result every time a puff
is split - nsplit=2 means that 1 puff splits
into 2
(NSPLIT)   Default: 3   ! NSPLIT = 3 !

Time(s) of a day when split puffs are eligible to
be split once again; this is typically set once
per day, around sunset before nocturnal shear develops.
24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
0=do not re-split   1=eligible for re-split
(IRESPLIT(24))   Default: Hour 17 = 1
! IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

Split is allowed only if last hour's mixing
height (m) exceeds a minimum value
(ZISPLIT)   Default: 100.   ! ZISPLIT = 100.0 !

Split is allowed only if ratio of last hour's
mixing ht to the maximum mixing ht experienced
by the puff is less than a maximum value (this
postpones a split until a nocturnal layer develops)
(ROLDMAX)   Default: 0.25   ! ROLDMAX = 0.25 !

HORIZONTAL SPLIT

Number of puffs that result every time a puff
is split - nsplith=5 means that 1 puff splits
into 5
(NSPLITH)   Default: 5   ! NSPLITH = 5 !

Minimum sigma-y (Grid Cells Units) of puff
before it may be split
(SYSPLITH)   Default: 1.0   ! SYSPLITH = 1.0 !

Minimum puff elongation rate (SYSPLITH/hr) due to
wind shear, before it may be split
(SHSPLITH)   Default: 2.   ! SHSPLITH = 2.0 !

Minimum concentration (g/m^3) of each
species in puff before it may be split
Enter array of NSPEC values; if a single value is
entered, it will be used for ALL species
(CNSPLITH)   Default: 1.0E-07   ! CNSPLITH = 1.0E-07 !

Integration control variables ------------------------

Fractional convergence criterion for numerical SLUG
sampling integration
(EPSSLUG)   Default: 1.0e-04 ! EPSSLUG = 1.0E-04 !

Fractional convergence criterion for numerical AREA
source integration
(EPSAREA) Default: 1.0e-06 ! EPSAREA = 1.0E-06 !

Trajectory step-length (m) used for numerical rise
integration
(DSRISE) Default: 1.0 ! DSRISE = 1.0 !

Boundary Condition (BC) Puff control variables ------------------------

Minimum height (m) to which BC puffs are mixed as they are emitted
(MBCON=2 ONLY). Actual height is reset to the current mixing height
at the release point if greater than this minimum.
(HTMINBC) Default: 500. ! HTMINBC = 500.0 !

Search radius (in BC segment lengths) about a receptor for sampling
nearest BC puff. BC puffs are emitted with a spacing of one segment
length, so the search radius should be greater than 1.
(RSAMPBC) Default: 4. ! RSAMPBC = 10.0 !

Near-Surface depletion adjustment to concentration profile used when
sampling BC puffs?
(MDEPBC) Default: 1 ! MDEPBC = 1 !
0 = Concentration is NOT adjusted for depletion
1 = Adjust Concentration for depletion

!END!

INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters

Subgroup (13a)

Number of point sources with
parameters provided below (NPT1) No default ! NPT1 = 2 !

Units used for point source
emissions below (IPTU) Default: 1 ! IPTU = 1 !
1 = g/s
2 = kg/hr
3 = lb/hr
4 = tons/yr
5 = Odour Unit * m**3/s (vol. flux of odour compound)
6 = Odour Unit * m**3/min
7 = metric tons/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (13d) (NSPT1) Default: 0 ! NSPT1 = 0 !

```
    Number of point sources with
    variable emission parameters
    provided in external file      (NPT2)  No default  !  NPT2 =  0  !

    (If NPT2 > 0, these point
    source emissions are read from
    the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                 a
        POINT SOURCE: CONSTANT DATA
        -----------------------------
                                                                b          c
 Source       X         Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
  No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
           (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
 ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
  1 ! SRCNAM = PRK5 !
  1 ! X =  602.9152,  -201.7885,    23.16, 141.0,    3.35,  6.45, 468.47,  0.0, 4.49817E00,  0.0E00,
8.20255E00,
     0.0E00,  0.0E00, 1.40237E00 !
  1 ! FMFAC  =      1.0 !   !END!
  2 ! SRCNAM = PRK6 !
  2 ! X =  605.9046,  -201.6629,    23.16, 140.0,    3.35,  6.45, 468.47,  0.0, 4.46176E00,  0.0E00,
8.13614E00,
     0.0E00,  0.0E00, 1.39102E00 !
  2 ! FMFAC  =      1.0 !   !END!
--------

   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.

    SRCNAM  is a 12-character name for a source
           (No default)
    X       is an array holding the source data listed by the column headings
           (No default)
    SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
           (Default: 0.,0.)
    FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
           the effect of rain-caps or other physical configurations that
           reduce momentum rise associated with the actual exit velocity.
           (Default: 1.0  -- full momentum used)

   b
    0. = No building downwash modeled, 1. = downwash modeled
    NOTE: must be entered as a REAL number (i.e., with decimal point)

   c
    An emission rate must be entered for every pollutant modeled.
    Enter emission rate of zero for secondary pollutants that are
    modeled, but not emitted.  Units are specified by IPTU
```

(e.g. 1 for g/s).

Subgroup (13c)

BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

```
Source                                                   a
 No.      Effective building height, width, length and X/Y offset (in meters)
          every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed for
          MBDW=2 (PRIME downwash option)
------    ------------------------------------------------------------------
```

----

a
Building height, width, length, and X/Y offset from the source are treated as a separate input subgroup for each source and therefore must end with an input group terminator. The X/Y offset is the position, relative to the stack, of the center of the upwind face of the projected building, with the x-axis pointing along the flow direction.

Subgroup (13d)
----

a
POINT SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:

```
(IVARY)                    Default: 0
     0 =     Constant
     1 =     Diurnal cycle (24 scaling factors: hours 1-24)
     2 =     Monthly cycle (12 scaling factors: months 1-12)
     3 =     Hour & Season (4 groups of 24 hourly scaling factors,
                     where first group is DEC-JAN-FEB)
     4 =     Speed & Stab. (6 groups of 6 scaling factors, where
                     first group is Stability Class A,
                     and the speed classes have upper
                     bounds (m/s) defined in Group 12
     5 =     Temperature   (12 scaling factors, where temperature
                     classes have upper bounds (C) of:
                     0, 5, 10, 15, 20, 25, 30, 35, 40,
                     45, 50, 50+)
```

----

a
Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

Number of polygon area sources with
parameters specified below (NAR1)   No default ! NAR1 = 0   !

Units used for area source
emissions below   (IARU)   Default: 1 ! IARU =   1 !
1 =   g/m**2/s
2 =   kg/m**2/hr
3 =   lb/m**2/hr
4 =   tons/m**2/yr
5 =   Odour Unit * m/s (vol. flux/m**2 of odour compound)
6 =   Odour Unit * m/min
7 =   metric tons/m**2/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (14d)   (NSAR1) Default: 0 ! NSAR1 = 0 !

Number of buoyant polygon area sources
with variable location and emission
parameters (NAR2)   No default ! NAR2 = 0   !
(If NAR2 > 0, ALL parameter data for
these sources are read from the file: BAEMARB.DAT)

!END!

Subgroup (14b)
----

a
AREA SOURCE: CONSTANT DATA

Source No.	Effect. Height (m)	Base Elevation (m)	Initial Sigma z (m)	Emission Rates [b]

----
a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.
b
An emission rate must be entered for every pollutant modeled.

Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by IARU
(e.g. 1 for g/m**2/s).

Subgroup (14c)

COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON

```
Source                                                  a
 No.      Ordered list of X followed by list of Y, grouped by source
------    ------------------------------------------------------------
```

----
[a] Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

Subgroup (14d)

AREA SOURCE: VARIABLE EMISSIONS DATA[a]

Use this subgroup to describe temporal variations in the emission
rates given in 14b. Factors entered multiply the rates in 14b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

```
     0 =    Constant
     1 =    Diurnal cycle (24 scaling factors: hours 1-24)
     2 =    Monthly cycle (12 scaling factors: months 1-12)
     3 =    Hour & Season (4 groups of 24 hourly scaling factors,
                   where first group is DEC-JAN-FEB)
     4 =    Speed & Stab. (6 groups of 6 scaling factors, where
                   first group is Stability Class A,
                   and the speed classes have upper
                   bounds (m/s) defined in Group 12
     5 =    Temperature   (12 scaling factors, where temperature
                   classes have upper bounds (C) of:
                   0, 5, 10, 15, 20, 25, 30, 35, 40,
                   45, 50, 50+)
```

----
[a] Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

```
-------------------------------------------------------------------------------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                   No default  !  NLN2 =  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)      No default   ! NLINES =  0  !

     Units used for line source
     emissions below          (ILNU)        Default: 1  !  ILNU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)       (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                  Default: 7   ! MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which           Default: 6   ! NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)           No default   ! XL = .0 !
                                          (in meters)

        Average building height (HBL)          No default   ! HBL = .0 !
                                          (in meters)

        Average building width (WBL)           No default   ! WBL = .0 !
                                          (in meters)

        Average line source width (WML)        No default   ! WML = .0 !
                                          (in meters)

        Average separation between buildings (DXL)  No default   ! DXL = .0 !
                                          (in meters)
```

Average buoyancy parameter (FPRIMEL)   No default   ! FPRIMEL = .0 !
(in m**4/s**3)

!END!

Subgroup (15b)

BUOYANT LINE SOURCE: CONSTANT DATA

Source No.	Beg. X Coordinate (km)	Beg. Y Coordinate (km)	End. X Coordinate (km)	End. Y Coordinate (km)	Release Height (m)	Base Elevation (m)	Emission Rates[a]

----

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by ILNTU (e.g. 1 for g/s).

Subgroup (15c)

BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA[a]

Use this subgroup to describe temporal variations in the emission rates given in 15b. Factors entered multiply the rates in 15b. Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY)   Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

```
    Number of volume sources with
    parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !

    Units used for volume source
    emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1  !
         1 =        g/s
         2 =       kg/hr
         3 =       lb/hr
         4 =     tons/yr
         5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
         6 =     Odour Unit * m**3/min
         7 =     metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

    Number of volume sources with
    variable location and emission
    parameters                   (NVL2)     No default  !  NVL2 =   0   !

    (If NVL2 > 0, ALL parameter data for
     these sources are read from the VOLEMARB.DAT file(s) )

!END!
```

Subgroup (16b)

```
                                    a
         VOLUME SOURCE: CONSTANT DATA
         ------------------------------
                                                          b
      X          Y        Effect.    Base     Initial    Initial    Emission
    Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z     Rates
      (km)       (km)        (m)       (m)        (m)       (m)
    ----------  ----------   ------    ------    --------   --------   --------
```

----
a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by IVLU
(e.g. 1 for g/s).

Subgroup (16c)
----
a
VOLUME SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission
rates given in 16b. Factors entered multiply the rates in 16b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0
0 = Constant
1 = Diurnal cycle (24 scaling factors: hours 1-24)
2 = Monthly cycle (12 scaling factors: months 1-12)
3 = Hour & Season (4 groups of 24 hourly scaling factors,
where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where
first group is Stability Class A,
and the speed classes have upper
bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

Number of non-gridded receptors (NREC) No default ! NREC = 698 !

!END!

Subgroup (17b)
----
a
NON-GRIDDED (DISCRETE) RECEPTOR DATA

Receptor No.	X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height b Above Ground (m)
--------	----------	----------	---------	------------
1 ! X =	596.5576895,	-316.1011881,	106,	0.000! !END!

2 ! X = 596.538613, -315.8526241, 108, 0.000! !END!
3 ! X = 596.5194378, -315.6040651, 108, 0.000! !END!
4 ! X = 596.500263, -315.3555064, 106, 0.000! !END!
5 ! X = 596.4812331, -315.1079393, 115, 0.000! !END!
6 ! X = 596.4620591, -314.8593815, 121, 0.000! !END!
7 ! X = 596.8061573, -316.0819418, 104, 0.000! !END!
8 ! X = 596.7869813, -315.8333827, 105, 0.000! !END!
9 ! X = 596.7678057, -315.584824, 106, 0.000! !END!
10 ! X = 596.7487751, -315.3372569, 106, 0.000! !END!
11 ! X = 596.7296004, -315.0886991, 110, 0.000! !END!
12 ! X = 596.7104261, -314.8401416, 116, 0.000! !END!
13 ! X = 596.6912521, -314.5915846, 121, 0.000! !END!
14 ! X = 597.0545255, -316.0626996, 103, 0.000! !END!
15 ! X = 597.0353492, -315.814141, 104, 0.000! !END!
16 ! X = 597.0162725, -315.5655782, 105, 0.000! !END!
17 ! X = 596.9971423, -315.318016, 105, 0.000! !END!
18 ! X = 596.9779672, -315.0694586, 106, 0.000! !END!
19 ! X = 596.9588917, -314.820897, 109, 0.000! !END!
20 ! X = 596.9397174, -314.5723404, 113, 0.000! !END!
21 ! X = 596.9205436, -314.3237842, 117, 0.000! !END!
22 ! X = 597.2264328, -315.0502132, 105, 0.000! !END!
23 ! X = 597.2072578, -314.8016566, 105, 0.000! !END!
24 ! X = 597.1880832, -314.5531004, 106, 0.000! !END!
25 ! X = 597.168909, -314.3045446, 112, 0.000! !END!
26 ! X = 597.1498343, -314.0559848, 118, 0.000! !END!
27 ! X = 597.55136, -316.02421, 102, 0.000! !END!
28 ! X = 597.5322284, -315.7766477, 102, 0.000! !END!
29 ! X = 597.5130518, -315.5280903, 102, 0.000! !END!
30 ! X = 597.4939747, -315.2795288, 103, 0.000! !END!
31 ! X = 597.4747989, -315.0309721, 104, 0.000! !END!
32 ! X = 597.4556235, -314.7824159, 104, 0.000! !END!
33 ! X = 597.4364486, -314.5338601, 105, 0.000! !END!
34 ! X = 597.4173732, -314.2853002, 106, 0.000! !END!
35 ! X = 597.3982444, -314.0377409, 112, 0.000! !END!
36 ! X = 597.3790706, -313.7891863, 116, 0.000! !END!
37 ! X = 597.3598973, -313.5406322, 117, 0.000! !END!
38 ! X = 597.799727, -316.0049669, 102, 0.000! !END!
39 ! X = 597.7805951, -315.7574051, 102, 0.000! !END!
40 ! X = 597.7615172, -315.5088436, 102, 0.000! !END!
41 ! X = 597.7423407, -315.2602869, 102, 0.000! !END!
42 ! X = 597.7231646, -315.0117307, 103, 0.000! !END!
43 ! X = 597.704088, -314.7631704, 103, 0.000! !END!
44 ! X = 597.6849127, -314.514615, 104, 0.000! !END!
45 ! X = 597.6657831, -314.2670557, 105, 0.000! !END!
46 ! X = 597.6466086, -314.0185011, 105, 0.000! !END!
47 ! X = 597.6275337, -313.7699425, 106, 0.000! !END!
48 ! X = 597.60836, -313.5213887, 110, 0.000! !END!
49 ! X = 597.5891868, -313.2728354, 119, 0.000! !END!
50 ! X = 598.0482382, -315.9867148, 102, 0.000! !END!
51 ! X = 598.0290605, -315.7381577, 102, 0.000! !END!
52 ! X = 598.0098832, -315.4896011, 102, 0.000! !END!
53 ! X = 597.9907063, -315.2410448, 102, 0.000! !END!
54 ! X = 597.971629, -314.9924845, 102, 0.000! !END!
55 ! X = 597.9524529, -314.7439291, 102, 0.000! !END!
56 ! X = 597.9332772, -314.4953741, 102, 0.000! !END!
57 ! X = 597.9141473, -314.2478152, 103, 0.000! !END!

58 ! X = 597.8950716, -313.9992566, 104, 0.000! !END!
59 ! X = 597.8758972, -313.7507028, 105, 0.000! !END!
60 ! X = 597.8567232, -313.5021495, 106, 0.000! !END!
61 ! X = 597.8375496, -313.2535965, 110, 0.000! !END!
62 ! X = 597.8184755, -313.0050395, 117, 0.000! !END!
63 ! X = 598.2966045, -315.9674711, 102, 0.000! !END!
64 ! X = 598.2774264, -315.7189145, 102, 0.000! !END!
65 ! X = 598.2582487, -315.4703582, 102, 0.000! !END!
66 ! X = 598.2391706, -315.2217979, 102, 0.000! !END!
67 ! X = 598.2199938, -314.9732425, 102, 0.000! !END!
68 ! X = 598.2008174, -314.7246875, 102, 0.000! !END!
69 ! X = 598.1817859, -314.4771241, 102, 0.000! !END!
70 ! X = 598.1626103, -314.2285699, 102, 0.000! !END!
71 ! X = 598.1434351, -313.9800162, 102, 0.000! !END!
72 ! X = 598.1242603, -313.7314628, 103, 0.000! !END!
73 ! X = 598.1051851, -313.4829054, 104, 0.000! !END!
74 ! X = 598.0860111, -313.2343529, 106, 0.000! !END!
75 ! X = 598.0668376, -312.9858008, 106, 0.000! !END!
76 ! X = 598.0477098, -312.7382447, 108, 0.000! !END!
77 ! X = 598.0285371, -312.4896934, 121, 0.000! !END!
78 ! X = 598.5641491, -316.1967839, 102, 0.000! !END!
79 ! X = 598.5449703, -315.9482272, 102, 0.000! !END!
80 ! X = 598.525891, -315.6996665, 102, 0.000! !END!
81 ! X = 598.506713, -315.4511106, 102, 0.000! !END!
82 ! X = 598.4875354, -315.2025552, 102, 0.000! !END!
83 ! X = 598.4683582, -314.9540002, 102, 0.000! !END!
84 ! X = 598.449326, -314.7064368, 102, 0.000! !END!
85 ! X = 598.4301496, -314.4578826, 102, 0.000! !END!
86 ! X = 598.4109737, -314.2093289, 102, 0.000! !END!
87 ! X = 598.3917981, -313.9607755, 102, 0.000! !END!
88 ! X = 598.3727221, -313.7122181, 102, 0.000! !END!
89 ! X = 598.3535474, -313.4636656, 103, 0.000! !END!
90 ! X = 598.3343731, -313.2151135, 104, 0.000! !END!
91 ! X = 598.3152446, -312.9675574, 105, 0.000! !END!
92 ! X = 598.2961702, -312.7190016, 106, 0.000! !END!
93 ! X = 598.2769972, -312.4704507, 116, 0.000! !END!
94 ! X = 598.2578245, -312.2219003, 121, 0.000! !END!
95 ! X = 598.7168214, -314.9347532, 102, 0.000! !END!
96 ! X = 598.6976897, -314.6871946, 102, 0.000! !END!
97 ! X = 598.678513, -314.4386409, 102, 0.000! !END!
98 ! X = 598.6594358, -314.190083, 102, 0.000! !END!
99 ! X = 598.6402599, -313.9415301, 102, 0.000! !END!
100 ! X = 598.6210844, -313.6929775, 102, 0.000! !END!
101 ! X = 598.6019094, -313.4444254, 102, 0.000! !END!
102 ! X = 598.5827347, -313.1958737, 103, 0.000! !END!
103 ! X = 598.563705, -312.9483136, 104, 0.000! !END!
104 ! X = 598.5445312, -312.6997627, 106, 0.000! !END!
105 ! X = 598.5253577, -312.4512122, 111, 0.000! !END!
106 ! X = 598.5061847, -312.2026621, 118, 0.000! !END!
107 ! X = 598.4871113, -311.954108, 121, 0.000! !END!
108 ! X = 598.4679391, -311.7055588, 121, 0.000! !END!
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110 ! X = 598.926975, -314.4193943, 102, 0.000! !END!
111 ! X = 598.9077984, -314.1708414, 102, 0.000! !END!
112 ! X = 598.8886222, -313.9222888, 102, 0.000! !END!
113 ! X = 598.8694463, -313.6737367, 102, 0.000! !END!

114 ! X = 598.8503701, -313.4251805, 102, 0.000! !END!
115 ! X = 598.8312404, -313.1776248, 102, 0.000! !END!
116 ! X = 598.8120658, -312.9290739, 103, 0.000! !END!
117 ! X = 598.7928917, -312.6805235, 105, 0.000! !END!
118 ! X = 598.773817, -312.4319689, 105, 0.000! !END!
119 ! X = 598.7546437, -312.1834193, 110, 0.000! !END!
120 ! X = 598.7354707, -311.93487, 117, 0.000! !END!
121 ! X = 598.7162982, -311.6863212, 121, 0.000! !END!
122 ! X = 599.2135936, -314.8972627, 102, 0.000! !END!
123 ! X = 599.194515, -314.6487049, 102, 0.000! !END!
124 ! X = 599.1753376, -314.4001519, 102, 0.000! !END!
125 ! X = 599.1561606, -314.1515994, 102, 0.000! !END!
126 ! X = 599.1370831, -313.9030428, 102, 0.000! !END!
127 ! X = 599.1179069, -313.6544911, 102, 0.000! !END!
128 ! X = 599.0987766, -313.4069354, 102, 0.000! !END!
129 ! X = 599.0796012, -313.1583845, 102, 0.000! !END!
130 ! X = 599.0604263, -312.909834, 102, 0.000! !END!
131 ! X = 599.0413509, -312.6612795, 103, 0.000! !END!
132 ! X = 599.0221768, -312.4127298, 104, 0.000! !END!
133 ! X = 599.0030031, -312.1641806, 106, 0.000! !END!
134 ! X = 598.9838298, -311.9156317, 108, 0.000! !END!
135 ! X = 598.9648014, -311.6680744, 121, 0.000! !END!
136 ! X = 598.945629, -311.4195264, 121, 0.000! !END!
137 ! X = 599.4620556, -314.8780148, 102, 0.000! !END!
138 ! X = 599.4428774, -314.6294618, 102, 0.000! !END!
139 ! X = 599.4236997, -314.3809093, 102, 0.000! !END!
140 ! X = 599.4046215, -314.1323527, 102, 0.000! !END!
141 ! X = 599.3854445, -313.8838009, 102, 0.000! !END!
142 ! X = 599.366268, -313.6352496, 102, 0.000! !END!
143 ! X = 599.3471373, -313.3876944, 102, 0.000! !END!
144 ! X = 599.3280607, -313.1391394, 102, 0.000! !END!
145 ! X = 599.3088855, -312.8905893, 102, 0.000! !END!
146 ! X = 599.2897106, -312.6420397, 102, 0.000! !END!
147 ! X = 599.2705361, -312.3934904, 103, 0.000! !END!
148 ! X = 599.2514612, -312.1449371, 103, 0.000! !END!
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150 ! X = 599.2131597, -311.6488363, 109, 0.000! !END!
151 ! X = 599.1939869, -311.4002886, 119, 0.000! !END!
152 ! X = 599.1748145, -311.1517414, 107, 0.000! !END!
153 ! X = 599.710418, -314.858771, 102, 0.000! !END!
154 ! X = 599.6721605, -314.3616618, 102, 0.000! !END!
155 ! X = 599.6529828, -314.1131101, 102, 0.000! !END!
156 ! X = 599.6338056, -313.8645588, 102, 0.000! !END!
157 ! X = 599.6147732, -313.6169991, 102, 0.000! !END!
158 ! X = 599.5955967, -313.3684486, 102, 0.000! !END!
159 ! X = 599.5764207, -313.1198985, 102, 0.000! !END!
160 ! X = 599.5572451, -312.8713488, 102, 0.000! !END!
161 ! X = 599.5380699, -312.6227996, 102, 0.000! !END!
162 ! X = 599.5189942, -312.3742463, 102, 0.000! !END!
163 ! X = 599.4998198, -312.1256978, 102, 0.000! !END!
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166 ! X = 599.4424436, -311.3810461, 105, 0.000! !END!
167 ! X = 599.4232709, -311.1324993, 106, 0.000! !END!
168 ! X = 599.4040986, -310.8839529, 112, 0.000! !END!
169 ! X = 599.3849266, -310.6354069, 121, 0.000! !END!

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171 ! X = 599.8823107, -313.8463075, 102, 0.000! !END!
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173 ! X = 599.8439567, -313.349207, 102, 0.000! !END!
174 ! X = 599.8247803, -313.1006573, 102, 0.000! !END!
175 ! X = 599.8057034, -312.8521036, 102, 0.000! !END!
176 ! X = 599.7865279, -312.6035547, 102, 0.000! !END!
177 ! X = 599.7673527, -312.3550063, 102, 0.000! !END!
178 ! X = 599.7482234, -312.1074539, 102, 0.000! !END!
179 ! X = 599.7291482, -311.8589018, 102, 0.000! !END!
180 ! X = 599.7099743, -311.6103546, 103, 0.000! !END!
181 ! X = 599.6908008, -311.3618078, 104, 0.000! !END!
182 ! X = 599.6716277, -311.1132614, 105, 0.000! !END!
183 ! X = 599.652455, -310.8647154, 107, 0.000! !END!
184 ! X = 599.6333819, -310.6161653, 118, 0.000! !END!
185 ! X = 599.6142554, -310.3686158, 121, 0.000! !END!
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188 ! X = 600.1114933, -313.5785147, 102, 0.000! !END!
189 ! X = 600.0924153, -313.3299606, 102, 0.000! !END!
190 ! X = 600.0732386, -313.0814113, 102, 0.000! !END!
191 ! X = 600.0540623, -312.8328625, 102, 0.000! !END!
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193 ! X = 600.0157109, -312.335766, 102, 0.000! !END!
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199 ! X = 599.9009102, -310.8454731, 105, 0.000! !END!
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205 ! X = 600.3599519, -313.5592676, 102, 0.000! !END!
206 ! X = 600.3407744, -313.3107184, 102, 0.000! !END!
207 ! X = 600.3215973, -313.0621695, 102, 0.000! !END!
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209 ! X = 600.2833435, -312.5650686, 102, 0.000! !END!
210 ! X = 600.2642131, -312.3175166, 102, 0.000! !END!
211 ! X = 600.2450377, -312.0689694, 102, 0.000! !END!
212 ! X = 600.2258626, -311.8204226, 102, 0.000! !END!
213 ! X = 600.2067872, -311.5718717, 102, 0.000! !END!
214 ! X = 600.187613, -311.3233258, 102, 0.000! !END!
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218 ! X = 600.1110649, -310.330137, 108, 0.000! !END!
219 ! X = 600.0918928, -310.0815931, 114, 0.000! !END!
220 ! X = 600.0727211, -309.8330496, 116, 0.000! !END!
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222 ! X = 600.0343789, -309.3359637, 122, 0.000! !END!
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225 ! X = 600.5700548, -313.042923, 102, 0.000! !END!

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230 ! X = 600.4743184, -311.8011781, 102, 0.000! !END!
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239 ! X = 600.3020024, -309.5652656, 113, 0.000! !END!
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241 ! X = 600.8566696, -313.5207815, 114, 0.000! !END!
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243 ! X = 600.8184127, -313.0236806, 103, 0.000! !END!
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268 ! X = 600.9519539, -311.5141475, 102, 0.000! !END!
269 ! X = 600.9327787, -311.2656028, 102, 0.000! !END!
270 ! X = 600.9136493, -311.018054, 102, 0.000! !END!
271 ! X = 600.8944749, -310.7695101, 102, 0.000! !END!
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281 ! X = 600.7029974, -308.2850797, 119, 0.000! !END!

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292 ! X = 601.142928, -310.7502664, 102, 0.000! !END!
293 ! X = 601.1237537, -310.5017233, 102, 0.000! !END!
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295 ! X = 601.0854063, -310.0046383, 102, 0.000! !END!
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298 ! X = 601.0280329, -309.2600049, 102, 0.000! !END!
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303 ! X = 600.932277, -308.017301, 105, 0.000! !END!
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308 ! X = 601.5061938, -312.2213005, 102, 0.000! !END!
309 ! X = 601.4870166, -311.9727553, 102, 0.000! !END!
310 ! X = 601.4678399, -311.7242106, 102, 0.000! !END!
311 ! X = 601.4487627, -311.4756618, 102, 0.000! !END!
312 ! X = 601.4296322, -311.2281135, 102, 0.000! !END!
313 ! X = 601.4104567, -310.9795699, 102, 0.000! !END!
314 ! X = 601.3912816, -310.7310268, 102, 0.000! !END!
315 ! X = 601.372107, -310.4824841, 102, 0.000! !END!
316 ! X = 601.3530319, -310.2339373, 102, 0.000! !END!
317 ! X = 601.333858, -309.9853955, 102, 0.000! !END!
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320 ! X = 601.2763844, -309.2407678, 102, 0.000! !END!
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325 ! X = 601.1806269, -307.998066, 103, 0.000! !END!
326 ! X = 601.1615021, -307.7505234, 103, 0.000! !END!
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330 ! X = 601.7929053, -312.6991489, 103, 0.000! !END!
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332 ! X = 601.7545491, -312.2020582, 102, 0.000! !END!
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334 ! X = 601.7162936, -311.7049646, 102, 0.000! !END!
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343 ! X = 601.5440076, -309.4700662, 102, 0.000! !END!
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602 ! X = 598.6696495, -316.0094196, 102, 0.000! !END!
603 ! X = 598.6803615, -316.2443923, 102, 0.000! !END!
604 ! X = 598.5987819, -316.2460964, 102, 0.000! !END!
605 ! X = 598.4286163, -316.1829758, 102, 0.000! !END!
606 ! X = 598.2584053, -316.1188593, 102, 0.000! !END!
607 ! X = 598.0570909, -316.1329764, 102, 0.000! !END!
608 ! X = 597.8559207, -316.1480845, 102, 0.000! !END!
609 ! X = 597.6546057, -316.1622013, 102, 0.000! !END!
610 ! X = 597.4533359, -316.1773134, 102, 0.000! !END!
611 ! X = 597.4417085, -315.9483671, 102, 0.000! !END!
612 ! X = 597.4300814, -315.7194211, 102, 0.000! !END!
613 ! X = 597.4184547, -315.4904754, 103, 0.000! !END!
614 ! X = 597.4068736, -315.2625258, 104, 0.000! !END!
615 ! X = 597.2116232, -315.2723752, 104, 0.000! !END!
616 ! X = 597.0163726, -315.2822245, 105, 0.000! !END!
617 ! X = 597.0301173, -315.5140674, 105, 0.000! !END!

618 ! X = 597.0439078, -315.7469063, 104, 0.000! !END!
619 ! X = 597.0577523, -315.9787454, 103, 0.000! !END!
620 ! X = 597.0715435, -316.2115851, 103, 0.000! !END!
621 ! X = 596.88454, -316.2280453, 104, 0.000! !END!
622 ! X = 596.6975364, -316.2445054, 104, 0.000! !END!
623 ! X = 596.510677, -316.2619565, 106, 0.000! !END!
624 ! X = 596.3236729, -316.2784162, 106, 0.000! !END!
625 ! X = 596.311128, -316.0794413, 111, 0.000! !END!
626 ! X = 596.2985835, -315.8804667, 115, 0.000! !END!
627 ! X = 596.4136062, -315.869266, 111, 0.000! !END!
628 ! X = 596.457343, -315.7804821, 110, 0.000! !END!
629 ! X = 596.4486656, -315.6990629, 110, 0.000! !END!
630 ! X = 596.4420411, -315.5536971, 110, 0.000! !END!
631 ! X = 596.2756344, -315.5512635, 119, 0.000! !END!
632 ! X = 596.2696908, -315.4208325, 121, 0.000! !END!
633 ! X = 596.4923492, -315.4107392, 106, 0.000! !END!
634 ! X = 596.488158, -315.2642658, 110, 0.000! !END!
635 ! X = 596.4839215, -315.1167968, 115, 0.000! !END!
636 ! X = 596.4366792, -315.0610712, 118, 0.000! !END!
637 ! X = 596.266526, -315.0657909, 120, 0.000! !END!
638 ! X = 596.4054177, -314.8938755, 121, 0.000! !END!
639 ! X = 596.54421, -314.7219651, 121, 0.000! !END!
640 ! X = 596.683002, -314.550055, 121, 0.000! !END!
641 ! X = 596.821893, -314.3781409, 120, 0.000! !END!
642 ! X = 596.9140526, -314.1704327, 120, 0.000! !END!
643 ! X = 596.972757, -314.1049168, 120, 0.000! !END!
644 ! X = 597.1703434, -314.0460759, 118, 0.000! !END!
645 ! X = 597.2532999, -313.8347949, 121, 0.000! !END!
646 ! X = 597.257361, -313.7059083, 121, 0.000! !END!
647 ! X = 597.2340863, -313.6311385, 121, 0.000! !END!
648 ! X = 597.3320911, -313.5299202, 117, 0.000! !END!
649 ! X = 597.4300958, -313.4287021, 118, 0.000! !END!
650 ! X = 597.498693, -313.2968908, 121, 0.000! !END!
651 ! X = 597.5875385, -313.158176, 121, 0.000! !END!
652 ! X = 597.6763386, -313.0184657, 121, 0.000! !END!
653 ! X = 597.7654848, -312.8318488, 117, 0.000! !END!
654 ! X = 597.8545318, -312.6452368, 116, 0.000! !END!
655 ! X = 597.9436778, -312.4586207, 121, 0.000! !END!
656 ! X = 597.9709431, -312.2917702, 121, 0.000! !END!
657 ! X = 598.0769296, -312.2131384, 121, 0.000! !END!
658 ! X = 598.2887709, -312.0987811, 121, 0.000! !END!
659 ! X = 598.3073809, -312.0690051, 121, 0.000! !END!
660 ! X = 598.3155824, -311.9219752, 121, 0.000! !END!
661 ! X = 598.3959356, -311.7168034, 121, 0.000! !END!
662 ! X = 598.4043065, -311.6825032, 121, 0.000! !END!
663 ! X = 598.5315769, -311.6567817, 121, 0.000! !END!
664 ! X = 598.640219, -311.5710465, 121, 0.000! !END!
665 ! X = 598.7488609, -311.4853115, 121, 0.000! !END!
666 ! X = 598.8775628, -311.3078796, 121, 0.000! !END!
667 ! X = 599.0061654, -311.1304527, 111, 0.000! !END!
668 ! X = 599.1348131, -310.9540218, 113, 0.000! !END!
669 ! X = 599.2634152, -310.7765956, 121, 0.000! !END!
670 ! X = 599.3793269, -310.564827, 121, 0.000! !END!
671 ! X = 599.4951392, -310.3530634, 121, 0.000! !END!
672 ! X = 599.6110506, -310.1412958, 121, 0.000! !END!
673 ! X = 599.7268627, -309.9295333, 121, 0.000! !END!

674 ! X = 599.7768136, -309.7417066, 121, 0.000! !END!
675 ! X = 599.8266654, -309.5538848, 121, 0.000! !END!
676 ! X = 599.8764719, -309.3650677, 122, 0.000! !END!
677 ! X = 600.0501914, -309.2644143, 122, 0.000! !END!
678 ! X = 600.1948339, -309.1491165, 119, 0.000! !END!
679 ! X = 600.3394223, -309.0348188, 113, 0.000! !END!
680 ! X = 600.4349036, -308.8259757, 119, 0.000! !END!
681 ! X = 600.5302857, -308.6171376, 122, 0.000! !END!
682 ! X = 600.6257214, -308.4072999, 121, 0.000! !END!
683 ! X = 600.7377771, -308.2046907, 114, 0.000! !END!
684 ! X = 600.8499318, -308.0020775, 106, 0.000! !END!
685 ! X = 600.9620863, -307.7994647, 104, 0.000! !END!
686 ! X = 601.0741416, -307.596857, 103, 0.000! !END!
687 ! X = 601.1862505, -307.3932496, 103, 0.000! !END!
688 ! X = 601.2984047, -307.1906384, 103, 0.000! !END!
689 ! X = 601.4352985, -306.9968828, 104, 0.000! !END!
690 ! X = 601.5723365, -306.8041188, 104, 0.000! !END!
691 ! X = 601.7092298, -306.6103642, 104, 0.000! !END!
692 ! X = 601.846222, -306.4166056, 105, 0.000! !END!
693 ! X = 601.9831149, -306.222852, 107, 0.000! !END!
694 ! X = 602.1201066, -306.0290943, 107, 0.000! !END!
695 ! X = 602.2571435, -305.8363327, 105, 0.000! !END!
696 ! X = 602.3940357, -305.6425805, 104, 0.000! !END!
697 ! X = 602.5310267, -305.4488242, 104, 0.000! !END!
698 ! X = 602.6679185, -305.255073, 104, 0.000! !END!

----

a

Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b

Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
UMC BART CLASS I ANALYSIS (HERCULES)
MDNR RUNS
CENRAP - 6KM CALMET CENTRAL METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =           *
   or
ISCMET.DAT    input    * ISCDAT =           *
   or
PLMMET.DAT    input    * PLMDAT =           *
   or
PROFILE.DAT   input    * PRFDAT =           *
SURFACE.DAT   input    * SFCDAT =           *
RESTARTB.DAT  input    * RSTARTB=           *
-------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =UMCH2003Q4.LST     !
CONC.DAT      output   ! CONDAT =UMCH2003Q4.CON     !
DFLX.DAT      output   ! DFDAT  =UMCH2003Q4.DRY     !
WFLX.DAT      output   ! WFDAT  =UMCH2003Q4.WET     !

VISB.DAT      output   ! VISDAT =UMCH2003Q4.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2001.DAT     !
-------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =           *
VOLEMARB.DAT  input    * VOLDAT =           *
BAEMARB.DAT   input    * ARDAT  =           *
LNEMARB.DAT   input    * LNDAT  =           *
-------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =           *
CHEM.DAT      input    * CHEMDAT=           *
H2O2.DAT      input    * H2O2DAT=           *
HILL.DAT      input    * HILDAT=            *
HILLRCT.DAT   input    * RCTDAT=            *
COASTLN.DAT   input    * CSTDAT=            *
FLUXBDY.DAT   input    * BDYDAT=            *
BCON.DAT      input    * BCNDAT=            *
DEBUG.DAT     output   * DEBUG =            *
MASSFLX.DAT   output   * FLXDAT=            *
MASSBAL.DAT   output   * BALDAT=            *
FOG.DAT       output   * FOGDAT=            *
-------------------------------------------------------------------------------
```

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
    T = lower case   ! LCFILES = T !
    F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length

Provision for multiple input files

  Number of CALMET.DAT files for run (NMETDAT)
                  Default: 1   ! NMETDAT = 4   !

  Number of PTEMARB.DAT files for run (NPTDAT)
                  Default: 0   ! NPTDAT = 0 !

  Number of BAEMARB.DAT files for run (NARDAT)
                  Default: 0   ! NARDAT = 0 !

  Number of VOLEMARB.DAT files for run (NVOLDAT)
                  Default: 0   ! NVOLDAT = 0 !

!END!

Subgroup (0a)

 The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name Type   File Name
------------ ----   ---------
none   input   *METDAT=/raid1a/calmet.6km.central/2003/cmet.2003.01.central.dat * *END*
none   input   *METDAT=/raid1a/calmet.6km.central/2003/cmet.2003.02.central.dat * *END*
none   input   *METDAT=/raid1a/calmet.6km.central/2003/cmet.2003.03.central.dat * *END*
none   input   *METDAT=/raidlocal/cmet.2003.04.central.dat   * *END*
none   input   *METDAT=/raidlocal/cmet.2003.05.central.dat   * *END*
none   input   *METDAT=/raidlocal/cmet.2003.06.central.dat   * *END*
none   input   *METDAT=/raidlocal/cmet.2003.07.central.dat   * *END*
none   input   *METDAT=/raidlocal/cmet.2003.08.central.dat   * *END*
none   input   !METDAT=/raidlocal/cmet.2003.09.central.dat   ! !END!
none   input   !METDAT=/raidlocal/cmet.2003.10.central.dat   ! !END!
none   input   !METDAT=/raidlocal/cmet.2003.11.central.dat   ! !END!
none   input   !METDAT=/raidlocal/cmet.2003.12.central.dat   ! !END!

INPUT GROUP: 1 -- General run control parameters

  Option to run all periods found
  in the met. file   (METRUN)   Default: 0   ! METRUN =   0 !

    METRUN = 0 - Run period explicitly defined below
    METRUN = 1 - Run all periods in met. file

Starting date: Year (IBYR) -- No default ! IBYR = 2003 !
(used only if Month (IBMO) -- No default ! IBMO = 9 !
METRUN = 0) Day (IBDY) -- No default ! IBDY = 27 !
Hour (IBHR) -- No default ! IBHR = 0 !

Base time zone (XBTZ) -- No default ! XBTZ = 0.0 !
PST = 8., MST = 7.
CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default ! IRLG = 2304 !

Number of chemical species (NSPEC)
Default: 5 ! NSPEC = 6 !

Number of chemical species
to be emitted (NSE) Default: 3 ! NSE = 3 !

Flag to stop run after
SETUP phase (ITEST) Default: 2 ! ITEST = 2 !
(Used to allow checking
of the model inputs, files, etc.)
ITEST = 1 - STOPS program after SETUP phase
ITEST = 2 - Continues with execution of program
after SETUP

Restart Configuration:

Control flag (MRESTART) Default: 0 ! MRESTART = 0 !

0 = Do not read or write a restart file
1 = Read a restart file at the beginning of
the run
2 = Write a restart file during run
3 = Read a restart file at beginning of run
and write a restart file during run

Number of periods in Restart
output cycle (NRESPD) Default: 0 ! NRESPD = 0 !

0 = File written only at last period
>0 = File updated every NRESPD periods

Meteorological Data Format (METFM)
Default: 1 ! METFM = 1 !

METFM = 1 - CALMET binary file (CALMET.MET)
METFM = 2 - ISC ASCII file (ISCMET.MET)
METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
surface parameters file (SURFACE.DAT)

Meteorological Profile Data Format (MPRFFM)
(used only for METFM = 1, 2, 3)
Default: 1 ! MPRFFM = 1 !

MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)

MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
Averaging Time (minutes) (AVET)
Default: 60.0 ! AVET = 60. !
PG Averaging Time (minutes) (PGTIME)
Default: 60.0 ! PGTIME = 60. !

!END!

INPUT GROUP: 2 -- Technical options

Vertical distribution used in the
near field (MGAUSS) Default: 1 ! MGAUSS = 1 !
0 = uniform
1 = Gaussian

Terrain adjustment method
(MCTADJ) Default: 3 ! MCTADJ = 3 !
0 = no adjustment
1 = ISC-type of terrain adjustment
2 = simple, CALPUFF-type of terrain
adjustment
3 = partial plume path adjustment

Subgrid-scale complex terrain
flag (MCTSG) Default: 0 ! MCTSG = 0 !
0 = not modeled
1 = modeled

Near-field puffs modeled as
elongated 0 (MSLUG) Default: 0 ! MSLUG = 0 !
0 = no
1 = yes (slug model used)

Transitional plume rise modeled ?
(MTRANS) Default: 1 ! MTRANS = 1 !
0 = no (i.e., final rise only)
1 = yes (i.e., transitional rise computed)

Stack tip downwash? (MTIP) Default: 1 ! MTIP = 1 !
0 = no (i.e., no stack tip downwash)
1 = yes (i.e., use stack tip downwash)

Method used to simulate building
downwash? (MBDW) Default: 1 ! MBDW = 1 !
1 = ISC method
2 = PRIME method

Vertical wind shear modeled above

stack top? (MSHEAR) Default: 0 ! MSHEAR = 0 !
0 = no (i.e., vertical wind shear not modeled)
1 = yes (i.e., vertical wind shear modeled)

Puff splitting allowed? (MSPLIT) Default: 0 ! MSPLIT = 0 !
0 = no (i.e., puffs not split)
1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM) Default: 1 ! MCHEM = 1 !
0 = chemical transformation not modeled
1 = transformation rates computed internally (MESOPUFF II scheme)
2 = user-specified transformation rates used
3 = transformation rates computed internally (RIVAD/ARM3 scheme)
4 = secondary organic aerosol formation computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3) Default: 0 ! MAQCHEM = 0 !
0 = aqueous phase transformation not modeled
1 = transformation rates adjusted for aqueous phase reactions

Wet removal modeled ? (MWET) Default: 1 ! MWET = 1 !
0 = no
1 = yes

Dry deposition modeled ? (MDRY) Default: 1 ! MDRY = 1 !
0 = no
1 = yes
(dry deposition method specified for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP) Default: 3 ! MDISP = 3 !

1 = dispersion coefficients computed from measured values of turbulence, sigma v, sigma w
2 = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas
4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.
5 = CTDM sigmas used for stable and neutral conditions. For unstable conditions, sigmas are computed as in MDISP = 3, described above. MDISP = 5 assumes that measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)

(Used only if MDISP = 1 or 5)   Default: 3   ! MTURBVW = 3 !
1 = use sigma-v or sigma-theta measurements
from PROFILE.DAT to compute sigma-y
(valid for METFM = 1, 2, 3, 4)
2 = use sigma-w measurements
from PROFILE.DAT to compute sigma-z
(valid for METFM = 1, 2, 3, 4)
3 = use both sigma-(v/theta) and sigma-w
from PROFILE.DAT to compute sigma-y and sigma-z
(valid for METFM = 1, 2, 3, 4)
4 = use sigma-theta measurements
from PLMMET.DAT to compute sigma-y
(valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2)   Default: 3   ! MDISP2 = 3 !
(used only if MDISP = 1 or 5)
2 = dispersion coefficients from internally calculated
sigma v, sigma w using micrometeorological variables
(u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using
the ISCST multi-segment approximation) and MP coefficients in
urban areas
4 = same as 3 except PG coefficients computed using
the MESOPUFF II eqns.

[DIAGNOSTIC FEATURE]
Method used for Lagrangian timescale for Sigma-y
(used only if MDISP=1,2 or MDISP2=1,2)
(MTAULY)   Default: 0   ! MTAULY = 0 !
0 = Draxler default 617.284 (s)
1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
10 < Direct user input (s)   -- e.g., 306.9

[DIAGNOSTIC FEATURE]
Method used for Advective-Decay timescale for Turbulence
(used only if MDISP=2 or MDISP2=2)
(MTAUADV)   Default: 0   ! MTAUADV = 0 !
0 = No turbulence advection
1 = Computed (OPTION NOT IMPLEMENTED)
10 < Direct user input (s)   -- e.g., 300

Method used to compute turbulence sigma-v &
sigma-w using micrometeorological variables
(Used only if MDISP = 2 or MDISP2 = 2)
(MCTURB)   Default: 1   ! MCTURB = 1 !
1 = Standard CALPUFF subroutines
2 = AERMOD subroutines

PG sigma-y,z adj. for roughness?   Default: 0   ! MROUGH = 0 !
(MROUGH)
0 = no
1 = yes

Partial plume penetration of elevated inversion? (MPARTL)   Default: 1   ! MPARTL = 1 !
0 = no
1 = yes

Strength of temperature inversion provided in PROFILE.DAT extended records? (MTINV)   Default: 0   ! MTINV = 0 !
0 = no (computed from measured/default gradients)
1 = yes

PDF used for dispersion under convective conditions? (MPDF)   Default: 0   ! MPDF = 0 !
0 = no
1 = yes

Sub-Grid TIBL module used for shore line? (MSGTIBL)   Default: 0   ! MSGTIBL = 0 !
0 = no
1 = yes

Boundary conditions (concentration) modeled? (MBCON)   Default: 0   ! MBCON = 0 !
0 = no
1 = yes, using formatted BCON.DAT file
2 = yes, using unformatted CONC.DAT file

Analyses of fogging and icing impacts due to emissions from arrays of mechanically-forced cooling towers can be performed using CALPUFF in conjunction with a cooling tower emissions processor (CTEMISS) and its associated postprocessors. Hourly emissions of water vapor and temperature from each cooling tower cell are computed for the current cell configuration and ambient conditions by CTEMISS. CALPUFF models the dispersion of these emissions and provides cloud information in a specialized format for further analysis. Output to FOG.DAT is provided in either 'plume mode' or 'receptor mode' format.

Configure for FOG Model output? (MFOG)   Default: 0   ! MFOG = 0 !
0 = no
1 = yes - report results in PLUME Mode format
2 = yes - report results in RECEPTOR Mode format

Test options specified to see if they conform to regulatory values? (MREG)   Default: 1   ! MREG = 1 !

0 = NO checks are made

```
        1 = Technical options must conform to USEPA
            Long Range Transport (LRT) guidance
                     METFM    1 or 2
                     AVET     60. (min)
                     PGTIME   60. (min)
                     MGAUSS   1
                     MCTADJ   3
                     MTRANS   1
                     MTIP     1
                     MCHEM    1 or 3 (if modeling SOx, NOx)
                     MWET     1
                     MDRY     1
                     MDISP    2 or 3
                     MPDF     0 if MDISP=3
                              1 if MDISP=2
                     MROUGH   0
                     MPARTL   1
                     SYTDEP   550. (m)
                     MHFTSZ   0


!END!


-------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!

                                                        Dry                 OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED                NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,                (0=NONE,
   (Limit: 12                                     1=COMPUTED-GAS        1=1st CGRUP,
    Characters                                      2=COMPUTED-PARTICLE   2=2nd CGRUP,
    in length)                                    3=USER-SPECIFIED)     3= etc.)

!          SO2  =         1,              1,          1,                0   !
!          SO4  =         1,              0,          2,                0   !
!          NOX  =         1,              1,          1,                0   !
!         HNO3  =         1,              0,          1,                0   !
!          NO3  =         1,              0,          2,                0   !
!         PM10  =         1,              1,          2,                0   !
```

```
!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



--------------------------------------------------------------------------------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 40N  !
     (RLON0)                    No Default      ! RLON0 = 97W  !

         TTM :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
```

PS : RLON0 identifies central (grid N/S) meridian of projection
RLAT0 selected for convenience
EM : RLON0 identifies central meridian of projection
RLAT0 is REPLACED by 0.0N (Equator)
LAZA: RLON0 identifies longitude of tangent-point of mapping plane
RLAT0 identifies latitude of tangent-point of mapping plane

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1) No Default ! XLAT1 = 33N !
(XLAT2) No Default ! XLAT2 = 45N !

LCC : Projection cone slices through Earth's surface at XLAT1 and XLAT2
PS : Projection plane slices through Earth at XLAT1
(XLAT2 is not used)

Note: Latitudes and longitudes should be positive, and include a
letter N,S,E, or W indicating north or south latitude, and
east or west longitude. For example,
35.9 N Latitude = 35.9N
118.7 E Longitude = 118.7E

Datum-region

The Datum-Region for the coordinates is identified by a character string. Many mapping products currently available use the model of the Earth known as the World Geodetic System 1984 (WGS-G). Other local models may be in use, and their selection in CALMET will make its output consistent with local mapping products. The list of Datum-Regions with official transformation parameters is provided by the National Imagery and Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)

WGS-G WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
NAS-C NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
NWS-27 NWS 6370KM Radius, Sphere
NWS-84 NWS 6370KM Radius, Sphere
ESR-S ESRI REFERENCE 6371KM Radius, Sphere

Datum-region for output coordinates

(DATUM) Default: WGS-G ! DATUM = WGS-G !

METEOROLOGICAL Grid:

Rectangular grid defined for projection PMAP,
with X the Easting and Y the Northing coordinate

No. X grid cells (NX) No default ! NX = 366 !
No. Y grid cells (NY) No default ! NY = 234 !
No. vertical layers (NZ) No default ! NZ = 10 !

Grid spacing (DGRIDKM)   No default   ! DGRIDKM = 6 !
Units: km

Cell face heights
(ZFACE(nz+1))   No defaults
Units: m
! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
4000. !

Reference Coordinates
of SOUTHWEST corner of
grid cell(1, 1):

X-coordinate (XORIGKM)   No default   ! XORIGKM = -1008. !
Y coordinate (YORIGKM)   No default   ! YORIGKM = -864. !
Units: km

COMPUTATIONAL Grid:

The computational grid is identical to or a subset of the MET. grid.
The lower left (LL) corner of the computational grid is at grid point
(IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the
computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
The grid spacing of the computational grid is the same as the MET. grid.

X index of LL corner (IBCOMP)   No default   ! IBCOMP = 168 !
(1 <= IBCOMP <= NX)

Y index of LL corner (JBCOMP)   No default   ! JBCOMP = 24 !
(1 <= JBCOMP <= NY)

X index of UR corner (IECOMP)   No default   ! IECOMP = 320 !
(1 <= IECOMP <= NX)

Y index of UR corner (JECOMP)   No default   ! JECOMP = 168 !
(1 <= JECOMP <= NY)

SAMPLING Grid (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point
(IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the
sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
The sampling grid must be identical to or a subset of the computational
grid. It may be a nested grid inside the computational grid.
The grid spacing of the sampling grid is DGRIDKM/MESHDN.

Logical flag indicating if gridded
receptors are used (LSAMP)   Default: T   ! LSAMP = F !
(T=yes, F=no)

X index of LL corner (IBSAMP)   No default   ! IBSAMP = 1 !
(IBCOMP <= IBSAMP <= IECOMP)

```
      Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1   !
       (JBCOMP <= JBSAMP <= JECOMP)


      X index of UR corner (IESAMP)      No default     ! IESAMP =  251   !
       (IBCOMP <= IESAMP <= IECOMP)

      Y index of UR corner (JESAMP)      No default     ! JESAMP =  246   !
       (JBCOMP <= JESAMP <= JECOMP)


     Nesting factor of the sampling
      grid (MESHDN)                   Default: 1     ! MESHDN =  1  !
      (MESHDN is an integer >= 1)

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------
                                    *                      *
    FILE                    DEFAULT VALUE           VALUE THIS RUN
    ----                  -------------           --------------

   Concentrations (ICON)            1                  !  ICON =  1   !
   Dry Fluxes (IDRY)              1                  !  IDRY =  1   !
   Wet Fluxes (IWET)              1                  !  IWET =  1   !
   Relative Humidity (IVIS)         1                  !  IVIS =  1   !
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                      Default: T        ! LCOMPRS = T !

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                    Default: 0        ! IMFLX =  0  !
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                    Default: 0        ! IMBAL =  0  !
         0 = no
         1 = yes (MASSBAL.DAT filename is
             specified in Input Group 0)
```

LINE PRINTER OUTPUT OPTIONS:

Print concentrations (ICPRT) Default: 0 ! ICPRT = 0 !
Print dry fluxes (IDPRT) Default: 0 ! IDPRT = 0 !
Print wet fluxes (IWPRT) Default: 0 ! IWPRT = 0 !
(0 = Do not print, 1 = Print)

Concentration print interval
(ICFRQ) in hours Default: 1 ! ICFRQ = 1 !
Dry flux print interval
(IDFRQ) in hours Default: 1 ! IDFRQ = 1 !
Wet flux print interval
(IWFRQ) in hours Default: 1 ! IWFRQ = 1 !

Units for Line Printer Output
(IPRTU) Default: 1 ! IPRTU = 3 !

	for Concentration	for Deposition
1 =	g/m**3	g/m**2/s
2 =	mg/m**3	mg/m**2/s
3 =	ug/m**3	ug/m**2/s
4 =	ng/m**3	ng/m**2/s
5 =	Odour Units	

Messages tracking progress of run
written to the screen ?
(IMESG) Default: 2 ! IMESG = 2 !
0 = no
1 = yes (advection step, puff ID)
2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)

SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

	SPECIES /GROUP	---- CONCENTRATIONS ---- PRINTED?	SAVED ON DISK?	------ DRY FLUXES ------ PRINTED?	SAVED ON DISK?	------ WET FLUXES ------ PRINTED?	SAVED ON DISK?	-- MASS FLUX -- SAVED ON DISK?	
!	SO2 =	0,	1,	0,	1,	0,	1,	0	!
!	SO4 =	0,	1,	0,	1,	0,	1,	0	!
!	NOX =	0,	1,	0,	1,	0,	1,	0	!
!	HNO3 =	0,	1,	0,	1,	0,	1,	0	!
!	NO3 =	0,	1,	0,	1,	0,	1,	0	!
!	PM10 =	0,	1,	0,	1,	0,	1,	0	!

OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

Logical for debug output
(LDEBUG) Default: F ! LDEBUG = F !

First puff to track
(IPFDEB) Default: 1 ! IPFDEB = 1 !

Number of puffs to track
(NPFDEB) Default: 1 ! NPFDEB = 1 !

Met. period to start output
(NN1) Default: 1 ! NN1 = 1 !

Met. period to end output
(NN2) Default: 10 ! NN2 = 10 !

!END!

INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
----

Subgroup (6a)

Number of terrain features (NHILL) Default: 0 ! NHILL = 0 !

Number of special complex terrain
receptors (NCTREC) Default: 0 ! NCTREC = 0 !

Terrain and CTSG Receptor data for
CTSG hills input in CTDM format ?
(MHILL) No Default ! MHILL = 2 !
1 = Hill and Receptor data created
by CTDM processors & read from
HILL.DAT and HILLRCT.DAT files
2 = Hill data created by OPTHILL &
input below in Subgroup (6b);
Receptor data in Subgroup (6c)

Factor to convert horizontal dimensions Default: 1.0 ! XHILL2M = 1. !
to meters (MHILL=1)

Factor to convert vertical dimensions Default: 1.0 ! ZHILL2M = 1. !
to meters (MHILL=1)

X-origin of CTDM system relative to No Default ! XCTDMKM = 0.0E00 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

Y-origin of CTDM system relative to No Default ! YCTDMKM = 0.0E00 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

Subgroup (6b)
----

1 **
HILL information

```
HILL        XC      YC      THETAH  ZGRID  RELIEF   EXPO 1   EXPO 2  SCALE 1   SCALE 2
AMAX1    AMAX2
 NO.       (km)     (km)     (deg.)   (m)     (m)      (m)       (m)      (m)       (m)      (m)       (m)
----       ----     ----     ------  -----  ------    ------    ------   -------   -------   -----    -----

---------------
Subgroup (6c)
---------------

   COMPLEX TERRAIN RECEPTOR INFORMATION

                 XRCT       YRCT       ZRCT        XHH
                 (km)        (km)        (m)
                ------       -----      ------        ----


-------------------
1
    Description of Complex Terrain Variables:
        XC, YC  = Coordinates of center of hill
        THETAH  = Orientation of major axis of hill (clockwise from
                North)
        ZGRID   = Height of the  0  of the grid above mean sea
                level
        RELIEF  = Height of the crest of the hill above the grid elevation
        EXPO 1  = Hill-shape exponent for the major axis
        EXPO 2  = Hill-shape exponent for the major axis
        SCALE 1 = Horizontal length scale along the major axis
        SCALE 2 = Horizontal length scale along the minor axis
        AMAX    = Maximum allowed axis length for the major axis
        BMAX    = Maximum allowed axis length for the major axis

        XRCT, YRCT = Coordinates of the complex terrain receptors
        ZRCT    = Height of the ground (MSL) at the complex terrain
                Receptor
        XHH     = Hill number associated with each complex terrain receptor
                (NOTE: MUST BE ENTERED AS A REAL NUMBER)

  **
    NOTE: DATA for each hill and CTSG receptor are treated as a separate
         input subgroup and therefore must end with an input group terminator.

-------------------------------------------------------------------------------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

     SPECIES    DIFFUSIVITY     ALPHA STAR     REACTIVITY    MESOPHYLL RESISTANCE
HENRY'S LAW COEFFICIENT
      NAME       (cm**2/s)                              (s/cm)             (dimensionless)
     -------    -----------      ----------     ----------    --------------------     -----------------------

!         SO2 =     0.1509,        1000.,           8.,              0.,                0.04 !
!         NOX =     0.1656,           1.,           8.,              5.,                3.5 !
```

```
!        HNO3 =     0.1628,           1.,          18.,               0.,           0.00000008 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

    For SINGLE SPECIES, the mean and standard deviation are used to
    compute a deposition velocity for NINT (see group 9) size-ranges,
    and these are then averaged to obtain a mean deposition velocity.

    For GROUPED SPECIES, the size distribution should be explicitly
    specified (by the 'species' in the group), and the standard deviation
    for each should be entered as 0.  The model will then use the
    deposition velocity for the stated mean diameter.

     SPECIES      GEOMETRIC MASS MEAN       GEOMETRIC STANDARD
      NAME            DIAMETER                   DEVIATION
                      (microns)                  (microns)
     -------      -------------------       ------------------
!         SO4 =         0.48,                   2.   !
!         NO3 =         0.48,                   2.   !
!        PM10 =           2.,                   2.   !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

    Reference cuticle resistance (s/cm)
    (RCUTR)                    Default: 30    !  RCUTR = 30.0 !
    Reference ground resistance  (s/cm)
    (RGR)                      Default: 10    !    RGR = 10.0 !
    Reference pollutant reactivity
    (REACTR)                   Default: 8     ! REACTR = 8.0 !

    Number of particle-size intervals used to
    evaluate effective particle deposition velocity
    (NINT)                     Default: 9     !   NINT =  9  !

    Vegetation state in unirrigated areas
    (IVEG)                     Default: 1     !   IVEG =  1   !
      IVEG=1 for active and unstressed vegetation
      IVEG=2 for active and stressed vegetation
      IVEG=3 for inactive vegetation

!END!
```

INPUT GROUP: 10 -- Wet Deposition Parameters

```
                   Scavenging Coefficient -- Units: (sec)**(-1)

      Pollutant     Liquid Precip.      Frozen Precip.
      ---------     --------------      --------------
!         SO2 =        3.0E-05,            0.0E00 !
!         SO4 =        1.0E-04,            3.0E-05 !
!        HNO3 =        6.0E-05,            0.0E00 !
!         NO3 =        1.0E-04,            3.0E-05 !
!        PM10 =        1.0E-04,            3.0E-05 !

!END!
```

INPUT GROUP: 11 -- Chemistry Parameters

```
    Ozone data input option (MOZ)     Default: 1           ! MOZ =  0   !
    (Used only if MCHEM = 1, 3, or 4)
      0 = use a monthly background ozone value
      1 = read hourly ozone concentrations from
          the OZONE.DAT data file

    Monthly ozone concentrations
    (Used only if MCHEM = 1, 3, or 4 and
     MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
    (BCKO3) in ppb                    Default: 12*80.
    !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00, 65.00, 65.00, 26.00, 26.00 !

    Monthly ammonia concentrations
    (Used only if MCHEM = 1, or 3)
    (BCKNH3) in ppb                   Default: 12*10.
    !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50 !

    Nighttime SO2 loss rate (RNITE1)
    in percent/hour                   Default: 0.2         ! RNITE1 = .2 !

    Nighttime NOx loss rate (RNITE2)
    in percent/hour                   Default: 2.0         ! RNITE2 = 2.0 !

    Nighttime HNO3 formation rate (RNITE3)
    in percent/hour                   Default: 2.0         ! RNITE3 = 2.0 !

    H2O2 data input option (MH2O2)    Default: 1           ! MH2O2 =  0   !
    (Used only if MAQCHEM = 1)
      0 = use a monthly background H2O2 value
      1 = read hourly H2O2 concentrations from
```

the H2O2.DAT data file

Monthly H2O2 concentrations
(Used only if MQACHEM = 1 and
MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
(BCKH2O2) in ppb Default: 12*1.
! BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !

--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
(used only if MCHEM = 4)

The SOA module uses monthly values of:
Fine particulate concentration in ug/m^3 (BCKPMF)
Organic fraction of fine particulate (OFRAC)
VOC / NOX ratio (after reaction) (VCNX)
to characterize the air mass when computing
the formation of SOA from VOC emissions.
Typical values for several distinct air mass types are:

Month	1	2	3	4	5	6	7	8	9	10	11	12
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Clean Continental

BCKPMF	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
OFRAC	.15	.15	.20	.20	.20	.20	.20	.20	.20	.20	.20	.15
VCNX	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.

Clean Marine (surface)

BCKPMF	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
OFRAC	.25	.25	.30	.30	.30	.30	.30	.30	.30	.30	.30	.25
VCNX	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.

Urban - low biogenic (controls present)

BCKPMF	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.
OFRAC	.20	.20	.25	.25	.25	.25	.25	.25	.20	.20	.20	.20
VCNX	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.

Urban - high biogenic (controls present)

BCKPMF	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.
OFRAC	.25	.25	.30	.30	.30	.55	.55	.55	.35	.35	.35	.25
VCNX	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.

Regional Plume

BCKPMF	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
OFRAC	.20	.20	.25	.35	.25	.40	.40	.40	.30	.30	.30	.20
VCNX	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.

Urban - no controls present

BCKPMF	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
OFRAC	.30	.30	.35	.35	.35	.55	.55	.55	.35	.35	.35	.30
VCNX	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

Default: Clean Continental
! BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
! OFRAC = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !

! VCNX = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !

!END!

INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
----

Horizontal size of puff (m) beyond which
time-dependent dispersion equations (Heffter)
are used to determine sigma-y and
sigma-z (SYTDEP) Default: 550. ! SYTDEP = 5.5E02 !

Switch for using Heffter equation for sigma z
as above (0 = Not use Heffter; 1 = use Heffter
(MHFTSZ) Default: 0 ! MHFTSZ = 0 !

Stability class used to determine plume
growth rates for puffs above the boundary
layer (JSUP) Default: 5 ! JSUP = 5 !

Vertical dispersion constant for stable
conditions (k1 in Eqn. 2.7-3) (CONK1) Default: 0.01 ! CONK1 = .01 !

Vertical dispersion constant for neutral/
unstable conditions (k2 in Eqn. 2.7-4)
(CONK2) Default: 0.1 ! CONK2 = .1 !

Factor for determining Transition-point from
Schulman-Scire to Huber-Snyder Building Downwash
scheme (SS used for Hs < Hb + TBD * HL)
(TBD) Default: 0.5 ! TBD = .5 !
TBD < 0 ==> always use Huber-Snyder
TBD = 1.5 ==> always use Schulman-Scire
TBD = 0.5 ==> ISC Transition-point

Range of land use categories for which
urban dispersion is assumed
(IURB1, IURB2) Default: 10 ! IURB1 = 10 !
19 ! IURB2 = 19 !

Site characterization parameters for single-point Met data files ---------
(needed for METFM = 2,3,4)

Land use category for modeling domain
(ILANDUIN) Default: 20 ! ILANDUIN = 20 !

Roughness length (m) for modeling domain
(Z0IN) Default: 0.25 ! Z0IN = .25 !

Leaf area index for modeling domain
(XLAIIN) Default: 3.0 ! XLAIIN = 3.0 !

Elevation above sea level (m)
(ELEVIN) Default: 0.0 ! ELEVIN = .0 !

Latitude (degrees) for met location
(XLATIN) Default: -999. ! XLATIN = -999.0 !

Longitude (degrees) for met location
(XLONIN) Default: -999. ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

Anemometer height (m) (Used only if METFM = 2,3)
(ANEMHT) Default: 10. ! ANEMHT = 10.0 !

Form of lateral turbulance data in PROFILE.DAT file
(Used only if METFM = 4 or MTURBVW = 1 or 3)
(ISIGMAV) Default: 1 ! ISIGMAV = 1 !
0 = read sigma-theta
1 = read sigma-v

Choice of mixing heights (Used only if METFM = 4)
(IMIXCTDM) Default: 0 ! IMIXCTDM = 0 !
0 = read PREDICTED mixing heights
1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN) Default: 1.0 ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN) Default: 1.0 ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW) Default: 99 ! MXNEW = 99 !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM) Default: 99 ! MXSAM = 99 !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT) Default: 2 ! NCOUNT = 2 !

Minimum sigma y for a new puff/slug (m)
(SYMIN) Default: 1.0 ! SYMIN = 1.0 !

Minimum sigma z for a new puff/slug (m)
(SZMIN) Default: 1.0 ! SZMIN = 1.0 !

Default minimum turbulence velocities sigma-v and sigma-w
for each stability class over land and over water (m/s)
(SVMIN(12) and SWMIN(12))

```
             ----------  LAND  ----------       ---------  WATER  ----------
   Stab Class :  A    B    C    D    E    F        A    B    C    D    E    F
                 ---  ---  ---  ---  ---  ---      ---  ---  ---  ---  ---  ---
Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37, .37, .37, .37
Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08, .06, .03, .016

     ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370, 0.370, 0.370!
     ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!


Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))                        Default: 0.0,0.0  ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                          Default: 0.5    ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)                          Default: 3000.  ! XMAXZI = 4000.0 !

Minimum mixing height (m)
(XMINZI)                          Default: 50.    ! XMINZI = 20.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))                  Default   :
                      ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

                 Wind Speed Class :  1     2     3     4     5
                                    ---   ---   ---   ---   ---
                       ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))                   Default   : ISC RURAL values
                      ISC RURAL : .07, .07, .10, .15, .35, .55
                      ISC URBAN : .15, .15, .20, .25, .30, .30

                 Stability Class :  A     B     C     D     E     F
                                    ---   ---   ---   ---   ---   ---
                        ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))                   Default: 0.020, 0.035
                        ! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
```

for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))   Stability Class : A   B   C   D   E   F
                        Default PPC : .50, .50, .50, .50, .35, .35
                                       ---   ---   ---   ---   ---   ---
                          ! PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)   Default: 10.   ! SL2PF = 10.0 !

Puff-splitting control variables ------------------------

VERTICAL SPLIT

Number of puffs that result every time a puff
is split - nsplit=2 means that 1 puff splits
into 2
(NSPLIT)   Default: 3   ! NSPLIT = 3 !

Time(s) of a day when split puffs are eligible to
be split once again; this is typically set once
per day, around sunset before nocturnal shear develops.
24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
0=do not re-split   1=eligible for re-split
(IRESPLIT(24))   Default: Hour 17 = 1
! IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

Split is allowed only if last hour's mixing
height (m) exceeds a minimum value
(ZISPLIT)   Default: 100.   ! ZISPLIT = 100.0 !

Split is allowed only if ratio of last hour's
mixing ht to the maximum mixing ht experienced
by the puff is less than a maximum value (this
postpones a split until a nocturnal layer develops)
(ROLDMAX)   Default: 0.25   ! ROLDMAX = 0.25 !

HORIZONTAL SPLIT

Number of puffs that result every time a puff
is split - nsplith=5 means that 1 puff splits
into 5
(NSPLITH)   Default: 5   ! NSPLITH = 5 !

Minimum sigma-y (Grid Cells Units) of puff
before it may be split
(SYSPLITH)   Default: 1.0   ! SYSPLITH = 1.0 !

Minimum puff elongation rate (SYSPLITH/hr) due to
wind shear, before it may be split
(SHSPLITH)   Default: 2.   ! SHSPLITH = 2.0 !

Minimum concentration (g/m^3) of each
species in puff before it may be split
Enter array of NSPEC values; if a single value is
entered, it will be used for ALL species
(CNSPLITH) Default: 1.0E-07 ! CNSPLITH = 1.0E-07 !

Integration control variables ------------------------

Fractional convergence criterion for numerical SLUG
sampling integration
(EPSSLUG) Default: 1.0e-04 ! EPSSLUG = 1.0E-04 !

Fractional convergence criterion for numerical AREA
source integration
(EPSAREA) Default: 1.0e-06 ! EPSAREA = 1.0E-06 !

Trajectory step-length (m) used for numerical rise
integration
(DSRISE) Default: 1.0 ! DSRISE = 1.0 !

Boundary Condition (BC) Puff control variables ------------------------

Minimum height (m) to which BC puffs are mixed as they are emitted
(MBCON=2 ONLY). Actual height is reset to the current mixing height
at the release point if greater than this minimum.
(HTMINBC) Default: 500. ! HTMINBC = 500.0 !

Search radius (in BC segment lengths) about a receptor for sampling
nearest BC puff. BC puffs are emitted with a spacing of one segment
length, so the search radius should be greater than 1.
(RSAMPBC) Default: 4. ! RSAMPBC = 10.0 !

Near-Surface depletion adjustment to concentration profile used when
sampling BC puffs?
(MDEPBC) Default: 1 ! MDEPBC = 1 !
0 = Concentration is NOT adjusted for depletion
1 = Adjust Concentration for depletion

!END!

INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters

Subgroup (13a)

Number of point sources with
parameters provided below (NPT1) No default ! NPT1 = 1 !

Units used for point source
emissions below (IPTU) Default: 1 ! IPTU = 1 !

```
        1 =        g/s
        2 =       kg/hr
        3 =       lb/hr
        4 =     tons/yr
        5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
        6 =     Odour Unit * m**3/min
        7 =     metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

    Number of point sources with
    variable emission parameters
    provided in external file      (NPT2)  No default  !  NPT2 =  0  !

    (If NPT2 > 0, these point
    source emissions are read from
    the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                a
        POINT SOURCE: CONSTANT DATA
        -----------------------------
                                                          b         c
  Source       X         Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
             (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = EP10 !
   1 ! X =  401.0797,  -106.0267,  103.94, 213.0,    2.74, 10.86, 449.82,  0.0, 2.218864E02,  0.0E00,
1.71281E01,
      0.0E00,  0.0E00, 2.05537E-01 !
   1 ! FMFAC  =      1.0 !   !END!
--------

   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.

    SRCNAM  is a 12-character name for a source
            (No default)
    X       is an array holding the source data listed by the column headings
            (No default)
    SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
            (Default: 0.,0.)
    FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
            the effect of rain-caps or other physical configurations that
            reduce momentum rise associated with the actual exit velocity.
            (Default: 1.0  -- full momentum used)
```

b
0. = No building downwash modeled, 1. = downwash modeled
NOTE: must be entered as a REAL number (i.e., with decimal point)

c
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by IPTU
(e.g. 1 for g/s).

```
---------------
Subgroup (13c)
---------------

         BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
         -------------------------------------------------------
Source                                                        a
 No.       Effective building height, width, length and X/Y offset (in meters)
         every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed for
         MBDW=2 (PRIME downwash option)
------     -------------------------------------------------------------------

--------
```

a
Building height, width, length, and X/Y offset from the source are treated
as a separate input subgroup for each source and therefore must end with
an input group terminator. The X/Y offset is the position, relative to the
stack, of the center of the upwind face of the projected building, with the
x-axis pointing along the flow direction.

```
---------------
Subgroup (13d)
---------------
                                        a
        POINT SOURCE: VARIABLE EMISSIONS DATA
        ---------------------------------------
```

Use this subgroup to describe temporal variations in the emission
rates given in 13b. Factors entered multiply the rates in 13b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY)   Default: 0

```
     0 =       Constant
     1 =       Diurnal cycle (24 scaling factors: hours 1-24)
     2 =       Monthly cycle (12 scaling factors: months 1-12)
     3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                          where first group is DEC-JAN-FEB)
     4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                          first group is Stability Class A,
                          and the speed classes have upper
                          bounds (m/s) defined in Group 12
     5 =       Temperature   (12 scaling factors, where temperature
                          classes have upper bounds (C) of:
```

```
                              0, 5, 10, 15, 20, 25, 30, 35, 40,
                              45, 50, 50+)


--------
   a
    Data for each species are treated as a separate input subgroup
    and therefore must end with an input group terminator.


-------------------------------------------------------------------------------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
--------------------------------

---------------
Subgroup (14a)
---------------

    Number of polygon area sources with
    parameters specified below (NAR1)       No default  !  NAR1 =  0   !

    Units used for area source
    emissions below            (IARU)       Default: 1  !  IARU =   1  !
         1 =        g/m**2/s
         2 =       kg/m**2/hr
         3 =       lb/m**2/hr
         4 =     tons/m**2/yr
         5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
         6 =     Odour Unit * m/min
         7 =     metric tons/m**2/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

    Number of buoyant polygon area sources
    with variable location and emission
    parameters (NAR2)                    No default  !  NAR2 =  0   !
    (If NAR2 > 0, ALL parameter data for
    these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                               a
        AREA SOURCE: CONSTANT DATA
        ----------------------------
                                               b
Source          Effect.    Base      Initial    Emission
 No.            Height   Elevation   Sigma z     Rates
                 (m)       (m)        (m)
```

------- ------ ------ -------- ---------

----
a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.
b
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by IARU
(e.g. 1 for g/m**2/s).

Subgroup (14c)

COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON

Source a
No. Ordered list of X followed by list of Y, grouped by source
------ --

----
a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

Subgroup (14d)
----
a
AREA SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission
rates given in 14b. Factors entered multiply the rates in 14b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0
0 = Constant
1 = Diurnal cycle (24 scaling factors: hours 1-24)
2 = Monthly cycle (12 scaling factors: months 1-12)
3 = Hour & Season (4 groups of 24 hourly scaling factors,
where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where
first group is Stability Class A,
and the speed classes have upper
bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,

45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

Subgroup (15a)

```
    Number of buoyant line sources
    with variable location and emission
    parameters (NLN2)                    No default  !  NLN2 =  0   !

    (If NLN2 > 0, ALL parameter data for
     these sources are read from the file: LNEMARB.DAT)

    Number of buoyant line sources (NLINES)      No default   ! NLINES =  0  !

    Units used for line source
    emissions below             (ILNU)       Default: 1  !  ILNU =   1  !
          1 =       g/s
          2 =      kg/hr
          3 =      lb/hr
          4 =    tons/yr
          5 =    Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =    Odour Unit * m**3/min
          7 =    metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (15c)       (NSLN1) Default: 0  !  NSLN1 =  0  !

    Maximum number of segments used to model
    each line (MXNSEG)                   Default: 7   ! MXNSEG =  7  !

    The following variables are required only if NLINES > 0.  They are
    used in the buoyant line source plume rise calculations.

       Number of distances at which           Default: 6   ! NLRISE =  6  !
       transitional rise is computed

       Average building length (XL)           No default   ! XL = .0 !
                                           (in meters)

       Average building height (HBL)          No default   ! HBL = .0 !
```

(in meters)

Average building width (WBL)   No default   ! WBL = .0 !
(in meters)

Average line source width (WML)   No default   ! WML = .0 !
(in meters)

Average separation between buildings (DXL) No default   ! DXL = .0 !
(in meters)

Average buoyancy parameter (FPRIMEL)   No default   ! FPRIMEL = .0 !
(in m**4/s**3)

!END!

Subgroup (15b)

BUOYANT LINE SOURCE: CONSTANT DATA

Source No.	Beg. X Coordinate (km)	Beg. Y Coordinate (km)	End. X Coordinate (km)	End. Y Coordinate (km)	Release Height (m)	Base Elevation (m)	Emission Rates
------	----------	----------	---------	----------	-------	---------	---------

Header note: a (printed above "Release Height")

----

a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by ILNTU (e.g. 1 for g/s).

Subgroup (15c)

BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission rates given in 15b. Factors entered multiply the rates in 15b. Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY)   Default: 0
- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)

3 = Hour & Season (4 groups of 24 hourly scaling factors,
where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where
first group is Stability Class A,
and the speed classes have upper
bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

Number of volume sources with
parameters provided in 16b,c (NVL1) No default ! NVL1 = 0 !

Units used for volume source
emissions below in 16b (IVLU) Default: 1 ! IVLU = 1 !
1 = g/s
2 = kg/hr
3 = lb/hr
4 = tons/yr
5 = Odour Unit * m**3/s (vol. flux of odour compound)
6 = Odour Unit * m**3/min
7 = metric tons/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (16c) (NSVL1) Default: 0 ! NSVL1 = 0 !

Number of volume sources with
variable location and emission
parameters (NVL2) No default ! NVL2 = 0 !

(If NVL2 > 0, ALL parameter data for
these sources are read from the VOLEMARB.DAT file(s))

!END!

```
---------------
Subgroup (16b)
---------------
                                  a
         VOLUME SOURCE: CONSTANT DATA
         ------------------------------
                                                               b
       X          Y       Effect.    Base     Initial    Initial    Emission
    Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z     Rates
      (km)       (km)         (m)       (m)        (m)       (m)
    ----------  ----------   ------    ------    --------   --------   --------

--------
   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.

   b
    An emission rate must be entered for every pollutant modeled.
    Enter emission rate of zero for secondary pollutants that are
    modeled, but not emitted.  Units are specified by IVLU
    (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                         a
        VOLUME SOURCE: VARIABLE EMISSIONS DATA
        ----------------------------------------

    Use this subgroup to describe temporal variations in the emission
    rates given in 16b.  Factors entered multiply the rates in 16b.
    Skip sources here that have constant emissions.  For more elaborate
    variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

    IVARY determines the type of variation, and is source-specific:
    (IVARY)                      Default: 0
         0 =       Constant
         1 =       Diurnal cycle (24 scaling factors: hours 1-24)
         2 =       Monthly cycle (12 scaling factors: months 1-12)
         3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                            where first group is DEC-JAN-FEB)
         4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                            first group is Stability Class A,
                            and the speed classes have upper
                            bounds (m/s) defined in Group 12
         5 =       Temperature   (12 scaling factors, where temperature
                            classes have upper bounds (C) of:
                            0, 5, 10, 15, 20, 25, 30, 35, 40,
                            45, 50, 50+)


    Number of non-gridded receptors (NREC)  No default  !  NREC =  1046  !

!END!
```

Subgroup (17b)
----

a
NON-GRIDDED (DISCRETE) RECEPTOR DATA

Receptor No.	X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height b Above Ground (m)
1 ! X =	356.5460,	-357.4577,	274,	0.000! !END!
2 ! X =	356.5350,	-357.2085,	274,	0.000! !END!
3 ! X =	356.5241,	-356.9594,	235,	0.000! !END!
4 ! X =	356.7941,	-357.4468,	288,	0.000! !END!
5 ! X =	356.7831,	-357.1976,	276,	0.000! !END!
6 ! X =	356.7721,	-356.9484,	244,	0.000! !END!
7 ! X =	357.0422,	-357.4358,	304,	0.000! !END!
8 ! X =	357.0312,	-357.1867,	304,	0.000! !END!
9 ! X =	357.0202,	-356.9375,	274,	0.000! !END!
10 ! X =	356.9543,	-355.4425,	274,	0.000! !END!
11 ! X =	357.2903,	-357.4249,	304,	0.000! !END!
12 ! X =	357.2793,	-357.1757,	304,	0.000! !END!
13 ! X =	357.2683,	-356.9266,	290,	0.000! !END!
14 ! X =	357.2024,	-355.4316,	265,	0.000! !END!
15 ! X =	357.6591,	-360.1548,	274,	0.000! !END!
16 ! X =	357.6481,	-359.9057,	274,	0.000! !END!
17 ! X =	357.6371,	-359.6565,	274,	0.000! !END!
18 ! X =	357.6262,	-359.4073,	274,	0.000! !END!
19 ! X =	357.6152,	-359.1582,	274,	0.000! !END!
20 ! X =	357.6042,	-358.9090,	274,	0.000! !END!
21 ! X =	357.5383,	-357.4140,	302,	0.000! !END!
22 ! X =	357.5274,	-357.1648,	304,	0.000! !END!
23 ! X =	357.5164,	-356.9156,	304,	0.000! !END!
24 ! X =	357.5054,	-356.6665,	287,	0.000! !END!
25 ! X =	357.4944,	-356.4173,	274,	0.000! !END!
26 ! X =	357.4834,	-356.1681,	304,	0.000! !END!
27 ! X =	357.4505,	-355.4206,	275,	0.000! !END!
28 ! X =	357.9182,	-360.3931,	274,	0.000! !END!
29 ! X =	357.9072,	-360.1439,	274,	0.000! !END!
30 ! X =	357.8962,	-359.8947,	274,	0.000! !END!
31 ! X =	357.8852,	-359.6456,	274,	0.000! !END!
32 ! X =	357.8743,	-359.3964,	274,	0.000! !END!
33 ! X =	357.8633,	-359.1472,	273,	0.000! !END!
34 ! X =	357.8523,	-358.8981,	274,	0.000! !END!
35 ! X =	357.7864,	-357.4030,	304,	0.000! !END!
36 ! X =	357.7754,	-357.1539,	304,	0.000! !END!
37 ! X =	357.7645,	-356.9047,	307,	0.000! !END!
38 ! X =	357.7535,	-356.6555,	314,	0.000! !END!
39 ! X =	357.7425,	-356.4064,	313,	0.000! !END!
40 ! X =	357.7315,	-356.1572,	304,	0.000! !END!
41 ! X =	357.7205,	-355.9080,	304,	0.000! !END!
42 ! X =	357.7096,	-355.6589,	292,	0.000! !END!
43 ! X =	357.6986,	-355.4097,	275,	0.000! !END!
44 ! X =	358.2102,	-361.3789,	278,	0.000! !END!
45 ! X =	358.1663,	-360.3822,	272,	0.000! !END!

46 ! X = 358.1553, -360.1330, 274, 0.000! !END!
47 ! X = 358.1443, -359.8838, 274, 0.000! !END!
48 ! X = 358.1333, -359.6346, 274, 0.000! !END!
49 ! X = 358.1223, -359.3855, 274, 0.000! !END!
50 ! X = 358.1114, -359.1363, 274, 0.000! !END!
51 ! X = 358.1004, -358.8871, 278, 0.000! !END!
52 ! X = 358.0345, -357.3921, 295, 0.000! !END!
53 ! X = 358.0235, -357.1429, 304, 0.000! !END!
54 ! X = 358.0125, -356.8938, 319, 0.000! !END!
55 ! X = 358.0016, -356.6446, 335, 0.000! !END!
56 ! X = 357.9906, -356.3954, 337, 0.000! !END!
57 ! X = 357.9796, -356.1463, 320, 0.000! !END!
58 ! X = 357.9686, -355.8971, 299, 0.000! !END!
59 ! X = 357.9576, -355.6479, 277, 0.000! !END!
60 ! X = 357.9467, -355.3988, 274, 0.000! !END!
61 ! X = 357.9357, -355.1496, 274, 0.000! !END!
62 ! X = 357.9247, -354.9005, 243, 0.000! !END!
63 ! X = 358.4583, -361.3679, 304, 0.000! !END!
64 ! X = 358.4473, -361.1187, 274, 0.000! !END!
65 ! X = 358.4363, -360.8696, 274, 0.000! !END!
66 ! X = 358.4253, -360.6204, 271, 0.000! !END!
67 ! X = 358.4143, -360.3712, 274, 0.000! !END!
68 ! X = 358.4034, -360.1221, 274, 0.000! !END!
69 ! X = 358.3924, -359.8729, 274, 0.000! !END!
70 ! X = 358.3814, -359.6237, 279, 0.000! !END!
71 ! X = 358.3704, -359.3745, 281, 0.000! !END!
72 ! X = 358.3594, -359.1254, 288, 0.000! !END!
73 ! X = 358.3485, -358.8762, 293, 0.000! !END!
74 ! X = 358.2826, -357.3812, 290, 0.000! !END!
75 ! X = 358.2716, -357.1320, 302, 0.000! !END!
76 ! X = 358.2606, -356.8828, 327, 0.000! !END!
77 ! X = 358.2496, -356.6337, 365, 0.000! !END!
78 ! X = 358.2387, -356.3845, 395, 0.000! !END!
79 ! X = 358.2277, -356.1353, 343, 0.000! !END!
80 ! X = 358.2167, -355.8862, 304, 0.000! !END!
81 ! X = 358.2057, -355.6370, 296, 0.000! !END!
82 ! X = 358.1947, -355.3878, 290, 0.000! !END!
83 ! X = 358.1838, -355.1387, 277, 0.000! !END!
84 ! X = 358.1728, -354.8895, 259, 0.000! !END!
85 ! X = 358.7064, -361.3570, 304, 0.000! !END!
86 ! X = 358.6954, -361.1078, 274, 0.000! !END!
87 ! X = 358.6844, -360.8586, 274, 0.000! !END!
88 ! X = 358.6734, -360.6095, 274, 0.000! !END!
89 ! X = 358.6624, -360.3603, 274, 0.000! !END!
90 ! X = 358.6515, -360.1111, 274, 0.000! !END!
91 ! X = 358.6405, -359.8619, 286, 0.000! !END!
92 ! X = 358.6295, -359.6128, 304, 0.000! !END!
93 ! X = 358.6185, -359.3636, 311, 0.000! !END!
94 ! X = 358.6075, -359.1144, 318, 0.000! !END!
95 ! X = 358.5965, -358.8653, 322, 0.000! !END!
96 ! X = 358.5856, -358.6161, 308, 0.000! !END!
97 ! X = 358.5746, -358.3669, 298, 0.000! !END!
98 ! X = 358.5307, -357.3702, 290, 0.000! !END!
99 ! X = 358.5197, -357.1211, 308, 0.000! !END!
100 ! X = 358.5087, -356.8719, 343, 0.000! !END!
101 ! X = 358.4977, -356.6227, 371, 0.000! !END!

102 ! X =	358.4867,	-356.3736,	395,	0.000! !END!
103 ! X =	358.4758,	-356.1244,	365,	0.000! !END!
104 ! X =	358.4648,	-355.8752,	321,	0.000! !END!
105 ! X =	358.4538,	-355.6261,	307,	0.000! !END!
106 ! X =	358.4428,	-355.3769,	302,	0.000! !END!
107 ! X =	358.4318,	-355.1278,	283,	0.000! !END!
108 ! X =	358.4209,	-354.8786,	274,	0.000! !END!
109 ! X =	358.9544,	-361.3461,	297,	0.000! !END!
110 ! X =	358.9435,	-361.0969,	286,	0.000! !END!
111 ! X =	358.9325,	-360.8477,	274,	0.000! !END!
112 ! X =	358.9215,	-360.5985,	274,	0.000! !END!
113 ! X =	358.9105,	-360.3494,	274,	0.000! !END!
114 ! X =	358.8995,	-360.1002,	274,	0.000! !END!
115 ! X =	358.8886,	-359.8510,	288,	0.000! !END!
116 ! X =	358.8776,	-359.6018,	335,	0.000! !END!
117 ! X =	358.8666,	-359.3527,	335,	0.000! !END!
118 ! X =	358.8556,	-359.1035,	335,	0.000! !END!
119 ! X =	358.8446,	-358.8543,	335,	0.000! !END!
120 ! X =	358.8336,	-358.6052,	335,	0.000! !END!
121 ! X =	358.8227,	-358.3560,	292,	0.000! !END!
122 ! X =	358.8117,	-358.1068,	259,	0.000! !END!
123 ! X =	358.8007,	-357.8576,	274,	0.000! !END!
124 ! X =	358.7897,	-357.6085,	274,	0.000! !END!
125 ! X =	358.7787,	-357.3593,	285,	0.000! !END!
126 ! X =	358.7678,	-357.1101,	304,	0.000! !END!
127 ! X =	358.7568,	-356.8610,	332,	0.000! !END!
128 ! X =	358.7458,	-356.6118,	360,	0.000! !END!
129 ! X =	358.7348,	-356.3626,	365,	0.000! !END!
130 ! X =	358.7238,	-356.1135,	344,	0.000! !END!
131 ! X =	358.7129,	-355.8643,	335,	0.000! !END!
132 ! X =	358.7019,	-355.6151,	309,	0.000! !END!
133 ! X =	358.6909,	-355.3660,	302,	0.000! !END!
134 ! X =	358.6799,	-355.1168,	280,	0.000! !END!
135 ! X =	358.6689,	-354.8677,	274,	0.000! !END!
136 ! X =	359.2025,	-361.3351,	304,	0.000! !END!
137 ! X =	359.1916,	-361.0860,	303,	0.000! !END!
138 ! X =	359.1806,	-360.8368,	294,	0.000! !END!
139 ! X =	359.1696,	-360.5876,	292,	0.000! !END!
140 ! X =	359.1586,	-360.3384,	283,	0.000! !END!
141 ! X =	359.1476,	-360.0893,	275,	0.000! !END!
142 ! X =	359.1366,	-359.8401,	283,	0.000! !END!
143 ! X =	359.1257,	-359.5909,	316,	0.000! !END!
144 ! X =	359.1147,	-359.3417,	335,	0.000! !END!
145 ! X =	359.1037,	-359.0926,	335,	0.000! !END!
146 ! X =	359.0927,	-358.8434,	335,	0.000! !END!
147 ! X =	359.0817,	-358.5942,	327,	0.000! !END!
148 ! X =	359.0707,	-358.3451,	268,	0.000! !END!
149 ! X =	359.0598,	-358.0959,	258,	0.000! !END!
150 ! X =	359.0488,	-357.8467,	274,	0.000! !END!
151 ! X =	359.0378,	-357.5975,	277,	0.000! !END!
152 ! X =	359.0268,	-357.3484,	284,	0.000! !END!
153 ! X =	359.0158,	-357.0992,	280,	0.000! !END!
154 ! X =	359.0049,	-356.8500,	307,	0.000! !END!
155 ! X =	358.9939,	-356.6009,	320,	0.000! !END!
156 ! X =	358.9829,	-356.3517,	335,	0.000! !END!
157 ! X =	358.9719,	-356.1025,	335,	0.000! !END!

158 ! X =	358.9609,	-355.8534,	335,	0.000! !END!
159 ! X =	358.9500,	-355.6042,	313,	0.000! !END!
160 ! X =	358.9390,	-355.3551,	300,	0.000! !END!
161 ! X =	358.9280,	-355.1059,	283,	0.000! !END!
162 ! X =	358.9170,	-354.8567,	274,	0.000! !END!
163 ! X =	359.4616,	-361.5734,	304,	0.000! !END!
164 ! X =	359.4506,	-361.3242,	309,	0.000! !END!
165 ! X =	359.4396,	-361.0750,	312,	0.000! !END!
166 ! X =	359.4287,	-360.8258,	323,	0.000! !END!
167 ! X =	359.4177,	-360.5767,	308,	0.000! !END!
168 ! X =	359.4067,	-360.3275,	304,	0.000! !END!
169 ! X =	359.3957,	-360.0783,	304,	0.000! !END!
170 ! X =	359.3847,	-359.8291,	299,	0.000! !END!
171 ! X =	359.3737,	-359.5800,	304,	0.000! !END!
172 ! X =	359.3628,	-359.3308,	335,	0.000! !END!
173 ! X =	359.3518,	-359.0816,	335,	0.000! !END!
174 ! X =	359.3408,	-358.8325,	310,	0.000! !END!
175 ! X =	359.3298,	-358.5833,	281,	0.000! !END!
176 ! X =	359.3188,	-358.3341,	261,	0.000! !END!
177 ! X =	359.3078,	-358.0850,	278,	0.000! !END!
178 ! X =	359.2969,	-357.8358,	274,	0.000! !END!
179 ! X =	359.2859,	-357.5866,	281,	0.000! !END!
180 ! X =	359.2749,	-357.3374,	304,	0.000! !END!
181 ! X =	359.2639,	-357.0883,	304,	0.000! !END!
182 ! X =	359.2529,	-356.8391,	303,	0.000! !END!
183 ! X =	359.2420,	-356.5899,	320,	0.000! !END!
184 ! X =	359.2310,	-356.3408,	335,	0.000! !END!
185 ! X =	359.2200,	-356.0916,	335,	0.000! !END!
186 ! X =	359.2090,	-355.8424,	333,	0.000! !END!
187 ! X =	359.1980,	-355.5933,	313,	0.000! !END!
188 ! X =	359.1870,	-355.3441,	300,	0.000! !END!
189 ! X =	359.1761,	-355.0950,	280,	0.000! !END!
190 ! X =	359.1651,	-354.8458,	274,	0.000! !END!
191 ! X =	359.7317,	-362.0608,	306,	0.000! !END!
192 ! X =	359.7207,	-361.8116,	286,	0.000! !END!
193 ! X =	359.7097,	-361.5624,	308,	0.000! !END!
194 ! X =	359.6987,	-361.3133,	328,	0.000! !END!
195 ! X =	359.6877,	-361.0641,	335,	0.000! !END!
196 ! X =	359.6767,	-360.8149,	336,	0.000! !END!
197 ! X =	359.6658,	-360.5657,	345,	0.000! !END!
198 ! X =	359.6548,	-360.3166,	349,	0.000! !END!
199 ! X =	359.6438,	-360.0674,	337,	0.000! !END!
200 ! X =	359.6328,	-359.8182,	316,	0.000! !END!
201 ! X =	359.6218,	-359.5690,	306,	0.000! !END!
202 ! X =	359.6108,	-359.3199,	314,	0.000! !END!
203 ! X =	359.5999,	-359.0707,	314,	0.000! !END!
204 ! X =	359.5889,	-358.8215,	290,	0.000! !END!
205 ! X =	359.5779,	-358.5724,	258,	0.000! !END!
206 ! X =	359.5669,	-358.3232,	281,	0.000! !END!
207 ! X =	359.5559,	-358.0740,	304,	0.000! !END!
208 ! X =	359.5449,	-357.8248,	301,	0.000! !END!
209 ! X =	359.5340,	-357.5757,	280,	0.000! !END!
210 ! X =	359.5230,	-357.3265,	304,	0.000! !END!
211 ! X =	359.5120,	-357.0773,	304,	0.000! !END!
212 ! X =	359.5010,	-356.8282,	318,	0.000! !END!
213 ! X =	359.4900,	-356.5790,	335,	0.000! !END!

214 ! X =	359.4791,	-356.3298,	335,	0.000!	!END!
215 ! X =	359.4681,	-356.0807,	335,	0.000!	!END!
216 ! X =	359.4571,	-355.8315,	318,	0.000!	!END!
217 ! X =	359.4461,	-355.5823,	304,	0.000!	!END!
218 ! X =	359.4351,	-355.3332,	292,	0.000!	!END!
219 ! X =	359.9797,	-362.0499,	326,	0.000!	!END!
220 ! X =	359.9688,	-361.8007,	286,	0.000!	!END!
221 ! X =	359.9578,	-361.5515,	308,	0.000!	!END!
222 ! X =	359.9468,	-361.3023,	322,	0.000!	!END!
223 ! X =	359.9358,	-361.0532,	335,	0.000!	!END!
224 ! X =	359.9248,	-360.8040,	344,	0.000!	!END!
225 ! X =	359.9138,	-360.5548,	365,	0.000!	!END!
226 ! X =	359.9029,	-360.3056,	365,	0.000!	!END!
227 ! X =	359.8919,	-360.0565,	359,	0.000!	!END!
228 ! X =	359.8809,	-359.8073,	330,	0.000!	!END!
229 ! X =	359.8699,	-359.5581,	309,	0.000!	!END!
230 ! X =	359.8589,	-359.3089,	304,	0.000!	!END!
231 ! X =	359.8479,	-359.0598,	289,	0.000!	!END!
232 ! X =	359.8370,	-358.8106,	270,	0.000!	!END!
233 ! X =	359.8260,	-358.5614,	274,	0.000!	!END!
234 ! X =	359.8150,	-358.3123,	289,	0.000!	!END!
235 ! X =	359.8040,	-358.0631,	304,	0.000!	!END!
236 ! X =	359.7930,	-357.8139,	304,	0.000!	!END!
237 ! X =	359.7820,	-357.5647,	304,	0.000!	!END!
238 ! X =	359.7711,	-357.3156,	297,	0.000!	!END!
239 ! X =	359.7601,	-357.0664,	305,	0.000!	!END!
240 ! X =	359.7491,	-356.8172,	327,	0.000!	!END!
241 ! X =	359.7381,	-356.5681,	335,	0.000!	!END!
242 ! X =	359.7271,	-356.3189,	335,	0.000!	!END!
243 ! X =	359.7162,	-356.0697,	333,	0.000!	!END!
244 ! X =	359.7052,	-355.8206,	313,	0.000!	!END!
245 ! X =	359.6942,	-355.5714,	279,	0.000!	!END!
246 ! X =	359.6832,	-355.3223,	304,	0.000!	!END!
247 ! X =	360.2169,	-361.7897,	296,	0.000!	!END!
248 ! X =	360.2059,	-361.5406,	304,	0.000!	!END!
249 ! X =	360.1949,	-361.2914,	307,	0.000!	!END!
250 ! X =	360.1839,	-361.0422,	335,	0.000!	!END!
251 ! X =	360.1729,	-360.7930,	351,	0.000!	!END!
252 ! X =	360.1619,	-360.5439,	365,	0.000!	!END!
253 ! X =	360.1509,	-360.2947,	365,	0.000!	!END!
254 ! X =	360.1400,	-360.0455,	365,	0.000!	!END!
255 ! X =	360.1290,	-359.7963,	330,	0.000!	!END!
256 ! X =	360.1180,	-359.5472,	306,	0.000!	!END!
257 ! X =	360.1070,	-359.2980,	290,	0.000!	!END!
258 ! X =	360.0960,	-359.0488,	304,	0.000!	!END!
259 ! X =	360.0850,	-358.7997,	300,	0.000!	!END!
260 ! X =	360.0741,	-358.5505,	275,	0.000!	!END!
261 ! X =	360.0631,	-358.3013,	289,	0.000!	!END!
262 ! X =	360.0521,	-358.0521,	311,	0.000!	!END!
263 ! X =	360.0411,	-357.8030,	331,	0.000!	!END!
264 ! X =	360.0301,	-357.5538,	335,	0.000!	!END!
265 ! X =	360.0191,	-357.3046,	318,	0.000!	!END!
266 ! X =	360.0082,	-357.0555,	301,	0.000!	!END!
267 ! X =	359.9972,	-356.8063,	319,	0.000!	!END!
268 ! X =	359.9862,	-356.5571,	335,	0.000!	!END!
269 ! X =	359.9752,	-356.3080,	335,	0.000!	!END!

270 ! X =	359.9642,	-356.0588,	328,	0.000! !END!
271 ! X =	359.9532,	-355.8096,	308,	0.000! !END!
272 ! X =	359.9423,	-355.5605,	289,	0.000! !END!
273 ! X =	359.9313,	-355.3113,	300,	0.000! !END!
274 ! X =	360.4649,	-361.7788,	299,	0.000! !END!
275 ! X =	360.4540,	-361.5296,	304,	0.000! !END!
276 ! X =	360.4430,	-361.2805,	315,	0.000! !END!
277 ! X =	360.4320,	-361.0313,	325,	0.000! !END!
278 ! X =	360.4210,	-360.7821,	349,	0.000! !END!
279 ! X =	360.4100,	-360.5329,	365,	0.000! !END!
280 ! X =	360.3990,	-360.2838,	365,	0.000! !END!
281 ! X =	360.3881,	-360.0346,	335,	0.000! !END!
282 ! X =	360.3771,	-359.7854,	310,	0.000! !END!
283 ! X =	360.3661,	-359.5362,	304,	0.000! !END!
284 ! X =	360.3551,	-359.2871,	304,	0.000! !END!
285 ! X =	360.3441,	-359.0379,	304,	0.000! !END!
286 ! X =	360.3331,	-358.7887,	304,	0.000! !END!
287 ! X =	360.3221,	-358.5396,	289,	0.000! !END!
288 ! X =	360.3112,	-358.2904,	284,	0.000! !END!
289 ! X =	360.3002,	-358.0412,	309,	0.000! !END!
290 ! X =	360.2892,	-357.7920,	335,	0.000! !END!
291 ! X =	360.2782,	-357.5429,	335,	0.000! !END!
292 ! X =	360.2672,	-357.2937,	335,	0.000! !END!
293 ! X =	360.2562,	-357.0445,	312,	0.000! !END!
294 ! X =	360.2453,	-356.7954,	336,	0.000! !END!
295 ! X =	360.2343,	-356.5462,	358,	0.000! !END!
296 ! X =	360.2233,	-356.2970,	355,	0.000! !END!
297 ! X =	360.2123,	-356.0479,	330,	0.000! !END!
298 ! X =	360.2013,	-355.7987,	309,	0.000! !END!
299 ! X =	360.1903,	-355.5495,	289,	0.000! !END!
300 ! X =	360.1794,	-355.3004,	282,	0.000! !END!
301 ! X =	360.7240,	-362.0171,	335,	0.000! !END!
302 ! X =	360.7130,	-361.7679,	304,	0.000! !END!
303 ! X =	360.7020,	-361.5187,	304,	0.000! !END!
304 ! X =	360.6911,	-361.2695,	335,	0.000! !END!
305 ! X =	360.6801,	-361.0203,	344,	0.000! !END!
306 ! X =	360.6691,	-360.7712,	330,	0.000! !END!
307 ! X =	360.6581,	-360.5220,	365,	0.000! !END!
308 ! X =	360.6471,	-360.2728,	365,	0.000! !END!
309 ! X =	360.6361,	-360.0236,	349,	0.000! !END!
310 ! X =	360.6252,	-359.7745,	335,	0.000! !END!
311 ! X =	360.6142,	-359.5253,	326,	0.000! !END!
312 ! X =	360.6032,	-359.2761,	312,	0.000! !END!
313 ! X =	360.5922,	-359.0270,	305,	0.000! !END!
314 ! X =	360.5812,	-358.7778,	304,	0.000! !END!
315 ! X =	360.5702,	-358.5286,	287,	0.000! !END!
316 ! X =	360.5592,	-358.2794,	289,	0.000! !END!
317 ! X =	360.5483,	-358.0303,	318,	0.000! !END!
318 ! X =	360.5373,	-357.7811,	335,	0.000! !END!
319 ! X =	360.5263,	-357.5319,	335,	0.000! !END!
320 ! X =	360.5153,	-357.2828,	335,	0.000! !END!
321 ! X =	360.5043,	-357.0336,	330,	0.000! !END!
322 ! X =	360.4933,	-356.7844,	362,	0.000! !END!
323 ! X =	360.4824,	-356.5353,	365,	0.000! !END!
324 ! X =	360.4714,	-356.2861,	365,	0.000! !END!
325 ! X =	360.4604,	-356.0369,	340,	0.000! !END!

326	! X =	360.4494,	-355.7878,	312,	0.000! !END!
327	! X =	360.4384,	-355.5386,	304,	0.000! !END!
328	! X =	360.4274,	-355.2894,	304,	0.000! !END!
329	! X =	360.9721,	-362.0061,	350,	0.000! !END!
330	! X =	360.9611,	-361.7569,	313,	0.000! !END!
331	! X =	360.9501,	-361.5078,	335,	0.000! !END!
332	! X =	360.9391,	-361.2586,	355,	0.000! !END!
333	! X =	360.9282,	-361.0094,	365,	0.000! !END!
334	! X =	360.9172,	-360.7602,	373,	0.000! !END!
335	! X =	360.9062,	-360.5111,	365,	0.000! !END!
336	! X =	360.8952,	-360.2619,	365,	0.000! !END!
337	! X =	360.8842,	-360.0127,	335,	0.000! !END!
338	! X =	360.8732,	-359.7635,	335,	0.000! !END!
339	! X =	360.8623,	-359.5144,	335,	0.000! !END!
340	! X =	360.8513,	-359.2652,	323,	0.000! !END!
341	! X =	360.8403,	-359.0160,	305,	0.000! !END!
342	! X =	360.8293,	-358.7669,	296,	0.000! !END!
343	! X =	360.8183,	-358.5177,	274,	0.000! !END!
344	! X =	360.8073,	-358.2685,	284,	0.000! !END!
345	! X =	360.7963,	-358.0193,	313,	0.000! !END!
346	! X =	360.7854,	-357.7702,	325,	0.000! !END!
347	! X =	360.7744,	-357.5210,	335,	0.000! !END!
348	! X =	360.7634,	-357.2718,	335,	0.000! !END!
349	! X =	360.7524,	-357.0227,	357,	0.000! !END!
350	! X =	360.7414,	-356.7735,	365,	0.000! !END!
351	! X =	360.7304,	-356.5243,	365,	0.000! !END!
352	! X =	360.7194,	-356.2752,	365,	0.000! !END!
353	! X =	360.7085,	-356.0260,	334,	0.000! !END!
354	! X =	360.6975,	-355.7768,	334,	0.000! !END!
355	! X =	360.6865,	-355.5277,	326,	0.000! !END!
356	! X =	361.2202,	-361.9952,	365,	0.000! !END!
357	! X =	361.2092,	-361.7460,	336,	0.000! !END!
358	! X =	361.1982,	-361.4968,	352,	0.000! !END!
359	! X =	361.1872,	-361.2477,	353,	0.000! !END!
360	! X =	361.1763,	-360.9985,	367,	0.000! !END!
361	! X =	361.1653,	-360.7493,	396,	0.000! !END!
362	! X =	361.1213,	-359.7526,	329,	0.000! !END!
363	! X =	361.1103,	-359.5034,	329,	0.000! !END!
364	! X =	361.0994,	-359.2543,	311,	0.000! !END!
365	! X =	361.0884,	-359.0051,	293,	0.000! !END!
366	! X =	361.0774,	-358.7559,	277,	0.000! !END!
367	! X =	361.0664,	-358.5067,	275,	0.000! !END!
368	! X =	361.0554,	-358.2576,	275,	0.000! !END!
369	! X =	361.0444,	-358.0084,	294,	0.000! !END!
370	! X =	361.0334,	-357.7592,	303,	0.000! !END!
371	! X =	361.0225,	-357.5101,	323,	0.000! !END!
372	! X =	361.0115,	-357.2609,	338,	0.000! !END!
373	! X =	361.0005,	-357.0117,	365,	0.000! !END!
374	! X =	360.9895,	-356.7626,	365,	0.000! !END!
375	! X =	360.9785,	-356.5134,	351,	0.000! !END!
376	! X =	360.9675,	-356.2642,	335,	0.000! !END!
377	! X =	360.9565,	-356.0151,	335,	0.000! !END!
378	! X =	360.9456,	-355.7659,	335,	0.000! !END!
379	! X =	360.9346,	-355.5167,	335,	0.000! !END!
380	! X =	361.4683,	-361.9842,	365,	0.000! !END!
381	! X =	361.4573,	-361.7351,	339,	0.000! !END!

382 ! X =	361.4463,	-361.4859,	365,	0.000!	!END!
383 ! X =	361.4353,	-361.2367,	365,	0.000!	!END!
384 ! X =	361.4243,	-360.9875,	358,	0.000!	!END!
385 ! X =	361.4134,	-360.7384,	396,	0.000!	!END!
386 ! X =	361.3694,	-359.7417,	328,	0.000!	!END!
387 ! X =	361.3584,	-359.4925,	305,	0.000!	!END!
388 ! X =	361.3474,	-359.2433,	304,	0.000!	!END!
389 ! X =	361.3365,	-358.9942,	300,	0.000!	!END!
390 ! X =	361.3255,	-358.7450,	304,	0.000!	!END!
391 ! X =	361.3145,	-358.4958,	297,	0.000!	!END!
392 ! X =	361.3035,	-358.2466,	274,	0.000!	!END!
393 ! X =	361.2925,	-357.9975,	304,	0.000!	!END!
394 ! X =	361.2815,	-357.7483,	304,	0.000!	!END!
395 ! X =	361.2705,	-357.4991,	307,	0.000!	!END!
396 ! X =	361.2596,	-357.2500,	335,	0.000!	!END!
397 ! X =	361.2486,	-357.0008,	365,	0.000!	!END!
398 ! X =	361.2376,	-356.7516,	365,	0.000!	!END!
399 ! X =	361.2266,	-356.5025,	354,	0.000!	!END!
400 ! X =	361.2156,	-356.2533,	335,	0.000!	!END!
401 ! X =	361.2046,	-356.0041,	312,	0.000!	!END!
402 ! X =	361.1936,	-355.7550,	335,	0.000!	!END!
403 ! X =	361.1827,	-355.5058,	316,	0.000!	!END!
404 ! X =	361.1717,	-355.2566,	306,	0.000!	!END!
405 ! X =	361.1607,	-355.0075,	284,	0.000!	!END!
406 ! X =	361.1497,	-354.7583,	297,	0.000!	!END!
407 ! X =	361.7164,	-361.9733,	365,	0.000!	!END!
408 ! X =	361.7054,	-361.7241,	365,	0.000!	!END!
409 ! X =	361.6944,	-361.4750,	383,	0.000!	!END!
410 ! X =	361.6834,	-361.2258,	390,	0.000!	!END!
411 ! X =	361.6724,	-360.9766,	386,	0.000!	!END!
412 ! X =	361.6614,	-360.7274,	367,	0.000!	!END!
413 ! X =	361.6175,	-359.7307,	335,	0.000!	!END!
414 ! X =	361.6065,	-359.4816,	335,	0.000!	!END!
415 ! X =	361.5955,	-359.2324,	316,	0.000!	!END!
416 ! X =	361.5845,	-358.9832,	304,	0.000!	!END!
417 ! X =	361.5735,	-358.7340,	304,	0.000!	!END!
418 ! X =	361.5626,	-358.4849,	304,	0.000!	!END!
419 ! X =	361.5516,	-358.2357,	277,	0.000!	!END!
420 ! X =	361.5406,	-357.9865,	296,	0.000!	!END!
421 ! X =	361.5296,	-357.7374,	304,	0.000!	!END!
422 ! X =	361.5186,	-357.4882,	307,	0.000!	!END!
423 ! X =	361.5076,	-357.2390,	328,	0.000!	!END!
424 ! X =	361.4966,	-356.9899,	348,	0.000!	!END!
425 ! X =	361.4857,	-356.7407,	355,	0.000!	!END!
426 ! X =	361.4747,	-356.4915,	347,	0.000!	!END!
427 ! X =	361.4637,	-356.2424,	335,	0.000!	!END!
428 ! X =	361.4527,	-355.9932,	311,	0.000!	!END!
429 ! X =	361.4417,	-355.7440,	302,	0.000!	!END!
430 ! X =	361.4307,	-355.4949,	284,	0.000!	!END!
431 ! X =	361.4197,	-355.2457,	277,	0.000!	!END!
432 ! X =	361.4088,	-354.9965,	296,	0.000!	!END!
433 ! X =	361.3978,	-354.7474,	301,	0.000!	!END!
434 ! X =	361.9535,	-361.7132,	372,	0.000!	!END!
435 ! X =	361.8656,	-359.7198,	335,	0.000!	!END!
436 ! X =	361.8546,	-359.4706,	335,	0.000!	!END!
437 ! X =	361.8436,	-359.2215,	316,	0.000!	!END!

438 ! X =	361.8326,	-358.9723,	321,	0.000!	!END!
439 ! X =	361.8216,	-358.7231,	331,	0.000!	!END!
440 ! X =	361.8106,	-358.4739,	305,	0.000!	!END!
441 ! X =	361.7997,	-358.2248,	287,	0.000!	!END!
442 ! X =	361.7887,	-357.9756,	304,	0.000!	!END!
443 ! X =	361.7777,	-357.7264,	305,	0.000!	!END!
444 ! X =	361.7667,	-357.4773,	310,	0.000!	!END!
445 ! X =	361.7557,	-357.2281,	320,	0.000!	!END!
446 ! X =	361.7447,	-356.9789,	339,	0.000!	!END!
447 ! X =	361.7337,	-356.7298,	340,	0.000!	!END!
448 ! X =	361.7228,	-356.4806,	335,	0.000!	!END!
449 ! X =	361.7118,	-356.2314,	319,	0.000!	!END!
450 ! X =	361.7008,	-355.9823,	304,	0.000!	!END!
451 ! X =	361.6898,	-355.7331,	304,	0.000!	!END!
452 ! X =	361.6788,	-355.4839,	284,	0.000!	!END!
453 ! X =	361.6678,	-355.2348,	304,	0.000!	!END!
454 ! X =	361.6568,	-354.9856,	304,	0.000!	!END!
455 ! X =	361.6458,	-354.7364,	304,	0.000!	!END!
456 ! X =	362.1137,	-359.7089,	329,	0.000!	!END!
457 ! X =	362.1027,	-359.4597,	312,	0.000!	!END!
458 ! X =	362.0917,	-359.2105,	327,	0.000!	!END!
459 ! X =	362.0807,	-358.9613,	335,	0.000!	!END!
460 ! X =	362.0697,	-358.7122,	335,	0.000!	!END!
461 ! X =	362.0587,	-358.4630,	297,	0.000!	!END!
462 ! X =	362.0477,	-358.2138,	304,	0.000!	!END!
463 ! X =	362.0368,	-357.9647,	304,	0.000!	!END!
464 ! X =	362.0258,	-357.7155,	310,	0.000!	!END!
465 ! X =	362.0148,	-357.4663,	324,	0.000!	!END!
466 ! X =	362.0038,	-357.2172,	338,	0.000!	!END!
467 ! X =	361.9928,	-356.9680,	339,	0.000!	!END!
468 ! X =	361.9818,	-356.7188,	335,	0.000!	!END!
469 ! X =	361.9708,	-356.4697,	326,	0.000!	!END!
470 ! X =	361.9598,	-356.2205,	309,	0.000!	!END!
471 ! X =	361.9489,	-355.9713,	301,	0.000!	!END!
472 ! X =	361.9379,	-355.7222,	296,	0.000!	!END!
473 ! X =	361.9269,	-355.4730,	304,	0.000!	!END!
474 ! X =	361.9159,	-355.2238,	305,	0.000!	!END!
475 ! X =	361.9049,	-354.9747,	304,	0.000!	!END!
476 ! X =	361.8939,	-354.7255,	304,	0.000!	!END!
477 ! X =	362.3617,	-359.6979,	335,	0.000!	!END!
478 ! X =	362.3508,	-359.4487,	329,	0.000!	!END!
479 ! X =	362.3398,	-359.1996,	335,	0.000!	!END!
480 ! X =	362.3288,	-358.9504,	335,	0.000!	!END!
481 ! X =	362.3178,	-358.7012,	319,	0.000!	!END!
482 ! X =	362.3068,	-358.4521,	298,	0.000!	!END!
483 ! X =	362.2958,	-358.2029,	304,	0.000!	!END!
484 ! X =	362.2848,	-357.9537,	311,	0.000!	!END!
485 ! X =	362.2738,	-357.7046,	335,	0.000!	!END!
486 ! X =	362.2629,	-357.4554,	339,	0.000!	!END!
487 ! X =	362.2519,	-357.2062,	365,	0.000!	!END!
488 ! X =	362.2409,	-356.9571,	365,	0.000!	!END!
489 ! X =	362.2299,	-356.7079,	347,	0.000!	!END!
490 ! X =	362.2189,	-356.4587,	326,	0.000!	!END!
491 ! X =	362.2079,	-356.2096,	309,	0.000!	!END!
492 ! X =	362.1969,	-355.9604,	302,	0.000!	!END!
493 ! X =	362.1859,	-355.7112,	309,	0.000!	!END!

494 ! X =	362.1750,	-355.4621,	335,	0.000!	!END!
495 ! X =	362.1640,	-355.2129,	322,	0.000!	!END!
496 ! X =	362.1530,	-354.9637,	305,	0.000!	!END!
497 ! X =	362.1420,	-354.7146,	304,	0.000!	!END!
498 ! X =	362.6098,	-359.6870,	345,	0.000!	!END!
499 ! X =	362.5988,	-359.4378,	340,	0.000!	!END!
500 ! X =	362.5879,	-359.1886,	335,	0.000!	!END!
501 ! X =	362.5769,	-358.9395,	335,	0.000!	!END!
502 ! X =	362.5659,	-358.6903,	304,	0.000!	!END!
503 ! X =	362.5549,	-358.4411,	304,	0.000!	!END!
504 ! X =	362.5439,	-358.1920,	304,	0.000!	!END!
505 ! X =	362.5329,	-357.9428,	310,	0.000!	!END!
506 ! X =	362.5219,	-357.6936,	335,	0.000!	!END!
507 ! X =	362.5109,	-357.4445,	343,	0.000!	!END!
508 ! X =	362.5000,	-357.1953,	365,	0.000!	!END!
509 ! X =	362.4890,	-356.9461,	365,	0.000!	!END!
510 ! X =	362.4780,	-356.6969,	350,	0.000!	!END!
511 ! X =	362.4670,	-356.4478,	319,	0.000!	!END!
512 ! X =	362.4560,	-356.1986,	304,	0.000!	!END!
513 ! X =	362.4450,	-355.9495,	328,	0.000!	!END!
514 ! X =	362.4340,	-355.7003,	335,	0.000!	!END!
515 ! X =	362.4230,	-355.4511,	335,	0.000!	!END!
516 ! X =	362.4121,	-355.2020,	330,	0.000!	!END!
517 ! X =	362.4011,	-354.9528,	300,	0.000!	!END!
518 ! X =	362.3901,	-354.7036,	275,	0.000!	!END!
519 ! X =	362.9019,	-360.6727,	376,	0.000!	!END!
520 ! X =	362.8799,	-360.1744,	365,	0.000!	!END!
521 ! X =	362.8689,	-359.9252,	365,	0.000!	!END!
522 ! X =	362.8579,	-359.6760,	365,	0.000!	!END!
523 ! X =	362.8469,	-359.4269,	361,	0.000!	!END!
524 ! X =	362.8359,	-359.1777,	337,	0.000!	!END!
525 ! X =	362.8250,	-358.9285,	306,	0.000!	!END!
526 ! X =	362.8140,	-358.6794,	318,	0.000!	!END!
527 ! X =	362.8030,	-358.4302,	335,	0.000!	!END!
528 ! X =	362.7920,	-358.1810,	309,	0.000!	!END!
529 ! X =	362.7810,	-357.9318,	305,	0.000!	!END!
530 ! X =	362.7700,	-357.6827,	312,	0.000!	!END!
531 ! X =	362.7590,	-357.4335,	338,	0.000!	!END!
532 ! X =	362.7480,	-357.1843,	365,	0.000!	!END!
533 ! X =	362.7370,	-356.9352,	365,	0.000!	!END!
534 ! X =	362.7261,	-356.6860,	350,	0.000!	!END!
535 ! X =	362.7151,	-356.4368,	335,	0.000!	!END!
536 ! X =	362.7041,	-356.1877,	349,	0.000!	!END!
537 ! X =	362.6931,	-355.9385,	365,	0.000!	!END!
538 ! X =	362.6821,	-355.6893,	351,	0.000!	!END!
539 ! X =	362.6711,	-355.4402,	335,	0.000!	!END!
540 ! X =	362.6601,	-355.1910,	319,	0.000!	!END!
541 ! X =	362.6491,	-354.9419,	302,	0.000!	!END!
542 ! X =	362.6382,	-354.6927,	284,	0.000!	!END!
543 ! X =	362.6272,	-354.4435,	274,	0.000!	!END!
544 ! X =	363.1500,	-360.6618,	391,	0.000!	!END!
545 ! X =	363.1390,	-360.4126,	382,	0.000!	!END!
546 ! X =	363.1280,	-360.1635,	366,	0.000!	!END!
547 ! X =	363.1170,	-359.9143,	365,	0.000!	!END!
548 ! X =	363.1060,	-359.6651,	365,	0.000!	!END!
549 ! X =	363.0950,	-359.4159,	359,	0.000!	!END!

550 ! X =	363.0840,	-359.1668,	323,	0.000! !END!
551 ! X =	363.0730,	-358.9176,	327,	0.000! !END!
552 ! X =	363.0620,	-358.6684,	335,	0.000! !END!
553 ! X =	363.0511,	-358.4192,	335,	0.000! !END!
554 ! X =	363.0401,	-358.1701,	331,	0.000! !END!
555 ! X =	363.0291,	-357.9209,	320,	0.000! !END!
556 ! X =	363.0181,	-357.6717,	335,	0.000! !END!
557 ! X =	363.0071,	-357.4226,	335,	0.000! !END!
558 ! X =	362.9961,	-357.1734,	341,	0.000! !END!
559 ! X =	362.9851,	-356.9242,	349,	0.000! !END!
560 ! X =	362.9741,	-356.6751,	350,	0.000! !END!
561 ! X =	362.9631,	-356.4259,	365,	0.000! !END!
562 ! X =	362.9522,	-356.1767,	365,	0.000! !END!
563 ! X =	362.9412,	-355.9276,	365,	0.000! !END!
564 ! X =	362.9302,	-355.6784,	352,	0.000! !END!
565 ! X =	362.9192,	-355.4292,	335,	0.000! !END!
566 ! X =	362.9082,	-355.1801,	315,	0.000! !END!
567 ! X =	362.8972,	-354.9309,	305,	0.000! !END!
568 ! X =	362.8862,	-354.6818,	301,	0.000! !END!
569 ! X =	362.8752,	-354.4326,	275,	0.000! !END!
570 ! X =	363.3871,	-360.4017,	396,	0.000! !END!
571 ! X =	363.3761,	-360.1525,	382,	0.000! !END!
572 ! X =	363.3651,	-359.9033,	355,	0.000! !END!
573 ! X =	363.3541,	-359.6542,	340,	0.000! !END!
574 ! X =	363.3431,	-359.4050,	327,	0.000! !END!
575 ! X =	363.3321,	-359.1558,	342,	0.000! !END!
576 ! X =	363.3211,	-358.9067,	349,	0.000! !END!
577 ! X =	363.3101,	-358.6575,	350,	0.000! !END!
578 ! X =	363.2991,	-358.4083,	365,	0.000! !END!
579 ! X =	363.2882,	-358.1591,	351,	0.000! !END!
580 ! X =	363.2772,	-357.9100,	335,	0.000! !END!
581 ! X =	363.2662,	-357.6608,	340,	0.000! !END!
582 ! X =	363.2552,	-357.4116,	348,	0.000! !END!
583 ! X =	363.2442,	-357.1625,	356,	0.000! !END!
584 ! X =	363.2332,	-356.9133,	365,	0.000! !END!
585 ! X =	363.2222,	-356.6641,	365,	0.000! !END!
586 ! X =	363.2112,	-356.4150,	365,	0.000! !END!
587 ! X =	363.2002,	-356.1658,	365,	0.000! !END!
588 ! X =	363.1893,	-355.9166,	361,	0.000! !END!
589 ! X =	363.1783,	-355.6675,	332,	0.000! !END!
590 ! X =	363.1673,	-355.4183,	320,	0.000! !END!
591 ! X =	363.1563,	-355.1691,	305,	0.000! !END!
592 ! X =	363.1453,	-354.9200,	304,	0.000! !END!
593 ! X =	363.1343,	-354.6708,	299,	0.000! !END!
594 ! X =	363.1233,	-354.4217,	277,	0.000! !END!
595 ! X =	363.6242,	-360.1416,	391,	0.000! !END!
596 ! X =	363.6132,	-359.8924,	356,	0.000! !END!
597 ! X =	363.6022,	-359.6432,	335,	0.000! !END!
598 ! X =	363.5912,	-359.3941,	311,	0.000! !END!
599 ! X =	363.5802,	-359.1449,	342,	0.000! !END!
600 ! X =	363.5692,	-358.8957,	380,	0.000! !END!
601 ! X =	363.5582,	-358.6465,	389,	0.000! !END!
602 ! X =	363.5472,	-358.3974,	396,	0.000! !END!
603 ! X =	363.5362,	-358.1482,	369,	0.000! !END!
604 ! X =	363.5252,	-357.8990,	341,	0.000! !END!
605 ! X =	363.5143,	-357.6499,	359,	0.000! !END!

606 ! X =	363.5033,	-357.4007,	365,	0.000! !END!
607 ! X =	363.4923,	-357.1515,	365,	0.000! !END!
608 ! X =	363.4813,	-356.9024,	365,	0.000! !END!
609 ! X =	363.4703,	-356.6532,	365,	0.000! !END!
610 ! X =	363.4593,	-356.4040,	365,	0.000! !END!
611 ! X =	363.4483,	-356.1549,	365,	0.000! !END!
612 ! X =	363.4373,	-355.9057,	342,	0.000! !END!
613 ! X =	363.4263,	-355.6565,	325,	0.000! !END!
614 ! X =	363.4154,	-355.4074,	309,	0.000! !END!
615 ! X =	363.4044,	-355.1582,	304,	0.000! !END!
616 ! X =	363.3934,	-354.9090,	297,	0.000! !END!
617 ! X =	363.3824,	-354.6599,	282,	0.000! !END!
618 ! X =	363.3714,	-354.4107,	274,	0.000! !END!
619 ! X =	363.8722,	-360.1306,	391,	0.000! !END!
620 ! X =	363.8612,	-359.8815,	350,	0.000! !END!
621 ! X =	363.8503,	-359.6323,	337,	0.000! !END!
622 ! X =	363.8393,	-359.3831,	313,	0.000! !END!
623 ! X =	363.8283,	-359.1339,	335,	0.000! !END!
624 ! X =	363.8173,	-358.8848,	396,	0.000! !END!
625 ! X =	363.8063,	-358.6356,	396,	0.000! !END!
626 ! X =	363.7953,	-358.3864,	396,	0.000! !END!
627 ! X =	363.7843,	-358.1373,	386,	0.000! !END!
628 ! X =	363.7733,	-357.8881,	360,	0.000! !END!
629 ! X =	363.7623,	-357.6389,	365,	0.000! !END!
630 ! X =	363.7513,	-357.3898,	365,	0.000! !END!
631 ! X =	363.7404,	-357.1406,	365,	0.000! !END!
632 ! X =	363.7294,	-356.8914,	365,	0.000! !END!
633 ! X =	363.7184,	-356.6423,	351,	0.000! !END!
634 ! X =	363.7074,	-356.3931,	350,	0.000! !END!
635 ! X =	363.6964,	-356.1439,	335,	0.000! !END!
636 ! X =	363.6854,	-355.8948,	322,	0.000! !END!
637 ! X =	363.6744,	-355.6456,	310,	0.000! !END!
638 ! X =	363.6634,	-355.3964,	305,	0.000! !END!
639 ! X =	363.6524,	-355.1473,	291,	0.000! !END!
640 ! X =	363.6414,	-354.8981,	276,	0.000! !END!
641 ! X =	363.6305,	-354.6489,	274,	0.000! !END!
642 ! X =	363.6195,	-354.3998,	274,	0.000! !END!
643 ! X =	363.6085,	-354.1506,	268,	0.000! !END!
644 ! X =	364.1203,	-360.1197,	380,	0.000! !END!
645 ! X =	364.1093,	-359.8705,	396,	0.000! !END!
646 ! X =	364.0983,	-359.6213,	370,	0.000! !END!
647 ! X =	364.0874,	-359.3722,	332,	0.000! !END!
648 ! X =	364.0764,	-359.1230,	356,	0.000! !END!
649 ! X =	364.0654,	-358.8738,	372,	0.000! !END!
650 ! X =	364.0544,	-358.6247,	396,	0.000! !END!
651 ! X =	364.0434,	-358.3755,	396,	0.000! !END!
652 ! X =	364.0324,	-358.1263,	384,	0.000! !END!
653 ! X =	364.0214,	-357.8772,	365,	0.000! !END!
654 ! X =	364.0104,	-357.6280,	365,	0.000! !END!
655 ! X =	363.9994,	-357.3788,	365,	0.000! !END!
656 ! X =	363.9884,	-357.1296,	355,	0.000! !END!
657 ! X =	363.9774,	-356.8805,	333,	0.000! !END!
658 ! X =	363.9665,	-356.6313,	327,	0.000! !END!
659 ! X =	363.9555,	-356.3821,	335,	0.000! !END!
660 ! X =	363.9445,	-356.1330,	313,	0.000! !END!
661 ! X =	363.9335,	-355.8838,	304,	0.000! !END!

662 ! X =	363.9225,	-355.6347,	304,	0.000!	!END!
663 ! X =	363.9115,	-355.3855,	304,	0.000!	!END!
664 ! X =	363.9005,	-355.1363,	284,	0.000!	!END!
665 ! X =	363.8895,	-354.8872,	274,	0.000!	!END!
666 ! X =	363.8785,	-354.6380,	274,	0.000!	!END!
667 ! X =	363.8675,	-354.3888,	267,	0.000!	!END!
668 ! X =	364.3464,	-359.6104,	372,	0.000!	!END!
669 ! X =	364.3354,	-359.3612,	335,	0.000!	!END!
670 ! X =	364.3244,	-359.1121,	365,	0.000!	!END!
671 ! X =	364.3135,	-358.8629,	396,	0.000!	!END!
672 ! X =	364.3025,	-358.6137,	396,	0.000!	!END!
673 ! X =	364.2915,	-358.3646,	396,	0.000!	!END!
674 ! X =	364.2805,	-358.1154,	373,	0.000!	!END!
675 ! X =	364.2695,	-357.8662,	366,	0.000!	!END!
676 ! X =	364.2585,	-357.6170,	365,	0.000!	!END!
677 ! X =	364.2475,	-357.3679,	365,	0.000!	!END!
678 ! X =	364.2365,	-357.1187,	341,	0.000!	!END!
679 ! X =	364.2255,	-356.8695,	335,	0.000!	!END!
680 ! X =	364.2145,	-356.6204,	307,	0.000!	!END!
681 ! X =	364.2035,	-356.3712,	309,	0.000!	!END!
682 ! X =	364.1926,	-356.1220,	305,	0.000!	!END!
683 ! X =	364.1816,	-355.8729,	300,	0.000!	!END!
684 ! X =	364.1706,	-355.6237,	280,	0.000!	!END!
685 ! X =	364.1596,	-355.3745,	292,	0.000!	!END!
686 ! X =	364.1486,	-355.1254,	294,	0.000!	!END!
687 ! X =	364.1376,	-354.8762,	291,	0.000!	!END!
688 ! X =	364.1266,	-354.6271,	281,	0.000!	!END!
689 ! X =	364.5945,	-359.5995,	366,	0.000!	!END!
690 ! X =	364.5835,	-359.3503,	344,	0.000!	!END!
691 ! X =	364.5725,	-359.1011,	365,	0.000!	!END!
692 ! X =	364.5615,	-358.8520,	396,	0.000!	!END!
693 ! X =	364.5505,	-358.6028,	396,	0.000!	!END!
694 ! X =	364.5396,	-358.3536,	396,	0.000!	!END!
695 ! X =	364.5286,	-358.1044,	391,	0.000!	!END!
696 ! X =	364.5176,	-357.8553,	372,	0.000!	!END!
697 ! X =	364.5066,	-357.6061,	365,	0.000!	!END!
698 ! X =	364.4956,	-357.3569,	360,	0.000!	!END!
699 ! X =	364.4846,	-357.1078,	332,	0.000!	!END!
700 ! X =	364.4736,	-356.8586,	320,	0.000!	!END!
701 ! X =	364.4626,	-356.6094,	335,	0.000!	!END!
702 ! X =	364.4516,	-356.3603,	335,	0.000!	!END!
703 ! X =	364.4406,	-356.1111,	311,	0.000!	!END!
704 ! X =	364.4296,	-355.8619,	302,	0.000!	!END!
705 ! X =	364.4187,	-355.6128,	297,	0.000!	!END!
706 ! X =	364.4077,	-355.3636,	304,	0.000!	!END!
707 ! X =	364.3967,	-355.1144,	304,	0.000!	!END!
708 ! X =	364.3857,	-354.8653,	304,	0.000!	!END!
709 ! X =	364.3747,	-354.6161,	304,	0.000!	!END!
710 ! X =	364.8426,	-359.5885,	390,	0.000!	!END!
711 ! X =	364.8316,	-359.3394,	379,	0.000!	!END!
712 ! X =	364.8206,	-359.0902,	353,	0.000!	!END!
713 ! X =	364.8096,	-358.8410,	386,	0.000!	!END!
714 ! X =	364.7986,	-358.5918,	402,	0.000!	!END!
715 ! X =	364.7876,	-358.3427,	397,	0.000!	!END!
716 ! X =	364.7766,	-358.0935,	396,	0.000!	!END!
717 ! X =	364.7657,	-357.8443,	384,	0.000!	!END!

718 ! X =	364.7547,	-357.5952,	356,	0.000! !END!
719 ! X =	364.7437,	-357.3460,	355,	0.000! !END!
720 ! X =	364.7327,	-357.0968,	363,	0.000! !END!
721 ! X =	364.7217,	-356.8477,	365,	0.000! !END!
722 ! X =	364.7107,	-356.5985,	357,	0.000! !END!
723 ! X =	364.6997,	-356.3493,	335,	0.000! !END!
724 ! X =	364.6887,	-356.1002,	318,	0.000! !END!
725 ! X =	364.6777,	-355.8510,	304,	0.000! !END!
726 ! X =	364.6667,	-355.6018,	304,	0.000! !END!
727 ! X =	364.6557,	-355.3527,	304,	0.000! !END!
728 ! X =	364.6447,	-355.1035,	304,	0.000! !END!
729 ! X =	364.6338,	-354.8543,	304,	0.000! !END!
730 ! X =	364.6228,	-354.6052,	304,	0.000! !END!
731 ! X =	365.0467,	-358.5809,	402,	0.000! !END!
732 ! X =	365.0357,	-358.3317,	396,	0.000! !END!
733 ! X =	365.0247,	-358.0826,	396,	0.000! !END!
734 ! X =	365.0137,	-357.8334,	386,	0.000! !END!
735 ! X =	365.0027,	-357.5842,	357,	0.000! !END!
736 ! X =	364.9918,	-357.3351,	381,	0.000! !END!
737 ! X =	364.9808,	-357.0859,	370,	0.000! !END!
738 ! X =	364.9698,	-356.8367,	365,	0.000! !END!
739 ! X =	364.9588,	-356.5876,	354,	0.000! !END!
740 ! X =	364.9478,	-356.3384,	320,	0.000! !END!
741 ! X =	364.9368,	-356.0892,	306,	0.000! !END!
742 ! X =	364.9258,	-355.8401,	304,	0.000! !END!
743 ! X =	364.9148,	-355.5909,	306,	0.000! !END!
744 ! X =	364.9038,	-355.3417,	305,	0.000! !END!
745 ! X =	364.8928,	-355.0926,	304,	0.000! !END!
746 ! X =	364.8818,	-354.8434,	304,	0.000! !END!
747 ! X =	364.8708,	-354.5942,	304,	0.000! !END!
748 ! X =	365.2948,	-358.5700,	396,	0.000! !END!
749 ! X =	365.2838,	-358.3208,	396,	0.000! !END!
750 ! X =	365.2728,	-358.0716,	396,	0.000! !END!
751 ! X =	365.2618,	-357.8224,	372,	0.000! !END!
752 ! X =	365.2508,	-357.5733,	355,	0.000! !END!
753 ! X =	365.2398,	-357.3241,	389,	0.000! !END!
754 ! X =	365.2288,	-357.0749,	389,	0.000! !END!
755 ! X =	365.2178,	-356.8258,	347,	0.000! !END!
756 ! X =	365.2069,	-356.5766,	340,	0.000! !END!
757 ! X =	365.1959,	-356.3274,	331,	0.000! !END!
758 ! X =	365.1849,	-356.0783,	308,	0.000! !END!
759 ! X =	365.1739,	-355.8291,	320,	0.000! !END!
760 ! X =	365.1629,	-355.5799,	335,	0.000! !END!
761 ! X =	365.1519,	-355.3308,	316,	0.000! !END!
762 ! X =	365.1409,	-355.0816,	304,	0.000! !END!
763 ! X =	365.5099,	-357.8115,	372,	0.000! !END!
764 ! X =	365.4989,	-357.5623,	396,	0.000! !END!
765 ! X =	365.4879,	-357.3132,	372,	0.000! !END!
766 ! X =	365.4769,	-357.0640,	365,	0.000! !END!
767 ! X =	365.4659,	-356.8148,	365,	0.000! !END!
768 ! X =	365.4549,	-356.5657,	365,	0.000! !END!
769 ! X =	365.4439,	-356.3165,	338,	0.000! !END!
770 ! X =	365.4329,	-356.0673,	314,	0.000! !END!
771 ! X =	365.4220,	-355.8182,	321,	0.000! !END!
772 ! X =	365.4110,	-355.5690,	335,	0.000! !END!
773 ! X =	365.4000,	-355.3198,	335,	0.000! !END!

774 ! X =	365.3890,	-355.0707,	292,	0.000! !END!
775 ! X =	365.7470,	-357.5514,	396,	0.000! !END!
776 ! X =	365.7360,	-357.3022,	386,	0.000! !END!
777 ! X =	365.7250,	-357.0531,	365,	0.000! !END!
778 ! X =	365.7140,	-356.8039,	365,	0.000! !END!
779 ! X =	365.7030,	-356.5547,	365,	0.000! !END!
780 ! X =	365.6920,	-356.3056,	338,	0.000! !END!
781 ! X =	365.6810,	-356.0564,	310,	0.000! !END!
782 ! X =	365.6700,	-355.8072,	312,	0.000! !END!
783 ! X =	365.6590,	-355.5581,	318,	0.000! !END!
784 ! X =	365.6480,	-355.3089,	307,	0.000! !END!
785 ! X =	365.6371,	-355.0597,	275,	0.000! !END!
786 ! X =	365.9731,	-357.0421,	365,	0.000! !END!
787 ! X =	365.9621,	-356.7929,	343,	0.000! !END!
788 ! X =	365.9511,	-356.5438,	341,	0.000! !END!
789 ! X =	365.9181,	-355.7963,	274,	0.000! !END!
790 ! X =	358.1317,	-357.5676,	274,	0.000! !END!
791 ! X =	358.3351,	-357.5586,	274,	0.000! !END!
792 ! X =	358.5386,	-357.5496,	274,	0.000! !END!
793 ! X =	358.5523,	-357.7488,	265,	0.000! !END!
794 ! X =	358.5661,	-357.9479,	244,	0.000! !END!
795 ! X =	358.5701,	-358.1524,	276,	0.000! !END!
796 ! X =	358.5741,	-358.3570,	295,	0.000! !END!
797 ! X =	358.5831,	-358.5613,	308,	0.000! !END!
798 ! X =	358.5922,	-358.7656,	322,	0.000! !END!
799 ! X =	358.3911,	-358.7715,	302,	0.000! !END!
800 ! X =	358.1900,	-358.7783,	284,	0.000! !END!
801 ! X =	357.9890,	-358.7852,	276,	0.000! !END!
802 ! X =	357.7879,	-358.7910,	274,	0.000! !END!
803 ! X =	357.5942,	-358.7946,	274,	0.000! !END!
804 ! X =	357.4005,	-358.7981,	274,	0.000! !END!
805 ! X =	357.4078,	-359.0205,	259,	0.000! !END!
806 ! X =	357.4151,	-359.2419,	274,	0.000! !END!
807 ! X =	357.4224,	-359.4642,	274,	0.000! !END!
808 ! X =	357.4296,	-359.6856,	274,	0.000! !END!
809 ! X =	357.4317,	-359.8453,	271,	0.000! !END!
810 ! X =	357.4338,	-360.0050,	256,	0.000! !END!
811 ! X =	357.4335,	-360.2247,	274,	0.000! !END!
812 ! X =	357.6273,	-360.3360,	274,	0.000! !END!
813 ! X =	357.8392,	-360.4066,	274,	0.000! !END!
814 ! X =	358.0379,	-360.4028,	274,	0.000! !END!
815 ! X =	358.2366,	-360.3990,	271,	0.000! !END!
816 ! X =	358.2429,	-360.5985,	251,	0.000! !END!
817 ! X =	358.2492,	-360.7979,	259,	0.000! !END!
818 ! X =	358.2555,	-360.9974,	272,	0.000! !END!
819 ! X =	358.2618,	-361.1968,	271,	0.000! !END!
820 ! X =	358.0733,	-361.2051,	243,	0.000! !END!
821 ! X =	358.0527,	-361.4158,	274,	0.000! !END!
822 ! X =	358.0214,	-361.6069,	274,	0.000! !END!
823 ! X =	358.2400,	-361.6042,	295,	0.000! !END!
824 ! X =	358.4586,	-361.6006,	304,	0.000! !END!
825 ! X =	358.6772,	-361.5980,	304,	0.000! !END!
826 ! X =	358.8782,	-361.5911,	304,	0.000! !END!
827 ! X =	359.0793,	-361.5852,	304,	0.000! !END!
828 ! X =	359.2804,	-361.5794,	304,	0.000! !END!
829 ! X =	359.4815,	-361.5725,	304,	0.000! !END!

830 ! X =	359.4855,	-361.7770,	294,	0.000! !END!
831 ! X =	359.4895,	-361.9816,	280,	0.000! !END!
832 ! X =	359.4931,	-362.0613,	284,	0.000! !END!
833 ! X =	359.6027,	-362.0665,	298,	0.000! !END!
834 ! X =	359.7714,	-362.0590,	308,	0.000! !END!
835 ! X =	359.9107,	-362.0629,	322,	0.000! !END!
836 ! X =	360.0699,	-362.0659,	335,	0.000! !END!
837 ! X =	360.1967,	-362.0103,	335,	0.000! !END!
838 ! X =	360.3158,	-362.0051,	335,	0.000! !END!
839 ! X =	360.3650,	-361.9929,	335,	0.000! !END!
840 ! X =	360.4638,	-361.9786,	335,	0.000! !END!
841 ! X =	360.5337,	-361.9855,	335,	0.000! !END!
842 ! X =	360.5954,	-362.0327,	335,	0.000! !END!
843 ! X =	360.6567,	-362.0699,	335,	0.000! !END!
844 ! X =	360.7496,	-362.1457,	344,	0.000! !END!
845 ! X =	360.8506,	-362.1812,	362,	0.000! !END!
846 ! X =	360.9300,	-362.1777,	365,	0.000! !END!
847 ! X =	361.0464,	-362.1127,	365,	0.000! !END!
848 ! X =	361.1534,	-362.0580,	365,	0.000! !END!
849 ! X =	361.2224,	-362.0450,	365,	0.000! !END!
850 ! X =	361.3712,	-362.0385,	365,	0.000! !END!
851 ! X =	361.5119,	-362.0722,	365,	0.000! !END!
852 ! X =	361.5948,	-362.1484,	365,	0.000! !END!
853 ! X =	361.6656,	-362.1753,	365,	0.000! !END!
854 ! X =	361.7713,	-362.0907,	365,	0.000! !END!
855 ! X =	361.8544,	-361.9472,	365,	0.000! !END!
856 ! X =	361.8807,	-361.8662,	366,	0.000! !END!
857 ! X =	361.9764,	-361.7821,	372,	0.000! !END!
858 ! X =	362.0527,	-361.7088,	372,	0.000! !END!
859 ! X =	362.1070,	-361.5866,	385,	0.000! !END!
860 ! X =	362.1332,	-361.5055,	386,	0.000! !END!
861 ! X =	361.8946,	-361.5061,	396,	0.000! !END!
862 ! X =	361.8882,	-361.3036,	396,	0.000! !END!
863 ! X =	361.8818,	-361.1022,	396,	0.000! !END!
864 ! X =	361.8754,	-360.9007,	396,	0.000! !END!
865 ! X =	361.8690,	-360.6983,	370,	0.000! !END!
866 ! X =	361.6678,	-360.7022,	367,	0.000! !END!
867 ! X =	361.4666,	-360.7061,	396,	0.000! !END!
868 ! X =	361.2654,	-360.7099,	396,	0.000! !END!
869 ! X =	361.0643,	-360.7138,	396,	0.000! !END!
870 ! X =	361.0577,	-360.5094,	377,	0.000! !END!
871 ! X =	361.0512,	-360.3049,	366,	0.000! !END!
872 ! X =	361.0447,	-360.1005,	337,	0.000! !END!
873 ! X =	361.0382,	-359.8961,	335,	0.000! !END!
874 ! X =	361.2682,	-359.8949,	333,	0.000! !END!
875 ! X =	361.4983,	-359.8928,	343,	0.000! !END!
876 ! X =	361.7283,	-359.8916,	350,	0.000! !END!
877 ! X =	361.9583,	-359.8895,	337,	0.000! !END!
878 ! X =	362.1883,	-359.8883,	344,	0.000! !END!
879 ! X =	362.4184,	-359.8862,	343,	0.000! !END!
880 ! X =	362.6484,	-359.8850,	335,	0.000! !END!
881 ! X =	362.6574,	-360.0893,	344,	0.000! !END!
882 ! X =	362.6664,	-360.2937,	356,	0.000! !END!
883 ! X =	362.8601,	-360.2901,	361,	0.000! !END!
884 ! X =	363.0539,	-360.2866,	365,	0.000! !END!
885 ! X =	363.0622,	-360.4759,	376,	0.000! !END!

886 ! X =	362.8638,	-360.4847,	350,	0.000!	!END!
887 ! X =	362.6653,	-360.4934,	365,	0.000!	!END!
888 ! X =	362.6741,	-360.6928,	364,	0.000!	!END!
889 ! X =	362.8661,	-360.6873,	375,	0.000!	!END!
890 ! X =	363.0581,	-360.6828,	391,	0.000!	!END!
891 ! X =	363.2501,	-360.6774,	393,	0.000!	!END!
892 ! X =	363.3535,	-360.5430,	396,	0.000!	!END!
893 ! X =	363.4497,	-360.4688,	396,	0.000!	!END!
894 ! X =	363.5480,	-360.4445,	396,	0.000!	!END!
895 ! X =	363.6041,	-360.3622,	396,	0.000!	!END!
896 ! X =	363.6407,	-360.2906,	396,	0.000!	!END!
897 ! X =	363.7787,	-360.2646,	395,	0.000!	!END!
898 ! X =	363.8577,	-360.2511,	395,	0.000!	!END!
899 ! X =	364.0712,	-360.2467,	395,	0.000!	!END!
900 ! X =	364.2650,	-360.2431,	396,	0.000!	!END!
901 ! X =	364.2560,	-360.0388,	396,	0.000!	!END!
902 ! X =	364.2469,	-359.8345,	396,	0.000!	!END!
903 ! X =	364.4206,	-359.8268,	396,	0.000!	!END!
904 ! X =	364.5943,	-359.8192,	395,	0.000!	!END!
905 ! X =	364.7880,	-359.8156,	395,	0.000!	!END!
906 ! X =	364.9817,	-359.8121,	395,	0.000!	!END!
907 ! X =	365.0512,	-359.8090,	395,	0.000!	!END!
908 ! X =	365.0465,	-359.5675,	396,	0.000!	!END!
909 ! X =	365.0418,	-359.3261,	396,	0.000!	!END!
910 ! X =	365.0371,	-359.0846,	365,	0.000!	!END!
911 ! X =	365.0324,	-358.8432,	389,	0.000!	!END!
912 ! X =	365.0277,	-358.6017,	402,	0.000!	!END!
913 ! X =	365.2312,	-358.5927,	396,	0.000!	!END!
914 ! X =	365.4346,	-358.5838,	396,	0.000!	!END!
915 ! X =	365.4208,	-358.3846,	396,	0.000!	!END!
916 ! X =	365.4071,	-358.1855,	396,	0.000!	!END!
917 ! X =	365.2632,	-358.1919,	396,	0.000!	!END!
918 ! X =	365.1193,	-358.1982,	396,	0.000!	!END!
919 ! X =	365.1059,	-358.1189,	396,	0.000!	!END!
920 ! X =	365.2746,	-358.1115,	396,	0.000!	!END!
921 ! X =	365.3259,	-358.1492,	396,	0.000!	!END!
922 ! X =	365.4605,	-358.0434,	390,	0.000!	!END!
923 ! X =	365.5730,	-357.8886,	372,	0.000!	!END!
924 ! X =	365.6182,	-357.7868,	380,	0.000!	!END!
925 ! X =	365.6625,	-357.6650,	396,	0.000!	!END!
926 ! X =	365.7871,	-357.5596,	396,	0.000!	!END!
927 ! X =	365.9117,	-357.4543,	396,	0.000!	!END!
928 ! X =	365.9448,	-357.3030,	370,	0.000!	!END!
929 ! X =	366.0315,	-357.2393,	365,	0.000!	!END!
930 ! X =	366.1903,	-357.2323,	365,	0.000!	!END!
931 ! X =	366.1832,	-356.9959,	365,	0.000!	!END!
932 ! X =	366.1761,	-356.7605,	330,	0.000!	!END!
933 ! X =	366.1690,	-356.5242,	331,	0.000!	!END!
934 ! X =	366.0100,	-356.5262,	337,	0.000!	!END!
935 ! X =	365.8510,	-356.5282,	348,	0.000!	!END!
936 ! X =	365.7617,	-356.5322,	359,	0.000!	!END!
937 ! X =	365.7566,	-356.3427,	342,	0.000!	!END!
938 ! X =	365.7516,	-356.1531,	321,	0.000!	!END!
939 ! X =	365.7465,	-355.9636,	305,	0.000!	!END!
940 ! X =	365.8237,	-355.9103,	292,	0.000!	!END!
941 ! X =	365.9768,	-355.7737,	273,	0.000!	!END!

942 ! X =	365.8180,	-355.7807,	286,	0.000! !END!
943 ! X =	365.7386,	-355.7842,	305,	0.000! !END!
944 ! X =	365.7335,	-355.5548,	297,	0.000! !END!
945 ! X =	365.7283,	-355.3253,	286,	0.000! !END!
946 ! X =	365.7978,	-355.3223,	272,	0.000! !END!
947 ! X =	365.8007,	-355.1624,	271,	0.000! !END!
948 ! X =	365.7264,	-355.0558,	272,	0.000! !END!
949 ! X =	365.7224,	-354.9661,	274,	0.000! !END!
950 ! X =	365.5238,	-354.9719,	278,	0.000! !END!
951 ! X =	365.3253,	-354.9786,	280,	0.000! !END!
952 ! X =	365.1267,	-354.9854,	304,	0.000! !END!
953 ! X =	364.9281,	-354.9911,	304,	0.000! !END!
954 ! X =	364.9241,	-354.7866,	304,	0.000! !END!
955 ! X =	364.9200,	-354.5821,	304,	0.000! !END!
956 ! X =	364.7165,	-354.5891,	304,	0.000! !END!
957 ! X =	364.5130,	-354.5950,	304,	0.000! !END!
958 ! X =	364.3094,	-354.6010,	304,	0.000! !END!
959 ! X =	364.1059,	-354.6080,	281,	0.000! !END!
960 ! X =	364.0989,	-354.4485,	273,	0.000! !END!
961 ! X =	364.0918,	-354.2891,	270,	0.000! !END!
962 ! X =	363.9611,	-354.2549,	267,	0.000! !END!
963 ! X =	363.8091,	-354.1917,	268,	0.000! !END!
964 ! X =	363.6779,	-354.1476,	268,	0.000! !END!
965 ! X =	363.5882,	-354.1415,	268,	0.000! !END!
966 ! X =	363.5377,	-354.1238,	274,	0.000! !END!
967 ! X =	363.4777,	-354.1164,	269,	0.000! !END!
968 ! X =	363.4821,	-354.2161,	274,	0.000! !END!
969 ! X =	363.3134,	-354.2235,	274,	0.000! !END!
970 ! X =	363.1447,	-354.2310,	274,	0.000! !END!
971 ! X =	362.9760,	-354.2384,	274,	0.000! !END!
972 ! X =	362.7442,	-354.2416,	259,	0.000! !END!
973 ! X =	362.5124,	-354.2459,	256,	0.000! !END!
974 ! X =	362.2806,	-354.2491,	256,	0.000! !END!
975 ! X =	362.2755,	-354.3592,	265,	0.000! !END!
976 ! X =	362.3886,	-354.4441,	265,	0.000! !END!
977 ! X =	362.4724,	-354.5402,	274,	0.000! !END!
978 ! X =	362.5566,	-354.6464,	276,	0.000! !END!
979 ! X =	362.5070,	-354.6486,	276,	0.000! !END!
980 ! X =	362.2786,	-354.6546,	279,	0.000! !END!
981 ! X =	362.0501,	-354.6597,	304,	0.000! !END!
982 ! X =	361.8217,	-354.6658,	304,	0.000! !END!
983 ! X =	361.5933,	-354.6719,	304,	0.000! !END!
984 ! X =	361.3648,	-354.6769,	294,	0.000! !END!
985 ! X =	361.1364,	-354.6830,	304,	0.000! !END!
986 ! X =	360.9080,	-354.6891,	304,	0.000! !END!
987 ! X =	360.9170,	-354.8934,	287,	0.000! !END!
988 ! X =	360.9260,	-355.0977,	304,	0.000! !END!
989 ! X =	360.9296,	-355.2923,	318,	0.000! !END!
990 ! X =	360.9333,	-355.4868,	335,	0.000! !END!
991 ! X =	360.7296,	-355.4908,	326,	0.000! !END!
992 ! X =	360.5260,	-355.4948,	309,	0.000! !END!
993 ! X =	360.5174,	-355.3005,	305,	0.000! !END!
994 ! X =	360.5088,	-355.1061,	304,	0.000! !END!
995 ! X =	360.3151,	-355.1097,	301,	0.000! !END!
996 ! X =	360.1214,	-355.1132,	281,	0.000! !END!
997 ! X =	359.9277,	-355.1168,	304,	0.000! !END!

998 ! X =	359.7340,	-355.1203,	304,	0.000! !END!
999 ! X =	359.5303,	-355.1243,	288,	0.000! !END!
1000 ! X =	359.3267,	-355.1283,	278,	0.000! !END!
1001 ! X =	359.3179,	-354.9289,	274,	0.000! !END!
1002 ! X =	359.3091,	-354.7296,	265,	0.000! !END!
1003 ! X =	359.0989,	-354.7369,	263,	0.000! !END!
1004 ! X =	358.8889,	-354.7451,	268,	0.000! !END!
1005 ! X =	358.6788,	-354.7524,	274,	0.000! !END!
1006 ! X =	358.4686,	-354.7596,	274,	0.000! !END!
1007 ! X =	358.2586,	-354.7679,	274,	0.000! !END!
1008 ! X =	358.0484,	-354.7752,	245,	0.000! !END!
1009 ! X =	357.9410,	-354.8198,	236,	0.000! !END!
1010 ! X =	357.8237,	-354.8650,	243,	0.000! !END!
1011 ! X =	357.7168,	-354.9196,	240,	0.000! !END!
1012 ! X =	357.7175,	-355.0494,	270,	0.000! !END!
1013 ! X =	357.7182,	-355.1792,	274,	0.000! !END!
1014 ! X =	357.5123,	-355.1862,	256,	0.000! !END!
1015 ! X =	357.3062,	-355.1923,	248,	0.000! !END!
1016 ! X =	357.1002,	-355.1984,	245,	0.000! !END!
1017 ! X =	356.8942,	-355.2055,	274,	0.000! !END!
1018 ! X =	356.8924,	-355.3903,	274,	0.000! !END!
1019 ! X =	356.8906,	-355.5751,	267,	0.000! !END!
1020 ! X =	357.0918,	-355.5732,	274,	0.000! !END!
1021 ! X =	357.2931,	-355.5724,	280,	0.000! !END!
1022 ! X =	357.4944,	-355.5715,	285,	0.000! !END!
1023 ! X =	357.6957,	-355.5696,	284,	0.000! !END!
1024 ! X =	357.6945,	-355.7694,	299,	0.000! !END!
1025 ! X =	357.6934,	-355.9691,	304,	0.000! !END!
1026 ! X =	357.4898,	-355.9731,	304,	0.000! !END!
1027 ! X =	357.2861,	-355.9771,	301,	0.000! !END!
1028 ! X =	357.2850,	-356.1769,	287,	0.000! !END!
1029 ! X =	357.2838,	-356.3766,	265,	0.000! !END!
1030 ! X =	357.2827,	-356.5764,	261,	0.000! !END!
1031 ! X =	357.2816,	-356.7762,	280,	0.000! !END!
1032 ! X =	357.0804,	-356.7801,	261,	0.000! !END!
1033 ! X =	356.8792,	-356.7839,	236,	0.000! !END!
1034 ! X =	356.6781,	-356.7878,	239,	0.000! !END!
1035 ! X =	356.4769,	-356.7917,	246,	0.000! !END!
1036 ! X =	356.4882,	-356.9929,	235,	0.000! !END!
1037 ! X =	356.4996,	-357.1951,	274,	0.000! !END!
1038 ! X =	356.5110,	-357.3963,	274,	0.000! !END!
1039 ! X =	356.5224,	-357.5985,	274,	0.000! !END!
1040 ! X =	356.7291,	-357.5954,	280,	0.000! !END!
1041 ! X =	356.9357,	-357.5923,	304,	0.000! !END!
1042 ! X =	357.1424,	-357.5892,	304,	0.000! !END!
1043 ! X =	357.3491,	-357.5861,	304,	0.000! !END!
1044 ! X =	357.5557,	-357.5830,	293,	0.000! !END!
1045 ! X =	357.7343,	-357.5751,	275,	0.000! !END!
1046 ! X =	357.9330,	-357.5713,	277,	0.000! !END!

----

a

Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b

Receptor height above ground is optional. If no value is entered,
the receptor is placed on the ground.

```
TRIGEN KC BART CLASS I ANALYSIS (HERCULES)
MDNR RUNS
CENRAP - 6KM CALMET CENTRAL METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =           *
   or
ISCMET.DAT    input    * ISCDAT =           *
   or
PLMMET.DAT    input    * PLMDAT =           *
   or
PROFILE.DAT   input    * PRFDAT =           *
SURFACE.DAT   input    * SFCDAT =           *
RESTARTB.DAT  input    * RSTARTB=           *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =TRIH2001Q1.LST     !
CONC.DAT      output   ! CONDAT =TRIH2001Q1.CON     !
DFLX.DAT      output   ! DFDAT  =TRIH2001Q1.DRY     !
WFLX.DAT      output   ! WFDAT  =TRIH2001Q1.WET     !

VISB.DAT      output   ! VISDAT =TRIH2001Q1.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2001.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =           *
VOLEMARB.DAT  input    * VOLDAT =           *
BAEMARB.DAT   input    * ARDAT  =           *
LNEMARB.DAT   input    * LNDAT  =           *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =           *
CHEM.DAT      input    * CHEMDAT=           *
H2O2.DAT      input    * H2O2DAT=           *
HILL.DAT      input    * HILDAT=            *
HILLRCT.DAT   input    * RCTDAT=            *
COASTLN.DAT   input    * CSTDAT=            *
FLUXBDY.DAT   input    * BDYDAT=            *
BCON.DAT      input    * BCNDAT=            *
DEBUG.DAT     output   * DEBUG =            *
MASSFLX.DAT   output   * FLXDAT=            *
MASSBAL.DAT   output   * BALDAT=            *
FOG.DAT       output   * FOGDAT=            *
--------------------------------------------------------------------------------
```

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
T = lower case ! LCFILES = T !
F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length

Provision for multiple input files

Number of CALMET.DAT files for run (NMETDAT)
Default: 1 ! NMETDAT = 9 !

Number of PTEMARB.DAT files for run (NPTDAT)
Default: 0 ! NPTDAT = 0 !

Number of BAEMARB.DAT files for run (NARDAT)
Default: 0 ! NARDAT = 0 !

Number of VOLEMARB.DAT files for run (NVOLDAT)
Default: 0 ! NVOLDAT = 0 !

!END!

Subgroup (0a)

The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

```
Default Name  Type         File Name
------------  ----         ---------
none        input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0101-0110.central.dat  !  !END!
none        input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0111-0120.central.dat  !  !END!
none        input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0121-0131.central.dat  !  !END!
none        input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0201-0210.central.dat  !  !END!
none        input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0211-0220.central.dat  !  !END!
none        input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0221-0228.central.dat  !  !END!
none        input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0301-0310.central.dat  !  !END!
none        input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0311-0320.central.dat  !  !END!
none        input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0321-0331.central.dat  !  !END!
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0401-0410.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0411-0420.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0421-0430.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0501-0510.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0511-0520.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0521-0531.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0601-0610.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0611-0620.central.dat  *
```

```
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0621-0630.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0701-0710.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0711-0720.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0721-0731.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0801-0810.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0811-0820.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0821-0831.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0901-0910.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0911-0920.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0921-0930.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1001-1010.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1011-1020.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1021-1031.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1101-1110.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1111-1120.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1121-1130.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1201-1210.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1211-1220.central.dat  *
*END*
none        input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1221-1231.central.dat  *
*END*


-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

   Option to run all periods found
   in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

       METRUN = 0 - Run period explicitly defined below
       METRUN = 1 - Run all periods in met. file

    Starting date:   Year (IBYR) -- No default       ! IBYR =  2001 !
    (used only if   Month (IBMO) -- No default       ! IBMO =   1 !
     METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   1  !
                     Hour (IBHR) -- No default       ! IBHR =   0 !
```

Base time zone (XBTZ) -- No default ! XBTZ = 0.0 !
PST = 8., MST = 7.
CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default ! IRLG = 2160 !

Number of chemical species (NSPEC)
Default: 5 ! NSPEC = 6 !

Number of chemical species
to be emitted (NSE) Default: 3 ! NSE = 3 !

Flag to stop run after
SETUP phase (ITEST) Default: 2 ! ITEST = 2 !
(Used to allow checking
of the model inputs, files, etc.)
ITEST = 1 - STOPS program after SETUP phase
ITEST = 2 - Continues with execution of program
after SETUP

Restart Configuration:

Control flag (MRESTART) Default: 0 ! MRESTART = 0 !

0 = Do not read or write a restart file
1 = Read a restart file at the beginning of
the run
2 = Write a restart file during run
3 = Read a restart file at beginning of run
and write a restart file during run

Number of periods in Restart
output cycle (NRESPD) Default: 0 ! NRESPD = 0 !

0 = File written only at last period
>0 = File updated every NRESPD periods

Meteorological Data Format (METFM)
Default: 1 ! METFM = 1 !

METFM = 1 - CALMET binary file (CALMET.MET)
METFM = 2 - ISC ASCII file (ISCMET.MET)
METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
surface parameters file (SURFACE.DAT)

Meteorological Profile Data Format (MPRFFM)
(used only for METFM = 1, 2, 3)
Default: 1 ! MPRFFM = 1 !

MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
Averaging Time (minutes) (AVET)
Default: 60.0 ! AVET = 60. !

```
    PG Averaging Time (minutes) (PGTIME)
                             Default: 60.0    ! PGTIME = 60. !


!END!


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


    Vertical distribution used in the
    near field (MGAUSS)                 Default: 1     ! MGAUSS =  1   !
       0 = uniform
       1 = Gaussian

    Terrain adjustment method
    (MCTADJ)                            Default: 3     ! MCTADJ =  3   !
       0 = no adjustment
       1 = ISC-type of terrain adjustment
       2 = simple, CALPUFF-type of terrain
           adjustment
       3 = partial plume path adjustment

    Subgrid-scale complex terrain
    flag (MCTSG)                        Default: 0     ! MCTSG =  0   !
       0 = not modeled
       1 = modeled

    Near-field puffs modeled as
    elongated 0 (MSLUG)                 Default: 0     ! MSLUG =  0   !
       0 = no
       1 = yes (slug model used)

    Transitional plume rise modeled ?
    (MTRANS)                            Default: 1     ! MTRANS =  1   !
       0 = no  (i.e., final rise only)
       1 = yes (i.e., transitional rise computed)

    Stack tip downwash? (MTIP)          Default: 1     ! MTIP =  1  !
       0 = no  (i.e., no stack tip downwash)
       1 = yes (i.e., use stack tip downwash)

    Method used to simulate building
    downwash? (MBDW)                    Default: 1     ! MBDW =   1  !
       1 = ISC method
       2 = PRIME method

    Vertical wind shear modeled above
    stack top? (MSHEAR)                 Default: 0     ! MSHEAR =  0  !
       0 = no  (i.e., vertical wind shear not modeled)
       1 = yes (i.e., vertical wind shear modeled)

    Puff splitting allowed? (MSPLIT)    Default: 0     ! MSPLIT =  0  !
```

0 = no (i.e., puffs not split)
1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM) Default: 1 ! MCHEM = 1 !
0 = chemical transformation not modeled
1 = transformation rates computed internally (MESOPUFF II scheme)
2 = user-specified transformation rates used
3 = transformation rates computed internally (RIVAD/ARM3 scheme)
4 = secondary organic aerosol formation computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3) Default: 0 ! MAQCHEM = 0 !
0 = aqueous phase transformation not modeled
1 = transformation rates adjusted for aqueous phase reactions

Wet removal modeled ? (MWET) Default: 1 ! MWET = 1 !
0 = no
1 = yes

Dry deposition modeled ? (MDRY) Default: 1 ! MDRY = 1 !
0 = no
1 = yes
(dry deposition method specified for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP) Default: 3 ! MDISP = 3 !

1 = dispersion coefficients computed from measured values of turbulence, sigma v, sigma w
2 = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas
4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.
5 = CTDM sigmas used for stable and neutral conditions. For unstable conditions, sigmas are computed as in MDISP = 3, described above. MDISP = 5 assumes that measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5) Default: 3 ! MTURBVW = 3 !
1 = use sigma-v or sigma-theta measurements from PROFILE.DAT to compute sigma-y (valid for METFM = 1, 2, 3, 4)
2 = use sigma-w measurements

from PROFILE.DAT to compute sigma-z
(valid for METFM = 1, 2, 3, 4)
3 = use both sigma-(v/theta) and sigma-w
from PROFILE.DAT to compute sigma-y and sigma-z
(valid for METFM = 1, 2, 3, 4)
4 = use sigma-theta measurements
from PLMMET.DAT to compute sigma-y
(valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2)   Default: 3   ! MDISP2 = 3 !
(used only if MDISP = 1 or 5)
2 = dispersion coefficients from internally calculated
sigma v, sigma w using micrometeorological variables
(u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using
the ISCST multi-segment approximation) and MP coefficients in
urban areas
4 = same as 3 except PG coefficients computed using
the MESOPUFF II eqns.

[DIAGNOSTIC FEATURE]
Method used for Lagrangian timescale for Sigma-y
(used only if MDISP=1,2 or MDISP2=1,2)
(MTAULY)   Default: 0   ! MTAULY = 0 !
0 = Draxler default 617.284 (s)
1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
10 < Direct user input (s)   -- e.g., 306.9

[DIAGNOSTIC FEATURE]
Method used for Advective-Decay timescale for Turbulence
(used only if MDISP=2 or MDISP2=2)
(MTAUADV)   Default: 0   ! MTAUADV = 0 !
0 = No turbulence advection
1 = Computed (OPTION NOT IMPLEMENTED)
10 < Direct user input (s)   -- e.g., 300

Method used to compute turbulence sigma-v &
sigma-w using micrometeorological variables
(Used only if MDISP = 2 or MDISP2 = 2)
(MCTURB)   Default: 1   ! MCTURB = 1 !
1 = Standard CALPUFF subroutines
2 = AERMOD subroutines

PG sigma-y,z adj. for roughness?   Default: 0   ! MROUGH = 0 !
(MROUGH)
0 = no
1 = yes

Partial plume penetration of   Default: 1   ! MPARTL = 1 !
elevated inversion?
(MPARTL)
0 = no

1 = yes

Strength of temperature inversion Default: 0 ! MTINV = 0 !
provided in PROFILE.DAT extended records?
(MTINV)
0 = no (computed from measured/default gradients)
1 = yes

PDF used for dispersion under convective conditions?
Default: 0 ! MPDF = 0 !
(MPDF)
0 = no
1 = yes

Sub-Grid TIBL module used for shore line?
Default: 0 ! MSGTIBL = 0 !
(MSGTIBL)
0 = no
1 = yes

Boundary conditions (concentration) modeled?
Default: 0 ! MBCON = 0 !
(MBCON)
0 = no
1 = yes, using formatted BCON.DAT file
2 = yes, using unformatted CONC.DAT file

Analyses of fogging and icing impacts due to emissions from arrays of mechanically-forced cooling towers can be performed using CALPUFF in conjunction with a cooling tower emissions processor (CTEMISS) and its associated postprocessors. Hourly emissions of water vapor and temperature from each cooling tower cell are computed for the current cell configuration and ambient conditions by CTEMISS. CALPUFF models the dispersion of these emissions and provides cloud information in a specialized format for further analysis. Output to FOG.DAT is provided in either 'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
Default: 0 ! MFOG = 0 !
(MFOG)
0 = no
1 = yes - report results in PLUME Mode format
2 = yes - report results in RECEPTOR Mode format

Test options specified to see if
they conform to regulatory
values? (MREG) Default: 1 ! MREG = 1 !

0 = NO checks are made
1 = Technical options must conform to USEPA
Long Range Transport (LRT) guidance
METFM 1 or 2
AVET 60. (min)

PGTIME 60. (min)
MGAUSS 1
MCTADJ 3
MTRANS 1
MTIP 1
MCHEM 1 or 3 (if modeling SOx, NOx)
MWET 1
MDRY 1
MDISP 2 or 3
MPDF 0 if MDISP=3
1 if MDISP=2
MROUGH 0
MPARTL 1
SYTDEP 550. (m)
MHFTSZ 0

!END!

INPUT GROUP: 3a, 3b -- Species list

Subgroup (3a)

The following species are modeled:

```
! CSPEC =      SO2 !     !END!
! CSPEC =      SO4 !     !END!
! CSPEC =      NOX !     !END!
! CSPEC =     HNO3 !     !END!
! CSPEC =      NO3 !     !END!
! CSPEC =     PM10 !     !END!

                                       Dry            OUTPUT GROUP
  SPECIES        MODELED         EMITTED       DEPOSITED             NUMBER
   NAME       (0=NO, 1=YES)   (0=NO, 1=YES)   (0=NO,             (0=NONE,
 (Limit: 12                                1=COMPUTED-GAS       1=1st CGRUP,
  Characters                                 2=COMPUTED-PARTICLE   2=2nd CGRUP,
  in length)                               3=USER-SPECIFIED)     3= etc.)

!      SO2  =      1,          1,        1,          0   !
!      SO4  =      1,          0,        2,          0   !
!      NOX  =      1,          1,        1,          0   !
!     HNO3  =      1,          0,        1,          0   !
!      NO3  =      1,          0,        2,          0   !
!     PM10  =      1,          1,        2,          0   !
```

!END!

Subgroup (3b)

The following names are used for Species-Groups in which results
for certain species are combined (added) prior to output. The
CGRUP name will be used as the species name in output files.
Use this feature to model specific particle-size distributions
by treating each size-range as a separate species.
Order must be consistent with 3(a) above.

INPUT GROUP: 4 -- Map Projection and Grid control parameters

Projection for all (X,Y):

Map projection
(PMAP) Default: UTM ! PMAP = LCC !

UTM : Universal Transverse Mercator
TTM : Tangential Transverse Mercator
LCC : Lambert Conformal Conic
PS : Polar Stereographic
EM : Equatorial Mercator
LAZA : Lambert Azimuthal Equal Area

False Easting and Northing (km) at the projection origin
(Used only if PMAP= TTM, LCC, or LAZA)
(FEAST) Default=0.0 ! FEAST = 0.000 !
(FNORTH) Default=0.0 ! FNORTH = 0.000 !

UTM zone (1 to 60)
(Used only if PMAP=UTM)
(IUTMZN) No Default ! IUTMZN = 15 !

Hemisphere for UTM projection?
(Used only if PMAP=UTM)
(UTMHEM) Default: N ! UTMHEM = N !
N : Northern hemisphere projection
S : Southern hemisphere projection

Latitude and Longitude (decimal degrees) of projection origin
(Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
(RLAT0) No Default ! RLAT0 = 40N !
(RLON0) No Default ! RLON0 = 97W !

TTM : RLON0 identifies central (true N/S) meridian of projection
RLAT0 selected for convenience
LCC : RLON0 identifies central (true N/S) meridian of projection
RLAT0 selected for convenience
PS : RLON0 identifies central (grid N/S) meridian of projection
RLAT0 selected for convenience
EM : RLON0 identifies central meridian of projection

RLAT0 is REPLACED by 0.0N (Equator)
LAZA: RLON0 identifies longitude of tangent-point of mapping plane
RLAT0 identifies latitude of tangent-point of mapping plane

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1) No Default ! XLAT1 = 33N !
(XLAT2) No Default ! XLAT2 = 45N !

LCC : Projection cone slices through Earth's surface at XLAT1 and XLAT2
PS : Projection plane slices through Earth at XLAT1
(XLAT2 is not used)

Note: Latitudes and longitudes should be positive, and include a
letter N,S,E, or W indicating north or south latitude, and
east or west longitude. For example,
35.9 N Latitude = 35.9N
118.7 E Longitude = 118.7E

Datum-region

The Datum-Region for the coordinates is identified by a character string. Many mapping products currently available use the model of the Earth known as the World Geodetic System 1984 (WGS-G). Other local models may be in use, and their selection in CALMET will make its output consistent with local mapping products. The list of Datum-Regions with official transformation parameters is provided by the National Imagery and Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)

WGS-G WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
NAS-C NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
NWS-27 NWS 6370KM Radius, Sphere
NWS-84 NWS 6370KM Radius, Sphere
ESR-S ESRI REFERENCE 6371KM Radius, Sphere

Datum-region for output coordinates
(DATUM) Default: WGS-G ! DATUM = WGS-G !

METEOROLOGICAL Grid:

Rectangular grid defined for projection PMAP,
with X the Easting and Y the Northing coordinate

No. X grid cells (NX) No default ! NX = 366 !
No. Y grid cells (NY) No default ! NY = 234 !
No. vertical layers (NZ) No default ! NZ = 10 !

Grid spacing (DGRIDKM) No default ! DGRIDKM = 6 !
Units: km

```
            Cell face heights
               (ZFACE(nz+1))      No defaults
                              Units: m
  ! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
          4000. !

         Reference Coordinates
        of SOUTHWEST corner of
            grid cell(1, 1):

         X-coordinate (XORIGKM)     No default     ! XORIGKM = -1008. !
         Y coordinate (YORIGKM)     No default     ! YORIGKM = -864. !
                             Units: km
```

COMPUTATIONAL Grid:

The computational grid is identical to or a subset of the MET. grid.
The lower left (LL) corner of the computational grid is at grid point
(IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the
computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
The grid spacing of the computational grid is the same as the MET. grid.

```
  X index of LL corner (IBCOMP)      No default     ! IBCOMP =  168   !
         (1 <= IBCOMP <= NX)

  Y index of LL corner (JBCOMP)      No default     ! JBCOMP =  24   !
         (1 <= JBCOMP <= NY)


  X index of UR corner (IECOMP)      No default     ! IECOMP =  320   !
         (1 <= IECOMP <= NX)

  Y index of UR corner (JECOMP)      No default     ! JECOMP =  168   !
         (1 <= JECOMP <= NY)
```

SAMPLING Grid (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point
(IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the
sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
The sampling grid must be identical to or a subset of the computational
grid. It may be a nested grid inside the computational grid.
The grid spacing of the sampling grid is DGRIDKM/MESHDN.

```
  Logical flag indicating if gridded
  receptors are used (LSAMP)        Default: T     ! LSAMP = F !
  (T=yes, F=no)

  X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1   !
   (IBCOMP <= IBSAMP <= IECOMP)

  Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1   !
   (JBCOMP <= JBSAMP <= JECOMP)
```

```
     X index of UR corner (IESAMP)      No default     ! IESAMP =  251   !
      (IBCOMP <= IESAMP <= IECOMP)

     Y index of UR corner (JESAMP)      No default     ! JESAMP =  246   !
      (JBCOMP <= JESAMP <= JECOMP)


    Nesting factor of the sampling
     grid (MESHDN)                      Default: 1     ! MESHDN =  1  !
     (MESHDN is an integer >= 1)

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------
                                     *                         *
   FILE                    DEFAULT VALUE            VALUE THIS RUN
   ----                    -------------            --------------

  Concentrations (ICON)            1                 !  ICON =  1   !
  Dry Fluxes (IDRY)                1                 !  IDRY =  1   !
  Wet Fluxes (IWET)                1                 !  IWET =  1   !
  Relative Humidity (IVIS)         1                 !  IVIS =  1   !
   (relative humidity file is
    required for visibility
    analysis)
  Use data compression option in output file?
  (LCOMPRS)                        Default: T        ! LCOMPRS = T !

  *
   0 = Do not create file, 1 = create file


   DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

      Mass flux across specified boundaries
      for selected species reported hourly?
      (IMFLX)                      Default: 0        ! IMFLX =  0  !
        0 = no
        1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                 are specified in Input Group 0)

      Mass balance for each species
      reported hourly?
      (IMBAL)                      Default: 0        ! IMBAL =  0  !
        0 = no
        1 = yes (MASSBAL.DAT filename is
             specified in Input Group 0)


   LINE PRINTER OUTPUT OPTIONS:
```

Print concentrations (ICPRT)   Default: 0   ! ICPRT = 0   !
Print dry fluxes (IDPRT)   Default: 0   ! IDPRT = 0   !
Print wet fluxes (IWPRT)   Default: 0   ! IWPRT = 0   !
(0 = Do not print, 1 = Print)

Concentration print interval
(ICFRQ) in hours   Default: 1   ! ICFRQ = 1   !
Dry flux print interval
(IDFRQ) in hours   Default: 1   ! IDFRQ = 1   !
Wet flux print interval
(IWFRQ) in hours   Default: 1   ! IWFRQ = 1   !

Units for Line Printer Output
(IPRTU)   Default: 1   ! IPRTU = 3   !

	for Concentration	for Deposition
1 =	g/m**3	g/m**2/s
2 =	mg/m**3	mg/m**2/s
3 =	ug/m**3	ug/m**2/s
4 =	ng/m**3	ng/m**2/s
5 =	Odour Units	

Messages tracking progress of run
written to the screen ?
(IMESG)   Default: 2   ! IMESG = 2   !
0 = no
1 = yes (advection step, puff ID)
2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)

SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

SPECIES /GROUP	---- CONCENTRATIONS ---- PRINTED?	SAVED ON DISK?	------ DRY FLUXES ------ PRINTED?	SAVED ON DISK?	------ WET FLUXES ------ PRINTED?	SAVED ON DISK?	-- MASS FLUX -- SAVED ON DISK?
! SO2 =	0,	1,	0,	1,	0,	1,	0 !
! SO4 =	0,	1,	0,	1,	0,	1,	0 !
! NOX =	0,	1,	0,	1,	0,	1,	0 !
! HNO3 =	0,	1,	0,	1,	0,	1,	0 !
! NO3 =	0,	1,	0,	1,	0,	1,	0 !
! PM10 =	0,	1,	0,	1,	0,	1,	0 !

OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

Logical for debug output
(LDEBUG)   Default: F   ! LDEBUG = F !

First puff to track
(IPFDEB)   Default: 1   ! IPFDEB = 1 !

Number of puffs to track
(NPFDEB)   Default: 1   ! NPFDEB = 1 !

Met. period to start output

(NN1) Default: 1 ! NN1 = 1 !

Met. period to end output
(NN2) Default: 10 ! NN2 = 10 !

!END!

INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
----

Subgroup (6a)

Number of terrain features (NHILL) Default: 0 ! NHILL = 0 !

Number of special complex terrain
receptors (NCTREC) Default: 0 ! NCTREC = 0 !

Terrain and CTSG Receptor data for
CTSG hills input in CTDM format ?
(MHILL) No Default ! MHILL = 2 !
1 = Hill and Receptor data created
by CTDM processors & read from
HILL.DAT and HILLRCT.DAT files
2 = Hill data created by OPTHILL &
input below in Subgroup (6b);
Receptor data in Subgroup (6c)

Factor to convert horizontal dimensions Default: 1.0 ! XHILL2M = 1. !
to meters (MHILL=1)

Factor to convert vertical dimensions Default: 1.0 ! ZHILL2M = 1. !
to meters (MHILL=1)

X-origin of CTDM system relative to No Default ! XCTDMKM = 0.0E00 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

Y-origin of CTDM system relative to No Default ! YCTDMKM = 0.0E00 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

Subgroup (6b)
----

1 **
HILL information

HILL XC YC THETAH ZGRID RELIEF EXPO 1 EXPO 2 SCALE 1 SCALE 2
AMAX1 AMAX2

NO. (km) (km) (deg.) (m) (m) (m) (m) (m) (m) (m) (m)
---- ---- ---- ------ ----- ------ ------ ------ ------- ------- ----- -----

----
Subgroup (6c)

COMPLEX TERRAIN RECEPTOR INFORMATION

XRCT	YRCT	ZRCT	XHH
(km)	(km)	(m)	
------	-----	------	----

1
Description of Complex Terrain Variables:
XC, YC = Coordinates of center of hill
THETAH = Orientation of major axis of hill (clockwise from North)
ZGRID = Height of the 0 of the grid above mean sea level
RELIEF = Height of the crest of the hill above the grid elevation
EXPO 1 = Hill-shape exponent for the major axis
EXPO 2 = Hill-shape exponent for the major axis
SCALE 1 = Horizontal length scale along the major axis
SCALE 2 = Horizontal length scale along the minor axis
AMAX = Maximum allowed axis length for the major axis
BMAX = Maximum allowed axis length for the major axis

XRCT, YRCT = Coordinates of the complex terrain receptors
ZRCT = Height of the ground (MSL) at the complex terrain Receptor
XHH = Hill number associated with each complex terrain receptor (NOTE: MUST BE ENTERED AS A REAL NUMBER)

**
NOTE: DATA for each hill and CTSG receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
----

SPECIES NAME	DIFFUSIVITY (cm**2/s)	ALPHA STAR	REACTIVITY	MESOPHYLL RESISTANCE (s/cm)	HENRY'S LAW COEFFICIENT (dimensionless)
-------	-----------	----------	----------	--------------------	-----------------------

! SO2 = 0.1509, 1000., 8., 0., 0.04 !
! NOX = 0.1656, 1., 8., 5., 3.5 !
! HNO3 = 0.1628, 1., 18., 0., 0.00000008 !

!END!

INPUT GROUP: 8 -- Size parameters for dry deposition of particles
----

For SINGLE SPECIES, the mean and standard deviation are used to
compute a deposition velocity for NINT (see group 9) size-ranges,
and these are then averaged to obtain a mean deposition velocity.

For GROUPED SPECIES, the size distribution should be explicitly
specified (by the 'species' in the group), and the standard deviation
for each should be entered as 0. The model will then use the
deposition velocity for the stated mean diameter.

```
      SPECIES      GEOMETRIC MASS MEAN       GEOMETRIC STANDARD
       NAME            DIAMETER                 DEVIATION
                      (microns)              (microns)
      -------      -------------------       ------------------
!        SO4 =          0.48,                    2.   !
!        NO3 =          0.48,                    2.   !
!       PM10 =           2.,                     2.   !
```

!END!

INPUT GROUP: 9 -- Miscellaneous dry deposition parameters

Reference cuticle resistance (s/cm)
(RCUTR)   Default: 30   ! RCUTR = 30.0 !
Reference ground resistance (s/cm)
(RGR)   Default: 10   !   RGR = 10.0 !
Reference pollutant reactivity
(REACTR)   Default: 8   ! REACTR = 8.0 !

Number of particle-size intervals used to
evaluate effective particle deposition velocity
(NINT)   Default: 9   !   NINT = 9 !

Vegetation state in unirrigated areas
(IVEG)   Default: 1   !   IVEG = 1   !
  IVEG=1 for active and unstressed vegetation
  IVEG=2 for active and stressed vegetation
  IVEG=3 for inactive vegetation

!END!

INPUT GROUP: 10 -- Wet Deposition Parameters

Scavenging Coefficient -- Units: (sec)**(-1)

	Pollutant	Liquid Precip.	Frozen Precip.
	---------	--------------	--------------
!	SO2 =	3.0E-05,	0.0E00 !
!	SO4 =	1.0E-04,	3.0E-05 !
!	HNO3 =	6.0E-05,	0.0E00 !
!	NO3 =	1.0E-04,	3.0E-05 !
!	PM10 =	1.0E-04,	3.0E-05 !

!END!

INPUT GROUP: 11 -- Chemistry Parameters

Ozone data input option (MOZ) Default: 1 ! MOZ = 0 !
(Used only if MCHEM = 1, 3, or 4)
0 = use a monthly background ozone value
1 = read hourly ozone concentrations from
the OZONE.DAT data file

Monthly ozone concentrations
(Used only if MCHEM = 1, 3, or 4 and
MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
(BCKO3) in ppb Default: 12*80.
! BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00, 65.00, 65.00, 26.00, 26.00 !

Monthly ammonia concentrations
(Used only if MCHEM = 1, or 3)
(BCKNH3) in ppb Default: 12*10.
! BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50 !

Nighttime SO2 loss rate (RNITE1)
in percent/hour Default: 0.2 ! RNITE1 = .2 !

Nighttime NOx loss rate (RNITE2)
in percent/hour Default: 2.0 ! RNITE2 = 2.0 !

Nighttime HNO3 formation rate (RNITE3)
in percent/hour Default: 2.0 ! RNITE3 = 2.0 !

H2O2 data input option (MH2O2) Default: 1 ! MH2O2 = 0 !
(Used only if MAQCHEM = 1)
0 = use a monthly background H2O2 value
1 = read hourly H2O2 concentrations from
the H2O2.DAT data file

Monthly H2O2 concentrations

```
   (Used only if MQACHEM = 1 and
    MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
   (BCKH2O2) in ppb                  Default: 12*1.
   !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !


--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
   (used only if MCHEM = 4)

   The SOA module uses monthly values of:
      Fine particulate concentration in ug/m^3 (BCKPMF)
      Organic fraction of fine particulate     (OFRAC)
      VOC / NOX ratio (after reaction)         (VCNX)
   to characterize the air mass when computing
   the formation of SOA from VOC emissions.
   Typical values for several distinct air mass types are:

     Month    1    2    3    4    5    6    7    8    9   10   11   12
             Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

   Clean Continental
     BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
     OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
     VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

   Clean Marine (surface)
     BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
     OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
     VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

   Urban - low biogenic (controls present)
     BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
     OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
     VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

   Urban - high biogenic (controls present)
     BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
     OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
     VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

   Regional Plume
     BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
     OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
     VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

   Urban - no controls present
     BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
     OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
     VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

   Default: Clean Continental
   !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
   !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
   !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !
```

!END!

INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
----

```
    Horizontal size of puff (m) beyond which
    time-dependent dispersion equations (Heffter)
    are used to determine sigma-y and
    sigma-z (SYTDEP)                    Default: 550.   ! SYTDEP = 5.5E02 !

    Switch for using Heffter equation for sigma z
    as above (0 = Not use Heffter; 1 = use Heffter
    (MHFTSZ)                            Default: 0      ! MHFTSZ =  0   !

    Stability class used to determine plume
    growth rates for puffs above the boundary
    layer (JSUP)                        Default: 5      ! JSUP =  5   !

    Vertical dispersion constant for stable
    conditions (k1 in Eqn. 2.7-3)  (CONK1)     Default: 0.01   ! CONK1 = .01 !

    Vertical dispersion constant for neutral/
    unstable conditions (k2 in Eqn. 2.7-4)
    (CONK2)                             Default: 0.1    ! CONK2 = .1 !

    Factor for determining Transition-point from
    Schulman-Scire to Huber-Snyder Building Downwash
    scheme (SS used for Hs < Hb + TBD * HL)
    (TBD)                               Default: 0.5    ! TBD = .5 !
      TBD < 0   ==> always use Huber-Snyder
      TBD = 1.5 ==> always use Schulman-Scire
      TBD = 0.5 ==> ISC Transition-point

    Range of land use categories for which
    urban dispersion is assumed
    (IURB1, IURB2)                      Default: 10     ! IURB1 =  10  !
                                                 19     ! IURB2 =  19  !

    Site characterization parameters for single-point Met data files ---------
    (needed for METFM = 2,3,4)

      Land use category for modeling domain
      (ILANDUIN)                        Default: 20     ! ILANDUIN =  20  !

      Roughness length (m) for modeling domain
      (Z0IN)                            Default: 0.25   ! Z0IN = .25 !

      Leaf area index for modeling domain
      (XLAIIN)                          Default: 3.0    ! XLAIIN = 3.0 !

      Elevation above sea level (m)
      (ELEVIN)                          Default: 0.0    ! ELEVIN = .0 !
```

Latitude (degrees) for met location
(XLATIN) Default: -999. ! XLATIN = -999.0 !

Longitude (degrees) for met location
(XLONIN) Default: -999. ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

Anemometer height (m) (Used only if METFM = 2,3)
(ANEMHT) Default: 10. ! ANEMHT = 10.0 !

Form of lateral turbulance data in PROFILE.DAT file
(Used only if METFM = 4 or MTURBVW = 1 or 3)
(ISIGMAV) Default: 1 ! ISIGMAV = 1 !
0 = read sigma-theta
1 = read sigma-v

Choice of mixing heights (Used only if METFM = 4)
(IMIXCTDM) Default: 0 ! IMIXCTDM = 0 !
0 = read PREDICTED mixing heights
1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN) Default: 1.0 ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN) Default: 1.0 ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW) Default: 99 ! MXNEW = 99 !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM) Default: 99 ! MXSAM = 99 !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT) Default: 2 ! NCOUNT = 2 !

Minimum sigma y for a new puff/slug (m)
(SYMIN) Default: 1.0 ! SYMIN = 1.0 !

Minimum sigma z for a new puff/slug (m)
(SZMIN) Default: 1.0 ! SZMIN = 1.0 !

Default minimum turbulence velocities sigma-v and sigma-w
for each stability class over land and over water (m/s)
(SVMIN(12) and SWMIN(12))

```
           ----------  LAND  ----------      ---------  WATER  ----------
  Stab Class :  A    B    C    D    E    F       A    B    C    D    E    F
           ---  ---  ---  ---  ---  ---      ---  ---  ---  ---  ---  ---
```

Default SVMIN : .50, .50, .50, .50, .50, .50,   .37, .37, .37, .37, .37, .37
Default SWMIN : .20, .12, .08, .06, .03, .016,   .20, .12, .08, .06, .03, .016

! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370, 0.370, 0.370!
! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))   Default: 0.0,0.0 ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)   Default: 0.5   ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)   Default: 3000. ! XMAXZI = 4000.0 !

Minimum mixing height (m)
(XMINZI)   Default: 50.   ! XMINZI = 20.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))   Default   :
ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

Wind Speed Class : 1   2   3   4   5
--- --- --- --- ---
! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))   Default   : ISC RURAL values
ISC RURAL : .07, .07, .10, .15, .35, .55
ISC URBAN : .15, .15, .20, .25, .30, .30

Stability Class : A   B   C   D   E   F
--- --- --- --- --- ---
! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))   Default: 0.020, 0.035
! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))   Stability Class : A   B   C   D   E   F

Default PPC : .50, .50, .50, .50, .35, .35
--- --- --- --- --- ---
! PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)   Default: 10.   ! SL2PF = 10.0 !

Puff-splitting control variables ------------------------

VERTICAL SPLIT

Number of puffs that result every time a puff
is split - nsplit=2 means that 1 puff splits
into 2
(NSPLIT)   Default: 3   ! NSPLIT = 3 !

Time(s) of a day when split puffs are eligible to
be split once again; this is typically set once
per day, around sunset before nocturnal shear develops.
24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
0=do not re-split   1=eligible for re-split
(IRESPLIT(24))   Default: Hour 17 = 1
! IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

Split is allowed only if last hour's mixing
height (m) exceeds a minimum value
(ZISPLIT)   Default: 100.   ! ZISPLIT = 100.0 !

Split is allowed only if ratio of last hour's
mixing ht to the maximum mixing ht experienced
by the puff is less than a maximum value (this
postpones a split until a nocturnal layer develops)
(ROLDMAX)   Default: 0.25   ! ROLDMAX = 0.25 !

HORIZONTAL SPLIT

Number of puffs that result every time a puff
is split - nsplith=5 means that 1 puff splits
into 5
(NSPLITH)   Default: 5   ! NSPLITH = 5 !

Minimum sigma-y (Grid Cells Units) of puff
before it may be split
(SYSPLITH)   Default: 1.0   ! SYSPLITH = 1.0 !

Minimum puff elongation rate (SYSPLITH/hr) due to
wind shear, before it may be split
(SHSPLITH)   Default: 2.   ! SHSPLITH = 2.0 !

Minimum concentration (g/m^3) of each
species in puff before it may be split
Enter array of NSPEC values; if a single value is

entered, it will be used for ALL species
(CNSPLITH) Default: 1.0E-07 ! CNSPLITH = 1.0E-07 !

Integration control variables ------------------------

Fractional convergence criterion for numerical SLUG
sampling integration
(EPSSLUG) Default: 1.0e-04 ! EPSSLUG = 1.0E-04 !

Fractional convergence criterion for numerical AREA
source integration
(EPSAREA) Default: 1.0e-06 ! EPSAREA = 1.0E-06 !

Trajectory step-length (m) used for numerical rise
integration
(DSRISE) Default: 1.0 ! DSRISE = 1.0 !

Boundary Condition (BC) Puff control variables ------------------------

Minimum height (m) to which BC puffs are mixed as they are emitted
(MBCON=2 ONLY). Actual height is reset to the current mixing height
at the release point if greater than this minimum.
(HTMINBC) Default: 500. ! HTMINBC = 500.0 !

Search radius (in BC segment lengths) about a receptor for sampling
nearest BC puff. BC puffs are emitted with a spacing of one segment
length, so the search radius should be greater than 1.
(RSAMPBC) Default: 4. ! RSAMPBC = 10.0 !

Near-Surface depletion adjustment to concentration profile used when
sampling BC puffs?
(MDEPBC) Default: 1 ! MDEPBC = 1 !
0 = Concentration is NOT adjusted for depletion
1 = Adjust Concentration for depletion

!END!

INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters

Subgroup (13a)

Number of point sources with
parameters provided below (NPT1) No default ! NPT1 = 1 !

Units used for point source
emissions below (IPTU) Default: 1 ! IPTU = 1 !
1 = g/s
2 = kg/hr
3 = lb/hr

```
          4 =     tons/yr
          5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =     Odour Unit * m**3/min
          7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                a
         POINT SOURCE: CONSTANT DATA
         -----------------------------
                                                              b         c
  Source      X         Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
             (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = EP10 !
   1 ! X =  207.6319,  -95.1489,  47.55, 239.3,    2.13, 8.94, 616.48,  0.0, 3.764247E01,  0.0E00,
1.31039E00,
       0.0E00,  0.0E00, 0.262078E00 !
   1 ! FMFAC  =      1.0 !   !END!
--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
             the effect of rain-caps or other physical configurations that
             reduce momentum rise associated with the actual exit velocity.
             (Default: 1.0  -- full momentum used)

    b
     0. = No building downwash modeled, 1. = downwash modeled
     NOTE: must be entered as a REAL number (i.e., with decimal point)
```

c
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IPTU (e.g. 1 for g/s).

Subgroup (13c)

BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

Source No. — Effective building height, width, length and X/Y offset (in meters)[a] every 10 degrees. LENGTH, XBADJ, and YBADJ are only needed for MBDW=2 (PRIME downwash option)

------ --

----

a
Building height, width, length, and X/Y offset from the source are treated as a separate input subgroup for each source and therefore must end with an input group terminator. The X/Y offset is the position, relative to the stack, of the center of the upwind face of the projected building, with the x-axis pointing along the flow direction.

Subgroup (13d)

POINT SOURCE: VARIABLE EMISSIONS DATA[a]

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

Number of polygon area sources with
parameters specified below (NAR1)   No default ! NAR1 = 0   !

Units used for area source
emissions below   (IARU)   Default: 1 ! IARU =   1 !
1 =   g/m**2/s
2 =   kg/m**2/hr
3 =   lb/m**2/hr
4 =   tons/m**2/yr
5 =   Odour Unit * m/s (vol. flux/m**2 of odour compound)
6 =   Odour Unit * m/min
7 =   metric tons/m**2/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (14d)   (NSAR1) Default: 0 ! NSAR1 = 0 !

Number of buoyant polygon area sources
with variable location and emission
parameters (NAR2)   No default ! NAR2 = 0   !
(If NAR2 > 0, ALL parameter data for
these sources are read from the file: BAEMARB.DAT)

!END!

Subgroup (14b)
----

a
AREA SOURCE: CONSTANT DATA

Source No.	Effect. Height (m)	Base Elevation (m)	Initial Sigma z (m)	Emission Rates[b]

----

a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.
b
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by IARU
(e.g. 1 for g/m**2/s).

Subgroup (14c)

COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON

```
Source                                              a
 No.     Ordered list of X followed by list of Y, grouped by source
------   ------------------------------------------------------------
```

----
a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

Subgroup (14d)
----

a
AREA SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission
rates given in 14b. Factors entered multiply the rates in 14b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

0 = Constant
1 = Diurnal cycle (24 scaling factors: hours 1-24)
2 = Monthly cycle (12 scaling factors: months 1-12)
3 = Hour & Season (4 groups of 24 hourly scaling factors,
where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where
first group is Stability Class A,
and the speed classes have upper
bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

----
 a
 Data for each species are treated as a separate input subgroup
 and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

Subgroup (15a)

Number of buoyant line sources
with variable location and emission
parameters (NLN2) No default ! NLN2 = 0 !

(If NLN2 > 0, ALL parameter data for
these sources are read from the file: LNEMARB.DAT)

Number of buoyant line sources (NLINES) No default ! NLINES = 0 !

Units used for line source
emissions below (ILNU) Default: 1 ! ILNU = 1 !
1 = g/s
2 = kg/hr
3 = lb/hr
4 = tons/yr
5 = Odour Unit * m**3/s (vol. flux of odour compound)
6 = Odour Unit * m**3/min
7 = metric tons/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (15c) (NSLN1) Default: 0 ! NSLN1 = 0 !

Maximum number of segments used to model
each line (MXNSEG) Default: 7 ! MXNSEG = 7 !

The following variables are required only if NLINES > 0. They are
used in the buoyant line source plume rise calculations.

Number of distances at which Default: 6 ! NLRISE = 6 !
transitional rise is computed

Average building length (XL) No default ! XL = .0 !
(in meters)

Average building height (HBL) No default ! HBL = .0 !
(in meters)

Average building width (WBL) No default ! WBL = .0 !
(in meters)

```
     Average line source width (WML)           No default   ! WML = .0 !
                                          (in meters)

     Average separation between buildings (DXL)  No default   ! DXL = .0 !
                                          (in meters)

     Average buoyancy parameter (FPRIMEL)       No default   ! FPRIMEL = .0 !
                                          (in m**4/s**3)
```

!END!

Subgroup (15b)

```
      BUOYANT LINE SOURCE: CONSTANT DATA
      ----------------------------------
                                                                         a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base       Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height    Elevation      Rates
          (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------   ---------    ---------

--------
```

a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by ILNTU (e.g. 1 for g/s).

Subgroup (15c)

```
                                   a
      BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
      ----------------------------------------------
```

Use this subgroup to describe temporal variations in the emission rates given in 15b. Factors entered multiply the rates in 15b. Skip sources here that have constant emissions.

```
   IVARY determines the type of variation, and is source-specific:
   (IVARY)                         Default: 0
       0 =      Constant
       1 =      Diurnal cycle (24 scaling factors: hours 1-24)
       2 =      Monthly cycle (12 scaling factors: months 1-12)
       3 =      Hour & Season (4 groups of 24 hourly scaling factors,
                         where first group is DEC-JAN-FEB)
       4 =      Speed & Stab. (6 groups of 6 scaling factors, where
                         first group is Stability Class A,
                         and the speed classes have upper
```

bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

Number of volume sources with
parameters provided in 16b,c (NVL1) No default ! NVL1 = 0 !

Units used for volume source
emissions below in 16b (IVLU) Default: 1 ! IVLU = 1 !
1 = g/s
2 = kg/hr
3 = lb/hr
4 = tons/yr
5 = Odour Unit * m**3/s (vol. flux of odour compound)
6 = Odour Unit * m**3/min
7 = metric tons/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (16c) (NSVL1) Default: 0 ! NSVL1 = 0 !

Number of volume sources with
variable location and emission
parameters (NVL2) No default ! NVL2 = 0 !

(If NVL2 > 0, ALL parameter data for
these sources are read from the VOLEMARB.DAT file(s))

!END!

Subgroup (16b)
----
a
VOLUME SOURCE: CONSTANT DATA

X Coordinate (km)	Y Coordinate (km)	Effect. Height (m)	Base Elevation (m)	Initial Sigma y (m)	Initial Sigma z (m)	Emission Rates[b]

----

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IVLU (e.g. 1 for g/s).

Subgroup (16c)

VOLUME SOURCE: VARIABLE EMISSIONS DATA[a]

Use this subgroup to describe temporal variations in the emission rates given in 16b. Factors entered multiply the rates in 16b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0
- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

Number of non-gridded receptors (NREC) No default ! NREC = 1046 !

!END!

Subgroup (17b)

NON-GRIDDED (DISCRETE) RECEPTOR DATA[a]

Receptor No.	X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height b Above Ground (m)
--------	----------	----------	---------	------------
1 ! X =	356.5460,	-357.4577,	274,	0.000! !END!
2 ! X =	356.5350,	-357.2085,	274,	0.000! !END!
3 ! X =	356.5241,	-356.9594,	235,	0.000! !END!
4 ! X =	356.7941,	-357.4468,	288,	0.000! !END!
5 ! X =	356.7831,	-357.1976,	276,	0.000! !END!
6 ! X =	356.7721,	-356.9484,	244,	0.000! !END!
7 ! X =	357.0422,	-357.4358,	304,	0.000! !END!
8 ! X =	357.0312,	-357.1867,	304,	0.000! !END!
9 ! X =	357.0202,	-356.9375,	274,	0.000! !END!
10 ! X =	356.9543,	-355.4425,	274,	0.000! !END!
11 ! X =	357.2903,	-357.4249,	304,	0.000! !END!
12 ! X =	357.2793,	-357.1757,	304,	0.000! !END!
13 ! X =	357.2683,	-356.9266,	290,	0.000! !END!
14 ! X =	357.2024,	-355.4316,	265,	0.000! !END!
15 ! X =	357.6591,	-360.1548,	274,	0.000! !END!
16 ! X =	357.6481,	-359.9057,	274,	0.000! !END!
17 ! X =	357.6371,	-359.6565,	274,	0.000! !END!
18 ! X =	357.6262,	-359.4073,	274,	0.000! !END!
19 ! X =	357.6152,	-359.1582,	274,	0.000! !END!
20 ! X =	357.6042,	-358.9090,	274,	0.000! !END!
21 ! X =	357.5383,	-357.4140,	302,	0.000! !END!
22 ! X =	357.5274,	-357.1648,	304,	0.000! !END!
23 ! X =	357.5164,	-356.9156,	304,	0.000! !END!
24 ! X =	357.5054,	-356.6665,	287,	0.000! !END!
25 ! X =	357.4944,	-356.4173,	274,	0.000! !END!
26 ! X =	357.4834,	-356.1681,	304,	0.000! !END!
27 ! X =	357.4505,	-355.4206,	275,	0.000! !END!
28 ! X =	357.9182,	-360.3931,	274,	0.000! !END!
29 ! X =	357.9072,	-360.1439,	274,	0.000! !END!
30 ! X =	357.8962,	-359.8947,	274,	0.000! !END!
31 ! X =	357.8852,	-359.6456,	274,	0.000! !END!
32 ! X =	357.8743,	-359.3964,	274,	0.000! !END!
33 ! X =	357.8633,	-359.1472,	273,	0.000! !END!
34 ! X =	357.8523,	-358.8981,	274,	0.000! !END!
35 ! X =	357.7864,	-357.4030,	304,	0.000! !END!
36 ! X =	357.7754,	-357.1539,	304,	0.000! !END!
37 ! X =	357.7645,	-356.9047,	307,	0.000! !END!
38 ! X =	357.7535,	-356.6555,	314,	0.000! !END!
39 ! X =	357.7425,	-356.4064,	313,	0.000! !END!
40 ! X =	357.7315,	-356.1572,	304,	0.000! !END!
41 ! X =	357.7205,	-355.9080,	304,	0.000! !END!
42 ! X =	357.7096,	-355.6589,	292,	0.000! !END!
43 ! X =	357.6986,	-355.4097,	275,	0.000! !END!
44 ! X =	358.2102,	-361.3789,	278,	0.000! !END!
45 ! X =	358.1663,	-360.3822,	272,	0.000! !END!
46 ! X =	358.1553,	-360.1330,	274,	0.000! !END!
47 ! X =	358.1443,	-359.8838,	274,	0.000! !END!
48 ! X =	358.1333,	-359.6346,	274,	0.000! !END!
49 ! X =	358.1223,	-359.3855,	274,	0.000! !END!
50 ! X =	358.1114,	-359.1363,	274,	0.000! !END!

51 ! X =	358.1004,	-358.8871,	278,	0.000! !END!
52 ! X =	358.0345,	-357.3921,	295,	0.000! !END!
53 ! X =	358.0235,	-357.1429,	304,	0.000! !END!
54 ! X =	358.0125,	-356.8938,	319,	0.000! !END!
55 ! X =	358.0016,	-356.6446,	335,	0.000! !END!
56 ! X =	357.9906,	-356.3954,	337,	0.000! !END!
57 ! X =	357.9796,	-356.1463,	320,	0.000! !END!
58 ! X =	357.9686,	-355.8971,	299,	0.000! !END!
59 ! X =	357.9576,	-355.6479,	277,	0.000! !END!
60 ! X =	357.9467,	-355.3988,	274,	0.000! !END!
61 ! X =	357.9357,	-355.1496,	274,	0.000! !END!
62 ! X =	357.9247,	-354.9005,	243,	0.000! !END!
63 ! X =	358.4583,	-361.3679,	304,	0.000! !END!
64 ! X =	358.4473,	-361.1187,	274,	0.000! !END!
65 ! X =	358.4363,	-360.8696,	274,	0.000! !END!
66 ! X =	358.4253,	-360.6204,	271,	0.000! !END!
67 ! X =	358.4143,	-360.3712,	274,	0.000! !END!
68 ! X =	358.4034,	-360.1221,	274,	0.000! !END!
69 ! X =	358.3924,	-359.8729,	274,	0.000! !END!
70 ! X =	358.3814,	-359.6237,	279,	0.000! !END!
71 ! X =	358.3704,	-359.3745,	281,	0.000! !END!
72 ! X =	358.3594,	-359.1254,	288,	0.000! !END!
73 ! X =	358.3485,	-358.8762,	293,	0.000! !END!
74 ! X =	358.2826,	-357.3812,	290,	0.000! !END!
75 ! X =	358.2716,	-357.1320,	302,	0.000! !END!
76 ! X =	358.2606,	-356.8828,	327,	0.000! !END!
77 ! X =	358.2496,	-356.6337,	365,	0.000! !END!
78 ! X =	358.2387,	-356.3845,	395,	0.000! !END!
79 ! X =	358.2277,	-356.1353,	343,	0.000! !END!
80 ! X =	358.2167,	-355.8862,	304,	0.000! !END!
81 ! X =	358.2057,	-355.6370,	296,	0.000! !END!
82 ! X =	358.1947,	-355.3878,	290,	0.000! !END!
83 ! X =	358.1838,	-355.1387,	277,	0.000! !END!
84 ! X =	358.1728,	-354.8895,	259,	0.000! !END!
85 ! X =	358.7064,	-361.3570,	304,	0.000! !END!
86 ! X =	358.6954,	-361.1078,	274,	0.000! !END!
87 ! X =	358.6844,	-360.8586,	274,	0.000! !END!
88 ! X =	358.6734,	-360.6095,	274,	0.000! !END!
89 ! X =	358.6624,	-360.3603,	274,	0.000! !END!
90 ! X =	358.6515,	-360.1111,	274,	0.000! !END!
91 ! X =	358.6405,	-359.8619,	286,	0.000! !END!
92 ! X =	358.6295,	-359.6128,	304,	0.000! !END!
93 ! X =	358.6185,	-359.3636,	311,	0.000! !END!
94 ! X =	358.6075,	-359.1144,	318,	0.000! !END!
95 ! X =	358.5965,	-358.8653,	322,	0.000! !END!
96 ! X =	358.5856,	-358.6161,	308,	0.000! !END!
97 ! X =	358.5746,	-358.3669,	298,	0.000! !END!
98 ! X =	358.5307,	-357.3702,	290,	0.000! !END!
99 ! X =	358.5197,	-357.1211,	308,	0.000! !END!
100 ! X =	358.5087,	-356.8719,	343,	0.000! !END!
101 ! X =	358.4977,	-356.6227,	371,	0.000! !END!
102 ! X =	358.4867,	-356.3736,	395,	0.000! !END!
103 ! X =	358.4758,	-356.1244,	365,	0.000! !END!
104 ! X =	358.4648,	-355.8752,	321,	0.000! !END!
105 ! X =	358.4538,	-355.6261,	307,	0.000! !END!
106 ! X =	358.4428,	-355.3769,	302,	0.000! !END!

107 ! X =	358.4318,	-355.1278,	283,	0.000! !END!
108 ! X =	358.4209,	-354.8786,	274,	0.000! !END!
109 ! X =	358.9544,	-361.3461,	297,	0.000! !END!
110 ! X =	358.9435,	-361.0969,	286,	0.000! !END!
111 ! X =	358.9325,	-360.8477,	274,	0.000! !END!
112 ! X =	358.9215,	-360.5985,	274,	0.000! !END!
113 ! X =	358.9105,	-360.3494,	274,	0.000! !END!
114 ! X =	358.8995,	-360.1002,	274,	0.000! !END!
115 ! X =	358.8886,	-359.8510,	288,	0.000! !END!
116 ! X =	358.8776,	-359.6018,	335,	0.000! !END!
117 ! X =	358.8666,	-359.3527,	335,	0.000! !END!
118 ! X =	358.8556,	-359.1035,	335,	0.000! !END!
119 ! X =	358.8446,	-358.8543,	335,	0.000! !END!
120 ! X =	358.8336,	-358.6052,	335,	0.000! !END!
121 ! X =	358.8227,	-358.3560,	292,	0.000! !END!
122 ! X =	358.8117,	-358.1068,	259,	0.000! !END!
123 ! X =	358.8007,	-357.8576,	274,	0.000! !END!
124 ! X =	358.7897,	-357.6085,	274,	0.000! !END!
125 ! X =	358.7787,	-357.3593,	285,	0.000! !END!
126 ! X =	358.7678,	-357.1101,	304,	0.000! !END!
127 ! X =	358.7568,	-356.8610,	332,	0.000! !END!
128 ! X =	358.7458,	-356.6118,	360,	0.000! !END!
129 ! X =	358.7348,	-356.3626,	365,	0.000! !END!
130 ! X =	358.7238,	-356.1135,	344,	0.000! !END!
131 ! X =	358.7129,	-355.8643,	335,	0.000! !END!
132 ! X =	358.7019,	-355.6151,	309,	0.000! !END!
133 ! X =	358.6909,	-355.3660,	302,	0.000! !END!
134 ! X =	358.6799,	-355.1168,	280,	0.000! !END!
135 ! X =	358.6689,	-354.8677,	274,	0.000! !END!
136 ! X =	359.2025,	-361.3351,	304,	0.000! !END!
137 ! X =	359.1916,	-361.0860,	303,	0.000! !END!
138 ! X =	359.1806,	-360.8368,	294,	0.000! !END!
139 ! X =	359.1696,	-360.5876,	292,	0.000! !END!
140 ! X =	359.1586,	-360.3384,	283,	0.000! !END!
141 ! X =	359.1476,	-360.0893,	275,	0.000! !END!
142 ! X =	359.1366,	-359.8401,	283,	0.000! !END!
143 ! X =	359.1257,	-359.5909,	316,	0.000! !END!
144 ! X =	359.1147,	-359.3417,	335,	0.000! !END!
145 ! X =	359.1037,	-359.0926,	335,	0.000! !END!
146 ! X =	359.0927,	-358.8434,	335,	0.000! !END!
147 ! X =	359.0817,	-358.5942,	327,	0.000! !END!
148 ! X =	359.0707,	-358.3451,	268,	0.000! !END!
149 ! X =	359.0598,	-358.0959,	258,	0.000! !END!
150 ! X =	359.0488,	-357.8467,	274,	0.000! !END!
151 ! X =	359.0378,	-357.5975,	277,	0.000! !END!
152 ! X =	359.0268,	-357.3484,	284,	0.000! !END!
153 ! X =	359.0158,	-357.0992,	280,	0.000! !END!
154 ! X =	359.0049,	-356.8500,	307,	0.000! !END!
155 ! X =	358.9939,	-356.6009,	320,	0.000! !END!
156 ! X =	358.9829,	-356.3517,	335,	0.000! !END!
157 ! X =	358.9719,	-356.1025,	335,	0.000! !END!
158 ! X =	358.9609,	-355.8534,	335,	0.000! !END!
159 ! X =	358.9500,	-355.6042,	313,	0.000! !END!
160 ! X =	358.9390,	-355.3551,	300,	0.000! !END!
161 ! X =	358.9280,	-355.1059,	283,	0.000! !END!
162 ! X =	358.9170,	-354.8567,	274,	0.000! !END!

163 ! X =	359.4616,	-361.5734,	304,	0.000! !END!
164 ! X =	359.4506,	-361.3242,	309,	0.000! !END!
165 ! X =	359.4396,	-361.0750,	312,	0.000! !END!
166 ! X =	359.4287,	-360.8258,	323,	0.000! !END!
167 ! X =	359.4177,	-360.5767,	308,	0.000! !END!
168 ! X =	359.4067,	-360.3275,	304,	0.000! !END!
169 ! X =	359.3957,	-360.0783,	304,	0.000! !END!
170 ! X =	359.3847,	-359.8291,	299,	0.000! !END!
171 ! X =	359.3737,	-359.5800,	304,	0.000! !END!
172 ! X =	359.3628,	-359.3308,	335,	0.000! !END!
173 ! X =	359.3518,	-359.0816,	335,	0.000! !END!
174 ! X =	359.3408,	-358.8325,	310,	0.000! !END!
175 ! X =	359.3298,	-358.5833,	281,	0.000! !END!
176 ! X =	359.3188,	-358.3341,	261,	0.000! !END!
177 ! X =	359.3078,	-358.0850,	278,	0.000! !END!
178 ! X =	359.2969,	-357.8358,	274,	0.000! !END!
179 ! X =	359.2859,	-357.5866,	281,	0.000! !END!
180 ! X =	359.2749,	-357.3374,	304,	0.000! !END!
181 ! X =	359.2639,	-357.0883,	304,	0.000! !END!
182 ! X =	359.2529,	-356.8391,	303,	0.000! !END!
183 ! X =	359.2420,	-356.5899,	320,	0.000! !END!
184 ! X =	359.2310,	-356.3408,	335,	0.000! !END!
185 ! X =	359.2200,	-356.0916,	335,	0.000! !END!
186 ! X =	359.2090,	-355.8424,	333,	0.000! !END!
187 ! X =	359.1980,	-355.5933,	313,	0.000! !END!
188 ! X =	359.1870,	-355.3441,	300,	0.000! !END!
189 ! X =	359.1761,	-355.0950,	280,	0.000! !END!
190 ! X =	359.1651,	-354.8458,	274,	0.000! !END!
191 ! X =	359.7317,	-362.0608,	306,	0.000! !END!
192 ! X =	359.7207,	-361.8116,	286,	0.000! !END!
193 ! X =	359.7097,	-361.5624,	308,	0.000! !END!
194 ! X =	359.6987,	-361.3133,	328,	0.000! !END!
195 ! X =	359.6877,	-361.0641,	335,	0.000! !END!
196 ! X =	359.6767,	-360.8149,	336,	0.000! !END!
197 ! X =	359.6658,	-360.5657,	345,	0.000! !END!
198 ! X =	359.6548,	-360.3166,	349,	0.000! !END!
199 ! X =	359.6438,	-360.0674,	337,	0.000! !END!
200 ! X =	359.6328,	-359.8182,	316,	0.000! !END!
201 ! X =	359.6218,	-359.5690,	306,	0.000! !END!
202 ! X =	359.6108,	-359.3199,	314,	0.000! !END!
203 ! X =	359.5999,	-359.0707,	314,	0.000! !END!
204 ! X =	359.5889,	-358.8215,	290,	0.000! !END!
205 ! X =	359.5779,	-358.5724,	258,	0.000! !END!
206 ! X =	359.5669,	-358.3232,	281,	0.000! !END!
207 ! X =	359.5559,	-358.0740,	304,	0.000! !END!
208 ! X =	359.5449,	-357.8248,	301,	0.000! !END!
209 ! X =	359.5340,	-357.5757,	280,	0.000! !END!
210 ! X =	359.5230,	-357.3265,	304,	0.000! !END!
211 ! X =	359.5120,	-357.0773,	304,	0.000! !END!
212 ! X =	359.5010,	-356.8282,	318,	0.000! !END!
213 ! X =	359.4900,	-356.5790,	335,	0.000! !END!
214 ! X =	359.4791,	-356.3298,	335,	0.000! !END!
215 ! X =	359.4681,	-356.0807,	335,	0.000! !END!
216 ! X =	359.4571,	-355.8315,	318,	0.000! !END!
217 ! X =	359.4461,	-355.5823,	304,	0.000! !END!
218 ! X =	359.4351,	-355.3332,	292,	0.000! !END!

219 ! X =	359.9797,	-362.0499,	326,	0.000!	!END!
220 ! X =	359.9688,	-361.8007,	286,	0.000!	!END!
221 ! X =	359.9578,	-361.5515,	308,	0.000!	!END!
222 ! X =	359.9468,	-361.3023,	322,	0.000!	!END!
223 ! X =	359.9358,	-361.0532,	335,	0.000!	!END!
224 ! X =	359.9248,	-360.8040,	344,	0.000!	!END!
225 ! X =	359.9138,	-360.5548,	365,	0.000!	!END!
226 ! X =	359.9029,	-360.3056,	365,	0.000!	!END!
227 ! X =	359.8919,	-360.0565,	359,	0.000!	!END!
228 ! X =	359.8809,	-359.8073,	330,	0.000!	!END!
229 ! X =	359.8699,	-359.5581,	309,	0.000!	!END!
230 ! X =	359.8589,	-359.3089,	304,	0.000!	!END!
231 ! X =	359.8479,	-359.0598,	289,	0.000!	!END!
232 ! X =	359.8370,	-358.8106,	270,	0.000!	!END!
233 ! X =	359.8260,	-358.5614,	274,	0.000!	!END!
234 ! X =	359.8150,	-358.3123,	289,	0.000!	!END!
235 ! X =	359.8040,	-358.0631,	304,	0.000!	!END!
236 ! X =	359.7930,	-357.8139,	304,	0.000!	!END!
237 ! X =	359.7820,	-357.5647,	304,	0.000!	!END!
238 ! X =	359.7711,	-357.3156,	297,	0.000!	!END!
239 ! X =	359.7601,	-357.0664,	305,	0.000!	!END!
240 ! X =	359.7491,	-356.8172,	327,	0.000!	!END!
241 ! X =	359.7381,	-356.5681,	335,	0.000!	!END!
242 ! X =	359.7271,	-356.3189,	335,	0.000!	!END!
243 ! X =	359.7162,	-356.0697,	333,	0.000!	!END!
244 ! X =	359.7052,	-355.8206,	313,	0.000!	!END!
245 ! X =	359.6942,	-355.5714,	279,	0.000!	!END!
246 ! X =	359.6832,	-355.3223,	304,	0.000!	!END!
247 ! X =	360.2169,	-361.7897,	296,	0.000!	!END!
248 ! X =	360.2059,	-361.5406,	304,	0.000!	!END!
249 ! X =	360.1949,	-361.2914,	307,	0.000!	!END!
250 ! X =	360.1839,	-361.0422,	335,	0.000!	!END!
251 ! X =	360.1729,	-360.7930,	351,	0.000!	!END!
252 ! X =	360.1619,	-360.5439,	365,	0.000!	!END!
253 ! X =	360.1509,	-360.2947,	365,	0.000!	!END!
254 ! X =	360.1400,	-360.0455,	365,	0.000!	!END!
255 ! X =	360.1290,	-359.7963,	330,	0.000!	!END!
256 ! X =	360.1180,	-359.5472,	306,	0.000!	!END!
257 ! X =	360.1070,	-359.2980,	290,	0.000!	!END!
258 ! X =	360.0960,	-359.0488,	304,	0.000!	!END!
259 ! X =	360.0850,	-358.7997,	300,	0.000!	!END!
260 ! X =	360.0741,	-358.5505,	275,	0.000!	!END!
261 ! X =	360.0631,	-358.3013,	289,	0.000!	!END!
262 ! X =	360.0521,	-358.0521,	311,	0.000!	!END!
263 ! X =	360.0411,	-357.8030,	331,	0.000!	!END!
264 ! X =	360.0301,	-357.5538,	335,	0.000!	!END!
265 ! X =	360.0191,	-357.3046,	318,	0.000!	!END!
266 ! X =	360.0082,	-357.0555,	301,	0.000!	!END!
267 ! X =	359.9972,	-356.8063,	319,	0.000!	!END!
268 ! X =	359.9862,	-356.5571,	335,	0.000!	!END!
269 ! X =	359.9752,	-356.3080,	335,	0.000!	!END!
270 ! X =	359.9642,	-356.0588,	328,	0.000!	!END!
271 ! X =	359.9532,	-355.8096,	308,	0.000!	!END!
272 ! X =	359.9423,	-355.5605,	289,	0.000!	!END!
273 ! X =	359.9313,	-355.3113,	300,	0.000!	!END!
274 ! X =	360.4649,	-361.7788,	299,	0.000!	!END!

275 ! X =	360.4540,	-361.5296,	304,	0.000! !END!
276 ! X =	360.4430,	-361.2805,	315,	0.000! !END!
277 ! X =	360.4320,	-361.0313,	325,	0.000! !END!
278 ! X =	360.4210,	-360.7821,	349,	0.000! !END!
279 ! X =	360.4100,	-360.5329,	365,	0.000! !END!
280 ! X =	360.3990,	-360.2838,	365,	0.000! !END!
281 ! X =	360.3881,	-360.0346,	335,	0.000! !END!
282 ! X =	360.3771,	-359.7854,	310,	0.000! !END!
283 ! X =	360.3661,	-359.5362,	304,	0.000! !END!
284 ! X =	360.3551,	-359.2871,	304,	0.000! !END!
285 ! X =	360.3441,	-359.0379,	304,	0.000! !END!
286 ! X =	360.3331,	-358.7887,	304,	0.000! !END!
287 ! X =	360.3221,	-358.5396,	289,	0.000! !END!
288 ! X =	360.3112,	-358.2904,	284,	0.000! !END!
289 ! X =	360.3002,	-358.0412,	309,	0.000! !END!
290 ! X =	360.2892,	-357.7920,	335,	0.000! !END!
291 ! X =	360.2782,	-357.5429,	335,	0.000! !END!
292 ! X =	360.2672,	-357.2937,	335,	0.000! !END!
293 ! X =	360.2562,	-357.0445,	312,	0.000! !END!
294 ! X =	360.2453,	-356.7954,	336,	0.000! !END!
295 ! X =	360.2343,	-356.5462,	358,	0.000! !END!
296 ! X =	360.2233,	-356.2970,	355,	0.000! !END!
297 ! X =	360.2123,	-356.0479,	330,	0.000! !END!
298 ! X =	360.2013,	-355.7987,	309,	0.000! !END!
299 ! X =	360.1903,	-355.5495,	289,	0.000! !END!
300 ! X =	360.1794,	-355.3004,	282,	0.000! !END!
301 ! X =	360.7240,	-362.0171,	335,	0.000! !END!
302 ! X =	360.7130,	-361.7679,	304,	0.000! !END!
303 ! X =	360.7020,	-361.5187,	304,	0.000! !END!
304 ! X =	360.6911,	-361.2695,	335,	0.000! !END!
305 ! X =	360.6801,	-361.0203,	344,	0.000! !END!
306 ! X =	360.6691,	-360.7712,	330,	0.000! !END!
307 ! X =	360.6581,	-360.5220,	365,	0.000! !END!
308 ! X =	360.6471,	-360.2728,	365,	0.000! !END!
309 ! X =	360.6361,	-360.0236,	349,	0.000! !END!
310 ! X =	360.6252,	-359.7745,	335,	0.000! !END!
311 ! X =	360.6142,	-359.5253,	326,	0.000! !END!
312 ! X =	360.6032,	-359.2761,	312,	0.000! !END!
313 ! X =	360.5922,	-359.0270,	305,	0.000! !END!
314 ! X =	360.5812,	-358.7778,	304,	0.000! !END!
315 ! X =	360.5702,	-358.5286,	287,	0.000! !END!
316 ! X =	360.5592,	-358.2794,	289,	0.000! !END!
317 ! X =	360.5483,	-358.0303,	318,	0.000! !END!
318 ! X =	360.5373,	-357.7811,	335,	0.000! !END!
319 ! X =	360.5263,	-357.5319,	335,	0.000! !END!
320 ! X =	360.5153,	-357.2828,	335,	0.000! !END!
321 ! X =	360.5043,	-357.0336,	330,	0.000! !END!
322 ! X =	360.4933,	-356.7844,	362,	0.000! !END!
323 ! X =	360.4824,	-356.5353,	365,	0.000! !END!
324 ! X =	360.4714,	-356.2861,	365,	0.000! !END!
325 ! X =	360.4604,	-356.0369,	340,	0.000! !END!
326 ! X =	360.4494,	-355.7878,	312,	0.000! !END!
327 ! X =	360.4384,	-355.5386,	304,	0.000! !END!
328 ! X =	360.4274,	-355.2894,	304,	0.000! !END!
329 ! X =	360.9721,	-362.0061,	350,	0.000! !END!
330 ! X =	360.9611,	-361.7569,	313,	0.000! !END!

331 ! X = 360.9501, -361.5078, 335, 0.000! !END!
332 ! X = 360.9391, -361.2586, 355, 0.000! !END!
333 ! X = 360.9282, -361.0094, 365, 0.000! !END!
334 ! X = 360.9172, -360.7602, 373, 0.000! !END!
335 ! X = 360.9062, -360.5111, 365, 0.000! !END!
336 ! X = 360.8952, -360.2619, 365, 0.000! !END!
337 ! X = 360.8842, -360.0127, 335, 0.000! !END!
338 ! X = 360.8732, -359.7635, 335, 0.000! !END!
339 ! X = 360.8623, -359.5144, 335, 0.000! !END!
340 ! X = 360.8513, -359.2652, 323, 0.000! !END!
341 ! X = 360.8403, -359.0160, 305, 0.000! !END!
342 ! X = 360.8293, -358.7669, 296, 0.000! !END!
343 ! X = 360.8183, -358.5177, 274, 0.000! !END!
344 ! X = 360.8073, -358.2685, 284, 0.000! !END!
345 ! X = 360.7963, -358.0193, 313, 0.000! !END!
346 ! X = 360.7854, -357.7702, 325, 0.000! !END!
347 ! X = 360.7744, -357.5210, 335, 0.000! !END!
348 ! X = 360.7634, -357.2718, 335, 0.000! !END!
349 ! X = 360.7524, -357.0227, 357, 0.000! !END!
350 ! X = 360.7414, -356.7735, 365, 0.000! !END!
351 ! X = 360.7304, -356.5243, 365, 0.000! !END!
352 ! X = 360.7194, -356.2752, 365, 0.000! !END!
353 ! X = 360.7085, -356.0260, 334, 0.000! !END!
354 ! X = 360.6975, -355.7768, 334, 0.000! !END!
355 ! X = 360.6865, -355.5277, 326, 0.000! !END!
356 ! X = 361.2202, -361.9952, 365, 0.000! !END!
357 ! X = 361.2092, -361.7460, 336, 0.000! !END!
358 ! X = 361.1982, -361.4968, 352, 0.000! !END!
359 ! X = 361.1872, -361.2477, 353, 0.000! !END!
360 ! X = 361.1763, -360.9985, 367, 0.000! !END!
361 ! X = 361.1653, -360.7493, 396, 0.000! !END!
362 ! X = 361.1213, -359.7526, 329, 0.000! !END!
363 ! X = 361.1103, -359.5034, 329, 0.000! !END!
364 ! X = 361.0994, -359.2543, 311, 0.000! !END!
365 ! X = 361.0884, -359.0051, 293, 0.000! !END!
366 ! X = 361.0774, -358.7559, 277, 0.000! !END!
367 ! X = 361.0664, -358.5067, 275, 0.000! !END!
368 ! X = 361.0554, -358.2576, 275, 0.000! !END!
369 ! X = 361.0444, -358.0084, 294, 0.000! !END!
370 ! X = 361.0334, -357.7592, 303, 0.000! !END!
371 ! X = 361.0225, -357.5101, 323, 0.000! !END!
372 ! X = 361.0115, -357.2609, 338, 0.000! !END!
373 ! X = 361.0005, -357.0117, 365, 0.000! !END!
374 ! X = 360.9895, -356.7626, 365, 0.000! !END!
375 ! X = 360.9785, -356.5134, 351, 0.000! !END!
376 ! X = 360.9675, -356.2642, 335, 0.000! !END!
377 ! X = 360.9565, -356.0151, 335, 0.000! !END!
378 ! X = 360.9456, -355.7659, 335, 0.000! !END!
379 ! X = 360.9346, -355.5167, 335, 0.000! !END!
380 ! X = 361.4683, -361.9842, 365, 0.000! !END!
381 ! X = 361.4573, -361.7351, 339, 0.000! !END!
382 ! X = 361.4463, -361.4859, 365, 0.000! !END!
383 ! X = 361.4353, -361.2367, 365, 0.000! !END!
384 ! X = 361.4243, -360.9875, 358, 0.000! !END!
385 ! X = 361.4134, -360.7384, 396, 0.000! !END!
386 ! X = 361.3694, -359.7417, 328, 0.000! !END!

387 ! X =	361.3584,	-359.4925,	305,	0.000!	!END!
388 ! X =	361.3474,	-359.2433,	304,	0.000!	!END!
389 ! X =	361.3365,	-358.9942,	300,	0.000!	!END!
390 ! X =	361.3255,	-358.7450,	304,	0.000!	!END!
391 ! X =	361.3145,	-358.4958,	297,	0.000!	!END!
392 ! X =	361.3035,	-358.2466,	274,	0.000!	!END!
393 ! X =	361.2925,	-357.9975,	304,	0.000!	!END!
394 ! X =	361.2815,	-357.7483,	304,	0.000!	!END!
395 ! X =	361.2705,	-357.4991,	307,	0.000!	!END!
396 ! X =	361.2596,	-357.2500,	335,	0.000!	!END!
397 ! X =	361.2486,	-357.0008,	365,	0.000!	!END!
398 ! X =	361.2376,	-356.7516,	365,	0.000!	!END!
399 ! X =	361.2266,	-356.5025,	354,	0.000!	!END!
400 ! X =	361.2156,	-356.2533,	335,	0.000!	!END!
401 ! X =	361.2046,	-356.0041,	312,	0.000!	!END!
402 ! X =	361.1936,	-355.7550,	335,	0.000!	!END!
403 ! X =	361.1827,	-355.5058,	316,	0.000!	!END!
404 ! X =	361.1717,	-355.2566,	306,	0.000!	!END!
405 ! X =	361.1607,	-355.0075,	284,	0.000!	!END!
406 ! X =	361.1497,	-354.7583,	297,	0.000!	!END!
407 ! X =	361.7164,	-361.9733,	365,	0.000!	!END!
408 ! X =	361.7054,	-361.7241,	365,	0.000!	!END!
409 ! X =	361.6944,	-361.4750,	383,	0.000!	!END!
410 ! X =	361.6834,	-361.2258,	390,	0.000!	!END!
411 ! X =	361.6724,	-360.9766,	386,	0.000!	!END!
412 ! X =	361.6614,	-360.7274,	367,	0.000!	!END!
413 ! X =	361.6175,	-359.7307,	335,	0.000!	!END!
414 ! X =	361.6065,	-359.4816,	335,	0.000!	!END!
415 ! X =	361.5955,	-359.2324,	316,	0.000!	!END!
416 ! X =	361.5845,	-358.9832,	304,	0.000!	!END!
417 ! X =	361.5735,	-358.7340,	304,	0.000!	!END!
418 ! X =	361.5626,	-358.4849,	304,	0.000!	!END!
419 ! X =	361.5516,	-358.2357,	277,	0.000!	!END!
420 ! X =	361.5406,	-357.9865,	296,	0.000!	!END!
421 ! X =	361.5296,	-357.7374,	304,	0.000!	!END!
422 ! X =	361.5186,	-357.4882,	307,	0.000!	!END!
423 ! X =	361.5076,	-357.2390,	328,	0.000!	!END!
424 ! X =	361.4966,	-356.9899,	348,	0.000!	!END!
425 ! X =	361.4857,	-356.7407,	355,	0.000!	!END!
426 ! X =	361.4747,	-356.4915,	347,	0.000!	!END!
427 ! X =	361.4637,	-356.2424,	335,	0.000!	!END!
428 ! X =	361.4527,	-355.9932,	311,	0.000!	!END!
429 ! X =	361.4417,	-355.7440,	302,	0.000!	!END!
430 ! X =	361.4307,	-355.4949,	284,	0.000!	!END!
431 ! X =	361.4197,	-355.2457,	277,	0.000!	!END!
432 ! X =	361.4088,	-354.9965,	296,	0.000!	!END!
433 ! X =	361.3978,	-354.7474,	301,	0.000!	!END!
434 ! X =	361.9535,	-361.7132,	372,	0.000!	!END!
435 ! X =	361.8656,	-359.7198,	335,	0.000!	!END!
436 ! X =	361.8546,	-359.4706,	335,	0.000!	!END!
437 ! X =	361.8436,	-359.2215,	316,	0.000!	!END!
438 ! X =	361.8326,	-358.9723,	321,	0.000!	!END!
439 ! X =	361.8216,	-358.7231,	331,	0.000!	!END!
440 ! X =	361.8106,	-358.4739,	305,	0.000!	!END!
441 ! X =	361.7997,	-358.2248,	287,	0.000!	!END!
442 ! X =	361.7887,	-357.9756,	304,	0.000!	!END!

443 ! X =	361.7777,	-357.7264,	305,	0.000!	!END!
444 ! X =	361.7667,	-357.4773,	310,	0.000!	!END!
445 ! X =	361.7557,	-357.2281,	320,	0.000!	!END!
446 ! X =	361.7447,	-356.9789,	339,	0.000!	!END!
447 ! X =	361.7337,	-356.7298,	340,	0.000!	!END!
448 ! X =	361.7228,	-356.4806,	335,	0.000!	!END!
449 ! X =	361.7118,	-356.2314,	319,	0.000!	!END!
450 ! X =	361.7008,	-355.9823,	304,	0.000!	!END!
451 ! X =	361.6898,	-355.7331,	304,	0.000!	!END!
452 ! X =	361.6788,	-355.4839,	284,	0.000!	!END!
453 ! X =	361.6678,	-355.2348,	304,	0.000!	!END!
454 ! X =	361.6568,	-354.9856,	304,	0.000!	!END!
455 ! X =	361.6458,	-354.7364,	304,	0.000!	!END!
456 ! X =	362.1137,	-359.7089,	329,	0.000!	!END!
457 ! X =	362.1027,	-359.4597,	312,	0.000!	!END!
458 ! X =	362.0917,	-359.2105,	327,	0.000!	!END!
459 ! X =	362.0807,	-358.9613,	335,	0.000!	!END!
460 ! X =	362.0697,	-358.7122,	335,	0.000!	!END!
461 ! X =	362.0587,	-358.4630,	297,	0.000!	!END!
462 ! X =	362.0477,	-358.2138,	304,	0.000!	!END!
463 ! X =	362.0368,	-357.9647,	304,	0.000!	!END!
464 ! X =	362.0258,	-357.7155,	310,	0.000!	!END!
465 ! X =	362.0148,	-357.4663,	324,	0.000!	!END!
466 ! X =	362.0038,	-357.2172,	338,	0.000!	!END!
467 ! X =	361.9928,	-356.9680,	339,	0.000!	!END!
468 ! X =	361.9818,	-356.7188,	335,	0.000!	!END!
469 ! X =	361.9708,	-356.4697,	326,	0.000!	!END!
470 ! X =	361.9598,	-356.2205,	309,	0.000!	!END!
471 ! X =	361.9489,	-355.9713,	301,	0.000!	!END!
472 ! X =	361.9379,	-355.7222,	296,	0.000!	!END!
473 ! X =	361.9269,	-355.4730,	304,	0.000!	!END!
474 ! X =	361.9159,	-355.2238,	305,	0.000!	!END!
475 ! X =	361.9049,	-354.9747,	304,	0.000!	!END!
476 ! X =	361.8939,	-354.7255,	304,	0.000!	!END!
477 ! X =	362.3617,	-359.6979,	335,	0.000!	!END!
478 ! X =	362.3508,	-359.4487,	329,	0.000!	!END!
479 ! X =	362.3398,	-359.1996,	335,	0.000!	!END!
480 ! X =	362.3288,	-358.9504,	335,	0.000!	!END!
481 ! X =	362.3178,	-358.7012,	319,	0.000!	!END!
482 ! X =	362.3068,	-358.4521,	298,	0.000!	!END!
483 ! X =	362.2958,	-358.2029,	304,	0.000!	!END!
484 ! X =	362.2848,	-357.9537,	311,	0.000!	!END!
485 ! X =	362.2738,	-357.7046,	335,	0.000!	!END!
486 ! X =	362.2629,	-357.4554,	339,	0.000!	!END!
487 ! X =	362.2519,	-357.2062,	365,	0.000!	!END!
488 ! X =	362.2409,	-356.9571,	365,	0.000!	!END!
489 ! X =	362.2299,	-356.7079,	347,	0.000!	!END!
490 ! X =	362.2189,	-356.4587,	326,	0.000!	!END!
491 ! X =	362.2079,	-356.2096,	309,	0.000!	!END!
492 ! X =	362.1969,	-355.9604,	302,	0.000!	!END!
493 ! X =	362.1859,	-355.7112,	309,	0.000!	!END!
494 ! X =	362.1750,	-355.4621,	335,	0.000!	!END!
495 ! X =	362.1640,	-355.2129,	322,	0.000!	!END!
496 ! X =	362.1530,	-354.9637,	305,	0.000!	!END!
497 ! X =	362.1420,	-354.7146,	304,	0.000!	!END!
498 ! X =	362.6098,	-359.6870,	345,	0.000!	!END!

499 ! X =	362.5988,	-359.4378,	340,	0.000! !END!
500 ! X =	362.5879,	-359.1886,	335,	0.000! !END!
501 ! X =	362.5769,	-358.9395,	335,	0.000! !END!
502 ! X =	362.5659,	-358.6903,	304,	0.000! !END!
503 ! X =	362.5549,	-358.4411,	304,	0.000! !END!
504 ! X =	362.5439,	-358.1920,	304,	0.000! !END!
505 ! X =	362.5329,	-357.9428,	310,	0.000! !END!
506 ! X =	362.5219,	-357.6936,	335,	0.000! !END!
507 ! X =	362.5109,	-357.4445,	343,	0.000! !END!
508 ! X =	362.5000,	-357.1953,	365,	0.000! !END!
509 ! X =	362.4890,	-356.9461,	365,	0.000! !END!
510 ! X =	362.4780,	-356.6969,	350,	0.000! !END!
511 ! X =	362.4670,	-356.4478,	319,	0.000! !END!
512 ! X =	362.4560,	-356.1986,	304,	0.000! !END!
513 ! X =	362.4450,	-355.9495,	328,	0.000! !END!
514 ! X =	362.4340,	-355.7003,	335,	0.000! !END!
515 ! X =	362.4230,	-355.4511,	335,	0.000! !END!
516 ! X =	362.4121,	-355.2020,	330,	0.000! !END!
517 ! X =	362.4011,	-354.9528,	300,	0.000! !END!
518 ! X =	362.3901,	-354.7036,	275,	0.000! !END!
519 ! X =	362.9019,	-360.6727,	376,	0.000! !END!
520 ! X =	362.8799,	-360.1744,	365,	0.000! !END!
521 ! X =	362.8689,	-359.9252,	365,	0.000! !END!
522 ! X =	362.8579,	-359.6760,	365,	0.000! !END!
523 ! X =	362.8469,	-359.4269,	361,	0.000! !END!
524 ! X =	362.8359,	-359.1777,	337,	0.000! !END!
525 ! X =	362.8250,	-358.9285,	306,	0.000! !END!
526 ! X =	362.8140,	-358.6794,	318,	0.000! !END!
527 ! X =	362.8030,	-358.4302,	335,	0.000! !END!
528 ! X =	362.7920,	-358.1810,	309,	0.000! !END!
529 ! X =	362.7810,	-357.9318,	305,	0.000! !END!
530 ! X =	362.7700,	-357.6827,	312,	0.000! !END!
531 ! X =	362.7590,	-357.4335,	338,	0.000! !END!
532 ! X =	362.7480,	-357.1843,	365,	0.000! !END!
533 ! X =	362.7370,	-356.9352,	365,	0.000! !END!
534 ! X =	362.7261,	-356.6860,	350,	0.000! !END!
535 ! X =	362.7151,	-356.4368,	335,	0.000! !END!
536 ! X =	362.7041,	-356.1877,	349,	0.000! !END!
537 ! X =	362.6931,	-355.9385,	365,	0.000! !END!
538 ! X =	362.6821,	-355.6893,	351,	0.000! !END!
539 ! X =	362.6711,	-355.4402,	335,	0.000! !END!
540 ! X =	362.6601,	-355.1910,	319,	0.000! !END!
541 ! X =	362.6491,	-354.9419,	302,	0.000! !END!
542 ! X =	362.6382,	-354.6927,	284,	0.000! !END!
543 ! X =	362.6272,	-354.4435,	274,	0.000! !END!
544 ! X =	363.1500,	-360.6618,	391,	0.000! !END!
545 ! X =	363.1390,	-360.4126,	382,	0.000! !END!
546 ! X =	363.1280,	-360.1635,	366,	0.000! !END!
547 ! X =	363.1170,	-359.9143,	365,	0.000! !END!
548 ! X =	363.1060,	-359.6651,	365,	0.000! !END!
549 ! X =	363.0950,	-359.4159,	359,	0.000! !END!
550 ! X =	363.0840,	-359.1668,	323,	0.000! !END!
551 ! X =	363.0730,	-358.9176,	327,	0.000! !END!
552 ! X =	363.0620,	-358.6684,	335,	0.000! !END!
553 ! X =	363.0511,	-358.4192,	335,	0.000! !END!
554 ! X =	363.0401,	-358.1701,	331,	0.000! !END!

555 ! X =	363.0291,	-357.9209,	320,	0.000! !END!
556 ! X =	363.0181,	-357.6717,	335,	0.000! !END!
557 ! X =	363.0071,	-357.4226,	335,	0.000! !END!
558 ! X =	362.9961,	-357.1734,	341,	0.000! !END!
559 ! X =	362.9851,	-356.9242,	349,	0.000! !END!
560 ! X =	362.9741,	-356.6751,	350,	0.000! !END!
561 ! X =	362.9631,	-356.4259,	365,	0.000! !END!
562 ! X =	362.9522,	-356.1767,	365,	0.000! !END!
563 ! X =	362.9412,	-355.9276,	365,	0.000! !END!
564 ! X =	362.9302,	-355.6784,	352,	0.000! !END!
565 ! X =	362.9192,	-355.4292,	335,	0.000! !END!
566 ! X =	362.9082,	-355.1801,	315,	0.000! !END!
567 ! X =	362.8972,	-354.9309,	305,	0.000! !END!
568 ! X =	362.8862,	-354.6818,	301,	0.000! !END!
569 ! X =	362.8752,	-354.4326,	275,	0.000! !END!
570 ! X =	363.3871,	-360.4017,	396,	0.000! !END!
571 ! X =	363.3761,	-360.1525,	382,	0.000! !END!
572 ! X =	363.3651,	-359.9033,	355,	0.000! !END!
573 ! X =	363.3541,	-359.6542,	340,	0.000! !END!
574 ! X =	363.3431,	-359.4050,	327,	0.000! !END!
575 ! X =	363.3321,	-359.1558,	342,	0.000! !END!
576 ! X =	363.3211,	-358.9067,	349,	0.000! !END!
577 ! X =	363.3101,	-358.6575,	350,	0.000! !END!
578 ! X =	363.2991,	-358.4083,	365,	0.000! !END!
579 ! X =	363.2882,	-358.1591,	351,	0.000! !END!
580 ! X =	363.2772,	-357.9100,	335,	0.000! !END!
581 ! X =	363.2662,	-357.6608,	340,	0.000! !END!
582 ! X =	363.2552,	-357.4116,	348,	0.000! !END!
583 ! X =	363.2442,	-357.1625,	356,	0.000! !END!
584 ! X =	363.2332,	-356.9133,	365,	0.000! !END!
585 ! X =	363.2222,	-356.6641,	365,	0.000! !END!
586 ! X =	363.2112,	-356.4150,	365,	0.000! !END!
587 ! X =	363.2002,	-356.1658,	365,	0.000! !END!
588 ! X =	363.1893,	-355.9166,	361,	0.000! !END!
589 ! X =	363.1783,	-355.6675,	332,	0.000! !END!
590 ! X =	363.1673,	-355.4183,	320,	0.000! !END!
591 ! X =	363.1563,	-355.1691,	305,	0.000! !END!
592 ! X =	363.1453,	-354.9200,	304,	0.000! !END!
593 ! X =	363.1343,	-354.6708,	299,	0.000! !END!
594 ! X =	363.1233,	-354.4217,	277,	0.000! !END!
595 ! X =	363.6242,	-360.1416,	391,	0.000! !END!
596 ! X =	363.6132,	-359.8924,	356,	0.000! !END!
597 ! X =	363.6022,	-359.6432,	335,	0.000! !END!
598 ! X =	363.5912,	-359.3941,	311,	0.000! !END!
599 ! X =	363.5802,	-359.1449,	342,	0.000! !END!
600 ! X =	363.5692,	-358.8957,	380,	0.000! !END!
601 ! X =	363.5582,	-358.6465,	389,	0.000! !END!
602 ! X =	363.5472,	-358.3974,	396,	0.000! !END!
603 ! X =	363.5362,	-358.1482,	369,	0.000! !END!
604 ! X =	363.5252,	-357.8990,	341,	0.000! !END!
605 ! X =	363.5143,	-357.6499,	359,	0.000! !END!
606 ! X =	363.5033,	-357.4007,	365,	0.000! !END!
607 ! X =	363.4923,	-357.1515,	365,	0.000! !END!
608 ! X =	363.4813,	-356.9024,	365,	0.000! !END!
609 ! X =	363.4703,	-356.6532,	365,	0.000! !END!
610 ! X =	363.4593,	-356.4040,	365,	0.000! !END!

611 ! X =	363.4483,	-356.1549,	365,	0.000!	!END!
612 ! X =	363.4373,	-355.9057,	342,	0.000!	!END!
613 ! X =	363.4263,	-355.6565,	325,	0.000!	!END!
614 ! X =	363.4154,	-355.4074,	309,	0.000!	!END!
615 ! X =	363.4044,	-355.1582,	304,	0.000!	!END!
616 ! X =	363.3934,	-354.9090,	297,	0.000!	!END!
617 ! X =	363.3824,	-354.6599,	282,	0.000!	!END!
618 ! X =	363.3714,	-354.4107,	274,	0.000!	!END!
619 ! X =	363.8722,	-360.1306,	391,	0.000!	!END!
620 ! X =	363.8612,	-359.8815,	350,	0.000!	!END!
621 ! X =	363.8503,	-359.6323,	337,	0.000!	!END!
622 ! X =	363.8393,	-359.3831,	313,	0.000!	!END!
623 ! X =	363.8283,	-359.1339,	335,	0.000!	!END!
624 ! X =	363.8173,	-358.8848,	396,	0.000!	!END!
625 ! X =	363.8063,	-358.6356,	396,	0.000!	!END!
626 ! X =	363.7953,	-358.3864,	396,	0.000!	!END!
627 ! X =	363.7843,	-358.1373,	386,	0.000!	!END!
628 ! X =	363.7733,	-357.8881,	360,	0.000!	!END!
629 ! X =	363.7623,	-357.6389,	365,	0.000!	!END!
630 ! X =	363.7513,	-357.3898,	365,	0.000!	!END!
631 ! X =	363.7404,	-357.1406,	365,	0.000!	!END!
632 ! X =	363.7294,	-356.8914,	365,	0.000!	!END!
633 ! X =	363.7184,	-356.6423,	351,	0.000!	!END!
634 ! X =	363.7074,	-356.3931,	350,	0.000!	!END!
635 ! X =	363.6964,	-356.1439,	335,	0.000!	!END!
636 ! X =	363.6854,	-355.8948,	322,	0.000!	!END!
637 ! X =	363.6744,	-355.6456,	310,	0.000!	!END!
638 ! X =	363.6634,	-355.3964,	305,	0.000!	!END!
639 ! X =	363.6524,	-355.1473,	291,	0.000!	!END!
640 ! X =	363.6414,	-354.8981,	276,	0.000!	!END!
641 ! X =	363.6305,	-354.6489,	274,	0.000!	!END!
642 ! X =	363.6195,	-354.3998,	274,	0.000!	!END!
643 ! X =	363.6085,	-354.1506,	268,	0.000!	!END!
644 ! X =	364.1203,	-360.1197,	380,	0.000!	!END!
645 ! X =	364.1093,	-359.8705,	396,	0.000!	!END!
646 ! X =	364.0983,	-359.6213,	370,	0.000!	!END!
647 ! X =	364.0874,	-359.3722,	332,	0.000!	!END!
648 ! X =	364.0764,	-359.1230,	356,	0.000!	!END!
649 ! X =	364.0654,	-358.8738,	372,	0.000!	!END!
650 ! X =	364.0544,	-358.6247,	396,	0.000!	!END!
651 ! X =	364.0434,	-358.3755,	396,	0.000!	!END!
652 ! X =	364.0324,	-358.1263,	384,	0.000!	!END!
653 ! X =	364.0214,	-357.8772,	365,	0.000!	!END!
654 ! X =	364.0104,	-357.6280,	365,	0.000!	!END!
655 ! X =	363.9994,	-357.3788,	365,	0.000!	!END!
656 ! X =	363.9884,	-357.1296,	355,	0.000!	!END!
657 ! X =	363.9774,	-356.8805,	333,	0.000!	!END!
658 ! X =	363.9665,	-356.6313,	327,	0.000!	!END!
659 ! X =	363.9555,	-356.3821,	335,	0.000!	!END!
660 ! X =	363.9445,	-356.1330,	313,	0.000!	!END!
661 ! X =	363.9335,	-355.8838,	304,	0.000!	!END!
662 ! X =	363.9225,	-355.6347,	304,	0.000!	!END!
663 ! X =	363.9115,	-355.3855,	304,	0.000!	!END!
664 ! X =	363.9005,	-355.1363,	284,	0.000!	!END!
665 ! X =	363.8895,	-354.8872,	274,	0.000!	!END!
666 ! X =	363.8785,	-354.6380,	274,	0.000!	!END!

667 ! X =	363.8675,	-354.3888,	267,	0.000!	!END!
668 ! X =	364.3464,	-359.6104,	372,	0.000!	!END!
669 ! X =	364.3354,	-359.3612,	335,	0.000!	!END!
670 ! X =	364.3244,	-359.1121,	365,	0.000!	!END!
671 ! X =	364.3135,	-358.8629,	396,	0.000!	!END!
672 ! X =	364.3025,	-358.6137,	396,	0.000!	!END!
673 ! X =	364.2915,	-358.3646,	396,	0.000!	!END!
674 ! X =	364.2805,	-358.1154,	373,	0.000!	!END!
675 ! X =	364.2695,	-357.8662,	366,	0.000!	!END!
676 ! X =	364.2585,	-357.6170,	365,	0.000!	!END!
677 ! X =	364.2475,	-357.3679,	365,	0.000!	!END!
678 ! X =	364.2365,	-357.1187,	341,	0.000!	!END!
679 ! X =	364.2255,	-356.8695,	335,	0.000!	!END!
680 ! X =	364.2145,	-356.6204,	307,	0.000!	!END!
681 ! X =	364.2035,	-356.3712,	309,	0.000!	!END!
682 ! X =	364.1926,	-356.1220,	305,	0.000!	!END!
683 ! X =	364.1816,	-355.8729,	300,	0.000!	!END!
684 ! X =	364.1706,	-355.6237,	280,	0.000!	!END!
685 ! X =	364.1596,	-355.3745,	292,	0.000!	!END!
686 ! X =	364.1486,	-355.1254,	294,	0.000!	!END!
687 ! X =	364.1376,	-354.8762,	291,	0.000!	!END!
688 ! X =	364.1266,	-354.6271,	281,	0.000!	!END!
689 ! X =	364.5945,	-359.5995,	366,	0.000!	!END!
690 ! X =	364.5835,	-359.3503,	344,	0.000!	!END!
691 ! X =	364.5725,	-359.1011,	365,	0.000!	!END!
692 ! X =	364.5615,	-358.8520,	396,	0.000!	!END!
693 ! X =	364.5505,	-358.6028,	396,	0.000!	!END!
694 ! X =	364.5396,	-358.3536,	396,	0.000!	!END!
695 ! X =	364.5286,	-358.1044,	391,	0.000!	!END!
696 ! X =	364.5176,	-357.8553,	372,	0.000!	!END!
697 ! X =	364.5066,	-357.6061,	365,	0.000!	!END!
698 ! X =	364.4956,	-357.3569,	360,	0.000!	!END!
699 ! X =	364.4846,	-357.1078,	332,	0.000!	!END!
700 ! X =	364.4736,	-356.8586,	320,	0.000!	!END!
701 ! X =	364.4626,	-356.6094,	335,	0.000!	!END!
702 ! X =	364.4516,	-356.3603,	335,	0.000!	!END!
703 ! X =	364.4406,	-356.1111,	311,	0.000!	!END!
704 ! X =	364.4296,	-355.8619,	302,	0.000!	!END!
705 ! X =	364.4187,	-355.6128,	297,	0.000!	!END!
706 ! X =	364.4077,	-355.3636,	304,	0.000!	!END!
707 ! X =	364.3967,	-355.1144,	304,	0.000!	!END!
708 ! X =	364.3857,	-354.8653,	304,	0.000!	!END!
709 ! X =	364.3747,	-354.6161,	304,	0.000!	!END!
710 ! X =	364.8426,	-359.5885,	390,	0.000!	!END!
711 ! X =	364.8316,	-359.3394,	379,	0.000!	!END!
712 ! X =	364.8206,	-359.0902,	353,	0.000!	!END!
713 ! X =	364.8096,	-358.8410,	386,	0.000!	!END!
714 ! X =	364.7986,	-358.5918,	402,	0.000!	!END!
715 ! X =	364.7876,	-358.3427,	397,	0.000!	!END!
716 ! X =	364.7766,	-358.0935,	396,	0.000!	!END!
717 ! X =	364.7657,	-357.8443,	384,	0.000!	!END!
718 ! X =	364.7547,	-357.5952,	356,	0.000!	!END!
719 ! X =	364.7437,	-357.3460,	355,	0.000!	!END!
720 ! X =	364.7327,	-357.0968,	363,	0.000!	!END!
721 ! X =	364.7217,	-356.8477,	365,	0.000!	!END!
722 ! X =	364.7107,	-356.5985,	357,	0.000!	!END!

723 ! X =	364.6997,	-356.3493,	335,	0.000!	!END!
724 ! X =	364.6887,	-356.1002,	318,	0.000!	!END!
725 ! X =	364.6777,	-355.8510,	304,	0.000!	!END!
726 ! X =	364.6667,	-355.6018,	304,	0.000!	!END!
727 ! X =	364.6557,	-355.3527,	304,	0.000!	!END!
728 ! X =	364.6447,	-355.1035,	304,	0.000!	!END!
729 ! X =	364.6338,	-354.8543,	304,	0.000!	!END!
730 ! X =	364.6228,	-354.6052,	304,	0.000!	!END!
731 ! X =	365.0467,	-358.5809,	402,	0.000!	!END!
732 ! X =	365.0357,	-358.3317,	396,	0.000!	!END!
733 ! X =	365.0247,	-358.0826,	396,	0.000!	!END!
734 ! X =	365.0137,	-357.8334,	386,	0.000!	!END!
735 ! X =	365.0027,	-357.5842,	357,	0.000!	!END!
736 ! X =	364.9918,	-357.3351,	381,	0.000!	!END!
737 ! X =	364.9808,	-357.0859,	370,	0.000!	!END!
738 ! X =	364.9698,	-356.8367,	365,	0.000!	!END!
739 ! X =	364.9588,	-356.5876,	354,	0.000!	!END!
740 ! X =	364.9478,	-356.3384,	320,	0.000!	!END!
741 ! X =	364.9368,	-356.0892,	306,	0.000!	!END!
742 ! X =	364.9258,	-355.8401,	304,	0.000!	!END!
743 ! X =	364.9148,	-355.5909,	306,	0.000!	!END!
744 ! X =	364.9038,	-355.3417,	305,	0.000!	!END!
745 ! X =	364.8928,	-355.0926,	304,	0.000!	!END!
746 ! X =	364.8818,	-354.8434,	304,	0.000!	!END!
747 ! X =	364.8708,	-354.5942,	304,	0.000!	!END!
748 ! X =	365.2948,	-358.5700,	396,	0.000!	!END!
749 ! X =	365.2838,	-358.3208,	396,	0.000!	!END!
750 ! X =	365.2728,	-358.0716,	396,	0.000!	!END!
751 ! X =	365.2618,	-357.8224,	372,	0.000!	!END!
752 ! X =	365.2508,	-357.5733,	355,	0.000!	!END!
753 ! X =	365.2398,	-357.3241,	389,	0.000!	!END!
754 ! X =	365.2288,	-357.0749,	389,	0.000!	!END!
755 ! X =	365.2178,	-356.8258,	347,	0.000!	!END!
756 ! X =	365.2069,	-356.5766,	340,	0.000!	!END!
757 ! X =	365.1959,	-356.3274,	331,	0.000!	!END!
758 ! X =	365.1849,	-356.0783,	308,	0.000!	!END!
759 ! X =	365.1739,	-355.8291,	320,	0.000!	!END!
760 ! X =	365.1629,	-355.5799,	335,	0.000!	!END!
761 ! X =	365.1519,	-355.3308,	316,	0.000!	!END!
762 ! X =	365.1409,	-355.0816,	304,	0.000!	!END!
763 ! X =	365.5099,	-357.8115,	372,	0.000!	!END!
764 ! X =	365.4989,	-357.5623,	396,	0.000!	!END!
765 ! X =	365.4879,	-357.3132,	372,	0.000!	!END!
766 ! X =	365.4769,	-357.0640,	365,	0.000!	!END!
767 ! X =	365.4659,	-356.8148,	365,	0.000!	!END!
768 ! X =	365.4549,	-356.5657,	365,	0.000!	!END!
769 ! X =	365.4439,	-356.3165,	338,	0.000!	!END!
770 ! X =	365.4329,	-356.0673,	314,	0.000!	!END!
771 ! X =	365.4220,	-355.8182,	321,	0.000!	!END!
772 ! X =	365.4110,	-355.5690,	335,	0.000!	!END!
773 ! X =	365.4000,	-355.3198,	335,	0.000!	!END!
774 ! X =	365.3890,	-355.0707,	292,	0.000!	!END!
775 ! X =	365.7470,	-357.5514,	396,	0.000!	!END!
776 ! X =	365.7360,	-357.3022,	386,	0.000!	!END!
777 ! X =	365.7250,	-357.0531,	365,	0.000!	!END!
778 ! X =	365.7140,	-356.8039,	365,	0.000!	!END!

779 ! X =	365.7030,	-356.5547,	365,	0.000!	!END!
780 ! X =	365.6920,	-356.3056,	338,	0.000!	!END!
781 ! X =	365.6810,	-356.0564,	310,	0.000!	!END!
782 ! X =	365.6700,	-355.8072,	312,	0.000!	!END!
783 ! X =	365.6590,	-355.5581,	318,	0.000!	!END!
784 ! X =	365.6480,	-355.3089,	307,	0.000!	!END!
785 ! X =	365.6371,	-355.0597,	275,	0.000!	!END!
786 ! X =	365.9731,	-357.0421,	365,	0.000!	!END!
787 ! X =	365.9621,	-356.7929,	343,	0.000!	!END!
788 ! X =	365.9511,	-356.5438,	341,	0.000!	!END!
789 ! X =	365.9181,	-355.7963,	274,	0.000!	!END!
790 ! X =	358.1317,	-357.5676,	274,	0.000!	!END!
791 ! X =	358.3351,	-357.5586,	274,	0.000!	!END!
792 ! X =	358.5386,	-357.5496,	274,	0.000!	!END!
793 ! X =	358.5523,	-357.7488,	265,	0.000!	!END!
794 ! X =	358.5661,	-357.9479,	244,	0.000!	!END!
795 ! X =	358.5701,	-358.1524,	276,	0.000!	!END!
796 ! X =	358.5741,	-358.3570,	295,	0.000!	!END!
797 ! X =	358.5831,	-358.5613,	308,	0.000!	!END!
798 ! X =	358.5922,	-358.7656,	322,	0.000!	!END!
799 ! X =	358.3911,	-358.7715,	302,	0.000!	!END!
800 ! X =	358.1900,	-358.7783,	284,	0.000!	!END!
801 ! X =	357.9890,	-358.7852,	276,	0.000!	!END!
802 ! X =	357.7879,	-358.7910,	274,	0.000!	!END!
803 ! X =	357.5942,	-358.7946,	274,	0.000!	!END!
804 ! X =	357.4005,	-358.7981,	274,	0.000!	!END!
805 ! X =	357.4078,	-359.0205,	259,	0.000!	!END!
806 ! X =	357.4151,	-359.2419,	274,	0.000!	!END!
807 ! X =	357.4224,	-359.4642,	274,	0.000!	!END!
808 ! X =	357.4296,	-359.6856,	274,	0.000!	!END!
809 ! X =	357.4317,	-359.8453,	271,	0.000!	!END!
810 ! X =	357.4338,	-360.0050,	256,	0.000!	!END!
811 ! X =	357.4335,	-360.2247,	274,	0.000!	!END!
812 ! X =	357.6273,	-360.3360,	274,	0.000!	!END!
813 ! X =	357.8392,	-360.4066,	274,	0.000!	!END!
814 ! X =	358.0379,	-360.4028,	274,	0.000!	!END!
815 ! X =	358.2366,	-360.3990,	271,	0.000!	!END!
816 ! X =	358.2429,	-360.5985,	251,	0.000!	!END!
817 ! X =	358.2492,	-360.7979,	259,	0.000!	!END!
818 ! X =	358.2555,	-360.9974,	272,	0.000!	!END!
819 ! X =	358.2618,	-361.1968,	271,	0.000!	!END!
820 ! X =	358.0733,	-361.2051,	243,	0.000!	!END!
821 ! X =	358.0527,	-361.4158,	274,	0.000!	!END!
822 ! X =	358.0214,	-361.6069,	274,	0.000!	!END!
823 ! X =	358.2400,	-361.6042,	295,	0.000!	!END!
824 ! X =	358.4586,	-361.6006,	304,	0.000!	!END!
825 ! X =	358.6772,	-361.5980,	304,	0.000!	!END!
826 ! X =	358.8782,	-361.5911,	304,	0.000!	!END!
827 ! X =	359.0793,	-361.5852,	304,	0.000!	!END!
828 ! X =	359.2804,	-361.5794,	304,	0.000!	!END!
829 ! X =	359.4815,	-361.5725,	304,	0.000!	!END!
830 ! X =	359.4855,	-361.7770,	294,	0.000!	!END!
831 ! X =	359.4895,	-361.9816,	280,	0.000!	!END!
832 ! X =	359.4931,	-362.0613,	284,	0.000!	!END!
833 ! X =	359.6027,	-362.0665,	298,	0.000!	!END!
834 ! X =	359.7714,	-362.0590,	308,	0.000!	!END!

835 ! X =	359.9107,	-362.0629,	322,	0.000! !END!
836 ! X =	360.0699,	-362.0659,	335,	0.000! !END!
837 ! X =	360.1967,	-362.0103,	335,	0.000! !END!
838 ! X =	360.3158,	-362.0051,	335,	0.000! !END!
839 ! X =	360.3650,	-361.9929,	335,	0.000! !END!
840 ! X =	360.4638,	-361.9786,	335,	0.000! !END!
841 ! X =	360.5337,	-361.9855,	335,	0.000! !END!
842 ! X =	360.5954,	-362.0327,	335,	0.000! !END!
843 ! X =	360.6567,	-362.0699,	335,	0.000! !END!
844 ! X =	360.7496,	-362.1457,	344,	0.000! !END!
845 ! X =	360.8506,	-362.1812,	362,	0.000! !END!
846 ! X =	360.9300,	-362.1777,	365,	0.000! !END!
847 ! X =	361.0464,	-362.1127,	365,	0.000! !END!
848 ! X =	361.1534,	-362.0580,	365,	0.000! !END!
849 ! X =	361.2224,	-362.0450,	365,	0.000! !END!
850 ! X =	361.3712,	-362.0385,	365,	0.000! !END!
851 ! X =	361.5119,	-362.0722,	365,	0.000! !END!
852 ! X =	361.5948,	-362.1484,	365,	0.000! !END!
853 ! X =	361.6656,	-362.1753,	365,	0.000! !END!
854 ! X =	361.7713,	-362.0907,	365,	0.000! !END!
855 ! X =	361.8544,	-361.9472,	365,	0.000! !END!
856 ! X =	361.8807,	-361.8662,	366,	0.000! !END!
857 ! X =	361.9764,	-361.7821,	372,	0.000! !END!
858 ! X =	362.0527,	-361.7088,	372,	0.000! !END!
859 ! X =	362.1070,	-361.5866,	385,	0.000! !END!
860 ! X =	362.1332,	-361.5055,	386,	0.000! !END!
861 ! X =	361.8946,	-361.5061,	396,	0.000! !END!
862 ! X =	361.8882,	-361.3036,	396,	0.000! !END!
863 ! X =	361.8818,	-361.1022,	396,	0.000! !END!
864 ! X =	361.8754,	-360.9007,	396,	0.000! !END!
865 ! X =	361.8690,	-360.6983,	370,	0.000! !END!
866 ! X =	361.6678,	-360.7022,	367,	0.000! !END!
867 ! X =	361.4666,	-360.7061,	396,	0.000! !END!
868 ! X =	361.2654,	-360.7099,	396,	0.000! !END!
869 ! X =	361.0643,	-360.7138,	396,	0.000! !END!
870 ! X =	361.0577,	-360.5094,	377,	0.000! !END!
871 ! X =	361.0512,	-360.3049,	366,	0.000! !END!
872 ! X =	361.0447,	-360.1005,	337,	0.000! !END!
873 ! X =	361.0382,	-359.8961,	335,	0.000! !END!
874 ! X =	361.2682,	-359.8949,	333,	0.000! !END!
875 ! X =	361.4983,	-359.8928,	343,	0.000! !END!
876 ! X =	361.7283,	-359.8916,	350,	0.000! !END!
877 ! X =	361.9583,	-359.8895,	337,	0.000! !END!
878 ! X =	362.1883,	-359.8883,	344,	0.000! !END!
879 ! X =	362.4184,	-359.8862,	343,	0.000! !END!
880 ! X =	362.6484,	-359.8850,	335,	0.000! !END!
881 ! X =	362.6574,	-360.0893,	344,	0.000! !END!
882 ! X =	362.6664,	-360.2937,	356,	0.000! !END!
883 ! X =	362.8601,	-360.2901,	361,	0.000! !END!
884 ! X =	363.0539,	-360.2866,	365,	0.000! !END!
885 ! X =	363.0622,	-360.4759,	376,	0.000! !END!
886 ! X =	362.8638,	-360.4847,	350,	0.000! !END!
887 ! X =	362.6653,	-360.4934,	365,	0.000! !END!
888 ! X =	362.6741,	-360.6928,	364,	0.000! !END!
889 ! X =	362.8661,	-360.6873,	375,	0.000! !END!
890 ! X =	363.0581,	-360.6828,	391,	0.000! !END!

891 ! X = 363.2501, -360.6774, 393, 0.000! !END!
892 ! X = 363.3535, -360.5430, 396, 0.000! !END!
893 ! X = 363.4497, -360.4688, 396, 0.000! !END!
894 ! X = 363.5480, -360.4445, 396, 0.000! !END!
895 ! X = 363.6041, -360.3622, 396, 0.000! !END!
896 ! X = 363.6407, -360.2906, 396, 0.000! !END!
897 ! X = 363.7787, -360.2646, 395, 0.000! !END!
898 ! X = 363.8577, -360.2511, 395, 0.000! !END!
899 ! X = 364.0712, -360.2467, 395, 0.000! !END!
900 ! X = 364.2650, -360.2431, 396, 0.000! !END!
901 ! X = 364.2560, -360.0388, 396, 0.000! !END!
902 ! X = 364.2469, -359.8345, 396, 0.000! !END!
903 ! X = 364.4206, -359.8268, 396, 0.000! !END!
904 ! X = 364.5943, -359.8192, 395, 0.000! !END!
905 ! X = 364.7880, -359.8156, 395, 0.000! !END!
906 ! X = 364.9817, -359.8121, 395, 0.000! !END!
907 ! X = 365.0512, -359.8090, 395, 0.000! !END!
908 ! X = 365.0465, -359.5675, 396, 0.000! !END!
909 ! X = 365.0418, -359.3261, 396, 0.000! !END!
910 ! X = 365.0371, -359.0846, 365, 0.000! !END!
911 ! X = 365.0324, -358.8432, 389, 0.000! !END!
912 ! X = 365.0277, -358.6017, 402, 0.000! !END!
913 ! X = 365.2312, -358.5927, 396, 0.000! !END!
914 ! X = 365.4346, -358.5838, 396, 0.000! !END!
915 ! X = 365.4208, -358.3846, 396, 0.000! !END!
916 ! X = 365.4071, -358.1855, 396, 0.000! !END!
917 ! X = 365.2632, -358.1919, 396, 0.000! !END!
918 ! X = 365.1193, -358.1982, 396, 0.000! !END!
919 ! X = 365.1059, -358.1189, 396, 0.000! !END!
920 ! X = 365.2746, -358.1115, 396, 0.000! !END!
921 ! X = 365.3259, -358.1492, 396, 0.000! !END!
922 ! X = 365.4605, -358.0434, 390, 0.000! !END!
923 ! X = 365.5730, -357.8886, 372, 0.000! !END!
924 ! X = 365.6182, -357.7868, 380, 0.000! !END!
925 ! X = 365.6625, -357.6650, 396, 0.000! !END!
926 ! X = 365.7871, -357.5596, 396, 0.000! !END!
927 ! X = 365.9117, -357.4543, 396, 0.000! !END!
928 ! X = 365.9448, -357.3030, 370, 0.000! !END!
929 ! X = 366.0315, -357.2393, 365, 0.000! !END!
930 ! X = 366.1903, -357.2323, 365, 0.000! !END!
931 ! X = 366.1832, -356.9959, 365, 0.000! !END!
932 ! X = 366.1761, -356.7605, 330, 0.000! !END!
933 ! X = 366.1690, -356.5242, 331, 0.000! !END!
934 ! X = 366.0100, -356.5262, 337, 0.000! !END!
935 ! X = 365.8510, -356.5282, 348, 0.000! !END!
936 ! X = 365.7617, -356.5322, 359, 0.000! !END!
937 ! X = 365.7566, -356.3427, 342, 0.000! !END!
938 ! X = 365.7516, -356.1531, 321, 0.000! !END!
939 ! X = 365.7465, -355.9636, 305, 0.000! !END!
940 ! X = 365.8237, -355.9103, 292, 0.000! !END!
941 ! X = 365.9768, -355.7737, 273, 0.000! !END!
942 ! X = 365.8180, -355.7807, 286, 0.000! !END!
943 ! X = 365.7386, -355.7842, 305, 0.000! !END!
944 ! X = 365.7335, -355.5548, 297, 0.000! !END!
945 ! X = 365.7283, -355.3253, 286, 0.000! !END!
946 ! X = 365.7978, -355.3223, 272, 0.000! !END!

947 ! X =	365.8007,	-355.1624,	271,	0.000!	!END!
948 ! X =	365.7264,	-355.0558,	272,	0.000!	!END!
949 ! X =	365.7224,	-354.9661,	274,	0.000!	!END!
950 ! X =	365.5238,	-354.9719,	278,	0.000!	!END!
951 ! X =	365.3253,	-354.9786,	280,	0.000!	!END!
952 ! X =	365.1267,	-354.9854,	304,	0.000!	!END!
953 ! X =	364.9281,	-354.9911,	304,	0.000!	!END!
954 ! X =	364.9241,	-354.7866,	304,	0.000!	!END!
955 ! X =	364.9200,	-354.5821,	304,	0.000!	!END!
956 ! X =	364.7165,	-354.5891,	304,	0.000!	!END!
957 ! X =	364.5130,	-354.5950,	304,	0.000!	!END!
958 ! X =	364.3094,	-354.6010,	304,	0.000!	!END!
959 ! X =	364.1059,	-354.6080,	281,	0.000!	!END!
960 ! X =	364.0989,	-354.4485,	273,	0.000!	!END!
961 ! X =	364.0918,	-354.2891,	270,	0.000!	!END!
962 ! X =	363.9611,	-354.2549,	267,	0.000!	!END!
963 ! X =	363.8091,	-354.1917,	268,	0.000!	!END!
964 ! X =	363.6779,	-354.1476,	268,	0.000!	!END!
965 ! X =	363.5882,	-354.1415,	268,	0.000!	!END!
966 ! X =	363.5377,	-354.1238,	274,	0.000!	!END!
967 ! X =	363.4777,	-354.1164,	269,	0.000!	!END!
968 ! X =	363.4821,	-354.2161,	274,	0.000!	!END!
969 ! X =	363.3134,	-354.2235,	274,	0.000!	!END!
970 ! X =	363.1447,	-354.2310,	274,	0.000!	!END!
971 ! X =	362.9760,	-354.2384,	274,	0.000!	!END!
972 ! X =	362.7442,	-354.2416,	259,	0.000!	!END!
973 ! X =	362.5124,	-354.2459,	256,	0.000!	!END!
974 ! X =	362.2806,	-354.2491,	256,	0.000!	!END!
975 ! X =	362.2755,	-354.3592,	265,	0.000!	!END!
976 ! X =	362.3886,	-354.4441,	265,	0.000!	!END!
977 ! X =	362.4724,	-354.5402,	274,	0.000!	!END!
978 ! X =	362.5566,	-354.6464,	276,	0.000!	!END!
979 ! X =	362.5070,	-354.6486,	276,	0.000!	!END!
980 ! X =	362.2786,	-354.6546,	279,	0.000!	!END!
981 ! X =	362.0501,	-354.6597,	304,	0.000!	!END!
982 ! X =	361.8217,	-354.6658,	304,	0.000!	!END!
983 ! X =	361.5933,	-354.6719,	304,	0.000!	!END!
984 ! X =	361.3648,	-354.6769,	294,	0.000!	!END!
985 ! X =	361.1364,	-354.6830,	304,	0.000!	!END!
986 ! X =	360.9080,	-354.6891,	304,	0.000!	!END!
987 ! X =	360.9170,	-354.8934,	287,	0.000!	!END!
988 ! X =	360.9260,	-355.0977,	304,	0.000!	!END!
989 ! X =	360.9296,	-355.2923,	318,	0.000!	!END!
990 ! X =	360.9333,	-355.4868,	335,	0.000!	!END!
991 ! X =	360.7296,	-355.4908,	326,	0.000!	!END!
992 ! X =	360.5260,	-355.4948,	309,	0.000!	!END!
993 ! X =	360.5174,	-355.3005,	305,	0.000!	!END!
994 ! X =	360.5088,	-355.1061,	304,	0.000!	!END!
995 ! X =	360.3151,	-355.1097,	301,	0.000!	!END!
996 ! X =	360.1214,	-355.1132,	281,	0.000!	!END!
997 ! X =	359.9277,	-355.1168,	304,	0.000!	!END!
998 ! X =	359.7340,	-355.1203,	304,	0.000!	!END!
999 ! X =	359.5303,	-355.1243,	288,	0.000!	!END!
1000 ! X =	359.3267,	-355.1283,	278,	0.000!	!END!
1001 ! X =	359.3179,	-354.9289,	274,	0.000!	!END!
1002 ! X =	359.3091,	-354.7296,	265,	0.000!	!END!

1003 ! X =	359.0989,	-354.7369,	263,	0.000!	!END!
1004 ! X =	358.8889,	-354.7451,	268,	0.000!	!END!
1005 ! X =	358.6788,	-354.7524,	274,	0.000!	!END!
1006 ! X =	358.4686,	-354.7596,	274,	0.000!	!END!
1007 ! X =	358.2586,	-354.7679,	274,	0.000!	!END!
1008 ! X =	358.0484,	-354.7752,	245,	0.000!	!END!
1009 ! X =	357.9410,	-354.8198,	236,	0.000!	!END!
1010 ! X =	357.8237,	-354.8650,	243,	0.000!	!END!
1011 ! X =	357.7168,	-354.9196,	240,	0.000!	!END!
1012 ! X =	357.7175,	-355.0494,	270,	0.000!	!END!
1013 ! X =	357.7182,	-355.1792,	274,	0.000!	!END!
1014 ! X =	357.5123,	-355.1862,	256,	0.000!	!END!
1015 ! X =	357.3062,	-355.1923,	248,	0.000!	!END!
1016 ! X =	357.1002,	-355.1984,	245,	0.000!	!END!
1017 ! X =	356.8942,	-355.2055,	274,	0.000!	!END!
1018 ! X =	356.8924,	-355.3903,	274,	0.000!	!END!
1019 ! X =	356.8906,	-355.5751,	267,	0.000!	!END!
1020 ! X =	357.0918,	-355.5732,	274,	0.000!	!END!
1021 ! X =	357.2931,	-355.5724,	280,	0.000!	!END!
1022 ! X =	357.4944,	-355.5715,	285,	0.000!	!END!
1023 ! X =	357.6957,	-355.5696,	284,	0.000!	!END!
1024 ! X =	357.6945,	-355.7694,	299,	0.000!	!END!
1025 ! X =	357.6934,	-355.9691,	304,	0.000!	!END!
1026 ! X =	357.4898,	-355.9731,	304,	0.000!	!END!
1027 ! X =	357.2861,	-355.9771,	301,	0.000!	!END!
1028 ! X =	357.2850,	-356.1769,	287,	0.000!	!END!
1029 ! X =	357.2838,	-356.3766,	265,	0.000!	!END!
1030 ! X =	357.2827,	-356.5764,	261,	0.000!	!END!
1031 ! X =	357.2816,	-356.7762,	280,	0.000!	!END!
1032 ! X =	357.0804,	-356.7801,	261,	0.000!	!END!
1033 ! X =	356.8792,	-356.7839,	236,	0.000!	!END!
1034 ! X =	356.6781,	-356.7878,	239,	0.000!	!END!
1035 ! X =	356.4769,	-356.7917,	246,	0.000!	!END!
1036 ! X =	356.4882,	-356.9929,	235,	0.000!	!END!
1037 ! X =	356.4996,	-357.1951,	274,	0.000!	!END!
1038 ! X =	356.5110,	-357.3963,	274,	0.000!	!END!
1039 ! X =	356.5224,	-357.5985,	274,	0.000!	!END!
1040 ! X =	356.7291,	-357.5954,	280,	0.000!	!END!
1041 ! X =	356.9357,	-357.5923,	304,	0.000!	!END!
1042 ! X =	357.1424,	-357.5892,	304,	0.000!	!END!
1043 ! X =	357.3491,	-357.5861,	304,	0.000!	!END!
1044 ! X =	357.5557,	-357.5830,	293,	0.000!	!END!
1045 ! X =	357.7343,	-357.5751,	275,	0.000!	!END!
1046 ! X =	357.9330,	-357.5713,	277,	0.000!	!END!

----

a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
EGUs BART CLASS I ANALYSIS (HERCULES)
MDNR RUNS (PM ONLY, NO SO2 or NOx)
CENRAP - 6KM CALMET CENTRAL METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =            *
   or
ISCMET.DAT    input    * ISCDAT =            *
   or
PLMMET.DAT    input    * PLMDAT =            *
   or
PROFILE.DAT   input    * PRFDAT =            *
SURFACE.DAT   input    * SFCDAT =            *
RESTARTB.DAT  input    * RSTARTB=            *
-------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =EGUHG2001Q2.LST     !
CONC.DAT      output   ! CONDAT =EGUHG2001Q2.CON     !
DFLX.DAT      output   ! DFDAT  =EGUHG2001Q2.DRY     !
WFLX.DAT      output   ! WFDAT  =EGUHG2001Q2.WET     !

VISB.DAT      output   ! VISDAT =EGUHG2001Q2.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2001.DAT     !
-------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =            *
VOLEMARB.DAT  input    * VOLDAT =            *
BAEMARB.DAT   input    * ARDAT  =            *
LNEMARB.DAT   input    * LNDAT  =            *
-------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =            *
VD.DAT        input    * VDDAT  =            *
CHEM.DAT      input    * CHEMDAT=            *
H2O2.DAT      input    * H2O2DAT=            *
HILL.DAT      input    * HILDAT=             *
HILLRCT.DAT   input    * RCTDAT=             *
COASTLN.DAT   input    * CSTDAT=             *
FLUXBDY.DAT   input    * BDYDAT=             *
BCON.DAT      input    * BCNDAT=             *
DEBUG.DAT     output   * DEBUG =             *
MASSFLX.DAT   output   * FLXDAT=             *
MASSBAL.DAT   output   * BALDAT=             *
FOG.DAT       output   * FOGDAT=             *
-------------------------------------------------------------------------------
```

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
T = lower case ! LCFILES = T !
F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length

Provision for multiple input files

Number of CALMET.DAT files for run (NMETDAT)
Default: 1 ! NMETDAT = 10 !

Number of PTEMARB.DAT files for run (NPTDAT)
Default: 0 ! NPTDAT = 0 !

Number of BAEMARB.DAT files for run (NARDAT)
Default: 0 ! NARDAT = 0 !

Number of VOLEMARB.DAT files for run (NVOLDAT)
Default: 0 ! NVOLDAT = 0 !

!END!

Subgroup (0a)

The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

```
Default Name  Type          File Name
------------  ----          ---------
none          input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0101-0110.central.dat *
*END*
none          input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0111-0120.central.dat *
*END*
none          input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0121-0131.central.dat *
*END*
none          input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0201-0210.central.dat *
*END*
none          input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0211-0220.central.dat *
*END*
none          input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0221-0228.central.dat *
*END*
none          input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0301-0310.central.dat *
*END*
none          input    *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0311-0320.central.dat *
*END*
none          input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0321-0331.central.dat !   !END!
none          input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0401-0410.central.dat !   !END!
none          input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0411-0420.central.dat !   !END!
none          input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0421-0430.central.dat !   !END!
none          input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0501-0510.central.dat !   !END!
none          input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0511-0520.central.dat !   !END!
none          input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0521-0531.central.dat !   !END!
none          input    !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0601-0610.central.dat !   !END!
```

none input !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0611-0620.central.dat ! !END!
none input !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0621-0630.central.dat ! !END!
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0701-0710.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0711-0720.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0721-0731.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0801-0810.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0811-0820.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0821-0831.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0901-0910.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0911-0920.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0921-0930.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1001-1010.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1011-1020.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1021-1031.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1101-1110.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1111-1120.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1121-1130.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1201-1210.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1211-1220.central.dat *
END
none input *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1221-1231.central.dat *
END

INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file (METRUN) Default: 0 ! METRUN = 0 !

METRUN = 0 - Run period explicitly defined below
METRUN = 1 - Run all periods in met. file

Starting date: Year (IBYR) -- No default ! IBYR = 2001 !
(used only if Month (IBMO) -- No default ! IBMO = 03 !
METRUN = 0) Day (IBDY) -- No default ! IBDY = 28 !
Hour (IBHR) -- No default ! IBHR = 0 !

Base time zone   (XBTZ) -- No default   ! XBTZ = 0.0 !
PST = 8., MST = 7.
CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default   ! IRLG = 2280 !

Number of chemical species (NSPEC)
Default: 5   ! NSPEC = 7   !

Number of chemical species
to be emitted (NSE)   Default: 3   ! NSE = 4   !

Flag to stop run after
SETUP phase (ITEST)   Default: 2   ! ITEST = 2   !
(Used to allow checking
of the model inputs, files, etc.)
ITEST = 1 - STOPS program after SETUP phase
ITEST = 2 - Continues with execution of program
after SETUP

Restart Configuration:

Control flag (MRESTART)   Default: 0   ! MRESTART = 0   !

0 = Do not read or write a restart file
1 = Read a restart file at the beginning of
the run
2 = Write a restart file during run
3 = Read a restart file at beginning of run
and write a restart file during run

Number of periods in Restart
output cycle (NRESPD)   Default: 0   ! NRESPD = 0   !

0 = File written only at last period
>0 = File updated every NRESPD periods

Meteorological Data Format (METFM)
Default: 1   ! METFM = 1   !

METFM = 1 - CALMET binary file (CALMET.MET)
METFM = 2 - ISC ASCII file (ISCMET.MET)
METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
surface parameters file (SURFACE.DAT)

Meteorological Profile Data Format (MPRFFM)
(used only for METFM = 1, 2, 3)
Default: 1   ! MPRFFM = 1   !

MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
Averaging Time (minutes) (AVET)
Default: 60.0   ! AVET = 60. !

```
    PG Averaging Time (minutes) (PGTIME)
                              Default: 60.0    ! PGTIME = 60. !


!END!


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


    Vertical distribution used in the
    near field (MGAUSS)               Default: 1     ! MGAUSS =  1   !
      0 = uniform
      1 = Gaussian

    Terrain adjustment method
    (MCTADJ)                          Default: 3     ! MCTADJ =  3   !
      0 = no adjustment
      1 = ISC-type of terrain adjustment
      2 = simple, CALPUFF-type of terrain
          adjustment
      3 = partial plume path adjustment

    Subgrid-scale complex terrain
    flag (MCTSG)                      Default: 0     ! MCTSG =  0   !
      0 = not modeled
      1 = modeled

    Near-field puffs modeled as
    elongated 0 (MSLUG)               Default: 0     ! MSLUG =  0   !
      0 = no
      1 = yes (slug model used)

    Transitional plume rise modeled ?
    (MTRANS)                          Default: 1     ! MTRANS =  1   !
      0 = no  (i.e., final rise only)
      1 = yes (i.e., transitional rise computed)

    Stack tip downwash? (MTIP)        Default: 1     ! MTIP =  1  !
      0 = no  (i.e., no stack tip downwash)
      1 = yes (i.e., use stack tip downwash)

    Method used to simulate building
    downwash? (MBDW)                  Default: 1     ! MBDW =   1  !
      1 = ISC method
      2 = PRIME method

    Vertical wind shear modeled above
    stack top? (MSHEAR)               Default: 0     ! MSHEAR =  0  !
      0 = no  (i.e., vertical wind shear not modeled)
      1 = yes (i.e., vertical wind shear modeled)

    Puff splitting allowed? (MSPLIT)  Default: 0     ! MSPLIT =  0  !
```

0 = no (i.e., puffs not split)
1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM)   Default: 1   ! MCHEM = 1 !
0 = chemical transformation not modeled
1 = transformation rates computed internally (MESOPUFF II scheme)
2 = user-specified transformation rates used
3 = transformation rates computed internally (RIVAD/ARM3 scheme)
4 = secondary organic aerosol formation computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3)   Default: 0   ! MAQCHEM = 0 !
0 = aqueous phase transformation not modeled
1 = transformation rates adjusted for aqueous phase reactions

Wet removal modeled ? (MWET)   Default: 1   ! MWET = 1 !
0 = no
1 = yes

Dry deposition modeled ? (MDRY)   Default: 1   ! MDRY = 1 !
0 = no
1 = yes
(dry deposition method specified for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP)   Default: 3   ! MDISP = 3 !

1 = dispersion coefficients computed from measured values of turbulence, sigma v, sigma w
2 = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas
4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.
5 = CTDM sigmas used for stable and neutral conditions. For unstable conditions, sigmas are computed as in MDISP = 3, described above. MDISP = 5 assumes that measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5)   Default: 3   ! MTURBVW = 3 !
1 = use sigma-v or sigma-theta measurements from PROFILE.DAT to compute sigma-y (valid for METFM = 1, 2, 3, 4)
2 = use sigma-w measurements

from PROFILE.DAT to compute sigma-z
(valid for METFM = 1, 2, 3, 4)
3 = use both sigma-(v/theta) and sigma-w
from PROFILE.DAT to compute sigma-y and sigma-z
(valid for METFM = 1, 2, 3, 4)
4 = use sigma-theta measurements
from PLMMET.DAT to compute sigma-y
(valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2) Default: 3 ! MDISP2 = 3 !
(used only if MDISP = 1 or 5)
2 = dispersion coefficients from internally calculated
sigma v, sigma w using micrometeorological variables
(u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using
the ISCST multi-segment approximation) and MP coefficients in
urban areas
4 = same as 3 except PG coefficients computed using
the MESOPUFF II eqns.

[DIAGNOSTIC FEATURE]
Method used for Lagrangian timescale for Sigma-y
(used only if MDISP=1,2 or MDISP2=1,2)
(MTAULY) Default: 0 ! MTAULY = 0 !
0 = Draxler default 617.284 (s)
1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
10 < Direct user input (s) -- e.g., 306.9

[DIAGNOSTIC FEATURE]
Method used for Advective-Decay timescale for Turbulence
(used only if MDISP=2 or MDISP2=2)
(MTAUADV) Default: 0 ! MTAUADV = 0 !
0 = No turbulence advection
1 = Computed (OPTION NOT IMPLEMENTED)
10 < Direct user input (s) -- e.g., 300

Method used to compute turbulence sigma-v &
sigma-w using micrometeorological variables
(Used only if MDISP = 2 or MDISP2 = 2)
(MCTURB) Default: 1 ! MCTURB = 1 !
1 = Standard CALPUFF subroutines
2 = AERMOD subroutines

PG sigma-y,z adj. for roughness? Default: 0 ! MROUGH = 0 !
(MROUGH)
0 = no
1 = yes

Partial plume penetration of Default: 1 ! MPARTL = 1 !
elevated inversion?
(MPARTL)
0 = no

1 = yes

Strength of temperature inversion   Default: 0   ! MTINV = 0 !
provided in PROFILE.DAT extended records?
(MTINV)
0 = no (computed from measured/default gradients)
1 = yes

PDF used for dispersion under convective conditions?
Default: 0   ! MPDF = 0 !
(MPDF)
0 = no
1 = yes

Sub-Grid TIBL module used for shore line?
Default: 0   ! MSGTIBL = 0 !
(MSGTIBL)
0 = no
1 = yes

Boundary conditions (concentration) modeled?
Default: 0   ! MBCON = 0 !
(MBCON)
0 = no
1 = yes, using formatted BCON.DAT file
2 = yes, using unformatted CONC.DAT file

Analyses of fogging and icing impacts due to emissions from arrays of mechanically-forced cooling towers can be performed using CALPUFF in conjunction with a cooling tower emissions processor (CTEMISS) and its associated postprocessors. Hourly emissions of water vapor and temperature from each cooling tower cell are computed for the current cell configuration and ambient conditions by CTEMISS. CALPUFF models the dispersion of these emissions and provides cloud information in a specialized format for further analysis. Output to FOG.DAT is provided in either 'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
Default: 0   ! MFOG = 0   !
(MFOG)
0 = no
1 = yes - report results in PLUME Mode format
2 = yes - report results in RECEPTOR Mode format

Test options specified to see if
they conform to regulatory
values? (MREG)   Default: 1   ! MREG = 1   !

0 = NO checks are made
1 = Technical options must conform to USEPA
Long Range Transport (LRT) guidance
METFM   1 or 2
AVET   60. (min)

```
            PGTIME   60. (min)
            MGAUSS   1
            MCTADJ   3
            MTRANS   1
            MTIP     1
            MCHEM    1 or 3 (if modeling SOx, NOx)
            MWET     1
            MDRY     1
            MDISP    2 or 3
            MPDF     0 if MDISP=3
                     1 if MDISP=2
            MROUGH   0
            MPARTL   1
            SYTDEP   550. (m)
            MHFTSZ   0


!END!


-------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =        SO2 !       !END!
! CSPEC =        SO4 !       !END!
! CSPEC =        NOX !       !END!
! CSPEC =       HNO3 !       !END!
! CSPEC =        NO3 !       !END!
! CSPEC =        PMC !       !END!
! CSPEC =        PMF !       !END!

                                             Dry            OUTPUT GROUP
   SPECIES        MODELED        EMITTED      DEPOSITED            NUMBER
    NAME        (0=NO, 1=YES)   (0=NO, 1=YES)   (0=NO,             (0=NONE,
  (Limit: 12                                 1=COMPUTED-GAS       1=1st CGRUP,
   Characters                                  2=COMPUTED-PARTICLE   2=2nd CGRUP,
   in length)                                3=USER-SPECIFIED)     3= etc.)

!        SO2  =        1,           1,         1,             0  !
!        SO4  =        1,           0,         2,             0  !
!        NOX  =        1,           1,         1,             0  !
!       HNO3  =        1,           0,         1,             0  !
!        NO3  =        1,           0,         2,             0  !
!        PMC  =        1,           1,         2,             0  !
!        PMF  =        1,           1,         2,             0  !


!END!
```

```
-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



------------------------------------------------------------------------------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                  Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                 Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                 No Default      ! RLAT0 = 40N  !
     (RLON0)                 No Default      ! RLON0 = 97W  !

         TTM :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of projection
```

RLAT0 selected for convenience
EM : RLON0 identifies central meridian of projection
RLAT0 is REPLACED by 0.0N (Equator)
LAZA: RLON0 identifies longitude of tangent-point of mapping plane
RLAT0 identifies latitude of tangent-point of mapping plane

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1) No Default ! XLAT1 = 33N !
(XLAT2) No Default ! XLAT2 = 45N !

LCC : Projection cone slices through Earth's surface at XLAT1 and XLAT2
PS : Projection plane slices through Earth at XLAT1
(XLAT2 is not used)

Note: Latitudes and longitudes should be positive, and include a
letter N,S,E, or W indicating north or south latitude, and
east or west longitude. For example,
35.9 N Latitude = 35.9N
118.7 E Longitude = 118.7E

Datum-region

The Datum-Region for the coordinates is identified by a character string. Many mapping products currently available use the model of the Earth known as the World Geodetic System 1984 (WGS-G). Other local models may be in use, and their selection in CALMET will make its output consistent with local mapping products. The list of Datum-Regions with official transformation parameters is provided by the National Imagery and Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)

WGS-G WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
NAS-C NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
NWS-27 NWS 6370KM Radius, Sphere
NWS-84 NWS 6370KM Radius, Sphere
ESR-S ESRI REFERENCE 6371KM Radius, Sphere

Datum-region for output coordinates
(DATUM) Default: WGS-G ! DATUM = WGS-G !

METEOROLOGICAL Grid:

Rectangular grid defined for projection PMAP,
with X the Easting and Y the Northing coordinate

No. X grid cells (NX) No default ! NX = 366 !
No. Y grid cells (NY) No default ! NY = 234 !
No. vertical layers (NZ) No default ! NZ = 10 !

Grid spacing (DGRIDKM) No default ! DGRIDKM = 6 !

Units: km

Cell face heights
(ZFACE(nz+1)) No defaults
Units: m
! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
4000. !

Reference Coordinates
of SOUTHWEST corner of
grid cell(1, 1):

X-coordinate (XORIGKM) No default ! XORIGKM = -1008. !
Y coordinate (YORIGKM) No default ! YORIGKM = -864. !
Units: km

COMPUTATIONAL Grid:

The computational grid is identical to or a subset of the MET. grid.
The lower left (LL) corner of the computational grid is at grid point
(IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the
computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
The grid spacing of the computational grid is the same as the MET. grid.

X index of LL corner (IBCOMP) No default ! IBCOMP = 168 !
(1 <= IBCOMP <= NX)

Y index of LL corner (JBCOMP) No default ! JBCOMP = 44 !
(1 <= JBCOMP <= NY)

X index of UR corner (IECOMP) No default ! IECOMP = 320 !
(1 <= IECOMP <= NX)

Y index of UR corner (JECOMP) No default ! JECOMP = 168 !
(1 <= JECOMP <= NY)

SAMPLING Grid (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point
(IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the
sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
The sampling grid must be identical to or a subset of the computational
grid. It may be a nested grid inside the computational grid.
The grid spacing of the sampling grid is DGRIDKM/MESHDN.

Logical flag indicating if gridded
receptors are used (LSAMP) Default: T ! LSAMP = F !
(T=yes, F=no)

X index of LL corner (IBSAMP) No default ! IBSAMP = 1 !
(IBCOMP <= IBSAMP <= IECOMP)

```
     Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1   !
      (JBCOMP <= JBSAMP <= JECOMP)


     X index of UR corner (IESAMP)      No default     ! IESAMP =  251   !
      (IBCOMP <= IESAMP <= IECOMP)

     Y index of UR corner (JESAMP)      No default     ! JESAMP =  246   !
      (JBCOMP <= JESAMP <= JECOMP)


    Nesting factor of the sampling
     grid (MESHDN)                   Default: 1     ! MESHDN =  1  !
     (MESHDN is an integer >= 1)

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------
                                  *                    *
   FILE                   DEFAULT VALUE           VALUE THIS RUN
   ----                   -------------           --------------

  Concentrations (ICON)            1                 !  ICON =  1   !
  Dry Fluxes (IDRY)                1                 !  IDRY =  1   !
  Wet Fluxes (IWET)                1                 !  IWET =  1   !
  Relative Humidity (IVIS)         1                 !  IVIS =  1   !
   (relative humidity file is
    required for visibility
    analysis)
  Use data compression option in output file?
  (LCOMPRS)                        Default: T        ! LCOMPRS = T !

  *
   0 = Do not create file, 1 = create file


   DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

    Mass flux across specified boundaries
    for selected species reported hourly?
    (IMFLX)                        Default: 0        ! IMFLX =  0  !
      0 = no
      1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
            are specified in Input Group 0)

    Mass balance for each species
    reported hourly?
    (IMBAL)                        Default: 0        ! IMBAL =  0  !
      0 = no
      1 = yes (MASSBAL.DAT filename is
          specified in Input Group 0)
```

LINE PRINTER OUTPUT OPTIONS:

Print concentrations (ICPRT)   Default: 0   ! ICPRT = 0   !
Print dry fluxes (IDPRT)   Default: 0   ! IDPRT = 0   !
Print wet fluxes (IWPRT)   Default: 0   ! IWPRT = 0   !
(0 = Do not print, 1 = Print)

Concentration print interval
(ICFRQ) in hours   Default: 1   ! ICFRQ = 1   !
Dry flux print interval
(IDFRQ) in hours   Default: 1   ! IDFRQ = 1   !
Wet flux print interval
(IWFRQ) in hours   Default: 1   ! IWFRQ = 1   !

Units for Line Printer Output
(IPRTU)   Default: 1   ! IPRTU = 3   !

	for Concentration	for Deposition
1 =	g/m**3	g/m**2/s
2 =	mg/m**3	mg/m**2/s
3 =	ug/m**3	ug/m**2/s
4 =	ng/m**3	ng/m**2/s
5 =	Odour Units	

Messages tracking progress of run
written to the screen ?
(IMESG)   Default: 2   ! IMESG = 2   !
0 = no
1 = yes (advection step, puff ID)
2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)

SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

		---- CONCENTRATIONS ----		------ DRY FLUXES ------		------ WET FLUXES ------		-- MASS FLUX --	
	SPECIES /GROUP	PRINTED?	SAVED ON DISK?	PRINTED?	SAVED ON DISK?	PRINTED?	SAVED ON DISK?	SAVED ON DISK?	
!	SO2 =	0,	1,	0,	1,	0,	1,	0	!
!	SO4 =	0,	1,	0,	1,	0,	1,	0	!
!	NOX =	0,	1,	0,	1,	0,	1,	0	!
!	HNO3 =	0,	1,	0,	1,	0,	1,	0	!
!	NO3 =	0,	1,	0,	1,	0,	1,	0	!
!	PMC =	0,	1,	0,	1,	0,	1,	0	!
!	PMF =	0,	1,	0,	1,	0,	1,	0	!

OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

Logical for debug output
(LDEBUG)   Default: F   ! LDEBUG = F !

First puff to track

(IPFDEB)   Default: 1   ! IPFDEB = 1 !

Number of puffs to track
(NPFDEB)   Default: 1   ! NPFDEB = 1 !

Met. period to start output
(NN1)   Default: 1   ! NN1 = 1   !

Met. period to end output
(NN2)   Default: 10   ! NN2 = 10 !

!END!

INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
----

Subgrid (6a)

Number of terrain features (NHILL)   Default: 0   ! NHILL = 0   !

Number of special complex terrain
receptors (NCTREC)   Default: 0   ! NCTREC = 0   !

Terrain and CTSG Receptor data for
CTSG hills input in CTDM format ?
(MHILL)   No Default   ! MHILL = 2   !
1 = Hill and Receptor data created
   by CTDM processors & read from
   HILL.DAT and HILLRCT.DAT files
2 = Hill data created by OPTHILL &
   input below in Subgroup (6b);
   Receptor data in Subgroup (6c)

Factor to convert horizontal dimensions Default: 1.0   ! XHILL2M = 1. !
to meters (MHILL=1)

Factor to convert vertical dimensions   Default: 1.0   ! ZHILL2M = 1. !
to meters (MHILL=1)

X-origin of CTDM system relative to   No Default   ! XCTDMKM = 0.0E00 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

Y-origin of CTDM system relative to   No Default   ! YCTDMKM = 0.0E00 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

Subgroup (6b)
----

1 **
HILL information

HILL XC YC THETAH ZGRID RELIEF EXPO 1 EXPO 2 SCALE 1 SCALE 2
AMAX1 AMAX2
NO. (km) (km) (deg.) (m) (m) (m) (m) (m) (m) (m) (m)
---- ---- ---- ------ ----- ------ ------ ------ ------- ------- ----- -----

----
Subgroup (6c)

COMPLEX TERRAIN RECEPTOR INFORMATION

XRCT YRCT ZRCT XHH
(km) (km) (m)
------ ----- ------ ----

1
Description of Complex Terrain Variables:
XC, YC = Coordinates of center of hill
THETAH = Orientation of major axis of hill (clockwise from North)
ZGRID = Height of the 0 of the grid above mean sea level
RELIEF = Height of the crest of the hill above the grid elevation
EXPO 1 = Hill-shape exponent for the major axis
EXPO 2 = Hill-shape exponent for the major axis
SCALE 1 = Horizontal length scale along the major axis
SCALE 2 = Horizontal length scale along the minor axis
AMAX = Maximum allowed axis length for the major axis
BMAX = Maximum allowed axis length for the major axis

XRCT, YRCT = Coordinates of the complex terrain receptors
ZRCT = Height of the ground (MSL) at the complex terrain Receptor
XHH = Hill number associated with each complex terrain receptor (NOTE: MUST BE ENTERED AS A REAL NUMBER)

**
NOTE: DATA for each hill and CTSG receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
----

SPECIES DIFFUSIVITY ALPHA STAR REACTIVITY MESOPHYLL RESISTANCE
HENRY'S LAW COEFFICIENT
NAME (cm**2/s) (s/cm) (dimensionless)
------- ----------- ---------- ---------- -------------------- -----------------------

```
!        SO2 =     0.1509,        1000.,          8.,              0.,               0.04 !
!        NOX =     0.1656,           1.,          8.,              5.,               3.5 !
!       HNO3 =     0.1628,           1.,         18.,              0.,         0.00000008 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

   For SINGLE SPECIES, the mean and standard deviation are used to
   compute a deposition velocity for NINT (see group 9) size-ranges,
   and these are then averaged to obtain a mean deposition velocity.

   For GROUPED SPECIES, the size distribution should be explicitly
   specified (by the 'species' in the group), and the standard deviation
   for each should be entered as 0.  The model will then use the
   deposition velocity for the stated mean diameter.

    SPECIES     GEOMETRIC MASS MEAN       GEOMETRIC STANDARD
     NAME           DIAMETER                 DEVIATION
                   (microns)              (microns)
    -------      -------------------       ------------------
!        SO4 =         0.48,                  2.   !
!        NO3 =         0.48,                  2.   !
!        PMC =           6.,                  2.   !
!        PMF =         0.48,                  2.   !


!END!


-------------------------------------------------------------------------------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

   Reference cuticle resistance (s/cm)
   (RCUTR)                     Default: 30    !  RCUTR = 30.0 !
   Reference ground resistance  (s/cm)
   (RGR)                       Default: 10    !    RGR = 10.0 !
   Reference pollutant reactivity
   (REACTR)                    Default: 8     ! REACTR = 8.0 !

   Number of particle-size intervals used to
   evaluate effective particle deposition velocity
   (NINT)                      Default: 9     !   NINT =  9  !

   Vegetation state in unirrigated areas
   (IVEG)                      Default: 1     !   IVEG =  1   !
     IVEG=1 for active and unstressed vegetation
     IVEG=2 for active and stressed vegetation
```

```
        IVEG=3 for inactive vegetation

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!         SO2 =         3.0E-05,             0.0E00 !
!         SO4 =         1.0E-04,            3.0E-05 !
!        HNO3 =         6.0E-05,             0.0E00 !
!         NO3 =         1.0E-04,            3.0E-05 !
!         PMC =         1.0E-04,            3.0E-05 !
!         PMF =         1.0E-04,            3.0E-05 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0   !
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                   Default: 12*80.
     !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00, 65.00, 65.00, 26.00, 26.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                  Default: 12*10.
     !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                  Default: 0.2          ! RNITE1 = .2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                  Default: 2.0          ! RNITE2 = 2.0 !

     Nighttime HNO3 formation rate (RNITE3)
```

```
   in percent/hour                    Default: 2.0         ! RNITE3 = 2.0 !

   H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =  0   !
   (Used only if MAQCHEM = 1)
     0 = use a monthly background H2O2 value
     1 = read hourly H2O2 concentrations from
         the H2O2.DAT data file

   Monthly H2O2 concentrations
   (Used only if MQACHEM = 1 and
    MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
   (BCKH2O2) in ppb                   Default: 12*1.
   !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !


--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
   (used only if MCHEM = 4)

   The SOA module uses monthly values of:
       Fine particulate concentration in ug/m^3 (BCKPMF)
       Organic fraction of fine particulate     (OFRAC)
       VOC / NOX ratio (after reaction)         (VCNX)
   to characterize the air mass when computing
   the formation of SOA from VOC emissions.
   Typical values for several distinct air mass types are:

     Month    1    2    3    4    5    6    7    8    9   10   11   12
             Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

   Clean Continental
     BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
     OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
     VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

   Clean Marine (surface)
     BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
     OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
     VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

   Urban - low biogenic (controls present)
     BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
     OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
     VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

   Urban - high biogenic (controls present)
     BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
     OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
     VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

   Regional Plume
     BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
     OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
     VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

   Urban - no controls present
     BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
```

```
    OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
    VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

  Default: Clean Continental
  !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
  !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
  !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !


!END!


-------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

  Horizontal size of puff (m) beyond which
  time-dependent dispersion equations (Heffter)
  are used to determine sigma-y and
  sigma-z (SYTDEP)                           Default: 550.   ! SYTDEP = 5.5E02 !

  Switch for using Heffter equation for sigma z
  as above (0 = Not use Heffter; 1 = use Heffter
  (MHFTSZ)                                   Default: 0      ! MHFTSZ =  0   !

  Stability class used to determine plume
  growth rates for puffs above the boundary
  layer (JSUP)                               Default: 5      ! JSUP =  5   !

  Vertical dispersion constant for stable
  conditions (k1 in Eqn. 2.7-3)  (CONK1)     Default: 0.01   ! CONK1 = .01 !

  Vertical dispersion constant for neutral/
  unstable conditions (k2 in Eqn. 2.7-4)
  (CONK2)                                    Default: 0.1    ! CONK2 = .1 !

  Factor for determining Transition-point from
  Schulman-Scire to Huber-Snyder Building Downwash
  scheme (SS used for Hs < Hb + TBD * HL)
  (TBD)                                      Default: 0.5    ! TBD = .5 !
    TBD < 0   ==> always use Huber-Snyder
    TBD = 1.5 ==> always use Schulman-Scire
    TBD = 0.5 ==> ISC Transition-point

  Range of land use categories for which
  urban dispersion is assumed
  (IURB1, IURB2)                             Default: 10     ! IURB1 =  10  !
                                             19     ! IURB2 =  19  !

  Site characterization parameters for single-point Met data files ---------
  (needed for METFM = 2,3,4)

    Land use category for modeling domain
    (ILANDUIN)                               Default: 20     ! ILANDUIN =  20  !
```

Roughness length (m) for modeling domain
(Z0IN) Default: 0.25 ! Z0IN = .25 !

Leaf area index for modeling domain
(XLAIIN) Default: 3.0 ! XLAIIN = 3.0 !

Elevation above sea level (m)
(ELEVIN) Default: 0.0 ! ELEVIN = .0 !

Latitude (degrees) for met location
(XLATIN) Default: -999. ! XLATIN = -999.0 !

Longitude (degrees) for met location
(XLONIN) Default: -999. ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

Anemometer height (m) (Used only if METFM = 2,3)
(ANEMHT) Default: 10. ! ANEMHT = 10.0 !

Form of lateral turbulance data in PROFILE.DAT file
(Used only if METFM = 4 or MTURBVW = 1 or 3)
(ISIGMAV) Default: 1 ! ISIGMAV = 1 !
0 = read sigma-theta
1 = read sigma-v

Choice of mixing heights (Used only if METFM = 4)
(IMIXCTDM) Default: 0 ! IMIXCTDM = 0 !
0 = read PREDICTED mixing heights
1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN) Default: 1.0 ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN) Default: 1.0 ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW) Default: 99 ! MXNEW = 99 !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM) Default: 99 ! MXSAM = 99 !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT) Default: 2 ! NCOUNT = 2 !

Minimum sigma y for a new puff/slug (m)
(SYMIN) Default: 1.0 ! SYMIN = 1.0 !

Minimum sigma z for a new puff/slug (m)

(SZMIN) Default: 1.0 ! SZMIN = 1.0 !

Default minimum turbulence velocities sigma-v and sigma-w
for each stability class over land and over water (m/s)
(SVMIN(12) and SWMIN(12))

```
              ----------  LAND  ----------       ---------  WATER  ----------
   Stab Class :  A    B    C    D    E    F         A    B    C    D    E    F
              ---  ---  ---  ---  ---  ---       ---  ---  ---  ---  ---  ---
Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37, .37, .37, .37
Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08, .06, .03, .016
```

! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370, 0.370, 0.370!
! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2)) Default: 0.0,0.0 ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM) Default: 0.5 ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI) Default: 3000. ! XMAXZI = 4000.0 !

Minimum mixing height (m)
(XMINZI) Default: 50. ! XMINZI = 20.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5)) Default :
ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

```
Wind Speed Class :  1     2     3     4     5
                   ---   ---   ---   ---   ---
     ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !
```

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6)) Default : ISC RURAL values
ISC RURAL : .07, .07, .10, .15, .35, .55
ISC URBAN : .15, .15, .20, .25, .30, .30

```
Stability Class :  A     B     C     D     E     F
                  ---   ---   ---   ---   ---   ---
     ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !
```

Default potential temperature gradient

for stable classes E, F (degK/m)
(PTG0(2))   Default: 0.020, 0.035
                                 ! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))   Stability Class : A   B   C   D   E   F
                             Default PPC : .50, .50, .50, .50, .35, .35
                                           ---   ---   ---   ---   ---   ---
                                 ! PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)   Default: 10.   ! SL2PF = 10.0 !

Puff-splitting control variables ------------------------

VERTICAL SPLIT

Number of puffs that result every time a puff
is split - nsplit=2 means that 1 puff splits
into 2
(NSPLIT)   Default: 3   ! NSPLIT = 3 !

Time(s) of a day when split puffs are eligible to
be split once again; this is typically set once
per day, around sunset before nocturnal shear develops.
24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
0=do not re-split   1=eligible for re-split
(IRESPLIT(24))   Default: Hour 17 = 1
! IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

Split is allowed only if last hour's mixing
height (m) exceeds a minimum value
(ZISPLIT)   Default: 100.   ! ZISPLIT = 100.0 !

Split is allowed only if ratio of last hour's
mixing ht to the maximum mixing ht experienced
by the puff is less than a maximum value (this
postpones a split until a nocturnal layer develops)
(ROLDMAX)   Default: 0.25   ! ROLDMAX = 0.25 !

HORIZONTAL SPLIT

Number of puffs that result every time a puff
is split - nsplith=5 means that 1 puff splits
into 5
(NSPLITH)   Default: 5   ! NSPLITH = 5 !

Minimum sigma-y (Grid Cells Units) of puff
before it may be split

```
       (SYSPLITH)                    Default:  1.0      ! SYSPLITH = 1.0 !

       Minimum puff elongation rate (SYSPLITH/hr) due to
       wind shear, before it may be split
       (SHSPLITH)                    Default:  2.       ! SHSPLITH = 2.0 !

       Minimum concentration (g/m^3) of each
       species in puff before it may be split
       Enter array of NSPEC values; if a single value is
       entered, it will be used for ALL species
       (CNSPLITH)                    Default:  1.0E-07   ! CNSPLITH = 1.0E-07 !

     Integration control variables ------------------------

       Fractional convergence criterion for numerical SLUG
       sampling integration
       (EPSSLUG)                     Default:   1.0e-04  ! EPSSLUG = 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                     Default:   1.0e-06  ! EPSAREA = 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                      Default:   1.0     ! DSRISE = 1.0 !

       Boundary Condition (BC) Puff control variables ------------------------

       Minimum height (m) to which BC puffs are mixed as they are emitted
       (MBCON=2 ONLY).  Actual height is reset to the current mixing height
       at the release point if greater than this minimum.
       (HTMINBC)                     Default:   500.     ! HTMINBC = 500.0 !

       Search radius (in BC segment lengths) about a receptor for sampling
       nearest BC puff.  BC puffs are emitted with a spacing of one segment
       length, so the search radius should be greater than 1.
       (RSAMPBC)                     Default:   4.      ! RSAMPBC = 10.0 !

       Near-Surface depletion adjustment to concentration profile used when
       sampling BC puffs?
       (MDEPBC)                      Default:   1       ! MDEPBC =  1  !
         0 = Concentration is NOT adjusted for depletion
         1 = Adjust Concentration for depletion

!END!


-------------------------------------------------------------------------------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------
```

```
    Number of point sources with
    parameters provided below      (NPT1)  No default  !  NPT1 =   9  !

    Units used for point source
    emissions below                (IPTU)  Default: 1  !  IPTU =   3  !
         1 =       g/s
         2 =       kg/hr
         3 =       lb/hr
         4 =     tons/yr
         5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
         6 =     Odour Unit * m**3/min
         7 =     metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

    Number of point sources with
    variable emission parameters
    provided in external file      (NPT2)  No default  !  NPT2 =  0  !

    (If NPT2 > 0, these point
    source emissions are read from
    the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                   a
          POINT SOURCE: CONSTANT DATA
          -----------------------------
                                                             b         c
 Source       X         Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
  No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
             (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
 ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
  1 ! SRCNAM = LABADIE !
  1 ! X =  532.410,  -140.672, 213.36, 144.0,   6.25,  28.04, 444.26,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00, 0.0E00,  3.4708E02 !
  1 ! FMFAC  =      1.0 !   !END!
  2 ! SRCNAM = SIOUX   !
  2 ! X =  576.771,   -98.441, 182.88, 129.0,   5.79,  29.26, 427.59,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00, 0.0E00,  1.5178E01 !
  2 ! FMFAC  =      1.0 !   !END!
  3 ! SRCNAM = RUSHISL !
  3 ! X =  585.495,  -184.756, 213.36, 119.0,   8.84,  24.99, 405.37,  0.0, 0.0E00,  0.0E00,  0.00E00,
     0.0E00,  0.0E00, 0.0E00,  1.6534E02 !
  3 ! FMFAC =       1.0 !   !END!
  4 ! SRCNAM = SIBLEY  !
  4 ! X =  241.296,   -86.868, 213.36, 219.0,   4.11,  31.95, 423.15,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00, 0.0E00,  7.0303E00 !
  4 ! FMFAC  =      1.0 !   !END!
  5 ! SRCNAM = NEWMADR !
```

```
  5 ! X =  660.775,  -357.992, 243.84,  91.0,   6.10,  20.57, 426.48,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00, 0.0E00,  3.8684E01 !
  5 ! FMFAC  =      1.0 !   !END!
  6 ! SRCNAM = STHWST  !
  6 ! X =  318.336,  -308.628, 117.35, 380.0,   3.66,  23.88, 397.04,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00, 0.0E00,  5.7721E01 !
  6 ! FMFAC  =      1.0 !   !END!
  7 ! SRCNAM = JMSRVR  !
  7 ! X =  329.875,  -312.995,  60.96, 355.0,   3.66,  10.21, 422.04,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00, 0.0E00,  1.1488E02 !
  7 ! FMFAC  =      1.0 !   !END!
  8 ! SRCNAM = ASBURY  !
  8 ! X =  211.974,  -288.767, 123.45, 291.0,   3.96,  23.47, 417.59,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00, 0.0E00,  1.5962E01 !
  8 ! FMFAC  =      1.0 !   !END!
  9 ! SRCNAM = MNTRSE  !
  9 ! X =  265.873,  -182.081, 137.16, 225.0,   4.57,  36.58, 416.48,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00,  0.0E00, 2.4340E01 !
  9 ! FMFAC =       1.0 !   !END!
--------

   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.

    SRCNAM  is a 12-character name for a source
            (No default)
    X       is an array holding the source data listed by the column headings
            (No default)
    SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
            (Default: 0.,0.)
    FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
            the effect of rain-caps or other physical configurations that
            reduce momentum rise associated with the actual exit velocity.
            (Default: 1.0  -- full momentum used)

   b
    0. = No building downwash modeled, 1. = downwash modeled
    NOTE: must be entered as a REAL number (i.e., with decimal point)

   c
    An emission rate must be entered for every pollutant modeled.
    Enter emission rate of zero for secondary pollutants that are
    modeled, but not emitted.  Units are specified by IPTU
    (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
           -------------------------------------------------------
Source                                                       a
 No.       Effective building height, width, length and X/Y offset (in meters)
           every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed for
           MBDW=2 (PRIME downwash option)
```

------   ---

----

a
Building height, width, length, and X/Y offset from the source are treated as a separate input subgroup for each source and therefore must end with an input group terminator. The X/Y offset is the position, relative to the stack, of the center of the upwind face of the projected building, with the x-axis pointing along the flow direction.

Subgroup (13d)
----

a
POINT SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY)   Default: 0
0 =   Constant
1 =   Diurnal cycle (24 scaling factors: hours 1-24)
2 =   Monthly cycle (12 scaling factors: months 1-12)
3 =   Hour & Season (4 groups of 24 hourly scaling factors,
            where first group is DEC-JAN-FEB)
4 =   Speed & Stab. (6 groups of 6 scaling factors, where
            first group is Stability Class A,
            and the speed classes have upper
            bounds (m/s) defined in Group 12
5 =   Temperature   (12 scaling factors, where temperature
            classes have upper bounds (C) of:
            0, 5, 10, 15, 20, 25, 30, 35, 40,
            45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

```
    Number of polygon area sources with
    parameters specified below (NAR1)       No default  !  NAR1 =  0   !

    Units used for area source
    emissions below           (IARU)       Default: 1  !  IARU =   1  !
         1 =        g/m**2/s
         2 =       kg/m**2/hr
         3 =       lb/m**2/hr
         4 =     tons/m**2/yr
         5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
         6 =     Odour Unit * m/min
         7 =     metric tons/m**2/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

    Number of buoyant polygon area sources
    with variable location and emission
    parameters (NAR2)                   No default  !  NAR2 =  0   !
    (If NAR2 > 0, ALL parameter data for
    these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                               a
        AREA SOURCE: CONSTANT DATA
        ----------------------------
                                               b
Source          Effect.    Base      Initial    Emission
 No.           Height   Elevation   Sigma z     Rates
               (m)       (m)        (m)
-------        ------    ------     --------   ---------


--------
   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.
   b
    An emission rate must be entered for every pollutant modeled.
    Enter emission rate of zero for secondary pollutants that are
    modeled, but not emitted.  Units are specified by IARU
    (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

         COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
         --------------------------------------------------------
Source                                                  a
```

No. Ordered list of X followed by list of Y, grouped by source
------ ---

----
a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

Subgroup (14d)
----

a
AREA SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission
rates given in 14b. Factors entered multiply the rates in 14b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0
0 = Constant
1 = Diurnal cycle (24 scaling factors: hours 1-24)
2 = Monthly cycle (12 scaling factors: months 1-12)
3 = Hour & Season (4 groups of 24 hourly scaling factors,
where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where
first group is Stability Class A,
and the speed classes have upper

bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

Subgroup (15a)

```
     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                        No default  !  NLN2 =  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)       No default   ! NLINES =  0  !

     Units used for line source
     emissions below               (ILNU)         Default: 1  !  ILNU =   3  !
          1 =        g/s
          2 =       kg/hr
          3 =       lb/hr
          4 =     tons/yr
          5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =     Odour Unit * m**3/min
          7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)       (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                       Default: 7   ! MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which              Default: 6   ! NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)              No default   ! XL = 527.91 !
                                           (in meters)

        Average building height (HBL)             No default   ! HBL = 16.0 !
                                           (in meters)

        Average building width (WBL)              No default   ! WBL = 19.81 !
                                           (in meters)

        Average line source width (WML)           No default   ! WML = 5.85 !
                                           (in meters)

        Average separation between buildings (DXL)  No default   ! DXL = 19.81 !
                                           (in meters)

        Average buoyancy parameter (FPRIMEL)       No default   ! FPRIMEL = 1011.99 !
                                           (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------
```

BUOYANT LINE SOURCE: CONSTANT DATA

Source No.	Beg. X Coordinate (km)	Beg. Y Coordinate (km)	End. X Coordinate (km)	End. Y Coordinate (km)	Release Height (m)	Base Elevation (m)	Emission Rates [a]
------	----------	----------	---------	----------	-------	---------	---------

----

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by ILNTU (e.g. 1 for g/s).

Subgroup (15c)

BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission rates given in 15b. Factors entered multiply the rates in 15b. Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

----

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

```
INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

    Number of volume sources with
    parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !

    Units used for volume source
    emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   3  !
         1 =        g/s
         2 =       kg/hr
         3 =       lb/hr
         4 =     tons/yr
         5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
         6 =     Odour Unit * m**3/min
         7 =     metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

    Number of volume sources with
    variable location and emission
    parameters                   (NVL2)     No default  !  NVL2 =   0   !

    (If NVL2 > 0, ALL parameter data for
     these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                 a
         VOLUME SOURCE: CONSTANT DATA
         ------------------------------
                                                               b
       X          Y        Effect.    Base     Initial    Initial    Emission
    Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z     Rates
      (km)       (km)        (m)       (m)        (m)       (m)
    ----------  ----------   ------    ------    --------   --------   --------


--------
   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.

   b
    An emission rate must be entered for every pollutant modeled.
    Enter emission rate of zero for secondary pollutants that are
```

modeled, but not emitted. Units are specified by IVLU
(e.g. 1 for g/s).

Subgroup (16c)
----

a
VOLUME SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 16b. Factors entered multiply the rates in 16b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0
- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

Number of non-gridded receptors (NREC) No default ! NREC = 1046 !

!END!

Subgroup (17b)
----

a
NON-GRIDDED (DISCRETE) RECEPTOR DATA

Receptor No.		X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height b Above Ground (m)
1 !	X =	356.5460,	-357.4577,	274,	0.000! !END!
2 !	X =	356.5350,	-357.2085,	274,	0.000! !END!
3 !	X =	356.5241,	-356.9594,	235,	0.000! !END!
4 !	X =	356.7941,	-357.4468,	288,	0.000! !END!
5 !	X =	356.7831,	-357.1976,	276,	0.000! !END!
6 !	X =	356.7721,	-356.9484,	244,	0.000! !END!
7 !	X =	357.0422,	-357.4358,	304,	0.000! !END!
8 !	X =	357.0312,	-357.1867,	304,	0.000! !END!
9 !	X =	357.0202,	-356.9375,	274,	0.000! !END!

10 ! X =	356.9543,	-355.4425,	274,	0.000! !END!
11 ! X =	357.2903,	-357.4249,	304,	0.000! !END!
12 ! X =	357.2793,	-357.1757,	304,	0.000! !END!
13 ! X =	357.2683,	-356.9266,	290,	0.000! !END!
14 ! X =	357.2024,	-355.4316,	265,	0.000! !END!
15 ! X =	357.6591,	-360.1548,	274,	0.000! !END!
16 ! X =	357.6481,	-359.9057,	274,	0.000! !END!
17 ! X =	357.6371,	-359.6565,	274,	0.000! !END!
18 ! X =	357.6262,	-359.4073,	274,	0.000! !END!
19 ! X =	357.6152,	-359.1582,	274,	0.000! !END!
20 ! X =	357.6042,	-358.9090,	274,	0.000! !END!
21 ! X =	357.5383,	-357.4140,	302,	0.000! !END!
22 ! X =	357.5274,	-357.1648,	304,	0.000! !END!
23 ! X =	357.5164,	-356.9156,	304,	0.000! !END!
24 ! X =	357.5054,	-356.6665,	287,	0.000! !END!
25 ! X =	357.4944,	-356.4173,	274,	0.000! !END!
26 ! X =	357.4834,	-356.1681,	304,	0.000! !END!
27 ! X =	357.4505,	-355.4206,	275,	0.000! !END!
28 ! X =	357.9182,	-360.3931,	274,	0.000! !END!
29 ! X =	357.9072,	-360.1439,	274,	0.000! !END!
30 ! X =	357.8962,	-359.8947,	274,	0.000! !END!
31 ! X =	357.8852,	-359.6456,	274,	0.000! !END!
32 ! X =	357.8743,	-359.3964,	274,	0.000! !END!
33 ! X =	357.8633,	-359.1472,	273,	0.000! !END!
34 ! X =	357.8523,	-358.8981,	274,	0.000! !END!
35 ! X =	357.7864,	-357.4030,	304,	0.000! !END!
36 ! X =	357.7754,	-357.1539,	304,	0.000! !END!
37 ! X =	357.7645,	-356.9047,	307,	0.000! !END!
38 ! X =	357.7535,	-356.6555,	314,	0.000! !END!
39 ! X =	357.7425,	-356.4064,	313,	0.000! !END!
40 ! X =	357.7315,	-356.1572,	304,	0.000! !END!
41 ! X =	357.7205,	-355.9080,	304,	0.000! !END!
42 ! X =	357.7096,	-355.6589,	292,	0.000! !END!
43 ! X =	357.6986,	-355.4097,	275,	0.000! !END!
44 ! X =	358.2102,	-361.3789,	278,	0.000! !END!
45 ! X =	358.1663,	-360.3822,	272,	0.000! !END!
46 ! X =	358.1553,	-360.1330,	274,	0.000! !END!
47 ! X =	358.1443,	-359.8838,	274,	0.000! !END!
48 ! X =	358.1333,	-359.6346,	274,	0.000! !END!
49 ! X =	358.1223,	-359.3855,	274,	0.000! !END!
50 ! X =	358.1114,	-359.1363,	274,	0.000! !END!
51 ! X =	358.1004,	-358.8871,	278,	0.000! !END!
52 ! X =	358.0345,	-357.3921,	295,	0.000! !END!
53 ! X =	358.0235,	-357.1429,	304,	0.000! !END!
54 ! X =	358.0125,	-356.8938,	319,	0.000! !END!
55 ! X =	358.0016,	-356.6446,	335,	0.000! !END!
56 ! X =	357.9906,	-356.3954,	337,	0.000! !END!
57 ! X =	357.9796,	-356.1463,	320,	0.000! !END!
58 ! X =	357.9686,	-355.8971,	299,	0.000! !END!
59 ! X =	357.9576,	-355.6479,	277,	0.000! !END!
60 ! X =	357.9467,	-355.3988,	274,	0.000! !END!
61 ! X =	357.9357,	-355.1496,	274,	0.000! !END!
62 ! X =	357.9247,	-354.9005,	243,	0.000! !END!
63 ! X =	358.4583,	-361.3679,	304,	0.000! !END!
64 ! X =	358.4473,	-361.1187,	274,	0.000! !END!
65 ! X =	358.4363,	-360.8696,	274,	0.000! !END!

66 ! X = 358.4253, -360.6204, 271, 0.000! !END!
67 ! X = 358.4143, -360.3712, 274, 0.000! !END!
68 ! X = 358.4034, -360.1221, 274, 0.000! !END!
69 ! X = 358.3924, -359.8729, 274, 0.000! !END!
70 ! X = 358.3814, -359.6237, 279, 0.000! !END!
71 ! X = 358.3704, -359.3745, 281, 0.000! !END!
72 ! X = 358.3594, -359.1254, 288, 0.000! !END!
73 ! X = 358.3485, -358.8762, 293, 0.000! !END!
74 ! X = 358.2826, -357.3812, 290, 0.000! !END!
75 ! X = 358.2716, -357.1320, 302, 0.000! !END!
76 ! X = 358.2606, -356.8828, 327, 0.000! !END!
77 ! X = 358.2496, -356.6337, 365, 0.000! !END!
78 ! X = 358.2387, -356.3845, 395, 0.000! !END!
79 ! X = 358.2277, -356.1353, 343, 0.000! !END!
80 ! X = 358.2167, -355.8862, 304, 0.000! !END!
81 ! X = 358.2057, -355.6370, 296, 0.000! !END!
82 ! X = 358.1947, -355.3878, 290, 0.000! !END!
83 ! X = 358.1838, -355.1387, 277, 0.000! !END!
84 ! X = 358.1728, -354.8895, 259, 0.000! !END!
85 ! X = 358.7064, -361.3570, 304, 0.000! !END!
86 ! X = 358.6954, -361.1078, 274, 0.000! !END!
87 ! X = 358.6844, -360.8586, 274, 0.000! !END!
88 ! X = 358.6734, -360.6095, 274, 0.000! !END!
89 ! X = 358.6624, -360.3603, 274, 0.000! !END!
90 ! X = 358.6515, -360.1111, 274, 0.000! !END!
91 ! X = 358.6405, -359.8619, 286, 0.000! !END!
92 ! X = 358.6295, -359.6128, 304, 0.000! !END!
93 ! X = 358.6185, -359.3636, 311, 0.000! !END!
94 ! X = 358.6075, -359.1144, 318, 0.000! !END!
95 ! X = 358.5965, -358.8653, 322, 0.000! !END!
96 ! X = 358.5856, -358.6161, 308, 0.000! !END!
97 ! X = 358.5746, -358.3669, 298, 0.000! !END!
98 ! X = 358.5307, -357.3702, 290, 0.000! !END!
99 ! X = 358.5197, -357.1211, 308, 0.000! !END!
100 ! X = 358.5087, -356.8719, 343, 0.000! !END!
101 ! X = 358.4977, -356.6227, 371, 0.000! !END!
102 ! X = 358.4867, -356.3736, 395, 0.000! !END!
103 ! X = 358.4758, -356.1244, 365, 0.000! !END!
104 ! X = 358.4648, -355.8752, 321, 0.000! !END!
105 ! X = 358.4538, -355.6261, 307, 0.000! !END!
106 ! X = 358.4428, -355.3769, 302, 0.000! !END!
107 ! X = 358.4318, -355.1278, 283, 0.000! !END!
108 ! X = 358.4209, -354.8786, 274, 0.000! !END!
109 ! X = 358.9544, -361.3461, 297, 0.000! !END!
110 ! X = 358.9435, -361.0969, 286, 0.000! !END!
111 ! X = 358.9325, -360.8477, 274, 0.000! !END!
112 ! X = 358.9215, -360.5985, 274, 0.000! !END!
113 ! X = 358.9105, -360.3494, 274, 0.000! !END!
114 ! X = 358.8995, -360.1002, 274, 0.000! !END!
115 ! X = 358.8886, -359.8510, 288, 0.000! !END!
116 ! X = 358.8776, -359.6018, 335, 0.000! !END!
117 ! X = 358.8666, -359.3527, 335, 0.000! !END!
118 ! X = 358.8556, -359.1035, 335, 0.000! !END!
119 ! X = 358.8446, -358.8543, 335, 0.000! !END!
120 ! X = 358.8336, -358.6052, 335, 0.000! !END!
121 ! X = 358.8227, -358.3560, 292, 0.000! !END!

122 ! X =	358.8117,	-358.1068,	259,	0.000! !END!
123 ! X =	358.8007,	-357.8576,	274,	0.000! !END!
124 ! X =	358.7897,	-357.6085,	274,	0.000! !END!
125 ! X =	358.7787,	-357.3593,	285,	0.000! !END!
126 ! X =	358.7678,	-357.1101,	304,	0.000! !END!
127 ! X =	358.7568,	-356.8610,	332,	0.000! !END!
128 ! X =	358.7458,	-356.6118,	360,	0.000! !END!
129 ! X =	358.7348,	-356.3626,	365,	0.000! !END!
130 ! X =	358.7238,	-356.1135,	344,	0.000! !END!
131 ! X =	358.7129,	-355.8643,	335,	0.000! !END!
132 ! X =	358.7019,	-355.6151,	309,	0.000! !END!
133 ! X =	358.6909,	-355.3660,	302,	0.000! !END!
134 ! X =	358.6799,	-355.1168,	280,	0.000! !END!
135 ! X =	358.6689,	-354.8677,	274,	0.000! !END!
136 ! X =	359.2025,	-361.3351,	304,	0.000! !END!
137 ! X =	359.1916,	-361.0860,	303,	0.000! !END!
138 ! X =	359.1806,	-360.8368,	294,	0.000! !END!
139 ! X =	359.1696,	-360.5876,	292,	0.000! !END!
140 ! X =	359.1586,	-360.3384,	283,	0.000! !END!
141 ! X =	359.1476,	-360.0893,	275,	0.000! !END!
142 ! X =	359.1366,	-359.8401,	283,	0.000! !END!
143 ! X =	359.1257,	-359.5909,	316,	0.000! !END!
144 ! X =	359.1147,	-359.3417,	335,	0.000! !END!
145 ! X =	359.1037,	-359.0926,	335,	0.000! !END!
146 ! X =	359.0927,	-358.8434,	335,	0.000! !END!
147 ! X =	359.0817,	-358.5942,	327,	0.000! !END!
148 ! X =	359.0707,	-358.3451,	268,	0.000! !END!
149 ! X =	359.0598,	-358.0959,	258,	0.000! !END!
150 ! X =	359.0488,	-357.8467,	274,	0.000! !END!
151 ! X =	359.0378,	-357.5975,	277,	0.000! !END!
152 ! X =	359.0268,	-357.3484,	284,	0.000! !END!
153 ! X =	359.0158,	-357.0992,	280,	0.000! !END!
154 ! X =	359.0049,	-356.8500,	307,	0.000! !END!
155 ! X =	358.9939,	-356.6009,	320,	0.000! !END!
156 ! X =	358.9829,	-356.3517,	335,	0.000! !END!
157 ! X =	358.9719,	-356.1025,	335,	0.000! !END!
158 ! X =	358.9609,	-355.8534,	335,	0.000! !END!
159 ! X =	358.9500,	-355.6042,	313,	0.000! !END!
160 ! X =	358.9390,	-355.3551,	300,	0.000! !END!
161 ! X =	358.9280,	-355.1059,	283,	0.000! !END!
162 ! X =	358.9170,	-354.8567,	274,	0.000! !END!
163 ! X =	359.4616,	-361.5734,	304,	0.000! !END!
164 ! X =	359.4506,	-361.3242,	309,	0.000! !END!
165 ! X =	359.4396,	-361.0750,	312,	0.000! !END!
166 ! X =	359.4287,	-360.8258,	323,	0.000! !END!
167 ! X =	359.4177,	-360.5767,	308,	0.000! !END!
168 ! X =	359.4067,	-360.3275,	304,	0.000! !END!
169 ! X =	359.3957,	-360.0783,	304,	0.000! !END!
170 ! X =	359.3847,	-359.8291,	299,	0.000! !END!
171 ! X =	359.3737,	-359.5800,	304,	0.000! !END!
172 ! X =	359.3628,	-359.3308,	335,	0.000! !END!
173 ! X =	359.3518,	-359.0816,	335,	0.000! !END!
174 ! X =	359.3408,	-358.8325,	310,	0.000! !END!
175 ! X =	359.3298,	-358.5833,	281,	0.000! !END!
176 ! X =	359.3188,	-358.3341,	261,	0.000! !END!
177 ! X =	359.3078,	-358.0850,	278,	0.000! !END!

178 ! X =	359.2969,	-357.8358,	274,	0.000! !END!
179 ! X =	359.2859,	-357.5866,	281,	0.000! !END!
180 ! X =	359.2749,	-357.3374,	304,	0.000! !END!
181 ! X =	359.2639,	-357.0883,	304,	0.000! !END!
182 ! X =	359.2529,	-356.8391,	303,	0.000! !END!
183 ! X =	359.2420,	-356.5899,	320,	0.000! !END!
184 ! X =	359.2310,	-356.3408,	335,	0.000! !END!
185 ! X =	359.2200,	-356.0916,	335,	0.000! !END!
186 ! X =	359.2090,	-355.8424,	333,	0.000! !END!
187 ! X =	359.1980,	-355.5933,	313,	0.000! !END!
188 ! X =	359.1870,	-355.3441,	300,	0.000! !END!
189 ! X =	359.1761,	-355.0950,	280,	0.000! !END!
190 ! X =	359.1651,	-354.8458,	274,	0.000! !END!
191 ! X =	359.7317,	-362.0608,	306,	0.000! !END!
192 ! X =	359.7207,	-361.8116,	286,	0.000! !END!
193 ! X =	359.7097,	-361.5624,	308,	0.000! !END!
194 ! X =	359.6987,	-361.3133,	328,	0.000! !END!
195 ! X =	359.6877,	-361.0641,	335,	0.000! !END!
196 ! X =	359.6767,	-360.8149,	336,	0.000! !END!
197 ! X =	359.6658,	-360.5657,	345,	0.000! !END!
198 ! X =	359.6548,	-360.3166,	349,	0.000! !END!
199 ! X =	359.6438,	-360.0674,	337,	0.000! !END!
200 ! X =	359.6328,	-359.8182,	316,	0.000! !END!
201 ! X =	359.6218,	-359.5690,	306,	0.000! !END!
202 ! X =	359.6108,	-359.3199,	314,	0.000! !END!
203 ! X =	359.5999,	-359.0707,	314,	0.000! !END!
204 ! X =	359.5889,	-358.8215,	290,	0.000! !END!
205 ! X =	359.5779,	-358.5724,	258,	0.000! !END!
206 ! X =	359.5669,	-358.3232,	281,	0.000! !END!
207 ! X =	359.5559,	-358.0740,	304,	0.000! !END!
208 ! X =	359.5449,	-357.8248,	301,	0.000! !END!
209 ! X =	359.5340,	-357.5757,	280,	0.000! !END!
210 ! X =	359.5230,	-357.3265,	304,	0.000! !END!
211 ! X =	359.5120,	-357.0773,	304,	0.000! !END!
212 ! X =	359.5010,	-356.8282,	318,	0.000! !END!
213 ! X =	359.4900,	-356.5790,	335,	0.000! !END!
214 ! X =	359.4791,	-356.3298,	335,	0.000! !END!
215 ! X =	359.4681,	-356.0807,	335,	0.000! !END!
216 ! X =	359.4571,	-355.8315,	318,	0.000! !END!
217 ! X =	359.4461,	-355.5823,	304,	0.000! !END!
218 ! X =	359.4351,	-355.3332,	292,	0.000! !END!
219 ! X =	359.9797,	-362.0499,	326,	0.000! !END!
220 ! X =	359.9688,	-361.8007,	286,	0.000! !END!
221 ! X =	359.9578,	-361.5515,	308,	0.000! !END!
222 ! X =	359.9468,	-361.3023,	322,	0.000! !END!
223 ! X =	359.9358,	-361.0532,	335,	0.000! !END!
224 ! X =	359.9248,	-360.8040,	344,	0.000! !END!
225 ! X =	359.9138,	-360.5548,	365,	0.000! !END!
226 ! X =	359.9029,	-360.3056,	365,	0.000! !END!
227 ! X =	359.8919,	-360.0565,	359,	0.000! !END!
228 ! X =	359.8809,	-359.8073,	330,	0.000! !END!
229 ! X =	359.8699,	-359.5581,	309,	0.000! !END!
230 ! X =	359.8589,	-359.3089,	304,	0.000! !END!
231 ! X =	359.8479,	-359.0598,	289,	0.000! !END!
232 ! X =	359.8370,	-358.8106,	270,	0.000! !END!
233 ! X =	359.8260,	-358.5614,	274,	0.000! !END!

234 ! X =	359.8150,	-358.3123,	289,	0.000!	!END!
235 ! X =	359.8040,	-358.0631,	304,	0.000!	!END!
236 ! X =	359.7930,	-357.8139,	304,	0.000!	!END!
237 ! X =	359.7820,	-357.5647,	304,	0.000!	!END!
238 ! X =	359.7711,	-357.3156,	297,	0.000!	!END!
239 ! X =	359.7601,	-357.0664,	305,	0.000!	!END!
240 ! X =	359.7491,	-356.8172,	327,	0.000!	!END!
241 ! X =	359.7381,	-356.5681,	335,	0.000!	!END!
242 ! X =	359.7271,	-356.3189,	335,	0.000!	!END!
243 ! X =	359.7162,	-356.0697,	333,	0.000!	!END!
244 ! X =	359.7052,	-355.8206,	313,	0.000!	!END!
245 ! X =	359.6942,	-355.5714,	279,	0.000!	!END!
246 ! X =	359.6832,	-355.3223,	304,	0.000!	!END!
247 ! X =	360.2169,	-361.7897,	296,	0.000!	!END!
248 ! X =	360.2059,	-361.5406,	304,	0.000!	!END!
249 ! X =	360.1949,	-361.2914,	307,	0.000!	!END!
250 ! X =	360.1839,	-361.0422,	335,	0.000!	!END!
251 ! X =	360.1729,	-360.7930,	351,	0.000!	!END!
252 ! X =	360.1619,	-360.5439,	365,	0.000!	!END!
253 ! X =	360.1509,	-360.2947,	365,	0.000!	!END!
254 ! X =	360.1400,	-360.0455,	365,	0.000!	!END!
255 ! X =	360.1290,	-359.7963,	330,	0.000!	!END!
256 ! X =	360.1180,	-359.5472,	306,	0.000!	!END!
257 ! X =	360.1070,	-359.2980,	290,	0.000!	!END!
258 ! X =	360.0960,	-359.0488,	304,	0.000!	!END!
259 ! X =	360.0850,	-358.7997,	300,	0.000!	!END!
260 ! X =	360.0741,	-358.5505,	275,	0.000!	!END!
261 ! X =	360.0631,	-358.3013,	289,	0.000!	!END!
262 ! X =	360.0521,	-358.0521,	311,	0.000!	!END!
263 ! X =	360.0411,	-357.8030,	331,	0.000!	!END!
264 ! X =	360.0301,	-357.5538,	335,	0.000!	!END!
265 ! X =	360.0191,	-357.3046,	318,	0.000!	!END!
266 ! X =	360.0082,	-357.0555,	301,	0.000!	!END!
267 ! X =	359.9972,	-356.8063,	319,	0.000!	!END!
268 ! X =	359.9862,	-356.5571,	335,	0.000!	!END!
269 ! X =	359.9752,	-356.3080,	335,	0.000!	!END!
270 ! X =	359.9642,	-356.0588,	328,	0.000!	!END!
271 ! X =	359.9532,	-355.8096,	308,	0.000!	!END!
272 ! X =	359.9423,	-355.5605,	289,	0.000!	!END!
273 ! X =	359.9313,	-355.3113,	300,	0.000!	!END!
274 ! X =	360.4649,	-361.7788,	299,	0.000!	!END!
275 ! X =	360.4540,	-361.5296,	304,	0.000!	!END!
276 ! X =	360.4430,	-361.2805,	315,	0.000!	!END!
277 ! X =	360.4320,	-361.0313,	325,	0.000!	!END!
278 ! X =	360.4210,	-360.7821,	349,	0.000!	!END!
279 ! X =	360.4100,	-360.5329,	365,	0.000!	!END!
280 ! X =	360.3990,	-360.2838,	365,	0.000!	!END!
281 ! X =	360.3881,	-360.0346,	335,	0.000!	!END!
282 ! X =	360.3771,	-359.7854,	310,	0.000!	!END!
283 ! X =	360.3661,	-359.5362,	304,	0.000!	!END!
284 ! X =	360.3551,	-359.2871,	304,	0.000!	!END!
285 ! X =	360.3441,	-359.0379,	304,	0.000!	!END!
286 ! X =	360.3331,	-358.7887,	304,	0.000!	!END!
287 ! X =	360.3221,	-358.5396,	289,	0.000!	!END!
288 ! X =	360.3112,	-358.2904,	284,	0.000!	!END!
289 ! X =	360.3002,	-358.0412,	309,	0.000!	!END!

290 ! X =	360.2892,	-357.7920,	335,	0.000! !END!
291 ! X =	360.2782,	-357.5429,	335,	0.000! !END!
292 ! X =	360.2672,	-357.2937,	335,	0.000! !END!
293 ! X =	360.2562,	-357.0445,	312,	0.000! !END!
294 ! X =	360.2453,	-356.7954,	336,	0.000! !END!
295 ! X =	360.2343,	-356.5462,	358,	0.000! !END!
296 ! X =	360.2233,	-356.2970,	355,	0.000! !END!
297 ! X =	360.2123,	-356.0479,	330,	0.000! !END!
298 ! X =	360.2013,	-355.7987,	309,	0.000! !END!
299 ! X =	360.1903,	-355.5495,	289,	0.000! !END!
300 ! X =	360.1794,	-355.3004,	282,	0.000! !END!
301 ! X =	360.7240,	-362.0171,	335,	0.000! !END!
302 ! X =	360.7130,	-361.7679,	304,	0.000! !END!
303 ! X =	360.7020,	-361.5187,	304,	0.000! !END!
304 ! X =	360.6911,	-361.2695,	335,	0.000! !END!
305 ! X =	360.6801,	-361.0203,	344,	0.000! !END!
306 ! X =	360.6691,	-360.7712,	330,	0.000! !END!
307 ! X =	360.6581,	-360.5220,	365,	0.000! !END!
308 ! X =	360.6471,	-360.2728,	365,	0.000! !END!
309 ! X =	360.6361,	-360.0236,	349,	0.000! !END!
310 ! X =	360.6252,	-359.7745,	335,	0.000! !END!
311 ! X =	360.6142,	-359.5253,	326,	0.000! !END!
312 ! X =	360.6032,	-359.2761,	312,	0.000! !END!
313 ! X =	360.5922,	-359.0270,	305,	0.000! !END!
314 ! X =	360.5812,	-358.7778,	304,	0.000! !END!
315 ! X =	360.5702,	-358.5286,	287,	0.000! !END!
316 ! X =	360.5592,	-358.2794,	289,	0.000! !END!
317 ! X =	360.5483,	-358.0303,	318,	0.000! !END!
318 ! X =	360.5373,	-357.7811,	335,	0.000! !END!
319 ! X =	360.5263,	-357.5319,	335,	0.000! !END!
320 ! X =	360.5153,	-357.2828,	335,	0.000! !END!
321 ! X =	360.5043,	-357.0336,	330,	0.000! !END!
322 ! X =	360.4933,	-356.7844,	362,	0.000! !END!
323 ! X =	360.4824,	-356.5353,	365,	0.000! !END!
324 ! X =	360.4714,	-356.2861,	365,	0.000! !END!
325 ! X =	360.4604,	-356.0369,	340,	0.000! !END!
326 ! X =	360.4494,	-355.7878,	312,	0.000! !END!
327 ! X =	360.4384,	-355.5386,	304,	0.000! !END!
328 ! X =	360.4274,	-355.2894,	304,	0.000! !END!
329 ! X =	360.9721,	-362.0061,	350,	0.000! !END!
330 ! X =	360.9611,	-361.7569,	313,	0.000! !END!
331 ! X =	360.9501,	-361.5078,	335,	0.000! !END!
332 ! X =	360.9391,	-361.2586,	355,	0.000! !END!
333 ! X =	360.9282,	-361.0094,	365,	0.000! !END!
334 ! X =	360.9172,	-360.7602,	373,	0.000! !END!
335 ! X =	360.9062,	-360.5111,	365,	0.000! !END!
336 ! X =	360.8952,	-360.2619,	365,	0.000! !END!
337 ! X =	360.8842,	-360.0127,	335,	0.000! !END!
338 ! X =	360.8732,	-359.7635,	335,	0.000! !END!
339 ! X =	360.8623,	-359.5144,	335,	0.000! !END!
340 ! X =	360.8513,	-359.2652,	323,	0.000! !END!
341 ! X =	360.8403,	-359.0160,	305,	0.000! !END!
342 ! X =	360.8293,	-358.7669,	296,	0.000! !END!
343 ! X =	360.8183,	-358.5177,	274,	0.000! !END!
344 ! X =	360.8073,	-358.2685,	284,	0.000! !END!

345 ! X =	360.7963,	-358.0193,	313,	0.000! !END!
346 ! X =	360.7854,	-357.7702,	325,	0.000! !END!
347 ! X =	360.7744,	-357.5210,	335,	0.000! !END!
348 ! X =	360.7634,	-357.2718,	335,	0.000! !END!
349 ! X =	360.7524,	-357.0227,	357,	0.000! !END!
350 ! X =	360.7414,	-356.7735,	365,	0.000! !END!
351 ! X =	360.7304,	-356.5243,	365,	0.000! !END!
352 ! X =	360.7194,	-356.2752,	365,	0.000! !END!
353 ! X =	360.7085,	-356.0260,	334,	0.000! !END!
354 ! X =	360.6975,	-355.7768,	334,	0.000! !END!
355 ! X =	360.6865,	-355.5277,	326,	0.000! !END!
356 ! X =	361.2202,	-361.9952,	365,	0.000! !END!
357 ! X =	361.2092,	-361.7460,	336,	0.000! !END!
358 ! X =	361.1982,	-361.4968,	352,	0.000! !END!
359 ! X =	361.1872,	-361.2477,	353,	0.000! !END!
360 ! X =	361.1763,	-360.9985,	367,	0.000! !END!
361 ! X =	361.1653,	-360.7493,	396,	0.000! !END!
362 ! X =	361.1213,	-359.7526,	329,	0.000! !END!
363 ! X =	361.1103,	-359.5034,	329,	0.000! !END!
364 ! X =	361.0994,	-359.2543,	311,	0.000! !END!
365 ! X =	361.0884,	-359.0051,	293,	0.000! !END!
366 ! X =	361.0774,	-358.7559,	277,	0.000! !END!
367 ! X =	361.0664,	-358.5067,	275,	0.000! !END!
368 ! X =	361.0554,	-358.2576,	275,	0.000! !END!
369 ! X =	361.0444,	-358.0084,	294,	0.000! !END!
370 ! X =	361.0334,	-357.7592,	303,	0.000! !END!
371 ! X =	361.0225,	-357.5101,	323,	0.000! !END!
372 ! X =	361.0115,	-357.2609,	338,	0.000! !END!
373 ! X =	361.0005,	-357.0117,	365,	0.000! !END!
374 ! X =	360.9895,	-356.7626,	365,	0.000! !END!
375 ! X =	360.9785,	-356.5134,	351,	0.000! !END!
376 ! X =	360.9675,	-356.2642,	335,	0.000! !END!
377 ! X =	360.9565,	-356.0151,	335,	0.000! !END!
378 ! X =	360.9456,	-355.7659,	335,	0.000! !END!
379 ! X =	360.9346,	-355.5167,	335,	0.000! !END!
380 ! X =	361.4683,	-361.9842,	365,	0.000! !END!
381 ! X =	361.4573,	-361.7351,	339,	0.000! !END!
382 ! X =	361.4463,	-361.4859,	365,	0.000! !END!
383 ! X =	361.4353,	-361.2367,	365,	0.000! !END!
384 ! X =	361.4243,	-360.9875,	358,	0.000! !END!
385 ! X =	361.4134,	-360.7384,	396,	0.000! !END!
386 ! X =	361.3694,	-359.7417,	328,	0.000! !END!
387 ! X =	361.3584,	-359.4925,	305,	0.000! !END!
388 ! X =	361.3474,	-359.2433,	304,	0.000! !END!
389 ! X =	361.3365,	-358.9942,	300,	0.000! !END!
390 ! X =	361.3255,	-358.7450,	304,	0.000! !END!
391 ! X =	361.3145,	-358.4958,	297,	0.000! !END!
392 ! X =	361.3035,	-358.2466,	274,	0.000! !END!
393 ! X =	361.2925,	-357.9975,	304,	0.000! !END!
394 ! X =	361.2815,	-357.7483,	304,	0.000! !END!
395 ! X =	361.2705,	-357.4991,	307,	0.000! !END!
396 ! X =	361.2596,	-357.2500,	335,	0.000! !END!
397 ! X =	361.2486,	-357.0008,	365,	0.000! !END!
398 ! X =	361.2376,	-356.7516,	365,	0.000! !END!
399 ! X =	361.2266,	-356.5025,	354,	0.000! !END!
400 ! X =	361.2156,	-356.2533,	335,	0.000! !END!

401 ! X =	361.2046,	-356.0041,	312,	0.000!	!END!
402 ! X =	361.1936,	-355.7550,	335,	0.000!	!END!
403 ! X =	361.1827,	-355.5058,	316,	0.000!	!END!
404 ! X =	361.1717,	-355.2566,	306,	0.000!	!END!
405 ! X =	361.1607,	-355.0075,	284,	0.000!	!END!
406 ! X =	361.1497,	-354.7583,	297,	0.000!	!END!
407 ! X =	361.7164,	-361.9733,	365,	0.000!	!END!
408 ! X =	361.7054,	-361.7241,	365,	0.000!	!END!
409 ! X =	361.6944,	-361.4750,	383,	0.000!	!END!
410 ! X =	361.6834,	-361.2258,	390,	0.000!	!END!
411 ! X =	361.6724,	-360.9766,	386,	0.000!	!END!
412 ! X =	361.6614,	-360.7274,	367,	0.000!	!END!
413 ! X =	361.6175,	-359.7307,	335,	0.000!	!END!
414 ! X =	361.6065,	-359.4816,	335,	0.000!	!END!
415 ! X =	361.5955,	-359.2324,	316,	0.000!	!END!
416 ! X =	361.5845,	-358.9832,	304,	0.000!	!END!
417 ! X =	361.5735,	-358.7340,	304,	0.000!	!END!
418 ! X =	361.5626,	-358.4849,	304,	0.000!	!END!
419 ! X =	361.5516,	-358.2357,	277,	0.000!	!END!
420 ! X =	361.5406,	-357.9865,	296,	0.000!	!END!
421 ! X =	361.5296,	-357.7374,	304,	0.000!	!END!
422 ! X =	361.5186,	-357.4882,	307,	0.000!	!END!
423 ! X =	361.5076,	-357.2390,	328,	0.000!	!END!
424 ! X =	361.4966,	-356.9899,	348,	0.000!	!END!
425 ! X =	361.4857,	-356.7407,	355,	0.000!	!END!
426 ! X =	361.4747,	-356.4915,	347,	0.000!	!END!
427 ! X =	361.4637,	-356.2424,	335,	0.000!	!END!
428 ! X =	361.4527,	-355.9932,	311,	0.000!	!END!
429 ! X =	361.4417,	-355.7440,	302,	0.000!	!END!
430 ! X =	361.4307,	-355.4949,	284,	0.000!	!END!
431 ! X =	361.4197,	-355.2457,	277,	0.000!	!END!
432 ! X =	361.4088,	-354.9965,	296,	0.000!	!END!
433 ! X =	361.3978,	-354.7474,	301,	0.000!	!END!
434 ! X =	361.9535,	-361.7132,	372,	0.000!	!END!
435 ! X =	361.8656,	-359.7198,	335,	0.000!	!END!
436 ! X =	361.8546,	-359.4706,	335,	0.000!	!END!
437 ! X =	361.8436,	-359.2215,	316,	0.000!	!END!
438 ! X =	361.8326,	-358.9723,	321,	0.000!	!END!
439 ! X =	361.8216,	-358.7231,	331,	0.000!	!END!
440 ! X =	361.8106,	-358.4739,	305,	0.000!	!END!
441 ! X =	361.7997,	-358.2248,	287,	0.000!	!END!
442 ! X =	361.7887,	-357.9756,	304,	0.000!	!END!
443 ! X =	361.7777,	-357.7264,	305,	0.000!	!END!
444 ! X =	361.7667,	-357.4773,	310,	0.000!	!END!
445 ! X =	361.7557,	-357.2281,	320,	0.000!	!END!
446 ! X =	361.7447,	-356.9789,	339,	0.000!	!END!
447 ! X =	361.7337,	-356.7298,	340,	0.000!	!END!
448 ! X =	361.7228,	-356.4806,	335,	0.000!	!END!
449 ! X =	361.7118,	-356.2314,	319,	0.000!	!END!
450 ! X =	361.7008,	-355.9823,	304,	0.000!	!END!
451 ! X =	361.6898,	-355.7331,	304,	0.000!	!END!
452 ! X =	361.6788,	-355.4839,	284,	0.000!	!END!
453 ! X =	361.6678,	-355.2348,	304,	0.000!	!END!
454 ! X =	361.6568,	-354.9856,	304,	0.000!	!END!
455 ! X =	361.6458,	-354.7364,	304,	0.000!	!END!
456 ! X =	362.1137,	-359.7089,	329,	0.000!	!END!

457 ! X =	362.1027,	-359.4597,	312,	0.000! !END!
458 ! X =	362.0917,	-359.2105,	327,	0.000! !END!
459 ! X =	362.0807,	-358.9613,	335,	0.000! !END!
460 ! X =	362.0697,	-358.7122,	335,	0.000! !END!
461 ! X =	362.0587,	-358.4630,	297,	0.000! !END!
462 ! X =	362.0477,	-358.2138,	304,	0.000! !END!
463 ! X =	362.0368,	-357.9647,	304,	0.000! !END!
464 ! X =	362.0258,	-357.7155,	310,	0.000! !END!
465 ! X =	362.0148,	-357.4663,	324,	0.000! !END!
466 ! X =	362.0038,	-357.2172,	338,	0.000! !END!
467 ! X =	361.9928,	-356.9680,	339,	0.000! !END!
468 ! X =	361.9818,	-356.7188,	335,	0.000! !END!
469 ! X =	361.9708,	-356.4697,	326,	0.000! !END!
470 ! X =	361.9598,	-356.2205,	309,	0.000! !END!
471 ! X =	361.9489,	-355.9713,	301,	0.000! !END!
472 ! X =	361.9379,	-355.7222,	296,	0.000! !END!
473 ! X =	361.9269,	-355.4730,	304,	0.000! !END!
474 ! X =	361.9159,	-355.2238,	305,	0.000! !END!
475 ! X =	361.9049,	-354.9747,	304,	0.000! !END!
476 ! X =	361.8939,	-354.7255,	304,	0.000! !END!
477 ! X =	362.3617,	-359.6979,	335,	0.000! !END!
478 ! X =	362.3508,	-359.4487,	329,	0.000! !END!
479 ! X =	362.3398,	-359.1996,	335,	0.000! !END!
480 ! X =	362.3288,	-358.9504,	335,	0.000! !END!
481 ! X =	362.3178,	-358.7012,	319,	0.000! !END!
482 ! X =	362.3068,	-358.4521,	298,	0.000! !END!
483 ! X =	362.2958,	-358.2029,	304,	0.000! !END!
484 ! X =	362.2848,	-357.9537,	311,	0.000! !END!
485 ! X =	362.2738,	-357.7046,	335,	0.000! !END!
486 ! X =	362.2629,	-357.4554,	339,	0.000! !END!
487 ! X =	362.2519,	-357.2062,	365,	0.000! !END!
488 ! X =	362.2409,	-356.9571,	365,	0.000! !END!
489 ! X =	362.2299,	-356.7079,	347,	0.000! !END!
490 ! X =	362.2189,	-356.4587,	326,	0.000! !END!
491 ! X =	362.2079,	-356.2096,	309,	0.000! !END!
492 ! X =	362.1969,	-355.9604,	302,	0.000! !END!
493 ! X =	362.1859,	-355.7112,	309,	0.000! !END!
494 ! X =	362.1750,	-355.4621,	335,	0.000! !END!
495 ! X =	362.1640,	-355.2129,	322,	0.000! !END!
496 ! X =	362.1530,	-354.9637,	305,	0.000! !END!
497 ! X =	362.1420,	-354.7146,	304,	0.000! !END!
498 ! X =	362.6098,	-359.6870,	345,	0.000! !END!
499 ! X =	362.5988,	-359.4378,	340,	0.000! !END!
500 ! X =	362.5879,	-359.1886,	335,	0.000! !END!
501 ! X =	362.5769,	-358.9395,	335,	0.000! !END!
502 ! X =	362.5659,	-358.6903,	304,	0.000! !END!
503 ! X =	362.5549,	-358.4411,	304,	0.000! !END!
504 ! X =	362.5439,	-358.1920,	304,	0.000! !END!
505 ! X =	362.5329,	-357.9428,	310,	0.000! !END!
506 ! X =	362.5219,	-357.6936,	335,	0.000! !END!
507 ! X =	362.5109,	-357.4445,	343,	0.000! !END!
508 ! X =	362.5000,	-357.1953,	365,	0.000! !END!
509 ! X =	362.4890,	-356.9461,	365,	0.000! !END!
510 ! X =	362.4780,	-356.6969,	350,	0.000! !END!
511 ! X =	362.4670,	-356.4478,	319,	0.000! !END!
512 ! X =	362.4560,	-356.1986,	304,	0.000! !END!

513 ! X =	362.4450,	-355.9495,	328,	0.000! !END!
514 ! X =	362.4340,	-355.7003,	335,	0.000! !END!
515 ! X =	362.4230,	-355.4511,	335,	0.000! !END!
516 ! X =	362.4121,	-355.2020,	330,	0.000! !END!
517 ! X =	362.4011,	-354.9528,	300,	0.000! !END!
518 ! X =	362.3901,	-354.7036,	275,	0.000! !END!
519 ! X =	362.9019,	-360.6727,	376,	0.000! !END!
520 ! X =	362.8799,	-360.1744,	365,	0.000! !END!
521 ! X =	362.8689,	-359.9252,	365,	0.000! !END!
522 ! X =	362.8579,	-359.6760,	365,	0.000! !END!
523 ! X =	362.8469,	-359.4269,	361,	0.000! !END!
524 ! X =	362.8359,	-359.1777,	337,	0.000! !END!
525 ! X =	362.8250,	-358.9285,	306,	0.000! !END!
526 ! X =	362.8140,	-358.6794,	318,	0.000! !END!
527 ! X =	362.8030,	-358.4302,	335,	0.000! !END!
528 ! X =	362.7920,	-358.1810,	309,	0.000! !END!
529 ! X =	362.7810,	-357.9318,	305,	0.000! !END!
530 ! X =	362.7700,	-357.6827,	312,	0.000! !END!
531 ! X =	362.7590,	-357.4335,	338,	0.000! !END!
532 ! X =	362.7480,	-357.1843,	365,	0.000! !END!
533 ! X =	362.7370,	-356.9352,	365,	0.000! !END!
534 ! X =	362.7261,	-356.6860,	350,	0.000! !END!
535 ! X =	362.7151,	-356.4368,	335,	0.000! !END!
536 ! X =	362.7041,	-356.1877,	349,	0.000! !END!
537 ! X =	362.6931,	-355.9385,	365,	0.000! !END!
538 ! X =	362.6821,	-355.6893,	351,	0.000! !END!
539 ! X =	362.6711,	-355.4402,	335,	0.000! !END!
540 ! X =	362.6601,	-355.1910,	319,	0.000! !END!
541 ! X =	362.6491,	-354.9419,	302,	0.000! !END!
542 ! X =	362.6382,	-354.6927,	284,	0.000! !END!
543 ! X =	362.6272,	-354.4435,	274,	0.000! !END!
544 ! X =	363.1500,	-360.6618,	391,	0.000! !END!
545 ! X =	363.1390,	-360.4126,	382,	0.000! !END!
546 ! X =	363.1280,	-360.1635,	366,	0.000! !END!
547 ! X =	363.1170,	-359.9143,	365,	0.000! !END!
548 ! X =	363.1060,	-359.6651,	365,	0.000! !END!
549 ! X =	363.0950,	-359.4159,	359,	0.000! !END!
550 ! X =	363.0840,	-359.1668,	323,	0.000! !END!
551 ! X =	363.0730,	-358.9176,	327,	0.000! !END!
552 ! X =	363.0620,	-358.6684,	335,	0.000! !END!
553 ! X =	363.0511,	-358.4192,	335,	0.000! !END!
554 ! X =	363.0401,	-358.1701,	331,	0.000! !END!
555 ! X =	363.0291,	-357.9209,	320,	0.000! !END!
556 ! X =	363.0181,	-357.6717,	335,	0.000! !END!
557 ! X =	363.0071,	-357.4226,	335,	0.000! !END!
558 ! X =	362.9961,	-357.1734,	341,	0.000! !END!
559 ! X =	362.9851,	-356.9242,	349,	0.000! !END!
560 ! X =	362.9741,	-356.6751,	350,	0.000! !END!
561 ! X =	362.9631,	-356.4259,	365,	0.000! !END!
562 ! X =	362.9522,	-356.1767,	365,	0.000! !END!
563 ! X =	362.9412,	-355.9276,	365,	0.000! !END!
564 ! X =	362.9302,	-355.6784,	352,	0.000! !END!
565 ! X =	362.9192,	-355.4292,	335,	0.000! !END!
566 ! X =	362.9082,	-355.1801,	315,	0.000! !END!
567 ! X =	362.8972,	-354.9309,	305,	0.000! !END!
568 ! X =	362.8862,	-354.6818,	301,	0.000! !END!

569 ! X =	362.8752,	-354.4326,	275,	0.000!	!END!
570 ! X =	363.3871,	-360.4017,	396,	0.000!	!END!
571 ! X =	363.3761,	-360.1525,	382,	0.000!	!END!
572 ! X =	363.3651,	-359.9033,	355,	0.000!	!END!
573 ! X =	363.3541,	-359.6542,	340,	0.000!	!END!
574 ! X =	363.3431,	-359.4050,	327,	0.000!	!END!
575 ! X =	363.3321,	-359.1558,	342,	0.000!	!END!
576 ! X =	363.3211,	-358.9067,	349,	0.000!	!END!
577 ! X =	363.3101,	-358.6575,	350,	0.000!	!END!
578 ! X =	363.2991,	-358.4083,	365,	0.000!	!END!
579 ! X =	363.2882,	-358.1591,	351,	0.000!	!END!
580 ! X =	363.2772,	-357.9100,	335,	0.000!	!END!
581 ! X =	363.2662,	-357.6608,	340,	0.000!	!END!
582 ! X =	363.2552,	-357.4116,	348,	0.000!	!END!
583 ! X =	363.2442,	-357.1625,	356,	0.000!	!END!
584 ! X =	363.2332,	-356.9133,	365,	0.000!	!END!
585 ! X =	363.2222,	-356.6641,	365,	0.000!	!END!
586 ! X =	363.2112,	-356.4150,	365,	0.000!	!END!
587 ! X =	363.2002,	-356.1658,	365,	0.000!	!END!
588 ! X =	363.1893,	-355.9166,	361,	0.000!	!END!
589 ! X =	363.1783,	-355.6675,	332,	0.000!	!END!
590 ! X =	363.1673,	-355.4183,	320,	0.000!	!END!
591 ! X =	363.1563,	-355.1691,	305,	0.000!	!END!
592 ! X =	363.1453,	-354.9200,	304,	0.000!	!END!
593 ! X =	363.1343,	-354.6708,	299,	0.000!	!END!
594 ! X =	363.1233,	-354.4217,	277,	0.000!	!END!
595 ! X =	363.6242,	-360.1416,	391,	0.000!	!END!
596 ! X =	363.6132,	-359.8924,	356,	0.000!	!END!
597 ! X =	363.6022,	-359.6432,	335,	0.000!	!END!
598 ! X =	363.5912,	-359.3941,	311,	0.000!	!END!
599 ! X =	363.5802,	-359.1449,	342,	0.000!	!END!
600 ! X =	363.5692,	-358.8957,	380,	0.000!	!END!
601 ! X =	363.5582,	-358.6465,	389,	0.000!	!END!
602 ! X =	363.5472,	-358.3974,	396,	0.000!	!END!
603 ! X =	363.5362,	-358.1482,	369,	0.000!	!END!
604 ! X =	363.5252,	-357.8990,	341,	0.000!	!END!
605 ! X =	363.5143,	-357.6499,	359,	0.000!	!END!
606 ! X =	363.5033,	-357.4007,	365,	0.000!	!END!
607 ! X =	363.4923,	-357.1515,	365,	0.000!	!END!
608 ! X =	363.4813,	-356.9024,	365,	0.000!	!END!
609 ! X =	363.4703,	-356.6532,	365,	0.000!	!END!
610 ! X =	363.4593,	-356.4040,	365,	0.000!	!END!
611 ! X =	363.4483,	-356.1549,	365,	0.000!	!END!
612 ! X =	363.4373,	-355.9057,	342,	0.000!	!END!
613 ! X =	363.4263,	-355.6565,	325,	0.000!	!END!
614 ! X =	363.4154,	-355.4074,	309,	0.000!	!END!
615 ! X =	363.4044,	-355.1582,	304,	0.000!	!END!
616 ! X =	363.3934,	-354.9090,	297,	0.000!	!END!
617 ! X =	363.3824,	-354.6599,	282,	0.000!	!END!
618 ! X =	363.3714,	-354.4107,	274,	0.000!	!END!
619 ! X =	363.8722,	-360.1306,	391,	0.000!	!END!
620 ! X =	363.8612,	-359.8815,	350,	0.000!	!END!
621 ! X =	363.8503,	-359.6323,	337,	0.000!	!END!
622 ! X =	363.8393,	-359.3831,	313,	0.000!	!END!
623 ! X =	363.8283,	-359.1339,	335,	0.000!	!END!
624 ! X =	363.8173,	-358.8848,	396,	0.000!	!END!

625 ! X =	363.8063,	-358.6356,	396,	0.000! !END!
626 ! X =	363.7953,	-358.3864,	396,	0.000! !END!
627 ! X =	363.7843,	-358.1373,	386,	0.000! !END!
628 ! X =	363.7733,	-357.8881,	360,	0.000! !END!
629 ! X =	363.7623,	-357.6389,	365,	0.000! !END!
630 ! X =	363.7513,	-357.3898,	365,	0.000! !END!
631 ! X =	363.7404,	-357.1406,	365,	0.000! !END!
632 ! X =	363.7294,	-356.8914,	365,	0.000! !END!
633 ! X =	363.7184,	-356.6423,	351,	0.000! !END!
634 ! X =	363.7074,	-356.3931,	350,	0.000! !END!
635 ! X =	363.6964,	-356.1439,	335,	0.000! !END!
636 ! X =	363.6854,	-355.8948,	322,	0.000! !END!
637 ! X =	363.6744,	-355.6456,	310,	0.000! !END!
638 ! X =	363.6634,	-355.3964,	305,	0.000! !END!
639 ! X =	363.6524,	-355.1473,	291,	0.000! !END!
640 ! X =	363.6414,	-354.8981,	276,	0.000! !END!
641 ! X =	363.6305,	-354.6489,	274,	0.000! !END!
642 ! X =	363.6195,	-354.3998,	274,	0.000! !END!
643 ! X =	363.6085,	-354.1506,	268,	0.000! !END!
644 ! X =	364.1203,	-360.1197,	380,	0.000! !END!
645 ! X =	364.1093,	-359.8705,	396,	0.000! !END!
646 ! X =	364.0983,	-359.6213,	370,	0.000! !END!
647 ! X =	364.0874,	-359.3722,	332,	0.000! !END!
648 ! X =	364.0764,	-359.1230,	356,	0.000! !END!
649 ! X =	364.0654,	-358.8738,	372,	0.000! !END!
650 ! X =	364.0544,	-358.6247,	396,	0.000! !END!
651 ! X =	364.0434,	-358.3755,	396,	0.000! !END!
652 ! X =	364.0324,	-358.1263,	384,	0.000! !END!
653 ! X =	364.0214,	-357.8772,	365,	0.000! !END!
654 ! X =	364.0104,	-357.6280,	365,	0.000! !END!
655 ! X =	363.9994,	-357.3788,	365,	0.000! !END!
656 ! X =	363.9884,	-357.1296,	355,	0.000! !END!
657 ! X =	363.9774,	-356.8805,	333,	0.000! !END!
658 ! X =	363.9665,	-356.6313,	327,	0.000! !END!
659 ! X =	363.9555,	-356.3821,	335,	0.000! !END!
660 ! X =	363.9445,	-356.1330,	313,	0.000! !END!
661 ! X =	363.9335,	-355.8838,	304,	0.000! !END!
662 ! X =	363.9225,	-355.6347,	304,	0.000! !END!
663 ! X =	363.9115,	-355.3855,	304,	0.000! !END!
664 ! X =	363.9005,	-355.1363,	284,	0.000! !END!
665 ! X =	363.8895,	-354.8872,	274,	0.000! !END!
666 ! X =	363.8785,	-354.6380,	274,	0.000! !END!
667 ! X =	363.8675,	-354.3888,	267,	0.000! !END!
668 ! X =	364.3464,	-359.6104,	372,	0.000! !END!
669 ! X =	364.3354,	-359.3612,	335,	0.000! !END!
670 ! X =	364.3244,	-359.1121,	365,	0.000! !END!
671 ! X =	364.3135,	-358.8629,	396,	0.000! !END!
672 ! X =	364.3025,	-358.6137,	396,	0.000! !END!
673 ! X =	364.2915,	-358.3646,	396,	0.000! !END!
674 ! X =	364.2805,	-358.1154,	373,	0.000! !END!
675 ! X =	364.2695,	-357.8662,	366,	0.000! !END!
676 ! X =	364.2585,	-357.6170,	365,	0.000! !END!
677 ! X =	364.2475,	-357.3679,	365,	0.000! !END!
678 ! X =	364.2365,	-357.1187,	341,	0.000! !END!
679 ! X =	364.2255,	-356.8695,	335,	0.000! !END!
680 ! X =	364.2145,	-356.6204,	307,	0.000! !END!

681 ! X =	364.2035,	-356.3712,	309,	0.000! !END!
682 ! X =	364.1926,	-356.1220,	305,	0.000! !END!
683 ! X =	364.1816,	-355.8729,	300,	0.000! !END!
684 ! X =	364.1706,	-355.6237,	280,	0.000! !END!
685 ! X =	364.1596,	-355.3745,	292,	0.000! !END!
686 ! X =	364.1486,	-355.1254,	294,	0.000! !END!
687 ! X =	364.1376,	-354.8762,	291,	0.000! !END!
688 ! X =	364.1266,	-354.6271,	281,	0.000! !END!
689 ! X =	364.5945,	-359.5995,	366,	0.000! !END!
690 ! X =	364.5835,	-359.3503,	344,	0.000! !END!
691 ! X =	364.5725,	-359.1011,	365,	0.000! !END!
692 ! X =	364.5615,	-358.8520,	396,	0.000! !END!
693 ! X =	364.5505,	-358.6028,	396,	0.000! !END!
694 ! X =	364.5396,	-358.3536,	396,	0.000! !END!
695 ! X =	364.5286,	-358.1044,	391,	0.000! !END!
696 ! X =	364.5176,	-357.8553,	372,	0.000! !END!
697 ! X =	364.5066,	-357.6061,	365,	0.000! !END!
698 ! X =	364.4956,	-357.3569,	360,	0.000! !END!
699 ! X =	364.4846,	-357.1078,	332,	0.000! !END!
700 ! X =	364.4736,	-356.8586,	320,	0.000! !END!
701 ! X =	364.4626,	-356.6094,	335,	0.000! !END!
702 ! X =	364.4516,	-356.3603,	335,	0.000! !END!
703 ! X =	364.4406,	-356.1111,	311,	0.000! !END!
704 ! X =	364.4296,	-355.8619,	302,	0.000! !END!
705 ! X =	364.4187,	-355.6128,	297,	0.000! !END!
706 ! X =	364.4077,	-355.3636,	304,	0.000! !END!
707 ! X =	364.3967,	-355.1144,	304,	0.000! !END!
708 ! X =	364.3857,	-354.8653,	304,	0.000! !END!
709 ! X =	364.3747,	-354.6161,	304,	0.000! !END!
710 ! X =	364.8426,	-359.5885,	390,	0.000! !END!
711 ! X =	364.8316,	-359.3394,	379,	0.000! !END!
712 ! X =	364.8206,	-359.0902,	353,	0.000! !END!
713 ! X =	364.8096,	-358.8410,	386,	0.000! !END!
714 ! X =	364.7986,	-358.5918,	402,	0.000! !END!
715 ! X =	364.7876,	-358.3427,	397,	0.000! !END!
716 ! X =	364.7766,	-358.0935,	396,	0.000! !END!
717 ! X =	364.7657,	-357.8443,	384,	0.000! !END!
718 ! X =	364.7547,	-357.5952,	356,	0.000! !END!
719 ! X =	364.7437,	-357.3460,	355,	0.000! !END!
720 ! X =	364.7327,	-357.0968,	363,	0.000! !END!
721 ! X =	364.7217,	-356.8477,	365,	0.000! !END!
722 ! X =	364.7107,	-356.5985,	357,	0.000! !END!
723 ! X =	364.6997,	-356.3493,	335,	0.000! !END!
724 ! X =	364.6887,	-356.1002,	318,	0.000! !END!
725 ! X =	364.6777,	-355.8510,	304,	0.000! !END!
726 ! X =	364.6667,	-355.6018,	304,	0.000! !END!
727 ! X =	364.6557,	-355.3527,	304,	0.000! !END!
728 ! X =	364.6447,	-355.1035,	304,	0.000! !END!
729 ! X =	364.6338,	-354.8543,	304,	0.000! !END!
730 ! X =	364.6228,	-354.6052,	304,	0.000! !END!
731 ! X =	365.0467,	-358.5809,	402,	0.000! !END!
732 ! X =	365.0357,	-358.3317,	396,	0.000! !END!
733 ! X =	365.0247,	-358.0826,	396,	0.000! !END!
734 ! X =	365.0137,	-357.8334,	386,	0.000! !END!
735 ! X =	365.0027,	-357.5842,	357,	0.000! !END!
736 ! X =	364.9918,	-357.3351,	381,	0.000! !END!

737 ! X =	364.9808,	-357.0859,	370,	0.000!	!END!
738 ! X =	364.9698,	-356.8367,	365,	0.000!	!END!
739 ! X =	364.9588,	-356.5876,	354,	0.000!	!END!
740 ! X =	364.9478,	-356.3384,	320,	0.000!	!END!
741 ! X =	364.9368,	-356.0892,	306,	0.000!	!END!
742 ! X =	364.9258,	-355.8401,	304,	0.000!	!END!
743 ! X =	364.9148,	-355.5909,	306,	0.000!	!END!
744 ! X =	364.9038,	-355.3417,	305,	0.000!	!END!
745 ! X =	364.8928,	-355.0926,	304,	0.000!	!END!
746 ! X =	364.8818,	-354.8434,	304,	0.000!	!END!
747 ! X =	364.8708,	-354.5942,	304,	0.000!	!END!
748 ! X =	365.2948,	-358.5700,	396,	0.000!	!END!
749 ! X =	365.2838,	-358.3208,	396,	0.000!	!END!
750 ! X =	365.2728,	-358.0716,	396,	0.000!	!END!
751 ! X =	365.2618,	-357.8224,	372,	0.000!	!END!
752 ! X =	365.2508,	-357.5733,	355,	0.000!	!END!
753 ! X =	365.2398,	-357.3241,	389,	0.000!	!END!
754 ! X =	365.2288,	-357.0749,	389,	0.000!	!END!
755 ! X =	365.2178,	-356.8258,	347,	0.000!	!END!
756 ! X =	365.2069,	-356.5766,	340,	0.000!	!END!
757 ! X =	365.1959,	-356.3274,	331,	0.000!	!END!
758 ! X =	365.1849,	-356.0783,	308,	0.000!	!END!
759 ! X =	365.1739,	-355.8291,	320,	0.000!	!END!
760 ! X =	365.1629,	-355.5799,	335,	0.000!	!END!
761 ! X =	365.1519,	-355.3308,	316,	0.000!	!END!
762 ! X =	365.1409,	-355.0816,	304,	0.000!	!END!
763 ! X =	365.5099,	-357.8115,	372,	0.000!	!END!
764 ! X =	365.4989,	-357.5623,	396,	0.000!	!END!
765 ! X =	365.4879,	-357.3132,	372,	0.000!	!END!
766 ! X =	365.4769,	-357.0640,	365,	0.000!	!END!
767 ! X =	365.4659,	-356.8148,	365,	0.000!	!END!
768 ! X =	365.4549,	-356.5657,	365,	0.000!	!END!
769 ! X =	365.4439,	-356.3165,	338,	0.000!	!END!
770 ! X =	365.4329,	-356.0673,	314,	0.000!	!END!
771 ! X =	365.4220,	-355.8182,	321,	0.000!	!END!
772 ! X =	365.4110,	-355.5690,	335,	0.000!	!END!
773 ! X =	365.4000,	-355.3198,	335,	0.000!	!END!
774 ! X =	365.3890,	-355.0707,	292,	0.000!	!END!
775 ! X =	365.7470,	-357.5514,	396,	0.000!	!END!
776 ! X =	365.7360,	-357.3022,	386,	0.000!	!END!
777 ! X =	365.7250,	-357.0531,	365,	0.000!	!END!
778 ! X =	365.7140,	-356.8039,	365,	0.000!	!END!
779 ! X =	365.7030,	-356.5547,	365,	0.000!	!END!
780 ! X =	365.6920,	-356.3056,	338,	0.000!	!END!
781 ! X =	365.6810,	-356.0564,	310,	0.000!	!END!
782 ! X =	365.6700,	-355.8072,	312,	0.000!	!END!
783 ! X =	365.6590,	-355.5581,	318,	0.000!	!END!
784 ! X =	365.6480,	-355.3089,	307,	0.000!	!END!
785 ! X =	365.6371,	-355.0597,	275,	0.000!	!END!
786 ! X =	365.9731,	-357.0421,	365,	0.000!	!END!
787 ! X =	365.9621,	-356.7929,	343,	0.000!	!END!
788 ! X =	365.9511,	-356.5438,	341,	0.000!	!END!
789 ! X =	365.9181,	-355.7963,	274,	0.000!	!END!
790 ! X =	358.1317,	-357.5676,	274,	0.000!	!END!
791 ! X =	358.3351,	-357.5586,	274,	0.000!	!END!
792 ! X =	358.5386,	-357.5496,	274,	0.000!	!END!
793 ! X =	358.5523,	-357.7488,	265,	0.000!	!END!

794 ! X =	358.5661,	-357.9479,	244,	0.000! !END!
795 ! X =	358.5701,	-358.1524,	276,	0.000! !END!
796 ! X =	358.5741,	-358.3570,	295,	0.000! !END!
797 ! X =	358.5831,	-358.5613,	308,	0.000! !END!
798 ! X =	358.5922,	-358.7656,	322,	0.000! !END!
799 ! X =	358.3911,	-358.7715,	302,	0.000! !END!
800 ! X =	358.1900,	-358.7783,	284,	0.000! !END!
801 ! X =	357.9890,	-358.7852,	276,	0.000! !END!
802 ! X =	357.7879,	-358.7910,	274,	0.000! !END!
803 ! X =	357.5942,	-358.7946,	274,	0.000! !END!
804 ! X =	357.4005,	-358.7981,	274,	0.000! !END!
805 ! X =	357.4078,	-359.0205,	259,	0.000! !END!
806 ! X =	357.4151,	-359.2419,	274,	0.000! !END!
807 ! X =	357.4224,	-359.4642,	274,	0.000! !END!
808 ! X =	357.4296,	-359.6856,	274,	0.000! !END!
809 ! X =	357.4317,	-359.8453,	271,	0.000! !END!
810 ! X =	357.4338,	-360.0050,	256,	0.000! !END!
811 ! X =	357.4335,	-360.2247,	274,	0.000! !END!
812 ! X =	357.6273,	-360.3360,	274,	0.000! !END!
813 ! X =	357.8392,	-360.4066,	274,	0.000! !END!
814 ! X =	358.0379,	-360.4028,	274,	0.000! !END!
815 ! X =	358.2366,	-360.3990,	271,	0.000! !END!
816 ! X =	358.2429,	-360.5985,	251,	0.000! !END!
817 ! X =	358.2492,	-360.7979,	259,	0.000! !END!
818 ! X =	358.2555,	-360.9974,	272,	0.000! !END!
819 ! X =	358.2618,	-361.1968,	271,	0.000! !END!
820 ! X =	358.0733,	-361.2051,	243,	0.000! !END!
821 ! X =	358.0527,	-361.4158,	274,	0.000! !END!
822 ! X =	358.0214,	-361.6069,	274,	0.000! !END!
823 ! X =	358.2400,	-361.6042,	295,	0.000! !END!
824 ! X =	358.4586,	-361.6006,	304,	0.000! !END!
825 ! X =	358.6772,	-361.5980,	304,	0.000! !END!
826 ! X =	358.8782,	-361.5911,	304,	0.000! !END!
827 ! X =	359.0793,	-361.5852,	304,	0.000! !END!
828 ! X =	359.2804,	-361.5794,	304,	0.000! !END!
829 ! X =	359.4815,	-361.5725,	304,	0.000! !END!
830 ! X =	359.4855,	-361.7770,	294,	0.000! !END!
831 ! X =	359.4895,	-361.9816,	280,	0.000! !END!
832 ! X =	359.4931,	-362.0613,	284,	0.000! !END!
833 ! X =	359.6027,	-362.0665,	298,	0.000! !END!
834 ! X =	359.7714,	-362.0590,	308,	0.000! !END!
835 ! X =	359.9107,	-362.0629,	322,	0.000! !END!
836 ! X =	360.0699,	-362.0659,	335,	0.000! !END!
837 ! X =	360.1967,	-362.0103,	335,	0.000! !END!
838 ! X =	360.3158,	-362.0051,	335,	0.000! !END!
839 ! X =	360.3650,	-361.9929,	335,	0.000! !END!
840 ! X =	360.4638,	-361.9786,	335,	0.000! !END!
841 ! X =	360.5337,	-361.9855,	335,	0.000! !END!
842 ! X =	360.5954,	-362.0327,	335,	0.000! !END!
843 ! X =	360.6567,	-362.0699,	335,	0.000! !END!
844 ! X =	360.7496,	-362.1457,	344,	0.000! !END!
845 ! X =	360.8506,	-362.1812,	362,	0.000! !END!
846 ! X =	360.9300,	-362.1777,	365,	0.000! !END!
847 ! X =	361.0464,	-362.1127,	365,	0.000! !END!
848 ! X =	361.1534,	-362.0580,	365,	0.000! !END!
849 ! X =	361.2224,	-362.0450,	365,	0.000! !END!

850 ! X =	361.3712,	-362.0385,	365,	0.000! !END!
851 ! X =	361.5119,	-362.0722,	365,	0.000! !END!
852 ! X =	361.5948,	-362.1484,	365,	0.000! !END!
853 ! X =	361.6656,	-362.1753,	365,	0.000! !END!
854 ! X =	361.7713,	-362.0907,	365,	0.000! !END!
855 ! X =	361.8544,	-361.9472,	365,	0.000! !END!
856 ! X =	361.8807,	-361.8662,	366,	0.000! !END!
857 ! X =	361.9764,	-361.7821,	372,	0.000! !END!
858 ! X =	362.0527,	-361.7088,	372,	0.000! !END!
859 ! X =	362.1070,	-361.5866,	385,	0.000! !END!
860 ! X =	362.1332,	-361.5055,	386,	0.000! !END!
861 ! X =	361.8946,	-361.5061,	396,	0.000! !END!
862 ! X =	361.8882,	-361.3036,	396,	0.000! !END!
863 ! X =	361.8818,	-361.1022,	396,	0.000! !END!
864 ! X =	361.8754,	-360.9007,	396,	0.000! !END!
865 ! X =	361.8690,	-360.6983,	370,	0.000! !END!
866 ! X =	361.6678,	-360.7022,	367,	0.000! !END!
867 ! X =	361.4666,	-360.7061,	396,	0.000! !END!
868 ! X =	361.2654,	-360.7099,	396,	0.000! !END!
869 ! X =	361.0643,	-360.7138,	396,	0.000! !END!
870 ! X =	361.0577,	-360.5094,	377,	0.000! !END!
871 ! X =	361.0512,	-360.3049,	366,	0.000! !END!
872 ! X =	361.0447,	-360.1005,	337,	0.000! !END!
873 ! X =	361.0382,	-359.8961,	335,	0.000! !END!
874 ! X =	361.2682,	-359.8949,	333,	0.000! !END!
875 ! X =	361.4983,	-359.8928,	343,	0.000! !END!
876 ! X =	361.7283,	-359.8916,	350,	0.000! !END!
877 ! X =	361.9583,	-359.8895,	337,	0.000! !END!
878 ! X =	362.1883,	-359.8883,	344,	0.000! !END!
879 ! X =	362.4184,	-359.8862,	343,	0.000! !END!
880 ! X =	362.6484,	-359.8850,	335,	0.000! !END!
881 ! X =	362.6574,	-360.0893,	344,	0.000! !END!
882 ! X =	362.6664,	-360.2937,	356,	0.000! !END!
883 ! X =	362.8601,	-360.2901,	361,	0.000! !END!
884 ! X =	363.0539,	-360.2866,	365,	0.000! !END!
885 ! X =	363.0622,	-360.4759,	376,	0.000! !END!
886 ! X =	362.8638,	-360.4847,	350,	0.000! !END!
887 ! X =	362.6653,	-360.4934,	365,	0.000! !END!
888 ! X =	362.6741,	-360.6928,	364,	0.000! !END!
889 ! X =	362.8661,	-360.6873,	375,	0.000! !END!
890 ! X =	363.0581,	-360.6828,	391,	0.000! !END!
891 ! X =	363.2501,	-360.6774,	393,	0.000! !END!
892 ! X =	363.3535,	-360.5430,	396,	0.000! !END!
893 ! X =	363.4497,	-360.4688,	396,	0.000! !END!
894 ! X =	363.5480,	-360.4445,	396,	0.000! !END!
895 ! X =	363.6041,	-360.3622,	396,	0.000! !END!
896 ! X =	363.6407,	-360.2906,	396,	0.000! !END!
897 ! X =	363.7787,	-360.2646,	395,	0.000! !END!
898 ! X =	363.8577,	-360.2511,	395,	0.000! !END!
899 ! X =	364.0712,	-360.2467,	395,	0.000! !END!
900 ! X =	364.2650,	-360.2431,	396,	0.000! !END!
901 ! X =	364.2560,	-360.0388,	396,	0.000! !END!
902 ! X =	364.2469,	-359.8345,	396,	0.000! !END!
903 ! X =	364.4206,	-359.8268,	396,	0.000! !END!
904 ! X =	364.5943,	-359.8192,	395,	0.000! !END!

905 ! X =	364.7880,	-359.8156,	395,	0.000! !END!
906 ! X =	364.9817,	-359.8121,	395,	0.000! !END!
907 ! X =	365.0512,	-359.8090,	395,	0.000! !END!
908 ! X =	365.0465,	-359.5675,	396,	0.000! !END!
909 ! X =	365.0418,	-359.3261,	396,	0.000! !END!
910 ! X =	365.0371,	-359.0846,	365,	0.000! !END!
911 ! X =	365.0324,	-358.8432,	389,	0.000! !END!
912 ! X =	365.0277,	-358.6017,	402,	0.000! !END!
913 ! X =	365.2312,	-358.5927,	396,	0.000! !END!
914 ! X =	365.4346,	-358.5838,	396,	0.000! !END!
915 ! X =	365.4208,	-358.3846,	396,	0.000! !END!
916 ! X =	365.4071,	-358.1855,	396,	0.000! !END!
917 ! X =	365.2632,	-358.1919,	396,	0.000! !END!
918 ! X =	365.1193,	-358.1982,	396,	0.000! !END!
919 ! X =	365.1059,	-358.1189,	396,	0.000! !END!
920 ! X =	365.2746,	-358.1115,	396,	0.000! !END!
921 ! X =	365.3259,	-358.1492,	396,	0.000! !END!
922 ! X =	365.4605,	-358.0434,	390,	0.000! !END!
923 ! X =	365.5730,	-357.8886,	372,	0.000! !END!
924 ! X =	365.6182,	-357.7868,	380,	0.000! !END!
925 ! X =	365.6625,	-357.6650,	396,	0.000! !END!
926 ! X =	365.7871,	-357.5596,	396,	0.000! !END!
927 ! X =	365.9117,	-357.4543,	396,	0.000! !END!
928 ! X =	365.9448,	-357.3030,	370,	0.000! !END!
929 ! X =	366.0315,	-357.2393,	365,	0.000! !END!
930 ! X =	366.1903,	-357.2323,	365,	0.000! !END!
931 ! X =	366.1832,	-356.9959,	365,	0.000! !END!
932 ! X =	366.1761,	-356.7605,	330,	0.000! !END!
933 ! X =	366.1690,	-356.5242,	331,	0.000! !END!
934 ! X =	366.0100,	-356.5262,	337,	0.000! !END!
935 ! X =	365.8510,	-356.5282,	348,	0.000! !END!
936 ! X =	365.7617,	-356.5322,	359,	0.000! !END!
937 ! X =	365.7566,	-356.3427,	342,	0.000! !END!
938 ! X =	365.7516,	-356.1531,	321,	0.000! !END!
939 ! X =	365.7465,	-355.9636,	305,	0.000! !END!
940 ! X =	365.8237,	-355.9103,	292,	0.000! !END!
941 ! X =	365.9768,	-355.7737,	273,	0.000! !END!
942 ! X =	365.8180,	-355.7807,	286,	0.000! !END!
943 ! X =	365.7386,	-355.7842,	305,	0.000! !END!
944 ! X =	365.7335,	-355.5548,	297,	0.000! !END!
945 ! X =	365.7283,	-355.3253,	286,	0.000! !END!
946 ! X =	365.7978,	-355.3223,	272,	0.000! !END!
947 ! X =	365.8007,	-355.1624,	271,	0.000! !END!
948 ! X =	365.7264,	-355.0558,	272,	0.000! !END!
949 ! X =	365.7224,	-354.9661,	274,	0.000! !END!
950 ! X =	365.5238,	-354.9719,	278,	0.000! !END!
951 ! X =	365.3253,	-354.9786,	280,	0.000! !END!
952 ! X =	365.1267,	-354.9854,	304,	0.000! !END!
953 ! X =	364.9281,	-354.9911,	304,	0.000! !END!
954 ! X =	364.9241,	-354.7866,	304,	0.000! !END!
955 ! X =	364.9200,	-354.5821,	304,	0.000! !END!
956 ! X =	364.7165,	-354.5891,	304,	0.000! !END!
957 ! X =	364.5130,	-354.5950,	304,	0.000! !END!
958 ! X =	364.3094,	-354.6010,	304,	0.000! !END!
959 ! X =	364.1059,	-354.6080,	281,	0.000! !END!
960 ! X =	364.0989,	-354.4485,	273,	0.000! !END!

961 ! X =	364.0918,	-354.2891,	270,	0.000!	!END!
962 ! X =	363.9611,	-354.2549,	267,	0.000!	!END!
963 ! X =	363.8091,	-354.1917,	268,	0.000!	!END!
964 ! X =	363.6779,	-354.1476,	268,	0.000!	!END!
965 ! X =	363.5882,	-354.1415,	268,	0.000!	!END!
966 ! X =	363.5377,	-354.1238,	274,	0.000!	!END!
967 ! X =	363.4777,	-354.1164,	269,	0.000!	!END!
968 ! X =	363.4821,	-354.2161,	274,	0.000!	!END!
969 ! X =	363.3134,	-354.2235,	274,	0.000!	!END!
970 ! X =	363.1447,	-354.2310,	274,	0.000!	!END!
971 ! X =	362.9760,	-354.2384,	274,	0.000!	!END!
972 ! X =	362.7442,	-354.2416,	259,	0.000!	!END!
973 ! X =	362.5124,	-354.2459,	256,	0.000!	!END!
974 ! X =	362.2806,	-354.2491,	256,	0.000!	!END!
975 ! X =	362.2755,	-354.3592,	265,	0.000!	!END!
976 ! X =	362.3886,	-354.4441,	265,	0.000!	!END!
977 ! X =	362.4724,	-354.5402,	274,	0.000!	!END!
978 ! X =	362.5566,	-354.6464,	276,	0.000!	!END!
979 ! X =	362.5070,	-354.6486,	276,	0.000!	!END!
980 ! X =	362.2786,	-354.6546,	279,	0.000!	!END!
981 ! X =	362.0501,	-354.6597,	304,	0.000!	!END!
982 ! X =	361.8217,	-354.6658,	304,	0.000!	!END!
983 ! X =	361.5933,	-354.6719,	304,	0.000!	!END!
984 ! X =	361.3648,	-354.6769,	294,	0.000!	!END!
985 ! X =	361.1364,	-354.6830,	304,	0.000!	!END!
986 ! X =	360.9080,	-354.6891,	304,	0.000!	!END!
987 ! X =	360.9170,	-354.8934,	287,	0.000!	!END!
988 ! X =	360.9260,	-355.0977,	304,	0.000!	!END!
989 ! X =	360.9296,	-355.2923,	318,	0.000!	!END!
990 ! X =	360.9333,	-355.4868,	335,	0.000!	!END!
991 ! X =	360.7296,	-355.4908,	326,	0.000!	!END!
992 ! X =	360.5260,	-355.4948,	309,	0.000!	!END!
993 ! X =	360.5174,	-355.3005,	305,	0.000!	!END!
994 ! X =	360.5088,	-355.1061,	304,	0.000!	!END!
995 ! X =	360.3151,	-355.1097,	301,	0.000!	!END!
996 ! X =	360.1214,	-355.1132,	281,	0.000!	!END!
997 ! X =	359.9277,	-355.1168,	304,	0.000!	!END!
998 ! X =	359.7340,	-355.1203,	304,	0.000!	!END!
999 ! X =	359.5303,	-355.1243,	288,	0.000!	!END!
1000 ! X =	359.3267,	-355.1283,	278,	0.000!	!END!
1001 ! X =	359.3179,	-354.9289,	274,	0.000!	!END!
1002 ! X =	359.3091,	-354.7296,	265,	0.000!	!END!
1003 ! X =	359.0989,	-354.7369,	263,	0.000!	!END!
1004 ! X =	358.8889,	-354.7451,	268,	0.000!	!END!
1005 ! X =	358.6788,	-354.7524,	274,	0.000!	!END!
1006 ! X =	358.4686,	-354.7596,	274,	0.000!	!END!
1007 ! X =	358.2586,	-354.7679,	274,	0.000!	!END!
1008 ! X =	358.0484,	-354.7752,	245,	0.000!	!END!
1009 ! X =	357.9410,	-354.8198,	236,	0.000!	!END!
1010 ! X =	357.8237,	-354.8650,	243,	0.000!	!END!
1011 ! X =	357.7168,	-354.9196,	240,	0.000!	!END!
1012 ! X =	357.7175,	-355.0494,	270,	0.000!	!END!
1013 ! X =	357.7182,	-355.1792,	274,	0.000!	!END!
1014 ! X =	357.5123,	-355.1862,	256,	0.000!	!END!
1015 ! X =	357.3062,	-355.1923,	248,	0.000!	!END!
1016 ! X =	357.1002,	-355.1984,	245,	0.000!	!END!

1017 ! X =	356.8942,	-355.2055,	274,	0.000! !END!
1018 ! X =	356.8924,	-355.3903,	274,	0.000! !END!
1019 ! X =	356.8906,	-355.5751,	267,	0.000! !END!
1020 ! X =	357.0918,	-355.5732,	274,	0.000! !END!
1021 ! X =	357.2931,	-355.5724,	280,	0.000! !END!
1022 ! X =	357.4944,	-355.5715,	285,	0.000! !END!
1023 ! X =	357.6957,	-355.5696,	284,	0.000! !END!
1024 ! X =	357.6945,	-355.7694,	299,	0.000! !END!
1025 ! X =	357.6934,	-355.9691,	304,	0.000! !END!
1026 ! X =	357.4898,	-355.9731,	304,	0.000! !END!
1027 ! X =	357.2861,	-355.9771,	301,	0.000! !END!
1028 ! X =	357.2850,	-356.1769,	287,	0.000! !END!
1029 ! X =	357.2838,	-356.3766,	265,	0.000! !END!
1030 ! X =	357.2827,	-356.5764,	261,	0.000! !END!
1031 ! X =	357.2816,	-356.7762,	280,	0.000! !END!
1032 ! X =	357.0804,	-356.7801,	261,	0.000! !END!
1033 ! X =	356.8792,	-356.7839,	236,	0.000! !END!
1034 ! X =	356.6781,	-356.7878,	239,	0.000! !END!
1035 ! X =	356.4769,	-356.7917,	246,	0.000! !END!
1036 ! X =	356.4882,	-356.9929,	235,	0.000! !END!
1037 ! X =	356.4996,	-357.1951,	274,	0.000! !END!
1038 ! X =	356.5110,	-357.3963,	274,	0.000! !END!
1039 ! X =	356.5224,	-357.5985,	274,	0.000! !END!
1040 ! X =	356.7291,	-357.5954,	280,	0.000! !END!
1041 ! X =	356.9357,	-357.5923,	304,	0.000! !END!
1042 ! X =	357.1424,	-357.5892,	304,	0.000! !END!
1043 ! X =	357.3491,	-357.5861,	304,	0.000! !END!
1044 ! X =	357.5557,	-357.5830,	293,	0.000! !END!
1045 ! X =	357.7343,	-357.5751,	275,	0.000! !END!
1046 ! X =	357.9330,	-357.5713,	277,	0.000! !END!

----

a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
EXIDE BART CLASS I ANALYSIS (UPPER BUFFALO)
MDNR RUNS
CENRAP - 6KM CALMET CENTRAL METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =           *
   or
ISCMET.DAT    input    * ISCDAT =           *
   or
PLMMET.DAT    input    * PLMDAT =           *
   or
PROFILE.DAT   input    * PRFDAT =           *
SURFACE.DAT   input    * SFCDAT =           *
RESTARTB.DAT  input    * RSTARTB=           *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =EXDUB2001Q1.LST     !
CONC.DAT      output   ! CONDAT =EXDUB2001Q1.CON     !
DFLX.DAT      output   ! DFDAT  =EXDUB2001Q1.DRY     !
WFLX.DAT      output   ! WFDAT  =EXDUB2001Q1.WET     !

VISB.DAT      output   ! VISDAT =EXDUB2001Q1.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2001.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =           *
VOLEMARB.DAT  input    * VOLDAT =           *
BAEMARB.DAT   input    * ARDAT  =           *
LNEMARB.DAT   input    * LNDAT  =           *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =           *
CHEM.DAT      input    * CHEMDAT=           *
H2O2.DAT      input    * H2O2DAT=           *
HILL.DAT      input    * HILDAT=            *
HILLRCT.DAT   input    * RCTDAT=            *
COASTLN.DAT   input    * CSTDAT=            *
FLUXBDY.DAT   input    * BDYDAT=            *
BCON.DAT      input    * BCNDAT=            *
DEBUG.DAT     output   * DEBUG =            *
MASSFLX.DAT   output   * FLXDAT=            *
MASSBAL.DAT   output   * BALDAT=            *
FOG.DAT       output   * FOGDAT=            *
--------------------------------------------------------------------------------
```

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
        T = lower case   ! LCFILES = T !
        F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length

Provision for multiple input files

    Number of CALMET.DAT files for run (NMETDAT)
                              Default: 1   ! NMETDAT =   9   !

    Number of PTEMARB.DAT files for run (NPTDAT)
                              Default: 0   ! NPTDAT = 0 !

    Number of BAEMARB.DAT files for run (NARDAT)
                              Default: 0   ! NARDAT = 0 !

    Number of VOLEMARB.DAT files for run (NVOLDAT)
                              Default: 0   ! NVOLDAT = 0 !

!END!

Subgroup (0a)

  The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name Type   File Name
------------ ----   ---------
none   input   !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0101-0110.central.dat ! !END!
none   input   !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0111-0120.central.dat ! !END!
none   input   !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0121-0131.central.dat ! !END!
none   input   !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0201-0210.central.dat ! !END!
none   input   !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0211-0220.central.dat ! !END!
none   input   !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0221-0228.central.dat ! !END!
none   input   !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0301-0310.central.dat ! !END!
none   input   !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0311-0320.central.dat ! !END!
none   input   !METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0321-0331.central.dat ! !END!
none   input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0401-0410.central.dat *
END
none   input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0411-0420.central.dat *
END
none   input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0421-0430.central.dat *
END
none   input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0501-0510.central.dat *
END
none   input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0511-0520.central.dat *
END
none   input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0521-0531.central.dat *
END
none   input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0601-0610.central.dat *
END
none   input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0611-0620.central.dat *

```
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0621-0630.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0701-0710.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0711-0720.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0721-0731.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0801-0810.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0811-0820.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0821-0831.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0901-0910.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0911-0920.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.0921-0930.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1001-1010.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1011-1020.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1021-1031.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1101-1110.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1111-1120.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1121-1130.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1201-1210.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1211-1220.central.dat  *
*END*
none        input   *METDAT=/raid1a/calmet.6km.central/2001/cmet.2001.1221-1231.central.dat  *
*END*


-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

   Option to run all periods found
   in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

       METRUN = 0 - Run period explicitly defined below
       METRUN = 1 - Run all periods in met. file

    Starting date:   Year (IBYR) -- No default       ! IBYR =  2001 !
    (used only if   Month (IBMO) -- No default       ! IBMO =   1 !
     METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   1  !
                    Hour (IBHR) -- No default       ! IBHR =   0 !
```

```
Base time zone        (XBTZ) -- No default       ! XBTZ = 0.0  !
  PST = 8., MST = 7.
  CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default       ! IRLG =  2160 !

Number of chemical species (NSPEC)
                     Default: 5       ! NSPEC =  6   !

Number of chemical species
to be emitted  (NSE)          Default: 3       ! NSE =  3   !

Flag to stop run after
SETUP phase (ITEST)           Default: 2       ! ITEST =  2   !
(Used to allow checking
of the model inputs, files, etc.)
    ITEST = 1 - STOPS program after SETUP phase
    ITEST = 2 - Continues with execution of program
            after SETUP

Restart Configuration:

  Control flag (MRESTART)      Default: 0       ! MRESTART =  0   !

    0 = Do not read or write a restart file
    1 = Read a restart file at the beginning of
       the run
    2 = Write a restart file during run
    3 = Read a restart file at beginning of run
       and write a restart file during run

  Number of periods in Restart
  output cycle (NRESPD)       Default: 0       ! NRESPD =  0   !

    0 = File written only at last period
   >0 = File updated every NRESPD periods

Meteorological Data Format (METFM)
                     Default: 1       ! METFM =  1   !

    METFM = 1 - CALMET binary file (CALMET.MET)
    METFM = 2 - ISC ASCII file (ISCMET.MET)
    METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
    METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
            surface parameters file (SURFACE.DAT)

Meteorological Profile Data Format (MPRFFM)
      (used only for METFM = 1, 2, 3)
                     Default: 1       ! MPRFFM =  1   !

    MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
    MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
Averaging Time (minutes) (AVET)
                     Default: 60.0    ! AVET = 60. !
```

```
    PG Averaging Time (minutes) (PGTIME)
                          Default: 60.0    ! PGTIME = 60. !


!END!


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


    Vertical distribution used in the
    near field (MGAUSS)               Default: 1     ! MGAUSS =  1   !
      0 = uniform
      1 = Gaussian

    Terrain adjustment method
    (MCTADJ)                          Default: 3     ! MCTADJ =  3   !
      0 = no adjustment
      1 = ISC-type of terrain adjustment
      2 = simple, CALPUFF-type of terrain
         adjustment
      3 = partial plume path adjustment

    Subgrid-scale complex terrain
    flag (MCTSG)                      Default: 0     ! MCTSG =  0   !
      0 = not modeled
      1 = modeled

    Near-field puffs modeled as
    elongated 0 (MSLUG)               Default: 0     ! MSLUG =  0   !
      0 = no
      1 = yes (slug model used)

    Transitional plume rise modeled ?
    (MTRANS)                          Default: 1     ! MTRANS =  1   !
      0 = no  (i.e., final rise only)
      1 = yes (i.e., transitional rise computed)

    Stack tip downwash? (MTIP)        Default: 1     ! MTIP =  1  !
      0 = no  (i.e., no stack tip downwash)
      1 = yes (i.e., use stack tip downwash)

    Method used to simulate building
    downwash? (MBDW)                  Default: 1     ! MBDW =   1  !
      1 = ISC method
      2 = PRIME method

    Vertical wind shear modeled above
    stack top? (MSHEAR)               Default: 0     ! MSHEAR =  0  !
      0 = no  (i.e., vertical wind shear not modeled)
      1 = yes (i.e., vertical wind shear modeled)

    Puff splitting allowed? (MSPLIT)  Default: 0     ! MSPLIT =  0  !
```

0 = no (i.e., puffs not split)
1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM) Default: 1 ! MCHEM = 1 !
0 = chemical transformation not modeled
1 = transformation rates computed internally (MESOPUFF II scheme)
2 = user-specified transformation rates used
3 = transformation rates computed internally (RIVAD/ARM3 scheme)
4 = secondary organic aerosol formation computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3) Default: 0 ! MAQCHEM = 0 !
0 = aqueous phase transformation not modeled
1 = transformation rates adjusted for aqueous phase reactions

Wet removal modeled ? (MWET) Default: 1 ! MWET = 1 !
0 = no
1 = yes

Dry deposition modeled ? (MDRY) Default: 1 ! MDRY = 1 !
0 = no
1 = yes
(dry deposition method specified for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP) Default: 3 ! MDISP = 3 !

1 = dispersion coefficients computed from measured values of turbulence, sigma v, sigma w
2 = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas
4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.
5 = CTDM sigmas used for stable and neutral conditions. For unstable conditions, sigmas are computed as in MDISP = 3, described above. MDISP = 5 assumes that measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5) Default: 3 ! MTURBVW = 3 !
1 = use sigma-v or sigma-theta measurements from PROFILE.DAT to compute sigma-y (valid for METFM = 1, 2, 3, 4)
2 = use sigma-w measurements

from PROFILE.DAT to compute sigma-z
(valid for METFM = 1, 2, 3, 4)
3 = use both sigma-(v/theta) and sigma-w
from PROFILE.DAT to compute sigma-y and sigma-z
(valid for METFM = 1, 2, 3, 4)
4 = use sigma-theta measurements
from PLMMET.DAT to compute sigma-y
(valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2) Default: 3 ! MDISP2 = 3 !
(used only if MDISP = 1 or 5)
2 = dispersion coefficients from internally calculated
sigma v, sigma w using micrometeorological variables
(u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using
the ISCST multi-segment approximation) and MP coefficients in
urban areas
4 = same as 3 except PG coefficients computed using
the MESOPUFF II eqns.

[DIAGNOSTIC FEATURE]
Method used for Lagrangian timescale for Sigma-y
(used only if MDISP=1,2 or MDISP2=1,2)
(MTAULY) Default: 0 ! MTAULY = 0 !
0 = Draxler default 617.284 (s)
1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
10 < Direct user input (s) -- e.g., 306.9

[DIAGNOSTIC FEATURE]
Method used for Advective-Decay timescale for Turbulence
(used only if MDISP=2 or MDISP2=2)
(MTAUADV) Default: 0 ! MTAUADV = 0 !
0 = No turbulence advection
1 = Computed (OPTION NOT IMPLEMENTED)
10 < Direct user input (s) -- e.g., 300

Method used to compute turbulence sigma-v &
sigma-w using micrometeorological variables
(Used only if MDISP = 2 or MDISP2 = 2)
(MCTURB) Default: 1 ! MCTURB = 1 !

1 = Standard CALPUFF subroutines
2 = AERMOD subroutines

PG sigma-y,z adj. for roughness? Default: 0 ! MROUGH = 0 !
(MROUGH)
0 = no
1 = yes

Partial plume penetration of Default: 1 ! MPARTL = 1 !
elevated inversion?
(MPARTL)

0 = no
1 = yes

Strength of temperature inversion   Default: 0   ! MTINV = 0 !
provided in PROFILE.DAT extended records?
(MTINV)
0 = no (computed from measured/default gradients)
1 = yes

PDF used for dispersion under convective conditions?
Default: 0   ! MPDF = 0 !
(MPDF)
0 = no
1 = yes

Sub-Grid TIBL module used for shore line?
Default: 0   ! MSGTIBL = 0 !
(MSGTIBL)
0 = no
1 = yes

Boundary conditions (concentration) modeled?
Default: 0   ! MBCON = 0 !
(MBCON)
0 = no
1 = yes, using formatted BCON.DAT file
2 = yes, using unformatted CONC.DAT file

Analyses of fogging and icing impacts due to emissions from arrays of mechanically-forced cooling towers can be performed using CALPUFF in conjunction with a cooling tower emissions processor (CTEMISS) and its associated postprocessors. Hourly emissions of water vapor and temperature from each cooling tower cell are computed for the current cell configuration and ambient conditions by CTEMISS. CALPUFF models the dispersion of these emissions and provides cloud information in a specialized format for further analysis. Output to FOG.DAT is provided in either 'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
Default: 0   ! MFOG = 0   !
(MFOG)
0 = no
1 = yes - report results in PLUME Mode format
2 = yes - report results in RECEPTOR Mode format

Test options specified to see if
they conform to regulatory
values? (MREG)   Default: 1   ! MREG = 1   !

0 = NO checks are made
1 = Technical options must conform to USEPA
Long Range Transport (LRT) guidance
METFM   1 or 2

AVET 60. (min)
PGTIME 60. (min)
MGAUSS 1
MCTADJ 3
MTRANS 1
MTIP 1
MCHEM 1 or 3 (if modeling SOx, NOx)
MWET 1
MDRY 1
MDISP 2 or 3
MPDF 0 if MDISP=3
1 if MDISP=2
MROUGH 0
MPARTL 1
SYTDEP 550. (m)
MHFTSZ 0

!END!

INPUT GROUP: 3a, 3b -- Species list

Subgroup (3a)

The following species are modeled:

```
! CSPEC =         SO2 !         !END!
! CSPEC =         SO4 !         !END!
! CSPEC =         NOX !         !END!
! CSPEC =        HNO3 !         !END!
! CSPEC =         NO3 !         !END!
! CSPEC =        PM10 !         !END!

                                              Dry               OUTPUT GROUP
   SPECIES         MODELED          EMITTED       DEPOSITED              NUMBER
    NAME        (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,                (0=NONE,
  (Limit: 12                                  1=COMPUTED-GAS        1=1st CGRUP,
   Characters                                   2=COMPUTED-PARTICLE   2=2nd CGRUP,
   in length)                                 3=USER-SPECIFIED)     3= etc.)

!         SO2  =         1,              1,           1,               0   !
!         SO4  =         1,              0,           2,               0   !
!         NOX  =         1,              1,           1,               0   !
!        HNO3  =         1,              0,           1,               0   !
!         NO3  =         1,              0,           2,               0   !
!        PM10  =         1,              1,           2,               0   !
```

!END!

Subgroup (3b)

The following names are used for Species-Groups in which results for certain species are combined (added) prior to output. The CGRUP name will be used as the species name in output files. Use this feature to model specific particle-size distributions by treating each size-range as a separate species. Order must be consistent with 3(a) above.

INPUT GROUP: 4 -- Map Projection and Grid control parameters

```
    Projection for all (X,Y):
    -------------------------

    Map projection
    (PMAP)              Default: UTM    ! PMAP = LCC  !

       UTM :  Universal Transverse Mercator
       TTM :  Tangential Transverse Mercator
       LCC :  Lambert Conformal Conic
        PS :  Polar Stereographic
        EM :  Equatorial Mercator
      LAZA :  Lambert Azimuthal Equal Area

    False Easting and Northing (km) at the projection origin
    (Used only if PMAP= TTM, LCC, or LAZA)
    (FEAST)             Default=0.0     ! FEAST  = 0.000  !
    (FNORTH)            Default=0.0     ! FNORTH = 0.000  !

    UTM zone (1 to 60)
    (Used only if PMAP=UTM)
    (IUTMZN)            No Default      ! IUTMZN =  15   !

    Hemisphere for UTM projection?
    (Used only if PMAP=UTM)
    (UTMHEM)            Default: N      ! UTMHEM = N  !
       N   :  Northern hemisphere projection
       S   :  Southern hemisphere projection

    Latitude and Longitude (decimal degrees) of projection origin
    (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
    (RLAT0)             No Default      ! RLAT0 = 40N  !
    (RLON0)             No Default      ! RLON0 = 97W  !

       TTM :  RLON0 identifies central (true N/S) meridian of projection
              RLAT0 selected for convenience
       LCC :  RLON0 identifies central (true N/S) meridian of projection
              RLAT0 selected for convenience
       PS  :  RLON0 identifies central (grid N/S) meridian of projection
              RLAT0 selected for convenience
```

EM : RLON0 identifies central meridian of projection
RLAT0 is REPLACED by 0.0N (Equator)
LAZA: RLON0 identifies longitude of tangent-point of mapping plane
RLAT0 identifies latitude of tangent-point of mapping plane

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1) No Default ! XLAT1 = 33N !
(XLAT2) No Default ! XLAT2 = 45N !

LCC : Projection cone slices through Earth's surface at XLAT1 and XLAT2
PS : Projection plane slices through Earth at XLAT1
(XLAT2 is not used)

Note: Latitudes and longitudes should be positive, and include a
letter N,S,E, or W indicating north or south latitude, and
east or west longitude. For example,
35.9 N Latitude = 35.9N
118.7 E Longitude = 118.7E

Datum-region

The Datum-Region for the coordinates is identified by a character string. Many mapping products currently available use the model of the Earth known as the World Geodetic System 1984 (WGS-G). Other local models may be in use, and their selection in CALMET will make its output consistent with local mapping products. The list of Datum-Regions with official transformation parameters is provided by the National Imagery and Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)

WGS-G WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
NAS-C NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
NWS-27 NWS 6370KM Radius, Sphere
NWS-84 NWS 6370KM Radius, Sphere
ESR-S ESRI REFERENCE 6371KM Radius, Sphere

Datum-region for output coordinates
(DATUM) Default: WGS-G ! DATUM = WGS-G !

METEOROLOGICAL Grid:

Rectangular grid defined for projection PMAP,
with X the Easting and Y the Northing coordinate

No. X grid cells (NX) No default ! NX = 366 !
No. Y grid cells (NY) No default ! NY = 234 !
No. vertical layers (NZ) No default ! NZ = 10 !

Grid spacing (DGRIDKM) No default ! DGRIDKM = 6 !
Units: km

Cell face heights
(ZFACE(nz+1)) No defaults
Units: m
! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
4000. !

Reference Coordinates
of SOUTHWEST corner of
grid cell(1, 1):

X-coordinate (XORIGKM) No default ! XORIGKM = -1008. !
Y coordinate (YORIGKM) No default ! YORIGKM = -864. !
Units: km

COMPUTATIONAL Grid:

The computational grid is identical to or a subset of the MET. grid.
The lower left (LL) corner of the computational grid is at grid point
(IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the
computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
The grid spacing of the computational grid is the same as the MET. grid.

X index of LL corner (IBCOMP) No default ! IBCOMP = 168 !
(1 <= IBCOMP <= NX)

Y index of LL corner (JBCOMP) No default ! JBCOMP = 24 !
(1 <= JBCOMP <= NY)

X index of UR corner (IECOMP) No default ! IECOMP = 320 !
(1 <= IECOMP <= NX)

Y index of UR corner (JECOMP) No default ! JECOMP = 168 !
(1 <= JECOMP <= NY)

SAMPLING Grid (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point
(IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the
sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
The sampling grid must be identical to or a subset of the computational
grid. It may be a nested grid inside the computational grid.
The grid spacing of the sampling grid is DGRIDKM/MESHDN.

Logical flag indicating if gridded
receptors are used (LSAMP) Default: T ! LSAMP = F !
(T=yes, F=no)

X index of LL corner (IBSAMP) No default ! IBSAMP = 1 !
(IBCOMP <= IBSAMP <= IECOMP)

Y index of LL corner (JBSAMP) No default ! JBSAMP = 1 !
(JBCOMP <= JBSAMP <= JECOMP)

```
    X index of UR corner (IESAMP)      No default     ! IESAMP =  251   !
     (IBCOMP <= IESAMP <= IECOMP)

    Y index of UR corner (JESAMP)      No default     ! JESAMP =  246   !
     (JBCOMP <= JESAMP <= JECOMP)


   Nesting factor of the sampling
    grid (MESHDN)                   Default: 1     ! MESHDN =  1  !
    (MESHDN is an integer >= 1)

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------
                                 *                        *
   FILE                    DEFAULT VALUE            VALUE THIS RUN
   ----                    -------------            --------------

  Concentrations (ICON)            1                  !  ICON =  1   !
  Dry Fluxes (IDRY)                1                  !  IDRY =  1   !
  Wet Fluxes (IWET)                1                  !  IWET =  1   !
  Relative Humidity (IVIS)         1                  !  IVIS =  1   !
   (relative humidity file is
    required for visibility
    analysis)
  Use data compression option in output file?
  (LCOMPRS)                     Default: T         ! LCOMPRS = T !

  *
   0 = Do not create file, 1 = create file


   DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

      Mass flux across specified boundaries
      for selected species reported hourly?
      (IMFLX)                      Default: 0        ! IMFLX =  0  !
        0 = no
        1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                are specified in Input Group 0)

      Mass balance for each species
      reported hourly?
      (IMBAL)                      Default: 0        ! IMBAL =  0  !
        0 = no
        1 = yes (MASSBAL.DAT filename is
            specified in Input Group 0)


   LINE PRINTER OUTPUT OPTIONS:
```

Print concentrations (ICPRT)   Default: 0   ! ICPRT = 0   !
Print dry fluxes (IDPRT)   Default: 0   ! IDPRT = 0   !
Print wet fluxes (IWPRT)   Default: 0   ! IWPRT = 0   !
(0 = Do not print, 1 = Print)

Concentration print interval
(ICFRQ) in hours   Default: 1   ! ICFRQ = 1   !
Dry flux print interval
(IDFRQ) in hours   Default: 1   ! IDFRQ = 1   !
Wet flux print interval
(IWFRQ) in hours   Default: 1   ! IWFRQ = 1   !

Units for Line Printer Output
(IPRTU)   Default: 1   ! IPRTU = 3   !

```
              for             for
           Concentration    Deposition
    1 =       g/m**3         g/m**2/s
    2 =      mg/m**3        mg/m**2/s
    3 =      ug/m**3        ug/m**2/s
    4 =      ng/m**3        ng/m**2/s
    5 =     Odour Units
```

Messages tracking progress of run
written to the screen ?
(IMESG)   Default: 2   ! IMESG = 2   !
 0 = no
 1 = yes (advection step, puff ID)
 2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)

SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

```
            ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ------   -- MASS
FLUX --
  SPECIES
  /GROUP       PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED
ON DISK?   SAVED ON DISK?
  -------      ------------------------   ------------------------   ------------------------   ---------------
!        SO2 =     0,          1,          0,          1,          0,          1,          0   !
!        SO4 =     0,          1,          0,          1,          0,          1,          0   !
!        NOX =     0,          1,          0,          1,          0,          1,          0   !
!       HNO3 =     0,          1,          0,          1,          0,          1,          0   !
!        NO3 =     0,          1,          0,          1,          0,          1,          0   !
!       PM10 =     0,          1,          0,          1,          0,          1,          0   !
```

OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

Logical for debug output
(LDEBUG)   Default: F   ! LDEBUG = F !

First puff to track
(IPFDEB)   Default: 1   ! IPFDEB = 1 !

Number of puffs to track
(NPFDEB)   Default: 1   ! NPFDEB = 1 !

Met. period to start output

```
      (NN1)                          Default: 1     ! NN1 =  1   !

      Met. period to end output
      (NN2)                          Default: 10    ! NN2 =  10  !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
      Number of terrain features (NHILL)       Default: 0     ! NHILL =  0   !

      Number of special complex terrain
      receptors  (NCTREC)                  Default: 0     ! NCTREC =  0   !

      Terrain and CTSG Receptor data for
      CTSG hills input in CTDM format ?
      (MHILL)                        No Default     ! MHILL =  2   !
      1 = Hill and Receptor data created
         by CTDM processors & read from
         HILL.DAT and HILLRCT.DAT files
      2 = Hill data created by OPTHILL &
         input below in Subgroup (6b);
         Receptor data in Subgroup (6c)

      Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1. !
      to meters (MHILL=1)

      Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1. !
      to meters (MHILL=1)

      X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

      Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
    HILL information


HILL          XC       YC       THETAH  ZGRID  RELIEF    EXPO 1    EXPO 2   SCALE 1    SCALE 2
AMAX1     AMAX2
```

```
 NO.       (km)     (km)     (deg.)   (m)     (m)     (m)      (m)      (m)       (m)      (m)      (m)
----        ----     ----     ------  -----  ------    ------    ------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------

   COMPLEX TERRAIN RECEPTOR INFORMATION

                     XRCT        YRCT       ZRCT         XHH
                    (km)         (km)        (m)
                   ------       -----      ------         ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a separate
           input subgroup and therefore must end with an input group terminator.

-------------------------------------------------------------------------------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY     ALPHA STAR     REACTIVITY    MESOPHYLL RESISTANCE
HENRY'S LAW COEFFICIENT
       NAME       (cm**2/s)                                   (s/cm)             (dimensionless)
      -------     -----------      ----------      ----------    --------------------     -----------------------

!          SO2 =     0.1509,         1000.,           8.,              0.,                 0.04 !
!          NOX =     0.1656,            1.,           8.,              5.,                 3.5 !
!         HNO3 =     0.1628,            1.,          18.,              0.,          0.00000008 !

!END!
```

INPUT GROUP: 8 -- Size parameters for dry deposition of particles
----

For SINGLE SPECIES, the mean and standard deviation are used to compute a deposition velocity for NINT (see group 9) size-ranges, and these are then averaged to obtain a mean deposition velocity.

For GROUPED SPECIES, the size distribution should be explicitly specified (by the 'species' in the group), and the standard deviation for each should be entered as 0. The model will then use the deposition velocity for the stated mean diameter.

```
     SPECIES      GEOMETRIC MASS MEAN       GEOMETRIC STANDARD
      NAME           DIAMETER                  DEVIATION
                   (microns)              (microns)
     -------      -------------------       ------------------
!        SO4 =         0.48,                   2.   !
!        NO3 =         0.48,                   2.   !
!       PM10 =           2.,                   2.   !
```

!END!

INPUT GROUP: 9 -- Miscellaneous dry deposition parameters

Reference cuticle resistance (s/cm)
(RCUTR) Default: 30 ! RCUTR = 30.0 !
Reference ground resistance (s/cm)
(RGR) Default: 10 ! RGR = 10.0 !
Reference pollutant reactivity
(REACTR) Default: 8 ! REACTR = 8.0 !

Number of particle-size intervals used to
evaluate effective particle deposition velocity
(NINT) Default: 9 ! NINT = 9 !

Vegetation state in unirrigated areas
(IVEG) Default: 1 ! IVEG = 1 !
IVEG=1 for active and unstressed vegetation
IVEG=2 for active and stressed vegetation
IVEG=3 for inactive vegetation

!END!

```
INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                  Scavenging Coefficient -- Units: (sec)**(-1)

      Pollutant      Liquid Precip.       Frozen Precip.
      ---------      --------------       --------------
!         SO2 =        3.0E-05,            0.0E00 !
!         SO4 =        1.0E-04,            3.0E-05 !
!        HNO3 =        6.0E-05,            0.0E00 !
!         NO3 =        1.0E-04,            3.0E-05 !
!        PM10 =        1.0E-04,            3.0E-05 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

    Ozone data input option (MOZ)     Default: 1            ! MOZ =  0   !
    (Used only if MCHEM = 1, 3, or 4)
      0 = use a monthly background ozone value
      1 = read hourly ozone concentrations from
          the OZONE.DAT data file

    Monthly ozone concentrations
    (Used only if MCHEM = 1, 3, or 4 and
     MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
    (BCKO3) in ppb                   Default: 12*80.
    !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00, 65.00, 65.00, 26.00, 26.00 !

    Monthly ammonia concentrations
    (Used only if MCHEM = 1, or 3)
    (BCKNH3) in ppb                  Default: 12*10.
    !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50 !

    Nighttime SO2 loss rate (RNITE1)
    in percent/hour                  Default: 0.2         ! RNITE1 = .2 !

    Nighttime NOx loss rate (RNITE2)
    in percent/hour                  Default: 2.0         ! RNITE2 = 2.0 !

    Nighttime HNO3 formation rate (RNITE3)
    in percent/hour                  Default: 2.0         ! RNITE3 = 2.0 !

    H2O2 data input option (MH2O2)    Default: 1           ! MH2O2 =  0   !
    (Used only if MAQCHEM = 1)
      0 = use a monthly background H2O2 value
      1 = read hourly H2O2 concentrations from
          the H2O2.DAT data file

    Monthly H2O2 concentrations
```

```
   (Used only if MQACHEM = 1 and
    MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
   (BCKH2O2) in ppb                Default: 12*1.
   !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !


--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
   (used only if MCHEM = 4)

   The SOA module uses monthly values of:
      Fine particulate concentration in ug/m^3 (BCKPMF)
      Organic fraction of fine particulate     (OFRAC)
      VOC / NOX ratio (after reaction)         (VCNX)
   to characterize the air mass when computing
   the formation of SOA from VOC emissions.
   Typical values for several distinct air mass types are:

     Month    1    2    3    4    5    6    7    8    9   10   11   12
             Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

   Clean Continental
     BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
     OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
     VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

   Clean Marine (surface)
     BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
     OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
     VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

   Urban - low biogenic (controls present)
     BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
     OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
     VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

   Urban - high biogenic (controls present)
     BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
     OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
     VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

   Regional Plume
     BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
     OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
     VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

   Urban - no controls present
     BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
     OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
     VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

   Default: Clean Continental
   !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
   !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
   !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !
```

!END!

INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
----

```
    Horizontal size of puff (m) beyond which
    time-dependent dispersion equations (Heffter)
    are used to determine sigma-y and
    sigma-z (SYTDEP)                    Default: 550.   ! SYTDEP = 5.5E02 !

    Switch for using Heffter equation for sigma z
    as above (0 = Not use Heffter; 1 = use Heffter
    (MHFTSZ)                            Default: 0      ! MHFTSZ =  0   !

    Stability class used to determine plume
    growth rates for puffs above the boundary
    layer (JSUP)                        Default: 5      ! JSUP =  5   !

    Vertical dispersion constant for stable
    conditions (k1 in Eqn. 2.7-3)  (CONK1)     Default: 0.01   ! CONK1 = .01 !

    Vertical dispersion constant for neutral/
    unstable conditions (k2 in Eqn. 2.7-4)
    (CONK2)                             Default: 0.1    ! CONK2 = .1 !

    Factor for determining Transition-point from
    Schulman-Scire to Huber-Snyder Building Downwash
    scheme (SS used for Hs < Hb + TBD * HL)
    (TBD)                               Default: 0.5    ! TBD = .5 !
      TBD < 0   ==> always use Huber-Snyder
      TBD = 1.5 ==> always use Schulman-Scire
      TBD = 0.5 ==> ISC Transition-point

    Range of land use categories for which
    urban dispersion is assumed
    (IURB1, IURB2)                      Default: 10     ! IURB1 =  10  !
                                                 19     ! IURB2 =  19  !

    Site characterization parameters for single-point Met data files ---------
    (needed for METFM = 2,3,4)

      Land use category for modeling domain
      (ILANDUIN)                        Default: 20     ! ILANDUIN =  20  !

      Roughness length (m) for modeling domain
      (Z0IN)                            Default: 0.25   ! Z0IN = .25 !

      Leaf area index for modeling domain
      (XLAIIN)                          Default: 3.0    ! XLAIIN = 3.0 !

      Elevation above sea level (m)
      (ELEVIN)                          Default: 0.0    ! ELEVIN = .0 !
```

Latitude (degrees) for met location
(XLATIN) Default: -999. ! XLATIN = -999.0 !

Longitude (degrees) for met location
(XLONIN) Default: -999. ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

Anemometer height (m) (Used only if METFM = 2,3)
(ANEMHT) Default: 10. ! ANEMHT = 10.0 !

Form of lateral turbulance data in PROFILE.DAT file
(Used only if METFM = 4 or MTURBVW = 1 or 3)
(ISIGMAV) Default: 1 ! ISIGMAV = 1 !
0 = read sigma-theta
1 = read sigma-v

Choice of mixing heights (Used only if METFM = 4)
(IMIXCTDM) Default: 0 ! IMIXCTDM = 0 !
0 = read PREDICTED mixing heights
1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN) Default: 1.0 ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN) Default: 1.0 ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW) Default: 99 ! MXNEW = 99 !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM) Default: 99 ! MXSAM = 99 !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT) Default: 2 ! NCOUNT = 2 !

Minimum sigma y for a new puff/slug (m)
(SYMIN) Default: 1.0 ! SYMIN = 1.0 !

Minimum sigma z for a new puff/slug (m)
(SZMIN) Default: 1.0 ! SZMIN = 1.0 !

Default minimum turbulence velocities sigma-v and sigma-w
for each stability class over land and over water (m/s)
(SVMIN(12) and SWMIN(12))

```
           ----------  LAND  ----------       ---------  WATER  ----------
Stab Class :  A    B    C    D    E    F        A    B    C    D    E    F
             ---  ---  ---  ---  ---  ---      ---  ---  ---  ---  ---  ---
```

Default SVMIN : .50, .50, .50, .50, .50, .50,   .37, .37, .37, .37, .37, .37
Default SWMIN : .20, .12, .08, .06, .03, .016,   .20, .12, .08, .06, .03, .016

! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370, 0.370, 0.370!
! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))   Default: 0.0,0.0 ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)   Default: 0.5   ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)   Default: 3000. ! XMAXZI = 4000.0 !

Minimum mixing height (m)
(XMINZI)   Default: 50.   ! XMINZI = 20.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))   Default   :
ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

Wind Speed Class : 1   2   3   4   5
--- --- --- --- ---
! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))   Default   : ISC RURAL values
ISC RURAL : .07, .07, .10, .15, .35, .55
ISC URBAN : .15, .15, .20, .25, .30, .30

Stability Class : A   B   C   D   E   F
--- --- --- --- --- ---
! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))   Default: 0.020, 0.035
! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))   Stability Class : A   B   C   D   E   F

Default PPC : .50, .50, .50, .50, .35, .35
--- --- --- --- --- ---
! PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF) Default: 10. ! SL2PF = 10.0 !

Puff-splitting control variables ------------------------

VERTICAL SPLIT

Number of puffs that result every time a puff
is split - nsplit=2 means that 1 puff splits
into 2
(NSPLIT) Default: 3 ! NSPLIT = 3 !

Time(s) of a day when split puffs are eligible to
be split once again; this is typically set once
per day, around sunset before nocturnal shear develops.
24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
0=do not re-split 1=eligible for re-split
(IRESPLIT(24)) Default: Hour 17 = 1
! IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

Split is allowed only if last hour's mixing
height (m) exceeds a minimum value
(ZISPLIT) Default: 100. ! ZISPLIT = 100.0 !

Split is allowed only if ratio of last hour's
mixing ht to the maximum mixing ht experienced
by the puff is less than a maximum value (this
postpones a split until a nocturnal layer develops)
(ROLDMAX) Default: 0.25 ! ROLDMAX = 0.25 !

HORIZONTAL SPLIT

Number of puffs that result every time a puff
is split - nsplith=5 means that 1 puff splits
into 5
(NSPLITH) Default: 5 ! NSPLITH = 5 !

Minimum sigma-y (Grid Cells Units) of puff
before it may be split
(SYSPLITH) Default: 1.0 ! SYSPLITH = 1.0 !

Minimum puff elongation rate (SYSPLITH/hr) due to
wind shear, before it may be split
(SHSPLITH) Default: 2. ! SHSPLITH = 2.0 !

Minimum concentration (g/m^3) of each
species in puff before it may be split
Enter array of NSPEC values; if a single value is

entered, it will be used for ALL species
(CNSPLITH)   Default: 1.0E-07   ! CNSPLITH = 1.0E-07 !

Integration control variables ------------------------

Fractional convergence criterion for numerical SLUG
sampling integration
(EPSSLUG)   Default: 1.0e-04 ! EPSSLUG = 1.0E-04 !

Fractional convergence criterion for numerical AREA
source integration
(EPSAREA)   Default: 1.0e-06 ! EPSAREA = 1.0E-06 !

Trajectory step-length (m) used for numerical rise
integration
(DSRISE)   Default: 1.0   ! DSRISE = 1.0 !

Boundary Condition (BC) Puff control variables ------------------------

Minimum height (m) to which BC puffs are mixed as they are emitted
(MBCON=2 ONLY). Actual height is reset to the current mixing height
at the release point if greater than this minimum.
(HTMINBC)   Default: 500.   ! HTMINBC = 500.0 !

Search radius (in BC segment lengths) about a receptor for sampling
nearest BC puff. BC puffs are emitted with a spacing of one segment
length, so the search radius should be greater than 1.
(RSAMPBC)   Default: 4.   ! RSAMPBC = 10.0 !

Near-Surface depletion adjustment to concentration profile used when
sampling BC puffs?
(MDEPBC)   Default: 1   ! MDEPBC = 1 !
  0 = Concentration is NOT adjusted for depletion
  1 = Adjust Concentration for depletion

!END!

INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters

Subgroup (13a)

Number of point sources with
parameters provided below   (NPT1) No default ! NPT1 =   1 !

Units used for point source
emissions below   (IPTU) Default: 1 ! IPTU =   1 !
    1 =   g/s
    2 =   kg/hr
    3 =   lb/hr

```
         4 =     tons/yr
         5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
         6 =     Odour Unit * m**3/min
         7 =     metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

    Number of point sources with
    variable emission parameters
    provided in external file      (NPT2)  No default  !  NPT2 =  0  !

    (If NPT2 > 0, these point
    source emissions are read from
    the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                               a
        POINT SOURCE: CONSTANT DATA
        -----------------------------
                                                             b          c
  Source       X         Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = EP001 !
   1 ! X =  149.5818,  5.1675,  39.01, 278.9,    1.83, 12.04, 310.93,  0.0, 8.354211E00,  0.0E00,
0.407582E00,
      0.0E00,  0.0E00, 0.704398E00 !
   1 ! FMFAC  =      1.0 !   !END!
--------

   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.

    SRCNAM  is a 12-character name for a source
          (No default)
    X       is an array holding the source data listed by the column headings
          (No default)
    SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
          (Default: 0.,0.)
    FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
          the effect of rain-caps or other physical configurations that
          reduce momentum rise associated with the actual exit velocity.
          (Default: 1.0  -- full momentum used)

   b
    0. = No building downwash modeled, 1. = downwash modeled
    NOTE: must be entered as a REAL number (i.e., with decimal point)
```

c
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IPTU (e.g. 1 for g/s).

Subgroup (13c)

BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

```
Source                                                   a
 No.      Effective building height, width, length and X/Y offset (in meters)
        every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed for
        MBDW=2 (PRIME downwash option)
------   --------------------------------------------------------------------
```

----

a
Building height, width, length, and X/Y offset from the source are treated as a separate input subgroup for each source and therefore must end with an input group terminator. The X/Y offset is the position, relative to the stack, of the center of the upwind face of the projected building, with the x-axis pointing along the flow direction.

Subgroup (13d)
----

a
POINT SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

```
IVARY determines the type of variation, and is source-specific:
(IVARY)                          Default: 0
     0 =     Constant
     1 =     Diurnal cycle (24 scaling factors: hours 1-24)
     2 =     Monthly cycle (12 scaling factors: months 1-12)
     3 =     Hour & Season (4 groups of 24 hourly scaling factors,
                     where first group is DEC-JAN-FEB)
     4 =     Speed & Stab. (6 groups of 6 scaling factors, where
                     first group is Stability Class A,
                     and the speed classes have upper
                     bounds (m/s) defined in Group 12
     5 =     Temperature   (12 scaling factors, where temperature
                     classes have upper bounds (C) of:
                     0, 5, 10, 15, 20, 25, 30, 35, 40,
                     45, 50, 50+)
```

----
  a
  Data for each species are treated as a separate input subgroup
  and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

  Number of polygon area sources with
  parameters specified below (NAR1)   No default ! NAR1 = 0   !

  Units used for area source
  emissions below   (IARU)   Default: 1 ! IARU =   1 !
     1 =   g/m**2/s
     2 =   kg/m**2/hr
     3 =   lb/m**2/hr
     4 =   tons/m**2/yr
     5 =   Odour Unit * m/s (vol. flux/m**2 of odour compound)
     6 =   Odour Unit * m/min
     7 =   metric tons/m**2/yr

  Number of source-species
  combinations with variable
  emissions scaling factors
  provided below in (14d)   (NSAR1) Default: 0 ! NSAR1 = 0 !

  Number of buoyant polygon area sources
  with variable location and emission
  parameters (NAR2)   No default ! NAR2 = 0   !
  (If NAR2 > 0, ALL parameter data for
  these sources are read from the file: BAEMARB.DAT)

!END!

Subgroup (14b)
----
                          a
        AREA SOURCE: CONSTANT DATA
        ----
                                                b
Source No.	Effect. Height (m)	Base Elevation (m)	Initial Sigma z (m)	Emission Rates

----

a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IARU (e.g. 1 for g/m**2/s).

Subgroup (14c)

COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON

```
Source                                              a
 No.      Ordered list of X followed by list of Y, grouped by source
------    ------------------------------------------------------------
```

----
a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (14d)

```
                              a
      AREA SOURCE: VARIABLE EMISSIONS DATA
      ---------------------------------------
```

Use this subgroup to describe temporal variations in the emission rates given in 14b. Factors entered multiply the rates in 14b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

```
     0 =     Constant
     1 =     Diurnal cycle (24 scaling factors: hours 1-24)
     2 =     Monthly cycle (12 scaling factors: months 1-12)
     3 =     Hour & Season (4 groups of 24 hourly scaling factors,
                  where first group is DEC-JAN-FEB)
     4 =     Speed & Stab. (6 groups of 6 scaling factors, where
                  first group is Stability Class A,
                  and the speed classes have upper
                  bounds (m/s) defined in Group 12
     5 =     Temperature   (12 scaling factors, where temperature
                  classes have upper bounds (C) of:
                  0, 5, 10, 15, 20, 25, 30, 35, 40,
                  45, 50, 50+)
```

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

Subgroup (15a)

Number of buoyant line sources
with variable location and emission
parameters (NLN2)   No default ! NLN2 = 0   !

(If NLN2 > 0, ALL parameter data for
these sources are read from the file: LNEMARB.DAT)

Number of buoyant line sources (NLINES)   No default   ! NLINES = 0 !

Units used for line source
emissions below   (ILNU)   Default: 1 ! ILNU =   1 !
1 = g/s
2 = kg/hr
3 = lb/hr
4 = tons/yr
5 = Odour Unit * m**3/s (vol. flux of odour compound)
6 = Odour Unit * m**3/min
7 = metric tons/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (15c)   (NSLN1) Default: 0 ! NSLN1 = 0 !

Maximum number of segments used to model
each line (MXNSEG)   Default: 7   ! MXNSEG = 7 !

The following variables are required only if NLINES > 0. They are
used in the buoyant line source plume rise calculations.

Number of distances at which   Default: 6   ! NLRISE = 6 !
transitional rise is computed

Average building length (XL)   No default   ! XL = .0 !
(in meters)

Average building height (HBL)   No default   ! HBL = .0 !
(in meters)

Average building width (WBL)   No default   ! WBL = .0 !
(in meters)

Average line source width (WML)   No default   ! WML = .0 !
(in meters)

Average separation between buildings (DXL) No default   ! DXL = .0 !
(in meters)

Average buoyancy parameter (FPRIMEL)   No default   ! FPRIMEL = .0 !
(in m**4/s**3)

!END!

Subgroup (15b)

BUOYANT LINE SOURCE: CONSTANT DATA

Source No.	Beg. X Coordinate (km)	Beg. Y Coordinate (km)	End. X Coordinate (km)	End. Y Coordinate (km)	Release Height (m)	Base Elevation (m)	Emission Rates
------	----------	----------	---------	----------	-------	---------	---------

(a: Source No.; b: Emission Rates)

----

a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by ILNTU
(e.g. 1 for g/s).

Subgroup (15c)

BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA[a]

Use this subgroup to describe temporal variations in the emission
rates given in 15b. Factors entered multiply the rates in 15b.
Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY)   Default: 0
0 =   Constant
1 =   Diurnal cycle (24 scaling factors: hours 1-24)
2 =   Monthly cycle (12 scaling factors: months 1-12)
3 =   Hour & Season (4 groups of 24 hourly scaling factors,
where first group is DEC-JAN-FEB)
4 =   Speed & Stab. (6 groups of 6 scaling factors, where
first group is Stability Class A,
and the speed classes have upper

```
                         bounds (m/s) defined in Group 12
        5 =      Temperature   (12 scaling factors, where temperature
                         classes have upper bounds (C) of:
                         0, 5, 10, 15, 20, 25, 30, 35, 40,
                         45, 50, 50+)



--------
   a
    Data for each species are treated as a separate input subgroup
    and therefore must end with an input group terminator.


-------------------------------------------------------------------------------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

    Number of volume sources with
    parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !

    Units used for volume source
    emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1  !
         1 =        g/s
         2 =       kg/hr
         3 =       lb/hr
         4 =     tons/yr
         5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
         6 =     Odour Unit * m**3/min
         7 =     metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

    Number of volume sources with
    variable location and emission
    parameters                   (NVL2)     No default  !  NVL2 =   0   !

    (If NVL2 > 0, ALL parameter data for
     these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                              a
         VOLUME SOURCE: CONSTANT DATA
```

X Coordinate (km)	Y Coordinate (km)	Effect. Height (m)	Base Elevation (m)	Initial Sigma y (m)	Initial Sigma z (m)	Emission Rates [b]
----------	----------	------	------	--------	--------	--------

----

a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by IVLU
(e.g. 1 for g/s).

Subgroup (16c)
----

a
VOLUME SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission
rates given in 16b. Factors entered multiply the rates in 16b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0
- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

Number of non-gridded receptors (NREC) No default ! NREC = 2803 !

!END!

Subgroup (17b)
----

a
NON-GRIDDED (DISCRETE) RECEPTOR DATA

```
------------------------------------

              X           Y         Ground       Height   b
Receptor     Coordinate   Coordinate   Elevation   Above Ground
 No.          (km)        (km)         (m)          (m)
--------      ----------  ----------   ---------   ------------
1 ! X =    318.6501,       -445.7821,     670,     0.000! !END!
2 ! X =    318.6392,       -445.5327,     670,     0.000! !END!
3 ! X =    318.8875,       -445.5219,     670,     0.000! !END!
4 ! X =    318.8766,       -445.2725,     670,     0.000! !END!
5 ! X =    318.8657,       -445.0231,     664,     0.000! !END!
6 ! X =    319.1357,       -445.5110,     670,     0.000! !END!
7 ! X =    319.1248,       -445.2617,     670,     0.000! !END!
8 ! X =    319.1139,       -445.0123,     648,     0.000! !END!
9 ! X =    319.1030,       -444.7629,     670,     0.000! !END!
10 ! X =    319.0922,       -444.5136,     670,     0.000! !END!
11 ! X =    319.0813,       -444.2642,     670,     0.000! !END!
12 ! X =    319.0704,       -444.0149,     656,     0.000! !END!
13 ! X =    319.0595,       -443.7655,     635,     0.000! !END!
14 ! X =    319.0486,       -443.5161,     632,     0.000! !END!
15 ! X =    319.0377,       -443.2668,     632,     0.000! !END!
16 ! X =    319.0268,       -443.0174,     621,     0.000! !END!
17 ! X =    319.3840,       -445.5002,     654,     0.000! !END!
18 ! X =    319.3731,       -445.2508,     647,     0.000! !END!
19 ! X =    319.3622,       -445.0014,     645,     0.000! !END!
20 ! X =    319.3513,       -444.7521,     670,     0.000! !END!
21 ! X =    319.3404,       -444.5027,     670,     0.000! !END!
22 ! X =    319.3295,       -444.2534,     670,     0.000! !END!
23 ! X =    319.3186,       -444.0040,     662,     0.000! !END!
24 ! X =    319.3077,       -443.7546,     650,     0.000! !END!
25 ! X =    319.2968,       -443.5053,     641,     0.000! !END!
26 ! X =    319.2859,       -443.2559,     640,     0.000! !END!
27 ! X =    319.2750,       -443.0066,     639,     0.000! !END!
28 ! X =    319.2641,       -442.7572,     624,     0.000! !END!
29 ! X =    319.2532,       -442.5079,     591,     0.000! !END!
30 ! X =    319.2424,       -442.2585,     523,     0.000! !END!
31 ! X =    319.6322,       -445.4893,     629,     0.000! !END!
32 ! X =    319.6213,       -445.2399,     620,     0.000! !END!
33 ! X =    319.6104,       -444.9906,     629,     0.000! !END!
34 ! X =    319.5995,       -444.7412,     658,     0.000! !END!
35 ! X =    319.5887,       -444.4919,     670,     0.000! !END!
36 ! X =    319.5778,       -444.2425,     670,     0.000! !END!
37 ! X =    319.5669,       -443.9931,     658,     0.000! !END!
38 ! X =    319.5560,       -443.7438,     659,     0.000! !END!
39 ! X =    319.5451,       -443.4944,     643,     0.000! !END!
40 ! X =    319.5342,       -443.2451,     640,     0.000! !END!
41 ! X =    319.5233,       -442.9957,     640,     0.000! !END!
42 ! X =    319.5124,       -442.7464,     640,     0.000! !END!
43 ! X =    319.5015,       -442.4970,     620,     0.000! !END!
44 ! X =    319.4906,       -442.2477,     593,     0.000! !END!
45 ! X =    319.4797,       -441.9983,     484,     0.000! !END!
46 ! X =    319.4688,       -441.7489,     426,     0.000! !END!
47 ! X =    319.4579,       -441.4996,     436,     0.000! !END!
48 ! X =    319.8805,       -445.4784,     599,     0.000! !END!
49 ! X =    319.8696,       -445.2291,     583,     0.000! !END!
50 ! X =    319.8587,       -444.9797,     612,     0.000! !END!
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51 ! X = 319.8478, -444.7304, 643, 0.000! !END!
52 ! X = 319.8369, -444.4810, 670, 0.000! !END!
53 ! X = 319.8260, -444.2316, 663, 0.000! !END!
54 ! X = 319.8151, -443.9823, 668, 0.000! !END!
55 ! X = 319.8042, -443.7329, 668, 0.000! !END!
56 ! X = 319.7933, -443.4836, 643, 0.000! !END!
57 ! X = 319.7824, -443.2342, 640, 0.000! !END!
58 ! X = 319.7715, -442.9849, 640, 0.000! !END!
59 ! X = 319.7606, -442.7355, 640, 0.000! !END!
60 ! X = 319.7497, -442.4861, 636, 0.000! !END!
61 ! X = 319.7388, -442.2368, 612, 0.000! !END!
62 ! X = 319.7279, -441.9874, 545, 0.000! !END!
63 ! X = 319.7171, -441.7381, 457, 0.000! !END!
64 ! X = 319.7062, -441.4887, 428, 0.000! !END!
65 ! X = 319.6953, -441.2394, 462, 0.000! !END!
66 ! X = 319.6844, -440.9900, 505, 0.000! !END!
67 ! X = 319.6735, -440.7407, 579, 0.000! !END!
68 ! X = 320.1287, -445.4676, 518, 0.000! !END!
69 ! X = 320.1178, -445.2182, 487, 0.000! !END!
70 ! X = 320.1069, -444.9689, 548, 0.000! !END!
71 ! X = 320.0960, -444.7195, 589, 0.000! !END!
72 ! X = 320.0852, -444.4701, 601, 0.000! !END!
73 ! X = 320.0743, -444.2208, 619, 0.000! !END!
74 ! X = 320.0634, -443.9714, 640, 0.000! !END!
75 ! X = 320.0525, -443.7221, 640, 0.000! !END!
76 ! X = 320.0416, -443.4727, 627, 0.000! !END!
77 ! X = 320.0307, -443.2234, 626, 0.000! !END!
78 ! X = 320.0198, -442.9740, 640, 0.000! !END!
79 ! X = 320.0089, -442.7246, 640, 0.000! !END!
80 ! X = 319.9980, -442.4753, 640, 0.000! !END!
81 ! X = 319.9871, -442.2259, 632, 0.000! !END!
82 ! X = 319.9762, -441.9766, 598, 0.000! !END!
83 ! X = 319.9653, -441.7272, 527, 0.000! !END!
84 ! X = 319.9544, -441.4779, 450, 0.000! !END!
85 ! X = 319.9435, -441.2285, 414, 0.000! !END!
86 ! X = 319.9326, -440.9792, 457, 0.000! !END!
87 ! X = 319.9217, -440.7298, 487, 0.000! !END!
88 ! X = 319.9108, -440.4805, 520, 0.000! !END!
89 ! X = 319.8999, -440.2311, 579, 0.000! !END!
90 ! X = 320.3770, -445.4567, 457, 0.000! !END!
91 ! X = 320.3661, -445.2074, 439, 0.000! !END!
92 ! X = 320.3552, -444.9580, 457, 0.000! !END!
93 ! X = 320.3443, -444.7087, 486, 0.000! !END!
94 ! X = 320.3334, -444.4593, 499, 0.000! !END!
95 ! X = 320.3225, -444.2099, 557, 0.000! !END!
96 ! X = 320.3116, -443.9606, 591, 0.000! !END!
97 ! X = 320.3007, -443.7112, 583, 0.000! !END!
98 ! X = 320.2898, -443.4619, 579, 0.000! !END!
99 ! X = 320.2789, -443.2125, 579, 0.000! !END!
100 ! X = 320.2680, -442.9631, 614, 0.000! !END!
101 ! X = 320.2571, -442.7138, 636, 0.000! !END!
102 ! X = 320.2462, -442.4644, 638, 0.000! !END!
103 ! X = 320.2353, -442.2151, 625, 0.000! !END!
104 ! X = 320.2244, -441.9657, 610, 0.000! !END!
105 ! X = 320.2135, -441.7164, 579, 0.000! !END!
106 ! X = 320.2026, -441.4670, 525, 0.000! !END!

107 ! X =	320.1917,	-441.2177,	471,	0.000!	!END!
108 ! X =	320.1808,	-440.9683,	411,	0.000!	!END!
109 ! X =	320.1700,	-440.7190,	405,	0.000!	!END!
110 ! X =	320.1591,	-440.4696,	448,	0.000!	!END!
111 ! X =	320.1482,	-440.2203,	483,	0.000!	!END!
112 ! X =	320.1373,	-439.9709,	579,	0.000!	!END!
113 ! X =	320.1264,	-439.7216,	604,	0.000!	!END!
114 ! X =	320.6252,	-445.4459,	414,	0.000!	!END!
115 ! X =	320.6143,	-445.1965,	422,	0.000!	!END!
116 ! X =	320.6034,	-444.9472,	422,	0.000!	!END!
117 ! X =	320.5925,	-444.6978,	415,	0.000!	!END!
118 ! X =	320.5817,	-444.4484,	426,	0.000!	!END!
119 ! X =	320.5708,	-444.1991,	442,	0.000!	!END!
120 ! X =	320.5599,	-443.9497,	457,	0.000!	!END!
121 ! X =	320.5490,	-443.7004,	457,	0.000!	!END!
122 ! X =	320.5381,	-443.4510,	480,	0.000!	!END!
123 ! X =	320.5272,	-443.2016,	507,	0.000!	!END!
124 ! X =	320.5163,	-442.9523,	558,	0.000!	!END!
125 ! X =	320.5054,	-442.7029,	589,	0.000!	!END!
126 ! X =	320.4945,	-442.4536,	613,	0.000!	!END!
127 ! X =	320.4836,	-442.2042,	613,	0.000!	!END!
128 ! X =	320.4727,	-441.9549,	610,	0.000!	!END!
129 ! X =	320.4618,	-441.7055,	609,	0.000!	!END!
130 ! X =	320.4509,	-441.4562,	594,	0.000!	!END!
131 ! X =	320.4400,	-441.2068,	543,	0.000!	!END!
132 ! X =	320.4291,	-440.9575,	494,	0.000!	!END!
133 ! X =	320.4182,	-440.7081,	457,	0.000!	!END!
134 ! X =	320.4073,	-440.4588,	406,	0.000!	!END!
135 ! X =	320.3964,	-440.2094,	451,	0.000!	!END!
136 ! X =	320.3855,	-439.9601,	484,	0.000!	!END!
137 ! X =	320.3746,	-439.7107,	587,	0.000!	!END!
138 ! X =	320.3637,	-439.4614,	609,	0.000!	!END!
139 ! X =	320.3528,	-439.2120,	609,	0.000!	!END!
140 ! X =	320.8735,	-445.4350,	457,	0.000!	!END!
141 ! X =	320.8626,	-445.1857,	462,	0.000!	!END!
142 ! X =	320.8517,	-444.9363,	473,	0.000!	!END!
143 ! X =	320.8408,	-444.6869,	457,	0.000!	!END!
144 ! X =	320.8299,	-444.4376,	431,	0.000!	!END!
145 ! X =	320.8190,	-444.1882,	408,	0.000!	!END!
146 ! X =	320.8081,	-443.9389,	419,	0.000!	!END!
147 ! X =	320.7972,	-443.6895,	422,	0.000!	!END!
148 ! X =	320.7863,	-443.4401,	423,	0.000!	!END!
149 ! X =	320.7754,	-443.1908,	433,	0.000!	!END!
150 ! X =	320.7645,	-442.9414,	482,	0.000!	!END!
151 ! X =	320.7536,	-442.6921,	526,	0.000!	!END!
152 ! X =	320.7427,	-442.4427,	594,	0.000!	!END!
153 ! X =	320.7318,	-442.1934,	609,	0.000!	!END!
154 ! X =	320.7209,	-441.9440,	609,	0.000!	!END!
155 ! X =	320.7100,	-441.6947,	609,	0.000!	!END!
156 ! X =	320.6991,	-441.4453,	609,	0.000!	!END!
157 ! X =	320.6882,	-441.1960,	609,	0.000!	!END!
158 ! X =	320.6773,	-440.9466,	559,	0.000!	!END!
159 ! X =	320.6664,	-440.6972,	502,	0.000!	!END!
160 ! X =	320.6555,	-440.4479,	440,	0.000!	!END!
161 ! X =	320.6446,	-440.1985,	401,	0.000!	!END!
162 ! X =	320.6337,	-439.9492,	450,	0.000!	!END!

163 ! X =	320.6228,	-439.6999,	487,	0.000! !END!
164 ! X =	320.6119,	-439.4505,	579,	0.000! !END!
165 ! X =	320.6010,	-439.2012,	579,	0.000! !END!
166 ! X =	320.5901,	-438.9518,	550,	0.000! !END!
167 ! X =	320.5792,	-438.7025,	496,	0.000! !END!
168 ! X =	320.5683,	-438.4531,	396,	0.000! !END!
169 ! X =	321.1217,	-445.4242,	540,	0.000! !END!
170 ! X =	321.1108,	-445.1748,	554,	0.000! !END!
171 ! X =	321.0999,	-444.9254,	548,	0.000! !END!
172 ! X =	321.0891,	-444.6761,	548,	0.000! !END!
173 ! X =	321.0782,	-444.4267,	501,	0.000! !END!
174 ! X =	321.0673,	-444.1774,	452,	0.000! !END!
175 ! X =	321.0564,	-443.9280,	457,	0.000! !END!
176 ! X =	321.0455,	-443.6786,	419,	0.000! !END!
177 ! X =	321.0346,	-443.4293,	396,	0.000! !END!
178 ! X =	321.0237,	-443.1799,	407,	0.000! !END!
179 ! X =	321.0128,	-442.9306,	426,	0.000! !END!
180 ! X =	321.0019,	-442.6812,	457,	0.000! !END!
181 ! X =	320.9910,	-442.4319,	541,	0.000! !END!
182 ! X =	320.9801,	-442.1825,	609,	0.000! !END!
183 ! X =	320.9692,	-441.9331,	609,	0.000! !END!
184 ! X =	320.9583,	-441.6838,	608,	0.000! !END!
185 ! X =	320.9474,	-441.4344,	608,	0.000! !END!
186 ! X =	320.9365,	-441.1851,	608,	0.000! !END!
187 ! X =	320.9256,	-440.9357,	609,	0.000! !END!
188 ! X =	320.9147,	-440.6864,	562,	0.000! !END!
189 ! X =	320.9038,	-440.4370,	499,	0.000! !END!
190 ! X =	320.8929,	-440.1877,	438,	0.000! !END!
191 ! X =	320.8820,	-439.9383,	422,	0.000! !END!
192 ! X =	320.8711,	-439.6890,	457,	0.000! !END!
193 ! X =	320.8602,	-439.4396,	502,	0.000! !END!
194 ! X =	320.8493,	-439.1903,	533,	0.000! !END!
195 ! X =	320.8384,	-438.9410,	497,	0.000! !END!
196 ! X =	320.8275,	-438.6916,	441,	0.000! !END!
197 ! X =	320.8166,	-438.4423,	390,	0.000! !END!
198 ! X =	320.8057,	-438.1929,	452,	0.000! !END!
199 ! X =	320.7948,	-437.9436,	518,	0.000! !END!
200 ! X =	320.7839,	-437.6942,	548,	0.000! !END!
201 ! X =	321.3700,	-445.4133,	592,	0.000! !END!
202 ! X =	321.3591,	-445.1639,	609,	0.000! !END!
203 ! X =	321.3482,	-444.9146,	602,	0.000! !END!
204 ! X =	321.3373,	-444.6652,	586,	0.000! !END!
205 ! X =	321.3264,	-444.4159,	549,	0.000! !END!
206 ! X =	321.3155,	-444.1665,	514,	0.000! !END!
207 ! X =	321.3046,	-443.9171,	499,	0.000! !END!
208 ! X =	321.2937,	-443.6678,	459,	0.000! !END!
209 ! X =	321.2828,	-443.4184,	427,	0.000! !END!
210 ! X =	321.2719,	-443.1691,	389,	0.000! !END!
211 ! X =	321.2610,	-442.9197,	406,	0.000! !END!
212 ! X =	321.2501,	-442.6704,	426,	0.000! !END!
213 ! X =	321.2392,	-442.4210,	523,	0.000! !END!
214 ! X =	321.2283,	-442.1716,	593,	0.000! !END!
215 ! X =	321.2174,	-441.9223,	609,	0.000! !END!
216 ! X =	321.2065,	-441.6729,	609,	0.000! !END!
217 ! X =	321.1956,	-441.4236,	609,	0.000! !END!
218 ! X =	321.1847,	-441.1742,	609,	0.000! !END!

219 ! X =	321.1738,	-440.9249,	609,	0.000! !END!
220 ! X =	321.1629,	-440.6755,	579,	0.000! !END!
221 ! X =	321.1520,	-440.4262,	518,	0.000! !END!
222 ! X =	321.1411,	-440.1768,	457,	0.000! !END!
223 ! X =	321.1302,	-439.9275,	396,	0.000! !END!
224 ! X =	321.1193,	-439.6781,	426,	0.000! !END!
225 ! X =	321.1084,	-439.4288,	457,	0.000! !END!
226 ! X =	321.0975,	-439.1794,	457,	0.000! !END!
227 ! X =	321.0866,	-438.9301,	447,	0.000! !END!
228 ! X =	321.0757,	-438.6807,	401,	0.000! !END!
229 ! X =	321.0648,	-438.4314,	416,	0.000! !END!
230 ! X =	321.0539,	-438.1821,	495,	0.000! !END!
231 ! X =	321.0430,	-437.9327,	543,	0.000! !END!
232 ! X =	321.0321,	-437.6834,	579,	0.000! !END!
233 ! X =	321.0212,	-437.4340,	640,	0.000! !END!
234 ! X =	321.0103,	-437.1847,	640,	0.000! !END!
235 ! X =	321.6182,	-445.4024,	645,	0.000! !END!
236 ! X =	321.6074,	-445.1531,	670,	0.000! !END!
237 ! X =	321.5965,	-444.9037,	670,	0.000! !END!
238 ! X =	321.5856,	-444.6544,	640,	0.000! !END!
239 ! X =	321.5747,	-444.4050,	609,	0.000! !END!
240 ! X =	321.5638,	-444.1556,	579,	0.000! !END!
241 ! X =	321.5529,	-443.9063,	579,	0.000! !END!
242 ! X =	321.5420,	-443.6569,	548,	0.000! !END!
243 ! X =	321.5311,	-443.4076,	483,	0.000! !END!
244 ! X =	321.5202,	-443.1582,	406,	0.000! !END!
245 ! X =	321.5093,	-442.9088,	402,	0.000! !END!
246 ! X =	321.4984,	-442.6595,	436,	0.000! !END!
247 ! X =	321.4875,	-442.4101,	505,	0.000! !END!
248 ! X =	321.4766,	-442.1608,	548,	0.000! !END!
249 ! X =	321.4657,	-441.9114,	591,	0.000! !END!
250 ! X =	321.4548,	-441.6621,	609,	0.000! !END!
251 ! X =	321.4439,	-441.4127,	609,	0.000! !END!
252 ! X =	321.4330,	-441.1634,	609,	0.000! !END!
253 ! X =	321.4221,	-440.9140,	609,	0.000! !END!
254 ! X =	321.4112,	-440.6647,	562,	0.000! !END!
255 ! X =	321.4003,	-440.4153,	506,	0.000! !END!
256 ! X =	321.3894,	-440.1660,	457,	0.000! !END!
257 ! X =	321.3785,	-439.9166,	375,	0.000! !END!
258 ! X =	321.3676,	-439.6673,	403,	0.000! !END!
259 ! X =	321.3567,	-439.4179,	420,	0.000! !END!
260 ! X =	321.3458,	-439.1686,	429,	0.000! !END!
261 ! X =	321.3349,	-438.9192,	392,	0.000! !END!
262 ! X =	321.3240,	-438.6699,	381,	0.000! !END!
263 ! X =	321.3131,	-438.4205,	441,	0.000! !END!
264 ! X =	321.3022,	-438.1712,	502,	0.000! !END!
265 ! X =	321.2913,	-437.9219,	564,	0.000! !END!
266 ! X =	321.2804,	-437.6725,	593,	0.000! !END!
267 ! X =	321.2695,	-437.4232,	640,	0.000! !END!
268 ! X =	321.2586,	-437.1738,	640,	0.000! !END!
269 ! X =	321.2477,	-436.9245,	634,	0.000! !END!
270 ! X =	321.8665,	-445.3916,	670,	0.000! !END!
271 ! X =	321.8556,	-445.1422,	670,	0.000! !END!
272 ! X =	321.8447,	-444.8929,	670,	0.000! !END!
273 ! X =	321.8338,	-444.6435,	650,	0.000! !END!
274 ! X =	321.8229,	-444.3941,	640,	0.000! !END!

275 ! X =	321.8120,	-444.1448,	632,	0.000!	!END!
276 ! X =	321.8011,	-443.8954,	635,	0.000!	!END!
277 ! X =	321.7902,	-443.6461,	619,	0.000!	!END!
278 ! X =	321.7793,	-443.3967,	579,	0.000!	!END!
279 ! X =	321.7684,	-443.1473,	441,	0.000!	!END!
280 ! X =	321.7575,	-442.8980,	405,	0.000!	!END!
281 ! X =	321.7466,	-442.6486,	426,	0.000!	!END!
282 ! X =	321.7357,	-442.3993,	467,	0.000!	!END!
283 ! X =	321.7248,	-442.1499,	509,	0.000!	!END!
284 ! X =	321.7139,	-441.9006,	548,	0.000!	!END!
285 ! X =	321.7030,	-441.6512,	565,	0.000!	!END!
286 ! X =	321.6921,	-441.4019,	579,	0.000!	!END!
287 ! X =	321.6812,	-441.1525,	579,	0.000!	!END!
288 ! X =	321.6703,	-440.9032,	579,	0.000!	!END!
289 ! X =	321.6594,	-440.6538,	530,	0.000!	!END!
290 ! X =	321.6485,	-440.4045,	477,	0.000!	!END!
291 ! X =	321.6376,	-440.1551,	436,	0.000!	!END!
292 ! X =	321.6267,	-439.9058,	372,	0.000!	!END!
293 ! X =	321.6158,	-439.6564,	367,	0.000!	!END!
294 ! X =	321.6049,	-439.4071,	400,	0.000!	!END!
295 ! X =	321.5940,	-439.1577,	398,	0.000!	!END!
296 ! X =	321.5831,	-438.9084,	373,	0.000!	!END!
297 ! X =	321.5722,	-438.6590,	405,	0.000!	!END!
298 ! X =	321.5613,	-438.4097,	441,	0.000!	!END!
299 ! X =	321.5504,	-438.1603,	502,	0.000!	!END!
300 ! X =	321.5395,	-437.9110,	559,	0.000!	!END!
301 ! X =	321.5286,	-437.6616,	592,	0.000!	!END!
302 ! X =	321.5177,	-437.4123,	620,	0.000!	!END!
303 ! X =	321.5068,	-437.1630,	617,	0.000!	!END!
304 ! X =	321.4959,	-436.9136,	597,	0.000!	!END!
305 ! X =	322.1148,	-445.3807,	670,	0.000!	!END!
306 ! X =	322.1039,	-445.1314,	670,	0.000!	!END!
307 ! X =	322.0930,	-444.8820,	651,	0.000!	!END!
308 ! X =	322.0821,	-444.6326,	643,	0.000!	!END!
309 ! X =	322.0712,	-444.3833,	666,	0.000!	!END!
310 ! X =	322.0603,	-444.1339,	666,	0.000!	!END!
311 ! X =	322.0494,	-443.8846,	640,	0.000!	!END!
312 ! X =	322.0385,	-443.6352,	640,	0.000!	!END!
313 ! X =	322.0276,	-443.3858,	599,	0.000!	!END!
314 ! X =	322.0166,	-443.1365,	449,	0.000!	!END!
315 ! X =	322.0057,	-442.8871,	391,	0.000!	!END!
316 ! X =	321.9948,	-442.6378,	398,	0.000!	!END!
317 ! X =	321.9839,	-442.3884,	416,	0.000!	!END!
318 ! X =	321.9730,	-442.1391,	443,	0.000!	!END!
319 ! X =	321.9621,	-441.8897,	487,	0.000!	!END!
320 ! X =	321.9512,	-441.6404,	487,	0.000!	!END!
321 ! X =	321.9403,	-441.3910,	497,	0.000!	!END!
322 ! X =	321.9294,	-441.1416,	502,	0.000!	!END!
323 ! X =	321.9185,	-440.8923,	487,	0.000!	!END!
324 ! X =	321.9076,	-440.6429,	472,	0.000!	!END!
325 ! X =	321.8967,	-440.3936,	419,	0.000!	!END!
326 ! X =	321.8858,	-440.1442,	373,	0.000!	!END!
327 ! X =	321.8749,	-439.8949,	365,	0.000!	!END!
328 ! X =	321.8640,	-439.6456,	365,	0.000!	!END!
329 ! X =	321.8531,	-439.3962,	368,	0.000!	!END!
330 ! X =	321.8422,	-439.1469,	368,	0.000!	!END!

331 ! X =	321.8313,	-438.8975,	365,	0.000!	!END!
332 ! X =	321.8204,	-438.6482,	396,	0.000!	!END!
333 ! X =	321.8095,	-438.3988,	426,	0.000!	!END!
334 ! X =	321.7986,	-438.1495,	462,	0.000!	!END!
335 ! X =	321.7877,	-437.9001,	518,	0.000!	!END!
336 ! X =	321.7768,	-437.6508,	553,	0.000!	!END!
337 ! X =	321.7659,	-437.4014,	579,	0.000!	!END!
338 ! X =	321.7550,	-437.1521,	548,	0.000!	!END!
339 ! X =	321.7441,	-436.9028,	518,	0.000!	!END!
340 ! X =	322.3630,	-445.3699,	670,	0.000!	!END!
341 ! X =	322.3521,	-445.1205,	670,	0.000!	!END!
342 ! X =	322.3412,	-444.8711,	664,	0.000!	!END!
343 ! X =	322.3303,	-444.6218,	670,	0.000!	!END!
344 ! X =	322.3194,	-444.3724,	670,	0.000!	!END!
345 ! X =	322.3085,	-444.1231,	670,	0.000!	!END!
346 ! X =	322.2976,	-443.8737,	660,	0.000!	!END!
347 ! X =	322.2867,	-443.6243,	641,	0.000!	!END!
348 ! X =	322.2758,	-443.3750,	609,	0.000!	!END!
349 ! X =	322.2649,	-443.1256,	452,	0.000!	!END!
350 ! X =	322.2540,	-442.8763,	420,	0.000!	!END!
351 ! X =	322.2431,	-442.6269,	366,	0.000!	!END!
352 ! X =	322.2322,	-442.3776,	396,	0.000!	!END!
353 ! X =	322.2213,	-442.1282,	408,	0.000!	!END!
354 ! X =	322.2104,	-441.8788,	426,	0.000!	!END!
355 ! X =	322.1995,	-441.6295,	441,	0.000!	!END!
356 ! X =	322.1886,	-441.3801,	449,	0.000!	!END!
357 ! X =	322.1777,	-441.1308,	457,	0.000!	!END!
358 ! X =	322.1668,	-440.8814,	444,	0.000!	!END!
359 ! X =	322.1559,	-440.6321,	396,	0.000!	!END!
360 ! X =	322.1450,	-440.3827,	376,	0.000!	!END!
361 ! X =	322.1341,	-440.1334,	365,	0.000!	!END!
362 ! X =	322.1232,	-439.8840,	365,	0.000!	!END!
363 ! X =	322.1123,	-439.6347,	365,	0.000!	!END!
364 ! X =	322.1014,	-439.3853,	365,	0.000!	!END!
365 ! X =	322.0905,	-439.1360,	365,	0.000!	!END!
366 ! X =	322.0796,	-438.8866,	365,	0.000!	!END!
367 ! X =	322.0687,	-438.6373,	372,	0.000!	!END!
368 ! X =	322.0578,	-438.3880,	395,	0.000!	!END!
369 ! X =	322.0469,	-438.1386,	430,	0.000!	!END!
370 ! X =	322.0360,	-437.8893,	466,	0.000!	!END!
371 ! X =	322.0251,	-437.6399,	495,	0.000!	!END!
372 ! X =	322.0142,	-437.3906,	502,	0.000!	!END!
373 ! X =	322.0033,	-437.1412,	496,	0.000!	!END!
374 ! X =	321.9924,	-436.8919,	464,	0.000!	!END!
375 ! X =	322.6113,	-445.3590,	670,	0.000!	!END!
376 ! X =	322.6004,	-445.1096,	670,	0.000!	!END!
377 ! X =	322.5895,	-444.8603,	670,	0.000!	!END!
378 ! X =	322.5786,	-444.6109,	670,	0.000!	!END!
379 ! X =	322.5677,	-444.3616,	670,	0.000!	!END!
380 ! X =	322.5568,	-444.1122,	670,	0.000!	!END!
381 ! X =	322.5458,	-443.8628,	666,	0.000!	!END!
382 ! X =	322.5349,	-443.6135,	624,	0.000!	!END!
383 ! X =	322.5240,	-443.3641,	579,	0.000!	!END!
384 ! X =	322.5131,	-443.1148,	487,	0.000!	!END!
385 ! X =	322.5022,	-442.8654,	472,	0.000!	!END!
386 ! X =	322.4913,	-442.6160,	457,	0.000!	!END!

387 ! X =	322.4804,	-442.3667,	382,	0.000! !END!	
388 ! X =	322.4695,	-442.1173,	365,	0.000! !END!	
389 ! X =	322.4586,	-441.8680,	367,	0.000! !END!	
390 ! X =	322.4477,	-441.6186,	381,	0.000! !END!	
391 ! X =	322.4368,	-441.3693,	396,	0.000! !END!	
392 ! X =	322.4259,	-441.1199,	396,	0.000! !END!	
393 ! X =	322.4150,	-440.8706,	375,	0.000! !END!	
394 ! X =	322.4041,	-440.6212,	395,	0.000! !END!	
395 ! X =	322.3932,	-440.3719,	396,	0.000! !END!	
396 ! X =	322.3823,	-440.1225,	440,	0.000! !END!	
397 ! X =	322.3714,	-439.8732,	426,	0.000! !END!	
398 ! X =	322.3605,	-439.6238,	380,	0.000! !END!	
399 ! X =	322.3496,	-439.3745,	365,	0.000! !END!	
400 ! X =	322.3387,	-439.1251,	365,	0.000! !END!	
401 ! X =	322.3278,	-438.8758,	365,	0.000! !END!	
402 ! X =	322.3169,	-438.6264,	365,	0.000! !END!	
403 ! X =	322.3060,	-438.3771,	366,	0.000! !END!	
404 ! X =	322.2951,	-438.1277,	396,	0.000! !END!	
405 ! X =	322.2842,	-437.8784,	407,	0.000! !END!	
406 ! X =	322.2733,	-437.6291,	431,	0.000! !END!	
407 ! X =	322.2624,	-437.3797,	436,	0.000! !END!	
408 ! X =	322.2515,	-437.1304,	417,	0.000! !END!	
409 ! X =	322.2406,	-436.8810,	396,	0.000! !END!	
410 ! X =	322.2297,	-436.6317,	388,	0.000! !END!	
411 ! X =	322.2188,	-436.3824,	457,	0.000! !END!	
412 ! X =	322.2079,	-436.1330,	457,	0.000! !END!	
413 ! X =	322.1970,	-435.8837,	458,	0.000! !END!	
414 ! X =	322.8268,	-444.6000,	670,	0.000! !END!	
415 ! X =	322.8159,	-444.3507,	670,	0.000! !END!	
416 ! X =	322.8050,	-444.1013,	665,	0.000! !END!	
417 ! X =	322.7941,	-443.8520,	645,	0.000! !END!	
418 ! X =	322.7832,	-443.6026,	609,	0.000! !END!	
419 ! X =	322.7723,	-443.3533,	546,	0.000! !END!	
420 ! X =	322.7614,	-443.1039,	548,	0.000! !END!	
421 ! X =	322.7505,	-442.8545,	518,	0.000! !END!	
422 ! X =	322.7396,	-442.6052,	490,	0.000! !END!	
423 ! X =	322.7287,	-442.3558,	457,	0.000! !END!	
424 ! X =	322.7178,	-442.1065,	385,	0.000! !END!	
425 ! X =	322.7069,	-441.8571,	365,	0.000! !END!	
426 ! X =	322.6960,	-441.6078,	366,	0.000! !END!	
427 ! X =	322.6851,	-441.3584,	366,	0.000! !END!	
428 ! X =	322.6742,	-441.1091,	413,	0.000! !END!	
429 ! X =	322.6633,	-440.8597,	469,	0.000! !END!	
430 ! X =	322.6524,	-440.6104,	471,	0.000! !END!	
431 ! X =	322.6415,	-440.3610,	474,	0.000! !END!	
432 ! X =	322.6306,	-440.1117,	476,	0.000! !END!	
433 ! X =	322.6197,	-439.8623,	469,	0.000! !END!	
434 ! X =	322.6088,	-439.6130,	426,	0.000! !END!	
435 ! X =	322.5979,	-439.3636,	385,	0.000! !END!	
436 ! X =	322.5870,	-439.1143,	365,	0.000! !END!	
437 ! X =	322.5760,	-438.8649,	365,	0.000! !END!	
438 ! X =	322.5651,	-438.6156,	365,	0.000! !END!	
439 ! X =	322.5542,	-438.3662,	365,	0.000! !END!	
440 ! X =	322.5433,	-438.1169,	366,	0.000! !END!	
441 ! X =	322.5324,	-437.8675,	365,	0.000! !END!	
442 ! X =	322.5215,	-437.6182,	365,	0.000! !END!	

443 ! X =	322.5106,	-437.3689,	357,	0.000! !END!
444 ! X =	322.4997,	-437.1195,	354,	0.000! !END!
445 ! X =	322.4888,	-436.8702,	361,	0.000! !END!
446 ! X =	322.4779,	-436.6208,	388,	0.000! !END!
447 ! X =	322.4670,	-436.3715,	467,	0.000! !END!
448 ! X =	322.4561,	-436.1221,	467,	0.000! !END!
449 ! X =	322.4452,	-435.8728,	474,	0.000! !END!
450 ! X =	322.4343,	-435.6235,	498,	0.000! !END!
451 ! X =	322.4234,	-435.3741,	532,	0.000! !END!
452 ! X =	322.4125,	-435.1248,	557,	0.000! !END!
453 ! X =	323.0533,	-444.0905,	640,	0.000! !END!
454 ! X =	323.0423,	-443.8411,	640,	0.000! !END!
455 ! X =	323.0314,	-443.5917,	640,	0.000! !END!
456 ! X =	323.0205,	-443.3424,	640,	0.000! !END!
457 ! X =	323.0096,	-443.0930,	631,	0.000! !END!
458 ! X =	322.9987,	-442.8437,	599,	0.000! !END!
459 ! X =	322.9878,	-442.5943,	563,	0.000! !END!
460 ! X =	322.9769,	-442.3450,	487,	0.000! !END!
461 ! X =	322.9660,	-442.0956,	424,	0.000! !END!
462 ! X =	322.9551,	-441.8463,	370,	0.000! !END!
463 ! X =	322.9442,	-441.5969,	396,	0.000! !END!
464 ! X =	322.9333,	-441.3476,	431,	0.000! !END!
465 ! X =	322.9224,	-441.0982,	492,	0.000! !END!
466 ! X =	322.9115,	-440.8488,	518,	0.000! !END!
467 ! X =	322.9006,	-440.5995,	531,	0.000! !END!
468 ! X =	322.8897,	-440.3501,	548,	0.000! !END!
469 ! X =	322.8788,	-440.1008,	535,	0.000! !END!
470 ! X =	322.8679,	-439.8514,	512,	0.000! !END!
471 ! X =	322.8570,	-439.6021,	466,	0.000! !END!
472 ! X =	322.8461,	-439.3528,	414,	0.000! !END!
473 ! X =	322.8352,	-439.1034,	376,	0.000! !END!
474 ! X =	322.8243,	-438.8541,	365,	0.000! !END!
475 ! X =	322.8134,	-438.6047,	379,	0.000! !END!
476 ! X =	322.8025,	-438.3554,	426,	0.000! !END!
477 ! X =	322.7916,	-438.1060,	426,	0.000! !END!
478 ! X =	322.7807,	-437.8567,	411,	0.000! !END!
479 ! X =	322.7698,	-437.6073,	405,	0.000! !END!
480 ! X =	322.7589,	-437.3580,	384,	0.000! !END!
481 ! X =	322.7480,	-437.1086,	336,	0.000! !END!
482 ! X =	322.7371,	-436.8593,	352,	0.000! !END!
483 ! X =	322.7262,	-436.6100,	367,	0.000! !END!
484 ! X =	322.7153,	-436.3606,	426,	0.000! !END!
485 ! X =	322.7043,	-436.1113,	450,	0.000! !END!
486 ! X =	322.6934,	-435.8619,	471,	0.000! !END!
487 ! X =	322.6825,	-435.6126,	492,	0.000! !END!
488 ! X =	322.6716,	-435.3633,	529,	0.000! !END!
489 ! X =	322.6607,	-435.1139,	578,	0.000! !END!
490 ! X =	323.2797,	-443.5809,	655,	0.000! !END!
491 ! X =	323.2688,	-443.3315,	640,	0.000! !END!
492 ! X =	323.2579,	-443.0822,	640,	0.000! !END!
493 ! X =	323.2470,	-442.8328,	620,	0.000! !END!
494 ! X =	323.2361,	-442.5835,	579,	0.000! !END!
495 ! X =	323.2252,	-442.3341,	497,	0.000! !END!
496 ! X =	323.2143,	-442.0847,	426,	0.000! !END!
497 ! X =	323.2034,	-441.8354,	390,	0.000! !END!
498 ! X =	323.1925,	-441.5860,	432,	0.000! !END!

499 ! X =	323.1816,	-441.3367,	513,	0.000! !END!	
500 ! X =	323.1707,	-441.0873,	547,	0.000! !END!	
501 ! X =	323.1598,	-440.8380,	593,	0.000! !END!	
502 ! X =	323.1489,	-440.5886,	631,	0.000! !END!	
503 ! X =	323.1379,	-440.3393,	618,	0.000! !END!	
504 ! X =	323.1270,	-440.0899,	599,	0.000! !END!	
505 ! X =	323.1161,	-439.8406,	525,	0.000! !END!	
506 ! X =	323.1052,	-439.5912,	472,	0.000! !END!	
507 ! X =	323.0943,	-439.3419,	434,	0.000! !END!	
508 ! X =	323.0834,	-439.0925,	374,	0.000! !END!	
509 ! X =	323.0725,	-438.8432,	436,	0.000! !END!	
510 ! X =	323.0616,	-438.5938,	457,	0.000! !END!	
511 ! X =	323.0507,	-438.3445,	487,	0.000! !END!	
512 ! X =	323.0398,	-438.0952,	496,	0.000! !END!	
513 ! X =	323.0289,	-437.8458,	501,	0.000! !END!	
514 ! X =	323.0180,	-437.5965,	480,	0.000! !END!	
515 ! X =	323.0071,	-437.3471,	446,	0.000! !END!	
516 ! X =	322.9962,	-437.0978,	406,	0.000! !END!	
517 ! X =	322.9853,	-436.8484,	355,	0.000! !END!	
518 ! X =	322.9744,	-436.5991,	348,	0.000! !END!	
519 ! X =	322.9635,	-436.3498,	379,	0.000! !END!	
520 ! X =	322.9526,	-436.1004,	414,	0.000! !END!	
521 ! X =	322.9417,	-435.8511,	421,	0.000! !END!	
522 ! X =	322.9308,	-435.6017,	444,	0.000! !END!	
523 ! X =	322.9199,	-435.3524,	505,	0.000! !END!	
524 ! X =	322.9090,	-435.1031,	548,	0.000! !END!	
525 ! X =	323.5061,	-443.0713,	639,	0.000! !END!	
526 ! X =	323.4952,	-442.8219,	598,	0.000! !END!	
527 ! X =	323.4843,	-442.5726,	548,	0.000! !END!	
528 ! X =	323.4734,	-442.3232,	487,	0.000! !END!	
529 ! X =	323.4625,	-442.0739,	432,	0.000! !END!	
530 ! X =	323.4516,	-441.8245,	420,	0.000! !END!	
531 ! X =	323.4407,	-441.5752,	457,	0.000! !END!	
532 ! X =	323.4298,	-441.3258,	541,	0.000! !END!	
533 ! X =	323.4189,	-441.0765,	601,	0.000! !END!	
534 ! X =	323.4080,	-440.8271,	640,	0.000! !END!	
535 ! X =	323.3971,	-440.5778,	644,	0.000! !END!	
536 ! X =	323.3862,	-440.3284,	640,	0.000! !END!	
537 ! X =	323.3753,	-440.0791,	609,	0.000! !END!	
538 ! X =	323.3644,	-439.8297,	533,	0.000! !END!	
539 ! X =	323.3535,	-439.5804,	475,	0.000! !END!	
540 ! X =	323.3426,	-439.3310,	434,	0.000! !END!	
541 ! X =	323.3317,	-439.0817,	448,	0.000! !END!	
542 ! X =	323.3208,	-438.8323,	487,	0.000! !END!	
543 ! X =	323.3099,	-438.5830,	504,	0.000! !END!	
544 ! X =	323.2990,	-438.3336,	511,	0.000! !END!	
545 ! X =	323.2880,	-438.0843,	528,	0.000! !END!	
546 ! X =	323.2771,	-437.8349,	536,	0.000! !END!	
547 ! X =	323.2662,	-437.5856,	527,	0.000! !END!	
548 ! X =	323.2553,	-437.3363,	496,	0.000! !END!	
549 ! X =	323.2444,	-437.0869,	464,	0.000! !END!	
550 ! X =	323.2335,	-436.8376,	426,	0.000! !END!	
551 ! X =	323.2226,	-436.5882,	380,	0.000! !END!	
552 ! X =	323.2117,	-436.3389,	343,	0.000! !END!	
553 ! X =	323.2008,	-436.0896,	370,	0.000! !END!	
554 ! X =	323.1899,	-435.8402,	387,	0.000! !END!	

555 ! X =	323.1790,	-435.5909,	426,	0.000! !END!
556 ! X =	323.1681,	-435.3415,	477,	0.000! !END!
557 ! X =	323.1572,	-435.0922,	518,	0.000! !END!
558 ! X =	323.7326,	-442.5617,	495,	0.000! !END!
559 ! X =	323.7217,	-442.3124,	446,	0.000! !END!
560 ! X =	323.7108,	-442.0630,	401,	0.000! !END!
561 ! X =	323.6999,	-441.8137,	426,	0.000! !END!
562 ! X =	323.6890,	-441.5643,	472,	0.000! !END!
563 ! X =	323.6780,	-441.3150,	563,	0.000! !END!
564 ! X =	323.6671,	-441.0656,	640,	0.000! !END!
565 ! X =	323.6562,	-440.8163,	665,	0.000! !END!
566 ! X =	323.6453,	-440.5669,	668,	0.000! !END!
567 ! X =	323.6344,	-440.3176,	644,	0.000! !END!
568 ! X =	323.6235,	-440.0682,	589,	0.000! !END!
569 ! X =	323.6126,	-439.8189,	525,	0.000! !END!
570 ! X =	323.6017,	-439.5695,	484,	0.000! !END!
571 ! X =	323.5908,	-439.3202,	426,	0.000! !END!
572 ! X =	323.5799,	-439.0708,	480,	0.000! !END!
573 ! X =	323.5690,	-438.8215,	508,	0.000! !END!
574 ! X =	323.5581,	-438.5721,	542,	0.000! !END!
575 ! X =	323.5472,	-438.3228,	587,	0.000! !END!
576 ! X =	323.5363,	-438.0734,	593,	0.000! !END!
577 ! X =	323.5254,	-437.8241,	592,	0.000! !END!
578 ! X =	323.5145,	-437.5747,	579,	0.000! !END!
579 ! X =	323.5036,	-437.3254,	548,	0.000! !END!
580 ! X =	323.4927,	-437.0761,	518,	0.000! !END!
581 ! X =	323.4818,	-436.8267,	487,	0.000! !END!
582 ! X =	323.4709,	-436.5774,	457,	0.000! !END!
583 ! X =	323.4600,	-436.3280,	381,	0.000! !END!
584 ! X =	323.4490,	-436.0787,	352,	0.000! !END!
585 ! X =	323.4381,	-435.8294,	371,	0.000! !END!
586 ! X =	323.4272,	-435.5800,	381,	0.000! !END!
587 ! X =	323.4163,	-435.3307,	441,	0.000! !END!
588 ! X =	323.4054,	-435.0813,	492,	0.000! !END!
589 ! X =	323.9699,	-442.3015,	404,	0.000! !END!
590 ! X =	323.9590,	-442.0522,	409,	0.000! !END!
591 ! X =	323.9481,	-441.8028,	434,	0.000! !END!
592 ! X =	323.9372,	-441.5534,	472,	0.000! !END!
593 ! X =	323.9263,	-441.3041,	566,	0.000! !END!
594 ! X =	323.9154,	-441.0547,	640,	0.000! !END!
595 ! X =	323.9045,	-440.8054,	670,	0.000! !END!
596 ! X =	323.8936,	-440.5560,	670,	0.000! !END!
597 ! X =	323.8827,	-440.3067,	662,	0.000! !END!
598 ! X =	323.8718,	-440.0573,	579,	0.000! !END!
599 ! X =	323.8609,	-439.8080,	511,	0.000! !END!
600 ! X =	323.8500,	-439.5586,	466,	0.000! !END!
601 ! X =	323.8391,	-439.3093,	448,	0.000! !END!
602 ! X =	323.8281,	-439.0599,	492,	0.000! !END!
603 ! X =	323.8172,	-438.8106,	539,	0.000! !END!
604 ! X =	323.8063,	-438.5613,	586,	0.000! !END!
605 ! X =	323.7954,	-438.3119,	629,	0.000! !END!
606 ! X =	323.7845,	-438.0626,	644,	0.000! !END!
607 ! X =	323.7736,	-437.8132,	643,	0.000! !END!
608 ! X =	323.7627,	-437.5639,	633,	0.000! !END!
609 ! X =	323.7518,	-437.3145,	612,	0.000! !END!
610 ! X =	323.7409,	-437.0652,	557,	0.000! !END!

611 ! X =	323.7300,	-436.8158,	509,	0.000! !END!
612 ! X =	323.7191,	-436.5665,	472,	0.000! !END!
613 ! X =	323.7082,	-436.3172,	414,	0.000! !END!
614 ! X =	323.6973,	-436.0678,	358,	0.000! !END!
615 ! X =	323.6864,	-435.8185,	345,	0.000! !END!
616 ! X =	323.6755,	-435.5691,	349,	0.000! !END!
617 ! X =	323.6646,	-435.3198,	416,	0.000! !END!
618 ! X =	323.6537,	-435.0705,	460,	0.000! !END!
619 ! X =	323.6427,	-434.8211,	484,	0.000! !END!
620 ! X =	323.6318,	-434.5718,	483,	0.000! !END!
621 ! X =	323.6209,	-434.3225,	457,	0.000! !END!
622 ! X =	323.6100,	-434.0731,	458,	0.000! !END!
623 ! X =	324.2291,	-442.5400,	406,	0.000! !END!
624 ! X =	324.2182,	-442.2906,	411,	0.000! !END!
625 ! X =	324.2073,	-442.0413,	430,	0.000! !END!
626 ! X =	324.1963,	-441.7919,	448,	0.000! !END!
627 ! X =	324.1854,	-441.5426,	477,	0.000! !END!
628 ! X =	324.1745,	-441.2932,	554,	0.000! !END!
629 ! X =	324.1636,	-441.0439,	627,	0.000! !END!
630 ! X =	324.1527,	-440.7945,	657,	0.000! !END!
631 ! X =	324.1418,	-440.5452,	658,	0.000! !END!
632 ! X =	324.1309,	-440.2958,	640,	0.000! !END!
633 ! X =	324.1200,	-440.0465,	564,	0.000! !END!
634 ! X =	324.1091,	-439.7971,	499,	0.000! !END!
635 ! X =	324.0982,	-439.5478,	441,	0.000! !END!
636 ! X =	324.0873,	-439.2984,	462,	0.000! !END!
637 ! X =	324.0764,	-439.0491,	496,	0.000! !END!
638 ! X =	324.0655,	-438.7997,	554,	0.000! !END!
639 ! X =	324.0546,	-438.5504,	609,	0.000! !END!
640 ! X =	324.0437,	-438.3010,	641,	0.000! !END!
641 ! X =	324.0328,	-438.0517,	654,	0.000! !END!
642 ! X =	324.0219,	-437.8024,	657,	0.000! !END!
643 ! X =	324.0109,	-437.5530,	651,	0.000! !END!
644 ! X =	324.0000,	-437.3037,	636,	0.000! !END!
645 ! X =	323.9891,	-437.0543,	579,	0.000! !END!
646 ! X =	323.9782,	-436.8050,	531,	0.000! !END!
647 ! X =	323.9673,	-436.5556,	487,	0.000! !END!
648 ! X =	323.9564,	-436.3063,	457,	0.000! !END!
649 ! X =	323.9455,	-436.0570,	384,	0.000! !END!
650 ! X =	323.9346,	-435.8076,	357,	0.000! !END!
651 ! X =	323.9237,	-435.5583,	336,	0.000! !END!
652 ! X =	323.9128,	-435.3089,	381,	0.000! !END!
653 ! X =	323.9019,	-435.0596,	429,	0.000! !END!
654 ! X =	323.8910,	-434.8103,	458,	0.000! !END!
655 ! X =	323.8801,	-434.5609,	449,	0.000! !END!
656 ! X =	323.8692,	-434.3116,	410,	0.000! !END!
657 ! X =	323.8583,	-434.0623,	466,	0.000! !END!
658 ! X =	323.8474,	-433.8129,	548,	0.000! !END!
659 ! X =	323.8364,	-433.5636,	609,	0.000! !END!
660 ! X =	324.4773,	-442.5291,	426,	0.000! !END!
661 ! X =	324.4664,	-442.2798,	431,	0.000! !END!
662 ! X =	324.4555,	-442.0304,	457,	0.000! !END!
663 ! X =	324.4446,	-441.7811,	480,	0.000! !END!
664 ! X =	324.4119,	-441.0330,	584,	0.000! !END!
665 ! X =	324.4010,	-440.7837,	622,	0.000! !END!
666 ! X =	324.3901,	-440.5343,	640,	0.000! !END!

667 ! X =	324.3792,	-440.2850,	612,	0.000! !END!
668 ! X =	324.3682,	-440.0356,	558,	0.000! !END!
669 ! X =	324.3573,	-439.7863,	487,	0.000! !END!
670 ! X =	324.3464,	-439.5369,	441,	0.000! !END!
671 ! X =	324.3355,	-439.2876,	495,	0.000! !END!
672 ! X =	324.3246,	-439.0382,	528,	0.000! !END!
673 ! X =	324.3137,	-438.7889,	566,	0.000! !END!
674 ! X =	324.3028,	-438.5395,	621,	0.000! !END!
675 ! X =	324.2919,	-438.2902,	642,	0.000! !END!
676 ! X =	324.2810,	-438.0408,	670,	0.000! !END!
677 ! X =	324.2701,	-437.7915,	670,	0.000! !END!
678 ! X =	324.2592,	-437.5421,	669,	0.000! !END!
679 ! X =	324.2483,	-437.2928,	647,	0.000! !END!
680 ! X =	324.2374,	-437.0435,	611,	0.000! !END!
681 ! X =	324.2265,	-436.7941,	563,	0.000! !END!
682 ! X =	324.2156,	-436.5448,	507,	0.000! !END!
683 ! X =	324.2046,	-436.2954,	480,	0.000! !END!
684 ! X =	324.1937,	-436.0461,	441,	0.000! !END!
685 ! X =	324.1828,	-435.7968,	375,	0.000! !END!
686 ! X =	324.1719,	-435.5474,	337,	0.000! !END!
687 ! X =	324.1610,	-435.2981,	401,	0.000! !END!
688 ! X =	324.1501,	-435.0487,	426,	0.000! !END!
689 ! X =	324.1392,	-434.7994,	426,	0.000! !END!
690 ! X =	324.1283,	-434.5501,	396,	0.000! !END!
691 ! X =	324.1174,	-434.3007,	447,	0.000! !END!
692 ! X =	324.1065,	-434.0514,	495,	0.000! !END!
693 ! X =	324.0956,	-433.8021,	559,	0.000! !END!
694 ! X =	324.0847,	-433.5527,	609,	0.000! !END!
695 ! X =	324.7037,	-442.0196,	475,	0.000! !END!
696 ! X =	324.6928,	-441.7702,	524,	0.000! !END!
697 ! X =	324.6383,	-440.5234,	640,	0.000! !END!
698 ! X =	324.6274,	-440.2741,	609,	0.000! !END!
699 ! X =	324.6165,	-440.0247,	548,	0.000! !END!
700 ! X =	324.6056,	-439.7754,	479,	0.000! !END!
701 ! X =	324.5947,	-439.5260,	441,	0.000! !END!
702 ! X =	324.5838,	-439.2767,	512,	0.000! !END!
703 ! X =	324.5729,	-439.0273,	548,	0.000! !END!
704 ! X =	324.5620,	-438.7780,	601,	0.000! !END!
705 ! X =	324.5510,	-438.5287,	634,	0.000! !END!
706 ! X =	324.5401,	-438.2793,	664,	0.000! !END!
707 ! X =	324.5292,	-438.0300,	670,	0.000! !END!
708 ! X =	324.5183,	-437.7806,	670,	0.000! !END!
709 ! X =	324.5074,	-437.5313,	670,	0.000! !END!
710 ! X =	324.4965,	-437.2819,	647,	0.000! !END!
711 ! X =	324.4856,	-437.0326,	612,	0.000! !END!
712 ! X =	324.4747,	-436.7832,	579,	0.000! !END!
713 ! X =	324.4638,	-436.5339,	518,	0.000! !END!
714 ! X =	324.4529,	-436.2846,	480,	0.000! !END!
715 ! X =	324.4420,	-436.0352,	435,	0.000! !END!
716 ! X =	324.4311,	-435.7859,	380,	0.000! !END!
717 ! X =	324.4202,	-435.5365,	342,	0.000! !END!
718 ! X =	324.4093,	-435.2872,	398,	0.000! !END!
719 ! X =	324.3983,	-435.0379,	413,	0.000! !END!
720 ! X =	324.3874,	-434.7885,	401,	0.000! !END!
721 ! X =	324.3765,	-434.5392,	396,	0.000! !END!
722 ! X =	324.3656,	-434.2899,	463,	0.000! !END!

723 ! X =	324.3547,	-434.0405,	510,	0.000! !END!
724 ! X =	324.3438,	-433.7912,	579,	0.000! !END!
725 ! X =	324.3329,	-433.5419,	609,	0.000! !END!
726 ! X =	324.3220,	-433.2925,	609,	0.000! !END!
727 ! X =	324.8538,	-439.7645,	484,	0.000! !END!
728 ! X =	324.8429,	-439.5152,	454,	0.000! !END!
729 ! X =	324.8320,	-439.2658,	525,	0.000! !END!
730 ! X =	324.8211,	-439.0165,	558,	0.000! !END!
731 ! X =	324.8102,	-438.7671,	624,	0.000! !END!
732 ! X =	324.7993,	-438.5178,	670,	0.000! !END!
733 ! X =	324.7884,	-438.2684,	670,	0.000! !END!
734 ! X =	324.7775,	-438.0191,	670,	0.000! !END!
735 ! X =	324.7666,	-437.7698,	670,	0.000! !END!
736 ! X =	324.7557,	-437.5204,	647,	0.000! !END!
737 ! X =	324.7447,	-437.2711,	625,	0.000! !END!
738 ! X =	324.7338,	-437.0217,	609,	0.000! !END!
739 ! X =	324.7229,	-436.7724,	548,	0.000! !END!
740 ! X =	324.7120,	-436.5230,	492,	0.000! !END!
741 ! X =	324.7011,	-436.2737,	462,	0.000! !END!
742 ! X =	324.6902,	-436.0244,	410,	0.000! !END!
743 ! X =	324.6793,	-435.7750,	379,	0.000! !END!
744 ! X =	324.6684,	-435.5257,	342,	0.000! !END!
745 ! X =	324.6575,	-435.2763,	343,	0.000! !END!
746 ! X =	324.6466,	-435.0270,	396,	0.000! !END!
747 ! X =	324.6357,	-434.7777,	389,	0.000! !END!
748 ! X =	324.6248,	-434.5283,	396,	0.000! !END!
749 ! X =	324.6138,	-434.2790,	480,	0.000! !END!
750 ! X =	324.6029,	-434.0297,	512,	0.000! !END!
751 ! X =	324.5920,	-433.7803,	579,	0.000! !END!
752 ! X =	324.5811,	-433.5310,	579,	0.000! !END!
753 ! X =	324.5702,	-433.2817,	579,	0.000! !END!
754 ! X =	324.5593,	-433.0323,	548,	0.000! !END!
755 ! X =	325.0693,	-439.0056,	554,	0.000! !END!
756 ! X =	325.0584,	-438.7563,	624,	0.000! !END!
757 ! X =	325.0475,	-438.5069,	670,	0.000! !END!
758 ! X =	325.0366,	-438.2576,	670,	0.000! !END!
759 ! X =	325.0257,	-438.0082,	670,	0.000! !END!
760 ! X =	325.0148,	-437.7589,	640,	0.000! !END!
761 ! X =	325.0039,	-437.5095,	609,	0.000! !END!
762 ! X =	324.9930,	-437.2602,	548,	0.000! !END!
763 ! X =	324.9821,	-437.0109,	532,	0.000! !END!
764 ! X =	324.9712,	-436.7615,	487,	0.000! !END!
765 ! X =	324.9603,	-436.5122,	457,	0.000! !END!
766 ! X =	324.9493,	-436.2628,	426,	0.000! !END!
767 ! X =	324.9384,	-436.0135,	396,	0.000! !END!
768 ! X =	324.9275,	-435.7641,	366,	0.000! !END!
769 ! X =	324.9166,	-435.5148,	341,	0.000! !END!
770 ! X =	324.9057,	-435.2655,	335,	0.000! !END!
771 ! X =	324.8948,	-435.0161,	341,	0.000! !END!
772 ! X =	324.8839,	-434.7668,	352,	0.000! !END!
773 ! X =	324.8730,	-434.5175,	396,	0.000! !END!
774 ! X =	324.8621,	-434.2681,	480,	0.000! !END!
775 ! X =	324.8512,	-434.0188,	525,	0.000! !END!
776 ! X =	324.8403,	-433.7695,	579,	0.000! !END!
777 ! X =	324.8294,	-433.5201,	579,	0.000! !END!
778 ! X =	324.8184,	-433.2708,	522,	0.000! !END!

779 ! X =	324.8075,	-433.0215,	487,	0.000! !END!
780 ! X =	324.7966,	-432.7721,	464,	0.000! !END!
781 ! X =	325.3176,	-438.9947,	561,	0.000! !END!
782 ! X =	325.3067,	-438.7454,	624,	0.000! !END!
783 ! X =	325.2958,	-438.4960,	666,	0.000! !END!
784 ! X =	325.2849,	-438.2467,	670,	0.000! !END!
785 ! X =	325.2739,	-437.9974,	634,	0.000! !END!
786 ! X =	325.2630,	-437.7480,	595,	0.000! !END!
787 ! X =	325.2521,	-437.4987,	545,	0.000! !END!
788 ! X =	325.2412,	-437.2493,	518,	0.000! !END!
789 ! X =	325.2303,	-437.0000,	469,	0.000! !END!
790 ! X =	325.2194,	-436.7506,	434,	0.000! !END!
791 ! X =	325.2085,	-436.5013,	411,	0.000! !END!
792 ! X =	325.1976,	-436.2520,	365,	0.000! !END!
793 ! X =	325.1867,	-436.0026,	365,	0.000! !END!
794 ! X =	325.1758,	-435.7533,	348,	0.000! !END!
795 ! X =	325.1649,	-435.5039,	337,	0.000! !END!
796 ! X =	325.1539,	-435.2546,	335,	0.000! !END!
797 ! X =	325.1430,	-435.0053,	335,	0.000! !END!
798 ! X =	325.1321,	-434.7559,	345,	0.000! !END!
799 ! X =	325.1212,	-434.5066,	396,	0.000! !END!
800 ! X =	325.1103,	-434.2573,	478,	0.000! !END!
801 ! X =	325.0994,	-434.0079,	523,	0.000! !END!
802 ! X =	325.0885,	-433.7586,	549,	0.000! !END!
803 ! X =	325.0776,	-433.5093,	542,	0.000! !END!
804 ! X =	325.0667,	-433.2599,	489,	0.000! !END!
805 ! X =	325.0558,	-433.0106,	427,	0.000! !END!
806 ! X =	325.0449,	-432.7613,	375,	0.000! !END!
807 ! X =	325.0339,	-432.5119,	372,	0.000! !END!
808 ! X =	325.5658,	-438.9839,	586,	0.000! !END!
809 ! X =	325.5549,	-438.7345,	640,	0.000! !END!
810 ! X =	325.5440,	-438.4852,	648,	0.000! !END!
811 ! X =	325.5331,	-438.2358,	640,	0.000! !END!
812 ! X =	325.5222,	-437.9865,	599,	0.000! !END!
813 ! X =	325.5113,	-437.7371,	565,	0.000! !END!
814 ! X =	325.5004,	-437.4878,	543,	0.000! !END!
815 ! X =	325.4894,	-437.2385,	518,	0.000! !END!
816 ! X =	325.4785,	-436.9891,	493,	0.000! !END!
817 ! X =	325.4676,	-436.7398,	465,	0.000! !END!
818 ! X =	325.4567,	-436.4904,	444,	0.000! !END!
819 ! X =	325.4458,	-436.2411,	394,	0.000! !END!
820 ! X =	325.4349,	-435.9918,	366,	0.000! !END!
821 ! X =	325.4240,	-435.7424,	360,	0.000! !END!
822 ! X =	325.4131,	-435.4931,	389,	0.000! !END!
823 ! X =	325.4022,	-435.2437,	363,	0.000! !END!
824 ! X =	325.3913,	-434.9944,	335,	0.000! !END!
825 ! X =	325.3804,	-434.7451,	340,	0.000! !END!
826 ! X =	325.3694,	-434.4957,	365,	0.000! !END!
827 ! X =	325.3585,	-434.2464,	439,	0.000! !END!
828 ! X =	325.3476,	-433.9971,	490,	0.000! !END!
829 ! X =	325.3367,	-433.7477,	518,	0.000! !END!
830 ! X =	325.3258,	-433.4984,	493,	0.000! !END!
831 ! X =	325.3149,	-433.2490,	437,	0.000! !END!
832 ! X =	325.3040,	-432.9997,	396,	0.000! !END!
833 ! X =	325.2931,	-432.7504,	365,	0.000! !END!
834 ! X =	325.2822,	-432.5011,	377,	0.000! !END!

835 ! X =	325.2713,	-432.2517,	386,	0.000! !END!
836 ! X =	325.8031,	-438.7237,	657,	0.000! !END!
837 ! X =	325.7922,	-438.4743,	678,	0.000! !END!
838 ! X =	325.7813,	-438.2250,	665,	0.000! !END!
839 ! X =	325.7704,	-437.9756,	627,	0.000! !END!
840 ! X =	325.7595,	-437.7263,	616,	0.000! !END!
841 ! X =	325.7486,	-437.4769,	600,	0.000! !END!
842 ! X =	325.7377,	-437.2276,	560,	0.000! !END!
843 ! X =	325.7268,	-436.9782,	518,	0.000! !END!
844 ! X =	325.7159,	-436.7289,	489,	0.000! !END!
845 ! X =	325.7050,	-436.4796,	457,	0.000! !END!
846 ! X =	325.6940,	-436.2302,	384,	0.000! !END!
847 ! X =	325.6831,	-435.9809,	368,	0.000! !END!
848 ! X =	325.6722,	-435.7315,	396,	0.000! !END!
849 ! X =	325.6613,	-435.4822,	419,	0.000! !END!
850 ! X =	325.6504,	-435.2329,	431,	0.000! !END!
851 ! X =	325.6395,	-434.9835,	396,	0.000! !END!
852 ! X =	325.6286,	-434.7342,	335,	0.000! !END!
853 ! X =	325.6177,	-434.4849,	338,	0.000! !END!
854 ! X =	325.6068,	-434.2355,	380,	0.000! !END!
855 ! X =	325.5959,	-433.9862,	419,	0.000! !END!
856 ! X =	325.5849,	-433.7368,	425,	0.000! !END!
857 ! X =	325.5740,	-433.4875,	396,	0.000! !END!
858 ! X =	325.5631,	-433.2382,	368,	0.000! !END!
859 ! X =	325.5522,	-432.9888,	381,	0.000! !END!
860 ! X =	325.5413,	-432.7395,	424,	0.000! !END!
861 ! X =	325.5304,	-432.4902,	441,	0.000! !END!
862 ! X =	325.5195,	-432.2409,	439,	0.000! !END!
863 ! X =	325.5086,	-431.9915,	412,	0.000! !END!
864 ! X =	325.4977,	-431.7422,	408,	0.000! !END!
865 ! X =	326.0077,	-437.7154,	640,	0.000! !END!
866 ! X =	325.9968,	-437.4661,	638,	0.000! !END!
867 ! X =	325.9859,	-437.2167,	601,	0.000! !END!
868 ! X =	325.9750,	-436.9674,	533,	0.000! !END!
869 ! X =	325.9641,	-436.7180,	502,	0.000! !END!
870 ! X =	325.9532,	-436.4687,	464,	0.000! !END!
871 ! X =	325.9423,	-436.2194,	401,	0.000! !END!
872 ! X =	325.9314,	-435.9700,	390,	0.000! !END!
873 ! X =	325.9205,	-435.7207,	441,	0.000! !END!
874 ! X =	325.9095,	-435.4713,	466,	0.000! !END!
875 ! X =	325.8986,	-435.2220,	466,	0.000! !END!
876 ! X =	325.8877,	-434.9727,	441,	0.000! !END!
877 ! X =	325.8768,	-434.7233,	389,	0.000! !END!
878 ! X =	325.8659,	-434.4740,	335,	0.000! !END!
879 ! X =	325.8550,	-434.2246,	336,	0.000! !END!
880 ! X =	325.8441,	-433.9753,	365,	0.000! !END!
881 ! X =	325.8332,	-433.7260,	369,	0.000! !END!
882 ! X =	325.8223,	-433.4766,	356,	0.000! !END!
883 ! X =	325.8113,	-433.2273,	376,	0.000! !END!
884 ! X =	325.8004,	-432.9780,	410,	0.000! !END!
885 ! X =	325.7895,	-432.7286,	461,	0.000! !END!
886 ! X =	325.7786,	-432.4793,	490,	0.000! !END!
887 ! X =	325.7677,	-432.2300,	489,	0.000! !END!
888 ! X =	325.7568,	-431.9807,	473,	0.000! !END!
889 ! X =	325.7459,	-431.7313,	419,	0.000! !END!
890 ! X =	325.7350,	-431.4820,	452,	0.000! !END!

891 ! X =	326.2560,	-437.7045,	640,	0.000! !END!
892 ! X =	326.2451,	-437.4552,	640,	0.000! !END!
893 ! X =	326.2342,	-437.2058,	601,	0.000! !END!
894 ! X =	326.2232,	-436.9565,	533,	0.000! !END!
895 ! X =	326.2123,	-436.7072,	493,	0.000! !END!
896 ! X =	326.2014,	-436.4578,	457,	0.000! !END!
897 ! X =	326.1905,	-436.2085,	391,	0.000! !END!
898 ! X =	326.1796,	-435.9591,	429,	0.000! !END!
899 ! X =	326.1687,	-435.7098,	464,	0.000! !END!
900 ! X =	326.1578,	-435.4605,	492,	0.000! !END!
901 ! X =	326.1469,	-435.2111,	487,	0.000! !END!
902 ! X =	326.1360,	-434.9618,	457,	0.000! !END!
903 ! X =	326.1250,	-434.7124,	403,	0.000! !END!
904 ! X =	326.1141,	-434.4631,	371,	0.000! !END!
905 ! X =	326.1032,	-434.2138,	346,	0.000! !END!
906 ! X =	326.0923,	-433.9644,	336,	0.000! !END!
907 ! X =	326.0814,	-433.7151,	335,	0.000! !END!
908 ! X =	326.0705,	-433.4658,	336,	0.000! !END!
909 ! X =	326.0596,	-433.2164,	368,	0.000! !END!
910 ! X =	326.0487,	-432.9671,	408,	0.000! !END!
911 ! X =	326.0378,	-432.7178,	475,	0.000! !END!
912 ! X =	326.0268,	-432.4684,	518,	0.000! !END!
913 ! X =	326.0159,	-432.2191,	518,	0.000! !END!
914 ! X =	326.0050,	-431.9698,	517,	0.000! !END!
915 ! X =	325.9941,	-431.7205,	464,	0.000! !END!
916 ! X =	325.9832,	-431.4711,	443,	0.000! !END!
917 ! X =	325.9723,	-431.2218,	451,	0.000! !END!
918 ! X =	325.9614,	-430.9725,	476,	0.000! !END!
919 ! X =	326.5042,	-437.6937,	623,	0.000! !END!
920 ! X =	326.4933,	-437.4443,	613,	0.000! !END!
921 ! X =	326.4824,	-437.1950,	570,	0.000! !END!
922 ! X =	326.4715,	-436.9456,	502,	0.000! !END!
923 ! X =	326.4606,	-436.6963,	465,	0.000! !END!
924 ! X =	326.4497,	-436.4469,	429,	0.000! !END!
925 ! X =	326.4387,	-436.1976,	460,	0.000! !END!
926 ! X =	326.4278,	-435.9483,	472,	0.000! !END!
927 ! X =	326.4169,	-435.6989,	507,	0.000! !END!
928 ! X =	326.4060,	-435.4496,	518,	0.000! !END!
929 ! X =	326.3951,	-435.2003,	498,	0.000! !END!
930 ! X =	326.3842,	-434.9509,	451,	0.000! !END!
931 ! X =	326.3733,	-434.7016,	396,	0.000! !END!
932 ! X =	326.3624,	-434.4522,	411,	0.000! !END!
933 ! X =	326.3514,	-434.2029,	408,	0.000! !END!
934 ! X =	326.3405,	-433.9536,	386,	0.000! !END!
935 ! X =	326.3296,	-433.7042,	336,	0.000! !END!
936 ! X =	326.3187,	-433.4549,	335,	0.000! !END!
937 ! X =	326.3078,	-433.2056,	337,	0.000! !END!
938 ! X =	326.2969,	-432.9562,	364,	0.000! !END!
939 ! X =	326.2860,	-432.7069,	419,	0.000! !END!
940 ! X =	326.2751,	-432.4576,	497,	0.000! !END!
941 ! X =	326.2642,	-432.2082,	518,	0.000! !END!
942 ! X =	326.2532,	-431.9589,	518,	0.000! !END!
943 ! X =	326.2423,	-431.7096,	487,	0.000! !END!
944 ! X =	326.2314,	-431.4602,	487,	0.000! !END!
945 ! X =	326.2205,	-431.2109,	493,	0.000! !END!
946 ! X =	326.2096,	-430.9616,	526,	0.000! !END!

947 ! X = 326.1987, -430.7123, 563, 0.000! !END!
948 ! X = 326.7415, -437.4334, 548, 0.000! !END!
949 ! X = 326.7306, -437.1841, 507, 0.000! !END!
950 ! X = 326.7197, -436.9348, 470, 0.000! !END!
951 ! X = 326.7088, -436.6854, 426, 0.000! !END!
952 ! X = 326.6979, -436.4361, 457, 0.000! !END!
953 ! X = 326.6870, -436.1867, 499, 0.000! !END!
954 ! X = 326.6761, -435.9374, 509, 0.000! !END!
955 ! X = 326.6652, -435.6881, 548, 0.000! !END!
956 ! X = 326.6542, -435.4387, 552, 0.000! !END!
957 ! X = 326.6433, -435.1894, 518, 0.000! !END!
958 ! X = 326.6324, -434.9400, 457, 0.000! !END!
959 ! X = 326.6215, -434.6907, 457, 0.000! !END!
960 ! X = 326.6106, -434.4414, 456, 0.000! !END!
961 ! X = 326.5997, -434.1920, 426, 0.000! !END!
962 ! X = 326.5888, -433.9427, 399, 0.000! !END!
963 ! X = 326.5779, -433.6934, 355, 0.000! !END!
964 ! X = 326.5669, -433.4440, 365, 0.000! !END!
965 ! X = 326.5560, -433.1947, 365, 0.000! !END!
966 ! X = 326.5451, -432.9454, 360, 0.000! !END!
967 ! X = 326.5342, -432.6960, 355, 0.000! !END!
968 ! X = 326.5233, -432.4467, 445, 0.000! !END!
969 ! X = 326.5124, -432.1974, 472, 0.000! !END!
970 ! X = 326.5015, -431.9480, 472, 0.000! !END!
971 ! X = 326.4906, -431.6987, 487, 0.000! !END!
972 ! X = 326.4796, -431.4494, 487, 0.000! !END!
973 ! X = 326.4687, -431.2000, 493, 0.000! !END!
974 ! X = 326.4578, -430.9507, 530, 0.000! !END!
975 ! X = 326.4469, -430.7014, 593, 0.000! !END!
976 ! X = 326.4360, -430.4521, 630, 0.000! !END!
977 ! X = 326.4251, -430.2027, 644, 0.000! !END!
978 ! X = 326.9789, -437.1732, 446, 0.000! !END!
979 ! X = 326.9679, -436.9239, 440, 0.000! !END!
980 ! X = 326.9570, -436.6745, 482, 0.000! !END!
981 ! X = 326.9461, -436.4252, 503, 0.000! !END!
982 ! X = 326.9352, -436.1759, 536, 0.000! !END!
983 ! X = 326.9243, -435.9265, 556, 0.000! !END!
984 ! X = 326.9134, -435.6772, 574, 0.000! !END!
985 ! X = 326.9025, -435.4278, 602, 0.000! !END!
986 ! X = 326.8916, -435.1785, 548, 0.000! !END!
987 ! X = 326.8806, -434.9292, 514, 0.000! !END!
988 ! X = 326.8697, -434.6798, 487, 0.000! !END!
989 ! X = 326.8588, -434.4305, 460, 0.000! !END!
990 ! X = 326.8479, -434.1812, 426, 0.000! !END!
991 ! X = 326.8370, -433.9318, 414, 0.000! !END!
992 ! X = 326.8261, -433.6825, 424, 0.000! !END!
993 ! X = 326.8152, -433.4332, 435, 0.000! !END!
994 ! X = 326.8043, -433.1838, 435, 0.000! !END!
995 ! X = 326.7933, -432.9345, 402, 0.000! !END!
996 ! X = 326.7824, -432.6852, 354, 0.000! !END!
997 ! X = 326.7715, -432.4358, 345, 0.000! !END!
998 ! X = 326.7606, -432.1865, 396, 0.000! !END!
999 ! X = 326.7497, -431.9372, 396, 0.000! !END!
1000 ! X = 326.7388, -431.6878, 396, 0.000! !END!
1001 ! X = 326.7279, -431.4385, 457, 0.000! !END!
1002 ! X = 326.7169, -431.1892, 468, 0.000! !END!

1003 ! X =	326.7060,	-430.9398,	509,	0.000! !END!
1004 ! X =	326.6951,	-430.6905,	557,	0.000! !END!
1005 ! X =	326.6842,	-430.4412,	611,	0.000! !END!
1006 ! X =	326.6733,	-430.1919,	623,	0.000! !END!
1007 ! X =	326.6624,	-429.9425,	581,	0.000! !END!
1008 ! X =	326.6515,	-429.6932,	566,	0.000! !END!
1009 ! X =	326.6406,	-429.4439,	527,	0.000! !END!
1010 ! X =	327.2053,	-436.6637,	518,	0.000! !END!
1011 ! X =	327.1944,	-436.4143,	560,	0.000! !END!
1012 ! X =	327.1834,	-436.1650,	579,	0.000! !END!
1013 ! X =	327.1725,	-435.9157,	593,	0.000! !END!
1014 ! X =	327.1616,	-435.6663,	609,	0.000! !END!
1015 ! X =	327.1507,	-435.4170,	609,	0.000! !END!
1016 ! X =	327.1398,	-435.1676,	592,	0.000! !END!
1017 ! X =	327.1289,	-434.9183,	573,	0.000! !END!
1018 ! X =	327.1180,	-434.6690,	519,	0.000! !END!
1019 ! X =	327.1070,	-434.4196,	460,	0.000! !END!
1020 ! X =	327.0961,	-434.1703,	439,	0.000! !END!
1021 ! X =	327.0852,	-433.9210,	479,	0.000! !END!
1022 ! X =	327.0743,	-433.6716,	487,	0.000! !END!
1023 ! X =	327.0634,	-433.4223,	487,	0.000! !END!
1024 ! X =	327.0525,	-433.1729,	487,	0.000! !END!
1025 ! X =	327.0416,	-432.9236,	461,	0.000! !END!
1026 ! X =	327.0307,	-432.6743,	403,	0.000! !END!
1027 ! X =	327.0197,	-432.4250,	337,	0.000! !END!
1028 ! X =	327.0088,	-432.1756,	320,	0.000! !END!
1029 ! X =	326.9979,	-431.9263,	335,	0.000! !END!
1030 ! X =	326.9870,	-431.6770,	314,	0.000! !END!
1031 ! X =	326.9761,	-431.4276,	320,	0.000! !END!
1032 ! X =	326.9652,	-431.1783,	364,	0.000! !END!
1033 ! X =	326.9543,	-430.9290,	475,	0.000! !END!
1034 ! X =	326.9433,	-430.6796,	531,	0.000! !END!
1035 ! X =	326.9324,	-430.4303,	579,	0.000! !END!
1036 ! X =	326.9215,	-430.1810,	566,	0.000! !END!
1037 ! X =	326.9106,	-429.9317,	499,	0.000! !END!
1038 ! X =	326.8997,	-429.6823,	470,	0.000! !END!
1039 ! X =	326.8888,	-429.4330,	457,	0.000! !END!
1040 ! X =	326.8779,	-429.1837,	432,	0.000! !END!
1041 ! X =	326.8669,	-428.9344,	540,	0.000! !END!
1042 ! X =	326.8560,	-428.6851,	591,	0.000! !END!
1043 ! X =	326.8451,	-428.4357,	640,	0.000! !END!
1044 ! X =	326.8342,	-428.1864,	640,	0.000! !END!
1045 ! X =	326.8233,	-427.9371,	612,	0.000! !END!
1046 ! X =	326.8124,	-427.6878,	548,	0.000! !END!
1047 ! X =	326.8015,	-427.4384,	484,	0.000! !END!
1048 ! X =	326.7905,	-427.1891,	510,	0.000! !END!
1049 ! X =	327.4535,	-436.6528,	563,	0.000! !END!
1050 ! X =	327.4426,	-436.4035,	614,	0.000! !END!
1051 ! X =	327.4317,	-436.1541,	645,	0.000! !END!
1052 ! X =	327.4208,	-435.9048,	645,	0.000! !END!
1053 ! X =	327.4098,	-435.6554,	642,	0.000! !END!
1054 ! X =	327.3989,	-435.4061,	650,	0.000! !END!
1055 ! X =	327.3880,	-435.1568,	640,	0.000! !END!
1056 ! X =	327.3771,	-434.9074,	592,	0.000! !END!
1057 ! X =	327.3662,	-434.6581,	528,	0.000! !END!
1058 ! X =	327.3553,	-434.4088,	457,	0.000! !END!

1059 ! X =	327.3444,	-434.1594,	501,	0.000! !END!
1060 ! X =	327.3334,	-433.9101,	548,	0.000! !END!
1061 ! X =	327.3225,	-433.6607,	579,	0.000! !END!
1062 ! X =	327.3116,	-433.4114,	573,	0.000! !END!
1063 ! X =	327.3007,	-433.1621,	548,	0.000! !END!
1064 ! X =	327.2898,	-432.9127,	518,	0.000! !END!
1065 ! X =	327.2789,	-432.6634,	470,	0.000! !END!
1066 ! X =	327.2680,	-432.4141,	457,	0.000! !END!
1067 ! X =	327.2570,	-432.1647,	445,	0.000! !END!
1068 ! X =	327.2461,	-431.9154,	437,	0.000! !END!
1069 ! X =	327.2352,	-431.6661,	421,	0.000! !END!
1070 ! X =	327.2243,	-431.4168,	396,	0.000! !END!
1071 ! X =	327.2134,	-431.1674,	355,	0.000! !END!
1072 ! X =	327.2025,	-430.9181,	428,	0.000! !END!
1073 ! X =	327.1916,	-430.6688,	506,	0.000! !END!
1074 ! X =	327.1806,	-430.4194,	530,	0.000! !END!
1075 ! X =	327.1697,	-430.1701,	519,	0.000! !END!
1076 ! X =	327.1588,	-429.9208,	457,	0.000! !END!
1077 ! X =	327.1479,	-429.6715,	384,	0.000! !END!
1078 ! X =	327.1370,	-429.4221,	432,	0.000! !END!
1079 ! X =	327.1261,	-429.1728,	457,	0.000! !END!
1080 ! X =	327.1152,	-428.9235,	545,	0.000! !END!
1081 ! X =	327.1042,	-428.6742,	591,	0.000! !END!
1082 ! X =	327.0933,	-428.4249,	611,	0.000! !END!
1083 ! X =	327.0824,	-428.1755,	611,	0.000! !END!
1084 ! X =	327.0715,	-427.9262,	566,	0.000! !END!
1085 ! X =	327.0606,	-427.6769,	502,	0.000! !END!
1086 ! X =	327.0497,	-427.4276,	457,	0.000! !END!
1087 ! X =	327.0388,	-427.1783,	530,	0.000! !END!
1088 ! X =	327.6908,	-436.3926,	651,	0.000! !END!
1089 ! X =	327.6799,	-436.1432,	672,	0.000! !END!
1090 ! X =	327.6690,	-435.8939,	672,	0.000! !END!
1091 ! X =	327.6581,	-435.6446,	657,	0.000! !END!
1092 ! X =	327.6472,	-435.3952,	657,	0.000! !END!
1093 ! X =	327.6362,	-435.1459,	640,	0.000! !END!
1094 ! X =	327.6253,	-434.8966,	591,	0.000! !END!
1095 ! X =	327.6144,	-434.6472,	525,	0.000! !END!
1096 ! X =	327.6035,	-434.3979,	502,	0.000! !END!
1097 ! X =	327.5926,	-434.1485,	569,	0.000! !END!
1098 ! X =	327.5817,	-433.8992,	603,	0.000! !END!
1099 ! X =	327.5708,	-433.6499,	609,	0.000! !END!
1100 ! X =	327.5598,	-433.4005,	586,	0.000! !END!
1101 ! X =	327.5489,	-433.1512,	559,	0.000! !END!
1102 ! X =	327.5380,	-432.9019,	518,	0.000! !END!
1103 ! X =	327.5271,	-432.6525,	472,	0.000! !END!
1104 ! X =	327.5162,	-432.4032,	457,	0.000! !END!
1105 ! X =	327.5053,	-432.1539,	457,	0.000! !END!
1106 ! X =	327.4944,	-431.9045,	457,	0.000! !END!
1107 ! X =	327.4834,	-431.6552,	430,	0.000! !END!
1108 ! X =	327.4725,	-431.4059,	401,	0.000! !END!
1109 ! X =	327.4616,	-431.1566,	341,	0.000! !END!
1110 ! X =	327.4507,	-430.9072,	411,	0.000! !END!
1111 ! X =	327.4398,	-430.6579,	471,	0.000! !END!
1112 ! X =	327.4289,	-430.4086,	489,	0.000! !END!
1113 ! X =	327.4180,	-430.1592,	466,	0.000! !END!
1114 ! X =	327.4070,	-429.9099,	370,	0.000! !END!

1115 ! X =	327.3961,	-429.6606,	457,	0.000! !END!
1116 ! X =	327.3852,	-429.4113,	514,	0.000! !END!
1117 ! X =	327.3743,	-429.1619,	552,	0.000! !END!
1118 ! X =	327.3634,	-428.9126,	579,	0.000! !END!
1119 ! X =	327.3525,	-428.6633,	579,	0.000! !END!
1120 ! X =	327.3415,	-428.4140,	587,	0.000! !END!
1121 ! X =	327.3306,	-428.1647,	567,	0.000! !END!
1122 ! X =	327.3197,	-427.9153,	525,	0.000! !END!
1123 ! X =	327.3088,	-427.6660,	457,	0.000! !END!
1124 ! X =	327.2979,	-427.4167,	521,	0.000! !END!
1125 ! X =	327.2870,	-427.1674,	626,	0.000! !END!
1126 ! X =	327.9391,	-436.3817,	670,	0.000! !END!
1127 ! X =	327.9281,	-436.1324,	671,	0.000! !END!
1128 ! X =	327.9172,	-435.8830,	671,	0.000! !END!
1129 ! X =	327.9063,	-435.6337,	650,	0.000! !END!
1130 ! X =	327.8954,	-435.3844,	646,	0.000! !END!
1131 ! X =	327.8845,	-435.1350,	618,	0.000! !END!
1132 ! X =	327.8736,	-434.8857,	554,	0.000! !END!
1133 ! X =	327.8627,	-434.6363,	505,	0.000! !END!
1134 ! X =	327.8517,	-434.3870,	548,	0.000! !END!
1135 ! X =	327.8408,	-434.1377,	609,	0.000! !END!
1136 ! X =	327.8299,	-433.8883,	609,	0.000! !END!
1137 ! X =	327.8190,	-433.6390,	609,	0.000! !END!
1138 ! X =	327.8081,	-433.3897,	586,	0.000! !END!
1139 ! X =	327.7972,	-433.1403,	536,	0.000! !END!
1140 ! X =	327.7862,	-432.8910,	491,	0.000! !END!
1141 ! X =	327.7753,	-432.6417,	465,	0.000! !END!
1142 ! X =	327.7644,	-432.3923,	457,	0.000! !END!
1143 ! X =	327.7535,	-432.1430,	431,	0.000! !END!
1144 ! X =	327.7426,	-431.8937,	433,	0.000! !END!
1145 ! X =	327.7317,	-431.6443,	363,	0.000! !END!
1146 ! X =	327.7208,	-431.3950,	327,	0.000! !END!
1147 ! X =	327.7098,	-431.1457,	326,	0.000! !END!
1148 ! X =	327.6989,	-430.8964,	344,	0.000! !END!
1149 ! X =	327.6880,	-430.6470,	381,	0.000! !END!
1150 ! X =	327.6771,	-430.3977,	363,	0.000! !END!
1151 ! X =	327.6662,	-430.1484,	352,	0.000! !END!
1152 ! X =	327.6553,	-429.8990,	421,	0.000! !END!
1153 ! X =	327.6443,	-429.6497,	503,	0.000! !END!
1154 ! X =	327.6334,	-429.4004,	564,	0.000! !END!
1155 ! X =	327.6225,	-429.1511,	579,	0.000! !END!
1156 ! X =	327.6116,	-428.9018,	579,	0.000! !END!
1157 ! X =	327.6007,	-428.6524,	571,	0.000! !END!
1158 ! X =	327.5898,	-428.4031,	548,	0.000! !END!
1159 ! X =	327.5788,	-428.1538,	510,	0.000! !END!
1160 ! X =	327.5679,	-427.9045,	447,	0.000! !END!
1161 ! X =	327.5570,	-427.6551,	487,	0.000! !END!
1162 ! X =	327.5461,	-427.4058,	551,	0.000! !END!
1163 ! X =	328.1764,	-436.1215,	670,	0.000! !END!
1164 ! X =	328.1655,	-435.8722,	663,	0.000! !END!
1165 ! X =	328.1545,	-435.6228,	632,	0.000! !END!
1166 ! X =	328.1436,	-435.3735,	583,	0.000! !END!
1167 ! X =	328.1327,	-435.1241,	543,	0.000! !END!
1168 ! X =	328.1218,	-434.8748,	522,	0.000! !END!
1169 ! X =	328.1109,	-434.6255,	555,	0.000! !END!
1170 ! X =	328.1000,	-434.3761,	575,	0.000! !END!

1171	! X =	328.0890,	-434.1268,	609,	0.000! !END!
1172	! X =	328.0781,	-433.8775,	609,	0.000! !END!
1173	! X =	328.0672,	-433.6281,	609,	0.000! !END!
1174	! X =	328.0563,	-433.3788,	544,	0.000! !END!
1175	! X =	328.0454,	-433.1295,	511,	0.000! !END!
1176	! X =	328.0345,	-432.8801,	457,	0.000! !END!
1177	! X =	328.0236,	-432.6308,	414,	0.000! !END!
1178	! X =	328.0126,	-432.3815,	401,	0.000! !END!
1179	! X =	328.0017,	-432.1321,	369,	0.000! !END!
1180	! X =	327.9908,	-431.8828,	367,	0.000! !END!
1181	! X =	327.9799,	-431.6335,	367,	0.000! !END!
1182	! X =	327.9690,	-431.3841,	320,	0.000! !END!
1183	! X =	327.9581,	-431.1348,	335,	0.000! !END!
1184	! X =	327.9471,	-430.8855,	335,	0.000! !END!
1185	! X =	327.9362,	-430.6362,	320,	0.000! !END!
1186	! X =	327.9253,	-430.3868,	305,	0.000! !END!
1187	! X =	327.9144,	-430.1375,	320,	0.000! !END!
1188	! X =	327.9035,	-429.8882,	435,	0.000! !END!
1189	! X =	327.8926,	-429.6388,	526,	0.000! !END!
1190	! X =	327.8816,	-429.3895,	568,	0.000! !END!
1191	! X =	327.8707,	-429.1402,	579,	0.000! !END!
1192	! X =	327.8598,	-428.8909,	563,	0.000! !END!
1193	! X =	327.8489,	-428.6416,	530,	0.000! !END!
1194	! X =	327.8380,	-428.3922,	488,	0.000! !END!
1195	! X =	327.8271,	-428.1429,	444,	0.000! !END!
1196	! X =	327.8161,	-427.8936,	423,	0.000! !END!
1197	! X =	327.8052,	-427.6443,	487,	0.000! !END!
1198	! X =	327.7943,	-427.3949,	529,	0.000! !END!
1199	! X =	327.7834,	-427.1456,	536,	0.000! !END!
1200	! X =	327.7725,	-426.8963,	640,	0.000! !END!
1201	! X =	327.7616,	-426.6470,	640,	0.000! !END!
1202	! X =	328.4246,	-436.1106,	670,	0.000! !END!
1203	! X =	328.4137,	-435.8613,	639,	0.000! !END!
1204	! X =	328.4028,	-435.6119,	626,	0.000! !END!
1205	! X =	328.3919,	-435.3626,	620,	0.000! !END!
1206	! X =	328.3809,	-435.1133,	573,	0.000! !END!
1207	! X =	328.3700,	-434.8639,	609,	0.000! !END!
1208	! X =	328.3591,	-434.6146,	640,	0.000! !END!
1209	! X =	328.3482,	-434.3653,	617,	0.000! !END!
1210	! X =	328.3373,	-434.1159,	609,	0.000! !END!
1211	! X =	328.3264,	-433.8666,	609,	0.000! !END!
1212	! X =	328.3154,	-433.6172,	585,	0.000! !END!
1213	! X =	328.3045,	-433.3679,	517,	0.000! !END!
1214	! X =	328.2936,	-433.1186,	470,	0.000! !END!
1215	! X =	328.2827,	-432.8692,	420,	0.000! !END!
1216	! X =	328.2718,	-432.6199,	365,	0.000! !END!
1217	! X =	328.2609,	-432.3706,	367,	0.000! !END!
1218	! X =	328.2499,	-432.1213,	424,	0.000! !END!
1219	! X =	328.2390,	-431.8719,	460,	0.000! !END!
1220	! X =	328.2281,	-431.6226,	456,	0.000! !END!
1221	! X =	328.2172,	-431.3733,	469,	0.000! !END!
1222	! X =	328.2063,	-431.1239,	438,	0.000! !END!
1223	! X =	328.1954,	-430.8746,	381,	0.000! !END!
1224	! X =	328.1844,	-430.6253,	397,	0.000! !END!
1225	! X =	328.1735,	-430.3759,	335,	0.000! !END!
1226	! X =	328.1626,	-430.1266,	335,	0.000! !END!

1227 ! X =	328.1517,	-429.8773,	423,	0.000! !END!
1228 ! X =	328.1408,	-429.6280,	497,	0.000! !END!
1229 ! X =	328.1299,	-429.3786,	527,	0.000! !END!
1230 ! X =	328.1189,	-429.1293,	534,	0.000! !END!
1231 ! X =	328.1080,	-428.8800,	503,	0.000! !END!
1232 ! X =	328.0971,	-428.6307,	457,	0.000! !END!
1233 ! X =	328.0862,	-428.3814,	390,	0.000! !END!
1234 ! X =	328.0753,	-428.1320,	362,	0.000! !END!
1235 ! X =	328.0644,	-427.8827,	395,	0.000! !END!
1236 ! X =	328.0534,	-427.6334,	431,	0.000! !END!
1237 ! X =	328.0425,	-427.3841,	462,	0.000! !END!
1238 ! X =	328.0316,	-427.1348,	474,	0.000! !END!
1239 ! X =	328.0207,	-426.8854,	548,	0.000! !END!
1240 ! X =	328.0098,	-426.6361,	570,	0.000! !END!
1241 ! X =	327.9989,	-426.3868,	548,	0.000! !END!
1242 ! X =	327.9879,	-426.1375,	588,	0.000! !END!
1243 ! X =	328.6619,	-435.8504,	656,	0.000! !END!
1244 ! X =	328.6510,	-435.6011,	637,	0.000! !END!
1245 ! X =	328.6401,	-435.3517,	622,	0.000! !END!
1246 ! X =	328.6292,	-435.1024,	626,	0.000! !END!
1247 ! X =	328.6183,	-434.8531,	640,	0.000! !END!
1248 ! X =	328.6073,	-434.6037,	640,	0.000! !END!
1249 ! X =	328.5964,	-434.3544,	626,	0.000! !END!
1250 ! X =	328.5855,	-434.1050,	609,	0.000! !END!
1251 ! X =	328.5746,	-433.8557,	568,	0.000! !END!
1252 ! X =	328.5637,	-433.6064,	527,	0.000! !END!
1253 ! X =	328.5528,	-433.3570,	491,	0.000! !END!
1254 ! X =	328.5418,	-433.1077,	434,	0.000! !END!
1255 ! X =	328.5309,	-432.8584,	370,	0.000! !END!
1256 ! X =	328.5200,	-432.6090,	382,	0.000! !END!
1257 ! X =	328.5091,	-432.3597,	457,	0.000! !END!
1258 ! X =	328.4982,	-432.1104,	470,	0.000! !END!
1259 ! X =	328.4873,	-431.8610,	481,	0.000! !END!
1260 ! X =	328.4763,	-431.6117,	493,	0.000! !END!
1261 ! X =	328.4654,	-431.3624,	518,	0.000! !END!
1262 ! X =	328.4545,	-431.1131,	518,	0.000! !END!
1263 ! X =	328.4436,	-430.8637,	487,	0.000! !END!
1264 ! X =	328.4327,	-430.6144,	441,	0.000! !END!
1265 ! X =	328.4218,	-430.3651,	364,	0.000! !END!
1266 ! X =	328.4108,	-430.1157,	335,	0.000! !END!
1267 ! X =	328.3999,	-429.8664,	431,	0.000! !END!
1268 ! X =	328.3890,	-429.6171,	460,	0.000! !END!
1269 ! X =	328.3781,	-429.3678,	487,	0.000! !END!
1270 ! X =	328.3672,	-429.1184,	479,	0.000! !END!
1271 ! X =	328.3562,	-428.8691,	418,	0.000! !END!
1272 ! X =	328.3453,	-428.6198,	395,	0.000! !END!
1273 ! X =	328.3344,	-428.3705,	467,	0.000! !END!
1274 ! X =	328.3235,	-428.1212,	457,	0.000! !END!
1275 ! X =	328.3126,	-427.8718,	424,	0.000! !END!
1276 ! X =	328.3017,	-427.6225,	457,	0.000! !END!
1277 ! X =	328.2907,	-427.3732,	487,	0.000! !END!
1278 ! X =	328.2798,	-427.1239,	479,	0.000! !END!
1279 ! X =	328.2689,	-426.8746,	473,	0.000! !END!
1280 ! X =	328.2580,	-426.6252,	487,	0.000! !END!
1281 ! X =	328.2471,	-426.3759,	491,	0.000! !END!
1282 ! X =	328.2362,	-426.1266,	562,	0.000! !END!

1283 ! X =	328.9102,	-435.8395,	685,	0.000! !END!
1284 ! X =	328.8992,	-435.5902,	655,	0.000! !END!
1285 ! X =	328.8883,	-435.3409,	644,	0.000! !END!
1286 ! X =	328.8774,	-435.0915,	640,	0.000! !END!
1287 ! X =	328.8665,	-434.8422,	640,	0.000! !END!
1288 ! X =	328.8556,	-434.5928,	633,	0.000! !END!
1289 ! X =	328.8447,	-434.3435,	575,	0.000! !END!
1290 ! X =	328.8337,	-434.0942,	535,	0.000! !END!
1291 ! X =	328.8228,	-433.8448,	518,	0.000! !END!
1292 ! X =	328.8119,	-433.5955,	484,	0.000! !END!
1293 ! X =	328.8010,	-433.3462,	434,	0.000! !END!
1294 ! X =	328.7901,	-433.0968,	397,	0.000! !END!
1295 ! X =	328.7791,	-432.8475,	396,	0.000! !END!
1296 ! X =	328.7682,	-432.5982,	387,	0.000! !END!
1297 ! X =	328.7573,	-432.3488,	459,	0.000! !END!
1298 ! X =	328.7464,	-432.0995,	478,	0.000! !END!
1299 ! X =	328.7355,	-431.8502,	487,	0.000! !END!
1300 ! X =	328.7246,	-431.6008,	509,	0.000! !END!
1301 ! X =	328.7136,	-431.3515,	518,	0.000! !END!
1302 ! X =	328.7027,	-431.1022,	518,	0.000! !END!
1303 ! X =	328.6918,	-430.8529,	489,	0.000! !END!
1304 ! X =	328.6809,	-430.6035,	441,	0.000! !END!
1305 ! X =	328.6700,	-430.3542,	365,	0.000! !END!
1306 ! X =	328.6591,	-430.1049,	335,	0.000! !END!
1307 ! X =	328.6481,	-429.8555,	438,	0.000! !END!
1308 ! X =	328.6372,	-429.6062,	457,	0.000! !END!
1309 ! X =	328.6263,	-429.3569,	457,	0.000! !END!
1310 ! X =	328.6154,	-429.1076,	385,	0.000! !END!
1311 ! X =	328.6045,	-428.8582,	388,	0.000! !END!
1312 ! X =	328.5935,	-428.6089,	477,	0.000! !END!
1313 ! X =	328.5826,	-428.3596,	505,	0.000! !END!
1314 ! X =	328.5717,	-428.1103,	518,	0.000! !END!
1315 ! X =	328.5608,	-427.8610,	498,	0.000! !END!
1316 ! X =	328.5499,	-427.6116,	457,	0.000! !END!
1317 ! X =	328.5390,	-427.3623,	518,	0.000! !END!
1318 ! X =	328.5280,	-427.1130,	548,	0.000! !END!
1319 ! X =	328.5171,	-426.8637,	548,	0.000! !END!
1320 ! X =	328.5062,	-426.6144,	528,	0.000! !END!
1321 ! X =	328.4953,	-426.3650,	556,	0.000! !END!
1322 ! X =	329.0601,	-433.5846,	457,	0.000! !END!
1323 ! X =	329.0492,	-433.3353,	410,	0.000! !END!
1324 ! X =	329.0383,	-433.0859,	397,	0.000! !END!
1325 ! X =	329.0274,	-432.8366,	371,	0.000! !END!
1326 ! X =	329.0165,	-432.5873,	386,	0.000! !END!
1327 ! X =	329.0055,	-432.3380,	457,	0.000! !END!
1328 ! X =	328.9946,	-432.0886,	482,	0.000! !END!
1329 ! X =	328.9837,	-431.8393,	487,	0.000! !END!
1330 ! X =	328.9728,	-431.5900,	492,	0.000! !END!
1331 ! X =	328.9619,	-431.3406,	518,	0.000! !END!
1332 ! X =	328.9509,	-431.0913,	490,	0.000! !END!
1333 ! X =	328.9400,	-430.8420,	457,	0.000! !END!
1334 ! X =	328.9291,	-430.5926,	362,	0.000! !END!
1335 ! X =	328.9182,	-430.3433,	327,	0.000! !END!
1336 ! X =	328.9073,	-430.0940,	308,	0.000! !END!
1337 ! X =	328.8964,	-429.8447,	426,	0.000! !END!
1338 ! X =	328.8854,	-429.5953,	445,	0.000! !END!

1339 ! X =	328.8745,	-429.3460,	426,	0.000! !END!
1340 ! X =	328.8636,	-429.0967,	320,	0.000! !END!
1341 ! X =	328.8527,	-428.8474,	402,	0.000! !END!
1342 ! X =	328.8418,	-428.5980,	487,	0.000! !END!
1343 ! X =	328.8308,	-428.3487,	519,	0.000! !END!
1344 ! X =	328.8199,	-428.0994,	543,	0.000! !END!
1345 ! X =	328.8090,	-427.8501,	548,	0.000! !END!
1346 ! X =	328.7981,	-427.6008,	506,	0.000! !END!
1347 ! X =	328.7872,	-427.3514,	499,	0.000! !END!
1348 ! X =	328.7763,	-427.1021,	564,	0.000! !END!
1349 ! X =	328.7653,	-426.8528,	591,	0.000! !END!
1350 ! X =	328.7544,	-426.6035,	594,	0.000! !END!
1351 ! X =	328.7435,	-426.3542,	595,	0.000! !END!
1352 ! X =	329.2974,	-433.3244,	396,	0.000! !END!
1353 ! X =	329.2865,	-433.0751,	396,	0.000! !END!
1354 ! X =	329.2756,	-432.8257,	435,	0.000! !END!
1355 ! X =	329.2647,	-432.5764,	457,	0.000! !END!
1356 ! X =	329.2538,	-432.3271,	457,	0.000! !END!
1357 ! X =	329.2428,	-432.0777,	463,	0.000! !END!
1358 ! X =	329.2319,	-431.8284,	464,	0.000! !END!
1359 ! X =	329.2210,	-431.5791,	457,	0.000! !END!
1360 ! X =	329.2101,	-431.3298,	448,	0.000! !END!
1361 ! X =	329.1992,	-431.0804,	418,	0.000! !END!
1362 ! X =	329.1883,	-430.8311,	342,	0.000! !END!
1363 ! X =	329.1773,	-430.5818,	396,	0.000! !END!
1364 ! X =	329.1664,	-430.3324,	396,	0.000! !END!
1365 ! X =	329.1555,	-430.0831,	457,	0.000! !END!
1366 ! X =	329.1446,	-429.8338,	487,	0.000! !END!
1367 ! X =	329.1337,	-429.5845,	487,	0.000! !END!
1368 ! X =	329.1227,	-429.3351,	426,	0.000! !END!
1369 ! X =	329.1118,	-429.0858,	320,	0.000! !END!
1370 ! X =	329.1009,	-428.8365,	404,	0.000! !END!
1371 ! X =	329.0900,	-428.5872,	472,	0.000! !END!
1372 ! X =	329.0791,	-428.3378,	519,	0.000! !END!
1373 ! X =	329.0681,	-428.0885,	579,	0.000! !END!
1374 ! X =	329.0572,	-427.8392,	580,	0.000! !END!
1375 ! X =	329.0463,	-427.5899,	583,	0.000! !END!
1376 ! X =	329.0354,	-427.3406,	559,	0.000! !END!
1377 ! X =	329.0245,	-427.0912,	595,	0.000! !END!
1378 ! X =	329.0135,	-426.8419,	633,	0.000! !END!
1379 ! X =	329.0026,	-426.5926,	648,	0.000! !END!
1380 ! X =	328.9917,	-426.3433,	650,	0.000! !END!
1381 ! X =	328.9808,	-426.0940,	648,	0.000! !END!
1382 ! X =	329.5457,	-433.3135,	415,	0.000! !END!
1383 ! X =	329.5347,	-433.0642,	443,	0.000! !END!
1384 ! X =	329.5238,	-432.8149,	457,	0.000! !END!
1385 ! X =	329.5129,	-432.5655,	457,	0.000! !END!
1386 ! X =	329.5020,	-432.3162,	457,	0.000! !END!
1387 ! X =	329.4911,	-432.0669,	457,	0.000! !END!
1388 ! X =	329.4801,	-431.8175,	411,	0.000! !END!
1389 ! X =	329.4692,	-431.5682,	335,	0.000! !END!
1390 ! X =	329.4583,	-431.3189,	335,	0.000! !END!
1391 ! X =	329.4474,	-431.0695,	312,	0.000! !END!
1392 ! X =	329.4365,	-430.8202,	315,	0.000! !END!
1393 ! X =	329.4256,	-430.5709,	396,	0.000! !END!
1394 ! X =	329.4146,	-430.3216,	405,	0.000! !END!

1395 ! X =	329.4037,	-430.0722,	460,	0.000!	!END!
1396 ! X =	329.3928,	-429.8229,	487,	0.000!	!END!
1397 ! X =	329.3819,	-429.5736,	457,	0.000!	!END!
1398 ! X =	329.3710,	-429.3243,	411,	0.000!	!END!
1399 ! X =	329.3600,	-429.0749,	319,	0.000!	!END!
1400 ! X =	329.3491,	-428.8256,	388,	0.000!	!END!
1401 ! X =	329.3382,	-428.5763,	472,	0.000!	!END!
1402 ! X =	329.3273,	-428.3270,	519,	0.000!	!END!
1403 ! X =	329.3164,	-428.0776,	579,	0.000!	!END!
1404 ! X =	329.3054,	-427.8283,	593,	0.000!	!END!
1405 ! X =	329.2945,	-427.5790,	613,	0.000!	!END!
1406 ! X =	329.2836,	-427.3297,	640,	0.000!	!END!
1407 ! X =	329.2727,	-427.0804,	640,	0.000!	!END!
1408 ! X =	329.2618,	-426.8310,	670,	0.000!	!END!
1409 ! X =	329.2508,	-426.5817,	670,	0.000!	!END!
1410 ! X =	329.2399,	-426.3324,	670,	0.000!	!END!
1411 ! X =	329.2290,	-426.0831,	670,	0.000!	!END!
1412 ! X =	329.2181,	-425.8338,	645,	0.000!	!END!
1413 ! X =	329.2072,	-425.5845,	633,	0.000!	!END!
1414 ! X =	329.1962,	-425.3352,	640,	0.000!	!END!
1415 ! X =	329.1853,	-425.0858,	640,	0.000!	!END!
1416 ! X =	329.7939,	-433.3027,	487,	0.000!	!END!
1417 ! X =	329.7830,	-433.0533,	464,	0.000!	!END!
1418 ! X =	329.7721,	-432.8040,	457,	0.000!	!END!
1419 ! X =	329.7611,	-432.5547,	457,	0.000!	!END!
1420 ! X =	329.7502,	-432.3053,	457,	0.000!	!END!
1421 ! X =	329.7393,	-432.0560,	405,	0.000!	!END!
1422 ! X =	329.7284,	-431.8067,	364,	0.000!	!END!
1423 ! X =	329.7175,	-431.5573,	380,	0.000!	!END!
1424 ! X =	329.7065,	-431.3080,	423,	0.000!	!END!
1425 ! X =	329.6956,	-431.0587,	427,	0.000!	!END!
1426 ! X =	329.6847,	-430.8093,	377,	0.000!	!END!
1427 ! X =	329.6738,	-430.5600,	358,	0.000!	!END!
1428 ! X =	329.6629,	-430.3107,	396,	0.000!	!END!
1429 ! X =	329.6519,	-430.0614,	396,	0.000!	!END!
1430 ! X =	329.6410,	-429.8120,	414,	0.000!	!END!
1431 ! X =	329.6301,	-429.5627,	381,	0.000!	!END!
1432 ! X =	329.6192,	-429.3134,	364,	0.000!	!END!
1433 ! X =	329.6083,	-429.0641,	323,	0.000!	!END!
1434 ! X =	329.5973,	-428.8147,	457,	0.000!	!END!
1435 ! X =	329.5864,	-428.5654,	508,	0.000!	!END!
1436 ! X =	329.5755,	-428.3161,	530,	0.000!	!END!
1437 ! X =	329.5646,	-428.0668,	561,	0.000!	!END!
1438 ! X =	329.5537,	-427.8174,	590,	0.000!	!END!
1439 ! X =	329.5427,	-427.5681,	620,	0.000!	!END!
1440 ! X =	329.5318,	-427.3188,	656,	0.000!	!END!
1441 ! X =	329.5209,	-427.0695,	670,	0.000!	!END!
1442 ! X =	329.5100,	-426.8202,	670,	0.000!	!END!
1443 ! X =	329.4991,	-426.5709,	670,	0.000!	!END!
1444 ! X =	329.4881,	-426.3215,	670,	0.000!	!END!
1445 ! X =	329.4772,	-426.0722,	670,	0.000!	!END!
1446 ! X =	329.4663,	-425.8229,	653,	0.000!	!END!
1447 ! X =	329.4554,	-425.5736,	627,	0.000!	!END!
1448 ! X =	329.4445,	-425.3243,	614,	0.000!	!END!
1449 ! X =	329.4335,	-425.0750,	617,	0.000!	!END!
1450 ! X =	330.0421,	-433.2918,	497,	0.000!	!END!

1451 ! X =	330.0312,	-433.0424,	474,	0.000! !END!
1452 ! X =	330.0203,	-432.7931,	458,	0.000! !END!
1453 ! X =	330.0094,	-432.5438,	423,	0.000! !END!
1454 ! X =	329.9984,	-432.2944,	407,	0.000! !END!
1455 ! X =	329.9875,	-432.0451,	432,	0.000! !END!
1456 ! X =	329.9766,	-431.7958,	450,	0.000! !END!
1457 ! X =	329.9657,	-431.5464,	480,	0.000! !END!
1458 ! X =	329.9548,	-431.2971,	500,	0.000! !END!
1459 ! X =	329.9438,	-431.0478,	479,	0.000! !END!
1460 ! X =	329.9329,	-430.7985,	426,	0.000! !END!
1461 ! X =	329.9220,	-430.5491,	426,	0.000! !END!
1462 ! X =	329.9111,	-430.2998,	426,	0.000! !END!
1463 ! X =	329.9002,	-430.0505,	396,	0.000! !END!
1464 ! X =	329.8892,	-429.8012,	328,	0.000! !END!
1465 ! X =	329.8783,	-429.5518,	310,	0.000! !END!
1466 ! X =	329.8674,	-429.3025,	322,	0.000! !END!
1467 ! X =	329.8565,	-429.0532,	335,	0.000! !END!
1468 ! X =	329.8456,	-428.8039,	422,	0.000! !END!
1469 ! X =	329.8346,	-428.5545,	477,	0.000! !END!
1470 ! X =	329.8237,	-428.3052,	518,	0.000! !END!
1471 ! X =	329.8128,	-428.0559,	518,	0.000! !END!
1472 ! X =	329.8019,	-427.8066,	527,	0.000! !END!
1473 ! X =	329.7909,	-427.5572,	609,	0.000! !END!
1474 ! X =	329.7800,	-427.3079,	662,	0.000! !END!
1475 ! X =	329.7691,	-427.0586,	671,	0.000! !END!
1476 ! X =	329.7582,	-426.8093,	674,	0.000! !END!
1477 ! X =	329.7473,	-426.5600,	677,	0.000! !END!
1478 ! X =	329.7363,	-426.3107,	675,	0.000! !END!
1479 ! X =	329.7254,	-426.0613,	671,	0.000! !END!
1480 ! X =	329.7145,	-425.8120,	652,	0.000! !END!
1481 ! X =	329.7036,	-425.5627,	633,	0.000! !END!
1482 ! X =	329.6927,	-425.3134,	623,	0.000! !END!
1483 ! X =	329.6817,	-425.0641,	609,	0.000! !END!
1484 ! X =	330.2903,	-433.2809,	521,	0.000! !END!
1485 ! X =	330.2794,	-433.0316,	477,	0.000! !END!
1486 ! X =	330.2685,	-432.7822,	442,	0.000! !END!
1487 ! X =	330.2576,	-432.5329,	436,	0.000! !END!
1488 ! X =	330.2467,	-432.2836,	447,	0.000! !END!
1489 ! X =	330.2357,	-432.0342,	475,	0.000! !END!
1490 ! X =	330.2248,	-431.7849,	512,	0.000! !END!
1491 ! X =	330.2139,	-431.5356,	548,	0.000! !END!
1492 ! X =	330.2030,	-431.2862,	548,	0.000! !END!
1493 ! X =	330.1921,	-431.0369,	511,	0.000! !END!
1494 ! X =	330.1811,	-430.7876,	457,	0.000! !END!
1495 ! X =	330.1702,	-430.5383,	473,	0.000! !END!
1496 ! X =	330.1593,	-430.2889,	474,	0.000! !END!
1497 ! X =	330.1484,	-430.0396,	452,	0.000! !END!
1498 ! X =	330.1375,	-429.7903,	431,	0.000! !END!
1499 ! X =	330.1265,	-429.5409,	329,	0.000! !END!
1500 ! X =	330.1156,	-429.2916,	304,	0.000! !END!
1501 ! X =	330.1047,	-429.0423,	314,	0.000! !END!
1502 ! X =	330.0938,	-428.7930,	354,	0.000! !END!
1503 ! X =	330.0828,	-428.5437,	396,	0.000! !END!
1504 ! X =	330.0719,	-428.2943,	398,	0.000! !END!
1505 ! X =	330.0610,	-428.0450,	385,	0.000! !END!
1506 ! X =	330.0501,	-427.7957,	481,	0.000! !END!

1507 ! X =	330.0392,	-427.5464,	566,	0.000! !END!
1508 ! X =	330.0282,	-427.2970,	635,	0.000! !END!
1509 ! X =	330.0173,	-427.0477,	673,	0.000! !END!
1510 ! X =	330.0064,	-426.7984,	680,	0.000! !END!
1511 ! X =	329.9955,	-426.5491,	683,	0.000! !END!
1512 ! X =	329.9846,	-426.2998,	675,	0.000! !END!
1513 ! X =	329.9736,	-426.0505,	670,	0.000! !END!
1514 ! X =	329.9627,	-425.8011,	649,	0.000! !END!
1515 ! X =	329.9518,	-425.5518,	640,	0.000! !END!
1516 ! X =	329.9409,	-425.3025,	640,	0.000! !END!
1517 ! X =	329.9300,	-425.0532,	640,	0.000! !END!
1518 ! X =	330.5495,	-433.5193,	596,	0.000! !END!
1519 ! X =	330.5386,	-433.2700,	567,	0.000! !END!
1520 ! X =	330.5277,	-433.0207,	534,	0.000! !END!
1521 ! X =	330.5167,	-432.7713,	506,	0.000! !END!
1522 ! X =	330.5058,	-432.5220,	502,	0.000! !END!
1523 ! X =	330.4949,	-432.2727,	524,	0.000! !END!
1524 ! X =	330.4840,	-432.0234,	552,	0.000! !END!
1525 ! X =	330.4730,	-431.7740,	579,	0.000! !END!
1526 ! X =	330.4621,	-431.5247,	592,	0.000! !END!
1527 ! X =	330.4512,	-431.2754,	609,	0.000! !END!
1528 ! X =	330.4403,	-431.0260,	554,	0.000! !END!
1529 ! X =	330.4294,	-430.7767,	534,	0.000! !END!
1530 ! X =	330.4184,	-430.5274,	518,	0.000! !END!
1531 ! X =	330.4075,	-430.2780,	518,	0.000! !END!
1532 ! X =	330.3966,	-430.0287,	498,	0.000! !END!
1533 ! X =	330.3857,	-429.7794,	478,	0.000! !END!
1534 ! X =	330.3748,	-429.5301,	429,	0.000! !END!
1535 ! X =	330.3638,	-429.2807,	329,	0.000! !END!
1536 ! X =	330.3529,	-429.0314,	307,	0.000! !END!
1537 ! X =	330.3420,	-428.7821,	305,	0.000! !END!
1538 ! X =	330.3311,	-428.5328,	335,	0.000! !END!
1539 ! X =	330.3201,	-428.2835,	350,	0.000! !END!
1540 ! X =	330.3092,	-428.0341,	437,	0.000! !END!
1541 ! X =	330.2983,	-427.7848,	457,	0.000! !END!
1542 ! X =	330.2874,	-427.5355,	508,	0.000! !END!
1543 ! X =	330.2765,	-427.2862,	617,	0.000! !END!
1544 ! X =	330.2655,	-427.0369,	673,	0.000! !END!
1545 ! X =	330.2546,	-426.7875,	686,	0.000! !END!
1546 ! X =	330.2437,	-426.5382,	688,	0.000! !END!
1547 ! X =	330.2328,	-426.2889,	677,	0.000! !END!
1548 ! X =	330.2218,	-426.0396,	670,	0.000! !END!
1549 ! X =	330.2109,	-425.7903,	651,	0.000! !END!
1550 ! X =	330.2000,	-425.5409,	640,	0.000! !END!
1551 ! X =	330.1891,	-425.2916,	640,	0.000! !END!
1552 ! X =	330.1782,	-425.0423,	640,	0.000! !END!
1553 ! X =	330.8196,	-434.0071,	658,	0.000! !END!
1554 ! X =	330.8086,	-433.7578,	670,	0.000! !END!
1555 ! X =	330.7977,	-433.5085,	658,	0.000! !END!
1556 ! X =	330.7868,	-433.2591,	640,	0.000! !END!
1557 ! X =	330.7759,	-433.0098,	589,	0.000! !END!
1558 ! X =	330.7650,	-432.7605,	580,	0.000! !END!
1559 ! X =	330.7540,	-432.5111,	559,	0.000! !END!
1560 ! X =	330.7431,	-432.2618,	583,	0.000! !END!
1561 ! X =	330.7322,	-432.0125,	624,	0.000! !END!
1562 ! X =	330.7213,	-431.7631,	646,	0.000! !END!

1563	! X =	330.7103,	-431.5138,	644,	0.000! !END!
1564	! X =	330.6994,	-431.2645,	640,	0.000! !END!
1565	! X =	330.6885,	-431.0152,	614,	0.000! !END!
1566	! X =	330.6776,	-430.7658,	579,	0.000! !END!
1567	! X =	330.6667,	-430.5165,	534,	0.000! !END!
1568	! X =	330.6557,	-430.2672,	518,	0.000! !END!
1569	! X =	330.6448,	-430.0178,	511,	0.000! !END!
1570	! X =	330.6339,	-429.7685,	487,	0.000! !END!
1571	! X =	330.6230,	-429.5192,	463,	0.000! !END!
1572	! X =	330.6120,	-429.2699,	348,	0.000! !END!
1573	! X =	330.6011,	-429.0205,	306,	0.000! !END!
1574	! X =	330.5902,	-428.7712,	304,	0.000! !END!
1575	! X =	330.5793,	-428.5219,	330,	0.000! !END!
1576	! X =	330.5684,	-428.2726,	422,	0.000! !END!
1577	! X =	330.5574,	-428.0233,	512,	0.000! !END!
1578	! X =	330.5465,	-427.7739,	560,	0.000! !END!
1579	! X =	330.5356,	-427.5246,	609,	0.000! !END!
1580	! X =	330.5247,	-427.2753,	651,	0.000! !END!
1581	! X =	330.5137,	-427.0260,	673,	0.000! !END!
1582	! X =	330.5028,	-426.7767,	687,	0.000! !END!
1583	! X =	330.4919,	-426.5273,	694,	0.000! !END!
1584	! X =	330.4810,	-426.2780,	684,	0.000! !END!
1585	! X =	330.4701,	-426.0287,	671,	0.000! !END!
1586	! X =	330.4591,	-425.7794,	655,	0.000! !END!
1587	! X =	330.4482,	-425.5301,	643,	0.000! !END!
1588	! X =	330.4373,	-425.2808,	640,	0.000! !END!
1589	! X =	330.4264,	-425.0314,	639,	0.000! !END!
1590	! X =	331.0787,	-434.2456,	687,	0.000! !END!
1591	! X =	331.0678,	-433.9963,	671,	0.000! !END!
1592	! X =	331.0569,	-433.7469,	670,	0.000! !END!
1593	! X =	331.0459,	-433.4976,	670,	0.000! !END!
1594	! X =	331.0350,	-433.2483,	670,	0.000! !END!
1595	! X =	331.0241,	-432.9989,	651,	0.000! !END!
1596	! X =	331.0132,	-432.7496,	640,	0.000! !END!
1597	! X =	331.0023,	-432.5003,	640,	0.000! !END!
1598	! X =	330.9913,	-432.2509,	645,	0.000! !END!
1599	! X =	330.9804,	-432.0016,	670,	0.000! !END!
1600	! X =	330.9695,	-431.7523,	670,	0.000! !END!
1601	! X =	330.9586,	-431.5029,	670,	0.000! !END!
1602	! X =	330.9476,	-431.2536,	642,	0.000! !END!
1603	! X =	330.9367,	-431.0043,	640,	0.000! !END!
1604	! X =	330.9258,	-430.7549,	594,	0.000! !END!
1605	! X =	330.9149,	-430.5056,	534,	0.000! !END!
1606	! X =	330.9040,	-430.2563,	497,	0.000! !END!
1607	! X =	330.8930,	-430.0070,	482,	0.000! !END!
1608	! X =	330.8821,	-429.7576,	474,	0.000! !END!
1609	! X =	330.8712,	-429.5083,	437,	0.000! !END!
1610	! X =	330.8603,	-429.2590,	308,	0.000! !END!
1611	! X =	330.8493,	-429.0097,	320,	0.000! !END!
1612	! X =	330.8384,	-428.7603,	320,	0.000! !END!
1613	! X =	330.8275,	-428.5110,	373,	0.000! !END!
1614	! X =	330.8166,	-428.2617,	449,	0.000! !END!
1615	! X =	330.8057,	-428.0124,	548,	0.000! !END!
1616	! X =	330.7947,	-427.7630,	624,	0.000! !END!
1617	! X =	330.7838,	-427.5137,	676,	0.000! !END!
1618	! X =	330.7729,	-427.2644,	690,	0.000! !END!

1619 ! X =	330.7620,	-427.0151,	698,	0.000!	!END!
1620 ! X =	330.7510,	-426.7658,	701,	0.000!	!END!
1621 ! X =	330.7401,	-426.5165,	698,	0.000!	!END!
1622 ! X =	330.7292,	-426.2671,	685,	0.000!	!END!
1623 ! X =	330.7183,	-426.0178,	671,	0.000!	!END!
1624 ! X =	330.7073,	-425.7685,	658,	0.000!	!END!
1625 ! X =	330.6964,	-425.5192,	644,	0.000!	!END!
1626 ! X =	330.6855,	-425.2699,	640,	0.000!	!END!
1627 ! X =	330.6746,	-425.0206,	640,	0.000!	!END!
1628 ! X =	331.3379,	-434.4841,	662,	0.000!	!END!
1629 ! X =	331.3269,	-434.2347,	672,	0.000!	!END!
1630 ! X =	331.3160,	-433.9854,	671,	0.000!	!END!
1631 ! X =	331.3051,	-433.7360,	670,	0.000!	!END!
1632 ! X =	331.2942,	-433.4867,	670,	0.000!	!END!
1633 ! X =	331.2833,	-433.2374,	670,	0.000!	!END!
1634 ! X =	331.2723,	-432.9880,	651,	0.000!	!END!
1635 ! X =	331.2614,	-432.7387,	642,	0.000!	!END!
1636 ! X =	331.2505,	-432.4894,	662,	0.000!	!END!
1637 ! X =	331.2396,	-432.2400,	670,	0.000!	!END!
1638 ! X =	331.2286,	-431.9907,	670,	0.000!	!END!
1639 ! X =	331.2177,	-431.7414,	670,	0.000!	!END!
1640 ! X =	331.2068,	-431.4920,	651,	0.000!	!END!
1641 ! X =	331.1959,	-431.2427,	642,	0.000!	!END!
1642 ! X =	331.1849,	-430.9934,	632,	0.000!	!END!
1643 ! X =	331.1740,	-430.7441,	579,	0.000!	!END!
1644 ! X =	331.1631,	-430.4947,	497,	0.000!	!END!
1645 ! X =	331.1522,	-430.2454,	437,	0.000!	!END!
1646 ! X =	331.1413,	-429.9961,	436,	0.000!	!END!
1647 ! X =	331.1303,	-429.7468,	426,	0.000!	!END!
1648 ! X =	331.1194,	-429.4974,	363,	0.000!	!END!
1649 ! X =	331.1085,	-429.2481,	306,	0.000!	!END!
1650 ! X =	331.0976,	-428.9988,	365,	0.000!	!END!
1651 ! X =	331.0866,	-428.7495,	385,	0.000!	!END!
1652 ! X =	331.0757,	-428.5001,	432,	0.000!	!END!
1653 ! X =	331.0648,	-428.2508,	492,	0.000!	!END!
1654 ! X =	331.0539,	-428.0015,	578,	0.000!	!END!
1655 ! X =	331.0429,	-427.7522,	639,	0.000!	!END!
1656 ! X =	331.0320,	-427.5028,	701,	0.000!	!END!
1657 ! X =	331.0211,	-427.2535,	701,	0.000!	!END!
1658 ! X =	331.0102,	-427.0042,	701,	0.000!	!END!
1659 ! X =	330.9993,	-426.7549,	701,	0.000!	!END!
1660 ! X =	330.9883,	-426.5056,	701,	0.000!	!END!
1661 ! X =	330.9774,	-426.2563,	683,	0.000!	!END!
1662 ! X =	330.9665,	-426.0069,	672,	0.000!	!END!
1663 ! X =	331.5970,	-434.7225,	609,	0.000!	!END!
1664 ! X =	331.5861,	-434.4732,	642,	0.000!	!END!
1665 ! X =	331.5752,	-434.2238,	654,	0.000!	!END!
1666 ! X =	331.5643,	-433.9745,	666,	0.000!	!END!
1667 ! X =	331.5533,	-433.7252,	665,	0.000!	!END!
1668 ! X =	331.5424,	-433.4758,	664,	0.000!	!END!
1669 ! X =	331.5315,	-433.2265,	650,	0.000!	!END!
1670 ! X =	331.5206,	-432.9772,	639,	0.000!	!END!
1671 ! X =	331.5096,	-432.7278,	641,	0.000!	!END!
1672 ! X =	331.4987,	-432.4785,	658,	0.000!	!END!
1673 ! X =	331.4878,	-432.2292,	670,	0.000!	!END!
1674 ! X =	331.4769,	-431.9798,	670,	0.000!	!END!

1675 ! X =	331.4659,	-431.7305,	651,	0.000!	!END!
1676 ! X =	331.4550,	-431.4812,	640,	0.000!	!END!
1677 ! X =	331.4441,	-431.2318,	640,	0.000!	!END!
1678 ! X =	331.4332,	-430.9825,	612,	0.000!	!END!
1679 ! X =	331.4222,	-430.7332,	548,	0.000!	!END!
1680 ! X =	331.4113,	-430.4839,	457,	0.000!	!END!
1681 ! X =	331.4004,	-430.2345,	426,	0.000!	!END!
1682 ! X =	331.3895,	-429.9852,	346,	0.000!	!END!
1683 ! X =	331.3786,	-429.7359,	321,	0.000!	!END!
1684 ! X =	331.3676,	-429.4865,	315,	0.000!	!END!
1685 ! X =	331.3567,	-429.2372,	340,	0.000!	!END!
1686 ! X =	331.3458,	-428.9879,	409,	0.000!	!END!
1687 ! X =	331.3349,	-428.7386,	456,	0.000!	!END!
1688 ! X =	331.3239,	-428.4893,	491,	0.000!	!END!
1689 ! X =	331.3130,	-428.2399,	556,	0.000!	!END!
1690 ! X =	331.3021,	-427.9906,	603,	0.000!	!END!
1691 ! X =	331.2912,	-427.7413,	649,	0.000!	!END!
1692 ! X =	331.2802,	-427.4920,	701,	0.000!	!END!
1693 ! X =	331.2693,	-427.2426,	701,	0.000!	!END!
1694 ! X =	331.2584,	-426.9933,	701,	0.000!	!END!
1695 ! X =	331.2475,	-426.7440,	701,	0.000!	!END!
1696 ! X =	331.2365,	-426.4947,	701,	0.000!	!END!
1697 ! X =	331.2256,	-426.2454,	673,	0.000!	!END!
1698 ! X =	331.8562,	-434.9610,	562,	0.000!	!END!
1699 ! X =	331.8453,	-434.7116,	571,	0.000!	!END!
1700 ! X =	331.8343,	-434.4623,	615,	0.000!	!END!
1701 ! X =	331.8234,	-434.2130,	626,	0.000!	!END!
1702 ! X =	331.8125,	-433.9636,	640,	0.000!	!END!
1703 ! X =	331.8016,	-433.7143,	640,	0.000!	!END!
1704 ! X =	331.7906,	-433.4649,	640,	0.000!	!END!
1705 ! X =	331.7797,	-433.2156,	640,	0.000!	!END!
1706 ! X =	331.7688,	-432.9663,	619,	0.000!	!END!
1707 ! X =	331.7579,	-432.7169,	624,	0.000!	!END!
1708 ! X =	331.7469,	-432.4676,	646,	0.000!	!END!
1709 ! X =	331.7360,	-432.2183,	648,	0.000!	!END!
1710 ! X =	331.7251,	-431.9689,	646,	0.000!	!END!
1711 ! X =	331.7142,	-431.7196,	640,	0.000!	!END!
1712 ! X =	331.7032,	-431.4703,	609,	0.000!	!END!
1713 ! X =	331.6923,	-431.2210,	609,	0.000!	!END!
1714 ! X =	331.6814,	-430.9716,	587,	0.000!	!END!
1715 ! X =	331.6705,	-430.7223,	534,	0.000!	!END!
1716 ! X =	331.6595,	-430.4730,	434,	0.000!	!END!
1717 ! X =	331.6486,	-430.2236,	345,	0.000!	!END!
1718 ! X =	331.6377,	-429.9743,	309,	0.000!	!END!
1719 ! X =	331.6268,	-429.7250,	294,	0.000!	!END!
1720 ! X =	331.6158,	-429.4757,	346,	0.000!	!END!
1721 ! X =	331.6049,	-429.2263,	425,	0.000!	!END!
1722 ! X =	331.5940,	-428.9770,	457,	0.000!	!END!
1723 ! X =	331.5831,	-428.7277,	527,	0.000!	!END!
1724 ! X =	331.5722,	-428.4784,	586,	0.000!	!END!
1725 ! X =	331.5612,	-428.2290,	634,	0.000!	!END!
1726 ! X =	331.5503,	-427.9797,	670,	0.000!	!END!
1727 ! X =	331.5394,	-427.7304,	674,	0.000!	!END!
1728 ! X =	331.5285,	-427.4811,	701,	0.000!	!END!
1729 ! X =	331.5175,	-427.2318,	701,	0.000!	!END!
1730 ! X =	331.5066,	-426.9824,	701,	0.000!	!END!

1731 ! X =	331.4957,	-426.7331,	699,	0.000! !END!
1732 ! X =	331.4848,	-426.4838,	674,	0.000! !END!
1733 ! X =	331.4738,	-426.2345,	670,	0.000! !END!
1734 ! X =	332.1153,	-435.1994,	548,	0.000! !END!
1735 ! X =	332.1044,	-434.9501,	516,	0.000! !END!
1736 ! X =	332.0935,	-434.7007,	536,	0.000! !END!
1737 ! X =	332.0826,	-434.4514,	555,	0.000! !END!
1738 ! X =	332.0716,	-434.2021,	583,	0.000! !END!
1739 ! X =	332.0607,	-433.9527,	604,	0.000! !END!
1740 ! X =	332.0498,	-433.7034,	620,	0.000! !END!
1741 ! X =	332.0389,	-433.4541,	634,	0.000! !END!
1742 ! X =	332.0279,	-433.2047,	640,	0.000! !END!
1743 ! X =	332.0170,	-432.9554,	619,	0.000! !END!
1744 ! X =	332.0061,	-432.7061,	609,	0.000! !END!
1745 ! X =	331.9952,	-432.4567,	615,	0.000! !END!
1746 ! X =	331.9842,	-432.2074,	609,	0.000! !END!
1747 ! X =	331.9733,	-431.9581,	573,	0.000! !END!
1748 ! X =	331.9624,	-431.7087,	569,	0.000! !END!
1749 ! X =	331.9515,	-431.4594,	548,	0.000! !END!
1750 ! X =	331.9405,	-431.2101,	553,	0.000! !END!
1751 ! X =	331.9296,	-430.9607,	557,	0.000! !END!
1752 ! X =	331.9187,	-430.7114,	524,	0.000! !END!
1753 ! X =	331.9078,	-430.4621,	457,	0.000! !END!
1754 ! X =	331.8968,	-430.2128,	342,	0.000! !END!
1755 ! X =	331.8859,	-429.9634,	281,	0.000! !END!
1756 ! X =	331.8750,	-429.7141,	317,	0.000! !END!
1757 ! X =	331.8641,	-429.4648,	432,	0.000! !END!
1758 ! X =	331.8531,	-429.2155,	457,	0.000! !END!
1759 ! X =	331.8422,	-428.9661,	495,	0.000! !END!
1760 ! X =	331.8313,	-428.7168,	562,	0.000! !END!
1761 ! X =	331.8204,	-428.4675,	615,	0.000! !END!
1762 ! X =	331.8094,	-428.2182,	665,	0.000! !END!
1763 ! X =	331.7985,	-427.9688,	670,	0.000! !END!
1764 ! X =	331.7876,	-427.7195,	673,	0.000! !END!
1765 ! X =	331.7767,	-427.4702,	688,	0.000! !END!
1766 ! X =	331.7657,	-427.2209,	701,	0.000! !END!
1767 ! X =	332.3636,	-435.1885,	531,	0.000! !END!
1768 ! X =	332.3526,	-434.9392,	554,	0.000! !END!
1769 ! X =	332.3417,	-434.6899,	595,	0.000! !END!
1770 ! X =	332.3308,	-434.4405,	617,	0.000! !END!
1771 ! X =	332.3199,	-434.1912,	640,	0.000! !END!
1772 ! X =	332.3089,	-433.9418,	646,	0.000! !END!
1773 ! X =	332.2980,	-433.6925,	642,	0.000! !END!
1774 ! X =	332.2871,	-433.4432,	637,	0.000! !END!
1775 ! X =	332.2762,	-433.1938,	623,	0.000! !END!
1776 ! X =	332.2652,	-432.9445,	612,	0.000! !END!
1777 ! X =	332.2543,	-432.6952,	584,	0.000! !END!
1778 ! X =	332.2434,	-432.4458,	562,	0.000! !END!
1779 ! X =	332.2325,	-432.1965,	539,	0.000! !END!
1780 ! X =	332.2215,	-431.9472,	484,	0.000! !END!
1781 ! X =	332.2106,	-431.6978,	464,	0.000! !END!
1782 ! X =	332.1997,	-431.4485,	452,	0.000! !END!
1783 ! X =	332.1888,	-431.1992,	487,	0.000! !END!
1784 ! X =	332.1778,	-430.9499,	519,	0.000! !END!
1785 ! X =	332.1669,	-430.7005,	493,	0.000! !END!
1786 ! X =	332.1560,	-430.4512,	457,	0.000! !END!

1787 ! X =	332.1451,	-430.2019,	304,	0.000! !END!
1788 ! X =	332.1341,	-429.9525,	281,	0.000! !END!
1789 ! X =	332.1232,	-429.7032,	317,	0.000! !END!
1790 ! X =	332.1123,	-429.4539,	431,	0.000! !END!
1791 ! X =	332.1014,	-429.2046,	468,	0.000! !END!
1792 ! X =	332.0904,	-428.9552,	498,	0.000! !END!
1793 ! X =	332.0795,	-428.7059,	558,	0.000! !END!
1794 ! X =	332.0686,	-428.4566,	601,	0.000! !END!
1795 ! X =	332.0577,	-428.2073,	645,	0.000! !END!
1796 ! X =	332.0467,	-427.9580,	670,	0.000! !END!
1797 ! X =	332.0358,	-427.7086,	670,	0.000! !END!
1798 ! X =	332.0249,	-427.4593,	673,	0.000! !END!
1799 ! X =	332.0140,	-427.2100,	692,	0.000! !END!
1800 ! X =	332.6118,	-435.1777,	576,	0.000! !END!
1801 ! X =	332.6009,	-434.9283,	618,	0.000! !END!
1802 ! X =	332.5899,	-434.6790,	635,	0.000! !END!
1803 ! X =	332.5790,	-434.4296,	645,	0.000! !END!
1804 ! X =	332.5681,	-434.1803,	667,	0.000! !END!
1805 ! X =	332.5572,	-433.9310,	670,	0.000! !END!
1806 ! X =	332.5462,	-433.6816,	663,	0.000! !END!
1807 ! X =	332.5353,	-433.4323,	643,	0.000! !END!
1808 ! X =	332.5244,	-433.1830,	637,	0.000! !END!
1809 ! X =	332.5135,	-432.9336,	628,	0.000! !END!
1810 ! X =	332.5025,	-432.6843,	609,	0.000! !END!
1811 ! X =	332.4916,	-432.4350,	585,	0.000! !END!
1812 ! X =	332.4807,	-432.1856,	568,	0.000! !END!
1813 ! X =	332.4698,	-431.9363,	564,	0.000! !END!
1814 ! X =	332.4588,	-431.6870,	535,	0.000! !END!
1815 ! X =	332.4479,	-431.4376,	479,	0.000! !END!
1816 ! X =	332.4370,	-431.1883,	436,	0.000! !END!
1817 ! X =	332.4261,	-430.9390,	428,	0.000! !END!
1818 ! X =	332.4151,	-430.6896,	426,	0.000! !END!
1819 ! X =	332.4042,	-430.4403,	426,	0.000! !END!
1820 ! X =	332.3933,	-430.1910,	304,	0.000! !END!
1821 ! X =	332.3824,	-429.9417,	304,	0.000! !END!
1822 ! X =	332.3714,	-429.6923,	284,	0.000! !END!
1823 ! X =	332.3605,	-429.4430,	374,	0.000! !END!
1824 ! X =	332.3496,	-429.1937,	447,	0.000! !END!
1825 ! X =	332.3387,	-428.9444,	492,	0.000! !END!
1826 ! X =	332.3277,	-428.6950,	518,	0.000! !END!
1827 ! X =	332.3168,	-428.4457,	558,	0.000! !END!
1828 ! X =	332.3059,	-428.1964,	603,	0.000! !END!
1829 ! X =	332.2950,	-427.9471,	644,	0.000! !END!
1830 ! X =	332.2840,	-427.6978,	670,	0.000! !END!
1831 ! X =	332.2731,	-427.4484,	670,	0.000! !END!
1832 ! X =	332.2622,	-427.1991,	675,	0.000! !END!
1833 ! X =	332.8600,	-435.1668,	609,	0.000! !END!
1834 ! X =	332.8491,	-434.9174,	626,	0.000! !END!
1835 ! X =	332.8382,	-434.6681,	640,	0.000! !END!
1836 ! X =	332.8272,	-434.4188,	645,	0.000! !END!
1837 ! X =	332.8163,	-434.1694,	667,	0.000! !END!
1838 ! X =	332.8054,	-433.9201,	670,	0.000! !END!
1839 ! X =	332.7945,	-433.6707,	668,	0.000! !END!
1840 ! X =	332.7835,	-433.4214,	653,	0.000! !END!
1841 ! X =	332.7726,	-433.1721,	643,	0.000! !END!
1842 ! X =	332.7617,	-432.9227,	640,	0.000! !END!

1843 ! X =	332.7508,	-432.6734,	640,	0.000! !END!
1844 ! X =	332.7398,	-432.4241,	619,	0.000! !END!
1845 ! X =	332.7289,	-432.1747,	609,	0.000! !END!
1846 ! X =	332.7180,	-431.9254,	609,	0.000! !END!
1847 ! X =	332.7071,	-431.6761,	580,	0.000! !END!
1848 ! X =	332.6961,	-431.4268,	536,	0.000! !END!
1849 ! X =	332.6852,	-431.1774,	452,	0.000! !END!
1850 ! X =	332.6743,	-430.9281,	426,	0.000! !END!
1851 ! X =	332.6634,	-430.6788,	396,	0.000! !END!
1852 ! X =	332.6524,	-430.4294,	375,	0.000! !END!
1853 ! X =	332.6415,	-430.1801,	335,	0.000! !END!
1854 ! X =	332.6306,	-429.9308,	321,	0.000! !END!
1855 ! X =	332.6197,	-429.6815,	304,	0.000! !END!
1856 ! X =	332.6087,	-429.4321,	315,	0.000! !END!
1857 ! X =	332.5978,	-429.1828,	386,	0.000! !END!
1858 ! X =	332.5869,	-428.9335,	419,	0.000! !END!
1859 ! X =	332.5759,	-428.6842,	457,	0.000! !END!
1860 ! X =	332.5650,	-428.4348,	539,	0.000! !END!
1861 ! X =	332.5541,	-428.1855,	580,	0.000! !END!
1862 ! X =	332.5432,	-427.9362,	633,	0.000! !END!
1863 ! X =	332.5322,	-427.6869,	656,	0.000! !END!
1864 ! X =	333.0973,	-434.9065,	623,	0.000! !END!
1865 ! X =	333.0864,	-434.6572,	638,	0.000! !END!
1866 ! X =	333.0755,	-434.4079,	640,	0.000! !END!
1867 ! X =	333.0646,	-434.1585,	641,	0.000! !END!
1868 ! X =	333.0536,	-433.9092,	667,	0.000! !END!
1869 ! X =	333.0427,	-433.6599,	667,	0.000! !END!
1870 ! X =	333.0318,	-433.4105,	661,	0.000! !END!
1871 ! X =	333.0208,	-433.1612,	647,	0.000! !END!
1872 ! X =	333.0099,	-432.9119,	640,	0.000! !END!
1873 ! X =	332.9990,	-432.6625,	640,	0.000! !END!
1874 ! X =	332.9881,	-432.4132,	640,	0.000! !END!
1875 ! X =	332.9771,	-432.1639,	623,	0.000! !END!
1876 ! X =	332.9662,	-431.9145,	613,	0.000! !END!
1877 ! X =	332.9553,	-431.6652,	605,	0.000! !END!
1878 ! X =	332.9444,	-431.4159,	579,	0.000! !END!
1879 ! X =	332.9334,	-431.1665,	530,	0.000! !END!
1880 ! X =	332.9225,	-430.9172,	520,	0.000! !END!
1881 ! X =	332.9116,	-430.6679,	509,	0.000! !END!
1882 ! X =	332.9007,	-430.4186,	440,	0.000! !END!
1883 ! X =	332.8897,	-430.1692,	384,	0.000! !END!
1884 ! X =	332.8788,	-429.9199,	350,	0.000! !END!
1885 ! X =	332.8679,	-429.6706,	334,	0.000! !END!
1886 ! X =	332.8569,	-429.4212,	325,	0.000! !END!
1887 ! X =	332.8460,	-429.1719,	347,	0.000! !END!
1888 ! X =	332.8351,	-428.9226,	389,	0.000! !END!
1889 ! X =	332.8242,	-428.6733,	468,	0.000! !END!
1890 ! X =	332.8132,	-428.4240,	512,	0.000! !END!
1891 ! X =	332.8023,	-428.1746,	549,	0.000! !END!
1892 ! X =	332.7914,	-427.9253,	590,	0.000! !END!
1893 ! X =	333.3456,	-434.8957,	583,	0.000! !END!
1894 ! X =	333.3346,	-434.6463,	609,	0.000! !END!
1895 ! X =	333.3237,	-434.3970,	617,	0.000! !END!
1896 ! X =	333.3128,	-434.1476,	620,	0.000! !END!
1897 ! X =	333.3019,	-433.8983,	643,	0.000! !END!
1898 ! X =	333.2909,	-433.6490,	658,	0.000! !END!

1899 ! X =	333.2800,	-433.3996,	660,	0.000! !END!
1900 ! X =	333.2691,	-433.1503,	649,	0.000! !END!
1901 ! X =	333.2581,	-432.9010,	640,	0.000! !END!
1902 ! X =	333.2472,	-432.6516,	640,	0.000! !END!
1903 ! X =	333.2363,	-432.4023,	639,	0.000! !END!
1904 ! X =	333.2254,	-432.1530,	623,	0.000! !END!
1905 ! X =	333.2144,	-431.9036,	614,	0.000! !END!
1906 ! X =	333.2035,	-431.6543,	609,	0.000! !END!
1907 ! X =	333.1926,	-431.4050,	592,	0.000! !END!
1908 ! X =	333.1817,	-431.1557,	579,	0.000! !END!
1909 ! X =	333.1707,	-430.9063,	573,	0.000! !END!
1910 ! X =	333.1598,	-430.6570,	548,	0.000! !END!
1911 ! X =	333.1489,	-430.4077,	468,	0.000! !END!
1912 ! X =	333.1379,	-430.1583,	401,	0.000! !END!
1913 ! X =	333.1270,	-429.9090,	360,	0.000! !END!
1914 ! X =	333.1161,	-429.6597,	340,	0.000! !END!
1915 ! X =	333.1052,	-429.4104,	335,	0.000! !END!
1916 ! X =	333.0942,	-429.1610,	331,	0.000! !END!
1917 ! X =	333.0833,	-428.9117,	375,	0.000! !END!
1918 ! X =	333.0724,	-428.6624,	439,	0.000! !END!
1919 ! X =	333.0615,	-428.4131,	478,	0.000! !END!
1920 ! X =	333.0505,	-428.1637,	501,	0.000! !END!
1921 ! X =	333.0396,	-427.9144,	523,	0.000! !END!
1922 ! X =	333.5938,	-434.8848,	620,	0.000! !END!
1923 ! X =	333.5829,	-434.6354,	626,	0.000! !END!
1924 ! X =	333.5719,	-434.3861,	632,	0.000! !END!
1925 ! X =	333.5610,	-434.1368,	640,	0.000! !END!
1926 ! X =	333.5501,	-433.8874,	643,	0.000! !END!
1927 ! X =	333.5392,	-433.6381,	651,	0.000! !END!
1928 ! X =	333.5282,	-433.3888,	658,	0.000! !END!
1929 ! X =	333.5173,	-433.1394,	651,	0.000! !END!
1930 ! X =	333.5064,	-432.8901,	642,	0.000! !END!
1931 ! X =	333.4954,	-432.6408,	640,	0.000! !END!
1932 ! X =	333.4845,	-432.3914,	639,	0.000! !END!
1933 ! X =	333.4736,	-432.1421,	620,	0.000! !END!
1934 ! X =	333.4627,	-431.8928,	612,	0.000! !END!
1935 ! X =	333.4517,	-431.6434,	610,	0.000! !END!
1936 ! X =	333.4408,	-431.3941,	609,	0.000! !END!
1937 ! X =	333.4299,	-431.1448,	580,	0.000! !END!
1938 ! X =	333.4190,	-430.8954,	573,	0.000! !END!
1939 ! X =	333.4080,	-430.6461,	551,	0.000! !END!
1940 ! X =	333.3971,	-430.3968,	457,	0.000! !END!
1941 ! X =	333.3862,	-430.1475,	400,	0.000! !END!
1942 ! X =	333.3752,	-429.8981,	380,	0.000! !END!
1943 ! X =	333.3643,	-429.6488,	360,	0.000! !END!
1944 ! X =	333.3534,	-429.3995,	278,	0.000! !END!
1945 ! X =	333.3425,	-429.1502,	320,	0.000! !END!
1946 ! X =	333.3315,	-428.9008,	346,	0.000! !END!
1947 ! X =	333.3206,	-428.6515,	386,	0.000! !END!
1948 ! X =	333.3097,	-428.4022,	458,	0.000! !END!
1949 ! X =	333.2987,	-428.1529,	462,	0.000! !END!
1950 ! X =	333.2878,	-427.9035,	509,	0.000! !END!
1951 ! X =	333.8420,	-434.8739,	640,	0.000! !END!
1952 ! X =	333.8311,	-434.6246,	640,	0.000! !END!
1953 ! X =	333.8202,	-434.3752,	640,	0.000! !END!
1954 ! X =	333.8092,	-434.1259,	640,	0.000! !END!

1955 ! X =	333.7983,	-433.8765,	643,	0.000! !END!
1956 ! X =	333.7874,	-433.6272,	648,	0.000! !END!
1957 ! X =	333.7765,	-433.3779,	649,	0.000! !END!
1958 ! X =	333.7655,	-433.1285,	646,	0.000! !END!
1959 ! X =	333.7546,	-432.8792,	641,	0.000! !END!
1960 ! X =	333.7437,	-432.6299,	640,	0.000! !END!
1961 ! X =	333.7327,	-432.3805,	617,	0.000! !END!
1962 ! X =	333.7218,	-432.1312,	610,	0.000! !END!
1963 ! X =	333.7109,	-431.8819,	610,	0.000! !END!
1964 ! X =	333.7000,	-431.6325,	609,	0.000! !END!
1965 ! X =	333.6890,	-431.3832,	596,	0.000! !END!
1966 ! X =	333.6781,	-431.1339,	568,	0.000! !END!
1967 ! X =	333.6672,	-430.8846,	548,	0.000! !END!
1968 ! X =	333.6562,	-430.6352,	503,	0.000! !END!
1969 ! X =	333.6453,	-430.3859,	487,	0.000! !END!
1970 ! X =	333.6344,	-430.1366,	471,	0.000! !END!
1971 ! X =	333.6235,	-429.8872,	406,	0.000! !END!
1972 ! X =	333.6125,	-429.6379,	320,	0.000! !END!
1973 ! X =	333.6016,	-429.3886,	280,	0.000! !END!
1974 ! X =	333.5907,	-429.1393,	300,	0.000! !END!
1975 ! X =	333.5797,	-428.8899,	320,	0.000! !END!
1976 ! X =	333.5688,	-428.6406,	340,	0.000! !END!
1977 ! X =	333.5579,	-428.3913,	404,	0.000! !END!
1978 ! X =	333.5470,	-428.1420,	471,	0.000! !END!
1979 ! X =	333.5360,	-427.8926,	525,	0.000! !END!
1980 ! X =	334.0684,	-434.3643,	639,	0.000! !END!
1981 ! X =	334.0575,	-434.1150,	640,	0.000! !END!
1982 ! X =	334.0465,	-433.8657,	640,	0.000! !END!
1983 ! X =	334.0356,	-433.6163,	642,	0.000! !END!
1984 ! X =	334.0247,	-433.3670,	642,	0.000! !END!
1985 ! X =	334.0138,	-433.1176,	641,	0.000! !END!
1986 ! X =	334.0028,	-432.8683,	640,	0.000! !END!
1987 ! X =	333.9919,	-432.6190,	626,	0.000! !END!
1988 ! X =	333.9810,	-432.3696,	612,	0.000! !END!
1989 ! X =	333.9700,	-432.1203,	609,	0.000! !END!
1990 ! X =	333.9591,	-431.8710,	605,	0.000! !END!
1991 ! X =	333.9482,	-431.6217,	583,	0.000! !END!
1992 ! X =	333.9373,	-431.3723,	601,	0.000! !END!
1993 ! X =	333.9263,	-431.1230,	609,	0.000! !END!
1994 ! X =	333.9154,	-430.8737,	596,	0.000! !END!
1995 ! X =	333.9045,	-430.6243,	574,	0.000! !END!
1996 ! X =	333.8935,	-430.3750,	548,	0.000! !END!
1997 ! X =	333.8826,	-430.1257,	496,	0.000! !END!
1998 ! X =	333.8717,	-429.8764,	441,	0.000! !END!
1999 ! X =	333.8608,	-429.6270,	328,	0.000! !END!
2000 ! X =	333.8498,	-429.3777,	297,	0.000! !END!
2001 ! X =	333.8389,	-429.1284,	293,	0.000! !END!
2002 ! X =	333.8280,	-428.8791,	297,	0.000! !END!
2003 ! X =	333.8170,	-428.6297,	335,	0.000! !END!
2004 ! X =	333.8061,	-428.3804,	441,	0.000! !END!
2005 ! X =	333.7952,	-428.1311,	474,	0.000! !END!
2006 ! X =	334.2838,	-433.6054,	640,	0.000! !END!
2007 ! X =	334.2729,	-433.3561,	631,	0.000! !END!
2008 ! X =	334.2620,	-433.1068,	626,	0.000! !END!
2009 ! X =	334.2511,	-432.8574,	611,	0.000! !END!
2010 ! X =	334.2401,	-432.6081,	609,	0.000! !END!

2011 ! X =	334.2292,	-432.3588,	610,	0.000! !END!
2012 ! X =	334.2183,	-432.1094,	609,	0.000! !END!
2013 ! X =	334.2073,	-431.8601,	609,	0.000! !END!
2014 ! X =	334.1964,	-431.6108,	610,	0.000! !END!
2015 ! X =	334.1855,	-431.3614,	615,	0.000! !END!
2016 ! X =	334.1745,	-431.1121,	614,	0.000! !END!
2017 ! X =	334.1636,	-430.8628,	610,	0.000! !END!
2018 ! X =	334.1527,	-430.6134,	608,	0.000! !END!
2019 ! X =	334.1418,	-430.3641,	553,	0.000! !END!
2020 ! X =	334.1308,	-430.1148,	496,	0.000! !END!
2021 ! X =	334.1199,	-429.8655,	470,	0.000! !END!
2022 ! X =	334.1090,	-429.6161,	419,	0.000! !END!
2023 ! X =	334.0980,	-429.3668,	371,	0.000! !END!
2024 ! X =	334.0871,	-429.1175,	318,	0.000! !END!
2025 ! X =	334.0762,	-428.8682,	282,	0.000! !END!
2026 ! X =	334.0653,	-428.6188,	335,	0.000! !END!
2027 ! X =	334.0543,	-428.3695,	444,	0.000! !END!
2028 ! X =	334.0434,	-428.1202,	480,	0.000! !END!
2029 ! X =	334.0325,	-427.8709,	533,	0.000! !END!
2030 ! X =	334.0215,	-427.6216,	612,	0.000! !END!
2031 ! X =	334.0106,	-427.3722,	621,	0.000! !END!
2032 ! X =	333.9997,	-427.1229,	620,	0.000! !END!
2033 ! X =	333.9887,	-426.8736,	614,	0.000! !END!
2034 ! X =	333.9778,	-426.6243,	612,	0.000! !END!
2035 ! X =	333.9669,	-426.3750,	609,	0.000! !END!
2036 ! X =	333.9560,	-426.1256,	584,	0.000! !END!
2037 ! X =	333.9450,	-425.8763,	502,	0.000! !END!
2038 ! X =	333.9341,	-425.6270,	457,	0.000! !END!
2039 ! X =	333.9232,	-425.3777,	392,	0.000! !END!
2040 ! X =	333.9122,	-425.1284,	409,	0.000! !END!
2041 ! X =	333.9013,	-424.8791,	418,	0.000! !END!
2042 ! X =	334.4993,	-432.8465,	579,	0.000! !END!
2043 ! X =	334.4884,	-432.5972,	588,	0.000! !END!
2044 ! X =	334.4774,	-432.3479,	609,	0.000! !END!
2045 ! X =	334.4665,	-432.0985,	613,	0.000! !END!
2046 ! X =	334.4556,	-431.8492,	619,	0.000! !END!
2047 ! X =	334.4446,	-431.5999,	627,	0.000! !END!
2048 ! X =	334.4337,	-431.3505,	637,	0.000! !END!
2049 ! X =	334.4228,	-431.1012,	621,	0.000! !END!
2050 ! X =	334.4118,	-430.8519,	613,	0.000! !END!
2051 ! X =	334.4009,	-430.6026,	601,	0.000! !END!
2052 ! X =	334.3900,	-430.3532,	548,	0.000! !END!
2053 ! X =	334.3791,	-430.1039,	489,	0.000! !END!
2054 ! X =	334.3681,	-429.8546,	462,	0.000! !END!
2055 ! X =	334.3572,	-429.6053,	427,	0.000! !END!
2056 ! X =	334.3463,	-429.3559,	396,	0.000! !END!
2057 ! X =	334.3353,	-429.1066,	324,	0.000! !END!
2058 ! X =	334.3244,	-428.8573,	277,	0.000! !END!
2059 ! X =	334.3135,	-428.6080,	359,	0.000! !END!
2060 ! X =	334.3025,	-428.3586,	448,	0.000! !END!
2061 ! X =	334.2916,	-428.1093,	480,	0.000! !END!
2062 ! X =	334.2807,	-427.8600,	525,	0.000! !END!
2063 ! X =	334.2697,	-427.6107,	609,	0.000! !END!
2064 ! X =	334.2588,	-427.3613,	610,	0.000! !END!
2065 ! X =	334.2479,	-427.1120,	610,	0.000! !END!
2066 ! X =	334.2370,	-426.8627,	609,	0.000! !END!

2067 ! X =	334.2260,	-426.6134,	609,	0.000! !END!
2068 ! X =	334.2151,	-426.3641,	609,	0.000! !END!
2069 ! X =	334.2042,	-426.1148,	563,	0.000! !END!
2070 ! X =	334.1932,	-425.8654,	481,	0.000! !END!
2071 ! X =	334.1823,	-425.6161,	431,	0.000! !END!
2072 ! X =	334.1714,	-425.3668,	388,	0.000! !END!
2073 ! X =	334.1604,	-425.1175,	374,	0.000! !END!
2074 ! X =	334.1495,	-424.8682,	380,	0.000! !END!
2075 ! X =	334.6929,	-431.5890,	640,	0.000! !END!
2076 ! X =	334.6819,	-431.3397,	640,	0.000! !END!
2077 ! X =	334.6710,	-431.0903,	625,	0.000! !END!
2078 ! X =	334.6601,	-430.8410,	609,	0.000! !END!
2079 ! X =	334.6491,	-430.5917,	542,	0.000! !END!
2080 ! X =	334.6382,	-430.3423,	477,	0.000! !END!
2081 ! X =	334.6273,	-430.0930,	450,	0.000! !END!
2082 ! X =	334.6163,	-429.8437,	427,	0.000! !END!
2083 ! X =	334.6054,	-429.5944,	411,	0.000! !END!
2084 ! X =	334.5945,	-429.3450,	374,	0.000! !END!
2085 ! X =	334.5835,	-429.0957,	304,	0.000! !END!
2086 ! X =	334.5726,	-428.8464,	288,	0.000! !END!
2087 ! X =	334.5617,	-428.5971,	351,	0.000! !END!
2088 ! X =	334.5508,	-428.3477,	434,	0.000! !END!
2089 ! X =	334.5398,	-428.0984,	482,	0.000! !END!
2090 ! X =	334.5289,	-427.8491,	522,	0.000! !END!
2091 ! X =	334.5180,	-427.5998,	581,	0.000! !END!
2092 ! X =	334.5070,	-427.3505,	609,	0.000! !END!
2093 ! X =	334.4961,	-427.1011,	609,	0.000! !END!
2094 ! X =	334.4852,	-426.8518,	589,	0.000! !END!
2095 ! X =	334.4742,	-426.6025,	585,	0.000! !END!
2096 ! X =	334.4633,	-426.3532,	541,	0.000! !END!
2097 ! X =	334.4524,	-426.1039,	499,	0.000! !END!
2098 ! X =	334.4414,	-425.8545,	460,	0.000! !END!
2099 ! X =	334.4305,	-425.6052,	420,	0.000! !END!
2100 ! X =	334.4196,	-425.3559,	381,	0.000! !END!
2101 ! X =	334.4087,	-425.1066,	335,	0.000! !END!
2102 ! X =	334.3977,	-424.8573,	335,	0.000! !END!
2103 ! X =	334.9192,	-431.0794,	618,	0.000! !END!
2104 ! X =	334.9083,	-430.8301,	579,	0.000! !END!
2105 ! X =	334.8974,	-430.5808,	522,	0.000! !END!
2106 ! X =	334.8864,	-430.3315,	477,	0.000! !END!
2107 ! X =	334.8755,	-430.0821,	444,	0.000! !END!
2108 ! X =	334.8646,	-429.8328,	416,	0.000! !END!
2109 ! X =	334.8536,	-429.5835,	347,	0.000! !END!
2110 ! X =	334.8427,	-429.3342,	324,	0.000! !END!
2111 ! X =	334.8318,	-429.0848,	293,	0.000! !END!
2112 ! X =	334.8208,	-428.8355,	295,	0.000! !END!
2113 ! X =	334.8099,	-428.5862,	340,	0.000! !END!
2114 ! X =	334.7990,	-428.3369,	432,	0.000! !END!
2115 ! X =	334.7880,	-428.0875,	465,	0.000! !END!
2116 ! X =	334.7771,	-427.8382,	502,	0.000! !END!
2117 ! X =	334.7662,	-427.5889,	553,	0.000! !END!
2118 ! X =	334.7552,	-427.3396,	609,	0.000! !END!
2119 ! X =	334.7443,	-427.0902,	609,	0.000! !END!
2120 ! X =	334.7334,	-426.8409,	609,	0.000! !END!
2121 ! X =	334.7225,	-426.5916,	548,	0.000! !END!
2122 ! X =	334.7115,	-426.3423,	480,	0.000! !END!

2123 ! X =	334.7006,	-426.0930,	446,	0.000! !END!
2124 ! X =	334.6897,	-425.8437,	429,	0.000! !END!
2125 ! X =	334.6787,	-425.5943,	403,	0.000! !END!
2126 ! X =	334.6678,	-425.3450,	371,	0.000! !END!
2127 ! X =	334.6569,	-425.0957,	335,	0.000! !END!
2128 ! X =	334.6459,	-424.8464,	366,	0.000! !END!
2129 ! X =	335.1674,	-431.0686,	616,	0.000! !END!
2130 ! X =	335.1565,	-430.8192,	610,	0.000! !END!
2131 ! X =	335.1456,	-430.5699,	574,	0.000! !END!
2132 ! X =	335.1346,	-430.3206,	516,	0.000! !END!
2133 ! X =	335.1237,	-430.0712,	462,	0.000! !END!
2134 ! X =	335.1128,	-429.8219,	426,	0.000! !END!
2135 ! X =	335.1019,	-429.5726,	397,	0.000! !END!
2136 ! X =	335.0909,	-429.3233,	355,	0.000! !END!
2137 ! X =	335.0800,	-429.0739,	306,	0.000! !END!
2138 ! X =	335.0691,	-428.8246,	288,	0.000! !END!
2139 ! X =	335.0581,	-428.5753,	335,	0.000! !END!
2140 ! X =	335.0472,	-428.3260,	382,	0.000! !END!
2141 ! X =	335.0363,	-428.0766,	432,	0.000! !END!
2142 ! X =	335.0253,	-427.8273,	480,	0.000! !END!
2143 ! X =	335.0144,	-427.5780,	528,	0.000! !END!
2144 ! X =	335.0035,	-427.3287,	569,	0.000! !END!
2145 ! X =	334.9925,	-427.0794,	592,	0.000! !END!
2146 ! X =	334.9816,	-426.8300,	587,	0.000! !END!
2147 ! X =	334.9707,	-426.5807,	561,	0.000! !END!
2148 ! X =	334.9597,	-426.3314,	475,	0.000! !END!
2149 ! X =	334.9488,	-426.0821,	411,	0.000! !END!
2150 ! X =	334.9379,	-425.8328,	396,	0.000! !END!
2151 ! X =	334.9269,	-425.5835,	365,	0.000! !END!
2152 ! X =	334.9160,	-425.3341,	341,	0.000! !END!
2153 ! X =	334.9051,	-425.0848,	402,	0.000! !END!
2154 ! X =	334.8941,	-424.8355,	415,	0.000! !END!
2155 ! X =	334.8832,	-424.5862,	423,	0.000! !END!
2156 ! X =	335.4157,	-431.0577,	640,	0.000! !END!
2157 ! X =	335.4047,	-430.8083,	639,	0.000! !END!
2158 ! X =	335.3938,	-430.5590,	615,	0.000! !END!
2159 ! X =	335.3829,	-430.3097,	548,	0.000! !END!
2160 ! X =	335.3719,	-430.0604,	491,	0.000! !END!
2161 ! X =	335.3610,	-429.8110,	452,	0.000! !END!
2162 ! X =	335.3501,	-429.5617,	425,	0.000! !END!
2163 ! X =	335.3391,	-429.3124,	358,	0.000! !END!
2164 ! X =	335.3282,	-429.0630,	315,	0.000! !END!
2165 ! X =	335.3173,	-428.8137,	304,	0.000! !END!
2166 ! X =	335.3063,	-428.5644,	285,	0.000! !END!
2167 ! X =	335.2954,	-428.3151,	331,	0.000! !END!
2168 ! X =	335.2845,	-428.0658,	388,	0.000! !END!
2169 ! X =	335.2735,	-427.8164,	448,	0.000! !END!
2170 ! X =	335.2626,	-427.5671,	470,	0.000! !END!
2171 ! X =	335.2517,	-427.3178,	513,	0.000! !END!
2172 ! X =	335.2407,	-427.0685,	553,	0.000! !END!
2173 ! X =	335.2298,	-426.8192,	560,	0.000! !END!
2174 ! X =	335.2189,	-426.5698,	541,	0.000! !END!
2175 ! X =	335.2079,	-426.3205,	486,	0.000! !END!
2176 ! X =	335.1970,	-426.0712,	411,	0.000! !END!
2177 ! X =	335.1861,	-425.8219,	372,	0.000! !END!

2178 ! X =	335.1752,	-425.5726,	335,	0.000! !END!
2179 ! X =	335.1642,	-425.3232,	396,	0.000! !END!
2180 ! X =	335.1533,	-425.0739,	426,	0.000! !END!
2181 ! X =	335.1424,	-424.8246,	443,	0.000! !END!
2182 ! X =	335.1314,	-424.5753,	453,	0.000! !END!
2183 ! X =	335.6639,	-431.0468,	640,	0.000! !END!
2184 ! X =	335.6530,	-430.7974,	639,	0.000! !END!
2185 ! X =	335.6420,	-430.5481,	619,	0.000! !END!
2186 ! X =	335.6311,	-430.2988,	548,	0.000! !END!
2187 ! X =	335.6202,	-430.0495,	491,	0.000! !END!
2188 ! X =	335.6092,	-429.8001,	457,	0.000! !END!
2189 ! X =	335.5983,	-429.5508,	411,	0.000! !END!
2190 ! X =	335.5874,	-429.3015,	359,	0.000! !END!
2191 ! X =	335.5764,	-429.0522,	374,	0.000! !END!
2192 ! X =	335.5655,	-428.8028,	362,	0.000! !END!
2193 ! X =	335.5546,	-428.5535,	335,	0.000! !END!
2194 ! X =	335.5436,	-428.3042,	296,	0.000! !END!
2195 ! X =	335.5327,	-428.0549,	341,	0.000! !END!
2196 ! X =	335.5218,	-427.8055,	388,	0.000! !END!
2197 ! X =	335.5108,	-427.5562,	418,	0.000! !END!
2198 ! X =	335.4999,	-427.3069,	468,	0.000! !END!
2199 ! X =	335.4890,	-427.0576,	496,	0.000! !END!
2200 ! X =	335.4780,	-426.8083,	518,	0.000! !END!
2201 ! X =	335.4671,	-426.5589,	518,	0.000! !END!
2202 ! X =	335.4562,	-426.3096,	464,	0.000! !END!
2203 ! X =	335.4452,	-426.0603,	410,	0.000! !END!
2204 ! X =	335.4343,	-425.8110,	375,	0.000! !END!
2205 ! X =	335.4234,	-425.5617,	337,	0.000! !END!
2206 ! X =	335.4124,	-425.3124,	396,	0.000! !END!
2207 ! X =	335.4015,	-425.0630,	427,	0.000! !END!
2208 ! X =	335.3906,	-424.8137,	464,	0.000! !END!
2209 ! X =	335.3796,	-424.5644,	517,	0.000! !END!
2210 ! X =	335.9012,	-430.7866,	635,	0.000! !END!
2211 ! X =	335.8902,	-430.5372,	601,	0.000! !END!
2212 ! X =	335.8793,	-430.2879,	525,	0.000! !END!
2213 ! X =	335.8684,	-430.0386,	453,	0.000! !END!
2214 ! X =	335.8574,	-429.7892,	426,	0.000! !END!
2215 ! X =	335.8465,	-429.5399,	410,	0.000! !END!
2216 ! X =	335.8356,	-429.2906,	434,	0.000! !END!
2217 ! X =	335.8246,	-429.0413,	430,	0.000! !END!
2218 ! X =	335.8137,	-428.7919,	421,	0.000! !END!
2219 ! X =	335.8028,	-428.5426,	373,	0.000! !END!
2220 ! X =	335.7918,	-428.2933,	304,	0.000! !END!
2221 ! X =	335.7809,	-428.0440,	319,	0.000! !END!
2222 ! X =	335.7700,	-427.7947,	353,	0.000! !END!
2223 ! X =	335.7590,	-427.5453,	396,	0.000! !END!
2224 ! X =	335.7481,	-427.2960,	426,	0.000! !END!
2225 ! X =	335.7372,	-427.0467,	440,	0.000! !END!
2226 ! X =	335.7262,	-426.7974,	457,	0.000! !END!
2227 ! X =	335.7153,	-426.5481,	459,	0.000! !END!
2228 ! X =	335.7044,	-426.2987,	432,	0.000! !END!
2229 ! X =	335.6934,	-426.0494,	396,	0.000! !END!
2230 ! X =	335.6825,	-425.8001,	365,	0.000! !END!
2231 ! X =	335.6716,	-425.5508,	370,	0.000! !END!
2232 ! X =	335.6606,	-425.3015,	412,	0.000! !END!
2233 ! X =	335.6497,	-425.0522,	442,	0.000! !END!

2234 ! X =	335.6388,	-424.8028,	496,	0.000! !END!
2235 ! X =	335.6278,	-424.5535,	563,	0.000! !END!
2236 ! X =	336.1494,	-430.7757,	612,	0.000! !END!
2237 ! X =	336.1385,	-430.5263,	556,	0.000! !END!
2238 ! X =	336.1275,	-430.2770,	487,	0.000! !END!
2239 ! X =	336.1166,	-430.0277,	457,	0.000! !END!
2240 ! X =	336.1057,	-429.7784,	450,	0.000! !END!
2241 ! X =	336.0947,	-429.5290,	470,	0.000! !END!
2242 ! X =	336.0838,	-429.2797,	470,	0.000! !END!
2243 ! X =	336.0729,	-429.0304,	460,	0.000! !END!
2244 ! X =	336.0619,	-428.7811,	453,	0.000! !END!
2245 ! X =	336.0510,	-428.5317,	418,	0.000! !END!
2246 ! X =	336.0401,	-428.2824,	335,	0.000! !END!
2247 ! X =	336.0291,	-428.0331,	313,	0.000! !END!
2248 ! X =	336.0182,	-427.7838,	339,	0.000! !END!
2249 ! X =	336.0073,	-427.5344,	372,	0.000! !END!
2250 ! X =	335.9963,	-427.2851,	396,	0.000! !END!
2251 ! X =	335.9854,	-427.0358,	387,	0.000! !END!
2252 ! X =	335.9745,	-426.7865,	413,	0.000! !END!
2253 ! X =	335.9635,	-426.5372,	415,	0.000! !END!
2254 ! X =	335.9526,	-426.2878,	396,	0.000! !END!
2255 ! X =	335.9417,	-426.0385,	376,	0.000! !END!
2256 ! X =	335.9307,	-425.7892,	335,	0.000! !END!
2257 ! X =	335.9198,	-425.5399,	379,	0.000! !END!
2258 ! X =	335.9089,	-425.2906,	416,	0.000! !END!
2259 ! X =	335.8979,	-425.0413,	449,	0.000! !END!
2260 ! X =	336.3320,	-429.2688,	517,	0.000! !END!
2261 ! X =	336.3211,	-429.0195,	501,	0.000! !END!
2262 ! X =	336.3101,	-428.7702,	479,	0.000! !END!
2263 ! X =	336.2992,	-428.5208,	456,	0.000! !END!
2264 ! X =	336.2883,	-428.2715,	379,	0.000! !END!
2265 ! X =	336.2773,	-428.0222,	306,	0.000! !END!
2266 ! X =	336.2664,	-427.7729,	324,	0.000! !END!
2267 ! X =	336.2555,	-427.5235,	346,	0.000! !END!
2268 ! X =	336.2445,	-427.2742,	354,	0.000! !END!
2269 ! X =	336.2336,	-427.0249,	356,	0.000! !END!
2270 ! X =	336.2227,	-426.7756,	376,	0.000! !END!
2271 ! X =	336.2117,	-426.5263,	383,	0.000! !END!
2272 ! X =	336.2008,	-426.2770,	376,	0.000! !END!
2273 ! X =	336.1899,	-426.0276,	365,	0.000! !END!
2274 ! X =	336.1789,	-425.7783,	335,	0.000! !END!
2275 ! X =	336.1680,	-425.5290,	369,	0.000! !END!
2276 ! X =	336.1571,	-425.2797,	415,	0.000! !END!
2277 ! X =	336.1461,	-425.0304,	445,	0.000! !END!
2278 ! X =	336.5584,	-428.7593,	538,	0.000! !END!
2279 ! X =	336.5474,	-428.5099,	483,	0.000! !END!
2280 ! X =	336.5365,	-428.2606,	427,	0.000! !END!
2281 ! X =	336.5256,	-428.0113,	320,	0.000! !END!
2282 ! X =	336.5146,	-427.7620,	306,	0.000! !END!
2283 ! X =	336.5037,	-427.5127,	312,	0.000! !END!
2284 ! X =	336.4928,	-427.2633,	318,	0.000! !END!
2285 ! X =	336.4818,	-427.0140,	329,	0.000! !END!
2286 ! X =	336.4709,	-426.7647,	351,	0.000! !END!
2287 ! X =	336.4600,	-426.5154,	367,	0.000! !END!
2288 ! X =	336.4490,	-426.2661,	353,	0.000! !END!
2289 ! X =	336.4381,	-426.0167,	335,	0.000! !END!

2290 ! X =	336.4271,	-425.7674,	304,	0.000! !END!	
2291 ! X =	336.4162,	-425.5181,	342,	0.000! !END!	
2292 ! X =	336.4053,	-425.2688,	382,	0.000! !END!	
2293 ! X =	336.8066,	-428.7484,	609,	0.000! !END!	
2294 ! X =	336.7956,	-428.4991,	518,	0.000! !END!	
2295 ! X =	336.7847,	-428.2497,	445,	0.000! !END!	
2296 ! X =	336.7738,	-428.0004,	386,	0.000! !END!	
2297 ! X =	336.7628,	-427.7511,	321,	0.000! !END!	
2298 ! X =	336.7519,	-427.5018,	284,	0.000! !END!	
2299 ! X =	336.7410,	-427.2524,	278,	0.000! !END!	
2300 ! X =	336.7300,	-427.0031,	307,	0.000! !END!	
2301 ! X =	336.7191,	-426.7538,	322,	0.000! !END!	
2302 ! X =	336.7082,	-426.5045,	336,	0.000! !END!	
2303 ! X =	336.6972,	-426.2552,	337,	0.000! !END!	
2304 ! X =	336.6863,	-426.0059,	335,	0.000! !END!	
2305 ! X =	336.6754,	-425.7565,	305,	0.000! !END!	
2306 ! X =	336.6644,	-425.5072,	338,	0.000! !END!	
2307 ! X =	336.6535,	-425.2579,	381,	0.000! !END!	
2308 ! X =	337.0548,	-428.7375,	609,	0.000! !END!	
2309 ! X =	337.0439,	-428.4882,	518,	0.000! !END!	
2310 ! X =	337.0329,	-428.2388,	446,	0.000! !END!	
2311 ! X =	337.0220,	-427.9895,	414,	0.000! !END!	
2312 ! X =	337.0111,	-427.7402,	359,	0.000! !END!	
2313 ! X =	337.0001,	-427.4909,	313,	0.000! !END!	
2314 ! X =	336.9892,	-427.2416,	285,	0.000! !END!	
2315 ! X =	336.9782,	-426.9922,	275,	0.000! !END!	
2316 ! X =	336.9673,	-426.7429,	285,	0.000! !END!	
2317 ! X =	336.9564,	-426.4936,	301,	0.000! !END!	
2318 ! X =	336.9454,	-426.2443,	315,	0.000! !END!	
2319 ! X =	336.9345,	-425.9950,	313,	0.000! !END!	
2320 ! X =	336.9236,	-425.7456,	305,	0.000! !END!	
2321 ! X =	336.9126,	-425.4963,	335,	0.000! !END!	
2322 ! X =	336.9017,	-425.2470,	365,	0.000! !END!	
2323 ! X =	337.3030,	-428.7266,	532,	0.000! !END!	
2324 ! X =	337.2921,	-428.4773,	502,	0.000! !END!	
2325 ! X =	337.2811,	-428.2279,	445,	0.000! !END!	
2326 ! X =	337.2702,	-427.9786,	396,	0.000! !END!	
2327 ! X =	337.2593,	-427.7293,	361,	0.000! !END!	
2328 ! X =	337.2483,	-427.4800,	313,	0.000! !END!	
2329 ! X =	337.2374,	-427.2307,	291,	0.000! !END!	
2330 ! X =	337.2265,	-426.9813,	274,	0.000! !END!	
2331 ! X =	337.2155,	-426.7320,	276,	0.000! !END!	
2332 ! X =	337.2046,	-426.4827,	287,	0.000! !END!	
2333 ! X =	337.1937,	-426.2334,	304,	0.000! !END!	
2334 ! X =	337.1827,	-425.9841,	305,	0.000! !END!	
2335 ! X =	337.1718,	-425.7347,	294,	0.000! !END!	
2336 ! X =	337.1608,	-425.4854,	322,	0.000! !END!	
2337 ! X =	337.1499,	-425.2361,	349,	0.000! !END!	
2338 ! X =	337.5512,	-428.7157,	471,	0.000! !END!	
2339 ! X =	337.5403,	-428.4664,	439,	0.000! !END!	
2340 ! X =	337.5294,	-428.2171,	411,	0.000! !END!	
2341 ! X =	337.5184,	-427.9677,	365,	0.000! !END!	
2342 ! X =	337.5075,	-427.7184,	335,	0.000! !END!	
2343 ! X =	337.4966,	-427.4691,	309,	0.000! !END!	
2344 ! X =	337.4856,	-427.2198,	290,	0.000! !END!	
2345 ! X =	337.4747,	-426.9704,	274,	0.000! !END!	

2346 ! X =	337.4637,	-426.7211,	274,	0.000! !END!
2347 ! X =	337.4528,	-426.4718,	304,	0.000! !END!
2348 ! X =	337.4419,	-426.2225,	304,	0.000! !END!
2349 ! X =	337.4309,	-425.9732,	304,	0.000! !END!
2350 ! X =	337.7995,	-428.7048,	433,	0.000! !END!
2351 ! X =	337.7885,	-428.4555,	401,	0.000! !END!
2352 ! X =	337.7776,	-428.2062,	348,	0.000! !END!
2353 ! X =	337.7666,	-427.9568,	320,	0.000! !END!
2354 ! X =	337.7557,	-427.7075,	304,	0.000! !END!
2355 ! X =	337.7448,	-427.4582,	289,	0.000! !END!
2356 ! X =	337.7338,	-427.2089,	279,	0.000! !END!
2357 ! X =	337.7229,	-426.9596,	274,	0.000! !END!
2358 ! X =	337.7120,	-426.7102,	274,	0.000! !END!
2359 ! X =	337.7010,	-426.4609,	292,	0.000! !END!
2360 ! X =	337.6901,	-426.2116,	304,	0.000! !END!
2361 ! X =	337.6791,	-425.9623,	297,	0.000! !END!
2362 ! X =	338.0477,	-428.6939,	371,	0.000! !END!
2363 ! X =	338.0367,	-428.4446,	348,	0.000! !END!
2364 ! X =	338.0258,	-428.1953,	312,	0.000! !END!
2365 ! X =	338.0149,	-427.9459,	292,	0.000! !END!
2366 ! X =	338.0039,	-427.6966,	287,	0.000! !END!
2367 ! X =	337.9930,	-427.4473,	292,	0.000! !END!
2368 ! X =	337.9820,	-427.1980,	277,	0.000! !END!
2369 ! X =	337.9711,	-426.9487,	274,	0.000! !END!
2370 ! X =	337.9602,	-426.6993,	281,	0.000! !END!
2371 ! X =	337.9492,	-426.4500,	292,	0.000! !END!
2372 ! X =	337.9383,	-426.2007,	288,	0.000! !END!
2373 ! X =	337.9274,	-425.9514,	286,	0.000! !END!
2374 ! X =	338.2850,	-428.4337,	329,	0.000! !END!
2375 ! X =	338.2740,	-428.1844,	307,	0.000! !END!
2376 ! X =	338.2631,	-427.9350,	308,	0.000! !END!
2377 ! X =	338.2521,	-427.6857,	304,	0.000! !END!
2378 ! X =	338.2412,	-427.4364,	304,	0.000! !END!
2379 ! X =	338.2303,	-427.1871,	282,	0.000! !END!
2380 ! X =	338.2193,	-426.9378,	278,	0.000! !END!
2381 ! X =	338.2084,	-426.6884,	304,	0.000! !END!
2382 ! X =	338.1974,	-426.4391,	322,	0.000! !END!
2383 ! X =	338.1865,	-426.1898,	330,	0.000! !END!
2384 ! X =	338.1756,	-425.9405,	304,	0.000! !END!
2385 ! X =	338.1646,	-425.6912,	324,	0.000! !END!
2386 ! X =	338.5332,	-428.4228,	365,	0.000! !END!
2387 ! X =	338.5222,	-428.1735,	350,	0.000! !END!
2388 ! X =	338.5113,	-427.9242,	342,	0.000! !END!
2389 ! X =	338.5004,	-427.6748,	335,	0.000! !END!
2390 ! X =	338.4894,	-427.4255,	304,	0.000! !END!
2391 ! X =	338.4785,	-427.1762,	279,	0.000! !END!
2392 ! X =	338.4675,	-426.9269,	302,	0.000! !END!
2393 ! X =	338.4566,	-426.6775,	310,	0.000! !END!
2394 ! X =	338.4457,	-426.4282,	335,	0.000! !END!
2395 ! X =	338.4347,	-426.1789,	335,	0.000! !END!
2396 ! X =	338.4238,	-425.9296,	335,	0.000! !END!
2397 ! X =	338.4128,	-425.6803,	335,	0.000! !END!
2398 ! X =	338.6939,	-426.4173,	335,	0.000! !END!
2399 ! X =	338.6829,	-426.1680,	335,	0.000! !END!
2400 ! X =	338.6720,	-425.9187,	335,	0.000! !END!
2401 ! X =	338.6611,	-425.6694,	340,	0.000! !END!

2402 ! X =	338.9421,	-426.4064,	304,	0.000! !END!
2403 ! X =	338.9311,	-426.1571,	335,	0.000! !END!
2404 ! X =	338.9202,	-425.9078,	335,	0.000! !END!
2405 ! X =	338.9093,	-425.6585,	340,	0.000! !END!
2406 ! X =	339.1903,	-426.3955,	274,	0.000! !END!
2407 ! X =	339.1794,	-426.1462,	304,	0.000! !END!
2408 ! X =	339.1684,	-425.8969,	306,	0.000! !END!
2409 ! X =	339.1575,	-425.6476,	335,	0.000! !END!
2410 ! X =	339.4385,	-426.3846,	291,	0.000! !END!
2411 ! X =	339.4276,	-426.1353,	304,	0.000! !END!
2412 ! X =	339.4166,	-425.8860,	306,	0.000! !END!
2413 ! X =	339.4057,	-425.6367,	330,	0.000! !END!
2414 ! X =	339.6867,	-426.3737,	311,	0.000! !END!
2415 ! X =	339.6758,	-426.1244,	304,	0.000! !END!
2416 ! X =	339.6648,	-425.8751,	292,	0.000! !END!
2417 ! X =	339.6539,	-425.6258,	335,	0.000! !END!
2418 ! X =	339.9459,	-426.6122,	334,	0.000! !END!
2419 ! X =	338.5717,	-426.3537,	335,	0.000! !END!
2420 ! X =	338.5709,	-426.5836,	319,	0.000! !END!
2421 ! X =	338.5700,	-426.8135,	305,	0.000! !END!
2422 ! X =	338.5691,	-427.0433,	281,	0.000! !END!
2423 ! X =	338.5683,	-427.2732,	288,	0.000! !END!
2424 ! X =	338.5674,	-427.5030,	306,	0.000! !END!
2425 ! X =	338.5666,	-427.7329,	343,	0.000! !END!
2426 ! X =	338.5657,	-427.9627,	354,	0.000! !END!
2427 ! X =	338.5649,	-428.1926,	365,	0.000! !END!
2428 ! X =	338.5640,	-428.4214,	365,	0.000! !END!
2429 ! X =	338.5631,	-428.6513,	382,	0.000! !END!
2430 ! X =	338.3378,	-428.6742,	358,	0.000! !END!
2431 ! X =	338.1124,	-428.6961,	358,	0.000! !END!
2432 ! X =	337.8871,	-428.7189,	411,	0.000! !END!
2433 ! X =	337.6618,	-428.7418,	461,	0.000! !END!
2434 ! X =	337.4365,	-428.7637,	507,	0.000! !END!
2435 ! X =	337.2111,	-428.7856,	579,	0.000! !END!
2436 ! X =	336.9858,	-428.8085,	609,	0.000! !END!
2437 ! X =	336.7604,	-428.8303,	609,	0.000! !END!
2438 ! X =	336.5816,	-428.9481,	576,	0.000! !END!
2439 ! X =	336.4027,	-429.0659,	548,	0.000! !END!
2440 ! X =	336.3696,	-429.3021,	548,	0.000! !END!
2441 ! X =	336.3364,	-429.5384,	517,	0.000! !END!
2442 ! X =	336.3033,	-429.7747,	484,	0.000! !END!
2443 ! X =	336.2701,	-430.0110,	487,	0.000! !END!
2444 ! X =	336.2368,	-430.2472,	487,	0.000! !END!
2445 ! X =	336.2037,	-430.4835,	533,	0.000! !END!
2446 ! X =	336.1705,	-430.7198,	601,	0.000! !END!
2447 ! X =	336.1374,	-430.9561,	624,	0.000! !END!
2448 ! X =	335.9082,	-431.0211,	640,	0.000! !END!
2449 ! X =	335.6788,	-431.0861,	640,	0.000! !END!
2450 ! X =	335.4496,	-431.1511,	640,	0.000! !END!
2451 ! X =	335.2204,	-431.2161,	618,	0.000! !END!
2452 ! X =	334.9910,	-431.2811,	640,	0.000! !END!
2453 ! X =	334.7618,	-431.3462,	640,	0.000! !END!
2454 ! X =	334.7224,	-431.5827,	640,	0.000! !END!
2455 ! X =	334.6831,	-431.8192,	637,	0.000! !END!
2456 ! X =	334.6437,	-432.0558,	621,	0.000! !END!
2457 ! X =	334.6043,	-432.2923,	611,	0.000! !END!

2458 ! X =	334.5649,	-432.5289,	597,	0.000! !END!
2459 ! X =	334.5256,	-432.7654,	577,	0.000! !END!
2460 ! X =	334.4862,	-433.0020,	583,	0.000! !END!
2461 ! X =	334.4468,	-433.2386,	612,	0.000! !END!
2462 ! X =	334.3832,	-433.4742,	640,	0.000! !END!
2463 ! X =	334.3197,	-433.7098,	640,	0.000! !END!
2464 ! X =	334.2562,	-433.9454,	640,	0.000! !END!
2465 ! X =	334.1925,	-434.1810,	640,	0.000! !END!
2466 ! X =	334.1289,	-434.4156,	639,	0.000! !END!
2467 ! X =	334.0654,	-434.6513,	640,	0.000! !END!
2468 ! X =	334.0018,	-434.8869,	640,	0.000! !END!
2469 ! X =	333.7708,	-434.9510,	631,	0.000! !END!
2470 ! X =	333.5398,	-435.0141,	609,	0.000! !END!
2471 ! X =	333.3088,	-435.0781,	548,	0.000! !END!
2472 ! X =	333.0778,	-435.1422,	590,	0.000! !END!
2473 ! X =	332.8468,	-435.2063,	584,	0.000! !END!
2474 ! X =	332.6159,	-435.2704,	558,	0.000! !END!
2475 ! X =	332.3848,	-435.3335,	495,	0.000! !END!
2476 ! X =	332.1539,	-435.3976,	544,	0.000! !END!
2477 ! X =	331.9852,	-435.2441,	582,	0.000! !END!
2478 ! X =	331.8163,	-435.0896,	588,	0.000! !END!
2479 ! X =	331.6476,	-434.9361,	609,	0.000! !END!
2480 ! X =	331.4788,	-434.7816,	640,	0.000! !END!
2481 ! X =	331.3101,	-434.6282,	657,	0.000! !END!
2482 ! X =	331.1413,	-434.4737,	687,	0.000! !END!
2483 ! X =	330.9726,	-434.3202,	687,	0.000! !END!
2484 ! X =	330.8708,	-434.1548,	671,	0.000! !END!
2485 ! X =	330.7690,	-433.9894,	648,	0.000! !END!
2486 ! X =	330.6598,	-433.9942,	640,	0.000! !END!
2487 ! X =	330.6520,	-433.8146,	640,	0.000! !END!
2488 ! X =	330.5451,	-433.6464,	591,	0.000! !END!
2489 ! X =	330.4382,	-433.4773,	566,	0.000! !END!
2490 ! X =	330.3314,	-433.3091,	521,	0.000! !END!
2491 ! X =	330.1224,	-433.3462,	517,	0.000! !END!
2492 ! X =	329.9136,	-433.3843,	487,	0.000! !END!
2493 ! X =	329.7046,	-433.4215,	466,	0.000! !END!
2494 ! X =	329.4957,	-433.4596,	410,	0.000! !END!
2495 ! X =	329.2868,	-433.4967,	402,	0.000! !END!
2496 ! X =	329.0778,	-433.5339,	435,	0.000! !END!
2497 ! X =	329.0633,	-433.7703,	472,	0.000! !END!
2498 ! X =	329.0488,	-434.0068,	506,	0.000! !END!
2499 ! X =	329.0343,	-434.2433,	529,	0.000! !END!
2500 ! X =	329.0197,	-434.4797,	555,	0.000! !END!
2501 ! X =	329.0052,	-434.7162,	609,	0.000! !END!
2502 ! X =	328.9907,	-434.9526,	640,	0.000! !END!
2503 ! X =	328.9762,	-435.1891,	643,	0.000! !END!
2504 ! X =	328.9617,	-435.4256,	653,	0.000! !END!
2505 ! X =	328.9472,	-435.6620,	662,	0.000! !END!
2506 ! X =	328.9326,	-435.8985,	696,	0.000! !END!
2507 ! X =	328.7396,	-436.0079,	669,	0.000! !END!
2508 ! X =	328.5465,	-436.1173,	670,	0.000! !END!
2509 ! X =	328.3534,	-436.2267,	670,	0.000! !END!
2510 ! X =	328.1604,	-436.3360,	670,	0.000! !END!
2511 ! X =	327.9672,	-436.4454,	670,	0.000! !END!
2512 ! X =	327.7742,	-436.5548,	641,	0.000! !END!
2513 ! X =	327.5812,	-436.6652,	590,	0.000! !END!

2514 ! X =	327.3881,	-436.7746,	531,	0.000! !END!
2515 ! X =	327.1950,	-436.8840,	487,	0.000! !END!
2516 ! X =	327.1163,	-437.0743,	457,	0.000! !END!
2517 ! X =	327.0376,	-437.2656,	461,	0.000! !END!
2518 ! X =	326.9589,	-437.4559,	487,	0.000! !END!
2519 ! X =	326.8802,	-437.6472,	510,	0.000! !END!
2520 ! X =	326.6772,	-437.6921,	579,	0.000! !END!
2521 ! X =	326.4743,	-437.7369,	640,	0.000! !END!
2522 ! X =	326.2713,	-437.7818,	641,	0.000! !END!
2523 ! X =	326.0683,	-437.8267,	645,	0.000! !END!
2524 ! X =	325.8653,	-437.8715,	641,	0.000! !END!
2525 ! X =	325.8761,	-438.0729,	660,	0.000! !END!
2526 ! X =	325.8869,	-438.2743,	696,	0.000! !END!
2527 ! X =	325.8977,	-438.4757,	701,	0.000! !END!
2528 ! X =	325.9086,	-438.6771,	680,	0.000! !END!
2529 ! X =	325.9194,	-438.8785,	655,	0.000! !END!
2530 ! X =	325.7086,	-438.9496,	609,	0.000! !END!
2531 ! X =	325.4978,	-439.0218,	575,	0.000! !END!
2532 ! X =	325.2871,	-439.0930,	545,	0.000! !END!
2533 ! X =	325.0763,	-439.1652,	538,	0.000! !END!
2534 ! X =	325.0145,	-439.3748,	482,	0.000! !END!
2535 ! X =	324.9526,	-439.5843,	472,	0.000! !END!
2536 ! X =	324.8906,	-439.7939,	487,	0.000! !END!
2537 ! X =	324.8288,	-440.0035,	548,	0.000! !END!
2538 ! X =	324.7669,	-440.2130,	609,	0.000! !END!
2539 ! X =	324.7050,	-440.4236,	640,	0.000! !END!
2540 ! X =	324.6431,	-440.6332,	640,	0.000! !END!
2541 ! X =	324.5545,	-440.8369,	623,	0.000! !END!
2542 ! X =	324.4659,	-441.0406,	579,	0.000! !END!
2543 ! X =	324.3773,	-441.2434,	545,	0.000! !END!
2544 ! X =	324.2888,	-441.4481,	506,	0.000! !END!
2545 ! X =	324.2002,	-441.6519,	455,	0.000! !END!
2546 ! X =	324.3962,	-441.6593,	484,	0.000! !END!
2547 ! X =	324.5921,	-441.6677,	524,	0.000! !END!
2548 ! X =	324.7882,	-441.6751,	579,	0.000! !END!
2549 ! X =	324.7559,	-441.9043,	502,	0.000! !END!
2550 ! X =	324.7236,	-442.1326,	457,	0.000! !END!
2551 ! X =	324.6914,	-442.3619,	432,	0.000! !END!
2552 ! X =	324.6591,	-442.5911,	464,	0.000! !END!
2553 ! X =	324.4493,	-442.5703,	432,	0.000! !END!
2554 ! X =	324.2394,	-442.5495,	406,	0.000! !END!
2555 ! X =	324.0296,	-442.5277,	426,	0.000! !END!
2556 ! X =	323.8197,	-442.5069,	467,	0.000! !END!
2557 ! X =	323.7271,	-442.7209,	529,	0.000! !END!
2558 ! X =	323.6345,	-442.9348,	579,	0.000! !END!
2559 ! X =	323.5419,	-443.1487,	639,	0.000! !END!
2560 ! X =	323.4492,	-443.3626,	640,	0.000! !END!
2561 ! X =	323.4406,	-443.3930,	646,	0.000! !END!
2562 ! X =	323.3591,	-443.5774,	664,	0.000! !END!
2563 ! X =	323.2590,	-443.7897,	663,	0.000! !END!
2564 ! X =	323.1588,	-444.0019,	658,	0.000! !END!
2565 ! X =	323.0587,	-444.2151,	640,	0.000! !END!
2566 ! X =	322.9585,	-444.4274,	670,	0.000! !END!
2567 ! X =	322.8584,	-444.6406,	670,	0.000! !END!
2568 ! X =	322.7583,	-444.8539,	670,	0.000! !END!
2569 ! X =	322.6581,	-445.0661,	670,	0.000! !END!

2570 ! X =	322.6522,	-445.2713,	670,	0.000! !END!
2571 ! X =	322.6462,	-445.4764,	670,	0.000! !END!
2572 ! X =	322.3995,	-445.4952,	670,	0.000! !END!
2573 ! X =	322.1529,	-445.5150,	670,	0.000! !END!
2574 ! X =	321.9060,	-445.5338,	647,	0.000! !END!
2575 ! X =	321.6593,	-445.5525,	627,	0.000! !END!
2576 ! X =	321.4126,	-445.5713,	596,	0.000! !END!
2577 ! X =	321.1660,	-445.5911,	548,	0.000! !END!
2578 ! X =	320.9191,	-445.6099,	442,	0.000! !END!
2579 ! X =	320.6724,	-445.6287,	418,	0.000! !END!
2580 ! X =	320.4257,	-445.6475,	487,	0.000! !END!
2581 ! X =	320.1790,	-445.6673,	548,	0.000! !END!
2582 ! X =	319.9322,	-445.6861,	618,	0.000! !END!
2583 ! X =	319.6855,	-445.7048,	638,	0.000! !END!
2584 ! X =	319.4388,	-445.7236,	650,	0.000! !END!
2585 ! X =	319.1921,	-445.7434,	670,	0.000! !END!
2586 ! X =	318.9453,	-445.7622,	670,	0.000! !END!
2587 ! X =	318.6986,	-445.7810,	670,	0.000! !END!
2588 ! X =	318.4519,	-445.7997,	670,	0.000! !END!
2589 ! X =	318.3832,	-445.5929,	667,	0.000! !END!
2590 ! X =	318.5365,	-445.4013,	667,	0.000! !END!
2591 ! X =	318.6898,	-445.2097,	670,	0.000! !END!
2592 ! X =	318.8431,	-445.0181,	651,	0.000! !END!
2593 ! X =	318.9964,	-444.8266,	660,	0.000! !END!
2594 ! X =	318.9900,	-444.5830,	670,	0.000! !END!
2595 ! X =	318.9837,	-444.3394,	670,	0.000! !END!
2596 ! X =	318.9773,	-444.0949,	656,	0.000! !END!
2597 ! X =	318.9708,	-443.8513,	639,	0.000! !END!
2598 ! X =	318.9644,	-443.6078,	626,	0.000! !END!
2599 ! X =	318.9581,	-443.3642,	624,	0.000! !END!
2600 ! X =	318.9517,	-443.1196,	620,	0.000! !END!
2601 ! X =	319.0196,	-442.8948,	614,	0.000! !END!
2602 ! X =	319.0876,	-442.6690,	601,	0.000! !END!
2603 ! X =	319.1554,	-442.4432,	554,	0.000! !END!
2604 ! X =	319.2233,	-442.2174,	512,	0.000! !END!
2605 ! X =	319.2913,	-441.9925,	462,	0.000! !END!
2606 ! X =	319.3593,	-441.7667,	420,	0.000! !END!
2607 ! X =	319.4272,	-441.5419,	431,	0.000! !END!
2608 ! X =	319.4951,	-441.3161,	466,	0.000! !END!
2609 ! X =	319.5630,	-441.0903,	513,	0.000! !END!
2610 ! X =	319.6309,	-440.8645,	546,	0.000! !END!
2611 ! X =	319.6989,	-440.6396,	591,	0.000! !END!
2612 ! X =	319.7849,	-440.4220,	579,	0.000! !END!
2613 ! X =	319.8709,	-440.2044,	584,	0.000! !END!
2614 ! X =	319.9569,	-439.9868,	600,	0.000! !END!
2615 ! X =	320.0429,	-439.7692,	610,	0.000! !END!
2616 ! X =	320.1289,	-439.5516,	609,	0.000! !END!
2617 ! X =	320.2149,	-439.3340,	609,	0.000! !END!
2618 ! X =	320.3009,	-439.1164,	601,	0.000! !END!
2619 ! X =	320.3869,	-438.8987,	554,	0.000! !END!
2620 ! X =	320.4729,	-438.6811,	496,	0.000! !END!
2621 ! X =	320.5589,	-438.4635,	396,	0.000! !END!
2622 ! X =	320.6123,	-438.2543,	408,	0.000! !END!
2623 ! X =	320.6656,	-438.0442,	467,	0.000! !END!
2624 ! X =	320.7190,	-437.8350,	523,	0.000! !END!
2625 ! X =	320.7723,	-437.6258,	548,	0.000! !END!

2626 ! X =	320.8258,	-437.4166,	609,	0.000! !END!
2627 ! X =	320.8792,	-437.2074,	639,	0.000! !END!
2628 ! X =	320.9325,	-436.9982,	640,	0.000! !END!
2629 ! X =	321.1588,	-436.9404,	640,	0.000! !END!
2630 ! X =	321.3851,	-436.8825,	606,	0.000! !END!
2631 ! X =	321.6114,	-436.8246,	532,	0.000! !END!
2632 ! X =	321.8377,	-436.7668,	487,	0.000! !END!
2633 ! X =	322.0639,	-436.7089,	404,	0.000! !END!
2634 ! X =	322.0924,	-436.4818,	397,	0.000! !END!
2635 ! X =	322.1208,	-436.2547,	440,	0.000! !END!
2636 ! X =	322.1493,	-436.0287,	443,	0.000! !END!
2637 ! X =	322.1778,	-435.8016,	474,	0.000! !END!
2638 ! X =	322.2062,	-435.5745,	493,	0.000! !END!
2639 ! X =	322.2347,	-435.3484,	521,	0.000! !END!
2640 ! X =	322.2631,	-435.1213,	541,	0.000! !END!
2641 ! X =	322.5025,	-435.0889,	580,	0.000! !END!
2642 ! X =	322.7418,	-435.0564,	578,	0.000! !END!
2643 ! X =	322.9811,	-435.0240,	548,	0.000! !END!
2644 ! X =	323.2204,	-434.9915,	533,	0.000! !END!
2645 ! X =	323.4598,	-434.9590,	497,	0.000! !END!
2646 ! X =	323.4918,	-434.7428,	524,	0.000! !END!
2647 ! X =	323.5237,	-434.5266,	492,	0.000! !END!
2648 ! X =	323.5557,	-434.3103,	457,	0.000! !END!
2649 ! X =	323.5878,	-434.0941,	448,	0.000! !END!
2650 ! X =	323.6197,	-433.8779,	518,	0.000! !END!
2651 ! X =	323.6517,	-433.6616,	587,	0.000! !END!
2652 ! X =	323.8327,	-433.5108,	609,	0.000! !END!
2653 ! X =	324.0137,	-433.3600,	609,	0.000! !END!
2654 ! X =	324.1947,	-433.2102,	609,	0.000! !END!
2655 ! X =	324.3758,	-433.0593,	590,	0.000! !END!
2656 ! X =	324.5568,	-432.9085,	521,	0.000! !END!
2657 ! X =	324.7377,	-432.7577,	464,	0.000! !END!
2658 ! X =	324.9187,	-432.6069,	375,	0.000! !END!
2659 ! X =	325.0400,	-432.4067,	401,	0.000! !END!
2660 ! X =	325.1612,	-432.2056,	396,	0.000! !END!
2661 ! X =	325.2825,	-432.0044,	381,	0.000! !END!
2662 ! X =	325.4037,	-431.8033,	382,	0.000! !END!
2663 ! X =	325.5250,	-431.6031,	428,	0.000! !END!
2664 ! X =	325.6462,	-431.4019,	470,	0.000! !END!
2665 ! X =	325.7674,	-431.2008,	487,	0.000! !END!
2666 ! X =	325.8887,	-431.0006,	471,	0.000! !END!
2667 ! X =	326.0099,	-430.7995,	518,	0.000! !END!
2668 ! X =	326.1311,	-430.5983,	582,	0.000! !END!
2669 ! X =	326.2524,	-430.3972,	640,	0.000! !END!
2670 ! X =	326.3737,	-430.1970,	662,	0.000! !END!
2671 ! X =	326.4949,	-429.9958,	640,	0.000! !END!
2672 ! X =	326.6161,	-429.7947,	575,	0.000! !END!
2673 ! X =	326.6242,	-429.5635,	556,	0.000! !END!
2674 ! X =	326.6323,	-429.3313,	499,	0.000! !END!
2675 ! X =	326.6404,	-429.1002,	464,	0.000! !END!
2676 ! X =	326.6485,	-428.8680,	519,	0.000! !END!
2677 ! X =	326.6566,	-428.6358,	599,	0.000! !END!
2678 ! X =	326.6647,	-428.4037,	640,	0.000! !END!
2679 ! X =	326.6728,	-428.1725,	642,	0.000! !END!
2680 ! X =	326.6809,	-427.9403,	630,	0.000! !END!
2681 ! X =	326.6890,	-427.7092,	570,	0.000! !END!

2682 ! X =	326.6970,	-427.4770,	511,	0.000! !END!
2683 ! X =	326.7051,	-427.2448,	532,	0.000! !END!
2684 ! X =	326.7132,	-427.0137,	572,	0.000! !END!
2685 ! X =	326.9515,	-427.0602,	520,	0.000! !END!
2686 ! X =	327.1899,	-427.1077,	626,	0.000! !END!
2687 ! X =	327.4281,	-427.1542,	626,	0.000! !END!
2688 ! X =	327.6665,	-427.2017,	562,	0.000! !END!
2689 ! X =	327.6989,	-426.9955,	624,	0.000! !END!
2690 ! X =	327.7314,	-426.7892,	650,	0.000! !END!
2691 ! X =	327.7637,	-426.5830,	640,	0.000! !END!
2692 ! X =	327.7962,	-426.3767,	594,	0.000! !END!
2693 ! X =	327.8286,	-426.1704,	597,	0.000! !END!
2694 ! X =	327.8610,	-425.9642,	643,	0.000! !END!
2695 ! X =	328.0745,	-426.0248,	624,	0.000! !END!
2696 ! X =	328.2881,	-426.0854,	609,	0.000! !END!
2697 ! X =	328.5016,	-426.1459,	603,	0.000! !END!
2698 ! X =	328.7151,	-426.2065,	617,	0.000! !END!
2699 ! X =	328.9287,	-426.2671,	645,	0.000! !END!
2700 ! X =	328.9542,	-426.0322,	644,	0.000! !END!
2701 ! X =	328.9797,	-425.7973,	640,	0.000! !END!
2702 ! X =	329.0053,	-425.5623,	640,	0.000! !END!
2703 ! X =	329.0308,	-425.3274,	640,	0.000! !END!
2704 ! X =	329.0563,	-425.0925,	640,	0.000! !END!
2705 ! X =	329.2869,	-425.0694,	640,	0.000! !END!
2706 ! X =	329.5175,	-425.0463,	622,	0.000! !END!
2707 ! X =	329.7482,	-425.0232,	612,	0.000! !END!
2708 ! X =	329.9788,	-425.0001,	640,	0.000! !END!
2709 ! X =	330.2095,	-424.9780,	640,	0.000! !END!
2710 ! X =	330.4401,	-424.9549,	639,	0.000! !END!
2711 ! X =	330.6707,	-424.9318,	640,	0.000! !END!
2712 ! X =	330.6984,	-425.1674,	640,	0.000! !END!
2713 ! X =	330.7262,	-425.4040,	642,	0.000! !END!
2714 ! X =	330.7539,	-425.6396,	650,	0.000! !END!
2715 ! X =	330.7817,	-425.8762,	669,	0.000! !END!
2716 ! X =	330.9889,	-425.9520,	671,	0.000! !END!
2717 ! X =	331.1962,	-426.0278,	670,	0.000! !END!
2718 ! X =	331.4034,	-426.1037,	670,	0.000! !END!
2719 ! X =	331.6107,	-426.1795,	670,	0.000! !END!
2720 ! X =	331.5923,	-426.3852,	671,	0.000! !END!
2721 ! X =	331.5740,	-426.5908,	682,	0.000! !END!
2722 ! X =	331.5557,	-426.7964,	699,	0.000! !END!
2723 ! X =	331.5373,	-427.0021,	701,	0.000! !END!
2724 ! X =	331.7607,	-427.0492,	701,	0.000! !END!
2725 ! X =	331.9841,	-427.0964,	701,	0.000! !END!
2726 ! X =	332.2076,	-427.1446,	682,	0.000! !END!
2727 ! X =	332.4310,	-427.1917,	670,	0.000! !END!
2728 ! X =	332.4885,	-427.3700,	670,	0.000! !END!
2729 ! X =	332.5460,	-427.5474,	664,	0.000! !END!
2730 ! X =	332.6035,	-427.7247,	648,	0.000! !END!
2731 ! X =	332.8420,	-427.7572,	596,	0.000! !END!
2732 ! X =	333.0806,	-427.7897,	523,	0.000! !END!
2733 ! X =	333.3191,	-427.8222,	533,	0.000! !END!
2734 ! X =	333.5577,	-427.8557,	548,	0.000! !END!
2735 ! X =	333.7962,	-427.8882,	527,	0.000! !END!
2736 ! X =	334.0347,	-427.9217,	527,	0.000! !END!
2737 ! X =	334.0148,	-427.6758,	594,	0.000! !END!

2738 ! X =	333.9947,	-427.4299,	620,	0.000!	!END!
2739 ! X =	333.9748,	-427.1840,	621,	0.000!	!END!
2740 ! X =	333.9549,	-426.9380,	619,	0.000!	!END!
2741 ! X =	333.9349,	-426.6921,	613,	0.000!	!END!
2742 ! X =	333.9149,	-426.4462,	609,	0.000!	!END!
2743 ! X =	333.8950,	-426.2003,	602,	0.000!	!END!
2744 ! X =	333.8750,	-425.9543,	548,	0.000!	!END!
2745 ! X =	333.8550,	-425.7084,	472,	0.000!	!END!
2746 ! X =	333.8351,	-425.4635,	413,	0.000!	!END!
2747 ! X =	333.8151,	-425.2166,	426,	0.000!	!END!
2748 ! X =	333.7951,	-424.9716,	432,	0.000!	!END!
2749 ! X =	333.7752,	-424.7257,	427,	0.000!	!END!
2750 ! X =	334.0071,	-424.6956,	396,	0.000!	!END!
2751 ! X =	334.2390,	-424.6654,	367,	0.000!	!END!
2752 ! X =	334.4709,	-424.6353,	365,	0.000!	!END!
2753 ! X =	334.7028,	-424.6051,	400,	0.000!	!END!
2754 ! X =	334.9346,	-424.5749,	428,	0.000!	!END!
2755 ! X =	335.1666,	-424.5448,	458,	0.000!	!END!
2756 ! X =	335.3984,	-424.5146,	528,	0.000!	!END!
2757 ! X =	335.6304,	-424.4845,	583,	0.000!	!END!
2758 ! X =	335.8622,	-424.4543,	612,	0.000!	!END!
2759 ! X =	335.8600,	-424.6303,	548,	0.000!	!END!
2760 ! X =	335.8578,	-424.8072,	515,	0.000!	!END!
2761 ! X =	335.8556,	-424.9842,	464,	0.000!	!END!
2762 ! X =	336.0737,	-425.0056,	449,	0.000!	!END!
2763 ! X =	336.2920,	-425.0280,	435,	0.000!	!END!
2764 ! X =	336.5101,	-425.0504,	426,	0.000!	!END!
2765 ! X =	336.7282,	-425.0718,	411,	0.000!	!END!
2766 ! X =	336.9464,	-425.0942,	387,	0.000!	!END!
2767 ! X =	337.1646,	-425.1166,	355,	0.000!	!END!
2768 ! X =	337.2214,	-425.3539,	335,	0.000!	!END!
2769 ! X =	337.2782,	-425.5912,	288,	0.000!	!END!
2770 ! X =	337.3351,	-425.8285,	297,	0.000!	!END!
2771 ! X =	337.5629,	-425.7875,	291,	0.000!	!END!
2772 ! X =	337.7908,	-425.7465,	304,	0.000!	!END!
2773 ! X =	338.0187,	-425.7056,	324,	0.000!	!END!
2774 ! X =	338.2467,	-425.6646,	321,	0.000!	!END!
2775 ! X =	338.4745,	-425.6236,	335,	0.000!	!END!
2776 ! X =	338.7024,	-425.5826,	349,	0.000!	!END!
2777 ! X =	338.9304,	-425.5416,	351,	0.000!	!END!
2778 ! X =	339.1583,	-425.5017,	342,	0.000!	!END!
2779 ! X =	339.3862,	-425.4607,	340,	0.000!	!END!
2780 ! X =	339.6141,	-425.4187,	336,	0.000!	!END!
2781 ! X =	339.8420,	-425.3787,	336,	0.000!	!END!
2782 ! X =	339.8514,	-425.5921,	335,	0.000!	!END!
2783 ! X =	339.8607,	-425.8056,	309,	0.000!	!END!
2784 ! X =	339.8701,	-426.0190,	304,	0.000!	!END!
2785 ! X =	339.8795,	-426.2324,	327,	0.000!	!END!
2786 ! X =	339.8888,	-426.4458,	335,	0.000!	!END!
2787 ! X =	340.0911,	-426.4469,	349,	0.000!	!END!
2788 ! X =	340.2935,	-426.4480,	380,	0.000!	!END!
2789 ! X =	340.4958,	-426.4491,	396,	0.000!	!END!
2790 ! X =	340.4212,	-426.5623,	380,	0.000!	!END!
2791 ! X =	340.2747,	-426.6237,	360,	0.000!	!END!
2792 ! X =	340.1281,	-426.6851,	335,	0.000!	!END!
2793 ! X =	339.9971,	-426.6459,	334,	0.000!	!END!

2794 ! X =	339.8660,	-426.6057,	327,	0.000! !END!
2795 ! X =	339.7113,	-426.5935,	304,	0.000! !END!
2796 ! X =	339.5565,	-426.5803,	291,	0.000! !END!
2797 ! X =	339.4277,	-426.5910,	267,	0.000! !END!
2798 ! X =	339.2988,	-426.6016,	260,	0.000! !END!
2799 ! X =	339.1667,	-426.5375,	274,	0.000! !END!
2800 ! X =	339.0346,	-426.4733,	295,	0.000! !END!
2801 ! X =	338.9107,	-426.4838,	310,	0.000! !END!
2802 ! X =	338.7868,	-426.4942,	323,	0.000! !END!
2803 ! X =	338.6792,	-426.4240,	335,	0.000! !END!

----

a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
NORANDA BART CLASS I ANALYSIS (MAMMOTH CAVE)
MDNR RUNS - REVISIONS TO SOURCES
CENRAP - 6KM CALMET CENTRAL METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =            *
   or
ISCMET.DAT    input    * ISCDAT =            *
   or
PLMMET.DAT    input    * PLMDAT =            *
   or
PROFILE.DAT   input    * PRFDAT =            *
SURFACE.DAT   input    * SFCDAT =            *
RESTARTB.DAT  input    * RSTARTB=            *
-------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =NRCMC2002Q1.LST     !
CONC.DAT      output   ! CONDAT =NRCMC2002Q1.CON     !
DFLX.DAT      output   ! DFDAT  =NRCMC2002Q1.DRY     !
WFLX.DAT      output   ! WFDAT  =NRCMC2002Q1.WET     !

VISB.DAT      output   ! VISDAT =NRCMC2002Q1.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2002.DAT     !
-------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =            *
VOLEMARB.DAT  input    * VOLDAT =            *
BAEMARB.DAT   input    * ARDAT  =            *
LNEMARB.DAT   input    * LNDAT  =            *
-------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =            *
VD.DAT        input    * VDDAT  =            *
CHEM.DAT      input    * CHEMDAT=            *
H2O2.DAT      input    * H2O2DAT=            *
HILL.DAT      input    * HILDAT=            *
HILLRCT.DAT   input    * RCTDAT=            *
COASTLN.DAT   input    * CSTDAT=            *
FLUXBDY.DAT   input    * BDYDAT=            *
BCON.DAT      input    * BCNDAT=            *
DEBUG.DAT     output   * DEBUG =            *
MASSFLX.DAT   output   * FLXDAT=            *
MASSBAL.DAT   output   * BALDAT=            *
FOG.DAT       output   * FOGDAT=            *
-------------------------------------------------------------------------------
```

```
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
        T = lower case      ! LCFILES = T !
        F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

    Number of CALMET.DAT files for run (NMETDAT)
                              Default: 1       ! NMETDAT =  3  !

    Number of PTEMARB.DAT files for run (NPTDAT)
                              Default: 0       ! NPTDAT =  0  !

    Number of BAEMARB.DAT files for run (NARDAT)
                              Default: 0       ! NARDAT =  0  !

    Number of VOLEMARB.DAT files for run (NVOLDAT)
                              Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------
none          input    !METDAT=/raid1a/calmet.6km.central/2002/cmet.2002.01.central.dat !   !END!
none          input    !METDAT=/raid1a/calmet.6km.central/2002/cmet.2002.02.central.dat !   !END!
none          input    !METDAT=/raid1a/calmet.6km.central/2002/cmet.2002.03.central.dat !   !END!
none          input    *METDAT=/raid1a/calmet.6km.central/2002/cmet.2002.04.central.dat *   *END*
none          input    *METDAT=/raid1a/calmet.6km.central/2002/cmet.2002.05.central.dat *   *END*
none          input    *METDAT=/raidlocal/cmet.2002.06.central.dat *                        *END*
none          input    *METDAT=/raidlocal/cmet.2002.07.central.dat *                        *END*
none          input    *METDAT=/raidlocal/cmet.2002.08.central.dat *                        *END*
none          input    *METDAT=/raidlocal/cmet.2002.09.central.dat *                        *END*
none          input    *METDAT=/raidlocal/cmet.2002.10.central.dat *                        *END*
none          input    *METDAT=/raidlocal/cmet.2002.11.central.dat *                        *END*
none          input    *METDAT=/raidlocal/cmet.2002.12.central.dat *                        *END*


--------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

   Option to run all periods found
   in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

       METRUN = 0 - Run period explicitly defined below
       METRUN = 1 - Run all periods in met. file
```

Starting date: Year (IBYR) -- No default ! IBYR = 2002 !
(used only if Month (IBMO) -- No default ! IBMO = 01 !
METRUN = 0) Day (IBDY) -- No default ! IBDY = 01 !
Hour (IBHR) -- No default ! IBHR = 0 !

Base time zone (XBTZ) -- No default ! XBTZ = 0.0 !
PST = 8., MST = 7.
CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default ! IRLG = 2160 !

Number of chemical species (NSPEC)
Default: 5 ! NSPEC = 7 !

Number of chemical species
to be emitted (NSE) Default: 3 ! NSE = 4 !

Flag to stop run after
SETUP phase (ITEST) Default: 2 ! ITEST = 2 !
(Used to allow checking
of the model inputs, files, etc.)
ITEST = 1 - STOPS program after SETUP phase
ITEST = 2 - Continues with execution of program
after SETUP

Restart Configuration:

Control flag (MRESTART) Default: 0 ! MRESTART = 0 !

0 = Do not read or write a restart file
1 = Read a restart file at the beginning of
the run
2 = Write a restart file during run
3 = Read a restart file at beginning of run
and write a restart file during run

Number of periods in Restart
output cycle (NRESPD) Default: 0 ! NRESPD = 0 !

0 = File written only at last period
>0 = File updated every NRESPD periods

Meteorological Data Format (METFM)
Default: 1 ! METFM = 1 !

METFM = 1 - CALMET binary file (CALMET.MET)
METFM = 2 - ISC ASCII file (ISCMET.MET)
METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
surface parameters file (SURFACE.DAT)

Meteorological Profile Data Format (MPRFFM)
(used only for METFM = 1, 2, 3)
Default: 1 ! MPRFFM = 1 !

MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)

MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
Averaging Time (minutes) (AVET)
Default: 60.0 ! AVET = 60. !
PG Averaging Time (minutes) (PGTIME)
Default: 60.0 ! PGTIME = 60. !

!END!

INPUT GROUP: 2 -- Technical options

Vertical distribution used in the
near field (MGAUSS) Default: 1 ! MGAUSS = 1 !
0 = uniform
1 = Gaussian

Terrain adjustment method
(MCTADJ) Default: 3 ! MCTADJ = 3 !
0 = no adjustment
1 = ISC-type of terrain adjustment
2 = simple, CALPUFF-type of terrain
adjustment
3 = partial plume path adjustment

Subgrid-scale complex terrain
flag (MCTSG) Default: 0 ! MCTSG = 0 !
0 = not modeled
1 = modeled

Near-field puffs modeled as
elongated 0 (MSLUG) Default: 0 ! MSLUG = 0 !
0 = no
1 = yes (slug model used)

Transitional plume rise modeled ?
(MTRANS) Default: 1 ! MTRANS = 1 !
0 = no (i.e., final rise only)
1 = yes (i.e., transitional rise computed)

Stack tip downwash? (MTIP) Default: 1 ! MTIP = 1 !
0 = no (i.e., no stack tip downwash)
1 = yes (i.e., use stack tip downwash)

Method used to simulate building
downwash? (MBDW) Default: 1 ! MBDW = 1 !
1 = ISC method
2 = PRIME method

Vertical wind shear modeled above

stack top? (MSHEAR) Default: 0 ! MSHEAR = 0 !
0 = no (i.e., vertical wind shear not modeled)
1 = yes (i.e., vertical wind shear modeled)

Puff splitting allowed? (MSPLIT) Default: 0 ! MSPLIT = 0 !
0 = no (i.e., puffs not split)
1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM) Default: 1 ! MCHEM = 1 !
0 = chemical transformation not modeled
1 = transformation rates computed internally (MESOPUFF II scheme)
2 = user-specified transformation rates used
3 = transformation rates computed internally (RIVAD/ARM3 scheme)
4 = secondary organic aerosol formation computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3) Default: 0 ! MAQCHEM = 0 !
0 = aqueous phase transformation not modeled
1 = transformation rates adjusted for aqueous phase reactions

Wet removal modeled ? (MWET) Default: 1 ! MWET = 1 !
0 = no
1 = yes

Dry deposition modeled ? (MDRY) Default: 1 ! MDRY = 1 !
0 = no
1 = yes
(dry deposition method specified for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP) Default: 3 ! MDISP = 3 !

1 = dispersion coefficients computed from measured values of turbulence, sigma v, sigma w
2 = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas
4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.
5 = CTDM sigmas used for stable and neutral conditions. For unstable conditions, sigmas are computed as in MDISP = 3, described above. MDISP = 5 assumes that measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)

```
 (Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3  !
   1 = use sigma-v or sigma-theta measurements
       from PROFILE.DAT to compute sigma-y
       (valid for METFM = 1, 2, 3, 4)
   2 = use sigma-w measurements
       from PROFILE.DAT to compute sigma-z
       (valid for METFM = 1, 2, 3, 4)
   3 = use both sigma-(v/theta) and sigma-w
       from PROFILE.DAT to compute sigma-y and sigma-z
       (valid for METFM = 1, 2, 3, 4)
   4 = use sigma-theta measurements
       from PLMMET.DAT to compute sigma-y
       (valid only if METFM = 3)

 Back-up method used to compute dispersion
 when measured turbulence data are
 missing (MDISP2)                    Default: 3     ! MDISP2 =  3  !
 (used only if MDISP = 1 or 5)
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
       (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
       the ISCST multi-segment approximation) and MP coefficients in
       urban areas
   4 = same as 3 except PG coefficients computed using
       the MESOPUFF II eqns.

[DIAGNOSTIC FEATURE]
 Method used for Lagrangian timescale for Sigma-y
 (used only if MDISP=1,2 or MDISP2=1,2)
 (MTAULY)                            Default: 0     ! MTAULY =  0  !
   0 = Draxler default 617.284 (s)
   1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
  10 < Direct user input (s)             -- e.g., 306.9


 [DIAGNOSTIC FEATURE]
 Method used for Advective-Decay timescale for Turbulence
 (used only if MDISP=2 or MDISP2=2)
 (MTAUADV)                           Default: 0     ! MTAUADV =  0  !
   0 = No turbulence advection
   1 = Computed (OPTION NOT IMPLEMENTED)
  10 < Direct user input (s)   -- e.g., 300


 Method used to compute turbulence sigma-v &
 sigma-w using micrometeorological variables
 (Used only if MDISP = 2 or MDISP2 = 2)
 (MCTURB)                            Default: 1     ! MCTURB =  1  !
   1 = Standard CALPUFF subroutines
   2 = AERMOD subroutines

 PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH =  0  !
 (MROUGH)
   0 = no
   1 = yes
```

Partial plume penetration of   Default: 1   ! MPARTL = 1 !
elevated inversion?
(MPARTL)
  0 = no
  1 = yes

Strength of temperature inversion   Default: 0   ! MTINV = 0 !
provided in PROFILE.DAT extended records?
(MTINV)
  0 = no (computed from measured/default gradients)
  1 = yes

PDF used for dispersion under convective conditions?
                              Default: 0   ! MPDF = 0 !
(MPDF)
  0 = no
  1 = yes

Sub-Grid TIBL module used for shore line?
                              Default: 0   ! MSGTIBL = 0 !
(MSGTIBL)
  0 = no
  1 = yes

Boundary conditions (concentration) modeled?
                              Default: 0   ! MBCON = 0 !
(MBCON)
  0 = no
  1 = yes, using formatted BCON.DAT file
  2 = yes, using unformatted CONC.DAT file

Analyses of fogging and icing impacts due to emissions from arrays of mechanically-forced cooling towers can be performed using CALPUFF in conjunction with a cooling tower emissions processor (CTEMISS) and its associated postprocessors. Hourly emissions of water vapor and temperature from each cooling tower cell are computed for the current cell configuration and ambient conditions by CTEMISS. CALPUFF models the dispersion of these emissions and provides cloud information in a specialized format for further analysis. Output to FOG.DAT is provided in either 'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
                              Default: 0   ! MFOG = 0   !
(MFOG)
  0 = no
  1 = yes - report results in PLUME Mode format
  2 = yes - report results in RECEPTOR Mode format

Test options specified to see if
they conform to regulatory
values? (MREG)   Default: 1   ! MREG = 1   !

  0 = NO checks are made

1 = Technical options must conform to USEPA
Long Range Transport (LRT) guidance

```
METFM    1 or 2
AVET     60. (min)
PGTIME   60. (min)
MGAUSS   1
MCTADJ   3
MTRANS   1
MTIP     1
MCHEM    1 or 3 (if modeling SOx, NOx)
MWET     1
MDRY     1
MDISP    2 or 3
MPDF     0 if MDISP=3
         1 if MDISP=2
MROUGH   0
MPARTL   1
SYTDEP   550. (m)
MHFTSZ   0
```

!END!

INPUT GROUP: 3a, 3b -- Species list

Subgroup (3a)

The following species are modeled:

```
! CSPEC =         SO2 !         !END!
! CSPEC =         SO4 !         !END!
! CSPEC =         NOX !         !END!
! CSPEC =        HNO3 !         !END!
! CSPEC =         NO3 !         !END!
! CSPEC =         PMC !         !END!
! CSPEC =         PMF !         !END!
```

```
                                               Dry              OUTPUT GROUP
   SPECIES         MODELED          EMITTED       DEPOSITED              NUMBER
    NAME        (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,               (0=NONE,
  (Limit: 12                                   1=COMPUTED-GAS        1=1st CGRUP,
   Characters                                   2=COMPUTED-PARTICLE   2=2nd CGRUP,
   in length)                                  3=USER-SPECIFIED)     3= etc.)

!         SO2  =        1,              1,           1,                0   !
!         SO4  =        1,              0,           2,                0   !
!         NOX  =        1,              1,           1,                0   !
!        HNO3  =        1,              0,           1,                0   !
!         NO3  =        1,              0,           2,                0   !
!         PMC  =        1,              1,           2,                0   !
```

```
!        PMF  =        1,             1,          2,               0   !


!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



-------------------------------------------------------------------------------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                   Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                  Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                 Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                 No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                 Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                  No Default      ! RLAT0 = 40N  !
     (RLON0)                  No Default      ! RLON0 = 97W  !
```

TTM : RLON0 identifies central (true N/S) meridian of projection
RLAT0 selected for convenience
LCC : RLON0 identifies central (true N/S) meridian of projection
RLAT0 selected for convenience
PS : RLON0 identifies central (grid N/S) meridian of projection
RLAT0 selected for convenience
EM : RLON0 identifies central meridian of projection
RLAT0 is REPLACED by 0.0N (Equator)
LAZA: RLON0 identifies longitude of tangent-point of mapping plane
RLAT0 identifies latitude of tangent-point of mapping plane

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1) No Default ! XLAT1 = 33N !
(XLAT2) No Default ! XLAT2 = 45N !

LCC : Projection cone slices through Earth's surface at XLAT1 and XLAT2
PS : Projection plane slices through Earth at XLAT1
(XLAT2 is not used)

Note: Latitudes and longitudes should be positive, and include a
letter N,S,E, or W indicating north or south latitude, and
east or west longitude. For example,
35.9 N Latitude = 35.9N
118.7 E Longitude = 118.7E

Datum-region

The Datum-Region for the coordinates is identified by a character string. Many mapping products currently available use the model of the Earth known as the World Geodetic System 1984 (WGS-G). Other local models may be in use, and their selection in CALMET will make its output consistent with local mapping products. The list of Datum-Regions with official transformation parameters is provided by the National Imagery and Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)

WGS-G WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
NAS-C NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
NWS-27 NWS 6370KM Radius, Sphere
NWS-84 NWS 6370KM Radius, Sphere
ESR-S ESRI REFERENCE 6371KM Radius, Sphere

Datum-region for output coordinates
(DATUM) Default: WGS-G ! DATUM = WGS-G !

METEOROLOGICAL Grid:

Rectangular grid defined for projection PMAP,
with X the Easting and Y the Northing coordinate

No. X grid cells (NX)   No default   ! NX = 366   !
No. Y grid cells (NY)   No default   ! NY = 234   !
No. vertical layers (NZ)   No default   ! NZ = 10   !

Grid spacing (DGRIDKM)   No default   ! DGRIDKM = 6 !
Units: km

Cell face heights
(ZFACE(nz+1))   No defaults
Units: m
! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
4000. !

Reference Coordinates
of SOUTHWEST corner of
grid cell(1, 1):

X-coordinate (XORIGKM)   No default   ! XORIGKM = -1008. !
Y coordinate (YORIGKM)   No default   ! YORIGKM = -864. !
Units: km

COMPUTATIONAL Grid:

The computational grid is identical to or a subset of the MET. grid.
The lower left (LL) corner of the computational grid is at grid point
(IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the
computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
The grid spacing of the computational grid is the same as the MET. grid.

X index of LL corner (IBCOMP)   No default   ! IBCOMP = 259 !
(1 <= IBCOMP <= NX)

Y index of LL corner (JBCOMP)   No default   ! JBCOMP = 65   !
(1 <= JBCOMP <= NY)

X index of UR corner (IECOMP)   No default   ! IECOMP = 347   !
(1 <= IECOMP <= NX)

Y index of UR corner (JECOMP)   No default   ! JECOMP = 122   !
(1 <= JECOMP <= NY)

SAMPLING Grid (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point
(IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the
sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
The sampling grid must be identical to or a subset of the computational
grid. It may be a nested grid inside the computational grid.
The grid spacing of the sampling grid is DGRIDKM/MESHDN.

Logical flag indicating if gridded
receptors are used (LSAMP)   Default: T   ! LSAMP = F !

```
      (T=yes, F=no)

      X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1   !
       (IBCOMP <= IBSAMP <= IECOMP)

      Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1   !
       (JBCOMP <= JBSAMP <= JECOMP)


      X index of UR corner (IESAMP)      No default     ! IESAMP =  251   !
       (IBCOMP <= IESAMP <= IECOMP)

      Y index of UR corner (JESAMP)      No default     ! JESAMP =  246   !
       (JBCOMP <= JESAMP <= JECOMP)


     Nesting factor of the sampling
      grid (MESHDN)                   Default: 1     ! MESHDN =  1  !
      (MESHDN is an integer >= 1)

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------
                                  *                         *
    FILE                    DEFAULT VALUE           VALUE THIS RUN
    ----                    -------------           --------------

   Concentrations (ICON)            1                 !  ICON =  1   !
   Dry Fluxes (IDRY)               1                 !  IDRY =  1   !
   Wet Fluxes (IWET)                1                 !  IWET =  1   !
   Relative Humidity (IVIS)         1                 !  IVIS =  1   !
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                        Default: T        ! LCOMPRS = T !

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

      Mass flux across specified boundaries
      for selected species reported hourly?
      (IMFLX)                        Default: 0        ! IMFLX =  0  !
        0 = no
        1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                 are specified in Input Group 0)

      Mass balance for each species
```

reported hourly?
(IMBAL) Default: 0 ! IMBAL = 0 !
0 = no
1 = yes (MASSBAL.DAT filename is
specified in Input Group 0)

LINE PRINTER OUTPUT OPTIONS:

Print concentrations (ICPRT) Default: 0 ! ICPRT = 0 !
Print dry fluxes (IDPRT) Default: 0 ! IDPRT = 0 !
Print wet fluxes (IWPRT) Default: 0 ! IWPRT = 0 !
(0 = Do not print, 1 = Print)

Concentration print interval
(ICFRQ) in hours Default: 1 ! ICFRQ = 1 !
Dry flux print interval
(IDFRQ) in hours Default: 1 ! IDFRQ = 1 !
Wet flux print interval
(IWFRQ) in hours Default: 1 ! IWFRQ = 1 !

Units for Line Printer Output
(IPRTU) Default: 1 ! IPRTU = 3 !

	for Concentration	for Deposition
1 =	g/m**3	g/m**2/s
2 =	mg/m**3	mg/m**2/s
3 =	ug/m**3	ug/m**2/s
4 =	ng/m**3	ng/m**2/s
5 =	Odour Units	

Messages tracking progress of run
written to the screen ?
(IMESG) Default: 2 ! IMESG = 2 !
0 = no
1 = yes (advection step, puff ID)
2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)

SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

```
              ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ------   -- MASS
FLUX --
  SPECIES
  /GROUP       PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED
ON DISK?   SAVED ON DISK?
  -------      ------------------------   ------------------------   ------------------------   ---------------
!      SO2 =     0,          1,          0,          1,          0,          1,          0   !
!      SO4 =     0,          1,          0,          1,          0,          1,          0   !
!      NOX =     0,          1,          0,          1,          0,          1,          0   !
!     HNO3 =     0,          1,          0,          1,          0,          1,          0   !
!      NO3 =     0,          1,          0,          1,          0,          1,          0   !
!      PMC =     0,          1,          0,          1,          0,          1,          0   !
!      PMF =     0,          1,          0,          1,          0,          1,          0   !
```

OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

```
   Logical for debug output
   (LDEBUG)                         Default: F     ! LDEBUG = F !

   First puff to track
   (IPFDEB)                         Default: 1     ! IPFDEB =  1  !

   Number of puffs to track
   (NPFDEB)                         Default: 1     ! NPFDEB =  1  !

   Met. period to start output
   (NN1)                            Default: 1     ! NN1 =  1   !

   Met. period to end output
   (NN2)                            Default: 10    ! NN2 =  10  !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
   Number of terrain features (NHILL)       Default: 0     ! NHILL =  0   !

   Number of special complex terrain
   receptors  (NCTREC)                      Default: 0     ! NCTREC =  0   !

   Terrain and CTSG Receptor data for
   CTSG hills input in CTDM format ?
   (MHILL)                          No Default     ! MHILL =  2   !
   1 = Hill and Receptor data created
       by CTDM processors & read from
       HILL.DAT and HILLRCT.DAT files
   2 = Hill data created by OPTHILL &
       input below in Subgroup (6b);
       Receptor data in Subgroup (6c)

   Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1. !
   to meters (MHILL=1)

   Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1. !
   to meters (MHILL=1)

   X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0.0E00 !
   CALPUFF coordinate system, in Kilometers (MHILL=1)

   Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0.0E00 !
   CALPUFF coordinate system, in Kilometers (MHILL=1)
```

```
! END !

---------------
Subgroup (6b)
---------------

                  1 **
    HILL information


HILL         XC       YC      THETAH  ZGRID  RELIEF    EXPO 1    EXPO 2   SCALE 1    SCALE 2
AMAX1     AMAX2
 NO.        (km)      (km)      (deg.)   (m)     (m)      (m)       (m)       (m)        (m)       (m)        (m)
----        ----      ----      ------  -----  ------    ------    ------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------

   COMPLEX TERRAIN RECEPTOR INFORMATION

                  XRCT        YRCT       ZRCT         XHH
                  (km)        (km)        (m)
                 ------       -----      ------        ----


-------------------
1
    Description of Complex Terrain Variables:
        XC, YC  = Coordinates of center of hill
        THETAH  = Orientation of major axis of hill (clockwise from
                North)
        ZGRID   = Height of the  0  of the grid above mean sea
                level
        RELIEF  = Height of the crest of the hill above the grid elevation
        EXPO 1  = Hill-shape exponent for the major axis
        EXPO 2  = Hill-shape exponent for the major axis
        SCALE 1 = Horizontal length scale along the major axis
        SCALE 2 = Horizontal length scale along the minor axis
        AMAX    = Maximum allowed axis length for the major axis
        BMAX    = Maximum allowed axis length for the major axis

        XRCT, YRCT = Coordinates of the complex terrain receptors
        ZRCT    = Height of the ground (MSL) at the complex terrain
                Receptor
        XHH     = Hill number associated with each complex terrain receptor
                (NOTE: MUST BE ENTERED AS A REAL NUMBER)

  **
    NOTE: DATA for each hill and CTSG receptor are treated as a separate
          input subgroup and therefore must end with an input group terminator.

-------------------------------------------------------------------------------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
```

```
--------------

     SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY    MESOPHYLL RESISTANCE
HENRY'S LAW COEFFICIENT
      NAME       (cm**2/s)                                   (s/cm)            (dimensionless)
     -------     -----------      ----------      ----------    --------------------     -----------------------

!          SO2 =     0.1509,         1000.,           8.,              0.,                0.04 !
!          NOX =     0.1656,           1.,           8.,              5.,                3.5 !
!         HNO3 =     0.1628,           1.,          18.,              0.,          0.00000008 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

    For SINGLE SPECIES, the mean and standard deviation are used to
    compute a deposition velocity for NINT (see group 9) size-ranges,
    and these are then averaged to obtain a mean deposition velocity.

    For GROUPED SPECIES, the size distribution should be explicitly
    specified (by the 'species' in the group), and the standard deviation
    for each should be entered as 0.  The model will then use the
    deposition velocity for the stated mean diameter.

     SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
      NAME            DIAMETER                    DEVIATION
                     (microns)              (microns)
     -------      -------------------        ------------------
!          SO4 =         0.48,                  2.   !
!          NO3 =         0.48,                  2.   !
!          PMC =           6.,                  2.   !
!          PMF =         0.48,                  2.   !


!END!


-------------------------------------------------------------------------------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

    Reference cuticle resistance (s/cm)
    (RCUTR)                      Default: 30    !  RCUTR = 30.0 !
    Reference ground resistance  (s/cm)
    (RGR)                        Default: 10    !    RGR = 10.0 !
    Reference pollutant reactivity
    (REACTR)                     Default: 8     ! REACTR = 8.0 !

    Number of particle-size intervals used to
```

```
    evaluate effective particle deposition velocity
    (NINT)                     Default: 9     !   NINT =  9  !

    Vegetation state in unirrigated areas
    (IVEG)                     Default: 1     !   IVEG =  1   !
      IVEG=1 for active and unstressed vegetation
      IVEG=2 for active and stressed vegetation
      IVEG=3 for inactive vegetation

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                 Scavenging Coefficient -- Units: (sec)**(-1)

      Pollutant     Liquid Precip.      Frozen Precip.
      ---------     --------------      --------------
!        SO2 =        3.0E-05,            0.0E00 !
!        SO4 =        1.0E-04,            3.0E-05 !
!       HNO3 =        6.0E-05,            0.0E00 !
!        NO3 =        1.0E-04,            3.0E-05 !
!        PMC =        1.0E-04,            3.0E-05 !
!        PMF =        1.0E-04,            3.0E-05 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

    Ozone data input option (MOZ)     Default: 1           ! MOZ =  0   !
    (Used only if MCHEM = 1, 3, or 4)
      0 = use a monthly background ozone value
      1 = read hourly ozone concentrations from
          the OZONE.DAT data file

    Monthly ozone concentrations
    (Used only if MCHEM = 1, 3, or 4 and
     MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
    (BCKO3) in ppb                  Default: 12*80.
    !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00, 65.00, 65.00, 26.00, 26.00 !

    Monthly ammonia concentrations
    (Used only if MCHEM = 1, or 3)
    (BCKNH3) in ppb                 Default: 12*10.
    !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50 !
```

```
   Nighttime SO2 loss rate (RNITE1)
   in percent/hour                  Default: 0.2         ! RNITE1 = .2 !

   Nighttime NOx loss rate (RNITE2)
   in percent/hour                  Default: 2.0         ! RNITE2 = 2.0 !

   Nighttime HNO3 formation rate (RNITE3)
   in percent/hour                  Default: 2.0         ! RNITE3 = 2.0 !

   H2O2 data input option (MH2O2)    Default: 1           ! MH2O2 =  0   !
   (Used only if MAQCHEM = 1)
     0 = use a monthly background H2O2 value
     1 = read hourly H2O2 concentrations from
        the H2O2.DAT data file

   Monthly H2O2 concentrations
   (Used only if MQACHEM = 1 and
    MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
   (BCKH2O2) in ppb                 Default: 12*1.
   !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !


--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
   (used only if MCHEM = 4)

   The SOA module uses monthly values of:
      Fine particulate concentration in ug/m^3 (BCKPMF)
      Organic fraction of fine particulate     (OFRAC)
      VOC / NOX ratio (after reaction)         (VCNX)
   to characterize the air mass when computing
   the formation of SOA from VOC emissions.
   Typical values for several distinct air mass types are:

     Month    1    2    3    4    5    6    7    8    9   10   11   12
           Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

   Clean Continental
     BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
     OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
     VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

   Clean Marine (surface)
     BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
     OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
     VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

   Urban - low biogenic (controls present)
     BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
     OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
     VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

   Urban - high biogenic (controls present)
     BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
     OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
     VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
```

```
    Regional Plume
      BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
      OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
      VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

    Urban - no controls present
      BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
      OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
      VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

    Default: Clean Continental
    !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
    !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
    !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !


!END!


-------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

    Horizontal size of puff (m) beyond which
    time-dependent dispersion equations (Heffter)
    are used to determine sigma-y and
    sigma-z (SYTDEP)                          Default: 550.   ! SYTDEP = 5.5E02 !

    Switch for using Heffter equation for sigma z
    as above (0 = Not use Heffter; 1 = use Heffter
    (MHFTSZ)                                  Default: 0      ! MHFTSZ =  0   !

    Stability class used to determine plume
    growth rates for puffs above the boundary
    layer (JSUP)                              Default: 5      ! JSUP =  5   !

    Vertical dispersion constant for stable
    conditions (k1 in Eqn. 2.7-3)  (CONK1)     Default: 0.01   ! CONK1 = .01 !

    Vertical dispersion constant for neutral/
    unstable conditions (k2 in Eqn. 2.7-4)
    (CONK2)                                   Default: 0.1    ! CONK2 = .1 !

    Factor for determining Transition-point from
    Schulman-Scire to Huber-Snyder Building Downwash
    scheme (SS used for Hs < Hb + TBD * HL)
    (TBD)                                     Default: 0.5    ! TBD = .5 !
      TBD < 0   ==> always use Huber-Snyder
      TBD = 1.5 ==> always use Schulman-Scire
      TBD = 0.5 ==> ISC Transition-point

    Range of land use categories for which
    urban dispersion is assumed
    (IURB1, IURB2)                            Default: 10     ! IURB1 =  10  !
```

19 ! IURB2 = 19 !

Site characterization parameters for single-point Met data files ---------
(needed for METFM = 2,3,4)

Land use category for modeling domain
(ILANDUIN) Default: 20 ! ILANDUIN = 20 !

Roughness length (m) for modeling domain
(Z0IN) Default: 0.25 ! Z0IN = .25 !

Leaf area index for modeling domain
(XLAIIN) Default: 3.0 ! XLAIIN = 3.0 !

Elevation above sea level (m)
(ELEVIN) Default: 0.0 ! ELEVIN = .0 !

Latitude (degrees) for met location
(XLATIN) Default: -999. ! XLATIN = -999.0 !

Longitude (degrees) for met location
(XLONIN) Default: -999. ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

Anemometer height (m) (Used only if METFM = 2,3)
(ANEMHT) Default: 10. ! ANEMHT = 10.0 !

Form of lateral turbulance data in PROFILE.DAT file
(Used only if METFM = 4 or MTURBVW = 1 or 3)
(ISIGMAV) Default: 1 ! ISIGMAV = 1 !
0 = read sigma-theta
1 = read sigma-v

Choice of mixing heights (Used only if METFM = 4)
(IMIXCTDM) Default: 0 ! IMIXCTDM = 0 !
0 = read PREDICTED mixing heights
1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN) Default: 1.0 ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN) Default: 1.0 ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW) Default: 99 ! MXNEW = 99 !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM) Default: 99 ! MXSAM = 99 !

Number of iterations used when computing
the transport wind for a sampling step

that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT) Default: 2 ! NCOUNT = 2 !

Minimum sigma y for a new puff/slug (m)
(SYMIN) Default: 1.0 ! SYMIN = 1.0 !

Minimum sigma z for a new puff/slug (m)
(SZMIN) Default: 1.0 ! SZMIN = 1.0 !

Default minimum turbulence velocities sigma-v and sigma-w
for each stability class over land and over water (m/s)
(SVMIN(12) and SWMIN(12))

```
             ----------  LAND  ----------       ---------  WATER  ----------
  Stab Class :  A    B    C    D    E    F        A    B    C    D    E    F
             ---  ---  ---  ---  ---  ---       ---  ---  ---  ---  ---  ---
Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37, .37, .37, .37
Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08, .06, .03, .016
```

! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370, 0.370, 0.370!
! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2)) Default: 0.0,0.0 ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM) Default: 0.5 ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI) Default: 3000. ! XMAXZI = 4000.0 !

Minimum mixing height (m)
(XMINZI) Default: 50. ! XMINZI = 20.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5)) Default :
ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

```
Wind Speed Class :  1     2     3     4     5
                   ---   ---   ---   ---   ---
     ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !
```

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6)) Default : ISC RURAL values

ISC RURAL : .07, .07, .10, .15, .35, .55
ISC URBAN : .15, .15, .20, .25, .30, .30

Stability Class : A B C D E F
--- --- --- --- --- ---
! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2)) Default: 0.020, 0.035
! PTG0 = 0.020, 0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6)) Stability Class : A B C D E F
Default PPC : .50, .50, .50, .50, .35, .35
--- --- --- --- --- ---
! PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF) Default: 10. ! SL2PF = 10.0 !

Puff-splitting control variables ------------------------

VERTICAL SPLIT

Number of puffs that result every time a puff
is split - nsplit=2 means that 1 puff splits
into 2
(NSPLIT) Default: 3 ! NSPLIT = 3 !

Time(s) of a day when split puffs are eligible to
be split once again; this is typically set once
per day, around sunset before nocturnal shear develops.
24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
0=do not re-split 1=eligible for re-split
(IRESPLIT(24)) Default: Hour 17 = 1
! IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

Split is allowed only if last hour's mixing
height (m) exceeds a minimum value
(ZISPLIT) Default: 100. ! ZISPLIT = 100.0 !

Split is allowed only if ratio of last hour's
mixing ht to the maximum mixing ht experienced
by the puff is less than a maximum value (this
postpones a split until a nocturnal layer develops)
(ROLDMAX) Default: 0.25 ! ROLDMAX = 0.25 !

HORIZONTAL SPLIT

```
Number of puffs that result every time a puff
is split - nsplith=5 means that 1 puff splits
into 5
(NSPLITH)                    Default:   5       ! NSPLITH =  5  !

Minimum sigma-y (Grid Cells Units) of puff
before it may be split
(SYSPLITH)                   Default:  1.0      ! SYSPLITH = 1.0 !

Minimum puff elongation rate (SYSPLITH/hr) due to
wind shear, before it may be split
(SHSPLITH)                   Default:  2.       ! SHSPLITH = 2.0 !

Minimum concentration (g/m^3) of each
species in puff before it may be split
Enter array of NSPEC values; if a single value is
entered, it will be used for ALL species
(CNSPLITH)                   Default:  1.0E-07   ! CNSPLITH = 1.0E-07 !

Integration control variables ------------------------

Fractional convergence criterion for numerical SLUG
sampling integration
(EPSSLUG)                    Default:   1.0e-04  ! EPSSLUG = 1.0E-04 !

Fractional convergence criterion for numerical AREA
source integration
(EPSAREA)                    Default:   1.0e-06  ! EPSAREA = 1.0E-06 !

Trajectory step-length (m) used for numerical rise
integration
(DSRISE)                     Default:   1.0      ! DSRISE = 1.0 !

Boundary Condition (BC) Puff control variables ------------------------

Minimum height (m) to which BC puffs are mixed as they are emitted
(MBCON=2 ONLY).  Actual height is reset to the current mixing height
at the release point if greater than this minimum.
(HTMINBC)                    Default:   500.     ! HTMINBC = 500.0 !

Search radius (in BC segment lengths) about a receptor for sampling
nearest BC puff.  BC puffs are emitted with a spacing of one segment
length, so the search radius should be greater than 1.
(RSAMPBC)                    Default:   4.       ! RSAMPBC = 10.0 !

Near-Surface depletion adjustment to concentration profile used when
sampling BC puffs?
(MDEPBC)                     Default:   1        ! MDEPBC =  1  !
  0 = Concentration is NOT adjusted for depletion
  1 = Adjust Concentration for depletion

!END!

-------------------------------------------------------------------------------
```

```
INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =  14  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   3  !
          1 =       g/s
          2 =      kg/hr
          3 =      lb/hr
          4 =    tons/yr
          5 =    Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =    Odour Unit * m**3/min
          7 =    metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)       (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                     a
          POINT SOURCE: CONSTANT DATA
          -----------------------------
                                                              b         c
  Source       X        Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
            (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = PSRC1A  !
   1 ! X =  660.942,  -359.137,   1.83, 87.0,   0.67,  12.82, 298.15,  0.0, 0.0E00,  0.0E00,  0.0E00,
       0.0E00,  0.0E00, 0.0E00,  1.4113E00 !
   1 ! FMFAC  =      0.0 !   !END!
   2 ! SRCNAM = PSRC1B  !
   2 ! X =  661.106,  -358.974,   3.66, 84.0,   0.94,  16.64, 298.15,  0.0, 3.60E-03,  0.0E00,  0.6E00,
       0.0E00,  0.0E00, 0.0E00,  2.1056E00 !
   2 ! FMFAC  =      0.0 !   !END!
   3 ! SRCNAM = PSRC2A  !
   3 ! X =  660.714,  -359.310,   2.44, 88.0,   0.61,   0.29, 298.15,  0.0, 0.0E00,  0.0E00,  0.00E00,
```

```
     0.0E00,  0.0E00, 0.0E00,  0.6E00 !
   3 ! FMFAC =      1.0 !   !END!
   4 ! SRCNAM = PSRC2B  !
   4 ! X =  660.944,  -359.111,  20.73, 87.0,   0.46,  21.30, 298.15,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00, 0.0E00,  1.3200E00 !
   4 ! FMFAC  =     0.0 !   !END!
   5 ! SRCNAM = PSRC2C  !
   5 ! X =  661.011,  -359.274,  42.98, 87.0,   0.58,  16.13, 298.15,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00, 0.0E00,  2.6194E00 !
   5 ! FMFAC  =     0.0 !   !END!
   6 ! SRCNAM = PSCR3A  !
   6 ! X =  660.775,  -359.002,   1.52, 88.0,   0.61,  10.25, 298.15,  0.0, 1.14E-03, 0.0E00, 0.1905E00,
     0.0E00,  0.0E00, 0.0E00,  4.0862E00 !
   6 ! FMFAC  =     1.0 !   !END!
   7 ! SRCNAM = PSRC3B  !
   7 ! X =  661.006,  -359.151,   3.25, 87.0,   0.45,  12.90, 298.15,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00, 0.0E00,  1.1379E00 !
   7 ! FMFAC  =     1.0 !   !END!
   8 ! SRCNAM = PSRC3C  !
   8 ! X =  660.228,  -359.056,   5.64, 91.0,   0.24,   0.17, 298.15,  0.0, 1.03E-03, 0.0E00, 0.1174E00,
     0.0E00,  0.0E00, 0.0E00,  0.0130E00 !
   8 ! FMFAC  =     1.0 !   !END!
   9 ! SRCNAM = PSRC4A  !
   9 ! X =  661.508,  -359.025,  28.80, 87.0,   0.52,   9.91, 298.15,  0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00,  0.0E00,  1.0719E00 !
   9 ! FMFAC =      1.0 !   !END!
  10 ! SRCNAM = PSRC4B  !
  10 ! X = 660.926,  -359.016,   28.96, 87.0,   0.67,  24.26, 298.15,  0.0, 4.00E-03, 0.0E00, 6.6667E-01,
     0.0E00,  0.0E00,  0.0E00,  2.6838E00 !
  10 ! FMFAC =      1.0 !   !END!
  11 ! SRCNAM = PSRC5   !
  11 ! X = 660.953,  -359.050,   30.48, 87.0,   0.34,   0.91, 310.033, 0.0, 0.0E00,  0.0E00,  0.0E00,
     0.0E00,  0.0E00,  0.0E00,  3.4286E-01 !
  11 ! FMFAC =      0.0 !   !END!
   6 ! SRCNAM = PSRC6  !
   6 ! X =  661.023,  -358.926,   15.24, 85.0,   1.676,  19.672,343.706,  0.0, 2.8320E01,  0.0E00,  0.00E00,
     0.0E00,  0.0E00, 3.0467E00, 1.4854E01 !
   6 ! FMFAC =      1.0 !   !END!
   7 ! SRCNAM = PSRC7  !
   7 ! X =  661.044,  -358.951,  17.069, 85.0,   1.676,  19.672,343.706,  0.0, 2.8777E01,  0.0E00,
0.00E00,
     0.0E00,  0.0E00, 3.0467E00, 1.4854E01 !
   7 ! FMFAC =      1.0 !   !END!
   8 ! SRCNAM = PSRC8  !
   8 ! X =  661.010,  -359.148,  89.916, 86.0,   7.925,  14.041,360.372,  0.0, 9.84772E02, 0.0E00,
6.348E-02,
     0.0E00,  0.0E00, 1.4999E01, 1.4001E01 !
   8 ! FMFAC =      1.0 !   !END!
--------
```

a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

SRCNAM is a 12-character name for a source
(No default)

X   is an array holding the source data listed by the column headings
(No default)
SIGYZI is an array holding the initial sigma-y and sigma-z (m)
(Default: 0.,0.)
FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
the effect of rain-caps or other physical configurations that
reduce momentum rise associated with the actual exit velocity.
(Default: 1.0 -- full momentum used)

b
0. = No building downwash modeled, 1. = downwash modeled
NOTE: must be entered as a REAL number (i.e., with decimal point)

c
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by IPTU
(e.g. 1 for g/s).

Subgroup (13c)

BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

Source   a
No.   Effective building height, width, length and X/Y offset (in meters)
every 10 degrees. LENGTH, XBADJ, and YBADJ are only needed for
MBDW=2 (PRIME downwash option)
------   --

----

a
Building height, width, length, and X/Y offset from the source are treated
as a separate input subgroup for each source and therefore must end with
an input group terminator. The X/Y offset is the position, relative to the
stack, of the center of the upwind face of the projected building, with the
x-axis pointing along the flow direction.

Subgroup (13d)
----
a
POINT SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission
rates given in 13b. Factors entered multiply the rates in 13b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY)   Default: 0
0 =   Constant
1 =   Diurnal cycle (24 scaling factors: hours 1-24)

2 = Monthly cycle (12 scaling factors: months 1-12)
3 = Hour & Season (4 groups of 24 hourly scaling factors,
where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where
first group is Stability Class A,
and the speed classes have upper
bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

Number of polygon area sources with
parameters specified below (NAR1) No default ! NAR1 = 0 !

Units used for area source
emissions below (IARU) Default: 1 ! IARU = 1 !
1 = g/m**2/s
2 = kg/m**2/hr
3 = lb/m**2/hr
4 = tons/m**2/yr
5 = Odour Unit * m/s (vol. flux/m**2 of odour compound)
6 = Odour Unit * m/min
7 = metric tons/m**2/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (14d) (NSAR1) Default: 0 ! NSAR1 = 0 !

Number of buoyant polygon area sources
with variable location and emission
parameters (NAR2) No default ! NAR2 = 0 !
(If NAR2 > 0, ALL parameter data for
these sources are read from the file: BAEMARB.DAT)

!END!

```
Subgroup (14b)
---------------
                                   a
         AREA SOURCE: CONSTANT DATA
         ----------------------------
                                                        b
Source          Effect.    Base      Initial    Emission
 No.            Height   Elevation   Sigma z     Rates
                 (m)       (m)        (m)
-------         ------    ------     --------   ---------


--------
   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.
   b
    An emission rate must be entered for every pollutant modeled.
    Enter emission rate of zero for secondary pollutants that are
    modeled, but not emitted.  Units are specified by IARU
    (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

          COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
          --------------------------------------------------------
Source                                                  a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------


--------
   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                            a
         AREA SOURCE: VARIABLE EMISSIONS DATA
         --------------------------------------

    Use this subgroup to describe temporal variations in the emission
    rates given in 14b.  Factors entered multiply the rates in 14b.
    Skip sources here that have constant emissions.  For more elaborate
    variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

    IVARY determines the type of variation, and is source-specific:
    (IVARY)                           Default: 0
          0 =       Constant
          1 =       Diurnal cycle (24 scaling factors: hours 1-24)
          2 =       Monthly cycle (12 scaling factors: months 1-12)
```

3 = Hour & Season (4 groups of 24 hourly scaling factors,
where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where
first group is Stability Class A,
and the speed classes have upper
bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

Subgroup (15a)

Number of buoyant line sources
with variable location and emission
parameters (NLN2) No default ! NLN2 = 0 !

(If NLN2 > 0, ALL parameter data for
these sources are read from the file: LNEMARB.DAT)

Number of buoyant line sources (NLINES) No default ! NLINES = 4 !

Units used for line source
emissions below (ILNU) Default: 1 ! ILNU = 3 !
1 = g/s
2 = kg/hr
3 = lb/hr
4 = tons/yr
5 = Odour Unit * m**3/s (vol. flux of odour compound)
6 = Odour Unit * m**3/min
7 = metric tons/yr

Number of source-species
combinations with variable
emissions scaling factors
provided below in (15c) (NSLN1) Default: 0 ! NSLN1 = 0 !

Maximum number of segments used to model
each line (MXNSEG) Default: 7 ! MXNSEG = 7 !

The following variables are required only if NLINES > 0. They are

used in the buoyant line source plume rise calculations.

```
Number of distances at which              Default: 6   ! NLRISE =  6  !
transitional rise is computed

Average building length (XL)              No default   ! XL = 527.91 !
                                    (in meters)

Average building height (HBL)             No default   ! HBL = 16.0 !
                                    (in meters)

Average building width (WBL)              No default   ! WBL = 19.81 !
                                    (in meters)

Average line source width (WML)           No default   ! WML = 5.85 !
                                    (in meters)

Average separation between buildings (DXL)  No default   ! DXL = 19.81 !
                                    (in meters)

Average buoyancy parameter (FPRIMEL)      No default   ! FPRIMEL = 1011.99 !
                                    (in m**4/s**3)
```

!END!

```
---------------
Subgroup (15b)
---------------

        BUOYANT LINE SOURCE: CONSTANT DATA
        ----------------------------------
                                                                              a
Source    Beg. X     Beg. Y     End. X    End. Y    Release   Base       Emission
 No.    Coordinate  Coordinate  Coordinate Coordinate  Height   Elevation     Rates
          (km)       (km)       (km)       (km)       (m)       (m)
------  ----------  ----------  ---------  ----------  -------   ---------    ---------
1 ! SRCNAM = BLP1A !
1 ! X =   660.414,  -358.913,  660.915,  -358.890,   16.00,   90.00,    1.1362E01, 0.0E00, 7.32E-04,
      0.0E00, 0.0E00, 1.3002E01, 1.2138E01 !
!END!
2 ! SRCNAM = BLP1B !
2 ! X =   660.415,  -358.953,  660.918,  -358.930,   16.00,   90.00,    1.1362E01, 0.0E00, 7.32E-04,
      0.0E00, 0.0E00, 1.3002E01, 1.2138E01 !
!END!
3 ! SRCNAM = BLP2A !
3 ! X =   660.418,  -358.992,  660.919,  -358.969,   16.00,   90.00,    1.4553E01, 0.0E00, 9.38E-04,
      0.0E00, 0.0E00, 8.0528E00, 7.5172E00 !
!END!
4 ! SRCNAM = BLP2B !
4 ! X =   660.419,  -359.032,  660.921,  -359.009,   16.00,   90.00,    1.4553E01, 0.0E00, 9.38E-04,
      0.0E00, 0.0E00, 8.0528E00, 7.5172E00 !
!END!

-------
```

a

Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by ILNTU
(e.g. 1 for g/s).

Subgroup (15c)
----

a
BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission
rates given in 15b. Factors entered multiply the rates in 15b.
Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0
0 = Constant
1 = Diurnal cycle (24 scaling factors: hours 1-24)
2 = Monthly cycle (12 scaling factors: months 1-12)
3 = Hour & Season (4 groups of 24 hourly scaling factors,
where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where
first group is Stability Class A,
and the speed classes have upper
bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

Number of volume sources with
parameters provided in 16b,c (NVL1) No default ! NVL1 = 0 !

```
    Units used for volume source
    emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   3  !
         1 =        g/s
         2 =       kg/hr
         3 =       lb/hr
         4 =     tons/yr
         5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
         6 =     Odour Unit * m**3/min
         7 =     metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

    Number of volume sources with
    variable location and emission
    parameters                   (NVL2)     No default  !  NVL2 =   0   !

    (If NVL2 > 0, ALL parameter data for
     these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                     a
         VOLUME SOURCE: CONSTANT DATA
         ------------------------------
                                                                 b
       X          Y        Effect.    Base     Initial    Initial    Emission
    Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z     Rates
      (km)       (km)        (m)       (m)        (m)       (m)
    ----------  ----------   ------    ------    --------   --------   --------


--------
   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.

   b
    An emission rate must be entered for every pollutant modeled.
    Enter emission rate of zero for secondary pollutants that are
    modeled, but not emitted.  Units are specified by IVLU
    (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                          a
        VOLUME SOURCE: VARIABLE EMISSIONS DATA
        ---------------------------------------

    Use this subgroup to describe temporal variations in the emission
```

rates given in 16b. Factors entered multiply the rates in 16b.
Skip sources here that have constant emissions. For more elaborate variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
----

Subgroup (17a)

Number of non-gridded receptors (NREC) No default ! NREC = 302 !

!END!

Subgroup (17b)

```
                                     a
        NON-GRIDDED (DISCRETE) RECEPTOR DATA
        ------------------------------------

              X UTM      Y UTM       Ground       Height   b
Receptor    Coordinate  Coordinate   Elevation   Above Ground
  No.          (km)       (km)          (m)          (m)
--------    ----------  ----------   ---------   ------------


   1 ! X =     955.838,   -260.274,     183,        0 ! !END!
   2 ! X =     956.568,   -260.187,     213,        0 ! !END!
   3 ! X =     958.027,   -260.011,     244,        0 ! !END!
   4 ! X =     958.757,   -259.923,     244,        0 ! !END!
   5 ! X =     959.487,   -259.835,     243,        0 ! !END!
   6 ! X =     960.217,   -259.747,     244,        0 ! !END!
   7 ! X =     960.946,   -259.659,     224,        0 ! !END!
   8 ! X =     961.676,   -259.571,     244,        0 ! !END!
   9 ! X =     954.269,   -259.534,     212,        0 ! !END!
  10 ! X =     954.998,   -259.447,     214,        0 ! !END!
  11 ! X =     955.728,   -259.359,     198,        0 ! !END!
```

12 ! X =	956.458,	-259.271,	231,	0 ! !END!
13 ! X =	957.188,	-259.184,	215,	0 ! !END!
14 ! X =	957.917,	-259.096,	213,	0 ! !END!
15 ! X =	958.647,	-259.008,	244,	0 ! !END!
16 ! X =	959.377,	-258.920,	216,	0 ! !END!
17 ! X =	960.106,	-258.832,	244,	0 ! !END!
18 ! X =	960.836,	-258.744,	244,	0 ! !END!
19 ! X =	961.566,	-258.656,	244,	0 ! !END!
20 ! X =	962.295,	-258.568,	213,	0 ! !END!
21 ! X =	963.025,	-258.479,	213,	0 ! !END!
22 ! X =	954.159,	-258.619,	181,	0 ! !END!
23 ! X =	954.889,	-258.531,	189,	0 ! !END!
24 ! X =	955.618,	-258.444,	210,	0 ! !END!
25 ! X =	956.348,	-258.356,	183,	0 ! !END!
26 ! X =	957.077,	-258.268,	184,	0 ! !END!
27 ! X =	957.807,	-258.181,	185,	0 ! !END!
28 ! X =	958.537,	-258.093,	244,	0 ! !END!
29 ! X =	959.266,	-258.005,	239,	0 ! !END!
30 ! X =	959.996,	-257.917,	244,	0 ! !END!
31 ! X =	960.725,	-257.829,	215,	0 ! !END!
32 ! X =	961.455,	-257.741,	244,	0 ! !END!
33 ! X =	962.185,	-257.652,	213,	0 ! !END!
34 ! X =	962.914,	-257.564,	213,	0 ! !END!
35 ! X =	954.049,	-257.703,	182,	0 ! !END!
36 ! X =	954.779,	-257.616,	182,	0 ! !END!
37 ! X =	955.508,	-257.528,	213,	0 ! !END!
38 ! X =	956.238,	-257.441,	184,	0 ! !END!
39 ! X =	956.967,	-257.353,	231,	0 ! !END!
40 ! X =	957.697,	-257.265,	229,	0 ! !END!
41 ! X =	958.426,	-257.177,	228,	0 ! !END!
42 ! X =	959.156,	-257.089,	237,	0 ! !END!
43 ! X =	959.885,	-257.001,	213,	0 ! !END!
44 ! X =	960.615,	-256.913,	213,	0 ! !END!
45 ! X =	961.344,	-256.825,	226,	0 ! !END!
46 ! X =	962.074,	-256.737,	246,	0 ! !END!
47 ! X =	962.803,	-256.649,	271,	0 ! !END!
48 ! X =	963.533,	-256.561,	271,	0 ! !END!
49 ! X =	953.210,	-256.876,	151,	0 ! !END!
50 ! X =	953.939,	-256.788,	185,	0 ! !END!
51 ! X =	954.669,	-256.701,	214,	0 ! !END!
52 ! X =	955.398,	-256.613,	219,	0 ! !END!
53 ! X =	956.128,	-256.525,	224,	0 ! !END!
54 ! X =	956.857,	-256.438,	214,	0 ! !END!
55 ! X =	957.587,	-256.350,	156,	0 ! !END!
56 ! X =	958.316,	-256.262,	216,	0 ! !END!
57 ! X =	959.046,	-256.174,	198,	0 ! !END!
58 ! X =	959.775,	-256.086,	213,	0 ! !END!
59 ! X =	960.504,	-255.998,	244,	0 ! !END!
60 ! X =	961.234,	-255.910,	244,	0 ! !END!
61 ! X =	961.963,	-255.822,	237,	0 ! !END!
62 ! X =	962.693,	-255.734,	219,	0 ! !END!
63 ! X =	963.422,	-255.645,	261,	0 ! !END!
64 ! X =	950.912,	-256.222,	196,	0 ! !END!
65 ! X =	951.641,	-256.135,	215,	0 ! !END!
66 ! X =	952.371,	-256.048,	213,	0 ! !END!
67 ! X =	953.100,	-255.960,	154,	0 ! !END!
68 ! X =	953.830,	-255.873,	179,	0 ! !END!

69 ! X =	954.559,	-255.785,	186,	0 ! !END!
70 ! X =	955.288,	-255.698,	215,	0 ! !END!
71 ! X =	956.018,	-255.610,	222,	0 ! !END!
72 ! X =	956.747,	-255.522,	183,	0 ! !END!
73 ! X =	957.477,	-255.435,	214,	0 ! !END!
74 ! X =	958.206,	-255.347,	213,	0 ! !END!
75 ! X =	958.935,	-255.259,	234,	0 ! !END!
76 ! X =	959.665,	-255.171,	244,	0 ! !END!
77 ! X =	960.394,	-255.083,	242,	0 ! !END!
78 ! X =	961.123,	-254.995,	213,	0 ! !END!
79 ! X =	961.852,	-254.907,	227,	0 ! !END!
80 ! X =	962.582,	-254.818,	211,	0 ! !END!
81 ! X =	963.311,	-254.730,	244,	0 ! !END!
82 ! X =	950.803,	-255.307,	205,	0 ! !END!
83 ! X =	951.532,	-255.219,	153,	0 ! !END!
84 ! X =	952.261,	-255.132,	192,	0 ! !END!
85 ! X =	952.991,	-255.045,	153,	0 ! !END!
86 ! X =	953.720,	-254.957,	152,	0 ! !END!
87 ! X =	954.449,	-254.870,	213,	0 ! !END!
88 ! X =	955.179,	-254.782,	203,	0 ! !END!
89 ! X =	955.908,	-254.695,	215,	0 ! !END!
90 ! X =	956.637,	-254.607,	152,	0 ! !END!
91 ! X =	957.366,	-254.519,	152,	0 ! !END!
92 ! X =	958.096,	-254.431,	183,	0 ! !END!
93 ! X =	958.825,	-254.344,	219,	0 ! !END!
94 ! X =	959.554,	-254.256,	226,	0 ! !END!
95 ! X =	960.283,	-254.168,	214,	0 ! !END!
96 ! X =	961.013,	-254.080,	225,	0 ! !END!
97 ! X =	961.742,	-253.991,	188,	0 ! !END!
98 ! X =	962.471,	-253.903,	217,	0 ! !END!
99 ! X =	948.505,	-254.653,	198,	0 ! !END!
100 ! X =	949.235,	-254.566,	213,	0 ! !END!
101 ! X =	949.964,	-254.478,	175,	0 ! !END!
102 ! X =	950.693,	-254.391,	161,	0 ! !END!
103 ! X =	951.422,	-254.304,	153,	0 ! !END!
104 ! X =	952.152,	-254.217,	157,	0 ! !END!
105 ! X =	952.881,	-254.129,	174,	0 ! !END!
106 ! X =	953.610,	-254.042,	199,	0 ! !END!
107 ! X =	954.339,	-253.955,	152,	0 ! !END!
108 ! X =	955.069,	-253.867,	152,	0 ! !END!
109 ! X =	955.798,	-253.779,	152,	0 ! !END!
110 ! X =	956.527,	-253.692,	182,	0 ! !END!
111 ! X =	957.256,	-253.604,	168,	0 ! !END!
112 ! X =	957.985,	-253.516,	202,	0 ! !END!
113 ! X =	958.714,	-253.428,	183,	0 ! !END!
114 ! X =	959.444,	-253.340,	183,	0 ! !END!
115 ! X =	960.173,	-253.252,	195,	0 ! !END!
116 ! X =	960.902,	-253.164,	213,	0 ! !END!
117 ! X =	961.631,	-253.076,	243,	0 ! !END!
118 ! X =	962.360,	-252.988,	244,	0 ! !END!
119 ! X =	945.479,	-254.084,	213,	0 ! !END!
120 ! X =	946.209,	-253.998,	202,	0 ! !END!
121 ! X =	946.938,	-253.911,	158,	0 ! !END!
122 ! X =	947.667,	-253.824,	183,	0 ! !END!
123 ! X =	948.396,	-253.737,	215,	0 ! !END!
124 ! X =	949.125,	-253.650,	198,	0 ! !END!

125 ! X =	949.855,	-253.563,	187,	0 ! !END!
126 ! X =	950.584,	-253.476,	177,	0 ! !END!
127 ! X =	951.313,	-253.389,	167,	0 ! !END!
128 ! X =	952.042,	-253.301,	221,	0 ! !END!
129 ! X =	952.771,	-253.214,	244,	0 ! !END!
130 ! X =	953.500,	-253.127,	243,	0 ! !END!
131 ! X =	954.230,	-253.039,	185,	0 ! !END!
132 ! X =	954.959,	-252.952,	213,	0 ! !END!
133 ! X =	955.688,	-252.864,	183,	0 ! !END!
134 ! X =	956.417,	-252.776,	225,	0 ! !END!
135 ! X =	957.146,	-252.689,	213,	0 ! !END!
136 ! X =	957.875,	-252.601,	152,	0 ! !END!
137 ! X =	958.604,	-252.513,	193,	0 ! !END!
138 ! X =	959.333,	-252.425,	244,	0 ! !END!
139 ! X =	960.062,	-252.337,	244,	0 ! !END!
140 ! X =	960.791,	-252.249,	244,	0 ! !END!
141 ! X =	961.520,	-252.161,	244,	0 ! !END!
142 ! X =	962.249,	-252.073,	247,	0 ! !END!
143 ! X =	962.978,	-251.984,	244,	0 ! !END!
144 ! X =	944.641,	-253.256,	183,	0 ! !END!
145 ! X =	945.371,	-253.169,	150,	0 ! !END!
146 ! X =	946.100,	-253.082,	153,	0 ! !END!
147 ! X =	946.829,	-252.996,	185,	0 ! !END!
148 ! X =	947.558,	-252.909,	213,	0 ! !END!
149 ! X =	948.287,	-252.822,	152,	0 ! !END!
150 ! X =	949.016,	-252.735,	152,	0 ! !END!
151 ! X =	949.745,	-252.648,	152,	0 ! !END!
152 ! X =	950.474,	-252.561,	152,	0 ! !END!
153 ! X =	951.203,	-252.473,	213,	0 ! !END!
154 ! X =	951.933,	-252.386,	213,	0 ! !END!
155 ! X =	952.662,	-252.299,	214,	0 ! !END!
156 ! X =	953.391,	-252.211,	244,	0 ! !END!
157 ! X =	954.120,	-252.124,	230,	0 ! !END!
158 ! X =	954.849,	-252.036,	232,	0 ! !END!
159 ! X =	955.578,	-251.949,	213,	0 ! !END!
160 ! X =	956.307,	-251.861,	223,	0 ! !END!
161 ! X =	957.036,	-251.773,	156,	0 ! !END!
162 ! X =	957.765,	-251.686,	191,	0 ! !END!
163 ! X =	958.494,	-251.598,	223,	0 ! !END!
164 ! X =	959.223,	-251.510,	226,	0 ! !END!
165 ! X =	959.952,	-251.422,	228,	0 ! !END!
166 ! X =	960.681,	-251.334,	224,	0 ! !END!
167 ! X =	961.410,	-251.246,	214,	0 ! !END!
168 ! X =	962.139,	-251.157,	239,	0 ! !END!
169 ! X =	962.868,	-251.069,	244,	0 ! !END!
170 ! X =	963.597,	-250.981,	181,	0 ! !END!
171 ! X =	964.325,	-250.892,	190,	0 ! !END!
172 ! X =	943.804,	-252.427,	168,	0 ! !END!
173 ! X =	944.533,	-252.340,	177,	0 ! !END!
174 ! X =	945.262,	-252.254,	140,	0 ! !END!
175 ! X =	945.991,	-252.167,	189,	0 ! !END!
176 ! X =	946.720,	-252.080,	152,	0 ! !END!
177 ! X =	947.449,	-251.993,	152,	0 ! !END!
178 ! X =	948.178,	-251.906,	187,	0 ! !END!
179 ! X =	948.907,	-251.819,	186,	0 ! !END!
180 ! X =	949.636,	-251.732,	177,	0 ! !END!

181 ! X =	950.365,	-251.645,	183,	0 ! !END!
182 ! X =	951.094,	-251.558,	170,	0 ! !END!
183 ! X =	951.823,	-251.471,	152,	0 ! !END!
184 ! X =	952.552,	-251.383,	197,	0 ! !END!
185 ! X =	953.281,	-251.296,	183,	0 ! !END!
186 ! X =	954.010,	-251.209,	213,	0 ! !END!
187 ! X =	954.739,	-251.121,	213,	0 ! !END!
188 ! X =	955.468,	-251.034,	237,	0 ! !END!
189 ! X =	956.197,	-250.946,	201,	0 ! !END!
190 ! X =	956.926,	-250.858,	178,	0 ! !END!
191 ! X =	957.655,	-250.770,	179,	0 ! !END!
192 ! X =	958.383,	-250.683,	215,	0 ! !END!
193 ! X =	959.112,	-250.595,	219,	0 ! !END!
194 ! X =	959.841,	-250.507,	215,	0 ! !END!
195 ! X =	960.570,	-250.419,	187,	0 ! !END!
196 ! X =	961.299,	-250.330,	181,	0 ! !END!
197 ! X =	962.028,	-250.242,	189,	0 ! !END!
198 ! X =	962.757,	-250.154,	208,	0 ! !END!
199 ! X =	963.486,	-250.066,	223,	0 ! !END!
200 ! X =	964.214,	-249.977,	244,	0 ! !END!
201 ! X =	945.153,	-251.338,	148,	0 ! !END!
202 ! X =	945.882,	-251.251,	167,	0 ! !END!
203 ! X =	946.611,	-251.165,	184,	0 ! !END!
204 ! X =	947.340,	-251.078,	242,	0 ! !END!
205 ! X =	948.069,	-250.991,	239,	0 ! !END!
206 ! X =	948.798,	-250.904,	243,	0 ! !END!
207 ! X =	949.527,	-250.817,	244,	0 ! !END!
208 ! X =	950.256,	-250.730,	153,	0 ! !END!
209 ! X =	950.984,	-250.643,	213,	0 ! !END!
210 ! X =	951.713,	-250.555,	231,	0 ! !END!
211 ! X =	952.442,	-250.468,	212,	0 ! !END!
212 ! X =	953.171,	-250.381,	187,	0 ! !END!
213 ! X =	953.900,	-250.293,	216,	0 ! !END!
214 ! X =	954.629,	-250.206,	244,	0 ! !END!
215 ! X =	955.358,	-250.118,	218,	0 ! !END!
216 ! X =	956.087,	-250.031,	219,	0 ! !END!
217 ! X =	956.815,	-249.943,	215,	0 ! !END!
218 ! X =	957.544,	-249.855,	152,	0 ! !END!
219 ! X =	958.273,	-249.767,	153,	0 ! !END!
220 ! X =	959.002,	-249.679,	152,	0 ! !END!
221 ! X =	959.731,	-249.591,	152,	0 ! !END!
222 ! X =	960.460,	-249.503,	164,	0 ! !END!
223 ! X =	961.188,	-249.415,	152,	0 ! !END!
224 ! X =	961.917,	-249.327,	213,	0 ! !END!
225 ! X =	962.646,	-249.239,	155,	0 ! !END!
226 ! X =	963.375,	-249.151,	194,	0 ! !END!
227 ! X =	964.103,	-249.062,	244,	0 ! !END!
228 ! X =	945.044,	-250.423,	188,	0 ! !END!
229 ! X =	945.773,	-250.336,	152,	0 ! !END!
230 ! X =	946.502,	-250.249,	166,	0 ! !END!
231 ! X =	947.231,	-250.162,	183,	0 ! !END!
232 ! X =	947.960,	-250.076,	215,	0 ! !END!
233 ! X =	948.688,	-249.989,	182,	0 ! !END!
234 ! X =	949.417,	-249.902,	244,	0 ! !END!
235 ! X =	950.146,	-249.814,	213,	0 ! !END!
236 ! X =	950.875,	-249.727,	186,	0 ! !END!

237 ! X =	951.604,	-249.640,	194,	0 ! !END!
238 ! X =	952.333,	-249.553,	213,	0 ! !END!
239 ! X =	953.061,	-249.465,	226,	0 ! !END!
240 ! X =	953.790,	-249.378,	183,	0 ! !END!
241 ! X =	954.519,	-249.290,	239,	0 ! !END!
242 ! X =	955.248,	-249.203,	245,	0 ! !END!
243 ! X =	955.976,	-249.115,	218,	0 ! !END!
244 ! X =	956.705,	-249.028,	185,	0 ! !END!
245 ! X =	957.434,	-248.940,	152,	0 ! !END!
246 ! X =	958.163,	-248.852,	187,	0 ! !END!
247 ! X =	958.891,	-248.764,	213,	0 ! !END!
248 ! X =	959.620,	-248.676,	196,	0 ! !END!
249 ! X =	960.349,	-248.588,	182,	0 ! !END!
250 ! X =	961.078,	-248.500,	196,	0 ! !END!
251 ! X =	961.806,	-248.412,	244,	0 ! !END!
252 ! X =	962.535,	-248.324,	193,	0 ! !END!
253 ! X =	963.264,	-248.235,	162,	0 ! !END!
254 ! X =	944.206,	-249.594,	154,	0 ! !END!
255 ! X =	944.935,	-249.507,	152,	0 ! !END!
256 ! X =	945.664,	-249.421,	152,	0 ! !END!
257 ! X =	946.393,	-249.334,	152,	0 ! !END!
258 ! X =	947.122,	-249.247,	243,	0 ! !END!
259 ! X =	947.850,	-249.160,	244,	0 ! !END!
260 ! X =	948.579,	-249.073,	245,	0 ! !END!
261 ! X =	949.308,	-248.986,	184,	0 ! !END!
262 ! X =	950.037,	-248.899,	247,	0 ! !END!
263 ! X =	950.765,	-248.812,	221,	0 ! !END!
264 ! X =	951.494,	-248.725,	198,	0 ! !END!
265 ! X =	952.223,	-248.637,	244,	0 ! !END!
266 ! X =	952.952,	-248.550,	240,	0 ! !END!
267 ! X =	953.680,	-248.463,	221,	0 ! !END!
268 ! X =	955.866,	-248.200,	230,	0 ! !END!
269 ! X =	956.595,	-248.112,	213,	0 ! !END!
270 ! X =	960.238,	-247.673,	229,	0 ! !END!
271 ! X =	960.967,	-247.585,	251,	0 ! !END!
272 ! X =	961.696,	-247.497,	244,	0 ! !END!
273 ! X =	962.424,	-247.408,	217,	0 ! !END!
274 ! X =	963.153,	-247.320,	152,	0 ! !END!
275 ! X =	944.098,	-248.678,	152,	0 ! !END!
276 ! X =	944.826,	-248.592,	165,	0 ! !END!
277 ! X =	945.555,	-248.505,	224,	0 ! !END!
278 ! X =	946.284,	-248.418,	215,	0 ! !END!
279 ! X =	949.927,	-247.984,	244,	0 ! !END!
280 ! X =	950.656,	-247.897,	238,	0 ! !END!
281 ! X =	951.385,	-247.809,	212,	0 ! !END!
282 ! X =	952.842,	-247.635,	242,	0 ! !END!
283 ! X =	960.856,	-246.670,	246,	0 ! !END!
284 ! X =	961.585,	-246.581,	213,	0 ! !END!
285 ! X =	962.313,	-246.493,	242,	0 ! !END!
286 ! X =	963.042,	-246.405,	213,	0 ! !END!
287 ! X =	963.770,	-246.317,	146,	0 ! !END!
288 ! X =	944.718,	-247.676,	152,	0 ! !END!
289 ! X =	945.446,	-247.590,	195,	0 ! !END!
290 ! X =	946.175,	-247.503,	244,	0 ! !END!
291 ! X =	951.275,	-246.894,	244,	0 ! !END!
292 ! X =	952.732,	-246.719,	244,	0 ! !END!

293 ! X =	961.474,	-245.666,	240,	0 ! !END!
294 ! X =	962.202,	-245.578,	244,	0 ! !END!
295 ! X =	962.931,	-245.490,	243,	0 ! !END!
296 ! X =	963.659,	-245.401,	142,	0 ! !END!
297 ! X =	944.609,	-246.761,	180,	0 ! !END!
298 ! X =	945.337,	-246.674,	180,	0 ! !END!
299 ! X =	946.066,	-246.588,	171,	0 ! !END!
300 ! X =	962.092,	-244.663,	217,	0 ! !END!
301 ! X =	962.820,	-244.575,	183,	0 ! !END!
302 ! X =	963.548,	-244.486,	194,	0 ! !END!

----

a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

CALPUFF UMC 2003 BART Evaluation
MINGO UMC REFINED 6km MET FIELD
REFINED ANALYSIS

---------------- Run title (3 lines) --

CALPOST MODEL CONTROL FILE

INPUT GROUP: 0 -- Input and Output File Names

Input Files

```
File                    Default File Name
----                    -----------------
Conc/Dep Flux File       MODEL.DAT  ! MODDAT =../../calpuff/outputs/2003/umcref/umcm2003.con  !
Relative Humidity File    VISB.DAT   ! VISDAT =../../calpuff/outputs/2003/umcref/umcm2003.vis  !
Background Data File      BACK.DAT          * BACKDAT =   *
Transmissometer or        VSRN.DAT          * VSRDAT =   *
Nephelometer Data File     or
DATSAV Weather Data File   or
Prognostic Weather  File
```

Output Files

```
File                    Default File Name
----                    -----------------
List File                CALPOST.LST       ! PSTLST = umcm2003.lst   !

Pathname for Timeseries Files   (blank)      * TSPATH =   *
(activate with exclamation points only if
providing NON-BLANK character string)

Pathname for Plot Files   (blank)           * PLPATH =   *
(activate with exclamation points only if
 providing NON-BLANK character string)

User Character String (U) to augment default filenames
(activate with exclamation points only if
 providing NON-BLANK character string)

Timeseries          TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT
Peak Value          PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT

                                   * TSUNAM =   *

Top Nth Rank Plot   RANK(ALL)_ASPEC_ttHR_CONC_TUNAM.DAT
             or  RANK(ii)_ASPEC_ttHR_CONC_TUNAM.GRD

                                   * TUNAM =   *
```

Exceedance Plot   EXCEED_ASPEC_ttHR_CONC_XUNAM.DAT
or EXCEED_ASPEC_ttHR_CONC_XUNAM.GRD

* XUNAM =   *

Echo Plot
(Specific Days)
yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.DAT
or   yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.GRD

Visibility Plot   DAILY_VISIB_VUNAM.DAT   * VUNAM =VTEST   *
(Daily Peak Summary)

Auxiliary Output Files

File   Default File Name
----   -----------------
Visibility Change   DELVIS.DAT   * DVISDAT = deciview.dat *

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
T = lower case   ! LCFILES = T !
F = UPPER CASE
NOTE: (1) file/path names can be up to 132 characters in length
NOTE: (2) Filenames for ALL PLOT and TIMESERIES FILES are constructed
using a template that includes a pathname, user-supplied
character(s), and context-specific strings, where
ASPEC = Species Name
CONC = CONC Or WFLX Or DFLX Or TFLX
tt = Averaging Period (e.g. 03)
ii = Rank (e.g. 02)
hh = Hour(ending) in LST
szzzz = LST time zone shift (EST is -0500)
yyyy = Year(LST)
mm = Month(LST)
dd = day of month (LST)
are determined internally based on selections made below.
If a path or user-supplied character(s) are supplied, each
must contain at least 1 non-blank character.

!END!

INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file(s) (METRUN)   Default: 0   ! METRUN =   1 !

METRUN = 0 - Run period explicitly defined below

```
       METRUN = 1 - Run all periods in CALPUFF data file(s)

     Starting date:    Year  (ISYR) --    No default   ! ISYR  =  2003   !
     (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
      METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                   Hour  (ISHR) --    No default   ! ISHR  =  0   !

     Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

     Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
      (1 = every hour processed,
       2 = every 2nd hour processed,
       5 = every 5th hour processed, etc.)

Species & Concentration/Deposition Information
----------------------------------------------

      Species to process (ASPEC)       -- No default   ! ASPEC = VISIB  !
      (ASPEC = VISIB for visibility processing)

      Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
        '1'  for CALPUFF concentrations,
        '-1' for dry deposition fluxes,
        '-2' for wet deposition fluxes,
        '-3' for wet+dry deposition fluxes.

      Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
           X(new) = X(old) * A + B         A = 0.0    ! B =  0.0    !
        (NOT applied if A = B = 0.0)        B = 0.0

      Add Hourly Background Concentrations/Fluxes?
                          (LBACK)  -- Default: F   ! LBACK =  F !

Source information
------------------

  Option to process source contributions:
       0 =  Process only total reported contributions
       1 =  Sum all individual source contributions and process
       2 =  Run in TRACEBACK mode to identify source
            contributions at a SINGLE receptor
                         (MSOURCE) -- Default: 0   ! MSOURCE =  0  !

Receptor information
--------------------

  Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                             (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):
```

Select ALL DISCRETE receptors by setting NDRECP flag to -1;
OR
Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
0 = discrete receptor not processed
1 = discrete receptor processed
using repeated value notation to select blocks of receptors:
23*1, 15*0, 12*1
Flag for all receptors after the last one assigned is set to 0
(NDRECP) -- Default: -1
! NDRECP = -1 !

--Select range of GRIDDED receptors (only used when LG = T):

X index of LL corner (IBGRID) -- Default: -1 ! IBGRID = -1 !
(-1 OR 1 <= IBGRID <= NX)

Y index of LL corner (JBGRID) -- Default: -1 ! JBGRID = -1 !
(-1 OR 1 <= JBGRID <= NY)

X index of UR corner (IEGRID) -- Default: -1 ! IEGRID = -1 !
(-1 OR 1 <= IEGRID <= NX)

Y index of UR corner (JEGRID) -- Default: -1 ! JEGRID = -1 !
(-1 OR 1 <= JEGRID <= NY)

Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

--Specific gridded receptors can also be excluded from CALPOST
processing by filling a processing grid array with 0s and 1s. If the
processing flag for receptor index (i,j) is 1 (ON), that receptor
will be processed if it lies within the range delineated by IBGRID,
JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be
processed in the run. By default, all array values are set to 1 (ON).

Number of gridded receptor rows provided in Subgroup (1a) to
identify specific gridded receptors to process
(NGONOFF) -- Default: 0 ! NGONOFF = 0 !

!END!

Subgroup (1a) -- Specific gridded receptors included/excluded

----

Specific gridded receptors are excluded from CALPOST processing
by filling a processing grid array with 0s and 1s. A total of
NGONOFF lines are read here. Each line corresponds to one 'row'
in the sampling grid, starting with the NORTHERNMOST row that
contains receptors that you wish to exclude, and finishing with
row 1 to the SOUTH (no intervening rows may be skipped). Within
a row, each receptor position is assigned either a 0 or 1,
starting with the westernmost receptor.
0 = gridded receptor not processed

```
      1 = gridded receptor processed

    Repeated value notation may be used to select blocks of receptors:
      23*1, 15*0, 12*1

    Because all values are initially set to 1, any receptors north of
    the first row entered, or east of the last value provided in a row,
    remain ON.

    (NGXRECP) -- Default: 1


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Identify the Base Time Zone for the CALPUFF simulation
                       (BTZONE) -- No default   * BTZONE =  0.*

    Particle growth curve f(RH) for hygroscopic species
                        (MFRH) -- Default: 2   ! MFRH   =  2  !

         1 =  IWAQM (1998) f(RH) curve (originally used with MVISBK=1)
         2 =  FLAG (2000) f(RH) tabulation
         3 =  EPA (2003) f(RH) tabulation

    Maximum relative humidity (%) used in particle growth curve
                       (RHMAX) -- Default: 98  ! RHMAX  = 95.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = F  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
     Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
               COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
               FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PM10 !

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
    MODELED particulate species:
           PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
           PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
           PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
          AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
          AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
          ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
```

SOIL (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
ELEMENTAL CARBON (EEEC) -- Default: 10. ! EEEC = 10.0 !

Background Extinction Computation

Method used for the 24h-average of percent change of light extinction:
Hourly ratio of source light extinction / background light extinction
is averaged? (LAVER) -- Default: F ! LAVER = F !

Method used for background light extinction
(MVISBK) -- Default: 2 ! MVISBK = 2 !

1 = Supply single light extinction and hygroscopic fraction
- Hourly F(RH) adjustment applied to hygroscopic background and modeled sulfate and nitrate

2 = Compute extinction from speciated PM measurements (A)
- Hourly F(RH) adjustment applied to observed and modeled sulfate and nitrate
- F(RH) factor is capped at F(RHMAX)

3 = Compute extinction from speciated PM measurements (B)
- Hourly F(RH) adjustment applied to observed and modeled sulfate and nitrate
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours

4 = Read hourly transmissometer background extinction measurements
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference, or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours

5 = Read hourly nephelometer background extinction measurements
- Rayleigh extinction value (BEXTRAY) added to measurement
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference, or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours

6 = Compute extinction from speciated PM measurements
- FLAG monthly RH adjustment factor applied to observed and modeled sulfate and nitrate

7 = Use observed weather or prognostic weather information for background extinction during weather events; otherwise, use Method 2
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- F(RH) factor is capped at F(RHMAX)
- During observed weather events, compute Bext from visual range if using an observed weather data file, or
- During prognostic weather events, use Bext from the prognostic weather file
- Use Method 2 for hours without a weather event

Additional inputs used for MVISBK = 1:

Background light extinction (1/Mm)
(BEXTBK) -- No default ! BEXTBK = 12.0 !

Percentage of particles affected by relative humidity
(RHFRAC) -- No default ! RHFRAC = 10.0 !

Additional inputs used for MVISBK = 6:

Extinction coefficients for hygroscopic species (modeled and background) are computed using a monthly RH adjustment factor in place of an hourly RH factor (VISB.DAT file is NOT needed). Enter the 12 monthly factors here (RHFAC). Month 1 is January.

(RHFAC) -- No default ! RHFAC = 3.3, 3.0, 2.8, 2.6,
3.0, 3.2, 3.3, 3.5,
3.5, 3.1, 3.1, 3.3 !

Additional inputs used for MVISBK = 7:

The weather data file (DATSAV abbreviated space-delimited) that is identified as VSRN.DAT may contain data for more than one station. Identify the stations that are needed in the order in which they will be used to obtain valid weather and visual range. The first station that contains valid data for an hour will be used. Enter up to MXWSTA (set in PARAMS file) integer station IDs of up to 6 digits each as variable IDWSTA, and enter the corresponding time zone for each, as variable TZONE (= UTC-LST).

A prognostic weather data file with Bext for weather events may be used in place of the observed weather file. Identify this as the VSRN.DAT file and use a station ID of IDWSTA = 999999, and TZONE = 0.

NOTE: TZONE identifies the time zone used in the dataset. The DATSAV abbreviated space-delimited data usually are prepared with UTC time rather than local time, so TZONE is typically set to zero.

(IDWSTA) -- No default
! IDWSTA = 690230 ,80020 ,80140 !
(TZONE) -- No default
! TZONE = 0.0 ,0.0 ,0.0 !

Additional inputs used for MVISBK = 2,3,6,7:

Background extinction coefficients are computed from monthly CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3), coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and elemental carbon (BKEC). Month 1 is January.
(ug/m**3)

(BKSO4) -- No default ! BKSO4 = 0.23, 0.23, 0.23, 0.23,
0.23, 0.23, 0.23, 0.23,
0.23, 0.23, 0.23, 0.23 !
(BKNO3) -- No default ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
0.1, 0.1, 0.1, 0.1,
0.1, 0.1, 0.1, 0.1 !
(BKPMC) -- No default ! BKPMC = 3.0, 3.0, 3.0, 3.0,
3.0, 3.0, 3.0, 3.0,
3.0, 3.0, 3.0, 3.0 !

```
 (BKOC)   -- No default     ! BKOC  = 1.4, 1.4, 1.4, 1.4,
                               1.4, 1.4, 1.4, 1.4,
                               1.4, 1.4, 1.4, 1.4 !
 (BKSOIL) -- No default     ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                               0.5, 0.5, 0.5, 0.5,
                               0.5, 0.5, 0.5, 0.5 !
 (BKEC)   -- No default     ! BKEC  = 0.02, 0.02, 0.02, 0.02,
                               0.02, 0.02, 0.02, 0.02,
                               0.02, 0.02, 0.02, 0.02 !

Additional inputs used for MVISBK = 2,3,5,6,7:
-----------------------------------------------
 Extinction due to Rayleigh scattering is added (1/Mm)
                  (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

   Documentation records contained in the header of the
   CALPUFF output file may be written to the list file.
   Print documentation image?
                        (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
   Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                 for           for
              Concentration    Deposition
      1 =        g/m**3        g/m**2/s
      2 =       mg/m**3        mg/m**2/s
      3 =       ug/m**3        ug/m**2/s
      4 =       ng/m**3        ng/m**2/s
      5 =     Odour Units

   Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

   1-hr averages          (L1HR) -- Default: T   !   L1HR = F  !

   3-hr averages          (L3HR) -- Default: T   !   L3HR = F  !

   24-hr averages         (L24HR) -- Default: T   !  L24HR = F  !

   Run-length averages    (LRUNL) -- Default: T   !  LRUNL = F  !

   User-specified averaging time in hours - results for
   an averaging time of NAVG hours are reported for
```

NAVG greater than 0:
(NAVG) -- Default: 0 ! NAVG = 0 !

Types of tabulations reported
----

1) Visibility: daily visibility tabulations are always reported
for the selected receptors when ASPEC = VISIB.
In addition, any of the other tabulations listed
below may be chosen to characterize the light
extinction coefficients.
[List file or Plot/Analysis File]

2) Top 50 table for each averaging time selected
[List file only]
(LT50) -- Default: T ! LT50 = F !

3) Top 'N' table for each averaging time selected
[List file or Plot file]
(LTOPN) -- Default: F ! LTOPN = F !

-- Number of 'Top-N' values at each receptor
selected (NTOP must be <= 4)
(NTOP) -- Default: 4 ! NTOP = 1 !

-- Specific ranks of 'Top-N' values reported
(NTOP values must be entered)
(ITOP(4) array) -- Default: ! ITOP = 1 !
1,2,3,4

4) Threshold exceedance counts for each receptor and each averaging
time selected
[List file or Plot file]
(LEXCD) -- Default: F ! LEXCD = F !

-- Identify the threshold for each averaging time by assigning a
non-negative value (output units).

-- Default: 0.5
Threshold for 1-hr averages (THRESH1) ! THRESH1 = 1.000E01 !
Threshold for 3-hr averages (THRESH3) ! THRESH3 = -1.0 !
Threshold for 24-hr averages (THRESH24) ! THRESH24 = -1.0 !
Threshold for NAVG-hr averages (THRESHN) ! THRESHN = -1.0 !

-- Counts for the shortest averaging period selected can be
tallied daily, and receptors that experience more than NCOUNT
counts over any NDAY period will be reported. This type of
exceedance violation output is triggered only if NDAY > 0.

Accumulation period(Days)
(NDAY) -- Default: 0 ! NDAY = 0 !
Number of exceedances allowed

(NCOUNT) -- Default: 1 ! NCOUNT = 1 !

5) Selected day table(s)

Echo Option -- Many records are written each averaging period
selected and output is grouped by day
[List file or Plot file]
(LECHO) -- Default: F ! LECHO = F !

Timeseries Option -- Averages at all selected receptors for
each selected averaging period are written to timeseries files.
Each file contains one averaging period, and all receptors are
written to a single record each averaging time.
[TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LTIME) -- Default: F ! LTIME = F !

Peak Value Option -- Averages at all selected receptors for
each selected averaging period are screened and the peak value
each period is written to timeseries files.
Each file contains one averaging period.
[PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LPEAK) -- Default: F ! LPEAK = F !

-- Days selected for output
(IECHO(366)) -- Default: 366*0
! IECHO = 366*0 !
(366 values must be entered)

Plot output options

Plot files can be created for the Top-N, Exceedance, and Echo
tables selected above. Two formats for these files are available,
DATA and GRID. In the DATA format, results at all receptors are
listed along with the receptor location [x,y,val1,val2,...].
In the GRID format, results at only gridded receptors are written,
using a compact representation. The gridded values are written in
rows (x varies), starting with the most southern row of the grid.
The GRID format is given the .GRD extension, and includes headers
compatible with the SURFER(R) plotting software.

A plotting and analysis file can also be created for the daily
peak visibility summary output, in DATA format only.

Generate Plot file output in addition to writing tables
to List file?
(LPLT) -- Default: F ! LPLT = F !

Use GRID format rather than DATA format,
when available?
(LGRD) -- Default: F ! LGRD = F !

Auxiliary Output Files (for subsequent analyses)

Visibility

A separate output file may be requested that contains the change
in visibility at each selected receptor when ASPEC = VISIB. This
file can be processed to construct visibility measures that are
not available in CALPOST.

Output file with the visibility change at each receptor?
(MDVIS) -- Default: 0 ! MDVIS = 0 !

0 = Do Not create file
1 = Create file of DAILY (24 hour) Delta-Deciview
2 = Create file of DAILY (24 hour) Extinction Change (%)
3 = Create file of HOURLY Delta-Deciview
4 = Create file of HOURLY Extinction Change (%)

Additional Debug Output

Output selected information to List file
for debugging?
(LDEBUG) -- Default: F ! LDEBUG = T !

Output hourly extinction information to REPORT.HRV?
(Visibility Method 7)
(LVEXTHR) -- Default: F ! LVEXTHR = F !

!END!

CALPUFF UMC 2003 BART Evaluation
MINGO REFINED 6km MET FIELD
REFINED ANALYSIS

---------------- Run title (3 lines) --

CALPOST MODEL CONTROL FILE

INPUT GROUP: 0 -- Input and Output File Names

Input Files

```
File                    Default File Name
----                    -----------------
Conc/Dep Flux File       MODEL.DAT    ! MODDAT =../../calpuff/outputs/2003/umcref/umcm2003.con  !
Relative Humidity File   VISB.DAT     ! VISDAT =../../calpuff/outputs/2003/umcref/umcm2003.vis  !
Background Data File     BACK.DAT          * BACKDAT =   *
Transmissometer or       VSRN.DAT          * VSRDAT =   *
Nephelometer Data File     or
DATSAV Weather Data File   or
Prognostic Weather  File
```

Output Files

```
File                    Default File Name
----                    -----------------
List File                CALPOST.LST       ! PSTLST = umcm2003m6.lst   !

Pathname for Timeseries Files   (blank)      * TSPATH =   *
(activate with exclamation points only if
providing NON-BLANK character string)

Pathname for Plot Files   (blank)           * PLPATH =   *
(activate with exclamation points only if
 providing NON-BLANK character string)

User Character String (U) to augment default filenames
(activate with exclamation points only if
 providing NON-BLANK character string)

Timeseries         TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT
Peak Value         PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT

                                  * TSUNAM =   *

Top Nth Rank Plot   RANK(ALL)_ASPEC_ttHR_CONC_TUNAM.DAT
             or  RANK(ii)_ASPEC_ttHR_CONC_TUNAM.GRD

                                  * TUNAM =   *
```

Exceedance Plot   EXCEED_ASPEC_ttHR_CONC_XUNAM.DAT
or EXCEED_ASPEC_ttHR_CONC_XUNAM.GRD

* XUNAM =   *

Echo Plot
(Specific Days)
yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.DAT
or   yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.GRD

Visibility Plot   DAILY_VISIB_VUNAM.DAT   * VUNAM =VTEST   *
(Daily Peak Summary)

Auxiliary Output Files

File   Default File Name
----   -----------------
Visibility Change   DELVIS.DAT   * DVISDAT = deciview.dat *

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
T = lower case   ! LCFILES = T !
F = UPPER CASE
NOTE: (1) file/path names can be up to 132 characters in length
NOTE: (2) Filenames for ALL PLOT and TIMESERIES FILES are constructed
using a template that includes a pathname, user-supplied
character(s), and context-specific strings, where
ASPEC = Species Name
CONC = CONC Or WFLX Or DFLX Or TFLX
tt = Averaging Period (e.g. 03)
ii = Rank (e.g. 02)
hh = Hour(ending) in LST
szzzz = LST time zone shift (EST is -0500)
yyyy = Year(LST)
mm = Month(LST)
dd = day of month (LST)
are determined internally based on selections made below.
If a path or user-supplied character(s) are supplied, each
must contain at least 1 non-blank character.

!END!

INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file(s) (METRUN)   Default: 0   ! METRUN =   1 !

METRUN = 0 - Run period explicitly defined below

```
      METRUN = 1 - Run all periods in CALPUFF data file(s)

    Starting date:    Year  (ISYR) --    No default   ! ISYR  =  2003   !
    (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
     METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                      Hour  (ISHR) --    No default   ! ISHR  =  0   !

    Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

    Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
     (1 = every hour processed,
      2 = every 2nd hour processed,
      5 = every 5th hour processed, etc.)

Species & Concentration/Deposition Information
-------------------------------------------------

     Species to process (ASPEC)       -- No default   ! ASPEC = VISIB  !
     (ASPEC = VISIB for visibility processing)

     Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
       '1'  for CALPUFF concentrations,
       '-1' for dry deposition fluxes,
       '-2' for wet deposition fluxes,
       '-3' for wet+dry deposition fluxes.

     Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
           X(new) = X(old) * A + B         A = 0.0    ! B =  0.0    !
       (NOT applied if A = B = 0.0)        B = 0.0

     Add Hourly Background Concentrations/Fluxes?
                         (LBACK)  -- Default: F   ! LBACK =  F !

Source information
-------------------

  Option to process source contributions:
       0 =  Process only total reported contributions
       1 =  Sum all individual source contributions and process
       2 =  Run in TRACEBACK mode to identify source
            contributions at a SINGLE receptor
                        (MSOURCE) -- Default: 0   ! MSOURCE =  0  !

Receptor information
--------------------

  Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                           (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):
```

Select ALL DISCRETE receptors by setting NDRECP flag to -1;
OR
Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
0 = discrete receptor not processed
1 = discrete receptor processed
using repeated value notation to select blocks of receptors:
23*1, 15*0, 12*1
Flag for all receptors after the last one assigned is set to 0
(NDRECP) -- Default: -1
! NDRECP = -1 !

--Select range of GRIDDED receptors (only used when LG = T):

X index of LL corner (IBGRID) -- Default: -1 ! IBGRID = -1 !
(-1 OR 1 <= IBGRID <= NX)

Y index of LL corner (JBGRID) -- Default: -1 ! JBGRID = -1 !
(-1 OR 1 <= JBGRID <= NY)

X index of UR corner (IEGRID) -- Default: -1 ! IEGRID = -1 !
(-1 OR 1 <= IEGRID <= NX)

Y index of UR corner (JEGRID) -- Default: -1 ! JEGRID = -1 !
(-1 OR 1 <= JEGRID <= NY)

Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

--Specific gridded receptors can also be excluded from CALPOST processing by filling a processing grid array with 0s and 1s. If the processing flag for receptor index (i,j) is 1 (ON), that receptor will be processed if it lies within the range delineated by IBGRID, JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be processed in the run. By default, all array values are set to 1 (ON).

Number of gridded receptor rows provided in Subgroup (1a) to identify specific gridded receptors to process
(NGONOFF) -- Default: 0 ! NGONOFF = 0 !

!END!

Subgroup (1a) -- Specific gridded receptors included/excluded
----

Specific gridded receptors are excluded from CALPOST processing by filling a processing grid array with 0s and 1s. A total of NGONOFF lines are read here. Each line corresponds to one 'row' in the sampling grid, starting with the NORTHERNMOST row that contains receptors that you wish to exclude, and finishing with row 1 to the SOUTH (no intervening rows may be skipped). Within a row, each receptor position is assigned either a 0 or 1, starting with the westernmost receptor.
0 = gridded receptor not processed

1 = gridded receptor processed

Repeated value notation may be used to select blocks of receptors:
23*1, 15*0, 12*1

Because all values are initially set to 1, any receptors north of the first row entered, or east of the last value provided in a row, remain ON.

(NGXRECP) -- Default: 1

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)

```
   Identify the Base Time Zone for the CALPUFF simulation
                          (BTZONE) -- No default   * BTZONE =  0.*

   Particle growth curve f(RH) for hygroscopic species
                           (MFRH) -- Default: 2   ! MFRH   =  2  !

        1 =  IWAQM (1998) f(RH) curve (originally used with MVISBK=1)
        2 =  FLAG (2000) f(RH) tabulation
        3 =  EPA (2003) f(RH) tabulation

   Maximum relative humidity (%) used in particle growth curve
                          (RHMAX) -- Default: 98  ! RHMAX  = 95.0 !

   Modeled species to be included in computing the light extinction
    Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
    Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
    Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
    Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = F  !
    Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
    Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

   And, when ranking for TOP-N, TOP-50, and Exceedance tables,
    Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

   Species name used for particulates in MODEL.DAT file
              COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
              FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PM10 !

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
   MODELED particulate species:
           PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
           PM  FINE       (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
   BACKGROUND particulate species:
           PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
   Other species:
          AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
          AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
          ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
```

SOIL (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
ELEMENTAL CARBON (EEEC) -- Default: 10. ! EEEC = 10.0 !

Background Extinction Computation

Method used for the 24h-average of percent change of light extinction:
Hourly ratio of source light extinction / background light extinction
is averaged? (LAVER) -- Default: F ! LAVER = F !

Method used for background light extinction
(MVISBK) -- Default: 2 ! MVISBK = 6 !

1 = Supply single light extinction and hygroscopic fraction
- Hourly F(RH) adjustment applied to hygroscopic background
and modeled sulfate and nitrate
2 = Compute extinction from speciated PM measurements (A)
- Hourly F(RH) adjustment applied to observed and modeled sulfate
and nitrate
- F(RH) factor is capped at F(RHMAX)
3 = Compute extinction from speciated PM measurements (B)
- Hourly F(RH) adjustment applied to observed and modeled sulfate
and nitrate
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
4 = Read hourly transmissometer background extinction measurements
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference,
or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
5 = Read hourly nephelometer background extinction measurements
- Rayleigh extinction value (BEXTRAY) added to measurement
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference,
or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
6 = Compute extinction from speciated PM measurements
- FLAG monthly RH adjustment factor applied to observed and
modeled sulfate and nitrate
7 = Use observed weather or prognostic weather information for
background extinction during weather events; otherwise, use Method 2
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- F(RH) factor is capped at F(RHMAX)
- During observed weather events, compute Bext from visual range
if using an observed weather data file, or
- During prognostic weather events, use Bext from the prognostic
weather file
- Use Method 2 for hours without a weather event

Additional inputs used for MVISBK = 1:

Background light extinction (1/Mm)
(BEXTBK) -- No default ! BEXTBK = 12.0 !

Percentage of particles affected by relative humidity
(RHFRAC) -- No default ! RHFRAC = 10.0 !

Additional inputs used for MVISBK = 6:

Extinction coefficients for hygroscopic species (modeled and background) are computed using a monthly RH adjustment factor in place of an hourly RH factor (VISB.DAT file is NOT needed). Enter the 12 monthly factors here (RHFAC). Month 1 is January.

```
(RHFAC)  -- No default     ! RHFAC = 3.3, 3.0, 2.8, 2.6,
                             3.0, 3.2, 3.3, 3.5,
                             3.5, 3.1, 3.1, 3.3 !
```

Additional inputs used for MVISBK = 7:

The weather data file (DATSAV abbreviated space-delimited) that is identified as VSRN.DAT may contain data for more than one station. Identify the stations that are needed in the order in which they will be used to obtain valid weather and visual range. The first station that contains valid data for an hour will be used. Enter up to MXWSTA (set in PARAMS file) integer station IDs of up to 6 digits each as variable IDWSTA, and enter the corresponding time zone for each, as variable TZONE (= UTC-LST).

A prognostic weather data file with Bext for weather events may be used in place of the observed weather file. Identify this as the VSRN.DAT file and use a station ID of IDWSTA = 999999, and TZONE = 0.

NOTE: TZONE identifies the time zone used in the dataset. The DATSAV abbreviated space-delimited data usually are prepared with UTC time rather than local time, so TZONE is typically set to zero.

```
 (IDWSTA)   -- No default
! IDWSTA = 690230 ,80020 ,80140 !
 (TZONE)    -- No default
! TZONE  = 0.0 ,0.0 ,0.0 !
```

Additional inputs used for MVISBK = 2,3,6,7:

Background extinction coefficients are computed from monthly CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3), coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and elemental carbon (BKEC). Month 1 is January.
(ug/m**3)

```
(BKSO4)  -- No default     ! BKSO4 = 0.23, 0.23, 0.23, 0.23,
                             0.23, 0.23, 0.23, 0.23,
                             0.23, 0.23, 0.23, 0.23 !
(BKNO3)  -- No default     ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
                             0.1, 0.1, 0.1, 0.1,
                             0.1, 0.1, 0.1, 0.1 !
(BKPMC)  -- No default     ! BKPMC = 3.0, 3.0, 3.0, 3.0,
                             3.0, 3.0, 3.0, 3.0,
                             3.0, 3.0, 3.0, 3.0 !
```

```
 (BKOC)   -- No default     ! BKOC  = 1.4, 1.4, 1.4, 1.4,
                              1.4, 1.4, 1.4, 1.4,
                              1.4, 1.4, 1.4, 1.4 !
 (BKSOIL) -- No default     ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                              0.5, 0.5, 0.5, 0.5,
                              0.5, 0.5, 0.5, 0.5 !
 (BKEC)   -- No default     ! BKEC  = 0.02, 0.02, 0.02, 0.02,
                              0.02, 0.02, 0.02, 0.02,
                              0.02, 0.02, 0.02, 0.02 !

Additional inputs used for MVISBK = 2,3,5,6,7:
----------------------------------------------
 Extinction due to Rayleigh scattering is added (1/Mm)
                  (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

   Documentation records contained in the header of the
   CALPUFF output file may be written to the list file.
   Print documentation image?
                        (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
   Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                for            for
           Concentration    Deposition
     1 =        g/m**3        g/m**2/s
     2 =       mg/m**3        mg/m**2/s
     3 =       ug/m**3        ug/m**2/s
     4 =       ng/m**3        ng/m**2/s
     5 =     Odour Units

   Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

   1-hr averages          (L1HR) -- Default: T   !   L1HR = F  !

   3-hr averages          (L3HR) -- Default: T   !   L3HR = F  !

   24-hr averages         (L24HR) -- Default: T   !  L24HR = F  !

   Run-length averages    (LRUNL) -- Default: T   !  LRUNL = F  !

   User-specified averaging time in hours - results for
   an averaging time of NAVG hours are reported for
```

NAVG greater than 0:
(NAVG) -- Default: 0 ! NAVG = 0 !

Types of tabulations reported
----

1) Visibility: daily visibility tabulations are always reported
for the selected receptors when ASPEC = VISIB.
In addition, any of the other tabulations listed
below may be chosen to characterize the light
extinction coefficients.
[List file or Plot/Analysis File]

2) Top 50 table for each averaging time selected
[List file only]
(LT50) -- Default: T ! LT50 = F !

3) Top 'N' table for each averaging time selected
[List file or Plot file]
(LTOPN) -- Default: F ! LTOPN = T !

-- Number of 'Top-N' values at each receptor
selected (NTOP must be <= 4)
(NTOP) -- Default: 4 ! NTOP = 1 !

-- Specific ranks of 'Top-N' values reported
(NTOP values must be entered)
(ITOP(4) array) -- Default: ! ITOP = 1 !
1,2,3,4

4) Threshold exceedance counts for each receptor and each averaging
time selected
[List file or Plot file]
(LEXCD) -- Default: F ! LEXCD = T !

-- Identify the threshold for each averaging time by assigning a
non-negative value (output units).

-- Default: 0.5
Threshold for 1-hr averages (THRESH1) ! THRESH1 = 1.000E01 !
Threshold for 3-hr averages (THRESH3) ! THRESH3 = -1.0 !
Threshold for 24-hr averages (THRESH24) ! THRESH24 = -1.0 !
Threshold for NAVG-hr averages (THRESHN) ! THRESHN = -1.0 !

-- Counts for the shortest averaging period selected can be
tallied daily, and receptors that experience more than NCOUNT
counts over any NDAY period will be reported. This type of
exceedance violation output is triggered only if NDAY > 0.

Accumulation period(Days)
(NDAY) -- Default: 0 ! NDAY = 0 !
Number of exceedances allowed

(NCOUNT) -- Default: 1   ! NCOUNT = 1 !

5) Selected day table(s)

Echo Option -- Many records are written each averaging period
selected and output is grouped by day
[List file or Plot file]
(LECHO) -- Default: F   ! LECHO = F !

Timeseries Option -- Averages at all selected receptors for
each selected averaging period are written to timeseries files.
Each file contains one averaging period, and all receptors are
written to a single record each averaging time.
[TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LTIME) -- Default: F   ! LTIME = F !

Peak Value Option -- Averages at all selected receptors for
each selected averaging period are screened and the peak value
each period is written to timeseries files.
Each file contains one averaging period.
[PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LPEAK) -- Default: F   ! LPEAK = F !

-- Days selected for output
(IECHO(366)) -- Default: 366*0
! IECHO = 366*0 !
(366 values must be entered)

Plot output options

Plot files can be created for the Top-N, Exceedance, and Echo
tables selected above. Two formats for these files are available,
DATA and GRID. In the DATA format, results at all receptors are
listed along with the receptor location [x,y,val1,val2,...].
In the GRID format, results at only gridded receptors are written,
using a compact representation. The gridded values are written in
rows (x varies), starting with the most southern row of the grid.
The GRID format is given the .GRD extension, and includes headers
compatible with the SURFER(R) plotting software.

A plotting and analysis file can also be created for the daily
peak visibility summary output, in DATA format only.

Generate Plot file output in addition to writing tables
to List file?
(LPLT) -- Default: F   ! LPLT = F !

Use GRID format rather than DATA format,
when available?
(LGRD) -- Default: F   ! LGRD = F !

Auxiliary Output Files (for subsequent analyses)

Visibility

A separate output file may be requested that contains the change in visibility at each selected receptor when ASPEC = VISIB. This file can be processed to construct visibility measures that are not available in CALPOST.

Output file with the visibility change at each receptor?
(MDVIS) -- Default: 0 ! MDVIS = 0 !

0 = Do Not create file
1 = Create file of DAILY (24 hour) Delta-Deciview
2 = Create file of DAILY (24 hour) Extinction Change (%)
3 = Create file of HOURLY Delta-Deciview
4 = Create file of HOURLY Extinction Change (%)

Additional Debug Output

Output selected information to List file
for debugging?
(LDEBUG) -- Default: F ! LDEBUG = F !

Output hourly extinction information to REPORT.HRV?
(Visibility Method 7)
(LVEXTHR) -- Default: F ! LVEXTHR = F !

!END!

CALPUFF UMC 2003 BART Evaluation
HERC REFINED 6km MET FIELD
REFINED ANALYSIS

---------------- Run title (3 lines) --

CALPOST MODEL CONTROL FILE

INPUT GROUP: 0 -- Input and Output File Names

Input Files

File Default File Name
---- -----------------
Conc/Dep Flux File MODEL.DAT ! MODDAT =../../calpuff/outputs/2003/umcref/umch2003.con !
Relative Humidity File VISB.DAT ! VISDAT =../../calpuff/outputs/2003/umcref/umch2003.vis !
Background Data File BACK.DAT * BACKDAT = *
Transmissometer or VSRN.DAT * VSRDAT = *
Nephelometer Data File or
DATSAV Weather Data File or
Prognostic Weather File

Output Files

File Default File Name
---- -----------------
List File CALPOST.LST ! PSTLST = umch2003.lst !

Pathname for Timeseries Files (blank) * TSPATH = *
(activate with exclamation points only if
providing NON-BLANK character string)

Pathname for Plot Files (blank) * PLPATH = *
(activate with exclamation points only if
providing NON-BLANK character string)

User Character String (U) to augment default filenames
(activate with exclamation points only if
providing NON-BLANK character string)

Timeseries TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT
Peak Value PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT

* TSUNAM = *

Top Nth Rank Plot RANK(ALL)_ASPEC_ttHR_CONC_TUNAM.DAT
or RANK(ii)_ASPEC_ttHR_CONC_TUNAM.GRD

* TUNAM = *

Exceedance Plot   EXCEED_ASPEC_ttHR_CONC_XUNAM.DAT
or EXCEED_ASPEC_ttHR_CONC_XUNAM.GRD

* XUNAM =   *

Echo Plot
(Specific Days)
yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.DAT
or   yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.GRD

Visibility Plot   DAILY_VISIB_VUNAM.DAT   * VUNAM =VTEST   *
(Daily Peak Summary)

Auxiliary Output Files

File   Default File Name
----   -----------------
Visibility Change   DELVIS.DAT   * DVISDAT = deciview.dat *

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
T = lower case   ! LCFILES = T !
F = UPPER CASE
NOTE: (1) file/path names can be up to 132 characters in length
NOTE: (2) Filenames for ALL PLOT and TIMESERIES FILES are constructed
using a template that includes a pathname, user-supplied
character(s), and context-specific strings, where
ASPEC = Species Name
CONC = CONC Or WFLX Or DFLX Or TFLX
tt = Averaging Period (e.g. 03)
ii = Rank (e.g. 02)
hh = Hour(ending) in LST
szzzz = LST time zone shift (EST is -0500)
yyyy = Year(LST)
mm = Month(LST)
dd = day of month (LST)
are determined internally based on selections made below.
If a path or user-supplied character(s) are supplied, each
must contain at least 1 non-blank character.

!END!

INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file(s) (METRUN)   Default: 0   ! METRUN =   1 !

METRUN = 0 - Run period explicitly defined below

```
       METRUN = 1 - Run all periods in CALPUFF data file(s)

     Starting date:    Year  (ISYR) --    No default   ! ISYR  =  2003   !
     (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
      METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                     Hour  (ISHR) --    No default   ! ISHR  =  0   !

     Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

     Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
      (1 = every hour processed,
       2 = every 2nd hour processed,
       5 = every 5th hour processed, etc.)

Species & Concentration/Deposition Information
----------------------------------------------

      Species to process (ASPEC)       -- No default   ! ASPEC = VISIB  !
      (ASPEC = VISIB for visibility processing)

      Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
        '1'  for CALPUFF concentrations,
        '-1' for dry deposition fluxes,
        '-2' for wet deposition fluxes,
        '-3' for wet+dry deposition fluxes.

      Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
           X(new) = X(old) * A + B         A = 0.0    ! B =  0.0    !
        (NOT applied if A = B = 0.0)        B = 0.0

      Add Hourly Background Concentrations/Fluxes?
                           (LBACK)  -- Default: F   ! LBACK =  F !

Source information
------------------

  Option to process source contributions:
       0 =  Process only total reported contributions
       1 =  Sum all individual source contributions and process
       2 =  Run in TRACEBACK mode to identify source
            contributions at a SINGLE receptor
                      (MSOURCE) -- Default: 0   ! MSOURCE =  0  !

Receptor information
--------------------

  Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                          (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):
```

```
  Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                              OR
  Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
     0 = discrete receptor not processed
     1 = discrete receptor processed
  using repeated value notation to select blocks of receptors:
     23*1, 15*0, 12*1
  Flag for all receptors after the last one assigned is set to 0
  (NDRECP) -- Default: -1
                                         ! NDRECP =  -1  !


--Select range of GRIDDED receptors (only used when LG = T):

       X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
           (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
           (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
           (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
           (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1


--Specific gridded receptors can also be excluded from CALPOST
  processing by filling a processing grid array with 0s and 1s.  If the
  processing flag for receptor index (i,j) is 1 (ON), that receptor
  will be processed if it lies within the range delineated by IBGRID,
  JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be
  processed in the run.  By default, all array values are set to 1 (ON).

  Number of gridded receptor rows provided in Subgroup (1a) to
  identify specific gridded receptors to process
                         (NGONOFF) -- Default: 0      ! NGONOFF =  0  !

!END!


--------------
Subgroup (1a) -- Specific gridded receptors included/excluded
--------------

    Specific gridded receptors are excluded from CALPOST processing
    by filling a processing grid array with 0s and 1s.  A total of
    NGONOFF lines are read here.  Each line corresponds to one 'row'
    in the sampling grid, starting with the NORTHERNMOST row that
    contains receptors that you wish to exclude, and finishing with
    row 1 to the SOUTH (no intervening rows may be skipped).  Within
    a row, each receptor position is assigned either a 0 or 1,
    starting with the westernmost receptor.
       0 = gridded receptor not processed
```

```
     1 = gridded receptor processed

   Repeated value notation may be used to select blocks of receptors:
     23*1, 15*0, 12*1

   Because all values are initially set to 1, any receptors north of
   the first row entered, or east of the last value provided in a row,
   remain ON.

   (NGXRECP) -- Default: 1


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

   Identify the Base Time Zone for the CALPUFF simulation
                      (BTZONE) -- No default   * BTZONE =  0.*

   Particle growth curve f(RH) for hygroscopic species
                       (MFRH) -- Default: 2   ! MFRH   =  2  !

      1 =  IWAQM (1998) f(RH) curve (originally used with MVISBK=1)
      2 =  FLAG (2000) f(RH) tabulation
      3 =  EPA (2003) f(RH) tabulation

   Maximum relative humidity (%) used in particle growth curve
                      (RHMAX) -- Default: 98  ! RHMAX  = 95.0 !

   Modeled species to be included in computing the light extinction
    Include SULFATE?         (LVSO4) -- Default: T   ! LVSO4  = T  !
    Include NITRATE?         (LVNO3) -- Default: T   ! LVNO3  = T  !
    Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
    Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = F  !
    Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
    Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

   And, when ranking for TOP-N, TOP-50, and Exceedance tables,
    Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

   Species name used for particulates in MODEL.DAT file
              COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
              FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PM10!

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
   MODELED particulate species:
           PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
           PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
   BACKGROUND particulate species:
           PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
   Other species:
          AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
          AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
          ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
```

SOIL (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
ELEMENTAL CARBON (EEEC) -- Default: 10. ! EEEC = 10.0 !

Background Extinction Computation

Method used for the 24h-average of percent change of light extinction:
Hourly ratio of source light extinction / background light extinction
is averaged? (LAVER) -- Default: F ! LAVER = F !

Method used for background light extinction
(MVISBK) -- Default: 2 ! MVISBK = 2 !

1 = Supply single light extinction and hygroscopic fraction
- Hourly F(RH) adjustment applied to hygroscopic background
and modeled sulfate and nitrate
2 = Compute extinction from speciated PM measurements (A)
- Hourly F(RH) adjustment applied to observed and modeled sulfate
and nitrate
- F(RH) factor is capped at F(RHMAX)
3 = Compute extinction from speciated PM measurements (B)
- Hourly F(RH) adjustment applied to observed and modeled sulfate
and nitrate
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
4 = Read hourly transmissometer background extinction measurements
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference,
or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
5 = Read hourly nephelometer background extinction measurements
- Rayleigh extinction value (BEXTRAY) added to measurement
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference,
or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
6 = Compute extinction from speciated PM measurements
- FLAG monthly RH adjustment factor applied to observed and
modeled sulfate and nitrate
7 = Use observed weather or prognostic weather information for
background extinction during weather events; otherwise, use Method 2
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- F(RH) factor is capped at F(RHMAX)
- During observed weather events, compute Bext from visual range
if using an observed weather data file, or
- During prognostic weather events, use Bext from the prognostic
weather file
- Use Method 2 for hours without a weather event

Additional inputs used for MVISBK = 1:

Background light extinction (1/Mm)
(BEXTBK) -- No default ! BEXTBK = 12.0 !

Percentage of particles affected by relative humidity
(RHFRAC) -- No default ! RHFRAC = 10.0 !

Additional inputs used for MVISBK = 6:

Extinction coefficients for hygroscopic species (modeled and background) are computed using a monthly RH adjustment factor in place of an hourly RH factor (VISB.DAT file is NOT needed). Enter the 12 monthly factors here (RHFAC). Month 1 is January.

```
(RHFAC)  -- No default     ! RHFAC = 3.2, 2.9, 2.7, 2.7,
                             3.3, 3.3, 3.3, 3.3,
                             3.4, 3.1, 3.1, 3.3 !
```

Additional inputs used for MVISBK = 7:

The weather data file (DATSAV abbreviated space-delimited) that is identified as VSRN.DAT may contain data for more than one station. Identify the stations that are needed in the order in which they will be used to obtain valid weather and visual range. The first station that contains valid data for an hour will be used. Enter up to MXWSTA (set in PARAMS file) integer station IDs of up to 6 digits each as variable IDWSTA, and enter the corresponding time zone for each, as variable TZONE (= UTC-LST).

A prognostic weather data file with Bext for weather events may be used in place of the observed weather file. Identify this as the VSRN.DAT file and use a station ID of IDWSTA = 999999, and TZONE = 0.

NOTE: TZONE identifies the time zone used in the dataset. The DATSAV abbreviated space-delimited data usually are prepared with UTC time rather than local time, so TZONE is typically set to zero.

```
 (IDWSTA)   -- No default
! IDWSTA = 690230 ,80020 ,80140 !
 (TZONE)    -- No default
! TZONE  = 0.0 ,0.0 ,0.0 !
```

Additional inputs used for MVISBK = 2,3,6,7:

Background extinction coefficients are computed from monthly CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3), coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and elemental carbon (BKEC). Month 1 is January.
(ug/m**3)

```
(BKSO4)  -- No default     ! BKSO4 = 0.23, 0.23, 0.23, 0.23,
                             0.23, 0.23, 0.23, 0.23,
                             0.23, 0.23, 0.23, 0.23 !
(BKNO3)  -- No default     ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
                             0.1, 0.1, 0.1, 0.1,
                             0.1, 0.1, 0.1, 0.1 !
(BKPMC)  -- No default     ! BKPMC = 3.0, 3.0, 3.0, 3.0,
                             3.0, 3.0, 3.0, 3.0,
                             3.0, 3.0, 3.0, 3.0 !
```

```
 (BKOC)   -- No default     ! BKOC  = 1.4, 1.4, 1.4, 1.4,
                              1.4, 1.4, 1.4, 1.4,
                              1.4, 1.4, 1.4, 1.4 !
 (BKSOIL) -- No default     ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                              0.5, 0.5, 0.5, 0.5,
                              0.5, 0.5, 0.5, 0.5 !
 (BKEC)   -- No default     ! BKEC  = 0.02, 0.02, 0.02, 0.02,
                              0.02, 0.02, 0.02, 0.02,
                              0.02, 0.02, 0.02, 0.02 !

Additional inputs used for MVISBK = 2,3,5,6,7:
-----------------------------------------------
 Extinction due to Rayleigh scattering is added (1/Mm)
                   (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

   Documentation records contained in the header of the
   CALPUFF output file may be written to the list file.
   Print documentation image?
                        (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
   Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                for           for
            Concentration    Deposition
     1 =        g/m**3         g/m**2/s
     2 =       mg/m**3        mg/m**2/s
     3 =       ug/m**3        ug/m**2/s
     4 =       ng/m**3        ng/m**2/s
     5 =     Odour Units

   Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

   1-hr averages          (L1HR) -- Default: T   !   L1HR = F  !

   3-hr averages          (L3HR) -- Default: T   !   L3HR = F  !

   24-hr averages         (L24HR) -- Default: T   !  L24HR = F  !

   Run-length averages    (LRUNL) -- Default: T   !  LRUNL = F  !

   User-specified averaging time in hours - results for
   an averaging time of NAVG hours are reported for
```

NAVG greater than 0:
(NAVG) -- Default: 0 ! NAVG = 0 !

Types of tabulations reported
----

1) Visibility: daily visibility tabulations are always reported
for the selected receptors when ASPEC = VISIB.
In addition, any of the other tabulations listed
below may be chosen to characterize the light
extinction coefficients.
[List file or Plot/Analysis File]

2) Top 50 table for each averaging time selected
[List file only]
(LT50) -- Default: T ! LT50 = F !

3) Top 'N' table for each averaging time selected
[List file or Plot file]
(LTOPN) -- Default: F ! LTOPN = T !

-- Number of 'Top-N' values at each receptor
selected (NTOP must be <= 4)
(NTOP) -- Default: 4 ! NTOP = 1 !

-- Specific ranks of 'Top-N' values reported
(NTOP values must be entered)
(ITOP(4) array) -- Default: ! ITOP = 1 !
1,2,3,4

4) Threshold exceedance counts for each receptor and each averaging
time selected
[List file or Plot file]
(LEXCD) -- Default: F ! LEXCD = T !

-- Identify the threshold for each averaging time by assigning a
non-negative value (output units).

-- Default: 0.5
Threshold for 1-hr averages (THRESH1) ! THRESH1 = 1.000E01 !
Threshold for 3-hr averages (THRESH3) ! THRESH3 = -1.0 !
Threshold for 24-hr averages (THRESH24) ! THRESH24 = -1.0 !
Threshold for NAVG-hr averages (THRESHN) ! THRESHN = -1.0 !

-- Counts for the shortest averaging period selected can be
tallied daily, and receptors that experience more than NCOUNT
counts over any NDAY period will be reported. This type of
exceedance violation output is triggered only if NDAY > 0.

Accumulation period(Days)
(NDAY) -- Default: 0 ! NDAY = 0 !
Number of exceedances allowed

(NCOUNT) -- Default: 1 ! NCOUNT = 1 !

5) Selected day table(s)

Echo Option -- Many records are written each averaging period
selected and output is grouped by day
[List file or Plot file]
(LECHO) -- Default: F ! LECHO = F !

Timeseries Option -- Averages at all selected receptors for
each selected averaging period are written to timeseries files.
Each file contains one averaging period, and all receptors are
written to a single record each averaging time.
[TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LTIME) -- Default: F ! LTIME = F !

Peak Value Option -- Averages at all selected receptors for
each selected averaging period are screened and the peak value
each period is written to timeseries files.
Each file contains one averaging period.
[PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LPEAK) -- Default: F ! LPEAK = F !

-- Days selected for output
(IECHO(366)) -- Default: 366*0
! IECHO = 366*0 !
(366 values must be entered)

Plot output options

Plot files can be created for the Top-N, Exceedance, and Echo
tables selected above. Two formats for these files are available,
DATA and GRID. In the DATA format, results at all receptors are
listed along with the receptor location [x,y,val1,val2,...].
In the GRID format, results at only gridded receptors are written,
using a compact representation. The gridded values are written in
rows (x varies), starting with the most southern row of the grid.
The GRID format is given the .GRD extension, and includes headers
compatible with the SURFER(R) plotting software.

A plotting and analysis file can also be created for the daily
peak visibility summary output, in DATA format only.

Generate Plot file output in addition to writing tables
to List file?
(LPLT) -- Default: F ! LPLT = F !

Use GRID format rather than DATA format,
when available?
(LGRD) -- Default: F ! LGRD = F !

Auxiliary Output Files (for subsequent analyses)

Visibility

A separate output file may be requested that contains the change in visibility at each selected receptor when ASPEC = VISIB. This file can be processed to construct visibility measures that are not available in CALPOST.

Output file with the visibility change at each receptor?
(MDVIS) -- Default: 0   ! MDVIS = 0 !

0 = Do Not create file
1 = Create file of DAILY (24 hour) Delta-Deciview
2 = Create file of DAILY (24 hour) Extinction Change (%)
3 = Create file of HOURLY Delta-Deciview
4 = Create file of HOURLY Extinction Change (%)

Additional Debug Output

Output selected information to List file
for debugging?
(LDEBUG) -- Default: F ! LDEBUG = F !

Output hourly extinction information to REPORT.HRV?
(Visibility Method 7)
(LVEXTHR) -- Default: F ! LVEXTHR = F !

!END!

CALPUFF UMC 2003 BART Evaluation
HERCULES REFINED 6km MET FIELD
REFINED ANALYSIS

---------------- Run title (3 lines) --

CALPOST MODEL CONTROL FILE

INPUT GROUP: 0 -- Input and Output File Names

Input Files

```
File                     Default File Name
----                     -----------------
Conc/Dep Flux File       MODEL.DAT    ! MODDAT =../../calpuff/outputs/2003/umcref/umch2003.con  !
Relative Humidity File   VISB.DAT     ! VISDAT =../../calpuff/outputs/2003/umcref/umch2003.vis  !
Background Data File     BACK.DAT          * BACKDAT =   *
Transmissometer or       VSRN.DAT          * VSRDAT =   *
Nephelometer Data File     or
DATSAV Weather Data File   or
Prognostic Weather  File
```

Output Files

```
File                     Default File Name
----                     -----------------
List File                CALPOST.LST       ! PSTLST = umch2003m6.lst   !
```

Pathname for Timeseries Files   (blank)   * TSPATH =   *
(activate with exclamation points only if
providing NON-BLANK character string)

Pathname for Plot Files   (blank)   * PLPATH =   *
(activate with exclamation points only if
providing NON-BLANK character string)

User Character String (U) to augment default filenames
(activate with exclamation points only if
providing NON-BLANK character string)

```
Timeseries         TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT
Peak Value         PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT

                                 * TSUNAM =   *

Top Nth Rank Plot   RANK(ALL)_ASPEC_ttHR_CONC_TUNAM.DAT
             or  RANK(ii)_ASPEC_ttHR_CONC_TUNAM.GRD

                                 * TUNAM =   *
```

Exceedance Plot   EXCEED_ASPEC_ttHR_CONC_XUNAM.DAT
or EXCEED_ASPEC_ttHR_CONC_XUNAM.GRD

* XUNAM =   *

Echo Plot
(Specific Days)
yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.DAT
or   yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.GRD

Visibility Plot   DAILY_VISIB_VUNAM.DAT   * VUNAM =VTEST   *
(Daily Peak Summary)

Auxiliary Output Files

File   Default File Name
----   -----------------
Visibility Change   DELVIS.DAT   * DVISDAT = deciview.dat *

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
T = lower case   ! LCFILES = T !
F = UPPER CASE
NOTE: (1) file/path names can be up to 132 characters in length
NOTE: (2) Filenames for ALL PLOT and TIMESERIES FILES are constructed
using a template that includes a pathname, user-supplied
character(s), and context-specific strings, where
ASPEC = Species Name
CONC = CONC Or WFLX Or DFLX Or TFLX
tt = Averaging Period (e.g. 03)
ii = Rank (e.g. 02)
hh = Hour(ending) in LST
szzzz = LST time zone shift (EST is -0500)
yyyy = Year(LST)
mm = Month(LST)
dd = day of month (LST)
are determined internally based on selections made below.
If a path or user-supplied character(s) are supplied, each
must contain at least 1 non-blank character.

!END!

INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file(s) (METRUN)   Default: 0   ! METRUN =   1 !

METRUN = 0 - Run period explicitly defined below

```
       METRUN = 1 - Run all periods in CALPUFF data file(s)

     Starting date:    Year  (ISYR) --    No default   ! ISYR  =  2003   !
     (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
      METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                     Hour  (ISHR) --    No default   ! ISHR  =  0   !

     Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

     Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
      (1 = every hour processed,
       2 = every 2nd hour processed,
       5 = every 5th hour processed, etc.)

Species & Concentration/Deposition Information
---------------------------------------------

      Species to process (ASPEC)       -- No default   ! ASPEC = VISIB  !
      (ASPEC = VISIB for visibility processing)

      Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
        '1'  for CALPUFF concentrations,
        '-1' for dry deposition fluxes,
        '-2' for wet deposition fluxes,
        '-3' for wet+dry deposition fluxes.

      Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
           X(new) = X(old) * A + B         A = 0.0    ! B =  0.0    !
        (NOT applied if A = B = 0.0)        B = 0.0

      Add Hourly Background Concentrations/Fluxes?
                         (LBACK)  -- Default: F   ! LBACK =  F !

Source information
------------------

  Option to process source contributions:
       0 =  Process only total reported contributions
       1 =  Sum all individual source contributions and process
       2 =  Run in TRACEBACK mode to identify source
            contributions at a SINGLE receptor
                        (MSOURCE) -- Default: 0   ! MSOURCE =  0  !

Receptor information
--------------------

  Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                            (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):
```

Select ALL DISCRETE receptors by setting NDRECP flag to -1;
OR
Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
0 = discrete receptor not processed
1 = discrete receptor processed
using repeated value notation to select blocks of receptors:
23*1, 15*0, 12*1
Flag for all receptors after the last one assigned is set to 0
(NDRECP) -- Default: -1
! NDRECP = -1 !

--Select range of GRIDDED receptors (only used when LG = T):

X index of LL corner (IBGRID) -- Default: -1 ! IBGRID = -1 !
(-1 OR 1 <= IBGRID <= NX)

Y index of LL corner (JBGRID) -- Default: -1 ! JBGRID = -1 !
(-1 OR 1 <= JBGRID <= NY)

X index of UR corner (IEGRID) -- Default: -1 ! IEGRID = -1 !
(-1 OR 1 <= IEGRID <= NX)

Y index of UR corner (JEGRID) -- Default: -1 ! JEGRID = -1 !
(-1 OR 1 <= JEGRID <= NY)

Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

--Specific gridded receptors can also be excluded from CALPOST processing by filling a processing grid array with 0s and 1s. If the processing flag for receptor index (i,j) is 1 (ON), that receptor will be processed if it lies within the range delineated by IBGRID, JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be processed in the run. By default, all array values are set to 1 (ON).

Number of gridded receptor rows provided in Subgroup (1a) to identify specific gridded receptors to process
(NGONOFF) -- Default: 0 ! NGONOFF = 0 !

!END!

Subgroup (1a) -- Specific gridded receptors included/excluded
----

Specific gridded receptors are excluded from CALPOST processing by filling a processing grid array with 0s and 1s. A total of NGONOFF lines are read here. Each line corresponds to one 'row' in the sampling grid, starting with the NORTHERNMOST row that contains receptors that you wish to exclude, and finishing with row 1 to the SOUTH (no intervening rows may be skipped). Within a row, each receptor position is assigned either a 0 or 1, starting with the westernmost receptor.
0 = gridded receptor not processed

```
      1 = gridded receptor processed

   Repeated value notation may be used to select blocks of receptors:
      23*1, 15*0, 12*1

   Because all values are initially set to 1, any receptors north of
   the first row entered, or east of the last value provided in a row,
   remain ON.

   (NGXRECP) -- Default: 1


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

   Identify the Base Time Zone for the CALPUFF simulation
                    (BTZONE) -- No default   * BTZONE =  0.*

   Particle growth curve f(RH) for hygroscopic species
                     (MFRH) -- Default: 2   ! MFRH   =  2  !

       1 =  IWAQM (1998) f(RH) curve (originally used with MVISBK=1)
       2 =  FLAG (2000) f(RH) tabulation
       3 =  EPA (2003) f(RH) tabulation

   Maximum relative humidity (%) used in particle growth curve
                    (RHMAX) -- Default: 98  ! RHMAX  = 95.0 !

   Modeled species to be included in computing the light extinction
    Include SULFATE?         (LVSO4) -- Default: T   ! LVSO4  = T  !
    Include NITRATE?         (LVNO3) -- Default: T   ! LVNO3  = T  !
    Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
    Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = F  !
    Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
    Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

   And, when ranking for TOP-N, TOP-50, and Exceedance tables,
    Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

   Species name used for particulates in MODEL.DAT file
              COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
              FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PM10!

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
   MODELED particulate species:
          PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
          PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
   BACKGROUND particulate species:
          PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
   Other species:
         AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
         AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
         ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
```

SOIL (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
ELEMENTAL CARBON (EEEC) -- Default: 10. ! EEEC = 10.0 !

Background Extinction Computation

Method used for the 24h-average of percent change of light extinction:
Hourly ratio of source light extinction / background light extinction
is averaged? (LAVER) -- Default: F ! LAVER = F !

Method used for background light extinction
(MVISBK) -- Default: 2 ! MVISBK = 6 !

1 = Supply single light extinction and hygroscopic fraction
- Hourly F(RH) adjustment applied to hygroscopic background
and modeled sulfate and nitrate
2 = Compute extinction from speciated PM measurements (A)
- Hourly F(RH) adjustment applied to observed and modeled sulfate
and nitrate
- F(RH) factor is capped at F(RHMAX)
3 = Compute extinction from speciated PM measurements (B)
- Hourly F(RH) adjustment applied to observed and modeled sulfate
and nitrate
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
4 = Read hourly transmissometer background extinction measurements
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference,
or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
5 = Read hourly nephelometer background extinction measurements
- Rayleigh extinction value (BEXTRAY) added to measurement
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference,
or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
6 = Compute extinction from speciated PM measurements
- FLAG monthly RH adjustment factor applied to observed and
modeled sulfate and nitrate
7 = Use observed weather or prognostic weather information for
background extinction during weather events; otherwise, use Method 2
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- F(RH) factor is capped at F(RHMAX)
- During observed weather events, compute Bext from visual range
if using an observed weather data file, or
- During prognostic weather events, use Bext from the prognostic
weather file
- Use Method 2 for hours without a weather event

Additional inputs used for MVISBK = 1:

Background light extinction (1/Mm)
(BEXTBK) -- No default ! BEXTBK = 12.0 !

Percentage of particles affected by relative humidity
(RHFRAC) -- No default   ! RHFRAC = 10.0 !

Additional inputs used for MVISBK = 6:

Extinction coefficients for hygroscopic species (modeled and background) are computed using a monthly RH adjustment factor in place of an hourly RH factor (VISB.DAT file is NOT needed). Enter the 12 monthly factors here (RHFAC). Month 1 is January.

(RHFAC) -- No default   ! RHFAC = 3.2, 2.9, 2.7, 2.7,
3.3, 3.3, 3.3, 3.3,
3.4, 3.1, 3.1, 3.3 !

Additional inputs used for MVISBK = 7:

The weather data file (DATSAV abbreviated space-delimited) that is identified as VSRN.DAT may contain data for more than one station. Identify the stations that are needed in the order in which they will be used to obtain valid weather and visual range. The first station that contains valid data for an hour will be used. Enter up to MXWSTA (set in PARAMS file) integer station IDs of up to 6 digits each as variable IDWSTA, and enter the corresponding time zone for each, as variable TZONE (= UTC-LST).

A prognostic weather data file with Bext for weather events may be used in place of the observed weather file. Identify this as the VSRN.DAT file and use a station ID of IDWSTA = 999999, and TZONE = 0.

NOTE: TZONE identifies the time zone used in the dataset. The DATSAV abbreviated space-delimited data usually are prepared with UTC time rather than local time, so TZONE is typically set to zero.

(IDWSTA) -- No default
! IDWSTA = 690230 ,80020 ,80140 !
(TZONE) -- No default
! TZONE = 0.0 ,0.0 ,0.0 !

Additional inputs used for MVISBK = 2,3,6,7:

Background extinction coefficients are computed from monthly CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3), coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and elemental carbon (BKEC). Month 1 is January.
(ug/m**3)

(BKSO4) -- No default   ! BKSO4 = 0.23, 0.23, 0.23, 0.23,
0.23, 0.23, 0.23, 0.23,
0.23, 0.23, 0.23, 0.23 !
(BKNO3) -- No default   ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
0.1, 0.1, 0.1, 0.1,
0.1, 0.1, 0.1, 0.1 !
(BKPMC) -- No default   ! BKPMC = 3.0, 3.0, 3.0, 3.0,
3.0, 3.0, 3.0, 3.0,
3.0, 3.0, 3.0, 3.0 !

```
  (BKOC)   -- No default     ! BKOC  = 1.4, 1.4, 1.4, 1.4,
                             1.4, 1.4, 1.4, 1.4,
                             1.4, 1.4, 1.4, 1.4 !
  (BKSOIL) -- No default     ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                             0.5, 0.5, 0.5, 0.5,
                             0.5, 0.5, 0.5, 0.5 !
  (BKEC)   -- No default     ! BKEC  = 0.02, 0.02, 0.02, 0.02,
                             0.02, 0.02, 0.02, 0.02,
                             0.02, 0.02, 0.02, 0.02 !

 Additional inputs used for MVISBK = 2,3,5,6,7:
 ----------------------------------------------
  Extinction due to Rayleigh scattering is added (1/Mm)
                 (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

 Documentation records contained in the header of the
 CALPUFF output file may be written to the list file.
 Print documentation image?
                  (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
 Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
              for            for
          Concentration    Deposition
   1 =        g/m**3        g/m**2/s
   2 =       mg/m**3        mg/m**2/s
   3 =       ug/m**3        ug/m**2/s
   4 =       ng/m**3        ng/m**2/s
   5 =     Odour Units

 Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

 1-hr averages          (L1HR) -- Default: T   !   L1HR = F  !

 3-hr averages          (L3HR) -- Default: T   !   L3HR = F  !

 24-hr averages         (L24HR) -- Default: T   !  L24HR = F  !

 Run-length averages    (LRUNL) -- Default: T   !  LRUNL = F  !

 User-specified averaging time in hours - results for
 an averaging time of NAVG hours are reported for
```

NAVG greater than 0:
(NAVG) -- Default: 0 ! NAVG = 0 !

Types of tabulations reported
----

1) Visibility: daily visibility tabulations are always reported
for the selected receptors when ASPEC = VISIB.
In addition, any of the other tabulations listed
below may be chosen to characterize the light
extinction coefficients.
[List file or Plot/Analysis File]

2) Top 50 table for each averaging time selected
[List file only]
(LT50) -- Default: T ! LT50 = F !

3) Top 'N' table for each averaging time selected
[List file or Plot file]
(LTOPN) -- Default: F ! LTOPN = T !

-- Number of 'Top-N' values at each receptor
selected (NTOP must be <= 4)
(NTOP) -- Default: 4 ! NTOP = 1 !

-- Specific ranks of 'Top-N' values reported
(NTOP values must be entered)
(ITOP(4) array) -- Default: ! ITOP = 1 !
1,2,3,4

4) Threshold exceedance counts for each receptor and each averaging
time selected
[List file or Plot file]
(LEXCD) -- Default: F ! LEXCD = T !

-- Identify the threshold for each averaging time by assigning a
non-negative value (output units).

-- Default: 0.5
Threshold for 1-hr averages (THRESH1) ! THRESH1 = 1.000E01 !
Threshold for 3-hr averages (THRESH3) ! THRESH3 = -1.0 !
Threshold for 24-hr averages (THRESH24) ! THRESH24 = -1.0 !
Threshold for NAVG-hr averages (THRESHN) ! THRESHN = -1.0 !

-- Counts for the shortest averaging period selected can be
tallied daily, and receptors that experience more than NCOUNT
counts over any NDAY period will be reported. This type of
exceedance violation output is triggered only if NDAY > 0.

Accumulation period(Days)
(NDAY) -- Default: 0 ! NDAY = 0 !

Number of exceedances allowed
(NCOUNT) -- Default: 1 ! NCOUNT = 1 !

5) Selected day table(s)

Echo Option -- Many records are written each averaging period
selected and output is grouped by day
[List file or Plot file]
(LECHO) -- Default: F ! LECHO = F !

Timeseries Option -- Averages at all selected receptors for
each selected averaging period are written to timeseries files.
Each file contains one averaging period, and all receptors are
written to a single record each averaging time.
[TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LTIME) -- Default: F ! LTIME = F !

Peak Value Option -- Averages at all selected receptors for
each selected averaging period are screened and the peak value
each period is written to timeseries files.
Each file contains one averaging period.
[PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LPEAK) -- Default: F ! LPEAK = F !

-- Days selected for output
(IECHO(366)) -- Default: 366*0
! IECHO = 366*0 !
(366 values must be entered)

Plot output options

Plot files can be created for the Top-N, Exceedance, and Echo
tables selected above. Two formats for these files are available,
DATA and GRID. In the DATA format, results at all receptors are
listed along with the receptor location [x,y,val1,val2,...].
In the GRID format, results at only gridded receptors are written,
using a compact representation. The gridded values are written in
rows (x varies), starting with the most southern row of the grid.
The GRID format is given the .GRD extension, and includes headers
compatible with the SURFER(R) plotting software.

A plotting and analysis file can also be created for the daily
peak visibility summary output, in DATA format only.

Generate Plot file output in addition to writing tables
to List file?
(LPLT) -- Default: F ! LPLT = F !

Use GRID format rather than DATA format,
when available?
(LGRD) -- Default: F ! LGRD = F !

Auxiliary Output Files (for subsequent analyses)

Visibility

A separate output file may be requested that contains the change in visibility at each selected receptor when ASPEC = VISIB. This file can be processed to construct visibility measures that are not available in CALPOST.

Output file with the visibility change at each receptor?
(MDVIS) -- Default: 0 ! MDVIS = 0 !

0 = Do Not create file
1 = Create file of DAILY (24 hour) Delta-Deciview
2 = Create file of DAILY (24 hour) Extinction Change (%)
3 = Create file of HOURLY Delta-Deciview
4 = Create file of HOURLY Extinction Change (%)

Additional Debug Output

Output selected information to List file for debugging?
(LDEBUG) -- Default: F ! LDEBUG = F !

Output hourly extinction information to REPORT.HRV? (Visibility Method 7)
(LVEXTHR) -- Default: F ! LVEXTHR = F !

!END!

CALPUFF UMC 2003 BART Evaluation
UPPER BUFFALO REFINED 6km MET FIELD
REFINED ANALYSIS

---------------- Run title (3 lines) --

CALPOST MODEL CONTROL FILE

INPUT GROUP: 0 -- Input and Output File Names

Input Files

File Default File Name
---- -----------------
Conc/Dep Flux File MODEL.DAT ! MODDAT =../../calpuff/outputs/2003/umcref/umcub2003.con !
Relative Humidity File VISB.DAT ! VISDAT =../../calpuff/outputs/2003/umcref/umcub2003.vis !
Background Data File BACK.DAT * BACKDAT = *
Transmissometer or VSRN.DAT * VSRDAT = *
Nephelometer Data File or
DATSAV Weather Data File or
Prognostic Weather File

Output Files

File Default File Name
---- -----------------
List File CALPOST.LST ! PSTLST = umcub2003.lst !

Pathname for Timeseries Files (blank) * TSPATH = *
(activate with exclamation points only if
providing NON-BLANK character string)

Pathname for Plot Files (blank) * PLPATH = *
(activate with exclamation points only if
providing NON-BLANK character string)

User Character String (U) to augment default filenames
(activate with exclamation points only if
providing NON-BLANK character string)

Timeseries TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT
Peak Value PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT

* TSUNAM = *

Top Nth Rank Plot RANK(ALL)_ASPEC_ttHR_CONC_TUNAM.DAT
or RANK(ii)_ASPEC_ttHR_CONC_TUNAM.GRD

* TUNAM = *

```
Exceedance Plot      EXCEED_ASPEC_ttHR_CONC_XUNAM.DAT
              or  EXCEED_ASPEC_ttHR_CONC_XUNAM.GRD

                                     * XUNAM =   *

Echo Plot
(Specific Days)
         yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.DAT
    or    yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.GRD


Visibility Plot      DAILY_VISIB_VUNAM.DAT   * VUNAM =VTEST   *
(Daily Peak Summary)



Auxiliary Output Files
----------------------

File                   Default File Name
----                   -----------------
Visibility Change        DELVIS.DAT          * DVISDAT = deciview.dat  *


--------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
       T = lower case              ! LCFILES = T !
       F = UPPER CASE
NOTE: (1) file/path names can be up to 132 characters in length
NOTE: (2) Filenames for ALL PLOT and TIMESERIES FILES are constructed
        using a template that includes a pathname, user-supplied
        character(s), and context-specific strings, where
          ASPEC = Species Name
           CONC = CONC Or WFLX Or DFLX Or TFLX
             tt = Averaging Period (e.g. 03)
             ii = Rank (e.g. 02)
             hh = Hour(ending) in LST
          szzzz = LST time zone shift (EST is -0500)
           yyyy = Year(LST)
             mm = Month(LST)
             dd = day of month (LST)
        are determined internally based on selections made below.
        If a path or user-supplied character(s) are supplied, each
        must contain at least 1 non-blank character.

!END!
--------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file(s)  (METRUN)       Default: 0   ! METRUN =   1  !

       METRUN = 0 - Run period explicitly defined below
```

```
      METRUN = 1 - Run all periods in CALPUFF data file(s)

    Starting date:    Year  (ISYR) --    No default   ! ISYR  =  2003   !
    (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
     METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                      Hour  (ISHR) --    No default   ! ISHR  =  0   !

    Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

    Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
     (1 = every hour processed,
      2 = every 2nd hour processed,
      5 = every 5th hour processed, etc.)

Species & Concentration/Deposition Information
---------------------------------------------

     Species to process (ASPEC)       -- No default   ! ASPEC = VISIB  !
     (ASPEC = VISIB for visibility processing)

     Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
       '1'  for CALPUFF concentrations,
       '-1' for dry deposition fluxes,
       '-2' for wet deposition fluxes,
       '-3' for wet+dry deposition fluxes.

     Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
          X(new) = X(old) * A + B         A = 0.0     ! B =  0.0    !
       (NOT applied if A = B = 0.0)       B = 0.0

     Add Hourly Background Concentrations/Fluxes?
                        (LBACK)  -- Default: F   ! LBACK =  F !

Source information
------------------

  Option to process source contributions:
       0 =  Process only total reported contributions
       1 =  Sum all individual source contributions and process
       2 =  Run in TRACEBACK mode to identify source
            contributions at a SINGLE receptor
                       (MSOURCE) -- Default: 0   ! MSOURCE =  0  !

Receptor information
--------------------

  Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                           (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):
```

```
  Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                              OR
  Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
     0 = discrete receptor not processed
     1 = discrete receptor processed
  using repeated value notation to select blocks of receptors:
     23*1, 15*0, 12*1
  Flag for all receptors after the last one assigned is set to 0
  (NDRECP) -- Default: -1
                                            ! NDRECP =  -1  !


--Select range of GRIDDED receptors (only used when LG = T):

       X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
           (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
           (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
           (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
           (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1


--Specific gridded receptors can also be excluded from CALPOST
  processing by filling a processing grid array with 0s and 1s.  If the
  processing flag for receptor index (i,j) is 1 (ON), that receptor
  will be processed if it lies within the range delineated by IBGRID,
  JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be
  processed in the run.  By default, all array values are set to 1 (ON).

  Number of gridded receptor rows provided in Subgroup (1a) to
  identify specific gridded receptors to process
                        (NGONOFF) -- Default: 0      ! NGONOFF =  0  !

!END!


--------------
Subgroup (1a) -- Specific gridded receptors included/excluded
--------------

    Specific gridded receptors are excluded from CALPOST processing
    by filling a processing grid array with 0s and 1s.  A total of
    NGONOFF lines are read here.  Each line corresponds to one 'row'
    in the sampling grid, starting with the NORTHERNMOST row that
    contains receptors that you wish to exclude, and finishing with
    row 1 to the SOUTH (no intervening rows may be skipped).  Within
    a row, each receptor position is assigned either a 0 or 1,
    starting with the westernmost receptor.
       0 = gridded receptor not processed
```

```
      1 = gridded receptor processed

   Repeated value notation may be used to select blocks of receptors:
      23*1, 15*0, 12*1

   Because all values are initially set to 1, any receptors north of
   the first row entered, or east of the last value provided in a row,
   remain ON.

   (NGXRECP) -- Default: 1


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

   Identify the Base Time Zone for the CALPUFF simulation
                     (BTZONE) -- No default   * BTZONE =  0.*

   Particle growth curve f(RH) for hygroscopic species
                      (MFRH) -- Default: 2   ! MFRH   =  2  !

       1 =  IWAQM (1998) f(RH) curve (originally used with MVISBK=1)
       2 =  FLAG (2000) f(RH) tabulation
       3 =  EPA (2003) f(RH) tabulation

   Maximum relative humidity (%) used in particle growth curve
                     (RHMAX) -- Default: 98  ! RHMAX  = 95.0 !

   Modeled species to be included in computing the light extinction
    Include SULFATE?         (LVSO4) -- Default: T   ! LVSO4  = T  !
    Include NITRATE?         (LVNO3) -- Default: T   ! LVNO3  = T  !
    Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
    Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = F  !
    Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
    Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

   And, when ranking for TOP-N, TOP-50, and Exceedance tables,
    Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

   Species name used for particulates in MODEL.DAT file
              COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
              FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PM10 !

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
   MODELED particulate species:
           PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
           PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
   BACKGROUND particulate species:
           PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
   Other species:
          AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
          AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
          ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
```

```
          SOIL           (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
          ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

   Method used for the 24h-average of percent change of light extinction:
   Hourly ratio of source light extinction / background light extinction
   is averaged?             (LAVER) -- Default: F   ! LAVER = F  !


   Method used for background light extinction
                      (MVISBK) -- Default: 2   ! MVISBK =  2  !

       1 =  Supply single light extinction and hygroscopic fraction
          - Hourly F(RH) adjustment applied to hygroscopic background
            and modeled sulfate and nitrate
       2 =  Compute extinction from speciated PM measurements (A)
          - Hourly F(RH) adjustment applied to observed and modeled sulfate
            and nitrate
          - F(RH) factor is capped at F(RHMAX)
       3 =  Compute extinction from speciated PM measurements (B)
          - Hourly F(RH) adjustment applied to observed and modeled sulfate
            and nitrate
          - Receptor-hour excluded if RH>RHMAX
          - Receptor-day excluded if fewer than 6 valid receptor-hours
       4 =  Read hourly transmissometer background extinction measurements
          - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
          - Hour excluded if measurement invalid (missing, interference,
            or large RH)
          - Receptor-hour excluded if RH>RHMAX
          - Receptor-day excluded if fewer than 6 valid receptor-hours
       5 =  Read hourly nephelometer background extinction measurements
          - Rayleigh extinction value (BEXTRAY) added to measurement
          - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
          - Hour excluded if measurement invalid (missing, interference,
            or large RH)
          - Receptor-hour excluded if RH>RHMAX
          - Receptor-day excluded if fewer than 6 valid receptor-hours
       6 =  Compute extinction from speciated PM measurements
          - FLAG monthly RH adjustment factor applied to observed and
            modeled sulfate and nitrate
       7 =  Use observed weather or prognostic weather information for
          background extinction during weather events; otherwise, use Method 2
          - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
          - F(RH) factor is capped at F(RHMAX)
          - During observed weather events, compute Bext from visual range
            if using an observed weather data file, or
          - During prognostic weather events, use Bext from the prognostic
            weather file
          - Use Method 2 for hours without a weather event

   Additional inputs used for MVISBK = 1:
   -------------------------------------
    Background light extinction (1/Mm)
                      (BEXTBK) -- No default   ! BEXTBK = 12.0 !
```

```
 Percentage of particles affected by relative humidity
                         (RHFRAC) -- No default   ! RHFRAC = 10.0 !

Additional inputs used for MVISBK = 6:
--------------------------------------
 Extinction coefficients for hygroscopic species (modeled and
 background) are computed using a monthly RH adjustment factor
 in place of an hourly RH factor (VISB.DAT file is NOT needed).
 Enter the 12 monthly factors here (RHFAC).  Month 1 is January.

 (RHFAC)  -- No default     ! RHFAC = 3.3, 3.0, 2.7, 2.8,
                                    3.4, 3.4, 3.4, 3.4,
                                    3.6, 3.3, 3.2, 3.3 !

Additional inputs used for MVISBK = 7:
--------------------------------------
 The weather data file (DATSAV abbreviated space-delimited) that
 is identified as VSRN.DAT may contain data for more than one
 station.  Identify the stations that are needed in the order in
 which they will be used to obtain valid weather and visual range.
 The first station that contains valid data for an hour will be
 used.  Enter up to MXWSTA (set in PARAMS file) integer station IDs
 of up to 6 digits each as variable IDWSTA, and enter the corresponding
 time zone for each, as variable TZONE (= UTC-LST).

 A prognostic weather data file with Bext for weather events may be used
 in place of the observed weather file.  Identify this as the VSRN.DAT
 file and use a station ID of IDWSTA = 999999, and TZONE = 0.

 NOTE:  TZONE identifies the time zone used in the dataset.  The
        DATSAV abbreviated space-delimited data usually are prepared
        with UTC time rather than local time, so TZONE is typically
        set to zero.

 (IDWSTA)   -- No default
! IDWSTA = 690230 ,80020 ,80140 !
 (TZONE)    -- No default
! TZONE  = 0.0 ,0.0 ,0.0 !

Additional inputs used for MVISBK = 2,3,6,7:
--------------------------------------------
 Background extinction coefficients are computed from monthly
 CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
 coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
 elemental carbon (BKEC).  Month 1 is January.
 (ug/m**3)

 (BKSO4)  -- No default     ! BKSO4 = 0.23, 0.23, 0.23, 0.23,
                                    0.23, 0.23, 0.23, 0.23,
                                    0.23, 0.23, 0.23, 0.23 !
 (BKNO3)  -- No default     ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
                                    0.1, 0.1, 0.1, 0.1,
                                    0.1, 0.1, 0.1, 0.1 !
 (BKPMC)  -- No default     ! BKPMC = 3.0, 3.0, 3.0, 3.0,
                                    3.0, 3.0, 3.0, 3.0,
                                    3.0, 3.0, 3.0, 3.0 !
```

```
 (BKOC)   -- No default     ! BKOC  = 1.4, 1.4, 1.4, 1.4,
                            1.4, 1.4, 1.4, 1.4,
                            1.4, 1.4, 1.4, 1.4 !
 (BKSOIL) -- No default     ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                            0.5, 0.5, 0.5, 0.5,
                            0.5, 0.5, 0.5, 0.5 !
 (BKEC)   -- No default     ! BKEC  = 0.02, 0.02, 0.02, 0.02,
                            0.02, 0.02, 0.02, 0.02,
                            0.02, 0.02, 0.02, 0.02 !

Additional inputs used for MVISBK = 2,3,5,6,7:
----------------------------------------------
 Extinction due to Rayleigh scattering is added (1/Mm)
                 (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

   Documentation records contained in the header of the
   CALPUFF output file may be written to the list file.
   Print documentation image?
                      (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
   Units for All Output      (IPRTU) -- Default: 1   ! IPRTU =  3   !
                for           for
            Concentration    Deposition
     1 =       g/m**3         g/m**2/s
     2 =      mg/m**3         mg/m**2/s
     3 =      ug/m**3         ug/m**2/s
     4 =      ng/m**3         ng/m**2/s
     5 =     Odour Units

   Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

   1-hr averages          (L1HR) -- Default: T   !   L1HR = F  !

   3-hr averages          (L3HR) -- Default: T   !   L3HR = F  !

   24-hr averages         (L24HR) -- Default: T   !  L24HR = F  !

   Run-length averages    (LRUNL) -- Default: T   !  LRUNL = F  !

   User-specified averaging time in hours - results for
   an averaging time of NAVG hours are reported for
```

NAVG greater than 0:
(NAVG) -- Default: 0 ! NAVG = 0 !

Types of tabulations reported
----

1) Visibility: daily visibility tabulations are always reported
for the selected receptors when ASPEC = VISIB.
In addition, any of the other tabulations listed
below may be chosen to characterize the light
extinction coefficients.
[List file or Plot/Analysis File]

2) Top 50 table for each averaging time selected
[List file only]
(LT50) -- Default: T ! LT50 = F !

3) Top 'N' table for each averaging time selected
[List file or Plot file]
(LTOPN) -- Default: F ! LTOPN = T !

-- Number of 'Top-N' values at each receptor
selected (NTOP must be <= 4)
(NTOP) -- Default: 4 ! NTOP = 1 !

-- Specific ranks of 'Top-N' values reported
(NTOP values must be entered)
(ITOP(4) array) -- Default: ! ITOP = 1 !
1,2,3,4

4) Threshold exceedance counts for each receptor and each averaging
time selected
[List file or Plot file]
(LEXCD) -- Default: F ! LEXCD = T !

-- Identify the threshold for each averaging time by assigning a
non-negative value (output units).

-- Default: 0.5
Threshold for 1-hr averages (THRESH1) ! THRESH1 = 1.000E01 !
Threshold for 3-hr averages (THRESH3) ! THRESH3 = -1.0 !
Threshold for 24-hr averages (THRESH24) ! THRESH24 = -1.0 !
Threshold for NAVG-hr averages (THRESHN) ! THRESHN = -1.0 !

-- Counts for the shortest averaging period selected can be
tallied daily, and receptors that experience more than NCOUNT
counts over any NDAY period will be reported. This type of
exceedance violation output is triggered only if NDAY > 0.

Accumulation period(Days)
(NDAY) -- Default: 0 ! NDAY = 0 !
Number of exceedances allowed

(NCOUNT) -- Default: 1   ! NCOUNT = 1 !

5) Selected day table(s)

Echo Option -- Many records are written each averaging period
selected and output is grouped by day
[List file or Plot file]
(LECHO) -- Default: F   ! LECHO = F !

Timeseries Option -- Averages at all selected receptors for
each selected averaging period are written to timeseries files.
Each file contains one averaging period, and all receptors are
written to a single record each averaging time.
[TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LTIME) -- Default: F   ! LTIME = F !

Peak Value Option -- Averages at all selected receptors for
each selected averaging period are screened and the peak value
each period is written to timeseries files.
Each file contains one averaging period.
[PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LPEAK) -- Default: F   ! LPEAK = F !

-- Days selected for output
(IECHO(366)) -- Default: 366*0
! IECHO = 366*0 !
(366 values must be entered)

Plot output options

Plot files can be created for the Top-N, Exceedance, and Echo
tables selected above. Two formats for these files are available,
DATA and GRID. In the DATA format, results at all receptors are
listed along with the receptor location [x,y,val1,val2,...].
In the GRID format, results at only gridded receptors are written,
using a compact representation. The gridded values are written in
rows (x varies), starting with the most southern row of the grid.
The GRID format is given the .GRD extension, and includes headers
compatible with the SURFER(R) plotting software.

A plotting and analysis file can also be created for the daily
peak visibility summary output, in DATA format only.

Generate Plot file output in addition to writing tables
to List file?
(LPLT) -- Default: F   ! LPLT = F !

Use GRID format rather than DATA format,
when available?
(LGRD) -- Default: F   ! LGRD = F !

Auxiliary Output Files (for subsequent analyses)

Visibility

A separate output file may be requested that contains the change in visibility at each selected receptor when ASPEC = VISIB. This file can be processed to construct visibility measures that are not available in CALPOST.

Output file with the visibility change at each receptor?
(MDVIS) -- Default: 0   ! MDVIS = 0 !

0 = Do Not create file
1 = Create file of DAILY (24 hour) Delta-Deciview
2 = Create file of DAILY (24 hour) Extinction Change (%)
3 = Create file of HOURLY Delta-Deciview
4 = Create file of HOURLY Extinction Change (%)

Additional Debug Output

Output selected information to List file
for debugging?
(LDEBUG) -- Default: F ! LDEBUG = F !

Output hourly extinction information to REPORT.HRV?
(Visibility Method 7)
(LVEXTHR) -- Default: F ! LVEXTHR = F !

!END!

```
CALPUFF UMC 2003 BART Evaluation
UPPER BUFFALO REFINED 6km MET FIELD
REFINED ANALYSIS

---------------- Run title (3 lines) ------------------------------------------

                    CALPOST MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names
--------------

Input Files
-----------

File                    Default File Name
----                    -----------------
Conc/Dep Flux File       MODEL.DAT    ! MODDAT =../../calpuff/outputs/2003/umcref/umcub2003.con  !
Relative Humidity File    VISB.DAT     ! VISDAT =../../calpuff/outputs/2003/umcref/umcub2003.vis  !
Background Data File      BACK.DAT           * BACKDAT =   *
Transmissometer or        VSRN.DAT           * VSRDAT =   *
Nephelometer Data File     or
DATSAV Weather Data File   or
Prognostic Weather  File

Output Files
------------

File                    Default File Name
----                    -----------------
List File                CALPOST.LST        ! PSTLST = umcub2003m6.lst   !

Pathname for Timeseries Files   (blank)      * TSPATH =   *
(activate with exclamation points only if
providing NON-BLANK character string)

Pathname for Plot Files   (blank)           * PLPATH =   *
(activate with exclamation points only if
 providing NON-BLANK character string)

User Character String (U) to augment default filenames
(activate with exclamation points only if
 providing NON-BLANK character string)

Timeseries          TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT
Peak Value          PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT

                                    * TSUNAM =   *

Top Nth Rank Plot   RANK(ALL)_ASPEC_ttHR_CONC_TUNAM.DAT
             or  RANK(ii)_ASPEC_ttHR_CONC_TUNAM.GRD

                                    * TUNAM =   *
```

```
Exceedance Plot      EXCEED_ASPEC_ttHR_CONC_XUNAM.DAT
                 or  EXCEED_ASPEC_ttHR_CONC_XUNAM.GRD

                                    * XUNAM =   *

Echo Plot
(Specific Days)
           yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.DAT
     or    yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.GRD


Visibility Plot      DAILY_VISIB_VUNAM.DAT   * VUNAM =VTEST   *
(Daily Peak Summary)



Auxiliary Output Files
---------------------

File                   Default File Name
----                   -----------------
Visibility Change         DELVIS.DAT          * DVISDAT = deciview.dat  *


-------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
        T = lower case              ! LCFILES = T !
        F = UPPER CASE
NOTE: (1) file/path names can be up to 132 characters in length
NOTE: (2) Filenames for ALL PLOT and TIMESERIES FILES are constructed
          using a template that includes a pathname, user-supplied
          character(s), and context-specific strings, where
             ASPEC = Species Name
              CONC = CONC Or WFLX Or DFLX Or TFLX
                tt = Averaging Period (e.g. 03)
                ii = Rank (e.g. 02)
                hh = Hour(ending) in LST
             szzzz = LST time zone shift (EST is -0500)
              yyyy = Year(LST)
                mm = Month(LST)
                dd = day of month (LST)
          are determined internally based on selections made below.
          If a path or user-supplied character(s) are supplied, each
          must contain at least 1 non-blank character.

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

     Option to run all periods found
     in the met. file(s)  (METRUN)       Default: 0   ! METRUN =   1  !

         METRUN = 0 - Run period explicitly defined below
```

```
       METRUN = 1 - Run all periods in CALPUFF data file(s)

     Starting date:    Year  (ISYR) --    No default   ! ISYR  =  2003   !
     (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
      METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                       Hour  (ISHR) --    No default   ! ISHR  =  0   !

     Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

     Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
      (1 = every hour processed,
       2 = every 2nd hour processed,
       5 = every 5th hour processed, etc.)

Species & Concentration/Deposition Information
----------------------------------------------

      Species to process (ASPEC)       -- No default   ! ASPEC = VISIB  !
      (ASPEC = VISIB for visibility processing)

      Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
        '1'  for CALPUFF concentrations,
        '-1' for dry deposition fluxes,
        '-2' for wet deposition fluxes,
        '-3' for wet+dry deposition fluxes.

      Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
           X(new) = X(old) * A + B         A = 0.0    ! B =  0.0    !
        (NOT applied if A = B = 0.0)        B = 0.0

      Add Hourly Background Concentrations/Fluxes?
                        (LBACK)  -- Default: F   ! LBACK =  F !

Source information
------------------

  Option to process source contributions:
       0 =  Process only total reported contributions
       1 =  Sum all individual source contributions and process
       2 =  Run in TRACEBACK mode to identify source
            contributions at a SINGLE receptor
                        (MSOURCE) -- Default: 0   ! MSOURCE =  0  !

Receptor information
--------------------

  Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                           (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):
```

Select ALL DISCRETE receptors by setting NDRECP flag to -1;
OR
Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
0 = discrete receptor not processed
1 = discrete receptor processed
using repeated value notation to select blocks of receptors:
23*1, 15*0, 12*1
Flag for all receptors after the last one assigned is set to 0
(NDRECP) -- Default: -1
! NDRECP = -1 !

--Select range of GRIDDED receptors (only used when LG = T):

X index of LL corner (IBGRID) -- Default: -1 ! IBGRID = -1 !
(-1 OR 1 <= IBGRID <= NX)

Y index of LL corner (JBGRID) -- Default: -1 ! JBGRID = -1 !
(-1 OR 1 <= JBGRID <= NY)

X index of UR corner (IEGRID) -- Default: -1 ! IEGRID = -1 !
(-1 OR 1 <= IEGRID <= NX)

Y index of UR corner (JEGRID) -- Default: -1 ! JEGRID = -1 !
(-1 OR 1 <= JEGRID <= NY)

Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

--Specific gridded receptors can also be excluded from CALPOST processing by filling a processing grid array with 0s and 1s. If the processing flag for receptor index (i,j) is 1 (ON), that receptor will be processed if it lies within the range delineated by IBGRID, JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be processed in the run. By default, all array values are set to 1 (ON).

Number of gridded receptor rows provided in Subgroup (1a) to identify specific gridded receptors to process
(NGONOFF) -- Default: 0 ! NGONOFF = 0 !

!END!

Subgroup (1a) -- Specific gridded receptors included/excluded
----

Specific gridded receptors are excluded from CALPOST processing by filling a processing grid array with 0s and 1s. A total of NGONOFF lines are read here. Each line corresponds to one 'row' in the sampling grid, starting with the NORTHERNMOST row that contains receptors that you wish to exclude, and finishing with row 1 to the SOUTH (no intervening rows may be skipped). Within a row, each receptor position is assigned either a 0 or 1, starting with the westernmost receptor.
0 = gridded receptor not processed

```
     1 = gridded receptor processed

   Repeated value notation may be used to select blocks of receptors:
     23*1, 15*0, 12*1

   Because all values are initially set to 1, any receptors north of
   the first row entered, or east of the last value provided in a row,
   remain ON.

   (NGXRECP) -- Default: 1


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

   Identify the Base Time Zone for the CALPUFF simulation
                          (BTZONE) -- No default   * BTZONE =  0.*

   Particle growth curve f(RH) for hygroscopic species
                            (MFRH) -- Default: 2   ! MFRH   =  2  !

        1 =  IWAQM (1998) f(RH) curve (originally used with MVISBK=1)
        2 =  FLAG (2000) f(RH) tabulation
        3 =  EPA (2003) f(RH) tabulation

   Maximum relative humidity (%) used in particle growth curve
                           (RHMAX) -- Default: 98  ! RHMAX  = 95.0 !

   Modeled species to be included in computing the light extinction
    Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
    Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
    Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
    Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = F  !
    Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
    Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

   And, when ranking for TOP-N, TOP-50, and Exceedance tables,
    Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

   Species name used for particulates in MODEL.DAT file
               COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
               FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PM10 !

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
   MODELED particulate species:
           PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
           PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
   BACKGROUND particulate species:
           PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
   Other species:
          AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
          AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
          ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
```

SOIL (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
ELEMENTAL CARBON (EEEC) -- Default: 10. ! EEEC = 10.0 !

Background Extinction Computation

Method used for the 24h-average of percent change of light extinction:
Hourly ratio of source light extinction / background light extinction
is averaged? (LAVER) -- Default: F ! LAVER = F !

Method used for background light extinction
(MVISBK) -- Default: 2 ! MVISBK = 6 !

1 = Supply single light extinction and hygroscopic fraction
- Hourly F(RH) adjustment applied to hygroscopic background and modeled sulfate and nitrate

2 = Compute extinction from speciated PM measurements (A)
- Hourly F(RH) adjustment applied to observed and modeled sulfate and nitrate
- F(RH) factor is capped at F(RHMAX)

3 = Compute extinction from speciated PM measurements (B)
- Hourly F(RH) adjustment applied to observed and modeled sulfate and nitrate
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours

4 = Read hourly transmissometer background extinction measurements
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference, or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours

5 = Read hourly nephelometer background extinction measurements
- Rayleigh extinction value (BEXTRAY) added to measurement
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference, or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours

6 = Compute extinction from speciated PM measurements
- FLAG monthly RH adjustment factor applied to observed and modeled sulfate and nitrate

7 = Use observed weather or prognostic weather information for background extinction during weather events; otherwise, use Method 2
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- F(RH) factor is capped at F(RHMAX)
- During observed weather events, compute Bext from visual range if using an observed weather data file, or
- During prognostic weather events, use Bext from the prognostic weather file
- Use Method 2 for hours without a weather event

Additional inputs used for MVISBK = 1:

Background light extinction (1/Mm)
(BEXTBK) -- No default ! BEXTBK = 12.0 !

Percentage of particles affected by relative humidity
(RHFRAC) -- No default ! RHFRAC = 10.0 !

Additional inputs used for MVISBK = 6:

Extinction coefficients for hygroscopic species (modeled and background) are computed using a monthly RH adjustment factor in place of an hourly RH factor (VISB.DAT file is NOT needed). Enter the 12 monthly factors here (RHFAC). Month 1 is January.

```
(RHFAC)  -- No default     ! RHFAC = 3.3, 3.0, 2.7, 2.8,
                             3.4, 3.4, 3.4, 3.4,
                             3.6, 3.3, 3.2, 3.3 !
```

Additional inputs used for MVISBK = 7:

The weather data file (DATSAV abbreviated space-delimited) that is identified as VSRN.DAT may contain data for more than one station. Identify the stations that are needed in the order in which they will be used to obtain valid weather and visual range. The first station that contains valid data for an hour will be used. Enter up to MXWSTA (set in PARAMS file) integer station IDs of up to 6 digits each as variable IDWSTA, and enter the corresponding time zone for each, as variable TZONE (= UTC-LST).

A prognostic weather data file with Bext for weather events may be used in place of the observed weather file. Identify this as the VSRN.DAT file and use a station ID of IDWSTA = 999999, and TZONE = 0.

NOTE: TZONE identifies the time zone used in the dataset. The DATSAV abbreviated space-delimited data usually are prepared with UTC time rather than local time, so TZONE is typically set to zero.

```
 (IDWSTA)   -- No default
! IDWSTA = 690230 ,80020 ,80140 !
 (TZONE)    -- No default
! TZONE  = 0.0 ,0.0 ,0.0 !
```

Additional inputs used for MVISBK = 2,3,6,7:

Background extinction coefficients are computed from monthly CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3), coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and elemental carbon (BKEC). Month 1 is January.
(ug/m**3)

```
(BKSO4)  -- No default     ! BKSO4 = 0.23, 0.23, 0.23, 0.23,
                             0.23, 0.23, 0.23, 0.23,
                             0.23, 0.23, 0.23, 0.23 !
(BKNO3)  -- No default     ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
                             0.1, 0.1, 0.1, 0.1,
                             0.1, 0.1, 0.1, 0.1 !
(BKPMC)  -- No default     ! BKPMC = 3.0, 3.0, 3.0, 3.0,
                             3.0, 3.0, 3.0, 3.0,
                             3.0, 3.0, 3.0, 3.0 !
```

```
     (BKOC)   -- No default     ! BKOC  = 1.4, 1.4, 1.4, 1.4,
                                  1.4, 1.4, 1.4, 1.4,
                                  1.4, 1.4, 1.4, 1.4 !
     (BKSOIL) -- No default     ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                                  0.5, 0.5, 0.5, 0.5,
                                  0.5, 0.5, 0.5, 0.5 !
     (BKEC)   -- No default     ! BKEC  = 0.02, 0.02, 0.02, 0.02,
                                  0.02, 0.02, 0.02, 0.02,
                                  0.02, 0.02, 0.02, 0.02 !

    Additional inputs used for MVISBK = 2,3,5,6,7:
    ----------------------------------------------
     Extinction due to Rayleigh scattering is added (1/Mm)
                          (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

    Documentation records contained in the header of the
    CALPUFF output file may be written to the list file.
    Print documentation image?
                             (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                    for            for
               Concentration    Deposition
       1 =        g/m**3        g/m**2/s
       2 =       mg/m**3        mg/m**2/s
       3 =       ug/m**3       ug/m**2/s
       4 =       ng/m**3       ng/m**2/s
       5 =     Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

    1-hr averages          (L1HR) -- Default: T   !   L1HR = F  !

    3-hr averages          (L3HR) -- Default: T   !   L3HR = F  !

    24-hr averages         (L24HR) -- Default: T   !  L24HR = F  !

    Run-length averages    (LRUNL) -- Default: T   !  LRUNL = F  !

    User-specified averaging time in hours - results for
    an averaging time of NAVG hours are reported for
```

NAVG greater than 0:
(NAVG) -- Default: 0 ! NAVG = 0 !

Types of tabulations reported
----

1) Visibility: daily visibility tabulations are always reported
for the selected receptors when ASPEC = VISIB.
In addition, any of the other tabulations listed
below may be chosen to characterize the light
extinction coefficients.
[List file or Plot/Analysis File]

2) Top 50 table for each averaging time selected
[List file only]
(LT50) -- Default: T ! LT50 = F !

3) Top 'N' table for each averaging time selected
[List file or Plot file]
(LTOPN) -- Default: F ! LTOPN = T !

-- Number of 'Top-N' values at each receptor
selected (NTOP must be <= 4)
(NTOP) -- Default: 4 ! NTOP = 1 !

-- Specific ranks of 'Top-N' values reported
(NTOP values must be entered)
(ITOP(4) array) -- Default: ! ITOP = 1 !
1,2,3,4

4) Threshold exceedance counts for each receptor and each averaging
time selected
[List file or Plot file]
(LEXCD) -- Default: F ! LEXCD = T !

-- Identify the threshold for each averaging time by assigning a
non-negative value (output units).

-- Default: 0.5
Threshold for 1-hr averages (THRESH1) ! THRESH1 = 1.000E01 !
Threshold for 3-hr averages (THRESH3) ! THRESH3 = -1.0 !
Threshold for 24-hr averages (THRESH24) ! THRESH24 = -1.0 !
Threshold for NAVG-hr averages (THRESHN) ! THRESHN = -1.0 !

-- Counts for the shortest averaging period selected can be
tallied daily, and receptors that experience more than NCOUNT
counts over any NDAY period will be reported. This type of
exceedance violation output is triggered only if NDAY > 0.

Accumulation period(Days)
(NDAY) -- Default: 0 ! NDAY = 0 !
Number of exceedances allowed

(NCOUNT) -- Default: 1 ! NCOUNT = 1 !

5) Selected day table(s)

Echo Option -- Many records are written each averaging period
selected and output is grouped by day
[List file or Plot file]
(LECHO) -- Default: F ! LECHO = F !

Timeseries Option -- Averages at all selected receptors for
each selected averaging period are written to timeseries files.
Each file contains one averaging period, and all receptors are
written to a single record each averaging time.
[TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LTIME) -- Default: F ! LTIME = F !

Peak Value Option -- Averages at all selected receptors for
each selected averaging period are screened and the peak value
each period is written to timeseries files.
Each file contains one averaging period.
[PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LPEAK) -- Default: F ! LPEAK = F !

-- Days selected for output
(IECHO(366)) -- Default: 366*0
! IECHO = 366*0 !
(366 values must be entered)

Plot output options

Plot files can be created for the Top-N, Exceedance, and Echo
tables selected above. Two formats for these files are available,
DATA and GRID. In the DATA format, results at all receptors are
listed along with the receptor location [x,y,val1,val2,...].
In the GRID format, results at only gridded receptors are written,
using a compact representation. The gridded values are written in
rows (x varies), starting with the most southern row of the grid.
The GRID format is given the .GRD extension, and includes headers
compatible with the SURFER(R) plotting software.

A plotting and analysis file can also be created for the daily
peak visibility summary output, in DATA format only.

Generate Plot file output in addition to writing tables
to List file?
(LPLT) -- Default: F ! LPLT = F !

Use GRID format rather than DATA format,
when available?
(LGRD) -- Default: F ! LGRD = F !

Auxiliary Output Files (for subsequent analyses)

Visibility

A separate output file may be requested that contains the change
in visibility at each selected receptor when ASPEC = VISIB. This
file can be processed to construct visibility measures that are
not available in CALPOST.

Output file with the visibility change at each receptor?
(MDVIS) -- Default: 0   ! MDVIS = 0 !

0 = Do Not create file
1 = Create file of DAILY (24 hour) Delta-Deciview
2 = Create file of DAILY (24 hour) Extinction Change (%)
3 = Create file of HOURLY Delta-Deciview
4 = Create file of HOURLY Extinction Change (%)

Additional Debug Output

Output selected information to List file
for debugging?
(LDEBUG) -- Default: F ! LDEBUG = F !

Output hourly extinction information to REPORT.HRV?
(Visibility Method 7)
(LVEXTHR) -- Default: F ! LVEXTHR = F !

!END!

```
CALPUFF NOR 2003 BART Evaluation
MAMMOTH CAVE CENRAP 6km MET FIELD
SCREENING ANALYSIS

---------------- Run title (3 lines) ------------------------------------------

                    CALPOST MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names
--------------

Input Files
-----------

File                     Default File Name
----                     -----------------
Conc/Dep Flux File       MODEL.DAT    ! MODDAT =../calpuff/outputs/nor/nrcmc2003q4.con  !
Relative Humidity File    VISB.DAT     ! VISDAT =../calpuff/outputs/nor/nrcmc2003q4.vis  !
Background Data File      BACK.DAT          * BACKDAT =   *
Transmissometer or       VSRN.DAT          * VSRDAT =   *
Nephelometer Data File     or
DATSAV Weather Data File   or
Prognostic Weather  File

Output Files
------------

File                     Default File Name
----                     -----------------
List File                 CALPOST.LST       ! PSTLST = nrcmc2003q4.lst   !

Pathname for Timeseries Files   (blank)      * TSPATH =   *
(activate with exclamation points only if
providing NON-BLANK character string)

Pathname for Plot Files   (blank)           * PLPATH =   *
(activate with exclamation points only if
 providing NON-BLANK character string)

User Character String (U) to augment default filenames
(activate with exclamation points only if
 providing NON-BLANK character string)

Timeseries         TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT
Peak Value         PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT

                                   * TSUNAM =   *

Top Nth Rank Plot   RANK(ALL)_ASPEC_ttHR_CONC_TUNAM.DAT
              or  RANK(ii)_ASPEC_ttHR_CONC_TUNAM.GRD

                                   * TUNAM =   *
```

```
Exceedance Plot      EXCEED_ASPEC_ttHR_CONC_XUNAM.DAT
             or  EXCEED_ASPEC_ttHR_CONC_XUNAM.GRD

                                   * XUNAM =   *

Echo Plot
(Specific Days)
         yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.DAT
    or    yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.GRD


Visibility Plot      DAILY_VISIB_VUNAM.DAT   * VUNAM =VTEST   *
(Daily Peak Summary)



Auxiliary Output Files
---------------------

File                    Default File Name
----                    -----------------
Visibility Change        DELVIS.DAT          * DVISDAT = deciview.dat  *


-------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
       T = lower case              ! LCFILES = T !
       F = UPPER CASE
NOTE: (1) file/path names can be up to 132 characters in length
NOTE: (2) Filenames for ALL PLOT and TIMESERIES FILES are constructed
        using a template that includes a pathname, user-supplied
        character(s), and context-specific strings, where
          ASPEC = Species Name
           CONC = CONC Or WFLX Or DFLX Or TFLX
             tt = Averaging Period (e.g. 03)
             ii = Rank (e.g. 02)
             hh = Hour(ending) in LST
          szzzz = LST time zone shift (EST is -0500)
           yyyy = Year(LST)
             mm = Month(LST)
             dd = day of month (LST)
        are determined internally based on selections made below.
        If a path or user-supplied character(s) are supplied, each
        must contain at least 1 non-blank character.

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file(s)  (METRUN)       Default: 0   ! METRUN =   1  !

       METRUN = 0 - Run period explicitly defined below
```

```
       METRUN = 1 - Run all periods in CALPUFF data file(s)

     Starting date:    Year  (ISYR) --    No default   ! ISYR  =  2003   !
     (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
      METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                       Hour  (ISHR) --    No default   ! ISHR  =  0   !

     Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

     Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
      (1 = every hour processed,
       2 = every 2nd hour processed,
       5 = every 5th hour processed, etc.)

Species & Concentration/Deposition Information
----------------------------------------------

      Species to process (ASPEC)       -- No default   ! ASPEC = VISIB  !
      (ASPEC = VISIB for visibility processing)

      Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
        '1'  for CALPUFF concentrations,
        '-1' for dry deposition fluxes,
        '-2' for wet deposition fluxes,
        '-3' for wet+dry deposition fluxes.

      Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
           X(new) = X(old) * A + B         A = 0.0    ! B =  0.0    !
        (NOT applied if A = B = 0.0)        B = 0.0

      Add Hourly Background Concentrations/Fluxes?
                         (LBACK)  -- Default: F   ! LBACK =  F !

Source information
------------------

  Option to process source contributions:
       0 =  Process only total reported contributions
       1 =  Sum all individual source contributions and process
       2 =  Run in TRACEBACK mode to identify source
            contributions at a SINGLE receptor
                      (MSOURCE) -- Default: 0   ! MSOURCE =  0  !

Receptor information
--------------------

  Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                           (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):
```

Select ALL DISCRETE receptors by setting NDRECP flag to -1;
OR
Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
0 = discrete receptor not processed
1 = discrete receptor processed
using repeated value notation to select blocks of receptors:
23*1, 15*0, 12*1
Flag for all receptors after the last one assigned is set to 0
(NDRECP) -- Default: -1
! NDRECP = -1 !

--Select range of GRIDDED receptors (only used when LG = T):

X index of LL corner (IBGRID) -- Default: -1   ! IBGRID = -1 !
(-1 OR 1 <= IBGRID <= NX)

Y index of LL corner (JBGRID) -- Default: -1   ! JBGRID = -1 !
(-1 OR 1 <= JBGRID <= NY)

X index of UR corner (IEGRID) -- Default: -1   ! IEGRID = -1 !
(-1 OR 1 <= IEGRID <= NX)

Y index of UR corner (JEGRID) -- Default: -1   ! JEGRID = -1 !
(-1 OR 1 <= JEGRID <= NY)

Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

--Specific gridded receptors can also be excluded from CALPOST processing by filling a processing grid array with 0s and 1s. If the processing flag for receptor index (i,j) is 1 (ON), that receptor will be processed if it lies within the range delineated by IBGRID, JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be processed in the run. By default, all array values are set to 1 (ON).

Number of gridded receptor rows provided in Subgroup (1a) to identify specific gridded receptors to process
(NGONOFF) -- Default: 0   ! NGONOFF = 0 !

!END!

Subgroup (1a) -- Specific gridded receptors included/excluded
----

Specific gridded receptors are excluded from CALPOST processing by filling a processing grid array with 0s and 1s. A total of NGONOFF lines are read here. Each line corresponds to one 'row' in the sampling grid, starting with the NORTHERNMOST row that contains receptors that you wish to exclude, and finishing with row 1 to the SOUTH (no intervening rows may be skipped). Within a row, each receptor position is assigned either a 0 or 1, starting with the westernmost receptor.
0 = gridded receptor not processed

```
       1 = gridded receptor processed

    Repeated value notation may be used to select blocks of receptors:
       23*1, 15*0, 12*1

    Because all values are initially set to 1, any receptors north of
    the first row entered, or east of the last value provided in a row,
    remain ON.

    (NGXRECP) -- Default: 1


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Identify the Base Time Zone for the CALPUFF simulation
                          (BTZONE) -- No default   * BTZONE =  0.*

    Particle growth curve f(RH) for hygroscopic species
                           (MFRH) -- Default: 2   ! MFRH   =  2  !

         1 =  IWAQM (1998) f(RH) curve (originally used with MVISBK=1)
         2 =  FLAG (2000) f(RH) tabulation
         3 =  EPA (2003) f(RH) tabulation

    Maximum relative humidity (%) used in particle growth curve
                          (RHMAX) -- Default: 98  ! RHMAX  = 95.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?         (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?         (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
     Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
```

SOIL (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
ELEMENTAL CARBON (EEEC) -- Default: 10. ! EEEC = 10.0 !

Background Extinction Computation

Method used for the 24h-average of percent change of light extinction:
Hourly ratio of source light extinction / background light extinction
is averaged? (LAVER) -- Default: F ! LAVER = F !

Method used for background light extinction
(MVISBK) -- Default: 2 ! MVISBK = 2 !

1 = Supply single light extinction and hygroscopic fraction
 - Hourly F(RH) adjustment applied to hygroscopic background
 and modeled sulfate and nitrate
2 = Compute extinction from speciated PM measurements (A)
 - Hourly F(RH) adjustment applied to observed and modeled sulfate
 and nitrate
 - F(RH) factor is capped at F(RHMAX)
3 = Compute extinction from speciated PM measurements (B)
 - Hourly F(RH) adjustment applied to observed and modeled sulfate
 and nitrate
 - Receptor-hour excluded if RH>RHMAX
 - Receptor-day excluded if fewer than 6 valid receptor-hours
4 = Read hourly transmissometer background extinction measurements
 - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
 - Hour excluded if measurement invalid (missing, interference,
 or large RH)
 - Receptor-hour excluded if RH>RHMAX
 - Receptor-day excluded if fewer than 6 valid receptor-hours
5 = Read hourly nephelometer background extinction measurements
 - Rayleigh extinction value (BEXTRAY) added to measurement
 - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
 - Hour excluded if measurement invalid (missing, interference,
 or large RH)
 - Receptor-hour excluded if RH>RHMAX
 - Receptor-day excluded if fewer than 6 valid receptor-hours
6 = Compute extinction from speciated PM measurements
 - FLAG monthly RH adjustment factor applied to observed and
 modeled sulfate and nitrate
7 = Use observed weather or prognostic weather information for
 background extinction during weather events; otherwise, use Method 2
 - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
 - F(RH) factor is capped at F(RHMAX)
 - During observed weather events, compute Bext from visual range
 if using an observed weather data file, or
 - During prognostic weather events, use Bext from the prognostic
 weather file
 - Use Method 2 for hours without a weather event

Additional inputs used for MVISBK = 1:

Background light extinction (1/Mm)
(BEXTBK) -- No default ! BEXTBK = 12.0 !

Percentage of particles affected by relative humidity
(RHFRAC) -- No default ! RHFRAC = 10.0 !

Additional inputs used for MVISBK = 6:

Extinction coefficients for hygroscopic species (modeled and background) are computed using a monthly RH adjustment factor in place of an hourly RH factor (VISB.DAT file is NOT needed). Enter the 12 monthly factors here (RHFAC). Month 1 is January.

```
(RHFAC)  -- No default     ! RHFAC = 3.4, 3.1, 2.9, 2.6,
                             3.2, 3.5, 3.7, 3.9,
                             3.9, 3.4, 3.2, 3.5 !
```

Additional inputs used for MVISBK = 7:

The weather data file (DATSAV abbreviated space-delimited) that is identified as VSRN.DAT may contain data for more than one station. Identify the stations that are needed in the order in which they will be used to obtain valid weather and visual range. The first station that contains valid data for an hour will be used. Enter up to MXWSTA (set in PARAMS file) integer station IDs of up to 6 digits each as variable IDWSTA, and enter the corresponding time zone for each, as variable TZONE (= UTC-LST).

A prognostic weather data file with Bext for weather events may be used in place of the observed weather file. Identify this as the VSRN.DAT file and use a station ID of IDWSTA = 999999, and TZONE = 0.

NOTE: TZONE identifies the time zone used in the dataset. The DATSAV abbreviated space-delimited data usually are prepared with UTC time rather than local time, so TZONE is typically set to zero.

```
 (IDWSTA)   -- No default
! IDWSTA = 690230 ,80020 ,80140 !
 (TZONE)    -- No default
! TZONE  = 0.0 ,0.0 ,0.0 !
```

Additional inputs used for MVISBK = 2,3,6,7:

Background extinction coefficients are computed from monthly CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3), coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and elemental carbon (BKEC). Month 1 is January.
(ug/m**3)

```
(BKSO4)  -- No default     ! BKSO4 = 0.23, 0.23, 0.23, 0.23,
                             0.23, 0.23, 0.23, 0.23,
                             0.23, 0.23, 0.23, 0.23 !
(BKNO3)  -- No default     ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
                             0.1, 0.1, 0.1, 0.1,
                             0.1, 0.1, 0.1, 0.1 !
(BKPMC)  -- No default     ! BKPMC = 3.0, 3.0, 3.0, 3.0,
                             3.0, 3.0, 3.0, 3.0,
                             3.0, 3.0, 3.0, 3.0 !
```

```
 (BKOC)   -- No default     ! BKOC  = 1.4, 1.4, 1.4, 1.4,
                                1.4, 1.4, 1.4, 1.4,
                                1.4, 1.4, 1.4, 1.4 !
 (BKSOIL) -- No default     ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                                0.5, 0.5, 0.5, 0.5,
                                0.5, 0.5, 0.5, 0.5 !
 (BKEC)   -- No default     ! BKEC  = 0.02, 0.02, 0.02, 0.02,
                                0.02, 0.02, 0.02, 0.02,
                                0.02, 0.02, 0.02, 0.02 !

Additional inputs used for MVISBK = 2,3,5,6,7:
-----------------------------------------------
 Extinction due to Rayleigh scattering is added (1/Mm)
                (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

   Documentation records contained in the header of the
   CALPUFF output file may be written to the list file.
   Print documentation image?
                  (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
   Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                for           for
           Concentration    Deposition
     1 =        g/m**3        g/m**2/s
     2 =       mg/m**3        mg/m**2/s
     3 =       ug/m**3       ug/m**2/s
     4 =       ng/m**3       ng/m**2/s
     5 =     Odour Units

   Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

   1-hr averages          (L1HR) -- Default: T   !   L1HR = F  !

   3-hr averages          (L3HR) -- Default: T   !   L3HR = F  !

   24-hr averages         (L24HR) -- Default: T   !  L24HR = F  !

   Run-length averages    (LRUNL) -- Default: T   !  LRUNL = F  !

   User-specified averaging time in hours - results for
   an averaging time of NAVG hours are reported for
```

NAVG greater than 0:
(NAVG) -- Default: 0 ! NAVG = 0 !

Types of tabulations reported
----

1) Visibility: daily visibility tabulations are always reported
for the selected receptors when ASPEC = VISIB.
In addition, any of the other tabulations listed
below may be chosen to characterize the light
extinction coefficients.
[List file or Plot/Analysis File]

2) Top 50 table for each averaging time selected
[List file only]
(LT50) -- Default: T ! LT50 = F !

3) Top 'N' table for each averaging time selected
[List file or Plot file]
(LTOPN) -- Default: F ! LTOPN = T !

-- Number of 'Top-N' values at each receptor
selected (NTOP must be <= 4)
(NTOP) -- Default: 4 ! NTOP = 1 !

-- Specific ranks of 'Top-N' values reported
(NTOP values must be entered)
(ITOP(4) array) -- Default: ! ITOP = 1 !
1,2,3,4

4) Threshold exceedance counts for each receptor and each averaging
time selected
[List file or Plot file]
(LEXCD) -- Default: F ! LEXCD = T !

-- Identify the threshold for each averaging time by assigning a
non-negative value (output units).

-- Default: 0.5
Threshold for 1-hr averages (THRESH1) ! THRESH1 = 1.000E01 !
Threshold for 3-hr averages (THRESH3) ! THRESH3 = -1.0 !
Threshold for 24-hr averages (THRESH24) ! THRESH24 = -1.0 !
Threshold for NAVG-hr averages (THRESHN) ! THRESHN = -1.0 !

-- Counts for the shortest averaging period selected can be
tallied daily, and receptors that experience more than NCOUNT
counts over any NDAY period will be reported. This type of
exceedance violation output is triggered only if NDAY > 0.

Accumulation period(Days)
(NDAY) -- Default: 0 ! NDAY = 0 !
Number of exceedances allowed

(NCOUNT) -- Default: 1 ! NCOUNT = 1 !

5) Selected day table(s)

Echo Option -- Many records are written each averaging period
selected and output is grouped by day
[List file or Plot file]
(LECHO) -- Default: F ! LECHO = F !

Timeseries Option -- Averages at all selected receptors for
each selected averaging period are written to timeseries files.
Each file contains one averaging period, and all receptors are
written to a single record each averaging time.
[TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LTIME) -- Default: F ! LTIME = F !

Peak Value Option -- Averages at all selected receptors for
each selected averaging period are screened and the peak value
each period is written to timeseries files.
Each file contains one averaging period.
[PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LPEAK) -- Default: F ! LPEAK = F !

-- Days selected for output
(IECHO(366)) -- Default: 366*0
! IECHO = 366*0 !
(366 values must be entered)

Plot output options

Plot files can be created for the Top-N, Exceedance, and Echo
tables selected above. Two formats for these files are available,
DATA and GRID. In the DATA format, results at all receptors are
listed along with the receptor location [x,y,val1,val2,...].
In the GRID format, results at only gridded receptors are written,
using a compact representation. The gridded values are written in
rows (x varies), starting with the most southern row of the grid.
The GRID format is given the .GRD extension, and includes headers
compatible with the SURFER(R) plotting software.

A plotting and analysis file can also be created for the daily
peak visibility summary output, in DATA format only.

Generate Plot file output in addition to writing tables
to List file?
(LPLT) -- Default: F ! LPLT = F !

Use GRID format rather than DATA format,
when available?
(LGRD) -- Default: F ! LGRD = F !

Auxiliary Output Files (for subsequent analyses)

Visibility

A separate output file may be requested that contains the change in visibility at each selected receptor when ASPEC = VISIB. This file can be processed to construct visibility measures that are not available in CALPOST.

Output file with the visibility change at each receptor?
(MDVIS) -- Default: 0 ! MDVIS = 0 !

0 = Do Not create file
1 = Create file of DAILY (24 hour) Delta-Deciview
2 = Create file of DAILY (24 hour) Extinction Change (%)
3 = Create file of HOURLY Delta-Deciview
4 = Create file of HOURLY Extinction Change (%)

Additional Debug Output

Output selected information to List file
for debugging?
(LDEBUG) -- Default: F ! LDEBUG = F !

Output hourly extinction information to REPORT.HRV?
(Visibility Method 7)
(LVEXTHR) -- Default: F ! LVEXTHR = F !

!END!

```
CALPUFF NOR 2003 BART Evaluation
MAMMOTH CAVE CENRAP 6km MET FIELD
SCREENING ANALYSIS

---------------- Run title (3 lines) ------------------------------------------

                    CALPOST MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names
--------------

Input Files
-----------

File                    Default File Name
----                    -----------------
Conc/Dep Flux File       MODEL.DAT    ! MODDAT =../calpuff/outputs/nor/nrcmc2003q4.con  !
Relative Humidity File    VISB.DAT     ! VISDAT =../calpuff/outputs/nor/nrcmc2003q4.vis  !
Background Data File      BACK.DAT           * BACKDAT =   *
Transmissometer or        VSRN.DAT           * VSRDAT =   *
Nephelometer Data File     or
DATSAV Weather Data File   or
Prognostic Weather  File

Output Files
------------

File                    Default File Name
----                    -----------------
List File                CALPOST.LST        ! PSTLST = nrcmc2003q4m6.lst   !

Pathname for Timeseries Files   (blank)      * TSPATH =   *
(activate with exclamation points only if
providing NON-BLANK character string)

Pathname for Plot Files   (blank)           * PLPATH =   *
(activate with exclamation points only if
 providing NON-BLANK character string)

User Character String (U) to augment default filenames
(activate with exclamation points only if
 providing NON-BLANK character string)

Timeseries          TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT
Peak Value          PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT

                                  * TSUNAM =   *

Top Nth Rank Plot   RANK(ALL)_ASPEC_ttHR_CONC_TUNAM.DAT
               or  RANK(ii)_ASPEC_ttHR_CONC_TUNAM.GRD

                                  * TUNAM =   *
```

```
Exceedance Plot      EXCEED_ASPEC_ttHR_CONC_XUNAM.DAT
             or  EXCEED_ASPEC_ttHR_CONC_XUNAM.GRD

                                    * XUNAM =   *

Echo Plot
(Specific Days)
         yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.DAT
    or    yyyy_Mmm_Ddd_hh00(UTCszzzz)_L00_ASPEC_ttHR_CONC.GRD


Visibility Plot      DAILY_VISIB_VUNAM.DAT   * VUNAM =VTEST   *
(Daily Peak Summary)



Auxiliary Output Files
---------------------

File                    Default File Name
----                    -----------------
Visibility Change        DELVIS.DAT          * DVISDAT = deciview.dat  *


-------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
       T = lower case              ! LCFILES = T !
       F = UPPER CASE
NOTE: (1) file/path names can be up to 132 characters in length
NOTE: (2) Filenames for ALL PLOT and TIMESERIES FILES are constructed
        using a template that includes a pathname, user-supplied
        character(s), and context-specific strings, where
          ASPEC = Species Name
           CONC = CONC Or WFLX Or DFLX Or TFLX
             tt = Averaging Period (e.g. 03)
             ii = Rank (e.g. 02)
             hh = Hour(ending) in LST
          szzzz = LST time zone shift (EST is -0500)
           yyyy = Year(LST)
             mm = Month(LST)
             dd = day of month (LST)
        are determined internally based on selections made below.
        If a path or user-supplied character(s) are supplied, each
        must contain at least 1 non-blank character.

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file(s)  (METRUN)       Default: 0   ! METRUN =   1  !

       METRUN = 0 - Run period explicitly defined below
```

```
      METRUN = 1 - Run all periods in CALPUFF data file(s)

    Starting date:    Year  (ISYR) --    No default   ! ISYR  =  2003   !
    (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
     METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                    Hour  (ISHR) --    No default   ! ISHR  =  0   !

    Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

    Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
     (1 = every hour processed,
      2 = every 2nd hour processed,
      5 = every 5th hour processed, etc.)

Species & Concentration/Deposition Information
----------------------------------------------

     Species to process (ASPEC)       -- No default   ! ASPEC = VISIB  !
     (ASPEC = VISIB for visibility processing)

     Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
       '1'  for CALPUFF concentrations,
       '-1' for dry deposition fluxes,
       '-2' for wet deposition fluxes,
       '-3' for wet+dry deposition fluxes.

     Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
         X(new) = X(old) * A + B         A = 0.0    ! B =  0.0    !
       (NOT applied if A = B = 0.0)        B = 0.0

     Add Hourly Background Concentrations/Fluxes?
                         (LBACK)  -- Default: F   ! LBACK =  F !

Source information
------------------

  Option to process source contributions:
       0 =  Process only total reported contributions
       1 =  Sum all individual source contributions and process
       2 =  Run in TRACEBACK mode to identify source
            contributions at a SINGLE receptor
                        (MSOURCE) -- Default: 0   ! MSOURCE =  0  !

Receptor information
--------------------

  Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                          (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):
```

Select ALL DISCRETE receptors by setting NDRECP flag to -1;
OR
Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
0 = discrete receptor not processed
1 = discrete receptor processed
using repeated value notation to select blocks of receptors:
23*1, 15*0, 12*1
Flag for all receptors after the last one assigned is set to 0
(NDRECP) -- Default: -1
! NDRECP = -1 !

--Select range of GRIDDED receptors (only used when LG = T):

X index of LL corner (IBGRID) -- Default: -1 ! IBGRID = -1 !
(-1 OR 1 <= IBGRID <= NX)

Y index of LL corner (JBGRID) -- Default: -1 ! JBGRID = -1 !
(-1 OR 1 <= JBGRID <= NY)

X index of UR corner (IEGRID) -- Default: -1 ! IEGRID = -1 !
(-1 OR 1 <= IEGRID <= NX)

Y index of UR corner (JEGRID) -- Default: -1 ! JEGRID = -1 !
(-1 OR 1 <= JEGRID <= NY)

Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

--Specific gridded receptors can also be excluded from CALPOST processing by filling a processing grid array with 0s and 1s. If the processing flag for receptor index (i,j) is 1 (ON), that receptor will be processed if it lies within the range delineated by IBGRID, JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be processed in the run. By default, all array values are set to 1 (ON).

Number of gridded receptor rows provided in Subgroup (1a) to identify specific gridded receptors to process
(NGONOFF) -- Default: 0 ! NGONOFF = 0 !

!END!

Subgroup (1a) -- Specific gridded receptors included/excluded
----

Specific gridded receptors are excluded from CALPOST processing by filling a processing grid array with 0s and 1s. A total of NGONOFF lines are read here. Each line corresponds to one 'row' in the sampling grid, starting with the NORTHERNMOST row that contains receptors that you wish to exclude, and finishing with row 1 to the SOUTH (no intervening rows may be skipped). Within a row, each receptor position is assigned either a 0 or 1, starting with the westernmost receptor.
0 = gridded receptor not processed

1 = gridded receptor processed

Repeated value notation may be used to select blocks of receptors:
23*1, 15*0, 12*1

Because all values are initially set to 1, any receptors north of
the first row entered, or east of the last value provided in a row,
remain ON.

(NGXRECP) -- Default: 1

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)

Identify the Base Time Zone for the CALPUFF simulation
(BTZONE) -- No default * BTZONE = 0.*

Particle growth curve f(RH) for hygroscopic species
(MFRH) -- Default: 2 ! MFRH = 2 !

1 = IWAQM (1998) f(RH) curve (originally used with MVISBK=1)
2 = FLAG (2000) f(RH) tabulation
3 = EPA (2003) f(RH) tabulation

Maximum relative humidity (%) used in particle growth curve
(RHMAX) -- Default: 98 ! RHMAX = 95.0 !

Modeled species to be included in computing the light extinction
Include SULFATE? (LVSO4) -- Default: T ! LVSO4 = T !
Include NITRATE? (LVNO3) -- Default: T ! LVNO3 = T !
Include ORGANIC CARBON? (LVOC) -- Default: T ! LVOC = F !
Include COARSE PARTICLES? (LVPMC) -- Default: T ! LVPMC = T !
Include FINE PARTICLES? (LVPMF) -- Default: T ! LVPMF = T !
Include ELEMENTAL CARBON? (LVEC) -- Default: T ! LVEC = F !

And, when ranking for TOP-N, TOP-50, and Exceedance tables,
Include BACKGROUND? (LVBK) -- Default: T ! LVBK = T !

Species name used for particulates in MODEL.DAT file
COARSE (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
FINE (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

Extinction Efficiency (1/Mm per ug/m**3)

MODELED particulate species:
PM COARSE (EEPMC) -- Default: 0.6 ! EEPMC = 0.6 !
PM FINE (EEPMF) -- Default: 1.0 ! EEPMF = 1.0 !
BACKGROUND particulate species:
PM COARSE (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
Other species:
AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4 = 3.0 !
AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3 = 3.0 !
ORGANIC CARBON (EEOC) -- Default: 4.0 ! EEOC = 4.0 !

SOIL (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
ELEMENTAL CARBON (EEEC) -- Default: 10. ! EEEC = 10.0 !

Background Extinction Computation

Method used for the 24h-average of percent change of light extinction:
Hourly ratio of source light extinction / background light extinction
is averaged? (LAVER) -- Default: F ! LAVER = F !

Method used for background light extinction
(MVISBK) -- Default: 2 ! MVISBK = 6 !

1 = Supply single light extinction and hygroscopic fraction
- Hourly F(RH) adjustment applied to hygroscopic background
and modeled sulfate and nitrate
2 = Compute extinction from speciated PM measurements (A)
- Hourly F(RH) adjustment applied to observed and modeled sulfate
and nitrate
- F(RH) factor is capped at F(RHMAX)
3 = Compute extinction from speciated PM measurements (B)
- Hourly F(RH) adjustment applied to observed and modeled sulfate
and nitrate
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
4 = Read hourly transmissometer background extinction measurements
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference,
or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
5 = Read hourly nephelometer background extinction measurements
- Rayleigh extinction value (BEXTRAY) added to measurement
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- Hour excluded if measurement invalid (missing, interference,
or large RH)
- Receptor-hour excluded if RH>RHMAX
- Receptor-day excluded if fewer than 6 valid receptor-hours
6 = Compute extinction from speciated PM measurements
- FLAG monthly RH adjustment factor applied to observed and
modeled sulfate and nitrate
7 = Use observed weather or prognostic weather information for
background extinction during weather events; otherwise, use Method 2
- Hourly F(RH) adjustment applied to modeled sulfate and nitrate
- F(RH) factor is capped at F(RHMAX)
- During observed weather events, compute Bext from visual range
if using an observed weather data file, or
- During prognostic weather events, use Bext from the prognostic
weather file
- Use Method 2 for hours without a weather event

Additional inputs used for MVISBK = 1:

Background light extinction (1/Mm)
(BEXTBK) -- No default ! BEXTBK = 12.0 !

```
 Percentage of particles affected by relative humidity
                        (RHFRAC) -- No default   ! RHFRAC = 10.0 !

Additional inputs used for MVISBK = 6:
--------------------------------------
 Extinction coefficients for hygroscopic species (modeled and
 background) are computed using a monthly RH adjustment factor
 in place of an hourly RH factor (VISB.DAT file is NOT needed).
 Enter the 12 monthly factors here (RHFAC).  Month 1 is January.

 (RHFAC)  -- No default     ! RHFAC = 3.4, 3.1, 2.9, 2.6,
                                    3.2, 3.5, 3.7, 3.9,
                                    3.9, 3.4, 3.2, 3.5 !

Additional inputs used for MVISBK = 7:
--------------------------------------
 The weather data file (DATSAV abbreviated space-delimited) that
 is identified as VSRN.DAT may contain data for more than one
 station.  Identify the stations that are needed in the order in
 which they will be used to obtain valid weather and visual range.
 The first station that contains valid data for an hour will be
 used.  Enter up to MXWSTA (set in PARAMS file) integer station IDs
 of up to 6 digits each as variable IDWSTA, and enter the corresponding
 time zone for each, as variable TZONE (= UTC-LST).

 A prognostic weather data file with Bext for weather events may be used
 in place of the observed weather file.  Identify this as the VSRN.DAT
 file and use a station ID of IDWSTA = 999999, and TZONE = 0.

 NOTE:  TZONE identifies the time zone used in the dataset.  The
        DATSAV abbreviated space-delimited data usually are prepared
        with UTC time rather than local time, so TZONE is typically
        set to zero.

 (IDWSTA)   -- No default
! IDWSTA = 690230 ,80020 ,80140 !
 (TZONE)    -- No default
! TZONE  = 0.0 ,0.0 ,0.0 !

Additional inputs used for MVISBK = 2,3,6,7:
--------------------------------------------
 Background extinction coefficients are computed from monthly
 CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
 coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
 elemental carbon (BKEC).  Month 1 is January.
 (ug/m**3)

 (BKSO4)  -- No default     ! BKSO4 = 0.23, 0.23, 0.23, 0.23,
                                    0.23, 0.23, 0.23, 0.23,
                                    0.23, 0.23, 0.23, 0.23 !
 (BKNO3)  -- No default     ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
                                    0.1, 0.1, 0.1, 0.1,
                                    0.1, 0.1, 0.1, 0.1 !
 (BKPMC)  -- No default     ! BKPMC = 3.0, 3.0, 3.0, 3.0,
                                    3.0, 3.0, 3.0, 3.0,
                                    3.0, 3.0, 3.0, 3.0 !
```

```
 (BKOC)   -- No default     ! BKOC  = 1.4, 1.4, 1.4, 1.4,
                             1.4, 1.4, 1.4, 1.4,
                             1.4, 1.4, 1.4, 1.4 !
 (BKSOIL) -- No default     ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                             0.5, 0.5, 0.5, 0.5,
                             0.5, 0.5, 0.5, 0.5 !
 (BKEC)   -- No default     ! BKEC  = 0.02, 0.02, 0.02, 0.02,
                             0.02, 0.02, 0.02, 0.02,
                             0.02, 0.02, 0.02, 0.02 !

Additional inputs used for MVISBK = 2,3,5,6,7:
-----------------------------------------------
 Extinction due to Rayleigh scattering is added (1/Mm)
                  (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
--------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

   Documentation records contained in the header of the
   CALPUFF output file may be written to the list file.
   Print documentation image?
                        (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
   Units for All Output      (IPRTU) -- Default: 1   ! IPRTU =  3   !
                for           for
             Concentration    Deposition
     1 =        g/m**3        g/m**2/s
     2 =       mg/m**3        mg/m**2/s
     3 =       ug/m**3        ug/m**2/s
     4 =       ng/m**3        ng/m**2/s
     5 =     Odour Units

   Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

   1-hr averages          (L1HR) -- Default: T   !   L1HR = F  !

   3-hr averages          (L3HR) -- Default: T   !   L3HR = F  !

   24-hr averages         (L24HR) -- Default: T   !  L24HR = F  !

   Run-length averages    (LRUNL) -- Default: T   !  LRUNL = F  !

   User-specified averaging time in hours - results for
   an averaging time of NAVG hours are reported for
```

NAVG greater than 0:
(NAVG) -- Default: 0 ! NAVG = 0 !

Types of tabulations reported
----

1) Visibility: daily visibility tabulations are always reported
for the selected receptors when ASPEC = VISIB.
In addition, any of the other tabulations listed
below may be chosen to characterize the light
extinction coefficients.
[List file or Plot/Analysis File]

2) Top 50 table for each averaging time selected
[List file only]
(LT50) -- Default: T ! LT50 = F !

3) Top 'N' table for each averaging time selected
[List file or Plot file]
(LTOPN) -- Default: F ! LTOPN = T !

-- Number of 'Top-N' values at each receptor
selected (NTOP must be <= 4)
(NTOP) -- Default: 4 ! NTOP = 1 !

-- Specific ranks of 'Top-N' values reported
(NTOP values must be entered)
(ITOP(4) array) -- Default: ! ITOP = 1 !
1,2,3,4

4) Threshold exceedance counts for each receptor and each averaging
time selected
[List file or Plot file]
(LEXCD) -- Default: F ! LEXCD = T !

-- Identify the threshold for each averaging time by assigning a
non-negative value (output units).

-- Default: 0.5
Threshold for 1-hr averages (THRESH1) ! THRESH1 = 1.000E01 !
Threshold for 3-hr averages (THRESH3) ! THRESH3 = -1.0 !
Threshold for 24-hr averages (THRESH24) ! THRESH24 = -1.0 !
Threshold for NAVG-hr averages (THRESHN) ! THRESHN = -1.0 !

-- Counts for the shortest averaging period selected can be
tallied daily, and receptors that experience more than NCOUNT
counts over any NDAY period will be reported. This type of
exceedance violation output is triggered only if NDAY > 0.

Accumulation period(Days)
(NDAY) -- Default: 0 ! NDAY = 0 !
Number of exceedances allowed

(NCOUNT) -- Default: 1   ! NCOUNT = 1 !

5) Selected day table(s)

Echo Option -- Many records are written each averaging period
selected and output is grouped by day
[List file or Plot file]
(LECHO) -- Default: F   ! LECHO = F !

Timeseries Option -- Averages at all selected receptors for
each selected averaging period are written to timeseries files.
Each file contains one averaging period, and all receptors are
written to a single record each averaging time.
[TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LTIME) -- Default: F   ! LTIME = F !

Peak Value Option -- Averages at all selected receptors for
each selected averaging period are screened and the peak value
each period is written to timeseries files.
Each file contains one averaging period.
[PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT files]
(LPEAK) -- Default: F   ! LPEAK = F !

-- Days selected for output
(IECHO(366)) -- Default: 366*0
! IECHO = 366*0 !
(366 values must be entered)

Plot output options

Plot files can be created for the Top-N, Exceedance, and Echo
tables selected above. Two formats for these files are available,
DATA and GRID. In the DATA format, results at all receptors are
listed along with the receptor location [x,y,val1,val2,...].
In the GRID format, results at only gridded receptors are written,
using a compact representation. The gridded values are written in
rows (x varies), starting with the most southern row of the grid.
The GRID format is given the .GRD extension, and includes headers
compatible with the SURFER(R) plotting software.

A plotting and analysis file can also be created for the daily
peak visibility summary output, in DATA format only.

Generate Plot file output in addition to writing tables
to List file?
(LPLT) -- Default: F   ! LPLT = F !

Use GRID format rather than DATA format,
when available?
(LGRD) -- Default: F   ! LGRD = F !

Auxiliary Output Files (for subsequent analyses)

Visibility

A separate output file may be requested that contains the change in visibility at each selected receptor when ASPEC = VISIB. This file can be processed to construct visibility measures that are not available in CALPOST.

Output file with the visibility change at each receptor?
(MDVIS) -- Default: 0 ! MDVIS = 0 !

0 = Do Not create file
1 = Create file of DAILY (24 hour) Delta-Deciview
2 = Create file of DAILY (24 hour) Extinction Change (%)
3 = Create file of HOURLY Delta-Deciview
4 = Create file of HOURLY Extinction Change (%)

Additional Debug Output

Output selected information to List file
for debugging?
(LDEBUG) -- Default: F ! LDEBUG = F !

Output hourly extinction information to REPORT.HRV?
(Visibility Method 7)
(LVEXTHR) -- Default: F ! LVEXTHR = F !

!END!

```
MISSISSIPPI LIME SCREENING POINT SOURCE EMISSION RATES
(Emission Rates in g/s --> SO2, SO4, NOx, HNO3, NO3, PM10)

  Source       X          Y       Stack    Base     Stack    Exit  Exit     Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.    Dwash   Rates
              (km)       (km)      (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
   1 ! SRCNAM =        69!
   1 ! X =         604.487,  -201.419, 23.16,  140.00,  3.35,   6.45, 468.47, 0.00,
                 4.46095E+00,  0.00E+00,  8.13467E+00,  0.00E+00,  0.00E+00,  2.3326E-01!
   1 ! FMFAC = 1.0 ! !END!
   2 ! SRCNAM =        70!
   2 ! X =         604.474,  -201.408, 23.16,  140.00,  3.35,   6.45, 468.47, 0.00,
                 4.46095E+00,  0.00E+00,  8.13467E+00,  0.00E+00,  0.00E+00,  2.3326E-01!
   2 ! FMFAC = 1.0 ! !END!
   3 ! SRCNAM =        71!
   3 ! X =         604.457,  -201.400, 23.16,  140.00,  3.35,   6.45, 468.47, 0.00,
                 4.46095E+00,  0.00E+00,  8.13467E+00,  0.00E+00,  0.00E+00,  2.3326E-01!
   3 ! FMFAC = 1.0 ! !END!
   4 ! SRCNAM =        73!
   4 ! X =         604.481,  -201.418, 14.02,  140.00,  1.42,  25.02, 435.93, 0.00,
                 0.00E+00,  0.00E+00,  0.00E+00,  0.00E+00,  0.00E+00,  1.085E-02!
   4 ! FMFAC = 1.0 ! !END!
   5 ! SRCNAM =        74!
   5 ! X =         604.468,  -201.408, 14.02,  140.00,  1.42,  25.02, 435.93, 0.00,
                 0.00E+00,  0.00E+00,  0.00E+00,  0.00E+00,  0.00E+00,  1.085E-02!
   5 ! FMFAC = 1.0 ! !END!
   6 ! SRCNAM =        75!
   6 ! X =         604.452,  -201.398, 14.02, 140.00,   1.42,  25.02, 435.93, 0.00,
                 0.00E+00,  0.00E+00,  0.00E+00,  0.00E+00,  0.00E+00,  1.085E-02!
   6 ! FMFAC = 1.0 ! !END!


MISSISSIPPI LIME SCREENING POINT SOURCE EMISSION RATES
(Emission Rates in g/s --> SO2, SO4, NOx, HNO3, NO3, PM10)

        X          Y        Effect.    Base     Initial    Initial    Emission
    Coordinate  Coordinate  Height   Elevation  Sigma y    Sigma z     Rates
      (km)        (km)       (m)       (m)        (m)        (m)
    ----------  ----------  ------    ------    --------   --------   --------

   7 ! SRCNAM =       63B!
     ! X =         604.487,  -201.415, 22.25, 140.00, 0.21, 0.28, 0.00E+00,
                   0.00E+00, 0.00E+00, 0.00E+00, 0.00E+00, 6.93E-03!
     !END!
   8 ! SRCNAM =       63C!
     ! X =         604.472,  -201.407, 22.25, 140.00, 0.21, 0.28, 0.00E+00,
                   0.00E+00, 0.00E+00, 0.00E+00, 0.00E+00, 6.93E-03!
     !END!
   9 ! SRCNAM =       63D!
     ! X =         604.457,  -201.397, 22.25, 140.00, 0.21, 0.28, 0.00E+00,
                   0.00E+00, 0.00E+00, 0.00E+00, 0.00E+00, 6.93E-03!
     !END!


INDEPENDENCE P&L SCREENING EMISSION INPUT
(Emission Rates in g/s --> SO2, SO4, NOx, HNO3, NO3, PM10)

  Source       X          Y       Stack    Base     Stack    Exit  Exit     Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.    Dwash   Rates
              (km)       (km)      (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
```

```
   1 ! SRCNAM = EP05 !
   1 ! X =  229.4372,  -96.8095,  76.20, 238.36, 2.042, 28.524, 436.48,  0.0, 3.877866E02,
0.0E00, 3.26725E01, 0.0E00,  0.0E00, 5.43787E00 !
   1 ! FMFAC  =      1.0 !   !END!

INDEPENDENCE P&L REFINED EMISSION INPUT
(Emission Rates in g/s --> SO2, SO4, NOx, HNO3, NO3, PM10)

  Source       X          Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------   ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = EP05 !
   1 ! X =  -199.0226, 233.2908,  76.20, 238.4,  2.04, 28.524, 436.48,  0.0, 3.877866E02,
0.0E00,  3.26725E01, 0.0E00,  0.0E00, 5.43787E00 !
   1 ! FMFAC  =      1.0 !   !END!


MARSHALL MUNICIPAL SCREENING EMISSION INPUT
(Emission Rates in g/s --> SO2, SO4, NOx, HNO3, NO3, PM10)

  Source       X          Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------   ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = EP05  !
   1 ! X =  325.2775,  -90.0850, 49.683, 239.58,   1.524, 17.821, 449.82,  0.0,
1.844760E02,  0.0E00,  3.057429E01, 0.0E00,  0.0E00,  3.46011E00 !
   1 ! FMFAC  =      1.0 !   !END!


MARSHALL MUNICIPAL REFINED EMISSION INPUT
(Emission Rates in g/s --> SO2, SO4, NOx, HNO3, NO3, PM10)

  Source       X          Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------   ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = EP05 !
   1 ! X = -103.2238, 234.7896,  49.68, 239.6,    1.524, 17.821, 449.82,  0.0,
1.844760E02,  0.0E00,  3.057429E01, 0.0E00,  0.0E00, 3.46011E00 !
   1 ! FMFAC  =      1.0 !   !END!


COLUMBIA MUNICIPAL SCREENING EMISSION INPUT
(Emission Rates in g/s --> SO2, SO4, NOx, HNO3, NO3, PM10)

  Source       X          Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------   ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = EP02 !
   1 ! X =  402.4222, -103.9007, 91.44, 237.1,   2.44,  15.34, 438.71,  0.0, 8.330881E01,
0.0E00,  2.589565E01, 0.0E00,  0.0E00, 0.0E00,  0.057975E00 !
   1 ! FMFAC  =      1.0 !   !END!


COLUMBIA MUNICIPAL REFINED EMISSION INPUT
(Emission Rates in g/s --> SO2, SO4, NOx, HNO3, NO3, PM10)

  Source       X          Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
```

```
             (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------   ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = EP02 !
   1 ! X =  -27.1638,  216.8230,  91.44, 237.1,   2.44, 15.34, 438.71,  0.0, 8.330881E01,
0.0E00,  2.589565E01, 0.0E00,  0.0E00, 5.7975E-02 !
   1 ! FMFAC  =      1.0 !   !END!
```

HOLCIM CLARKSVILLE SCREENING EMISSION INPUT
(Emission Rates in g/s --> SO2, SO4, NOx, HNO3, NO3, PM10)

```
  Source       X          Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
             (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------   ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = EP14 !
   1 ! X =  516.7272,  -51.6388,  76.20, 155.45,    6.40, 9.55, 447.59,  0.0, 5.064852E02,
 0.0E00, 3.062725E02, 0.0E00,  0.0E00, 6.5294E00 !
   1 ! FMFAC  =      1.0 !   !END!
```

HOLCIM CLARKSVILLE REFINED EMISSION INPUT
(Emission Rates in g/s --> SO2, SO4, NOx, HNO3, NO3, PM10)

```
  Source       X          Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
             (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------   ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = EP14 !
   1 ! X =  89.5282, 262.5797,  76.20, 155.45,   6.40,  9.55, 447.59,  0.0, 5.064852E02,
0.0E00,  3.062728E02, 0.0E00,  0.0E00, 6.5294E00 !
   1 ! FMFAC  =      1.0 !   !END!
```

Appendix K

CALPUFF/CALPOST Modeling Files

```
BAS BART CLASS I ANALYSIS (HERCULES)
MAY 2009 BASE (5 units PTE)
UMC 6KM CALMET METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =            *
    or
ISCMET.DAT    input    * ISCDAT =            *
    or
PLMMET.DAT    input    * PLMDAT =            *
    or
PROFILE.DAT   input    * PRFDAT =            *
SURFACE.DAT   input    * SFCDAT =            *
RESTARTB.DAT  input    * RSTARTB=            *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =BASH2001REF.LST     !
CONC.DAT      output   ! CONDAT =BASH2001REF.CON     !
DFLX.DAT      output   ! DFDAT  =BASH2001REF.DRY     !
WFLX.DAT      output   ! WFDAT  =BASH2001REF.WET     !

VISB.DAT      output   ! VISDAT =BASH2001REF.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2001.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =            *
VOLEMARB.DAT  input    * VOLDAT =            *
BAEMARB.DAT   input    * ARDAT  =            *
LNEMARB.DAT   input    * LNDAT  =            *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =            *
CHEM.DAT      input    * CHEMDAT=            *
H2O2.DAT      input    * H2O2DAT=            *
HILL.DAT      input    * HILDAT=            *
HILLRCT.DAT   input    * RCTDAT=            *
COASTLN.DAT   input    * CSTDAT=            *
FLUXBDY.DAT   input    * BDYDAT=            *
BCON.DAT      input    * BCNDAT=            *
DEBUG.DAT     output   * DEBUG =            *
MASSFLX.DAT   output   * FLXDAT=            *
MASSBAL.DAT   output   * BALDAT=            *
FOG.DAT       output   * FOGDAT=            *
```

```
-------------------------------------------------------------------------
--------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                     Default: 1       ! NMETDAT =   2
!

     Number of PTEMARB.DAT files for run (NPTDAT)
                                     Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                     Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                     Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if
NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------
none          input    !METDAT=/raid2c/umc/calmet/2001/janjun01.dat  !
!END!
none          input    !METDAT=/raid2c/umc/calmet/2001/juldec01.dat  !
!END!

-------------------------------------------------------------------------
--------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  2001 !
     (used only if   Month (IBMO) -- No default       ! IBMO =   1 !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   1  !
                      Hour (IBHR) -- No default       ! IBHR =   1 !

     Base time zone        (XBTZ) -- No default       ! XBTZ = 6.0  !
        PST = 8., MST = 7.
```

```
   CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default       ! IRLG =  8760 !

Number of chemical species (NSPEC)
                                Default: 5       ! NSPEC =  6   !

Number of chemical species
to be emitted  (NSE)            Default: 3       ! NSE =  3   !

Flag to stop run after
SETUP phase (ITEST)             Default: 2       ! ITEST =  2   !
(Used to allow checking
of the model inputs, files, etc.)
      ITEST = 1 - STOPS program after SETUP phase
      ITEST = 2 - Continues with execution of program
                  after SETUP

Restart Configuration:

   Control flag (MRESTART)      Default: 0       ! MRESTART =  0
!

      0 = Do not read or write a restart file
      1 = Read a restart file at the beginning of
          the run
      2 = Write a restart file during run
      3 = Read a restart file at beginning of run
          and write a restart file during run

   Number of periods in Restart
   output cycle (NRESPD)        Default: 0       ! NRESPD =  0   !

      0 = File written only at last period
     >0 = File updated every NRESPD periods

Meteorological Data Format (METFM)
                                Default: 1       ! METFM =  1   !

      METFM = 1 - CALMET binary file (CALMET.MET)
      METFM = 2 - ISC ASCII file (ISCMET.MET)
      METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
      METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                  surface parameters file (SURFACE.DAT)

 Meteorological Profile Data Format (MPRFFM)
          (used only for METFM = 1, 2, 3)
                                Default: 1       ! MPRFFM =  1   !

      MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
      MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
Averaging Time (minutes) (AVET)
                                Default: 60.0    ! AVET = 60. !
PG Averaging Time (minutes) (PGTIME)
                                Default: 60.0    ! PGTIME = 60. !


!END!
```

```
--------------------------------------------------------------------------
-------

INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)                   Default: 1     ! MGAUSS =  1
!
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                              Default: 3     ! MCTADJ =  3
!
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                          Default: 0     ! MCTSG =  0
!
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated 0 (MSLUG)                   Default: 0     ! MSLUG =  0
!
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled ?
     (MTRANS)                              Default: 1     ! MTRANS =  1
!
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)            Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to simulate building
     downwash? (MBDW)                      Default: 1     ! MBDW =   1
!
        1 = ISC method
        2 = PRIME method

     Vertical wind shear modeled above
     stack top? (MSHEAR)                   Default: 0     ! MSHEAR =  0
!
        0 = no  (i.e., vertical wind shear not modeled)
        1 = yes (i.e., vertical wind shear modeled)

     Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0
!
```

```
         0 = no (i.e., puffs not split)
         1 = yes (i.e., puffs are split)

     Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  1
!
         0 = chemical transformation not
             modeled
         1 = transformation rates computed
             internally (MESOPUFF II scheme)
         2 = user-specified transformation
             rates used
         3 = transformation rates computed
             internally (RIVAD/ARM3 scheme)
         4 = secondary organic aerosol formation
             computed (MESOPUFF II scheme for OH)

     Aqueous phase transformation flag (MAQCHEM)
     (Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0
!
         0 = aqueous phase transformation
             not modeled
         1 = transformation rates adjusted
             for aqueous phase reactions

     Wet removal modeled ? (MWET)          Default: 1     ! MWET =  1
!
         0 = no
         1 = yes

     Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  1
!
         0 = no
         1 = yes
         (dry deposition method specified
          for each species in Input Group 3)

     Method used to compute dispersion
     coefficients (MDISP)                  Default: 3     ! MDISP =  3
!

         1 = dispersion coefficients computed from measured values
             of turbulence, sigma v, sigma w
         2 = dispersion coefficients from internally calculated
             sigma v, sigma w using micrometeorological variables
             (u*, w*, L, etc.)
         3 = PG dispersion coefficients for RURAL areas (computed using
             the ISCST multi-segment approximation) and MP coefficients
in
             urban areas
         4 = same as 3 except PG coefficients computed using
             the MESOPUFF II eqns.
         5 = CTDM sigmas used for stable and neutral conditions.
             For unstable conditions, sigmas are computed as in
             MDISP = 3, described above.  MDISP = 5 assumes that
             measured values are read

     Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
     (Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3
!
         1 = use sigma-v or sigma-theta measurements
```

```
              from PROFILE.DAT to compute sigma-y
              (valid for METFM = 1, 2, 3, 4)
          2 = use sigma-w measurements
              from PROFILE.DAT to compute sigma-z
              (valid for METFM = 1, 2, 3, 4)
          3 = use both sigma-(v/theta) and sigma-w
              from PROFILE.DAT to compute sigma-y and sigma-z
              (valid for METFM = 1, 2, 3, 4)
          4 = use sigma-theta measurements
              from PLMMET.DAT to compute sigma-y
              (valid only if METFM = 3)

       Back-up method used to compute dispersion
       when measured turbulence data are
       missing (MDISP2)                      Default: 3     ! MDISP2 =  3
!
       (used only if MDISP = 1 or 5)
          2 = dispersion coefficients from internally calculated
              sigma v, sigma w using micrometeorological variables
              (u*, w*, L, etc.)
          3 = PG dispersion coefficients for RURAL areas (computed using
              the ISCST multi-segment approximation) and MP coefficients
in
              urban areas
          4 = same as 3 except PG coefficients computed using
              the MESOPUFF II eqns.

     [DIAGNOSTIC FEATURE]
       Method used for Lagrangian timescale for Sigma-y
       (used only if MDISP=1,2 or MDISP2=1,2)
       (MTAULY)                              Default: 0     ! MTAULY =  0
!
          0 = Draxler default 617.284 (s)
          1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
         10 < Direct user input (s)             -- e.g., 306.9


       [DIAGNOSTIC FEATURE]
       Method used for Advective-Decay timescale for Turbulence
       (used only if MDISP=2 or MDISP2=2)
       (MTAUADV)                             Default: 0     ! MTAUADV =  0
!
          0 = No turbulence advection
          1 = Computed (OPTION NOT IMPLEMENTED)
         10 < Direct user input (s)   -- e.g., 300


       Method used to compute turbulence sigma-v &
       sigma-w using micrometeorological variables
       (Used only if MDISP = 2 or MDISP2 = 2)
       (MCTURB)                              Default: 1     ! MCTURB =  1
!
          1 = Standard CALPUFF subroutines
          2 = AERMOD subroutines

       PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH =  0
!
       (MROUGH)
          0 = no
          1 = yes
```

```
    Partial plume penetration of          Default: 1     ! MPARTL =  1
!
    elevated inversion?
    (MPARTL)
       0 = no
       1 = yes

    Strength of temperature inversion     Default: 0     ! MTINV =  0
!
    provided in PROFILE.DAT extended records?
    (MTINV)
       0 = no (computed from measured/default gradients)
       1 = yes

    PDF used for dispersion under convective conditions?
                                          Default: 0     ! MPDF =  0  !
    (MPDF)
       0 = no
       1 = yes

    Sub-Grid TIBL module used for shore line?
                                          Default: 0     ! MSGTIBL = 0
!
    (MSGTIBL)
       0 = no
       1 = yes

    Boundary conditions (concentration) modeled?
                                          Default: 0     ! MBCON = 0  !
    (MBCON)
       0 = no
       1 = yes, using formatted BCON.DAT file
       2 = yes, using unformatted CONC.DAT file


    Analyses of fogging and icing impacts due to emissions from
    arrays of mechanically-forced cooling towers can be performed
    using CALPUFF in conjunction with a cooling tower emissions
    processor (CTEMISS) and its associated postprocessors.  Hourly
    emissions of water vapor and temperature from each cooling tower
    cell are computed for the current cell configuration and ambient
    conditions by CTEMISS. CALPUFF models the dispersion of these
    emissions and provides cloud information in a specialized format
    for further analysis. Output to FOG.DAT is provided in either
    'plume mode' or 'receptor mode' format.

    Configure for FOG Model output?
                                          Default: 0     ! MFOG =  0
!
    (MFOG)
       0 = no
       1 = yes  - report results in PLUME Mode format
       2 = yes  - report results in RECEPTOR Mode format


    Test options specified to see if
    they conform to regulatory
    values? (MREG)                        Default: 1     ! MREG =  1
!
```

```
        0 = NO checks are made
        1 = Technical options must conform to USEPA
            Long Range Transport (LRT) guidance
                       METFM    1 or 2
                       AVET     60. (min)
                       PGTIME   60. (min)
                       MGAUSS   1
                       MCTADJ   3
                       MTRANS   1
                       MTIP     1
                       MCHEM    1 or 3 (if modeling SOx, NOx)
                       MWET     1
                       MDRY     1
                       MDISP    2 or 3
                       MPDF     0 if MDISP=3
                                1 if MDISP=2
                       MROUGH   0
                       MPARTL   1
                       SYTDEP   550. (m)
                       MHFTSZ   0


!END!


------------------------------------------------------------------------
-------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!

                                                       Dry
OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED
NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,
(0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS
1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE
2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)
3= etc.)

!          SO2  =         1,               1,           1,
0   !
```

```
!          SO4  =         1,                0,           2,
0   !
!          NOX  =         1,                1,           1,
0   !
!         HNO3  =         1,                0,           1,
0   !
!          NO3  =         1,                0,           2,
0   !
!         PM10  =         1,                1,           2,
0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



------------------------------------------------------------------------
-------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection
```

```
Latitude and Longitude (decimal degrees) of projection origin
(Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
(RLAT0)                    No Default      ! RLAT0 = 37N  !
(RLON0)                    No Default      ! RLON0 = 92W  !

    TTM :  RLON0 identifies central (true N/S) meridian of
projection
           RLAT0 selected for convenience
    LCC :  RLON0 identifies central (true N/S) meridian of
projection
           RLAT0 selected for convenience
    PS  :  RLON0 identifies central (grid N/S) meridian of
projection
           RLAT0 selected for convenience
    EM  :  RLON0 identifies central meridian of projection
           RLAT0 is REPLACED by 0.0N (Equator)
    LAZA:  RLON0 identifies longitude of tangent-point of mapping
plane
           RLAT0 identifies latitude of tangent-point of mapping
plane

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1)                    No Default      ! XLAT1 = 30N  !
(XLAT2)                    No Default      ! XLAT2 = 45N  !

    LCC :  Projection cone slices through Earth's surface at XLAT1
and XLAT2
    PS  :  Projection plane slices through Earth at XLAT1
           (XLAT2 is not used)

----------
Note:  Latitudes and longitudes should be positive, and include a
       letter N,S,E, or W indicating north or south latitude, and
       east or west longitude.  For example,
       35.9  N Latitude  =  35.9N
       118.7 E Longitude = 118.7E


Datum-region
------------

The Datum-Region for the coordinates is identified by a character
string.  Many mapping products currently available use the model of
the
Earth known as the World Geodetic System 1984 (WGS-G ).  Other
local
models may be in use, and their selection in CALMET will make its
output
consistent with local mapping products.  The list of Datum-Regions
with
official transformation parameters is provided by the National
Imagery and
Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)

------------------------------------------------------------------------
------
WGS-G     WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
```

```
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS
(NAD27)
     NWS-27    NWS 6370KM Radius, Sphere
     NWS-84    NWS 6370KM Radius, Sphere
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere

     Datum-region for output coordinates
     (DATUM)                   Default: WGS-G     ! DATUM = WGS-84 !


METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =  87    !
            No. Y grid cells (NY)      No default     ! NY =  111   !
         No. vertical layers (NZ)      No default     ! NZ =  10   !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 6 !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
              4000. !

            Reference Coordinates
           of SOUTHWEST corner of
                 grid cell(1, 1):

            X-coordinate (XORIGKM)     No default     ! XORIGKM = -258.
!
            Y coordinate (YORIGKM)     No default     ! YORIGKM = -330.
!
                                      Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET.
grid.
     The lower left (LL) corner of the computational grid is at grid
point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of
the
     computational grid is at grid point (IECOMP, JECOMP) of the MET.
grid.
     The grid spacing of the computational grid is the same as the MET.
grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =   1
!
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =   1
!
                  (1 <= JBCOMP <= NY)
```

```
        X index of UR corner (IECOMP)      No default     ! IECOMP =
87   !
                  (1 <= IECOMP <= NX)

        Y index of UR corner (JECOMP)      No default     ! JECOMP =
111   !
                  (1 <= JECOMP <= NY)



SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of
the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the
computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1
!
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1
!
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =
87   !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =
111   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1
!
        (MESHDN is an integer >= 1)

!END!


-----------------------------------------------------------------------
-------


INPUT GROUP: 5 -- Output Options
--------------
                                             *
*
```

```
     FILE                       DEFAULT VALUE             VALUE THIS RUN
     ----                       -------------             --------------

   Concentrations (ICON)              1                   !  ICON =  1
!
   Dry Fluxes (IDRY)                  1                   !  IDRY =  1
!
   Wet Fluxes (IWET)                  1                   !  IWET =  1
!
   Relative Humidity (IVIS)           1                   !  IVIS =  1
!
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                           Default: T         ! LCOMPRS = T
!

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                         Default: 0         ! IMFLX =  0
!
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                         Default: 0         ! IMBAL =  0
!
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)    Default: 0         ! ICPRT =  0
!
       Print dry fluxes (IDPRT)        Default: 0         ! IDPRT =  0
!
       Print wet fluxes (IWPRT)        Default: 0         ! IWPRT =  0
!
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours                Default: 1         ! ICFRQ =  1
!
       Dry flux print interval
       (IDFRQ) in hours                Default: 1         ! IDFRQ =  1
!
       Wet flux print interval
       (IWFRQ) in hours                Default: 1         ! IWFRQ =  1
!
```

```
       Units for Line Printer Output
       (IPRTU)                         Default: 1         ! IPRTU =  3
!
                       for            for
                  Concentration    Deposition
           1 =       g/m**3         g/m**2/s
           2 =      mg/m**3        mg/m**2/s
           3 =      ug/m**3        ug/m**2/s
           4 =      ng/m**3        ng/m**2/s
           5 =     Odour Units

       Messages tracking progress of run
       written to the screen ?
       (IMESG)                         Default: 2         ! IMESG =  2
!
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------
------ WET FLUXES ------   -- MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?
PRINTED?  SAVED ON DISK?   SAVED ON DISK?
   -------       ------------------------   ------------------------
------------------------   ---------------
!          SO2 =     0,            1,           0,            1,
0,          1,           0   !
!          SO4 =     0,            1,           0,            1,
0,          1,           0   !
!          NOX =     0,            1,           0,            1,
0,          1,           0   !
!         HNO3 =     0,            1,           0,            1,
0,          1,           0   !
!          NO3 =     0,            1,           0,            1,
0,          1,           0   !
!         PM10 =     0,            1,           0,            1,
0,          1,           0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                 Default: F     ! LDEBUG
= F !

       First puff to track
       (IPFDEB)                                 Default: 1     ! IPFDEB
=  1  !

       Number of puffs to track
       (NPFDEB)                                 Default: 1     ! NPFDEB
=  1  !

       Met. period to start output
       (NN1)                                    Default: 1     ! NN1 =
1   !
```

```
       Met. period to end output
       (NN2)                                  Default: 10    ! NN2 =
10  !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =
0   !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC
=  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                  No Default     ! MHILL =
2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M
= 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M
= 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information
```

```
HILL            XC         YC       THETAH  ZGRID  RELIEF    EXPO 1
EXPO 2   SCALE 1    SCALE 2    AMAX1     AMAX2
 NO.           (km)       (km)       (deg.)   (m)     (m)      (m)
(m)       (m)        (m)        (m)        (m)
----          ----       ----       ------  -----  ------    ------
------   -------    -------    -----     -----
```

```
---------------
Subgroup (6c)
---------------
```

    COMPLEX TERRAIN RECEPTOR INFORMATION

```
                      XRCT         YRCT        ZRCT          XHH
                      (km)         (km)         (m)
                     ------        -----      ------         ----
```

```
-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid
elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain
receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a
separate
           input subgroup and therefore must end with an input group
terminator.

------------------------------------------------------------------------
-------
```

```
INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY
MESOPHYLL RESISTANCE     HENRY'S LAW COEFFICIENT
       NAME        (cm**2/s)
```

```
(s/cm)                (dimensionless)
      -------     -----------      ----------      ----------
--------------------     -----------------------

!          SO2 =     0.1509,         1000.,            8.,
0.,                  0.04 !
!          NOX =     0.1656,            1.,            8.,
5.,                   3.5 !
!         HNO3 =     0.1628,            1.,           18.,
0.,            0.00000008 !

!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard
deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                   DEVIATION
                        (microns)                  (microns)
      -------      -------------------        ------------------
!          SO4 =          0.48,                     2.   !
!          NO3 =          0.48,                     2.   !
!         PM10 =            2.,                     2.   !

!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                           Default: 30    !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                             Default: 10    !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                          Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                            Default: 9     !   NINT =  9  !
```

```
     Vegetation state in unirrigated areas
     (IVEG)                            Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation

!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,             0.0E00 !
!          SO4 =         1.0E-04,            3.0E-05 !
!         HNO3 =         6.0E-05,             0.0E00 !
!          NO3 =         1.0E-04,            3.0E-05 !
!         PM10 =         1.0E-04,            3.0E-05 !

!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0
!
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                    Default: 12*80.
     !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00,
65.00, 65.00, 26.00, 26.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                   Default: 12*10.
     !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50,
0.50, 0.50, 0.50 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2          ! RNITE1 =
.2 !
```

```
     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0          ! RNITE2 =
2.0 !

     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                   Default: 2.0          ! RNITE3 =
2.0 !

     H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =
0   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb                  Default: 12*1.
     !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
     (used only if MCHEM = 4)

     The SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)
          VOC / NOX ratio (after reaction)         (VCNX)
     to characterize the air mass when computing
     the formation of SOA from VOC emissions.
     Typical values for several distinct air mass types are:

        Month    1    2    3    4    5    6    7    8    9   10   11
12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Dec

     Clean Continental
        BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
1.
        OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20
.15
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Clean Marine (surface)
        BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
.5
        OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30
.25
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Urban - low biogenic (controls present)
        BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
30.
        OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20
```

```
.20
        VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.
4.

     Urban - high biogenic (controls present)
        BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
60.
        OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35
.25
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Regional Plume
        BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
20.
        OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30
.20
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Urban - no controls present
        BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
100.
        OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35
.30
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.
2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20,
0.20, 0.20, 0.15 !
     !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00,
50.00, 50.00, 50.00, 50.00 !


!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                           Default: 550.   ! SYTDEP
= 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                   Default: 0      ! MHFTSZ
=  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
```

```
     layout (JSUP)                               Default: 5      ! JSUP =
5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)     Default: 0.01   ! CONK1
= .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                     Default: 0.1    ! CONK2
= .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                       Default: 0.5    ! TBD =
.5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                              Default: 10     ! IURB1
=  10  !
                                                          19     ! IURB2
=  19  !

     Site characterization parameters for single-point Met data files
---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                               Default: 20     !
ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                                   Default: 0.25   ! Z0IN =
.25 !

        Leaf area index for modeling domain
        (XLAIIN)                                 Default: 3.0    ! XLAIIN
= 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                                 Default: 0.0    ! ELEVIN
= .0 !

        Latitude (degrees) for met location
        (XLATIN)                                 Default: -999.  ! XLATIN
= -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                                 Default: -999.  ! XLONIN
= -999.0 !

     Specialized information for interpreting single-point Met data
files -----

        Anemometer height (m) (Used only if METFM = 2,3)
```

```
        (ANEMHT)                               Default: 10.    ! ANEMHT
= 10.0 !

        Form of lateral turbulance data in PROFILE.DAT file
        (Used only if METFM = 4 or MTURBVW = 1 or 3)
        (ISIGMAV)                              Default: 1      !
ISIGMAV =  1  !
            0 = read sigma-theta
            1 = read sigma-v

        Choice of mixing heights (Used only if METFM = 4)
        (IMIXCTDM)                             Default: 0      !
IMIXCTDM =  0  !
            0 = read PREDICTED mixing heights
            1 = read OBSERVED mixing heights

     Maximum length of a slug (met. grid units)
     (XMXLEN)                                  Default: 1.0    ! XMXLEN
= 1.0 !

     Maximum travel distance of a puff/slug (in
     grid units) during one sampling step
     (XSAMLEN)                                 Default: 1.0    !
XSAMLEN = 1.0 !

     Maximum Number of slugs/puffs release from
     one source during one time step
     (MXNEW)                                   Default: 99     ! MXNEW
=  99   !

     Maximum Number of sampling steps for
     one puff/slug during one time step
     (MXSAM)                                   Default: 99     ! MXSAM
=  99   !

     Number of iterations used when computing
     the transport wind for a sampling step
     that includes gradual rise (for CALMET
     and PROFILE winds)
     (NCOUNT)                                  Default: 2      ! NCOUNT
=  2   !

     Minimum sigma y for a new puff/slug (m)
     (SYMIN)                                   Default: 1.0    ! SYMIN
= 1.0  !

     Minimum sigma z for a new puff/slug (m)
     (SZMIN)                                   Default: 1.0    ! SZMIN
= 1.0  !

     Default minimum turbulence velocities sigma-v and sigma-w
     for each stability class over land and over water (m/s)
     (SVMIN(12) and SWMIN(12))

                     ----------  LAND  ----------       ---------  WATER
----------
        Stab Class :  A    B    C    D    E    F         A    B    C
D    E    F
                     ---  ---  ---  ---  ---  ---       ---  ---  ---
---  ---  ---
```

```
     Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37,
.37, .37, .37
     Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08,
.06, .03, .016

           ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370,
0.370, 0.370, 0.370, 0.370, 0.370!
           ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200,
0.120, 0.080, 0.060, 0.030, 0.016!


     Divergence criterion for dw/dz across puff
     used to initiate adjustment for horizontal
     convergence (1/s)
     Partial adjustment starts at CDIV(1), and
     full adjustment is reached at CDIV(2)
     (CDIV(2))                                   Default: 0.0,0.0  ! CDIV
= .0, .0 !

     Minimum wind speed (m/s) allowed for
     non-calm conditions. Also used as minimum
     speed returned when using power-law
     extrapolation toward surface
     (WSCALM)                                    Default: 0.5    ! WSCALM
= .5 !

     Maximum mixing height (m)
     (XMAXZI)                                    Default: 3000.  ! XMAXZI
= 4000.0 !

     Minimum mixing height (m)
     (XMINZI)                                    Default: 50.    ! XMINZI
= 20.0 !

     Default wind speed classes --
     5 upper bounds (m/s) are entered;
     the 6th class has no upper limit
     (WSCAT(5))                       Default   :
                                      ISC RURAL : 1.54, 3.09, 5.14, 8.23,
10.8 (10.8+)

                               Wind Speed Class :  1     2     3     4
5
                                                  ---   ---   ---   ---
---
                                        ! WSCAT = 1.54, 3.09, 5.14, 8.23,
10.80 !

     Default wind speed profile power-law
     exponents for stabilities 1-6
     (PLX0(6))                        Default   : ISC RURAL values
                                      ISC RURAL : .07, .07, .10, .15,
.35, .55
                                      ISC URBAN : .15, .15, .20, .25,
.30, .30

                                Stability Class :  A     B     C     D
E     F
                                                  ---   ---   ---   ---
---   ---
```

```
                                        ! PLX0 = 0.07, 0.07, 0.10, 0.15,
0.35, 0.55 !

     Default potential temperature gradient
     for stable classes E, F (degK/m)
     (PTG0(2))                       Default: 0.020, 0.035
                                        ! PTG0 = 0.020,   0.035 !

     Default plume path coefficients for
     each stability class (used when option
     for partial plume height terrain adjustment
     is selected -- MCTADJ=3)
     (PPC(6))                  Stability Class :  A     B     C     D
E     F
                                  Default  PPC : .50,  .50,  .50,  .50,
.35,  .35
                                                 ---   ---   ---   ---
---   ---
                                        !  PPC = 0.50, 0.50, 0.50, 0.50,
0.35, 0.35 !

     Slug-to-puff transition criterion factor
     equal to sigma-y/length of slug
     (SL2PF)                                Default: 10.        ! SL2PF =
10.0 !

     Puff-splitting control variables ------------------------

       VERTICAL SPLIT
       --------------

       Number of puffs that result every time a puff
       is split - nsplit=2 means that 1 puff splits
       into 2
       (NSPLIT)                             Default:   3        ! NSPLIT
=  3  !

       Time(s) of a day when split puffs are eligible to
       be split once again; this is typically set once
       per day, around sunset before nocturnal shear develops.
       24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
       0=do not re-split    1=eligible for re-split
       (IRESPLIT(24))                       Default:  Hour 17 = 1
       !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

       Split is allowed only if last hour's mixing
       height (m) exceeds a minimum value
       (ZISPLIT)                            Default: 100.       ! ZISPLIT
= 100.0 !

       Split is allowed only if ratio of last hour's
       mixing ht to the maximum mixing ht experienced
       by the puff is less than a maximum value (this
       postpones a split until a nocturnal layer develops)
       (ROLDMAX)                            Default: 0.25       ! ROLDMAX
= 0.25 !


       HORIZONTAL SPLIT
       ----------------
```

```
       Number of puffs that result every time a puff
       is split - nsplith=5 means that 1 puff splits
       into 5
       (NSPLITH)                          Default:   5        ! NSPLITH
=  5  !

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
       (SYSPLITH)                         Default:  1.0       !
SYSPLITH = 1.0 !

       Minimum puff elongation rate (SYSPLITH/hr) due to
       wind shear, before it may be split
       (SHSPLITH)                         Default:  2.        !
SHSPLITH = 2.0 !

       Minimum concentration (g/m^3) of each
       species in puff before it may be split
       Enter array of NSPEC values; if a single value is
       entered, it will be used for ALL species
       (CNSPLITH)                         Default:  1.0E-07   !
CNSPLITH = 1.0E-07 !

     Integration control variables ------------------------

       Fractional convergence criterion for numerical SLUG
       sampling integration
       (EPSSLUG)                          Default:   1.0e-04  ! EPSSLUG
= 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                          Default:   1.0e-06  ! EPSAREA
= 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                           Default:   1.0      ! DSRISE
= 1.0 !

       Boundary Condition (BC) Puff control variables
------------------------

       Minimum height (m) to which BC puffs are mixed as they are
emitted
       (MBCON=2 ONLY).  Actual height is reset to the current mixing
height
       at the release point if greater than this minimum.
       (HTMINBC)                          Default:   500.     ! HTMINBC
= 500.0 !

       Search radius (in BC segment lengths) about a receptor for
sampling
       nearest BC puff.  BC puffs are emitted with a spacing of one
segment
       length, so the search radius should be greater than 1.
       (RSAMPBC)                          Default:   4.      ! RSAMPBC
= 10.0 !
```

```
       Near-Surface depletion adjustment to concentration profile used
when
       sampling BC puffs?
       (MDEPBC)                            Default:   1        ! MDEPBC
=  1  !
          0 = Concentration is NOT adjusted for depletion
          1 = Adjust Concentration for depletion

!END!


--------------------------------------------------------------------------------
-------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =   2  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                        a
          POINT SOURCE: CONSTANT DATA
          -----------------------------

b          c
  Source       X          Y       Stack    Base     Stack    Exit  Exit
Bldg.  Emission
```

```
   No.      Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.
Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg.
K)
  ------   ---------- ---------- ------  ------   -------- -----
-------- ----- --------
   1 ! SRCNAM = EPC !
   1 ! X = 47.6934,  312.8110,  30.48, 142.95,  1.22, 16.256, 355.37,
0.0, 0.0E00, 0.0E00,  4.45204E01,
       0.0E00,  0.0E00, 6.10309E00 !
   1 ! FMFAC  =      1.0 !   !END!
   2 ! SRCNAM = TC01 !
   2 ! X = 47.6934,  312.8110,  22.86, 142.95,  1.07, 5.283, 352.59,
0.0, 9.31628E-01, 0.0E00, 1.62293E00,
       0.0E00,  0.0E00, 4.03115E-01 !
   2 ! FMFAC  =      1.0 !   !END!
--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column
headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to
represent
             the effect of rain-caps or other physical configurations
that
             reduce momentum rise associated with the actual exit
velocity.
             (Default: 1.0  -- full momentum used)

    b
     0. = No building downwash modeled, 1. = downwash modeled
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
           -------------------------------------------------------
Source
a
 No.       Effective building height, width, length and X/Y offset (in
meters)
           every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed
for
           MBDW=2 (PRIME downwash option)
```


----

a
Building height, width, length, and X/Y offset from the source are treated
as a separate input subgroup for each source and therefore must end with
an input group terminator. The X/Y offset is the position, relative to the
stack, of the center of the upwind face of the projected building, with the
x-axis pointing along the flow direction.

Subgroup (13d)

POINT SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission
rates given in 13b. Factors entered multiply the rates in 13b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

```
      0 =       Constant
      1 =       Diurnal cycle (24 scaling factors: hours 1-24)
      2 =       Monthly cycle (12 scaling factors: months 1-12)
      3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                               where first group is DEC-JAN-FEB)
      4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                               first group is Stability Class A,
                               and the speed classes have upper
                               bounds (m/s) defined in Group 12
      5 =       Temperature   (12 scaling factors, where temperature
                               classes have upper bounds (C) of:
                               0, 5, 10, 15, 20, 25, 30, 35, 40,
                               45, 50, 50+)
```

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

```
---------------
Subgroup (14a)
---------------

     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  0
!

     Units used for area source
     emissions below            (IARU)       Default: 1  !  IARU =   1
!
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                     a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                         b
Source           Effect.    Base      Initial    Emission
 No.             Height   Elevation   Sigma z     Rates
                   (m)       (m)        (m)
-------          ------    ------     --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
```

```
           -------------------------------------------------------
Source                                                                a
 No.       Ordered list of X followed by list of Y, grouped by source
------     -----------------------------------------------------------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                                      a
          AREA SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 14b.  Factors entered multiply the rates in 14b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------
```

```
     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                              No default  !  NLN2
=  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)        No default   !
NLINES =  0  !

     Units used for line source
     emissions below                (ILNU)          Default: 1  !  ILNU
=   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7   !
MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6   !
NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default   ! XL =
.0 !
                                                    (in meters)

        Average building height (HBL)               No default   ! HBL =
.0 !
                                                    (in meters)

        Average building width (WBL)                No default   ! WBL =
.0 !
                                                    (in meters)

        Average line source width (WML)             No default   ! WML =
.0 !
                                                    (in meters)

        Average separation between buildings (DXL)  No default   ! DXL =
.0 !
                                                    (in meters)

        Average buoyancy parameter (FPRIMEL)        No default   !
FPRIMEL = .0 !
```

```
                                                    (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
          ----------------------------------

a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base
Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height
Elevation      Rates
             (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------
---------    ---------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                         a
          BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                 Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)
```

```
--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0
!

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1
!
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0
!

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0
!

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                            a
           VOLUME SOURCE: CONSTANT DATA
           ------------------------------

b
         X            Y         Effect.    Base     Initial    Initial
```

```
Emission
     Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z
Rates
        (km)       (km)         (m)       (m)        (m)       (m)
     ----------  ----------   ------    ------    --------   --------
--------

--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                                a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


------------------------------------------------------------------------
-------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
-----------------------

---------------
Subgroup (17a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC =  1046
```

```
!

!END!

---------------
Subgroup (17b)
---------------
                                                a
           NON-GRIDDED (DISCRETE) RECEPTOR DATA
           ------------------------------------

                        X            Y          Ground         Height   b
Receptor           Coordinate   Coordinate    Elevation    Above Ground
  No.                 (km)         (km)          (m)            (m)
--------           ----------   ----------    ---------    ------------
     1 ! X =    -87.79324,  -33.47899,     274.000,        0.000!   !END!
     2 ! X =    -87.79062,  -33.23052,     274.000,        0.000!   !END!
     3 ! X =     -87.7879,  -32.98214,     235.000,        0.000!   !END!
     4 ! X =    -87.54586,  -33.48166,     288.000,        0.000!   !END!
     5 ! X =    -87.54324,  -33.23318,     276.000,        0.000!   !END!
     6 ! X =    -87.54061,   -32.9847,     244.000,        0.000!   !END!
     7 ! X =    -87.29848,  -33.48422,     304.000,        0.000!   !END!
     8 ! X =    -87.29586,  -33.23585,     304.000,        0.000!   !END!
     9 ! X =    -87.29323,  -32.98737,     274.000,        0.000!   !END!
    10 ! X =    -87.27739,  -31.49669,     274.000,        0.000!   !END!
    11 ! X =     -87.0511,  -33.48689,     304.000,        0.000!   !END!
    12 ! X =    -87.04848,  -33.23841,     304.000,        0.000!   !END!
    13 ! X =    -87.04586,  -32.99003,     290.000,        0.000!   !END!
    14 ! X =    -87.03001,  -31.49936,     265.000,        0.000!   !END!
    15 ! X =    -86.83288,  -36.22239,     274.000,        0.000!   !END!
    16 ! X =    -86.83026,  -35.97401,     274.000,        0.000!   !END!
    17 ! X =    -86.82764,  -35.72553,     274.000,        0.000!   !END!
    18 ! X =    -86.82491,  -35.47706,     274.000,        0.000!   !END!
    19 ! X =    -86.82229,  -35.22869,     274.000,        0.000!   !END!
    20 ! X =    -86.81967,  -34.98021,     274.000,        0.000!   !END!
    21 ! X =    -86.80382,  -33.48955,     302.000,        0.000!   !END!
    22 ! X =     -86.8011,  -33.24108,     304.000,        0.000!   !END!
    23 ! X =    -86.79847,   -32.9926,     304.000,        0.000!   !END!
    24 ! X =    -86.79585,  -32.74422,     287.000,        0.000!   !END!
    25 ! X =    -86.79322,  -32.49574,     274.000,        0.000!   !END!
    26 ! X =     -86.7906,  -32.24726,     304.000,        0.000!   !END!
    27 ! X =    -86.78263,  -31.50193,     275.000,        0.000!   !END!
    28 ! X =    -86.58813,  -36.47353,     274.000,        0.000!   !END!
    29 ! X =    -86.58551,  -36.22505,     274.000,        0.000!   !END!
    30 ! X =    -86.58288,  -35.97658,     274.000,        0.000!   !END!
    31 ! X =    -86.58026,   -35.7282,     274.000,        0.000!   !END!
    32 ! X =    -86.57754,  -35.47973,     274.000,        0.000!   !END!
    33 ! X =    -86.57491,  -35.23125,     273.000,        0.000!   !END!
    34 ! X =    -86.57229,  -34.98288,     274.000,        0.000!   !END!
    35 ! X =    -86.55644,  -33.49212,     304.000,        0.000!   !END!
    36 ! X =    -86.55382,  -33.24374,     304.000,        0.000!   !END!
    37 ! X =    -86.55109,  -32.99526,     307.000,        0.000!   !END!
    38 ! X =    -86.54847,  -32.74678,     314.000,        0.000!   !END!
    39 ! X =    -86.54585,  -32.49841,     313.000,        0.000!   !END!
    40 ! X =    -86.54322,  -32.24993,     304.000,        0.000!   !END!
    41 ! X =    -86.54059,  -32.00145,     304.000,        0.000!   !END!
    42 ! X =    -86.53787,  -31.75307,     292.000,        0.000!   !END!
    43 ! X =    -86.53525,  -31.50459,     275.000,        0.000!   !END!
    44 ! X =    -86.35136,  -37.46999,     278.000,        0.000!   !END!
    45 ! X =    -86.34076,  -36.47619,     272.000,        0.000!   !END!
```

```
 46 ! X =   -86.33813,  -36.22772,     274.000,       0.000!   !END!
 47 ! X =   -86.33551,  -35.97924,     274.000,       0.000!   !END!
 48 ! X =   -86.33288,  -35.73077,     274.000,       0.000!   !END!
 49 ! X =   -86.33026,  -35.48239,     274.000,       0.000!   !END!
 50 ! X =   -86.32753,  -35.23392,     274.000,       0.000!   !END!
 51 ! X =   -86.32491,  -34.98544,     278.000,       0.000!   !END!
 52 ! X =   -86.30906,  -33.49478,     295.000,       0.000!   !END!
 53 ! X =   -86.30643,   -33.2463,     304.000,       0.000!   !END!
 54 ! X =   -86.30381,  -32.99792,     319.000,       0.000!   !END!
 55 ! X =   -86.30109,  -32.74945,     335.000,       0.000!   !END!
 56 ! X =   -86.29846,  -32.50097,     337.000,       0.000!   !END!
 57 ! X =   -86.29584,  -32.25259,     320.000,       0.000!   !END!
 58 ! X =   -86.29321,  -32.00411,     299.000,       0.000!   !END!
 59 ! X =   -86.29059,  -31.75563,     277.000,       0.000!   !END!
 60 ! X =   -86.28787,  -31.50726,     274.000,       0.000!   !END!
 61 ! X =   -86.28524,  -31.25878,     274.000,       0.000!   !END!
 62 ! X =   -86.28262,   -31.0104,     243.000,       0.000!   !END!
 63 ! X =   -86.10398,  -37.47255,     304.000,       0.000!   !END!
 64 ! X =   -86.10135,  -37.22408,     274.000,       0.000!   !END!
 65 ! X =   -86.09873,   -36.9757,     274.000,       0.000!   !END!
 66 ! X =    -86.0961,  -36.72723,     271.000,       0.000!   !END!
 67 ! X =   -86.09348,  -36.47875,     274.000,       0.000!   !END!
 68 ! X =   -86.09076,  -36.23038,     274.000,       0.000!   !END!
 69 ! X =   -86.08813,  -35.98191,     274.000,       0.000!   !END!
 70 ! X =    -86.0855,  -35.73343,     279.000,       0.000!   !END!
 71 ! X =   -86.08288,  -35.48496,     281.000,       0.000!   !END!
 72 ! X =   -86.08026,  -35.23658,     288.000,       0.000!   !END!
 73 ! X =   -86.07753,  -34.98811,     293.000,       0.000!   !END!
 74 ! X =   -86.06168,  -33.49745,     290.000,       0.000!   !END!
 75 ! X =   -86.05905,  -33.24897,     302.000,       0.000!   !END!
 76 ! X =   -86.05643,  -33.00049,     327.000,       0.000!   !END!
 77 ! X =   -86.05381,  -32.75211,     365.000,       0.000!   !END!
 78 ! X =   -86.05108,  -32.50364,     395.000,       0.000!   !END!
 79 ! X =   -86.04845,  -32.25516,     343.000,       0.000!   !END!
 80 ! X =   -86.04583,  -32.00678,     304.000,       0.000!   !END!
 81 ! X =   -86.04321,   -31.7583,     296.000,       0.000!   !END!
 82 ! X =   -86.04058,  -31.50982,     290.000,       0.000!   !END!
 83 ! X =   -86.03786,  -31.26144,     277.000,       0.000!   !END!
 84 ! X =   -86.03523,  -31.01296,     259.000,       0.000!   !END!
 85 ! X =    -85.8566,  -37.47522,     304.000,       0.000!   !END!
 86 ! X =   -85.85398,  -37.22675,     274.000,       0.000!   !END!
 87 ! X =   -85.85135,  -36.97827,     274.000,       0.000!   !END!
 88 ! X =   -85.84873,   -36.7299,     274.000,       0.000!   !END!
 89 ! X =    -85.8461,  -36.48142,     274.000,       0.000!   !END!
 90 ! X =   -85.84337,  -36.23295,     274.000,       0.000!   !END!
 91 ! X =   -85.84075,  -35.98447,     286.000,       0.000!   !END!
 92 ! X =   -85.83813,   -35.7361,     304.000,       0.000!   !END!
 93 ! X =    -85.8355,  -35.48762,     311.000,       0.000!   !END!
 94 ! X =   -85.83287,  -35.23915,     318.000,       0.000!   !END!
 95 ! X =   -85.83025,  -34.99077,     322.000,       0.000!   !END!
 96 ! X =   -85.82753,   -34.7423,     308.000,       0.000!   !END!
 97 ! X =    -85.8249,  -34.49382,     298.000,       0.000!   !END!
 98 ! X =    -85.8143,  -33.50001,     290.000,       0.000!   !END!
 99 ! X =   -85.81168,  -33.25164,     308.000,       0.000!   !END!
100 ! X =   -85.80905,  -33.00316,     343.000,       0.000!   !END!
101 ! X =   -85.80642,  -32.75468,     371.000,       0.000!   !END!
102 ! X =    -85.8038,   -32.5063,     395.000,       0.000!   !END!
103 ! X =   -85.80107,  -32.25782,     365.000,       0.000!   !END!
104 ! X =   -85.79845,  -32.00935,     321.000,       0.000!   !END!
105 ! X =   -85.79583,  -31.76096,     307.000,       0.000!   !END!
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106 ! X =    -85.7932,  -31.51248,     302.000,        0.000!   !END!
107 ! X =   -85.79058,   -31.2641,     283.000,        0.000!   !END!
108 ! X =   -85.78785,  -31.01563,     274.000,        0.000!   !END!
109 ! X =   -85.60933,  -37.47788,     297.000,        0.000!   !END!
110 ! X =    -85.6066,  -37.22941,     286.000,        0.000!   !END!
111 ! X =   -85.60397,  -36.98094,     274.000,        0.000!   !END!
112 ! X =   -85.60135,  -36.73246,     274.000,        0.000!   !END!
113 ! X =   -85.59873,  -36.48409,     274.000,        0.000!   !END!
114 ! X =    -85.5961,  -36.23561,     274.000,        0.000!   !END!
115 ! X =   -85.59337,  -35.98714,     288.000,        0.000!   !END!
116 ! X =   -85.59074,  -35.73867,     335.000,        0.000!   !END!
117 ! X =   -85.58812,  -35.49029,     335.000,        0.000!   !END!
118 ! X =    -85.5855,  -35.24181,     335.000,        0.000!   !END!
119 ! X =   -85.58287,  -34.99334,     335.000,        0.000!   !END!
120 ! X =   -85.58025,  -34.74496,     335.000,        0.000!   !END!
121 ! X =   -85.57752,  -34.49649,     292.000,        0.000!   !END!
122 ! X =   -85.57489,  -34.24801,     259.000,        0.000!   !END!
123 ! X =   -85.57227,  -33.99953,     274.000,        0.000!   !END!
124 ! X =   -85.56964,  -33.75115,     274.000,        0.000!   !END!
125 ! X =   -85.56702,  -33.50268,     285.000,        0.000!   !END!
126 ! X =   -85.56429,   -33.2542,     304.000,        0.000!   !END!
127 ! X =   -85.56167,  -33.00582,     332.000,        0.000!   !END!
128 ! X =   -85.55904,  -32.75734,     360.000,        0.000!   !END!
129 ! X =   -85.55642,  -32.50887,     365.000,        0.000!   !END!
130 ! X =   -85.55379,  -32.26049,     344.000,        0.000!   !END!
131 ! X =   -85.55107,  -32.01201,     335.000,        0.000!   !END!
132 ! X =   -85.54844,  -31.76353,     309.000,        0.000!   !END!
133 ! X =   -85.54582,  -31.51515,     302.000,        0.000!   !END!
134 ! X =   -85.54319,  -31.26667,     280.000,        0.000!   !END!
135 ! X =   -85.54057,  -31.01829,     274.000,        0.000!   !END!
136 ! X =   -85.36195,  -37.48045,     304.000,        0.000!   !END!
137 ! X =   -85.35923,  -37.23208,     303.000,        0.000!   !END!
138 ! X =    -85.3566,   -36.9836,     294.000,        0.000!   !END!
139 ! X =   -85.35397,  -36.73513,     292.000,        0.000!   !END!
140 ! X =   -85.35134,  -36.48665,     283.000,        0.000!   !END!
141 ! X =   -85.34872,  -36.23828,     275.000,        0.000!   !END!
142 ! X =    -85.3461,   -35.9898,     283.000,        0.000!   !END!
143 ! X =   -85.34337,  -35.74133,     316.000,        0.000!   !END!
144 ! X =   -85.34074,  -35.49286,     335.000,        0.000!   !END!
145 ! X =   -85.33812,  -35.24448,     335.000,        0.000!   !END!
146 ! X =   -85.33549,    -34.996,     335.000,        0.000!   !END!
147 ! X =   -85.33286,  -34.74753,     327.000,        0.000!   !END!
148 ! X =   -85.33024,  -34.49915,     268.000,        0.000!   !END!
149 ! X =   -85.32752,  -34.25068,     258.000,        0.000!   !END!
150 ! X =   -85.32489,   -34.0022,     274.000,        0.000!   !END!
151 ! X =   -85.32226,  -33.75372,     277.000,        0.000!   !END!
152 ! X =   -85.31964,  -33.50534,     284.000,        0.000!   !END!
153 ! X =   -85.31701,  -33.25686,     280.000,        0.000!   !END!
154 ! X =   -85.31429,  -33.00839,     307.000,        0.000!   !END!
155 ! X =   -85.31166,  -32.76001,     320.000,        0.000!   !END!
156 ! X =   -85.30904,  -32.51153,     335.000,        0.000!   !END!
157 ! X =   -85.30641,  -32.26305,     335.000,        0.000!   !END!
158 ! X =   -85.30379,  -32.01467,     335.000,        0.000!   !END!
159 ! X =   -85.30106,   -31.7662,     313.000,        0.000!   !END!
160 ! X =   -85.29844,  -31.51782,     300.000,        0.000!   !END!
161 ! X =   -85.29581,  -31.26934,     283.000,        0.000!   !END!
162 ! X =   -85.29318,  -31.02086,     274.000,        0.000!   !END!
163 ! X =    -85.1172,  -37.73159,     304.000,        0.000!   !END!
164 ! X =   -85.11457,  -37.48312,     309.000,        0.000!   !END!
165 ! X =   -85.11195,  -37.23464,     312.000,        0.000!   !END!
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166 ! X =   -85.10922,  -36.98617,     323.000,       0.000!   !END!
167 ! X =    -85.1066,   -36.7378,     308.000,       0.000!   !END!
168 ! X =   -85.10397,  -36.48932,     304.000,       0.000!   !END!
169 ! X =   -85.10134,  -36.24085,     304.000,       0.000!   !END!
170 ! X =   -85.09871,  -35.99237,     299.000,       0.000!   !END!
171 ! X =   -85.09609,  -35.74399,     304.000,       0.000!   !END!
172 ! X =   -85.09336,  -35.49552,     335.000,       0.000!   !END!
173 ! X =   -85.09074,  -35.24705,     335.000,       0.000!   !END!
174 ! X =   -85.08811,  -34.99867,     310.000,       0.000!   !END!
175 ! X =   -85.08549,  -34.75019,     281.000,       0.000!   !END!
176 ! X =   -85.08286,  -34.50172,     261.000,       0.000!   !END!
177 ! X =   -85.08024,  -34.25334,     278.000,       0.000!   !END!
178 ! X =   -85.07751,  -34.00487,     274.000,       0.000!   !END!
179 ! X =   -85.07488,  -33.75639,     281.000,       0.000!   !END!
180 ! X =   -85.07226,  -33.50791,     304.000,       0.000!   !END!
181 ! X =   -85.06963,  -33.25953,     304.000,       0.000!   !END!
182 ! X =   -85.06701,  -33.01105,     303.000,       0.000!   !END!
183 ! X =   -85.06428,  -32.76258,     320.000,       0.000!   !END!
184 ! X =   -85.06166,   -32.5142,     335.000,       0.000!   !END!
185 ! X =   -85.05903,  -32.26572,     335.000,       0.000!   !END!
186 ! X =    -85.0564,  -32.01724,     333.000,       0.000!   !END!
187 ! X =   -85.05378,  -31.76886,     313.000,       0.000!   !END!
188 ! X =   -85.05115,  -31.52038,     300.000,       0.000!   !END!
189 ! X =   -85.04843,    -31.272,     280.000,       0.000!   !END!
190 ! X =    -85.0458,  -31.02352,     274.000,       0.000!   !END!
191 ! X =   -84.87508,   -38.2311,     306.000,       0.000!   !END!
192 ! X =   -84.87245,  -37.98263,     286.000,       0.000!   !END!
193 ! X =   -84.86982,  -37.73416,     308.000,       0.000!   !END!
194 ! X =    -84.8672,  -37.48578,     328.000,       0.000!   !END!
195 ! X =   -84.86457,  -37.23731,     335.000,       0.000!   !END!
196 ! X =   -84.86194,  -36.98883,     336.000,       0.000!   !END!
197 ! X =   -84.85922,  -36.74036,     345.000,       0.000!   !END!
198 ! X =   -84.85659,  -36.49199,     349.000,       0.000!   !END!
199 ! X =   -84.85397,  -36.24351,     337.000,       0.000!   !END!
200 ! X =   -84.85134,  -35.99504,     316.000,       0.000!   !END!
201 ! X =   -84.84871,  -35.74656,     306.000,       0.000!   !END!
202 ! X =   -84.84609,  -35.49818,     314.000,       0.000!   !END!
203 ! X =   -84.84336,  -35.24971,     314.000,       0.000!   !END!
204 ! X =   -84.84073,  -35.00124,     290.000,       0.000!   !END!
205 ! X =   -84.83811,  -34.75286,     258.000,       0.000!   !END!
206 ! X =   -84.83548,  -34.50438,     281.000,       0.000!   !END!
207 ! X =   -84.83285,  -34.25591,     304.000,       0.000!   !END!
208 ! X =   -84.83023,  -34.00743,     301.000,       0.000!   !END!
209 ! X =    -84.8275,  -33.75906,     280.000,       0.000!   !END!
210 ! X =   -84.82488,  -33.51058,     304.000,       0.000!   !END!
211 ! X =   -84.82225,   -33.2621,     304.000,       0.000!   !END!
212 ! X =   -84.81963,  -33.01372,     318.000,       0.000!   !END!
213 ! X =     -84.817,  -32.76524,     335.000,       0.000!   !END!
214 ! X =   -84.81427,  -32.51677,     335.000,       0.000!   !END!
215 ! X =   -84.81165,  -32.26839,     335.000,       0.000!   !END!
216 ! X =   -84.80902,  -32.01991,     318.000,       0.000!   !END!
217 ! X =   -84.80639,  -31.77143,     304.000,       0.000!   !END!
218 ! X =   -84.80377,  -31.52305,     292.000,       0.000!   !END!
219 ! X =    -84.6278,  -38.23377,     326.000,       0.000!   !END!
220 ! X =   -84.62507,   -37.9853,     286.000,       0.000!   !END!
221 ! X =   -84.62245,  -37.73682,     308.000,       0.000!   !END!
222 ! X =   -84.61982,  -37.48835,     322.000,       0.000!   !END!
223 ! X =    -84.6172,  -37.23998,     335.000,       0.000!   !END!
224 ! X =   -84.61457,   -36.9915,     344.000,       0.000!   !END!
225 ! X =   -84.61194,  -36.74303,     365.000,       0.000!   !END!
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226 ! X =   -84.60921,  -36.49456,     365.000,       0.000!   !END!
227 ! X =   -84.60659,  -36.24618,     359.000,       0.000!   !END!
228 ! X =   -84.60396,   -35.9977,     330.000,       0.000!   !END!
229 ! X =   -84.60133,  -35.74923,     309.000,       0.000!   !END!
230 ! X =   -84.59871,  -35.50075,     304.000,       0.000!   !END!
231 ! X =   -84.59608,  -35.25238,     289.000,       0.000!   !END!
232 ! X =   -84.59335,   -35.0039,     270.000,       0.000!   !END!
233 ! X =   -84.59073,  -34.75543,     274.000,       0.000!   !END!
234 ! X =    -84.5881,  -34.50705,     289.000,       0.000!   !END!
235 ! X =   -84.58548,  -34.25857,     304.000,       0.000!   !END!
236 ! X =   -84.58285,   -34.0101,     304.000,       0.000!   !END!
237 ! X =   -84.58022,  -33.76162,     304.000,       0.000!   !END!
238 ! X =    -84.5775,  -33.51324,     297.000,       0.000!   !END!
239 ! X =   -84.57487,  -33.26477,     305.000,       0.000!   !END!
240 ! X =   -84.57224,  -33.01629,     327.000,       0.000!   !END!
241 ! X =   -84.56962,  -32.76791,     335.000,       0.000!   !END!
242 ! X =   -84.56699,  -32.51943,     335.000,       0.000!   !END!
243 ! X =   -84.56426,  -32.27096,     333.000,       0.000!   !END!
244 ! X =   -84.56164,  -32.02258,     313.000,       0.000!   !END!
245 ! X =   -84.55901,   -31.7741,     279.000,       0.000!   !END!
246 ! X =   -84.55639,  -31.52572,     304.000,       0.000!   !END!
247 ! X =   -84.37769,  -37.98787,     296.000,       0.000!   !END!
248 ! X =   -84.37507,  -37.73949,     304.000,       0.000!   !END!
249 ! X =   -84.37244,  -37.49102,     307.000,       0.000!   !END!
250 ! X =   -84.36981,  -37.24254,     335.000,       0.000!   !END!
251 ! X =   -84.36719,  -36.99407,     351.000,       0.000!   !END!
252 ! X =   -84.36456,  -36.74569,     365.000,       0.000!   !END!
253 ! X =   -84.36194,  -36.49722,     365.000,       0.000!   !END!
254 ! X =   -84.35921,  -36.24875,     365.000,       0.000!   !END!
255 ! X =   -84.35658,  -36.00027,     330.000,       0.000!   !END!
256 ! X =   -84.35396,   -35.7519,     306.000,       0.000!   !END!
257 ! X =   -84.35133,  -35.50342,     290.000,       0.000!   !END!
258 ! X =    -84.3487,  -35.25494,     304.000,       0.000!   !END!
259 ! X =   -84.34608,  -35.00657,     300.000,       0.000!   !END!
260 ! X =   -84.34335,   -34.7581,     275.000,       0.000!   !END!
261 ! X =   -84.34072,  -34.50962,     289.000,       0.000!   !END!
262 ! X =   -84.33809,  -34.26114,     311.000,       0.000!   !END!
263 ! X =   -84.33547,  -34.01276,     331.000,       0.000!   !END!
264 ! X =   -84.33284,  -33.76429,     335.000,       0.000!   !END!
265 ! X =   -84.33021,  -33.51581,     318.000,       0.000!   !END!
266 ! X =   -84.32749,  -33.26743,     301.000,       0.000!   !END!
267 ! X =   -84.32486,  -33.01896,     319.000,       0.000!   !END!
268 ! X =   -84.32223,  -32.77048,     335.000,       0.000!   !END!
269 ! X =   -84.31961,   -32.5221,     335.000,       0.000!   !END!
270 ! X =   -84.31698,  -32.27362,     328.000,       0.000!   !END!
271 ! X =   -84.31436,  -32.02514,     308.000,       0.000!   !END!
272 ! X =   -84.31163,  -31.77676,     289.000,       0.000!   !END!
273 ! X =     -84.309,  -31.52828,     300.000,       0.000!   !END!
274 ! X =   -84.13042,  -37.99053,     299.000,       0.000!   !END!
275 ! X =   -84.12769,  -37.74206,     304.000,       0.000!   !END!
276 ! X =   -84.12507,  -37.49369,     315.000,       0.000!   !END!
277 ! X =   -84.12244,  -37.24521,     325.000,       0.000!   !END!
278 ! X =   -84.11981,  -36.99674,     349.000,       0.000!   !END!
279 ! X =   -84.11718,  -36.74826,     365.000,       0.000!   !END!
280 ! X =   -84.11456,  -36.49989,     365.000,       0.000!   !END!
281 ! X =   -84.11183,  -36.25142,     335.000,       0.000!   !END!
282 ! X =    -84.1092,  -36.00294,     310.000,       0.000!   !END!
283 ! X =   -84.10657,  -35.75447,     304.000,       0.000!   !END!
284 ! X =   -84.10395,  -35.50609,     304.000,       0.000!   !END!
285 ! X =   -84.10132,  -35.25761,     304.000,       0.000!   !END!
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286 !	X =	-84.09869,	-35.00914,	304.000,	0.000!	!END!
287 !	X =	-84.09607,	-34.76076,	289.000,	0.000!	!END!
288 !	X =	-84.09334,	-34.51229,	284.000,	0.000!	!END!
289 !	X =	-84.09072,	-34.26381,	309.000,	0.000!	!END!
290 !	X =	-84.08809,	-34.01533,	335.000,	0.000!	!END!
291 !	X =	-84.08546,	-33.76695,	335.000,	0.000!	!END!
292 !	X =	-84.08284,	-33.51848,	335.000,	0.000!	!END!
293 !	X =	-84.08021,	-33.27,	312.000,	0.000!	!END!
294 !	X =	-84.07748,	-33.02162,	336.000,	0.000!	!END!
295 !	X =	-84.07486,	-32.77314,	358.000,	0.000!	!END!
296 !	X =	-84.07223,	-32.52467,	355.000,	0.000!	!END!
297 !	X =	-84.0696,	-32.27629,	330.000,	0.000!	!END!
298 !	X =	-84.06698,	-32.02781,	309.000,	0.000!	!END!
299 !	X =	-84.06435,	-31.77933,	289.000,	0.000!	!END!
300 !	X =	-84.06162,	-31.53095,	282.000,	0.000!	!END!
301 !	X =	-83.88567,	-38.24167,	335.000,	0.000!	!END!
302 !	X =	-83.88305,	-37.9932,	304.000,	0.000!	!END!
303 !	X =	-83.88042,	-37.74472,	304.000,	0.000!	!END!
304 !	X =	-83.87769,	-37.49625,	335.000,	0.000!	!END!
305 !	X =	-83.87506,	-37.24778,	344.000,	0.000!	!END!
306 !	X =	-83.87244,	-36.99941,	330.000,	0.000!	!END!
307 !	X =	-83.86981,	-36.75093,	365.000,	0.000!	!END!
308 !	X =	-83.86718,	-36.50246,	365.000,	0.000!	!END!
309 !	X =	-83.86455,	-36.25398,	349.000,	0.000!	!END!
310 !	X =	-83.86183,	-36.00561,	335.000,	0.000!	!END!
311 !	X =	-83.8592,	-35.75713,	326.000,	0.000!	!END!
312 !	X =	-83.85657,	-35.50866,	312.000,	0.000!	!END!
313 !	X =	-83.85395,	-35.26028,	305.000,	0.000!	!END!
314 !	X =	-83.85132,	-35.0118,	304.000,	0.000!	!END!
315 !	X =	-83.84869,	-34.76333,	287.000,	0.000!	!END!
316 !	X =	-83.84606,	-34.51485,	289.000,	0.000!	!END!
317 !	X =	-83.84334,	-34.26648,	318.000,	0.000!	!END!
318 !	X =	-83.84071,	-34.018,	335.000,	0.000!	!END!
319 !	X =	-83.83808,	-33.76952,	335.000,	0.000!	!END!
320 !	X =	-83.83546,	-33.52114,	335.000,	0.000!	!END!
321 !	X =	-83.83283,	-33.27267,	330.000,	0.000!	!END!
322 !	X =	-83.8302,	-33.02419,	362.000,	0.000!	!END!
323 !	X =	-83.82748,	-32.77581,	365.000,	0.000!	!END!
324 !	X =	-83.82485,	-32.52733,	365.000,	0.000!	!END!
325 !	X =	-83.82222,	-32.27885,	340.000,	0.000!	!END!
326 !	X =	-83.8196,	-32.03047,	312.000,	0.000!	!END!
327 !	X =	-83.81697,	-31.78199,	304.000,	0.000!	!END!
328 !	X =	-83.81434,	-31.53351,	304.000,	0.000!	!END!
329 !	X =	-83.63829,	-38.24424,	350.000,	0.000!	!END!
330 !	X =	-83.63567,	-37.99577,	313.000,	0.000!	!END!
331 !	X =	-83.63304,	-37.74739,	335.000,	0.000!	!END!
332 !	X =	-83.63041,	-37.49892,	355.000,	0.000!	!END!
333 !	X =	-83.62768,	-37.25045,	365.000,	0.000!	!END!
334 !	X =	-83.62506,	-37.00197,	373.000,	0.000!	!END!
335 !	X =	-83.62243,	-36.7536,	365.000,	0.000!	!END!
336 !	X =	-83.6198,	-36.50512,	365.000,	0.000!	!END!
337 !	X =	-83.61717,	-36.25665,	335.000,	0.000!	!END!
338 !	X =	-83.61455,	-36.00817,	335.000,	0.000!	!END!
339 !	X =	-83.61182,	-35.7598,	335.000,	0.000!	!END!
340 !	X =	-83.60919,	-35.51133,	323.000,	0.000!	!END!
341 !	X =	-83.60656,	-35.26285,	305.000,	0.000!	!END!
342 !	X =	-83.60394,	-35.01447,	296.000,	0.000!	!END!
343 !	X =	-83.60131,	-34.766,	274.000,	0.000!	!END!
344 !	X =	-83.59868,	-34.51752,	284.000,	0.000!	!END!
345 !	X =	-83.59605,	-34.26904,	313.000,	0.000!	!END!

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346 ! X =   -83.59333,  -34.02067,     325.000,       0.000!   !END!
347 ! X =    -83.5907,  -33.77219,     335.000,       0.000!   !END!
348 ! X =   -83.58807,  -33.52371,     335.000,       0.000!   !END!
349 ! X =   -83.58545,  -33.27533,     357.000,       0.000!   !END!
350 ! X =   -83.58282,  -33.02686,     365.000,       0.000!   !END!
351 ! X =   -83.58019,  -32.77838,     365.000,       0.000!   !END!
352 ! X =   -83.57757,     -32.53,     365.000,       0.000!   !END!
353 ! X =   -83.57484,  -32.28152,     334.000,       0.000!   !END!
354 ! X =   -83.57221,  -32.03304,     334.000,       0.000!   !END!
355 ! X =   -83.56959,  -31.78466,     326.000,       0.000!   !END!
356 ! X =   -83.39092,  -38.24691,     365.000,       0.000!   !END!
357 ! X =   -83.38829,  -37.99844,     336.000,       0.000!   !END!
358 ! X =   -83.38566,  -37.74996,     352.000,       0.000!   !END!
359 ! X =   -83.38304,  -37.50159,     353.000,       0.000!   !END!
360 ! X =   -83.38031,  -37.25312,     367.000,       0.000!   !END!
361 ! X =   -83.37768,  -37.00464,     396.000,       0.000!   !END!
362 ! X =   -83.36717,  -36.01084,     329.000,       0.000!   !END!
363 ! X =   -83.36454,  -35.76237,     329.000,       0.000!   !END!
364 ! X =   -83.36182,  -35.51399,     311.000,       0.000!   !END!
365 ! X =   -83.35919,  -35.26552,     293.000,       0.000!   !END!
366 ! X =   -83.35656,  -35.01704,     277.000,       0.000!   !END!
367 ! X =   -83.35393,  -34.76856,     275.000,       0.000!   !END!
368 ! X =    -83.3513,  -34.52019,     275.000,       0.000!   !END!
369 ! X =   -83.34868,  -34.27171,     294.000,       0.000!   !END!
370 ! X =   -83.34605,  -34.02323,     303.000,       0.000!   !END!
371 ! X =   -83.34332,  -33.77486,     323.000,       0.000!   !END!
372 ! X =   -83.34069,  -33.52638,     338.000,       0.000!   !END!
373 ! X =   -83.33806,   -33.2779,     365.000,       0.000!   !END!
374 ! X =   -83.33544,  -33.02952,     365.000,       0.000!   !END!
375 ! X =   -83.33281,  -32.78105,     351.000,       0.000!   !END!
376 ! X =   -83.33018,  -32.53257,     335.000,       0.000!   !END!
377 ! X =   -83.32756,  -32.28419,     335.000,       0.000!   !END!
378 ! X =   -83.32483,  -32.03571,     335.000,       0.000!   !END!
379 ! X =    -83.3222,  -31.78723,     335.000,       0.000!   !END!
380 ! X =   -83.14354,  -38.24948,     365.000,       0.000!   !END!
381 ! X =   -83.14092,   -38.0011,     339.000,       0.000!   !END!
382 ! X =   -83.13829,  -37.75263,     365.000,       0.000!   !END!
383 ! X =   -83.13566,  -37.50416,     365.000,       0.000!   !END!
384 ! X =   -83.13303,  -37.25568,     358.000,       0.000!   !END!
385 ! X =   -83.13031,  -37.00731,     396.000,       0.000!   !END!
386 ! X =   -83.11979,  -36.01351,     328.000,       0.000!   !END!
387 ! X =   -83.11716,  -35.76503,     305.000,       0.000!   !END!
388 ! X =   -83.11453,  -35.51656,     304.000,       0.000!   !END!
389 ! X =   -83.11181,  -35.26819,     300.000,       0.000!   !END!
390 ! X =   -83.10918,  -35.01971,     304.000,       0.000!   !END!
391 ! X =   -83.10655,  -34.77123,     297.000,       0.000!   !END!
392 ! X =   -83.10392,  -34.52276,     274.000,       0.000!   !END!
393 ! X =    -83.1013,  -34.27438,     304.000,       0.000!   !END!
394 ! X =   -83.09867,   -34.0259,     304.000,       0.000!   !END!
395 ! X =   -83.09604,  -33.77742,     307.000,       0.000!   !END!
396 ! X =   -83.09332,  -33.52905,     335.000,       0.000!   !END!
397 ! X =   -83.09069,  -33.28057,     365.000,       0.000!   !END!
398 ! X =   -83.08806,  -33.03209,     365.000,       0.000!   !END!
399 ! X =   -83.08543,  -32.78371,     354.000,       0.000!   !END!
400 ! X =    -83.0828,  -32.53524,     335.000,       0.000!   !END!
401 ! X =   -83.08017,  -32.28676,     312.000,       0.000!   !END!
402 ! X =   -83.07755,  -32.03838,     335.000,       0.000!   !END!
403 ! X =   -83.07482,   -31.7899,     316.000,       0.000!   !END!
404 ! X =   -83.07219,  -31.54142,     306.000,       0.000!   !END!
405 ! X =   -83.06957,  -31.29304,     284.000,       0.000!   !END!
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406 ! X =   -83.06694,  -31.04456,     297.000,       0.000!   !END!
407 ! X =   -82.89617,  -38.25215,     365.000,       0.000!   !END!
408 ! X =   -82.89354,  -38.00367,     365.000,       0.000!   !END!
409 ! X =   -82.89091,   -37.7553,     383.000,       0.000!   !END!
410 ! X =   -82.88828,  -37.50683,     390.000,       0.000!   !END!
411 ! X =   -82.88565,  -37.25835,     386.000,       0.000!   !END!
412 ! X =   -82.88302,  -37.00988,     367.000,       0.000!   !END!
413 ! X =   -82.87241,  -36.01608,     335.000,       0.000!   !END!
414 ! X =   -82.86979,   -35.7677,     335.000,       0.000!   !END!
415 ! X =   -82.86716,  -35.51923,     316.000,       0.000!   !END!
416 ! X =   -82.86453,  -35.27075,     304.000,       0.000!   !END!
417 ! X =    -82.8619,  -35.02227,     304.000,       0.000!   !END!
418 ! X =   -82.85917,   -34.7739,     304.000,       0.000!   !END!
419 ! X =   -82.85654,  -34.52543,     277.000,       0.000!   !END!
420 ! X =   -82.85391,  -34.27695,     296.000,       0.000!   !END!
421 ! X =   -82.85129,  -34.02857,     304.000,       0.000!   !END!
422 ! X =   -82.84866,  -33.78009,     307.000,       0.000!   !END!
423 ! X =   -82.84603,  -33.53161,     328.000,       0.000!   !END!
424 ! X =   -82.84341,  -33.28324,     348.000,       0.000!   !END!
425 ! X =   -82.84068,  -33.03476,     355.000,       0.000!   !END!
426 ! X =   -82.83805,  -32.78628,     347.000,       0.000!   !END!
427 ! X =   -82.83542,   -32.5379,     335.000,       0.000!   !END!
428 ! X =   -82.83279,  -32.28943,     311.000,       0.000!   !END!
429 ! X =   -82.83016,  -32.04095,     302.000,       0.000!   !END!
430 ! X =   -82.82754,  -31.79257,     284.000,       0.000!   !END!
431 ! X =   -82.82491,  -31.54409,     277.000,       0.000!   !END!
432 ! X =   -82.82218,  -31.29561,     296.000,       0.000!   !END!
433 ! X =   -82.81956,  -31.04723,     301.000,       0.000!   !END!
434 ! X =   -82.64616,  -38.00634,     372.000,       0.000!   !END!
435 ! X =   -82.62504,  -36.01875,     335.000,       0.000!   !END!
436 ! X =   -82.62241,  -35.77027,     335.000,       0.000!   !END!
437 ! X =   -82.61978,   -35.5219,     316.000,       0.000!   !END!
438 ! X =   -82.61715,  -35.27342,     321.000,       0.000!   !END!
439 ! X =   -82.61452,  -35.02494,     331.000,       0.000!   !END!
440 ! X =   -82.61189,  -34.77647,     305.000,       0.000!   !END!
441 ! X =   -82.60917,   -34.5281,     287.000,       0.000!   !END!
442 ! X =   -82.60654,  -34.27962,     304.000,       0.000!   !END!
443 ! X =   -82.60391,  -34.03114,     305.000,       0.000!   !END!
444 ! X =   -82.60128,  -33.78276,     310.000,       0.000!   !END!
445 ! X =   -82.59865,  -33.53428,     320.000,       0.000!   !END!
446 ! X =   -82.59602,  -33.28581,     339.000,       0.000!   !END!
447 ! X =    -82.5934,  -33.03743,     340.000,       0.000!   !END!
448 ! X =   -82.59067,  -32.78895,     335.000,       0.000!   !END!
449 ! X =   -82.58804,  -32.54047,     319.000,       0.000!   !END!
450 ! X =   -82.58541,  -32.29209,     304.000,       0.000!   !END!
451 ! X =   -82.58278,  -32.04362,     304.000,       0.000!   !END!
452 ! X =   -82.58015,  -31.79514,     284.000,       0.000!   !END!
453 ! X =   -82.57753,  -31.54675,     304.000,       0.000!   !END!
454 ! X =    -82.5749,  -31.29827,     304.000,       0.000!   !END!
455 ! X =   -82.57227,  -31.04979,     304.000,       0.000!   !END!
456 ! X =   -82.37766,  -36.02142,     329.000,       0.000!   !END!
457 ! X =   -82.37503,  -35.77294,     312.000,       0.000!   !END!
458 ! X =    -82.3724,  -35.52447,     327.000,       0.000!   !END!
459 ! X =   -82.36977,  -35.27599,     335.000,       0.000!   !END!
460 ! X =   -82.36714,  -35.02761,     335.000,       0.000!   !END!
461 ! X =   -82.36451,  -34.77914,     297.000,       0.000!   !END!
462 ! X =   -82.36188,  -34.53066,     304.000,       0.000!   !END!
463 ! X =   -82.35916,  -34.28229,     304.000,       0.000!   !END!
464 ! X =   -82.35653,  -34.03381,     310.000,       0.000!   !END!
465 ! X =    -82.3539,  -33.78533,     324.000,       0.000!   !END!
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466 ! X =   -82.35127,  -33.53695,     338.000,       0.000!   !END!
467 ! X =   -82.34864,  -33.28848,     339.000,       0.000!   !END!
468 ! X =   -82.34601,     -33.04,     335.000,       0.000!   !END!
469 ! X =   -82.34339,  -32.79162,     326.000,       0.000!   !END!
470 ! X =   -82.34076,  -32.54314,     309.000,       0.000!   !END!
471 ! X =   -82.33803,  -32.29466,     301.000,       0.000!   !END!
472 ! X =    -82.3354,  -32.04628,     296.000,       0.000!   !END!
473 ! X =   -82.33277,   -31.7978,     304.000,       0.000!   !END!
474 ! X =   -82.33014,  -31.54932,     305.000,       0.000!   !END!
475 ! X =   -82.32752,  -31.30094,     304.000,       0.000!   !END!
476 ! X =   -82.32489,  -31.05246,     304.000,       0.000!   !END!
477 ! X =   -82.13038,  -36.02398,     335.000,       0.000!   !END!
478 ! X =   -82.12765,  -35.77551,     329.000,       0.000!   !END!
479 ! X =   -82.12502,  -35.52714,     335.000,       0.000!   !END!
480 ! X =   -82.12239,  -35.27866,     335.000,       0.000!   !END!
481 ! X =   -82.11976,  -35.03018,     319.000,       0.000!   !END!
482 ! X =   -82.11714,  -34.78181,     298.000,       0.000!   !END!
483 ! X =   -82.11451,  -34.53333,     304.000,       0.000!   !END!
484 ! X =   -82.11188,  -34.28485,     311.000,       0.000!   !END!
485 ! X =   -82.10925,  -34.03647,     335.000,       0.000!   !END!
486 ! X =   -82.10652,    -33.788,     339.000,       0.000!   !END!
487 ! X =   -82.10389,  -33.53952,     365.000,       0.000!   !END!
488 ! X =   -82.10126,  -33.29115,     365.000,       0.000!   !END!
489 ! X =   -82.09863,  -33.04267,     347.000,       0.000!   !END!
490 ! X =     -82.096,  -32.79419,     326.000,       0.000!   !END!
491 ! X =   -82.09338,  -32.54581,     309.000,       0.000!   !END!
492 ! X =   -82.09075,  -32.29733,     302.000,       0.000!   !END!
493 ! X =   -82.08812,  -32.04885,     309.000,       0.000!   !END!
494 ! X =   -82.08539,  -31.80047,     335.000,       0.000!   !END!
495 ! X =   -82.08276,  -31.55199,     322.000,       0.000!   !END!
496 ! X =   -82.08013,  -31.30351,     305.000,       0.000!   !END!
497 ! X =   -82.07751,  -31.05513,     304.000,       0.000!   !END!
498 ! X =     -81.883,  -36.02665,     345.000,       0.000!   !END!
499 ! X =   -81.88037,  -35.77818,     340.000,       0.000!   !END!
500 ! X =   -81.87764,  -35.52971,     335.000,       0.000!   !END!
501 ! X =   -81.87501,  -35.28133,     335.000,       0.000!   !END!
502 ! X =   -81.87238,  -35.03285,     304.000,       0.000!   !END!
503 ! X =   -81.86975,  -34.78438,     304.000,       0.000!   !END!
504 ! X =   -81.86713,    -34.536,     304.000,       0.000!   !END!
505 ! X =    -81.8645,  -34.28752,     310.000,       0.000!   !END!
506 ! X =   -81.86187,  -34.03905,     335.000,       0.000!   !END!
507 ! X =   -81.85924,  -33.79067,     343.000,       0.000!   !END!
508 ! X =   -81.85651,  -33.54219,     365.000,       0.000!   !END!
509 ! X =   -81.85388,  -33.29372,     365.000,       0.000!   !END!
510 ! X =   -81.85125,  -33.04524,     350.000,       0.000!   !END!
511 ! X =   -81.84862,  -32.79686,     319.000,       0.000!   !END!
512 ! X =   -81.84599,  -32.54838,     304.000,       0.000!   !END!
513 ! X =   -81.84337,      -32.3,     328.000,       0.000!   !END!
514 ! X =   -81.84074,  -32.05152,     335.000,       0.000!   !END!
515 ! X =   -81.83811,  -31.80304,     335.000,       0.000!   !END!
516 ! X =   -81.83538,  -31.55467,     330.000,       0.000!   !END!
517 ! X =   -81.83275,  -31.30618,     300.000,       0.000!   !END!
518 ! X =   -81.83012,   -31.0577,     275.000,       0.000!   !END!
519 ! X =   -81.64614,  -37.02303,     376.000,       0.000!   !END!
520 ! X =   -81.64088,  -36.52618,     365.000,       0.000!   !END!
521 ! X =   -81.63825,   -36.2777,     365.000,       0.000!   !END!
522 ! X =   -81.63562,  -36.02923,     365.000,       0.000!   !END!
523 ! X =   -81.63299,  -35.78085,     361.000,       0.000!   !END!
524 ! X =   -81.63036,  -35.53237,     337.000,       0.000!   !END!
525 ! X =   -81.62763,   -35.2839,     306.000,       0.000!   !END!
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526 ! X =   -81.62501,  -35.03552,     318.000,        0.000!   !END!
527 ! X =   -81.62238,  -34.78705,     335.000,        0.000!   !END!
528 ! X =   -81.61975,  -34.53857,     309.000,        0.000!   !END!
529 ! X =   -81.61711,  -34.29009,     305.000,        0.000!   !END!
530 ! X =   -81.61449,  -34.04172,     312.000,        0.000!   !END!
531 ! X =   -81.61186,  -33.79324,     338.000,        0.000!   !END!
532 ! X =   -81.60923,  -33.54476,     365.000,        0.000!   !END!
533 ! X =    -81.6066,  -33.29638,     365.000,        0.000!   !END!
534 ! X =   -81.60387,  -33.04791,     350.000,        0.000!   !END!
535 ! X =   -81.60124,  -32.79943,     335.000,        0.000!   !END!
536 ! X =   -81.59861,  -32.55105,     349.000,        0.000!   !END!
537 ! X =   -81.59598,  -32.30257,     365.000,        0.000!   !END!
538 ! X =   -81.59335,  -32.05409,     351.000,        0.000!   !END!
539 ! X =   -81.59073,  -31.80571,     335.000,        0.000!   !END!
540 ! X =    -81.5881,  -31.55723,     319.000,        0.000!   !END!
541 ! X =   -81.58547,  -31.30885,     302.000,        0.000!   !END!
542 ! X =   -81.58274,  -31.06037,     284.000,        0.000!   !END!
543 ! X =   -81.58011,  -30.81189,     274.000,        0.000!   !END!
544 ! X =   -81.39876,   -37.0257,     391.000,        0.000!   !END!
545 ! X =   -81.39613,  -36.77722,     382.000,        0.000!   !END!
546 ! X =   -81.39351,  -36.52885,     366.000,        0.000!   !END!
547 ! X =   -81.39087,  -36.28037,     365.000,        0.000!   !END!
548 ! X =   -81.38824,   -36.0319,     365.000,        0.000!   !END!
549 ! X =   -81.38561,  -35.78342,     359.000,        0.000!   !END!
550 ! X =   -81.38299,  -35.53504,     323.000,        0.000!   !END!
551 ! X =   -81.38036,  -35.28657,     327.000,        0.000!   !END!
552 ! X =   -81.37772,  -35.03809,     335.000,        0.000!   !END!
553 ! X =   -81.37499,  -34.78962,     335.000,        0.000!   !END!
554 ! X =   -81.37237,  -34.54124,     331.000,        0.000!   !END!
555 ! X =   -81.36974,  -34.29276,     320.000,        0.000!   !END!
556 ! X =   -81.36711,  -34.04429,     335.000,        0.000!   !END!
557 ! X =   -81.36448,  -33.79591,     335.000,        0.000!   !END!
558 ! X =   -81.36185,  -33.54743,     341.000,        0.000!   !END!
559 ! X =   -81.35922,  -33.29895,     349.000,        0.000!   !END!
560 ! X =   -81.35659,  -33.05057,     350.000,        0.000!   !END!
561 ! X =   -81.35396,  -32.80209,     365.000,        0.000!   !END!
562 ! X =   -81.35123,  -32.55362,     365.000,        0.000!   !END!
563 ! X =    -81.3486,  -32.30524,     365.000,        0.000!   !END!
564 ! X =   -81.34597,  -32.05676,     352.000,        0.000!   !END!
565 ! X =   -81.34334,  -31.80828,     335.000,        0.000!   !END!
566 ! X =   -81.34072,   -31.5599,     315.000,        0.000!   !END!
567 ! X =   -81.33808,  -31.31142,     305.000,        0.000!   !END!
568 ! X =   -81.33546,  -31.06304,     301.000,        0.000!   !END!
569 ! X =   -81.33283,  -30.81456,     275.000,        0.000!   !END!
570 ! X =   -81.14876,  -36.77989,     396.000,        0.000!   !END!
571 ! X =   -81.14612,  -36.53142,     382.000,        0.000!   !END!
572 ! X =   -81.14349,  -36.28294,     355.000,        0.000!   !END!
573 ! X =   -81.14087,  -36.03457,     340.000,        0.000!   !END!
574 ! X =   -81.13824,  -35.78609,     327.000,        0.000!   !END!
575 ! X =    -81.1356,  -35.53761,     342.000,        0.000!   !END!
576 ! X =   -81.13298,  -35.28924,     349.000,        0.000!   !END!
577 ! X =   -81.13035,  -35.04076,     350.000,        0.000!   !END!
578 ! X =   -81.12772,  -34.79228,     365.000,        0.000!   !END!
579 ! X =   -81.12498,  -34.54381,     351.000,        0.000!   !END!
580 ! X =   -81.12236,  -34.29544,     335.000,        0.000!   !END!
581 ! X =   -81.11973,  -34.04696,     340.000,        0.000!   !END!
582 ! X =    -81.1171,  -33.79848,     348.000,        0.000!   !END!
583 ! X =   -81.11447,   -33.5501,     356.000,        0.000!   !END!
584 ! X =   -81.11184,  -33.30162,     365.000,        0.000!   !END!
585 ! X =   -81.10921,  -33.05314,     365.000,        0.000!   !END!
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586 ! X =   -81.10658,  -32.80477,     365.000,        0.000!   !END!
587 ! X =   -81.10395,  -32.55629,     365.000,        0.000!   !END!
588 ! X =   -81.10122,  -32.30781,     361.000,        0.000!   !END!
589 ! X =   -81.09859,  -32.05943,     332.000,        0.000!   !END!
590 ! X =   -81.09596,  -31.81095,     320.000,        0.000!   !END!
591 ! X =   -81.09333,  -31.56247,     305.000,        0.000!   !END!
592 ! X =    -81.0907,  -31.31409,     304.000,        0.000!   !END!
593 ! X =   -81.08807,  -31.06561,     299.000,        0.000!   !END!
594 ! X =   -81.08545,  -30.81723,     277.000,        0.000!   !END!
595 ! X =   -80.89875,  -36.53409,     391.000,        0.000!   !END!
596 ! X =   -80.89612,  -36.28561,     356.000,        0.000!   !END!
597 ! X =   -80.89349,  -36.03714,     335.000,        0.000!   !END!
598 ! X =   -80.89086,  -35.78876,     311.000,        0.000!   !END!
599 ! X =   -80.88823,  -35.54029,     342.000,        0.000!   !END!
600 ! X =    -80.8856,  -35.29181,     380.000,        0.000!   !END!
601 ! X =   -80.88296,  -35.04333,     389.000,        0.000!   !END!
602 ! X =   -80.88034,  -34.79496,     396.000,        0.000!   !END!
603 ! X =   -80.87771,  -34.54648,     369.000,        0.000!   !END!
604 ! X =   -80.87507,    -34.298,     341.000,        0.000!   !END!
605 ! X =   -80.87235,  -34.04963,     359.000,        0.000!   !END!
606 ! X =   -80.86972,  -33.80115,     365.000,        0.000!   !END!
607 ! X =   -80.86709,  -33.55267,     365.000,        0.000!   !END!
608 ! X =   -80.86446,  -33.30429,     365.000,        0.000!   !END!
609 ! X =   -80.86183,  -33.05582,     365.000,        0.000!   !END!
610 ! X =    -80.8592,  -32.80734,     365.000,        0.000!   !END!
611 ! X =   -80.85657,  -32.55896,     365.000,        0.000!   !END!
612 ! X =   -80.85394,  -32.31048,     342.000,        0.000!   !END!
613 ! X =   -80.85131,    -32.062,     325.000,        0.000!   !END!
614 ! X =   -80.84858,  -31.81362,     309.000,        0.000!   !END!
615 ! X =   -80.84595,  -31.56514,     304.000,        0.000!   !END!
616 ! X =   -80.84332,  -31.31666,     297.000,        0.000!   !END!
617 ! X =   -80.84069,  -31.06828,     282.000,        0.000!   !END!
618 ! X =   -80.83806,   -30.8198,     274.000,        0.000!   !END!
619 ! X =   -80.65147,  -36.53666,     391.000,        0.000!   !END!
620 ! X =   -80.64884,  -36.28828,     350.000,        0.000!   !END!
621 ! X =   -80.64611,  -36.03981,     337.000,        0.000!   !END!
622 ! X =   -80.64348,  -35.79133,     313.000,        0.000!   !END!
623 ! X =   -80.64085,  -35.54286,     335.000,        0.000!   !END!
624 ! X =   -80.63822,  -35.29448,     396.000,        0.000!   !END!
625 ! X =   -80.63559,    -35.046,     396.000,        0.000!   !END!
626 ! X =   -80.63296,  -34.79753,     396.000,        0.000!   !END!
627 ! X =   -80.63033,  -34.54915,     386.000,        0.000!   !END!
628 ! X =    -80.6277,  -34.30067,     360.000,        0.000!   !END!
629 ! X =   -80.62507,   -34.0522,     365.000,        0.000!   !END!
630 ! X =   -80.62244,  -33.80382,     365.000,        0.000!   !END!
631 ! X =   -80.61971,  -33.55534,     365.000,        0.000!   !END!
632 ! X =   -80.61708,  -33.30687,     365.000,        0.000!   !END!
633 ! X =   -80.61445,  -33.05849,     351.000,        0.000!   !END!
634 ! X =   -80.61182,  -32.81001,     350.000,        0.000!   !END!
635 ! X =   -80.60918,  -32.56153,     335.000,        0.000!   !END!
636 ! X =   -80.60656,  -32.31315,     322.000,        0.000!   !END!
637 ! X =   -80.60393,  -32.06467,     310.000,        0.000!   !END!
638 ! X =   -80.60129,  -31.81619,     305.000,        0.000!   !END!
639 ! X =   -80.59867,  -31.56781,     291.000,        0.000!   !END!
640 ! X =   -80.59604,  -31.31933,     276.000,        0.000!   !END!
641 ! X =    -80.5933,  -31.07085,     274.000,        0.000!   !END!
642 ! X =   -80.59068,  -30.82247,     274.000,        0.000!   !END!
643 ! X =   -80.58805,  -30.57399,     268.000,        0.000!   !END!
644 ! X =   -80.40409,  -36.53933,     380.000,        0.000!   !END!
645 ! X =   -80.40146,  -36.29085,     396.000,        0.000!   !END!
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646 ! X =   -80.39883,  -36.04238,     370.000,        0.000!   !END!
647 ! X =    -80.3961,  -35.79401,     332.000,        0.000!   !END!
648 ! X =   -80.39347,  -35.54553,     356.000,        0.000!   !END!
649 ! X =   -80.39084,  -35.29705,     372.000,        0.000!   !END!
650 ! X =   -80.38821,  -35.04868,     396.000,        0.000!   !END!
651 ! X =   -80.38558,   -34.8002,     396.000,        0.000!   !END!
652 ! X =   -80.38295,  -34.55172,     384.000,        0.000!   !END!
653 ! X =   -80.38032,  -34.30334,     365.000,        0.000!   !END!
654 ! X =   -80.37769,  -34.05487,     365.000,        0.000!   !END!
655 ! X =   -80.37505,  -33.80639,     365.000,        0.000!   !END!
656 ! X =   -80.37242,  -33.55791,     355.000,        0.000!   !END!
657 ! X =    -80.3698,  -33.30953,     333.000,        0.000!   !END!
658 ! X =   -80.36706,  -33.06106,     327.000,        0.000!   !END!
659 ! X =   -80.36443,  -32.81258,     335.000,        0.000!   !END!
660 ! X =   -80.36181,   -32.5642,     313.000,        0.000!   !END!
661 ! X =   -80.35917,  -32.31572,     304.000,        0.000!   !END!
662 ! X =   -80.35655,  -32.06734,     304.000,        0.000!   !END!
663 ! X =   -80.35391,  -31.81886,     304.000,        0.000!   !END!
664 ! X =   -80.35128,  -31.57038,     284.000,        0.000!   !END!
665 ! X =   -80.34866,    -31.322,     274.000,        0.000!   !END!
666 ! X =   -80.34602,  -31.07352,     274.000,        0.000!   !END!
667 ! X =   -80.34339,  -30.82504,     267.000,        0.000!   !END!
668 ! X =   -80.15145,  -36.04505,     372.000,        0.000!   !END!
669 ! X =   -80.14882,  -35.79657,     335.000,        0.000!   !END!
670 ! X =   -80.14619,   -35.5482,     365.000,        0.000!   !END!
671 ! X =   -80.14346,  -35.29972,     396.000,        0.000!   !END!
672 ! X =   -80.14083,  -35.05125,     396.000,        0.000!   !END!
673 ! X =    -80.1382,  -34.80287,     396.000,        0.000!   !END!
674 ! X =   -80.13557,  -34.55439,     373.000,        0.000!   !END!
675 ! X =   -80.13294,  -34.30592,     366.000,        0.000!   !END!
676 ! X =    -80.1303,  -34.05744,     365.000,        0.000!   !END!
677 ! X =   -80.12768,  -33.80906,     365.000,        0.000!   !END!
678 ! X =   -80.12504,  -33.56058,     341.000,        0.000!   !END!
679 ! X =   -80.12241,   -33.3121,     335.000,        0.000!   !END!
680 ! X =   -80.11978,  -33.06373,     307.000,        0.000!   !END!
681 ! X =   -80.11715,  -32.81525,     309.000,        0.000!   !END!
682 ! X =   -80.11442,  -32.56677,     305.000,        0.000!   !END!
683 ! X =   -80.11179,  -32.31839,     300.000,        0.000!   !END!
684 ! X =   -80.10916,  -32.06991,     280.000,        0.000!   !END!
685 ! X =   -80.10653,  -31.82143,     292.000,        0.000!   !END!
686 ! X =    -80.1039,  -31.57305,     294.000,        0.000!   !END!
687 ! X =   -80.10127,  -31.32457,     291.000,        0.000!   !END!
688 ! X =   -80.09864,  -31.07619,     281.000,        0.000!   !END!
689 ! X =   -79.90408,  -36.04772,     366.000,        0.000!   !END!
690 ! X =   -79.90144,  -35.79924,     344.000,        0.000!   !END!
691 ! X =   -79.89881,  -35.55077,     365.000,        0.000!   !END!
692 ! X =   -79.89618,  -35.30239,     396.000,        0.000!   !END!
693 ! X =   -79.89355,  -35.05391,     396.000,        0.000!   !END!
694 ! X =   -79.89082,  -34.80544,     396.000,        0.000!   !END!
695 ! X =   -79.88819,  -34.55697,     391.000,        0.000!   !END!
696 ! X =   -79.88556,  -34.30859,     372.000,        0.000!   !END!
697 ! X =   -79.88293,  -34.06011,     365.000,        0.000!   !END!
698 ! X =   -79.88029,  -33.81163,     360.000,        0.000!   !END!
699 ! X =   -79.87767,  -33.56325,     332.000,        0.000!   !END!
700 ! X =   -79.87503,  -33.31478,     320.000,        0.000!   !END!
701 ! X =    -79.8724,   -33.0663,     335.000,        0.000!   !END!
702 ! X =   -79.86977,  -32.81792,     335.000,        0.000!   !END!
703 ! X =   -79.86714,  -32.56944,     311.000,        0.000!   !END!
704 ! X =   -79.86451,  -32.32096,     302.000,        0.000!   !END!
705 ! X =   -79.86178,  -32.07259,     297.000,        0.000!   !END!
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706 ! X =   -79.85915,  -31.82411,     304.000,       0.000!   !END!
707 ! X =   -79.85652,  -31.57563,     304.000,       0.000!   !END!
708 ! X =   -79.85389,  -31.32725,     304.000,       0.000!   !END!
709 ! X =   -79.85126,  -31.07877,     304.000,       0.000!   !END!
710 ! X =   -79.65669,  -36.05029,     390.000,       0.000!   !END!
711 ! X =   -79.65407,  -35.80192,     379.000,       0.000!   !END!
712 ! X =   -79.65143,  -35.55344,     353.000,       0.000!   !END!
713 ! X =    -79.6488,  -35.30496,     386.000,       0.000!   !END!
714 ! X =   -79.64617,  -35.05649,     402.000,       0.000!   !END!
715 ! X =   -79.64354,  -34.80811,     397.000,       0.000!   !END!
716 ! X =   -79.64091,  -34.55963,     396.000,       0.000!   !END!
717 ! X =   -79.63817,  -34.31116,     384.000,       0.000!   !END!
718 ! X =   -79.63555,  -34.06278,     356.000,       0.000!   !END!
719 ! X =   -79.63291,  -33.81431,     355.000,       0.000!   !END!
720 ! X =   -79.63028,  -33.56583,     363.000,       0.000!   !END!
721 ! X =   -79.62765,  -33.31745,     365.000,       0.000!   !END!
722 ! X =   -79.62502,  -33.06897,     357.000,       0.000!   !END!
723 ! X =   -79.62239,  -32.82049,     335.000,       0.000!   !END!
724 ! X =   -79.61976,  -32.57211,     318.000,       0.000!   !END!
725 ! X =   -79.61713,  -32.32363,     304.000,       0.000!   !END!
726 ! X =    -79.6145,  -32.07515,     304.000,       0.000!   !END!
727 ! X =   -79.61187,  -31.82677,     304.000,       0.000!   !END!
728 ! X =   -79.60923,  -31.57829,     304.000,       0.000!   !END!
729 ! X =    -79.6065,  -31.32982,     304.000,       0.000!   !END!
730 ! X =   -79.60387,  -31.08144,     304.000,       0.000!   !END!
731 ! X =   -79.39879,  -35.05916,     402.000,       0.000!   !END!
732 ! X =   -79.39616,  -34.81068,     396.000,       0.000!   !END!
733 ! X =   -79.39353,  -34.56231,     396.000,       0.000!   !END!
734 ! X =    -79.3909,  -34.31383,     386.000,       0.000!   !END!
735 ! X =   -79.38826,  -34.06535,     357.000,       0.000!   !END!
736 ! X =   -79.38554,  -33.81698,     381.000,       0.000!   !END!
737 ! X =    -79.3829,   -33.5685,     370.000,       0.000!   !END!
738 ! X =   -79.38027,  -33.32002,     365.000,       0.000!   !END!
739 ! X =   -79.37764,  -33.07164,     354.000,       0.000!   !END!
740 ! X =   -79.37501,  -32.82316,     320.000,       0.000!   !END!
741 ! X =   -79.37238,  -32.57469,     306.000,       0.000!   !END!
742 ! X =   -79.36975,  -32.32631,     304.000,       0.000!   !END!
743 ! X =   -79.36712,  -32.07783,     306.000,       0.000!   !END!
744 ! X =   -79.36448,  -31.82935,     305.000,       0.000!   !END!
745 ! X =   -79.36185,  -31.58097,     304.000,       0.000!   !END!
746 ! X =   -79.35922,  -31.33249,     304.000,       0.000!   !END!
747 ! X =   -79.35659,  -31.08401,     304.000,       0.000!   !END!
748 ! X =   -79.15141,  -35.06183,     396.000,       0.000!   !END!
749 ! X =   -79.14878,  -34.81336,     396.000,       0.000!   !END!
750 ! X =   -79.14615,  -34.56488,     396.000,       0.000!   !END!
751 ! X =   -79.14351,   -34.3164,     372.000,       0.000!   !END!
752 ! X =   -79.14089,  -34.06802,     355.000,       0.000!   !END!
753 ! X =   -79.13825,  -33.81955,     389.000,       0.000!   !END!
754 ! X =   -79.13562,  -33.57107,     389.000,       0.000!   !END!
755 ! X =   -79.13299,  -33.32269,     347.000,       0.000!   !END!
756 ! X =   -79.13026,  -33.07422,     340.000,       0.000!   !END!
757 ! X =   -79.12762,  -32.82574,     331.000,       0.000!   !END!
758 ! X =     -79.125,  -32.57736,     308.000,       0.000!   !END!
759 ! X =   -79.12236,  -32.32888,     320.000,       0.000!   !END!
760 ! X =   -79.11973,   -32.0804,     335.000,       0.000!   !END!
761 ! X =    -79.1171,  -31.83202,     316.000,       0.000!   !END!
762 ! X =   -79.11447,  -31.58354,     304.000,       0.000!   !END!
763 ! X =   -78.89614,  -34.31907,     372.000,       0.000!   !END!
764 ! X =    -78.8935,   -34.0706,     396.000,       0.000!   !END!
765 ! X =   -78.89087,  -33.82222,     372.000,       0.000!   !END!
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766 ! X =   -78.88824,  -33.57374,     365.000,        0.000!   !END!
767 ! X =   -78.88561,  -33.32526,     365.000,        0.000!   !END!
768 ! X =   -78.88298,  -33.07688,     365.000,        0.000!   !END!
769 ! X =   -78.88034,  -32.82841,     338.000,        0.000!   !END!
770 ! X =   -78.87771,  -32.57993,     314.000,        0.000!   !END!
771 ! X =   -78.87498,  -32.33155,     321.000,        0.000!   !END!
772 ! X =   -78.87235,  -32.08307,     335.000,        0.000!   !END!
773 ! X =   -78.86972,  -31.83459,     335.000,        0.000!   !END!
774 ! X =   -78.86709,  -31.58621,     292.000,        0.000!   !END!
775 ! X =   -78.64612,  -34.07327,     396.000,        0.000!   !END!
776 ! X =   -78.64349,  -33.82479,     386.000,        0.000!   !END!
777 ! X =   -78.64086,  -33.57641,     365.000,        0.000!   !END!
778 ! X =   -78.63823,  -33.32794,     365.000,        0.000!   !END!
779 ! X =   -78.63559,  -33.07946,     365.000,        0.000!   !END!
780 ! X =   -78.63297,  -32.83108,     338.000,        0.000!   !END!
781 ! X =   -78.63033,   -32.5826,     310.000,        0.000!   !END!
782 ! X =    -78.6277,  -32.33412,     312.000,        0.000!   !END!
783 ! X =   -78.62507,  -32.08574,     318.000,        0.000!   !END!
784 ! X =   -78.62244,  -31.83726,     307.000,        0.000!   !END!
785 ! X =    -78.6197,  -31.58879,     275.000,        0.000!   !END!
786 ! X =   -78.39348,  -33.57899,     365.000,        0.000!   !END!
787 ! X =   -78.39084,  -33.33051,     343.000,        0.000!   !END!
788 ! X =   -78.38822,  -33.08213,     341.000,        0.000!   !END!
789 ! X =   -78.38032,  -32.33679,     274.000,        0.000!   !END!
790 ! X =   -86.22193,  -33.67464,     274.000,        0.000!   !END!
791 ! X =   -86.01912,  -33.67677,     274.000,        0.000!   !END!
792 ! X =   -85.81621,  -33.67889,     274.000,        0.000!   !END!
793 ! X =   -85.81343,  -33.87778,     265.000,        0.000!   !END!
794 ! X =   -85.81054,  -34.07658,     244.000,        0.000!   !END!
795 ! X =    -85.8177,  -34.28021,     276.000,        0.000!   !END!
796 ! X =   -85.82486,  -34.48395,     295.000,        0.000!   !END!
797 ! X =   -85.82703,  -34.68765,     308.000,        0.000!   !END!
798 ! X =    -85.8291,  -34.89136,     322.000,        0.000!   !END!
799 ! X =   -86.02945,  -34.88628,     302.000,        0.000!   !END!
800 ! X =   -86.22986,   -34.8821,     284.000,        0.000!   !END!
801 ! X =   -86.43017,  -34.87802,     276.000,        0.000!   !END!
802 ! X =   -86.63052,  -34.87284,     274.000,        0.000!   !END!
803 ! X =   -86.82338,  -34.86587,     274.000,        0.000!   !END!
804 ! X =   -87.01625,  -34.85881,     274.000,        0.000!   !END!
805 ! X =   -87.02109,  -35.08043,     259.000,        0.000!   !END!
806 ! X =   -87.02589,  -35.30105,     274.000,        0.000!   !END!
807 ! X =   -87.03073,  -35.52257,     274.000,        0.000!   !END!
808 ! X =   -87.03562,  -35.74318,     274.000,        0.000!   !END!
809 ! X =   -87.04223,  -35.90215,     271.000,        0.000!   !END!
810 ! X =   -87.04883,  -36.06112,     256.000,        0.000!   !END!
811 ! X =   -87.06109,  -36.27963,     274.000,        0.000!   !END!
812 ! X =   -86.87438,  -36.40089,     274.000,        0.000!   !END!
813 ! X =   -86.66745,  -36.48265,     274.000,        0.000!   !END!
814 ! X =    -86.4696,  -36.48969,     274.000,        0.000!   !END!
815 ! X =   -86.27175,  -36.49673,     271.000,        0.000!   !END!
816 ! X =   -86.27634,  -36.69551,     251.000,        0.000!   !END!
817 ! X =   -86.28093,   -36.8942,     259.000,        0.000!   !END!
818 ! X =   -86.28553,  -37.09298,     272.000,        0.000!   !END!
819 ! X =   -86.29012,  -37.29166,     271.000,        0.000!   !END!
820 ! X =   -86.47807,  -37.28966,     243.000,        0.000!   !END!
821 ! X =   -86.51003,  -37.49812,     274.000,        0.000!   !END!
822 ! X =   -86.55157,   -37.6865,     274.000,        0.000!   !END!
823 ! X =   -86.33398,  -37.69571,     295.000,        0.000!   !END!
824 ! X =   -86.11635,  -37.70403,     304.000,        0.000!   !END!
825 ! X =   -85.89877,  -37.71335,     304.000,        0.000!   !END!
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826 ! X =   -85.69846,  -37.71743,     304.000,        0.000!   !END!
827 ! X =   -85.49811,  -37.72251,     304.000,        0.000!   !END!
828 ! X =   -85.29776,  -37.72769,     304.000,        0.000!   !END!
829 ! X =   -85.09736,  -37.73178,     304.000,        0.000!   !END!
830 ! X =   -85.10451,  -37.93541,     294.000,        0.000!   !END!
831 ! X =   -85.11168,  -38.13914,     280.000,        0.000!   !END!
832 ! X =   -85.11243,  -38.21861,     284.000,        0.000!   !END!
833 ! X =    -85.0037,  -38.22975,     298.000,        0.000!   !END!
834 ! X =   -84.83549,  -38.23148,     308.000,        0.000!   !END!
835 ! X =   -84.69714,  -38.24294,     322.000,        0.000!   !END!
836 ! X =   -84.53895,  -38.25459,     335.000,        0.000!   !END!
837 ! X =    -84.4098,  -38.20619,     335.000,        0.000!   !END!
838 ! X =   -84.29105,  -38.20751,     335.000,        0.000!   !END!
839 ! X =   -84.24145,  -38.19805,     335.000,        0.000!   !END!
840 ! X =   -84.14239,  -38.18921,     335.000,        0.000!   !END!
841 ! X =   -84.07324,  -38.19988,     335.000,        0.000!   !END!
842 ! X =   -84.01444,  -38.25019,     335.000,        0.000!   !END!
843 ! X =   -83.95549,  -38.29053,     335.000,        0.000!   !END!
844 ! X =   -83.86721,  -38.37098,     344.000,        0.000!   !END!
845 ! X =   -83.76868,  -38.41179,     362.000,        0.000!   !END!
846 ! X =   -83.68952,  -38.41263,     365.000,        0.000!   !END!
847 ! X =   -83.57019,  -38.35432,     365.000,        0.000!   !END!
848 ! X =   -83.46079,  -38.30574,     365.000,        0.000!   !END!
849 ! X =   -83.39144,  -38.29656,     365.000,        0.000!   !END!
850 ! X =   -83.24308,   -38.2982,     365.000,        0.000!   !END!
851 ! X =   -83.10497,  -38.33938,     365.000,        0.000!   !END!
852 ! X =   -83.02666,  -38.41969,     365.000,        0.000!   !END!
853 ! X =    -82.9577,  -38.45031,     365.000,        0.000!   !END!
854 ! X =   -82.84795,  -38.37191,     365.000,        0.000!   !END!
855 ! X =   -82.75748,   -38.2337,     365.000,        0.000!   !END!
856 ! X =   -82.72691,  -38.15456,     366.000,        0.000!   !END!
857 ! X =   -82.62714,  -38.07612,     372.000,        0.000!   !END!
858 ! X =   -82.54725,  -38.00737,     372.000,        0.000!   !END!
859 ! X =   -82.48659,  -37.88878,     385.000,        0.000!   !END!
860 ! X =   -82.45611,  -37.80953,     386.000,        0.000!   !END!
861 ! X =   -82.69347,  -37.79714,     396.000,        0.000!   !END!
862 ! X =   -82.68881,  -37.59536,     396.000,        0.000!   !END!
863 ! X =   -82.68421,  -37.39469,     396.000,        0.000!   !END!
864 ! X =    -82.6796,  -37.19391,     396.000,        0.000!   !END!
865 ! X =   -82.67494,  -36.99224,     370.000,        0.000!   !END!
866 ! X =   -82.87529,  -36.98516,     367.000,        0.000!   !END!
867 ! X =   -83.07563,  -36.97808,     396.000,        0.000!   !END!
868 ! X =   -83.27597,   -36.9709,     396.000,        0.000!   !END!
869 ! X =   -83.47621,  -36.96383,     396.000,        0.000!   !END!
870 ! X =   -83.47164,  -36.76016,     377.000,        0.000!   !END!
871 ! X =   -83.46697,  -36.55639,     366.000,        0.000!   !END!
872 ! X =   -83.46231,  -36.35272,     337.000,        0.000!   !END!
873 ! X =   -83.45764,  -36.14905,     335.000,        0.000!   !END!
874 ! X =    -83.2288,  -36.16039,     333.000,        0.000!   !END!
875 ! X =   -82.99981,  -36.17083,     343.000,        0.000!   !END!
876 ! X =   -82.77096,  -36.18216,     350.000,        0.000!   !END!
877 ! X =   -82.54207,   -36.1926,     337.000,        0.000!   !END!
878 ! X =   -82.31323,  -36.20393,     344.000,        0.000!   !END!
879 ! X =   -82.08423,  -36.21437,     343.000,        0.000!   !END!
880 ! X =   -81.85539,  -36.22571,     335.000,        0.000!   !END!
881 ! X =   -81.85756,  -36.42941,     344.000,        0.000!   !END!
882 ! X =   -81.85974,  -36.63321,     356.000,        0.000!   !END!
883 ! X =   -81.66688,  -36.64018,     361.000,        0.000!   !END!
884 ! X =   -81.47392,  -36.64726,     365.000,        0.000!   !END!
885 ! X =   -81.47597,    -36.836,     376.000,        0.000!   !END!
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886 ! X =   -81.6738,  -36.83395,     350.000,       0.000!   !END!
887 ! X =  -81.87171,  -36.83179,     365.000,       0.000!   !END!
888 ! X =  -81.87382,  -37.03061,     364.000,       0.000!   !END!
889 ! X =  -81.68254,   -37.0356,     375.000,       0.000!   !END!
890 ! X =  -81.49132,  -37.04158,     391.000,       0.000!   !END!
891 ! X =  -81.30004,  -37.04667,     393.000,       0.000!   !END!
892 ! X =  -81.18987,  -36.91861,     396.000,       0.000!   !END!
893 ! X =  -81.09014,  -36.85005,     396.000,       0.000!   !END!
894 ! X =  -80.99104,  -36.83123,     396.000,       0.000!   !END!
895 ! X =  -80.93076,  -36.75242,     396.000,       0.000!   !END!
896 ! X =  -80.89045,   -36.6832,     396.000,       0.000!   !END!
897 ! X =  -80.75177,  -36.66485,     395.000,       0.000!   !END!
898 ! X =  -80.67245,  -36.65573,     395.000,       0.000!   !END!
899 ! X =  -80.45985,  -36.66298,     395.000,       0.000!   !END!
900 ! X =  -80.26688,  -36.66995,     396.000,       0.000!   !END!
901 ! X =  -80.26471,  -36.46625,     396.000,       0.000!   !END!
902 ! X =  -80.26263,  -36.26254,     396.000,       0.000!   !END!
903 ! X =  -80.08943,  -36.26434,     396.000,       0.000!   !END!
904 ! X =  -79.91624,  -36.26624,     395.000,       0.000!   !END!
905 ! X =  -79.72337,  -36.27321,     395.000,       0.000!   !END!
906 ! X =  -79.53051,  -36.28028,     395.000,       0.000!   !END!
907 ! X =  -79.46121,  -36.28098,     395.000,       0.000!   !END!
908 ! X =  -79.45273,  -36.04051,     396.000,       0.000!   !END!
909 ! X =  -79.44426,  -35.80014,     396.000,       0.000!   !END!
910 ! X =  -79.43578,  -35.55966,     365.000,       0.000!   !END!
911 ! X =   -79.4273,  -35.31929,     389.000,       0.000!   !END!
912 ! X =  -79.41882,  -35.07881,     402.000,       0.000!   !END!
913 ! X =  -79.21591,  -35.08095,     396.000,       0.000!   !END!
914 ! X =  -79.01311,  -35.08318,     396.000,       0.000!   !END!
915 ! X =  -79.01598,  -34.88428,     396.000,       0.000!   !END!
916 ! X =  -79.01876,  -34.68549,     396.000,       0.000!   !END!
917 ! X =  -79.16225,  -34.68402,     396.000,       0.000!   !END!
918 ! X =  -79.30573,  -34.68245,     396.000,       0.000!   !END!
919 ! X =  -79.31474,  -34.60284,     396.000,       0.000!   !END!
920 ! X =  -79.14653,  -34.60467,     396.000,       0.000!   !END!
921 ! X =  -79.09756,  -34.64496,     396.000,       0.000!   !END!
922 ! X =  -78.95791,  -34.54705,     390.000,       0.000!   !END!
923 ! X =  -78.83757,   -34.3992,     372.000,       0.000!   !END!
924 ! X =  -78.78706,  -34.30041,     380.000,       0.000!   !END!
925 ! X =  -78.73636,  -34.18166,     396.000,       0.000!   !END!
926 ! X =  -78.60668,  -34.08361,     396.000,       0.000!   !END!
927 ! X =  -78.47701,  -33.98566,     396.000,       0.000!   !END!
928 ! X =  -78.43584,  -33.83696,     370.000,       0.000!   !END!
929 ! X =  -78.34613,  -33.77832,     365.000,       0.000!   !END!
930 ! X =  -78.18779,  -33.78001,     365.000,       0.000!   !END!
931 ! X =  -78.18197,  -33.54448,     365.000,       0.000!   !END!
932 ! X =  -78.17621,  -33.30994,     330.000,       0.000!   !END!
933 ! X =   -78.1704,  -33.07451,     331.000,       0.000!   !END!
934 ! X =  -78.32867,  -33.06783,     337.000,       0.000!   !END!
935 ! X =  -78.48693,  -33.06116,     348.000,       0.000!   !END!
936 ! X =  -78.57598,  -33.06027,     359.000,       0.000!   !END!
937 ! X =  -78.57073,   -32.8715,     342.000,       0.000!   !END!
938 ! X =  -78.56537,  -32.68263,     321.000,       0.000!   !END!
939 ! X =  -78.56012,  -32.49386,     305.000,       0.000!   !END!
940 ! X =  -78.48043,  -32.44505,     292.000,       0.000!   !END!
941 ! X =   -78.3207,  -32.31751,     273.000,       0.000!   !END!
942 ! X =  -78.47904,  -32.31582,     286.000,       0.000!   !END!
943 ! X =  -78.55821,  -32.31498,     305.000,       0.000!   !END!
944 ! X =  -78.55078,  -32.08652,     297.000,       0.000!   !END!
945 ! X =  -78.54345,  -31.85795,     286.000,       0.000!   !END!
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 946 ! X =   -78.47416,  -31.85875,     272.000,       0.000!   !END!
 947 ! X =   -78.46256,  -31.69985,     271.000,       0.000!   !END!
 948 ! X =   -78.53066,  -31.58977,     272.000,       0.000!   !END!
 949 ! X =   -78.52975,  -31.50033,     274.000,       0.000!   !END!
 950 ! X =   -78.72762,  -31.49528,     278.000,       0.000!   !END!
 951 ! X =   -78.92543,  -31.49113,     280.000,       0.000!   !END!
 952 ! X =   -79.12335,  -31.48707,     304.000,       0.000!   !END!
 953 ! X =   -79.32121,  -31.48193,     304.000,       0.000!   !END!
 954 ! X =   -79.31405,  -31.27829,     304.000,       0.000!   !END!
 955 ! X =   -79.30699,  -31.07465,     304.000,       0.000!   !END!
 956 ! X =   -79.50979,  -31.07053,     304.000,       0.000!   !END!
 957 ! X =   -79.71254,  -31.06531,     304.000,       0.000!   !END!
 958 ! X =   -79.91539,  -31.06019,     304.000,       0.000!   !END!
 959 ! X =   -80.11819,  -31.05607,     281.000,       0.000!   !END!
 960 ! X =   -80.11647,  -30.89703,     273.000,       0.000!   !END!
 961 ! X =   -80.11485,  -30.73809,     270.000,       0.000!   !END!
 962 ! X =   -80.24299,  -30.69695,     267.000,       0.000!   !END!
 963 ! X =   -80.39075,   -30.6258,     268.000,       0.000!   !END!
 964 ! X =   -80.51885,  -30.57479,     268.000,       0.000!   !END!
 965 ! X =   -80.60774,  -30.56383,     268.000,       0.000!   !END!
 966 ! X =   -80.65701,  -30.54348,     274.000,       0.000!   !END!
 967 ! X =   -80.71629,  -30.53285,     269.000,       0.000!   !END!
 968 ! X =   -80.71735,  -30.63226,     274.000,       0.000!   !END!
 969 ! X =   -80.88556,  -30.63043,     274.000,       0.000!   !END!
 970 ! X =   -81.05377,   -30.6287,     274.000,       0.000!   !END!
 971 ! X =   -81.22198,  -30.62688,     274.000,       0.000!   !END!
 972 ! X =   -81.45273,  -30.61743,     259.000,       0.000!   !END!
 973 ! X =   -81.68354,  -30.60909,     256.000,       0.000!   !END!
 974 ! X =   -81.91429,  -30.59964,     256.000,       0.000!   !END!
 975 ! X =   -81.92536,  -30.70888,     265.000,       0.000!   !END!
 976 ! X =   -81.81748,   -30.7995,     265.000,       0.000!   !END!
 977 ! X =   -81.73936,  -30.89965,     274.000,       0.000!   !END!
 978 ! X =   -81.66139,  -31.00988,     276.000,       0.000!   !END!
 979 ! X =   -81.71084,  -31.00936,     276.000,       0.000!   !END!
 980 ! X =   -81.93836,  -31.00289,     279.000,       0.000!   !END!
 981 ! X =   -82.16593,  -30.99552,     304.000,       0.000!   !END!
 982 ! X =   -82.39345,  -30.98915,     304.000,       0.000!   !END!
 983 ! X =   -82.62098,  -30.98278,     304.000,       0.000!   !END!
 984 ! X =   -82.84854,  -30.97531,     294.000,       0.000!   !END!
 985 ! X =   -83.07607,  -30.96893,     304.000,       0.000!   !END!
 986 ! X =   -83.30359,  -30.96256,     304.000,       0.000!   !END!
 987 ! X =   -83.30576,  -31.16627,     287.000,       0.000!   !END!
 988 ! X =   -83.30794,  -31.36998,     304.000,       0.000!   !END!
 989 ! X =   -83.31495,  -31.56375,     318.000,       0.000!   !END!
 990 ! X =   -83.32187,  -31.75742,     335.000,       0.000!   !END!
 991 ! X =    -83.5247,  -31.75031,     326.000,       0.000!   !END!
 992 ! X =   -83.72744,   -31.7432,     309.000,       0.000!   !END!
 993 ! X =   -83.72542,  -31.54946,     305.000,       0.000!   !END!
 994 ! X =   -83.72339,  -31.35562,     304.000,       0.000!   !END!
 995 ! X =   -83.91626,  -31.34865,     301.000,       0.000!   !END!
 996 ! X =   -84.10912,  -31.34158,     281.000,       0.000!   !END!
 997 ! X =   -84.30199,  -31.33462,     304.000,       0.000!   !END!
 998 ! X =   -84.49486,  -31.32755,     304.000,       0.000!   !END!
 999 ! X =    -84.6977,  -31.32044,     288.000,       0.000!   !END!
1000 ! X =   -84.90044,  -31.31333,     278.000,       0.000!   !END!
1001 ! X =   -84.89834,  -31.11451,     274.000,       0.000!   !END!
1002 ! X =   -84.89624,  -30.91578,     265.000,       0.000!   !END!
1003 ! X =   -85.10572,   -30.9116,     263.000,       0.000!   !END!
1004 ! X =   -85.31506,  -30.90832,     268.000,       0.000!   !END!
1005 ! X =   -85.52444,  -30.90414,     274.000,       0.000!   !END!
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  1006 ! X =   -85.73392,  -30.89986,     274.000,       0.000!   !END!
  1007 ! X =   -85.94327,  -30.89668,     274.000,       0.000!   !END!
  1008 ! X =   -86.15275,  -30.89249,     245.000,       0.000!   !END!
  1009 ! X =   -86.26201,  -30.93101,     236.000,       0.000!   !END!
  1010 ! X =   -86.38115,  -30.96958,     243.000,       0.000!   !END!
  1011 ! X =   -86.49046,  -31.01808,     240.000,       0.000!   !END!
  1012 ! X =   -86.49683,  -31.14723,     270.000,       0.000!   !END!
  1013 ! X =    -86.5032,  -31.27638,     274.000,       0.000!   !END!
  1014 ! X =   -86.70839,  -31.27213,     256.000,       0.000!   !END!
  1015 ! X =   -86.91373,  -31.26698,     248.000,       0.000!   !END!
  1016 ! X =   -87.11898,  -31.26183,     245.000,       0.000!   !END!
  1017 ! X =   -87.32427,  -31.25768,     274.000,       0.000!   !END!
  1018 ! X =   -87.33612,   -31.4414,     274.000,       0.000!   !END!
  1019 ! X =   -87.34798,  -31.62513,     267.000,       0.000!   !END!
  1020 ! X =   -87.14774,  -31.63419,     274.000,       0.000!   !END!
  1021 ! X =   -86.94746,  -31.64435,     280.000,       0.000!   !END!
  1022 ! X =   -86.74718,  -31.65442,     285.000,       0.000!   !END!
  1023 ! X =   -86.54684,  -31.66349,     284.000,       0.000!   !END!
  1024 ! X =   -86.55891,  -31.86216,     299.000,       0.000!   !END!
  1025 ! X =   -86.57088,  -32.06075,     304.000,       0.000!   !END!
  1026 ! X =   -86.77362,  -32.05364,     304.000,       0.000!   !END!
  1027 ! X =   -86.97646,  -32.04653,     301.000,       0.000!   !END!
  1028 ! X =   -86.98843,  -32.24521,     287.000,       0.000!   !END!
  1029 ! X =   -87.00049,  -32.44379,     265.000,       0.000!   !END!
  1030 ! X =   -87.01247,  -32.64247,     261.000,       0.000!   !END!
  1031 ! X =   -87.02444,  -32.84115,     280.000,       0.000!   !END!
  1032 ! X =   -87.22478,  -32.83408,     261.000,       0.000!   !END!
  1033 ! X =   -87.42513,   -32.8269,     236.000,       0.000!   !END!
  1034 ! X =   -87.62537,  -32.81984,     239.000,       0.000!   !END!
  1035 ! X =   -87.82572,  -32.81276,     246.000,       0.000!   !END!
  1036 ! X =   -87.82543,  -33.01351,     235.000,       0.000!   !END!
  1037 ! X =    -87.8251,  -33.21526,     274.000,       0.000!   !END!
  1038 ! X =   -87.82471,  -33.41601,     274.000,       0.000!   !END!
  1039 ! X =   -87.82438,  -33.61776,     274.000,       0.000!   !END!
  1040 ! X =   -87.61861,  -33.62593,     280.000,       0.000!   !END!
  1041 ! X =   -87.41294,   -33.6341,     304.000,       0.000!   !END!
  1042 ! X =   -87.20716,  -33.64227,     304.000,       0.000!   !END!
  1043 ! X =   -87.00139,  -33.65044,     304.000,       0.000!   !END!
  1044 ! X =   -86.79572,   -33.6586,     293.000,       0.000!   !END!
  1045 ! X =   -86.61763,  -33.66047,     275.000,       0.000!   !END!
  1046 ! X =   -86.41978,  -33.66751,     277.000,       0.000!   !END!
```

----

a Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
BAS BART CLASS I ANALYSIS (MINGO)
MAY 2009 BASE (5 units PTE)
6KM UMC REFINED CALMET METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    ! METDAT = /raid2c/umc/calmet/2002/calmet02.dat !
    or
ISCMET.DAT    input    * ISCDAT =             *
    or
PLMMET.DAT    input    * PLMDAT =             *
    or
PROFILE.DAT   input    * PRFDAT =             *
SURFACE.DAT   input    * SFCDAT =             *
RESTARTB.DAT  input    * RSTARTB=             *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =BASM2002REF.LST     !
CONC.DAT      output   ! CONDAT =BASM2002REF.CON     !
DFLX.DAT      output   ! DFDAT  =BASM2002REF.DRY     !
WFLX.DAT      output   ! WFDAT  =BASM2002REF.WET     !

VISB.DAT      output   ! VISDAT =BASM2002REF.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2002.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =             *
VOLEMARB.DAT  input    * VOLDAT =             *
BAEMARB.DAT   input    * ARDAT  =             *
LNEMARB.DAT   input    * LNDAT  =             *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =             *
CHEM.DAT      input    * CHEMDAT=             *
H2O2.DAT      input    * H2O2DAT=             *
HILL.DAT      input    * HILDAT=             *
HILLRCT.DAT   input    * RCTDAT=             *
COASTLN.DAT   input    * CSTDAT=             *
FLUXBDY.DAT   input    * BDYDAT=             *
BCON.DAT      input    * BCNDAT=             *
DEBUG.DAT     output   * DEBUG =             *
MASSFLX.DAT   output   * FLXDAT=             *
MASSBAL.DAT   output   * BALDAT=             *
FOG.DAT       output   * FOGDAT=             *
```

```
------------------------------------------------------------------------
--------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                Default: 1       ! NMETDAT =  1  !

     Number of PTEMARB.DAT files for run (NPTDAT)
                                Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if
NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------


------------------------------------------------------------------------
--------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  2002 !
     (used only if   Month (IBMO) -- No default       ! IBMO =   01 !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   01 !
                      Hour (IBHR) -- No default       ! IBHR =   01 !

     Base time zone        (XBTZ) -- No default       ! XBTZ = 6.0  !
        PST = 8., MST = 7.
        CST = 6., EST = 5.

     Length of run (hours) (IRLG) -- No default       ! IRLG =  8760 !
```

```
     Number of chemical species (NSPEC)
                                     Default: 5       ! NSPEC =  6   !

     Number of chemical species
     to be emitted  (NSE)            Default: 3       ! NSE =  3   !

     Flag to stop run after
     SETUP phase (ITEST)             Default: 2       ! ITEST =  2   !
     (Used to allow checking
     of the model inputs, files, etc.)
           ITEST = 1 - STOPS program after SETUP phase
           ITEST = 2 - Continues with execution of program
                       after SETUP

     Restart Configuration:

        Control flag (MRESTART)      Default: 0       ! MRESTART =  0
!

           0 = Do not read or write a restart file
           1 = Read a restart file at the beginning of
               the run
           2 = Write a restart file during run
           3 = Read a restart file at beginning of run
               and write a restart file during run

        Number of periods in Restart
        output cycle (NRESPD)        Default: 0       ! NRESPD =  0   !

           0 = File written only at last period
          >0 = File updated every NRESPD periods

     Meteorological Data Format (METFM)
                                     Default: 1       ! METFM =  1   !

           METFM = 1 - CALMET binary file (CALMET.MET)
           METFM = 2 - ISC ASCII file (ISCMET.MET)
           METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
           METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                       surface parameters file (SURFACE.DAT)

  Meteorological Profile Data Format (MPRFFM)
            (used only for METFM = 1, 2, 3)
                                     Default: 1       ! MPRFFM =  1   !

           MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
           MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

     PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
     Averaging Time (minutes) (AVET)
                                     Default: 60.0    ! AVET = 60. !
     PG Averaging Time (minutes) (PGTIME)
                                     Default: 60.0    ! PGTIME = 60. !


!END!


-------------------------------------------------------------------------
-------
```

```
INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)                   Default: 1     ! MGAUSS =  1
!
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                              Default: 3     ! MCTADJ =  3
!
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                          Default: 0     ! MCTSG =  0
!
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated 0 (MSLUG)                   Default: 0     ! MSLUG =  0
!
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled ?
     (MTRANS)                              Default: 1     ! MTRANS =  1
!
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)            Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to simulate building
     downwash? (MBDW)                      Default: 1     ! MBDW =   1
!
        1 = ISC method
        2 = PRIME method

     Vertical wind shear modeled above
     stack top? (MSHEAR)                   Default: 0     ! MSHEAR =  0
!
        0 = no  (i.e., vertical wind shear not modeled)
        1 = yes (i.e., vertical wind shear modeled)

     Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0
!
        0 = no (i.e., puffs not split)
        1 = yes (i.e., puffs are split)

     Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  1
```

```
!
        0 = chemical transformation not
            modeled
        1 = transformation rates computed
            internally (MESOPUFF II scheme)
        2 = user-specified transformation
            rates used
        3 = transformation rates computed
            internally (RIVAD/ARM3 scheme)
        4 = secondary organic aerosol formation
            computed (MESOPUFF II scheme for OH)

     Aqueous phase transformation flag (MAQCHEM)
     (Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0
!
        0 = aqueous phase transformation
            not modeled
        1 = transformation rates adjusted
            for aqueous phase reactions

     Wet removal modeled ? (MWET)          Default: 1     ! MWET =  1
!
        0 = no
        1 = yes

     Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  1
!
        0 = no
        1 = yes
        (dry deposition method specified
         for each species in Input Group 3)

     Method used to compute dispersion
     coefficients (MDISP)                  Default: 3     ! MDISP =  3
!

        1 = dispersion coefficients computed from measured values
            of turbulence, sigma v, sigma w
        2 = dispersion coefficients from internally calculated
            sigma v, sigma w using micrometeorological variables
            (u*, w*, L, etc.)
        3 = PG dispersion coefficients for RURAL areas (computed using
            the ISCST multi-segment approximation) and MP coefficients
in
            urban areas
        4 = same as 3 except PG coefficients computed using
            the MESOPUFF II eqns.
        5 = CTDM sigmas used for stable and neutral conditions.
            For unstable conditions, sigmas are computed as in
            MDISP = 3, described above.  MDISP = 5 assumes that
            measured values are read

     Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
     (Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3
!
        1 = use sigma-v or sigma-theta measurements
            from PROFILE.DAT to compute sigma-y
            (valid for METFM = 1, 2, 3, 4)
        2 = use sigma-w measurements
            from PROFILE.DAT to compute sigma-z
```

```
          (valid for METFM = 1, 2, 3, 4)
       3 = use both sigma-(v/theta) and sigma-w
          from PROFILE.DAT to compute sigma-y and sigma-z
          (valid for METFM = 1, 2, 3, 4)
       4 = use sigma-theta measurements
          from PLMMET.DAT to compute sigma-y
          (valid only if METFM = 3)

     Back-up method used to compute dispersion
     when measured turbulence data are
     missing (MDISP2)                     Default: 3     ! MDISP2 =  3
!
     (used only if MDISP = 1 or 5)
       2 = dispersion coefficients from internally calculated
          sigma v, sigma w using micrometeorological variables
          (u*, w*, L, etc.)
       3 = PG dispersion coefficients for RURAL areas (computed using
          the ISCST multi-segment approximation) and MP coefficients
in
          urban areas
       4 = same as 3 except PG coefficients computed using
          the MESOPUFF II eqns.

   [DIAGNOSTIC FEATURE]
     Method used for Lagrangian timescale for Sigma-y
     (used only if MDISP=1,2 or MDISP2=1,2)
     (MTAULY)                             Default: 0     ! MTAULY =  0
!
       0 = Draxler default 617.284 (s)
       1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
      10 < Direct user input (s)             -- e.g., 306.9


     [DIAGNOSTIC FEATURE]
     Method used for Advective-Decay timescale for Turbulence
     (used only if MDISP=2 or MDISP2=2)
     (MTAUADV)                            Default: 0     ! MTAUADV =  0
!
       0 = No turbulence advection
       1 = Computed (OPTION NOT IMPLEMENTED)
      10 < Direct user input (s)   -- e.g., 300


     Method used to compute turbulence sigma-v &
     sigma-w using micrometeorological variables
     (Used only if MDISP = 2 or MDISP2 = 2)
     (MCTURB)                             Default: 1     ! MCTURB =  1
!
       1 = Standard CALPUFF subroutines
       2 = AERMOD subroutines

     PG sigma-y,z adj. for roughness?     Default: 0     ! MROUGH =  0
!
     (MROUGH)
       0 = no
       1 = yes

     Partial plume penetration of         Default: 1     ! MPARTL =  1
!
     elevated inversion?
```

```
     (MPARTL)
        0 = no
        1 = yes

     Strength of temperature inversion     Default: 0     ! MTINV =  0
!
     provided in PROFILE.DAT extended records?
     (MTINV)
        0 = no (computed from measured/default gradients)
        1 = yes

     PDF used for dispersion under convective conditions?
                                           Default: 0     ! MPDF =  0  !
     (MPDF)
        0 = no
        1 = yes

     Sub-Grid TIBL module used for shore line?
                                           Default: 0     ! MSGTIBL = 0
!
     (MSGTIBL)
        0 = no
        1 = yes

     Boundary conditions (concentration) modeled?
                                           Default: 0     ! MBCON = 0  !
     (MBCON)
        0 = no
        1 = yes, using formatted BCON.DAT file
        2 = yes, using unformatted CONC.DAT file


     Analyses of fogging and icing impacts due to emissions from
     arrays of mechanically-forced cooling towers can be performed
     using CALPUFF in conjunction with a cooling tower emissions
     processor (CTEMISS) and its associated postprocessors.  Hourly
     emissions of water vapor and temperature from each cooling tower
     cell are computed for the current cell configuration and ambient
     conditions by CTEMISS. CALPUFF models the dispersion of these
     emissions and provides cloud information in a specialized format
     for further analysis. Output to FOG.DAT is provided in either
     'plume mode' or 'receptor mode' format.

     Configure for FOG Model output?
                                           Default: 0     ! MFOG =  0
!
     (MFOG)
        0 = no
        1 = yes  - report results in PLUME Mode format
        2 = yes  - report results in RECEPTOR Mode format


     Test options specified to see if
     they conform to regulatory
     values? (MREG)                        Default: 1     ! MREG =  1
!

        0 = NO checks are made
        1 = Technical options must conform to USEPA
            Long Range Transport (LRT) guidance
```

```
METFM    1 or 2
AVET     60. (min)
PGTIME   60. (min)
MGAUSS   1
MCTADJ   3
MTRANS   1
MTIP     1
MCHEM    1 or 3 (if modeling SOx, NOx)
MWET     1
MDRY     1
MDISP    2 or 3
MPDF     0 if MDISP=3
         1 if MDISP=2
MROUGH   0
MPARTL   1
SYTDEP   550. (m)
MHFTSZ   0
```

!END!

INPUT GROUP: 3a, 3b -- Species list

Subgroup (3a)

  The following species are modeled:

```
! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!
```

```
                                                                  Dry
OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED
NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,
(0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS
1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE
2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)
3= etc.)

!          SO2  =         1,               1,           1,
0   !
!          SO4  =         1,               0,           2,
0   !
!          NOX  =         1,               1,           1,
0   !
```

```
!         HNO3  =         1,                0,           1,
0   !
!          NO3  =         1,                0,           2,
0   !
!         PM10  =         1,                1,           2,
0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



------------------------------------------------------------------------
-------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 37N  !
     (RLON0)                    No Default      ! RLON0 = 92W  !
```

```
         TTM :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of
projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping
plane
                RLAT0 identifies latitude of tangent-point of mapping
plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                   No Default      ! XLAT1 = 30N  !
     (XLAT2)                   No Default      ! XLAT2 = 45N  !

         LCC :  Projection cone slices through Earth's surface at XLAT1
and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of
the
     Earth known as the World Geodetic System 1984 (WGS-G ).  Other
local
     models may be in use, and their selection in CALMET will make its
output
     consistent with local mapping products.  The list of Datum-Regions
with
     official transformation parameters is provided by the National
Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)

------------------------------------------------------------------------
------
     WGS-G     WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS
(NAD27)
     NWS-27    NWS 6370KM Radius, Sphere
     NWS-84    NWS 6370KM Radius, Sphere
```

```
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere

     Datum-region for output coordinates
     (DATUM)                    Default: WGS-G     ! DATUM = WGS-84  !


METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =  87    !
            No. Y grid cells (NY)      No default     ! NY =  111   !
         No. vertical layers (NZ)      No default     ! NZ =  10   !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 6 !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
              4000. !

            Reference Coordinates
           of SOUTHWEST corner of
                 grid cell(1, 1):

            X-coordinate (XORIGKM)     No default     ! XORIGKM = -258.
!
            Y coordinate (YORIGKM)     No default     ! YORIGKM = -330.
!
                                      Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET.
grid.
     The lower left (LL) corner of the computational grid is at grid
point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of
the
     computational grid is at grid point (IECOMP, JECOMP) of the MET.
grid.
     The grid spacing of the computational grid is the same as the MET.
grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =  1
!
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =  1
!
                  (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)      No default     ! IECOMP =  87
!
                  (1 <= IECOMP <= NX)
```

```
        Y index of UR corner (JECOMP)      No default     ! JECOMP =
111    !
                  (1 <= JECOMP <= NY)



SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of
the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the
computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1
!
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1
!
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =  87
!
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =
111   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1
!
        (MESHDN is an integer >= 1)

!END!


-----------------------------------------------------------------------
-------


INPUT GROUP: 5 -- Output Options
--------------
                                             *
*
     FILE                          DEFAULT VALUE           VALUE THIS RUN
     ----                          -------------           --------------

   Concentrations (ICON)                 1                 !  ICON =  1
```

```
!
   Dry Fluxes (IDRY)                  1                    !  IDRY =  1
!
   Wet Fluxes (IWET)                  1                    !  IWET =  1
!
   Relative Humidity (IVIS)           1                    !  IVIS =  1
!
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                           Default: T          ! LCOMPRS = T
!

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                         Default: 0          ! IMFLX =  0
!
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                         Default: 0          ! IMBAL =  0
!
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)    Default: 0          ! ICPRT =  0
!
       Print dry fluxes (IDPRT)        Default: 0          ! IDPRT =  0
!
       Print wet fluxes (IWPRT)        Default: 0          ! IWPRT =  0
!
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours                Default: 1          ! ICFRQ =  1
!
       Dry flux print interval
       (IDFRQ) in hours                Default: 1          ! IDFRQ =  1
!
       Wet flux print interval
       (IWFRQ) in hours                Default: 1          ! IWFRQ =  1
!

       Units for Line Printer Output
       (IPRTU)                         Default: 1          ! IPRTU =  3
!
```

```
                      for            for
                 Concentration    Deposition
          1 =       g/m**3         g/m**2/s
          2 =      mg/m**3        mg/m**2/s
          3 =      ug/m**3        ug/m**2/s
          4 =      ng/m**3        ng/m**2/s
          5 =     Odour Units

       Messages tracking progress of run
       written to the screen ?
       (IMESG)                        Default: 2         ! IMESG =  2
!
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------
------ WET FLUXES ------   -- MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?
PRINTED?  SAVED ON DISK?   SAVED ON DISK?
   -------       ------------------------   ------------------------
------------------------   ---------------
!          SO2 =     0,            1,           0,            1,
0,           1,           0   !
!          SO4 =     0,            1,           0,            1,
0,           1,           0   !
!          NOX =     0,            1,           0,            1,
0,           1,           0   !
!         HNO3 =     0,            1,           0,            1,
0,           1,           0   !
!          NO3 =     0,            1,           0,            1,
0,           1,           0   !
!         PM10 =     0,            1,           0,            1,
0,           1,           0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                Default: F     ! LDEBUG
= F !

       First puff to track
       (IPFDEB)                                Default: 1     ! IPFDEB
=  1  !

       Number of puffs to track
       (NPFDEB)                                Default: 1     ! NPFDEB
=  1  !

       Met. period to start output
       (NN1)                                   Default: 1     ! NN1 =
1   !

       Met. period to end output
       (NN2)                                   Default: 10    ! NN2 =
10  !
```

```
!END!


---------------------------------------------------------------------------
-------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =
0   !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC
=  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                  No Default     ! MHILL =
2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M
= 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M
= 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL           XC         YC       THETAH  ZGRID  RELIEF    EXPO 1
EXPO 2   SCALE 1    SCALE 2    AMAX1     AMAX2
```

```
 NO.          (km)      (km)      (deg.)   (m)     (m)      (m)
(m)       (m)        (m)       (m)       (m)
----          ----      ----      ------  -----  ------    ------
------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                      XRCT         YRCT        ZRCT           XHH
                      (km)         (km)         (m)
                     ------        -----      ------          ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid
elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain
receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a
separate
           input subgroup and therefore must end with an input group
terminator.

------------------------------------------------------------------------
-------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY
MESOPHYLL RESISTANCE     HENRY'S LAW COEFFICIENT
       NAME        (cm**2/s)
(s/cm)                (dimensionless)
      -------     -----------      ----------      ----------
--------------------     -----------------------
```

```
!          SO2 =     0.1509,         1000.,            8.,
0.,                  0.04 !
!          NOX =     0.1656,            1.,            8.,
5.,                   3.5 !
!         HNO3 =     0.1628,            1.,           18.,
0.,            0.00000008 !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard
deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                   DEVIATION
                        (microns)                  (microns)
      -------      -------------------        ------------------
!          SO4 =          0.48,                      2.   !
!          NO3 =          0.48,                      2.   !
!         PM10 =            2.,                      2.   !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                           Default: 30    !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                             Default: 10    !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                          Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                            Default: 9     !   NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                            Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
```

```
        IVEG=3 for inactive vegetation

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,             0.0E00 !
!          SO4 =         1.0E-04,            3.0E-05 !
!         HNO3 =         6.0E-05,             0.0E00 !
!          NO3 =         1.0E-04,            3.0E-05 !
!         PM10 =         1.0E-04,            3.0E-05 !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0
!
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                    Default: 12*80.
     !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00,
65.00, 65.00, 26.00, 26.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                   Default: 12*10.
     !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50,
0.50, 0.50, 0.50 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2          ! RNITE1 =
.2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0          ! RNITE2 =
2.0 !
```

```
     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                    Default: 2.0          ! RNITE3 =
2.0 !

     H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =
0   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb                   Default: 12*1.
     !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
     (used only if MCHEM = 4)

     The SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)
          VOC / NOX ratio (after reaction)         (VCNX)
     to characterize the air mass when computing
     the formation of SOA from VOC emissions.
     Typical values for several distinct air mass types are:

        Month    1    2    3    4    5    6    7    8    9   10   11
12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Dec

     Clean Continental
        BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
1.
        OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20
.15
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Clean Marine (surface)
        BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
.5
        OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30
.25
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Urban - low biogenic (controls present)
        BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
30.
        OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20
.20
        VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.
4.
```

```
     Urban - high biogenic (controls present)
        BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
60.
        OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35
.25
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Regional Plume
        BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
20.
        OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30
.20
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Urban - no controls present
        BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
100.
        OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35
.30
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.
2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20,
0.20, 0.20, 0.15 !
     !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00,
50.00, 50.00, 50.00, 50.00 !


!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                          Default: 550.   ! SYTDEP
= 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                  Default: 0      ! MHFTSZ
=  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                              Default: 5      ! JSUP =
5   !

     Vertical dispersion constant for stable
```

```
     conditions (k1 in Eqn. 2.7-3)  (CONK1)     Default: 0.01   ! CONK1
= .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                    Default: 0.1    ! CONK2
= .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                      Default: 0.5    ! TBD =
.5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                             Default: 10     ! IURB1
=  10  !
                                                         19     ! IURB2
=  19  !

     Site characterization parameters for single-point Met data files
---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                              Default: 20     !
ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                                  Default: 0.25   ! Z0IN =
.25 !

        Leaf area index for modeling domain
        (XLAIIN)                                Default: 3.0    ! XLAIIN
= 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                                Default: 0.0    ! ELEVIN
= .0 !

        Latitude (degrees) for met location
        (XLATIN)                                Default: -999.  ! XLATIN
= -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                                Default: -999.  ! XLONIN
= -999.0 !

     Specialized information for interpreting single-point Met data
files -----

        Anemometer height (m) (Used only if METFM = 2,3)
        (ANEMHT)                                Default: 10.    ! ANEMHT
= 10.0 !

        Form of lateral turbulance data in PROFILE.DAT file
```

```
        (Used only if METFM = 4 or MTURBVW = 1 or 3)
        (ISIGMAV)                              Default: 1      !
ISIGMAV =  1  !
            0 = read sigma-theta
            1 = read sigma-v

        Choice of mixing heights (Used only if METFM = 4)
        (IMIXCTDM)                             Default: 0      !
IMIXCTDM =  0  !
            0 = read PREDICTED mixing heights
            1 = read OBSERVED mixing heights

     Maximum length of a slug (met. grid units)
     (XMXLEN)                                  Default: 1.0    ! XMXLEN
= 1.0 !

     Maximum travel distance of a puff/slug (in
     grid units) during one sampling step
     (XSAMLEN)                                 Default: 1.0    !
XSAMLEN = 1.0 !

     Maximum Number of slugs/puffs release from
     one source during one time step
     (MXNEW)                                   Default: 99     ! MXNEW
=  99   !

     Maximum Number of sampling steps for
     one puff/slug during one time step
     (MXSAM)                                   Default: 99     ! MXSAM
=  99   !

     Number of iterations used when computing
     the transport wind for a sampling step
     that includes gradual rise (for CALMET
     and PROFILE winds)
     (NCOUNT)                                  Default: 2      ! NCOUNT
=  2   !

     Minimum sigma y for a new puff/slug (m)
     (SYMIN)                                   Default: 1.0    ! SYMIN
= 1.0  !

     Minimum sigma z for a new puff/slug (m)
     (SZMIN)                                   Default: 1.0    ! SZMIN
= 1.0  !

     Default minimum turbulence velocities sigma-v and sigma-w
     for each stability class over land and over water (m/s)
     (SVMIN(12) and SWMIN(12))

                     ----------  LAND  ----------       ---------  WATER
----------
        Stab Class :  A    B    C    D    E    F         A    B    C
D    E    F
                     ---  ---  ---  ---  ---  ---       ---  ---  ---
---  ---  ---
     Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37,
.37, .37, .37
     Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08,
.06, .03, .016
```

```
           ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370,
0.370, 0.370, 0.370, 0.370, 0.370!
           ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200,
0.120, 0.080, 0.060, 0.030, 0.016!


     Divergence criterion for dw/dz across puff
     used to initiate adjustment for horizontal
     convergence (1/s)
     Partial adjustment starts at CDIV(1), and
     full adjustment is reached at CDIV(2)
     (CDIV(2))                                Default: 0.0,0.0  ! CDIV
= .0, .0 !

     Minimum wind speed (m/s) allowed for
     non-calm conditions. Also used as minimum
     speed returned when using power-law
     extrapolation toward surface
     (WSCALM)                                 Default: 0.5    ! WSCALM
= .5 !

     Maximum mixing height (m)
     (XMAXZI)                                 Default: 3000.  ! XMAXZI
= 4000.0 !

     Minimum mixing height (m)
     (XMINZI)                                 Default: 50.    ! XMINZI
= 20.0 !

     Default wind speed classes --
     5 upper bounds (m/s) are entered;
     the 6th class has no upper limit
     (WSCAT(5))                   Default   :
                                  ISC RURAL : 1.54, 3.09, 5.14, 8.23,
10.8 (10.8+)

                               Wind Speed Class :  1     2     3     4
5
                                                  ---   ---   ---   ---
---
                                    ! WSCAT = 1.54, 3.09, 5.14, 8.23,
10.80 !

     Default wind speed profile power-law
     exponents for stabilities 1-6
     (PLX0(6))                    Default   : ISC RURAL values
                                  ISC RURAL : .07, .07, .10, .15,
.35, .55
                                  ISC URBAN : .15, .15, .20, .25,
.30, .30

                                Stability Class :  A     B     C     D
E     F
                                                  ---   ---   ---   ---
---   ---
                                     ! PLX0 = 0.07, 0.07, 0.10, 0.15,
0.35, 0.55 !

     Default potential temperature gradient
```

```
     for stable classes E, F (degK/m)
     (PTG0(2))                       Default: 0.020, 0.035
                                        ! PTG0 = 0.020,   0.035 !

     Default plume path coefficients for
     each stability class (used when option
     for partial plume height terrain adjustment
     is selected -- MCTADJ=3)
     (PPC(6))                  Stability Class :  A     B     C     D
E     F
                                  Default  PPC : .50,  .50,  .50,  .50,
.35,  .35
                                                ---   ---   ---   ---
---   ---
                                        !  PPC = 0.50, 0.50, 0.50, 0.50,
0.35, 0.35 !

     Slug-to-puff transition criterion factor
     equal to sigma-y/length of slug
     (SL2PF)                                 Default: 10.        ! SL2PF =
10.0 !

     Puff-splitting control variables ------------------------

       VERTICAL SPLIT
       --------------

       Number of puffs that result every time a puff
       is split - nsplit=2 means that 1 puff splits
       into 2
       (NSPLIT)                              Default:   3        ! NSPLIT
=  3  !

       Time(s) of a day when split puffs are eligible to
       be split once again; this is typically set once
       per day, around sunset before nocturnal shear develops.
       24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
       0=do not re-split    1=eligible for re-split
       (IRESPLIT(24))                        Default:  Hour 17 = 1
       !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

       Split is allowed only if last hour's mixing
       height (m) exceeds a minimum value
       (ZISPLIT)                             Default: 100.       ! ZISPLIT
= 100.0 !

       Split is allowed only if ratio of last hour's
       mixing ht to the maximum mixing ht experienced
       by the puff is less than a maximum value (this
       postpones a split until a nocturnal layer develops)
       (ROLDMAX)                             Default: 0.25       ! ROLDMAX
= 0.25 !


       HORIZONTAL SPLIT
       ----------------

       Number of puffs that result every time a puff
       is split - nsplith=5 means that 1 puff splits
       into 5
```

```
       (NSPLITH)                          Default:   5        ! NSPLITH
=  5  !

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
       (SYSPLITH)                         Default:  1.0       !
SYSPLITH = 1.0 !

       Minimum puff elongation rate (SYSPLITH/hr) due to
       wind shear, before it may be split
       (SHSPLITH)                         Default:  2.        !
SHSPLITH = 2.0 !

       Minimum concentration (g/m^3) of each
       species in puff before it may be split
       Enter array of NSPEC values; if a single value is
       entered, it will be used for ALL species
       (CNSPLITH)                         Default:  1.0E-07   !
CNSPLITH = 1.0E-07 !

     Integration control variables ------------------------

       Fractional convergence criterion for numerical SLUG
       sampling integration
       (EPSSLUG)                          Default:   1.0e-04  ! EPSSLUG
= 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                          Default:   1.0e-06  ! EPSAREA
= 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                           Default:   1.0      ! DSRISE
= 1.0 !

       Boundary Condition (BC) Puff control variables
------------------------

       Minimum height (m) to which BC puffs are mixed as they are
emitted
       (MBCON=2 ONLY).  Actual height is reset to the current mixing
height
       at the release point if greater than this minimum.
       (HTMINBC)                          Default:   500.     ! HTMINBC
= 500.0 !

       Search radius (in BC segment lengths) about a receptor for
sampling
       nearest BC puff.  BC puffs are emitted with a spacing of one
segment
       length, so the search radius should be greater than 1.
       (RSAMPBC)                          Default:   4.      ! RSAMPBC
= 10.0 !

       Near-Surface depletion adjustment to concentration profile used
when
       sampling BC puffs?
       (MDEPBC)                           Default:   1        ! MDEPBC
```

```
= 1 !
          0 = Concentration is NOT adjusted for depletion
          1 = Adjust Concentration for depletion

!END!


------------------------------------------------------------------------
-------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =   2  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                                a
          POINT SOURCE: CONSTANT DATA
          -----------------------------

b          c
  Source       X          Y        Stack    Base     Stack    Exit  Exit
Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.
Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg.
K)
```

```
  ------   ---------- ---------- ------  ------   -------- -----
-------- ----- --------
   1 ! SRCNAM = EPC !
   1 ! X =  47.6934, 312.8110,  30.48, 142.95,   1.22, 16.256, 355.37,
0.0, 0.0E00,  0.0E00,  4.45204E01,
       0.0E00,  0.0E00, 6.10309E00 !
   1 ! FMFAC  =     1.0 !   !END!
   2 ! SRCNAM = TC01 !
   2 ! X =  47.6934, 312.8110,  22.86, 142.95,   1.07, 5.283,  352.59,
0.0, 9.31628E-01, 0.0E00, 1.62293E00,
       0.0E00,  0.0E00, 4.03115E-01 !
   2 ! FMFAC  =     1.0 !   !END!
--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column
headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to
represent
             the effect of rain-caps or other physical configurations
that
             reduce momentum rise associated with the actual exit
velocity.
             (Default: 1.0  -- full momentum used)

    b
     0. = No building downwash modeled, 1. = downwash modeled
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
           -------------------------------------------------------
Source
a
 No.       Effective building height, width, length and X/Y offset (in
meters)
           every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed
for
           MBDW=2 (PRIME downwash option)
------
--------------------------------------------------------------------

--------
```

a Building height, width, length, and X/Y offset from the source are treated as a separate input subgroup for each source and therefore must end with an input group terminator. The X/Y offset is the position, relative to the stack, of the center of the upwind face of the projected building, with the x-axis pointing along the flow direction.

Subgroup (13d)

POINT SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

```
      0 =       Constant
      1 =       Diurnal cycle (24 scaling factors: hours 1-24)
      2 =       Monthly cycle (12 scaling factors: months 1-12)
      3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                               where first group is DEC-JAN-FEB)
      4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                               first group is Stability Class A,
                               and the speed classes have upper
                               bounds (m/s) defined in Group 12
      5 =       Temperature   (12 scaling factors, where temperature
                               classes have upper bounds (C) of:
                               0, 5, 10, 15, 20, 25, 30, 35, 40,
                               45, 50, 50+)
```

----
a Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

```
     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  0
!

     Units used for area source
     emissions below            (IARU)       Default: 1  !  IARU =   1
!
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                     a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                                 b
Source           Effect.    Base      Initial    Emission
 No.             Height   Elevation   Sigma z     Rates
                   (m)       (m)        (m)
-------          ------    ------     --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
           --------------------------------------------------------
Source                                                              a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------
```

```
--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                               a
          AREA SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 14b.  Factors entered multiply the rates in 14b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


-------------------------------------------------------------------------
-------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                               No default  !  NLN2
=  0   !
```

```
     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)        No default   !
NLINES =  0  !

     Units used for line source
     emissions below                (ILNU)          Default: 1  !  ILNU
=   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7   !
MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6   !
NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default   ! XL =
.0 !
                                                    (in meters)

        Average building height (HBL)               No default   ! HBL =
.0 !
                                                    (in meters)

        Average building width (WBL)                No default   ! WBL =
.0 !
                                                    (in meters)

        Average line source width (WML)             No default   ! WML =
.0 !
                                                    (in meters)

        Average separation between buildings (DXL)  No default   ! DXL =
.0 !
                                                    (in meters)

        Average buoyancy parameter (FPRIMEL)        No default   !
FPRIMEL = .0 !
                                                    (in m**4/s**3)

!END!
```

```
---------------
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
          ----------------------------------

a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base
Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height
Elevation      Rates
            (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------
---------    ---------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                       a
          BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


--------
```

```
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


---------------------------------------------------------------------------
-------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0
!

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1
!
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0
!

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0
!

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                        a
           VOLUME SOURCE: CONSTANT DATA
           ------------------------------

b
         X           Y        Effect.    Base     Initial    Initial
Emission
     Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z
Rates
        (km)       (km)         (m)       (m)        (m)        (m)
```

```
     ----------  ----------   ------    ------    --------   --------
--------

--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                                 a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                              Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)

-------------------------------------------------------------------------
-------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
-----------------------

---------------
Subgroup (17a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC =  698
!

!END!

---------------
```

Subgroup (17b)

NON-GRIDDED (DISCRETE) RECEPTOR DATA[a]

Receptor No.		X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height[b] Above Ground (m)	
1	! X =	153.22463,	-5.52074,	106.000,	0.000!	!END!
2	! X =	153.21942,	-5.27242,	108.000,	0.000!	!END!
3	! X =	153.21411,	-5.0241,	108.000,	0.000!	!END!
4	! X =	153.2088,	-4.77579,	106.000,	0.000!	!END!
5	! X =	153.20359,	-4.52846,	115.000,	0.000!	!END!
6	! X =	153.19828,	-4.28015,	121.000,	0.000!	!END!
7	! X =	153.47286,	-5.51536,	104.000,	0.000!	!END!
8	! X =	153.46755,	-5.26704,	105.000,	0.000!	!END!
9	! X =	153.46224,	-5.01872,	106.000,	0.000!	!END!
10	! X =	153.45702,	-4.7714,	106.000,	0.000!	!END!
11	! X =	153.45172,	-4.52308,	110.000,	0.000!	!END!
12	! X =	153.44641,	-4.27476,	116.000,	0.000!	!END!
13	! X =	153.44111,	-4.02645,	121.000,	0.000!	!END!
14	! X =	153.72099,	-5.50997,	103.000,	0.000!	!END!
15	! X =	153.71568,	-5.26166,	104.000,	0.000!	!END!
16	! X =	153.71047,	-5.01334,	105.000,	0.000!	!END!
17	! X =	153.70515,	-4.76602,	105.000,	0.000!	!END!
18	! X =	153.69985,	-4.5177,	106.000,	0.000!	!END!
19	! X =	153.69464,	-4.26938,	109.000,	0.000!	!END!
20	! X =	153.68934,	-4.02107,	113.000,	0.000!	!END!
21	! X =	153.68403,	-3.77275,	117.000,	0.000!	!END!
22	! X =	153.94808,	-4.51232,	105.000,	0.000!	!END!
23	! X =	153.94277,	-4.264,	105.000,	0.000!	!END!
24	! X =	153.93747,	-4.01569,	106.000,	0.000!	!END!
25	! X =	153.93216,	-3.76737,	112.000,	0.000!	!END!
26	! X =	153.92695,	-3.51906,	118.000,	0.000!	!END!
27	! X =	154.21735,	-5.49921,	102.000,	0.000!	!END!
28	! X =	154.21203,	-5.25188,	102.000,	0.000!	!END!
29	! X =	154.20672,	-5.00357,	102.000,	0.000!	!END!
30	! X =	154.20151,	-4.75525,	103.000,	0.000!	!END!
31	! X =	154.19621,	-4.50694,	104.000,	0.000!	!END!
32	! X =	154.1909,	-4.25862,	104.000,	0.000!	!END!
33	! X =	154.1856,	-4.01031,	105.000,	0.000!	!END!
34	! X =	154.18039,	-3.76199,	106.000,	0.000!	!END!
35	! X =	154.17507,	-3.51467,	112.000,	0.000!	!END!
36	! X =	154.16977,	-3.26635,	116.000,	0.000!	!END!
37	! X =	154.16446,	-3.01804,	117.000,	0.000!	!END!
38	! X =	154.46548,	-5.49382,	102.000,	0.000!	!END!
39	! X =	154.46016,	-5.2465,	102.000,	0.000!	!END!
40	! X =	154.45495,	-4.99819,	102.000,	0.000!	!END!
41	! X =	154.44964,	-4.74987,	102.000,	0.000!	!END!
42	! X =	154.44434,	-4.50155,	103.000,	0.000!	!END!
43	! X =	154.43913,	-4.25324,	103.000,	0.000!	!END!
44	! X =	154.43382,	-4.00492,	104.000,	0.000!	!END!
45	! X =	154.42851,	-3.7576,	105.000,	0.000!	!END!
46	! X =	154.4232,	-3.50929,	105.000,	0.000!	!END!
47	! X =	154.418,	-3.26098,	106.000,	0.000!	!END!
48	! X =	154.41269,	-3.01266,	110.000,	0.000!	!END!
49	! X =	154.40739,	-2.76435,	119.000,	0.000!	!END!
50	! X =	154.7137,	-5.48943,	102.000,	0.000!	!END!

```
 51 ! X =   154.70839,   -5.24112,     102.000,       0.000!   !END!
 52 ! X =   154.70308,    -4.9928,     102.000,       0.000!   !END!
 53 ! X =   154.69777,   -4.74449,     102.000,       0.000!   !END!
 54 ! X =   154.69256,   -4.49617,     102.000,       0.000!   !END!
 55 ! X =   154.68726,   -4.24786,     102.000,       0.000!   !END!
 56 ! X =   154.68195,   -3.99954,     102.000,       0.000!   !END!
 57 ! X =   154.67664,   -3.75222,     103.000,       0.000!   !END!
 58 ! X =   154.67143,   -3.50391,     104.000,       0.000!   !END!
 59 ! X =   154.66613,   -3.25559,     105.000,       0.000!   !END!
 60 ! X =   154.66082,   -3.00728,     106.000,       0.000!   !END!
 61 ! X =   154.65552,   -2.75897,     110.000,       0.000!   !END!
 62 ! X =   154.65031,   -2.51065,     117.000,       0.000!   !END!
 63 ! X =   154.96182,   -5.48405,     102.000,       0.000!   !END!
 64 ! X =   154.95652,   -5.23573,     102.000,       0.000!   !END!
 65 ! X =   154.95121,   -4.98742,     102.000,       0.000!   !END!
 66 ! X =     154.946,    -4.7391,     102.000,       0.000!   !END!
 67 ! X =   154.94069,   -4.49079,     102.000,       0.000!   !END!
 68 ! X =   154.93539,   -4.24248,     102.000,       0.000!   !END!
 69 ! X =   154.93017,   -3.99516,     102.000,       0.000!   !END!
 70 ! X =   154.92486,   -3.74684,     102.000,       0.000!   !END!
 71 ! X =   154.91956,   -3.49853,     102.000,       0.000!   !END!
 72 ! X =   154.91425,   -3.25021,     103.000,       0.000!   !END!
 73 ! X =   154.90905,    -3.0019,     104.000,       0.000!   !END!
 74 ! X =   154.90374,   -2.75359,     106.000,       0.000!   !END!
 75 ! X =   154.89844,   -2.50528,     106.000,       0.000!   !END!
 76 ! X =   154.89313,   -2.25796,     108.000,       0.000!   !END!
 77 ! X =   154.88782,   -2.00964,     121.000,       0.000!   !END!
 78 ! X =   155.21526,   -5.72698,     102.000,       0.000!   !END!
 79 ! X =   155.20995,   -5.47866,     102.000,       0.000!   !END!
 80 ! X =   155.20474,   -5.23035,     102.000,       0.000!   !END!
 81 ! X =   155.19944,   -4.98204,     102.000,       0.000!   !END!
 82 ! X =   155.19413,   -4.73372,     102.000,       0.000!   !END!
 83 ! X =   155.18882,   -4.48541,     102.000,       0.000!   !END!
 84 ! X =    155.1836,   -4.23809,     102.000,       0.000!   !END!
 85 ! X =    155.1783,   -3.98977,     102.000,       0.000!   !END!
 86 ! X =   155.17299,   -3.74146,     102.000,       0.000!   !END!
 87 ! X =   155.16769,   -3.49315,     102.000,       0.000!   !END!
 88 ! X =   155.16248,   -3.24483,     102.000,       0.000!   !END!
 89 ! X =   155.15718,   -2.99652,     103.000,       0.000!   !END!
 90 ! X =   155.15187,   -2.74821,     104.000,       0.000!   !END!
 91 ! X =   155.14656,   -2.50089,     105.000,       0.000!   !END!
 92 ! X =   155.14135,   -2.25258,     106.000,       0.000!   !END!
 93 ! X =   155.13605,   -2.00426,     116.000,       0.000!   !END!
 94 ! X =   155.13075,   -1.75595,     121.000,       0.000!   !END!
 95 ! X =   155.43705,   -4.48003,     102.000,       0.000!   !END!
 96 ! X =   155.43173,   -4.23271,     102.000,       0.000!   !END!
 97 ! X =   155.42643,   -3.98439,     102.000,       0.000!   !END!
 98 ! X =   155.42122,   -3.73608,     102.000,       0.000!   !END!
 99 ! X =   155.41591,   -3.48777,     102.000,       0.000!   !END!
100 ! X =   155.41061,   -3.23945,     102.000,       0.000!   !END!
101 ! X =    155.4053,   -2.99114,     102.000,       0.000!   !END!
102 ! X =       155.4,   -2.74283,     103.000,       0.000!   !END!
103 ! X =   155.39478,   -2.49551,     104.000,       0.000!   !END!
104 ! X =   155.38948,    -2.2472,     106.000,       0.000!   !END!
105 ! X =   155.38418,   -1.99889,     111.000,       0.000!   !END!
106 ! X =   155.37887,   -1.75057,     118.000,       0.000!   !END!
107 ! X =   155.37367,   -1.50226,     121.000,       0.000!   !END!
108 ! X =   155.36837,   -1.25395,     121.000,       0.000!   !END!
109 ! X =   155.67986,   -4.22732,     102.000,       0.000!   !END!
110 ! X =   155.67465,   -3.97901,     102.000,       0.000!   !END!
```

```
111 ! X =   155.66935,    -3.7307,     102.000,        0.000!   !END!
112 ! X =   155.66404,   -3.48239,     102.000,        0.000!   !END!
113 ! X =   155.65873,   -3.23407,     102.000,        0.000!   !END!
114 ! X =   155.65353,   -2.98576,     102.000,        0.000!   !END!
115 ! X =   155.64821,   -2.73844,     102.000,        0.000!   !END!
116 ! X =   155.64291,   -2.49013,     103.000,        0.000!   !END!
117 ! X =   155.63761,   -2.24182,     105.000,        0.000!   !END!
118 ! X =    155.6324,   -1.99351,     105.000,        0.000!   !END!
119 ! X =    155.6271,    -1.7452,     110.000,        0.000!   !END!
120 ! X =    155.6218,   -1.49689,     117.000,        0.000!   !END!
121 ! X =   155.61649,   -1.24857,     121.000,        0.000!   !END!
122 ! X =   155.93329,   -4.47025,     102.000,        0.000!   !END!
123 ! X =   155.92809,   -4.22194,     102.000,        0.000!   !END!
124 ! X =   155.92278,   -3.97363,     102.000,        0.000!   !END!
125 ! X =   155.91747,   -3.72532,     102.000,        0.000!   !END!
126 ! X =   155.91227,   -3.47701,     102.000,        0.000!   !END!
127 ! X =   155.90696,   -3.22869,     102.000,        0.000!   !END!
128 ! X =   155.90164,   -2.98137,     102.000,        0.000!   !END!
129 ! X =   155.89634,   -2.73306,     102.000,        0.000!   !END!
130 ! X =   155.89104,   -2.48475,     102.000,        0.000!   !END!
131 ! X =   155.88583,   -2.23644,     103.000,        0.000!   !END!
132 ! X =   155.88053,   -1.98813,     104.000,        0.000!   !END!
133 ! X =   155.87522,   -1.73982,     106.000,        0.000!   !END!
134 ! X =   155.86992,   -1.49151,     108.000,        0.000!   !END!
135 ! X =   155.86471,   -1.24419,     121.000,        0.000!   !END!
136 ! X =   155.85941,    -.99588,     121.000,        0.000!   !END!
137 ! X =   156.18152,   -4.46487,     102.000,        0.000!   !END!
138 ! X =   156.17621,   -4.21656,     102.000,        0.000!   !END!
139 ! X =   156.17091,   -3.96825,     102.000,        0.000!   !END!
140 ! X =    156.1657,   -3.71994,     102.000,        0.000!   !END!
141 ! X =   156.16039,   -3.47162,     102.000,        0.000!   !END!
142 ! X =   156.15509,   -3.22331,     102.000,        0.000!   !END!
143 ! X =   156.14977,   -2.97599,     102.000,        0.000!   !END!
144 ! X =   156.14456,   -2.72768,     102.000,        0.000!   !END!
145 ! X =   156.13926,   -2.47937,     102.000,        0.000!   !END!
146 ! X =   156.13396,   -2.23106,     102.000,        0.000!   !END!
147 ! X =   156.12865,   -1.98275,     103.000,        0.000!   !END!
148 ! X =   156.12345,   -1.73444,     103.000,        0.000!   !END!
149 ! X =   156.11814,   -1.48712,     105.000,        0.000!   !END!
150 ! X =   156.11283,   -1.23881,     109.000,        0.000!   !END!
151 ! X =   156.10753,     -.9905,     119.000,        0.000!   !END!
152 ! X =   156.10223,    -.74219,     107.000,        0.000!   !END!
153 ! X =   156.42965,   -4.45949,     102.000,        0.000!   !END!
154 ! X =   156.41913,   -3.96287,     102.000,        0.000!   !END!
155 ! X =   156.41382,   -3.71455,     102.000,        0.000!   !END!
156 ! X =   156.40852,   -3.46624,     102.000,        0.000!   !END!
157 ! X =    156.4033,   -3.21893,     102.000,        0.000!   !END!
158 ! X =     156.398,   -2.97061,     102.000,        0.000!   !END!
159 ! X =   156.39269,    -2.7223,     102.000,        0.000!   !END!
160 ! X =   156.38739,   -2.47399,     102.000,        0.000!   !END!
161 ! X =   156.38208,   -2.22568,     102.000,        0.000!   !END!
162 ! X =   156.37688,   -1.97737,     102.000,        0.000!   !END!
163 ! X =   156.37157,   -1.72906,     102.000,        0.000!   !END!
164 ! X =   156.36626,   -1.48174,     104.000,        0.000!   !END!
165 ! X =   156.36096,   -1.23343,     104.000,        0.000!   !END!
166 ! X =   156.35575,    -.98513,     105.000,        0.000!   !END!
167 ! X =   156.35045,    -.73682,     106.000,        0.000!   !END!
168 ! X =   156.34515,    -.48851,     112.000,        0.000!   !END!
169 ! X =   156.33985,     -.2402,     121.000,        0.000!   !END!
170 ! X =   156.66195,   -3.70917,     102.000,        0.000!   !END!
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171	! X =	156.65673,	-3.46186,	102.000,	0.000!	!END!
172	! X =	156.65143,	-3.21354,	102.000,	0.000!	!END!
173	! X =	156.64612,	-2.96523,	102.000,	0.000!	!END!
174	! X =	156.64082,	-2.71692,	102.000,	0.000!	!END!
175	! X =	156.63561,	-2.46861,	102.000,	0.000!	!END!
176	! X =	156.63031,	-2.2203,	102.000,	0.000!	!END!
177	! X =	156.625,	-1.97199,	102.000,	0.000!	!END!
178	! X =	156.61969,	-1.72468,	102.000,	0.000!	!END!
179	! X =	156.61448,	-1.47637,	102.000,	0.000!	!END!
180	! X =	156.60918,	-1.22806,	103.000,	0.000!	!END!
181	! X =	156.60388,	-.97975,	104.000,	0.000!	!END!
182	! X =	156.59858,	-.73144,	105.000,	0.000!	!END!
183	! X =	156.59327,	-.48313,	107.000,	0.000!	!END!
184	! X =	156.58807,	-.23482,	118.000,	0.000!	!END!
185	! X =	156.58276,	.01249,	121.000,	0.000!	!END!
186	! X =	156.91017,	-3.70379,	102.000,	0.000!	!END!
187	! X =	156.90486,	-3.45647,	102.000,	0.000!	!END!
188	! X =	156.89955,	-3.20816,	102.000,	0.000!	!END!
189	! X =	156.89434,	-2.95985,	102.000,	0.000!	!END!
190	! X =	156.88904,	-2.71154,	102.000,	0.000!	!END!
191	! X =	156.88373,	-2.46323,	102.000,	0.000!	!END!
192	! X =	156.87843,	-2.21492,	102.000,	0.000!	!END!
193	! X =	156.87313,	-1.96661,	102.000,	0.000!	!END!
194	! X =	156.86791,	-1.7193,	102.000,	0.000!	!END!
195	! X =	156.86261,	-1.47099,	102.000,	0.000!	!END!
196	! X =	156.8573,	-1.22268,	102.000,	0.000!	!END!
197	! X =	156.852,	-.97437,	103.000,	0.000!	!END!
198	! X =	156.8468,	-.72606,	104.000,	0.000!	!END!
199	! X =	156.8415,	-.47775,	105.000,	0.000!	!END!
200	! X =	156.83619,	-.23044,	108.000,	0.000!	!END!
201	! X =	156.83088,	.01787,	115.000,	0.000!	!END!
202	! X =	156.82558,	.26618,	119.000,	0.000!	!END!
203	! X =	156.82038,	.51448,	121.000,	0.000!	!END!
204	! X =	157.15298,	-3.45109,	104.000,	0.000!	!END!
205	! X =	157.14778,	-3.20278,	102.000,	0.000!	!END!
206	! X =	157.14247,	-2.95447,	102.000,	0.000!	!END!
207	! X =	157.13716,	-2.70616,	102.000,	0.000!	!END!
208	! X =	157.13186,	-2.45785,	102.000,	0.000!	!END!
209	! X =	157.12665,	-2.20954,	102.000,	0.000!	!END!
210	! X =	157.12134,	-1.96223,	102.000,	0.000!	!END!
211	! X =	157.11604,	-1.71392,	102.000,	0.000!	!END!
212	! X =	157.11073,	-1.46561,	102.000,	0.000!	!END!
213	! X =	157.10553,	-1.2173,	102.000,	0.000!	!END!
214	! X =	157.10022,	-.96899,	102.000,	0.000!	!END!
215	! X =	157.09492,	-.72069,	103.000,	0.000!	!END!
216	! X =	157.08962,	-.47238,	104.000,	0.000!	!END!
217	! X =	157.08431,	-.22506,	105.000,	0.000!	!END!
218	! X =	157.07911,	.02324,	108.000,	0.000!	!END!
219	! X =	157.07381,	.27155,	114.000,	0.000!	!END!
220	! X =	157.06851,	.51986,	116.000,	0.000!	!END!
221	! X =	157.06321,	.76817,	119.000,	0.000!	!END!
222	! X =	157.05791,	1.01647,	122.000,	0.000!	!END!
223	! X =	157.3959,	-3.1974,	104.000,	0.000!	!END!
224	! X =	157.39059,	-2.94909,	102.000,	0.000!	!END!
225	! X =	157.38539,	-2.70078,	102.000,	0.000!	!END!
226	! X =	157.38008,	-2.45247,	102.000,	0.000!	!END!
227	! X =	157.37477,	-2.20516,	102.000,	0.000!	!END!
228	! X =	157.36946,	-1.95685,	102.000,	0.000!	!END!
229	! X =	157.36416,	-1.70854,	102.000,	0.000!	!END!
230	! X =	157.35895,	-1.46023,	102.000,	0.000!	!END!

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231 ! X =   157.35365,   -1.21192,     102.000,       0.000!   !END!
232 ! X =   157.34835,    -.96362,     102.000,       0.000!   !END!
233 ! X =   157.34305,    -.71531,     103.000,       0.000!   !END!
234 ! X =   157.33783,    -.46799,     103.000,       0.000!   !END!
235 ! X =   157.33253,    -.21969,     104.000,       0.000!   !END!
236 ! X =   157.32723,     .02862,     105.000,       0.000!   !END!
237 ! X =   157.32193,     .27693,     106.000,       0.000!   !END!
238 ! X =   157.31663,     .52523,     109.000,       0.000!   !END!
239 ! X =   157.31143,     .77354,     113.000,       0.000!   !END!
240 ! X =   157.30613,    1.02185,     115.000,       0.000!   !END!
241 ! X =   157.64402,   -3.19202,     114.000,       0.000!   !END!
242 ! X =   157.63882,   -2.94371,     104.000,       0.000!   !END!
243 ! X =   157.63351,    -2.6954,     103.000,       0.000!   !END!
244 ! X =   157.62821,   -2.44709,     102.000,       0.000!   !END!
245 ! X =   157.62289,   -2.19978,     102.000,       0.000!   !END!
246 ! X =   157.61768,   -1.95147,     102.000,       0.000!   !END!
247 ! X =   157.61238,   -1.70316,     102.000,       0.000!   !END!
248 ! X =   157.60708,   -1.45485,     102.000,       0.000!   !END!
249 ! X =   157.60177,   -1.20655,     102.000,       0.000!   !END!
250 ! X =   157.59657,    -.95824,     102.000,       0.000!   !END!
251 ! X =   157.59127,    -.70993,     102.000,       0.000!   !END!
252 ! X =   157.58595,    -.46262,     103.000,       0.000!   !END!
253 ! X =   157.58065,    -.21431,     103.000,       0.000!   !END!
254 ! X =   157.57535,       .034,     104.000,       0.000!   !END!
255 ! X =   157.57015,      .2823,     104.000,       0.000!   !END!
256 ! X =   157.56485,     .53061,     104.000,       0.000!   !END!
257 ! X =   157.55955,     .77892,     103.000,       0.000!   !END!
258 ! X =   157.55425,    1.02722,     107.000,       0.000!   !END!
259 ! X =   157.54894,    1.27454,     107.000,       0.000!   !END!
260 ! X =   157.54364,    1.52284,     115.000,       0.000!   !END!
261 ! X =   157.88694,   -2.93833,     106.000,       0.000!   !END!
262 ! X =   157.88163,   -2.69002,     104.000,       0.000!   !END!
263 ! X =   157.87642,   -2.44271,     102.000,       0.000!   !END!
264 ! X =   157.87111,    -2.1944,     102.000,       0.000!   !END!
265 ! X =   157.86581,   -1.94609,     102.000,       0.000!   !END!
266 ! X =    157.8605,   -1.69778,     102.000,       0.000!   !END!
267 ! X =    157.8553,   -1.44948,     102.000,       0.000!   !END!
268 ! X =      157.85,   -1.20117,     102.000,       0.000!   !END!
269 ! X =   157.84469,    -.95286,     102.000,       0.000!   !END!
270 ! X =   157.83938,    -.70555,     102.000,       0.000!   !END!
271 ! X =   157.83408,    -.45724,     102.000,       0.000!   !END!
272 ! X =   157.82887,    -.20893,     102.000,       0.000!   !END!
273 ! X =   157.82357,     .03937,     103.000,       0.000!   !END!
274 ! X =   157.81827,     .28768,     103.000,       0.000!   !END!
275 ! X =   157.81297,     .53598,     103.000,       0.000!   !END!
276 ! X =   157.80767,     .78429,     101.000,       0.000!   !END!
277 ! X =   157.80246,     1.0316,     104.000,       0.000!   !END!
278 ! X =   157.79716,    1.27991,     105.000,       0.000!   !END!
279 ! X =   157.79186,    1.52821,     106.000,       0.000!   !END!
280 ! X =   157.78656,    1.77652,     114.000,       0.000!   !END!
281 ! X =   157.78126,    2.02482,     119.000,       0.000!   !END!
282 ! X =   158.13516,   -2.93295,     113.000,       0.000!   !END!
283 ! X =   158.12985,   -2.68564,     104.000,       0.000!   !END!
284 ! X =   158.12454,   -2.43733,     102.000,       0.000!   !END!
285 ! X =   158.11924,   -2.18902,     102.000,       0.000!   !END!
286 ! X =   158.11393,   -1.94071,     102.000,       0.000!   !END!
287 ! X =   158.10872,   -1.69241,     102.000,       0.000!   !END!
288 ! X =   158.10342,    -1.4441,     102.000,       0.000!   !END!
289 ! X =   158.09812,   -1.19579,     102.000,       0.000!   !END!
290 ! X =    158.0928,    -.94848,     102.000,       0.000!   !END!
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291 ! X =   158.08671,    -.70016,     102.000,       0.000!   !END!
292 ! X =    158.0823,    -.45186,     102.000,       0.000!   !END!
293 ! X =     158.077,    -.20356,     102.000,       0.000!   !END!
294 ! X =   158.07169,     .04475,     102.000,       0.000!   !END!
295 ! X =   158.06639,     .29305,     102.000,       0.000!   !END!
296 ! X =   158.06119,     .54136,     102.000,       0.000!   !END!
297 ! X =   158.05588,     .78867,     102.000,       0.000!   !END!
298 ! X =   158.05058,    1.03698,     102.000,       0.000!   !END!
299 ! X =   158.04528,    1.28528,     103.000,       0.000!   !END!
300 ! X =   158.03998,    1.53359,     104.000,       0.000!   !END!
301 ! X =   158.03468,    1.78189,     105.000,       0.000!   !END!
302 ! X =   158.02948,     2.0302,     105.000,       0.000!   !END!
303 ! X =   158.02418,     2.2785,     105.000,       0.000!   !END!
304 ! X =   158.38328,   -2.92757,     114.000,       0.000!   !END!
305 ! X =   158.37797,   -2.68025,     105.000,       0.000!   !END!
306 ! X =   158.37266,   -2.43195,     103.000,       0.000!   !END!
307 ! X =   158.36746,   -2.18364,     102.000,       0.000!   !END!
308 ! X =   158.36215,   -1.93533,     102.000,       0.000!   !END!
309 ! X =   158.35685,   -1.68703,     102.000,       0.000!   !END!
310 ! X =   158.35154,   -1.43872,     102.000,       0.000!   !END!
311 ! X =   158.34634,   -1.19041,     102.000,       0.000!   !END!
312 ! X =   158.34102,     -.9431,     102.000,       0.000!   !END!
313 ! X =   158.33572,    -.69479,     102.000,       0.000!   !END!
314 ! X =   158.33042,    -.44649,     102.000,       0.000!   !END!
315 ! X =   158.32512,    -.19818,     102.000,       0.000!   !END!
316 ! X =   158.31991,     .05012,     102.000,       0.000!   !END!
317 ! X =   158.31461,     .29843,     102.000,       0.000!   !END!
318 ! X =   158.30931,     .54674,     102.000,       0.000!   !END!
319 ! X =     158.304,     .79405,     102.000,       0.000!   !END!
320 ! X =    158.2987,    1.04235,     102.000,       0.000!   !END!
321 ! X =    158.2935,    1.29066,     102.000,       0.000!   !END!
322 ! X =    158.2882,    1.53896,     102.000,       0.000!   !END!
323 ! X =    158.2829,    1.78727,     103.000,       0.000!   !END!
324 ! X =    158.2776,    2.03557,     103.000,       0.000!   !END!
325 ! X =    158.2723,    2.28387,     103.000,       0.000!   !END!
326 ! X =     158.267,    2.53119,     103.000,       0.000!   !END!
327 ! X =    158.2618,    2.77949,     103.000,       0.000!   !END!
328 ! X =    158.6314,   -2.92318,     108.000,       0.000!   !END!
329 ! X =   158.62619,   -2.67488,     104.000,       0.000!   !END!
330 ! X =   158.62088,   -2.42657,     103.000,       0.000!   !END!
331 ! X =   158.61558,   -2.17826,     102.000,       0.000!   !END!
332 ! X =   158.61027,   -1.92995,     102.000,       0.000!   !END!
333 ! X =   158.60507,   -1.68165,     102.000,       0.000!   !END!
334 ! X =   158.59976,   -1.43334,     102.000,       0.000!   !END!
335 ! X =   158.59445,   -1.18603,     102.000,       0.000!   !END!
336 ! X =   158.58915,    -.93772,     102.000,       0.000!   !END!
337 ! X =   158.58384,    -.68942,     102.000,       0.000!   !END!
338 ! X =   158.57864,    -.44111,     102.000,       0.000!   !END!
339 ! X =   158.57334,     -.1928,     102.000,       0.000!   !END!
340 ! X =   158.56803,      .0555,     102.000,       0.000!   !END!
341 ! X =   158.56273,     .30381,     102.000,       0.000!   !END!
342 ! X =   158.55742,     .55112,     102.000,       0.000!   !END!
343 ! X =   158.55222,     .79942,     102.000,       0.000!   !END!
344 ! X =   158.54692,    1.04773,     102.000,       0.000!   !END!
345 ! X =   158.54162,    1.29603,     102.000,       0.000!   !END!
346 ! X =   158.53632,    1.54434,     102.000,       0.000!   !END!
347 ! X =   158.53102,    1.79264,     102.000,       0.000!   !END!
348 ! X =   158.52572,    2.04094,     102.000,       0.000!   !END!
349 ! X =   158.52051,    2.28825,     102.000,       0.000!   !END!
350 ! X =   158.51521,    2.53656,     103.000,       0.000!   !END!
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351 ! X =   158.50992,    2.78486,     103.000,       0.000!   !END!
352 ! X =   158.50462,    3.03316,     103.000,       0.000!   !END!
353 ! X =   158.87962,    -2.9178,     117.000,       0.000!   !END!
354 ! X =   158.87431,   -2.66949,     105.000,       0.000!   !END!
355 ! X =   158.86901,   -2.42119,     103.000,       0.000!   !END!
356 ! X =    158.8638,   -2.17288,     102.000,       0.000!   !END!
357 ! X =   158.85849,   -1.92457,     102.000,       0.000!   !END!
358 ! X =   158.85319,   -1.67627,     102.000,       0.000!   !END!
359 ! X =   158.84787,   -1.42896,     102.000,       0.000!   !END!
360 ! X =   158.84257,   -1.18065,     102.000,       0.000!   !END!
361 ! X =   158.83737,    -.93234,     102.000,       0.000!   !END!
362 ! X =   158.83206,    -.68404,     102.000,       0.000!   !END!
363 ! X =   158.82676,    -.43573,     102.000,       0.000!   !END!
364 ! X =   158.82146,    -.18743,     102.000,       0.000!   !END!
365 ! X =   158.81616,     .06088,     102.000,       0.000!   !END!
366 ! X =   158.81094,     .30819,     102.000,       0.000!   !END!
367 ! X =   158.80564,     .55649,     102.000,       0.000!   !END!
368 ! X =   158.80034,      .8048,     102.000,       0.000!   !END!
369 ! X =   158.79504,     1.0531,     102.000,       0.000!   !END!
370 ! X =   158.78974,    1.30141,     102.000,       0.000!   !END!
371 ! X =   158.78454,    1.54971,     102.000,       0.000!   !END!
372 ! X =   158.77924,    1.79801,     102.000,       0.000!   !END!
373 ! X =   158.77394,    2.04632,     102.000,       0.000!   !END!
374 ! X =   158.76863,    2.29363,     102.000,       0.000!   !END!
375 ! X =   158.76333,    2.54193,     102.000,       0.000!   !END!
376 ! X =   158.75804,    2.79023,     103.000,       0.000!   !END!
377 ! X =   158.75284,    3.03854,     103.000,       0.000!   !END!
378 ! X =   158.74754,    3.28684,     103.000,       0.000!   !END!
379 ! X =   159.12243,   -2.66411,     105.000,       0.000!   !END!
380 ! X =   159.11723,   -2.41581,     103.000,       0.000!   !END!
381 ! X =   159.11192,    -2.1675,     102.000,       0.000!   !END!
382 ! X =   159.10661,    -1.9192,     102.000,       0.000!   !END!
383 ! X =   159.10131,   -1.67089,     102.000,       0.000!   !END!
384 ! X =   159.09609,   -1.42358,     102.000,       0.000!   !END!
385 ! X =   159.09079,   -1.17527,     102.000,       0.000!   !END!
386 ! X =   159.08549,    -.92697,     102.000,       0.000!   !END!
387 ! X =   159.08018,    -.67866,     102.000,       0.000!   !END!
388 ! X =   159.07488,    -.43036,     102.000,       0.000!   !END!
389 ! X =   159.06968,    -.18205,     102.000,       0.000!   !END!
390 ! X =   159.06437,     .06625,     102.000,       0.000!   !END!
391 ! X =   159.05906,     .31356,     102.000,       0.000!   !END!
392 ! X =   159.05376,     .56187,     102.000,       0.000!   !END!
393 ! X =   159.04846,     .81017,     102.000,       0.000!   !END!
394 ! X =   159.04326,    1.05848,     102.000,       0.000!   !END!
395 ! X =   159.03796,    1.30678,     102.000,       0.000!   !END!
396 ! X =   159.03266,    1.55508,     102.000,       0.000!   !END!
397 ! X =   159.02736,    1.80339,     102.000,       0.000!   !END!
398 ! X =   159.02205,     2.0507,     102.000,       0.000!   !END!
399 ! X =   159.01675,      2.299,     102.000,       0.000!   !END!
400 ! X =   159.01155,     2.5473,     102.000,       0.000!   !END!
401 ! X =   159.00625,    2.79561,     102.000,       0.000!   !END!
402 ! X =   159.00096,    3.04391,     103.000,       0.000!   !END!
403 ! X =   158.99566,    3.29221,     103.000,       0.000!   !END!
404 ! X =   158.99036,    3.54051,     103.000,       0.000!   !END!
405 ! X =   159.37065,   -2.65873,     105.000,       0.000!   !END!
406 ! X =   159.36535,   -2.41043,     104.000,       0.000!   !END!
407 ! X =   159.36004,   -2.16212,     102.000,       0.000!   !END!
408 ! X =   159.35483,   -1.91382,     102.000,       0.000!   !END!
409 ! X =   159.34952,    -1.6665,     102.000,       0.000!   !END!
410 ! X =   159.34421,    -1.4182,     102.000,       0.000!   !END!
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411 ! X =   159.33891,   -1.16989,     102.000,        0.000!   !END!
412 ! X =   159.33361,    -.92159,     102.000,        0.000!   !END!
413 ! X =    159.3284,    -.67328,     102.000,        0.000!   !END!
414 ! X =    159.3231,    -.42498,     102.000,        0.000!   !END!
415 ! X =    159.3178,    -.17667,     102.000,        0.000!   !END!
416 ! X =   159.31248,     .07064,     102.000,        0.000!   !END!
417 ! X =   159.30718,     .31894,     102.000,        0.000!   !END!
418 ! X =   159.30198,     .56724,     102.000,        0.000!   !END!
419 ! X =   159.29668,     .81555,     102.000,        0.000!   !END!
420 ! X =   159.29138,    1.06385,     102.000,        0.000!   !END!
421 ! X =   159.28608,    1.31215,     102.000,        0.000!   !END!
422 ! X =   159.28078,    1.56046,     102.000,        0.000!   !END!
423 ! X =   159.27478,    1.80778,     102.000,        0.000!   !END!
424 ! X =   159.27027,    2.05607,     102.000,        0.000!   !END!
425 ! X =   159.26497,    2.30437,     102.000,        0.000!   !END!
426 ! X =   159.25967,    2.55268,     102.000,        0.000!   !END!
427 ! X =   159.25437,    2.80098,     102.000,        0.000!   !END!
428 ! X =   159.24907,    3.04928,     102.000,        0.000!   !END!
429 ! X =   159.24388,    3.29758,     103.000,        0.000!   !END!
430 ! X =   159.23857,    3.54489,     103.000,        0.000!   !END!
431 ! X =   159.23327,    3.79319,     103.000,        0.000!   !END!
432 ! X =   159.22798,    4.04149,     107.000,        0.000!   !END!
433 ! X =   159.61877,   -2.65335,     105.000,        0.000!   !END!
434 ! X =   159.61357,   -2.40505,     104.000,        0.000!   !END!
435 ! X =   159.60826,   -2.15674,     102.000,        0.000!   !END!
436 ! X =   159.60294,   -1.90943,     102.000,        0.000!   !END!
437 ! X =   159.59764,   -1.66112,     102.000,        0.000!   !END!
438 ! X =   159.59233,   -1.41282,     102.000,        0.000!   !END!
439 ! X =   159.58713,   -1.16452,     102.000,        0.000!   !END!
440 ! X =   159.58182,    -.91621,     102.000,        0.000!   !END!
441 ! X =   159.57652,    -.66791,     102.000,        0.000!   !END!
442 ! X =   159.57122,     -.4196,     102.000,        0.000!   !END!
443 ! X =   159.56601,     -.1713,     102.000,        0.000!   !END!
444 ! X =    159.5607,     .07601,     101.000,        0.000!   !END!
445 ! X =    159.5554,     .32432,     102.000,        0.000!   !END!
446 ! X =    159.5501,     .57262,     102.000,        0.000!   !END!
447 ! X =    159.5448,     .82092,     102.000,        0.000!   !END!
448 ! X =    159.5395,    1.06923,     102.000,        0.000!   !END!
449 ! X =   159.53429,    1.31753,     102.000,        0.000!   !END!
450 ! X =   159.52899,    1.56583,     102.000,        0.000!   !END!
451 ! X =   159.52368,    1.81314,     102.000,        0.000!   !END!
452 ! X =   159.51839,    2.06144,     102.000,        0.000!   !END!
453 ! X =   159.51309,    2.30975,     102.000,        0.000!   !END!
454 ! X =   159.50789,    2.55805,     102.000,        0.000!   !END!
455 ! X =   159.50259,    2.80635,     102.000,        0.000!   !END!
456 ! X =   159.49729,    3.05465,     102.000,        0.000!   !END!
457 ! X =   159.49199,    3.30295,     103.000,        0.000!   !END!
458 ! X =   159.48669,    3.55026,     103.000,        0.000!   !END!
459 ! X =   159.48139,    3.79856,     103.000,        0.000!   !END!
460 ! X =   159.47609,    4.04686,     104.000,        0.000!   !END!
461 ! X =    159.4709,    4.29516,     104.000,        0.000!   !END!
462 ! X =   159.86169,   -2.39967,     105.000,        0.000!   !END!
463 ! X =   159.85638,   -2.15136,     103.000,        0.000!   !END!
464 ! X =   159.85106,   -1.90405,     102.000,        0.000!   !END!
465 ! X =   159.84586,   -1.65575,     102.000,        0.000!   !END!
466 ! X =   159.84055,   -1.40744,     102.000,        0.000!   !END!
467 ! X =   159.83525,   -1.15914,     102.000,        0.000!   !END!
468 ! X =   159.82994,    -.91083,     102.000,        0.000!   !END!
469 ! X =   159.82474,    -.66253,     102.000,        0.000!   !END!
470 ! X =   159.81944,    -.41422,     102.000,        0.000!   !END!
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471 ! X =   159.81412,    -.16691,     102.000,       0.000!   !END!
472 ! X =   159.80882,     .08139,     102.000,       0.000!   !END!
473 ! X =   159.80352,     .32969,     102.000,       0.000!   !END!
474 ! X =   159.79832,       .578,     102.000,       0.000!   !END!
475 ! X =   159.79301,      .8263,     102.000,       0.000!   !END!
476 ! X =   159.78771,     1.0746,     102.000,       0.000!   !END!
477 ! X =   159.78241,     1.3229,     102.000,       0.000!   !END!
478 ! X =    159.7771,    1.57021,     102.000,       0.000!   !END!
479 ! X =    159.7718,    1.81852,     102.000,       0.000!   !END!
480 ! X =    159.7666,    2.06682,     102.000,       0.000!   !END!
481 ! X =    159.7613,    2.31512,     102.000,       0.000!   !END!
482 ! X =     159.756,    2.56342,     102.000,       0.000!   !END!
483 ! X =   159.75071,    2.81172,     102.000,       0.000!   !END!
484 ! X =   159.74541,    3.06002,     102.000,       0.000!   !END!
485 ! X =    159.7401,    3.30733,     102.000,       0.000!   !END!
486 ! X =    159.7349,    3.55563,     103.000,       0.000!   !END!
487 ! X =   159.72961,    3.80393,     103.000,       0.000!   !END!
488 ! X =   159.72431,    4.05223,     103.000,       0.000!   !END!
489 ! X =   159.71901,    4.30053,     103.000,       0.000!   !END!
490 ! X =   159.71372,    4.54883,     103.000,       0.000!   !END!
491 ! X =   160.08867,   -1.40206,     102.000,       0.000!   !END!
492 ! X =   160.08347,   -1.15376,     102.000,       0.000!   !END!
493 ! X =   160.07816,    -.90545,     102.000,       0.000!   !END!
494 ! X =   160.07286,    -.65715,     102.000,       0.000!   !END!
495 ! X =   160.06754,    -.40984,     101.000,       0.000!   !END!
496 ! X =   160.06224,    -.16154,     102.000,       0.000!   !END!
497 ! X =   160.05704,     .08677,     102.000,       0.000!   !END!
498 ! X =   160.05174,     .33507,     102.000,       0.000!   !END!
499 ! X =   160.04643,     .58337,     102.000,       0.000!   !END!
500 ! X =   160.04113,     .83167,     102.000,       0.000!   !END!
501 ! X =   160.03583,    1.07998,     102.000,       0.000!   !END!
502 ! X =   160.03062,    1.32728,     102.000,       0.000!   !END!
503 ! X =   160.02532,    1.57559,     102.000,       0.000!   !END!
504 ! X =   160.02002,    1.82389,     102.000,       0.000!   !END!
505 ! X =   160.01472,    2.07219,     102.000,       0.000!   !END!
506 ! X =   160.00942,    2.32049,     102.000,       0.000!   !END!
507 ! X =   160.00412,    2.56879,     102.000,       0.000!   !END!
508 ! X =   159.99892,    2.81709,     102.000,       0.000!   !END!
509 ! X =   159.99362,    3.06539,     102.000,       0.000!   !END!
510 ! X =   159.98832,     3.3127,     102.000,       0.000!   !END!
511 ! X =   159.98302,      3.561,     102.000,       0.000!   !END!
512 ! X =   159.97772,     3.8093,     103.000,       0.000!   !END!
513 ! X =   159.97243,     4.0576,     103.000,       0.000!   !END!
514 ! X =   159.96713,     4.3059,     103.000,       0.000!   !END!
515 ! X =   159.96193,     4.5542,     103.000,       0.000!   !END!
516 ! X =   159.95664,     4.8025,     103.000,       0.000!   !END!
517 ! X =   160.05087,    5.11531,     104.000,       0.000!   !END!
518 ! X =   160.05241,    4.86804,     103.000,       0.000!   !END!
519 ! X =   160.05386,    4.62077,     103.000,       0.000!   !END!
520 ! X =   160.05541,     4.3735,     103.000,       0.000!   !END!
521 ! X =   160.05696,    4.12624,     103.000,       0.000!   !END!
522 ! X =   160.05852,    3.87996,     103.000,       0.000!   !END!
523 ! X =   160.06007,    3.63269,     102.000,       0.000!   !END!
524 ! X =   160.06152,    3.38542,     102.000,       0.000!   !END!
525 ! X =   160.06308,    3.13816,     102.000,       0.000!   !END!
526 ! X =   160.06463,    2.89089,     102.000,       0.000!   !END!
527 ! X =   160.06619,    2.64461,     102.000,       0.000!   !END!
528 ! X =   160.06774,    2.39734,     102.000,       0.000!   !END!
529 ! X =   160.06919,    2.15007,     102.000,       0.000!   !END!
530 ! X =   160.07075,     1.9028,     102.000,       0.000!   !END!
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531 ! X =   160.07231,    1.65653,     102.000,       0.000!   !END!
532 ! X =   160.07376,    1.40926,     102.000,       0.000!   !END!
533 ! X =   160.07532,    1.16199,     102.000,       0.000!   !END!
534 ! X =   160.07687,     .91472,     102.000,       0.000!   !END!
535 ! X =   160.07843,     .66744,     102.000,       0.000!   !END!
536 ! X =   160.07989,     .42117,     102.000,       0.000!   !END!
537 ! X =   160.08145,      .1739,     102.000,       0.000!   !END!
538 ! X =   160.08301,    -.07337,     102.000,       0.000!   !END!
539 ! X =   160.08456,    -.32065,     101.000,       0.000!   !END!
540 ! X =   160.08602,    -.56792,     102.000,       0.000!   !END!
541 ! X =   160.08759,     -.8142,     102.000,       0.000!   !END!
542 ! X =   160.08914,   -1.06147,     102.000,       0.000!   !END!
543 ! X =    160.0907,   -1.30874,     102.000,       0.000!   !END!
544 ! X =   160.09216,   -1.55601,     102.000,       0.000!   !END!
545 ! X =   160.09373,   -1.80229,     102.000,       0.000!   !END!
546 ! X =   160.09529,   -2.04956,     102.000,       0.000!   !END!
547 ! X =   160.09675,   -2.29684,     104.000,       0.000!   !END!
548 ! X =   160.09831,   -2.54411,     109.000,       0.000!   !END!
549 ! X =   159.88694,   -2.62137,     106.000,       0.000!   !END!
550 ! X =   159.67545,   -2.69962,     106.000,       0.000!   !END!
551 ! X =   159.46398,   -2.77687,     106.000,       0.000!   !END!
552 ! X =   159.25261,   -2.85413,     111.000,       0.000!   !END!
553 ! X =   159.02408,   -2.90638,     121.000,       0.000!   !END!
554 ! X =   158.79555,   -2.95963,     113.000,       0.000!   !END!
555 ! X =   158.56703,   -3.01189,     121.000,       0.000!   !END!
556 ! X =    158.3386,   -3.06414,     123.000,       0.000!   !END!
557 ! X =   158.11008,    -3.1164,     139.000,       0.000!   !END!
558 ! X =   157.88155,   -3.16866,     133.000,       0.000!   !END!
559 ! X =   157.65303,   -3.22091,     114.000,       0.000!   !END!
560 ! X =    157.4648,     -3.356,     107.000,       0.000!   !END!
561 ! X =   157.27655,   -3.49209,     105.000,       0.000!   !END!
562 ! X =   157.08832,   -3.62718,     104.000,       0.000!   !END!
563 ! X =   156.90008,   -3.76327,     103.000,       0.000!   !END!
564 ! X =    156.9011,   -3.66199,     102.000,       0.000!   !END!
565 ! X =   156.68415,   -3.65479,     102.000,       0.000!   !END!
566 ! X =   156.61502,   -3.82289,     102.000,       0.000!   !END!
567 ! X =   156.54591,   -3.98999,     102.000,       0.000!   !END!
568 ! X =   156.44447,   -4.02867,     102.000,       0.000!   !END!
569 ! X =   156.34457,   -3.90549,     102.000,       0.000!   !END!
570 ! X =   156.18916,   -3.88403,     102.000,       0.000!   !END!
571 ! X =   156.22471,   -3.99561,     102.000,       0.000!   !END!
572 ! X =   156.22729,   -4.03437,     102.000,       0.000!   !END!
573 ! X =   156.16243,   -4.07342,     102.000,       0.000!   !END!
574 ! X =   156.14481,   -4.15367,     102.000,       0.000!   !END!
575 ! X =   156.18777,   -4.21767,     102.000,       0.000!   !END!
576 ! X =   156.28167,   -4.24049,     102.000,       0.000!   !END!
577 ! X =   156.32803,   -4.26083,     102.000,       0.000!   !END!
578 ! X =   156.39661,   -4.34296,     102.000,       0.000!   !END!
579 ! X =   156.38778,    -4.4243,     102.000,       0.000!   !END!
580 ! X =   156.44188,   -4.47153,     102.000,       0.000!   !END!
581 ! X =   156.38181,   -4.53645,     102.000,       0.000!   !END!
582 ! X =   156.35904,   -4.62758,     102.000,       0.000!   !END!
583 ! X =   156.32898,   -4.65706,     102.000,       0.000!   !END!
584 ! X =    156.3118,   -4.59531,     102.000,       0.000!   !END!
585 ! X =   156.25318,   -4.60464,     102.000,       0.000!   !END!
586 ! X =   156.05992,   -4.69897,     102.000,       0.000!   !END!
587 ! X =   155.92703,   -4.70951,     102.000,       0.000!   !END!
588 ! X =   155.92228,   -4.67967,     102.000,       0.000!   !END!
589 ! X =    155.9746,    -4.6097,     102.000,       0.000!   !END!
590 ! X =   155.97366,   -4.50642,     102.000,       0.000!   !END!
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591 ! X =   155.89969,   -4.46891,     102.000,        0.000!   !END!
592 ! X =   155.73603,   -4.43247,     102.000,        0.000!   !END!
593 ! X =   155.57236,   -4.39602,     102.000,        0.000!   !END!
594 ! X =    155.5221,   -4.45806,     102.000,        0.000!   !END!
595 ! X =   155.50861,   -4.52148,     102.000,        0.000!   !END!
596 ! X =   155.52275,   -4.59014,     102.000,        0.000!   !END!
597 ! X =    155.4853,   -4.66622,     102.000,        0.000!   !END!
598 ! X =   155.34025,   -4.60812,     102.000,        0.000!   !END!
599 ! X =   155.33777,   -4.84345,     102.000,        0.000!   !END!
600 ! X =   155.33541,   -5.07778,     102.000,        0.000!   !END!
601 ! X =   155.33305,   -5.31211,     102.000,        0.000!   !END!
602 ! X =   155.33059,   -5.54644,     102.000,        0.000!   !END!
603 ! X =   155.32823,   -5.78078,     102.000,        0.000!   !END!
604 ! X =   155.24698,   -5.77795,     102.000,        0.000!   !END!
605 ! X =   155.08121,   -5.70574,     102.000,        0.000!   !END!
606 ! X =   154.91544,   -5.63253,     102.000,        0.000!   !END!
607 ! X =    154.7144,   -5.63542,     102.000,        0.000!   !END!
608 ! X =   154.51345,    -5.6393,     102.000,        0.000!   !END!
609 ! X =   154.31241,   -5.64219,     102.000,        0.000!   !END!
610 ! X =   154.11136,   -5.64608,     102.000,        0.000!   !END!
611 ! X =   154.11247,   -5.41769,     102.000,        0.000!   !END!
612 ! X =   154.11359,    -5.1893,     102.000,        0.000!   !END!
613 ! X =    154.1147,   -4.96091,     103.000,        0.000!   !END!
614 ! X =   154.11581,   -4.73351,     104.000,        0.000!   !END!
615 ! X =   153.92104,    -4.7325,     104.000,        0.000!   !END!
616 ! X =   153.72627,   -4.73148,     105.000,        0.000!   !END!
617 ! X =    153.7271,   -4.96287,     105.000,        0.000!   !END!
618 ! X =   153.72792,   -5.19525,     104.000,        0.000!   !END!
619 ! X =   153.72885,   -5.42664,     103.000,        0.000!   !END!
620 ! X =   153.72967,   -5.65902,     103.000,        0.000!   !END!
621 ! X =   153.54273,   -5.66504,     104.000,        0.000!   !END!
622 ! X =    153.3558,   -5.67105,     104.000,        0.000!   !END!
623 ! X =   153.16895,   -5.67806,     106.000,        0.000!   !END!
624 ! X =   152.98202,   -5.68408,     106.000,        0.000!   !END!
625 ! X =   152.98056,   -5.48545,     111.000,        0.000!   !END!
626 ! X =    152.9791,   -5.28682,     115.000,        0.000!   !END!
627 ! X =   153.09414,   -5.28205,     111.000,        0.000!   !END!
628 ! X =   153.14257,   -5.19616,     110.000,        0.000!   !END!
629 ! X =   153.13845,   -5.11468,     110.000,        0.000!   !END!
630 ! X =   153.13991,   -4.96971,     110.000,        0.000!   !END!
631 ! X =   152.97451,   -4.95808,     119.000,        0.000!   !END!
632 ! X =   152.97582,     -4.828,     121.000,        0.000!   !END!
633 ! X =   153.19787,   -4.83029,     106.000,        0.000!   !END!
634 ! X =   153.20182,   -4.68435,     110.000,        0.000!   !END!
635 ! X =   153.20577,   -4.53742,     115.000,        0.000!   !END!
636 ! X =   153.16186,   -4.47937,     118.000,        0.000!   !END!
637 ! X =   152.99234,   -4.47464,     120.000,        0.000!   !END!
638 ! X =   153.14003,   -4.31132,     121.000,        0.000!   !END!
639 ! X =   153.28761,     -4.148,     121.000,        0.000!   !END!
640 ! X =    153.4352,   -3.98468,     121.000,        0.000!   !END!
641 ! X =   153.58289,   -3.82136,     120.000,        0.000!   !END!
642 ! X =   153.68607,   -3.61984,     120.000,        0.000!   !END!
643 ! X =   153.74809,   -3.55792,     120.000,        0.000!   !END!
644 ! X =    153.9479,   -3.51034,     118.000,        0.000!   !END!
645 ! X =   154.04213,   -3.30476,     121.000,        0.000!   !END!
646 ! X =   154.05331,   -3.17677,     121.000,        0.000!   !END!
647 ! X =    154.0343,    -3.1011,     121.000,        0.000!   !END!
648 ! X =    154.1374,   -3.00584,     117.000,        0.000!   !END!
649 ! X =    154.2405,   -2.91058,     118.000,        0.000!   !END!
650 ! X =   154.31604,   -2.78326,     121.000,        0.000!   !END!
```

```
651 ! X =    154.4121,    -2.6502,     121.000,       0.000!   !END!
652 ! X =   154.50818,   -2.51614,     121.000,       0.000!   !END!
653 ! X =   154.60719,   -2.33543,     117.000,       0.000!   !END!
654 ! X =   154.70611,   -2.15473,     116.000,       0.000!   !END!
655 ! X =   154.80513,   -1.97403,     121.000,       0.000!   !END!
656 ! X =   154.84149,   -1.80956,     121.000,       0.000!   !END!
657 ! X =   154.95128,   -1.73722,     121.000,       0.000!   !END!
658 ! X =   155.16835,   -1.63519,     121.000,       0.000!   !END!
659 ! X =   155.18851,    -1.6066,     121.000,       0.000!   !END!
660 ! X =   155.20482,    -1.4608,     121.000,       0.000!   !END!
661 ! X =   155.29612,   -1.26115,     121.000,       0.000!   !END!
662 ! X =   155.30634,   -1.22749,     121.000,       0.000!   !END!
663 ! X =   155.43437,   -1.20896,     121.000,       0.000!   !END!
664 ! X =    155.5472,   -1.12969,     121.000,       0.000!   !END!
665 ! X =   155.66002,   -1.05042,     121.000,       0.000!   !END!
666 ! X =   155.79788,    -.88105,     121.000,       0.000!   !END!
667 ! X =   155.93564,    -.71167,     111.000,       0.000!   !END!
668 ! X =   156.07339,    -.54329,     113.000,       0.000!   !END!
669 ! X =   156.21115,    -.37392,     121.000,       0.000!   !END!
670 ! X =   156.33819,    -.16968,     121.000,       0.000!   !END!
671 ! X =   156.46513,     .03456,     121.000,       0.000!   !END!
672 ! X =   156.59217,      .2388,     121.000,       0.000!   !END!
673 ! X =   156.71911,     .44304,     121.000,       0.000!   !END!
674 ! X =    156.7792,     .62712,     121.000,       0.000!   !END!
675 ! X =    156.8392,      .8112,     121.000,       0.000!   !END!
676 ! X =   156.89921,     .99627,     122.000,       0.000!   !END!
677 ! X =    157.0776,    1.08677,     122.000,       0.000!   !END!
678 ! X =   157.22788,    1.19345,     119.000,       0.000!   !END!
679 ! X =   157.37804,    1.29914,     113.000,       0.000!   !END!
680 ! X =    157.4846,    1.50161,     119.000,       0.000!   !END!
681 ! X =   157.59105,    1.70407,     122.000,       0.000!   !END!
682 ! X =   157.69762,    1.90752,     121.000,       0.000!   !END!
683 ! X =   157.82032,    2.10287,     114.000,       0.000!   !END!
684 ! X =   157.94311,    2.29821,     106.000,       0.000!   !END!
685 ! X =   158.06591,    2.49355,     104.000,       0.000!   !END!
686 ! X =   158.18861,    2.68889,     103.000,       0.000!   !END!
687 ! X =   158.31141,    2.88523,     103.000,       0.000!   !END!
688 ! X =   158.43421,    3.08057,     103.000,       0.000!   !END!
689 ! X =   158.58113,    3.26572,     104.000,       0.000!   !END!
690 ! X =   158.72813,    3.44989,     104.000,       0.000!   !END!
691 ! X =   158.87505,    3.63505,     104.000,       0.000!   !END!
692 ! X =   159.02206,    3.82021,     105.000,       0.000!   !END!
693 ! X =   159.16898,    4.00536,     107.000,       0.000!   !END!
694 ! X =     159.316,    4.19052,     107.000,       0.000!   !END!
695 ! X =     159.463,    4.37468,     105.000,       0.000!   !END!
696 ! X =   159.60992,    4.55984,     104.000,       0.000!   !END!
697 ! X =   159.75693,      4.745,     104.000,       0.000!   !END!
698 ! X =   159.90385,    4.93015,     104.000,       0.000!   !END!
```

----

a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
BAS BART CLASS I ANALYSIS (UPPER BUFFALO)
MAY 2009 BASE (5 units PTE)
UMC 6KM CALMET METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    ! METDAT = /raid2c/umc/calmet/2003/calmet03.dat !
    or
ISCMET.DAT    input    * ISCDAT =             *
    or
PLMMET.DAT    input    * PLMDAT =             *
    or
PROFILE.DAT   input    * PRFDAT =             *
SURFACE.DAT   input    * SFCDAT =             *
RESTARTB.DAT  input    * RSTARTB=             *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =BASUB2003REF.LST     !
CONC.DAT      output   ! CONDAT =BASUB2003REF.CON     !
DFLX.DAT      output   ! DFDAT  =BASUB2003REF.DRY     !
WFLX.DAT      output   ! WFDAT  =BASUB2003REF.WET     !

VISB.DAT      output   ! VISDAT =BASUB2003REF.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2003.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =             *
VOLEMARB.DAT  input    * VOLDAT =             *
BAEMARB.DAT   input    * ARDAT  =             *
LNEMARB.DAT   input    * LNDAT  =             *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =             *
CHEM.DAT      input    * CHEMDAT=             *
H2O2.DAT      input    * H2O2DAT=             *
HILL.DAT      input    * HILDAT=             *
HILLRCT.DAT   input    * RCTDAT=             *
COASTLN.DAT   input    * CSTDAT=             *
FLUXBDY.DAT   input    * BDYDAT=             *
BCON.DAT      input    * BCNDAT=             *
DEBUG.DAT     output   * DEBUG =             *
MASSFLX.DAT   output   * FLXDAT=             *
MASSBAL.DAT   output   * BALDAT=             *
FOG.DAT       output   * FOGDAT=             *
```

```
--------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                     Default: 1       ! NMETDAT =  1   !

     Number of PTEMARB.DAT files for run (NPTDAT)
                                     Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                     Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                     Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if
NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------

--------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  2003 !
     (used only if   Month (IBMO) -- No default       ! IBMO =   01 !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   01 !
                      Hour (IBHR) -- No default       ! IBHR =   01 !

     Base time zone        (XBTZ) -- No default       ! XBTZ = 6.0  !
        PST = 8., MST = 7.
        CST = 6., EST = 5.

     Length of run (hours) (IRLG) -- No default       ! IRLG =  8760 !

     Number of chemical species (NSPEC)
```

```
                                    Default: 5       ! NSPEC =  6   !

    Number of chemical species
    to be emitted  (NSE)            Default: 3       ! NSE =  3   !

    Flag to stop run after
    SETUP phase (ITEST)             Default: 2       ! ITEST =  2   !
    (Used to allow checking
    of the model inputs, files, etc.)
          ITEST = 1 - STOPS program after SETUP phase
          ITEST = 2 - Continues with execution of program
                      after SETUP

    Restart Configuration:

       Control flag (MRESTART)      Default: 0       ! MRESTART =  0
!

          0 = Do not read or write a restart file
          1 = Read a restart file at the beginning of
              the run
          2 = Write a restart file during run
          3 = Read a restart file at beginning of run
              and write a restart file during run

       Number of periods in Restart
       output cycle (NRESPD)        Default: 0       ! NRESPD =  0   !

          0 = File written only at last period
         >0 = File updated every NRESPD periods

    Meteorological Data Format (METFM)
                                    Default: 1       ! METFM =  1   !

          METFM = 1 - CALMET binary file (CALMET.MET)
          METFM = 2 - ISC ASCII file (ISCMET.MET)
          METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
          METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                      surface parameters file (SURFACE.DAT)

 Meteorological Profile Data Format (MPRFFM)
           (used only for METFM = 1, 2, 3)
                                    Default: 1       ! MPRFFM =  1   !

          MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
          MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

    PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
    Averaging Time (minutes) (AVET)
                                    Default: 60.0    ! AVET = 60. !
    PG Averaging Time (minutes) (PGTIME)
                                    Default: 60.0    ! PGTIME = 60. !


!END!


------------------------------------------------------------------------
-------
```

```
INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)                   Default: 1     ! MGAUSS =  1
!
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                              Default: 3     ! MCTADJ =  3
!
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                          Default: 0     ! MCTSG =  0
!
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated 0 (MSLUG)                   Default: 0     ! MSLUG =  0
!
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled ?
     (MTRANS)                              Default: 1     ! MTRANS =  1
!
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)            Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to simulate building
     downwash? (MBDW)                      Default: 1     ! MBDW =   1
!
        1 = ISC method
        2 = PRIME method

     Vertical wind shear modeled above
     stack top? (MSHEAR)                   Default: 0     ! MSHEAR =  0
!
        0 = no  (i.e., vertical wind shear not modeled)
        1 = yes (i.e., vertical wind shear modeled)

     Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0
!
        0 = no (i.e., puffs not split)
        1 = yes (i.e., puffs are split)

     Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  1
!
```

```
        0 = chemical transformation not
            modeled
        1 = transformation rates computed
            internally (MESOPUFF II scheme)
        2 = user-specified transformation
            rates used
        3 = transformation rates computed
            internally (RIVAD/ARM3 scheme)
        4 = secondary organic aerosol formation
            computed (MESOPUFF II scheme for OH)

     Aqueous phase transformation flag (MAQCHEM)
     (Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0
!
        0 = aqueous phase transformation
            not modeled
        1 = transformation rates adjusted
            for aqueous phase reactions

     Wet removal modeled ? (MWET)          Default: 1     ! MWET =  1
!
        0 = no
        1 = yes

     Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  1
!
        0 = no
        1 = yes
        (dry deposition method specified
         for each species in Input Group 3)

     Method used to compute dispersion
     coefficients (MDISP)                  Default: 3     ! MDISP =  3
!

        1 = dispersion coefficients computed from measured values
            of turbulence, sigma v, sigma w
        2 = dispersion coefficients from internally calculated
            sigma v, sigma w using micrometeorological variables
            (u*, w*, L, etc.)
        3 = PG dispersion coefficients for RURAL areas (computed using
            the ISCST multi-segment approximation) and MP coefficients
in
            urban areas
        4 = same as 3 except PG coefficients computed using
            the MESOPUFF II eqns.
        5 = CTDM sigmas used for stable and neutral conditions.
            For unstable conditions, sigmas are computed as in
            MDISP = 3, described above.  MDISP = 5 assumes that
            measured values are read

     Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
     (Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3
!
        1 = use sigma-v or sigma-theta measurements
            from PROFILE.DAT to compute sigma-y
            (valid for METFM = 1, 2, 3, 4)
        2 = use sigma-w measurements
            from PROFILE.DAT to compute sigma-z
            (valid for METFM = 1, 2, 3, 4)
```

```
          3 = use both sigma-(v/theta) and sigma-w
              from PROFILE.DAT to compute sigma-y and sigma-z
              (valid for METFM = 1, 2, 3, 4)
          4 = use sigma-theta measurements
              from PLMMET.DAT to compute sigma-y
              (valid only if METFM = 3)

       Back-up method used to compute dispersion
       when measured turbulence data are
       missing (MDISP2)                      Default: 3     ! MDISP2 =  3
!
       (used only if MDISP = 1 or 5)
          2 = dispersion coefficients from internally calculated
              sigma v, sigma w using micrometeorological variables
              (u*, w*, L, etc.)
          3 = PG dispersion coefficients for RURAL areas (computed using
              the ISCST multi-segment approximation) and MP coefficients
in
              urban areas
          4 = same as 3 except PG coefficients computed using
              the MESOPUFF II eqns.

     [DIAGNOSTIC FEATURE]
       Method used for Lagrangian timescale for Sigma-y
       (used only if MDISP=1,2 or MDISP2=1,2)
       (MTAULY)                              Default: 0     ! MTAULY =  0
!
          0 = Draxler default 617.284 (s)
          1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
         10 < Direct user input (s)             -- e.g., 306.9


       [DIAGNOSTIC FEATURE]
       Method used for Advective-Decay timescale for Turbulence
       (used only if MDISP=2 or MDISP2=2)
       (MTAUADV)                             Default: 0     ! MTAUADV =  0
!
          0 = No turbulence advection
          1 = Computed (OPTION NOT IMPLEMENTED)
         10 < Direct user input (s)   -- e.g., 300


       Method used to compute turbulence sigma-v &
       sigma-w using micrometeorological variables
       (Used only if MDISP = 2 or MDISP2 = 2)
       (MCTURB)                              Default: 1     ! MCTURB =  1
!
          1 = Standard CALPUFF subroutines
          2 = AERMOD subroutines

       PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH =  0
!
       (MROUGH)
          0 = no
          1 = yes

       Partial plume penetration of          Default: 1     ! MPARTL =  1
!
       elevated inversion?
       (MPARTL)
```

```
   0 = no
   1 = yes

Strength of temperature inversion     Default: 0     ! MTINV =  0
!
provided in PROFILE.DAT extended records?
(MTINV)
   0 = no (computed from measured/default gradients)
   1 = yes

PDF used for dispersion under convective conditions?
                                      Default: 0     ! MPDF =  0  !
(MPDF)
   0 = no
   1 = yes

Sub-Grid TIBL module used for shore line?
                                      Default: 0     ! MSGTIBL = 0
!
(MSGTIBL)
   0 = no
   1 = yes

Boundary conditions (concentration) modeled?
                                      Default: 0     ! MBCON = 0  !
(MBCON)
   0 = no
   1 = yes, using formatted BCON.DAT file
   2 = yes, using unformatted CONC.DAT file


Analyses of fogging and icing impacts due to emissions from
arrays of mechanically-forced cooling towers can be performed
using CALPUFF in conjunction with a cooling tower emissions
processor (CTEMISS) and its associated postprocessors.  Hourly
emissions of water vapor and temperature from each cooling tower
cell are computed for the current cell configuration and ambient
conditions by CTEMISS. CALPUFF models the dispersion of these
emissions and provides cloud information in a specialized format
for further analysis. Output to FOG.DAT is provided in either
'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
                                      Default: 0     ! MFOG =  0
!
(MFOG)
   0 = no
   1 = yes  - report results in PLUME Mode format
   2 = yes  - report results in RECEPTOR Mode format


Test options specified to see if
they conform to regulatory
values? (MREG)                        Default: 1     ! MREG =  1
!

   0 = NO checks are made
   1 = Technical options must conform to USEPA
       Long Range Transport (LRT) guidance
                  METFM    1 or 2
```

```
                       AVET      60. (min)
                       PGTIME    60. (min)
                       MGAUSS    1
                       MCTADJ    3
                       MTRANS    1
                       MTIP      1
                       MCHEM     1 or 3 (if modeling SOx, NOx)
                       MWET      1
                       MDRY      1
                       MDISP     2 or 3
                       MPDF      0 if MDISP=3
                                 1 if MDISP=2
                       MROUGH    0
                       MPARTL    1
                       SYTDEP    550. (m)
                       MHFTSZ    0


!END!


------------------------------------------------------------------------
-------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!

                                                       Dry
OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED
NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,
(0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS
1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE
2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)
3= etc.)

!          SO2  =         1,               1,            1,
0   !
!          SO4  =         1,               0,            2,
0   !
!          NOX  =         1,               1,            1,
0   !
!         HNO3  =         1,               0,            1,
```

```
0   !
!          NO3  =         1,                0,           2,
0   !
!         PM10  =         1,                1,           2,
0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



------------------------------------------------------------------------
-------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 37N  !
     (RLON0)                    No Default      ! RLON0 = 92W  !
```

```
         TTM :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of
projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping
plane
                RLAT0 identifies latitude of tangent-point of mapping
plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                  No Default      ! XLAT1 = 30N  !
     (XLAT2)                  No Default      ! XLAT2 = 45N  !

         LCC :  Projection cone slices through Earth's surface at XLAT1
and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of
the
     Earth known as the World Geodetic System 1984 (WGS-G ).  Other
local
     models may be in use, and their selection in CALMET will make its
output
     consistent with local mapping products.  The list of Datum-Regions
with
     official transformation parameters is provided by the National
Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)

------------------------------------------------------------------------
------
     WGS-G     WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS
(NAD27)
     NWS-27    NWS 6370KM Radius, Sphere
     NWS-84    NWS 6370KM Radius, Sphere
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere
```

```
     Datum-region for output coordinates
     (DATUM)                    Default: WGS-G     ! DATUM = WGS-84  !


METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =   87   !
            No. Y grid cells (NY)      No default     ! NY =  111   !
         No. vertical layers (NZ)      No default     ! NZ =  10   !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 6 !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
              4000. !

            Reference Coordinates
           of SOUTHWEST corner of
                 grid cell(1, 1):

            X-coordinate (XORIGKM)     No default     ! XORIGKM = -258.
!
            Y coordinate (YORIGKM)     No default     ! YORIGKM = -330.
!
                                      Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET.
grid.
     The lower left (LL) corner of the computational grid is at grid
point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of
the
     computational grid is at grid point (IECOMP, JECOMP) of the MET.
grid.
     The grid spacing of the computational grid is the same as the MET.
grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =   1
!
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =   1
!
                  (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)      No default     ! IECOMP =
87   !
                  (1 <= IECOMP <= NX)
```

```
        Y index of UR corner (JECOMP)      No default     ! JECOMP =
111   !
                  (1 <= JECOMP <= NY)



SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of
the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the
computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1
!
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1
!
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =
87   !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =
111   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1
!
        (MESHDN is an integer >= 1)

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 5 -- Output Options
--------------
                                                        *
*
     FILE                          DEFAULT VALUE            VALUE THIS RUN
     ----                          -------------            --------------

   Concentrations (ICON)                 1                  !  ICON =  1
!
```

```
   Dry Fluxes (IDRY)                  1                    !  IDRY =  1
!
   Wet Fluxes (IWET)                  1                    !  IWET =  1
!
   Relative Humidity (IVIS)           1                    !  IVIS =  1
!
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                           Default: T          ! LCOMPRS = T
!

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                         Default: 0          ! IMFLX =  0
!
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                         Default: 0          ! IMBAL =  0
!
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)    Default: 0          ! ICPRT =  0
!
       Print dry fluxes (IDPRT)        Default: 0          ! IDPRT =  0
!
       Print wet fluxes (IWPRT)        Default: 0          ! IWPRT =  0
!
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours                Default: 1          ! ICFRQ =  1
!
       Dry flux print interval
       (IDFRQ) in hours                Default: 1          ! IDFRQ =  1
!
       Wet flux print interval
       (IWFRQ) in hours                Default: 1          ! IWFRQ =  1
!

       Units for Line Printer Output
       (IPRTU)                         Default: 1          ! IPRTU =  3
!
                       for            for
```

```
                 Concentration    Deposition
          1 =       g/m**3         g/m**2/s
          2 =      mg/m**3        mg/m**2/s
          3 =      ug/m**3        ug/m**2/s
          4 =      ng/m**3        ng/m**2/s
          5 =     Odour Units

      Messages tracking progress of run
      written to the screen ?
      (IMESG)                         Default: 2         ! IMESG =  2
!
        0 = no
        1 = yes (advection step, puff ID)
        2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                ---- CONCENTRATIONS ----   ------ DRY FLUXES ------
------ WET FLUXES ------   -- MASS FLUX --
   SPECIES
   /GROUP       PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?
PRINTED?  SAVED ON DISK?   SAVED ON DISK?
   -------      ------------------------   ------------------------
------------------------   ---------------
!          SO2 =     0,            1,           0,            1,
0,          1,          0   !
!          SO4 =     0,            1,           0,            1,
0,          1,          0   !
!          NOX =     0,            1,           0,            1,
0,          1,          0   !
!         HNO3 =     0,            1,           0,            1,
0,          1,          0   !
!          NO3 =     0,            1,           0,            1,
0,          1,          0   !
!         PM10 =     0,            1,           0,            1,
0,          1,          0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                 Default: F     ! LDEBUG
= F !

       First puff to track
       (IPFDEB)                                 Default: 1     ! IPFDEB
=  1  !

       Number of puffs to track
       (NPFDEB)                                 Default: 1     ! NPFDEB
=  1  !

       Met. period to start output
       (NN1)                                    Default: 1     ! NN1 =
1   !

       Met. period to end output
       (NN2)                                    Default: 10    ! NN2 =
10  !
```

```
!END!


--------------------------------------------------------------------------------
-------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =
0   !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC
=  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                  No Default     ! MHILL =
2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M
= 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M
= 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL           XC        YC       THETAH  ZGRID  RELIEF    EXPO 1
EXPO 2   SCALE 1    SCALE 2    AMAX1     AMAX2
 NO.          (km)      (km)      (deg.)   (m)     (m)      (m)
```

```
(m)        (m)         (m)        (m)        (m)
----           ----       ----       ------  -----  ------    ------
------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                      XRCT         YRCT        ZRCT          XHH
                      (km)         (km)         (m)
                     ------        -----      ------         ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid
elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain
receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a
separate
           input subgroup and therefore must end with an input group
terminator.

------------------------------------------------------------------------
-------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY
MESOPHYLL RESISTANCE     HENRY'S LAW COEFFICIENT
       NAME        (cm**2/s)
(s/cm)                (dimensionless)
      -------     -----------      ----------      ----------
--------------------     -----------------------

!          SO2 =     0.1509,         1000.,            8.,
```

```
0.,                  0.04 !
!          NOX =     0.1656,            1.,            8.,
5.,                   3.5 !
!         HNO3 =     0.1628,            1.,           18.,
0.,            0.00000008 !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard
deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                   DEVIATION
                        (microns)                  (microns)
      -------      -------------------        ------------------
!          SO4 =         0.48,                      2.   !
!          NO3 =         0.48,                      2.   !
!         PM10 =           2.,                      2.   !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                          Default: 30    !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                            Default: 10    !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                         Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                           Default: 9     !   NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                           Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation
```

```
!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,              0.0E00 !
!          SO4 =         1.0E-04,             3.0E-05 !
!         HNO3 =         6.0E-05,              0.0E00 !
!          NO3 =         1.0E-04,             3.0E-05 !
!         PM10 =         1.0E-04,             3.0E-05 !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0
!
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                    Default: 12*80.
     !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00,
65.00, 65.00, 26.00, 26.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                   Default: 12*10.
     !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50,
0.50, 0.50, 0.50 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2          ! RNITE1 =
.2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0          ! RNITE2 =
2.0 !
```

```
     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                   Default: 2.0          ! RNITE3 =
2.0 !

     H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =
0   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb                  Default: 12*1.
     !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
     (used only if MCHEM = 4)

     The SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)
          VOC / NOX ratio (after reaction)         (VCNX)
     to characterize the air mass when computing
     the formation of SOA from VOC emissions.
     Typical values for several distinct air mass types are:

        Month    1    2    3    4    5    6    7    8    9   10   11
12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Dec

     Clean Continental
        BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
1.
        OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20
.15
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Clean Marine (surface)
        BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
.5
        OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30
.25
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Urban - low biogenic (controls present)
        BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
30.
        OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20
.20
        VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.
4.

     Urban - high biogenic (controls present)
```

```
        BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
60.
        OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35
.25
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Regional Plume
        BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
20.
        OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30
.20
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Urban - no controls present
        BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
100.
        OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35
.30
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.
2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20,
0.20, 0.20, 0.15 !
     !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00,
50.00, 50.00, 50.00, 50.00 !


!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                          Default: 550.   ! SYTDEP
= 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                  Default: 0      ! MHFTSZ
=  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                              Default: 5      ! JSUP =
5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)    Default: 0.01   ! CONK1
```

```
= .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                    Default: 0.1    ! CONK2
= .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                      Default: 0.5    ! TBD =
.5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                             Default: 10     ! IURB1
=  10  !
                                                         19     ! IURB2
=  19  !

     Site characterization parameters for single-point Met data files
---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                              Default: 20     !
ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                                  Default: 0.25   ! Z0IN =
.25 !

        Leaf area index for modeling domain
        (XLAIIN)                                Default: 3.0    ! XLAIIN
= 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                                Default: 0.0    ! ELEVIN
= .0 !

        Latitude (degrees) for met location
        (XLATIN)                                Default: -999.  ! XLATIN
= -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                                Default: -999.  ! XLONIN
= -999.0 !

     Specialized information for interpreting single-point Met data
files -----

        Anemometer height (m) (Used only if METFM = 2,3)
        (ANEMHT)                                Default: 10.    ! ANEMHT
= 10.0 !

        Form of lateral turbulance data in PROFILE.DAT file
        (Used only if METFM = 4 or MTURBVW = 1 or 3)
```

```
        (ISIGMAV)                               Default: 1      !
ISIGMAV =  1  !
            0 = read sigma-theta
            1 = read sigma-v

        Choice of mixing heights (Used only if METFM = 4)
        (IMIXCTDM)                              Default: 0      !
IMIXCTDM =  0  !
            0 = read PREDICTED mixing heights
            1 = read OBSERVED mixing heights

     Maximum length of a slug (met. grid units)
     (XMXLEN)                                   Default: 1.0    ! XMXLEN
= 1.0 !

     Maximum travel distance of a puff/slug (in
     grid units) during one sampling step
     (XSAMLEN)                                  Default: 1.0    !
XSAMLEN = 1.0 !

     Maximum Number of slugs/puffs release from
     one source during one time step
     (MXNEW)                                    Default: 99     ! MXNEW
=  99   !

     Maximum Number of sampling steps for
     one puff/slug during one time step
     (MXSAM)                                    Default: 99     ! MXSAM
=  99   !

     Number of iterations used when computing
     the transport wind for a sampling step
     that includes gradual rise (for CALMET
     and PROFILE winds)
     (NCOUNT)                                   Default: 2      ! NCOUNT
=  2   !

     Minimum sigma y for a new puff/slug (m)
     (SYMIN)                                    Default: 1.0    ! SYMIN
= 1.0  !

     Minimum sigma z for a new puff/slug (m)
     (SZMIN)                                    Default: 1.0    ! SZMIN
= 1.0  !

     Default minimum turbulence velocities sigma-v and sigma-w
     for each stability class over land and over water (m/s)
     (SVMIN(12) and SWMIN(12))

                     ----------  LAND  ----------       ---------  WATER
----------
        Stab Class :  A    B    C    D    E    F         A    B    C
D    E    F
                     ---  ---  ---  ---  ---  ---       ---  ---  ---
---  ---  ---
     Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37,
.37, .37, .37
     Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08,
.06, .03, .016
```

```
           ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370,
0.370, 0.370, 0.370, 0.370, 0.370!
           ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200,
0.120, 0.080, 0.060, 0.030, 0.016!


     Divergence criterion for dw/dz across puff
     used to initiate adjustment for horizontal
     convergence (1/s)
     Partial adjustment starts at CDIV(1), and
     full adjustment is reached at CDIV(2)
     (CDIV(2))                                 Default: 0.0,0.0  ! CDIV
= .0, .0 !

     Minimum wind speed (m/s) allowed for
     non-calm conditions. Also used as minimum
     speed returned when using power-law
     extrapolation toward surface
     (WSCALM)                                  Default: 0.5    ! WSCALM
= .5 !

     Maximum mixing height (m)
     (XMAXZI)                                  Default: 3000.  ! XMAXZI
= 4000.0 !

     Minimum mixing height (m)
     (XMINZI)                                  Default: 50.    ! XMINZI
= 20.0 !

     Default wind speed classes --
     5 upper bounds (m/s) are entered;
     the 6th class has no upper limit
     (WSCAT(5))                    Default   :
                                   ISC RURAL : 1.54, 3.09, 5.14, 8.23,
10.8 (10.8+)

                              Wind Speed Class :  1     2     3     4
5
                                                 ---   ---   ---   ---
---
                                     ! WSCAT = 1.54, 3.09, 5.14, 8.23,
10.80 !

     Default wind speed profile power-law
     exponents for stabilities 1-6
     (PLX0(6))                     Default   : ISC RURAL values
                                   ISC RURAL : .07, .07, .10, .15,
.35, .55
                                   ISC URBAN : .15, .15, .20, .25,
.30, .30

                               Stability Class :  A     B     C     D
E     F
                                                 ---   ---   ---   ---
---   ---
                                      ! PLX0 = 0.07, 0.07, 0.10, 0.15,
0.35, 0.55 !

     Default potential temperature gradient
     for stable classes E, F (degK/m)
```

```
     (PTG0(2))                        Default: 0.020, 0.035
                                         ! PTG0 = 0.020,   0.035 !

     Default plume path coefficients for
     each stability class (used when option
     for partial plume height terrain adjustment
     is selected -- MCTADJ=3)
     (PPC(6))                 Stability Class :  A     B     C     D
E     F
                                 Default  PPC : .50,  .50,  .50,  .50,
.35,  .35
                                                ---   ---   ---   ---
---   ---
                                       !  PPC = 0.50, 0.50, 0.50, 0.50,
0.35, 0.35 !

     Slug-to-puff transition criterion factor
     equal to sigma-y/length of slug
     (SL2PF)                                Default: 10.        ! SL2PF =
10.0 !

     Puff-splitting control variables ------------------------

       VERTICAL SPLIT
       --------------

       Number of puffs that result every time a puff
       is split - nsplit=2 means that 1 puff splits
       into 2
       (NSPLIT)                             Default:   3        ! NSPLIT
=  3  !

       Time(s) of a day when split puffs are eligible to
       be split once again; this is typically set once
       per day, around sunset before nocturnal shear develops.
       24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
       0=do not re-split    1=eligible for re-split
       (IRESPLIT(24))                       Default:  Hour 17 = 1
       !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

       Split is allowed only if last hour's mixing
       height (m) exceeds a minimum value
       (ZISPLIT)                            Default: 100.       ! ZISPLIT
= 100.0 !

       Split is allowed only if ratio of last hour's
       mixing ht to the maximum mixing ht experienced
       by the puff is less than a maximum value (this
       postpones a split until a nocturnal layer develops)
       (ROLDMAX)                            Default: 0.25       ! ROLDMAX
= 0.25 !


       HORIZONTAL SPLIT
       ----------------

       Number of puffs that result every time a puff
       is split - nsplith=5 means that 1 puff splits
       into 5
       (NSPLITH)                            Default:   5        ! NSPLITH
```

```
=  5  !

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
       (SYSPLITH)                          Default:  1.0       !
SYSPLITH = 1.0 !

       Minimum puff elongation rate (SYSPLITH/hr) due to
       wind shear, before it may be split
       (SHSPLITH)                          Default:  2.        !
SHSPLITH = 2.0 !

       Minimum concentration (g/m^3) of each
       species in puff before it may be split
       Enter array of NSPEC values; if a single value is
       entered, it will be used for ALL species
       (CNSPLITH)                          Default:  1.0E-07   !
CNSPLITH = 1.0E-07 !

     Integration control variables ------------------------

       Fractional convergence criterion for numerical SLUG
       sampling integration
       (EPSSLUG)                           Default:   1.0e-04  ! EPSSLUG
= 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                           Default:   1.0e-06  ! EPSAREA
= 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                            Default:   1.0      ! DSRISE
= 1.0 !

       Boundary Condition (BC) Puff control variables
------------------------

       Minimum height (m) to which BC puffs are mixed as they are
emitted
       (MBCON=2 ONLY).  Actual height is reset to the current mixing
height
       at the release point if greater than this minimum.
       (HTMINBC)                           Default:   500.     ! HTMINBC
= 500.0 !

       Search radius (in BC segment lengths) about a receptor for
sampling
       nearest BC puff.  BC puffs are emitted with a spacing of one
segment
       length, so the search radius should be greater than 1.
       (RSAMPBC)                           Default:   4.      ! RSAMPBC
= 10.0 !

       Near-Surface depletion adjustment to concentration profile used
when
       sampling BC puffs?
       (MDEPBC)                            Default:   1        ! MDEPBC
=  1  !
```

```
          0 = Concentration is NOT adjusted for depletion
          1 = Adjust Concentration for depletion

!END!


--------------------------------------------------------------------------
-------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =   2  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                            a
          POINT SOURCE: CONSTANT DATA
          -----------------------------

b          c
  Source       X          Y       Stack    Base     Stack    Exit  Exit
Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.
Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg.
K)
  ------    ---------- ---------- ------  ------   -------- -----
```

```
-------- ----- --------
   1 ! SRCNAM = EPC !
   1 ! X = 47.6934,  312.8110,  30.48, 142.95,  1.22,16.256, 355.37,
0.0, 0.0E00,  0.0E00,  4.45204E01,
       0.0E00,  0.0E00, 6.10309E00 !
   1 ! FMFAC  =      1.0 !   !END!
   2 ! SRCNAM = TC01 !
   2 ! X = 47.6934,  312.8110,  22.86, 142.95,  1.07, 5.283, 352.59,
0.0, 9.31628E-01, 0.0E00, 1.62293E00,
       0.0E00,  0.0E00, 4.03115E-01 !
   2 ! FMFAC  =      1.0 !   !END!
--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column
headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to
represent
             the effect of rain-caps or other physical configurations
that
             reduce momentum rise associated with the actual exit
velocity.
             (Default: 1.0  -- full momentum used)

    b
     0. = No building downwash modeled, 1. = downwash modeled
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
           -------------------------------------------------------
Source
a
 No.       Effective building height, width, length and X/Y offset (in
meters)
           every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed
for
           MBDW=2 (PRIME downwash option)
------
--------------------------------------------------------------------

--------
```

```
    a
     Building height, width, length, and X/Y offset from the source are
treated
     as a separate input subgroup for each source and therefore must end
with
     an input group terminator.  The X/Y offset is the position,
relative to the
     stack, of the center of the upwind face of the projected building,
with the
     x-axis pointing along the flow direction.

---------------
Subgroup (13d)
---------------
                                                a
          POINT SOURCE: VARIABLE EMISSIONS DATA
          ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 13b.  Factors entered multiply the rates in 13b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                  Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
--------------------------------

---------------
Subgroup (14a)
---------------

     Number of polygon area sources with
```

```
     parameters specified below (NAR1)       No default  !  NAR1 =  0
!

     Units used for area source
     emissions below           (IARU)       Default: 1  !  IARU =   1
!
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                         No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                     a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                         b
Source           Effect.    Base      Initial    Emission
 No.             Height   Elevation   Sigma z     Rates
                   (m)       (m)        (m)
-------          ------    ------     --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
           --------------------------------------------------------
Source                                                                   a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------
```

----
a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (14d)

AREA SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission rates given in 14b. Factors entered multiply the rates in 14b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

0 = Constant
1 = Diurnal cycle (24 scaling factors: hours 1-24)
2 = Monthly cycle (12 scaling factors: months 1-12)
3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

Subgroup (15a)

Number of buoyant line sources with variable location and emission parameters (NLN2) No default ! NLN2 = 0 !

```
     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)        No default   !
NLINES =  0  !

     Units used for line source
     emissions below                (ILNU)          Default: 1  !  ILNU
=   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7   !
MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6   !
NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default   ! XL =
.0 !
                                                    (in meters)

        Average building height (HBL)               No default   ! HBL =
.0 !
                                                    (in meters)

        Average building width (WBL)                No default   ! WBL =
.0 !
                                                    (in meters)

        Average line source width (WML)             No default   ! WML =
.0 !
                                                    (in meters)

        Average separation between buildings (DXL)  No default   ! DXL =
.0 !
                                                    (in meters)

        Average buoyancy parameter (FPRIMEL)        No default   !
FPRIMEL = .0 !
                                                    (in m**4/s**3)

!END!

---------------
```

Subgroup (15b)

BUOYANT LINE SOURCE: CONSTANT DATA

Source No.[a]	Beg. X Coordinate (km)	Beg. Y Coordinate (km)	End. X Coordinate (km)	End. Y Coordinate (km)	Release Height (m)	Base Elevation (m)	Emission Rates

----

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by ILNTU (e.g. 1 for g/s).

Subgroup (15c)

BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA[a]

Use this subgroup to describe temporal variations in the emission rates given in 15b. Factors entered multiply the rates in 15b. Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

----
a

```
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


--------------------------------------------------------------------------------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0
!

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1
!
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0
!

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0
!

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                        a
           VOLUME SOURCE: CONSTANT DATA
           ------------------------------

b
        X           Y        Effect.    Base     Initial    Initial
Emission
     Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z
Rates
        (km)       (km)         (m)       (m)        (m)        (m)
     ----------  ----------   ------    ------    --------   --------
```

```
--------

--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                                 a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)

------------------------------------------------------------------------
-------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
-----------------------

---------------
Subgroup (17a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC =  2803
!

!END!

---------------
Subgroup (17b)
```

NON-GRIDDED (DISCRETE) RECEPTOR DATA [a]

Receptor No.		X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height Above Ground (m) [b]	
1	! X =	-130.28262,	-119.26119,	670.000,	0.000!	!END!
2	! X =	-130.27992,	-119.0126,	670.000,	0.000!	!END!
3	! X =	-130.03243,	-119.01534,	670.000,	0.000!	!END!
4	! X =	-130.02974,	-118.76675,	670.000,	0.000!	!END!
5	! X =	-130.02704,	-118.51816,	664.000,	0.000!	!END!
6	! X =	-129.78504,	-119.01797,	670.000,	0.000!	!END!
7	! X =	-129.78235,	-118.76948,	670.000,	0.000!	!END!
8	! X =	-129.77965,	-118.52089,	648.000,	0.000!	!END!
9	! X =	-129.77696,	-118.2723,	670.000,	0.000!	!END!
10	! X =	-129.77417,	-118.02382,	670.000,	0.000!	!END!
11	! X =	-129.77148,	-117.77523,	670.000,	0.000!	!END!
12	! X =	-129.76879,	-117.52674,	656.000,	0.000!	!END!
13	! X =	-129.76609,	-117.27815,	635.000,	0.000!	!END!
14	! X =	-129.7634,	-117.02956,	632.000,	0.000!	!END!
15	! X =	-129.76071,	-116.78107,	632.000,	0.000!	!END!
16	! X =	-129.75801,	-116.53247,	621.000,	0.000!	!END!
17	! X =	-129.53755,	-119.0207,	654.000,	0.000!	!END!
18	! X =	-129.53485,	-118.77211,	647.000,	0.000!	!END!
19	! X =	-129.53216,	-118.52353,	645.000,	0.000!	!END!
20	! X =	-129.52947,	-118.27504,	670.000,	0.000!	!END!
21	! X =	-129.52677,	-118.02645,	670.000,	0.000!	!END!
22	! X =	-129.52408,	-117.77796,	670.000,	0.000!	!END!
23	! X =	-129.52139,	-117.52937,	662.000,	0.000!	!END!
24	! X =	-129.51869,	-117.28078,	650.000,	0.000!	!END!
25	! X =	-129.51601,	-117.03229,	641.000,	0.000!	!END!
26	! X =	-129.51331,	-116.78369,	640.000,	0.000!	!END!
27	! X =	-129.51062,	-116.5352,	639.000,	0.000!	!END!
28	! X =	-129.50793,	-116.28661,	624.000,	0.000!	!END!
29	! X =	-129.50524,	-116.03812,	591.000,	0.000!	!END!
30	! X =	-129.50244,	-115.78953,	523.000,	0.000!	!END!
31	! X =	-129.29015,	-119.02333,	629.000,	0.000!	!END!
32	! X =	-129.28746,	-118.77474,	620.000,	0.000!	!END!
33	! X =	-129.28477,	-118.52625,	629.000,	0.000!	!END!
34	! X =	-129.28207,	-118.27767,	658.000,	0.000!	!END!
35	! X =	-129.27928,	-118.02918,	670.000,	0.000!	!END!
36	! X =	-129.27659,	-117.78059,	670.000,	0.000!	!END!
37	! X =	-129.27389,	-117.532,	658.000,	0.000!	!END!
38	! X =	-129.2712,	-117.28351,	659.000,	0.000!	!END!
39	! X =	-129.26851,	-117.03492,	643.000,	0.000!	!END!
40	! X =	-129.26582,	-116.78643,	640.000,	0.000!	!END!
41	! X =	-129.26312,	-116.53784,	640.000,	0.000!	!END!
42	! X =	-129.26043,	-116.28935,	640.000,	0.000!	!END!
43	! X =	-129.25774,	-116.04076,	620.000,	0.000!	!END!
44	! X =	-129.25505,	-115.79226,	593.000,	0.000!	!END!
45	! X =	-129.25235,	-115.54367,	484.000,	0.000!	!END!
46	! X =	-129.24966,	-115.29508,	426.000,	0.000!	!END!
47	! X =	-129.24697,	-115.04659,	436.000,	0.000!	!END!
48	! X =	-129.04266,	-119.02597,	599.000,	0.000!	!END!
49	! X =	-129.03997,	-118.77748,	583.000,	0.000!	!END!
50	! X =	-129.03727,	-118.52889,	612.000,	0.000!	!END!
51	! X =	-129.03458,	-118.2804,	643.000,	0.000!	!END!

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 52 ! X =  -129.03189, -118.03181,     670.000,       0.000!   !END!
 53 ! X =  -129.02919, -117.78322,     663.000,       0.000!   !END!
 54 ! X =   -129.0265, -117.53473,     668.000,       0.000!   !END!
 55 ! X =  -129.02381, -117.28614,     668.000,       0.000!   !END!
 56 ! X =  -129.02112, -117.03765,     643.000,       0.000!   !END!
 57 ! X =  -129.01842, -116.78906,     640.000,       0.000!   !END!
 58 ! X =  -129.01573, -116.54057,     640.000,       0.000!   !END!
 59 ! X =  -129.01304, -116.29198,     640.000,       0.000!   !END!
 60 ! X =  -129.01034, -116.04339,     636.000,       0.000!   !END!
 61 ! X =  -129.00765, -115.79489,     612.000,       0.000!   !END!
 62 ! X =  -129.00496,  -115.5463,     545.000,       0.000!   !END!
 63 ! X =  -129.00217, -115.29782,     457.000,       0.000!   !END!
 64 ! X =  -128.99947, -115.04922,     428.000,       0.000!   !END!
 65 ! X =  -128.99678, -114.80073,     462.000,       0.000!   !END!
 66 ! X =  -128.99409, -114.55214,     505.000,       0.000!   !END!
 67 ! X =   -128.9914, -114.30364,     579.000,       0.000!   !END!
 68 ! X =  -128.79527,  -119.0287,     518.000,       0.000!   !END!
 69 ! X =  -128.79257, -118.78011,     487.000,       0.000!   !END!
 70 ! X =  -128.78988, -118.53162,     548.000,       0.000!   !END!
 71 ! X =  -128.78719, -118.28303,     589.000,       0.000!   !END!
 72 ! X =  -128.78439, -118.03445,     601.000,       0.000!   !END!
 73 ! X =   -128.7817, -117.78596,     619.000,       0.000!   !END!
 74 ! X =  -128.77901, -117.53737,     640.000,       0.000!   !END!
 75 ! X =  -128.77632, -117.28888,     640.000,       0.000!   !END!
 76 ! X =  -128.77362, -117.04029,     627.000,       0.000!   !END!
 77 ! X =  -128.77093,  -116.7918,     626.000,       0.000!   !END!
 78 ! X =  -128.76823,  -116.5432,     640.000,       0.000!   !END!
 79 ! X =  -128.76554, -116.29461,     640.000,       0.000!   !END!
 80 ! X =  -128.76285, -116.04612,     640.000,       0.000!   !END!
 81 ! X =  -128.76015, -115.79753,     632.000,       0.000!   !END!
 82 ! X =  -128.75746, -115.54904,     598.000,       0.000!   !END!
 83 ! X =  -128.75477, -115.30045,     527.000,       0.000!   !END!
 84 ! X =  -128.75208, -115.05195,     450.000,       0.000!   !END!
 85 ! X =  -128.74938, -114.80336,     414.000,       0.000!   !END!
 86 ! X =  -128.74669, -114.55487,     457.000,       0.000!   !END!
 87 ! X =    -128.744, -114.30627,     487.000,       0.000!   !END!
 88 ! X =  -128.74131, -114.05778,     520.000,       0.000!   !END!
 89 ! X =  -128.73861, -113.80919,     579.000,       0.000!   !END!
 90 ! X =  -128.54777, -119.03133,     457.000,       0.000!   !END!
 91 ! X =  -128.54508, -118.78284,     439.000,       0.000!   !END!
 92 ! X =  -128.54239, -118.53426,     457.000,       0.000!   !END!
 93 ! X =   -128.5397, -118.28577,     486.000,       0.000!   !END!
 94 ! X =    -128.537, -118.03718,     499.000,       0.000!   !END!
 95 ! X =  -128.53431, -117.78859,     557.000,       0.000!   !END!
 96 ! X =  -128.53161,  -117.5401,     591.000,       0.000!   !END!
 97 ! X =  -128.52892, -117.29151,     583.000,       0.000!   !END!
 98 ! X =  -128.52623, -117.04302,     579.000,       0.000!   !END!
 99 ! X =  -128.52353, -116.79443,     579.000,       0.000!   !END!
100 ! X =  -128.52084, -116.54583,     614.000,       0.000!   !END!
101 ! X =  -128.51815, -116.29734,     636.000,       0.000!   !END!
102 ! X =  -128.51545, -116.04875,     638.000,       0.000!   !END!
103 ! X =  -128.51276, -115.80026,     625.000,       0.000!   !END!
104 ! X =  -128.51006, -115.55167,     610.000,       0.000!   !END!
105 ! X =  -128.50737, -115.30318,     579.000,       0.000!   !END!
106 ! X =  -128.50468, -115.05458,     525.000,       0.000!   !END!
107 ! X =  -128.50199, -114.80609,     471.000,       0.000!   !END!
108 ! X =  -128.49929,  -114.5575,     411.000,       0.000!   !END!
109 ! X =   -128.4965, -114.30901,     405.000,       0.000!   !END!
110 ! X =  -128.49381, -114.06042,     448.000,       0.000!   !END!
111 ! X =  -128.49112, -113.81192,     483.000,       0.000!   !END!
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112 ! X =  -128.48842, -113.56333,     579.000,       0.000!   !END!
113 ! X =  -128.48573, -113.31483,     604.000,       0.000!   !END!
114 ! X =  -128.30038, -119.03406,     414.000,       0.000!   !END!
115 ! X =  -128.29769, -118.78548,     422.000,       0.000!   !END!
116 ! X =    -128.295, -118.53699,     422.000,       0.000!   !END!
117 ! X =   -128.2923,  -118.2884,     415.000,       0.000!   !END!
118 ! X =  -128.28951, -118.03981,     426.000,       0.000!   !END!
119 ! X =  -128.28681, -117.79132,     442.000,       0.000!   !END!
120 ! X =  -128.28412, -117.54273,     457.000,       0.000!   !END!
121 ! X =  -128.28143, -117.29424,     457.000,       0.000!   !END!
122 ! X =  -128.27873, -117.04565,     480.000,       0.000!   !END!
123 ! X =  -128.27604, -116.79706,     507.000,       0.000!   !END!
124 ! X =  -128.27335, -116.54857,     558.000,       0.000!   !END!
125 ! X =  -128.27065, -116.29998,     589.000,       0.000!   !END!
126 ! X =  -128.26796, -116.05149,     613.000,       0.000!   !END!
127 ! X =  -128.26526,  -115.8029,     613.000,       0.000!   !END!
128 ! X =  -128.26257,  -115.5544,     610.000,       0.000!   !END!
129 ! X =  -128.25988, -115.30581,     609.000,       0.000!   !END!
130 ! X =  -128.25719, -115.05732,     594.000,       0.000!   !END!
131 ! X =  -128.25449, -114.80873,     543.000,       0.000!   !END!
132 ! X =   -128.2518, -114.56023,     494.000,       0.000!   !END!
133 ! X =   -128.2491, -114.31164,     457.000,       0.000!   !END!
134 ! X =  -128.24641, -114.06315,     406.000,       0.000!   !END!
135 ! X =  -128.24372, -113.81455,     451.000,       0.000!   !END!
136 ! X =  -128.24102, -113.56606,     484.000,       0.000!   !END!
137 ! X =  -128.23833, -113.31747,     587.000,       0.000!   !END!
138 ! X =  -128.23564, -113.06897,     609.000,       0.000!   !END!
139 ! X =  -128.23294, -112.82038,     609.000,       0.000!   !END!
140 ! X =  -128.05289,  -119.0367,     457.000,       0.000!   !END!
141 ! X =   -128.0502, -118.78821,     462.000,       0.000!   !END!
142 ! X =   -128.0475, -118.53962,     473.000,       0.000!   !END!
143 ! X =  -128.04481, -118.29103,     457.000,       0.000!   !END!
144 ! X =  -128.04211, -118.04254,     431.000,       0.000!   !END!
145 ! X =  -128.03942, -117.79395,     408.000,       0.000!   !END!
146 ! X =  -128.03673, -117.54546,     419.000,       0.000!   !END!
147 ! X =  -128.03403, -117.29687,     422.000,       0.000!   !END!
148 ! X =  -128.03134, -117.04828,     423.000,       0.000!   !END!
149 ! X =  -128.02864, -116.79979,     433.000,       0.000!   !END!
150 ! X =  -128.02595,  -116.5512,     482.000,       0.000!   !END!
151 ! X =  -128.02326, -116.30271,     526.000,       0.000!   !END!
152 ! X =  -128.02056, -116.05412,     594.000,       0.000!   !END!
153 ! X =  -128.01787, -115.80563,     609.000,       0.000!   !END!
154 ! X =  -128.01517, -115.55704,     609.000,       0.000!   !END!
155 ! X =  -128.01248, -115.30854,     609.000,       0.000!   !END!
156 ! X =  -128.00979, -115.05995,     609.000,       0.000!   !END!
157 ! X =   -128.0071, -114.81146,     609.000,       0.000!   !END!
158 ! X =   -128.0044, -114.56286,     559.000,       0.000!   !END!
159 ! X =   -128.0017, -114.31427,     502.000,       0.000!   !END!
160 ! X =  -127.99901, -114.06578,     440.000,       0.000!   !END!
161 ! X =  -127.99632, -113.81718,     401.000,       0.000!   !END!
162 ! X =  -127.99362, -113.56869,     450.000,       0.000!   !END!
163 ! X =  -127.99093,  -113.3202,     487.000,       0.000!   !END!
164 ! X =  -127.98824,  -113.0716,     579.000,       0.000!   !END!
165 ! X =  -127.98555, -112.82311,     579.000,       0.000!   !END!
166 ! X =  -127.98285, -112.57451,     550.000,       0.000!   !END!
167 ! X =  -127.98016, -112.32602,     496.000,       0.000!   !END!
168 ! X =  -127.97746, -112.07742,     396.000,       0.000!   !END!
169 ! X =   -127.8055, -119.03943,     540.000,       0.000!   !END!
170 ! X =   -127.8028, -118.79084,     554.000,       0.000!   !END!
171 ! X =  -127.80011, -118.54225,     548.000,       0.000!   !END!
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172 ! X =  -127.79732, -118.29377,     548.000,       0.000!   !END!
173 ! X =  -127.79462, -118.04518,     501.000,       0.000!   !END!
174 ! X =  -127.79193, -117.79669,     452.000,       0.000!   !END!
175 ! X =  -127.78923,  -117.5481,     457.000,       0.000!   !END!
176 ! X =  -127.78654, -117.29951,     419.000,       0.000!   !END!
177 ! X =  -127.78384, -117.05102,     396.000,       0.000!   !END!
178 ! X =  -127.78115, -116.80243,     407.000,       0.000!   !END!
179 ! X =  -127.77846, -116.55394,     426.000,       0.000!   !END!
180 ! X =  -127.77576, -116.30535,     457.000,       0.000!   !END!
181 ! X =  -127.77307, -116.05686,     541.000,       0.000!   !END!
182 ! X =  -127.77037, -115.80826,     609.000,       0.000!   !END!
183 ! X =  -127.76768, -115.55967,     609.000,       0.000!   !END!
184 ! X =  -127.76498, -115.31118,     608.000,       0.000!   !END!
185 ! X =  -127.76229, -115.06259,     608.000,       0.000!   !END!
186 ! X =   -127.7596, -114.81409,     608.000,       0.000!   !END!
187 ! X =   -127.7569,  -114.5655,     609.000,       0.000!   !END!
188 ! X =  -127.75421, -114.31701,     562.000,       0.000!   !END!
189 ! X =  -127.75151, -114.06841,     499.000,       0.000!   !END!
190 ! X =  -127.74882, -113.81992,     438.000,       0.000!   !END!
191 ! X =  -127.74612, -113.57133,     422.000,       0.000!   !END!
192 ! X =  -127.74343, -113.32283,     457.000,       0.000!   !END!
193 ! X =  -127.74074, -113.07424,     502.000,       0.000!   !END!
194 ! X =  -127.73805, -112.82574,     533.000,       0.000!   !END!
195 ! X =  -127.73535, -112.57725,     497.000,       0.000!   !END!
196 ! X =  -127.73266, -112.32865,     441.000,       0.000!   !END!
197 ! X =  -127.72997, -112.08016,     390.000,       0.000!   !END!
198 ! X =  -127.72727, -111.83156,     452.000,       0.000!   !END!
199 ! X =  -127.72458, -111.58307,     518.000,       0.000!   !END!
200 ! X =  -127.72188, -111.33447,     548.000,       0.000!   !END!
201 ! X =    -127.558, -119.04207,     592.000,       0.000!   !END!
202 ! X =  -127.55531, -118.79348,     609.000,       0.000!   !END!
203 ! X =  -127.55262, -118.54499,     602.000,       0.000!   !END!
204 ! X =  -127.54992,  -118.2964,     586.000,       0.000!   !END!
205 ! X =  -127.54723, -118.04791,     549.000,       0.000!   !END!
206 ! X =  -127.54453, -117.79932,     514.000,       0.000!   !END!
207 ! X =  -127.54183, -117.55073,     499.000,       0.000!   !END!
208 ! X =  -127.53914, -117.30224,     459.000,       0.000!   !END!
209 ! X =  -127.53645, -117.05365,     427.000,       0.000!   !END!
210 ! X =  -127.53376, -116.80516,     389.000,       0.000!   !END!
211 ! X =  -127.53106, -116.55657,     406.000,       0.000!   !END!
212 ! X =  -127.52837, -116.30808,     426.000,       0.000!   !END!
213 ! X =  -127.52567, -116.05949,     523.000,       0.000!   !END!
214 ! X =  -127.52297,  -115.8109,     593.000,       0.000!   !END!
215 ! X =  -127.52028,  -115.5624,     609.000,       0.000!   !END!
216 ! X =  -127.51759, -115.31381,     609.000,       0.000!   !END!
217 ! X =  -127.51489, -115.06532,     609.000,       0.000!   !END!
218 ! X =   -127.5122, -114.81673,     609.000,       0.000!   !END!
219 ! X =  -127.50951, -114.56823,     609.000,       0.000!   !END!
220 ! X =  -127.50681, -114.31964,     579.000,       0.000!   !END!
221 ! X =  -127.50412, -114.07115,     518.000,       0.000!   !END!
222 ! X =  -127.50142, -113.82255,     457.000,       0.000!   !END!
223 ! X =  -127.49873, -113.57406,     396.000,       0.000!   !END!
224 ! X =  -127.49603, -113.32546,     426.000,       0.000!   !END!
225 ! X =  -127.49334, -113.07697,     457.000,       0.000!   !END!
226 ! X =  -127.49064, -112.82838,     457.000,       0.000!   !END!
227 ! X =  -127.48795, -112.57988,     447.000,       0.000!   !END!
228 ! X =  -127.48526, -112.33129,     401.000,       0.000!   !END!
229 ! X =  -127.48256, -112.08279,     416.000,       0.000!   !END!
230 ! X =  -127.47987, -111.83429,     495.000,       0.000!   !END!
231 ! X =  -127.47718,  -111.5857,     543.000,       0.000!   !END!
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232 ! X =  -127.47448,  -111.3372,     579.000,       0.000!   !END!
233 ! X =  -127.47179, -111.08861,     640.000,       0.000!   !END!
234 ! X =   -127.4691, -110.84011,     640.000,       0.000!   !END!
235 ! X =  -127.31061,  -119.0447,     645.000,       0.000!   !END!
236 ! X =  -127.30782, -118.79622,     670.000,       0.000!   !END!
237 ! X =  -127.30512, -118.54763,     670.000,       0.000!   !END!
238 ! X =  -127.30243, -118.29914,     640.000,       0.000!   !END!
239 ! X =  -127.29973, -118.05055,     609.000,       0.000!   !END!
240 ! X =  -127.29704, -117.80196,     579.000,       0.000!   !END!
241 ! X =  -127.29434, -117.55347,     579.000,       0.000!   !END!
242 ! X =  -127.29165, -117.30488,     548.000,       0.000!   !END!
243 ! X =  -127.28896, -117.05639,     483.000,       0.000!   !END!
244 ! X =  -127.28626,  -116.8078,     406.000,       0.000!   !END!
245 ! X =  -127.28356, -116.55921,     402.000,       0.000!   !END!
246 ! X =  -127.28087, -116.31072,     436.000,       0.000!   !END!
247 ! X =  -127.27817, -116.06212,     505.000,       0.000!   !END!
248 ! X =  -127.27548, -115.81363,     548.000,       0.000!   !END!
249 ! X =  -127.27278, -115.56504,     591.000,       0.000!   !END!
250 ! X =  -127.27009, -115.31655,     609.000,       0.000!   !END!
251 ! X =   -127.2674, -115.06796,     609.000,       0.000!   !END!
252 ! X =   -127.2647, -114.81946,     609.000,       0.000!   !END!
253 ! X =  -127.26201, -114.57087,     609.000,       0.000!   !END!
254 ! X =  -127.25932, -114.32238,     562.000,       0.000!   !END!
255 ! X =  -127.25662, -114.07378,     506.000,       0.000!   !END!
256 ! X =  -127.25393, -113.82529,     457.000,       0.000!   !END!
257 ! X =  -127.25123,  -113.5767,     375.000,       0.000!   !END!
258 ! X =  -127.24854,  -113.3282,     403.000,       0.000!   !END!
259 ! X =  -127.24584, -113.07961,     420.000,       0.000!   !END!
260 ! X =  -127.24315, -112.83111,     429.000,       0.000!   !END!
261 ! X =  -127.24045, -112.58252,     392.000,       0.000!   !END!
262 ! X =  -127.23776, -112.33402,     381.000,       0.000!   !END!
263 ! X =  -127.23506, -112.08543,     441.000,       0.000!   !END!
264 ! X =  -127.23237, -111.83693,     502.000,       0.000!   !END!
265 ! X =  -127.22968, -111.58843,     564.000,       0.000!   !END!
266 ! X =  -127.22698, -111.33984,     593.000,       0.000!   !END!
267 ! X =  -127.22429, -111.09134,     640.000,       0.000!   !END!
268 ! X =  -127.22159, -110.84275,     640.000,       0.000!   !END!
269 ! X =   -127.2189, -110.59425,     634.000,       0.000!   !END!
270 ! X =  -127.06312, -119.04744,     670.000,       0.000!   !END!
271 ! X =  -127.06042, -118.79885,     670.000,       0.000!   !END!
272 ! X =  -127.05773, -118.55036,     670.000,       0.000!   !END!
273 ! X =  -127.05503, -118.30177,     650.000,       0.000!   !END!
274 ! X =  -127.05234, -118.05318,     640.000,       0.000!   !END!
275 ! X =  -127.04964, -117.80469,     632.000,       0.000!   !END!
276 ! X =  -127.04695,  -117.5561,     635.000,       0.000!   !END!
277 ! X =  -127.04426, -117.30761,     619.000,       0.000!   !END!
278 ! X =  -127.04156, -117.05902,     579.000,       0.000!   !END!
279 ! X =  -127.03886, -116.81043,     441.000,       0.000!   !END!
280 ! X =  -127.03617, -116.56194,     405.000,       0.000!   !END!
281 ! X =  -127.03347, -116.31335,     426.000,       0.000!   !END!
282 ! X =  -127.03078, -116.06486,     467.000,       0.000!   !END!
283 ! X =  -127.02808, -115.81626,     509.000,       0.000!   !END!
284 ! X =  -127.02539, -115.56777,     548.000,       0.000!   !END!
285 ! X =  -127.02269, -115.31918,     565.000,       0.000!   !END!
286 ! X =     -127.02, -115.07069,     579.000,       0.000!   !END!
287 ! X =   -127.0173, -114.82209,     579.000,       0.000!   !END!
288 ! X =  -127.01461,  -114.5736,     579.000,       0.000!   !END!
289 ! X =  -127.01192, -114.32501,     530.000,       0.000!   !END!
290 ! X =  -127.00922, -114.07651,     477.000,       0.000!   !END!
291 ! X =  -127.00653, -113.82792,     436.000,       0.000!   !END!
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292 ! X =  -127.00383, -113.57943,     372.000,       0.000!   !END!
293 ! X =  -127.00114, -113.33083,     367.000,       0.000!   !END!
294 ! X =  -126.99845, -113.08234,     400.000,       0.000!   !END!
295 ! X =  -126.99575, -112.83374,     398.000,       0.000!   !END!
296 ! X =  -126.99306, -112.58525,     373.000,       0.000!   !END!
297 ! X =  -126.99036, -112.33665,     405.000,       0.000!   !END!
298 ! X =  -126.98767, -112.08816,     441.000,       0.000!   !END!
299 ! X =  -126.98497, -111.83956,     502.000,       0.000!   !END!
300 ! X =  -126.98228, -111.59107,     559.000,       0.000!   !END!
301 ! X =  -126.97958, -111.34247,     592.000,       0.000!   !END!
302 ! X =  -126.97689, -111.09397,     620.000,       0.000!   !END!
303 ! X =   -126.9742, -110.84548,     617.000,       0.000!   !END!
304 ! X =   -126.9715, -110.59688,     597.000,       0.000!   !END!
305 ! X =  -126.81563, -119.05007,     670.000,       0.000!   !END!
306 ! X =  -126.81293, -118.80159,     670.000,       0.000!   !END!
307 ! X =  -126.81024,   -118.553,     651.000,       0.000!   !END!
308 ! X =  -126.80754, -118.30441,     643.000,       0.000!   !END!
309 ! X =  -126.80485, -118.05592,     666.000,       0.000!   !END!
310 ! X =  -126.80215, -117.80733,     666.000,       0.000!   !END!
311 ! X =  -126.79946, -117.55884,     640.000,       0.000!   !END!
312 ! X =  -126.79676, -117.31025,     640.000,       0.000!   !END!
313 ! X =  -126.79406, -117.06166,     599.000,       0.000!   !END!
314 ! X =  -126.79147, -116.81316,     449.000,       0.000!   !END!
315 ! X =  -126.78877, -116.56457,     391.000,       0.000!   !END!
316 ! X =  -126.78608, -116.31608,     398.000,       0.000!   !END!
317 ! X =  -126.78338, -116.06749,     416.000,       0.000!   !END!
318 ! X =  -126.78069,   -115.819,     443.000,       0.000!   !END!
319 ! X =  -126.77799,  -115.5704,     487.000,       0.000!   !END!
320 ! X =   -126.7753, -115.32191,     487.000,       0.000!   !END!
321 ! X =   -126.7726, -115.07332,     497.000,       0.000!   !END!
322 ! X =  -126.76991, -114.82473,     502.000,       0.000!   !END!
323 ! X =  -126.76721, -114.57623,     487.000,       0.000!   !END!
324 ! X =  -126.76452, -114.32764,     472.000,       0.000!   !END!
325 ! X =  -126.76182, -114.07915,     419.000,       0.000!   !END!
326 ! X =  -126.75913, -113.83055,     373.000,       0.000!   !END!
327 ! X =  -126.75643, -113.58206,     365.000,       0.000!   !END!
328 ! X =  -126.75374, -113.33356,     365.000,       0.000!   !END!
329 ! X =  -126.75104, -113.08497,     368.000,       0.000!   !END!
330 ! X =  -126.74835, -112.83648,     368.000,       0.000!   !END!
331 ! X =  -126.74565, -112.58788,     365.000,       0.000!   !END!
332 ! X =  -126.74296, -112.33939,     396.000,       0.000!   !END!
333 ! X =  -126.74026, -112.09079,     426.000,       0.000!   !END!
334 ! X =  -126.73757, -111.84229,     462.000,       0.000!   !END!
335 ! X =  -126.73488,  -111.5937,     518.000,       0.000!   !END!
336 ! X =  -126.73218,  -111.3452,     553.000,       0.000!   !END!
337 ! X =  -126.72949, -111.09661,     579.000,       0.000!   !END!
338 ! X =  -126.72679, -110.84811,     548.000,       0.000!   !END!
339 ! X =   -126.7241, -110.59961,     518.000,       0.000!   !END!
340 ! X =  -126.56824, -119.05281,     670.000,       0.000!   !END!
341 ! X =  -126.56554, -118.80422,     670.000,       0.000!   !END!
342 ! X =  -126.56284, -118.55563,     664.000,       0.000!   !END!
343 ! X =  -126.56015, -118.30714,     670.000,       0.000!   !END!
344 ! X =  -126.55745, -118.05855,     670.000,       0.000!   !END!
345 ! X =  -126.55476, -117.81006,     670.000,       0.000!   !END!
346 ! X =  -126.55206, -117.56147,     660.000,       0.000!   !END!
347 ! X =  -126.54936, -117.31288,     641.000,       0.000!   !END!
348 ! X =  -126.54667, -117.06439,     609.000,       0.000!   !END!
349 ! X =  -126.54397,  -116.8158,     452.000,       0.000!   !END!
350 ! X =  -126.54128, -116.56731,     420.000,       0.000!   !END!
351 ! X =  -126.53858, -116.31872,     366.000,       0.000!   !END!
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352 ! X =  -126.53589, -116.07022,     396.000,       0.000!   !END!
353 ! X =  -126.53319, -115.82163,     408.000,       0.000!   !END!
354 ! X =  -126.53049, -115.57304,     426.000,       0.000!   !END!
355 ! X =   -126.5278, -115.32455,     441.000,       0.000!   !END!
356 ! X =   -126.5251, -115.07596,     449.000,       0.000!   !END!
357 ! X =  -126.52241, -114.82746,     457.000,       0.000!   !END!
358 ! X =  -126.51971, -114.57887,     444.000,       0.000!   !END!
359 ! X =  -126.51702, -114.33038,     396.000,       0.000!   !END!
360 ! X =  -126.51432, -114.08178,     376.000,       0.000!   !END!
361 ! X =  -126.51163, -113.83329,     365.000,       0.000!   !END!
362 ! X =  -126.50893,  -113.5847,     365.000,       0.000!   !END!
363 ! X =  -126.50624,  -113.3362,     365.000,       0.000!   !END!
364 ! X =  -126.50354, -113.08761,     365.000,       0.000!   !END!
365 ! X =  -126.50085, -112.83911,     365.000,       0.000!   !END!
366 ! X =  -126.49815, -112.59052,     365.000,       0.000!   !END!
367 ! X =  -126.49546, -112.34202,     372.000,       0.000!   !END!
368 ! X =  -126.49277, -112.09353,     395.000,       0.000!   !END!
369 ! X =  -126.49007, -111.84493,     430.000,       0.000!   !END!
370 ! X =  -126.48738, -111.59644,     466.000,       0.000!   !END!
371 ! X =  -126.48468, -111.34784,     495.000,       0.000!   !END!
372 ! X =  -126.48199, -111.09934,     502.000,       0.000!   !END!
373 ! X =  -126.47929, -110.85075,     496.000,       0.000!   !END!
374 ! X =   -126.4766, -110.60225,     464.000,       0.000!   !END!
375 ! X =  -126.32074, -119.05544,     670.000,       0.000!   !END!
376 ! X =  -126.31804, -118.80686,     670.000,       0.000!   !END!
377 ! X =  -126.31535, -118.55837,     670.000,       0.000!   !END!
378 ! X =  -126.31265, -118.30978,     670.000,       0.000!   !END!
379 ! X =  -126.30996, -118.06129,     670.000,       0.000!   !END!
380 ! X =  -126.30726,  -117.8127,     670.000,       0.000!   !END!
381 ! X =  -126.30466,  -117.5641,     666.000,       0.000!   !END!
382 ! X =  -126.30197, -117.31561,     624.000,       0.000!   !END!
383 ! X =  -126.29927, -117.06702,     579.000,       0.000!   !END!
384 ! X =  -126.29658, -116.81853,     487.000,       0.000!   !END!
385 ! X =  -126.29388, -116.56994,     472.000,       0.000!   !END!
386 ! X =  -126.29118, -116.32135,     457.000,       0.000!   !END!
387 ! X =  -126.28849, -116.07286,     382.000,       0.000!   !END!
388 ! X =  -126.28579, -115.82427,     365.000,       0.000!   !END!
389 ! X =   -126.2831, -115.57577,     367.000,       0.000!   !END!
390 ! X =   -126.2804, -115.32718,     381.000,       0.000!   !END!
391 ! X =  -126.27771, -115.07869,     396.000,       0.000!   !END!
392 ! X =  -126.27501,  -114.8301,     396.000,       0.000!   !END!
393 ! X =  -126.27232,  -114.5816,     375.000,       0.000!   !END!
394 ! X =  -126.26962, -114.33301,     395.000,       0.000!   !END!
395 ! X =  -126.26693, -114.08452,     396.000,       0.000!   !END!
396 ! X =  -126.26423, -113.83592,     440.000,       0.000!   !END!
397 ! X =  -126.26154, -113.58743,     426.000,       0.000!   !END!
398 ! X =  -126.25884, -113.33884,     380.000,       0.000!   !END!
399 ! X =  -126.25615, -113.09034,     365.000,       0.000!   !END!
400 ! X =  -126.25345, -112.84175,     365.000,       0.000!   !END!
401 ! X =  -126.25076, -112.59325,     365.000,       0.000!   !END!
402 ! X =  -126.24806, -112.34466,     365.000,       0.000!   !END!
403 ! X =  -126.24537, -112.09616,     366.000,       0.000!   !END!
404 ! X =  -126.24267, -111.84757,     396.000,       0.000!   !END!
405 ! X =  -126.23998, -111.59907,     407.000,       0.000!   !END!
406 ! X =  -126.23728, -111.35057,     431.000,       0.000!   !END!
407 ! X =  -126.23459, -111.10198,     436.000,       0.000!   !END!
408 ! X =  -126.23189, -110.85348,     417.000,       0.000!   !END!
409 ! X =   -126.2292, -110.60488,     396.000,       0.000!   !END!
410 ! X =   -126.2265, -110.35639,     388.000,       0.000!   !END!
411 ! X =  -126.22381, -110.10789,     457.000,       0.000!   !END!
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412 ! X =  -126.22111, -109.85929,     457.000,        0.000!   !END!
413 ! X =  -126.21842, -109.61079,     458.000,        0.000!   !END!
414 ! X =  -126.06526, -118.31241,     670.000,        0.000!   !END!
415 ! X =  -126.06256, -118.06392,     670.000,        0.000!   !END!
416 ! X =  -126.05987, -117.81533,     665.000,        0.000!   !END!
417 ! X =  -126.05717, -117.56684,     645.000,        0.000!   !END!
418 ! X =  -126.05447, -117.31825,     609.000,        0.000!   !END!
419 ! X =  -126.05178, -117.06976,     546.000,        0.000!   !END!
420 ! X =  -126.04908, -116.82117,     548.000,        0.000!   !END!
421 ! X =  -126.04639, -116.57258,     518.000,        0.000!   !END!
422 ! X =  -126.04369, -116.32409,     490.000,        0.000!   !END!
423 ! X =  -126.04099,  -116.0755,     457.000,        0.000!   !END!
424 ! X =   -126.0383,   -115.827,     385.000,        0.000!   !END!
425 ! X =   -126.0356, -115.57841,     365.000,        0.000!   !END!
426 ! X =  -126.03291, -115.32992,     366.000,        0.000!   !END!
427 ! X =  -126.03021, -115.08133,     366.000,        0.000!   !END!
428 ! X =  -126.02752, -114.83283,     413.000,        0.000!   !END!
429 ! X =  -126.02482, -114.58424,     469.000,        0.000!   !END!
430 ! X =  -126.02213, -114.33575,     471.000,        0.000!   !END!
431 ! X =  -126.01943, -114.08716,     474.000,        0.000!   !END!
432 ! X =  -126.01674, -113.83866,     476.000,        0.000!   !END!
433 ! X =  -126.01404, -113.59007,     469.000,        0.000!   !END!
434 ! X =  -126.01135, -113.34157,     426.000,        0.000!   !END!
435 ! X =  -126.00865, -113.09298,     385.000,        0.000!   !END!
436 ! X =  -126.00596, -112.84448,     365.000,        0.000!   !END!
437 ! X =  -126.00336, -112.59588,     365.000,        0.000!   !END!
438 ! X =  -126.00066, -112.34739,     365.000,        0.000!   !END!
439 ! X =  -125.99797, -112.09879,     365.000,        0.000!   !END!
440 ! X =  -125.99527,  -111.8503,     366.000,        0.000!   !END!
441 ! X =  -125.99257,  -111.6017,     365.000,        0.000!   !END!
442 ! X =  -125.98988, -111.35321,     365.000,        0.000!   !END!
443 ! X =  -125.98719, -111.10471,     357.000,        0.000!   !END!
444 ! X =  -125.98449, -110.85611,     354.000,        0.000!   !END!
445 ! X =   -125.9818, -110.60762,     361.000,        0.000!   !END!
446 ! X =   -125.9791, -110.35902,     388.000,        0.000!   !END!
447 ! X =  -125.97641, -110.11052,     467.000,        0.000!   !END!
448 ! X =  -125.97371, -109.86192,     467.000,        0.000!   !END!
449 ! X =  -125.97101, -109.61343,     474.000,        0.000!   !END!
450 ! X =  -125.96832, -109.36493,     498.000,        0.000!   !END!
451 ! X =  -125.96562, -109.11633,     532.000,        0.000!   !END!
452 ! X =  -125.96293, -108.86783,     557.000,        0.000!   !END!
453 ! X =  -125.81238, -117.81807,     640.000,        0.000!   !END!
454 ! X =  -125.80978, -117.56947,     640.000,        0.000!   !END!
455 ! X =  -125.80708, -117.32088,     640.000,        0.000!   !END!
456 ! X =  -125.80438, -117.07239,     640.000,        0.000!   !END!
457 ! X =  -125.80169,  -116.8238,     631.000,        0.000!   !END!
458 ! X =  -125.79899, -116.57531,     599.000,        0.000!   !END!
459 ! X =  -125.79629, -116.32672,     563.000,        0.000!   !END!
460 ! X =   -125.7936, -116.07823,     487.000,        0.000!   !END!
461 ! X =   -125.7909, -115.82964,     424.000,        0.000!   !END!
462 ! X =  -125.78821, -115.58115,     370.000,        0.000!   !END!
463 ! X =  -125.78551, -115.33255,     396.000,        0.000!   !END!
464 ! X =  -125.78282, -115.08406,     431.000,        0.000!   !END!
465 ! X =  -125.78012, -114.83547,     492.000,        0.000!   !END!
466 ! X =  -125.77742, -114.58688,     518.000,        0.000!   !END!
467 ! X =  -125.77473, -114.33838,     531.000,        0.000!   !END!
468 ! X =  -125.77203, -114.08979,     548.000,        0.000!   !END!
469 ! X =  -125.76934, -113.84129,     535.000,        0.000!   !END!
470 ! X =  -125.76664,  -113.5927,     512.000,        0.000!   !END!
471 ! X =  -125.76395, -113.34421,     466.000,        0.000!   !END!
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472 ! X =  -125.76125, -113.09571,     414.000,       0.000!   !END!
473 ! X =  -125.75855, -112.84712,     376.000,       0.000!   !END!
474 ! X =  -125.75586, -112.59862,     365.000,       0.000!   !END!
475 ! X =  -125.75316, -112.35003,     379.000,       0.000!   !END!
476 ! X =  -125.75047, -112.10153,     426.000,       0.000!   !END!
477 ! X =  -125.74777, -111.85294,     426.000,       0.000!   !END!
478 ! X =  -125.74508, -111.60444,     411.000,       0.000!   !END!
479 ! X =  -125.74238, -111.35584,     405.000,       0.000!   !END!
480 ! X =  -125.73969, -111.10735,     384.000,       0.000!   !END!
481 ! X =  -125.73699, -110.85875,     336.000,       0.000!   !END!
482 ! X =  -125.73429, -110.61025,     352.000,       0.000!   !END!
483 ! X =   -125.7316, -110.36176,     367.000,       0.000!   !END!
484 ! X =   -125.7289, -110.11316,     426.000,       0.000!   !END!
485 ! X =  -125.72631, -109.86466,     450.000,       0.000!   !END!
486 ! X =  -125.72361, -109.61606,     471.000,       0.000!   !END!
487 ! X =  -125.72092, -109.36756,     492.000,       0.000!   !END!
488 ! X =  -125.71822, -109.11906,     529.000,       0.000!   !END!
489 ! X =  -125.71553, -108.87046,     578.000,       0.000!   !END!
490 ! X =  -125.55959, -117.32362,     655.000,       0.000!   !END!
491 ! X =  -125.55689, -117.07503,     640.000,       0.000!   !END!
492 ! X =  -125.55419, -116.82654,     640.000,       0.000!   !END!
493 ! X =   -125.5515, -116.57795,     620.000,       0.000!   !END!
494 ! X =   -125.5488, -116.32946,     579.000,       0.000!   !END!
495 ! X =   -125.5461, -116.08087,     497.000,       0.000!   !END!
496 ! X =  -125.54341, -115.83228,     426.000,       0.000!   !END!
497 ! X =  -125.54071, -115.58378,     390.000,       0.000!   !END!
498 ! X =  -125.53801, -115.33519,     432.000,       0.000!   !END!
499 ! X =  -125.53532,  -115.0867,     513.000,       0.000!   !END!
500 ! X =  -125.53262, -114.83811,     547.000,       0.000!   !END!
501 ! X =  -125.52993, -114.58961,     593.000,       0.000!   !END!
502 ! X =  -125.52723, -114.34102,     631.000,       0.000!   !END!
503 ! X =  -125.52464, -114.09252,     618.000,       0.000!   !END!
504 ! X =  -125.52194, -113.84393,     599.000,       0.000!   !END!
505 ! X =  -125.51924, -113.59543,     525.000,       0.000!   !END!
506 ! X =  -125.51654, -113.34684,     472.000,       0.000!   !END!
507 ! X =  -125.51385, -113.09835,     434.000,       0.000!   !END!
508 ! X =  -125.51115, -112.84975,     374.000,       0.000!   !END!
509 ! X =  -125.50846, -112.60126,     436.000,       0.000!   !END!
510 ! X =  -125.50576, -112.35266,     457.000,       0.000!   !END!
511 ! X =  -125.50307, -112.10417,     487.000,       0.000!   !END!
512 ! X =  -125.50037, -111.85567,     496.000,       0.000!   !END!
513 ! X =  -125.49768, -111.60707,     501.000,       0.000!   !END!
514 ! X =  -125.49498, -111.35858,     480.000,       0.000!   !END!
515 ! X =  -125.49228, -111.10998,     446.000,       0.000!   !END!
516 ! X =  -125.48959, -110.86148,     406.000,       0.000!   !END!
517 ! X =  -125.48689, -110.61289,     355.000,       0.000!   !END!
518 ! X =   -125.4842, -110.36439,     348.000,       0.000!   !END!
519 ! X =   -125.4815, -110.11589,     379.000,       0.000!   !END!
520 ! X =  -125.47881,  -109.8673,     414.000,       0.000!   !END!
521 ! X =  -125.47611,  -109.6188,     421.000,       0.000!   !END!
522 ! X =  -125.47341,  -109.3702,     444.000,       0.000!   !END!
523 ! X =  -125.47072,  -109.1217,     505.000,       0.000!   !END!
524 ! X =  -125.46803,  -108.8732,     548.000,       0.000!   !END!
525 ! X =   -125.3068, -116.82917,     639.000,       0.000!   !END!
526 ! X =   -125.3041, -116.58058,     598.000,       0.000!   !END!
527 ! X =  -125.30141, -116.33209,     548.000,       0.000!   !END!
528 ! X =  -125.29871,  -116.0835,     487.000,       0.000!   !END!
529 ! X =  -125.29601, -115.83501,     432.000,       0.000!   !END!
530 ! X =  -125.29331, -115.58642,     420.000,       0.000!   !END!
531 ! X =  -125.29062, -115.33793,     457.000,       0.000!   !END!
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532 ! X =  -125.28792, -115.08933,     541.000,       0.000!   !END!
533 ! X =  -125.28523, -114.84084,     601.000,       0.000!   !END!
534 ! X =  -125.28253, -114.59225,     640.000,       0.000!   !END!
535 ! X =  -125.27984, -114.34375,     644.000,       0.000!   !END!
536 ! X =  -125.27714, -114.09516,     640.000,       0.000!   !END!
537 ! X =  -125.27444, -113.84667,     609.000,       0.000!   !END!
538 ! X =  -125.27174, -113.59807,     533.000,       0.000!   !END!
539 ! X =  -125.26905, -113.34958,     475.000,       0.000!   !END!
540 ! X =  -125.26635, -113.10098,     434.000,       0.000!   !END!
541 ! X =  -125.26366, -112.85249,     448.000,       0.000!   !END!
542 ! X =  -125.26096,  -112.6039,     487.000,       0.000!   !END!
543 ! X =  -125.25826,  -112.3554,     504.000,       0.000!   !END!
544 ! X =  -125.25557,  -112.1068,     511.000,       0.000!   !END!
545 ! X =  -125.25297,  -111.8583,     528.000,       0.000!   !END!
546 ! X =  -125.25027, -111.60971,     536.000,       0.000!   !END!
547 ! X =  -125.24758, -111.36121,     527.000,       0.000!   !END!
548 ! X =  -125.24489, -111.11271,     496.000,       0.000!   !END!
549 ! X =  -125.24219, -110.86412,     464.000,       0.000!   !END!
550 ! X =  -125.23949, -110.61562,     426.000,       0.000!   !END!
551 ! X =  -125.23679, -110.36702,     380.000,       0.000!   !END!
552 ! X =   -125.2341, -110.11853,     343.000,       0.000!   !END!
553 ! X =  -125.23141, -109.87003,     370.000,       0.000!   !END!
554 ! X =  -125.22871, -109.62143,     387.000,       0.000!   !END!
555 ! X =  -125.22601, -109.37293,     426.000,       0.000!   !END!
556 ! X =  -125.22332, -109.12434,     477.000,       0.000!   !END!
557 ! X =  -125.22062, -108.87584,     518.000,       0.000!   !END!
558 ! X =  -125.05391, -116.33473,     495.000,       0.000!   !END!
559 ! X =  -125.05121, -116.08624,     446.000,       0.000!   !END!
560 ! X =  -125.04851, -115.83765,     401.000,       0.000!   !END!
561 ! X =  -125.04582, -115.58916,     426.000,       0.000!   !END!
562 ! X =  -125.04312, -115.34056,     472.000,       0.000!   !END!
563 ! X =  -125.04053, -115.09207,     563.000,       0.000!   !END!
564 ! X =  -125.03783, -114.84347,     640.000,       0.000!   !END!
565 ! X =  -125.03513, -114.59498,     665.000,       0.000!   !END!
566 ! X =  -125.03244, -114.34639,     668.000,       0.000!   !END!
567 ! X =  -125.02974, -114.09789,     644.000,       0.000!   !END!
568 ! X =  -125.02704,  -113.8493,     589.000,       0.000!   !END!
569 ! X =  -125.02435, -113.60081,     525.000,       0.000!   !END!
570 ! X =  -125.02165, -113.35221,     484.000,       0.000!   !END!
571 ! X =  -125.01896, -113.10372,     426.000,       0.000!   !END!
572 ! X =  -125.01626, -112.85512,     480.000,       0.000!   !END!
573 ! X =  -125.01356, -112.60663,     508.000,       0.000!   !END!
574 ! X =  -125.01086, -112.35803,     542.000,       0.000!   !END!
575 ! X =  -125.00817, -112.10954,     587.000,       0.000!   !END!
576 ! X =  -125.00547, -111.86094,     593.000,       0.000!   !END!
577 ! X =  -125.00278, -111.61245,     592.000,       0.000!   !END!
578 ! X =  -125.00008, -111.36385,     579.000,       0.000!   !END!
579 ! X =  -124.99738, -111.11535,     548.000,       0.000!   !END!
580 ! X =  -124.99469, -110.86686,     518.000,       0.000!   !END!
581 ! X =  -124.99199, -110.61826,     487.000,       0.000!   !END!
582 ! X =   -124.9893, -110.36976,     457.000,       0.000!   !END!
583 ! X =   -124.9866, -110.12117,     381.000,       0.000!   !END!
584 ! X =    -124.984, -109.87266,     352.000,       0.000!   !END!
585 ! X =  -124.98131, -109.62417,     371.000,       0.000!   !END!
586 ! X =  -124.97861, -109.37557,     381.000,       0.000!   !END!
587 ! X =  -124.97592, -109.12707,     441.000,       0.000!   !END!
588 ! X =  -124.97322, -108.87847,     492.000,       0.000!   !END!
589 ! X =  -124.80382, -116.08887,     404.000,       0.000!   !END!
590 ! X =  -124.80112, -115.84038,     409.000,       0.000!   !END!
591 ! X =  -124.79842, -115.59179,     434.000,       0.000!   !END!
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592 ! X =  -124.79572,  -115.3432,     472.000,       0.000!   !END!
593 ! X =  -124.79303, -115.09471,     566.000,       0.000!   !END!
594 ! X =  -124.79033, -114.84611,     640.000,       0.000!   !END!
595 ! X =  -124.78764, -114.59762,     670.000,       0.000!   !END!
596 ! X =  -124.78494, -114.34903,     670.000,       0.000!   !END!
597 ! X =  -124.78224, -114.10053,     662.000,       0.000!   !END!
598 ! X =  -124.77954, -113.85194,     579.000,       0.000!   !END!
599 ! X =  -124.77685, -113.60345,     511.000,       0.000!   !END!
600 ! X =  -124.77415, -113.35485,     466.000,       0.000!   !END!
601 ! X =  -124.77146, -113.10636,     448.000,       0.000!   !END!
602 ! X =  -124.76886, -112.85776,     492.000,       0.000!   !END!
603 ! X =  -124.76616, -112.60926,     539.000,       0.000!   !END!
604 ! X =  -124.76347, -112.36077,     586.000,       0.000!   !END!
605 ! X =  -124.76077, -112.11217,     629.000,       0.000!   !END!
606 ! X =  -124.75807, -111.86368,     644.000,       0.000!   !END!
607 ! X =  -124.75537, -111.61508,     643.000,       0.000!   !END!
608 ! X =  -124.75268, -111.36658,     633.000,       0.000!   !END!
609 ! X =  -124.74998, -111.11799,     612.000,       0.000!   !END!
610 ! X =  -124.74729, -110.86949,     557.000,       0.000!   !END!
611 ! X =  -124.74459,  -110.6209,     509.000,       0.000!   !END!
612 ! X =  -124.74189,  -110.3724,     472.000,       0.000!   !END!
613 ! X =   -124.7392,  -110.1239,     414.000,       0.000!   !END!
614 ! X =   -124.7365,  -109.8753,     358.000,       0.000!   !END!
615 ! X =  -124.73381, -109.62681,     345.000,       0.000!   !END!
616 ! X =  -124.73111, -109.37821,     349.000,       0.000!   !END!
617 ! X =  -124.72841, -109.12971,     416.000,       0.000!   !END!
618 ! X =  -124.72572, -108.88121,     460.000,       0.000!   !END!
619 ! X =  -124.72312, -108.63261,     484.000,       0.000!   !END!
620 ! X =  -124.72042, -108.38411,     483.000,       0.000!   !END!
621 ! X =  -124.71773, -108.13561,     457.000,       0.000!   !END!
622 ! X =  -124.71503, -107.88701,     458.000,       0.000!   !END!
623 ! X =  -124.55902, -116.34011,     406.000,       0.000!   !END!
624 ! X =  -124.55632, -116.09151,     411.000,       0.000!   !END!
625 ! X =  -124.55362, -115.84302,     430.000,       0.000!   !END!
626 ! X =  -124.55102, -115.59443,     448.000,       0.000!   !END!
627 ! X =  -124.54833, -115.34593,     477.000,       0.000!   !END!
628 ! X =  -124.54563, -115.09734,     554.000,       0.000!   !END!
629 ! X =  -124.54294, -114.84885,     627.000,       0.000!   !END!
630 ! X =  -124.54024, -114.60025,     657.000,       0.000!   !END!
631 ! X =  -124.53754, -114.35176,     658.000,       0.000!   !END!
632 ! X =  -124.53484, -114.10317,     640.000,       0.000!   !END!
633 ! X =  -124.53215, -113.85467,     564.000,       0.000!   !END!
634 ! X =  -124.52945, -113.60608,     499.000,       0.000!   !END!
635 ! X =  -124.52675, -113.35759,     441.000,       0.000!   !END!
636 ! X =  -124.52405, -113.10899,     462.000,       0.000!   !END!
637 ! X =  -124.52136,  -112.8605,     496.000,       0.000!   !END!
638 ! X =  -124.51866,  -112.6119,     554.000,       0.000!   !END!
639 ! X =  -124.51597, -112.36341,     609.000,       0.000!   !END!
640 ! X =  -124.51327, -112.11481,     641.000,       0.000!   !END!
641 ! X =  -124.51057, -111.86632,     654.000,       0.000!   !END!
642 ! X =  -124.50788, -111.61782,     657.000,       0.000!   !END!
643 ! X =  -124.50528, -111.36922,     651.000,       0.000!   !END!
644 ! X =  -124.50258, -111.12072,     636.000,       0.000!   !END!
645 ! X =  -124.49988, -110.87213,     579.000,       0.000!   !END!
646 ! X =  -124.49719, -110.62363,     531.000,       0.000!   !END!
647 ! X =  -124.49449, -110.37503,     487.000,       0.000!   !END!
648 ! X =   -124.4918, -110.12653,     457.000,       0.000!   !END!
649 ! X =   -124.4891, -109.87804,     384.000,       0.000!   !END!
650 ! X =   -124.4864, -109.62944,     357.000,       0.000!   !END!
651 ! X =  -124.48371, -109.38094,     336.000,       0.000!   !END!
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652 ! X =  -124.48101, -109.13234,     381.000,       0.000!   !END!
653 ! X =  -124.47831, -108.88384,     429.000,       0.000!   !END!
654 ! X =  -124.47562, -108.63535,     458.000,       0.000!   !END!
655 ! X =  -124.47292, -108.38675,     449.000,       0.000!   !END!
656 ! X =  -124.47022, -108.13825,     410.000,       0.000!   !END!
657 ! X =  -124.46753, -107.88975,     466.000,       0.000!   !END!
658 ! X =  -124.46483, -107.64115,     548.000,       0.000!   !END!
659 ! X =  -124.46224, -107.39264,     609.000,       0.000!   !END!
660 ! X =  -124.31162, -116.34274,     426.000,       0.000!   !END!
661 ! X =  -124.30893, -116.09425,     431.000,       0.000!   !END!
662 ! X =  -124.30623, -115.84566,     457.000,       0.000!   !END!
663 ! X =  -124.30353, -115.59716,     480.000,       0.000!   !END!
664 ! X =  -124.29544, -114.85149,     584.000,       0.000!   !END!
665 ! X =  -124.29274, -114.60299,     622.000,       0.000!   !END!
666 ! X =  -124.29004,  -114.3544,     640.000,       0.000!   !END!
667 ! X =  -124.28735, -114.10591,     612.000,       0.000!   !END!
668 ! X =  -124.28475, -113.85731,     558.000,       0.000!   !END!
669 ! X =  -124.28205, -113.60881,     487.000,       0.000!   !END!
670 ! X =  -124.27935, -113.36022,     441.000,       0.000!   !END!
671 ! X =  -124.27666, -113.11173,     495.000,       0.000!   !END!
672 ! X =  -124.27396, -112.86313,     528.000,       0.000!   !END!
673 ! X =  -124.27126, -112.61464,     566.000,       0.000!   !END!
674 ! X =  -124.26856, -112.36604,     621.000,       0.000!   !END!
675 ! X =  -124.26587, -112.11755,     642.000,       0.000!   !END!
676 ! X =  -124.26317, -111.86895,     670.000,       0.000!   !END!
677 ! X =  -124.26048, -111.62045,     670.000,       0.000!   !END!
678 ! X =  -124.25778, -111.37186,     669.000,       0.000!   !END!
679 ! X =  -124.25508, -111.12336,     647.000,       0.000!   !END!
680 ! X =  -124.25239, -110.87487,     611.000,       0.000!   !END!
681 ! X =  -124.24969, -110.62627,     563.000,       0.000!   !END!
682 ! X =  -124.24699, -110.37777,     507.000,       0.000!   !END!
683 ! X =  -124.24439, -110.12917,     480.000,       0.000!   !END!
684 ! X =   -124.2417, -109.88067,     441.000,       0.000!   !END!
685 ! X =    -124.239, -109.63217,     375.000,       0.000!   !END!
686 ! X =   -124.2363, -109.38358,     337.000,       0.000!   !END!
687 ! X =  -124.23361, -109.13508,     401.000,       0.000!   !END!
688 ! X =  -124.23091, -108.88648,     426.000,       0.000!   !END!
689 ! X =  -124.22821, -108.63798,     426.000,       0.000!   !END!
690 ! X =  -124.22552, -108.38948,     396.000,       0.000!   !END!
691 ! X =  -124.22282, -108.14088,     447.000,       0.000!   !END!
692 ! X =  -124.22012, -107.89238,     495.000,       0.000!   !END!
693 ! X =  -124.21743, -107.64388,     559.000,       0.000!   !END!
694 ! X =  -124.21473, -107.39528,     609.000,       0.000!   !END!
695 ! X =  -124.05883, -115.84839,     475.000,       0.000!   !END!
696 ! X =  -124.05613,  -115.5998,     524.000,       0.000!   !END!
697 ! X =  -124.04264, -114.35704,     640.000,       0.000!   !END!
698 ! X =  -124.03995, -114.10854,     609.000,       0.000!   !END!
699 ! X =  -124.03725, -113.85995,     548.000,       0.000!   !END!
700 ! X =  -124.03455, -113.61146,     479.000,       0.000!   !END!
701 ! X =  -124.03185, -113.36286,     441.000,       0.000!   !END!
702 ! X =  -124.02916, -113.11437,     512.000,       0.000!   !END!
703 ! X =  -124.02646, -112.86577,     548.000,       0.000!   !END!
704 ! X =  -124.02376, -112.61728,     601.000,       0.000!   !END!
705 ! X =  -124.02117, -112.36878,     634.000,       0.000!   !END!
706 ! X =  -124.01847, -112.12018,     664.000,       0.000!   !END!
707 ! X =  -124.01577, -111.87169,     670.000,       0.000!   !END!
708 ! X =  -124.01307, -111.62309,     670.000,       0.000!   !END!
709 ! X =  -124.01038, -111.37459,     670.000,       0.000!   !END!
710 ! X =  -124.00768,   -111.126,     647.000,       0.000!   !END!
711 ! X =  -124.00498,  -110.8775,     612.000,       0.000!   !END!
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712	! X =	-124.00228,	-110.6289,	579.000,	0.000!	!END!
713	! X =	-123.99959,	-110.38041,	518.000,	0.000!	!END!
714	! X =	-123.99689,	-110.13191,	480.000,	0.000!	!END!
715	! X =	-123.99419,	-109.88331,	435.000,	0.000!	!END!
716	! X =	-123.9915,	-109.63481,	380.000,	0.000!	!END!
717	! X =	-123.9888,	-109.38622,	342.000,	0.000!	!END!
718	! X =	-123.9861,	-109.13772,	398.000,	0.000!	!END!
719	! X =	-123.98351,	-108.88921,	413.000,	0.000!	!END!
720	! X =	-123.98081,	-108.64062,	401.000,	0.000!	!END!
721	! X =	-123.97811,	-108.39212,	396.000,	0.000!	!END!
722	! X =	-123.97542,	-108.14362,	463.000,	0.000!	!END!
723	! X =	-123.97272,	-107.89502,	510.000,	0.000!	!END!
724	! X =	-123.97002,	-107.64652,	579.000,	0.000!	!END!
725	! X =	-123.96733,	-107.39802,	609.000,	0.000!	!END!
726	! X =	-123.96463,	-107.14942,	609.000,	0.000!	!END!
727	! X =	-123.78715,	-113.61409,	484.000,	0.000!	!END!
728	! X =	-123.78446,	-113.3656,	454.000,	0.000!	!END!
729	! X =	-123.78176,	-113.117,	525.000,	0.000!	!END!
730	! X =	-123.77906,	-112.86851,	558.000,	0.000!	!END!
731	! X =	-123.77636,	-112.61991,	624.000,	0.000!	!END!
732	! X =	-123.77367,	-112.37142,	670.000,	0.000!	!END!
733	! X =	-123.77097,	-112.12282,	670.000,	0.000!	!END!
734	! X =	-123.76827,	-111.87433,	670.000,	0.000!	!END!
735	! X =	-123.76558,	-111.62583,	670.000,	0.000!	!END!
736	! X =	-123.76288,	-111.37723,	647.000,	0.000!	!END!
737	! X =	-123.76028,	-111.12873,	625.000,	0.000!	!END!
738	! X =	-123.75758,	-110.88014,	609.000,	0.000!	!END!
739	! X =	-123.75489,	-110.63164,	548.000,	0.000!	!END!
740	! X =	-123.75218,	-110.38304,	492.000,	0.000!	!END!
741	! X =	-123.74949,	-110.13454,	462.000,	0.000!	!END!
742	! X =	-123.74679,	-109.88605,	410.000,	0.000!	!END!
743	! X =	-123.74409,	-109.63745,	379.000,	0.000!	!END!
744	! X =	-123.7414,	-109.38895,	342.000,	0.000!	!END!
745	! X =	-123.7387,	-109.14035,	343.000,	0.000!	!END!
746	! X =	-123.736,	-108.89185,	396.000,	0.000!	!END!
747	! X =	-123.73331,	-108.64336,	389.000,	0.000!	!END!
748	! X =	-123.73061,	-108.39476,	396.000,	0.000!	!END!
749	! X =	-123.72801,	-108.14625,	480.000,	0.000!	!END!
750	! X =	-123.72532,	-107.89775,	512.000,	0.000!	!END!
751	! X =	-123.72262,	-107.64915,	579.000,	0.000!	!END!
752	! X =	-123.71992,	-107.40065,	579.000,	0.000!	!END!
753	! X =	-123.71723,	-107.15215,	579.000,	0.000!	!END!
754	! X =	-123.71453,	-106.90355,	548.000,	0.000!	!END!
755	! X =	-123.53166,	-112.87114,	554.000,	0.000!	!END!
756	! X =	-123.52897,	-112.62265,	624.000,	0.000!	!END!
757	! X =	-123.52627,	-112.37405,	670.000,	0.000!	!END!
758	! X =	-123.52357,	-112.12556,	670.000,	0.000!	!END!
759	! X =	-123.52087,	-111.87696,	670.000,	0.000!	!END!
760	! X =	-123.51817,	-111.62847,	640.000,	0.000!	!END!
761	! X =	-123.51547,	-111.37987,	609.000,	0.000!	!END!
762	! X =	-123.51278,	-111.13137,	548.000,	0.000!	!END!
763	! X =	-123.51008,	-110.88288,	532.000,	0.000!	!END!
764	! X =	-123.50738,	-110.63428,	487.000,	0.000!	!END!
765	! X =	-123.50469,	-110.38578,	457.000,	0.000!	!END!
766	! X =	-123.50209,	-110.13718,	426.000,	0.000!	!END!
767	! X =	-123.49939,	-109.88868,	396.000,	0.000!	!END!
768	! X =	-123.49669,	-109.64008,	366.000,	0.000!	!END!
769	! X =	-123.49399,	-109.39159,	341.000,	0.000!	!END!
770	! X =	-123.4913,	-109.14309,	335.000,	0.000!	!END!
771	! X =	-123.4886,	-108.89449,	341.000,	0.000!	!END!

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772 ! X =   -123.4859, -108.64599,     352.000,        0.000!   !END!
773 ! X =  -123.48321, -108.39749,     396.000,        0.000!   !END!
774 ! X =  -123.48051, -108.14889,     480.000,        0.000!   !END!
775 ! X =  -123.47781, -107.90039,     525.000,        0.000!   !END!
776 ! X =  -123.47512, -107.65189,     579.000,        0.000!   !END!
777 ! X =  -123.47242, -107.40329,     579.000,        0.000!   !END!
778 ! X =  -123.46982, -107.15479,     522.000,        0.000!   !END!
779 ! X =  -123.46713, -106.90629,     487.000,        0.000!   !END!
780 ! X =  -123.46442, -106.65769,     464.000,        0.000!   !END!
781 ! X =  -123.28416, -112.87378,     561.000,        0.000!   !END!
782 ! X =  -123.28147, -112.62529,     624.000,        0.000!   !END!
783 ! X =  -123.27876, -112.37669,     666.000,        0.000!   !END!
784 ! X =  -123.27607,  -112.1282,     670.000,        0.000!   !END!
785 ! X =  -123.27347,  -111.8797,     634.000,        0.000!   !END!
786 ! X =  -123.27077,  -111.6311,     595.000,        0.000!   !END!
787 ! X =  -123.26808,  -111.3826,     545.000,        0.000!   !END!
788 ! X =  -123.26538, -111.13401,     518.000,        0.000!   !END!
789 ! X =  -123.26268, -110.88551,     469.000,        0.000!   !END!
790 ! X =  -123.25998, -110.63692,     434.000,        0.000!   !END!
791 ! X =  -123.25728, -110.38842,     411.000,        0.000!   !END!
792 ! X =  -123.25459, -110.13992,     365.000,        0.000!   !END!
793 ! X =  -123.25189, -109.89132,     365.000,        0.000!   !END!
794 ! X =  -123.24919, -109.64283,     348.000,        0.000!   !END!
795 ! X =  -123.24649, -109.39423,     337.000,        0.000!   !END!
796 ! X =  -123.24389, -109.14572,     335.000,        0.000!   !END!
797 ! X =   -123.2412, -108.89722,     335.000,        0.000!   !END!
798 ! X =   -123.2385, -108.64863,     345.000,        0.000!   !END!
799 ! X =   -123.2358, -108.40013,     396.000,        0.000!   !END!
800 ! X =  -123.23311, -108.15163,     478.000,        0.000!   !END!
801 ! X =  -123.23041, -107.90303,     523.000,        0.000!   !END!
802 ! X =  -123.22771, -107.65453,     549.000,        0.000!   !END!
803 ! X =  -123.22502, -107.40603,     542.000,        0.000!   !END!
804 ! X =  -123.22231, -107.15743,     489.000,        0.000!   !END!
805 ! X =  -123.21962, -106.90893,     427.000,        0.000!   !END!
806 ! X =  -123.21692, -106.66043,     375.000,        0.000!   !END!
807 ! X =  -123.21432, -106.41182,     372.000,        0.000!   !END!
808 ! X =  -123.03676, -112.87652,     586.000,        0.000!   !END!
809 ! X =  -123.03406, -112.62792,     640.000,        0.000!   !END!
810 ! X =  -123.03137, -112.37943,     648.000,        0.000!   !END!
811 ! X =  -123.02867, -112.13083,     640.000,        0.000!   !END!
812 ! X =  -123.02597, -111.88234,     599.000,        0.000!   !END!
813 ! X =  -123.02327, -111.63374,     565.000,        0.000!   !END!
814 ! X =  -123.02057, -111.38525,     543.000,        0.000!   !END!
815 ! X =  -123.01798, -111.13674,     518.000,        0.000!   !END!
816 ! X =  -123.01528, -110.88815,     493.000,        0.000!   !END!
817 ! X =  -123.01258, -110.63965,     465.000,        0.000!   !END!
818 ! X =  -123.00988, -110.39105,     444.000,        0.000!   !END!
819 ! X =  -123.00718, -110.14256,     394.000,        0.000!   !END!
820 ! X =  -123.00449, -109.89406,     366.000,        0.000!   !END!
821 ! X =  -123.00179, -109.64546,     360.000,        0.000!   !END!
822 ! X =  -122.99909, -109.39696,     389.000,        0.000!   !END!
823 ! X =  -122.99639, -109.14836,     363.000,        0.000!   !END!
824 ! X =  -122.99369, -108.89987,     335.000,        0.000!   !END!
825 ! X =    -122.991, -108.65137,     340.000,        0.000!   !END!
826 ! X =   -122.9884, -108.40276,     365.000,        0.000!   !END!
827 ! X =   -122.9857, -108.15426,     439.000,        0.000!   !END!
828 ! X =  -122.98301, -107.90576,     490.000,        0.000!   !END!
829 ! X =   -122.9803, -107.65716,     518.000,        0.000!   !END!
830 ! X =  -122.97761, -107.40866,     493.000,        0.000!   !END!
831 ! X =  -122.97491, -107.16006,     437.000,        0.000!   !END!
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832 ! X =  -122.97221, -106.91156,     396.000,       0.000!   !END!
833 ! X =  -122.96952, -106.66306,     365.000,       0.000!   !END!
834 ! X =  -122.96682, -106.41456,     377.000,       0.000!   !END!
835 ! X =  -122.96412, -106.16596,     386.000,       0.000!   !END!
836 ! X =  -122.78667, -112.63066,     657.000,       0.000!   !END!
837 ! X =  -122.78397, -112.38206,     678.000,       0.000!   !END!
838 ! X =  -122.78127, -112.13357,     665.000,       0.000!   !END!
839 ! X =  -122.77857, -111.88497,     627.000,       0.000!   !END!
840 ! X =  -122.77587, -111.63648,     616.000,       0.000!   !END!
841 ! X =  -122.77317, -111.38788,     600.000,       0.000!   !END!
842 ! X =  -122.77048, -111.13939,     560.000,       0.000!   !END!
843 ! X =  -122.76777, -110.89079,     518.000,       0.000!   !END!
844 ! X =  -122.76508, -110.64229,     489.000,       0.000!   !END!
845 ! X =  -122.76238, -110.39379,     457.000,       0.000!   !END!
846 ! X =  -122.75978, -110.14519,     384.000,       0.000!   !END!
847 ! X =  -122.75708, -109.89669,     368.000,       0.000!   !END!
848 ! X =  -122.75438,  -109.6481,     396.000,       0.000!   !END!
849 ! X =  -122.75169,  -109.3996,     419.000,       0.000!   !END!
850 ! X =  -122.74899,  -109.1511,     431.000,       0.000!   !END!
851 ! X =  -122.74629,  -108.9025,     396.000,       0.000!   !END!
852 ! X =  -122.74359,   -108.654,     335.000,       0.000!   !END!
853 ! X =   -122.7409,  -108.4055,     338.000,       0.000!   !END!
854 ! X =   -122.7382, -108.15691,     380.000,       0.000!   !END!
855 ! X =   -122.7355, -107.90841,     419.000,       0.000!   !END!
856 ! X =   -122.7329,  -107.6598,     425.000,       0.000!   !END!
857 ! X =   -122.7302,  -107.4113,     396.000,       0.000!   !END!
858 ! X =  -122.72751,  -107.1628,     368.000,       0.000!   !END!
859 ! X =   -122.7248,  -106.9142,     381.000,       0.000!   !END!
860 ! X =  -122.72211,  -106.6657,     424.000,       0.000!   !END!
861 ! X =  -122.71941,  -106.4172,     441.000,       0.000!   !END!
862 ! X =  -122.71672,  -106.1687,     439.000,       0.000!   !END!
863 ! X =  -122.71402,  -105.9201,     412.000,       0.000!   !END!
864 ! X =  -122.71132, -105.67159,     408.000,       0.000!   !END!
865 ! X =  -122.52847, -111.63911,     640.000,       0.000!   !END!
866 ! X =  -122.52577, -111.39062,     638.000,       0.000!   !END!
867 ! X =  -122.52307, -111.14202,     601.000,       0.000!   !END!
868 ! X =  -122.52038, -110.89353,     533.000,       0.000!   !END!
869 ! X =  -122.51767, -110.64493,     502.000,       0.000!   !END!
870 ! X =  -122.51498, -110.39643,     464.000,       0.000!   !END!
871 ! X =  -122.51228, -110.14793,     401.000,       0.000!   !END!
872 ! X =  -122.50958, -109.89934,     390.000,       0.000!   !END!
873 ! X =  -122.50688, -109.65084,     441.000,       0.000!   !END!
874 ! X =  -122.50428, -109.40224,     466.000,       0.000!   !END!
875 ! X =  -122.50159, -109.15374,     466.000,       0.000!   !END!
876 ! X =  -122.49889, -108.90524,     441.000,       0.000!   !END!
877 ! X =  -122.49619, -108.65664,     389.000,       0.000!   !END!
878 ! X =  -122.49349, -108.40814,     335.000,       0.000!   !END!
879 ! X =  -122.49079, -108.15954,     336.000,       0.000!   !END!
880 ! X =  -122.48809, -107.91104,     365.000,       0.000!   !END!
881 ! X =   -122.4854, -107.66254,     369.000,       0.000!   !END!
882 ! X =   -122.4827, -107.41394,     356.000,       0.000!   !END!
883 ! X =   -122.4801, -107.16544,     376.000,       0.000!   !END!
884 ! X =   -122.4774, -106.91694,     410.000,       0.000!   !END!
885 ! X =   -122.4747, -106.66834,     461.000,       0.000!   !END!
886 ! X =  -122.47201, -106.41983,     490.000,       0.000!   !END!
887 ! X =  -122.46931, -106.17133,     489.000,       0.000!   !END!
888 ! X =  -122.46661, -105.92283,     473.000,       0.000!   !END!
889 ! X =  -122.46391, -105.67423,     419.000,       0.000!   !END!
890 ! X =  -122.46122, -105.42573,     452.000,       0.000!   !END!
891 ! X =  -122.28097, -111.64176,     640.000,       0.000!   !END!
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892 ! X =  -122.27827, -111.39326,     640.000,       0.000!   !END!
893 ! X =  -122.27557, -111.14466,     601.000,       0.000!   !END!
894 ! X =  -122.27297, -110.89616,     533.000,       0.000!   !END!
895 ! X =  -122.27028, -110.64766,     493.000,       0.000!   !END!
896 ! X =  -122.26758, -110.39907,     457.000,       0.000!   !END!
897 ! X =  -122.26488, -110.15057,     391.000,       0.000!   !END!
898 ! X =  -122.26218, -109.90197,     429.000,       0.000!   !END!
899 ! X =  -122.25948, -109.65348,     464.000,       0.000!   !END!
900 ! X =  -122.25678, -109.40498,     492.000,       0.000!   !END!
901 ! X =  -122.25408, -109.15638,     487.000,       0.000!   !END!
902 ! X =  -122.25139, -108.90788,     457.000,       0.000!   !END!
903 ! X =  -122.24878, -108.65928,     403.000,       0.000!   !END!
904 ! X =  -122.24609, -108.41078,     371.000,       0.000!   !END!
905 ! X =  -122.24339, -108.16228,     346.000,       0.000!   !END!
906 ! X =  -122.24069, -107.91368,     336.000,       0.000!   !END!
907 ! X =  -122.23799, -107.66518,     335.000,       0.000!   !END!
908 ! X =   -122.2353, -107.41668,     336.000,       0.000!   !END!
909 ! X =  -122.23259, -107.16808,     368.000,       0.000!   !END!
910 ! X =   -122.2299, -106.91958,     408.000,       0.000!   !END!
911 ! X =   -122.2272, -106.67108,     475.000,       0.000!   !END!
912 ! X =   -122.2246, -106.42247,     518.000,       0.000!   !END!
913 ! X =   -122.2219, -106.17397,     518.000,       0.000!   !END!
914 ! X =  -122.21921, -105.92547,     517.000,       0.000!   !END!
915 ! X =  -122.21651, -105.67697,     464.000,       0.000!   !END!
916 ! X =  -122.21381, -105.42836,     443.000,       0.000!   !END!
917 ! X =  -122.21111, -105.17986,     451.000,       0.000!   !END!
918 ! X =  -122.20841, -104.93136,     476.000,       0.000!   !END!
919 ! X =  -122.03357, -111.64449,     623.000,       0.000!   !END!
920 ! X =  -122.03087,  -111.3959,     613.000,       0.000!   !END!
921 ! X =  -122.02817,  -111.1474,     570.000,       0.000!   !END!
922 ! X =  -122.02547,  -110.8988,     502.000,       0.000!   !END!
923 ! X =  -122.02277, -110.65031,     465.000,       0.000!   !END!
924 ! X =  -122.02007, -110.40171,     429.000,       0.000!   !END!
925 ! X =  -122.01747, -110.15321,     460.000,       0.000!   !END!
926 ! X =  -122.01478, -109.90471,     472.000,       0.000!   !END!
927 ! X =  -122.01208, -109.65611,     507.000,       0.000!   !END!
928 ! X =  -122.00938, -109.40761,     518.000,       0.000!   !END!
929 ! X =  -122.00668, -109.15912,     498.000,       0.000!   !END!
930 ! X =  -122.00398, -108.91052,     451.000,       0.000!   !END!
931 ! X =  -122.00128, -108.66202,     396.000,       0.000!   !END!
932 ! X =  -121.99858, -108.41342,     411.000,       0.000!   !END!
933 ! X =  -121.99598, -108.16491,     408.000,       0.000!   !END!
934 ! X =  -121.99329, -107.91641,     386.000,       0.000!   !END!
935 ! X =  -121.99059, -107.66782,     336.000,       0.000!   !END!
936 ! X =  -121.98789, -107.41932,     335.000,       0.000!   !END!
937 ! X =  -121.98519, -107.17081,     337.000,       0.000!   !END!
938 ! X =  -121.98249, -106.92221,     364.000,       0.000!   !END!
939 ! X =  -121.97979, -106.67371,     419.000,       0.000!   !END!
940 ! X =   -121.9771, -106.42521,     497.000,       0.000!   !END!
941 ! X =  -121.97439, -106.17661,     518.000,       0.000!   !END!
942 ! X =   -121.9718,  -105.9281,     518.000,       0.000!   !END!
943 ! X =   -121.9691,  -105.6796,     487.000,       0.000!   !END!
944 ! X =   -121.9664,   -105.431,     487.000,       0.000!   !END!
945 ! X =   -121.9637,  -105.1825,     493.000,       0.000!   !END!
946 ! X =  -121.96101,   -104.934,     526.000,       0.000!   !END!
947 ! X =  -121.95831, -104.68549,     563.000,       0.000!   !END!
948 ! X =  -121.78347, -111.39853,     548.000,       0.000!   !END!
949 ! X =  -121.78077, -111.15004,     507.000,       0.000!   !END!
950 ! X =  -121.77807, -110.90154,     470.000,       0.000!   !END!
951 ! X =  -121.77537, -110.65294,     426.000,       0.000!   !END!
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 952 ! X =  -121.77267, -110.40445,     457.000,       0.000!   !END!
 953 ! X =  -121.76997, -110.15585,     499.000,       0.000!   !END!
 954 ! X =  -121.76727, -109.90735,     509.000,       0.000!   !END!
 955 ! X =  -121.76458, -109.65885,     548.000,       0.000!   !END!
 956 ! X =  -121.76197, -109.41025,     552.000,       0.000!   !END!
 957 ! X =  -121.75928, -109.16175,     518.000,       0.000!   !END!
 958 ! X =  -121.75658, -108.91315,     457.000,       0.000!   !END!
 959 ! X =  -121.75388, -108.66466,     457.000,       0.000!   !END!
 960 ! X =  -121.75118, -108.41616,     456.000,       0.000!   !END!
 961 ! X =  -121.74848, -108.16756,     426.000,       0.000!   !END!
 962 ! X =  -121.74578, -107.91906,     399.000,       0.000!   !END!
 963 ! X =  -121.74309, -107.67056,     355.000,       0.000!   !END!
 964 ! X =  -121.74048, -107.42195,     365.000,       0.000!   !END!
 965 ! X =  -121.73779, -107.17345,     365.000,       0.000!   !END!
 966 ! X =  -121.73509, -106.92495,     360.000,       0.000!   !END!
 967 ! X =  -121.73239, -106.67635,     355.000,       0.000!   !END!
 968 ! X =  -121.72969, -106.42785,     445.000,       0.000!   !END!
 969 ! X =  -121.72699, -106.17935,     472.000,       0.000!   !END!
 970 ! X =  -121.72429, -105.93075,     472.000,       0.000!   !END!
 971 ! X =  -121.72159, -105.68225,     487.000,       0.000!   !END!
 972 ! X =    -121.719, -105.43374,     487.000,       0.000!   !END!
 973 ! X =  -121.71629, -105.18514,     493.000,       0.000!   !END!
 974 ! X =   -121.7136, -104.93663,     530.000,       0.000!   !END!
 975 ! X =   -121.7109, -104.68813,     593.000,       0.000!   !END!
 976 ! X =   -121.7082, -104.43963,     630.000,       0.000!   !END!
 977 ! X =   -121.7055, -104.19103,     644.000,       0.000!   !END!
 978 ! X =  -121.53327, -111.15268,     446.000,       0.000!   !END!
 979 ! X =  -121.53067, -110.90418,     440.000,       0.000!   !END!
 980 ! X =  -121.52797, -110.65558,     482.000,       0.000!   !END!
 981 ! X =  -121.52527, -110.40708,     503.000,       0.000!   !END!
 982 ! X =  -121.52257, -110.15859,     536.000,       0.000!   !END!
 983 ! X =  -121.51987, -109.90999,     556.000,       0.000!   !END!
 984 ! X =  -121.51717, -109.66149,     574.000,       0.000!   !END!
 985 ! X =  -121.51447, -109.41289,     602.000,       0.000!   !END!
 986 ! X =  -121.51177,  -109.1644,     548.000,       0.000!   !END!
 987 ! X =  -121.50918, -108.91589,     514.000,       0.000!   !END!
 988 ! X =  -121.50647, -108.66729,     487.000,       0.000!   !END!
 989 ! X =  -121.50378, -108.41879,     460.000,       0.000!   !END!
 990 ! X =  -121.50108, -108.17029,     426.000,       0.000!   !END!
 991 ! X =  -121.49838, -107.92169,     414.000,       0.000!   !END!
 992 ! X =  -121.49568, -107.67319,     424.000,       0.000!   !END!
 993 ! X =  -121.49298, -107.42469,     435.000,       0.000!   !END!
 994 ! X =  -121.49028, -107.17609,     435.000,       0.000!   !END!
 995 ! X =  -121.48768, -106.92759,     402.000,       0.000!   !END!
 996 ! X =  -121.48498, -106.67909,     354.000,       0.000!   !END!
 997 ! X =  -121.48228, -106.43049,     345.000,       0.000!   !END!
 998 ! X =  -121.47958, -106.18199,     396.000,       0.000!   !END!
 999 ! X =  -121.47689, -105.93348,     396.000,       0.000!   !END!
1000 ! X =  -121.47419, -105.68488,     396.000,       0.000!   !END!
1001 ! X =  -121.47149, -105.43638,     457.000,       0.000!   !END!
1002 ! X =  -121.46889, -105.18787,     468.000,       0.000!   !END!
1003 ! X =  -121.46619, -104.93927,     509.000,       0.000!   !END!
1004 ! X =  -121.46349, -104.69077,     557.000,       0.000!   !END!
1005 ! X =  -121.46079, -104.44227,     611.000,       0.000!   !END!
1006 ! X =   -121.4581, -104.19376,     623.000,       0.000!   !END!
1007 ! X =  -121.45539, -103.94516,     581.000,       0.000!   !END!
1008 ! X =   -121.4527, -103.69666,     566.000,       0.000!   !END!
1009 ! X =     -121.45, -103.44815,     527.000,       0.000!   !END!
1010 ! X =  -121.28047, -110.65832,     518.000,       0.000!   !END!
1011 ! X =  -121.27777, -110.40973,     560.000,       0.000!   !END!
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1012 ! X =  -121.27517, -110.16122,     579.000,       0.000!   !END!
1013 ! X =  -121.27247, -109.91273,     593.000,       0.000!   !END!
1014 ! X =  -121.26977, -109.66413,     609.000,       0.000!   !END!
1015 ! X =  -121.26707, -109.41563,     609.000,       0.000!   !END!
1016 ! X =  -121.26437, -109.16703,     592.000,       0.000!   !END!
1017 ! X =  -121.26167, -108.91853,     573.000,       0.000!   !END!
1018 ! X =  -121.25897, -108.67003,     519.000,       0.000!   !END!
1019 ! X =  -121.25637, -108.42143,     460.000,       0.000!   !END!
1020 ! X =  -121.25367, -108.17293,     439.000,       0.000!   !END!
1021 ! X =  -121.25098, -107.92443,     479.000,       0.000!   !END!
1022 ! X =  -121.24827, -107.67583,     487.000,       0.000!   !END!
1023 ! X =  -121.24558, -107.42733,     487.000,       0.000!   !END!
1024 ! X =  -121.24287, -107.17873,     487.000,       0.000!   !END!
1025 ! X =  -121.24018, -106.93023,     461.000,       0.000!   !END!
1026 ! X =  -121.23748, -106.68173,     403.000,       0.000!   !END!
1027 ! X =  -121.23488, -106.43322,     337.000,       0.000!   !END!
1028 ! X =  -121.23218, -106.18462,     320.000,       0.000!   !END!
1029 ! X =  -121.22948, -105.93612,     335.000,       0.000!   !END!
1030 ! X =  -121.22678, -105.68762,     314.000,       0.000!   !END!
1031 ! X =  -121.22408, -105.43902,     320.000,       0.000!   !END!
1032 ! X =  -121.22138, -105.19052,     364.000,       0.000!   !END!
1033 ! X =  -121.21868, -104.94201,     475.000,       0.000!   !END!
1034 ! X =  -121.21608, -104.69341,     531.000,       0.000!   !END!
1035 ! X =  -121.21338,  -104.4449,     579.000,       0.000!   !END!
1036 ! X =  -121.21069,  -104.1964,     566.000,       0.000!   !END!
1037 ! X =  -121.20799,  -103.9479,     499.000,       0.000!   !END!
1038 ! X =  -121.20529, -103.69929,     470.000,       0.000!   !END!
1039 ! X =  -121.20259, -103.45079,     457.000,       0.000!   !END!
1040 ! X =  -121.19989, -103.20228,     432.000,       0.000!   !END!
1041 ! X =  -121.19729, -102.95377,     540.000,       0.000!   !END!
1042 ! X =   -121.1946, -102.70527,     591.000,       0.000!   !END!
1043 ! X =  -121.19189, -102.45667,     640.000,       0.000!   !END!
1044 ! X =   -121.1892, -102.20816,     640.000,       0.000!   !END!
1045 ! X =   -121.1865, -101.95965,     612.000,       0.000!   !END!
1046 ! X =   -121.1838, -101.71115,     548.000,       0.000!   !END!
1047 ! X =   -121.1811, -101.46254,     484.000,       0.000!   !END!
1048 ! X =   -121.1785, -101.21403,     510.000,       0.000!   !END!
1049 ! X =  -121.03307, -110.66096,     563.000,       0.000!   !END!
1050 ! X =  -121.03037, -110.41246,     614.000,       0.000!   !END!
1051 ! X =  -121.02767, -110.16387,     645.000,       0.000!   !END!
1052 ! X =  -121.02497, -109.91537,     645.000,       0.000!   !END!
1053 ! X =  -121.02237, -109.66677,     642.000,       0.000!   !END!
1054 ! X =  -121.01967, -109.41827,     650.000,       0.000!   !END!
1055 ! X =  -121.01697, -109.16977,     640.000,       0.000!   !END!
1056 ! X =  -121.01427, -108.92117,     592.000,       0.000!   !END!
1057 ! X =  -121.01157, -108.67267,     528.000,       0.000!   !END!
1058 ! X =  -121.00887, -108.42417,     457.000,       0.000!   !END!
1059 ! X =  -121.00617, -108.17557,     501.000,       0.000!   !END!
1060 ! X =  -121.00357, -107.92707,     548.000,       0.000!   !END!
1061 ! X =  -121.00087, -107.67847,     579.000,       0.000!   !END!
1062 ! X =  -120.99817, -107.42997,     573.000,       0.000!   !END!
1063 ! X =  -120.99547, -107.18147,     548.000,       0.000!   !END!
1064 ! X =  -120.99277, -106.93287,     518.000,       0.000!   !END!
1065 ! X =  -120.99007, -106.68437,     470.000,       0.000!   !END!
1066 ! X =  -120.98737, -106.43587,     457.000,       0.000!   !END!
1067 ! X =  -120.98477, -106.18726,     445.000,       0.000!   !END!
1068 ! X =  -120.98207, -105.93876,     437.000,       0.000!   !END!
1069 ! X =  -120.97937, -105.69026,     421.000,       0.000!   !END!
1070 ! X =  -120.97668, -105.44176,     396.000,       0.000!   !END!
1071 ! X =  -120.97397, -105.19315,     355.000,       0.000!   !END!
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1072 ! X =  -120.97128, -104.94465,     428.000,       0.000!   !END!
1073 ! X =  -120.96858, -104.69615,     506.000,       0.000!   !END!
1074 ! X =  -120.96597, -104.44754,     530.000,       0.000!   !END!
1075 ! X =  -120.96328, -104.19904,     519.000,       0.000!   !END!
1076 ! X =  -120.96058, -103.95053,     457.000,       0.000!   !END!
1077 ! X =  -120.95788, -103.70203,     384.000,       0.000!   !END!
1078 ! X =  -120.95518, -103.45343,     432.000,       0.000!   !END!
1079 ! X =  -120.95248, -103.20492,     457.000,       0.000!   !END!
1080 ! X =  -120.94978, -102.95642,     545.000,       0.000!   !END!
1081 ! X =  -120.94718, -102.70791,     591.000,       0.000!   !END!
1082 ! X =  -120.94449,  -102.4594,     611.000,       0.000!   !END!
1083 ! X =  -120.94178,  -102.2108,     611.000,       0.000!   !END!
1084 ! X =  -120.93909, -101.96229,     566.000,       0.000!   !END!
1085 ! X =  -120.93639, -101.71379,     502.000,       0.000!   !END!
1086 ! X =  -120.93369, -101.46528,     457.000,       0.000!   !END!
1087 ! X =  -120.93099, -101.21677,     530.000,       0.000!   !END!
1088 ! X =  -120.78297,  -110.4151,     651.000,       0.000!   !END!
1089 ! X =  -120.78026, -110.16651,     672.000,       0.000!   !END!
1090 ! X =  -120.77756, -109.91801,     672.000,       0.000!   !END!
1091 ! X =  -120.77487, -109.66951,     657.000,       0.000!   !END!
1092 ! X =  -120.77216, -109.42091,     657.000,       0.000!   !END!
1093 ! X =  -120.76957, -109.17241,     640.000,       0.000!   !END!
1094 ! X =  -120.76687, -108.92391,     591.000,       0.000!   !END!
1095 ! X =  -120.76416, -108.67531,     525.000,       0.000!   !END!
1096 ! X =  -120.76147, -108.42681,     502.000,       0.000!   !END!
1097 ! X =  -120.75876, -108.17821,     569.000,       0.000!   !END!
1098 ! X =  -120.75606, -107.92971,     603.000,       0.000!   !END!
1099 ! X =  -120.75337, -107.68121,     609.000,       0.000!   !END!
1100 ! X =  -120.75076, -107.43261,     586.000,       0.000!   !END!
1101 ! X =  -120.74806, -107.18411,     559.000,       0.000!   !END!
1102 ! X =  -120.74537, -106.93561,     518.000,       0.000!   !END!
1103 ! X =  -120.74266, -106.68701,     472.000,       0.000!   !END!
1104 ! X =  -120.73997, -106.43851,     457.000,       0.000!   !END!
1105 ! X =  -120.73727,    -106.19,     457.000,       0.000!   !END!
1106 ! X =  -120.73456,  -105.9414,     457.000,       0.000!   !END!
1107 ! X =  -120.73197,  -105.6929,     430.000,       0.000!   !END!
1108 ! X =  -120.72927, -105.44439,     401.000,       0.000!   !END!
1109 ! X =  -120.72657, -105.19589,     341.000,       0.000!   !END!
1110 ! X =  -120.72387, -104.94729,     411.000,       0.000!   !END!
1111 ! X =  -120.72117, -104.69879,     471.000,       0.000!   !END!
1112 ! X =  -120.71847, -104.45028,     489.000,       0.000!   !END!
1113 ! X =  -120.71577, -104.20168,     466.000,       0.000!   !END!
1114 ! X =  -120.71317, -103.95317,     370.000,       0.000!   !END!
1115 ! X =  -120.71047, -103.70467,     457.000,       0.000!   !END!
1116 ! X =  -120.70777, -103.45616,     514.000,       0.000!   !END!
1117 ! X =  -120.70507, -103.20756,     552.000,       0.000!   !END!
1118 ! X =  -120.70237, -102.95906,     579.000,       0.000!   !END!
1119 ! X =  -120.69967, -102.71055,     579.000,       0.000!   !END!
1120 ! X =  -120.69708, -102.46204,     587.000,       0.000!   !END!
1121 ! X =  -120.69438, -102.21354,     567.000,       0.000!   !END!
1122 ! X =  -120.69167, -101.96493,     525.000,       0.000!   !END!
1123 ! X =  -120.68898, -101.71642,     457.000,       0.000!   !END!
1124 ! X =  -120.68628, -101.46792,     521.000,       0.000!   !END!
1125 ! X =  -120.68358, -101.21941,     626.000,       0.000!   !END!
1126 ! X =  -120.53546, -110.41775,     670.000,       0.000!   !END!
1127 ! X =  -120.53286, -110.16924,     671.000,       0.000!   !END!
1128 ! X =  -120.53016, -109.92065,     671.000,       0.000!   !END!
1129 ! X =  -120.52746, -109.67215,     650.000,       0.000!   !END!
1130 ! X =  -120.52476, -109.42365,     646.000,       0.000!   !END!
1131 ! X =  -120.52206, -109.17505,     618.000,       0.000!   !END!
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1132 ! X =  -120.51936, -108.92655,     554.000,       0.000!   !END!
1133 ! X =  -120.51666, -108.67795,     505.000,       0.000!   !END!
1134 ! X =  -120.51406, -108.42945,     548.000,       0.000!   !END!
1135 ! X =  -120.51136, -108.18095,     609.000,       0.000!   !END!
1136 ! X =  -120.50866, -107.93235,     609.000,       0.000!   !END!
1137 ! X =  -120.50596, -107.68385,     609.000,       0.000!   !END!
1138 ! X =  -120.50326, -107.43535,     586.000,       0.000!   !END!
1139 ! X =  -120.50056, -107.18675,     536.000,       0.000!   !END!
1140 ! X =  -120.49796, -106.93825,     491.000,       0.000!   !END!
1141 ! X =  -120.49526, -106.68974,     465.000,       0.000!   !END!
1142 ! X =  -120.49256, -106.44114,     457.000,       0.000!   !END!
1143 ! X =  -120.48986, -106.19264,     431.000,       0.000!   !END!
1144 ! X =  -120.48716, -105.94414,     433.000,       0.000!   !END!
1145 ! X =  -120.48446, -105.69554,     363.000,       0.000!   !END!
1146 ! X =  -120.48176, -105.44704,     327.000,       0.000!   !END!
1147 ! X =  -120.47916, -105.19853,     326.000,       0.000!   !END!
1148 ! X =  -120.47646, -104.95003,     344.000,       0.000!   !END!
1149 ! X =  -120.47376, -104.70142,     381.000,       0.000!   !END!
1150 ! X =  -120.47106, -104.45292,     363.000,       0.000!   !END!
1151 ! X =  -120.46836, -104.20442,     352.000,       0.000!   !END!
1152 ! X =  -120.46566, -103.95582,     421.000,       0.000!   !END!
1153 ! X =  -120.46306, -103.70731,     503.000,       0.000!   !END!
1154 ! X =  -120.46036,  -103.4588,     564.000,       0.000!   !END!
1155 ! X =  -120.45766,  -103.2103,     579.000,       0.000!   !END!
1156 ! X =  -120.45497, -102.96179,     579.000,       0.000!   !END!
1157 ! X =  -120.45226, -102.71319,     571.000,       0.000!   !END!
1158 ! X =  -120.44957, -102.46468,     548.000,       0.000!   !END!
1159 ! X =  -120.44697, -102.21617,     510.000,       0.000!   !END!
1160 ! X =  -120.44427, -101.96767,     447.000,       0.000!   !END!
1161 ! X =  -120.44156, -101.71906,     487.000,       0.000!   !END!
1162 ! X =  -120.43887, -101.47056,     551.000,       0.000!   !END!
1163 ! X =  -120.28536, -110.17189,     670.000,       0.000!   !END!
1164 ! X =  -120.28266, -109.92339,     663.000,       0.000!   !END!
1165 ! X =  -120.28006, -109.67479,     632.000,       0.000!   !END!
1166 ! X =  -120.27736, -109.42629,     583.000,       0.000!   !END!
1167 ! X =  -120.27466, -109.17769,     543.000,       0.000!   !END!
1168 ! X =  -120.27196, -108.92919,     522.000,       0.000!   !END!
1169 ! X =  -120.26926, -108.68069,     555.000,       0.000!   !END!
1170 ! X =  -120.26656, -108.43209,     575.000,       0.000!   !END!
1171 ! X =  -120.26396, -108.18359,     609.000,       0.000!   !END!
1172 ! X =  -120.26126, -107.93509,     609.000,       0.000!   !END!
1173 ! X =  -120.25855, -107.68649,     609.000,       0.000!   !END!
1174 ! X =  -120.25586, -107.43799,     544.000,       0.000!   !END!
1175 ! X =  -120.25316, -107.18949,     511.000,       0.000!   !END!
1176 ! X =  -120.25045, -106.94089,     457.000,       0.000!   !END!
1177 ! X =  -120.24776, -106.69239,     414.000,       0.000!   !END!
1178 ! X =  -120.24516, -106.44388,     401.000,       0.000!   !END!
1179 ! X =  -120.24245, -106.19528,     369.000,       0.000!   !END!
1180 ! X =  -120.23975, -105.94678,     367.000,       0.000!   !END!
1181 ! X =  -120.23706, -105.69828,     367.000,       0.000!   !END!
1182 ! X =  -120.23435, -105.44968,     320.000,       0.000!   !END!
1183 ! X =  -120.23165, -105.20117,     335.000,       0.000!   !END!
1184 ! X =  -120.22905, -104.95267,     335.000,       0.000!   !END!
1185 ! X =  -120.22636, -104.70416,     320.000,       0.000!   !END!
1186 ! X =  -120.22365, -104.45556,     305.000,       0.000!   !END!
1187 ! X =  -120.22095, -104.20706,     320.000,       0.000!   !END!
1188 ! X =  -120.21826, -103.95855,     435.000,       0.000!   !END!
1189 ! X =  -120.21555, -103.70995,     526.000,       0.000!   !END!
1190 ! X =  -120.21295, -103.46144,     568.000,       0.000!   !END!
1191 ! X =  -120.21025, -103.21294,     579.000,       0.000!   !END!
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1192 ! X =  -120.20756, -102.96443,     563.000,       0.000!   !END!
1193 ! X =  -120.20486, -102.71593,     530.000,       0.000!   !END!
1194 ! X =  -120.20215, -102.46732,     488.000,       0.000!   !END!
1195 ! X =  -120.19946, -102.21882,     444.000,       0.000!   !END!
1196 ! X =  -120.19686, -101.97031,     423.000,       0.000!   !END!
1197 ! X =  -120.19416,  -101.7218,     487.000,       0.000!   !END!
1198 ! X =  -120.19145,  -101.4732,     529.000,       0.000!   !END!
1199 ! X =  -120.18876, -101.22469,     536.000,       0.000!   !END!
1200 ! X =  -120.18606, -100.97618,     640.000,       0.000!   !END!
1201 ! X =  -120.18336, -100.72768,     640.000,       0.000!   !END!
1202 ! X =  -120.03796, -110.17453,     670.000,       0.000!   !END!
1203 ! X =  -120.03526, -109.92603,     639.000,       0.000!   !END!
1204 ! X =  -120.03255, -109.67743,     626.000,       0.000!   !END!
1205 ! X =  -120.02986, -109.42893,     620.000,       0.000!   !END!
1206 ! X =  -120.02726, -109.18043,     573.000,       0.000!   !END!
1207 ! X =  -120.02455, -108.93183,     609.000,       0.000!   !END!
1208 ! X =  -120.02185, -108.68333,     640.000,       0.000!   !END!
1209 ! X =  -120.01916, -108.43483,     617.000,       0.000!   !END!
1210 ! X =  -120.01645, -108.18623,     609.000,       0.000!   !END!
1211 ! X =  -120.01375, -107.93773,     609.000,       0.000!   !END!
1212 ! X =  -120.01115, -107.68913,     585.000,       0.000!   !END!
1213 ! X =  -120.00845, -107.44063,     517.000,       0.000!   !END!
1214 ! X =  -120.00575, -107.19213,     470.000,       0.000!   !END!
1215 ! X =  -120.00305, -106.94353,     420.000,       0.000!   !END!
1216 ! X =  -120.00035, -106.69503,     365.000,       0.000!   !END!
1217 ! X =  -119.99765, -106.44653,     367.000,       0.000!   !END!
1218 ! X =  -119.99505, -106.19802,     424.000,       0.000!   !END!
1219 ! X =  -119.99235, -105.94942,     460.000,       0.000!   !END!
1220 ! X =  -119.98965, -105.70092,     456.000,       0.000!   !END!
1221 ! X =  -119.98695, -105.45241,     469.000,       0.000!   !END!
1222 ! X =  -119.98425, -105.20381,     438.000,       0.000!   !END!
1223 ! X =  -119.98155, -104.95531,     381.000,       0.000!   !END!
1224 ! X =  -119.97895,  -104.7068,     397.000,       0.000!   !END!
1225 ! X =  -119.97624,  -104.4582,     335.000,       0.000!   !END!
1226 ! X =  -119.97354,  -104.2097,     335.000,       0.000!   !END!
1227 ! X =  -119.97085, -103.96119,     423.000,       0.000!   !END!
1228 ! X =  -119.96815, -103.71269,     497.000,       0.000!   !END!
1229 ! X =  -119.96544, -103.46409,     527.000,       0.000!   !END!
1230 ! X =  -119.96284, -103.21558,     534.000,       0.000!   !END!
1231 ! X =  -119.96015, -102.96707,     503.000,       0.000!   !END!
1232 ! X =  -119.95745, -102.71857,     457.000,       0.000!   !END!
1233 ! X =  -119.95475, -102.47006,     390.000,       0.000!   !END!
1234 ! X =  -119.95204, -102.22146,     362.000,       0.000!   !END!
1235 ! X =  -119.94935, -101.97295,     395.000,       0.000!   !END!
1236 ! X =  -119.94675, -101.72444,     431.000,       0.000!   !END!
1237 ! X =  -119.94405, -101.47593,     462.000,       0.000!   !END!
1238 ! X =  -119.94135, -101.22743,     474.000,       0.000!   !END!
1239 ! X =  -119.93864, -100.97882,     548.000,       0.000!   !END!
1240 ! X =  -119.93595, -100.73032,     570.000,       0.000!   !END!
1241 ! X =  -119.93325, -100.48181,     548.000,       0.000!   !END!
1242 ! X =  -119.93065,  -100.2333,     588.000,       0.000!   !END!
1243 ! X =  -119.78785, -109.92867,     656.000,       0.000!   !END!
1244 ! X =  -119.78516, -109.68017,     637.000,       0.000!   !END!
1245 ! X =  -119.78245, -109.43157,     622.000,       0.000!   !END!
1246 ! X =  -119.77975, -109.18307,     626.000,       0.000!   !END!
1247 ! X =  -119.77705, -108.93457,     640.000,       0.000!   !END!
1248 ! X =  -119.77445, -108.68597,     640.000,       0.000!   !END!
1249 ! X =  -119.77175, -108.43747,     626.000,       0.000!   !END!
1250 ! X =  -119.76905, -108.18887,     609.000,       0.000!   !END!
1251 ! X =  -119.76635, -107.94037,     568.000,       0.000!   !END!
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1252 ! X =  -119.76365, -107.69187,     527.000,        0.000!   !END!
1253 ! X =  -119.76094, -107.44327,     491.000,        0.000!   !END!
1254 ! X =  -119.75834, -107.19477,     434.000,        0.000!   !END!
1255 ! X =  -119.75565, -106.94627,     370.000,        0.000!   !END!
1256 ! X =  -119.75294, -106.69767,     382.000,        0.000!   !END!
1257 ! X =  -119.75024, -106.44917,     457.000,        0.000!   !END!
1258 ! X =  -119.74754, -106.20066,     470.000,        0.000!   !END!
1259 ! X =  -119.74484, -105.95206,     481.000,        0.000!   !END!
1260 ! X =  -119.74224, -105.70356,     493.000,        0.000!   !END!
1261 ! X =  -119.73954, -105.45505,     518.000,        0.000!   !END!
1262 ! X =  -119.73684, -105.20655,     518.000,        0.000!   !END!
1263 ! X =  -119.73414, -104.95795,     487.000,        0.000!   !END!
1264 ! X =  -119.73144, -104.70945,     441.000,        0.000!   !END!
1265 ! X =  -119.72874, -104.46094,     364.000,        0.000!   !END!
1266 ! X =  -119.72614, -104.21233,     335.000,        0.000!   !END!
1267 ! X =  -119.72344, -103.96383,     431.000,        0.000!   !END!
1268 ! X =  -119.72074, -103.71533,     460.000,        0.000!   !END!
1269 ! X =  -119.71804, -103.46682,     487.000,        0.000!   !END!
1270 ! X =  -119.71533, -103.21822,     479.000,        0.000!   !END!
1271 ! X =  -119.71273, -102.96971,     418.000,        0.000!   !END!
1272 ! X =  -119.71004, -102.72121,     395.000,        0.000!   !END!
1273 ! X =  -119.70734,  -102.4727,     467.000,        0.000!   !END!
1274 ! X =  -119.70464,  -102.2242,     457.000,        0.000!   !END!
1275 ! X =  -119.70193, -101.97559,     424.000,        0.000!   !END!
1276 ! X =  -119.69923, -101.72708,     457.000,        0.000!   !END!
1277 ! X =  -119.69664, -101.47857,     487.000,        0.000!   !END!
1278 ! X =  -119.69394, -101.23007,     479.000,        0.000!   !END!
1279 ! X =  -119.69124, -100.98156,     473.000,        0.000!   !END!
1280 ! X =  -119.68853, -100.73295,     487.000,        0.000!   !END!
1281 ! X =  -119.68583, -100.48445,     491.000,        0.000!   !END!
1282 ! X =  -119.68314, -100.23594,     562.000,        0.000!   !END!
1283 ! X =  -119.54035, -109.93131,     685.000,        0.000!   !END!
1284 ! X =  -119.53775, -109.68281,     655.000,        0.000!   !END!
1285 ! X =  -119.53505, -109.43431,     644.000,        0.000!   !END!
1286 ! X =  -119.53235, -109.18571,     640.000,        0.000!   !END!
1287 ! X =  -119.52965, -108.93721,     640.000,        0.000!   !END!
1288 ! X =  -119.52694, -108.68861,     633.000,        0.000!   !END!
1289 ! X =  -119.52425, -108.44012,     575.000,        0.000!   !END!
1290 ! X =  -119.52165, -108.19161,     535.000,        0.000!   !END!
1291 ! X =  -119.51894, -107.94301,     518.000,        0.000!   !END!
1292 ! X =  -119.51624, -107.69451,     484.000,        0.000!   !END!
1293 ! X =  -119.51354, -107.44601,     434.000,        0.000!   !END!
1294 ! X =  -119.51084, -107.19741,     397.000,        0.000!   !END!
1295 ! X =  -119.50824, -106.94891,     396.000,        0.000!   !END!
1296 ! X =  -119.50554,  -106.7004,     387.000,        0.000!   !END!
1297 ! X =  -119.50283,  -106.4518,     459.000,        0.000!   !END!
1298 ! X =  -119.50014,  -106.2033,     478.000,        0.000!   !END!
1299 ! X =  -119.49744,  -105.9548,     487.000,        0.000!   !END!
1300 ! X =  -119.49473,  -105.7062,     509.000,        0.000!   !END!
1301 ! X =  -119.49213, -105.45769,     518.000,        0.000!   !END!
1302 ! X =  -119.48943, -105.20919,     518.000,        0.000!   !END!
1303 ! X =  -119.48673, -104.96069,     489.000,        0.000!   !END!
1304 ! X =  -119.48403, -104.71209,     441.000,        0.000!   !END!
1305 ! X =  -119.48133, -104.46358,     365.000,        0.000!   !END!
1306 ! X =  -119.47863, -104.21508,     335.000,        0.000!   !END!
1307 ! X =  -119.47603, -103.96647,     438.000,        0.000!   !END!
1308 ! X =  -119.47333, -103.71797,     457.000,        0.000!   !END!
1309 ! X =  -119.47063, -103.46946,     457.000,        0.000!   !END!
1310 ! X =  -119.46793, -103.22096,     385.000,        0.000!   !END!
1311 ! X =  -119.46522, -102.97235,     388.000,        0.000!   !END!
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1312 ! X =  -119.46262, -102.72384,     477.000,       0.000!   !END!
1313 ! X =  -119.45993, -102.47534,     505.000,       0.000!   !END!
1314 ! X =  -119.45723, -102.22683,     518.000,       0.000!   !END!
1315 ! X =  -119.45453, -101.97833,     498.000,       0.000!   !END!
1316 ! X =  -119.45182, -101.72972,     457.000,       0.000!   !END!
1317 ! X =  -119.44912, -101.48122,     518.000,       0.000!   !END!
1318 ! X =  -119.44652, -101.23271,     548.000,       0.000!   !END!
1319 ! X =  -119.44382,  -100.9842,     548.000,       0.000!   !END!
1320 ! X =  -119.44113, -100.73569,     528.000,       0.000!   !END!
1321 ! X =  -119.43842, -100.48709,     556.000,       0.000!   !END!
1322 ! X =  -119.26884, -107.69715,     457.000,       0.000!   !END!
1323 ! X =  -119.26614, -107.44865,     410.000,       0.000!   !END!
1324 ! X =  -119.26343, -107.20005,     397.000,       0.000!   !END!
1325 ! X =  -119.26073, -106.95155,     371.000,       0.000!   !END!
1326 ! X =  -119.25803, -106.70305,     386.000,       0.000!   !END!
1327 ! X =  -119.25543, -106.45454,     457.000,       0.000!   !END!
1328 ! X =  -119.25273, -106.20594,     482.000,       0.000!   !END!
1329 ! X =  -119.25003, -105.95744,     487.000,       0.000!   !END!
1330 ! X =  -119.24733, -105.70894,     492.000,       0.000!   !END!
1331 ! X =  -119.24462, -105.46034,     518.000,       0.000!   !END!
1332 ! X =  -119.24202, -105.21183,     490.000,       0.000!   !END!
1333 ! X =  -119.23933, -104.96333,     457.000,       0.000!   !END!
1334 ! X =  -119.23662, -104.71472,     362.000,       0.000!   !END!
1335 ! X =  -119.23392, -104.46622,     327.000,       0.000!   !END!
1336 ! X =  -119.23122, -104.21772,     308.000,       0.000!   !END!
1337 ! X =  -119.22852, -103.96922,     426.000,       0.000!   !END!
1338 ! X =  -119.22592, -103.72061,     445.000,       0.000!   !END!
1339 ! X =  -119.22322,  -103.4721,     426.000,       0.000!   !END!
1340 ! X =  -119.22052,  -103.2236,     320.000,       0.000!   !END!
1341 ! X =  -119.21782, -102.97509,     402.000,       0.000!   !END!
1342 ! X =  -119.21511, -102.72649,     487.000,       0.000!   !END!
1343 ! X =  -119.21251, -102.47798,     519.000,       0.000!   !END!
1344 ! X =  -119.20982, -102.22947,     543.000,       0.000!   !END!
1345 ! X =  -119.20712, -101.98097,     548.000,       0.000!   !END!
1346 ! X =  -119.20442, -101.73246,     506.000,       0.000!   !END!
1347 ! X =  -119.20171, -101.48386,     499.000,       0.000!   !END!
1348 ! X =  -119.19901, -101.23535,     564.000,       0.000!   !END!
1349 ! X =  -119.19641, -100.98684,     591.000,       0.000!   !END!
1350 ! X =  -119.19371, -100.73833,     594.000,       0.000!   !END!
1351 ! X =  -119.19101, -100.48983,     595.000,       0.000!   !END!
1352 ! X =  -119.01873, -107.45129,     396.000,       0.000!   !END!
1353 ! X =  -119.01603, -107.20279,     396.000,       0.000!   !END!
1354 ! X =  -119.01333, -106.95419,     435.000,       0.000!   !END!
1355 ! X =  -119.01063, -106.70569,     457.000,       0.000!   !END!
1356 ! X =  -119.00793, -106.45719,     457.000,       0.000!   !END!
1357 ! X =  -119.00532, -106.20858,     463.000,       0.000!   !END!
1358 ! X =  -119.00262, -105.96008,     464.000,       0.000!   !END!
1359 ! X =  -118.99992, -105.71158,     457.000,       0.000!   !END!
1360 ! X =  -118.99722, -105.46308,     448.000,       0.000!   !END!
1361 ! X =  -118.99452, -105.21447,     418.000,       0.000!   !END!
1362 ! X =  -118.99182, -104.96597,     342.000,       0.000!   !END!
1363 ! X =  -118.98922, -104.71746,     396.000,       0.000!   !END!
1364 ! X =  -118.98651, -104.46886,     396.000,       0.000!   !END!
1365 ! X =  -118.98381, -104.22036,     457.000,       0.000!   !END!
1366 ! X =  -118.98111, -103.97185,     487.000,       0.000!   !END!
1367 ! X =  -118.97841, -103.72335,     487.000,       0.000!   !END!
1368 ! X =  -118.97581, -103.47474,     426.000,       0.000!   !END!
1369 ! X =  -118.97311, -103.22624,     320.000,       0.000!   !END!
1370 ! X =  -118.97041, -102.97773,     404.000,       0.000!   !END!
1371 ! X =  -118.96771, -102.72923,     472.000,       0.000!   !END!
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1372 ! X =    -118.965, -102.48062,     519.000,       0.000!   !END!
1373 ! X =   -118.9624, -102.23211,     579.000,       0.000!   !END!
1374 ! X =   -118.9597, -101.98361,     580.000,       0.000!   !END!
1375 ! X =    -118.957,  -101.7351,     583.000,       0.000!   !END!
1376 ! X =   -118.9543,  -101.4866,     559.000,       0.000!   !END!
1377 ! X =   -118.9516, -101.23799,     595.000,       0.000!   !END!
1378 ! X =    -118.949, -100.98948,     633.000,       0.000!   !END!
1379 ! X =   -118.9463, -100.74097,     648.000,       0.000!   !END!
1380 ! X =   -118.9436, -100.49247,     650.000,       0.000!   !END!
1381 ! X =   -118.9409, -100.24396,     648.000,       0.000!   !END!
1382 ! X =  -118.77122, -107.45394,     415.000,       0.000!   !END!
1383 ! X =  -118.76862, -107.20543,     443.000,       0.000!   !END!
1384 ! X =  -118.76592, -106.95693,     457.000,       0.000!   !END!
1385 ! X =  -118.76322, -106.70833,     457.000,       0.000!   !END!
1386 ! X =  -118.76052, -106.45983,     457.000,       0.000!   !END!
1387 ! X =  -118.75782, -106.21133,     457.000,       0.000!   !END!
1388 ! X =  -118.75521, -105.96272,     411.000,       0.000!   !END!
1389 ! X =  -118.75251, -105.71422,     335.000,       0.000!   !END!
1390 ! X =  -118.74981, -105.46572,     335.000,       0.000!   !END!
1391 ! X =  -118.74711, -105.21711,     312.000,       0.000!   !END!
1392 ! X =  -118.74441, -104.96861,     315.000,       0.000!   !END!
1393 ! X =  -118.74171, -104.72011,     396.000,       0.000!   !END!
1394 ! X =  -118.73911,  -104.4716,     405.000,       0.000!   !END!
1395 ! X =   -118.7364,   -104.223,     460.000,       0.000!   !END!
1396 ! X =   -118.7337, -103.97449,     487.000,       0.000!   !END!
1397 ! X =    -118.731, -103.72599,     457.000,       0.000!   !END!
1398 ! X =   -118.7283, -103.47749,     411.000,       0.000!   !END!
1399 ! X =   -118.7257, -103.22888,     319.000,       0.000!   !END!
1400 ! X =    -118.723, -102.98037,     388.000,       0.000!   !END!
1401 ! X =   -118.7203, -102.73187,     472.000,       0.000!   !END!
1402 ! X =   -118.7176, -102.48336,     519.000,       0.000!   !END!
1403 ! X =  -118.71489, -102.23476,     579.000,       0.000!   !END!
1404 ! X =  -118.71229, -101.98625,     593.000,       0.000!   !END!
1405 ! X =  -118.70959, -101.73774,     613.000,       0.000!   !END!
1406 ! X =  -118.70689, -101.48924,     640.000,       0.000!   !END!
1407 ! X =  -118.70419, -101.24073,     640.000,       0.000!   !END!
1408 ! X =  -118.70149, -100.99212,     670.000,       0.000!   !END!
1409 ! X =  -118.69889, -100.74361,     670.000,       0.000!   !END!
1410 ! X =  -118.69619, -100.49511,     670.000,       0.000!   !END!
1411 ! X =  -118.69349,  -100.2466,     670.000,       0.000!   !END!
1412 ! X =  -118.69079,  -99.99809,     645.000,       0.000!   !END!
1413 ! X =  -118.68809,  -99.74958,     633.000,       0.000!   !END!
1414 ! X =  -118.68549,  -99.50107,     640.000,       0.000!   !END!
1415 ! X =  -118.68278,  -99.25246,     640.000,       0.000!   !END!
1416 ! X =  -118.52382, -107.45668,     487.000,       0.000!   !END!
1417 ! X =  -118.52112, -107.20808,     464.000,       0.000!   !END!
1418 ! X =  -118.51842, -106.95958,     457.000,       0.000!   !END!
1419 ! X =  -118.51582, -106.71107,     457.000,       0.000!   !END!
1420 ! X =  -118.51311, -106.46247,     457.000,       0.000!   !END!
1421 ! X =  -118.51041, -106.21397,     405.000,       0.000!   !END!
1422 ! X =  -118.50771, -105.96547,     364.000,       0.000!   !END!
1423 ! X =  -118.50501, -105.71686,     380.000,       0.000!   !END!
1424 ! X =  -118.50241, -105.46836,     423.000,       0.000!   !END!
1425 ! X =  -118.49971, -105.21985,     427.000,       0.000!   !END!
1426 ! X =    -118.497, -104.97125,     377.000,       0.000!   !END!
1427 ! X =   -118.4943, -104.72275,     358.000,       0.000!   !END!
1428 ! X =   -118.4916, -104.47425,     396.000,       0.000!   !END!
1429 ! X =    -118.489, -104.22574,     396.000,       0.000!   !END!
1430 ! X =  -118.48629, -103.97714,     414.000,       0.000!   !END!
1431 ! X =  -118.48359, -103.72863,     381.000,       0.000!   !END!
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1432 ! X =  -118.48089, -103.48013,     364.000,       0.000!   !END!
1433 ! X =  -118.47819, -103.23162,     323.000,       0.000!   !END!
1434 ! X =  -118.47559, -102.98301,     457.000,       0.000!   !END!
1435 ! X =  -118.47289, -102.73451,     508.000,       0.000!   !END!
1436 ! X =  -118.47019,   -102.486,     530.000,       0.000!   !END!
1437 ! X =  -118.46749,  -102.2375,     561.000,       0.000!   !END!
1438 ! X =  -118.46478, -101.98889,     590.000,       0.000!   !END!
1439 ! X =  -118.46218, -101.74038,     620.000,       0.000!   !END!
1440 ! X =  -118.45948, -101.49188,     656.000,       0.000!   !END!
1441 ! X =  -118.45678, -101.24337,     670.000,       0.000!   !END!
1442 ! X =  -118.45408, -100.99486,     670.000,       0.000!   !END!
1443 ! X =  -118.45138, -100.74636,     670.000,       0.000!   !END!
1444 ! X =  -118.44877, -100.49775,     670.000,       0.000!   !END!
1445 ! X =  -118.44607, -100.24924,     670.000,       0.000!   !END!
1446 ! X =  -118.44337, -100.00073,     653.000,       0.000!   !END!
1447 ! X =  -118.44067,  -99.75222,     627.000,       0.000!   !END!
1448 ! X =  -118.43797,  -99.50372,     614.000,       0.000!   !END!
1449 ! X =  -118.43537,   -99.2552,     617.000,       0.000!   !END!
1450 ! X =  -118.27642, -107.45932,     497.000,       0.000!   !END!
1451 ! X =  -118.27371, -107.21072,     474.000,       0.000!   !END!
1452 ! X =  -118.27101, -106.96222,     458.000,       0.000!   !END!
1453 ! X =  -118.26831, -106.71371,     423.000,       0.000!   !END!
1454 ! X =   -118.2657, -106.46511,     407.000,       0.000!   !END!
1455 ! X =    -118.263, -106.21661,     432.000,       0.000!   !END!
1456 ! X =   -118.2603, -105.96811,     450.000,       0.000!   !END!
1457 ! X =   -118.2576,  -105.7195,     480.000,       0.000!   !END!
1458 ! X =   -118.2549,   -105.471,     500.000,       0.000!   !END!
1459 ! X =   -118.2523, -105.22249,     479.000,       0.000!   !END!
1460 ! X =   -118.2496, -104.97399,     426.000,       0.000!   !END!
1461 ! X =  -118.24689, -104.72539,     426.000,       0.000!   !END!
1462 ! X =  -118.24419, -104.47689,     426.000,       0.000!   !END!
1463 ! X =  -118.24149, -104.22838,     396.000,       0.000!   !END!
1464 ! X =  -118.23889, -103.97987,     328.000,       0.000!   !END!
1465 ! X =  -118.23618, -103.73127,     310.000,       0.000!   !END!
1466 ! X =  -118.23348, -103.48277,     322.000,       0.000!   !END!
1467 ! X =  -118.23078, -103.23426,     335.000,       0.000!   !END!
1468 ! X =  -118.22808, -102.98576,     422.000,       0.000!   !END!
1469 ! X =  -118.22548, -102.73715,     477.000,       0.000!   !END!
1470 ! X =  -118.22278, -102.48864,     518.000,       0.000!   !END!
1471 ! X =  -118.22008, -102.24014,     518.000,       0.000!   !END!
1472 ! X =  -118.21737, -101.99163,     527.000,       0.000!   !END!
1473 ! X =  -118.21477, -101.74302,     609.000,       0.000!   !END!
1474 ! X =  -118.21207, -101.49452,     662.000,       0.000!   !END!
1475 ! X =  -118.20937, -101.24601,     671.000,       0.000!   !END!
1476 ! X =  -118.20667,  -100.9975,     674.000,       0.000!   !END!
1477 ! X =  -118.20397,   -100.749,     677.000,       0.000!   !END!
1478 ! X =  -118.20137, -100.50049,     675.000,       0.000!   !END!
1479 ! X =  -118.19866, -100.25188,     671.000,       0.000!   !END!
1480 ! X =  -118.19596, -100.00337,     652.000,       0.000!   !END!
1481 ! X =  -118.19326,  -99.75486,     633.000,       0.000!   !END!
1482 ! X =  -118.19056,  -99.50636,     623.000,       0.000!   !END!
1483 ! X =  -118.18796,  -99.25784,     609.000,       0.000!   !END!
1484 ! X =  -118.02901, -107.46196,     521.000,       0.000!   !END!
1485 ! X =  -118.02631, -107.21346,     477.000,       0.000!   !END!
1486 ! X =   -118.0236, -106.96486,     442.000,       0.000!   !END!
1487 ! X =   -118.0209, -106.71636,     436.000,       0.000!   !END!
1488 ! X =   -118.0182, -106.46785,     447.000,       0.000!   !END!
1489 ! X =   -118.0156, -106.21925,     475.000,       0.000!   !END!
1490 ! X =   -118.0129, -105.97075,     512.000,       0.000!   !END!
1491 ! X =   -118.0102, -105.72224,     548.000,       0.000!   !END!
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1492 !	X =	-118.00749,	-105.47364,	548.000,	0.000!	!END!
1493 !	X =	-118.00479,	-105.22514,	511.000,	0.000!	!END!
1494 !	X =	-118.00219,	-104.97663,	457.000,	0.000!	!END!
1495 !	X =	-117.99949,	-104.72813,	473.000,	0.000!	!END!
1496 !	X =	-117.99678,	-104.47953,	474.000,	0.000!	!END!
1497 !	X =	-117.99408,	-104.23102,	452.000,	0.000!	!END!
1498 !	X =	-117.99138,	-103.98252,	431.000,	0.000!	!END!
1499 !	X =	-117.98877,	-103.73391,	329.000,	0.000!	!END!
1500 !	X =	-117.98607,	-103.48541,	304.000,	0.000!	!END!
1501 !	X =	-117.98337,	-103.2369,	314.000,	0.000!	!END!
1502 !	X =	-117.98067,	-102.9884,	354.000,	0.000!	!END!
1503 !	X =	-117.97807,	-102.73989,	396.000,	0.000!	!END!
1504 !	X =	-117.97536,	-102.49129,	398.000,	0.000!	!END!
1505 !	X =	-117.97266,	-102.24278,	385.000,	0.000!	!END!
1506 !	X =	-117.96996,	-101.99427,	481.000,	0.000!	!END!
1507 !	X =	-117.96726,	-101.74577,	566.000,	0.000!	!END!
1508 !	X =	-117.96466,	-101.49716,	635.000,	0.000!	!END!
1509 !	X =	-117.96196,	-101.24865,	673.000,	0.000!	!END!
1510 !	X =	-117.95925,	-101.00015,	680.000,	0.000!	!END!
1511 !	X =	-117.95655,	-100.75164,	683.000,	0.000!	!END!
1512 !	X =	-117.95385,	-100.50313,	675.000,	0.000!	!END!
1513 !	X =	-117.95125,	-100.25462,	670.000,	0.000!	!END!
1514 !	X =	-117.94855,	-100.00601,	649.000,	0.000!	!END!
1515 !	X =	-117.94585,	-99.7575,	640.000,	0.000!	!END!
1516 !	X =	-117.94315,	-99.509,	640.000,	0.000!	!END!
1517 !	X =	-117.94044,	-99.26049,	640.000,	0.000!	!END!
1518 !	X =	-117.78421,	-107.7131,	596.000,	0.000!	!END!
1519 !	X =	-117.7815,	-107.4646,	567.000,	0.000!	!END!
1520 !	X =	-117.7788,	-107.2161,	534.000,	0.000!	!END!
1521 !	X =	-117.7762,	-106.9675,	506.000,	0.000!	!END!
1522 !	X =	-117.7735,	-106.719,	502.000,	0.000!	!END!
1523 !	X =	-117.7708,	-106.4705,	524.000,	0.000!	!END!
1524 !	X =	-117.76809,	-106.22199,	552.000,	0.000!	!END!
1525 !	X =	-117.76549,	-105.97339,	579.000,	0.000!	!END!
1526 !	X =	-117.76279,	-105.72489,	592.000,	0.000!	!END!
1527 !	X =	-117.76009,	-105.47638,	609.000,	0.000!	!END!
1528 !	X =	-117.75738,	-105.22778,	554.000,	0.000!	!END!
1529 !	X =	-117.75468,	-104.97928,	534.000,	0.000!	!END!
1530 !	X =	-117.75208,	-104.73077,	518.000,	0.000!	!END!
1531 !	X =	-117.74937,	-104.48217,	518.000,	0.000!	!END!
1532 !	X =	-117.74667,	-104.23367,	498.000,	0.000!	!END!
1533 !	X =	-117.74397,	-103.98516,	478.000,	0.000!	!END!
1534 !	X =	-117.74127,	-103.73666,	429.000,	0.000!	!END!
1535 !	X =	-117.73866,	-103.48805,	329.000,	0.000!	!END!
1536 !	X =	-117.73596,	-103.23955,	307.000,	0.000!	!END!
1537 !	X =	-117.73326,	-102.99104,	305.000,	0.000!	!END!
1538 !	X =	-117.73056,	-102.74254,	335.000,	0.000!	!END!
1539 !	X =	-117.72796,	-102.49403,	350.000,	0.000!	!END!
1540 !	X =	-117.72525,	-102.24542,	437.000,	0.000!	!END!
1541 !	X =	-117.72255,	-101.99692,	457.000,	0.000!	!END!
1542 !	X =	-117.71985,	-101.74841,	508.000,	0.000!	!END!
1543 !	X =	-117.71715,	-101.4999,	617.000,	0.000!	!END!
1544 !	X =	-117.71455,	-101.25139,	673.000,	0.000!	!END!
1545 !	X =	-117.71184,	-101.00279,	686.000,	0.000!	!END!
1546 !	X =	-117.70914,	-100.75428,	688.000,	0.000!	!END!
1547 !	X =	-117.70644,	-100.50577,	677.000,	0.000!	!END!
1548 !	X =	-117.70384,	-100.25726,	670.000,	0.000!	!END!
1549 !	X =	-117.70114,	-100.00875,	651.000,	0.000!	!END!
1550 !	X =	-117.69843,	-99.76015,	640.000,	0.000!	!END!
1551 !	X =	-117.69573,	-99.51164,	640.000,	0.000!	!END!

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1552 ! X =  -117.69303,  -99.26313,     640.000,        0.000!   !END!
1553 ! X =  -117.54211, -108.21285,     658.000,        0.000!   !END!
1554 ! X =  -117.53951, -107.96434,     670.000,        0.000!   !END!
1555 ! X =   -117.5368, -107.71584,     658.000,        0.000!   !END!
1556 ! X =   -117.5341, -107.46724,     640.000,        0.000!   !END!
1557 ! X =   -117.5314, -107.21874,     589.000,        0.000!   !END!
1558 ! X =   -117.5287, -106.97024,     580.000,        0.000!   !END!
1559 ! X =  -117.52609, -106.72164,     559.000,        0.000!   !END!
1560 ! X =  -117.52339, -106.47314,     583.000,        0.000!   !END!
1561 ! X =  -117.52069, -106.22464,     624.000,        0.000!   !END!
1562 ! X =  -117.51798, -105.97603,     646.000,        0.000!   !END!
1563 ! X =  -117.51538, -105.72753,     644.000,        0.000!   !END!
1564 ! X =  -117.51268, -105.47902,     640.000,        0.000!   !END!
1565 ! X =  -117.50998, -105.23052,     614.000,        0.000!   !END!
1566 ! X =  -117.50727, -104.98192,     579.000,        0.000!   !END!
1567 ! X =  -117.50457, -104.73342,     534.000,        0.000!   !END!
1568 ! X =  -117.50197, -104.48491,     518.000,        0.000!   !END!
1569 ! X =  -117.49926, -104.23631,     511.000,        0.000!   !END!
1570 ! X =  -117.49656,  -103.9878,     487.000,        0.000!   !END!
1571 ! X =  -117.49386,  -103.7393,     463.000,        0.000!   !END!
1572 ! X =  -117.49126, -103.49079,     348.000,        0.000!   !END!
1573 ! X =  -117.48855, -103.24219,     306.000,        0.000!   !END!
1574 ! X =  -117.48585, -102.99368,     304.000,        0.000!   !END!
1575 ! X =  -117.48315, -102.74518,     330.000,        0.000!   !END!
1576 ! X =  -117.48045, -102.49667,     422.000,        0.000!   !END!
1577 ! X =  -117.47785, -102.24816,     512.000,        0.000!   !END!
1578 ! X =  -117.47514, -101.99956,     560.000,        0.000!   !END!
1579 ! X =  -117.47244, -101.75105,     609.000,        0.000!   !END!
1580 ! X =  -117.46974, -101.50255,     651.000,        0.000!   !END!
1581 ! X =  -117.46714, -101.25403,     673.000,        0.000!   !END!
1582 ! X =  -117.46444, -101.00553,     687.000,        0.000!   !END!
1583 ! X =  -117.46173, -100.75692,     694.000,        0.000!   !END!
1584 ! X =  -117.45903, -100.50841,     684.000,        0.000!   !END!
1585 ! X =  -117.45633, -100.25991,     671.000,        0.000!   !END!
1586 ! X =  -117.45372, -100.01139,     655.000,        0.000!   !END!
1587 ! X =  -117.45102,  -99.76289,     643.000,        0.000!   !END!
1588 ! X =  -117.44832,  -99.51438,     640.000,        0.000!   !END!
1589 ! X =  -117.44562,  -99.26577,     639.000,        0.000!   !END!
1590 ! X =  -117.29741, -108.46409,     687.000,        0.000!   !END!
1591 ! X =  -117.29471, -108.21559,     671.000,        0.000!   !END!
1592 ! X =    -117.292, -107.96699,     670.000,        0.000!   !END!
1593 ! X =   -117.2894, -107.71849,     670.000,        0.000!   !END!
1594 ! X =   -117.2867, -107.46999,     670.000,        0.000!   !END!
1595 ! X =  -117.28399, -107.22139,     651.000,        0.000!   !END!
1596 ! X =  -117.28129, -106.97288,     640.000,        0.000!   !END!
1597 ! X =  -117.27859, -106.72438,     640.000,        0.000!   !END!
1598 ! X =  -117.27598, -106.47578,     645.000,        0.000!   !END!
1599 ! X =  -117.27328, -106.22728,     670.000,        0.000!   !END!
1600 ! X =  -117.27058, -105.97878,     670.000,        0.000!   !END!
1601 ! X =  -117.26787, -105.73017,     670.000,        0.000!   !END!
1602 ! X =  -117.26527, -105.48167,     642.000,        0.000!   !END!
1603 ! X =  -117.26257, -105.23316,     640.000,        0.000!   !END!
1604 ! X =  -117.25986, -104.98456,     594.000,        0.000!   !END!
1605 ! X =  -117.25716, -104.73606,     534.000,        0.000!   !END!
1606 ! X =  -117.25446, -104.48756,     497.000,        0.000!   !END!
1607 ! X =  -117.25186, -104.23905,     482.000,        0.000!   !END!
1608 ! X =  -117.24915, -103.99044,     474.000,        0.000!   !END!
1609 ! X =  -117.24645, -103.74194,     437.000,        0.000!   !END!
1610 ! X =  -117.24375, -103.49344,     308.000,        0.000!   !END!
1611 ! X =  -117.24115, -103.24493,     320.000,        0.000!   !END!
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1612 ! X =  -117.23844, -102.99632,     320.000,        0.000!   !END!
1613 ! X =  -117.23574, -102.74782,     373.000,        0.000!   !END!
1614 ! X =  -117.23304, -102.49931,     449.000,        0.000!   !END!
1615 ! X =  -117.23034, -102.25081,     548.000,        0.000!   !END!
1616 ! X =  -117.22773,  -102.0022,     624.000,        0.000!   !END!
1617 ! X =  -117.22503, -101.75369,     676.000,        0.000!   !END!
1618 ! X =  -117.22233, -101.50519,     690.000,        0.000!   !END!
1619 ! X =  -117.21962, -101.25668,     698.000,        0.000!   !END!
1620 ! X =  -117.21702, -101.00817,     701.000,        0.000!   !END!
1621 ! X =  -117.21432, -100.75966,     698.000,        0.000!   !END!
1622 ! X =  -117.21161, -100.51106,     685.000,        0.000!   !END!
1623 ! X =  -117.20891, -100.26255,     671.000,        0.000!   !END!
1624 ! X =  -117.20631, -100.01404,     658.000,        0.000!   !END!
1625 ! X =  -117.20361,  -99.76553,     644.000,        0.000!   !END!
1626 ! X =  -117.20091,  -99.51702,     640.000,        0.000!   !END!
1627 ! X =  -117.19821,  -99.26851,     640.000,        0.000!   !END!
1628 ! X =  -117.05261, -108.71533,     662.000,        0.000!   !END!
1629 ! X =     -117.05, -108.46673,     672.000,        0.000!   !END!
1630 ! X =   -117.0473, -108.21823,     671.000,        0.000!   !END!
1631 ! X =  -117.04459, -107.96963,     670.000,        0.000!   !END!
1632 ! X =  -117.04189, -107.72113,     670.000,        0.000!   !END!
1633 ! X =  -117.03919, -107.47263,     670.000,        0.000!   !END!
1634 ! X =  -117.03658, -107.22403,     651.000,        0.000!   !END!
1635 ! X =  -117.03388, -106.97553,     642.000,        0.000!   !END!
1636 ! X =  -117.03118, -106.72703,     662.000,        0.000!   !END!
1637 ! X =  -117.02847, -106.47843,     670.000,        0.000!   !END!
1638 ! X =  -117.02587, -106.22992,     670.000,        0.000!   !END!
1639 ! X =  -117.02317, -105.98142,     670.000,        0.000!   !END!
1640 ! X =  -117.02046, -105.73282,     651.000,        0.000!   !END!
1641 ! X =  -117.01776, -105.48431,     642.000,        0.000!   !END!
1642 ! X =  -117.01516, -105.23581,     632.000,        0.000!   !END!
1643 ! X =  -117.01246,  -104.9873,     579.000,        0.000!   !END!
1644 ! X =  -117.00975,  -104.7387,     497.000,        0.000!   !END!
1645 ! X =  -117.00705,  -104.4902,     437.000,        0.000!   !END!
1646 ! X =  -117.00435, -104.24169,     436.000,        0.000!   !END!
1647 ! X =  -117.00175, -103.99319,     426.000,        0.000!   !END!
1648 ! X =  -116.99904, -103.74458,     363.000,        0.000!   !END!
1649 ! X =  -116.99634, -103.49608,     306.000,        0.000!   !END!
1650 ! X =  -116.99364, -103.24757,     365.000,        0.000!   !END!
1651 ! X =  -116.99103, -102.99906,     385.000,        0.000!   !END!
1652 ! X =  -116.98833, -102.75046,     432.000,        0.000!   !END!
1653 ! X =  -116.98563, -102.50196,     492.000,        0.000!   !END!
1654 ! X =  -116.98292, -102.25345,     578.000,        0.000!   !END!
1655 ! X =  -116.98032, -102.00494,     639.000,        0.000!   !END!
1656 ! X =  -116.97761, -101.75633,     701.000,        0.000!   !END!
1657 ! X =  -116.97491, -101.50783,     701.000,        0.000!   !END!
1658 ! X =  -116.97221, -101.25932,     701.000,        0.000!   !END!
1659 ! X =  -116.96951, -101.01082,     701.000,        0.000!   !END!
1660 ! X =  -116.96691,  -100.7623,     701.000,        0.000!   !END!
1661 ! X =  -116.96421,  -100.5138,     683.000,        0.000!   !END!
1662 ! X =   -116.9615, -100.26519,     672.000,        0.000!   !END!
1663 ! X =  -116.80791, -108.96648,     609.000,        0.000!   !END!
1664 ! X =   -116.8052, -108.71798,     642.000,        0.000!   !END!
1665 ! X =   -116.8025, -108.46938,     654.000,        0.000!   !END!
1666 ! X =   -116.7998, -108.22088,     666.000,        0.000!   !END!
1667 ! X =  -116.79719, -107.97237,     665.000,        0.000!   !END!
1668 ! X =  -116.79449, -107.72377,     664.000,        0.000!   !END!
1669 ! X =  -116.79178, -107.47527,     650.000,        0.000!   !END!
1670 ! X =  -116.78908, -107.22677,     639.000,        0.000!   !END!
1671 ! X =  -116.78648, -106.97817,     641.000,        0.000!   !END!
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1672 ! X =  -116.78377, -106.72967,     658.000,       0.000!   !END!
1673 ! X =  -116.78107, -106.48117,     670.000,       0.000!   !END!
1674 ! X =  -116.77836, -106.23257,     670.000,       0.000!   !END!
1675 ! X =  -116.77576, -105.98406,     651.000,       0.000!   !END!
1676 ! X =  -116.77306, -105.73556,     640.000,       0.000!   !END!
1677 ! X =  -116.77035, -105.48696,     640.000,       0.000!   !END!
1678 ! X =  -116.76765, -105.23845,     612.000,       0.000!   !END!
1679 ! X =  -116.76505, -104.98995,     548.000,       0.000!   !END!
1680 ! X =  -116.76235, -104.74144,     457.000,       0.000!   !END!
1681 ! X =  -116.75964, -104.49284,     426.000,       0.000!   !END!
1682 ! X =  -116.75694, -104.24434,     346.000,       0.000!   !END!
1683 ! X =  -116.75424, -103.99583,     321.000,       0.000!   !END!
1684 ! X =  -116.75163, -103.74722,     315.000,       0.000!   !END!
1685 ! X =  -116.74893, -103.49872,     340.000,       0.000!   !END!
1686 ! X =  -116.74623, -103.25022,     409.000,       0.000!   !END!
1687 ! X =  -116.74352, -103.00171,     456.000,       0.000!   !END!
1688 ! X =  -116.74092,  -102.7532,     491.000,       0.000!   !END!
1689 ! X =  -116.73821,  -102.5046,     556.000,       0.000!   !END!
1690 ! X =  -116.73551, -102.25609,     603.000,       0.000!   !END!
1691 ! X =  -116.73281, -102.00759,     649.000,       0.000!   !END!
1692 ! X =  -116.73021, -101.75908,     701.000,       0.000!   !END!
1693 ! X =   -116.7275, -101.51047,     701.000,       0.000!   !END!
1694 ! X =   -116.7248, -101.26196,     701.000,       0.000!   !END!
1695 ! X =   -116.7221, -101.01346,     701.000,       0.000!   !END!
1696 ! X =   -116.7195, -100.76495,     701.000,       0.000!   !END!
1697 ! X =  -116.71679, -100.51644,     673.000,       0.000!   !END!
1698 ! X =  -116.56311, -109.21772,     562.000,       0.000!   !END!
1699 ! X =   -116.5604, -108.96912,     571.000,       0.000!   !END!
1700 ! X =   -116.5578, -108.72062,     615.000,       0.000!   !END!
1701 ! X =   -116.5551, -108.47212,     626.000,       0.000!   !END!
1702 ! X =  -116.55239, -108.22352,     640.000,       0.000!   !END!
1703 ! X =  -116.54969, -107.97502,     640.000,       0.000!   !END!
1704 ! X =  -116.54708, -107.72642,     640.000,       0.000!   !END!
1705 ! X =  -116.54438, -107.47792,     640.000,       0.000!   !END!
1706 ! X =  -116.54168, -107.22942,     619.000,       0.000!   !END!
1707 ! X =  -116.53897, -106.98082,     624.000,       0.000!   !END!
1708 ! X =  -116.53637, -106.73231,     646.000,       0.000!   !END!
1709 ! X =  -116.53366, -106.48381,     648.000,       0.000!   !END!
1710 ! X =  -116.53096, -106.23521,     646.000,       0.000!   !END!
1711 ! X =  -116.52826, -105.98671,     640.000,       0.000!   !END!
1712 ! X =  -116.52565,  -105.7382,     609.000,       0.000!   !END!
1713 ! X =  -116.52295,  -105.4897,     609.000,       0.000!   !END!
1714 ! X =  -116.52024,  -105.2411,     587.000,       0.000!   !END!
1715 ! X =  -116.51754, -104.99259,     534.000,       0.000!   !END!
1716 ! X =  -116.51494, -104.74408,     434.000,       0.000!   !END!
1717 ! X =  -116.51223, -104.49548,     345.000,       0.000!   !END!
1718 ! X =  -116.50953, -104.24698,     309.000,       0.000!   !END!
1719 ! X =  -116.50683, -103.99848,     294.000,       0.000!   !END!
1720 ! X =  -116.50422, -103.74997,     346.000,       0.000!   !END!
1721 ! X =  -116.50152, -103.50136,     425.000,       0.000!   !END!
1722 ! X =  -116.49882, -103.25286,     457.000,       0.000!   !END!
1723 ! X =  -116.49611, -103.00435,     527.000,       0.000!   !END!
1724 ! X =  -116.49341, -102.75585,     586.000,       0.000!   !END!
1725 ! X =   -116.4908, -102.50724,     634.000,       0.000!   !END!
1726 ! X =   -116.4881, -102.25873,     670.000,       0.000!   !END!
1727 ! X =   -116.4854, -102.01023,     674.000,       0.000!   !END!
1728 ! X =   -116.4827, -101.76172,     701.000,       0.000!   !END!
1729 ! X =  -116.48009, -101.51321,     701.000,       0.000!   !END!
1730 ! X =  -116.47739, -101.26461,     701.000,       0.000!   !END!
1731 ! X =  -116.47469,  -101.0161,     699.000,       0.000!   !END!
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1732 ! X =  -116.47198, -100.76759,     674.000,       0.000!   !END!
1733 ! X =  -116.46938, -100.51908,     670.000,       0.000!   !END!
1734 ! X =  -116.31841, -109.46886,     548.000,       0.000!   !END!
1735 ! X =   -116.3157, -109.22036,     516.000,       0.000!   !END!
1736 ! X =    -116.313, -108.97177,     536.000,       0.000!   !END!
1737 ! X =   -116.3103, -108.72327,     555.000,       0.000!   !END!
1738 ! X =  -116.30769, -108.47476,     583.000,       0.000!   !END!
1739 ! X =  -116.30498, -108.22616,     604.000,       0.000!   !END!
1740 ! X =  -116.30228, -107.97766,     620.000,       0.000!   !END!
1741 ! X =  -116.29958, -107.72916,     634.000,       0.000!   !END!
1742 ! X =  -116.29697, -107.48056,     640.000,       0.000!   !END!
1743 ! X =  -116.29427, -107.23206,     619.000,       0.000!   !END!
1744 ! X =  -116.29157, -106.98356,     609.000,       0.000!   !END!
1745 ! X =  -116.28886, -106.73496,     615.000,       0.000!   !END!
1746 ! X =  -116.28626, -106.48645,     609.000,       0.000!   !END!
1747 ! X =  -116.28355, -106.23795,     573.000,       0.000!   !END!
1748 ! X =  -116.28085, -105.98935,     569.000,       0.000!   !END!
1749 ! X =  -116.27815, -105.74085,     548.000,       0.000!   !END!
1750 ! X =  -116.27554, -105.49234,     553.000,       0.000!   !END!
1751 ! X =  -116.27283, -105.24374,     557.000,       0.000!   !END!
1752 ! X =  -116.27013, -104.99523,     524.000,       0.000!   !END!
1753 ! X =  -116.26743, -104.74673,     457.000,       0.000!   !END!
1754 ! X =  -116.26483, -104.49822,     342.000,       0.000!   !END!
1755 ! X =  -116.26212, -104.24962,     281.000,       0.000!   !END!
1756 ! X =  -116.25942, -104.00112,     317.000,       0.000!   !END!
1757 ! X =  -116.25672, -103.75261,     432.000,       0.000!   !END!
1758 ! X =  -116.25411,  -103.5041,     457.000,       0.000!   !END!
1759 ! X =   -116.2514,  -103.2555,     495.000,       0.000!   !END!
1760 ! X =   -116.2487,   -103.007,     562.000,       0.000!   !END!
1761 ! X =    -116.246, -102.75849,     615.000,       0.000!   !END!
1762 ! X =   -116.2434, -102.50998,     665.000,       0.000!   !END!
1763 ! X =  -116.24069, -102.26138,     670.000,       0.000!   !END!
1764 ! X =  -116.23799, -102.01287,     673.000,       0.000!   !END!
1765 ! X =  -116.23529, -101.76437,     688.000,       0.000!   !END!
1766 ! X =  -116.23268, -101.51585,     701.000,       0.000!   !END!
1767 ! X =   -116.0709, -109.47151,     531.000,       0.000!   !END!
1768 ! X =   -116.0683, -109.22301,     554.000,       0.000!   !END!
1769 ! X =   -116.0656, -108.97451,     595.000,       0.000!   !END!
1770 ! X =  -116.06289, -108.72591,     617.000,       0.000!   !END!
1771 ! X =  -116.06019, -108.47741,     640.000,       0.000!   !END!
1772 ! X =  -116.05758, -108.22881,     646.000,       0.000!   !END!
1773 ! X =  -116.05488, -107.98031,     642.000,       0.000!   !END!
1774 ! X =  -116.05217, -107.73181,     637.000,       0.000!   !END!
1775 ! X =  -116.04947, -107.48321,     623.000,       0.000!   !END!
1776 ! X =  -116.04686,  -107.2347,     612.000,       0.000!   !END!
1777 ! X =  -116.04416,  -106.9862,     584.000,       0.000!   !END!
1778 ! X =  -116.04145,  -106.7376,     562.000,       0.000!   !END!
1779 ! X =  -116.03875,  -106.4891,     539.000,       0.000!   !END!
1780 ! X =  -116.03615, -106.24059,     484.000,       0.000!   !END!
1781 ! X =  -116.03344, -105.99199,     464.000,       0.000!   !END!
1782 ! X =  -116.03074, -105.74349,     452.000,       0.000!   !END!
1783 ! X =  -116.02803, -105.49499,     487.000,       0.000!   !END!
1784 ! X =  -116.02543, -105.24648,     519.000,       0.000!   !END!
1785 ! X =  -116.02272, -104.99788,     493.000,       0.000!   !END!
1786 ! X =  -116.02002, -104.74937,     457.000,       0.000!   !END!
1787 ! X =  -116.01732, -104.50087,     304.000,       0.000!   !END!
1788 ! X =  -116.01471, -104.25226,     281.000,       0.000!   !END!
1789 ! X =  -116.01201, -104.00376,     317.000,       0.000!   !END!
1790 ! X =  -116.00931, -103.75526,     431.000,       0.000!   !END!
1791 ! X =   -116.0066, -103.50675,     468.000,       0.000!   !END!
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1792 ! X =  -116.00399, -103.25814,     498.000,        0.000!   !END!
1793 ! X =  -116.00129, -103.00964,     558.000,        0.000!   !END!
1794 ! X =  -115.99859, -102.76113,     601.000,        0.000!   !END!
1795 ! X =  -115.99589, -102.51263,     645.000,        0.000!   !END!
1796 ! X =  -115.99328, -102.26412,     670.000,        0.000!   !END!
1797 ! X =  -115.99058, -102.01551,     670.000,        0.000!   !END!
1798 ! X =  -115.98787, -101.76701,     673.000,        0.000!   !END!
1799 ! X =  -115.98517,  -101.5185,     692.000,        0.000!   !END!
1800 ! X =   -115.8235, -109.47425,     576.000,        0.000!   !END!
1801 ! X =   -115.8208, -109.22565,     618.000,        0.000!   !END!
1802 ! X =  -115.81819, -108.97715,     635.000,        0.000!   !END!
1803 ! X =  -115.81548, -108.72855,     645.000,        0.000!   !END!
1804 ! X =  -115.81278, -108.48005,     667.000,        0.000!   !END!
1805 ! X =  -115.81008, -108.23155,     670.000,        0.000!   !END!
1806 ! X =  -115.80747, -107.98295,     663.000,        0.000!   !END!
1807 ! X =  -115.80477, -107.73445,     643.000,        0.000!   !END!
1808 ! X =  -115.80207, -107.48595,     637.000,        0.000!   !END!
1809 ! X =  -115.79936, -107.23735,     628.000,        0.000!   !END!
1810 ! X =  -115.79675, -106.98884,     609.000,        0.000!   !END!
1811 ! X =  -115.79405, -106.74034,     585.000,        0.000!   !END!
1812 ! X =  -115.79134, -106.49174,     568.000,        0.000!   !END!
1813 ! X =  -115.78864, -106.24324,     564.000,        0.000!   !END!
1814 ! X =  -115.78604, -105.99473,     535.000,        0.000!   !END!
1815 ! X =  -115.78333, -105.74613,     479.000,        0.000!   !END!
1816 ! X =  -115.78063, -105.49763,     436.000,        0.000!   !END!
1817 ! X =  -115.77792, -105.24913,     428.000,        0.000!   !END!
1818 ! X =  -115.77531, -105.00052,     426.000,        0.000!   !END!
1819 ! X =  -115.77261, -104.75202,     426.000,        0.000!   !END!
1820 ! X =  -115.76991, -104.50351,     304.000,        0.000!   !END!
1821 ! X =  -115.76721, -104.25501,     304.000,        0.000!   !END!
1822 ! X =   -115.7646,  -104.0064,     284.000,        0.000!   !END!
1823 ! X =   -115.7619,  -103.7579,     374.000,        0.000!   !END!
1824 ! X =  -115.75919,  -103.5094,     447.000,        0.000!   !END!
1825 ! X =  -115.75649, -103.26089,     492.000,        0.000!   !END!
1826 ! X =  -115.75388, -103.01228,     518.000,        0.000!   !END!
1827 ! X =  -115.75118, -102.76378,     558.000,        0.000!   !END!
1828 ! X =  -115.74848, -102.51527,     603.000,        0.000!   !END!
1829 ! X =  -115.74577, -102.26677,     644.000,        0.000!   !END!
1830 ! X =  -115.74317, -102.01826,     670.000,        0.000!   !END!
1831 ! X =  -115.74046, -101.76965,     670.000,        0.000!   !END!
1832 ! X =  -115.73776, -101.52114,     675.000,        0.000!   !END!
1833 ! X =   -115.5761,  -109.4769,     609.000,        0.000!   !END!
1834 ! X =  -115.57339,  -109.2283,     626.000,        0.000!   !END!
1835 ! X =  -115.57069,  -108.9798,     640.000,        0.000!   !END!
1836 ! X =  -115.56808, -108.73129,     645.000,        0.000!   !END!
1837 ! X =  -115.56538,  -108.4827,     667.000,        0.000!   !END!
1838 ! X =  -115.56267,  -108.2342,     670.000,        0.000!   !END!
1839 ! X =  -115.55997,  -107.9856,     668.000,        0.000!   !END!
1840 ! X =  -115.55736, -107.73709,     653.000,        0.000!   !END!
1841 ! X =  -115.55466, -107.48859,     643.000,        0.000!   !END!
1842 ! X =  -115.55195, -107.23999,     640.000,        0.000!   !END!
1843 ! X =  -115.54925, -106.99149,     640.000,        0.000!   !END!
1844 ! X =  -115.54664, -106.74299,     619.000,        0.000!   !END!
1845 ! X =  -115.54394, -106.49438,     609.000,        0.000!   !END!
1846 ! X =  -115.54123, -106.24588,     609.000,        0.000!   !END!
1847 ! X =  -115.53853, -105.99738,     580.000,        0.000!   !END!
1848 ! X =  -115.53593, -105.74887,     536.000,        0.000!   !END!
1849 ! X =  -115.53322, -105.50027,     452.000,        0.000!   !END!
1850 ! X =  -115.53051, -105.25177,     426.000,        0.000!   !END!
1851 ! X =  -115.52781, -105.00327,     396.000,        0.000!   !END!
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1852 ! X =   -115.5252, -104.75466,     375.000,       0.000!   !END!
1853 ! X =   -115.5225, -104.50616,     335.000,       0.000!   !END!
1854 ! X =   -115.5198, -104.25765,     321.000,       0.000!   !END!
1855 ! X =  -115.51709, -104.00915,     304.000,       0.000!   !END!
1856 ! X =  -115.51449, -103.76054,     315.000,       0.000!   !END!
1857 ! X =  -115.51178, -103.51204,     386.000,       0.000!   !END!
1858 ! X =  -115.50908, -103.26353,     419.000,       0.000!   !END!
1859 ! X =  -115.50648, -103.01502,     457.000,       0.000!   !END!
1860 ! X =  -115.50377, -102.76642,     539.000,       0.000!   !END!
1861 ! X =  -115.50106, -102.51792,     580.000,       0.000!   !END!
1862 ! X =  -115.49836, -102.26941,     633.000,       0.000!   !END!
1863 ! X =  -115.49576,  -102.0209,     656.000,       0.000!   !END!
1864 ! X =  -115.32599, -109.23094,     623.000,       0.000!   !END!
1865 ! X =  -115.32328, -108.98244,     638.000,       0.000!   !END!
1866 ! X =  -115.32058, -108.73394,     640.000,       0.000!   !END!
1867 ! X =  -115.31787, -108.48534,     641.000,       0.000!   !END!
1868 ! X =  -115.31527, -108.23684,     667.000,       0.000!   !END!
1869 ! X =  -115.31256, -107.98834,     667.000,       0.000!   !END!
1870 ! X =  -115.30986, -107.73974,     661.000,       0.000!   !END!
1871 ! X =  -115.30725, -107.49124,     647.000,       0.000!   !END!
1872 ! X =  -115.30455, -107.24273,     640.000,       0.000!   !END!
1873 ! X =  -115.30184, -106.99413,     640.000,       0.000!   !END!
1874 ! X =  -115.29914, -106.74563,     640.000,       0.000!   !END!
1875 ! X =  -115.29653, -106.49713,     623.000,       0.000!   !END!
1876 ! X =  -115.29383, -106.24853,     613.000,       0.000!   !END!
1877 ! X =  -115.29112, -106.00003,     605.000,       0.000!   !END!
1878 ! X =  -115.28842, -105.75152,     579.000,       0.000!   !END!
1879 ! X =  -115.28581, -105.50292,     530.000,       0.000!   !END!
1880 ! X =  -115.28311, -105.25441,     520.000,       0.000!   !END!
1881 ! X =   -115.2804, -105.00591,     509.000,       0.000!   !END!
1882 ! X =   -115.2777, -104.75741,     440.000,       0.000!   !END!
1883 ! X =  -115.27509,  -104.5088,     384.000,       0.000!   !END!
1884 ! X =  -115.27239,  -104.2603,     350.000,       0.000!   !END!
1885 ! X =  -115.26968, -104.01179,     334.000,       0.000!   !END!
1886 ! X =  -115.26708, -103.76319,     325.000,       0.000!   !END!
1887 ! X =  -115.26437, -103.51468,     347.000,       0.000!   !END!
1888 ! X =  -115.26167, -103.26618,     389.000,       0.000!   !END!
1889 ! X =  -115.25897, -103.01767,     468.000,       0.000!   !END!
1890 ! X =  -115.25636, -102.76916,     512.000,       0.000!   !END!
1891 ! X =  -115.25365, -102.52056,     549.000,       0.000!   !END!
1892 ! X =  -115.25095, -102.27205,     590.000,       0.000!   !END!
1893 ! X =  -115.07849, -109.23369,     583.000,       0.000!   !END!
1894 ! X =  -115.07588, -108.98509,     609.000,       0.000!   !END!
1895 ! X =  -115.07318, -108.73659,     617.000,       0.000!   !END!
1896 ! X =  -115.07047, -108.48799,     620.000,       0.000!   !END!
1897 ! X =  -115.06776, -108.23949,     643.000,       0.000!   !END!
1898 ! X =  -115.06516, -107.99098,     658.000,       0.000!   !END!
1899 ! X =  -115.06245, -107.74238,     660.000,       0.000!   !END!
1900 ! X =  -115.05975, -107.49388,     649.000,       0.000!   !END!
1901 ! X =  -115.05714, -107.24538,     640.000,       0.000!   !END!
1902 ! X =  -115.05443, -106.99678,     640.000,       0.000!   !END!
1903 ! X =  -115.05173, -106.74828,     639.000,       0.000!   !END!
1904 ! X =  -115.04903, -106.49978,     623.000,       0.000!   !END!
1905 ! X =  -115.04642, -106.25117,     614.000,       0.000!   !END!
1906 ! X =  -115.04371, -106.00267,     609.000,       0.000!   !END!
1907 ! X =  -115.04101, -105.75417,     592.000,       0.000!   !END!
1908 ! X =  -115.03831, -105.50566,     579.000,       0.000!   !END!
1909 ! X =   -115.0357, -105.25706,     573.000,       0.000!   !END!
1910 ! X =  -115.03299, -105.00856,     548.000,       0.000!   !END!
1911 ! X =  -115.03029, -104.76005,     468.000,       0.000!   !END!
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1912 ! X =  -115.02768, -104.51144,     401.000,       0.000!   !END!
1913 ! X =  -115.02498, -104.26294,     360.000,       0.000!   !END!
1914 ! X =  -115.02227, -104.01444,     340.000,       0.000!   !END!
1915 ! X =  -115.01957, -103.76593,     335.000,       0.000!   !END!
1916 ! X =  -115.01696, -103.51733,     331.000,       0.000!   !END!
1917 ! X =  -115.01426, -103.26882,     375.000,       0.000!   !END!
1918 ! X =  -115.01155, -103.02032,     439.000,       0.000!   !END!
1919 ! X =  -115.00885, -102.77181,     478.000,       0.000!   !END!
1920 ! X =  -115.00624,  -102.5232,     501.000,       0.000!   !END!
1921 ! X =  -115.00354,  -102.2747,     523.000,       0.000!   !END!
1922 ! X =  -114.83108, -109.23633,     620.000,       0.000!   !END!
1923 ! X =  -114.82837, -108.98773,     626.000,       0.000!   !END!
1924 ! X =  -114.82577, -108.73923,     632.000,       0.000!   !END!
1925 ! X =  -114.82307, -108.49073,     640.000,       0.000!   !END!
1926 ! X =  -114.82036, -108.24213,     643.000,       0.000!   !END!
1927 ! X =  -114.81765, -107.99363,     651.000,       0.000!   !END!
1928 ! X =  -114.81505, -107.74513,     658.000,       0.000!   !END!
1929 ! X =  -114.81234, -107.49653,     651.000,       0.000!   !END!
1930 ! X =  -114.80964, -107.24803,     642.000,       0.000!   !END!
1931 ! X =  -114.80703, -106.99952,     640.000,       0.000!   !END!
1932 ! X =  -114.80432, -106.75092,     639.000,       0.000!   !END!
1933 ! X =  -114.80162, -106.50242,     620.000,       0.000!   !END!
1934 ! X =  -114.79892, -106.25392,     612.000,       0.000!   !END!
1935 ! X =  -114.79631, -106.00531,     610.000,       0.000!   !END!
1936 ! X =   -114.7936, -105.75681,     609.000,       0.000!   !END!
1937 ! X =   -114.7909, -105.50831,     580.000,       0.000!   !END!
1938 ! X =  -114.78819, -105.25971,     573.000,       0.000!   !END!
1939 ! X =  -114.78559,  -105.0112,     551.000,       0.000!   !END!
1940 ! X =  -114.78288,  -104.7627,     457.000,       0.000!   !END!
1941 ! X =  -114.78018, -104.51419,     400.000,       0.000!   !END!
1942 ! X =  -114.77757, -104.26559,     380.000,       0.000!   !END!
1943 ! X =  -114.77487, -104.01708,     360.000,       0.000!   !END!
1944 ! X =  -114.77216, -103.76858,     278.000,       0.000!   !END!
1945 ! X =  -114.76946, -103.52007,     320.000,       0.000!   !END!
1946 ! X =  -114.76685, -103.27146,     346.000,       0.000!   !END!
1947 ! X =  -114.76414, -103.02296,     386.000,       0.000!   !END!
1948 ! X =  -114.76144, -102.77446,     458.000,       0.000!   !END!
1949 ! X =  -114.75884, -102.52595,     462.000,       0.000!   !END!
1950 ! X =  -114.75613, -102.27734,     509.000,       0.000!   !END!
1951 ! X =  -114.58368, -109.23898,     640.000,       0.000!   !END!
1952 ! X =  -114.58097, -108.99048,     640.000,       0.000!   !END!
1953 ! X =  -114.57827, -108.74188,     640.000,       0.000!   !END!
1954 ! X =  -114.57566, -108.49338,     640.000,       0.000!   !END!
1955 ! X =  -114.57295, -108.24478,     643.000,       0.000!   !END!
1956 ! X =  -114.57025, -107.99628,     648.000,       0.000!   !END!
1957 ! X =  -114.56754, -107.74778,     649.000,       0.000!   !END!
1958 ! X =  -114.56493, -107.49917,     646.000,       0.000!   !END!
1959 ! X =  -114.56223, -107.25067,     641.000,       0.000!   !END!
1960 ! X =  -114.55953, -107.00217,     640.000,       0.000!   !END!
1961 ! X =  -114.55692, -106.75357,     617.000,       0.000!   !END!
1962 ! X =  -114.55421, -106.50506,     610.000,       0.000!   !END!
1963 ! X =  -114.55151, -106.25656,     610.000,       0.000!   !END!
1964 ! X =   -114.5488, -106.00796,     609.000,       0.000!   !END!
1965 ! X =  -114.54619, -105.75945,     596.000,       0.000!   !END!
1966 ! X =  -114.54349, -105.51095,     568.000,       0.000!   !END!
1967 ! X =  -114.54079, -105.26245,     548.000,       0.000!   !END!
1968 ! X =  -114.53818, -105.01384,     503.000,       0.000!   !END!
1969 ! X =  -114.53547, -104.76534,     487.000,       0.000!   !END!
1970 ! X =  -114.53277, -104.51684,     471.000,       0.000!   !END!
1971 ! X =  -114.53006, -104.26823,     406.000,       0.000!   !END!
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1972 ! X =  -114.52746, -104.01973,     320.000,       0.000!   !END!
1973 ! X =  -114.52475, -103.77122,     280.000,       0.000!   !END!
1974 ! X =  -114.52205, -103.52272,     300.000,       0.000!   !END!
1975 ! X =  -114.51944, -103.27411,     320.000,       0.000!   !END!
1976 ! X =  -114.51673,  -103.0256,     340.000,       0.000!   !END!
1977 ! X =  -114.51403,  -102.7771,     404.000,       0.000!   !END!
1978 ! X =  -114.51133, -102.52859,     471.000,       0.000!   !END!
1979 ! X =  -114.50872, -102.27998,     525.000,       0.000!   !END!
1980 ! X =  -114.33086, -108.74452,     639.000,       0.000!   !END!
1981 ! X =  -114.32816, -108.49603,     640.000,       0.000!   !END!
1982 ! X =  -114.32555, -108.24752,     640.000,       0.000!   !END!
1983 ! X =  -114.32284, -107.99892,     642.000,       0.000!   !END!
1984 ! X =  -114.32014, -107.75042,     642.000,       0.000!   !END!
1985 ! X =  -114.31743, -107.50182,     641.000,       0.000!   !END!
1986 ! X =  -114.31482, -107.25332,     640.000,       0.000!   !END!
1987 ! X =  -114.31212, -107.00482,     626.000,       0.000!   !END!
1988 ! X =  -114.30941, -106.75622,     612.000,       0.000!   !END!
1989 ! X =   -114.3068, -106.50771,     609.000,       0.000!   !END!
1990 ! X =   -114.3041, -106.25921,     605.000,       0.000!   !END!
1991 ! X =   -114.3014, -106.01071,     583.000,       0.000!   !END!
1992 ! X =  -114.29869,  -105.7621,     601.000,       0.000!   !END!
1993 ! X =  -114.29608,  -105.5136,     609.000,       0.000!   !END!
1994 ! X =  -114.29338, -105.26509,     596.000,       0.000!   !END!
1995 ! X =  -114.29067, -105.01649,     574.000,       0.000!   !END!
1996 ! X =  -114.28806, -104.76798,     548.000,       0.000!   !END!
1997 ! X =  -114.28536, -104.51948,     496.000,       0.000!   !END!
1998 ! X =  -114.28266, -104.27098,     441.000,       0.000!   !END!
1999 ! X =  -114.27995, -104.02238,     328.000,       0.000!   !END!
2000 ! X =  -114.27734, -103.77387,     297.000,       0.000!   !END!
2001 ! X =  -114.27464, -103.52536,     293.000,       0.000!   !END!
2002 ! X =  -114.27193, -103.27686,     297.000,       0.000!   !END!
2003 ! X =  -114.26932, -103.02825,     335.000,       0.000!   !END!
2004 ! X =  -114.26662, -102.77974,     441.000,       0.000!   !END!
2005 ! X =  -114.26391, -102.53124,     474.000,       0.000!   !END!
2006 ! X =  -114.07544, -108.00157,     640.000,       0.000!   !END!
2007 ! X =  -114.07273, -107.75307,     631.000,       0.000!   !END!
2008 ! X =  -114.07003, -107.50457,     626.000,       0.000!   !END!
2009 ! X =  -114.06732, -107.25597,     611.000,       0.000!   !END!
2010 ! X =  -114.06471, -107.00746,     609.000,       0.000!   !END!
2011 ! X =  -114.06201, -106.75896,     610.000,       0.000!   !END!
2012 ! X =   -114.0593, -106.51036,     609.000,       0.000!   !END!
2013 ! X =  -114.05669, -106.26185,     609.000,       0.000!   !END!
2014 ! X =  -114.05399, -106.01335,     610.000,       0.000!   !END!
2015 ! X =  -114.05128, -105.76475,     615.000,       0.000!   !END!
2016 ! X =  -114.04867, -105.51624,     614.000,       0.000!   !END!
2017 ! X =  -114.04597, -105.26774,     610.000,       0.000!   !END!
2018 ! X =  -114.04326, -105.01914,     608.000,       0.000!   !END!
2019 ! X =  -114.04056, -104.77063,     553.000,       0.000!   !END!
2020 ! X =  -114.03795, -104.52213,     496.000,       0.000!   !END!
2021 ! X =  -114.03525, -104.27362,     470.000,       0.000!   !END!
2022 ! X =  -114.03254, -104.02502,     419.000,       0.000!   !END!
2023 ! X =  -114.02993, -103.77651,     371.000,       0.000!   !END!
2024 ! X =  -114.02723, -103.52801,     318.000,       0.000!   !END!
2025 ! X =  -114.02452,  -103.2795,     282.000,       0.000!   !END!
2026 ! X =  -114.02181,  -103.0309,     335.000,       0.000!   !END!
2027 ! X =  -114.01921, -102.78239,     444.000,       0.000!   !END!
2028 ! X =   -114.0165, -102.53388,     480.000,       0.000!   !END!
2029 ! X =   -114.0138, -102.28538,     533.000,       0.000!   !END!
2030 ! X =  -114.01119, -102.03687,     612.000,       0.000!   !END!
2031 ! X =  -114.00848, -101.78826,     621.000,       0.000!   !END!
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2032 ! X =  -114.00578, -101.53976,     620.000,        0.000!   !END!
2033 ! X =  -114.00317, -101.29125,     614.000,        0.000!   !END!
2034 ! X =  -114.00047, -101.04274,     612.000,        0.000!   !END!
2035 ! X =  -113.99777, -100.79423,     609.000,        0.000!   !END!
2036 ! X =  -113.99506, -100.54563,     584.000,        0.000!   !END!
2037 ! X =  -113.99245, -100.29711,     502.000,        0.000!   !END!
2038 ! X =  -113.98975, -100.04861,     457.000,        0.000!   !END!
2039 ! X =  -113.98704,   -99.8001,     392.000,        0.000!   !END!
2040 ! X =  -113.98444,  -99.55159,     409.000,        0.000!   !END!
2041 ! X =  -113.98173,  -99.30308,     418.000,        0.000!   !END!
2042 ! X =  -113.81991, -107.25861,     579.000,        0.000!   !END!
2043 ! X =  -113.81721, -107.01011,     588.000,        0.000!   !END!
2044 ! X =   -113.8146,  -106.7616,     609.000,        0.000!   !END!
2045 ! X =  -113.81189,   -106.513,     613.000,        0.000!   !END!
2046 ! X =  -113.80919,  -106.2645,     619.000,        0.000!   !END!
2047 ! X =  -113.80658, -106.01599,     627.000,        0.000!   !END!
2048 ! X =  -113.80387, -105.76739,     637.000,        0.000!   !END!
2049 ! X =  -113.80117, -105.51889,     621.000,        0.000!   !END!
2050 ! X =  -113.79856, -105.27038,     613.000,        0.000!   !END!
2051 ! X =  -113.79586, -105.02188,     601.000,        0.000!   !END!
2052 ! X =  -113.79315, -104.77328,     548.000,        0.000!   !END!
2053 ! X =  -113.79044, -104.52478,     489.000,        0.000!   !END!
2054 ! X =  -113.78784, -104.27627,     462.000,        0.000!   !END!
2055 ! X =  -113.78513, -104.02776,     427.000,        0.000!   !END!
2056 ! X =  -113.78242, -103.77916,     396.000,        0.000!   !END!
2057 ! X =  -113.77982, -103.53065,     324.000,        0.000!   !END!
2058 ! X =  -113.77711, -103.28215,     277.000,        0.000!   !END!
2059 ! X =  -113.77441, -103.03364,     359.000,        0.000!   !END!
2060 ! X =   -113.7718, -102.78503,     448.000,        0.000!   !END!
2061 ! X =  -113.76909, -102.53653,     480.000,        0.000!   !END!
2062 ! X =  -113.76639, -102.28802,     525.000,        0.000!   !END!
2063 ! X =  -113.76378, -102.03951,     609.000,        0.000!   !END!
2064 ! X =  -113.76107, -101.79091,     610.000,        0.000!   !END!
2065 ! X =  -113.75837,  -101.5424,     610.000,        0.000!   !END!
2066 ! X =  -113.75566,  -101.2939,     609.000,        0.000!   !END!
2067 ! X =  -113.75306, -101.04538,     609.000,        0.000!   !END!
2068 ! X =  -113.75035, -100.79688,     609.000,        0.000!   !END!
2069 ! X =  -113.74765, -100.54837,     563.000,        0.000!   !END!
2070 ! X =  -113.74504, -100.29976,     481.000,        0.000!   !END!
2071 ! X =  -113.74233, -100.05125,     431.000,        0.000!   !END!
2072 ! X =  -113.73963,  -99.80274,     388.000,        0.000!   !END!
2073 ! X =  -113.73702,  -99.55423,     374.000,        0.000!   !END!
2074 ! X =  -113.73432,  -99.30572,     380.000,        0.000!   !END!
2075 ! X =  -113.55907, -106.01865,     640.000,        0.000!   !END!
2076 ! X =  -113.55647, -105.77014,     640.000,        0.000!   !END!
2077 ! X =  -113.55376, -105.52154,     625.000,        0.000!   !END!
2078 ! X =  -113.55105, -105.27303,     609.000,        0.000!   !END!
2079 ! X =  -113.54845, -105.02453,     542.000,        0.000!   !END!
2080 ! X =  -113.54574, -104.77592,     477.000,        0.000!   !END!
2081 ! X =  -113.54303, -104.52742,     450.000,        0.000!   !END!
2082 ! X =  -113.54043, -104.27891,     427.000,        0.000!   !END!
2083 ! X =  -113.53772, -104.03041,     411.000,        0.000!   !END!
2084 ! X =  -113.53501, -103.78181,     374.000,        0.000!   !END!
2085 ! X =  -113.53241,  -103.5333,     304.000,        0.000!   !END!
2086 ! X =   -113.5297, -103.28479,     288.000,        0.000!   !END!
2087 ! X =    -113.527, -103.03629,     351.000,        0.000!   !END!
2088 ! X =  -113.52429, -102.78768,     434.000,        0.000!   !END!
2089 ! X =  -113.52168, -102.53917,     482.000,        0.000!   !END!
2090 ! X =  -113.51898, -102.29067,     522.000,        0.000!   !END!
2091 ! X =  -113.51627, -102.04216,     581.000,        0.000!   !END!
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2092 ! X =  -113.51367, -101.79365,     609.000,       0.000!   !END!
2093 ! X =  -113.51096, -101.54505,     609.000,       0.000!   !END!
2094 ! X =  -113.50825, -101.29654,     589.000,       0.000!   !END!
2095 ! X =  -113.50565, -101.04803,     585.000,       0.000!   !END!
2096 ! X =  -113.50294, -100.79952,     541.000,       0.000!   !END!
2097 ! X =  -113.50024, -100.55102,     499.000,       0.000!   !END!
2098 ! X =  -113.49762,  -100.3024,     460.000,       0.000!   !END!
2099 ! X =  -113.49492,  -100.0539,     420.000,       0.000!   !END!
2100 ! X =  -113.49221,  -99.80539,     381.000,       0.000!   !END!
2101 ! X =  -113.48951,  -99.55688,     335.000,       0.000!   !END!
2102 ! X =   -113.4869,  -99.30837,     335.000,       0.000!   !END!
2103 ! X =  -113.30635, -105.52418,     618.000,       0.000!   !END!
2104 ! X =  -113.30364, -105.27568,     579.000,       0.000!   !END!
2105 ! X =  -113.30094, -105.02718,     522.000,       0.000!   !END!
2106 ! X =  -113.29833, -104.77867,     477.000,       0.000!   !END!
2107 ! X =  -113.29562, -104.53007,     444.000,       0.000!   !END!
2108 ! X =  -113.29292, -104.28156,     416.000,       0.000!   !END!
2109 ! X =  -113.29031, -104.03305,     347.000,       0.000!   !END!
2110 ! X =  -113.28761, -103.78455,     324.000,       0.000!   !END!
2111 ! X =   -113.2849, -103.53595,     293.000,       0.000!   !END!
2112 ! X =  -113.28229, -103.28744,     295.000,       0.000!   !END!
2113 ! X =  -113.27959, -103.03893,     340.000,       0.000!   !END!
2114 ! X =  -113.27688, -102.79043,     432.000,       0.000!   !END!
2115 ! X =  -113.27427, -102.54182,     465.000,       0.000!   !END!
2116 ! X =  -113.27156, -102.29331,     502.000,       0.000!   !END!
2117 ! X =  -113.26886, -102.04481,     553.000,       0.000!   !END!
2118 ! X =  -113.26625,  -101.7963,     609.000,       0.000!   !END!
2119 ! X =  -113.26354, -101.54769,     609.000,       0.000!   !END!
2120 ! X =  -113.26084, -101.29919,     609.000,       0.000!   !END!
2121 ! X =  -113.25813, -101.05068,     548.000,       0.000!   !END!
2122 ! X =  -113.25553, -100.80217,     480.000,       0.000!   !END!
2123 ! X =  -113.25282, -100.55366,     446.000,       0.000!   !END!
2124 ! X =  -113.25012, -100.30515,     429.000,       0.000!   !END!
2125 ! X =  -113.24751, -100.05654,     403.000,       0.000!   !END!
2126 ! X =   -113.2448,  -99.80803,     371.000,       0.000!   !END!
2127 ! X =   -113.2421,  -99.55953,     335.000,       0.000!   !END!
2128 ! X =  -113.23949,  -99.31101,     366.000,       0.000!   !END!
2129 ! X =  -113.05895, -105.52693,     616.000,       0.000!   !END!
2130 ! X =  -113.05624, -105.27833,     610.000,       0.000!   !END!
2131 ! X =  -113.05353, -105.02982,     574.000,       0.000!   !END!
2132 ! X =  -113.05092, -104.78131,     516.000,       0.000!   !END!
2133 ! X =  -113.04821, -104.53271,     462.000,       0.000!   !END!
2134 ! X =  -113.04551, -104.28421,     426.000,       0.000!   !END!
2135 ! X =   -113.0428, -104.03571,     397.000,       0.000!   !END!
2136 ! X =   -113.0402,  -103.7872,     355.000,       0.000!   !END!
2137 ! X =  -113.03749, -103.53859,     306.000,       0.000!   !END!
2138 ! X =  -113.03478, -103.29009,     288.000,       0.000!   !END!
2139 ! X =  -113.03218, -103.04158,     335.000,       0.000!   !END!
2140 ! X =  -113.02947, -102.79307,     382.000,       0.000!   !END!
2141 ! X =  -113.02676, -102.54447,     432.000,       0.000!   !END!
2142 ! X =  -113.02415, -102.29596,     480.000,       0.000!   !END!
2143 ! X =  -113.02145, -102.04745,     528.000,       0.000!   !END!
2144 ! X =  -113.01874, -101.79895,     569.000,       0.000!   !END!
2145 ! X =  -113.01614, -101.55044,     592.000,       0.000!   !END!
2146 ! X =  -113.01343, -101.30183,     587.000,       0.000!   !END!
2147 ! X =  -113.01072, -101.05332,     561.000,       0.000!   !END!
2148 ! X =  -113.00811, -100.80481,     475.000,       0.000!   !END!
2149 ! X =  -113.00541, -100.55631,     411.000,       0.000!   !END!
2150 ! X =   -113.0027,  -100.3078,     396.000,       0.000!   !END!
2151 ! X =   -113.0001, -100.05929,     365.000,       0.000!   !END!
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2152 ! X =  -112.99739,  -99.81068,     341.000,       0.000!   !END!
2153 ! X =  -112.99468,  -99.56217,     402.000,       0.000!   !END!
2154 ! X =  -112.99208,  -99.31366,     415.000,       0.000!   !END!
2155 ! X =  -112.98937,  -99.06515,     423.000,       0.000!   !END!
2156 ! X =  -112.81144, -105.52958,     640.000,       0.000!   !END!
2157 ! X =  -112.80883, -105.28097,     639.000,       0.000!   !END!
2158 ! X =  -112.80612, -105.03247,     615.000,       0.000!   !END!
2159 ! X =  -112.80342, -104.78397,     548.000,       0.000!   !END!
2160 ! X =  -112.80081, -104.53546,     491.000,       0.000!   !END!
2161 ! X =   -112.7981, -104.28685,     452.000,       0.000!   !END!
2162 ! X =  -112.79539, -104.03835,     425.000,       0.000!   !END!
2163 ! X =  -112.79279, -103.78984,     358.000,       0.000!   !END!
2164 ! X =  -112.79008, -103.54124,     315.000,       0.000!   !END!
2165 ! X =  -112.78737, -103.29273,     304.000,       0.000!   !END!
2166 ! X =  -112.78476, -103.04422,     285.000,       0.000!   !END!
2167 ! X =  -112.78206, -102.79572,     331.000,       0.000!   !END!
2168 ! X =  -112.77935, -102.54721,     388.000,       0.000!   !END!
2169 ! X =  -112.77674,  -102.2986,     448.000,       0.000!   !END!
2170 ! X =  -112.77404,  -102.0501,     470.000,       0.000!   !END!
2171 ! X =  -112.77133, -101.80159,     513.000,       0.000!   !END!
2172 ! X =  -112.76872, -101.55308,     553.000,       0.000!   !END!
2173 ! X =  -112.76602, -101.30458,     560.000,       0.000!   !END!
2174 ! X =  -112.76331, -101.05597,     541.000,       0.000!   !END!
2175 ! X =   -112.7607, -100.80746,     486.000,       0.000!   !END!
2176 ! X =    -112.758, -100.55895,     411.000,       0.000!   !END!
2177 ! X =  -112.75529, -100.31044,     372.000,       0.000!   !END!
2178 ! X =  -112.75258, -100.06194,     335.000,       0.000!   !END!
2179 ! X =  -112.74997,  -99.81332,     396.000,       0.000!   !END!
2180 ! X =  -112.74727,  -99.56482,     426.000,       0.000!   !END!
2181 ! X =  -112.74456,  -99.31631,     443.000,       0.000!   !END!
2182 ! X =  -112.74196,   -99.0678,     453.000,       0.000!   !END!
2183 ! X =  -112.56403, -105.53222,     640.000,       0.000!   !END!
2184 ! X =  -112.56132, -105.28362,     639.000,       0.000!   !END!
2185 ! X =  -112.55871, -105.03511,     619.000,       0.000!   !END!
2186 ! X =  -112.55601, -104.78661,     548.000,       0.000!   !END!
2187 ! X =   -112.5533, -104.53811,     491.000,       0.000!   !END!
2188 ! X =  -112.55069,  -104.2895,     457.000,       0.000!   !END!
2189 ! X =  -112.54798,   -104.041,     411.000,       0.000!   !END!
2190 ! X =  -112.54528, -103.79249,     359.000,       0.000!   !END!
2191 ! X =  -112.54267, -103.54398,     374.000,       0.000!   !END!
2192 ! X =  -112.53996, -103.29538,     362.000,       0.000!   !END!
2193 ! X =  -112.53725, -103.04688,     335.000,       0.000!   !END!
2194 ! X =  -112.53465, -102.79837,     296.000,       0.000!   !END!
2195 ! X =  -112.53194, -102.54986,     341.000,       0.000!   !END!
2196 ! X =  -112.52923, -102.30126,     388.000,       0.000!   !END!
2197 ! X =  -112.52662, -102.05275,     418.000,       0.000!   !END!
2198 ! X =  -112.52392, -101.80424,     468.000,       0.000!   !END!
2199 ! X =  -112.52121, -101.55573,     496.000,       0.000!   !END!
2200 ! X =  -112.51861, -101.30722,     518.000,       0.000!   !END!
2201 ! X =   -112.5159, -101.05862,     518.000,       0.000!   !END!
2202 ! X =  -112.51319, -100.81011,     464.000,       0.000!   !END!
2203 ! X =  -112.51058,  -100.5616,     410.000,       0.000!   !END!
2204 ! X =  -112.50788, -100.31309,     375.000,       0.000!   !END!
2205 ! X =  -112.50517, -100.06458,     337.000,       0.000!   !END!
2206 ! X =  -112.50256,  -99.81607,     396.000,       0.000!   !END!
2207 ! X =  -112.49985,  -99.56746,     427.000,       0.000!   !END!
2208 ! X =  -112.49715,  -99.31895,     464.000,       0.000!   !END!
2209 ! X =  -112.49454,  -99.07044,     517.000,       0.000!   !END!
2210 ! X =  -112.31392, -105.28637,     635.000,       0.000!   !END!
2211 ! X =   -112.3113, -105.03776,     601.000,       0.000!   !END!
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2212 ! X =   -112.3086, -104.78926,     525.000,        0.000!   !END!
2213 ! X =  -112.30589, -104.54075,     453.000,        0.000!   !END!
2214 ! X =  -112.30328, -104.29215,     426.000,        0.000!   !END!
2215 ! X =  -112.30057, -104.04364,     410.000,        0.000!   !END!
2216 ! X =  -112.29787, -103.79514,     434.000,        0.000!   !END!
2217 ! X =  -112.29526, -103.54663,     430.000,        0.000!   !END!
2218 ! X =  -112.29255, -103.29803,     421.000,        0.000!   !END!
2219 ! X =  -112.28984, -103.04952,     373.000,        0.000!   !END!
2220 ! X =  -112.28724, -102.80101,     304.000,        0.000!   !END!
2221 ! X =  -112.28453, -102.55251,     319.000,        0.000!   !END!
2222 ! X =  -112.28183,   -102.304,     353.000,        0.000!   !END!
2223 ! X =  -112.27921, -102.05539,     396.000,        0.000!   !END!
2224 ! X =  -112.27651, -101.80689,     426.000,        0.000!   !END!
2225 ! X =   -112.2738, -101.55838,     440.000,        0.000!   !END!
2226 ! X =  -112.27119, -101.30987,     457.000,        0.000!   !END!
2227 ! X =  -112.26849, -101.06136,     459.000,        0.000!   !END!
2228 ! X =  -112.26578, -100.81276,     432.000,        0.000!   !END!
2229 ! X =  -112.26317, -100.56424,     396.000,        0.000!   !END!
2230 ! X =  -112.26046, -100.31574,     365.000,        0.000!   !END!
2231 ! X =  -112.25776, -100.06723,     370.000,        0.000!   !END!
2232 ! X =  -112.25515,  -99.81872,     412.000,        0.000!   !END!
2233 ! X =  -112.25245,  -99.57021,     442.000,        0.000!   !END!
2234 ! X =  -112.24973,   -99.3216,     496.000,        0.000!   !END!
2235 ! X =  -112.24713,  -99.07309,     563.000,        0.000!   !END!
2236 ! X =  -112.06651, -105.28901,     612.000,        0.000!   !END!
2237 ! X =   -112.0638, -105.04041,     556.000,        0.000!   !END!
2238 ! X =  -112.06119,  -104.7919,     487.000,        0.000!   !END!
2239 ! X =  -112.05848,  -104.5434,     457.000,        0.000!   !END!
2240 ! X =  -112.05578,  -104.2949,     450.000,        0.000!   !END!
2241 ! X =  -112.05316, -104.04629,     470.000,        0.000!   !END!
2242 ! X =  -112.05046, -103.79779,     470.000,        0.000!   !END!
2243 ! X =  -112.04775, -103.54928,     460.000,        0.000!   !END!
2244 ! X =  -112.04515, -103.30077,     453.000,        0.000!   !END!
2245 ! X =  -112.04243, -103.05217,     418.000,        0.000!   !END!
2246 ! X =  -112.03973, -102.80366,     335.000,        0.000!   !END!
2247 ! X =  -112.03712, -102.55515,     313.000,        0.000!   !END!
2248 ! X =  -112.03441, -102.30665,     339.000,        0.000!   !END!
2249 ! X =   -112.0317, -102.05804,     372.000,        0.000!   !END!
2250 ! X =   -112.0291, -101.80953,     396.000,        0.000!   !END!
2251 ! X =  -112.02639, -101.56103,     387.000,        0.000!   !END!
2252 ! X =  -112.02368, -101.31252,     413.000,        0.000!   !END!
2253 ! X =  -112.02108, -101.06401,     415.000,        0.000!   !END!
2254 ! X =  -112.01836,  -100.8154,     396.000,        0.000!   !END!
2255 ! X =  -112.01566,  -100.5669,     376.000,        0.000!   !END!
2256 ! X =  -112.01305, -100.31838,     335.000,        0.000!   !END!
2257 ! X =  -112.01034, -100.06988,     379.000,        0.000!   !END!
2258 ! X =  -112.00764,  -99.82137,     416.000,        0.000!   !END!
2259 ! X =  -112.00503,  -99.57285,     449.000,        0.000!   !END!
2260 ! X =  -111.80305, -103.80043,     517.000,        0.000!   !END!
2261 ! X =  -111.80034, -103.55193,     501.000,        0.000!   !END!
2262 ! X =  -111.79773, -103.30342,     479.000,        0.000!   !END!
2263 ! X =  -111.79502, -103.05481,     456.000,        0.000!   !END!
2264 ! X =  -111.79232, -102.80631,     379.000,        0.000!   !END!
2265 ! X =  -111.78971,  -102.5578,     306.000,        0.000!   !END!
2266 ! X =    -111.787, -102.30929,     324.000,        0.000!   !END!
2267 ! X =  -111.78429, -102.06069,     346.000,        0.000!   !END!
2268 ! X =  -111.78168, -101.81218,     354.000,        0.000!   !END!
2269 ! X =  -111.77898, -101.56367,     356.000,        0.000!   !END!
2270 ! X =  -111.77627, -101.31517,     376.000,        0.000!   !END!
2271 ! X =  -111.77366, -101.06666,     383.000,        0.000!   !END!
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2272 ! X =  -111.77096, -100.81815,     376.000,        0.000!   !END!
2273 ! X =  -111.76824, -100.56954,     365.000,        0.000!   !END!
2274 ! X =  -111.76564, -100.32103,     335.000,        0.000!   !END!
2275 ! X =  -111.76293, -100.07252,     369.000,        0.000!   !END!
2276 ! X =  -111.76022,  -99.82401,     415.000,        0.000!   !END!
2277 ! X =  -111.75762,   -99.5755,     445.000,        0.000!   !END!
2278 ! X =  -111.55022, -103.30607,     538.000,        0.000!   !END!
2279 ! X =  -111.54761, -103.05746,     483.000,        0.000!   !END!
2280 ! X =  -111.54491, -102.80896,     427.000,        0.000!   !END!
2281 ! X =   -111.5422, -102.56045,     320.000,        0.000!   !END!
2282 ! X =  -111.53959, -102.31194,     306.000,        0.000!   !END!
2283 ! X =  -111.53688, -102.06344,     312.000,        0.000!   !END!
2284 ! X =  -111.53417, -101.81483,     318.000,        0.000!   !END!
2285 ! X =  -111.53156, -101.56632,     329.000,        0.000!   !END!
2286 ! X =  -111.52886, -101.31781,     351.000,        0.000!   !END!
2287 ! X =  -111.52615, -101.06931,     367.000,        0.000!   !END!
2288 ! X =  -111.52354,  -100.8208,     353.000,        0.000!   !END!
2289 ! X =  -111.52083, -100.57219,     335.000,        0.000!   !END!
2290 ! X =  -111.51822, -100.32368,     304.000,        0.000!   !END!
2291 ! X =  -111.51552, -100.07517,     342.000,        0.000!   !END!
2292 ! X =  -111.51281,  -99.82666,     382.000,        0.000!   !END!
2293 ! X =  -111.30281, -103.30872,     609.000,        0.000!   !END!
2294 ! X =  -111.30021, -103.06021,     518.000,        0.000!   !END!
2295 ! X =  -111.29749,  -102.8116,     445.000,        0.000!   !END!
2296 ! X =  -111.29479,  -102.5631,     386.000,        0.000!   !END!
2297 ! X =  -111.29218, -102.31459,     321.000,        0.000!   !END!
2298 ! X =  -111.28947, -102.06608,     284.000,        0.000!   !END!
2299 ! X =  -111.28676, -101.81748,     278.000,        0.000!   !END!
2300 ! X =  -111.28415, -101.56897,     307.000,        0.000!   !END!
2301 ! X =  -111.28145, -101.32046,     322.000,        0.000!   !END!
2302 ! X =  -111.27874, -101.07195,     336.000,        0.000!   !END!
2303 ! X =  -111.27613, -100.82344,     337.000,        0.000!   !END!
2304 ! X =  -111.27342, -100.57494,     335.000,        0.000!   !END!
2305 ! X =  -111.27071, -100.32633,     305.000,        0.000!   !END!
2306 ! X =   -111.2681, -100.07782,     338.000,        0.000!   !END!
2307 ! X =   -111.2654,  -99.82931,     381.000,        0.000!   !END!
2308 ! X =   -111.0554, -103.31137,     609.000,        0.000!   !END!
2309 ! X =   -111.0527, -103.06286,     518.000,        0.000!   !END!
2310 ! X =  -111.05008, -102.81425,     446.000,        0.000!   !END!
2311 ! X =  -111.04738, -102.56575,     414.000,        0.000!   !END!
2312 ! X =  -111.04467, -102.31724,     359.000,        0.000!   !END!
2313 ! X =  -111.04206, -102.06873,     313.000,        0.000!   !END!
2314 ! X =  -111.03935, -101.82023,     285.000,        0.000!   !END!
2315 ! X =  -111.03674, -101.57161,     275.000,        0.000!   !END!
2316 ! X =  -111.03403, -101.32311,     285.000,        0.000!   !END!
2317 ! X =  -111.03133,  -101.0746,     301.000,        0.000!   !END!
2318 ! X =  -111.02872, -100.82609,     315.000,        0.000!   !END!
2319 ! X =  -111.02601, -100.57758,     313.000,        0.000!   !END!
2320 ! X =   -111.0233, -100.32898,     305.000,        0.000!   !END!
2321 ! X =  -111.02069, -100.08046,     335.000,        0.000!   !END!
2322 ! X =  -111.01798,  -99.83196,     365.000,        0.000!   !END!
2323 ! X =  -110.80799, -103.31401,     532.000,        0.000!   !END!
2324 ! X =  -110.80529, -103.06551,     502.000,        0.000!   !END!
2325 ! X =  -110.80267,  -102.8169,     445.000,        0.000!   !END!
2326 ! X =  -110.79996, -102.56839,     396.000,        0.000!   !END!
2327 ! X =  -110.79726, -102.31989,     361.000,        0.000!   !END!
2328 ! X =  -110.79465, -102.07138,     313.000,        0.000!   !END!
2329 ! X =  -110.79194, -101.82287,     291.000,        0.000!   !END!
2330 ! X =  -110.78923, -101.57427,     274.000,        0.000!   !END!
2331 ! X =  -110.78662, -101.32576,     276.000,        0.000!   !END!
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2332 ! X =  -110.78391, -101.07725,     287.000,       0.000!   !END!
2333 ! X =  -110.78121, -100.82874,     304.000,       0.000!   !END!
2334 ! X =   -110.7786, -100.58023,     305.000,       0.000!   !END!
2335 ! X =  -110.77588, -100.33162,     294.000,       0.000!   !END!
2336 ! X =  -110.77328, -100.08311,     322.000,       0.000!   !END!
2337 ! X =  -110.77057,   -99.8346,     349.000,       0.000!   !END!
2338 ! X =  -110.56058, -103.31666,     471.000,       0.000!   !END!
2339 ! X =  -110.55788, -103.06816,     439.000,       0.000!   !END!
2340 ! X =  -110.55517, -102.81965,     411.000,       0.000!   !END!
2341 ! X =  -110.55255, -102.57104,     365.000,       0.000!   !END!
2342 ! X =  -110.54985, -102.32254,     335.000,       0.000!   !END!
2343 ! X =  -110.54714, -102.07403,     309.000,       0.000!   !END!
2344 ! X =  -110.54453, -101.82552,     290.000,       0.000!   !END!
2345 ! X =  -110.54182, -101.57692,     274.000,       0.000!   !END!
2346 ! X =  -110.53921,  -101.3284,     274.000,       0.000!   !END!
2347 ! X =   -110.5365,  -101.0799,     304.000,       0.000!   !END!
2348 ! X =  -110.53379, -100.83139,     304.000,       0.000!   !END!
2349 ! X =  -110.53118, -100.58288,     304.000,       0.000!   !END!
2350 ! X =  -110.31307, -103.31931,     433.000,       0.000!   !END!
2351 ! X =  -110.31046,  -103.0708,     401.000,       0.000!   !END!
2352 ! X =  -110.30776,  -102.8223,     348.000,       0.000!   !END!
2353 ! X =  -110.30514, -102.57369,     320.000,       0.000!   !END!
2354 ! X =  -110.30243, -102.32519,     304.000,       0.000!   !END!
2355 ! X =  -110.29973, -102.07668,     289.000,       0.000!   !END!
2356 ! X =  -110.29712, -101.82817,     279.000,       0.000!   !END!
2357 ! X =  -110.29441, -101.57966,     274.000,       0.000!   !END!
2358 ! X =   -110.2917, -101.33106,     274.000,       0.000!   !END!
2359 ! X =  -110.28909, -101.08255,     292.000,       0.000!   !END!
2360 ! X =  -110.28638, -100.83404,     304.000,       0.000!   !END!
2361 ! X =  -110.28377, -100.58553,     297.000,       0.000!   !END!
2362 ! X =  -110.06566, -103.32196,     371.000,       0.000!   !END!
2363 ! X =  -110.06305, -103.07345,     348.000,       0.000!   !END!
2364 ! X =  -110.06035, -102.82495,     312.000,       0.000!   !END!
2365 ! X =  -110.05763, -102.57634,     292.000,       0.000!   !END!
2366 ! X =  -110.05502, -102.32783,     287.000,       0.000!   !END!
2367 ! X =  -110.05232, -102.07933,     292.000,       0.000!   !END!
2368 ! X =  -110.04971, -101.83082,     277.000,       0.000!   !END!
2369 ! X =    -110.047, -101.58231,     274.000,       0.000!   !END!
2370 ! X =  -110.04428, -101.33371,     281.000,       0.000!   !END!
2371 ! X =  -110.04168, -101.08519,     292.000,       0.000!   !END!
2372 ! X =  -110.03897, -100.83669,     288.000,       0.000!   !END!
2373 ! X =  -110.03626, -100.58818,     286.000,       0.000!   !END!
2374 ! X =  -109.81554, -103.07611,     329.000,       0.000!   !END!
2375 ! X =  -109.81293,  -102.8276,     307.000,       0.000!   !END!
2376 ! X =  -109.81022, -102.57899,     308.000,       0.000!   !END!
2377 ! X =  -109.80761, -102.33048,     304.000,       0.000!   !END!
2378 ! X =   -109.8049, -102.08198,     304.000,       0.000!   !END!
2379 ! X =  -109.80219, -101.83347,     282.000,       0.000!   !END!
2380 ! X =  -109.79959, -101.58496,     278.000,       0.000!   !END!
2381 ! X =  -109.79687, -101.33635,     304.000,       0.000!   !END!
2382 ! X =  -109.79426, -101.08784,     322.000,       0.000!   !END!
2383 ! X =  -109.79155, -100.83934,     330.000,       0.000!   !END!
2384 ! X =  -109.78885, -100.59083,     304.000,       0.000!   !END!
2385 ! X =  -109.78624, -100.34232,     324.000,       0.000!   !END!
2386 ! X =  -109.56813, -103.07876,     365.000,       0.000!   !END!
2387 ! X =  -109.56552, -102.83025,     350.000,       0.000!   !END!
2388 ! X =  -109.56282, -102.58174,     342.000,       0.000!   !END!
2389 ! X =   -109.5601, -102.33314,     335.000,       0.000!   !END!
2390 ! X =  -109.55749, -102.08463,     304.000,       0.000!   !END!
2391 ! X =  -109.55478, -101.83612,     279.000,       0.000!   !END!
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2392	! X =	-109.55217,	-101.58761,	302.000,	0.000!	!END!
2393	! X =	-109.54946,	-101.339,	310.000,	0.000!	!END!
2394	! X =	-109.54675,	-101.0905,	335.000,	0.000!	!END!
2395	! X =	-109.54414,	-100.84198,	335.000,	0.000!	!END!
2396	! X =	-109.54143,	-100.59348,	335.000,	0.000!	!END!
2397	! X =	-109.53882,	-100.34497,	335.000,	0.000!	!END!
2398	! X =	-109.29934,	-101.09315,	335.000,	0.000!	!END!
2399	! X =	-109.29673,	-100.84463,	335.000,	0.000!	!END!
2400	! X =	-109.29402,	-100.59613,	335.000,	0.000!	!END!
2401	! X =	-109.29131,	-100.34762,	340.000,	0.000!	!END!
2402	! X =	-109.05193,	-101.0958,	304.000,	0.000!	!END!
2403	! X =	-109.04932,	-100.84728,	335.000,	0.000!	!END!
2404	! X =	-109.04661,	-100.59878,	335.000,	0.000!	!END!
2405	! X =	-109.0439,	-100.35027,	340.000,	0.000!	!END!
2406	! X =	-108.80451,	-101.09844,	274.000,	0.000!	!END!
2407	! X =	-108.8018,	-100.84994,	304.000,	0.000!	!END!
2408	! X =	-108.79919,	-100.60143,	306.000,	0.000!	!END!
2409	! X =	-108.79648,	-100.35292,	335.000,	0.000!	!END!
2410	! X =	-108.5571,	-101.10109,	291.000,	0.000!	!END!
2411	! X =	-108.55439,	-100.85259,	304.000,	0.000!	!END!
2412	! X =	-108.55178,	-100.60408,	306.000,	0.000!	!END!
2413	! X =	-108.54907,	-100.35557,	330.000,	0.000!	!END!
2414	! X =	-108.30969,	-101.10374,	311.000,	0.000!	!END!
2415	! X =	-108.30698,	-100.85524,	304.000,	0.000!	!END!
2416	! X =	-108.30437,	-100.60673,	292.000,	0.000!	!END!
2417	! X =	-108.30166,	-100.35822,	335.000,	0.000!	!END!
2418	! X =	-108.06489,	-101.35501,	334.000,	0.000!	!END!
2419	! X =	-109.4174,	-101.02326,	335.000,	0.000!	!END!
2420	! X =	-109.43069,	-101.25184,	319.000,	0.000!	!END!
2421	! X =	-109.44408,	-101.48041,	305.000,	0.000!	!END!
2422	! X =	-109.45746,	-101.70888,	281.000,	0.000!	!END!
2423	! X =	-109.47075,	-101.93746,	288.000,	0.000!	!END!
2424	! X =	-109.48414,	-102.16593,	306.000,	0.000!	!END!
2425	! X =	-109.49743,	-102.39451,	343.000,	0.000!	!END!
2426	! X =	-109.51081,	-102.62298,	354.000,	0.000!	!END!
2427	! X =	-109.5241,	-102.85156,	365.000,	0.000!	!END!
2428	! X =	-109.53743,	-103.07904,	365.000,	0.000!	!END!
2429	! X =	-109.55082,	-103.30761,	382.000,	0.000!	!END!
2430	! X =	-109.77611,	-103.31814,	358.000,	0.000!	!END!
2431	! X =	-110.00144,	-103.32767,	358.000,	0.000!	!END!
2432	! X =	-110.22673,	-103.3381,	411.000,	0.000!	!END!
2433	! X =	-110.45202,	-103.34863,	461.000,	0.000!	!END!
2434	! X =	-110.67725,	-103.35816,	507.000,	0.000!	!END!
2435	! X =	-110.90259,	-103.36769,	579.000,	0.000!	!END!
2436	! X =	-111.12788,	-103.37822,	609.000,	0.000!	!END!
2437	! X =	-111.35321,	-103.38765,	609.000,	0.000!	!END!
2438	! X =	-111.53741,	-103.49508,	576.000,	0.000!	!END!
2439	! X =	-111.72172,	-103.6025,	548.000,	0.000!	!END!
2440	! X =	-111.76747,	-103.83559,	548.000,	0.000!	!END!
2441	! X =	-111.81332,	-104.06877,	517.000,	0.000!	!END!
2442	! X =	-111.85908,	-104.30195,	484.000,	0.000!	!END!
2443	! X =	-111.90493,	-104.53513,	487.000,	0.000!	!END!
2444	! X =	-111.95088,	-104.76821,	487.000,	0.000!	!END!
2445	! X =	-111.99663,	-105.00139,	533.000,	0.000!	!END!
2446	! X =	-112.04249,	-105.23457,	601.000,	0.000!	!END!
2447	! X =	-112.08824,	-105.46776,	624.000,	0.000!	!END!
2448	! X =	-112.3197,	-105.51994,	640.000,	0.000!	!END!
2449	! X =	-112.55135,	-105.57211,	640.000,	0.000!	!END!
2450	! X =	-112.7828,	-105.6243,	640.000,	0.000!	!END!
2451	! X =	-113.01426,	-105.67648,	618.000,	0.000!	!END!

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2452 ! X =  -113.24591, -105.72866,     640.000,        0.000!   !END!
2453 ! X =  -113.47737, -105.78094,     640.000,        0.000!   !END!
2454 ! X =   -113.5294, -106.01398,     640.000,        0.000!   !END!
2455 ! X =  -113.58133, -106.24703,     637.000,        0.000!   !END!
2456 ! X =  -113.63336, -106.48017,     621.000,        0.000!   !END!
2457 ! X =  -113.68539, -106.71321,     611.000,        0.000!   !END!
2458 ! X =  -113.73742, -106.94635,     597.000,        0.000!   !END!
2459 ! X =  -113.78935, -107.17939,     577.000,        0.000!   !END!
2460 ! X =  -113.84139, -107.41253,     583.000,        0.000!   !END!
2461 ! X =  -113.89342, -107.64567,     612.000,        0.000!   !END!
2462 ! X =  -113.96946,  -107.8765,     640.000,        0.000!   !END!
2463 ! X =  -114.04541, -108.10733,     640.000,        0.000!   !END!
2464 ! X =  -114.12135, -108.33817,     640.000,        0.000!   !END!
2465 ! X =   -114.1975, -108.56899,     640.000,        0.000!   !END!
2466 ! X =  -114.27349, -108.79882,     639.000,        0.000!   !END!
2467 ! X =  -114.34943, -109.02976,     640.000,        0.000!   !END!
2468 ! X =  -114.42548, -109.26059,     640.000,        0.000!   !END!
2469 ! X =  -114.65867, -109.31178,     631.000,        0.000!   !END!
2470 ! X =  -114.89181, -109.36198,     609.000,        0.000!   !END!
2471 ! X =  -115.12499, -109.41307,     548.000,        0.000!   !END!
2472 ! X =  -115.35818, -109.46426,     590.000,        0.000!   !END!
2473 ! X =  -115.59137, -109.51546,     584.000,        0.000!   !END!
2474 ! X =  -115.82446, -109.56666,     558.000,        0.000!   !END!
2475 ! X =   -116.0577, -109.61685,     495.000,        0.000!   !END!
2476 ! X =  -116.29079, -109.66805,     544.000,        0.000!   !END!
2477 ! X =  -116.45021, -109.50625,     582.000,        0.000!   !END!
2478 ! X =  -116.60977, -109.34344,     588.000,        0.000!   !END!
2479 ! X =  -116.76919, -109.18163,     609.000,        0.000!   !END!
2480 ! X =  -116.92866, -109.01883,     640.000,        0.000!   !END!
2481 ! X =  -117.08808, -108.85712,     657.000,        0.000!   !END!
2482 ! X =  -117.24755, -108.69431,     687.000,        0.000!   !END!
2483 ! X =  -117.40697, -108.53251,     687.000,        0.000!   !END!
2484 ! X =  -117.49922,  -108.3625,     671.000,        0.000!   !END!
2485 ! X =  -117.59146,  -108.1925,     648.000,        0.000!   !END!
2486 ! X =  -117.70031, -108.19134,     640.000,        0.000!   !END!
2487 ! X =  -117.69832, -108.01232,     640.000,        0.000!   !END!
2488 ! X =  -117.79548, -107.83925,     591.000,        0.000!   !END!
2489 ! X =   -117.8926, -107.66529,     566.000,        0.000!   !END!
2490 ! X =  -117.98967, -107.49223,     521.000,        0.000!   !END!
2491 ! X =  -118.19952, -107.51777,     517.000,        0.000!   !END!
2492 ! X =  -118.40922, -107.54432,     487.000,        0.000!   !END!
2493 ! X =  -118.61908, -107.56996,     466.000,        0.000!   !END!
2494 ! X =  -118.82888, -107.59651,     410.000,        0.000!   !END!
2495 ! X =  -119.03863, -107.62205,     402.000,        0.000!   !END!
2496 ! X =  -119.24848,  -107.6477,     435.000,        0.000!   !END!
2497 ! X =  -119.27574, -107.88199,     472.000,        0.000!   !END!
2498 ! X =    -119.303, -108.11638,     506.000,        0.000!   !END!
2499 ! X =  -119.33026, -108.35077,     529.000,        0.000!   !END!
2500 ! X =  -119.35762, -108.58506,     555.000,        0.000!   !END!
2501 ! X =  -119.38488, -108.81945,     609.000,        0.000!   !END!
2502 ! X =  -119.41214, -109.05374,     640.000,        0.000!   !END!
2503 ! X =   -119.4394, -109.28813,     643.000,        0.000!   !END!
2504 ! X =  -119.46666, -109.52252,     653.000,        0.000!   !END!
2505 ! X =  -119.49392, -109.75681,     662.000,        0.000!   !END!
2506 ! X =  -119.52128,  -109.9912,     696.000,        0.000!   !END!
2507 ! X =  -119.71914, -110.08951,     669.000,        0.000!   !END!
2508 ! X =   -119.9171, -110.18781,     670.000,        0.000!   !END!
2509 ! X =  -120.11506, -110.28611,     670.000,        0.000!   !END!
2510 ! X =  -120.31292, -110.38432,     670.000,        0.000!   !END!
2511 ! X =  -120.51098, -110.48262,     670.000,        0.000!   !END!
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2512 ! X =  -120.70884, -110.58092,     641.000,       0.000!   !END!
2513 ! X =  -120.90675, -110.68023,     590.000,       0.000!   !END!
2514 ! X =  -121.10471, -110.77853,     531.000,       0.000!   !END!
2515 ! X =  -121.30267, -110.87683,     487.000,       0.000!   !END!
2516 ! X =  -121.39127, -111.06179,     457.000,       0.000!   !END!
2517 ! X =  -121.47991, -111.24775,     461.000,       0.000!   !END!
2518 ! X =  -121.56851, -111.43271,     487.000,       0.000!   !END!
2519 ! X =  -121.65715, -111.61867,     510.000,       0.000!   !END!
2520 ! X =  -121.86145, -111.65229,     579.000,       0.000!   !END!
2521 ! X =  -122.06565, -111.68583,     640.000,       0.000!   !END!
2522 ! X =  -122.26995, -111.71945,     641.000,       0.000!   !END!
2523 ! X =  -122.47425, -111.75308,     645.000,       0.000!   !END!
2524 ! X =  -122.67855, -111.78661,     641.000,       0.000!   !END!
2525 ! X =  -122.67874, -111.98747,     660.000,       0.000!   !END!
2526 ! X =  -122.67894, -112.18833,     696.000,       0.000!   !END!
2527 ! X =  -122.67913, -112.38918,     701.000,       0.000!   !END!
2528 ! X =  -122.67923, -112.59005,     680.000,       0.000!   !END!
2529 ! X =  -122.67942, -112.79091,     655.000,       0.000!   !END!
2530 ! X =   -122.8929, -112.85016,     609.000,       0.000!   !END!
2531 ! X =  -123.10644, -112.91051,     575.000,       0.000!   !END!
2532 ! X =  -123.31983, -112.96988,     545.000,       0.000!   !END!
2533 ! X =  -123.53336, -113.03023,     538.000,       0.000!   !END!
2534 ! X =   -123.6062,  -113.2353,     482.000,       0.000!   !END!
2535 ! X =  -123.67912, -113.44026,     472.000,       0.000!   !END!
2536 ! X =  -123.75216, -113.64532,     487.000,       0.000!   !END!
2537 ! X =  -123.82499, -113.85039,     548.000,       0.000!   !END!
2538 ! X =  -123.89791, -114.05536,     609.000,       0.000!   !END!
2539 ! X =   -123.9709, -114.26142,     640.000,       0.000!   !END!
2540 ! X =  -124.04383, -114.46648,     640.000,       0.000!   !END!
2541 ! X =  -124.14299, -114.66423,     623.000,       0.000!   !END!
2542 ! X =  -124.24215, -114.86198,     579.000,       0.000!   !END!
2543 ! X =  -124.34126, -115.05883,     545.000,       0.000!   !END!
2544 ! X =  -124.44038, -115.25758,     506.000,       0.000!   !END!
2545 ! X =  -124.53955, -115.45542,     455.000,       0.000!   !END!
2546 ! X =  -124.34505, -115.47342,     484.000,       0.000!   !END!
2547 ! X =   -124.1507, -115.49241,     524.000,       0.000!   !END!
2548 ! X =  -123.95611, -115.51041,     579.000,       0.000!   !END!
2549 ! X =  -124.00067, -115.73657,     502.000,       0.000!   !END!
2550 ! X =  -124.04518, -115.96184,     457.000,       0.000!   !END!
2551 ! X =  -124.08965,  -116.1881,     432.000,       0.000!   !END!
2552 ! X =  -124.13421, -116.41426,     464.000,       0.000!   !END!
2553 ! X =   -124.3417, -116.38219,     432.000,       0.000!   !END!
2554 ! X =  -124.54929, -116.35011,     406.000,       0.000!   !END!
2555 ! X =  -124.75673, -116.31704,     426.000,       0.000!   !END!
2556 ! X =  -124.96432, -116.28497,     467.000,       0.000!   !END!
2557 ! X =  -125.06802, -116.49274,     529.000,       0.000!   !END!
2558 ! X =  -125.17171, -116.70041,     579.000,       0.000!   !END!
2559 ! X =   -125.2754, -116.90808,     639.000,       0.000!   !END!
2560 ! X =  -125.37919, -117.11575,     640.000,       0.000!   !END!
2561 ! X =  -125.38939, -117.14551,     646.000,       0.000!   !END!
2562 ! X =  -125.48044, -117.32445,     664.000,       0.000!   !END!
2563 ! X =   -125.5915, -117.53013,     663.000,       0.000!   !END!
2564 ! X =  -125.70266, -117.73569,     658.000,       0.000!   !END!
2565 ! X =  -125.81377, -117.94226,     640.000,       0.000!   !END!
2566 ! X =  -125.92493, -118.14793,     670.000,       0.000!   !END!
2567 ! X =  -126.03604,  -118.3545,     670.000,       0.000!   !END!
2568 ! X =  -126.14715, -118.56116,     670.000,       0.000!   !END!
2569 ! X =  -126.25831, -118.76673,     670.000,       0.000!   !END!
2570 ! X =  -126.27531, -118.97046,     670.000,       0.000!   !END!
2571 ! X =  -126.29241, -119.17408,     670.000,       0.000!   !END!
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2572 ! X =  -126.53874, -119.17938,     670.000,        0.000!   !END!
2573 ! X =  -126.78503, -119.18569,     670.000,        0.000!   !END!
2574 ! X =  -127.03156, -119.19098,     647.000,        0.000!   !END!
2575 ! X =  -127.27789, -119.19619,     627.000,        0.000!   !END!
2576 ! X =  -127.52422, -119.20149,     596.000,        0.000!   !END!
2577 ! X =  -127.77051,  -119.2078,     548.000,        0.000!   !END!
2578 ! X =  -128.01704, -119.21309,     442.000,        0.000!   !END!
2579 ! X =  -128.26337,  -119.2184,     418.000,        0.000!   !END!
2580 ! X =   -128.5097,  -119.2237,     487.000,        0.000!   !END!
2581 ! X =  -128.75609,    -119.23,     548.000,        0.000!   !END!
2582 ! X =  -129.00252, -119.23531,     618.000,        0.000!   !END!
2583 ! X =  -129.24885, -119.24051,     638.000,        0.000!   !END!
2584 ! X =  -129.49518, -119.24582,     650.000,        0.000!   !END!
2585 ! X =  -129.74157, -119.25212,     670.000,        0.000!   !END!
2586 ! X =    -129.988, -119.25742,     670.000,        0.000!   !END!
2587 ! X =  -130.23433, -119.26273,     670.000,        0.000!   !END!
2588 ! X =  -130.48066, -119.26794,     670.000,        0.000!   !END!
2589 ! X =  -130.53775, -119.05858,     667.000,        0.000!   !END!
2590 ! X =  -130.37491, -118.87637,     667.000,        0.000!   !END!
2591 ! X =  -130.21208, -118.69417,     670.000,        0.000!   !END!
2592 ! X =  -130.04925, -118.51196,     651.000,        0.000!   !END!
2593 ! X =  -129.88642, -118.32986,     660.000,        0.000!   !END!
2594 ! X =  -129.87956, -118.08728,     670.000,        0.000!   !END!
2595 ! X =  -129.87261, -117.84471,     670.000,        0.000!   !END!
2596 ! X =   -129.8657, -117.60124,     656.000,        0.000!   !END!
2597 ! X =  -129.85895, -117.35865,     639.000,        0.000!   !END!
2598 ! X =   -129.8521, -117.11617,     626.000,        0.000!   !END!
2599 ! X =  -129.84515,  -116.8736,     624.000,        0.000!   !END!
2600 ! X =  -129.83824, -116.63003,     620.000,        0.000!   !END!
2601 ! X =  -129.75852, -116.41017,     614.000,        0.000!   !END!
2602 ! X =  -129.67865, -116.18933,     601.000,        0.000!   !END!
2603 ! X =  -129.59898, -115.96848,     554.000,        0.000!   !END!
2604 ! X =   -129.5192, -115.74763,     512.000,        0.000!   !END!
2605 ! X =  -129.43938, -115.52768,     462.000,        0.000!   !END!
2606 ! X =  -129.35951, -115.30684,     420.000,        0.000!   !END!
2607 ! X =  -129.27979, -115.08698,     431.000,        0.000!   !END!
2608 ! X =  -129.20002, -114.86614,     466.000,        0.000!   !END!
2609 ! X =  -129.12025, -114.64529,     513.000,        0.000!   !END!
2610 ! X =  -129.04047, -114.42444,     546.000,        0.000!   !END!
2611 ! X =  -128.96065, -114.20449,     591.000,        0.000!   !END!
2612 ! X =  -128.86333, -113.99278,     579.000,        0.000!   !END!
2613 ! X =    -128.766, -113.78106,     584.000,        0.000!   !END!
2614 ! X =  -128.66867, -113.56935,     600.000,        0.000!   !END!
2615 ! X =  -128.57134, -113.35764,     610.000,        0.000!   !END!
2616 ! X =  -128.47402, -113.14592,     609.000,        0.000!   !END!
2617 ! X =  -128.37669, -112.93421,     609.000,        0.000!   !END!
2618 ! X =  -128.27936,  -112.7225,     601.000,        0.000!   !END!
2619 ! X =  -128.18203, -112.51068,     554.000,        0.000!   !END!
2620 ! X =   -128.0847, -112.29897,     496.000,        0.000!   !END!
2621 ! X =  -127.98737, -112.08725,     396.000,        0.000!   !END!
2622 ! X =  -127.92292, -111.88212,     408.000,        0.000!   !END!
2623 ! X =  -127.85852, -111.67609,     467.000,        0.000!   !END!
2624 ! X =  -127.79406, -111.47096,     523.000,        0.000!   !END!
2625 ! X =  -127.72971, -111.26582,     548.000,        0.000!   !END!
2626 ! X =  -127.66515,  -111.0607,     609.000,        0.000!   !END!
2627 ! X =   -127.6007, -110.85557,     639.000,        0.000!   !END!
2628 ! X =  -127.53634, -110.65043,     640.000,        0.000!   !END!
2629 ! X =  -127.30817, -110.60524,     640.000,        0.000!   !END!
2630 ! X =  -127.07999, -110.55994,     606.000,        0.000!   !END!
2631 ! X =  -126.85181, -110.51465,     532.000,        0.000!   !END!
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2632 ! X =  -126.62364, -110.46945,     487.000,       0.000!   !END!
2633 ! X =  -126.39557, -110.42416,     404.000,       0.000!   !END!
2634 ! X =   -126.3549, -110.19987,     397.000,       0.000!   !END!
2635 ! X =  -126.31433, -109.97558,     440.000,       0.000!   !END!
2636 ! X =  -126.27372, -109.75239,     443.000,       0.000!   !END!
2637 ! X =  -126.23306, -109.52811,     474.000,       0.000!   !END!
2638 ! X =  -126.19249, -109.30382,     493.000,       0.000!   !END!
2639 ! X =  -126.15187, -109.08053,     521.000,       0.000!   !END!
2640 ! X =  -126.11131, -108.85624,     541.000,       0.000!   !END!
2641 ! X =  -125.87149, -108.83702,     580.000,       0.000!   !END!
2642 ! X =  -125.63176, -108.81769,     578.000,       0.000!   !END!
2643 ! X =  -125.39204, -108.79846,     548.000,       0.000!   !END!
2644 ! X =  -125.15231, -108.77913,     533.000,       0.000!   !END!
2645 ! X =  -124.91248, -108.75981,     497.000,       0.000!   !END!
2646 ! X =  -124.86892, -108.54655,     524.000,       0.000!   !END!
2647 ! X =  -124.82547, -108.33329,     492.000,       0.000!   !END!
2648 ! X =   -124.7819, -108.11994,     457.000,       0.000!   !END!
2649 ! X =  -124.73825, -107.90669,     448.000,       0.000!   !END!
2650 ! X =  -124.69479, -107.69342,     518.000,       0.000!   !END!
2651 ! X =  -124.65122, -107.48007,     587.000,       0.000!   !END!
2652 ! X =  -124.46305, -107.33994,     609.000,       0.000!   !END!
2653 ! X =  -124.27487,  -107.1998,     609.000,       0.000!   !END!
2654 ! X =  -124.08675, -107.06067,     609.000,       0.000!   !END!
2655 ! X =  -123.89847, -106.92044,     590.000,       0.000!   !END!
2656 ! X =  -123.71029, -106.78031,     521.000,       0.000!   !END!
2657 ! X =  -123.52221, -106.64017,     464.000,       0.000!   !END!
2658 ! X =  -123.33404, -106.50004,     375.000,       0.000!   !END!
2659 ! X =  -123.20254, -106.30754,     401.000,       0.000!   !END!
2660 ! X =   -123.0711, -106.11414,     396.000,       0.000!   !END!
2661 ! X =  -122.93956, -105.92065,     381.000,       0.000!   !END!
2662 ! X =  -122.80811, -105.72725,     382.000,       0.000!   !END!
2663 ! X =  -122.67662, -105.53475,     428.000,       0.000!   !END!
2664 ! X =  -122.54517, -105.34125,     470.000,       0.000!   !END!
2665 ! X =  -122.41373, -105.14785,     487.000,       0.000!   !END!
2666 ! X =  -122.28223, -104.95536,     471.000,       0.000!   !END!
2667 ! X =  -122.15079, -104.76196,     518.000,       0.000!   !END!
2668 ! X =  -122.01934, -104.56846,     582.000,       0.000!   !END!
2669 ! X =   -121.8878, -104.37506,     640.000,       0.000!   !END!
2670 ! X =   -121.7563, -104.18257,     662.000,       0.000!   !END!
2671 ! X =  -121.62485, -103.98907,     640.000,       0.000!   !END!
2672 ! X =  -121.49341, -103.79567,     575.000,       0.000!   !END!
2673 ! X =   -121.4728, -103.56619,     556.000,       0.000!   !END!
2674 ! X =  -121.45214, -103.33573,     499.000,       0.000!   !END!
2675 ! X =  -121.43154, -103.10635,     464.000,       0.000!   !END!
2676 ! X =  -121.41087, -102.87589,     519.000,       0.000!   !END!
2677 ! X =  -121.39021, -102.64542,     599.000,       0.000!   !END!
2678 ! X =  -121.36955, -102.41505,     640.000,       0.000!   !END!
2679 ! X =  -121.34894, -102.18557,     642.000,       0.000!   !END!
2680 ! X =  -121.32828,  -101.9551,     630.000,       0.000!   !END!
2681 ! X =  -121.30768, -101.72573,     570.000,       0.000!   !END!
2682 ! X =  -121.28711, -101.49525,     511.000,       0.000!   !END!
2683 ! X =  -121.26645, -101.26479,     532.000,       0.000!   !END!
2684 ! X =  -121.24585, -101.03541,     572.000,       0.000!   !END!
2685 ! X =  -121.01139, -101.09459,     520.000,       0.000!   !END!
2686 ! X =   -120.7769, -101.15477,     626.000,       0.000!   !END!
2687 ! X =  -120.54255, -101.21395,     626.000,       0.000!   !END!
2688 ! X =  -120.30805, -101.27413,     562.000,       0.000!   !END!
2689 ! X =  -120.26464, -101.07084,     624.000,       0.000!   !END!
2690 ! X =  -120.22111, -100.86745,     650.000,       0.000!   !END!
2691 ! X =   -120.1778, -100.66415,     640.000,       0.000!   !END!
```

```
2692 ! X =  -120.13427, -100.46076,     594.000,       0.000!   !END!
2693 ! X =  -120.09085, -100.25736,     597.000,       0.000!   !END!
2694 ! X =  -120.04743, -100.05407,     643.000,       0.000!   !END!
2695 ! X =  -119.83841, -100.12592,     624.000,       0.000!   !END!
2696 ! X =  -119.62929, -100.19779,     609.000,       0.000!   !END!
2697 ! X =  -119.42026, -100.26955,     603.000,       0.000!   !END!
2698 ! X =  -119.21123,  -100.3414,     617.000,       0.000!   !END!
2699 ! X =  -119.00211, -100.41327,     645.000,       0.000!   !END!
2700 ! X =    -118.964, -100.18106,     644.000,       0.000!   !END!
2701 ! X =  -118.92588,  -99.94885,     640.000,       0.000!   !END!
2702 ! X =  -118.88766,  -99.71654,     640.000,       0.000!   !END!
2703 ! X =  -118.84955,  -99.48433,     640.000,       0.000!   !END!
2704 ! X =  -118.81143,  -99.25212,     640.000,       0.000!   !END!
2705 ! X =  -118.58086,  -99.24167,     640.000,       0.000!   !END!
2706 ! X =  -118.35028,  -99.23122,     622.000,       0.000!   !END!
2707 ! X =  -118.11961,  -99.22078,     612.000,       0.000!   !END!
2708 ! X =  -117.88903,  -99.21033,     640.000,       0.000!   !END!
2709 ! X =  -117.65841,  -99.20089,     640.000,       0.000!   !END!
2710 ! X =  -117.42784,  -99.19044,     639.000,       0.000!   !END!
2711 ! X =  -117.19726,  -99.17999,     640.000,       0.000!   !END!
2712 ! X =  -117.18251,  -99.41579,     640.000,       0.000!   !END!
2713 ! X =  -117.16772,  -99.65259,     642.000,       0.000!   !END!
2714 ! X =  -117.15297,  -99.88838,     650.000,       0.000!   !END!
2715 ! X =  -117.13817, -100.12518,     669.000,       0.000!   !END!
2716 ! X =  -116.93624, -100.21181,     671.000,       0.000!   !END!
2717 ! X =  -116.73421, -100.29845,     670.000,       0.000!   !END!
2718 ! X =  -116.53228, -100.38518,     670.000,       0.000!   !END!
2719 ! X =  -116.33025, -100.47182,     670.000,       0.000!   !END!
2720 ! X =  -116.35972, -100.67538,     671.000,       0.000!   !END!
2721 ! X =  -116.38909, -100.87884,     682.000,       0.000!   !END!
2722 ! X =  -116.41846, -101.08231,     699.000,       0.000!   !END!
2723 ! X =  -116.44793, -101.28586,     701.000,       0.000!   !END!
2724 ! X =  -116.22833, -101.34484,     701.000,       0.000!   !END!
2725 ! X =  -116.00873, -101.40391,     701.000,       0.000!   !END!
2726 ! X =  -115.78909, -101.46398,     682.000,       0.000!   !END!
2727 ! X =   -115.5695, -101.52296,     670.000,       0.000!   !END!
2728 ! X =    -115.522, -101.70339,     670.000,       0.000!   !END!
2729 ! X =  -115.47446, -101.88292,     664.000,       0.000!   !END!
2730 ! X =  -115.42691, -102.06236,     648.000,       0.000!   !END!
2731 ! X =   -115.1915, -102.10764,     596.000,       0.000!   !END!
2732 ! X =  -114.95599, -102.15292,     523.000,       0.000!   !END!
2733 ! X =  -114.72058, -102.19819,     533.000,       0.000!   !END!
2734 ! X =  -114.48513, -102.24447,     548.000,       0.000!   !END!
2735 ! X =  -114.24972, -102.28974,     527.000,       0.000!   !END!
2736 ! X =  -114.01437, -102.33602,     527.000,       0.000!   !END!
2737 ! X =   -114.0208,  -102.0904,     594.000,       0.000!   !END!
2738 ! X =  -114.02743, -101.84478,     620.000,       0.000!   !END!
2739 ! X =  -114.03386, -101.59916,     621.000,       0.000!   !END!
2740 ! X =  -114.04029, -101.35345,     619.000,       0.000!   !END!
2741 ! X =  -114.04682, -101.10783,     613.000,       0.000!   !END!
2742 ! X =  -114.05335, -100.86221,     609.000,       0.000!   !END!
2743 ! X =  -114.05978,  -100.6166,     602.000,       0.000!   !END!
2744 ! X =   -114.0663, -100.37088,     548.000,       0.000!   !END!
2745 ! X =  -114.07283, -100.12526,     472.000,       0.000!   !END!
2746 ! X =  -114.07931,  -99.88064,     413.000,       0.000!   !END!
2747 ! X =  -114.08579,  -99.63402,     426.000,       0.000!   !END!
2748 ! X =  -114.09237,  -99.38929,     432.000,       0.000!   !END!
2749 ! X =   -114.0988,  -99.14368,     427.000,       0.000!   !END!
2750 ! X =  -113.86655,  -99.12634,     396.000,       0.000!   !END!
2751 ! X =   -113.6343,  -99.10891,     367.000,       0.000!   !END!
```

```
2752 ! X =  -113.40205,  -99.09158,     365.000,       0.000!   !END!
2753 ! X =   -113.1698,  -99.07414,     400.000,       0.000!   !END!
2754 ! X =  -112.93764,   -99.0567,     428.000,       0.000!   !END!
2755 ! X =  -112.70529,  -99.03938,     458.000,       0.000!   !END!
2756 ! X =  -112.47314,  -99.02194,     528.000,       0.000!   !END!
2757 ! X =  -112.24079,  -99.00461,     583.000,       0.000!   !END!
2758 ! X =  -112.00864,  -98.98717,     612.000,       0.000!   !END!
2759 ! X =  -112.02039,  -99.16208,     548.000,       0.000!   !END!
2760 ! X =  -112.03219,  -99.33788,     515.000,       0.000!   !END!
2761 ! X =  -112.04399,  -99.51377,     464.000,       0.000!   !END!
2762 ! X =  -111.82827,  -99.54691,     449.000,       0.000!   !END!
2763 ! X =   -111.6124,  -99.58104,     435.000,       0.000!   !END!
2764 ! X =  -111.39673,  -99.61517,     426.000,       0.000!   !END!
2765 ! X =    -111.181,   -99.6483,     411.000,       0.000!   !END!
2766 ! X =  -110.96523,  -99.68243,     387.000,       0.000!   !END!
2767 ! X =  -110.74946,  -99.71657,     355.000,       0.000!   !END!
2768 ! X =  -110.70587,  -99.95564,     335.000,       0.000!   !END!
2769 ! X =  -110.66228,  -100.1947,     288.000,       0.000!   !END!
2770 ! X =  -110.61859, -100.43378,     297.000,       0.000!   !END!
2771 ! X =  -110.38983, -100.40538,     291.000,       0.000!   !END!
2772 ! X =  -110.16097,   -100.377,     304.000,       0.000!   !END!
2773 ! X =  -109.93211, -100.34871,     324.000,       0.000!   !END!
2774 ! X =  -109.70315, -100.32033,     321.000,       0.000!   !END!
2775 ! X =  -109.47439, -100.29193,     335.000,       0.000!   !END!
2776 ! X =  -109.24552, -100.26355,     349.000,       0.000!   !END!
2777 ! X =  -109.01656, -100.23517,     351.000,       0.000!   !END!
2778 ! X =  -108.78776, -100.20787,     342.000,       0.000!   !END!
2779 ! X =   -108.5589, -100.17949,     340.000,       0.000!   !END!
2780 ! X =  -108.32998, -100.15011,     336.000,       0.000!   !END!
2781 ! X =  -108.10117, -100.12271,     336.000,       0.000!   !END!
2782 ! X =  -108.10342, -100.33544,     335.000,       0.000!   !END!
2783 ! X =  -108.10578, -100.54826,     309.000,       0.000!   !END!
2784 ! X =  -108.10803, -100.76098,     304.000,       0.000!   !END!
2785 ! X =  -108.11028, -100.97371,     327.000,       0.000!   !END!
2786 ! X =  -108.11263, -101.18643,     335.000,       0.000!   !END!
2787 ! X =  -107.91151, -101.19852,     349.000,       0.000!   !END!
2788 ! X =   -107.7103, -101.21061,     380.000,       0.000!   !END!
2789 ! X =  -107.50918,  -101.2227,     396.000,       0.000!   !END!
2790 ! X =  -107.58952, -101.33122,     380.000,       0.000!   !END!
2791 ! X =  -107.73854, -101.38431,     360.000,       0.000!   !END!
2792 ! X =  -107.88767,  -101.4374,     335.000,       0.000!   !END!
2793 ! X =  -108.01581,  -101.3913,     334.000,       0.000!   !END!
2794 ! X =  -108.14399,  -101.3442,     327.000,       0.000!   !END!
2795 ! X =  -108.29717, -101.32366,     304.000,       0.000!   !END!
2796 ! X =  -108.45039, -101.30212,     291.000,       0.000!   !END!
2797 ! X =  -108.57906, -101.30576,     267.000,       0.000!   !END!
2798 ! X =  -108.70782,  -101.3093,     260.000,       0.000!   !END!
2799 ! X =   -108.8357, -101.23837,     274.000,       0.000!   !END!
2800 ! X =  -108.96358, -101.16735,     295.000,       0.000!   !END!
2801 ! X =  -109.08736, -101.17106,     310.000,       0.000!   !END!
2802 ! X =  -109.21113, -101.17467,     323.000,       0.000!   !END!
2803 ! X =  -109.31432, -101.09901,     335.000,       0.000!   !END!
```

----
a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
HOLCIM BART CLASS I ANALYSIS (HERCULES)
JUNE 2008 BASE FOR CONTROL
UMC 6KM CALMET METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =             *
    or
ISCMET.DAT    input    * ISCDAT =             *
    or
PLMMET.DAT    input    * PLMDAT =             *
    or
PROFILE.DAT   input    * PRFDAT =             *
SURFACE.DAT   input    * SFCDAT =             *
RESTARTB.DAT  input    * RSTARTB=             *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =HOLH2001BASE608.LST     !
CONC.DAT      output   ! CONDAT =HOLH2001BASE608.CON     !
DFLX.DAT      output   ! DFDAT  =HOLH2001BASE608.DRY     !
WFLX.DAT      output   ! WFDAT  =HOLH2001BASE608.WET     !

VISB.DAT      output   ! VISDAT =HOLH2001BASE608.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2001.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =             *
VOLEMARB.DAT  input    * VOLDAT =             *
BAEMARB.DAT   input    * ARDAT  =             *
LNEMARB.DAT   input    * LNDAT  =             *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =             *
CHEM.DAT      input    * CHEMDAT=             *
H2O2.DAT      input    * H2O2DAT=             *
HILL.DAT      input    * HILDAT=             *
HILLRCT.DAT   input    * RCTDAT=             *
COASTLN.DAT   input    * CSTDAT=             *
FLUXBDY.DAT   input    * BDYDAT=             *
BCON.DAT      input    * BCNDAT=             *
DEBUG.DAT     output   * DEBUG =             *
MASSFLX.DAT   output   * FLXDAT=             *
MASSBAL.DAT   output   * BALDAT=             *
FOG.DAT       output   * FOGDAT=             *
```

```
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--------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                     Default: 1       ! NMETDAT =   2
!

     Number of PTEMARB.DAT files for run (NPTDAT)
                                     Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                     Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                     Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if
NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------
none          input    !METDAT=/raid2c/umc/calmet/2001/janjun01.dat  !
!END!
none          input    !METDAT=/raid2c/umc/calmet/2001/juldec01.dat  !
!END!

------------------------------------------------------------------------
--------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  2001 !
     (used only if   Month (IBMO) -- No default       ! IBMO =   1 !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   1  !
                      Hour (IBHR) -- No default       ! IBHR =   1 !

     Base time zone        (XBTZ) -- No default       ! XBTZ = 6.0  !
        PST = 8., MST = 7.
```

```
         CST = 6., EST = 5.

      Length of run (hours) (IRLG) -- No default       ! IRLG =  8760 !

      Number of chemical species (NSPEC)
                                      Default: 5       ! NSPEC =  6   !

      Number of chemical species
      to be emitted  (NSE)            Default: 3       ! NSE =  3   !

      Flag to stop run after
      SETUP phase (ITEST)             Default: 2       ! ITEST =  2   !
      (Used to allow checking
      of the model inputs, files, etc.)
            ITEST = 1 - STOPS program after SETUP phase
            ITEST = 2 - Continues with execution of program
                        after SETUP

      Restart Configuration:

         Control flag (MRESTART)      Default: 0       ! MRESTART =  0
!

            0 = Do not read or write a restart file
            1 = Read a restart file at the beginning of
                the run
            2 = Write a restart file during run
            3 = Read a restart file at beginning of run
                and write a restart file during run

         Number of periods in Restart
         output cycle (NRESPD)        Default: 0       ! NRESPD =  0   !

            0 = File written only at last period
           >0 = File updated every NRESPD periods

      Meteorological Data Format (METFM)
                                      Default: 1       ! METFM =  1   !

            METFM = 1 - CALMET binary file (CALMET.MET)
            METFM = 2 - ISC ASCII file (ISCMET.MET)
            METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
            METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                        surface parameters file (SURFACE.DAT)

   Meteorological Profile Data Format (MPRFFM)
             (used only for METFM = 1, 2, 3)
                                      Default: 1       ! MPRFFM =  1   !

            MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
            MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

      PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
      Averaging Time (minutes) (AVET)
                                      Default: 60.0    ! AVET = 60. !
      PG Averaging Time (minutes) (PGTIME)
                                      Default: 60.0    ! PGTIME = 60. !


!END!
```

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--------------------------------------------------------------------------
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INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)                   Default: 1     ! MGAUSS =  1
!
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                              Default: 3     ! MCTADJ =  3
!
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                          Default: 0     ! MCTSG =  0
!
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated 0 (MSLUG)                   Default: 0     ! MSLUG =  0
!
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled ?
     (MTRANS)                              Default: 1     ! MTRANS =  1
!
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)            Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to simulate building
     downwash? (MBDW)                      Default: 1     ! MBDW =   1
!
        1 = ISC method
        2 = PRIME method

     Vertical wind shear modeled above
     stack top? (MSHEAR)                   Default: 0     ! MSHEAR =  0
!
        0 = no  (i.e., vertical wind shear not modeled)
        1 = yes (i.e., vertical wind shear modeled)

     Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0
!
```

```
         0 = no (i.e., puffs not split)
         1 = yes (i.e., puffs are split)

      Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  1
!
         0 = chemical transformation not
             modeled
         1 = transformation rates computed
             internally (MESOPUFF II scheme)
         2 = user-specified transformation
             rates used
         3 = transformation rates computed
             internally (RIVAD/ARM3 scheme)
         4 = secondary organic aerosol formation
             computed (MESOPUFF II scheme for OH)

      Aqueous phase transformation flag (MAQCHEM)
      (Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0
!
         0 = aqueous phase transformation
             not modeled
         1 = transformation rates adjusted
             for aqueous phase reactions

      Wet removal modeled ? (MWET)          Default: 1     ! MWET =  1
!
         0 = no
         1 = yes

      Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  1
!
         0 = no
         1 = yes
         (dry deposition method specified
          for each species in Input Group 3)

      Method used to compute dispersion
      coefficients (MDISP)                  Default: 3     ! MDISP =  3
!

         1 = dispersion coefficients computed from measured values
             of turbulence, sigma v, sigma w
         2 = dispersion coefficients from internally calculated
             sigma v, sigma w using micrometeorological variables
             (u*, w*, L, etc.)
         3 = PG dispersion coefficients for RURAL areas (computed using
             the ISCST multi-segment approximation) and MP coefficients
in
             urban areas
         4 = same as 3 except PG coefficients computed using
             the MESOPUFF II eqns.
         5 = CTDM sigmas used for stable and neutral conditions.
             For unstable conditions, sigmas are computed as in
             MDISP = 3, described above.  MDISP = 5 assumes that
             measured values are read

      Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
      (Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3
!
         1 = use sigma-v or sigma-theta measurements
```

```
            from PROFILE.DAT to compute sigma-y
            (valid for METFM = 1, 2, 3, 4)
        2 = use sigma-w measurements
            from PROFILE.DAT to compute sigma-z
            (valid for METFM = 1, 2, 3, 4)
        3 = use both sigma-(v/theta) and sigma-w
            from PROFILE.DAT to compute sigma-y and sigma-z
            (valid for METFM = 1, 2, 3, 4)
        4 = use sigma-theta measurements
            from PLMMET.DAT to compute sigma-y
            (valid only if METFM = 3)

     Back-up method used to compute dispersion
     when measured turbulence data are
     missing (MDISP2)                     Default: 3     ! MDISP2 =  3
!
     (used only if MDISP = 1 or 5)
        2 = dispersion coefficients from internally calculated
            sigma v, sigma w using micrometeorological variables
            (u*, w*, L, etc.)
        3 = PG dispersion coefficients for RURAL areas (computed using
            the ISCST multi-segment approximation) and MP coefficients
in
            urban areas
        4 = same as 3 except PG coefficients computed using
            the MESOPUFF II eqns.

   [DIAGNOSTIC FEATURE]
     Method used for Lagrangian timescale for Sigma-y
     (used only if MDISP=1,2 or MDISP2=1,2)
     (MTAULY)                             Default: 0     ! MTAULY =  0
!
        0 = Draxler default 617.284 (s)
        1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
       10 < Direct user input (s)             -- e.g., 306.9


     [DIAGNOSTIC FEATURE]
     Method used for Advective-Decay timescale for Turbulence
     (used only if MDISP=2 or MDISP2=2)
     (MTAUADV)                            Default: 0     ! MTAUADV =  0
!
        0 = No turbulence advection
        1 = Computed (OPTION NOT IMPLEMENTED)
       10 < Direct user input (s)   -- e.g., 300


     Method used to compute turbulence sigma-v &
     sigma-w using micrometeorological variables
     (Used only if MDISP = 2 or MDISP2 = 2)
     (MCTURB)                             Default: 1     ! MCTURB =  1
!
        1 = Standard CALPUFF subroutines
        2 = AERMOD subroutines

     PG sigma-y,z adj. for roughness?     Default: 0     ! MROUGH =  0
!
     (MROUGH)
        0 = no
        1 = yes
```

```
     Partial plume penetration of          Default: 1     ! MPARTL =  1
!
     elevated inversion?
     (MPARTL)
        0 = no
        1 = yes

     Strength of temperature inversion     Default: 0     ! MTINV =  0
!
     provided in PROFILE.DAT extended records?
     (MTINV)
        0 = no (computed from measured/default gradients)
        1 = yes

     PDF used for dispersion under convective conditions?
                                           Default: 0     ! MPDF =  0  !
     (MPDF)
        0 = no
        1 = yes

     Sub-Grid TIBL module used for shore line?
                                           Default: 0     ! MSGTIBL = 0
!
     (MSGTIBL)
        0 = no
        1 = yes

     Boundary conditions (concentration) modeled?
                                           Default: 0     ! MBCON = 0  !
     (MBCON)
        0 = no
        1 = yes, using formatted BCON.DAT file
        2 = yes, using unformatted CONC.DAT file


     Analyses of fogging and icing impacts due to emissions from
     arrays of mechanically-forced cooling towers can be performed
     using CALPUFF in conjunction with a cooling tower emissions
     processor (CTEMISS) and its associated postprocessors.  Hourly
     emissions of water vapor and temperature from each cooling tower
     cell are computed for the current cell configuration and ambient
     conditions by CTEMISS. CALPUFF models the dispersion of these
     emissions and provides cloud information in a specialized format
     for further analysis. Output to FOG.DAT is provided in either
     'plume mode' or 'receptor mode' format.

     Configure for FOG Model output?
                                           Default: 0     ! MFOG =  0
!
     (MFOG)
        0 = no
        1 = yes  - report results in PLUME Mode format
        2 = yes  - report results in RECEPTOR Mode format


     Test options specified to see if
     they conform to regulatory
     values? (MREG)                        Default: 1     ! MREG =  1
!
```

```
        0 = NO checks are made
        1 = Technical options must conform to USEPA
            Long Range Transport (LRT) guidance
                       METFM    1 or 2
                       AVET     60. (min)
                       PGTIME   60. (min)
                       MGAUSS   1
                       MCTADJ   3
                       MTRANS   1
                       MTIP     1
                       MCHEM    1 or 3 (if modeling SOx, NOx)
                       MWET     1
                       MDRY     1
                       MDISP    2 or 3
                       MPDF     0 if MDISP=3
                                1 if MDISP=2
                       MROUGH   0
                       MPARTL   1
                       SYTDEP   550. (m)
                       MHFTSZ   0


!END!


------------------------------------------------------------------------
-------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!

                                                       Dry
OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED
NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,
(0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS
1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE
2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)
3= etc.)

!          SO2  =         1,                1,            1,
0   !
```

```
!          SO4  =         1,               0,           2,
0   !
!          NOX  =         1,               1,           1,
0   !
!         HNO3  =         1,               0,           1,
0   !
!          NO3  =         1,               0,           2,
0   !
!         PM10  =         1,               1,           2,
0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



------------------------------------------------------------------------
-------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection
```

```
     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 37N  !
     (RLON0)                    No Default      ! RLON0 = 92W  !

         TTM :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of
projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping
plane
                RLAT0 identifies latitude of tangent-point of mapping
plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                    No Default      ! XLAT1 = 30N  !
     (XLAT2)                    No Default      ! XLAT2 = 45N  !

         LCC :  Projection cone slices through Earth's surface at XLAT1
and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of
the
     Earth known as the World Geodetic System 1984 (WGS-G ).  Other
local
     models may be in use, and their selection in CALMET will make its
output
     consistent with local mapping products.  The list of Datum-Regions
with
     official transformation parameters is provided by the National
Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)

------------------------------------------------------------------------
------
     WGS-G     WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
```

```
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS
(NAD27)
     NWS-27    NWS 6370KM Radius, Sphere
     NWS-84    NWS 6370KM Radius, Sphere
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere

     Datum-region for output coordinates
     (DATUM)                   Default: WGS-G     ! DATUM = WGS-84 !


METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =  87    !
            No. Y grid cells (NY)      No default     ! NY =  111   !
         No. vertical layers (NZ)      No default     ! NZ =  10   !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 6 !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
              4000. !

            Reference Coordinates
           of SOUTHWEST corner of
                 grid cell(1, 1):

            X-coordinate (XORIGKM)     No default     ! XORIGKM = -258.
!
            Y coordinate (YORIGKM)     No default     ! YORIGKM = -330.
!
                                      Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET.
grid.
     The lower left (LL) corner of the computational grid is at grid
point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of
the
     computational grid is at grid point (IECOMP, JECOMP) of the MET.
grid.
     The grid spacing of the computational grid is the same as the MET.
grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =   1
!
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =   1
!
                  (1 <= JBCOMP <= NY)
```

```
        X index of UR corner (IECOMP)      No default     ! IECOMP =
87   !
                  (1 <= IECOMP <= NX)

        Y index of UR corner (JECOMP)      No default     ! JECOMP =
111   !
                  (1 <= JECOMP <= NY)



SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of
the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the
computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1
!
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1
!
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =
87   !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =
111   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1
!
        (MESHDN is an integer >= 1)

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 5 -- Output Options
--------------
                                                     *
*
```

```
     FILE                           DEFAULT VALUE             VALUE THIS RUN
     ----                           -------------             --------------

   Concentrations (ICON)                 1                    !  ICON =  1
!
   Dry Fluxes (IDRY)                     1                    !  IDRY =  1
!
   Wet Fluxes (IWET)                     1                    !  IWET =  1
!
   Relative Humidity (IVIS)              1                    !  IVIS =  1
!
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                              Default: T          ! LCOMPRS = T
!

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                            Default: 0          ! IMFLX =  0
!
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                            Default: 0          ! IMBAL =  0
!
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)       Default: 0          ! ICPRT =  0
!
       Print dry fluxes (IDPRT)           Default: 0          ! IDPRT =  0
!
       Print wet fluxes (IWPRT)           Default: 0          ! IWPRT =  0
!
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours                   Default: 1          ! ICFRQ =  1
!
       Dry flux print interval
       (IDFRQ) in hours                   Default: 1          ! IDFRQ =  1
!
       Wet flux print interval
       (IWFRQ) in hours                   Default: 1          ! IWFRQ =  1
!
```

```
       Units for Line Printer Output
       (IPRTU)                         Default: 1         ! IPRTU =  3
!
                        for             for
                   Concentration    Deposition
           1 =       g/m**3          g/m**2/s
           2 =      mg/m**3         mg/m**2/s
           3 =      ug/m**3         ug/m**2/s
           4 =      ng/m**3         ng/m**2/s
           5 =     Odour Units

       Messages tracking progress of run
       written to the screen ?
       (IMESG)                         Default: 2         ! IMESG =  2
!
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------
------ WET FLUXES ------   -- MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?
PRINTED?  SAVED ON DISK?   SAVED ON DISK?
   -------       ------------------------   ------------------------
------------------------   ---------------
!          SO2 =     0,            1,           0,            1,
0,          1,           0   !
!          SO4 =     0,            1,           0,            1,
0,          1,           0   !
!          NOX =     0,            1,           0,            1,
0,          1,           0   !
!         HNO3 =     0,            1,           0,            1,
0,          1,           0   !
!          NO3 =     0,            1,           0,            1,
0,          1,           0   !
!         PM10 =     0,            1,           0,            1,
0,          1,           0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                 Default: F     ! LDEBUG
= F !

       First puff to track
       (IPFDEB)                                 Default: 1     ! IPFDEB
=  1  !

       Number of puffs to track
       (NPFDEB)                                 Default: 1     ! NPFDEB
=  1  !

       Met. period to start output
       (NN1)                                    Default: 1     ! NN1 =
1   !
```

```
       Met. period to end output
       (NN2)                                  Default: 10    ! NN2 =
10  !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =
0   !

       Number of special complex terrain
       receptors  (NCTREC)                    Default: 0     ! NCTREC
=  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                No Default     ! MHILL =
2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M
= 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M
= 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------


                      1 **
     HILL information
```

```
HILL            XC         YC       THETAH  ZGRID  RELIEF    EXPO 1
EXPO 2   SCALE 1    SCALE 2    AMAX1     AMAX2
 NO.           (km)       (km)      (deg.)   (m)     (m)      (m)
(m)       (m)        (m)        (m)       (m)
----           ----       ----      ------  -----  ------    ------
------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                      XRCT         YRCT        ZRCT           XHH
                      (km)         (km)         (m)
                     ------        -----      ------          ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid
elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain
receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a
separate
           input subgroup and therefore must end with an input group
terminator.

-----------------------------------------------------------------------
-------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY
MESOPHYLL RESISTANCE     HENRY'S LAW COEFFICIENT
       NAME        (cm**2/s)
```

```
(s/cm)                (dimensionless)
      -------     -----------      ----------      ----------
--------------------     -----------------------

!          SO2 =     0.1509,         1000.,            8.,
0.,                  0.04 !
!          NOX =     0.1656,            1.,            8.,
5.,                   3.5 !
!         HNO3 =     0.1628,            1.,           18.,
0.,            0.00000008 !

!END!
```

```
-----------------------------------------------------------------------
-------
```

```
INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard
deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                   DEVIATION
                        (microns)                  (microns)
      -------      -------------------        ------------------
!          SO4 =          0.48,                     2.   !
!          NO3 =          0.48,                     2.   !
!         PM10 =            2.,                     2.   !

!END!
```

```
-----------------------------------------------------------------------
-------
```

```
INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                            Default: 30    !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                              Default: 10    !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                           Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                             Default: 9     !   NINT =  9  !
```

```
     Vegetation state in unirrigated areas
     (IVEG)                            Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation

!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,             0.0E00 !
!          SO4 =         1.0E-04,            3.0E-05 !
!         HNO3 =         6.0E-05,             0.0E00 !
!          NO3 =         1.0E-04,            3.0E-05 !
!         PM10 =         1.0E-04,            3.0E-05 !

!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0
!
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                    Default: 12*80.
     !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00,
65.00, 65.00, 26.00, 26.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                   Default: 12*10.
     !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50,
0.50, 0.50, 0.50 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2          ! RNITE1 =
.2 !
```

```
     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0          ! RNITE2 =
2.0 !

     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                   Default: 2.0          ! RNITE3 =
2.0 !

     H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =
0   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb                  Default: 12*1.
     !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
     (used only if MCHEM = 4)

     The SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)
          VOC / NOX ratio (after reaction)         (VCNX)
     to characterize the air mass when computing
     the formation of SOA from VOC emissions.
     Typical values for several distinct air mass types are:

        Month    1    2    3    4    5    6    7    8    9   10   11
12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Dec

     Clean Continental
        BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
1.
        OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20
.15
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Clean Marine (surface)
        BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
.5
        OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30
.25
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Urban - low biogenic (controls present)
        BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
30.
        OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20
```

```
.20
        VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.
4.

     Urban - high biogenic (controls present)
        BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
60.
        OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35
.25
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Regional Plume
        BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
20.
        OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30
.20
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Urban - no controls present
        BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
100.
        OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35
.30
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.
2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20,
0.20, 0.20, 0.15 !
     !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00,
50.00, 50.00, 50.00, 50.00 !


!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                            Default: 550.   ! SYTDEP
= 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                    Default: 0      ! MHFTSZ
=  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
```

```
     layer (JSUP)                              Default: 5      ! JSUP =
5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)    Default: 0.01   ! CONK1
= .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                   Default: 0.1    ! CONK2
= .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                     Default: 0.5    ! TBD =
.5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                            Default: 10     ! IURB1
=  10  !
                                                        19     ! IURB2
=  19  !

     Site characterization parameters for single-point Met data files
---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                             Default: 20     !
ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                                 Default: 0.25   ! Z0IN =
.25 !

        Leaf area index for modeling domain
        (XLAIIN)                               Default: 3.0    ! XLAIIN
= 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                               Default: 0.0    ! ELEVIN
= .0 !

        Latitude (degrees) for met location
        (XLATIN)                               Default: -999.  ! XLATIN
= -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                               Default: -999.  ! XLONIN
= -999.0 !

     Specialized information for interpreting single-point Met data
files -----

        Anemometer height (m) (Used only if METFM = 2,3)
```

```
        (ANEMHT)                                Default: 10.    ! ANEMHT
= 10.0 !

        Form of lateral turbulance data in PROFILE.DAT file
        (Used only if METFM = 4 or MTURBVW = 1 or 3)
        (ISIGMAV)                               Default: 1      !
ISIGMAV =  1  !
            0 = read sigma-theta
            1 = read sigma-v

        Choice of mixing heights (Used only if METFM = 4)
        (IMIXCTDM)                              Default: 0      !
IMIXCTDM =  0  !
            0 = read PREDICTED mixing heights
            1 = read OBSERVED mixing heights

     Maximum length of a slug (met. grid units)
     (XMXLEN)                                   Default: 1.0    ! XMXLEN
= 1.0 !

     Maximum travel distance of a puff/slug (in
     grid units) during one sampling step
     (XSAMLEN)                                  Default: 1.0    !
XSAMLEN = 1.0 !

     Maximum Number of slugs/puffs release from
     one source during one time step
     (MXNEW)                                    Default: 99     ! MXNEW
=  99   !

     Maximum Number of sampling steps for
     one puff/slug during one time step
     (MXSAM)                                    Default: 99     ! MXSAM
=  99   !

     Number of iterations used when computing
     the transport wind for a sampling step
     that includes gradual rise (for CALMET
     and PROFILE winds)
     (NCOUNT)                                   Default: 2      ! NCOUNT
=  2   !

     Minimum sigma y for a new puff/slug (m)
     (SYMIN)                                    Default: 1.0    ! SYMIN
= 1.0  !

     Minimum sigma z for a new puff/slug (m)
     (SZMIN)                                    Default: 1.0    ! SZMIN
= 1.0  !

     Default minimum turbulence velocities sigma-v and sigma-w
     for each stability class over land and over water (m/s)
     (SVMIN(12) and SWMIN(12))

                     ----------  LAND  ----------       ---------  WATER
----------
        Stab Class :  A    B    C    D    E    F         A    B    C
D    E    F
                     ---  ---  ---  ---  ---  ---       ---  ---  ---
---  ---  ---
```

```
     Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37,
.37, .37, .37
     Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08,
.06, .03, .016

           ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370,
0.370, 0.370, 0.370, 0.370, 0.370!
           ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200,
0.120, 0.080, 0.060, 0.030, 0.016!


     Divergence criterion for dw/dz across puff
     used to initiate adjustment for horizontal
     convergence (1/s)
     Partial adjustment starts at CDIV(1), and
     full adjustment is reached at CDIV(2)
     (CDIV(2))                            Default: 0.0,0.0  ! CDIV
= .0, .0 !

     Minimum wind speed (m/s) allowed for
     non-calm conditions. Also used as minimum
     speed returned when using power-law
     extrapolation toward surface
     (WSCALM)                             Default: 0.5    ! WSCALM
= .5 !

     Maximum mixing height (m)
     (XMAXZI)                             Default: 3000.  ! XMAXZI
= 4000.0 !

     Minimum mixing height (m)
     (XMINZI)                             Default: 50.    ! XMINZI
= 20.0 !

     Default wind speed classes --
     5 upper bounds (m/s) are entered;
     the 6th class has no upper limit
     (WSCAT(5))                     Default   :
                                    ISC RURAL : 1.54, 3.09, 5.14, 8.23,
10.8 (10.8+)

                             Wind Speed Class :  1     2     3     4
5
                                                ---   ---   ---   ---
---
                                      ! WSCAT = 1.54, 3.09, 5.14, 8.23,
10.80 !

     Default wind speed profile power-law
     exponents for stabilities 1-6
     (PLX0(6))                      Default   : ISC RURAL values
                                    ISC RURAL : .07, .07, .10, .15,
.35, .55
                                    ISC URBAN : .15, .15, .20, .25,
.30, .30

                              Stability Class :  A     B     C     D
E     F
                                                ---   ---   ---   ---
---   ---
```

```
                                       ! PLX0 = 0.07, 0.07, 0.10, 0.15,
0.35, 0.55 !

     Default potential temperature gradient
     for stable classes E, F (degK/m)
     (PTG0(2))                      Default: 0.020, 0.035
                                       ! PTG0 = 0.020,   0.035 !

     Default plume path coefficients for
     each stability class (used when option
     for partial plume height terrain adjustment
     is selected -- MCTADJ=3)
     (PPC(6))                 Stability Class :  A     B     C     D
E     F
                                 Default  PPC : .50,  .50,  .50,  .50,
.35,  .35
                                                ---   ---   ---   ---
---   ---
                                       !  PPC = 0.50, 0.50, 0.50, 0.50,
0.35, 0.35 !

     Slug-to-puff transition criterion factor
     equal to sigma-y/length of slug
     (SL2PF)                                 Default: 10.        ! SL2PF =
10.0 !

     Puff-splitting control variables ------------------------

       VERTICAL SPLIT
       --------------

       Number of puffs that result every time a puff
       is split - nsplit=2 means that 1 puff splits
       into 2
       (NSPLIT)                              Default:   3        ! NSPLIT
=  3  !

       Time(s) of a day when split puffs are eligible to
       be split once again; this is typically set once
       per day, around sunset before nocturnal shear develops.
       24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
       0=do not re-split    1=eligible for re-split
       (IRESPLIT(24))                        Default:  Hour 17 = 1
       !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

       Split is allowed only if last hour's mixing
       height (m) exceeds a minimum value
       (ZISPLIT)                             Default: 100.       ! ZISPLIT
= 100.0 !

       Split is allowed only if ratio of last hour's
       mixing ht to the maximum mixing ht experienced
       by the puff is less than a maximum value (this
       postpones a split until a nocturnal layer develops)
       (ROLDMAX)                             Default: 0.25       ! ROLDMAX
= 0.25 !


       HORIZONTAL SPLIT
       ----------------
```

```
       Number of puffs that result every time a puff
       is split - nsplith=5 means that 1 puff splits
       into 5
       (NSPLITH)                            Default:   5        ! NSPLITH
=  5  !

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
       (SYSPLITH)                           Default:  1.0       !
SYSPLITH = 1.0 !

       Minimum puff elongation rate (SYSPLITH/hr) due to
       wind shear, before it may be split
       (SHSPLITH)                           Default:  2.        !
SHSPLITH = 2.0 !

       Minimum concentration (g/m^3) of each
       species in puff before it may be split
       Enter array of NSPEC values; if a single value is
       entered, it will be used for ALL species
       (CNSPLITH)                           Default:  1.0E-07   !
CNSPLITH = 1.0E-07 !

     Integration control variables ------------------------

       Fractional convergence criterion for numerical SLUG
       sampling integration
       (EPSSLUG)                            Default:   1.0e-04  ! EPSSLUG
= 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                            Default:   1.0e-06  ! EPSAREA
= 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                             Default:   1.0      ! DSRISE
= 1.0 !

       Boundary Condition (BC) Puff control variables
------------------------

       Minimum height (m) to which BC puffs are mixed as they are
emitted
       (MBCON=2 ONLY).  Actual height is reset to the current mixing
height
       at the release point if greater than this minimum.
       (HTMINBC)                            Default:   500.     ! HTMINBC
= 500.0 !

       Search radius (in BC segment lengths) about a receptor for
sampling
       nearest BC puff.  BC puffs are emitted with a spacing of one
segment
       length, so the search radius should be greater than 1.
       (RSAMPBC)                            Default:   4.      ! RSAMPBC
= 10.0 !
```

```
       Near-Surface depletion adjustment to concentration profile used
when
       sampling BC puffs?
       (MDEPBC)                            Default:   1        ! MDEPBC
=  1  !
          0 = Concentration is NOT adjusted for depletion
          1 = Adjust Concentration for depletion

!END!


--------------------------------------------------------------------------------
-------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =   1  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                      a
          POINT SOURCE: CONSTANT DATA
          -----------------------------

b          c
  Source       X         Y       Stack    Base     Stack    Exit  Exit
Bldg.  Emission
```

```
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.
Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg.
K)
  ------   ---------- ---------- ------  ------   -------- -----
-------- ----- --------
   1 ! SRCNAM = EP14 !
   1 ! X =  89.5282,  262.5797,  76.20, 155.45,  6.40, 9.55, 447.59,
0.0, 6.175153E02,  0.0E00,  3.842201E02,
       0.0E00,  0.0E00, 6.5294E00 !
   1 ! FMFAC  =      1.0 !   !END!
--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column
headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to
represent
             the effect of rain-caps or other physical configurations
that
             reduce momentum rise associated with the actual exit
velocity.
             (Default: 1.0  -- full momentum used)

    b
     0. = No building downwash modeled, 1. = downwash modeled
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
           -------------------------------------------------------
Source
a
 No.       Effective building height, width, length and X/Y offset (in
meters)
           every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed
for
           MBDW=2 (PRIME downwash option)
------
--------------------------------------------------------------------

--------
```

```
    a
     Building height, width, length, and X/Y offset from the source are
treated
     as a separate input subgroup for each source and therefore must end
with
     an input group terminator.  The X/Y offset is the position,
relative to the
     stack, of the center of the upwind face of the projected building,
with the
     x-axis pointing along the flow direction.

---------------
Subgroup (13d)
---------------
                                                a
          POINT SOURCE: VARIABLE EMISSIONS DATA
          ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 13b.  Factors entered multiply the rates in 13b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
--------------------------------

---------------
Subgroup (14a)
---------------

     Number of polygon area sources with
```

```
     parameters specified below (NAR1)       No default  !  NAR1 =  0
!

     Units used for area source
     emissions below            (IARU)       Default: 1  !  IARU =   1
!
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                     a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                         b
Source           Effect.    Base      Initial    Emission
 No.             Height   Elevation   Sigma z     Rates
                   (m)       (m)        (m)
-------          ------    ------     --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
           --------------------------------------------------------
Source                                                               a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------
```

----
a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

Subgroup (14d)

AREA SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission
rates given in 14b. Factors entered multiply the rates in 14b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY)   Default: 0
      0 =   Constant
      1 =   Diurnal cycle (24 scaling factors: hours 1-24)
      2 =   Monthly cycle (12 scaling factors: months 1-12)
      3 =   Hour & Season (4 groups of 24 hourly scaling
factors,
                               where first group is DEC-JAN-FEB)
      4 =   Speed & Stab. (6 groups of 6 scaling factors, where
                               first group is Stability Class A,
                               and the speed classes have upper
                               bounds (m/s) defined in Group 12
      5 =   Temperature   (12 scaling factors, where
temperature
                               classes have upper bounds (C) of:
                               0, 5, 10, 15, 20, 25, 30, 35, 40,
                               45, 50, 50+)

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

Subgroup (15a)

Number of buoyant line sources
with variable location and emission
parameters (NLN2)   No default ! NLN2
= 0   !

```
     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)        No default   !
NLINES =  0  !

     Units used for line source
     emissions below                (ILNU)          Default: 1  !  ILNU
=   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7   !
MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6   !
NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default   ! XL =
.0 !
                                                    (in meters)

        Average building height (HBL)               No default   ! HBL =
.0 !
                                                    (in meters)

        Average building width (WBL)                No default   ! WBL =
.0 !
                                                    (in meters)

        Average line source width (WML)             No default   ! WML =
.0 !
                                                    (in meters)

        Average separation between buildings (DXL)  No default   ! DXL =
.0 !
                                                    (in meters)

        Average buoyancy parameter (FPRIMEL)        No default   !
FPRIMEL = .0 !
                                                    (in m**4/s**3)

!END!

---------------
```

```
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
          ----------------------------------

a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base
Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height
Elevation      Rates
            (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------
---------    ---------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                       a
          BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
```

```
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
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INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0
!

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1
!
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0
!

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0
!

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                        a
           VOLUME SOURCE: CONSTANT DATA
           ------------------------------

b
        X           Y        Effect.    Base     Initial    Initial
Emission
     Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z
Rates
        (km)       (km)         (m)       (m)        (m)       (m)
     ----------  ----------   ------    ------    --------   --------
```

----

a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IVLU (e.g. 1 for g/s).

Subgroup (16c)

VOLUME SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission rates given in 16b. Factors entered multiply the rates in 16b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

```
     IVARY determines the type of variation, and is source-specific:
     (IVARY)                               Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)
```

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
----

Subgroup (17a)

Number of non-gridded receptors (NREC) No default ! NREC = 1046
!

!END!

Subgroup (17b)

NON-GRIDDED (DISCRETE) RECEPTOR DATA [a]

Receptor No.		X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height Above Ground (m) [b]	
1	! X =	-87.79324,	-33.47899,	274.000,	0.000!	!END!
2	! X =	-87.79062,	-33.23052,	274.000,	0.000!	!END!
3	! X =	-87.7879,	-32.98214,	235.000,	0.000!	!END!
4	! X =	-87.54586,	-33.48166,	288.000,	0.000!	!END!
5	! X =	-87.54324,	-33.23318,	276.000,	0.000!	!END!
6	! X =	-87.54061,	-32.9847,	244.000,	0.000!	!END!
7	! X =	-87.29848,	-33.48422,	304.000,	0.000!	!END!
8	! X =	-87.29586,	-33.23585,	304.000,	0.000!	!END!
9	! X =	-87.29323,	-32.98737,	274.000,	0.000!	!END!
10	! X =	-87.27739,	-31.49669,	274.000,	0.000!	!END!
11	! X =	-87.0511,	-33.48689,	304.000,	0.000!	!END!
12	! X =	-87.04848,	-33.23841,	304.000,	0.000!	!END!
13	! X =	-87.04586,	-32.99003,	290.000,	0.000!	!END!
14	! X =	-87.03001,	-31.49936,	265.000,	0.000!	!END!
15	! X =	-86.83288,	-36.22239,	274.000,	0.000!	!END!
16	! X =	-86.83026,	-35.97401,	274.000,	0.000!	!END!
17	! X =	-86.82764,	-35.72553,	274.000,	0.000!	!END!
18	! X =	-86.82491,	-35.47706,	274.000,	0.000!	!END!
19	! X =	-86.82229,	-35.22869,	274.000,	0.000!	!END!
20	! X =	-86.81967,	-34.98021,	274.000,	0.000!	!END!
21	! X =	-86.80382,	-33.48955,	302.000,	0.000!	!END!
22	! X =	-86.8011,	-33.24108,	304.000,	0.000!	!END!
23	! X =	-86.79847,	-32.9926,	304.000,	0.000!	!END!
24	! X =	-86.79585,	-32.74422,	287.000,	0.000!	!END!
25	! X =	-86.79322,	-32.49574,	274.000,	0.000!	!END!
26	! X =	-86.7906,	-32.24726,	304.000,	0.000!	!END!
27	! X =	-86.78263,	-31.50193,	275.000,	0.000!	!END!
28	! X =	-86.58813,	-36.47353,	274.000,	0.000!	!END!
29	! X =	-86.58551,	-36.22505,	274.000,	0.000!	!END!
30	! X =	-86.58288,	-35.97658,	274.000,	0.000!	!END!
31	! X =	-86.58026,	-35.7282,	274.000,	0.000!	!END!
32	! X =	-86.57754,	-35.47973,	274.000,	0.000!	!END!
33	! X =	-86.57491,	-35.23125,	273.000,	0.000!	!END!
34	! X =	-86.57229,	-34.98288,	274.000,	0.000!	!END!
35	! X =	-86.55644,	-33.49212,	304.000,	0.000!	!END!
36	! X =	-86.55382,	-33.24374,	304.000,	0.000!	!END!
37	! X =	-86.55109,	-32.99526,	307.000,	0.000!	!END!
38	! X =	-86.54847,	-32.74678,	314.000,	0.000!	!END!
39	! X =	-86.54585,	-32.49841,	313.000,	0.000!	!END!
40	! X =	-86.54322,	-32.24993,	304.000,	0.000!	!END!
41	! X =	-86.54059,	-32.00145,	304.000,	0.000!	!END!
42	! X =	-86.53787,	-31.75307,	292.000,	0.000!	!END!
43	! X =	-86.53525,	-31.50459,	275.000,	0.000!	!END!
44	! X =	-86.35136,	-37.46999,	278.000,	0.000!	!END!
45	! X =	-86.34076,	-36.47619,	272.000,	0.000!	!END!
46	! X =	-86.33813,	-36.22772,	274.000,	0.000!	!END!
47	! X =	-86.33551,	-35.97924,	274.000,	0.000!	!END!
48	! X =	-86.33288,	-35.73077,	274.000,	0.000!	!END!
49	! X =	-86.33026,	-35.48239,	274.000,	0.000!	!END!
50	! X =	-86.32753,	-35.23392,	274.000,	0.000!	!END!

```
 51 ! X =   -86.32491,  -34.98544,     278.000,       0.000!   !END!
 52 ! X =   -86.30906,  -33.49478,     295.000,       0.000!   !END!
 53 ! X =   -86.30643,   -33.2463,     304.000,       0.000!   !END!
 54 ! X =   -86.30381,  -32.99792,     319.000,       0.000!   !END!
 55 ! X =   -86.30109,  -32.74945,     335.000,       0.000!   !END!
 56 ! X =   -86.29846,  -32.50097,     337.000,       0.000!   !END!
 57 ! X =   -86.29584,  -32.25259,     320.000,       0.000!   !END!
 58 ! X =   -86.29321,  -32.00411,     299.000,       0.000!   !END!
 59 ! X =   -86.29059,  -31.75563,     277.000,       0.000!   !END!
 60 ! X =   -86.28787,  -31.50726,     274.000,       0.000!   !END!
 61 ! X =   -86.28524,  -31.25878,     274.000,       0.000!   !END!
 62 ! X =   -86.28262,   -31.0104,     243.000,       0.000!   !END!
 63 ! X =   -86.10398,  -37.47255,     304.000,       0.000!   !END!
 64 ! X =   -86.10135,  -37.22408,     274.000,       0.000!   !END!
 65 ! X =   -86.09873,   -36.9757,     274.000,       0.000!   !END!
 66 ! X =    -86.0961,  -36.72723,     271.000,       0.000!   !END!
 67 ! X =   -86.09348,  -36.47875,     274.000,       0.000!   !END!
 68 ! X =   -86.09076,  -36.23038,     274.000,       0.000!   !END!
 69 ! X =   -86.08813,  -35.98191,     274.000,       0.000!   !END!
 70 ! X =    -86.0855,  -35.73343,     279.000,       0.000!   !END!
 71 ! X =   -86.08288,  -35.48496,     281.000,       0.000!   !END!
 72 ! X =   -86.08026,  -35.23658,     288.000,       0.000!   !END!
 73 ! X =   -86.07753,  -34.98811,     293.000,       0.000!   !END!
 74 ! X =   -86.06168,  -33.49745,     290.000,       0.000!   !END!
 75 ! X =   -86.05905,  -33.24897,     302.000,       0.000!   !END!
 76 ! X =   -86.05643,  -33.00049,     327.000,       0.000!   !END!
 77 ! X =   -86.05381,  -32.75211,     365.000,       0.000!   !END!
 78 ! X =   -86.05108,  -32.50364,     395.000,       0.000!   !END!
 79 ! X =   -86.04845,  -32.25516,     343.000,       0.000!   !END!
 80 ! X =   -86.04583,  -32.00678,     304.000,       0.000!   !END!
 81 ! X =   -86.04321,   -31.7583,     296.000,       0.000!   !END!
 82 ! X =   -86.04058,  -31.50982,     290.000,       0.000!   !END!
 83 ! X =   -86.03786,  -31.26144,     277.000,       0.000!   !END!
 84 ! X =   -86.03523,  -31.01296,     259.000,       0.000!   !END!
 85 ! X =    -85.8566,  -37.47522,     304.000,       0.000!   !END!
 86 ! X =   -85.85398,  -37.22675,     274.000,       0.000!   !END!
 87 ! X =   -85.85135,  -36.97827,     274.000,       0.000!   !END!
 88 ! X =   -85.84873,   -36.7299,     274.000,       0.000!   !END!
 89 ! X =    -85.8461,  -36.48142,     274.000,       0.000!   !END!
 90 ! X =   -85.84337,  -36.23295,     274.000,       0.000!   !END!
 91 ! X =   -85.84075,  -35.98447,     286.000,       0.000!   !END!
 92 ! X =   -85.83813,   -35.7361,     304.000,       0.000!   !END!
 93 ! X =    -85.8355,  -35.48762,     311.000,       0.000!   !END!
 94 ! X =   -85.83287,  -35.23915,     318.000,       0.000!   !END!
 95 ! X =   -85.83025,  -34.99077,     322.000,       0.000!   !END!
 96 ! X =   -85.82753,   -34.7423,     308.000,       0.000!   !END!
 97 ! X =    -85.8249,  -34.49382,     298.000,       0.000!   !END!
 98 ! X =    -85.8143,  -33.50001,     290.000,       0.000!   !END!
 99 ! X =   -85.81168,  -33.25164,     308.000,       0.000!   !END!
100 ! X =   -85.80905,  -33.00316,     343.000,       0.000!   !END!
101 ! X =   -85.80642,  -32.75468,     371.000,       0.000!   !END!
102 ! X =    -85.8038,   -32.5063,     395.000,       0.000!   !END!
103 ! X =   -85.80107,  -32.25782,     365.000,       0.000!   !END!
104 ! X =   -85.79845,  -32.00935,     321.000,       0.000!   !END!
105 ! X =   -85.79583,  -31.76096,     307.000,       0.000!   !END!
106 ! X =    -85.7932,  -31.51248,     302.000,       0.000!   !END!
107 ! X =   -85.79058,   -31.2641,     283.000,       0.000!   !END!
108 ! X =   -85.78785,  -31.01563,     274.000,       0.000!   !END!
109 ! X =   -85.60933,  -37.47788,     297.000,       0.000!   !END!
110 ! X =    -85.6066,  -37.22941,     286.000,       0.000!   !END!
```

```
111 ! X =   -85.60397,  -36.98094,     274.000,       0.000!   !END!
112 ! X =   -85.60135,  -36.73246,     274.000,       0.000!   !END!
113 ! X =   -85.59873,  -36.48409,     274.000,       0.000!   !END!
114 ! X =    -85.5961,  -36.23561,     274.000,       0.000!   !END!
115 ! X =   -85.59337,  -35.98714,     288.000,       0.000!   !END!
116 ! X =   -85.59074,  -35.73867,     335.000,       0.000!   !END!
117 ! X =   -85.58812,  -35.49029,     335.000,       0.000!   !END!
118 ! X =    -85.5855,  -35.24181,     335.000,       0.000!   !END!
119 ! X =   -85.58287,  -34.99334,     335.000,       0.000!   !END!
120 ! X =   -85.58025,  -34.74496,     335.000,       0.000!   !END!
121 ! X =   -85.57752,  -34.49649,     292.000,       0.000!   !END!
122 ! X =   -85.57489,  -34.24801,     259.000,       0.000!   !END!
123 ! X =   -85.57227,  -33.99953,     274.000,       0.000!   !END!
124 ! X =   -85.56964,  -33.75115,     274.000,       0.000!   !END!
125 ! X =   -85.56702,  -33.50268,     285.000,       0.000!   !END!
126 ! X =   -85.56429,   -33.2542,     304.000,       0.000!   !END!
127 ! X =   -85.56167,  -33.00582,     332.000,       0.000!   !END!
128 ! X =   -85.55904,  -32.75734,     360.000,       0.000!   !END!
129 ! X =   -85.55642,  -32.50887,     365.000,       0.000!   !END!
130 ! X =   -85.55379,  -32.26049,     344.000,       0.000!   !END!
131 ! X =   -85.55107,  -32.01201,     335.000,       0.000!   !END!
132 ! X =   -85.54844,  -31.76353,     309.000,       0.000!   !END!
133 ! X =   -85.54582,  -31.51515,     302.000,       0.000!   !END!
134 ! X =   -85.54319,  -31.26667,     280.000,       0.000!   !END!
135 ! X =   -85.54057,  -31.01829,     274.000,       0.000!   !END!
136 ! X =   -85.36195,  -37.48045,     304.000,       0.000!   !END!
137 ! X =   -85.35923,  -37.23208,     303.000,       0.000!   !END!
138 ! X =    -85.3566,   -36.9836,     294.000,       0.000!   !END!
139 ! X =   -85.35397,  -36.73513,     292.000,       0.000!   !END!
140 ! X =   -85.35134,  -36.48665,     283.000,       0.000!   !END!
141 ! X =   -85.34872,  -36.23828,     275.000,       0.000!   !END!
142 ! X =    -85.3461,   -35.9898,     283.000,       0.000!   !END!
143 ! X =   -85.34337,  -35.74133,     316.000,       0.000!   !END!
144 ! X =   -85.34074,  -35.49286,     335.000,       0.000!   !END!
145 ! X =   -85.33812,  -35.24448,     335.000,       0.000!   !END!
146 ! X =   -85.33549,    -34.996,     335.000,       0.000!   !END!
147 ! X =   -85.33286,  -34.74753,     327.000,       0.000!   !END!
148 ! X =   -85.33024,  -34.49915,     268.000,       0.000!   !END!
149 ! X =   -85.32752,  -34.25068,     258.000,       0.000!   !END!
150 ! X =   -85.32489,   -34.0022,     274.000,       0.000!   !END!
151 ! X =   -85.32226,  -33.75372,     277.000,       0.000!   !END!
152 ! X =   -85.31964,  -33.50534,     284.000,       0.000!   !END!
153 ! X =   -85.31701,  -33.25686,     280.000,       0.000!   !END!
154 ! X =   -85.31429,  -33.00839,     307.000,       0.000!   !END!
155 ! X =   -85.31166,  -32.76001,     320.000,       0.000!   !END!
156 ! X =   -85.30904,  -32.51153,     335.000,       0.000!   !END!
157 ! X =   -85.30641,  -32.26305,     335.000,       0.000!   !END!
158 ! X =   -85.30379,  -32.01467,     335.000,       0.000!   !END!
159 ! X =   -85.30106,   -31.7662,     313.000,       0.000!   !END!
160 ! X =   -85.29844,  -31.51782,     300.000,       0.000!   !END!
161 ! X =   -85.29581,  -31.26934,     283.000,       0.000!   !END!
162 ! X =   -85.29318,  -31.02086,     274.000,       0.000!   !END!
163 ! X =    -85.1172,  -37.73159,     304.000,       0.000!   !END!
164 ! X =   -85.11457,  -37.48312,     309.000,       0.000!   !END!
165 ! X =   -85.11195,  -37.23464,     312.000,       0.000!   !END!
166 ! X =   -85.10922,  -36.98617,     323.000,       0.000!   !END!
167 ! X =    -85.1066,   -36.7378,     308.000,       0.000!   !END!
168 ! X =   -85.10397,  -36.48932,     304.000,       0.000!   !END!
169 ! X =   -85.10134,  -36.24085,     304.000,       0.000!   !END!
170 ! X =   -85.09871,  -35.99237,     299.000,       0.000!   !END!
```

```
171 ! X =   -85.09609,  -35.74399,     304.000,       0.000!   !END!
172 ! X =   -85.09336,  -35.49552,     335.000,       0.000!   !END!
173 ! X =   -85.09074,  -35.24705,     335.000,       0.000!   !END!
174 ! X =   -85.08811,  -34.99867,     310.000,       0.000!   !END!
175 ! X =   -85.08549,  -34.75019,     281.000,       0.000!   !END!
176 ! X =   -85.08286,  -34.50172,     261.000,       0.000!   !END!
177 ! X =   -85.08024,  -34.25334,     278.000,       0.000!   !END!
178 ! X =   -85.07751,  -34.00487,     274.000,       0.000!   !END!
179 ! X =   -85.07488,  -33.75639,     281.000,       0.000!   !END!
180 ! X =   -85.07226,  -33.50791,     304.000,       0.000!   !END!
181 ! X =   -85.06963,  -33.25953,     304.000,       0.000!   !END!
182 ! X =   -85.06701,  -33.01105,     303.000,       0.000!   !END!
183 ! X =   -85.06428,  -32.76258,     320.000,       0.000!   !END!
184 ! X =   -85.06166,   -32.5142,     335.000,       0.000!   !END!
185 ! X =   -85.05903,  -32.26572,     335.000,       0.000!   !END!
186 ! X =    -85.0564,  -32.01724,     333.000,       0.000!   !END!
187 ! X =   -85.05378,  -31.76886,     313.000,       0.000!   !END!
188 ! X =   -85.05115,  -31.52038,     300.000,       0.000!   !END!
189 ! X =   -85.04843,    -31.272,     280.000,       0.000!   !END!
190 ! X =    -85.0458,  -31.02352,     274.000,       0.000!   !END!
191 ! X =   -84.87508,   -38.2311,     306.000,       0.000!   !END!
192 ! X =   -84.87245,  -37.98263,     286.000,       0.000!   !END!
193 ! X =   -84.86982,  -37.73416,     308.000,       0.000!   !END!
194 ! X =    -84.8672,  -37.48578,     328.000,       0.000!   !END!
195 ! X =   -84.86457,  -37.23731,     335.000,       0.000!   !END!
196 ! X =   -84.86194,  -36.98883,     336.000,       0.000!   !END!
197 ! X =   -84.85922,  -36.74036,     345.000,       0.000!   !END!
198 ! X =   -84.85659,  -36.49199,     349.000,       0.000!   !END!
199 ! X =   -84.85397,  -36.24351,     337.000,       0.000!   !END!
200 ! X =   -84.85134,  -35.99504,     316.000,       0.000!   !END!
201 ! X =   -84.84871,  -35.74656,     306.000,       0.000!   !END!
202 ! X =   -84.84609,  -35.49818,     314.000,       0.000!   !END!
203 ! X =   -84.84336,  -35.24971,     314.000,       0.000!   !END!
204 ! X =   -84.84073,  -35.00124,     290.000,       0.000!   !END!
205 ! X =   -84.83811,  -34.75286,     258.000,       0.000!   !END!
206 ! X =   -84.83548,  -34.50438,     281.000,       0.000!   !END!
207 ! X =   -84.83285,  -34.25591,     304.000,       0.000!   !END!
208 ! X =   -84.83023,  -34.00743,     301.000,       0.000!   !END!
209 ! X =    -84.8275,  -33.75906,     280.000,       0.000!   !END!
210 ! X =   -84.82488,  -33.51058,     304.000,       0.000!   !END!
211 ! X =   -84.82225,   -33.2621,     304.000,       0.000!   !END!
212 ! X =   -84.81963,  -33.01372,     318.000,       0.000!   !END!
213 ! X =     -84.817,  -32.76524,     335.000,       0.000!   !END!
214 ! X =   -84.81427,  -32.51677,     335.000,       0.000!   !END!
215 ! X =   -84.81165,  -32.26839,     335.000,       0.000!   !END!
216 ! X =   -84.80902,  -32.01991,     318.000,       0.000!   !END!
217 ! X =   -84.80639,  -31.77143,     304.000,       0.000!   !END!
218 ! X =   -84.80377,  -31.52305,     292.000,       0.000!   !END!
219 ! X =    -84.6278,  -38.23377,     326.000,       0.000!   !END!
220 ! X =   -84.62507,   -37.9853,     286.000,       0.000!   !END!
221 ! X =   -84.62245,  -37.73682,     308.000,       0.000!   !END!
222 ! X =   -84.61982,  -37.48835,     322.000,       0.000!   !END!
223 ! X =    -84.6172,  -37.23998,     335.000,       0.000!   !END!
224 ! X =   -84.61457,   -36.9915,     344.000,       0.000!   !END!
225 ! X =   -84.61194,  -36.74303,     365.000,       0.000!   !END!
226 ! X =   -84.60921,  -36.49456,     365.000,       0.000!   !END!
227 ! X =   -84.60659,  -36.24618,     359.000,       0.000!   !END!
228 ! X =   -84.60396,   -35.9977,     330.000,       0.000!   !END!
229 ! X =   -84.60133,  -35.74923,     309.000,       0.000!   !END!
230 ! X =   -84.59871,  -35.50075,     304.000,       0.000!   !END!
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231 ! X =   -84.59608,  -35.25238,     289.000,       0.000!   !END!
232 ! X =   -84.59335,   -35.0039,     270.000,       0.000!   !END!
233 ! X =   -84.59073,  -34.75543,     274.000,       0.000!   !END!
234 ! X =    -84.5881,  -34.50705,     289.000,       0.000!   !END!
235 ! X =   -84.58548,  -34.25857,     304.000,       0.000!   !END!
236 ! X =   -84.58285,   -34.0101,     304.000,       0.000!   !END!
237 ! X =   -84.58022,  -33.76162,     304.000,       0.000!   !END!
238 ! X =    -84.5775,  -33.51324,     297.000,       0.000!   !END!
239 ! X =   -84.57487,  -33.26477,     305.000,       0.000!   !END!
240 ! X =   -84.57224,  -33.01629,     327.000,       0.000!   !END!
241 ! X =   -84.56962,  -32.76791,     335.000,       0.000!   !END!
242 ! X =   -84.56699,  -32.51943,     335.000,       0.000!   !END!
243 ! X =   -84.56426,  -32.27096,     333.000,       0.000!   !END!
244 ! X =   -84.56164,  -32.02258,     313.000,       0.000!   !END!
245 ! X =   -84.55901,   -31.7741,     279.000,       0.000!   !END!
246 ! X =   -84.55639,  -31.52572,     304.000,       0.000!   !END!
247 ! X =   -84.37769,  -37.98787,     296.000,       0.000!   !END!
248 ! X =   -84.37507,  -37.73949,     304.000,       0.000!   !END!
249 ! X =   -84.37244,  -37.49102,     307.000,       0.000!   !END!
250 ! X =   -84.36981,  -37.24254,     335.000,       0.000!   !END!
251 ! X =   -84.36719,  -36.99407,     351.000,       0.000!   !END!
252 ! X =   -84.36456,  -36.74569,     365.000,       0.000!   !END!
253 ! X =   -84.36194,  -36.49722,     365.000,       0.000!   !END!
254 ! X =   -84.35921,  -36.24875,     365.000,       0.000!   !END!
255 ! X =   -84.35658,  -36.00027,     330.000,       0.000!   !END!
256 ! X =   -84.35396,   -35.7519,     306.000,       0.000!   !END!
257 ! X =   -84.35133,  -35.50342,     290.000,       0.000!   !END!
258 ! X =    -84.3487,  -35.25494,     304.000,       0.000!   !END!
259 ! X =   -84.34608,  -35.00657,     300.000,       0.000!   !END!
260 ! X =   -84.34335,   -34.7581,     275.000,       0.000!   !END!
261 ! X =   -84.34072,  -34.50962,     289.000,       0.000!   !END!
262 ! X =   -84.33809,  -34.26114,     311.000,       0.000!   !END!
263 ! X =   -84.33547,  -34.01276,     331.000,       0.000!   !END!
264 ! X =   -84.33284,  -33.76429,     335.000,       0.000!   !END!
265 ! X =   -84.33021,  -33.51581,     318.000,       0.000!   !END!
266 ! X =   -84.32749,  -33.26743,     301.000,       0.000!   !END!
267 ! X =   -84.32486,  -33.01896,     319.000,       0.000!   !END!
268 ! X =   -84.32223,  -32.77048,     335.000,       0.000!   !END!
269 ! X =   -84.31961,   -32.5221,     335.000,       0.000!   !END!
270 ! X =   -84.31698,  -32.27362,     328.000,       0.000!   !END!
271 ! X =   -84.31436,  -32.02514,     308.000,       0.000!   !END!
272 ! X =   -84.31163,  -31.77676,     289.000,       0.000!   !END!
273 ! X =     -84.309,  -31.52828,     300.000,       0.000!   !END!
274 ! X =   -84.13042,  -37.99053,     299.000,       0.000!   !END!
275 ! X =   -84.12769,  -37.74206,     304.000,       0.000!   !END!
276 ! X =   -84.12507,  -37.49369,     315.000,       0.000!   !END!
277 ! X =   -84.12244,  -37.24521,     325.000,       0.000!   !END!
278 ! X =   -84.11981,  -36.99674,     349.000,       0.000!   !END!
279 ! X =   -84.11718,  -36.74826,     365.000,       0.000!   !END!
280 ! X =   -84.11456,  -36.49989,     365.000,       0.000!   !END!
281 ! X =   -84.11183,  -36.25142,     335.000,       0.000!   !END!
282 ! X =    -84.1092,  -36.00294,     310.000,       0.000!   !END!
283 ! X =   -84.10657,  -35.75447,     304.000,       0.000!   !END!
284 ! X =   -84.10395,  -35.50609,     304.000,       0.000!   !END!
285 ! X =   -84.10132,  -35.25761,     304.000,       0.000!   !END!
286 ! X =   -84.09869,  -35.00914,     304.000,       0.000!   !END!
287 ! X =   -84.09607,  -34.76076,     289.000,       0.000!   !END!
288 ! X =   -84.09334,  -34.51229,     284.000,       0.000!   !END!
289 ! X =   -84.09072,  -34.26381,     309.000,       0.000!   !END!
290 ! X =   -84.08809,  -34.01533,     335.000,       0.000!   !END!
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291	!	X =	-84.08546,	-33.76695,	335.000,	0.000!	!END!
292	!	X =	-84.08284,	-33.51848,	335.000,	0.000!	!END!
293	!	X =	-84.08021,	-33.27,	312.000,	0.000!	!END!
294	!	X =	-84.07748,	-33.02162,	336.000,	0.000!	!END!
295	!	X =	-84.07486,	-32.77314,	358.000,	0.000!	!END!
296	!	X =	-84.07223,	-32.52467,	355.000,	0.000!	!END!
297	!	X =	-84.0696,	-32.27629,	330.000,	0.000!	!END!
298	!	X =	-84.06698,	-32.02781,	309.000,	0.000!	!END!
299	!	X =	-84.06435,	-31.77933,	289.000,	0.000!	!END!
300	!	X =	-84.06162,	-31.53095,	282.000,	0.000!	!END!
301	!	X =	-83.88567,	-38.24167,	335.000,	0.000!	!END!
302	!	X =	-83.88305,	-37.9932,	304.000,	0.000!	!END!
303	!	X =	-83.88042,	-37.74472,	304.000,	0.000!	!END!
304	!	X =	-83.87769,	-37.49625,	335.000,	0.000!	!END!
305	!	X =	-83.87506,	-37.24778,	344.000,	0.000!	!END!
306	!	X =	-83.87244,	-36.99941,	330.000,	0.000!	!END!
307	!	X =	-83.86981,	-36.75093,	365.000,	0.000!	!END!
308	!	X =	-83.86718,	-36.50246,	365.000,	0.000!	!END!
309	!	X =	-83.86455,	-36.25398,	349.000,	0.000!	!END!
310	!	X =	-83.86183,	-36.00561,	335.000,	0.000!	!END!
311	!	X =	-83.8592,	-35.75713,	326.000,	0.000!	!END!
312	!	X =	-83.85657,	-35.50866,	312.000,	0.000!	!END!
313	!	X =	-83.85395,	-35.26028,	305.000,	0.000!	!END!
314	!	X =	-83.85132,	-35.0118,	304.000,	0.000!	!END!
315	!	X =	-83.84869,	-34.76333,	287.000,	0.000!	!END!
316	!	X =	-83.84606,	-34.51485,	289.000,	0.000!	!END!
317	!	X =	-83.84334,	-34.26648,	318.000,	0.000!	!END!
318	!	X =	-83.84071,	-34.018,	335.000,	0.000!	!END!
319	!	X =	-83.83808,	-33.76952,	335.000,	0.000!	!END!
320	!	X =	-83.83546,	-33.52114,	335.000,	0.000!	!END!
321	!	X =	-83.83283,	-33.27267,	330.000,	0.000!	!END!
322	!	X =	-83.8302,	-33.02419,	362.000,	0.000!	!END!
323	!	X =	-83.82748,	-32.77581,	365.000,	0.000!	!END!
324	!	X =	-83.82485,	-32.52733,	365.000,	0.000!	!END!
325	!	X =	-83.82222,	-32.27885,	340.000,	0.000!	!END!
326	!	X =	-83.8196,	-32.03047,	312.000,	0.000!	!END!
327	!	X =	-83.81697,	-31.78199,	304.000,	0.000!	!END!
328	!	X =	-83.81434,	-31.53351,	304.000,	0.000!	!END!
329	!	X =	-83.63829,	-38.24424,	350.000,	0.000!	!END!
330	!	X =	-83.63567,	-37.99577,	313.000,	0.000!	!END!
331	!	X =	-83.63304,	-37.74739,	335.000,	0.000!	!END!
332	!	X =	-83.63041,	-37.49892,	355.000,	0.000!	!END!
333	!	X =	-83.62768,	-37.25045,	365.000,	0.000!	!END!
334	!	X =	-83.62506,	-37.00197,	373.000,	0.000!	!END!
335	!	X =	-83.62243,	-36.7536,	365.000,	0.000!	!END!
336	!	X =	-83.6198,	-36.50512,	365.000,	0.000!	!END!
337	!	X =	-83.61717,	-36.25665,	335.000,	0.000!	!END!
338	!	X =	-83.61455,	-36.00817,	335.000,	0.000!	!END!
339	!	X =	-83.61182,	-35.7598,	335.000,	0.000!	!END!
340	!	X =	-83.60919,	-35.51133,	323.000,	0.000!	!END!
341	!	X =	-83.60656,	-35.26285,	305.000,	0.000!	!END!
342	!	X =	-83.60394,	-35.01447,	296.000,	0.000!	!END!
343	!	X =	-83.60131,	-34.766,	274.000,	0.000!	!END!
344	!	X =	-83.59868,	-34.51752,	284.000,	0.000!	!END!
345	!	X =	-83.59605,	-34.26904,	313.000,	0.000!	!END!
346	!	X =	-83.59333,	-34.02067,	325.000,	0.000!	!END!
347	!	X =	-83.5907,	-33.77219,	335.000,	0.000!	!END!
348	!	X =	-83.58807,	-33.52371,	335.000,	0.000!	!END!
349	!	X =	-83.58545,	-33.27533,	357.000,	0.000!	!END!
350	!	X =	-83.58282,	-33.02686,	365.000,	0.000!	!END!

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351 ! X =   -83.58019,  -32.77838,     365.000,       0.000!   !END!
352 ! X =   -83.57757,     -32.53,     365.000,       0.000!   !END!
353 ! X =   -83.57484,  -32.28152,     334.000,       0.000!   !END!
354 ! X =   -83.57221,  -32.03304,     334.000,       0.000!   !END!
355 ! X =   -83.56959,  -31.78466,     326.000,       0.000!   !END!
356 ! X =   -83.39092,  -38.24691,     365.000,       0.000!   !END!
357 ! X =   -83.38829,  -37.99844,     336.000,       0.000!   !END!
358 ! X =   -83.38566,  -37.74996,     352.000,       0.000!   !END!
359 ! X =   -83.38304,  -37.50159,     353.000,       0.000!   !END!
360 ! X =   -83.38031,  -37.25312,     367.000,       0.000!   !END!
361 ! X =   -83.37768,  -37.00464,     396.000,       0.000!   !END!
362 ! X =   -83.36717,  -36.01084,     329.000,       0.000!   !END!
363 ! X =   -83.36454,  -35.76237,     329.000,       0.000!   !END!
364 ! X =   -83.36182,  -35.51399,     311.000,       0.000!   !END!
365 ! X =   -83.35919,  -35.26552,     293.000,       0.000!   !END!
366 ! X =   -83.35656,  -35.01704,     277.000,       0.000!   !END!
367 ! X =   -83.35393,  -34.76856,     275.000,       0.000!   !END!
368 ! X =    -83.3513,  -34.52019,     275.000,       0.000!   !END!
369 ! X =   -83.34868,  -34.27171,     294.000,       0.000!   !END!
370 ! X =   -83.34605,  -34.02323,     303.000,       0.000!   !END!
371 ! X =   -83.34332,  -33.77486,     323.000,       0.000!   !END!
372 ! X =   -83.34069,  -33.52638,     338.000,       0.000!   !END!
373 ! X =   -83.33806,   -33.2779,     365.000,       0.000!   !END!
374 ! X =   -83.33544,  -33.02952,     365.000,       0.000!   !END!
375 ! X =   -83.33281,  -32.78105,     351.000,       0.000!   !END!
376 ! X =   -83.33018,  -32.53257,     335.000,       0.000!   !END!
377 ! X =   -83.32756,  -32.28419,     335.000,       0.000!   !END!
378 ! X =   -83.32483,  -32.03571,     335.000,       0.000!   !END!
379 ! X =    -83.3222,  -31.78723,     335.000,       0.000!   !END!
380 ! X =   -83.14354,  -38.24948,     365.000,       0.000!   !END!
381 ! X =   -83.14092,   -38.0011,     339.000,       0.000!   !END!
382 ! X =   -83.13829,  -37.75263,     365.000,       0.000!   !END!
383 ! X =   -83.13566,  -37.50416,     365.000,       0.000!   !END!
384 ! X =   -83.13303,  -37.25568,     358.000,       0.000!   !END!
385 ! X =   -83.13031,  -37.00731,     396.000,       0.000!   !END!
386 ! X =   -83.11979,  -36.01351,     328.000,       0.000!   !END!
387 ! X =   -83.11716,  -35.76503,     305.000,       0.000!   !END!
388 ! X =   -83.11453,  -35.51656,     304.000,       0.000!   !END!
389 ! X =   -83.11181,  -35.26819,     300.000,       0.000!   !END!
390 ! X =   -83.10918,  -35.01971,     304.000,       0.000!   !END!
391 ! X =   -83.10655,  -34.77123,     297.000,       0.000!   !END!
392 ! X =   -83.10392,  -34.52276,     274.000,       0.000!   !END!
393 ! X =    -83.1013,  -34.27438,     304.000,       0.000!   !END!
394 ! X =   -83.09867,   -34.0259,     304.000,       0.000!   !END!
395 ! X =   -83.09604,  -33.77742,     307.000,       0.000!   !END!
396 ! X =   -83.09332,  -33.52905,     335.000,       0.000!   !END!
397 ! X =   -83.09069,  -33.28057,     365.000,       0.000!   !END!
398 ! X =   -83.08806,  -33.03209,     365.000,       0.000!   !END!
399 ! X =   -83.08543,  -32.78371,     354.000,       0.000!   !END!
400 ! X =    -83.0828,  -32.53524,     335.000,       0.000!   !END!
401 ! X =   -83.08017,  -32.28676,     312.000,       0.000!   !END!
402 ! X =   -83.07755,  -32.03838,     335.000,       0.000!   !END!
403 ! X =   -83.07482,   -31.7899,     316.000,       0.000!   !END!
404 ! X =   -83.07219,  -31.54142,     306.000,       0.000!   !END!
405 ! X =   -83.06957,  -31.29304,     284.000,       0.000!   !END!
406 ! X =   -83.06694,  -31.04456,     297.000,       0.000!   !END!
407 ! X =   -82.89617,  -38.25215,     365.000,       0.000!   !END!
408 ! X =   -82.89354,  -38.00367,     365.000,       0.000!   !END!
409 ! X =   -82.89091,   -37.7553,     383.000,       0.000!   !END!
410 ! X =   -82.88828,  -37.50683,     390.000,       0.000!   !END!
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411 ! X =   -82.88565,  -37.25835,     386.000,       0.000!   !END!
412 ! X =   -82.88302,  -37.00988,     367.000,       0.000!   !END!
413 ! X =   -82.87241,  -36.01608,     335.000,       0.000!   !END!
414 ! X =   -82.86979,   -35.7677,     335.000,       0.000!   !END!
415 ! X =   -82.86716,  -35.51923,     316.000,       0.000!   !END!
416 ! X =   -82.86453,  -35.27075,     304.000,       0.000!   !END!
417 ! X =    -82.8619,  -35.02227,     304.000,       0.000!   !END!
418 ! X =   -82.85917,   -34.7739,     304.000,       0.000!   !END!
419 ! X =   -82.85654,  -34.52543,     277.000,       0.000!   !END!
420 ! X =   -82.85391,  -34.27695,     296.000,       0.000!   !END!
421 ! X =   -82.85129,  -34.02857,     304.000,       0.000!   !END!
422 ! X =   -82.84866,  -33.78009,     307.000,       0.000!   !END!
423 ! X =   -82.84603,  -33.53161,     328.000,       0.000!   !END!
424 ! X =   -82.84341,  -33.28324,     348.000,       0.000!   !END!
425 ! X =   -82.84068,  -33.03476,     355.000,       0.000!   !END!
426 ! X =   -82.83805,  -32.78628,     347.000,       0.000!   !END!
427 ! X =   -82.83542,   -32.5379,     335.000,       0.000!   !END!
428 ! X =   -82.83279,  -32.28943,     311.000,       0.000!   !END!
429 ! X =   -82.83016,  -32.04095,     302.000,       0.000!   !END!
430 ! X =   -82.82754,  -31.79257,     284.000,       0.000!   !END!
431 ! X =   -82.82491,  -31.54409,     277.000,       0.000!   !END!
432 ! X =   -82.82218,  -31.29561,     296.000,       0.000!   !END!
433 ! X =   -82.81956,  -31.04723,     301.000,       0.000!   !END!
434 ! X =   -82.64616,  -38.00634,     372.000,       0.000!   !END!
435 ! X =   -82.62504,  -36.01875,     335.000,       0.000!   !END!
436 ! X =   -82.62241,  -35.77027,     335.000,       0.000!   !END!
437 ! X =   -82.61978,   -35.5219,     316.000,       0.000!   !END!
438 ! X =   -82.61715,  -35.27342,     321.000,       0.000!   !END!
439 ! X =   -82.61452,  -35.02494,     331.000,       0.000!   !END!
440 ! X =   -82.61189,  -34.77647,     305.000,       0.000!   !END!
441 ! X =   -82.60917,   -34.5281,     287.000,       0.000!   !END!
442 ! X =   -82.60654,  -34.27962,     304.000,       0.000!   !END!
443 ! X =   -82.60391,  -34.03114,     305.000,       0.000!   !END!
444 ! X =   -82.60128,  -33.78276,     310.000,       0.000!   !END!
445 ! X =   -82.59865,  -33.53428,     320.000,       0.000!   !END!
446 ! X =   -82.59602,  -33.28581,     339.000,       0.000!   !END!
447 ! X =    -82.5934,  -33.03743,     340.000,       0.000!   !END!
448 ! X =   -82.59067,  -32.78895,     335.000,       0.000!   !END!
449 ! X =   -82.58804,  -32.54047,     319.000,       0.000!   !END!
450 ! X =   -82.58541,  -32.29209,     304.000,       0.000!   !END!
451 ! X =   -82.58278,  -32.04362,     304.000,       0.000!   !END!
452 ! X =   -82.58015,  -31.79514,     284.000,       0.000!   !END!
453 ! X =   -82.57753,  -31.54675,     304.000,       0.000!   !END!
454 ! X =    -82.5749,  -31.29827,     304.000,       0.000!   !END!
455 ! X =   -82.57227,  -31.04979,     304.000,       0.000!   !END!
456 ! X =   -82.37766,  -36.02142,     329.000,       0.000!   !END!
457 ! X =   -82.37503,  -35.77294,     312.000,       0.000!   !END!
458 ! X =    -82.3724,  -35.52447,     327.000,       0.000!   !END!
459 ! X =   -82.36977,  -35.27599,     335.000,       0.000!   !END!
460 ! X =   -82.36714,  -35.02761,     335.000,       0.000!   !END!
461 ! X =   -82.36451,  -34.77914,     297.000,       0.000!   !END!
462 ! X =   -82.36188,  -34.53066,     304.000,       0.000!   !END!
463 ! X =   -82.35916,  -34.28229,     304.000,       0.000!   !END!
464 ! X =   -82.35653,  -34.03381,     310.000,       0.000!   !END!
465 ! X =    -82.3539,  -33.78533,     324.000,       0.000!   !END!
466 ! X =   -82.35127,  -33.53695,     338.000,       0.000!   !END!
467 ! X =   -82.34864,  -33.28848,     339.000,       0.000!   !END!
468 ! X =   -82.34601,     -33.04,     335.000,       0.000!   !END!
469 ! X =   -82.34339,  -32.79162,     326.000,       0.000!   !END!
470 ! X =   -82.34076,  -32.54314,     309.000,       0.000!   !END!
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471 ! X =   -82.33803,  -32.29466,     301.000,       0.000!   !END!
472 ! X =    -82.3354,  -32.04628,     296.000,       0.000!   !END!
473 ! X =   -82.33277,   -31.7978,     304.000,       0.000!   !END!
474 ! X =   -82.33014,  -31.54932,     305.000,       0.000!   !END!
475 ! X =   -82.32752,  -31.30094,     304.000,       0.000!   !END!
476 ! X =   -82.32489,  -31.05246,     304.000,       0.000!   !END!
477 ! X =   -82.13038,  -36.02398,     335.000,       0.000!   !END!
478 ! X =   -82.12765,  -35.77551,     329.000,       0.000!   !END!
479 ! X =   -82.12502,  -35.52714,     335.000,       0.000!   !END!
480 ! X =   -82.12239,  -35.27866,     335.000,       0.000!   !END!
481 ! X =   -82.11976,  -35.03018,     319.000,       0.000!   !END!
482 ! X =   -82.11714,  -34.78181,     298.000,       0.000!   !END!
483 ! X =   -82.11451,  -34.53333,     304.000,       0.000!   !END!
484 ! X =   -82.11188,  -34.28485,     311.000,       0.000!   !END!
485 ! X =   -82.10925,  -34.03647,     335.000,       0.000!   !END!
486 ! X =   -82.10652,    -33.788,     339.000,       0.000!   !END!
487 ! X =   -82.10389,  -33.53952,     365.000,       0.000!   !END!
488 ! X =   -82.10126,  -33.29115,     365.000,       0.000!   !END!
489 ! X =   -82.09863,  -33.04267,     347.000,       0.000!   !END!
490 ! X =     -82.096,  -32.79419,     326.000,       0.000!   !END!
491 ! X =   -82.09338,  -32.54581,     309.000,       0.000!   !END!
492 ! X =   -82.09075,  -32.29733,     302.000,       0.000!   !END!
493 ! X =   -82.08812,  -32.04885,     309.000,       0.000!   !END!
494 ! X =   -82.08539,  -31.80047,     335.000,       0.000!   !END!
495 ! X =   -82.08276,  -31.55199,     322.000,       0.000!   !END!
496 ! X =   -82.08013,  -31.30351,     305.000,       0.000!   !END!
497 ! X =   -82.07751,  -31.05513,     304.000,       0.000!   !END!
498 ! X =     -81.883,  -36.02665,     345.000,       0.000!   !END!
499 ! X =   -81.88037,  -35.77818,     340.000,       0.000!   !END!
500 ! X =   -81.87764,  -35.52971,     335.000,       0.000!   !END!
501 ! X =   -81.87501,  -35.28133,     335.000,       0.000!   !END!
502 ! X =   -81.87238,  -35.03285,     304.000,       0.000!   !END!
503 ! X =   -81.86975,  -34.78438,     304.000,       0.000!   !END!
504 ! X =   -81.86713,    -34.536,     304.000,       0.000!   !END!
505 ! X =    -81.8645,  -34.28752,     310.000,       0.000!   !END!
506 ! X =   -81.86187,  -34.03905,     335.000,       0.000!   !END!
507 ! X =   -81.85924,  -33.79067,     343.000,       0.000!   !END!
508 ! X =   -81.85651,  -33.54219,     365.000,       0.000!   !END!
509 ! X =   -81.85388,  -33.29372,     365.000,       0.000!   !END!
510 ! X =   -81.85125,  -33.04524,     350.000,       0.000!   !END!
511 ! X =   -81.84862,  -32.79686,     319.000,       0.000!   !END!
512 ! X =   -81.84599,  -32.54838,     304.000,       0.000!   !END!
513 ! X =   -81.84337,      -32.3,     328.000,       0.000!   !END!
514 ! X =   -81.84074,  -32.05152,     335.000,       0.000!   !END!
515 ! X =   -81.83811,  -31.80304,     335.000,       0.000!   !END!
516 ! X =   -81.83538,  -31.55467,     330.000,       0.000!   !END!
517 ! X =   -81.83275,  -31.30618,     300.000,       0.000!   !END!
518 ! X =   -81.83012,   -31.0577,     275.000,       0.000!   !END!
519 ! X =   -81.64614,  -37.02303,     376.000,       0.000!   !END!
520 ! X =   -81.64088,  -36.52618,     365.000,       0.000!   !END!
521 ! X =   -81.63825,   -36.2777,     365.000,       0.000!   !END!
522 ! X =   -81.63562,  -36.02923,     365.000,       0.000!   !END!
523 ! X =   -81.63299,  -35.78085,     361.000,       0.000!   !END!
524 ! X =   -81.63036,  -35.53237,     337.000,       0.000!   !END!
525 ! X =   -81.62763,   -35.2839,     306.000,       0.000!   !END!
526 ! X =   -81.62501,  -35.03552,     318.000,       0.000!   !END!
527 ! X =   -81.62238,  -34.78705,     335.000,       0.000!   !END!
528 ! X =   -81.61975,  -34.53857,     309.000,       0.000!   !END!
529 ! X =   -81.61711,  -34.29009,     305.000,       0.000!   !END!
530 ! X =   -81.61449,  -34.04172,     312.000,       0.000!   !END!
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531 ! X =   -81.61186,  -33.79324,     338.000,       0.000!   !END!
532 ! X =   -81.60923,  -33.54476,     365.000,       0.000!   !END!
533 ! X =    -81.6066,  -33.29638,     365.000,       0.000!   !END!
534 ! X =   -81.60387,  -33.04791,     350.000,       0.000!   !END!
535 ! X =   -81.60124,  -32.79943,     335.000,       0.000!   !END!
536 ! X =   -81.59861,  -32.55105,     349.000,       0.000!   !END!
537 ! X =   -81.59598,  -32.30257,     365.000,       0.000!   !END!
538 ! X =   -81.59335,  -32.05409,     351.000,       0.000!   !END!
539 ! X =   -81.59073,  -31.80571,     335.000,       0.000!   !END!
540 ! X =    -81.5881,  -31.55723,     319.000,       0.000!   !END!
541 ! X =   -81.58547,  -31.30885,     302.000,       0.000!   !END!
542 ! X =   -81.58274,  -31.06037,     284.000,       0.000!   !END!
543 ! X =   -81.58011,  -30.81189,     274.000,       0.000!   !END!
544 ! X =   -81.39876,   -37.0257,     391.000,       0.000!   !END!
545 ! X =   -81.39613,  -36.77722,     382.000,       0.000!   !END!
546 ! X =   -81.39351,  -36.52885,     366.000,       0.000!   !END!
547 ! X =   -81.39087,  -36.28037,     365.000,       0.000!   !END!
548 ! X =   -81.38824,   -36.0319,     365.000,       0.000!   !END!
549 ! X =   -81.38561,  -35.78342,     359.000,       0.000!   !END!
550 ! X =   -81.38299,  -35.53504,     323.000,       0.000!   !END!
551 ! X =   -81.38036,  -35.28657,     327.000,       0.000!   !END!
552 ! X =   -81.37772,  -35.03809,     335.000,       0.000!   !END!
553 ! X =   -81.37499,  -34.78962,     335.000,       0.000!   !END!
554 ! X =   -81.37237,  -34.54124,     331.000,       0.000!   !END!
555 ! X =   -81.36974,  -34.29276,     320.000,       0.000!   !END!
556 ! X =   -81.36711,  -34.04429,     335.000,       0.000!   !END!
557 ! X =   -81.36448,  -33.79591,     335.000,       0.000!   !END!
558 ! X =   -81.36185,  -33.54743,     341.000,       0.000!   !END!
559 ! X =   -81.35922,  -33.29895,     349.000,       0.000!   !END!
560 ! X =   -81.35659,  -33.05057,     350.000,       0.000!   !END!
561 ! X =   -81.35396,  -32.80209,     365.000,       0.000!   !END!
562 ! X =   -81.35123,  -32.55362,     365.000,       0.000!   !END!
563 ! X =    -81.3486,  -32.30524,     365.000,       0.000!   !END!
564 ! X =   -81.34597,  -32.05676,     352.000,       0.000!   !END!
565 ! X =   -81.34334,  -31.80828,     335.000,       0.000!   !END!
566 ! X =   -81.34072,   -31.5599,     315.000,       0.000!   !END!
567 ! X =   -81.33808,  -31.31142,     305.000,       0.000!   !END!
568 ! X =   -81.33546,  -31.06304,     301.000,       0.000!   !END!
569 ! X =   -81.33283,  -30.81456,     275.000,       0.000!   !END!
570 ! X =   -81.14876,  -36.77989,     396.000,       0.000!   !END!
571 ! X =   -81.14612,  -36.53142,     382.000,       0.000!   !END!
572 ! X =   -81.14349,  -36.28294,     355.000,       0.000!   !END!
573 ! X =   -81.14087,  -36.03457,     340.000,       0.000!   !END!
574 ! X =   -81.13824,  -35.78609,     327.000,       0.000!   !END!
575 ! X =    -81.1356,  -35.53761,     342.000,       0.000!   !END!
576 ! X =   -81.13298,  -35.28924,     349.000,       0.000!   !END!
577 ! X =   -81.13035,  -35.04076,     350.000,       0.000!   !END!
578 ! X =   -81.12772,  -34.79228,     365.000,       0.000!   !END!
579 ! X =   -81.12498,  -34.54381,     351.000,       0.000!   !END!
580 ! X =   -81.12236,  -34.29544,     335.000,       0.000!   !END!
581 ! X =   -81.11973,  -34.04696,     340.000,       0.000!   !END!
582 ! X =    -81.1171,  -33.79848,     348.000,       0.000!   !END!
583 ! X =   -81.11447,   -33.5501,     356.000,       0.000!   !END!
584 ! X =   -81.11184,  -33.30162,     365.000,       0.000!   !END!
585 ! X =   -81.10921,  -33.05314,     365.000,       0.000!   !END!
586 ! X =   -81.10658,  -32.80477,     365.000,       0.000!   !END!
587 ! X =   -81.10395,  -32.55629,     365.000,       0.000!   !END!
588 ! X =   -81.10122,  -32.30781,     361.000,       0.000!   !END!
589 ! X =   -81.09859,  -32.05943,     332.000,       0.000!   !END!
590 ! X =   -81.09596,  -31.81095,     320.000,       0.000!   !END!
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591 ! X =   -81.09333,  -31.56247,     305.000,       0.000!   !END!
592 ! X =    -81.0907,  -31.31409,     304.000,       0.000!   !END!
593 ! X =   -81.08807,  -31.06561,     299.000,       0.000!   !END!
594 ! X =   -81.08545,  -30.81723,     277.000,       0.000!   !END!
595 ! X =   -80.89875,  -36.53409,     391.000,       0.000!   !END!
596 ! X =   -80.89612,  -36.28561,     356.000,       0.000!   !END!
597 ! X =   -80.89349,  -36.03714,     335.000,       0.000!   !END!
598 ! X =   -80.89086,  -35.78876,     311.000,       0.000!   !END!
599 ! X =   -80.88823,  -35.54029,     342.000,       0.000!   !END!
600 ! X =    -80.8856,  -35.29181,     380.000,       0.000!   !END!
601 ! X =   -80.88296,  -35.04333,     389.000,       0.000!   !END!
602 ! X =   -80.88034,  -34.79496,     396.000,       0.000!   !END!
603 ! X =   -80.87771,  -34.54648,     369.000,       0.000!   !END!
604 ! X =   -80.87507,    -34.298,     341.000,       0.000!   !END!
605 ! X =   -80.87235,  -34.04963,     359.000,       0.000!   !END!
606 ! X =   -80.86972,  -33.80115,     365.000,       0.000!   !END!
607 ! X =   -80.86709,  -33.55267,     365.000,       0.000!   !END!
608 ! X =   -80.86446,  -33.30429,     365.000,       0.000!   !END!
609 ! X =   -80.86183,  -33.05582,     365.000,       0.000!   !END!
610 ! X =    -80.8592,  -32.80734,     365.000,       0.000!   !END!
611 ! X =   -80.85657,  -32.55896,     365.000,       0.000!   !END!
612 ! X =   -80.85394,  -32.31048,     342.000,       0.000!   !END!
613 ! X =   -80.85131,    -32.062,     325.000,       0.000!   !END!
614 ! X =   -80.84858,  -31.81362,     309.000,       0.000!   !END!
615 ! X =   -80.84595,  -31.56514,     304.000,       0.000!   !END!
616 ! X =   -80.84332,  -31.31666,     297.000,       0.000!   !END!
617 ! X =   -80.84069,  -31.06828,     282.000,       0.000!   !END!
618 ! X =   -80.83806,   -30.8198,     274.000,       0.000!   !END!
619 ! X =   -80.65147,  -36.53666,     391.000,       0.000!   !END!
620 ! X =   -80.64884,  -36.28828,     350.000,       0.000!   !END!
621 ! X =   -80.64611,  -36.03981,     337.000,       0.000!   !END!
622 ! X =   -80.64348,  -35.79133,     313.000,       0.000!   !END!
623 ! X =   -80.64085,  -35.54286,     335.000,       0.000!   !END!
624 ! X =   -80.63822,  -35.29448,     396.000,       0.000!   !END!
625 ! X =   -80.63559,    -35.046,     396.000,       0.000!   !END!
626 ! X =   -80.63296,  -34.79753,     396.000,       0.000!   !END!
627 ! X =   -80.63033,  -34.54915,     386.000,       0.000!   !END!
628 ! X =    -80.6277,  -34.30067,     360.000,       0.000!   !END!
629 ! X =   -80.62507,   -34.0522,     365.000,       0.000!   !END!
630 ! X =   -80.62244,  -33.80382,     365.000,       0.000!   !END!
631 ! X =   -80.61971,  -33.55534,     365.000,       0.000!   !END!
632 ! X =   -80.61708,  -33.30687,     365.000,       0.000!   !END!
633 ! X =   -80.61445,  -33.05849,     351.000,       0.000!   !END!
634 ! X =   -80.61182,  -32.81001,     350.000,       0.000!   !END!
635 ! X =   -80.60918,  -32.56153,     335.000,       0.000!   !END!
636 ! X =   -80.60656,  -32.31315,     322.000,       0.000!   !END!
637 ! X =   -80.60393,  -32.06467,     310.000,       0.000!   !END!
638 ! X =   -80.60129,  -31.81619,     305.000,       0.000!   !END!
639 ! X =   -80.59867,  -31.56781,     291.000,       0.000!   !END!
640 ! X =   -80.59604,  -31.31933,     276.000,       0.000!   !END!
641 ! X =    -80.5933,  -31.07085,     274.000,       0.000!   !END!
642 ! X =   -80.59068,  -30.82247,     274.000,       0.000!   !END!
643 ! X =   -80.58805,  -30.57399,     268.000,       0.000!   !END!
644 ! X =   -80.40409,  -36.53933,     380.000,       0.000!   !END!
645 ! X =   -80.40146,  -36.29085,     396.000,       0.000!   !END!
646 ! X =   -80.39883,  -36.04238,     370.000,       0.000!   !END!
647 ! X =    -80.3961,  -35.79401,     332.000,       0.000!   !END!
648 ! X =   -80.39347,  -35.54553,     356.000,       0.000!   !END!
649 ! X =   -80.39084,  -35.29705,     372.000,       0.000!   !END!
650 ! X =   -80.38821,  -35.04868,     396.000,       0.000!   !END!
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651 ! X =   -80.38558,   -34.8002,     396.000,        0.000!   !END!
652 ! X =   -80.38295,  -34.55172,     384.000,        0.000!   !END!
653 ! X =   -80.38032,  -34.30334,     365.000,        0.000!   !END!
654 ! X =   -80.37769,  -34.05487,     365.000,        0.000!   !END!
655 ! X =   -80.37505,  -33.80639,     365.000,        0.000!   !END!
656 ! X =   -80.37242,  -33.55791,     355.000,        0.000!   !END!
657 ! X =    -80.3698,  -33.30953,     333.000,        0.000!   !END!
658 ! X =   -80.36706,  -33.06106,     327.000,        0.000!   !END!
659 ! X =   -80.36443,  -32.81258,     335.000,        0.000!   !END!
660 ! X =   -80.36181,   -32.5642,     313.000,        0.000!   !END!
661 ! X =   -80.35917,  -32.31572,     304.000,        0.000!   !END!
662 ! X =   -80.35655,  -32.06734,     304.000,        0.000!   !END!
663 ! X =   -80.35391,  -31.81886,     304.000,        0.000!   !END!
664 ! X =   -80.35128,  -31.57038,     284.000,        0.000!   !END!
665 ! X =   -80.34866,    -31.322,     274.000,        0.000!   !END!
666 ! X =   -80.34602,  -31.07352,     274.000,        0.000!   !END!
667 ! X =   -80.34339,  -30.82504,     267.000,        0.000!   !END!
668 ! X =   -80.15145,  -36.04505,     372.000,        0.000!   !END!
669 ! X =   -80.14882,  -35.79657,     335.000,        0.000!   !END!
670 ! X =   -80.14619,   -35.5482,     365.000,        0.000!   !END!
671 ! X =   -80.14346,  -35.29972,     396.000,        0.000!   !END!
672 ! X =   -80.14083,  -35.05125,     396.000,        0.000!   !END!
673 ! X =    -80.1382,  -34.80287,     396.000,        0.000!   !END!
674 ! X =   -80.13557,  -34.55439,     373.000,        0.000!   !END!
675 ! X =   -80.13294,  -34.30592,     366.000,        0.000!   !END!
676 ! X =    -80.1303,  -34.05744,     365.000,        0.000!   !END!
677 ! X =   -80.12768,  -33.80906,     365.000,        0.000!   !END!
678 ! X =   -80.12504,  -33.56058,     341.000,        0.000!   !END!
679 ! X =   -80.12241,   -33.3121,     335.000,        0.000!   !END!
680 ! X =   -80.11978,  -33.06373,     307.000,        0.000!   !END!
681 ! X =   -80.11715,  -32.81525,     309.000,        0.000!   !END!
682 ! X =   -80.11442,  -32.56677,     305.000,        0.000!   !END!
683 ! X =   -80.11179,  -32.31839,     300.000,        0.000!   !END!
684 ! X =   -80.10916,  -32.06991,     280.000,        0.000!   !END!
685 ! X =   -80.10653,  -31.82143,     292.000,        0.000!   !END!
686 ! X =    -80.1039,  -31.57305,     294.000,        0.000!   !END!
687 ! X =   -80.10127,  -31.32457,     291.000,        0.000!   !END!
688 ! X =   -80.09864,  -31.07619,     281.000,        0.000!   !END!
689 ! X =   -79.90408,  -36.04772,     366.000,        0.000!   !END!
690 ! X =   -79.90144,  -35.79924,     344.000,        0.000!   !END!
691 ! X =   -79.89881,  -35.55077,     365.000,        0.000!   !END!
692 ! X =   -79.89618,  -35.30239,     396.000,        0.000!   !END!
693 ! X =   -79.89355,  -35.05391,     396.000,        0.000!   !END!
694 ! X =   -79.89082,  -34.80544,     396.000,        0.000!   !END!
695 ! X =   -79.88819,  -34.55697,     391.000,        0.000!   !END!
696 ! X =   -79.88556,  -34.30859,     372.000,        0.000!   !END!
697 ! X =   -79.88293,  -34.06011,     365.000,        0.000!   !END!
698 ! X =   -79.88029,  -33.81163,     360.000,        0.000!   !END!
699 ! X =   -79.87767,  -33.56325,     332.000,        0.000!   !END!
700 ! X =   -79.87503,  -33.31478,     320.000,        0.000!   !END!
701 ! X =    -79.8724,   -33.0663,     335.000,        0.000!   !END!
702 ! X =   -79.86977,  -32.81792,     335.000,        0.000!   !END!
703 ! X =   -79.86714,  -32.56944,     311.000,        0.000!   !END!
704 ! X =   -79.86451,  -32.32096,     302.000,        0.000!   !END!
705 ! X =   -79.86178,  -32.07259,     297.000,        0.000!   !END!
706 ! X =   -79.85915,  -31.82411,     304.000,        0.000!   !END!
707 ! X =   -79.85652,  -31.57563,     304.000,        0.000!   !END!
708 ! X =   -79.85389,  -31.32725,     304.000,        0.000!   !END!
709 ! X =   -79.85126,  -31.07877,     304.000,        0.000!   !END!
710 ! X =   -79.65669,  -36.05029,     390.000,        0.000!   !END!
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711	! X =	-79.65407,	-35.80192,	379.000,	0.000!	!END!
712	! X =	-79.65143,	-35.55344,	353.000,	0.000!	!END!
713	! X =	-79.6488,	-35.30496,	386.000,	0.000!	!END!
714	! X =	-79.64617,	-35.05649,	402.000,	0.000!	!END!
715	! X =	-79.64354,	-34.80811,	397.000,	0.000!	!END!
716	! X =	-79.64091,	-34.55963,	396.000,	0.000!	!END!
717	! X =	-79.63817,	-34.31116,	384.000,	0.000!	!END!
718	! X =	-79.63555,	-34.06278,	356.000,	0.000!	!END!
719	! X =	-79.63291,	-33.81431,	355.000,	0.000!	!END!
720	! X =	-79.63028,	-33.56583,	363.000,	0.000!	!END!
721	! X =	-79.62765,	-33.31745,	365.000,	0.000!	!END!
722	! X =	-79.62502,	-33.06897,	357.000,	0.000!	!END!
723	! X =	-79.62239,	-32.82049,	335.000,	0.000!	!END!
724	! X =	-79.61976,	-32.57211,	318.000,	0.000!	!END!
725	! X =	-79.61713,	-32.32363,	304.000,	0.000!	!END!
726	! X =	-79.6145,	-32.07515,	304.000,	0.000!	!END!
727	! X =	-79.61187,	-31.82677,	304.000,	0.000!	!END!
728	! X =	-79.60923,	-31.57829,	304.000,	0.000!	!END!
729	! X =	-79.6065,	-31.32982,	304.000,	0.000!	!END!
730	! X =	-79.60387,	-31.08144,	304.000,	0.000!	!END!
731	! X =	-79.39879,	-35.05916,	402.000,	0.000!	!END!
732	! X =	-79.39616,	-34.81068,	396.000,	0.000!	!END!
733	! X =	-79.39353,	-34.56231,	396.000,	0.000!	!END!
734	! X =	-79.3909,	-34.31383,	386.000,	0.000!	!END!
735	! X =	-79.38826,	-34.06535,	357.000,	0.000!	!END!
736	! X =	-79.38554,	-33.81698,	381.000,	0.000!	!END!
737	! X =	-79.3829,	-33.5685,	370.000,	0.000!	!END!
738	! X =	-79.38027,	-33.32002,	365.000,	0.000!	!END!
739	! X =	-79.37764,	-33.07164,	354.000,	0.000!	!END!
740	! X =	-79.37501,	-32.82316,	320.000,	0.000!	!END!
741	! X =	-79.37238,	-32.57469,	306.000,	0.000!	!END!
742	! X =	-79.36975,	-32.32631,	304.000,	0.000!	!END!
743	! X =	-79.36712,	-32.07783,	306.000,	0.000!	!END!
744	! X =	-79.36448,	-31.82935,	305.000,	0.000!	!END!
745	! X =	-79.36185,	-31.58097,	304.000,	0.000!	!END!
746	! X =	-79.35922,	-31.33249,	304.000,	0.000!	!END!
747	! X =	-79.35659,	-31.08401,	304.000,	0.000!	!END!
748	! X =	-79.15141,	-35.06183,	396.000,	0.000!	!END!
749	! X =	-79.14878,	-34.81336,	396.000,	0.000!	!END!
750	! X =	-79.14615,	-34.56488,	396.000,	0.000!	!END!
751	! X =	-79.14351,	-34.3164,	372.000,	0.000!	!END!
752	! X =	-79.14089,	-34.06802,	355.000,	0.000!	!END!
753	! X =	-79.13825,	-33.81955,	389.000,	0.000!	!END!
754	! X =	-79.13562,	-33.57107,	389.000,	0.000!	!END!
755	! X =	-79.13299,	-33.32269,	347.000,	0.000!	!END!
756	! X =	-79.13026,	-33.07422,	340.000,	0.000!	!END!
757	! X =	-79.12762,	-32.82574,	331.000,	0.000!	!END!
758	! X =	-79.125,	-32.57736,	308.000,	0.000!	!END!
759	! X =	-79.12236,	-32.32888,	320.000,	0.000!	!END!
760	! X =	-79.11973,	-32.0804,	335.000,	0.000!	!END!
761	! X =	-79.1171,	-31.83202,	316.000,	0.000!	!END!
762	! X =	-79.11447,	-31.58354,	304.000,	0.000!	!END!
763	! X =	-78.89614,	-34.31907,	372.000,	0.000!	!END!
764	! X =	-78.8935,	-34.0706,	396.000,	0.000!	!END!
765	! X =	-78.89087,	-33.82222,	372.000,	0.000!	!END!
766	! X =	-78.88824,	-33.57374,	365.000,	0.000!	!END!
767	! X =	-78.88561,	-33.32526,	365.000,	0.000!	!END!
768	! X =	-78.88298,	-33.07688,	365.000,	0.000!	!END!
769	! X =	-78.88034,	-32.82841,	338.000,	0.000!	!END!
770	! X =	-78.87771,	-32.57993,	314.000,	0.000!	!END!

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771 ! X =   -78.87498,  -32.33155,     321.000,       0.000!   !END!
772 ! X =   -78.87235,  -32.08307,     335.000,       0.000!   !END!
773 ! X =   -78.86972,  -31.83459,     335.000,       0.000!   !END!
774 ! X =   -78.86709,  -31.58621,     292.000,       0.000!   !END!
775 ! X =   -78.64612,  -34.07327,     396.000,       0.000!   !END!
776 ! X =   -78.64349,  -33.82479,     386.000,       0.000!   !END!
777 ! X =   -78.64086,  -33.57641,     365.000,       0.000!   !END!
778 ! X =   -78.63823,  -33.32794,     365.000,       0.000!   !END!
779 ! X =   -78.63559,  -33.07946,     365.000,       0.000!   !END!
780 ! X =   -78.63297,  -32.83108,     338.000,       0.000!   !END!
781 ! X =   -78.63033,   -32.5826,     310.000,       0.000!   !END!
782 ! X =    -78.6277,  -32.33412,     312.000,       0.000!   !END!
783 ! X =   -78.62507,  -32.08574,     318.000,       0.000!   !END!
784 ! X =   -78.62244,  -31.83726,     307.000,       0.000!   !END!
785 ! X =    -78.6197,  -31.58879,     275.000,       0.000!   !END!
786 ! X =   -78.39348,  -33.57899,     365.000,       0.000!   !END!
787 ! X =   -78.39084,  -33.33051,     343.000,       0.000!   !END!
788 ! X =   -78.38822,  -33.08213,     341.000,       0.000!   !END!
789 ! X =   -78.38032,  -32.33679,     274.000,       0.000!   !END!
790 ! X =   -86.22193,  -33.67464,     274.000,       0.000!   !END!
791 ! X =   -86.01912,  -33.67677,     274.000,       0.000!   !END!
792 ! X =   -85.81621,  -33.67889,     274.000,       0.000!   !END!
793 ! X =   -85.81343,  -33.87778,     265.000,       0.000!   !END!
794 ! X =   -85.81054,  -34.07658,     244.000,       0.000!   !END!
795 ! X =    -85.8177,  -34.28021,     276.000,       0.000!   !END!
796 ! X =   -85.82486,  -34.48395,     295.000,       0.000!   !END!
797 ! X =   -85.82703,  -34.68765,     308.000,       0.000!   !END!
798 ! X =    -85.8291,  -34.89136,     322.000,       0.000!   !END!
799 ! X =   -86.02945,  -34.88628,     302.000,       0.000!   !END!
800 ! X =   -86.22986,   -34.8821,     284.000,       0.000!   !END!
801 ! X =   -86.43017,  -34.87802,     276.000,       0.000!   !END!
802 ! X =   -86.63052,  -34.87284,     274.000,       0.000!   !END!
803 ! X =   -86.82338,  -34.86587,     274.000,       0.000!   !END!
804 ! X =   -87.01625,  -34.85881,     274.000,       0.000!   !END!
805 ! X =   -87.02109,  -35.08043,     259.000,       0.000!   !END!
806 ! X =   -87.02589,  -35.30105,     274.000,       0.000!   !END!
807 ! X =   -87.03073,  -35.52257,     274.000,       0.000!   !END!
808 ! X =   -87.03562,  -35.74318,     274.000,       0.000!   !END!
809 ! X =   -87.04223,  -35.90215,     271.000,       0.000!   !END!
810 ! X =   -87.04883,  -36.06112,     256.000,       0.000!   !END!
811 ! X =   -87.06109,  -36.27963,     274.000,       0.000!   !END!
812 ! X =   -86.87438,  -36.40089,     274.000,       0.000!   !END!
813 ! X =   -86.66745,  -36.48265,     274.000,       0.000!   !END!
814 ! X =    -86.4696,  -36.48969,     274.000,       0.000!   !END!
815 ! X =   -86.27175,  -36.49673,     271.000,       0.000!   !END!
816 ! X =   -86.27634,  -36.69551,     251.000,       0.000!   !END!
817 ! X =   -86.28093,   -36.8942,     259.000,       0.000!   !END!
818 ! X =   -86.28553,  -37.09298,     272.000,       0.000!   !END!
819 ! X =   -86.29012,  -37.29166,     271.000,       0.000!   !END!
820 ! X =   -86.47807,  -37.28966,     243.000,       0.000!   !END!
821 ! X =   -86.51003,  -37.49812,     274.000,       0.000!   !END!
822 ! X =   -86.55157,   -37.6865,     274.000,       0.000!   !END!
823 ! X =   -86.33398,  -37.69571,     295.000,       0.000!   !END!
824 ! X =   -86.11635,  -37.70403,     304.000,       0.000!   !END!
825 ! X =   -85.89877,  -37.71335,     304.000,       0.000!   !END!
826 ! X =   -85.69846,  -37.71743,     304.000,       0.000!   !END!
827 ! X =   -85.49811,  -37.72251,     304.000,       0.000!   !END!
828 ! X =   -85.29776,  -37.72769,     304.000,       0.000!   !END!
829 ! X =   -85.09736,  -37.73178,     304.000,       0.000!   !END!
830 ! X =   -85.10451,  -37.93541,     294.000,       0.000!   !END!
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831 ! X =   -85.11168,  -38.13914,     280.000,       0.000!   !END!
832 ! X =   -85.11243,  -38.21861,     284.000,       0.000!   !END!
833 ! X =    -85.0037,  -38.22975,     298.000,       0.000!   !END!
834 ! X =   -84.83549,  -38.23148,     308.000,       0.000!   !END!
835 ! X =   -84.69714,  -38.24294,     322.000,       0.000!   !END!
836 ! X =   -84.53895,  -38.25459,     335.000,       0.000!   !END!
837 ! X =    -84.4098,  -38.20619,     335.000,       0.000!   !END!
838 ! X =   -84.29105,  -38.20751,     335.000,       0.000!   !END!
839 ! X =   -84.24145,  -38.19805,     335.000,       0.000!   !END!
840 ! X =   -84.14239,  -38.18921,     335.000,       0.000!   !END!
841 ! X =   -84.07324,  -38.19988,     335.000,       0.000!   !END!
842 ! X =   -84.01444,  -38.25019,     335.000,       0.000!   !END!
843 ! X =   -83.95549,  -38.29053,     335.000,       0.000!   !END!
844 ! X =   -83.86721,  -38.37098,     344.000,       0.000!   !END!
845 ! X =   -83.76868,  -38.41179,     362.000,       0.000!   !END!
846 ! X =   -83.68952,  -38.41263,     365.000,       0.000!   !END!
847 ! X =   -83.57019,  -38.35432,     365.000,       0.000!   !END!
848 ! X =   -83.46079,  -38.30574,     365.000,       0.000!   !END!
849 ! X =   -83.39144,  -38.29656,     365.000,       0.000!   !END!
850 ! X =   -83.24308,   -38.2982,     365.000,       0.000!   !END!
851 ! X =   -83.10497,  -38.33938,     365.000,       0.000!   !END!
852 ! X =   -83.02666,  -38.41969,     365.000,       0.000!   !END!
853 ! X =    -82.9577,  -38.45031,     365.000,       0.000!   !END!
854 ! X =   -82.84795,  -38.37191,     365.000,       0.000!   !END!
855 ! X =   -82.75748,   -38.2337,     365.000,       0.000!   !END!
856 ! X =   -82.72691,  -38.15456,     366.000,       0.000!   !END!
857 ! X =   -82.62714,  -38.07612,     372.000,       0.000!   !END!
858 ! X =   -82.54725,  -38.00737,     372.000,       0.000!   !END!
859 ! X =   -82.48659,  -37.88878,     385.000,       0.000!   !END!
860 ! X =   -82.45611,  -37.80953,     386.000,       0.000!   !END!
861 ! X =   -82.69347,  -37.79714,     396.000,       0.000!   !END!
862 ! X =   -82.68881,  -37.59536,     396.000,       0.000!   !END!
863 ! X =   -82.68421,  -37.39469,     396.000,       0.000!   !END!
864 ! X =    -82.6796,  -37.19391,     396.000,       0.000!   !END!
865 ! X =   -82.67494,  -36.99224,     370.000,       0.000!   !END!
866 ! X =   -82.87529,  -36.98516,     367.000,       0.000!   !END!
867 ! X =   -83.07563,  -36.97808,     396.000,       0.000!   !END!
868 ! X =   -83.27597,   -36.9709,     396.000,       0.000!   !END!
869 ! X =   -83.47621,  -36.96383,     396.000,       0.000!   !END!
870 ! X =   -83.47164,  -36.76016,     377.000,       0.000!   !END!
871 ! X =   -83.46697,  -36.55639,     366.000,       0.000!   !END!
872 ! X =   -83.46231,  -36.35272,     337.000,       0.000!   !END!
873 ! X =   -83.45764,  -36.14905,     335.000,       0.000!   !END!
874 ! X =    -83.2288,  -36.16039,     333.000,       0.000!   !END!
875 ! X =   -82.99981,  -36.17083,     343.000,       0.000!   !END!
876 ! X =   -82.77096,  -36.18216,     350.000,       0.000!   !END!
877 ! X =   -82.54207,   -36.1926,     337.000,       0.000!   !END!
878 ! X =   -82.31323,  -36.20393,     344.000,       0.000!   !END!
879 ! X =   -82.08423,  -36.21437,     343.000,       0.000!   !END!
880 ! X =   -81.85539,  -36.22571,     335.000,       0.000!   !END!
881 ! X =   -81.85756,  -36.42941,     344.000,       0.000!   !END!
882 ! X =   -81.85974,  -36.63321,     356.000,       0.000!   !END!
883 ! X =   -81.66688,  -36.64018,     361.000,       0.000!   !END!
884 ! X =   -81.47392,  -36.64726,     365.000,       0.000!   !END!
885 ! X =   -81.47597,    -36.836,     376.000,       0.000!   !END!
886 ! X =    -81.6738,  -36.83395,     350.000,       0.000!   !END!
887 ! X =   -81.87171,  -36.83179,     365.000,       0.000!   !END!
888 ! X =   -81.87382,  -37.03061,     364.000,       0.000!   !END!
889 ! X =   -81.68254,   -37.0356,     375.000,       0.000!   !END!
890 ! X =   -81.49132,  -37.04158,     391.000,       0.000!   !END!
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891 ! X =	-81.30004,	-37.04667,	393.000,	0.000!	!END!
892 ! X =	-81.18987,	-36.91861,	396.000,	0.000!	!END!
893 ! X =	-81.09014,	-36.85005,	396.000,	0.000!	!END!
894 ! X =	-80.99104,	-36.83123,	396.000,	0.000!	!END!
895 ! X =	-80.93076,	-36.75242,	396.000,	0.000!	!END!
896 ! X =	-80.89045,	-36.6832,	396.000,	0.000!	!END!
897 ! X =	-80.75177,	-36.66485,	395.000,	0.000!	!END!
898 ! X =	-80.67245,	-36.65573,	395.000,	0.000!	!END!
899 ! X =	-80.45985,	-36.66298,	395.000,	0.000!	!END!
900 ! X =	-80.26688,	-36.66995,	396.000,	0.000!	!END!
901 ! X =	-80.26471,	-36.46625,	396.000,	0.000!	!END!
902 ! X =	-80.26263,	-36.26254,	396.000,	0.000!	!END!
903 ! X =	-80.08943,	-36.26434,	396.000,	0.000!	!END!
904 ! X =	-79.91624,	-36.26624,	395.000,	0.000!	!END!
905 ! X =	-79.72337,	-36.27321,	395.000,	0.000!	!END!
906 ! X =	-79.53051,	-36.28028,	395.000,	0.000!	!END!
907 ! X =	-79.46121,	-36.28098,	395.000,	0.000!	!END!
908 ! X =	-79.45273,	-36.04051,	396.000,	0.000!	!END!
909 ! X =	-79.44426,	-35.80014,	396.000,	0.000!	!END!
910 ! X =	-79.43578,	-35.55966,	365.000,	0.000!	!END!
911 ! X =	-79.4273,	-35.31929,	389.000,	0.000!	!END!
912 ! X =	-79.41882,	-35.07881,	402.000,	0.000!	!END!
913 ! X =	-79.21591,	-35.08095,	396.000,	0.000!	!END!
914 ! X =	-79.01311,	-35.08318,	396.000,	0.000!	!END!
915 ! X =	-79.01598,	-34.88428,	396.000,	0.000!	!END!
916 ! X =	-79.01876,	-34.68549,	396.000,	0.000!	!END!
917 ! X =	-79.16225,	-34.68402,	396.000,	0.000!	!END!
918 ! X =	-79.30573,	-34.68245,	396.000,	0.000!	!END!
919 ! X =	-79.31474,	-34.60284,	396.000,	0.000!	!END!
920 ! X =	-79.14653,	-34.60467,	396.000,	0.000!	!END!
921 ! X =	-79.09756,	-34.64496,	396.000,	0.000!	!END!
922 ! X =	-78.95791,	-34.54705,	390.000,	0.000!	!END!
923 ! X =	-78.83757,	-34.3992,	372.000,	0.000!	!END!
924 ! X =	-78.78706,	-34.30041,	380.000,	0.000!	!END!
925 ! X =	-78.73636,	-34.18166,	396.000,	0.000!	!END!
926 ! X =	-78.60668,	-34.08361,	396.000,	0.000!	!END!
927 ! X =	-78.47701,	-33.98566,	396.000,	0.000!	!END!
928 ! X =	-78.43584,	-33.83696,	370.000,	0.000!	!END!
929 ! X =	-78.34613,	-33.77832,	365.000,	0.000!	!END!
930 ! X =	-78.18779,	-33.78001,	365.000,	0.000!	!END!
931 ! X =	-78.18197,	-33.54448,	365.000,	0.000!	!END!
932 ! X =	-78.17621,	-33.30994,	330.000,	0.000!	!END!
933 ! X =	-78.1704,	-33.07451,	331.000,	0.000!	!END!
934 ! X =	-78.32867,	-33.06783,	337.000,	0.000!	!END!
935 ! X =	-78.48693,	-33.06116,	348.000,	0.000!	!END!
936 ! X =	-78.57598,	-33.06027,	359.000,	0.000!	!END!
937 ! X =	-78.57073,	-32.8715,	342.000,	0.000!	!END!
938 ! X =	-78.56537,	-32.68263,	321.000,	0.000!	!END!
939 ! X =	-78.56012,	-32.49386,	305.000,	0.000!	!END!
940 ! X =	-78.48043,	-32.44505,	292.000,	0.000!	!END!
941 ! X =	-78.3207,	-32.31751,	273.000,	0.000!	!END!
942 ! X =	-78.47904,	-32.31582,	286.000,	0.000!	!END!
943 ! X =	-78.55821,	-32.31498,	305.000,	0.000!	!END!
944 ! X =	-78.55078,	-32.08652,	297.000,	0.000!	!END!
945 ! X =	-78.54345,	-31.85795,	286.000,	0.000!	!END!
946 ! X =	-78.47416,	-31.85875,	272.000,	0.000!	!END!
947 ! X =	-78.46256,	-31.69985,	271.000,	0.000!	!END!
948 ! X =	-78.53066,	-31.58977,	272.000,	0.000!	!END!
949 ! X =	-78.52975,	-31.50033,	274.000,	0.000!	!END!
950 ! X =	-78.72762,	-31.49528,	278.000,	0.000!	!END!

```
 951 ! X =   -78.92543,  -31.49113,     280.000,       0.000!   !END!
 952 ! X =   -79.12335,  -31.48707,     304.000,       0.000!   !END!
 953 ! X =   -79.32121,  -31.48193,     304.000,       0.000!   !END!
 954 ! X =   -79.31405,  -31.27829,     304.000,       0.000!   !END!
 955 ! X =   -79.30699,  -31.07465,     304.000,       0.000!   !END!
 956 ! X =   -79.50979,  -31.07053,     304.000,       0.000!   !END!
 957 ! X =   -79.71254,  -31.06531,     304.000,       0.000!   !END!
 958 ! X =   -79.91539,  -31.06019,     304.000,       0.000!   !END!
 959 ! X =   -80.11819,  -31.05607,     281.000,       0.000!   !END!
 960 ! X =   -80.11647,  -30.89703,     273.000,       0.000!   !END!
 961 ! X =   -80.11485,  -30.73809,     270.000,       0.000!   !END!
 962 ! X =   -80.24299,  -30.69695,     267.000,       0.000!   !END!
 963 ! X =   -80.39075,   -30.6258,     268.000,       0.000!   !END!
 964 ! X =   -80.51885,  -30.57479,     268.000,       0.000!   !END!
 965 ! X =   -80.60774,  -30.56383,     268.000,       0.000!   !END!
 966 ! X =   -80.65701,  -30.54348,     274.000,       0.000!   !END!
 967 ! X =   -80.71629,  -30.53285,     269.000,       0.000!   !END!
 968 ! X =   -80.71735,  -30.63226,     274.000,       0.000!   !END!
 969 ! X =   -80.88556,  -30.63043,     274.000,       0.000!   !END!
 970 ! X =   -81.05377,   -30.6287,     274.000,       0.000!   !END!
 971 ! X =   -81.22198,  -30.62688,     274.000,       0.000!   !END!
 972 ! X =   -81.45273,  -30.61743,     259.000,       0.000!   !END!
 973 ! X =   -81.68354,  -30.60909,     256.000,       0.000!   !END!
 974 ! X =   -81.91429,  -30.59964,     256.000,       0.000!   !END!
 975 ! X =   -81.92536,  -30.70888,     265.000,       0.000!   !END!
 976 ! X =   -81.81748,   -30.7995,     265.000,       0.000!   !END!
 977 ! X =   -81.73936,  -30.89965,     274.000,       0.000!   !END!
 978 ! X =   -81.66139,  -31.00988,     276.000,       0.000!   !END!
 979 ! X =   -81.71084,  -31.00936,     276.000,       0.000!   !END!
 980 ! X =   -81.93836,  -31.00289,     279.000,       0.000!   !END!
 981 ! X =   -82.16593,  -30.99552,     304.000,       0.000!   !END!
 982 ! X =   -82.39345,  -30.98915,     304.000,       0.000!   !END!
 983 ! X =   -82.62098,  -30.98278,     304.000,       0.000!   !END!
 984 ! X =   -82.84854,  -30.97531,     294.000,       0.000!   !END!
 985 ! X =   -83.07607,  -30.96893,     304.000,       0.000!   !END!
 986 ! X =   -83.30359,  -30.96256,     304.000,       0.000!   !END!
 987 ! X =   -83.30576,  -31.16627,     287.000,       0.000!   !END!
 988 ! X =   -83.30794,  -31.36998,     304.000,       0.000!   !END!
 989 ! X =   -83.31495,  -31.56375,     318.000,       0.000!   !END!
 990 ! X =   -83.32187,  -31.75742,     335.000,       0.000!   !END!
 991 ! X =    -83.5247,  -31.75031,     326.000,       0.000!   !END!
 992 ! X =   -83.72744,   -31.7432,     309.000,       0.000!   !END!
 993 ! X =   -83.72542,  -31.54946,     305.000,       0.000!   !END!
 994 ! X =   -83.72339,  -31.35562,     304.000,       0.000!   !END!
 995 ! X =   -83.91626,  -31.34865,     301.000,       0.000!   !END!
 996 ! X =   -84.10912,  -31.34158,     281.000,       0.000!   !END!
 997 ! X =   -84.30199,  -31.33462,     304.000,       0.000!   !END!
 998 ! X =   -84.49486,  -31.32755,     304.000,       0.000!   !END!
 999 ! X =    -84.6977,  -31.32044,     288.000,       0.000!   !END!
1000 ! X =   -84.90044,  -31.31333,     278.000,       0.000!   !END!
1001 ! X =   -84.89834,  -31.11451,     274.000,       0.000!   !END!
1002 ! X =   -84.89624,  -30.91578,     265.000,       0.000!   !END!
1003 ! X =   -85.10572,   -30.9116,     263.000,       0.000!   !END!
1004 ! X =   -85.31506,  -30.90832,     268.000,       0.000!   !END!
1005 ! X =   -85.52444,  -30.90414,     274.000,       0.000!   !END!
1006 ! X =   -85.73392,  -30.89986,     274.000,       0.000!   !END!
1007 ! X =   -85.94327,  -30.89668,     274.000,       0.000!   !END!
1008 ! X =   -86.15275,  -30.89249,     245.000,       0.000!   !END!
1009 ! X =   -86.26201,  -30.93101,     236.000,       0.000!   !END!
1010 ! X =   -86.38115,  -30.96958,     243.000,       0.000!   !END!
```

```
1011 ! X =   -86.49046,  -31.01808,     240.000,       0.000!   !END!
1012 ! X =   -86.49683,  -31.14723,     270.000,       0.000!   !END!
1013 ! X =    -86.5032,  -31.27638,     274.000,       0.000!   !END!
1014 ! X =   -86.70839,  -31.27213,     256.000,       0.000!   !END!
1015 ! X =   -86.91373,  -31.26698,     248.000,       0.000!   !END!
1016 ! X =   -87.11898,  -31.26183,     245.000,       0.000!   !END!
1017 ! X =   -87.32427,  -31.25768,     274.000,       0.000!   !END!
1018 ! X =   -87.33612,   -31.4414,     274.000,       0.000!   !END!
1019 ! X =   -87.34798,  -31.62513,     267.000,       0.000!   !END!
1020 ! X =   -87.14774,  -31.63419,     274.000,       0.000!   !END!
1021 ! X =   -86.94746,  -31.64435,     280.000,       0.000!   !END!
1022 ! X =   -86.74718,  -31.65442,     285.000,       0.000!   !END!
1023 ! X =   -86.54684,  -31.66349,     284.000,       0.000!   !END!
1024 ! X =   -86.55891,  -31.86216,     299.000,       0.000!   !END!
1025 ! X =   -86.57088,  -32.06075,     304.000,       0.000!   !END!
1026 ! X =   -86.77362,  -32.05364,     304.000,       0.000!   !END!
1027 ! X =   -86.97646,  -32.04653,     301.000,       0.000!   !END!
1028 ! X =   -86.98843,  -32.24521,     287.000,       0.000!   !END!
1029 ! X =   -87.00049,  -32.44379,     265.000,       0.000!   !END!
1030 ! X =   -87.01247,  -32.64247,     261.000,       0.000!   !END!
1031 ! X =   -87.02444,  -32.84115,     280.000,       0.000!   !END!
1032 ! X =   -87.22478,  -32.83408,     261.000,       0.000!   !END!
1033 ! X =   -87.42513,   -32.8269,     236.000,       0.000!   !END!
1034 ! X =   -87.62537,  -32.81984,     239.000,       0.000!   !END!
1035 ! X =   -87.82572,  -32.81276,     246.000,       0.000!   !END!
1036 ! X =   -87.82543,  -33.01351,     235.000,       0.000!   !END!
1037 ! X =    -87.8251,  -33.21526,     274.000,       0.000!   !END!
1038 ! X =   -87.82471,  -33.41601,     274.000,       0.000!   !END!
1039 ! X =   -87.82438,  -33.61776,     274.000,       0.000!   !END!
1040 ! X =   -87.61861,  -33.62593,     280.000,       0.000!   !END!
1041 ! X =   -87.41294,   -33.6341,     304.000,       0.000!   !END!
1042 ! X =   -87.20716,  -33.64227,     304.000,       0.000!   !END!
1043 ! X =   -87.00139,  -33.65044,     304.000,       0.000!   !END!
1044 ! X =   -86.79572,   -33.6586,     293.000,       0.000!   !END!
1045 ! X =   -86.61763,  -33.66047,     275.000,       0.000!   !END!
1046 ! X =   -86.41978,  -33.66751,     277.000,       0.000!   !END!
```

----

a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
HOLCIM BART CLASS I ANALYSIS (HERCULES)
JUNE 2008 CONTROL B (Max 30-day avg, 20% NOx, 27% SO2)
UMC 6KM CALMET METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =            *
    or
ISCMET.DAT    input    * ISCDAT =            *
    or
PLMMET.DAT    input    * PLMDAT =            *
    or
PROFILE.DAT   input    * PRFDAT =            *
SURFACE.DAT   input    * SFCDAT =            *
RESTARTB.DAT  input    * RSTARTB=            *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =HOLH2001CONB608.LST     !
CONC.DAT      output   ! CONDAT =HOLH2001CONB608.CON     !
DFLX.DAT      output   ! DFDAT  =HOLH2001CONB608.DRY     !
WFLX.DAT      output   ! WFDAT  =HOLH2001CONB608.WET     !

VISB.DAT      output   ! VISDAT =HOLH2001CONB608.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2001.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =            *
VOLEMARB.DAT  input    * VOLDAT =            *
BAEMARB.DAT   input    * ARDAT  =            *
LNEMARB.DAT   input    * LNDAT  =            *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =            *
CHEM.DAT      input    * CHEMDAT=            *
H2O2.DAT      input    * H2O2DAT=            *
HILL.DAT      input    * HILDAT=            *
HILLRCT.DAT   input    * RCTDAT=            *
COASTLN.DAT   input    * CSTDAT=            *
FLUXBDY.DAT   input    * BDYDAT=            *
BCON.DAT      input    * BCNDAT=            *
DEBUG.DAT     output   * DEBUG =            *
MASSFLX.DAT   output   * FLXDAT=            *
MASSBAL.DAT   output   * BALDAT=            *
FOG.DAT       output   * FOGDAT=            *
```

```
--------------------------------------------------------------------------
--------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                     Default: 1       ! NMETDAT =   2
!

     Number of PTEMARB.DAT files for run (NPTDAT)
                                     Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                     Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                     Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if
NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------
none          input    !METDAT=/raid2c/umc/calmet/2001/janjun01.dat  !
!END!
none          input    !METDAT=/raid2c/umc/calmet/2001/juldec01.dat  !
!END!

--------------------------------------------------------------------------
--------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  2001 !
     (used only if   Month (IBMO) -- No default       ! IBMO =   1 !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   1  !
                      Hour (IBHR) -- No default       ! IBHR =   1 !

     Base time zone        (XBTZ) -- No default       ! XBTZ = 6.0  !
        PST = 8., MST = 7.
```

```
      CST = 6., EST = 5.

   Length of run (hours) (IRLG) -- No default       ! IRLG =  8760 !

   Number of chemical species (NSPEC)
                                Default: 5       ! NSPEC =  6   !

   Number of chemical species
   to be emitted  (NSE)         Default: 3       ! NSE =  3   !

   Flag to stop run after
   SETUP phase (ITEST)          Default: 2       ! ITEST =  2   !
   (Used to allow checking
   of the model inputs, files, etc.)
         ITEST = 1 - STOPS program after SETUP phase
         ITEST = 2 - Continues with execution of program
                     after SETUP

   Restart Configuration:

      Control flag (MRESTART)   Default: 0       ! MRESTART =  0
!

         0 = Do not read or write a restart file
         1 = Read a restart file at the beginning of
             the run
         2 = Write a restart file during run
         3 = Read a restart file at beginning of run
             and write a restart file during run

      Number of periods in Restart
      output cycle (NRESPD)     Default: 0       ! NRESPD =  0   !

         0 = File written only at last period
        >0 = File updated every NRESPD periods

   Meteorological Data Format (METFM)
                                Default: 1       ! METFM =  1   !

         METFM = 1 - CALMET binary file (CALMET.MET)
         METFM = 2 - ISC ASCII file (ISCMET.MET)
         METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
         METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                     surface parameters file (SURFACE.DAT)

 Meteorological Profile Data Format (MPRFFM)
           (used only for METFM = 1, 2, 3)
                                Default: 1       ! MPRFFM =  1   !

         MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
         MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

   PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
   Averaging Time (minutes) (AVET)
                                Default: 60.0    ! AVET = 60. !
   PG Averaging Time (minutes) (PGTIME)
                                Default: 60.0    ! PGTIME = 60. !


!END!
```

```
-------------------------------------------------------------------------
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INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)                   Default: 1     ! MGAUSS =  1
!
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                              Default: 3     ! MCTADJ =  3
!
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                          Default: 0     ! MCTSG =  0
!
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated 0 (MSLUG)                   Default: 0     ! MSLUG =  0
!
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled ?
     (MTRANS)                              Default: 1     ! MTRANS =  1
!
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)            Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to simulate building
     downwash? (MBDW)                      Default: 1     ! MBDW =   1
!
        1 = ISC method
        2 = PRIME method

     Vertical wind shear modeled above
     stack top? (MSHEAR)                   Default: 0     ! MSHEAR =  0
!
        0 = no  (i.e., vertical wind shear not modeled)
        1 = yes (i.e., vertical wind shear modeled)

     Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0
!
```

```
           0 = no (i.e., puffs not split)
           1 = yes (i.e., puffs are split)

        Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  1
!
           0 = chemical transformation not
               modeled
           1 = transformation rates computed
               internally (MESOPUFF II scheme)
           2 = user-specified transformation
               rates used
           3 = transformation rates computed
               internally (RIVAD/ARM3 scheme)
           4 = secondary organic aerosol formation
               computed (MESOPUFF II scheme for OH)

        Aqueous phase transformation flag (MAQCHEM)
        (Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0
!
           0 = aqueous phase transformation
               not modeled
           1 = transformation rates adjusted
               for aqueous phase reactions

        Wet removal modeled ? (MWET)          Default: 1     ! MWET =  1
!
           0 = no
           1 = yes

        Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  1
!
           0 = no
           1 = yes
           (dry deposition method specified
            for each species in Input Group 3)

        Method used to compute dispersion
        coefficients (MDISP)                  Default: 3     ! MDISP =  3
!

           1 = dispersion coefficients computed from measured values
               of turbulence, sigma v, sigma w
           2 = dispersion coefficients from internally calculated
               sigma v, sigma w using micrometeorological variables
               (u*, w*, L, etc.)
           3 = PG dispersion coefficients for RURAL areas (computed using
               the ISCST multi-segment approximation) and MP coefficients
in
               urban areas
           4 = same as 3 except PG coefficients computed using
               the MESOPUFF II eqns.
           5 = CTDM sigmas used for stable and neutral conditions.
               For unstable conditions, sigmas are computed as in
               MDISP = 3, described above.  MDISP = 5 assumes that
               measured values are read

        Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
        (Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3
!
           1 = use sigma-v or sigma-theta measurements
```

```
              from PROFILE.DAT to compute sigma-y
              (valid for METFM = 1, 2, 3, 4)
          2 = use sigma-w measurements
              from PROFILE.DAT to compute sigma-z
              (valid for METFM = 1, 2, 3, 4)
          3 = use both sigma-(v/theta) and sigma-w
              from PROFILE.DAT to compute sigma-y and sigma-z
              (valid for METFM = 1, 2, 3, 4)
          4 = use sigma-theta measurements
              from PLMMET.DAT to compute sigma-y
              (valid only if METFM = 3)

       Back-up method used to compute dispersion
       when measured turbulence data are
       missing (MDISP2)                     Default: 3     ! MDISP2 =  3
!
       (used only if MDISP = 1 or 5)
          2 = dispersion coefficients from internally calculated
              sigma v, sigma w using micrometeorological variables
              (u*, w*, L, etc.)
          3 = PG dispersion coefficients for RURAL areas (computed using
              the ISCST multi-segment approximation) and MP coefficients
in
              urban areas
          4 = same as 3 except PG coefficients computed using
              the MESOPUFF II eqns.

     [DIAGNOSTIC FEATURE]
       Method used for Lagrangian timescale for Sigma-y
       (used only if MDISP=1,2 or MDISP2=1,2)
       (MTAULY)                             Default: 0     ! MTAULY =  0
!
          0 = Draxler default 617.284 (s)
          1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
         10 < Direct user input (s)             -- e.g., 306.9


       [DIAGNOSTIC FEATURE]
       Method used for Advective-Decay timescale for Turbulence
       (used only if MDISP=2 or MDISP2=2)
       (MTAUADV)                            Default: 0     ! MTAUADV =  0
!
          0 = No turbulence advection
          1 = Computed (OPTION NOT IMPLEMENTED)
         10 < Direct user input (s)   -- e.g., 300


       Method used to compute turbulence sigma-v &
       sigma-w using micrometeorological variables
       (Used only if MDISP = 2 or MDISP2 = 2)
       (MCTURB)                             Default: 1     ! MCTURB =  1
!
          1 = Standard CALPUFF subroutines
          2 = AERMOD subroutines

       PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH =  0
!
       (MROUGH)
          0 = no
          1 = yes
```

```
     Partial plume penetration of          Default: 1     ! MPARTL =  1
!
     elevated inversion?
     (MPARTL)
        0 = no
        1 = yes

     Strength of temperature inversion     Default: 0     ! MTINV =  0
!
     provided in PROFILE.DAT extended records?
     (MTINV)
        0 = no (computed from measured/default gradients)
        1 = yes

     PDF used for dispersion under convective conditions?
                                           Default: 0     ! MPDF =  0  !
     (MPDF)
        0 = no
        1 = yes

     Sub-Grid TIBL module used for shore line?
                                           Default: 0     ! MSGTIBL = 0
!
     (MSGTIBL)
        0 = no
        1 = yes

     Boundary conditions (concentration) modeled?
                                           Default: 0     ! MBCON = 0  !
     (MBCON)
        0 = no
        1 = yes, using formatted BCON.DAT file
        2 = yes, using unformatted CONC.DAT file


     Analyses of fogging and icing impacts due to emissions from
     arrays of mechanically-forced cooling towers can be performed
     using CALPUFF in conjunction with a cooling tower emissions
     processor (CTEMISS) and its associated postprocessors.  Hourly
     emissions of water vapor and temperature from each cooling tower
     cell are computed for the current cell configuration and ambient
     conditions by CTEMISS. CALPUFF models the dispersion of these
     emissions and provides cloud information in a specialized format
     for further analysis. Output to FOG.DAT is provided in either
     'plume mode' or 'receptor mode' format.

     Configure for FOG Model output?
                                           Default: 0     ! MFOG =  0
!
     (MFOG)
        0 = no
        1 = yes  - report results in PLUME Mode format
        2 = yes  - report results in RECEPTOR Mode format


     Test options specified to see if
     they conform to regulatory
     values? (MREG)                        Default: 1     ! MREG =  1
!
```

```
        0 = NO checks are made
        1 = Technical options must conform to USEPA
            Long Range Transport (LRT) guidance
                       METFM    1 or 2
                       AVET     60. (min)
                       PGTIME   60. (min)
                       MGAUSS   1
                       MCTADJ   3
                       MTRANS   1
                       MTIP     1
                       MCHEM    1 or 3 (if modeling SOx, NOx)
                       MWET     1
                       MDRY     1
                       MDISP    2 or 3
                       MPDF     0 if MDISP=3
                                1 if MDISP=2
                       MROUGH   0
                       MPARTL   1
                       SYTDEP   550. (m)
                       MHFTSZ   0


!END!


------------------------------------------------------------------------
-------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!

                                                       Dry
OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED
NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,
(0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS
1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE
2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)
3= etc.)

!          SO2  =         1,               1,            1,
0   !
```

```
!          SO4  =         1,                0,           2,
0   !
!          NOX  =         1,                1,           1,
0   !
!         HNO3  =         1,                0,           1,
0   !
!          NO3  =         1,                0,           2,
0   !
!         PM10  =         1,                1,           2,
0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



------------------------------------------------------------------------
-------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection
```

```
     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 37N  !
     (RLON0)                    No Default      ! RLON0 = 92W  !

         TTM :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of
projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping
plane
                RLAT0 identifies latitude of tangent-point of mapping
plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                    No Default      ! XLAT1 = 30N  !
     (XLAT2)                    No Default      ! XLAT2 = 45N  !

         LCC :  Projection cone slices through Earth's surface at XLAT1
and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of
the
     Earth known as the World Geodetic System 1984 (WGS-G ).  Other
local
     models may be in use, and their selection in CALMET will make its
output
     consistent with local mapping products.  The list of Datum-Regions
with
     official transformation parameters is provided by the National
Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)

------------------------------------------------------------------------
------
     WGS-G     WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
```

```
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS
(NAD27)
     NWS-27    NWS 6370KM Radius, Sphere
     NWS-84    NWS 6370KM Radius, Sphere
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere

     Datum-region for output coordinates
     (DATUM)                   Default: WGS-G     ! DATUM = WGS-84 !


METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =  87    !
            No. Y grid cells (NY)      No default     ! NY =  111   !
         No. vertical layers (NZ)      No default     ! NZ =  10   !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 6 !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
             4000. !

            Reference Coordinates
           of SOUTHWEST corner of
                 grid cell(1, 1):

            X-coordinate (XORIGKM)     No default     ! XORIGKM = -258.
!
            Y coordinate (YORIGKM)     No default     ! YORIGKM = -330.
!
                                      Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET.
grid.
     The lower left (LL) corner of the computational grid is at grid
point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of
the
     computational grid is at grid point (IECOMP, JECOMP) of the MET.
grid.
     The grid spacing of the computational grid is the same as the MET.
grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =   1
!
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =   1
!
                  (1 <= JBCOMP <= NY)
```

```
        X index of UR corner (IECOMP)      No default     ! IECOMP =
87   !
                  (1 <= IECOMP <= NX)

        Y index of UR corner (JECOMP)      No default     ! JECOMP =
111   !
                  (1 <= JECOMP <= NY)



SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of
the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the
computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1
!
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1
!
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =
87   !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =
111   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1
!
        (MESHDN is an integer >= 1)

!END!


-----------------------------------------------------------------------
-------


INPUT GROUP: 5 -- Output Options
--------------
                                             *
*
```

```
     FILE                           DEFAULT VALUE             VALUE THIS RUN
     ----                           -------------             --------------

   Concentrations (ICON)                 1                    !  ICON =  1
!
   Dry Fluxes (IDRY)                     1                    !  IDRY =  1
!
   Wet Fluxes (IWET)                     1                    !  IWET =  1
!
   Relative Humidity (IVIS)              1                    !  IVIS =  1
!
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                              Default: T          ! LCOMPRS = T
!

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                            Default: 0          ! IMFLX =  0
!
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                            Default: 0          ! IMBAL =  0
!
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)    Default: 0          ! ICPRT =  0
!
       Print dry fluxes (IDPRT)        Default: 0          ! IDPRT =  0
!
       Print wet fluxes (IWPRT)        Default: 0          ! IWPRT =  0
!
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours                Default: 1          ! ICFRQ =  1
!
       Dry flux print interval
       (IDFRQ) in hours                Default: 1          ! IDFRQ =  1
!
       Wet flux print interval
       (IWFRQ) in hours                Default: 1          ! IWFRQ =  1
!
```

```
       Units for Line Printer Output
       (IPRTU)                         Default: 1         ! IPRTU =  3
!
                       for             for
                  Concentration    Deposition
           1 =       g/m**3         g/m**2/s
           2 =      mg/m**3        mg/m**2/s
           3 =      ug/m**3        ug/m**2/s
           4 =      ng/m**3        ng/m**2/s
           5 =     Odour Units

       Messages tracking progress of run
       written to the screen ?
       (IMESG)                         Default: 2         ! IMESG =  2
!
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------
------ WET FLUXES ------   -- MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?
PRINTED?  SAVED ON DISK?   SAVED ON DISK?
   -------       ------------------------   ------------------------
------------------------   ---------------
!          SO2 =     0,            1,           0,            1,
0,           1,           0   !
!          SO4 =     0,            1,           0,            1,
0,           1,           0   !
!          NOX =     0,            1,           0,            1,
0,           1,           0   !
!         HNO3 =     0,            1,           0,            1,
0,           1,           0   !
!          NO3 =     0,            1,           0,            1,
0,           1,           0   !
!         PM10 =     0,            1,           0,            1,
0,           1,           0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                 Default: F     ! LDEBUG
= F !

       First puff to track
       (IPFDEB)                                 Default: 1     ! IPFDEB
=  1  !

       Number of puffs to track
       (NPFDEB)                                 Default: 1     ! NPFDEB
=  1  !

       Met. period to start output
       (NN1)                                    Default: 1     ! NN1 =
1   !
```

```
       Met. period to end output
       (NN2)                                  Default: 10    ! NN2 =
10  !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =
0   !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC
=  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                No Default     ! MHILL =
2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M
= 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M
= 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------


                      1 **
     HILL information
```

```
HILL           XC        YC       THETAH  ZGRID  RELIEF    EXPO 1
EXPO 2   SCALE 1    SCALE 2    AMAX1     AMAX2
 NO.          (km)      (km)      (deg.)   (m)     (m)      (m)
(m)       (m)        (m)        (m)       (m)
----          ----      ----      ------  -----  ------    ------
------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                      XRCT         YRCT        ZRCT          XHH
                      (km)         (km)         (m)
                     ------        -----      ------         ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid
elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain
receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a
separate
           input subgroup and therefore must end with an input group
terminator.

-------------------------------------------------------------------------
-------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY
MESOPHYLL RESISTANCE     HENRY'S LAW COEFFICIENT
       NAME        (cm**2/s)
```

```
(s/cm)                (dimensionless)
      -------     -----------      ----------      ----------
--------------------     -----------------------

!          SO2 =     0.1509,         1000.,            8.,
0.,                  0.04 !
!          NOX =     0.1656,            1.,            8.,
5.,                   3.5 !
!         HNO3 =     0.1628,            1.,           18.,
0.,            0.00000008 !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard
deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                   DEVIATION
                        (microns)                  (microns)
      -------      -------------------        ------------------
!          SO4 =          0.48,                      2.   !
!          NO3 =          0.48,                      2.   !
!         PM10 =            2.,                      2.   !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                          Default: 30    !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                            Default: 10    !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                         Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                           Default: 9     !   NINT =  9  !
```

```
     Vegetation state in unirrigated areas
     (IVEG)                            Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation

!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,             0.0E00 !
!          SO4 =         1.0E-04,            3.0E-05 !
!         HNO3 =         6.0E-05,             0.0E00 !
!          NO3 =         1.0E-04,            3.0E-05 !
!         PM10 =         1.0E-04,            3.0E-05 !

!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0
!
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                    Default: 12*80.
     !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00,
65.00, 65.00, 26.00, 26.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                   Default: 12*10.
     !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50,
0.50, 0.50, 0.50 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2          ! RNITE1 =
.2 !
```

```
     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0          ! RNITE2 =
2.0 !

     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                   Default: 2.0          ! RNITE3 =
2.0 !

     H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =
0   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb                  Default: 12*1.
     !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
     (used only if MCHEM = 4)

     The SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)
          VOC / NOX ratio (after reaction)         (VCNX)
     to characterize the air mass when computing
     the formation of SOA from VOC emissions.
     Typical values for several distinct air mass types are:

        Month    1    2    3    4    5    6    7    8    9   10   11
12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Dec

     Clean Continental
        BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
1.
        OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20
.15
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Clean Marine (surface)
        BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
.5
        OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30
.25
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Urban - low biogenic (controls present)
        BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
30.
        OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20
```

```
.20
        VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.
4.

     Urban - high biogenic (controls present)
        BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
60.
        OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35
.25
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Regional Plume
        BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
20.
        OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30
.20
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Urban - no controls present
        BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
100.
        OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35
.30
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.
2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20,
0.20, 0.20, 0.15 !
     !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00,
50.00, 50.00, 50.00, 50.00 !


!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                           Default: 550.   ! SYTDEP
= 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                   Default: 0      ! MHFTSZ
=  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
```

```
     layer (JSUP)                              Default: 5      ! JSUP =
5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)    Default: 0.01   ! CONK1
= .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                   Default: 0.1    ! CONK2
= .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                     Default: 0.5    ! TBD =
.5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                            Default: 10     ! IURB1
=  10  !
                                                        19     ! IURB2
=  19  !

     Site characterization parameters for single-point Met data files
---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                             Default: 20     !
ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                                 Default: 0.25   ! Z0IN =
.25 !

        Leaf area index for modeling domain
        (XLAIIN)                               Default: 3.0    ! XLAIIN
= 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                               Default: 0.0    ! ELEVIN
= .0 !

        Latitude (degrees) for met location
        (XLATIN)                               Default: -999.  ! XLATIN
= -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                               Default: -999.  ! XLONIN
= -999.0 !

     Specialized information for interpreting single-point Met data
files -----

        Anemometer height (m) (Used only if METFM = 2,3)
```

```
        (ANEMHT)                                Default: 10.    ! ANEMHT
= 10.0 !

        Form of lateral turbulance data in PROFILE.DAT file
        (Used only if METFM = 4 or MTURBVW = 1 or 3)
        (ISIGMAV)                               Default: 1      !
ISIGMAV =  1  !
            0 = read sigma-theta
            1 = read sigma-v

        Choice of mixing heights (Used only if METFM = 4)
        (IMIXCTDM)                              Default: 0      !
IMIXCTDM =  0  !
            0 = read PREDICTED mixing heights
            1 = read OBSERVED mixing heights

     Maximum length of a slug (met. grid units)
     (XMXLEN)                                   Default: 1.0    ! XMXLEN
= 1.0 !

     Maximum travel distance of a puff/slug (in
     grid units) during one sampling step
     (XSAMLEN)                                  Default: 1.0    !
XSAMLEN = 1.0 !

     Maximum Number of slugs/puffs release from
     one source during one time step
     (MXNEW)                                    Default: 99     ! MXNEW
=  99   !

     Maximum Number of sampling steps for
     one puff/slug during one time step
     (MXSAM)                                    Default: 99     ! MXSAM
=  99   !

     Number of iterations used when computing
     the transport wind for a sampling step
     that includes gradual rise (for CALMET
     and PROFILE winds)
     (NCOUNT)                                   Default: 2      ! NCOUNT
=  2   !

     Minimum sigma y for a new puff/slug (m)
     (SYMIN)                                    Default: 1.0    ! SYMIN
= 1.0  !

     Minimum sigma z for a new puff/slug (m)
     (SZMIN)                                    Default: 1.0    ! SZMIN
= 1.0  !

     Default minimum turbulence velocities sigma-v and sigma-w
     for each stability class over land and over water (m/s)
     (SVMIN(12) and SWMIN(12))

                     ----------  LAND  ----------       ---------  WATER
----------
        Stab Class :  A    B    C    D    E    F         A    B    C
D    E    F
                     ---  ---  ---  ---  ---  ---       ---  ---  ---
---  ---  ---
```

```
     Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37,
.37, .37, .37
     Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08,
.06, .03, .016

           ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370,
0.370, 0.370, 0.370, 0.370, 0.370!
           ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200,
0.120, 0.080, 0.060, 0.030, 0.016!


     Divergence criterion for dw/dz across puff
     used to initiate adjustment for horizontal
     convergence (1/s)
     Partial adjustment starts at CDIV(1), and
     full adjustment is reached at CDIV(2)
     (CDIV(2))                                Default: 0.0,0.0  ! CDIV
= .0, .0 !

     Minimum wind speed (m/s) allowed for
     non-calm conditions. Also used as minimum
     speed returned when using power-law
     extrapolation toward surface
     (WSCALM)                                 Default: 0.5    ! WSCALM
= .5 !

     Maximum mixing height (m)
     (XMAXZI)                                 Default: 3000.  ! XMAXZI
= 4000.0 !

     Minimum mixing height (m)
     (XMINZI)                                 Default: 50.    ! XMINZI
= 20.0 !

     Default wind speed classes --
     5 upper bounds (m/s) are entered;
     the 6th class has no upper limit
     (WSCAT(5))                   Default   :
                                  ISC RURAL : 1.54, 3.09, 5.14, 8.23,
10.8 (10.8+)

                           Wind Speed Class :  1     2     3     4
5
                                               ---   ---   ---   ---
---
                                    ! WSCAT = 1.54, 3.09, 5.14, 8.23,
10.80 !

     Default wind speed profile power-law
     exponents for stabilities 1-6
     (PLX0(6))                    Default   : ISC RURAL values
                                  ISC RURAL : .07, .07, .10, .15,
.35, .55
                                  ISC URBAN : .15, .15, .20, .25,
.30, .30

                            Stability Class :  A     B     C     D
E     F
                                               ---   ---   ---   ---
---   ---
```

```
                                        ! PLX0 = 0.07, 0.07, 0.10, 0.15,
0.35, 0.55 !

     Default potential temperature gradient
     for stable classes E, F (degK/m)
     (PTG0(2))                      Default: 0.020, 0.035
                                        ! PTG0 = 0.020,   0.035 !

     Default plume path coefficients for
     each stability class (used when option
     for partial plume height terrain adjustment
     is selected -- MCTADJ=3)
     (PPC(6))                 Stability Class :  A     B     C     D
E     F
                                 Default  PPC : .50,  .50,  .50,  .50,
.35,  .35
                                                ---   ---   ---   ---
---   ---
                                        !  PPC = 0.50, 0.50, 0.50, 0.50,
0.35, 0.35 !

     Slug-to-puff transition criterion factor
     equal to sigma-y/length of slug
     (SL2PF)                              Default: 10.        ! SL2PF =
10.0 !

     Puff-splitting control variables ------------------------

       VERTICAL SPLIT
       --------------

       Number of puffs that result every time a puff
       is split - nsplit=2 means that 1 puff splits
       into 2
       (NSPLIT)                           Default:   3        ! NSPLIT
=  3  !

       Time(s) of a day when split puffs are eligible to
       be split once again; this is typically set once
       per day, around sunset before nocturnal shear develops.
       24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
       0=do not re-split    1=eligible for re-split
       (IRESPLIT(24))                     Default:  Hour 17 = 1
       !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

       Split is allowed only if last hour's mixing
       height (m) exceeds a minimum value
       (ZISPLIT)                          Default: 100.       ! ZISPLIT
= 100.0 !

       Split is allowed only if ratio of last hour's
       mixing ht to the maximum mixing ht experienced
       by the puff is less than a maximum value (this
       postpones a split until a nocturnal layer develops)
       (ROLDMAX)                          Default: 0.25       ! ROLDMAX
= 0.25 !


       HORIZONTAL SPLIT
       ----------------
```

```
       Number of puffs that result every time a puff
       is split - nsplith=5 means that 1 puff splits
       into 5
       (NSPLITH)                           Default:   5        ! NSPLITH
=  5  !

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
       (SYSPLITH)                          Default:  1.0       !
SYSPLITH = 1.0 !

       Minimum puff elongation rate (SYSPLITH/hr) due to
       wind shear, before it may be split
       (SHSPLITH)                          Default:  2.        !
SHSPLITH = 2.0 !

       Minimum concentration (g/m^3) of each
       species in puff before it may be split
       Enter array of NSPEC values; if a single value is
       entered, it will be used for ALL species
       (CNSPLITH)                          Default:  1.0E-07   !
CNSPLITH = 1.0E-07 !

     Integration control variables ------------------------

       Fractional convergence criterion for numerical SLUG
       sampling integration
       (EPSSLUG)                           Default:   1.0e-04  ! EPSSLUG
= 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                           Default:   1.0e-06  ! EPSAREA
= 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                            Default:   1.0      ! DSRISE
= 1.0 !

       Boundary Condition (BC) Puff control variables
------------------------

       Minimum height (m) to which BC puffs are mixed as they are
emitted
       (MBCON=2 ONLY).  Actual height is reset to the current mixing
height
       at the release point if greater than this minimum.
       (HTMINBC)                           Default:   500.     ! HTMINBC
= 500.0 !

       Search radius (in BC segment lengths) about a receptor for
sampling
       nearest BC puff.  BC puffs are emitted with a spacing of one
segment
       length, so the search radius should be greater than 1.
       (RSAMPBC)                           Default:   4.      ! RSAMPBC
= 10.0 !
```

```
       Near-Surface depletion adjustment to concentration profile used
when
       sampling BC puffs?
       (MDEPBC)                            Default:   1        ! MDEPBC
=  1  !
          0 = Concentration is NOT adjusted for depletion
          1 = Adjust Concentration for depletion

!END!


------------------------------------------------------------------------
-------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =   1  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                      a
          POINT SOURCE: CONSTANT DATA
          -----------------------------

b          c
  Source       X         Y       Stack    Base     Stack    Exit  Exit
Bldg.  Emission
```

```
   No.      Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.
Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg.
K)
  ------   ---------- ---------- ------  ------   -------- -----
-------- ----- --------
   1 ! SRCNAM = EP14 !
   1 ! X =  89.5282,  262.5797,  76.20, 155.45,  6.40, 9.55, 447.59,
0.0, 3.086288E02,  0.0E00,  2.220052E02,
       0.0E00,  0.0E00, 6.5294E00 !
   1 ! FMFAC  =      1.0 !   !END!
--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column
headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to
represent
             the effect of rain-caps or other physical configurations
that
             reduce momentum rise associated with the actual exit
velocity.
             (Default: 1.0  -- full momentum used)

    b
     0. = No building downwash modeled, 1. = downwash modeled
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
           -------------------------------------------------------
Source
a
 No.       Effective building height, width, length and X/Y offset (in
meters)
           every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed
for
           MBDW=2 (PRIME downwash option)
------
--------------------------------------------------------------------

--------
```

a
Building height, width, length, and X/Y offset from the source are treated
as a separate input subgroup for each source and therefore must end with
an input group terminator. The X/Y offset is the position, relative to the
stack, of the center of the upwind face of the projected building, with the
x-axis pointing along the flow direction.

Subgroup (13d)

```
                                              a
          POINT SOURCE: VARIABLE EMISSIONS DATA
          ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 13b.  Factors entered multiply the rates in 13b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                 Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)
```

----
a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

Number of polygon area sources with

```
     parameters specified below (NAR1)       No default  !  NAR1 =  0
!

     Units used for area source
     emissions below           (IARU)       Default: 1  !  IARU =   1
!
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                     a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                         b
Source           Effect.    Base      Initial    Emission
 No.             Height   Elevation   Sigma z     Rates
                   (m)       (m)        (m)
-------          ------    ------     --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
           --------------------------------------------------------
Source                                                                   a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------
```

```
--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                                 a
          AREA SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 14b.  Factors entered multiply the rates in 14b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                              No default  !  NLN2
=  0   !
```

```
     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)        No default   !
NLINES =  0  !

     Units used for line source
     emissions below                (ILNU)          Default: 1  !  ILNU
=   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7   !
MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6   !
NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default   ! XL =
.0 !
                                                    (in meters)

        Average building height (HBL)               No default   ! HBL =
.0 !
                                                    (in meters)

        Average building width (WBL)                No default   ! WBL =
.0 !
                                                    (in meters)

        Average line source width (WML)             No default   ! WML =
.0 !
                                                    (in meters)

        Average separation between buildings (DXL)  No default   ! DXL =
.0 !
                                                    (in meters)

        Average buoyancy parameter (FPRIMEL)        No default   !
FPRIMEL = .0 !
                                                    (in m**4/s**3)

!END!

---------------
```

```
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
          ----------------------------------

a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base
Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height
Elevation      Rates
            (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------
---------    ---------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                        a
          BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
```

```
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0
!

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1
!
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0
!

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0
!

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                        a
           VOLUME SOURCE: CONSTANT DATA
           ------------------------------

b
        X           Y        Effect.    Base     Initial    Initial
Emission
     Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z
Rates
        (km)       (km)         (m)       (m)        (m)       (m)
     ----------  ----------   ------    ------    --------   --------
```

```
--------

--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                                 a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


------------------------------------------------------------------------
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INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
-----------------------

---------------
Subgroup (17a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC =  1046
!

!END!

---------------
```

Subgroup (17b)

NON-GRIDDED (DISCRETE) RECEPTOR DATA[a]

Receptor No.		X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height Above Ground (m)[b]	
1	! X =	-87.79324,	-33.47899,	274.000,	0.000!	!END!
2	! X =	-87.79062,	-33.23052,	274.000,	0.000!	!END!
3	! X =	-87.7879,	-32.98214,	235.000,	0.000!	!END!
4	! X =	-87.54586,	-33.48166,	288.000,	0.000!	!END!
5	! X =	-87.54324,	-33.23318,	276.000,	0.000!	!END!
6	! X =	-87.54061,	-32.9847,	244.000,	0.000!	!END!
7	! X =	-87.29848,	-33.48422,	304.000,	0.000!	!END!
8	! X =	-87.29586,	-33.23585,	304.000,	0.000!	!END!
9	! X =	-87.29323,	-32.98737,	274.000,	0.000!	!END!
10	! X =	-87.27739,	-31.49669,	274.000,	0.000!	!END!
11	! X =	-87.0511,	-33.48689,	304.000,	0.000!	!END!
12	! X =	-87.04848,	-33.23841,	304.000,	0.000!	!END!
13	! X =	-87.04586,	-32.99003,	290.000,	0.000!	!END!
14	! X =	-87.03001,	-31.49936,	265.000,	0.000!	!END!
15	! X =	-86.83288,	-36.22239,	274.000,	0.000!	!END!
16	! X =	-86.83026,	-35.97401,	274.000,	0.000!	!END!
17	! X =	-86.82764,	-35.72553,	274.000,	0.000!	!END!
18	! X =	-86.82491,	-35.47706,	274.000,	0.000!	!END!
19	! X =	-86.82229,	-35.22869,	274.000,	0.000!	!END!
20	! X =	-86.81967,	-34.98021,	274.000,	0.000!	!END!
21	! X =	-86.80382,	-33.48955,	302.000,	0.000!	!END!
22	! X =	-86.8011,	-33.24108,	304.000,	0.000!	!END!
23	! X =	-86.79847,	-32.9926,	304.000,	0.000!	!END!
24	! X =	-86.79585,	-32.74422,	287.000,	0.000!	!END!
25	! X =	-86.79322,	-32.49574,	274.000,	0.000!	!END!
26	! X =	-86.7906,	-32.24726,	304.000,	0.000!	!END!
27	! X =	-86.78263,	-31.50193,	275.000,	0.000!	!END!
28	! X =	-86.58813,	-36.47353,	274.000,	0.000!	!END!
29	! X =	-86.58551,	-36.22505,	274.000,	0.000!	!END!
30	! X =	-86.58288,	-35.97658,	274.000,	0.000!	!END!
31	! X =	-86.58026,	-35.7282,	274.000,	0.000!	!END!
32	! X =	-86.57754,	-35.47973,	274.000,	0.000!	!END!
33	! X =	-86.57491,	-35.23125,	273.000,	0.000!	!END!
34	! X =	-86.57229,	-34.98288,	274.000,	0.000!	!END!
35	! X =	-86.55644,	-33.49212,	304.000,	0.000!	!END!
36	! X =	-86.55382,	-33.24374,	304.000,	0.000!	!END!
37	! X =	-86.55109,	-32.99526,	307.000,	0.000!	!END!
38	! X =	-86.54847,	-32.74678,	314.000,	0.000!	!END!
39	! X =	-86.54585,	-32.49841,	313.000,	0.000!	!END!
40	! X =	-86.54322,	-32.24993,	304.000,	0.000!	!END!
41	! X =	-86.54059,	-32.00145,	304.000,	0.000!	!END!
42	! X =	-86.53787,	-31.75307,	292.000,	0.000!	!END!
43	! X =	-86.53525,	-31.50459,	275.000,	0.000!	!END!
44	! X =	-86.35136,	-37.46999,	278.000,	0.000!	!END!
45	! X =	-86.34076,	-36.47619,	272.000,	0.000!	!END!
46	! X =	-86.33813,	-36.22772,	274.000,	0.000!	!END!
47	! X =	-86.33551,	-35.97924,	274.000,	0.000!	!END!
48	! X =	-86.33288,	-35.73077,	274.000,	0.000!	!END!
49	! X =	-86.33026,	-35.48239,	274.000,	0.000!	!END!
50	! X =	-86.32753,	-35.23392,	274.000,	0.000!	!END!

```
 51 ! X =   -86.32491,  -34.98544,     278.000,       0.000!   !END!
 52 ! X =   -86.30906,  -33.49478,     295.000,       0.000!   !END!
 53 ! X =   -86.30643,   -33.2463,     304.000,       0.000!   !END!
 54 ! X =   -86.30381,  -32.99792,     319.000,       0.000!   !END!
 55 ! X =   -86.30109,  -32.74945,     335.000,       0.000!   !END!
 56 ! X =   -86.29846,  -32.50097,     337.000,       0.000!   !END!
 57 ! X =   -86.29584,  -32.25259,     320.000,       0.000!   !END!
 58 ! X =   -86.29321,  -32.00411,     299.000,       0.000!   !END!
 59 ! X =   -86.29059,  -31.75563,     277.000,       0.000!   !END!
 60 ! X =   -86.28787,  -31.50726,     274.000,       0.000!   !END!
 61 ! X =   -86.28524,  -31.25878,     274.000,       0.000!   !END!
 62 ! X =   -86.28262,   -31.0104,     243.000,       0.000!   !END!
 63 ! X =   -86.10398,  -37.47255,     304.000,       0.000!   !END!
 64 ! X =   -86.10135,  -37.22408,     274.000,       0.000!   !END!
 65 ! X =   -86.09873,   -36.9757,     274.000,       0.000!   !END!
 66 ! X =    -86.0961,  -36.72723,     271.000,       0.000!   !END!
 67 ! X =   -86.09348,  -36.47875,     274.000,       0.000!   !END!
 68 ! X =   -86.09076,  -36.23038,     274.000,       0.000!   !END!
 69 ! X =   -86.08813,  -35.98191,     274.000,       0.000!   !END!
 70 ! X =    -86.0855,  -35.73343,     279.000,       0.000!   !END!
 71 ! X =   -86.08288,  -35.48496,     281.000,       0.000!   !END!
 72 ! X =   -86.08026,  -35.23658,     288.000,       0.000!   !END!
 73 ! X =   -86.07753,  -34.98811,     293.000,       0.000!   !END!
 74 ! X =   -86.06168,  -33.49745,     290.000,       0.000!   !END!
 75 ! X =   -86.05905,  -33.24897,     302.000,       0.000!   !END!
 76 ! X =   -86.05643,  -33.00049,     327.000,       0.000!   !END!
 77 ! X =   -86.05381,  -32.75211,     365.000,       0.000!   !END!
 78 ! X =   -86.05108,  -32.50364,     395.000,       0.000!   !END!
 79 ! X =   -86.04845,  -32.25516,     343.000,       0.000!   !END!
 80 ! X =   -86.04583,  -32.00678,     304.000,       0.000!   !END!
 81 ! X =   -86.04321,   -31.7583,     296.000,       0.000!   !END!
 82 ! X =   -86.04058,  -31.50982,     290.000,       0.000!   !END!
 83 ! X =   -86.03786,  -31.26144,     277.000,       0.000!   !END!
 84 ! X =   -86.03523,  -31.01296,     259.000,       0.000!   !END!
 85 ! X =    -85.8566,  -37.47522,     304.000,       0.000!   !END!
 86 ! X =   -85.85398,  -37.22675,     274.000,       0.000!   !END!
 87 ! X =   -85.85135,  -36.97827,     274.000,       0.000!   !END!
 88 ! X =   -85.84873,   -36.7299,     274.000,       0.000!   !END!
 89 ! X =    -85.8461,  -36.48142,     274.000,       0.000!   !END!
 90 ! X =   -85.84337,  -36.23295,     274.000,       0.000!   !END!
 91 ! X =   -85.84075,  -35.98447,     286.000,       0.000!   !END!
 92 ! X =   -85.83813,   -35.7361,     304.000,       0.000!   !END!
 93 ! X =    -85.8355,  -35.48762,     311.000,       0.000!   !END!
 94 ! X =   -85.83287,  -35.23915,     318.000,       0.000!   !END!
 95 ! X =   -85.83025,  -34.99077,     322.000,       0.000!   !END!
 96 ! X =   -85.82753,   -34.7423,     308.000,       0.000!   !END!
 97 ! X =    -85.8249,  -34.49382,     298.000,       0.000!   !END!
 98 ! X =    -85.8143,  -33.50001,     290.000,       0.000!   !END!
 99 ! X =   -85.81168,  -33.25164,     308.000,       0.000!   !END!
100 ! X =   -85.80905,  -33.00316,     343.000,       0.000!   !END!
101 ! X =   -85.80642,  -32.75468,     371.000,       0.000!   !END!
102 ! X =    -85.8038,   -32.5063,     395.000,       0.000!   !END!
103 ! X =   -85.80107,  -32.25782,     365.000,       0.000!   !END!
104 ! X =   -85.79845,  -32.00935,     321.000,       0.000!   !END!
105 ! X =   -85.79583,  -31.76096,     307.000,       0.000!   !END!
106 ! X =    -85.7932,  -31.51248,     302.000,       0.000!   !END!
107 ! X =   -85.79058,   -31.2641,     283.000,       0.000!   !END!
108 ! X =   -85.78785,  -31.01563,     274.000,       0.000!   !END!
109 ! X =   -85.60933,  -37.47788,     297.000,       0.000!   !END!
110 ! X =    -85.6066,  -37.22941,     286.000,       0.000!   !END!
```

```
111 ! X =   -85.60397,  -36.98094,     274.000,        0.000!   !END!
112 ! X =   -85.60135,  -36.73246,     274.000,        0.000!   !END!
113 ! X =   -85.59873,  -36.48409,     274.000,        0.000!   !END!
114 ! X =    -85.5961,  -36.23561,     274.000,        0.000!   !END!
115 ! X =   -85.59337,  -35.98714,     288.000,        0.000!   !END!
116 ! X =   -85.59074,  -35.73867,     335.000,        0.000!   !END!
117 ! X =   -85.58812,  -35.49029,     335.000,        0.000!   !END!
118 ! X =    -85.5855,  -35.24181,     335.000,        0.000!   !END!
119 ! X =   -85.58287,  -34.99334,     335.000,        0.000!   !END!
120 ! X =   -85.58025,  -34.74496,     335.000,        0.000!   !END!
121 ! X =   -85.57752,  -34.49649,     292.000,        0.000!   !END!
122 ! X =   -85.57489,  -34.24801,     259.000,        0.000!   !END!
123 ! X =   -85.57227,  -33.99953,     274.000,        0.000!   !END!
124 ! X =   -85.56964,  -33.75115,     274.000,        0.000!   !END!
125 ! X =   -85.56702,  -33.50268,     285.000,        0.000!   !END!
126 ! X =   -85.56429,   -33.2542,     304.000,        0.000!   !END!
127 ! X =   -85.56167,  -33.00582,     332.000,        0.000!   !END!
128 ! X =   -85.55904,  -32.75734,     360.000,        0.000!   !END!
129 ! X =   -85.55642,  -32.50887,     365.000,        0.000!   !END!
130 ! X =   -85.55379,  -32.26049,     344.000,        0.000!   !END!
131 ! X =   -85.55107,  -32.01201,     335.000,        0.000!   !END!
132 ! X =   -85.54844,  -31.76353,     309.000,        0.000!   !END!
133 ! X =   -85.54582,  -31.51515,     302.000,        0.000!   !END!
134 ! X =   -85.54319,  -31.26667,     280.000,        0.000!   !END!
135 ! X =   -85.54057,  -31.01829,     274.000,        0.000!   !END!
136 ! X =   -85.36195,  -37.48045,     304.000,        0.000!   !END!
137 ! X =   -85.35923,  -37.23208,     303.000,        0.000!   !END!
138 ! X =    -85.3566,   -36.9836,     294.000,        0.000!   !END!
139 ! X =   -85.35397,  -36.73513,     292.000,        0.000!   !END!
140 ! X =   -85.35134,  -36.48665,     283.000,        0.000!   !END!
141 ! X =   -85.34872,  -36.23828,     275.000,        0.000!   !END!
142 ! X =    -85.3461,   -35.9898,     283.000,        0.000!   !END!
143 ! X =   -85.34337,  -35.74133,     316.000,        0.000!   !END!
144 ! X =   -85.34074,  -35.49286,     335.000,        0.000!   !END!
145 ! X =   -85.33812,  -35.24448,     335.000,        0.000!   !END!
146 ! X =   -85.33549,    -34.996,     335.000,        0.000!   !END!
147 ! X =   -85.33286,  -34.74753,     327.000,        0.000!   !END!
148 ! X =   -85.33024,  -34.49915,     268.000,        0.000!   !END!
149 ! X =   -85.32752,  -34.25068,     258.000,        0.000!   !END!
150 ! X =   -85.32489,   -34.0022,     274.000,        0.000!   !END!
151 ! X =   -85.32226,  -33.75372,     277.000,        0.000!   !END!
152 ! X =   -85.31964,  -33.50534,     284.000,        0.000!   !END!
153 ! X =   -85.31701,  -33.25686,     280.000,        0.000!   !END!
154 ! X =   -85.31429,  -33.00839,     307.000,        0.000!   !END!
155 ! X =   -85.31166,  -32.76001,     320.000,        0.000!   !END!
156 ! X =   -85.30904,  -32.51153,     335.000,        0.000!   !END!
157 ! X =   -85.30641,  -32.26305,     335.000,        0.000!   !END!
158 ! X =   -85.30379,  -32.01467,     335.000,        0.000!   !END!
159 ! X =   -85.30106,   -31.7662,     313.000,        0.000!   !END!
160 ! X =   -85.29844,  -31.51782,     300.000,        0.000!   !END!
161 ! X =   -85.29581,  -31.26934,     283.000,        0.000!   !END!
162 ! X =   -85.29318,  -31.02086,     274.000,        0.000!   !END!
163 ! X =    -85.1172,  -37.73159,     304.000,        0.000!   !END!
164 ! X =   -85.11457,  -37.48312,     309.000,        0.000!   !END!
165 ! X =   -85.11195,  -37.23464,     312.000,        0.000!   !END!
166 ! X =   -85.10922,  -36.98617,     323.000,        0.000!   !END!
167 ! X =    -85.1066,   -36.7378,     308.000,        0.000!   !END!
168 ! X =   -85.10397,  -36.48932,     304.000,        0.000!   !END!
169 ! X =   -85.10134,  -36.24085,     304.000,        0.000!   !END!
170 ! X =   -85.09871,  -35.99237,     299.000,        0.000!   !END!
```

171 ! X =	-85.09609,	-35.74399,	304.000,	0.000!	!END!
172 ! X =	-85.09336,	-35.49552,	335.000,	0.000!	!END!
173 ! X =	-85.09074,	-35.24705,	335.000,	0.000!	!END!
174 ! X =	-85.08811,	-34.99867,	310.000,	0.000!	!END!
175 ! X =	-85.08549,	-34.75019,	281.000,	0.000!	!END!
176 ! X =	-85.08286,	-34.50172,	261.000,	0.000!	!END!
177 ! X =	-85.08024,	-34.25334,	278.000,	0.000!	!END!
178 ! X =	-85.07751,	-34.00487,	274.000,	0.000!	!END!
179 ! X =	-85.07488,	-33.75639,	281.000,	0.000!	!END!
180 ! X =	-85.07226,	-33.50791,	304.000,	0.000!	!END!
181 ! X =	-85.06963,	-33.25953,	304.000,	0.000!	!END!
182 ! X =	-85.06701,	-33.01105,	303.000,	0.000!	!END!
183 ! X =	-85.06428,	-32.76258,	320.000,	0.000!	!END!
184 ! X =	-85.06166,	-32.5142,	335.000,	0.000!	!END!
185 ! X =	-85.05903,	-32.26572,	335.000,	0.000!	!END!
186 ! X =	-85.0564,	-32.01724,	333.000,	0.000!	!END!
187 ! X =	-85.05378,	-31.76886,	313.000,	0.000!	!END!
188 ! X =	-85.05115,	-31.52038,	300.000,	0.000!	!END!
189 ! X =	-85.04843,	-31.272,	280.000,	0.000!	!END!
190 ! X =	-85.0458,	-31.02352,	274.000,	0.000!	!END!
191 ! X =	-84.87508,	-38.2311,	306.000,	0.000!	!END!
192 ! X =	-84.87245,	-37.98263,	286.000,	0.000!	!END!
193 ! X =	-84.86982,	-37.73416,	308.000,	0.000!	!END!
194 ! X =	-84.8672,	-37.48578,	328.000,	0.000!	!END!
195 ! X =	-84.86457,	-37.23731,	335.000,	0.000!	!END!
196 ! X =	-84.86194,	-36.98883,	336.000,	0.000!	!END!
197 ! X =	-84.85922,	-36.74036,	345.000,	0.000!	!END!
198 ! X =	-84.85659,	-36.49199,	349.000,	0.000!	!END!
199 ! X =	-84.85397,	-36.24351,	337.000,	0.000!	!END!
200 ! X =	-84.85134,	-35.99504,	316.000,	0.000!	!END!
201 ! X =	-84.84871,	-35.74656,	306.000,	0.000!	!END!
202 ! X =	-84.84609,	-35.49818,	314.000,	0.000!	!END!
203 ! X =	-84.84336,	-35.24971,	314.000,	0.000!	!END!
204 ! X =	-84.84073,	-35.00124,	290.000,	0.000!	!END!
205 ! X =	-84.83811,	-34.75286,	258.000,	0.000!	!END!
206 ! X =	-84.83548,	-34.50438,	281.000,	0.000!	!END!
207 ! X =	-84.83285,	-34.25591,	304.000,	0.000!	!END!
208 ! X =	-84.83023,	-34.00743,	301.000,	0.000!	!END!
209 ! X =	-84.8275,	-33.75906,	280.000,	0.000!	!END!
210 ! X =	-84.82488,	-33.51058,	304.000,	0.000!	!END!
211 ! X =	-84.82225,	-33.2621,	304.000,	0.000!	!END!
212 ! X =	-84.81963,	-33.01372,	318.000,	0.000!	!END!
213 ! X =	-84.817,	-32.76524,	335.000,	0.000!	!END!
214 ! X =	-84.81427,	-32.51677,	335.000,	0.000!	!END!
215 ! X =	-84.81165,	-32.26839,	335.000,	0.000!	!END!
216 ! X =	-84.80902,	-32.01991,	318.000,	0.000!	!END!
217 ! X =	-84.80639,	-31.77143,	304.000,	0.000!	!END!
218 ! X =	-84.80377,	-31.52305,	292.000,	0.000!	!END!
219 ! X =	-84.6278,	-38.23377,	326.000,	0.000!	!END!
220 ! X =	-84.62507,	-37.9853,	286.000,	0.000!	!END!
221 ! X =	-84.62245,	-37.73682,	308.000,	0.000!	!END!
222 ! X =	-84.61982,	-37.48835,	322.000,	0.000!	!END!
223 ! X =	-84.6172,	-37.23998,	335.000,	0.000!	!END!
224 ! X =	-84.61457,	-36.9915,	344.000,	0.000!	!END!
225 ! X =	-84.61194,	-36.74303,	365.000,	0.000!	!END!
226 ! X =	-84.60921,	-36.49456,	365.000,	0.000!	!END!
227 ! X =	-84.60659,	-36.24618,	359.000,	0.000!	!END!
228 ! X =	-84.60396,	-35.9977,	330.000,	0.000!	!END!
229 ! X =	-84.60133,	-35.74923,	309.000,	0.000!	!END!
230 ! X =	-84.59871,	-35.50075,	304.000,	0.000!	!END!

231	! X =	-84.59608,	-35.25238,	289.000,	0.000!	!END!
232	! X =	-84.59335,	-35.0039,	270.000,	0.000!	!END!
233	! X =	-84.59073,	-34.75543,	274.000,	0.000!	!END!
234	! X =	-84.5881,	-34.50705,	289.000,	0.000!	!END!
235	! X =	-84.58548,	-34.25857,	304.000,	0.000!	!END!
236	! X =	-84.58285,	-34.0101,	304.000,	0.000!	!END!
237	! X =	-84.58022,	-33.76162,	304.000,	0.000!	!END!
238	! X =	-84.5775,	-33.51324,	297.000,	0.000!	!END!
239	! X =	-84.57487,	-33.26477,	305.000,	0.000!	!END!
240	! X =	-84.57224,	-33.01629,	327.000,	0.000!	!END!
241	! X =	-84.56962,	-32.76791,	335.000,	0.000!	!END!
242	! X =	-84.56699,	-32.51943,	335.000,	0.000!	!END!
243	! X =	-84.56426,	-32.27096,	333.000,	0.000!	!END!
244	! X =	-84.56164,	-32.02258,	313.000,	0.000!	!END!
245	! X =	-84.55901,	-31.7741,	279.000,	0.000!	!END!
246	! X =	-84.55639,	-31.52572,	304.000,	0.000!	!END!
247	! X =	-84.37769,	-37.98787,	296.000,	0.000!	!END!
248	! X =	-84.37507,	-37.73949,	304.000,	0.000!	!END!
249	! X =	-84.37244,	-37.49102,	307.000,	0.000!	!END!
250	! X =	-84.36981,	-37.24254,	335.000,	0.000!	!END!
251	! X =	-84.36719,	-36.99407,	351.000,	0.000!	!END!
252	! X =	-84.36456,	-36.74569,	365.000,	0.000!	!END!
253	! X =	-84.36194,	-36.49722,	365.000,	0.000!	!END!
254	! X =	-84.35921,	-36.24875,	365.000,	0.000!	!END!
255	! X =	-84.35658,	-36.00027,	330.000,	0.000!	!END!
256	! X =	-84.35396,	-35.7519,	306.000,	0.000!	!END!
257	! X =	-84.35133,	-35.50342,	290.000,	0.000!	!END!
258	! X =	-84.3487,	-35.25494,	304.000,	0.000!	!END!
259	! X =	-84.34608,	-35.00657,	300.000,	0.000!	!END!
260	! X =	-84.34335,	-34.7581,	275.000,	0.000!	!END!
261	! X =	-84.34072,	-34.50962,	289.000,	0.000!	!END!
262	! X =	-84.33809,	-34.26114,	311.000,	0.000!	!END!
263	! X =	-84.33547,	-34.01276,	331.000,	0.000!	!END!
264	! X =	-84.33284,	-33.76429,	335.000,	0.000!	!END!
265	! X =	-84.33021,	-33.51581,	318.000,	0.000!	!END!
266	! X =	-84.32749,	-33.26743,	301.000,	0.000!	!END!
267	! X =	-84.32486,	-33.01896,	319.000,	0.000!	!END!
268	! X =	-84.32223,	-32.77048,	335.000,	0.000!	!END!
269	! X =	-84.31961,	-32.5221,	335.000,	0.000!	!END!
270	! X =	-84.31698,	-32.27362,	328.000,	0.000!	!END!
271	! X =	-84.31436,	-32.02514,	308.000,	0.000!	!END!
272	! X =	-84.31163,	-31.77676,	289.000,	0.000!	!END!
273	! X =	-84.309,	-31.52828,	300.000,	0.000!	!END!
274	! X =	-84.13042,	-37.99053,	299.000,	0.000!	!END!
275	! X =	-84.12769,	-37.74206,	304.000,	0.000!	!END!
276	! X =	-84.12507,	-37.49369,	315.000,	0.000!	!END!
277	! X =	-84.12244,	-37.24521,	325.000,	0.000!	!END!
278	! X =	-84.11981,	-36.99674,	349.000,	0.000!	!END!
279	! X =	-84.11718,	-36.74826,	365.000,	0.000!	!END!
280	! X =	-84.11456,	-36.49989,	365.000,	0.000!	!END!
281	! X =	-84.11183,	-36.25142,	335.000,	0.000!	!END!
282	! X =	-84.1092,	-36.00294,	310.000,	0.000!	!END!
283	! X =	-84.10657,	-35.75447,	304.000,	0.000!	!END!
284	! X =	-84.10395,	-35.50609,	304.000,	0.000!	!END!
285	! X =	-84.10132,	-35.25761,	304.000,	0.000!	!END!
286	! X =	-84.09869,	-35.00914,	304.000,	0.000!	!END!
287	! X =	-84.09607,	-34.76076,	289.000,	0.000!	!END!
288	! X =	-84.09334,	-34.51229,	284.000,	0.000!	!END!
289	! X =	-84.09072,	-34.26381,	309.000,	0.000!	!END!
290	! X =	-84.08809,	-34.01533,	335.000,	0.000!	!END!

291	! X =	-84.08546,	-33.76695,	335.000,	0.000!	!END!
292	! X =	-84.08284,	-33.51848,	335.000,	0.000!	!END!
293	! X =	-84.08021,	-33.27,	312.000,	0.000!	!END!
294	! X =	-84.07748,	-33.02162,	336.000,	0.000!	!END!
295	! X =	-84.07486,	-32.77314,	358.000,	0.000!	!END!
296	! X =	-84.07223,	-32.52467,	355.000,	0.000!	!END!
297	! X =	-84.0696,	-32.27629,	330.000,	0.000!	!END!
298	! X =	-84.06698,	-32.02781,	309.000,	0.000!	!END!
299	! X =	-84.06435,	-31.77933,	289.000,	0.000!	!END!
300	! X =	-84.06162,	-31.53095,	282.000,	0.000!	!END!
301	! X =	-83.88567,	-38.24167,	335.000,	0.000!	!END!
302	! X =	-83.88305,	-37.9932,	304.000,	0.000!	!END!
303	! X =	-83.88042,	-37.74472,	304.000,	0.000!	!END!
304	! X =	-83.87769,	-37.49625,	335.000,	0.000!	!END!
305	! X =	-83.87506,	-37.24778,	344.000,	0.000!	!END!
306	! X =	-83.87244,	-36.99941,	330.000,	0.000!	!END!
307	! X =	-83.86981,	-36.75093,	365.000,	0.000!	!END!
308	! X =	-83.86718,	-36.50246,	365.000,	0.000!	!END!
309	! X =	-83.86455,	-36.25398,	349.000,	0.000!	!END!
310	! X =	-83.86183,	-36.00561,	335.000,	0.000!	!END!
311	! X =	-83.8592,	-35.75713,	326.000,	0.000!	!END!
312	! X =	-83.85657,	-35.50866,	312.000,	0.000!	!END!
313	! X =	-83.85395,	-35.26028,	305.000,	0.000!	!END!
314	! X =	-83.85132,	-35.0118,	304.000,	0.000!	!END!
315	! X =	-83.84869,	-34.76333,	287.000,	0.000!	!END!
316	! X =	-83.84606,	-34.51485,	289.000,	0.000!	!END!
317	! X =	-83.84334,	-34.26648,	318.000,	0.000!	!END!
318	! X =	-83.84071,	-34.018,	335.000,	0.000!	!END!
319	! X =	-83.83808,	-33.76952,	335.000,	0.000!	!END!
320	! X =	-83.83546,	-33.52114,	335.000,	0.000!	!END!
321	! X =	-83.83283,	-33.27267,	330.000,	0.000!	!END!
322	! X =	-83.8302,	-33.02419,	362.000,	0.000!	!END!
323	! X =	-83.82748,	-32.77581,	365.000,	0.000!	!END!
324	! X =	-83.82485,	-32.52733,	365.000,	0.000!	!END!
325	! X =	-83.82222,	-32.27885,	340.000,	0.000!	!END!
326	! X =	-83.8196,	-32.03047,	312.000,	0.000!	!END!
327	! X =	-83.81697,	-31.78199,	304.000,	0.000!	!END!
328	! X =	-83.81434,	-31.53351,	304.000,	0.000!	!END!
329	! X =	-83.63829,	-38.24424,	350.000,	0.000!	!END!
330	! X =	-83.63567,	-37.99577,	313.000,	0.000!	!END!
331	! X =	-83.63304,	-37.74739,	335.000,	0.000!	!END!
332	! X =	-83.63041,	-37.49892,	355.000,	0.000!	!END!
333	! X =	-83.62768,	-37.25045,	365.000,	0.000!	!END!
334	! X =	-83.62506,	-37.00197,	373.000,	0.000!	!END!
335	! X =	-83.62243,	-36.7536,	365.000,	0.000!	!END!
336	! X =	-83.6198,	-36.50512,	365.000,	0.000!	!END!
337	! X =	-83.61717,	-36.25665,	335.000,	0.000!	!END!
338	! X =	-83.61455,	-36.00817,	335.000,	0.000!	!END!
339	! X =	-83.61182,	-35.7598,	335.000,	0.000!	!END!
340	! X =	-83.60919,	-35.51133,	323.000,	0.000!	!END!
341	! X =	-83.60656,	-35.26285,	305.000,	0.000!	!END!
342	! X =	-83.60394,	-35.01447,	296.000,	0.000!	!END!
343	! X =	-83.60131,	-34.766,	274.000,	0.000!	!END!
344	! X =	-83.59868,	-34.51752,	284.000,	0.000!	!END!
345	! X =	-83.59605,	-34.26904,	313.000,	0.000!	!END!
346	! X =	-83.59333,	-34.02067,	325.000,	0.000!	!END!
347	! X =	-83.5907,	-33.77219,	335.000,	0.000!	!END!
348	! X =	-83.58807,	-33.52371,	335.000,	0.000!	!END!
349	! X =	-83.58545,	-33.27533,	357.000,	0.000!	!END!
350	! X =	-83.58282,	-33.02686,	365.000,	0.000!	!END!

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351 ! X =   -83.58019,  -32.77838,     365.000,       0.000!   !END!
352 ! X =   -83.57757,     -32.53,     365.000,       0.000!   !END!
353 ! X =   -83.57484,  -32.28152,     334.000,       0.000!   !END!
354 ! X =   -83.57221,  -32.03304,     334.000,       0.000!   !END!
355 ! X =   -83.56959,  -31.78466,     326.000,       0.000!   !END!
356 ! X =   -83.39092,  -38.24691,     365.000,       0.000!   !END!
357 ! X =   -83.38829,  -37.99844,     336.000,       0.000!   !END!
358 ! X =   -83.38566,  -37.74996,     352.000,       0.000!   !END!
359 ! X =   -83.38304,  -37.50159,     353.000,       0.000!   !END!
360 ! X =   -83.38031,  -37.25312,     367.000,       0.000!   !END!
361 ! X =   -83.37768,  -37.00464,     396.000,       0.000!   !END!
362 ! X =   -83.36717,  -36.01084,     329.000,       0.000!   !END!
363 ! X =   -83.36454,  -35.76237,     329.000,       0.000!   !END!
364 ! X =   -83.36182,  -35.51399,     311.000,       0.000!   !END!
365 ! X =   -83.35919,  -35.26552,     293.000,       0.000!   !END!
366 ! X =   -83.35656,  -35.01704,     277.000,       0.000!   !END!
367 ! X =   -83.35393,  -34.76856,     275.000,       0.000!   !END!
368 ! X =    -83.3513,  -34.52019,     275.000,       0.000!   !END!
369 ! X =   -83.34868,  -34.27171,     294.000,       0.000!   !END!
370 ! X =   -83.34605,  -34.02323,     303.000,       0.000!   !END!
371 ! X =   -83.34332,  -33.77486,     323.000,       0.000!   !END!
372 ! X =   -83.34069,  -33.52638,     338.000,       0.000!   !END!
373 ! X =   -83.33806,   -33.2779,     365.000,       0.000!   !END!
374 ! X =   -83.33544,  -33.02952,     365.000,       0.000!   !END!
375 ! X =   -83.33281,  -32.78105,     351.000,       0.000!   !END!
376 ! X =   -83.33018,  -32.53257,     335.000,       0.000!   !END!
377 ! X =   -83.32756,  -32.28419,     335.000,       0.000!   !END!
378 ! X =   -83.32483,  -32.03571,     335.000,       0.000!   !END!
379 ! X =    -83.3222,  -31.78723,     335.000,       0.000!   !END!
380 ! X =   -83.14354,  -38.24948,     365.000,       0.000!   !END!
381 ! X =   -83.14092,   -38.0011,     339.000,       0.000!   !END!
382 ! X =   -83.13829,  -37.75263,     365.000,       0.000!   !END!
383 ! X =   -83.13566,  -37.50416,     365.000,       0.000!   !END!
384 ! X =   -83.13303,  -37.25568,     358.000,       0.000!   !END!
385 ! X =   -83.13031,  -37.00731,     396.000,       0.000!   !END!
386 ! X =   -83.11979,  -36.01351,     328.000,       0.000!   !END!
387 ! X =   -83.11716,  -35.76503,     305.000,       0.000!   !END!
388 ! X =   -83.11453,  -35.51656,     304.000,       0.000!   !END!
389 ! X =   -83.11181,  -35.26819,     300.000,       0.000!   !END!
390 ! X =   -83.10918,  -35.01971,     304.000,       0.000!   !END!
391 ! X =   -83.10655,  -34.77123,     297.000,       0.000!   !END!
392 ! X =   -83.10392,  -34.52276,     274.000,       0.000!   !END!
393 ! X =    -83.1013,  -34.27438,     304.000,       0.000!   !END!
394 ! X =   -83.09867,   -34.0259,     304.000,       0.000!   !END!
395 ! X =   -83.09604,  -33.77742,     307.000,       0.000!   !END!
396 ! X =   -83.09332,  -33.52905,     335.000,       0.000!   !END!
397 ! X =   -83.09069,  -33.28057,     365.000,       0.000!   !END!
398 ! X =   -83.08806,  -33.03209,     365.000,       0.000!   !END!
399 ! X =   -83.08543,  -32.78371,     354.000,       0.000!   !END!
400 ! X =    -83.0828,  -32.53524,     335.000,       0.000!   !END!
401 ! X =   -83.08017,  -32.28676,     312.000,       0.000!   !END!
402 ! X =   -83.07755,  -32.03838,     335.000,       0.000!   !END!
403 ! X =   -83.07482,   -31.7899,     316.000,       0.000!   !END!
404 ! X =   -83.07219,  -31.54142,     306.000,       0.000!   !END!
405 ! X =   -83.06957,  -31.29304,     284.000,       0.000!   !END!
406 ! X =   -83.06694,  -31.04456,     297.000,       0.000!   !END!
407 ! X =   -82.89617,  -38.25215,     365.000,       0.000!   !END!
408 ! X =   -82.89354,  -38.00367,     365.000,       0.000!   !END!
409 ! X =   -82.89091,   -37.7553,     383.000,       0.000!   !END!
410 ! X =   -82.88828,  -37.50683,     390.000,       0.000!   !END!
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411 ! X =   -82.88565,  -37.25835,     386.000,        0.000!   !END!
412 ! X =   -82.88302,  -37.00988,     367.000,        0.000!   !END!
413 ! X =   -82.87241,  -36.01608,     335.000,        0.000!   !END!
414 ! X =   -82.86979,   -35.7677,     335.000,        0.000!   !END!
415 ! X =   -82.86716,  -35.51923,     316.000,        0.000!   !END!
416 ! X =   -82.86453,  -35.27075,     304.000,        0.000!   !END!
417 ! X =    -82.8619,  -35.02227,     304.000,        0.000!   !END!
418 ! X =   -82.85917,   -34.7739,     304.000,        0.000!   !END!
419 ! X =   -82.85654,  -34.52543,     277.000,        0.000!   !END!
420 ! X =   -82.85391,  -34.27695,     296.000,        0.000!   !END!
421 ! X =   -82.85129,  -34.02857,     304.000,        0.000!   !END!
422 ! X =   -82.84866,  -33.78009,     307.000,        0.000!   !END!
423 ! X =   -82.84603,  -33.53161,     328.000,        0.000!   !END!
424 ! X =   -82.84341,  -33.28324,     348.000,        0.000!   !END!
425 ! X =   -82.84068,  -33.03476,     355.000,        0.000!   !END!
426 ! X =   -82.83805,  -32.78628,     347.000,        0.000!   !END!
427 ! X =   -82.83542,   -32.5379,     335.000,        0.000!   !END!
428 ! X =   -82.83279,  -32.28943,     311.000,        0.000!   !END!
429 ! X =   -82.83016,  -32.04095,     302.000,        0.000!   !END!
430 ! X =   -82.82754,  -31.79257,     284.000,        0.000!   !END!
431 ! X =   -82.82491,  -31.54409,     277.000,        0.000!   !END!
432 ! X =   -82.82218,  -31.29561,     296.000,        0.000!   !END!
433 ! X =   -82.81956,  -31.04723,     301.000,        0.000!   !END!
434 ! X =   -82.64616,  -38.00634,     372.000,        0.000!   !END!
435 ! X =   -82.62504,  -36.01875,     335.000,        0.000!   !END!
436 ! X =   -82.62241,  -35.77027,     335.000,        0.000!   !END!
437 ! X =   -82.61978,   -35.5219,     316.000,        0.000!   !END!
438 ! X =   -82.61715,  -35.27342,     321.000,        0.000!   !END!
439 ! X =   -82.61452,  -35.02494,     331.000,        0.000!   !END!
440 ! X =   -82.61189,  -34.77647,     305.000,        0.000!   !END!
441 ! X =   -82.60917,   -34.5281,     287.000,        0.000!   !END!
442 ! X =   -82.60654,  -34.27962,     304.000,        0.000!   !END!
443 ! X =   -82.60391,  -34.03114,     305.000,        0.000!   !END!
444 ! X =   -82.60128,  -33.78276,     310.000,        0.000!   !END!
445 ! X =   -82.59865,  -33.53428,     320.000,        0.000!   !END!
446 ! X =   -82.59602,  -33.28581,     339.000,        0.000!   !END!
447 ! X =    -82.5934,  -33.03743,     340.000,        0.000!   !END!
448 ! X =   -82.59067,  -32.78895,     335.000,        0.000!   !END!
449 ! X =   -82.58804,  -32.54047,     319.000,        0.000!   !END!
450 ! X =   -82.58541,  -32.29209,     304.000,        0.000!   !END!
451 ! X =   -82.58278,  -32.04362,     304.000,        0.000!   !END!
452 ! X =   -82.58015,  -31.79514,     284.000,        0.000!   !END!
453 ! X =   -82.57753,  -31.54675,     304.000,        0.000!   !END!
454 ! X =    -82.5749,  -31.29827,     304.000,        0.000!   !END!
455 ! X =   -82.57227,  -31.04979,     304.000,        0.000!   !END!
456 ! X =   -82.37766,  -36.02142,     329.000,        0.000!   !END!
457 ! X =   -82.37503,  -35.77294,     312.000,        0.000!   !END!
458 ! X =    -82.3724,  -35.52447,     327.000,        0.000!   !END!
459 ! X =   -82.36977,  -35.27599,     335.000,        0.000!   !END!
460 ! X =   -82.36714,  -35.02761,     335.000,        0.000!   !END!
461 ! X =   -82.36451,  -34.77914,     297.000,        0.000!   !END!
462 ! X =   -82.36188,  -34.53066,     304.000,        0.000!   !END!
463 ! X =   -82.35916,  -34.28229,     304.000,        0.000!   !END!
464 ! X =   -82.35653,  -34.03381,     310.000,        0.000!   !END!
465 ! X =    -82.3539,  -33.78533,     324.000,        0.000!   !END!
466 ! X =   -82.35127,  -33.53695,     338.000,        0.000!   !END!
467 ! X =   -82.34864,  -33.28848,     339.000,        0.000!   !END!
468 ! X =   -82.34601,     -33.04,     335.000,        0.000!   !END!
469 ! X =   -82.34339,  -32.79162,     326.000,        0.000!   !END!
470 ! X =   -82.34076,  -32.54314,     309.000,        0.000!   !END!
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471 ! X =   -82.33803,  -32.29466,     301.000,       0.000!   !END!
472 ! X =    -82.3354,  -32.04628,     296.000,       0.000!   !END!
473 ! X =   -82.33277,   -31.7978,     304.000,       0.000!   !END!
474 ! X =   -82.33014,  -31.54932,     305.000,       0.000!   !END!
475 ! X =   -82.32752,  -31.30094,     304.000,       0.000!   !END!
476 ! X =   -82.32489,  -31.05246,     304.000,       0.000!   !END!
477 ! X =   -82.13038,  -36.02398,     335.000,       0.000!   !END!
478 ! X =   -82.12765,  -35.77551,     329.000,       0.000!   !END!
479 ! X =   -82.12502,  -35.52714,     335.000,       0.000!   !END!
480 ! X =   -82.12239,  -35.27866,     335.000,       0.000!   !END!
481 ! X =   -82.11976,  -35.03018,     319.000,       0.000!   !END!
482 ! X =   -82.11714,  -34.78181,     298.000,       0.000!   !END!
483 ! X =   -82.11451,  -34.53333,     304.000,       0.000!   !END!
484 ! X =   -82.11188,  -34.28485,     311.000,       0.000!   !END!
485 ! X =   -82.10925,  -34.03647,     335.000,       0.000!   !END!
486 ! X =   -82.10652,    -33.788,     339.000,       0.000!   !END!
487 ! X =   -82.10389,  -33.53952,     365.000,       0.000!   !END!
488 ! X =   -82.10126,  -33.29115,     365.000,       0.000!   !END!
489 ! X =   -82.09863,  -33.04267,     347.000,       0.000!   !END!
490 ! X =     -82.096,  -32.79419,     326.000,       0.000!   !END!
491 ! X =   -82.09338,  -32.54581,     309.000,       0.000!   !END!
492 ! X =   -82.09075,  -32.29733,     302.000,       0.000!   !END!
493 ! X =   -82.08812,  -32.04885,     309.000,       0.000!   !END!
494 ! X =   -82.08539,  -31.80047,     335.000,       0.000!   !END!
495 ! X =   -82.08276,  -31.55199,     322.000,       0.000!   !END!
496 ! X =   -82.08013,  -31.30351,     305.000,       0.000!   !END!
497 ! X =   -82.07751,  -31.05513,     304.000,       0.000!   !END!
498 ! X =     -81.883,  -36.02665,     345.000,       0.000!   !END!
499 ! X =   -81.88037,  -35.77818,     340.000,       0.000!   !END!
500 ! X =   -81.87764,  -35.52971,     335.000,       0.000!   !END!
501 ! X =   -81.87501,  -35.28133,     335.000,       0.000!   !END!
502 ! X =   -81.87238,  -35.03285,     304.000,       0.000!   !END!
503 ! X =   -81.86975,  -34.78438,     304.000,       0.000!   !END!
504 ! X =   -81.86713,    -34.536,     304.000,       0.000!   !END!
505 ! X =    -81.8645,  -34.28752,     310.000,       0.000!   !END!
506 ! X =   -81.86187,  -34.03905,     335.000,       0.000!   !END!
507 ! X =   -81.85924,  -33.79067,     343.000,       0.000!   !END!
508 ! X =   -81.85651,  -33.54219,     365.000,       0.000!   !END!
509 ! X =   -81.85388,  -33.29372,     365.000,       0.000!   !END!
510 ! X =   -81.85125,  -33.04524,     350.000,       0.000!   !END!
511 ! X =   -81.84862,  -32.79686,     319.000,       0.000!   !END!
512 ! X =   -81.84599,  -32.54838,     304.000,       0.000!   !END!
513 ! X =   -81.84337,      -32.3,     328.000,       0.000!   !END!
514 ! X =   -81.84074,  -32.05152,     335.000,       0.000!   !END!
515 ! X =   -81.83811,  -31.80304,     335.000,       0.000!   !END!
516 ! X =   -81.83538,  -31.55467,     330.000,       0.000!   !END!
517 ! X =   -81.83275,  -31.30618,     300.000,       0.000!   !END!
518 ! X =   -81.83012,   -31.0577,     275.000,       0.000!   !END!
519 ! X =   -81.64614,  -37.02303,     376.000,       0.000!   !END!
520 ! X =   -81.64088,  -36.52618,     365.000,       0.000!   !END!
521 ! X =   -81.63825,   -36.2777,     365.000,       0.000!   !END!
522 ! X =   -81.63562,  -36.02923,     365.000,       0.000!   !END!
523 ! X =   -81.63299,  -35.78085,     361.000,       0.000!   !END!
524 ! X =   -81.63036,  -35.53237,     337.000,       0.000!   !END!
525 ! X =   -81.62763,   -35.2839,     306.000,       0.000!   !END!
526 ! X =   -81.62501,  -35.03552,     318.000,       0.000!   !END!
527 ! X =   -81.62238,  -34.78705,     335.000,       0.000!   !END!
528 ! X =   -81.61975,  -34.53857,     309.000,       0.000!   !END!
529 ! X =   -81.61711,  -34.29009,     305.000,       0.000!   !END!
530 ! X =   -81.61449,  -34.04172,     312.000,       0.000!   !END!
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531 ! X =   -81.61186,  -33.79324,     338.000,        0.000!   !END!
532 ! X =   -81.60923,  -33.54476,     365.000,        0.000!   !END!
533 ! X =    -81.6066,  -33.29638,     365.000,        0.000!   !END!
534 ! X =   -81.60387,  -33.04791,     350.000,        0.000!   !END!
535 ! X =   -81.60124,  -32.79943,     335.000,        0.000!   !END!
536 ! X =   -81.59861,  -32.55105,     349.000,        0.000!   !END!
537 ! X =   -81.59598,  -32.30257,     365.000,        0.000!   !END!
538 ! X =   -81.59335,  -32.05409,     351.000,        0.000!   !END!
539 ! X =   -81.59073,  -31.80571,     335.000,        0.000!   !END!
540 ! X =    -81.5881,  -31.55723,     319.000,        0.000!   !END!
541 ! X =   -81.58547,  -31.30885,     302.000,        0.000!   !END!
542 ! X =   -81.58274,  -31.06037,     284.000,        0.000!   !END!
543 ! X =   -81.58011,  -30.81189,     274.000,        0.000!   !END!
544 ! X =   -81.39876,   -37.0257,     391.000,        0.000!   !END!
545 ! X =   -81.39613,  -36.77722,     382.000,        0.000!   !END!
546 ! X =   -81.39351,  -36.52885,     366.000,        0.000!   !END!
547 ! X =   -81.39087,  -36.28037,     365.000,        0.000!   !END!
548 ! X =   -81.38824,   -36.0319,     365.000,        0.000!   !END!
549 ! X =   -81.38561,  -35.78342,     359.000,        0.000!   !END!
550 ! X =   -81.38299,  -35.53504,     323.000,        0.000!   !END!
551 ! X =   -81.38036,  -35.28657,     327.000,        0.000!   !END!
552 ! X =   -81.37772,  -35.03809,     335.000,        0.000!   !END!
553 ! X =   -81.37499,  -34.78962,     335.000,        0.000!   !END!
554 ! X =   -81.37237,  -34.54124,     331.000,        0.000!   !END!
555 ! X =   -81.36974,  -34.29276,     320.000,        0.000!   !END!
556 ! X =   -81.36711,  -34.04429,     335.000,        0.000!   !END!
557 ! X =   -81.36448,  -33.79591,     335.000,        0.000!   !END!
558 ! X =   -81.36185,  -33.54743,     341.000,        0.000!   !END!
559 ! X =   -81.35922,  -33.29895,     349.000,        0.000!   !END!
560 ! X =   -81.35659,  -33.05057,     350.000,        0.000!   !END!
561 ! X =   -81.35396,  -32.80209,     365.000,        0.000!   !END!
562 ! X =   -81.35123,  -32.55362,     365.000,        0.000!   !END!
563 ! X =    -81.3486,  -32.30524,     365.000,        0.000!   !END!
564 ! X =   -81.34597,  -32.05676,     352.000,        0.000!   !END!
565 ! X =   -81.34334,  -31.80828,     335.000,        0.000!   !END!
566 ! X =   -81.34072,   -31.5599,     315.000,        0.000!   !END!
567 ! X =   -81.33808,  -31.31142,     305.000,        0.000!   !END!
568 ! X =   -81.33546,  -31.06304,     301.000,        0.000!   !END!
569 ! X =   -81.33283,  -30.81456,     275.000,        0.000!   !END!
570 ! X =   -81.14876,  -36.77989,     396.000,        0.000!   !END!
571 ! X =   -81.14612,  -36.53142,     382.000,        0.000!   !END!
572 ! X =   -81.14349,  -36.28294,     355.000,        0.000!   !END!
573 ! X =   -81.14087,  -36.03457,     340.000,        0.000!   !END!
574 ! X =   -81.13824,  -35.78609,     327.000,        0.000!   !END!
575 ! X =    -81.1356,  -35.53761,     342.000,        0.000!   !END!
576 ! X =   -81.13298,  -35.28924,     349.000,        0.000!   !END!
577 ! X =   -81.13035,  -35.04076,     350.000,        0.000!   !END!
578 ! X =   -81.12772,  -34.79228,     365.000,        0.000!   !END!
579 ! X =   -81.12498,  -34.54381,     351.000,        0.000!   !END!
580 ! X =   -81.12236,  -34.29544,     335.000,        0.000!   !END!
581 ! X =   -81.11973,  -34.04696,     340.000,        0.000!   !END!
582 ! X =    -81.1171,  -33.79848,     348.000,        0.000!   !END!
583 ! X =   -81.11447,   -33.5501,     356.000,        0.000!   !END!
584 ! X =   -81.11184,  -33.30162,     365.000,        0.000!   !END!
585 ! X =   -81.10921,  -33.05314,     365.000,        0.000!   !END!
586 ! X =   -81.10658,  -32.80477,     365.000,        0.000!   !END!
587 ! X =   -81.10395,  -32.55629,     365.000,        0.000!   !END!
588 ! X =   -81.10122,  -32.30781,     361.000,        0.000!   !END!
589 ! X =   -81.09859,  -32.05943,     332.000,        0.000!   !END!
590 ! X =   -81.09596,  -31.81095,     320.000,        0.000!   !END!
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591 ! X =   -81.09333,  -31.56247,     305.000,       0.000!   !END!
592 ! X =    -81.0907,  -31.31409,     304.000,       0.000!   !END!
593 ! X =   -81.08807,  -31.06561,     299.000,       0.000!   !END!
594 ! X =   -81.08545,  -30.81723,     277.000,       0.000!   !END!
595 ! X =   -80.89875,  -36.53409,     391.000,       0.000!   !END!
596 ! X =   -80.89612,  -36.28561,     356.000,       0.000!   !END!
597 ! X =   -80.89349,  -36.03714,     335.000,       0.000!   !END!
598 ! X =   -80.89086,  -35.78876,     311.000,       0.000!   !END!
599 ! X =   -80.88823,  -35.54029,     342.000,       0.000!   !END!
600 ! X =    -80.8856,  -35.29181,     380.000,       0.000!   !END!
601 ! X =   -80.88296,  -35.04333,     389.000,       0.000!   !END!
602 ! X =   -80.88034,  -34.79496,     396.000,       0.000!   !END!
603 ! X =   -80.87771,  -34.54648,     369.000,       0.000!   !END!
604 ! X =   -80.87507,    -34.298,     341.000,       0.000!   !END!
605 ! X =   -80.87235,  -34.04963,     359.000,       0.000!   !END!
606 ! X =   -80.86972,  -33.80115,     365.000,       0.000!   !END!
607 ! X =   -80.86709,  -33.55267,     365.000,       0.000!   !END!
608 ! X =   -80.86446,  -33.30429,     365.000,       0.000!   !END!
609 ! X =   -80.86183,  -33.05582,     365.000,       0.000!   !END!
610 ! X =    -80.8592,  -32.80734,     365.000,       0.000!   !END!
611 ! X =   -80.85657,  -32.55896,     365.000,       0.000!   !END!
612 ! X =   -80.85394,  -32.31048,     342.000,       0.000!   !END!
613 ! X =   -80.85131,    -32.062,     325.000,       0.000!   !END!
614 ! X =   -80.84858,  -31.81362,     309.000,       0.000!   !END!
615 ! X =   -80.84595,  -31.56514,     304.000,       0.000!   !END!
616 ! X =   -80.84332,  -31.31666,     297.000,       0.000!   !END!
617 ! X =   -80.84069,  -31.06828,     282.000,       0.000!   !END!
618 ! X =   -80.83806,   -30.8198,     274.000,       0.000!   !END!
619 ! X =   -80.65147,  -36.53666,     391.000,       0.000!   !END!
620 ! X =   -80.64884,  -36.28828,     350.000,       0.000!   !END!
621 ! X =   -80.64611,  -36.03981,     337.000,       0.000!   !END!
622 ! X =   -80.64348,  -35.79133,     313.000,       0.000!   !END!
623 ! X =   -80.64085,  -35.54286,     335.000,       0.000!   !END!
624 ! X =   -80.63822,  -35.29448,     396.000,       0.000!   !END!
625 ! X =   -80.63559,    -35.046,     396.000,       0.000!   !END!
626 ! X =   -80.63296,  -34.79753,     396.000,       0.000!   !END!
627 ! X =   -80.63033,  -34.54915,     386.000,       0.000!   !END!
628 ! X =    -80.6277,  -34.30067,     360.000,       0.000!   !END!
629 ! X =   -80.62507,   -34.0522,     365.000,       0.000!   !END!
630 ! X =   -80.62244,  -33.80382,     365.000,       0.000!   !END!
631 ! X =   -80.61971,  -33.55534,     365.000,       0.000!   !END!
632 ! X =   -80.61708,  -33.30687,     365.000,       0.000!   !END!
633 ! X =   -80.61445,  -33.05849,     351.000,       0.000!   !END!
634 ! X =   -80.61182,  -32.81001,     350.000,       0.000!   !END!
635 ! X =   -80.60918,  -32.56153,     335.000,       0.000!   !END!
636 ! X =   -80.60656,  -32.31315,     322.000,       0.000!   !END!
637 ! X =   -80.60393,  -32.06467,     310.000,       0.000!   !END!
638 ! X =   -80.60129,  -31.81619,     305.000,       0.000!   !END!
639 ! X =   -80.59867,  -31.56781,     291.000,       0.000!   !END!
640 ! X =   -80.59604,  -31.31933,     276.000,       0.000!   !END!
641 ! X =    -80.5933,  -31.07085,     274.000,       0.000!   !END!
642 ! X =   -80.59068,  -30.82247,     274.000,       0.000!   !END!
643 ! X =   -80.58805,  -30.57399,     268.000,       0.000!   !END!
644 ! X =   -80.40409,  -36.53933,     380.000,       0.000!   !END!
645 ! X =   -80.40146,  -36.29085,     396.000,       0.000!   !END!
646 ! X =   -80.39883,  -36.04238,     370.000,       0.000!   !END!
647 ! X =    -80.3961,  -35.79401,     332.000,       0.000!   !END!
648 ! X =   -80.39347,  -35.54553,     356.000,       0.000!   !END!
649 ! X =   -80.39084,  -35.29705,     372.000,       0.000!   !END!
650 ! X =   -80.38821,  -35.04868,     396.000,       0.000!   !END!
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651	! X =	-80.38558,	-34.8002,	396.000,	0.000!	!END!
652	! X =	-80.38295,	-34.55172,	384.000,	0.000!	!END!
653	! X =	-80.38032,	-34.30334,	365.000,	0.000!	!END!
654	! X =	-80.37769,	-34.05487,	365.000,	0.000!	!END!
655	! X =	-80.37505,	-33.80639,	365.000,	0.000!	!END!
656	! X =	-80.37242,	-33.55791,	355.000,	0.000!	!END!
657	! X =	-80.3698,	-33.30953,	333.000,	0.000!	!END!
658	! X =	-80.36706,	-33.06106,	327.000,	0.000!	!END!
659	! X =	-80.36443,	-32.81258,	335.000,	0.000!	!END!
660	! X =	-80.36181,	-32.5642,	313.000,	0.000!	!END!
661	! X =	-80.35917,	-32.31572,	304.000,	0.000!	!END!
662	! X =	-80.35655,	-32.06734,	304.000,	0.000!	!END!
663	! X =	-80.35391,	-31.81886,	304.000,	0.000!	!END!
664	! X =	-80.35128,	-31.57038,	284.000,	0.000!	!END!
665	! X =	-80.34866,	-31.322,	274.000,	0.000!	!END!
666	! X =	-80.34602,	-31.07352,	274.000,	0.000!	!END!
667	! X =	-80.34339,	-30.82504,	267.000,	0.000!	!END!
668	! X =	-80.15145,	-36.04505,	372.000,	0.000!	!END!
669	! X =	-80.14882,	-35.79657,	335.000,	0.000!	!END!
670	! X =	-80.14619,	-35.5482,	365.000,	0.000!	!END!
671	! X =	-80.14346,	-35.29972,	396.000,	0.000!	!END!
672	! X =	-80.14083,	-35.05125,	396.000,	0.000!	!END!
673	! X =	-80.1382,	-34.80287,	396.000,	0.000!	!END!
674	! X =	-80.13557,	-34.55439,	373.000,	0.000!	!END!
675	! X =	-80.13294,	-34.30592,	366.000,	0.000!	!END!
676	! X =	-80.1303,	-34.05744,	365.000,	0.000!	!END!
677	! X =	-80.12768,	-33.80906,	365.000,	0.000!	!END!
678	! X =	-80.12504,	-33.56058,	341.000,	0.000!	!END!
679	! X =	-80.12241,	-33.3121,	335.000,	0.000!	!END!
680	! X =	-80.11978,	-33.06373,	307.000,	0.000!	!END!
681	! X =	-80.11715,	-32.81525,	309.000,	0.000!	!END!
682	! X =	-80.11442,	-32.56677,	305.000,	0.000!	!END!
683	! X =	-80.11179,	-32.31839,	300.000,	0.000!	!END!
684	! X =	-80.10916,	-32.06991,	280.000,	0.000!	!END!
685	! X =	-80.10653,	-31.82143,	292.000,	0.000!	!END!
686	! X =	-80.1039,	-31.57305,	294.000,	0.000!	!END!
687	! X =	-80.10127,	-31.32457,	291.000,	0.000!	!END!
688	! X =	-80.09864,	-31.07619,	281.000,	0.000!	!END!
689	! X =	-79.90408,	-36.04772,	366.000,	0.000!	!END!
690	! X =	-79.90144,	-35.79924,	344.000,	0.000!	!END!
691	! X =	-79.89881,	-35.55077,	365.000,	0.000!	!END!
692	! X =	-79.89618,	-35.30239,	396.000,	0.000!	!END!
693	! X =	-79.89355,	-35.05391,	396.000,	0.000!	!END!
694	! X =	-79.89082,	-34.80544,	396.000,	0.000!	!END!
695	! X =	-79.88819,	-34.55697,	391.000,	0.000!	!END!
696	! X =	-79.88556,	-34.30859,	372.000,	0.000!	!END!
697	! X =	-79.88293,	-34.06011,	365.000,	0.000!	!END!
698	! X =	-79.88029,	-33.81163,	360.000,	0.000!	!END!
699	! X =	-79.87767,	-33.56325,	332.000,	0.000!	!END!
700	! X =	-79.87503,	-33.31478,	320.000,	0.000!	!END!
701	! X =	-79.8724,	-33.0663,	335.000,	0.000!	!END!
702	! X =	-79.86977,	-32.81792,	335.000,	0.000!	!END!
703	! X =	-79.86714,	-32.56944,	311.000,	0.000!	!END!
704	! X =	-79.86451,	-32.32096,	302.000,	0.000!	!END!
705	! X =	-79.86178,	-32.07259,	297.000,	0.000!	!END!
706	! X =	-79.85915,	-31.82411,	304.000,	0.000!	!END!
707	! X =	-79.85652,	-31.57563,	304.000,	0.000!	!END!
708	! X =	-79.85389,	-31.32725,	304.000,	0.000!	!END!
709	! X =	-79.85126,	-31.07877,	304.000,	0.000!	!END!
710	! X =	-79.65669,	-36.05029,	390.000,	0.000!	!END!

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711 ! X =   -79.65407,  -35.80192,     379.000,        0.000!   !END!
712 ! X =   -79.65143,  -35.55344,     353.000,        0.000!   !END!
713 ! X =    -79.6488,  -35.30496,     386.000,        0.000!   !END!
714 ! X =   -79.64617,  -35.05649,     402.000,        0.000!   !END!
715 ! X =   -79.64354,  -34.80811,     397.000,        0.000!   !END!
716 ! X =   -79.64091,  -34.55963,     396.000,        0.000!   !END!
717 ! X =   -79.63817,  -34.31116,     384.000,        0.000!   !END!
718 ! X =   -79.63555,  -34.06278,     356.000,        0.000!   !END!
719 ! X =   -79.63291,  -33.81431,     355.000,        0.000!   !END!
720 ! X =   -79.63028,  -33.56583,     363.000,        0.000!   !END!
721 ! X =   -79.62765,  -33.31745,     365.000,        0.000!   !END!
722 ! X =   -79.62502,  -33.06897,     357.000,        0.000!   !END!
723 ! X =   -79.62239,  -32.82049,     335.000,        0.000!   !END!
724 ! X =   -79.61976,  -32.57211,     318.000,        0.000!   !END!
725 ! X =   -79.61713,  -32.32363,     304.000,        0.000!   !END!
726 ! X =    -79.6145,  -32.07515,     304.000,        0.000!   !END!
727 ! X =   -79.61187,  -31.82677,     304.000,        0.000!   !END!
728 ! X =   -79.60923,  -31.57829,     304.000,        0.000!   !END!
729 ! X =    -79.6065,  -31.32982,     304.000,        0.000!   !END!
730 ! X =   -79.60387,  -31.08144,     304.000,        0.000!   !END!
731 ! X =   -79.39879,  -35.05916,     402.000,        0.000!   !END!
732 ! X =   -79.39616,  -34.81068,     396.000,        0.000!   !END!
733 ! X =   -79.39353,  -34.56231,     396.000,        0.000!   !END!
734 ! X =    -79.3909,  -34.31383,     386.000,        0.000!   !END!
735 ! X =   -79.38826,  -34.06535,     357.000,        0.000!   !END!
736 ! X =   -79.38554,  -33.81698,     381.000,        0.000!   !END!
737 ! X =    -79.3829,   -33.5685,     370.000,        0.000!   !END!
738 ! X =   -79.38027,  -33.32002,     365.000,        0.000!   !END!
739 ! X =   -79.37764,  -33.07164,     354.000,        0.000!   !END!
740 ! X =   -79.37501,  -32.82316,     320.000,        0.000!   !END!
741 ! X =   -79.37238,  -32.57469,     306.000,        0.000!   !END!
742 ! X =   -79.36975,  -32.32631,     304.000,        0.000!   !END!
743 ! X =   -79.36712,  -32.07783,     306.000,        0.000!   !END!
744 ! X =   -79.36448,  -31.82935,     305.000,        0.000!   !END!
745 ! X =   -79.36185,  -31.58097,     304.000,        0.000!   !END!
746 ! X =   -79.35922,  -31.33249,     304.000,        0.000!   !END!
747 ! X =   -79.35659,  -31.08401,     304.000,        0.000!   !END!
748 ! X =   -79.15141,  -35.06183,     396.000,        0.000!   !END!
749 ! X =   -79.14878,  -34.81336,     396.000,        0.000!   !END!
750 ! X =   -79.14615,  -34.56488,     396.000,        0.000!   !END!
751 ! X =   -79.14351,   -34.3164,     372.000,        0.000!   !END!
752 ! X =   -79.14089,  -34.06802,     355.000,        0.000!   !END!
753 ! X =   -79.13825,  -33.81955,     389.000,        0.000!   !END!
754 ! X =   -79.13562,  -33.57107,     389.000,        0.000!   !END!
755 ! X =   -79.13299,  -33.32269,     347.000,        0.000!   !END!
756 ! X =   -79.13026,  -33.07422,     340.000,        0.000!   !END!
757 ! X =   -79.12762,  -32.82574,     331.000,        0.000!   !END!
758 ! X =     -79.125,  -32.57736,     308.000,        0.000!   !END!
759 ! X =   -79.12236,  -32.32888,     320.000,        0.000!   !END!
760 ! X =   -79.11973,   -32.0804,     335.000,        0.000!   !END!
761 ! X =    -79.1171,  -31.83202,     316.000,        0.000!   !END!
762 ! X =   -79.11447,  -31.58354,     304.000,        0.000!   !END!
763 ! X =   -78.89614,  -34.31907,     372.000,        0.000!   !END!
764 ! X =    -78.8935,   -34.0706,     396.000,        0.000!   !END!
765 ! X =   -78.89087,  -33.82222,     372.000,        0.000!   !END!
766 ! X =   -78.88824,  -33.57374,     365.000,        0.000!   !END!
767 ! X =   -78.88561,  -33.32526,     365.000,        0.000!   !END!
768 ! X =   -78.88298,  -33.07688,     365.000,        0.000!   !END!
769 ! X =   -78.88034,  -32.82841,     338.000,        0.000!   !END!
770 ! X =   -78.87771,  -32.57993,     314.000,        0.000!   !END!
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771 ! X =   -78.87498,  -32.33155,     321.000,       0.000!   !END!
772 ! X =   -78.87235,  -32.08307,     335.000,       0.000!   !END!
773 ! X =   -78.86972,  -31.83459,     335.000,       0.000!   !END!
774 ! X =   -78.86709,  -31.58621,     292.000,       0.000!   !END!
775 ! X =   -78.64612,  -34.07327,     396.000,       0.000!   !END!
776 ! X =   -78.64349,  -33.82479,     386.000,       0.000!   !END!
777 ! X =   -78.64086,  -33.57641,     365.000,       0.000!   !END!
778 ! X =   -78.63823,  -33.32794,     365.000,       0.000!   !END!
779 ! X =   -78.63559,  -33.07946,     365.000,       0.000!   !END!
780 ! X =   -78.63297,  -32.83108,     338.000,       0.000!   !END!
781 ! X =   -78.63033,   -32.5826,     310.000,       0.000!   !END!
782 ! X =    -78.6277,  -32.33412,     312.000,       0.000!   !END!
783 ! X =   -78.62507,  -32.08574,     318.000,       0.000!   !END!
784 ! X =   -78.62244,  -31.83726,     307.000,       0.000!   !END!
785 ! X =    -78.6197,  -31.58879,     275.000,       0.000!   !END!
786 ! X =   -78.39348,  -33.57899,     365.000,       0.000!   !END!
787 ! X =   -78.39084,  -33.33051,     343.000,       0.000!   !END!
788 ! X =   -78.38822,  -33.08213,     341.000,       0.000!   !END!
789 ! X =   -78.38032,  -32.33679,     274.000,       0.000!   !END!
790 ! X =   -86.22193,  -33.67464,     274.000,       0.000!   !END!
791 ! X =   -86.01912,  -33.67677,     274.000,       0.000!   !END!
792 ! X =   -85.81621,  -33.67889,     274.000,       0.000!   !END!
793 ! X =   -85.81343,  -33.87778,     265.000,       0.000!   !END!
794 ! X =   -85.81054,  -34.07658,     244.000,       0.000!   !END!
795 ! X =    -85.8177,  -34.28021,     276.000,       0.000!   !END!
796 ! X =   -85.82486,  -34.48395,     295.000,       0.000!   !END!
797 ! X =   -85.82703,  -34.68765,     308.000,       0.000!   !END!
798 ! X =    -85.8291,  -34.89136,     322.000,       0.000!   !END!
799 ! X =   -86.02945,  -34.88628,     302.000,       0.000!   !END!
800 ! X =   -86.22986,   -34.8821,     284.000,       0.000!   !END!
801 ! X =   -86.43017,  -34.87802,     276.000,       0.000!   !END!
802 ! X =   -86.63052,  -34.87284,     274.000,       0.000!   !END!
803 ! X =   -86.82338,  -34.86587,     274.000,       0.000!   !END!
804 ! X =   -87.01625,  -34.85881,     274.000,       0.000!   !END!
805 ! X =   -87.02109,  -35.08043,     259.000,       0.000!   !END!
806 ! X =   -87.02589,  -35.30105,     274.000,       0.000!   !END!
807 ! X =   -87.03073,  -35.52257,     274.000,       0.000!   !END!
808 ! X =   -87.03562,  -35.74318,     274.000,       0.000!   !END!
809 ! X =   -87.04223,  -35.90215,     271.000,       0.000!   !END!
810 ! X =   -87.04883,  -36.06112,     256.000,       0.000!   !END!
811 ! X =   -87.06109,  -36.27963,     274.000,       0.000!   !END!
812 ! X =   -86.87438,  -36.40089,     274.000,       0.000!   !END!
813 ! X =   -86.66745,  -36.48265,     274.000,       0.000!   !END!
814 ! X =    -86.4696,  -36.48969,     274.000,       0.000!   !END!
815 ! X =   -86.27175,  -36.49673,     271.000,       0.000!   !END!
816 ! X =   -86.27634,  -36.69551,     251.000,       0.000!   !END!
817 ! X =   -86.28093,   -36.8942,     259.000,       0.000!   !END!
818 ! X =   -86.28553,  -37.09298,     272.000,       0.000!   !END!
819 ! X =   -86.29012,  -37.29166,     271.000,       0.000!   !END!
820 ! X =   -86.47807,  -37.28966,     243.000,       0.000!   !END!
821 ! X =   -86.51003,  -37.49812,     274.000,       0.000!   !END!
822 ! X =   -86.55157,   -37.6865,     274.000,       0.000!   !END!
823 ! X =   -86.33398,  -37.69571,     295.000,       0.000!   !END!
824 ! X =   -86.11635,  -37.70403,     304.000,       0.000!   !END!
825 ! X =   -85.89877,  -37.71335,     304.000,       0.000!   !END!
826 ! X =   -85.69846,  -37.71743,     304.000,       0.000!   !END!
827 ! X =   -85.49811,  -37.72251,     304.000,       0.000!   !END!
828 ! X =   -85.29776,  -37.72769,     304.000,       0.000!   !END!
829 ! X =   -85.09736,  -37.73178,     304.000,       0.000!   !END!
830 ! X =   -85.10451,  -37.93541,     294.000,       0.000!   !END!
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831 ! X =   -85.11168,  -38.13914,      280.000,        0.000!   !END!
832 ! X =   -85.11243,  -38.21861,      284.000,        0.000!   !END!
833 ! X =    -85.0037,  -38.22975,      298.000,        0.000!   !END!
834 ! X =   -84.83549,  -38.23148,      308.000,        0.000!   !END!
835 ! X =   -84.69714,  -38.24294,      322.000,        0.000!   !END!
836 ! X =   -84.53895,  -38.25459,      335.000,        0.000!   !END!
837 ! X =    -84.4098,  -38.20619,      335.000,        0.000!   !END!
838 ! X =   -84.29105,  -38.20751,      335.000,        0.000!   !END!
839 ! X =   -84.24145,  -38.19805,      335.000,        0.000!   !END!
840 ! X =   -84.14239,  -38.18921,      335.000,        0.000!   !END!
841 ! X =   -84.07324,  -38.19988,      335.000,        0.000!   !END!
842 ! X =   -84.01444,  -38.25019,      335.000,        0.000!   !END!
843 ! X =   -83.95549,  -38.29053,      335.000,        0.000!   !END!
844 ! X =   -83.86721,  -38.37098,      344.000,        0.000!   !END!
845 ! X =   -83.76868,  -38.41179,      362.000,        0.000!   !END!
846 ! X =   -83.68952,  -38.41263,      365.000,        0.000!   !END!
847 ! X =   -83.57019,  -38.35432,      365.000,        0.000!   !END!
848 ! X =   -83.46079,  -38.30574,      365.000,        0.000!   !END!
849 ! X =   -83.39144,  -38.29656,      365.000,        0.000!   !END!
850 ! X =   -83.24308,   -38.2982,      365.000,        0.000!   !END!
851 ! X =   -83.10497,  -38.33938,      365.000,        0.000!   !END!
852 ! X =   -83.02666,  -38.41969,      365.000,        0.000!   !END!
853 ! X =    -82.9577,  -38.45031,      365.000,        0.000!   !END!
854 ! X =   -82.84795,  -38.37191,      365.000,        0.000!   !END!
855 ! X =   -82.75748,   -38.2337,      365.000,        0.000!   !END!
856 ! X =   -82.72691,  -38.15456,      366.000,        0.000!   !END!
857 ! X =   -82.62714,  -38.07612,      372.000,        0.000!   !END!
858 ! X =   -82.54725,  -38.00737,      372.000,        0.000!   !END!
859 ! X =   -82.48659,  -37.88878,      385.000,        0.000!   !END!
860 ! X =   -82.45611,  -37.80953,      386.000,        0.000!   !END!
861 ! X =   -82.69347,  -37.79714,      396.000,        0.000!   !END!
862 ! X =   -82.68881,  -37.59536,      396.000,        0.000!   !END!
863 ! X =   -82.68421,  -37.39469,      396.000,        0.000!   !END!
864 ! X =    -82.6796,  -37.19391,      396.000,        0.000!   !END!
865 ! X =   -82.67494,  -36.99224,      370.000,        0.000!   !END!
866 ! X =   -82.87529,  -36.98516,      367.000,        0.000!   !END!
867 ! X =   -83.07563,  -36.97808,      396.000,        0.000!   !END!
868 ! X =   -83.27597,   -36.9709,      396.000,        0.000!   !END!
869 ! X =   -83.47621,  -36.96383,      396.000,        0.000!   !END!
870 ! X =   -83.47164,  -36.76016,      377.000,        0.000!   !END!
871 ! X =   -83.46697,  -36.55639,      366.000,        0.000!   !END!
872 ! X =   -83.46231,  -36.35272,      337.000,        0.000!   !END!
873 ! X =   -83.45764,  -36.14905,      335.000,        0.000!   !END!
874 ! X =    -83.2288,  -36.16039,      333.000,        0.000!   !END!
875 ! X =   -82.99981,  -36.17083,      343.000,        0.000!   !END!
876 ! X =   -82.77096,  -36.18216,      350.000,        0.000!   !END!
877 ! X =   -82.54207,   -36.1926,      337.000,        0.000!   !END!
878 ! X =   -82.31323,  -36.20393,      344.000,        0.000!   !END!
879 ! X =   -82.08423,  -36.21437,      343.000,        0.000!   !END!
880 ! X =   -81.85539,  -36.22571,      335.000,        0.000!   !END!
881 ! X =   -81.85756,  -36.42941,      344.000,        0.000!   !END!
882 ! X =   -81.85974,  -36.63321,      356.000,        0.000!   !END!
883 ! X =   -81.66688,  -36.64018,      361.000,        0.000!   !END!
884 ! X =   -81.47392,  -36.64726,      365.000,        0.000!   !END!
885 ! X =   -81.47597,     -36.836,      376.000,        0.000!   !END!
886 ! X =    -81.6738,  -36.83395,      350.000,        0.000!   !END!
887 ! X =   -81.87171,  -36.83179,      365.000,        0.000!   !END!
888 ! X =   -81.87382,  -37.03061,      364.000,        0.000!   !END!
889 ! X =   -81.68254,   -37.0356,      375.000,        0.000!   !END!
890 ! X =   -81.49132,  -37.04158,      391.000,        0.000!   !END!
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891 ! X =	-81.30004,	-37.04667,	393.000,	0.000!	!END!
892 ! X =	-81.18987,	-36.91861,	396.000,	0.000!	!END!
893 ! X =	-81.09014,	-36.85005,	396.000,	0.000!	!END!
894 ! X =	-80.99104,	-36.83123,	396.000,	0.000!	!END!
895 ! X =	-80.93076,	-36.75242,	396.000,	0.000!	!END!
896 ! X =	-80.89045,	-36.6832,	396.000,	0.000!	!END!
897 ! X =	-80.75177,	-36.66485,	395.000,	0.000!	!END!
898 ! X =	-80.67245,	-36.65573,	395.000,	0.000!	!END!
899 ! X =	-80.45985,	-36.66298,	395.000,	0.000!	!END!
900 ! X =	-80.26688,	-36.66995,	396.000,	0.000!	!END!
901 ! X =	-80.26471,	-36.46625,	396.000,	0.000!	!END!
902 ! X =	-80.26263,	-36.26254,	396.000,	0.000!	!END!
903 ! X =	-80.08943,	-36.26434,	396.000,	0.000!	!END!
904 ! X =	-79.91624,	-36.26624,	395.000,	0.000!	!END!
905 ! X =	-79.72337,	-36.27321,	395.000,	0.000!	!END!
906 ! X =	-79.53051,	-36.28028,	395.000,	0.000!	!END!
907 ! X =	-79.46121,	-36.28098,	395.000,	0.000!	!END!
908 ! X =	-79.45273,	-36.04051,	396.000,	0.000!	!END!
909 ! X =	-79.44426,	-35.80014,	396.000,	0.000!	!END!
910 ! X =	-79.43578,	-35.55966,	365.000,	0.000!	!END!
911 ! X =	-79.4273,	-35.31929,	389.000,	0.000!	!END!
912 ! X =	-79.41882,	-35.07881,	402.000,	0.000!	!END!
913 ! X =	-79.21591,	-35.08095,	396.000,	0.000!	!END!
914 ! X =	-79.01311,	-35.08318,	396.000,	0.000!	!END!
915 ! X =	-79.01598,	-34.88428,	396.000,	0.000!	!END!
916 ! X =	-79.01876,	-34.68549,	396.000,	0.000!	!END!
917 ! X =	-79.16225,	-34.68402,	396.000,	0.000!	!END!
918 ! X =	-79.30573,	-34.68245,	396.000,	0.000!	!END!
919 ! X =	-79.31474,	-34.60284,	396.000,	0.000!	!END!
920 ! X =	-79.14653,	-34.60467,	396.000,	0.000!	!END!
921 ! X =	-79.09756,	-34.64496,	396.000,	0.000!	!END!
922 ! X =	-78.95791,	-34.54705,	390.000,	0.000!	!END!
923 ! X =	-78.83757,	-34.3992,	372.000,	0.000!	!END!
924 ! X =	-78.78706,	-34.30041,	380.000,	0.000!	!END!
925 ! X =	-78.73636,	-34.18166,	396.000,	0.000!	!END!
926 ! X =	-78.60668,	-34.08361,	396.000,	0.000!	!END!
927 ! X =	-78.47701,	-33.98566,	396.000,	0.000!	!END!
928 ! X =	-78.43584,	-33.83696,	370.000,	0.000!	!END!
929 ! X =	-78.34613,	-33.77832,	365.000,	0.000!	!END!
930 ! X =	-78.18779,	-33.78001,	365.000,	0.000!	!END!
931 ! X =	-78.18197,	-33.54448,	365.000,	0.000!	!END!
932 ! X =	-78.17621,	-33.30994,	330.000,	0.000!	!END!
933 ! X =	-78.1704,	-33.07451,	331.000,	0.000!	!END!
934 ! X =	-78.32867,	-33.06783,	337.000,	0.000!	!END!
935 ! X =	-78.48693,	-33.06116,	348.000,	0.000!	!END!
936 ! X =	-78.57598,	-33.06027,	359.000,	0.000!	!END!
937 ! X =	-78.57073,	-32.8715,	342.000,	0.000!	!END!
938 ! X =	-78.56537,	-32.68263,	321.000,	0.000!	!END!
939 ! X =	-78.56012,	-32.49386,	305.000,	0.000!	!END!
940 ! X =	-78.48043,	-32.44505,	292.000,	0.000!	!END!
941 ! X =	-78.3207,	-32.31751,	273.000,	0.000!	!END!
942 ! X =	-78.47904,	-32.31582,	286.000,	0.000!	!END!
943 ! X =	-78.55821,	-32.31498,	305.000,	0.000!	!END!
944 ! X =	-78.55078,	-32.08652,	297.000,	0.000!	!END!
945 ! X =	-78.54345,	-31.85795,	286.000,	0.000!	!END!
946 ! X =	-78.47416,	-31.85875,	272.000,	0.000!	!END!
947 ! X =	-78.46256,	-31.69985,	271.000,	0.000!	!END!
948 ! X =	-78.53066,	-31.58977,	272.000,	0.000!	!END!
949 ! X =	-78.52975,	-31.50033,	274.000,	0.000!	!END!
950 ! X =	-78.72762,	-31.49528,	278.000,	0.000!	!END!

```
 951 ! X =   -78.92543,  -31.49113,     280.000,       0.000!   !END!
 952 ! X =   -79.12335,  -31.48707,     304.000,       0.000!   !END!
 953 ! X =   -79.32121,  -31.48193,     304.000,       0.000!   !END!
 954 ! X =   -79.31405,  -31.27829,     304.000,       0.000!   !END!
 955 ! X =   -79.30699,  -31.07465,     304.000,       0.000!   !END!
 956 ! X =   -79.50979,  -31.07053,     304.000,       0.000!   !END!
 957 ! X =   -79.71254,  -31.06531,     304.000,       0.000!   !END!
 958 ! X =   -79.91539,  -31.06019,     304.000,       0.000!   !END!
 959 ! X =   -80.11819,  -31.05607,     281.000,       0.000!   !END!
 960 ! X =   -80.11647,  -30.89703,     273.000,       0.000!   !END!
 961 ! X =   -80.11485,  -30.73809,     270.000,       0.000!   !END!
 962 ! X =   -80.24299,  -30.69695,     267.000,       0.000!   !END!
 963 ! X =   -80.39075,   -30.6258,     268.000,       0.000!   !END!
 964 ! X =   -80.51885,  -30.57479,     268.000,       0.000!   !END!
 965 ! X =   -80.60774,  -30.56383,     268.000,       0.000!   !END!
 966 ! X =   -80.65701,  -30.54348,     274.000,       0.000!   !END!
 967 ! X =   -80.71629,  -30.53285,     269.000,       0.000!   !END!
 968 ! X =   -80.71735,  -30.63226,     274.000,       0.000!   !END!
 969 ! X =   -80.88556,  -30.63043,     274.000,       0.000!   !END!
 970 ! X =   -81.05377,   -30.6287,     274.000,       0.000!   !END!
 971 ! X =   -81.22198,  -30.62688,     274.000,       0.000!   !END!
 972 ! X =   -81.45273,  -30.61743,     259.000,       0.000!   !END!
 973 ! X =   -81.68354,  -30.60909,     256.000,       0.000!   !END!
 974 ! X =   -81.91429,  -30.59964,     256.000,       0.000!   !END!
 975 ! X =   -81.92536,  -30.70888,     265.000,       0.000!   !END!
 976 ! X =   -81.81748,   -30.7995,     265.000,       0.000!   !END!
 977 ! X =   -81.73936,  -30.89965,     274.000,       0.000!   !END!
 978 ! X =   -81.66139,  -31.00988,     276.000,       0.000!   !END!
 979 ! X =   -81.71084,  -31.00936,     276.000,       0.000!   !END!
 980 ! X =   -81.93836,  -31.00289,     279.000,       0.000!   !END!
 981 ! X =   -82.16593,  -30.99552,     304.000,       0.000!   !END!
 982 ! X =   -82.39345,  -30.98915,     304.000,       0.000!   !END!
 983 ! X =   -82.62098,  -30.98278,     304.000,       0.000!   !END!
 984 ! X =   -82.84854,  -30.97531,     294.000,       0.000!   !END!
 985 ! X =   -83.07607,  -30.96893,     304.000,       0.000!   !END!
 986 ! X =   -83.30359,  -30.96256,     304.000,       0.000!   !END!
 987 ! X =   -83.30576,  -31.16627,     287.000,       0.000!   !END!
 988 ! X =   -83.30794,  -31.36998,     304.000,       0.000!   !END!
 989 ! X =   -83.31495,  -31.56375,     318.000,       0.000!   !END!
 990 ! X =   -83.32187,  -31.75742,     335.000,       0.000!   !END!
 991 ! X =    -83.5247,  -31.75031,     326.000,       0.000!   !END!
 992 ! X =   -83.72744,   -31.7432,     309.000,       0.000!   !END!
 993 ! X =   -83.72542,  -31.54946,     305.000,       0.000!   !END!
 994 ! X =   -83.72339,  -31.35562,     304.000,       0.000!   !END!
 995 ! X =   -83.91626,  -31.34865,     301.000,       0.000!   !END!
 996 ! X =   -84.10912,  -31.34158,     281.000,       0.000!   !END!
 997 ! X =   -84.30199,  -31.33462,     304.000,       0.000!   !END!
 998 ! X =   -84.49486,  -31.32755,     304.000,       0.000!   !END!
 999 ! X =    -84.6977,  -31.32044,     288.000,       0.000!   !END!
1000 ! X =   -84.90044,  -31.31333,     278.000,       0.000!   !END!
1001 ! X =   -84.89834,  -31.11451,     274.000,       0.000!   !END!
1002 ! X =   -84.89624,  -30.91578,     265.000,       0.000!   !END!
1003 ! X =   -85.10572,   -30.9116,     263.000,       0.000!   !END!
1004 ! X =   -85.31506,  -30.90832,     268.000,       0.000!   !END!
1005 ! X =   -85.52444,  -30.90414,     274.000,       0.000!   !END!
1006 ! X =   -85.73392,  -30.89986,     274.000,       0.000!   !END!
1007 ! X =   -85.94327,  -30.89668,     274.000,       0.000!   !END!
1008 ! X =   -86.15275,  -30.89249,     245.000,       0.000!   !END!
1009 ! X =   -86.26201,  -30.93101,     236.000,       0.000!   !END!
1010 ! X =   -86.38115,  -30.96958,     243.000,       0.000!   !END!
```

```
 1011 ! X =   -86.49046,  -31.01808,     240.000,        0.000!   !END!
 1012 ! X =   -86.49683,  -31.14723,     270.000,        0.000!   !END!
 1013 ! X =    -86.5032,  -31.27638,     274.000,        0.000!   !END!
 1014 ! X =   -86.70839,  -31.27213,     256.000,        0.000!   !END!
 1015 ! X =   -86.91373,  -31.26698,     248.000,        0.000!   !END!
 1016 ! X =   -87.11898,  -31.26183,     245.000,        0.000!   !END!
 1017 ! X =   -87.32427,  -31.25768,     274.000,        0.000!   !END!
 1018 ! X =   -87.33612,   -31.4414,     274.000,        0.000!   !END!
 1019 ! X =   -87.34798,  -31.62513,     267.000,        0.000!   !END!
 1020 ! X =   -87.14774,  -31.63419,     274.000,        0.000!   !END!
 1021 ! X =   -86.94746,  -31.64435,     280.000,        0.000!   !END!
 1022 ! X =   -86.74718,  -31.65442,     285.000,        0.000!   !END!
 1023 ! X =   -86.54684,  -31.66349,     284.000,        0.000!   !END!
 1024 ! X =   -86.55891,  -31.86216,     299.000,        0.000!   !END!
 1025 ! X =   -86.57088,  -32.06075,     304.000,        0.000!   !END!
 1026 ! X =   -86.77362,  -32.05364,     304.000,        0.000!   !END!
 1027 ! X =   -86.97646,  -32.04653,     301.000,        0.000!   !END!
 1028 ! X =   -86.98843,  -32.24521,     287.000,        0.000!   !END!
 1029 ! X =   -87.00049,  -32.44379,     265.000,        0.000!   !END!
 1030 ! X =   -87.01247,  -32.64247,     261.000,        0.000!   !END!
 1031 ! X =   -87.02444,  -32.84115,     280.000,        0.000!   !END!
 1032 ! X =   -87.22478,  -32.83408,     261.000,        0.000!   !END!
 1033 ! X =   -87.42513,   -32.8269,     236.000,        0.000!   !END!
 1034 ! X =   -87.62537,  -32.81984,     239.000,        0.000!   !END!
 1035 ! X =   -87.82572,  -32.81276,     246.000,        0.000!   !END!
 1036 ! X =   -87.82543,  -33.01351,     235.000,        0.000!   !END!
 1037 ! X =    -87.8251,  -33.21526,     274.000,        0.000!   !END!
 1038 ! X =   -87.82471,  -33.41601,     274.000,        0.000!   !END!
 1039 ! X =   -87.82438,  -33.61776,     274.000,        0.000!   !END!
 1040 ! X =   -87.61861,  -33.62593,     280.000,        0.000!   !END!
 1041 ! X =   -87.41294,   -33.6341,     304.000,        0.000!   !END!
 1042 ! X =   -87.20716,  -33.64227,     304.000,        0.000!   !END!
 1043 ! X =   -87.00139,  -33.65044,     304.000,        0.000!   !END!
 1044 ! X =   -86.79572,   -33.6586,     293.000,        0.000!   !END!
 1045 ! X =   -86.61763,  -33.66047,     275.000,        0.000!   !END!
 1046 ! X =   -86.41978,  -33.66751,     277.000,        0.000!   !END!
```

----

a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
HOL BART CLASS I ANALYSIS (MINGO)
JUNE 2008 BASE FOR CONTROL
6KM UMC REFINED CALMET METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

--------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    ! METDAT = /raid2c/umc/calmet/2002/calmet02.dat !
    or
ISCMET.DAT    input    * ISCDAT =             *
    or
PLMMET.DAT    input    * PLMDAT =             *
    or
PROFILE.DAT   input    * PRFDAT =             *
SURFACE.DAT   input    * SFCDAT =             *
RESTARTB.DAT  input    * RSTARTB=             *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =HOLM2002BASE608.LST     !
CONC.DAT      output   ! CONDAT =HOLM2002BASE608.CON     !
DFLX.DAT      output   ! DFDAT  =HOLM2002BASE608.DRY     !
WFLX.DAT      output   ! WFDAT  =HOLM2002BASE608.WET     !

VISB.DAT      output   ! VISDAT =HOLM2002BASE608.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2002.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =             *
VOLEMARB.DAT  input    * VOLDAT =             *
BAEMARB.DAT   input    * ARDAT  =             *
LNEMARB.DAT   input    * LNDAT  =             *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =             *
CHEM.DAT      input    * CHEMDAT=             *
H2O2.DAT      input    * H2O2DAT=             *
HILL.DAT      input    * HILDAT=             *
HILLRCT.DAT   input    * RCTDAT=             *
COASTLN.DAT   input    * CSTDAT=             *
FLUXBDY.DAT   input    * BDYDAT=             *
BCON.DAT      input    * BCNDAT=             *
DEBUG.DAT     output   * DEBUG =             *
MASSFLX.DAT   output   * FLXDAT=             *
MASSBAL.DAT   output   * BALDAT=             *
FOG.DAT       output   * FOGDAT=             *
```

```
-------------------------------------------------------------------------
--------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                Default: 1       ! NMETDAT =  1  !

     Number of PTEMARB.DAT files for run (NPTDAT)
                                Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if
NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------


-------------------------------------------------------------------------
--------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  2002 !
     (used only if   Month (IBMO) -- No default       ! IBMO =   01 !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   01 !
                      Hour (IBHR) -- No default       ! IBHR =   01 !

     Base time zone        (XBTZ) -- No default       ! XBTZ = 6.0  !
        PST = 8., MST = 7.
        CST = 6., EST = 5.

     Length of run (hours) (IRLG) -- No default       ! IRLG =  8760 !
```

```
     Number of chemical species (NSPEC)
                                        Default: 5       ! NSPEC =  6   !

     Number of chemical species
     to be emitted  (NSE)               Default: 3       ! NSE =  3   !

     Flag to stop run after
     SETUP phase (ITEST)                Default: 2       ! ITEST =  2   !
     (Used to allow checking
     of the model inputs, files, etc.)
           ITEST = 1 - STOPS program after SETUP phase
           ITEST = 2 - Continues with execution of program
                       after SETUP

     Restart Configuration:

        Control flag (MRESTART)         Default: 0       ! MRESTART =  0
!

           0 = Do not read or write a restart file
           1 = Read a restart file at the beginning of
               the run
           2 = Write a restart file during run
           3 = Read a restart file at beginning of run
               and write a restart file during run

        Number of periods in Restart
        output cycle (NRESPD)           Default: 0       ! NRESPD =  0   !

           0 = File written only at last period
          >0 = File updated every NRESPD periods

     Meteorological Data Format (METFM)
                                        Default: 1       ! METFM =  1   !

           METFM = 1 - CALMET binary file (CALMET.MET)
           METFM = 2 - ISC ASCII file (ISCMET.MET)
           METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
           METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                       surface parameters file (SURFACE.DAT)

  Meteorological Profile Data Format (MPRFFM)
            (used only for METFM = 1, 2, 3)
                                        Default: 1       ! MPRFFM =  1   !

           MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
           MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

     PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
     Averaging Time (minutes) (AVET)
                                        Default: 60.0    ! AVET = 60. !
     PG Averaging Time (minutes) (PGTIME)
                                        Default: 60.0    ! PGTIME = 60. !


!END!


------------------------------------------------------------------------
-------
```

```
INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)                    Default: 1     ! MGAUSS =  1
!
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                               Default: 3     ! MCTADJ =  3
!
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                           Default: 0     ! MCTSG =  0
!
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated 0 (MSLUG)                    Default: 0     ! MSLUG =  0
!
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled ?
     (MTRANS)                               Default: 1     ! MTRANS =  1
!
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)             Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to simulate building
     downwash? (MBDW)                       Default: 1     ! MBDW =   1
!
        1 = ISC method
        2 = PRIME method

     Vertical wind shear modeled above
     stack top? (MSHEAR)                    Default: 0     ! MSHEAR =  0
!
        0 = no  (i.e., vertical wind shear not modeled)
        1 = yes (i.e., vertical wind shear modeled)

     Puff splitting allowed? (MSPLIT)       Default: 0     ! MSPLIT =  0
!
        0 = no (i.e., puffs not split)
        1 = yes (i.e., puffs are split)

     Chemical mechanism flag (MCHEM)        Default: 1     ! MCHEM =  1
```

```
!
        0 = chemical transformation not
            modeled
        1 = transformation rates computed
            internally (MESOPUFF II scheme)
        2 = user-specified transformation
            rates used
        3 = transformation rates computed
            internally (RIVAD/ARM3 scheme)
        4 = secondary organic aerosol formation
            computed (MESOPUFF II scheme for OH)

     Aqueous phase transformation flag (MAQCHEM)
     (Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0
!
        0 = aqueous phase transformation
            not modeled
        1 = transformation rates adjusted
            for aqueous phase reactions

     Wet removal modeled ? (MWET)          Default: 1     ! MWET =  1
!
        0 = no
        1 = yes

     Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  1
!
        0 = no
        1 = yes
        (dry deposition method specified
         for each species in Input Group 3)

     Method used to compute dispersion
     coefficients (MDISP)                  Default: 3     ! MDISP =  3
!

        1 = dispersion coefficients computed from measured values
            of turbulence, sigma v, sigma w
        2 = dispersion coefficients from internally calculated
            sigma v, sigma w using micrometeorological variables
            (u*, w*, L, etc.)
        3 = PG dispersion coefficients for RURAL areas (computed using
            the ISCST multi-segment approximation) and MP coefficients
in
            urban areas
        4 = same as 3 except PG coefficients computed using
            the MESOPUFF II eqns.
        5 = CTDM sigmas used for stable and neutral conditions.
            For unstable conditions, sigmas are computed as in
            MDISP = 3, described above.  MDISP = 5 assumes that
            measured values are read

     Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
     (Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3
!
        1 = use sigma-v or sigma-theta measurements
            from PROFILE.DAT to compute sigma-y
            (valid for METFM = 1, 2, 3, 4)
        2 = use sigma-w measurements
            from PROFILE.DAT to compute sigma-z
```

```
            (valid for METFM = 1, 2, 3, 4)
         3 = use both sigma-(v/theta) and sigma-w
             from PROFILE.DAT to compute sigma-y and sigma-z
             (valid for METFM = 1, 2, 3, 4)
         4 = use sigma-theta measurements
             from PLMMET.DAT to compute sigma-y
             (valid only if METFM = 3)

      Back-up method used to compute dispersion
      when measured turbulence data are
      missing (MDISP2)                      Default: 3     ! MDISP2 =  3
!
      (used only if MDISP = 1 or 5)
         2 = dispersion coefficients from internally calculated
             sigma v, sigma w using micrometeorological variables
             (u*, w*, L, etc.)
         3 = PG dispersion coefficients for RURAL areas (computed using
             the ISCST multi-segment approximation) and MP coefficients
in
             urban areas
         4 = same as 3 except PG coefficients computed using
             the MESOPUFF II eqns.

    [DIAGNOSTIC FEATURE]
      Method used for Lagrangian timescale for Sigma-y
      (used only if MDISP=1,2 or MDISP2=1,2)
      (MTAULY)                              Default: 0     ! MTAULY =  0
!
         0 = Draxler default 617.284 (s)
         1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
        10 < Direct user input (s)             -- e.g., 306.9


      [DIAGNOSTIC FEATURE]
      Method used for Advective-Decay timescale for Turbulence
      (used only if MDISP=2 or MDISP2=2)
      (MTAUADV)                             Default: 0     ! MTAUADV =  0
!
         0 = No turbulence advection
         1 = Computed (OPTION NOT IMPLEMENTED)
        10 < Direct user input (s)   -- e.g., 300


      Method used to compute turbulence sigma-v &
      sigma-w using micrometeorological variables
      (Used only if MDISP = 2 or MDISP2 = 2)
      (MCTURB)                              Default: 1     ! MCTURB =  1
!
         1 = Standard CALPUFF subroutines
         2 = AERMOD subroutines

      PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH =  0
!
      (MROUGH)
         0 = no
         1 = yes

      Partial plume penetration of          Default: 1     ! MPARTL =  1
!
      elevated inversion?
```

```
     (MPARTL)
        0 = no
        1 = yes

     Strength of temperature inversion     Default: 0     ! MTINV =  0
!
     provided in PROFILE.DAT extended records?
     (MTINV)
        0 = no (computed from measured/default gradients)
        1 = yes

     PDF used for dispersion under convective conditions?
                                           Default: 0     ! MPDF =  0  !
     (MPDF)
        0 = no
        1 = yes

     Sub-Grid TIBL module used for shore line?
                                           Default: 0     ! MSGTIBL = 0
!
     (MSGTIBL)
        0 = no
        1 = yes

     Boundary conditions (concentration) modeled?
                                           Default: 0     ! MBCON = 0  !
     (MBCON)
        0 = no
        1 = yes, using formatted BCON.DAT file
        2 = yes, using unformatted CONC.DAT file


     Analyses of fogging and icing impacts due to emissions from
     arrays of mechanically-forced cooling towers can be performed
     using CALPUFF in conjunction with a cooling tower emissions
     processor (CTEMISS) and its associated postprocessors.  Hourly
     emissions of water vapor and temperature from each cooling tower
     cell are computed for the current cell configuration and ambient
     conditions by CTEMISS. CALPUFF models the dispersion of these
     emissions and provides cloud information in a specialized format
     for further analysis. Output to FOG.DAT is provided in either
     'plume mode' or 'receptor mode' format.

     Configure for FOG Model output?
                                           Default: 0     ! MFOG =  0
!
     (MFOG)
        0 = no
        1 = yes  - report results in PLUME Mode format
        2 = yes  - report results in RECEPTOR Mode format


     Test options specified to see if
     they conform to regulatory
     values? (MREG)                        Default: 1     ! MREG =  1
!

        0 = NO checks are made
        1 = Technical options must conform to USEPA
            Long Range Transport (LRT) guidance
```

```
                       METFM    1 or 2
                       AVET     60. (min)
                       PGTIME   60. (min)
                       MGAUSS   1
                       MCTADJ   3
                       MTRANS   1
                       MTIP     1
                       MCHEM    1 or 3 (if modeling SOx, NOx)
                       MWET     1
                       MDRY     1
                       MDISP    2 or 3
                       MPDF     0 if MDISP=3
                                1 if MDISP=2
                       MROUGH   0
                       MPARTL   1
                       SYTDEP   550. (m)
                       MHFTSZ   0

!END!


------------------------------------------------------------------------
-------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!

                                                       Dry
OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED
NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,
(0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS
1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE
2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)
3= etc.)

!          SO2  =         1,               1,           1,
0   !
!          SO4  =         1,               0,           2,
0   !
!          NOX  =         1,               1,           1,
0   !
```

```
!         HNO3  =         1,                0,           1,
0   !
!          NO3  =         1,                0,           2,
0   !
!         PM10  =         1,                1,           2,
0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



------------------------------------------------------------------------
-------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 37N  !
     (RLON0)                    No Default      ! RLON0 = 92W  !
```

```
         TTM :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of
projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping
plane
                RLAT0 identifies latitude of tangent-point of mapping
plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                   No Default      ! XLAT1 = 30N  !
     (XLAT2)                   No Default      ! XLAT2 = 45N  !

         LCC :  Projection cone slices through Earth's surface at XLAT1
and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of
the
     Earth known as the World Geodetic System 1984 (WGS-G ).  Other
local
     models may be in use, and their selection in CALMET will make its
output
     consistent with local mapping products.  The list of Datum-Regions
with
     official transformation parameters is provided by the National
Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)

------------------------------------------------------------------------
------
     WGS-G     WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS
(NAD27)
     NWS-27    NWS 6370KM Radius, Sphere
     NWS-84    NWS 6370KM Radius, Sphere
```

```
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere

     Datum-region for output coordinates
     (DATUM)                    Default: WGS-G     ! DATUM = WGS-84  !


METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =  87    !
            No. Y grid cells (NY)      No default     ! NY =  111   !
         No. vertical layers (NZ)      No default     ! NZ =  10   !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 6 !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
              4000. !

            Reference Coordinates
           of SOUTHWEST corner of
                 grid cell(1, 1):

            X-coordinate (XORIGKM)     No default     ! XORIGKM = -258.
!
            Y coordinate (YORIGKM)     No default     ! YORIGKM = -330.
!
                                      Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET.
grid.
     The lower left (LL) corner of the computational grid is at grid
point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of
the
     computational grid is at grid point (IECOMP, JECOMP) of the MET.
grid.
     The grid spacing of the computational grid is the same as the MET.
grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =  1
!
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =  1
!
                  (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)      No default     ! IECOMP =  87
!
                  (1 <= IECOMP <= NX)
```

```
        Y index of UR corner (JECOMP)      No default     ! JECOMP =
111    !
                  (1 <= JECOMP <= NY)



SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of
the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the
computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1
!
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1
!
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =  87
!
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =
111   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1
!
        (MESHDN is an integer >= 1)

!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 5 -- Output Options
--------------
                                                    *
*
     FILE                          DEFAULT VALUE            VALUE THIS RUN
     ----                          -------------            --------------

   Concentrations (ICON)                 1                  !  ICON =  1
```

```
!
   Dry Fluxes (IDRY)                  1                    !  IDRY =  1
!
   Wet Fluxes (IWET)                  1                    !  IWET =  1
!
   Relative Humidity (IVIS)           1                    !  IVIS =  1
!
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                           Default: T          ! LCOMPRS = T
!

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                         Default: 0          ! IMFLX =  0
!
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                         Default: 0          ! IMBAL =  0
!
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)    Default: 0          ! ICPRT =  0
!
       Print dry fluxes (IDPRT)        Default: 0          ! IDPRT =  0
!
       Print wet fluxes (IWPRT)        Default: 0          ! IWPRT =  0
!
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours                Default: 1          ! ICFRQ =  1
!
       Dry flux print interval
       (IDFRQ) in hours                Default: 1          ! IDFRQ =  1
!
       Wet flux print interval
       (IWFRQ) in hours                Default: 1          ! IWFRQ =  1
!

       Units for Line Printer Output
       (IPRTU)                         Default: 1          ! IPRTU =  3
!
```

```
                        for           for
                   Concentration    Deposition
            1 =       g/m**3         g/m**2/s
            2 =      mg/m**3        mg/m**2/s
            3 =      ug/m**3        ug/m**2/s
            4 =      ng/m**3        ng/m**2/s
            5 =     Odour Units

       Messages tracking progress of run
       written to the screen ?
       (IMESG)                         Default: 2         ! IMESG =  2
!
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                ---- CONCENTRATIONS ----   ------ DRY FLUXES ------
------ WET FLUXES ------   -- MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?
PRINTED?  SAVED ON DISK?   SAVED ON DISK?
   -------      ------------------------   ------------------------
------------------------   ---------------
!          SO2 =     0,            1,            0,            1,
0,          1,          0   !
!          SO4 =     0,            1,            0,            1,
0,          1,          0   !
!          NOX =     0,            1,            0,            1,
0,          1,          0   !
!         HNO3 =     0,            1,            0,            1,
0,          1,          0   !
!          NO3 =     0,            1,            0,            1,
0,          1,          0   !
!         PM10 =     0,            1,            0,            1,
0,          1,          0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                 Default: F     ! LDEBUG
= F !

       First puff to track
       (IPFDEB)                                 Default: 1     ! IPFDEB
=  1  !

       Number of puffs to track
       (NPFDEB)                                 Default: 1     ! NPFDEB
=  1  !

       Met. period to start output
       (NN1)                                    Default: 1     ! NN1 =
1   !

       Met. period to end output
       (NN2)                                    Default: 10    ! NN2 =
10  !
```

```
!END!


---------------------------------------------------------------------------
-------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =
0   !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC
=  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                  No Default     ! MHILL =
2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M
= 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M
= 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL           XC        YC       THETAH  ZGRID  RELIEF    EXPO 1
EXPO 2   SCALE 1    SCALE 2    AMAX1     AMAX2
```

```
 NO.          (km)      (km)      (deg.)   (m)     (m)      (m)
(m)       (m)        (m)       (m)       (m)
----          ----      ----      ------  -----  ------    ------
------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                      XRCT         YRCT        ZRCT           XHH
                      (km)         (km)         (m)
                     ------        -----      ------          ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid
elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain
receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a
separate
           input subgroup and therefore must end with an input group
terminator.

------------------------------------------------------------------------
-------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY
MESOPHYLL RESISTANCE     HENRY'S LAW COEFFICIENT
       NAME        (cm**2/s)
(s/cm)                (dimensionless)
      -------     -----------      ----------      ----------
--------------------     ----------------------
```

```
!          SO2 =     0.1509,         1000.,            8.,
0.,                  0.04 !
!          NOX =     0.1656,            1.,            8.,
5.,                   3.5 !
!         HNO3 =     0.1628,            1.,           18.,
0.,            0.00000008 !

!END!
```

INPUT GROUP: 8 -- Size parameters for dry deposition of particles
----

For SINGLE SPECIES, the mean and standard deviation are used to compute a deposition velocity for NINT (see group 9) size-ranges, and these are then averaged to obtain a mean deposition velocity.

For GROUPED SPECIES, the size distribution should be explicitly specified (by the 'species' in the group), and the standard deviation for each should be entered as 0. The model will then use the deposition velocity for the stated mean diameter.

```
      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME              DIAMETER                   DEVIATION
                        (microns)                   (microns)
      -------      -------------------        ------------------
!          SO4 =          0.48,                       2.   !
!          NO3 =          0.48,                       2.   !
!         PM10 =            2.,                       2.   !

!END!
```

INPUT GROUP: 9 -- Miscellaneous dry deposition parameters

```
     Reference cuticle resistance (s/cm)
     (RCUTR)                          Default: 30    !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                            Default: 10    !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                         Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                           Default: 9     !   NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                           Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
```

```
        IVEG=3 for inactive vegetation

!END!


-----------------------------------------------------------------------
-------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,             0.0E00 !
!          SO4 =         1.0E-04,            3.0E-05 !
!         HNO3 =         6.0E-05,             0.0E00 !
!          NO3 =         1.0E-04,            3.0E-05 !
!         PM10 =         1.0E-04,            3.0E-05 !

!END!


-----------------------------------------------------------------------
-------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0
!
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                    Default: 12*80.
     !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00,
65.00, 65.00, 26.00, 26.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                   Default: 12*10.
     !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50,
0.50, 0.50, 0.50 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2          ! RNITE1 =
.2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0          ! RNITE2 =
2.0 !
```

```
     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                   Default: 2.0          ! RNITE3 =
2.0 !

     H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =
0   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb                  Default: 12*1.
     !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
     (used only if MCHEM = 4)

     The SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)
          VOC / NOX ratio (after reaction)         (VCNX)
     to characterize the air mass when computing
     the formation of SOA from VOC emissions.
     Typical values for several distinct air mass types are:

        Month    1    2    3    4    5    6    7    8    9   10   11
12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Dec

     Clean Continental
        BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
1.
        OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20
.15
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Clean Marine (surface)
        BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
.5
        OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30
.25
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Urban - low biogenic (controls present)
        BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
30.
        OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20
.20
        VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.
4.
```

```
     Urban - high biogenic (controls present)
        BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
60.
        OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35
.25
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Regional Plume
        BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
20.
        OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30
.20
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Urban - no controls present
        BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
100.
        OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35
.30
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.
2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20,
0.20, 0.20, 0.15 !
     !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00,
50.00, 50.00, 50.00, 50.00 !


!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                           Default: 550.   ! SYTDEP
= 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                   Default: 0      ! MHFTSZ
=  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                               Default: 5      ! JSUP =
5   !

     Vertical dispersion constant for stable
```

```
     conditions (k1 in Eqn. 2.7-3)  (CONK1)     Default: 0.01   ! CONK1
= .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                    Default: 0.1    ! CONK2
= .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                      Default: 0.5    ! TBD =
.5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                             Default: 10     ! IURB1
=  10  !
                                                         19     ! IURB2
=  19  !

     Site characterization parameters for single-point Met data files
---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                              Default: 20     !
ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                                  Default: 0.25   ! Z0IN =
.25 !

        Leaf area index for modeling domain
        (XLAIIN)                                Default: 3.0    ! XLAIIN
= 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                                Default: 0.0    ! ELEVIN
= .0 !

        Latitude (degrees) for met location
        (XLATIN)                                Default: -999.  ! XLATIN
= -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                                Default: -999.  ! XLONIN
= -999.0 !

     Specialized information for interpreting single-point Met data
files -----

        Anemometer height (m) (Used only if METFM = 2,3)
        (ANEMHT)                                Default: 10.    ! ANEMHT
= 10.0 !

        Form of lateral turbulance data in PROFILE.DAT file
```

```
        (Used only if METFM = 4 or MTURBVW = 1 or 3)
        (ISIGMAV)                               Default: 1      !
ISIGMAV =  1  !
            0 = read sigma-theta
            1 = read sigma-v

        Choice of mixing heights (Used only if METFM = 4)
        (IMIXCTDM)                              Default: 0      !
IMIXCTDM =  0  !
            0 = read PREDICTED mixing heights
            1 = read OBSERVED mixing heights

     Maximum length of a slug (met. grid units)
     (XMXLEN)                                   Default: 1.0    ! XMXLEN
= 1.0 !

     Maximum travel distance of a puff/slug (in
     grid units) during one sampling step
     (XSAMLEN)                                  Default: 1.0    !
XSAMLEN = 1.0 !

     Maximum Number of slugs/puffs release from
     one source during one time step
     (MXNEW)                                    Default: 99     ! MXNEW
=  99   !

     Maximum Number of sampling steps for
     one puff/slug during one time step
     (MXSAM)                                    Default: 99     ! MXSAM
=  99   !

     Number of iterations used when computing
     the transport wind for a sampling step
     that includes gradual rise (for CALMET
     and PROFILE winds)
     (NCOUNT)                                   Default: 2      ! NCOUNT
=  2   !

     Minimum sigma y for a new puff/slug (m)
     (SYMIN)                                    Default: 1.0    ! SYMIN
= 1.0  !

     Minimum sigma z for a new puff/slug (m)
     (SZMIN)                                    Default: 1.0    ! SZMIN
= 1.0  !

     Default minimum turbulence velocities sigma-v and sigma-w
     for each stability class over land and over water (m/s)
     (SVMIN(12) and SWMIN(12))

                      ----------  LAND  ----------       ---------  WATER
----------
        Stab Class :  A    B    C    D    E    F         A    B    C
D    E    F
                      ---  ---  ---  ---  ---  ---       ---  ---  ---
---  ---  ---
     Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37,
.37, .37, .37
     Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08,
.06, .03, .016
```

```
           ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370,
0.370, 0.370, 0.370, 0.370, 0.370!
           ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200,
0.120, 0.080, 0.060, 0.030, 0.016!


     Divergence criterion for dw/dz across puff
     used to initiate adjustment for horizontal
     convergence (1/s)
     Partial adjustment starts at CDIV(1), and
     full adjustment is reached at CDIV(2)
     (CDIV(2))                                 Default: 0.0,0.0  ! CDIV
= .0, .0 !

     Minimum wind speed (m/s) allowed for
     non-calm conditions. Also used as minimum
     speed returned when using power-law
     extrapolation toward surface
     (WSCALM)                                  Default: 0.5    ! WSCALM
= .5 !

     Maximum mixing height (m)
     (XMAXZI)                                  Default: 3000.  ! XMAXZI
= 4000.0 !

     Minimum mixing height (m)
     (XMINZI)                                  Default: 50.    ! XMINZI
= 20.0 !

     Default wind speed classes --
     5 upper bounds (m/s) are entered;
     the 6th class has no upper limit
     (WSCAT(5))                   Default   :
                                  ISC RURAL : 1.54, 3.09, 5.14, 8.23,
10.8 (10.8+)

                           Wind Speed Class :  1     2     3     4
5
                                               ---   ---   ---   ---
---
                                    ! WSCAT = 1.54, 3.09, 5.14, 8.23,
10.80 !

     Default wind speed profile power-law
     exponents for stabilities 1-6
     (PLX0(6))                    Default   : ISC RURAL values
                                  ISC RURAL : .07, .07, .10, .15,
.35, .55
                                  ISC URBAN : .15, .15, .20, .25,
.30, .30

                            Stability Class :  A     B     C     D
E     F
                                               ---   ---   ---   ---
---   ---
                                     ! PLX0 = 0.07, 0.07, 0.10, 0.15,
0.35, 0.55 !

     Default potential temperature gradient
```

```
     for stable classes E, F (degK/m)
     (PTG0(2))                        Default: 0.020, 0.035
                                         ! PTG0 = 0.020,   0.035 !

     Default plume path coefficients for
     each stability class (used when option
     for partial plume height terrain adjustment
     is selected -- MCTADJ=3)
     (PPC(6))                   Stability Class :  A     B     C     D
E     F
                                   Default  PPC : .50,  .50,  .50,  .50,
.35,  .35
                                                  ---   ---   ---   ---
---   ---
                                         !  PPC = 0.50, 0.50, 0.50, 0.50,
0.35, 0.35 !

     Slug-to-puff transition criterion factor
     equal to sigma-y/length of slug
     (SL2PF)                            Default: 10.        ! SL2PF =
10.0 !

     Puff-splitting control variables ------------------------

       VERTICAL SPLIT
       --------------

       Number of puffs that result every time a puff
       is split - nsplit=2 means that 1 puff splits
       into 2
       (NSPLIT)                         Default:   3        ! NSPLIT
=  3  !

       Time(s) of a day when split puffs are eligible to
       be split once again; this is typically set once
       per day, around sunset before nocturnal shear develops.
       24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
       0=do not re-split    1=eligible for re-split
       (IRESPLIT(24))                   Default:  Hour 17 = 1
       !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

       Split is allowed only if last hour's mixing
       height (m) exceeds a minimum value
       (ZISPLIT)                        Default: 100.       ! ZISPLIT
= 100.0 !

       Split is allowed only if ratio of last hour's
       mixing ht to the maximum mixing ht experienced
       by the puff is less than a maximum value (this
       postpones a split until a nocturnal layer develops)
       (ROLDMAX)                        Default: 0.25       ! ROLDMAX
= 0.25 !


       HORIZONTAL SPLIT
       ----------------

       Number of puffs that result every time a puff
       is split - nsplith=5 means that 1 puff splits
       into 5
```

```
       (NSPLITH)                          Default:   5        ! NSPLITH
=  5  !

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
       (SYSPLITH)                         Default:  1.0       !
SYSPLITH = 1.0 !

       Minimum puff elongation rate (SYSPLITH/hr) due to
       wind shear, before it may be split
       (SHSPLITH)                         Default:  2.        !
SHSPLITH = 2.0 !

       Minimum concentration (g/m^3) of each
       species in puff before it may be split
       Enter array of NSPEC values; if a single value is
       entered, it will be used for ALL species
       (CNSPLITH)                         Default:  1.0E-07   !
CNSPLITH = 1.0E-07 !

     Integration control variables ------------------------

       Fractional convergence criterion for numerical SLUG
       sampling integration
       (EPSSLUG)                          Default:   1.0e-04  ! EPSSLUG
= 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                          Default:   1.0e-06  ! EPSAREA
= 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                           Default:   1.0      ! DSRISE
= 1.0 !

       Boundary Condition (BC) Puff control variables
------------------------

       Minimum height (m) to which BC puffs are mixed as they are
emitted
       (MBCON=2 ONLY).  Actual height is reset to the current mixing
height
       at the release point if greater than this minimum.
       (HTMINBC)                          Default:   500.     ! HTMINBC
= 500.0 !

       Search radius (in BC segment lengths) about a receptor for
sampling
       nearest BC puff.  BC puffs are emitted with a spacing of one
segment
       length, so the search radius should be greater than 1.
       (RSAMPBC)                          Default:   4.      ! RSAMPBC
= 10.0 !

       Near-Surface depletion adjustment to concentration profile used
when
       sampling BC puffs?
       (MDEPBC)                           Default:   1        ! MDEPBC
```

```
=  1  !
          0 = Concentration is NOT adjusted for depletion
          1 = Adjust Concentration for depletion

!END!


-------------------------------------------------------------------------
-------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =   1  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                                        a
          POINT SOURCE: CONSTANT DATA
          -----------------------------

b          c
  Source       X          Y       Stack    Base     Stack    Exit  Exit
Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.
Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg.
K)
```

```
  ------   ---------- --------- ------  ------   -------- -----
-------- ----- --------
   1 ! SRCNAM = EP14 !
   1 ! X =  89.5282, 262.5797,  76.20, 155.45,   6.40,  9.55, 447.59,
0.0, 6.175153E02,  0.0E00,  3.842201E02,
       0.0E00,  0.0E00, 6.5294E00 !
   1 ! FMFAC  =      1.0 !   !END!
--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column
headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to
represent
             the effect of rain-caps or other physical configurations
that
             reduce momentum rise associated with the actual exit
velocity.
             (Default: 1.0  -- full momentum used)

    b
     0. = No building downwash modeled, 1. = downwash modeled
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
           -------------------------------------------------------
Source
a
 No.       Effective building height, width, length and X/Y offset (in
meters)
           every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed
for
           MBDW=2 (PRIME downwash option)
------
--------------------------------------------------------------------

--------

    a
     Building height, width, length, and X/Y offset from the source are
treated
     as a separate input subgroup for each source and therefore must end
```

```
with
     an input group terminator.  The X/Y offset is the position,
relative to the
     stack, of the center of the upwind face of the projected building,
with the
     x-axis pointing along the flow direction.

---------------
Subgroup (13d)
---------------
                                                a
          POINT SOURCE: VARIABLE EMISSIONS DATA
          ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 13b.  Factors entered multiply the rates in 13b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
--------------------------------

---------------
Subgroup (14a)
---------------

     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  0
!

     Units used for area source
```

```
     emissions below            (IARU)       Default: 1  !  IARU =   1
!
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)       (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                     No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                     a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                         b
Source           Effect.    Base      Initial    Emission
 No.             Height   Elevation   Sigma z     Rates
                   (m)       (m)        (m)
-------          ------    ------     --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
           --------------------------------------------------------
Source                                                             a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------


--------
    a
     Data for each source are treated as a separate input subgroup
```

```
     and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                                a
          AREA SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 14b.  Factors entered multiply the rates in 14b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                              No default  !  NLN2
=  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)        No default   !
```

```
NLINES =  0  !

     Units used for line source
     emissions below                (ILNU)          Default: 1  !  ILNU
=   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7   !
MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6   !
NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default   ! XL =
.0 !
                                                    (in meters)

        Average building height (HBL)               No default   ! HBL =
.0 !
                                                    (in meters)

        Average building width (WBL)                No default   ! WBL =
.0 !
                                                    (in meters)

        Average line source width (WML)             No default   ! WML =
.0 !
                                                    (in meters)

        Average separation between buildings (DXL)  No default   ! DXL =
.0 !
                                                    (in meters)

        Average buoyancy parameter (FPRIMEL)        No default   !
FPRIMEL = .0 !
                                                    (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
```

```
          ---------------------------------

a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base
Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height
Elevation      Rates
            (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------
---------    ---------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                       a
          BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.
```

```
--------------------------------------------------------------------------
-------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0
!

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1
!
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0
!

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0
!

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                        a
           VOLUME SOURCE: CONSTANT DATA
           ------------------------------

b
         X           Y        Effect.    Base     Initial    Initial
Emission
     Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z
Rates
        (km)       (km)         (m)       (m)        (m)       (m)
     ----------  ----------   ------    ------    --------   --------
--------

--------
    a
```

```
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                                  a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                               Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)

------------------------------------------------------------------------
-------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
-----------------------

---------------
Subgroup (17a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC =  698
!

!END!

---------------
Subgroup (17b)
---------------
                                                a
           NON-GRIDDED (DISCRETE) RECEPTOR DATA
           ------------------------------------
```

Receptor No.		X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height b Above Ground (m)	
1	! X =	153.22463,	-5.52074,	106.000,	0.000!	!END!
2	! X =	153.21942,	-5.27242,	108.000,	0.000!	!END!
3	! X =	153.21411,	-5.0241,	108.000,	0.000!	!END!
4	! X =	153.2088,	-4.77579,	106.000,	0.000!	!END!
5	! X =	153.20359,	-4.52846,	115.000,	0.000!	!END!
6	! X =	153.19828,	-4.28015,	121.000,	0.000!	!END!
7	! X =	153.47286,	-5.51536,	104.000,	0.000!	!END!
8	! X =	153.46755,	-5.26704,	105.000,	0.000!	!END!
9	! X =	153.46224,	-5.01872,	106.000,	0.000!	!END!
10	! X =	153.45702,	-4.7714,	106.000,	0.000!	!END!
11	! X =	153.45172,	-4.52308,	110.000,	0.000!	!END!
12	! X =	153.44641,	-4.27476,	116.000,	0.000!	!END!
13	! X =	153.44111,	-4.02645,	121.000,	0.000!	!END!
14	! X =	153.72099,	-5.50997,	103.000,	0.000!	!END!
15	! X =	153.71568,	-5.26166,	104.000,	0.000!	!END!
16	! X =	153.71047,	-5.01334,	105.000,	0.000!	!END!
17	! X =	153.70515,	-4.76602,	105.000,	0.000!	!END!
18	! X =	153.69985,	-4.5177,	106.000,	0.000!	!END!
19	! X =	153.69464,	-4.26938,	109.000,	0.000!	!END!
20	! X =	153.68934,	-4.02107,	113.000,	0.000!	!END!
21	! X =	153.68403,	-3.77275,	117.000,	0.000!	!END!
22	! X =	153.94808,	-4.51232,	105.000,	0.000!	!END!
23	! X =	153.94277,	-4.264,	105.000,	0.000!	!END!
24	! X =	153.93747,	-4.01569,	106.000,	0.000!	!END!
25	! X =	153.93216,	-3.76737,	112.000,	0.000!	!END!
26	! X =	153.92695,	-3.51906,	118.000,	0.000!	!END!
27	! X =	154.21735,	-5.49921,	102.000,	0.000!	!END!
28	! X =	154.21203,	-5.25188,	102.000,	0.000!	!END!
29	! X =	154.20672,	-5.00357,	102.000,	0.000!	!END!
30	! X =	154.20151,	-4.75525,	103.000,	0.000!	!END!
31	! X =	154.19621,	-4.50694,	104.000,	0.000!	!END!
32	! X =	154.1909,	-4.25862,	104.000,	0.000!	!END!
33	! X =	154.1856,	-4.01031,	105.000,	0.000!	!END!
34	! X =	154.18039,	-3.76199,	106.000,	0.000!	!END!
35	! X =	154.17507,	-3.51467,	112.000,	0.000!	!END!
36	! X =	154.16977,	-3.26635,	116.000,	0.000!	!END!
37	! X =	154.16446,	-3.01804,	117.000,	0.000!	!END!
38	! X =	154.46548,	-5.49382,	102.000,	0.000!	!END!
39	! X =	154.46016,	-5.2465,	102.000,	0.000!	!END!
40	! X =	154.45495,	-4.99819,	102.000,	0.000!	!END!
41	! X =	154.44964,	-4.74987,	102.000,	0.000!	!END!
42	! X =	154.44434,	-4.50155,	103.000,	0.000!	!END!
43	! X =	154.43913,	-4.25324,	103.000,	0.000!	!END!
44	! X =	154.43382,	-4.00492,	104.000,	0.000!	!END!
45	! X =	154.42851,	-3.7576,	105.000,	0.000!	!END!
46	! X =	154.4232,	-3.50929,	105.000,	0.000!	!END!
47	! X =	154.418,	-3.26098,	106.000,	0.000!	!END!
48	! X =	154.41269,	-3.01266,	110.000,	0.000!	!END!
49	! X =	154.40739,	-2.76435,	119.000,	0.000!	!END!
50	! X =	154.7137,	-5.48943,	102.000,	0.000!	!END!
51	! X =	154.70839,	-5.24112,	102.000,	0.000!	!END!
52	! X =	154.70308,	-4.9928,	102.000,	0.000!	!END!
53	! X =	154.69777,	-4.74449,	102.000,	0.000!	!END!
54	! X =	154.69256,	-4.49617,	102.000,	0.000!	!END!
55	! X =	154.68726,	-4.24786,	102.000,	0.000!	!END!

```
 56 ! X =   154.68195,   -3.99954,     102.000,       0.000!   !END!
 57 ! X =   154.67664,   -3.75222,     103.000,       0.000!   !END!
 58 ! X =   154.67143,   -3.50391,     104.000,       0.000!   !END!
 59 ! X =   154.66613,   -3.25559,     105.000,       0.000!   !END!
 60 ! X =   154.66082,   -3.00728,     106.000,       0.000!   !END!
 61 ! X =   154.65552,   -2.75897,     110.000,       0.000!   !END!
 62 ! X =   154.65031,   -2.51065,     117.000,       0.000!   !END!
 63 ! X =   154.96182,   -5.48405,     102.000,       0.000!   !END!
 64 ! X =   154.95652,   -5.23573,     102.000,       0.000!   !END!
 65 ! X =   154.95121,   -4.98742,     102.000,       0.000!   !END!
 66 ! X =     154.946,    -4.7391,     102.000,       0.000!   !END!
 67 ! X =   154.94069,   -4.49079,     102.000,       0.000!   !END!
 68 ! X =   154.93539,   -4.24248,     102.000,       0.000!   !END!
 69 ! X =   154.93017,   -3.99516,     102.000,       0.000!   !END!
 70 ! X =   154.92486,   -3.74684,     102.000,       0.000!   !END!
 71 ! X =   154.91956,   -3.49853,     102.000,       0.000!   !END!
 72 ! X =   154.91425,   -3.25021,     103.000,       0.000!   !END!
 73 ! X =   154.90905,    -3.0019,     104.000,       0.000!   !END!
 74 ! X =   154.90374,   -2.75359,     106.000,       0.000!   !END!
 75 ! X =   154.89844,   -2.50528,     106.000,       0.000!   !END!
 76 ! X =   154.89313,   -2.25796,     108.000,       0.000!   !END!
 77 ! X =   154.88782,   -2.00964,     121.000,       0.000!   !END!
 78 ! X =   155.21526,   -5.72698,     102.000,       0.000!   !END!
 79 ! X =   155.20995,   -5.47866,     102.000,       0.000!   !END!
 80 ! X =   155.20474,   -5.23035,     102.000,       0.000!   !END!
 81 ! X =   155.19944,   -4.98204,     102.000,       0.000!   !END!
 82 ! X =   155.19413,   -4.73372,     102.000,       0.000!   !END!
 83 ! X =   155.18882,   -4.48541,     102.000,       0.000!   !END!
 84 ! X =    155.1836,   -4.23809,     102.000,       0.000!   !END!
 85 ! X =    155.1783,   -3.98977,     102.000,       0.000!   !END!
 86 ! X =   155.17299,   -3.74146,     102.000,       0.000!   !END!
 87 ! X =   155.16769,   -3.49315,     102.000,       0.000!   !END!
 88 ! X =   155.16248,   -3.24483,     102.000,       0.000!   !END!
 89 ! X =   155.15718,   -2.99652,     103.000,       0.000!   !END!
 90 ! X =   155.15187,   -2.74821,     104.000,       0.000!   !END!
 91 ! X =   155.14656,   -2.50089,     105.000,       0.000!   !END!
 92 ! X =   155.14135,   -2.25258,     106.000,       0.000!   !END!
 93 ! X =   155.13605,   -2.00426,     116.000,       0.000!   !END!
 94 ! X =   155.13075,   -1.75595,     121.000,       0.000!   !END!
 95 ! X =   155.43705,   -4.48003,     102.000,       0.000!   !END!
 96 ! X =   155.43173,   -4.23271,     102.000,       0.000!   !END!
 97 ! X =   155.42643,   -3.98439,     102.000,       0.000!   !END!
 98 ! X =   155.42122,   -3.73608,     102.000,       0.000!   !END!
 99 ! X =   155.41591,   -3.48777,     102.000,       0.000!   !END!
100 ! X =   155.41061,   -3.23945,     102.000,       0.000!   !END!
101 ! X =    155.4053,   -2.99114,     102.000,       0.000!   !END!
102 ! X =       155.4,   -2.74283,     103.000,       0.000!   !END!
103 ! X =   155.39478,   -2.49551,     104.000,       0.000!   !END!
104 ! X =   155.38948,    -2.2472,     106.000,       0.000!   !END!
105 ! X =   155.38418,   -1.99889,     111.000,       0.000!   !END!
106 ! X =   155.37887,   -1.75057,     118.000,       0.000!   !END!
107 ! X =   155.37367,   -1.50226,     121.000,       0.000!   !END!
108 ! X =   155.36837,   -1.25395,     121.000,       0.000!   !END!
109 ! X =   155.67986,   -4.22732,     102.000,       0.000!   !END!
110 ! X =   155.67465,   -3.97901,     102.000,       0.000!   !END!
111 ! X =   155.66935,    -3.7307,     102.000,       0.000!   !END!
112 ! X =   155.66404,   -3.48239,     102.000,       0.000!   !END!
113 ! X =   155.65873,   -3.23407,     102.000,       0.000!   !END!
114 ! X =   155.65353,   -2.98576,     102.000,       0.000!   !END!
115 ! X =   155.64821,   -2.73844,     102.000,       0.000!   !END!
```

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116 ! X =   155.64291,   -2.49013,     103.000,       0.000!   !END!
117 ! X =   155.63761,   -2.24182,     105.000,       0.000!   !END!
118 ! X =    155.6324,   -1.99351,     105.000,       0.000!   !END!
119 ! X =    155.6271,    -1.7452,     110.000,       0.000!   !END!
120 ! X =    155.6218,   -1.49689,     117.000,       0.000!   !END!
121 ! X =   155.61649,   -1.24857,     121.000,       0.000!   !END!
122 ! X =   155.93329,   -4.47025,     102.000,       0.000!   !END!
123 ! X =   155.92809,   -4.22194,     102.000,       0.000!   !END!
124 ! X =   155.92278,   -3.97363,     102.000,       0.000!   !END!
125 ! X =   155.91747,   -3.72532,     102.000,       0.000!   !END!
126 ! X =   155.91227,   -3.47701,     102.000,       0.000!   !END!
127 ! X =   155.90696,   -3.22869,     102.000,       0.000!   !END!
128 ! X =   155.90164,   -2.98137,     102.000,       0.000!   !END!
129 ! X =   155.89634,   -2.73306,     102.000,       0.000!   !END!
130 ! X =   155.89104,   -2.48475,     102.000,       0.000!   !END!
131 ! X =   155.88583,   -2.23644,     103.000,       0.000!   !END!
132 ! X =   155.88053,   -1.98813,     104.000,       0.000!   !END!
133 ! X =   155.87522,   -1.73982,     106.000,       0.000!   !END!
134 ! X =   155.86992,   -1.49151,     108.000,       0.000!   !END!
135 ! X =   155.86471,   -1.24419,     121.000,       0.000!   !END!
136 ! X =   155.85941,    -.99588,     121.000,       0.000!   !END!
137 ! X =   156.18152,   -4.46487,     102.000,       0.000!   !END!
138 ! X =   156.17621,   -4.21656,     102.000,       0.000!   !END!
139 ! X =   156.17091,   -3.96825,     102.000,       0.000!   !END!
140 ! X =    156.1657,   -3.71994,     102.000,       0.000!   !END!
141 ! X =   156.16039,   -3.47162,     102.000,       0.000!   !END!
142 ! X =   156.15509,   -3.22331,     102.000,       0.000!   !END!
143 ! X =   156.14977,   -2.97599,     102.000,       0.000!   !END!
144 ! X =   156.14456,   -2.72768,     102.000,       0.000!   !END!
145 ! X =   156.13926,   -2.47937,     102.000,       0.000!   !END!
146 ! X =   156.13396,   -2.23106,     102.000,       0.000!   !END!
147 ! X =   156.12865,   -1.98275,     103.000,       0.000!   !END!
148 ! X =   156.12345,   -1.73444,     103.000,       0.000!   !END!
149 ! X =   156.11814,   -1.48712,     105.000,       0.000!   !END!
150 ! X =   156.11283,   -1.23881,     109.000,       0.000!   !END!
151 ! X =   156.10753,     -.9905,     119.000,       0.000!   !END!
152 ! X =   156.10223,    -.74219,     107.000,       0.000!   !END!
153 ! X =   156.42965,   -4.45949,     102.000,       0.000!   !END!
154 ! X =   156.41913,   -3.96287,     102.000,       0.000!   !END!
155 ! X =   156.41382,   -3.71455,     102.000,       0.000!   !END!
156 ! X =   156.40852,   -3.46624,     102.000,       0.000!   !END!
157 ! X =    156.4033,   -3.21893,     102.000,       0.000!   !END!
158 ! X =     156.398,   -2.97061,     102.000,       0.000!   !END!
159 ! X =   156.39269,    -2.7223,     102.000,       0.000!   !END!
160 ! X =   156.38739,   -2.47399,     102.000,       0.000!   !END!
161 ! X =   156.38208,   -2.22568,     102.000,       0.000!   !END!
162 ! X =   156.37688,   -1.97737,     102.000,       0.000!   !END!
163 ! X =   156.37157,   -1.72906,     102.000,       0.000!   !END!
164 ! X =   156.36626,   -1.48174,     104.000,       0.000!   !END!
165 ! X =   156.36096,   -1.23343,     104.000,       0.000!   !END!
166 ! X =   156.35575,    -.98513,     105.000,       0.000!   !END!
167 ! X =   156.35045,    -.73682,     106.000,       0.000!   !END!
168 ! X =   156.34515,    -.48851,     112.000,       0.000!   !END!
169 ! X =   156.33985,     -.2402,     121.000,       0.000!   !END!
170 ! X =   156.66195,   -3.70917,     102.000,       0.000!   !END!
171 ! X =   156.65673,   -3.46186,     102.000,       0.000!   !END!
172 ! X =   156.65143,   -3.21354,     102.000,       0.000!   !END!
173 ! X =   156.64612,   -2.96523,     102.000,       0.000!   !END!
174 ! X =   156.64082,   -2.71692,     102.000,       0.000!   !END!
175 ! X =   156.63561,   -2.46861,     102.000,       0.000!   !END!
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176 ! X =   156.63031,    -2.2203,     102.000,       0.000!   !END!
177 ! X =     156.625,   -1.97199,     102.000,       0.000!   !END!
178 ! X =   156.61969,   -1.72468,     102.000,       0.000!   !END!
179 ! X =   156.61448,   -1.47637,     102.000,       0.000!   !END!
180 ! X =   156.60918,   -1.22806,     103.000,       0.000!   !END!
181 ! X =   156.60388,    -.97975,     104.000,       0.000!   !END!
182 ! X =   156.59858,    -.73144,     105.000,       0.000!   !END!
183 ! X =   156.59327,    -.48313,     107.000,       0.000!   !END!
184 ! X =   156.58807,    -.23482,     118.000,       0.000!   !END!
185 ! X =   156.58276,     .01249,     121.000,       0.000!   !END!
186 ! X =   156.91017,   -3.70379,     102.000,       0.000!   !END!
187 ! X =   156.90486,   -3.45647,     102.000,       0.000!   !END!
188 ! X =   156.89955,   -3.20816,     102.000,       0.000!   !END!
189 ! X =   156.89434,   -2.95985,     102.000,       0.000!   !END!
190 ! X =   156.88904,   -2.71154,     102.000,       0.000!   !END!
191 ! X =   156.88373,   -2.46323,     102.000,       0.000!   !END!
192 ! X =   156.87843,   -2.21492,     102.000,       0.000!   !END!
193 ! X =   156.87313,   -1.96661,     102.000,       0.000!   !END!
194 ! X =   156.86791,    -1.7193,     102.000,       0.000!   !END!
195 ! X =   156.86261,   -1.47099,     102.000,       0.000!   !END!
196 ! X =    156.8573,   -1.22268,     102.000,       0.000!   !END!
197 ! X =     156.852,    -.97437,     103.000,       0.000!   !END!
198 ! X =    156.8468,    -.72606,     104.000,       0.000!   !END!
199 ! X =    156.8415,    -.47775,     105.000,       0.000!   !END!
200 ! X =   156.83619,    -.23044,     108.000,       0.000!   !END!
201 ! X =   156.83088,     .01787,     115.000,       0.000!   !END!
202 ! X =   156.82558,     .26618,     119.000,       0.000!   !END!
203 ! X =   156.82038,     .51448,     121.000,       0.000!   !END!
204 ! X =   157.15298,   -3.45109,     104.000,       0.000!   !END!
205 ! X =   157.14778,   -3.20278,     102.000,       0.000!   !END!
206 ! X =   157.14247,   -2.95447,     102.000,       0.000!   !END!
207 ! X =   157.13716,   -2.70616,     102.000,       0.000!   !END!
208 ! X =   157.13186,   -2.45785,     102.000,       0.000!   !END!
209 ! X =   157.12665,   -2.20954,     102.000,       0.000!   !END!
210 ! X =   157.12134,   -1.96223,     102.000,       0.000!   !END!
211 ! X =   157.11604,   -1.71392,     102.000,       0.000!   !END!
212 ! X =   157.11073,   -1.46561,     102.000,       0.000!   !END!
213 ! X =   157.10553,    -1.2173,     102.000,       0.000!   !END!
214 ! X =   157.10022,    -.96899,     102.000,       0.000!   !END!
215 ! X =   157.09492,    -.72069,     103.000,       0.000!   !END!
216 ! X =   157.08962,    -.47238,     104.000,       0.000!   !END!
217 ! X =   157.08431,    -.22506,     105.000,       0.000!   !END!
218 ! X =   157.07911,     .02324,     108.000,       0.000!   !END!
219 ! X =   157.07381,     .27155,     114.000,       0.000!   !END!
220 ! X =   157.06851,     .51986,     116.000,       0.000!   !END!
221 ! X =   157.06321,     .76817,     119.000,       0.000!   !END!
222 ! X =   157.05791,    1.01647,     122.000,       0.000!   !END!
223 ! X =    157.3959,    -3.1974,     104.000,       0.000!   !END!
224 ! X =   157.39059,   -2.94909,     102.000,       0.000!   !END!
225 ! X =   157.38539,   -2.70078,     102.000,       0.000!   !END!
226 ! X =   157.38008,   -2.45247,     102.000,       0.000!   !END!
227 ! X =   157.37477,   -2.20516,     102.000,       0.000!   !END!
228 ! X =   157.36946,   -1.95685,     102.000,       0.000!   !END!
229 ! X =   157.36416,   -1.70854,     102.000,       0.000!   !END!
230 ! X =   157.35895,   -1.46023,     102.000,       0.000!   !END!
231 ! X =   157.35365,   -1.21192,     102.000,       0.000!   !END!
232 ! X =   157.34835,    -.96362,     102.000,       0.000!   !END!
233 ! X =   157.34305,    -.71531,     103.000,       0.000!   !END!
234 ! X =   157.33783,    -.46799,     103.000,       0.000!   !END!
235 ! X =   157.33253,    -.21969,     104.000,       0.000!   !END!
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236 ! X =   157.32723,      .02862,     105.000,       0.000!   !END!
237 ! X =   157.32193,      .27693,     106.000,       0.000!   !END!
238 ! X =   157.31663,      .52523,     109.000,       0.000!   !END!
239 ! X =   157.31143,      .77354,     113.000,       0.000!   !END!
240 ! X =   157.30613,     1.02185,     115.000,       0.000!   !END!
241 ! X =   157.64402,    -3.19202,     114.000,       0.000!   !END!
242 ! X =   157.63882,    -2.94371,     104.000,       0.000!   !END!
243 ! X =   157.63351,     -2.6954,     103.000,       0.000!   !END!
244 ! X =   157.62821,    -2.44709,     102.000,       0.000!   !END!
245 ! X =   157.62289,    -2.19978,     102.000,       0.000!   !END!
246 ! X =   157.61768,    -1.95147,     102.000,       0.000!   !END!
247 ! X =   157.61238,    -1.70316,     102.000,       0.000!   !END!
248 ! X =   157.60708,    -1.45485,     102.000,       0.000!   !END!
249 ! X =   157.60177,    -1.20655,     102.000,       0.000!   !END!
250 ! X =   157.59657,     -.95824,     102.000,       0.000!   !END!
251 ! X =   157.59127,     -.70993,     102.000,       0.000!   !END!
252 ! X =   157.58595,     -.46262,     103.000,       0.000!   !END!
253 ! X =   157.58065,     -.21431,     103.000,       0.000!   !END!
254 ! X =   157.57535,        .034,     104.000,       0.000!   !END!
255 ! X =   157.57015,       .2823,     104.000,       0.000!   !END!
256 ! X =   157.56485,      .53061,     104.000,       0.000!   !END!
257 ! X =   157.55955,      .77892,     103.000,       0.000!   !END!
258 ! X =   157.55425,     1.02722,     107.000,       0.000!   !END!
259 ! X =   157.54894,     1.27454,     107.000,       0.000!   !END!
260 ! X =   157.54364,     1.52284,     115.000,       0.000!   !END!
261 ! X =   157.88694,    -2.93833,     106.000,       0.000!   !END!
262 ! X =   157.88163,    -2.69002,     104.000,       0.000!   !END!
263 ! X =   157.87642,    -2.44271,     102.000,       0.000!   !END!
264 ! X =   157.87111,     -2.1944,     102.000,       0.000!   !END!
265 ! X =   157.86581,    -1.94609,     102.000,       0.000!   !END!
266 ! X =    157.8605,    -1.69778,     102.000,       0.000!   !END!
267 ! X =    157.8553,    -1.44948,     102.000,       0.000!   !END!
268 ! X =      157.85,    -1.20117,     102.000,       0.000!   !END!
269 ! X =   157.84469,     -.95286,     102.000,       0.000!   !END!
270 ! X =   157.83938,     -.70555,     102.000,       0.000!   !END!
271 ! X =   157.83408,     -.45724,     102.000,       0.000!   !END!
272 ! X =   157.82887,     -.20893,     102.000,       0.000!   !END!
273 ! X =   157.82357,      .03937,     103.000,       0.000!   !END!
274 ! X =   157.81827,      .28768,     103.000,       0.000!   !END!
275 ! X =   157.81297,      .53598,     103.000,       0.000!   !END!
276 ! X =   157.80767,      .78429,     101.000,       0.000!   !END!
277 ! X =   157.80246,      1.0316,     104.000,       0.000!   !END!
278 ! X =   157.79716,     1.27991,     105.000,       0.000!   !END!
279 ! X =   157.79186,     1.52821,     106.000,       0.000!   !END!
280 ! X =   157.78656,     1.77652,     114.000,       0.000!   !END!
281 ! X =   157.78126,     2.02482,     119.000,       0.000!   !END!
282 ! X =   158.13516,    -2.93295,     113.000,       0.000!   !END!
283 ! X =   158.12985,    -2.68564,     104.000,       0.000!   !END!
284 ! X =   158.12454,    -2.43733,     102.000,       0.000!   !END!
285 ! X =   158.11924,    -2.18902,     102.000,       0.000!   !END!
286 ! X =   158.11393,    -1.94071,     102.000,       0.000!   !END!
287 ! X =   158.10872,    -1.69241,     102.000,       0.000!   !END!
288 ! X =   158.10342,     -1.4441,     102.000,       0.000!   !END!
289 ! X =   158.09812,    -1.19579,     102.000,       0.000!   !END!
290 ! X =    158.0928,     -.94848,     102.000,       0.000!   !END!
291 ! X =   158.08671,     -.70016,     102.000,       0.000!   !END!
292 ! X =    158.0823,     -.45186,     102.000,       0.000!   !END!
293 ! X =     158.077,     -.20356,     102.000,       0.000!   !END!
294 ! X =   158.07169,      .04475,     102.000,       0.000!   !END!
295 ! X =   158.06639,      .29305,     102.000,       0.000!   !END!
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296 ! X =   158.06119,      .54136,     102.000,       0.000!   !END!
297 ! X =   158.05588,      .78867,     102.000,       0.000!   !END!
298 ! X =   158.05058,     1.03698,     102.000,       0.000!   !END!
299 ! X =   158.04528,     1.28528,     103.000,       0.000!   !END!
300 ! X =   158.03998,     1.53359,     104.000,       0.000!   !END!
301 ! X =   158.03468,     1.78189,     105.000,       0.000!   !END!
302 ! X =   158.02948,      2.0302,     105.000,       0.000!   !END!
303 ! X =   158.02418,      2.2785,     105.000,       0.000!   !END!
304 ! X =   158.38328,    -2.92757,     114.000,       0.000!   !END!
305 ! X =   158.37797,    -2.68025,     105.000,       0.000!   !END!
306 ! X =   158.37266,    -2.43195,     103.000,       0.000!   !END!
307 ! X =   158.36746,    -2.18364,     102.000,       0.000!   !END!
308 ! X =   158.36215,    -1.93533,     102.000,       0.000!   !END!
309 ! X =   158.35685,    -1.68703,     102.000,       0.000!   !END!
310 ! X =   158.35154,    -1.43872,     102.000,       0.000!   !END!
311 ! X =   158.34634,    -1.19041,     102.000,       0.000!   !END!
312 ! X =   158.34102,      -.9431,     102.000,       0.000!   !END!
313 ! X =   158.33572,     -.69479,     102.000,       0.000!   !END!
314 ! X =   158.33042,     -.44649,     102.000,       0.000!   !END!
315 ! X =   158.32512,     -.19818,     102.000,       0.000!   !END!
316 ! X =   158.31991,      .05012,     102.000,       0.000!   !END!
317 ! X =   158.31461,      .29843,     102.000,       0.000!   !END!
318 ! X =   158.30931,      .54674,     102.000,       0.000!   !END!
319 ! X =     158.304,      .79405,     102.000,       0.000!   !END!
320 ! X =    158.2987,     1.04235,     102.000,       0.000!   !END!
321 ! X =    158.2935,     1.29066,     102.000,       0.000!   !END!
322 ! X =    158.2882,     1.53896,     102.000,       0.000!   !END!
323 ! X =    158.2829,     1.78727,     103.000,       0.000!   !END!
324 ! X =    158.2776,     2.03557,     103.000,       0.000!   !END!
325 ! X =    158.2723,     2.28387,     103.000,       0.000!   !END!
326 ! X =     158.267,     2.53119,     103.000,       0.000!   !END!
327 ! X =    158.2618,     2.77949,     103.000,       0.000!   !END!
328 ! X =    158.6314,    -2.92318,     108.000,       0.000!   !END!
329 ! X =   158.62619,    -2.67488,     104.000,       0.000!   !END!
330 ! X =   158.62088,    -2.42657,     103.000,       0.000!   !END!
331 ! X =   158.61558,    -2.17826,     102.000,       0.000!   !END!
332 ! X =   158.61027,    -1.92995,     102.000,       0.000!   !END!
333 ! X =   158.60507,    -1.68165,     102.000,       0.000!   !END!
334 ! X =   158.59976,    -1.43334,     102.000,       0.000!   !END!
335 ! X =   158.59445,    -1.18603,     102.000,       0.000!   !END!
336 ! X =   158.58915,     -.93772,     102.000,       0.000!   !END!
337 ! X =   158.58384,     -.68942,     102.000,       0.000!   !END!
338 ! X =   158.57864,     -.44111,     102.000,       0.000!   !END!
339 ! X =   158.57334,      -.1928,     102.000,       0.000!   !END!
340 ! X =   158.56803,       .0555,     102.000,       0.000!   !END!
341 ! X =   158.56273,      .30381,     102.000,       0.000!   !END!
342 ! X =   158.55742,      .55112,     102.000,       0.000!   !END!
343 ! X =   158.55222,      .79942,     102.000,       0.000!   !END!
344 ! X =   158.54692,     1.04773,     102.000,       0.000!   !END!
345 ! X =   158.54162,     1.29603,     102.000,       0.000!   !END!
346 ! X =   158.53632,     1.54434,     102.000,       0.000!   !END!
347 ! X =   158.53102,     1.79264,     102.000,       0.000!   !END!
348 ! X =   158.52572,     2.04094,     102.000,       0.000!   !END!
349 ! X =   158.52051,     2.28825,     102.000,       0.000!   !END!
350 ! X =   158.51521,     2.53656,     103.000,       0.000!   !END!
351 ! X =   158.50992,     2.78486,     103.000,       0.000!   !END!
352 ! X =   158.50462,     3.03316,     103.000,       0.000!   !END!
353 ! X =   158.87962,     -2.9178,     117.000,       0.000!   !END!
354 ! X =   158.87431,    -2.66949,     105.000,       0.000!   !END!
355 ! X =   158.86901,    -2.42119,     103.000,       0.000!   !END!
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356 ! X =   158.8638,   -2.17288,     102.000,       0.000!   !END!
357 ! X =  158.85849,   -1.92457,     102.000,       0.000!   !END!
358 ! X =  158.85319,   -1.67627,     102.000,       0.000!   !END!
359 ! X =  158.84787,   -1.42896,     102.000,       0.000!   !END!
360 ! X =  158.84257,   -1.18065,     102.000,       0.000!   !END!
361 ! X =  158.83737,    -.93234,     102.000,       0.000!   !END!
362 ! X =  158.83206,    -.68404,     102.000,       0.000!   !END!
363 ! X =  158.82676,    -.43573,     102.000,       0.000!   !END!
364 ! X =  158.82146,    -.18743,     102.000,       0.000!   !END!
365 ! X =  158.81616,     .06088,     102.000,       0.000!   !END!
366 ! X =  158.81094,     .30819,     102.000,       0.000!   !END!
367 ! X =  158.80564,     .55649,     102.000,       0.000!   !END!
368 ! X =  158.80034,      .8048,     102.000,       0.000!   !END!
369 ! X =  158.79504,     1.0531,     102.000,       0.000!   !END!
370 ! X =  158.78974,    1.30141,     102.000,       0.000!   !END!
371 ! X =  158.78454,    1.54971,     102.000,       0.000!   !END!
372 ! X =  158.77924,    1.79801,     102.000,       0.000!   !END!
373 ! X =  158.77394,    2.04632,     102.000,       0.000!   !END!
374 ! X =  158.76863,    2.29363,     102.000,       0.000!   !END!
375 ! X =  158.76333,    2.54193,     102.000,       0.000!   !END!
376 ! X =  158.75804,    2.79023,     103.000,       0.000!   !END!
377 ! X =  158.75284,    3.03854,     103.000,       0.000!   !END!
378 ! X =  158.74754,    3.28684,     103.000,       0.000!   !END!
379 ! X =  159.12243,   -2.66411,     105.000,       0.000!   !END!
380 ! X =  159.11723,   -2.41581,     103.000,       0.000!   !END!
381 ! X =  159.11192,    -2.1675,     102.000,       0.000!   !END!
382 ! X =  159.10661,    -1.9192,     102.000,       0.000!   !END!
383 ! X =  159.10131,   -1.67089,     102.000,       0.000!   !END!
384 ! X =  159.09609,   -1.42358,     102.000,       0.000!   !END!
385 ! X =  159.09079,   -1.17527,     102.000,       0.000!   !END!
386 ! X =  159.08549,    -.92697,     102.000,       0.000!   !END!
387 ! X =  159.08018,    -.67866,     102.000,       0.000!   !END!
388 ! X =  159.07488,    -.43036,     102.000,       0.000!   !END!
389 ! X =  159.06968,    -.18205,     102.000,       0.000!   !END!
390 ! X =  159.06437,     .06625,     102.000,       0.000!   !END!
391 ! X =  159.05906,     .31356,     102.000,       0.000!   !END!
392 ! X =  159.05376,     .56187,     102.000,       0.000!   !END!
393 ! X =  159.04846,     .81017,     102.000,       0.000!   !END!
394 ! X =  159.04326,    1.05848,     102.000,       0.000!   !END!
395 ! X =  159.03796,    1.30678,     102.000,       0.000!   !END!
396 ! X =  159.03266,    1.55508,     102.000,       0.000!   !END!
397 ! X =  159.02736,    1.80339,     102.000,       0.000!   !END!
398 ! X =  159.02205,     2.0507,     102.000,       0.000!   !END!
399 ! X =  159.01675,      2.299,     102.000,       0.000!   !END!
400 ! X =  159.01155,     2.5473,     102.000,       0.000!   !END!
401 ! X =  159.00625,    2.79561,     102.000,       0.000!   !END!
402 ! X =  159.00096,    3.04391,     103.000,       0.000!   !END!
403 ! X =  158.99566,    3.29221,     103.000,       0.000!   !END!
404 ! X =  158.99036,    3.54051,     103.000,       0.000!   !END!
405 ! X =  159.37065,   -2.65873,     105.000,       0.000!   !END!
406 ! X =  159.36535,   -2.41043,     104.000,       0.000!   !END!
407 ! X =  159.36004,   -2.16212,     102.000,       0.000!   !END!
408 ! X =  159.35483,   -1.91382,     102.000,       0.000!   !END!
409 ! X =  159.34952,    -1.6665,     102.000,       0.000!   !END!
410 ! X =  159.34421,    -1.4182,     102.000,       0.000!   !END!
411 ! X =  159.33891,   -1.16989,     102.000,       0.000!   !END!
412 ! X =  159.33361,    -.92159,     102.000,       0.000!   !END!
413 ! X =   159.3284,    -.67328,     102.000,       0.000!   !END!
414 ! X =   159.3231,    -.42498,     102.000,       0.000!   !END!
415 ! X =   159.3178,    -.17667,     102.000,       0.000!   !END!
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416 ! X =   159.31248,      .07064,      102.000,       0.000!   !END!
417 ! X =   159.30718,      .31894,      102.000,       0.000!   !END!
418 ! X =   159.30198,      .56724,      102.000,       0.000!   !END!
419 ! X =   159.29668,      .81555,      102.000,       0.000!   !END!
420 ! X =   159.29138,     1.06385,      102.000,       0.000!   !END!
421 ! X =   159.28608,     1.31215,      102.000,       0.000!   !END!
422 ! X =   159.28078,     1.56046,      102.000,       0.000!   !END!
423 ! X =   159.27478,     1.80778,      102.000,       0.000!   !END!
424 ! X =   159.27027,     2.05607,      102.000,       0.000!   !END!
425 ! X =   159.26497,     2.30437,      102.000,       0.000!   !END!
426 ! X =   159.25967,     2.55268,      102.000,       0.000!   !END!
427 ! X =   159.25437,     2.80098,      102.000,       0.000!   !END!
428 ! X =   159.24907,     3.04928,      102.000,       0.000!   !END!
429 ! X =   159.24388,     3.29758,      103.000,       0.000!   !END!
430 ! X =   159.23857,     3.54489,      103.000,       0.000!   !END!
431 ! X =   159.23327,     3.79319,      103.000,       0.000!   !END!
432 ! X =   159.22798,     4.04149,      107.000,       0.000!   !END!
433 ! X =   159.61877,    -2.65335,      105.000,       0.000!   !END!
434 ! X =   159.61357,    -2.40505,      104.000,       0.000!   !END!
435 ! X =   159.60826,    -2.15674,      102.000,       0.000!   !END!
436 ! X =   159.60294,    -1.90943,      102.000,       0.000!   !END!
437 ! X =   159.59764,    -1.66112,      102.000,       0.000!   !END!
438 ! X =   159.59233,    -1.41282,      102.000,       0.000!   !END!
439 ! X =   159.58713,    -1.16452,      102.000,       0.000!   !END!
440 ! X =   159.58182,     -.91621,      102.000,       0.000!   !END!
441 ! X =   159.57652,     -.66791,      102.000,       0.000!   !END!
442 ! X =   159.57122,      -.4196,      102.000,       0.000!   !END!
443 ! X =   159.56601,      -.1713,      102.000,       0.000!   !END!
444 ! X =    159.5607,      .07601,      101.000,       0.000!   !END!
445 ! X =    159.5554,      .32432,      102.000,       0.000!   !END!
446 ! X =    159.5501,      .57262,      102.000,       0.000!   !END!
447 ! X =    159.5448,      .82092,      102.000,       0.000!   !END!
448 ! X =    159.5395,     1.06923,      102.000,       0.000!   !END!
449 ! X =   159.53429,     1.31753,      102.000,       0.000!   !END!
450 ! X =   159.52899,     1.56583,      102.000,       0.000!   !END!
451 ! X =   159.52368,     1.81314,      102.000,       0.000!   !END!
452 ! X =   159.51839,     2.06144,      102.000,       0.000!   !END!
453 ! X =   159.51309,     2.30975,      102.000,       0.000!   !END!
454 ! X =   159.50789,     2.55805,      102.000,       0.000!   !END!
455 ! X =   159.50259,     2.80635,      102.000,       0.000!   !END!
456 ! X =   159.49729,     3.05465,      102.000,       0.000!   !END!
457 ! X =   159.49199,     3.30295,      103.000,       0.000!   !END!
458 ! X =   159.48669,     3.55026,      103.000,       0.000!   !END!
459 ! X =   159.48139,     3.79856,      103.000,       0.000!   !END!
460 ! X =   159.47609,     4.04686,      104.000,       0.000!   !END!
461 ! X =    159.4709,     4.29516,      104.000,       0.000!   !END!
462 ! X =   159.86169,    -2.39967,      105.000,       0.000!   !END!
463 ! X =   159.85638,    -2.15136,      103.000,       0.000!   !END!
464 ! X =   159.85106,    -1.90405,      102.000,       0.000!   !END!
465 ! X =   159.84586,    -1.65575,      102.000,       0.000!   !END!
466 ! X =   159.84055,    -1.40744,      102.000,       0.000!   !END!
467 ! X =   159.83525,    -1.15914,      102.000,       0.000!   !END!
468 ! X =   159.82994,     -.91083,      102.000,       0.000!   !END!
469 ! X =   159.82474,     -.66253,      102.000,       0.000!   !END!
470 ! X =   159.81944,     -.41422,      102.000,       0.000!   !END!
471 ! X =   159.81412,     -.16691,      102.000,       0.000!   !END!
472 ! X =   159.80882,      .08139,      102.000,       0.000!   !END!
473 ! X =   159.80352,      .32969,      102.000,       0.000!   !END!
474 ! X =   159.79832,        .578,      102.000,       0.000!   !END!
475 ! X =   159.79301,       .8263,      102.000,       0.000!   !END!
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476	! X =	159.78771,	1.0746,	102.000,	0.000!	!END!
477	! X =	159.78241,	1.3229,	102.000,	0.000!	!END!
478	! X =	159.7771,	1.57021,	102.000,	0.000!	!END!
479	! X =	159.7718,	1.81852,	102.000,	0.000!	!END!
480	! X =	159.7666,	2.06682,	102.000,	0.000!	!END!
481	! X =	159.7613,	2.31512,	102.000,	0.000!	!END!
482	! X =	159.756,	2.56342,	102.000,	0.000!	!END!
483	! X =	159.75071,	2.81172,	102.000,	0.000!	!END!
484	! X =	159.74541,	3.06002,	102.000,	0.000!	!END!
485	! X =	159.7401,	3.30733,	102.000,	0.000!	!END!
486	! X =	159.7349,	3.55563,	103.000,	0.000!	!END!
487	! X =	159.72961,	3.80393,	103.000,	0.000!	!END!
488	! X =	159.72431,	4.05223,	103.000,	0.000!	!END!
489	! X =	159.71901,	4.30053,	103.000,	0.000!	!END!
490	! X =	159.71372,	4.54883,	103.000,	0.000!	!END!
491	! X =	160.08867,	-1.40206,	102.000,	0.000!	!END!
492	! X =	160.08347,	-1.15376,	102.000,	0.000!	!END!
493	! X =	160.07816,	-.90545,	102.000,	0.000!	!END!
494	! X =	160.07286,	-.65715,	102.000,	0.000!	!END!
495	! X =	160.06754,	-.40984,	101.000,	0.000!	!END!
496	! X =	160.06224,	-.16154,	102.000,	0.000!	!END!
497	! X =	160.05704,	.08677,	102.000,	0.000!	!END!
498	! X =	160.05174,	.33507,	102.000,	0.000!	!END!
499	! X =	160.04643,	.58337,	102.000,	0.000!	!END!
500	! X =	160.04113,	.83167,	102.000,	0.000!	!END!
501	! X =	160.03583,	1.07998,	102.000,	0.000!	!END!
502	! X =	160.03062,	1.32728,	102.000,	0.000!	!END!
503	! X =	160.02532,	1.57559,	102.000,	0.000!	!END!
504	! X =	160.02002,	1.82389,	102.000,	0.000!	!END!
505	! X =	160.01472,	2.07219,	102.000,	0.000!	!END!
506	! X =	160.00942,	2.32049,	102.000,	0.000!	!END!
507	! X =	160.00412,	2.56879,	102.000,	0.000!	!END!
508	! X =	159.99892,	2.81709,	102.000,	0.000!	!END!
509	! X =	159.99362,	3.06539,	102.000,	0.000!	!END!
510	! X =	159.98832,	3.3127,	102.000,	0.000!	!END!
511	! X =	159.98302,	3.561,	102.000,	0.000!	!END!
512	! X =	159.97772,	3.8093,	103.000,	0.000!	!END!
513	! X =	159.97243,	4.0576,	103.000,	0.000!	!END!
514	! X =	159.96713,	4.3059,	103.000,	0.000!	!END!
515	! X =	159.96193,	4.5542,	103.000,	0.000!	!END!
516	! X =	159.95664,	4.8025,	103.000,	0.000!	!END!
517	! X =	160.05087,	5.11531,	104.000,	0.000!	!END!
518	! X =	160.05241,	4.86804,	103.000,	0.000!	!END!
519	! X =	160.05386,	4.62077,	103.000,	0.000!	!END!
520	! X =	160.05541,	4.3735,	103.000,	0.000!	!END!
521	! X =	160.05696,	4.12624,	103.000,	0.000!	!END!
522	! X =	160.05852,	3.87996,	103.000,	0.000!	!END!
523	! X =	160.06007,	3.63269,	102.000,	0.000!	!END!
524	! X =	160.06152,	3.38542,	102.000,	0.000!	!END!
525	! X =	160.06308,	3.13816,	102.000,	0.000!	!END!
526	! X =	160.06463,	2.89089,	102.000,	0.000!	!END!
527	! X =	160.06619,	2.64461,	102.000,	0.000!	!END!
528	! X =	160.06774,	2.39734,	102.000,	0.000!	!END!
529	! X =	160.06919,	2.15007,	102.000,	0.000!	!END!
530	! X =	160.07075,	1.9028,	102.000,	0.000!	!END!
531	! X =	160.07231,	1.65653,	102.000,	0.000!	!END!
532	! X =	160.07376,	1.40926,	102.000,	0.000!	!END!
533	! X =	160.07532,	1.16199,	102.000,	0.000!	!END!
534	! X =	160.07687,	.91472,	102.000,	0.000!	!END!
535	! X =	160.07843,	.66744,	102.000,	0.000!	!END!

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536 ! X =   160.07989,      .42117,      102.000,        0.000!   !END!
537 ! X =   160.08145,       .1739,      102.000,        0.000!   !END!
538 ! X =   160.08301,    -.07337,      102.000,        0.000!   !END!
539 ! X =   160.08456,    -.32065,      101.000,        0.000!   !END!
540 ! X =   160.08602,    -.56792,      102.000,        0.000!   !END!
541 ! X =   160.08759,     -.8142,      102.000,        0.000!   !END!
542 ! X =   160.08914,   -1.06147,      102.000,        0.000!   !END!
543 ! X =    160.0907,   -1.30874,      102.000,        0.000!   !END!
544 ! X =   160.09216,   -1.55601,      102.000,        0.000!   !END!
545 ! X =   160.09373,   -1.80229,      102.000,        0.000!   !END!
546 ! X =   160.09529,   -2.04956,      102.000,        0.000!   !END!
547 ! X =   160.09675,   -2.29684,      104.000,        0.000!   !END!
548 ! X =   160.09831,   -2.54411,      109.000,        0.000!   !END!
549 ! X =   159.88694,   -2.62137,      106.000,        0.000!   !END!
550 ! X =   159.67545,   -2.69962,      106.000,        0.000!   !END!
551 ! X =   159.46398,   -2.77687,      106.000,        0.000!   !END!
552 ! X =   159.25261,   -2.85413,      111.000,        0.000!   !END!
553 ! X =   159.02408,   -2.90638,      121.000,        0.000!   !END!
554 ! X =   158.79555,   -2.95963,      113.000,        0.000!   !END!
555 ! X =   158.56703,   -3.01189,      121.000,        0.000!   !END!
556 ! X =    158.3386,   -3.06414,      123.000,        0.000!   !END!
557 ! X =   158.11008,    -3.1164,      139.000,        0.000!   !END!
558 ! X =   157.88155,   -3.16866,      133.000,        0.000!   !END!
559 ! X =   157.65303,   -3.22091,      114.000,        0.000!   !END!
560 ! X =    157.4648,     -3.356,      107.000,        0.000!   !END!
561 ! X =   157.27655,   -3.49209,      105.000,        0.000!   !END!
562 ! X =   157.08832,   -3.62718,      104.000,        0.000!   !END!
563 ! X =   156.90008,   -3.76327,      103.000,        0.000!   !END!
564 ! X =    156.9011,   -3.66199,      102.000,        0.000!   !END!
565 ! X =   156.68415,   -3.65479,      102.000,        0.000!   !END!
566 ! X =   156.61502,   -3.82289,      102.000,        0.000!   !END!
567 ! X =   156.54591,   -3.98999,      102.000,        0.000!   !END!
568 ! X =   156.44447,   -4.02867,      102.000,        0.000!   !END!
569 ! X =   156.34457,   -3.90549,      102.000,        0.000!   !END!
570 ! X =   156.18916,   -3.88403,      102.000,        0.000!   !END!
571 ! X =   156.22471,   -3.99561,      102.000,        0.000!   !END!
572 ! X =   156.22729,   -4.03437,      102.000,        0.000!   !END!
573 ! X =   156.16243,   -4.07342,      102.000,        0.000!   !END!
574 ! X =   156.14481,   -4.15367,      102.000,        0.000!   !END!
575 ! X =   156.18777,   -4.21767,      102.000,        0.000!   !END!
576 ! X =   156.28167,   -4.24049,      102.000,        0.000!   !END!
577 ! X =   156.32803,   -4.26083,      102.000,        0.000!   !END!
578 ! X =   156.39661,   -4.34296,      102.000,        0.000!   !END!
579 ! X =   156.38778,    -4.4243,      102.000,        0.000!   !END!
580 ! X =   156.44188,   -4.47153,      102.000,        0.000!   !END!
581 ! X =   156.38181,   -4.53645,      102.000,        0.000!   !END!
582 ! X =   156.35904,   -4.62758,      102.000,        0.000!   !END!
583 ! X =   156.32898,   -4.65706,      102.000,        0.000!   !END!
584 ! X =    156.3118,   -4.59531,      102.000,        0.000!   !END!
585 ! X =   156.25318,   -4.60464,      102.000,        0.000!   !END!
586 ! X =   156.05992,   -4.69897,      102.000,        0.000!   !END!
587 ! X =   155.92703,   -4.70951,      102.000,        0.000!   !END!
588 ! X =   155.92228,   -4.67967,      102.000,        0.000!   !END!
589 ! X =    155.9746,    -4.6097,      102.000,        0.000!   !END!
590 ! X =   155.97366,   -4.50642,      102.000,        0.000!   !END!
591 ! X =   155.89969,   -4.46891,      102.000,        0.000!   !END!
592 ! X =   155.73603,   -4.43247,      102.000,        0.000!   !END!
593 ! X =   155.57236,   -4.39602,      102.000,        0.000!   !END!
594 ! X =    155.5221,   -4.45806,      102.000,        0.000!   !END!
595 ! X =   155.50861,   -4.52148,      102.000,        0.000!   !END!
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596	!	X =	155.52275,	-4.59014,	102.000,	0.000!	!END!
597	!	X =	155.4853,	-4.66622,	102.000,	0.000!	!END!
598	!	X =	155.34025,	-4.60812,	102.000,	0.000!	!END!
599	!	X =	155.33777,	-4.84345,	102.000,	0.000!	!END!
600	!	X =	155.33541,	-5.07778,	102.000,	0.000!	!END!
601	!	X =	155.33305,	-5.31211,	102.000,	0.000!	!END!
602	!	X =	155.33059,	-5.54644,	102.000,	0.000!	!END!
603	!	X =	155.32823,	-5.78078,	102.000,	0.000!	!END!
604	!	X =	155.24698,	-5.77795,	102.000,	0.000!	!END!
605	!	X =	155.08121,	-5.70574,	102.000,	0.000!	!END!
606	!	X =	154.91544,	-5.63253,	102.000,	0.000!	!END!
607	!	X =	154.7144,	-5.63542,	102.000,	0.000!	!END!
608	!	X =	154.51345,	-5.6393,	102.000,	0.000!	!END!
609	!	X =	154.31241,	-5.64219,	102.000,	0.000!	!END!
610	!	X =	154.11136,	-5.64608,	102.000,	0.000!	!END!
611	!	X =	154.11247,	-5.41769,	102.000,	0.000!	!END!
612	!	X =	154.11359,	-5.1893,	102.000,	0.000!	!END!
613	!	X =	154.1147,	-4.96091,	103.000,	0.000!	!END!
614	!	X =	154.11581,	-4.73351,	104.000,	0.000!	!END!
615	!	X =	153.92104,	-4.7325,	104.000,	0.000!	!END!
616	!	X =	153.72627,	-4.73148,	105.000,	0.000!	!END!
617	!	X =	153.7271,	-4.96287,	105.000,	0.000!	!END!
618	!	X =	153.72792,	-5.19525,	104.000,	0.000!	!END!
619	!	X =	153.72885,	-5.42664,	103.000,	0.000!	!END!
620	!	X =	153.72967,	-5.65902,	103.000,	0.000!	!END!
621	!	X =	153.54273,	-5.66504,	104.000,	0.000!	!END!
622	!	X =	153.3558,	-5.67105,	104.000,	0.000!	!END!
623	!	X =	153.16895,	-5.67806,	106.000,	0.000!	!END!
624	!	X =	152.98202,	-5.68408,	106.000,	0.000!	!END!
625	!	X =	152.98056,	-5.48545,	111.000,	0.000!	!END!
626	!	X =	152.9791,	-5.28682,	115.000,	0.000!	!END!
627	!	X =	153.09414,	-5.28205,	111.000,	0.000!	!END!
628	!	X =	153.14257,	-5.19616,	110.000,	0.000!	!END!
629	!	X =	153.13845,	-5.11468,	110.000,	0.000!	!END!
630	!	X =	153.13991,	-4.96971,	110.000,	0.000!	!END!
631	!	X =	152.97451,	-4.95808,	119.000,	0.000!	!END!
632	!	X =	152.97582,	-4.828,	121.000,	0.000!	!END!
633	!	X =	153.19787,	-4.83029,	106.000,	0.000!	!END!
634	!	X =	153.20182,	-4.68435,	110.000,	0.000!	!END!
635	!	X =	153.20577,	-4.53742,	115.000,	0.000!	!END!
636	!	X =	153.16186,	-4.47937,	118.000,	0.000!	!END!
637	!	X =	152.99234,	-4.47464,	120.000,	0.000!	!END!
638	!	X =	153.14003,	-4.31132,	121.000,	0.000!	!END!
639	!	X =	153.28761,	-4.148,	121.000,	0.000!	!END!
640	!	X =	153.4352,	-3.98468,	121.000,	0.000!	!END!
641	!	X =	153.58289,	-3.82136,	120.000,	0.000!	!END!
642	!	X =	153.68607,	-3.61984,	120.000,	0.000!	!END!
643	!	X =	153.74809,	-3.55792,	120.000,	0.000!	!END!
644	!	X =	153.9479,	-3.51034,	118.000,	0.000!	!END!
645	!	X =	154.04213,	-3.30476,	121.000,	0.000!	!END!
646	!	X =	154.05331,	-3.17677,	121.000,	0.000!	!END!
647	!	X =	154.0343,	-3.1011,	121.000,	0.000!	!END!
648	!	X =	154.1374,	-3.00584,	117.000,	0.000!	!END!
649	!	X =	154.2405,	-2.91058,	118.000,	0.000!	!END!
650	!	X =	154.31604,	-2.78326,	121.000,	0.000!	!END!
651	!	X =	154.4121,	-2.6502,	121.000,	0.000!	!END!
652	!	X =	154.50818,	-2.51614,	121.000,	0.000!	!END!
653	!	X =	154.60719,	-2.33543,	117.000,	0.000!	!END!
654	!	X =	154.70611,	-2.15473,	116.000,	0.000!	!END!
655	!	X =	154.80513,	-1.97403,	121.000,	0.000!	!END!

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656 ! X =   154.84149,   -1.80956,     121.000,       0.000!   !END!
657 ! X =   154.95128,   -1.73722,     121.000,       0.000!   !END!
658 ! X =   155.16835,   -1.63519,     121.000,       0.000!   !END!
659 ! X =   155.18851,    -1.6066,     121.000,       0.000!   !END!
660 ! X =   155.20482,    -1.4608,     121.000,       0.000!   !END!
661 ! X =   155.29612,   -1.26115,     121.000,       0.000!   !END!
662 ! X =   155.30634,   -1.22749,     121.000,       0.000!   !END!
663 ! X =   155.43437,   -1.20896,     121.000,       0.000!   !END!
664 ! X =    155.5472,   -1.12969,     121.000,       0.000!   !END!
665 ! X =   155.66002,   -1.05042,     121.000,       0.000!   !END!
666 ! X =   155.79788,    -.88105,     121.000,       0.000!   !END!
667 ! X =   155.93564,    -.71167,     111.000,       0.000!   !END!
668 ! X =   156.07339,    -.54329,     113.000,       0.000!   !END!
669 ! X =   156.21115,    -.37392,     121.000,       0.000!   !END!
670 ! X =   156.33819,    -.16968,     121.000,       0.000!   !END!
671 ! X =   156.46513,     .03456,     121.000,       0.000!   !END!
672 ! X =   156.59217,      .2388,     121.000,       0.000!   !END!
673 ! X =   156.71911,     .44304,     121.000,       0.000!   !END!
674 ! X =    156.7792,     .62712,     121.000,       0.000!   !END!
675 ! X =    156.8392,      .8112,     121.000,       0.000!   !END!
676 ! X =   156.89921,     .99627,     122.000,       0.000!   !END!
677 ! X =    157.0776,    1.08677,     122.000,       0.000!   !END!
678 ! X =   157.22788,    1.19345,     119.000,       0.000!   !END!
679 ! X =   157.37804,    1.29914,     113.000,       0.000!   !END!
680 ! X =    157.4846,    1.50161,     119.000,       0.000!   !END!
681 ! X =   157.59105,    1.70407,     122.000,       0.000!   !END!
682 ! X =   157.69762,    1.90752,     121.000,       0.000!   !END!
683 ! X =   157.82032,    2.10287,     114.000,       0.000!   !END!
684 ! X =   157.94311,    2.29821,     106.000,       0.000!   !END!
685 ! X =   158.06591,    2.49355,     104.000,       0.000!   !END!
686 ! X =   158.18861,    2.68889,     103.000,       0.000!   !END!
687 ! X =   158.31141,    2.88523,     103.000,       0.000!   !END!
688 ! X =   158.43421,    3.08057,     103.000,       0.000!   !END!
689 ! X =   158.58113,    3.26572,     104.000,       0.000!   !END!
690 ! X =   158.72813,    3.44989,     104.000,       0.000!   !END!
691 ! X =   158.87505,    3.63505,     104.000,       0.000!   !END!
692 ! X =   159.02206,    3.82021,     105.000,       0.000!   !END!
693 ! X =   159.16898,    4.00536,     107.000,       0.000!   !END!
694 ! X =     159.316,    4.19052,     107.000,       0.000!   !END!
695 ! X =     159.463,    4.37468,     105.000,       0.000!   !END!
696 ! X =   159.60992,    4.55984,     104.000,       0.000!   !END!
697 ! X =   159.75693,      4.745,     104.000,       0.000!   !END!
698 ! X =   159.90385,    4.93015,     104.000,       0.000!   !END!
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[a] Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

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HOL BART CLASS I ANALYSIS (MINGO)
JUNE 2008 CONTROL B (Max 30-day avg, 20% NOx, 27% SO2)
6KM UMC REFINED CALMET METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    ! METDAT = /raid2c/umc/calmet/2002/calmet02.dat !
    or
ISCMET.DAT    input    * ISCDAT =             *
    or
PLMMET.DAT    input    * PLMDAT =             *
    or
PROFILE.DAT   input    * PRFDAT =             *
SURFACE.DAT   input    * SFCDAT =             *
RESTARTB.DAT  input    * RSTARTB=             *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =HOLM2002CONB608.LST     !
CONC.DAT      output   ! CONDAT =HOLM2002CONB608.CON     !
DFLX.DAT      output   ! DFDAT  =HOLM2002CONB608.DRY     !
WFLX.DAT      output   ! WFDAT  =HOLM2002CONB608.WET     !

VISB.DAT      output   ! VISDAT =HOLM2002CONB608.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2002.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =             *
VOLEMARB.DAT  input    * VOLDAT =             *
BAEMARB.DAT   input    * ARDAT  =             *
LNEMARB.DAT   input    * LNDAT  =             *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =             *
CHEM.DAT      input    * CHEMDAT=             *
H2O2.DAT      input    * H2O2DAT=             *
HILL.DAT      input    * HILDAT=             *
HILLRCT.DAT   input    * RCTDAT=             *
COASTLN.DAT   input    * CSTDAT=             *
FLUXBDY.DAT   input    * BDYDAT=             *
BCON.DAT      input    * BCNDAT=             *
DEBUG.DAT     output   * DEBUG =             *
MASSFLX.DAT   output   * FLXDAT=             *
MASSBAL.DAT   output   * BALDAT=             *
FOG.DAT       output   * FOGDAT=             *
```

```
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--------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                Default: 1       ! NMETDAT =  1  !

     Number of PTEMARB.DAT files for run (NPTDAT)
                                Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if
NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------


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INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  2002 !
     (used only if   Month (IBMO) -- No default       ! IBMO =   01 !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   01 !
                      Hour (IBHR) -- No default       ! IBHR =   01 !

     Base time zone        (XBTZ) -- No default       ! XBTZ = 6.0  !
        PST = 8., MST = 7.
        CST = 6., EST = 5.

     Length of run (hours) (IRLG) -- No default       ! IRLG =  8760 !
```

```
     Number of chemical species (NSPEC)
                                     Default: 5       ! NSPEC =  6   !

     Number of chemical species
     to be emitted  (NSE)            Default: 3       ! NSE =  3   !

     Flag to stop run after
     SETUP phase (ITEST)             Default: 2       ! ITEST =  2   !
     (Used to allow checking
     of the model inputs, files, etc.)
           ITEST = 1 - STOPS program after SETUP phase
           ITEST = 2 - Continues with execution of program
                       after SETUP

     Restart Configuration:

        Control flag (MRESTART)      Default: 0       ! MRESTART =  0
!

           0 = Do not read or write a restart file
           1 = Read a restart file at the beginning of
               the run
           2 = Write a restart file during run
           3 = Read a restart file at beginning of run
               and write a restart file during run

        Number of periods in Restart
        output cycle (NRESPD)        Default: 0       ! NRESPD =  0   !

           0 = File written only at last period
          >0 = File updated every NRESPD periods

     Meteorological Data Format (METFM)
                                     Default: 1       ! METFM =  1   !

           METFM = 1 - CALMET binary file (CALMET.MET)
           METFM = 2 - ISC ASCII file (ISCMET.MET)
           METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
           METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                       surface parameters file (SURFACE.DAT)

  Meteorological Profile Data Format (MPRFFM)
            (used only for METFM = 1, 2, 3)
                                     Default: 1       ! MPRFFM =  1   !

           MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
           MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

     PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
     Averaging Time (minutes) (AVET)
                                     Default: 60.0    ! AVET = 60. !
     PG Averaging Time (minutes) (PGTIME)
                                     Default: 60.0    ! PGTIME = 60. !


!END!


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```

```
INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)                   Default: 1     ! MGAUSS =  1
!
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                              Default: 3     ! MCTADJ =  3
!
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                          Default: 0     ! MCTSG =  0
!
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated 0 (MSLUG)                   Default: 0     ! MSLUG =  0
!
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled ?
     (MTRANS)                              Default: 1     ! MTRANS =  1
!
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)            Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to simulate building
     downwash? (MBDW)                      Default: 1     ! MBDW =   1
!
        1 = ISC method
        2 = PRIME method

     Vertical wind shear modeled above
     stack top? (MSHEAR)                   Default: 0     ! MSHEAR =  0
!
        0 = no  (i.e., vertical wind shear not modeled)
        1 = yes (i.e., vertical wind shear modeled)

     Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0
!
        0 = no (i.e., puffs not split)
        1 = yes (i.e., puffs are split)

     Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  1
```

```
!
        0 = chemical transformation not
            modeled
        1 = transformation rates computed
            internally (MESOPUFF II scheme)
        2 = user-specified transformation
            rates used
        3 = transformation rates computed
            internally (RIVAD/ARM3 scheme)
        4 = secondary organic aerosol formation
            computed (MESOPUFF II scheme for OH)

     Aqueous phase transformation flag (MAQCHEM)
     (Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0
!
        0 = aqueous phase transformation
            not modeled
        1 = transformation rates adjusted
            for aqueous phase reactions

     Wet removal modeled ? (MWET)          Default: 1     ! MWET =  1
!
        0 = no
        1 = yes

     Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  1
!
        0 = no
        1 = yes
        (dry deposition method specified
         for each species in Input Group 3)

     Method used to compute dispersion
     coefficients (MDISP)                  Default: 3     ! MDISP =  3
!

        1 = dispersion coefficients computed from measured values
            of turbulence, sigma v, sigma w
        2 = dispersion coefficients from internally calculated
            sigma v, sigma w using micrometeorological variables
            (u*, w*, L, etc.)
        3 = PG dispersion coefficients for RURAL areas (computed using
            the ISCST multi-segment approximation) and MP coefficients
in
            urban areas
        4 = same as 3 except PG coefficients computed using
            the MESOPUFF II eqns.
        5 = CTDM sigmas used for stable and neutral conditions.
            For unstable conditions, sigmas are computed as in
            MDISP = 3, described above.  MDISP = 5 assumes that
            measured values are read

     Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
     (Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3
!
        1 = use sigma-v or sigma-theta measurements
            from PROFILE.DAT to compute sigma-y
            (valid for METFM = 1, 2, 3, 4)
        2 = use sigma-w measurements
            from PROFILE.DAT to compute sigma-z
```

```
             (valid for METFM = 1, 2, 3, 4)
          3 = use both sigma-(v/theta) and sigma-w
              from PROFILE.DAT to compute sigma-y and sigma-z
              (valid for METFM = 1, 2, 3, 4)
          4 = use sigma-theta measurements
              from PLMMET.DAT to compute sigma-y
              (valid only if METFM = 3)

       Back-up method used to compute dispersion
       when measured turbulence data are
       missing (MDISP2)                      Default: 3     ! MDISP2 =  3
!
       (used only if MDISP = 1 or 5)
          2 = dispersion coefficients from internally calculated
              sigma v, sigma w using micrometeorological variables
              (u*, w*, L, etc.)
          3 = PG dispersion coefficients for RURAL areas (computed using
              the ISCST multi-segment approximation) and MP coefficients
in
              urban areas
          4 = same as 3 except PG coefficients computed using
              the MESOPUFF II eqns.

     [DIAGNOSTIC FEATURE]
       Method used for Lagrangian timescale for Sigma-y
       (used only if MDISP=1,2 or MDISP2=1,2)
       (MTAULY)                              Default: 0     ! MTAULY =  0
!
          0 = Draxler default 617.284 (s)
          1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
         10 < Direct user input (s)             -- e.g., 306.9


       [DIAGNOSTIC FEATURE]
       Method used for Advective-Decay timescale for Turbulence
       (used only if MDISP=2 or MDISP2=2)
       (MTAUADV)                             Default: 0     ! MTAUADV =  0
!
          0 = No turbulence advection
          1 = Computed (OPTION NOT IMPLEMENTED)
         10 < Direct user input (s)   -- e.g., 300


       Method used to compute turbulence sigma-v &
       sigma-w using micrometeorological variables
       (Used only if MDISP = 2 or MDISP2 = 2)
       (MCTURB)                              Default: 1     ! MCTURB =  1
!
          1 = Standard CALPUFF subroutines
          2 = AERMOD subroutines

       PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH =  0
!
       (MROUGH)
          0 = no
          1 = yes

       Partial plume penetration of          Default: 1     ! MPARTL =  1
!
       elevated inversion?
```

```
     (MPARTL)
        0 = no
        1 = yes

     Strength of temperature inversion     Default: 0     ! MTINV =  0
!
     provided in PROFILE.DAT extended records?
     (MTINV)
        0 = no (computed from measured/default gradients)
        1 = yes

     PDF used for dispersion under convective conditions?
                                           Default: 0     ! MPDF =  0  !
     (MPDF)
        0 = no
        1 = yes

     Sub-Grid TIBL module used for shore line?
                                           Default: 0     ! MSGTIBL = 0
!
     (MSGTIBL)
        0 = no
        1 = yes

     Boundary conditions (concentration) modeled?
                                           Default: 0     ! MBCON = 0  !
     (MBCON)
        0 = no
        1 = yes, using formatted BCON.DAT file
        2 = yes, using unformatted CONC.DAT file


     Analyses of fogging and icing impacts due to emissions from
     arrays of mechanically-forced cooling towers can be performed
     using CALPUFF in conjunction with a cooling tower emissions
     processor (CTEMISS) and its associated postprocessors.  Hourly
     emissions of water vapor and temperature from each cooling tower
     cell are computed for the current cell configuration and ambient
     conditions by CTEMISS. CALPUFF models the dispersion of these
     emissions and provides cloud information in a specialized format
     for further analysis. Output to FOG.DAT is provided in either
     'plume mode' or 'receptor mode' format.

     Configure for FOG Model output?
                                           Default: 0     ! MFOG =  0
!
     (MFOG)
        0 = no
        1 = yes  - report results in PLUME Mode format
        2 = yes  - report results in RECEPTOR Mode format


     Test options specified to see if
     they conform to regulatory
     values? (MREG)                        Default: 1     ! MREG =  1
!

        0 = NO checks are made
        1 = Technical options must conform to USEPA
            Long Range Transport (LRT) guidance
```

```
                       METFM    1 or 2
                       AVET     60. (min)
                       PGTIME   60. (min)
                       MGAUSS   1
                       MCTADJ   3
                       MTRANS   1
                       MTIP     1
                       MCHEM    1 or 3 (if modeling SOx, NOx)
                       MWET     1
                       MDRY     1
                       MDISP    2 or 3
                       MPDF     0 if MDISP=3
                                1 if MDISP=2
                       MROUGH   0
                       MPARTL   1
                       SYTDEP   550. (m)
                       MHFTSZ   0

!END!


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INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!

                                                              Dry
OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED
NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,
(0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS
1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE
2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)
3= etc.)

!          SO2  =         1,               1,            1,
0   !
!          SO4  =         1,               0,            2,
0   !
!          NOX  =         1,               1,            1,
0   !
```

```
!         HNO3  =         1,                0,           1,
0   !
!          NO3  =         1,                0,           2,
0   !
!         PM10  =         1,                1,           2,
0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



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INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 37N  !
     (RLON0)                    No Default      ! RLON0 = 92W  !
```

```
         TTM :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of
projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping
plane
                RLAT0 identifies latitude of tangent-point of mapping
plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                   No Default      ! XLAT1 = 30N  !
     (XLAT2)                   No Default      ! XLAT2 = 45N  !

         LCC :  Projection cone slices through Earth's surface at XLAT1
and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of
the
     Earth known as the World Geodetic System 1984 (WGS-G ).  Other
local
     models may be in use, and their selection in CALMET will make its
output
     consistent with local mapping products.  The list of Datum-Regions
with
     official transformation parameters is provided by the National
Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)

------------------------------------------------------------------------
------
     WGS-G     WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS
(NAD27)
     NWS-27    NWS 6370KM Radius, Sphere
     NWS-84    NWS 6370KM Radius, Sphere
```

```
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere

     Datum-region for output coordinates
     (DATUM)                    Default: WGS-G     ! DATUM = WGS-84  !


METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =  87    !
            No. Y grid cells (NY)      No default     ! NY =  111   !
         No. vertical layers (NZ)      No default     ! NZ =  10   !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 6 !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
              4000. !

            Reference Coordinates
           of SOUTHWEST corner of
                 grid cell(1, 1):

            X-coordinate (XORIGKM)     No default     ! XORIGKM = -258.
!
            Y coordinate (YORIGKM)     No default     ! YORIGKM = -330.
!
                                      Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET.
grid.
     The lower left (LL) corner of the computational grid is at grid
point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of
the
     computational grid is at grid point (IECOMP, JECOMP) of the MET.
grid.
     The grid spacing of the computational grid is the same as the MET.
grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =  1
!
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =  1
!
                  (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)      No default     ! IECOMP =  87
!
                  (1 <= IECOMP <= NX)
```

```
        Y index of UR corner (JECOMP)      No default     ! JECOMP =
111    !
                  (1 <= JECOMP <= NY)



SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of
the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the
computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1
!
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1
!
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =  87
!
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =
111   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1
!
        (MESHDN is an integer >= 1)

!END!


-----------------------------------------------------------------------
-------


INPUT GROUP: 5 -- Output Options
--------------
                                             *
*
     FILE                        DEFAULT VALUE             VALUE THIS RUN
     ----                        -------------             --------------

   Concentrations (ICON)               1                   !  ICON =  1
```

```
!
   Dry Fluxes (IDRY)                  1                    !  IDRY =  1
!
   Wet Fluxes (IWET)                  1                    !  IWET =  1
!
   Relative Humidity (IVIS)           1                    !  IVIS =  1
!
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                           Default: T          ! LCOMPRS = T
!

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                         Default: 0          ! IMFLX =  0
!
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                         Default: 0          ! IMBAL =  0
!
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)    Default: 0          ! ICPRT =  0
!
       Print dry fluxes (IDPRT)        Default: 0          ! IDPRT =  0
!
       Print wet fluxes (IWPRT)        Default: 0          ! IWPRT =  0
!
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours                Default: 1          ! ICFRQ =  1
!
       Dry flux print interval
       (IDFRQ) in hours                Default: 1          ! IDFRQ =  1
!
       Wet flux print interval
       (IWFRQ) in hours                Default: 1          ! IWFRQ =  1
!

       Units for Line Printer Output
       (IPRTU)                         Default: 1          ! IPRTU =  3
!
```

```
                    for            for
               Concentration    Deposition
          1 =       g/m**3         g/m**2/s
          2 =      mg/m**3        mg/m**2/s
          3 =      ug/m**3        ug/m**2/s
          4 =      ng/m**3        ng/m**2/s
          5 =     Odour Units

       Messages tracking progress of run
       written to the screen ?
       (IMESG)                        Default: 2         ! IMESG =  2
!
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------
------ WET FLUXES ------   -- MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?
PRINTED?  SAVED ON DISK?   SAVED ON DISK?
   -------       ------------------------   ------------------------
------------------------   ---------------
!          SO2 =     0,            1,           0,            1,
0,           1,           0   !
!          SO4 =     0,            1,           0,            1,
0,           1,           0   !
!          NOX =     0,            1,           0,            1,
0,           1,           0   !
!         HNO3 =     0,            1,           0,            1,
0,           1,           0   !
!          NO3 =     0,            1,           0,            1,
0,           1,           0   !
!         PM10 =     0,            1,           0,            1,
0,           1,           0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                Default: F     ! LDEBUG
= F !

       First puff to track
       (IPFDEB)                                Default: 1     ! IPFDEB
=  1  !

       Number of puffs to track
       (NPFDEB)                                Default: 1     ! NPFDEB
=  1  !

       Met. period to start output
       (NN1)                                   Default: 1     ! NN1 =
1   !

       Met. period to end output
       (NN2)                                   Default: 10    ! NN2 =
10  !
```

```
!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =
0   !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC
=  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                  No Default     ! MHILL =
2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M
= 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M
= 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL           XC         YC       THETAH  ZGRID  RELIEF    EXPO 1
EXPO 2   SCALE 1    SCALE 2    AMAX1     AMAX2
```

```
 NO.          (km)      (km)      (deg.)   (m)     (m)      (m)
(m)       (m)        (m)       (m)       (m)
----          ----      ----      ------  -----  ------    ------
------   -------    -------    -----     -----
```

```
---------------
Subgroup (6c)
---------------
```

COMPLEX TERRAIN RECEPTOR INFORMATION

```
                      XRCT         YRCT        ZRCT           XHH
                      (km)         (km)         (m)
                     ------        -----      ------         ----
```

```
------------------
1
```

Description of Complex Terrain Variables:

```
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid
elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain
receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)
```

**
NOTE: DATA for each hill and CTSG receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

```
--------------------------------------------------------------------------
-------
```

INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases

```
--------------
```

```
      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY
MESOPHYLL RESISTANCE     HENRY'S LAW COEFFICIENT
       NAME        (cm**2/s)
(s/cm)                (dimensionless)
      -------     -----------      ----------      ----------
--------------------     -----------------------
```

```
!          SO2 =     0.1509,         1000.,            8.,
0.,                  0.04 !
!          NOX =     0.1656,            1.,            8.,
5.,                   3.5 !
!         HNO3 =     0.1628,            1.,           18.,
0.,            0.00000008 !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard
deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                   DEVIATION
                        (microns)                  (microns)
      -------      -------------------        ------------------
!          SO4 =          0.48,                       2.   !
!          NO3 =          0.48,                       2.   !
!         PM10 =            2.,                       2.   !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                          Default: 30    !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                            Default: 10    !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                         Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                           Default: 9     !   NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                           Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
```

```
        IVEG=3 for inactive vegetation

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,             0.0E00 !
!          SO4 =         1.0E-04,            3.0E-05 !
!         HNO3 =         6.0E-05,             0.0E00 !
!          NO3 =         1.0E-04,            3.0E-05 !
!         PM10 =         1.0E-04,            3.0E-05 !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0
!
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                    Default: 12*80.
     !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00,
65.00, 65.00, 26.00, 26.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                   Default: 12*10.
     !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50,
0.50, 0.50, 0.50 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2          ! RNITE1 =
.2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0          ! RNITE2 =
2.0 !
```

```
     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                  Default: 2.0         ! RNITE3 =
2.0 !

     H2O2 data input option (MH2O2)    Default: 1           ! MH2O2 =
0   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb                  Default: 12*1.
     !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
     (used only if MCHEM = 4)

     The SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)
          VOC / NOX ratio (after reaction)         (VCNX)
     to characterize the air mass when computing
     the formation of SOA from VOC emissions.
     Typical values for several distinct air mass types are:

        Month    1    2    3    4    5    6    7    8    9   10   11
12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Dec

     Clean Continental
        BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
1.
        OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20
.15
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Clean Marine (surface)
        BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
.5
        OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30
.25
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Urban - low biogenic (controls present)
        BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
30.
        OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20
.20
        VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.
4.
```

```
     Urban - high biogenic (controls present)
        BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
60.
        OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35
.25
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Regional Plume
        BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
20.
        OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30
.20
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Urban - no controls present
        BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
100.
        OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35
.30
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.
2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20,
0.20, 0.20, 0.15 !
     !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00,
50.00, 50.00, 50.00, 50.00 !


!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                           Default: 550.   ! SYTDEP
= 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                   Default: 0      ! MHFTSZ
=  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                               Default: 5      ! JSUP =
5   !

     Vertical dispersion constant for stable
```

```
     conditions (k1 in Eqn. 2.7-3)  (CONK1)     Default: 0.01   ! CONK1
= .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                    Default: 0.1    ! CONK2
= .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                      Default: 0.5    ! TBD =
.5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                             Default: 10     ! IURB1
=  10  !
                                                         19     ! IURB2
=  19  !

     Site characterization parameters for single-point Met data files
---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                              Default: 20     !
ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                                  Default: 0.25   ! Z0IN =
.25 !

        Leaf area index for modeling domain
        (XLAIIN)                                Default: 3.0    ! XLAIIN
= 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                                Default: 0.0    ! ELEVIN
= .0 !

        Latitude (degrees) for met location
        (XLATIN)                                Default: -999.  ! XLATIN
= -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                                Default: -999.  ! XLONIN
= -999.0 !

     Specialized information for interpreting single-point Met data
files -----

        Anemometer height (m) (Used only if METFM = 2,3)
        (ANEMHT)                                Default: 10.    ! ANEMHT
= 10.0 !

        Form of lateral turbulance data in PROFILE.DAT file
```

```
        (Used only if METFM = 4 or MTURBVW = 1 or 3)
        (ISIGMAV)                           Default: 1      !
ISIGMAV =  1  !
            0 = read sigma-theta
            1 = read sigma-v

        Choice of mixing heights (Used only if METFM = 4)
        (IMIXCTDM)                          Default: 0      !
IMIXCTDM =  0  !
            0 = read PREDICTED mixing heights
            1 = read OBSERVED mixing heights

     Maximum length of a slug (met. grid units)
     (XMXLEN)                               Default: 1.0    ! XMXLEN
= 1.0 !

     Maximum travel distance of a puff/slug (in
     grid units) during one sampling step
     (XSAMLEN)                              Default: 1.0    !
XSAMLEN = 1.0 !

     Maximum Number of slugs/puffs release from
     one source during one time step
     (MXNEW)                                Default: 99     ! MXNEW
=  99   !

     Maximum Number of sampling steps for
     one puff/slug during one time step
     (MXSAM)                                Default: 99     ! MXSAM
=  99   !

     Number of iterations used when computing
     the transport wind for a sampling step
     that includes gradual rise (for CALMET
     and PROFILE winds)
     (NCOUNT)                               Default: 2      ! NCOUNT
=  2   !

     Minimum sigma y for a new puff/slug (m)
     (SYMIN)                                Default: 1.0    ! SYMIN
= 1.0  !

     Minimum sigma z for a new puff/slug (m)
     (SZMIN)                                Default: 1.0    ! SZMIN
= 1.0  !

     Default minimum turbulence velocities sigma-v and sigma-w
     for each stability class over land and over water (m/s)
     (SVMIN(12) and SWMIN(12))

                     ----------  LAND  ----------       ---------  WATER
----------
        Stab Class :  A    B    C    D    E    F         A    B    C
D    E    F
                     ---  ---  ---  ---  ---  ---       ---  ---  ---
---  ---  ---
     Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37,
.37, .37, .37
     Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08,
.06, .03, .016
```

```
           ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370,
0.370, 0.370, 0.370, 0.370, 0.370!
           ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200,
0.120, 0.080, 0.060, 0.030, 0.016!


     Divergence criterion for dw/dz across puff
     used to initiate adjustment for horizontal
     convergence (1/s)
     Partial adjustment starts at CDIV(1), and
     full adjustment is reached at CDIV(2)
     (CDIV(2))                                 Default: 0.0,0.0  ! CDIV
= .0, .0 !

     Minimum wind speed (m/s) allowed for
     non-calm conditions. Also used as minimum
     speed returned when using power-law
     extrapolation toward surface
     (WSCALM)                                  Default: 0.5    ! WSCALM
= .5 !

     Maximum mixing height (m)
     (XMAXZI)                                  Default: 3000.  ! XMAXZI
= 4000.0 !

     Minimum mixing height (m)
     (XMINZI)                                  Default: 50.    ! XMINZI
= 20.0 !

     Default wind speed classes --
     5 upper bounds (m/s) are entered;
     the 6th class has no upper limit
     (WSCAT(5))                    Default   :
                                   ISC RURAL : 1.54, 3.09, 5.14, 8.23,
10.8 (10.8+)

                            Wind Speed Class :  1     2     3     4
5
                                                ---   ---   ---   ---
---
                                     ! WSCAT = 1.54, 3.09, 5.14, 8.23,
10.80 !

     Default wind speed profile power-law
     exponents for stabilities 1-6
     (PLX0(6))                     Default   : ISC RURAL values
                                   ISC RURAL : .07, .07, .10, .15,
.35, .55
                                   ISC URBAN : .15, .15, .20, .25,
.30, .30

                             Stability Class :  A     B     C     D
E     F
                                                ---   ---   ---   ---
---   ---
                                      ! PLX0 = 0.07, 0.07, 0.10, 0.15,
0.35, 0.55 !

     Default potential temperature gradient
```

```
     for stable classes E, F (degK/m)
     (PTG0(2))                        Default: 0.020, 0.035
                                         ! PTG0 = 0.020,   0.035 !

     Default plume path coefficients for
     each stability class (used when option
     for partial plume height terrain adjustment
     is selected -- MCTADJ=3)
     (PPC(6))                  Stability Class :  A     B     C     D
E     F
                                  Default  PPC : .50,  .50,  .50,  .50,
.35,  .35
                                                 ---   ---   ---   ---
---   ---
                                         !  PPC = 0.50, 0.50, 0.50, 0.50,
0.35, 0.35 !

     Slug-to-puff transition criterion factor
     equal to sigma-y/length of slug
     (SL2PF)                                Default: 10.        ! SL2PF =
10.0 !

     Puff-splitting control variables ------------------------

       VERTICAL SPLIT
       --------------

       Number of puffs that result every time a puff
       is split - nsplit=2 means that 1 puff splits
       into 2
       (NSPLIT)                             Default:   3        ! NSPLIT
=  3  !

       Time(s) of a day when split puffs are eligible to
       be split once again; this is typically set once
       per day, around sunset before nocturnal shear develops.
       24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
       0=do not re-split    1=eligible for re-split
       (IRESPLIT(24))                       Default:  Hour 17 = 1
       !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

       Split is allowed only if last hour's mixing
       height (m) exceeds a minimum value
       (ZISPLIT)                            Default: 100.       ! ZISPLIT
= 100.0 !

       Split is allowed only if ratio of last hour's
       mixing ht to the maximum mixing ht experienced
       by the puff is less than a maximum value (this
       postpones a split until a nocturnal layer develops)
       (ROLDMAX)                            Default: 0.25       ! ROLDMAX
= 0.25 !


       HORIZONTAL SPLIT
       ----------------

       Number of puffs that result every time a puff
       is split - nsplith=5 means that 1 puff splits
       into 5
```

```
       (NSPLITH)                          Default:   5        ! NSPLITH
=  5  !

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
       (SYSPLITH)                         Default:  1.0       !
SYSPLITH = 1.0 !

       Minimum puff elongation rate (SYSPLITH/hr) due to
       wind shear, before it may be split
       (SHSPLITH)                         Default:  2.        !
SHSPLITH = 2.0 !

       Minimum concentration (g/m^3) of each
       species in puff before it may be split
       Enter array of NSPEC values; if a single value is
       entered, it will be used for ALL species
       (CNSPLITH)                         Default:  1.0E-07   !
CNSPLITH = 1.0E-07 !

     Integration control variables ------------------------

       Fractional convergence criterion for numerical SLUG
       sampling integration
       (EPSSLUG)                          Default:   1.0e-04  ! EPSSLUG
= 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                          Default:   1.0e-06  ! EPSAREA
= 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                           Default:   1.0      ! DSRISE
= 1.0 !

       Boundary Condition (BC) Puff control variables
------------------------

       Minimum height (m) to which BC puffs are mixed as they are
emitted
       (MBCON=2 ONLY).  Actual height is reset to the current mixing
height
       at the release point if greater than this minimum.
       (HTMINBC)                          Default:   500.     ! HTMINBC
= 500.0 !

       Search radius (in BC segment lengths) about a receptor for
sampling
       nearest BC puff.  BC puffs are emitted with a spacing of one
segment
       length, so the search radius should be greater than 1.
       (RSAMPBC)                          Default:   4.      ! RSAMPBC
= 10.0 !

       Near-Surface depletion adjustment to concentration profile used
when
       sampling BC puffs?
       (MDEPBC)                           Default:   1        ! MDEPBC
```

```
=  1  !
          0 = Concentration is NOT adjusted for depletion
          1 = Adjust Concentration for depletion

!END!


-------------------------------------------------------------------------------
-------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =   1  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                                        a
          POINT SOURCE: CONSTANT DATA
          -----------------------------

b          c
  Source       X          Y       Stack    Base     Stack    Exit  Exit
Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.
Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg.
K)
```

```
  ------   ---------- --------- ------  ------   -------- -----
-------- ----- --------
   1 ! SRCNAM = EP14 !
   1 ! X =  89.5282, 262.5797,  76.20, 155.45,   6.40,  9.55, 447.59,
0.0, 3.086288E02,  0.0E00,  2.220052E02,
       0.0E00,  0.0E00, 6.5294E00 !
   1 ! FMFAC  =      1.0 !   !END!
--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column
headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to
represent
             the effect of rain-caps or other physical configurations
that
             reduce momentum rise associated with the actual exit
velocity.
             (Default: 1.0  -- full momentum used)

    b
     0. = No building downwash modeled, 1. = downwash modeled
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
           -------------------------------------------------------
Source
a
 No.       Effective building height, width, length and X/Y offset (in
meters)
           every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed
for
           MBDW=2 (PRIME downwash option)
------
--------------------------------------------------------------------

--------

    a
     Building height, width, length, and X/Y offset from the source are
treated
     as a separate input subgroup for each source and therefore must end
```

```
with
     an input group terminator.  The X/Y offset is the position,
relative to the
     stack, of the center of the upwind face of the projected building,
with the
     x-axis pointing along the flow direction.

---------------
Subgroup (13d)
---------------
                                                 a
          POINT SOURCE: VARIABLE EMISSIONS DATA
          ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 13b.  Factors entered multiply the rates in 13b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
--------------------------------

---------------
Subgroup (14a)
---------------

     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  0
!

     Units used for area source
```

```
     emissions below            (IARU)       Default: 1  !  IARU =   1
!
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                     a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                         b
Source           Effect.    Base      Initial    Emission
 No.             Height   Elevation   Sigma z     Rates
                   (m)       (m)        (m)
-------          ------    ------     --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
           --------------------------------------------------------
Source                                                               a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------


--------
    a
     Data for each source are treated as a separate input subgroup
```

and therefore must end with an input group terminator.

Subgroup (14d)

AREA SOURCE: VARIABLE EMISSIONS DATA[a]

Use this subgroup to describe temporal variations in the emission rates given in 14b. Factors entered multiply the rates in 14b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

```
     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)
```

----
[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

Subgroup (15a)

```
     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                              No default  !  NLN2
=  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)        No default   !
```

```
NLINES =  0  !

     Units used for line source
     emissions below                (ILNU)         Default: 1  !  ILNU
=   1  !
           1 =       g/s
           2 =      kg/hr
           3 =      lb/hr
           4 =    tons/yr
           5 =    Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =    Odour Unit * m**3/min
           7 =    metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7   !
MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6   !
NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default   ! XL =
.0 !
                                                    (in meters)

        Average building height (HBL)               No default   ! HBL =
.0 !
                                                    (in meters)

        Average building width (WBL)                No default   ! WBL =
.0 !
                                                    (in meters)

        Average line source width (WML)             No default   ! WML =
.0 !
                                                    (in meters)

        Average separation between buildings (DXL)  No default   ! DXL =
.0 !
                                                    (in meters)

        Average buoyancy parameter (FPRIMEL)        No default   !
FPRIMEL = .0 !
                                                    (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
```

----

[a]

```
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base
Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height
Elevation      Rates
            (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------
---------    ---------
```

----

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by ILNTU (e.g. 1 for g/s).

Subgroup (15c)

BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission rates given in 15b. Factors entered multiply the rates in 15b. Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:

```
(IVARY)                                Default: 0
      0 =       Constant
      1 =       Diurnal cycle (24 scaling factors: hours 1-24)
      2 =       Monthly cycle (12 scaling factors: months 1-12)
      3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                               where first group is DEC-JAN-FEB)
      4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                               first group is Stability Class A,
                               and the speed classes have upper
                               bounds (m/s) defined in Group 12
      5 =       Temperature   (12 scaling factors, where
temperature
                               classes have upper bounds (C) of:
                               0, 5, 10, 15, 20, 25, 30, 35, 40,
                               45, 50, 50+)
```

----

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

```
-------------------------------------------------------------------------
-------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0
!

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1
!
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0
!

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0
!

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                        a
           VOLUME SOURCE: CONSTANT DATA
           ------------------------------

b
         X           Y        Effect.    Base     Initial    Initial
Emission
     Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z
Rates
        (km)       (km)         (m)       (m)        (m)       (m)
     ----------  ----------   ------    ------    --------   --------
--------

--------
    a
```

```
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                                 a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)

------------------------------------------------------------------------
-------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
-----------------------

---------------
Subgroup (17a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC =  698
!

!END!

---------------
Subgroup (17b)
---------------
                                               a
           NON-GRIDDED (DISCRETE) RECEPTOR DATA
           ------------------------------------
```

Receptor No.		X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height b Above Ground (m)	
--------		----------	----------	---------	------------	
1	! X =	153.22463,	-5.52074,	106.000,	0.000!	!END!
2	! X =	153.21942,	-5.27242,	108.000,	0.000!	!END!
3	! X =	153.21411,	-5.0241,	108.000,	0.000!	!END!
4	! X =	153.2088,	-4.77579,	106.000,	0.000!	!END!
5	! X =	153.20359,	-4.52846,	115.000,	0.000!	!END!
6	! X =	153.19828,	-4.28015,	121.000,	0.000!	!END!
7	! X =	153.47286,	-5.51536,	104.000,	0.000!	!END!
8	! X =	153.46755,	-5.26704,	105.000,	0.000!	!END!
9	! X =	153.46224,	-5.01872,	106.000,	0.000!	!END!
10	! X =	153.45702,	-4.7714,	106.000,	0.000!	!END!
11	! X =	153.45172,	-4.52308,	110.000,	0.000!	!END!
12	! X =	153.44641,	-4.27476,	116.000,	0.000!	!END!
13	! X =	153.44111,	-4.02645,	121.000,	0.000!	!END!
14	! X =	153.72099,	-5.50997,	103.000,	0.000!	!END!
15	! X =	153.71568,	-5.26166,	104.000,	0.000!	!END!
16	! X =	153.71047,	-5.01334,	105.000,	0.000!	!END!
17	! X =	153.70515,	-4.76602,	105.000,	0.000!	!END!
18	! X =	153.69985,	-4.5177,	106.000,	0.000!	!END!
19	! X =	153.69464,	-4.26938,	109.000,	0.000!	!END!
20	! X =	153.68934,	-4.02107,	113.000,	0.000!	!END!
21	! X =	153.68403,	-3.77275,	117.000,	0.000!	!END!
22	! X =	153.94808,	-4.51232,	105.000,	0.000!	!END!
23	! X =	153.94277,	-4.264,	105.000,	0.000!	!END!
24	! X =	153.93747,	-4.01569,	106.000,	0.000!	!END!
25	! X =	153.93216,	-3.76737,	112.000,	0.000!	!END!
26	! X =	153.92695,	-3.51906,	118.000,	0.000!	!END!
27	! X =	154.21735,	-5.49921,	102.000,	0.000!	!END!
28	! X =	154.21203,	-5.25188,	102.000,	0.000!	!END!
29	! X =	154.20672,	-5.00357,	102.000,	0.000!	!END!
30	! X =	154.20151,	-4.75525,	103.000,	0.000!	!END!
31	! X =	154.19621,	-4.50694,	104.000,	0.000!	!END!
32	! X =	154.1909,	-4.25862,	104.000,	0.000!	!END!
33	! X =	154.1856,	-4.01031,	105.000,	0.000!	!END!
34	! X =	154.18039,	-3.76199,	106.000,	0.000!	!END!
35	! X =	154.17507,	-3.51467,	112.000,	0.000!	!END!
36	! X =	154.16977,	-3.26635,	116.000,	0.000!	!END!
37	! X =	154.16446,	-3.01804,	117.000,	0.000!	!END!
38	! X =	154.46548,	-5.49382,	102.000,	0.000!	!END!
39	! X =	154.46016,	-5.2465,	102.000,	0.000!	!END!
40	! X =	154.45495,	-4.99819,	102.000,	0.000!	!END!
41	! X =	154.44964,	-4.74987,	102.000,	0.000!	!END!
42	! X =	154.44434,	-4.50155,	103.000,	0.000!	!END!
43	! X =	154.43913,	-4.25324,	103.000,	0.000!	!END!
44	! X =	154.43382,	-4.00492,	104.000,	0.000!	!END!
45	! X =	154.42851,	-3.7576,	105.000,	0.000!	!END!
46	! X =	154.4232,	-3.50929,	105.000,	0.000!	!END!
47	! X =	154.418,	-3.26098,	106.000,	0.000!	!END!
48	! X =	154.41269,	-3.01266,	110.000,	0.000!	!END!
49	! X =	154.40739,	-2.76435,	119.000,	0.000!	!END!
50	! X =	154.7137,	-5.48943,	102.000,	0.000!	!END!
51	! X =	154.70839,	-5.24112,	102.000,	0.000!	!END!
52	! X =	154.70308,	-4.9928,	102.000,	0.000!	!END!
53	! X =	154.69777,	-4.74449,	102.000,	0.000!	!END!
54	! X =	154.69256,	-4.49617,	102.000,	0.000!	!END!
55	! X =	154.68726,	-4.24786,	102.000,	0.000!	!END!

```
 56 ! X =   154.68195,   -3.99954,     102.000,       0.000!   !END!
 57 ! X =   154.67664,   -3.75222,     103.000,       0.000!   !END!
 58 ! X =   154.67143,   -3.50391,     104.000,       0.000!   !END!
 59 ! X =   154.66613,   -3.25559,     105.000,       0.000!   !END!
 60 ! X =   154.66082,   -3.00728,     106.000,       0.000!   !END!
 61 ! X =   154.65552,   -2.75897,     110.000,       0.000!   !END!
 62 ! X =   154.65031,   -2.51065,     117.000,       0.000!   !END!
 63 ! X =   154.96182,   -5.48405,     102.000,       0.000!   !END!
 64 ! X =   154.95652,   -5.23573,     102.000,       0.000!   !END!
 65 ! X =   154.95121,   -4.98742,     102.000,       0.000!   !END!
 66 ! X =     154.946,    -4.7391,     102.000,       0.000!   !END!
 67 ! X =   154.94069,   -4.49079,     102.000,       0.000!   !END!
 68 ! X =   154.93539,   -4.24248,     102.000,       0.000!   !END!
 69 ! X =   154.93017,   -3.99516,     102.000,       0.000!   !END!
 70 ! X =   154.92486,   -3.74684,     102.000,       0.000!   !END!
 71 ! X =   154.91956,   -3.49853,     102.000,       0.000!   !END!
 72 ! X =   154.91425,   -3.25021,     103.000,       0.000!   !END!
 73 ! X =   154.90905,    -3.0019,     104.000,       0.000!   !END!
 74 ! X =   154.90374,   -2.75359,     106.000,       0.000!   !END!
 75 ! X =   154.89844,   -2.50528,     106.000,       0.000!   !END!
 76 ! X =   154.89313,   -2.25796,     108.000,       0.000!   !END!
 77 ! X =   154.88782,   -2.00964,     121.000,       0.000!   !END!
 78 ! X =   155.21526,   -5.72698,     102.000,       0.000!   !END!
 79 ! X =   155.20995,   -5.47866,     102.000,       0.000!   !END!
 80 ! X =   155.20474,   -5.23035,     102.000,       0.000!   !END!
 81 ! X =   155.19944,   -4.98204,     102.000,       0.000!   !END!
 82 ! X =   155.19413,   -4.73372,     102.000,       0.000!   !END!
 83 ! X =   155.18882,   -4.48541,     102.000,       0.000!   !END!
 84 ! X =    155.1836,   -4.23809,     102.000,       0.000!   !END!
 85 ! X =    155.1783,   -3.98977,     102.000,       0.000!   !END!
 86 ! X =   155.17299,   -3.74146,     102.000,       0.000!   !END!
 87 ! X =   155.16769,   -3.49315,     102.000,       0.000!   !END!
 88 ! X =   155.16248,   -3.24483,     102.000,       0.000!   !END!
 89 ! X =   155.15718,   -2.99652,     103.000,       0.000!   !END!
 90 ! X =   155.15187,   -2.74821,     104.000,       0.000!   !END!
 91 ! X =   155.14656,   -2.50089,     105.000,       0.000!   !END!
 92 ! X =   155.14135,   -2.25258,     106.000,       0.000!   !END!
 93 ! X =   155.13605,   -2.00426,     116.000,       0.000!   !END!
 94 ! X =   155.13075,   -1.75595,     121.000,       0.000!   !END!
 95 ! X =   155.43705,   -4.48003,     102.000,       0.000!   !END!
 96 ! X =   155.43173,   -4.23271,     102.000,       0.000!   !END!
 97 ! X =   155.42643,   -3.98439,     102.000,       0.000!   !END!
 98 ! X =   155.42122,   -3.73608,     102.000,       0.000!   !END!
 99 ! X =   155.41591,   -3.48777,     102.000,       0.000!   !END!
100 ! X =   155.41061,   -3.23945,     102.000,       0.000!   !END!
101 ! X =    155.4053,   -2.99114,     102.000,       0.000!   !END!
102 ! X =       155.4,   -2.74283,     103.000,       0.000!   !END!
103 ! X =   155.39478,   -2.49551,     104.000,       0.000!   !END!
104 ! X =   155.38948,    -2.2472,     106.000,       0.000!   !END!
105 ! X =   155.38418,   -1.99889,     111.000,       0.000!   !END!
106 ! X =   155.37887,   -1.75057,     118.000,       0.000!   !END!
107 ! X =   155.37367,   -1.50226,     121.000,       0.000!   !END!
108 ! X =   155.36837,   -1.25395,     121.000,       0.000!   !END!
109 ! X =   155.67986,   -4.22732,     102.000,       0.000!   !END!
110 ! X =   155.67465,   -3.97901,     102.000,       0.000!   !END!
111 ! X =   155.66935,    -3.7307,     102.000,       0.000!   !END!
112 ! X =   155.66404,   -3.48239,     102.000,       0.000!   !END!
113 ! X =   155.65873,   -3.23407,     102.000,       0.000!   !END!
114 ! X =   155.65353,   -2.98576,     102.000,       0.000!   !END!
115 ! X =   155.64821,   -2.73844,     102.000,       0.000!   !END!
```

```
116 ! X =   155.64291,   -2.49013,     103.000,       0.000!   !END!
117 ! X =   155.63761,   -2.24182,     105.000,       0.000!   !END!
118 ! X =    155.6324,   -1.99351,     105.000,       0.000!   !END!
119 ! X =    155.6271,    -1.7452,     110.000,       0.000!   !END!
120 ! X =    155.6218,   -1.49689,     117.000,       0.000!   !END!
121 ! X =   155.61649,   -1.24857,     121.000,       0.000!   !END!
122 ! X =   155.93329,   -4.47025,     102.000,       0.000!   !END!
123 ! X =   155.92809,   -4.22194,     102.000,       0.000!   !END!
124 ! X =   155.92278,   -3.97363,     102.000,       0.000!   !END!
125 ! X =   155.91747,   -3.72532,     102.000,       0.000!   !END!
126 ! X =   155.91227,   -3.47701,     102.000,       0.000!   !END!
127 ! X =   155.90696,   -3.22869,     102.000,       0.000!   !END!
128 ! X =   155.90164,   -2.98137,     102.000,       0.000!   !END!
129 ! X =   155.89634,   -2.73306,     102.000,       0.000!   !END!
130 ! X =   155.89104,   -2.48475,     102.000,       0.000!   !END!
131 ! X =   155.88583,   -2.23644,     103.000,       0.000!   !END!
132 ! X =   155.88053,   -1.98813,     104.000,       0.000!   !END!
133 ! X =   155.87522,   -1.73982,     106.000,       0.000!   !END!
134 ! X =   155.86992,   -1.49151,     108.000,       0.000!   !END!
135 ! X =   155.86471,   -1.24419,     121.000,       0.000!   !END!
136 ! X =   155.85941,    -.99588,     121.000,       0.000!   !END!
137 ! X =   156.18152,   -4.46487,     102.000,       0.000!   !END!
138 ! X =   156.17621,   -4.21656,     102.000,       0.000!   !END!
139 ! X =   156.17091,   -3.96825,     102.000,       0.000!   !END!
140 ! X =    156.1657,   -3.71994,     102.000,       0.000!   !END!
141 ! X =   156.16039,   -3.47162,     102.000,       0.000!   !END!
142 ! X =   156.15509,   -3.22331,     102.000,       0.000!   !END!
143 ! X =   156.14977,   -2.97599,     102.000,       0.000!   !END!
144 ! X =   156.14456,   -2.72768,     102.000,       0.000!   !END!
145 ! X =   156.13926,   -2.47937,     102.000,       0.000!   !END!
146 ! X =   156.13396,   -2.23106,     102.000,       0.000!   !END!
147 ! X =   156.12865,   -1.98275,     103.000,       0.000!   !END!
148 ! X =   156.12345,   -1.73444,     103.000,       0.000!   !END!
149 ! X =   156.11814,   -1.48712,     105.000,       0.000!   !END!
150 ! X =   156.11283,   -1.23881,     109.000,       0.000!   !END!
151 ! X =   156.10753,     -.9905,     119.000,       0.000!   !END!
152 ! X =   156.10223,    -.74219,     107.000,       0.000!   !END!
153 ! X =   156.42965,   -4.45949,     102.000,       0.000!   !END!
154 ! X =   156.41913,   -3.96287,     102.000,       0.000!   !END!
155 ! X =   156.41382,   -3.71455,     102.000,       0.000!   !END!
156 ! X =   156.40852,   -3.46624,     102.000,       0.000!   !END!
157 ! X =    156.4033,   -3.21893,     102.000,       0.000!   !END!
158 ! X =     156.398,   -2.97061,     102.000,       0.000!   !END!
159 ! X =   156.39269,    -2.7223,     102.000,       0.000!   !END!
160 ! X =   156.38739,   -2.47399,     102.000,       0.000!   !END!
161 ! X =   156.38208,   -2.22568,     102.000,       0.000!   !END!
162 ! X =   156.37688,   -1.97737,     102.000,       0.000!   !END!
163 ! X =   156.37157,   -1.72906,     102.000,       0.000!   !END!
164 ! X =   156.36626,   -1.48174,     104.000,       0.000!   !END!
165 ! X =   156.36096,   -1.23343,     104.000,       0.000!   !END!
166 ! X =   156.35575,    -.98513,     105.000,       0.000!   !END!
167 ! X =   156.35045,    -.73682,     106.000,       0.000!   !END!
168 ! X =   156.34515,    -.48851,     112.000,       0.000!   !END!
169 ! X =   156.33985,     -.2402,     121.000,       0.000!   !END!
170 ! X =   156.66195,   -3.70917,     102.000,       0.000!   !END!
171 ! X =   156.65673,   -3.46186,     102.000,       0.000!   !END!
172 ! X =   156.65143,   -3.21354,     102.000,       0.000!   !END!
173 ! X =   156.64612,   -2.96523,     102.000,       0.000!   !END!
174 ! X =   156.64082,   -2.71692,     102.000,       0.000!   !END!
175 ! X =   156.63561,   -2.46861,     102.000,       0.000!   !END!
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176	! X =	156.63031,	-2.2203,	102.000,	0.000!	!END!
177	! X =	156.625,	-1.97199,	102.000,	0.000!	!END!
178	! X =	156.61969,	-1.72468,	102.000,	0.000!	!END!
179	! X =	156.61448,	-1.47637,	102.000,	0.000!	!END!
180	! X =	156.60918,	-1.22806,	103.000,	0.000!	!END!
181	! X =	156.60388,	-.97975,	104.000,	0.000!	!END!
182	! X =	156.59858,	-.73144,	105.000,	0.000!	!END!
183	! X =	156.59327,	-.48313,	107.000,	0.000!	!END!
184	! X =	156.58807,	-.23482,	118.000,	0.000!	!END!
185	! X =	156.58276,	.01249,	121.000,	0.000!	!END!
186	! X =	156.91017,	-3.70379,	102.000,	0.000!	!END!
187	! X =	156.90486,	-3.45647,	102.000,	0.000!	!END!
188	! X =	156.89955,	-3.20816,	102.000,	0.000!	!END!
189	! X =	156.89434,	-2.95985,	102.000,	0.000!	!END!
190	! X =	156.88904,	-2.71154,	102.000,	0.000!	!END!
191	! X =	156.88373,	-2.46323,	102.000,	0.000!	!END!
192	! X =	156.87843,	-2.21492,	102.000,	0.000!	!END!
193	! X =	156.87313,	-1.96661,	102.000,	0.000!	!END!
194	! X =	156.86791,	-1.7193,	102.000,	0.000!	!END!
195	! X =	156.86261,	-1.47099,	102.000,	0.000!	!END!
196	! X =	156.8573,	-1.22268,	102.000,	0.000!	!END!
197	! X =	156.852,	-.97437,	103.000,	0.000!	!END!
198	! X =	156.8468,	-.72606,	104.000,	0.000!	!END!
199	! X =	156.8415,	-.47775,	105.000,	0.000!	!END!
200	! X =	156.83619,	-.23044,	108.000,	0.000!	!END!
201	! X =	156.83088,	.01787,	115.000,	0.000!	!END!
202	! X =	156.82558,	.26618,	119.000,	0.000!	!END!
203	! X =	156.82038,	.51448,	121.000,	0.000!	!END!
204	! X =	157.15298,	-3.45109,	104.000,	0.000!	!END!
205	! X =	157.14778,	-3.20278,	102.000,	0.000!	!END!
206	! X =	157.14247,	-2.95447,	102.000,	0.000!	!END!
207	! X =	157.13716,	-2.70616,	102.000,	0.000!	!END!
208	! X =	157.13186,	-2.45785,	102.000,	0.000!	!END!
209	! X =	157.12665,	-2.20954,	102.000,	0.000!	!END!
210	! X =	157.12134,	-1.96223,	102.000,	0.000!	!END!
211	! X =	157.11604,	-1.71392,	102.000,	0.000!	!END!
212	! X =	157.11073,	-1.46561,	102.000,	0.000!	!END!
213	! X =	157.10553,	-1.2173,	102.000,	0.000!	!END!
214	! X =	157.10022,	-.96899,	102.000,	0.000!	!END!
215	! X =	157.09492,	-.72069,	103.000,	0.000!	!END!
216	! X =	157.08962,	-.47238,	104.000,	0.000!	!END!
217	! X =	157.08431,	-.22506,	105.000,	0.000!	!END!
218	! X =	157.07911,	.02324,	108.000,	0.000!	!END!
219	! X =	157.07381,	.27155,	114.000,	0.000!	!END!
220	! X =	157.06851,	.51986,	116.000,	0.000!	!END!
221	! X =	157.06321,	.76817,	119.000,	0.000!	!END!
222	! X =	157.05791,	1.01647,	122.000,	0.000!	!END!
223	! X =	157.3959,	-3.1974,	104.000,	0.000!	!END!
224	! X =	157.39059,	-2.94909,	102.000,	0.000!	!END!
225	! X =	157.38539,	-2.70078,	102.000,	0.000!	!END!
226	! X =	157.38008,	-2.45247,	102.000,	0.000!	!END!
227	! X =	157.37477,	-2.20516,	102.000,	0.000!	!END!
228	! X =	157.36946,	-1.95685,	102.000,	0.000!	!END!
229	! X =	157.36416,	-1.70854,	102.000,	0.000!	!END!
230	! X =	157.35895,	-1.46023,	102.000,	0.000!	!END!
231	! X =	157.35365,	-1.21192,	102.000,	0.000!	!END!
232	! X =	157.34835,	-.96362,	102.000,	0.000!	!END!
233	! X =	157.34305,	-.71531,	103.000,	0.000!	!END!
234	! X =	157.33783,	-.46799,	103.000,	0.000!	!END!
235	! X =	157.33253,	-.21969,	104.000,	0.000!	!END!

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236 ! X =   157.32723,      .02862,      105.000,        0.000!   !END!
237 ! X =   157.32193,      .27693,      106.000,        0.000!   !END!
238 ! X =   157.31663,      .52523,      109.000,        0.000!   !END!
239 ! X =   157.31143,      .77354,      113.000,        0.000!   !END!
240 ! X =   157.30613,     1.02185,      115.000,        0.000!   !END!
241 ! X =   157.64402,    -3.19202,      114.000,        0.000!   !END!
242 ! X =   157.63882,    -2.94371,      104.000,        0.000!   !END!
243 ! X =   157.63351,     -2.6954,      103.000,        0.000!   !END!
244 ! X =   157.62821,    -2.44709,      102.000,        0.000!   !END!
245 ! X =   157.62289,    -2.19978,      102.000,        0.000!   !END!
246 ! X =   157.61768,    -1.95147,      102.000,        0.000!   !END!
247 ! X =   157.61238,    -1.70316,      102.000,        0.000!   !END!
248 ! X =   157.60708,    -1.45485,      102.000,        0.000!   !END!
249 ! X =   157.60177,    -1.20655,      102.000,        0.000!   !END!
250 ! X =   157.59657,     -.95824,      102.000,        0.000!   !END!
251 ! X =   157.59127,     -.70993,      102.000,        0.000!   !END!
252 ! X =   157.58595,     -.46262,      103.000,        0.000!   !END!
253 ! X =   157.58065,     -.21431,      103.000,        0.000!   !END!
254 ! X =   157.57535,        .034,      104.000,        0.000!   !END!
255 ! X =   157.57015,       .2823,      104.000,        0.000!   !END!
256 ! X =   157.56485,      .53061,      104.000,        0.000!   !END!
257 ! X =   157.55955,      .77892,      103.000,        0.000!   !END!
258 ! X =   157.55425,     1.02722,      107.000,        0.000!   !END!
259 ! X =   157.54894,     1.27454,      107.000,        0.000!   !END!
260 ! X =   157.54364,     1.52284,      115.000,        0.000!   !END!
261 ! X =   157.88694,    -2.93833,      106.000,        0.000!   !END!
262 ! X =   157.88163,    -2.69002,      104.000,        0.000!   !END!
263 ! X =   157.87642,    -2.44271,      102.000,        0.000!   !END!
264 ! X =   157.87111,     -2.1944,      102.000,        0.000!   !END!
265 ! X =   157.86581,    -1.94609,      102.000,        0.000!   !END!
266 ! X =    157.8605,    -1.69778,      102.000,        0.000!   !END!
267 ! X =    157.8553,    -1.44948,      102.000,        0.000!   !END!
268 ! X =      157.85,    -1.20117,      102.000,        0.000!   !END!
269 ! X =   157.84469,     -.95286,      102.000,        0.000!   !END!
270 ! X =   157.83938,     -.70555,      102.000,        0.000!   !END!
271 ! X =   157.83408,     -.45724,      102.000,        0.000!   !END!
272 ! X =   157.82887,     -.20893,      102.000,        0.000!   !END!
273 ! X =   157.82357,      .03937,      103.000,        0.000!   !END!
274 ! X =   157.81827,      .28768,      103.000,        0.000!   !END!
275 ! X =   157.81297,      .53598,      103.000,        0.000!   !END!
276 ! X =   157.80767,      .78429,      101.000,        0.000!   !END!
277 ! X =   157.80246,      1.0316,      104.000,        0.000!   !END!
278 ! X =   157.79716,     1.27991,      105.000,        0.000!   !END!
279 ! X =   157.79186,     1.52821,      106.000,        0.000!   !END!
280 ! X =   157.78656,     1.77652,      114.000,        0.000!   !END!
281 ! X =   157.78126,     2.02482,      119.000,        0.000!   !END!
282 ! X =   158.13516,    -2.93295,      113.000,        0.000!   !END!
283 ! X =   158.12985,    -2.68564,      104.000,        0.000!   !END!
284 ! X =   158.12454,    -2.43733,      102.000,        0.000!   !END!
285 ! X =   158.11924,    -2.18902,      102.000,        0.000!   !END!
286 ! X =   158.11393,    -1.94071,      102.000,        0.000!   !END!
287 ! X =   158.10872,    -1.69241,      102.000,        0.000!   !END!
288 ! X =   158.10342,     -1.4441,      102.000,        0.000!   !END!
289 ! X =   158.09812,    -1.19579,      102.000,        0.000!   !END!
290 ! X =    158.0928,     -.94848,      102.000,        0.000!   !END!
291 ! X =   158.08671,     -.70016,      102.000,        0.000!   !END!
292 ! X =    158.0823,     -.45186,      102.000,        0.000!   !END!
293 ! X =     158.077,     -.20356,      102.000,        0.000!   !END!
294 ! X =   158.07169,      .04475,      102.000,        0.000!   !END!
295 ! X =   158.06639,      .29305,      102.000,        0.000!   !END!
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296 ! X =   158.06119,      .54136,     102.000,       0.000!   !END!
297 ! X =   158.05588,      .78867,     102.000,       0.000!   !END!
298 ! X =   158.05058,    1.03698,     102.000,       0.000!   !END!
299 ! X =   158.04528,    1.28528,     103.000,       0.000!   !END!
300 ! X =   158.03998,    1.53359,     104.000,       0.000!   !END!
301 ! X =   158.03468,    1.78189,     105.000,       0.000!   !END!
302 ! X =   158.02948,      2.0302,     105.000,       0.000!   !END!
303 ! X =   158.02418,      2.2785,     105.000,       0.000!   !END!
304 ! X =   158.38328,   -2.92757,     114.000,       0.000!   !END!
305 ! X =   158.37797,   -2.68025,     105.000,       0.000!   !END!
306 ! X =   158.37266,   -2.43195,     103.000,       0.000!   !END!
307 ! X =   158.36746,   -2.18364,     102.000,       0.000!   !END!
308 ! X =   158.36215,   -1.93533,     102.000,       0.000!   !END!
309 ! X =   158.35685,   -1.68703,     102.000,       0.000!   !END!
310 ! X =   158.35154,   -1.43872,     102.000,       0.000!   !END!
311 ! X =   158.34634,   -1.19041,     102.000,       0.000!   !END!
312 ! X =   158.34102,      -.9431,     102.000,       0.000!   !END!
313 ! X =   158.33572,    -.69479,     102.000,       0.000!   !END!
314 ! X =   158.33042,    -.44649,     102.000,       0.000!   !END!
315 ! X =   158.32512,    -.19818,     102.000,       0.000!   !END!
316 ! X =   158.31991,      .05012,     102.000,       0.000!   !END!
317 ! X =   158.31461,      .29843,     102.000,       0.000!   !END!
318 ! X =   158.30931,      .54674,     102.000,       0.000!   !END!
319 ! X =     158.304,      .79405,     102.000,       0.000!   !END!
320 ! X =    158.2987,    1.04235,     102.000,       0.000!   !END!
321 ! X =    158.2935,    1.29066,     102.000,       0.000!   !END!
322 ! X =    158.2882,    1.53896,     102.000,       0.000!   !END!
323 ! X =    158.2829,    1.78727,     103.000,       0.000!   !END!
324 ! X =    158.2776,    2.03557,     103.000,       0.000!   !END!
325 ! X =    158.2723,    2.28387,     103.000,       0.000!   !END!
326 ! X =     158.267,    2.53119,     103.000,       0.000!   !END!
327 ! X =    158.2618,    2.77949,     103.000,       0.000!   !END!
328 ! X =    158.6314,   -2.92318,     108.000,       0.000!   !END!
329 ! X =   158.62619,   -2.67488,     104.000,       0.000!   !END!
330 ! X =   158.62088,   -2.42657,     103.000,       0.000!   !END!
331 ! X =   158.61558,   -2.17826,     102.000,       0.000!   !END!
332 ! X =   158.61027,   -1.92995,     102.000,       0.000!   !END!
333 ! X =   158.60507,   -1.68165,     102.000,       0.000!   !END!
334 ! X =   158.59976,   -1.43334,     102.000,       0.000!   !END!
335 ! X =   158.59445,   -1.18603,     102.000,       0.000!   !END!
336 ! X =   158.58915,    -.93772,     102.000,       0.000!   !END!
337 ! X =   158.58384,    -.68942,     102.000,       0.000!   !END!
338 ! X =   158.57864,    -.44111,     102.000,       0.000!   !END!
339 ! X =   158.57334,      -.1928,     102.000,       0.000!   !END!
340 ! X =   158.56803,       .0555,     102.000,       0.000!   !END!
341 ! X =   158.56273,      .30381,     102.000,       0.000!   !END!
342 ! X =   158.55742,      .55112,     102.000,       0.000!   !END!
343 ! X =   158.55222,      .79942,     102.000,       0.000!   !END!
344 ! X =   158.54692,    1.04773,     102.000,       0.000!   !END!
345 ! X =   158.54162,    1.29603,     102.000,       0.000!   !END!
346 ! X =   158.53632,    1.54434,     102.000,       0.000!   !END!
347 ! X =   158.53102,    1.79264,     102.000,       0.000!   !END!
348 ! X =   158.52572,    2.04094,     102.000,       0.000!   !END!
349 ! X =   158.52051,    2.28825,     102.000,       0.000!   !END!
350 ! X =   158.51521,    2.53656,     103.000,       0.000!   !END!
351 ! X =   158.50992,    2.78486,     103.000,       0.000!   !END!
352 ! X =   158.50462,    3.03316,     103.000,       0.000!   !END!
353 ! X =   158.87962,     -2.9178,     117.000,       0.000!   !END!
354 ! X =   158.87431,   -2.66949,     105.000,       0.000!   !END!
355 ! X =   158.86901,   -2.42119,     103.000,       0.000!   !END!
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356 ! X =   158.8638,   -2.17288,     102.000,       0.000!   !END!
357 ! X =  158.85849,   -1.92457,     102.000,       0.000!   !END!
358 ! X =  158.85319,   -1.67627,     102.000,       0.000!   !END!
359 ! X =  158.84787,   -1.42896,     102.000,       0.000!   !END!
360 ! X =  158.84257,   -1.18065,     102.000,       0.000!   !END!
361 ! X =  158.83737,    -.93234,     102.000,       0.000!   !END!
362 ! X =  158.83206,    -.68404,     102.000,       0.000!   !END!
363 ! X =  158.82676,    -.43573,     102.000,       0.000!   !END!
364 ! X =  158.82146,    -.18743,     102.000,       0.000!   !END!
365 ! X =  158.81616,     .06088,     102.000,       0.000!   !END!
366 ! X =  158.81094,     .30819,     102.000,       0.000!   !END!
367 ! X =  158.80564,     .55649,     102.000,       0.000!   !END!
368 ! X =  158.80034,      .8048,     102.000,       0.000!   !END!
369 ! X =  158.79504,     1.0531,     102.000,       0.000!   !END!
370 ! X =  158.78974,    1.30141,     102.000,       0.000!   !END!
371 ! X =  158.78454,    1.54971,     102.000,       0.000!   !END!
372 ! X =  158.77924,    1.79801,     102.000,       0.000!   !END!
373 ! X =  158.77394,    2.04632,     102.000,       0.000!   !END!
374 ! X =  158.76863,    2.29363,     102.000,       0.000!   !END!
375 ! X =  158.76333,    2.54193,     102.000,       0.000!   !END!
376 ! X =  158.75804,    2.79023,     103.000,       0.000!   !END!
377 ! X =  158.75284,    3.03854,     103.000,       0.000!   !END!
378 ! X =  158.74754,    3.28684,     103.000,       0.000!   !END!
379 ! X =  159.12243,   -2.66411,     105.000,       0.000!   !END!
380 ! X =  159.11723,   -2.41581,     103.000,       0.000!   !END!
381 ! X =  159.11192,    -2.1675,     102.000,       0.000!   !END!
382 ! X =  159.10661,    -1.9192,     102.000,       0.000!   !END!
383 ! X =  159.10131,   -1.67089,     102.000,       0.000!   !END!
384 ! X =  159.09609,   -1.42358,     102.000,       0.000!   !END!
385 ! X =  159.09079,   -1.17527,     102.000,       0.000!   !END!
386 ! X =  159.08549,    -.92697,     102.000,       0.000!   !END!
387 ! X =  159.08018,    -.67866,     102.000,       0.000!   !END!
388 ! X =  159.07488,    -.43036,     102.000,       0.000!   !END!
389 ! X =  159.06968,    -.18205,     102.000,       0.000!   !END!
390 ! X =  159.06437,     .06625,     102.000,       0.000!   !END!
391 ! X =  159.05906,     .31356,     102.000,       0.000!   !END!
392 ! X =  159.05376,     .56187,     102.000,       0.000!   !END!
393 ! X =  159.04846,     .81017,     102.000,       0.000!   !END!
394 ! X =  159.04326,    1.05848,     102.000,       0.000!   !END!
395 ! X =  159.03796,    1.30678,     102.000,       0.000!   !END!
396 ! X =  159.03266,    1.55508,     102.000,       0.000!   !END!
397 ! X =  159.02736,    1.80339,     102.000,       0.000!   !END!
398 ! X =  159.02205,     2.0507,     102.000,       0.000!   !END!
399 ! X =  159.01675,      2.299,     102.000,       0.000!   !END!
400 ! X =  159.01155,     2.5473,     102.000,       0.000!   !END!
401 ! X =  159.00625,    2.79561,     102.000,       0.000!   !END!
402 ! X =  159.00096,    3.04391,     103.000,       0.000!   !END!
403 ! X =  158.99566,    3.29221,     103.000,       0.000!   !END!
404 ! X =  158.99036,    3.54051,     103.000,       0.000!   !END!
405 ! X =  159.37065,   -2.65873,     105.000,       0.000!   !END!
406 ! X =  159.36535,   -2.41043,     104.000,       0.000!   !END!
407 ! X =  159.36004,   -2.16212,     102.000,       0.000!   !END!
408 ! X =  159.35483,   -1.91382,     102.000,       0.000!   !END!
409 ! X =  159.34952,    -1.6665,     102.000,       0.000!   !END!
410 ! X =  159.34421,    -1.4182,     102.000,       0.000!   !END!
411 ! X =  159.33891,   -1.16989,     102.000,       0.000!   !END!
412 ! X =  159.33361,    -.92159,     102.000,       0.000!   !END!
413 ! X =   159.3284,    -.67328,     102.000,       0.000!   !END!
414 ! X =   159.3231,    -.42498,     102.000,       0.000!   !END!
415 ! X =   159.3178,    -.17667,     102.000,       0.000!   !END!
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416 ! X =   159.31248,      .07064,     102.000,        0.000!   !END!
417 ! X =   159.30718,      .31894,     102.000,        0.000!   !END!
418 ! X =   159.30198,      .56724,     102.000,        0.000!   !END!
419 ! X =   159.29668,      .81555,     102.000,        0.000!   !END!
420 ! X =   159.29138,     1.06385,     102.000,        0.000!   !END!
421 ! X =   159.28608,     1.31215,     102.000,        0.000!   !END!
422 ! X =   159.28078,     1.56046,     102.000,        0.000!   !END!
423 ! X =   159.27478,     1.80778,     102.000,        0.000!   !END!
424 ! X =   159.27027,     2.05607,     102.000,        0.000!   !END!
425 ! X =   159.26497,     2.30437,     102.000,        0.000!   !END!
426 ! X =   159.25967,     2.55268,     102.000,        0.000!   !END!
427 ! X =   159.25437,     2.80098,     102.000,        0.000!   !END!
428 ! X =   159.24907,     3.04928,     102.000,        0.000!   !END!
429 ! X =   159.24388,     3.29758,     103.000,        0.000!   !END!
430 ! X =   159.23857,     3.54489,     103.000,        0.000!   !END!
431 ! X =   159.23327,     3.79319,     103.000,        0.000!   !END!
432 ! X =   159.22798,     4.04149,     107.000,        0.000!   !END!
433 ! X =   159.61877,    -2.65335,     105.000,        0.000!   !END!
434 ! X =   159.61357,    -2.40505,     104.000,        0.000!   !END!
435 ! X =   159.60826,    -2.15674,     102.000,        0.000!   !END!
436 ! X =   159.60294,    -1.90943,     102.000,        0.000!   !END!
437 ! X =   159.59764,    -1.66112,     102.000,        0.000!   !END!
438 ! X =   159.59233,    -1.41282,     102.000,        0.000!   !END!
439 ! X =   159.58713,    -1.16452,     102.000,        0.000!   !END!
440 ! X =   159.58182,     -.91621,     102.000,        0.000!   !END!
441 ! X =   159.57652,     -.66791,     102.000,        0.000!   !END!
442 ! X =   159.57122,      -.4196,     102.000,        0.000!   !END!
443 ! X =   159.56601,      -.1713,     102.000,        0.000!   !END!
444 ! X =    159.5607,      .07601,     101.000,        0.000!   !END!
445 ! X =    159.5554,      .32432,     102.000,        0.000!   !END!
446 ! X =    159.5501,      .57262,     102.000,        0.000!   !END!
447 ! X =    159.5448,      .82092,     102.000,        0.000!   !END!
448 ! X =    159.5395,     1.06923,     102.000,        0.000!   !END!
449 ! X =   159.53429,     1.31753,     102.000,        0.000!   !END!
450 ! X =   159.52899,     1.56583,     102.000,        0.000!   !END!
451 ! X =   159.52368,     1.81314,     102.000,        0.000!   !END!
452 ! X =   159.51839,     2.06144,     102.000,        0.000!   !END!
453 ! X =   159.51309,     2.30975,     102.000,        0.000!   !END!
454 ! X =   159.50789,     2.55805,     102.000,        0.000!   !END!
455 ! X =   159.50259,     2.80635,     102.000,        0.000!   !END!
456 ! X =   159.49729,     3.05465,     102.000,        0.000!   !END!
457 ! X =   159.49199,     3.30295,     103.000,        0.000!   !END!
458 ! X =   159.48669,     3.55026,     103.000,        0.000!   !END!
459 ! X =   159.48139,     3.79856,     103.000,        0.000!   !END!
460 ! X =   159.47609,     4.04686,     104.000,        0.000!   !END!
461 ! X =    159.4709,     4.29516,     104.000,        0.000!   !END!
462 ! X =   159.86169,    -2.39967,     105.000,        0.000!   !END!
463 ! X =   159.85638,    -2.15136,     103.000,        0.000!   !END!
464 ! X =   159.85106,    -1.90405,     102.000,        0.000!   !END!
465 ! X =   159.84586,    -1.65575,     102.000,        0.000!   !END!
466 ! X =   159.84055,    -1.40744,     102.000,        0.000!   !END!
467 ! X =   159.83525,    -1.15914,     102.000,        0.000!   !END!
468 ! X =   159.82994,     -.91083,     102.000,        0.000!   !END!
469 ! X =   159.82474,     -.66253,     102.000,        0.000!   !END!
470 ! X =   159.81944,     -.41422,     102.000,        0.000!   !END!
471 ! X =   159.81412,     -.16691,     102.000,        0.000!   !END!
472 ! X =   159.80882,      .08139,     102.000,        0.000!   !END!
473 ! X =   159.80352,      .32969,     102.000,        0.000!   !END!
474 ! X =   159.79832,        .578,     102.000,        0.000!   !END!
475 ! X =   159.79301,       .8263,     102.000,        0.000!   !END!
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476	! X =	159.78771,	1.0746,	102.000,	0.000!	!END!
477	! X =	159.78241,	1.3229,	102.000,	0.000!	!END!
478	! X =	159.7771,	1.57021,	102.000,	0.000!	!END!
479	! X =	159.7718,	1.81852,	102.000,	0.000!	!END!
480	! X =	159.7666,	2.06682,	102.000,	0.000!	!END!
481	! X =	159.7613,	2.31512,	102.000,	0.000!	!END!
482	! X =	159.756,	2.56342,	102.000,	0.000!	!END!
483	! X =	159.75071,	2.81172,	102.000,	0.000!	!END!
484	! X =	159.74541,	3.06002,	102.000,	0.000!	!END!
485	! X =	159.7401,	3.30733,	102.000,	0.000!	!END!
486	! X =	159.7349,	3.55563,	103.000,	0.000!	!END!
487	! X =	159.72961,	3.80393,	103.000,	0.000!	!END!
488	! X =	159.72431,	4.05223,	103.000,	0.000!	!END!
489	! X =	159.71901,	4.30053,	103.000,	0.000!	!END!
490	! X =	159.71372,	4.54883,	103.000,	0.000!	!END!
491	! X =	160.08867,	-1.40206,	102.000,	0.000!	!END!
492	! X =	160.08347,	-1.15376,	102.000,	0.000!	!END!
493	! X =	160.07816,	-.90545,	102.000,	0.000!	!END!
494	! X =	160.07286,	-.65715,	102.000,	0.000!	!END!
495	! X =	160.06754,	-.40984,	101.000,	0.000!	!END!
496	! X =	160.06224,	-.16154,	102.000,	0.000!	!END!
497	! X =	160.05704,	.08677,	102.000,	0.000!	!END!
498	! X =	160.05174,	.33507,	102.000,	0.000!	!END!
499	! X =	160.04643,	.58337,	102.000,	0.000!	!END!
500	! X =	160.04113,	.83167,	102.000,	0.000!	!END!
501	! X =	160.03583,	1.07998,	102.000,	0.000!	!END!
502	! X =	160.03062,	1.32728,	102.000,	0.000!	!END!
503	! X =	160.02532,	1.57559,	102.000,	0.000!	!END!
504	! X =	160.02002,	1.82389,	102.000,	0.000!	!END!
505	! X =	160.01472,	2.07219,	102.000,	0.000!	!END!
506	! X =	160.00942,	2.32049,	102.000,	0.000!	!END!
507	! X =	160.00412,	2.56879,	102.000,	0.000!	!END!
508	! X =	159.99892,	2.81709,	102.000,	0.000!	!END!
509	! X =	159.99362,	3.06539,	102.000,	0.000!	!END!
510	! X =	159.98832,	3.3127,	102.000,	0.000!	!END!
511	! X =	159.98302,	3.561,	102.000,	0.000!	!END!
512	! X =	159.97772,	3.8093,	103.000,	0.000!	!END!
513	! X =	159.97243,	4.0576,	103.000,	0.000!	!END!
514	! X =	159.96713,	4.3059,	103.000,	0.000!	!END!
515	! X =	159.96193,	4.5542,	103.000,	0.000!	!END!
516	! X =	159.95664,	4.8025,	103.000,	0.000!	!END!
517	! X =	160.05087,	5.11531,	104.000,	0.000!	!END!
518	! X =	160.05241,	4.86804,	103.000,	0.000!	!END!
519	! X =	160.05386,	4.62077,	103.000,	0.000!	!END!
520	! X =	160.05541,	4.3735,	103.000,	0.000!	!END!
521	! X =	160.05696,	4.12624,	103.000,	0.000!	!END!
522	! X =	160.05852,	3.87996,	103.000,	0.000!	!END!
523	! X =	160.06007,	3.63269,	102.000,	0.000!	!END!
524	! X =	160.06152,	3.38542,	102.000,	0.000!	!END!
525	! X =	160.06308,	3.13816,	102.000,	0.000!	!END!
526	! X =	160.06463,	2.89089,	102.000,	0.000!	!END!
527	! X =	160.06619,	2.64461,	102.000,	0.000!	!END!
528	! X =	160.06774,	2.39734,	102.000,	0.000!	!END!
529	! X =	160.06919,	2.15007,	102.000,	0.000!	!END!
530	! X =	160.07075,	1.9028,	102.000,	0.000!	!END!
531	! X =	160.07231,	1.65653,	102.000,	0.000!	!END!
532	! X =	160.07376,	1.40926,	102.000,	0.000!	!END!
533	! X =	160.07532,	1.16199,	102.000,	0.000!	!END!
534	! X =	160.07687,	.91472,	102.000,	0.000!	!END!
535	! X =	160.07843,	.66744,	102.000,	0.000!	!END!

536	! X =	160.07989,	.42117,	102.000,	0.000!	!END!
537	! X =	160.08145,	.1739,	102.000,	0.000!	!END!
538	! X =	160.08301,	-.07337,	102.000,	0.000!	!END!
539	! X =	160.08456,	-.32065,	101.000,	0.000!	!END!
540	! X =	160.08602,	-.56792,	102.000,	0.000!	!END!
541	! X =	160.08759,	-.8142,	102.000,	0.000!	!END!
542	! X =	160.08914,	-1.06147,	102.000,	0.000!	!END!
543	! X =	160.0907,	-1.30874,	102.000,	0.000!	!END!
544	! X =	160.09216,	-1.55601,	102.000,	0.000!	!END!
545	! X =	160.09373,	-1.80229,	102.000,	0.000!	!END!
546	! X =	160.09529,	-2.04956,	102.000,	0.000!	!END!
547	! X =	160.09675,	-2.29684,	104.000,	0.000!	!END!
548	! X =	160.09831,	-2.54411,	109.000,	0.000!	!END!
549	! X =	159.88694,	-2.62137,	106.000,	0.000!	!END!
550	! X =	159.67545,	-2.69962,	106.000,	0.000!	!END!
551	! X =	159.46398,	-2.77687,	106.000,	0.000!	!END!
552	! X =	159.25261,	-2.85413,	111.000,	0.000!	!END!
553	! X =	159.02408,	-2.90638,	121.000,	0.000!	!END!
554	! X =	158.79555,	-2.95963,	113.000,	0.000!	!END!
555	! X =	158.56703,	-3.01189,	121.000,	0.000!	!END!
556	! X =	158.3386,	-3.06414,	123.000,	0.000!	!END!
557	! X =	158.11008,	-3.1164,	139.000,	0.000!	!END!
558	! X =	157.88155,	-3.16866,	133.000,	0.000!	!END!
559	! X =	157.65303,	-3.22091,	114.000,	0.000!	!END!
560	! X =	157.4648,	-3.356,	107.000,	0.000!	!END!
561	! X =	157.27655,	-3.49209,	105.000,	0.000!	!END!
562	! X =	157.08832,	-3.62718,	104.000,	0.000!	!END!
563	! X =	156.90008,	-3.76327,	103.000,	0.000!	!END!
564	! X =	156.9011,	-3.66199,	102.000,	0.000!	!END!
565	! X =	156.68415,	-3.65479,	102.000,	0.000!	!END!
566	! X =	156.61502,	-3.82289,	102.000,	0.000!	!END!
567	! X =	156.54591,	-3.98999,	102.000,	0.000!	!END!
568	! X =	156.44447,	-4.02867,	102.000,	0.000!	!END!
569	! X =	156.34457,	-3.90549,	102.000,	0.000!	!END!
570	! X =	156.18916,	-3.88403,	102.000,	0.000!	!END!
571	! X =	156.22471,	-3.99561,	102.000,	0.000!	!END!
572	! X =	156.22729,	-4.03437,	102.000,	0.000!	!END!
573	! X =	156.16243,	-4.07342,	102.000,	0.000!	!END!
574	! X =	156.14481,	-4.15367,	102.000,	0.000!	!END!
575	! X =	156.18777,	-4.21767,	102.000,	0.000!	!END!
576	! X =	156.28167,	-4.24049,	102.000,	0.000!	!END!
577	! X =	156.32803,	-4.26083,	102.000,	0.000!	!END!
578	! X =	156.39661,	-4.34296,	102.000,	0.000!	!END!
579	! X =	156.38778,	-4.4243,	102.000,	0.000!	!END!
580	! X =	156.44188,	-4.47153,	102.000,	0.000!	!END!
581	! X =	156.38181,	-4.53645,	102.000,	0.000!	!END!
582	! X =	156.35904,	-4.62758,	102.000,	0.000!	!END!
583	! X =	156.32898,	-4.65706,	102.000,	0.000!	!END!
584	! X =	156.3118,	-4.59531,	102.000,	0.000!	!END!
585	! X =	156.25318,	-4.60464,	102.000,	0.000!	!END!
586	! X =	156.05992,	-4.69897,	102.000,	0.000!	!END!
587	! X =	155.92703,	-4.70951,	102.000,	0.000!	!END!
588	! X =	155.92228,	-4.67967,	102.000,	0.000!	!END!
589	! X =	155.9746,	-4.6097,	102.000,	0.000!	!END!
590	! X =	155.97366,	-4.50642,	102.000,	0.000!	!END!
591	! X =	155.89969,	-4.46891,	102.000,	0.000!	!END!
592	! X =	155.73603,	-4.43247,	102.000,	0.000!	!END!
593	! X =	155.57236,	-4.39602,	102.000,	0.000!	!END!
594	! X =	155.5221,	-4.45806,	102.000,	0.000!	!END!
595	! X =	155.50861,	-4.52148,	102.000,	0.000!	!END!

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596 ! X =   155.52275,   -4.59014,     102.000,       0.000!   !END!
597 ! X =    155.4853,   -4.66622,     102.000,       0.000!   !END!
598 ! X =   155.34025,   -4.60812,     102.000,       0.000!   !END!
599 ! X =   155.33777,   -4.84345,     102.000,       0.000!   !END!
600 ! X =   155.33541,   -5.07778,     102.000,       0.000!   !END!
601 ! X =   155.33305,   -5.31211,     102.000,       0.000!   !END!
602 ! X =   155.33059,   -5.54644,     102.000,       0.000!   !END!
603 ! X =   155.32823,   -5.78078,     102.000,       0.000!   !END!
604 ! X =   155.24698,   -5.77795,     102.000,       0.000!   !END!
605 ! X =   155.08121,   -5.70574,     102.000,       0.000!   !END!
606 ! X =   154.91544,   -5.63253,     102.000,       0.000!   !END!
607 ! X =    154.7144,   -5.63542,     102.000,       0.000!   !END!
608 ! X =   154.51345,    -5.6393,     102.000,       0.000!   !END!
609 ! X =   154.31241,   -5.64219,     102.000,       0.000!   !END!
610 ! X =   154.11136,   -5.64608,     102.000,       0.000!   !END!
611 ! X =   154.11247,   -5.41769,     102.000,       0.000!   !END!
612 ! X =   154.11359,    -5.1893,     102.000,       0.000!   !END!
613 ! X =    154.1147,   -4.96091,     103.000,       0.000!   !END!
614 ! X =   154.11581,   -4.73351,     104.000,       0.000!   !END!
615 ! X =   153.92104,    -4.7325,     104.000,       0.000!   !END!
616 ! X =   153.72627,   -4.73148,     105.000,       0.000!   !END!
617 ! X =    153.7271,   -4.96287,     105.000,       0.000!   !END!
618 ! X =   153.72792,   -5.19525,     104.000,       0.000!   !END!
619 ! X =   153.72885,   -5.42664,     103.000,       0.000!   !END!
620 ! X =   153.72967,   -5.65902,     103.000,       0.000!   !END!
621 ! X =   153.54273,   -5.66504,     104.000,       0.000!   !END!
622 ! X =    153.3558,   -5.67105,     104.000,       0.000!   !END!
623 ! X =   153.16895,   -5.67806,     106.000,       0.000!   !END!
624 ! X =   152.98202,   -5.68408,     106.000,       0.000!   !END!
625 ! X =   152.98056,   -5.48545,     111.000,       0.000!   !END!
626 ! X =    152.9791,   -5.28682,     115.000,       0.000!   !END!
627 ! X =   153.09414,   -5.28205,     111.000,       0.000!   !END!
628 ! X =   153.14257,   -5.19616,     110.000,       0.000!   !END!
629 ! X =   153.13845,   -5.11468,     110.000,       0.000!   !END!
630 ! X =   153.13991,   -4.96971,     110.000,       0.000!   !END!
631 ! X =   152.97451,   -4.95808,     119.000,       0.000!   !END!
632 ! X =   152.97582,     -4.828,     121.000,       0.000!   !END!
633 ! X =   153.19787,   -4.83029,     106.000,       0.000!   !END!
634 ! X =   153.20182,   -4.68435,     110.000,       0.000!   !END!
635 ! X =   153.20577,   -4.53742,     115.000,       0.000!   !END!
636 ! X =   153.16186,   -4.47937,     118.000,       0.000!   !END!
637 ! X =   152.99234,   -4.47464,     120.000,       0.000!   !END!
638 ! X =   153.14003,   -4.31132,     121.000,       0.000!   !END!
639 ! X =   153.28761,     -4.148,     121.000,       0.000!   !END!
640 ! X =    153.4352,   -3.98468,     121.000,       0.000!   !END!
641 ! X =   153.58289,   -3.82136,     120.000,       0.000!   !END!
642 ! X =   153.68607,   -3.61984,     120.000,       0.000!   !END!
643 ! X =   153.74809,   -3.55792,     120.000,       0.000!   !END!
644 ! X =    153.9479,   -3.51034,     118.000,       0.000!   !END!
645 ! X =   154.04213,   -3.30476,     121.000,       0.000!   !END!
646 ! X =   154.05331,   -3.17677,     121.000,       0.000!   !END!
647 ! X =    154.0343,    -3.1011,     121.000,       0.000!   !END!
648 ! X =    154.1374,   -3.00584,     117.000,       0.000!   !END!
649 ! X =    154.2405,   -2.91058,     118.000,       0.000!   !END!
650 ! X =   154.31604,   -2.78326,     121.000,       0.000!   !END!
651 ! X =    154.4121,    -2.6502,     121.000,       0.000!   !END!
652 ! X =   154.50818,   -2.51614,     121.000,       0.000!   !END!
653 ! X =   154.60719,   -2.33543,     117.000,       0.000!   !END!
654 ! X =   154.70611,   -2.15473,     116.000,       0.000!   !END!
655 ! X =   154.80513,   -1.97403,     121.000,       0.000!   !END!
```

```
656 ! X =   154.84149,   -1.80956,     121.000,       0.000!   !END!
657 ! X =   154.95128,   -1.73722,     121.000,       0.000!   !END!
658 ! X =   155.16835,   -1.63519,     121.000,       0.000!   !END!
659 ! X =   155.18851,    -1.6066,     121.000,       0.000!   !END!
660 ! X =   155.20482,    -1.4608,     121.000,       0.000!   !END!
661 ! X =   155.29612,   -1.26115,     121.000,       0.000!   !END!
662 ! X =   155.30634,   -1.22749,     121.000,       0.000!   !END!
663 ! X =   155.43437,   -1.20896,     121.000,       0.000!   !END!
664 ! X =    155.5472,   -1.12969,     121.000,       0.000!   !END!
665 ! X =   155.66002,   -1.05042,     121.000,       0.000!   !END!
666 ! X =   155.79788,    -.88105,     121.000,       0.000!   !END!
667 ! X =   155.93564,    -.71167,     111.000,       0.000!   !END!
668 ! X =   156.07339,    -.54329,     113.000,       0.000!   !END!
669 ! X =   156.21115,    -.37392,     121.000,       0.000!   !END!
670 ! X =   156.33819,    -.16968,     121.000,       0.000!   !END!
671 ! X =   156.46513,     .03456,     121.000,       0.000!   !END!
672 ! X =   156.59217,      .2388,     121.000,       0.000!   !END!
673 ! X =   156.71911,     .44304,     121.000,       0.000!   !END!
674 ! X =    156.7792,     .62712,     121.000,       0.000!   !END!
675 ! X =    156.8392,      .8112,     121.000,       0.000!   !END!
676 ! X =   156.89921,     .99627,     122.000,       0.000!   !END!
677 ! X =    157.0776,    1.08677,     122.000,       0.000!   !END!
678 ! X =   157.22788,    1.19345,     119.000,       0.000!   !END!
679 ! X =   157.37804,    1.29914,     113.000,       0.000!   !END!
680 ! X =    157.4846,    1.50161,     119.000,       0.000!   !END!
681 ! X =   157.59105,    1.70407,     122.000,       0.000!   !END!
682 ! X =   157.69762,    1.90752,     121.000,       0.000!   !END!
683 ! X =   157.82032,    2.10287,     114.000,       0.000!   !END!
684 ! X =   157.94311,    2.29821,     106.000,       0.000!   !END!
685 ! X =   158.06591,    2.49355,     104.000,       0.000!   !END!
686 ! X =   158.18861,    2.68889,     103.000,       0.000!   !END!
687 ! X =   158.31141,    2.88523,     103.000,       0.000!   !END!
688 ! X =   158.43421,    3.08057,     103.000,       0.000!   !END!
689 ! X =   158.58113,    3.26572,     104.000,       0.000!   !END!
690 ! X =   158.72813,    3.44989,     104.000,       0.000!   !END!
691 ! X =   158.87505,    3.63505,     104.000,       0.000!   !END!
692 ! X =   159.02206,    3.82021,     105.000,       0.000!   !END!
693 ! X =   159.16898,    4.00536,     107.000,       0.000!   !END!
694 ! X =     159.316,    4.19052,     107.000,       0.000!   !END!
695 ! X =     159.463,    4.37468,     105.000,       0.000!   !END!
696 ! X =   159.60992,    4.55984,     104.000,       0.000!   !END!
697 ! X =   159.75693,      4.745,     104.000,       0.000!   !END!
698 ! X =   159.90385,    4.93015,     104.000,       0.000!   !END!
```

----

[a] Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
HOLCIM BART CLASS I ANALYSIS (UPPER BUFFALO)
JUNE 2008 BASE FOR CONTROL
UMC 6KM CALMET METEOROLOGICAL DATA
---------------- Run title (3 lines) 
------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------
-------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    ! METDAT = /raid2c/umc/calmet/2003/calmet03.dat !
    or
ISCMET.DAT    input    * ISCDAT =             *
    or
PLMMET.DAT    input    * PLMDAT =             *
    or
PROFILE.DAT   input    * PRFDAT =             *
SURFACE.DAT   input    * SFCDAT =             *
RESTARTB.DAT  input    * RSTARTB=             *
-------------------------------------------------------------------------
--------
CALPUFF.LST   output   ! PUFLST =HOLUB2003BASE608.LST     !
CONC.DAT      output   ! CONDAT =HOLUB2003BASE608.CON     !
DFLX.DAT      output   ! DFDAT  =HOLUB2003BASE608.DRY     !
WFLX.DAT      output   ! WFDAT  =HOLUB2003BASE608.WET     !

VISB.DAT      output   ! VISDAT =HOLUB2003BASE608.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2003.DAT     !
-------------------------------------------------------------------------
--------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =             *
VOLEMARB.DAT  input    * VOLDAT =             *
BAEMARB.DAT   input    * ARDAT  =             *
LNEMARB.DAT   input    * LNDAT  =             *
-------------------------------------------------------------------------
--------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =             *
CHEM.DAT      input    * CHEMDAT=             *
H2O2.DAT      input    * H2O2DAT=             *
HILL.DAT      input    * HILDAT=             *
HILLRCT.DAT   input    * RCTDAT=             *
COASTLN.DAT   input    * CSTDAT=             *
FLUXBDY.DAT   input    * BDYDAT=             *
BCON.DAT      input    * BCNDAT=             *
DEBUG.DAT     output   * DEBUG =             *
MASSFLX.DAT   output   * FLXDAT=             *
MASSBAL.DAT   output   * BALDAT=             *
FOG.DAT       output   * FOGDAT=             *
```

```
-------------------------------------------------------------------------
--------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                     Default: 1       ! NMETDAT =  1   !

     Number of PTEMARB.DAT files for run (NPTDAT)
                                     Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                     Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                     Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if
NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------

-------------------------------------------------------------------------
--------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  2003 !
     (used only if   Month (IBMO) -- No default       ! IBMO =   01 !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   01 !
                      Hour (IBHR) -- No default       ! IBHR =   01 !

     Base time zone        (XBTZ) -- No default       ! XBTZ = 6.0  !
        PST = 8., MST = 7.
        CST = 6., EST = 5.

     Length of run (hours) (IRLG) -- No default       ! IRLG =  8760 !

     Number of chemical species (NSPEC)
```

```
                                 Default: 5       ! NSPEC =  6   !

     Number of chemical species
     to be emitted  (NSE)        Default: 3       ! NSE =  3   !

     Flag to stop run after
     SETUP phase (ITEST)         Default: 2       ! ITEST =  2   !
     (Used to allow checking
     of the model inputs, files, etc.)
           ITEST = 1 - STOPS program after SETUP phase
           ITEST = 2 - Continues with execution of program
                       after SETUP

     Restart Configuration:

        Control flag (MRESTART)      Default: 0       ! MRESTART =  0
!

           0 = Do not read or write a restart file
           1 = Read a restart file at the beginning of
               the run
           2 = Write a restart file during run
           3 = Read a restart file at beginning of run
               and write a restart file during run

        Number of periods in Restart
        output cycle (NRESPD)        Default: 0       ! NRESPD =  0   !

           0 = File written only at last period
          >0 = File updated every NRESPD periods

     Meteorological Data Format (METFM)
                                 Default: 1       ! METFM =  1   !

           METFM = 1 - CALMET binary file (CALMET.MET)
           METFM = 2 - ISC ASCII file (ISCMET.MET)
           METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
           METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                       surface parameters file (SURFACE.DAT)

  Meteorological Profile Data Format (MPRFFM)
            (used only for METFM = 1, 2, 3)
                                 Default: 1       ! MPRFFM =  1   !

           MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
           MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

     PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
     Averaging Time (minutes) (AVET)
                                 Default: 60.0    ! AVET = 60. !
     PG Averaging Time (minutes) (PGTIME)
                                 Default: 60.0    ! PGTIME = 60. !


!END!


-------------------------------------------------------------------------
-------
```

```
INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)                   Default: 1     ! MGAUSS =  1
!
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                              Default: 3     ! MCTADJ =  3
!
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                          Default: 0     ! MCTSG =  0
!
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated 0 (MSLUG)                   Default: 0     ! MSLUG =  0
!
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled ?
     (MTRANS)                              Default: 1     ! MTRANS =  1
!
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)            Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to simulate building
     downwash? (MBDW)                      Default: 1     ! MBDW =   1
!
        1 = ISC method
        2 = PRIME method

     Vertical wind shear modeled above
     stack top? (MSHEAR)                   Default: 0     ! MSHEAR =  0
!
        0 = no  (i.e., vertical wind shear not modeled)
        1 = yes (i.e., vertical wind shear modeled)

     Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0
!
        0 = no (i.e., puffs not split)
        1 = yes (i.e., puffs are split)

     Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  1
!
```

```
           0 = chemical transformation not
               modeled
           1 = transformation rates computed
               internally (MESOPUFF II scheme)
           2 = user-specified transformation
               rates used
           3 = transformation rates computed
               internally (RIVAD/ARM3 scheme)
           4 = secondary organic aerosol formation
               computed (MESOPUFF II scheme for OH)

      Aqueous phase transformation flag (MAQCHEM)
      (Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0
!
           0 = aqueous phase transformation
               not modeled
           1 = transformation rates adjusted
               for aqueous phase reactions

      Wet removal modeled ? (MWET)          Default: 1     ! MWET =  1
!
           0 = no
           1 = yes

      Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  1
!
           0 = no
           1 = yes
           (dry deposition method specified
            for each species in Input Group 3)

      Method used to compute dispersion
      coefficients (MDISP)                  Default: 3     ! MDISP =  3
!

           1 = dispersion coefficients computed from measured values
               of turbulence, sigma v, sigma w
           2 = dispersion coefficients from internally calculated
               sigma v, sigma w using micrometeorological variables
               (u*, w*, L, etc.)
           3 = PG dispersion coefficients for RURAL areas (computed using
               the ISCST multi-segment approximation) and MP coefficients
in
               urban areas
           4 = same as 3 except PG coefficients computed using
               the MESOPUFF II eqns.
           5 = CTDM sigmas used for stable and neutral conditions.
               For unstable conditions, sigmas are computed as in
               MDISP = 3, described above.  MDISP = 5 assumes that
               measured values are read

      Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
      (Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3
!
           1 = use sigma-v or sigma-theta measurements
               from PROFILE.DAT to compute sigma-y
               (valid for METFM = 1, 2, 3, 4)
           2 = use sigma-w measurements
               from PROFILE.DAT to compute sigma-z
               (valid for METFM = 1, 2, 3, 4)
```

```
        3 = use both sigma-(v/theta) and sigma-w
            from PROFILE.DAT to compute sigma-y and sigma-z
            (valid for METFM = 1, 2, 3, 4)
        4 = use sigma-theta measurements
            from PLMMET.DAT to compute sigma-y
            (valid only if METFM = 3)

     Back-up method used to compute dispersion
     when measured turbulence data are
     missing (MDISP2)                      Default: 3     ! MDISP2 =  3
!
     (used only if MDISP = 1 or 5)
        2 = dispersion coefficients from internally calculated
            sigma v, sigma w using micrometeorological variables
            (u*, w*, L, etc.)
        3 = PG dispersion coefficients for RURAL areas (computed using
            the ISCST multi-segment approximation) and MP coefficients
in
            urban areas
        4 = same as 3 except PG coefficients computed using
            the MESOPUFF II eqns.

   [DIAGNOSTIC FEATURE]
     Method used for Lagrangian timescale for Sigma-y
     (used only if MDISP=1,2 or MDISP2=1,2)
     (MTAULY)                              Default: 0     ! MTAULY =  0
!
        0 = Draxler default 617.284 (s)
        1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
       10 < Direct user input (s)             -- e.g., 306.9


     [DIAGNOSTIC FEATURE]
     Method used for Advective-Decay timescale for Turbulence
     (used only if MDISP=2 or MDISP2=2)
     (MTAUADV)                             Default: 0     ! MTAUADV =  0
!
        0 = No turbulence advection
        1 = Computed (OPTION NOT IMPLEMENTED)
       10 < Direct user input (s)   -- e.g., 300


     Method used to compute turbulence sigma-v &
     sigma-w using micrometeorological variables
     (Used only if MDISP = 2 or MDISP2 = 2)
     (MCTURB)                              Default: 1     ! MCTURB =  1
!
        1 = Standard CALPUFF subroutines
        2 = AERMOD subroutines

     PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH =  0
!
     (MROUGH)
        0 = no
        1 = yes

     Partial plume penetration of          Default: 1     ! MPARTL =  1
!
     elevated inversion?
     (MPARTL)
```

```
   0 = no
   1 = yes

Strength of temperature inversion     Default: 0     ! MTINV =  0
!
provided in PROFILE.DAT extended records?
(MTINV)
   0 = no (computed from measured/default gradients)
   1 = yes

PDF used for dispersion under convective conditions?
                                      Default: 0     ! MPDF =  0  !
(MPDF)
   0 = no
   1 = yes

Sub-Grid TIBL module used for shore line?
                                      Default: 0     ! MSGTIBL = 0
!
(MSGTIBL)
   0 = no
   1 = yes

Boundary conditions (concentration) modeled?
                                      Default: 0     ! MBCON = 0  !
(MBCON)
   0 = no
   1 = yes, using formatted BCON.DAT file
   2 = yes, using unformatted CONC.DAT file


Analyses of fogging and icing impacts due to emissions from
arrays of mechanically-forced cooling towers can be performed
using CALPUFF in conjunction with a cooling tower emissions
processor (CTEMISS) and its associated postprocessors.  Hourly
emissions of water vapor and temperature from each cooling tower
cell are computed for the current cell configuration and ambient
conditions by CTEMISS. CALPUFF models the dispersion of these
emissions and provides cloud information in a specialized format
for further analysis. Output to FOG.DAT is provided in either
'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
                                      Default: 0     ! MFOG =  0
!
(MFOG)
   0 = no
   1 = yes  - report results in PLUME Mode format
   2 = yes  - report results in RECEPTOR Mode format


Test options specified to see if
they conform to regulatory
values? (MREG)                        Default: 1     ! MREG =  1
!

   0 = NO checks are made
   1 = Technical options must conform to USEPA
       Long Range Transport (LRT) guidance
                  METFM    1 or 2
```

```
                       AVET      60. (min)
                       PGTIME    60. (min)
                       MGAUSS    1
                       MCTADJ    3
                       MTRANS    1
                       MTIP      1
                       MCHEM     1 or 3 (if modeling SOx, NOx)
                       MWET      1
                       MDRY      1
                       MDISP     2 or 3
                       MPDF      0 if MDISP=3
                                 1 if MDISP=2
                       MROUGH    0
                       MPARTL    1
                       SYTDEP    550. (m)
                       MHFTSZ    0


!END!


-------------------------------------------------------------------------
-------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!

                                                               Dry
OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED
NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,
(0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS
1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE
2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)
3= etc.)

!          SO2  =         1,               1,           1,
0   !
!          SO4  =         1,               0,           2,
0   !
!          NOX  =         1,               1,           1,
0   !
!         HNO3  =         1,               0,           1,
```

```
0   !
!          NO3  =         1,                0,           2,
0   !
!         PM10  =         1,                1,           2,
0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



------------------------------------------------------------------------
-------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 37N  !
     (RLON0)                    No Default      ! RLON0 = 92W  !
```

```
         TTM :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of
projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping
plane
                RLAT0 identifies latitude of tangent-point of mapping
plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                   No Default      ! XLAT1 = 30N  !
     (XLAT2)                   No Default      ! XLAT2 = 45N  !

         LCC :  Projection cone slices through Earth's surface at XLAT1
and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of
the
     Earth known as the World Geodetic System 1984 (WGS-G ).  Other
local
     models may be in use, and their selection in CALMET will make its
output
     consistent with local mapping products.  The list of Datum-Regions
with
     official transformation parameters is provided by the National
Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)

------------------------------------------------------------------------
------
     WGS-G     WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS
(NAD27)
     NWS-27    NWS 6370KM Radius, Sphere
     NWS-84    NWS 6370KM Radius, Sphere
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere
```

```
     Datum-region for output coordinates
     (DATUM)                    Default: WGS-G     ! DATUM = WGS-84  !


METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =   87   !
            No. Y grid cells (NY)      No default     ! NY =  111   !
         No. vertical layers (NZ)      No default     ! NZ =  10   !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 6 !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
              4000. !

            Reference Coordinates
           of SOUTHWEST corner of
                 grid cell(1, 1):

            X-coordinate (XORIGKM)     No default     ! XORIGKM = -258.
!
            Y coordinate (YORIGKM)     No default     ! YORIGKM = -330.
!
                                      Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET.
grid.
     The lower left (LL) corner of the computational grid is at grid
point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of
the
     computational grid is at grid point (IECOMP, JECOMP) of the MET.
grid.
     The grid spacing of the computational grid is the same as the MET.
grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =   1
!
                   (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =   1
!
                   (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)      No default     ! IECOMP =
87   !
                   (1 <= IECOMP <= NX)
```

```
        Y index of UR corner (JECOMP)      No default     ! JECOMP =
111   !
                  (1 <= JECOMP <= NY)


SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of
the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the
computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1
!
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1
!
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =
87   !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =
111   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1
!
        (MESHDN is an integer >= 1)

!END!


-----------------------------------------------------------------------
-------


INPUT GROUP: 5 -- Output Options
--------------
                                             *
*
     FILE                       DEFAULT VALUE             VALUE THIS RUN
     ----                       -------------             --------------

   Concentrations (ICON)              1                   !  ICON =  1
!
```

```
   Dry Fluxes (IDRY)                 1                    !  IDRY =  1
!
   Wet Fluxes (IWET)                 1                    !  IWET =  1
!
   Relative Humidity (IVIS)          1                    !  IVIS =  1
!
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                          Default: T          ! LCOMPRS = T
!

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                        Default: 0          ! IMFLX =  0
!
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                        Default: 0          ! IMBAL =  0
!
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)    Default: 0          ! ICPRT =  0
!
       Print dry fluxes (IDPRT)        Default: 0          ! IDPRT =  0
!
       Print wet fluxes (IWPRT)        Default: 0          ! IWPRT =  0
!
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours               Default: 1          ! ICFRQ =  1
!
       Dry flux print interval
       (IDFRQ) in hours               Default: 1          ! IDFRQ =  1
!
       Wet flux print interval
       (IWFRQ) in hours               Default: 1          ! IWFRQ =  1
!

       Units for Line Printer Output
       (IPRTU)                        Default: 1          ! IPRTU =  3
!
                       for            for
```

```
                 Concentration    Deposition
          1 =       g/m**3         g/m**2/s
          2 =      mg/m**3        mg/m**2/s
          3 =      ug/m**3        ug/m**2/s
          4 =      ng/m**3        ng/m**2/s
          5 =     Odour Units

       Messages tracking progress of run
       written to the screen ?
       (IMESG)                        Default: 2         ! IMESG =  2
!
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                ---- CONCENTRATIONS ----   ------ DRY FLUXES ------
------ WET FLUXES ------   -- MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?
PRINTED?  SAVED ON DISK?   SAVED ON DISK?
   -------       ------------------------   ------------------------
------------------------   ---------------
!          SO2 =     0,            1,           0,            1,
0,          1,          0   !
!          SO4 =     0,            1,           0,            1,
0,          1,          0   !
!          NOX =     0,            1,           0,            1,
0,          1,          0   !
!         HNO3 =     0,            1,           0,            1,
0,          1,          0   !
!          NO3 =     0,            1,           0,            1,
0,          1,          0   !
!         PM10 =     0,            1,           0,            1,
0,          1,          0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                Default: F     ! LDEBUG
= F !

       First puff to track
       (IPFDEB)                                Default: 1     ! IPFDEB
=  1  !

       Number of puffs to track
       (NPFDEB)                                Default: 1     ! NPFDEB
=  1  !

       Met. period to start output
       (NN1)                                   Default: 1     ! NN1 =
1   !

       Met. period to end output
       (NN2)                                   Default: 10    ! NN2 =
10  !
```

```
!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =
0   !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC
=  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                  No Default     ! MHILL =
2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M
= 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M
= 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL           XC         YC       THETAH  ZGRID  RELIEF    EXPO 1
EXPO 2   SCALE 1    SCALE 2    AMAX1     AMAX2
 NO.          (km)       (km)      (deg.)   (m)     (m)      (m)
```

```
(m)       (m)        (m)       (m)       (m)
----          ----      ----      ------  -----  ------    ------
------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                      XRCT         YRCT        ZRCT          XHH
                      (km)         (km)         (m)
                     ------       -----      ------         ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid
elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain
receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a
separate
           input subgroup and therefore must end with an input group
terminator.

------------------------------------------------------------------------
-------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY
MESOPHYLL RESISTANCE     HENRY'S LAW COEFFICIENT
       NAME        (cm**2/s)
(s/cm)                (dimensionless)
      -------     -----------      ----------      ----------
--------------------     ----------------------

!          SO2 =     0.1509,         1000.,            8.,
```

```
0.,                  0.04 !
!          NOX =     0.1656,            1.,            8.,
5.,                   3.5 !
!         HNO3 =     0.1628,            1.,           18.,
0.,            0.00000008 !

!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard
deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME              DIAMETER                  DEVIATION
                         (microns)                 (microns)
      -------      -------------------        ------------------
!          SO4 =          0.48,                     2.   !
!          NO3 =          0.48,                     2.   !
!         PM10 =            2.,                     2.   !

!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                          Default: 30    !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                            Default: 10    !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                         Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                           Default: 9     !   NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                           Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation
```

```
!END!


-------------------------------------------------------------------------------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,             0.0E00 !
!          SO4 =         1.0E-04,            3.0E-05 !
!         HNO3 =         6.0E-05,             0.0E00 !
!          NO3 =         1.0E-04,            3.0E-05 !
!         PM10 =         1.0E-04,            3.0E-05 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0
!
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                    Default: 12*80.
     !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00,
65.00, 65.00, 26.00, 26.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                   Default: 12*10.
     !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50,
0.50, 0.50, 0.50 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2          ! RNITE1 =
.2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0          ! RNITE2 =
2.0 !
```

```
     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                   Default: 2.0          ! RNITE3 =
2.0 !

     H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =
0   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb                  Default: 12*1.
     !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
     (used only if MCHEM = 4)

     The SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)
          VOC / NOX ratio (after reaction)         (VCNX)
     to characterize the air mass when computing
     the formation of SOA from VOC emissions.
     Typical values for several distinct air mass types are:

        Month    1    2    3    4    5    6    7    8    9   10   11
12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Dec

     Clean Continental
        BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
1.
        OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20
.15
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Clean Marine (surface)
        BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
.5
        OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30
.25
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Urban - low biogenic (controls present)
        BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
30.
        OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20
.20
        VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.
4.

     Urban - high biogenic (controls present)
```

```
        BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
60.
        OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35
.25
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Regional Plume
        BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
20.
        OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30
.20
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Urban - no controls present
        BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
100.
        OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35
.30
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.
2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20,
0.20, 0.20, 0.15 !
     !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00,
50.00, 50.00, 50.00, 50.00 !


!END!


-----------------------------------------------------------------------
-------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                          Default: 550.   ! SYTDEP
= 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                  Default: 0      ! MHFTSZ
=  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                              Default: 5      ! JSUP =
5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)     Default: 0.01   ! CONK1
```

```
= .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                    Default: 0.1    ! CONK2
= .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                      Default: 0.5    ! TBD =
.5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                             Default: 10     ! IURB1
=  10  !
                                                         19     ! IURB2
=  19  !

     Site characterization parameters for single-point Met data files
---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                              Default: 20     !
ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                                  Default: 0.25   ! Z0IN =
.25 !

        Leaf area index for modeling domain
        (XLAIIN)                                Default: 3.0    ! XLAIIN
= 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                                Default: 0.0    ! ELEVIN
= .0 !

        Latitude (degrees) for met location
        (XLATIN)                                Default: -999.  ! XLATIN
= -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                                Default: -999.  ! XLONIN
= -999.0 !

     Specialized information for interpreting single-point Met data
files -----

        Anemometer height (m) (Used only if METFM = 2,3)
        (ANEMHT)                                Default: 10.    ! ANEMHT
= 10.0 !

        Form of lateral turbulance data in PROFILE.DAT file
        (Used only if METFM = 4 or MTURBVW = 1 or 3)
```

```
        (ISIGMAV)                               Default: 1      !
ISIGMAV =  1  !
            0 = read sigma-theta
            1 = read sigma-v

        Choice of mixing heights (Used only if METFM = 4)
        (IMIXCTDM)                              Default: 0      !
IMIXCTDM =  0  !
            0 = read PREDICTED mixing heights
            1 = read OBSERVED mixing heights

     Maximum length of a slug (met. grid units)
     (XMXLEN)                                   Default: 1.0    ! XMXLEN
= 1.0 !

     Maximum travel distance of a puff/slug (in
     grid units) during one sampling step
     (XSAMLEN)                                  Default: 1.0    !
XSAMLEN = 1.0 !

     Maximum Number of slugs/puffs release from
     one source during one time step
     (MXNEW)                                    Default: 99     ! MXNEW
=  99   !

     Maximum Number of sampling steps for
     one puff/slug during one time step
     (MXSAM)                                    Default: 99     ! MXSAM
=  99   !

     Number of iterations used when computing
     the transport wind for a sampling step
     that includes gradual rise (for CALMET
     and PROFILE winds)
     (NCOUNT)                                   Default: 2      ! NCOUNT
=  2   !

     Minimum sigma y for a new puff/slug (m)
     (SYMIN)                                    Default: 1.0    ! SYMIN
= 1.0  !

     Minimum sigma z for a new puff/slug (m)
     (SZMIN)                                    Default: 1.0    ! SZMIN
= 1.0  !

     Default minimum turbulence velocities sigma-v and sigma-w
     for each stability class over land and over water (m/s)
     (SVMIN(12) and SWMIN(12))

                     ----------  LAND  ----------       ---------  WATER
----------
        Stab Class :  A    B    C    D    E    F         A    B    C
D    E    F
                     ---  ---  ---  ---  ---  ---       ---  ---  ---
---  ---  ---
     Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37,
.37, .37, .37
     Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08,
.06, .03, .016
```

```
           ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370,
0.370, 0.370, 0.370, 0.370, 0.370!
           ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200,
0.120, 0.080, 0.060, 0.030, 0.016!


     Divergence criterion for dw/dz across puff
     used to initiate adjustment for horizontal
     convergence (1/s)
     Partial adjustment starts at CDIV(1), and
     full adjustment is reached at CDIV(2)
     (CDIV(2))                                 Default: 0.0,0.0  ! CDIV
= .0, .0 !

     Minimum wind speed (m/s) allowed for
     non-calm conditions. Also used as minimum
     speed returned when using power-law
     extrapolation toward surface
     (WSCALM)                                  Default: 0.5    ! WSCALM
= .5 !

     Maximum mixing height (m)
     (XMAXZI)                                  Default: 3000.  ! XMAXZI
= 4000.0 !

     Minimum mixing height (m)
     (XMINZI)                                  Default: 50.    ! XMINZI
= 20.0 !

     Default wind speed classes --
     5 upper bounds (m/s) are entered;
     the 6th class has no upper limit
     (WSCAT(5))                   Default   :
                                  ISC RURAL : 1.54, 3.09, 5.14, 8.23,
10.8 (10.8+)

                           Wind Speed Class :  1     2     3     4
5
                                               ---   ---   ---   ---
---
                                    ! WSCAT = 1.54, 3.09, 5.14, 8.23,
10.80 !

     Default wind speed profile power-law
     exponents for stabilities 1-6
     (PLX0(6))                    Default   : ISC RURAL values
                                  ISC RURAL : .07, .07, .10, .15,
.35, .55
                                  ISC URBAN : .15, .15, .20, .25,
.30, .30

                            Stability Class :  A     B     C     D
E     F
                                               ---   ---   ---   ---
---   ---
                                     ! PLX0 = 0.07, 0.07, 0.10, 0.15,
0.35, 0.55 !

     Default potential temperature gradient
     for stable classes E, F (degK/m)
```

```
     (PTG0(2))                       Default: 0.020, 0.035
                                        ! PTG0 = 0.020,   0.035 !

     Default plume path coefficients for
     each stability class (used when option
     for partial plume height terrain adjustment
     is selected -- MCTADJ=3)
     (PPC(6))                  Stability Class :  A     B     C     D
E     F
                                  Default  PPC : .50,  .50,  .50,  .50,
.35,  .35
                                                 ---   ---   ---   ---
---   ---
                                        !  PPC = 0.50, 0.50, 0.50, 0.50,
0.35, 0.35 !

     Slug-to-puff transition criterion factor
     equal to sigma-y/length of slug
     (SL2PF)                            Default: 10.        ! SL2PF =
10.0 !

     Puff-splitting control variables ------------------------

       VERTICAL SPLIT
       --------------

       Number of puffs that result every time a puff
       is split - nsplit=2 means that 1 puff splits
       into 2
       (NSPLIT)                         Default:   3        ! NSPLIT
=  3  !

       Time(s) of a day when split puffs are eligible to
       be split once again; this is typically set once
       per day, around sunset before nocturnal shear develops.
       24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
       0=do not re-split    1=eligible for re-split
       (IRESPLIT(24))                   Default:  Hour 17 = 1
       !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

       Split is allowed only if last hour's mixing
       height (m) exceeds a minimum value
       (ZISPLIT)                        Default: 100.       ! ZISPLIT
= 100.0 !

       Split is allowed only if ratio of last hour's
       mixing ht to the maximum mixing ht experienced
       by the puff is less than a maximum value (this
       postpones a split until a nocturnal layer develops)
       (ROLDMAX)                        Default: 0.25       ! ROLDMAX
= 0.25 !


       HORIZONTAL SPLIT
       ----------------

       Number of puffs that result every time a puff
       is split - nsplith=5 means that 1 puff splits
       into 5
       (NSPLITH)                        Default:   5        ! NSPLITH
```

```
=  5  !

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
       (SYSPLITH)                          Default:  1.0       !
SYSPLITH = 1.0 !

       Minimum puff elongation rate (SYSPLITH/hr) due to
       wind shear, before it may be split
       (SHSPLITH)                          Default:  2.        !
SHSPLITH = 2.0 !

       Minimum concentration (g/m^3) of each
       species in puff before it may be split
       Enter array of NSPEC values; if a single value is
       entered, it will be used for ALL species
       (CNSPLITH)                          Default:  1.0E-07   !
CNSPLITH = 1.0E-07 !

     Integration control variables ------------------------

       Fractional convergence criterion for numerical SLUG
       sampling integration
       (EPSSLUG)                           Default:   1.0e-04  ! EPSSLUG
= 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                           Default:   1.0e-06  ! EPSAREA
= 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                            Default:   1.0      ! DSRISE
= 1.0 !

       Boundary Condition (BC) Puff control variables
------------------------

       Minimum height (m) to which BC puffs are mixed as they are
emitted
       (MBCON=2 ONLY).  Actual height is reset to the current mixing
height
       at the release point if greater than this minimum.
       (HTMINBC)                           Default:   500.     ! HTMINBC
= 500.0 !

       Search radius (in BC segment lengths) about a receptor for
sampling
       nearest BC puff.  BC puffs are emitted with a spacing of one
segment
       length, so the search radius should be greater than 1.
       (RSAMPBC)                           Default:   4.      ! RSAMPBC
= 10.0 !

       Near-Surface depletion adjustment to concentration profile used
when
       sampling BC puffs?
       (MDEPBC)                            Default:   1        ! MDEPBC
=  1  !
```

```
          0 = Concentration is NOT adjusted for depletion
          1 = Adjust Concentration for depletion

!END!


-------------------------------------------------------------------------
-------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =   1  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                      a
          POINT SOURCE: CONSTANT DATA
          -----------------------------

b          c
  Source       X          Y        Stack    Base     Stack    Exit  Exit
Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.
Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg.
K)
  ------   ---------- ---------- ------  ------   -------- -----
```

```
-------- ----- --------
   1 ! SRCNAM = EP14 !
   1 ! X =  89.5282,  262.5797,  76.20, 155.45,  6.40, 9.55, 447.59,
0.0, 6.175153E02,  0.0E00,  3.842201E02,
       0.0E00,  0.0E00, 6.5294E00 !
   1 ! FMFAC  =      1.0 !   !END!
--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column
headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to
represent
             the effect of rain-caps or other physical configurations
that
             reduce momentum rise associated with the actual exit
velocity.
             (Default: 1.0  -- full momentum used)

    b
     0. = No building downwash modeled, 1. = downwash modeled
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
           -------------------------------------------------------
Source
a
 No.       Effective building height, width, length and X/Y offset (in
meters)
           every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed
for
           MBDW=2 (PRIME downwash option)
------
--------------------------------------------------------------------

--------

    a
     Building height, width, length, and X/Y offset from the source are
treated
     as a separate input subgroup for each source and therefore must end
with
```

```
     an input group terminator.  The X/Y offset is the position,
relative to the
     stack, of the center of the upwind face of the projected building,
with the
     x-axis pointing along the flow direction.

---------------
Subgroup (13d)
---------------
                                                 a
          POINT SOURCE: VARIABLE EMISSIONS DATA
          ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 13b.  Factors entered multiply the rates in 13b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
--------------------------------

---------------
Subgroup (14a)
---------------

     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  0
!

     Units used for area source
     emissions below            (IARU)       Default: 1  !  IARU =   1
```

```
!
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                        No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                     a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                         b
Source           Effect.    Base      Initial    Emission
 No.             Height   Elevation   Sigma z     Rates
                   (m)       (m)        (m)
-------          ------    ------     --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
           --------------------------------------------------------
Source                                                                a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
```

```
---------------
Subgroup (14d)
---------------
                                                  a
          AREA SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 14b.  Factors entered multiply the rates in 14b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                              No default  !  NLN2
=  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)        No default   !
NLINES =  0  !
```

```
     Units used for line source
     emissions below                (ILNU)          Default: 1  !  ILNU
=   1  !
           1 =       g/s
           2 =      kg/hr
           3 =      lb/hr
           4 =    tons/yr
           5 =    Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =    Odour Unit * m**3/min
           7 =    metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7   !
MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6   !
NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default   ! XL =
.0 !
                                                    (in meters)

        Average building height (HBL)               No default   ! HBL =
.0 !
                                                    (in meters)

        Average building width (WBL)                No default   ! WBL =
.0 !
                                                    (in meters)

        Average line source width (WML)             No default   ! WML =
.0 !
                                                    (in meters)

        Average separation between buildings (DXL)  No default   ! DXL =
.0 !
                                                    (in meters)

        Average buoyancy parameter (FPRIMEL)        No default   !
FPRIMEL = .0 !
                                                    (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
          ----------------------------------
```

```
a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base
Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height
Elevation      Rates
            (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------
---------    ---------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                       a
          BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
```

```
-------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0
!

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1
!
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0
!

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0
!

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                        a
           VOLUME SOURCE: CONSTANT DATA
           ------------------------------

b
         X           Y        Effect.    Base     Initial    Initial
Emission
     Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z
Rates
        (km)       (km)        (m)       (m)        (m)       (m)
     ----------  ----------   ------    ------    --------   --------
--------

--------
    a
     Data for each source are treated as a separate input subgroup
```

```
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                                    a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)

------------------------------------------------------------------------
-------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
-----------------------

---------------
Subgroup (17a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC =  2803
!

!END!

---------------
Subgroup (17b)
---------------
                                                  a
           NON-GRIDDED (DISCRETE) RECEPTOR DATA
           ------------------------------------
```

Receptor No.		X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height b Above Ground (m)	
1	! X =	-130.28262,	-119.26119,	670.000,	0.000!	!END!
2	! X =	-130.27992,	-119.0126,	670.000,	0.000!	!END!
3	! X =	-130.03243,	-119.01534,	670.000,	0.000!	!END!
4	! X =	-130.02974,	-118.76675,	670.000,	0.000!	!END!
5	! X =	-130.02704,	-118.51816,	664.000,	0.000!	!END!
6	! X =	-129.78504,	-119.01797,	670.000,	0.000!	!END!
7	! X =	-129.78235,	-118.76948,	670.000,	0.000!	!END!
8	! X =	-129.77965,	-118.52089,	648.000,	0.000!	!END!
9	! X =	-129.77696,	-118.2723,	670.000,	0.000!	!END!
10	! X =	-129.77417,	-118.02382,	670.000,	0.000!	!END!
11	! X =	-129.77148,	-117.77523,	670.000,	0.000!	!END!
12	! X =	-129.76879,	-117.52674,	656.000,	0.000!	!END!
13	! X =	-129.76609,	-117.27815,	635.000,	0.000!	!END!
14	! X =	-129.7634,	-117.02956,	632.000,	0.000!	!END!
15	! X =	-129.76071,	-116.78107,	632.000,	0.000!	!END!
16	! X =	-129.75801,	-116.53247,	621.000,	0.000!	!END!
17	! X =	-129.53755,	-119.0207,	654.000,	0.000!	!END!
18	! X =	-129.53485,	-118.77211,	647.000,	0.000!	!END!
19	! X =	-129.53216,	-118.52353,	645.000,	0.000!	!END!
20	! X =	-129.52947,	-118.27504,	670.000,	0.000!	!END!
21	! X =	-129.52677,	-118.02645,	670.000,	0.000!	!END!
22	! X =	-129.52408,	-117.77796,	670.000,	0.000!	!END!
23	! X =	-129.52139,	-117.52937,	662.000,	0.000!	!END!
24	! X =	-129.51869,	-117.28078,	650.000,	0.000!	!END!
25	! X =	-129.51601,	-117.03229,	641.000,	0.000!	!END!
26	! X =	-129.51331,	-116.78369,	640.000,	0.000!	!END!
27	! X =	-129.51062,	-116.5352,	639.000,	0.000!	!END!
28	! X =	-129.50793,	-116.28661,	624.000,	0.000!	!END!
29	! X =	-129.50524,	-116.03812,	591.000,	0.000!	!END!
30	! X =	-129.50244,	-115.78953,	523.000,	0.000!	!END!
31	! X =	-129.29015,	-119.02333,	629.000,	0.000!	!END!
32	! X =	-129.28746,	-118.77474,	620.000,	0.000!	!END!
33	! X =	-129.28477,	-118.52625,	629.000,	0.000!	!END!
34	! X =	-129.28207,	-118.27767,	658.000,	0.000!	!END!
35	! X =	-129.27928,	-118.02918,	670.000,	0.000!	!END!
36	! X =	-129.27659,	-117.78059,	670.000,	0.000!	!END!
37	! X =	-129.27389,	-117.532,	658.000,	0.000!	!END!
38	! X =	-129.2712,	-117.28351,	659.000,	0.000!	!END!
39	! X =	-129.26851,	-117.03492,	643.000,	0.000!	!END!
40	! X =	-129.26582,	-116.78643,	640.000,	0.000!	!END!
41	! X =	-129.26312,	-116.53784,	640.000,	0.000!	!END!
42	! X =	-129.26043,	-116.28935,	640.000,	0.000!	!END!
43	! X =	-129.25774,	-116.04076,	620.000,	0.000!	!END!
44	! X =	-129.25505,	-115.79226,	593.000,	0.000!	!END!
45	! X =	-129.25235,	-115.54367,	484.000,	0.000!	!END!
46	! X =	-129.24966,	-115.29508,	426.000,	0.000!	!END!
47	! X =	-129.24697,	-115.04659,	436.000,	0.000!	!END!
48	! X =	-129.04266,	-119.02597,	599.000,	0.000!	!END!
49	! X =	-129.03997,	-118.77748,	583.000,	0.000!	!END!
50	! X =	-129.03727,	-118.52889,	612.000,	0.000!	!END!
51	! X =	-129.03458,	-118.2804,	643.000,	0.000!	!END!
52	! X =	-129.03189,	-118.03181,	670.000,	0.000!	!END!
53	! X =	-129.02919,	-117.78322,	663.000,	0.000!	!END!
54	! X =	-129.0265,	-117.53473,	668.000,	0.000!	!END!
55	! X =	-129.02381,	-117.28614,	668.000,	0.000!	!END!
56	! X =	-129.02112,	-117.03765,	643.000,	0.000!	!END!

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 57 ! X =  -129.01842, -116.78906,     640.000,       0.000!   !END!
 58 ! X =  -129.01573, -116.54057,     640.000,       0.000!   !END!
 59 ! X =  -129.01304, -116.29198,     640.000,       0.000!   !END!
 60 ! X =  -129.01034, -116.04339,     636.000,       0.000!   !END!
 61 ! X =  -129.00765, -115.79489,     612.000,       0.000!   !END!
 62 ! X =  -129.00496,  -115.5463,     545.000,       0.000!   !END!
 63 ! X =  -129.00217, -115.29782,     457.000,       0.000!   !END!
 64 ! X =  -128.99947, -115.04922,     428.000,       0.000!   !END!
 65 ! X =  -128.99678, -114.80073,     462.000,       0.000!   !END!
 66 ! X =  -128.99409, -114.55214,     505.000,       0.000!   !END!
 67 ! X =   -128.9914, -114.30364,     579.000,       0.000!   !END!
 68 ! X =  -128.79527,  -119.0287,     518.000,       0.000!   !END!
 69 ! X =  -128.79257, -118.78011,     487.000,       0.000!   !END!
 70 ! X =  -128.78988, -118.53162,     548.000,       0.000!   !END!
 71 ! X =  -128.78719, -118.28303,     589.000,       0.000!   !END!
 72 ! X =  -128.78439, -118.03445,     601.000,       0.000!   !END!
 73 ! X =   -128.7817, -117.78596,     619.000,       0.000!   !END!
 74 ! X =  -128.77901, -117.53737,     640.000,       0.000!   !END!
 75 ! X =  -128.77632, -117.28888,     640.000,       0.000!   !END!
 76 ! X =  -128.77362, -117.04029,     627.000,       0.000!   !END!
 77 ! X =  -128.77093,  -116.7918,     626.000,       0.000!   !END!
 78 ! X =  -128.76823,  -116.5432,     640.000,       0.000!   !END!
 79 ! X =  -128.76554, -116.29461,     640.000,       0.000!   !END!
 80 ! X =  -128.76285, -116.04612,     640.000,       0.000!   !END!
 81 ! X =  -128.76015, -115.79753,     632.000,       0.000!   !END!
 82 ! X =  -128.75746, -115.54904,     598.000,       0.000!   !END!
 83 ! X =  -128.75477, -115.30045,     527.000,       0.000!   !END!
 84 ! X =  -128.75208, -115.05195,     450.000,       0.000!   !END!
 85 ! X =  -128.74938, -114.80336,     414.000,       0.000!   !END!
 86 ! X =  -128.74669, -114.55487,     457.000,       0.000!   !END!
 87 ! X =    -128.744, -114.30627,     487.000,       0.000!   !END!
 88 ! X =  -128.74131, -114.05778,     520.000,       0.000!   !END!
 89 ! X =  -128.73861, -113.80919,     579.000,       0.000!   !END!
 90 ! X =  -128.54777, -119.03133,     457.000,       0.000!   !END!
 91 ! X =  -128.54508, -118.78284,     439.000,       0.000!   !END!
 92 ! X =  -128.54239, -118.53426,     457.000,       0.000!   !END!
 93 ! X =   -128.5397, -118.28577,     486.000,       0.000!   !END!
 94 ! X =    -128.537, -118.03718,     499.000,       0.000!   !END!
 95 ! X =  -128.53431, -117.78859,     557.000,       0.000!   !END!
 96 ! X =  -128.53161,  -117.5401,     591.000,       0.000!   !END!
 97 ! X =  -128.52892, -117.29151,     583.000,       0.000!   !END!
 98 ! X =  -128.52623, -117.04302,     579.000,       0.000!   !END!
 99 ! X =  -128.52353, -116.79443,     579.000,       0.000!   !END!
100 ! X =  -128.52084, -116.54583,     614.000,       0.000!   !END!
101 ! X =  -128.51815, -116.29734,     636.000,       0.000!   !END!
102 ! X =  -128.51545, -116.04875,     638.000,       0.000!   !END!
103 ! X =  -128.51276, -115.80026,     625.000,       0.000!   !END!
104 ! X =  -128.51006, -115.55167,     610.000,       0.000!   !END!
105 ! X =  -128.50737, -115.30318,     579.000,       0.000!   !END!
106 ! X =  -128.50468, -115.05458,     525.000,       0.000!   !END!
107 ! X =  -128.50199, -114.80609,     471.000,       0.000!   !END!
108 ! X =  -128.49929,  -114.5575,     411.000,       0.000!   !END!
109 ! X =   -128.4965, -114.30901,     405.000,       0.000!   !END!
110 ! X =  -128.49381, -114.06042,     448.000,       0.000!   !END!
111 ! X =  -128.49112, -113.81192,     483.000,       0.000!   !END!
112 ! X =  -128.48842, -113.56333,     579.000,       0.000!   !END!
113 ! X =  -128.48573, -113.31483,     604.000,       0.000!   !END!
114 ! X =  -128.30038, -119.03406,     414.000,       0.000!   !END!
115 ! X =  -128.29769, -118.78548,     422.000,       0.000!   !END!
116 ! X =    -128.295, -118.53699,     422.000,       0.000!   !END!
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117 ! X =   -128.2923,  -118.2884,     415.000,       0.000!   !END!
118 ! X =  -128.28951, -118.03981,     426.000,       0.000!   !END!
119 ! X =  -128.28681, -117.79132,     442.000,       0.000!   !END!
120 ! X =  -128.28412, -117.54273,     457.000,       0.000!   !END!
121 ! X =  -128.28143, -117.29424,     457.000,       0.000!   !END!
122 ! X =  -128.27873, -117.04565,     480.000,       0.000!   !END!
123 ! X =  -128.27604, -116.79706,     507.000,       0.000!   !END!
124 ! X =  -128.27335, -116.54857,     558.000,       0.000!   !END!
125 ! X =  -128.27065, -116.29998,     589.000,       0.000!   !END!
126 ! X =  -128.26796, -116.05149,     613.000,       0.000!   !END!
127 ! X =  -128.26526,  -115.8029,     613.000,       0.000!   !END!
128 ! X =  -128.26257,  -115.5544,     610.000,       0.000!   !END!
129 ! X =  -128.25988, -115.30581,     609.000,       0.000!   !END!
130 ! X =  -128.25719, -115.05732,     594.000,       0.000!   !END!
131 ! X =  -128.25449, -114.80873,     543.000,       0.000!   !END!
132 ! X =   -128.2518, -114.56023,     494.000,       0.000!   !END!
133 ! X =   -128.2491, -114.31164,     457.000,       0.000!   !END!
134 ! X =  -128.24641, -114.06315,     406.000,       0.000!   !END!
135 ! X =  -128.24372, -113.81455,     451.000,       0.000!   !END!
136 ! X =  -128.24102, -113.56606,     484.000,       0.000!   !END!
137 ! X =  -128.23833, -113.31747,     587.000,       0.000!   !END!
138 ! X =  -128.23564, -113.06897,     609.000,       0.000!   !END!
139 ! X =  -128.23294, -112.82038,     609.000,       0.000!   !END!
140 ! X =  -128.05289,  -119.0367,     457.000,       0.000!   !END!
141 ! X =   -128.0502, -118.78821,     462.000,       0.000!   !END!
142 ! X =   -128.0475, -118.53962,     473.000,       0.000!   !END!
143 ! X =  -128.04481, -118.29103,     457.000,       0.000!   !END!
144 ! X =  -128.04211, -118.04254,     431.000,       0.000!   !END!
145 ! X =  -128.03942, -117.79395,     408.000,       0.000!   !END!
146 ! X =  -128.03673, -117.54546,     419.000,       0.000!   !END!
147 ! X =  -128.03403, -117.29687,     422.000,       0.000!   !END!
148 ! X =  -128.03134, -117.04828,     423.000,       0.000!   !END!
149 ! X =  -128.02864, -116.79979,     433.000,       0.000!   !END!
150 ! X =  -128.02595,  -116.5512,     482.000,       0.000!   !END!
151 ! X =  -128.02326, -116.30271,     526.000,       0.000!   !END!
152 ! X =  -128.02056, -116.05412,     594.000,       0.000!   !END!
153 ! X =  -128.01787, -115.80563,     609.000,       0.000!   !END!
154 ! X =  -128.01517, -115.55704,     609.000,       0.000!   !END!
155 ! X =  -128.01248, -115.30854,     609.000,       0.000!   !END!
156 ! X =  -128.00979, -115.05995,     609.000,       0.000!   !END!
157 ! X =   -128.0071, -114.81146,     609.000,       0.000!   !END!
158 ! X =   -128.0044, -114.56286,     559.000,       0.000!   !END!
159 ! X =   -128.0017, -114.31427,     502.000,       0.000!   !END!
160 ! X =  -127.99901, -114.06578,     440.000,       0.000!   !END!
161 ! X =  -127.99632, -113.81718,     401.000,       0.000!   !END!
162 ! X =  -127.99362, -113.56869,     450.000,       0.000!   !END!
163 ! X =  -127.99093,  -113.3202,     487.000,       0.000!   !END!
164 ! X =  -127.98824,  -113.0716,     579.000,       0.000!   !END!
165 ! X =  -127.98555, -112.82311,     579.000,       0.000!   !END!
166 ! X =  -127.98285, -112.57451,     550.000,       0.000!   !END!
167 ! X =  -127.98016, -112.32602,     496.000,       0.000!   !END!
168 ! X =  -127.97746, -112.07742,     396.000,       0.000!   !END!
169 ! X =   -127.8055, -119.03943,     540.000,       0.000!   !END!
170 ! X =   -127.8028, -118.79084,     554.000,       0.000!   !END!
171 ! X =  -127.80011, -118.54225,     548.000,       0.000!   !END!
172 ! X =  -127.79732, -118.29377,     548.000,       0.000!   !END!
173 ! X =  -127.79462, -118.04518,     501.000,       0.000!   !END!
174 ! X =  -127.79193, -117.79669,     452.000,       0.000!   !END!
175 ! X =  -127.78923,  -117.5481,     457.000,       0.000!   !END!
176 ! X =  -127.78654, -117.29951,     419.000,       0.000!   !END!
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177 ! X =  -127.78384, -117.05102,     396.000,        0.000!   !END!
178 ! X =  -127.78115, -116.80243,     407.000,        0.000!   !END!
179 ! X =  -127.77846, -116.55394,     426.000,        0.000!   !END!
180 ! X =  -127.77576, -116.30535,     457.000,        0.000!   !END!
181 ! X =  -127.77307, -116.05686,     541.000,        0.000!   !END!
182 ! X =  -127.77037, -115.80826,     609.000,        0.000!   !END!
183 ! X =  -127.76768, -115.55967,     609.000,        0.000!   !END!
184 ! X =  -127.76498, -115.31118,     608.000,        0.000!   !END!
185 ! X =  -127.76229, -115.06259,     608.000,        0.000!   !END!
186 ! X =   -127.7596, -114.81409,     608.000,        0.000!   !END!
187 ! X =   -127.7569,  -114.5655,     609.000,        0.000!   !END!
188 ! X =  -127.75421, -114.31701,     562.000,        0.000!   !END!
189 ! X =  -127.75151, -114.06841,     499.000,        0.000!   !END!
190 ! X =  -127.74882, -113.81992,     438.000,        0.000!   !END!
191 ! X =  -127.74612, -113.57133,     422.000,        0.000!   !END!
192 ! X =  -127.74343, -113.32283,     457.000,        0.000!   !END!
193 ! X =  -127.74074, -113.07424,     502.000,        0.000!   !END!
194 ! X =  -127.73805, -112.82574,     533.000,        0.000!   !END!
195 ! X =  -127.73535, -112.57725,     497.000,        0.000!   !END!
196 ! X =  -127.73266, -112.32865,     441.000,        0.000!   !END!
197 ! X =  -127.72997, -112.08016,     390.000,        0.000!   !END!
198 ! X =  -127.72727, -111.83156,     452.000,        0.000!   !END!
199 ! X =  -127.72458, -111.58307,     518.000,        0.000!   !END!
200 ! X =  -127.72188, -111.33447,     548.000,        0.000!   !END!
201 ! X =    -127.558, -119.04207,     592.000,        0.000!   !END!
202 ! X =  -127.55531, -118.79348,     609.000,        0.000!   !END!
203 ! X =  -127.55262, -118.54499,     602.000,        0.000!   !END!
204 ! X =  -127.54992,  -118.2964,     586.000,        0.000!   !END!
205 ! X =  -127.54723, -118.04791,     549.000,        0.000!   !END!
206 ! X =  -127.54453, -117.79932,     514.000,        0.000!   !END!
207 ! X =  -127.54183, -117.55073,     499.000,        0.000!   !END!
208 ! X =  -127.53914, -117.30224,     459.000,        0.000!   !END!
209 ! X =  -127.53645, -117.05365,     427.000,        0.000!   !END!
210 ! X =  -127.53376, -116.80516,     389.000,        0.000!   !END!
211 ! X =  -127.53106, -116.55657,     406.000,        0.000!   !END!
212 ! X =  -127.52837, -116.30808,     426.000,        0.000!   !END!
213 ! X =  -127.52567, -116.05949,     523.000,        0.000!   !END!
214 ! X =  -127.52297,  -115.8109,     593.000,        0.000!   !END!
215 ! X =  -127.52028,  -115.5624,     609.000,        0.000!   !END!
216 ! X =  -127.51759, -115.31381,     609.000,        0.000!   !END!
217 ! X =  -127.51489, -115.06532,     609.000,        0.000!   !END!
218 ! X =   -127.5122, -114.81673,     609.000,        0.000!   !END!
219 ! X =  -127.50951, -114.56823,     609.000,        0.000!   !END!
220 ! X =  -127.50681, -114.31964,     579.000,        0.000!   !END!
221 ! X =  -127.50412, -114.07115,     518.000,        0.000!   !END!
222 ! X =  -127.50142, -113.82255,     457.000,        0.000!   !END!
223 ! X =  -127.49873, -113.57406,     396.000,        0.000!   !END!
224 ! X =  -127.49603, -113.32546,     426.000,        0.000!   !END!
225 ! X =  -127.49334, -113.07697,     457.000,        0.000!   !END!
226 ! X =  -127.49064, -112.82838,     457.000,        0.000!   !END!
227 ! X =  -127.48795, -112.57988,     447.000,        0.000!   !END!
228 ! X =  -127.48526, -112.33129,     401.000,        0.000!   !END!
229 ! X =  -127.48256, -112.08279,     416.000,        0.000!   !END!
230 ! X =  -127.47987, -111.83429,     495.000,        0.000!   !END!
231 ! X =  -127.47718,  -111.5857,     543.000,        0.000!   !END!
232 ! X =  -127.47448,  -111.3372,     579.000,        0.000!   !END!
233 ! X =  -127.47179, -111.08861,     640.000,        0.000!   !END!
234 ! X =   -127.4691, -110.84011,     640.000,        0.000!   !END!
235 ! X =  -127.31061,  -119.0447,     645.000,        0.000!   !END!
236 ! X =  -127.30782, -118.79622,     670.000,        0.000!   !END!
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237 ! X =  -127.30512, -118.54763,     670.000,       0.000!   !END!
238 ! X =  -127.30243, -118.29914,     640.000,       0.000!   !END!
239 ! X =  -127.29973, -118.05055,     609.000,       0.000!   !END!
240 ! X =  -127.29704, -117.80196,     579.000,       0.000!   !END!
241 ! X =  -127.29434, -117.55347,     579.000,       0.000!   !END!
242 ! X =  -127.29165, -117.30488,     548.000,       0.000!   !END!
243 ! X =  -127.28896, -117.05639,     483.000,       0.000!   !END!
244 ! X =  -127.28626,  -116.8078,     406.000,       0.000!   !END!
245 ! X =  -127.28356, -116.55921,     402.000,       0.000!   !END!
246 ! X =  -127.28087, -116.31072,     436.000,       0.000!   !END!
247 ! X =  -127.27817, -116.06212,     505.000,       0.000!   !END!
248 ! X =  -127.27548, -115.81363,     548.000,       0.000!   !END!
249 ! X =  -127.27278, -115.56504,     591.000,       0.000!   !END!
250 ! X =  -127.27009, -115.31655,     609.000,       0.000!   !END!
251 ! X =   -127.2674, -115.06796,     609.000,       0.000!   !END!
252 ! X =   -127.2647, -114.81946,     609.000,       0.000!   !END!
253 ! X =  -127.26201, -114.57087,     609.000,       0.000!   !END!
254 ! X =  -127.25932, -114.32238,     562.000,       0.000!   !END!
255 ! X =  -127.25662, -114.07378,     506.000,       0.000!   !END!
256 ! X =  -127.25393, -113.82529,     457.000,       0.000!   !END!
257 ! X =  -127.25123,  -113.5767,     375.000,       0.000!   !END!
258 ! X =  -127.24854,  -113.3282,     403.000,       0.000!   !END!
259 ! X =  -127.24584, -113.07961,     420.000,       0.000!   !END!
260 ! X =  -127.24315, -112.83111,     429.000,       0.000!   !END!
261 ! X =  -127.24045, -112.58252,     392.000,       0.000!   !END!
262 ! X =  -127.23776, -112.33402,     381.000,       0.000!   !END!
263 ! X =  -127.23506, -112.08543,     441.000,       0.000!   !END!
264 ! X =  -127.23237, -111.83693,     502.000,       0.000!   !END!
265 ! X =  -127.22968, -111.58843,     564.000,       0.000!   !END!
266 ! X =  -127.22698, -111.33984,     593.000,       0.000!   !END!
267 ! X =  -127.22429, -111.09134,     640.000,       0.000!   !END!
268 ! X =  -127.22159, -110.84275,     640.000,       0.000!   !END!
269 ! X =   -127.2189, -110.59425,     634.000,       0.000!   !END!
270 ! X =  -127.06312, -119.04744,     670.000,       0.000!   !END!
271 ! X =  -127.06042, -118.79885,     670.000,       0.000!   !END!
272 ! X =  -127.05773, -118.55036,     670.000,       0.000!   !END!
273 ! X =  -127.05503, -118.30177,     650.000,       0.000!   !END!
274 ! X =  -127.05234, -118.05318,     640.000,       0.000!   !END!
275 ! X =  -127.04964, -117.80469,     632.000,       0.000!   !END!
276 ! X =  -127.04695,  -117.5561,     635.000,       0.000!   !END!
277 ! X =  -127.04426, -117.30761,     619.000,       0.000!   !END!
278 ! X =  -127.04156, -117.05902,     579.000,       0.000!   !END!
279 ! X =  -127.03886, -116.81043,     441.000,       0.000!   !END!
280 ! X =  -127.03617, -116.56194,     405.000,       0.000!   !END!
281 ! X =  -127.03347, -116.31335,     426.000,       0.000!   !END!
282 ! X =  -127.03078, -116.06486,     467.000,       0.000!   !END!
283 ! X =  -127.02808, -115.81626,     509.000,       0.000!   !END!
284 ! X =  -127.02539, -115.56777,     548.000,       0.000!   !END!
285 ! X =  -127.02269, -115.31918,     565.000,       0.000!   !END!
286 ! X =     -127.02, -115.07069,     579.000,       0.000!   !END!
287 ! X =   -127.0173, -114.82209,     579.000,       0.000!   !END!
288 ! X =  -127.01461,  -114.5736,     579.000,       0.000!   !END!
289 ! X =  -127.01192, -114.32501,     530.000,       0.000!   !END!
290 ! X =  -127.00922, -114.07651,     477.000,       0.000!   !END!
291 ! X =  -127.00653, -113.82792,     436.000,       0.000!   !END!
292 ! X =  -127.00383, -113.57943,     372.000,       0.000!   !END!
293 ! X =  -127.00114, -113.33083,     367.000,       0.000!   !END!
294 ! X =  -126.99845, -113.08234,     400.000,       0.000!   !END!
295 ! X =  -126.99575, -112.83374,     398.000,       0.000!   !END!
296 ! X =  -126.99306, -112.58525,     373.000,       0.000!   !END!
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297 ! X =  -126.99036, -112.33665,     405.000,       0.000!   !END!
298 ! X =  -126.98767, -112.08816,     441.000,       0.000!   !END!
299 ! X =  -126.98497, -111.83956,     502.000,       0.000!   !END!
300 ! X =  -126.98228, -111.59107,     559.000,       0.000!   !END!
301 ! X =  -126.97958, -111.34247,     592.000,       0.000!   !END!
302 ! X =  -126.97689, -111.09397,     620.000,       0.000!   !END!
303 ! X =   -126.9742, -110.84548,     617.000,       0.000!   !END!
304 ! X =   -126.9715, -110.59688,     597.000,       0.000!   !END!
305 ! X =  -126.81563, -119.05007,     670.000,       0.000!   !END!
306 ! X =  -126.81293, -118.80159,     670.000,       0.000!   !END!
307 ! X =  -126.81024,   -118.553,     651.000,       0.000!   !END!
308 ! X =  -126.80754, -118.30441,     643.000,       0.000!   !END!
309 ! X =  -126.80485, -118.05592,     666.000,       0.000!   !END!
310 ! X =  -126.80215, -117.80733,     666.000,       0.000!   !END!
311 ! X =  -126.79946, -117.55884,     640.000,       0.000!   !END!
312 ! X =  -126.79676, -117.31025,     640.000,       0.000!   !END!
313 ! X =  -126.79406, -117.06166,     599.000,       0.000!   !END!
314 ! X =  -126.79147, -116.81316,     449.000,       0.000!   !END!
315 ! X =  -126.78877, -116.56457,     391.000,       0.000!   !END!
316 ! X =  -126.78608, -116.31608,     398.000,       0.000!   !END!
317 ! X =  -126.78338, -116.06749,     416.000,       0.000!   !END!
318 ! X =  -126.78069,   -115.819,     443.000,       0.000!   !END!
319 ! X =  -126.77799,  -115.5704,     487.000,       0.000!   !END!
320 ! X =   -126.7753, -115.32191,     487.000,       0.000!   !END!
321 ! X =   -126.7726, -115.07332,     497.000,       0.000!   !END!
322 ! X =  -126.76991, -114.82473,     502.000,       0.000!   !END!
323 ! X =  -126.76721, -114.57623,     487.000,       0.000!   !END!
324 ! X =  -126.76452, -114.32764,     472.000,       0.000!   !END!
325 ! X =  -126.76182, -114.07915,     419.000,       0.000!   !END!
326 ! X =  -126.75913, -113.83055,     373.000,       0.000!   !END!
327 ! X =  -126.75643, -113.58206,     365.000,       0.000!   !END!
328 ! X =  -126.75374, -113.33356,     365.000,       0.000!   !END!
329 ! X =  -126.75104, -113.08497,     368.000,       0.000!   !END!
330 ! X =  -126.74835, -112.83648,     368.000,       0.000!   !END!
331 ! X =  -126.74565, -112.58788,     365.000,       0.000!   !END!
332 ! X =  -126.74296, -112.33939,     396.000,       0.000!   !END!
333 ! X =  -126.74026, -112.09079,     426.000,       0.000!   !END!
334 ! X =  -126.73757, -111.84229,     462.000,       0.000!   !END!
335 ! X =  -126.73488,  -111.5937,     518.000,       0.000!   !END!
336 ! X =  -126.73218,  -111.3452,     553.000,       0.000!   !END!
337 ! X =  -126.72949, -111.09661,     579.000,       0.000!   !END!
338 ! X =  -126.72679, -110.84811,     548.000,       0.000!   !END!
339 ! X =   -126.7241, -110.59961,     518.000,       0.000!   !END!
340 ! X =  -126.56824, -119.05281,     670.000,       0.000!   !END!
341 ! X =  -126.56554, -118.80422,     670.000,       0.000!   !END!
342 ! X =  -126.56284, -118.55563,     664.000,       0.000!   !END!
343 ! X =  -126.56015, -118.30714,     670.000,       0.000!   !END!
344 ! X =  -126.55745, -118.05855,     670.000,       0.000!   !END!
345 ! X =  -126.55476, -117.81006,     670.000,       0.000!   !END!
346 ! X =  -126.55206, -117.56147,     660.000,       0.000!   !END!
347 ! X =  -126.54936, -117.31288,     641.000,       0.000!   !END!
348 ! X =  -126.54667, -117.06439,     609.000,       0.000!   !END!
349 ! X =  -126.54397,  -116.8158,     452.000,       0.000!   !END!
350 ! X =  -126.54128, -116.56731,     420.000,       0.000!   !END!
351 ! X =  -126.53858, -116.31872,     366.000,       0.000!   !END!
352 ! X =  -126.53589, -116.07022,     396.000,       0.000!   !END!
353 ! X =  -126.53319, -115.82163,     408.000,       0.000!   !END!
354 ! X =  -126.53049, -115.57304,     426.000,       0.000!   !END!
355 ! X =   -126.5278, -115.32455,     441.000,       0.000!   !END!
356 ! X =   -126.5251, -115.07596,     449.000,       0.000!   !END!
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357 ! X =  -126.52241, -114.82746,     457.000,       0.000!   !END!
358 ! X =  -126.51971, -114.57887,     444.000,       0.000!   !END!
359 ! X =  -126.51702, -114.33038,     396.000,       0.000!   !END!
360 ! X =  -126.51432, -114.08178,     376.000,       0.000!   !END!
361 ! X =  -126.51163, -113.83329,     365.000,       0.000!   !END!
362 ! X =  -126.50893,  -113.5847,     365.000,       0.000!   !END!
363 ! X =  -126.50624,  -113.3362,     365.000,       0.000!   !END!
364 ! X =  -126.50354, -113.08761,     365.000,       0.000!   !END!
365 ! X =  -126.50085, -112.83911,     365.000,       0.000!   !END!
366 ! X =  -126.49815, -112.59052,     365.000,       0.000!   !END!
367 ! X =  -126.49546, -112.34202,     372.000,       0.000!   !END!
368 ! X =  -126.49277, -112.09353,     395.000,       0.000!   !END!
369 ! X =  -126.49007, -111.84493,     430.000,       0.000!   !END!
370 ! X =  -126.48738, -111.59644,     466.000,       0.000!   !END!
371 ! X =  -126.48468, -111.34784,     495.000,       0.000!   !END!
372 ! X =  -126.48199, -111.09934,     502.000,       0.000!   !END!
373 ! X =  -126.47929, -110.85075,     496.000,       0.000!   !END!
374 ! X =   -126.4766, -110.60225,     464.000,       0.000!   !END!
375 ! X =  -126.32074, -119.05544,     670.000,       0.000!   !END!
376 ! X =  -126.31804, -118.80686,     670.000,       0.000!   !END!
377 ! X =  -126.31535, -118.55837,     670.000,       0.000!   !END!
378 ! X =  -126.31265, -118.30978,     670.000,       0.000!   !END!
379 ! X =  -126.30996, -118.06129,     670.000,       0.000!   !END!
380 ! X =  -126.30726,  -117.8127,     670.000,       0.000!   !END!
381 ! X =  -126.30466,  -117.5641,     666.000,       0.000!   !END!
382 ! X =  -126.30197, -117.31561,     624.000,       0.000!   !END!
383 ! X =  -126.29927, -117.06702,     579.000,       0.000!   !END!
384 ! X =  -126.29658, -116.81853,     487.000,       0.000!   !END!
385 ! X =  -126.29388, -116.56994,     472.000,       0.000!   !END!
386 ! X =  -126.29118, -116.32135,     457.000,       0.000!   !END!
387 ! X =  -126.28849, -116.07286,     382.000,       0.000!   !END!
388 ! X =  -126.28579, -115.82427,     365.000,       0.000!   !END!
389 ! X =   -126.2831, -115.57577,     367.000,       0.000!   !END!
390 ! X =   -126.2804, -115.32718,     381.000,       0.000!   !END!
391 ! X =  -126.27771, -115.07869,     396.000,       0.000!   !END!
392 ! X =  -126.27501,  -114.8301,     396.000,       0.000!   !END!
393 ! X =  -126.27232,  -114.5816,     375.000,       0.000!   !END!
394 ! X =  -126.26962, -114.33301,     395.000,       0.000!   !END!
395 ! X =  -126.26693, -114.08452,     396.000,       0.000!   !END!
396 ! X =  -126.26423, -113.83592,     440.000,       0.000!   !END!
397 ! X =  -126.26154, -113.58743,     426.000,       0.000!   !END!
398 ! X =  -126.25884, -113.33884,     380.000,       0.000!   !END!
399 ! X =  -126.25615, -113.09034,     365.000,       0.000!   !END!
400 ! X =  -126.25345, -112.84175,     365.000,       0.000!   !END!
401 ! X =  -126.25076, -112.59325,     365.000,       0.000!   !END!
402 ! X =  -126.24806, -112.34466,     365.000,       0.000!   !END!
403 ! X =  -126.24537, -112.09616,     366.000,       0.000!   !END!
404 ! X =  -126.24267, -111.84757,     396.000,       0.000!   !END!
405 ! X =  -126.23998, -111.59907,     407.000,       0.000!   !END!
406 ! X =  -126.23728, -111.35057,     431.000,       0.000!   !END!
407 ! X =  -126.23459, -111.10198,     436.000,       0.000!   !END!
408 ! X =  -126.23189, -110.85348,     417.000,       0.000!   !END!
409 ! X =   -126.2292, -110.60488,     396.000,       0.000!   !END!
410 ! X =   -126.2265, -110.35639,     388.000,       0.000!   !END!
411 ! X =  -126.22381, -110.10789,     457.000,       0.000!   !END!
412 ! X =  -126.22111, -109.85929,     457.000,       0.000!   !END!
413 ! X =  -126.21842, -109.61079,     458.000,       0.000!   !END!
414 ! X =  -126.06526, -118.31241,     670.000,       0.000!   !END!
415 ! X =  -126.06256, -118.06392,     670.000,       0.000!   !END!
416 ! X =  -126.05987, -117.81533,     665.000,       0.000!   !END!
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417 ! X =  -126.05717, -117.56684,     645.000,       0.000!   !END!
418 ! X =  -126.05447, -117.31825,     609.000,       0.000!   !END!
419 ! X =  -126.05178, -117.06976,     546.000,       0.000!   !END!
420 ! X =  -126.04908, -116.82117,     548.000,       0.000!   !END!
421 ! X =  -126.04639, -116.57258,     518.000,       0.000!   !END!
422 ! X =  -126.04369, -116.32409,     490.000,       0.000!   !END!
423 ! X =  -126.04099,  -116.0755,     457.000,       0.000!   !END!
424 ! X =   -126.0383,   -115.827,     385.000,       0.000!   !END!
425 ! X =   -126.0356, -115.57841,     365.000,       0.000!   !END!
426 ! X =  -126.03291, -115.32992,     366.000,       0.000!   !END!
427 ! X =  -126.03021, -115.08133,     366.000,       0.000!   !END!
428 ! X =  -126.02752, -114.83283,     413.000,       0.000!   !END!
429 ! X =  -126.02482, -114.58424,     469.000,       0.000!   !END!
430 ! X =  -126.02213, -114.33575,     471.000,       0.000!   !END!
431 ! X =  -126.01943, -114.08716,     474.000,       0.000!   !END!
432 ! X =  -126.01674, -113.83866,     476.000,       0.000!   !END!
433 ! X =  -126.01404, -113.59007,     469.000,       0.000!   !END!
434 ! X =  -126.01135, -113.34157,     426.000,       0.000!   !END!
435 ! X =  -126.00865, -113.09298,     385.000,       0.000!   !END!
436 ! X =  -126.00596, -112.84448,     365.000,       0.000!   !END!
437 ! X =  -126.00336, -112.59588,     365.000,       0.000!   !END!
438 ! X =  -126.00066, -112.34739,     365.000,       0.000!   !END!
439 ! X =  -125.99797, -112.09879,     365.000,       0.000!   !END!
440 ! X =  -125.99527,  -111.8503,     366.000,       0.000!   !END!
441 ! X =  -125.99257,  -111.6017,     365.000,       0.000!   !END!
442 ! X =  -125.98988, -111.35321,     365.000,       0.000!   !END!
443 ! X =  -125.98719, -111.10471,     357.000,       0.000!   !END!
444 ! X =  -125.98449, -110.85611,     354.000,       0.000!   !END!
445 ! X =   -125.9818, -110.60762,     361.000,       0.000!   !END!
446 ! X =   -125.9791, -110.35902,     388.000,       0.000!   !END!
447 ! X =  -125.97641, -110.11052,     467.000,       0.000!   !END!
448 ! X =  -125.97371, -109.86192,     467.000,       0.000!   !END!
449 ! X =  -125.97101, -109.61343,     474.000,       0.000!   !END!
450 ! X =  -125.96832, -109.36493,     498.000,       0.000!   !END!
451 ! X =  -125.96562, -109.11633,     532.000,       0.000!   !END!
452 ! X =  -125.96293, -108.86783,     557.000,       0.000!   !END!
453 ! X =  -125.81238, -117.81807,     640.000,       0.000!   !END!
454 ! X =  -125.80978, -117.56947,     640.000,       0.000!   !END!
455 ! X =  -125.80708, -117.32088,     640.000,       0.000!   !END!
456 ! X =  -125.80438, -117.07239,     640.000,       0.000!   !END!
457 ! X =  -125.80169,  -116.8238,     631.000,       0.000!   !END!
458 ! X =  -125.79899, -116.57531,     599.000,       0.000!   !END!
459 ! X =  -125.79629, -116.32672,     563.000,       0.000!   !END!
460 ! X =   -125.7936, -116.07823,     487.000,       0.000!   !END!
461 ! X =   -125.7909, -115.82964,     424.000,       0.000!   !END!
462 ! X =  -125.78821, -115.58115,     370.000,       0.000!   !END!
463 ! X =  -125.78551, -115.33255,     396.000,       0.000!   !END!
464 ! X =  -125.78282, -115.08406,     431.000,       0.000!   !END!
465 ! X =  -125.78012, -114.83547,     492.000,       0.000!   !END!
466 ! X =  -125.77742, -114.58688,     518.000,       0.000!   !END!
467 ! X =  -125.77473, -114.33838,     531.000,       0.000!   !END!
468 ! X =  -125.77203, -114.08979,     548.000,       0.000!   !END!
469 ! X =  -125.76934, -113.84129,     535.000,       0.000!   !END!
470 ! X =  -125.76664,  -113.5927,     512.000,       0.000!   !END!
471 ! X =  -125.76395, -113.34421,     466.000,       0.000!   !END!
472 ! X =  -125.76125, -113.09571,     414.000,       0.000!   !END!
473 ! X =  -125.75855, -112.84712,     376.000,       0.000!   !END!
474 ! X =  -125.75586, -112.59862,     365.000,       0.000!   !END!
475 ! X =  -125.75316, -112.35003,     379.000,       0.000!   !END!
476 ! X =  -125.75047, -112.10153,     426.000,       0.000!   !END!
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477 ! X =  -125.74777, -111.85294,     426.000,       0.000!   !END!
478 ! X =  -125.74508, -111.60444,     411.000,       0.000!   !END!
479 ! X =  -125.74238, -111.35584,     405.000,       0.000!   !END!
480 ! X =  -125.73969, -111.10735,     384.000,       0.000!   !END!
481 ! X =  -125.73699, -110.85875,     336.000,       0.000!   !END!
482 ! X =  -125.73429, -110.61025,     352.000,       0.000!   !END!
483 ! X =   -125.7316, -110.36176,     367.000,       0.000!   !END!
484 ! X =   -125.7289, -110.11316,     426.000,       0.000!   !END!
485 ! X =  -125.72631, -109.86466,     450.000,       0.000!   !END!
486 ! X =  -125.72361, -109.61606,     471.000,       0.000!   !END!
487 ! X =  -125.72092, -109.36756,     492.000,       0.000!   !END!
488 ! X =  -125.71822, -109.11906,     529.000,       0.000!   !END!
489 ! X =  -125.71553, -108.87046,     578.000,       0.000!   !END!
490 ! X =  -125.55959, -117.32362,     655.000,       0.000!   !END!
491 ! X =  -125.55689, -117.07503,     640.000,       0.000!   !END!
492 ! X =  -125.55419, -116.82654,     640.000,       0.000!   !END!
493 ! X =   -125.5515, -116.57795,     620.000,       0.000!   !END!
494 ! X =   -125.5488, -116.32946,     579.000,       0.000!   !END!
495 ! X =   -125.5461, -116.08087,     497.000,       0.000!   !END!
496 ! X =  -125.54341, -115.83228,     426.000,       0.000!   !END!
497 ! X =  -125.54071, -115.58378,     390.000,       0.000!   !END!
498 ! X =  -125.53801, -115.33519,     432.000,       0.000!   !END!
499 ! X =  -125.53532,  -115.0867,     513.000,       0.000!   !END!
500 ! X =  -125.53262, -114.83811,     547.000,       0.000!   !END!
501 ! X =  -125.52993, -114.58961,     593.000,       0.000!   !END!
502 ! X =  -125.52723, -114.34102,     631.000,       0.000!   !END!
503 ! X =  -125.52464, -114.09252,     618.000,       0.000!   !END!
504 ! X =  -125.52194, -113.84393,     599.000,       0.000!   !END!
505 ! X =  -125.51924, -113.59543,     525.000,       0.000!   !END!
506 ! X =  -125.51654, -113.34684,     472.000,       0.000!   !END!
507 ! X =  -125.51385, -113.09835,     434.000,       0.000!   !END!
508 ! X =  -125.51115, -112.84975,     374.000,       0.000!   !END!
509 ! X =  -125.50846, -112.60126,     436.000,       0.000!   !END!
510 ! X =  -125.50576, -112.35266,     457.000,       0.000!   !END!
511 ! X =  -125.50307, -112.10417,     487.000,       0.000!   !END!
512 ! X =  -125.50037, -111.85567,     496.000,       0.000!   !END!
513 ! X =  -125.49768, -111.60707,     501.000,       0.000!   !END!
514 ! X =  -125.49498, -111.35858,     480.000,       0.000!   !END!
515 ! X =  -125.49228, -111.10998,     446.000,       0.000!   !END!
516 ! X =  -125.48959, -110.86148,     406.000,       0.000!   !END!
517 ! X =  -125.48689, -110.61289,     355.000,       0.000!   !END!
518 ! X =   -125.4842, -110.36439,     348.000,       0.000!   !END!
519 ! X =   -125.4815, -110.11589,     379.000,       0.000!   !END!
520 ! X =  -125.47881,  -109.8673,     414.000,       0.000!   !END!
521 ! X =  -125.47611,  -109.6188,     421.000,       0.000!   !END!
522 ! X =  -125.47341,  -109.3702,     444.000,       0.000!   !END!
523 ! X =  -125.47072,  -109.1217,     505.000,       0.000!   !END!
524 ! X =  -125.46803,  -108.8732,     548.000,       0.000!   !END!
525 ! X =   -125.3068, -116.82917,     639.000,       0.000!   !END!
526 ! X =   -125.3041, -116.58058,     598.000,       0.000!   !END!
527 ! X =  -125.30141, -116.33209,     548.000,       0.000!   !END!
528 ! X =  -125.29871,  -116.0835,     487.000,       0.000!   !END!
529 ! X =  -125.29601, -115.83501,     432.000,       0.000!   !END!
530 ! X =  -125.29331, -115.58642,     420.000,       0.000!   !END!
531 ! X =  -125.29062, -115.33793,     457.000,       0.000!   !END!
532 ! X =  -125.28792, -115.08933,     541.000,       0.000!   !END!
533 ! X =  -125.28523, -114.84084,     601.000,       0.000!   !END!
534 ! X =  -125.28253, -114.59225,     640.000,       0.000!   !END!
535 ! X =  -125.27984, -114.34375,     644.000,       0.000!   !END!
536 ! X =  -125.27714, -114.09516,     640.000,       0.000!   !END!
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537 ! X =  -125.27444, -113.84667,     609.000,       0.000!   !END!
538 ! X =  -125.27174, -113.59807,     533.000,       0.000!   !END!
539 ! X =  -125.26905, -113.34958,     475.000,       0.000!   !END!
540 ! X =  -125.26635, -113.10098,     434.000,       0.000!   !END!
541 ! X =  -125.26366, -112.85249,     448.000,       0.000!   !END!
542 ! X =  -125.26096,  -112.6039,     487.000,       0.000!   !END!
543 ! X =  -125.25826,  -112.3554,     504.000,       0.000!   !END!
544 ! X =  -125.25557,  -112.1068,     511.000,       0.000!   !END!
545 ! X =  -125.25297,  -111.8583,     528.000,       0.000!   !END!
546 ! X =  -125.25027, -111.60971,     536.000,       0.000!   !END!
547 ! X =  -125.24758, -111.36121,     527.000,       0.000!   !END!
548 ! X =  -125.24489, -111.11271,     496.000,       0.000!   !END!
549 ! X =  -125.24219, -110.86412,     464.000,       0.000!   !END!
550 ! X =  -125.23949, -110.61562,     426.000,       0.000!   !END!
551 ! X =  -125.23679, -110.36702,     380.000,       0.000!   !END!
552 ! X =   -125.2341, -110.11853,     343.000,       0.000!   !END!
553 ! X =  -125.23141, -109.87003,     370.000,       0.000!   !END!
554 ! X =  -125.22871, -109.62143,     387.000,       0.000!   !END!
555 ! X =  -125.22601, -109.37293,     426.000,       0.000!   !END!
556 ! X =  -125.22332, -109.12434,     477.000,       0.000!   !END!
557 ! X =  -125.22062, -108.87584,     518.000,       0.000!   !END!
558 ! X =  -125.05391, -116.33473,     495.000,       0.000!   !END!
559 ! X =  -125.05121, -116.08624,     446.000,       0.000!   !END!
560 ! X =  -125.04851, -115.83765,     401.000,       0.000!   !END!
561 ! X =  -125.04582, -115.58916,     426.000,       0.000!   !END!
562 ! X =  -125.04312, -115.34056,     472.000,       0.000!   !END!
563 ! X =  -125.04053, -115.09207,     563.000,       0.000!   !END!
564 ! X =  -125.03783, -114.84347,     640.000,       0.000!   !END!
565 ! X =  -125.03513, -114.59498,     665.000,       0.000!   !END!
566 ! X =  -125.03244, -114.34639,     668.000,       0.000!   !END!
567 ! X =  -125.02974, -114.09789,     644.000,       0.000!   !END!
568 ! X =  -125.02704,  -113.8493,     589.000,       0.000!   !END!
569 ! X =  -125.02435, -113.60081,     525.000,       0.000!   !END!
570 ! X =  -125.02165, -113.35221,     484.000,       0.000!   !END!
571 ! X =  -125.01896, -113.10372,     426.000,       0.000!   !END!
572 ! X =  -125.01626, -112.85512,     480.000,       0.000!   !END!
573 ! X =  -125.01356, -112.60663,     508.000,       0.000!   !END!
574 ! X =  -125.01086, -112.35803,     542.000,       0.000!   !END!
575 ! X =  -125.00817, -112.10954,     587.000,       0.000!   !END!
576 ! X =  -125.00547, -111.86094,     593.000,       0.000!   !END!
577 ! X =  -125.00278, -111.61245,     592.000,       0.000!   !END!
578 ! X =  -125.00008, -111.36385,     579.000,       0.000!   !END!
579 ! X =  -124.99738, -111.11535,     548.000,       0.000!   !END!
580 ! X =  -124.99469, -110.86686,     518.000,       0.000!   !END!
581 ! X =  -124.99199, -110.61826,     487.000,       0.000!   !END!
582 ! X =   -124.9893, -110.36976,     457.000,       0.000!   !END!
583 ! X =   -124.9866, -110.12117,     381.000,       0.000!   !END!
584 ! X =    -124.984, -109.87266,     352.000,       0.000!   !END!
585 ! X =  -124.98131, -109.62417,     371.000,       0.000!   !END!
586 ! X =  -124.97861, -109.37557,     381.000,       0.000!   !END!
587 ! X =  -124.97592, -109.12707,     441.000,       0.000!   !END!
588 ! X =  -124.97322, -108.87847,     492.000,       0.000!   !END!
589 ! X =  -124.80382, -116.08887,     404.000,       0.000!   !END!
590 ! X =  -124.80112, -115.84038,     409.000,       0.000!   !END!
591 ! X =  -124.79842, -115.59179,     434.000,       0.000!   !END!
592 ! X =  -124.79572,  -115.3432,     472.000,       0.000!   !END!
593 ! X =  -124.79303, -115.09471,     566.000,       0.000!   !END!
594 ! X =  -124.79033, -114.84611,     640.000,       0.000!   !END!
595 ! X =  -124.78764, -114.59762,     670.000,       0.000!   !END!
596 ! X =  -124.78494, -114.34903,     670.000,       0.000!   !END!
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597 ! X =  -124.78224, -114.10053,     662.000,       0.000!   !END!
598 ! X =  -124.77954, -113.85194,     579.000,       0.000!   !END!
599 ! X =  -124.77685, -113.60345,     511.000,       0.000!   !END!
600 ! X =  -124.77415, -113.35485,     466.000,       0.000!   !END!
601 ! X =  -124.77146, -113.10636,     448.000,       0.000!   !END!
602 ! X =  -124.76886, -112.85776,     492.000,       0.000!   !END!
603 ! X =  -124.76616, -112.60926,     539.000,       0.000!   !END!
604 ! X =  -124.76347, -112.36077,     586.000,       0.000!   !END!
605 ! X =  -124.76077, -112.11217,     629.000,       0.000!   !END!
606 ! X =  -124.75807, -111.86368,     644.000,       0.000!   !END!
607 ! X =  -124.75537, -111.61508,     643.000,       0.000!   !END!
608 ! X =  -124.75268, -111.36658,     633.000,       0.000!   !END!
609 ! X =  -124.74998, -111.11799,     612.000,       0.000!   !END!
610 ! X =  -124.74729, -110.86949,     557.000,       0.000!   !END!
611 ! X =  -124.74459,  -110.6209,     509.000,       0.000!   !END!
612 ! X =  -124.74189,  -110.3724,     472.000,       0.000!   !END!
613 ! X =   -124.7392,  -110.1239,     414.000,       0.000!   !END!
614 ! X =   -124.7365,  -109.8753,     358.000,       0.000!   !END!
615 ! X =  -124.73381, -109.62681,     345.000,       0.000!   !END!
616 ! X =  -124.73111, -109.37821,     349.000,       0.000!   !END!
617 ! X =  -124.72841, -109.12971,     416.000,       0.000!   !END!
618 ! X =  -124.72572, -108.88121,     460.000,       0.000!   !END!
619 ! X =  -124.72312, -108.63261,     484.000,       0.000!   !END!
620 ! X =  -124.72042, -108.38411,     483.000,       0.000!   !END!
621 ! X =  -124.71773, -108.13561,     457.000,       0.000!   !END!
622 ! X =  -124.71503, -107.88701,     458.000,       0.000!   !END!
623 ! X =  -124.55902, -116.34011,     406.000,       0.000!   !END!
624 ! X =  -124.55632, -116.09151,     411.000,       0.000!   !END!
625 ! X =  -124.55362, -115.84302,     430.000,       0.000!   !END!
626 ! X =  -124.55102, -115.59443,     448.000,       0.000!   !END!
627 ! X =  -124.54833, -115.34593,     477.000,       0.000!   !END!
628 ! X =  -124.54563, -115.09734,     554.000,       0.000!   !END!
629 ! X =  -124.54294, -114.84885,     627.000,       0.000!   !END!
630 ! X =  -124.54024, -114.60025,     657.000,       0.000!   !END!
631 ! X =  -124.53754, -114.35176,     658.000,       0.000!   !END!
632 ! X =  -124.53484, -114.10317,     640.000,       0.000!   !END!
633 ! X =  -124.53215, -113.85467,     564.000,       0.000!   !END!
634 ! X =  -124.52945, -113.60608,     499.000,       0.000!   !END!
635 ! X =  -124.52675, -113.35759,     441.000,       0.000!   !END!
636 ! X =  -124.52405, -113.10899,     462.000,       0.000!   !END!
637 ! X =  -124.52136,  -112.8605,     496.000,       0.000!   !END!
638 ! X =  -124.51866,  -112.6119,     554.000,       0.000!   !END!
639 ! X =  -124.51597, -112.36341,     609.000,       0.000!   !END!
640 ! X =  -124.51327, -112.11481,     641.000,       0.000!   !END!
641 ! X =  -124.51057, -111.86632,     654.000,       0.000!   !END!
642 ! X =  -124.50788, -111.61782,     657.000,       0.000!   !END!
643 ! X =  -124.50528, -111.36922,     651.000,       0.000!   !END!
644 ! X =  -124.50258, -111.12072,     636.000,       0.000!   !END!
645 ! X =  -124.49988, -110.87213,     579.000,       0.000!   !END!
646 ! X =  -124.49719, -110.62363,     531.000,       0.000!   !END!
647 ! X =  -124.49449, -110.37503,     487.000,       0.000!   !END!
648 ! X =   -124.4918, -110.12653,     457.000,       0.000!   !END!
649 ! X =   -124.4891, -109.87804,     384.000,       0.000!   !END!
650 ! X =   -124.4864, -109.62944,     357.000,       0.000!   !END!
651 ! X =  -124.48371, -109.38094,     336.000,       0.000!   !END!
652 ! X =  -124.48101, -109.13234,     381.000,       0.000!   !END!
653 ! X =  -124.47831, -108.88384,     429.000,       0.000!   !END!
654 ! X =  -124.47562, -108.63535,     458.000,       0.000!   !END!
655 ! X =  -124.47292, -108.38675,     449.000,       0.000!   !END!
656 ! X =  -124.47022, -108.13825,     410.000,       0.000!   !END!
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657 ! X =  -124.46753, -107.88975,     466.000,       0.000!   !END!
658 ! X =  -124.46483, -107.64115,     548.000,       0.000!   !END!
659 ! X =  -124.46224, -107.39264,     609.000,       0.000!   !END!
660 ! X =  -124.31162, -116.34274,     426.000,       0.000!   !END!
661 ! X =  -124.30893, -116.09425,     431.000,       0.000!   !END!
662 ! X =  -124.30623, -115.84566,     457.000,       0.000!   !END!
663 ! X =  -124.30353, -115.59716,     480.000,       0.000!   !END!
664 ! X =  -124.29544, -114.85149,     584.000,       0.000!   !END!
665 ! X =  -124.29274, -114.60299,     622.000,       0.000!   !END!
666 ! X =  -124.29004,  -114.3544,     640.000,       0.000!   !END!
667 ! X =  -124.28735, -114.10591,     612.000,       0.000!   !END!
668 ! X =  -124.28475, -113.85731,     558.000,       0.000!   !END!
669 ! X =  -124.28205, -113.60881,     487.000,       0.000!   !END!
670 ! X =  -124.27935, -113.36022,     441.000,       0.000!   !END!
671 ! X =  -124.27666, -113.11173,     495.000,       0.000!   !END!
672 ! X =  -124.27396, -112.86313,     528.000,       0.000!   !END!
673 ! X =  -124.27126, -112.61464,     566.000,       0.000!   !END!
674 ! X =  -124.26856, -112.36604,     621.000,       0.000!   !END!
675 ! X =  -124.26587, -112.11755,     642.000,       0.000!   !END!
676 ! X =  -124.26317, -111.86895,     670.000,       0.000!   !END!
677 ! X =  -124.26048, -111.62045,     670.000,       0.000!   !END!
678 ! X =  -124.25778, -111.37186,     669.000,       0.000!   !END!
679 ! X =  -124.25508, -111.12336,     647.000,       0.000!   !END!
680 ! X =  -124.25239, -110.87487,     611.000,       0.000!   !END!
681 ! X =  -124.24969, -110.62627,     563.000,       0.000!   !END!
682 ! X =  -124.24699, -110.37777,     507.000,       0.000!   !END!
683 ! X =  -124.24439, -110.12917,     480.000,       0.000!   !END!
684 ! X =   -124.2417, -109.88067,     441.000,       0.000!   !END!
685 ! X =    -124.239, -109.63217,     375.000,       0.000!   !END!
686 ! X =   -124.2363, -109.38358,     337.000,       0.000!   !END!
687 ! X =  -124.23361, -109.13508,     401.000,       0.000!   !END!
688 ! X =  -124.23091, -108.88648,     426.000,       0.000!   !END!
689 ! X =  -124.22821, -108.63798,     426.000,       0.000!   !END!
690 ! X =  -124.22552, -108.38948,     396.000,       0.000!   !END!
691 ! X =  -124.22282, -108.14088,     447.000,       0.000!   !END!
692 ! X =  -124.22012, -107.89238,     495.000,       0.000!   !END!
693 ! X =  -124.21743, -107.64388,     559.000,       0.000!   !END!
694 ! X =  -124.21473, -107.39528,     609.000,       0.000!   !END!
695 ! X =  -124.05883, -115.84839,     475.000,       0.000!   !END!
696 ! X =  -124.05613,  -115.5998,     524.000,       0.000!   !END!
697 ! X =  -124.04264, -114.35704,     640.000,       0.000!   !END!
698 ! X =  -124.03995, -114.10854,     609.000,       0.000!   !END!
699 ! X =  -124.03725, -113.85995,     548.000,       0.000!   !END!
700 ! X =  -124.03455, -113.61146,     479.000,       0.000!   !END!
701 ! X =  -124.03185, -113.36286,     441.000,       0.000!   !END!
702 ! X =  -124.02916, -113.11437,     512.000,       0.000!   !END!
703 ! X =  -124.02646, -112.86577,     548.000,       0.000!   !END!
704 ! X =  -124.02376, -112.61728,     601.000,       0.000!   !END!
705 ! X =  -124.02117, -112.36878,     634.000,       0.000!   !END!
706 ! X =  -124.01847, -112.12018,     664.000,       0.000!   !END!
707 ! X =  -124.01577, -111.87169,     670.000,       0.000!   !END!
708 ! X =  -124.01307, -111.62309,     670.000,       0.000!   !END!
709 ! X =  -124.01038, -111.37459,     670.000,       0.000!   !END!
710 ! X =  -124.00768,   -111.126,     647.000,       0.000!   !END!
711 ! X =  -124.00498,  -110.8775,     612.000,       0.000!   !END!
712 ! X =  -124.00228,  -110.6289,     579.000,       0.000!   !END!
713 ! X =  -123.99959, -110.38041,     518.000,       0.000!   !END!
714 ! X =  -123.99689, -110.13191,     480.000,       0.000!   !END!
715 ! X =  -123.99419, -109.88331,     435.000,       0.000!   !END!
716 ! X =   -123.9915, -109.63481,     380.000,       0.000!   !END!
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717 ! X =   -123.9888, -109.38622,     342.000,       0.000!   !END!
718 ! X =   -123.9861, -109.13772,     398.000,       0.000!   !END!
719 ! X =  -123.98351, -108.88921,     413.000,       0.000!   !END!
720 ! X =  -123.98081, -108.64062,     401.000,       0.000!   !END!
721 ! X =  -123.97811, -108.39212,     396.000,       0.000!   !END!
722 ! X =  -123.97542, -108.14362,     463.000,       0.000!   !END!
723 ! X =  -123.97272, -107.89502,     510.000,       0.000!   !END!
724 ! X =  -123.97002, -107.64652,     579.000,       0.000!   !END!
725 ! X =  -123.96733, -107.39802,     609.000,       0.000!   !END!
726 ! X =  -123.96463, -107.14942,     609.000,       0.000!   !END!
727 ! X =  -123.78715, -113.61409,     484.000,       0.000!   !END!
728 ! X =  -123.78446,  -113.3656,     454.000,       0.000!   !END!
729 ! X =  -123.78176,   -113.117,     525.000,       0.000!   !END!
730 ! X =  -123.77906, -112.86851,     558.000,       0.000!   !END!
731 ! X =  -123.77636, -112.61991,     624.000,       0.000!   !END!
732 ! X =  -123.77367, -112.37142,     670.000,       0.000!   !END!
733 ! X =  -123.77097, -112.12282,     670.000,       0.000!   !END!
734 ! X =  -123.76827, -111.87433,     670.000,       0.000!   !END!
735 ! X =  -123.76558, -111.62583,     670.000,       0.000!   !END!
736 ! X =  -123.76288, -111.37723,     647.000,       0.000!   !END!
737 ! X =  -123.76028, -111.12873,     625.000,       0.000!   !END!
738 ! X =  -123.75758, -110.88014,     609.000,       0.000!   !END!
739 ! X =  -123.75489, -110.63164,     548.000,       0.000!   !END!
740 ! X =  -123.75218, -110.38304,     492.000,       0.000!   !END!
741 ! X =  -123.74949, -110.13454,     462.000,       0.000!   !END!
742 ! X =  -123.74679, -109.88605,     410.000,       0.000!   !END!
743 ! X =  -123.74409, -109.63745,     379.000,       0.000!   !END!
744 ! X =   -123.7414, -109.38895,     342.000,       0.000!   !END!
745 ! X =   -123.7387, -109.14035,     343.000,       0.000!   !END!
746 ! X =    -123.736, -108.89185,     396.000,       0.000!   !END!
747 ! X =  -123.73331, -108.64336,     389.000,       0.000!   !END!
748 ! X =  -123.73061, -108.39476,     396.000,       0.000!   !END!
749 ! X =  -123.72801, -108.14625,     480.000,       0.000!   !END!
750 ! X =  -123.72532, -107.89775,     512.000,       0.000!   !END!
751 ! X =  -123.72262, -107.64915,     579.000,       0.000!   !END!
752 ! X =  -123.71992, -107.40065,     579.000,       0.000!   !END!
753 ! X =  -123.71723, -107.15215,     579.000,       0.000!   !END!
754 ! X =  -123.71453, -106.90355,     548.000,       0.000!   !END!
755 ! X =  -123.53166, -112.87114,     554.000,       0.000!   !END!
756 ! X =  -123.52897, -112.62265,     624.000,       0.000!   !END!
757 ! X =  -123.52627, -112.37405,     670.000,       0.000!   !END!
758 ! X =  -123.52357, -112.12556,     670.000,       0.000!   !END!
759 ! X =  -123.52087, -111.87696,     670.000,       0.000!   !END!
760 ! X =  -123.51817, -111.62847,     640.000,       0.000!   !END!
761 ! X =  -123.51547, -111.37987,     609.000,       0.000!   !END!
762 ! X =  -123.51278, -111.13137,     548.000,       0.000!   !END!
763 ! X =  -123.51008, -110.88288,     532.000,       0.000!   !END!
764 ! X =  -123.50738, -110.63428,     487.000,       0.000!   !END!
765 ! X =  -123.50469, -110.38578,     457.000,       0.000!   !END!
766 ! X =  -123.50209, -110.13718,     426.000,       0.000!   !END!
767 ! X =  -123.49939, -109.88868,     396.000,       0.000!   !END!
768 ! X =  -123.49669, -109.64008,     366.000,       0.000!   !END!
769 ! X =  -123.49399, -109.39159,     341.000,       0.000!   !END!
770 ! X =   -123.4913, -109.14309,     335.000,       0.000!   !END!
771 ! X =   -123.4886, -108.89449,     341.000,       0.000!   !END!
772 ! X =   -123.4859, -108.64599,     352.000,       0.000!   !END!
773 ! X =  -123.48321, -108.39749,     396.000,       0.000!   !END!
774 ! X =  -123.48051, -108.14889,     480.000,       0.000!   !END!
775 ! X =  -123.47781, -107.90039,     525.000,       0.000!   !END!
776 ! X =  -123.47512, -107.65189,     579.000,       0.000!   !END!
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777 ! X =  -123.47242, -107.40329,     579.000,       0.000!   !END!
778 ! X =  -123.46982, -107.15479,     522.000,       0.000!   !END!
779 ! X =  -123.46713, -106.90629,     487.000,       0.000!   !END!
780 ! X =  -123.46442, -106.65769,     464.000,       0.000!   !END!
781 ! X =  -123.28416, -112.87378,     561.000,       0.000!   !END!
782 ! X =  -123.28147, -112.62529,     624.000,       0.000!   !END!
783 ! X =  -123.27876, -112.37669,     666.000,       0.000!   !END!
784 ! X =  -123.27607,  -112.1282,     670.000,       0.000!   !END!
785 ! X =  -123.27347,  -111.8797,     634.000,       0.000!   !END!
786 ! X =  -123.27077,  -111.6311,     595.000,       0.000!   !END!
787 ! X =  -123.26808,  -111.3826,     545.000,       0.000!   !END!
788 ! X =  -123.26538, -111.13401,     518.000,       0.000!   !END!
789 ! X =  -123.26268, -110.88551,     469.000,       0.000!   !END!
790 ! X =  -123.25998, -110.63692,     434.000,       0.000!   !END!
791 ! X =  -123.25728, -110.38842,     411.000,       0.000!   !END!
792 ! X =  -123.25459, -110.13992,     365.000,       0.000!   !END!
793 ! X =  -123.25189, -109.89132,     365.000,       0.000!   !END!
794 ! X =  -123.24919, -109.64283,     348.000,       0.000!   !END!
795 ! X =  -123.24649, -109.39423,     337.000,       0.000!   !END!
796 ! X =  -123.24389, -109.14572,     335.000,       0.000!   !END!
797 ! X =   -123.2412, -108.89722,     335.000,       0.000!   !END!
798 ! X =   -123.2385, -108.64863,     345.000,       0.000!   !END!
799 ! X =   -123.2358, -108.40013,     396.000,       0.000!   !END!
800 ! X =  -123.23311, -108.15163,     478.000,       0.000!   !END!
801 ! X =  -123.23041, -107.90303,     523.000,       0.000!   !END!
802 ! X =  -123.22771, -107.65453,     549.000,       0.000!   !END!
803 ! X =  -123.22502, -107.40603,     542.000,       0.000!   !END!
804 ! X =  -123.22231, -107.15743,     489.000,       0.000!   !END!
805 ! X =  -123.21962, -106.90893,     427.000,       0.000!   !END!
806 ! X =  -123.21692, -106.66043,     375.000,       0.000!   !END!
807 ! X =  -123.21432, -106.41182,     372.000,       0.000!   !END!
808 ! X =  -123.03676, -112.87652,     586.000,       0.000!   !END!
809 ! X =  -123.03406, -112.62792,     640.000,       0.000!   !END!
810 ! X =  -123.03137, -112.37943,     648.000,       0.000!   !END!
811 ! X =  -123.02867, -112.13083,     640.000,       0.000!   !END!
812 ! X =  -123.02597, -111.88234,     599.000,       0.000!   !END!
813 ! X =  -123.02327, -111.63374,     565.000,       0.000!   !END!
814 ! X =  -123.02057, -111.38525,     543.000,       0.000!   !END!
815 ! X =  -123.01798, -111.13674,     518.000,       0.000!   !END!
816 ! X =  -123.01528, -110.88815,     493.000,       0.000!   !END!
817 ! X =  -123.01258, -110.63965,     465.000,       0.000!   !END!
818 ! X =  -123.00988, -110.39105,     444.000,       0.000!   !END!
819 ! X =  -123.00718, -110.14256,     394.000,       0.000!   !END!
820 ! X =  -123.00449, -109.89406,     366.000,       0.000!   !END!
821 ! X =  -123.00179, -109.64546,     360.000,       0.000!   !END!
822 ! X =  -122.99909, -109.39696,     389.000,       0.000!   !END!
823 ! X =  -122.99639, -109.14836,     363.000,       0.000!   !END!
824 ! X =  -122.99369, -108.89987,     335.000,       0.000!   !END!
825 ! X =    -122.991, -108.65137,     340.000,       0.000!   !END!
826 ! X =   -122.9884, -108.40276,     365.000,       0.000!   !END!
827 ! X =   -122.9857, -108.15426,     439.000,       0.000!   !END!
828 ! X =  -122.98301, -107.90576,     490.000,       0.000!   !END!
829 ! X =   -122.9803, -107.65716,     518.000,       0.000!   !END!
830 ! X =  -122.97761, -107.40866,     493.000,       0.000!   !END!
831 ! X =  -122.97491, -107.16006,     437.000,       0.000!   !END!
832 ! X =  -122.97221, -106.91156,     396.000,       0.000!   !END!
833 ! X =  -122.96952, -106.66306,     365.000,       0.000!   !END!
834 ! X =  -122.96682, -106.41456,     377.000,       0.000!   !END!
835 ! X =  -122.96412, -106.16596,     386.000,       0.000!   !END!
836 ! X =  -122.78667, -112.63066,     657.000,       0.000!   !END!
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837 ! X =  -122.78397, -112.38206,     678.000,        0.000!   !END!
838 ! X =  -122.78127, -112.13357,     665.000,        0.000!   !END!
839 ! X =  -122.77857, -111.88497,     627.000,        0.000!   !END!
840 ! X =  -122.77587, -111.63648,     616.000,        0.000!   !END!
841 ! X =  -122.77317, -111.38788,     600.000,        0.000!   !END!
842 ! X =  -122.77048, -111.13939,     560.000,        0.000!   !END!
843 ! X =  -122.76777, -110.89079,     518.000,        0.000!   !END!
844 ! X =  -122.76508, -110.64229,     489.000,        0.000!   !END!
845 ! X =  -122.76238, -110.39379,     457.000,        0.000!   !END!
846 ! X =  -122.75978, -110.14519,     384.000,        0.000!   !END!
847 ! X =  -122.75708, -109.89669,     368.000,        0.000!   !END!
848 ! X =  -122.75438,  -109.6481,     396.000,        0.000!   !END!
849 ! X =  -122.75169,  -109.3996,     419.000,        0.000!   !END!
850 ! X =  -122.74899,  -109.1511,     431.000,        0.000!   !END!
851 ! X =  -122.74629,  -108.9025,     396.000,        0.000!   !END!
852 ! X =  -122.74359,   -108.654,     335.000,        0.000!   !END!
853 ! X =   -122.7409,  -108.4055,     338.000,        0.000!   !END!
854 ! X =   -122.7382, -108.15691,     380.000,        0.000!   !END!
855 ! X =   -122.7355, -107.90841,     419.000,        0.000!   !END!
856 ! X =   -122.7329,  -107.6598,     425.000,        0.000!   !END!
857 ! X =   -122.7302,  -107.4113,     396.000,        0.000!   !END!
858 ! X =  -122.72751,  -107.1628,     368.000,        0.000!   !END!
859 ! X =   -122.7248,  -106.9142,     381.000,        0.000!   !END!
860 ! X =  -122.72211,  -106.6657,     424.000,        0.000!   !END!
861 ! X =  -122.71941,  -106.4172,     441.000,        0.000!   !END!
862 ! X =  -122.71672,  -106.1687,     439.000,        0.000!   !END!
863 ! X =  -122.71402,  -105.9201,     412.000,        0.000!   !END!
864 ! X =  -122.71132, -105.67159,     408.000,        0.000!   !END!
865 ! X =  -122.52847, -111.63911,     640.000,        0.000!   !END!
866 ! X =  -122.52577, -111.39062,     638.000,        0.000!   !END!
867 ! X =  -122.52307, -111.14202,     601.000,        0.000!   !END!
868 ! X =  -122.52038, -110.89353,     533.000,        0.000!   !END!
869 ! X =  -122.51767, -110.64493,     502.000,        0.000!   !END!
870 ! X =  -122.51498, -110.39643,     464.000,        0.000!   !END!
871 ! X =  -122.51228, -110.14793,     401.000,        0.000!   !END!
872 ! X =  -122.50958, -109.89934,     390.000,        0.000!   !END!
873 ! X =  -122.50688, -109.65084,     441.000,        0.000!   !END!
874 ! X =  -122.50428, -109.40224,     466.000,        0.000!   !END!
875 ! X =  -122.50159, -109.15374,     466.000,        0.000!   !END!
876 ! X =  -122.49889, -108.90524,     441.000,        0.000!   !END!
877 ! X =  -122.49619, -108.65664,     389.000,        0.000!   !END!
878 ! X =  -122.49349, -108.40814,     335.000,        0.000!   !END!
879 ! X =  -122.49079, -108.15954,     336.000,        0.000!   !END!
880 ! X =  -122.48809, -107.91104,     365.000,        0.000!   !END!
881 ! X =   -122.4854, -107.66254,     369.000,        0.000!   !END!
882 ! X =   -122.4827, -107.41394,     356.000,        0.000!   !END!
883 ! X =   -122.4801, -107.16544,     376.000,        0.000!   !END!
884 ! X =   -122.4774, -106.91694,     410.000,        0.000!   !END!
885 ! X =   -122.4747, -106.66834,     461.000,        0.000!   !END!
886 ! X =  -122.47201, -106.41983,     490.000,        0.000!   !END!
887 ! X =  -122.46931, -106.17133,     489.000,        0.000!   !END!
888 ! X =  -122.46661, -105.92283,     473.000,        0.000!   !END!
889 ! X =  -122.46391, -105.67423,     419.000,        0.000!   !END!
890 ! X =  -122.46122, -105.42573,     452.000,        0.000!   !END!
891 ! X =  -122.28097, -111.64176,     640.000,        0.000!   !END!
892 ! X =  -122.27827, -111.39326,     640.000,        0.000!   !END!
893 ! X =  -122.27557, -111.14466,     601.000,        0.000!   !END!
894 ! X =  -122.27297, -110.89616,     533.000,        0.000!   !END!
895 ! X =  -122.27028, -110.64766,     493.000,        0.000!   !END!
896 ! X =  -122.26758, -110.39907,     457.000,        0.000!   !END!
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897 ! X =  -122.26488, -110.15057,     391.000,        0.000!   !END!
898 ! X =  -122.26218, -109.90197,     429.000,        0.000!   !END!
899 ! X =  -122.25948, -109.65348,     464.000,        0.000!   !END!
900 ! X =  -122.25678, -109.40498,     492.000,        0.000!   !END!
901 ! X =  -122.25408, -109.15638,     487.000,        0.000!   !END!
902 ! X =  -122.25139, -108.90788,     457.000,        0.000!   !END!
903 ! X =  -122.24878, -108.65928,     403.000,        0.000!   !END!
904 ! X =  -122.24609, -108.41078,     371.000,        0.000!   !END!
905 ! X =  -122.24339, -108.16228,     346.000,        0.000!   !END!
906 ! X =  -122.24069, -107.91368,     336.000,        0.000!   !END!
907 ! X =  -122.23799, -107.66518,     335.000,        0.000!   !END!
908 ! X =   -122.2353, -107.41668,     336.000,        0.000!   !END!
909 ! X =  -122.23259, -107.16808,     368.000,        0.000!   !END!
910 ! X =   -122.2299, -106.91958,     408.000,        0.000!   !END!
911 ! X =   -122.2272, -106.67108,     475.000,        0.000!   !END!
912 ! X =   -122.2246, -106.42247,     518.000,        0.000!   !END!
913 ! X =   -122.2219, -106.17397,     518.000,        0.000!   !END!
914 ! X =  -122.21921, -105.92547,     517.000,        0.000!   !END!
915 ! X =  -122.21651, -105.67697,     464.000,        0.000!   !END!
916 ! X =  -122.21381, -105.42836,     443.000,        0.000!   !END!
917 ! X =  -122.21111, -105.17986,     451.000,        0.000!   !END!
918 ! X =  -122.20841, -104.93136,     476.000,        0.000!   !END!
919 ! X =  -122.03357, -111.64449,     623.000,        0.000!   !END!
920 ! X =  -122.03087,  -111.3959,     613.000,        0.000!   !END!
921 ! X =  -122.02817,  -111.1474,     570.000,        0.000!   !END!
922 ! X =  -122.02547,  -110.8988,     502.000,        0.000!   !END!
923 ! X =  -122.02277, -110.65031,     465.000,        0.000!   !END!
924 ! X =  -122.02007, -110.40171,     429.000,        0.000!   !END!
925 ! X =  -122.01747, -110.15321,     460.000,        0.000!   !END!
926 ! X =  -122.01478, -109.90471,     472.000,        0.000!   !END!
927 ! X =  -122.01208, -109.65611,     507.000,        0.000!   !END!
928 ! X =  -122.00938, -109.40761,     518.000,        0.000!   !END!
929 ! X =  -122.00668, -109.15912,     498.000,        0.000!   !END!
930 ! X =  -122.00398, -108.91052,     451.000,        0.000!   !END!
931 ! X =  -122.00128, -108.66202,     396.000,        0.000!   !END!
932 ! X =  -121.99858, -108.41342,     411.000,        0.000!   !END!
933 ! X =  -121.99598, -108.16491,     408.000,        0.000!   !END!
934 ! X =  -121.99329, -107.91641,     386.000,        0.000!   !END!
935 ! X =  -121.99059, -107.66782,     336.000,        0.000!   !END!
936 ! X =  -121.98789, -107.41932,     335.000,        0.000!   !END!
937 ! X =  -121.98519, -107.17081,     337.000,        0.000!   !END!
938 ! X =  -121.98249, -106.92221,     364.000,        0.000!   !END!
939 ! X =  -121.97979, -106.67371,     419.000,        0.000!   !END!
940 ! X =   -121.9771, -106.42521,     497.000,        0.000!   !END!
941 ! X =  -121.97439, -106.17661,     518.000,        0.000!   !END!
942 ! X =   -121.9718,  -105.9281,     518.000,        0.000!   !END!
943 ! X =   -121.9691,  -105.6796,     487.000,        0.000!   !END!
944 ! X =   -121.9664,   -105.431,     487.000,        0.000!   !END!
945 ! X =   -121.9637,  -105.1825,     493.000,        0.000!   !END!
946 ! X =  -121.96101,   -104.934,     526.000,        0.000!   !END!
947 ! X =  -121.95831, -104.68549,     563.000,        0.000!   !END!
948 ! X =  -121.78347, -111.39853,     548.000,        0.000!   !END!
949 ! X =  -121.78077, -111.15004,     507.000,        0.000!   !END!
950 ! X =  -121.77807, -110.90154,     470.000,        0.000!   !END!
951 ! X =  -121.77537, -110.65294,     426.000,        0.000!   !END!
952 ! X =  -121.77267, -110.40445,     457.000,        0.000!   !END!
953 ! X =  -121.76997, -110.15585,     499.000,        0.000!   !END!
954 ! X =  -121.76727, -109.90735,     509.000,        0.000!   !END!
955 ! X =  -121.76458, -109.65885,     548.000,        0.000!   !END!
956 ! X =  -121.76197, -109.41025,     552.000,        0.000!   !END!
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 957 ! X =  -121.75928, -109.16175,     518.000,       0.000!   !END!
 958 ! X =  -121.75658, -108.91315,     457.000,       0.000!   !END!
 959 ! X =  -121.75388, -108.66466,     457.000,       0.000!   !END!
 960 ! X =  -121.75118, -108.41616,     456.000,       0.000!   !END!
 961 ! X =  -121.74848, -108.16756,     426.000,       0.000!   !END!
 962 ! X =  -121.74578, -107.91906,     399.000,       0.000!   !END!
 963 ! X =  -121.74309, -107.67056,     355.000,       0.000!   !END!
 964 ! X =  -121.74048, -107.42195,     365.000,       0.000!   !END!
 965 ! X =  -121.73779, -107.17345,     365.000,       0.000!   !END!
 966 ! X =  -121.73509, -106.92495,     360.000,       0.000!   !END!
 967 ! X =  -121.73239, -106.67635,     355.000,       0.000!   !END!
 968 ! X =  -121.72969, -106.42785,     445.000,       0.000!   !END!
 969 ! X =  -121.72699, -106.17935,     472.000,       0.000!   !END!
 970 ! X =  -121.72429, -105.93075,     472.000,       0.000!   !END!
 971 ! X =  -121.72159, -105.68225,     487.000,       0.000!   !END!
 972 ! X =    -121.719, -105.43374,     487.000,       0.000!   !END!
 973 ! X =  -121.71629, -105.18514,     493.000,       0.000!   !END!
 974 ! X =   -121.7136, -104.93663,     530.000,       0.000!   !END!
 975 ! X =   -121.7109, -104.68813,     593.000,       0.000!   !END!
 976 ! X =   -121.7082, -104.43963,     630.000,       0.000!   !END!
 977 ! X =   -121.7055, -104.19103,     644.000,       0.000!   !END!
 978 ! X =  -121.53327, -111.15268,     446.000,       0.000!   !END!
 979 ! X =  -121.53067, -110.90418,     440.000,       0.000!   !END!
 980 ! X =  -121.52797, -110.65558,     482.000,       0.000!   !END!
 981 ! X =  -121.52527, -110.40708,     503.000,       0.000!   !END!
 982 ! X =  -121.52257, -110.15859,     536.000,       0.000!   !END!
 983 ! X =  -121.51987, -109.90999,     556.000,       0.000!   !END!
 984 ! X =  -121.51717, -109.66149,     574.000,       0.000!   !END!
 985 ! X =  -121.51447, -109.41289,     602.000,       0.000!   !END!
 986 ! X =  -121.51177,  -109.1644,     548.000,       0.000!   !END!
 987 ! X =  -121.50918, -108.91589,     514.000,       0.000!   !END!
 988 ! X =  -121.50647, -108.66729,     487.000,       0.000!   !END!
 989 ! X =  -121.50378, -108.41879,     460.000,       0.000!   !END!
 990 ! X =  -121.50108, -108.17029,     426.000,       0.000!   !END!
 991 ! X =  -121.49838, -107.92169,     414.000,       0.000!   !END!
 992 ! X =  -121.49568, -107.67319,     424.000,       0.000!   !END!
 993 ! X =  -121.49298, -107.42469,     435.000,       0.000!   !END!
 994 ! X =  -121.49028, -107.17609,     435.000,       0.000!   !END!
 995 ! X =  -121.48768, -106.92759,     402.000,       0.000!   !END!
 996 ! X =  -121.48498, -106.67909,     354.000,       0.000!   !END!
 997 ! X =  -121.48228, -106.43049,     345.000,       0.000!   !END!
 998 ! X =  -121.47958, -106.18199,     396.000,       0.000!   !END!
 999 ! X =  -121.47689, -105.93348,     396.000,       0.000!   !END!
1000 ! X =  -121.47419, -105.68488,     396.000,       0.000!   !END!
1001 ! X =  -121.47149, -105.43638,     457.000,       0.000!   !END!
1002 ! X =  -121.46889, -105.18787,     468.000,       0.000!   !END!
1003 ! X =  -121.46619, -104.93927,     509.000,       0.000!   !END!
1004 ! X =  -121.46349, -104.69077,     557.000,       0.000!   !END!
1005 ! X =  -121.46079, -104.44227,     611.000,       0.000!   !END!
1006 ! X =   -121.4581, -104.19376,     623.000,       0.000!   !END!
1007 ! X =  -121.45539, -103.94516,     581.000,       0.000!   !END!
1008 ! X =   -121.4527, -103.69666,     566.000,       0.000!   !END!
1009 ! X =     -121.45, -103.44815,     527.000,       0.000!   !END!
1010 ! X =  -121.28047, -110.65832,     518.000,       0.000!   !END!
1011 ! X =  -121.27777, -110.40973,     560.000,       0.000!   !END!
1012 ! X =  -121.27517, -110.16122,     579.000,       0.000!   !END!
1013 ! X =  -121.27247, -109.91273,     593.000,       0.000!   !END!
1014 ! X =  -121.26977, -109.66413,     609.000,       0.000!   !END!
1015 ! X =  -121.26707, -109.41563,     609.000,       0.000!   !END!
1016 ! X =  -121.26437, -109.16703,     592.000,       0.000!   !END!
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1017 ! X =  -121.26167, -108.91853,     573.000,        0.000!   !END!
1018 ! X =  -121.25897, -108.67003,     519.000,        0.000!   !END!
1019 ! X =  -121.25637, -108.42143,     460.000,        0.000!   !END!
1020 ! X =  -121.25367, -108.17293,     439.000,        0.000!   !END!
1021 ! X =  -121.25098, -107.92443,     479.000,        0.000!   !END!
1022 ! X =  -121.24827, -107.67583,     487.000,        0.000!   !END!
1023 ! X =  -121.24558, -107.42733,     487.000,        0.000!   !END!
1024 ! X =  -121.24287, -107.17873,     487.000,        0.000!   !END!
1025 ! X =  -121.24018, -106.93023,     461.000,        0.000!   !END!
1026 ! X =  -121.23748, -106.68173,     403.000,        0.000!   !END!
1027 ! X =  -121.23488, -106.43322,     337.000,        0.000!   !END!
1028 ! X =  -121.23218, -106.18462,     320.000,        0.000!   !END!
1029 ! X =  -121.22948, -105.93612,     335.000,        0.000!   !END!
1030 ! X =  -121.22678, -105.68762,     314.000,        0.000!   !END!
1031 ! X =  -121.22408, -105.43902,     320.000,        0.000!   !END!
1032 ! X =  -121.22138, -105.19052,     364.000,        0.000!   !END!
1033 ! X =  -121.21868, -104.94201,     475.000,        0.000!   !END!
1034 ! X =  -121.21608, -104.69341,     531.000,        0.000!   !END!
1035 ! X =  -121.21338,  -104.4449,     579.000,        0.000!   !END!
1036 ! X =  -121.21069,  -104.1964,     566.000,        0.000!   !END!
1037 ! X =  -121.20799,  -103.9479,     499.000,        0.000!   !END!
1038 ! X =  -121.20529, -103.69929,     470.000,        0.000!   !END!
1039 ! X =  -121.20259, -103.45079,     457.000,        0.000!   !END!
1040 ! X =  -121.19989, -103.20228,     432.000,        0.000!   !END!
1041 ! X =  -121.19729, -102.95377,     540.000,        0.000!   !END!
1042 ! X =   -121.1946, -102.70527,     591.000,        0.000!   !END!
1043 ! X =  -121.19189, -102.45667,     640.000,        0.000!   !END!
1044 ! X =   -121.1892, -102.20816,     640.000,        0.000!   !END!
1045 ! X =   -121.1865, -101.95965,     612.000,        0.000!   !END!
1046 ! X =   -121.1838, -101.71115,     548.000,        0.000!   !END!
1047 ! X =   -121.1811, -101.46254,     484.000,        0.000!   !END!
1048 ! X =   -121.1785, -101.21403,     510.000,        0.000!   !END!
1049 ! X =  -121.03307, -110.66096,     563.000,        0.000!   !END!
1050 ! X =  -121.03037, -110.41246,     614.000,        0.000!   !END!
1051 ! X =  -121.02767, -110.16387,     645.000,        0.000!   !END!
1052 ! X =  -121.02497, -109.91537,     645.000,        0.000!   !END!
1053 ! X =  -121.02237, -109.66677,     642.000,        0.000!   !END!
1054 ! X =  -121.01967, -109.41827,     650.000,        0.000!   !END!
1055 ! X =  -121.01697, -109.16977,     640.000,        0.000!   !END!
1056 ! X =  -121.01427, -108.92117,     592.000,        0.000!   !END!
1057 ! X =  -121.01157, -108.67267,     528.000,        0.000!   !END!
1058 ! X =  -121.00887, -108.42417,     457.000,        0.000!   !END!
1059 ! X =  -121.00617, -108.17557,     501.000,        0.000!   !END!
1060 ! X =  -121.00357, -107.92707,     548.000,        0.000!   !END!
1061 ! X =  -121.00087, -107.67847,     579.000,        0.000!   !END!
1062 ! X =  -120.99817, -107.42997,     573.000,        0.000!   !END!
1063 ! X =  -120.99547, -107.18147,     548.000,        0.000!   !END!
1064 ! X =  -120.99277, -106.93287,     518.000,        0.000!   !END!
1065 ! X =  -120.99007, -106.68437,     470.000,        0.000!   !END!
1066 ! X =  -120.98737, -106.43587,     457.000,        0.000!   !END!
1067 ! X =  -120.98477, -106.18726,     445.000,        0.000!   !END!
1068 ! X =  -120.98207, -105.93876,     437.000,        0.000!   !END!
1069 ! X =  -120.97937, -105.69026,     421.000,        0.000!   !END!
1070 ! X =  -120.97668, -105.44176,     396.000,        0.000!   !END!
1071 ! X =  -120.97397, -105.19315,     355.000,        0.000!   !END!
1072 ! X =  -120.97128, -104.94465,     428.000,        0.000!   !END!
1073 ! X =  -120.96858, -104.69615,     506.000,        0.000!   !END!
1074 ! X =  -120.96597, -104.44754,     530.000,        0.000!   !END!
1075 ! X =  -120.96328, -104.19904,     519.000,        0.000!   !END!
1076 ! X =  -120.96058, -103.95053,     457.000,        0.000!   !END!
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1077 ! X =  -120.95788, -103.70203,     384.000,       0.000!   !END!
1078 ! X =  -120.95518, -103.45343,     432.000,       0.000!   !END!
1079 ! X =  -120.95248, -103.20492,     457.000,       0.000!   !END!
1080 ! X =  -120.94978, -102.95642,     545.000,       0.000!   !END!
1081 ! X =  -120.94718, -102.70791,     591.000,       0.000!   !END!
1082 ! X =  -120.94449,  -102.4594,     611.000,       0.000!   !END!
1083 ! X =  -120.94178,  -102.2108,     611.000,       0.000!   !END!
1084 ! X =  -120.93909, -101.96229,     566.000,       0.000!   !END!
1085 ! X =  -120.93639, -101.71379,     502.000,       0.000!   !END!
1086 ! X =  -120.93369, -101.46528,     457.000,       0.000!   !END!
1087 ! X =  -120.93099, -101.21677,     530.000,       0.000!   !END!
1088 ! X =  -120.78297,  -110.4151,     651.000,       0.000!   !END!
1089 ! X =  -120.78026, -110.16651,     672.000,       0.000!   !END!
1090 ! X =  -120.77756, -109.91801,     672.000,       0.000!   !END!
1091 ! X =  -120.77487, -109.66951,     657.000,       0.000!   !END!
1092 ! X =  -120.77216, -109.42091,     657.000,       0.000!   !END!
1093 ! X =  -120.76957, -109.17241,     640.000,       0.000!   !END!
1094 ! X =  -120.76687, -108.92391,     591.000,       0.000!   !END!
1095 ! X =  -120.76416, -108.67531,     525.000,       0.000!   !END!
1096 ! X =  -120.76147, -108.42681,     502.000,       0.000!   !END!
1097 ! X =  -120.75876, -108.17821,     569.000,       0.000!   !END!
1098 ! X =  -120.75606, -107.92971,     603.000,       0.000!   !END!
1099 ! X =  -120.75337, -107.68121,     609.000,       0.000!   !END!
1100 ! X =  -120.75076, -107.43261,     586.000,       0.000!   !END!
1101 ! X =  -120.74806, -107.18411,     559.000,       0.000!   !END!
1102 ! X =  -120.74537, -106.93561,     518.000,       0.000!   !END!
1103 ! X =  -120.74266, -106.68701,     472.000,       0.000!   !END!
1104 ! X =  -120.73997, -106.43851,     457.000,       0.000!   !END!
1105 ! X =  -120.73727,    -106.19,     457.000,       0.000!   !END!
1106 ! X =  -120.73456,  -105.9414,     457.000,       0.000!   !END!
1107 ! X =  -120.73197,  -105.6929,     430.000,       0.000!   !END!
1108 ! X =  -120.72927, -105.44439,     401.000,       0.000!   !END!
1109 ! X =  -120.72657, -105.19589,     341.000,       0.000!   !END!
1110 ! X =  -120.72387, -104.94729,     411.000,       0.000!   !END!
1111 ! X =  -120.72117, -104.69879,     471.000,       0.000!   !END!
1112 ! X =  -120.71847, -104.45028,     489.000,       0.000!   !END!
1113 ! X =  -120.71577, -104.20168,     466.000,       0.000!   !END!
1114 ! X =  -120.71317, -103.95317,     370.000,       0.000!   !END!
1115 ! X =  -120.71047, -103.70467,     457.000,       0.000!   !END!
1116 ! X =  -120.70777, -103.45616,     514.000,       0.000!   !END!
1117 ! X =  -120.70507, -103.20756,     552.000,       0.000!   !END!
1118 ! X =  -120.70237, -102.95906,     579.000,       0.000!   !END!
1119 ! X =  -120.69967, -102.71055,     579.000,       0.000!   !END!
1120 ! X =  -120.69708, -102.46204,     587.000,       0.000!   !END!
1121 ! X =  -120.69438, -102.21354,     567.000,       0.000!   !END!
1122 ! X =  -120.69167, -101.96493,     525.000,       0.000!   !END!
1123 ! X =  -120.68898, -101.71642,     457.000,       0.000!   !END!
1124 ! X =  -120.68628, -101.46792,     521.000,       0.000!   !END!
1125 ! X =  -120.68358, -101.21941,     626.000,       0.000!   !END!
1126 ! X =  -120.53546, -110.41775,     670.000,       0.000!   !END!
1127 ! X =  -120.53286, -110.16924,     671.000,       0.000!   !END!
1128 ! X =  -120.53016, -109.92065,     671.000,       0.000!   !END!
1129 ! X =  -120.52746, -109.67215,     650.000,       0.000!   !END!
1130 ! X =  -120.52476, -109.42365,     646.000,       0.000!   !END!
1131 ! X =  -120.52206, -109.17505,     618.000,       0.000!   !END!
1132 ! X =  -120.51936, -108.92655,     554.000,       0.000!   !END!
1133 ! X =  -120.51666, -108.67795,     505.000,       0.000!   !END!
1134 ! X =  -120.51406, -108.42945,     548.000,       0.000!   !END!
1135 ! X =  -120.51136, -108.18095,     609.000,       0.000!   !END!
1136 ! X =  -120.50866, -107.93235,     609.000,       0.000!   !END!
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1137 ! X =  -120.50596, -107.68385,     609.000,        0.000!   !END!
1138 ! X =  -120.50326, -107.43535,     586.000,        0.000!   !END!
1139 ! X =  -120.50056, -107.18675,     536.000,        0.000!   !END!
1140 ! X =  -120.49796, -106.93825,     491.000,        0.000!   !END!
1141 ! X =  -120.49526, -106.68974,     465.000,        0.000!   !END!
1142 ! X =  -120.49256, -106.44114,     457.000,        0.000!   !END!
1143 ! X =  -120.48986, -106.19264,     431.000,        0.000!   !END!
1144 ! X =  -120.48716, -105.94414,     433.000,        0.000!   !END!
1145 ! X =  -120.48446, -105.69554,     363.000,        0.000!   !END!
1146 ! X =  -120.48176, -105.44704,     327.000,        0.000!   !END!
1147 ! X =  -120.47916, -105.19853,     326.000,        0.000!   !END!
1148 ! X =  -120.47646, -104.95003,     344.000,        0.000!   !END!
1149 ! X =  -120.47376, -104.70142,     381.000,        0.000!   !END!
1150 ! X =  -120.47106, -104.45292,     363.000,        0.000!   !END!
1151 ! X =  -120.46836, -104.20442,     352.000,        0.000!   !END!
1152 ! X =  -120.46566, -103.95582,     421.000,        0.000!   !END!
1153 ! X =  -120.46306, -103.70731,     503.000,        0.000!   !END!
1154 ! X =  -120.46036,  -103.4588,     564.000,        0.000!   !END!
1155 ! X =  -120.45766,  -103.2103,     579.000,        0.000!   !END!
1156 ! X =  -120.45497, -102.96179,     579.000,        0.000!   !END!
1157 ! X =  -120.45226, -102.71319,     571.000,        0.000!   !END!
1158 ! X =  -120.44957, -102.46468,     548.000,        0.000!   !END!
1159 ! X =  -120.44697, -102.21617,     510.000,        0.000!   !END!
1160 ! X =  -120.44427, -101.96767,     447.000,        0.000!   !END!
1161 ! X =  -120.44156, -101.71906,     487.000,        0.000!   !END!
1162 ! X =  -120.43887, -101.47056,     551.000,        0.000!   !END!
1163 ! X =  -120.28536, -110.17189,     670.000,        0.000!   !END!
1164 ! X =  -120.28266, -109.92339,     663.000,        0.000!   !END!
1165 ! X =  -120.28006, -109.67479,     632.000,        0.000!   !END!
1166 ! X =  -120.27736, -109.42629,     583.000,        0.000!   !END!
1167 ! X =  -120.27466, -109.17769,     543.000,        0.000!   !END!
1168 ! X =  -120.27196, -108.92919,     522.000,        0.000!   !END!
1169 ! X =  -120.26926, -108.68069,     555.000,        0.000!   !END!
1170 ! X =  -120.26656, -108.43209,     575.000,        0.000!   !END!
1171 ! X =  -120.26396, -108.18359,     609.000,        0.000!   !END!
1172 ! X =  -120.26126, -107.93509,     609.000,        0.000!   !END!
1173 ! X =  -120.25855, -107.68649,     609.000,        0.000!   !END!
1174 ! X =  -120.25586, -107.43799,     544.000,        0.000!   !END!
1175 ! X =  -120.25316, -107.18949,     511.000,        0.000!   !END!
1176 ! X =  -120.25045, -106.94089,     457.000,        0.000!   !END!
1177 ! X =  -120.24776, -106.69239,     414.000,        0.000!   !END!
1178 ! X =  -120.24516, -106.44388,     401.000,        0.000!   !END!
1179 ! X =  -120.24245, -106.19528,     369.000,        0.000!   !END!
1180 ! X =  -120.23975, -105.94678,     367.000,        0.000!   !END!
1181 ! X =  -120.23706, -105.69828,     367.000,        0.000!   !END!
1182 ! X =  -120.23435, -105.44968,     320.000,        0.000!   !END!
1183 ! X =  -120.23165, -105.20117,     335.000,        0.000!   !END!
1184 ! X =  -120.22905, -104.95267,     335.000,        0.000!   !END!
1185 ! X =  -120.22636, -104.70416,     320.000,        0.000!   !END!
1186 ! X =  -120.22365, -104.45556,     305.000,        0.000!   !END!
1187 ! X =  -120.22095, -104.20706,     320.000,        0.000!   !END!
1188 ! X =  -120.21826, -103.95855,     435.000,        0.000!   !END!
1189 ! X =  -120.21555, -103.70995,     526.000,        0.000!   !END!
1190 ! X =  -120.21295, -103.46144,     568.000,        0.000!   !END!
1191 ! X =  -120.21025, -103.21294,     579.000,        0.000!   !END!
1192 ! X =  -120.20756, -102.96443,     563.000,        0.000!   !END!
1193 ! X =  -120.20486, -102.71593,     530.000,        0.000!   !END!
1194 ! X =  -120.20215, -102.46732,     488.000,        0.000!   !END!
1195 ! X =  -120.19946, -102.21882,     444.000,        0.000!   !END!
1196 ! X =  -120.19686, -101.97031,     423.000,        0.000!   !END!
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1197 ! X =  -120.19416,  -101.7218,     487.000,       0.000!   !END!
1198 ! X =  -120.19145,  -101.4732,     529.000,       0.000!   !END!
1199 ! X =  -120.18876, -101.22469,     536.000,       0.000!   !END!
1200 ! X =  -120.18606, -100.97618,     640.000,       0.000!   !END!
1201 ! X =  -120.18336, -100.72768,     640.000,       0.000!   !END!
1202 ! X =  -120.03796, -110.17453,     670.000,       0.000!   !END!
1203 ! X =  -120.03526, -109.92603,     639.000,       0.000!   !END!
1204 ! X =  -120.03255, -109.67743,     626.000,       0.000!   !END!
1205 ! X =  -120.02986, -109.42893,     620.000,       0.000!   !END!
1206 ! X =  -120.02726, -109.18043,     573.000,       0.000!   !END!
1207 ! X =  -120.02455, -108.93183,     609.000,       0.000!   !END!
1208 ! X =  -120.02185, -108.68333,     640.000,       0.000!   !END!
1209 ! X =  -120.01916, -108.43483,     617.000,       0.000!   !END!
1210 ! X =  -120.01645, -108.18623,     609.000,       0.000!   !END!
1211 ! X =  -120.01375, -107.93773,     609.000,       0.000!   !END!
1212 ! X =  -120.01115, -107.68913,     585.000,       0.000!   !END!
1213 ! X =  -120.00845, -107.44063,     517.000,       0.000!   !END!
1214 ! X =  -120.00575, -107.19213,     470.000,       0.000!   !END!
1215 ! X =  -120.00305, -106.94353,     420.000,       0.000!   !END!
1216 ! X =  -120.00035, -106.69503,     365.000,       0.000!   !END!
1217 ! X =  -119.99765, -106.44653,     367.000,       0.000!   !END!
1218 ! X =  -119.99505, -106.19802,     424.000,       0.000!   !END!
1219 ! X =  -119.99235, -105.94942,     460.000,       0.000!   !END!
1220 ! X =  -119.98965, -105.70092,     456.000,       0.000!   !END!
1221 ! X =  -119.98695, -105.45241,     469.000,       0.000!   !END!
1222 ! X =  -119.98425, -105.20381,     438.000,       0.000!   !END!
1223 ! X =  -119.98155, -104.95531,     381.000,       0.000!   !END!
1224 ! X =  -119.97895,  -104.7068,     397.000,       0.000!   !END!
1225 ! X =  -119.97624,  -104.4582,     335.000,       0.000!   !END!
1226 ! X =  -119.97354,  -104.2097,     335.000,       0.000!   !END!
1227 ! X =  -119.97085, -103.96119,     423.000,       0.000!   !END!
1228 ! X =  -119.96815, -103.71269,     497.000,       0.000!   !END!
1229 ! X =  -119.96544, -103.46409,     527.000,       0.000!   !END!
1230 ! X =  -119.96284, -103.21558,     534.000,       0.000!   !END!
1231 ! X =  -119.96015, -102.96707,     503.000,       0.000!   !END!
1232 ! X =  -119.95745, -102.71857,     457.000,       0.000!   !END!
1233 ! X =  -119.95475, -102.47006,     390.000,       0.000!   !END!
1234 ! X =  -119.95204, -102.22146,     362.000,       0.000!   !END!
1235 ! X =  -119.94935, -101.97295,     395.000,       0.000!   !END!
1236 ! X =  -119.94675, -101.72444,     431.000,       0.000!   !END!
1237 ! X =  -119.94405, -101.47593,     462.000,       0.000!   !END!
1238 ! X =  -119.94135, -101.22743,     474.000,       0.000!   !END!
1239 ! X =  -119.93864, -100.97882,     548.000,       0.000!   !END!
1240 ! X =  -119.93595, -100.73032,     570.000,       0.000!   !END!
1241 ! X =  -119.93325, -100.48181,     548.000,       0.000!   !END!
1242 ! X =  -119.93065,  -100.2333,     588.000,       0.000!   !END!
1243 ! X =  -119.78785, -109.92867,     656.000,       0.000!   !END!
1244 ! X =  -119.78516, -109.68017,     637.000,       0.000!   !END!
1245 ! X =  -119.78245, -109.43157,     622.000,       0.000!   !END!
1246 ! X =  -119.77975, -109.18307,     626.000,       0.000!   !END!
1247 ! X =  -119.77705, -108.93457,     640.000,       0.000!   !END!
1248 ! X =  -119.77445, -108.68597,     640.000,       0.000!   !END!
1249 ! X =  -119.77175, -108.43747,     626.000,       0.000!   !END!
1250 ! X =  -119.76905, -108.18887,     609.000,       0.000!   !END!
1251 ! X =  -119.76635, -107.94037,     568.000,       0.000!   !END!
1252 ! X =  -119.76365, -107.69187,     527.000,       0.000!   !END!
1253 ! X =  -119.76094, -107.44327,     491.000,       0.000!   !END!
1254 ! X =  -119.75834, -107.19477,     434.000,       0.000!   !END!
1255 ! X =  -119.75565, -106.94627,     370.000,       0.000!   !END!
1256 ! X =  -119.75294, -106.69767,     382.000,       0.000!   !END!
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1257 ! X =  -119.75024, -106.44917,     457.000,       0.000!   !END!
1258 ! X =  -119.74754, -106.20066,     470.000,       0.000!   !END!
1259 ! X =  -119.74484, -105.95206,     481.000,       0.000!   !END!
1260 ! X =  -119.74224, -105.70356,     493.000,       0.000!   !END!
1261 ! X =  -119.73954, -105.45505,     518.000,       0.000!   !END!
1262 ! X =  -119.73684, -105.20655,     518.000,       0.000!   !END!
1263 ! X =  -119.73414, -104.95795,     487.000,       0.000!   !END!
1264 ! X =  -119.73144, -104.70945,     441.000,       0.000!   !END!
1265 ! X =  -119.72874, -104.46094,     364.000,       0.000!   !END!
1266 ! X =  -119.72614, -104.21233,     335.000,       0.000!   !END!
1267 ! X =  -119.72344, -103.96383,     431.000,       0.000!   !END!
1268 ! X =  -119.72074, -103.71533,     460.000,       0.000!   !END!
1269 ! X =  -119.71804, -103.46682,     487.000,       0.000!   !END!
1270 ! X =  -119.71533, -103.21822,     479.000,       0.000!   !END!
1271 ! X =  -119.71273, -102.96971,     418.000,       0.000!   !END!
1272 ! X =  -119.71004, -102.72121,     395.000,       0.000!   !END!
1273 ! X =  -119.70734,  -102.4727,     467.000,       0.000!   !END!
1274 ! X =  -119.70464,  -102.2242,     457.000,       0.000!   !END!
1275 ! X =  -119.70193, -101.97559,     424.000,       0.000!   !END!
1276 ! X =  -119.69923, -101.72708,     457.000,       0.000!   !END!
1277 ! X =  -119.69664, -101.47857,     487.000,       0.000!   !END!
1278 ! X =  -119.69394, -101.23007,     479.000,       0.000!   !END!
1279 ! X =  -119.69124, -100.98156,     473.000,       0.000!   !END!
1280 ! X =  -119.68853, -100.73295,     487.000,       0.000!   !END!
1281 ! X =  -119.68583, -100.48445,     491.000,       0.000!   !END!
1282 ! X =  -119.68314, -100.23594,     562.000,       0.000!   !END!
1283 ! X =  -119.54035, -109.93131,     685.000,       0.000!   !END!
1284 ! X =  -119.53775, -109.68281,     655.000,       0.000!   !END!
1285 ! X =  -119.53505, -109.43431,     644.000,       0.000!   !END!
1286 ! X =  -119.53235, -109.18571,     640.000,       0.000!   !END!
1287 ! X =  -119.52965, -108.93721,     640.000,       0.000!   !END!
1288 ! X =  -119.52694, -108.68861,     633.000,       0.000!   !END!
1289 ! X =  -119.52425, -108.44012,     575.000,       0.000!   !END!
1290 ! X =  -119.52165, -108.19161,     535.000,       0.000!   !END!
1291 ! X =  -119.51894, -107.94301,     518.000,       0.000!   !END!
1292 ! X =  -119.51624, -107.69451,     484.000,       0.000!   !END!
1293 ! X =  -119.51354, -107.44601,     434.000,       0.000!   !END!
1294 ! X =  -119.51084, -107.19741,     397.000,       0.000!   !END!
1295 ! X =  -119.50824, -106.94891,     396.000,       0.000!   !END!
1296 ! X =  -119.50554,  -106.7004,     387.000,       0.000!   !END!
1297 ! X =  -119.50283,  -106.4518,     459.000,       0.000!   !END!
1298 ! X =  -119.50014,  -106.2033,     478.000,       0.000!   !END!
1299 ! X =  -119.49744,  -105.9548,     487.000,       0.000!   !END!
1300 ! X =  -119.49473,  -105.7062,     509.000,       0.000!   !END!
1301 ! X =  -119.49213, -105.45769,     518.000,       0.000!   !END!
1302 ! X =  -119.48943, -105.20919,     518.000,       0.000!   !END!
1303 ! X =  -119.48673, -104.96069,     489.000,       0.000!   !END!
1304 ! X =  -119.48403, -104.71209,     441.000,       0.000!   !END!
1305 ! X =  -119.48133, -104.46358,     365.000,       0.000!   !END!
1306 ! X =  -119.47863, -104.21508,     335.000,       0.000!   !END!
1307 ! X =  -119.47603, -103.96647,     438.000,       0.000!   !END!
1308 ! X =  -119.47333, -103.71797,     457.000,       0.000!   !END!
1309 ! X =  -119.47063, -103.46946,     457.000,       0.000!   !END!
1310 ! X =  -119.46793, -103.22096,     385.000,       0.000!   !END!
1311 ! X =  -119.46522, -102.97235,     388.000,       0.000!   !END!
1312 ! X =  -119.46262, -102.72384,     477.000,       0.000!   !END!
1313 ! X =  -119.45993, -102.47534,     505.000,       0.000!   !END!
1314 ! X =  -119.45723, -102.22683,     518.000,       0.000!   !END!
1315 ! X =  -119.45453, -101.97833,     498.000,       0.000!   !END!
1316 ! X =  -119.45182, -101.72972,     457.000,       0.000!   !END!
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1317 ! X =  -119.44912, -101.48122,     518.000,       0.000!   !END!
1318 ! X =  -119.44652, -101.23271,     548.000,       0.000!   !END!
1319 ! X =  -119.44382,  -100.9842,     548.000,       0.000!   !END!
1320 ! X =  -119.44113, -100.73569,     528.000,       0.000!   !END!
1321 ! X =  -119.43842, -100.48709,     556.000,       0.000!   !END!
1322 ! X =  -119.26884, -107.69715,     457.000,       0.000!   !END!
1323 ! X =  -119.26614, -107.44865,     410.000,       0.000!   !END!
1324 ! X =  -119.26343, -107.20005,     397.000,       0.000!   !END!
1325 ! X =  -119.26073, -106.95155,     371.000,       0.000!   !END!
1326 ! X =  -119.25803, -106.70305,     386.000,       0.000!   !END!
1327 ! X =  -119.25543, -106.45454,     457.000,       0.000!   !END!
1328 ! X =  -119.25273, -106.20594,     482.000,       0.000!   !END!
1329 ! X =  -119.25003, -105.95744,     487.000,       0.000!   !END!
1330 ! X =  -119.24733, -105.70894,     492.000,       0.000!   !END!
1331 ! X =  -119.24462, -105.46034,     518.000,       0.000!   !END!
1332 ! X =  -119.24202, -105.21183,     490.000,       0.000!   !END!
1333 ! X =  -119.23933, -104.96333,     457.000,       0.000!   !END!
1334 ! X =  -119.23662, -104.71472,     362.000,       0.000!   !END!
1335 ! X =  -119.23392, -104.46622,     327.000,       0.000!   !END!
1336 ! X =  -119.23122, -104.21772,     308.000,       0.000!   !END!
1337 ! X =  -119.22852, -103.96922,     426.000,       0.000!   !END!
1338 ! X =  -119.22592, -103.72061,     445.000,       0.000!   !END!
1339 ! X =  -119.22322,  -103.4721,     426.000,       0.000!   !END!
1340 ! X =  -119.22052,  -103.2236,     320.000,       0.000!   !END!
1341 ! X =  -119.21782, -102.97509,     402.000,       0.000!   !END!
1342 ! X =  -119.21511, -102.72649,     487.000,       0.000!   !END!
1343 ! X =  -119.21251, -102.47798,     519.000,       0.000!   !END!
1344 ! X =  -119.20982, -102.22947,     543.000,       0.000!   !END!
1345 ! X =  -119.20712, -101.98097,     548.000,       0.000!   !END!
1346 ! X =  -119.20442, -101.73246,     506.000,       0.000!   !END!
1347 ! X =  -119.20171, -101.48386,     499.000,       0.000!   !END!
1348 ! X =  -119.19901, -101.23535,     564.000,       0.000!   !END!
1349 ! X =  -119.19641, -100.98684,     591.000,       0.000!   !END!
1350 ! X =  -119.19371, -100.73833,     594.000,       0.000!   !END!
1351 ! X =  -119.19101, -100.48983,     595.000,       0.000!   !END!
1352 ! X =  -119.01873, -107.45129,     396.000,       0.000!   !END!
1353 ! X =  -119.01603, -107.20279,     396.000,       0.000!   !END!
1354 ! X =  -119.01333, -106.95419,     435.000,       0.000!   !END!
1355 ! X =  -119.01063, -106.70569,     457.000,       0.000!   !END!
1356 ! X =  -119.00793, -106.45719,     457.000,       0.000!   !END!
1357 ! X =  -119.00532, -106.20858,     463.000,       0.000!   !END!
1358 ! X =  -119.00262, -105.96008,     464.000,       0.000!   !END!
1359 ! X =  -118.99992, -105.71158,     457.000,       0.000!   !END!
1360 ! X =  -118.99722, -105.46308,     448.000,       0.000!   !END!
1361 ! X =  -118.99452, -105.21447,     418.000,       0.000!   !END!
1362 ! X =  -118.99182, -104.96597,     342.000,       0.000!   !END!
1363 ! X =  -118.98922, -104.71746,     396.000,       0.000!   !END!
1364 ! X =  -118.98651, -104.46886,     396.000,       0.000!   !END!
1365 ! X =  -118.98381, -104.22036,     457.000,       0.000!   !END!
1366 ! X =  -118.98111, -103.97185,     487.000,       0.000!   !END!
1367 ! X =  -118.97841, -103.72335,     487.000,       0.000!   !END!
1368 ! X =  -118.97581, -103.47474,     426.000,       0.000!   !END!
1369 ! X =  -118.97311, -103.22624,     320.000,       0.000!   !END!
1370 ! X =  -118.97041, -102.97773,     404.000,       0.000!   !END!
1371 ! X =  -118.96771, -102.72923,     472.000,       0.000!   !END!
1372 ! X =    -118.965, -102.48062,     519.000,       0.000!   !END!
1373 ! X =   -118.9624, -102.23211,     579.000,       0.000!   !END!
1374 ! X =   -118.9597, -101.98361,     580.000,       0.000!   !END!
1375 ! X =    -118.957,  -101.7351,     583.000,       0.000!   !END!
1376 ! X =   -118.9543,  -101.4866,     559.000,       0.000!   !END!
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1377 ! X =   -118.9516, -101.23799,     595.000,        0.000!   !END!
1378 ! X =    -118.949, -100.98948,     633.000,        0.000!   !END!
1379 ! X =   -118.9463, -100.74097,     648.000,        0.000!   !END!
1380 ! X =   -118.9436, -100.49247,     650.000,        0.000!   !END!
1381 ! X =   -118.9409, -100.24396,     648.000,        0.000!   !END!
1382 ! X =  -118.77122, -107.45394,     415.000,        0.000!   !END!
1383 ! X =  -118.76862, -107.20543,     443.000,        0.000!   !END!
1384 ! X =  -118.76592, -106.95693,     457.000,        0.000!   !END!
1385 ! X =  -118.76322, -106.70833,     457.000,        0.000!   !END!
1386 ! X =  -118.76052, -106.45983,     457.000,        0.000!   !END!
1387 ! X =  -118.75782, -106.21133,     457.000,        0.000!   !END!
1388 ! X =  -118.75521, -105.96272,     411.000,        0.000!   !END!
1389 ! X =  -118.75251, -105.71422,     335.000,        0.000!   !END!
1390 ! X =  -118.74981, -105.46572,     335.000,        0.000!   !END!
1391 ! X =  -118.74711, -105.21711,     312.000,        0.000!   !END!
1392 ! X =  -118.74441, -104.96861,     315.000,        0.000!   !END!
1393 ! X =  -118.74171, -104.72011,     396.000,        0.000!   !END!
1394 ! X =  -118.73911,  -104.4716,     405.000,        0.000!   !END!
1395 ! X =   -118.7364,   -104.223,     460.000,        0.000!   !END!
1396 ! X =   -118.7337, -103.97449,     487.000,        0.000!   !END!
1397 ! X =    -118.731, -103.72599,     457.000,        0.000!   !END!
1398 ! X =   -118.7283, -103.47749,     411.000,        0.000!   !END!
1399 ! X =   -118.7257, -103.22888,     319.000,        0.000!   !END!
1400 ! X =    -118.723, -102.98037,     388.000,        0.000!   !END!
1401 ! X =   -118.7203, -102.73187,     472.000,        0.000!   !END!
1402 ! X =   -118.7176, -102.48336,     519.000,        0.000!   !END!
1403 ! X =  -118.71489, -102.23476,     579.000,        0.000!   !END!
1404 ! X =  -118.71229, -101.98625,     593.000,        0.000!   !END!
1405 ! X =  -118.70959, -101.73774,     613.000,        0.000!   !END!
1406 ! X =  -118.70689, -101.48924,     640.000,        0.000!   !END!
1407 ! X =  -118.70419, -101.24073,     640.000,        0.000!   !END!
1408 ! X =  -118.70149, -100.99212,     670.000,        0.000!   !END!
1409 ! X =  -118.69889, -100.74361,     670.000,        0.000!   !END!
1410 ! X =  -118.69619, -100.49511,     670.000,        0.000!   !END!
1411 ! X =  -118.69349,  -100.2466,     670.000,        0.000!   !END!
1412 ! X =  -118.69079,  -99.99809,     645.000,        0.000!   !END!
1413 ! X =  -118.68809,  -99.74958,     633.000,        0.000!   !END!
1414 ! X =  -118.68549,  -99.50107,     640.000,        0.000!   !END!
1415 ! X =  -118.68278,  -99.25246,     640.000,        0.000!   !END!
1416 ! X =  -118.52382, -107.45668,     487.000,        0.000!   !END!
1417 ! X =  -118.52112, -107.20808,     464.000,        0.000!   !END!
1418 ! X =  -118.51842, -106.95958,     457.000,        0.000!   !END!
1419 ! X =  -118.51582, -106.71107,     457.000,        0.000!   !END!
1420 ! X =  -118.51311, -106.46247,     457.000,        0.000!   !END!
1421 ! X =  -118.51041, -106.21397,     405.000,        0.000!   !END!
1422 ! X =  -118.50771, -105.96547,     364.000,        0.000!   !END!
1423 ! X =  -118.50501, -105.71686,     380.000,        0.000!   !END!
1424 ! X =  -118.50241, -105.46836,     423.000,        0.000!   !END!
1425 ! X =  -118.49971, -105.21985,     427.000,        0.000!   !END!
1426 ! X =    -118.497, -104.97125,     377.000,        0.000!   !END!
1427 ! X =   -118.4943, -104.72275,     358.000,        0.000!   !END!
1428 ! X =   -118.4916, -104.47425,     396.000,        0.000!   !END!
1429 ! X =    -118.489, -104.22574,     396.000,        0.000!   !END!
1430 ! X =  -118.48629, -103.97714,     414.000,        0.000!   !END!
1431 ! X =  -118.48359, -103.72863,     381.000,        0.000!   !END!
1432 ! X =  -118.48089, -103.48013,     364.000,        0.000!   !END!
1433 ! X =  -118.47819, -103.23162,     323.000,        0.000!   !END!
1434 ! X =  -118.47559, -102.98301,     457.000,        0.000!   !END!
1435 ! X =  -118.47289, -102.73451,     508.000,        0.000!   !END!
1436 ! X =  -118.47019,   -102.486,     530.000,        0.000!   !END!
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1437 ! X =  -118.46749,  -102.2375,     561.000,       0.000!   !END!
1438 ! X =  -118.46478, -101.98889,     590.000,       0.000!   !END!
1439 ! X =  -118.46218, -101.74038,     620.000,       0.000!   !END!
1440 ! X =  -118.45948, -101.49188,     656.000,       0.000!   !END!
1441 ! X =  -118.45678, -101.24337,     670.000,       0.000!   !END!
1442 ! X =  -118.45408, -100.99486,     670.000,       0.000!   !END!
1443 ! X =  -118.45138, -100.74636,     670.000,       0.000!   !END!
1444 ! X =  -118.44877, -100.49775,     670.000,       0.000!   !END!
1445 ! X =  -118.44607, -100.24924,     670.000,       0.000!   !END!
1446 ! X =  -118.44337, -100.00073,     653.000,       0.000!   !END!
1447 ! X =  -118.44067,  -99.75222,     627.000,       0.000!   !END!
1448 ! X =  -118.43797,  -99.50372,     614.000,       0.000!   !END!
1449 ! X =  -118.43537,   -99.2552,     617.000,       0.000!   !END!
1450 ! X =  -118.27642, -107.45932,     497.000,       0.000!   !END!
1451 ! X =  -118.27371, -107.21072,     474.000,       0.000!   !END!
1452 ! X =  -118.27101, -106.96222,     458.000,       0.000!   !END!
1453 ! X =  -118.26831, -106.71371,     423.000,       0.000!   !END!
1454 ! X =   -118.2657, -106.46511,     407.000,       0.000!   !END!
1455 ! X =    -118.263, -106.21661,     432.000,       0.000!   !END!
1456 ! X =   -118.2603, -105.96811,     450.000,       0.000!   !END!
1457 ! X =   -118.2576,  -105.7195,     480.000,       0.000!   !END!
1458 ! X =   -118.2549,   -105.471,     500.000,       0.000!   !END!
1459 ! X =   -118.2523, -105.22249,     479.000,       0.000!   !END!
1460 ! X =   -118.2496, -104.97399,     426.000,       0.000!   !END!
1461 ! X =  -118.24689, -104.72539,     426.000,       0.000!   !END!
1462 ! X =  -118.24419, -104.47689,     426.000,       0.000!   !END!
1463 ! X =  -118.24149, -104.22838,     396.000,       0.000!   !END!
1464 ! X =  -118.23889, -103.97987,     328.000,       0.000!   !END!
1465 ! X =  -118.23618, -103.73127,     310.000,       0.000!   !END!
1466 ! X =  -118.23348, -103.48277,     322.000,       0.000!   !END!
1467 ! X =  -118.23078, -103.23426,     335.000,       0.000!   !END!
1468 ! X =  -118.22808, -102.98576,     422.000,       0.000!   !END!
1469 ! X =  -118.22548, -102.73715,     477.000,       0.000!   !END!
1470 ! X =  -118.22278, -102.48864,     518.000,       0.000!   !END!
1471 ! X =  -118.22008, -102.24014,     518.000,       0.000!   !END!
1472 ! X =  -118.21737, -101.99163,     527.000,       0.000!   !END!
1473 ! X =  -118.21477, -101.74302,     609.000,       0.000!   !END!
1474 ! X =  -118.21207, -101.49452,     662.000,       0.000!   !END!
1475 ! X =  -118.20937, -101.24601,     671.000,       0.000!   !END!
1476 ! X =  -118.20667,  -100.9975,     674.000,       0.000!   !END!
1477 ! X =  -118.20397,   -100.749,     677.000,       0.000!   !END!
1478 ! X =  -118.20137, -100.50049,     675.000,       0.000!   !END!
1479 ! X =  -118.19866, -100.25188,     671.000,       0.000!   !END!
1480 ! X =  -118.19596, -100.00337,     652.000,       0.000!   !END!
1481 ! X =  -118.19326,  -99.75486,     633.000,       0.000!   !END!
1482 ! X =  -118.19056,  -99.50636,     623.000,       0.000!   !END!
1483 ! X =  -118.18796,  -99.25784,     609.000,       0.000!   !END!
1484 ! X =  -118.02901, -107.46196,     521.000,       0.000!   !END!
1485 ! X =  -118.02631, -107.21346,     477.000,       0.000!   !END!
1486 ! X =   -118.0236, -106.96486,     442.000,       0.000!   !END!
1487 ! X =   -118.0209, -106.71636,     436.000,       0.000!   !END!
1488 ! X =   -118.0182, -106.46785,     447.000,       0.000!   !END!
1489 ! X =   -118.0156, -106.21925,     475.000,       0.000!   !END!
1490 ! X =   -118.0129, -105.97075,     512.000,       0.000!   !END!
1491 ! X =   -118.0102, -105.72224,     548.000,       0.000!   !END!
1492 ! X =  -118.00749, -105.47364,     548.000,       0.000!   !END!
1493 ! X =  -118.00479, -105.22514,     511.000,       0.000!   !END!
1494 ! X =  -118.00219, -104.97663,     457.000,       0.000!   !END!
1495 ! X =  -117.99949, -104.72813,     473.000,       0.000!   !END!
1496 ! X =  -117.99678, -104.47953,     474.000,       0.000!   !END!
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1497 ! X =  -117.99408, -104.23102,     452.000,       0.000!   !END!
1498 ! X =  -117.99138, -103.98252,     431.000,       0.000!   !END!
1499 ! X =  -117.98877, -103.73391,     329.000,       0.000!   !END!
1500 ! X =  -117.98607, -103.48541,     304.000,       0.000!   !END!
1501 ! X =  -117.98337,  -103.2369,     314.000,       0.000!   !END!
1502 ! X =  -117.98067,  -102.9884,     354.000,       0.000!   !END!
1503 ! X =  -117.97807, -102.73989,     396.000,       0.000!   !END!
1504 ! X =  -117.97536, -102.49129,     398.000,       0.000!   !END!
1505 ! X =  -117.97266, -102.24278,     385.000,       0.000!   !END!
1506 ! X =  -117.96996, -101.99427,     481.000,       0.000!   !END!
1507 ! X =  -117.96726, -101.74577,     566.000,       0.000!   !END!
1508 ! X =  -117.96466, -101.49716,     635.000,       0.000!   !END!
1509 ! X =  -117.96196, -101.24865,     673.000,       0.000!   !END!
1510 ! X =  -117.95925, -101.00015,     680.000,       0.000!   !END!
1511 ! X =  -117.95655, -100.75164,     683.000,       0.000!   !END!
1512 ! X =  -117.95385, -100.50313,     675.000,       0.000!   !END!
1513 ! X =  -117.95125, -100.25462,     670.000,       0.000!   !END!
1514 ! X =  -117.94855, -100.00601,     649.000,       0.000!   !END!
1515 ! X =  -117.94585,   -99.7575,     640.000,       0.000!   !END!
1516 ! X =  -117.94315,    -99.509,     640.000,       0.000!   !END!
1517 ! X =  -117.94044,  -99.26049,     640.000,       0.000!   !END!
1518 ! X =  -117.78421,  -107.7131,     596.000,       0.000!   !END!
1519 ! X =   -117.7815,  -107.4646,     567.000,       0.000!   !END!
1520 ! X =   -117.7788,  -107.2161,     534.000,       0.000!   !END!
1521 ! X =   -117.7762,  -106.9675,     506.000,       0.000!   !END!
1522 ! X =   -117.7735,   -106.719,     502.000,       0.000!   !END!
1523 ! X =   -117.7708,  -106.4705,     524.000,       0.000!   !END!
1524 ! X =  -117.76809, -106.22199,     552.000,       0.000!   !END!
1525 ! X =  -117.76549, -105.97339,     579.000,       0.000!   !END!
1526 ! X =  -117.76279, -105.72489,     592.000,       0.000!   !END!
1527 ! X =  -117.76009, -105.47638,     609.000,       0.000!   !END!
1528 ! X =  -117.75738, -105.22778,     554.000,       0.000!   !END!
1529 ! X =  -117.75468, -104.97928,     534.000,       0.000!   !END!
1530 ! X =  -117.75208, -104.73077,     518.000,       0.000!   !END!
1531 ! X =  -117.74937, -104.48217,     518.000,       0.000!   !END!
1532 ! X =  -117.74667, -104.23367,     498.000,       0.000!   !END!
1533 ! X =  -117.74397, -103.98516,     478.000,       0.000!   !END!
1534 ! X =  -117.74127, -103.73666,     429.000,       0.000!   !END!
1535 ! X =  -117.73866, -103.48805,     329.000,       0.000!   !END!
1536 ! X =  -117.73596, -103.23955,     307.000,       0.000!   !END!
1537 ! X =  -117.73326, -102.99104,     305.000,       0.000!   !END!
1538 ! X =  -117.73056, -102.74254,     335.000,       0.000!   !END!
1539 ! X =  -117.72796, -102.49403,     350.000,       0.000!   !END!
1540 ! X =  -117.72525, -102.24542,     437.000,       0.000!   !END!
1541 ! X =  -117.72255, -101.99692,     457.000,       0.000!   !END!
1542 ! X =  -117.71985, -101.74841,     508.000,       0.000!   !END!
1543 ! X =  -117.71715,  -101.4999,     617.000,       0.000!   !END!
1544 ! X =  -117.71455, -101.25139,     673.000,       0.000!   !END!
1545 ! X =  -117.71184, -101.00279,     686.000,       0.000!   !END!
1546 ! X =  -117.70914, -100.75428,     688.000,       0.000!   !END!
1547 ! X =  -117.70644, -100.50577,     677.000,       0.000!   !END!
1548 ! X =  -117.70384, -100.25726,     670.000,       0.000!   !END!
1549 ! X =  -117.70114, -100.00875,     651.000,       0.000!   !END!
1550 ! X =  -117.69843,  -99.76015,     640.000,       0.000!   !END!
1551 ! X =  -117.69573,  -99.51164,     640.000,       0.000!   !END!
1552 ! X =  -117.69303,  -99.26313,     640.000,       0.000!   !END!
1553 ! X =  -117.54211, -108.21285,     658.000,       0.000!   !END!
1554 ! X =  -117.53951, -107.96434,     670.000,       0.000!   !END!
1555 ! X =   -117.5368, -107.71584,     658.000,       0.000!   !END!
1556 ! X =   -117.5341, -107.46724,     640.000,       0.000!   !END!
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1557 ! X =   -117.5314, -107.21874,     589.000,       0.000!   !END!
1558 ! X =   -117.5287, -106.97024,     580.000,       0.000!   !END!
1559 ! X =  -117.52609, -106.72164,     559.000,       0.000!   !END!
1560 ! X =  -117.52339, -106.47314,     583.000,       0.000!   !END!
1561 ! X =  -117.52069, -106.22464,     624.000,       0.000!   !END!
1562 ! X =  -117.51798, -105.97603,     646.000,       0.000!   !END!
1563 ! X =  -117.51538, -105.72753,     644.000,       0.000!   !END!
1564 ! X =  -117.51268, -105.47902,     640.000,       0.000!   !END!
1565 ! X =  -117.50998, -105.23052,     614.000,       0.000!   !END!
1566 ! X =  -117.50727, -104.98192,     579.000,       0.000!   !END!
1567 ! X =  -117.50457, -104.73342,     534.000,       0.000!   !END!
1568 ! X =  -117.50197, -104.48491,     518.000,       0.000!   !END!
1569 ! X =  -117.49926, -104.23631,     511.000,       0.000!   !END!
1570 ! X =  -117.49656,  -103.9878,     487.000,       0.000!   !END!
1571 ! X =  -117.49386,  -103.7393,     463.000,       0.000!   !END!
1572 ! X =  -117.49126, -103.49079,     348.000,       0.000!   !END!
1573 ! X =  -117.48855, -103.24219,     306.000,       0.000!   !END!
1574 ! X =  -117.48585, -102.99368,     304.000,       0.000!   !END!
1575 ! X =  -117.48315, -102.74518,     330.000,       0.000!   !END!
1576 ! X =  -117.48045, -102.49667,     422.000,       0.000!   !END!
1577 ! X =  -117.47785, -102.24816,     512.000,       0.000!   !END!
1578 ! X =  -117.47514, -101.99956,     560.000,       0.000!   !END!
1579 ! X =  -117.47244, -101.75105,     609.000,       0.000!   !END!
1580 ! X =  -117.46974, -101.50255,     651.000,       0.000!   !END!
1581 ! X =  -117.46714, -101.25403,     673.000,       0.000!   !END!
1582 ! X =  -117.46444, -101.00553,     687.000,       0.000!   !END!
1583 ! X =  -117.46173, -100.75692,     694.000,       0.000!   !END!
1584 ! X =  -117.45903, -100.50841,     684.000,       0.000!   !END!
1585 ! X =  -117.45633, -100.25991,     671.000,       0.000!   !END!
1586 ! X =  -117.45372, -100.01139,     655.000,       0.000!   !END!
1587 ! X =  -117.45102,  -99.76289,     643.000,       0.000!   !END!
1588 ! X =  -117.44832,  -99.51438,     640.000,       0.000!   !END!
1589 ! X =  -117.44562,  -99.26577,     639.000,       0.000!   !END!
1590 ! X =  -117.29741, -108.46409,     687.000,       0.000!   !END!
1591 ! X =  -117.29471, -108.21559,     671.000,       0.000!   !END!
1592 ! X =    -117.292, -107.96699,     670.000,       0.000!   !END!
1593 ! X =   -117.2894, -107.71849,     670.000,       0.000!   !END!
1594 ! X =   -117.2867, -107.46999,     670.000,       0.000!   !END!
1595 ! X =  -117.28399, -107.22139,     651.000,       0.000!   !END!
1596 ! X =  -117.28129, -106.97288,     640.000,       0.000!   !END!
1597 ! X =  -117.27859, -106.72438,     640.000,       0.000!   !END!
1598 ! X =  -117.27598, -106.47578,     645.000,       0.000!   !END!
1599 ! X =  -117.27328, -106.22728,     670.000,       0.000!   !END!
1600 ! X =  -117.27058, -105.97878,     670.000,       0.000!   !END!
1601 ! X =  -117.26787, -105.73017,     670.000,       0.000!   !END!
1602 ! X =  -117.26527, -105.48167,     642.000,       0.000!   !END!
1603 ! X =  -117.26257, -105.23316,     640.000,       0.000!   !END!
1604 ! X =  -117.25986, -104.98456,     594.000,       0.000!   !END!
1605 ! X =  -117.25716, -104.73606,     534.000,       0.000!   !END!
1606 ! X =  -117.25446, -104.48756,     497.000,       0.000!   !END!
1607 ! X =  -117.25186, -104.23905,     482.000,       0.000!   !END!
1608 ! X =  -117.24915, -103.99044,     474.000,       0.000!   !END!
1609 ! X =  -117.24645, -103.74194,     437.000,       0.000!   !END!
1610 ! X =  -117.24375, -103.49344,     308.000,       0.000!   !END!
1611 ! X =  -117.24115, -103.24493,     320.000,       0.000!   !END!
1612 ! X =  -117.23844, -102.99632,     320.000,       0.000!   !END!
1613 ! X =  -117.23574, -102.74782,     373.000,       0.000!   !END!
1614 ! X =  -117.23304, -102.49931,     449.000,       0.000!   !END!
1615 ! X =  -117.23034, -102.25081,     548.000,       0.000!   !END!
1616 ! X =  -117.22773,  -102.0022,     624.000,       0.000!   !END!
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1617 ! X =  -117.22503, -101.75369,     676.000,       0.000!   !END!
1618 ! X =  -117.22233, -101.50519,     690.000,       0.000!   !END!
1619 ! X =  -117.21962, -101.25668,     698.000,       0.000!   !END!
1620 ! X =  -117.21702, -101.00817,     701.000,       0.000!   !END!
1621 ! X =  -117.21432, -100.75966,     698.000,       0.000!   !END!
1622 ! X =  -117.21161, -100.51106,     685.000,       0.000!   !END!
1623 ! X =  -117.20891, -100.26255,     671.000,       0.000!   !END!
1624 ! X =  -117.20631, -100.01404,     658.000,       0.000!   !END!
1625 ! X =  -117.20361,  -99.76553,     644.000,       0.000!   !END!
1626 ! X =  -117.20091,  -99.51702,     640.000,       0.000!   !END!
1627 ! X =  -117.19821,  -99.26851,     640.000,       0.000!   !END!
1628 ! X =  -117.05261, -108.71533,     662.000,       0.000!   !END!
1629 ! X =     -117.05, -108.46673,     672.000,       0.000!   !END!
1630 ! X =   -117.0473, -108.21823,     671.000,       0.000!   !END!
1631 ! X =  -117.04459, -107.96963,     670.000,       0.000!   !END!
1632 ! X =  -117.04189, -107.72113,     670.000,       0.000!   !END!
1633 ! X =  -117.03919, -107.47263,     670.000,       0.000!   !END!
1634 ! X =  -117.03658, -107.22403,     651.000,       0.000!   !END!
1635 ! X =  -117.03388, -106.97553,     642.000,       0.000!   !END!
1636 ! X =  -117.03118, -106.72703,     662.000,       0.000!   !END!
1637 ! X =  -117.02847, -106.47843,     670.000,       0.000!   !END!
1638 ! X =  -117.02587, -106.22992,     670.000,       0.000!   !END!
1639 ! X =  -117.02317, -105.98142,     670.000,       0.000!   !END!
1640 ! X =  -117.02046, -105.73282,     651.000,       0.000!   !END!
1641 ! X =  -117.01776, -105.48431,     642.000,       0.000!   !END!
1642 ! X =  -117.01516, -105.23581,     632.000,       0.000!   !END!
1643 ! X =  -117.01246,  -104.9873,     579.000,       0.000!   !END!
1644 ! X =  -117.00975,  -104.7387,     497.000,       0.000!   !END!
1645 ! X =  -117.00705,  -104.4902,     437.000,       0.000!   !END!
1646 ! X =  -117.00435, -104.24169,     436.000,       0.000!   !END!
1647 ! X =  -117.00175, -103.99319,     426.000,       0.000!   !END!
1648 ! X =  -116.99904, -103.74458,     363.000,       0.000!   !END!
1649 ! X =  -116.99634, -103.49608,     306.000,       0.000!   !END!
1650 ! X =  -116.99364, -103.24757,     365.000,       0.000!   !END!
1651 ! X =  -116.99103, -102.99906,     385.000,       0.000!   !END!
1652 ! X =  -116.98833, -102.75046,     432.000,       0.000!   !END!
1653 ! X =  -116.98563, -102.50196,     492.000,       0.000!   !END!
1654 ! X =  -116.98292, -102.25345,     578.000,       0.000!   !END!
1655 ! X =  -116.98032, -102.00494,     639.000,       0.000!   !END!
1656 ! X =  -116.97761, -101.75633,     701.000,       0.000!   !END!
1657 ! X =  -116.97491, -101.50783,     701.000,       0.000!   !END!
1658 ! X =  -116.97221, -101.25932,     701.000,       0.000!   !END!
1659 ! X =  -116.96951, -101.01082,     701.000,       0.000!   !END!
1660 ! X =  -116.96691,  -100.7623,     701.000,       0.000!   !END!
1661 ! X =  -116.96421,  -100.5138,     683.000,       0.000!   !END!
1662 ! X =   -116.9615, -100.26519,     672.000,       0.000!   !END!
1663 ! X =  -116.80791, -108.96648,     609.000,       0.000!   !END!
1664 ! X =   -116.8052, -108.71798,     642.000,       0.000!   !END!
1665 ! X =   -116.8025, -108.46938,     654.000,       0.000!   !END!
1666 ! X =   -116.7998, -108.22088,     666.000,       0.000!   !END!
1667 ! X =  -116.79719, -107.97237,     665.000,       0.000!   !END!
1668 ! X =  -116.79449, -107.72377,     664.000,       0.000!   !END!
1669 ! X =  -116.79178, -107.47527,     650.000,       0.000!   !END!
1670 ! X =  -116.78908, -107.22677,     639.000,       0.000!   !END!
1671 ! X =  -116.78648, -106.97817,     641.000,       0.000!   !END!
1672 ! X =  -116.78377, -106.72967,     658.000,       0.000!   !END!
1673 ! X =  -116.78107, -106.48117,     670.000,       0.000!   !END!
1674 ! X =  -116.77836, -106.23257,     670.000,       0.000!   !END!
1675 ! X =  -116.77576, -105.98406,     651.000,       0.000!   !END!
1676 ! X =  -116.77306, -105.73556,     640.000,       0.000!   !END!
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1677 ! X =  -116.77035, -105.48696,     640.000,       0.000!   !END!
1678 ! X =  -116.76765, -105.23845,     612.000,       0.000!   !END!
1679 ! X =  -116.76505, -104.98995,     548.000,       0.000!   !END!
1680 ! X =  -116.76235, -104.74144,     457.000,       0.000!   !END!
1681 ! X =  -116.75964, -104.49284,     426.000,       0.000!   !END!
1682 ! X =  -116.75694, -104.24434,     346.000,       0.000!   !END!
1683 ! X =  -116.75424, -103.99583,     321.000,       0.000!   !END!
1684 ! X =  -116.75163, -103.74722,     315.000,       0.000!   !END!
1685 ! X =  -116.74893, -103.49872,     340.000,       0.000!   !END!
1686 ! X =  -116.74623, -103.25022,     409.000,       0.000!   !END!
1687 ! X =  -116.74352, -103.00171,     456.000,       0.000!   !END!
1688 ! X =  -116.74092,  -102.7532,     491.000,       0.000!   !END!
1689 ! X =  -116.73821,  -102.5046,     556.000,       0.000!   !END!
1690 ! X =  -116.73551, -102.25609,     603.000,       0.000!   !END!
1691 ! X =  -116.73281, -102.00759,     649.000,       0.000!   !END!
1692 ! X =  -116.73021, -101.75908,     701.000,       0.000!   !END!
1693 ! X =   -116.7275, -101.51047,     701.000,       0.000!   !END!
1694 ! X =   -116.7248, -101.26196,     701.000,       0.000!   !END!
1695 ! X =   -116.7221, -101.01346,     701.000,       0.000!   !END!
1696 ! X =   -116.7195, -100.76495,     701.000,       0.000!   !END!
1697 ! X =  -116.71679, -100.51644,     673.000,       0.000!   !END!
1698 ! X =  -116.56311, -109.21772,     562.000,       0.000!   !END!
1699 ! X =   -116.5604, -108.96912,     571.000,       0.000!   !END!
1700 ! X =   -116.5578, -108.72062,     615.000,       0.000!   !END!
1701 ! X =   -116.5551, -108.47212,     626.000,       0.000!   !END!
1702 ! X =  -116.55239, -108.22352,     640.000,       0.000!   !END!
1703 ! X =  -116.54969, -107.97502,     640.000,       0.000!   !END!
1704 ! X =  -116.54708, -107.72642,     640.000,       0.000!   !END!
1705 ! X =  -116.54438, -107.47792,     640.000,       0.000!   !END!
1706 ! X =  -116.54168, -107.22942,     619.000,       0.000!   !END!
1707 ! X =  -116.53897, -106.98082,     624.000,       0.000!   !END!
1708 ! X =  -116.53637, -106.73231,     646.000,       0.000!   !END!
1709 ! X =  -116.53366, -106.48381,     648.000,       0.000!   !END!
1710 ! X =  -116.53096, -106.23521,     646.000,       0.000!   !END!
1711 ! X =  -116.52826, -105.98671,     640.000,       0.000!   !END!
1712 ! X =  -116.52565,  -105.7382,     609.000,       0.000!   !END!
1713 ! X =  -116.52295,  -105.4897,     609.000,       0.000!   !END!
1714 ! X =  -116.52024,  -105.2411,     587.000,       0.000!   !END!
1715 ! X =  -116.51754, -104.99259,     534.000,       0.000!   !END!
1716 ! X =  -116.51494, -104.74408,     434.000,       0.000!   !END!
1717 ! X =  -116.51223, -104.49548,     345.000,       0.000!   !END!
1718 ! X =  -116.50953, -104.24698,     309.000,       0.000!   !END!
1719 ! X =  -116.50683, -103.99848,     294.000,       0.000!   !END!
1720 ! X =  -116.50422, -103.74997,     346.000,       0.000!   !END!
1721 ! X =  -116.50152, -103.50136,     425.000,       0.000!   !END!
1722 ! X =  -116.49882, -103.25286,     457.000,       0.000!   !END!
1723 ! X =  -116.49611, -103.00435,     527.000,       0.000!   !END!
1724 ! X =  -116.49341, -102.75585,     586.000,       0.000!   !END!
1725 ! X =   -116.4908, -102.50724,     634.000,       0.000!   !END!
1726 ! X =   -116.4881, -102.25873,     670.000,       0.000!   !END!
1727 ! X =   -116.4854, -102.01023,     674.000,       0.000!   !END!
1728 ! X =   -116.4827, -101.76172,     701.000,       0.000!   !END!
1729 ! X =  -116.48009, -101.51321,     701.000,       0.000!   !END!
1730 ! X =  -116.47739, -101.26461,     701.000,       0.000!   !END!
1731 ! X =  -116.47469,  -101.0161,     699.000,       0.000!   !END!
1732 ! X =  -116.47198, -100.76759,     674.000,       0.000!   !END!
1733 ! X =  -116.46938, -100.51908,     670.000,       0.000!   !END!
1734 ! X =  -116.31841, -109.46886,     548.000,       0.000!   !END!
1735 ! X =   -116.3157, -109.22036,     516.000,       0.000!   !END!
1736 ! X =    -116.313, -108.97177,     536.000,       0.000!   !END!
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1737 ! X =   -116.3103, -108.72327,     555.000,       0.000!   !END!
1738 ! X =  -116.30769, -108.47476,     583.000,       0.000!   !END!
1739 ! X =  -116.30498, -108.22616,     604.000,       0.000!   !END!
1740 ! X =  -116.30228, -107.97766,     620.000,       0.000!   !END!
1741 ! X =  -116.29958, -107.72916,     634.000,       0.000!   !END!
1742 ! X =  -116.29697, -107.48056,     640.000,       0.000!   !END!
1743 ! X =  -116.29427, -107.23206,     619.000,       0.000!   !END!
1744 ! X =  -116.29157, -106.98356,     609.000,       0.000!   !END!
1745 ! X =  -116.28886, -106.73496,     615.000,       0.000!   !END!
1746 ! X =  -116.28626, -106.48645,     609.000,       0.000!   !END!
1747 ! X =  -116.28355, -106.23795,     573.000,       0.000!   !END!
1748 ! X =  -116.28085, -105.98935,     569.000,       0.000!   !END!
1749 ! X =  -116.27815, -105.74085,     548.000,       0.000!   !END!
1750 ! X =  -116.27554, -105.49234,     553.000,       0.000!   !END!
1751 ! X =  -116.27283, -105.24374,     557.000,       0.000!   !END!
1752 ! X =  -116.27013, -104.99523,     524.000,       0.000!   !END!
1753 ! X =  -116.26743, -104.74673,     457.000,       0.000!   !END!
1754 ! X =  -116.26483, -104.49822,     342.000,       0.000!   !END!
1755 ! X =  -116.26212, -104.24962,     281.000,       0.000!   !END!
1756 ! X =  -116.25942, -104.00112,     317.000,       0.000!   !END!
1757 ! X =  -116.25672, -103.75261,     432.000,       0.000!   !END!
1758 ! X =  -116.25411,  -103.5041,     457.000,       0.000!   !END!
1759 ! X =   -116.2514,  -103.2555,     495.000,       0.000!   !END!
1760 ! X =   -116.2487,   -103.007,     562.000,       0.000!   !END!
1761 ! X =    -116.246, -102.75849,     615.000,       0.000!   !END!
1762 ! X =   -116.2434, -102.50998,     665.000,       0.000!   !END!
1763 ! X =  -116.24069, -102.26138,     670.000,       0.000!   !END!
1764 ! X =  -116.23799, -102.01287,     673.000,       0.000!   !END!
1765 ! X =  -116.23529, -101.76437,     688.000,       0.000!   !END!
1766 ! X =  -116.23268, -101.51585,     701.000,       0.000!   !END!
1767 ! X =   -116.0709, -109.47151,     531.000,       0.000!   !END!
1768 ! X =   -116.0683, -109.22301,     554.000,       0.000!   !END!
1769 ! X =   -116.0656, -108.97451,     595.000,       0.000!   !END!
1770 ! X =  -116.06289, -108.72591,     617.000,       0.000!   !END!
1771 ! X =  -116.06019, -108.47741,     640.000,       0.000!   !END!
1772 ! X =  -116.05758, -108.22881,     646.000,       0.000!   !END!
1773 ! X =  -116.05488, -107.98031,     642.000,       0.000!   !END!
1774 ! X =  -116.05217, -107.73181,     637.000,       0.000!   !END!
1775 ! X =  -116.04947, -107.48321,     623.000,       0.000!   !END!
1776 ! X =  -116.04686,  -107.2347,     612.000,       0.000!   !END!
1777 ! X =  -116.04416,  -106.9862,     584.000,       0.000!   !END!
1778 ! X =  -116.04145,  -106.7376,     562.000,       0.000!   !END!
1779 ! X =  -116.03875,  -106.4891,     539.000,       0.000!   !END!
1780 ! X =  -116.03615, -106.24059,     484.000,       0.000!   !END!
1781 ! X =  -116.03344, -105.99199,     464.000,       0.000!   !END!
1782 ! X =  -116.03074, -105.74349,     452.000,       0.000!   !END!
1783 ! X =  -116.02803, -105.49499,     487.000,       0.000!   !END!
1784 ! X =  -116.02543, -105.24648,     519.000,       0.000!   !END!
1785 ! X =  -116.02272, -104.99788,     493.000,       0.000!   !END!
1786 ! X =  -116.02002, -104.74937,     457.000,       0.000!   !END!
1787 ! X =  -116.01732, -104.50087,     304.000,       0.000!   !END!
1788 ! X =  -116.01471, -104.25226,     281.000,       0.000!   !END!
1789 ! X =  -116.01201, -104.00376,     317.000,       0.000!   !END!
1790 ! X =  -116.00931, -103.75526,     431.000,       0.000!   !END!
1791 ! X =   -116.0066, -103.50675,     468.000,       0.000!   !END!
1792 ! X =  -116.00399, -103.25814,     498.000,       0.000!   !END!
1793 ! X =  -116.00129, -103.00964,     558.000,       0.000!   !END!
1794 ! X =  -115.99859, -102.76113,     601.000,       0.000!   !END!
1795 ! X =  -115.99589, -102.51263,     645.000,       0.000!   !END!
1796 ! X =  -115.99328, -102.26412,     670.000,       0.000!   !END!
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1797 ! X = -115.99058, -102.01551, 670.000, 0.000! !END!
1798 ! X = -115.98787, -101.76701, 673.000, 0.000! !END!
1799 ! X = -115.98517, -101.5185, 692.000, 0.000! !END!
1800 ! X = -115.8235, -109.47425, 576.000, 0.000! !END!
1801 ! X = -115.8208, -109.22565, 618.000, 0.000! !END!
1802 ! X = -115.81819, -108.97715, 635.000, 0.000! !END!
1803 ! X = -115.81548, -108.72855, 645.000, 0.000! !END!
1804 ! X = -115.81278, -108.48005, 667.000, 0.000! !END!
1805 ! X = -115.81008, -108.23155, 670.000, 0.000! !END!
1806 ! X = -115.80747, -107.98295, 663.000, 0.000! !END!
1807 ! X = -115.80477, -107.73445, 643.000, 0.000! !END!
1808 ! X = -115.80207, -107.48595, 637.000, 0.000! !END!
1809 ! X = -115.79936, -107.23735, 628.000, 0.000! !END!
1810 ! X = -115.79675, -106.98884, 609.000, 0.000! !END!
1811 ! X = -115.79405, -106.74034, 585.000, 0.000! !END!
1812 ! X = -115.79134, -106.49174, 568.000, 0.000! !END!
1813 ! X = -115.78864, -106.24324, 564.000, 0.000! !END!
1814 ! X = -115.78604, -105.99473, 535.000, 0.000! !END!
1815 ! X = -115.78333, -105.74613, 479.000, 0.000! !END!
1816 ! X = -115.78063, -105.49763, 436.000, 0.000! !END!
1817 ! X = -115.77792, -105.24913, 428.000, 0.000! !END!
1818 ! X = -115.77531, -105.00052, 426.000, 0.000! !END!
1819 ! X = -115.77261, -104.75202, 426.000, 0.000! !END!
1820 ! X = -115.76991, -104.50351, 304.000, 0.000! !END!
1821 ! X = -115.76721, -104.25501, 304.000, 0.000! !END!
1822 ! X = -115.7646, -104.0064, 284.000, 0.000! !END!
1823 ! X = -115.7619, -103.7579, 374.000, 0.000! !END!
1824 ! X = -115.75919, -103.5094, 447.000, 0.000! !END!
1825 ! X = -115.75649, -103.26089, 492.000, 0.000! !END!
1826 ! X = -115.75388, -103.01228, 518.000, 0.000! !END!
1827 ! X = -115.75118, -102.76378, 558.000, 0.000! !END!
1828 ! X = -115.74848, -102.51527, 603.000, 0.000! !END!
1829 ! X = -115.74577, -102.26677, 644.000, 0.000! !END!
1830 ! X = -115.74317, -102.01826, 670.000, 0.000! !END!
1831 ! X = -115.74046, -101.76965, 670.000, 0.000! !END!
1832 ! X = -115.73776, -101.52114, 675.000, 0.000! !END!
1833 ! X = -115.5761, -109.4769, 609.000, 0.000! !END!
1834 ! X = -115.57339, -109.2283, 626.000, 0.000! !END!
1835 ! X = -115.57069, -108.9798, 640.000, 0.000! !END!
1836 ! X = -115.56808, -108.73129, 645.000, 0.000! !END!
1837 ! X = -115.56538, -108.4827, 667.000, 0.000! !END!
1838 ! X = -115.56267, -108.2342, 670.000, 0.000! !END!
1839 ! X = -115.55997, -107.9856, 668.000, 0.000! !END!
1840 ! X = -115.55736, -107.73709, 653.000, 0.000! !END!
1841 ! X = -115.55466, -107.48859, 643.000, 0.000! !END!
1842 ! X = -115.55195, -107.23999, 640.000, 0.000! !END!
1843 ! X = -115.54925, -106.99149, 640.000, 0.000! !END!
1844 ! X = -115.54664, -106.74299, 619.000, 0.000! !END!
1845 ! X = -115.54394, -106.49438, 609.000, 0.000! !END!
1846 ! X = -115.54123, -106.24588, 609.000, 0.000! !END!
1847 ! X = -115.53853, -105.99738, 580.000, 0.000! !END!
1848 ! X = -115.53593, -105.74887, 536.000, 0.000! !END!
1849 ! X = -115.53322, -105.50027, 452.000, 0.000! !END!
1850 ! X = -115.53051, -105.25177, 426.000, 0.000! !END!
1851 ! X = -115.52781, -105.00327, 396.000, 0.000! !END!
1852 ! X = -115.5252, -104.75466, 375.000, 0.000! !END!
1853 ! X = -115.5225, -104.50616, 335.000, 0.000! !END!
1854 ! X = -115.5198, -104.25765, 321.000, 0.000! !END!
1855 ! X = -115.51709, -104.00915, 304.000, 0.000! !END!
1856 ! X = -115.51449, -103.76054, 315.000, 0.000! !END!

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1857 ! X =  -115.51178, -103.51204,     386.000,       0.000!   !END!
1858 ! X =  -115.50908, -103.26353,     419.000,       0.000!   !END!
1859 ! X =  -115.50648, -103.01502,     457.000,       0.000!   !END!
1860 ! X =  -115.50377, -102.76642,     539.000,       0.000!   !END!
1861 ! X =  -115.50106, -102.51792,     580.000,       0.000!   !END!
1862 ! X =  -115.49836, -102.26941,     633.000,       0.000!   !END!
1863 ! X =  -115.49576,  -102.0209,     656.000,       0.000!   !END!
1864 ! X =  -115.32599, -109.23094,     623.000,       0.000!   !END!
1865 ! X =  -115.32328, -108.98244,     638.000,       0.000!   !END!
1866 ! X =  -115.32058, -108.73394,     640.000,       0.000!   !END!
1867 ! X =  -115.31787, -108.48534,     641.000,       0.000!   !END!
1868 ! X =  -115.31527, -108.23684,     667.000,       0.000!   !END!
1869 ! X =  -115.31256, -107.98834,     667.000,       0.000!   !END!
1870 ! X =  -115.30986, -107.73974,     661.000,       0.000!   !END!
1871 ! X =  -115.30725, -107.49124,     647.000,       0.000!   !END!
1872 ! X =  -115.30455, -107.24273,     640.000,       0.000!   !END!
1873 ! X =  -115.30184, -106.99413,     640.000,       0.000!   !END!
1874 ! X =  -115.29914, -106.74563,     640.000,       0.000!   !END!
1875 ! X =  -115.29653, -106.49713,     623.000,       0.000!   !END!
1876 ! X =  -115.29383, -106.24853,     613.000,       0.000!   !END!
1877 ! X =  -115.29112, -106.00003,     605.000,       0.000!   !END!
1878 ! X =  -115.28842, -105.75152,     579.000,       0.000!   !END!
1879 ! X =  -115.28581, -105.50292,     530.000,       0.000!   !END!
1880 ! X =  -115.28311, -105.25441,     520.000,       0.000!   !END!
1881 ! X =   -115.2804, -105.00591,     509.000,       0.000!   !END!
1882 ! X =   -115.2777, -104.75741,     440.000,       0.000!   !END!
1883 ! X =  -115.27509,  -104.5088,     384.000,       0.000!   !END!
1884 ! X =  -115.27239,  -104.2603,     350.000,       0.000!   !END!
1885 ! X =  -115.26968, -104.01179,     334.000,       0.000!   !END!
1886 ! X =  -115.26708, -103.76319,     325.000,       0.000!   !END!
1887 ! X =  -115.26437, -103.51468,     347.000,       0.000!   !END!
1888 ! X =  -115.26167, -103.26618,     389.000,       0.000!   !END!
1889 ! X =  -115.25897, -103.01767,     468.000,       0.000!   !END!
1890 ! X =  -115.25636, -102.76916,     512.000,       0.000!   !END!
1891 ! X =  -115.25365, -102.52056,     549.000,       0.000!   !END!
1892 ! X =  -115.25095, -102.27205,     590.000,       0.000!   !END!
1893 ! X =  -115.07849, -109.23369,     583.000,       0.000!   !END!
1894 ! X =  -115.07588, -108.98509,     609.000,       0.000!   !END!
1895 ! X =  -115.07318, -108.73659,     617.000,       0.000!   !END!
1896 ! X =  -115.07047, -108.48799,     620.000,       0.000!   !END!
1897 ! X =  -115.06776, -108.23949,     643.000,       0.000!   !END!
1898 ! X =  -115.06516, -107.99098,     658.000,       0.000!   !END!
1899 ! X =  -115.06245, -107.74238,     660.000,       0.000!   !END!
1900 ! X =  -115.05975, -107.49388,     649.000,       0.000!   !END!
1901 ! X =  -115.05714, -107.24538,     640.000,       0.000!   !END!
1902 ! X =  -115.05443, -106.99678,     640.000,       0.000!   !END!
1903 ! X =  -115.05173, -106.74828,     639.000,       0.000!   !END!
1904 ! X =  -115.04903, -106.49978,     623.000,       0.000!   !END!
1905 ! X =  -115.04642, -106.25117,     614.000,       0.000!   !END!
1906 ! X =  -115.04371, -106.00267,     609.000,       0.000!   !END!
1907 ! X =  -115.04101, -105.75417,     592.000,       0.000!   !END!
1908 ! X =  -115.03831, -105.50566,     579.000,       0.000!   !END!
1909 ! X =   -115.0357, -105.25706,     573.000,       0.000!   !END!
1910 ! X =  -115.03299, -105.00856,     548.000,       0.000!   !END!
1911 ! X =  -115.03029, -104.76005,     468.000,       0.000!   !END!
1912 ! X =  -115.02768, -104.51144,     401.000,       0.000!   !END!
1913 ! X =  -115.02498, -104.26294,     360.000,       0.000!   !END!
1914 ! X =  -115.02227, -104.01444,     340.000,       0.000!   !END!
1915 ! X =  -115.01957, -103.76593,     335.000,       0.000!   !END!
1916 ! X =  -115.01696, -103.51733,     331.000,       0.000!   !END!
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1917 ! X =  -115.01426, -103.26882,     375.000,        0.000!   !END!
1918 ! X =  -115.01155, -103.02032,     439.000,        0.000!   !END!
1919 ! X =  -115.00885, -102.77181,     478.000,        0.000!   !END!
1920 ! X =  -115.00624,  -102.5232,     501.000,        0.000!   !END!
1921 ! X =  -115.00354,  -102.2747,     523.000,        0.000!   !END!
1922 ! X =  -114.83108, -109.23633,     620.000,        0.000!   !END!
1923 ! X =  -114.82837, -108.98773,     626.000,        0.000!   !END!
1924 ! X =  -114.82577, -108.73923,     632.000,        0.000!   !END!
1925 ! X =  -114.82307, -108.49073,     640.000,        0.000!   !END!
1926 ! X =  -114.82036, -108.24213,     643.000,        0.000!   !END!
1927 ! X =  -114.81765, -107.99363,     651.000,        0.000!   !END!
1928 ! X =  -114.81505, -107.74513,     658.000,        0.000!   !END!
1929 ! X =  -114.81234, -107.49653,     651.000,        0.000!   !END!
1930 ! X =  -114.80964, -107.24803,     642.000,        0.000!   !END!
1931 ! X =  -114.80703, -106.99952,     640.000,        0.000!   !END!
1932 ! X =  -114.80432, -106.75092,     639.000,        0.000!   !END!
1933 ! X =  -114.80162, -106.50242,     620.000,        0.000!   !END!
1934 ! X =  -114.79892, -106.25392,     612.000,        0.000!   !END!
1935 ! X =  -114.79631, -106.00531,     610.000,        0.000!   !END!
1936 ! X =   -114.7936, -105.75681,     609.000,        0.000!   !END!
1937 ! X =   -114.7909, -105.50831,     580.000,        0.000!   !END!
1938 ! X =  -114.78819, -105.25971,     573.000,        0.000!   !END!
1939 ! X =  -114.78559,  -105.0112,     551.000,        0.000!   !END!
1940 ! X =  -114.78288,  -104.7627,     457.000,        0.000!   !END!
1941 ! X =  -114.78018, -104.51419,     400.000,        0.000!   !END!
1942 ! X =  -114.77757, -104.26559,     380.000,        0.000!   !END!
1943 ! X =  -114.77487, -104.01708,     360.000,        0.000!   !END!
1944 ! X =  -114.77216, -103.76858,     278.000,        0.000!   !END!
1945 ! X =  -114.76946, -103.52007,     320.000,        0.000!   !END!
1946 ! X =  -114.76685, -103.27146,     346.000,        0.000!   !END!
1947 ! X =  -114.76414, -103.02296,     386.000,        0.000!   !END!
1948 ! X =  -114.76144, -102.77446,     458.000,        0.000!   !END!
1949 ! X =  -114.75884, -102.52595,     462.000,        0.000!   !END!
1950 ! X =  -114.75613, -102.27734,     509.000,        0.000!   !END!
1951 ! X =  -114.58368, -109.23898,     640.000,        0.000!   !END!
1952 ! X =  -114.58097, -108.99048,     640.000,        0.000!   !END!
1953 ! X =  -114.57827, -108.74188,     640.000,        0.000!   !END!
1954 ! X =  -114.57566, -108.49338,     640.000,        0.000!   !END!
1955 ! X =  -114.57295, -108.24478,     643.000,        0.000!   !END!
1956 ! X =  -114.57025, -107.99628,     648.000,        0.000!   !END!
1957 ! X =  -114.56754, -107.74778,     649.000,        0.000!   !END!
1958 ! X =  -114.56493, -107.49917,     646.000,        0.000!   !END!
1959 ! X =  -114.56223, -107.25067,     641.000,        0.000!   !END!
1960 ! X =  -114.55953, -107.00217,     640.000,        0.000!   !END!
1961 ! X =  -114.55692, -106.75357,     617.000,        0.000!   !END!
1962 ! X =  -114.55421, -106.50506,     610.000,        0.000!   !END!
1963 ! X =  -114.55151, -106.25656,     610.000,        0.000!   !END!
1964 ! X =   -114.5488, -106.00796,     609.000,        0.000!   !END!
1965 ! X =  -114.54619, -105.75945,     596.000,        0.000!   !END!
1966 ! X =  -114.54349, -105.51095,     568.000,        0.000!   !END!
1967 ! X =  -114.54079, -105.26245,     548.000,        0.000!   !END!
1968 ! X =  -114.53818, -105.01384,     503.000,        0.000!   !END!
1969 ! X =  -114.53547, -104.76534,     487.000,        0.000!   !END!
1970 ! X =  -114.53277, -104.51684,     471.000,        0.000!   !END!
1971 ! X =  -114.53006, -104.26823,     406.000,        0.000!   !END!
1972 ! X =  -114.52746, -104.01973,     320.000,        0.000!   !END!
1973 ! X =  -114.52475, -103.77122,     280.000,        0.000!   !END!
1974 ! X =  -114.52205, -103.52272,     300.000,        0.000!   !END!
1975 ! X =  -114.51944, -103.27411,     320.000,        0.000!   !END!
1976 ! X =  -114.51673,  -103.0256,     340.000,        0.000!   !END!
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1977 ! X =  -114.51403,  -102.7771,      404.000,        0.000!   !END!
1978 ! X =  -114.51133, -102.52859,      471.000,        0.000!   !END!
1979 ! X =  -114.50872, -102.27998,      525.000,        0.000!   !END!
1980 ! X =  -114.33086, -108.74452,      639.000,        0.000!   !END!
1981 ! X =  -114.32816, -108.49603,      640.000,        0.000!   !END!
1982 ! X =  -114.32555, -108.24752,      640.000,        0.000!   !END!
1983 ! X =  -114.32284, -107.99892,      642.000,        0.000!   !END!
1984 ! X =  -114.32014, -107.75042,      642.000,        0.000!   !END!
1985 ! X =  -114.31743, -107.50182,      641.000,        0.000!   !END!
1986 ! X =  -114.31482, -107.25332,      640.000,        0.000!   !END!
1987 ! X =  -114.31212, -107.00482,      626.000,        0.000!   !END!
1988 ! X =  -114.30941, -106.75622,      612.000,        0.000!   !END!
1989 ! X =   -114.3068, -106.50771,      609.000,        0.000!   !END!
1990 ! X =   -114.3041, -106.25921,      605.000,        0.000!   !END!
1991 ! X =   -114.3014, -106.01071,      583.000,        0.000!   !END!
1992 ! X =  -114.29869,  -105.7621,      601.000,        0.000!   !END!
1993 ! X =  -114.29608,  -105.5136,      609.000,        0.000!   !END!
1994 ! X =  -114.29338, -105.26509,      596.000,        0.000!   !END!
1995 ! X =  -114.29067, -105.01649,      574.000,        0.000!   !END!
1996 ! X =  -114.28806, -104.76798,      548.000,        0.000!   !END!
1997 ! X =  -114.28536, -104.51948,      496.000,        0.000!   !END!
1998 ! X =  -114.28266, -104.27098,      441.000,        0.000!   !END!
1999 ! X =  -114.27995, -104.02238,      328.000,        0.000!   !END!
2000 ! X =  -114.27734, -103.77387,      297.000,        0.000!   !END!
2001 ! X =  -114.27464, -103.52536,      293.000,        0.000!   !END!
2002 ! X =  -114.27193, -103.27686,      297.000,        0.000!   !END!
2003 ! X =  -114.26932, -103.02825,      335.000,        0.000!   !END!
2004 ! X =  -114.26662, -102.77974,      441.000,        0.000!   !END!
2005 ! X =  -114.26391, -102.53124,      474.000,        0.000!   !END!
2006 ! X =  -114.07544, -108.00157,      640.000,        0.000!   !END!
2007 ! X =  -114.07273, -107.75307,      631.000,        0.000!   !END!
2008 ! X =  -114.07003, -107.50457,      626.000,        0.000!   !END!
2009 ! X =  -114.06732, -107.25597,      611.000,        0.000!   !END!
2010 ! X =  -114.06471, -107.00746,      609.000,        0.000!   !END!
2011 ! X =  -114.06201, -106.75896,      610.000,        0.000!   !END!
2012 ! X =   -114.0593, -106.51036,      609.000,        0.000!   !END!
2013 ! X =  -114.05669, -106.26185,      609.000,        0.000!   !END!
2014 ! X =  -114.05399, -106.01335,      610.000,        0.000!   !END!
2015 ! X =  -114.05128, -105.76475,      615.000,        0.000!   !END!
2016 ! X =  -114.04867, -105.51624,      614.000,        0.000!   !END!
2017 ! X =  -114.04597, -105.26774,      610.000,        0.000!   !END!
2018 ! X =  -114.04326, -105.01914,      608.000,        0.000!   !END!
2019 ! X =  -114.04056, -104.77063,      553.000,        0.000!   !END!
2020 ! X =  -114.03795, -104.52213,      496.000,        0.000!   !END!
2021 ! X =  -114.03525, -104.27362,      470.000,        0.000!   !END!
2022 ! X =  -114.03254, -104.02502,      419.000,        0.000!   !END!
2023 ! X =  -114.02993, -103.77651,      371.000,        0.000!   !END!
2024 ! X =  -114.02723, -103.52801,      318.000,        0.000!   !END!
2025 ! X =  -114.02452,  -103.2795,      282.000,        0.000!   !END!
2026 ! X =  -114.02181,  -103.0309,      335.000,        0.000!   !END!
2027 ! X =  -114.01921, -102.78239,      444.000,        0.000!   !END!
2028 ! X =   -114.0165, -102.53388,      480.000,        0.000!   !END!
2029 ! X =   -114.0138, -102.28538,      533.000,        0.000!   !END!
2030 ! X =  -114.01119, -102.03687,      612.000,        0.000!   !END!
2031 ! X =  -114.00848, -101.78826,      621.000,        0.000!   !END!
2032 ! X =  -114.00578, -101.53976,      620.000,        0.000!   !END!
2033 ! X =  -114.00317, -101.29125,      614.000,        0.000!   !END!
2034 ! X =  -114.00047, -101.04274,      612.000,        0.000!   !END!
2035 ! X =  -113.99777, -100.79423,      609.000,        0.000!   !END!
2036 ! X =  -113.99506, -100.54563,      584.000,        0.000!   !END!
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2037 ! X =  -113.99245, -100.29711,     502.000,       0.000!   !END!
2038 ! X =  -113.98975, -100.04861,     457.000,       0.000!   !END!
2039 ! X =  -113.98704,   -99.8001,     392.000,       0.000!   !END!
2040 ! X =  -113.98444,  -99.55159,     409.000,       0.000!   !END!
2041 ! X =  -113.98173,  -99.30308,     418.000,       0.000!   !END!
2042 ! X =  -113.81991, -107.25861,     579.000,       0.000!   !END!
2043 ! X =  -113.81721, -107.01011,     588.000,       0.000!   !END!
2044 ! X =   -113.8146,  -106.7616,     609.000,       0.000!   !END!
2045 ! X =  -113.81189,   -106.513,     613.000,       0.000!   !END!
2046 ! X =  -113.80919,  -106.2645,     619.000,       0.000!   !END!
2047 ! X =  -113.80658, -106.01599,     627.000,       0.000!   !END!
2048 ! X =  -113.80387, -105.76739,     637.000,       0.000!   !END!
2049 ! X =  -113.80117, -105.51889,     621.000,       0.000!   !END!
2050 ! X =  -113.79856, -105.27038,     613.000,       0.000!   !END!
2051 ! X =  -113.79586, -105.02188,     601.000,       0.000!   !END!
2052 ! X =  -113.79315, -104.77328,     548.000,       0.000!   !END!
2053 ! X =  -113.79044, -104.52478,     489.000,       0.000!   !END!
2054 ! X =  -113.78784, -104.27627,     462.000,       0.000!   !END!
2055 ! X =  -113.78513, -104.02776,     427.000,       0.000!   !END!
2056 ! X =  -113.78242, -103.77916,     396.000,       0.000!   !END!
2057 ! X =  -113.77982, -103.53065,     324.000,       0.000!   !END!
2058 ! X =  -113.77711, -103.28215,     277.000,       0.000!   !END!
2059 ! X =  -113.77441, -103.03364,     359.000,       0.000!   !END!
2060 ! X =   -113.7718, -102.78503,     448.000,       0.000!   !END!
2061 ! X =  -113.76909, -102.53653,     480.000,       0.000!   !END!
2062 ! X =  -113.76639, -102.28802,     525.000,       0.000!   !END!
2063 ! X =  -113.76378, -102.03951,     609.000,       0.000!   !END!
2064 ! X =  -113.76107, -101.79091,     610.000,       0.000!   !END!
2065 ! X =  -113.75837,  -101.5424,     610.000,       0.000!   !END!
2066 ! X =  -113.75566,  -101.2939,     609.000,       0.000!   !END!
2067 ! X =  -113.75306, -101.04538,     609.000,       0.000!   !END!
2068 ! X =  -113.75035, -100.79688,     609.000,       0.000!   !END!
2069 ! X =  -113.74765, -100.54837,     563.000,       0.000!   !END!
2070 ! X =  -113.74504, -100.29976,     481.000,       0.000!   !END!
2071 ! X =  -113.74233, -100.05125,     431.000,       0.000!   !END!
2072 ! X =  -113.73963,  -99.80274,     388.000,       0.000!   !END!
2073 ! X =  -113.73702,  -99.55423,     374.000,       0.000!   !END!
2074 ! X =  -113.73432,  -99.30572,     380.000,       0.000!   !END!
2075 ! X =  -113.55907, -106.01865,     640.000,       0.000!   !END!
2076 ! X =  -113.55647, -105.77014,     640.000,       0.000!   !END!
2077 ! X =  -113.55376, -105.52154,     625.000,       0.000!   !END!
2078 ! X =  -113.55105, -105.27303,     609.000,       0.000!   !END!
2079 ! X =  -113.54845, -105.02453,     542.000,       0.000!   !END!
2080 ! X =  -113.54574, -104.77592,     477.000,       0.000!   !END!
2081 ! X =  -113.54303, -104.52742,     450.000,       0.000!   !END!
2082 ! X =  -113.54043, -104.27891,     427.000,       0.000!   !END!
2083 ! X =  -113.53772, -104.03041,     411.000,       0.000!   !END!
2084 ! X =  -113.53501, -103.78181,     374.000,       0.000!   !END!
2085 ! X =  -113.53241,  -103.5333,     304.000,       0.000!   !END!
2086 ! X =   -113.5297, -103.28479,     288.000,       0.000!   !END!
2087 ! X =    -113.527, -103.03629,     351.000,       0.000!   !END!
2088 ! X =  -113.52429, -102.78768,     434.000,       0.000!   !END!
2089 ! X =  -113.52168, -102.53917,     482.000,       0.000!   !END!
2090 ! X =  -113.51898, -102.29067,     522.000,       0.000!   !END!
2091 ! X =  -113.51627, -102.04216,     581.000,       0.000!   !END!
2092 ! X =  -113.51367, -101.79365,     609.000,       0.000!   !END!
2093 ! X =  -113.51096, -101.54505,     609.000,       0.000!   !END!
2094 ! X =  -113.50825, -101.29654,     589.000,       0.000!   !END!
2095 ! X =  -113.50565, -101.04803,     585.000,       0.000!   !END!
2096 ! X =  -113.50294, -100.79952,     541.000,       0.000!   !END!
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2097 ! X =  -113.50024, -100.55102,     499.000,       0.000!   !END!
2098 ! X =  -113.49762,  -100.3024,     460.000,       0.000!   !END!
2099 ! X =  -113.49492,  -100.0539,     420.000,       0.000!   !END!
2100 ! X =  -113.49221,  -99.80539,     381.000,       0.000!   !END!
2101 ! X =  -113.48951,  -99.55688,     335.000,       0.000!   !END!
2102 ! X =   -113.4869,  -99.30837,     335.000,       0.000!   !END!
2103 ! X =  -113.30635, -105.52418,     618.000,       0.000!   !END!
2104 ! X =  -113.30364, -105.27568,     579.000,       0.000!   !END!
2105 ! X =  -113.30094, -105.02718,     522.000,       0.000!   !END!
2106 ! X =  -113.29833, -104.77867,     477.000,       0.000!   !END!
2107 ! X =  -113.29562, -104.53007,     444.000,       0.000!   !END!
2108 ! X =  -113.29292, -104.28156,     416.000,       0.000!   !END!
2109 ! X =  -113.29031, -104.03305,     347.000,       0.000!   !END!
2110 ! X =  -113.28761, -103.78455,     324.000,       0.000!   !END!
2111 ! X =   -113.2849, -103.53595,     293.000,       0.000!   !END!
2112 ! X =  -113.28229, -103.28744,     295.000,       0.000!   !END!
2113 ! X =  -113.27959, -103.03893,     340.000,       0.000!   !END!
2114 ! X =  -113.27688, -102.79043,     432.000,       0.000!   !END!
2115 ! X =  -113.27427, -102.54182,     465.000,       0.000!   !END!
2116 ! X =  -113.27156, -102.29331,     502.000,       0.000!   !END!
2117 ! X =  -113.26886, -102.04481,     553.000,       0.000!   !END!
2118 ! X =  -113.26625,  -101.7963,     609.000,       0.000!   !END!
2119 ! X =  -113.26354, -101.54769,     609.000,       0.000!   !END!
2120 ! X =  -113.26084, -101.29919,     609.000,       0.000!   !END!
2121 ! X =  -113.25813, -101.05068,     548.000,       0.000!   !END!
2122 ! X =  -113.25553, -100.80217,     480.000,       0.000!   !END!
2123 ! X =  -113.25282, -100.55366,     446.000,       0.000!   !END!
2124 ! X =  -113.25012, -100.30515,     429.000,       0.000!   !END!
2125 ! X =  -113.24751, -100.05654,     403.000,       0.000!   !END!
2126 ! X =   -113.2448,  -99.80803,     371.000,       0.000!   !END!
2127 ! X =   -113.2421,  -99.55953,     335.000,       0.000!   !END!
2128 ! X =  -113.23949,  -99.31101,     366.000,       0.000!   !END!
2129 ! X =  -113.05895, -105.52693,     616.000,       0.000!   !END!
2130 ! X =  -113.05624, -105.27833,     610.000,       0.000!   !END!
2131 ! X =  -113.05353, -105.02982,     574.000,       0.000!   !END!
2132 ! X =  -113.05092, -104.78131,     516.000,       0.000!   !END!
2133 ! X =  -113.04821, -104.53271,     462.000,       0.000!   !END!
2134 ! X =  -113.04551, -104.28421,     426.000,       0.000!   !END!
2135 ! X =   -113.0428, -104.03571,     397.000,       0.000!   !END!
2136 ! X =   -113.0402,  -103.7872,     355.000,       0.000!   !END!
2137 ! X =  -113.03749, -103.53859,     306.000,       0.000!   !END!
2138 ! X =  -113.03478, -103.29009,     288.000,       0.000!   !END!
2139 ! X =  -113.03218, -103.04158,     335.000,       0.000!   !END!
2140 ! X =  -113.02947, -102.79307,     382.000,       0.000!   !END!
2141 ! X =  -113.02676, -102.54447,     432.000,       0.000!   !END!
2142 ! X =  -113.02415, -102.29596,     480.000,       0.000!   !END!
2143 ! X =  -113.02145, -102.04745,     528.000,       0.000!   !END!
2144 ! X =  -113.01874, -101.79895,     569.000,       0.000!   !END!
2145 ! X =  -113.01614, -101.55044,     592.000,       0.000!   !END!
2146 ! X =  -113.01343, -101.30183,     587.000,       0.000!   !END!
2147 ! X =  -113.01072, -101.05332,     561.000,       0.000!   !END!
2148 ! X =  -113.00811, -100.80481,     475.000,       0.000!   !END!
2149 ! X =  -113.00541, -100.55631,     411.000,       0.000!   !END!
2150 ! X =   -113.0027,  -100.3078,     396.000,       0.000!   !END!
2151 ! X =   -113.0001, -100.05929,     365.000,       0.000!   !END!
2152 ! X =  -112.99739,  -99.81068,     341.000,       0.000!   !END!
2153 ! X =  -112.99468,  -99.56217,     402.000,       0.000!   !END!
2154 ! X =  -112.99208,  -99.31366,     415.000,       0.000!   !END!
2155 ! X =  -112.98937,  -99.06515,     423.000,       0.000!   !END!
2156 ! X =  -112.81144, -105.52958,     640.000,       0.000!   !END!
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2157 ! X =  -112.80883, -105.28097,     639.000,       0.000!   !END!
2158 ! X =  -112.80612, -105.03247,     615.000,       0.000!   !END!
2159 ! X =  -112.80342, -104.78397,     548.000,       0.000!   !END!
2160 ! X =  -112.80081, -104.53546,     491.000,       0.000!   !END!
2161 ! X =   -112.7981, -104.28685,     452.000,       0.000!   !END!
2162 ! X =  -112.79539, -104.03835,     425.000,       0.000!   !END!
2163 ! X =  -112.79279, -103.78984,     358.000,       0.000!   !END!
2164 ! X =  -112.79008, -103.54124,     315.000,       0.000!   !END!
2165 ! X =  -112.78737, -103.29273,     304.000,       0.000!   !END!
2166 ! X =  -112.78476, -103.04422,     285.000,       0.000!   !END!
2167 ! X =  -112.78206, -102.79572,     331.000,       0.000!   !END!
2168 ! X =  -112.77935, -102.54721,     388.000,       0.000!   !END!
2169 ! X =  -112.77674,  -102.2986,     448.000,       0.000!   !END!
2170 ! X =  -112.77404,  -102.0501,     470.000,       0.000!   !END!
2171 ! X =  -112.77133, -101.80159,     513.000,       0.000!   !END!
2172 ! X =  -112.76872, -101.55308,     553.000,       0.000!   !END!
2173 ! X =  -112.76602, -101.30458,     560.000,       0.000!   !END!
2174 ! X =  -112.76331, -101.05597,     541.000,       0.000!   !END!
2175 ! X =   -112.7607, -100.80746,     486.000,       0.000!   !END!
2176 ! X =    -112.758, -100.55895,     411.000,       0.000!   !END!
2177 ! X =  -112.75529, -100.31044,     372.000,       0.000!   !END!
2178 ! X =  -112.75258, -100.06194,     335.000,       0.000!   !END!
2179 ! X =  -112.74997,  -99.81332,     396.000,       0.000!   !END!
2180 ! X =  -112.74727,  -99.56482,     426.000,       0.000!   !END!
2181 ! X =  -112.74456,  -99.31631,     443.000,       0.000!   !END!
2182 ! X =  -112.74196,   -99.0678,     453.000,       0.000!   !END!
2183 ! X =  -112.56403, -105.53222,     640.000,       0.000!   !END!
2184 ! X =  -112.56132, -105.28362,     639.000,       0.000!   !END!
2185 ! X =  -112.55871, -105.03511,     619.000,       0.000!   !END!
2186 ! X =  -112.55601, -104.78661,     548.000,       0.000!   !END!
2187 ! X =   -112.5533, -104.53811,     491.000,       0.000!   !END!
2188 ! X =  -112.55069,  -104.2895,     457.000,       0.000!   !END!
2189 ! X =  -112.54798,   -104.041,     411.000,       0.000!   !END!
2190 ! X =  -112.54528, -103.79249,     359.000,       0.000!   !END!
2191 ! X =  -112.54267, -103.54398,     374.000,       0.000!   !END!
2192 ! X =  -112.53996, -103.29538,     362.000,       0.000!   !END!
2193 ! X =  -112.53725, -103.04688,     335.000,       0.000!   !END!
2194 ! X =  -112.53465, -102.79837,     296.000,       0.000!   !END!
2195 ! X =  -112.53194, -102.54986,     341.000,       0.000!   !END!
2196 ! X =  -112.52923, -102.30126,     388.000,       0.000!   !END!
2197 ! X =  -112.52662, -102.05275,     418.000,       0.000!   !END!
2198 ! X =  -112.52392, -101.80424,     468.000,       0.000!   !END!
2199 ! X =  -112.52121, -101.55573,     496.000,       0.000!   !END!
2200 ! X =  -112.51861, -101.30722,     518.000,       0.000!   !END!
2201 ! X =   -112.5159, -101.05862,     518.000,       0.000!   !END!
2202 ! X =  -112.51319, -100.81011,     464.000,       0.000!   !END!
2203 ! X =  -112.51058,  -100.5616,     410.000,       0.000!   !END!
2204 ! X =  -112.50788, -100.31309,     375.000,       0.000!   !END!
2205 ! X =  -112.50517, -100.06458,     337.000,       0.000!   !END!
2206 ! X =  -112.50256,  -99.81607,     396.000,       0.000!   !END!
2207 ! X =  -112.49985,  -99.56746,     427.000,       0.000!   !END!
2208 ! X =  -112.49715,  -99.31895,     464.000,       0.000!   !END!
2209 ! X =  -112.49454,  -99.07044,     517.000,       0.000!   !END!
2210 ! X =  -112.31392, -105.28637,     635.000,       0.000!   !END!
2211 ! X =   -112.3113, -105.03776,     601.000,       0.000!   !END!
2212 ! X =   -112.3086, -104.78926,     525.000,       0.000!   !END!
2213 ! X =  -112.30589, -104.54075,     453.000,       0.000!   !END!
2214 ! X =  -112.30328, -104.29215,     426.000,       0.000!   !END!
2215 ! X =  -112.30057, -104.04364,     410.000,       0.000!   !END!
2216 ! X =  -112.29787, -103.79514,     434.000,       0.000!   !END!
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2217 ! X =  -112.29526, -103.54663,     430.000,       0.000!   !END!
2218 ! X =  -112.29255, -103.29803,     421.000,       0.000!   !END!
2219 ! X =  -112.28984, -103.04952,     373.000,       0.000!   !END!
2220 ! X =  -112.28724, -102.80101,     304.000,       0.000!   !END!
2221 ! X =  -112.28453, -102.55251,     319.000,       0.000!   !END!
2222 ! X =  -112.28183,   -102.304,     353.000,       0.000!   !END!
2223 ! X =  -112.27921, -102.05539,     396.000,       0.000!   !END!
2224 ! X =  -112.27651, -101.80689,     426.000,       0.000!   !END!
2225 ! X =   -112.2738, -101.55838,     440.000,       0.000!   !END!
2226 ! X =  -112.27119, -101.30987,     457.000,       0.000!   !END!
2227 ! X =  -112.26849, -101.06136,     459.000,       0.000!   !END!
2228 ! X =  -112.26578, -100.81276,     432.000,       0.000!   !END!
2229 ! X =  -112.26317, -100.56424,     396.000,       0.000!   !END!
2230 ! X =  -112.26046, -100.31574,     365.000,       0.000!   !END!
2231 ! X =  -112.25776, -100.06723,     370.000,       0.000!   !END!
2232 ! X =  -112.25515,  -99.81872,     412.000,       0.000!   !END!
2233 ! X =  -112.25245,  -99.57021,     442.000,       0.000!   !END!
2234 ! X =  -112.24973,   -99.3216,     496.000,       0.000!   !END!
2235 ! X =  -112.24713,  -99.07309,     563.000,       0.000!   !END!
2236 ! X =  -112.06651, -105.28901,     612.000,       0.000!   !END!
2237 ! X =   -112.0638, -105.04041,     556.000,       0.000!   !END!
2238 ! X =  -112.06119,  -104.7919,     487.000,       0.000!   !END!
2239 ! X =  -112.05848,  -104.5434,     457.000,       0.000!   !END!
2240 ! X =  -112.05578,  -104.2949,     450.000,       0.000!   !END!
2241 ! X =  -112.05316, -104.04629,     470.000,       0.000!   !END!
2242 ! X =  -112.05046, -103.79779,     470.000,       0.000!   !END!
2243 ! X =  -112.04775, -103.54928,     460.000,       0.000!   !END!
2244 ! X =  -112.04515, -103.30077,     453.000,       0.000!   !END!
2245 ! X =  -112.04243, -103.05217,     418.000,       0.000!   !END!
2246 ! X =  -112.03973, -102.80366,     335.000,       0.000!   !END!
2247 ! X =  -112.03712, -102.55515,     313.000,       0.000!   !END!
2248 ! X =  -112.03441, -102.30665,     339.000,       0.000!   !END!
2249 ! X =   -112.0317, -102.05804,     372.000,       0.000!   !END!
2250 ! X =   -112.0291, -101.80953,     396.000,       0.000!   !END!
2251 ! X =  -112.02639, -101.56103,     387.000,       0.000!   !END!
2252 ! X =  -112.02368, -101.31252,     413.000,       0.000!   !END!
2253 ! X =  -112.02108, -101.06401,     415.000,       0.000!   !END!
2254 ! X =  -112.01836,  -100.8154,     396.000,       0.000!   !END!
2255 ! X =  -112.01566,  -100.5669,     376.000,       0.000!   !END!
2256 ! X =  -112.01305, -100.31838,     335.000,       0.000!   !END!
2257 ! X =  -112.01034, -100.06988,     379.000,       0.000!   !END!
2258 ! X =  -112.00764,  -99.82137,     416.000,       0.000!   !END!
2259 ! X =  -112.00503,  -99.57285,     449.000,       0.000!   !END!
2260 ! X =  -111.80305, -103.80043,     517.000,       0.000!   !END!
2261 ! X =  -111.80034, -103.55193,     501.000,       0.000!   !END!
2262 ! X =  -111.79773, -103.30342,     479.000,       0.000!   !END!
2263 ! X =  -111.79502, -103.05481,     456.000,       0.000!   !END!
2264 ! X =  -111.79232, -102.80631,     379.000,       0.000!   !END!
2265 ! X =  -111.78971,  -102.5578,     306.000,       0.000!   !END!
2266 ! X =    -111.787, -102.30929,     324.000,       0.000!   !END!
2267 ! X =  -111.78429, -102.06069,     346.000,       0.000!   !END!
2268 ! X =  -111.78168, -101.81218,     354.000,       0.000!   !END!
2269 ! X =  -111.77898, -101.56367,     356.000,       0.000!   !END!
2270 ! X =  -111.77627, -101.31517,     376.000,       0.000!   !END!
2271 ! X =  -111.77366, -101.06666,     383.000,       0.000!   !END!
2272 ! X =  -111.77096, -100.81815,     376.000,       0.000!   !END!
2273 ! X =  -111.76824, -100.56954,     365.000,       0.000!   !END!
2274 ! X =  -111.76564, -100.32103,     335.000,       0.000!   !END!
2275 ! X =  -111.76293, -100.07252,     369.000,       0.000!   !END!
2276 ! X =  -111.76022,  -99.82401,     415.000,       0.000!   !END!
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2277 ! X =  -111.75762,   -99.5755,      445.000,        0.000!   !END!
2278 ! X =  -111.55022, -103.30607,      538.000,        0.000!   !END!
2279 ! X =  -111.54761, -103.05746,      483.000,        0.000!   !END!
2280 ! X =  -111.54491, -102.80896,      427.000,        0.000!   !END!
2281 ! X =   -111.5422, -102.56045,      320.000,        0.000!   !END!
2282 ! X =  -111.53959, -102.31194,      306.000,        0.000!   !END!
2283 ! X =  -111.53688, -102.06344,      312.000,        0.000!   !END!
2284 ! X =  -111.53417, -101.81483,      318.000,        0.000!   !END!
2285 ! X =  -111.53156, -101.56632,      329.000,        0.000!   !END!
2286 ! X =  -111.52886, -101.31781,      351.000,        0.000!   !END!
2287 ! X =  -111.52615, -101.06931,      367.000,        0.000!   !END!
2288 ! X =  -111.52354,  -100.8208,      353.000,        0.000!   !END!
2289 ! X =  -111.52083, -100.57219,      335.000,        0.000!   !END!
2290 ! X =  -111.51822, -100.32368,      304.000,        0.000!   !END!
2291 ! X =  -111.51552, -100.07517,      342.000,        0.000!   !END!
2292 ! X =  -111.51281,  -99.82666,      382.000,        0.000!   !END!
2293 ! X =  -111.30281, -103.30872,      609.000,        0.000!   !END!
2294 ! X =  -111.30021, -103.06021,      518.000,        0.000!   !END!
2295 ! X =  -111.29749,  -102.8116,      445.000,        0.000!   !END!
2296 ! X =  -111.29479,  -102.5631,      386.000,        0.000!   !END!
2297 ! X =  -111.29218, -102.31459,      321.000,        0.000!   !END!
2298 ! X =  -111.28947, -102.06608,      284.000,        0.000!   !END!
2299 ! X =  -111.28676, -101.81748,      278.000,        0.000!   !END!
2300 ! X =  -111.28415, -101.56897,      307.000,        0.000!   !END!
2301 ! X =  -111.28145, -101.32046,      322.000,        0.000!   !END!
2302 ! X =  -111.27874, -101.07195,      336.000,        0.000!   !END!
2303 ! X =  -111.27613, -100.82344,      337.000,        0.000!   !END!
2304 ! X =  -111.27342, -100.57494,      335.000,        0.000!   !END!
2305 ! X =  -111.27071, -100.32633,      305.000,        0.000!   !END!
2306 ! X =   -111.2681, -100.07782,      338.000,        0.000!   !END!
2307 ! X =   -111.2654,  -99.82931,      381.000,        0.000!   !END!
2308 ! X =   -111.0554, -103.31137,      609.000,        0.000!   !END!
2309 ! X =   -111.0527, -103.06286,      518.000,        0.000!   !END!
2310 ! X =  -111.05008, -102.81425,      446.000,        0.000!   !END!
2311 ! X =  -111.04738, -102.56575,      414.000,        0.000!   !END!
2312 ! X =  -111.04467, -102.31724,      359.000,        0.000!   !END!
2313 ! X =  -111.04206, -102.06873,      313.000,        0.000!   !END!
2314 ! X =  -111.03935, -101.82023,      285.000,        0.000!   !END!
2315 ! X =  -111.03674, -101.57161,      275.000,        0.000!   !END!
2316 ! X =  -111.03403, -101.32311,      285.000,        0.000!   !END!
2317 ! X =  -111.03133,  -101.0746,      301.000,        0.000!   !END!
2318 ! X =  -111.02872, -100.82609,      315.000,        0.000!   !END!
2319 ! X =  -111.02601, -100.57758,      313.000,        0.000!   !END!
2320 ! X =   -111.0233, -100.32898,      305.000,        0.000!   !END!
2321 ! X =  -111.02069, -100.08046,      335.000,        0.000!   !END!
2322 ! X =  -111.01798,  -99.83196,      365.000,        0.000!   !END!
2323 ! X =  -110.80799, -103.31401,      532.000,        0.000!   !END!
2324 ! X =  -110.80529, -103.06551,      502.000,        0.000!   !END!
2325 ! X =  -110.80267,  -102.8169,      445.000,        0.000!   !END!
2326 ! X =  -110.79996, -102.56839,      396.000,        0.000!   !END!
2327 ! X =  -110.79726, -102.31989,      361.000,        0.000!   !END!
2328 ! X =  -110.79465, -102.07138,      313.000,        0.000!   !END!
2329 ! X =  -110.79194, -101.82287,      291.000,        0.000!   !END!
2330 ! X =  -110.78923, -101.57427,      274.000,        0.000!   !END!
2331 ! X =  -110.78662, -101.32576,      276.000,        0.000!   !END!
2332 ! X =  -110.78391, -101.07725,      287.000,        0.000!   !END!
2333 ! X =  -110.78121, -100.82874,      304.000,        0.000!   !END!
2334 ! X =   -110.7786, -100.58023,      305.000,        0.000!   !END!
2335 ! X =  -110.77588, -100.33162,      294.000,        0.000!   !END!
2336 ! X =  -110.77328, -100.08311,      322.000,        0.000!   !END!
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2337 ! X =  -110.77057,   -99.8346,     349.000,       0.000!   !END!
2338 ! X =  -110.56058, -103.31666,     471.000,       0.000!   !END!
2339 ! X =  -110.55788, -103.06816,     439.000,       0.000!   !END!
2340 ! X =  -110.55517, -102.81965,     411.000,       0.000!   !END!
2341 ! X =  -110.55255, -102.57104,     365.000,       0.000!   !END!
2342 ! X =  -110.54985, -102.32254,     335.000,       0.000!   !END!
2343 ! X =  -110.54714, -102.07403,     309.000,       0.000!   !END!
2344 ! X =  -110.54453, -101.82552,     290.000,       0.000!   !END!
2345 ! X =  -110.54182, -101.57692,     274.000,       0.000!   !END!
2346 ! X =  -110.53921,  -101.3284,     274.000,       0.000!   !END!
2347 ! X =   -110.5365,  -101.0799,     304.000,       0.000!   !END!
2348 ! X =  -110.53379, -100.83139,     304.000,       0.000!   !END!
2349 ! X =  -110.53118, -100.58288,     304.000,       0.000!   !END!
2350 ! X =  -110.31307, -103.31931,     433.000,       0.000!   !END!
2351 ! X =  -110.31046,  -103.0708,     401.000,       0.000!   !END!
2352 ! X =  -110.30776,  -102.8223,     348.000,       0.000!   !END!
2353 ! X =  -110.30514, -102.57369,     320.000,       0.000!   !END!
2354 ! X =  -110.30243, -102.32519,     304.000,       0.000!   !END!
2355 ! X =  -110.29973, -102.07668,     289.000,       0.000!   !END!
2356 ! X =  -110.29712, -101.82817,     279.000,       0.000!   !END!
2357 ! X =  -110.29441, -101.57966,     274.000,       0.000!   !END!
2358 ! X =   -110.2917, -101.33106,     274.000,       0.000!   !END!
2359 ! X =  -110.28909, -101.08255,     292.000,       0.000!   !END!
2360 ! X =  -110.28638, -100.83404,     304.000,       0.000!   !END!
2361 ! X =  -110.28377, -100.58553,     297.000,       0.000!   !END!
2362 ! X =  -110.06566, -103.32196,     371.000,       0.000!   !END!
2363 ! X =  -110.06305, -103.07345,     348.000,       0.000!   !END!
2364 ! X =  -110.06035, -102.82495,     312.000,       0.000!   !END!
2365 ! X =  -110.05763, -102.57634,     292.000,       0.000!   !END!
2366 ! X =  -110.05502, -102.32783,     287.000,       0.000!   !END!
2367 ! X =  -110.05232, -102.07933,     292.000,       0.000!   !END!
2368 ! X =  -110.04971, -101.83082,     277.000,       0.000!   !END!
2369 ! X =    -110.047, -101.58231,     274.000,       0.000!   !END!
2370 ! X =  -110.04428, -101.33371,     281.000,       0.000!   !END!
2371 ! X =  -110.04168, -101.08519,     292.000,       0.000!   !END!
2372 ! X =  -110.03897, -100.83669,     288.000,       0.000!   !END!
2373 ! X =  -110.03626, -100.58818,     286.000,       0.000!   !END!
2374 ! X =  -109.81554, -103.07611,     329.000,       0.000!   !END!
2375 ! X =  -109.81293,  -102.8276,     307.000,       0.000!   !END!
2376 ! X =  -109.81022, -102.57899,     308.000,       0.000!   !END!
2377 ! X =  -109.80761, -102.33048,     304.000,       0.000!   !END!
2378 ! X =   -109.8049, -102.08198,     304.000,       0.000!   !END!
2379 ! X =  -109.80219, -101.83347,     282.000,       0.000!   !END!
2380 ! X =  -109.79959, -101.58496,     278.000,       0.000!   !END!
2381 ! X =  -109.79687, -101.33635,     304.000,       0.000!   !END!
2382 ! X =  -109.79426, -101.08784,     322.000,       0.000!   !END!
2383 ! X =  -109.79155, -100.83934,     330.000,       0.000!   !END!
2384 ! X =  -109.78885, -100.59083,     304.000,       0.000!   !END!
2385 ! X =  -109.78624, -100.34232,     324.000,       0.000!   !END!
2386 ! X =  -109.56813, -103.07876,     365.000,       0.000!   !END!
2387 ! X =  -109.56552, -102.83025,     350.000,       0.000!   !END!
2388 ! X =  -109.56282, -102.58174,     342.000,       0.000!   !END!
2389 ! X =   -109.5601, -102.33314,     335.000,       0.000!   !END!
2390 ! X =  -109.55749, -102.08463,     304.000,       0.000!   !END!
2391 ! X =  -109.55478, -101.83612,     279.000,       0.000!   !END!
2392 ! X =  -109.55217, -101.58761,     302.000,       0.000!   !END!
2393 ! X =  -109.54946,   -101.339,     310.000,       0.000!   !END!
2394 ! X =  -109.54675,  -101.0905,     335.000,       0.000!   !END!
2395 ! X =  -109.54414, -100.84198,     335.000,       0.000!   !END!
2396 ! X =  -109.54143, -100.59348,     335.000,       0.000!   !END!
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2397 ! X = -109.53882, -100.34497, 335.000, 0.000! !END!
2398 ! X = -109.29934, -101.09315, 335.000, 0.000! !END!
2399 ! X = -109.29673, -100.84463, 335.000, 0.000! !END!
2400 ! X = -109.29402, -100.59613, 335.000, 0.000! !END!
2401 ! X = -109.29131, -100.34762, 340.000, 0.000! !END!
2402 ! X = -109.05193, -101.0958, 304.000, 0.000! !END!
2403 ! X = -109.04932, -100.84728, 335.000, 0.000! !END!
2404 ! X = -109.04661, -100.59878, 335.000, 0.000! !END!
2405 ! X = -109.0439, -100.35027, 340.000, 0.000! !END!
2406 ! X = -108.80451, -101.09844, 274.000, 0.000! !END!
2407 ! X = -108.8018, -100.84994, 304.000, 0.000! !END!
2408 ! X = -108.79919, -100.60143, 306.000, 0.000! !END!
2409 ! X = -108.79648, -100.35292, 335.000, 0.000! !END!
2410 ! X = -108.5571, -101.10109, 291.000, 0.000! !END!
2411 ! X = -108.55439, -100.85259, 304.000, 0.000! !END!
2412 ! X = -108.55178, -100.60408, 306.000, 0.000! !END!
2413 ! X = -108.54907, -100.35557, 330.000, 0.000! !END!
2414 ! X = -108.30969, -101.10374, 311.000, 0.000! !END!
2415 ! X = -108.30698, -100.85524, 304.000, 0.000! !END!
2416 ! X = -108.30437, -100.60673, 292.000, 0.000! !END!
2417 ! X = -108.30166, -100.35822, 335.000, 0.000! !END!
2418 ! X = -108.06489, -101.35501, 334.000, 0.000! !END!
2419 ! X = -109.4174, -101.02326, 335.000, 0.000! !END!
2420 ! X = -109.43069, -101.25184, 319.000, 0.000! !END!
2421 ! X = -109.44408, -101.48041, 305.000, 0.000! !END!
2422 ! X = -109.45746, -101.70888, 281.000, 0.000! !END!
2423 ! X = -109.47075, -101.93746, 288.000, 0.000! !END!
2424 ! X = -109.48414, -102.16593, 306.000, 0.000! !END!
2425 ! X = -109.49743, -102.39451, 343.000, 0.000! !END!
2426 ! X = -109.51081, -102.62298, 354.000, 0.000! !END!
2427 ! X = -109.5241, -102.85156, 365.000, 0.000! !END!
2428 ! X = -109.53743, -103.07904, 365.000, 0.000! !END!
2429 ! X = -109.55082, -103.30761, 382.000, 0.000! !END!
2430 ! X = -109.77611, -103.31814, 358.000, 0.000! !END!
2431 ! X = -110.00144, -103.32767, 358.000, 0.000! !END!
2432 ! X = -110.22673, -103.3381, 411.000, 0.000! !END!
2433 ! X = -110.45202, -103.34863, 461.000, 0.000! !END!
2434 ! X = -110.67725, -103.35816, 507.000, 0.000! !END!
2435 ! X = -110.90259, -103.36769, 579.000, 0.000! !END!
2436 ! X = -111.12788, -103.37822, 609.000, 0.000! !END!
2437 ! X = -111.35321, -103.38765, 609.000, 0.000! !END!
2438 ! X = -111.53741, -103.49508, 576.000, 0.000! !END!
2439 ! X = -111.72172, -103.6025, 548.000, 0.000! !END!
2440 ! X = -111.76747, -103.83559, 548.000, 0.000! !END!
2441 ! X = -111.81332, -104.06877, 517.000, 0.000! !END!
2442 ! X = -111.85908, -104.30195, 484.000, 0.000! !END!
2443 ! X = -111.90493, -104.53513, 487.000, 0.000! !END!
2444 ! X = -111.95088, -104.76821, 487.000, 0.000! !END!
2445 ! X = -111.99663, -105.00139, 533.000, 0.000! !END!
2446 ! X = -112.04249, -105.23457, 601.000, 0.000! !END!
2447 ! X = -112.08824, -105.46776, 624.000, 0.000! !END!
2448 ! X = -112.3197, -105.51994, 640.000, 0.000! !END!
2449 ! X = -112.55135, -105.57211, 640.000, 0.000! !END!
2450 ! X = -112.7828, -105.6243, 640.000, 0.000! !END!
2451 ! X = -113.01426, -105.67648, 618.000, 0.000! !END!
2452 ! X = -113.24591, -105.72866, 640.000, 0.000! !END!
2453 ! X = -113.47737, -105.78094, 640.000, 0.000! !END!
2454 ! X = -113.5294, -106.01398, 640.000, 0.000! !END!
2455 ! X = -113.58133, -106.24703, 637.000, 0.000! !END!
2456 ! X = -113.63336, -106.48017, 621.000, 0.000! !END!

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2457 ! X =  -113.68539, -106.71321,     611.000,        0.000!   !END!
2458 ! X =  -113.73742, -106.94635,     597.000,        0.000!   !END!
2459 ! X =  -113.78935, -107.17939,     577.000,        0.000!   !END!
2460 ! X =  -113.84139, -107.41253,     583.000,        0.000!   !END!
2461 ! X =  -113.89342, -107.64567,     612.000,        0.000!   !END!
2462 ! X =  -113.96946,  -107.8765,     640.000,        0.000!   !END!
2463 ! X =  -114.04541, -108.10733,     640.000,        0.000!   !END!
2464 ! X =  -114.12135, -108.33817,     640.000,        0.000!   !END!
2465 ! X =   -114.1975, -108.56899,     640.000,        0.000!   !END!
2466 ! X =  -114.27349, -108.79882,     639.000,        0.000!   !END!
2467 ! X =  -114.34943, -109.02976,     640.000,        0.000!   !END!
2468 ! X =  -114.42548, -109.26059,     640.000,        0.000!   !END!
2469 ! X =  -114.65867, -109.31178,     631.000,        0.000!   !END!
2470 ! X =  -114.89181, -109.36198,     609.000,        0.000!   !END!
2471 ! X =  -115.12499, -109.41307,     548.000,        0.000!   !END!
2472 ! X =  -115.35818, -109.46426,     590.000,        0.000!   !END!
2473 ! X =  -115.59137, -109.51546,     584.000,        0.000!   !END!
2474 ! X =  -115.82446, -109.56666,     558.000,        0.000!   !END!
2475 ! X =   -116.0577, -109.61685,     495.000,        0.000!   !END!
2476 ! X =  -116.29079, -109.66805,     544.000,        0.000!   !END!
2477 ! X =  -116.45021, -109.50625,     582.000,        0.000!   !END!
2478 ! X =  -116.60977, -109.34344,     588.000,        0.000!   !END!
2479 ! X =  -116.76919, -109.18163,     609.000,        0.000!   !END!
2480 ! X =  -116.92866, -109.01883,     640.000,        0.000!   !END!
2481 ! X =  -117.08808, -108.85712,     657.000,        0.000!   !END!
2482 ! X =  -117.24755, -108.69431,     687.000,        0.000!   !END!
2483 ! X =  -117.40697, -108.53251,     687.000,        0.000!   !END!
2484 ! X =  -117.49922,  -108.3625,     671.000,        0.000!   !END!
2485 ! X =  -117.59146,  -108.1925,     648.000,        0.000!   !END!
2486 ! X =  -117.70031, -108.19134,     640.000,        0.000!   !END!
2487 ! X =  -117.69832, -108.01232,     640.000,        0.000!   !END!
2488 ! X =  -117.79548, -107.83925,     591.000,        0.000!   !END!
2489 ! X =   -117.8926, -107.66529,     566.000,        0.000!   !END!
2490 ! X =  -117.98967, -107.49223,     521.000,        0.000!   !END!
2491 ! X =  -118.19952, -107.51777,     517.000,        0.000!   !END!
2492 ! X =  -118.40922, -107.54432,     487.000,        0.000!   !END!
2493 ! X =  -118.61908, -107.56996,     466.000,        0.000!   !END!
2494 ! X =  -118.82888, -107.59651,     410.000,        0.000!   !END!
2495 ! X =  -119.03863, -107.62205,     402.000,        0.000!   !END!
2496 ! X =  -119.24848,  -107.6477,     435.000,        0.000!   !END!
2497 ! X =  -119.27574, -107.88199,     472.000,        0.000!   !END!
2498 ! X =    -119.303, -108.11638,     506.000,        0.000!   !END!
2499 ! X =  -119.33026, -108.35077,     529.000,        0.000!   !END!
2500 ! X =  -119.35762, -108.58506,     555.000,        0.000!   !END!
2501 ! X =  -119.38488, -108.81945,     609.000,        0.000!   !END!
2502 ! X =  -119.41214, -109.05374,     640.000,        0.000!   !END!
2503 ! X =   -119.4394, -109.28813,     643.000,        0.000!   !END!
2504 ! X =  -119.46666, -109.52252,     653.000,        0.000!   !END!
2505 ! X =  -119.49392, -109.75681,     662.000,        0.000!   !END!
2506 ! X =  -119.52128,  -109.9912,     696.000,        0.000!   !END!
2507 ! X =  -119.71914, -110.08951,     669.000,        0.000!   !END!
2508 ! X =   -119.9171, -110.18781,     670.000,        0.000!   !END!
2509 ! X =  -120.11506, -110.28611,     670.000,        0.000!   !END!
2510 ! X =  -120.31292, -110.38432,     670.000,        0.000!   !END!
2511 ! X =  -120.51098, -110.48262,     670.000,        0.000!   !END!
2512 ! X =  -120.70884, -110.58092,     641.000,        0.000!   !END!
2513 ! X =  -120.90675, -110.68023,     590.000,        0.000!   !END!
2514 ! X =  -121.10471, -110.77853,     531.000,        0.000!   !END!
2515 ! X =  -121.30267, -110.87683,     487.000,        0.000!   !END!
2516 ! X =  -121.39127, -111.06179,     457.000,        0.000!   !END!
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2517 ! X =  -121.47991, -111.24775,     461.000,       0.000!   !END!
2518 ! X =  -121.56851, -111.43271,     487.000,       0.000!   !END!
2519 ! X =  -121.65715, -111.61867,     510.000,       0.000!   !END!
2520 ! X =  -121.86145, -111.65229,     579.000,       0.000!   !END!
2521 ! X =  -122.06565, -111.68583,     640.000,       0.000!   !END!
2522 ! X =  -122.26995, -111.71945,     641.000,       0.000!   !END!
2523 ! X =  -122.47425, -111.75308,     645.000,       0.000!   !END!
2524 ! X =  -122.67855, -111.78661,     641.000,       0.000!   !END!
2525 ! X =  -122.67874, -111.98747,     660.000,       0.000!   !END!
2526 ! X =  -122.67894, -112.18833,     696.000,       0.000!   !END!
2527 ! X =  -122.67913, -112.38918,     701.000,       0.000!   !END!
2528 ! X =  -122.67923, -112.59005,     680.000,       0.000!   !END!
2529 ! X =  -122.67942, -112.79091,     655.000,       0.000!   !END!
2530 ! X =   -122.8929, -112.85016,     609.000,       0.000!   !END!
2531 ! X =  -123.10644, -112.91051,     575.000,       0.000!   !END!
2532 ! X =  -123.31983, -112.96988,     545.000,       0.000!   !END!
2533 ! X =  -123.53336, -113.03023,     538.000,       0.000!   !END!
2534 ! X =   -123.6062,  -113.2353,     482.000,       0.000!   !END!
2535 ! X =  -123.67912, -113.44026,     472.000,       0.000!   !END!
2536 ! X =  -123.75216, -113.64532,     487.000,       0.000!   !END!
2537 ! X =  -123.82499, -113.85039,     548.000,       0.000!   !END!
2538 ! X =  -123.89791, -114.05536,     609.000,       0.000!   !END!
2539 ! X =   -123.9709, -114.26142,     640.000,       0.000!   !END!
2540 ! X =  -124.04383, -114.46648,     640.000,       0.000!   !END!
2541 ! X =  -124.14299, -114.66423,     623.000,       0.000!   !END!
2542 ! X =  -124.24215, -114.86198,     579.000,       0.000!   !END!
2543 ! X =  -124.34126, -115.05883,     545.000,       0.000!   !END!
2544 ! X =  -124.44038, -115.25758,     506.000,       0.000!   !END!
2545 ! X =  -124.53955, -115.45542,     455.000,       0.000!   !END!
2546 ! X =  -124.34505, -115.47342,     484.000,       0.000!   !END!
2547 ! X =   -124.1507, -115.49241,     524.000,       0.000!   !END!
2548 ! X =  -123.95611, -115.51041,     579.000,       0.000!   !END!
2549 ! X =  -124.00067, -115.73657,     502.000,       0.000!   !END!
2550 ! X =  -124.04518, -115.96184,     457.000,       0.000!   !END!
2551 ! X =  -124.08965,  -116.1881,     432.000,       0.000!   !END!
2552 ! X =  -124.13421, -116.41426,     464.000,       0.000!   !END!
2553 ! X =   -124.3417, -116.38219,     432.000,       0.000!   !END!
2554 ! X =  -124.54929, -116.35011,     406.000,       0.000!   !END!
2555 ! X =  -124.75673, -116.31704,     426.000,       0.000!   !END!
2556 ! X =  -124.96432, -116.28497,     467.000,       0.000!   !END!
2557 ! X =  -125.06802, -116.49274,     529.000,       0.000!   !END!
2558 ! X =  -125.17171, -116.70041,     579.000,       0.000!   !END!
2559 ! X =   -125.2754, -116.90808,     639.000,       0.000!   !END!
2560 ! X =  -125.37919, -117.11575,     640.000,       0.000!   !END!
2561 ! X =  -125.38939, -117.14551,     646.000,       0.000!   !END!
2562 ! X =  -125.48044, -117.32445,     664.000,       0.000!   !END!
2563 ! X =   -125.5915, -117.53013,     663.000,       0.000!   !END!
2564 ! X =  -125.70266, -117.73569,     658.000,       0.000!   !END!
2565 ! X =  -125.81377, -117.94226,     640.000,       0.000!   !END!
2566 ! X =  -125.92493, -118.14793,     670.000,       0.000!   !END!
2567 ! X =  -126.03604,  -118.3545,     670.000,       0.000!   !END!
2568 ! X =  -126.14715, -118.56116,     670.000,       0.000!   !END!
2569 ! X =  -126.25831, -118.76673,     670.000,       0.000!   !END!
2570 ! X =  -126.27531, -118.97046,     670.000,       0.000!   !END!
2571 ! X =  -126.29241, -119.17408,     670.000,       0.000!   !END!
2572 ! X =  -126.53874, -119.17938,     670.000,       0.000!   !END!
2573 ! X =  -126.78503, -119.18569,     670.000,       0.000!   !END!
2574 ! X =  -127.03156, -119.19098,     647.000,       0.000!   !END!
2575 ! X =  -127.27789, -119.19619,     627.000,       0.000!   !END!
2576 ! X =  -127.52422, -119.20149,     596.000,       0.000!   !END!
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2577 ! X =  -127.77051,  -119.2078,     548.000,       0.000!   !END!
2578 ! X =  -128.01704, -119.21309,     442.000,       0.000!   !END!
2579 ! X =  -128.26337,  -119.2184,     418.000,       0.000!   !END!
2580 ! X =   -128.5097,  -119.2237,     487.000,       0.000!   !END!
2581 ! X =  -128.75609,    -119.23,     548.000,       0.000!   !END!
2582 ! X =  -129.00252, -119.23531,     618.000,       0.000!   !END!
2583 ! X =  -129.24885, -119.24051,     638.000,       0.000!   !END!
2584 ! X =  -129.49518, -119.24582,     650.000,       0.000!   !END!
2585 ! X =  -129.74157, -119.25212,     670.000,       0.000!   !END!
2586 ! X =    -129.988, -119.25742,     670.000,       0.000!   !END!
2587 ! X =  -130.23433, -119.26273,     670.000,       0.000!   !END!
2588 ! X =  -130.48066, -119.26794,     670.000,       0.000!   !END!
2589 ! X =  -130.53775, -119.05858,     667.000,       0.000!   !END!
2590 ! X =  -130.37491, -118.87637,     667.000,       0.000!   !END!
2591 ! X =  -130.21208, -118.69417,     670.000,       0.000!   !END!
2592 ! X =  -130.04925, -118.51196,     651.000,       0.000!   !END!
2593 ! X =  -129.88642, -118.32986,     660.000,       0.000!   !END!
2594 ! X =  -129.87956, -118.08728,     670.000,       0.000!   !END!
2595 ! X =  -129.87261, -117.84471,     670.000,       0.000!   !END!
2596 ! X =   -129.8657, -117.60124,     656.000,       0.000!   !END!
2597 ! X =  -129.85895, -117.35865,     639.000,       0.000!   !END!
2598 ! X =   -129.8521, -117.11617,     626.000,       0.000!   !END!
2599 ! X =  -129.84515,  -116.8736,     624.000,       0.000!   !END!
2600 ! X =  -129.83824, -116.63003,     620.000,       0.000!   !END!
2601 ! X =  -129.75852, -116.41017,     614.000,       0.000!   !END!
2602 ! X =  -129.67865, -116.18933,     601.000,       0.000!   !END!
2603 ! X =  -129.59898, -115.96848,     554.000,       0.000!   !END!
2604 ! X =   -129.5192, -115.74763,     512.000,       0.000!   !END!
2605 ! X =  -129.43938, -115.52768,     462.000,       0.000!   !END!
2606 ! X =  -129.35951, -115.30684,     420.000,       0.000!   !END!
2607 ! X =  -129.27979, -115.08698,     431.000,       0.000!   !END!
2608 ! X =  -129.20002, -114.86614,     466.000,       0.000!   !END!
2609 ! X =  -129.12025, -114.64529,     513.000,       0.000!   !END!
2610 ! X =  -129.04047, -114.42444,     546.000,       0.000!   !END!
2611 ! X =  -128.96065, -114.20449,     591.000,       0.000!   !END!
2612 ! X =  -128.86333, -113.99278,     579.000,       0.000!   !END!
2613 ! X =    -128.766, -113.78106,     584.000,       0.000!   !END!
2614 ! X =  -128.66867, -113.56935,     600.000,       0.000!   !END!
2615 ! X =  -128.57134, -113.35764,     610.000,       0.000!   !END!
2616 ! X =  -128.47402, -113.14592,     609.000,       0.000!   !END!
2617 ! X =  -128.37669, -112.93421,     609.000,       0.000!   !END!
2618 ! X =  -128.27936,  -112.7225,     601.000,       0.000!   !END!
2619 ! X =  -128.18203, -112.51068,     554.000,       0.000!   !END!
2620 ! X =   -128.0847, -112.29897,     496.000,       0.000!   !END!
2621 ! X =  -127.98737, -112.08725,     396.000,       0.000!   !END!
2622 ! X =  -127.92292, -111.88212,     408.000,       0.000!   !END!
2623 ! X =  -127.85852, -111.67609,     467.000,       0.000!   !END!
2624 ! X =  -127.79406, -111.47096,     523.000,       0.000!   !END!
2625 ! X =  -127.72971, -111.26582,     548.000,       0.000!   !END!
2626 ! X =  -127.66515,  -111.0607,     609.000,       0.000!   !END!
2627 ! X =   -127.6007, -110.85557,     639.000,       0.000!   !END!
2628 ! X =  -127.53634, -110.65043,     640.000,       0.000!   !END!
2629 ! X =  -127.30817, -110.60524,     640.000,       0.000!   !END!
2630 ! X =  -127.07999, -110.55994,     606.000,       0.000!   !END!
2631 ! X =  -126.85181, -110.51465,     532.000,       0.000!   !END!
2632 ! X =  -126.62364, -110.46945,     487.000,       0.000!   !END!
2633 ! X =  -126.39557, -110.42416,     404.000,       0.000!   !END!
2634 ! X =   -126.3549, -110.19987,     397.000,       0.000!   !END!
2635 ! X =  -126.31433, -109.97558,     440.000,       0.000!   !END!
2636 ! X =  -126.27372, -109.75239,     443.000,       0.000!   !END!
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2637 ! X =  -126.23306, -109.52811,     474.000,        0.000!   !END!
2638 ! X =  -126.19249, -109.30382,     493.000,        0.000!   !END!
2639 ! X =  -126.15187, -109.08053,     521.000,        0.000!   !END!
2640 ! X =  -126.11131, -108.85624,     541.000,        0.000!   !END!
2641 ! X =  -125.87149, -108.83702,     580.000,        0.000!   !END!
2642 ! X =  -125.63176, -108.81769,     578.000,        0.000!   !END!
2643 ! X =  -125.39204, -108.79846,     548.000,        0.000!   !END!
2644 ! X =  -125.15231, -108.77913,     533.000,        0.000!   !END!
2645 ! X =  -124.91248, -108.75981,     497.000,        0.000!   !END!
2646 ! X =  -124.86892, -108.54655,     524.000,        0.000!   !END!
2647 ! X =  -124.82547, -108.33329,     492.000,        0.000!   !END!
2648 ! X =   -124.7819, -108.11994,     457.000,        0.000!   !END!
2649 ! X =  -124.73825, -107.90669,     448.000,        0.000!   !END!
2650 ! X =  -124.69479, -107.69342,     518.000,        0.000!   !END!
2651 ! X =  -124.65122, -107.48007,     587.000,        0.000!   !END!
2652 ! X =  -124.46305, -107.33994,     609.000,        0.000!   !END!
2653 ! X =  -124.27487,  -107.1998,     609.000,        0.000!   !END!
2654 ! X =  -124.08675, -107.06067,     609.000,        0.000!   !END!
2655 ! X =  -123.89847, -106.92044,     590.000,        0.000!   !END!
2656 ! X =  -123.71029, -106.78031,     521.000,        0.000!   !END!
2657 ! X =  -123.52221, -106.64017,     464.000,        0.000!   !END!
2658 ! X =  -123.33404, -106.50004,     375.000,        0.000!   !END!
2659 ! X =  -123.20254, -106.30754,     401.000,        0.000!   !END!
2660 ! X =   -123.0711, -106.11414,     396.000,        0.000!   !END!
2661 ! X =  -122.93956, -105.92065,     381.000,        0.000!   !END!
2662 ! X =  -122.80811, -105.72725,     382.000,        0.000!   !END!
2663 ! X =  -122.67662, -105.53475,     428.000,        0.000!   !END!
2664 ! X =  -122.54517, -105.34125,     470.000,        0.000!   !END!
2665 ! X =  -122.41373, -105.14785,     487.000,        0.000!   !END!
2666 ! X =  -122.28223, -104.95536,     471.000,        0.000!   !END!
2667 ! X =  -122.15079, -104.76196,     518.000,        0.000!   !END!
2668 ! X =  -122.01934, -104.56846,     582.000,        0.000!   !END!
2669 ! X =   -121.8878, -104.37506,     640.000,        0.000!   !END!
2670 ! X =   -121.7563, -104.18257,     662.000,        0.000!   !END!
2671 ! X =  -121.62485, -103.98907,     640.000,        0.000!   !END!
2672 ! X =  -121.49341, -103.79567,     575.000,        0.000!   !END!
2673 ! X =   -121.4728, -103.56619,     556.000,        0.000!   !END!
2674 ! X =  -121.45214, -103.33573,     499.000,        0.000!   !END!
2675 ! X =  -121.43154, -103.10635,     464.000,        0.000!   !END!
2676 ! X =  -121.41087, -102.87589,     519.000,        0.000!   !END!
2677 ! X =  -121.39021, -102.64542,     599.000,        0.000!   !END!
2678 ! X =  -121.36955, -102.41505,     640.000,        0.000!   !END!
2679 ! X =  -121.34894, -102.18557,     642.000,        0.000!   !END!
2680 ! X =  -121.32828,  -101.9551,     630.000,        0.000!   !END!
2681 ! X =  -121.30768, -101.72573,     570.000,        0.000!   !END!
2682 ! X =  -121.28711, -101.49525,     511.000,        0.000!   !END!
2683 ! X =  -121.26645, -101.26479,     532.000,        0.000!   !END!
2684 ! X =  -121.24585, -101.03541,     572.000,        0.000!   !END!
2685 ! X =  -121.01139, -101.09459,     520.000,        0.000!   !END!
2686 ! X =   -120.7769, -101.15477,     626.000,        0.000!   !END!
2687 ! X =  -120.54255, -101.21395,     626.000,        0.000!   !END!
2688 ! X =  -120.30805, -101.27413,     562.000,        0.000!   !END!
2689 ! X =  -120.26464, -101.07084,     624.000,        0.000!   !END!
2690 ! X =  -120.22111, -100.86745,     650.000,        0.000!   !END!
2691 ! X =   -120.1778, -100.66415,     640.000,        0.000!   !END!
2692 ! X =  -120.13427, -100.46076,     594.000,        0.000!   !END!
2693 ! X =  -120.09085, -100.25736,     597.000,        0.000!   !END!
2694 ! X =  -120.04743, -100.05407,     643.000,        0.000!   !END!
2695 ! X =  -119.83841, -100.12592,     624.000,        0.000!   !END!
2696 ! X =  -119.62929, -100.19779,     609.000,        0.000!   !END!
```

```
2697 ! X =  -119.42026, -100.26955,     603.000,       0.000!   !END!
2698 ! X =  -119.21123,  -100.3414,     617.000,       0.000!   !END!
2699 ! X =  -119.00211, -100.41327,     645.000,       0.000!   !END!
2700 ! X =    -118.964, -100.18106,     644.000,       0.000!   !END!
2701 ! X =  -118.92588,  -99.94885,     640.000,       0.000!   !END!
2702 ! X =  -118.88766,  -99.71654,     640.000,       0.000!   !END!
2703 ! X =  -118.84955,  -99.48433,     640.000,       0.000!   !END!
2704 ! X =  -118.81143,  -99.25212,     640.000,       0.000!   !END!
2705 ! X =  -118.58086,  -99.24167,     640.000,       0.000!   !END!
2706 ! X =  -118.35028,  -99.23122,     622.000,       0.000!   !END!
2707 ! X =  -118.11961,  -99.22078,     612.000,       0.000!   !END!
2708 ! X =  -117.88903,  -99.21033,     640.000,       0.000!   !END!
2709 ! X =  -117.65841,  -99.20089,     640.000,       0.000!   !END!
2710 ! X =  -117.42784,  -99.19044,     639.000,       0.000!   !END!
2711 ! X =  -117.19726,  -99.17999,     640.000,       0.000!   !END!
2712 ! X =  -117.18251,  -99.41579,     640.000,       0.000!   !END!
2713 ! X =  -117.16772,  -99.65259,     642.000,       0.000!   !END!
2714 ! X =  -117.15297,  -99.88838,     650.000,       0.000!   !END!
2715 ! X =  -117.13817, -100.12518,     669.000,       0.000!   !END!
2716 ! X =  -116.93624, -100.21181,     671.000,       0.000!   !END!
2717 ! X =  -116.73421, -100.29845,     670.000,       0.000!   !END!
2718 ! X =  -116.53228, -100.38518,     670.000,       0.000!   !END!
2719 ! X =  -116.33025, -100.47182,     670.000,       0.000!   !END!
2720 ! X =  -116.35972, -100.67538,     671.000,       0.000!   !END!
2721 ! X =  -116.38909, -100.87884,     682.000,       0.000!   !END!
2722 ! X =  -116.41846, -101.08231,     699.000,       0.000!   !END!
2723 ! X =  -116.44793, -101.28586,     701.000,       0.000!   !END!
2724 ! X =  -116.22833, -101.34484,     701.000,       0.000!   !END!
2725 ! X =  -116.00873, -101.40391,     701.000,       0.000!   !END!
2726 ! X =  -115.78909, -101.46398,     682.000,       0.000!   !END!
2727 ! X =   -115.5695, -101.52296,     670.000,       0.000!   !END!
2728 ! X =    -115.522, -101.70339,     670.000,       0.000!   !END!
2729 ! X =  -115.47446, -101.88292,     664.000,       0.000!   !END!
2730 ! X =  -115.42691, -102.06236,     648.000,       0.000!   !END!
2731 ! X =   -115.1915, -102.10764,     596.000,       0.000!   !END!
2732 ! X =  -114.95599, -102.15292,     523.000,       0.000!   !END!
2733 ! X =  -114.72058, -102.19819,     533.000,       0.000!   !END!
2734 ! X =  -114.48513, -102.24447,     548.000,       0.000!   !END!
2735 ! X =  -114.24972, -102.28974,     527.000,       0.000!   !END!
2736 ! X =  -114.01437, -102.33602,     527.000,       0.000!   !END!
2737 ! X =   -114.0208,  -102.0904,     594.000,       0.000!   !END!
2738 ! X =  -114.02743, -101.84478,     620.000,       0.000!   !END!
2739 ! X =  -114.03386, -101.59916,     621.000,       0.000!   !END!
2740 ! X =  -114.04029, -101.35345,     619.000,       0.000!   !END!
2741 ! X =  -114.04682, -101.10783,     613.000,       0.000!   !END!
2742 ! X =  -114.05335, -100.86221,     609.000,       0.000!   !END!
2743 ! X =  -114.05978,  -100.6166,     602.000,       0.000!   !END!
2744 ! X =   -114.0663, -100.37088,     548.000,       0.000!   !END!
2745 ! X =  -114.07283, -100.12526,     472.000,       0.000!   !END!
2746 ! X =  -114.07931,  -99.88064,     413.000,       0.000!   !END!
2747 ! X =  -114.08579,  -99.63402,     426.000,       0.000!   !END!
2748 ! X =  -114.09237,  -99.38929,     432.000,       0.000!   !END!
2749 ! X =   -114.0988,  -99.14368,     427.000,       0.000!   !END!
2750 ! X =  -113.86655,  -99.12634,     396.000,       0.000!   !END!
2751 ! X =   -113.6343,  -99.10891,     367.000,       0.000!   !END!
2752 ! X =  -113.40205,  -99.09158,     365.000,       0.000!   !END!
2753 ! X =   -113.1698,  -99.07414,     400.000,       0.000!   !END!
2754 ! X =  -112.93764,   -99.0567,     428.000,       0.000!   !END!
2755 ! X =  -112.70529,  -99.03938,     458.000,       0.000!   !END!
2756 ! X =  -112.47314,  -99.02194,     528.000,       0.000!   !END!
```

```
 2757 ! X =  -112.24079,  -99.00461,     583.000,       0.000!   !END!
 2758 ! X =  -112.00864,  -98.98717,     612.000,       0.000!   !END!
 2759 ! X =  -112.02039,  -99.16208,     548.000,       0.000!   !END!
 2760 ! X =  -112.03219,  -99.33788,     515.000,       0.000!   !END!
 2761 ! X =  -112.04399,  -99.51377,     464.000,       0.000!   !END!
 2762 ! X =  -111.82827,  -99.54691,     449.000,       0.000!   !END!
 2763 ! X =   -111.6124,  -99.58104,     435.000,       0.000!   !END!
 2764 ! X =  -111.39673,  -99.61517,     426.000,       0.000!   !END!
 2765 ! X =    -111.181,   -99.6483,     411.000,       0.000!   !END!
 2766 ! X =  -110.96523,  -99.68243,     387.000,       0.000!   !END!
 2767 ! X =  -110.74946,  -99.71657,     355.000,       0.000!   !END!
 2768 ! X =  -110.70587,  -99.95564,     335.000,       0.000!   !END!
 2769 ! X =  -110.66228,  -100.1947,     288.000,       0.000!   !END!
 2770 ! X =  -110.61859, -100.43378,     297.000,       0.000!   !END!
 2771 ! X =  -110.38983, -100.40538,     291.000,       0.000!   !END!
 2772 ! X =  -110.16097,   -100.377,     304.000,       0.000!   !END!
 2773 ! X =  -109.93211, -100.34871,     324.000,       0.000!   !END!
 2774 ! X =  -109.70315, -100.32033,     321.000,       0.000!   !END!
 2775 ! X =  -109.47439, -100.29193,     335.000,       0.000!   !END!
 2776 ! X =  -109.24552, -100.26355,     349.000,       0.000!   !END!
 2777 ! X =  -109.01656, -100.23517,     351.000,       0.000!   !END!
 2778 ! X =  -108.78776, -100.20787,     342.000,       0.000!   !END!
 2779 ! X =   -108.5589, -100.17949,     340.000,       0.000!   !END!
 2780 ! X =  -108.32998, -100.15011,     336.000,       0.000!   !END!
 2781 ! X =  -108.10117, -100.12271,     336.000,       0.000!   !END!
 2782 ! X =  -108.10342, -100.33544,     335.000,       0.000!   !END!
 2783 ! X =  -108.10578, -100.54826,     309.000,       0.000!   !END!
 2784 ! X =  -108.10803, -100.76098,     304.000,       0.000!   !END!
 2785 ! X =  -108.11028, -100.97371,     327.000,       0.000!   !END!
 2786 ! X =  -108.11263, -101.18643,     335.000,       0.000!   !END!
 2787 ! X =  -107.91151, -101.19852,     349.000,       0.000!   !END!
 2788 ! X =   -107.7103, -101.21061,     380.000,       0.000!   !END!
 2789 ! X =  -107.50918,  -101.2227,     396.000,       0.000!   !END!
 2790 ! X =  -107.58952, -101.33122,     380.000,       0.000!   !END!
 2791 ! X =  -107.73854, -101.38431,     360.000,       0.000!   !END!
 2792 ! X =  -107.88767,  -101.4374,     335.000,       0.000!   !END!
 2793 ! X =  -108.01581,  -101.3913,     334.000,       0.000!   !END!
 2794 ! X =  -108.14399,  -101.3442,     327.000,       0.000!   !END!
 2795 ! X =  -108.29717, -101.32366,     304.000,       0.000!   !END!
 2796 ! X =  -108.45039, -101.30212,     291.000,       0.000!   !END!
 2797 ! X =  -108.57906, -101.30576,     267.000,       0.000!   !END!
 2798 ! X =  -108.70782,  -101.3093,     260.000,       0.000!   !END!
 2799 ! X =   -108.8357, -101.23837,     274.000,       0.000!   !END!
 2800 ! X =  -108.96358, -101.16735,     295.000,       0.000!   !END!
 2801 ! X =  -109.08736, -101.17106,     310.000,       0.000!   !END!
 2802 ! X =  -109.21113, -101.17467,     323.000,       0.000!   !END!
 2803 ! X =  -109.31432, -101.09901,     335.000,       0.000!   !END!
```

----

a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
HOLCIM BART CLASS I ANALYSIS (UPPER BUFFALO)
JUNE 2008 CONTROL B (Max 30-day avg, 20% NOx, 27% SO2)
UMC 6KM CALMET METEOROLOGICAL DATA
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    ! METDAT = /raid2c/umc/calmet/2003/calmet03.dat !
    or
ISCMET.DAT    input    * ISCDAT =             *
    or
PLMMET.DAT    input    * PLMDAT =             *
    or
PROFILE.DAT   input    * PRFDAT =             *
SURFACE.DAT   input    * SFCDAT =             *
RESTARTB.DAT  input    * RSTARTB=             *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =HOLUB2003CONB608.LST     !
CONC.DAT      output   ! CONDAT =HOLUB2003CONB608.CON     !
DFLX.DAT      output   ! DFDAT  =HOLUB2003CONB608.DRY     !
WFLX.DAT      output   ! WFDAT  =HOLUB2003CONB608.WET     !

VISB.DAT      output   ! VISDAT =HOLUB2003CONB608.VIS     !
RESTARTE.DAT  output   ! RSTARTE=RSRT2003.DAT     !
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =             *
VOLEMARB.DAT  input    * VOLDAT =             *
BAEMARB.DAT   input    * ARDAT  =             *
LNEMARB.DAT   input    * LNDAT  =             *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =C:\BART_Met\OZAP90.DAT    *
VD.DAT        input    * VDDAT  =             *
CHEM.DAT      input    * CHEMDAT=             *
H2O2.DAT      input    * H2O2DAT=             *
HILL.DAT      input    * HILDAT=            *
HILLRCT.DAT   input    * RCTDAT=            *
COASTLN.DAT   input    * CSTDAT=            *
FLUXBDY.DAT   input    * BDYDAT=            *
BCON.DAT      input    * BCNDAT=            *
DEBUG.DAT     output   * DEBUG =            *
MASSFLX.DAT   output   * FLXDAT=            *
MASSBAL.DAT   output   * BALDAT=            *
FOG.DAT       output   * FOGDAT=            *
```

```
-------------------------------------------------------------------------
--------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                     Default: 1       ! NMETDAT =  1   !

     Number of PTEMARB.DAT files for run (NPTDAT)
                                     Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                     Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                     Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if
NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------

-------------------------------------------------------------------------
--------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  2003 !
     (used only if   Month (IBMO) -- No default       ! IBMO =   01 !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =   01 !
                      Hour (IBHR) -- No default       ! IBHR =   01 !

     Base time zone        (XBTZ) -- No default       ! XBTZ = 6.0  !
        PST = 8., MST = 7.
        CST = 6., EST = 5.

     Length of run (hours) (IRLG) -- No default       ! IRLG =  8760 !

     Number of chemical species (NSPEC)
```

```
                                   Default: 5       ! NSPEC =  6   !

     Number of chemical species
     to be emitted  (NSE)          Default: 3       ! NSE =  3   !

     Flag to stop run after
     SETUP phase (ITEST)           Default: 2       ! ITEST =  2   !
     (Used to allow checking
     of the model inputs, files, etc.)
           ITEST = 1 - STOPS program after SETUP phase
           ITEST = 2 - Continues with execution of program
                       after SETUP

     Restart Configuration:

        Control flag (MRESTART)      Default: 0       ! MRESTART =  0
!

           0 = Do not read or write a restart file
           1 = Read a restart file at the beginning of
               the run
           2 = Write a restart file during run
           3 = Read a restart file at beginning of run
               and write a restart file during run

        Number of periods in Restart
        output cycle (NRESPD)        Default: 0       ! NRESPD =  0   !

           0 = File written only at last period
          >0 = File updated every NRESPD periods

     Meteorological Data Format (METFM)
                                   Default: 1       ! METFM =  1   !

           METFM = 1 - CALMET binary file (CALMET.MET)
           METFM = 2 - ISC ASCII file (ISCMET.MET)
           METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
           METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                       surface parameters file (SURFACE.DAT)

  Meteorological Profile Data Format (MPRFFM)
            (used only for METFM = 1, 2, 3)
                                   Default: 1       ! MPRFFM =  1   !

           MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
           MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

     PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
     Averaging Time (minutes) (AVET)
                                   Default: 60.0    ! AVET = 60. !
     PG Averaging Time (minutes) (PGTIME)
                                   Default: 60.0    ! PGTIME = 60. !


!END!


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```

```
INPUT GROUP: 2 -- Technical options
--------------

     Vertical distribution used in the
     near field (MGAUSS)                   Default: 1     ! MGAUSS =  1
!
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                              Default: 3     ! MCTADJ =  3
!
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                          Default: 0     ! MCTSG =  0
!
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated 0 (MSLUG)                   Default: 0     ! MSLUG =  0
!
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled ?
     (MTRANS)                              Default: 1     ! MTRANS =  1
!
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)            Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to simulate building
     downwash? (MBDW)                      Default: 1     ! MBDW =   1
!
        1 = ISC method
        2 = PRIME method

     Vertical wind shear modeled above
     stack top? (MSHEAR)                   Default: 0     ! MSHEAR =  0
!
        0 = no  (i.e., vertical wind shear not modeled)
        1 = yes (i.e., vertical wind shear modeled)

     Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0
!
        0 = no (i.e., puffs not split)
        1 = yes (i.e., puffs are split)

     Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  1
!
```

```
          0 = chemical transformation not
              modeled
          1 = transformation rates computed
              internally (MESOPUFF II scheme)
          2 = user-specified transformation
              rates used
          3 = transformation rates computed
              internally (RIVAD/ARM3 scheme)
          4 = secondary organic aerosol formation
              computed (MESOPUFF II scheme for OH)

       Aqueous phase transformation flag (MAQCHEM)
       (Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0
!
          0 = aqueous phase transformation
              not modeled
          1 = transformation rates adjusted
              for aqueous phase reactions

       Wet removal modeled ? (MWET)          Default: 1     ! MWET =  1
!
          0 = no
          1 = yes

       Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  1
!
          0 = no
          1 = yes
          (dry deposition method specified
           for each species in Input Group 3)

       Method used to compute dispersion
       coefficients (MDISP)                  Default: 3     ! MDISP =  3
!

          1 = dispersion coefficients computed from measured values
              of turbulence, sigma v, sigma w
          2 = dispersion coefficients from internally calculated
              sigma v, sigma w using micrometeorological variables
              (u*, w*, L, etc.)
          3 = PG dispersion coefficients for RURAL areas (computed using
              the ISCST multi-segment approximation) and MP coefficients
in
              urban areas
          4 = same as 3 except PG coefficients computed using
              the MESOPUFF II eqns.
          5 = CTDM sigmas used for stable and neutral conditions.
              For unstable conditions, sigmas are computed as in
              MDISP = 3, described above.  MDISP = 5 assumes that
              measured values are read

       Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
       (Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3
!
          1 = use sigma-v or sigma-theta measurements
              from PROFILE.DAT to compute sigma-y
              (valid for METFM = 1, 2, 3, 4)
          2 = use sigma-w measurements
              from PROFILE.DAT to compute sigma-z
              (valid for METFM = 1, 2, 3, 4)
```

```
         3 = use both sigma-(v/theta) and sigma-w
             from PROFILE.DAT to compute sigma-y and sigma-z
             (valid for METFM = 1, 2, 3, 4)
         4 = use sigma-theta measurements
             from PLMMET.DAT to compute sigma-y
             (valid only if METFM = 3)

      Back-up method used to compute dispersion
      when measured turbulence data are
      missing (MDISP2)                      Default: 3     ! MDISP2 =  3
!
      (used only if MDISP = 1 or 5)
         2 = dispersion coefficients from internally calculated
             sigma v, sigma w using micrometeorological variables
             (u*, w*, L, etc.)
         3 = PG dispersion coefficients for RURAL areas (computed using
             the ISCST multi-segment approximation) and MP coefficients
in
             urban areas
         4 = same as 3 except PG coefficients computed using
             the MESOPUFF II eqns.

    [DIAGNOSTIC FEATURE]
      Method used for Lagrangian timescale for Sigma-y
      (used only if MDISP=1,2 or MDISP2=1,2)
      (MTAULY)                              Default: 0     ! MTAULY =  0
!
         0 = Draxler default 617.284 (s)
         1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
        10 < Direct user input (s)             -- e.g., 306.9


      [DIAGNOSTIC FEATURE]
      Method used for Advective-Decay timescale for Turbulence
      (used only if MDISP=2 or MDISP2=2)
      (MTAUADV)                             Default: 0     ! MTAUADV =  0
!
         0 = No turbulence advection
         1 = Computed (OPTION NOT IMPLEMENTED)
        10 < Direct user input (s)   -- e.g., 300


      Method used to compute turbulence sigma-v &
      sigma-w using micrometeorological variables
      (Used only if MDISP = 2 or MDISP2 = 2)
      (MCTURB)                              Default: 1     ! MCTURB =  1
!
         1 = Standard CALPUFF subroutines
         2 = AERMOD subroutines

      PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH =  0
!
      (MROUGH)
         0 = no
         1 = yes

      Partial plume penetration of          Default: 1     ! MPARTL =  1
!
      elevated inversion?
      (MPARTL)
```

```
         0 = no
         1 = yes

      Strength of temperature inversion     Default: 0     ! MTINV =  0
!
      provided in PROFILE.DAT extended records?
      (MTINV)
         0 = no (computed from measured/default gradients)
         1 = yes

      PDF used for dispersion under convective conditions?
                                            Default: 0     ! MPDF =  0  !
      (MPDF)
         0 = no
         1 = yes

      Sub-Grid TIBL module used for shore line?
                                            Default: 0     ! MSGTIBL = 0
!
      (MSGTIBL)
         0 = no
         1 = yes

      Boundary conditions (concentration) modeled?
                                            Default: 0     ! MBCON = 0  !
      (MBCON)
         0 = no
         1 = yes, using formatted BCON.DAT file
         2 = yes, using unformatted CONC.DAT file


      Analyses of fogging and icing impacts due to emissions from
      arrays of mechanically-forced cooling towers can be performed
      using CALPUFF in conjunction with a cooling tower emissions
      processor (CTEMISS) and its associated postprocessors.  Hourly
      emissions of water vapor and temperature from each cooling tower
      cell are computed for the current cell configuration and ambient
      conditions by CTEMISS. CALPUFF models the dispersion of these
      emissions and provides cloud information in a specialized format
      for further analysis. Output to FOG.DAT is provided in either
      'plume mode' or 'receptor mode' format.

      Configure for FOG Model output?
                                            Default: 0     ! MFOG =  0
!
      (MFOG)
         0 = no
         1 = yes  - report results in PLUME Mode format
         2 = yes  - report results in RECEPTOR Mode format


      Test options specified to see if
      they conform to regulatory
      values? (MREG)                        Default: 1     ! MREG =  1
!

         0 = NO checks are made
         1 = Technical options must conform to USEPA
             Long Range Transport (LRT) guidance
                        METFM    1 or 2
```

```
                   AVET     60. (min)
                   PGTIME   60. (min)
                   MGAUSS   1
                   MCTADJ   3
                   MTRANS   1
                   MTIP     1
                   MCHEM    1 or 3 (if modeling SOx, NOx)
                   MWET     1
                   MDRY     1
                   MDISP    2 or 3
                   MPDF     0 if MDISP=3
                            1 if MDISP=2
                   MROUGH   0
                   MPARTL   1
                   SYTDEP   550. (m)
                   MHFTSZ   0


!END!


------------------------------------------------------------------------
-------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!

                                                                  Dry
OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED
NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,
(0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS
1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE
2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)
3= etc.)

!          SO2  =         1,               1,            1,
0   !
!          SO4  =         1,               0,            2,
0   !
!          NOX  =         1,               1,            1,
0   !
!         HNO3  =         1,               0,            1,
```

```
0   !
!          NO3  =         1,                0,           2,
0   !
!         PM10  =         1,                1,           2,
0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.



------------------------------------------------------------------------
-------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  15   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 37N  !
     (RLON0)                    No Default      ! RLON0 = 92W  !
```

```
         TTM :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of
projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of
projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping
plane
                RLAT0 identifies latitude of tangent-point of mapping
plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                    No Default      ! XLAT1 = 30N  !
     (XLAT2)                    No Default      ! XLAT2 = 45N  !

         LCC :  Projection cone slices through Earth's surface at XLAT1
and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of
the
     Earth known as the World Geodetic System 1984 (WGS-G ).  Other
local
     models may be in use, and their selection in CALMET will make its
output
     consistent with local mapping products.  The list of Datum-Regions
with
     official transformation parameters is provided by the National
Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)

------------------------------------------------------------------------
------
     WGS-G     WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS
(NAD27)
     NWS-27    NWS 6370KM Radius, Sphere
     NWS-84    NWS 6370KM Radius, Sphere
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere
```

```
     Datum-region for output coordinates
     (DATUM)                    Default: WGS-G     ! DATUM = WGS-84  !


METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =   87   !
            No. Y grid cells (NY)      No default     ! NY =  111   !
         No. vertical layers (NZ)      No default     ! NZ =  10   !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 6 !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1200., 2000., 3000.,
             4000. !

            Reference Coordinates
           of SOUTHWEST corner of
                 grid cell(1, 1):

            X-coordinate (XORIGKM)     No default     ! XORIGKM = -258.
!
            Y coordinate (YORIGKM)     No default     ! YORIGKM = -330.
!
                                      Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET.
grid.
     The lower left (LL) corner of the computational grid is at grid
point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of
the
     computational grid is at grid point (IECOMP, JECOMP) of the MET.
grid.
     The grid spacing of the computational grid is the same as the MET.
grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =   1
!
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =   1
!
                  (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)      No default     ! IECOMP =
87   !
                  (1 <= IECOMP <= NX)
```

```
        Y index of UR corner (JECOMP)      No default     ! JECOMP =
111   !
                  (1 <= JECOMP <= NY)


SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of
the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the
computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1
!
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1
!
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =
87   !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =
111   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1
!
        (MESHDN is an integer >= 1)

!END!


-----------------------------------------------------------------------
-------


INPUT GROUP: 5 -- Output Options
--------------
                                             *
*
     FILE                       DEFAULT VALUE             VALUE THIS RUN
     ----                       -------------             --------------

   Concentrations (ICON)              1                   !  ICON =  1
!
```

```
   Dry Fluxes (IDRY)                  1                    !  IDRY =  1
!
   Wet Fluxes (IWET)                  1                    !  IWET =  1
!
   Relative Humidity (IVIS)           1                    !  IVIS =  1
!
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                           Default: T          ! LCOMPRS = T
!

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                         Default: 0          ! IMFLX =  0
!
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                         Default: 0          ! IMBAL =  0
!
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)    Default: 0          ! ICPRT =  0
!
       Print dry fluxes (IDPRT)        Default: 0          ! IDPRT =  0
!
       Print wet fluxes (IWPRT)        Default: 0          ! IWPRT =  0
!
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours                Default: 1          ! ICFRQ =  1
!
       Dry flux print interval
       (IDFRQ) in hours                Default: 1          ! IDFRQ =  1
!
       Wet flux print interval
       (IWFRQ) in hours                Default: 1          ! IWFRQ =  1
!

       Units for Line Printer Output
       (IPRTU)                         Default: 1          ! IPRTU =  3
!
                       for            for
```

```
                  Concentration    Deposition
           1 =       g/m**3         g/m**2/s
           2 =      mg/m**3        mg/m**2/s
           3 =      ug/m**3        ug/m**2/s
           4 =      ng/m**3        ng/m**2/s
           5 =     Odour Units

       Messages tracking progress of run
       written to the screen ?
       (IMESG)                        Default: 2         ! IMESG =  2
!
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------
------ WET FLUXES ------   -- MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?
PRINTED?  SAVED ON DISK?   SAVED ON DISK?
   -------       ------------------------   ------------------------
------------------------   ---------------
!          SO2 =     0,            1,            0,            1,
0,           1,          0   !
!          SO4 =     0,            1,            0,            1,
0,           1,          0   !
!          NOX =     0,            1,            0,            1,
0,           1,          0   !
!         HNO3 =     0,            1,            0,            1,
0,           1,          0   !
!          NO3 =     0,            1,            0,            1,
0,           1,          0   !
!         PM10 =     0,            1,            0,            1,
0,           1,          0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                Default: F     ! LDEBUG
= F !

       First puff to track
       (IPFDEB)                                Default: 1     ! IPFDEB
=  1  !

       Number of puffs to track
       (NPFDEB)                                Default: 1     ! NPFDEB
=  1  !

       Met. period to start output
       (NN1)                                   Default: 1     ! NN1 =
1   !

       Met. period to end output
       (NN2)                                   Default: 10    ! NN2 =
10  !
```

```
!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =
0   !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC
=  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                  No Default     ! MHILL =
2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M
= 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M
= 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM
= 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL           XC        YC       THETAH  ZGRID  RELIEF    EXPO 1
EXPO 2   SCALE 1    SCALE 2    AMAX1     AMAX2
 NO.          (km)      (km)      (deg.)   (m)     (m)      (m)
```

```
(m)       (m)        (m)       (m)       (m)
----          ----      ----      ------  -----  ------    ------
------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                      XRCT         YRCT        ZRCT          XHH
                      (km)         (km)         (m)
                     ------       -----      ------         ----


------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid
elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain
receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a
separate
           input subgroup and therefore must end with an input group
terminator.

-------------------------------------------------------------------------
-------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY
MESOPHYLL RESISTANCE     HENRY'S LAW COEFFICIENT
       NAME        (cm**2/s)
(s/cm)                (dimensionless)
      -------     -----------      ----------      ----------
--------------------     -----------------------

!          SO2 =     0.1509,         1000.,            8.,
```

```
0.,                  0.04 !
!          NOX =     0.1656,            1.,            8.,
5.,                   3.5 !
!         HNO3 =     0.1628,            1.,           18.,
0.,            0.00000008 !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard
deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                   DEVIATION
                        (microns)                  (microns)
      -------      -------------------        ------------------
!          SO4 =          0.48,                       2.   !
!          NO3 =          0.48,                       2.   !
!         PM10 =            2.,                       2.   !

!END!


-------------------------------------------------------------------------
-------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                           Default: 30    !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                             Default: 10    !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                          Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                            Default: 9     !   NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                            Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation
```

```
!END!


-----------------------------------------------------------------------
-------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,              0.0E00 !
!          SO4 =         1.0E-04,             3.0E-05 !
!         HNO3 =         6.0E-05,              0.0E00 !
!          NO3 =         1.0E-04,             3.0E-05 !
!         PM10 =         1.0E-04,             3.0E-05 !

!END!


-----------------------------------------------------------------------
-------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0
!
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                    Default: 12*80.
     !  BCKO3 = 26.00, 26.00, 26.00, 65.00, 65.00, 80.00, 80.00, 80.00,
65.00, 65.00, 26.00, 26.00 !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                   Default: 12*10.
     !  BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50,
0.50, 0.50, 0.50 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2          ! RNITE1 =
.2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0          ! RNITE2 =
2.0 !
```

```
     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                   Default: 2.0          ! RNITE3 =
2.0 !

     H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =
0   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb                  Default: 12*1.
     !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
     (used only if MCHEM = 4)

     The SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)
          VOC / NOX ratio (after reaction)         (VCNX)
     to characterize the air mass when computing
     the formation of SOA from VOC emissions.
     Typical values for several distinct air mass types are:

        Month    1    2    3    4    5    6    7    8    9   10   11
12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Dec

     Clean Continental
        BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
1.
        OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20
.15
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Clean Marine (surface)
        BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
.5
        OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30
.25
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.
50.

     Urban - low biogenic (controls present)
        BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
30.
        OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20
.20
        VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.
4.

     Urban - high biogenic (controls present)
```

```
        BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
60.
        OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35
.25
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Regional Plume
        BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
20.
        OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30
.20
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
15.

     Urban - no controls present
        BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
100.
        OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35
.30
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.
2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20,
0.20, 0.20, 0.15 !
     !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00,
50.00, 50.00, 50.00, 50.00 !


!END!


------------------------------------------------------------------------
-------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                           Default: 550.   ! SYTDEP
= 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                   Default: 0      ! MHFTSZ
=  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                               Default: 5      ! JSUP =
5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)     Default: 0.01   ! CONK1
```

```
= .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                   Default: 0.1    ! CONK2
= .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                     Default: 0.5    ! TBD =
.5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                            Default: 10     ! IURB1
=  10  !
                                                        19     ! IURB2
=  19  !

     Site characterization parameters for single-point Met data files
---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                             Default: 20     !
ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                                 Default: 0.25   ! Z0IN =
.25 !

        Leaf area index for modeling domain
        (XLAIIN)                               Default: 3.0    ! XLAIIN
= 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                               Default: 0.0    ! ELEVIN
= .0 !

        Latitude (degrees) for met location
        (XLATIN)                               Default: -999.  ! XLATIN
= -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                               Default: -999.  ! XLONIN
= -999.0 !

     Specialized information for interpreting single-point Met data
files -----

        Anemometer height (m) (Used only if METFM = 2,3)
        (ANEMHT)                               Default: 10.    ! ANEMHT
= 10.0 !

        Form of lateral turbulance data in PROFILE.DAT file
        (Used only if METFM = 4 or MTURBVW = 1 or 3)
```

```
        (ISIGMAV)                               Default: 1      !
ISIGMAV =  1  !
            0 = read sigma-theta
            1 = read sigma-v

        Choice of mixing heights (Used only if METFM = 4)
        (IMIXCTDM)                              Default: 0      !
IMIXCTDM =  0  !
            0 = read PREDICTED mixing heights
            1 = read OBSERVED mixing heights

     Maximum length of a slug (met. grid units)
     (XMXLEN)                                   Default: 1.0    ! XMXLEN
= 1.0 !

     Maximum travel distance of a puff/slug (in
     grid units) during one sampling step
     (XSAMLEN)                                  Default: 1.0    !
XSAMLEN = 1.0 !

     Maximum Number of slugs/puffs release from
     one source during one time step
     (MXNEW)                                    Default: 99     ! MXNEW
=  99   !

     Maximum Number of sampling steps for
     one puff/slug during one time step
     (MXSAM)                                    Default: 99     ! MXSAM
=  99   !

     Number of iterations used when computing
     the transport wind for a sampling step
     that includes gradual rise (for CALMET
     and PROFILE winds)
     (NCOUNT)                                   Default: 2      ! NCOUNT
=  2   !

     Minimum sigma y for a new puff/slug (m)
     (SYMIN)                                    Default: 1.0    ! SYMIN
= 1.0  !

     Minimum sigma z for a new puff/slug (m)
     (SZMIN)                                    Default: 1.0    ! SZMIN
= 1.0  !

     Default minimum turbulence velocities sigma-v and sigma-w
     for each stability class over land and over water (m/s)
     (SVMIN(12) and SWMIN(12))

                     ----------  LAND  ----------       ---------  WATER
----------
        Stab Class :  A    B    C    D    E    F         A    B    C
D    E    F
                     ---  ---  ---  ---  ---  ---       ---  ---  ---
---  ---  ---
     Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37,
.37, .37, .37
     Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08,
.06, .03, .016
```

```
           ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370,
0.370, 0.370, 0.370, 0.370, 0.370!
           ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200,
0.120, 0.080, 0.060, 0.030, 0.016!


     Divergence criterion for dw/dz across puff
     used to initiate adjustment for horizontal
     convergence (1/s)
     Partial adjustment starts at CDIV(1), and
     full adjustment is reached at CDIV(2)
     (CDIV(2))                                  Default: 0.0,0.0  ! CDIV
= .0, .0 !

     Minimum wind speed (m/s) allowed for
     non-calm conditions. Also used as minimum
     speed returned when using power-law
     extrapolation toward surface
     (WSCALM)                                   Default: 0.5    ! WSCALM
= .5 !

     Maximum mixing height (m)
     (XMAXZI)                                   Default: 3000.  ! XMAXZI
= 4000.0 !

     Minimum mixing height (m)
     (XMINZI)                                   Default: 50.    ! XMINZI
= 20.0 !

     Default wind speed classes --
     5 upper bounds (m/s) are entered;
     the 6th class has no upper limit
     (WSCAT(5))                     Default   :
                                    ISC RURAL : 1.54, 3.09, 5.14, 8.23,
10.8 (10.8+)

                              Wind Speed Class :  1     2     3     4
5
                                                 ---   ---   ---   ---
---
                                      ! WSCAT = 1.54, 3.09, 5.14, 8.23,
10.80 !

     Default wind speed profile power-law
     exponents for stabilities 1-6
     (PLX0(6))                      Default   : ISC RURAL values
                                    ISC RURAL : .07, .07, .10, .15,
.35, .55
                                    ISC URBAN : .15, .15, .20, .25,
.30, .30

                               Stability Class :  A     B     C     D
E     F
                                                 ---   ---   ---   ---
---   ---
                                       ! PLX0 = 0.07, 0.07, 0.10, 0.15,
0.35, 0.55 !

     Default potential temperature gradient
     for stable classes E, F (degK/m)
```

```
     (PTG0(2))                      Default: 0.020, 0.035
                                       ! PTG0 = 0.020,   0.035 !

     Default plume path coefficients for
     each stability class (used when option
     for partial plume height terrain adjustment
     is selected -- MCTADJ=3)
     (PPC(6))                 Stability Class :  A     B     C     D
E     F
                                 Default  PPC : .50,  .50,  .50,  .50,
.35,  .35
                                                ---   ---   ---   ---
---   ---
                                       !  PPC = 0.50, 0.50, 0.50, 0.50,
0.35, 0.35 !

     Slug-to-puff transition criterion factor
     equal to sigma-y/length of slug
     (SL2PF)                             Default: 10.        ! SL2PF =
10.0 !

     Puff-splitting control variables ------------------------

       VERTICAL SPLIT
       --------------

       Number of puffs that result every time a puff
       is split - nsplit=2 means that 1 puff splits
       into 2
       (NSPLIT)                          Default:   3        ! NSPLIT
=  3  !

       Time(s) of a day when split puffs are eligible to
       be split once again; this is typically set once
       per day, around sunset before nocturnal shear develops.
       24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
       0=do not re-split    1=eligible for re-split
       (IRESPLIT(24))                    Default:  Hour 17 = 1
       !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

       Split is allowed only if last hour's mixing
       height (m) exceeds a minimum value
       (ZISPLIT)                         Default: 100.       ! ZISPLIT
= 100.0 !

       Split is allowed only if ratio of last hour's
       mixing ht to the maximum mixing ht experienced
       by the puff is less than a maximum value (this
       postpones a split until a nocturnal layer develops)
       (ROLDMAX)                         Default: 0.25       ! ROLDMAX
= 0.25 !


       HORIZONTAL SPLIT
       ----------------

       Number of puffs that result every time a puff
       is split - nsplith=5 means that 1 puff splits
       into 5
       (NSPLITH)                         Default:   5        ! NSPLITH
```

```
= 5 !

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
       (SYSPLITH)                          Default:  1.0       !
SYSPLITH = 1.0 !

       Minimum puff elongation rate (SYSPLITH/hr) due to
       wind shear, before it may be split
       (SHSPLITH)                          Default:  2.        !
SHSPLITH = 2.0 !

       Minimum concentration (g/m^3) of each
       species in puff before it may be split
       Enter array of NSPEC values; if a single value is
       entered, it will be used for ALL species
       (CNSPLITH)                          Default:  1.0E-07   !
CNSPLITH = 1.0E-07 !

     Integration control variables ------------------------

       Fractional convergence criterion for numerical SLUG
       sampling integration
       (EPSSLUG)                           Default:   1.0e-04  ! EPSSLUG
= 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                           Default:   1.0e-06  ! EPSAREA
= 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                            Default:   1.0      ! DSRISE
= 1.0 !

       Boundary Condition (BC) Puff control variables
------------------------

       Minimum height (m) to which BC puffs are mixed as they are
emitted
       (MBCON=2 ONLY).  Actual height is reset to the current mixing
height
       at the release point if greater than this minimum.
       (HTMINBC)                           Default:   500.     ! HTMINBC
= 500.0 !

       Search radius (in BC segment lengths) about a receptor for
sampling
       nearest BC puff.  BC puffs are emitted with a spacing of one
segment
       length, so the search radius should be greater than 1.
       (RSAMPBC)                           Default:   4.      ! RSAMPBC
= 10.0 !

       Near-Surface depletion adjustment to concentration profile used
when
       sampling BC puffs?
       (MDEPBC)                            Default:   1        ! MDEPBC
= 1 !
```

```
          0 = Concentration is NOT adjusted for depletion
          1 = Adjust Concentration for depletion

!END!


------------------------------------------------------------------------
-------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =   1  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                        a
          POINT SOURCE: CONSTANT DATA
          -----------------------------

b          c
  Source       X         Y       Stack    Base     Stack    Exit  Exit
Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.
Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg.
K)
  ------   ---------- ---------- ------  ------   -------- -----
```

```
-------- ----- --------
   1 ! SRCNAM = EP14 !
   1 ! X =  89.5282,  262.5797,  76.20, 155.45,  6.40, 9.55, 447.59,
0.0, 3.086288E02,  0.0E00,  2.220052E02,
       0.0E00,  0.0E00, 6.5294E00 !
   1 ! FMFAC  =      1.0 !   !END!
--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column
headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to
represent
             the effect of rain-caps or other physical configurations
that
             reduce momentum rise associated with the actual exit
velocity.
             (Default: 1.0  -- full momentum used)

    b
     0. = No building downwash modeled, 1. = downwash modeled
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
           -------------------------------------------------------
Source
a
 No.       Effective building height, width, length and X/Y offset (in
meters)
           every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed
for
           MBDW=2 (PRIME downwash option)
------
--------------------------------------------------------------------

--------

    a
     Building height, width, length, and X/Y offset from the source are
treated
     as a separate input subgroup for each source and therefore must end
with
```

```
     an input group terminator.  The X/Y offset is the position,
relative to the
     stack, of the center of the upwind face of the projected building,
with the
     x-axis pointing along the flow direction.

---------------
Subgroup (13d)
---------------
                                                 a
          POINT SOURCE: VARIABLE EMISSIONS DATA
          ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 13b.  Factors entered multiply the rates in 13b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
--------------------------------

---------------
Subgroup (14a)
---------------

     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  0
!

     Units used for area source
     emissions below            (IARU)       Default: 1  !  IARU =   1
```

```
!
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                     a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                         b
Source           Effect.    Base      Initial    Emission
 No.             Height   Elevation   Sigma z     Rates
                   (m)       (m)        (m)
-------          ------    ------     --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
           --------------------------------------------------------
Source                                                               a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
```

```
---------------
Subgroup (14d)
---------------
                                                   a
          AREA SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 14b.  Factors entered multiply the rates in 14b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
-------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                              No default  !  NLN2
=  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)        No default   !
NLINES =  0  !
```

```
     Units used for line source
     emissions below                (ILNU)          Default: 1  !  ILNU
=   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7   !
MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6   !
NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default   ! XL =
.0 !
                                                    (in meters)

        Average building height (HBL)               No default   ! HBL =
.0 !
                                                    (in meters)

        Average building width (WBL)                No default   ! WBL =
.0 !
                                                    (in meters)

        Average line source width (WML)             No default   ! WML =
.0 !
                                                    (in meters)

        Average separation between buildings (DXL)  No default   ! DXL =
.0 !
                                                    (in meters)

        Average buoyancy parameter (FPRIMEL)        No default   !
FPRIMEL = .0 !
                                                    (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
          ----------------------------------
```

```
a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base
Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height
Elevation      Rates
            (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------
---------    ---------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                        a
          BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


------------------------------------------------------------------------
```

```
-------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0
!

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1
!
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0
!

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0
!

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                        a
           VOLUME SOURCE: CONSTANT DATA
           ------------------------------

b
         X           Y        Effect.    Base     Initial    Initial
Emission
     Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z
Rates
        (km)       (km)         (m)       (m)        (m)       (m)
     ----------  ----------   ------    ------    --------   --------
--------

--------
    a
     Data for each source are treated as a separate input subgroup
```

```
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                                 a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                               Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling
factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where
temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)

------------------------------------------------------------------------
-------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
-----------------------

---------------
Subgroup (17a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC =  2803
!

!END!

---------------
Subgroup (17b)
---------------
                                               a
           NON-GRIDDED (DISCRETE) RECEPTOR DATA
           ------------------------------------
```

Receptor No.		X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height Above Ground (m)	b
1	! X =	-130.28262,	-119.26119,	670.000,	0.000!	!END!
2	! X =	-130.27992,	-119.0126,	670.000,	0.000!	!END!
3	! X =	-130.03243,	-119.01534,	670.000,	0.000!	!END!
4	! X =	-130.02974,	-118.76675,	670.000,	0.000!	!END!
5	! X =	-130.02704,	-118.51816,	664.000,	0.000!	!END!
6	! X =	-129.78504,	-119.01797,	670.000,	0.000!	!END!
7	! X =	-129.78235,	-118.76948,	670.000,	0.000!	!END!
8	! X =	-129.77965,	-118.52089,	648.000,	0.000!	!END!
9	! X =	-129.77696,	-118.2723,	670.000,	0.000!	!END!
10	! X =	-129.77417,	-118.02382,	670.000,	0.000!	!END!
11	! X =	-129.77148,	-117.77523,	670.000,	0.000!	!END!
12	! X =	-129.76879,	-117.52674,	656.000,	0.000!	!END!
13	! X =	-129.76609,	-117.27815,	635.000,	0.000!	!END!
14	! X =	-129.7634,	-117.02956,	632.000,	0.000!	!END!
15	! X =	-129.76071,	-116.78107,	632.000,	0.000!	!END!
16	! X =	-129.75801,	-116.53247,	621.000,	0.000!	!END!
17	! X =	-129.53755,	-119.0207,	654.000,	0.000!	!END!
18	! X =	-129.53485,	-118.77211,	647.000,	0.000!	!END!
19	! X =	-129.53216,	-118.52353,	645.000,	0.000!	!END!
20	! X =	-129.52947,	-118.27504,	670.000,	0.000!	!END!
21	! X =	-129.52677,	-118.02645,	670.000,	0.000!	!END!
22	! X =	-129.52408,	-117.77796,	670.000,	0.000!	!END!
23	! X =	-129.52139,	-117.52937,	662.000,	0.000!	!END!
24	! X =	-129.51869,	-117.28078,	650.000,	0.000!	!END!
25	! X =	-129.51601,	-117.03229,	641.000,	0.000!	!END!
26	! X =	-129.51331,	-116.78369,	640.000,	0.000!	!END!
27	! X =	-129.51062,	-116.5352,	639.000,	0.000!	!END!
28	! X =	-129.50793,	-116.28661,	624.000,	0.000!	!END!
29	! X =	-129.50524,	-116.03812,	591.000,	0.000!	!END!
30	! X =	-129.50244,	-115.78953,	523.000,	0.000!	!END!
31	! X =	-129.29015,	-119.02333,	629.000,	0.000!	!END!
32	! X =	-129.28746,	-118.77474,	620.000,	0.000!	!END!
33	! X =	-129.28477,	-118.52625,	629.000,	0.000!	!END!
34	! X =	-129.28207,	-118.27767,	658.000,	0.000!	!END!
35	! X =	-129.27928,	-118.02918,	670.000,	0.000!	!END!
36	! X =	-129.27659,	-117.78059,	670.000,	0.000!	!END!
37	! X =	-129.27389,	-117.532,	658.000,	0.000!	!END!
38	! X =	-129.2712,	-117.28351,	659.000,	0.000!	!END!
39	! X =	-129.26851,	-117.03492,	643.000,	0.000!	!END!
40	! X =	-129.26582,	-116.78643,	640.000,	0.000!	!END!
41	! X =	-129.26312,	-116.53784,	640.000,	0.000!	!END!
42	! X =	-129.26043,	-116.28935,	640.000,	0.000!	!END!
43	! X =	-129.25774,	-116.04076,	620.000,	0.000!	!END!
44	! X =	-129.25505,	-115.79226,	593.000,	0.000!	!END!
45	! X =	-129.25235,	-115.54367,	484.000,	0.000!	!END!
46	! X =	-129.24966,	-115.29508,	426.000,	0.000!	!END!
47	! X =	-129.24697,	-115.04659,	436.000,	0.000!	!END!
48	! X =	-129.04266,	-119.02597,	599.000,	0.000!	!END!
49	! X =	-129.03997,	-118.77748,	583.000,	0.000!	!END!
50	! X =	-129.03727,	-118.52889,	612.000,	0.000!	!END!
51	! X =	-129.03458,	-118.2804,	643.000,	0.000!	!END!
52	! X =	-129.03189,	-118.03181,	670.000,	0.000!	!END!
53	! X =	-129.02919,	-117.78322,	663.000,	0.000!	!END!
54	! X =	-129.0265,	-117.53473,	668.000,	0.000!	!END!
55	! X =	-129.02381,	-117.28614,	668.000,	0.000!	!END!
56	! X =	-129.02112,	-117.03765,	643.000,	0.000!	!END!

```
 57 ! X =  -129.01842, -116.78906,     640.000,       0.000!   !END!
 58 ! X =  -129.01573, -116.54057,     640.000,       0.000!   !END!
 59 ! X =  -129.01304, -116.29198,     640.000,       0.000!   !END!
 60 ! X =  -129.01034, -116.04339,     636.000,       0.000!   !END!
 61 ! X =  -129.00765, -115.79489,     612.000,       0.000!   !END!
 62 ! X =  -129.00496,  -115.5463,     545.000,       0.000!   !END!
 63 ! X =  -129.00217, -115.29782,     457.000,       0.000!   !END!
 64 ! X =  -128.99947, -115.04922,     428.000,       0.000!   !END!
 65 ! X =  -128.99678, -114.80073,     462.000,       0.000!   !END!
 66 ! X =  -128.99409, -114.55214,     505.000,       0.000!   !END!
 67 ! X =   -128.9914, -114.30364,     579.000,       0.000!   !END!
 68 ! X =  -128.79527,  -119.0287,     518.000,       0.000!   !END!
 69 ! X =  -128.79257, -118.78011,     487.000,       0.000!   !END!
 70 ! X =  -128.78988, -118.53162,     548.000,       0.000!   !END!
 71 ! X =  -128.78719, -118.28303,     589.000,       0.000!   !END!
 72 ! X =  -128.78439, -118.03445,     601.000,       0.000!   !END!
 73 ! X =   -128.7817, -117.78596,     619.000,       0.000!   !END!
 74 ! X =  -128.77901, -117.53737,     640.000,       0.000!   !END!
 75 ! X =  -128.77632, -117.28888,     640.000,       0.000!   !END!
 76 ! X =  -128.77362, -117.04029,     627.000,       0.000!   !END!
 77 ! X =  -128.77093,  -116.7918,     626.000,       0.000!   !END!
 78 ! X =  -128.76823,  -116.5432,     640.000,       0.000!   !END!
 79 ! X =  -128.76554, -116.29461,     640.000,       0.000!   !END!
 80 ! X =  -128.76285, -116.04612,     640.000,       0.000!   !END!
 81 ! X =  -128.76015, -115.79753,     632.000,       0.000!   !END!
 82 ! X =  -128.75746, -115.54904,     598.000,       0.000!   !END!
 83 ! X =  -128.75477, -115.30045,     527.000,       0.000!   !END!
 84 ! X =  -128.75208, -115.05195,     450.000,       0.000!   !END!
 85 ! X =  -128.74938, -114.80336,     414.000,       0.000!   !END!
 86 ! X =  -128.74669, -114.55487,     457.000,       0.000!   !END!
 87 ! X =    -128.744, -114.30627,     487.000,       0.000!   !END!
 88 ! X =  -128.74131, -114.05778,     520.000,       0.000!   !END!
 89 ! X =  -128.73861, -113.80919,     579.000,       0.000!   !END!
 90 ! X =  -128.54777, -119.03133,     457.000,       0.000!   !END!
 91 ! X =  -128.54508, -118.78284,     439.000,       0.000!   !END!
 92 ! X =  -128.54239, -118.53426,     457.000,       0.000!   !END!
 93 ! X =   -128.5397, -118.28577,     486.000,       0.000!   !END!
 94 ! X =    -128.537, -118.03718,     499.000,       0.000!   !END!
 95 ! X =  -128.53431, -117.78859,     557.000,       0.000!   !END!
 96 ! X =  -128.53161,  -117.5401,     591.000,       0.000!   !END!
 97 ! X =  -128.52892, -117.29151,     583.000,       0.000!   !END!
 98 ! X =  -128.52623, -117.04302,     579.000,       0.000!   !END!
 99 ! X =  -128.52353, -116.79443,     579.000,       0.000!   !END!
100 ! X =  -128.52084, -116.54583,     614.000,       0.000!   !END!
101 ! X =  -128.51815, -116.29734,     636.000,       0.000!   !END!
102 ! X =  -128.51545, -116.04875,     638.000,       0.000!   !END!
103 ! X =  -128.51276, -115.80026,     625.000,       0.000!   !END!
104 ! X =  -128.51006, -115.55167,     610.000,       0.000!   !END!
105 ! X =  -128.50737, -115.30318,     579.000,       0.000!   !END!
106 ! X =  -128.50468, -115.05458,     525.000,       0.000!   !END!
107 ! X =  -128.50199, -114.80609,     471.000,       0.000!   !END!
108 ! X =  -128.49929,  -114.5575,     411.000,       0.000!   !END!
109 ! X =   -128.4965, -114.30901,     405.000,       0.000!   !END!
110 ! X =  -128.49381, -114.06042,     448.000,       0.000!   !END!
111 ! X =  -128.49112, -113.81192,     483.000,       0.000!   !END!
112 ! X =  -128.48842, -113.56333,     579.000,       0.000!   !END!
113 ! X =  -128.48573, -113.31483,     604.000,       0.000!   !END!
114 ! X =  -128.30038, -119.03406,     414.000,       0.000!   !END!
115 ! X =  -128.29769, -118.78548,     422.000,       0.000!   !END!
116 ! X =    -128.295, -118.53699,     422.000,       0.000!   !END!
```

```
117 ! X =   -128.2923,  -118.2884,     415.000,        0.000!   !END!
118 ! X =  -128.28951, -118.03981,     426.000,        0.000!   !END!
119 ! X =  -128.28681, -117.79132,     442.000,        0.000!   !END!
120 ! X =  -128.28412, -117.54273,     457.000,        0.000!   !END!
121 ! X =  -128.28143, -117.29424,     457.000,        0.000!   !END!
122 ! X =  -128.27873, -117.04565,     480.000,        0.000!   !END!
123 ! X =  -128.27604, -116.79706,     507.000,        0.000!   !END!
124 ! X =  -128.27335, -116.54857,     558.000,        0.000!   !END!
125 ! X =  -128.27065, -116.29998,     589.000,        0.000!   !END!
126 ! X =  -128.26796, -116.05149,     613.000,        0.000!   !END!
127 ! X =  -128.26526,  -115.8029,     613.000,        0.000!   !END!
128 ! X =  -128.26257,  -115.5544,     610.000,        0.000!   !END!
129 ! X =  -128.25988, -115.30581,     609.000,        0.000!   !END!
130 ! X =  -128.25719, -115.05732,     594.000,        0.000!   !END!
131 ! X =  -128.25449, -114.80873,     543.000,        0.000!   !END!
132 ! X =   -128.2518, -114.56023,     494.000,        0.000!   !END!
133 ! X =   -128.2491, -114.31164,     457.000,        0.000!   !END!
134 ! X =  -128.24641, -114.06315,     406.000,        0.000!   !END!
135 ! X =  -128.24372, -113.81455,     451.000,        0.000!   !END!
136 ! X =  -128.24102, -113.56606,     484.000,        0.000!   !END!
137 ! X =  -128.23833, -113.31747,     587.000,        0.000!   !END!
138 ! X =  -128.23564, -113.06897,     609.000,        0.000!   !END!
139 ! X =  -128.23294, -112.82038,     609.000,        0.000!   !END!
140 ! X =  -128.05289,  -119.0367,     457.000,        0.000!   !END!
141 ! X =   -128.0502, -118.78821,     462.000,        0.000!   !END!
142 ! X =   -128.0475, -118.53962,     473.000,        0.000!   !END!
143 ! X =  -128.04481, -118.29103,     457.000,        0.000!   !END!
144 ! X =  -128.04211, -118.04254,     431.000,        0.000!   !END!
145 ! X =  -128.03942, -117.79395,     408.000,        0.000!   !END!
146 ! X =  -128.03673, -117.54546,     419.000,        0.000!   !END!
147 ! X =  -128.03403, -117.29687,     422.000,        0.000!   !END!
148 ! X =  -128.03134, -117.04828,     423.000,        0.000!   !END!
149 ! X =  -128.02864, -116.79979,     433.000,        0.000!   !END!
150 ! X =  -128.02595,  -116.5512,     482.000,        0.000!   !END!
151 ! X =  -128.02326, -116.30271,     526.000,        0.000!   !END!
152 ! X =  -128.02056, -116.05412,     594.000,        0.000!   !END!
153 ! X =  -128.01787, -115.80563,     609.000,        0.000!   !END!
154 ! X =  -128.01517, -115.55704,     609.000,        0.000!   !END!
155 ! X =  -128.01248, -115.30854,     609.000,        0.000!   !END!
156 ! X =  -128.00979, -115.05995,     609.000,        0.000!   !END!
157 ! X =   -128.0071, -114.81146,     609.000,        0.000!   !END!
158 ! X =   -128.0044, -114.56286,     559.000,        0.000!   !END!
159 ! X =   -128.0017, -114.31427,     502.000,        0.000!   !END!
160 ! X =  -127.99901, -114.06578,     440.000,        0.000!   !END!
161 ! X =  -127.99632, -113.81718,     401.000,        0.000!   !END!
162 ! X =  -127.99362, -113.56869,     450.000,        0.000!   !END!
163 ! X =  -127.99093,  -113.3202,     487.000,        0.000!   !END!
164 ! X =  -127.98824,  -113.0716,     579.000,        0.000!   !END!
165 ! X =  -127.98555, -112.82311,     579.000,        0.000!   !END!
166 ! X =  -127.98285, -112.57451,     550.000,        0.000!   !END!
167 ! X =  -127.98016, -112.32602,     496.000,        0.000!   !END!
168 ! X =  -127.97746, -112.07742,     396.000,        0.000!   !END!
169 ! X =   -127.8055, -119.03943,     540.000,        0.000!   !END!
170 ! X =   -127.8028, -118.79084,     554.000,        0.000!   !END!
171 ! X =  -127.80011, -118.54225,     548.000,        0.000!   !END!
172 ! X =  -127.79732, -118.29377,     548.000,        0.000!   !END!
173 ! X =  -127.79462, -118.04518,     501.000,        0.000!   !END!
174 ! X =  -127.79193, -117.79669,     452.000,        0.000!   !END!
175 ! X =  -127.78923,  -117.5481,     457.000,        0.000!   !END!
176 ! X =  -127.78654, -117.29951,     419.000,        0.000!   !END!
```

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177 ! X =  -127.78384, -117.05102,     396.000,       0.000!   !END!
178 ! X =  -127.78115, -116.80243,     407.000,       0.000!   !END!
179 ! X =  -127.77846, -116.55394,     426.000,       0.000!   !END!
180 ! X =  -127.77576, -116.30535,     457.000,       0.000!   !END!
181 ! X =  -127.77307, -116.05686,     541.000,       0.000!   !END!
182 ! X =  -127.77037, -115.80826,     609.000,       0.000!   !END!
183 ! X =  -127.76768, -115.55967,     609.000,       0.000!   !END!
184 ! X =  -127.76498, -115.31118,     608.000,       0.000!   !END!
185 ! X =  -127.76229, -115.06259,     608.000,       0.000!   !END!
186 ! X =   -127.7596, -114.81409,     608.000,       0.000!   !END!
187 ! X =   -127.7569,  -114.5655,     609.000,       0.000!   !END!
188 ! X =  -127.75421, -114.31701,     562.000,       0.000!   !END!
189 ! X =  -127.75151, -114.06841,     499.000,       0.000!   !END!
190 ! X =  -127.74882, -113.81992,     438.000,       0.000!   !END!
191 ! X =  -127.74612, -113.57133,     422.000,       0.000!   !END!
192 ! X =  -127.74343, -113.32283,     457.000,       0.000!   !END!
193 ! X =  -127.74074, -113.07424,     502.000,       0.000!   !END!
194 ! X =  -127.73805, -112.82574,     533.000,       0.000!   !END!
195 ! X =  -127.73535, -112.57725,     497.000,       0.000!   !END!
196 ! X =  -127.73266, -112.32865,     441.000,       0.000!   !END!
197 ! X =  -127.72997, -112.08016,     390.000,       0.000!   !END!
198 ! X =  -127.72727, -111.83156,     452.000,       0.000!   !END!
199 ! X =  -127.72458, -111.58307,     518.000,       0.000!   !END!
200 ! X =  -127.72188, -111.33447,     548.000,       0.000!   !END!
201 ! X =    -127.558, -119.04207,     592.000,       0.000!   !END!
202 ! X =  -127.55531, -118.79348,     609.000,       0.000!   !END!
203 ! X =  -127.55262, -118.54499,     602.000,       0.000!   !END!
204 ! X =  -127.54992,  -118.2964,     586.000,       0.000!   !END!
205 ! X =  -127.54723, -118.04791,     549.000,       0.000!   !END!
206 ! X =  -127.54453, -117.79932,     514.000,       0.000!   !END!
207 ! X =  -127.54183, -117.55073,     499.000,       0.000!   !END!
208 ! X =  -127.53914, -117.30224,     459.000,       0.000!   !END!
209 ! X =  -127.53645, -117.05365,     427.000,       0.000!   !END!
210 ! X =  -127.53376, -116.80516,     389.000,       0.000!   !END!
211 ! X =  -127.53106, -116.55657,     406.000,       0.000!   !END!
212 ! X =  -127.52837, -116.30808,     426.000,       0.000!   !END!
213 ! X =  -127.52567, -116.05949,     523.000,       0.000!   !END!
214 ! X =  -127.52297,  -115.8109,     593.000,       0.000!   !END!
215 ! X =  -127.52028,  -115.5624,     609.000,       0.000!   !END!
216 ! X =  -127.51759, -115.31381,     609.000,       0.000!   !END!
217 ! X =  -127.51489, -115.06532,     609.000,       0.000!   !END!
218 ! X =   -127.5122, -114.81673,     609.000,       0.000!   !END!
219 ! X =  -127.50951, -114.56823,     609.000,       0.000!   !END!
220 ! X =  -127.50681, -114.31964,     579.000,       0.000!   !END!
221 ! X =  -127.50412, -114.07115,     518.000,       0.000!   !END!
222 ! X =  -127.50142, -113.82255,     457.000,       0.000!   !END!
223 ! X =  -127.49873, -113.57406,     396.000,       0.000!   !END!
224 ! X =  -127.49603, -113.32546,     426.000,       0.000!   !END!
225 ! X =  -127.49334, -113.07697,     457.000,       0.000!   !END!
226 ! X =  -127.49064, -112.82838,     457.000,       0.000!   !END!
227 ! X =  -127.48795, -112.57988,     447.000,       0.000!   !END!
228 ! X =  -127.48526, -112.33129,     401.000,       0.000!   !END!
229 ! X =  -127.48256, -112.08279,     416.000,       0.000!   !END!
230 ! X =  -127.47987, -111.83429,     495.000,       0.000!   !END!
231 ! X =  -127.47718,  -111.5857,     543.000,       0.000!   !END!
232 ! X =  -127.47448,  -111.3372,     579.000,       0.000!   !END!
233 ! X =  -127.47179, -111.08861,     640.000,       0.000!   !END!
234 ! X =   -127.4691, -110.84011,     640.000,       0.000!   !END!
235 ! X =  -127.31061,  -119.0447,     645.000,       0.000!   !END!
236 ! X =  -127.30782, -118.79622,     670.000,       0.000!   !END!
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237 ! X =  -127.30512, -118.54763,     670.000,        0.000!   !END!
238 ! X =  -127.30243, -118.29914,     640.000,        0.000!   !END!
239 ! X =  -127.29973, -118.05055,     609.000,        0.000!   !END!
240 ! X =  -127.29704, -117.80196,     579.000,        0.000!   !END!
241 ! X =  -127.29434, -117.55347,     579.000,        0.000!   !END!
242 ! X =  -127.29165, -117.30488,     548.000,        0.000!   !END!
243 ! X =  -127.28896, -117.05639,     483.000,        0.000!   !END!
244 ! X =  -127.28626,  -116.8078,     406.000,        0.000!   !END!
245 ! X =  -127.28356, -116.55921,     402.000,        0.000!   !END!
246 ! X =  -127.28087, -116.31072,     436.000,        0.000!   !END!
247 ! X =  -127.27817, -116.06212,     505.000,        0.000!   !END!
248 ! X =  -127.27548, -115.81363,     548.000,        0.000!   !END!
249 ! X =  -127.27278, -115.56504,     591.000,        0.000!   !END!
250 ! X =  -127.27009, -115.31655,     609.000,        0.000!   !END!
251 ! X =   -127.2674, -115.06796,     609.000,        0.000!   !END!
252 ! X =   -127.2647, -114.81946,     609.000,        0.000!   !END!
253 ! X =  -127.26201, -114.57087,     609.000,        0.000!   !END!
254 ! X =  -127.25932, -114.32238,     562.000,        0.000!   !END!
255 ! X =  -127.25662, -114.07378,     506.000,        0.000!   !END!
256 ! X =  -127.25393, -113.82529,     457.000,        0.000!   !END!
257 ! X =  -127.25123,  -113.5767,     375.000,        0.000!   !END!
258 ! X =  -127.24854,  -113.3282,     403.000,        0.000!   !END!
259 ! X =  -127.24584, -113.07961,     420.000,        0.000!   !END!
260 ! X =  -127.24315, -112.83111,     429.000,        0.000!   !END!
261 ! X =  -127.24045, -112.58252,     392.000,        0.000!   !END!
262 ! X =  -127.23776, -112.33402,     381.000,        0.000!   !END!
263 ! X =  -127.23506, -112.08543,     441.000,        0.000!   !END!
264 ! X =  -127.23237, -111.83693,     502.000,        0.000!   !END!
265 ! X =  -127.22968, -111.58843,     564.000,        0.000!   !END!
266 ! X =  -127.22698, -111.33984,     593.000,        0.000!   !END!
267 ! X =  -127.22429, -111.09134,     640.000,        0.000!   !END!
268 ! X =  -127.22159, -110.84275,     640.000,        0.000!   !END!
269 ! X =   -127.2189, -110.59425,     634.000,        0.000!   !END!
270 ! X =  -127.06312, -119.04744,     670.000,        0.000!   !END!
271 ! X =  -127.06042, -118.79885,     670.000,        0.000!   !END!
272 ! X =  -127.05773, -118.55036,     670.000,        0.000!   !END!
273 ! X =  -127.05503, -118.30177,     650.000,        0.000!   !END!
274 ! X =  -127.05234, -118.05318,     640.000,        0.000!   !END!
275 ! X =  -127.04964, -117.80469,     632.000,        0.000!   !END!
276 ! X =  -127.04695,  -117.5561,     635.000,        0.000!   !END!
277 ! X =  -127.04426, -117.30761,     619.000,        0.000!   !END!
278 ! X =  -127.04156, -117.05902,     579.000,        0.000!   !END!
279 ! X =  -127.03886, -116.81043,     441.000,        0.000!   !END!
280 ! X =  -127.03617, -116.56194,     405.000,        0.000!   !END!
281 ! X =  -127.03347, -116.31335,     426.000,        0.000!   !END!
282 ! X =  -127.03078, -116.06486,     467.000,        0.000!   !END!
283 ! X =  -127.02808, -115.81626,     509.000,        0.000!   !END!
284 ! X =  -127.02539, -115.56777,     548.000,        0.000!   !END!
285 ! X =  -127.02269, -115.31918,     565.000,        0.000!   !END!
286 ! X =     -127.02, -115.07069,     579.000,        0.000!   !END!
287 ! X =   -127.0173, -114.82209,     579.000,        0.000!   !END!
288 ! X =  -127.01461,  -114.5736,     579.000,        0.000!   !END!
289 ! X =  -127.01192, -114.32501,     530.000,        0.000!   !END!
290 ! X =  -127.00922, -114.07651,     477.000,        0.000!   !END!
291 ! X =  -127.00653, -113.82792,     436.000,        0.000!   !END!
292 ! X =  -127.00383, -113.57943,     372.000,        0.000!   !END!
293 ! X =  -127.00114, -113.33083,     367.000,        0.000!   !END!
294 ! X =  -126.99845, -113.08234,     400.000,        0.000!   !END!
295 ! X =  -126.99575, -112.83374,     398.000,        0.000!   !END!
296 ! X =  -126.99306, -112.58525,     373.000,        0.000!   !END!
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297 ! X =  -126.99036, -112.33665,     405.000,       0.000!   !END!
298 ! X =  -126.98767, -112.08816,     441.000,       0.000!   !END!
299 ! X =  -126.98497, -111.83956,     502.000,       0.000!   !END!
300 ! X =  -126.98228, -111.59107,     559.000,       0.000!   !END!
301 ! X =  -126.97958, -111.34247,     592.000,       0.000!   !END!
302 ! X =  -126.97689, -111.09397,     620.000,       0.000!   !END!
303 ! X =   -126.9742, -110.84548,     617.000,       0.000!   !END!
304 ! X =   -126.9715, -110.59688,     597.000,       0.000!   !END!
305 ! X =  -126.81563, -119.05007,     670.000,       0.000!   !END!
306 ! X =  -126.81293, -118.80159,     670.000,       0.000!   !END!
307 ! X =  -126.81024,   -118.553,     651.000,       0.000!   !END!
308 ! X =  -126.80754, -118.30441,     643.000,       0.000!   !END!
309 ! X =  -126.80485, -118.05592,     666.000,       0.000!   !END!
310 ! X =  -126.80215, -117.80733,     666.000,       0.000!   !END!
311 ! X =  -126.79946, -117.55884,     640.000,       0.000!   !END!
312 ! X =  -126.79676, -117.31025,     640.000,       0.000!   !END!
313 ! X =  -126.79406, -117.06166,     599.000,       0.000!   !END!
314 ! X =  -126.79147, -116.81316,     449.000,       0.000!   !END!
315 ! X =  -126.78877, -116.56457,     391.000,       0.000!   !END!
316 ! X =  -126.78608, -116.31608,     398.000,       0.000!   !END!
317 ! X =  -126.78338, -116.06749,     416.000,       0.000!   !END!
318 ! X =  -126.78069,   -115.819,     443.000,       0.000!   !END!
319 ! X =  -126.77799,  -115.5704,     487.000,       0.000!   !END!
320 ! X =   -126.7753, -115.32191,     487.000,       0.000!   !END!
321 ! X =   -126.7726, -115.07332,     497.000,       0.000!   !END!
322 ! X =  -126.76991, -114.82473,     502.000,       0.000!   !END!
323 ! X =  -126.76721, -114.57623,     487.000,       0.000!   !END!
324 ! X =  -126.76452, -114.32764,     472.000,       0.000!   !END!
325 ! X =  -126.76182, -114.07915,     419.000,       0.000!   !END!
326 ! X =  -126.75913, -113.83055,     373.000,       0.000!   !END!
327 ! X =  -126.75643, -113.58206,     365.000,       0.000!   !END!
328 ! X =  -126.75374, -113.33356,     365.000,       0.000!   !END!
329 ! X =  -126.75104, -113.08497,     368.000,       0.000!   !END!
330 ! X =  -126.74835, -112.83648,     368.000,       0.000!   !END!
331 ! X =  -126.74565, -112.58788,     365.000,       0.000!   !END!
332 ! X =  -126.74296, -112.33939,     396.000,       0.000!   !END!
333 ! X =  -126.74026, -112.09079,     426.000,       0.000!   !END!
334 ! X =  -126.73757, -111.84229,     462.000,       0.000!   !END!
335 ! X =  -126.73488,  -111.5937,     518.000,       0.000!   !END!
336 ! X =  -126.73218,  -111.3452,     553.000,       0.000!   !END!
337 ! X =  -126.72949, -111.09661,     579.000,       0.000!   !END!
338 ! X =  -126.72679, -110.84811,     548.000,       0.000!   !END!
339 ! X =   -126.7241, -110.59961,     518.000,       0.000!   !END!
340 ! X =  -126.56824, -119.05281,     670.000,       0.000!   !END!
341 ! X =  -126.56554, -118.80422,     670.000,       0.000!   !END!
342 ! X =  -126.56284, -118.55563,     664.000,       0.000!   !END!
343 ! X =  -126.56015, -118.30714,     670.000,       0.000!   !END!
344 ! X =  -126.55745, -118.05855,     670.000,       0.000!   !END!
345 ! X =  -126.55476, -117.81006,     670.000,       0.000!   !END!
346 ! X =  -126.55206, -117.56147,     660.000,       0.000!   !END!
347 ! X =  -126.54936, -117.31288,     641.000,       0.000!   !END!
348 ! X =  -126.54667, -117.06439,     609.000,       0.000!   !END!
349 ! X =  -126.54397,  -116.8158,     452.000,       0.000!   !END!
350 ! X =  -126.54128, -116.56731,     420.000,       0.000!   !END!
351 ! X =  -126.53858, -116.31872,     366.000,       0.000!   !END!
352 ! X =  -126.53589, -116.07022,     396.000,       0.000!   !END!
353 ! X =  -126.53319, -115.82163,     408.000,       0.000!   !END!
354 ! X =  -126.53049, -115.57304,     426.000,       0.000!   !END!
355 ! X =   -126.5278, -115.32455,     441.000,       0.000!   !END!
356 ! X =   -126.5251, -115.07596,     449.000,       0.000!   !END!
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357 ! X =  -126.52241, -114.82746,     457.000,       0.000!   !END!
358 ! X =  -126.51971, -114.57887,     444.000,       0.000!   !END!
359 ! X =  -126.51702, -114.33038,     396.000,       0.000!   !END!
360 ! X =  -126.51432, -114.08178,     376.000,       0.000!   !END!
361 ! X =  -126.51163, -113.83329,     365.000,       0.000!   !END!
362 ! X =  -126.50893,  -113.5847,     365.000,       0.000!   !END!
363 ! X =  -126.50624,  -113.3362,     365.000,       0.000!   !END!
364 ! X =  -126.50354, -113.08761,     365.000,       0.000!   !END!
365 ! X =  -126.50085, -112.83911,     365.000,       0.000!   !END!
366 ! X =  -126.49815, -112.59052,     365.000,       0.000!   !END!
367 ! X =  -126.49546, -112.34202,     372.000,       0.000!   !END!
368 ! X =  -126.49277, -112.09353,     395.000,       0.000!   !END!
369 ! X =  -126.49007, -111.84493,     430.000,       0.000!   !END!
370 ! X =  -126.48738, -111.59644,     466.000,       0.000!   !END!
371 ! X =  -126.48468, -111.34784,     495.000,       0.000!   !END!
372 ! X =  -126.48199, -111.09934,     502.000,       0.000!   !END!
373 ! X =  -126.47929, -110.85075,     496.000,       0.000!   !END!
374 ! X =   -126.4766, -110.60225,     464.000,       0.000!   !END!
375 ! X =  -126.32074, -119.05544,     670.000,       0.000!   !END!
376 ! X =  -126.31804, -118.80686,     670.000,       0.000!   !END!
377 ! X =  -126.31535, -118.55837,     670.000,       0.000!   !END!
378 ! X =  -126.31265, -118.30978,     670.000,       0.000!   !END!
379 ! X =  -126.30996, -118.06129,     670.000,       0.000!   !END!
380 ! X =  -126.30726,  -117.8127,     670.000,       0.000!   !END!
381 ! X =  -126.30466,  -117.5641,     666.000,       0.000!   !END!
382 ! X =  -126.30197, -117.31561,     624.000,       0.000!   !END!
383 ! X =  -126.29927, -117.06702,     579.000,       0.000!   !END!
384 ! X =  -126.29658, -116.81853,     487.000,       0.000!   !END!
385 ! X =  -126.29388, -116.56994,     472.000,       0.000!   !END!
386 ! X =  -126.29118, -116.32135,     457.000,       0.000!   !END!
387 ! X =  -126.28849, -116.07286,     382.000,       0.000!   !END!
388 ! X =  -126.28579, -115.82427,     365.000,       0.000!   !END!
389 ! X =   -126.2831, -115.57577,     367.000,       0.000!   !END!
390 ! X =   -126.2804, -115.32718,     381.000,       0.000!   !END!
391 ! X =  -126.27771, -115.07869,     396.000,       0.000!   !END!
392 ! X =  -126.27501,  -114.8301,     396.000,       0.000!   !END!
393 ! X =  -126.27232,  -114.5816,     375.000,       0.000!   !END!
394 ! X =  -126.26962, -114.33301,     395.000,       0.000!   !END!
395 ! X =  -126.26693, -114.08452,     396.000,       0.000!   !END!
396 ! X =  -126.26423, -113.83592,     440.000,       0.000!   !END!
397 ! X =  -126.26154, -113.58743,     426.000,       0.000!   !END!
398 ! X =  -126.25884, -113.33884,     380.000,       0.000!   !END!
399 ! X =  -126.25615, -113.09034,     365.000,       0.000!   !END!
400 ! X =  -126.25345, -112.84175,     365.000,       0.000!   !END!
401 ! X =  -126.25076, -112.59325,     365.000,       0.000!   !END!
402 ! X =  -126.24806, -112.34466,     365.000,       0.000!   !END!
403 ! X =  -126.24537, -112.09616,     366.000,       0.000!   !END!
404 ! X =  -126.24267, -111.84757,     396.000,       0.000!   !END!
405 ! X =  -126.23998, -111.59907,     407.000,       0.000!   !END!
406 ! X =  -126.23728, -111.35057,     431.000,       0.000!   !END!
407 ! X =  -126.23459, -111.10198,     436.000,       0.000!   !END!
408 ! X =  -126.23189, -110.85348,     417.000,       0.000!   !END!
409 ! X =   -126.2292, -110.60488,     396.000,       0.000!   !END!
410 ! X =   -126.2265, -110.35639,     388.000,       0.000!   !END!
411 ! X =  -126.22381, -110.10789,     457.000,       0.000!   !END!
412 ! X =  -126.22111, -109.85929,     457.000,       0.000!   !END!
413 ! X =  -126.21842, -109.61079,     458.000,       0.000!   !END!
414 ! X =  -126.06526, -118.31241,     670.000,       0.000!   !END!
415 ! X =  -126.06256, -118.06392,     670.000,       0.000!   !END!
416 ! X =  -126.05987, -117.81533,     665.000,       0.000!   !END!
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417 ! X =  -126.05717, -117.56684,     645.000,       0.000!   !END!
418 ! X =  -126.05447, -117.31825,     609.000,       0.000!   !END!
419 ! X =  -126.05178, -117.06976,     546.000,       0.000!   !END!
420 ! X =  -126.04908, -116.82117,     548.000,       0.000!   !END!
421 ! X =  -126.04639, -116.57258,     518.000,       0.000!   !END!
422 ! X =  -126.04369, -116.32409,     490.000,       0.000!   !END!
423 ! X =  -126.04099,  -116.0755,     457.000,       0.000!   !END!
424 ! X =   -126.0383,   -115.827,     385.000,       0.000!   !END!
425 ! X =   -126.0356, -115.57841,     365.000,       0.000!   !END!
426 ! X =  -126.03291, -115.32992,     366.000,       0.000!   !END!
427 ! X =  -126.03021, -115.08133,     366.000,       0.000!   !END!
428 ! X =  -126.02752, -114.83283,     413.000,       0.000!   !END!
429 ! X =  -126.02482, -114.58424,     469.000,       0.000!   !END!
430 ! X =  -126.02213, -114.33575,     471.000,       0.000!   !END!
431 ! X =  -126.01943, -114.08716,     474.000,       0.000!   !END!
432 ! X =  -126.01674, -113.83866,     476.000,       0.000!   !END!
433 ! X =  -126.01404, -113.59007,     469.000,       0.000!   !END!
434 ! X =  -126.01135, -113.34157,     426.000,       0.000!   !END!
435 ! X =  -126.00865, -113.09298,     385.000,       0.000!   !END!
436 ! X =  -126.00596, -112.84448,     365.000,       0.000!   !END!
437 ! X =  -126.00336, -112.59588,     365.000,       0.000!   !END!
438 ! X =  -126.00066, -112.34739,     365.000,       0.000!   !END!
439 ! X =  -125.99797, -112.09879,     365.000,       0.000!   !END!
440 ! X =  -125.99527,  -111.8503,     366.000,       0.000!   !END!
441 ! X =  -125.99257,  -111.6017,     365.000,       0.000!   !END!
442 ! X =  -125.98988, -111.35321,     365.000,       0.000!   !END!
443 ! X =  -125.98719, -111.10471,     357.000,       0.000!   !END!
444 ! X =  -125.98449, -110.85611,     354.000,       0.000!   !END!
445 ! X =   -125.9818, -110.60762,     361.000,       0.000!   !END!
446 ! X =   -125.9791, -110.35902,     388.000,       0.000!   !END!
447 ! X =  -125.97641, -110.11052,     467.000,       0.000!   !END!
448 ! X =  -125.97371, -109.86192,     467.000,       0.000!   !END!
449 ! X =  -125.97101, -109.61343,     474.000,       0.000!   !END!
450 ! X =  -125.96832, -109.36493,     498.000,       0.000!   !END!
451 ! X =  -125.96562, -109.11633,     532.000,       0.000!   !END!
452 ! X =  -125.96293, -108.86783,     557.000,       0.000!   !END!
453 ! X =  -125.81238, -117.81807,     640.000,       0.000!   !END!
454 ! X =  -125.80978, -117.56947,     640.000,       0.000!   !END!
455 ! X =  -125.80708, -117.32088,     640.000,       0.000!   !END!
456 ! X =  -125.80438, -117.07239,     640.000,       0.000!   !END!
457 ! X =  -125.80169,  -116.8238,     631.000,       0.000!   !END!
458 ! X =  -125.79899, -116.57531,     599.000,       0.000!   !END!
459 ! X =  -125.79629, -116.32672,     563.000,       0.000!   !END!
460 ! X =   -125.7936, -116.07823,     487.000,       0.000!   !END!
461 ! X =   -125.7909, -115.82964,     424.000,       0.000!   !END!
462 ! X =  -125.78821, -115.58115,     370.000,       0.000!   !END!
463 ! X =  -125.78551, -115.33255,     396.000,       0.000!   !END!
464 ! X =  -125.78282, -115.08406,     431.000,       0.000!   !END!
465 ! X =  -125.78012, -114.83547,     492.000,       0.000!   !END!
466 ! X =  -125.77742, -114.58688,     518.000,       0.000!   !END!
467 ! X =  -125.77473, -114.33838,     531.000,       0.000!   !END!
468 ! X =  -125.77203, -114.08979,     548.000,       0.000!   !END!
469 ! X =  -125.76934, -113.84129,     535.000,       0.000!   !END!
470 ! X =  -125.76664,  -113.5927,     512.000,       0.000!   !END!
471 ! X =  -125.76395, -113.34421,     466.000,       0.000!   !END!
472 ! X =  -125.76125, -113.09571,     414.000,       0.000!   !END!
473 ! X =  -125.75855, -112.84712,     376.000,       0.000!   !END!
474 ! X =  -125.75586, -112.59862,     365.000,       0.000!   !END!
475 ! X =  -125.75316, -112.35003,     379.000,       0.000!   !END!
476 ! X =  -125.75047, -112.10153,     426.000,       0.000!   !END!
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477 ! X =  -125.74777, -111.85294,     426.000,       0.000!   !END!
478 ! X =  -125.74508, -111.60444,     411.000,       0.000!   !END!
479 ! X =  -125.74238, -111.35584,     405.000,       0.000!   !END!
480 ! X =  -125.73969, -111.10735,     384.000,       0.000!   !END!
481 ! X =  -125.73699, -110.85875,     336.000,       0.000!   !END!
482 ! X =  -125.73429, -110.61025,     352.000,       0.000!   !END!
483 ! X =   -125.7316, -110.36176,     367.000,       0.000!   !END!
484 ! X =   -125.7289, -110.11316,     426.000,       0.000!   !END!
485 ! X =  -125.72631, -109.86466,     450.000,       0.000!   !END!
486 ! X =  -125.72361, -109.61606,     471.000,       0.000!   !END!
487 ! X =  -125.72092, -109.36756,     492.000,       0.000!   !END!
488 ! X =  -125.71822, -109.11906,     529.000,       0.000!   !END!
489 ! X =  -125.71553, -108.87046,     578.000,       0.000!   !END!
490 ! X =  -125.55959, -117.32362,     655.000,       0.000!   !END!
491 ! X =  -125.55689, -117.07503,     640.000,       0.000!   !END!
492 ! X =  -125.55419, -116.82654,     640.000,       0.000!   !END!
493 ! X =   -125.5515, -116.57795,     620.000,       0.000!   !END!
494 ! X =   -125.5488, -116.32946,     579.000,       0.000!   !END!
495 ! X =   -125.5461, -116.08087,     497.000,       0.000!   !END!
496 ! X =  -125.54341, -115.83228,     426.000,       0.000!   !END!
497 ! X =  -125.54071, -115.58378,     390.000,       0.000!   !END!
498 ! X =  -125.53801, -115.33519,     432.000,       0.000!   !END!
499 ! X =  -125.53532,  -115.0867,     513.000,       0.000!   !END!
500 ! X =  -125.53262, -114.83811,     547.000,       0.000!   !END!
501 ! X =  -125.52993, -114.58961,     593.000,       0.000!   !END!
502 ! X =  -125.52723, -114.34102,     631.000,       0.000!   !END!
503 ! X =  -125.52464, -114.09252,     618.000,       0.000!   !END!
504 ! X =  -125.52194, -113.84393,     599.000,       0.000!   !END!
505 ! X =  -125.51924, -113.59543,     525.000,       0.000!   !END!
506 ! X =  -125.51654, -113.34684,     472.000,       0.000!   !END!
507 ! X =  -125.51385, -113.09835,     434.000,       0.000!   !END!
508 ! X =  -125.51115, -112.84975,     374.000,       0.000!   !END!
509 ! X =  -125.50846, -112.60126,     436.000,       0.000!   !END!
510 ! X =  -125.50576, -112.35266,     457.000,       0.000!   !END!
511 ! X =  -125.50307, -112.10417,     487.000,       0.000!   !END!
512 ! X =  -125.50037, -111.85567,     496.000,       0.000!   !END!
513 ! X =  -125.49768, -111.60707,     501.000,       0.000!   !END!
514 ! X =  -125.49498, -111.35858,     480.000,       0.000!   !END!
515 ! X =  -125.49228, -111.10998,     446.000,       0.000!   !END!
516 ! X =  -125.48959, -110.86148,     406.000,       0.000!   !END!
517 ! X =  -125.48689, -110.61289,     355.000,       0.000!   !END!
518 ! X =   -125.4842, -110.36439,     348.000,       0.000!   !END!
519 ! X =   -125.4815, -110.11589,     379.000,       0.000!   !END!
520 ! X =  -125.47881,  -109.8673,     414.000,       0.000!   !END!
521 ! X =  -125.47611,  -109.6188,     421.000,       0.000!   !END!
522 ! X =  -125.47341,  -109.3702,     444.000,       0.000!   !END!
523 ! X =  -125.47072,  -109.1217,     505.000,       0.000!   !END!
524 ! X =  -125.46803,  -108.8732,     548.000,       0.000!   !END!
525 ! X =   -125.3068, -116.82917,     639.000,       0.000!   !END!
526 ! X =   -125.3041, -116.58058,     598.000,       0.000!   !END!
527 ! X =  -125.30141, -116.33209,     548.000,       0.000!   !END!
528 ! X =  -125.29871,  -116.0835,     487.000,       0.000!   !END!
529 ! X =  -125.29601, -115.83501,     432.000,       0.000!   !END!
530 ! X =  -125.29331, -115.58642,     420.000,       0.000!   !END!
531 ! X =  -125.29062, -115.33793,     457.000,       0.000!   !END!
532 ! X =  -125.28792, -115.08933,     541.000,       0.000!   !END!
533 ! X =  -125.28523, -114.84084,     601.000,       0.000!   !END!
534 ! X =  -125.28253, -114.59225,     640.000,       0.000!   !END!
535 ! X =  -125.27984, -114.34375,     644.000,       0.000!   !END!
536 ! X =  -125.27714, -114.09516,     640.000,       0.000!   !END!
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537 ! X =  -125.27444, -113.84667,     609.000,       0.000!   !END!
538 ! X =  -125.27174, -113.59807,     533.000,       0.000!   !END!
539 ! X =  -125.26905, -113.34958,     475.000,       0.000!   !END!
540 ! X =  -125.26635, -113.10098,     434.000,       0.000!   !END!
541 ! X =  -125.26366, -112.85249,     448.000,       0.000!   !END!
542 ! X =  -125.26096,  -112.6039,     487.000,       0.000!   !END!
543 ! X =  -125.25826,  -112.3554,     504.000,       0.000!   !END!
544 ! X =  -125.25557,  -112.1068,     511.000,       0.000!   !END!
545 ! X =  -125.25297,  -111.8583,     528.000,       0.000!   !END!
546 ! X =  -125.25027, -111.60971,     536.000,       0.000!   !END!
547 ! X =  -125.24758, -111.36121,     527.000,       0.000!   !END!
548 ! X =  -125.24489, -111.11271,     496.000,       0.000!   !END!
549 ! X =  -125.24219, -110.86412,     464.000,       0.000!   !END!
550 ! X =  -125.23949, -110.61562,     426.000,       0.000!   !END!
551 ! X =  -125.23679, -110.36702,     380.000,       0.000!   !END!
552 ! X =   -125.2341, -110.11853,     343.000,       0.000!   !END!
553 ! X =  -125.23141, -109.87003,     370.000,       0.000!   !END!
554 ! X =  -125.22871, -109.62143,     387.000,       0.000!   !END!
555 ! X =  -125.22601, -109.37293,     426.000,       0.000!   !END!
556 ! X =  -125.22332, -109.12434,     477.000,       0.000!   !END!
557 ! X =  -125.22062, -108.87584,     518.000,       0.000!   !END!
558 ! X =  -125.05391, -116.33473,     495.000,       0.000!   !END!
559 ! X =  -125.05121, -116.08624,     446.000,       0.000!   !END!
560 ! X =  -125.04851, -115.83765,     401.000,       0.000!   !END!
561 ! X =  -125.04582, -115.58916,     426.000,       0.000!   !END!
562 ! X =  -125.04312, -115.34056,     472.000,       0.000!   !END!
563 ! X =  -125.04053, -115.09207,     563.000,       0.000!   !END!
564 ! X =  -125.03783, -114.84347,     640.000,       0.000!   !END!
565 ! X =  -125.03513, -114.59498,     665.000,       0.000!   !END!
566 ! X =  -125.03244, -114.34639,     668.000,       0.000!   !END!
567 ! X =  -125.02974, -114.09789,     644.000,       0.000!   !END!
568 ! X =  -125.02704,  -113.8493,     589.000,       0.000!   !END!
569 ! X =  -125.02435, -113.60081,     525.000,       0.000!   !END!
570 ! X =  -125.02165, -113.35221,     484.000,       0.000!   !END!
571 ! X =  -125.01896, -113.10372,     426.000,       0.000!   !END!
572 ! X =  -125.01626, -112.85512,     480.000,       0.000!   !END!
573 ! X =  -125.01356, -112.60663,     508.000,       0.000!   !END!
574 ! X =  -125.01086, -112.35803,     542.000,       0.000!   !END!
575 ! X =  -125.00817, -112.10954,     587.000,       0.000!   !END!
576 ! X =  -125.00547, -111.86094,     593.000,       0.000!   !END!
577 ! X =  -125.00278, -111.61245,     592.000,       0.000!   !END!
578 ! X =  -125.00008, -111.36385,     579.000,       0.000!   !END!
579 ! X =  -124.99738, -111.11535,     548.000,       0.000!   !END!
580 ! X =  -124.99469, -110.86686,     518.000,       0.000!   !END!
581 ! X =  -124.99199, -110.61826,     487.000,       0.000!   !END!
582 ! X =   -124.9893, -110.36976,     457.000,       0.000!   !END!
583 ! X =   -124.9866, -110.12117,     381.000,       0.000!   !END!
584 ! X =    -124.984, -109.87266,     352.000,       0.000!   !END!
585 ! X =  -124.98131, -109.62417,     371.000,       0.000!   !END!
586 ! X =  -124.97861, -109.37557,     381.000,       0.000!   !END!
587 ! X =  -124.97592, -109.12707,     441.000,       0.000!   !END!
588 ! X =  -124.97322, -108.87847,     492.000,       0.000!   !END!
589 ! X =  -124.80382, -116.08887,     404.000,       0.000!   !END!
590 ! X =  -124.80112, -115.84038,     409.000,       0.000!   !END!
591 ! X =  -124.79842, -115.59179,     434.000,       0.000!   !END!
592 ! X =  -124.79572,  -115.3432,     472.000,       0.000!   !END!
593 ! X =  -124.79303, -115.09471,     566.000,       0.000!   !END!
594 ! X =  -124.79033, -114.84611,     640.000,       0.000!   !END!
595 ! X =  -124.78764, -114.59762,     670.000,       0.000!   !END!
596 ! X =  -124.78494, -114.34903,     670.000,       0.000!   !END!
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597 ! X =  -124.78224, -114.10053,     662.000,       0.000!   !END!
598 ! X =  -124.77954, -113.85194,     579.000,       0.000!   !END!
599 ! X =  -124.77685, -113.60345,     511.000,       0.000!   !END!
600 ! X =  -124.77415, -113.35485,     466.000,       0.000!   !END!
601 ! X =  -124.77146, -113.10636,     448.000,       0.000!   !END!
602 ! X =  -124.76886, -112.85776,     492.000,       0.000!   !END!
603 ! X =  -124.76616, -112.60926,     539.000,       0.000!   !END!
604 ! X =  -124.76347, -112.36077,     586.000,       0.000!   !END!
605 ! X =  -124.76077, -112.11217,     629.000,       0.000!   !END!
606 ! X =  -124.75807, -111.86368,     644.000,       0.000!   !END!
607 ! X =  -124.75537, -111.61508,     643.000,       0.000!   !END!
608 ! X =  -124.75268, -111.36658,     633.000,       0.000!   !END!
609 ! X =  -124.74998, -111.11799,     612.000,       0.000!   !END!
610 ! X =  -124.74729, -110.86949,     557.000,       0.000!   !END!
611 ! X =  -124.74459,  -110.6209,     509.000,       0.000!   !END!
612 ! X =  -124.74189,  -110.3724,     472.000,       0.000!   !END!
613 ! X =   -124.7392,  -110.1239,     414.000,       0.000!   !END!
614 ! X =   -124.7365,  -109.8753,     358.000,       0.000!   !END!
615 ! X =  -124.73381, -109.62681,     345.000,       0.000!   !END!
616 ! X =  -124.73111, -109.37821,     349.000,       0.000!   !END!
617 ! X =  -124.72841, -109.12971,     416.000,       0.000!   !END!
618 ! X =  -124.72572, -108.88121,     460.000,       0.000!   !END!
619 ! X =  -124.72312, -108.63261,     484.000,       0.000!   !END!
620 ! X =  -124.72042, -108.38411,     483.000,       0.000!   !END!
621 ! X =  -124.71773, -108.13561,     457.000,       0.000!   !END!
622 ! X =  -124.71503, -107.88701,     458.000,       0.000!   !END!
623 ! X =  -124.55902, -116.34011,     406.000,       0.000!   !END!
624 ! X =  -124.55632, -116.09151,     411.000,       0.000!   !END!
625 ! X =  -124.55362, -115.84302,     430.000,       0.000!   !END!
626 ! X =  -124.55102, -115.59443,     448.000,       0.000!   !END!
627 ! X =  -124.54833, -115.34593,     477.000,       0.000!   !END!
628 ! X =  -124.54563, -115.09734,     554.000,       0.000!   !END!
629 ! X =  -124.54294, -114.84885,     627.000,       0.000!   !END!
630 ! X =  -124.54024, -114.60025,     657.000,       0.000!   !END!
631 ! X =  -124.53754, -114.35176,     658.000,       0.000!   !END!
632 ! X =  -124.53484, -114.10317,     640.000,       0.000!   !END!
633 ! X =  -124.53215, -113.85467,     564.000,       0.000!   !END!
634 ! X =  -124.52945, -113.60608,     499.000,       0.000!   !END!
635 ! X =  -124.52675, -113.35759,     441.000,       0.000!   !END!
636 ! X =  -124.52405, -113.10899,     462.000,       0.000!   !END!
637 ! X =  -124.52136,  -112.8605,     496.000,       0.000!   !END!
638 ! X =  -124.51866,  -112.6119,     554.000,       0.000!   !END!
639 ! X =  -124.51597, -112.36341,     609.000,       0.000!   !END!
640 ! X =  -124.51327, -112.11481,     641.000,       0.000!   !END!
641 ! X =  -124.51057, -111.86632,     654.000,       0.000!   !END!
642 ! X =  -124.50788, -111.61782,     657.000,       0.000!   !END!
643 ! X =  -124.50528, -111.36922,     651.000,       0.000!   !END!
644 ! X =  -124.50258, -111.12072,     636.000,       0.000!   !END!
645 ! X =  -124.49988, -110.87213,     579.000,       0.000!   !END!
646 ! X =  -124.49719, -110.62363,     531.000,       0.000!   !END!
647 ! X =  -124.49449, -110.37503,     487.000,       0.000!   !END!
648 ! X =   -124.4918, -110.12653,     457.000,       0.000!   !END!
649 ! X =   -124.4891, -109.87804,     384.000,       0.000!   !END!
650 ! X =   -124.4864, -109.62944,     357.000,       0.000!   !END!
651 ! X =  -124.48371, -109.38094,     336.000,       0.000!   !END!
652 ! X =  -124.48101, -109.13234,     381.000,       0.000!   !END!
653 ! X =  -124.47831, -108.88384,     429.000,       0.000!   !END!
654 ! X =  -124.47562, -108.63535,     458.000,       0.000!   !END!
655 ! X =  -124.47292, -108.38675,     449.000,       0.000!   !END!
656 ! X =  -124.47022, -108.13825,     410.000,       0.000!   !END!
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657 ! X =  -124.46753, -107.88975,     466.000,        0.000!   !END!
658 ! X =  -124.46483, -107.64115,     548.000,        0.000!   !END!
659 ! X =  -124.46224, -107.39264,     609.000,        0.000!   !END!
660 ! X =  -124.31162, -116.34274,     426.000,        0.000!   !END!
661 ! X =  -124.30893, -116.09425,     431.000,        0.000!   !END!
662 ! X =  -124.30623, -115.84566,     457.000,        0.000!   !END!
663 ! X =  -124.30353, -115.59716,     480.000,        0.000!   !END!
664 ! X =  -124.29544, -114.85149,     584.000,        0.000!   !END!
665 ! X =  -124.29274, -114.60299,     622.000,        0.000!   !END!
666 ! X =  -124.29004,  -114.3544,     640.000,        0.000!   !END!
667 ! X =  -124.28735, -114.10591,     612.000,        0.000!   !END!
668 ! X =  -124.28475, -113.85731,     558.000,        0.000!   !END!
669 ! X =  -124.28205, -113.60881,     487.000,        0.000!   !END!
670 ! X =  -124.27935, -113.36022,     441.000,        0.000!   !END!
671 ! X =  -124.27666, -113.11173,     495.000,        0.000!   !END!
672 ! X =  -124.27396, -112.86313,     528.000,        0.000!   !END!
673 ! X =  -124.27126, -112.61464,     566.000,        0.000!   !END!
674 ! X =  -124.26856, -112.36604,     621.000,        0.000!   !END!
675 ! X =  -124.26587, -112.11755,     642.000,        0.000!   !END!
676 ! X =  -124.26317, -111.86895,     670.000,        0.000!   !END!
677 ! X =  -124.26048, -111.62045,     670.000,        0.000!   !END!
678 ! X =  -124.25778, -111.37186,     669.000,        0.000!   !END!
679 ! X =  -124.25508, -111.12336,     647.000,        0.000!   !END!
680 ! X =  -124.25239, -110.87487,     611.000,        0.000!   !END!
681 ! X =  -124.24969, -110.62627,     563.000,        0.000!   !END!
682 ! X =  -124.24699, -110.37777,     507.000,        0.000!   !END!
683 ! X =  -124.24439, -110.12917,     480.000,        0.000!   !END!
684 ! X =   -124.2417, -109.88067,     441.000,        0.000!   !END!
685 ! X =    -124.239, -109.63217,     375.000,        0.000!   !END!
686 ! X =   -124.2363, -109.38358,     337.000,        0.000!   !END!
687 ! X =  -124.23361, -109.13508,     401.000,        0.000!   !END!
688 ! X =  -124.23091, -108.88648,     426.000,        0.000!   !END!
689 ! X =  -124.22821, -108.63798,     426.000,        0.000!   !END!
690 ! X =  -124.22552, -108.38948,     396.000,        0.000!   !END!
691 ! X =  -124.22282, -108.14088,     447.000,        0.000!   !END!
692 ! X =  -124.22012, -107.89238,     495.000,        0.000!   !END!
693 ! X =  -124.21743, -107.64388,     559.000,        0.000!   !END!
694 ! X =  -124.21473, -107.39528,     609.000,        0.000!   !END!
695 ! X =  -124.05883, -115.84839,     475.000,        0.000!   !END!
696 ! X =  -124.05613,  -115.5998,     524.000,        0.000!   !END!
697 ! X =  -124.04264, -114.35704,     640.000,        0.000!   !END!
698 ! X =  -124.03995, -114.10854,     609.000,        0.000!   !END!
699 ! X =  -124.03725, -113.85995,     548.000,        0.000!   !END!
700 ! X =  -124.03455, -113.61146,     479.000,        0.000!   !END!
701 ! X =  -124.03185, -113.36286,     441.000,        0.000!   !END!
702 ! X =  -124.02916, -113.11437,     512.000,        0.000!   !END!
703 ! X =  -124.02646, -112.86577,     548.000,        0.000!   !END!
704 ! X =  -124.02376, -112.61728,     601.000,        0.000!   !END!
705 ! X =  -124.02117, -112.36878,     634.000,        0.000!   !END!
706 ! X =  -124.01847, -112.12018,     664.000,        0.000!   !END!
707 ! X =  -124.01577, -111.87169,     670.000,        0.000!   !END!
708 ! X =  -124.01307, -111.62309,     670.000,        0.000!   !END!
709 ! X =  -124.01038, -111.37459,     670.000,        0.000!   !END!
710 ! X =  -124.00768,   -111.126,     647.000,        0.000!   !END!
711 ! X =  -124.00498,  -110.8775,     612.000,        0.000!   !END!
712 ! X =  -124.00228,  -110.6289,     579.000,        0.000!   !END!
713 ! X =  -123.99959, -110.38041,     518.000,        0.000!   !END!
714 ! X =  -123.99689, -110.13191,     480.000,        0.000!   !END!
715 ! X =  -123.99419, -109.88331,     435.000,        0.000!   !END!
716 ! X =   -123.9915, -109.63481,     380.000,        0.000!   !END!
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717 ! X =   -123.9888, -109.38622,     342.000,       0.000!   !END!
718 ! X =   -123.9861, -109.13772,     398.000,       0.000!   !END!
719 ! X =  -123.98351, -108.88921,     413.000,       0.000!   !END!
720 ! X =  -123.98081, -108.64062,     401.000,       0.000!   !END!
721 ! X =  -123.97811, -108.39212,     396.000,       0.000!   !END!
722 ! X =  -123.97542, -108.14362,     463.000,       0.000!   !END!
723 ! X =  -123.97272, -107.89502,     510.000,       0.000!   !END!
724 ! X =  -123.97002, -107.64652,     579.000,       0.000!   !END!
725 ! X =  -123.96733, -107.39802,     609.000,       0.000!   !END!
726 ! X =  -123.96463, -107.14942,     609.000,       0.000!   !END!
727 ! X =  -123.78715, -113.61409,     484.000,       0.000!   !END!
728 ! X =  -123.78446,  -113.3656,     454.000,       0.000!   !END!
729 ! X =  -123.78176,   -113.117,     525.000,       0.000!   !END!
730 ! X =  -123.77906, -112.86851,     558.000,       0.000!   !END!
731 ! X =  -123.77636, -112.61991,     624.000,       0.000!   !END!
732 ! X =  -123.77367, -112.37142,     670.000,       0.000!   !END!
733 ! X =  -123.77097, -112.12282,     670.000,       0.000!   !END!
734 ! X =  -123.76827, -111.87433,     670.000,       0.000!   !END!
735 ! X =  -123.76558, -111.62583,     670.000,       0.000!   !END!
736 ! X =  -123.76288, -111.37723,     647.000,       0.000!   !END!
737 ! X =  -123.76028, -111.12873,     625.000,       0.000!   !END!
738 ! X =  -123.75758, -110.88014,     609.000,       0.000!   !END!
739 ! X =  -123.75489, -110.63164,     548.000,       0.000!   !END!
740 ! X =  -123.75218, -110.38304,     492.000,       0.000!   !END!
741 ! X =  -123.74949, -110.13454,     462.000,       0.000!   !END!
742 ! X =  -123.74679, -109.88605,     410.000,       0.000!   !END!
743 ! X =  -123.74409, -109.63745,     379.000,       0.000!   !END!
744 ! X =   -123.7414, -109.38895,     342.000,       0.000!   !END!
745 ! X =   -123.7387, -109.14035,     343.000,       0.000!   !END!
746 ! X =    -123.736, -108.89185,     396.000,       0.000!   !END!
747 ! X =  -123.73331, -108.64336,     389.000,       0.000!   !END!
748 ! X =  -123.73061, -108.39476,     396.000,       0.000!   !END!
749 ! X =  -123.72801, -108.14625,     480.000,       0.000!   !END!
750 ! X =  -123.72532, -107.89775,     512.000,       0.000!   !END!
751 ! X =  -123.72262, -107.64915,     579.000,       0.000!   !END!
752 ! X =  -123.71992, -107.40065,     579.000,       0.000!   !END!
753 ! X =  -123.71723, -107.15215,     579.000,       0.000!   !END!
754 ! X =  -123.71453, -106.90355,     548.000,       0.000!   !END!
755 ! X =  -123.53166, -112.87114,     554.000,       0.000!   !END!
756 ! X =  -123.52897, -112.62265,     624.000,       0.000!   !END!
757 ! X =  -123.52627, -112.37405,     670.000,       0.000!   !END!
758 ! X =  -123.52357, -112.12556,     670.000,       0.000!   !END!
759 ! X =  -123.52087, -111.87696,     670.000,       0.000!   !END!
760 ! X =  -123.51817, -111.62847,     640.000,       0.000!   !END!
761 ! X =  -123.51547, -111.37987,     609.000,       0.000!   !END!
762 ! X =  -123.51278, -111.13137,     548.000,       0.000!   !END!
763 ! X =  -123.51008, -110.88288,     532.000,       0.000!   !END!
764 ! X =  -123.50738, -110.63428,     487.000,       0.000!   !END!
765 ! X =  -123.50469, -110.38578,     457.000,       0.000!   !END!
766 ! X =  -123.50209, -110.13718,     426.000,       0.000!   !END!
767 ! X =  -123.49939, -109.88868,     396.000,       0.000!   !END!
768 ! X =  -123.49669, -109.64008,     366.000,       0.000!   !END!
769 ! X =  -123.49399, -109.39159,     341.000,       0.000!   !END!
770 ! X =   -123.4913, -109.14309,     335.000,       0.000!   !END!
771 ! X =   -123.4886, -108.89449,     341.000,       0.000!   !END!
772 ! X =   -123.4859, -108.64599,     352.000,       0.000!   !END!
773 ! X =  -123.48321, -108.39749,     396.000,       0.000!   !END!
774 ! X =  -123.48051, -108.14889,     480.000,       0.000!   !END!
775 ! X =  -123.47781, -107.90039,     525.000,       0.000!   !END!
776 ! X =  -123.47512, -107.65189,     579.000,       0.000!   !END!
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777 ! X =  -123.47242, -107.40329,     579.000,       0.000!   !END!
778 ! X =  -123.46982, -107.15479,     522.000,       0.000!   !END!
779 ! X =  -123.46713, -106.90629,     487.000,       0.000!   !END!
780 ! X =  -123.46442, -106.65769,     464.000,       0.000!   !END!
781 ! X =  -123.28416, -112.87378,     561.000,       0.000!   !END!
782 ! X =  -123.28147, -112.62529,     624.000,       0.000!   !END!
783 ! X =  -123.27876, -112.37669,     666.000,       0.000!   !END!
784 ! X =  -123.27607,  -112.1282,     670.000,       0.000!   !END!
785 ! X =  -123.27347,  -111.8797,     634.000,       0.000!   !END!
786 ! X =  -123.27077,  -111.6311,     595.000,       0.000!   !END!
787 ! X =  -123.26808,  -111.3826,     545.000,       0.000!   !END!
788 ! X =  -123.26538, -111.13401,     518.000,       0.000!   !END!
789 ! X =  -123.26268, -110.88551,     469.000,       0.000!   !END!
790 ! X =  -123.25998, -110.63692,     434.000,       0.000!   !END!
791 ! X =  -123.25728, -110.38842,     411.000,       0.000!   !END!
792 ! X =  -123.25459, -110.13992,     365.000,       0.000!   !END!
793 ! X =  -123.25189, -109.89132,     365.000,       0.000!   !END!
794 ! X =  -123.24919, -109.64283,     348.000,       0.000!   !END!
795 ! X =  -123.24649, -109.39423,     337.000,       0.000!   !END!
796 ! X =  -123.24389, -109.14572,     335.000,       0.000!   !END!
797 ! X =   -123.2412, -108.89722,     335.000,       0.000!   !END!
798 ! X =   -123.2385, -108.64863,     345.000,       0.000!   !END!
799 ! X =   -123.2358, -108.40013,     396.000,       0.000!   !END!
800 ! X =  -123.23311, -108.15163,     478.000,       0.000!   !END!
801 ! X =  -123.23041, -107.90303,     523.000,       0.000!   !END!
802 ! X =  -123.22771, -107.65453,     549.000,       0.000!   !END!
803 ! X =  -123.22502, -107.40603,     542.000,       0.000!   !END!
804 ! X =  -123.22231, -107.15743,     489.000,       0.000!   !END!
805 ! X =  -123.21962, -106.90893,     427.000,       0.000!   !END!
806 ! X =  -123.21692, -106.66043,     375.000,       0.000!   !END!
807 ! X =  -123.21432, -106.41182,     372.000,       0.000!   !END!
808 ! X =  -123.03676, -112.87652,     586.000,       0.000!   !END!
809 ! X =  -123.03406, -112.62792,     640.000,       0.000!   !END!
810 ! X =  -123.03137, -112.37943,     648.000,       0.000!   !END!
811 ! X =  -123.02867, -112.13083,     640.000,       0.000!   !END!
812 ! X =  -123.02597, -111.88234,     599.000,       0.000!   !END!
813 ! X =  -123.02327, -111.63374,     565.000,       0.000!   !END!
814 ! X =  -123.02057, -111.38525,     543.000,       0.000!   !END!
815 ! X =  -123.01798, -111.13674,     518.000,       0.000!   !END!
816 ! X =  -123.01528, -110.88815,     493.000,       0.000!   !END!
817 ! X =  -123.01258, -110.63965,     465.000,       0.000!   !END!
818 ! X =  -123.00988, -110.39105,     444.000,       0.000!   !END!
819 ! X =  -123.00718, -110.14256,     394.000,       0.000!   !END!
820 ! X =  -123.00449, -109.89406,     366.000,       0.000!   !END!
821 ! X =  -123.00179, -109.64546,     360.000,       0.000!   !END!
822 ! X =  -122.99909, -109.39696,     389.000,       0.000!   !END!
823 ! X =  -122.99639, -109.14836,     363.000,       0.000!   !END!
824 ! X =  -122.99369, -108.89987,     335.000,       0.000!   !END!
825 ! X =    -122.991, -108.65137,     340.000,       0.000!   !END!
826 ! X =   -122.9884, -108.40276,     365.000,       0.000!   !END!
827 ! X =   -122.9857, -108.15426,     439.000,       0.000!   !END!
828 ! X =  -122.98301, -107.90576,     490.000,       0.000!   !END!
829 ! X =   -122.9803, -107.65716,     518.000,       0.000!   !END!
830 ! X =  -122.97761, -107.40866,     493.000,       0.000!   !END!
831 ! X =  -122.97491, -107.16006,     437.000,       0.000!   !END!
832 ! X =  -122.97221, -106.91156,     396.000,       0.000!   !END!
833 ! X =  -122.96952, -106.66306,     365.000,       0.000!   !END!
834 ! X =  -122.96682, -106.41456,     377.000,       0.000!   !END!
835 ! X =  -122.96412, -106.16596,     386.000,       0.000!   !END!
836 ! X =  -122.78667, -112.63066,     657.000,       0.000!   !END!
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837 ! X =  -122.78397, -112.38206,     678.000,        0.000!   !END!
838 ! X =  -122.78127, -112.13357,     665.000,        0.000!   !END!
839 ! X =  -122.77857, -111.88497,     627.000,        0.000!   !END!
840 ! X =  -122.77587, -111.63648,     616.000,        0.000!   !END!
841 ! X =  -122.77317, -111.38788,     600.000,        0.000!   !END!
842 ! X =  -122.77048, -111.13939,     560.000,        0.000!   !END!
843 ! X =  -122.76777, -110.89079,     518.000,        0.000!   !END!
844 ! X =  -122.76508, -110.64229,     489.000,        0.000!   !END!
845 ! X =  -122.76238, -110.39379,     457.000,        0.000!   !END!
846 ! X =  -122.75978, -110.14519,     384.000,        0.000!   !END!
847 ! X =  -122.75708, -109.89669,     368.000,        0.000!   !END!
848 ! X =  -122.75438,  -109.6481,     396.000,        0.000!   !END!
849 ! X =  -122.75169,  -109.3996,     419.000,        0.000!   !END!
850 ! X =  -122.74899,  -109.1511,     431.000,        0.000!   !END!
851 ! X =  -122.74629,  -108.9025,     396.000,        0.000!   !END!
852 ! X =  -122.74359,   -108.654,     335.000,        0.000!   !END!
853 ! X =   -122.7409,  -108.4055,     338.000,        0.000!   !END!
854 ! X =   -122.7382, -108.15691,     380.000,        0.000!   !END!
855 ! X =   -122.7355, -107.90841,     419.000,        0.000!   !END!
856 ! X =   -122.7329,  -107.6598,     425.000,        0.000!   !END!
857 ! X =   -122.7302,  -107.4113,     396.000,        0.000!   !END!
858 ! X =  -122.72751,  -107.1628,     368.000,        0.000!   !END!
859 ! X =   -122.7248,  -106.9142,     381.000,        0.000!   !END!
860 ! X =  -122.72211,  -106.6657,     424.000,        0.000!   !END!
861 ! X =  -122.71941,  -106.4172,     441.000,        0.000!   !END!
862 ! X =  -122.71672,  -106.1687,     439.000,        0.000!   !END!
863 ! X =  -122.71402,  -105.9201,     412.000,        0.000!   !END!
864 ! X =  -122.71132, -105.67159,     408.000,        0.000!   !END!
865 ! X =  -122.52847, -111.63911,     640.000,        0.000!   !END!
866 ! X =  -122.52577, -111.39062,     638.000,        0.000!   !END!
867 ! X =  -122.52307, -111.14202,     601.000,        0.000!   !END!
868 ! X =  -122.52038, -110.89353,     533.000,        0.000!   !END!
869 ! X =  -122.51767, -110.64493,     502.000,        0.000!   !END!
870 ! X =  -122.51498, -110.39643,     464.000,        0.000!   !END!
871 ! X =  -122.51228, -110.14793,     401.000,        0.000!   !END!
872 ! X =  -122.50958, -109.89934,     390.000,        0.000!   !END!
873 ! X =  -122.50688, -109.65084,     441.000,        0.000!   !END!
874 ! X =  -122.50428, -109.40224,     466.000,        0.000!   !END!
875 ! X =  -122.50159, -109.15374,     466.000,        0.000!   !END!
876 ! X =  -122.49889, -108.90524,     441.000,        0.000!   !END!
877 ! X =  -122.49619, -108.65664,     389.000,        0.000!   !END!
878 ! X =  -122.49349, -108.40814,     335.000,        0.000!   !END!
879 ! X =  -122.49079, -108.15954,     336.000,        0.000!   !END!
880 ! X =  -122.48809, -107.91104,     365.000,        0.000!   !END!
881 ! X =   -122.4854, -107.66254,     369.000,        0.000!   !END!
882 ! X =   -122.4827, -107.41394,     356.000,        0.000!   !END!
883 ! X =   -122.4801, -107.16544,     376.000,        0.000!   !END!
884 ! X =   -122.4774, -106.91694,     410.000,        0.000!   !END!
885 ! X =   -122.4747, -106.66834,     461.000,        0.000!   !END!
886 ! X =  -122.47201, -106.41983,     490.000,        0.000!   !END!
887 ! X =  -122.46931, -106.17133,     489.000,        0.000!   !END!
888 ! X =  -122.46661, -105.92283,     473.000,        0.000!   !END!
889 ! X =  -122.46391, -105.67423,     419.000,        0.000!   !END!
890 ! X =  -122.46122, -105.42573,     452.000,        0.000!   !END!
891 ! X =  -122.28097, -111.64176,     640.000,        0.000!   !END!
892 ! X =  -122.27827, -111.39326,     640.000,        0.000!   !END!
893 ! X =  -122.27557, -111.14466,     601.000,        0.000!   !END!
894 ! X =  -122.27297, -110.89616,     533.000,        0.000!   !END!
895 ! X =  -122.27028, -110.64766,     493.000,        0.000!   !END!
896 ! X =  -122.26758, -110.39907,     457.000,        0.000!   !END!
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897 ! X =  -122.26488, -110.15057,     391.000,       0.000!   !END!
898 ! X =  -122.26218, -109.90197,     429.000,       0.000!   !END!
899 ! X =  -122.25948, -109.65348,     464.000,       0.000!   !END!
900 ! X =  -122.25678, -109.40498,     492.000,       0.000!   !END!
901 ! X =  -122.25408, -109.15638,     487.000,       0.000!   !END!
902 ! X =  -122.25139, -108.90788,     457.000,       0.000!   !END!
903 ! X =  -122.24878, -108.65928,     403.000,       0.000!   !END!
904 ! X =  -122.24609, -108.41078,     371.000,       0.000!   !END!
905 ! X =  -122.24339, -108.16228,     346.000,       0.000!   !END!
906 ! X =  -122.24069, -107.91368,     336.000,       0.000!   !END!
907 ! X =  -122.23799, -107.66518,     335.000,       0.000!   !END!
908 ! X =   -122.2353, -107.41668,     336.000,       0.000!   !END!
909 ! X =  -122.23259, -107.16808,     368.000,       0.000!   !END!
910 ! X =   -122.2299, -106.91958,     408.000,       0.000!   !END!
911 ! X =   -122.2272, -106.67108,     475.000,       0.000!   !END!
912 ! X =   -122.2246, -106.42247,     518.000,       0.000!   !END!
913 ! X =   -122.2219, -106.17397,     518.000,       0.000!   !END!
914 ! X =  -122.21921, -105.92547,     517.000,       0.000!   !END!
915 ! X =  -122.21651, -105.67697,     464.000,       0.000!   !END!
916 ! X =  -122.21381, -105.42836,     443.000,       0.000!   !END!
917 ! X =  -122.21111, -105.17986,     451.000,       0.000!   !END!
918 ! X =  -122.20841, -104.93136,     476.000,       0.000!   !END!
919 ! X =  -122.03357, -111.64449,     623.000,       0.000!   !END!
920 ! X =  -122.03087,  -111.3959,     613.000,       0.000!   !END!
921 ! X =  -122.02817,  -111.1474,     570.000,       0.000!   !END!
922 ! X =  -122.02547,  -110.8988,     502.000,       0.000!   !END!
923 ! X =  -122.02277, -110.65031,     465.000,       0.000!   !END!
924 ! X =  -122.02007, -110.40171,     429.000,       0.000!   !END!
925 ! X =  -122.01747, -110.15321,     460.000,       0.000!   !END!
926 ! X =  -122.01478, -109.90471,     472.000,       0.000!   !END!
927 ! X =  -122.01208, -109.65611,     507.000,       0.000!   !END!
928 ! X =  -122.00938, -109.40761,     518.000,       0.000!   !END!
929 ! X =  -122.00668, -109.15912,     498.000,       0.000!   !END!
930 ! X =  -122.00398, -108.91052,     451.000,       0.000!   !END!
931 ! X =  -122.00128, -108.66202,     396.000,       0.000!   !END!
932 ! X =  -121.99858, -108.41342,     411.000,       0.000!   !END!
933 ! X =  -121.99598, -108.16491,     408.000,       0.000!   !END!
934 ! X =  -121.99329, -107.91641,     386.000,       0.000!   !END!
935 ! X =  -121.99059, -107.66782,     336.000,       0.000!   !END!
936 ! X =  -121.98789, -107.41932,     335.000,       0.000!   !END!
937 ! X =  -121.98519, -107.17081,     337.000,       0.000!   !END!
938 ! X =  -121.98249, -106.92221,     364.000,       0.000!   !END!
939 ! X =  -121.97979, -106.67371,     419.000,       0.000!   !END!
940 ! X =   -121.9771, -106.42521,     497.000,       0.000!   !END!
941 ! X =  -121.97439, -106.17661,     518.000,       0.000!   !END!
942 ! X =   -121.9718,  -105.9281,     518.000,       0.000!   !END!
943 ! X =   -121.9691,  -105.6796,     487.000,       0.000!   !END!
944 ! X =   -121.9664,   -105.431,     487.000,       0.000!   !END!
945 ! X =   -121.9637,  -105.1825,     493.000,       0.000!   !END!
946 ! X =  -121.96101,   -104.934,     526.000,       0.000!   !END!
947 ! X =  -121.95831, -104.68549,     563.000,       0.000!   !END!
948 ! X =  -121.78347, -111.39853,     548.000,       0.000!   !END!
949 ! X =  -121.78077, -111.15004,     507.000,       0.000!   !END!
950 ! X =  -121.77807, -110.90154,     470.000,       0.000!   !END!
951 ! X =  -121.77537, -110.65294,     426.000,       0.000!   !END!
952 ! X =  -121.77267, -110.40445,     457.000,       0.000!   !END!
953 ! X =  -121.76997, -110.15585,     499.000,       0.000!   !END!
954 ! X =  -121.76727, -109.90735,     509.000,       0.000!   !END!
955 ! X =  -121.76458, -109.65885,     548.000,       0.000!   !END!
956 ! X =  -121.76197, -109.41025,     552.000,       0.000!   !END!
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 957 ! X =  -121.75928, -109.16175,     518.000,       0.000!   !END!
 958 ! X =  -121.75658, -108.91315,     457.000,       0.000!   !END!
 959 ! X =  -121.75388, -108.66466,     457.000,       0.000!   !END!
 960 ! X =  -121.75118, -108.41616,     456.000,       0.000!   !END!
 961 ! X =  -121.74848, -108.16756,     426.000,       0.000!   !END!
 962 ! X =  -121.74578, -107.91906,     399.000,       0.000!   !END!
 963 ! X =  -121.74309, -107.67056,     355.000,       0.000!   !END!
 964 ! X =  -121.74048, -107.42195,     365.000,       0.000!   !END!
 965 ! X =  -121.73779, -107.17345,     365.000,       0.000!   !END!
 966 ! X =  -121.73509, -106.92495,     360.000,       0.000!   !END!
 967 ! X =  -121.73239, -106.67635,     355.000,       0.000!   !END!
 968 ! X =  -121.72969, -106.42785,     445.000,       0.000!   !END!
 969 ! X =  -121.72699, -106.17935,     472.000,       0.000!   !END!
 970 ! X =  -121.72429, -105.93075,     472.000,       0.000!   !END!
 971 ! X =  -121.72159, -105.68225,     487.000,       0.000!   !END!
 972 ! X =    -121.719, -105.43374,     487.000,       0.000!   !END!
 973 ! X =  -121.71629, -105.18514,     493.000,       0.000!   !END!
 974 ! X =   -121.7136, -104.93663,     530.000,       0.000!   !END!
 975 ! X =   -121.7109, -104.68813,     593.000,       0.000!   !END!
 976 ! X =   -121.7082, -104.43963,     630.000,       0.000!   !END!
 977 ! X =   -121.7055, -104.19103,     644.000,       0.000!   !END!
 978 ! X =  -121.53327, -111.15268,     446.000,       0.000!   !END!
 979 ! X =  -121.53067, -110.90418,     440.000,       0.000!   !END!
 980 ! X =  -121.52797, -110.65558,     482.000,       0.000!   !END!
 981 ! X =  -121.52527, -110.40708,     503.000,       0.000!   !END!
 982 ! X =  -121.52257, -110.15859,     536.000,       0.000!   !END!
 983 ! X =  -121.51987, -109.90999,     556.000,       0.000!   !END!
 984 ! X =  -121.51717, -109.66149,     574.000,       0.000!   !END!
 985 ! X =  -121.51447, -109.41289,     602.000,       0.000!   !END!
 986 ! X =  -121.51177,  -109.1644,     548.000,       0.000!   !END!
 987 ! X =  -121.50918, -108.91589,     514.000,       0.000!   !END!
 988 ! X =  -121.50647, -108.66729,     487.000,       0.000!   !END!
 989 ! X =  -121.50378, -108.41879,     460.000,       0.000!   !END!
 990 ! X =  -121.50108, -108.17029,     426.000,       0.000!   !END!
 991 ! X =  -121.49838, -107.92169,     414.000,       0.000!   !END!
 992 ! X =  -121.49568, -107.67319,     424.000,       0.000!   !END!
 993 ! X =  -121.49298, -107.42469,     435.000,       0.000!   !END!
 994 ! X =  -121.49028, -107.17609,     435.000,       0.000!   !END!
 995 ! X =  -121.48768, -106.92759,     402.000,       0.000!   !END!
 996 ! X =  -121.48498, -106.67909,     354.000,       0.000!   !END!
 997 ! X =  -121.48228, -106.43049,     345.000,       0.000!   !END!
 998 ! X =  -121.47958, -106.18199,     396.000,       0.000!   !END!
 999 ! X =  -121.47689, -105.93348,     396.000,       0.000!   !END!
1000 ! X =  -121.47419, -105.68488,     396.000,       0.000!   !END!
1001 ! X =  -121.47149, -105.43638,     457.000,       0.000!   !END!
1002 ! X =  -121.46889, -105.18787,     468.000,       0.000!   !END!
1003 ! X =  -121.46619, -104.93927,     509.000,       0.000!   !END!
1004 ! X =  -121.46349, -104.69077,     557.000,       0.000!   !END!
1005 ! X =  -121.46079, -104.44227,     611.000,       0.000!   !END!
1006 ! X =   -121.4581, -104.19376,     623.000,       0.000!   !END!
1007 ! X =  -121.45539, -103.94516,     581.000,       0.000!   !END!
1008 ! X =   -121.4527, -103.69666,     566.000,       0.000!   !END!
1009 ! X =     -121.45, -103.44815,     527.000,       0.000!   !END!
1010 ! X =  -121.28047, -110.65832,     518.000,       0.000!   !END!
1011 ! X =  -121.27777, -110.40973,     560.000,       0.000!   !END!
1012 ! X =  -121.27517, -110.16122,     579.000,       0.000!   !END!
1013 ! X =  -121.27247, -109.91273,     593.000,       0.000!   !END!
1014 ! X =  -121.26977, -109.66413,     609.000,       0.000!   !END!
1015 ! X =  -121.26707, -109.41563,     609.000,       0.000!   !END!
1016 ! X =  -121.26437, -109.16703,     592.000,       0.000!   !END!
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1017 ! X =  -121.26167, -108.91853,     573.000,       0.000!   !END!
1018 ! X =  -121.25897, -108.67003,     519.000,       0.000!   !END!
1019 ! X =  -121.25637, -108.42143,     460.000,       0.000!   !END!
1020 ! X =  -121.25367, -108.17293,     439.000,       0.000!   !END!
1021 ! X =  -121.25098, -107.92443,     479.000,       0.000!   !END!
1022 ! X =  -121.24827, -107.67583,     487.000,       0.000!   !END!
1023 ! X =  -121.24558, -107.42733,     487.000,       0.000!   !END!
1024 ! X =  -121.24287, -107.17873,     487.000,       0.000!   !END!
1025 ! X =  -121.24018, -106.93023,     461.000,       0.000!   !END!
1026 ! X =  -121.23748, -106.68173,     403.000,       0.000!   !END!
1027 ! X =  -121.23488, -106.43322,     337.000,       0.000!   !END!
1028 ! X =  -121.23218, -106.18462,     320.000,       0.000!   !END!
1029 ! X =  -121.22948, -105.93612,     335.000,       0.000!   !END!
1030 ! X =  -121.22678, -105.68762,     314.000,       0.000!   !END!
1031 ! X =  -121.22408, -105.43902,     320.000,       0.000!   !END!
1032 ! X =  -121.22138, -105.19052,     364.000,       0.000!   !END!
1033 ! X =  -121.21868, -104.94201,     475.000,       0.000!   !END!
1034 ! X =  -121.21608, -104.69341,     531.000,       0.000!   !END!
1035 ! X =  -121.21338,  -104.4449,     579.000,       0.000!   !END!
1036 ! X =  -121.21069,  -104.1964,     566.000,       0.000!   !END!
1037 ! X =  -121.20799,  -103.9479,     499.000,       0.000!   !END!
1038 ! X =  -121.20529, -103.69929,     470.000,       0.000!   !END!
1039 ! X =  -121.20259, -103.45079,     457.000,       0.000!   !END!
1040 ! X =  -121.19989, -103.20228,     432.000,       0.000!   !END!
1041 ! X =  -121.19729, -102.95377,     540.000,       0.000!   !END!
1042 ! X =   -121.1946, -102.70527,     591.000,       0.000!   !END!
1043 ! X =  -121.19189, -102.45667,     640.000,       0.000!   !END!
1044 ! X =   -121.1892, -102.20816,     640.000,       0.000!   !END!
1045 ! X =   -121.1865, -101.95965,     612.000,       0.000!   !END!
1046 ! X =   -121.1838, -101.71115,     548.000,       0.000!   !END!
1047 ! X =   -121.1811, -101.46254,     484.000,       0.000!   !END!
1048 ! X =   -121.1785, -101.21403,     510.000,       0.000!   !END!
1049 ! X =  -121.03307, -110.66096,     563.000,       0.000!   !END!
1050 ! X =  -121.03037, -110.41246,     614.000,       0.000!   !END!
1051 ! X =  -121.02767, -110.16387,     645.000,       0.000!   !END!
1052 ! X =  -121.02497, -109.91537,     645.000,       0.000!   !END!
1053 ! X =  -121.02237, -109.66677,     642.000,       0.000!   !END!
1054 ! X =  -121.01967, -109.41827,     650.000,       0.000!   !END!
1055 ! X =  -121.01697, -109.16977,     640.000,       0.000!   !END!
1056 ! X =  -121.01427, -108.92117,     592.000,       0.000!   !END!
1057 ! X =  -121.01157, -108.67267,     528.000,       0.000!   !END!
1058 ! X =  -121.00887, -108.42417,     457.000,       0.000!   !END!
1059 ! X =  -121.00617, -108.17557,     501.000,       0.000!   !END!
1060 ! X =  -121.00357, -107.92707,     548.000,       0.000!   !END!
1061 ! X =  -121.00087, -107.67847,     579.000,       0.000!   !END!
1062 ! X =  -120.99817, -107.42997,     573.000,       0.000!   !END!
1063 ! X =  -120.99547, -107.18147,     548.000,       0.000!   !END!
1064 ! X =  -120.99277, -106.93287,     518.000,       0.000!   !END!
1065 ! X =  -120.99007, -106.68437,     470.000,       0.000!   !END!
1066 ! X =  -120.98737, -106.43587,     457.000,       0.000!   !END!
1067 ! X =  -120.98477, -106.18726,     445.000,       0.000!   !END!
1068 ! X =  -120.98207, -105.93876,     437.000,       0.000!   !END!
1069 ! X =  -120.97937, -105.69026,     421.000,       0.000!   !END!
1070 ! X =  -120.97668, -105.44176,     396.000,       0.000!   !END!
1071 ! X =  -120.97397, -105.19315,     355.000,       0.000!   !END!
1072 ! X =  -120.97128, -104.94465,     428.000,       0.000!   !END!
1073 ! X =  -120.96858, -104.69615,     506.000,       0.000!   !END!
1074 ! X =  -120.96597, -104.44754,     530.000,       0.000!   !END!
1075 ! X =  -120.96328, -104.19904,     519.000,       0.000!   !END!
1076 ! X =  -120.96058, -103.95053,     457.000,       0.000!   !END!
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1077 ! X =  -120.95788, -103.70203,     384.000,       0.000!   !END!
1078 ! X =  -120.95518, -103.45343,     432.000,       0.000!   !END!
1079 ! X =  -120.95248, -103.20492,     457.000,       0.000!   !END!
1080 ! X =  -120.94978, -102.95642,     545.000,       0.000!   !END!
1081 ! X =  -120.94718, -102.70791,     591.000,       0.000!   !END!
1082 ! X =  -120.94449,  -102.4594,     611.000,       0.000!   !END!
1083 ! X =  -120.94178,  -102.2108,     611.000,       0.000!   !END!
1084 ! X =  -120.93909, -101.96229,     566.000,       0.000!   !END!
1085 ! X =  -120.93639, -101.71379,     502.000,       0.000!   !END!
1086 ! X =  -120.93369, -101.46528,     457.000,       0.000!   !END!
1087 ! X =  -120.93099, -101.21677,     530.000,       0.000!   !END!
1088 ! X =  -120.78297,  -110.4151,     651.000,       0.000!   !END!
1089 ! X =  -120.78026, -110.16651,     672.000,       0.000!   !END!
1090 ! X =  -120.77756, -109.91801,     672.000,       0.000!   !END!
1091 ! X =  -120.77487, -109.66951,     657.000,       0.000!   !END!
1092 ! X =  -120.77216, -109.42091,     657.000,       0.000!   !END!
1093 ! X =  -120.76957, -109.17241,     640.000,       0.000!   !END!
1094 ! X =  -120.76687, -108.92391,     591.000,       0.000!   !END!
1095 ! X =  -120.76416, -108.67531,     525.000,       0.000!   !END!
1096 ! X =  -120.76147, -108.42681,     502.000,       0.000!   !END!
1097 ! X =  -120.75876, -108.17821,     569.000,       0.000!   !END!
1098 ! X =  -120.75606, -107.92971,     603.000,       0.000!   !END!
1099 ! X =  -120.75337, -107.68121,     609.000,       0.000!   !END!
1100 ! X =  -120.75076, -107.43261,     586.000,       0.000!   !END!
1101 ! X =  -120.74806, -107.18411,     559.000,       0.000!   !END!
1102 ! X =  -120.74537, -106.93561,     518.000,       0.000!   !END!
1103 ! X =  -120.74266, -106.68701,     472.000,       0.000!   !END!
1104 ! X =  -120.73997, -106.43851,     457.000,       0.000!   !END!
1105 ! X =  -120.73727,    -106.19,     457.000,       0.000!   !END!
1106 ! X =  -120.73456,  -105.9414,     457.000,       0.000!   !END!
1107 ! X =  -120.73197,  -105.6929,     430.000,       0.000!   !END!
1108 ! X =  -120.72927, -105.44439,     401.000,       0.000!   !END!
1109 ! X =  -120.72657, -105.19589,     341.000,       0.000!   !END!
1110 ! X =  -120.72387, -104.94729,     411.000,       0.000!   !END!
1111 ! X =  -120.72117, -104.69879,     471.000,       0.000!   !END!
1112 ! X =  -120.71847, -104.45028,     489.000,       0.000!   !END!
1113 ! X =  -120.71577, -104.20168,     466.000,       0.000!   !END!
1114 ! X =  -120.71317, -103.95317,     370.000,       0.000!   !END!
1115 ! X =  -120.71047, -103.70467,     457.000,       0.000!   !END!
1116 ! X =  -120.70777, -103.45616,     514.000,       0.000!   !END!
1117 ! X =  -120.70507, -103.20756,     552.000,       0.000!   !END!
1118 ! X =  -120.70237, -102.95906,     579.000,       0.000!   !END!
1119 ! X =  -120.69967, -102.71055,     579.000,       0.000!   !END!
1120 ! X =  -120.69708, -102.46204,     587.000,       0.000!   !END!
1121 ! X =  -120.69438, -102.21354,     567.000,       0.000!   !END!
1122 ! X =  -120.69167, -101.96493,     525.000,       0.000!   !END!
1123 ! X =  -120.68898, -101.71642,     457.000,       0.000!   !END!
1124 ! X =  -120.68628, -101.46792,     521.000,       0.000!   !END!
1125 ! X =  -120.68358, -101.21941,     626.000,       0.000!   !END!
1126 ! X =  -120.53546, -110.41775,     670.000,       0.000!   !END!
1127 ! X =  -120.53286, -110.16924,     671.000,       0.000!   !END!
1128 ! X =  -120.53016, -109.92065,     671.000,       0.000!   !END!
1129 ! X =  -120.52746, -109.67215,     650.000,       0.000!   !END!
1130 ! X =  -120.52476, -109.42365,     646.000,       0.000!   !END!
1131 ! X =  -120.52206, -109.17505,     618.000,       0.000!   !END!
1132 ! X =  -120.51936, -108.92655,     554.000,       0.000!   !END!
1133 ! X =  -120.51666, -108.67795,     505.000,       0.000!   !END!
1134 ! X =  -120.51406, -108.42945,     548.000,       0.000!   !END!
1135 ! X =  -120.51136, -108.18095,     609.000,       0.000!   !END!
1136 ! X =  -120.50866, -107.93235,     609.000,       0.000!   !END!
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1137 ! X =  -120.50596, -107.68385,     609.000,       0.000!   !END!
1138 ! X =  -120.50326, -107.43535,     586.000,       0.000!   !END!
1139 ! X =  -120.50056, -107.18675,     536.000,       0.000!   !END!
1140 ! X =  -120.49796, -106.93825,     491.000,       0.000!   !END!
1141 ! X =  -120.49526, -106.68974,     465.000,       0.000!   !END!
1142 ! X =  -120.49256, -106.44114,     457.000,       0.000!   !END!
1143 ! X =  -120.48986, -106.19264,     431.000,       0.000!   !END!
1144 ! X =  -120.48716, -105.94414,     433.000,       0.000!   !END!
1145 ! X =  -120.48446, -105.69554,     363.000,       0.000!   !END!
1146 ! X =  -120.48176, -105.44704,     327.000,       0.000!   !END!
1147 ! X =  -120.47916, -105.19853,     326.000,       0.000!   !END!
1148 ! X =  -120.47646, -104.95003,     344.000,       0.000!   !END!
1149 ! X =  -120.47376, -104.70142,     381.000,       0.000!   !END!
1150 ! X =  -120.47106, -104.45292,     363.000,       0.000!   !END!
1151 ! X =  -120.46836, -104.20442,     352.000,       0.000!   !END!
1152 ! X =  -120.46566, -103.95582,     421.000,       0.000!   !END!
1153 ! X =  -120.46306, -103.70731,     503.000,       0.000!   !END!
1154 ! X =  -120.46036,  -103.4588,     564.000,       0.000!   !END!
1155 ! X =  -120.45766,  -103.2103,     579.000,       0.000!   !END!
1156 ! X =  -120.45497, -102.96179,     579.000,       0.000!   !END!
1157 ! X =  -120.45226, -102.71319,     571.000,       0.000!   !END!
1158 ! X =  -120.44957, -102.46468,     548.000,       0.000!   !END!
1159 ! X =  -120.44697, -102.21617,     510.000,       0.000!   !END!
1160 ! X =  -120.44427, -101.96767,     447.000,       0.000!   !END!
1161 ! X =  -120.44156, -101.71906,     487.000,       0.000!   !END!
1162 ! X =  -120.43887, -101.47056,     551.000,       0.000!   !END!
1163 ! X =  -120.28536, -110.17189,     670.000,       0.000!   !END!
1164 ! X =  -120.28266, -109.92339,     663.000,       0.000!   !END!
1165 ! X =  -120.28006, -109.67479,     632.000,       0.000!   !END!
1166 ! X =  -120.27736, -109.42629,     583.000,       0.000!   !END!
1167 ! X =  -120.27466, -109.17769,     543.000,       0.000!   !END!
1168 ! X =  -120.27196, -108.92919,     522.000,       0.000!   !END!
1169 ! X =  -120.26926, -108.68069,     555.000,       0.000!   !END!
1170 ! X =  -120.26656, -108.43209,     575.000,       0.000!   !END!
1171 ! X =  -120.26396, -108.18359,     609.000,       0.000!   !END!
1172 ! X =  -120.26126, -107.93509,     609.000,       0.000!   !END!
1173 ! X =  -120.25855, -107.68649,     609.000,       0.000!   !END!
1174 ! X =  -120.25586, -107.43799,     544.000,       0.000!   !END!
1175 ! X =  -120.25316, -107.18949,     511.000,       0.000!   !END!
1176 ! X =  -120.25045, -106.94089,     457.000,       0.000!   !END!
1177 ! X =  -120.24776, -106.69239,     414.000,       0.000!   !END!
1178 ! X =  -120.24516, -106.44388,     401.000,       0.000!   !END!
1179 ! X =  -120.24245, -106.19528,     369.000,       0.000!   !END!
1180 ! X =  -120.23975, -105.94678,     367.000,       0.000!   !END!
1181 ! X =  -120.23706, -105.69828,     367.000,       0.000!   !END!
1182 ! X =  -120.23435, -105.44968,     320.000,       0.000!   !END!
1183 ! X =  -120.23165, -105.20117,     335.000,       0.000!   !END!
1184 ! X =  -120.22905, -104.95267,     335.000,       0.000!   !END!
1185 ! X =  -120.22636, -104.70416,     320.000,       0.000!   !END!
1186 ! X =  -120.22365, -104.45556,     305.000,       0.000!   !END!
1187 ! X =  -120.22095, -104.20706,     320.000,       0.000!   !END!
1188 ! X =  -120.21826, -103.95855,     435.000,       0.000!   !END!
1189 ! X =  -120.21555, -103.70995,     526.000,       0.000!   !END!
1190 ! X =  -120.21295, -103.46144,     568.000,       0.000!   !END!
1191 ! X =  -120.21025, -103.21294,     579.000,       0.000!   !END!
1192 ! X =  -120.20756, -102.96443,     563.000,       0.000!   !END!
1193 ! X =  -120.20486, -102.71593,     530.000,       0.000!   !END!
1194 ! X =  -120.20215, -102.46732,     488.000,       0.000!   !END!
1195 ! X =  -120.19946, -102.21882,     444.000,       0.000!   !END!
1196 ! X =  -120.19686, -101.97031,     423.000,       0.000!   !END!
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1197 ! X =  -120.19416,  -101.7218,     487.000,       0.000!   !END!
1198 ! X =  -120.19145,  -101.4732,     529.000,       0.000!   !END!
1199 ! X =  -120.18876, -101.22469,     536.000,       0.000!   !END!
1200 ! X =  -120.18606, -100.97618,     640.000,       0.000!   !END!
1201 ! X =  -120.18336, -100.72768,     640.000,       0.000!   !END!
1202 ! X =  -120.03796, -110.17453,     670.000,       0.000!   !END!
1203 ! X =  -120.03526, -109.92603,     639.000,       0.000!   !END!
1204 ! X =  -120.03255, -109.67743,     626.000,       0.000!   !END!
1205 ! X =  -120.02986, -109.42893,     620.000,       0.000!   !END!
1206 ! X =  -120.02726, -109.18043,     573.000,       0.000!   !END!
1207 ! X =  -120.02455, -108.93183,     609.000,       0.000!   !END!
1208 ! X =  -120.02185, -108.68333,     640.000,       0.000!   !END!
1209 ! X =  -120.01916, -108.43483,     617.000,       0.000!   !END!
1210 ! X =  -120.01645, -108.18623,     609.000,       0.000!   !END!
1211 ! X =  -120.01375, -107.93773,     609.000,       0.000!   !END!
1212 ! X =  -120.01115, -107.68913,     585.000,       0.000!   !END!
1213 ! X =  -120.00845, -107.44063,     517.000,       0.000!   !END!
1214 ! X =  -120.00575, -107.19213,     470.000,       0.000!   !END!
1215 ! X =  -120.00305, -106.94353,     420.000,       0.000!   !END!
1216 ! X =  -120.00035, -106.69503,     365.000,       0.000!   !END!
1217 ! X =  -119.99765, -106.44653,     367.000,       0.000!   !END!
1218 ! X =  -119.99505, -106.19802,     424.000,       0.000!   !END!
1219 ! X =  -119.99235, -105.94942,     460.000,       0.000!   !END!
1220 ! X =  -119.98965, -105.70092,     456.000,       0.000!   !END!
1221 ! X =  -119.98695, -105.45241,     469.000,       0.000!   !END!
1222 ! X =  -119.98425, -105.20381,     438.000,       0.000!   !END!
1223 ! X =  -119.98155, -104.95531,     381.000,       0.000!   !END!
1224 ! X =  -119.97895,  -104.7068,     397.000,       0.000!   !END!
1225 ! X =  -119.97624,  -104.4582,     335.000,       0.000!   !END!
1226 ! X =  -119.97354,  -104.2097,     335.000,       0.000!   !END!
1227 ! X =  -119.97085, -103.96119,     423.000,       0.000!   !END!
1228 ! X =  -119.96815, -103.71269,     497.000,       0.000!   !END!
1229 ! X =  -119.96544, -103.46409,     527.000,       0.000!   !END!
1230 ! X =  -119.96284, -103.21558,     534.000,       0.000!   !END!
1231 ! X =  -119.96015, -102.96707,     503.000,       0.000!   !END!
1232 ! X =  -119.95745, -102.71857,     457.000,       0.000!   !END!
1233 ! X =  -119.95475, -102.47006,     390.000,       0.000!   !END!
1234 ! X =  -119.95204, -102.22146,     362.000,       0.000!   !END!
1235 ! X =  -119.94935, -101.97295,     395.000,       0.000!   !END!
1236 ! X =  -119.94675, -101.72444,     431.000,       0.000!   !END!
1237 ! X =  -119.94405, -101.47593,     462.000,       0.000!   !END!
1238 ! X =  -119.94135, -101.22743,     474.000,       0.000!   !END!
1239 ! X =  -119.93864, -100.97882,     548.000,       0.000!   !END!
1240 ! X =  -119.93595, -100.73032,     570.000,       0.000!   !END!
1241 ! X =  -119.93325, -100.48181,     548.000,       0.000!   !END!
1242 ! X =  -119.93065,  -100.2333,     588.000,       0.000!   !END!
1243 ! X =  -119.78785, -109.92867,     656.000,       0.000!   !END!
1244 ! X =  -119.78516, -109.68017,     637.000,       0.000!   !END!
1245 ! X =  -119.78245, -109.43157,     622.000,       0.000!   !END!
1246 ! X =  -119.77975, -109.18307,     626.000,       0.000!   !END!
1247 ! X =  -119.77705, -108.93457,     640.000,       0.000!   !END!
1248 ! X =  -119.77445, -108.68597,     640.000,       0.000!   !END!
1249 ! X =  -119.77175, -108.43747,     626.000,       0.000!   !END!
1250 ! X =  -119.76905, -108.18887,     609.000,       0.000!   !END!
1251 ! X =  -119.76635, -107.94037,     568.000,       0.000!   !END!
1252 ! X =  -119.76365, -107.69187,     527.000,       0.000!   !END!
1253 ! X =  -119.76094, -107.44327,     491.000,       0.000!   !END!
1254 ! X =  -119.75834, -107.19477,     434.000,       0.000!   !END!
1255 ! X =  -119.75565, -106.94627,     370.000,       0.000!   !END!
1256 ! X =  -119.75294, -106.69767,     382.000,       0.000!   !END!
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1257 ! X =  -119.75024, -106.44917,     457.000,        0.000!   !END!
1258 ! X =  -119.74754, -106.20066,     470.000,        0.000!   !END!
1259 ! X =  -119.74484, -105.95206,     481.000,        0.000!   !END!
1260 ! X =  -119.74224, -105.70356,     493.000,        0.000!   !END!
1261 ! X =  -119.73954, -105.45505,     518.000,        0.000!   !END!
1262 ! X =  -119.73684, -105.20655,     518.000,        0.000!   !END!
1263 ! X =  -119.73414, -104.95795,     487.000,        0.000!   !END!
1264 ! X =  -119.73144, -104.70945,     441.000,        0.000!   !END!
1265 ! X =  -119.72874, -104.46094,     364.000,        0.000!   !END!
1266 ! X =  -119.72614, -104.21233,     335.000,        0.000!   !END!
1267 ! X =  -119.72344, -103.96383,     431.000,        0.000!   !END!
1268 ! X =  -119.72074, -103.71533,     460.000,        0.000!   !END!
1269 ! X =  -119.71804, -103.46682,     487.000,        0.000!   !END!
1270 ! X =  -119.71533, -103.21822,     479.000,        0.000!   !END!
1271 ! X =  -119.71273, -102.96971,     418.000,        0.000!   !END!
1272 ! X =  -119.71004, -102.72121,     395.000,        0.000!   !END!
1273 ! X =  -119.70734,  -102.4727,     467.000,        0.000!   !END!
1274 ! X =  -119.70464,  -102.2242,     457.000,        0.000!   !END!
1275 ! X =  -119.70193, -101.97559,     424.000,        0.000!   !END!
1276 ! X =  -119.69923, -101.72708,     457.000,        0.000!   !END!
1277 ! X =  -119.69664, -101.47857,     487.000,        0.000!   !END!
1278 ! X =  -119.69394, -101.23007,     479.000,        0.000!   !END!
1279 ! X =  -119.69124, -100.98156,     473.000,        0.000!   !END!
1280 ! X =  -119.68853, -100.73295,     487.000,        0.000!   !END!
1281 ! X =  -119.68583, -100.48445,     491.000,        0.000!   !END!
1282 ! X =  -119.68314, -100.23594,     562.000,        0.000!   !END!
1283 ! X =  -119.54035, -109.93131,     685.000,        0.000!   !END!
1284 ! X =  -119.53775, -109.68281,     655.000,        0.000!   !END!
1285 ! X =  -119.53505, -109.43431,     644.000,        0.000!   !END!
1286 ! X =  -119.53235, -109.18571,     640.000,        0.000!   !END!
1287 ! X =  -119.52965, -108.93721,     640.000,        0.000!   !END!
1288 ! X =  -119.52694, -108.68861,     633.000,        0.000!   !END!
1289 ! X =  -119.52425, -108.44012,     575.000,        0.000!   !END!
1290 ! X =  -119.52165, -108.19161,     535.000,        0.000!   !END!
1291 ! X =  -119.51894, -107.94301,     518.000,        0.000!   !END!
1292 ! X =  -119.51624, -107.69451,     484.000,        0.000!   !END!
1293 ! X =  -119.51354, -107.44601,     434.000,        0.000!   !END!
1294 ! X =  -119.51084, -107.19741,     397.000,        0.000!   !END!
1295 ! X =  -119.50824, -106.94891,     396.000,        0.000!   !END!
1296 ! X =  -119.50554,  -106.7004,     387.000,        0.000!   !END!
1297 ! X =  -119.50283,  -106.4518,     459.000,        0.000!   !END!
1298 ! X =  -119.50014,  -106.2033,     478.000,        0.000!   !END!
1299 ! X =  -119.49744,  -105.9548,     487.000,        0.000!   !END!
1300 ! X =  -119.49473,  -105.7062,     509.000,        0.000!   !END!
1301 ! X =  -119.49213, -105.45769,     518.000,        0.000!   !END!
1302 ! X =  -119.48943, -105.20919,     518.000,        0.000!   !END!
1303 ! X =  -119.48673, -104.96069,     489.000,        0.000!   !END!
1304 ! X =  -119.48403, -104.71209,     441.000,        0.000!   !END!
1305 ! X =  -119.48133, -104.46358,     365.000,        0.000!   !END!
1306 ! X =  -119.47863, -104.21508,     335.000,        0.000!   !END!
1307 ! X =  -119.47603, -103.96647,     438.000,        0.000!   !END!
1308 ! X =  -119.47333, -103.71797,     457.000,        0.000!   !END!
1309 ! X =  -119.47063, -103.46946,     457.000,        0.000!   !END!
1310 ! X =  -119.46793, -103.22096,     385.000,        0.000!   !END!
1311 ! X =  -119.46522, -102.97235,     388.000,        0.000!   !END!
1312 ! X =  -119.46262, -102.72384,     477.000,        0.000!   !END!
1313 ! X =  -119.45993, -102.47534,     505.000,        0.000!   !END!
1314 ! X =  -119.45723, -102.22683,     518.000,        0.000!   !END!
1315 ! X =  -119.45453, -101.97833,     498.000,        0.000!   !END!
1316 ! X =  -119.45182, -101.72972,     457.000,        0.000!   !END!
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1317 ! X =  -119.44912, -101.48122,     518.000,       0.000!   !END!
1318 ! X =  -119.44652, -101.23271,     548.000,       0.000!   !END!
1319 ! X =  -119.44382,  -100.9842,     548.000,       0.000!   !END!
1320 ! X =  -119.44113, -100.73569,     528.000,       0.000!   !END!
1321 ! X =  -119.43842, -100.48709,     556.000,       0.000!   !END!
1322 ! X =  -119.26884, -107.69715,     457.000,       0.000!   !END!
1323 ! X =  -119.26614, -107.44865,     410.000,       0.000!   !END!
1324 ! X =  -119.26343, -107.20005,     397.000,       0.000!   !END!
1325 ! X =  -119.26073, -106.95155,     371.000,       0.000!   !END!
1326 ! X =  -119.25803, -106.70305,     386.000,       0.000!   !END!
1327 ! X =  -119.25543, -106.45454,     457.000,       0.000!   !END!
1328 ! X =  -119.25273, -106.20594,     482.000,       0.000!   !END!
1329 ! X =  -119.25003, -105.95744,     487.000,       0.000!   !END!
1330 ! X =  -119.24733, -105.70894,     492.000,       0.000!   !END!
1331 ! X =  -119.24462, -105.46034,     518.000,       0.000!   !END!
1332 ! X =  -119.24202, -105.21183,     490.000,       0.000!   !END!
1333 ! X =  -119.23933, -104.96333,     457.000,       0.000!   !END!
1334 ! X =  -119.23662, -104.71472,     362.000,       0.000!   !END!
1335 ! X =  -119.23392, -104.46622,     327.000,       0.000!   !END!
1336 ! X =  -119.23122, -104.21772,     308.000,       0.000!   !END!
1337 ! X =  -119.22852, -103.96922,     426.000,       0.000!   !END!
1338 ! X =  -119.22592, -103.72061,     445.000,       0.000!   !END!
1339 ! X =  -119.22322,  -103.4721,     426.000,       0.000!   !END!
1340 ! X =  -119.22052,  -103.2236,     320.000,       0.000!   !END!
1341 ! X =  -119.21782, -102.97509,     402.000,       0.000!   !END!
1342 ! X =  -119.21511, -102.72649,     487.000,       0.000!   !END!
1343 ! X =  -119.21251, -102.47798,     519.000,       0.000!   !END!
1344 ! X =  -119.20982, -102.22947,     543.000,       0.000!   !END!
1345 ! X =  -119.20712, -101.98097,     548.000,       0.000!   !END!
1346 ! X =  -119.20442, -101.73246,     506.000,       0.000!   !END!
1347 ! X =  -119.20171, -101.48386,     499.000,       0.000!   !END!
1348 ! X =  -119.19901, -101.23535,     564.000,       0.000!   !END!
1349 ! X =  -119.19641, -100.98684,     591.000,       0.000!   !END!
1350 ! X =  -119.19371, -100.73833,     594.000,       0.000!   !END!
1351 ! X =  -119.19101, -100.48983,     595.000,       0.000!   !END!
1352 ! X =  -119.01873, -107.45129,     396.000,       0.000!   !END!
1353 ! X =  -119.01603, -107.20279,     396.000,       0.000!   !END!
1354 ! X =  -119.01333, -106.95419,     435.000,       0.000!   !END!
1355 ! X =  -119.01063, -106.70569,     457.000,       0.000!   !END!
1356 ! X =  -119.00793, -106.45719,     457.000,       0.000!   !END!
1357 ! X =  -119.00532, -106.20858,     463.000,       0.000!   !END!
1358 ! X =  -119.00262, -105.96008,     464.000,       0.000!   !END!
1359 ! X =  -118.99992, -105.71158,     457.000,       0.000!   !END!
1360 ! X =  -118.99722, -105.46308,     448.000,       0.000!   !END!
1361 ! X =  -118.99452, -105.21447,     418.000,       0.000!   !END!
1362 ! X =  -118.99182, -104.96597,     342.000,       0.000!   !END!
1363 ! X =  -118.98922, -104.71746,     396.000,       0.000!   !END!
1364 ! X =  -118.98651, -104.46886,     396.000,       0.000!   !END!
1365 ! X =  -118.98381, -104.22036,     457.000,       0.000!   !END!
1366 ! X =  -118.98111, -103.97185,     487.000,       0.000!   !END!
1367 ! X =  -118.97841, -103.72335,     487.000,       0.000!   !END!
1368 ! X =  -118.97581, -103.47474,     426.000,       0.000!   !END!
1369 ! X =  -118.97311, -103.22624,     320.000,       0.000!   !END!
1370 ! X =  -118.97041, -102.97773,     404.000,       0.000!   !END!
1371 ! X =  -118.96771, -102.72923,     472.000,       0.000!   !END!
1372 ! X =    -118.965, -102.48062,     519.000,       0.000!   !END!
1373 ! X =   -118.9624, -102.23211,     579.000,       0.000!   !END!
1374 ! X =   -118.9597, -101.98361,     580.000,       0.000!   !END!
1375 ! X =    -118.957,  -101.7351,     583.000,       0.000!   !END!
1376 ! X =   -118.9543,  -101.4866,     559.000,       0.000!   !END!
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1377 ! X =   -118.9516, -101.23799,     595.000,       0.000!   !END!
1378 ! X =    -118.949, -100.98948,     633.000,       0.000!   !END!
1379 ! X =   -118.9463, -100.74097,     648.000,       0.000!   !END!
1380 ! X =   -118.9436, -100.49247,     650.000,       0.000!   !END!
1381 ! X =   -118.9409, -100.24396,     648.000,       0.000!   !END!
1382 ! X =  -118.77122, -107.45394,     415.000,       0.000!   !END!
1383 ! X =  -118.76862, -107.20543,     443.000,       0.000!   !END!
1384 ! X =  -118.76592, -106.95693,     457.000,       0.000!   !END!
1385 ! X =  -118.76322, -106.70833,     457.000,       0.000!   !END!
1386 ! X =  -118.76052, -106.45983,     457.000,       0.000!   !END!
1387 ! X =  -118.75782, -106.21133,     457.000,       0.000!   !END!
1388 ! X =  -118.75521, -105.96272,     411.000,       0.000!   !END!
1389 ! X =  -118.75251, -105.71422,     335.000,       0.000!   !END!
1390 ! X =  -118.74981, -105.46572,     335.000,       0.000!   !END!
1391 ! X =  -118.74711, -105.21711,     312.000,       0.000!   !END!
1392 ! X =  -118.74441, -104.96861,     315.000,       0.000!   !END!
1393 ! X =  -118.74171, -104.72011,     396.000,       0.000!   !END!
1394 ! X =  -118.73911,  -104.4716,     405.000,       0.000!   !END!
1395 ! X =   -118.7364,   -104.223,     460.000,       0.000!   !END!
1396 ! X =   -118.7337, -103.97449,     487.000,       0.000!   !END!
1397 ! X =    -118.731, -103.72599,     457.000,       0.000!   !END!
1398 ! X =   -118.7283, -103.47749,     411.000,       0.000!   !END!
1399 ! X =   -118.7257, -103.22888,     319.000,       0.000!   !END!
1400 ! X =    -118.723, -102.98037,     388.000,       0.000!   !END!
1401 ! X =   -118.7203, -102.73187,     472.000,       0.000!   !END!
1402 ! X =   -118.7176, -102.48336,     519.000,       0.000!   !END!
1403 ! X =  -118.71489, -102.23476,     579.000,       0.000!   !END!
1404 ! X =  -118.71229, -101.98625,     593.000,       0.000!   !END!
1405 ! X =  -118.70959, -101.73774,     613.000,       0.000!   !END!
1406 ! X =  -118.70689, -101.48924,     640.000,       0.000!   !END!
1407 ! X =  -118.70419, -101.24073,     640.000,       0.000!   !END!
1408 ! X =  -118.70149, -100.99212,     670.000,       0.000!   !END!
1409 ! X =  -118.69889, -100.74361,     670.000,       0.000!   !END!
1410 ! X =  -118.69619, -100.49511,     670.000,       0.000!   !END!
1411 ! X =  -118.69349,  -100.2466,     670.000,       0.000!   !END!
1412 ! X =  -118.69079,  -99.99809,     645.000,       0.000!   !END!
1413 ! X =  -118.68809,  -99.74958,     633.000,       0.000!   !END!
1414 ! X =  -118.68549,  -99.50107,     640.000,       0.000!   !END!
1415 ! X =  -118.68278,  -99.25246,     640.000,       0.000!   !END!
1416 ! X =  -118.52382, -107.45668,     487.000,       0.000!   !END!
1417 ! X =  -118.52112, -107.20808,     464.000,       0.000!   !END!
1418 ! X =  -118.51842, -106.95958,     457.000,       0.000!   !END!
1419 ! X =  -118.51582, -106.71107,     457.000,       0.000!   !END!
1420 ! X =  -118.51311, -106.46247,     457.000,       0.000!   !END!
1421 ! X =  -118.51041, -106.21397,     405.000,       0.000!   !END!
1422 ! X =  -118.50771, -105.96547,     364.000,       0.000!   !END!
1423 ! X =  -118.50501, -105.71686,     380.000,       0.000!   !END!
1424 ! X =  -118.50241, -105.46836,     423.000,       0.000!   !END!
1425 ! X =  -118.49971, -105.21985,     427.000,       0.000!   !END!
1426 ! X =    -118.497, -104.97125,     377.000,       0.000!   !END!
1427 ! X =   -118.4943, -104.72275,     358.000,       0.000!   !END!
1428 ! X =   -118.4916, -104.47425,     396.000,       0.000!   !END!
1429 ! X =    -118.489, -104.22574,     396.000,       0.000!   !END!
1430 ! X =  -118.48629, -103.97714,     414.000,       0.000!   !END!
1431 ! X =  -118.48359, -103.72863,     381.000,       0.000!   !END!
1432 ! X =  -118.48089, -103.48013,     364.000,       0.000!   !END!
1433 ! X =  -118.47819, -103.23162,     323.000,       0.000!   !END!
1434 ! X =  -118.47559, -102.98301,     457.000,       0.000!   !END!
1435 ! X =  -118.47289, -102.73451,     508.000,       0.000!   !END!
1436 ! X =  -118.47019,   -102.486,     530.000,       0.000!   !END!
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1437 ! X =  -118.46749,  -102.2375,     561.000,       0.000!   !END!
1438 ! X =  -118.46478, -101.98889,     590.000,       0.000!   !END!
1439 ! X =  -118.46218, -101.74038,     620.000,       0.000!   !END!
1440 ! X =  -118.45948, -101.49188,     656.000,       0.000!   !END!
1441 ! X =  -118.45678, -101.24337,     670.000,       0.000!   !END!
1442 ! X =  -118.45408, -100.99486,     670.000,       0.000!   !END!
1443 ! X =  -118.45138, -100.74636,     670.000,       0.000!   !END!
1444 ! X =  -118.44877, -100.49775,     670.000,       0.000!   !END!
1445 ! X =  -118.44607, -100.24924,     670.000,       0.000!   !END!
1446 ! X =  -118.44337, -100.00073,     653.000,       0.000!   !END!
1447 ! X =  -118.44067,  -99.75222,     627.000,       0.000!   !END!
1448 ! X =  -118.43797,  -99.50372,     614.000,       0.000!   !END!
1449 ! X =  -118.43537,   -99.2552,     617.000,       0.000!   !END!
1450 ! X =  -118.27642, -107.45932,     497.000,       0.000!   !END!
1451 ! X =  -118.27371, -107.21072,     474.000,       0.000!   !END!
1452 ! X =  -118.27101, -106.96222,     458.000,       0.000!   !END!
1453 ! X =  -118.26831, -106.71371,     423.000,       0.000!   !END!
1454 ! X =   -118.2657, -106.46511,     407.000,       0.000!   !END!
1455 ! X =    -118.263, -106.21661,     432.000,       0.000!   !END!
1456 ! X =   -118.2603, -105.96811,     450.000,       0.000!   !END!
1457 ! X =   -118.2576,  -105.7195,     480.000,       0.000!   !END!
1458 ! X =   -118.2549,   -105.471,     500.000,       0.000!   !END!
1459 ! X =   -118.2523, -105.22249,     479.000,       0.000!   !END!
1460 ! X =   -118.2496, -104.97399,     426.000,       0.000!   !END!
1461 ! X =  -118.24689, -104.72539,     426.000,       0.000!   !END!
1462 ! X =  -118.24419, -104.47689,     426.000,       0.000!   !END!
1463 ! X =  -118.24149, -104.22838,     396.000,       0.000!   !END!
1464 ! X =  -118.23889, -103.97987,     328.000,       0.000!   !END!
1465 ! X =  -118.23618, -103.73127,     310.000,       0.000!   !END!
1466 ! X =  -118.23348, -103.48277,     322.000,       0.000!   !END!
1467 ! X =  -118.23078, -103.23426,     335.000,       0.000!   !END!
1468 ! X =  -118.22808, -102.98576,     422.000,       0.000!   !END!
1469 ! X =  -118.22548, -102.73715,     477.000,       0.000!   !END!
1470 ! X =  -118.22278, -102.48864,     518.000,       0.000!   !END!
1471 ! X =  -118.22008, -102.24014,     518.000,       0.000!   !END!
1472 ! X =  -118.21737, -101.99163,     527.000,       0.000!   !END!
1473 ! X =  -118.21477, -101.74302,     609.000,       0.000!   !END!
1474 ! X =  -118.21207, -101.49452,     662.000,       0.000!   !END!
1475 ! X =  -118.20937, -101.24601,     671.000,       0.000!   !END!
1476 ! X =  -118.20667,  -100.9975,     674.000,       0.000!   !END!
1477 ! X =  -118.20397,   -100.749,     677.000,       0.000!   !END!
1478 ! X =  -118.20137, -100.50049,     675.000,       0.000!   !END!
1479 ! X =  -118.19866, -100.25188,     671.000,       0.000!   !END!
1480 ! X =  -118.19596, -100.00337,     652.000,       0.000!   !END!
1481 ! X =  -118.19326,  -99.75486,     633.000,       0.000!   !END!
1482 ! X =  -118.19056,  -99.50636,     623.000,       0.000!   !END!
1483 ! X =  -118.18796,  -99.25784,     609.000,       0.000!   !END!
1484 ! X =  -118.02901, -107.46196,     521.000,       0.000!   !END!
1485 ! X =  -118.02631, -107.21346,     477.000,       0.000!   !END!
1486 ! X =   -118.0236, -106.96486,     442.000,       0.000!   !END!
1487 ! X =   -118.0209, -106.71636,     436.000,       0.000!   !END!
1488 ! X =   -118.0182, -106.46785,     447.000,       0.000!   !END!
1489 ! X =   -118.0156, -106.21925,     475.000,       0.000!   !END!
1490 ! X =   -118.0129, -105.97075,     512.000,       0.000!   !END!
1491 ! X =   -118.0102, -105.72224,     548.000,       0.000!   !END!
1492 ! X =  -118.00749, -105.47364,     548.000,       0.000!   !END!
1493 ! X =  -118.00479, -105.22514,     511.000,       0.000!   !END!
1494 ! X =  -118.00219, -104.97663,     457.000,       0.000!   !END!
1495 ! X =  -117.99949, -104.72813,     473.000,       0.000!   !END!
1496 ! X =  -117.99678, -104.47953,     474.000,       0.000!   !END!
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1497 ! X =  -117.99408, -104.23102,     452.000,       0.000!   !END!
1498 ! X =  -117.99138, -103.98252,     431.000,       0.000!   !END!
1499 ! X =  -117.98877, -103.73391,     329.000,       0.000!   !END!
1500 ! X =  -117.98607, -103.48541,     304.000,       0.000!   !END!
1501 ! X =  -117.98337,  -103.2369,     314.000,       0.000!   !END!
1502 ! X =  -117.98067,  -102.9884,     354.000,       0.000!   !END!
1503 ! X =  -117.97807, -102.73989,     396.000,       0.000!   !END!
1504 ! X =  -117.97536, -102.49129,     398.000,       0.000!   !END!
1505 ! X =  -117.97266, -102.24278,     385.000,       0.000!   !END!
1506 ! X =  -117.96996, -101.99427,     481.000,       0.000!   !END!
1507 ! X =  -117.96726, -101.74577,     566.000,       0.000!   !END!
1508 ! X =  -117.96466, -101.49716,     635.000,       0.000!   !END!
1509 ! X =  -117.96196, -101.24865,     673.000,       0.000!   !END!
1510 ! X =  -117.95925, -101.00015,     680.000,       0.000!   !END!
1511 ! X =  -117.95655, -100.75164,     683.000,       0.000!   !END!
1512 ! X =  -117.95385, -100.50313,     675.000,       0.000!   !END!
1513 ! X =  -117.95125, -100.25462,     670.000,       0.000!   !END!
1514 ! X =  -117.94855, -100.00601,     649.000,       0.000!   !END!
1515 ! X =  -117.94585,   -99.7575,     640.000,       0.000!   !END!
1516 ! X =  -117.94315,    -99.509,     640.000,       0.000!   !END!
1517 ! X =  -117.94044,  -99.26049,     640.000,       0.000!   !END!
1518 ! X =  -117.78421,  -107.7131,     596.000,       0.000!   !END!
1519 ! X =   -117.7815,  -107.4646,     567.000,       0.000!   !END!
1520 ! X =   -117.7788,  -107.2161,     534.000,       0.000!   !END!
1521 ! X =   -117.7762,  -106.9675,     506.000,       0.000!   !END!
1522 ! X =   -117.7735,   -106.719,     502.000,       0.000!   !END!
1523 ! X =   -117.7708,  -106.4705,     524.000,       0.000!   !END!
1524 ! X =  -117.76809, -106.22199,     552.000,       0.000!   !END!
1525 ! X =  -117.76549, -105.97339,     579.000,       0.000!   !END!
1526 ! X =  -117.76279, -105.72489,     592.000,       0.000!   !END!
1527 ! X =  -117.76009, -105.47638,     609.000,       0.000!   !END!
1528 ! X =  -117.75738, -105.22778,     554.000,       0.000!   !END!
1529 ! X =  -117.75468, -104.97928,     534.000,       0.000!   !END!
1530 ! X =  -117.75208, -104.73077,     518.000,       0.000!   !END!
1531 ! X =  -117.74937, -104.48217,     518.000,       0.000!   !END!
1532 ! X =  -117.74667, -104.23367,     498.000,       0.000!   !END!
1533 ! X =  -117.74397, -103.98516,     478.000,       0.000!   !END!
1534 ! X =  -117.74127, -103.73666,     429.000,       0.000!   !END!
1535 ! X =  -117.73866, -103.48805,     329.000,       0.000!   !END!
1536 ! X =  -117.73596, -103.23955,     307.000,       0.000!   !END!
1537 ! X =  -117.73326, -102.99104,     305.000,       0.000!   !END!
1538 ! X =  -117.73056, -102.74254,     335.000,       0.000!   !END!
1539 ! X =  -117.72796, -102.49403,     350.000,       0.000!   !END!
1540 ! X =  -117.72525, -102.24542,     437.000,       0.000!   !END!
1541 ! X =  -117.72255, -101.99692,     457.000,       0.000!   !END!
1542 ! X =  -117.71985, -101.74841,     508.000,       0.000!   !END!
1543 ! X =  -117.71715,  -101.4999,     617.000,       0.000!   !END!
1544 ! X =  -117.71455, -101.25139,     673.000,       0.000!   !END!
1545 ! X =  -117.71184, -101.00279,     686.000,       0.000!   !END!
1546 ! X =  -117.70914, -100.75428,     688.000,       0.000!   !END!
1547 ! X =  -117.70644, -100.50577,     677.000,       0.000!   !END!
1548 ! X =  -117.70384, -100.25726,     670.000,       0.000!   !END!
1549 ! X =  -117.70114, -100.00875,     651.000,       0.000!   !END!
1550 ! X =  -117.69843,  -99.76015,     640.000,       0.000!   !END!
1551 ! X =  -117.69573,  -99.51164,     640.000,       0.000!   !END!
1552 ! X =  -117.69303,  -99.26313,     640.000,       0.000!   !END!
1553 ! X =  -117.54211, -108.21285,     658.000,       0.000!   !END!
1554 ! X =  -117.53951, -107.96434,     670.000,       0.000!   !END!
1555 ! X =   -117.5368, -107.71584,     658.000,       0.000!   !END!
1556 ! X =   -117.5341, -107.46724,     640.000,       0.000!   !END!
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1557 ! X =   -117.5314, -107.21874,     589.000,        0.000!   !END!
1558 ! X =   -117.5287, -106.97024,     580.000,        0.000!   !END!
1559 ! X =  -117.52609, -106.72164,     559.000,        0.000!   !END!
1560 ! X =  -117.52339, -106.47314,     583.000,        0.000!   !END!
1561 ! X =  -117.52069, -106.22464,     624.000,        0.000!   !END!
1562 ! X =  -117.51798, -105.97603,     646.000,        0.000!   !END!
1563 ! X =  -117.51538, -105.72753,     644.000,        0.000!   !END!
1564 ! X =  -117.51268, -105.47902,     640.000,        0.000!   !END!
1565 ! X =  -117.50998, -105.23052,     614.000,        0.000!   !END!
1566 ! X =  -117.50727, -104.98192,     579.000,        0.000!   !END!
1567 ! X =  -117.50457, -104.73342,     534.000,        0.000!   !END!
1568 ! X =  -117.50197, -104.48491,     518.000,        0.000!   !END!
1569 ! X =  -117.49926, -104.23631,     511.000,        0.000!   !END!
1570 ! X =  -117.49656,  -103.9878,     487.000,        0.000!   !END!
1571 ! X =  -117.49386,  -103.7393,     463.000,        0.000!   !END!
1572 ! X =  -117.49126, -103.49079,     348.000,        0.000!   !END!
1573 ! X =  -117.48855, -103.24219,     306.000,        0.000!   !END!
1574 ! X =  -117.48585, -102.99368,     304.000,        0.000!   !END!
1575 ! X =  -117.48315, -102.74518,     330.000,        0.000!   !END!
1576 ! X =  -117.48045, -102.49667,     422.000,        0.000!   !END!
1577 ! X =  -117.47785, -102.24816,     512.000,        0.000!   !END!
1578 ! X =  -117.47514, -101.99956,     560.000,        0.000!   !END!
1579 ! X =  -117.47244, -101.75105,     609.000,        0.000!   !END!
1580 ! X =  -117.46974, -101.50255,     651.000,        0.000!   !END!
1581 ! X =  -117.46714, -101.25403,     673.000,        0.000!   !END!
1582 ! X =  -117.46444, -101.00553,     687.000,        0.000!   !END!
1583 ! X =  -117.46173, -100.75692,     694.000,        0.000!   !END!
1584 ! X =  -117.45903, -100.50841,     684.000,        0.000!   !END!
1585 ! X =  -117.45633, -100.25991,     671.000,        0.000!   !END!
1586 ! X =  -117.45372, -100.01139,     655.000,        0.000!   !END!
1587 ! X =  -117.45102,  -99.76289,     643.000,        0.000!   !END!
1588 ! X =  -117.44832,  -99.51438,     640.000,        0.000!   !END!
1589 ! X =  -117.44562,  -99.26577,     639.000,        0.000!   !END!
1590 ! X =  -117.29741, -108.46409,     687.000,        0.000!   !END!
1591 ! X =  -117.29471, -108.21559,     671.000,        0.000!   !END!
1592 ! X =    -117.292, -107.96699,     670.000,        0.000!   !END!
1593 ! X =   -117.2894, -107.71849,     670.000,        0.000!   !END!
1594 ! X =   -117.2867, -107.46999,     670.000,        0.000!   !END!
1595 ! X =  -117.28399, -107.22139,     651.000,        0.000!   !END!
1596 ! X =  -117.28129, -106.97288,     640.000,        0.000!   !END!
1597 ! X =  -117.27859, -106.72438,     640.000,        0.000!   !END!
1598 ! X =  -117.27598, -106.47578,     645.000,        0.000!   !END!
1599 ! X =  -117.27328, -106.22728,     670.000,        0.000!   !END!
1600 ! X =  -117.27058, -105.97878,     670.000,        0.000!   !END!
1601 ! X =  -117.26787, -105.73017,     670.000,        0.000!   !END!
1602 ! X =  -117.26527, -105.48167,     642.000,        0.000!   !END!
1603 ! X =  -117.26257, -105.23316,     640.000,        0.000!   !END!
1604 ! X =  -117.25986, -104.98456,     594.000,        0.000!   !END!
1605 ! X =  -117.25716, -104.73606,     534.000,        0.000!   !END!
1606 ! X =  -117.25446, -104.48756,     497.000,        0.000!   !END!
1607 ! X =  -117.25186, -104.23905,     482.000,        0.000!   !END!
1608 ! X =  -117.24915, -103.99044,     474.000,        0.000!   !END!
1609 ! X =  -117.24645, -103.74194,     437.000,        0.000!   !END!
1610 ! X =  -117.24375, -103.49344,     308.000,        0.000!   !END!
1611 ! X =  -117.24115, -103.24493,     320.000,        0.000!   !END!
1612 ! X =  -117.23844, -102.99632,     320.000,        0.000!   !END!
1613 ! X =  -117.23574, -102.74782,     373.000,        0.000!   !END!
1614 ! X =  -117.23304, -102.49931,     449.000,        0.000!   !END!
1615 ! X =  -117.23034, -102.25081,     548.000,        0.000!   !END!
1616 ! X =  -117.22773,  -102.0022,     624.000,        0.000!   !END!
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1617 ! X =  -117.22503, -101.75369,     676.000,       0.000!   !END!
1618 ! X =  -117.22233, -101.50519,     690.000,       0.000!   !END!
1619 ! X =  -117.21962, -101.25668,     698.000,       0.000!   !END!
1620 ! X =  -117.21702, -101.00817,     701.000,       0.000!   !END!
1621 ! X =  -117.21432, -100.75966,     698.000,       0.000!   !END!
1622 ! X =  -117.21161, -100.51106,     685.000,       0.000!   !END!
1623 ! X =  -117.20891, -100.26255,     671.000,       0.000!   !END!
1624 ! X =  -117.20631, -100.01404,     658.000,       0.000!   !END!
1625 ! X =  -117.20361,  -99.76553,     644.000,       0.000!   !END!
1626 ! X =  -117.20091,  -99.51702,     640.000,       0.000!   !END!
1627 ! X =  -117.19821,  -99.26851,     640.000,       0.000!   !END!
1628 ! X =  -117.05261, -108.71533,     662.000,       0.000!   !END!
1629 ! X =     -117.05, -108.46673,     672.000,       0.000!   !END!
1630 ! X =   -117.0473, -108.21823,     671.000,       0.000!   !END!
1631 ! X =  -117.04459, -107.96963,     670.000,       0.000!   !END!
1632 ! X =  -117.04189, -107.72113,     670.000,       0.000!   !END!
1633 ! X =  -117.03919, -107.47263,     670.000,       0.000!   !END!
1634 ! X =  -117.03658, -107.22403,     651.000,       0.000!   !END!
1635 ! X =  -117.03388, -106.97553,     642.000,       0.000!   !END!
1636 ! X =  -117.03118, -106.72703,     662.000,       0.000!   !END!
1637 ! X =  -117.02847, -106.47843,     670.000,       0.000!   !END!
1638 ! X =  -117.02587, -106.22992,     670.000,       0.000!   !END!
1639 ! X =  -117.02317, -105.98142,     670.000,       0.000!   !END!
1640 ! X =  -117.02046, -105.73282,     651.000,       0.000!   !END!
1641 ! X =  -117.01776, -105.48431,     642.000,       0.000!   !END!
1642 ! X =  -117.01516, -105.23581,     632.000,       0.000!   !END!
1643 ! X =  -117.01246,  -104.9873,     579.000,       0.000!   !END!
1644 ! X =  -117.00975,  -104.7387,     497.000,       0.000!   !END!
1645 ! X =  -117.00705,  -104.4902,     437.000,       0.000!   !END!
1646 ! X =  -117.00435, -104.24169,     436.000,       0.000!   !END!
1647 ! X =  -117.00175, -103.99319,     426.000,       0.000!   !END!
1648 ! X =  -116.99904, -103.74458,     363.000,       0.000!   !END!
1649 ! X =  -116.99634, -103.49608,     306.000,       0.000!   !END!
1650 ! X =  -116.99364, -103.24757,     365.000,       0.000!   !END!
1651 ! X =  -116.99103, -102.99906,     385.000,       0.000!   !END!
1652 ! X =  -116.98833, -102.75046,     432.000,       0.000!   !END!
1653 ! X =  -116.98563, -102.50196,     492.000,       0.000!   !END!
1654 ! X =  -116.98292, -102.25345,     578.000,       0.000!   !END!
1655 ! X =  -116.98032, -102.00494,     639.000,       0.000!   !END!
1656 ! X =  -116.97761, -101.75633,     701.000,       0.000!   !END!
1657 ! X =  -116.97491, -101.50783,     701.000,       0.000!   !END!
1658 ! X =  -116.97221, -101.25932,     701.000,       0.000!   !END!
1659 ! X =  -116.96951, -101.01082,     701.000,       0.000!   !END!
1660 ! X =  -116.96691,  -100.7623,     701.000,       0.000!   !END!
1661 ! X =  -116.96421,  -100.5138,     683.000,       0.000!   !END!
1662 ! X =   -116.9615, -100.26519,     672.000,       0.000!   !END!
1663 ! X =  -116.80791, -108.96648,     609.000,       0.000!   !END!
1664 ! X =   -116.8052, -108.71798,     642.000,       0.000!   !END!
1665 ! X =   -116.8025, -108.46938,     654.000,       0.000!   !END!
1666 ! X =   -116.7998, -108.22088,     666.000,       0.000!   !END!
1667 ! X =  -116.79719, -107.97237,     665.000,       0.000!   !END!
1668 ! X =  -116.79449, -107.72377,     664.000,       0.000!   !END!
1669 ! X =  -116.79178, -107.47527,     650.000,       0.000!   !END!
1670 ! X =  -116.78908, -107.22677,     639.000,       0.000!   !END!
1671 ! X =  -116.78648, -106.97817,     641.000,       0.000!   !END!
1672 ! X =  -116.78377, -106.72967,     658.000,       0.000!   !END!
1673 ! X =  -116.78107, -106.48117,     670.000,       0.000!   !END!
1674 ! X =  -116.77836, -106.23257,     670.000,       0.000!   !END!
1675 ! X =  -116.77576, -105.98406,     651.000,       0.000!   !END!
1676 ! X =  -116.77306, -105.73556,     640.000,       0.000!   !END!
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1677 ! X =  -116.77035, -105.48696,     640.000,       0.000!   !END!
1678 ! X =  -116.76765, -105.23845,     612.000,       0.000!   !END!
1679 ! X =  -116.76505, -104.98995,     548.000,       0.000!   !END!
1680 ! X =  -116.76235, -104.74144,     457.000,       0.000!   !END!
1681 ! X =  -116.75964, -104.49284,     426.000,       0.000!   !END!
1682 ! X =  -116.75694, -104.24434,     346.000,       0.000!   !END!
1683 ! X =  -116.75424, -103.99583,     321.000,       0.000!   !END!
1684 ! X =  -116.75163, -103.74722,     315.000,       0.000!   !END!
1685 ! X =  -116.74893, -103.49872,     340.000,       0.000!   !END!
1686 ! X =  -116.74623, -103.25022,     409.000,       0.000!   !END!
1687 ! X =  -116.74352, -103.00171,     456.000,       0.000!   !END!
1688 ! X =  -116.74092,  -102.7532,     491.000,       0.000!   !END!
1689 ! X =  -116.73821,  -102.5046,     556.000,       0.000!   !END!
1690 ! X =  -116.73551, -102.25609,     603.000,       0.000!   !END!
1691 ! X =  -116.73281, -102.00759,     649.000,       0.000!   !END!
1692 ! X =  -116.73021, -101.75908,     701.000,       0.000!   !END!
1693 ! X =   -116.7275, -101.51047,     701.000,       0.000!   !END!
1694 ! X =   -116.7248, -101.26196,     701.000,       0.000!   !END!
1695 ! X =   -116.7221, -101.01346,     701.000,       0.000!   !END!
1696 ! X =   -116.7195, -100.76495,     701.000,       0.000!   !END!
1697 ! X =  -116.71679, -100.51644,     673.000,       0.000!   !END!
1698 ! X =  -116.56311, -109.21772,     562.000,       0.000!   !END!
1699 ! X =   -116.5604, -108.96912,     571.000,       0.000!   !END!
1700 ! X =   -116.5578, -108.72062,     615.000,       0.000!   !END!
1701 ! X =   -116.5551, -108.47212,     626.000,       0.000!   !END!
1702 ! X =  -116.55239, -108.22352,     640.000,       0.000!   !END!
1703 ! X =  -116.54969, -107.97502,     640.000,       0.000!   !END!
1704 ! X =  -116.54708, -107.72642,     640.000,       0.000!   !END!
1705 ! X =  -116.54438, -107.47792,     640.000,       0.000!   !END!
1706 ! X =  -116.54168, -107.22942,     619.000,       0.000!   !END!
1707 ! X =  -116.53897, -106.98082,     624.000,       0.000!   !END!
1708 ! X =  -116.53637, -106.73231,     646.000,       0.000!   !END!
1709 ! X =  -116.53366, -106.48381,     648.000,       0.000!   !END!
1710 ! X =  -116.53096, -106.23521,     646.000,       0.000!   !END!
1711 ! X =  -116.52826, -105.98671,     640.000,       0.000!   !END!
1712 ! X =  -116.52565,  -105.7382,     609.000,       0.000!   !END!
1713 ! X =  -116.52295,  -105.4897,     609.000,       0.000!   !END!
1714 ! X =  -116.52024,  -105.2411,     587.000,       0.000!   !END!
1715 ! X =  -116.51754, -104.99259,     534.000,       0.000!   !END!
1716 ! X =  -116.51494, -104.74408,     434.000,       0.000!   !END!
1717 ! X =  -116.51223, -104.49548,     345.000,       0.000!   !END!
1718 ! X =  -116.50953, -104.24698,     309.000,       0.000!   !END!
1719 ! X =  -116.50683, -103.99848,     294.000,       0.000!   !END!
1720 ! X =  -116.50422, -103.74997,     346.000,       0.000!   !END!
1721 ! X =  -116.50152, -103.50136,     425.000,       0.000!   !END!
1722 ! X =  -116.49882, -103.25286,     457.000,       0.000!   !END!
1723 ! X =  -116.49611, -103.00435,     527.000,       0.000!   !END!
1724 ! X =  -116.49341, -102.75585,     586.000,       0.000!   !END!
1725 ! X =   -116.4908, -102.50724,     634.000,       0.000!   !END!
1726 ! X =   -116.4881, -102.25873,     670.000,       0.000!   !END!
1727 ! X =   -116.4854, -102.01023,     674.000,       0.000!   !END!
1728 ! X =   -116.4827, -101.76172,     701.000,       0.000!   !END!
1729 ! X =  -116.48009, -101.51321,     701.000,       0.000!   !END!
1730 ! X =  -116.47739, -101.26461,     701.000,       0.000!   !END!
1731 ! X =  -116.47469,  -101.0161,     699.000,       0.000!   !END!
1732 ! X =  -116.47198, -100.76759,     674.000,       0.000!   !END!
1733 ! X =  -116.46938, -100.51908,     670.000,       0.000!   !END!
1734 ! X =  -116.31841, -109.46886,     548.000,       0.000!   !END!
1735 ! X =   -116.3157, -109.22036,     516.000,       0.000!   !END!
1736 ! X =    -116.313, -108.97177,     536.000,       0.000!   !END!
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1737 ! X =   -116.3103, -108.72327,     555.000,        0.000!   !END!
1738 ! X =  -116.30769, -108.47476,     583.000,        0.000!   !END!
1739 ! X =  -116.30498, -108.22616,     604.000,        0.000!   !END!
1740 ! X =  -116.30228, -107.97766,     620.000,        0.000!   !END!
1741 ! X =  -116.29958, -107.72916,     634.000,        0.000!   !END!
1742 ! X =  -116.29697, -107.48056,     640.000,        0.000!   !END!
1743 ! X =  -116.29427, -107.23206,     619.000,        0.000!   !END!
1744 ! X =  -116.29157, -106.98356,     609.000,        0.000!   !END!
1745 ! X =  -116.28886, -106.73496,     615.000,        0.000!   !END!
1746 ! X =  -116.28626, -106.48645,     609.000,        0.000!   !END!
1747 ! X =  -116.28355, -106.23795,     573.000,        0.000!   !END!
1748 ! X =  -116.28085, -105.98935,     569.000,        0.000!   !END!
1749 ! X =  -116.27815, -105.74085,     548.000,        0.000!   !END!
1750 ! X =  -116.27554, -105.49234,     553.000,        0.000!   !END!
1751 ! X =  -116.27283, -105.24374,     557.000,        0.000!   !END!
1752 ! X =  -116.27013, -104.99523,     524.000,        0.000!   !END!
1753 ! X =  -116.26743, -104.74673,     457.000,        0.000!   !END!
1754 ! X =  -116.26483, -104.49822,     342.000,        0.000!   !END!
1755 ! X =  -116.26212, -104.24962,     281.000,        0.000!   !END!
1756 ! X =  -116.25942, -104.00112,     317.000,        0.000!   !END!
1757 ! X =  -116.25672, -103.75261,     432.000,        0.000!   !END!
1758 ! X =  -116.25411,  -103.5041,     457.000,        0.000!   !END!
1759 ! X =   -116.2514,  -103.2555,     495.000,        0.000!   !END!
1760 ! X =   -116.2487,   -103.007,     562.000,        0.000!   !END!
1761 ! X =    -116.246, -102.75849,     615.000,        0.000!   !END!
1762 ! X =   -116.2434, -102.50998,     665.000,        0.000!   !END!
1763 ! X =  -116.24069, -102.26138,     670.000,        0.000!   !END!
1764 ! X =  -116.23799, -102.01287,     673.000,        0.000!   !END!
1765 ! X =  -116.23529, -101.76437,     688.000,        0.000!   !END!
1766 ! X =  -116.23268, -101.51585,     701.000,        0.000!   !END!
1767 ! X =   -116.0709, -109.47151,     531.000,        0.000!   !END!
1768 ! X =   -116.0683, -109.22301,     554.000,        0.000!   !END!
1769 ! X =   -116.0656, -108.97451,     595.000,        0.000!   !END!
1770 ! X =  -116.06289, -108.72591,     617.000,        0.000!   !END!
1771 ! X =  -116.06019, -108.47741,     640.000,        0.000!   !END!
1772 ! X =  -116.05758, -108.22881,     646.000,        0.000!   !END!
1773 ! X =  -116.05488, -107.98031,     642.000,        0.000!   !END!
1774 ! X =  -116.05217, -107.73181,     637.000,        0.000!   !END!
1775 ! X =  -116.04947, -107.48321,     623.000,        0.000!   !END!
1776 ! X =  -116.04686,  -107.2347,     612.000,        0.000!   !END!
1777 ! X =  -116.04416,  -106.9862,     584.000,        0.000!   !END!
1778 ! X =  -116.04145,  -106.7376,     562.000,        0.000!   !END!
1779 ! X =  -116.03875,  -106.4891,     539.000,        0.000!   !END!
1780 ! X =  -116.03615, -106.24059,     484.000,        0.000!   !END!
1781 ! X =  -116.03344, -105.99199,     464.000,        0.000!   !END!
1782 ! X =  -116.03074, -105.74349,     452.000,        0.000!   !END!
1783 ! X =  -116.02803, -105.49499,     487.000,        0.000!   !END!
1784 ! X =  -116.02543, -105.24648,     519.000,        0.000!   !END!
1785 ! X =  -116.02272, -104.99788,     493.000,        0.000!   !END!
1786 ! X =  -116.02002, -104.74937,     457.000,        0.000!   !END!
1787 ! X =  -116.01732, -104.50087,     304.000,        0.000!   !END!
1788 ! X =  -116.01471, -104.25226,     281.000,        0.000!   !END!
1789 ! X =  -116.01201, -104.00376,     317.000,        0.000!   !END!
1790 ! X =  -116.00931, -103.75526,     431.000,        0.000!   !END!
1791 ! X =   -116.0066, -103.50675,     468.000,        0.000!   !END!
1792 ! X =  -116.00399, -103.25814,     498.000,        0.000!   !END!
1793 ! X =  -116.00129, -103.00964,     558.000,        0.000!   !END!
1794 ! X =  -115.99859, -102.76113,     601.000,        0.000!   !END!
1795 ! X =  -115.99589, -102.51263,     645.000,        0.000!   !END!
1796 ! X =  -115.99328, -102.26412,     670.000,        0.000!   !END!
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1797 ! X =  -115.99058, -102.01551,     670.000,        0.000!   !END!
1798 ! X =  -115.98787, -101.76701,     673.000,        0.000!   !END!
1799 ! X =  -115.98517,  -101.5185,     692.000,        0.000!   !END!
1800 ! X =   -115.8235, -109.47425,     576.000,        0.000!   !END!
1801 ! X =   -115.8208, -109.22565,     618.000,        0.000!   !END!
1802 ! X =  -115.81819, -108.97715,     635.000,        0.000!   !END!
1803 ! X =  -115.81548, -108.72855,     645.000,        0.000!   !END!
1804 ! X =  -115.81278, -108.48005,     667.000,        0.000!   !END!
1805 ! X =  -115.81008, -108.23155,     670.000,        0.000!   !END!
1806 ! X =  -115.80747, -107.98295,     663.000,        0.000!   !END!
1807 ! X =  -115.80477, -107.73445,     643.000,        0.000!   !END!
1808 ! X =  -115.80207, -107.48595,     637.000,        0.000!   !END!
1809 ! X =  -115.79936, -107.23735,     628.000,        0.000!   !END!
1810 ! X =  -115.79675, -106.98884,     609.000,        0.000!   !END!
1811 ! X =  -115.79405, -106.74034,     585.000,        0.000!   !END!
1812 ! X =  -115.79134, -106.49174,     568.000,        0.000!   !END!
1813 ! X =  -115.78864, -106.24324,     564.000,        0.000!   !END!
1814 ! X =  -115.78604, -105.99473,     535.000,        0.000!   !END!
1815 ! X =  -115.78333, -105.74613,     479.000,        0.000!   !END!
1816 ! X =  -115.78063, -105.49763,     436.000,        0.000!   !END!
1817 ! X =  -115.77792, -105.24913,     428.000,        0.000!   !END!
1818 ! X =  -115.77531, -105.00052,     426.000,        0.000!   !END!
1819 ! X =  -115.77261, -104.75202,     426.000,        0.000!   !END!
1820 ! X =  -115.76991, -104.50351,     304.000,        0.000!   !END!
1821 ! X =  -115.76721, -104.25501,     304.000,        0.000!   !END!
1822 ! X =   -115.7646,  -104.0064,     284.000,        0.000!   !END!
1823 ! X =   -115.7619,  -103.7579,     374.000,        0.000!   !END!
1824 ! X =  -115.75919,  -103.5094,     447.000,        0.000!   !END!
1825 ! X =  -115.75649, -103.26089,     492.000,        0.000!   !END!
1826 ! X =  -115.75388, -103.01228,     518.000,        0.000!   !END!
1827 ! X =  -115.75118, -102.76378,     558.000,        0.000!   !END!
1828 ! X =  -115.74848, -102.51527,     603.000,        0.000!   !END!
1829 ! X =  -115.74577, -102.26677,     644.000,        0.000!   !END!
1830 ! X =  -115.74317, -102.01826,     670.000,        0.000!   !END!
1831 ! X =  -115.74046, -101.76965,     670.000,        0.000!   !END!
1832 ! X =  -115.73776, -101.52114,     675.000,        0.000!   !END!
1833 ! X =   -115.5761,  -109.4769,     609.000,        0.000!   !END!
1834 ! X =  -115.57339,  -109.2283,     626.000,        0.000!   !END!
1835 ! X =  -115.57069,  -108.9798,     640.000,        0.000!   !END!
1836 ! X =  -115.56808, -108.73129,     645.000,        0.000!   !END!
1837 ! X =  -115.56538,  -108.4827,     667.000,        0.000!   !END!
1838 ! X =  -115.56267,  -108.2342,     670.000,        0.000!   !END!
1839 ! X =  -115.55997,  -107.9856,     668.000,        0.000!   !END!
1840 ! X =  -115.55736, -107.73709,     653.000,        0.000!   !END!
1841 ! X =  -115.55466, -107.48859,     643.000,        0.000!   !END!
1842 ! X =  -115.55195, -107.23999,     640.000,        0.000!   !END!
1843 ! X =  -115.54925, -106.99149,     640.000,        0.000!   !END!
1844 ! X =  -115.54664, -106.74299,     619.000,        0.000!   !END!
1845 ! X =  -115.54394, -106.49438,     609.000,        0.000!   !END!
1846 ! X =  -115.54123, -106.24588,     609.000,        0.000!   !END!
1847 ! X =  -115.53853, -105.99738,     580.000,        0.000!   !END!
1848 ! X =  -115.53593, -105.74887,     536.000,        0.000!   !END!
1849 ! X =  -115.53322, -105.50027,     452.000,        0.000!   !END!
1850 ! X =  -115.53051, -105.25177,     426.000,        0.000!   !END!
1851 ! X =  -115.52781, -105.00327,     396.000,        0.000!   !END!
1852 ! X =   -115.5252, -104.75466,     375.000,        0.000!   !END!
1853 ! X =   -115.5225, -104.50616,     335.000,        0.000!   !END!
1854 ! X =   -115.5198, -104.25765,     321.000,        0.000!   !END!
1855 ! X =  -115.51709, -104.00915,     304.000,        0.000!   !END!
1856 ! X =  -115.51449, -103.76054,     315.000,        0.000!   !END!
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1857 ! X =  -115.51178, -103.51204,     386.000,       0.000!   !END!
1858 ! X =  -115.50908, -103.26353,     419.000,       0.000!   !END!
1859 ! X =  -115.50648, -103.01502,     457.000,       0.000!   !END!
1860 ! X =  -115.50377, -102.76642,     539.000,       0.000!   !END!
1861 ! X =  -115.50106, -102.51792,     580.000,       0.000!   !END!
1862 ! X =  -115.49836, -102.26941,     633.000,       0.000!   !END!
1863 ! X =  -115.49576,  -102.0209,     656.000,       0.000!   !END!
1864 ! X =  -115.32599, -109.23094,     623.000,       0.000!   !END!
1865 ! X =  -115.32328, -108.98244,     638.000,       0.000!   !END!
1866 ! X =  -115.32058, -108.73394,     640.000,       0.000!   !END!
1867 ! X =  -115.31787, -108.48534,     641.000,       0.000!   !END!
1868 ! X =  -115.31527, -108.23684,     667.000,       0.000!   !END!
1869 ! X =  -115.31256, -107.98834,     667.000,       0.000!   !END!
1870 ! X =  -115.30986, -107.73974,     661.000,       0.000!   !END!
1871 ! X =  -115.30725, -107.49124,     647.000,       0.000!   !END!
1872 ! X =  -115.30455, -107.24273,     640.000,       0.000!   !END!
1873 ! X =  -115.30184, -106.99413,     640.000,       0.000!   !END!
1874 ! X =  -115.29914, -106.74563,     640.000,       0.000!   !END!
1875 ! X =  -115.29653, -106.49713,     623.000,       0.000!   !END!
1876 ! X =  -115.29383, -106.24853,     613.000,       0.000!   !END!
1877 ! X =  -115.29112, -106.00003,     605.000,       0.000!   !END!
1878 ! X =  -115.28842, -105.75152,     579.000,       0.000!   !END!
1879 ! X =  -115.28581, -105.50292,     530.000,       0.000!   !END!
1880 ! X =  -115.28311, -105.25441,     520.000,       0.000!   !END!
1881 ! X =   -115.2804, -105.00591,     509.000,       0.000!   !END!
1882 ! X =   -115.2777, -104.75741,     440.000,       0.000!   !END!
1883 ! X =  -115.27509,  -104.5088,     384.000,       0.000!   !END!
1884 ! X =  -115.27239,  -104.2603,     350.000,       0.000!   !END!
1885 ! X =  -115.26968, -104.01179,     334.000,       0.000!   !END!
1886 ! X =  -115.26708, -103.76319,     325.000,       0.000!   !END!
1887 ! X =  -115.26437, -103.51468,     347.000,       0.000!   !END!
1888 ! X =  -115.26167, -103.26618,     389.000,       0.000!   !END!
1889 ! X =  -115.25897, -103.01767,     468.000,       0.000!   !END!
1890 ! X =  -115.25636, -102.76916,     512.000,       0.000!   !END!
1891 ! X =  -115.25365, -102.52056,     549.000,       0.000!   !END!
1892 ! X =  -115.25095, -102.27205,     590.000,       0.000!   !END!
1893 ! X =  -115.07849, -109.23369,     583.000,       0.000!   !END!
1894 ! X =  -115.07588, -108.98509,     609.000,       0.000!   !END!
1895 ! X =  -115.07318, -108.73659,     617.000,       0.000!   !END!
1896 ! X =  -115.07047, -108.48799,     620.000,       0.000!   !END!
1897 ! X =  -115.06776, -108.23949,     643.000,       0.000!   !END!
1898 ! X =  -115.06516, -107.99098,     658.000,       0.000!   !END!
1899 ! X =  -115.06245, -107.74238,     660.000,       0.000!   !END!
1900 ! X =  -115.05975, -107.49388,     649.000,       0.000!   !END!
1901 ! X =  -115.05714, -107.24538,     640.000,       0.000!   !END!
1902 ! X =  -115.05443, -106.99678,     640.000,       0.000!   !END!
1903 ! X =  -115.05173, -106.74828,     639.000,       0.000!   !END!
1904 ! X =  -115.04903, -106.49978,     623.000,       0.000!   !END!
1905 ! X =  -115.04642, -106.25117,     614.000,       0.000!   !END!
1906 ! X =  -115.04371, -106.00267,     609.000,       0.000!   !END!
1907 ! X =  -115.04101, -105.75417,     592.000,       0.000!   !END!
1908 ! X =  -115.03831, -105.50566,     579.000,       0.000!   !END!
1909 ! X =   -115.0357, -105.25706,     573.000,       0.000!   !END!
1910 ! X =  -115.03299, -105.00856,     548.000,       0.000!   !END!
1911 ! X =  -115.03029, -104.76005,     468.000,       0.000!   !END!
1912 ! X =  -115.02768, -104.51144,     401.000,       0.000!   !END!
1913 ! X =  -115.02498, -104.26294,     360.000,       0.000!   !END!
1914 ! X =  -115.02227, -104.01444,     340.000,       0.000!   !END!
1915 ! X =  -115.01957, -103.76593,     335.000,       0.000!   !END!
1916 ! X =  -115.01696, -103.51733,     331.000,       0.000!   !END!
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1917 ! X =  -115.01426, -103.26882,     375.000,       0.000!   !END!
1918 ! X =  -115.01155, -103.02032,     439.000,       0.000!   !END!
1919 ! X =  -115.00885, -102.77181,     478.000,       0.000!   !END!
1920 ! X =  -115.00624,  -102.5232,     501.000,       0.000!   !END!
1921 ! X =  -115.00354,  -102.2747,     523.000,       0.000!   !END!
1922 ! X =  -114.83108, -109.23633,     620.000,       0.000!   !END!
1923 ! X =  -114.82837, -108.98773,     626.000,       0.000!   !END!
1924 ! X =  -114.82577, -108.73923,     632.000,       0.000!   !END!
1925 ! X =  -114.82307, -108.49073,     640.000,       0.000!   !END!
1926 ! X =  -114.82036, -108.24213,     643.000,       0.000!   !END!
1927 ! X =  -114.81765, -107.99363,     651.000,       0.000!   !END!
1928 ! X =  -114.81505, -107.74513,     658.000,       0.000!   !END!
1929 ! X =  -114.81234, -107.49653,     651.000,       0.000!   !END!
1930 ! X =  -114.80964, -107.24803,     642.000,       0.000!   !END!
1931 ! X =  -114.80703, -106.99952,     640.000,       0.000!   !END!
1932 ! X =  -114.80432, -106.75092,     639.000,       0.000!   !END!
1933 ! X =  -114.80162, -106.50242,     620.000,       0.000!   !END!
1934 ! X =  -114.79892, -106.25392,     612.000,       0.000!   !END!
1935 ! X =  -114.79631, -106.00531,     610.000,       0.000!   !END!
1936 ! X =   -114.7936, -105.75681,     609.000,       0.000!   !END!
1937 ! X =   -114.7909, -105.50831,     580.000,       0.000!   !END!
1938 ! X =  -114.78819, -105.25971,     573.000,       0.000!   !END!
1939 ! X =  -114.78559,  -105.0112,     551.000,       0.000!   !END!
1940 ! X =  -114.78288,  -104.7627,     457.000,       0.000!   !END!
1941 ! X =  -114.78018, -104.51419,     400.000,       0.000!   !END!
1942 ! X =  -114.77757, -104.26559,     380.000,       0.000!   !END!
1943 ! X =  -114.77487, -104.01708,     360.000,       0.000!   !END!
1944 ! X =  -114.77216, -103.76858,     278.000,       0.000!   !END!
1945 ! X =  -114.76946, -103.52007,     320.000,       0.000!   !END!
1946 ! X =  -114.76685, -103.27146,     346.000,       0.000!   !END!
1947 ! X =  -114.76414, -103.02296,     386.000,       0.000!   !END!
1948 ! X =  -114.76144, -102.77446,     458.000,       0.000!   !END!
1949 ! X =  -114.75884, -102.52595,     462.000,       0.000!   !END!
1950 ! X =  -114.75613, -102.27734,     509.000,       0.000!   !END!
1951 ! X =  -114.58368, -109.23898,     640.000,       0.000!   !END!
1952 ! X =  -114.58097, -108.99048,     640.000,       0.000!   !END!
1953 ! X =  -114.57827, -108.74188,     640.000,       0.000!   !END!
1954 ! X =  -114.57566, -108.49338,     640.000,       0.000!   !END!
1955 ! X =  -114.57295, -108.24478,     643.000,       0.000!   !END!
1956 ! X =  -114.57025, -107.99628,     648.000,       0.000!   !END!
1957 ! X =  -114.56754, -107.74778,     649.000,       0.000!   !END!
1958 ! X =  -114.56493, -107.49917,     646.000,       0.000!   !END!
1959 ! X =  -114.56223, -107.25067,     641.000,       0.000!   !END!
1960 ! X =  -114.55953, -107.00217,     640.000,       0.000!   !END!
1961 ! X =  -114.55692, -106.75357,     617.000,       0.000!   !END!
1962 ! X =  -114.55421, -106.50506,     610.000,       0.000!   !END!
1963 ! X =  -114.55151, -106.25656,     610.000,       0.000!   !END!
1964 ! X =   -114.5488, -106.00796,     609.000,       0.000!   !END!
1965 ! X =  -114.54619, -105.75945,     596.000,       0.000!   !END!
1966 ! X =  -114.54349, -105.51095,     568.000,       0.000!   !END!
1967 ! X =  -114.54079, -105.26245,     548.000,       0.000!   !END!
1968 ! X =  -114.53818, -105.01384,     503.000,       0.000!   !END!
1969 ! X =  -114.53547, -104.76534,     487.000,       0.000!   !END!
1970 ! X =  -114.53277, -104.51684,     471.000,       0.000!   !END!
1971 ! X =  -114.53006, -104.26823,     406.000,       0.000!   !END!
1972 ! X =  -114.52746, -104.01973,     320.000,       0.000!   !END!
1973 ! X =  -114.52475, -103.77122,     280.000,       0.000!   !END!
1974 ! X =  -114.52205, -103.52272,     300.000,       0.000!   !END!
1975 ! X =  -114.51944, -103.27411,     320.000,       0.000!   !END!
1976 ! X =  -114.51673,  -103.0256,     340.000,       0.000!   !END!
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1977 ! X =  -114.51403,  -102.7771,     404.000,       0.000!   !END!
1978 ! X =  -114.51133, -102.52859,     471.000,       0.000!   !END!
1979 ! X =  -114.50872, -102.27998,     525.000,       0.000!   !END!
1980 ! X =  -114.33086, -108.74452,     639.000,       0.000!   !END!
1981 ! X =  -114.32816, -108.49603,     640.000,       0.000!   !END!
1982 ! X =  -114.32555, -108.24752,     640.000,       0.000!   !END!
1983 ! X =  -114.32284, -107.99892,     642.000,       0.000!   !END!
1984 ! X =  -114.32014, -107.75042,     642.000,       0.000!   !END!
1985 ! X =  -114.31743, -107.50182,     641.000,       0.000!   !END!
1986 ! X =  -114.31482, -107.25332,     640.000,       0.000!   !END!
1987 ! X =  -114.31212, -107.00482,     626.000,       0.000!   !END!
1988 ! X =  -114.30941, -106.75622,     612.000,       0.000!   !END!
1989 ! X =   -114.3068, -106.50771,     609.000,       0.000!   !END!
1990 ! X =   -114.3041, -106.25921,     605.000,       0.000!   !END!
1991 ! X =   -114.3014, -106.01071,     583.000,       0.000!   !END!
1992 ! X =  -114.29869,  -105.7621,     601.000,       0.000!   !END!
1993 ! X =  -114.29608,  -105.5136,     609.000,       0.000!   !END!
1994 ! X =  -114.29338, -105.26509,     596.000,       0.000!   !END!
1995 ! X =  -114.29067, -105.01649,     574.000,       0.000!   !END!
1996 ! X =  -114.28806, -104.76798,     548.000,       0.000!   !END!
1997 ! X =  -114.28536, -104.51948,     496.000,       0.000!   !END!
1998 ! X =  -114.28266, -104.27098,     441.000,       0.000!   !END!
1999 ! X =  -114.27995, -104.02238,     328.000,       0.000!   !END!
2000 ! X =  -114.27734, -103.77387,     297.000,       0.000!   !END!
2001 ! X =  -114.27464, -103.52536,     293.000,       0.000!   !END!
2002 ! X =  -114.27193, -103.27686,     297.000,       0.000!   !END!
2003 ! X =  -114.26932, -103.02825,     335.000,       0.000!   !END!
2004 ! X =  -114.26662, -102.77974,     441.000,       0.000!   !END!
2005 ! X =  -114.26391, -102.53124,     474.000,       0.000!   !END!
2006 ! X =  -114.07544, -108.00157,     640.000,       0.000!   !END!
2007 ! X =  -114.07273, -107.75307,     631.000,       0.000!   !END!
2008 ! X =  -114.07003, -107.50457,     626.000,       0.000!   !END!
2009 ! X =  -114.06732, -107.25597,     611.000,       0.000!   !END!
2010 ! X =  -114.06471, -107.00746,     609.000,       0.000!   !END!
2011 ! X =  -114.06201, -106.75896,     610.000,       0.000!   !END!
2012 ! X =   -114.0593, -106.51036,     609.000,       0.000!   !END!
2013 ! X =  -114.05669, -106.26185,     609.000,       0.000!   !END!
2014 ! X =  -114.05399, -106.01335,     610.000,       0.000!   !END!
2015 ! X =  -114.05128, -105.76475,     615.000,       0.000!   !END!
2016 ! X =  -114.04867, -105.51624,     614.000,       0.000!   !END!
2017 ! X =  -114.04597, -105.26774,     610.000,       0.000!   !END!
2018 ! X =  -114.04326, -105.01914,     608.000,       0.000!   !END!
2019 ! X =  -114.04056, -104.77063,     553.000,       0.000!   !END!
2020 ! X =  -114.03795, -104.52213,     496.000,       0.000!   !END!
2021 ! X =  -114.03525, -104.27362,     470.000,       0.000!   !END!
2022 ! X =  -114.03254, -104.02502,     419.000,       0.000!   !END!
2023 ! X =  -114.02993, -103.77651,     371.000,       0.000!   !END!
2024 ! X =  -114.02723, -103.52801,     318.000,       0.000!   !END!
2025 ! X =  -114.02452,  -103.2795,     282.000,       0.000!   !END!
2026 ! X =  -114.02181,  -103.0309,     335.000,       0.000!   !END!
2027 ! X =  -114.01921, -102.78239,     444.000,       0.000!   !END!
2028 ! X =   -114.0165, -102.53388,     480.000,       0.000!   !END!
2029 ! X =   -114.0138, -102.28538,     533.000,       0.000!   !END!
2030 ! X =  -114.01119, -102.03687,     612.000,       0.000!   !END!
2031 ! X =  -114.00848, -101.78826,     621.000,       0.000!   !END!
2032 ! X =  -114.00578, -101.53976,     620.000,       0.000!   !END!
2033 ! X =  -114.00317, -101.29125,     614.000,       0.000!   !END!
2034 ! X =  -114.00047, -101.04274,     612.000,       0.000!   !END!
2035 ! X =  -113.99777, -100.79423,     609.000,       0.000!   !END!
2036 ! X =  -113.99506, -100.54563,     584.000,       0.000!   !END!
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2037 ! X =  -113.99245, -100.29711,     502.000,       0.000!   !END!
2038 ! X =  -113.98975, -100.04861,     457.000,       0.000!   !END!
2039 ! X =  -113.98704,   -99.8001,     392.000,       0.000!   !END!
2040 ! X =  -113.98444,  -99.55159,     409.000,       0.000!   !END!
2041 ! X =  -113.98173,  -99.30308,     418.000,       0.000!   !END!
2042 ! X =  -113.81991, -107.25861,     579.000,       0.000!   !END!
2043 ! X =  -113.81721, -107.01011,     588.000,       0.000!   !END!
2044 ! X =   -113.8146,  -106.7616,     609.000,       0.000!   !END!
2045 ! X =  -113.81189,   -106.513,     613.000,       0.000!   !END!
2046 ! X =  -113.80919,  -106.2645,     619.000,       0.000!   !END!
2047 ! X =  -113.80658, -106.01599,     627.000,       0.000!   !END!
2048 ! X =  -113.80387, -105.76739,     637.000,       0.000!   !END!
2049 ! X =  -113.80117, -105.51889,     621.000,       0.000!   !END!
2050 ! X =  -113.79856, -105.27038,     613.000,       0.000!   !END!
2051 ! X =  -113.79586, -105.02188,     601.000,       0.000!   !END!
2052 ! X =  -113.79315, -104.77328,     548.000,       0.000!   !END!
2053 ! X =  -113.79044, -104.52478,     489.000,       0.000!   !END!
2054 ! X =  -113.78784, -104.27627,     462.000,       0.000!   !END!
2055 ! X =  -113.78513, -104.02776,     427.000,       0.000!   !END!
2056 ! X =  -113.78242, -103.77916,     396.000,       0.000!   !END!
2057 ! X =  -113.77982, -103.53065,     324.000,       0.000!   !END!
2058 ! X =  -113.77711, -103.28215,     277.000,       0.000!   !END!
2059 ! X =  -113.77441, -103.03364,     359.000,       0.000!   !END!
2060 ! X =   -113.7718, -102.78503,     448.000,       0.000!   !END!
2061 ! X =  -113.76909, -102.53653,     480.000,       0.000!   !END!
2062 ! X =  -113.76639, -102.28802,     525.000,       0.000!   !END!
2063 ! X =  -113.76378, -102.03951,     609.000,       0.000!   !END!
2064 ! X =  -113.76107, -101.79091,     610.000,       0.000!   !END!
2065 ! X =  -113.75837,  -101.5424,     610.000,       0.000!   !END!
2066 ! X =  -113.75566,  -101.2939,     609.000,       0.000!   !END!
2067 ! X =  -113.75306, -101.04538,     609.000,       0.000!   !END!
2068 ! X =  -113.75035, -100.79688,     609.000,       0.000!   !END!
2069 ! X =  -113.74765, -100.54837,     563.000,       0.000!   !END!
2070 ! X =  -113.74504, -100.29976,     481.000,       0.000!   !END!
2071 ! X =  -113.74233, -100.05125,     431.000,       0.000!   !END!
2072 ! X =  -113.73963,  -99.80274,     388.000,       0.000!   !END!
2073 ! X =  -113.73702,  -99.55423,     374.000,       0.000!   !END!
2074 ! X =  -113.73432,  -99.30572,     380.000,       0.000!   !END!
2075 ! X =  -113.55907, -106.01865,     640.000,       0.000!   !END!
2076 ! X =  -113.55647, -105.77014,     640.000,       0.000!   !END!
2077 ! X =  -113.55376, -105.52154,     625.000,       0.000!   !END!
2078 ! X =  -113.55105, -105.27303,     609.000,       0.000!   !END!
2079 ! X =  -113.54845, -105.02453,     542.000,       0.000!   !END!
2080 ! X =  -113.54574, -104.77592,     477.000,       0.000!   !END!
2081 ! X =  -113.54303, -104.52742,     450.000,       0.000!   !END!
2082 ! X =  -113.54043, -104.27891,     427.000,       0.000!   !END!
2083 ! X =  -113.53772, -104.03041,     411.000,       0.000!   !END!
2084 ! X =  -113.53501, -103.78181,     374.000,       0.000!   !END!
2085 ! X =  -113.53241,  -103.5333,     304.000,       0.000!   !END!
2086 ! X =   -113.5297, -103.28479,     288.000,       0.000!   !END!
2087 ! X =    -113.527, -103.03629,     351.000,       0.000!   !END!
2088 ! X =  -113.52429, -102.78768,     434.000,       0.000!   !END!
2089 ! X =  -113.52168, -102.53917,     482.000,       0.000!   !END!
2090 ! X =  -113.51898, -102.29067,     522.000,       0.000!   !END!
2091 ! X =  -113.51627, -102.04216,     581.000,       0.000!   !END!
2092 ! X =  -113.51367, -101.79365,     609.000,       0.000!   !END!
2093 ! X =  -113.51096, -101.54505,     609.000,       0.000!   !END!
2094 ! X =  -113.50825, -101.29654,     589.000,       0.000!   !END!
2095 ! X =  -113.50565, -101.04803,     585.000,       0.000!   !END!
2096 ! X =  -113.50294, -100.79952,     541.000,       0.000!   !END!
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2097 ! X =  -113.50024, -100.55102,     499.000,       0.000!   !END!
2098 ! X =  -113.49762,  -100.3024,     460.000,       0.000!   !END!
2099 ! X =  -113.49492,  -100.0539,     420.000,       0.000!   !END!
2100 ! X =  -113.49221,  -99.80539,     381.000,       0.000!   !END!
2101 ! X =  -113.48951,  -99.55688,     335.000,       0.000!   !END!
2102 ! X =   -113.4869,  -99.30837,     335.000,       0.000!   !END!
2103 ! X =  -113.30635, -105.52418,     618.000,       0.000!   !END!
2104 ! X =  -113.30364, -105.27568,     579.000,       0.000!   !END!
2105 ! X =  -113.30094, -105.02718,     522.000,       0.000!   !END!
2106 ! X =  -113.29833, -104.77867,     477.000,       0.000!   !END!
2107 ! X =  -113.29562, -104.53007,     444.000,       0.000!   !END!
2108 ! X =  -113.29292, -104.28156,     416.000,       0.000!   !END!
2109 ! X =  -113.29031, -104.03305,     347.000,       0.000!   !END!
2110 ! X =  -113.28761, -103.78455,     324.000,       0.000!   !END!
2111 ! X =   -113.2849, -103.53595,     293.000,       0.000!   !END!
2112 ! X =  -113.28229, -103.28744,     295.000,       0.000!   !END!
2113 ! X =  -113.27959, -103.03893,     340.000,       0.000!   !END!
2114 ! X =  -113.27688, -102.79043,     432.000,       0.000!   !END!
2115 ! X =  -113.27427, -102.54182,     465.000,       0.000!   !END!
2116 ! X =  -113.27156, -102.29331,     502.000,       0.000!   !END!
2117 ! X =  -113.26886, -102.04481,     553.000,       0.000!   !END!
2118 ! X =  -113.26625,  -101.7963,     609.000,       0.000!   !END!
2119 ! X =  -113.26354, -101.54769,     609.000,       0.000!   !END!
2120 ! X =  -113.26084, -101.29919,     609.000,       0.000!   !END!
2121 ! X =  -113.25813, -101.05068,     548.000,       0.000!   !END!
2122 ! X =  -113.25553, -100.80217,     480.000,       0.000!   !END!
2123 ! X =  -113.25282, -100.55366,     446.000,       0.000!   !END!
2124 ! X =  -113.25012, -100.30515,     429.000,       0.000!   !END!
2125 ! X =  -113.24751, -100.05654,     403.000,       0.000!   !END!
2126 ! X =   -113.2448,  -99.80803,     371.000,       0.000!   !END!
2127 ! X =   -113.2421,  -99.55953,     335.000,       0.000!   !END!
2128 ! X =  -113.23949,  -99.31101,     366.000,       0.000!   !END!
2129 ! X =  -113.05895, -105.52693,     616.000,       0.000!   !END!
2130 ! X =  -113.05624, -105.27833,     610.000,       0.000!   !END!
2131 ! X =  -113.05353, -105.02982,     574.000,       0.000!   !END!
2132 ! X =  -113.05092, -104.78131,     516.000,       0.000!   !END!
2133 ! X =  -113.04821, -104.53271,     462.000,       0.000!   !END!
2134 ! X =  -113.04551, -104.28421,     426.000,       0.000!   !END!
2135 ! X =   -113.0428, -104.03571,     397.000,       0.000!   !END!
2136 ! X =   -113.0402,  -103.7872,     355.000,       0.000!   !END!
2137 ! X =  -113.03749, -103.53859,     306.000,       0.000!   !END!
2138 ! X =  -113.03478, -103.29009,     288.000,       0.000!   !END!
2139 ! X =  -113.03218, -103.04158,     335.000,       0.000!   !END!
2140 ! X =  -113.02947, -102.79307,     382.000,       0.000!   !END!
2141 ! X =  -113.02676, -102.54447,     432.000,       0.000!   !END!
2142 ! X =  -113.02415, -102.29596,     480.000,       0.000!   !END!
2143 ! X =  -113.02145, -102.04745,     528.000,       0.000!   !END!
2144 ! X =  -113.01874, -101.79895,     569.000,       0.000!   !END!
2145 ! X =  -113.01614, -101.55044,     592.000,       0.000!   !END!
2146 ! X =  -113.01343, -101.30183,     587.000,       0.000!   !END!
2147 ! X =  -113.01072, -101.05332,     561.000,       0.000!   !END!
2148 ! X =  -113.00811, -100.80481,     475.000,       0.000!   !END!
2149 ! X =  -113.00541, -100.55631,     411.000,       0.000!   !END!
2150 ! X =   -113.0027,  -100.3078,     396.000,       0.000!   !END!
2151 ! X =   -113.0001, -100.05929,     365.000,       0.000!   !END!
2152 ! X =  -112.99739,  -99.81068,     341.000,       0.000!   !END!
2153 ! X =  -112.99468,  -99.56217,     402.000,       0.000!   !END!
2154 ! X =  -112.99208,  -99.31366,     415.000,       0.000!   !END!
2155 ! X =  -112.98937,  -99.06515,     423.000,       0.000!   !END!
2156 ! X =  -112.81144, -105.52958,     640.000,       0.000!   !END!
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2157 ! X =  -112.80883, -105.28097,     639.000,       0.000!   !END!
2158 ! X =  -112.80612, -105.03247,     615.000,       0.000!   !END!
2159 ! X =  -112.80342, -104.78397,     548.000,       0.000!   !END!
2160 ! X =  -112.80081, -104.53546,     491.000,       0.000!   !END!
2161 ! X =   -112.7981, -104.28685,     452.000,       0.000!   !END!
2162 ! X =  -112.79539, -104.03835,     425.000,       0.000!   !END!
2163 ! X =  -112.79279, -103.78984,     358.000,       0.000!   !END!
2164 ! X =  -112.79008, -103.54124,     315.000,       0.000!   !END!
2165 ! X =  -112.78737, -103.29273,     304.000,       0.000!   !END!
2166 ! X =  -112.78476, -103.04422,     285.000,       0.000!   !END!
2167 ! X =  -112.78206, -102.79572,     331.000,       0.000!   !END!
2168 ! X =  -112.77935, -102.54721,     388.000,       0.000!   !END!
2169 ! X =  -112.77674,  -102.2986,     448.000,       0.000!   !END!
2170 ! X =  -112.77404,  -102.0501,     470.000,       0.000!   !END!
2171 ! X =  -112.77133, -101.80159,     513.000,       0.000!   !END!
2172 ! X =  -112.76872, -101.55308,     553.000,       0.000!   !END!
2173 ! X =  -112.76602, -101.30458,     560.000,       0.000!   !END!
2174 ! X =  -112.76331, -101.05597,     541.000,       0.000!   !END!
2175 ! X =   -112.7607, -100.80746,     486.000,       0.000!   !END!
2176 ! X =    -112.758, -100.55895,     411.000,       0.000!   !END!
2177 ! X =  -112.75529, -100.31044,     372.000,       0.000!   !END!
2178 ! X =  -112.75258, -100.06194,     335.000,       0.000!   !END!
2179 ! X =  -112.74997,  -99.81332,     396.000,       0.000!   !END!
2180 ! X =  -112.74727,  -99.56482,     426.000,       0.000!   !END!
2181 ! X =  -112.74456,  -99.31631,     443.000,       0.000!   !END!
2182 ! X =  -112.74196,   -99.0678,     453.000,       0.000!   !END!
2183 ! X =  -112.56403, -105.53222,     640.000,       0.000!   !END!
2184 ! X =  -112.56132, -105.28362,     639.000,       0.000!   !END!
2185 ! X =  -112.55871, -105.03511,     619.000,       0.000!   !END!
2186 ! X =  -112.55601, -104.78661,     548.000,       0.000!   !END!
2187 ! X =   -112.5533, -104.53811,     491.000,       0.000!   !END!
2188 ! X =  -112.55069,  -104.2895,     457.000,       0.000!   !END!
2189 ! X =  -112.54798,   -104.041,     411.000,       0.000!   !END!
2190 ! X =  -112.54528, -103.79249,     359.000,       0.000!   !END!
2191 ! X =  -112.54267, -103.54398,     374.000,       0.000!   !END!
2192 ! X =  -112.53996, -103.29538,     362.000,       0.000!   !END!
2193 ! X =  -112.53725, -103.04688,     335.000,       0.000!   !END!
2194 ! X =  -112.53465, -102.79837,     296.000,       0.000!   !END!
2195 ! X =  -112.53194, -102.54986,     341.000,       0.000!   !END!
2196 ! X =  -112.52923, -102.30126,     388.000,       0.000!   !END!
2197 ! X =  -112.52662, -102.05275,     418.000,       0.000!   !END!
2198 ! X =  -112.52392, -101.80424,     468.000,       0.000!   !END!
2199 ! X =  -112.52121, -101.55573,     496.000,       0.000!   !END!
2200 ! X =  -112.51861, -101.30722,     518.000,       0.000!   !END!
2201 ! X =   -112.5159, -101.05862,     518.000,       0.000!   !END!
2202 ! X =  -112.51319, -100.81011,     464.000,       0.000!   !END!
2203 ! X =  -112.51058,  -100.5616,     410.000,       0.000!   !END!
2204 ! X =  -112.50788, -100.31309,     375.000,       0.000!   !END!
2205 ! X =  -112.50517, -100.06458,     337.000,       0.000!   !END!
2206 ! X =  -112.50256,  -99.81607,     396.000,       0.000!   !END!
2207 ! X =  -112.49985,  -99.56746,     427.000,       0.000!   !END!
2208 ! X =  -112.49715,  -99.31895,     464.000,       0.000!   !END!
2209 ! X =  -112.49454,  -99.07044,     517.000,       0.000!   !END!
2210 ! X =  -112.31392, -105.28637,     635.000,       0.000!   !END!
2211 ! X =   -112.3113, -105.03776,     601.000,       0.000!   !END!
2212 ! X =   -112.3086, -104.78926,     525.000,       0.000!   !END!
2213 ! X =  -112.30589, -104.54075,     453.000,       0.000!   !END!
2214 ! X =  -112.30328, -104.29215,     426.000,       0.000!   !END!
2215 ! X =  -112.30057, -104.04364,     410.000,       0.000!   !END!
2216 ! X =  -112.29787, -103.79514,     434.000,       0.000!   !END!
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2217 ! X =  -112.29526, -103.54663,     430.000,        0.000!   !END!
2218 ! X =  -112.29255, -103.29803,     421.000,        0.000!   !END!
2219 ! X =  -112.28984, -103.04952,     373.000,        0.000!   !END!
2220 ! X =  -112.28724, -102.80101,     304.000,        0.000!   !END!
2221 ! X =  -112.28453, -102.55251,     319.000,        0.000!   !END!
2222 ! X =  -112.28183,   -102.304,     353.000,        0.000!   !END!
2223 ! X =  -112.27921, -102.05539,     396.000,        0.000!   !END!
2224 ! X =  -112.27651, -101.80689,     426.000,        0.000!   !END!
2225 ! X =   -112.2738, -101.55838,     440.000,        0.000!   !END!
2226 ! X =  -112.27119, -101.30987,     457.000,        0.000!   !END!
2227 ! X =  -112.26849, -101.06136,     459.000,        0.000!   !END!
2228 ! X =  -112.26578, -100.81276,     432.000,        0.000!   !END!
2229 ! X =  -112.26317, -100.56424,     396.000,        0.000!   !END!
2230 ! X =  -112.26046, -100.31574,     365.000,        0.000!   !END!
2231 ! X =  -112.25776, -100.06723,     370.000,        0.000!   !END!
2232 ! X =  -112.25515,  -99.81872,     412.000,        0.000!   !END!
2233 ! X =  -112.25245,  -99.57021,     442.000,        0.000!   !END!
2234 ! X =  -112.24973,   -99.3216,     496.000,        0.000!   !END!
2235 ! X =  -112.24713,  -99.07309,     563.000,        0.000!   !END!
2236 ! X =  -112.06651, -105.28901,     612.000,        0.000!   !END!
2237 ! X =   -112.0638, -105.04041,     556.000,        0.000!   !END!
2238 ! X =  -112.06119,  -104.7919,     487.000,        0.000!   !END!
2239 ! X =  -112.05848,  -104.5434,     457.000,        0.000!   !END!
2240 ! X =  -112.05578,  -104.2949,     450.000,        0.000!   !END!
2241 ! X =  -112.05316, -104.04629,     470.000,        0.000!   !END!
2242 ! X =  -112.05046, -103.79779,     470.000,        0.000!   !END!
2243 ! X =  -112.04775, -103.54928,     460.000,        0.000!   !END!
2244 ! X =  -112.04515, -103.30077,     453.000,        0.000!   !END!
2245 ! X =  -112.04243, -103.05217,     418.000,        0.000!   !END!
2246 ! X =  -112.03973, -102.80366,     335.000,        0.000!   !END!
2247 ! X =  -112.03712, -102.55515,     313.000,        0.000!   !END!
2248 ! X =  -112.03441, -102.30665,     339.000,        0.000!   !END!
2249 ! X =   -112.0317, -102.05804,     372.000,        0.000!   !END!
2250 ! X =   -112.0291, -101.80953,     396.000,        0.000!   !END!
2251 ! X =  -112.02639, -101.56103,     387.000,        0.000!   !END!
2252 ! X =  -112.02368, -101.31252,     413.000,        0.000!   !END!
2253 ! X =  -112.02108, -101.06401,     415.000,        0.000!   !END!
2254 ! X =  -112.01836,  -100.8154,     396.000,        0.000!   !END!
2255 ! X =  -112.01566,  -100.5669,     376.000,        0.000!   !END!
2256 ! X =  -112.01305, -100.31838,     335.000,        0.000!   !END!
2257 ! X =  -112.01034, -100.06988,     379.000,        0.000!   !END!
2258 ! X =  -112.00764,  -99.82137,     416.000,        0.000!   !END!
2259 ! X =  -112.00503,  -99.57285,     449.000,        0.000!   !END!
2260 ! X =  -111.80305, -103.80043,     517.000,        0.000!   !END!
2261 ! X =  -111.80034, -103.55193,     501.000,        0.000!   !END!
2262 ! X =  -111.79773, -103.30342,     479.000,        0.000!   !END!
2263 ! X =  -111.79502, -103.05481,     456.000,        0.000!   !END!
2264 ! X =  -111.79232, -102.80631,     379.000,        0.000!   !END!
2265 ! X =  -111.78971,  -102.5578,     306.000,        0.000!   !END!
2266 ! X =    -111.787, -102.30929,     324.000,        0.000!   !END!
2267 ! X =  -111.78429, -102.06069,     346.000,        0.000!   !END!
2268 ! X =  -111.78168, -101.81218,     354.000,        0.000!   !END!
2269 ! X =  -111.77898, -101.56367,     356.000,        0.000!   !END!
2270 ! X =  -111.77627, -101.31517,     376.000,        0.000!   !END!
2271 ! X =  -111.77366, -101.06666,     383.000,        0.000!   !END!
2272 ! X =  -111.77096, -100.81815,     376.000,        0.000!   !END!
2273 ! X =  -111.76824, -100.56954,     365.000,        0.000!   !END!
2274 ! X =  -111.76564, -100.32103,     335.000,        0.000!   !END!
2275 ! X =  -111.76293, -100.07252,     369.000,        0.000!   !END!
2276 ! X =  -111.76022,  -99.82401,     415.000,        0.000!   !END!
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2277 ! X =  -111.75762,   -99.5755,     445.000,       0.000!   !END!
2278 ! X =  -111.55022, -103.30607,     538.000,       0.000!   !END!
2279 ! X =  -111.54761, -103.05746,     483.000,       0.000!   !END!
2280 ! X =  -111.54491, -102.80896,     427.000,       0.000!   !END!
2281 ! X =   -111.5422, -102.56045,     320.000,       0.000!   !END!
2282 ! X =  -111.53959, -102.31194,     306.000,       0.000!   !END!
2283 ! X =  -111.53688, -102.06344,     312.000,       0.000!   !END!
2284 ! X =  -111.53417, -101.81483,     318.000,       0.000!   !END!
2285 ! X =  -111.53156, -101.56632,     329.000,       0.000!   !END!
2286 ! X =  -111.52886, -101.31781,     351.000,       0.000!   !END!
2287 ! X =  -111.52615, -101.06931,     367.000,       0.000!   !END!
2288 ! X =  -111.52354,  -100.8208,     353.000,       0.000!   !END!
2289 ! X =  -111.52083, -100.57219,     335.000,       0.000!   !END!
2290 ! X =  -111.51822, -100.32368,     304.000,       0.000!   !END!
2291 ! X =  -111.51552, -100.07517,     342.000,       0.000!   !END!
2292 ! X =  -111.51281,  -99.82666,     382.000,       0.000!   !END!
2293 ! X =  -111.30281, -103.30872,     609.000,       0.000!   !END!
2294 ! X =  -111.30021, -103.06021,     518.000,       0.000!   !END!
2295 ! X =  -111.29749,  -102.8116,     445.000,       0.000!   !END!
2296 ! X =  -111.29479,  -102.5631,     386.000,       0.000!   !END!
2297 ! X =  -111.29218, -102.31459,     321.000,       0.000!   !END!
2298 ! X =  -111.28947, -102.06608,     284.000,       0.000!   !END!
2299 ! X =  -111.28676, -101.81748,     278.000,       0.000!   !END!
2300 ! X =  -111.28415, -101.56897,     307.000,       0.000!   !END!
2301 ! X =  -111.28145, -101.32046,     322.000,       0.000!   !END!
2302 ! X =  -111.27874, -101.07195,     336.000,       0.000!   !END!
2303 ! X =  -111.27613, -100.82344,     337.000,       0.000!   !END!
2304 ! X =  -111.27342, -100.57494,     335.000,       0.000!   !END!
2305 ! X =  -111.27071, -100.32633,     305.000,       0.000!   !END!
2306 ! X =   -111.2681, -100.07782,     338.000,       0.000!   !END!
2307 ! X =   -111.2654,  -99.82931,     381.000,       0.000!   !END!
2308 ! X =   -111.0554, -103.31137,     609.000,       0.000!   !END!
2309 ! X =   -111.0527, -103.06286,     518.000,       0.000!   !END!
2310 ! X =  -111.05008, -102.81425,     446.000,       0.000!   !END!
2311 ! X =  -111.04738, -102.56575,     414.000,       0.000!   !END!
2312 ! X =  -111.04467, -102.31724,     359.000,       0.000!   !END!
2313 ! X =  -111.04206, -102.06873,     313.000,       0.000!   !END!
2314 ! X =  -111.03935, -101.82023,     285.000,       0.000!   !END!
2315 ! X =  -111.03674, -101.57161,     275.000,       0.000!   !END!
2316 ! X =  -111.03403, -101.32311,     285.000,       0.000!   !END!
2317 ! X =  -111.03133,  -101.0746,     301.000,       0.000!   !END!
2318 ! X =  -111.02872, -100.82609,     315.000,       0.000!   !END!
2319 ! X =  -111.02601, -100.57758,     313.000,       0.000!   !END!
2320 ! X =   -111.0233, -100.32898,     305.000,       0.000!   !END!
2321 ! X =  -111.02069, -100.08046,     335.000,       0.000!   !END!
2322 ! X =  -111.01798,  -99.83196,     365.000,       0.000!   !END!
2323 ! X =  -110.80799, -103.31401,     532.000,       0.000!   !END!
2324 ! X =  -110.80529, -103.06551,     502.000,       0.000!   !END!
2325 ! X =  -110.80267,  -102.8169,     445.000,       0.000!   !END!
2326 ! X =  -110.79996, -102.56839,     396.000,       0.000!   !END!
2327 ! X =  -110.79726, -102.31989,     361.000,       0.000!   !END!
2328 ! X =  -110.79465, -102.07138,     313.000,       0.000!   !END!
2329 ! X =  -110.79194, -101.82287,     291.000,       0.000!   !END!
2330 ! X =  -110.78923, -101.57427,     274.000,       0.000!   !END!
2331 ! X =  -110.78662, -101.32576,     276.000,       0.000!   !END!
2332 ! X =  -110.78391, -101.07725,     287.000,       0.000!   !END!
2333 ! X =  -110.78121, -100.82874,     304.000,       0.000!   !END!
2334 ! X =   -110.7786, -100.58023,     305.000,       0.000!   !END!
2335 ! X =  -110.77588, -100.33162,     294.000,       0.000!   !END!
2336 ! X =  -110.77328, -100.08311,     322.000,       0.000!   !END!
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2337 ! X =  -110.77057,   -99.8346,     349.000,        0.000!   !END!
2338 ! X =  -110.56058, -103.31666,     471.000,        0.000!   !END!
2339 ! X =  -110.55788, -103.06816,     439.000,        0.000!   !END!
2340 ! X =  -110.55517, -102.81965,     411.000,        0.000!   !END!
2341 ! X =  -110.55255, -102.57104,     365.000,        0.000!   !END!
2342 ! X =  -110.54985, -102.32254,     335.000,        0.000!   !END!
2343 ! X =  -110.54714, -102.07403,     309.000,        0.000!   !END!
2344 ! X =  -110.54453, -101.82552,     290.000,        0.000!   !END!
2345 ! X =  -110.54182, -101.57692,     274.000,        0.000!   !END!
2346 ! X =  -110.53921,  -101.3284,     274.000,        0.000!   !END!
2347 ! X =   -110.5365,  -101.0799,     304.000,        0.000!   !END!
2348 ! X =  -110.53379, -100.83139,     304.000,        0.000!   !END!
2349 ! X =  -110.53118, -100.58288,     304.000,        0.000!   !END!
2350 ! X =  -110.31307, -103.31931,     433.000,        0.000!   !END!
2351 ! X =  -110.31046,  -103.0708,     401.000,        0.000!   !END!
2352 ! X =  -110.30776,  -102.8223,     348.000,        0.000!   !END!
2353 ! X =  -110.30514, -102.57369,     320.000,        0.000!   !END!
2354 ! X =  -110.30243, -102.32519,     304.000,        0.000!   !END!
2355 ! X =  -110.29973, -102.07668,     289.000,        0.000!   !END!
2356 ! X =  -110.29712, -101.82817,     279.000,        0.000!   !END!
2357 ! X =  -110.29441, -101.57966,     274.000,        0.000!   !END!
2358 ! X =   -110.2917, -101.33106,     274.000,        0.000!   !END!
2359 ! X =  -110.28909, -101.08255,     292.000,        0.000!   !END!
2360 ! X =  -110.28638, -100.83404,     304.000,        0.000!   !END!
2361 ! X =  -110.28377, -100.58553,     297.000,        0.000!   !END!
2362 ! X =  -110.06566, -103.32196,     371.000,        0.000!   !END!
2363 ! X =  -110.06305, -103.07345,     348.000,        0.000!   !END!
2364 ! X =  -110.06035, -102.82495,     312.000,        0.000!   !END!
2365 ! X =  -110.05763, -102.57634,     292.000,        0.000!   !END!
2366 ! X =  -110.05502, -102.32783,     287.000,        0.000!   !END!
2367 ! X =  -110.05232, -102.07933,     292.000,        0.000!   !END!
2368 ! X =  -110.04971, -101.83082,     277.000,        0.000!   !END!
2369 ! X =    -110.047, -101.58231,     274.000,        0.000!   !END!
2370 ! X =  -110.04428, -101.33371,     281.000,        0.000!   !END!
2371 ! X =  -110.04168, -101.08519,     292.000,        0.000!   !END!
2372 ! X =  -110.03897, -100.83669,     288.000,        0.000!   !END!
2373 ! X =  -110.03626, -100.58818,     286.000,        0.000!   !END!
2374 ! X =  -109.81554, -103.07611,     329.000,        0.000!   !END!
2375 ! X =  -109.81293,  -102.8276,     307.000,        0.000!   !END!
2376 ! X =  -109.81022, -102.57899,     308.000,        0.000!   !END!
2377 ! X =  -109.80761, -102.33048,     304.000,        0.000!   !END!
2378 ! X =   -109.8049, -102.08198,     304.000,        0.000!   !END!
2379 ! X =  -109.80219, -101.83347,     282.000,        0.000!   !END!
2380 ! X =  -109.79959, -101.58496,     278.000,        0.000!   !END!
2381 ! X =  -109.79687, -101.33635,     304.000,        0.000!   !END!
2382 ! X =  -109.79426, -101.08784,     322.000,        0.000!   !END!
2383 ! X =  -109.79155, -100.83934,     330.000,        0.000!   !END!
2384 ! X =  -109.78885, -100.59083,     304.000,        0.000!   !END!
2385 ! X =  -109.78624, -100.34232,     324.000,        0.000!   !END!
2386 ! X =  -109.56813, -103.07876,     365.000,        0.000!   !END!
2387 ! X =  -109.56552, -102.83025,     350.000,        0.000!   !END!
2388 ! X =  -109.56282, -102.58174,     342.000,        0.000!   !END!
2389 ! X =   -109.5601, -102.33314,     335.000,        0.000!   !END!
2390 ! X =  -109.55749, -102.08463,     304.000,        0.000!   !END!
2391 ! X =  -109.55478, -101.83612,     279.000,        0.000!   !END!
2392 ! X =  -109.55217, -101.58761,     302.000,        0.000!   !END!
2393 ! X =  -109.54946,   -101.339,     310.000,        0.000!   !END!
2394 ! X =  -109.54675,  -101.0905,     335.000,        0.000!   !END!
2395 ! X =  -109.54414, -100.84198,     335.000,        0.000!   !END!
2396 ! X =  -109.54143, -100.59348,     335.000,        0.000!   !END!
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2397 ! X =  -109.53882, -100.34497,     335.000,       0.000!   !END!
2398 ! X =  -109.29934, -101.09315,     335.000,       0.000!   !END!
2399 ! X =  -109.29673, -100.84463,     335.000,       0.000!   !END!
2400 ! X =  -109.29402, -100.59613,     335.000,       0.000!   !END!
2401 ! X =  -109.29131, -100.34762,     340.000,       0.000!   !END!
2402 ! X =  -109.05193,  -101.0958,     304.000,       0.000!   !END!
2403 ! X =  -109.04932, -100.84728,     335.000,       0.000!   !END!
2404 ! X =  -109.04661, -100.59878,     335.000,       0.000!   !END!
2405 ! X =   -109.0439, -100.35027,     340.000,       0.000!   !END!
2406 ! X =  -108.80451, -101.09844,     274.000,       0.000!   !END!
2407 ! X =   -108.8018, -100.84994,     304.000,       0.000!   !END!
2408 ! X =  -108.79919, -100.60143,     306.000,       0.000!   !END!
2409 ! X =  -108.79648, -100.35292,     335.000,       0.000!   !END!
2410 ! X =   -108.5571, -101.10109,     291.000,       0.000!   !END!
2411 ! X =  -108.55439, -100.85259,     304.000,       0.000!   !END!
2412 ! X =  -108.55178, -100.60408,     306.000,       0.000!   !END!
2413 ! X =  -108.54907, -100.35557,     330.000,       0.000!   !END!
2414 ! X =  -108.30969, -101.10374,     311.000,       0.000!   !END!
2415 ! X =  -108.30698, -100.85524,     304.000,       0.000!   !END!
2416 ! X =  -108.30437, -100.60673,     292.000,       0.000!   !END!
2417 ! X =  -108.30166, -100.35822,     335.000,       0.000!   !END!
2418 ! X =  -108.06489, -101.35501,     334.000,       0.000!   !END!
2419 ! X =   -109.4174, -101.02326,     335.000,       0.000!   !END!
2420 ! X =  -109.43069, -101.25184,     319.000,       0.000!   !END!
2421 ! X =  -109.44408, -101.48041,     305.000,       0.000!   !END!
2422 ! X =  -109.45746, -101.70888,     281.000,       0.000!   !END!
2423 ! X =  -109.47075, -101.93746,     288.000,       0.000!   !END!
2424 ! X =  -109.48414, -102.16593,     306.000,       0.000!   !END!
2425 ! X =  -109.49743, -102.39451,     343.000,       0.000!   !END!
2426 ! X =  -109.51081, -102.62298,     354.000,       0.000!   !END!
2427 ! X =   -109.5241, -102.85156,     365.000,       0.000!   !END!
2428 ! X =  -109.53743, -103.07904,     365.000,       0.000!   !END!
2429 ! X =  -109.55082, -103.30761,     382.000,       0.000!   !END!
2430 ! X =  -109.77611, -103.31814,     358.000,       0.000!   !END!
2431 ! X =  -110.00144, -103.32767,     358.000,       0.000!   !END!
2432 ! X =  -110.22673,  -103.3381,     411.000,       0.000!   !END!
2433 ! X =  -110.45202, -103.34863,     461.000,       0.000!   !END!
2434 ! X =  -110.67725, -103.35816,     507.000,       0.000!   !END!
2435 ! X =  -110.90259, -103.36769,     579.000,       0.000!   !END!
2436 ! X =  -111.12788, -103.37822,     609.000,       0.000!   !END!
2437 ! X =  -111.35321, -103.38765,     609.000,       0.000!   !END!
2438 ! X =  -111.53741, -103.49508,     576.000,       0.000!   !END!
2439 ! X =  -111.72172,  -103.6025,     548.000,       0.000!   !END!
2440 ! X =  -111.76747, -103.83559,     548.000,       0.000!   !END!
2441 ! X =  -111.81332, -104.06877,     517.000,       0.000!   !END!
2442 ! X =  -111.85908, -104.30195,     484.000,       0.000!   !END!
2443 ! X =  -111.90493, -104.53513,     487.000,       0.000!   !END!
2444 ! X =  -111.95088, -104.76821,     487.000,       0.000!   !END!
2445 ! X =  -111.99663, -105.00139,     533.000,       0.000!   !END!
2446 ! X =  -112.04249, -105.23457,     601.000,       0.000!   !END!
2447 ! X =  -112.08824, -105.46776,     624.000,       0.000!   !END!
2448 ! X =   -112.3197, -105.51994,     640.000,       0.000!   !END!
2449 ! X =  -112.55135, -105.57211,     640.000,       0.000!   !END!
2450 ! X =   -112.7828,  -105.6243,     640.000,       0.000!   !END!
2451 ! X =  -113.01426, -105.67648,     618.000,       0.000!   !END!
2452 ! X =  -113.24591, -105.72866,     640.000,       0.000!   !END!
2453 ! X =  -113.47737, -105.78094,     640.000,       0.000!   !END!
2454 ! X =   -113.5294, -106.01398,     640.000,       0.000!   !END!
2455 ! X =  -113.58133, -106.24703,     637.000,       0.000!   !END!
2456 ! X =  -113.63336, -106.48017,     621.000,       0.000!   !END!
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2457 ! X =  -113.68539, -106.71321,     611.000,       0.000!   !END!
2458 ! X =  -113.73742, -106.94635,     597.000,       0.000!   !END!
2459 ! X =  -113.78935, -107.17939,     577.000,       0.000!   !END!
2460 ! X =  -113.84139, -107.41253,     583.000,       0.000!   !END!
2461 ! X =  -113.89342, -107.64567,     612.000,       0.000!   !END!
2462 ! X =  -113.96946,  -107.8765,     640.000,       0.000!   !END!
2463 ! X =  -114.04541, -108.10733,     640.000,       0.000!   !END!
2464 ! X =  -114.12135, -108.33817,     640.000,       0.000!   !END!
2465 ! X =   -114.1975, -108.56899,     640.000,       0.000!   !END!
2466 ! X =  -114.27349, -108.79882,     639.000,       0.000!   !END!
2467 ! X =  -114.34943, -109.02976,     640.000,       0.000!   !END!
2468 ! X =  -114.42548, -109.26059,     640.000,       0.000!   !END!
2469 ! X =  -114.65867, -109.31178,     631.000,       0.000!   !END!
2470 ! X =  -114.89181, -109.36198,     609.000,       0.000!   !END!
2471 ! X =  -115.12499, -109.41307,     548.000,       0.000!   !END!
2472 ! X =  -115.35818, -109.46426,     590.000,       0.000!   !END!
2473 ! X =  -115.59137, -109.51546,     584.000,       0.000!   !END!
2474 ! X =  -115.82446, -109.56666,     558.000,       0.000!   !END!
2475 ! X =   -116.0577, -109.61685,     495.000,       0.000!   !END!
2476 ! X =  -116.29079, -109.66805,     544.000,       0.000!   !END!
2477 ! X =  -116.45021, -109.50625,     582.000,       0.000!   !END!
2478 ! X =  -116.60977, -109.34344,     588.000,       0.000!   !END!
2479 ! X =  -116.76919, -109.18163,     609.000,       0.000!   !END!
2480 ! X =  -116.92866, -109.01883,     640.000,       0.000!   !END!
2481 ! X =  -117.08808, -108.85712,     657.000,       0.000!   !END!
2482 ! X =  -117.24755, -108.69431,     687.000,       0.000!   !END!
2483 ! X =  -117.40697, -108.53251,     687.000,       0.000!   !END!
2484 ! X =  -117.49922,  -108.3625,     671.000,       0.000!   !END!
2485 ! X =  -117.59146,  -108.1925,     648.000,       0.000!   !END!
2486 ! X =  -117.70031, -108.19134,     640.000,       0.000!   !END!
2487 ! X =  -117.69832, -108.01232,     640.000,       0.000!   !END!
2488 ! X =  -117.79548, -107.83925,     591.000,       0.000!   !END!
2489 ! X =   -117.8926, -107.66529,     566.000,       0.000!   !END!
2490 ! X =  -117.98967, -107.49223,     521.000,       0.000!   !END!
2491 ! X =  -118.19952, -107.51777,     517.000,       0.000!   !END!
2492 ! X =  -118.40922, -107.54432,     487.000,       0.000!   !END!
2493 ! X =  -118.61908, -107.56996,     466.000,       0.000!   !END!
2494 ! X =  -118.82888, -107.59651,     410.000,       0.000!   !END!
2495 ! X =  -119.03863, -107.62205,     402.000,       0.000!   !END!
2496 ! X =  -119.24848,  -107.6477,     435.000,       0.000!   !END!
2497 ! X =  -119.27574, -107.88199,     472.000,       0.000!   !END!
2498 ! X =    -119.303, -108.11638,     506.000,       0.000!   !END!
2499 ! X =  -119.33026, -108.35077,     529.000,       0.000!   !END!
2500 ! X =  -119.35762, -108.58506,     555.000,       0.000!   !END!
2501 ! X =  -119.38488, -108.81945,     609.000,       0.000!   !END!
2502 ! X =  -119.41214, -109.05374,     640.000,       0.000!   !END!
2503 ! X =   -119.4394, -109.28813,     643.000,       0.000!   !END!
2504 ! X =  -119.46666, -109.52252,     653.000,       0.000!   !END!
2505 ! X =  -119.49392, -109.75681,     662.000,       0.000!   !END!
2506 ! X =  -119.52128,  -109.9912,     696.000,       0.000!   !END!
2507 ! X =  -119.71914, -110.08951,     669.000,       0.000!   !END!
2508 ! X =   -119.9171, -110.18781,     670.000,       0.000!   !END!
2509 ! X =  -120.11506, -110.28611,     670.000,       0.000!   !END!
2510 ! X =  -120.31292, -110.38432,     670.000,       0.000!   !END!
2511 ! X =  -120.51098, -110.48262,     670.000,       0.000!   !END!
2512 ! X =  -120.70884, -110.58092,     641.000,       0.000!   !END!
2513 ! X =  -120.90675, -110.68023,     590.000,       0.000!   !END!
2514 ! X =  -121.10471, -110.77853,     531.000,       0.000!   !END!
2515 ! X =  -121.30267, -110.87683,     487.000,       0.000!   !END!
2516 ! X =  -121.39127, -111.06179,     457.000,       0.000!   !END!
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2517 ! X =  -121.47991, -111.24775,     461.000,        0.000!   !END!
2518 ! X =  -121.56851, -111.43271,     487.000,        0.000!   !END!
2519 ! X =  -121.65715, -111.61867,     510.000,        0.000!   !END!
2520 ! X =  -121.86145, -111.65229,     579.000,        0.000!   !END!
2521 ! X =  -122.06565, -111.68583,     640.000,        0.000!   !END!
2522 ! X =  -122.26995, -111.71945,     641.000,        0.000!   !END!
2523 ! X =  -122.47425, -111.75308,     645.000,        0.000!   !END!
2524 ! X =  -122.67855, -111.78661,     641.000,        0.000!   !END!
2525 ! X =  -122.67874, -111.98747,     660.000,        0.000!   !END!
2526 ! X =  -122.67894, -112.18833,     696.000,        0.000!   !END!
2527 ! X =  -122.67913, -112.38918,     701.000,        0.000!   !END!
2528 ! X =  -122.67923, -112.59005,     680.000,        0.000!   !END!
2529 ! X =  -122.67942, -112.79091,     655.000,        0.000!   !END!
2530 ! X =   -122.8929, -112.85016,     609.000,        0.000!   !END!
2531 ! X =  -123.10644, -112.91051,     575.000,        0.000!   !END!
2532 ! X =  -123.31983, -112.96988,     545.000,        0.000!   !END!
2533 ! X =  -123.53336, -113.03023,     538.000,        0.000!   !END!
2534 ! X =   -123.6062,  -113.2353,     482.000,        0.000!   !END!
2535 ! X =  -123.67912, -113.44026,     472.000,        0.000!   !END!
2536 ! X =  -123.75216, -113.64532,     487.000,        0.000!   !END!
2537 ! X =  -123.82499, -113.85039,     548.000,        0.000!   !END!
2538 ! X =  -123.89791, -114.05536,     609.000,        0.000!   !END!
2539 ! X =   -123.9709, -114.26142,     640.000,        0.000!   !END!
2540 ! X =  -124.04383, -114.46648,     640.000,        0.000!   !END!
2541 ! X =  -124.14299, -114.66423,     623.000,        0.000!   !END!
2542 ! X =  -124.24215, -114.86198,     579.000,        0.000!   !END!
2543 ! X =  -124.34126, -115.05883,     545.000,        0.000!   !END!
2544 ! X =  -124.44038, -115.25758,     506.000,        0.000!   !END!
2545 ! X =  -124.53955, -115.45542,     455.000,        0.000!   !END!
2546 ! X =  -124.34505, -115.47342,     484.000,        0.000!   !END!
2547 ! X =   -124.1507, -115.49241,     524.000,        0.000!   !END!
2548 ! X =  -123.95611, -115.51041,     579.000,        0.000!   !END!
2549 ! X =  -124.00067, -115.73657,     502.000,        0.000!   !END!
2550 ! X =  -124.04518, -115.96184,     457.000,        0.000!   !END!
2551 ! X =  -124.08965,  -116.1881,     432.000,        0.000!   !END!
2552 ! X =  -124.13421, -116.41426,     464.000,        0.000!   !END!
2553 ! X =   -124.3417, -116.38219,     432.000,        0.000!   !END!
2554 ! X =  -124.54929, -116.35011,     406.000,        0.000!   !END!
2555 ! X =  -124.75673, -116.31704,     426.000,        0.000!   !END!
2556 ! X =  -124.96432, -116.28497,     467.000,        0.000!   !END!
2557 ! X =  -125.06802, -116.49274,     529.000,        0.000!   !END!
2558 ! X =  -125.17171, -116.70041,     579.000,        0.000!   !END!
2559 ! X =   -125.2754, -116.90808,     639.000,        0.000!   !END!
2560 ! X =  -125.37919, -117.11575,     640.000,        0.000!   !END!
2561 ! X =  -125.38939, -117.14551,     646.000,        0.000!   !END!
2562 ! X =  -125.48044, -117.32445,     664.000,        0.000!   !END!
2563 ! X =   -125.5915, -117.53013,     663.000,        0.000!   !END!
2564 ! X =  -125.70266, -117.73569,     658.000,        0.000!   !END!
2565 ! X =  -125.81377, -117.94226,     640.000,        0.000!   !END!
2566 ! X =  -125.92493, -118.14793,     670.000,        0.000!   !END!
2567 ! X =  -126.03604,  -118.3545,     670.000,        0.000!   !END!
2568 ! X =  -126.14715, -118.56116,     670.000,        0.000!   !END!
2569 ! X =  -126.25831, -118.76673,     670.000,        0.000!   !END!
2570 ! X =  -126.27531, -118.97046,     670.000,        0.000!   !END!
2571 ! X =  -126.29241, -119.17408,     670.000,        0.000!   !END!
2572 ! X =  -126.53874, -119.17938,     670.000,        0.000!   !END!
2573 ! X =  -126.78503, -119.18569,     670.000,        0.000!   !END!
2574 ! X =  -127.03156, -119.19098,     647.000,        0.000!   !END!
2575 ! X =  -127.27789, -119.19619,     627.000,        0.000!   !END!
2576 ! X =  -127.52422, -119.20149,     596.000,        0.000!   !END!
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2577 ! X =  -127.77051,  -119.2078,     548.000,       0.000!   !END!
2578 ! X =  -128.01704, -119.21309,     442.000,       0.000!   !END!
2579 ! X =  -128.26337,  -119.2184,     418.000,       0.000!   !END!
2580 ! X =   -128.5097,  -119.2237,     487.000,       0.000!   !END!
2581 ! X =  -128.75609,    -119.23,     548.000,       0.000!   !END!
2582 ! X =  -129.00252, -119.23531,     618.000,       0.000!   !END!
2583 ! X =  -129.24885, -119.24051,     638.000,       0.000!   !END!
2584 ! X =  -129.49518, -119.24582,     650.000,       0.000!   !END!
2585 ! X =  -129.74157, -119.25212,     670.000,       0.000!   !END!
2586 ! X =    -129.988, -119.25742,     670.000,       0.000!   !END!
2587 ! X =  -130.23433, -119.26273,     670.000,       0.000!   !END!
2588 ! X =  -130.48066, -119.26794,     670.000,       0.000!   !END!
2589 ! X =  -130.53775, -119.05858,     667.000,       0.000!   !END!
2590 ! X =  -130.37491, -118.87637,     667.000,       0.000!   !END!
2591 ! X =  -130.21208, -118.69417,     670.000,       0.000!   !END!
2592 ! X =  -130.04925, -118.51196,     651.000,       0.000!   !END!
2593 ! X =  -129.88642, -118.32986,     660.000,       0.000!   !END!
2594 ! X =  -129.87956, -118.08728,     670.000,       0.000!   !END!
2595 ! X =  -129.87261, -117.84471,     670.000,       0.000!   !END!
2596 ! X =   -129.8657, -117.60124,     656.000,       0.000!   !END!
2597 ! X =  -129.85895, -117.35865,     639.000,       0.000!   !END!
2598 ! X =   -129.8521, -117.11617,     626.000,       0.000!   !END!
2599 ! X =  -129.84515,  -116.8736,     624.000,       0.000!   !END!
2600 ! X =  -129.83824, -116.63003,     620.000,       0.000!   !END!
2601 ! X =  -129.75852, -116.41017,     614.000,       0.000!   !END!
2602 ! X =  -129.67865, -116.18933,     601.000,       0.000!   !END!
2603 ! X =  -129.59898, -115.96848,     554.000,       0.000!   !END!
2604 ! X =   -129.5192, -115.74763,     512.000,       0.000!   !END!
2605 ! X =  -129.43938, -115.52768,     462.000,       0.000!   !END!
2606 ! X =  -129.35951, -115.30684,     420.000,       0.000!   !END!
2607 ! X =  -129.27979, -115.08698,     431.000,       0.000!   !END!
2608 ! X =  -129.20002, -114.86614,     466.000,       0.000!   !END!
2609 ! X =  -129.12025, -114.64529,     513.000,       0.000!   !END!
2610 ! X =  -129.04047, -114.42444,     546.000,       0.000!   !END!
2611 ! X =  -128.96065, -114.20449,     591.000,       0.000!   !END!
2612 ! X =  -128.86333, -113.99278,     579.000,       0.000!   !END!
2613 ! X =    -128.766, -113.78106,     584.000,       0.000!   !END!
2614 ! X =  -128.66867, -113.56935,     600.000,       0.000!   !END!
2615 ! X =  -128.57134, -113.35764,     610.000,       0.000!   !END!
2616 ! X =  -128.47402, -113.14592,     609.000,       0.000!   !END!
2617 ! X =  -128.37669, -112.93421,     609.000,       0.000!   !END!
2618 ! X =  -128.27936,  -112.7225,     601.000,       0.000!   !END!
2619 ! X =  -128.18203, -112.51068,     554.000,       0.000!   !END!
2620 ! X =   -128.0847, -112.29897,     496.000,       0.000!   !END!
2621 ! X =  -127.98737, -112.08725,     396.000,       0.000!   !END!
2622 ! X =  -127.92292, -111.88212,     408.000,       0.000!   !END!
2623 ! X =  -127.85852, -111.67609,     467.000,       0.000!   !END!
2624 ! X =  -127.79406, -111.47096,     523.000,       0.000!   !END!
2625 ! X =  -127.72971, -111.26582,     548.000,       0.000!   !END!
2626 ! X =  -127.66515,  -111.0607,     609.000,       0.000!   !END!
2627 ! X =   -127.6007, -110.85557,     639.000,       0.000!   !END!
2628 ! X =  -127.53634, -110.65043,     640.000,       0.000!   !END!
2629 ! X =  -127.30817, -110.60524,     640.000,       0.000!   !END!
2630 ! X =  -127.07999, -110.55994,     606.000,       0.000!   !END!
2631 ! X =  -126.85181, -110.51465,     532.000,       0.000!   !END!
2632 ! X =  -126.62364, -110.46945,     487.000,       0.000!   !END!
2633 ! X =  -126.39557, -110.42416,     404.000,       0.000!   !END!
2634 ! X =   -126.3549, -110.19987,     397.000,       0.000!   !END!
2635 ! X =  -126.31433, -109.97558,     440.000,       0.000!   !END!
2636 ! X =  -126.27372, -109.75239,     443.000,       0.000!   !END!
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2637 ! X =  -126.23306, -109.52811,     474.000,       0.000!   !END!
2638 ! X =  -126.19249, -109.30382,     493.000,       0.000!   !END!
2639 ! X =  -126.15187, -109.08053,     521.000,       0.000!   !END!
2640 ! X =  -126.11131, -108.85624,     541.000,       0.000!   !END!
2641 ! X =  -125.87149, -108.83702,     580.000,       0.000!   !END!
2642 ! X =  -125.63176, -108.81769,     578.000,       0.000!   !END!
2643 ! X =  -125.39204, -108.79846,     548.000,       0.000!   !END!
2644 ! X =  -125.15231, -108.77913,     533.000,       0.000!   !END!
2645 ! X =  -124.91248, -108.75981,     497.000,       0.000!   !END!
2646 ! X =  -124.86892, -108.54655,     524.000,       0.000!   !END!
2647 ! X =  -124.82547, -108.33329,     492.000,       0.000!   !END!
2648 ! X =   -124.7819, -108.11994,     457.000,       0.000!   !END!
2649 ! X =  -124.73825, -107.90669,     448.000,       0.000!   !END!
2650 ! X =  -124.69479, -107.69342,     518.000,       0.000!   !END!
2651 ! X =  -124.65122, -107.48007,     587.000,       0.000!   !END!
2652 ! X =  -124.46305, -107.33994,     609.000,       0.000!   !END!
2653 ! X =  -124.27487,  -107.1998,     609.000,       0.000!   !END!
2654 ! X =  -124.08675, -107.06067,     609.000,       0.000!   !END!
2655 ! X =  -123.89847, -106.92044,     590.000,       0.000!   !END!
2656 ! X =  -123.71029, -106.78031,     521.000,       0.000!   !END!
2657 ! X =  -123.52221, -106.64017,     464.000,       0.000!   !END!
2658 ! X =  -123.33404, -106.50004,     375.000,       0.000!   !END!
2659 ! X =  -123.20254, -106.30754,     401.000,       0.000!   !END!
2660 ! X =   -123.0711, -106.11414,     396.000,       0.000!   !END!
2661 ! X =  -122.93956, -105.92065,     381.000,       0.000!   !END!
2662 ! X =  -122.80811, -105.72725,     382.000,       0.000!   !END!
2663 ! X =  -122.67662, -105.53475,     428.000,       0.000!   !END!
2664 ! X =  -122.54517, -105.34125,     470.000,       0.000!   !END!
2665 ! X =  -122.41373, -105.14785,     487.000,       0.000!   !END!
2666 ! X =  -122.28223, -104.95536,     471.000,       0.000!   !END!
2667 ! X =  -122.15079, -104.76196,     518.000,       0.000!   !END!
2668 ! X =  -122.01934, -104.56846,     582.000,       0.000!   !END!
2669 ! X =   -121.8878, -104.37506,     640.000,       0.000!   !END!
2670 ! X =   -121.7563, -104.18257,     662.000,       0.000!   !END!
2671 ! X =  -121.62485, -103.98907,     640.000,       0.000!   !END!
2672 ! X =  -121.49341, -103.79567,     575.000,       0.000!   !END!
2673 ! X =   -121.4728, -103.56619,     556.000,       0.000!   !END!
2674 ! X =  -121.45214, -103.33573,     499.000,       0.000!   !END!
2675 ! X =  -121.43154, -103.10635,     464.000,       0.000!   !END!
2676 ! X =  -121.41087, -102.87589,     519.000,       0.000!   !END!
2677 ! X =  -121.39021, -102.64542,     599.000,       0.000!   !END!
2678 ! X =  -121.36955, -102.41505,     640.000,       0.000!   !END!
2679 ! X =  -121.34894, -102.18557,     642.000,       0.000!   !END!
2680 ! X =  -121.32828,  -101.9551,     630.000,       0.000!   !END!
2681 ! X =  -121.30768, -101.72573,     570.000,       0.000!   !END!
2682 ! X =  -121.28711, -101.49525,     511.000,       0.000!   !END!
2683 ! X =  -121.26645, -101.26479,     532.000,       0.000!   !END!
2684 ! X =  -121.24585, -101.03541,     572.000,       0.000!   !END!
2685 ! X =  -121.01139, -101.09459,     520.000,       0.000!   !END!
2686 ! X =   -120.7769, -101.15477,     626.000,       0.000!   !END!
2687 ! X =  -120.54255, -101.21395,     626.000,       0.000!   !END!
2688 ! X =  -120.30805, -101.27413,     562.000,       0.000!   !END!
2689 ! X =  -120.26464, -101.07084,     624.000,       0.000!   !END!
2690 ! X =  -120.22111, -100.86745,     650.000,       0.000!   !END!
2691 ! X =   -120.1778, -100.66415,     640.000,       0.000!   !END!
2692 ! X =  -120.13427, -100.46076,     594.000,       0.000!   !END!
2693 ! X =  -120.09085, -100.25736,     597.000,       0.000!   !END!
2694 ! X =  -120.04743, -100.05407,     643.000,       0.000!   !END!
2695 ! X =  -119.83841, -100.12592,     624.000,       0.000!   !END!
2696 ! X =  -119.62929, -100.19779,     609.000,       0.000!   !END!
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2697 ! X =  -119.42026, -100.26955,     603.000,       0.000!   !END!
2698 ! X =  -119.21123,  -100.3414,     617.000,       0.000!   !END!
2699 ! X =  -119.00211, -100.41327,     645.000,       0.000!   !END!
2700 ! X =    -118.964, -100.18106,     644.000,       0.000!   !END!
2701 ! X =  -118.92588,  -99.94885,     640.000,       0.000!   !END!
2702 ! X =  -118.88766,  -99.71654,     640.000,       0.000!   !END!
2703 ! X =  -118.84955,  -99.48433,     640.000,       0.000!   !END!
2704 ! X =  -118.81143,  -99.25212,     640.000,       0.000!   !END!
2705 ! X =  -118.58086,  -99.24167,     640.000,       0.000!   !END!
2706 ! X =  -118.35028,  -99.23122,     622.000,       0.000!   !END!
2707 ! X =  -118.11961,  -99.22078,     612.000,       0.000!   !END!
2708 ! X =  -117.88903,  -99.21033,     640.000,       0.000!   !END!
2709 ! X =  -117.65841,  -99.20089,     640.000,       0.000!   !END!
2710 ! X =  -117.42784,  -99.19044,     639.000,       0.000!   !END!
2711 ! X =  -117.19726,  -99.17999,     640.000,       0.000!   !END!
2712 ! X =  -117.18251,  -99.41579,     640.000,       0.000!   !END!
2713 ! X =  -117.16772,  -99.65259,     642.000,       0.000!   !END!
2714 ! X =  -117.15297,  -99.88838,     650.000,       0.000!   !END!
2715 ! X =  -117.13817, -100.12518,     669.000,       0.000!   !END!
2716 ! X =  -116.93624, -100.21181,     671.000,       0.000!   !END!
2717 ! X =  -116.73421, -100.29845,     670.000,       0.000!   !END!
2718 ! X =  -116.53228, -100.38518,     670.000,       0.000!   !END!
2719 ! X =  -116.33025, -100.47182,     670.000,       0.000!   !END!
2720 ! X =  -116.35972, -100.67538,     671.000,       0.000!   !END!
2721 ! X =  -116.38909, -100.87884,     682.000,       0.000!   !END!
2722 ! X =  -116.41846, -101.08231,     699.000,       0.000!   !END!
2723 ! X =  -116.44793, -101.28586,     701.000,       0.000!   !END!
2724 ! X =  -116.22833, -101.34484,     701.000,       0.000!   !END!
2725 ! X =  -116.00873, -101.40391,     701.000,       0.000!   !END!
2726 ! X =  -115.78909, -101.46398,     682.000,       0.000!   !END!
2727 ! X =   -115.5695, -101.52296,     670.000,       0.000!   !END!
2728 ! X =    -115.522, -101.70339,     670.000,       0.000!   !END!
2729 ! X =  -115.47446, -101.88292,     664.000,       0.000!   !END!
2730 ! X =  -115.42691, -102.06236,     648.000,       0.000!   !END!
2731 ! X =   -115.1915, -102.10764,     596.000,       0.000!   !END!
2732 ! X =  -114.95599, -102.15292,     523.000,       0.000!   !END!
2733 ! X =  -114.72058, -102.19819,     533.000,       0.000!   !END!
2734 ! X =  -114.48513, -102.24447,     548.000,       0.000!   !END!
2735 ! X =  -114.24972, -102.28974,     527.000,       0.000!   !END!
2736 ! X =  -114.01437, -102.33602,     527.000,       0.000!   !END!
2737 ! X =   -114.0208,  -102.0904,     594.000,       0.000!   !END!
2738 ! X =  -114.02743, -101.84478,     620.000,       0.000!   !END!
2739 ! X =  -114.03386, -101.59916,     621.000,       0.000!   !END!
2740 ! X =  -114.04029, -101.35345,     619.000,       0.000!   !END!
2741 ! X =  -114.04682, -101.10783,     613.000,       0.000!   !END!
2742 ! X =  -114.05335, -100.86221,     609.000,       0.000!   !END!
2743 ! X =  -114.05978,  -100.6166,     602.000,       0.000!   !END!
2744 ! X =   -114.0663, -100.37088,     548.000,       0.000!   !END!
2745 ! X =  -114.07283, -100.12526,     472.000,       0.000!   !END!
2746 ! X =  -114.07931,  -99.88064,     413.000,       0.000!   !END!
2747 ! X =  -114.08579,  -99.63402,     426.000,       0.000!   !END!
2748 ! X =  -114.09237,  -99.38929,     432.000,       0.000!   !END!
2749 ! X =   -114.0988,  -99.14368,     427.000,       0.000!   !END!
2750 ! X =  -113.86655,  -99.12634,     396.000,       0.000!   !END!
2751 ! X =   -113.6343,  -99.10891,     367.000,       0.000!   !END!
2752 ! X =  -113.40205,  -99.09158,     365.000,       0.000!   !END!
2753 ! X =   -113.1698,  -99.07414,     400.000,       0.000!   !END!
2754 ! X =  -112.93764,   -99.0567,     428.000,       0.000!   !END!
2755 ! X =  -112.70529,  -99.03938,     458.000,       0.000!   !END!
2756 ! X =  -112.47314,  -99.02194,     528.000,       0.000!   !END!
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2757 ! X =  -112.24079,  -99.00461,     583.000,       0.000!   !END!
2758 ! X =  -112.00864,  -98.98717,     612.000,       0.000!   !END!
2759 ! X =  -112.02039,  -99.16208,     548.000,       0.000!   !END!
2760 ! X =  -112.03219,  -99.33788,     515.000,       0.000!   !END!
2761 ! X =  -112.04399,  -99.51377,     464.000,       0.000!   !END!
2762 ! X =  -111.82827,  -99.54691,     449.000,       0.000!   !END!
2763 ! X =   -111.6124,  -99.58104,     435.000,       0.000!   !END!
2764 ! X =  -111.39673,  -99.61517,     426.000,       0.000!   !END!
2765 ! X =    -111.181,   -99.6483,     411.000,       0.000!   !END!
2766 ! X =  -110.96523,  -99.68243,     387.000,       0.000!   !END!
2767 ! X =  -110.74946,  -99.71657,     355.000,       0.000!   !END!
2768 ! X =  -110.70587,  -99.95564,     335.000,       0.000!   !END!
2769 ! X =  -110.66228,  -100.1947,     288.000,       0.000!   !END!
2770 ! X =  -110.61859, -100.43378,     297.000,       0.000!   !END!
2771 ! X =  -110.38983, -100.40538,     291.000,       0.000!   !END!
2772 ! X =  -110.16097,   -100.377,     304.000,       0.000!   !END!
2773 ! X =  -109.93211, -100.34871,     324.000,       0.000!   !END!
2774 ! X =  -109.70315, -100.32033,     321.000,       0.000!   !END!
2775 ! X =  -109.47439, -100.29193,     335.000,       0.000!   !END!
2776 ! X =  -109.24552, -100.26355,     349.000,       0.000!   !END!
2777 ! X =  -109.01656, -100.23517,     351.000,       0.000!   !END!
2778 ! X =  -108.78776, -100.20787,     342.000,       0.000!   !END!
2779 ! X =   -108.5589, -100.17949,     340.000,       0.000!   !END!
2780 ! X =  -108.32998, -100.15011,     336.000,       0.000!   !END!
2781 ! X =  -108.10117, -100.12271,     336.000,       0.000!   !END!
2782 ! X =  -108.10342, -100.33544,     335.000,       0.000!   !END!
2783 ! X =  -108.10578, -100.54826,     309.000,       0.000!   !END!
2784 ! X =  -108.10803, -100.76098,     304.000,       0.000!   !END!
2785 ! X =  -108.11028, -100.97371,     327.000,       0.000!   !END!
2786 ! X =  -108.11263, -101.18643,     335.000,       0.000!   !END!
2787 ! X =  -107.91151, -101.19852,     349.000,       0.000!   !END!
2788 ! X =   -107.7103, -101.21061,     380.000,       0.000!   !END!
2789 ! X =  -107.50918,  -101.2227,     396.000,       0.000!   !END!
2790 ! X =  -107.58952, -101.33122,     380.000,       0.000!   !END!
2791 ! X =  -107.73854, -101.38431,     360.000,       0.000!   !END!
2792 ! X =  -107.88767,  -101.4374,     335.000,       0.000!   !END!
2793 ! X =  -108.01581,  -101.3913,     334.000,       0.000!   !END!
2794 ! X =  -108.14399,  -101.3442,     327.000,       0.000!   !END!
2795 ! X =  -108.29717, -101.32366,     304.000,       0.000!   !END!
2796 ! X =  -108.45039, -101.30212,     291.000,       0.000!   !END!
2797 ! X =  -108.57906, -101.30576,     267.000,       0.000!   !END!
2798 ! X =  -108.70782,  -101.3093,     260.000,       0.000!   !END!
2799 ! X =   -108.8357, -101.23837,     274.000,       0.000!   !END!
2800 ! X =  -108.96358, -101.16735,     295.000,       0.000!   !END!
2801 ! X =  -109.08736, -101.17106,     310.000,       0.000!   !END!
2802 ! X =  -109.21113, -101.17467,     323.000,       0.000!   !END!
2803 ! X =  -109.31432, -101.09901,     335.000,       0.000!   !END!
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a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

Appendix K, Part 4

BASF - Mingo Refined Analysis Method 6 - 2001											% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TY	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	2	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	3	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	4	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	5	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	6	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	7	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	8	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	9	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	10	0	930	-78.188	-33.78	D	7.547	7.546	0.001	3.2	0.67	97.52	0	0	0	1.85
2001	11	0	930	-78.188	-33.78	D	7.553	7.546	0.007	3.2	1.65	95.9	0	0	0	2.47
2001	12	0	955	-79.307	-31.075	D	7.546	7.546	0	3.2	1.85	95.88	0	0	0	2.24
2001	13	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	14	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	15	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	16	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	17	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	18	0	933	-78.17	-33.075	D	7.668	7.546	0.121	3.2	1.03	96.62	0	0	0	2.35
2001	19	0	907	-79.461	-36.281	D	7.647	7.546	0.101	3.2	0.89	96.77	0	0	0	2.34
2001	20	0	619	-80.651	-36.537	D	7.546	7.546	0	3.2	1.24	85.63	0	0	0	2.34
2001	21	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	22	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	23	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	24	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	25	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	26	0	930	-78.188	-33.78	D	7.553	7.546	0.007	3.2	0.67	97.88	0	0	0	1.48
2001	27	0	643	-80.588	-30.574	D	7.547	7.546	0	3.2	0.71	98.4	0	0	0	0.81
2001	28	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	29	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	30	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	31	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	32	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	33	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	34	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	35	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	36	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	37	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	38	0	955	-79.307	-31.075	D	7.406	7.406	0	2.9	1.36	93.71	0	0	0	5.05
2001	39	0	955	-79.307	-31.075	D	7.408	7.406	0.003	2.9	1.45	94.32	0	0	0	4.25
2001	40	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TY	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	41	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	42	0	933	-78.17	-33.075	D	7.406	7.406	0	2.9	0.64	97.37	0	0	0	2.3
2001	43	0	1017	-87.324	-31.258	D	7.413	7.406	0.008	2.9	0.95	97.09	0	0	0	2
2001	44	0	643	-80.588	-30.574	D	7.406	7.406	0	2.9	1.19	97.65	0	0	0	1.27
2001	45	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	46	0	949	-78.53	-31.5	D	7.412	7.406	0.007	2.9	2.97	96.46	0	0	0	0.59
2001	47	0	930	-78.188	-33.78	D	7.408	7.406	0.002	2.9	2.33	97.21	0	0	0	0.62
2001	48	0	619	-80.651	-36.537	D	7.406	7.406	0	2.9	1.47	88.38	0	0	0	0.27
2001	49	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	50	0	930	-78.188	-33.78	D	7.407	7.406	0.002	2.9	1.98	95.25	0	0	0	2.98
2001	51	0	930	-78.188	-33.78	D	7.406	7.406	0	2.9	1.15	96.83	0	0	0	1.91
2001	52	0	1017	-87.324	-31.258	D	7.408	7.406	0.002	2.9	1.42	94.72	0	0	0	3.96
2001	53	0	1017	-87.324	-31.258	D	7.409	7.406	0.004	2.9	1.18	96.33	0	0	0	2.57
2001	54	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	2.71	98.34	0	0	0	1.66
2001	55	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	56	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	57	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	58	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	59	0	1007	-85.943	-30.897	D	7.406	7.406	0	2.9	2	99.58	0	0	0	3.28
2001	60	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	61	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	62	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	63	0	747	-79.357	-31.084	D	7.311	7.311	0.001	2.7	1.69	94.3	0	0	0	4.04
2001	64	0	947	-78.463	-31.7	D	7.415	7.311	0.105	2.7	1.3	95.54	0	0	0	3.16
2001	65	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	66	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	67	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	68	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	69	0	930	-78.188	-33.78	D	7.311	7.311	0	2.7	0.8	97.73	0	0	0	2.71
2001	70	0	907	-79.461	-36.281	D	7.312	7.311	0.001	2.7	3.43	91.49	0	0	0	5.32
2001	71	0	747	-79.357	-31.084	D	7.311	7.311	0	2.7	4.04	93.05	0	0	0	3.42
2001	72	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	75	0	191	-84.875	-38.231	D	7.311	7.311	0	2.7	0.39	100.97	0	0	0	0.02
2001	76	0	948	-78.531	-31.59	D	7.312	7.311	0.002	2.7	0.18	99.38	0	0	0	0.42
2001	77	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	78	0	949	-78.53	-31.5	D	7.32	7.311	0.01	2.7	2.24	91.97	0	0	0	5.8
2001	79	0	1039	-87.824	-33.618	D	7.311	7.311	0.001	2.7	2.77	92.23	0	0	0	5.03

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TY	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	80	0	1008	-86.153	-30.893	D	7.311	7.311	0	2.7	2.4	92.72	0	0	0	4.85
2001	81	0	967	-80.716	-30.533	D	7.333	7.311	0.022	2.7	1.98	91.21	0	0	0	6.82
2001	82	0	930	-78.188	-33.78	D	7.314	7.311	0.003	2.7	4.87	85.44	0	0	0	9.75
2001	83	0	906	-79.53	-36.28	D	7.312	7.311	0.002	2.7	12.32	70.45	0	0	0	17.36
2001	84	0	933	-78.17	-33.075	D	7.318	7.311	0.008	2.7	2.82	93.84	0	0	0	3.33
2001	85	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	86	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	87	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	88	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	89	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	90	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	91	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	92	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	93	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	94	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	95	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	96	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	97	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	98	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	99	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	100	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	101	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	102	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	103	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	104	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	105	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	106	0	774	-78.867	-31.586	D	7.311	7.311	0	2.7	7.08	77.75	0	0	0	12.54
2001	107	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	108	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	109	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	110	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	111	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	112	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	113	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	114	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	115	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	116	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	117	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	118	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TY	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	119	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	120	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	121	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	122	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	123	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	124	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	125	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	126	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	127	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	128	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	129	0	595	-80.899	-36.534	D	7.593	7.593	0	3.3	15.06	68.56	0	0	0	14.34
2001	130	0	907	-79.461	-36.281	D	7.593	7.593	0	3.3	11.94	78.1	0	0	0	9.66
2001	131	0	763	-78.896	-34.319	D	7.593	7.593	0	3.3	24.03	60.23	0	0	0	16.14
2001	132	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	133	0	930	-78.188	-33.78	D	7.593	7.593	0	3.3	10.96	66.7	0	0	0	21.11
2001	134	0	906	-79.53	-36.28	D	7.593	7.593	0	3.3	17.83	63.15	0	0	0	19.95
2001	135	0	544	-81.399	-37.026	D	7.593	7.593	0	3.3	8.46	81.91	0	0	0	8.71
2001	136	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	137	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	138	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	139	0	949	-78.53	-31.5	D	7.594	7.593	0.001	3.3	1.45	98	0	0	0	0.59
2001	140	0	947	-78.463	-31.7	D	7.594	7.593	0.001	3.3	9	74.82	0	0	0	16.17
2001	141	0	949	-78.53	-31.5	D	7.593	7.593	0.001	3.3	13.92	67.67	0	0	0	18.46
2001	142	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	143	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	144	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	145	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	146	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	147	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	148	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	149	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	150	0	191	-84.875	-38.231	D	7.593	7.593	0	3.3	28.68	29.07	0	0	0	28.58
2001	151	0	774	-78.867	-31.586	D	7.593	7.593	0	3.3	15.4	70.86	0	0	0	13.68
2001	152	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	153	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	154	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	155	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	156	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	157	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TY	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	158	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	159	0	1008	-86.153	-30.893	D	7.595	7.593	0.002	3.3	13.33	68.9	0	0	0	17.74
2001	160	0	947	-78.463	-31.7	D	7.615	7.593	0.022	3.3	8.51	81.75	0	0	0	9.74
2001	161	0	822	-86.552	-37.687	D	7.596	7.593	0.004	3.3	31.24	43.49	0	0	0	25.28
2001	162	0	643	-80.588	-30.574	D	7.594	7.593	0.001	3.3	23.71	61.11	0	0	0	15.24
2001	163	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	164	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	165	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	166	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	167	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	168	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	169	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	170	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	171	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	172	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	173	0	569	-81.333	-30.815	D	7.593	7.593	0	3.3	27.7	60.84	0	0	0	16.21
2001	174	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	175	0	780	-78.633	-32.831	D	7.593	7.593	0	3.3	7.23	83.04	0	0	0	8.98
2001	176	0	782	-78.628	-32.334	D	7.593	7.593	0	3.3	24.64	50.71	0	0	0	24.88
2001	177	0	784	-78.622	-31.837	D	7.593	7.593	0	3.3	28.08	49.51	0	0	0	22.27
2001	178	0	61	-86.285	-31.259	D	7.593	7.593	0	3.3	40.59	32.92	0	0	0	26.81
2001	179	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	41.05	52.13	0	0	0	26.39
2001	180	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	35.77	154.65	0	0	0	10.06
2001	181	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	182	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	183	0	783	-78.625	-32.086	D	7.593	7.593	0	3.3	16.84	65.31	0	0	0	16.77
2001	184	0	949	-78.53	-31.5	D	7.595	7.593	0.003	3.3	26.67	49.54	0	0	0	23.81
2001	185	0	688	-80.099	-31.076	D	7.593	7.593	0	3.3	29.47	51.79	0	0	0	17.25
2001	186	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	187	0	949	-78.53	-31.5	D	7.593	7.593	0	3.3	17.47	52.8	0	0	0	29.46
2001	188	0	948	-78.531	-31.59	D	7.593	7.593	0	3.3	16.39	70.26	0	0	0	14.2
2001	189	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	192	0	785	-78.62	-31.589	D	7.593	7.593	0	3.3	12.11	73.08	0	0	0	15.18
2001	193	0	933	-78.17	-33.075	D	7.595	7.593	0.002	3.3	21.05	49.03	0	0	0	29.98
2001	194	0	784	-78.622	-31.837	D	7.593	7.593	0	3.3	35.95	29.51	0	0	0	34.76
2001	195	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	196	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TY	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	
2001	197	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	198	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	199	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	200	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	201	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	202	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	203	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	204	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	205	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	206	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	207	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	208	0	785	-78.62	-31.589	D	7.593	7.593	0	3.3	25.31	68.16	0	0	0	6.52	
2001	209	0	948	-78.531	-31.59	D	7.593	7.593	0	3.3	11.58	86.39	0	0	0	2.34	
2001	210	0	27	-86.783	-31.502	D	7.593	7.593	0	3.3	12.51	75.9	0	0	0	1.16	
2001	211	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	212	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	213	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	214	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	215	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	216	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	217	0	927	-78.477	-33.986	D	7.593	7.593	0	3.3	40.35	24.91	0	0	0	34.99	
2001	218	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	84.88	17.54	0	0	0	11.58	
2001	219	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	220	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	221	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	222	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	223	0	949	-78.53	-31.5	D	7.596	7.593	0.003	3.3	15.79	65.14	0	0	0	19.06	
2001	224	0	967	-80.716	-30.533	D	7.604	7.593	0.011	3.3	24.27	51.12	0	0	0	24.62	
2001	225	0	1017	-87.324	-31.258	D	7.607	7.593	0.015	3.3	11.21	76.5	0	0	0	12.3	
2001	226	0	1017	-87.324	-31.258	D	7.594	7.593	0.002	3.3	16.22	63.06	0	0	0	20.74	
2001	227	0	930	-78.188	-33.78	D	7.594	7.593	0.001	3.3	9.78	60.55	0	0	0	29.79	
2001	228	0	191	-84.875	-38.231	D	7.593	7.593	0.001	3.3	36.61	29.27	0	0	0	34.23	
2001	229	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	230	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	231	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	232	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2001	233	0	667	-80.343	-30.825	D	7.593	7.593	0	3.3	14.2	48.26	0	0	0	12.47	
2001	234	0	594	-81.085	-30.817	D	7.593	7.593	0	3.3	13.35	51.27	0	0	0	13.19	
2001	235	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TY	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	236	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	237	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	238	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	239	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	240	0	949	-78.53	-31.5	D	7.594	7.593	0.001	3.3	26.23	46.8	0	0	0	27
2001	241	0	933	-78.17	-33.075	D	7.593	7.593	0.001	3.3	16.76	70.02	0	0	0	13.26
2001	242	0	789	-78.38	-32.337	D	7.593	7.593	0	3.3	44.91	26.44	0	0	0	28.46
2001	243	0	6	-87.541	-32.985	D	7.593	7.593	0	3.3	51.21	19.35	0	0	0	25.97
2001	244	0	403	-83.075	-31.79	D	7.593	7.593	0	3.3	8.69	70.19	0	0	0	11.12
2001	245	0	643	-80.588	-30.574	D	7.64	7.639	0.001	3.4	27.06	45.54	0	0	0	27.42
2001	246	0	62	-86.283	-31.01	D	7.639	7.639	0	3.4	13.03	75.69	0	0	0	11.65
2001	247	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	248	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	249	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	250	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	251	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	252	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	253	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	254	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	255	0	407	-82.896	-38.252	D	7.639	7.639	0	3.4	9.28	82.76	0	0	0	8.15
2001	256	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	15.34	90.82	0	0	0	33.21
2001	257	0	947	-78.463	-31.7	D	7.639	7.639	0	3.4	9	84.72	0	0	0	7.77
2001	258	0	643	-80.588	-30.574	D	7.641	7.639	0.003	3.4	11.23	75.87	0	0	0	12.9
2001	259	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	260	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	261	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	262	0	518	-81.83	-31.058	D	7.639	7.639	0	3.4	11.4	74.13	0	0	0	0.26
2001	263	0	433	-82.82	-31.047	D	7.639	7.639	0	3.4	6.98	4.85	0	0	0	0.02
2001	264	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	265	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	266	0	947	-78.463	-31.7	D	7.639	7.639	0	3.4	15.97	62.05	0	0	0	22.13
2001	267	0	666	-80.346	-31.074	D	7.639	7.639	0	3.4	2.64	66.8	0	0	0	3.29
2001	268	0	930	-78.188	-33.78	D	7.639	7.639	0	3.4	0.79	95	0	0	0	3.35
2001	269	0	804	-87.016	-34.859	D	7.687	7.639	0.048	3.4	1.18	94.35	0	0	0	4.47
2001	270	0	853	-82.958	-38.45	D	7.646	7.639	0.007	3.4	2.38	92.18	0	0	0	5.46
2001	271	0	852	-83.027	-38.42	D	7.64	7.639	0.002	3.4	6.62	85.83	0	0	0	7.52
2001	272	0	949	-78.53	-31.5	D	7.641	7.639	0.002	3.4	13.22	64.7	0	0	0	22.15
2001	273	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	274	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TY	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	275	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	276	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	279	0	1037	-87.825	-33.215	D	7.501	7.5	0.002	3.1	0.56	99.43	0	0	0	0.02
2001	280	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	281	0	947	-78.463	-31.7	D	7.5	7.5	0	3.1	3.84	88.55	0	0	0	8.05
2001	282	0	190	-85.046	-31.024	D	7.5	7.5	0	3.1	0.98	85.59	0	0	0	4.36
2001	283	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	285	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	286	0	1017	-87.324	-31.258	D	7.5	7.5	0	3.1	3.06	95.28	0	0	0	2.55
2001	287	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	288	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	289	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	290	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	291	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	292	0	930	-78.188	-33.78	D	7.5	7.5	0	3.1	5.95	91.63	0	0	0	11.74
2001	293	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	294	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	298	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	301	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	302	0	930	-78.188	-33.78	D	7.5	7.5	0.001	3.1	5.41	88.94	0	0	0	5.99
2001	303	0	594	-81.085	-30.817	D	7.5	7.5	0	3.1	2.51	94.13	0	0	0	2.31
2001	304	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	0	774	-78.867	-31.586	D	7.5	7.5	0	3.1	0.82	97.71	0	0	0	2.73
2001	308	0	949	-78.53	-31.5	D	7.504	7.5	0.004	3.1	3.32	93.73	0	0	0	3.01
2001	309	0	643	-80.588	-30.574	D	7.501	7.5	0.001	3.1	6.13	91.14	0	0	0	2.9
2001	310	0	933	-78.17	-33.075	D	7.504	7.5	0.005	3.1	5.37	86.16	0	0	0	8.47
2001	311	0	966	-80.657	-30.543	D	7.502	7.5	0.003	3.1	5.06	87.61	0	0	0	7.4
2001	312	0	906	-79.53	-36.28	D	7.5	7.5	0.001	3.1	7.55	85.62	0	0	0	7.12
2001	313	0	689	-79.904	-36.048	D	7.5	7.5	0	3.1	10.85	84.02	0	0	0	6.23

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TY	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	314	0	930	-78.188	-33.78	D	7.5	7.5	0	3.1	0.92	94.99	0	0	0	4.19
2001	315	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	316	0	1003	-85.106	-30.912	D	7.503	7.5	0.003	3.1	2.88	85.07	0	0	0	12.1
2001	317	0	1039	-87.824	-33.618	D	7.501	7.5	0.001	3.1	3.05	90.06	0	0	0	7.04
2001	318	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	322	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	323	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	324	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	325	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	326	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	327	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	333	0	930	-78.188	-33.78	D	7.508	7.5	0.008	3.1	1.47	96.19	0	0	0	2.36
2001	334	0	1007	-85.943	-30.897	D	7.574	7.5	0.075	3.1	1.39	96.62	0	0	0	2
2001	335	0	930	-78.188	-33.78	D	7.5	7.5	0	3.1	1.43	97.19	0	0	0	1.69
2001	336	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	342	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	343	0	1035	-87.826	-32.813	D	7.616	7.593	0.023	3.3	0.5	96.81	0	0	0	2.68
2001	344	0	930	-78.188	-33.78	D	7.593	7.593	0	3.3	0.49	97.22	0	0	0	2.29
2001	345	0	930	-78.188	-33.78	D	7.595	7.593	0.002	3.3	0.61	97.44	0	0	0	1.95
2001	346	0	931	-78.182	-33.544	D	7.595	7.593	0.002	3.3	1.73	95.39	0	0	0	2.88
2001	347	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	349	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	350	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	351	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	352	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TY	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	353	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
								MAX	0.121							

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	2	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	3	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	4	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	5	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	6	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	7	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	8	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	9	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	10	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	11	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	12	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	13	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	14	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	15	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	16	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	17	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	18	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	19	0	852	-83.027	-38.42	D	7.547	7.546	0.001	3.2	3.78	94.51	0	0	0	1.98
2002	20	0	956	-79.51	-31.071	D	7.547	7.546	0	3.2	5.66	92.4	0	0	0	2.23
2002	21	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	22	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	23	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	24	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	25	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	26	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	27	0	689	-79.904	-36.048	D	7.546	7.546	0	3.2	10.23	269.93	0	0	0	12.79
2002	28	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	29	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	30	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	31	0	963	-80.391	-30.626	D	7.554	7.546	0.008	3.2	1.37	98.17	0	0	0	0.47
2002	32	0	1017	-87.324	-31.258	D	7.547	7.546	0.001	3.2	0.36	99.73	0	0	0	0.01
2002	33	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	34	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	35	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	36	0	932	-78.176	-33.31	D	7.407	7.406	0.001	2.9	0.62	97.2	0	0	0	2.24
2002	37	0	955	-79.307	-31.075	D	7.413	7.406	0.007	2.9	0.73	97.21	0	0	0	2.09
2002	38	0	1007	-85.943	-30.897	D	7.406	7.406	0	2.9	0.07	100.17	0	0	0	1.76
2002	39	0	667	-80.343	-30.825	D	7.406	7.406	0	2.9	0	99.27	0	0	0	2.2
2002	40	0	731	-79.399	-35.059	D	7.406	7.406	0	2.9	0	98.31	0	0	0	1.71

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	41	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	42	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	43	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	44	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	45	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	46	0	907	-79.461	-36.281	D	7.406	7.406	0	2.9	0.98	95.05	0	0	0	4.63
2002	47	0	729	-79.606	-31.33	D	7.406	7.406	0	2.9	1.67	92.53	0	0	0	3.86
2002	48	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	49	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	50	0	930	-78.188	-33.78	D	7.406	7.406	0.001	2.9	1.21	95.73	0	0	0	3.19
2002	51	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	52	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	53	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	54	0	930	-78.188	-33.78	D	7.406	7.406	0	2.9	0.86	97.08	0	0	0	2.31
2002	55	0	932	-78.176	-33.31	D	7.408	7.406	0.002	2.9	1.09	96.34	0	0	0	2.58
2002	56	0	785	-78.62	-31.589	D	7.406	7.406	0	2.9	1.64	95.7	0	0	0	2.71
2002	57	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	58	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	59	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	60	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	61	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	62	0	822	-86.552	-37.687	D	7.311	7.311	0	2.7	1.38	97.68	0	0	0	0.76
2002	63	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	72	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	73	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	75	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	76	0	914	-79.013	-35.083	D	7.354	7.311	0.044	2.7	0.5	95.14	0	0	0	4.37
2002	77	0	44	-86.351	-37.47	D	7.311	7.311	0	2.7	1.28	98.98	0	0	0	0.06
2002	78	0	542	-81.583	-31.06	D	7.311	7.311	0	2.7	3.22	98.31	0	0	0	0.09
2002	79	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	80	0	930	-78.188	-33.78	D	7.313	7.311	0.002	2.7	3.32	94.23	0	0	0	2.47
2002	81	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	82	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	83	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	85	0	1036	-87.825	-33.014	D	7.312	7.311	0.002	2.7	2.99	94.11	0	0	0	2.99
2002	86	0	1039	-87.824	-33.618	D	7.324	7.311	0.014	2.7	1.64	96.27	0	0	0	2.09
2002	87	0	930	-78.188	-33.78	D	7.312	7.311	0.001	2.7	5	91.39	0	0	0	3.77
2002	88	0	949	-78.53	-31.5	D	7.311	7.311	0	2.7	4.5	92.88	0	0	0	2.64
2002	89	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	90	0	930	-78.188	-33.78	D	7.311	7.311	0	2.7	7.59	84.33	0	0	0	8.41
2002	91	0	967	-80.716	-30.533	D	7.317	7.311	0.007	2.7	3.51	86.98	0	0	0	9.55
2002	92	0	949	-78.53	-31.5	D	7.318	7.311	0.008	2.7	2.23	92.54	0	0	0	5.24
2002	93	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	94	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	95	0	949	-78.53	-31.5	D	7.32	7.311	0.009	2.7	2.42	92.91	0	0	0	4.69
2002	96	0	941	-78.321	-32.318	D	7.326	7.311	0.015	2.7	4.07	89.79	0	0	0	6.15
2002	97	0	930	-78.188	-33.78	D	7.317	7.311	0.006	2.7	8.74	81.85	0	0	0	9.44
2002	98	0	730	-79.604	-31.081	D	7.311	7.311	0	2.7	7.62	85.56	0	0	0	6.47
2002	99	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	100	0	927	-78.477	-33.986	D	7.311	7.311	0	2.7	1.71	94.64	0	0	0	3.79
2002	101	0	930	-78.188	-33.78	D	7.314	7.311	0.003	2.7	3.16	91.13	0	0	0	5.71
2002	102	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	103	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	104	0	643	-80.588	-30.574	D	7.311	7.311	0	2.7	56.65	40.7	0	0	0	11.17
2002	105	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	106	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	107	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	108	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	109	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	110	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	111	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	112	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	20.35	95.18	0	0	0	1.72
2002	113	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	114	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	115	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	116	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	117	0	163	-85.117	-37.732	D	7.311	7.311	0	2.7	2.27	95.98	0	0	0	5.59
2002	118	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	119	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	120	0	748	-79.151	-35.062	D	7.311	7.311	0	2.7	13.07	90.73	0	0	0	9.83
2002	121	0	785	-78.62	-31.589	D	7.311	7.311	0	2.7	14.18	76.11	0	0	0	11.48
2002	122	0	963	-80.391	-30.626	D	7.593	7.593	0.001	3.3	8.85	86.86	0	0	0	4.27
2002	123	0	930	-78.188	-33.78	D	7.597	7.593	0.004	3.3	5.51	91.96	0	0	0	2.54
2002	124	0	907	-79.461	-36.281	D	7.599	7.593	0.006	3.3	3.39	91.86	0	0	0	4.76
2002	125	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	126	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	127	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	128	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	129	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	130	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	131	0	643	-80.588	-30.574	D	7.593	7.593	0	3.3	12.23	61.48	0	0	0	25.99
2002	132	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	133	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	134	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	135	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	136	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	137	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	138	0	1017	-87.324	-31.258	D	7.593	7.593	0.001	3.3	5.3	91.64	0	0	0	3.08
2002	139	0	1017	-87.324	-31.258	D	7.594	7.593	0.001	3.3	6.44	85.01	0	0	0	8.59
2002	140	0	407	-82.896	-38.252	D	7.593	7.593	0	3.3	4.54	91.12	0	0	0	3.25
2002	141	0	643	-80.588	-30.574	D	7.593	7.593	0	3.3	8.3	80.06	0	0	0	11.72
2002	142	0	964	-80.519	-30.575	D	7.594	7.593	0.002	3.3	11.41	76.16	0	0	0	12.51
2002	143	0	785	-78.62	-31.589	D	7.593	7.593	0	3.3	14.84	76.45	0	0	0	8.65
2002	144	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	145	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	146	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	147	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	148	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	149	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	150	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	151	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	152	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	153	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	154	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	155	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	156	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	157	0	930	-78.188	-33.78	D	7.593	7.593	0	3.3	6.66	89.78	0	0	0	3.41

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	158	0	930	-78.188	-33.78	D	7.594	7.593	0.001	3.3	6.85	84.43	0	0	0	8.76
2002	159	0	907	-79.461	-36.281	D	7.595	7.593	0.002	3.3	20.53	61.25	0	0	0	18.23
2002	160	0	852	-83.027	-38.42	D	7.594	7.593	0.002	3.3	30.22	44.91	0	0	0	24.88
2002	161	0	966	-80.657	-30.543	D	7.593	7.593	0	3.3	18.88	70.33	0	0	0	10.15
2002	162	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	163	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	164	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	165	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	166	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	167	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	168	0	948	-78.531	-31.59	D	7.593	7.593	0	3.3	9.49	73.22	0	0	0	16.18
2002	169	0	947	-78.463	-31.7	D	7.593	7.593	0	3.3	7.74	76.64	0	0	0	15.41
2002	170	0	947	-78.463	-31.7	D	7.593	7.593	0	3.3	29.56	43.58	0	0	0	31.89
2002	171	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	172	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	173	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	174	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	175	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	176	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	177	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	178	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	179	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	180	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	181	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	182	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	183	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	185	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	186	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	187	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	188	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	189	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	190	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	192	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	22.71	77.96	0	0	0	1.72
2002	193	0	637	-80.604	-32.065	D	7.593	7.593	0	3.3	73.96	23.24	0	0	0	3.96
2002	194	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	91.61	17.48	0	0	0	3.55
2002	195	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	153.51	55.6	0	0	0	5.02
2002	196	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	197	0	10	-87.277	-31.497	D	7.593	7.593	0	3.3	20.48	49.72	0	0	0	25.4
2002	198	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	199	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	203	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	204	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	205	0	726	-79.614	-32.075	D	7.593	7.593	0	3.3	17.54	41.15	0	0	0	27.84
2002	206	0	947	-78.463	-31.7	D	7.596	7.593	0.003	3.3	19.58	61.58	0	0	0	18.84
2002	207	0	822	-86.552	-37.687	D	7.593	7.593	0.001	3.3	38.33	34.48	0	0	0	27.17
2002	208	0	906	-79.53	-36.28	D	7.593	7.593	0.001	3.3	23.2	61.81	0	0	0	15.02
2002	209	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	214	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	215	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	216	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	217	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	218	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	219	0	10	-87.277	-31.497	D	7.593	7.593	0	3.3	21.16	28.92	0	0	0	51.22
2002	220	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	221	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	222	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	223	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	224	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	225	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	226	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	227	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	228	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	229	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	230	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	231	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	232	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	233	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	234	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	235	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	236	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	237	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	238	0	930	-78.188	-33.78	D	7.593	7.593	0	3.3	5.23	82.41	0	0	0	11.71
2002	239	0	930	-78.188	-33.78	D	7.601	7.593	0.008	3.3	17.44	60.62	0	0	0	21.94
2002	240	0	1017	-87.324	-31.258	D	7.594	7.593	0.002	3.3	21.26	57.76	0	0	0	21.07
2002	241	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	23.95	0.91	0	0	0	1.38
2002	242	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	243	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	244	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	245	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	246	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	247	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	248	0	785	-78.62	-31.589	D	7.639	7.639	0	3.4	43.59	14.98	0	0	0	41.26
2002	249	0	930	-78.188	-33.78	D	7.64	7.639	0.001	3.4	27.35	48.2	0	0	0	24.5
2002	250	0	10	-87.277	-31.497	D	7.639	7.639	0	3.4	49.4	17.79	0	0	0	33.56
2002	251	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	252	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	253	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	254	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	255	0	930	-78.188	-33.78	D	7.642	7.639	0.003	3.4	14.44	47.76	0	0	0	37.86
2002	256	0	15	-86.833	-36.222	D	7.639	7.639	0	3.4	16.72	47.69	0	0	0	27.26
2002	257	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	50.59	22.96	0	0	0	38.82
2002	258	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	37.23	34.43	0	0	0	27.55
2002	259	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	28.83	89.8	0	0	0	8.81
2002	260	0	930	-78.188	-33.78	D	7.64	7.639	0.001	3.4	11.04	82.54	0	0	0	6.54
2002	261	0	543	-81.58	-30.812	D	7.639	7.639	0	3.4	7.88	90.11	0	0	0	3.07
2002	262	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	263	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	264	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	265	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	266	0	930	-78.188	-33.78	D	7.639	7.639	0	3.4	2.15	80.16	0	0	0	17.35
2002	267	0	930	-78.188	-33.78	D	7.639	7.639	0	3.4	16.78	57.31	0	0	0	25.89
2002	268	0	907	-79.461	-36.281	D	7.639	7.639	0.001	3.4	10.53	75.05	0	0	0	14.64
2002	269	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	25.79	43.1	0	0	0	11.78
2002	270	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	271	0	1008	-86.153	-30.893	D	7.64	7.639	0.002	3.4	22.18	48.57	0	0	0	29.26
2002	272	0	949	-78.53	-31.5	D	7.641	7.639	0.002	3.4	16.16	60.57	0	0	0	23.29
2002	273	0	785	-78.62	-31.589	D	7.639	7.639	0	3.4	16.98	66.69	0	0	0	16.35
2002	274	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	275	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	279	0	762	-79.114	-31.584	D	7.5	7.5	0	3.1	2.99	81.8	0	0	0	13.96
2002	280	0	788	-78.388	-33.082	D	7.5	7.5	0	3.1	1.13	91.5	0	0	0	5.63
2002	281	0	933	-78.17	-33.075	D	7.5	7.5	0.001	3.1	2.2	90.5	0	0	0	7.39
2002	282	0	930	-78.188	-33.78	D	7.502	7.5	0.003	3.1	5.94	80.73	0	0	0	13.42
2002	283	0	190	-85.046	-31.024	D	7.5	7.5	0	3.1	10.62	78.81	0	0	0	12.93
2002	284	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	9.88	73.66	0	0	0	11.55
2002	285	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	287	0	930	-78.188	-33.78	D	7.5	7.5	0	3.1	1.29	95.5	0	0	0	3.69
2002	288	0	1017	-87.324	-31.258	D	7.514	7.5	0.014	3.1	1.98	93.87	0	0	0	4.16
2002	289	0	906	-79.53	-36.28	D	7.501	7.5	0.002	3.1	3.32	92.45	0	0	0	4.28
2002	290	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	291	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	292	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	293	0	907	-79.461	-36.281	D	7.501	7.5	0.001	3.1	4.98	82.66	0	0	0	12.48
2002	294	0	907	-79.461	-36.281	D	7.511	7.5	0.012	3.1	3.94	87.43	0	0	0	8.64
2002	295	0	1017	-87.324	-31.258	D	7.505	7.5	0.005	3.1	5.82	86.94	0	0	0	7.27
2002	296	0	1017	-87.324	-31.258	D	7.502	7.5	0.002	3.1	9.71	79.83	0	0	0	10.51
2002	297	0	10	-87.277	-31.497	D	7.5	7.5	0	3.1	38.25	58.81	0	0	0	4.16
2002	298	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	299	0	966	-80.657	-30.543	D	7.503	7.5	0.004	3.1	6.52	89.67	0	0	0	3.86
2002	300	0	930	-78.188	-33.78	D	7.502	7.5	0.003	3.1	6.92	89.16	0	0	0	3.96
2002	301	0	853	-82.958	-38.45	D	7.538	7.5	0.039	3.1	2.76	93.74	0	0	0	3.51
2002	302	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	303	0	1035	-87.826	-32.813	D	7.502	7.5	0.002	3.1	1.51	98.37	0	0	0	0.16
2002	304	0	1035	-87.826	-32.813	D	7.522	7.5	0.023	3.1	2.87	95.17	0	0	0	1.97
2002	305	0	907	-79.461	-36.281	D	7.503	7.5	0.004	3.1	2.38	95.57	0	0	0	2.04
2002	306	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	307	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	308	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	309	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	310	0	730	-79.604	-31.081	D	7.5	7.5	0	3.1	4.31	92.83	0	0	0	1.79
2002	311	0	789	-78.38	-32.337	D	7.5	7.5	0	3.1	3.93	94.52	0	0	0	1.67
2002	312	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	314	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	315	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	316	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	317	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	318	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	320	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	321	0	930	-78.188	-33.78	D	7.501	7.5	0.001	3.1	0.34	95.88	0	0	0	3.79
2002	322	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	323	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	324	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	325	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	326	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	327	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	328	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	329	0	853	-82.958	-38.45	D	7.528	7.5	0.029	3.1	1.16	96.89	0	0	0	1.95
2002	330	0	930	-78.188	-33.78	D	7.509	7.5	0.01	3.1	0.51	97.2	0	0	0	2.3
2002	331	0	1017	-87.324	-31.258	D	7.557	7.5	0.057	3.1	0.97	96.25	0	0	0	2.78
2002	332	0	822	-86.552	-37.687	D	7.5	7.5	0.001	3.1	0.91	96.42	0	0	0	2.66
2002	333	0	852	-83.027	-38.42	D	7.5	7.5	0	3.1	1.32	97	0	0	0	2.06
2002	334	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	335	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	336	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	0	964	-80.519	-30.575	D	7.597	7.593	0.004	3.3	0.58	95.12	0	0	0	4.3
2002	338	0	832	-85.112	-38.219	D	7.598	7.593	0.006	3.3	0.45	96	0	0	0	3.55
2002	339	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	340	0	832	-85.112	-38.219	D	7.674	7.593	0.081	3.3	0.49	96.64	0	0	0	2.86
2002	341	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	343	0	1008	-86.153	-30.893	D	7.607	7.593	0.014	3.3	0.71	96.57	0	0	0	2.73
2002	344	0	1039	-87.824	-33.618	D	7.594	7.593	0.002	3.3	0.86	96.95	0	0	0	2.18
2002	345	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	348	0	949	-78.53	-31.5	D	7.616	7.593	0.023	3.3	1.33	95.48	0	0	0	3.18
2002	349	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	
2002	353	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2002	354	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2002	355	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2002	356	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2002	357	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2002	358	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2002	359	0	1017	-87.324	-31.258	D	7.61	7.593	0.018	3.3	0.79	96.83	0	0	0	2.39	
2002	360	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2002	361	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2002	362	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2002	363	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2002	364	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
2002	365	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	
								MAX	0.081								

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	2	0	517	160.051	5.115	D	7.593	7.593	0	3.3	0.75	96.64	0	0	0	2.51
2001	3	0	548	160.098	-2.544	D	7.693	7.593	0.1	3.3	0.72	96.85	0	0	0	2.43
2001	4	0	548	160.098	-2.544	D	7.596	7.593	0.004	3.3	1.11	97.37	0	0	0	1.52
2001	5	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	8	0	517	160.051	5.115	D	7.593	7.593	0.001	3.3	1.67	92.89	0	0	0	5.47
2001	9	0	517	160.051	5.115	D	7.625	7.593	0.033	3.3	0.47	95.71	0	0	0	3.83
2001	10	0	624	152.982	-5.684	D	7.647	7.593	0.054	3.3	0.75	96.58	0	0	0	2.67
2001	11	0	637	152.992	-4.475	D	7.611	7.593	0.018	3.3	1.02	97.02	0	0	0	1.96
2001	12	0	517	160.051	5.115	D	7.593	7.593	0	3.3	1.95	96.3	0	0	0	2.11
2001	13	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	17	0	517	160.051	5.115	D	7.628	7.593	0.036	3.3	0.98	96.22	0	0	0	2.8
2001	18	0	637	152.992	-4.475	D	7.63	7.593	0.038	3.3	0.97	95.98	0	0	0	3.05
2001	19	0	698	159.904	4.93	D	7.615	7.593	0.023	3.3	1.64	95.17	0	0	0	3.19
2001	20	0	632	152.976	-4.828	D	7.658	7.593	0.066	3.3	0.92	95.42	0	0	0	3.66
2001	21	0	620	153.73	-5.659	D	7.644	7.593	0.051	3.3	0.38	96.02	0	0	0	3.59
2001	22	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	23	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	25	0	690	158.728	3.45	D	7.601	7.593	0.008	3.3	0.42	95.53	0	0	0	4.05
2001	26	0	624	152.982	-5.684	D	7.594	7.593	0.002	3.3	0.38	95.77	0	0	0	3.82
2001	27	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0.42	92.73	0	0	0	0.49
2001	28	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	29	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	30	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	33	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	34	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	38	0	517	160.051	5.115	D	7.467	7.453	0.014	3	1.42	93.88	0	0	0	4.71
2001	39	0	624	152.982	-5.684	D	7.453	7.453	0.001	3	2.19	93.94	0	0	0	3.87
2001	40	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	41	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	42	0	656	154.842	-1.81	D	7.468	7.453	0.015	3	0.72	96.4	0	0	0	2.89
2001	43	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	44	0	517	160.051	5.115	D	7.453	7.453	0	3	1.9	97.94	0	0	0	1.84
2001	45	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	46	0	624	152.982	-5.684	D	7.453	7.453	0	3	1.46	98.19	0	0	0	0.46
2001	47	0	637	152.992	-4.475	D	7.481	7.453	0.028	3	1.83	96.18	0	0	0	2
2001	48	0	517	160.051	5.115	D	7.535	7.453	0.082	3	1.6	95.72	0	0	0	2.68
2001	49	0	517	160.051	5.115	D	7.518	7.453	0.065	3	0.6	96.43	0	0	0	2.96
2001	50	0	637	152.992	-4.475	D	7.497	7.453	0.045	3	0.99	96.36	0	0	0	2.66
2001	51	0	6	153.198	-4.28	D	7.453	7.453	0.001	3	0.99	97.38	0	0	0	1.75
2001	52	0	637	152.992	-4.475	D	7.454	7.453	0.001	3	2.27	93.14	0	0	0	4.67
2001	53	0	623	153.169	-5.678	D	7.453	7.453	0	3	1.58	96.31	0	0	0	1.78
2001	54	0	1	153.225	-5.521	D	7.453	7.453	0	3	4.05	115.02	0	0	0	2.28
2001	55	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	56	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	58	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	59	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	60	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	61	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	62	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	63	0	517	160.051	5.115	D	7.361	7.358	0.003	2.8	1.73	94.94	0	0	0	3.39
2001	64	0	676	156.899	0.996	D	7.379	7.358	0.021	2.8	1.14	94.79	0	0	0	4.08
2001	65	0	557	158.11	-3.116	D	7.378	7.358	0.02	2.8	0.37	95.37	0	0	0	4.26
2001	66	0	517	160.051	5.115	D	7.388	7.358	0.03	2.8	0.73	94.98	0	0	0	4.29
2001	67	0	517	160.051	5.115	D	7.442	7.358	0.084	2.8	0.48	94.11	0	0	0	5.41
2001	68	0	517	160.051	5.115	D	7.359	7.358	0.001	2.8	0.67	95.37	0	0	0	4.02
2001	69	0	637	152.992	-4.475	D	7.379	7.358	0.02	2.8	0.79	95.11	0	0	0	4.11
2001	70	0	688	158.434	3.081	D	7.367	7.358	0.008	2.8	1.1	95.89	0	0	0	3.01
2001	71	0	517	160.051	5.115	D	7.359	7.358	0	2.8	3.62	92.83	0	0	0	3.63
2001	72	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	73	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	74	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	75	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	76	0	603	155.328	-5.781	D	7.362	7.358	0.003	2.8	1.31	95.88	0	0	0	2.8
2001	77	0	517	160.051	5.115	D	7.375	7.358	0.017	2.8	1.87	94	0	0	0	4.15
2001	78	0	624	152.982	-5.684	D	7.358	7.358	0	2.8	1.27	95.28	0	0	0	3.61
2001	79	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	80	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	81	0	624	152.982	-5.684	D	7.358	7.358	0	2.8	3.89	90.16	0	0	0	7.4
2001	82	0	624	152.982	-5.684	D	7.362	7.358	0.004	2.8	6.02	82.71	0	0	0	11.36
2001	83	0	624	152.982	-5.684	D	7.361	7.358	0.003	2.8	8.83	78.36	0	0	0	12.92
2001	84	0	637	152.992	-4.475	D	7.375	7.358	0.017	2.8	1.67	94.49	0	0	0	3.86
2001	85	0	517	160.051	5.115	D	7.437	7.358	0.079	2.8	0.46	95.77	0	0	0	3.77
2001	86	0	523	160.06	3.633	D	7.377	7.358	0.019	2.8	0.31	96.1	0	0	0	3.58
2001	87	0	516	159.957	4.802	D	7.358	7.358	0	2.8	0.84	96.56	0	0	0	3.12
2001	88	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	89	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	90	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	91	0	517	160.051	5.115	D	7.359	7.358	0.001	2.8	1.42	93.8	0	0	0	4.85
2001	92	0	517	160.051	5.115	D	7.268	7.263	0.005	2.6	0.63	94.56	0	0	0	4.8
2001	93	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	94	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	95	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	96	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	97	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	98	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	99	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	100	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	101	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	102	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	103	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	104	0	517	160.051	5.115	D	7.263	7.263	0	2.6	11.57	44.93	0	0	0	45.91
2001	105	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	106	0	517	160.051	5.115	D	7.264	7.263	0.001	2.6	18.59	52.66	0	0	0	28.86
2001	107	0	662	155.306	-1.227	D	7.282	7.263	0.02	2.6	0.69	87.55	0	0	0	11.76
2001	108	0	517	160.051	5.115	D	7.293	7.263	0.03	2.6	1.58	93.94	0	0	0	4.49
2001	109	0	637	152.992	-4.475	D	7.286	7.263	0.023	2.6	0.91	94.15	0	0	0	4.96
2001	110	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	111	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	112	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	113	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	114	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	115	0	517	160.051	5.115	D	7.268	7.263	0.005	2.6	4.55	85.74	0	0	0	9.76
2001	116	0	517	160.051	5.115	D	7.268	7.263	0.005	2.6	2.55	93.32	0	0	0	4.14
2001	117	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	26.34	44.45	0	0	0	19.12
2001	118	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	119	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	120	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	121	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	122	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	123	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	124	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	125	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	126	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	127	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	128	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	129	0	517	160.051	5.115	D	7.458	7.453	0.005	3	6.84	79.47	0	0	0	13.72
2001	130	0	624	152.982	-5.684	D	7.454	7.453	0.002	3	9.53	81.19	0	0	0	9.36
2001	131	0	50	154.714	-5.489	D	7.453	7.453	0	3	21.13	63.05	0	0	0	16.01
2001	132	0	517	160.051	5.115	D	7.453	7.453	0	3	2.29	88.15	0	0	0	11.43
2001	133	0	517	160.051	5.115	D	7.463	7.453	0.01	3	1.62	88.74	0	0	0	9.64
2001	134	0	637	152.992	-4.475	D	7.454	7.453	0.002	3	19.75	54.24	0	0	0	26.15
2001	135	0	433	159.619	-2.653	D	7.453	7.453	0	3	18.32	63.53	0	0	0	18.67
2001	136	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	137	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	138	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	139	0	637	152.992	-4.475	D	7.453	7.453	0.001	3	0.83	99.07	0	0	0	0.29
2001	140	0	548	160.098	-2.544	D	7.454	7.453	0.001	3	1.29	98.14	0	0	0	0.62
2001	141	0	5	153.204	-4.528	D	7.453	7.453	0	3	29.31	42.12	0	0	0	31.05
2001	142	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	143	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	144	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	145	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	146	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	147	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	148	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	149	0	481	159.761	2.315	D	7.453	7.453	0	3	14.69	62.18	0	0	0	23.39
2001	150	0	623	153.169	-5.678	D	7.453	7.453	0	3	13.55	69.47	0	0	0	17.42
2001	151	0	517	160.051	5.115	D	7.453	7.453	0	3	15.92	69.25	0	0	0	15.75
2001	152	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	153	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	154	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	155	0	517	160.051	5.115	D	7.548	7.546	0.002	3.2	5.49	86.26	0	0	0	8.39
2001	156	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	157	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	158	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	159	0	517	160.051	5.115	D	7.548	7.546	0.002	3.2	35.01	36.6	0	0	0	28.5
2001	160	0	624	152.982	-5.684	D	7.547	7.546	0.001	3.2	6.95	88.29	0	0	0	4.8
2001	161	0	631	152.975	-4.958	D	7.546	7.546	0	3.2	44.32	19.76	0	0	0	36.47
2001	162	0	432	159.228	4.041	D	7.547	7.546	0.001	3.2	36.39	39.99	0	0	0	23.8
2001	163	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	164	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	165	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	166	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	167	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	168	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	169	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	170	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	171	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	172	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	173	0	624	152.982	-5.684	D	7.554	7.546	0.008	3.2	6.22	90.54	0	0	0	3.26
2001	174	0	517	160.051	5.115	D	7.554	7.546	0.008	3.2	5.87	83.34	0	0	0	10.81
2001	175	0	687	158.311	2.885	D	7.573	7.546	0.026	3.2	6.52	84.39	0	0	0	9.09
2001	176	0	624	152.982	-5.684	D	7.551	7.546	0.005	3.2	10.8	76.67	0	0	0	12.57
2001	177	0	631	152.975	-4.958	D	7.547	7.546	0	3.2	20.98	60.28	0	0	0	19.14
2001	178	0	2	153.219	-5.272	D	7.546	7.546	0	3.2	40.02	37.83	0	0	0	27.17
2001	179	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	55.25	153.15	0	0	0	48.29
2001	180	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	19.94	91.89	0	0	0	5.81
2001	181	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	182	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	183	0	517	160.051	5.115	D	7.595	7.593	0.002	3.3	22.6	53.76	0	0	0	23.62
2001	184	0	637	152.992	-4.475	D	7.595	7.593	0.002	3.3	22.75	57.7	0	0	0	19.53
2001	185	0	517	160.051	5.115	D	7.593	7.593	0.001	3.3	21.57	63.65	0	0	0	14.85
2001	186	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	187	0	5	153.204	-4.528	D	7.593	7.593	0	3.3	35.04	62.64	0	0	0	1.94
2001	188	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	40.45	61.17	0	0	0	1.43
2001	189	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	28.36	71.28	0	0	0	0.27
2001	190	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	0	517	160.051	5.115	D	7.593	7.593	0	3.3	0	2.37	0	0	0	9.06
2001	192	0	676	156.899	0.996	D	7.6	7.593	0.007	3.3	14.57	67.1	0	0	0	18.34
2001	193	0	624	152.982	-5.684	D	7.594	7.593	0.001	3.3	31.48	26.83	0	0	0	41.69
2001	194	0	624	152.982	-5.684	D	7.593	7.593	0	3.3	24.11	54.34	0	0	0	21.62
2001	195	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	119.87	19.99	0	0	0	30
2001	196	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	197	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	198	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	202	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	203	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	204	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	205	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	206	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	207	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	208	0	517	160.051	5.115	D	7.593	7.593	0	3.3	38.95	49.46	0	0	0	12.45
2001	209	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	11.5	88.56	0	0	0	1.9
2001	210	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	27.59	71.73	0	0	0	2.6
2001	211	0	517	160.051	5.115	D	7.593	7.593	0	3.3	20.18	58.24	0	0	0	21.94
2001	212	0	517	160.051	5.115	D	7.594	7.593	0.001	3.3	15.49	73.5	0	0	0	11.21
2001	213	0	5	153.204	-4.528	D	7.593	7.593	0	3.3	53.62	7.72	0	0	0	18.27
2001	214	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	215	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	216	0	637	152.992	-4.475	D	7.688	7.685	0.003	3.5	7.17	79.72	0	0	0	13.11
2001	217	0	624	152.982	-5.684	D	7.685	7.685	0	3.5	11.95	69.42	0	0	0	18.64
2001	218	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	219	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	220	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	221	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	222	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	223	0	303	158.024	2.278	D	7.685	7.685	0	3.5	17.84	65.32	0	0	0	16.53
2001	224	0	622	153.356	-5.671	D	7.685	7.685	0	3.5	18.92	64.47	0	0	0	15.86
2001	225	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	31.48	47.64	0	0	0	21.94
2001	226	0	517	160.051	5.115	D	7.686	7.685	0.002	3.5	39.07	14.99	0	0	0	45.96
2001	227	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	32.23	30.95	0	0	0	30.2
2001	228	0	4	153.209	-4.776	D	7.685	7.685	0	3.5	41.65	26.77	0	0	0	30.76
2001	229	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	2.44	1.45	0	0	0	0.86
2001	230	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	231	0	517	160.051	5.115	D	7.685	7.685	0	3.5	4.97	66.7	0	0	0	26.63
2001	232	0	517	160.051	5.115	D	7.697	7.685	0.012	3.5	0.64	95.66	0	0	0	3.7
2001	233	0	517	160.051	5.115	D	7.699	7.685	0.014	3.5	4.45	89.87	0	0	0	5.69
2001	234	0	431	159.233	3.793	D	7.685	7.685	0	3.5	21.21	61.81	0	0	0	16.86
2001	235	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	236	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	237	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	238	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	239	0	517	160.051	5.115	D	7.687	7.685	0.002	3.5	7.81	78.99	0	0	0	13.21
2001	240	0	624	152.982	-5.684	D	7.699	7.685	0.014	3.5	6.52	85.57	0	0	0	7.91
2001	241	0	625	152.981	-5.485	D	7.693	7.685	0.008	3.5	16.49	70.84	0	0	0	12.68
2001	242	0	517	160.051	5.115	D	7.689	7.685	0.004	3.5	21.33	57.09	0	0	0	21.57
2001	243	0	517	160.051	5.115	D	7.685	7.685	0	3.5	51.55	19.1	0	0	0	29.2
2001	244	0	517	160.051	5.115	D	7.686	7.685	0.001	3.5	3.66	90.85	0	0	0	5.48
2001	245	0	517	160.051	5.115	D	7.691	7.685	0.006	3.5	5.33	86.54	0	0	0	8.13
2001	246	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	9.02	38.27	0	0	0	8.6
2001	247	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	248	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	249	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	250	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	251	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	252	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	253	0	517	160.051	5.115	D	7.685	7.685	0	3.5	1.06	96.6	0	0	0	2.22
2001	254	0	548	160.098	-2.544	D	7.689	7.685	0.004	3.5	3.22	90.72	0	0	0	6.04
2001	255	0	624	152.982	-5.684	D	7.685	7.685	0	3.5	7.14	87.16	0	0	0	4.55
2001	256	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	41.25	4.25	0	0	0	10.62
2001	257	0	517	160.051	5.115	D	7.686	7.685	0.001	3.5	6	86.88	0	0	0	7.12
2001	258	0	631	152.975	-4.958	D	7.685	7.685	0	3.5	7.86	83.73	0	0	0	7.97
2001	259	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	260	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	261	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	262	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	3.73	34.33	0	0	0	0.07
2001	263	0	517	160.051	5.115	D	7.685	7.685	0	3.5	10.79	88.7	0	0	0	0.25
2001	264	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	265	0	516	159.957	4.802	D	7.685	7.685	0	3.5	1.28	93.47	0	0	0	2.74
2001	266	0	517	160.051	5.115	D	7.702	7.685	0.017	3.5	1.91	93.05	0	0	0	5.04
2001	267	0	637	152.992	-4.475	D	7.692	7.685	0.007	3.5	6.25	83.89	0	0	0	9.85
2001	268	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	15.95	0	0	0	3.16
2001	269	0	517	160.051	5.115	D	7.721	7.685	0.037	3.5	1.68	94.62	0	0	0	3.69
2001	270	0	517	160.051	5.115	D	7.748	7.685	0.063	3.5	0.96	95.75	0	0	0	3.29
2001	271	0	517	160.051	5.115	D	7.689	7.685	0.004	3.5	1.9	93.91	0	0	0	4.18
2001	272	0	624	152.982	-5.684	D	7.693	7.685	0.008	3.5	1.7	94.85	0	0	0	3.45
2001	273	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	274	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	275	0	517	160.051	5.115	D	7.5	7.5	0	3.1	47.63	12.91	0	0	0	47.87
2001	276	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	279	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	280	0	517	160.051	5.115	D	7.522	7.5	0.023	3.1	0.68	96.13	0	0	0	3.19
2001	281	0	548	160.098	-2.544	D	7.508	7.5	0.008	3.1	3.4	90	0	0	0	6.62
2001	282	0	461	159.471	4.295	D	7.5	7.5	0	3.1	2.82	89.44	0	0	0	5.24
2001	283	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	285	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	286	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	287	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	288	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	289	0	517	160.051	5.115	D	7.5	7.5	0	3.1	1.12	99.79	0	0	0	0.69
2001	290	0	517	160.051	5.115	D	7.5	7.5	0	3.1	0.92	98.86	0	0	0	0.5
2001	291	0	517	160.051	5.115	D	7.502	7.5	0.002	3.1	0.62	95.81	0	0	0	3.63
2001	292	0	548	160.098	-2.544	D	7.502	7.5	0.002	3.1	3.13	92.19	0	0	0	4.73
2001	293	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	294	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	298	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	0	517	160.051	5.115	D	7.503	7.5	0.003	3.1	0.29	96.46	0	0	0	3.27
2001	301	0	662	155.306	-1.227	D	7.589	7.5	0.09	3.1	0.6	95.94	0	0	0	3.46
2001	302	0	637	152.992	-4.475	D	7.507	7.5	0.008	3.1	1.25	96.52	0	0	0	2.25
2001	303	0	490	159.714	4.549	D	7.5	7.5	0	3.1	3.18	94.64	0	0	0	2.94
2001	304	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	0	517	160.051	5.115	D	7.509	7.5	0.009	3.1	1.12	97.64	0	0	0	1.25
2001	308	0	624	152.982	-5.684	D	7.503	7.5	0.003	3.1	1.11	97.85	0	0	0	1.04
2001	309	0	517	160.051	5.115	D	7.504	7.5	0.004	3.1	2.59	91.08	0	0	0	6.4
2001	310	0	624	152.982	-5.684	D	7.504	7.5	0.004	3.1	1.99	92.68	0	0	0	5.35
2001	311	0	637	152.992	-4.475	D	7.5	7.5	0	3.1	11.63	73.66	0	0	0	15.18
2001	312	0	637	152.992	-4.475	D	7.5	7.5	0.001	3.1	8.48	82.63	0	0	0	9.13
2001	313	0	624	152.982	-5.684	D	7.507	7.5	0.007	3.1	2.48	90	0	0	0	7.57

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	314	0	637	152.992	-4.475	D	7.504	7.5	0.004	3.1	1.58	95.15	0	0	0	3.28
2001	315	0	548	160.098	-2.544	D	7.504	7.5	0.004	3.1	1.43	95.81	0	0	0	2.77
2001	316	0	548	160.098	-2.544	D	7.514	7.5	0.015	3.1	0.47	95.92	0	0	0	3.61
2001	317	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	318	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	322	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	323	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	324	0	517	160.051	5.115	D	7.5	7.5	0	3.1	0.64	98.94	0	0	0	4.08
2001	325	0	548	160.098	-2.544	D	7.503	7.5	0.004	3.1	0.51	95.38	0	0	0	4.18
2001	326	0	548	160.098	-2.544	D	7.5	7.5	0	3.1	0.39	96.62	0	0	0	3.34
2001	327	0	78	155.215	-5.727	D	7.5	7.5	0	3.1	1.07	95.44	0	0	0	3.56
2001	328	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	333	0	637	152.992	-4.475	D	7.501	7.5	0.001	3.1	0.3	99.76	0	0	0	0.04
2001	334	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	2.73	101.72	0	0	0	0.52
2001	335	0	517	160.051	5.115	D	7.515	7.5	0.015	3.1	1.41	97.54	0	0	0	1.05
2001	336	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	342	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	343	0	517	160.051	5.115	D	7.616	7.593	0.023	3.3	1.9	92.72	0	0	0	5.38
2001	344	0	517	160.051	5.115	D	7.675	7.593	0.083	3.3	0.42	95.13	0	0	0	4.45
2001	345	0	631	152.975	-4.958	D	7.597	7.593	0.004	3.3	1.24	96.09	0	0	0	2.68
2001	346	0	637	152.992	-4.475	D	7.595	7.593	0.002	3.3	1.55	95.94	0	0	0	2.56
2001	347	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	0	517	160.051	5.115	D	7.599	7.593	0.006	3.3	1.46	96.06	0	0	0	2.48
2001	349	0	626	152.979	-5.287	D	7.597	7.593	0.004	3.3	1.42	97.37	0	0	0	1.2
2001	350	0	517	160.051	5.115	D	7.593	7.593	0	3.3	1.18	98.28	0	0	0	0.11
2001	351	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	352	0	637	152.992	-4.475	D	7.6	7.593	0.007	3.3	2.12	94.78	0	0	0	3.11

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BASF - Mingo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	353	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	0	517	160.051	5.115	D	7.604	7.593	0.012	3.3	0.77	94.71	0	0	0	4.52
2001	355	0	548	160.098	-2.544	D	7.593	7.593	0	3.3	0.45	94.99	0	0	0	2.87
2001	356	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
								MAX	0.1							

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	2	0	517	160.051	5.115	D	7.593	7.593	0	3.3	0.14	97.3	0	0	0	2.74
2002	3	0	637	152.992	-4.475	D	7.746	7.593	0.153	3.3	0.62	96.66	0	0	0	2.72
2002	4	0	548	160.098	-2.544	D	7.702	7.593	0.11	3.3	0.71	96.42	0	0	0	2.86
2002	5	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	6	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	7	0	517	160.051	5.115	D	7.627	7.593	0.035	3.3	1.67	94.6	0	0	0	3.73
2002	8	0	517	160.051	5.115	D	7.648	7.593	0.056	3.3	0.31	95.69	0	0	0	3.99
2002	9	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	11	0	517	160.051	5.115	D	7.623	7.593	0.031	3.3	2.03	91.25	0	0	0	6.72
2002	12	0	536	160.08	0.421	D	7.594	7.593	0.001	3.3	0.59	94.04	0	0	0	5.3
2002	13	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	18	0	517	160.051	5.115	D	7.631	7.593	0.038	3.3	0.49	96.46	0	0	0	3.05
2002	19	0	604	155.247	-5.778	D	7.595	7.593	0.003	3.3	2.7	95.16	0	0	0	2.18
2002	20	0	517	160.051	5.115	D	7.596	7.593	0.003	3.3	2.3	95.58	0	0	0	2.13
2002	21	0	517	160.051	5.115	D	7.594	7.593	0.002	3.3	2.13	95.64	0	0	0	2.23
2002	22	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	0	517	160.051	5.115	D	7.593	7.593	0	3.3	0.55	98.04	0	0	0	1.61
2002	25	0	624	152.982	-5.684	D	7.643	7.593	0.05	3.3	1.18	95.75	0	0	0	3.07
2002	26	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	96.23	0	0	0	2.92
2002	27	0	603	155.328	-5.781	D	7.593	7.593	0	3.3	3.65	92.28	0	0	0	3.91
2002	28	0	14	153.721	-5.51	D	7.593	7.593	0	3.3	2.21	91.57	0	0	0	3.11
2002	29	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	30	0	517	160.051	5.115	D	7.593	7.593	0	3.3	12.13	83.04	0	0	0	4.82
2002	31	0	517	160.051	5.115	D	7.609	7.593	0.016	3.3	0.71	98.99	0	0	0	0.31
2002	32	0	517	160.051	5.115	D	7.593	7.593	0	3.3	0.79	99.12	0	0	0	0.01
2002	33	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	34	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	35	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	36	0	517	160.051	5.115	D	7.472	7.453	0.019	3	0.37	95.77	0	0	0	3.86
2002	37	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	38	0	108	155.368	-1.254	D	7.453	7.453	0	3	3.71	110.35	0	0	0	2.14
2002	39	0	37	154.164	-3.018	D	7.453	7.453	0	3	0.46	98.51	0	0	0	2.14
2002	40	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	98.93	0	0	0	1.65

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	41	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	42	0	517	160.051	5.115	D	7.453	7.453	0	3	0.82	93.88	0	0	0	5.91
2002	43	0	517	160.051	5.115	D	7.475	7.453	0.023	3	0.41	95.38	0	0	0	4.22
2002	44	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	45	0	637	152.992	-4.475	D	7.499	7.453	0.046	3	0.48	94.2	0	0	0	5.33
2002	46	0	548	160.098	-2.544	D	7.461	7.453	0.008	3	1.1	95.15	0	0	0	3.8
2002	47	0	517	160.051	5.115	D	7.453	7.453	0.001	3	1.53	94.94	0	0	0	3.53
2002	48	0	517	160.051	5.115	D	7.453	7.453	0	3	0.41	94.15	0	0	0	5.4
2002	49	0	517	160.051	5.115	D	7.475	7.453	0.022	3	0.52	94.49	0	0	0	5
2002	50	0	624	152.982	-5.684	D	7.466	7.453	0.013	3	0.8	95.99	0	0	0	3.22
2002	51	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	54	0	624	152.982	-5.684	D	7.48	7.453	0.027	3	0.74	95.15	0	0	0	4.12
2002	55	0	637	152.992	-4.475	D	7.46	7.453	0.008	3	1.47	95.48	0	0	0	3.08
2002	56	0	490	159.714	4.549	D	7.453	7.453	0	3	1.93	95.42	0	0	0	2.49
2002	57	0	517	160.051	5.115	D	7.456	7.453	0.003	3	2.42	95.08	0	0	0	2.55
2002	58	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	61	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	62	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	63	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	64	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	65	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	66	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	67	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	68	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	69	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	70	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	71	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	72	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	73	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	74	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	75	0	548	160.098	-2.544	D	7.363	7.358	0.004	2.8	2.07	95.85	0	0	0	2.15
2002	76	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0.44	110.32	0	0	0	0.07
2002	77	0	3	153.214	-5.024	D	7.358	7.358	0	2.8	1.17	100.69	0	0	0	0.04
2002	78	0	517	160.051	5.115	D	7.358	7.358	0	2.8	1.74	99.21	0	0	0	0.06
2002	79	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	80	0	631	152.975	-4.958	D	7.365	7.358	0.006	2.8	1.95	93.02	0	0	0	5.07
2002	81	0	517	160.051	5.115	D	7.382	7.358	0.024	2.8	1.13	95.8	0	0	0	3.08
2002	82	0	548	160.098	-2.544	D	7.359	7.358	0	2.8	0.37	95.48	0	0	0	4.21
2002	83	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	84	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	85	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	86	0	517	160.051	5.115	D	7.374	7.358	0.016	2.8	2.08	94.65	0	0	0	3.28
2002	87	0	548	160.098	-2.544	D	7.38	7.358	0.022	2.8	2.35	93.9	0	0	0	3.77
2002	88	0	517	160.051	5.115	D	7.359	7.358	0	2.8	4.22	92.73	0	0	0	2.97
2002	89	0	675	156.839	0.811	D	7.359	7.358	0	2.8	1.54	96.22	0	0	0	2.2
2002	90	0	517	160.051	5.115	D	7.363	7.358	0.005	2.8	1.95	95.14	0	0	0	2.98
2002	91	0	517	160.051	5.115	D	7.366	7.358	0.008	2.8	2.99	89.96	0	0	0	7.07
2002	92	0	517	160.051	5.115	D	7.288	7.263	0.025	2.6	2.43	91.81	0	0	0	5.76
2002	93	0	517	160.051	5.115	D	7.275	7.263	0.012	2.6	2.28	90.75	0	0	0	7
2002	94	0	517	160.051	5.115	D	7.292	7.263	0.029	2.6	1.11	93.42	0	0	0	5.48
2002	95	0	637	152.992	-4.475	D	7.274	7.263	0.011	2.6	1.44	94.92	0	0	0	3.66
2002	96	0	637	152.992	-4.475	D	7.285	7.263	0.022	2.6	2.03	94.02	0	0	0	3.96
2002	97	0	517	160.051	5.115	D	7.275	7.263	0.012	2.6	2.21	91.89	0	0	0	5.92
2002	98	0	637	152.992	-4.475	D	7.263	7.263	0	2.6	6.48	86.14	0	0	0	6.49
2002	99	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	100	0	517	160.051	5.115	D	7.271	7.263	0.008	2.6	5.12	74.83	0	0	0	20.05
2002	101	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	5.57	99.07	0	0	0	5.19
2002	102	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	103	0	517	160.051	5.115	D	7.263	7.263	0	2.6	2.07	92.08	0	0	0	4.57
2002	104	0	517	160.051	5.115	D	7.265	7.263	0.002	2.6	3.83	90.83	0	0	0	5.43
2002	105	0	221	157.063	0.768	D	7.263	7.263	0	2.6	0.31	9.92	0	0	0	0.53
2002	106	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	107	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	108	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	109	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	110	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	111	0	517	160.051	5.115	D	7.263	7.263	0	2.6	1.45	100.19	0	0	0	0
2002	112	0	517	160.051	5.115	D	7.263	7.263	0	2.6	9.41	89.5	0	0	0	1.65
2002	113	0	548	160.098	-2.544	D	7.263	7.263	0	2.6	4.37	94.71	0	0	0	0.54
2002	114	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	115	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	116	0	517	160.051	5.115	D	7.273	7.263	0.01	2.6	0.95	87.33	0	0	0	11.74
2002	117	0	516	159.957	4.802	D	7.263	7.263	0	2.6	5.17	77.76	0	0	0	22.83
2002	118	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	119	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	120	0	517	160.051	5.115	D	7.271	7.263	0.008	2.6	5.78	81.11	0	0	0	13.14
2002	121	0	517	160.051	5.115	D	7.266	7.263	0.003	2.6	4.37	89.8	0	0	0	5.87
2002	122	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	123	0	637	152.992	-4.475	D	7.465	7.453	0.012	3	6.2	85.18	0	0	0	8.63
2002	124	0	637	152.992	-4.475	D	7.453	7.453	0	3	1.74	94.04	0	0	0	3.96
2002	125	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	126	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	127	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	128	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	129	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	130	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	131	0	517	160.051	5.115	D	7.454	7.453	0.002	3	3.12	78.96	0	0	0	17.95
2002	132	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	133	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	134	0	632	152.976	-4.828	D	7.454	7.453	0.002	3	8.28	76.86	0	0	0	14.93
2002	135	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	136	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	137	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	138	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	139	0	637	152.992	-4.475	D	7.461	7.453	0.008	3	3.44	92.15	0	0	0	4.44
2002	140	0	624	152.982	-5.684	D	7.472	7.453	0.019	3	2.74	94.02	0	0	0	3.26
2002	141	0	517	160.051	5.115	D	7.457	7.453	0.004	3	6.97	77.01	0	0	0	16.08
2002	142	0	624	152.982	-5.684	D	7.453	7.453	0	3	8.72	80.12	0	0	0	11.53
2002	143	0	1	153.225	-5.521	D	7.453	7.453	0	3	15.98	75.41	0	0	0	10.38
2002	144	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	145	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	146	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	147	0	517	160.051	5.115	D	7.454	7.453	0.002	3	12.9	64.18	0	0	0	23.02
2002	148	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	149	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	150	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	151	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	152	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	153	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	154	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	155	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	156	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	157	0	632	152.976	-4.828	D	7.548	7.546	0.001	3.2	3.05	96.4	0	0	0	0.58

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	158	0	631	152.975	-4.958	D	7.548	7.546	0.002	3.2	10.2	73.57	0	0	0	16.28
2002	159	0	624	152.982	-5.684	D	7.548	7.546	0.002	3.2	5.73	88.3	0	0	0	6.03
2002	160	0	6	153.198	-4.28	D	7.546	7.546	0	3.2	35.14	40.92	0	0	0	23.72
2002	161	0	108	155.368	-1.254	D	7.546	7.546	0	3.2	18.9	70.11	0	0	0	8.85
2002	162	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	163	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	164	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	165	0	517	160.051	5.115	D	7.548	7.546	0.001	3.2	26.19	25.44	0	0	0	48.42
2002	166	0	603	155.328	-5.781	D	7.547	7.546	0.001	3.2	7.12	74.07	0	0	0	18.87
2002	167	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	168	0	637	152.992	-4.475	D	7.548	7.546	0.002	3.2	2.7	91.54	0	0	0	5.87
2002	169	0	624	152.982	-5.684	D	7.55	7.546	0.004	3.2	9.81	75.94	0	0	0	14.28
2002	170	0	516	159.957	4.802	D	7.546	7.546	0	3.2	33.3	27.53	0	0	0	39.82
2002	171	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	172	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	173	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	174	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	175	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	176	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	177	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	178	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	179	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	180	0	517	160.051	5.115	D	7.547	7.546	0.001	3.2	30.3	32.97	0	0	0	36.89
2002	181	0	517	160.051	5.115	D	7.546	7.546	0	3.2	21.26	63.1	0	0	0	15.98
2002	182	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	183	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	185	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	186	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	187	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	188	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	189	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	190	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	192	0	517	160.051	5.115	D	7.593	7.593	0	3.3	27.06	34.59	0	0	0	39.15
2002	193	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	31.43	103.97	0	0	0	2.8
2002	194	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	87.11	28.25	0	0	0	4.51
2002	195	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	196	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	197	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	198	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	199	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	203	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	204	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	205	0	624	152.982	-5.684	D	7.594	7.593	0.001	3.3	40.78	10.44	0	0	0	48.77
2002	206	0	622	153.356	-5.671	D	7.593	7.593	0	3.3	5.16	90.37	0	0	0	3.68
2002	207	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	55.99	11.28	0	0	0	34.04
2002	208	0	1	153.225	-5.521	D	7.593	7.593	0.001	3.3	36.91	40.37	0	0	0	22.91
2002	209	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	214	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	215	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	216	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	217	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	218	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	219	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	220	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	221	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	222	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	223	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	224	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	225	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	226	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	227	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	228	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	229	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	230	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	231	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	232	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	233	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	234	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	235	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	236	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	237	0	517	160.051	5.115	D	7.701	7.685	0.016	3.5	7.76	81.26	0	0	0	10.98
2002	238	0	624	152.982	-5.684	D	7.725	7.685	0.04	3.5	5.11	87.46	0	0	0	7.43
2002	239	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	21.33	58.76	0	0	0	16.09
2002	240	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	241	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	242	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	243	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	244	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	245	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	246	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	247	0	461	159.471	4.295	D	7.685	7.685	0	3.5	13.12	58.99	0	0	0	21.01
2002	248	0	517	160.051	5.115	D	7.686	7.685	0.002	3.5	18.02	55.11	0	0	0	26.9
2002	249	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	26.74	51.33	0	0	0	23.73
2002	250	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	53.96	19.32	0	0	0	44.94
2002	251	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	252	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	253	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	254	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	255	0	548	160.098	-2.544	D	7.685	7.685	0	3.5	5.48	66.28	0	0	0	28.18
2002	256	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	257	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	16.65	4.69	0	0	0	9.06
2002	258	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	34.88	42.99	0	0	0	23.27
2002	259	0	656	154.842	-1.81	D	7.689	7.685	0.004	3.5	10.4	80.76	0	0	0	8.83
2002	260	0	624	152.982	-5.684	D	7.689	7.685	0.004	3.5	6.09	90.12	0	0	0	3.78
2002	261	0	203	156.82	0.514	D	7.685	7.685	0	3.5	10.21	85.81	0	0	0	2.21
2002	262	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	6.89	80.54	0	0	0	0.24
2002	263	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	264	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	265	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	266	0	637	152.992	-4.475	D	7.688	7.685	0.003	3.5	8.69	78.13	0	0	0	13.18
2002	267	0	637	152.992	-4.475	D	7.7	7.685	0.015	3.5	1.55	95.02	0	0	0	3.43
2002	268	0	696	159.61	4.56	D	7.686	7.685	0.001	3.5	3.12	93.11	0	0	0	3.74
2002	269	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	270	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	271	0	637	152.992	-4.475	D	7.702	7.685	0.017	3.5	3.74	89.6	0	0	0	6.66
2002	272	0	624	152.982	-5.684	D	7.693	7.685	0.008	3.5	4.54	89.1	0	0	0	6.36
2002	273	0	517	160.051	5.115	D	7.686	7.685	0.001	3.5	21.49	56.75	0	0	0	21.76
2002	274	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	275	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	279	0	517	160.051	5.115	D	7.502	7.5	0.002	3.1	6.78	63.55	0	0	0	29.8
2002	280	0	637	152.992	-4.475	D	7.501	7.5	0.001	3.1	2.43	92.68	0	0	0	4.94
2002	281	0	676	156.899	0.996	D	7.514	7.5	0.015	3.1	0.95	89.31	0	0	0	9.74
2002	282	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	9.84	82.11	0	0	0	11
2002	283	0	490	159.714	4.549	D	7.5	7.5	0	3.1	7.12	81.92	0	0	0	11.34
2002	284	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	285	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	0	517	160.051	5.115	D	7.502	7.5	0.003	3.1	1.22	95.76	0	0	0	3.04
2002	287	0	78	155.215	-5.727	D	7.5	7.5	0	3.1	1.72	95.05	0	0	0	3.31
2002	288	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	289	0	637	152.992	-4.475	D	7.507	7.5	0.008	3.1	3.68	85.47	0	0	0	10.87
2002	290	0	688	158.434	3.081	D	7.515	7.5	0.015	3.1	2.26	92.57	0	0	0	5.18
2002	291	0	517	160.051	5.115	D	7.525	7.5	0.026	3.1	1.79	93.61	0	0	0	4.6
2002	292	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	293	0	517	160.051	5.115	D	7.507	7.5	0.007	3.1	1.51	97.82	0	0	0	0.68
2002	294	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	295	0	169	156.34	-0.24	D	7.5	7.5	0	3.1	8.01	90.26	0	0	0	7.26
2002	296	0	637	152.992	-4.475	D	7.5	7.5	0	3.1	7.25	86.82	0	0	0	6.47
2002	297	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	40.6	55.48	0	0	0	3.3
2002	298	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	299	0	688	158.434	3.081	D	7.5	7.5	0.001	3.1	2.96	95.62	0	0	0	1.54
2002	300	0	517	160.051	5.115	D	7.638	7.5	0.139	3.1	2.58	95.04	0	0	0	2.39
2002	301	0	637	152.992	-4.475	D	7.504	7.5	0.005	3.1	2.05	95.26	0	0	0	2.68
2002	302	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	303	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	304	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	305	0	517	160.051	5.115	D	7.555	7.5	0.056	3.1	1.96	94.6	0	0	0	3.44
2002	306	0	517	160.051	5.115	D	7.51	7.5	0.01	3.1	1.08	93.53	0	0	0	5.41
2002	307	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	308	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	309	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	310	0	517	160.051	5.115	D	7.5	7.5	0	3.1	2.62	96.57	0	0	0	0.95
2002	311	0	624	152.982	-5.684	D	7.506	7.5	0.007	3.1	2.36	96.44	0	0	0	1.21
2002	312	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	314	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	315	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	316	0	517	160.051	5.115	D	7.5	7.5	0	3.1	1.23	95.13	0	0	0	3.85
2002	317	0	517	160.051	5.115	D	7.543	7.5	0.043	3.1	0.94	95.26	0	0	0	3.8
2002	318	0	548	160.098	-2.544	D	7.5	7.5	0	3.1	0.61	97.46	0	0	0	1.89
2002	319	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	320	0	631	152.975	-4.958	D	7.504	7.5	0.004	3.1	1.16	97.92	0	0	0	0.94
2002	321	0	637	152.992	-4.475	D	7.522	7.5	0.023	3.1	1.42	94.54	0	0	0	4.04
2002	322	0	517	160.051	5.115	D	7.579	7.5	0.08	3.1	1.29	95.24	0	0	0	3.47
2002	323	0	517	160.051	5.115	D	7.5	7.5	0	3.1	1.08	96.63	0	0	0	2.31
2002	324	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	325	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	326	0	517	160.051	5.115	D	7.508	7.5	0.008	3.1	0.79	91.98	0	0	0	7.24
2002	327	0	517	160.051	5.115	D	7.512	7.5	0.012	3.1	0.37	92.2	0	0	0	7.43
2002	328	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	329	0	637	152.992	-4.475	D	7.501	7.5	0.002	3.1	1.29	97.39	0	0	0	1.35
2002	330	0	624	152.982	-5.684	D	7.501	7.5	0.001	3.1	1.2	97.3	0	0	0	1.59
2002	331	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	2.64	98.85	0	0	0	1.8
2002	332	0	637	152.992	-4.475	D	7.514	7.5	0.015	3.1	0.74	96.92	0	0	0	2.37
2002	333	0	517	160.051	5.115	D	7.509	7.5	0.009	3.1	0.81	97.26	0	0	0	1.95
2002	334	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	335	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	336	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	0	637	152.992	-4.475	D	7.594	7.593	0.002	3.3	1.03	95.39	0	0	0	3.59
2002	338	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	340	0	624	152.982	-5.684	D	7.61	7.593	0.018	3.3	0.91	96.7	0	0	0	2.4
2002	341	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	343	0	517	160.051	5.115	D	7.595	7.593	0.003	3.3	0.69	96.59	0	0	0	2.76
2002	344	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	348	0	631	152.975	-4.958	D	7.593	7.593	0	3.3	0.43	95.91	0	0	0	3.41
2002	349	0	548	160.098	-2.544	D	7.648	7.593	0.055	3.3	0.3	96.27	0	0	0	3.43
2002	350	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	353	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	357	0	517	160.051	5.115	D	7.593	7.593	0.001	3.3	0.42	96.49	0	0	0	3.06
2002	358	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	359	0	624	152.982	-5.684	D	7.603	7.593	0.01	3.3	1.3	95.13	0	0	0	3.58
2002	360	0	517	160.051	5.115	D	7.594	7.593	0.001	3.3	0.49	95.55	0	0	0	3.95
2002	361	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
								MAX	0.153							

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BASF - Mingo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	2	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	3	0	517	160.051	5.115	D	7.618	7.593	0.025	3.3	1.85	94.15	0	0	0	4.01
2003	4	0	517	160.051	5.115	D	7.595	7.593	0.002	3.3	1.1	94.97	0	0	0	3.93
2003	5	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	6	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	7	0	521	160.057	4.126	D	7.638	7.593	0.046	3.3	0.85	94.87	0	0	0	4.29
2003	8	0	548	160.098	-2.544	D	7.601	7.593	0.008	3.3	1.06	96.66	0	0	0	2.29
2003	9	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	10	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	11	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	13	0	517	160.051	5.115	D	7.594	7.593	0.001	3.3	0.67	96.63	0	0	0	2.72
2003	14	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	15	0	624	152.982	-5.684	D	7.63	7.593	0.038	3.3	0.74	95.99	0	0	0	3.28
2003	16	0	603	155.328	-5.781	D	7.599	7.593	0.006	3.3	0.85	96.71	0	0	0	2.45
2003	17	0	624	152.982	-5.684	D	7.598	7.593	0.005	3.3	1.57	95.2	0	0	0	3.26
2003	18	0	517	160.051	5.115	D	7.594	7.593	0.001	3.3	0.31	96.95	0	0	0	2.78
2003	19	0	500	160.041	0.832	D	7.593	7.593	0	3.3	0	95.77	0	0	0	1.95
2003	20	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	21	0	517	160.051	5.115	D	7.6	7.593	0.007	3.3	1.21	94.13	0	0	0	4.66
2003	22	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	23	0	637	152.992	-4.475	D	7.614	7.593	0.021	3.3	1.25	95.21	0	0	0	3.54
2003	24	0	517	160.051	5.115	D	7.606	7.593	0.014	3.3	0.47	95.3	0	0	0	4.24
2003	25	0	548	160.098	-2.544	D	7.621	7.593	0.028	3.3	0.97	96.84	0	0	0	2.2
2003	26	0	548	160.098	-2.544	D	7.595	7.593	0.003	3.3	1.28	97.04	0	0	0	1.76
2003	27	0	637	152.992	-4.475	D	7.673	7.593	0.08	3.3	0.59	96.59	0	0	0	2.83
2003	28	0	637	152.992	-4.475	D	7.6	7.593	0.007	3.3	0.93	96.95	0	0	0	2.13
2003	29	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	3.45	8.99	0	0	0	0.19
2003	30	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	32	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	33	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	37	0	517	160.051	5.115	D	7.495	7.453	0.042	3	0.38	97.11	0	0	0	2.51
2003	38	0	637	152.992	-4.475	D	7.457	7.453	0.004	3	0.91	97.44	0	0	0	1.71
2003	39	0	546	160.095	-2.05	D	7.468	7.453	0.015	3	0.28	95.63	0	0	0	4.08
2003	40	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	41	0	517	160.051	5.115	D	7.454	7.453	0.001	3	0.56	96.41	0	0	0	3.08
2003	42	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	43	0	517	160.051	5.115	D	7.454	7.453	0.001	3	1.1	94.95	0	0	0	4.02
2003	44	0	548	160.098	-2.544	D	7.455	7.453	0.002	3	0.38	95.62	0	0	0	4.05
2003	45	0	38	154.466	-5.494	D	7.453	7.453	0	3	7	98.79	0	0	0	13.06
2003	46	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	49	0	624	152.982	-5.684	D	7.454	7.453	0.001	3	1.91	96.28	0	0	0	1.91
2003	50	0	517	160.051	5.115	D	7.473	7.453	0.02	3	2	96.03	0	0	0	1.98
2003	51	0	517	160.051	5.115	D	7.454	7.453	0.002	3	1.7	97.3	0	0	0	1.14
2003	52	0	623	153.169	-5.678	D	7.453	7.453	0	3	0.19	98.62	0	0	0	0.63
2003	53	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	54	0	624	152.982	-5.684	D	7.47	7.453	0.017	3	1.82	93.5	0	0	0	4.7
2003	55	0	517	160.051	5.115	D	7.484	7.453	0.032	3	0.44	94.99	0	0	0	4.58
2003	56	0	548	160.098	-2.544	D	7.473	7.453	0.02	3	0.31	96.32	0	0	0	3.37
2003	57	0	517	160.051	5.115	D	7.464	7.453	0.011	3	0.52	95.57	0	0	0	3.91
2003	58	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	59	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	60	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	61	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	62	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	63	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	64	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	65	0	517	160.051	5.115	D	7.425	7.358	0.067	2.8	1.3	96.59	0	0	0	2.12
2003	66	0	624	152.982	-5.684	D	7.359	7.358	0.001	2.8	1.81	95.5	0	0	0	2.69
2003	67	0	632	152.976	-4.828	D	7.362	7.358	0.003	2.8	4.21	92.29	0	0	0	3.52
2003	68	0	676	156.899	0.996	D	7.362	7.358	0.004	2.8	1.26	94.66	0	0	0	4.1
2003	69	0	637	152.992	-4.475	D	7.362	7.358	0.004	2.8	0.69	96.67	0	0	0	2.67
2003	70	0	637	152.992	-4.475	D	7.362	7.358	0.004	2.8	0.62	96.62	0	0	0	2.77
2003	71	0	637	152.992	-4.475	D	7.36	7.358	0.002	2.8	2.12	93.98	0	0	0	3.99
2003	72	0	461	159.471	4.295	D	7.358	7.358	0	2.8	1.85	96.13	0	0	0	1.73
2003	73	0	548	160.098	-2.544	D	7.361	7.358	0.003	2.8	2.28	90.95	0	0	0	6.76
2003	74	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	75	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	76	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	77	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	78	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	79	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	80	0	624	152.982	-5.684	D	7.358	7.358	0	2.8	2.87	93.4	0	0	0	4.05
2003	81	0	624	152.982	-5.684	D	7.367	7.358	0.009	2.8	0.49	93.87	0	0	0	5.64
2003	82	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	83	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	84	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	85	0	623	153.169	-5.678	D	7.358	7.358	0	2.8	1.08	99.11	0	0	0	0.73
2003	86	0	517	160.051	5.115	D	7.358	7.358	0	2.8	3.54	92.29	0	0	0	4.88
2003	87	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	88	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	89	0	517	160.051	5.115	D	7.358	7.358	0	2.8	0.58	95.13	0	0	0	4.89
2003	90	0	517	160.051	5.115	D	7.367	7.358	0.008	2.8	0.35	94.96	0	0	0	4.7
2003	91	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	92	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	93	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	94	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	95	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	96	0	517	160.051	5.115	D	7.267	7.263	0.004	2.6	2.21	93.94	0	0	0	3.9
2003	97	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	1.48	95.88	0	0	0	1.87
2003	98	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	99	0	624	152.982	-5.684	D	7.308	7.263	0.045	2.6	1.87	93.46	0	0	0	4.68
2003	100	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	101	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	102	0	517	160.051	5.115	D	7.263	7.263	0	2.6	15.4	67.47	0	0	0	18.9
2003	103	0	517	160.051	5.115	D	7.267	7.263	0.004	2.6	8.32	79.38	0	0	0	12.37
2003	104	0	516	159.957	4.802	D	7.263	7.263	0	2.6	10.69	74.42	0	0	0	15.15
2003	105	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	106	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	107	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	108	0	517	160.051	5.115	D	7.264	7.263	0.001	2.6	5.16	89.9	0	0	0	4.99
2003	109	0	517	160.051	5.115	D	7.267	7.263	0.004	2.6	4.28	89.25	0	0	0	6.51
2003	110	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	111	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	112	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	113	0	517	160.051	5.115	D	7.275	7.263	0.012	2.6	2.03	85.97	0	0	0	12
2003	114	0	624	152.982	-5.684	D	7.263	7.263	0	2.6	2.36	92.85	0	0	0	4.52
2003	115	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	116	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	117	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	118	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	126.82	68.97	0	0	0	69.01

Appendix K, Part 4

BASF - Mingo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	119	0	280	157.787	1.777	D	7.263	7.263	0	2.6	20.56	55.74	0	0	0	11.24
2003	120	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	121	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	122	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	123	0	517	160.051	5.115	D	7.456	7.453	0.003	3	12.85	70.27	0	0	0	16.97
2003	124	0	1	153.225	-5.521	D	7.453	7.453	0	3	13.96	68.01	0	0	0	13.35
2003	125	0	1	153.225	-5.521	D	7.453	7.453	0	3	34.31	61.66	0	0	0	11.7
2003	126	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	127	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	128	0	1	153.225	-5.521	D	7.453	7.453	0	3	13	81.54	0	0	0	10.58
2003	129	0	260	157.544	1.523	D	7.453	7.453	0	3	2.83	94.75	0	0	0	3.59
2003	130	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	131	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	132	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	133	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	134	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	135	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	136	0	517	160.051	5.115	D	7.453	7.453	0	3	11.9	76.18	0	0	0	11.52
2003	137	0	517	160.051	5.115	D	7.453	7.453	0	3	12.16	85.02	0	0	0	5.89
2003	138	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	139	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	140	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	141	0	624	152.982	-5.684	D	7.464	7.453	0.012	3	1.37	92.01	0	0	0	6.63
2003	142	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	143	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	144	0	6	153.198	-4.28	D	7.453	7.453	0	3	12.19	75.43	0	0	0	14.96
2003	145	0	517	160.051	5.115	D	7.454	7.453	0.002	3	13.23	73.69	0	0	0	13.32
2003	146	0	3	153.214	-5.024	D	7.453	7.453	0	3	11.04	82.42	0	0	0	7.57
2003	147	0	624	152.982	-5.684	D	7.453	7.453	0	3	11.07	74.91	0	0	0	4.43
2003	148	0	517	160.051	5.115	D	7.46	7.453	0.007	3	2.43	94.3	0	0	0	3.3
2003	149	0	548	160.098	-2.544	D	7.463	7.453	0.011	3	2.34	94.59	0	0	0	3.1
2003	150	0	637	152.992	-4.475	D	7.459	7.453	0.006	3	2.6	80.38	0	0	0	17.06
2003	151	0	517	160.051	5.115	D	7.453	7.453	0	3	0.56	93.29	0	0	0	6.96
2003	152	0	631	152.975	-4.958	D	7.453	7.453	0.001	3	20.76	42.4	0	0	0	36.96
2003	153	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	154	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	155	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	156	0	517	160.051	5.115	D	7.556	7.546	0.01	3.2	7.34	78.88	0	0	0	13.8
2003	157	0	517	160.051	5.115	D	7.552	7.546	0.006	3.2	9.15	79.63	0	0	0	11.27

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BASF - Mingo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	158	0	6	153.198	-4.28	D	7.547	7.546	0	3.2	8.3	81.66	0	0	0	9.93
2003	159	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	27.12	84.21	0	0	0	4.99
2003	160	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	161	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	162	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	163	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	164	0	517	160.051	5.115	D	7.546	7.546	0	3.2	14.82	73.78	0	0	0	12.48
2003	165	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	166	0	624	152.982	-5.684	D	7.547	7.546	0	3.2	10.24	85.53	0	0	0	4.92
2003	167	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	168	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	169	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	170	0	517	160.051	5.115	D	7.546	7.546	0	3.2	44.86	16.25	0	0	0	39.49
2003	171	0	517	160.051	5.115	D	7.551	7.546	0.005	3.2	26.85	49.82	0	0	0	23.38
2003	172	0	624	152.982	-5.684	D	7.547	7.546	0.001	3.2	10.6	82.42	0	0	0	7.21
2003	173	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	174	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	175	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	176	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	177	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	178	0	547	160.097	-2.297	D	7.546	7.546	0	3.2	2.96	90.7	0	0	0	6.28
2003	179	0	548	160.098	-2.544	D	7.548	7.546	0.002	3.2	8.1	77.94	0	0	0	14.11
2003	180	0	603	155.328	-5.781	D	7.547	7.546	0.001	3.2	12.59	74.3	0	0	0	13.31
2003	181	0	490	159.714	4.549	D	7.546	7.546	0	3.2	33.3	41.4	0	0	0	26.33
2003	182	0	5	153.204	-4.528	D	7.546	7.546	0	3.2	44.07	29.47	0	0	0	26.79
2003	183	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	184	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	185	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	193	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	194	0	517	160.051	5.115	D	7.593	7.593	0.001	3.3	23.63	33.64	0	0	0	42.77
2003	195	0	637	152.992	-4.475	D	7.594	7.593	0.001	3.3	27.45	35.92	0	0	0	36.77
2003	196	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	36.45	36.98	0	0	0	32.26

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BASF - Mingo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	197	0	517	160.051	5.115	D	7.593	7.593	0.001	3.3	6.86	81.5	0	0	0	11.57
2003	198	0	637	152.992	-4.475	D	7.598	7.593	0.005	3.3	17.32	45.7	0	0	0	36.99
2003	199	0	517	160.051	5.115	D	7.595	7.593	0.003	3.3	15.96	65.56	0	0	0	18.52
2003	200	0	518	160.052	4.868	D	7.593	7.593	0	3.3	40.75	32.85	0	0	0	26.56
2003	201	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	32.02	44.29	0	0	0	25.87
2003	202	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	203	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	204	0	688	158.434	3.081	D	7.596	7.593	0.003	3.3	18.77	38.9	0	0	0	42.33
2003	205	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	206	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	48.21	34.28	0	0	0	36.4
2003	207	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	29.59	51.06	0	0	0	22.58
2003	208	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	0	517	160.051	5.115	D	7.594	7.593	0.001	3.3	4.24	90.07	0	0	0	5.73
2003	211	0	676	156.899	0.996	D	7.593	7.593	0.001	3.3	12.56	75.2	0	0	0	12.22
2003	212	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	48.31	35.02	0	0	0	18.46
2003	213	0	622	153.356	-5.671	D	7.593	7.593	0	3.3	15.15	79.15	0	0	0	6.34
2003	214	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	41.27	49.76	0	0	0	4.94
2003	215	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	72.75	5.53	0	0	0	4.05
2003	216	0	431	159.233	3.793	D	7.685	7.685	0	3.5	26.22	31.93	0	0	0	21.64
2003	217	0	516	159.957	4.802	D	7.685	7.685	0	3.5	9.41	80.5	0	0	0	9.49
2003	218	0	517	160.051	5.115	D	7.695	7.685	0.01	3.5	15.3	69.42	0	0	0	15.28
2003	219	0	517	160.051	5.115	D	7.698	7.685	0.013	3.5	11.77	78.04	0	0	0	10.2
2003	220	0	624	152.982	-5.684	D	7.69	7.685	0.005	3.5	7.18	81.89	0	0	0	10.93
2003	221	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	48.44	11.12	0	0	0	21.07
2003	222	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	223	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	224	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	225	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	226	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	227	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	228	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	229	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	230	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	42.66	2.98	0	0	0	2.79
2003	231	0	6	153.198	-4.28	D	7.686	7.685	0.001	3.5	40.12	19.23	0	0	0	40.49
2003	232	0	624	152.982	-5.684	D	7.687	7.685	0.002	3.5	39.4	32.66	0	0	0	27.99
2003	233	0	623	153.169	-5.678	D	7.686	7.685	0.001	3.5	26.64	58.61	0	0	0	14.68
2003	234	0	1	153.225	-5.521	D	7.685	7.685	0.001	3.5	48.48	26.04	0	0	0	25.41
2003	235	0	623	153.169	-5.678	D	7.685	7.685	0	3.5	40.51	35.71	0	0	0	23.56

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BASF - Mingo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	236	0	624	152.982	-5.684	D	7.686	7.685	0.001	3.5	9.27	85.1	0	0	0	5.71
2003	237	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	12.71	77.95	0	0	0	7.17
2003	238	0	625	152.981	-5.485	D	7.685	7.685	0	3.5	42.43	29.68	0	0	0	25.07
2003	239	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	51.81	23.32	0	0	0	24.87
2003	240	0	279	157.792	1.528	D	7.685	7.685	0	3.5	31.72	42.47	0	0	0	15.37
2003	241	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	242	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	243	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	244	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	245	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	246	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	247	0	517	160.051	5.115	D	7.686	7.685	0.001	3.5	1.84	94.77	0	0	0	3.36
2003	248	0	517	160.051	5.115	D	7.712	7.685	0.027	3.5	1.35	95.05	0	0	0	3.6
2003	249	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	250	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	251	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	252	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	253	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	254	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	255	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	256	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	257	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	258	0	517	160.051	5.115	D	7.685	7.685	0	3.5	0.19	94.25	0	0	0	0
2003	259	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	260	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	261	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	262	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	263	0	546	160.095	-2.05	D	7.685	7.685	0	3.5	4.59	86.32	0	0	0	9.02
2003	264	0	517	160.051	5.115	D	7.707	7.685	0.022	3.5	2.16	92.09	0	0	0	5.74
2003	265	0	6	153.198	-4.28	D	7.685	7.685	0	3.5	17.63	66.16	0	0	0	16.68
2003	266	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	22.15	105.3	0	0	0	3.74
2003	267	0	517	160.051	5.115	D	7.686	7.685	0.001	3.5	4.99	66.74	0	0	0	28.33
2003	268	0	517	160.051	5.115	D	7.685	7.685	0	3.5	1.32	83.56	0	0	0	10.14
2003	269	0	517	160.051	5.115	D	7.687	7.685	0.002	3.5	1.19	89.32	0	0	0	9.51
2003	270	0	517	160.051	5.115	D	7.685	7.685	0.001	3.5	20.61	60.5	0	0	0	18.73
2003	271	0	637	152.992	-4.475	D	7.691	7.685	0.006	3.5	0.2	98.49	0	0	0	1.3
2003	272	0	517	160.051	5.115	D	7.691	7.685	0.006	3.5	0.36	95.63	0	0	0	4
2003	273	0	624	152.982	-5.684	D	7.701	7.685	0.016	3.5	0.78	94.61	0	0	0	4.61
2003	274	0	281	157.781	2.025	D	7.69	7.685	0.006	3.5	1.48	95.47	0	0	0	3.06

Appendix K, Part 4

BASF - Mingo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	275	0	517	160.051	5.115	D	7.508	7.5	0.008	3.1	1.2	96.05	0	0	0	2.76
2003	276	0	624	152.982	-5.684	D	7.511	7.5	0.012	3.1	1	96.21	0	0	0	2.79
2003	277	0	461	159.471	4.295	D	7.5	7.5	0	3.1	8.71	82.81	0	0	0	8.85
2003	278	0	517	160.051	5.115	D	7.5	7.5	0	3.1	7.15	52.48	0	0	0	40.82
2003	279	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	280	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	281	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	282	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	283	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	286	0	624	152.982	-5.684	D	7.5	7.5	0.001	3.1	0.92	88.57	0	0	0	10.49
2003	287	0	637	152.992	-4.475	D	7.5	7.5	0	3.1	10.63	79.23	0	0	0	10.5
2003	288	0	517	160.051	5.115	D	7.5	7.5	0	3.1	0.57	99.3	0	0	0	0.32
2003	289	0	517	160.051	5.115	D	7.5	7.5	0.001	3.1	0	95.59	0	0	0	4.32
2003	290	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	291	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	292	0	694	159.316	4.191	D	7.5	7.5	0	3.1	11.49	75.57	0	0	0	13.03
2003	293	0	78	155.215	-5.727	D	7.5	7.5	0	3.1	6.8	86.2	0	0	0	7.26
2003	294	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	97.83	8.37	0	0	0	5.26
2003	295	0	517	160.051	5.115	D	7.5	7.5	0.001	3.1	3.59	62.46	0	0	0	34.01
2003	296	0	517	160.051	5.115	D	7.508	7.5	0.009	3.1	1.05	95.21	0	0	0	3.76
2003	297	0	517	160.051	5.115	D	7.506	7.5	0.006	3.1	4.14	86.69	0	0	0	9.19
2003	298	0	637	152.992	-4.475	D	7.501	7.5	0.001	3.1	10.47	72.7	0	0	0	16.93
2003	299	0	637	152.992	-4.475	D	7.506	7.5	0.007	3.1	4.28	76.09	0	0	0	19.65
2003	300	0	517	160.051	5.115	D	7.519	7.5	0.02	3.1	1.72	93.1	0	0	0	5.18
2003	301	0	548	160.098	-2.544	D	7.527	7.5	0.027	3.1	2.37	92.93	0	0	0	4.7
2003	302	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	0	517	160.051	5.115	D	7.5	7.5	0.001	3.1	2.07	92.04	0	0	0	5.97
2003	306	0	656	154.842	-1.81	D	7.517	7.5	0.017	3.1	4.02	85.82	0	0	0	10.18
2003	307	0	517	160.051	5.115	D	7.5	7.5	0	3.1	2.72	91.46	0	0	0	4.43
2003	308	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	309	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	310	0	517	160.051	5.115	D	7.505	7.5	0.005	3.1	0.6	98.86	0	0	0	0.55
2003	311	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0.87	99.59	0	0	0	0.42
2003	312	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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BASF - Mingo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	314	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	318	0	548	160.098	-2.544	D	7.5	7.5	0	3.1	0.66	96.96	0	0	0	2.87
2003	319	0	548	160.098	-2.544	D	7.502	7.5	0.002	3.1	0.79	96.09	0	0	0	3.18
2003	320	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	0	517	160.051	5.115	D	7.5	7.5	0.001	3.1	1.32	93.78	0	0	0	5
2003	324	0	632	152.976	-4.828	D	7.508	7.5	0.008	3.1	0.53	90.77	0	0	0	8.69
2003	325	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	328	0	203	156.82	0.514	D	7.5	7.5	0	3.1	4.21	95.82	0	0	0	0.71
2003	329	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	332	0	517	160.051	5.115	D	7.506	7.5	0.006	3.1	1.32	94.64	0	0	0	4.05
2003	333	0	517	160.051	5.115	D	7.5	7.5	0.001	3.1	0.3	91.16	0	0	0	8.5
2003	334	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	336	0	548	160.098	-2.544	D	7.607	7.593	0.014	3.3	0.72	94.54	0	0	0	4.75
2003	337	0	517	160.051	5.115	D	7.597	7.593	0.004	3.3	1.01	94.1	0	0	0	4.91
2003	338	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	339	0	517	160.051	5.115	D	7.63	7.593	0.038	3.3	1.8	96.05	0	0	0	2.15
2003	340	0	603	155.328	-5.781	D	7.61	7.593	0.018	3.3	2	94.91	0	0	0	3.09
2003	341	0	694	159.316	4.191	D	7.627	7.593	0.035	3.3	1.04	96.28	0	0	0	2.68
2003	342	0	517	160.051	5.115	D	7.603	7.593	0.011	3.3	1.01	97.29	0	0	0	1.7
2003	343	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	345	0	517	160.051	5.115	D	7.596	7.593	0.003	3.3	0.64	98.9	0	0	0	0.46
2003	346	0	517	160.051	5.115	D	7.593	7.593	0.001	3.3	0.81	96.43	0	0	0	2.72
2003	347	0	517	160.051	5.115	D	7.638	7.593	0.045	3.3	0.9	96.38	0	0	0	2.72
2003	348	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	349	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix K, Part 4

BASF - Mingo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	353	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	355	0	517	160.051	5.115	D	7.598	7.593	0.005	3.3	0.2	96.76	0	0	0	3.06
2003	356	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	358	0	548	160.098	-2.544	D	7.598	7.593	0.006	3.3	0.63	96.65	0	0	0	2.74
2003	359	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	360	0	517	160.051	5.115	D	7.593	7.593	0	3.3	6.06	108.75	0	0	0	3.69
2003	361	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	362	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	365	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0
								MAX	0.08							

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BASF - Upper Buffalo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	2	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	3	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	4	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	5	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	8	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	9	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	10	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	0.81	97.38	0	0	0	1.82
2001	11	0	2789	-107.509	-101.223	D	7.599	7.593	0.006	3.3	1.55	96.14	0	0	0	2.32
2001	12	0	2781	-108.101	-100.123	D	7.593	7.593	0	3.3	1.71	95.12	0	0	0	2.17
2001	13	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	17	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	18	0	2789	-107.509	-101.223	D	7.656	7.593	0.064	3.3	1.23	96.61	0	0	0	2.16
2001	19	0	2789	-107.509	-101.223	D	7.711	7.593	0.119	3.3	0.99	96.92	0	0	0	2.08
2001	20	0	2418	-108.065	-101.355	D	7.593	7.593	0	3.3	1.66	94.51	0	0	0	2.31
2001	21	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	22	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	23	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	25	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	26	0	2789	-107.509	-101.223	D	7.598	7.593	0.006	3.3	0.74	97.85	0	0	0	1.42
2001	27	0	2209	-112.495	-99.07	D	7.593	7.593	0	3.3	0.62	98.32	0	0	0	0.87
2001	28	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	29	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	30	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	33	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	34	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	38	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	39	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	41	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	42	0	2418	-108.065	-101.355	D	7.453	7.453	0	3	0.28	99.6	0	0	0	1.89
2001	43	0	2588	-130.481	-119.268	D	7.462	7.453	0.009	3	1.03	97.23	0	0	0	1.77
2001	44	0	1412	-118.691	-99.998	D	7.453	7.453	0	3	1.09	92.67	0	0	0	1.11
2001	45	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	46	0	2781	-108.101	-100.123	D	7.453	7.453	0.001	3	4.23	95.29	0	0	0	0.6
2001	47	0	2789	-107.509	-101.223	D	7.454	7.453	0.001	3	2.58	97.15	0	0	0	0.44
2001	48	0	2418	-108.065	-101.355	D	7.453	7.453	0	3	1.15	91.52	0	0	0	0.16
2001	49	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	50	0	2789	-107.509	-101.223	D	7.454	7.453	0.001	3	2.04	95.14	0	0	0	3.08
2001	51	0	2789	-107.509	-101.223	D	7.453	7.453	0	3	1.06	96.85	0	0	0	2.11
2001	52	0	1415	-118.683	-99.252	D	7.453	7.453	0	3	1.33	96	0	0	0	3
2001	53	0	1415	-118.683	-99.252	D	7.456	7.453	0.003	3	1.47	96.48	0	0	0	2.11
2001	54	0	2041	-113.982	-99.303	D	7.453	7.453	0	3	2.97	98.01	0	0	0	1.67
2001	55	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	56	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	58	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	59	0	198	-127.727	-111.832	D	7.453	7.453	0	3	3.12	102.17	0	0	0	2.59
2001	60	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	61	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	62	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	63	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	64	0	2789	-107.509	-101.223	D	7.341	7.311	0.03	2.7	1.49	95.6	0	0	0	2.91
2001	65	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	66	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	67	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	68	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	69	0	2789	-107.509	-101.223	D	7.311	7.311	0	2.7	1.19	97.22	0	0	0	2.23
2001	70	0	2789	-107.509	-101.223	D	7.312	7.311	0.001	2.7	3.09	91.96	0	0	0	5.09
2001	71	0	2413	-108.549	-100.356	D	7.311	7.311	0	2.7	4.83	95.27	0	0	0	4
2001	72	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	75	0	2640	-126.111	-108.856	D	7.311	7.311	0	2.7	0.71	99.21	0	0	0	0.4
2001	76	0	2781	-108.101	-100.123	D	7.312	7.311	0.001	2.7	0.66	98.51	0	0	0	0.87
2001	77	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	78	0	2781	-108.101	-100.123	D	7.317	7.311	0.007	2.7	2.98	90.87	0	0	0	6.17
2001	79	0	2589	-130.538	-119.059	D	7.313	7.311	0.002	2.7	3.13	91.49	0	0	0	5.43

Appendix K, Part 4

BASF - Upper Buffalo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	80	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	81	0	2781	-108.101	-100.123	D	7.323	7.311	0.012	2.7	3.14	86.83	0	0	0	10.05
2001	82	0	2789	-107.509	-101.223	D	7.313	7.311	0.003	2.7	4.86	85.7	0	0	0	9.5
2001	83	0	2789	-107.509	-101.223	D	7.312	7.311	0.001	2.7	12.91	68.74	0	0	0	18.42
2001	84	0	2789	-107.509	-101.223	D	7.315	7.311	0.005	2.7	3.78	91.72	0	0	0	4.48
2001	85	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	86	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	87	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	88	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	89	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	90	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	91	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	92	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	93	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	94	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	95	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	96	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	97	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	98	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	99	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	100	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	101	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	102	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	103	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	104	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	105	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	106	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	107	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	108	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	109	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	110	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	111	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	112	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	113	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	114	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	115	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	116	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	117	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	118	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	119	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	120	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	121	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	122	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	123	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	124	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	125	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	126	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	127	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	128	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	129	0	2418	-108.065	-101.355	D	7.639	7.639	0	3.4	14.97	69.21	0	0	0	14.31
2001	130	0	2788	-107.71	-101.211	D	7.639	7.639	0	3.4	13.08	75.96	0	0	0	10.11
2001	131	0	2789	-107.509	-101.223	D	7.639	7.639	0	3.4	24.88	58.72	0	0	0	16.14
2001	132	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	133	0	2788	-107.71	-101.211	D	7.639	7.639	0	3.4	8.42	70.94	0	0	0	18.16
2001	134	0	2789	-107.509	-101.223	D	7.639	7.639	0	3.4	14.83	67.69	0	0	0	18
2001	135	0	2788	-107.71	-101.211	D	7.639	7.639	0	3.4	7.59	84.66	0	0	0	7.65
2001	136	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	137	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	138	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	139	0	2209	-112.495	-99.07	D	7.639	7.639	0	3.4	0.7	91.89	0	0	0	0.02
2001	140	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	8.41	78.96	0	0	0	12.81
2001	141	0	2417	-108.302	-100.358	D	7.639	7.639	0	3.4	15.46	66.3	0	0	0	18.13
2001	142	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	143	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	144	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	145	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	146	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	147	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	148	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	149	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	150	0	975	-121.711	-104.688	D	7.639	7.639	0	3.4	51.93	44.65	0	0	0	49.82
2001	151	0	2337	-110.771	-99.835	D	7.639	7.639	0	3.4	12.86	62.23	0	0	0	11.15
2001	152	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	153	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	154	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	155	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	156	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	157	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	158	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	159	0	2704	-118.811	-99.252	D	7.639	7.639	0	3.4	10.52	76.43	0	0	0	13.01
2001	160	0	2758	-112.009	-98.987	D	7.651	7.639	0.012	3.4	14.51	71.32	0	0	0	14.17
2001	161	0	2781	-108.101	-100.123	D	7.643	7.639	0.004	3.4	32.85	42.13	0	0	0	25.04
2001	162	0	2758	-112.009	-98.987	D	7.639	7.639	0	3.4	23.77	61.71	0	0	0	14.72
2001	163	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	164	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	165	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	166	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	167	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	168	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	169	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	170	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	171	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	172	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	173	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	174	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	175	0	2102	-113.487	-99.308	D	7.639	7.639	0	3.4	0	15.89	0	0	0	3.16
2001	176	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	29.25	46.47	0	0	0	24.05
2001	177	0	2414	-108.31	-101.104	D	7.639	7.639	0	3.4	37.49	35.63	0	0	0	26.82
2001	178	0	1412	-118.691	-99.998	D	7.639	7.639	0	3.4	46.57	26	0	0	0	28.84
2001	179	0	168	-127.977	-112.077	D	7.639	7.639	0	3.4	33.5	54.87	0	0	0	21.13
2001	180	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	22.73	105.54	0	0	0	6.27
2001	181	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	182	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	183	0	2181	-112.745	-99.316	D	7.639	7.639	0	3.4	13.94	44.65	0	0	0	13.31
2001	184	0	2781	-108.101	-100.123	D	7.64	7.639	0.001	3.4	23.62	56.66	0	0	0	19.96
2001	185	0	1040	-121.2	-103.202	D	7.639	7.639	0	3.4	35.59	21.66	0	0	0	17.19
2001	186	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	187	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	188	0	2383	-109.792	-100.839	D	7.639	7.639	0	3.4	24	81.36	0	0	0	0.58
2001	189	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	190	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	191	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	192	0	2397	-109.539	-100.345	D	7.639	7.639	0	3.4	0	41.01	0	0	0	3.61
2001	193	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	29.93	34.44	0	0	0	35.71
2001	194	0	2789	-107.509	-101.223	D	7.639	7.639	0	3.4	40.13	21.19	0	0	0	38.2
2001	195	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	196	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	197	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	198	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	199	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	200	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	201	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	202	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	203	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	204	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	205	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	206	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	207	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	208	0	2155	-112.989	-99.065	D	7.639	7.639	0	3.4	21.98	67.02	0	0	0	4.55
2001	209	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	11.09	87.23	0	0	0	2.25
2001	210	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	5.92	50.72	0	0	0	0.61
2001	211	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	212	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	213	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	214	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	215	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	216	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	217	0	2790	-107.59	-101.331	D	7.639	7.639	0	3.4	52.67	3.39	0	0	0	44.4
2001	218	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	86.71	23.11	0	0	0	16.98
2001	219	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	220	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	221	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	222	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	223	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	11.46	74.81	0	0	0	14.02
2001	224	0	2781	-108.101	-100.123	D	7.644	7.639	0.005	3.4	28.89	44.11	0	0	0	27.05
2001	225	0	2757	-112.241	-99.005	D	7.65	7.639	0.012	3.4	11.81	77.38	0	0	0	10.82
2001	226	0	2627	-127.601	-110.856	D	7.64	7.639	0.002	3.4	22.04	55.14	0	0	0	22.83
2001	227	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	28.8	21.48	0	0	0	49.78
2001	228	0	90	-128.548	-119.031	D	7.64	7.639	0.001	3.4	33.09	35.91	0	0	0	30.94
2001	229	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	230	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	231	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	232	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	233	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	234	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	235	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	236	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	237	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	238	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	239	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	240	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	47.97	8.62	0	0	0	46.77
2001	241	0	2789	-107.509	-101.223	D	7.639	7.639	0	3.4	21.89	61.17	0	0	0	17.37
2001	242	0	2410	-108.557	-101.101	D	7.639	7.639	0	3.4	44.17	28.73	0	0	0	27.37
2001	243	0	2401	-109.291	-100.348	D	7.639	7.639	0	3.4	54.72	21.21	0	0	0	26.75
2001	244	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	245	0	2758	-112.009	-98.987	D	7.731	7.731	0	3.6	38.27	26.99	0	0	0	34.49
2001	246	0	1414	-118.685	-99.501	D	7.731	7.731	0	3.6	13.29	75.31	0	0	0	10.81
2001	247	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	248	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	249	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	250	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	251	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	252	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	253	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	254	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0.84	7.14	0	0	0	0.94
2001	255	0	2790	-107.59	-101.331	D	7.731	7.731	0.001	3.6	8.86	81.87	0	0	0	9.1
2001	256	0	1042	-121.195	-102.705	D	7.731	7.731	0	3.6	13.41	74.19	0	0	0	28.81
2001	257	0	2413	-108.549	-100.356	D	7.731	7.731	0	3.6	28.67	59.13	0	0	0	8.65
2001	258	0	2758	-112.009	-98.987	D	7.732	7.731	0.001	3.6	15.5	68.02	0	0	0	16.56
2001	259	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	260	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	261	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	262	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	263	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	264	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	265	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	266	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	267	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	268	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	269	0	2780	-108.33	-100.15	D	7.763	7.731	0.032	3.6	1.5	94.48	0	0	0	4.02
2001	270	0	2789	-107.509	-101.223	D	7.746	7.731	0.015	3.6	2.87	91.72	0	0	0	5.41
2001	271	0	2468	-114.425	-109.261	D	7.734	7.731	0.003	3.6	6.99	84.87	0	0	0	8.11
2001	272	0	2781	-108.101	-100.123	D	7.732	7.731	0.001	3.6	27.92	34.51	0	0	0	37.41
2001	273	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	7.91	61.38	0	0	0	7.6
2001	274	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	275	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	276	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	277	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	278	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	279	0	2756	-112.473	-99.022	D	7.594	7.593	0.001	3.3	1.09	98.87	0	0	0	0.03
2001	280	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	281	0	2128	-113.239	-99.311	D	7.593	7.593	0	3.3	0.55	83.72	0	0	0	9.24
2001	282	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	283	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	284	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	285	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	286	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	287	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	288	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	289	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	290	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	291	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	292	0	1908	-115.038	-105.506	D	7.593	7.593	0	3.3	1.84	75.65	0	0	0	7.3
2001	293	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	294	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	295	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	296	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	297	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	298	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	299	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	300	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	301	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	302	0	2789	-107.509	-101.223	D	7.593	7.593	0.001	3.3	5.16	89.15	0	0	0	5.8
2001	303	0	2041	-113.982	-99.303	D	7.593	7.593	0	3.3	2.03	89.51	0	0	0	2.03
2001	304	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	305	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	306	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	307	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	308	0	2781	-108.101	-100.123	D	7.547	7.546	0.001	3.2	5.01	91.7	0	0	0	3.51
2001	309	0	2235	-112.247	-99.073	D	7.547	7.546	0.001	3.2	6.29	91.15	0	0	0	2.83
2001	310	0	2789	-107.509	-101.223	D	7.549	7.546	0.003	3.2	6.12	86.59	0	0	0	7.34
2001	311	0	2789	-107.509	-101.223	D	7.548	7.546	0.002	3.2	5.67	87.21	0	0	0	7.15
2001	312	0	2789	-107.509	-101.223	D	7.547	7.546	0.001	3.2	7.25	86.58	0	0	0	6.54
2001	313	0	2789	-107.509	-101.223	D	7.546	7.546	0	3.2	11.9	82.39	0	0	0	6.41

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BASF - Upper Buffalo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	314	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	315	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	316	0	2781	-108.101	-100.123	D	7.549	7.546	0.002	3.2	2.7	89.35	0	0	0	8.03
2001	317	0	2607	-129.28	-115.087	D	7.549	7.546	0.002	3.2	2.46	92.03	0	0	0	5.51
2001	318	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	319	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	320	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	321	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	322	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	323	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	324	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	325	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	326	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	327	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	328	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	329	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	330	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	331	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	332	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	333	0	2789	-107.509	-101.223	D	7.549	7.546	0.003	3.2	0.93	98.13	0	0	0	1
2001	334	0	2758	-112.009	-98.987	D	7.594	7.546	0.047	3.2	1.37	97.06	0	0	0	1.58
2001	335	0	2788	-107.71	-101.211	D	7.546	7.546	0	3.2	0.61	95.59	0	0	0	0.15
2001	336	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	342	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	343	0	2711	-117.197	-99.18	D	7.611	7.593	0.019	3.3	0.69	96.75	0	0	0	2.57
2001	344	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	0.43	97.13	0	0	0	2.21
2001	345	0	2789	-107.509	-101.223	D	7.595	7.593	0.002	3.3	0.73	97.25	0	0	0	2.1
2001	346	0	2789	-107.509	-101.223	D	7.595	7.593	0.002	3.3	1.58	95.9	0	0	0	2.61
2001	347	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	349	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	350	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	351	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	352	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2001												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	353	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
								MAX	0.119							

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BASF - Upper Buffalo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	2	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	3	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	4	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	5	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	6	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	7	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	8	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	9	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	11	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	12	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	13	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	18	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	19	0	2571	-126.292	-119.174	D	7.594	7.593	0.001	3.3	2.21	95.9	0	0	0	1.91
2002	20	0	1125	-120.684	-101.219	D	7.593	7.593	0	3.3	8.4	89.49	0	0	0	1.69
2002	21	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	12.67	17.96	0	0	0	0.47
2002	22	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	25	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	26	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	27	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	28	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	30	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	31	0	2758	-112.009	-98.987	D	7.593	7.593	0	3.3	1.48	97.73	0	0	0	0.44
2002	32	0	1415	-118.683	-99.252	D	7.593	7.593	0	3.3	0.23	100.07	0	0	0	0.01
2002	33	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	34	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	35	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	36	0	2789	-107.509	-101.223	D	7.453	7.453	0	3	0.65	97.28	0	0	0	2.21
2002	37	0	2781	-108.101	-100.123	D	7.457	7.453	0.004	3	0.77	97.22	0	0	0	2.09
2002	38	0	1046	-121.184	-101.711	D	7.453	7.453	0	3	0	123.78	0	0	0	1.98
2002	39	0	2337	-110.771	-99.835	D	7.453	7.453	0	3	0	99.77	0	0	0	2.19
2002	40	0	1770	-116.063	-108.726	D	7.453	7.453	0	3	0	95.95	0	0	0	1.62

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BASF - Upper Buffalo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	41	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	42	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	43	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	44	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	45	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	46	0	2789	-107.509	-101.223	D	7.453	7.453	0	3	1.1	94.64	0	0	0	5.1
2002	47	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	49	0	2386	-109.568	-103.079	D	7.453	7.453	0	3	1.59	101.14	0	0	0	4.1
2002	50	0	2789	-107.509	-101.223	D	7.453	7.453	0	3	1.28	95.77	0	0	0	3.2
2002	51	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	54	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	55	0	2789	-107.509	-101.223	D	7.453	7.453	0.001	3	1.53	95.76	0	0	0	3.1
2002	56	0	2416	-108.304	-100.607	D	7.453	7.453	0	3	1.4	95.25	0	0	0	2.77
2002	57	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	58	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	61	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	62	0	2417	-108.302	-100.358	D	7.311	7.311	0	2.7	1.42	97.74	0	0	0	0.71
2002	63	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	72	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	73	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	75	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	76	0	2781	-108.101	-100.123	D	7.341	7.311	0.03	2.7	0.8	94.72	0	0	0	4.49
2002	77	0	1414	-118.685	-99.501	D	7.311	7.311	0	2.7	1.13	99.03	0	0	0	0.05
2002	78	0	2413	-108.549	-100.356	D	7.311	7.311	0	2.7	3.69	103.29	0	0	0	0.11
2002	79	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	80	0	2789	-107.509	-101.223	D	7.311	7.311	0.001	2.7	3.79	93.61	0	0	0	2.54
2002	81	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	82	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	83	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	85	0	2628	-127.536	-110.65	D	7.32	7.311	0.009	2.7	3.37	93.41	0	0	0	3.22
2002	86	0	2781	-108.101	-100.123	D	7.323	7.311	0.012	2.7	2.35	95.55	0	0	0	2.1
2002	87	0	2789	-107.509	-101.223	D	7.312	7.311	0.001	2.7	5.71	90.17	0	0	0	4.28
2002	88	0	2781	-108.101	-100.123	D	7.311	7.311	0	2.7	4.57	92.69	0	0	0	2.96
2002	89	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	90	0	2417	-108.302	-100.358	D	7.311	7.311	0	2.7	3.94	91.83	0	0	0	4.72
2002	91	0	2781	-108.101	-100.123	D	7.313	7.311	0.002	2.7	3.67	87	0	0	0	9.42
2002	92	0	2781	-108.101	-100.123	D	7.36	7.358	0.002	2.8	2.6	91.9	0	0	0	5.51
2002	93	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	94	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	95	0	2789	-107.509	-101.223	D	7.361	7.358	0.003	2.8	2.95	92.54	0	0	0	4.56
2002	96	0	2789	-107.509	-101.223	D	7.37	7.358	0.012	2.8	4.83	88.66	0	0	0	6.52
2002	97	0	2789	-107.509	-101.223	D	7.364	7.358	0.006	2.8	8.77	82.25	0	0	0	9
2002	98	0	2781	-108.101	-100.123	D	7.358	7.358	0	2.8	7.87	85.58	0	0	0	6.71
2002	99	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	100	0	2789	-107.509	-101.223	D	7.358	7.358	0	2.8	1.32	96.03	0	0	0	3.04
2002	101	0	2789	-107.509	-101.223	D	7.362	7.358	0.003	2.8	2.73	92.5	0	0	0	4.77
2002	102	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	103	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	104	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	105	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	106	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	107	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	108	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	109	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	110	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	111	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	112	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	113	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	114	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	115	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	116	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	117	0	2588	-130.481	-119.268	D	7.358	7.358	0	2.8	2.52	93.37	0	0	0	4.53
2002	118	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	119	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	120	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	121	0	2407	-108.802	-100.85	D	7.358	7.358	0	2.8	14.47	76.09	0	0	0	8.96
2002	122	0	2074	-113.734	-99.306	D	7.639	7.639	0	3.4	9.42	75.64	0	0	0	3.17
2002	123	0	2789	-107.509	-101.223	D	7.642	7.639	0.003	3.4	7.2	89.44	0	0	0	3.38
2002	124	0	2781	-108.101	-100.123	D	7.643	7.639	0.004	3.4	5.49	89.59	0	0	0	4.93
2002	125	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	126	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	127	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	128	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	129	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	130	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	131	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	132	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	133	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	134	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	135	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	136	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	137	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	138	0	2704	-118.811	-99.252	D	7.639	7.639	0	3.4	9.91	86.03	0	0	0	4.12
2002	139	0	2694	-120.047	-100.054	D	7.64	7.639	0.001	3.4	10.13	79.08	0	0	0	10.72
2002	140	0	2571	-126.292	-119.174	D	7.64	7.639	0.001	3.4	4.35	92.06	0	0	0	3.58
2002	141	0	2381	-109.797	-101.336	D	7.639	7.639	0	3.4	11.51	66.36	0	0	0	14.58
2002	142	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	23.47	55.72	0	0	0	20.9
2002	143	0	2417	-108.302	-100.358	D	7.639	7.639	0	3.4	15.1	76.2	0	0	0	8.67
2002	144	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	145	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	146	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	147	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	148	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	149	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	150	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	151	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	152	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	153	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	154	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	155	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	156	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	157	0	2789	-107.509	-101.223	D	7.639	7.639	0	3.4	4.45	93.3	0	0	0	2.2

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BASF - Upper Buffalo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	158	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	18.09	65.26	0	0	0	16.88
2002	159	0	2571	-126.292	-119.174	D	7.643	7.639	0.004	3.4	18.55	66.17	0	0	0	15.34
2002	160	0	2789	-107.509	-101.223	D	7.641	7.639	0.002	3.4	26.04	52.41	0	0	0	21.59
2002	161	0	2041	-113.982	-99.303	D	7.639	7.639	0	3.4	20.37	65.66	0	0	0	10.01
2002	162	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	163	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	164	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	165	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	166	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	167	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	168	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	169	0	1009	-121.45	-103.448	D	7.639	7.639	0	3.4	31.7	31.97	0	0	0	27.18
2002	170	0	2038	-113.99	-100.049	D	7.639	7.639	0	3.4	2.9	6.49	0	0	0	1.96
2002	171	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	172	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	173	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	174	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	175	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	176	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	177	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	178	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	179	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	180	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	181	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	182	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	183	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	184	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	185	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	186	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	187	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	188	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	189	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	190	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	191	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	192	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	193	0	2322	-111.018	-99.832	D	7.639	7.639	0	3.4	92.51	4.95	0	0	0	4.36
2002	194	0	2209	-112.495	-99.07	D	7.639	7.639	0	3.4	93.46	13.47	0	0	0	3.07
2002	195	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	126.7	38.59	0	0	0	3.56
2002	196	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	197	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	198	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	199	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	200	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	201	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	202	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	203	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	204	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	205	0	2788	-107.71	-101.211	D	7.639	7.639	0	3.4	0.54	91.94	0	0	0	0.2
2002	206	0	2789	-107.509	-101.223	D	7.641	7.639	0.002	3.4	19.67	63.23	0	0	0	17.14
2002	207	0	2571	-126.292	-119.174	D	7.64	7.639	0.002	3.4	24.47	58.71	0	0	0	16.95
2002	208	0	2788	-107.71	-101.211	D	7.639	7.639	0.001	3.4	19.15	69.01	0	0	0	11.87
2002	209	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	210	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	211	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	212	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	213	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	214	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	215	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	216	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	217	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	218	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	219	0	1047	-121.181	-101.463	D	7.639	7.639	0	3.4	8.58	48.55	0	0	0	41.99
2002	220	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	12.47	0	0	0	16.56
2002	221	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	222	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	223	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	224	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	225	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	226	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	227	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	228	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	229	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	230	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	231	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	232	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	233	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	234	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	235	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	236	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	237	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	238	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	239	0	2789	-107.509	-101.223	D	7.644	7.639	0.006	3.4	19.27	58.98	0	0	0	21.77
2002	240	0	2589	-130.538	-119.059	D	7.642	7.639	0.003	3.4	9.56	81.93	0	0	0	8.54
2002	241	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	14.23	0.55	0	0	0	0.74
2002	242	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	243	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	244	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	245	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	246	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	247	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	248	0	2781	-108.101	-100.123	D	7.731	7.731	0	3.6	41.91	21.12	0	0	0	37.17
2002	249	0	2789	-107.509	-101.223	D	7.731	7.731	0.001	3.6	24.74	53.33	0	0	0	22.03
2002	250	0	1045	-121.186	-101.96	D	7.731	7.731	0	3.6	50.53	15.36	0	0	0	33.6
2002	251	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	252	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	253	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	254	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	255	0	2704	-118.811	-99.252	D	7.734	7.731	0.003	3.6	8.62	75.47	0	0	0	15.89
2002	256	0	2588	-130.481	-119.268	D	7.732	7.731	0.001	3.6	12.75	67.33	0	0	0	20
2002	257	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	43.38	24.46	0	0	0	33.52
2002	258	0	2035	-113.998	-100.794	D	7.731	7.731	0	3.6	37.64	31.54	0	0	0	26.45
2002	259	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	17.44	56.57	0	0	0	5.17
2002	260	0	2789	-107.509	-101.223	D	7.731	7.731	0.001	3.6	15.72	75.04	0	0	0	9.42
2002	261	0	2385	-109.786	-100.342	D	7.731	7.731	0	3.6	8.29	90.65	0	0	0	2.62
2002	262	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	263	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	264	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	265	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	266	0	2789	-107.509	-101.223	D	7.731	7.731	0	3.6	6.86	55.17	0	0	0	35.23
2002	267	0	2468	-114.425	-109.261	D	7.731	7.731	0	3.6	24.22	43.79	0	0	0	31.74
2002	268	0	2571	-126.292	-119.174	D	7.732	7.731	0.001	3.6	7.32	83.77	0	0	0	9.04
2002	269	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	13.83	21.94	0	0	0	5.4
2002	270	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	271	0	1517	-117.94	-99.261	D	7.731	7.731	0	3.6	23.26	49.29	0	0	0	27.21
2002	272	0	2789	-107.509	-101.223	D	7.731	7.731	0.001	3.6	19.12	54.08	0	0	0	26.84
2002	273	0	2780	-108.33	-100.15	D	7.731	7.731	0	3.6	18.47	58.31	0	0	0	15.7
2002	274	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	275	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	276	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	277	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	278	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	279	0	2417	-108.302	-100.358	D	7.593	7.593	0	3.3	0	42.06	0	0	0	10.8
2002	280	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	281	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	2.54	91.22	0	0	0	6.32
2002	282	0	2789	-107.509	-101.223	D	7.595	7.593	0.003	3.3	5.42	83.95	0	0	0	10.7
2002	283	0	1009	-121.45	-103.448	D	7.593	7.593	0	3.3	19.01	74.03	0	0	0	16.07
2002	284	0	2155	-112.989	-99.065	D	7.593	7.593	0	3.3	1.64	17.34	0	0	0	3.05
2002	285	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	286	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	287	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	1.01	95.15	0	0	0	3.58
2002	288	0	2757	-112.241	-99.005	D	7.606	7.593	0.013	3.3	2.54	93.37	0	0	0	4.09
2002	289	0	2789	-107.509	-101.223	D	7.594	7.593	0.002	3.3	3.41	92.65	0	0	0	4.05
2002	290	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	291	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	292	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	293	0	2468	-114.425	-109.261	D	7.6	7.593	0.007	3.3	1.85	95.18	0	0	0	2.99
2002	294	0	2571	-126.292	-119.174	D	7.612	7.593	0.019	3.3	3.86	90.23	0	0	0	5.92
2002	295	0	2684	-121.246	-101.035	D	7.597	7.593	0.005	3.3	6.8	85.88	0	0	0	7.34
2002	296	0	1415	-118.683	-99.252	D	7.594	7.593	0.002	3.3	10.05	80.34	0	0	0	9.63
2002	297	0	2041	-113.982	-99.303	D	7.593	7.593	0	3.3	66.71	30.82	0	0	0	5.03
2002	298	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	299	0	2781	-108.101	-100.123	D	7.594	7.593	0.001	3.3	7.83	88.46	0	0	0	3.72
2002	300	0	2789	-107.509	-101.223	D	7.594	7.593	0.002	3.3	10.37	84.64	0	0	0	5.09
2002	301	0	2789	-107.509	-101.223	D	7.643	7.593	0.05	3.3	2.95	94.17	0	0	0	2.89
2002	302	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	303	0	2684	-121.246	-101.035	D	7.597	7.593	0.004	3.3	1.53	98.32	0	0	0	0.16
2002	304	0	2684	-121.246	-101.035	D	7.619	7.593	0.026	3.3	3.58	94.9	0	0	0	1.53
2002	305	0	2571	-126.292	-119.174	D	7.603	7.593	0.011	3.3	2.42	95.9	0	0	0	1.67
2002	306	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	307	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	308	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	309	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	310	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	311	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	312	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	313	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix K, Part 4

BASF - Upper Buffalo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	314	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	315	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	316	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	317	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	318	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	319	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	320	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	321	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	322	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	323	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	324	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	325	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	326	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	327	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	328	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	329	0	2781	-108.101	-100.123	D	7.57	7.546	0.024	3.2	0.98	97.24	0	0	0	1.79
2002	330	0	2789	-107.509	-101.223	D	7.554	7.546	0.007	3.2	0.87	97.14	0	0	0	2
2002	331	0	2781	-108.101	-100.123	D	7.588	7.546	0.042	3.2	1	96.54	0	0	0	2.46
2002	332	0	2588	-130.481	-119.268	D	7.564	7.546	0.018	3.2	0.92	96.61	0	0	0	2.48
2002	333	0	2571	-126.292	-119.174	D	7.547	7.546	0.001	3.2	1.39	96.92	0	0	0	1.92
2002	334	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	335	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	336	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	338	0	1415	-118.683	-99.252	D	7.603	7.593	0.01	3.3	0.52	96.43	0	0	0	3.06
2002	339	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	340	0	2781	-108.101	-100.123	D	7.652	7.593	0.059	3.3	0.76	96.55	0	0	0	2.69
2002	341	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	343	0	2758	-112.009	-98.987	D	7.597	7.593	0.004	3.3	0.73	96.79	0	0	0	2.47
2002	344	0	2684	-121.246	-101.035	D	7.595	7.593	0.003	3.3	0.75	97.09	0	0	0	2.17
2002	345	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	348	0	2789	-107.509	-101.223	D	7.595	7.593	0.002	3.3	1.25	95.98	0	0	0	2.82
2002	349	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix K, Part 4

BASF - Upper Buffalo Refined Analysis Method 6 - 2002												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	353	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	357	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	358	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	359	0	2684	-121.246	-101.035	D	7.607	7.593	0.014	3.3	1.08	96.39	0	0	0	2.53
2002	360	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
								MAX	0.059							

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BASF - Upper Buffalo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	2	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	3	0	2704	-118.811	-99.252	D	7.598	7.593	0.005	3.3	0.45	98.23	0	0	0	1.32
2003	4	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	5	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	6	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	7	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	8	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	10	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	11	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	13	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	14	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	15	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	16	0	2789	-107.509	-101.223	D	7.598	7.593	0.005	3.3	1.05	97.16	0	0	0	1.8
2003	17	0	2704	-118.811	-99.252	D	7.616	7.593	0.023	3.3	1.1	96.87	0	0	0	2.03
2003	18	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	19	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	21	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	22	0	2704	-118.811	-99.252	D	7.596	7.593	0.003	3.3	0.88	97.56	0	0	0	1.56
2003	23	0	2702	-118.888	-99.717	D	7.612	7.593	0.02	3.3	0.33	97.25	0	0	0	2.42
2003	24	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	25	0	1893	-115.078	-109.234	D	7.593	7.593	0	3.3	0.92	101.36	0	0	0	1.4
2003	26	0	2341	-110.553	-102.571	D	7.593	7.593	0	3.3	2	94.46	0	0	0	2.08
2003	27	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	28	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	1.6	96.95	0	0	0	2
2003	29	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	30	0	2781	-108.101	-100.123	D	7.644	7.593	0.052	3.3	1.5	95.6	0	0	0	2.91
2003	31	0	2628	-127.536	-110.65	D	7.596	7.593	0.003	3.3	1.8	95.71	0	0	0	2.48
2003	32	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	33	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	37	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	38	0	2790	-107.59	-101.331	D	7.454	7.453	0.001	3	1.33	97.36	0	0	0	1.41
2003	39	0	2788	-107.71	-101.211	D	7.453	7.453	0	3	1.17	95.66	0	0	0	1.19
2003	40	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	41	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	42	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	43	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	44	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	45	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	46	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	0	2605	-129.439	-115.528	D	7.471	7.453	0.018	3	1.76	95.53	0	0	0	2.72
2003	49	0	2781	-108.101	-100.123	D	7.467	7.453	0.015	3	1.13	96.35	0	0	0	2.54
2003	50	0	2789	-107.509	-101.223	D	7.453	7.453	0.001	3	2.6	95.81	0	0	0	2.01
2003	51	0	2708	-117.889	-99.21	D	7.453	7.453	0	3	3.41	96.5	0	0	0	1.48
2003	52	0	2704	-118.811	-99.252	D	7.455	7.453	0.002	3	0.86	98.53	0	0	0	0.71
2003	53	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	54	0	2789	-107.509	-101.223	D	7.454	7.453	0.001	3	1.73	96.08	0	0	0	2.27
2003	55	0	2781	-108.101	-100.123	D	7.467	7.453	0.014	3	1.35	97.21	0	0	0	1.45
2003	56	0	2789	-107.509	-101.223	D	7.454	7.453	0.001	3	1.49	97.27	0	0	0	1.28
2003	57	0	2781	-108.101	-100.123	D	7.468	7.453	0.015	3	0.73	96.65	0	0	0	2.64
2003	58	0	2600	-129.838	-116.63	D	7.457	7.453	0.004	3	1.1	96.87	0	0	0	2.07
2003	59	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	60	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	61	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	62	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	63	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	64	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	65	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	66	0	2789	-107.509	-101.223	D	7.314	7.311	0.004	2.7	2.62	94.29	0	0	0	3.16
2003	67	0	2789	-107.509	-101.223	D	7.313	7.311	0.002	2.7	3.49	93.71	0	0	0	2.91
2003	68	0	2401	-109.291	-100.348	D	7.311	7.311	0	2.7	5.67	91.72	0	0	0	2.48
2003	69	0	2788	-107.71	-101.211	D	7.311	7.311	0	2.7	1.08	99.04	0	0	0	1.45
2003	70	0	2789	-107.509	-101.223	D	7.334	7.311	0.024	2.7	1.15	95.39	0	0	0	3.47
2003	71	0	2781	-108.101	-100.123	D	7.322	7.311	0.012	2.7	1.85	95.31	0	0	0	2.86
2003	72	0	412	-126.221	-109.859	D	7.311	7.311	0	2.7	1.17	74.66	0	0	0	1.21
2003	73	0	2781	-108.101	-100.123	D	7.315	7.311	0.005	2.7	3.17	91.68	0	0	0	5.19
2003	74	0	2618	-128.279	-112.723	D	7.319	7.311	0.008	2.7	2.92	92.35	0	0	0	4.75
2003	75	0	2684	-121.246	-101.035	D	7.311	7.311	0	2.7	4.07	92.19	0	0	0	4.2
2003	76	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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BASF - Upper Buffalo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	80	0	2781	-108.101	-100.123	D	7.311	7.311	0	2.7	2.22	97.1	0	0	0	1.03
2003	81	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	82	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	83	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	85	0	2707	-118.12	-99.221	D	7.314	7.311	0.003	2.7	2.3	95.65	0	0	0	2.09
2003	86	0	2684	-121.246	-101.035	D	7.312	7.311	0.001	2.7	1.44	96.95	0	0	0	1.64
2003	87	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	90	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	92	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	93	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	94	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	95	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	96	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	97	0	2155	-112.989	-99.065	D	7.358	7.358	0	2.8	1.61	96.26	0	0	0	1.48
2003	98	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	99	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	100	0	2789	-107.509	-101.223	D	7.358	7.358	0	2.8	1.24	96.52	0	0	0	3.26
2003	101	0	2789	-107.509	-101.223	D	7.38	7.358	0.022	2.8	1.93	92.55	0	0	0	5.53
2003	102	0	2789	-107.509	-101.223	D	7.36	7.358	0.002	2.8	4.27	89.46	0	0	0	6.38
2003	103	0	2788	-107.71	-101.211	D	7.359	7.358	0	2.8	7.75	83.57	0	0	0	8.97
2003	104	0	2418	-108.065	-101.355	D	7.358	7.358	0	2.8	17.28	56.4	0	0	0	12.98
2003	105	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	106	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	107	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	108	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	109	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	110	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	111	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	112	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	113	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	114	0	2789	-107.509	-101.223	D	7.359	7.358	0.001	2.8	6.56	78.8	0	0	0	14.69
2003	115	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	116	0	2781	-108.101	-100.123	D	7.367	7.358	0.009	2.8	2.8	95.2	0	0	0	2.03
2003	117	0	2781	-108.101	-100.123	D	7.365	7.358	0.006	2.8	2.73	93.43	0	0	0	3.88
2003	118	0	2588	-130.481	-119.268	D	7.359	7.358	0.001	2.8	11.42	81.13	0	0	0	7.79

Appendix K, Part 4

BASF - Upper Buffalo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	119	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	120	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	121	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	122	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	123	0	2789	-107.509	-101.223	D	7.644	7.639	0.005	3.4	3.54	92.72	0	0	0	3.74
2003	124	0	2781	-108.101	-100.123	D	7.654	7.639	0.015	3.4	6.49	87.68	0	0	0	5.83
2003	125	0	918	-122.208	-104.931	D	7.639	7.639	0	3.4	32.99	55.34	0	0	0	10.3
2003	126	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	127	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	128	0	2704	-118.811	-99.252	D	7.64	7.639	0.001	3.4	16	68.25	0	0	0	15.79
2003	129	0	2037	-113.992	-100.297	D	7.639	7.639	0	3.4	26.47	54.34	0	0	0	10.57
2003	130	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	131	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	132	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	133	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	134	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	135	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	136	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	137	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	138	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	139	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	140	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	141	0	2789	-107.509	-101.223	D	7.639	7.639	0	3.4	1.79	95.26	0	0	0	2.04
2003	142	0	2758	-112.009	-98.987	D	7.644	7.639	0.005	3.4	2.59	93.22	0	0	0	4.2
2003	143	0	2588	-130.481	-119.268	D	7.64	7.639	0.001	3.4	9.48	83.14	0	0	0	7.77
2003	144	0	2758	-112.009	-98.987	D	7.641	7.639	0.002	3.4	27.86	43.8	0	0	0	28.36
2003	145	0	2758	-112.009	-98.987	D	7.641	7.639	0.002	3.4	16.4	71.52	0	0	0	12.12
2003	146	0	1415	-118.683	-99.252	D	7.64	7.639	0.001	3.4	14.94	76.43	0	0	0	8.58
2003	147	0	1414	-118.685	-99.501	D	7.639	7.639	0	3.4	9.86	84.49	0	0	0	5.14
2003	148	0	2758	-112.009	-98.987	D	7.645	7.639	0.006	3.4	19.89	53.9	0	0	0	26.21
2003	149	0	2571	-126.292	-119.174	D	7.641	7.639	0.002	3.4	10.87	79.13	0	0	0	10.05
2003	150	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	151	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	152	0	2789	-107.509	-101.223	D	7.639	7.639	0	3.4	6.55	85.6	0	0	0	6.79
2003	153	0	2781	-108.101	-100.123	D	7.641	7.639	0.002	3.4	8.66	84.26	0	0	0	7.15
2003	154	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	155	0	2781	-108.101	-100.123	D	7.644	7.639	0.005	3.4	8.05	84.05	0	0	0	7.91
2003	156	0	2571	-126.292	-119.174	D	7.643	7.639	0.004	3.4	9.51	83.26	0	0	0	7.24
2003	157	0	2571	-126.292	-119.174	D	7.641	7.639	0.002	3.4	12.04	78.7	0	0	0	9.23

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BASF - Upper Buffalo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	158	0	2409	-108.796	-100.353	D	7.639	7.639	0	3.4	12.03	80.67	0	0	0	7.22
2003	159	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	18.77	80.53	0	0	0	2.91
2003	160	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	161	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	162	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	163	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	164	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	165	0	1415	-118.683	-99.252	D	7.639	7.639	0	3.4	4.69	95.21	0	0	0	1.05
2003	166	0	2781	-108.101	-100.123	D	7.643	7.639	0.005	3.4	16.43	71.05	0	0	0	12.55
2003	167	0	2588	-130.481	-119.268	D	7.643	7.639	0.004	3.4	8.43	85.73	0	0	0	5.85
2003	168	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	169	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	170	0	1042	-121.195	-102.705	D	7.639	7.639	0	3.4	21.79	63.83	0	0	0	13.7
2003	171	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	36.09	40.08	0	0	0	23.96
2003	172	0	2468	-114.425	-109.261	D	7.643	7.639	0.004	3.4	16.36	74.53	0	0	0	9.13
2003	173	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	174	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	175	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	176	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	177	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	178	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	179	0	305	-126.816	-119.05	D	7.639	7.639	0	3.4	8.61	82.95	0	0	0	7.39
2003	180	0	340	-126.568	-119.053	D	7.639	7.639	0	3.4	19.27	65.02	0	0	0	15.85
2003	181	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	39.72	36.08	0	0	0	24.18
2003	182	0	1042	-121.195	-102.705	D	7.639	7.639	0	3.4	43	31.28	0	0	0	22.45
2003	183	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	184	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	185	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	186	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	187	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	188	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	189	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	190	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	191	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	192	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	193	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	194	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	195	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	45.28	10.04	0	0	0	44.58
2003	196	0	2397	-109.539	-100.345	D	7.639	7.639	0	3.4	30.5	41.43	0	0	0	26.98

Appendix K, Part 4

BASF - Upper Buffalo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	197	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	198	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	199	0	1138	-120.503	-107.435	D	7.639	7.639	0	3.4	25.75	5.41	0	0	0	33.95
2003	200	0	2350	-110.313	-103.319	D	7.639	7.639	0	3.4	44.57	8.25	0	0	0	42.61
2003	201	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	32.23	17.65	0	0	0	29.15
2003	202	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	203	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	204	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	205	0	2789	-107.509	-101.223	D	7.644	7.639	0.005	3.4	12.27	62.73	0	0	0	25.02
2003	206	0	2155	-112.989	-99.065	D	7.642	7.639	0.003	3.4	16.51	61.15	0	0	0	22.38
2003	207	0	234	-127.469	-110.84	D	7.639	7.639	0	3.4	34.59	42.78	0	0	0	22.71
2003	208	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	209	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	210	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	211	0	2757	-112.241	-99.005	D	7.64	7.639	0.001	3.4	37.43	22.55	0	0	0	40.11
2003	212	0	2749	-114.099	-99.144	D	7.64	7.639	0.001	3.4	33.39	41.38	0	0	0	25.19
2003	213	0	2571	-126.292	-119.174	D	7.64	7.639	0.001	3.4	10.25	85.01	0	0	0	4.81
2003	214	0	305	-126.816	-119.05	D	7.639	7.639	0	3.4	30.65	71.16	0	0	0	4.67
2003	215	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	34.81	2.54	0	0	0	1.94
2003	216	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	217	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	218	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	219	0	2789	-107.509	-101.223	D	7.647	7.639	0.008	3.4	9.92	80.77	0	0	0	9.3
2003	220	0	2789	-107.509	-101.223	D	7.65	7.639	0.011	3.4	15.16	66.67	0	0	0	18.18
2003	221	0	2789	-107.509	-101.223	D	7.641	7.639	0.002	3.4	17.84	61.74	0	0	0	20.44
2003	222	0	16	-129.758	-116.532	D	7.641	7.639	0.002	3.4	39.16	22.63	0	0	0	38.25
2003	223	0	2628	-127.536	-110.65	D	7.643	7.639	0.004	3.4	37.19	29.66	0	0	0	33.14
2003	224	0	2588	-130.481	-119.268	D	7.642	7.639	0.003	3.4	28.7	47.79	0	0	0	23.52
2003	225	0	2628	-127.536	-110.65	D	7.639	7.639	0	3.4	10.28	81.58	0	0	0	8.09
2003	226	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	227	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	228	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	229	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	230	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	231	0	2408	-108.799	-100.601	D	7.639	7.639	0	3.4	42.58	18.13	0	0	0	39.99
2003	232	0	2788	-107.71	-101.211	D	7.639	7.639	0	3.4	36.47	36.45	0	0	0	27.07
2003	233	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	20.17	68.01	0	0	0	11.88
2003	234	0	2418	-108.065	-101.355	D	7.639	7.639	0	3.4	49.7	22.77	0	0	0	27.35
2003	235	0	2413	-108.549	-100.356	D	7.639	7.639	0	3.4	49.17	18.16	0	0	0	32.85

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BASF - Upper Buffalo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	236	0	2781	-108.101	-100.123	D	7.641	7.639	0.002	3.4	43.61	8.82	0	0	0	47.59
2003	237	0	1047	-121.181	-101.463	D	7.641	7.639	0.002	3.4	30.57	44.1	0	0	0	25.35
2003	238	0	1201	-120.183	-100.728	D	7.639	7.639	0	3.4	42.05	31.32	0	0	0	26.42
2003	239	0	2405	-109.044	-100.35	D	7.639	7.639	0	3.4	43.84	37.12	0	0	0	18.56
2003	240	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	26.03	36.42	0	0	0	12.9
2003	241	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	242	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	243	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	244	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	245	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	246	0	2589	-130.538	-119.059	D	7.759	7.731	0.028	3.6	2.92	94.99	0	0	0	2.09
2003	247	0	2588	-130.481	-119.268	D	7.757	7.731	0.026	3.6	3.44	94.42	0	0	0	2.15
2003	248	0	2789	-107.509	-101.223	D	7.736	7.731	0.005	3.6	5.49	88.96	0	0	0	5.55
2003	249	0	2789	-107.509	-101.223	D	7.736	7.731	0.006	3.6	7.86	77.74	0	0	0	14.39
2003	250	0	168	-127.977	-112.077	D	7.731	7.731	0	3.6	12.01	69.24	0	0	0	13.74
2003	251	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	252	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	253	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	254	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	255	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	256	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	257	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	258	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	259	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	260	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	261	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	262	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	263	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	264	0	2788	-107.71	-101.211	D	7.731	7.731	0	3.6	22.14	58.2	0	0	0	19.52
2003	265	0	2416	-108.304	-100.607	D	7.732	7.731	0.001	3.6	23.69	58.02	0	0	0	18.17
2003	266	0	1517	-117.94	-99.261	D	7.731	7.731	0	3.6	0.96	88.57	0	0	0	3.13
2003	267	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	268	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	269	0	2789	-107.509	-101.223	D	7.732	7.731	0.001	3.6	14.61	49.11	0	0	0	36.22
2003	270	0	2571	-126.292	-119.174	D	7.732	7.731	0.001	3.6	8.91	82.98	0	0	0	8.11
2003	271	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	272	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	273	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	274	0	2781	-108.101	-100.123	D	7.733	7.731	0.002	3.6	2.24	94.66	0	0	0	3.13

Appendix K, Part 4

BASF - Upper Buffalo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	275	0	2789	-107.509	-101.223	D	7.594	7.593	0.002	3.3	3.79	92.62	0	0	0	3.66
2003	276	0	2781	-108.101	-100.123	D	7.599	7.593	0.006	3.3	4.7	83.12	0	0	0	12.2
2003	277	0	1415	-118.683	-99.252	D	7.593	7.593	0.001	3.3	9.02	80.39	0	0	0	10.65
2003	278	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	279	0	1951	-114.584	-109.239	D	7.593	7.593	0	3.3	0	90.85	0	0	0	7.6
2003	280	0	2571	-126.292	-119.174	D	7.593	7.593	0	3.3	0	87.41	0	0	0	12.6
2003	281	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	90.6	0	0	0	11.03
2003	282	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	283	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	284	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	285	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	286	0	2781	-108.101	-100.123	D	7.593	7.593	0	3.3	2.57	92.63	0	0	0	4.75
2003	287	0	2789	-107.509	-101.223	D	7.594	7.593	0.001	3.3	7.06	85.3	0	0	0	7.67
2003	288	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	289	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	290	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	4.29	11.26	0	0	0	0.21
2003	291	0	2694	-120.047	-100.054	D	7.6	7.593	0.007	3.3	4.48	83.96	0	0	0	11.57
2003	292	0	2684	-121.246	-101.035	D	7.595	7.593	0.002	3.3	9.39	81.35	0	0	0	9.33
2003	293	0	2406	-108.804	-101.098	D	7.593	7.593	0	3.3	35.1	62.09	0	0	0	5.11
2003	294	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	66.24	2.87	0	0	0	3.49
2003	295	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	296	0	1414	-118.685	-99.501	D	7.594	7.593	0.001	3.3	14.81	49.13	0	0	0	35.96
2003	297	0	2588	-130.481	-119.268	D	7.595	7.593	0.002	3.3	3.69	88.74	0	0	0	7.58
2003	298	0	2373	-110.036	-100.588	D	7.593	7.593	0	3.3	20.58	44.52	0	0	0	32.78
2003	299	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	3.84	89.98	0	0	0	6.29
2003	300	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	301	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	302	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	303	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	304	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	305	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	306	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	307	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	308	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	309	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	310	0	2781	-108.101	-100.123	D	7.551	7.546	0.005	3.2	1.5	96.46	0	0	0	2.07
2003	311	0	2684	-121.246	-101.035	D	7.621	7.546	0.075	3.2	1.19	96.25	0	0	0	2.56
2003	312	0	2600	-129.838	-116.63	D	7.565	7.546	0.019	3.2	1.66	95.57	0	0	0	2.78
2003	313	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix K, Part 4

BASF - Upper Buffalo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	314	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	315	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	316	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	317	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	318	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	319	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	320	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	321	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	322	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	323	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	324	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	325	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	326	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	327	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	328	0	1242	-119.931	-100.233	D	7.546	7.546	0	3.2	6.76	85.9	0	0	0	7.63
2003	329	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	330	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	331	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	332	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	333	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	334	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	335	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	336	0	2571	-126.292	-119.174	D	7.593	7.593	0	3.3	0.84	95.91	0	0	0	3.78
2003	337	0	2571	-126.292	-119.174	D	7.599	7.593	0.006	3.3	1.27	94.11	0	0	0	4.61
2003	338	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	339	0	2781	-108.101	-100.123	D	7.593	7.593	0.001	3.3	2.2	96.39	0	0	0	1.33
2003	340	0	2788	-107.71	-101.211	D	7.593	7.593	0	3.3	1.82	90.17	0	0	0	1.35
2003	341	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	0.57	97.89	0	0	0	1.49
2003	342	0	2781	-108.101	-100.123	D	7.595	7.593	0.002	3.3	0.81	97.65	0	0	0	1.56
2003	343	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	345	0	2781	-108.101	-100.123	D	7.593	7.593	0	3.3	0.37	99.71	0	0	0	0.09
2003	346	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	347	0	2781	-108.101	-100.123	D	7.595	7.593	0.002	3.3	1.74	95.42	0	0	0	2.8
2003	348	0	47	-129.247	-115.047	D	7.593	7.593	0	3.3	0	20.57	0	0	0	0.43
2003	349	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix K, Part 4

BASF - Upper Buffalo Refined Analysis Method 6 - 2003												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	353	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	355	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	356	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	358	0	2788	-107.71	-101.211	D	7.593	7.593	0	3.3	0.02	94.53	0	0	0	0.01
2003	359	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	360	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	361	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	362	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	365	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0
								MAX	0.075							

```
*******************************************************************************************
****************************************
                                              CALPOST  Version 5.6392        Level 051130
*******************************************************************************************
****************************************



 Internal Coordinate Transformations by
  ---  COORDLIB   Version: 1.95   Level: 050126



  Run Title:
     CALPUFF BAS 2001 BART Evaluation
     HERCULES UMC 6km REFINED MET
     MAY 2009 BASE (5 units PTE)

 --------------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 --------------

      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   1  !

          METRUN = 0 - Run period explicitly defined below
          METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  2001   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                        Hour  (ISHR) --    No default   ! ISHR  =  0   !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Species & Concentration/Deposition Information
 ----------------------------------------------

       Species to process (ASPEC)       -- No default   ! ASPEC = VISIB  !
       (ASPEC = VISIB for visibility processing)

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes,
         '-3' for wet+dry deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
             X(new) = X(old) * A + B         A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations/Fluxes?
                              (LBACK)  -- Default: F   ! LBACK =  F !

 Source information
 ------------------
```

```
  Option to process source contributions:
         0 =  Process only total reported contributions
         1 =  Sum all individual source contributions and process
         2 =  Run in TRACEBACK mode to identify source
              contributions at a SINGLE receptor
                             (MSOURCE) -- Default: 0   ! MSOURCE =  0  !

Receptor information
--------------------

  Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                                 (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):

  Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                                OR
  Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
     0 = discrete receptor not processed
     1 = discrete receptor processed
  using repeated value notation to select blocks of receptors:
     23*1, 15*0, 12*1
  Flag for all receptors after the last one assigned is set to 0
  (NDRECP) -- Default: -1
                                                 ! NDRECP =  -1  !


--Select range of GRIDDED receptors (only used when LG = T):

       X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
           (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
           (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
           (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
           (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1


--Specific gridded receptors can also be excluded from CALPOST
  processing by filling a processing grid array with 0s and 1s.  If the
  processing flag for receptor index (i,j) is 1 (ON), that receptor
  will be processed if it lies within the range delineated by IBGRID,
  JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be
  processed in the run.  By default, all array values are set to 1 (ON).

  Number of gridded receptor rows provided in Subgroup (1a) to
  identify specific gridded receptors to process
                           (NGONOFF) -- Default: 0      ! NGONOFF =  0  !

!END!
```

```
--------------
Subgroup (1a) -- Specific gridded receptors included/excluded
--------------

    Specific gridded receptors are excluded from CALPOST processing
    by filling a processing grid array with 0s and 1s.  A total of
    NGONOFF lines are read here.  Each line corresponds to one 'row'
    in the sampling grid, starting with the NORTHERNMOST row that
    contains receptors that you wish to exclude, and finishing with
    row 1 to the SOUTH (no intervening rows may be skipped).  Within
    a row, each receptor position is assigned either a 0 or 1,
    starting with the westernmost receptor.
       0 = gridded receptor not processed
       1 = gridded receptor processed

    Repeated value notation may be used to select blocks of receptors:
       23*1, 15*0, 12*1

    Because all values are initially set to 1, any receptors north of
    the first row entered, or east of the last value provided in a row,
    remain ON.

    (NGXRECP) -- Default: 1


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Identify the Base Time Zone for the CALPUFF simulation
                           (BTZONE) -- No default   * BTZONE =  0.*

    Particle growth curve f(RH) for hygroscopic species
                             (MFRH) -- Default: 2   ! MFRH   =  2  !

         1 =  IWAQM (1998) f(RH) curve (originally used with MVISBK=1)
         2 =  FLAG (2000) f(RH) tabulation
         3 =  EPA (2003) f(RH) tabulation

    Maximum relative humidity (%) used in particle growth curve
                            (RHMAX) -- Default: 98  ! RHMAX  = 95.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = F  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
     Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                   COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                   FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PM10!

Extinction Efficiency (1/Mm per ug/m**3)
----------------------------------------
    MODELED particulate species:
               PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
```

```
           PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
     BACKGROUND particulate species:
           PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
     Other species:
          AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
          AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
          ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
          SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
          ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

 Background Extinction Computation
 ---------------------------------

     Method used for the 24h-average of percent change of light extinction:
     Hourly ratio of source light extinction / background light extinction
     is averaged?               (LAVER) -- Default: F   ! LAVER = F  !


     Method used for background light extinction
                               (MVISBK) -- Default: 2   ! MVISBK =  6  !

          1 =  Supply single light extinction and hygroscopic fraction
               - Hourly F(RH) adjustment applied to hygroscopic background
                 and modeled sulfate and nitrate
          2 =  Compute extinction from speciated PM measurements (A)
               - Hourly F(RH) adjustment applied to observed and modeled sulfate
                 and nitrate
               - F(RH) factor is capped at F(RHMAX)
          3 =  Compute extinction from speciated PM measurements (B)
               - Hourly F(RH) adjustment applied to observed and modeled sulfate
                 and nitrate
               - Receptor-hour excluded if RH>RHMAX
               - Receptor-day excluded if fewer than 6 valid receptor-hours
          4 =  Read hourly transmissometer background extinction measurements
               - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
               - Hour excluded if measurement invalid (missing, interference,
                 or large RH)
               - Receptor-hour excluded if RH>RHMAX
               - Receptor-day excluded if fewer than 6 valid receptor-hours
          5 =  Read hourly nephelometer background extinction measurements
               - Rayleigh extinction value (BEXTRAY) added to measurement
               - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
               - Hour excluded if measurement invalid (missing, interference,
                 or large RH)
               - Receptor-hour excluded if RH>RHMAX
               - Receptor-day excluded if fewer than 6 valid receptor-hours
          6 =  Compute extinction from speciated PM measurements
               - FLAG monthly RH adjustment factor applied to observed and
                 modeled sulfate and nitrate
          7 =  Use observed weather or prognostic weather information for
               background extinction during weather events; otherwise, use Method 2
               - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
               - F(RH) factor is capped at F(RHMAX)
               - During observed weather events, compute Bext from visual range
                 if using an observed weather data file, or
               - During prognostic weather events, use Bext from the prognostic
                 weather file
               - Use Method 2 for hours without a weather event

     Additional inputs used for MVISBK = 1:
     --------------------------------------
      Background light extinction (1/Mm)
                               (BEXTBK) -- No default   ! BEXTBK = 12.0 !
```

```
 Percentage of particles affected by relative humidity
                          (RHFRAC) -- No default   ! RHFRAC = 10.0 !

Additional inputs used for MVISBK = 6:
--------------------------------------
 Extinction coefficients for hygroscopic species (modeled and
 background) are computed using a monthly RH adjustment factor
 in place of an hourly RH factor (VISB.DAT file is NOT needed).
 Enter the 12 monthly factors here (RHFAC).  Month 1 is January.

 (RHFAC)  -- No default     ! RHFAC = 3.2, 2.9, 2.7, 2.7,
                                      3.3, 3.3, 3.3, 3.3,
                                      3.4, 3.1, 3.1, 3.3 !

Additional inputs used for MVISBK = 7:
--------------------------------------
 The weather data file (DATSAV abbreviated space-delimited) that
 is identified as VSRN.DAT may contain data for more than one
 station.  Identify the stations that are needed in the order in
 which they will be used to obtain valid weather and visual range.
 The first station that contains valid data for an hour will be
 used.  Enter up to MXWSTA (set in PARAMS file) integer station IDs
 of up to 6 digits each as variable IDWSTA, and enter the corresponding
 time zone for each, as variable TZONE (= UTC-LST).

 A prognostic weather data file with Bext for weather events may be used
 in place of the observed weather file.  Identify this as the VSRN.DAT
 file and use a station ID of IDWSTA = 999999, and TZONE = 0.

 NOTE:  TZONE identifies the time zone used in the dataset.  The
        DATSAV abbreviated space-delimited data usually are prepared
        with UTC time rather than local time, so TZONE is typically
        set to zero.

 (IDWSTA)   -- No default
! IDWSTA = 690230 ,80020 ,80140 !
 (TZONE)    -- No default
! TZONE  = 0.0 ,0.0 ,0.0 !

Additional inputs used for MVISBK = 2,3,6,7:
--------------------------------------------
 Background extinction coefficients are computed from monthly
 CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
 coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
 elemental carbon (BKEC).  Month 1 is January.
 (ug/m**3)

 (BKSO4)  -- No default     ! BKSO4 = 0.23, 0.23, 0.23, 0.23,
                                      0.23, 0.23, 0.23, 0.23,
                                      0.23, 0.23, 0.23, 0.23 !
 (BKNO3)  -- No default     ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
                                      0.1, 0.1, 0.1, 0.1,
                                      0.1, 0.1, 0.1, 0.1 !
 (BKPMC)  -- No default     ! BKPMC = 3.0, 3.0, 3.0, 3.0,
                                      3.0, 3.0, 3.0, 3.0,
                                      3.0, 3.0, 3.0, 3.0 !
 (BKOC)   -- No default     ! BKOC  = 1.4, 1.4, 1.4, 1.4,
                                      1.4, 1.4, 1.4, 1.4,
                                      1.4, 1.4, 1.4, 1.4 !
 (BKSOIL) -- No default     ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                                      0.5, 0.5, 0.5, 0.5,
                                      0.5, 0.5, 0.5, 0.5 !
 (BKEC)   -- No default     ! BKEC  = 0.02, 0.02, 0.02, 0.02,
```

```
                                          0.02, 0.02, 0.02, 0.02,
                                          0.02, 0.02, 0.02, 0.02 !

    Additional inputs used for MVISBK = 2,3,5,6,7:
    ----------------------------------------------
     Extinction due to Rayleigh scattering is added (1/Mm)
                              (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

    Documentation records contained in the header of the
    CALPUFF output file may be written to the list file.
    Print documentation image?
                                 (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                     for            for
                Concentration    Deposition
       1 =         g/m**3         g/m**2/s
       2 =        mg/m**3        mg/m**2/s
       3 =        ug/m**3        ug/m**2/s
       4 =        ng/m**3        ng/m**2/s
       5 =      Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

    1-hr averages           (L1HR) -- Default: T   !   L1HR = F  !

    3-hr averages           (L3HR) -- Default: T   !   L3HR = F  !

    24-hr averages         (L24HR) -- Default: T   !  L24HR = F  !

    Run-length averages    (LRUNL) -- Default: T   !  LRUNL = F  !

    User-specified averaging time in hours - results for
    an averaging time of NAVG hours are reported for
    NAVG greater than 0:
                            (NAVG) -- Default: 0   !   NAVG =  0  !


Types of tabulations reported
------------------------------

   1) Visibility: daily visibility tabulations are always reported
                  for the selected receptors when ASPEC = VISIB.
                  In addition, any of the other tabulations listed
                  below may be chosen to characterize the light
                  extinction coefficients.
                  [List file or Plot/Analysis File]
```

```
2) Top 50 table for each averaging time selected
   [List file only]
                      (LT50) -- Default: T   !   LT50 = F  !

3) Top 'N' table for each averaging time selected
   [List file or Plot file]
                     (LTOPN) -- Default: F   !  LTOPN = T  !

     -- Number of 'Top-N' values at each receptor
        selected (NTOP must be <= 4)
                      (NTOP) -- Default: 4   ! NTOP =  1   !

     -- Specific ranks of 'Top-N' values reported
        (NTOP values must be entered)
               (ITOP(4) array) -- Default:     ! ITOP =  1   !
                                 1,2,3,4


4) Threshold exceedance counts for each receptor and each averaging
   time selected
   [List file or Plot file]
                     (LEXCD) -- Default: F   !  LEXCD = T  !

     -- Identify the threshold for each averaging time by assigning a
        non-negative value (output units).

                                 -- Default: 0.5
        Threshold for  1-hr averages   (THRESH1) !  THRESH1 = 1.000E01 !
        Threshold for  3-hr averages   (THRESH3) !  THRESH3 = -1.0  !
        Threshold for 24-hr averages  (THRESH24) ! THRESH24 = -1.0  !
        Threshold for NAVG-hr averages (THRESHN) !  THRESHN = -1.0  !


     -- Counts for the shortest averaging period selected can be
        tallied daily, and receptors that experience more than NCOUNT
        counts over any NDAY period will be reported.  This type of
        exceedance violation output is triggered only if NDAY > 0.

        Accumulation period(Days)
                      (NDAY) -- Default: 0   !    NDAY =  0  !
        Number of exceedances allowed
                    (NCOUNT) -- Default: 1   !  NCOUNT =  1  !


5) Selected day table(s)

   Echo Option -- Many records are written each averaging period
   selected and output is grouped by day
   [List file or Plot file]
                     (LECHO) -- Default: F   !  LECHO = F  !

   Timeseries Option -- Averages at all selected receptors for
   each selected averaging period are written to timeseries files.
   Each file contains one averaging period, and all receptors are
   written to a single record each averaging time.
   [TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT files]
                     (LTIME) -- Default: F   !  LTIME = F  !

   Peak Value Option -- Averages at all selected receptors for
   each selected averaging period are screened and the peak value
   each period is written to timeseries files.
   Each file contains one averaging period.
```

```
      [PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT files]
                           (LPEAK) -- Default: F   !  LPEAK = F  !

        -- Days selected for output
                      (IECHO(366)) -- Default: 366*0
           ! IECHO  = 366*0  !
           (366 values must be entered)
```

Plot output options

```
     Plot files can be created for the Top-N, Exceedance, and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...].
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file can also be created for the daily
     peak visibility summary output, in DATA format only.

     Generate Plot file output in addition to writing tables
     to List file?
                                 (LPLT) -- Default: F   ! LPLT  = F !

     Use GRID format rather than DATA format,
     when available?
                                 (LGRD) -- Default: F   ! LGRD  = F !
```

Auxiliary Output Files (for subsequent analyses)

```
      Visibility

      A separate output file may be requested that contains the change
      in visibility at each selected receptor when ASPEC = VISIB.  This
      file can be processed to construct visibility measures that are
      not available in CALPOST.

      Output file with the visibility change at each receptor?
                                (MDVIS) -- Default: 0   ! MDVIS  = 0 !

           0 =  Do Not create file
           1 =  Create file of DAILY (24 hour) Delta-Deciview
           2 =  Create file of DAILY (24 hour) Extinction Change (%)
           3 =  Create file of HOURLY Delta-Deciview
           4 =  Create file of HOURLY Extinction Change (%)
```

Additional Debug Output

```
   Output selected information to List file
    for debugging?
                              (LDEBUG) -- Default: F  ! LDEBUG  = F !

   Output hourly extinction information to REPORT.HRV?
    (Visibility Method 7)
```

```
                                    (LVEXTHR) -- Default: F  ! LVEXTHR = F !

 !END!

 -------------------------------------------------
 NOTICE: Starting year in control file sets the
         expected century for the simulation.  All
         YY years are converted to YYYY years in
         the range:          1951        2050
 -------------------------------------------------


*******************************************************************************************
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                                              CALPOST  Version 5.6392        Level 051130
*******************************************************************************************
****************************************




  CALPOST Control File Input Summary ------------------------

     Replace run data with data in Puff file 1=Y:    1
                       Run starting date -- year: 2001
                                           month:    0
                                             day:    0
                                      Julian day:    0
         Time at beginning of run  -  hour(0-23):    0
                                   -      second:    0
                             Run length (hours):    0


 Every hour of data processed -- NREP = 1


  Species & Concentration/Deposition Information
                                          Species: VISIB
                         Layer of processed data:    1
     (>0=conc, -1=dry flux, -2=wet flux, -3=wet & dry flux)
                   Multiplicative scaling factor: 0.0000E+00
                         Additive scaling factor: 0.0000E+00
                  Hourly background values used?: F


  Source information
                  Source contribution processing: 0
                   0= No source contributions
                   1= Contributions are summed
                   2= TRACEBACK mode for 1 receptor
                   3= Reported TOTAL is processed


  Receptor information
                    Gridded receptors processed?: F
                   Discrete receptors processed?: T
      CTSG Complex terrain receptors processed?: F

  Discrete Receptors Processed

   (All Discrete Receptors are Used)
```

```
Visibility Processing Selected

Extinction Computation includes:
                            SULFATES
                            NITRATES
                            FINE PARTICLES
                            BACKGROUND
             Particle f(RH) growth curve      :   FLAG (2000) Tabulation
             Max. RH % for particle growth (%):  95.000

Species name for modeled particulates
                                          fine: PM10

Extinction Efficiency (1/Mm per ug/m**3)
                              ammonium sulfate:    3.00
                              ammonium nitrate:    3.00
                                organic carbon:    4.00
                                          soil:    1.00
                              elemental carbon:   10.00
                             MODELED coarse PM:    0.60
                             MODELED   fine PM:    1.00
                            BACKGRND coarse PM:    0.60

Background Extinction Calculation Method 6

         Rayleigh scattering extinction (1/Mm):   10.00

            Monthly background conc. (ug/m**3):

     (NH4)2SO4   (NH4)NO3       PM-C          OC        SOIL          EC
  1  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01
  2  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01
  3  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01
  4  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01
  5  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01
  6  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01
  7  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01
  8  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01
  9  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01
 10  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01
 11  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01
 12  .2300E+00  .1000E+00  .3000E+01  .1400E+01  .5000E+00  .2000E-01

     Monthly RH factor for hygroscopic species:
  1  .3200E+01
  2  .2900E+01
  3  .2700E+01
  4  .2700E+01
  5  .3300E+01
  6  .3300E+01
  7  .3300E+01
  8  .3300E+01
  9  .3400E+01
 10  .3100E+01
 11  .3100E+01
 12  .3300E+01

Optional output file for visibility      0

      Do Not create file
```

```
 Output options
                     Units requested for output:   (1/Mega-m)

 Averaging time(s) selected
     User-specified averaging time (NAVG hours):     0
                                 1-hr averages:     F
                                 3-hr averages:     F
                                24-hr averages:     F
                              NAVG-hr averages:     F
                        Length of run averages:     F

 Output components selected
                                        Top-50:     F
                 Top-N values at each receptor:     T
            Exceedance counts at each receptor:     T
      Output selected information for debugging:     F
                 Echo tables for selected days:     F
                 Time-series for selected days:     F
       Peak value Time-series for selected days:     F

 Top "n" table control
        Number of "top" values at each receptor:     1
        Specific ranks of "top" values reported:   1


 Plot file option
                            Plot files created:     F


 Threshold Exceedance control
      Exceedances of a specified value will be counted for --



IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF     5.753       051130

BAS BART CLASS I ANALYSIS (HERCULES)
MAY 2009 BASE (5 units PTE)
UMC 6KM CALMET METEOROLOGICAL DATA

Averaging time for values reported from model:
                 1    HOUR

Number of averaging periods in file from model:
              8760

Chemical species names for each layer in model:
SO2           1
SO4           1
NOX           1
HNO3          1
NO3           1
PM10          1



**************    NOTICE    ***************
NDRECP array reset to full range: all 1s
```

```
------------------------------------------------------------------------------------------
----------------------------------------
          INPUT FILES

 Default Name     Unit No.     File Name and Path
 ------------     --------     ------------------
  CALPOST.INP         5        calpost.inp.mdnr6.herc
    MODEL.DAT         4        ../../calpuff/outputs/2001/basref/bash2001ref.con


------------------------------------------------------------------------------------------
----------------------------------------
          OUTPUT FILES

 Default Name     Unit No.     File Name and Path
 ------------     --------     ------------------
  CALPOST.LST         8        bash2001refm6.lst

******************************************************************************************
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                                              CALPOST  Version 5.6392        Level 051130
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****************************************

                                                            24HR VISIBILITY

                                                            VISIB   B _SN_F

                                                              (1/Mega-m)


Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE BEXT(Model) BEXT(BKG) BEXT(Total) %CHANGE
F(RH)  bxSO4  bxNO3   bxOC   bxEC   bxPMC  bxPMF
2001   2  0     1         -87.793   -33.479   D      0.000     21.268     21.268     0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2001   3  0     1         -87.793   -33.479   D      0.000     21.268     21.268     0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2001   4  0     1         -87.793   -33.479   D      0.000     21.268     21.268     0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2001   5  0     1         -87.793   -33.479   D      0.000     21.268     21.268     0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2001   6  0     1         -87.793   -33.479   D      0.000     21.268     21.268     0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2001   7  0     1         -87.793   -33.479   D      0.000     21.268     21.268     0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2001   8  0     1         -87.793   -33.479   D      0.000     21.268     21.268     0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2001   9  0     1         -87.793   -33.479   D      0.000     21.268     21.268     0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2001  10  0   930         -78.188   -33.780   D      0.001     21.268     21.269     0.01
3.200  0.000  0.001  0.000  0.000  0.000  0.000
2001  11  0   930         -78.188   -33.780   D      0.014     21.268     21.282     0.07
3.200  0.000  0.014  0.000  0.000  0.000  0.000
2001  12  0   955         -79.307   -31.075   D      0.001     21.268     21.269     0.00
3.200  0.000  0.001  0.000  0.000  0.000  0.000
2001  13  0     1         -87.793   -33.479   D      0.000     21.268     21.268     0.00
```

3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 14 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 15 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 16 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 17 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 18 0 933 -78.170 -33.075 D 0.260 21.268 21.528 1.22
3.200 0.003 0.251 0.000 0.000 0.000 0.006
2001 19 0 907 -79.461 -36.281 D 0.216 21.268 21.484 1.02
3.200 0.002 0.209 0.000 0.000 0.000 0.005
2001 20 0 619 -80.651 -36.537 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 21 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 22 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 23 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 24 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 25 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 26 0 930 -78.188 -33.780 D 0.015 21.268 21.283 0.07
3.200 0.000 0.015 0.000 0.000 0.000 0.000
2001 27 0 643 -80.588 -30.574 D 0.001 21.268 21.269 0.00
3.200 0.000 0.001 0.000 0.000 0.000 0.000
2001 28 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 29 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 30 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 31 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 32 0 1 -87.793 -33.479 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2001 33 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 34 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 35 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 36 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 37 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 38 0 955 -79.307 -31.075 D 0.001 20.971 20.972 0.00
2.900 0.000 0.001 0.000 0.000 0.000 0.000
2001 39 0 955 -79.307 -31.075 D 0.005 20.971 20.976 0.03
2.900 0.000 0.005 0.000 0.000 0.000 0.000
2001 40 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 41 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 42 0 933 -78.170 -33.075 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 43 0 1017 -87.324 -31.258 D 0.016 20.971 20.987 0.08
2.900 0.000 0.016 0.000 0.000 0.000 0.000
2001 44 0 643 -80.588 -30.574 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000

2001 45 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 46 0 949 -78.530 -31.500 D 0.014 20.971 20.985 0.07
2.900 0.000 0.014 0.000 0.000 0.000 0.000
2001 47 0 930 -78.188 -33.780 D 0.004 20.971 20.975 0.02
2.900 0.000 0.004 0.000 0.000 0.000 0.000
2001 48 0 619 -80.651 -36.537 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 49 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 50 0 930 -78.188 -33.780 D 0.003 20.971 20.974 0.02
2.900 0.000 0.003 0.000 0.000 0.000 0.000
2001 51 0 930 -78.188 -33.780 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 52 0 1017 -87.324 -31.258 D 0.004 20.971 20.975 0.02
2.900 0.000 0.004 0.000 0.000 0.000 0.000
2001 53 0 1017 -87.324 -31.258 D 0.008 20.971 20.979 0.04
2.900 0.000 0.007 0.000 0.000 0.000 0.000
2001 54 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 55 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 56 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 57 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 58 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 59 0 1007 -85.943 -30.897 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 60 0 1 -87.793 -33.479 D 0.000 20.971 20.971 0.00
2.900 0.000 0.000 0.000 0.000 0.000 0.000
2001 61 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 62 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 63 0 747 -79.357 -31.084 D 0.001 20.773 20.774 0.01
2.700 0.000 0.001 0.000 0.000 0.000 0.000
2001 64 0 947 -78.463 -31.700 D 0.219 20.773 20.992 1.05
2.700 0.003 0.209 0.000 0.000 0.000 0.007
2001 65 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 66 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 67 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 68 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 69 0 930 -78.188 -33.780 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 70 0 907 -79.461 -36.281 D 0.002 20.773 20.775 0.01
2.700 0.000 0.002 0.000 0.000 0.000 0.000
2001 71 0 747 -79.357 -31.084 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 72 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 73 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 74 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 75 0 191 -84.875 -38.231 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 76 0 948 -78.531 -31.590 D 0.003 20.773 20.776 0.02

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2.700  0.000  0.003  0.000  0.000  0.000  0.000
2001  77  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  78  0   949       -78.530   -31.500   D      0.020     20.773     20.793     0.10
2.700  0.000  0.018  0.000  0.000  0.000  0.001
2001  79  0  1039       -87.824   -33.618   D      0.001     20.773     20.774     0.01
2.700  0.000  0.001  0.000  0.000  0.000  0.000
2001  80  0  1008       -86.153   -30.893   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  81  0   967       -80.716   -30.533   D      0.046     20.773     20.819     0.22
2.700  0.001  0.042  0.000  0.000  0.000  0.003
2001  82  0   930       -78.188   -33.780   D      0.006     20.773     20.779     0.03
2.700  0.000  0.005  0.000  0.000  0.000  0.001
2001  83  0   906       -79.530   -36.280   D      0.003     20.773     20.776     0.02
2.700  0.000  0.002  0.000  0.000  0.000  0.001
2001  84  0   933       -78.170   -33.075   D      0.016     20.773     20.789     0.08
2.700  0.000  0.015  0.000  0.000  0.000  0.001
2001  85  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  86  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  87  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  88  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  89  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  90  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  91  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  92  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  93  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  94  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  95  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  96  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  97  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  98  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001  99  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001 100  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001 101  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001 102  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001 103  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001 104  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001 105  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001 106  0   774       -78.867   -31.586   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
2001 107  0     1       -87.793   -33.479   D      0.000     20.773     20.773     0.00
2.700  0.000  0.000  0.000  0.000  0.000  0.000
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2001 108 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 109 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 110 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 111 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 112 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 113 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 114 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 115 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 116 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 117 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 118 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 119 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 120 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 121 0 1 -87.793 -33.479 D 0.000 20.773 20.773 0.00
2.700 0.000 0.000 0.000 0.000 0.000 0.000
2001 122 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 123 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 124 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 125 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 126 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 127 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 128 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 129 0 595 -80.899 -36.534 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 130 0 907 -79.461 -36.281 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 131 0 763 -78.896 -34.319 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 132 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 133 0 930 -78.188 -33.780 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 134 0 906 -79.530 -36.280 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 135 0 544 -81.399 -37.026 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 136 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 137 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 138 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 139 0 949 -78.530 -31.500 D 0.003 21.367 21.370 0.01

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3.300  0.000  0.003  0.000  0.000  0.000  0.000
2001 140  0   947        -78.463   -31.700   D      0.002     21.367     21.369     0.01
3.300  0.000  0.002  0.000  0.000  0.000  0.000
2001 141  0   949        -78.530   -31.500   D      0.002     21.367     21.369     0.01
3.300  0.000  0.001  0.000  0.000  0.000  0.000
2001 142  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 143  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 144  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 145  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 146  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 147  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 148  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 149  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 150  0   191        -84.875   -38.231   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 151  0   774        -78.867   -31.586   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 152  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 153  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 154  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 155  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 156  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 157  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 158  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 159  0  1008        -86.153   -30.893   D      0.004     21.367     21.371     0.02
3.300  0.001  0.003  0.000  0.000  0.000  0.001
2001 160  0   947        -78.463   -31.700   D      0.047     21.367     21.414     0.22
3.300  0.004  0.039  0.000  0.000  0.000  0.005
2001 161  0   822        -86.552   -37.687   D      0.008     21.367     21.375     0.04
3.300  0.002  0.003  0.000  0.000  0.000  0.002
2001 162  0   643        -80.588   -30.574   D      0.002     21.367     21.369     0.01
3.300  0.000  0.001  0.000  0.000  0.000  0.000
2001 163  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 164  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 165  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 166  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 167  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 168  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 169  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 170  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
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2001 171  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 172  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 173  0   569        -81.333   -30.815   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 174  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 175  0   780        -78.633   -32.831   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 176  0   782        -78.628   -32.334   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 177  0   784        -78.622   -31.837   D      0.001     21.367     21.368     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 178  0    61        -86.285   -31.259   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 179  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 180  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 181  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 182  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 183  0   783        -78.625   -32.086   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 184  0   949        -78.530   -31.500   D      0.006     21.367     21.373     0.03
3.300  0.002  0.003  0.000  0.000  0.000  0.001
2001 185  0   688        -80.099   -31.076   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 186  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 187  0   949        -78.530   -31.500   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 188  0   948        -78.531   -31.590   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 189  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 190  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 191  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 192  0   785        -78.620   -31.589   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 193  0   933        -78.170   -33.075   D      0.005     21.367     21.372     0.02
3.300  0.001  0.002  0.000  0.000  0.000  0.001
2001 194  0   784        -78.622   -31.837   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 195  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 196  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 197  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 198  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 199  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 200  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 201  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 202  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
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3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 203  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 204  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 205  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 206  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 207  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 208  0   785       -78.620   -31.589   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 209  0   948       -78.531   -31.590   D      0.001     21.367     21.368     0.00
3.300  0.000  0.001  0.000  0.000  0.000  0.000
2001 210  0    27       -86.783   -31.502   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 211  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 212  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 213  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 214  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 215  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 216  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 217  0   927       -78.477   -33.986   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 218  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 219  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 220  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 221  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 222  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 223  0   949       -78.530   -31.500   D      0.007     21.367     21.374     0.03
3.300  0.001  0.004  0.000  0.000  0.000  0.001
2001 224  0   967       -80.716   -30.533   D      0.024     21.367     21.391     0.11
3.300  0.006  0.012  0.000  0.000  0.000  0.006
2001 225  0  1017       -87.324   -31.258   D      0.031     21.367     21.398     0.15
3.300  0.003  0.024  0.000  0.000  0.000  0.004
2001 226  0  1017       -87.324   -31.258   D      0.004     21.367     21.371     0.02
3.300  0.001  0.002  0.000  0.000  0.000  0.001
2001 227  0   930       -78.188   -33.780   D      0.003     21.367     21.370     0.01
3.300  0.000  0.002  0.000  0.000  0.000  0.001
2001 228  0   191       -84.875   -38.231   D      0.002     21.367     21.369     0.01
3.300  0.001  0.000  0.000  0.000  0.000  0.001
2001 229  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 230  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 231  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 232  0     1       -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 233  0   667       -80.343   -30.825   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
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2001 234  0   594        -81.085   -30.817   D       0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 235  0     1        -87.793   -33.479   D       0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 236  0     1        -87.793   -33.479   D       0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 237  0     1        -87.793   -33.479   D       0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 238  0     1        -87.793   -33.479   D       0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 239  0     1        -87.793   -33.479   D       0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 240  0   949        -78.530   -31.500   D       0.003     21.367     21.370     0.01
3.300  0.001  0.001  0.000  0.000  0.000  0.001
2001 241  0   933        -78.170   -33.075   D       0.001     21.367     21.368     0.01
3.300  0.000  0.001  0.000  0.000  0.000  0.000
2001 242  0   789        -78.380   -32.337   D       0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 243  0     6        -87.541   -32.985   D       0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 244  0   403        -83.075   -31.790   D       0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 245  0   643        -80.588   -30.574   D       0.002     21.466     21.468     0.01
3.400  0.001  0.001  0.000  0.000  0.000  0.001
2001 246  0    62        -86.283   -31.010   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 247  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 248  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 249  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 250  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 251  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 252  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 253  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 254  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 255  0   407        -82.896   -38.252   D       0.001     21.466     21.467     0.00
3.400  0.000  0.001  0.000  0.000  0.000  0.000
2001 256  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 257  0   947        -78.463   -31.700   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 258  0   643        -80.588   -30.574   D       0.005     21.466     21.471     0.03
3.400  0.001  0.004  0.000  0.000  0.000  0.001
2001 259  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 260  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 261  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 262  0   518        -81.830   -31.058   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 263  0   433        -82.820   -31.047   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 264  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 265  0     1        -87.793   -33.479   D       0.000     21.466     21.466     0.00
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3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 266  0   947       -78.463   -31.700   D      0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 267  0   666       -80.346   -31.074   D      0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 268  0   930       -78.188   -33.780   D      0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 269  0   804       -87.016   -34.859   D      0.104     21.466     21.570     0.49
3.400  0.001  0.098  0.000  0.000  0.000  0.005
2001 270  0   853       -82.958   -38.450   D      0.016     21.466     21.482     0.07
3.400  0.000  0.015  0.000  0.000  0.000  0.001
2001 271  0   852       -83.027   -38.420   D      0.003     21.466     21.469     0.02
3.400  0.000  0.003  0.000  0.000  0.000  0.000
2001 272  0   949       -78.530   -31.500   D      0.004     21.466     21.470     0.02
3.400  0.001  0.003  0.000  0.000  0.000  0.001
2001 273  0     1       -87.793   -33.479   D      0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 274  0     1       -87.793   -33.479   D      0.000     21.466     21.466     0.00
3.400  0.000  0.000  0.000  0.000  0.000  0.000
2001 275  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 276  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 277  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 278  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 279  0  1037       -87.825   -33.215   D      0.004     21.169     21.173     0.02
3.100  0.000  0.004  0.000  0.000  0.000  0.000
2001 280  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 281  0   947       -78.463   -31.700   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 282  0   190       -85.046   -31.024   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 283  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 284  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 285  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 286  0  1017       -87.324   -31.258   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 287  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 288  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 289  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 290  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 291  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 292  0   930       -78.188   -33.780   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 293  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 294  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 295  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 296  0     1       -87.793   -33.479   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
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2001 297  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 298  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 299  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 300  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 301  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 302  0   930        -78.188   -33.780   D       0.001     21.169     21.170     0.01
3.100  0.000  0.001  0.000  0.000  0.000  0.000
2001 303  0   594        -81.085   -30.817   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 304  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 305  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 306  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 307  0   774        -78.867   -31.586   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 308  0   949        -78.530   -31.500   D       0.009     21.169     21.178     0.04
3.100  0.000  0.008  0.000  0.000  0.000  0.000
2001 309  0   643        -80.588   -30.574   D       0.003     21.169     21.172     0.01
3.100  0.000  0.002  0.000  0.000  0.000  0.000
2001 310  0   933        -78.170   -33.075   D       0.010     21.169     21.179     0.05
3.100  0.001  0.009  0.000  0.000  0.000  0.001
2001 311  0   966        -80.657   -30.543   D       0.006     21.169     21.175     0.03
3.100  0.000  0.005  0.000  0.000  0.000  0.000
2001 312  0   906        -79.530   -36.280   D       0.001     21.169     21.170     0.01
3.100  0.000  0.001  0.000  0.000  0.000  0.000
2001 313  0   689        -79.904   -36.048   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 314  0   930        -78.188   -33.780   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 315  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 316  0  1003        -85.106   -30.912   D       0.007     21.169     21.176     0.03
3.100  0.000  0.006  0.000  0.000  0.000  0.001
2001 317  0  1039        -87.824   -33.618   D       0.003     21.169     21.172     0.01
3.100  0.000  0.003  0.000  0.000  0.000  0.000
2001 318  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 319  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 320  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 321  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 322  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 323  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 324  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 325  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 326  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 327  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2001 328  0     1        -87.793   -33.479   D       0.000     21.169     21.169     0.00
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3.100 0.000 0.000 0.000 0.000 0.000 0.000
2001 329 0 1 -87.793 -33.479 D 0.000 21.169 21.169 0.00
3.100 0.000 0.000 0.000 0.000 0.000 0.000
2001 330 0 1 -87.793 -33.479 D 0.000 21.169 21.169 0.00
3.100 0.000 0.000 0.000 0.000 0.000 0.000
2001 331 0 1 -87.793 -33.479 D 0.000 21.169 21.169 0.00
3.100 0.000 0.000 0.000 0.000 0.000 0.000
2001 332 0 1 -87.793 -33.479 D 0.000 21.169 21.169 0.00
3.100 0.000 0.000 0.000 0.000 0.000 0.000
2001 333 0 930 -78.188 -33.780 D 0.017 21.169 21.186 0.08
3.100 0.000 0.017 0.000 0.000 0.000 0.000
2001 334 0 1007 -85.943 -30.897 D 0.159 21.169 21.328 0.75
3.100 0.002 0.153 0.000 0.000 0.000 0.003
2001 335 0 930 -78.188 -33.780 D 0.000 21.169 21.169 0.00
3.100 0.000 0.000 0.000 0.000 0.000 0.000
2001 336 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 337 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 338 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 339 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 340 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 341 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 342 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 343 0 1035 -87.826 -32.813 D 0.049 21.367 21.416 0.23
3.300 0.000 0.048 0.000 0.000 0.000 0.001
2001 344 0 930 -78.188 -33.780 D 0.001 21.367 21.368 0.00
3.300 0.000 0.001 0.000 0.000 0.000 0.000
2001 345 0 930 -78.188 -33.780 D 0.005 21.367 21.372 0.02
3.300 0.000 0.005 0.000 0.000 0.000 0.000
2001 346 0 931 -78.182 -33.544 D 0.004 21.367 21.371 0.02
3.300 0.000 0.004 0.000 0.000 0.000 0.000
2001 347 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 348 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 349 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 350 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 351 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 352 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 353 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 354 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 355 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 356 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 357 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 358 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2001 359 0 1 -87.793 -33.479 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000

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2001 360  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 361  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 362  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 363  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 364  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2001 365  0     1        -87.793   -33.479   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000


 --- Ranked Daily Visibility Change ---

Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE BEXT(Model) BEXT(BKG) BEXT(Total) %CHANGE
F(RH)  bxSO4  bxNO3   bxOC   bxEC  bxPMC  bxPMF
2001  18  0   933        -78.170   -33.075   D      0.260     21.268     21.528     1.22
3.200  0.003  0.251  0.000  0.000  0.000  0.006    1
2001  64  0   947        -78.463   -31.700   D      0.219     20.773     20.992     1.05
2.700  0.003  0.209  0.000  0.000  0.000  0.007    2
2001  19  0   907        -79.461   -36.281   D      0.216     21.268     21.484     1.02
3.200  0.002  0.209  0.000  0.000  0.000  0.005    3
2001 334  0  1007        -85.943   -30.897   D      0.159     21.169     21.328     0.75
3.100  0.002  0.153  0.000  0.000  0.000  0.003    4
2001 269  0   804        -87.016   -34.859   D      0.104     21.466     21.570     0.49
3.400  0.001  0.098  0.000  0.000  0.000  0.005    5
2001 343  0  1035        -87.826   -32.813   D      0.049     21.367     21.416     0.23
3.300  0.000  0.048  0.000  0.000  0.000  0.001    6
2001 160  0   947        -78.463   -31.700   D      0.047     21.367     21.414     0.22
3.300  0.004  0.039  0.000  0.000  0.000  0.005    7
2001  81  0   967        -80.716   -30.533   D      0.046     20.773     20.819     0.22
2.700  0.001  0.042  0.000  0.000  0.000  0.003    8
2001 225  0  1017        -87.324   -31.258   D      0.031     21.367     21.398     0.15
3.300  0.003  0.024  0.000  0.000  0.000  0.004    9
2001 224  0   967        -80.716   -30.533   D      0.024     21.367     21.391     0.11
3.300  0.006  0.012  0.000  0.000  0.000  0.006   10
2001  78  0   949        -78.530   -31.500   D      0.020     20.773     20.793     0.10
2.700  0.000  0.018  0.000  0.000  0.000  0.001   11
2001 333  0   930        -78.188   -33.780   D      0.017     21.169     21.186     0.08
3.100  0.000  0.017  0.000  0.000  0.000  0.000   12
2001  84  0   933        -78.170   -33.075   D      0.016     20.773     20.789     0.08
2.700  0.000  0.015  0.000  0.000  0.000  0.001   13
2001  43  0  1017        -87.324   -31.258   D      0.016     20.971     20.987     0.08
2.900  0.000  0.016  0.000  0.000  0.000  0.000   14
2001 270  0   853        -82.958   -38.450   D      0.016     21.466     21.482     0.07
3.400  0.000  0.015  0.000  0.000  0.000  0.001   15
2001  46  0   949        -78.530   -31.500   D      0.014     20.971     20.985     0.07
2.900  0.000  0.014  0.000  0.000  0.000  0.000   16
2001  26  0   930        -78.188   -33.780   D      0.015     21.268     21.283     0.07
3.200  0.000  0.015  0.000  0.000  0.000  0.000   17
2001  11  0   930        -78.188   -33.780   D      0.014     21.268     21.282     0.07
3.200  0.000  0.014  0.000  0.000  0.000  0.000   18
2001 310  0   933        -78.170   -33.075   D      0.010     21.169     21.179     0.05
3.100  0.001  0.009  0.000  0.000  0.000  0.001   19
2001 308  0   949        -78.530   -31.500   D      0.009     21.169     21.178     0.04
3.100  0.000  0.008  0.000  0.000  0.000  0.000   20
2001 161  0   822        -86.552   -37.687   D      0.008     21.367     21.375     0.04
3.300  0.002  0.003  0.000  0.000  0.000  0.002   21
2001  53  0  1017        -87.324   -31.258   D      0.008     20.971     20.979     0.04
2.900  0.000  0.007  0.000  0.000  0.000  0.000   22
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 --- Number of days with Extinction Change  =>   5.0 % :         0
 --- Number of days with Extinction Change  =>  10.0 % :         0
 ---             Largest Extinction Change  =                 1.22 %

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                                              CALPOST  Version 5.6392        Level 051130
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                                                     Run-Length VISIBILITY

                                                        VISIB   B _SN_F

                                                          (1/Mega-m)


             RECEPTOR    COORDINATES (km)  TYPE BEXT(Model) BEXT(BKG) BEXT(Total) %CHANGE
F(RH)

                1        -87.793   -33.479   D      0.004     21.204     21.207     0.02
3.135

 --- Number of recs with Extinction Change  >    1.0 % :         0
 ---             Largest Extinction Change  =                 0.02 %

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                                              CALPOST  Version 5.6392        Level 051130
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                                                        24HR VISIBILITY

                                                        VISIB   B _SN_F

                                                           (deciview)


                                                                                          %
of Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE  DV(Total)    DV(BKG)  DELTA DV  F(RH)  %
_SO4  %_NO3   %_OC   %_EC  %_PMC  %_PMF
2001   2  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001   3  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001   4  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001   5  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001   6  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001   7  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
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2001   8  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001   9  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  10  0   930        -78.188   -33.780   D      7.547      7.546      0.001  3.200
0.67  97.52   0.00   0.00   0.00   1.85
2001  11  0   930        -78.188   -33.780   D      7.553      7.546      0.007  3.200
1.65  95.90   0.00   0.00   0.00   2.47
2001  12  0   955        -79.307   -31.075   D      7.546      7.546      0.000  3.200
1.85  95.88   0.00   0.00   0.00   2.24
2001  13  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  14  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  15  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  16  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  17  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  18  0   933        -78.170   -33.075   D      7.668      7.546      0.121  3.200
1.03  96.62   0.00   0.00   0.00   2.35
2001  19  0   907        -79.461   -36.281   D      7.647      7.546      0.101  3.200
0.89  96.77   0.00   0.00   0.00   2.34
2001  20  0   619        -80.651   -36.537   D      7.546      7.546      0.000  3.200
1.24  85.63   0.00   0.00   0.00   2.34
2001  21  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  22  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  23  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  24  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  25  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  26  0   930        -78.188   -33.780   D      7.553      7.546      0.007  3.200
0.67  97.88   0.00   0.00   0.00   1.48
2001  27  0   643        -80.588   -30.574   D      7.547      7.546      0.000  3.200
0.71  98.40   0.00   0.00   0.00   0.81
2001  28  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  29  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  30  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  31  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  32  0     1        -87.793   -33.479   D      7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2001  33  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  34  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  35  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  36  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  37  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  38  0   955        -79.307   -31.075   D      7.406      7.406      0.000  2.900
1.36  93.71   0.00   0.00   0.00   5.05
2001  39  0   955        -79.307   -31.075   D      7.408      7.406      0.003  2.900
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1.45  94.32   0.00   0.00   0.00   4.25
2001  40  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  41  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  42  0   933        -78.170   -33.075   D      7.406      7.406      0.000  2.900
0.64  97.37   0.00   0.00   0.00   2.30
2001  43  0  1017        -87.324   -31.258   D      7.413      7.406      0.008  2.900
0.95  97.09   0.00   0.00   0.00   2.00
2001  44  0   643        -80.588   -30.574   D      7.406      7.406      0.000  2.900
1.19  97.65   0.00   0.00   0.00   1.27
2001  45  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  46  0   949        -78.530   -31.500   D      7.412      7.406      0.007  2.900
2.97  96.46   0.00   0.00   0.00   0.59
2001  47  0   930        -78.188   -33.780   D      7.408      7.406      0.002  2.900
2.33  97.21   0.00   0.00   0.00   0.62
2001  48  0   619        -80.651   -36.537   D      7.406      7.406      0.000  2.900
1.47  88.38   0.00   0.00   0.00   0.27
2001  49  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  50  0   930        -78.188   -33.780   D      7.407      7.406      0.002  2.900
1.98  95.25   0.00   0.00   0.00   2.98
2001  51  0   930        -78.188   -33.780   D      7.406      7.406      0.000  2.900
1.15  96.83   0.00   0.00   0.00   1.91
2001  52  0  1017        -87.324   -31.258   D      7.408      7.406      0.002  2.900
1.42  94.72   0.00   0.00   0.00   3.96
2001  53  0  1017        -87.324   -31.258   D      7.409      7.406      0.004  2.900
1.18  96.33   0.00   0.00   0.00   2.57
2001  54  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
2.71  98.34   0.00   0.00   0.00   1.66
2001  55  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  56  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  57  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  58  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  59  0  1007        -85.943   -30.897   D      7.406      7.406      0.000  2.900
2.00  99.58   0.00   0.00   0.00   3.28
2001  60  0     1        -87.793   -33.479   D      7.406      7.406      0.000  2.900
0.00   0.00   0.00   0.00   0.00   0.00
2001  61  0     1        -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  62  0     1        -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  63  0   747        -79.357   -31.084   D      7.311      7.311      0.001  2.700
1.69  94.30   0.00   0.00   0.00   4.04
2001  64  0   947        -78.463   -31.700   D      7.415      7.311      0.105  2.700
1.30  95.54   0.00   0.00   0.00   3.16
2001  65  0     1        -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  66  0     1        -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  67  0     1        -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  68  0     1        -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  69  0   930        -78.188   -33.780   D      7.311      7.311      0.000  2.700
0.80  97.73   0.00   0.00   0.00   2.71
2001  70  0   907        -79.461   -36.281   D      7.312      7.311      0.001  2.700
3.43  91.49   0.00   0.00   0.00   5.32
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2001  71  0   747         -79.357   -31.084   D       7.311      7.311      0.000  2.700
4.04  93.05   0.00   0.00   0.00   3.42
2001  72  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  73  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  74  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  75  0   191         -84.875   -38.231   D       7.311      7.311      0.000  2.700
0.39 100.97   0.00   0.00   0.00   0.02
2001  76  0   948         -78.531   -31.590   D       7.312      7.311      0.002  2.700
0.18  99.38   0.00   0.00   0.00   0.42
2001  77  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  78  0   949         -78.530   -31.500   D       7.320      7.311      0.010  2.700
2.24  91.97   0.00   0.00   0.00   5.80
2001  79  0  1039         -87.824   -33.618   D       7.311      7.311      0.001  2.700
2.77  92.23   0.00   0.00   0.00   5.03
2001  80  0  1008         -86.153   -30.893   D       7.311      7.311      0.000  2.700
2.40  92.72   0.00   0.00   0.00   4.85
2001  81  0   967         -80.716   -30.533   D       7.333      7.311      0.022  2.700
1.98  91.21   0.00   0.00   0.00   6.82
2001  82  0   930         -78.188   -33.780   D       7.314      7.311      0.003  2.700
4.87  85.44   0.00   0.00   0.00   9.75
2001  83  0   906         -79.530   -36.280   D       7.312      7.311      0.002  2.700
12.32  70.45   0.00   0.00   0.00  17.36
2001  84  0   933         -78.170   -33.075   D       7.318      7.311      0.008  2.700
2.82  93.84   0.00   0.00   0.00   3.33
2001  85  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  86  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  87  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  88  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  89  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  90  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  91  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  92  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  93  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  94  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  95  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  96  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  97  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  98  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001  99  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 100  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 101  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 102  0     1         -87.793   -33.479   D       7.311      7.311      0.000  2.700
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0.00   0.00   0.00   0.00   0.00   0.00
2001 103  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 104  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 105  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 106  0   774       -78.867   -31.586   D      7.311      7.311      0.000  2.700
7.08  77.75   0.00   0.00   0.00  12.54
2001 107  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 108  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 109  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 110  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 111  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 112  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 113  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 114  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 115  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 116  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 117  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 118  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 119  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 120  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 121  0     1       -87.793   -33.479   D      7.311      7.311      0.000  2.700
0.00   0.00   0.00   0.00   0.00   0.00
2001 122  0     1       -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 123  0     1       -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 124  0     1       -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 125  0     1       -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 126  0     1       -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 127  0     1       -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 128  0     1       -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 129  0   595       -80.899   -36.534   D      7.593      7.593      0.000  3.300
15.06  68.56   0.00   0.00   0.00  14.34
2001 130  0   907       -79.461   -36.281   D      7.593      7.593      0.000  3.300
11.94  78.10   0.00   0.00   0.00   9.66
2001 131  0   763       -78.896   -34.319   D      7.593      7.593      0.000  3.300
24.03  60.23   0.00   0.00   0.00  16.14
2001 132  0     1       -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 133  0   930       -78.188   -33.780   D      7.593      7.593      0.000  3.300
10.96  66.70   0.00   0.00   0.00  21.11
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2001 134  0   906        -79.530   -36.280   D       7.593       7.593       0.000  3.300
17.83  63.15   0.00   0.00   0.00  19.95
2001 135  0   544        -81.399   -37.026   D       7.593       7.593       0.000  3.300
8.46  81.91   0.00   0.00   0.00   8.71
2001 136  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 137  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 138  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 139  0   949        -78.530   -31.500   D       7.594       7.593       0.001  3.300
1.45  98.00   0.00   0.00   0.00   0.59
2001 140  0   947        -78.463   -31.700   D       7.594       7.593       0.001  3.300
9.00  74.82   0.00   0.00   0.00  16.17
2001 141  0   949        -78.530   -31.500   D       7.593       7.593       0.001  3.300
13.92  67.67   0.00   0.00   0.00  18.46
2001 142  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 143  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 144  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 145  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 146  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 147  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 148  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 149  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 150  0   191        -84.875   -38.231   D       7.593       7.593       0.000  3.300
28.68  29.07   0.00   0.00   0.00  28.58
2001 151  0   774        -78.867   -31.586   D       7.593       7.593       0.000  3.300
15.40  70.86   0.00   0.00   0.00  13.68
2001 152  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 153  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 154  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 155  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 156  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 157  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 158  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 159  0  1008        -86.153   -30.893   D       7.595       7.593       0.002  3.300
13.33  68.90   0.00   0.00   0.00  17.74
2001 160  0   947        -78.463   -31.700   D       7.615       7.593       0.022  3.300
8.51  81.75   0.00   0.00   0.00   9.74
2001 161  0   822        -86.552   -37.687   D       7.596       7.593       0.004  3.300
31.24  43.49   0.00   0.00   0.00  25.28
2001 162  0   643        -80.588   -30.574   D       7.594       7.593       0.001  3.300
23.71  61.11   0.00   0.00   0.00  15.24
2001 163  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 164  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 165  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
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0.00   0.00   0.00   0.00   0.00   0.00
2001 166  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 167  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 168  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 169  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 170  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 171  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 172  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 173  0   569        -81.333   -30.815   D      7.593      7.593      0.000  3.300
27.70  60.84   0.00   0.00   0.00  16.21
2001 174  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 175  0   780        -78.633   -32.831   D      7.593      7.593      0.000  3.300
7.23  83.04   0.00   0.00   0.00   8.98
2001 176  0   782        -78.628   -32.334   D      7.593      7.593      0.000  3.300
24.64  50.71   0.00   0.00   0.00  24.88
2001 177  0   784        -78.622   -31.837   D      7.593      7.593      0.000  3.300
28.08  49.51   0.00   0.00   0.00  22.27
2001 178  0   61         -86.285   -31.259   D      7.593      7.593      0.000  3.300
40.59  32.92   0.00   0.00   0.00  26.81
2001 179  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
41.05  52.13   0.00   0.00   0.00  26.39
2001 180  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
35.77 154.65   0.00   0.00   0.00  10.06
2001 181  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 182  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 183  0   783        -78.625   -32.086   D      7.593      7.593      0.000  3.300
16.84  65.31   0.00   0.00   0.00  16.77
2001 184  0   949        -78.530   -31.500   D      7.595      7.593      0.003  3.300
26.67  49.54   0.00   0.00   0.00  23.81
2001 185  0   688        -80.099   -31.076   D      7.593      7.593      0.000  3.300
29.47  51.79   0.00   0.00   0.00  17.25
2001 186  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 187  0   949        -78.530   -31.500   D      7.593      7.593      0.000  3.300
17.47  52.80   0.00   0.00   0.00  29.46
2001 188  0   948        -78.531   -31.590   D      7.593      7.593      0.000  3.300
16.39  70.26   0.00   0.00   0.00  14.20
2001 189  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 190  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 191  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 192  0   785        -78.620   -31.589   D      7.593      7.593      0.000  3.300
12.11  73.08   0.00   0.00   0.00  15.18
2001 193  0   933        -78.170   -33.075   D      7.595      7.593      0.002  3.300
21.05  49.03   0.00   0.00   0.00  29.98
2001 194  0   784        -78.622   -31.837   D      7.593      7.593      0.000  3.300
35.95  29.51   0.00   0.00   0.00  34.76
2001 195  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 196  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
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2001 197  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 198  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 199  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 200  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 201  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 202  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 203  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 204  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 205  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 206  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 207  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 208  0   785        -78.620   -31.589   D       7.593       7.593       0.000  3.300
25.31  68.16   0.00   0.00   0.00   6.52
2001 209  0   948        -78.531   -31.590   D       7.593       7.593       0.000  3.300
11.58  86.39   0.00   0.00   0.00   2.34
2001 210  0    27        -86.783   -31.502   D       7.593       7.593       0.000  3.300
12.51  75.90   0.00   0.00   0.00   1.16
2001 211  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 212  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 213  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 214  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 215  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 216  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 217  0   927        -78.477   -33.986   D       7.593       7.593       0.000  3.300
40.35  24.91   0.00   0.00   0.00  34.99
2001 218  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
84.88  17.54   0.00   0.00   0.00  11.58
2001 219  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 220  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 221  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 222  0     1        -87.793   -33.479   D       7.593       7.593       0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 223  0   949        -78.530   -31.500   D       7.596       7.593       0.003  3.300
15.79  65.14   0.00   0.00   0.00  19.06
2001 224  0   967        -80.716   -30.533   D       7.604       7.593       0.011  3.300
24.27  51.12   0.00   0.00   0.00  24.62
2001 225  0  1017        -87.324   -31.258   D       7.607       7.593       0.015  3.300
11.21  76.50   0.00   0.00   0.00  12.30
2001 226  0  1017        -87.324   -31.258   D       7.594       7.593       0.002  3.300
16.22  63.06   0.00   0.00   0.00  20.74
2001 227  0   930        -78.188   -33.780   D       7.594       7.593       0.001  3.300
9.78  60.55   0.00   0.00   0.00  29.79
2001 228  0   191        -84.875   -38.231   D       7.593       7.593       0.001  3.300
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36.61 29.27   0.00   0.00   0.00 34.23
2001 229 0   1   -87.793   -33.479   D   7.593   7.593   0.000 3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 230 0   1   -87.793   -33.479   D   7.593   7.593   0.000 3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 231 0   1   -87.793   -33.479   D   7.593   7.593   0.000 3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 232 0   1   -87.793   -33.479   D   7.593   7.593   0.000 3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 233 0   667   -80.343   -30.825   D   7.593   7.593   0.000 3.300
14.20 48.26   0.00   0.00   0.00 12.47
2001 234 0   594   -81.085   -30.817   D   7.593   7.593   0.000 3.300
13.35 51.27   0.00   0.00   0.00 13.19
2001 235 0   1   -87.793   -33.479   D   7.593   7.593   0.000 3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 236 0   1   -87.793   -33.479   D   7.593   7.593   0.000 3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 237 0   1   -87.793   -33.479   D   7.593   7.593   0.000 3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 238 0   1   -87.793   -33.479   D   7.593   7.593   0.000 3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 239 0   1   -87.793   -33.479   D   7.593   7.593   0.000 3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 240 0   949   -78.530   -31.500   D   7.594   7.593   0.001 3.300
26.23 46.80   0.00   0.00   0.00 27.00
2001 241 0   933   -78.170   -33.075   D   7.593   7.593   0.001 3.300
16.76 70.02   0.00   0.00   0.00 13.26
2001 242 0   789   -78.380   -32.337   D   7.593   7.593   0.000 3.300
44.91 26.44   0.00   0.00   0.00 28.46
2001 243 0   6   -87.541   -32.985   D   7.593   7.593   0.000 3.300
51.21 19.35   0.00   0.00   0.00 25.97
2001 244 0   403   -83.075   -31.790   D   7.593   7.593   0.000 3.300
8.69 70.19   0.00   0.00   0.00 11.12
2001 245 0   643   -80.588   -30.574   D   7.640   7.639   0.001 3.400
27.06 45.54   0.00   0.00   0.00 27.42
2001 246 0   62   -86.283   -31.010   D   7.639   7.639   0.000 3.400
13.03 75.69   0.00   0.00   0.00 11.65
2001 247 0   1   -87.793   -33.479   D   7.639   7.639   0.000 3.400
0.00   0.00   0.00   0.00   0.00   0.00
2001 248 0   1   -87.793   -33.479   D   7.639   7.639   0.000 3.400
0.00   0.00   0.00   0.00   0.00   0.00
2001 249 0   1   -87.793   -33.479   D   7.639   7.639   0.000 3.400
0.00   0.00   0.00   0.00   0.00   0.00
2001 250 0   1   -87.793   -33.479   D   7.639   7.639   0.000 3.400
0.00   0.00   0.00   0.00   0.00   0.00
2001 251 0   1   -87.793   -33.479   D   7.639   7.639   0.000 3.400
0.00   0.00   0.00   0.00   0.00   0.00
2001 252 0   1   -87.793   -33.479   D   7.639   7.639   0.000 3.400
0.00   0.00   0.00   0.00   0.00   0.00
2001 253 0   1   -87.793   -33.479   D   7.639   7.639   0.000 3.400
0.00   0.00   0.00   0.00   0.00   0.00
2001 254 0   1   -87.793   -33.479   D   7.639   7.639   0.000 3.400
0.00   0.00   0.00   0.00   0.00   0.00
2001 255 0   407   -82.896   -38.252   D   7.639   7.639   0.000 3.400
9.28 82.76   0.00   0.00   0.00   8.15
2001 256 0   1   -87.793   -33.479   D   7.639   7.639   0.000 3.400
15.34 90.82   0.00   0.00   0.00 33.21
2001 257 0   947   -78.463   -31.700   D   7.639   7.639   0.000 3.400
9.00 84.72   0.00   0.00   0.00   7.77
2001 258 0   643   -80.588   -30.574   D   7.641   7.639   0.003 3.400
11.23 75.87   0.00   0.00   0.00 12.90
2001 259 0   1   -87.793   -33.479   D   7.639   7.639   0.000 3.400
0.00   0.00   0.00   0.00   0.00   0.00

2001 260 0 1 -87.793 -33.479 D 7.639 7.639 0.000 3.400
0.00 0.00 0.00 0.00 0.00 0.00
2001 261 0 1 -87.793 -33.479 D 7.639 7.639 0.000 3.400
0.00 0.00 0.00 0.00 0.00 0.00
2001 262 0 518 -81.830 -31.058 D 7.639 7.639 0.000 3.400
11.40 74.13 0.00 0.00 0.00 0.26
2001 263 0 433 -82.820 -31.047 D 7.639 7.639 0.000 3.400
6.98 4.85 0.00 0.00 0.00 0.02
2001 264 0 1 -87.793 -33.479 D 7.639 7.639 0.000 3.400
0.00 0.00 0.00 0.00 0.00 0.00
2001 265 0 1 -87.793 -33.479 D 7.639 7.639 0.000 3.400
0.00 0.00 0.00 0.00 0.00 0.00
2001 266 0 947 -78.463 -31.700 D 7.639 7.639 0.000 3.400
15.97 62.05 0.00 0.00 0.00 22.13
2001 267 0 666 -80.346 -31.074 D 7.639 7.639 0.000 3.400
2.64 66.80 0.00 0.00 0.00 3.29
2001 268 0 930 -78.188 -33.780 D 7.639 7.639 0.000 3.400
0.79 95.00 0.00 0.00 0.00 3.35
2001 269 0 804 -87.016 -34.859 D 7.687 7.639 0.048 3.400
1.18 94.35 0.00 0.00 0.00 4.47
2001 270 0 853 -82.958 -38.450 D 7.646 7.639 0.007 3.400
2.38 92.18 0.00 0.00 0.00 5.46
2001 271 0 852 -83.027 -38.420 D 7.640 7.639 0.002 3.400
6.62 85.83 0.00 0.00 0.00 7.52
2001 272 0 949 -78.530 -31.500 D 7.641 7.639 0.002 3.400
13.22 64.70 0.00 0.00 0.00 22.15
2001 273 0 1 -87.793 -33.479 D 7.639 7.639 0.000 3.400
0.00 0.00 0.00 0.00 0.00 0.00
2001 274 0 1 -87.793 -33.479 D 7.639 7.639 0.000 3.400
0.00 0.00 0.00 0.00 0.00 0.00
2001 275 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 276 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 277 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 278 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 279 0 1037 -87.825 -33.215 D 7.501 7.500 0.002 3.100
0.56 99.43 0.00 0.00 0.00 0.02
2001 280 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 281 0 947 -78.463 -31.700 D 7.500 7.500 0.000 3.100
3.84 88.55 0.00 0.00 0.00 8.05
2001 282 0 190 -85.046 -31.024 D 7.500 7.500 0.000 3.100
0.98 85.59 0.00 0.00 0.00 4.36
2001 283 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 284 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 285 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 286 0 1017 -87.324 -31.258 D 7.500 7.500 0.000 3.100
3.06 95.28 0.00 0.00 0.00 2.55
2001 287 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 288 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 289 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 290 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 291 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100

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0.00   0.00   0.00   0.00   0.00   0.00
2001 292  0   930        -78.188   -33.780   D      7.500      7.500      0.000  3.100
5.95  91.63   0.00   0.00   0.00  11.74
2001 293  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 294  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 295  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 296  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 297  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 298  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 299  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 300  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 301  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 302  0   930        -78.188   -33.780   D      7.500      7.500      0.001  3.100
5.41  88.94   0.00   0.00   0.00   5.99
2001 303  0   594        -81.085   -30.817   D      7.500      7.500      0.000  3.100
2.51  94.13   0.00   0.00   0.00   2.31
2001 304  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 305  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 306  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 307  0   774        -78.867   -31.586   D      7.500      7.500      0.000  3.100
0.82  97.71   0.00   0.00   0.00   2.73
2001 308  0   949        -78.530   -31.500   D      7.504      7.500      0.004  3.100
3.32  93.73   0.00   0.00   0.00   3.01
2001 309  0   643        -80.588   -30.574   D      7.501      7.500      0.001  3.100
6.13  91.14   0.00   0.00   0.00   2.90
2001 310  0   933        -78.170   -33.075   D      7.504      7.500      0.005  3.100
5.37  86.16   0.00   0.00   0.00   8.47
2001 311  0   966        -80.657   -30.543   D      7.502      7.500      0.003  3.100
5.06  87.61   0.00   0.00   0.00   7.40
2001 312  0   906        -79.530   -36.280   D      7.500      7.500      0.001  3.100
7.55  85.62   0.00   0.00   0.00   7.12
2001 313  0   689        -79.904   -36.048   D      7.500      7.500      0.000  3.100
10.85  84.02   0.00   0.00   0.00   6.23
2001 314  0   930        -78.188   -33.780   D      7.500      7.500      0.000  3.100
0.92  94.99   0.00   0.00   0.00   4.19
2001 315  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 316  0  1003        -85.106   -30.912   D      7.503      7.500      0.003  3.100
2.88  85.07   0.00   0.00   0.00  12.10
2001 317  0  1039        -87.824   -33.618   D      7.501      7.500      0.001  3.100
3.05  90.06   0.00   0.00   0.00   7.04
2001 318  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 319  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 320  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 321  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2001 322  0     1        -87.793   -33.479   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
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2001 323 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 324 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 325 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 326 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 327 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 328 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 329 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 330 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 331 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 332 0 1 -87.793 -33.479 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2001 333 0 930 -78.188 -33.780 D 7.508 7.500 0.008 3.100
1.47 96.19 0.00 0.00 0.00 2.36
2001 334 0 1007 -85.943 -30.897 D 7.574 7.500 0.075 3.100
1.39 96.62 0.00 0.00 0.00 2.00
2001 335 0 930 -78.188 -33.780 D 7.500 7.500 0.000 3.100
1.43 97.19 0.00 0.00 0.00 1.69
2001 336 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 337 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 338 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 339 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 340 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 341 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 342 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 343 0 1035 -87.826 -32.813 D 7.616 7.593 0.023 3.300
0.50 96.81 0.00 0.00 0.00 2.68
2001 344 0 930 -78.188 -33.780 D 7.593 7.593 0.000 3.300
0.49 97.22 0.00 0.00 0.00 2.29
2001 345 0 930 -78.188 -33.780 D 7.595 7.593 0.002 3.300
0.61 97.44 0.00 0.00 0.00 1.95
2001 346 0 931 -78.182 -33.544 D 7.595 7.593 0.002 3.300
1.73 95.39 0.00 0.00 0.00 2.88
2001 347 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 348 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
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2001 349 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
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2001 350 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 351 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 352 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 353 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2001 354 0 1 -87.793 -33.479 D 7.593 7.593 0.000 3.300

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0.00   0.00   0.00   0.00   0.00   0.00
2001 355  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 356  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 357  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 358  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 359  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 360  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 361  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 362  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 363  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 364  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2001 365  0     1        -87.793   -33.479   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00


 --- Ranked Daily Visibility Change ---
                                                                                     %
of Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE  DV(Total)    DV(BKG)  DELTA DV  F(RH)  %
_SO4  %_NO3   %_OC   %_EC  %_PMC  %_PMF
2001  18  0   933        -78.170   -33.075   D      7.668      7.546      0.121  3.200
1.03  96.62   0.00   0.00   0.00   2.35    1
2001  64  0   947        -78.463   -31.700   D      7.415      7.311      0.105  2.700
1.30  95.54   0.00   0.00   0.00   3.16    2
2001  19  0   907        -79.461   -36.281   D      7.647      7.546      0.101  3.200
0.89  96.77   0.00   0.00   0.00   2.34    3
2001 334  0  1007        -85.943   -30.897   D      7.574      7.500      0.075  3.100
1.39  96.62   0.00   0.00   0.00   2.00    4
2001 269  0   804        -87.016   -34.859   D      7.687      7.639      0.048  3.400
1.18  94.35   0.00   0.00   0.00   4.47    5
2001 343  0  1035        -87.826   -32.813   D      7.616      7.593      0.023  3.300
0.50  96.81   0.00   0.00   0.00   2.68    6
2001 160  0   947        -78.463   -31.700   D      7.615      7.593      0.022  3.300
8.51  81.75   0.00   0.00   0.00   9.74    7
2001  81  0   967        -80.716   -30.533   D      7.333      7.311      0.022  2.700
1.98  91.21   0.00   0.00   0.00   6.82    8
2001 225  0  1017        -87.324   -31.258   D      7.607      7.593      0.015  3.300
11.21  76.50   0.00   0.00   0.00  12.30    9
2001 224  0   967        -80.716   -30.533   D      7.604      7.593      0.011  3.300
24.27  51.12   0.00   0.00   0.00  24.62   10
2001  78  0   949        -78.530   -31.500   D      7.320      7.311      0.010  2.700
2.24  91.97   0.00   0.00   0.00   5.80   11
2001 333  0   930        -78.188   -33.780   D      7.508      7.500      0.008  3.100
1.47  96.19   0.00   0.00   0.00   2.36   12
2001  84  0   933        -78.170   -33.075   D      7.318      7.311      0.008  2.700
2.82  93.84   0.00   0.00   0.00   3.33   13
2001  43  0  1017        -87.324   -31.258   D      7.413      7.406      0.008  2.900
0.95  97.09   0.00   0.00   0.00   2.00   14
2001 270  0   853        -82.958   -38.450   D      7.646      7.639      0.007  3.400
2.38  92.18   0.00   0.00   0.00   5.46   15
2001  46  0   949        -78.530   -31.500   D      7.412      7.406      0.007  2.900
2.97  96.46   0.00   0.00   0.00   0.59   16
2001  26  0   930        -78.188   -33.780   D      7.553      7.546      0.007  3.200
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0.67  97.88   0.00   0.00   0.00   1.48   17
2001  11  0   930        -78.188   -33.780   D      7.553      7.546      0.007  3.200
1.65  95.90   0.00   0.00   0.00   2.47   18
2001 310  0   933        -78.170   -33.075   D      7.504      7.500      0.005  3.100
5.37  86.16   0.00   0.00   0.00   8.47   19
2001 308  0   949        -78.530   -31.500   D      7.504      7.500      0.004  3.100
3.32  93.73   0.00   0.00   0.00   3.01   20
2001 161  0   822        -86.552   -37.687   D      7.596      7.593      0.004  3.300
31.24  43.49   0.00   0.00   0.00  25.28   21
2001  53  0  1017        -87.324   -31.258   D      7.409      7.406      0.004  2.900
1.18  96.33   0.00   0.00   0.00   2.57   22

 --- Number of days with Delta-Deciview  =>   0.50:         0
 --- Number of days with Delta-Deciview  =>   1.00:         0
 ---             Largest Delta-Deciview  =             0.121

*******************************************************************************************
****************************************
                                              CALPOST  Version 5.6392        Level 051130
*******************************************************************************************
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                                                     Run-Length VISIBILITY

                                                        VISIB   B _SN_F

                                                           (deciview)



             RECEPTOR    COORDINATES (km)  TYPE  DV(Total)    DV(BKG)  DELTA DV  F(RH)

                1        -87.793   -33.479   D      7.518      7.516      0.002  3.135

 --- Number of recs with Delta-Deciview  >    0.10:         0
 ---             Largest Delta-Deciview  =             0.002

*******************************************************************************************
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                                              CALPOST  Version 5.6392        Level 051130
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                                                        SUMMARY SECTION

                                                        VISIB   B _SN_F

                                                          (1/Mega-m)


 RECEPTOR     COORDINATES (km)    TYPE      PEAK (YEAR,DAY,ENDING TIME)     FOR RANK
FOR AVERAGE PERIOD
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Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extincition by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	2	0	517	160.051	5.115	D	7.616	7.593	0.023	3.3	39.96	59.82	0	0	0	0.22	0	0
2001	3	0	517	160.051	5.115	D	9.277	7.593	**1.685**	3.3	35.1	64.71	0	0	0	0.2	1	1
2001	4	0	548	160.098	-2.544	D	7.685	7.593	0.093	3.3	43.19	56.72	0	0	0	0.1	0	0
2001	5	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	6	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	7	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	8	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	9	0	517	160.051	5.115	D	7.631	7.593	0.038	3.3	31.81	67.77	0	0	0	0.43	0	0
2001	10	0	662	155.306	-1.227	D	8.925	7.593	**1.332**	3.3	30.56	69.17	0	0	0	0.27	1	1
2001	11	0	517	160.051	5.115	D	7.865	7.593	0.272	3.3	40.59	59.28	0	0	0	0.14	0	0
2001	12	0	517	160.051	5.115	D	7.605	7.593	0.012	3.3	52.92	46.98	0	0	0	0.1	0	0
2001	13	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	14	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	15	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	16	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	17	0	517	160.051	5.115	D	8.343	7.593	**0.75**	3.3	46.79	53	0	0	0	0.21	1	0
2001	18	0	637	152.992	-4.475	D	8.018	7.593	0.425	3.3	40.61	59.16	0	0	0	0.23	0	0
2001	19	0	682	157.698	1.908	D	8.367	7.593	**0.774**	3.3	53.68	46.15	0	0	0	0.17	1	0
2001	20	0	656	154.842	-1.81	D	8.593	7.593	**1.001**	3.3	42.4	57.26	0	0	0	0.34	1	1
2001	21	0	549	159.887	-2.621	D	8.067	7.593	0.475	3.3	19.11	80.44	0	0	0	0.45	0	0
2001	22	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	23	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	24	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	25	0	517	160.051	5.115	D	7.679	7.593	0.086	3.3	19.38	80.04	0	0	0	0.58	0	0
2001	26	0	624	152.982	-5.684	D	7.627	7.593	0.034	3.3	18.03	81.44	0	0	0	0.53	0	0
2001	27	0	517	160.051	5.115	D	7.593	7.593	0	3.3	34.86	64.95	0	0	0	0.05	0	0
2001	28	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	29	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	30	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	31	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	32	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	33	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	34	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	35	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	36	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	37	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	38	0	517	160.051	5.115	D	7.568	7.453	0.116	3	54.17	45.53	0	0	0	0.31	0	0
2001	39	0	624	152.982	-5.684	D	7.456	7.453	0.003	3	54.82	44.96	0	0	0	0.23	0	0
2001	40	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001											% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	41	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	42	0	637	152.992	-4.475	D	7.665	7.453	0.213	3	38.8	60.92	0	0	0	0.27	0	0
2001	43	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	44	0	517	160.051	5.115	D	7.454	7.453	0.002	3	63.23	36.83	0	0	0	0.1	0	0
2001	45	0	516	159.957	4.802	D	7.453	7.453	0	3	66.36	32.55	0	0	0	0.06	0	0
2001	46	0	676	156.899	0.996	D	7.634	7.453	0.181	3	58.43	41.51	0	0	0	0.06	0	0
2001	47	0	637	152.992	-4.475	D	8.673	7.453	**1.22**	3	54.64	45.21	0	0	0	0.15	1	1
2001	48	0	517	160.051	5.115	D	8.781	7.453	**1.329**	3	55.81	43.99	0	0	0	0.21	1	1
2001	49	0	517	160.051	5.115	D	8.087	7.453	**0.634**	3	33.84	65.86	0	0	0	0.31	1	0
2001	50	0	656	154.842	-1.81	D	8.372	7.453	**0.919**	3	36.51	63.27	0	0	0	0.21	1	0
2001	51	0	656	154.842	-1.81	D	7.47	7.453	0.018	3	55.26	44.64	0	0	0	0.1	0	0
2001	52	0	517	160.051	5.115	D	7.506	7.453	0.054	3	65.32	34.44	0	0	0	0.24	0	0
2001	53	0	624	152.982	-5.684	D	7.457	7.453	0.004	3	52.73	47.16	0	0	0	0.12	0	0
2001	54	0	517	160.051	5.115	D	7.458	7.453	0.006	3	60.65	39.3	0	0	0	0.09	0	0
2001	55	0	517	160.051	5.115	D	7.491	7.453	0.039	3	62.75	37.18	0	0	0	0.07	0	0
2001	56	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	57	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	58	0	517	160.051	5.115	D	7.672	7.453	0.22	3	41.77	57.81	0	0	0	0.43	0	0
2001	59	0	676	156.899	0.996	D	7.455	7.453	0.002	3	49.29	50.6	0	0	0	0.16	0	0
2001	60	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	61	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	62	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	63	0	517	160.051	5.115	D	7.644	7.358	0.286	2.8	61.49	38.35	0	0	0	0.16	0	0
2001	64	0	517	160.051	5.115	D	7.537	7.358	0.179	2.8	47.44	52.16	0	0	0	0.4	0	0
2001	65	0	548	160.098	-2.544	D	7.459	7.358	0.101	2.8	19.89	79.52	0	0	0	0.6	0	0
2001	66	0	517	160.051	5.115	D	7.496	7.358	0.138	2.8	43.18	56.42	0	0	0	0.41	0	0
2001	67	0	517	160.051	5.115	D	8.323	7.358	**0.964**	2.8	25.7	73.74	0	0	0	0.57	1	0
2001	68	0	517	160.051	5.115	D	7.383	7.358	0.025	2.8	24.46	75.07	0	0	0	0.47	0	0
2001	69	0	637	152.992	-4.475	D	7.728	7.358	0.369	2.8	34.18	65.41	0	0	0	0.41	0	0
2001	70	0	637	152.992	-4.475	D	7.603	7.358	0.245	2.8	54.16	45.65	0	0	0	0.2	0	0
2001	71	0	517	160.051	5.115	D	7.379	7.358	0.021	2.8	73.69	26.17	0	0	0	0.15	0	0
2001	72	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	73	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	74	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	75	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	76	0	548	160.098	-2.544	D	7.437	7.358	0.078	2.8	43.21	56.58	0	0	0	0.21	0	0
2001	77	0	517	160.051	5.115	D	7.645	7.358	0.287	2.8	49.24	50.45	0	0	0	0.31	0	0
2001	78	0	624	152.982	-5.684	D	7.365	7.358	0.006	2.8	36.11	63.54	0	0	0	0.35	0	0
2001	79	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001											% Modeled Extincition by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	80	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	81	0	637	152.992	-4.475	D	7.386	7.358	0.028	2.8	61.74	37.99	0	0	0	0.27	0	0
2001	82	0	637	152.992	-4.475	D	7.712	7.358	0.354	2.8	67.9	31.89	0	0	0	0.2	0	0
2001	83	0	624	152.982	-5.684	D	7.843	7.358	0.485	2.8	79.57	20.28	0	0	0	0.15	0	0
2001	84	0	517	160.051	5.115	D	7.954	7.358	**0.595**	2.8	55.35	44.37	0	0	0	0.28	1	0
2001	85	0	517	160.051	5.115	D	7.776	7.358	0.418	2.8	27.31	72.23	0	0	0	0.46	0	0
2001	86	0	517	160.051	5.115	D	7.368	7.358	0.01	2.8	18.37	81.07	0	0	0	0.56	0	0
2001	87	0	517	160.051	5.115	D	7.359	7.358	0.001	2.8	47.99	51.92	0	0	0	0.19	0	0
2001	88	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	89	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	90	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	91	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	92	0	517	160.051	5.115	D	7.263	7.263	0	2.6	28.08	70.79	0	0	0	0.68	0	0
2001	93	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	94	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	95	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	96	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	97	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	98	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	99	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	100	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	101	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	102	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	103	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	104	0	517	160.051	5.115	D	7.318	7.263	0.055	2.6	83.5	15.77	0	0	0	0.74	0	0
2001	105	0	517	160.051	5.115	D	7.263	7.263	0	2.6	91.26	8.42	0	0	0	0.26	0	0
2001	106	0	517	160.051	5.115	D	7.279	7.263	0.016	2.6	93.71	6.27	0	0	0	0.02	0	0
2001	107	0	548	160.098	-2.544	D	7.426	7.263	0.163	2.6	32.86	65.88	0	0	0	1.27	0	0
2001	108	0	517	160.051	5.115	D	7.455	7.263	0.192	2.6	34.54	65.06	0	0	0	0.41	0	0
2001	109	0	676	156.899	0.996	D	7.991	7.263	**0.728**	2.6	34.78	64.75	0	0	0	0.47	1	0
2001	110	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	111	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	112	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	113	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	114	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	115	0	517	160.051	5.115	D	7.584	7.263	0.321	2.6	74.33	25.41	0	0	0	0.26	0	0
2001	116	0	517	160.051	5.115	D	7.494	7.263	0.232	2.6	52.63	47.2	0	0	0	0.16	0	0
2001	117	0	78	155.215	-5.727	D	7.263	7.263	0	2.6	94.77	4.91	0	0	0	0.17	0	0
2001	118	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001											% Modeled Extinicition by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	119	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	120	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	121	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	122	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	123	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	124	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	125	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	126	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	127	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	128	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	129	0	547	160.097	-2.297	D	7.857	7.453	0.405	3	82.81	16.9	0	0	0	0.29	0	0
2001	130	0	603	155.328	-5.781	D	7.62	7.453	0.168	3	85.44	14.43	0	0	0	0.14	0	0
2001	131	0	603	155.328	-5.781	D	7.501	7.453	0.049	3	94.99	4.89	0	0	0	0.12	0	0
2001	132	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	133	0	517	160.051	5.115	D	7.539	7.453	0.086	3	50.52	48.51	0	0	0	0.97	0	0
2001	134	0	631	152.975	-4.958	D	7.705	7.453	0.253	3	87.88	11.89	0	0	0	0.23	0	0
2001	135	0	603	155.328	-5.781	D	7.478	7.453	0.025	3	94.27	5.58	0	0	0	0.15	0	0
2001	136	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	137	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	138	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	139	0	517	160.051	5.115	D	7.467	7.453	0.014	3	77.19	22.76	0	0	0	0.06	0	0
2001	140	0	548	160.098	-2.544	D	7.48	7.453	0.027	3	50.62	49.34	0	0	0	0.04	0	0
2001	141	0	637	152.992	-4.475	D	7.48	7.453	0.028	3	98.26	1.6	0	0	0	0.15	0	0
2001	142	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	143	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	144	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	145	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	146	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	147	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	148	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	149	0	517	160.051	5.115	D	7.502	7.453	0.049	3	95.52	4.26	0	0	0	0.22	0	0
2001	150	0	517	160.051	5.115	D	7.54	7.453	0.088	3	95.13	4.69	0	0	0	0.19	0	0
2001	151	0	517	160.051	5.115	D	7.458	7.453	0.005	3	94.93	4.95	0	0	0	0.13	0	0
2001	152	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	153	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	154	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	155	0	517	160.051	5.115	D	7.618	7.546	0.072	3.2	78.63	21.09	0	0	0	0.28	0	0
2001	156	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	157	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	158	0	517	160.051	5.115	D	7.546	7.546	0	3.2	97.02	3.86	0	0	0	0.01	0	0
2001	159	0	517	160.051	5.115	D	7.948	7.546	0.402	3.2	98.45	1.39	0	0	0	0.16	0	0
2001	160	0	624	152.982	-5.684	D	7.594	7.546	0.047	3.2	84.58	15.31	0	0	0	0.12	0	0
2001	161	0	624	152.982	-5.684	D	7.554	7.546	0.007	3.2	98.89	0.99	0	0	0	0.14	0	0
2001	162	0	517	160.051	5.115	D	7.724	7.546	0.177	3.2	98.76	1.15	0	0	0	0.09	0	0
2001	163	0	517	160.051	5.115	D	7.549	7.546	0.003	3.2	98.83	1.09	0	0	0	0.07	0	0
2001	164	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	165	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	166	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	167	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	168	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	169	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	170	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	171	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	172	0	517	160.051	5.115	D	7.547	7.546	0	3.2	99.19	1.01	0	0	0	0.1	0	0
2001	173	0	637	152.992	-4.475	D	7.946	7.546	0.399	3.2	83.03	16.84	0	0	0	0.13	0	0
2001	174	0	517	160.051	5.115	D	8.67	7.546	**1.124**	3.2	75.53	24.21	0	0	0	0.26	1	1
2001	175	0	676	156.899	0.996	D	8.857	7.546	**1.311**	3.2	73.41	26.42	0	0	0	0.17	1	1
2001	176	0	637	152.992	-4.475	D	8.109	7.546	**0.563**	3.2	90.88	8.97	0	0	0	0.15	1	0
2001	177	0	637	152.992	-4.475	D	7.676	7.546	0.13	3.2	93.71	6.18	0	0	0	0.11	0	0
2001	178	0	637	152.992	-4.475	D	7.567	7.546	0.021	3.2	98.85	1.05	0	0	0	0.11	0	0
2001	179	0	637	152.992	-4.475	D	7.547	7.546	0.001	3.2	96.04	4.02	0	0	0	0.06	0	0
2001	180	0	432	159.228	4.041	D	7.546	7.546	0	3.2	95.25	5.06	0	0	0	0.03	0	0
2001	181	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	182	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	183	0	517	160.051	5.115	D	7.886	7.593	0.294	3.3	95.54	4.31	0	0	0	0.15	0	0
2001	184	0	631	152.975	-4.958	D	8.275	7.593	**0.682**	3.3	96.05	3.83	0	0	0	0.12	1	0
2001	185	0	517	160.051	5.115	D	7.8	7.593	0.207	3.3	87.63	12.29	0	0	0	0.09	0	0
2001	186	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	187	0	637	152.992	-4.475	D	7.627	7.593	0.035	3.3	98.52	1.47	0	0	0	0.01	0	0
2001	188	0	637	152.992	-4.475	D	7.613	7.593	0.021	3.3	98.44	1.51	0	0	0	0.05	0	0
2001	189	0	517	160.051	5.115	D	7.597	7.593	0.004	3.3	94.81	5.19	0	0	0	0	0	0
2001	190	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	191	0	517	160.051	5.115	D	7.6	7.593	0.007	3.3	53.73	46.14	0	0	0	0.13	0	0
2001	192	0	637	152.992	-4.475	D	8.698	7.593	**1.105**	3.3	80.62	19.2	0	0	0	0.18	1	1
2001	193	0	624	152.982	-5.684	D	8.233	7.593	**0.64**	3.3	98.72	1.02	0	0	0	0.27	1	0
2001	194	0	624	152.982	-5.684	D	7.617	7.593	0.025	3.3	95.25	4.6	0	0	0	0.16	0	0
2001	195	0	603	155.328	-5.781	D	7.593	7.593	0.001	3.3	99.69	0.29	0	0	0	0.05	0	0
2001	196	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extincition by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	197	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	198	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	199	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	200	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	201	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	202	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	203	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	204	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	205	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	206	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	207	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	208	0	517	160.051	5.115	D	7.629	7.593	0.036	3.3	97.37	2.51	0	0	0	0.11	0	0
2001	209	0	624	152.982	-5.684	D	7.594	7.593	0.001	3.3	94.47	5.56	0	0	0	0.03	0	0
2001	210	0	517	160.051	5.115	D	7.594	7.593	0.001	3.3	98.53	1.57	0	0	0	0.02	0	0
2001	211	0	517	160.051	5.115	D	7.646	7.593	0.053	3.3	95.5	4.36	0	0	0	0.14	0	0
2001	212	0	517	160.051	5.115	D	7.775	7.593	0.183	3.3	93.71	6.17	0	0	0	0.12	0	0
2001	213	0	517	160.051	5.115	D	7.594	7.593	0.002	3.3	99.6	0.32	0	0	0	0.09	0	0
2001	214	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	215	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	216	0	637	152.992	-4.475	D	7.773	7.685	0.088	3.5	90.47	9.3	0	0	0	0.23	0	0
2001	217	0	624	152.982	-5.684	D	7.685	7.685	0	3.5	90.45	9.18	0	0	0	0.24	0	0
2001	218	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	219	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	220	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	221	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	222	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	223	0	676	156.899	0.996	D	7.803	7.685	0.119	3.5	95.59	4.3	0	0	0	0.11	0	0
2001	224	0	624	152.982	-5.684	D	7.741	7.685	0.056	3.5	95.99	3.92	0	0	0	0.09	0	0
2001	225	0	624	152.982	-5.684	D	7.707	7.685	0.022	3.5	98.79	1.13	0	0	0	0.08	0	0
2001	226	0	517	160.051	5.115	D	8.697	7.685	**1.012**	3.5	98.59	1.22	0	0	0	0.19	1	1
2001	227	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	228	0	637	152.992	-4.475	D	7.702	7.685	0.017	3.5	98.37	1.52	0	0	0	0.11	0	0
2001	229	0	516	159.957	4.802	D	7.685	7.685	0	3.5	98.34	0.92	0	0	0	0.07	0	0
2001	230	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	231	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	232	0	548	160.098	-2.544	D	7.763	7.685	0.078	3.5	21.58	78.01	0	0	0	0.41	0	0
2001	233	0	698	159.904	4.93	D	8.316	7.685	**0.631**	3.5	72.11	27.71	0	0	0	0.18	1	0
2001	234	0	517	160.051	5.115	D	7.748	7.685	0.063	3.5	95.27	4.6	0	0	0	0.12	0	0
2001	235	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001											% Modeled Extinicition by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	236	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	237	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	238	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	239	0	517	160.051	5.115	D	8.19	7.685	**0.505**	3.5	90.69	9.15	0	0	0	0.16	1	0
2001	240	0	624	152.982	-5.684	D	8.947	7.685	**1.262**	3.5	83.08	16.8	0	0	0	0.12	1	1
2001	241	0	604	155.247	-5.778	D	8.949	7.685	**1.264**	3.5	90.72	9.18	0	0	0	0.1	1	1
2001	242	0	517	160.051	5.115	D	8.416	7.685	**0.731**	3.5	93.26	6.56	0	0	0	0.18	1	0
2001	243	0	517	160.051	5.115	D	7.693	7.685	0.008	3.5	99.05	0.82	0	0	0	0.12	0	0
2001	244	0	517	160.051	5.115	D	7.719	7.685	0.034	3.5	71.76	28.08	0	0	0	0.16	0	0
2001	245	0	656	154.842	-1.81	D	8.007	7.685	0.322	3.5	79.84	20.01	0	0	0	0.15	0	0
2001	246	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	247	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	248	0	517	160.051	5.115	D	7.766	7.685	0.081	3.5	93.33	6.51	0	0	0	0.16	0	0
2001	249	0	517	160.051	5.115	D	7.719	7.685	0.034	3.5	84.96	14.91	0	0	0	0.13	0	0
2001	250	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	251	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	252	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	253	0	491	160.089	-1.402	D	7.685	7.685	0	3.5	33.56	63.05	0	0	0	0.17	0	0
2001	254	0	548	160.098	-2.544	D	7.89	7.685	0.206	3.5	70.36	29.49	0	0	0	0.15	0	0
2001	255	0	624	152.982	-5.684	D	7.754	7.685	0.07	3.5	60.37	39.51	0	0	0	0.12	0	0
2001	256	0	517	160.051	5.115	D	7.688	7.685	0.004	3.5	98.5	1.43	0	0	0	0.1	0	0
2001	257	0	517	160.051	5.115	D	7.839	7.685	0.154	3.5	95.03	4.84	0	0	0	0.13	0	0
2001	258	0	631	152.975	-4.958	D	7.701	7.685	0.016	3.5	94.54	5.36	0	0	0	0.1	0	0
2001	259	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	260	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	261	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	262	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	263	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	264	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	265	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	266	0	548	160.098	-2.544	D	7.977	7.685	0.292	3.5	44.48	55.25	0	0	0	0.27	0	0
2001	267	0	548	160.098	-2.544	D	8.026	7.685	0.341	3.5	78.92	20.79	0	0	0	0.3	0	0
2001	268	0	624	152.982	-5.684	D	7.687	7.685	0.002	3.5	71.96	27.43	0	0	0	0.54	0	0
2001	269	0	548	160.098	-2.544	D	8.138	7.685	0.453	3.5	67.93	31.87	0	0	0	0.2	0	0
2001	270	0	517	160.051	5.115	D	7.842	7.685	0.157	3.5	22.31	77.45	0	0	0	0.25	0	0
2001	271	0	517	160.051	5.115	D	7.856	7.685	0.171	3.5	52.35	47.49	0	0	0	0.16	0	0
2001	272	0	624	152.982	-5.684	D	7.822	7.685	0.137	3.5	47.95	51.9	0	0	0	0.14	0	0
2001	273	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	274	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	275	0	517	160.051	5.115	D	7.621	7.5	0.121	3.1	97.64	2.16	0	0	0	0.2	0	0
2001	276	0	517	160.051	5.115	D	7.506	7.5	0.007	3.1	81.77	18.14	0	0	0	0.1	0	0
2001	277	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	278	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	279	0	637	152.992	-4.475	D	7.507	7.5	0.007	3.1	33.38	66.33	0	0	0	0.29	0	0
2001	280	0	548	160.098	-2.544	D	7.83	7.5	0.331	3.1	28.44	71.23	0	0	0	0.33	0	0
2001	281	0	548	160.098	-2.544	D	7.802	7.5	0.302	3.1	69.43	30.33	0	0	0	0.24	0	0
2001	282	0	637	152.992	-4.475	D	7.502	7.5	0.002	3.1	75.38	24.5	0	0	0	0.13	0	0
2001	283	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	284	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	285	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	286	0	490	159.714	4.549	D	7.5	7.5	0	3.1	104.23	2	0	0	0	0	0	0
2001	287	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	288	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	289	0	517	160.051	5.115	D	7.51	7.5	0.01	3.1	34.27	65.68	0	0	0	0.06	0	0
2001	290	0	517	160.051	5.115	D	7.501	7.5	0.002	3.1	17.11	82.86	0	0	0	0.04	0	0
2001	291	0	517	160.051	5.115	D	7.778	7.5	0.279	3.1	42.29	57.39	0	0	0	0.32	0	0
2001	292	0	517	160.051	5.115	D	7.615	7.5	0.116	3.1	64.55	35.29	0	0	0	0.16	0	0
2001	293	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	294	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	295	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	296	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	297	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	298	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	299	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	300	0	517	160.051	5.115	D	7.513	7.5	0.013	3.1	18.83	80.63	0	0	0	0.54	0	0
2001	301	0	517	160.051	5.115	D	8.369	7.5	**0.869**	3.1	33.68	65.95	0	0	0	0.37	1	0
2001	302	0	637	152.992	-4.475	D	7.68	7.5	0.181	3.1	54.69	45.14	0	0	0	0.17	0	0
2001	303	0	517	160.051	5.115	D	7.502	7.5	0.002	3.1	77.61	22.31	0	0	0	0.1	0	0
2001	304	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	305	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	306	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	307	0	517	160.051	5.115	D	7.744	7.5	0.245	3.1	53.29	46.58	0	0	0	0.13	0	0
2001	308	0	624	152.982	-5.684	D	7.543	7.5	0.044	3.1	52.75	47.15	0	0	0	0.09	0	0
2001	309	0	517	160.051	5.115	D	7.726	7.5	0.226	3.1	59.25	40.46	0	0	0	0.29	0	0
2001	310	0	624	152.982	-5.684	D	7.586	7.5	0.086	3.1	51.15	48.56	0	0	0	0.3	0	0
2001	311	0	637	152.992	-4.475	D	7.51	7.5	0.011	3.1	89.54	10.27	0	0	0	0.2	0	0
2001	312	0	637	152.992	-4.475	D	7.521	7.5	0.022	3.1	84.16	15.7	0	0	0	0.16	0	0
2001	313	0	637	152.992	-4.475	D	7.686	7.5	0.187	3.1	52.43	47.1	0	0	0	0.47	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	314	0	637	152.992	-4.475	D	7.615	7.5	0.115	3.1	53.36	46.44	0	0	0	0.2	0	0
2001	315	0	548	160.098	-2.544	D	7.576	7.5	0.077	3.1	50.06	49.77	0	0	0	0.18	0	0
2001	316	0	548	160.098	-2.544	D	7.709	7.5	0.209	3.1	19.77	79.8	0	0	0	0.43	0	0
2001	317	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	318	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	319	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	320	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	321	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	322	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	323	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	324	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	325	0	548	160.098	-2.544	D	7.981	7.5	0.482	3.1	40.56	59.05	0	0	0	0.39	0	0
2001	326	0	548	160.098	-2.544	D	7.53	7.5	0.031	3.1	48.54	51.26	0	0	0	0.2	0	0
2001	327	0	548	160.098	-2.544	D	7.503	7.5	0.004	3.1	62.54	37.3	0	0	0	0.17	0	0
2001	328	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	329	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	330	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	331	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	332	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	333	0	517	160.051	5.115	D	7.508	7.5	0.009	3.1	12.02	87.83	0	0	0	0.15	0	0
2001	334	0	623	153.169	-5.678	D	7.5	7.5	0	3.1	40.02	59.96	0	0	0	0.01	0	0
2001	335	0	527	160.066	2.645	D	7.744	7.5	0.245	3.1	41.38	58.55	0	0	0	0.06	0	0
2001	336	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	337	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	338	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	339	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	340	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	341	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	342	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	343	0	517	160.051	5.115	D	7.957	7.593	0.365	3.3	58	41.59	0	0	0	0.41	0	0
2001	344	0	632	152.976	-4.828	D	8.384	7.593	**0.791**	3.3	25.13	74.36	0	0	0	0.51	1	0
2001	345	0	637	152.992	-4.475	D	7.724	7.593	0.131	3.3	56.42	43.43	0	0	0	0.15	0	0
2001	346	0	637	152.992	-4.475	D	7.657	7.593	0.064	3.3	58.99	40.88	0	0	0	0.13	0	0
2001	347	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	348	0	517	160.051	5.115	D	7.745	7.593	0.153	3.3	58.26	41.59	0	0	0	0.15	0	0
2001	349	0	637	152.992	-4.475	D	7.705	7.593	0.113	3.3	40.49	59.47	0	0	0	0.04	0	0
2001	350	0	517	160.051	5.115	D	7.595	7.593	0.003	3.3	32.56	67.44	0	0	0	0	0	0
2001	351	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	352	0	517	160.051	5.115	D	7.74	7.593	0.147	3.3	64.17	35.69	0	0	0	0.14	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extincition by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	353	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	354	0	517	160.051	5.115	D	7.599	7.593	0.007	3.3	45.11	54.4	0	0	0	0.49	0	0
2001	355	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	356	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	357	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	358	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	359	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	360	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	361	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	362	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	363	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	364	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	365	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									1.685								**26**	**11**

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	2	0	517	160.051	5.115	D	8.045	7.593	0.453	3.3	32.77	67.01	0	0	0	0.22	0	0
2002	3	0	637	152.992	-4.475	D	9.776	7.593	**2.183**	3.3	31.09	68.69	0	0	0	0.22	1	1
2002	4	0	557	158.11	-3.116	D	8.634	7.593	**1.042**	3.3	26.76	72.96	0	0	0	0.29	1	1
2002	5	0	548	160.098	-2.544	D	7.593	7.593	0	3.3	35.57	64.24	0	0	0	0.11	0	0
2002	6	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	7	0	517	160.051	5.115	D	7.718	7.593	0.125	3.3	40.33	59.27	0	0	0	0.4	0	0
2002	8	0	517	160.051	5.115	D	7.798	7.593	0.205	3.3	19.44	80.04	0	0	0	0.51	0	0
2002	9	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	10	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	11	0	517	160.051	5.115	D	8.046	7.593	0.454	3.3	64.95	34.71	0	0	0	0.34	0	0
2002	12	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	13	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	14	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	15	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	16	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	17	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	18	0	548	160.098	-2.544	D	8.215	7.593	**0.622**	3.3	34.46	65.26	0	0	0	0.28	1	0
2002	19	0	548	160.098	-2.544	D	7.909	7.593	0.316	3.3	44.74	55.08	0	0	0	0.18	0	0
2002	20	0	637	152.992	-4.475	D	7.794	7.593	0.201	3.3	65.32	34.59	0	0	0	0.09	0	0
2002	21	0	517	160.051	5.115	D	7.812	7.593	0.219	3.3	66.46	33.47	0	0	0	0.08	0	0
2002	22	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	23	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	24	0	517	160.051	5.115	D	7.595	7.593	0.002	3.3	11.98	87.95	0	0	0	0.09	0	0
2002	25	0	517	160.051	5.115	D	8.628	7.593	**1.035**	3.3	48.72	51.01	0	0	0	0.27	1	1
2002	26	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	27	0	603	155.328	-5.781	D	7.6	7.593	0.008	3.3	76.86	23.01	0	0	0	0.14	0	0
2002	28	0	548	160.098	-2.544	D	7.594	7.593	0.001	3.3	69.81	30.06	0	0	0	0.11	0	0
2002	29	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	30	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	31	0	517	160.051	5.115	D	7.916	7.593	0.323	3.3	19.77	80.2	0	0	0	0.03	0	0
2002	32	0	517	160.051	5.115	D	7.594	7.593	0.002	3.3	27.09	73	0	0	0	0	0	0
2002	33	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	34	0	517	160.051	5.115	D	7.465	7.453	0.012	3	47	52.8	0	0	0	0.22	0	0
2002	35	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	36	0	637	152.992	-4.475	D	7.72	7.453	0.267	3	31.28	68.39	0	0	0	0.33	0	0
2002	37	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	38	0	517	160.051	5.115	D	7.453	7.453	0.001	3	66.48	33.66	0	0	0	0.09	0	0
2002	39	0	517	160.051	5.115	D	7.547	7.453	0.094	3	43.5	56.19	0	0	0	0.31	0	0
2002	40	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	41	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	42	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	43	0	517	160.051	5.115	D	7.663	7.453	0.211	3	30.47	69.1	0	0	0	0.42	0	0
2002	44	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	45	0	632	152.976	-4.828	D	7.795	7.453	0.342	3	34.42	65.01	0	0	0	0.57	0	0
2002	46	0	548	160.098	-2.544	D	7.594	7.453	0.142	3	56.96	42.84	0	0	0	0.2	0	0
2002	47	0	517	160.051	5.115	D	7.475	7.453	0.023	3	64.42	35.42	0	0	0	0.16	0	0
2002	48	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	49	0	517	160.051	5.115	D	7.818	7.453	0.365	3	49.95	49.64	0	0	0	0.41	0	0
2002	50	0	637	152.992	-4.475	D	7.656	7.453	0.203	3	45.97	53.81	0	0	0	0.22	0	0
2002	51	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	52	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	53	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	54	0	637	152.992	-4.475	D	8.072	7.453	**0.62**	3	38.09	61.57	0	0	0	0.34	1	0
2002	55	0	637	152.992	-4.475	D	7.76	7.453	0.307	3	54.23	45.6	0	0	0	0.17	0	0
2002	56	0	517	160.051	5.115	D	7.459	7.453	0.006	3	65.96	33.94	0	0	0	0.11	0	0
2002	57	0	517	160.051	5.115	D	7.455	7.453	0.003	3	68.85	31.11	0	0	0	0.08	0	0
2002	58	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	59	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	60	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	61	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	62	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	63	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	64	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	65	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	66	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	67	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	68	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	69	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	70	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	71	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	72	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	73	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	74	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	75	0	517	160.051	5.115	D	7.453	7.358	0.095	2.8	64.87	35.04	0	0	0	0.09	0	0
2002	76	0	624	152.982	-5.684	D	7.358	7.358	0	2.8	18.67	84.11	0	0	0	0	0	0
2002	77	0	637	152.992	-4.475	D	7.365	7.358	0.007	2.8	51.55	48.48	0	0	0	0.01	0	0
2002	78	0	517	160.051	5.115	D	7.371	7.358	0.013	2.8	55.39	44.61	0	0	0	0.01	0	0
2002	79	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	80	0	624	152.982	-5.684	D	8.079	7.358	**0.72**	2.8	59.68	40.03	0	0	0	0.29	1	0
2002	81	0	522	160.059	3.88	D	7.594	7.358	0.235	2.8	39.8	59.9	0	0	0	0.3	0	0
2002	82	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	83	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	91.66	13.58	0	0	0	0.26	0	0
2002	84	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	85	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	86	0	603	155.328	-5.781	D	7.646	7.358	0.287	2.8	58.44	41.32	0	0	0	0.24	0	0
2002	87	0	548	160.098	-2.544	D	7.711	7.358	0.352	2.8	60.46	39.32	0	0	0	0.22	0	0
2002	88	0	517	160.051	5.115	D	7.415	7.358	0.057	2.8	69.84	30.03	0	0	0	0.12	0	0
2002	89	0	517	160.051	5.115	D	7.842	7.358	0.484	2.8	89.54	10.22	0	0	0	0.24	0	0
2002	90	0	517	160.051	5.115	D	7.645	7.358	0.287	2.8	49.81	49.95	0	0	0	0.24	0	0
2002	91	0	517	160.051	5.115	D	7.565	7.358	0.207	2.8	67.99	31.73	0	0	0	0.28	0	0
2002	92	0	526	160.065	2.891	D	7.913	7.263	**0.65**	2.6	62.26	37.49	0	0	0	0.25	1	0
2002	93	0	548	160.098	-2.544	D	7.32	7.263	0.057	2.6	58.75	40.79	0	0	0	0.46	0	0
2002	94	0	517	160.051	5.115	D	7.641	7.263	0.378	2.6	50.34	49.35	0	0	0	0.31	0	0
2002	95	0	517	160.051	5.115	D	7.799	7.263	**0.537**	2.6	48.84	50.95	0	0	0	0.21	1	0
2002	96	0	624	152.982	-5.684	D	7.842	7.263	**0.579**	2.6	46.65	53.14	0	0	0	0.22	1	0
2002	97	0	626	152.979	-5.287	D	7.454	7.263	0.191	2.6	67.9	31.86	0	0	0	0.24	0	0
2002	98	0	637	152.992	-4.475	D	7.267	7.263	0.004	2.6	87.07	12.8	0	0	0	0.11	0	0
2002	99	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	100	0	676	156.899	0.996	D	7.688	7.263	0.425	2.6	89.5	10.01	0	0	0	0.48	0	0
2002	101	0	637	152.992	-4.475	D	7.263	7.263	0	2.6	69.7	29.93	0	0	0	0.18	0	0
2002	102	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	103	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	104	0	517	160.051	5.115	D	7.335	7.263	0.072	2.6	74.08	25.76	0	0	0	0.16	0	0
2002	105	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	106	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	107	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	108	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	109	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	110	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	111	0	517	160.051	5.115	D	7.326	7.263	0.063	2.6	54.98	45.01	0	0	0	0.02	0	0
2002	112	0	517	160.051	5.115	D	7.29	7.263	0.027	2.6	91.75	8.25	0	0	0	0.01	0	0
2002	113	0	548	160.098	-2.544	D	7.263	7.263	0	2.6	82.86	17	0	0	0	0	0	0
2002	114	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	115	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	116	0	637	152.992	-4.475	D	7.465	7.263	0.202	2.6	56.24	42.9	0	0	0	0.86	0	0
2002	117	0	517	160.051	5.115	D	7.264	7.263	0.001	2.6	86.73	12.95	0	0	0	0.32	0	0
2002	118	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	119	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	120	0	517	160.051	5.115	D	7.917	7.263	**0.655**	2.6	80.46	19.21	0	0	0	0.33	1	0
2002	121	0	517	160.051	5.115	D	7.392	7.263	0.129	2.6	73.33	26.5	0	0	0	0.16	0	0
2002	122	0	637	152.992	-4.475	D	7.453	7.453	0	3	87.52	12.56	0	0	0	0.07	0	0
2002	123	0	637	152.992	-4.475	D	8.534	7.453	**1.082**	3	80.46	19.39	0	0	0	0.16	1	1
2002	124	0	637	152.992	-4.475	D	7.472	7.453	0.019	3	49.13	50.62	0	0	0	0.25	0	0
2002	125	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	126	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	127	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	128	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	129	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	130	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	131	0	517	160.051	5.115	D	7.524	7.453	0.071	3	57.45	41.79	0	0	0	0.76	0	0
2002	132	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	133	0	517	160.051	5.115	D	7.453	7.453	0	3	27.15	73.08	0	0	0	0.01	0	0
2002	134	0	632	152.976	-4.828	D	7.664	7.453	0.211	3	61.38	38.38	0	0	0	0.24	0	0
2002	135	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	136	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	137	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	138	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	139	0	637	152.992	-4.475	D	7.541	7.453	0.088	3	57.78	42.06	0	0	0	0.16	0	0
2002	140	0	603	155.328	-5.781	D	7.751	7.453	0.298	3	48.25	51.59	0	0	0	0.16	0	0
2002	141	0	517	160.051	5.115	D	7.635	7.453	0.183	3	77.52	22.13	0	0	0	0.35	0	0
2002	142	0	637	152.992	-4.475	D	7.477	7.453	0.025	3	80.18	19.66	0	0	0	0.17	0	0
2002	143	0	637	152.992	-4.475	D	7.463	7.453	0.011	3	93.61	6.3	0	0	0	0.1	0	0
2002	144	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	145	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	146	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	147	0	517	160.051	5.115	D	7.811	7.453	0.359	3	89.74	9.95	0	0	0	0.32	0	0
2002	148	0	517	160.051	5.115	D	7.453	7.453	0	3	97.02	3.02	0	0	0	0.15	0	0
2002	149	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	150	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	151	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	152	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	153	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	154	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	155	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	156	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	157	0	695	159.463	4.375	D	7.82	7.546	0.274	3.2	80.87	19.09	0	0	0	0.05	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002											% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	158	0	632	152.976	-4.828	D	8.564	7.546	**1.018**	3.2	79.87	19.94	0	0	0	0.19	1	1
2002	159	0	632	152.976	-4.828	D	7.595	7.546	0.049	3.2	76.34	23.5	0	0	0	0.16	0	0
2002	160	0	637	152.992	-4.475	D	7.564	7.546	0.018	3.2	97.4	2.49	0	0	0	0.12	0	0
2002	161	0	517	160.051	5.115	D	7.547	7.546	0.001	3.2	91.86	8.11	0	0	0	0.09	0	0
2002	162	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	163	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	164	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	165	0	517	160.051	5.115	D	7.643	7.546	0.097	3.2	96.27	3.25	0	0	0	0.48	0	0
2002	166	0	548	160.098	-2.544	D	7.595	7.546	0.049	3.2	80.17	19.34	0	0	0	0.49	0	0
2002	167	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	168	0	637	152.992	-4.475	D	7.642	7.546	0.096	3.2	78.4	21.48	0	0	0	0.12	0	0
2002	169	0	637	152.992	-4.475	D	8.034	7.546	0.488	3.2	91.41	8.45	0	0	0	0.14	0	0
2002	170	0	517	160.051	5.115	D	7.627	7.546	0.081	3.2	99.08	0.83	0	0	0	0.09	0	0
2002	171	0	490	159.714	4.549	D	7.546	7.546	0	3.2	99.16	0.06	0	0	0	0	0	0
2002	172	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	173	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	174	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	175	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	176	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	177	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	178	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	179	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	180	0	517	160.051	5.115	D	7.606	7.546	0.059	3.2	98.28	1.5	0	0	0	0.22	0	0
2002	181	0	517	160.051	5.115	D	7.55	7.546	0.003	3.2	95.22	4.66	0	0	0	0.12	0	0
2002	182	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	183	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	184	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	185	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	186	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	187	0	517	160.051	5.115	D	7.596	7.593	0.003	3.3	99.92	0.07	0	0	0	0.01	0	0
2002	188	0	517	160.051	5.115	D	7.599	7.593	0.007	3.3	99.88	0.13	0	0	0	0.01	0	0
2002	189	0	517	160.051	5.115	D	7.593	7.593	0	3.3	99.64	0.48	0	0	0	0	0	0
2002	190	0	517	160.051	5.115	D	7.596	7.593	0.003	3.3	99.82	0.07	0	0	0	0.12	0	0
2002	191	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	192	0	517	160.051	5.115	D	7.608	7.593	0.016	3.3	96.02	3.77	0	0	0	0.22	0	0
2002	193	0	637	152.992	-4.475	D	7.593	7.593	0.001	3.3	84.3	15.68	0	0	0	0.1	0	0
2002	194	0	624	152.982	-5.684	D	7.593	7.593	0.001	3.3	97.69	2.3	0	0	0	0.05	0	0
2002	195	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	97.84	1.43	0	0	0	0.03	0	0
2002	196	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002											% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	197	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	198	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	199	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	200	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	201	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	202	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	203	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	204	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	205	0	624	152.982	-5.684	D	8.161	7.593	**0.568**	3.3	99.48	0.37	0	0	0	0.15	1	0
2002	206	0	624	152.982	-5.684	D	7.593	7.593	0	3.3	73.35	26.45	0	0	0	0.08	0	0
2002	207	0	624	152.982	-5.684	D	7.605	7.593	0.012	3.3	99.68	0.23	0	0	0	0.09	0	0
2002	208	0	637	152.992	-4.475	D	7.655	7.593	0.062	3.3	99.17	0.75	0	0	0	0.08	0	0
2002	209	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	210	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	211	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	212	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	213	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	214	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	215	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	216	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	217	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	218	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	219	0	637	152.992	-4.475	D	7.685	7.685	0	3.5	95.68	4.45	0	0	0	0.04	0	0
2002	220	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	221	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	222	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	223	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	224	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	225	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	226	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	227	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	228	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	229	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	230	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	231	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	232	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	233	0	490	159.714	4.549	D	7.685	7.685	0	3.5	91.74	0.12	0	0	0	0.11	0	0
2002	234	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	235	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1	
2002	236	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	237	0	517	160.051	5.115	D	8.587	7.685	**0.902**	3.5	90.46	9.36	0	0	0	0.19	1	0	
2002	238	0	624	152.982	-5.684	D	9.175	7.685	**1.49**	3.5	68.19	31.57	0	0	0	0.24	1	1	
2002	239	0	637	152.992	-4.475	D	7.686	7.685	0.001	3.5	95.46	4.37	0	0	0	0.17	0	0	
2002	240	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	241	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	242	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	243	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	244	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	245	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	246	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	247	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	248	0	688	158.434	3.081	D	8.317	7.685	**0.632**	3.5	97.46	2.32	0	0	0	0.22	1	0	
2002	249	0	624	152.982	-5.684	D	7.688	7.685	0.003	3.5	93.65	6.16	0	0	0	0.18	0	0	
2002	250	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	251	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	252	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	253	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	254	0	517	160.051	5.115	D	7.685	7.685	0	3.5	86.18	13.54	0	0	0	0.2	0	0	
2002	255	0	624	152.982	-5.684	D	7.716	7.685	0.031	3.5	81.34	17.52	0	0	0	1.14	0	0	
2002	256	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	257	0	3	153.214	-5.024	D	7.685	7.685	0	3.5	99.36	0.27	0	0	0	0.12	0	0	
2002	258	0	517	160.051	5.115	D	7.688	7.685	0.004	3.5	98.39	1.52	0	0	0	0.12	0	0	
2002	259	0	697	159.757	4.745	D	8.191	7.685	**0.506**	3.5	92.78	7.06	0	0	0	0.16	1	0	
2002	260	0	624	152.982	-5.684	D	7.919	7.685	0.234	3.5	82.77	17.1	0	0	0	0.13	0	0	
2002	261	0	662	155.306	-1.227	D	7.687	7.685	0.002	3.5	95.16	4.77	0	0	0	0.02	0	0	
2002	262	0	517	160.051	5.115	D	7.685	7.685	0	3.5	93.92	5.19	0	0	0	0	0	0	
2002	263	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	264	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	265	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	266	0	637	152.992	-4.475	D	7.885	7.685	0.2	3.5	63.46	36.31	0	0	0	0.24	0	0	
2002	267	0	637	152.992	-4.475	D	8.048	7.685	0.363	3.5	41.48	58.31	0	0	0	0.2	0	0	
2002	268	0	517	160.051	5.115	D	7.805	7.685	0.12	3.5	82.33	17.48	0	0	0	0.19	0	0	
2002	269	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	270	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	
2002	271	0	684	157.943	2.298	D	8.625	7.685	**0.94**	3.5	77.62	22.21	0	0	0	0.17	1	0	
2002	272	0	624	152.982	-5.684	D	8.216	7.685	**0.532**	3.5	61.77	38.08	0	0	0	0.14	1	0	
2002	273	0	517	160.051	5.115	D	7.923	7.685	0.238	3.5	96.17	3.72	0	0	0	0.11	0	0	
2002	274	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0	

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	275	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	276	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	277	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	278	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	279	0	681	157.591	1.704	D	7.649	7.5	0.15	3.1	29.54	69.94	0	0	0	0.52	0	0
2002	280	0	603	155.328	-5.781	D	7.582	7.5	0.082	3.1	84.99	14.82	0	0	0	0.19	0	0
2002	281	0	632	152.976	-4.828	D	7.635	7.5	0.135	3.1	31.99	67	0	0	0	1	0	0
2002	282	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	283	0	517	160.051	5.115	D	7.501	7.5	0.002	3.1	88.22	11.78	0	0	0	0.15	0	0
2002	284	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	285	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	286	0	530	160.071	1.903	D	7.54	7.5	0.04	3.1	31.79	67.96	0	0	0	0.24	0	0
2002	287	0	548	160.098	-2.544	D	7.5	7.5	0	3.1	39.69	59.78	0	0	0	0.18	0	0
2002	288	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	289	0	517	160.051	5.115	D	7.709	7.5	0.209	3.1	67.13	32.37	0	0	0	0.49	0	0
2002	290	0	517	160.051	5.115	D	8.026	7.5	**0.527**	3.1	63.82	35.94	0	0	0	0.24	1	0
2002	291	0	517	160.051	5.115	D	7.745	7.5	0.246	3.1	46.18	53.55	0	0	0	0.26	0	0
2002	292	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	293	0	517	160.051	5.115	D	7.632	7.5	0.132	3.1	63.26	36.63	0	0	0	0.11	0	0
2002	294	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	295	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	92.8	7.88	0	0	0	0.14	0	0
2002	296	0	517	160.051	5.115	D	7.634	7.5	0.135	3.1	62.91	36.96	0	0	0	0.14	0	0
2002	297	0	517	160.051	5.115	D	7.749	7.5	0.25	3.1	58.38	41.51	0	0	0	0.11	0	0
2002	298	0	5	153.204	-4.528	D	7.5	7.5	0	3.1	79.66	20.03	0	0	0	0.09	0	0
2002	299	0	637	152.992	-4.475	D	7.523	7.5	0.023	3.1	80	19.94	0	0	0	0.06	0	0
2002	300	0	517	160.051	5.115	D	9.648	7.5	**2.148**	3.1	66.53	33.38	0	0	0	0.09	1	1
2002	301	0	637	152.992	-4.475	D	7.757	7.5	0.257	3.1	45.94	53.87	0	0	0	0.2	0	0
2002	302	0	624	152.982	-5.684	D	7.501	7.5	0.001	3.1	84.08	16.01	0	0	0	0.07	0	0
2002	303	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	304	0	692	159.022	3.82	D	7.531	7.5	0.031	3.1	61.67	38.2	0	0	0	0.13	0	0
2002	305	0	517	160.051	5.115	D	8.63	7.5	**1.13**	3.1	60.75	39.08	0	0	0	0.17	1	1
2002	306	0	548	160.098	-2.544	D	7.582	7.5	0.083	3.1	46.16	53.38	0	0	0	0.46	0	0
2002	307	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	308	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	309	0	517	160.051	5.115	D	7.543	7.5	0.043	3.1	57.78	42.02	0	0	0	0.2	0	0
2002	310	0	517	160.051	5.115	D	7.5	7.5	0	3.1	77.78	22.92	0	0	0	0.04	0	0
2002	311	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	312	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	313	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	314	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	315	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	316	0	517	160.051	5.115	D	7.556	7.5	0.057	3.1	43.92	55.82	0	0	0	0.26	0	0
2002	317	0	637	152.992	-4.475	D	8.251	7.5	**0.752**	3.1	45.55	54.16	0	0	0	0.29	1	0
2002	318	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	319	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	320	0	624	152.982	-5.684	D	7.715	7.5	0.216	3.1	57.31	42.51	0	0	0	0.18	0	0
2002	321	0	517	160.051	5.115	D	8.265	7.5	**0.766**	3.1	54.99	44.76	0	0	0	0.25	1	0
2002	322	0	517	160.051	5.115	D	8.239	7.5	**0.74**	3.1	42.05	57.7	0	0	0	0.25	1	0
2002	323	0	517	160.051	5.115	D	7.502	7.5	0.002	3.1	44.1	55.76	0	0	0	0.15	0	0
2002	324	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	325	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	326	0	517	160.051	5.115	D	7.504	7.5	0.005	3.1	24.33	74.68	0	0	0	1	0	0
2002	327	0	517	160.051	5.115	D	7.503	7.5	0.004	3.1	23.82	75.2	0	0	0	0.97	0	0
2002	328	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	329	0	637	152.992	-4.475	D	7.522	7.5	0.023	3.1	47.76	52.17	0	0	0	0.08	0	0
2002	330	0	624	152.982	-5.684	D	7.515	7.5	0.016	3.1	44.78	55.12	0	0	0	0.11	0	0
2002	331	0	637	152.992	-4.475	D	7.518	7.5	0.018	3.1	40.72	59.05	0	0	0	0.24	0	0
2002	332	0	637	152.992	-4.475	D	7.937	7.5	0.437	3.1	39.59	60.21	0	0	0	0.2	0	0
2002	333	0	548	160.098	-2.544	D	7.646	7.5	0.147	3.1	41.06	58.81	0	0	0	0.13	0	0
2002	334	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	335	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	336	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	337	0	548	160.098	-2.544	D	7.741	7.593	0.148	3.3	41.11	58.57	0	0	0	0.32	0	0
2002	338	0	603	155.328	-5.781	D	7.594	7.593	0.001	3.3	37.83	61.94	0	0	0	0.18	0	0
2002	339	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	340	0	517	160.051	5.115	D	7.833	7.593	0.24	3.3	40.68	59.1	0	0	0	0.22	0	0
2002	341	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	342	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	343	0	517	160.051	5.115	D	7.804	7.593	0.211	3.3	58.18	41.65	0	0	0	0.17	0	0
2002	344	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	345	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	346	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	347	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	348	0	637	152.992	-4.475	D	7.738	7.593	0.146	3.3	27.56	72.03	0	0	0	0.41	0	0
2002	349	0	517	160.051	5.115	D	7.695	7.593	0.102	3.3	16.35	83.22	0	0	0	0.43	0	0
2002	350	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	351	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	352	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	353	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	354	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	355	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	356	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	357	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	358	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	359	0	624	152.982	-5.684	D	7.762	7.593	0.17	3.3	47.32	52.34	0	0	0	0.33	0	0
2002	360	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	361	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	362	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	363	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	364	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	365	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									2.183								**25**	**8**

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003											% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	2	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	3	0	517	160.051	5.115	D	7.947	7.593	0.354	3.3	62.11	37.66	0	0	0	0.23	0	0
2003	4	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	5	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	6	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	7	0	553	159.024	-2.906	D	8.259	7.593	**0.667**	3.3	50.67	49.02	0	0	0	0.31	1	0
2003	8	0	548	160.098	-2.544	D	7.599	7.593	0.006	3.3	46.12	53.73	0	0	0	0.16	0	0
2003	9	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	10	0	548	160.098	-2.544	D	7.635	7.593	0.043	3.3	66.48	32.91	0	0	0	0.61	0	0
2003	11	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	12	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	13	0	517	160.051	5.115	D	7.86	7.593	0.268	3.3	32.66	67.13	0	0	0	0.22	0	0
2003	14	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	15	0	548	160.098	-2.544	D	8.7	7.593	**1.107**	3.3	32.28	67.41	0	0	0	0.31	1	1
2003	16	0	604	155.247	-5.778	D	7.72	7.593	0.127	3.3	33.64	66.18	0	0	0	0.18	0	0
2003	17	0	626	152.979	-5.287	D	7.708	7.593	0.115	3.3	57.91	41.88	0	0	0	0.21	0	0
2003	18	0	517	160.051	5.115	D	7.594	7.593	0.001	3.3	33.47	66.28	0	0	0	0.29	0	0
2003	19	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	20	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	21	0	517	160.051	5.115	D	7.774	7.593	0.181	3.3	54.04	45.69	0	0	0	0.27	0	0
2003	22	0	6	153.198	-4.28	D	7.593	7.593	0	3.3	41.86	48.27	0	0	0	0.12	0	0
2003	23	0	517	160.051	5.115	D	8.162	7.593	**0.569**	3.3	48.59	51.15	0	0	0	0.27	1	0
2003	24	0	548	160.098	-2.544	D	7.611	7.593	0.019	3.3	19.4	80.04	0	0	0	0.56	0	0
2003	25	0	546	160.095	-2.05	D	7.972	7.593	0.379	3.3	37.04	62.8	0	0	0	0.17	0	0
2003	26	0	548	160.098	-2.544	D	7.623	7.593	0.031	3.3	49.79	50.09	0	0	0	0.11	0	0
2003	27	0	517	160.051	5.115	D	8.115	7.593	**0.522**	3.3	32.33	67.36	0	0	0	0.31	1	0
2003	28	0	637	152.992	-4.475	D	7.855	7.593	0.262	3.3	32.03	67.73	0	0	0	0.24	0	0
2003	29	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	30	0	637	152.992	-4.475	D	7.76	7.593	0.167	3.3	35.17	64.63	0	0	0	0.2	0	0
2003	31	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	32	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	33	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	34	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	35	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	36	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	37	0	517	160.051	5.115	D	7.933	7.453	0.48	3	26.43	73.27	0	0	0	0.31	0	0
2003	38	0	637	152.992	-4.475	D	7.645	7.453	0.192	3	63.48	36.43	0	0	0	0.09	0	0
2003	39	0	517	160.051	5.115	D	7.56	7.453	0.107	3	20.49	78.96	0	0	0	0.55	0	0
2003	40	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	41	0	517	160.051	5.115	D	7.487	7.453	0.035	3	34.22	65.53	0	0	0	0.26	0	0
2003	42	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	43	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	44	0	548	160.098	-2.544	D	7.453	7.453	0	3	20.06	79.56	0	0	0	0.46	0	0
2003	45	0	603	155.328	-5.781	D	7.453	7.453	0	3	80.14	19.78	0	0	0	0.41	0	0
2003	46	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	47	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	48	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	49	0	637	152.992	-4.475	D	7.72	7.453	0.268	3	53.37	46.48	0	0	0	0.15	0	0
2003	50	0	517	160.051	5.115	D	7.836	7.453	0.384	3	55.36	44.51	0	0	0	0.12	0	0
2003	51	0	517	160.051	5.115	D	7.556	7.453	0.103	3	57.34	42.61	0	0	0	0.06	0	0
2003	52	0	624	152.982	-5.684	D	7.454	7.453	0.001	3	51.1	48.9	0	0	0	0.04	0	0
2003	53	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	54	0	517	160.051	5.115	D	7.703	7.453	0.25	3	61.17	38.51	0	0	0	0.32	0	0
2003	55	0	624	152.982	-5.684	D	7.73	7.453	0.277	3	38.71	60.92	0	0	0	0.37	0	0
2003	56	0	548	160.098	-2.544	D	7.602	7.453	0.149	3	18.03	81.59	0	0	0	0.39	0	0
2003	57	0	637	152.992	-4.475	D	7.58	7.453	0.127	3	23.76	75.81	0	0	0	0.43	0	0
2003	58	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	59	0	1	153.225	-5.521	D	7.453	7.453	0	3	71.16	33.12	0	0	0	0.08	0	0
2003	60	0	4	153.209	-4.776	D	7.453	7.453	0.001	3	71.85	28.49	0	0	0	0.07	0	0
2003	61	0	517	160.051	5.115	D	7.457	7.358	0.099	2.8	73.18	26.77	0	0	0	0.05	0	0
2003	62	0	517	160.051	5.115	D	7.786	7.358	0.427	2.8	73.34	26.59	0	0	0	0.06	0	0
2003	63	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	64	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	65	0	517	160.051	5.115	D	7.71	7.358	0.351	2.8	45.26	54.55	0	0	0	0.19	0	0
2003	66	0	624	152.982	-5.684	D	7.458	7.358	0.099	2.8	39.95	59.77	0	0	0	0.28	0	0
2003	67	0	632	152.976	-4.828	D	7.514	7.358	0.155	2.8	73.14	26.74	0	0	0	0.12	0	0
2003	68	0	517	160.051	5.115	D	7.388	7.358	0.03	2.8	65	34.8	0	0	0	0.2	0	0
2003	69	0	637	152.992	-4.475	D	7.77	7.358	0.412	2.8	31.03	68.67	0	0	0	0.29	0	0
2003	70	0	637	152.992	-4.475	D	7.466	7.358	0.108	2.8	26.56	73.15	0	0	0	0.29	0	0
2003	71	0	637	152.992	-4.475	D	7.412	7.358	0.054	2.8	61.11	38.71	0	0	0	0.18	0	0
2003	72	0	517	160.051	5.115	D	7.368	7.358	0.01	2.8	69.28	30.64	0	0	0	0.09	0	0
2003	73	0	548	160.098	-2.544	D	7.411	7.358	0.053	2.8	76.79	22.71	0	0	0	0.49	0	0
2003	74	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	75	0	632	152.976	-4.828	D	7.358	7.358	0	2.8	83.45	15.61	0	0	0	0.09	0	0
2003	76	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	77	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	78	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	79	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	80	0	624	152.982	-5.684	D	7.365	7.358	0.006	2.8	65.41	34.5	0	0	0	0.1	0	0
2003	81	0	624	152.982	-5.684	D	7.483	7.358	0.125	2.8	38.68	60.93	0	0	0	0.38	0	0
2003	82	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	83	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	84	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	85	0	517	160.051	5.115	D	7.501	7.358	0.143	2.8	65.28	34.55	0	0	0	0.16	0	0
2003	86	0	517	160.051	5.115	D	7.405	7.358	0.047	2.8	53.17	46.47	0	0	0	0.36	0	0
2003	87	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	88	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	89	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	90	0	517	160.051	5.115	D	7.383	7.358	0.025	2.8	18.39	81.02	0	0	0	0.58	0	0
2003	91	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	92	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	93	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	94	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	95	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	96	0	517	160.051	5.115	D	7.37	7.263	0.107	2.6	65.88	33.89	0	0	0	0.22	0	0
2003	97	0	624	152.982	-5.684	D	7.264	7.263	0.001	2.6	63.67	36.14	0	0	0	0.11	0	0
2003	98	0	517	160.051	5.115	D	7.263	7.263	0	2.6	63.43	35.9	0	0	0	0.17	0	0
2003	99	0	637	152.992	-4.475	D	9.174	7.263	**1.911**	2.6	58.32	41.44	0	0	0	0.24	1	1
2003	100	0	624	152.982	-5.684	D	7.284	7.263	0.021	2.6	27.45	72.02	0	0	0	0.54	0	0
2003	101	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	102	0	637	152.992	-4.475	D	7.679	7.263	0.416	2.6	83.36	16.45	0	0	0	0.19	0	0
2003	103	0	517	160.051	5.115	D	8.622	7.263	**1.359**	2.6	68.53	31.28	0	0	0	0.18	1	1
2003	104	0	517	160.051	5.115	D	7.268	7.263	0.005	2.6	95.56	4.21	0	0	0	0.23	0	0
2003	105	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	106	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	107	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	108	0	517	160.051	5.115	D	7.284	7.263	0.022	2.6	77.81	22.12	0	0	0	0.07	0	0
2003	109	0	517	160.051	5.115	D	7.272	7.263	0.009	2.6	76.59	23.19	0	0	0	0.24	0	0
2003	110	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	111	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	112	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	113	0	557	158.11	-3.116	D	7.798	7.263	**0.535**	2.6	64.59	34.81	0	0	0	0.6	1	0
2003	114	0	624	152.982	-5.684	D	7.264	7.263	0.001	2.6	63.7	36.09	0	0	0	0.14	0	0
2003	115	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	116	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	117	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	118	0	637	152.992	-4.475	D	7.263	7.263	0.001	2.6	99.31	1.03	0	0	0	0.08	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	119	0	517	160.051	5.115	D	7.264	7.263	0.001	2.6	95.33	4.62	0	0	0	0.08	0	0
2003	120	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	67.52	0.16	0	0	0	0	0	0
2003	121	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	122	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	123	0	632	152.976	-4.828	D	7.685	7.453	0.232	3	89.4	10.39	0	0	0	0.21	0	0
2003	124	0	624	152.982	-5.684	D	7.453	7.453	0	3	67.08	32.92	0	0	0	0.14	0	0
2003	125	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	126	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	127	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	128	0	637	152.992	-4.475	D	7.48	7.453	0.027	3	94.19	5.73	0	0	0	0.08	0	0
2003	129	0	517	160.051	5.115	D	7.467	7.453	0.015	3	85.46	14.49	0	0	0	0.06	0	0
2003	130	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	131	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	132	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	133	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	134	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	135	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	136	0	517	160.051	5.115	D	7.46	7.453	0.007	3	90.58	9.29	0	0	0	0.15	0	0
2003	137	0	517	160.051	5.115	D	7.456	7.453	0.003	3	74.41	25.53	0	0	0	0.11	0	0
2003	138	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	139	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	140	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	141	0	637	152.992	-4.475	D	7.938	7.453	0.485	3	77.86	21.89	0	0	0	0.26	0	0
2003	142	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	143	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	144	0	626	152.979	-5.287	D	7.472	7.453	0.019	3	91.35	8.46	0	0	0	0.21	0	0
2003	145	0	637	152.992	-4.475	D	7.867	7.453	0.415	3	89.45	10.4	0	0	0	0.15	0	0
2003	146	0	637	152.992	-4.475	D	7.513	7.453	0.061	3	88.57	11.35	0	0	0	0.08	0	0
2003	147	0	1	153.225	-5.521	D	7.453	7.453	0	3	88.57	12.21	0	0	0	0.05	0	0
2003	148	0	517	160.051	5.115	D	7.746	7.453	0.294	3	87.44	12.37	0	0	0	0.19	0	0
2003	149	0	548	160.098	-2.544	D	7.464	7.453	0.011	3	54.17	45.71	0	0	0	0.13	0	0
2003	150	0	632	152.976	-4.828	D	7.659	7.453	0.206	3	61	38.23	0	0	0	0.77	0	0
2003	151	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	152	0	624	152.982	-5.684	D	7.591	7.453	0.139	3	95.55	4.18	0	0	0	0.28	0	0
2003	153	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	154	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	155	0	632	152.976	-4.828	D	7.976	7.546	0.43	3.2	79.39	20.44	0	0	0	0.18	0	0
2003	156	0	548	160.098	-2.544	D	8.517	7.546	**0.97**	3.2	67.78	31.99	0	0	0	0.23	1	0
2003	157	0	517	160.051	5.115	D	7.63	7.546	0.084	3.2	92.26	7.57	0	0	0	0.17	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	158	0	517	160.051	5.115	D	7.553	7.546	0.006	3.2	93.31	6.62	0	0	0	0.09	0	0
2003	159	0	624	152.982	-5.684	D	7.548	7.546	0.002	3.2	92.3	7.75	0	0	0	0.06	0	0
2003	160	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	161	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	162	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	163	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	164	0	517	160.051	5.115	D	7.769	7.546	0.222	3.2	68.63	31.21	0	0	0	0.16	0	0
2003	165	0	517	160.051	5.115	D	7.559	7.546	0.013	3.2	79.18	20.76	0	0	0	0.05	0	0
2003	166	0	517	160.051	5.115	D	7.99	7.546	0.444	3.2	90.52	9.3	0	0	0	0.18	0	0
2003	167	0	624	152.982	-5.684	D	7.577	7.546	0.03	3.2	95	4.92	0	0	0	0.09	0	0
2003	168	0	624	152.982	-5.684	D	7.547	7.546	0.001	3.2	90.68	9.6	0	0	0	0.06	0	0
2003	169	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	88	14.62	0	0	0	0.03	0	0
2003	170	0	517	160.051	5.115	D	7.615	7.546	0.069	3.2	97.8	2.09	0	0	0	0.12	0	0
2003	171	0	632	152.976	-4.828	D	8.076	7.546	**0.529**	3.2	97.29	2.59	0	0	0	0.12	1	0
2003	172	0	624	152.982	-5.684	D	7.559	7.546	0.012	3.2	93.24	6.68	0	0	0	0.08	0	0
2003	173	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	174	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	175	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	176	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	177	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	178	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	179	0	548	160.098	-2.544	D	7.859	7.546	0.313	3.2	92.36	7.36	0	0	0	0.28	0	0
2003	180	0	624	152.982	-5.684	D	7.697	7.546	0.151	3.2	90.77	9.1	0	0	0	0.13	0	0
2003	181	0	517	160.051	5.115	D	7.604	7.546	0.058	3.2	98.35	1.54	0	0	0	0.11	0	0
2003	182	0	517	160.051	5.115	D	7.552	7.546	0.006	3.2	98.7	1.25	0	0	0	0.09	0	0
2003	183	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	239.71	6.54	0	0	0	0.02	0	0
2003	184	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	185	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	186	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	187	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	188	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	189	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	190	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	191	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	192	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	193	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	194	0	517	160.051	5.115	D	7.723	7.593	0.131	3.3	97.21	2.57	0	0	0	0.21	0	0
2003	195	0	637	152.992	-4.475	D	7.838	7.593	0.245	3.3	97.58	2.23	0	0	0	0.19	0	0
2003	196	0	637	152.992	-4.475	D	7.6	7.593	0.007	3.3	98.8	1.09	0	0	0	0.12	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	197	0	517	160.051	5.115	D	7.597	7.593	0.004	3.3	73.14	26.58	0	0	0	0.28	0	0
2003	198	0	637	152.992	-4.475	D	8.292	7.593	**0.699**	3.3	94.63	5.02	0	0	0	0.35	1	0
2003	199	0	517	160.051	5.115	D	8.582	7.593	**0.99**	3.3	92	7.86	0	0	0	0.15	1	0
2003	200	0	519	160.054	4.621	D	7.849	7.593	0.257	3.3	97.51	2.4	0	0	0	0.1	0	0
2003	201	0	603	155.328	-5.781	D	7.608	7.593	0.015	3.3	99.03	0.89	0	0	0	0.07	0	0
2003	202	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	203	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	204	0	632	152.976	-4.828	D	8.681	7.593	**1.088**	3.3	95.23	4.37	0	0	0	0.4	1	1
2003	205	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	206	0	637	152.992	-4.475	D	7.593	7.593	0.001	3.3	98.91	0.96	0	0	0	0.11	0	0
2003	207	0	637	152.992	-4.475	D	7.595	7.593	0.002	3.3	97.61	2.3	0	0	0	0.12	0	0
2003	208	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	209	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	210	0	517	160.051	5.115	D	7.851	7.593	0.258	3.3	80.96	18.94	0	0	0	0.11	0	0
2003	211	0	676	156.899	0.996	D	8.008	7.593	0.416	3.3	92.86	7.03	0	0	0	0.11	0	0
2003	212	0	624	152.982	-5.684	D	7.629	7.593	0.036	3.3	97.5	2.48	0	0	0	0.03	0	0
2003	213	0	624	152.982	-5.684	D	7.603	7.593	0.011	3.3	97.99	2.02	0	0	0	0.01	0	0
2003	214	0	624	152.982	-5.684	D	7.696	7.685	0.011	3.5	99.28	0.72	0	0	0	0.01	0	0
2003	215	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	99.18	0.06	0	0	0	0	0	0
2003	216	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	217	0	517	160.051	5.115	D	7.706	7.685	0.021	3.5	84.71	15.16	0	0	0	0.13	0	0
2003	218	0	517	160.051	5.115	D	9.748	7.685	**2.063**	3.5	93.31	6.55	0	0	0	0.13	1	1
2003	219	0	548	160.098	-2.544	D	7.881	7.685	0.196	3.5	89.47	10.43	0	0	0	0.1	0	0
2003	220	0	517	160.051	5.115	D	8.579	7.685	**0.894**	3.5	84.97	14.86	0	0	0	0.17	1	0
2003	221	0	624	152.982	-5.684	D	7.689	7.685	0.004	3.5	55.56	44.32	0	0	0	0.12	0	0
2003	222	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	223	0	624	152.982	-5.684	D	7.687	7.685	0.002	3.5	91.52	8.26	0	0	0	0.19	0	0
2003	224	0	624	152.982	-5.684	D	7.685	7.685	0	3.5	99.9	0.2	0	0	0	0.1	0	0
2003	225	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	226	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	227	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	228	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	229	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	230	0	517	160.051	5.115	D	7.72	7.685	0.035	3.5	95.78	4.05	0	0	0	0.17	0	0
2003	231	0	624	152.982	-5.684	D	8.428	7.685	**0.743**	3.5	86.72	13.12	0	0	0	0.15	1	0
2003	232	0	624	152.982	-5.684	D	7.777	7.685	0.092	3.5	96.19	3.69	0	0	0	0.11	0	0
2003	233	0	624	152.982	-5.684	D	7.761	7.685	0.076	3.5	92.97	6.95	0	0	0	0.08	0	0
2003	234	0	624	152.982	-5.684	D	7.758	7.685	0.074	3.5	98.21	1.71	0	0	0	0.08	0	0
2003	235	0	696	159.61	4.56	D	7.83	7.685	0.145	3.5	99.01	0.79	0	0	0	0.2	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	236	0	624	152.982	-5.684	D	7.756	7.685	0.071	3.5	92.78	7.05	0	0	0	0.17	0	0
2003	237	0	624	152.982	-5.684	D	7.689	7.685	0.004	3.5	95.31	4.56	0	0	0	0.12	0	0
2003	238	0	637	152.992	-4.475	D	7.709	7.685	0.024	3.5	99.32	0.59	0	0	0	0.09	0	0
2003	239	0	517	160.051	5.115	D	7.735	7.685	0.05	3.5	99.68	0.24	0	0	0	0.08	0	0
2003	240	0	517	160.051	5.115	D	7.687	7.685	0.002	3.5	98.88	1.01	0	0	0	0.07	0	0
2003	241	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	242	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	243	0	517	160.051	5.115	D	7.695	7.685	0.011	3.5	99.77	0.18	0	0	0	0.05	0	0
2003	244	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	245	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	246	0	517	160.051	5.115	D	7.685	7.685	0	3.5	95.23	6.23	0	0	0	0.01	0	0
2003	247	0	637	152.992	-4.475	D	8.266	7.685	**0.581**	3.5	60.76	39.13	0	0	0	0.11	1	0
2003	248	0	548	160.098	-2.544	D	8.296	7.685	**0.612**	3.5	47.01	52.76	0	0	0	0.23	1	0
2003	249	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	250	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	251	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	252	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	253	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	254	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	255	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	256	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	257	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	258	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	259	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	260	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	261	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	262	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	263	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	264	0	638	153.14	-4.311	D	8.239	7.685	**0.554**	3.5	39.69	60.02	0	0	0	0.28	1	0
2003	265	0	637	152.992	-4.475	D	7.693	7.685	0.009	3.5	91.11	8.73	0	0	0	0.15	0	0
2003	266	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	99.06	0.66	0	0	0	0	0	0
2003	267	0	517	160.051	5.115	D	7.991	7.685	0.306	3.5	90.42	9.09	0	0	0	0.49	0	0
2003	268	0	517	160.051	5.115	D	7.688	7.685	0.003	3.5	82.84	16.9	0	0	0	0.24	0	0
2003	269	0	517	160.051	5.115	D	7.707	7.685	0.023	3.5	49.71	49.19	0	0	0	1.09	0	0
2003	270	0	517	160.051	5.115	D	7.782	7.685	0.097	3.5	95.29	4.57	0	0	0	0.14	0	0
2003	271	0	626	152.979	-5.287	D	7.909	7.685	0.224	3.5	32.07	67.51	0	0	0	0.43	0	0
2003	272	0	517	160.051	5.115	D	7.891	7.685	0.206	3.5	18.37	81.08	0	0	0	0.55	0	0
2003	273	0	603	155.328	-5.781	D	7.968	7.685	0.283	3.5	52.03	47.6	0	0	0	0.36	0	0
2003	274	0	548	160.098	-2.544	D	7.849	7.685	0.164	3.5	60.46	39.33	0	0	0	0.21	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	275	0	517	160.051	5.115	D	7.67	7.5	0.171	3.1	36.06	63.75	0	0	0	0.19	0	0
2003	276	0	624	152.982	-5.684	D	7.614	7.5	0.114	3.1	25.52	74.25	0	0	0	0.23	0	0
2003	277	0	517	160.051	5.115	D	7.509	7.5	0.009	3.1	85.32	14.56	0	0	0	0.14	0	0
2003	278	0	517	160.051	5.115	D	7.553	7.5	0.053	3.1	87.26	12.23	0	0	0	0.52	0	0
2003	279	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	280	0	517	160.051	5.115	D	7.5	7.5	0.001	3.1	85.97	13.72	0	0	0	0.39	0	0
2003	281	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	282	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	283	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	284	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	285	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	286	0	624	152.982	-5.684	D	7.52	7.5	0.021	3.1	38.27	60.65	0	0	0	1.08	0	0
2003	287	0	637	152.992	-4.475	D	7.53	7.5	0.031	3.1	93.88	6	0	0	0	0.13	0	0
2003	288	0	517	160.051	5.115	D	7.5	7.5	0.001	3.1	82.05	17.91	0	0	0	0.09	0	0
2003	289	0	548	160.098	-2.544	D	7.715	7.5	0.216	3.1	32.1	67.39	0	0	0	0.51	0	0
2003	290	0	432	159.228	4.041	D	7.5	7.5	0	3.1	41.16	58.66	0	0	0	0.07	0	0
2003	291	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	292	0	517	160.051	5.115	D	7.554	7.5	0.054	3.1	93.74	6.1	0	0	0	0.17	0	0
2003	293	0	603	155.328	-5.781	D	7.517	7.5	0.017	3.1	89.98	9.89	0	0	0	0.14	0	0
2003	294	0	603	155.328	-5.781	D	7.505	7.5	0.006	3.1	97.89	2.01	0	0	0	0.12	0	0
2003	295	0	517	160.051	5.115	D	7.515	7.5	0.015	3.1	82.94	16.39	0	0	0	0.68	0	0
2003	296	0	517	160.051	5.115	D	7.733	7.5	0.234	3.1	37.54	62.2	0	0	0	0.26	0	0
2003	297	0	624	152.982	-5.684	D	7.751	7.5	0.252	3.1	82.61	16.96	0	0	0	0.43	0	0
2003	298	0	624	152.982	-5.684	D	7.61	7.5	0.11	3.1	94.35	5.37	0	0	0	0.28	0	0
2003	299	0	548	160.098	-2.544	D	7.662	7.5	0.162	3.1	78.48	21.04	0	0	0	0.48	0	0
2003	300	0	517	160.051	5.115	D	8.264	7.5	**0.765**	3.1	62.4	37.26	0	0	0	0.34	1	0
2003	301	0	548	160.098	-2.544	D	8.265	7.5	**0.765**	3.1	66.58	33.24	0	0	0	0.17	1	0
2003	302	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	303	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	304	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	305	0	517	160.051	5.115	D	7.512	7.5	0.012	3.1	46.16	53.54	0	0	0	0.31	0	0
2003	306	0	637	152.992	-4.475	D	8.066	7.5	**0.566**	3.1	69.51	30.15	0	0	0	0.34	1	0
2003	307	0	517	160.051	5.115	D	7.5	7.5	0	3.1	63.56	36.4	0	0	0	0.13	0	0
2003	308	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	309	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	310	0	517	160.051	5.115	D	7.598	7.5	0.099	3.1	42.52	57.43	0	0	0	0.05	0	0
2003	311	0	624	152.982	-5.684	D	7.501	7.5	0.001	3.1	54.52	45.4	0	0	0	0.1	0	0
2003	312	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	313	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	314	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	315	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	316	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	317	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	318	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	319	0	548	160.098	-2.544	D	7.513	7.5	0.013	3.1	48.23	51.52	0	0	0	0.26	0	0
2003	320	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	321	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	322	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	323	0	517	160.051	5.115	D	7.508	7.5	0.009	3.1	23.63	76.32	0	0	0	0.05	0	0
2003	324	0	632	152.976	-4.828	D	7.576	7.5	0.077	3.1	29.97	68.71	0	0	0	1.32	0	0
2003	325	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	326	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	327	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	328	0	517	160.051	5.115	D	7.5	7.5	0	3.1	66.23	34.51	0	0	0	0.01	0	0
2003	329	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	330	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	331	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	332	0	517	160.051	5.115	D	7.8	7.5	0.3	3.1	74.65	25.1	0	0	0	0.25	0	0
2003	333	0	517	160.051	5.115	D	7.5	7.5	0	3.1	25.69	73.93	0	0	0	1.18	0	0
2003	334	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	335	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	336	0	517	160.051	5.115	D	7.845	7.593	0.253	3.3	36.67	62.91	0	0	0	0.42	0	0
2003	337	0	281	157.781	2.025	D	7.811	7.593	0.219	3.3	45.6	54.05	0	0	0	0.35	0	0
2003	338	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	339	0	517	160.051	5.115	D	8.421	7.593	**0.828**	3.3	60.67	39.2	0	0	0	0.12	1	0
2003	340	0	548	160.098	-2.544	D	7.822	7.593	0.23	3.3	56.72	42.98	0	0	0	0.3	0	0
2003	341	0	517	160.051	5.115	D	7.696	7.593	0.104	3.3	52.03	47.79	0	0	0	0.18	0	0
2003	342	0	517	160.051	5.115	D	7.619	7.593	0.026	3.3	46.17	53.68	0	0	0	0.15	0	0
2003	343	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	344	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	345	0	603	155.328	-5.781	D	7.63	7.593	0.038	3.3	29.44	70.54	0	0	0	0.02	0	0
2003	346	0	517	160.051	5.115	D	7.618	7.593	0.025	3.3	41.81	57.99	0	0	0	0.2	0	0
2003	347	0	517	160.051	5.115	D	8.451	7.593	**0.859**	3.3	39.39	60.41	0	0	0	0.2	1	0
2003	348	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	349	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	350	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	351	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	352	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	353	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	354	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	355	0	517	160.051	5.115	D	7.81	7.593	0.217	3.3	32.49	67.25	0	0	0	0.27	0	0
2003	356	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	357	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	358	0	548	160.098	-2.544	D	7.644	7.593	0.052	3.3	29.39	70.48	0	0	0	0.13	0	0
2003	359	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	360	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	361	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	362	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	363	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	364	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	365	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									2.063								**23**	**5**

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	2	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	3	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	4	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	5	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	6	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	7	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	8	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	9	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	10	0	930	-78.188	-33.78	D	7.547	7.546	0	3.2	35.12	64.75	0	0	0	0.14	0	0
2001	11	0	930	-78.188	-33.78	D	7.642	7.546	0.096	3.2	53.75	46.12	0	0	0	0.13	0	0
2001	12	0	949	-78.53	-31.5	D	7.552	7.546	0.006	3.2	53.07	46.83	0	0	0	0.11	0	0
2001	13	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	14	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	15	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	16	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	17	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	18	0	907	-79.461	-36.281	D	8.615	7.546	**1.069**	3.2	44.58	55.27	0	0	0	0.15	1	1
2001	19	0	907	-79.461	-36.281	D	8.301	7.546	**0.755**	3.2	42.48	57.34	0	0	0	0.18	1	0
2001	20	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	21	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	22	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	23	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	24	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	25	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	26	0	933	-78.17	-33.075	D	7.664	7.546	0.118	3.2	36.31	63.55	0	0	0	0.15	0	0
2001	27	0	964	-80.519	-30.575	D	7.558	7.546	0.011	3.2	35.15	64.77	0	0	0	0.07	0	0
2001	28	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	29	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	30	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	31	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	32	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	33	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	34	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	35	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	36	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	37	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	38	0	949	-78.53	-31.5	D	7.409	7.406	0.004	2.9	54.49	45.24	0	0	0	0.29	0	0
2001	39	0	955	-79.307	-31.075	D	7.43	7.406	0.025	2.9	54.03	45.71	0	0	0	0.26	0	0
2001	40	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	41	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	42	0	930	-78.188	-33.78	D	7.408	7.406	0.002	2.9	42.03	57.78	0	0	0	0.2	0	0
2001	43	0	1017	-87.324	-31.258	D	7.546	7.406	0.14	2.9	45.27	54.57	0	0	0	0.16	0	0
2001	44	0	966	-80.657	-30.543	D	7.407	7.406	0.001	2.9	52.86	47.07	0	0	0	0.09	0	0
2001	45	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	46	0	947	-78.463	-31.7	D	7.407	7.406	0.002	2.9	61.69	38.3	0	0	0	0.05	0	0
2001	47	0	930	-78.188	-33.78	D	7.408	7.406	0.002	2.9	52.92	47.17	0	0	0	0.02	0	0
2001	48	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	49	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	50	0	930	-78.188	-33.78	D	7.431	7.406	0.025	2.9	58.2	41.65	0	0	0	0.16	0	0
2001	51	0	933	-78.17	-33.075	D	7.412	7.406	0.007	2.9	55.32	44.57	0	0	0	0.12	0	0
2001	52	0	1008	-86.153	-30.893	D	7.67	7.406	0.265	2.9	52.26	47.54	0	0	0	0.2	0	0
2001	53	0	1017	-87.324	-31.258	D	8	7.406	**0.595**	2.9	33.08	66.64	0	0	0	0.27	1	0
2001	54	0	1017	-87.324	-31.258	D	7.725	7.406	0.319	2.9	62.48	37.41	0	0	0	0.12	0	0
2001	55	0	1017	-87.324	-31.258	D	7.5	7.406	0.095	2.9	66.79	33.13	0	0	0	0.09	0	0
2001	56	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	57	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	58	0	949	-78.53	-31.5	D	7.406	7.406	0	2.9	57.01	43.05	0	0	0	0.24	0	0
2001	59	0	1008	-86.153	-30.893	D	7.431	7.406	0.025	2.9	62.93	36.94	0	0	0	0.14	0	0
2001	60	0	1017	-87.324	-31.258	D	7.416	7.406	0.01	2.9	43.8	55.97	0	0	0	0.25	0	0
2001	61	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	62	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	63	0	949	-78.53	-31.5	D	7.316	7.311	0.005	2.7	60.52	39.34	0	0	0	0.15	0	0
2001	64	0	931	-78.182	-33.544	D	8.2	7.311	**0.889**	2.7	53.21	46.6	0	0	0	0.19	1	0
2001	65	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	66	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	67	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	68	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	69	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	70	0	907	-79.461	-36.281	D	7.346	7.311	0.035	2.7	77.93	21.87	0	0	0	0.21	0	0
2001	71	0	949	-78.53	-31.5	D	7.317	7.311	0.006	2.7	73.8	26.09	0	0	0	0.14	0	0
2001	72	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	73	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	74	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	75	0	44	-86.351	-37.47	D	7.311	7.311	0	2.7	25.33	76.23	0	0	0	0	0	0
2001	76	0	949	-78.53	-31.5	D	7.324	7.311	0.013	2.7	13.7	86.26	0	0	0	0.04	0	0
2001	77	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	78	0	1017	-87.324	-31.258	D	7.434	7.311	0.124	2.7	60.37	39.35	0	0	0	0.29	0	0
2001	79	0	1039	-87.824	-33.618	D	7.329	7.311	0.018	2.7	63.4	36.39	0	0	0	0.22	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	80	0	966	-80.657	-30.543	D	7.618	7.311	0.307	2.7	54.76	44.98	0	0	0	0.25	0	0
2001	81	0	907	-79.461	-36.281	D	7.547	7.311	0.236	2.7	59.06	40.7	0	0	0	0.24	0	0
2001	82	0	949	-78.53	-31.5	D	7.524	7.311	0.213	2.7	76.74	23.09	0	0	0	0.17	0	0
2001	83	0	949	-78.53	-31.5	D	7.686	7.311	0.375	2.7	84.93	14.92	0	0	0	0.16	0	0
2001	84	0	930	-78.188	-33.78	D	7.43	7.311	0.119	2.7	83.44	16.47	0	0	0	0.09	0	0
2001	85	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	86	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	87	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	88	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	89	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	90	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	91	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	92	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	93	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	94	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	95	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	96	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	97	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	98	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	99	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	100	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	101	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	102	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	103	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	104	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	105	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	106	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	107	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	108	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	109	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	110	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	111	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	112	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	113	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	114	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	115	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	116	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	117	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	118	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	119	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	120	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	121	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	122	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	123	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	124	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	125	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	126	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	127	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	128	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	129	0	930	-78.188	-33.78	D	7.595	7.593	0.003	3.3	79.82	20	0	0	0	0.13	0	0
2001	130	0	907	-79.461	-36.281	D	7.608	7.593	0.016	3.3	86.73	13.16	0	0	0	0.12	0	0
2001	131	0	930	-78.188	-33.78	D	7.599	7.593	0.006	3.3	95.35	4.55	0	0	0	0.1	0	0
2001	132	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	133	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	134	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	135	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	136	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	137	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	138	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	139	0	774	-78.867	-31.586	D	7.593	7.593	0	3.3	52.08	43.43	0	0	0	0.02	0	0
2001	140	0	930	-78.188	-33.78	D	7.593	7.593	0	3.3	90.71	7.52	0	0	0	0.18	0	0
2001	141	0	933	-78.17	-33.075	D	7.621	7.593	0.028	3.3	94.01	5.81	0	0	0	0.18	0	0
2001	142	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	143	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	144	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	145	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	146	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	147	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	148	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	149	0	785	-78.62	-31.589	D	7.593	7.593	0	3.3	90.99	8.1	0	0	0	0.17	0	0
2001	150	0	947	-78.463	-31.7	D	7.594	7.593	0.001	3.3	95.26	4.65	0	0	0	0.16	0	0
2001	151	0	747	-79.357	-31.084	D	7.593	7.593	0	3.3	89.25	4.58	0	0	0	0.11	0	0
2001	152	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	153	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	154	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	155	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	156	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	157	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	158	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	159	0	949	-78.53	-31.5	D	7.795	7.593	0.202	3.3	92.26	7.59	0	0	0	0.15	0	0
2001	160	0	853	-82.958	-38.45	D	8.492	7.593	**0.9**	3.3	81.4	18.47	0	0	0	0.13	1	0
2001	161	0	822	-86.552	-37.687	D	8.078	7.593	0.485	3.3	97.14	2.73	0	0	0	0.14	0	0
2001	162	0	949	-78.53	-31.5	D	7.814	7.593	0.221	3.3	96.76	3.15	0	0	0	0.09	0	0
2001	163	0	785	-78.62	-31.589	D	7.593	7.593	0	3.3	98.58	1.04	0	0	0	0.07	0	0
2001	164	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	165	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	166	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	167	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	168	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	169	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	170	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	171	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	172	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	173	0	784	-78.622	-31.837	D	7.593	7.593	0	3.3	99.17	0.83	0	0	0	0	0	0
2001	174	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	175	0	930	-78.188	-33.78	D	7.594	7.593	0.001	3.3	72.68	27.13	0	0	0	0.14	0	0
2001	176	0	933	-78.17	-33.075	D	7.649	7.593	0.057	3.3	96.13	3.74	0	0	0	0.13	0	0
2001	177	0	947	-78.463	-31.7	D	7.727	7.593	0.135	3.3	97.14	2.75	0	0	0	0.11	0	0
2001	178	0	1008	-86.153	-30.893	D	7.671	7.593	0.079	3.3	98.92	0.98	0	0	0	0.1	0	0
2001	179	0	1017	-87.324	-31.258	D	7.596	7.593	0.003	3.3	97.25	2.69	0	0	0	0.08	0	0
2001	180	0	62	-86.283	-31.01	D	7.593	7.593	0.001	3.3	95.65	4.56	0	0	0	0.04	0	0
2001	181	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	182	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	183	0	949	-78.53	-31.5	D	7.6	7.593	0.007	3.3	96.91	2.96	0	0	0	0.13	0	0
2001	184	0	949	-78.53	-31.5	D	7.93	7.593	0.337	3.3	97.36	2.51	0	0	0	0.12	0	0
2001	185	0	949	-78.53	-31.5	D	7.623	7.593	0.031	3.3	81.31	18.61	0	0	0	0.08	0	0
2001	186	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	187	0	949	-78.53	-31.5	D	7.595	7.593	0.003	3.3	96.54	3.31	0	0	0	0.13	0	0
2001	188	0	949	-78.53	-31.5	D	7.609	7.593	0.017	3.3	96.49	3.46	0	0	0	0.06	0	0
2001	189	0	785	-78.62	-31.589	D	7.593	7.593	0	3.3	96.23	2.35	0	0	0	0	0	0
2001	190	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	191	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	192	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	193	0	933	-78.17	-33.075	D	7.769	7.593	0.176	3.3	99.42	0.35	0	0	0	0.22	0	0
2001	194	0	933	-78.17	-33.075	D	7.623	7.593	0.031	3.3	98.73	1.09	0	0	0	0.17	0	0
2001	195	0	900	-80.267	-36.67	D	7.593	7.593	0	3.3	99.62	0.11	0	0	0	0	0	0
2001	196	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	119.85	0.03	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	197	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	198	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	199	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	200	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	201	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	202	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	203	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	204	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	205	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	206	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	207	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	208	0	967	-80.716	-30.533	D	7.609	7.593	0.017	3.3	96.92	3.05	0	0	0	0.04	0	0
2001	209	0	964	-80.519	-30.575	D	7.603	7.593	0.01	3.3	92.43	7.52	0	0	0	0.05	0	0
2001	210	0	949	-78.53	-31.5	D	7.593	7.593	0	3.3	97.41	2.79	0	0	0	0.01	0	0
2001	211	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	212	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	213	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	214	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	215	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	216	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	217	0	930	-78.188	-33.78	D	7.657	7.593	0.064	3.3	99.13	0.65	0	0	0	0.22	0	0
2001	218	0	1017	-87.324	-31.258	D	7.659	7.593	0.066	3.3	99.59	0.27	0	0	0	0.14	0	0
2001	219	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	220	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	221	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	222	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	223	0	949	-78.53	-31.5	D	7.671	7.593	0.078	3.3	90.86	8.97	0	0	0	0.17	0	0
2001	224	0	949	-78.53	-31.5	D	9.127	7.593	**1.534**	3.3	96.25	3.57	0	0	0	0.18	1	1
2001	225	0	930	-78.188	-33.78	D	8.924	7.593	**1.331**	3.3	90.66	9.2	0	0	0	0.15	1	1
2001	226	0	1039	-87.824	-33.618	D	8	7.593	0.407	3.3	93.65	6.2	0	0	0	0.15	0	0
2001	227	0	1035	-87.826	-32.813	D	7.611	7.593	0.019	3.3	94.48	5	0	0	0	0.53	0	0
2001	228	0	907	-79.461	-36.281	D	7.688	7.593	0.096	3.3	98.89	0.97	0	0	0	0.15	0	0
2001	229	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	230	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	231	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	232	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	233	0	931	-78.182	-33.544	D	7.593	7.593	0	3.3	95.58	4.1	0	0	0	0.14	0	0
2001	234	0	933	-78.17	-33.075	D	7.593	7.593	0	3.3	95.41	4.24	0	0	0	0.14	0	0
2001	235	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	236	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	237	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	238	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	239	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	240	0	947	-78.463	-31.7	D	7.602	7.593	0.009	3.3	99.44	0.37	0	0	0	0.2	0	0
2001	241	0	930	-78.188	-33.78	D	7.596	7.593	0.004	3.3	99.75	0.16	0	0	0	0.12	0	0
2001	242	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	243	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	244	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	245	0	955	-79.307	-31.075	D	7.933	7.639	0.294	3.4	96.05	3.8	0	0	0	0.15	0	0
2001	246	0	1017	-87.324	-31.258	D	7.663	7.639	0.024	3.4	92.59	7.31	0	0	0	0.1	0	0
2001	247	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	248	0	949	-78.53	-31.5	D	7.648	7.639	0.009	3.4	98.85	0.99	0	0	0	0.18	0	0
2001	249	0	962	-80.243	-30.697	D	7.664	7.639	0.026	3.4	95.23	4.63	0	0	0	0.14	0	0
2001	250	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	251	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	252	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	253	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	254	0	689	-79.904	-36.048	D	7.639	7.639	0	3.4	88.13	4.95	0	0	0	0.17	0	0
2001	255	0	908	-79.453	-36.041	D	7.771	7.639	0.132	3.4	88.94	10.9	0	0	0	0.16	0	0
2001	256	0	966	-80.657	-30.543	D	7.641	7.639	0.002	3.4	97.83	2.1	0	0	0	0.1	0	0
2001	257	0	955	-79.307	-31.075	D	7.819	7.639	0.18	3.4	88.11	11.76	0	0	0	0.13	0	0
2001	258	0	1008	-86.153	-30.893	D	8.036	7.639	0.397	3.4	89.56	10.3	0	0	0	0.14	0	0
2001	259	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	260	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	261	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	262	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	263	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	264	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	265	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	266	0	941	-78.321	-32.318	D	7.64	7.639	0.001	3.4	89.73	10.07	0	0	0	0.21	0	0
2001	267	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	268	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	269	0	927	-78.477	-33.986	D	8.205	7.639	**0.566**	3.4	61.14	38.51	0	0	0	0.36	1	0
2001	270	0	853	-82.958	-38.45	D	7.69	7.639	0.051	3.4	91.89	7.94	0	0	0	0.17	0	0
2001	271	0	832	-85.112	-38.219	D	7.671	7.639	0.032	3.4	86.83	13.05	0	0	0	0.12	0	0
2001	272	0	853	-82.958	-38.45	D	7.822	7.639	0.183	3.4	94.53	5.13	0	0	0	0.34	0	0
2001	273	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	274	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	275	0	963	-80.391	-30.626	D	7.502	7.5	0.003	3.1	98.48	1.4	0	0	0	0.16	0	0
2001	276	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	277	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	278	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	279	0	1039	-87.824	-33.618	D	7.537	7.5	0.038	3.1	30	70.01	0	0	0	0	0	0
2001	280	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	281	0	930	-78.188	-33.78	D	7.516	7.5	0.017	3.1	79.35	20.49	0	0	0	0.17	0	0
2001	282	0	949	-78.53	-31.5	D	7.512	7.5	0.013	3.1	74.9	24.97	0	0	0	0.13	0	0
2001	283	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	284	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	285	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	286	0	1008	-86.153	-30.893	D	7.508	7.5	0.009	3.1	73.35	26.55	0	0	0	0.1	0	0
2001	287	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	288	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	289	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	290	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	291	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	292	0	930	-78.188	-33.78	D	7.5	7.5	0.001	3.1	78	21.92	0	0	0	0.2	0	0
2001	293	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	294	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	295	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	296	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	297	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	298	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	299	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	300	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	301	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	302	0	930	-78.188	-33.78	D	7.533	7.5	0.033	3.1	88.07	11.79	0	0	0	0.14	0	0
2001	303	0	949	-78.53	-31.5	D	7.501	7.5	0.002	3.1	77.14	22.79	0	0	0	0.08	0	0
2001	304	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	305	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	306	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	307	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	308	0	407	-82.896	-38.252	D	7.702	7.5	0.202	3.1	79.19	20.65	0	0	0	0.16	0	0
2001	309	0	967	-80.716	-30.533	D	7.539	7.5	0.039	3.1	87.35	12.54	0	0	0	0.11	0	0
2001	310	0	933	-78.17	-33.075	D	7.665	7.5	0.166	3.1	76.33	23.43	0	0	0	0.23	0	0
2001	311	0	963	-80.391	-30.626	D	7.578	7.5	0.078	3.1	72.28	27.54	0	0	0	0.19	0	0
2001	312	0	907	-79.461	-36.281	D	7.515	7.5	0.015	3.1	80.36	19.52	0	0	0	0.14	0	0
2001	313	0	930	-78.188	-33.78	D	7.501	7.5	0.002	3.1	87.42	12.6	0	0	0	0.1	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	314	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	315	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	316	0	955	-79.307	-31.075	D	7.58	7.5	0.08	3.1	71.78	27.72	0	0	0	0.5	0	0
2001	317	0	1039	-87.824	-33.618	D	7.542	7.5	0.043	3.1	68.84	30.92	0	0	0	0.26	0	0
2001	318	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	319	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	320	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	321	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	322	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	323	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	324	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	325	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	326	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	327	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	328	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	329	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	330	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	331	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	332	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	333	0	930	-78.188	-33.78	D	7.581	7.5	0.082	3.1	53.18	46.69	0	0	0	0.13	0	0
2001	334	0	930	-78.188	-33.78	D	8.23	7.5	**0.731**	3.1	45.16	54.73	0	0	0	0.1	1	0
2001	335	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	336	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	337	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	338	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	339	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	340	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	341	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	342	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	343	0	1017	-87.324	-31.258	D	7.857	7.593	0.265	3.3	36.33	63.52	0	0	0	0.15	0	0
2001	344	0	930	-78.188	-33.78	D	7.603	7.593	0.011	3.3	37.57	62.23	0	0	0	0.19	0	0
2001	345	0	930	-78.188	-33.78	D	7.65	7.593	0.057	3.3	41.59	58.27	0	0	0	0.15	0	0
2001	346	0	933	-78.17	-33.075	D	7.643	7.593	0.051	3.3	62.9	36.97	0	0	0	0.13	0	0
2001	347	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	348	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	349	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	350	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	351	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	352	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	353	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	354	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	355	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	356	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	357	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	358	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	359	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	360	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	361	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	362	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	363	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	364	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	365	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									1.534								**9**	**3**

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	2	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	3	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	4	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	5	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	6	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	7	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	8	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	9	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	10	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	11	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	12	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	13	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	14	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	15	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	16	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	17	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	18	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	19	0	907	-79.461	-36.281	D	7.625	7.546	0.079	3.2	58.03	41.86	0	0	0	0.11	0	0
2002	20	0	949	-78.53	-31.5	D	7.658	7.546	0.112	3.2	63.31	36.6	0	0	0	0.1	0	0
2002	21	0	933	-78.17	-33.075	D	7.571	7.546	0.025	3.2	70.01	29.93	0	0	0	0.07	0	0
2002	22	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	23	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	24	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	25	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	26	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	27	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	28	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	29	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	30	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	31	0	966	-80.657	-30.543	D	7.712	7.546	0.166	3.2	55.15	44.82	0	0	0	0.03	0	0
2002	32	0	1017	-87.324	-31.258	D	7.56	7.546	0.014	3.2	18.1	81.91	0	0	0	0	0	0
2002	33	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	34	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	35	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	36	0	931	-78.182	-33.544	D	7.411	7.406	0.005	2.9	39.75	60.07	0	0	0	0.2	0	0
2002	37	0	949	-78.53	-31.5	D	7.549	7.406	0.143	2.9	41.64	58.17	0	0	0	0.18	0	0
2002	38	0	1017	-87.324	-31.258	D	7.406	7.406	0.001	2.9	53.94	46.2	0	0	0	0.11	0	0
2002	39	0	785	-78.62	-31.589	D	7.406	7.406	0	2.9	68.15	32.22	0	0	0	0.09	0	0
2002	40	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	41	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	42	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	43	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	44	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	45	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	46	0	907	-79.461	-36.281	D	7.409	7.406	0.004	2.9	68.42	31.44	0	0	0	0.19	0	0
2002	47	0	930	-78.188	-33.78	D	7.406	7.406	0	2.9	66.74	33.2	0	0	0	0.17	0	0
2002	48	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	49	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	50	0	930	-78.188	-33.78	D	7.422	7.406	0.017	2.9	46.04	53.74	0	0	0	0.23	0	0
2002	51	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	52	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	53	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	54	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	55	0	933	-78.17	-33.075	D	7.425	7.406	0.019	2.9	54.49	45.35	0	0	0	0.18	0	0
2002	56	0	933	-78.17	-33.075	D	7.407	7.406	0.002	2.9	65.5	34.38	0	0	0	0.12	0	0
2002	57	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	58	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	59	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	60	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	61	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	62	0	822	-86.552	-37.687	D	7.317	7.311	0.007	2.7	49.88	50.06	0	0	0	0.05	0	0
2002	63	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	64	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	65	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	66	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	67	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	68	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	69	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	70	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	71	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	72	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	73	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	74	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	75	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	76	0	907	-79.461	-36.281	D	7.517	7.311	0.207	2.7	44.72	54.86	0	0	0	0.42	0	0
2002	77	0	854	-82.848	-38.372	D	7.332	7.311	0.022	2.7	44.88	55.11	0	0	0	0.01	0	0
2002	78	0	949	-78.53	-31.5	D	7.317	7.311	0.006	2.7	67.94	32.09	0	0	0	0.01	0	0
2002	79	0	967	-80.716	-30.533	D	7.313	7.311	0.002	2.7	70.27	29.68	0	0	0	0.07	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	80	0	947	-78.463	-31.7	D	7.927	7.311	**0.617**	2.7	68.14	31.78	0	0	0	0.08	1	0
2002	81	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	82	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	83	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	84	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	85	0	1017	-87.324	-31.258	D	8.197	7.311	**0.887**	2.7	69.83	30.01	0	0	0	0.16	1	0
2002	86	0	930	-78.188	-33.78	D	7.432	7.311	0.121	2.7	58.24	41.54	0	0	0	0.22	0	0
2002	87	0	907	-79.461	-36.281	D	7.325	7.311	0.014	2.7	73.83	26.05	0	0	0	0.13	0	0
2002	88	0	933	-78.17	-33.075	D	7.338	7.311	0.028	2.7	74.31	25.58	0	0	0	0.11	0	0
2002	89	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	90	0	955	-79.307	-31.075	D	7.356	7.311	0.045	2.7	83.05	16.75	0	0	0	0.2	0	0
2002	91	0	1017	-87.324	-31.258	D	7.658	7.311	0.347	2.7	76.12	23.61	0	0	0	0.27	0	0
2002	92	0	949	-78.53	-31.5	D	7.621	7.311	0.31	2.7	65.65	34.15	0	0	0	0.2	0	0
2002	93	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	94	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	95	0	964	-80.519	-30.575	D	7.499	7.311	0.188	2.7	58.68	41.13	0	0	0	0.19	0	0
2002	96	0	949	-78.53	-31.5	D	7.903	7.311	**0.593**	2.7	73.43	26.4	0	0	0	0.17	1	0
2002	97	0	822	-86.552	-37.687	D	7.724	7.311	0.413	2.7	87.11	12.75	0	0	0	0.14	0	0
2002	98	0	949	-78.53	-31.5	D	7.317	7.311	0.007	2.7	88.15	11.75	0	0	0	0.11	0	0
2002	99	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	100	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	101	0	930	-78.188	-33.78	D	7.421	7.311	0.111	2.7	78.22	21.57	0	0	0	0.21	0	0
2002	102	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	103	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	104	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	105	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	106	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	107	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	108	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	109	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	110	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	111	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	112	0	747	-79.357	-31.084	D	7.311	7.311	0	2.7	98.33	1.94	0	0	0	0.01	0	0
2002	113	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	114	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	115	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	116	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	117	0	822	-86.552	-37.687	D	7.317	7.311	0.006	2.7	87.58	12.33	0	0	0	0.14	0	0
2002	118	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	119	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	120	0	930	-78.188	-33.78	D	7.312	7.311	0.001	2.7	93.64	6.31	0	0	0	0.21	0	0
2002	121	0	949	-78.53	-31.5	D	7.338	7.311	0.027	2.7	91.11	8.71	0	0	0	0.18	0	0
2002	122	0	949	-78.53	-31.5	D	7.6	7.593	0.008	3.3	86.1	13.82	0	0	0	0.08	0	0
2002	123	0	930	-78.188	-33.78	D	7.596	7.593	0.003	3.3	90.17	9.73	0	0	0	0.08	0	0
2002	124	0	853	-82.958	-38.45	D	7.741	7.593	0.148	3.3	70.58	29.17	0	0	0	0.25	0	0
2002	125	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	126	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	127	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	128	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	129	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	130	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	131	0	963	-80.391	-30.626	D	7.683	7.593	0.091	3.3	89.61	10.03	0	0	0	0.36	0	0
2002	132	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	133	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	134	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	135	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	136	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	137	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	138	0	900	-80.267	-36.67	D	8.09	7.593	0.497	3.3	59.45	40.5	0	0	0	0.05	0	0
2002	139	0	907	-79.461	-36.281	D	7.923	7.593	0.33	3.3	38.65	61.11	0	0	0	0.24	0	0
2002	140	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	141	0	949	-78.53	-31.5	D	7.6	7.593	0.007	3.3	85.64	14.21	0	0	0	0.16	0	0
2002	142	0	949	-78.53	-31.5	D	7.681	7.593	0.088	3.3	91.65	8.21	0	0	0	0.14	0	0
2002	143	0	949	-78.53	-31.5	D	7.623	7.593	0.031	3.3	92.57	7.35	0	0	0	0.09	0	0
2002	144	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	145	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	146	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	147	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	148	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	149	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	150	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	151	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	152	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	153	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	154	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	155	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	156	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	157	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	158	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	159	0	845	-83.769	-38.412	D	7.778	7.593	0.186	3.3	96.54	3.34	0	0	0	0.12	0	0
2002	160	0	1017	-87.324	-31.258	D	7.957	7.593	0.364	3.3	97.92	1.97	0	0	0	0.11	0	0
2002	161	0	966	-80.657	-30.543	D	7.595	7.593	0.003	3.3	94.75	5.15	0	0	0	0.08	0	0
2002	162	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	163	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	164	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	165	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	166	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	167	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	168	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	169	0	949	-78.53	-31.5	D	7.616	7.593	0.023	3.3	99.19	0.68	0	0	0	0.13	0	0
2002	170	0	949	-78.53	-31.5	D	7.596	7.593	0.004	3.3	98.61	1.32	0	0	0	0.07	0	0
2002	171	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	72.59	0.04	0	0	0	0	0	0
2002	172	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	173	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	174	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	175	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	176	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	177	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	178	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	179	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	180	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	181	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	182	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	183	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	184	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	185	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	186	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	187	0	785	-78.62	-31.589	D	7.593	7.593	0	3.3	99.92	0.1	0	0	0	0	0	0
2002	188	0	963	-80.391	-30.626	D	7.6	7.593	0.007	3.3	99.88	0.09	0	0	0	0.01	0	0
2002	189	0	1008	-86.153	-30.893	D	7.594	7.593	0.001	3.3	99.44	0.49	0	0	0	0	0	0
2002	190	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	191	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	192	0	643	-80.588	-30.574	D	7.593	7.593	0	3.3	59.02	37.24	0	0	0	0.03	0	0
2002	193	0	949	-78.53	-31.5	D	7.598	7.593	0.006	3.3	97.62	2.31	0	0	0	0.08	0	0
2002	194	0	832	-85.112	-38.219	D	7.596	7.593	0.003	3.3	97.28	2.66	0	0	0	0.05	0	0
2002	195	0	1010	-86.381	-30.97	D	7.593	7.593	0.001	3.3	98.09	1.76	0	0	0	0.03	0	0
2002	196	0	1017	-87.324	-31.258	D	7.621	7.593	0.029	3.3	99.29	0.51	0	0	0	0.21	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	197	0	1017	-87.324	-31.258	D	7.647	7.593	0.055	3.3	95.12	4.74	0	0	0	0.14	0	0
2002	198	0	1017	-87.324	-31.258	D	7.594	7.593	0.002	3.3	95.38	4.58	0	0	0	0.1	0	0
2002	199	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	200	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	201	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	202	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	203	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	204	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	205	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	206	0	949	-78.53	-31.5	D	7.918	7.593	0.325	3.3	95.52	4.32	0	0	0	0.17	0	0
2002	207	0	822	-86.552	-37.687	D	7.712	7.593	0.119	3.3	98.38	1.52	0	0	0	0.11	0	0
2002	208	0	933	-78.17	-33.075	D	7.633	7.593	0.04	3.3	98.17	1.75	0	0	0	0.08	0	0
2002	209	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	210	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	211	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	212	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	213	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	214	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	215	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	216	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	217	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	218	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	219	0	933	-78.17	-33.075	D	8	7.593	0.408	3.3	98.41	1.41	0	0	0	0.18	0	0
2002	220	0	822	-86.552	-37.687	D	7.6	7.593	0.007	3.3	98.91	0.97	0	0	0	0.12	0	0
2002	221	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	222	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	223	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	224	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	225	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	226	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	227	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	228	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	229	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	230	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	231	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	232	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	233	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	234	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	235	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	236	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	237	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	238	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	239	0	907	-79.461	-36.281	D	7.946	7.593	0.354	3.3	93.74	6.04	0	0	0	0.22	0	0
2002	240	0	949	-78.53	-31.5	D	8.718	7.593	**1.125**	3.3	95.77	4.06	0	0	0	0.17	1	1
2002	241	0	1039	-87.824	-33.618	D	7.596	7.593	0.003	3.3	94.02	5.86	0	0	0	0.1	0	0
2002	242	0	1017	-87.324	-31.258	D	7.595	7.593	0.002	3.3	93.19	6.65	0	0	0	0.19	0	0
2002	243	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	244	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	245	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	246	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	247	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	248	0	930	-78.188	-33.78	D	7.66	7.639	0.022	3.4	98.03	1.82	0	0	0	0.15	0	0
2002	249	0	853	-82.958	-38.45	D	7.939	7.639	0.301	3.4	92.73	7.14	0	0	0	0.13	0	0
2002	250	0	1039	-87.824	-33.618	D	7.65	7.639	0.012	3.4	97.74	2.13	0	0	0	0.13	0	0
2002	251	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	252	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	253	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	254	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	255	0	1035	-87.826	-32.813	D	7.89	7.639	0.251	3.4	88.25	11.5	0	0	0	0.25	0	0
2002	256	0	822	-86.552	-37.687	D	7.649	7.639	0.01	3.4	83.67	16.12	0	0	0	0.21	0	0
2002	257	0	822	-86.552	-37.687	D	7.647	7.639	0.008	3.4	99.35	0.52	0	0	0	0.14	0	0
2002	258	0	967	-80.716	-30.533	D	7.646	7.639	0.007	3.4	98.75	1.13	0	0	0	0.12	0	0
2002	259	0	947	-78.463	-31.7	D	7.639	7.639	0.001	3.4	95.4	4.7	0	0	0	0.09	0	0
2002	260	0	930	-78.188	-33.78	D	7.729	7.639	0.09	3.4	97.36	2.49	0	0	0	0.15	0	0
2002	261	0	949	-78.53	-31.5	D	7.64	7.639	0.001	3.4	90.92	9.13	0	0	0	0.05	0	0
2002	262	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	68.76	4.79	0	0	0	0	0	0
2002	263	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	264	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	265	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	266	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	267	0	907	-79.461	-36.281	D	7.651	7.639	0.012	3.4	91.28	8.49	0	0	0	0.23	0	0
2002	268	0	955	-79.307	-31.075	D	7.863	7.639	0.224	3.4	94.61	5.17	0	0	0	0.23	0	0
2002	269	0	1017	-87.324	-31.258	D	7.643	7.639	0.004	3.4	92.62	7.25	0	0	0	0.13	0	0
2002	270	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	271	0	967	-80.716	-30.533	D	8.766	7.639	**1.127**	3.4	96.52	3.3	0	0	0	0.18	1	1
2002	272	0	949	-78.53	-31.5	D	8.607	7.639	**0.968**	3.4	95.04	4.81	0	0	0	0.15	1	0
2002	273	0	949	-78.53	-31.5	D	7.794	7.639	0.155	3.4	96.82	3.06	0	0	0	0.12	0	0
2002	274	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	275	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	276	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	277	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	278	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	279	0	933	-78.17	-33.075	D	7.533	7.5	0.033	3.1	94.79	4.96	0	0	0	0.26	0	0
2002	280	0	933	-78.17	-33.075	D	7.506	7.5	0.006	3.1	91.8	7.99	0	0	0	0.22	0	0
2002	281	0	933	-78.17	-33.075	D	7.542	7.5	0.042	3.1	77.49	22.29	0	0	0	0.21	0	0
2002	282	0	964	-80.519	-30.575	D	7.669	7.5	0.17	3.1	86.05	13.73	0	0	0	0.22	0	0
2002	283	0	1008	-86.153	-30.893	D	7.502	7.5	0.003	3.1	92.49	7.42	0	0	0	0.15	0	0
2002	284	0	62	-86.283	-31.01	D	7.5	7.5	0	3.1	93.74	6.37	0	0	0	0.11	0	0
2002	285	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	286	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	287	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	288	0	1035	-87.826	-32.813	D	7.786	7.5	0.286	3.1	56.73	43.04	0	0	0	0.24	0	0
2002	289	0	907	-79.461	-36.281	D	7.543	7.5	0.043	3.1	64.43	35.41	0	0	0	0.16	0	0
2002	290	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	291	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	292	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	293	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	294	0	907	-79.461	-36.281	D	7.84	7.5	0.341	3.1	71.46	28.21	0	0	0	0.33	0	0
2002	295	0	1017	-87.324	-31.258	D	7.673	7.5	0.173	3.1	76.52	23.31	0	0	0	0.17	0	0
2002	296	0	1017	-87.324	-31.258	D	7.675	7.5	0.175	3.1	86.4	13.44	0	0	0	0.16	0	0
2002	297	0	966	-80.657	-30.543	D	7.912	7.5	0.413	3.1	85	14.86	0	0	0	0.14	0	0
2002	298	0	1017	-87.324	-31.258	D	7.533	7.5	0.034	3.1	82.12	17.78	0	0	0	0.1	0	0
2002	299	0	955	-79.307	-31.075	D	7.633	7.5	0.133	3.1	87.07	12.88	0	0	0	0.05	0	0
2002	300	0	930	-78.188	-33.78	D	7.566	7.5	0.066	3.1	88.41	11.54	0	0	0	0.06	0	0
2002	301	0	853	-82.958	-38.45	D	8.485	7.5	**0.985**	3.1	65.59	34.27	0	0	0	0.15	1	0
2002	302	0	1017	-87.324	-31.258	D	7.526	7.5	0.027	3.1	82.24	17.7	0	0	0	0.06	0	0
2002	303	0	1017	-87.324	-31.258	D	8.871	7.5	**1.372**	3.1	55.12	44.83	0	0	0	0.05	1	1
2002	304	0	1039	-87.824	-33.618	D	9.629	7.5	**2.129**	3.1	68.12	31.78	0	0	0	0.1	1	1
2002	305	0	907	-79.461	-36.281	D	7.522	7.5	0.023	3.1	64.87	35.04	0	0	0	0.09	0	0
2002	306	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	307	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	308	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	309	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	310	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	311	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	312	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	313	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	314	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	315	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	316	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	317	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	318	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	319	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	320	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	321	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	322	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	323	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	324	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	325	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	326	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	327	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	328	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	329	0	933	-78.17	-33.075	D	7.929	7.5	0.429	3.1	48.23	51.67	0	0	0	0.11	0	0
2002	330	0	930	-78.188	-33.78	D	7.628	7.5	0.129	3.1	39.67	60.17	0	0	0	0.16	0	0
2002	331	0	1017	-87.324	-31.258	D	8.695	7.5	**1.195**	3.1	42.81	57.02	0	0	0	0.17	1	1
2002	332	0	822	-86.552	-37.687	D	7.503	7.5	0.003	3.1	44.46	55.47	0	0	0	0.13	0	0
2002	333	0	853	-82.958	-38.45	D	7.503	7.5	0.004	3.1	53.26	46.68	0	0	0	0.1	0	0
2002	334	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	335	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	336	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	337	0	933	-78.17	-33.075	D	7.593	7.593	0.001	3.3	22.42	77.1	0	0	0	0.49	0	0
2002	338	0	78	-86.051	-32.504	D	7.749	7.593	0.156	3.3	18.86	80.75	0	0	0	0.39	0	0
2002	339	0	1017	-87.324	-31.258	D	8.021	7.593	0.428	3.3	51.89	47.93	0	0	0	0.18	0	0
2002	340	0	907	-79.461	-36.281	D	8.038	7.593	0.446	3.3	37.03	62.71	0	0	0	0.26	0	0
2002	341	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	342	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	343	0	930	-78.188	-33.78	D	7.938	7.593	0.345	3.3	54.54	45.29	0	0	0	0.17	0	0
2002	344	0	811	-87.061	-36.28	D	7.69	7.593	0.097	3.3	60.88	38.99	0	0	0	0.13	0	0
2002	345	0	1008	-86.153	-30.893	D	7.605	7.593	0.012	3.3	63.64	36.28	0	0	0	0.08	0	0
2002	346	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	347	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	348	0	986	-83.304	-30.963	D	8.776	7.593	**1.183**	3.3	54.76	45.05	0	0	0	0.18	1	1
2002	349	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	350	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	351	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	352	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	353	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	354	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	355	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	356	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	357	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	358	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	359	0	1017	-87.324	-31.258	D	7.879	7.593	0.286	3.3	31.97	67.78	0	0	0	0.25	0	0
2002	360	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	361	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	362	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	363	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	364	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	365	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									2.129								**11**	**6**

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	2	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	3	0	930	-78.188	-33.78	D	7.64	7.546	0.094	3.2	17.67	82.13	0	0	0	0.21	0	0
2003	4	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	5	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	6	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	7	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	8	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	9	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	10	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	11	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	12	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	13	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	14	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	15	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	16	0	930	-78.188	-33.78	D	7.602	7.546	0.056	3.2	34.38	65.47	0	0	0	0.15	0	0
2003	17	0	949	-78.53	-31.5	D	8.077	7.546	**0.531**	3.2	42.48	57.38	0	0	0	0.14	1	0
2003	18	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	19	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	20	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	21	0	963	-80.391	-30.626	D	7.552	7.546	0.005	3.2	47.64	52.23	0	0	0	0.14	0	0
2003	22	0	1017	-87.324	-31.258	D	7.752	7.546	0.206	3.2	35.88	63.89	0	0	0	0.23	0	0
2003	23	0	807	-87.031	-35.523	D	8.376	7.546	**0.83**	3.2	22.44	77.22	0	0	0	0.34	1	0
2003	24	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	25	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	26	0	644	-80.404	-36.539	D	7.546	7.546	0	3.2	60.22	41.89	0	0	0	0.11	0	0
2003	27	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	28	0	933	-78.17	-33.075	D	7.547	7.546	0.001	3.2	39.51	60.32	0	0	0	0.18	0	0
2003	29	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	30	0	907	-79.461	-36.281	D	7.743	7.546	0.197	3.2	63.42	36.44	0	0	0	0.14	0	0
2003	31	0	1017	-87.324	-31.258	D	8.049	7.546	**0.502**	3.2	63.83	36.05	0	0	0	0.12	1	0
2003	32	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	33	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	34	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	35	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	36	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	37	0	930	-78.188	-33.78	D	7.407	7.406	0.002	2.9	31.82	68.04	0	0	0	0.2	0	0
2003	38	0	930	-78.188	-33.78	D	7.569	7.406	0.163	2.9	44.16	55.7	0	0	0	0.15	0	0
2003	39	0	906	-79.53	-36.28	D	7.406	7.406	0	2.9	63.06	36.89	0	0	0	0.07	0	0
2003	40	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	41	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	42	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	43	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	44	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	45	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	46	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	47	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	48	0	853	-82.958	-38.45	D	8.132	7.406	**0.727**	2.9	49.39	50.38	0	0	0	0.22	1	0
2003	49	0	933	-78.17	-33.075	D	7.428	7.406	0.023	2.9	25.04	74.63	0	0	0	0.34	0	0
2003	50	0	930	-78.188	-33.78	D	7.406	7.406	0.001	2.9	76.83	23.15	0	0	0	0.09	0	0
2003	51	0	964	-80.519	-30.575	D	7.566	7.406	0.16	2.9	52.62	47.29	0	0	0	0.09	0	0
2003	52	0	822	-86.552	-37.687	D	7.725	7.406	0.319	2.9	51.45	48.5	0	0	0	0.06	0	0
2003	53	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	54	0	931	-78.182	-33.544	D	7.534	7.406	0.129	2.9	51.86	47.99	0	0	0	0.15	0	0
2003	55	0	949	-78.53	-31.5	D	7.831	7.406	0.425	2.9	51.96	47.93	0	0	0	0.12	0	0
2003	56	0	907	-79.461	-36.281	D	7.412	7.406	0.007	2.9	52.33	47.58	0	0	0	0.09	0	0
2003	57	0	78	-86.051	-32.504	D	7.885	7.406	0.479	2.9	28.35	71.39	0	0	0	0.26	0	0
2003	58	0	1035	-87.826	-32.813	D	7.634	7.406	0.229	2.9	41.24	58.6	0	0	0	0.16	0	0
2003	59	0	1035	-87.826	-32.813	D	7.42	7.406	0.014	2.9	56.81	43.11	0	0	0	0.1	0	0
2003	60	0	1017	-87.324	-31.258	D	7.413	7.406	0.007	2.9	67.17	32.77	0	0	0	0.09	0	0
2003	61	0	966	-80.657	-30.543	D	7.373	7.311	0.063	2.7	72.7	27.23	0	0	0	0.07	0	0
2003	62	0	941	-78.321	-32.318	D	7.331	7.311	0.02	2.7	76.7	23.25	0	0	0	0.06	0	0
2003	63	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	64	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	65	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	66	0	933	-78.17	-33.075	D	7.485	7.311	0.174	2.7	57.33	42.51	0	0	0	0.16	0	0
2003	67	0	930	-78.188	-33.78	D	7.411	7.311	0.1	2.7	71.02	28.87	0	0	0	0.11	0	0
2003	68	0	949	-78.53	-31.5	D	7.317	7.311	0.006	2.7	77.35	22.58	0	0	0	0.07	0	0
2003	69	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	70	0	930	-78.188	-33.78	D	7.69	7.311	0.379	2.7	33.86	65.88	0	0	0	0.26	0	0
2003	71	0	930	-78.188	-33.78	D	7.655	7.311	0.344	2.7	55.59	44.23	0	0	0	0.17	0	0
2003	72	0	949	-78.53	-31.5	D	7.312	7.311	0.001	2.7	68.24	31.7	0	0	0	0.09	0	0
2003	73	0	933	-78.17	-33.075	D	7.499	7.311	0.189	2.7	66.17	33.61	0	0	0	0.23	0	0
2003	74	0	1039	-87.824	-33.618	D	7.429	7.311	0.119	2.7	72.08	27.73	0	0	0	0.19	0	0
2003	75	0	1017	-87.324	-31.258	D	7.372	7.311	0.061	2.7	83.34	16.56	0	0	0	0.1	0	0
2003	76	0	10	-87.277	-31.497	D	7.311	7.311	0	2.7	95.12	3.75	0	0	0	0.08	0	0
2003	77	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	78	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	79	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	80	0	949	-78.53	-31.5	D	7.43	7.311	0.119	2.7	54.13	45.82	0	0	0	0.05	0	0
2003	81	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	82	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	83	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	84	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	85	0	933	-78.17	-33.075	D	7.313	7.311	0.002	2.7	62.12	37.9	0	0	0	0.08	0	0
2003	86	0	853	-82.958	-38.45	D	7.383	7.311	0.072	2.7	60.78	38.88	0	0	0	0.34	0	0
2003	87	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	88	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	89	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	90	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	91	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	92	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	93	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	94	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	95	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	96	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	97	0	964	-80.519	-30.575	D	7.328	7.311	0.018	2.7	56.35	43.54	0	0	0	0.11	0	0
2003	98	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	99	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	100	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	101	0	927	-78.477	-33.986	D	7.559	7.311	0.248	2.7	62.2	37.46	0	0	0	0.34	0	0
2003	102	0	947	-78.463	-31.7	D	7.616	7.311	0.305	2.7	86.37	13.43	0	0	0	0.21	0	0
2003	103	0	907	-79.461	-36.281	D	7.332	7.311	0.021	2.7	84.54	15.31	0	0	0	0.15	0	0
2003	104	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	105	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	106	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	107	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	108	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	109	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	110	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	111	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	112	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	113	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	114	0	853	-82.958	-38.45	D	7.412	7.311	0.101	2.7	93.17	6.6	0	0	0	0.23	0	0
2003	115	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	116	0	949	-78.53	-31.5	D	8.08	7.311	**0.769**	2.7	59.77	40.19	0	0	0	0.04	1	0
2003	117	0	861	-82.693	-37.797	D	7.729	7.311	0.419	2.7	39.7	60.01	0	0	0	0.29	0	0
2003	118	0	1035	-87.826	-32.813	D	7.376	7.311	0.066	2.7	92.28	7.6	0	0	0	0.12	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	119	0	643	-80.588	-30.574	D	7.311	7.311	0	2.7	97.71	2.62	0	0	0	0.07	0	0
2003	120	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	121	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	122	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	123	0	930	-78.188	-33.78	D	7.729	7.593	0.136	3.3	74.53	25.37	0	0	0	0.11	0	0
2003	124	0	907	-79.461	-36.281	D	8.984	7.593	**1.391**	3.3	83.03	16.85	0	0	0	0.12	1	1
2003	125	0	1017	-87.324	-31.258	D	7.595	7.593	0.002	3.3	98.23	1.78	0	0	0	0.02	0	0
2003	126	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	127	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	128	0	1017	-87.324	-31.258	D	7.841	7.593	0.248	3.3	94.26	5.62	0	0	0	0.12	0	0
2003	129	0	961	-80.115	-30.738	D	7.604	7.593	0.012	3.3	93.18	6.74	0	0	0	0.08	0	0
2003	130	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	131	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	132	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	133	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	134	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	135	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	136	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	137	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	138	0	1017	-87.324	-31.258	D	7.894	7.593	0.301	3.3	75.58	24.25	0	0	0	0.17	0	0
2003	139	0	1017	-87.324	-31.258	D	7.732	7.593	0.139	3.3	55.9	43.91	0	0	0	0.18	0	0
2003	140	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	141	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	142	0	1010	-86.381	-30.97	D	7.749	7.593	0.156	3.3	36.91	62.84	0	0	0	0.25	0	0
2003	143	0	1008	-86.153	-30.893	D	8.539	7.593	**0.946**	3.3	92.6	7.16	0	0	0	0.24	1	0
2003	144	0	907	-79.461	-36.281	D	8.775	7.593	**1.183**	3.3	90.59	9.25	0	0	0	0.16	1	1
2003	145	0	930	-78.188	-33.78	D	8.339	7.593	**0.747**	3.3	92.75	7.14	0	0	0	0.11	1	0
2003	146	0	1008	-86.153	-30.893	D	7.824	7.593	0.232	3.3	90.18	9.75	0	0	0	0.07	0	0
2003	147	0	964	-80.519	-30.575	D	8.06	7.593	0.468	3.3	81.15	18.68	0	0	0	0.17	0	0
2003	148	0	853	-82.958	-38.45	D	8.04	7.593	0.447	3.3	66.95	32.93	0	0	0	0.12	0	0
2003	149	0	833	-85.004	-38.23	D	7.596	7.593	0.004	3.3	96.9	2.99	0	0	0	0.11	0	0
2003	150	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	151	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	152	0	930	-78.188	-33.78	D	7.593	7.593	0	3.3	78.97	20.43	0	0	0	0.21	0	0
2003	153	0	563	-81.349	-32.305	D	7.808	7.593	0.216	3.3	74.08	25.71	0	0	0	0.2	0	0
2003	154	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	155	0	822	-86.552	-37.687	D	7.958	7.593	0.365	3.3	89.43	10.46	0	0	0	0.11	0	0
2003	156	0	822	-86.552	-37.687	D	7.598	7.593	0.006	3.3	94.01	5.99	0	0	0	0.03	0	0
2003	157	0	852	-83.027	-38.42	D	7.594	7.593	0.002	3.3	88.45	11.41	0	0	0	0.08	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	158	0	853	-82.958	-38.45	D	7.609	7.593	0.016	3.3	87.55	12.38	0	0	0	0.07	0	0
2003	159	0	906	-79.53	-36.28	D	7.594	7.593	0.001	3.3	91.22	8.81	0	0	0	0.05	0	0
2003	160	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	161	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	162	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	163	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	164	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	165	0	1017	-87.324	-31.258	D	7.625	7.593	0.032	3.3	87.42	12.57	0	0	0	0.01	0	0
2003	166	0	949	-78.53	-31.5	D	7.754	7.593	0.161	3.3	86.61	13.32	0	0	0	0.07	0	0
2003	167	0	853	-82.958	-38.45	D	8.116	7.593	**0.523**	3.3	89.59	10.27	0	0	0	0.15	1	0
2003	168	0	1017	-87.324	-31.258	D	7.625	7.593	0.032	3.3	97.87	1.94	0	0	0	0.2	0	0
2003	169	0	1035	-87.826	-32.813	D	7.593	7.593	0	3.3	89.36	10.73	0	0	0	0.06	0	0
2003	170	0	949	-78.53	-31.5	D	7.668	7.593	0.076	3.3	97.57	2.32	0	0	0	0.11	0	0
2003	171	0	933	-78.17	-33.075	D	8.248	7.593	**0.655**	3.3	97.67	2.23	0	0	0	0.1	1	0
2003	172	0	822	-86.552	-37.687	D	7.957	7.593	0.365	3.3	95.1	4.83	0	0	0	0.08	0	0
2003	173	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	174	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	175	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	176	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	177	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	178	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	179	0	907	-79.461	-36.281	D	7.595	7.593	0.002	3.3	77.97	21.91	0	0	0	0.1	0	0
2003	180	0	907	-79.461	-36.281	D	7.71	7.593	0.118	3.3	96.74	3.14	0	0	0	0.13	0	0
2003	181	0	1008	-86.153	-30.893	D	7.703	7.593	0.11	3.3	98.19	1.71	0	0	0	0.1	0	0
2003	182	0	1008	-86.153	-30.893	D	7.609	7.593	0.017	3.3	97.95	1.98	0	0	0	0.08	0	0
2003	183	0	2	-87.791	-33.231	D	7.593	7.593	0	3.3	121.88	3.89	0	0	0	0.01	0	0
2003	184	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	185	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	186	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	187	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	188	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	189	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	190	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	191	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	192	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	193	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	194	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	195	0	949	-78.53	-31.5	D	7.672	7.593	0.079	3.3	99.46	0.41	0	0	0	0.14	0	0
2003	196	0	949	-78.53	-31.5	D	7.616	7.593	0.024	3.3	98.17	1.72	0	0	0	0.12	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	197	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	198	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	199	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	200	0	907	-79.461	-36.281	D	7.602	7.593	0.009	3.3	99.7	0.19	0	0	0	0.09	0	0
2003	201	0	907	-79.461	-36.281	D	7.594	7.593	0.001	3.3	99.42	0.55	0	0	0	0.08	0	0
2003	202	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	203	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	204	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	205	0	930	-78.188	-33.78	D	7.66	7.593	0.067	3.3	90.51	9.14	0	0	0	0.36	0	0
2003	206	0	949	-78.53	-31.5	D	8.329	7.593	**0.736**	3.3	96.3	3.53	0	0	0	0.17	1	0
2003	207	0	1017	-87.324	-31.258	D	7.665	7.593	0.073	3.3	97.95	1.93	0	0	0	0.12	0	0
2003	208	0	10	-87.277	-31.497	D	7.593	7.593	0	3.3	97.89	0.21	0	0	0	0.08	0	0
2003	209	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	210	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	211	0	947	-78.463	-31.7	D	7.685	7.593	0.093	3.3	98.65	1.28	0	0	0	0.06	0	0
2003	212	0	949	-78.53	-31.5	D	7.669	7.593	0.076	3.3	99.35	0.64	0	0	0	0.01	0	0
2003	213	0	853	-82.958	-38.45	D	7.614	7.593	0.022	3.3	97.62	2.38	0	0	0	0.01	0	0
2003	214	0	907	-79.461	-36.281	D	7.599	7.593	0.006	3.3	98.89	1.13	0	0	0	0.01	0	0
2003	215	0	644	-80.404	-36.539	D	7.593	7.593	0	3.3	98.96	0.06	0	0	0	0	0	0
2003	216	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	217	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	218	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	219	0	949	-78.53	-31.5	D	8.613	7.593	**1.02**	3.3	98.09	1.76	0	0	0	0.15	1	1
2003	220	0	853	-82.958	-38.45	D	8.444	7.593	**0.851**	3.3	92.68	7.12	0	0	0	0.2	1	0
2003	221	0	1017	-87.324	-31.258	D	7.848	7.593	0.255	3.3	98.07	1.75	0	0	0	0.18	0	0
2003	222	0	853	-82.958	-38.45	D	8.176	7.593	**0.583**	3.3	98.27	1.54	0	0	0	0.18	1	0
2003	223	0	930	-78.188	-33.78	D	8.081	7.593	0.488	3.3	96.65	3.18	0	0	0	0.16	0	0
2003	224	0	1008	-86.153	-30.893	D	8.09	7.593	0.498	3.3	94.36	5.48	0	0	0	0.16	0	0
2003	225	0	1035	-87.826	-32.813	D	7.898	7.593	0.305	3.3	92.48	7.34	0	0	0	0.18	0	0
2003	226	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	227	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	228	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	229	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	230	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	231	0	930	-78.188	-33.78	D	7.617	7.593	0.024	3.3	93.81	6.08	0	0	0	0.12	0	0
2003	232	0	907	-79.461	-36.281	D	7.659	7.593	0.066	3.3	94.21	5.69	0	0	0	0.11	0	0
2003	233	0	907	-79.461	-36.281	D	7.659	7.593	0.066	3.3	92.64	7.28	0	0	0	0.08	0	0
2003	234	0	907	-79.461	-36.281	D	7.632	7.593	0.039	3.3	97.75	2.17	0	0	0	0.08	0	0
2003	235	0	933	-78.17	-33.075	D	7.618	7.593	0.025	3.3	98.15	1.74	0	0	0	0.11	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	236	0	933	-78.17	-33.075	D	8.089	7.593	0.496	3.3	99.6	0.23	0	0	0	0.17	0	0
2003	237	0	1039	-87.824	-33.618	D	7.974	7.593	0.381	3.3	97.34	2.54	0	0	0	0.12	0	0
2003	238	0	1017	-87.324	-31.258	D	7.745	7.593	0.152	3.3	99.51	0.4	0	0	0	0.1	0	0
2003	239	0	949	-78.53	-31.5	D	7.632	7.593	0.039	3.3	99.54	0.38	0	0	0	0.09	0	0
2003	240	0	785	-78.62	-31.589	D	7.593	7.593	0	3.3	98.74	1.06	0	0	0	0.07	0	0
2003	241	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	242	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	243	0	967	-80.716	-30.533	D	7.596	7.593	0.003	3.3	99.21	0.76	0	0	0	0.04	0	0
2003	244	0	1017	-87.324	-31.258	D	7.594	7.593	0.001	3.3	91.23	8.78	0	0	0	0.03	0	0
2003	245	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	220.42	6.96	0	0	0	0	0	0
2003	246	0	1035	-87.826	-32.813	D	7.747	7.639	0.108	3.4	75.19	24.71	0	0	0	0.1	0	0
2003	247	0	949	-78.53	-31.5	D	7.978	7.639	0.339	3.4	90.45	9.48	0	0	0	0.08	0	0
2003	248	0	853	-82.958	-38.45	D	7.653	7.639	0.014	3.4	71.23	28.69	0	0	0	0.08	0	0
2003	249	0	822	-86.552	-37.687	D	7.812	7.639	0.173	3.4	92.91	6.74	0	0	0	0.35	0	0
2003	250	0	1017	-87.324	-31.258	D	7.641	7.639	0.003	3.4	91.26	8.6	0	0	0	0.18	0	0
2003	251	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	252	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	253	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	254	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	255	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	256	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	257	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	258	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	259	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	260	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	261	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	262	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	263	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	264	0	947	-78.463	-31.7	D	7.682	7.639	0.044	3.4	92.16	7.66	0	0	0	0.18	0	0
2003	265	0	1017	-87.324	-31.258	D	7.734	7.639	0.095	3.4	96.76	3.09	0	0	0	0.14	0	0
2003	266	0	668	-80.151	-36.045	D	7.639	7.639	0	3.4	97.57	2.21	0	0	0	0.01	0	0
2003	267	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	268	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	269	0	930	-78.188	-33.78	D	7.77	7.639	0.131	3.4	95.24	4.45	0	0	0	0.32	0	0
2003	270	0	907	-79.461	-36.281	D	7.723	7.639	0.085	3.4	91.74	8.11	0	0	0	0.16	0	0
2003	271	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	272	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	273	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	274	0	907	-79.461	-36.281	D	7.84	7.639	0.201	3.4	61.92	37.95	0	0	0	0.13	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	275	0	853	-82.958	-38.45	D	7.524	7.5	0.024	3.1	61.56	38.32	0	0	0	0.12	0	0
2003	276	0	869	-83.476	-36.964	D	7.721	7.5	0.222	3.1	22.56	76.97	0	0	0	0.47	0	0
2003	277	0	1017	-87.324	-31.258	D	7.552	7.5	0.052	3.1	80.68	19.15	0	0	0	0.18	0	0
2003	278	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	279	0	907	-79.461	-36.281	D	7.5	7.5	0	3.1	85.02	14.98	0	0	0	0.15	0	0
2003	280	0	845	-83.769	-38.412	D	7.505	7.5	0.005	3.1	89.69	10.23	0	0	0	0.14	0	0
2003	281	0	822	-86.552	-37.687	D	7.5	7.5	0	3.1	93.43	6.56	0	0	0	0.1	0	0
2003	282	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	283	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	284	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	285	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	286	0	930	-78.188	-33.78	D	7.54	7.5	0.04	3.1	76.37	23.45	0	0	0	0.18	0	0
2003	287	0	933	-78.17	-33.075	D	7.634	7.5	0.135	3.1	81.6	18.23	0	0	0	0.17	0	0
2003	288	0	190	-85.046	-31.024	D	7.5	7.5	0	3.1	69.56	26.9	0	0	0	0.03	0	0
2003	289	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	290	0	967	-80.716	-30.533	D	7.522	7.5	0.022	3.1	43.97	55.96	0	0	0	0.08	0	0
2003	291	0	859	-82.487	-37.889	D	8.106	7.5	**0.606**	3.1	57.73	41.97	0	0	0	0.3	1	0
2003	292	0	930	-78.188	-33.78	D	7.831	7.5	0.331	3.1	75.42	24.41	0	0	0	0.17	0	0
2003	293	0	907	-79.461	-36.281	D	7.503	7.5	0.003	3.1	87.56	12.33	0	0	0	0.14	0	0
2003	294	0	930	-78.188	-33.78	D	7.5	7.5	0.001	3.1	99.4	0.64	0	0	0	0.13	0	0
2003	295	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	296	0	78	-86.051	-32.504	D	7.631	7.5	0.131	3.1	86.87	12.62	0	0	0	0.5	0	0
2003	297	0	907	-79.461	-36.281	D	7.529	7.5	0.029	3.1	87	12.68	0	0	0	0.33	0	0
2003	298	0	930	-78.188	-33.78	D	7.503	7.5	0.003	3.1	98.85	1.02	0	0	0	0.2	0	0
2003	299	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	300	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	301	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	302	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	303	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	304	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	305	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	306	0	947	-78.463	-31.7	D	7.511	7.5	0.011	3.1	79.07	20.74	0	0	0	0.2	0	0
2003	307	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	308	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	309	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	310	0	949	-78.53	-31.5	D	7.537	7.5	0.038	3.1	63.39	36.46	0	0	0	0.15	0	0
2003	311	0	907	-79.461	-36.281	D	8.14	7.5	**0.64**	3.1	41.68	58.19	0	0	0	0.14	1	0
2003	312	0	78	-86.051	-32.504	D	8.448	7.5	**0.949**	3.1	39.59	60.11	0	0	0	0.3	1	0
2003	313	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	314	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	315	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	316	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	317	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	318	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	319	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	320	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	321	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	322	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	323	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	324	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	325	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	326	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	327	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	328	0	1008	-86.153	-30.893	D	7.5	7.5	0	3.1	52.95	46.86	0	0	0	0.07	0	0
2003	329	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	330	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	331	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	332	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	333	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	334	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	335	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	336	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	337	0	822	-86.552	-37.687	D	7.699	7.593	0.107	3.3	54.62	45.12	0	0	0	0.26	0	0
2003	338	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	339	0	949	-78.53	-31.5	D	7.835	7.593	0.242	3.3	63.09	36.83	0	0	0	0.08	0	0
2003	340	0	930	-78.188	-33.78	D	7.594	7.593	0.002	3.3	70.4	29.57	0	0	0	0.06	0	0
2003	341	0	930	-78.188	-33.78	D	7.603	7.593	0.011	3.3	42.83	57.04	0	0	0	0.13	0	0
2003	342	0	947	-78.463	-31.7	D	7.647	7.593	0.054	3.3	42.28	57.59	0	0	0	0.13	0	0
2003	343	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	344	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	29.17	52.25	0	0	0	0.01	0	0
2003	345	0	832	-85.112	-38.219	D	7.608	7.593	0.016	3.3	12.71	87.29	0	0	0	0	0	0
2003	346	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	347	0	949	-78.53	-31.5	D	7.883	7.593	0.291	3.3	56.04	43.81	0	0	0	0.15	0	0
2003	348	0	1017	-87.324	-31.258	D	7.593	7.593	0	3.3	52.98	45.77	0	0	0	0.12	0	0
2003	349	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	350	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	351	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	352	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003											% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	353	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	354	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	355	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	356	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	357	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	358	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	359	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	360	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	361	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	362	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	363	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	364	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	365	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									1.391								**18**	**3**

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	2	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	3	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	4	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	5	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	6	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	7	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	8	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	9	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	10	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	32.53	67.23	0	0	0	0.14	0	0
2001	11	0	2789	-107.509	-101.223	D	7.671	7.593	0.078	3.3	50.96	48.91	0	0	0	0.13	0	0
2001	12	0	2781	-108.101	-100.123	D	7.594	7.593	0.001	3.3	53.73	46.19	0	0	0	0.1	0	0
2001	13	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	14	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	15	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	16	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	17	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	18	0	2789	-107.509	-101.223	D	8.631	7.593	**1.038**	3.3	48.77	51.11	0	0	0	0.12	1	1
2001	19	0	2789	-107.509	-101.223	D	8.606	7.593	**1.013**	3.3	43.56	56.29	0	0	0	0.15	1	1
2001	20	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	21	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	22	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	23	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	24	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	25	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	26	0	2789	-107.509	-101.223	D	7.672	7.593	0.079	3.3	37.11	62.77	0	0	0	0.12	0	0
2001	27	0	2781	-108.101	-100.123	D	7.597	7.593	0.005	3.3	35.24	64.69	0	0	0	0.08	0	0
2001	28	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	29	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	30	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	31	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	32	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	33	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	34	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	35	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	36	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	37	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	38	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	39	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	40	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	41	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	42	0	2789	-107.509	-101.223	D	7.453	7.453	0	3	41.72	59.25	0	0	0	0.16	0	0
2001	43	0	2589	-130.538	-119.059	D	7.6	7.453	0.147	3	46.2	53.66	0	0	0	0.14	0	0
2001	44	0	2758	-112.009	-98.987	D	7.453	7.453	0	3	53.34	46.57	0	0	0	0.08	0	0
2001	45	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	46	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	47	0	2789	-107.509	-101.223	D	7.454	7.453	0.001	3	29.27	71.09	0	0	0	0	0	0
2001	48	0	68	-128.795	-119.029	D	7.453	7.453	0	3	10.41	66.93	0	0	0	0	0	0
2001	49	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	50	0	2789	-107.509	-101.223	D	7.47	7.453	0.018	3	59.86	39.99	0	0	0	0.16	0	0
2001	51	0	2789	-107.509	-101.223	D	7.455	7.453	0.003	3	55.38	44.5	0	0	0	0.13	0	0
2001	52	0	2710	-117.428	-99.19	D	7.479	7.453	0.026	3	51.11	48.73	0	0	0	0.17	0	0
2001	53	0	2704	-118.811	-99.252	D	7.625	7.453	0.172	3	47.92	51.94	0	0	0	0.14	0	0
2001	54	0	2711	-117.197	-99.18	D	7.707	7.453	0.254	3	63.5	36.4	0	0	0	0.11	0	0
2001	55	0	2704	-118.811	-99.252	D	7.515	7.453	0.063	3	67.04	32.88	0	0	0	0.08	0	0
2001	56	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	57	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	58	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	59	0	2704	-118.811	-99.252	D	7.465	7.453	0.012	3	62.55	37.36	0	0	0	0.11	0	0
2001	60	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	61	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	62	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	63	0	2789	-107.509	-101.223	D	7.311	7.311	0	2.7	62.66	37.53	0	0	0	0.11	0	0
2001	64	0	2789	-107.509	-101.223	D	7.497	7.311	0.186	2.7	51.72	48.11	0	0	0	0.17	0	0
2001	65	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	66	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	67	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	68	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	69	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	70	0	2789	-107.509	-101.223	D	7.347	7.311	0.037	2.7	76.71	23.07	0	0	0	0.23	0	0
2001	71	0	2781	-108.101	-100.123	D	7.313	7.311	0.002	2.7	75.64	24.27	0	0	0	0.15	0	0
2001	72	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	73	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	74	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	75	0	2628	-127.536	-110.65	D	7.312	7.311	0.001	2.7	34.93	65.15	0	0	0	0.04	0	0
2001	76	0	1009	-121.45	-103.448	D	7.325	7.311	0.014	2.7	38.11	61.81	0	0	0	0.08	0	0
2001	77	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	78	0	2789	-107.509	-101.223	D	7.425	7.311	0.114	2.7	65	34.73	0	0	0	0.27	0	0
2001	79	0	2589	-130.538	-119.059	D	7.373	7.311	0.062	2.7	66.78	33	0	0	0	0.22	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	80	0	2704	-118.811	-99.252	D	7.408	7.311	0.097	2.7	57.85	41.9	0	0	0	0.25	0	0
2001	81	0	2574	-127.032	-119.191	D	7.688	7.311	0.378	2.7	63.71	36.08	0	0	0	0.21	0	0
2001	82	0	2781	-108.101	-100.123	D	7.419	7.311	0.108	2.7	78.29	21.55	0	0	0	0.16	0	0
2001	83	0	2781	-108.101	-100.123	D	7.512	7.311	0.201	2.7	85.04	14.81	0	0	0	0.16	0	0
2001	84	0	2789	-107.509	-101.223	D	7.424	7.311	0.113	2.7	87.23	12.68	0	0	0	0.09	0	0
2001	85	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	86	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	87	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	88	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	89	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	90	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	91	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	92	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	93	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	94	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	95	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	96	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	97	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	98	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	99	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	100	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	101	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	102	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	103	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	104	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	105	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	106	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	107	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	108	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	109	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	110	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	111	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	112	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	113	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	114	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	115	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	116	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	117	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	118	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	119	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	120	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	121	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	122	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	123	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	124	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	125	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	126	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	127	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	128	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	129	0	2789	-107.509	-101.223	D	7.641	7.639	0.002	3.4	73.41	26.48	0	0	0	0.12	0	0
2001	130	0	2789	-107.509	-101.223	D	7.655	7.639	0.016	3.4	87.45	12.44	0	0	0	0.12	0	0
2001	131	0	2789	-107.509	-101.223	D	7.643	7.639	0.004	3.4	95.35	4.56	0	0	0	0.1	0	0
2001	132	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	133	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	134	0	2789	-107.509	-101.223	D	7.639	7.639	0.001	3.4	96.64	3.57	0	0	0	0.11	0	0
2001	135	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	136	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	137	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	138	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	139	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	140	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	141	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	95.22	4.57	0	0	0	0.16	0	0
2001	142	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	143	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	144	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	145	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	146	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	147	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	148	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	149	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	150	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	151	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	152	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	153	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	154	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	155	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	156	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	157	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	158	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	159	0	2781	-108.101	-100.123	D	7.667	7.639	0.028	3.4	89.28	10.58	0	0	0	0.14	0	0
2001	160	0	2789	-107.509	-101.223	D	8.97	7.639	**1.331**	3.4	89.5	10.37	0	0	0	0.13	1	1
2001	161	0	2571	-126.292	-119.174	D	8.202	7.639	**0.563**	3.4	98.13	1.75	0	0	0	0.12	1	0
2001	162	0	2781	-108.101	-100.123	D	7.778	7.639	0.139	3.4	96.69	3.23	0	0	0	0.09	0	0
2001	163	0	2780	-108.33	-100.15	D	7.639	7.639	0	3.4	98.63	1.05	0	0	0	0.07	0	0
2001	164	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	165	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	166	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	167	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	168	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	169	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	170	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	171	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	172	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	173	0	2411	-108.554	-100.853	D	7.639	7.639	0	3.4	99.79	0.13	0	0	0	0	0	0
2001	174	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	175	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	176	0	2789	-107.509	-101.223	D	7.67	7.639	0.031	3.4	96.54	3.34	0	0	0	0.13	0	0
2001	177	0	2789	-107.509	-101.223	D	7.736	7.639	0.097	3.4	98.59	1.3	0	0	0	0.11	0	0
2001	178	0	2758	-112.009	-98.987	D	7.708	7.639	0.069	3.4	99.16	0.74	0	0	0	0.1	0	0
2001	179	0	2704	-118.811	-99.252	D	7.641	7.639	0.002	3.4	96.87	3.07	0	0	0	0.07	0	0
2001	180	0	2758	-112.009	-98.987	D	7.639	7.639	0	3.4	95.23	4.63	0	0	0	0.04	0	0
2001	181	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	182	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	183	0	2781	-108.101	-100.123	D	7.639	7.639	0.001	3.4	95.99	3.97	0	0	0	0.12	0	0
2001	184	0	2781	-108.101	-100.123	D	7.749	7.639	0.11	3.4	97.73	2.16	0	0	0	0.12	0	0
2001	185	0	2781	-108.101	-100.123	D	7.646	7.639	0.008	3.4	79.53	20.41	0	0	0	0.07	0	0
2001	186	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	187	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	188	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	99.44	0.51	0	0	0	0	0	0
2001	189	0	2401	-109.291	-100.348	D	7.639	7.639	0	3.4	88.42	1.52	0	0	0	0	0	0
2001	190	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	191	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	192	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	193	0	2789	-107.509	-101.223	D	7.679	7.639	0.04	3.4	99.5	0.3	0	0	0	0.2	0	0
2001	194	0	2789	-107.509	-101.223	D	7.645	7.639	0.007	3.4	98.85	0.97	0	0	0	0.17	0	0
2001	195	0	2789	-107.509	-101.223	D	7.639	7.639	0	3.4	100.1	0.13	0	0	0	0	0	0
2001	196	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	98.41	0.03	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	197	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	198	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	199	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	200	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	201	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	202	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	203	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	204	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	205	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	206	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	207	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	208	0	2758	-112.009	-98.987	D	7.64	7.639	0.002	3.4	96.28	3.68	0	0	0	0.04	0	0
2001	209	0	2781	-108.101	-100.123	D	7.641	7.639	0.003	3.4	92.26	7.72	0	0	0	0.05	0	0
2001	210	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	96.94	2.43	0	0	0	0.01	0	0
2001	211	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	212	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	213	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	214	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	215	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	216	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	217	0	2789	-107.509	-101.223	D	7.704	7.639	0.065	3.4	99.68	0.15	0	0	0	0.18	0	0
2001	218	0	2694	-120.047	-100.054	D	7.659	7.639	0.02	3.4	99.62	0.25	0	0	0	0.13	0	0
2001	219	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	220	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	221	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	222	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	223	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	224	0	2789	-107.509	-101.223	D	8.103	7.639	0.465	3.4	97.28	2.57	0	0	0	0.15	0	0
2001	225	0	2789	-107.509	-101.223	D	8.711	7.639	**1.073**	3.4	89.51	10.36	0	0	0	0.13	1	1
2001	226	0	2589	-130.538	-119.059	D	8.216	7.639	**0.577**	3.4	95.12	4.75	0	0	0	0.13	1	0
2001	227	0	2571	-126.292	-119.174	D	7.691	7.639	0.053	3.4	93.87	5.93	0	0	0	0.2	0	0
2001	228	0	2468	-114.425	-109.261	D	7.757	7.639	0.118	3.4	98.31	1.54	0	0	0	0.15	0	0
2001	229	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	230	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	231	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	232	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	233	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	234	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	235	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	236	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	237	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	238	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	239	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	240	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	241	0	2789	-107.509	-101.223	D	7.64	7.639	0.002	3.4	99.58	0.3	0	0	0	0.12	0	0
2001	242	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	243	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	244	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	245	0	2758	-112.009	-98.987	D	7.828	7.731	0.097	3.6	98.68	1.19	0	0	0	0.13	0	0
2001	246	0	2704	-118.811	-99.252	D	7.736	7.731	0.006	3.6	92.6	7.32	0	0	0	0.1	0	0
2001	247	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	248	0	2758	-112.009	-98.987	D	7.731	7.731	0	3.6	98.76	1.2	0	0	0	0.16	0	0
2001	249	0	2757	-112.241	-99.005	D	7.731	7.731	0	3.6	98.51	1.1	0	0	0	0.14	0	0
2001	250	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	251	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	252	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	253	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	254	0	2386	-109.568	-103.079	D	7.731	7.731	0	3.6	83.34	13.01	0	0	0	0.15	0	0
2001	255	0	2781	-108.101	-100.123	D	7.847	7.731	0.117	3.6	87.56	12.29	0	0	0	0.15	0	0
2001	256	0	2155	-112.989	-99.065	D	7.731	7.731	0.001	3.6	98.25	1.67	0	0	0	0.08	0	0
2001	257	0	2781	-108.101	-100.123	D	7.775	7.731	0.044	3.6	89.76	10.13	0	0	0	0.11	0	0
2001	258	0	2704	-118.811	-99.252	D	7.876	7.731	0.145	3.6	94.43	5.46	0	0	0	0.11	0	0
2001	259	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	260	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	261	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	262	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	263	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	264	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	265	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	266	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	267	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	268	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	269	0	2789	-107.509	-101.223	D	8.156	7.731	0.425	3.6	77.37	22.36	0	0	0	0.28	0	0
2001	270	0	2571	-126.292	-119.174	D	8.07	7.731	0.339	3.6	81.51	18.34	0	0	0	0.15	0	0
2001	271	0	2588	-130.481	-119.268	D	7.89	7.731	0.159	3.6	88.11	11.78	0	0	0	0.12	0	0
2001	272	0	2789	-107.509	-101.223	D	7.94	7.731	0.21	3.6	98.5	1.27	0	0	0	0.24	0	0
2001	273	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	87.37	11.75	0	0	0	0.13	0	0
2001	274	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	275	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	276	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	277	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	278	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	279	0	2781	-108.101	-100.123	D	7.624	7.593	0.031	3.3	35.65	64.35	0	0	0	0	0	0
2001	280	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	281	0	2789	-107.509	-101.223	D	7.604	7.593	0.012	3.3	77.78	22.07	0	0	0	0.15	0	0
2001	282	0	2781	-108.101	-100.123	D	7.597	7.593	0.004	3.3	74.75	25.11	0	0	0	0.13	0	0
2001	283	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	284	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	285	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	286	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	287	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	288	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	289	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	290	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	291	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	292	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	74.23	25.56	0	0	0	0.18	0	0
2001	293	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	294	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	295	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	296	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	297	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	298	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	299	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	300	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	301	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	302	0	2789	-107.509	-101.223	D	7.626	7.593	0.033	3.3	88	11.86	0	0	0	0.14	0	0
2001	303	0	2781	-108.101	-100.123	D	7.593	7.593	0	3.3	77.16	22.79	0	0	0	0.07	0	0
2001	304	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	305	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	306	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	307	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	308	0	2781	-108.101	-100.123	D	7.693	7.546	0.147	3.2	84.58	15.3	0	0	0	0.12	0	0
2001	309	0	2758	-112.009	-98.987	D	7.569	7.546	0.023	3.2	87.4	12.49	0	0	0	0.11	0	0
2001	310	0	2781	-108.101	-100.123	D	7.632	7.546	0.086	3.2	77.8	22.03	0	0	0	0.17	0	0
2001	311	0	2789	-107.509	-101.223	D	7.597	7.546	0.051	3.2	74.1	25.72	0	0	0	0.18	0	0
2001	312	0	2789	-107.509	-101.223	D	7.563	7.546	0.017	3.2	78.96	20.91	0	0	0	0.13	0	0
2001	313	0	2789	-107.509	-101.223	D	7.547	7.546	0.001	3.2	90.08	9.91	0	0	0	0.09	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	314	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	315	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	316	0	2789	-107.509	-101.223	D	7.61	7.546	0.064	3.2	63.82	35.87	0	0	0	0.31	0	0
2001	317	0	2589	-130.538	-119.059	D	7.628	7.546	0.082	3.2	62.1	37.68	0	0	0	0.22	0	0
2001	318	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	319	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	320	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	321	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	322	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	323	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	324	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	325	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	326	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	327	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	328	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	329	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	330	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	331	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	332	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	333	0	2789	-107.509	-101.223	D	7.597	7.546	0.051	3.2	43.21	56.72	0	0	0	0.06	0	0
2001	334	0	2789	-107.509	-101.223	D	8.197	7.546	**0.651**	3.2	42.93	56.98	0	0	0	0.09	1	0
2001	335	0	1553	-117.542	-108.213	D	7.546	7.546	0	3.2	19.26	72.76	0	0	0	0	0	0
2001	336	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	337	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	338	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	339	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	340	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	341	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	342	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	343	0	2704	-118.811	-99.252	D	7.798	7.593	0.206	3.3	43.53	56.32	0	0	0	0.15	0	0
2001	344	0	2789	-107.509	-101.223	D	7.598	7.593	0.005	3.3	37.75	62.08	0	0	0	0.18	0	0
2001	345	0	2789	-107.509	-101.223	D	7.634	7.593	0.041	3.3	44.55	55.31	0	0	0	0.14	0	0
2001	346	0	2789	-107.509	-101.223	D	7.633	7.593	0.041	3.3	61.15	38.73	0	0	0	0.13	0	0
2001	347	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	348	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	349	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	350	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	351	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	352	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	353	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	354	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	355	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	356	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	357	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	358	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	359	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	360	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	361	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	362	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	363	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	364	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	365	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									1.331								**7**	**4**

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	2	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	3	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	4	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	5	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	6	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	7	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	8	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	9	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	10	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	11	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	12	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	13	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	14	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	15	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	16	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	17	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	18	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	19	0	2789	-107.509	-101.223	D	7.68	7.593	0.087	3.3	61.37	38.52	0	0	0	0.1	0	0
2002	20	0	2781	-108.101	-100.123	D	7.661	7.593	0.069	3.3	65.89	34.02	0	0	0	0.09	0	0
2002	21	0	2789	-107.509	-101.223	D	7.613	7.593	0.02	3.3	69.8	30.14	0	0	0	0.06	0	0
2002	22	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	23	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	24	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	25	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	26	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	27	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	28	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	29	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	30	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	31	0	1415	-118.683	-99.252	D	7.593	7.593	0	3.3	50.64	49.18	0	0	0	0.02	0	0
2002	32	0	2694	-120.047	-100.054	D	7.6	7.593	0.007	3.3	12.81	87.21	0	0	0	0	0	0
2002	33	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	34	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	35	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	36	0	2789	-107.509	-101.223	D	7.454	7.453	0.002	3	41.96	57.87	0	0	0	0.2	0	0
2002	37	0	2781	-108.101	-100.123	D	7.538	7.453	0.085	3	42.23	57.59	0	0	0	0.18	0	0
2002	38	0	2694	-120.047	-100.054	D	7.453	7.453	0	3	51.38	49.35	0	0	0	0.11	0	0
2002	39	0	2781	-108.101	-100.123	D	7.453	7.453	0	3	70.11	30.82	0	0	0	0.09	0	0
2002	40	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	41	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	42	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	43	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	44	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	45	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	46	0	2789	-107.509	-101.223	D	7.456	7.453	0.004	3	70.34	29.51	0	0	0	0.19	0	0
2002	47	0	2781	-108.101	-100.123	D	7.453	7.453	0	3	59.75	29.51	0	0	0	0.14	0	0
2002	48	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	49	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	50	0	2789	-107.509	-101.223	D	7.46	7.453	0.008	3	45.77	54.01	0	0	0	0.23	0	0
2002	51	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	52	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	53	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	54	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	55	0	2789	-107.509	-101.223	D	7.459	7.453	0.006	3	69.04	30.83	0	0	0	0.18	0	0
2002	56	0	2789	-107.509	-101.223	D	7.453	7.453	0.001	3	65.75	34.11	0	0	0	0.12	0	0
2002	57	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	58	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	59	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	60	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	61	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	62	0	2781	-108.101	-100.123	D	7.317	7.311	0.006	2.7	52.66	47.28	0	0	0	0.05	0	0
2002	63	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	64	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	65	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	66	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	67	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	68	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	69	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	70	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	71	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	72	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	73	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	74	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	75	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	76	0	2789	-107.509	-101.223	D	7.552	7.311	0.242	2.7	53.71	45.92	0	0	0	0.37	0	0
2002	77	0	2781	-108.101	-100.123	D	7.332	7.311	0.021	2.7	40.08	59.92	0	0	0	0.01	0	0
2002	78	0	2781	-108.101	-100.123	D	7.314	7.311	0.003	2.7	69.74	30.3	0	0	0	0.01	0	0
2002	79	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	80	0	2789	-107.509	-101.223	D	7.658	7.311	0.347	2.7	69.2	30.74	0	0	0	0.07	0	0
2002	81	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	82	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	83	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	84	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	85	0	2781	-108.101	-100.123	D	7.814	7.311	**0.504**	2.7	72.1	27.82	0	0	0	0.08	1	0
2002	86	0	2789	-107.509	-101.223	D	7.329	7.311	0.018	2.7	64.97	34.93	0	0	0	0.1	0	0
2002	87	0	2789	-107.509	-101.223	D	7.328	7.311	0.017	2.7	75.13	24.76	0	0	0	0.11	0	0
2002	88	0	2789	-107.509	-101.223	D	7.323	7.311	0.013	2.7	73.52	26.38	0	0	0	0.1	0	0
2002	89	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	90	0	2758	-112.009	-98.987	D	7.326	7.311	0.016	2.7	76.79	23.04	0	0	0	0.18	0	0
2002	91	0	2758	-112.009	-98.987	D	7.448	7.311	0.137	2.7	78.61	21.15	0	0	0	0.24	0	0
2002	92	0	2781	-108.101	-100.123	D	7.462	7.358	0.104	2.8	70.13	29.69	0	0	0	0.18	0	0
2002	93	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	94	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	95	0	2781	-108.101	-100.123	D	7.392	7.358	0.033	2.8	59.75	40.09	0	0	0	0.17	0	0
2002	96	0	2789	-107.509	-101.223	D	7.736	7.358	0.378	2.8	78.44	21.4	0	0	0	0.16	0	0
2002	97	0	2789	-107.509	-101.223	D	7.785	7.358	0.427	2.8	85.01	14.85	0	0	0	0.13	0	0
2002	98	0	2781	-108.101	-100.123	D	7.361	7.358	0.003	2.8	88.78	11.11	0	0	0	0.11	0	0
2002	99	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	100	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	101	0	2789	-107.509	-101.223	D	7.462	7.358	0.104	2.8	75.01	24.8	0	0	0	0.19	0	0
2002	102	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	103	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	104	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	105	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	106	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	107	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	108	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	109	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	110	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	111	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	112	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	113	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	114	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	115	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	116	0	2571	-126.292	-119.174	D	7.358	7.358	0	2.8	87.51	12.48	0	0	0	0.29	0	0
2002	117	0	2588	-130.481	-119.268	D	7.374	7.358	0.015	2.8	79.04	20.82	0	0	0	0.15	0	0
2002	118	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	119	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	120	0	2789	-107.509	-101.223	D	7.359	7.358	0.001	2.8	97.29	2.69	0	0	0	0.21	0	0
2002	121	0	2781	-108.101	-100.123	D	7.362	7.358	0.004	2.8	92.92	6.88	0	0	0	0.19	0	0
2002	122	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	123	0	2789	-107.509	-101.223	D	7.643	7.639	0.004	3.4	86.59	13.35	0	0	0	0.08	0	0
2002	124	0	2781	-108.101	-100.123	D	7.796	7.639	0.157	3.4	80.5	19.32	0	0	0	0.18	0	0
2002	125	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	126	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	127	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	128	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	129	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	130	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	131	0	2781	-108.101	-100.123	D	7.648	7.639	0.009	3.4	92.16	7.6	0	0	0	0.24	0	0
2002	132	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	133	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	134	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	135	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	136	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	137	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	138	0	2781	-108.101	-100.123	D	8.046	7.639	0.407	3.4	70.05	29.9	0	0	0	0.05	0	0
2002	139	0	2789	-107.509	-101.223	D	7.986	7.639	0.347	3.4	49.19	50.62	0	0	0	0.19	0	0
2002	140	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	141	0	2788	-107.71	-101.211	D	7.639	7.639	0	3.4	92.05	7.17	0	0	0	0.19	0	0
2002	142	0	2789	-107.509	-101.223	D	7.687	7.639	0.048	3.4	96.62	3.25	0	0	0	0.13	0	0
2002	143	0	2781	-108.101	-100.123	D	7.661	7.639	0.022	3.4	92.07	7.85	0	0	0	0.08	0	0
2002	144	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	145	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	146	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	147	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	148	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	149	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	150	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	151	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	152	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	153	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	154	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	155	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	156	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	157	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	158	0	2468	-114.425	-109.261	D	7.644	7.639	0.006	3.4	93.33	6.54	0	0	0	0.13	0	0
2002	159	0	2571	-126.292	-119.174	D	8.274	7.639	**0.635**	3.4	95.36	4.52	0	0	0	0.12	1	0
2002	160	0	2694	-120.047	-100.054	D	7.992	7.639	0.353	3.4	97.21	2.69	0	0	0	0.11	0	0
2002	161	0	2182	-112.742	-99.068	D	7.639	7.639	0	3.4	95.06	4.75	0	0	0	0.08	0	0
2002	162	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	163	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	164	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	165	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	166	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	167	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	168	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	169	0	2781	-108.101	-100.123	D	7.64	7.639	0.001	3.4	99.15	0.8	0	0	0	0.06	0	0
2002	170	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	99.41	1.08	0	0	0	0.02	0	0
2002	171	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	172	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	173	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	174	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	175	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	176	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	177	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	178	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	179	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	180	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	181	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	182	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	183	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	184	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	185	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	186	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	187	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	188	0	2781	-108.101	-100.123	D	7.643	7.639	0.004	3.4	99.95	0.08	0	0	0	0.01	0	0
2002	189	0	1483	-118.188	-99.258	D	7.639	7.639	0	3.4	99.86	0.4	0	0	0	0	0	0
2002	190	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	191	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	192	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	193	0	2781	-108.101	-100.123	D	7.641	7.639	0.003	3.4	98.99	0.93	0	0	0	0.07	0	0
2002	194	0	2781	-108.101	-100.123	D	7.641	7.639	0.003	3.4	97.18	2.78	0	0	0	0.05	0	0
2002	195	0	2704	-118.811	-99.252	D	7.639	7.639	0.001	3.4	98.49	1.42	0	0	0	0.03	0	0
2002	196	0	2694	-120.047	-100.054	D	7.641	7.639	0.003	3.4	99.49	0.38	0	0	0	0.17	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	197	0	2704	-118.811	-99.252	D	7.656	7.639	0.017	3.4	95.41	4.46	0	0	0	0.13	0	0
2002	198	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	199	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	200	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	201	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	202	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	203	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	204	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	205	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	206	0	2789	-107.509	-101.223	D	7.827	7.639	0.188	3.4	96.57	3.29	0	0	0	0.14	0	0
2002	207	0	2571	-126.292	-119.174	D	7.797	7.639	0.158	3.4	97.54	2.36	0	0	0	0.1	0	0
2002	208	0	2789	-107.509	-101.223	D	7.669	7.639	0.03	3.4	97.49	2.44	0	0	0	0.08	0	0
2002	209	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	210	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	211	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	212	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	213	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	214	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	215	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	216	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	217	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	218	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	219	0	2789	-107.509	-101.223	D	7.958	7.639	0.319	3.4	95.64	4.22	0	0	0	0.13	0	0
2002	220	0	2588	-130.481	-119.268	D	7.75	7.639	0.111	3.4	98.78	1.1	0	0	0	0.12	0	0
2002	221	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	222	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	223	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	224	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	225	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	226	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	227	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	228	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	229	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	230	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	231	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	232	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	233	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	234	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	235	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	236	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	237	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	238	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	239	0	2789	-107.509	-101.223	D	8.007	7.639	0.368	3.4	95.8	4.02	0	0	0	0.18	0	0
2002	240	0	2704	-118.811	-99.252	D	8.403	7.639	**0.765**	3.4	96.43	3.42	0	0	0	0.15	1	0
2002	241	0	2628	-127.536	-110.65	D	7.647	7.639	0.008	3.4	93.39	6.51	0	0	0	0.1	0	0
2002	242	0	1048	-121.178	-101.214	D	7.639	7.639	0	3.4	99.44	0.4	0	0	0	0.18	0	0
2002	243	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	244	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	245	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	246	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	247	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	248	0	2789	-107.509	-101.223	D	7.745	7.731	0.015	3.6	97.99	1.87	0	0	0	0.13	0	0
2002	249	0	2789	-107.509	-101.223	D	8.159	7.731	0.428	3.6	94.39	5.48	0	0	0	0.12	0	0
2002	250	0	2628	-127.536	-110.65	D	7.744	7.731	0.013	3.6	96.45	3.43	0	0	0	0.12	0	0
2002	251	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	252	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	253	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	254	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	255	0	2781	-108.101	-100.123	D	7.899	7.731	0.168	3.6	82.13	17.65	0	0	0	0.21	0	0
2002	256	0	2588	-130.481	-119.268	D	7.945	7.731	0.214	3.6	91.77	8.02	0	0	0	0.21	0	0
2002	257	0	2588	-130.481	-119.268	D	7.749	7.731	0.018	3.6	99.16	0.71	0	0	0	0.14	0	0
2002	258	0	2757	-112.241	-99.005	D	7.737	7.731	0.006	3.6	98.87	1.02	0	0	0	0.11	0	0
2002	259	0	2781	-108.101	-100.123	D	7.731	7.731	0	3.6	94.67	4.88	0	0	0	0.08	0	0
2002	260	0	2789	-107.509	-101.223	D	7.787	7.731	0.056	3.6	98.35	1.51	0	0	0	0.14	0	0
2002	261	0	2789	-107.509	-101.223	D	7.731	7.731	0	3.6	92	7.98	0	0	0	0.04	0	0
2002	262	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	263	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	264	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	265	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	266	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	267	0	2468	-114.425	-109.261	D	7.756	7.731	0.025	3.6	96.24	3.54	0	0	0	0.23	0	0
2002	268	0	2789	-107.509	-101.223	D	7.857	7.731	0.127	3.6	86.9	12.94	0	0	0	0.15	0	0
2002	269	0	1415	-118.683	-99.252	D	7.732	7.731	0.001	3.6	93.06	6.76	0	0	0	0.11	0	0
2002	270	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	271	0	2758	-112.009	-98.987	D	8.107	7.731	0.376	3.6	96.63	3.22	0	0	0	0.16	0	0
2002	272	0	2781	-108.101	-100.123	D	8.34	7.731	**0.61**	3.6	95.36	4.5	0	0	0	0.14	1	0
2002	273	0	2781	-108.101	-100.123	D	7.768	7.731	0.037	3.6	97.17	2.72	0	0	0	0.11	0	0
2002	274	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	275	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	276	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	277	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	278	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	279	0	2789	-107.509	-101.223	D	7.598	7.593	0.005	3.3	94.63	5.17	0	0	0	0.23	0	0
2002	280	0	2789	-107.509	-101.223	D	7.593	7.593	0.001	3.3	93.28	6.61	0	0	0	0.2	0	0
2002	281	0	2789	-107.509	-101.223	D	7.607	7.593	0.014	3.3	76.3	23.5	0	0	0	0.19	0	0
2002	282	0	2468	-114.425	-109.261	D	7.742	7.593	0.15	3.3	84.78	15.02	0	0	0	0.2	0	0
2002	283	0	1415	-118.683	-99.252	D	7.593	7.593	0	3.3	96.97	2.73	0	0	0	0.14	0	0
2002	284	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	285	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	286	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	287	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	288	0	2574	-127.032	-119.191	D	7.897	7.593	0.304	3.3	67.2	32.6	0	0	0	0.2	0	0
2002	289	0	2789	-107.509	-101.223	D	7.644	7.593	0.051	3.3	65.63	34.23	0	0	0	0.14	0	0
2002	290	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	291	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	292	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	293	0	2468	-114.425	-109.261	D	7.609	7.593	0.017	3.3	52.63	47.26	0	0	0	0.11	0	0
2002	294	0	2571	-126.292	-119.174	D	8.165	7.593	**0.572**	3.3	68.28	31.52	0	0	0	0.19	1	0
2002	295	0	2628	-127.536	-110.65	D	7.794	7.593	0.202	3.3	77.39	22.46	0	0	0	0.15	0	0
2002	296	0	2704	-118.811	-99.252	D	7.715	7.593	0.123	3.3	86.17	13.69	0	0	0	0.14	0	0
2002	297	0	2758	-112.009	-98.987	D	7.799	7.593	0.207	3.3	86.61	13.26	0	0	0	0.13	0	0
2002	298	0	2704	-118.811	-99.252	D	7.615	7.593	0.022	3.3	82.57	17.33	0	0	0	0.1	0	0
2002	299	0	2781	-108.101	-100.123	D	7.629	7.593	0.037	3.3	90.51	9.46	0	0	0	0.04	0	0
2002	300	0	2789	-107.509	-101.223	D	7.652	7.593	0.059	3.3	92.59	7.36	0	0	0	0.05	0	0
2002	301	0	2781	-108.101	-100.123	D	8.627	7.593	**1.034**	3.3	69.55	30.34	0	0	0	0.12	1	1
2002	302	0	2694	-120.047	-100.054	D	7.617	7.593	0.025	3.3	81.59	18.36	0	0	0	0.06	0	0
2002	303	0	2781	-108.101	-100.123	D	8.474	7.593	**0.881**	3.3	57.01	42.96	0	0	0	0.02	1	0
2002	304	0	2758	-112.009	-98.987	D	9.957	7.593	**2.364**	3.3	69.69	30.23	0	0	0	0.07	1	1
2002	305	0	2468	-114.425	-109.261	D	7.729	7.593	0.137	3.3	61.29	38.63	0	0	0	0.07	0	0
2002	306	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	307	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	308	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	309	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	310	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	311	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	312	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	313	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	314	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	315	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	316	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	317	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	318	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	319	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	320	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	321	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	322	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	323	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	324	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	325	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	326	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	327	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	328	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	329	0	2789	-107.509	-101.223	D	7.721	7.546	0.175	3.2	47.21	52.69	0	0	0	0.1	0	0
2002	330	0	2789	-107.509	-101.223	D	7.63	7.546	0.084	3.2	45.88	53.99	0	0	0	0.13	0	0
2002	331	0	2781	-108.101	-100.123	D	8.486	7.546	**0.94**	3.2	42.69	57.16	0	0	0	0.15	1	0
2002	332	0	2588	-130.481	-119.268	D	7.73	7.546	0.184	3.2	39.97	59.88	0	0	0	0.15	0	0
2002	333	0	2571	-126.292	-119.174	D	7.561	7.546	0.014	3.2	52.14	47.79	0	0	0	0.09	0	0
2002	334	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	335	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	336	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	337	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	338	0	2704	-118.811	-99.252	D	7.714	7.593	0.121	3.3	21.03	78.66	0	0	0	0.3	0	0
2002	339	0	2704	-118.811	-99.252	D	7.669	7.593	0.076	3.3	55.14	44.72	0	0	0	0.15	0	0
2002	340	0	2789	-107.509	-101.223	D	8.042	7.593	0.449	3.3	47.34	52.5	0	0	0	0.15	0	0
2002	341	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	342	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	343	0	2781	-108.101	-100.123	D	7.752	7.593	0.159	3.3	57.83	42.02	0	0	0	0.15	0	0
2002	344	0	2684	-121.246	-101.035	D	7.791	7.593	0.198	3.3	61.49	38.38	0	0	0	0.13	0	0
2002	345	0	2755	-112.705	-99.039	D	7.594	7.593	0.002	3.3	62.5	37.44	0	0	0	0.07	0	0
2002	346	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	347	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	348	0	2781	-108.101	-100.123	D	7.885	7.593	0.292	3.3	53.3	46.57	0	0	0	0.13	0	0
2002	349	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	350	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	351	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	352	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	353	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	354	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	355	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	356	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	357	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	358	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	359	0	2589	-130.538	-119.059	D	7.858	7.593	0.265	3.3	42.9	56.94	0	0	0	0.17	0	0
2002	360	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	361	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	362	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	363	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	364	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	365	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									2.364								**9**	**2**

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	2	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	3	0	2704	-118.811	-99.252	D	7.672	7.593	0.08	3.3	18.88	80.94	0	0	0	0.17	0	0
2003	4	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	5	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	6	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	7	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	8	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	9	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	10	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	11	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	12	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	13	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	14	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	15	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	16	0	2789	-107.509	-101.223	D	7.634	7.593	0.041	3.3	35.47	64.38	0	0	0	0.14	0	0
2003	17	0	2704	-118.811	-99.252	D	8.008	7.593	0.415	3.3	44.13	55.75	0	0	0	0.12	0	0
2003	18	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	19	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	20	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	21	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	22	0	2704	-118.811	-99.252	D	7.655	7.593	0.063	3.3	46.74	53.15	0	0	0	0.11	0	0
2003	23	0	2704	-118.811	-99.252	D	8.184	7.593	**0.591**	3.3	22.94	76.78	0	0	0	0.29	1	0
2003	24	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	25	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	26	0	2788	-107.71	-101.211	D	7.593	7.593	0	3.3	58.32	41.56	0	0	0	0.14	0	0
2003	27	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	28	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	60.87	39.49	0	0	0	0.12	0	0
2003	29	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	30	0	2789	-107.509	-101.223	D	7.803	7.593	0.21	3.3	63.9	35.97	0	0	0	0.13	0	0
2003	31	0	2684	-121.246	-101.035	D	7.894	7.593	0.301	3.3	63.94	35.95	0	0	0	0.11	0	0
2003	32	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	33	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	34	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	35	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	36	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	37	0	2781	-108.101	-100.123	D	7.453	7.453	0	3	33.02	66.8	0	0	0	0.2	0	0
2003	38	0	2781	-108.101	-100.123	D	7.577	7.453	0.124	3	49.71	50.17	0	0	0	0.12	0	0
2003	39	0	2468	-114.425	-109.261	D	7.453	7.453	0.001	3	62.63	37.28	0	0	0	0.06	0	0
2003	40	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	41	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	42	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	43	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	44	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	45	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	46	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	47	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	48	0	2789	-107.509	-101.223	D	8.25	7.453	**0.797**	3	51.75	48.08	0	0	0	0.16	1	0
2003	49	0	2468	-114.425	-109.261	D	7.485	7.453	0.032	3	47.87	51.94	0	0	0	0.18	0	0
2003	50	0	2789	-107.509	-101.223	D	7.453	7.453	0	3	84.47	18.11	0	0	0	0.09	0	0
2003	51	0	2781	-108.101	-100.123	D	7.458	7.453	0.006	3	57.45	42.52	0	0	0	0.07	0	0
2003	52	0	2704	-118.811	-99.252	D	7.733	7.453	0.281	3	53.25	46.7	0	0	0	0.05	0	0
2003	53	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	54	0	2789	-107.509	-101.223	D	7.497	7.453	0.044	3	55.88	44	0	0	0	0.12	0	0
2003	55	0	2781	-108.101	-100.123	D	7.525	7.453	0.073	3	51.79	48.11	0	0	0	0.1	0	0
2003	56	0	2789	-107.509	-101.223	D	7.458	7.453	0.006	3	53.14	46.78	0	0	0	0.07	0	0
2003	57	0	2789	-107.509	-101.223	D	7.75	7.453	0.298	3	35.84	63.95	0	0	0	0.2	0	0
2003	58	0	2694	-120.047	-100.054	D	7.668	7.453	0.215	3	47.51	52.35	0	0	0	0.13	0	0
2003	59	0	2684	-121.246	-101.035	D	7.47	7.453	0.018	3	56.87	43.05	0	0	0	0.09	0	0
2003	60	0	2601	-129.758	-116.41	D	7.46	7.453	0.007	3	69.85	30.11	0	0	0	0.07	0	0
2003	61	0	2781	-108.101	-100.123	D	7.322	7.311	0.011	2.7	74.12	25.83	0	0	0	0.07	0	0
2003	62	0	2789	-107.509	-101.223	D	7.318	7.311	0.007	2.7	79.14	20.8	0	0	0	0.06	0	0
2003	63	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	64	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	65	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	66	0	2789	-107.509	-101.223	D	7.398	7.311	0.088	2.7	58.95	40.92	0	0	0	0.14	0	0
2003	67	0	2789	-107.509	-101.223	D	7.395	7.311	0.084	2.7	71.58	28.31	0	0	0	0.11	0	0
2003	68	0	2781	-108.101	-100.123	D	7.312	7.311	0.002	2.7	77.64	22.31	0	0	0	0.07	0	0
2003	69	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	70	0	2789	-107.509	-101.223	D	7.64	7.311	0.329	2.7	40.19	59.57	0	0	0	0.24	0	0
2003	71	0	2789	-107.509	-101.223	D	7.638	7.311	0.327	2.7	59.34	40.5	0	0	0	0.16	0	0
2003	72	0	2781	-108.101	-100.123	D	7.311	7.311	0	2.7	67.95	31.94	0	0	0	0.08	0	0
2003	73	0	2789	-107.509	-101.223	D	7.37	7.311	0.06	2.7	71.12	28.68	0	0	0	0.2	0	0
2003	74	0	2628	-127.536	-110.65	D	7.709	7.311	0.399	2.7	73.81	26.03	0	0	0	0.16	0	0
2003	75	0	2684	-121.246	-101.035	D	7.361	7.311	0.05	2.7	82.88	17.02	0	0	0	0.1	0	0
2003	76	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	77	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	78	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	79	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	80	0	2781	-108.101	-100.123	D	7.33	7.311	0.019	2.7	54.87	45.1	0	0	0	0.04	0	0
2003	81	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	82	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	83	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	84	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	85	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	86	0	2781	-108.101	-100.123	D	7.407	7.311	0.096	2.7	54.55	45.13	0	0	0	0.32	0	0
2003	87	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	88	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	89	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	90	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	91	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	92	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	93	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	94	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	95	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	96	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	97	0	2758	-112.009	-98.987	D	7.359	7.358	0.001	2.8	54.92	44.98	0	0	0	0.1	0	0
2003	98	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	99	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	100	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	101	0	2789	-107.509	-101.223	D	7.406	7.358	0.048	2.8	68.63	31.1	0	0	0	0.28	0	0
2003	102	0	2789	-107.509	-101.223	D	7.451	7.358	0.093	2.8	87.27	12.54	0	0	0	0.19	0	0
2003	103	0	2789	-107.509	-101.223	D	7.377	7.358	0.019	2.8	85.18	14.67	0	0	0	0.15	0	0
2003	104	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	105	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	106	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	107	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	108	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	109	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	110	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	111	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	112	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	113	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	114	0	2789	-107.509	-101.223	D	7.462	7.358	0.104	2.8	91.19	8.58	0	0	0	0.23	0	0
2003	115	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	116	0	2781	-108.101	-100.123	D	7.6	7.358	0.241	2.8	68.54	31.4	0	0	0	0.06	0	0
2003	117	0	2789	-107.509	-101.223	D	7.633	7.358	0.275	2.8	64.27	35.48	0	0	0	0.25	0	0
2003	118	0	2684	-121.246	-101.035	D	7.43	7.358	0.072	2.8	87.5	12.39	0	0	0	0.11	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	119	0	2780	-108.33	-100.15	D	7.358	7.358	0	2.8	141.17	3.16	0	0	0	0.1	0	0
2003	120	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	121	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	122	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	123	0	2789	-107.509	-101.223	D	7.687	7.639	0.048	3.4	70.51	29.39	0	0	0	0.1	0	0
2003	124	0	2781	-108.101	-100.123	D	8.858	7.639	**1.219**	3.4	87.13	12.75	0	0	0	0.12	1	1
2003	125	0	2684	-121.246	-101.035	D	7.641	7.639	0.002	3.4	98.33	1.64	0	0	0	0.02	0	0
2003	126	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	127	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	128	0	2704	-118.811	-99.252	D	7.769	7.639	0.13	3.4	94.78	5.1	0	0	0	0.12	0	0
2003	129	0	2781	-108.101	-100.123	D	7.64	7.639	0.002	3.4	96.39	3.48	0	0	0	0.08	0	0
2003	130	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	131	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	132	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	133	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	134	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	135	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	136	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	137	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	138	0	2704	-118.811	-99.252	D	7.721	7.639	0.082	3.4	74.08	25.78	0	0	0	0.15	0	0
2003	139	0	2608	-129.2	-114.866	D	7.936	7.639	0.297	3.4	81.88	17.95	0	0	0	0.17	0	0
2003	140	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	141	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	142	0	2589	-130.538	-119.059	D	7.846	7.639	0.208	3.4	84.46	15.27	0	0	0	0.27	0	0
2003	143	0	2781	-108.101	-100.123	D	8.178	7.639	**0.54**	3.4	94.27	5.54	0	0	0	0.19	1	0
2003	144	0	2781	-108.101	-100.123	D	8.653	7.639	**1.014**	3.4	93.31	6.54	0	0	0	0.14	1	1
2003	145	0	2789	-107.509	-101.223	D	8.27	7.639	**0.632**	3.4	93.11	6.78	0	0	0	0.11	1	0
2003	146	0	2758	-112.009	-98.987	D	7.836	7.639	0.197	3.4	92.82	7.11	0	0	0	0.07	0	0
2003	147	0	2704	-118.811	-99.252	D	7.744	7.639	0.105	3.4	88.29	11.54	0	0	0	0.17	0	0
2003	148	0	2789	-107.509	-101.223	D	8.195	7.639	**0.556**	3.4	69.27	30.6	0	0	0	0.12	1	0
2003	149	0	2588	-130.481	-119.268	D	7.673	7.639	0.034	3.4	95.55	4.36	0	0	0	0.1	0	0
2003	150	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	151	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	152	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	153	0	2758	-112.009	-98.987	D	7.769	7.639	0.13	3.4	88.03	11.82	0	0	0	0.15	0	0
2003	154	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	155	0	2789	-107.509	-101.223	D	8.004	7.639	0.366	3.4	93.39	6.54	0	0	0	0.07	0	0
2003	156	0	2588	-130.481	-119.268	D	7.778	7.639	0.139	3.4	89.4	10.55	0	0	0	0.05	0	0
2003	157	0	2571	-126.292	-119.174	D	7.644	7.639	0.005	3.4	88.7	11.22	0	0	0	0.08	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	158	0	2789	-107.509	-101.223	D	7.657	7.639	0.018	3.4	86.16	13.77	0	0	0	0.07	0	0
2003	159	0	2789	-107.509	-101.223	D	7.641	7.639	0.002	3.4	91.21	8.72	0	0	0	0.05	0	0
2003	160	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	161	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	162	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	163	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	164	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	165	0	2704	-118.811	-99.252	D	7.648	7.639	0.009	3.4	91.64	8.36	0	0	0	0.01	0	0
2003	166	0	2758	-112.009	-98.987	D	7.722	7.639	0.084	3.4	88.06	11.92	0	0	0	0.02	0	0
2003	167	0	2468	-114.425	-109.261	D	8.292	7.639	**0.653**	3.4	95.26	4.6	0	0	0	0.14	1	0
2003	168	0	2589	-130.538	-119.059	D	7.662	7.639	0.023	3.4	94.02	5.89	0	0	0	0.09	0	0
2003	169	0	2628	-127.536	-110.65	D	7.639	7.639	0.001	3.4	85.87	14.69	0	0	0	0.08	0	0
2003	170	0	2781	-108.101	-100.123	D	7.646	7.639	0.007	3.4	96.51	3.41	0	0	0	0.09	0	0
2003	171	0	2789	-107.509	-101.223	D	8.102	7.639	0.463	3.4	97.99	1.92	0	0	0	0.09	0	0
2003	172	0	2571	-126.292	-119.174	D	8.268	7.639	**0.629**	3.4	95.73	4.2	0	0	0	0.08	1	0
2003	173	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	174	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	175	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	176	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	177	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	178	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	179	0	2790	-107.59	-101.331	D	7.646	7.639	0.007	3.4	80.83	19.07	0	0	0	0.11	0	0
2003	180	0	2468	-114.425	-109.261	D	7.795	7.639	0.156	3.4	95.51	4.37	0	0	0	0.12	0	0
2003	181	0	2704	-118.811	-99.252	D	7.716	7.639	0.077	3.4	98	1.9	0	0	0	0.1	0	0
2003	182	0	2705	-118.581	-99.242	D	7.647	7.639	0.008	3.4	98.29	1.65	0	0	0	0.08	0	0
2003	183	0	1046	-121.184	-101.711	D	7.639	7.639	0	3.4	91.93	2.72	0	0	0	0.01	0	0
2003	184	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	185	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	186	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	187	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	188	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	189	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	190	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	191	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	192	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	193	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	194	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	195	0	2781	-108.101	-100.123	D	7.651	7.639	0.012	3.4	99.48	0.39	0	0	0	0.12	0	0
2003	196	0	2781	-108.101	-100.123	D	7.643	7.639	0.004	3.4	98.24	1.66	0	0	0	0.11	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	197	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	198	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	199	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	200	0	2789	-107.509	-101.223	D	7.651	7.639	0.012	3.4	99.75	0.17	0	0	0	0.09	0	0
2003	201	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	99.41	0.53	0	0	0	0.08	0	0
2003	202	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	203	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	204	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	205	0	2789	-107.509	-101.223	D	7.69	7.639	0.052	3.4	85.6	14.22	0	0	0	0.19	0	0
2003	206	0	2781	-108.101	-100.123	D	8.149	7.639	**0.51**	3.4	93.92	5.92	0	0	0	0.16	1	0
2003	207	0	2684	-121.246	-101.035	D	7.704	7.639	0.065	3.4	97.82	2.07	0	0	0	0.11	0	0
2003	208	0	1044	-121.189	-102.208	D	7.639	7.639	0	3.4	38.35	0.08	0	0	0	0.03	0	0
2003	209	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	210	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	211	0	2758	-112.009	-98.987	D	7.679	7.639	0.04	3.4	99.42	0.55	0	0	0	0.03	0	0
2003	212	0	2758	-112.009	-98.987	D	7.695	7.639	0.056	3.4	99.38	0.61	0	0	0	0.01	0	0
2003	213	0	2468	-114.425	-109.261	D	7.67	7.639	0.032	3.4	97.78	2.22	0	0	0	0.01	0	0
2003	214	0	2789	-107.509	-101.223	D	7.646	7.639	0.007	3.4	98.74	1.26	0	0	0	0	0	0
2003	215	0	2350	-110.313	-103.319	D	7.639	7.639	0	3.4	96.63	0.06	0	0	0	0	0	0
2003	216	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	217	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	218	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	219	0	2781	-108.101	-100.123	D	8.32	7.639	**0.681**	3.4	94.8	5.08	0	0	0	0.13	1	0
2003	220	0	2571	-126.292	-119.174	D	9.216	7.639	**1.577**	3.4	95.05	4.81	0	0	0	0.14	1	1
2003	221	0	2588	-130.481	-119.268	D	7.9	7.639	0.261	3.4	93.58	6.29	0	0	0	0.14	0	0
2003	222	0	2475	-116.058	-109.617	D	8.363	7.639	**0.724**	3.4	97.69	2.16	0	0	0	0.15	1	0
2003	223	0	2468	-114.425	-109.261	D	8.162	7.639	**0.523**	3.4	96.24	3.63	0	0	0	0.13	1	0
2003	224	0	2571	-126.292	-119.174	D	8.067	7.639	0.428	3.4	94.58	5.31	0	0	0	0.11	0	0
2003	225	0	2684	-121.246	-101.035	D	7.842	7.639	0.203	3.4	81.69	18.17	0	0	0	0.14	0	0
2003	226	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	227	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	228	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	229	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	230	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	231	0	2789	-107.509	-101.223	D	7.653	7.639	0.015	3.4	90.42	9.48	0	0	0	0.1	0	0
2003	232	0	2789	-107.509	-101.223	D	7.726	7.639	0.087	3.4	95.44	4.46	0	0	0	0.1	0	0
2003	233	0	2790	-107.59	-101.331	D	7.736	7.639	0.097	3.4	92.37	7.55	0	0	0	0.08	0	0
2003	234	0	2789	-107.509	-101.223	D	7.686	7.639	0.047	3.4	97.56	2.36	0	0	0	0.08	0	0
2003	235	0	2789	-107.509	-101.223	D	7.656	7.639	0.018	3.4	97.13	2.82	0	0	0	0.06	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	236	0	2781	-108.101	-100.123	D	7.945	7.639	0.306	3.4	99.47	0.4	0	0	0	0.14	0	0
2003	237	0	2758	-112.009	-98.987	D	8.026	7.639	0.387	3.4	97.63	2.26	0	0	0	0.11	0	0
2003	238	0	2704	-118.811	-99.252	D	7.776	7.639	0.138	3.4	99.42	0.49	0	0	0	0.09	0	0
2003	239	0	2781	-108.101	-100.123	D	7.666	7.639	0.027	3.4	99.41	0.5	0	0	0	0.08	0	0
2003	240	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	98.59	1.13	0	0	0	0.07	0	0
2003	241	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	242	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	243	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	244	0	1415	-118.683	-99.252	D	7.639	7.639	0	3.4	89.08	10.24	0	0	0	0.03	0	0
2003	245	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	8.53	0	0	0	0	0	0	0
2003	246	0	2628	-127.536	-110.65	D	8.068	7.731	0.338	3.6	66.25	33.68	0	0	0	0.07	0	0
2003	247	0	2588	-130.481	-119.268	D	8.634	7.731	**0.903**	3.6	75.5	24.43	0	0	0	0.07	1	0
2003	248	0	2571	-126.292	-119.174	D	7.864	7.731	0.133	3.6	66.6	33.34	0	0	0	0.06	0	0
2003	249	0	2571	-126.292	-119.174	D	8.038	7.731	0.307	3.6	96.9	2.83	0	0	0	0.27	0	0
2003	250	0	2609	-129.12	-114.645	D	7.733	7.731	0.002	3.6	90.06	9.78	0	0	0	0.17	0	0
2003	251	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	252	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	253	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	254	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	255	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	256	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	257	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	258	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	259	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	260	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	261	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	262	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	263	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	264	0	2789	-107.509	-101.223	D	7.745	7.731	0.014	3.6	95.4	4.47	0	0	0	0.14	0	0
2003	265	0	2600	-129.838	-116.63	D	7.835	7.731	0.105	3.6	96.37	3.5	0	0	0	0.13	0	0
2003	266	0	2396	-109.541	-100.593	D	7.731	7.731	0	3.6	94.8	1.45	0	0	0	0	0	0
2003	267	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	268	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	269	0	2789	-107.509	-101.223	D	7.854	7.731	0.123	3.6	95.55	4.18	0	0	0	0.27	0	0
2003	270	0	2789	-107.509	-101.223	D	7.839	7.731	0.108	3.6	87.35	12.53	0	0	0	0.13	0	0
2003	271	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	272	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	273	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	274	0	2781	-108.101	-100.123	D	7.812	7.731	0.081	3.6	72.55	27.31	0	0	0	0.14	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	275	0	2789	-107.509	-101.223	D	7.694	7.593	0.101	3.3	71.68	28.21	0	0	0	0.12	0	0
2003	276	0	2704	-118.811	-99.252	D	7.859	7.593	0.267	3.3	48.7	50.95	0	0	0	0.35	0	0
2003	277	0	2684	-121.246	-101.035	D	7.633	7.593	0.04	3.3	85.03	14.79	0	0	0	0.17	0	0
2003	278	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	279	0	2468	-114.425	-109.261	D	7.594	7.593	0.001	3.3	85.6	14.25	0	0	0	0.14	0	0
2003	280	0	2571	-126.292	-119.174	D	7.619	7.593	0.027	3.3	92.54	7.34	0	0	0	0.13	0	0
2003	281	0	2588	-130.481	-119.268	D	7.594	7.593	0.002	3.3	93.28	6.57	0	0	0	0.1	0	0
2003	282	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	283	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	284	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	285	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	286	0	2789	-107.509	-101.223	D	7.601	7.593	0.009	3.3	72.51	27.33	0	0	0	0.16	0	0
2003	287	0	2789	-107.509	-101.223	D	7.649	7.593	0.056	3.3	88.97	10.88	0	0	0	0.15	0	0
2003	288	0	167	-127.98	-112.326	D	7.593	7.593	0	3.3	22.65	7.88	0	0	0	0.01	0	0
2003	289	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	290	0	2758	-112.009	-98.987	D	7.597	7.593	0.004	3.3	40.73	59.2	0	0	0	0.06	0	0
2003	291	0	2789	-107.509	-101.223	D	8.084	7.593	0.491	3.3	67.96	31.81	0	0	0	0.24	0	0
2003	292	0	2571	-126.292	-119.174	D	7.988	7.593	0.396	3.3	80.25	19.59	0	0	0	0.16	0	0
2003	293	0	2468	-114.425	-109.261	D	7.603	7.593	0.01	3.3	84.83	15.04	0	0	0	0.12	0	0
2003	294	0	2789	-107.509	-101.223	D	7.593	7.593	0.001	3.3	99.15	0.97	0	0	0	0.12	0	0
2003	295	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	296	0	2611	-128.961	-114.204	D	7.789	7.593	0.196	3.3	96.93	2.69	0	0	0	0.37	0	0
2003	297	0	2571	-126.292	-119.174	D	7.667	7.593	0.074	3.3	77.44	22.31	0	0	0	0.25	0	0
2003	298	0	2789	-107.509	-101.223	D	7.595	7.593	0.002	3.3	98.21	1.65	0	0	0	0.19	0	0
2003	299	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	300	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	301	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	302	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	303	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	304	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	305	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	306	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	307	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	308	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	309	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	310	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	311	0	2789	-107.509	-101.223	D	8.262	7.546	**0.716**	3.2	45.79	54.12	0	0	0	0.1	1	0
2003	312	0	2704	-118.811	-99.252	D	8.282	7.546	**0.736**	3.2	54.59	45.22	0	0	0	0.2	1	0
2003	313	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	314	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	315	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	316	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	317	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	318	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	319	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	320	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	321	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	322	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	323	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	324	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	325	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	326	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	327	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	328	0	1043	-121.192	-102.457	D	7.546	7.546	0	3.2	43.31	23.62	0	0	0	0.05	0	0
2003	329	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	330	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	331	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	332	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	333	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	334	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	335	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	336	0	2571	-126.292	-119.174	D	7.593	7.593	0	3.3	45.37	54.22	0	0	0	0.26	0	0
2003	337	0	2789	-107.509	-101.223	D	7.699	7.593	0.106	3.3	51.15	48.58	0	0	0	0.27	0	0
2003	338	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	339	0	2781	-108.101	-100.123	D	7.615	7.593	0.022	3.3	65.72	34.22	0	0	0	0.07	0	0
2003	340	0	2789	-107.509	-101.223	D	7.593	7.593	0.001	3.3	70.45	29.6	0	0	0	0.05	0	0
2003	341	0	2789	-107.509	-101.223	D	7.6	7.593	0.008	3.3	40.97	58.9	0	0	0	0.13	0	0
2003	342	0	2789	-107.509	-101.223	D	7.628	7.593	0.035	3.3	40.38	59.5	0	0	0	0.13	0	0
2003	343	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	344	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	345	0	2781	-108.101	-100.123	D	7.601	7.593	0.008	3.3	17.58	82.42	0	0	0	0	0	0
2003	346	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	347	0	2781	-108.101	-100.123	D	7.665	7.593	0.073	3.3	58.22	41.64	0	0	0	0.15	0	0
2003	348	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	349	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	350	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	351	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	352	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 5

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	353	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	354	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	355	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	356	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	357	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	358	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	359	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	360	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	361	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	362	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	363	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	364	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	365	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									1.577								**17**	**3**

```
******************************************************************************************
****************************************
                                              CALPOST  Version 5.6392        Level 051130
******************************************************************************************
****************************************




 Internal Coordinate Transformations by
  ---  COORDLIB   Version: 1.95   Level: 050126



  Run Title:
     CALPUFF 2002 BART Evaluation (Mingo)
     HOLCIM JUNE 2008 BASE FOR CONTROL
     UMC 6km MET FIELD

 --------------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 --------------

      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   1  !

          METRUN = 0 - Run period explicitly defined below
          METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  2002   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                        Hour  (ISHR) --    No default   ! ISHR  =  0   !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Species & Concentration/Deposition Information
 ----------------------------------------------

       Species to process (ASPEC)       -- No default   ! ASPEC = VISIB  !
       (ASPEC = VISIB for visibility processing)

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes,
         '-3' for wet+dry deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
             X(new) = X(old) * A + B         A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations/Fluxes?
                              (LBACK)  -- Default: F   ! LBACK =  F !

 Source information
 ------------------
```

```
  Option to process source contributions:
         0 =  Process only total reported contributions
         1 =  Sum all individual source contributions and process
         2 =  Run in TRACEBACK mode to identify source
              contributions at a SINGLE receptor
                             (MSOURCE) -- Default: 0   ! MSOURCE =  0  !

Receptor information
--------------------

  Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                                 (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):

  Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                                OR
  Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
     0 = discrete receptor not processed
     1 = discrete receptor processed
  using repeated value notation to select blocks of receptors:
     23*1, 15*0, 12*1
  Flag for all receptors after the last one assigned is set to 0
  (NDRECP) -- Default: -1
                                                 ! NDRECP =  -1  !


--Select range of GRIDDED receptors (only used when LG = T):

       X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
           (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
           (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
           (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
           (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1


--Specific gridded receptors can also be excluded from CALPOST
  processing by filling a processing grid array with 0s and 1s.  If the
  processing flag for receptor index (i,j) is 1 (ON), that receptor
  will be processed if it lies within the range delineated by IBGRID,
  JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be
  processed in the run.  By default, all array values are set to 1 (ON).

  Number of gridded receptor rows provided in Subgroup (1a) to
  identify specific gridded receptors to process
                           (NGONOFF) -- Default: 0      ! NGONOFF =  0  !

!END!
```

```
--------------
Subgroup (1a) -- Specific gridded receptors included/excluded
--------------

    Specific gridded receptors are excluded from CALPOST processing
    by filling a processing grid array with 0s and 1s.  A total of
    NGONOFF lines are read here.  Each line corresponds to one 'row'
    in the sampling grid, starting with the NORTHERNMOST row that
    contains receptors that you wish to exclude, and finishing with
    row 1 to the SOUTH (no intervening rows may be skipped).  Within
    a row, each receptor position is assigned either a 0 or 1,
    starting with the westernmost receptor.
       0 = gridded receptor not processed
       1 = gridded receptor processed

    Repeated value notation may be used to select blocks of receptors:
       23*1, 15*0, 12*1

    Because all values are initially set to 1, any receptors north of
    the first row entered, or east of the last value provided in a row,
    remain ON.

    (NGXRECP) -- Default: 1


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Identify the Base Time Zone for the CALPUFF simulation
                          (BTZONE) -- No default   * BTZONE =  0.*

    Particle growth curve f(RH) for hygroscopic species
                            (MFRH) -- Default: 2   ! MFRH   =  2  !

         1 =  IWAQM (1998) f(RH) curve (originally used with MVISBK=1)
         2 =  FLAG (2000) f(RH) tabulation
         3 =  EPA (2003) f(RH) tabulation

    Maximum relative humidity (%) used in particle growth curve
                           (RHMAX) -- Default: 98  ! RHMAX  = 95.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = F  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
     Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                   COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                   FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PM10 !

Extinction Efficiency (1/Mm per ug/m**3)
----------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
```

```
           PM  FINE       (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
           PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
          AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
          AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
          ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
          SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
          ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for the 24h-average of percent change of light extinction:
    Hourly ratio of source light extinction / background light extinction
    is averaged?               (LAVER) -- Default: F   ! LAVER = F  !


    Method used for background light extinction
                              (MVISBK) -- Default: 2   ! MVISBK =  6  !

         1 =  Supply single light extinction and hygroscopic fraction
              - Hourly F(RH) adjustment applied to hygroscopic background
                and modeled sulfate and nitrate
         2 =  Compute extinction from speciated PM measurements (A)
              - Hourly F(RH) adjustment applied to observed and modeled sulfate
                and nitrate
              - F(RH) factor is capped at F(RHMAX)
         3 =  Compute extinction from speciated PM measurements (B)
              - Hourly F(RH) adjustment applied to observed and modeled sulfate
                and nitrate
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         4 =  Read hourly transmissometer background extinction measurements
              - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
              - Hour excluded if measurement invalid (missing, interference,
                or large RH)
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         5 =  Read hourly nephelometer background extinction measurements
              - Rayleigh extinction value (BEXTRAY) added to measurement
              - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
              - Hour excluded if measurement invalid (missing, interference,
                or large RH)
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         6 =  Compute extinction from speciated PM measurements
              - FLAG monthly RH adjustment factor applied to observed and
                modeled sulfate and nitrate
         7 =  Use observed weather or prognostic weather information for
              background extinction during weather events; otherwise, use Method 2
              - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
              - F(RH) factor is capped at F(RHMAX)
              - During observed weather events, compute Bext from visual range
                if using an observed weather data file, or
              - During prognostic weather events, use Bext from the prognostic
                weather file
              - Use Method 2 for hours without a weather event

    Additional inputs used for MVISBK = 1:
    --------------------------------------
     Background light extinction (1/Mm)
                              (BEXTBK) -- No default   ! BEXTBK = 12.0 !
```

```
 Percentage of particles affected by relative humidity
                         (RHFRAC) -- No default   ! RHFRAC = 10.0 !

Additional inputs used for MVISBK = 6:
--------------------------------------
 Extinction coefficients for hygroscopic species (modeled and
 background) are computed using a monthly RH adjustment factor
 in place of an hourly RH factor (VISB.DAT file is NOT needed).
 Enter the 12 monthly factors here (RHFAC).  Month 1 is January.

 (RHFAC)  -- No default     ! RHFAC = 3.3, 3.0, 2.8, 2.6,
                                      3.0, 3.2, 3.3, 3.5,
                                      3.5, 3.1, 3.1, 3.3 !

Additional inputs used for MVISBK = 7:
--------------------------------------
 The weather data file (DATSAV abbreviated space-delimited) that
 is identified as VSRN.DAT may contain data for more than one
 station.  Identify the stations that are needed in the order in
 which they will be used to obtain valid weather and visual range.
 The first station that contains valid data for an hour will be
 used.  Enter up to MXWSTA (set in PARAMS file) integer station IDs
 of up to 6 digits each as variable IDWSTA, and enter the corresponding
 time zone for each, as variable TZONE (= UTC-LST).

 A prognostic weather data file with Bext for weather events may be used
 in place of the observed weather file.  Identify this as the VSRN.DAT
 file and use a station ID of IDWSTA = 999999, and TZONE = 0.

 NOTE:  TZONE identifies the time zone used in the dataset.  The
        DATSAV abbreviated space-delimited data usually are prepared
        with UTC time rather than local time, so TZONE is typically
        set to zero.

 (IDWSTA)   -- No default
! IDWSTA = 690230 ,80020 ,80140 !
 (TZONE)    -- No default
! TZONE  = 0.0 ,0.0 ,0.0 !

Additional inputs used for MVISBK = 2,3,6,7:
--------------------------------------------
 Background extinction coefficients are computed from monthly
 CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
 coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
 elemental carbon (BKEC).  Month 1 is January.
 (ug/m**3)

 (BKSO4)  -- No default     ! BKSO4 = 0.23, 0.23, 0.23, 0.23,
                                      0.23, 0.23, 0.23, 0.23,
                                      0.23, 0.23, 0.23, 0.23 !
 (BKNO3)  -- No default     ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
                                      0.1, 0.1, 0.1, 0.1,
                                      0.1, 0.1, 0.1, 0.1 !
 (BKPMC)  -- No default     ! BKPMC = 3.0, 3.0, 3.0, 3.0,
                                      3.0, 3.0, 3.0, 3.0,
                                      3.0, 3.0, 3.0, 3.0 !
 (BKOC)   -- No default     ! BKOC  = 1.4, 1.4, 1.4, 1.4,
                                      1.4, 1.4, 1.4, 1.4,
                                      1.4, 1.4, 1.4, 1.4 !
 (BKSOIL) -- No default     ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                                      0.5, 0.5, 0.5, 0.5,
                                      0.5, 0.5, 0.5, 0.5 !
 (BKEC)   -- No default     ! BKEC  = 0.02, 0.02, 0.02, 0.02,
```

```
                                          0.02, 0.02, 0.02, 0.02,
                                          0.02, 0.02, 0.02, 0.02 !

    Additional inputs used for MVISBK = 2,3,5,6,7:
    ----------------------------------------------
     Extinction due to Rayleigh scattering is added (1/Mm)
                            (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

    Documentation records contained in the header of the
    CALPUFF output file may be written to the list file.
    Print documentation image?
                               (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                     for            for
                Concentration    Deposition
       1 =         g/m**3         g/m**2/s
       2 =        mg/m**3        mg/m**2/s
       3 =        ug/m**3        ug/m**2/s
       4 =        ng/m**3        ng/m**2/s
       5 =      Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

    1-hr averages           (L1HR) -- Default: T   !   L1HR = F  !

    3-hr averages           (L3HR) -- Default: T   !   L3HR = F  !

    24-hr averages         (L24HR) -- Default: T   !  L24HR = F  !

    Run-length averages    (LRUNL) -- Default: T   !  LRUNL = F  !

    User-specified averaging time in hours - results for
    an averaging time of NAVG hours are reported for
    NAVG greater than 0:
                            (NAVG) -- Default: 0   !   NAVG =  0  !


Types of tabulations reported
------------------------------

   1) Visibility: daily visibility tabulations are always reported
                  for the selected receptors when ASPEC = VISIB.
                  In addition, any of the other tabulations listed
                  below may be chosen to characterize the light
                  extinction coefficients.
                  [List file or Plot/Analysis File]
```

```
2) Top 50 table for each averaging time selected
   [List file only]
                      (LT50) -- Default: T   !   LT50 = F  !

3) Top 'N' table for each averaging time selected
   [List file or Plot file]
                     (LTOPN) -- Default: F   !  LTOPN = T  !

     -- Number of 'Top-N' values at each receptor
        selected (NTOP must be <= 4)
                      (NTOP) -- Default: 4   ! NTOP =  1   !

     -- Specific ranks of 'Top-N' values reported
        (NTOP values must be entered)
              (ITOP(4) array) -- Default:     ! ITOP =  1   !
                                 1,2,3,4


4) Threshold exceedance counts for each receptor and each averaging
   time selected
   [List file or Plot file]
                     (LEXCD) -- Default: F   !  LEXCD = T  !

     -- Identify the threshold for each averaging time by assigning a
        non-negative value (output units).

                              -- Default: 0.5
        Threshold for  1-hr averages   (THRESH1) !  THRESH1 = 1.000E01 !
        Threshold for  3-hr averages   (THRESH3) !  THRESH3 = -1.0  !
        Threshold for 24-hr averages  (THRESH24) ! THRESH24 = -1.0  !
        Threshold for NAVG-hr averages (THRESHN) !  THRESHN = -1.0  !


     -- Counts for the shortest averaging period selected can be
        tallied daily, and receptors that experience more than NCOUNT
        counts over any NDAY period will be reported.  This type of
        exceedance violation output is triggered only if NDAY > 0.

        Accumulation period(Days)
                      (NDAY) -- Default: 0   !    NDAY =  0  !
        Number of exceedances allowed
                    (NCOUNT) -- Default: 1   !  NCOUNT =  1  !


5) Selected day table(s)

   Echo Option -- Many records are written each averaging period
   selected and output is grouped by day
   [List file or Plot file]
                     (LECHO) -- Default: F   !  LECHO = F  !

   Timeseries Option -- Averages at all selected receptors for
   each selected averaging period are written to timeseries files.
   Each file contains one averaging period, and all receptors are
   written to a single record each averaging time.
   [TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT files]
                     (LTIME) -- Default: F   !  LTIME = F  !

   Peak Value Option -- Averages at all selected receptors for
   each selected averaging period are screened and the peak value
   each period is written to timeseries files.
   Each file contains one averaging period.
```

```
      [PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT files]
                         (LPEAK) -- Default: F   !  LPEAK = F  !

        -- Days selected for output
                    (IECHO(366)) -- Default: 366*0
           ! IECHO  = 366*0  !
           (366 values must be entered)

Plot output options
-------------------

     Plot files can be created for the Top-N, Exceedance, and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...].
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file can also be created for the daily
     peak visibility summary output, in DATA format only.

     Generate Plot file output in addition to writing tables
     to List file?
                               (LPLT) -- Default: F   ! LPLT  = F !

     Use GRID format rather than DATA format,
     when available?
                               (LGRD) -- Default: F   ! LGRD  = F !


Auxiliary Output Files (for subsequent analyses)
------------------------------------------------

      Visibility

      A separate output file may be requested that contains the change
      in visibility at each selected receptor when ASPEC = VISIB.  This
      file can be processed to construct visibility measures that are
      not available in CALPOST.

      Output file with the visibility change at each receptor?
                              (MDVIS) -- Default: 0   ! MDVIS  = 0 !

           0 =  Do Not create file
           1 =  Create file of DAILY (24 hour) Delta-Deciview
           2 =  Create file of DAILY (24 hour) Extinction Change (%)
           3 =  Create file of HOURLY Delta-Deciview
           4 =  Create file of HOURLY Extinction Change (%)



Additional Debug Output
-----------------------

   Output selected information to List file
    for debugging?
                             (LDEBUG) -- Default: F  ! LDEBUG  = F !

   Output hourly extinction information to REPORT.HRV?
    (Visibility Method 7)
```

```
                                    (LVEXTHR) -- Default: F  ! LVEXTHR = F !

 !END!

 -------------------------------------------------
 NOTICE: Starting year in control file sets the
         expected century for the simulation.  All
         YY years are converted to YYYY years in
         the range:          1952         2051
 -------------------------------------------------


*****************************************************************************************
****************************************
                                              CALPOST  Version 5.6392        Level 051130
*****************************************************************************************
****************************************




  CALPOST Control File Input Summary ------------------------

     Replace run data with data in Puff file 1=Y:    1
                       Run starting date -- year: 2002
                                           month:    0
                                             day:    0
                                      Julian day:    0
         Time at beginning of run  -  hour(0-23):    0
                                   -      second:    0
                            Run length (hours):    0


 Every hour of data processed -- NREP = 1


  Species & Concentration/Deposition Information
                                              Species: VISIB
                         Layer of processed data:    1
     (>0=conc, -1=dry flux, -2=wet flux, -3=wet & dry flux)
                   Multiplicative scaling factor: 0.0000E+00
                         Additive scaling factor: 0.0000E+00
                  Hourly background values used?: F


  Source information
                  Source contribution processing: 0
                   0= No source contributions
                   1= Contributions are summed
                   2= TRACEBACK mode for 1 receptor
                   3= Reported TOTAL is processed


  Receptor information
                    Gridded receptors processed?: F
                   Discrete receptors processed?: T
       CTSG Complex terrain receptors processed?: F

  Discrete Receptors Processed

   (All Discrete Receptors are Used)
```

Visibility Processing Selected

Extinction Computation includes:
SULFATES
NITRATES
FINE PARTICLES
BACKGROUND
Particle f(RH) growth curve : FLAG (2000) Tabulation
Max. RH % for particle growth (%): 95.000

Species name for modeled particulates
fine: PM10

Extinction Efficiency (1/Mm per ug/m**3)

ammonium sulfate:	3.00
ammonium nitrate:	3.00
organic carbon:	4.00
soil:	1.00
elemental carbon:	10.00
MODELED coarse PM:	0.60
MODELED fine PM:	1.00
BACKGRND coarse PM:	0.60

Background Extinction Calculation Method 6

Rayleigh scattering extinction (1/Mm): 10.00

Monthly background conc. (ug/m**3):

	(NH4)2SO4	(NH4)NO3	PM-C	OC	SOIL	EC
1	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
2	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
3	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
4	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
5	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
6	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
7	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
8	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
9	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
10	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
11	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
12	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01

Monthly RH factor for hygroscopic species:

1	.3300E+01
2	.3000E+01
3	.2800E+01
4	.2600E+01
5	.3000E+01
6	.3200E+01
7	.3300E+01
8	.3500E+01
9	.3500E+01
10	.3100E+01
11	.3100E+01
12	.3300E+01

Optional output file for visibility 0

Do Not create file

```
 Output options
                    Units requested for output:   (1/Mega-m)

 Averaging time(s) selected
     User-specified averaging time (NAVG hours):     0
                                 1-hr averages:     F
                                 3-hr averages:     F
                                24-hr averages:     F
                              NAVG-hr averages:     F
                        Length of run averages:     F

 Output components selected
                                        Top-50:     F
                 Top-N values at each receptor:     T
            Exceedance counts at each receptor:     T
      Output selected information for debugging:     F
                 Echo tables for selected days:     F
                 Time-series for selected days:     F
       Peak value Time-series for selected days:     F

 Top "n" table control
        Number of "top" values at each receptor:     1
        Specific ranks of "top" values reported:   1


 Plot file option
                            Plot files created:     F


 Threshold Exceedance control
      Exceedances of a specified value will be counted for --



IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF     5.753       051130

HOL BART CLASS I ANALYSIS (MINGO)
JUNE 2008 BASE FOR CONTROL
6KM UMC REFINED CALMET METEOROLOGICAL DATA

Averaging time for values reported from model:
                1    HOUR

Number of averaging periods in file from model:
             8760

Chemical species names for each layer in model:
SO2          1
SO4          1
NOX          1
HNO3         1
NO3          1
PM10         1




**************    NOTICE    ***************
NDRECP array reset to full range: all 1s
```

```
----------------------------------------------------------------------------------------------------------------------------------
          INPUT FILES

 Default Name     Unit No.     File Name and Path
 ------------     --------     ------------------
  CALPOST.INP         5        calpost.inp.mdnr6.mingo
    MODEL.DAT         4        ../../calpuff/outputs/2002/holbase608/holm2002base608.con



----------------------------------------------------------------------------------------------------------------------------------
          OUTPUT FILES

 Default Name     Unit No.     File Name and Path
 ------------     --------     ------------------
  CALPOST.LST         8        holm2002base608m6.lst

**********************************************************************************************************************************
                                              CALPOST  Version 5.6392        Level 051130
**********************************************************************************************************************************


                                                        24HR VISIBILITY


                                                        VISIB   B _SN_F


                                                          (1/Mega-m)



Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE BEXT(Model) BEXT(BKG) BEXT(Total) %CHANGE
F(RH)  bxSO4  bxNO3   bxOC   bxEC  bxPMC  bxPMF
2002   2  0   517        160.051     5.115   D      0.990     21.367     22.357     4.63
3.300  0.324  0.663  0.000  0.000  0.000  0.002
2002   3  0   637        152.992    -4.475   D      5.214     21.367     26.581    24.40
3.300  1.621  3.581  0.000  0.000  0.000  0.011
2002   4  0   557        158.110    -3.116   D      2.346     21.367     23.713    10.98
3.300  0.628  1.711  0.000  0.000  0.000  0.007
2002   5  0   548        160.098    -2.544   D      0.001     21.367     21.368     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002   6  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002   7  0   517        160.051     5.115   D      0.269     21.367     21.636     1.26
3.300  0.108  0.159  0.000  0.000  0.000  0.001
2002   8  0   517        160.051     5.115   D      0.442     21.367     21.809     2.07
3.300  0.086  0.354  0.000  0.000  0.000  0.002
2002   9  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  10  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  11  0   517        160.051     5.115   D      0.992     21.367     22.359     4.64
3.300  0.644  0.344  0.000  0.000  0.000  0.003
2002  12  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  13  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
```

```
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  14  0     1        153.225    -5.521   D       0.000     21.367     21.367      0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  15  0     1        153.225    -5.521   D       0.000     21.367     21.367      0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  16  0     1        153.225    -5.521   D       0.000     21.367     21.367      0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  17  0     1        153.225    -5.521   D       0.000     21.367     21.367      0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  18  0   548        160.098    -2.544   D       1.372     21.367     22.739      6.42
3.300  0.473  0.895  0.000  0.000  0.000  0.004
2002  19  0   548        160.098    -2.544   D       0.687     21.367     22.054      3.21
3.300  0.307  0.378  0.000  0.000  0.000  0.001
2002  20  0   637        152.992    -4.475   D       0.435     21.367     21.802      2.03
3.300  0.284  0.150  0.000  0.000  0.000  0.000
2002  21  0   517        160.051     5.115   D       0.473     21.367     21.840      2.22
3.300  0.315  0.158  0.000  0.000  0.000  0.000
2002  22  0     1        153.225    -5.521   D       0.000     21.367     21.367      0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  23  0     1        153.225    -5.521   D       0.000     21.367     21.367      0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  24  0   517        160.051     5.115   D       0.005     21.367     21.372      0.02
3.300  0.001  0.005  0.000  0.000  0.000  0.000
2002  25  0   517        160.051     5.115   D       2.331     21.367     23.698     10.91
3.300  1.135  1.189  0.000  0.000  0.000  0.006
2002  26  0     1        153.225    -5.521   D       0.000     21.367     21.367      0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  27  0   603        155.328    -5.781   D       0.017     21.367     21.384      0.08
3.300  0.013  0.004  0.000  0.000  0.000  0.000
2002  28  0   548        160.098    -2.544   D       0.002     21.367     21.369      0.01
3.300  0.002  0.001  0.000  0.000  0.000  0.000
2002  29  0     1        153.225    -5.521   D       0.000     21.367     21.367      0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  30  0     1        153.225    -5.521   D       0.000     21.367     21.367      0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  31  0   517        160.051     5.115   D       0.702     21.367     22.069      3.29
3.300  0.139  0.563  0.000  0.000  0.000  0.000
2002  32  0   517        160.051     5.115   D       0.003     21.367     21.370      0.02
3.300  0.001  0.002  0.000  0.000  0.000  0.000
2002  33  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  34  0   517        160.051     5.115   D       0.025     21.070     21.095      0.12
3.000  0.012  0.013  0.000  0.000  0.000  0.000
2002  35  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  36  0   637        152.992    -4.475   D       0.571     21.070     21.641      2.71
3.000  0.179  0.390  0.000  0.000  0.000  0.002
2002  37  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  38  0   517        160.051     5.115   D       0.001     21.070     21.071      0.01
3.000  0.001  0.000  0.000  0.000  0.000  0.000
2002  39  0   517        160.051     5.115   D       0.199     21.070     21.269      0.94
3.000  0.087  0.112  0.000  0.000  0.000  0.001
2002  40  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  41  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  42  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  43  0   517        160.051     5.115   D       0.449     21.070     21.519      2.13
3.000  0.137  0.310  0.000  0.000  0.000  0.002
2002  44  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
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2002  45  0   632        152.976    -4.828   D       0.734     21.070     21.804     3.48
3.000  0.253  0.477  0.000  0.000  0.000  0.004
2002  46  0   548        160.098    -2.544   D       0.300     21.070     21.371     1.43
3.000  0.171  0.129  0.000  0.000  0.000  0.001
2002  47  0   517        160.051     5.115   D       0.047     21.070     21.117     0.23
3.000  0.031  0.017  0.000  0.000  0.000  0.000
2002  48  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  49  0   517        160.051     5.115   D       0.783     21.070     21.853     3.72
3.000  0.391  0.389  0.000  0.000  0.000  0.003
2002  50  0   637        152.992    -4.475   D       0.432     21.070     21.502     2.05
3.000  0.199  0.233  0.000  0.000  0.000  0.001
2002  51  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  52  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  53  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  54  0   637        152.992    -4.475   D       1.347     21.070     22.417     6.39
3.000  0.513  0.829  0.000  0.000  0.000  0.005
2002  55  0   637        152.992    -4.475   D       0.657     21.070     21.727     3.12
3.000  0.357  0.300  0.000  0.000  0.000  0.001
2002  56  0   517        160.051     5.115   D       0.014     21.070     21.084     0.06
3.000  0.009  0.005  0.000  0.000  0.000  0.000
2002  57  0   517        160.051     5.115   D       0.006     21.070     21.076     0.03
3.000  0.004  0.002  0.000  0.000  0.000  0.000
2002  58  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  59  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  60  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  61  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  62  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  63  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  64  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  65  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  66  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  67  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  68  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  69  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  70  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  71  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  72  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  73  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  74  0     1        153.225    -5.521   D       0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  75  0   517        160.051     5.115   D       0.200     20.872     21.072     0.96
2.800  0.129  0.070  0.000  0.000  0.000  0.000
2002  76  0   624        152.982    -5.684   D       0.000     20.872     20.872     0.00
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2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  77  0   637        152.992    -4.475   D      0.015     20.872     20.887     0.07
2.800  0.008  0.007  0.000  0.000  0.000  0.000
2002  78  0   517        160.051     5.115   D      0.028     20.872     20.900     0.13
2.800  0.015  0.012  0.000  0.000  0.000  0.000
2002  79  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  80  0   624        152.982    -5.684   D      1.559     20.872     22.431     7.47
2.800  0.930  0.624  0.000  0.000  0.000  0.004
2002  81  0   522        160.059     3.880   D      0.497     20.872     21.369     2.38
2.800  0.198  0.298  0.000  0.000  0.000  0.001
2002  82  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  83  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  84  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  85  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  86  0   603        155.328    -5.781   D      0.609     20.872     21.481     2.92
2.800  0.356  0.252  0.000  0.000  0.000  0.001
2002  87  0   548        160.098    -2.544   D      0.748     20.872     21.620     3.59
2.800  0.452  0.294  0.000  0.000  0.000  0.002
2002  88  0   517        160.051     5.115   D      0.119     20.872     20.991     0.57
2.800  0.083  0.036  0.000  0.000  0.000  0.000
2002  89  0   517        160.051     5.115   D      1.034     20.872     21.906     4.96
2.800  0.926  0.106  0.000  0.000  0.000  0.002
2002  90  0   517        160.051     5.115   D      0.608     20.872     21.480     2.91
2.800  0.303  0.304  0.000  0.000  0.000  0.001
2002  91  0   517        160.051     5.115   D      0.436     20.872     21.308     2.09
2.800  0.296  0.138  0.000  0.000  0.000  0.001
2002  92  0   526        160.065     2.891   D      1.388     20.674     22.062     6.71
2.600  0.864  0.520  0.000  0.000  0.000  0.003
2002  93  0   548        160.098    -2.544   D      0.119     20.674     20.793     0.58
2.600  0.070  0.049  0.000  0.000  0.000  0.001
2002  94  0   517        160.051     5.115   D      0.796     20.674     21.470     3.85
2.600  0.401  0.393  0.000  0.000  0.000  0.002
2002  95  0   517        160.051     5.115   D      1.140     20.674     21.814     5.51
2.600  0.557  0.581  0.000  0.000  0.000  0.002
2002  96  0   624        152.982    -5.684   D      1.233     20.674     21.907     5.96
2.600  0.575  0.655  0.000  0.000  0.000  0.003
2002  97  0   626        152.979    -5.287   D      0.398     20.674     21.072     1.92
2.600  0.270  0.127  0.000  0.000  0.000  0.001
2002  98  0   637        152.992    -4.475   D      0.008     20.674     20.682     0.04
2.600  0.007  0.001  0.000  0.000  0.000  0.000
2002  99  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 100  0   676        156.899     0.996   D      0.897     20.674     21.571     4.34
2.600  0.803  0.090  0.000  0.000  0.000  0.004
2002 101  0   637        152.992    -4.475   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 102  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 103  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 104  0   517        160.051     5.115   D      0.149     20.674     20.823     0.72
2.600  0.111  0.038  0.000  0.000  0.000  0.000
2002 105  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 106  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 107  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
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2002 108  0     1        153.225    -5.521   D       0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 109  0     1        153.225    -5.521   D       0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 110  0     1        153.225    -5.521   D       0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 111  0   517        160.051     5.115   D       0.132     20.674     20.806     0.64
2.600  0.072  0.059  0.000  0.000  0.000  0.000
2002 112  0   517        160.051     5.115   D       0.057     20.674     20.731     0.27
2.600  0.052  0.005  0.000  0.000  0.000  0.000
2002 113  0   548        160.098    -2.544   D       0.001     20.674     20.675     0.00
2.600  0.001  0.000  0.000  0.000  0.000  0.000
2002 114  0     1        153.225    -5.521   D       0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 115  0     1        153.225    -5.521   D       0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 116  0   637        152.992    -4.475   D       0.422     20.674     21.096     2.04
2.600  0.238  0.181  0.000  0.000  0.000  0.004
2002 117  0   517        160.051     5.115   D       0.001     20.674     20.675     0.01
2.600  0.001  0.000  0.000  0.000  0.000  0.000
2002 118  0     1        153.225    -5.521   D       0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 119  0     1        153.225    -5.521   D       0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 120  0   517        160.051     5.115   D       1.398     20.674     22.072     6.76
2.600  1.125  0.269  0.000  0.000  0.000  0.005
2002 121  0   517        160.051     5.115   D       0.268     20.674     20.942     1.30
2.600  0.196  0.071  0.000  0.000  0.000  0.000
2002 122  0   637        152.992    -4.475   D       0.001     21.070     21.071     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 123  0   637        152.992    -4.475   D       2.407     21.070     23.477    11.42
3.000  1.936  0.467  0.000  0.000  0.000  0.004
2002 124  0   637        152.992    -4.475   D       0.041     21.070     21.111     0.19
3.000  0.020  0.021  0.000  0.000  0.000  0.000
2002 125  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 126  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 127  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 128  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 129  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 130  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 131  0   517        160.051     5.115   D       0.150     21.070     21.220     0.71
3.000  0.086  0.063  0.000  0.000  0.000  0.001
2002 132  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 133  0   517        160.051     5.115   D       0.001     21.070     21.071     0.00
3.000  0.000  0.001  0.000  0.000  0.000  0.000
2002 134  0   632        152.976    -4.828   D       0.450     21.070     21.520     2.14
3.000  0.276  0.173  0.000  0.000  0.000  0.001
2002 135  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 136  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 137  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 138  0     1        153.225    -5.521   D       0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 139  0   637        152.992    -4.475   D       0.186     21.070     21.256     0.89
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3.000  0.108  0.078  0.000  0.000  0.000  0.000
2002 140  0   603        155.328    -5.781   D       0.638     21.070     21.708      3.03
3.000  0.308  0.329  0.000  0.000  0.000  0.001
2002 141  0   517        160.051     5.115   D       0.389     21.070     21.459      1.84
3.000  0.301  0.086  0.000  0.000  0.000  0.001
2002 142  0   637        152.992    -4.475   D       0.052     21.070     21.122      0.25
3.000  0.042  0.010  0.000  0.000  0.000  0.000
2002 143  0   637        152.992    -4.475   D       0.022     21.070     21.092      0.11
3.000  0.021  0.001  0.000  0.000  0.000  0.000
2002 144  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 145  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 146  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 147  0   517        160.051     5.115   D       0.769     21.070     21.839      3.65
3.000  0.690  0.077  0.000  0.000  0.000  0.002
2002 148  0   517        160.051     5.115   D       0.001     21.070     21.071      0.00
3.000  0.001  0.000  0.000  0.000  0.000  0.000
2002 149  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 150  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 151  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 152  0     1        153.225    -5.521   D       0.000     21.070     21.070      0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 153  0     1        153.225    -5.521   D       0.000     21.268     21.268      0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2002 154  0     1        153.225    -5.521   D       0.000     21.268     21.268      0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2002 155  0     1        153.225    -5.521   D       0.000     21.268     21.268      0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2002 156  0     1        153.225    -5.521   D       0.000     21.268     21.268      0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2002 157  0   695        159.463     4.375   D       0.591     21.268     21.859      2.78
3.200  0.478  0.113  0.000  0.000  0.000  0.000
2002 158  0   632        152.976    -4.828   D       2.280     21.268     23.548     10.72
3.200  1.821  0.454  0.000  0.000  0.000  0.004
2002 159  0   632        152.976    -4.828   D       0.105     21.268     21.373      0.49
3.200  0.080  0.025  0.000  0.000  0.000  0.000
2002 160  0   637        152.992    -4.475   D       0.037     21.268     21.305      0.18
3.200  0.036  0.001  0.000  0.000  0.000  0.000
2002 161  0   517        160.051     5.115   D       0.001     21.268     21.269      0.01
3.200  0.001  0.000  0.000  0.000  0.000  0.000
2002 162  0     1        153.225    -5.521   D       0.000     21.268     21.268      0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2002 163  0     1        153.225    -5.521   D       0.000     21.268     21.268      0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2002 164  0     1        153.225    -5.521   D       0.000     21.268     21.268      0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2002 165  0   517        160.051     5.115   D       0.207     21.268     21.475      0.97
3.200  0.199  0.007  0.000  0.000  0.000  0.001
2002 166  0   548        160.098    -2.544   D       0.105     21.268     21.373      0.49
3.200  0.084  0.020  0.000  0.000  0.000  0.001
2002 167  0     1        153.225    -5.521   D       0.000     21.268     21.268      0.00
3.200  0.000  0.000  0.000  0.000  0.000  0.000
2002 168  0   637        152.992    -4.475   D       0.205     21.268     21.473      0.96
3.200  0.160  0.044  0.000  0.000  0.000  0.000
2002 169  0   637        152.992    -4.475   D       1.063     21.268     22.331      5.00
3.200  0.972  0.090  0.000  0.000  0.000  0.001
2002 170  0   517        160.051     5.115   D       0.172     21.268     21.440      0.81
3.200  0.170  0.001  0.000  0.000  0.000  0.000
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2002 171 0 490 159.714 4.549 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 172 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 173 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 174 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 175 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 176 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 177 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 178 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 179 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 180 0 517 160.051 5.115 D 0.127 21.268 21.395 0.60
3.200 0.124 0.002 0.000 0.000 0.000 0.000
2002 181 0 517 160.051 5.115 D 0.007 21.268 21.275 0.03
3.200 0.007 0.000 0.000 0.000 0.000 0.000
2002 182 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 183 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 184 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 185 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 186 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 187 0 517 160.051 5.115 D 0.006 21.367 21.373 0.03
3.300 0.006 0.000 0.000 0.000 0.000 0.000
2002 188 0 517 160.051 5.115 D 0.014 21.367 21.381 0.07
3.300 0.014 0.000 0.000 0.000 0.000 0.000
2002 189 0 517 160.051 5.115 D 0.001 21.367 21.368 0.00
3.300 0.001 0.000 0.000 0.000 0.000 0.000
2002 190 0 517 160.051 5.115 D 0.007 21.367 21.374 0.03
3.300 0.007 0.000 0.000 0.000 0.000 0.000
2002 191 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 192 0 517 160.051 5.115 D 0.033 21.367 21.400 0.16
3.300 0.032 0.001 0.000 0.000 0.000 0.000
2002 193 0 637 152.992 -4.475 D 0.001 21.367 21.368 0.01
3.300 0.001 0.000 0.000 0.000 0.000 0.000
2002 194 0 624 152.982 -5.684 D 0.001 21.367 21.368 0.01
3.300 0.001 0.000 0.000 0.000 0.000 0.000
2002 195 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 196 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 197 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 198 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 199 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 200 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 201 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 202 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00

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3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 203  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 204  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 205  0   624        152.982    -5.684   D      1.249     21.367     22.616     5.84
3.300  1.242  0.005  0.000  0.000  0.000  0.002
2002 206  0   624        152.982    -5.684   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 207  0   624        152.982    -5.684   D      0.026     21.367     21.393     0.12
3.300  0.026  0.000  0.000  0.000  0.000  0.000
2002 208  0   637        152.992    -4.475   D      0.134     21.367     21.501     0.63
3.300  0.133  0.001  0.000  0.000  0.000  0.000
2002 209  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 210  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 211  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 212  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 213  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 214  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 215  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 216  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 217  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 218  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 219  0   637        152.992    -4.475   D      0.001     21.565     21.566     0.00
3.500  0.001  0.000  0.000  0.000  0.000  0.000
2002 220  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 221  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 222  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 223  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 224  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 225  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 226  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 227  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 228  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 229  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 230  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 231  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 232  0     1        153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 233  0   490        159.714     4.549   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
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2002 234  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 235  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 236  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 237  0   517        160.051     5.115   D       2.035     21.565     23.600     9.44
3.500  1.841  0.190  0.000  0.000  0.000  0.004
2002 238  0   624        152.982    -5.684   D       3.465     21.565     25.030    16.07
3.500  2.363  1.094  0.000  0.000  0.000  0.008
2002 239  0   637        152.992    -4.475   D       0.003     21.565     21.568     0.01
3.500  0.003  0.000  0.000  0.000  0.000  0.000
2002 240  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 241  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 242  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 243  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 244  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 245  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 246  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 247  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 248  0   688        158.434     3.081   D       1.408     21.565     22.973     6.53
3.500  1.372  0.033  0.000  0.000  0.000  0.003
2002 249  0   624        152.982    -5.684   D       0.006     21.565     21.571     0.03
3.500  0.006  0.000  0.000  0.000  0.000  0.000
2002 250  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 251  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 252  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 253  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 254  0   517        160.051     5.115   D       0.001     21.565     21.566     0.00
3.500  0.001  0.000  0.000  0.000  0.000  0.000
2002 255  0   624        152.982    -5.684   D       0.066     21.565     21.631     0.31
3.500  0.054  0.012  0.000  0.000  0.000  0.001
2002 256  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 257  0     3        153.214    -5.024   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 258  0   517        160.051     5.115   D       0.008     21.565     21.573     0.04
3.500  0.008  0.000  0.000  0.000  0.000  0.000
2002 259  0   697        159.757     4.745   D       1.119     21.565     22.684     5.19
3.500  1.038  0.079  0.000  0.000  0.000  0.002
2002 260  0   624        152.982    -5.684   D       0.510     21.565     22.075     2.37
3.500  0.422  0.087  0.000  0.000  0.000  0.001
2002 261  0   662        155.306    -1.227   D       0.004     21.565     21.569     0.02
3.500  0.003  0.000  0.000  0.000  0.000  0.000
2002 262  0   517        160.051     5.115   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 263  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 264  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 265  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
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3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 266  0   637       152.992    -4.475   D      0.436     21.565     22.001     2.02
3.500  0.277  0.158  0.000  0.000  0.000  0.001
2002 267  0   637       152.992    -4.475   D      0.797     21.565     22.362     3.70
3.500  0.331  0.465  0.000  0.000  0.000  0.002
2002 268  0   517       160.051     5.115   D      0.260     21.565     21.825     1.21
3.500  0.214  0.045  0.000  0.000  0.000  0.001
2002 269  0     1       153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 270  0     1       153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 271  0   684       157.943     2.298   D      2.126     21.565     23.691     9.86
3.500  1.650  0.472  0.000  0.000  0.000  0.004
2002 272  0   624       152.982    -5.684   D      1.177     21.565     22.742     5.46
3.500  0.727  0.448  0.000  0.000  0.000  0.002
2002 273  0   517       160.051     5.115   D      0.520     21.565     22.085     2.41
3.500  0.500  0.019  0.000  0.000  0.000  0.001
2002 274  0     1       153.225    -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 275  0     1       153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 276  0     1       153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 277  0     1       153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 278  0     1       153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 279  0   681       157.591     1.704   D      0.319     21.169     21.488     1.51
3.100  0.094  0.223  0.000  0.000  0.000  0.002
2002 280  0   603       155.328    -5.781   D      0.175     21.169     21.344     0.83
3.100  0.149  0.026  0.000  0.000  0.000  0.000
2002 281  0   632       152.976    -4.828   D      0.288     21.169     21.457     1.36
3.100  0.092  0.193  0.000  0.000  0.000  0.003
2002 282  0     1       153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 283  0   517       160.051     5.115   D      0.003     21.169     21.172     0.02
3.100  0.003  0.000  0.000  0.000  0.000  0.000
2002 284  0     1       153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 285  0     1       153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 286  0   530       160.071     1.903   D      0.085     21.169     21.254     0.40
3.100  0.027  0.058  0.000  0.000  0.000  0.000
2002 287  0   548       160.098    -2.544   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 288  0     1       153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 289  0   517       160.051     5.115   D      0.447     21.169     21.616     2.11
3.100  0.300  0.145  0.000  0.000  0.000  0.002
2002 290  0   517       160.051     5.115   D      1.145     21.169     22.314     5.41
3.100  0.731  0.412  0.000  0.000  0.000  0.003
2002 291  0   517       160.051     5.115   D      0.526     21.169     21.695     2.49
3.100  0.243  0.282  0.000  0.000  0.000  0.001
2002 292  0     1       153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 293  0   517       160.051     5.115   D      0.282     21.169     21.451     1.33
3.100  0.178  0.103  0.000  0.000  0.000  0.000
2002 294  0     1       153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 295  0     1       153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 296  0   517       160.051     5.115   D      0.288     21.169     21.457     1.36
3.100  0.181  0.106  0.000  0.000  0.000  0.000
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2002 297  0   517        160.051     5.115   D       0.536     21.169     21.705     2.53
3.100  0.313  0.222  0.000  0.000  0.000  0.001
2002 298  0     5        153.204    -4.528   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 299  0   637        152.992    -4.475   D       0.049     21.169     21.218     0.23
3.100  0.039  0.010  0.000  0.000  0.000  0.000
2002 300  0   517        160.051     5.115   D       5.073     21.169     26.242    23.96
3.100  3.375  1.693  0.000  0.000  0.000  0.004
2002 301  0   637        152.992    -4.475   D       0.552     21.169     21.721     2.61
3.100  0.254  0.297  0.000  0.000  0.000  0.001
2002 302  0   624        152.982    -5.684   D       0.002     21.169     21.171     0.01
3.100  0.002  0.000  0.000  0.000  0.000  0.000
2002 303  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 304  0   692        159.022     3.820   D       0.066     21.169     21.235     0.31
3.100  0.041  0.025  0.000  0.000  0.000  0.000
2002 305  0   517        160.051     5.115   D       2.533     21.169     23.702    11.96
3.100  1.539  0.990  0.000  0.000  0.000  0.004
2002 306  0   548        160.098    -2.544   D       0.175     21.169     21.344     0.83
3.100  0.081  0.094  0.000  0.000  0.000  0.001
2002 307  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 308  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 309  0   517        160.051     5.115   D       0.092     21.169     21.261     0.43
3.100  0.053  0.038  0.000  0.000  0.000  0.000
2002 310  0   517        160.051     5.115   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 311  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 312  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 313  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 314  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 315  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 316  0   517        160.051     5.115   D       0.121     21.169     21.290     0.57
3.100  0.053  0.067  0.000  0.000  0.000  0.000
2002 317  0   637        152.992    -4.475   D       1.653     21.169     22.822     7.81
3.100  0.753  0.895  0.000  0.000  0.000  0.005
2002 318  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 319  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 320  0   624        152.982    -5.684   D       0.462     21.169     21.631     2.18
3.100  0.265  0.196  0.000  0.000  0.000  0.001
2002 321  0   517        160.051     5.115   D       1.684     21.169     22.853     7.96
3.100  0.926  0.754  0.000  0.000  0.000  0.004
2002 322  0   517        160.051     5.115   D       1.626     21.169     22.795     7.68
3.100  0.684  0.938  0.000  0.000  0.000  0.004
2002 323  0   517        160.051     5.115   D       0.005     21.169     21.174     0.02
3.100  0.002  0.003  0.000  0.000  0.000  0.000
2002 324  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 325  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 326  0   517        160.051     5.115   D       0.010     21.169     21.179     0.05
3.100  0.002  0.008  0.000  0.000  0.000  0.000
2002 327  0   517        160.051     5.115   D       0.008     21.169     21.177     0.04
3.100  0.002  0.006  0.000  0.000  0.000  0.000
2002 328  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
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3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 329  0   637        152.992    -4.475   D      0.048     21.169     21.217     0.23
3.100  0.023  0.025  0.000  0.000  0.000  0.000
2002 330  0   624        152.982    -5.684   D      0.033     21.169     21.202     0.16
3.100  0.015  0.018  0.000  0.000  0.000  0.000
2002 331  0   637        152.992    -4.475   D      0.039     21.169     21.208     0.18
3.100  0.016  0.023  0.000  0.000  0.000  0.000
2002 332  0   637        152.992    -4.475   D      0.947     21.169     22.116     4.47
3.100  0.375  0.570  0.000  0.000  0.000  0.002
2002 333  0   548        160.098    -2.544   D      0.313     21.169     21.482     1.48
3.100  0.128  0.184  0.000  0.000  0.000  0.000
2002 334  0     1        153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 335  0     1        153.225    -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 336  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 337  0   548        160.098    -2.544   D      0.319     21.367     21.686     1.49
3.300  0.131  0.187  0.000  0.000  0.000  0.001
2002 338  0   603        155.328    -5.781   D      0.003     21.367     21.370     0.01
3.300  0.001  0.002  0.000  0.000  0.000  0.000
2002 339  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 340  0   517        160.051     5.115   D      0.520     21.367     21.887     2.43
3.300  0.212  0.307  0.000  0.000  0.000  0.001
2002 341  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 342  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 343  0   517        160.051     5.115   D      0.456     21.367     21.823     2.13
3.300  0.265  0.190  0.000  0.000  0.000  0.001
2002 344  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 345  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 346  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 347  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 348  0   637        152.992    -4.475   D      0.313     21.367     21.680     1.47
3.300  0.086  0.226  0.000  0.000  0.000  0.001
2002 349  0   517        160.051     5.115   D      0.219     21.367     21.586     1.03
3.300  0.036  0.183  0.000  0.000  0.000  0.001
2002 350  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 351  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 352  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 353  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 354  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 355  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 356  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 357  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 358  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 359  0   624        152.982    -5.684   D      0.366     21.367     21.733     1.71
3.300  0.173  0.191  0.000  0.000  0.000  0.001
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2002 360  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 361  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 362  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 363  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 364  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 365  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000


 --- Ranked Daily Visibility Change ---

Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE BEXT(Model) BEXT(BKG) BEXT(Total) %CHANGE
F(RH)  bxSO4  bxNO3   bxOC   bxEC  bxPMC  bxPMF
2002   3  0   637        152.992    -4.475   D      5.214     21.367     26.581    24.40
3.300  1.621  3.581  0.000  0.000  0.000  0.011    1
2002 300  0   517        160.051     5.115   D      5.073     21.169     26.242    23.96
3.100  3.375  1.693  0.000  0.000  0.000  0.004    2
2002 238  0   624        152.982    -5.684   D      3.465     21.565     25.030    16.07
3.500  2.363  1.094  0.000  0.000  0.000  0.008    3
2002 305  0   517        160.051     5.115   D      2.533     21.169     23.702    11.96
3.100  1.539  0.990  0.000  0.000  0.000  0.004    4
2002 123  0   637        152.992    -4.475   D      2.407     21.070     23.477    11.42
3.000  1.936  0.467  0.000  0.000  0.000  0.004    5
2002   4  0   557        158.110    -3.116   D      2.346     21.367     23.713    10.98
3.300  0.628  1.711  0.000  0.000  0.000  0.007    6
2002  25  0   517        160.051     5.115   D      2.331     21.367     23.698    10.91
3.300  1.135  1.189  0.000  0.000  0.000  0.006    7
2002 158  0   632        152.976    -4.828   D      2.280     21.268     23.548    10.72
3.200  1.821  0.454  0.000  0.000  0.000  0.004    8
2002 271  0   684        157.943     2.298   D      2.126     21.565     23.691     9.86
3.500  1.650  0.472  0.000  0.000  0.000  0.004    9
2002 237  0   517        160.051     5.115   D      2.035     21.565     23.600     9.44
3.500  1.841  0.190  0.000  0.000  0.000  0.004   10
2002 321  0   517        160.051     5.115   D      1.684     21.169     22.853     7.96
3.100  0.926  0.754  0.000  0.000  0.000  0.004   11
2002 317  0   637        152.992    -4.475   D      1.653     21.169     22.822     7.81
3.100  0.753  0.895  0.000  0.000  0.000  0.005   12
2002 322  0   517        160.051     5.115   D      1.626     21.169     22.795     7.68
3.100  0.684  0.938  0.000  0.000  0.000  0.004   13
2002  80  0   624        152.982    -5.684   D      1.559     20.872     22.431     7.47
2.800  0.930  0.624  0.000  0.000  0.000  0.004   14
2002 120  0   517        160.051     5.115   D      1.398     20.674     22.072     6.76
2.600  1.125  0.269  0.000  0.000  0.000  0.005   15
2002  92  0   526        160.065     2.891   D      1.388     20.674     22.062     6.71
2.600  0.864  0.520  0.000  0.000  0.000  0.003   16
2002 248  0   688        158.434     3.081   D      1.408     21.565     22.973     6.53
3.500  1.372  0.033  0.000  0.000  0.000  0.003   17
2002  18  0   548        160.098    -2.544   D      1.372     21.367     22.739     6.42
3.300  0.473  0.895  0.000  0.000  0.000  0.004   18
2002  54  0   637        152.992    -4.475   D      1.347     21.070     22.417     6.39
3.000  0.513  0.829  0.000  0.000  0.000  0.005   19
2002  96  0   624        152.982    -5.684   D      1.233     20.674     21.907     5.96
2.600  0.575  0.655  0.000  0.000  0.000  0.003   20
2002 205  0   624        152.982    -5.684   D      1.249     21.367     22.616     5.84
3.300  1.242  0.005  0.000  0.000  0.000  0.002   21
2002  95  0   517        160.051     5.115   D      1.140     20.674     21.814     5.51
2.600  0.557  0.581  0.000  0.000  0.000  0.002   22
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 --- Number of days with Extinction Change  =>   5.0 % :        26
 --- Number of days with Extinction Change  =>  10.0 % :         8
 ---             Largest Extinction Change  =                24.40 %

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                                              CALPOST  Version 5.6392        Level 051130
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                                                     Run-Length VISIBILITY


                                                        VISIB   B _SN_F


                                                          (1/Mega-m)



             RECEPTOR    COORDINATES (km)  TYPE BEXT(Model) BEXT(BKG) BEXT(Total) %CHANGE
F(RH)

              281        157.781     2.025   D      0.213     21.211     21.424     1.01
3.143

 --- Number of recs with Extinction Change  >    1.0 % :       281
 ---             Largest Extinction Change  =                 1.01 %

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                                              CALPOST  Version 5.6392        Level 051130
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                                                        24HR VISIBILITY


                                                        VISIB   B _SN_F


                                                           (deciview)



                                                                                          %
of Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE  DV(Total)    DV(BKG)  DELTA DV  F(RH)  %
_SO4  %_NO3   %_OC   %_EC  %_PMC  %_PMF
2002   2  0   517        160.051     5.115   D      8.045      7.593      0.453  3.300
32.77  67.01   0.00   0.00   0.00   0.22
2002   3  0   637        152.992    -4.475   D      9.776      7.593      2.183  3.300
31.09  68.69   0.00   0.00   0.00   0.22
2002   4  0   557        158.110    -3.116   D      8.634      7.593      1.042  3.300
26.76  72.96   0.00   0.00   0.00   0.29
2002   5  0   548        160.098    -2.544   D      7.593      7.593      0.000  3.300
35.57  64.24   0.00   0.00   0.00   0.11
2002   6  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002   7  0   517        160.051     5.115   D      7.718      7.593      0.125  3.300
40.33  59.27   0.00   0.00   0.00   0.40
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2002	8	0	517	160.051	5.115	D	7.798	7.593	0.205	3.300
19.44	80.04	0.00	0.00	0.00	0.51					
2002	9	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	10	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	11	0	517	160.051	5.115	D	8.046	7.593	0.454	3.300
64.95	34.71	0.00	0.00	0.00	0.34					
2002	12	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	13	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	14	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	15	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	16	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	17	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	18	0	548	160.098	-2.544	D	8.215	7.593	0.622	3.300
34.46	65.26	0.00	0.00	0.00	0.28					
2002	19	0	548	160.098	-2.544	D	7.909	7.593	0.316	3.300
44.74	55.08	0.00	0.00	0.00	0.18					
2002	20	0	637	152.992	-4.475	D	7.794	7.593	0.201	3.300
65.32	34.59	0.00	0.00	0.00	0.09					
2002	21	0	517	160.051	5.115	D	7.812	7.593	0.219	3.300
66.46	33.47	0.00	0.00	0.00	0.08					
2002	22	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	23	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	24	0	517	160.051	5.115	D	7.595	7.593	0.002	3.300
11.98	87.95	0.00	0.00	0.00	0.09					
2002	25	0	517	160.051	5.115	D	8.628	7.593	1.035	3.300
48.72	51.01	0.00	0.00	0.00	0.27					
2002	26	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	27	0	603	155.328	-5.781	D	7.600	7.593	0.008	3.300
76.86	23.01	0.00	0.00	0.00	0.14					
2002	28	0	548	160.098	-2.544	D	7.594	7.593	0.001	3.300
69.81	30.06	0.00	0.00	0.00	0.11					
2002	29	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	30	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	31	0	517	160.051	5.115	D	7.916	7.593	0.323	3.300
19.77	80.20	0.00	0.00	0.00	0.03					
2002	32	0	517	160.051	5.115	D	7.594	7.593	0.002	3.300
27.09	73.00	0.00	0.00	0.00	0.00					
2002	33	0	1	153.225	-5.521	D	7.453	7.453	0.000	3.000
0.00	0.00	0.00	0.00	0.00	0.00					
2002	34	0	517	160.051	5.115	D	7.465	7.453	0.012	3.000
47.00	52.80	0.00	0.00	0.00	0.22					
2002	35	0	1	153.225	-5.521	D	7.453	7.453	0.000	3.000
0.00	0.00	0.00	0.00	0.00	0.00					
2002	36	0	637	152.992	-4.475	D	7.720	7.453	0.267	3.000
31.28	68.39	0.00	0.00	0.00	0.33					
2002	37	0	1	153.225	-5.521	D	7.453	7.453	0.000	3.000
0.00	0.00	0.00	0.00	0.00	0.00					
2002	38	0	517	160.051	5.115	D	7.453	7.453	0.001	3.000
66.48	33.66	0.00	0.00	0.00	0.09					
2002	39	0	517	160.051	5.115	D	7.547	7.453	0.094	3.000

43.50 56.19 0.00 0.00 0.00 0.31
2002 40 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 41 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 42 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 43 0 517 160.051 5.115 D 7.663 7.453 0.211 3.000
30.47 69.10 0.00 0.00 0.00 0.42
2002 44 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 45 0 632 152.976 -4.828 D 7.795 7.453 0.342 3.000
34.42 65.01 0.00 0.00 0.00 0.57
2002 46 0 548 160.098 -2.544 D 7.594 7.453 0.142 3.000
56.96 42.84 0.00 0.00 0.00 0.20
2002 47 0 517 160.051 5.115 D 7.475 7.453 0.023 3.000
64.42 35.42 0.00 0.00 0.00 0.16
2002 48 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 49 0 517 160.051 5.115 D 7.818 7.453 0.365 3.000
49.95 49.64 0.00 0.00 0.00 0.41
2002 50 0 637 152.992 -4.475 D 7.656 7.453 0.203 3.000
45.97 53.81 0.00 0.00 0.00 0.22
2002 51 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 52 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 53 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 54 0 637 152.992 -4.475 D 8.072 7.453 0.620 3.000
38.09 61.57 0.00 0.00 0.00 0.34
2002 55 0 637 152.992 -4.475 D 7.760 7.453 0.307 3.000
54.23 45.60 0.00 0.00 0.00 0.17
2002 56 0 517 160.051 5.115 D 7.459 7.453 0.006 3.000
65.96 33.94 0.00 0.00 0.00 0.11
2002 57 0 517 160.051 5.115 D 7.455 7.453 0.003 3.000
68.85 31.11 0.00 0.00 0.00 0.08
2002 58 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 59 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 60 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 61 0 1 153.225 -5.521 D 7.358 7.358 0.000 2.800
0.00 0.00 0.00 0.00 0.00 0.00
2002 62 0 1 153.225 -5.521 D 7.358 7.358 0.000 2.800
0.00 0.00 0.00 0.00 0.00 0.00
2002 63 0 1 153.225 -5.521 D 7.358 7.358 0.000 2.800
0.00 0.00 0.00 0.00 0.00 0.00
2002 64 0 1 153.225 -5.521 D 7.358 7.358 0.000 2.800
0.00 0.00 0.00 0.00 0.00 0.00
2002 65 0 1 153.225 -5.521 D 7.358 7.358 0.000 2.800
0.00 0.00 0.00 0.00 0.00 0.00
2002 66 0 1 153.225 -5.521 D 7.358 7.358 0.000 2.800
0.00 0.00 0.00 0.00 0.00 0.00
2002 67 0 1 153.225 -5.521 D 7.358 7.358 0.000 2.800
0.00 0.00 0.00 0.00 0.00 0.00
2002 68 0 1 153.225 -5.521 D 7.358 7.358 0.000 2.800
0.00 0.00 0.00 0.00 0.00 0.00
2002 69 0 1 153.225 -5.521 D 7.358 7.358 0.000 2.800
0.00 0.00 0.00 0.00 0.00 0.00
2002 70 0 1 153.225 -5.521 D 7.358 7.358 0.000 2.800
0.00 0.00 0.00 0.00 0.00 0.00

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2002  71  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  72  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  73  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  74  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  75  0   517        160.051     5.115   D      7.453      7.358      0.095  2.800
64.87  35.04   0.00   0.00   0.00   0.09
2002  76  0   624        152.982    -5.684   D      7.358      7.358      0.000  2.800
18.67  84.11   0.00   0.00   0.00   0.00
2002  77  0   637        152.992    -4.475   D      7.365      7.358      0.007  2.800
51.55  48.48   0.00   0.00   0.00   0.01
2002  78  0   517        160.051     5.115   D      7.371      7.358      0.013  2.800
55.39  44.61   0.00   0.00   0.00   0.01
2002  79  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  80  0   624        152.982    -5.684   D      8.079      7.358      0.720  2.800
59.68  40.03   0.00   0.00   0.00   0.29
2002  81  0   522        160.059     3.880   D      7.594      7.358      0.235  2.800
39.80  59.90   0.00   0.00   0.00   0.30
2002  82  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  83  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
91.66  13.58   0.00   0.00   0.00   0.26
2002  84  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  85  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  86  0   603        155.328    -5.781   D      7.646      7.358      0.287  2.800
58.44  41.32   0.00   0.00   0.00   0.24
2002  87  0   548        160.098    -2.544   D      7.711      7.358      0.352  2.800
60.46  39.32   0.00   0.00   0.00   0.22
2002  88  0   517        160.051     5.115   D      7.415      7.358      0.057  2.800
69.84  30.03   0.00   0.00   0.00   0.12
2002  89  0   517        160.051     5.115   D      7.842      7.358      0.484  2.800
89.54  10.22   0.00   0.00   0.00   0.24
2002  90  0   517        160.051     5.115   D      7.645      7.358      0.287  2.800
49.81  49.95   0.00   0.00   0.00   0.24
2002  91  0   517        160.051     5.115   D      7.565      7.358      0.207  2.800
67.99  31.73   0.00   0.00   0.00   0.28
2002  92  0   526        160.065     2.891   D      7.913      7.263      0.650  2.600
62.26  37.49   0.00   0.00   0.00   0.25
2002  93  0   548        160.098    -2.544   D      7.320      7.263      0.057  2.600
58.75  40.79   0.00   0.00   0.00   0.46
2002  94  0   517        160.051     5.115   D      7.641      7.263      0.378  2.600
50.34  49.35   0.00   0.00   0.00   0.31
2002  95  0   517        160.051     5.115   D      7.799      7.263      0.537  2.600
48.84  50.95   0.00   0.00   0.00   0.21
2002  96  0   624        152.982    -5.684   D      7.842      7.263      0.579  2.600
46.65  53.14   0.00   0.00   0.00   0.22
2002  97  0   626        152.979    -5.287   D      7.454      7.263      0.191  2.600
67.90  31.86   0.00   0.00   0.00   0.24
2002  98  0   637        152.992    -4.475   D      7.267      7.263      0.004  2.600
87.07  12.80   0.00   0.00   0.00   0.11
2002  99  0     1        153.225    -5.521   D      7.263      7.263      0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 100  0   676        156.899     0.996   D      7.688      7.263      0.425  2.600
89.50  10.01   0.00   0.00   0.00   0.48
2002 101  0   637        152.992    -4.475   D      7.263      7.263      0.000  2.600
69.70  29.93   0.00   0.00   0.00   0.18
2002 102  0     1        153.225    -5.521   D      7.263      7.263      0.000  2.600
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0.00   0.00   0.00   0.00   0.00   0.00
2002 103  0     1       153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 104  0   517       160.051     5.115   D       7.335       7.263       0.072  2.600
74.08  25.76   0.00   0.00   0.00   0.16
2002 105  0     1       153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 106  0     1       153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 107  0     1       153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 108  0     1       153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 109  0     1       153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 110  0     1       153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 111  0   517       160.051     5.115   D       7.326       7.263       0.063  2.600
54.98  45.01   0.00   0.00   0.00   0.02
2002 112  0   517       160.051     5.115   D       7.290       7.263       0.027  2.600
91.75   8.25   0.00   0.00   0.00   0.01
2002 113  0   548       160.098    -2.544   D       7.263       7.263       0.000  2.600
82.86  17.00   0.00   0.00   0.00   0.00
2002 114  0     1       153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 115  0     1       153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 116  0   637       152.992    -4.475   D       7.465       7.263       0.202  2.600
56.24  42.90   0.00   0.00   0.00   0.86
2002 117  0   517       160.051     5.115   D       7.264       7.263       0.001  2.600
86.73  12.95   0.00   0.00   0.00   0.32
2002 118  0     1       153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 119  0     1       153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 120  0   517       160.051     5.115   D       7.917       7.263       0.655  2.600
80.46  19.21   0.00   0.00   0.00   0.33
2002 121  0   517       160.051     5.115   D       7.392       7.263       0.129  2.600
73.33  26.50   0.00   0.00   0.00   0.16
2002 122  0   637       152.992    -4.475   D       7.453       7.453       0.000  3.000
87.52  12.56   0.00   0.00   0.00   0.07
2002 123  0   637       152.992    -4.475   D       8.534       7.453       1.082  3.000
80.46  19.39   0.00   0.00   0.00   0.16
2002 124  0   637       152.992    -4.475   D       7.472       7.453       0.019  3.000
49.13  50.62   0.00   0.00   0.00   0.25
2002 125  0     1       153.225    -5.521   D       7.453       7.453       0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 126  0     1       153.225    -5.521   D       7.453       7.453       0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 127  0     1       153.225    -5.521   D       7.453       7.453       0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 128  0     1       153.225    -5.521   D       7.453       7.453       0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 129  0     1       153.225    -5.521   D       7.453       7.453       0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 130  0     1       153.225    -5.521   D       7.453       7.453       0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 131  0   517       160.051     5.115   D       7.524       7.453       0.071  3.000
57.45  41.79   0.00   0.00   0.00   0.76
2002 132  0     1       153.225    -5.521   D       7.453       7.453       0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 133  0   517       160.051     5.115   D       7.453       7.453       0.000  3.000
27.15  73.08   0.00   0.00   0.00   0.01
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2002 134  0   632        152.976    -4.828   D       7.664      7.453      0.211  3.000
61.38  38.38   0.00   0.00   0.00   0.24
2002 135  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 136  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 137  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 138  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 139  0   637        152.992    -4.475   D       7.541      7.453      0.088  3.000
57.78  42.06   0.00   0.00   0.00   0.16
2002 140  0   603        155.328    -5.781   D       7.751      7.453      0.298  3.000
48.25  51.59   0.00   0.00   0.00   0.16
2002 141  0   517        160.051     5.115   D       7.635      7.453      0.183  3.000
77.52  22.13   0.00   0.00   0.00   0.35
2002 142  0   637        152.992    -4.475   D       7.477      7.453      0.025  3.000
80.18  19.66   0.00   0.00   0.00   0.17
2002 143  0   637        152.992    -4.475   D       7.463      7.453      0.011  3.000
93.61   6.30   0.00   0.00   0.00   0.10
2002 144  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 145  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 146  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 147  0   517        160.051     5.115   D       7.811      7.453      0.359  3.000
89.74   9.95   0.00   0.00   0.00   0.32
2002 148  0   517        160.051     5.115   D       7.453      7.453      0.000  3.000
97.02   3.02   0.00   0.00   0.00   0.15
2002 149  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 150  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 151  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 152  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 153  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 154  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 155  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 156  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 157  0   695        159.463     4.375   D       7.820      7.546      0.274  3.200
80.87  19.09   0.00   0.00   0.00   0.05
2002 158  0   632        152.976    -4.828   D       8.564      7.546      1.018  3.200
79.87  19.94   0.00   0.00   0.00   0.19
2002 159  0   632        152.976    -4.828   D       7.595      7.546      0.049  3.200
76.34  23.50   0.00   0.00   0.00   0.16
2002 160  0   637        152.992    -4.475   D       7.564      7.546      0.018  3.200
97.40   2.49   0.00   0.00   0.00   0.12
2002 161  0   517        160.051     5.115   D       7.547      7.546      0.001  3.200
91.86   8.11   0.00   0.00   0.00   0.09
2002 162  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 163  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 164  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 165  0   517        160.051     5.115   D       7.643      7.546      0.097  3.200
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96.27	3.25	0.00	0.00	0.00	0.48					
2002	166	0	548	160.098	-2.544	D	7.595	7.546	0.049	3.200
80.17	19.34	0.00	0.00	0.00	0.49					
2002	167	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200
0.00	0.00	0.00	0.00	0.00	0.00					
2002	168	0	637	152.992	-4.475	D	7.642	7.546	0.096	3.200
78.40	21.48	0.00	0.00	0.00	0.12					
2002	169	0	637	152.992	-4.475	D	8.034	7.546	0.488	3.200
91.41	8.45	0.00	0.00	0.00	0.14					
2002	170	0	517	160.051	5.115	D	7.627	7.546	0.081	3.200
99.08	0.83	0.00	0.00	0.00	0.09					
2002	171	0	490	159.714	4.549	D	7.546	7.546	0.000	3.200
99.16	0.06	0.00	0.00	0.00	0.00					
2002	172	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200
0.00	0.00	0.00	0.00	0.00	0.00					
2002	173	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200
0.00	0.00	0.00	0.00	0.00	0.00					
2002	174	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200
0.00	0.00	0.00	0.00	0.00	0.00					
2002	175	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200
0.00	0.00	0.00	0.00	0.00	0.00					
2002	176	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200
0.00	0.00	0.00	0.00	0.00	0.00					
2002	177	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200
0.00	0.00	0.00	0.00	0.00	0.00					
2002	178	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200
0.00	0.00	0.00	0.00	0.00	0.00					
2002	179	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200
0.00	0.00	0.00	0.00	0.00	0.00					
2002	180	0	517	160.051	5.115	D	7.606	7.546	0.059	3.200
98.28	1.50	0.00	0.00	0.00	0.22					
2002	181	0	517	160.051	5.115	D	7.550	7.546	0.003	3.200
95.22	4.66	0.00	0.00	0.00	0.12					
2002	182	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200
0.00	0.00	0.00	0.00	0.00	0.00					
2002	183	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	184	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	185	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	186	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	187	0	517	160.051	5.115	D	7.596	7.593	0.003	3.300
99.92	0.07	0.00	0.00	0.00	0.01					
2002	188	0	517	160.051	5.115	D	7.599	7.593	0.007	3.300
99.88	0.13	0.00	0.00	0.00	0.01					
2002	189	0	517	160.051	5.115	D	7.593	7.593	0.000	3.300
99.64	0.48	0.00	0.00	0.00	0.00					
2002	190	0	517	160.051	5.115	D	7.596	7.593	0.003	3.300
99.82	0.07	0.00	0.00	0.00	0.12					
2002	191	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	192	0	517	160.051	5.115	D	7.608	7.593	0.016	3.300
96.02	3.77	0.00	0.00	0.00	0.22					
2002	193	0	637	152.992	-4.475	D	7.593	7.593	0.001	3.300
84.30	15.68	0.00	0.00	0.00	0.10					
2002	194	0	624	152.982	-5.684	D	7.593	7.593	0.001	3.300
97.69	2.30	0.00	0.00	0.00	0.05					
2002	195	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
97.84	1.43	0.00	0.00	0.00	0.03					
2002	196	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					

2002 197 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 198 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 199 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 200 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 201 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
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2002 202 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
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2002 203 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 204 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 205 0 624 152.982 -5.684 D 8.161 7.593 0.568 3.300
99.48 0.37 0.00 0.00 0.00 0.15
2002 206 0 624 152.982 -5.684 D 7.593 7.593 0.000 3.300
73.35 26.45 0.00 0.00 0.00 0.08
2002 207 0 624 152.982 -5.684 D 7.605 7.593 0.012 3.300
99.68 0.23 0.00 0.00 0.00 0.09
2002 208 0 637 152.992 -4.475 D 7.655 7.593 0.062 3.300
99.17 0.75 0.00 0.00 0.00 0.08
2002 209 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 210 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
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2002 211 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
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2002 212 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
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2002 213 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 214 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
0.00 0.00 0.00 0.00 0.00 0.00
2002 215 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
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2002 216 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
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2002 217 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
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2002 218 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
0.00 0.00 0.00 0.00 0.00 0.00
2002 219 0 637 152.992 -4.475 D 7.685 7.685 0.000 3.500
95.68 4.45 0.00 0.00 0.00 0.04
2002 220 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
0.00 0.00 0.00 0.00 0.00 0.00
2002 221 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
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2002 222 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
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2002 223 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
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2002 224 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
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2002 225 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
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2002 226 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
0.00 0.00 0.00 0.00 0.00 0.00
2002 227 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
0.00 0.00 0.00 0.00 0.00 0.00
2002 228 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500

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0.00   0.00   0.00   0.00   0.00   0.00
2002 229  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 230  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 231  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 232  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 233  0   490        159.714     4.549   D       7.685       7.685       0.000  3.500
91.74   0.12   0.00   0.00   0.00   0.11
2002 234  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 235  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 236  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 237  0   517        160.051     5.115   D       8.587       7.685       0.902  3.500
90.46   9.36   0.00   0.00   0.00   0.19
2002 238  0   624        152.982    -5.684   D       9.175       7.685       1.490  3.500
68.19  31.57   0.00   0.00   0.00   0.24
2002 239  0   637        152.992    -4.475   D       7.686       7.685       0.001  3.500
95.46   4.37   0.00   0.00   0.00   0.17
2002 240  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 241  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 242  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 243  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 244  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 245  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 246  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 247  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 248  0   688        158.434     3.081   D       8.317       7.685       0.632  3.500
97.46   2.32   0.00   0.00   0.00   0.22
2002 249  0   624        152.982    -5.684   D       7.688       7.685       0.003  3.500
93.65   6.16   0.00   0.00   0.00   0.18
2002 250  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 251  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 252  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 253  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 254  0   517        160.051     5.115   D       7.685       7.685       0.000  3.500
86.18  13.54   0.00   0.00   0.00   0.20
2002 255  0   624        152.982    -5.684   D       7.716       7.685       0.031  3.500
81.34  17.52   0.00   0.00   0.00   1.14
2002 256  0     1        153.225    -5.521   D       7.685       7.685       0.000  3.500
0.00   0.00   0.00   0.00   0.00   0.00
2002 257  0     3        153.214    -5.024   D       7.685       7.685       0.000  3.500
99.36   0.27   0.00   0.00   0.00   0.12
2002 258  0   517        160.051     5.115   D       7.688       7.685       0.004  3.500
98.39   1.52   0.00   0.00   0.00   0.12
2002 259  0   697        159.757     4.745   D       8.191       7.685       0.506  3.500
92.78   7.06   0.00   0.00   0.00   0.16
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2002	260	0	624	152.982	-5.684	D	7.919	7.685	0.234	3.500
82.77	17.10	0.00	0.00	0.00	0.13					
2002	261	0	662	155.306	-1.227	D	7.687	7.685	0.002	3.500
95.16	4.77	0.00	0.00	0.00	0.02					
2002	262	0	517	160.051	5.115	D	7.685	7.685	0.000	3.500
93.92	5.19	0.00	0.00	0.00	0.00					
2002	263	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	264	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	265	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	266	0	637	152.992	-4.475	D	7.885	7.685	0.200	3.500
63.46	36.31	0.00	0.00	0.00	0.24					
2002	267	0	637	152.992	-4.475	D	8.048	7.685	0.363	3.500
41.48	58.31	0.00	0.00	0.00	0.20					
2002	268	0	517	160.051	5.115	D	7.805	7.685	0.120	3.500
82.33	17.48	0.00	0.00	0.00	0.19					
2002	269	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	270	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	271	0	684	157.943	2.298	D	8.625	7.685	0.940	3.500
77.62	22.21	0.00	0.00	0.00	0.17					
2002	272	0	624	152.982	-5.684	D	8.216	7.685	0.532	3.500
61.77	38.08	0.00	0.00	0.00	0.14					
2002	273	0	517	160.051	5.115	D	7.923	7.685	0.238	3.500
96.17	3.72	0.00	0.00	0.00	0.11					
2002	274	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	275	0	1	153.225	-5.521	D	7.500	7.500	0.000	3.100
0.00	0.00	0.00	0.00	0.00	0.00					
2002	276	0	1	153.225	-5.521	D	7.500	7.500	0.000	3.100
0.00	0.00	0.00	0.00	0.00	0.00					
2002	277	0	1	153.225	-5.521	D	7.500	7.500	0.000	3.100
0.00	0.00	0.00	0.00	0.00	0.00					
2002	278	0	1	153.225	-5.521	D	7.500	7.500	0.000	3.100
0.00	0.00	0.00	0.00	0.00	0.00					
2002	279	0	681	157.591	1.704	D	7.649	7.500	0.150	3.100
29.54	69.94	0.00	0.00	0.00	0.52					
2002	280	0	603	155.328	-5.781	D	7.582	7.500	0.082	3.100
84.99	14.82	0.00	0.00	0.00	0.19					
2002	281	0	632	152.976	-4.828	D	7.635	7.500	0.135	3.100
31.99	67.00	0.00	0.00	0.00	1.00					
2002	282	0	1	153.225	-5.521	D	7.500	7.500	0.000	3.100
0.00	0.00	0.00	0.00	0.00	0.00					
2002	283	0	517	160.051	5.115	D	7.501	7.500	0.002	3.100
88.22	11.78	0.00	0.00	0.00	0.15					
2002	284	0	1	153.225	-5.521	D	7.500	7.500	0.000	3.100
0.00	0.00	0.00	0.00	0.00	0.00					
2002	285	0	1	153.225	-5.521	D	7.500	7.500	0.000	3.100
0.00	0.00	0.00	0.00	0.00	0.00					
2002	286	0	530	160.071	1.903	D	7.540	7.500	0.040	3.100
31.79	67.96	0.00	0.00	0.00	0.24					
2002	287	0	548	160.098	-2.544	D	7.500	7.500	0.000	3.100
39.69	59.78	0.00	0.00	0.00	0.18					
2002	288	0	1	153.225	-5.521	D	7.500	7.500	0.000	3.100
0.00	0.00	0.00	0.00	0.00	0.00					
2002	289	0	517	160.051	5.115	D	7.709	7.500	0.209	3.100
67.13	32.37	0.00	0.00	0.00	0.49					
2002	290	0	517	160.051	5.115	D	8.026	7.500	0.527	3.100
63.82	35.94	0.00	0.00	0.00	0.24					
2002	291	0	517	160.051	5.115	D	7.745	7.500	0.246	3.100

46.18 53.55   0.00   0.00   0.00   0.26
2002 292 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 293 0   517   160.051   5.115   D   7.632   7.500   0.132 3.100
63.26 36.63   0.00   0.00   0.00   0.11
2002 294 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 295 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
92.80   7.88   0.00   0.00   0.00   0.14
2002 296 0   517   160.051   5.115   D   7.634   7.500   0.135 3.100
62.91 36.96   0.00   0.00   0.00   0.14
2002 297 0   517   160.051   5.115   D   7.749   7.500   0.250 3.100
58.38 41.51   0.00   0.00   0.00   0.11
2002 298 0   5   153.204   -4.528   D   7.500   7.500   0.000 3.100
79.66 20.03   0.00   0.00   0.00   0.09
2002 299 0   637   152.992   -4.475   D   7.523   7.500   0.023 3.100
80.00 19.94   0.00   0.00   0.00   0.06
2002 300 0   517   160.051   5.115   D   9.648   7.500   2.148 3.100
66.53 33.38   0.00   0.00   0.00   0.09
2002 301 0   637   152.992   -4.475   D   7.757   7.500   0.257 3.100
45.94 53.87   0.00   0.00   0.00   0.20
2002 302 0   624   152.982   -5.684   D   7.501   7.500   0.001 3.100
84.08 16.01   0.00   0.00   0.00   0.07
2002 303 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 304 0   692   159.022   3.820   D   7.531   7.500   0.031 3.100
61.67 38.20   0.00   0.00   0.00   0.13
2002 305 0   517   160.051   5.115   D   8.630   7.500   1.130 3.100
60.75 39.08   0.00   0.00   0.00   0.17
2002 306 0   548   160.098   -2.544   D   7.582   7.500   0.083 3.100
46.16 53.38   0.00   0.00   0.00   0.46
2002 307 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 308 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 309 0   517   160.051   5.115   D   7.543   7.500   0.043 3.100
57.78 42.02   0.00   0.00   0.00   0.20
2002 310 0   517   160.051   5.115   D   7.500   7.500   0.000 3.100
77.78 22.92   0.00   0.00   0.00   0.04
2002 311 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 312 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 313 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 314 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 315 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 316 0   517   160.051   5.115   D   7.556   7.500   0.057 3.100
43.92 55.82   0.00   0.00   0.00   0.26
2002 317 0   637   152.992   -4.475   D   8.251   7.500   0.752 3.100
45.55 54.16   0.00   0.00   0.00   0.29
2002 318 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 319 0   1   153.225   -5.521   D   7.500   7.500   0.000 3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 320 0   624   152.982   -5.684   D   7.715   7.500   0.216 3.100
57.31 42.51   0.00   0.00   0.00   0.18
2002 321 0   517   160.051   5.115   D   8.265   7.500   0.766 3.100
54.99 44.76   0.00   0.00   0.00   0.25
2002 322 0   517   160.051   5.115   D   8.239   7.500   0.740 3.100
42.05 57.70   0.00   0.00   0.00   0.25

2002 323 0 517 160.051 5.115 D 7.502 7.500 0.002 3.100
44.10 55.76 0.00 0.00 0.00 0.15
2002 324 0 1 153.225 -5.521 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2002 325 0 1 153.225 -5.521 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2002 326 0 517 160.051 5.115 D 7.504 7.500 0.005 3.100
24.33 74.68 0.00 0.00 0.00 1.00
2002 327 0 517 160.051 5.115 D 7.503 7.500 0.004 3.100
23.82 75.20 0.00 0.00 0.00 0.97
2002 328 0 1 153.225 -5.521 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2002 329 0 637 152.992 -4.475 D 7.522 7.500 0.023 3.100
47.76 52.17 0.00 0.00 0.00 0.08
2002 330 0 624 152.982 -5.684 D 7.515 7.500 0.016 3.100
44.78 55.12 0.00 0.00 0.00 0.11
2002 331 0 637 152.992 -4.475 D 7.518 7.500 0.018 3.100
40.72 59.05 0.00 0.00 0.00 0.24
2002 332 0 637 152.992 -4.475 D 7.937 7.500 0.437 3.100
39.59 60.21 0.00 0.00 0.00 0.20
2002 333 0 548 160.098 -2.544 D 7.646 7.500 0.147 3.100
41.06 58.81 0.00 0.00 0.00 0.13
2002 334 0 1 153.225 -5.521 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2002 335 0 1 153.225 -5.521 D 7.500 7.500 0.000 3.100
0.00 0.00 0.00 0.00 0.00 0.00
2002 336 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 337 0 548 160.098 -2.544 D 7.741 7.593 0.148 3.300
41.11 58.57 0.00 0.00 0.00 0.32
2002 338 0 603 155.328 -5.781 D 7.594 7.593 0.001 3.300
37.83 61.94 0.00 0.00 0.00 0.18
2002 339 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 340 0 517 160.051 5.115 D 7.833 7.593 0.240 3.300
40.68 59.10 0.00 0.00 0.00 0.22
2002 341 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 342 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 343 0 517 160.051 5.115 D 7.804 7.593 0.211 3.300
58.18 41.65 0.00 0.00 0.00 0.17
2002 344 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 345 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 346 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 347 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 348 0 637 152.992 -4.475 D 7.738 7.593 0.146 3.300
27.56 72.03 0.00 0.00 0.00 0.41
2002 349 0 517 160.051 5.115 D 7.695 7.593 0.102 3.300
16.35 83.22 0.00 0.00 0.00 0.43
2002 350 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 351 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 352 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 353 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300
0.00 0.00 0.00 0.00 0.00 0.00
2002 354 0 1 153.225 -5.521 D 7.593 7.593 0.000 3.300

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0.00   0.00   0.00   0.00   0.00   0.00
2002 355  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 356  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 357  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 358  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 359  0   624        152.982    -5.684   D      7.762      7.593      0.170  3.300
47.32  52.34   0.00   0.00   0.00   0.33
2002 360  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 361  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 362  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 363  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 364  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 365  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00


 --- Ranked Daily Visibility Change ---
                                                                                      %
of Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE  DV(Total)    DV(BKG)  DELTA DV  F(RH)  %
_SO4  %_NO3   %_OC   %_EC  %_PMC  %_PMF
2002   3  0   637        152.992    -4.475   D      9.776      7.593      2.183  3.300
31.09  68.69   0.00   0.00   0.00   0.22    1
2002 300  0   517        160.051     5.115   D      9.648      7.500      2.148  3.100
66.53  33.38   0.00   0.00   0.00   0.09    2
2002 238  0   624        152.982    -5.684   D      9.175      7.685      1.490  3.500
68.19  31.57   0.00   0.00   0.00   0.24    3
2002 305  0   517        160.051     5.115   D      8.630      7.500      1.130  3.100
60.75  39.08   0.00   0.00   0.00   0.17    4
2002 123  0   637        152.992    -4.475   D      8.534      7.453      1.082  3.000
80.46  19.39   0.00   0.00   0.00   0.16    5
2002   4  0   557        158.110    -3.116   D      8.634      7.593      1.042  3.300
26.76  72.96   0.00   0.00   0.00   0.29    6
2002  25  0   517        160.051     5.115   D      8.628      7.593      1.035  3.300
48.72  51.01   0.00   0.00   0.00   0.27    7
2002 158  0   632        152.976    -4.828   D      8.564      7.546      1.018  3.200
79.87  19.94   0.00   0.00   0.00   0.19    8
2002 271  0   684        157.943     2.298   D      8.625      7.685      0.940  3.500
77.62  22.21   0.00   0.00   0.00   0.17    9
2002 237  0   517        160.051     5.115   D      8.587      7.685      0.902  3.500
90.46   9.36   0.00   0.00   0.00   0.19   10
2002 321  0   517        160.051     5.115   D      8.265      7.500      0.766  3.100
54.99  44.76   0.00   0.00   0.00   0.25   11
2002 317  0   637        152.992    -4.475   D      8.251      7.500      0.752  3.100
45.55  54.16   0.00   0.00   0.00   0.29   12
2002 322  0   517        160.051     5.115   D      8.239      7.500      0.740  3.100
42.05  57.70   0.00   0.00   0.00   0.25   13
2002  80  0   624        152.982    -5.684   D      8.079      7.358      0.720  2.800
59.68  40.03   0.00   0.00   0.00   0.29   14
2002 120  0   517        160.051     5.115   D      7.917      7.263      0.655  2.600
80.46  19.21   0.00   0.00   0.00   0.33   15
2002  92  0   526        160.065     2.891   D      7.913      7.263      0.650  2.600
62.26  37.49   0.00   0.00   0.00   0.25   16
2002 248  0   688        158.434     3.081   D      8.317      7.685      0.632  3.500
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97.46   2.32   0.00   0.00   0.00   0.22   17
2002  18  0   548        160.098    -2.544   D      8.215      7.593      0.622  3.300
34.46  65.26   0.00   0.00   0.00   0.28   18
2002  54  0   637        152.992    -4.475   D      8.072      7.453      0.620  3.000
38.09  61.57   0.00   0.00   0.00   0.34   19
2002  96  0   624        152.982    -5.684   D      7.842      7.263      0.579  2.600
46.65  53.14   0.00   0.00   0.00   0.22   20
2002 205  0   624        152.982    -5.684   D      8.161      7.593      0.568  3.300
99.48   0.37   0.00   0.00   0.00   0.15   21
2002  95  0   517        160.051     5.115   D      7.799      7.263      0.537  2.600
48.84  50.95   0.00   0.00   0.00   0.21   22

 --- Number of days with Delta-Deciview  =>   0.50:        25
 --- Number of days with Delta-Deciview  =>   1.00:         8
 ---             Largest Delta-Deciview  =             2.183

*****************************************************************************************
****************************************
                                              CALPOST  Version 5.6392        Level 051130
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                                                     Run-Length VISIBILITY

                                                        VISIB   B _SN_F

                                                           (deciview)


             RECEPTOR    COORDINATES (km)  TYPE  DV(Total)    DV(BKG)  DELTA DV  F(RH)

              432        159.228     4.041   D      7.620      7.519      0.101  3.143

 --- Number of recs with Delta-Deciview  >    0.10:       161
 ---             Largest Delta-Deciview  =             0.101

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                                              CALPOST  Version 5.6392        Level 051130
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                                                        SUMMARY SECTION

                                                        VISIB   B _SN_F

                                                          (1/Mega-m)


 RECEPTOR     COORDINATES (km)    TYPE      PEAK (YEAR,DAY,ENDING TIME)     FOR RANK
FOR AVERAGE PERIOD
```

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	2	0	517	160.051	5.115	D	7.605	7.593	0.013	3.3	36.86	62.74	0	0	0	0.4	0	0
2001	3	0	517	160.051	5.115	D	8.555	7.593	**0.963**	3.3	31.85	67.8	0	0	0	0.36	1	0
2001	4	0	548	160.098	-2.544	D	7.643	7.593	0.051	3.3	39.71	60.11	0	0	0	0.18	0	0
2001	5	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	6	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	7	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	8	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	9	0	517	160.051	5.115	D	7.614	7.593	0.021	3.3	28.64	70.59	0	0	0	0.77	0	0
2001	10	0	656	154.842	-1.81	D	8.354	7.593	**0.762**	3.3	27.44	72.07	0	0	0	0.49	1	0
2001	11	0	517	160.051	5.115	D	7.742	7.593	0.15	3.3	37.09	62.65	0	0	0	0.25	0	0
2001	12	0	517	160.051	5.115	D	7.599	7.593	0.007	3.3	49.29	50.52	0	0	0	0.19	0	0
2001	13	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	14	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	15	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	16	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	17	0	517	160.051	5.115	D	8.005	7.593	0.412	3.3	43.25	56.36	0	0	0	0.39	0	0
2001	18	0	637	152.992	-4.475	D	7.825	7.593	0.232	3.3	37.55	62.03	0	0	0	0.42	0	0
2001	19	0	517	160.051	5.115	D	8.008	7.593	0.416	3.3	50.75	48.93	0	0	0	0.32	0	0
2001	20	0	656	154.842	-1.81	D	8.152	7.593	**0.56**	3.3	38.75	60.63	0	0	0	0.62	1	0
2001	21	0	549	159.887	-2.621	D	7.864	7.593	0.271	3.3	16.9	82.3	0	0	0	0.8	0	0
2001	22	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	23	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	24	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	25	0	517	160.051	5.115	D	7.642	7.593	0.049	3.3	17.09	81.89	0	0	0	1.02	0	0
2001	26	0	624	152.982	-5.684	D	7.612	7.593	0.02	3.3	15.91	83.16	0	0	0	0.93	0	0
2001	27	0	516	159.957	4.802	D	7.593	7.593	0	3.3	31.41	67.66	0	0	0	0.09	0	0
2001	28	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	29	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	30	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	31	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	32	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	33	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	34	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	35	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	36	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	37	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	38	0	517	160.051	5.115	D	7.514	7.453	0.062	3	50.85	48.58	0	0	0	0.57	0	0
2001	39	0	624	152.982	-5.684	D	7.454	7.453	0.002	3	51.5	48.08	0	0	0	0.43	0	0
2001	40	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	41	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	42	0	637	152.992	-4.475	D	7.57	7.453	0.117	3	35.41	64.09	0	0	0	0.5	0	0
2001	43	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	44	0	517	160.051	5.115	D	7.454	7.453	0.001	3	59.87	40.32	0	0	0	0.19	0	0
2001	45	0	490	159.714	4.549	D	7.453	7.453	0	3	63.43	36.01	0	0	0	0.11	0	0
2001	46	0	676	156.899	0.996	D	7.549	7.453	0.096	3	55.4	44.49	0	0	0	0.11	0	0
2001	47	0	637	152.992	-4.475	D	8.123	7.453	**0.67**	3	51.11	48.61	0	0	0	0.28	1	0
2001	48	0	517	160.051	5.115	D	8.184	7.453	**0.731**	3	52.21	47.4	0	0	0	0.39	1	0
2001	49	0	517	160.051	5.115	D	7.805	7.453	0.352	3	30.9	68.54	0	0	0	0.56	0	0
2001	50	0	656	154.842	-1.81	D	7.957	7.453	**0.504**	3	33.96	65.64	0	0	0	0.4	1	0
2001	51	0	656	154.842	-1.81	D	7.462	7.453	0.009	3	52.32	47.5	0	0	0	0.19	0	0
2001	52	0	517	160.051	5.115	D	7.481	7.453	0.028	3	61.87	37.68	0	0	0	0.46	0	0
2001	53	0	624	152.982	-5.684	D	7.455	7.453	0.002	3	49.22	50.6	0	0	0	0.22	0	0
2001	54	0	517	160.051	5.115	D	7.456	7.453	0.003	3	58.06	41.86	0	0	0	0.16	0	0
2001	55	0	517	160.051	5.115	D	7.473	7.453	0.02	3	60.32	39.55	0	0	0	0.14	0	0
2001	56	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	57	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	58	0	517	160.051	5.115	D	7.574	7.453	0.121	3	38.08	61.15	0	0	0	0.78	0	0
2001	59	0	676	156.899	0.996	D	7.454	7.453	0.001	3	45.6	54.15	0	0	0	0.29	0	0
2001	60	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	61	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	62	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	63	0	517	160.051	5.115	D	7.51	7.358	0.152	2.8	58.23	41.47	0	0	0	0.3	0	0
2001	64	0	517	160.051	5.115	D	7.456	7.358	0.098	2.8	43.61	55.66	0	0	0	0.73	0	0
2001	65	0	548	160.098	-2.544	D	7.415	7.358	0.057	2.8	17.57	81.38	0	0	0	1.06	0	0
2001	66	0	517	160.051	5.115	D	7.434	7.358	0.075	2.8	39.64	59.61	0	0	0	0.75	0	0
2001	67	0	517	160.051	5.115	D	7.911	7.358	**0.552**	2.8	22.9	76.09	0	0	0	1.01	1	0
2001	68	0	517	160.051	5.115	D	7.372	7.358	0.014	2.8	21.74	77.42	0	0	0	0.84	0	0
2001	69	0	637	152.992	-4.475	D	7.564	7.358	0.206	2.8	30.87	68.39	0	0	0	0.75	0	0
2001	70	0	637	152.992	-4.475	D	7.49	7.358	0.132	2.8	50.46	49.17	0	0	0	0.37	0	0
2001	71	0	517	160.051	5.115	D	7.369	7.358	0.011	2.8	70.7	29.04	0	0	0	0.28	0	0
2001	72	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	73	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	74	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	75	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	76	0	548	160.098	-2.544	D	7.401	7.358	0.043	2.8	39.61	60	0	0	0	0.39	0	0
2001	77	0	517	160.051	5.115	D	7.514	7.358	0.156	2.8	45.64	53.78	0	0	0	0.58	0	0
2001	78	0	624	152.982	-5.684	D	7.362	7.358	0.003	2.8	33.02	66.32	0	0	0	0.65	0	0
2001	79	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	80	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	81	0	637	152.992	-4.475	D	7.373	7.358	0.015	2.8	58.71	40.78	0	0	0	0.52	0	0
2001	82	0	637	152.992	-4.475	D	7.544	7.358	0.186	2.8	65.09	34.52	0	0	0	0.39	0	0
2001	83	0	624	152.982	-5.684	D	7.61	7.358	0.252	2.8	77.53	22.18	0	0	0	0.28	0	0
2001	84	0	517	160.051	5.115	D	7.681	7.358	0.323	2.8	51.68	47.79	0	0	0	0.52	0	0
2001	85	0	517	160.051	5.115	D	7.594	7.358	0.236	2.8	24.43	74.75	0	0	0	0.82	0	0
2001	86	0	517	160.051	5.115	D	7.364	7.358	0.006	2.8	16.22	82.79	0	0	0	0.98	0	0
2001	87	0	517	160.051	5.115	D	7.359	7.358	0.001	2.8	44.29	55.43	0	0	0	0.34	0	0
2001	88	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	89	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	90	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	91	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	92	0	517	160.051	5.115	D	7.263	7.263	0	2.6	24.89	72.88	0	0	0	1.2	0	0
2001	93	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	94	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	95	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	96	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	97	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	98	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	99	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	100	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	101	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	102	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	103	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	104	0	517	160.051	5.115	D	7.291	7.263	0.028	2.6	81.26	17.31	0	0	0	1.43	0	0
2001	105	0	517	160.051	5.115	D	7.263	7.263	0	2.6	85.14	8.66	0	0	0	0.49	0	0
2001	106	0	517	160.051	5.115	D	7.271	7.263	0.008	2.6	93.01	6.96	0	0	0	0.04	0	0
2001	107	0	548	160.098	-2.544	D	7.354	7.263	0.092	2.6	29.38	68.35	0	0	0	2.27	0	0
2001	108	0	517	160.051	5.115	D	7.368	7.263	0.105	2.6	31.73	67.52	0	0	0	0.75	0	0
2001	109	0	676	156.899	0.996	D	7.671	7.263	0.409	2.6	31.47	67.68	0	0	0	0.86	0	0
2001	110	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	111	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	112	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	113	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	114	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	115	0	517	160.051	5.115	D	7.429	7.263	0.166	2.6	72.3	27.18	0	0	0	0.51	0	0
2001	116	0	517	160.051	5.115	D	7.385	7.263	0.122	2.6	50.21	49.47	0	0	0	0.31	0	0
2001	117	0	78	155.215	-5.727	D	7.263	7.263	0	2.6	94.18	5.35	0	0	0	0.35	0	0
2001	118	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	119	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	120	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	121	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2001	122	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	123	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	124	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	125	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	126	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	127	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	128	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	129	0	547	160.097	-2.297	D	7.661	7.453	0.208	3	81.28	18.15	0	0	0	0.57	0	0
2001	130	0	603	155.328	-5.781	D	7.538	7.453	0.085	3	84.29	15.44	0	0	0	0.27	0	0
2001	131	0	603	155.328	-5.781	D	7.477	7.453	0.024	3	94.47	5.31	0	0	0	0.23	0	0
2001	132	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	133	0	517	160.051	5.115	D	7.5	7.453	0.047	3	46.41	51.81	0	0	0	1.79	0	0
2001	134	0	631	152.975	-4.958	D	7.581	7.453	0.129	3	86.69	12.85	0	0	0	0.46	0	0
2001	135	0	548	160.098	-2.544	D	7.465	7.453	0.013	3	93.44	6.27	0	0	0	0.31	0	0
2001	136	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	137	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	138	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	139	0	517	160.051	5.115	D	7.46	7.453	0.007	3	75.26	24.66	0	0	0	0.12	0	0
2001	140	0	548	160.098	-2.544	D	7.467	7.453	0.014	3	48.08	51.85	0	0	0	0.08	0	0
2001	141	0	637	152.992	-4.475	D	7.467	7.453	0.014	3	97.97	1.76	0	0	0	0.29	0	0
2001	142	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	143	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	144	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	145	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	146	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	147	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	148	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	149	0	517	160.051	5.115	D	7.478	7.453	0.025	3	94.98	4.59	0	0	0	0.44	0	0
2001	150	0	517	160.051	5.115	D	7.497	7.453	0.044	3	94.59	5.05	0	0	0	0.37	0	0
2001	151	0	517	160.051	5.115	D	7.455	7.453	0.003	3	94.45	5.33	0	0	0	0.26	0	0
2001	152	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	153	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	154	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	155	0	517	160.051	5.115	D	7.583	7.546	0.037	3.2	76.97	22.48	0	0	0	0.55	0	0
2001	156	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	157	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	158	0	516	159.957	4.802	D	7.546	7.546	0	3.2	96.07	4.07	0	0	0	0.02	0	0
2001	159	0	517	160.051	5.115	D	7.75	7.546	0.203	3.2	98.14	1.54	0	0	0	0.32	0	0
2001	160	0	624	152.982	-5.684	D	7.57	7.546	0.024	3.2	83.12	16.66	0	0	0	0.23	0	0
2001	161	0	624	152.982	-5.684	D	7.55	7.546	0.004	3.2	98.68	1.08	0	0	0	0.28	0	0
2001	162	0	517	160.051	5.115	D	7.635	7.546	0.089	3.2	98.56	1.25	0	0	0	0.19	0	0
2001	163	0	517	160.051	5.115	D	7.548	7.546	0.002	3.2	98.68	1.19	0	0	0	0.14	0	0
2001	164	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	165	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	166	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	167	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	168	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	169	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	170	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	171	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	172	0	517	160.051	5.115	D	7.546	7.546	0	3.2	98.94	1.1	0	0	0	0.19	0	0
2001	173	0	637	152.992	-4.475	D	7.752	7.546	0.206	3.2	81.32	18.42	0	0	0	0.26	0	0
2001	174	0	676	156.899	0.996	D	8.144	7.546	**0.598**	3.2	71.85	27.65	0	0	0	0.51	1	0
2001	175	0	676	156.899	0.996	D	8.24	7.546	**0.694**	3.2	71.48	28.19	0	0	0	0.34	1	0
2001	176	0	637	152.992	-4.475	D	7.835	7.546	0.289	3.2	89.71	9.99	0	0	0	0.3	0	0
2001	177	0	637	152.992	-4.475	D	7.612	7.546	0.066	3.2	92.86	6.92	0	0	0	0.22	0	0
2001	178	0	637	152.992	-4.475	D	7.557	7.546	0.01	3.2	98.6	1.2	0	0	0	0.21	0	0
2001	179	0	632	152.976	-4.828	D	7.547	7.546	0	3.2	95.66	4.54	0	0	0	0.13	0	0
2001	180	0	432	159.228	4.041	D	7.546	7.546	0	3.2	94.7	5.6	0	0	0	0.06	0	0
2001	181	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	182	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	183	0	517	160.051	5.115	D	7.741	7.593	0.149	3.3	94.95	4.75	0	0	0	0.31	0	0
2001	184	0	631	152.975	-4.958	D	7.941	7.593	0.348	3.3	95.55	4.21	0	0	0	0.24	0	0
2001	185	0	517	160.051	5.115	D	7.698	7.593	0.106	3.3	86.4	13.42	0	0	0	0.17	0	0
2001	186	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	187	0	637	152.992	-4.475	D	7.61	7.593	0.017	3.3	98.37	1.62	0	0	0	0.02	0	0
2001	188	0	637	152.992	-4.475	D	7.603	7.593	0.01	3.3	98.23	1.67	0	0	0	0.11	0	0
2001	189	0	517	160.051	5.115	D	7.595	7.593	0.002	3.3	94.14	5.89	0	0	0	0	0	0
2001	190	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	191	0	517	160.051	5.115	D	7.596	7.593	0.004	3.3	51.34	48.4	0	0	0	0.26	0	0
2001	192	0	637	152.992	-4.475	D	8.172	7.593	**0.579**	3.3	78.97	20.67	0	0	0	0.36	1	0
2001	193	0	624	152.982	-5.684	D	7.919	7.593	0.326	3.3	98.35	1.12	0	0	0	0.53	0	0
2001	194	0	624	152.982	-5.684	D	7.605	7.593	0.012	3.3	94.43	5.26	0	0	0	0.31	0	0
2001	195	0	78	155.215	-5.727	D	7.593	7.593	0	3.3	99.73	0.34	0	0	0	0.1	0	0
2001	196	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	197	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	198	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	199	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	200	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	201	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	202	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	203	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	204	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	205	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	206	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	207	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	208	0	517	160.051	5.115	D	7.611	7.593	0.018	3.3	97.04	2.73	0	0	0	0.23	0	0
2001	209	0	624	152.982	-5.684	D	7.593	7.593	0.001	3.3	93.83	6.01	0	0	0	0.05	0	0
2001	210	0	515	159.962	4.554	D	7.593	7.593	0.001	3.3	98.39	1.71	0	0	0	0.03	0	0
2001	211	0	517	160.051	5.115	D	7.62	7.593	0.027	3.3	94.77	4.96	0	0	0	0.27	0	0
2001	212	0	517	160.051	5.115	D	7.685	7.593	0.093	3.3	92.77	6.99	0	0	0	0.24	0	0
2001	213	0	517	160.051	5.115	D	7.593	7.593	0.001	3.3	99.45	0.37	0	0	0	0.19	0	0
2001	214	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	215	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	216	0	637	152.992	-4.475	D	7.729	7.685	0.044	3.5	89.42	10.12	0	0	0	0.46	0	0
2001	217	0	624	152.982	-5.684	D	7.685	7.685	0	3.5	89.29	9.97	0	0	0	0.48	0	0
2001	218	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	219	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	220	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	221	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	222	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	223	0	676	156.899	0.996	D	7.745	7.685	0.06	3.5	94.85	4.94	0	0	0	0.21	0	0
2001	224	0	624	152.982	-5.684	D	7.713	7.685	0.028	3.5	95.32	4.5	0	0	0	0.18	0	0
2001	225	0	624	152.982	-5.684	D	7.696	7.685	0.011	3.5	98.58	1.26	0	0	0	0.17	0	0
2001	226	0	517	160.051	5.115	D	8.205	7.685	**0.52**	3.5	98.28	1.35	0	0	0	0.37	1	0
2001	227	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	228	0	637	152.992	-4.475	D	7.693	7.685	0.008	3.5	98.15	1.64	0	0	0	0.21	0	0
2001	229	0	516	159.957	4.802	D	7.685	7.685	0	3.5	97.76	0.99	0	0	0	0.15	0	0
2001	230	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	231	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	232	0	548	160.098	-2.544	D	7.729	7.685	0.044	3.5	19.14	80.13	0	0	0	0.72	0	0
2001	233	0	517	160.051	5.115	D	8.014	7.685	0.329	3.5	70.13	29.52	0	0	0	0.35	0	0
2001	234	0	517	160.051	5.115	D	7.717	7.685	0.032	3.5	94.75	5.01	0	0	0	0.25	0	0
2001	235	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	236	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	237	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	238	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	239	0	517	160.051	5.115	D	7.943	7.685	0.259	3.5	89.7	9.98	0	0	0	0.32	0	0
2001	240	0	624	152.982	-5.684	D	8.347	7.685	**0.662**	3.5	81.65	18.11	0	0	0	0.24	1	0
2001	241	0	604	155.247	-5.778	D	8.343	7.685	**0.658**	3.5	89.83	9.96	0	0	0	0.21	1	0
2001	242	0	517	160.051	5.115	D	8.06	7.685	0.375	3.5	92.49	7.15	0	0	0	0.37	0	0
2001	243	0	517	160.051	5.115	D	7.689	7.685	0.004	3.5	98.84	0.9	0	0	0	0.24	0	0
2001	244	0	517	160.051	5.115	D	7.702	7.685	0.017	3.5	69.73	29.97	0	0	0	0.3	0	0
2001	245	0	656	154.842	-1.81	D	7.85	7.685	0.165	3.5	78.24	21.46	0	0	0	0.3	0	0
2001	246	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	247	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	248	0	517	160.051	5.115	D	7.726	7.685	0.041	3.5	92.58	7.1	0	0	0	0.32	0	0
2001	249	0	517	160.051	5.115	D	7.702	7.685	0.017	3.5	83.54	16.21	0	0	0	0.26	0	0
2001	250	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	251	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	252	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	253	0	491	160.089	-1.402	D	7.685	7.685	0	3.5	30.2	63.09	0	0	0	0.31	0	0
2001	254	0	548	160.098	-2.544	D	7.793	7.685	0.108	3.5	67.29	32.42	0	0	0	0.29	0	0
2001	255	0	624	152.982	-5.684	D	7.722	7.685	0.037	3.5	56.92	42.86	0	0	0	0.22	0	0
2001	256	0	517	160.051	5.115	D	7.687	7.685	0.002	3.5	98.18	1.62	0	0	0	0.19	0	0
2001	257	0	517	160.051	5.115	D	7.763	7.685	0.078	3.5	94.4	5.34	0	0	0	0.26	0	0
2001	258	0	631	152.975	-4.958	D	7.693	7.685	0.008	3.5	93.86	5.95	0	0	0	0.19	0	0
2001	259	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	260	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	261	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	262	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	263	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	264	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	265	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	266	0	548	160.098	-2.544	D	7.841	7.685	0.157	3.5	41.75	57.74	0	0	0	0.51	0	0
2001	267	0	548	160.098	-2.544	D	7.861	7.685	0.176	3.5	76.96	22.46	0	0	0	0.58	0	0
2001	268	0	624	152.982	-5.684	D	7.686	7.685	0.001	3.5	68.99	29.91	0	0	0	1.04	0	0
2001	269	0	548	160.098	-2.544	D	7.922	7.685	0.237	3.5	65.63	33.99	0	0	0	0.39	0	0
2001	270	0	517	160.051	5.115	D	7.771	7.685	0.087	3.5	20.25	79.3	0	0	0	0.45	0	0
2001	271	0	517	160.051	5.115	D	7.775	7.685	0.09	3.5	49.88	49.81	0	0	0	0.31	0	0
2001	272	0	624	152.982	-5.684	D	7.757	7.685	0.072	3.5	45.55	54.18	0	0	0	0.27	0	0
2001	273	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2001	274	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	275	0	517	160.051	5.115	D	7.561	7.5	0.061	3.1	97.21	2.39	0	0	0	0.4	0	0
2001	276	0	517	160.051	5.115	D	7.503	7.5	0.003	3.1	80.26	19.55	0	0	0	0.2	0	0
2001	277	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	278	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	279	0	637	152.992	-4.475	D	7.504	7.5	0.004	3.1	30.12	69.38	0	0	0	0.53	0	0
2001	280	0	548	160.098	-2.544	D	7.686	7.5	0.187	3.1	25.37	74.04	0	0	0	0.59	0	0
2001	281	0	548	160.098	-2.544	D	7.657	7.5	0.157	3.1	67.33	32.21	0	0	0	0.47	0	0
2001	282	0	637	152.992	-4.475	D	7.501	7.5	0.001	3.1	73.47	26.32	0	0	0	0.25	0	0
2001	283	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	284	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	285	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	286	0	281	157.781	2.025	D	7.5	7.5	0	3.1	111.44	2.65	0	0	0	0	0	0
2001	287	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	288	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	289	0	517	160.051	5.115	D	7.505	7.5	0.005	3.1	34.04	65.85	0	0	0	0.12	0	0
2001	290	0	517	160.051	5.115	D	7.5	7.5	0.001	3.1	16.59	83.36	0	0	0	0.07	0	0
2001	291	0	517	160.051	5.115	D	7.653	7.5	0.153	3.1	38.68	60.73	0	0	0	0.59	0	0
2001	292	0	517	160.051	5.115	D	7.561	7.5	0.061	3.1	61.16	38.53	0	0	0	0.31	0	0
2001	293	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	294	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	295	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	296	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	297	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	298	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	299	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	300	0	517	160.051	5.115	D	7.507	7.5	0.008	3.1	16.61	82.44	0	0	0	0.96	0	0
2001	301	0	517	160.051	5.115	D	7.986	7.5	0.486	3.1	30.67	68.66	0	0	0	0.67	0	0
2001	302	0	637	152.992	-4.475	D	7.596	7.5	0.096	3.1	51.62	48.07	0	0	0	0.31	0	0
2001	303	0	517	160.051	5.115	D	7.501	7.5	0.001	3.1	74.98	24.93	0	0	0	0.19	0	0
2001	304	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	305	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	306	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	307	0	517	160.051	5.115	D	7.63	7.5	0.131	3.1	50.26	49.49	0	0	0	0.25	0	0
2001	308	0	624	152.982	-5.684	D	7.523	7.5	0.023	3.1	49.68	50.15	0	0	0	0.17	0	0
2001	309	0	517	160.051	5.115	D	7.619	7.5	0.12	3.1	56.11	43.34	0	0	0	0.56	0	0
2001	310	0	624	152.982	-5.684	D	7.546	7.5	0.046	3.1	47.93	51.52	0	0	0	0.55	0	0
2001	311	0	637	152.992	-4.475	D	7.505	7.5	0.005	3.1	88.04	11.61	0	0	0	0.4	0	0
2001	312	0	637	152.992	-4.475	D	7.511	7.5	0.011	3.1	82.2	17.51	0	0	0	0.31	0	0
2001	313	0	637	152.992	-4.475	D	7.601	7.5	0.101	3.1	48.51	50.62	0	0	0	0.87	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001											% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	314	0	637	152.992	-4.475	D	7.561	7.5	0.062	3.1	49.63	50	0	0	0	0.38	0	0
2001	315	0	548	160.098	-2.544	D	7.541	7.5	0.042	3.1	46.36	53.31	0	0	0	0.32	0	0
2001	316	0	548	160.098	-2.544	D	7.618	7.5	0.119	3.1	17.51	81.73	0	0	0	0.76	0	0
2001	317	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	318	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	319	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	320	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	321	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	322	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	323	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	324	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	325	0	548	160.098	-2.544	D	7.767	7.5	0.267	3.1	36.96	62.33	0	0	0	0.71	0	0
2001	326	0	548	160.098	-2.544	D	7.516	7.5	0.017	3.1	44.84	54.78	0	0	0	0.38	0	0
2001	327	0	548	160.098	-2.544	D	7.502	7.5	0.002	3.1	59	40.7	0	0	0	0.32	0	0
2001	328	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	329	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	330	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	331	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	332	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	333	0	517	160.051	5.115	D	7.505	7.5	0.005	3.1	10.58	89.16	0	0	0	0.26	0	0
2001	334	0	622	153.356	-5.671	D	7.5	7.5	0	3.1	37.44	62.65	0	0	0	0.02	0	0
2001	335	0	522	160.059	3.88	D	7.631	7.5	0.131	3.1	38.66	61.22	0	0	0	0.12	0	0
2001	336	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	337	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	338	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	339	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	340	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	341	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	342	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	343	0	517	160.051	5.115	D	7.79	7.593	0.197	3.3	54.09	45.16	0	0	0	0.76	0	0
2001	344	0	632	152.976	-4.828	D	8.044	7.593	0.452	3.3	22.39	76.7	0	0	0	0.91	0	0
2001	345	0	637	152.992	-4.475	D	7.663	7.593	0.07	3.3	52.75	46.97	0	0	0	0.28	0	0
2001	346	0	637	152.992	-4.475	D	7.627	7.593	0.034	3.3	55.38	44.38	0	0	0	0.24	0	0
2001	347	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	348	0	517	160.051	5.115	D	7.674	7.593	0.081	3.3	55.02	44.7	0	0	0	0.28	0	0
2001	349	0	637	152.992	-4.475	D	7.652	7.593	0.06	3.3	38.37	61.56	0	0	0	0.08	0	0
2001	350	0	517	160.051	5.115	D	7.594	7.593	0.001	3.3	31.07	68.91	0	0	0	0.01	0	0
2001	351	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	352	0	517	160.051	5.115	D	7.671	7.593	0.078	3.3	60.65	39.08	0	0	0	0.27	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	353	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	354	0	517	160.051	5.115	D	7.596	7.593	0.004	3.3	41.35	57.75	0	0	0	0.9	0	0
2001	355	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	356	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	357	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	358	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	359	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	360	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	361	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	362	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	363	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	364	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	365	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									0.963								**13**	**0**

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	2	0	517	160.051	5.115	D	7.844	7.593	0.252	3.3	29.75	69.85	0	0	0	0.39	0	0
2002	3	0	637	152.992	-4.475	D	8.846	7.593	**1.254**	3.3	28.39	71.21	0	0	0	0.4	1	1
2002	4	0	557	158.11	-3.116	D	8.184	7.593	**0.591**	3.3	24.1	75.38	0	0	0	0.51	1	0
2002	5	0	548	160.098	-2.544	D	7.593	7.593	0	3.3	32.61	67.12	0	0	0	0.2	0	0
2002	6	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	7	0	517	160.051	5.115	D	7.662	7.593	0.069	3.3	36.66	62.6	0	0	0	0.74	0	0
2002	8	0	517	160.051	5.115	D	7.709	7.593	0.116	3.3	17.2	81.89	0	0	0	0.91	0	0
2002	9	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	10	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	11	0	517	160.051	5.115	D	7.835	7.593	0.242	3.3	61.51	37.85	0	0	0	0.64	0	0
2002	12	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	13	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	14	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	15	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	16	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	17	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	18	0	548	160.098	-2.544	D	7.941	7.593	0.349	3.3	31.18	68.32	0	0	0	0.5	0	0
2002	19	0	548	160.098	-2.544	D	7.765	7.593	0.173	3.3	41.28	58.39	0	0	0	0.33	0	0
2002	20	0	637	152.992	-4.475	D	7.698	7.593	0.106	3.3	62.6	37.23	0	0	0	0.17	0	0
2002	21	0	517	160.051	5.115	D	7.707	7.593	0.115	3.3	63.83	36.03	0	0	0	0.15	0	0
2002	22	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	23	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	24	0	517	160.051	5.115	D	7.594	7.593	0.001	3.3	10.61	89.19	0	0	0	0.16	0	0
2002	25	0	517	160.051	5.115	D	8.166	7.593	**0.573**	3.3	45.04	54.45	0	0	0	0.51	1	0
2002	26	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	27	0	603	155.328	-5.781	D	7.597	7.593	0.004	3.3	75.01	24.75	0	0	0	0.27	0	0
2002	28	0	548	160.098	-2.544	D	7.593	7.593	0.001	3.3	67.66	32.07	0	0	0	0.21	0	0
2002	29	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	30	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	31	0	517	160.051	5.115	D	7.773	7.593	0.18	3.3	17.87	82.07	0	0	0	0.05	0	0
2002	32	0	517	160.051	5.115	D	7.593	7.593	0.001	3.3	24.6	75.52	0	0	0	0	0	0
2002	33	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	34	0	517	160.051	5.115	D	7.459	7.453	0.006	3	44.08	55.54	0	0	0	0.41	0	0
2002	35	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	36	0	637	152.992	-4.475	D	7.602	7.453	0.149	3	28.22	71.18	0	0	0	0.6	0	0
2002	37	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	38	0	517	160.051	5.115	D	7.453	7.453	0	3	63.45	37.02	0	0	0	0.17	0	0
2002	39	0	517	160.051	5.115	D	7.504	7.453	0.052	3	39.6	59.85	0	0	0	0.56	0	0
2002	40	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1	
2002	41	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0	
2002	42	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0	
2002	43	0	517	160.051	5.115	D	7.571	7.453	0.118	3	27.37	71.87	0	0	0	0.76	0	0	
2002	44	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0	
2002	45	0	632	152.976	-4.828	D	7.644	7.453	0.191	3	31.07	67.9	0	0	0	1.03	0	0	
2002	46	0	548	160.098	-2.544	D	7.528	7.453	0.075	3	53.95	45.67	0	0	0	0.38	0	0	
2002	47	0	517	160.051	5.115	D	7.465	7.453	0.012	3	61.05	38.64	0	0	0	0.31	0	0	
2002	48	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0	
2002	49	0	517	160.051	5.115	D	7.652	7.453	0.199	3	46.15	53.09	0	0	0	0.76	0	0	
2002	50	0	637	152.992	-4.475	D	7.563	7.453	0.111	3	42.31	57.29	0	0	0	0.4	0	0	
2002	51	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0	
2002	52	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0	
2002	53	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0	
2002	54	0	637	152.992	-4.475	D	7.798	7.453	0.346	3	34.61	64.76	0	0	0	0.62	0	0	
2002	55	0	637	152.992	-4.475	D	7.619	7.453	0.166	3	50.56	49.11	0	0	0	0.32	0	0	
2002	56	0	517	160.051	5.115	D	7.456	7.453	0.003	3	62.56	37.23	0	0	0	0.22	0	0	
2002	57	0	517	160.051	5.115	D	7.454	7.453	0.001	3	66.05	33.85	0	0	0	0.15	0	0	
2002	58	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0	
2002	59	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0	
2002	60	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0	
2002	61	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	62	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	63	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	64	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	65	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	66	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	67	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	68	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	69	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	70	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	71	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	72	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	73	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	74	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	
2002	75	0	517	160.051	5.115	D	7.408	7.358	0.05	2.8	62.03	37.8	0	0	0	0.17	0	0	
2002	76	0	624	152.982	-5.684	D	7.358	7.358	0	2.8	18.67	90.44	0	0	0	0	0	0	
2002	77	0	637	152.992	-4.475	D	7.362	7.358	0.004	2.8	49.06	50.96	0	0	0	0.01	0	0	
2002	78	0	517	160.051	5.115	D	7.365	7.358	0.007	2.8	52.9	47.11	0	0	0	0.01	0	0	
2002	79	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0	

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	80	0	624	152.982	-5.684	D	7.748	7.358	0.39	2.8	56	43.46	0	0	0	0.54	0	0
2002	81	0	521	160.057	4.126	D	7.486	7.358	0.128	2.8	36.72	62.73	0	0	0	0.55	0	0
2002	82	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	83	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	137.43	23.55	0	0	0	0.78	0	0
2002	84	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	85	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	86	0	603	155.328	-5.781	D	7.512	7.358	0.154	2.8	54.99	44.56	0	0	0	0.45	0	0
2002	87	0	548	160.098	-2.544	D	7.545	7.358	0.186	2.8	57.62	41.97	0	0	0	0.41	0	0
2002	88	0	517	160.051	5.115	D	7.388	7.358	0.029	2.8	67.43	32.32	0	0	0	0.24	0	0
2002	89	0	517	160.051	5.115	D	7.608	7.358	0.249	2.8	87.84	11.7	0	0	0	0.47	0	0
2002	90	0	517	160.051	5.115	D	7.513	7.358	0.155	2.8	46.45	53.11	0	0	0	0.45	0	0
2002	91	0	517	160.051	5.115	D	7.467	7.358	0.109	2.8	64.97	34.5	0	0	0	0.53	0	0
2002	92	0	527	160.066	2.645	D	7.61	7.263	0.347	2.6	59.16	40.37	0	0	0	0.47	0	0
2002	93	0	548	160.098	-2.544	D	7.293	7.263	0.03	2.6	55.48	43.65	0	0	0	0.87	0	0
2002	94	0	517	160.051	5.115	D	7.465	7.263	0.202	2.6	47.51	51.91	0	0	0	0.58	0	0
2002	95	0	517	160.051	5.115	D	7.549	7.263	0.286	2.6	46.3	53.29	0	0	0	0.4	0	0
2002	96	0	624	152.982	-5.684	D	7.573	7.263	0.31	2.6	44.16	55.43	0	0	0	0.41	0	0
2002	97	0	626	152.979	-5.287	D	7.363	7.263	0.1	2.6	64.94	34.6	0	0	0	0.46	0	0
2002	98	0	637	152.992	-4.475	D	7.265	7.263	0.002	2.6	85.96	13.79	0	0	0	0.23	0	0
2002	99	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	100	0	676	156.899	0.996	D	7.482	7.263	0.219	2.6	87.83	11.22	0	0	0	0.95	0	0
2002	101	0	637	152.992	-4.475	D	7.263	7.263	0	2.6	67.13	31.98	0	0	0	0.35	0	0
2002	102	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	103	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	104	0	517	160.051	5.115	D	7.3	7.263	0.037	2.6	72.43	27.27	0	0	0	0.31	0	0
2002	105	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	106	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	107	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	108	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	109	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	110	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	111	0	517	160.051	5.115	D	7.297	7.263	0.034	2.6	51.81	48.16	0	0	0	0.03	0	0
2002	112	0	517	160.051	5.115	D	7.277	7.263	0.014	2.6	91.21	8.79	0	0	0	0.01	0	0
2002	113	0	546	160.095	-2.05	D	7.263	7.263	0	2.6	83.29	16.38	0	0	0	0	0	0
2002	114	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	115	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	116	0	638	153.14	-4.311	D	7.372	7.263	0.109	2.6	52.14	46.27	0	0	0	1.6	0	0
2002	117	0	517	160.051	5.115	D	7.263	7.263	0	2.6	85.49	14.22	0	0	0	0.63	0	0
2002	118	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	119	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2002	120	0	517	160.051	5.115	D	7.606	7.263	0.343	2.6	77.99	21.38	0	0	0	0.63	0	0
2002	121	0	517	160.051	5.115	D	7.33	7.263	0.067	2.6	70.93	28.76	0	0	0	0.32	0	0
2002	122	0	637	152.992	-4.475	D	7.453	7.453	0	3	86.18	13.92	0	0	0	0.14	0	0
2002	123	0	637	152.992	-4.475	D	8.02	7.453	**0.567**	3	78.75	20.94	0	0	0	0.3	1	0
2002	124	0	637	152.992	-4.475	D	7.463	7.453	0.01	3	46.7	52.82	0	0	0	0.48	0	0
2002	125	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	126	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	127	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	128	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	129	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	130	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	131	0	517	160.051	5.115	D	7.491	7.453	0.038	3	53.88	44.69	0	0	0	1.43	0	0
2002	132	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	133	0	517	160.051	5.115	D	7.453	7.453	0	3	27.66	72.8	0	0	0	0.01	0	0
2002	134	0	632	152.976	-4.828	D	7.564	7.453	0.112	3	58.33	41.23	0	0	0	0.45	0	0
2002	135	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	136	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	137	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	138	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	139	0	637	152.992	-4.475	D	7.499	7.453	0.046	3	55.42	44.27	0	0	0	0.31	0	0
2002	140	0	603	155.328	-5.781	D	7.61	7.453	0.158	3	45.9	53.79	0	0	0	0.31	0	0
2002	141	0	517	160.051	5.115	D	7.547	7.453	0.094	3	75.65	23.67	0	0	0	0.69	0	0
2002	142	0	637	152.992	-4.475	D	7.465	7.453	0.013	3	77.96	21.73	0	0	0	0.33	0	0
2002	143	0	637	152.992	-4.475	D	7.458	7.453	0.005	3	93.04	6.8	0	0	0	0.19	0	0
2002	144	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	145	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	146	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	147	0	517	160.051	5.115	D	7.636	7.453	0.183	3	88.54	10.83	0	0	0	0.63	0	0
2002	148	0	517	160.051	5.115	D	7.453	7.453	0	3	96.51	3.3	0	0	0	0.29	0	0
2002	149	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	150	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	151	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	152	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	153	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	154	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	155	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	156	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	157	0	695	159.463	4.375	D	7.686	7.546	0.14	3.2	79.79	20.12	0	0	0	0.09	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	158	0	632	152.976	-4.828	D	8.078	7.546	0.532	3.2	78.36	21.26	0	0	0	0.38	1	0
2002	159	0	632	152.976	-4.828	D	7.571	7.546	0.025	3.2	74.53	25.16	0	0	0	0.31	0	0
2002	160	0	637	152.992	-4.475	D	7.555	7.546	0.009	3.2	97.06	2.72	0	0	0	0.24	0	0
2002	161	0	517	160.051	5.115	D	7.547	7.546	0	3.2	91.1	8.81	0	0	0	0.17	0	0
2002	162	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	163	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	164	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	165	0	517	160.051	5.115	D	7.595	7.546	0.049	3.2	95.5	3.56	0	0	0	0.95	0	0
2002	166	0	548	160.098	-2.544	D	7.571	7.546	0.025	3.2	78.27	20.77	0	0	0	0.96	0	0
2002	167	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	168	0	637	152.992	-4.475	D	7.596	7.546	0.049	3.2	76.11	23.66	0	0	0	0.23	0	0
2002	169	0	637	152.992	-4.475	D	7.796	7.546	0.249	3.2	90.44	9.29	0	0	0	0.27	0	0
2002	170	0	517	160.051	5.115	D	7.587	7.546	0.04	3.2	98.9	0.93	0	0	0	0.18	0	0
2002	171	0	432	159.228	4.041	D	7.546	7.546	0	3.2	98.32	0.07	0	0	0	0.01	0	0
2002	172	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	173	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	174	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	175	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	176	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	177	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	178	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	179	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	180	0	517	160.051	5.115	D	7.576	7.546	0.03	3.2	97.95	1.63	0	0	0	0.43	0	0
2002	181	0	517	160.051	5.115	D	7.548	7.546	0.002	3.2	94.73	5.05	0	0	0	0.24	0	0
2002	182	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	183	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	184	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	185	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	186	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	187	0	517	160.051	5.115	D	7.594	7.593	0.002	3.3	99.91	0.07	0	0	0	0.01	0	0
2002	188	0	517	160.051	5.115	D	7.596	7.593	0.003	3.3	99.93	0.14	0	0	0	0.01	0	0
2002	189	0	490	159.714	4.549	D	7.593	7.593	0	3.3	99.74	0.49	0	0	0	0.01	0	0
2002	190	0	517	160.051	5.115	D	7.594	7.593	0.002	3.3	99.76	0.07	0	0	0	0.25	0	0
2002	191	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	192	0	517	160.051	5.115	D	7.6	7.593	0.008	3.3	95.38	4.21	0	0	0	0.43	0	0
2002	193	0	637	152.992	-4.475	D	7.593	7.593	0	3.3	82.46	17.28	0	0	0	0.19	0	0
2002	194	0	631	152.975	-4.958	D	7.593	7.593	0	3.3	97.25	2.58	0	0	0	0.1	0	0
2002	195	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	104.8	1.73	0	0	0	0.06	0	0
2002	196	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	197	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	198	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	199	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	200	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	201	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	202	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	203	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	204	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	205	0	624	152.982	-5.684	D	7.881	7.593	0.289	3.3	99.28	0.41	0	0	0	0.3	0	0
2002	206	0	624	152.982	-5.684	D	7.593	7.593	0	3.3	70.47	28.7	0	0	0	0.16	0	0
2002	207	0	631	152.975	-4.958	D	7.599	7.593	0.006	3.3	99.56	0.25	0	0	0	0.19	0	0
2002	208	0	637	152.992	-4.475	D	7.624	7.593	0.031	3.3	99.02	0.81	0	0	0	0.17	0	0
2002	209	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	210	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	211	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	212	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	213	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	214	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	215	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	216	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	217	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	218	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	219	0	637	152.992	-4.475	D	7.685	7.685	0	3.5	95.04	4.83	0	0	0	0.08	0	0
2002	220	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	221	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	222	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	223	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	224	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	225	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	226	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	227	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	228	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	229	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	230	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	231	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	232	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	233	0	461	159.471	4.295	D	7.685	7.685	0	3.5	109.45	0.15	0	0	0	0.26	0	0
2002	234	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	235	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	236	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	237	0	517	160.051	5.115	D	8.151	7.685	0.466	3.5	89.46	10.17	0	0	0	0.37	0	0
2002	238	0	624	152.982	-5.684	D	8.482	7.685	**0.797**	3.5	65.98	33.56	0	0	0	0.46	1	0
2002	239	0	637	152.992	-4.475	D	7.685	7.685	0.001	3.5	94.74	4.93	0	0	0	0.33	0	0
2002	240	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	241	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	242	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	243	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	244	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	245	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	246	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	247	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	248	0	688	158.434	3.081	D	8.007	7.685	0.322	3.5	97.03	2.53	0	0	0	0.44	0	0
2002	249	0	624	152.982	-5.684	D	7.686	7.685	0.001	3.5	93.03	6.65	0	0	0	0.36	0	0
2002	250	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	251	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	252	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	253	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	254	0	517	160.051	5.115	D	7.685	7.685	0	3.5	84.33	14.95	0	0	0	0.39	0	0
2002	255	0	624	152.982	-5.684	D	7.701	7.685	0.016	3.5	78.54	19.27	0	0	0	2.19	0	0
2002	256	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	257	0	3	153.214	-5.024	D	7.685	7.685	0	3.5	98.63	0.31	0	0	0	0.24	0	0
2002	258	0	490	159.714	4.549	D	7.687	7.685	0.002	3.5	97.91	1.74	0	0	0	0.23	0	0
2002	259	0	697	159.757	4.745	D	7.944	7.685	0.259	3.5	91.72	7.97	0	0	0	0.31	0	0
2002	260	0	624	152.982	-5.684	D	7.805	7.685	0.12	3.5	81.07	18.67	0	0	0	0.26	0	0
2002	261	0	657	154.951	-1.737	D	7.686	7.685	0.001	3.5	94.56	5.22	0	0	0	0.04	0	0
2002	262	0	515	159.962	4.554	D	7.685	7.685	0	3.5	92.28	5.64	0	0	0	0.01	0	0
2002	263	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	264	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	265	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	266	0	637	152.992	-4.475	D	7.789	7.685	0.104	3.5	61.1	38.44	0	0	0	0.45	0	0
2002	267	0	637	152.992	-4.475	D	7.879	7.685	0.194	3.5	39.17	60.45	0	0	0	0.38	0	0
2002	268	0	517	160.051	5.115	D	7.747	7.685	0.062	3.5	80.11	19.51	0	0	0	0.38	0	0
2002	269	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	270	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2002	271	0	684	157.943	2.298	D	8.177	7.685	0.492	3.5	75.78	23.89	0	0	0	0.33	0	0
2002	272	0	624	152.982	-5.684	D	7.964	7.685	0.279	3.5	59.54	40.18	0	0	0	0.28	0	0
2002	273	0	517	160.051	5.115	D	7.805	7.685	0.12	3.5	95.69	4.08	0	0	0	0.23	0	0
2002	274	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	275	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	276	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	277	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	278	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	279	0	681	157.591	1.704	D	7.583	7.5	0.084	3.1	26.5	72.57	0	0	0	0.93	0	0
2002	280	0	603	155.328	-5.781	D	7.542	7.5	0.042	3.1	82.91	16.72	0	0	0	0.37	0	0
2002	281	0	632	152.976	-4.828	D	7.575	7.5	0.076	3.1	28.66	69.55	0	0	0	1.8	0	0
2002	282	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	283	0	517	160.051	5.115	D	7.5	7.5	0.001	3.1	86.85	12.96	0	0	0	0.3	0	0
2002	284	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	285	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	286	0	525	160.063	3.138	D	7.522	7.5	0.022	3.1	29.15	70.41	0	0	0	0.44	0	0
2002	287	0	548	160.098	-2.544	D	7.5	7.5	0	3.1	37.5	62.09	0	0	0	0.34	0	0
2002	288	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	289	0	517	160.051	5.115	D	7.61	7.5	0.11	3.1	64.11	34.95	0	0	0	0.94	0	0
2002	290	0	517	160.051	5.115	D	7.777	7.5	0.277	3.1	61.38	38.16	0	0	0	0.46	0	0
2002	291	0	517	160.051	5.115	D	7.63	7.5	0.131	3.1	43.6	55.91	0	0	0	0.49	0	0
2002	292	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	293	0	517	160.051	5.115	D	7.569	7.5	0.069	3.1	60.39	39.4	0	0	0	0.21	0	0
2002	294	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	295	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	94.86	9.19	0	0	0	0.28	0	0
2002	296	0	517	160.051	5.115	D	7.571	7.5	0.072	3.1	59.46	40.28	0	0	0	0.27	0	0
2002	297	0	517	160.051	5.115	D	7.633	7.5	0.134	3.1	54.93	44.87	0	0	0	0.21	0	0
2002	298	0	656	154.842	-1.81	D	7.5	7.5	0	3.1	77.71	21.85	0	0	0	0.18	0	0
2002	299	0	637	152.992	-4.475	D	7.511	7.5	0.012	3.1	78.57	21.32	0	0	0	0.11	0	0
2002	300	0	517	160.051	5.115	D	8.678	7.5	**1.178**	3.1	63.73	36.1	0	0	0	0.17	1	1
2002	301	0	637	152.992	-4.475	D	7.637	7.5	0.138	3.1	43.22	56.41	0	0	0	0.37	0	0
2002	302	0	624	152.982	-5.684	D	7.5	7.5	0.001	3.1	82.23	18.12	0	0	0	0.14	0	0
2002	303	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	304	0	692	159.022	3.82	D	7.516	7.5	0.016	3.1	59.35	40.41	0	0	0	0.24	0	0
2002	305	0	517	160.051	5.115	D	8.106	7.5	**0.606**	3.1	58.15	41.52	0	0	0	0.33	1	0
2002	306	0	548	160.098	-2.544	D	7.544	7.5	0.045	3.1	42.47	56.68	0	0	0	0.85	0	0
2002	307	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	308	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	309	0	517	160.051	5.115	D	7.523	7.5	0.023	3.1	54.09	45.55	0	0	0	0.37	0	0
2002	310	0	516	159.957	4.802	D	7.5	7.5	0	3.1	74.87	25.51	0	0	0	0.07	0	0
2002	311	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	312	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	313	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	314	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	315	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	316	0	517	160.051	5.115	D	7.53	7.5	0.031	3.1	40.72	58.8	0	0	0	0.49	0	0
2002	317	0	637	152.992	-4.475	D	7.913	7.5	0.414	3.1	42.1	57.37	0	0	0	0.54	0	0
2002	318	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	319	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	320	0	624	152.982	-5.684	D	7.615	7.5	0.116	3.1	53.58	46.09	0	0	0	0.33	0	0
2002	321	0	517	160.051	5.115	D	7.915	7.5	0.416	3.1	51.49	48.05	0	0	0	0.46	0	0
2002	322	0	517	160.051	5.115	D	7.908	7.5	0.409	3.1	38.66	60.88	0	0	0	0.46	0	0
2002	323	0	517	160.051	5.115	D	7.501	7.5	0.001	3.1	40.5	59.26	0	0	0	0.28	0	0
2002	324	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	325	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	326	0	517	160.051	5.115	D	7.502	7.5	0.003	3.1	21.56	76.69	0	0	0	1.78	0	0
2002	327	0	517	160.051	5.115	D	7.502	7.5	0.002	3.1	21.1	77.18	0	0	0	1.72	0	0
2002	328	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	329	0	637	152.992	-4.475	D	7.512	7.5	0.012	3.1	44.32	55.55	0	0	0	0.15	0	0
2002	330	0	624	152.982	-5.684	D	7.508	7.5	0.009	3.1	41.39	58.41	0	0	0	0.21	0	0
2002	331	0	637	152.992	-4.475	D	7.509	7.5	0.01	3.1	37.41	62.17	0	0	0	0.44	0	0
2002	332	0	637	152.992	-4.475	D	7.742	7.5	0.242	3.1	36.1	63.53	0	0	0	0.37	0	0
2002	333	0	548	160.098	-2.544	D	7.58	7.5	0.08	3.1	37.55	62.21	0	0	0	0.24	0	0
2002	334	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	335	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	336	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	337	0	548	160.098	-2.544	D	7.673	7.593	0.081	3.3	37.82	61.59	0	0	0	0.59	0	0
2002	338	0	603	155.328	-5.781	D	7.593	7.593	0.001	3.3	35.03	64.61	0	0	0	0.34	0	0
2002	339	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	340	0	517	160.051	5.115	D	7.724	7.593	0.131	3.3	37.44	62.16	0	0	0	0.41	0	0
2002	341	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	342	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	343	0	517	160.051	5.115	D	7.706	7.593	0.113	3.3	54.49	45.19	0	0	0	0.31	0	0
2002	344	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	345	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	346	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	347	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	348	0	637	152.992	-4.475	D	7.674	7.593	0.082	3.3	24.61	74.66	0	0	0	0.73	0	0
2002	349	0	517	160.051	5.115	D	7.651	7.593	0.058	3.3	14.41	84.83	0	0	0	0.76	0	0
2002	350	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	351	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	352	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	353	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	354	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	355	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	356	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	357	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	358	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	359	0	631	152.975	-4.958	D	7.685	7.593	0.093	3.3	43.26	56.13	0	0	0	0.62	0	0
2002	360	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	361	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	362	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	363	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	364	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	365	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									1.254								**8**	**2**

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Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	2	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	3	0	517	160.051	5.115	D	7.782	7.593	0.189	3.3	58.48	41.08	0	0	0	0.44	0	0
2003	4	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	5	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	6	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	7	0	553	159.024	-2.906	D	7.957	7.593	0.365	3.3	47.04	52.38	0	0	0	0.58	0	0
2003	8	0	548	160.098	-2.544	D	7.596	7.593	0.003	3.3	42.9	56.79	0	0	0	0.3	0	0
2003	9	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	10	0	548	160.098	-2.544	D	7.615	7.593	0.023	3.3	62.79	36.05	0	0	0	1.16	0	0
2003	11	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	12	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	13	0	517	160.051	5.115	D	7.741	7.593	0.149	3.3	29.6	70.01	0	0	0	0.39	0	0
2003	14	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	15	0	548	160.098	-2.544	D	8.219	7.593	**0.627**	3.3	29.21	70.24	0	0	0	0.56	1	0
2003	16	0	604	155.247	-5.778	D	7.663	7.593	0.07	3.3	30.57	69.1	0	0	0	0.33	0	0
2003	17	0	626	152.979	-5.287	D	7.654	7.593	0.062	3.3	54.25	45.35	0	0	0	0.4	0	0
2003	18	0	517	160.051	5.115	D	7.593	7.593	0.001	3.3	30.43	69.02	0	0	0	0.52	0	0
2003	19	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	20	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	21	0	517	160.051	5.115	D	7.69	7.593	0.098	3.3	50.25	49.25	0	0	0	0.51	0	0
2003	22	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	37.12	49.53	0	0	0	0.21	0	0
2003	23	0	517	160.051	5.115	D	7.906	7.593	0.313	3.3	44.69	54.82	0	0	0	0.49	0	0
2003	24	0	548	160.098	-2.544	D	7.603	7.593	0.011	3.3	17.15	81.86	0	0	0	0.99	0	0
2003	25	0	546	160.095	-2.05	D	7.797	7.593	0.205	3.3	34.55	65.14	0	0	0	0.31	0	0
2003	26	0	548	160.098	-2.544	D	7.609	7.593	0.016	3.3	46.91	52.89	0	0	0	0.22	0	0
2003	27	0	517	160.051	5.115	D	7.884	7.593	0.292	3.3	29.3	70.13	0	0	0	0.57	0	0
2003	28	0	637	152.992	-4.475	D	7.737	7.593	0.144	3.3	29.29	70.27	0	0	0	0.44	0	0
2003	29	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	30	0	637	152.992	-4.475	D	7.684	7.593	0.091	3.3	32.35	67.28	0	0	0	0.37	0	0
2003	31	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	32	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	33	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	34	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	35	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	36	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	37	0	517	160.051	5.115	D	7.724	7.453	0.271	3	23.64	75.81	0	0	0	0.55	0	0
2003	38	0	637	152.992	-4.475	D	7.554	7.453	0.102	3	60.15	39.68	0	0	0	0.17	0	0
2003	39	0	517	160.051	5.115	D	7.513	7.453	0.061	3	18.15	80.87	0	0	0	0.98	0	0
2003	40	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	41	0	517	160.051	5.115	D	7.472	7.453	0.019	3	30.97	68.57	0	0	0	0.47	0	0
2003	42	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	43	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	44	0	548	160.098	-2.544	D	7.453	7.453	0	3	17.88	82.02	0	0	0	0.81	0	0
2003	45	0	78	155.215	-5.727	D	7.453	7.453	0	3	77.69	22.19	0	0	0	0.79	0	0
2003	46	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	47	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	48	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	49	0	637	152.992	-4.475	D	7.597	7.453	0.145	3	49.69	50.03	0	0	0	0.28	0	0
2003	50	0	517	160.051	5.115	D	7.66	7.453	0.207	3	51.76	48.01	0	0	0	0.23	0	0
2003	51	0	517	160.051	5.115	D	7.508	7.453	0.055	3	53.84	46.06	0	0	0	0.11	0	0
2003	52	0	624	152.982	-5.684	D	7.453	7.453	0.001	3	47.44	52.5	0	0	0	0.08	0	0
2003	53	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	54	0	517	160.051	5.115	D	7.587	7.453	0.134	3	57.14	42.26	0	0	0	0.6	0	0
2003	55	0	624	152.982	-5.684	D	7.606	7.453	0.153	3	35.21	64.13	0	0	0	0.66	0	0
2003	56	0	548	160.098	-2.544	D	7.537	7.453	0.085	3	15.94	83.38	0	0	0	0.68	0	0
2003	57	0	637	152.992	-4.475	D	7.524	7.453	0.071	3	21.2	78.02	0	0	0	0.77	0	0
2003	58	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	59	0	1	153.225	-5.521	D	7.453	7.453	0	3	64.27	34.53	0	0	0	0.15	0	0
2003	60	0	624	152.982	-5.684	D	7.453	7.453	0	3	68.92	31.58	0	0	0	0.13	0	0
2003	61	0	517	160.051	5.115	D	7.41	7.358	0.051	2.8	70.76	29.14	0	0	0	0.1	0	0
2003	62	0	517	160.051	5.115	D	7.582	7.358	0.224	2.8	70.62	29.25	0	0	0	0.12	0	0
2003	63	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	64	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	65	0	517	160.051	5.115	D	7.549	7.358	0.191	2.8	41.9	57.76	0	0	0	0.35	0	0
2003	66	0	624	152.982	-5.684	D	7.412	7.358	0.054	2.8	36.66	62.82	0	0	0	0.52	0	0
2003	67	0	632	152.976	-4.828	D	7.439	7.358	0.08	2.8	70.85	28.92	0	0	0	0.23	0	0
2003	68	0	517	160.051	5.115	D	7.374	7.358	0.016	2.8	61.9	37.71	0	0	0	0.39	0	0
2003	69	0	637	152.992	-4.475	D	7.587	7.358	0.229	2.8	28.18	71.29	0	0	0	0.53	0	0
2003	70	0	637	152.992	-4.475	D	7.418	7.358	0.06	2.8	23.9	75.58	0	0	0	0.52	0	0
2003	71	0	637	152.992	-4.475	D	7.387	7.358	0.029	2.8	58.05	41.61	0	0	0	0.35	0	0
2003	72	0	517	160.051	5.115	D	7.363	7.358	0.005	2.8	66.66	33.18	0	0	0	0.17	0	0
2003	73	0	548	160.098	-2.544	D	7.386	7.358	0.028	2.8	73.66	25.39	0	0	0	0.95	0	0
2003	74	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	75	0	631	152.975	-4.958	D	7.358	7.358	0	2.8	81.01	17.06	0	0	0	0.17	0	0
2003	76	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	77	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	78	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	79	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	80	0	624	152.982	-5.684	D	7.362	7.358	0.003	2.8	62.36	37.48	0	0	0	0.2	0	0
2003	81	0	624	152.982	-5.684	D	7.427	7.358	0.069	2.8	35.15	64.16	0	0	0	0.7	0	0
2003	82	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	83	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	84	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	85	0	517	160.051	5.115	D	7.434	7.358	0.076	2.8	61.87	37.82	0	0	0	0.31	0	0
2003	86	0	517	160.051	5.115	D	7.383	7.358	0.025	2.8	50.18	49.15	0	0	0	0.68	0	0
2003	87	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	88	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	89	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	90	0	517	160.051	5.115	D	7.372	7.358	0.014	2.8	16.23	82.74	0	0	0	1.03	0	0
2003	91	0	1	153.225	-5.521	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	92	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	93	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	94	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	95	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	96	0	517	160.051	5.115	D	7.319	7.263	0.056	2.6	63.17	36.4	0	0	0	0.43	0	0
2003	97	0	624	152.982	-5.684	D	7.263	7.263	0	2.6	60.81	38.86	0	0	0	0.21	0	0
2003	98	0	517	160.051	5.115	D	7.263	7.263	0	2.6	61.19	38.48	0	0	0	0.33	0	0
2003	99	0	637	152.992	-4.475	D	8.316	7.263	**1.053**	2.6	55.25	44.29	0	0	0	0.46	1	1
2003	100	0	624	152.982	-5.684	D	7.275	7.263	0.012	2.6	24.52	74.52	0	0	0	0.96	0	0
2003	101	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	102	0	637	152.992	-4.475	D	7.477	7.263	0.214	2.6	81.71	17.92	0	0	0	0.38	0	0
2003	103	0	517	160.051	5.115	D	7.99	7.263	**0.727**	2.6	66.07	33.57	0	0	0	0.35	1	0
2003	104	0	517	160.051	5.115	D	7.266	7.263	0.003	2.6	94.98	4.62	0	0	0	0.47	0	0
2003	105	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	106	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	107	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	108	0	517	160.051	5.115	D	7.274	7.263	0.011	2.6	75.96	23.9	0	0	0	0.14	0	0
2003	109	0	517	160.051	5.115	D	7.268	7.263	0.005	2.6	74.53	25.04	0	0	0	0.47	0	0
2003	110	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	111	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	112	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	113	0	557	158.11	-3.116	D	7.55	7.263	0.287	2.6	60.91	37.96	0	0	0	1.13	0	0
2003	114	0	624	152.982	-5.684	D	7.263	7.263	0	2.6	61.43	38.19	0	0	0	0.27	0	0
2003	115	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	116	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	117	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	118	0	637	152.992	-4.475	D	7.263	7.263	0	2.6	99.28	1.12	0	0	0	0.17	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	119	0	517	160.051	5.115	D	7.263	7.263	0.001	2.6	95.03	5.05	0	0	0	0.17	0	0
2003	120	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	101.23	0.26	0	0	0	0	0	0
2003	121	0	1	153.225	-5.521	D	7.263	7.263	0	2.6	0	0	0	0	0	0	0	0
2003	122	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	123	0	632	152.976	-4.828	D	7.571	7.453	0.119	3	87.97	11.62	0	0	0	0.41	0	0
2003	124	0	623	153.169	-5.678	D	7.453	7.453	0	3	64.31	35.09	0	0	0	0.26	0	0
2003	125	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	126	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	127	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	128	0	637	152.992	-4.475	D	7.466	7.453	0.014	3	93.6	6.25	0	0	0	0.17	0	0
2003	129	0	517	160.051	5.115	D	7.46	7.453	0.008	3	84.23	15.67	0	0	0	0.13	0	0
2003	130	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	131	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	132	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	133	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	134	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	135	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	136	0	517	160.051	5.115	D	7.456	7.453	0.004	3	89.26	10.49	0	0	0	0.29	0	0
2003	137	0	517	160.051	5.115	D	7.454	7.453	0.002	3	71.53	28.34	0	0	0	0.22	0	0
2003	138	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	139	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	140	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	141	0	637	152.992	-4.475	D	7.706	7.453	0.253	3	75.44	24.07	0	0	0	0.5	0	0
2003	142	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	143	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	144	0	626	152.979	-5.287	D	7.462	7.453	0.01	3	90.27	9.35	0	0	0	0.41	0	0
2003	145	0	637	152.992	-4.475	D	7.665	7.453	0.212	3	88.3	11.41	0	0	0	0.29	0	0
2003	146	0	637	152.992	-4.475	D	7.484	7.453	0.031	3	87.32	12.52	0	0	0	0.17	0	0
2003	147	0	1	153.225	-5.521	D	7.453	7.453	0	3	87.14	13.57	0	0	0	0.11	0	0
2003	148	0	517	160.051	5.115	D	7.603	7.453	0.15	3	86.14	13.48	0	0	0	0.38	0	0
2003	149	0	548	160.098	-2.544	D	7.459	7.453	0.006	3	51.8	47.95	0	0	0	0.26	0	0
2003	150	0	632	152.976	-4.828	D	7.563	7.453	0.111	3	57.09	41.47	0	0	0	1.44	0	0
2003	151	0	1	153.225	-5.521	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	152	0	624	152.982	-5.684	D	7.523	7.453	0.07	3	94.83	4.62	0	0	0	0.55	0	0
2003	153	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	154	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	155	0	632	152.976	-4.828	D	7.769	7.546	0.223	3.2	77.3	22.36	0	0	0	0.34	0	0
2003	156	0	548	160.098	-2.544	D	8.064	7.546	**0.518**	3.2	64.98	34.57	0	0	0	0.45	1	0
2003	157	0	517	160.051	5.115	D	7.588	7.546	0.042	3.2	91.45	8.22	0	0	0	0.33	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	158	0	517	160.051	5.115	D	7.549	7.546	0.003	3.2	92.51	7.39	0	0	0	0.17	0	0
2003	159	0	624	152.982	-5.684	D	7.547	7.546	0.001	3.2	91.19	8.73	0	0	0	0.11	0	0
2003	160	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	161	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	162	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	163	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	164	0	517	160.051	5.115	D	7.662	7.546	0.116	3.2	66.08	33.62	0	0	0	0.3	0	0
2003	165	0	517	160.051	5.115	D	7.553	7.546	0.007	3.2	76.98	22.92	0	0	0	0.1	0	0
2003	166	0	517	160.051	5.115	D	7.773	7.546	0.227	3.2	89.35	10.3	0	0	0	0.35	0	0
2003	167	0	624	152.982	-5.684	D	7.561	7.546	0.015	3.2	94.39	5.44	0	0	0	0.18	0	0
2003	168	0	624	152.982	-5.684	D	7.547	7.546	0	3.2	89.7	10.57	0	0	0	0.11	0	0
2003	169	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	87.97	16.01	0	0	0	0.05	0	0
2003	170	0	517	160.051	5.115	D	7.581	7.546	0.035	3.2	97.44	2.33	0	0	0	0.23	0	0
2003	171	0	632	152.976	-4.828	D	7.815	7.546	0.269	3.2	96.9	2.87	0	0	0	0.23	0	0
2003	172	0	624	152.982	-5.684	D	7.552	7.546	0.006	3.2	92.47	7.39	0	0	0	0.16	0	0
2003	173	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	174	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	175	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	176	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	177	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	178	0	1	153.225	-5.521	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	179	0	548	160.098	-2.544	D	7.705	7.546	0.159	3.2	91.42	8.03	0	0	0	0.55	0	0
2003	180	0	624	152.982	-5.684	D	7.623	7.546	0.077	3.2	89.46	10.28	0	0	0	0.26	0	0
2003	181	0	517	160.051	5.115	D	7.575	7.546	0.029	3.2	98.04	1.74	0	0	0	0.22	0	0
2003	182	0	517	160.051	5.115	D	7.549	7.546	0.003	3.2	98.53	1.37	0	0	0	0.18	0	0
2003	183	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	119.9	3.58	0	0	0	0.02	0	0
2003	184	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	185	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	186	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	187	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	188	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	189	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	190	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	191	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	192	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	193	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	194	0	517	160.051	5.115	D	7.658	7.593	0.066	3.3	96.77	2.8	0	0	0	0.42	0	0
2003	195	0	637	152.992	-4.475	D	7.716	7.593	0.124	3.3	97.2	2.42	0	0	0	0.38	0	0
2003	196	0	637	152.992	-4.475	D	7.596	7.593	0.004	3.3	98.61	1.19	0	0	0	0.24	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	197	0	517	160.051	5.115	D	7.595	7.593	0.002	3.3	70.97	28.47	0	0	0	0.55	0	0
2003	198	0	637	152.992	-4.475	D	7.951	7.593	0.359	3.3	93.79	5.51	0	0	0	0.69	0	0
2003	199	0	517	160.051	5.115	D	8.104	7.593	**0.512**	3.3	91.09	8.62	0	0	0	0.29	1	0
2003	200	0	519	160.054	4.621	D	7.722	7.593	0.13	3.3	97.16	2.65	0	0	0	0.19	0	0
2003	201	0	603	155.328	-5.781	D	7.6	7.593	0.008	3.3	98.86	0.98	0	0	0	0.15	0	0
2003	202	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	203	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	204	0	632	152.976	-4.828	D	8.157	7.593	**0.565**	3.3	94.21	5	0	0	0	0.79	1	0
2003	205	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	206	0	637	152.992	-4.475	D	7.593	7.593	0	3.3	98.91	1.11	0	0	0	0.23	0	0
2003	207	0	637	152.992	-4.475	D	7.594	7.593	0.001	3.3	97.18	2.64	0	0	0	0.24	0	0
2003	208	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	209	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	210	0	517	160.051	5.115	D	7.725	7.593	0.132	3.3	79.29	20.5	0	0	0	0.22	0	0
2003	211	0	676	156.899	0.996	D	7.805	7.593	0.212	3.3	92	7.78	0	0	0	0.22	0	0
2003	212	0	624	152.982	-5.684	D	7.611	7.593	0.018	3.3	97.15	2.8	0	0	0	0.06	0	0
2003	213	0	624	152.982	-5.684	D	7.598	7.593	0.005	3.3	97.73	2.27	0	0	0	0.02	0	0
2003	214	0	624	152.982	-5.684	D	7.69	7.685	0.005	3.5	99.19	0.8	0	0	0	0.01	0	0
2003	215	0	7	153.473	-5.515	D	7.685	7.685	0	3.5	98.25	0.07	0	0	0	0.01	0	0
2003	216	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	217	0	517	160.051	5.115	D	7.696	7.685	0.011	3.5	82.79	16.95	0	0	0	0.26	0	0
2003	218	0	517	160.051	5.115	D	8.779	7.685	**1.094**	3.5	92.46	7.28	0	0	0	0.26	1	1
2003	219	0	548	160.098	-2.544	D	7.784	7.685	0.099	3.5	88.37	11.43	0	0	0	0.2	0	0
2003	220	0	517	160.051	5.115	D	8.149	7.685	0.464	3.5	83.55	16.11	0	0	0	0.34	0	0
2003	221	0	624	152.982	-5.684	D	7.687	7.685	0.002	3.5	53.22	46.54	0	0	0	0.23	0	0
2003	222	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	223	0	624	152.982	-5.684	D	7.686	7.685	0.001	3.5	90.61	9.01	0	0	0	0.37	0	0
2003	224	0	624	152.982	-5.684	D	7.685	7.685	0	3.5	99.57	0.42	0	0	0	0.19	0	0
2003	225	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	226	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	227	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	228	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	229	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	230	0	517	160.051	5.115	D	7.703	7.685	0.018	3.5	95.18	4.48	0	0	0	0.34	0	0
2003	231	0	624	152.982	-5.684	D	8.069	7.685	0.384	3.5	85.33	14.37	0	0	0	0.3	0	0
2003	232	0	624	152.982	-5.684	D	7.731	7.685	0.046	3.5	95.73	4.04	0	0	0	0.23	0	0
2003	233	0	624	152.982	-5.684	D	7.723	7.685	0.039	3.5	92.18	7.65	0	0	0	0.16	0	0
2003	234	0	624	152.982	-5.684	D	7.722	7.685	0.037	3.5	97.95	1.9	0	0	0	0.16	0	0
2003	235	0	696	159.61	4.56	D	7.758	7.685	0.073	3.5	98.71	0.89	0	0	0	0.4	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	236	0	624	152.982	-5.684	D	7.721	7.685	0.036	3.5	91.82	7.84	0	0	0	0.34	0	0
2003	237	0	624	152.982	-5.684	D	7.687	7.685	0.002	3.5	94.76	4.99	0	0	0	0.23	0	0
2003	238	0	637	152.992	-4.475	D	7.697	7.685	0.012	3.5	99.18	0.65	0	0	0	0.17	0	0
2003	239	0	517	160.051	5.115	D	7.71	7.685	0.025	3.5	99.57	0.27	0	0	0	0.16	0	0
2003	240	0	517	160.051	5.115	D	7.686	7.685	0.001	3.5	98.62	1.12	0	0	0	0.14	0	0
2003	241	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	242	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	243	0	517	160.051	5.115	D	7.69	7.685	0.005	3.5	99.68	0.2	0	0	0	0.1	0	0
2003	244	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	245	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	246	0	517	160.051	5.115	D	7.685	7.685	0	3.5	92.61	6.19	0	0	0	0.01	0	0
2003	247	0	637	152.992	-4.475	D	7.991	7.685	0.306	3.5	58.35	41.43	0	0	0	0.22	0	0
2003	248	0	548	160.098	-2.544	D	8.014	7.685	0.329	3.5	44.29	55.28	0	0	0	0.43	0	0
2003	249	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	250	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	251	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	252	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	253	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	254	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	255	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	256	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	257	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	258	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	259	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	260	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	261	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	262	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	263	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	0	0	0	0	0	0	0	0
2003	264	0	676	156.899	0.996	D	7.989	7.685	0.304	3.5	32.49	66.99	0	0	0	0.52	0	0
2003	265	0	637	152.992	-4.475	D	7.689	7.685	0.004	3.5	90.31	9.41	0	0	0	0.3	0	0
2003	266	0	1	153.225	-5.521	D	7.685	7.685	0	3.5	100.11	0.74	0	0	0	0.01	0	0
2003	267	0	517	160.051	5.115	D	7.842	7.685	0.157	3.5	88.69	10.34	0	0	0	0.97	0	0
2003	268	0	517	160.051	5.115	D	7.686	7.685	0.002	3.5	80.51	19.01	0	0	0	0.46	0	0
2003	269	0	517	160.051	5.115	D	7.697	7.685	0.012	3.5	45.54	52.46	0	0	0	2	0	0
2003	270	0	517	160.051	5.115	D	7.734	7.685	0.049	3.5	94.5	5.23	0	0	0	0.27	0	0
2003	271	0	626	152.979	-5.287	D	7.81	7.685	0.125	3.5	28.85	70.38	0	0	0	0.77	0	0
2003	272	0	517	160.051	5.115	D	7.802	7.685	0.118	3.5	16.17	82.86	0	0	0	0.97	0	0
2003	273	0	603	155.328	-5.781	D	7.839	7.685	0.154	3.5	48.1	51.24	0	0	0	0.67	0	0
2003	274	0	548	160.098	-2.544	D	7.771	7.685	0.086	3.5	57.7	41.89	0	0	0	0.4	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	275	0	517	160.051	5.115	D	7.591	7.5	0.091	3.1	33.8	65.85	0	0	0	0.35	0	0
2003	276	0	624	152.982	-5.684	D	7.562	7.5	0.062	3.1	23.55	76.02	0	0	0	0.43	0	0
2003	277	0	517	160.051	5.115	D	7.504	7.5	0.005	3.1	84.08	15.68	0	0	0	0.27	0	0
2003	278	0	517	160.051	5.115	D	7.527	7.5	0.027	3.1	85.12	13.87	0	0	0	1.01	0	0
2003	279	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	280	0	517	160.051	5.115	D	7.5	7.5	0	3.1	84.37	15	0	0	0	0.76	0	0
2003	281	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	282	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	283	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	284	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	285	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	286	0	624	152.982	-5.684	D	7.511	7.5	0.011	3.1	34.57	63.47	0	0	0	1.96	0	0
2003	287	0	637	152.992	-4.475	D	7.515	7.5	0.016	3.1	92.92	6.82	0	0	0	0.26	0	0
2003	288	0	517	160.051	5.115	D	7.5	7.5	0	3.1	79.89	20.02	0	0	0	0.18	0	0
2003	289	0	548	160.098	-2.544	D	7.62	7.5	0.12	3.1	28.9	70.19	0	0	0	0.92	0	0
2003	290	0	517	160.051	5.115	D	7.5	7.5	0	3.1	39.29	62	0	0	0	0.14	0	0
2003	291	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	292	0	517	160.051	5.115	D	7.527	7.5	0.027	3.1	93.03	6.65	0	0	0	0.33	0	0
2003	293	0	603	155.328	-5.781	D	7.508	7.5	0.009	3.1	88.98	10.77	0	0	0	0.27	0	0
2003	294	0	603	155.328	-5.781	D	7.502	7.5	0.003	3.1	97.53	2.27	0	0	0	0.24	0	0
2003	295	0	517	160.051	5.115	D	7.507	7.5	0.008	3.1	80.27	18.43	0	0	0	1.31	0	0
2003	296	0	517	160.051	5.115	D	7.624	7.5	0.125	3.1	35.37	64.14	0	0	0	0.5	0	0
2003	297	0	624	152.982	-5.684	D	7.629	7.5	0.129	3.1	80.87	18.29	0	0	0	0.84	0	0
2003	298	0	624	152.982	-5.684	D	7.555	7.5	0.056	3.1	93.52	5.93	0	0	0	0.56	0	0
2003	299	0	548	160.098	-2.544	D	7.584	7.5	0.085	3.1	75.6	23.48	0	0	0	0.92	0	0
2003	300	0	517	160.051	5.115	D	7.91	7.5	0.411	3.1	59.15	40.2	0	0	0	0.64	0	0
2003	301	0	548	160.098	-2.544	D	7.903	7.5	0.403	3.1	64.28	35.38	0	0	0	0.34	0	0
2003	302	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	303	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	304	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	305	0	517	160.051	5.115	D	7.506	7.5	0.006	3.1	43.01	56.42	0	0	0	0.58	0	0
2003	306	0	637	152.992	-4.475	D	7.798	7.5	0.298	3.1	66.89	32.45	0	0	0	0.66	0	0
2003	307	0	517	160.051	5.115	D	7.5	7.5	0	3.1	61.55	38.17	0	0	0	0.26	0	0
2003	308	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	309	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	310	0	517	160.051	5.115	D	7.553	7.5	0.054	3.1	38.99	60.92	0	0	0	0.09	0	0
2003	311	0	624	152.982	-5.684	D	7.5	7.5	0.001	3.1	50.92	48.89	0	0	0	0.18	0	0
2003	312	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	313	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	314	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	315	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	316	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	317	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	318	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	319	0	548	160.098	-2.544	D	7.507	7.5	0.007	3.1	45.11	54.41	0	0	0	0.48	0	0
2003	320	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	321	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	322	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	323	0	517	160.051	5.115	D	7.504	7.5	0.005	3.1	22.07	77.87	0	0	0	0.09	0	0
2003	324	0	632	152.976	-4.828	D	7.543	7.5	0.043	3.1	26.71	70.93	0	0	0	2.36	0	0
2003	325	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	326	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	327	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	328	0	517	160.051	5.115	D	7.5	7.5	0	3.1	65.26	35.48	0	0	0	0.02	0	0
2003	329	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	330	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	331	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	332	0	517	160.051	5.115	D	7.657	7.5	0.158	3.1	71.59	27.94	0	0	0	0.47	0	0
2003	333	0	517	160.051	5.115	D	7.5	7.5	0	3.1	23.11	77.05	0	0	0	2.12	0	0
2003	334	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	335	0	1	153.225	-5.521	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	336	0	517	160.051	5.115	D	7.732	7.593	0.139	3.3	33.52	65.72	0	0	0	0.77	0	0
2003	337	0	281	157.781	2.025	D	7.712	7.593	0.12	3.3	41.88	57.49	0	0	0	0.64	0	0
2003	338	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	339	0	517	160.051	5.115	D	8.041	7.593	0.448	3.3	57.16	42.61	0	0	0	0.23	0	0
2003	340	0	548	160.098	-2.544	D	7.716	7.593	0.123	3.3	53	46.44	0	0	0	0.56	0	0
2003	341	0	517	160.051	5.115	D	7.649	7.593	0.056	3.3	48.31	51.36	0	0	0	0.34	0	0
2003	342	0	517	160.051	5.115	D	7.607	7.593	0.014	3.3	42.54	57.19	0	0	0	0.28	0	0
2003	343	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	344	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	345	0	603	155.328	-5.781	D	7.614	7.593	0.021	3.3	26.52	73.44	0	0	0	0.04	0	0
2003	346	0	517	160.051	5.115	D	7.606	7.593	0.014	3.3	38.83	60.79	0	0	0	0.38	0	0
2003	347	0	517	160.051	5.115	D	8.064	7.593	0.471	3.3	36.62	63.01	0	0	0	0.38	0	0
2003	348	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	349	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	350	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	351	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	352	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Mingo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	353	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	354	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	355	0	517	160.051	5.115	D	7.714	7.593	0.121	3.3	29.31	70.2	0	0	0	0.49	0	0
2003	356	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	357	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	358	0	548	160.098	-2.544	D	7.621	7.593	0.028	3.3	26.73	73.04	0	0	0	0.23	0	0
2003	359	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	360	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	361	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	362	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	363	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	364	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	365	0	1	153.225	-5.521	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									1.094								**7**	**2**

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	2	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	3	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	4	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	5	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	6	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	7	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	8	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	9	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	10	0	930	-78.188	-33.78	D	7.546	7.546	0	3.2	31.9	68.01	0	0	0	0.26	0	0
2001	11	0	930	-78.188	-33.78	D	7.598	7.546	0.052	3.2	50.09	49.67	0	0	0	0.24	0	0
2001	12	0	949	-78.53	-31.5	D	7.549	7.546	0.003	3.2	49.45	50.36	0	0	0	0.2	0	0
2001	13	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	14	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	15	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	16	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	17	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	18	0	907	-79.461	-36.281	D	8.139	7.546	**0.593**	3.2	41.14	58.57	0	0	0	0.29	1	0
2001	19	0	907	-79.461	-36.281	D	7.964	7.546	0.418	3.2	39.01	60.66	0	0	0	0.34	0	0
2001	20	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	21	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	22	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	23	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	24	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	25	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	26	0	933	-78.17	-33.075	D	7.611	7.546	0.065	3.2	32.97	66.76	0	0	0	0.27	0	0
2001	27	0	964	-80.519	-30.575	D	7.552	7.546	0.006	3.2	31.9	67.96	0	0	0	0.13	0	0
2001	28	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	29	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	30	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	31	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	32	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	33	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	34	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	35	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	36	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	37	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	38	0	949	-78.53	-31.5	D	7.408	7.406	0.002	2.9	51.36	48.15	0	0	0	0.55	0	0
2001	39	0	955	-79.307	-31.075	D	7.419	7.406	0.013	2.9	50.83	48.68	0	0	0	0.49	0	0
2001	40	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	41	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	42	0	930	-78.188	-33.78	D	7.407	7.406	0.001	2.9	38.72	60.93	0	0	0	0.36	0	0
2001	43	0	1017	-87.324	-31.258	D	7.482	7.406	0.076	2.9	41.88	57.83	0	0	0	0.3	0	0
2001	44	0	965	-80.608	-30.564	D	7.406	7.406	0.001	2.9	49.19	50.65	0	0	0	0.17	0	0
2001	45	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	46	0	947	-78.463	-31.7	D	7.406	7.406	0.001	2.9	58.3	41.8	0	0	0	0.09	0	0
2001	47	0	930	-78.188	-33.78	D	7.407	7.406	0.001	2.9	49.76	50.48	0	0	0	0.03	0	0
2001	48	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	49	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	50	0	930	-78.188	-33.78	D	7.419	7.406	0.013	2.9	55.44	44.27	0	0	0	0.31	0	0
2001	51	0	933	-78.17	-33.075	D	7.409	7.406	0.004	2.9	52.41	47.38	0	0	0	0.22	0	0
2001	52	0	1008	-86.153	-30.893	D	7.548	7.406	0.143	2.9	48.75	50.88	0	0	0	0.36	0	0
2001	53	0	1017	-87.324	-31.258	D	7.737	7.406	0.331	2.9	30.1	69.4	0	0	0	0.5	0	0
2001	54	0	1017	-87.324	-31.258	D	7.574	7.406	0.169	2.9	59.65	40.13	0	0	0	0.22	0	0
2001	55	0	1017	-87.324	-31.258	D	7.455	7.406	0.049	2.9	64.15	35.69	0	0	0	0.16	0	0
2001	56	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	57	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2001	58	0	947	-78.463	-31.7	D	7.406	7.406	0	2.9	53.27	46.57	0	0	0	0.44	0	0
2001	59	0	1008	-86.153	-30.893	D	7.419	7.406	0.013	2.9	59.41	40.35	0	0	0	0.27	0	0
2001	60	0	1017	-87.324	-31.258	D	7.411	7.406	0.006	2.9	40.17	59.4	0	0	0	0.46	0	0
2001	61	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	62	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	63	0	949	-78.53	-31.5	D	7.313	7.311	0.003	2.7	57.37	42.38	0	0	0	0.28	0	0
2001	64	0	931	-78.182	-33.544	D	7.796	7.311	0.485	2.7	49.74	49.91	0	0	0	0.35	0	0
2001	65	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	66	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	67	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	68	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	69	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	70	0	907	-79.461	-36.281	D	7.329	7.311	0.018	2.7	75.2	24.41	0	0	0	0.4	0	0
2001	71	0	949	-78.53	-31.5	D	7.314	7.311	0.003	2.7	70.82	28.95	0	0	0	0.28	0	0
2001	72	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	73	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	74	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	75	0	28	-86.588	-36.474	D	7.311	7.311	0	2.7	23.43	80.75	0	0	0	0	0	0
2001	76	0	949	-78.53	-31.5	D	7.318	7.311	0.007	2.7	12.27	87.65	0	0	0	0.08	0	0
2001	77	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	78	0	1017	-87.324	-31.258	D	7.376	7.311	0.065	2.7	57.33	42.13	0	0	0	0.54	0	0
2001	79	0	1039	-87.824	-33.618	D	7.32	7.311	0.01	2.7	60.19	39.41	0	0	0	0.41	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	80	0	964	-80.519	-30.575	D	7.475	7.311	0.164	2.7	51.5	48.03	0	0	0	0.48	0	0
2001	81	0	907	-79.461	-36.281	D	7.436	7.311	0.125	2.7	55.81	43.74	0	0	0	0.45	0	0
2001	82	0	949	-78.53	-31.5	D	7.421	7.311	0.111	2.7	74.18	25.48	0	0	0	0.33	0	0
2001	83	0	949	-78.53	-31.5	D	7.504	7.311	0.193	2.7	83.24	16.46	0	0	0	0.3	0	0
2001	84	0	930	-78.188	-33.78	D	7.372	7.311	0.061	2.7	81.75	18.07	0	0	0	0.17	0	0
2001	85	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	86	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	87	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	88	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	89	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	90	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	91	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	92	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	93	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	94	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	95	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	96	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	97	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	98	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	99	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	100	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	101	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	102	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	103	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	104	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	105	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	106	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	107	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	108	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	109	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	110	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	111	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	112	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	113	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	114	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	115	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	116	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	117	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	118	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	119	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	120	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	121	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	122	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	123	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	124	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	125	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	126	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	127	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	128	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	129	0	930	-78.188	-33.78	D	7.594	7.593	0.001	3.3	78.41	21.32	0	0	0	0.26	0	0
2001	130	0	907	-79.461	-36.281	D	7.601	7.593	0.008	3.3	85.59	14.17	0	0	0	0.23	0	0
2001	131	0	930	-78.188	-33.78	D	7.596	7.593	0.003	3.3	94.89	4.95	0	0	0	0.21	0	0
2001	132	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	133	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	134	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	135	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	136	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	137	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	138	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	139	0	785	-78.62	-31.589	D	7.593	7.593	0	3.3	47.81	43.08	0	0	0	0.04	0	0
2001	140	0	930	-78.188	-33.78	D	7.593	7.593	0	3.3	90.68	8.3	0	0	0	0.36	0	0
2001	141	0	933	-78.17	-33.075	D	7.607	7.593	0.014	3.3	93.29	6.36	0	0	0	0.35	0	0
2001	142	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	143	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	144	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	145	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	146	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	147	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	148	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	149	0	746	-79.359	-31.332	D	7.593	7.593	0	3.3	89.69	8.67	0	0	0	0.34	0	0
2001	150	0	932	-78.176	-33.31	D	7.593	7.593	0.001	3.3	94.66	5.04	0	0	0	0.32	0	0
2001	151	0	747	-79.357	-31.084	D	7.593	7.593	0	3.3	89.2	4.95	0	0	0	0.22	0	0
2001	152	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	153	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	154	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	155	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	156	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	157	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	158	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	159	0	949	-78.53	-31.5	D	7.696	7.593	0.103	3.3	91.15	8.55	0	0	0	0.3	0	0
2001	160	0	853	-82.958	-38.45	D	8.063	7.593	0.47	3.3	79.52	20.22	0	0	0	0.26	0	0
2001	161	0	822	-86.552	-37.687	D	7.839	7.593	0.246	3.3	96.75	2.98	0	0	0	0.27	0	0
2001	162	0	949	-78.53	-31.5	D	7.704	7.593	0.112	3.3	96.39	3.43	0	0	0	0.18	0	0
2001	163	0	785	-78.62	-31.589	D	7.593	7.593	0	3.3	98.54	1.13	0	0	0	0.14	0	0
2001	164	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	165	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	166	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	167	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	168	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	169	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	170	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	171	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	172	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	173	0	785	-78.62	-31.589	D	7.593	7.593	0	3.3	98.74	0.91	0	0	0	0.01	0	0
2001	174	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	175	0	930	-78.188	-33.78	D	7.593	7.593	0.001	3.3	69.88	29.82	0	0	0	0.28	0	0
2001	176	0	933	-78.17	-33.075	D	7.621	7.593	0.029	3.3	95.55	4.2	0	0	0	0.26	0	0
2001	177	0	947	-78.463	-31.7	D	7.66	7.593	0.068	3.3	96.67	3.11	0	0	0	0.22	0	0
2001	178	0	1008	-86.153	-30.893	D	7.632	7.593	0.04	3.3	98.68	1.11	0	0	0	0.21	0	0
2001	179	0	1017	-87.324	-31.258	D	7.594	7.593	0.001	3.3	96.87	3.03	0	0	0	0.15	0	0
2001	180	0	10	-87.277	-31.497	D	7.593	7.593	0	3.3	95.38	5.11	0	0	0	0.08	0	0
2001	181	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	182	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	183	0	949	-78.53	-31.5	D	7.596	7.593	0.004	3.3	96.42	3.28	0	0	0	0.26	0	0
2001	184	0	949	-78.53	-31.5	D	7.763	7.593	0.17	3.3	96.99	2.76	0	0	0	0.25	0	0
2001	185	0	949	-78.53	-31.5	D	7.608	7.593	0.016	3.3	79.62	20.23	0	0	0	0.15	0	0
2001	186	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	187	0	949	-78.53	-31.5	D	7.594	7.593	0.001	3.3	96.16	3.58	0	0	0	0.27	0	0
2001	188	0	949	-78.53	-31.5	D	7.601	7.593	0.008	3.3	96.15	3.74	0	0	0	0.12	0	0
2001	189	0	758	-79.125	-32.577	D	7.593	7.593	0	3.3	94.38	2.65	0	0	0	0	0	0
2001	190	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	191	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	192	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	193	0	933	-78.17	-33.075	D	7.681	7.593	0.089	3.3	99.15	0.41	0	0	0	0.45	0	0
2001	194	0	933	-78.17	-33.075	D	7.608	7.593	0.015	3.3	98.4	1.25	0	0	0	0.35	0	0
2001	195	0	301	-83.886	-38.242	D	7.593	7.593	0	3.3	100.16	0.12	0	0	0	0.01	0	0
2001	196	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	85.83	0.02	0	0	0	0	0	0

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Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	197	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	198	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	199	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	200	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	201	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	202	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	203	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	204	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	205	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	206	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	207	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	208	0	967	-80.716	-30.533	D	7.601	7.593	0.008	3.3	96.61	3.32	0	0	0	0.08	0	0
2001	209	0	963	-80.391	-30.626	D	7.598	7.593	0.005	3.3	91.78	8.13	0	0	0	0.1	0	0
2001	210	0	774	-78.867	-31.586	D	7.593	7.593	0	3.3	97.18	3.03	0	0	0	0.03	0	0
2001	211	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	212	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	213	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	214	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	215	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	216	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	217	0	930	-78.188	-33.78	D	7.625	7.593	0.032	3.3	98.86	0.72	0	0	0	0.44	0	0
2001	218	0	1017	-87.324	-31.258	D	7.626	7.593	0.033	3.3	99.42	0.3	0	0	0	0.29	0	0
2001	219	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	220	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	221	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	222	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	223	0	949	-78.53	-31.5	D	7.632	7.593	0.04	3.3	89.9	9.77	0	0	0	0.33	0	0
2001	224	0	949	-78.53	-31.5	D	8.393	7.593	**0.8**	3.3	95.71	3.92	0	0	0	0.37	1	0
2001	225	0	930	-78.188	-33.78	D	8.289	7.593	**0.697**	3.3	89.43	10.27	0	0	0	0.29	1	0
2001	226	0	1039	-87.824	-33.618	D	7.8	7.593	0.207	3.3	92.87	6.82	0	0	0	0.31	0	0
2001	227	0	1035	-87.826	-32.813	D	7.602	7.593	0.009	3.3	93.51	5.45	0	0	0	1.04	0	0
2001	228	0	907	-79.461	-36.281	D	7.641	7.593	0.048	3.3	98.66	1.05	0	0	0	0.29	0	0
2001	229	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	230	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	231	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	232	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	233	0	930	-78.188	-33.78	D	7.593	7.593	0	3.3	94.16	4.42	0	0	0	0.28	0	0
2001	234	0	789	-78.38	-32.337	D	7.593	7.593	0	3.3	94	4.58	0	0	0	0.27	0	0
2001	235	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	236	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	237	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	238	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	239	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	240	0	947	-78.463	-31.7	D	7.597	7.593	0.005	3.3	99.22	0.4	0	0	0	0.4	0	0
2001	241	0	930	-78.188	-33.78	D	7.595	7.593	0.002	3.3	99.61	0.17	0	0	0	0.24	0	0
2001	242	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	243	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	244	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	245	0	955	-79.307	-31.075	D	7.788	7.639	0.149	3.4	95.56	4.14	0	0	0	0.31	0	0
2001	246	0	1017	-87.324	-31.258	D	7.651	7.639	0.012	3.4	91.89	7.92	0	0	0	0.2	0	0
2001	247	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	248	0	949	-78.53	-31.5	D	7.643	7.639	0.004	3.4	98.55	1.08	0	0	0	0.36	0	0
2001	249	0	962	-80.243	-30.697	D	7.652	7.639	0.013	3.4	94.65	5.08	0	0	0	0.28	0	0
2001	250	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	251	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	252	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	253	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	254	0	519	-81.646	-37.023	D	7.639	7.639	0	3.4	90.2	5.79	0	0	0	0.34	0	0
2001	255	0	907	-79.461	-36.281	D	7.706	7.639	0.067	3.4	87.31	12.37	0	0	0	0.32	0	0
2001	256	0	967	-80.716	-30.533	D	7.64	7.639	0.001	3.4	97.34	2.42	0	0	0	0.19	0	0
2001	257	0	955	-79.307	-31.075	D	7.731	7.639	0.092	3.4	86.92	12.82	0	0	0	0.26	0	0
2001	258	0	1008	-86.153	-30.893	D	7.842	7.639	0.203	3.4	88.4	11.33	0	0	0	0.27	0	0
2001	259	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	260	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	261	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	262	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	263	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	264	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	265	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	266	0	941	-78.321	-32.318	D	7.639	7.639	0.001	3.4	88.36	11.17	0	0	0	0.42	0	0
2001	267	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	268	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	269	0	927	-78.477	-33.986	D	7.944	7.639	0.305	3.4	57.43	41.91	0	0	0	0.67	0	0
2001	270	0	853	-82.958	-38.45	D	7.665	7.639	0.026	3.4	90.61	9.06	0	0	0	0.33	0	0
2001	271	0	832	-85.112	-38.219	D	7.655	7.639	0.016	3.4	85	14.78	0	0	0	0.23	0	0
2001	272	0	907	-79.461	-36.281	D	7.732	7.639	0.093	3.4	92.75	6.57	0	0	0	0.68	0	0
2001	273	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	274	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	275	0	964	-80.519	-30.575	D	7.501	7.5	0.001	3.1	98.18	1.54	0	0	0	0.32	0	0
2001	276	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	277	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	278	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	279	0	1039	-87.824	-33.618	D	7.52	7.5	0.021	3.1	27.08	72.93	0	0	0	0	0	0
2001	280	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	281	0	930	-78.188	-33.78	D	7.508	7.5	0.009	3.1	77.61	22.09	0	0	0	0.32	0	0
2001	282	0	949	-78.53	-31.5	D	7.506	7.5	0.007	3.1	72.91	26.84	0	0	0	0.25	0	0
2001	283	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	284	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	285	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	286	0	1008	-86.153	-30.893	D	7.504	7.5	0.005	3.1	71.06	28.76	0	0	0	0.19	0	0
2001	287	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	288	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	289	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	290	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	291	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	292	0	930	-78.188	-33.78	D	7.5	7.5	0	3.1	75.96	23.81	0	0	0	0.38	0	0
2001	293	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	294	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	295	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	296	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	297	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	298	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	299	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	300	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	301	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	302	0	930	-78.188	-33.78	D	7.516	7.5	0.017	3.1	86.35	13.37	0	0	0	0.28	0	0
2001	303	0	949	-78.53	-31.5	D	7.501	7.5	0.001	3.1	74.42	25.43	0	0	0	0.15	0	0
2001	304	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	305	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	306	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	307	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	308	0	908	-79.453	-36.041	D	7.604	7.5	0.104	3.1	76.23	23.47	0	0	0	0.31	0	0
2001	309	0	966	-80.657	-30.543	D	7.519	7.5	0.02	3.1	86.11	13.67	0	0	0	0.22	0	0
2001	310	0	933	-78.17	-33.075	D	7.586	7.5	0.086	3.1	73.56	25.99	0	0	0	0.45	0	0
2001	311	0	963	-80.391	-30.626	D	7.54	7.5	0.041	3.1	69.25	30.4	0	0	0	0.36	0	0
2001	312	0	907	-79.461	-36.281	D	7.507	7.5	0.008	3.1	78.16	21.59	0	0	0	0.28	0	0
2001	313	0	930	-78.188	-33.78	D	7.5	7.5	0.001	3.1	85.98	13.98	0	0	0	0.19	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	314	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	315	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	316	0	955	-79.307	-31.075	D	7.542	7.5	0.042	3.1	68.44	30.61	0	0	0	0.95	0	0
2001	317	0	1039	-87.824	-33.618	D	7.522	7.5	0.022	3.1	65.56	33.96	0	0	0	0.49	0	0
2001	318	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	319	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	320	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	321	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	322	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	323	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	324	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	325	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	326	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	327	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	328	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	329	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	330	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	331	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	332	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	333	0	930	-78.188	-33.78	D	7.543	7.5	0.044	3.1	50.05	49.7	0	0	0	0.25	0	0
2001	334	0	930	-78.188	-33.78	D	7.901	7.5	0.402	3.1	41.71	58.1	0	0	0	0.19	0	0
2001	335	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2001	336	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	337	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	338	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	339	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	340	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	341	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	342	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	343	0	1017	-87.324	-31.258	D	7.739	7.593	0.147	3.3	33	66.72	0	0	0	0.28	0	0
2001	344	0	930	-78.188	-33.78	D	7.599	7.593	0.006	3.3	34.17	65.48	0	0	0	0.34	0	0
2001	345	0	930	-78.188	-33.78	D	7.624	7.593	0.031	3.3	38.06	61.68	0	0	0	0.27	0	0
2001	346	0	933	-78.17	-33.075	D	7.62	7.593	0.027	3.3	59.39	40.36	0	0	0	0.25	0	0
2001	347	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	348	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	349	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	350	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	351	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	352	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	353	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	354	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	355	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	356	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	357	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	358	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	359	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	360	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	361	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	362	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	363	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	364	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	365	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									0.8								**3**	**0**

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Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	2	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	3	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	4	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	5	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	6	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	7	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	8	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	9	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	10	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	11	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	12	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	13	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	14	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	15	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	16	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	17	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	18	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	19	0	907	-79.461	-36.281	D	7.588	7.546	0.042	3.2	54.45	45.34	0	0	0	0.21	0	0
2002	20	0	949	-78.53	-31.5	D	7.605	7.546	0.059	3.2	60.16	39.66	0	0	0	0.19	0	0
2002	21	0	931	-78.182	-33.544	D	7.559	7.546	0.013	3.2	67.18	32.71	0	0	0	0.13	0	0
2002	22	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	23	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	24	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	25	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	26	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	27	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	28	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	29	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	30	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	31	0	966	-80.657	-30.543	D	7.635	7.546	0.089	3.2	51.57	48.38	0	0	0	0.06	0	0
2002	32	0	1017	-87.324	-31.258	D	7.554	7.546	0.008	3.2	16.14	83.86	0	0	0	0	0	0
2002	33	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	34	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	35	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	36	0	930	-78.188	-33.78	D	7.408	7.406	0.003	2.9	36.48	63.18	0	0	0	0.37	0	0
2002	37	0	949	-78.53	-31.5	D	7.484	7.406	0.078	2.9	38.27	61.39	0	0	0	0.34	0	0
2002	38	0	1016	-87.119	-31.262	D	7.406	7.406	0	2.9	50.32	49.67	0	0	0	0.2	0	0
2002	39	0	785	-78.62	-31.589	D	7.406	7.406	0	2.9	65.13	35.49	0	0	0	0.18	0	0
2002	40	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	41	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	42	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	43	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	44	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	45	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	46	0	907	-79.461	-36.281	D	7.407	7.406	0.002	2.9	65.09	34.57	0	0	0	0.36	0	0
2002	47	0	779	-78.636	-33.079	D	7.406	7.406	0	2.9	62.72	36.05	0	0	0	0.32	0	0
2002	48	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	49	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	50	0	930	-78.188	-33.78	D	7.415	7.406	0.009	2.9	42.39	57.21	0	0	0	0.42	0	0
2002	51	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	52	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	53	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	54	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	55	0	933	-78.17	-33.075	D	7.416	7.406	0.01	2.9	50.79	48.9	0	0	0	0.33	0	0
2002	56	0	933	-78.17	-33.075	D	7.407	7.406	0.001	2.9	62.08	37.69	0	0	0	0.23	0	0
2002	57	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	58	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	59	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	60	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2002	61	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	62	0	822	-86.552	-37.687	D	7.314	7.311	0.003	2.7	47.93	51.95	0	0	0	0.1	0	0
2002	63	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	64	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	65	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	66	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	67	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	68	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	69	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	70	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	71	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	72	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	73	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	74	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	75	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	76	0	907	-79.461	-36.281	D	7.424	7.311	0.113	2.7	40.96	58.28	0	0	0	0.76	0	0
2002	77	0	854	-82.848	-38.372	D	7.322	7.311	0.012	2.7	42.39	57.6	0	0	0	0.02	0	0
2002	78	0	949	-78.53	-31.5	D	7.314	7.311	0.003	2.7	65.75	34.3	0	0	0	0.01	0	0
2002	79	0	967	-80.716	-30.533	D	7.312	7.311	0.001	2.7	67.65	32.22	0	0	0	0.13	0	0

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Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	80	0	947	-78.463	-31.7	D	7.636	7.311	0.325	2.7	65.57	34.28	0	0	0	0.15	0	0
2002	81	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	82	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	83	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	84	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	85	0	1010	-86.381	-30.97	D	7.784	7.311	0.473	2.7	66.74	32.96	0	0	0	0.3	0	0
2002	86	0	930	-78.188	-33.78	D	7.375	7.311	0.065	2.7	54.83	44.76	0	0	0	0.42	0	0
2002	87	0	907	-79.461	-36.281	D	7.318	7.311	0.007	2.7	71.6	28.16	0	0	0	0.26	0	0
2002	88	0	933	-78.17	-33.075	D	7.325	7.311	0.014	2.7	72.12	27.67	0	0	0	0.21	0	0
2002	89	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	90	0	955	-79.307	-31.075	D	7.334	7.311	0.023	2.7	81.14	18.48	0	0	0	0.4	0	0
2002	91	0	1017	-87.324	-31.258	D	7.492	7.311	0.181	2.7	73.63	25.86	0	0	0	0.51	0	0
2002	92	0	949	-78.53	-31.5	D	7.474	7.311	0.163	2.7	62.73	36.88	0	0	0	0.38	0	0
2002	93	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	94	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	95	0	966	-80.657	-30.543	D	7.411	7.311	0.1	2.7	55.25	44.39	0	0	0	0.36	0	0
2002	96	0	949	-78.53	-31.5	D	7.622	7.311	0.312	2.7	70.75	28.92	0	0	0	0.33	0	0
2002	97	0	822	-86.552	-37.687	D	7.523	7.311	0.212	2.7	85.68	14.05	0	0	0	0.27	0	0
2002	98	0	949	-78.53	-31.5	D	7.314	7.311	0.003	2.7	87.14	12.65	0	0	0	0.22	0	0
2002	99	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	100	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	101	0	930	-78.188	-33.78	D	7.368	7.311	0.057	2.7	75.97	23.63	0	0	0	0.4	0	0
2002	102	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	103	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	104	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	105	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	106	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	107	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	108	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	109	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	110	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	111	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	112	0	747	-79.357	-31.084	D	7.311	7.311	0	2.7	99.11	2.11	0	0	0	0.02	0	0
2002	113	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	114	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	115	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	116	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	117	0	822	-86.552	-37.687	D	7.314	7.311	0.003	2.7	85.93	13.87	0	0	0	0.27	0	0
2002	118	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0

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Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	119	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	120	0	930	-78.188	-33.78	D	7.311	7.311	0.001	2.7	93.07	6.79	0	0	0	0.42	0	0
2002	121	0	949	-78.53	-31.5	D	7.324	7.311	0.014	2.7	90.3	9.35	0	0	0	0.36	0	0
2002	122	0	949	-78.53	-31.5	D	7.596	7.593	0.004	3.3	84.37	15.47	0	0	0	0.15	0	0
2002	123	0	930	-78.188	-33.78	D	7.594	7.593	0.002	3.3	88.84	11	0	0	0	0.16	0	0
2002	124	0	853	-82.958	-38.45	D	7.669	7.593	0.076	3.3	68.48	31.03	0	0	0	0.49	0	0
2002	125	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	126	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	127	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	128	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	129	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	130	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	131	0	963	-80.391	-30.626	D	7.639	7.593	0.046	3.3	88.23	11.05	0	0	0	0.72	0	0
2002	132	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	133	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	134	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	135	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	136	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	137	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	138	0	907	-79.461	-36.281	D	7.853	7.593	0.26	3.3	57.22	42.67	0	0	0	0.1	0	0
2002	139	0	907	-79.461	-36.281	D	7.775	7.593	0.182	3.3	35.26	64.29	0	0	0	0.45	0	0
2002	140	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	141	0	949	-78.53	-31.5	D	7.596	7.593	0.004	3.3	83.76	15.94	0	0	0	0.3	0	0
2002	142	0	949	-78.53	-31.5	D	7.637	7.593	0.045	3.3	90.53	9.19	0	0	0	0.28	0	0
2002	143	0	949	-78.53	-31.5	D	7.608	7.593	0.015	3.3	91.9	7.93	0	0	0	0.17	0	0
2002	144	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	145	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	146	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	147	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	148	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	149	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	150	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	151	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	152	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	153	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	154	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	155	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	156	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	157	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	158	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	159	0	845	-83.769	-38.412	D	7.686	7.593	0.094	3.3	96.04	3.72	0	0	0	0.24	0	0
2002	160	0	1017	-87.324	-31.258	D	7.777	7.593	0.184	3.3	97.61	2.17	0	0	0	0.22	0	0
2002	161	0	966	-80.657	-30.543	D	7.594	7.593	0.001	3.3	94.23	5.6	0	0	0	0.17	0	0
2002	162	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	163	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	164	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	165	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	166	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	167	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	168	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	169	0	949	-78.53	-31.5	D	7.604	7.593	0.012	3.3	98.99	0.76	0	0	0	0.25	0	0
2002	170	0	949	-78.53	-31.5	D	7.594	7.593	0.002	3.3	98.38	1.49	0	0	0	0.13	0	0
2002	171	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	72.56	0.05	0	0	0	0.01	0	0
2002	172	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	173	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	174	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	175	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	176	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	177	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	178	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	179	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	180	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	181	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	182	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	183	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	184	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	185	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	186	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	187	0	729	-79.606	-31.33	D	7.593	7.593	0	3.3	100.52	0.11	0	0	0	0.01	0	0
2002	188	0	643	-80.588	-30.574	D	7.596	7.593	0.004	3.3	99.88	0.09	0	0	0	0.01	0	0
2002	189	0	62	-86.283	-31.01	D	7.593	7.593	0.001	3.3	99.48	0.5	0	0	0	0.01	0	0
2002	190	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	191	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	192	0	643	-80.588	-30.574	D	7.593	7.593	0	3.3	59	42.34	0	0	0	0.06	0	0
2002	193	0	949	-78.53	-31.5	D	7.596	7.593	0.003	3.3	97.31	2.6	0	0	0	0.15	0	0
2002	194	0	191	-84.875	-38.231	D	7.594	7.593	0.002	3.3	96.89	2.98	0	0	0	0.1	0	0
2002	195	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	98.08	1.96	0	0	0	0.06	0	0
2002	196	0	1017	-87.324	-31.258	D	7.607	7.593	0.014	3.3	99.03	0.56	0	0	0	0.41	0	0

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Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	197	0	1017	-87.324	-31.258	D	7.62	7.593	0.028	3.3	94.52	5.2	0	0	0	0.29	0	0
2002	198	0	1017	-87.324	-31.258	D	7.593	7.593	0.001	3.3	94.84	5.04	0	0	0	0.2	0	0
2002	199	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	200	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	201	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	202	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	203	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	204	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	205	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	206	0	949	-78.53	-31.5	D	7.757	7.593	0.165	3.3	94.99	4.68	0	0	0	0.33	0	0
2002	207	0	822	-86.552	-37.687	D	7.653	7.593	0.06	3.3	98.15	1.65	0	0	0	0.21	0	0
2002	208	0	933	-78.17	-33.075	D	7.613	7.593	0.02	3.3	97.93	1.91	0	0	0	0.17	0	0
2002	209	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	210	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	211	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	212	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	213	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	214	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	215	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	216	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	217	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	218	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	219	0	933	-78.17	-33.075	D	7.799	7.593	0.207	3.3	98.1	1.55	0	0	0	0.35	0	0
2002	220	0	822	-86.552	-37.687	D	7.596	7.593	0.003	3.3	98.69	1.06	0	0	0	0.24	0	0
2002	221	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	222	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	223	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	224	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	225	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	226	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	227	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	228	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	229	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	230	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	231	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	232	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	233	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	234	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	235	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

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Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	236	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	237	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	238	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	239	0	907	-79.461	-36.281	D	7.772	7.593	0.18	3.3	92.97	6.59	0	0	0	0.44	0	0
2002	240	0	949	-78.53	-31.5	D	8.175	7.593	**0.582**	3.3	95.09	4.58	0	0	0	0.33	1	0
2002	241	0	1039	-87.824	-33.618	D	7.594	7.593	0.002	3.3	93.29	6.46	0	0	0	0.2	0	0
2002	242	0	1017	-87.324	-31.258	D	7.594	7.593	0.001	3.3	92.43	7.25	0	0	0	0.37	0	0
2002	243	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	244	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	245	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	246	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	247	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	248	0	930	-78.188	-33.78	D	7.65	7.639	0.011	3.4	97.72	1.99	0	0	0	0.3	0	0
2002	249	0	853	-82.958	-38.45	D	7.791	7.639	0.153	3.4	91.99	7.74	0	0	0	0.27	0	0
2002	250	0	1039	-87.824	-33.618	D	7.645	7.639	0.006	3.4	97.46	2.3	0	0	0	0.26	0	0
2002	251	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	252	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	253	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	254	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	255	0	1035	-87.826	-32.813	D	7.767	7.639	0.129	3.4	86.73	12.77	0	0	0	0.5	0	0
2002	256	0	822	-86.552	-37.687	D	7.644	7.639	0.005	3.4	81.92	17.69	0	0	0	0.41	0	0
2002	257	0	822	-86.552	-37.687	D	7.643	7.639	0.004	3.4	99.11	0.6	0	0	0	0.28	0	0
2002	258	0	643	-80.588	-30.574	D	7.642	7.639	0.004	3.4	98.47	1.3	0	0	0	0.24	0	0
2002	259	0	757	-79.128	-32.826	D	7.639	7.639	0	3.4	94.09	5.34	0	0	0	0.17	0	0
2002	260	0	930	-78.188	-33.78	D	7.684	7.639	0.045	3.4	96.95	2.75	0	0	0	0.3	0	0
2002	261	0	948	-78.531	-31.59	D	7.639	7.639	0.001	3.4	90.05	9.99	0	0	0	0.1	0	0
2002	262	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	34.37	2.65	0	0	0	0	0	0
2002	263	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	264	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	265	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	266	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	267	0	907	-79.461	-36.281	D	7.645	7.639	0.006	3.4	90.03	9.56	0	0	0	0.45	0	0
2002	268	0	955	-79.307	-31.075	D	7.753	7.639	0.114	3.4	93.64	5.91	0	0	0	0.45	0	0
2002	269	0	1017	-87.324	-31.258	D	7.641	7.639	0.002	3.4	91.65	8.13	0	0	0	0.25	0	0
2002	270	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	271	0	967	-80.716	-30.533	D	8.221	7.639	**0.582**	3.4	96	3.64	0	0	0	0.36	1	0
2002	272	0	949	-78.53	-31.5	D	8.138	7.639	0.499	3.4	94.36	5.34	0	0	0	0.3	0	0
2002	273	0	949	-78.53	-31.5	D	7.717	7.639	0.078	3.4	96.38	3.39	0	0	0	0.23	0	0
2002	274	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

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Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002											Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	275	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	276	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	277	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	278	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	279	0	933	-78.17	-33.075	D	7.516	7.5	0.017	3.1	93.82	5.68	0	0	0	0.51	0	0
2002	280	0	933	-78.17	-33.075	D	7.503	7.5	0.003	3.1	90.47	9.11	0	0	0	0.43	0	0
2002	281	0	933	-78.17	-33.075	D	7.521	7.5	0.022	3.1	75.33	24.26	0	0	0	0.41	0	0
2002	282	0	964	-80.519	-30.575	D	7.586	7.5	0.087	3.1	84.48	15.09	0	0	0	0.43	0	0
2002	283	0	1008	-86.153	-30.893	D	7.501	7.5	0.001	3.1	91.6	8.26	0	0	0	0.29	0	0
2002	284	0	1007	-85.943	-30.897	D	7.5	7.5	0	3.1	92.17	7.02	0	0	0	0.22	0	0
2002	285	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	286	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	287	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	288	0	1035	-87.826	-32.813	D	7.65	7.5	0.15	3.1	54.33	45.21	0	0	0	0.45	0	0
2002	289	0	907	-79.461	-36.281	D	7.522	7.5	0.022	3.1	62.33	37.37	0	0	0	0.31	0	0
2002	290	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	291	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	292	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	293	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	294	0	907	-79.461	-36.281	D	7.679	7.5	0.179	3.1	68.39	30.97	0	0	0	0.64	0	0
2002	295	0	1017	-87.324	-31.258	D	7.589	7.5	0.09	3.1	74.15	25.53	0	0	0	0.33	0	0
2002	296	0	1017	-87.324	-31.258	D	7.589	7.5	0.09	3.1	84.6	15.1	0	0	0	0.3	0	0
2002	297	0	966	-80.657	-30.543	D	7.713	7.5	0.213	3.1	83.07	16.65	0	0	0	0.28	0	0
2002	298	0	1017	-87.324	-31.258	D	7.517	7.5	0.017	3.1	80.1	19.7	0	0	0	0.2	0	0
2002	299	0	955	-79.307	-31.075	D	7.567	7.5	0.068	3.1	85.91	13.99	0	0	0	0.11	0	0
2002	300	0	930	-78.188	-33.78	D	7.533	7.5	0.034	3.1	87.36	12.53	0	0	0	0.12	0	0
2002	301	0	853	-82.958	-38.45	D	8.023	7.5	**0.524**	3.1	63.14	36.58	0	0	0	0.28	1	0
2002	302	0	1017	-87.324	-31.258	D	7.513	7.5	0.014	3.1	80	19.9	0	0	0	0.12	0	0
2002	303	0	1017	-87.324	-31.258	D	8.249	7.5	**0.75**	3.1	52.03	47.88	0	0	0	0.09	1	0
2002	304	0	1039	-87.824	-33.618	D	8.662	7.5	**1.163**	3.1	65.53	34.27	0	0	0	0.19	1	1
2002	305	0	907	-79.461	-36.281	D	7.512	7.5	0.012	3.1	61.54	38.29	0	0	0	0.17	0	0
2002	306	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	307	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	308	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	309	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	310	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	311	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	312	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	313	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	314	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	315	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	316	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	317	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	318	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	319	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	320	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	321	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	322	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	323	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	324	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	325	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	326	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	327	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	328	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	329	0	933	-78.17	-33.075	D	7.733	7.5	0.234	3.1	44.72	55.08	0	0	0	0.2	0	0
2002	330	0	930	-78.188	-33.78	D	7.569	7.5	0.069	3.1	36.79	62.91	0	0	0	0.3	0	0
2002	331	0	1017	-87.324	-31.258	D	8.158	7.5	**0.658**	3.1	39.93	59.76	0	0	0	0.32	1	0
2002	332	0	822	-86.552	-37.687	D	7.501	7.5	0.002	3.1	40.87	58.99	0	0	0	0.24	0	0
2002	333	0	853	-82.958	-38.45	D	7.502	7.5	0.002	3.1	49.58	50.28	0	0	0	0.19	0	0
2002	334	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	335	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2002	336	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	337	0	933	-78.17	-33.075	D	7.593	7.593	0	3.3	19.86	79.21	0	0	0	0.88	0	0
2002	338	0	78	-86.051	-32.504	D	7.681	7.593	0.089	3.3	16.67	82.64	0	0	0	0.69	0	0
2002	339	0	1017	-87.324	-31.258	D	7.824	7.593	0.232	3.3	48.4	51.25	0	0	0	0.34	0	0
2002	340	0	907	-79.461	-36.281	D	7.84	7.593	0.247	3.3	33.67	65.86	0	0	0	0.47	0	0
2002	341	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	342	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	343	0	930	-78.188	-33.78	D	7.779	7.593	0.187	3.3	50.81	48.87	0	0	0	0.31	0	0
2002	344	0	811	-87.061	-36.28	D	7.644	7.593	0.052	3.3	57.28	42.47	0	0	0	0.25	0	0
2002	345	0	1008	-86.153	-30.893	D	7.599	7.593	0.006	3.3	60.17	39.69	0	0	0	0.16	0	0
2002	346	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	347	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	348	0	986	-83.304	-30.963	D	8.245	7.593	**0.653**	3.3	50.97	48.69	0	0	0	0.34	1	0
2002	349	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	350	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	351	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	352	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

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Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2002												Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	353	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	354	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	355	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	356	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	357	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	358	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	359	0	1017	-87.324	-31.258	D	7.751	7.593	0.158	3.3	29.09	70.46	0	0	0	0.45	0	0
2002	360	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	361	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	362	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	363	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	364	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	365	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									1.163								**7**	**1**

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	2	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	3	0	930	-78.188	-33.78	D	7.599	7.546	0.053	3.2	15.63	84	0	0	0	0.37	0	0
2003	4	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	5	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	6	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	7	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	8	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	9	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	10	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	11	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	12	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	13	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	14	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	15	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	16	0	930	-78.188	-33.78	D	7.576	7.546	0.03	3.2	31.8	67.92	0	0	0	0.28	0	0
2003	17	0	949	-78.53	-31.5	D	7.836	7.546	0.29	3.2	39.41	60.32	0	0	0	0.27	0	0
2003	18	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	19	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	20	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	21	0	963	-80.391	-30.626	D	7.549	7.546	0.003	3.2	43.97	55.79	0	0	0	0.25	0	0
2003	22	0	1017	-87.324	-31.258	D	7.66	7.546	0.113	3.2	32.72	66.87	0	0	0	0.41	0	0
2003	23	0	119	-85.583	-34.993	D	8.02	7.546	0.473	3.2	19.95	79.43	0	0	0	0.62	0	0
2003	24	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	25	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	26	0	927	-78.477	-33.986	D	7.546	7.546	0	3.2	56.82	44.99	0	0	0	0.21	0	0
2003	27	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	28	0	932	-78.176	-33.31	D	7.547	7.546	0	3.2	36.73	62.99	0	0	0	0.33	0	0
2003	29	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	30	0	907	-79.461	-36.281	D	7.65	7.546	0.104	3.2	60.3	39.44	0	0	0	0.26	0	0
2003	31	0	1017	-87.324	-31.258	D	7.813	7.546	0.267	3.2	60.87	38.9	0	0	0	0.23	0	0
2003	32	0	1	-87.793	-33.479	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	33	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	34	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	35	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	36	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	37	0	930	-78.188	-33.78	D	7.407	7.406	0.001	2.9	28.68	70.92	0	0	0	0.36	0	0
2003	38	0	930	-78.188	-33.78	D	7.495	7.406	0.089	2.9	40.57	59.16	0	0	0	0.27	0	0
2003	39	0	907	-79.461	-36.281	D	7.406	7.406	0	2.9	59.49	40.24	0	0	0	0.12	0	0
2003	40	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0

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Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	41	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	42	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	43	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	44	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	45	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	46	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	47	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	48	0	853	-82.958	-38.45	D	7.804	7.406	0.399	2.9	45.77	53.81	0	0	0	0.42	0	0
2003	49	0	933	-78.17	-33.075	D	7.418	7.406	0.013	2.9	22.36	77.05	0	0	0	0.6	0	0
2003	50	0	930	-78.188	-33.78	D	7.406	7.406	0	2.9	75.07	25.33	0	0	0	0.18	0	0
2003	51	0	964	-80.519	-30.575	D	7.491	7.406	0.085	2.9	49.54	50.29	0	0	0	0.17	0	0
2003	52	0	822	-86.552	-37.687	D	7.578	7.406	0.172	2.9	48.04	51.85	0	0	0	0.11	0	0
2003	53	0	1	-87.793	-33.479	D	7.406	7.406	0	2.9	0	0	0	0	0	0	0	0
2003	54	0	931	-78.182	-33.544	D	7.474	7.406	0.068	2.9	48.87	50.85	0	0	0	0.28	0	0
2003	55	0	949	-78.53	-31.5	D	7.636	7.406	0.23	2.9	48.47	51.31	0	0	0	0.21	0	0
2003	56	0	907	-79.461	-36.281	D	7.409	7.406	0.004	2.9	48.93	50.9	0	0	0	0.17	0	0
2003	57	0	78	-86.051	-32.504	D	7.675	7.406	0.27	2.9	25.44	74.09	0	0	0	0.47	0	0
2003	58	0	1035	-87.826	-32.813	D	7.531	7.406	0.126	2.9	37.72	61.98	0	0	0	0.3	0	0
2003	59	0	1035	-87.826	-32.813	D	7.413	7.406	0.008	2.9	53.18	46.66	0	0	0	0.19	0	0
2003	60	0	1017	-87.324	-31.258	D	7.409	7.406	0.004	2.9	64.16	35.72	0	0	0	0.17	0	0
2003	61	0	966	-80.657	-30.543	D	7.343	7.311	0.032	2.7	70.43	29.44	0	0	0	0.13	0	0
2003	62	0	941	-78.321	-32.318	D	7.321	7.311	0.01	2.7	74.45	25.44	0	0	0	0.11	0	0
2003	63	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	64	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	65	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	66	0	933	-78.17	-33.075	D	7.403	7.311	0.092	2.7	54.22	45.48	0	0	0	0.3	0	0
2003	67	0	930	-78.188	-33.78	D	7.363	7.311	0.052	2.7	68.63	31.15	0	0	0	0.22	0	0
2003	68	0	949	-78.53	-31.5	D	7.314	7.311	0.003	2.7	75.34	24.54	0	0	0	0.13	0	0
2003	69	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	70	0	930	-78.188	-33.78	D	7.522	7.311	0.211	2.7	30.7	68.83	0	0	0	0.47	0	0
2003	71	0	930	-78.188	-33.78	D	7.494	7.311	0.183	2.7	52.52	47.16	0	0	0	0.33	0	0
2003	72	0	949	-78.53	-31.5	D	7.311	7.311	0.001	2.7	65.53	34.35	0	0	0	0.17	0	0
2003	73	0	933	-78.17	-33.075	D	7.41	7.311	0.1	2.7	63	36.57	0	0	0	0.43	0	0
2003	74	0	1039	-87.824	-33.618	D	7.372	7.311	0.062	2.7	69.36	30.27	0	0	0	0.37	0	0
2003	75	0	1017	-87.324	-31.258	D	7.342	7.311	0.031	2.7	81.58	18.24	0	0	0	0.19	0	0
2003	76	0	61	-86.285	-31.259	D	7.311	7.311	0	2.7	96.68	4.42	0	0	0	0.16	0	0
2003	77	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	78	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	79	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	80	0	949	-78.53	-31.5	D	7.375	7.311	0.064	2.7	50.5	49.41	0	0	0	0.1	0	0
2003	81	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	82	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	83	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	84	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	85	0	933	-78.17	-33.075	D	7.312	7.311	0.001	2.7	59.06	40.91	0	0	0	0.16	0	0
2003	86	0	853	-82.958	-38.45	D	7.348	7.311	0.038	2.7	57.99	41.37	0	0	0	0.64	0	0
2003	87	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	88	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	89	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	90	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	91	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	92	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	93	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	94	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	95	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	96	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	97	0	964	-80.519	-30.575	D	7.32	7.311	0.009	2.7	53.49	46.3	0	0	0	0.22	0	0
2003	98	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	99	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	100	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	101	0	927	-78.477	-33.986	D	7.443	7.311	0.133	2.7	58.55	40.82	0	0	0	0.63	0	0
2003	102	0	947	-78.463	-31.7	D	7.468	7.311	0.157	2.7	84.51	15.09	0	0	0	0.41	0	0
2003	103	0	907	-79.461	-36.281	D	7.322	7.311	0.011	2.7	82.73	16.98	0	0	0	0.29	0	0
2003	104	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	105	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	106	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	107	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	108	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	109	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	110	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	111	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	112	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	113	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	114	0	853	-82.958	-38.45	D	7.362	7.311	0.051	2.7	92.15	7.39	0	0	0	0.46	0	0
2003	115	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	116	0	949	-78.53	-31.5	D	7.722	7.311	0.412	2.7	56.81	43.1	0	0	0	0.08	0	0
2003	117	0	861	-82.693	-37.797	D	7.542	7.311	0.231	2.7	36.32	63.15	0	0	0	0.53	0	0
2003	118	0	1035	-87.826	-32.813	D	7.344	7.311	0.033	2.7	91.53	8.23	0	0	0	0.25	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	119	0	643	-80.588	-30.574	D	7.311	7.311	0	2.7	96.48	2.83	0	0	0	0.14	0	0
2003	120	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	121	0	1	-87.793	-33.479	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	122	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	123	0	930	-78.188	-33.78	D	7.663	7.593	0.071	3.3	72.19	27.6	0	0	0	0.21	0	0
2003	124	0	907	-79.461	-36.281	D	8.326	7.593	**0.734**	3.3	81.34	18.43	0	0	0	0.23	1	0
2003	125	0	1017	-87.324	-31.258	D	7.594	7.593	0.001	3.3	98.12	1.87	0	0	0	0.04	0	0
2003	126	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	127	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	128	0	1017	-87.324	-31.258	D	7.718	7.593	0.125	3.3	93.66	6.1	0	0	0	0.24	0	0
2003	129	0	961	-80.115	-30.738	D	7.598	7.593	0.006	3.3	92.52	7.33	0	0	0	0.17	0	0
2003	130	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	131	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	132	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	133	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	134	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	135	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	136	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	137	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	138	0	1017	-87.324	-31.258	D	7.748	7.593	0.156	3.3	73.62	26.05	0	0	0	0.33	0	0
2003	139	0	1017	-87.324	-31.258	D	7.666	7.593	0.073	3.3	53.16	46.49	0	0	0	0.35	0	0
2003	140	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	141	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	142	0	1008	-86.153	-30.893	D	7.676	7.593	0.083	3.3	34.56	64.96	0	0	0	0.47	0	0
2003	143	0	1008	-86.153	-30.893	D	8.081	7.593	0.489	3.3	91.65	7.87	0	0	0	0.48	0	0
2003	144	0	907	-79.461	-36.281	D	8.209	7.593	**0.616**	3.3	89.48	10.21	0	0	0	0.31	1	0
2003	145	0	930	-78.188	-33.78	D	7.976	7.593	0.383	3.3	91.92	7.85	0	0	0	0.23	0	0
2003	146	0	1008	-86.153	-30.893	D	7.71	7.593	0.118	3.3	89.08	10.77	0	0	0	0.15	0	0
2003	147	0	964	-80.519	-30.575	D	7.835	7.593	0.242	3.3	79.28	20.39	0	0	0	0.33	0	0
2003	148	0	853	-82.958	-38.45	D	7.827	7.593	0.235	3.3	64.48	35.28	0	0	0	0.24	0	0
2003	149	0	832	-85.112	-38.219	D	7.595	7.593	0.002	3.3	96.45	3.32	0	0	0	0.21	0	0
2003	150	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	151	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	152	0	930	-78.188	-33.78	D	7.593	7.593	0	3.3	78.94	22.54	0	0	0	0.42	0	0
2003	153	0	563	-81.349	-32.305	D	7.704	7.593	0.112	3.3	72.03	27.57	0	0	0	0.4	0	0
2003	154	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	155	0	822	-86.552	-37.687	D	7.779	7.593	0.186	3.3	88.48	11.31	0	0	0	0.21	0	0
2003	156	0	822	-86.552	-37.687	D	7.595	7.593	0.003	3.3	93.99	6	0	0	0	0.07	0	0
2003	157	0	852	-83.027	-38.42	D	7.593	7.593	0.001	3.3	87.02	12.8	0	0	0	0.16	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	158	0	852	-83.027	-38.42	D	7.601	7.593	0.008	3.3	85.99	13.86	0	0	0	0.14	0	0
2003	159	0	907	-79.461	-36.281	D	7.593	7.593	0.001	3.3	90.07	9.89	0	0	0	0.1	0	0
2003	160	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	161	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	162	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	163	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	164	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	165	0	1017	-87.324	-31.258	D	7.609	7.593	0.016	3.3	87.01	12.97	0	0	0	0.02	0	0
2003	166	0	949	-78.53	-31.5	D	7.674	7.593	0.082	3.3	85.5	14.37	0	0	0	0.13	0	0
2003	167	0	853	-82.958	-38.45	D	7.861	7.593	0.268	3.3	88.47	11.24	0	0	0	0.29	0	0
2003	168	0	1017	-87.324	-31.258	D	7.609	7.593	0.016	3.3	97.48	2.14	0	0	0	0.39	0	0
2003	169	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	89.7	11.75	0	0	0	0.13	0	0
2003	170	0	949	-78.53	-31.5	D	7.631	7.593	0.038	3.3	97.19	2.59	0	0	0	0.21	0	0
2003	171	0	933	-78.17	-33.075	D	7.927	7.593	0.334	3.3	97.33	2.48	0	0	0	0.2	0	0
2003	172	0	822	-86.552	-37.687	D	7.778	7.593	0.185	3.3	94.5	5.35	0	0	0	0.16	0	0
2003	173	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	174	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	175	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	176	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	177	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	178	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	179	0	907	-79.461	-36.281	D	7.594	7.593	0.001	3.3	76.64	23.2	0	0	0	0.19	0	0
2003	180	0	907	-79.461	-36.281	D	7.652	7.593	0.059	3.3	96.36	3.38	0	0	0	0.26	0	0
2003	181	0	1008	-86.153	-30.893	D	7.648	7.593	0.055	3.3	97.95	1.85	0	0	0	0.2	0	0
2003	182	0	1008	-86.153	-30.893	D	7.601	7.593	0.008	3.3	97.72	2.13	0	0	0	0.17	0	0
2003	183	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	91.19	3.17	0	0	0	0.02	0	0
2003	184	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	185	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	186	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	187	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	188	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	189	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	190	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	191	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	192	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	193	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	194	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	195	0	949	-78.53	-31.5	D	7.632	7.593	0.04	3.3	99.28	0.44	0	0	0	0.27	0	0
2003	196	0	949	-78.53	-31.5	D	7.604	7.593	0.012	3.3	97.91	1.87	0	0	0	0.23	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	197	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	198	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	199	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	200	0	907	-79.461	-36.281	D	7.597	7.593	0.005	3.3	99.61	0.21	0	0	0	0.18	0	0
2003	201	0	907	-79.461	-36.281	D	7.593	7.593	0.001	3.3	99.22	0.6	0	0	0	0.16	0	0
2003	202	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	203	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	204	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	205	0	930	-78.188	-33.78	D	7.627	7.593	0.034	3.3	89.25	10.05	0	0	0	0.7	0	0
2003	206	0	949	-78.53	-31.5	D	7.969	7.593	0.377	3.3	95.79	3.87	0	0	0	0.34	0	0
2003	207	0	1017	-87.324	-31.258	D	7.629	7.593	0.037	3.3	97.56	2.2	0	0	0	0.24	0	0
2003	208	0	10	-87.277	-31.497	D	7.593	7.593	0	3.3	98.11	0.24	0	0	0	0.15	0	0
2003	209	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	210	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	211	0	949	-78.53	-31.5	D	7.639	7.593	0.046	3.3	98.49	1.39	0	0	0	0.13	0	0
2003	212	0	949	-78.53	-31.5	D	7.631	7.593	0.038	3.3	99.27	0.71	0	0	0	0.02	0	0
2003	213	0	853	-82.958	-38.45	D	7.604	7.593	0.011	3.3	97.41	2.6	0	0	0	0.01	0	0
2003	214	0	907	-79.461	-36.281	D	7.596	7.593	0.003	3.3	98.77	1.24	0	0	0	0.01	0	0
2003	215	0	219	-84.628	-38.234	D	7.593	7.593	0	3.3	95.72	0.07	0	0	0	0.01	0	0
2003	216	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	217	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	218	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	219	0	949	-78.53	-31.5	D	8.117	7.593	0.525	3.3	97.74	1.96	0	0	0	0.31	1	0
2003	220	0	853	-82.958	-38.45	D	8.031	7.593	0.439	3.3	91.77	7.84	0	0	0	0.39	0	0
2003	221	0	1017	-87.324	-31.258	D	7.721	7.593	0.129	3.3	97.69	1.95	0	0	0	0.35	0	0
2003	222	0	853	-82.958	-38.45	D	7.889	7.593	0.297	3.3	97.94	1.69	0	0	0	0.37	0	0
2003	223	0	930	-78.188	-33.78	D	7.841	7.593	0.248	3.3	96.22	3.46	0	0	0	0.32	0	0
2003	224	0	1008	-86.153	-30.893	D	7.846	7.593	0.254	3.3	93.69	5.98	0	0	0	0.32	0	0
2003	225	0	1035	-87.826	-32.813	D	7.748	7.593	0.155	3.3	91.6	8.05	0	0	0	0.36	0	0
2003	226	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	227	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	228	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	229	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	230	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	231	0	930	-78.188	-33.78	D	7.605	7.593	0.012	3.3	93.14	6.63	0	0	0	0.23	0	0
2003	232	0	907	-79.461	-36.281	D	7.626	7.593	0.033	3.3	93.57	6.23	0	0	0	0.21	0	0
2003	233	0	907	-79.461	-36.281	D	7.626	7.593	0.034	3.3	91.81	8.03	0	0	0	0.16	0	0
2003	234	0	907	-79.461	-36.281	D	7.612	7.593	0.02	3.3	97.42	2.42	0	0	0	0.17	0	0
2003	235	0	933	-78.17	-33.075	D	7.605	7.593	0.013	3.3	97.85	1.93	0	0	0	0.22	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	236	0	933	-78.17	-33.075	D	7.844	7.593	0.252	3.3	99.4	0.26	0	0	0	0.34	0	0
2003	237	0	1039	-87.824	-33.618	D	7.786	7.593	0.193	3.3	97	2.77	0	0	0	0.23	0	0
2003	238	0	1017	-87.324	-31.258	D	7.669	7.593	0.076	3.3	99.37	0.44	0	0	0	0.19	0	0
2003	239	0	949	-78.53	-31.5	D	7.612	7.593	0.02	3.3	99.42	0.42	0	0	0	0.17	0	0
2003	240	0	784	-78.622	-31.837	D	7.593	7.593	0	3.3	98.37	1.17	0	0	0	0.15	0	0
2003	241	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	242	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	243	0	966	-80.657	-30.543	D	7.594	7.593	0.002	3.3	99.07	0.83	0	0	0	0.08	0	0
2003	244	0	1017	-87.324	-31.258	D	7.593	7.593	0.001	3.3	90.32	9.69	0	0	0	0.07	0	0
2003	245	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	110.16	2.8	0	0	0	0	0	0
2003	246	0	1035	-87.826	-32.813	D	7.695	7.639	0.056	3.4	72.56	27.25	0	0	0	0.2	0	0
2003	247	0	949	-78.53	-31.5	D	7.811	7.639	0.173	3.4	89.48	10.36	0	0	0	0.15	0	0
2003	248	0	853	-82.958	-38.45	D	7.646	7.639	0.007	3.4	68.79	31.05	0	0	0	0.16	0	0
2003	249	0	822	-86.552	-37.687	D	7.727	7.639	0.088	3.4	91.91	7.4	0	0	0	0.69	0	0
2003	250	0	1017	-87.324	-31.258	D	7.64	7.639	0.001	3.4	89.89	9.8	0	0	0	0.35	0	0
2003	251	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	252	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	253	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	254	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	255	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	256	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	257	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	258	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	259	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	260	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	261	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	262	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	263	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	264	0	947	-78.463	-31.7	D	7.661	7.639	0.022	3.4	91.36	8.29	0	0	0	0.35	0	0
2003	265	0	1017	-87.324	-31.258	D	7.687	7.639	0.048	3.4	96.35	3.37	0	0	0	0.28	0	0
2003	266	0	748	-79.151	-35.062	D	7.639	7.639	0	3.4	98.89	2.48	0	0	0	0.01	0	0
2003	267	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	268	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	269	0	930	-78.188	-33.78	D	7.705	7.639	0.066	3.4	94.3	5.08	0	0	0	0.62	0	0
2003	270	0	907	-79.461	-36.281	D	7.682	7.639	0.043	3.4	90.44	9.24	0	0	0	0.32	0	0
2003	271	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	272	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	273	0	1	-87.793	-33.479	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	274	0	907	-79.461	-36.281	D	7.744	7.639	0.105	3.4	59.57	40.18	0	0	0	0.25	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	275	0	853	-82.958	-38.45	D	7.512	7.5	0.012	3.1	59.25	40.52	0	0	0	0.23	0	0
2003	276	0	869	-83.476	-36.964	D	7.626	7.5	0.126	3.1	19.95	79.22	0	0	0	0.83	0	0
2003	277	0	1017	-87.324	-31.258	D	7.526	7.5	0.027	3.1	79.07	20.59	0	0	0	0.35	0	0
2003	278	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	279	0	853	-82.958	-38.45	D	7.5	7.5	0	3.1	83.12	16.62	0	0	0	0.3	0	0
2003	280	0	845	-83.769	-38.412	D	7.502	7.5	0.003	3.1	88.38	11.43	0	0	0	0.27	0	0
2003	281	0	822	-86.552	-37.687	D	7.5	7.5	0	3.1	92.2	7.32	0	0	0	0.21	0	0
2003	282	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	283	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	284	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	285	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	286	0	930	-78.188	-33.78	D	7.52	7.5	0.021	3.1	74.15	25.51	0	0	0	0.35	0	0
2003	287	0	933	-78.17	-33.075	D	7.569	7.5	0.069	3.1	79.63	20.04	0	0	0	0.33	0	0
2003	288	0	594	-81.085	-30.817	D	7.5	7.5	0	3.1	66.68	28.39	0	0	0	0.06	0	0
2003	289	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	290	0	967	-80.716	-30.533	D	7.512	7.5	0.012	3.1	40.57	59.29	0	0	0	0.14	0	0
2003	291	0	861	-82.693	-37.797	D	7.827	7.5	0.328	3.1	54.05	45.38	0	0	0	0.57	0	0
2003	292	0	930	-78.188	-33.78	D	7.671	7.5	0.171	3.1	73.53	26.13	0	0	0	0.34	0	0
2003	293	0	853	-82.958	-38.45	D	7.501	7.5	0.002	3.1	85.89	13.83	0	0	0	0.27	0	0
2003	294	0	906	-79.53	-36.28	D	7.5	7.5	0	3.1	99.5	0.74	0	0	0	0.26	0	0
2003	295	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	296	0	78	-86.051	-32.504	D	7.567	7.5	0.067	3.1	84.79	14.23	0	0	0	0.98	0	0
2003	297	0	907	-79.461	-36.281	D	7.514	7.5	0.015	3.1	85.04	14.31	0	0	0	0.64	0	0
2003	298	0	930	-78.188	-33.78	D	7.501	7.5	0.002	3.1	98.47	1.17	0	0	0	0.4	0	0
2003	299	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	300	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	301	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	302	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	303	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	304	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	305	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	306	0	947	-78.463	-31.7	D	7.505	7.5	0.006	3.1	77.37	22.24	0	0	0	0.4	0	0
2003	307	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	308	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	309	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	310	0	949	-78.53	-31.5	D	7.519	7.5	0.02	3.1	60.29	39.43	0	0	0	0.29	0	0
2003	311	0	907	-79.461	-36.281	D	7.851	7.5	0.352	3.1	38.47	61.28	0	0	0	0.25	0	0
2003	312	0	78	-86.051	-32.504	D	8.03	7.5	**0.53**	3.1	36.17	63.28	0	0	0	0.55	1	0
2003	313	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	314	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	315	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	316	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	317	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	318	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	319	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	320	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	321	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	322	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	323	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	324	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	325	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	326	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	327	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	328	0	1004	-85.315	-30.908	D	7.5	7.5	0	3.1	51.28	48.58	0	0	0	0.13	0	0
2003	329	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	330	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	331	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	332	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	333	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	334	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	335	0	1	-87.793	-33.479	D	7.5	7.5	0	3.1	0	0	0	0	0	0	0	0
2003	336	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	337	0	822	-86.552	-37.687	D	7.649	7.593	0.056	3.3	51.93	47.57	0	0	0	0.5	0	0
2003	338	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	339	0	949	-78.53	-31.5	D	7.72	7.593	0.127	3.3	60.44	39.4	0	0	0	0.15	0	0
2003	340	0	930	-78.188	-33.78	D	7.593	7.593	0.001	3.3	68.04	31.93	0	0	0	0.11	0	0
2003	341	0	930	-78.188	-33.78	D	7.598	7.593	0.006	3.3	39.27	60.49	0	0	0	0.24	0	0
2003	342	0	947	-78.463	-31.7	D	7.622	7.593	0.03	3.3	38.74	61.02	0	0	0	0.24	0	0
2003	343	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	344	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	14.58	29.68	0	0	0	0.01	0	0
2003	345	0	832	-85.112	-38.219	D	7.601	7.593	0.008	3.3	11.9	88.1	0	0	0	0	0	0
2003	346	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	347	0	949	-78.53	-31.5	D	7.746	7.593	0.153	3.3	53.51	46.21	0	0	0	0.28	0	0
2003	348	0	10	-87.277	-31.497	D	7.593	7.593	0	3.3	50.29	48.2	0	0	0	0.22	0	0
2003	349	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	350	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	351	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	352	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Hercules June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	353	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	354	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	355	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	356	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	357	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	358	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	359	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	360	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	361	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	362	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	363	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	364	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	365	0	1	-87.793	-33.479	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									0.734								**4**	**0**

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	2	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	3	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	4	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	5	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	6	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	7	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	8	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	9	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	10	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	29.37	70.19	0	0	0	0.25	0	0
2001	11	0	2789	-107.509	-101.223	D	7.635	7.593	0.042	3.3	47.3	52.46	0	0	0	0.25	0	0
2001	12	0	2781	-108.101	-100.123	D	7.593	7.593	0	3.3	50.1	49.69	0	0	0	0.19	0	0
2001	13	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	14	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	15	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	16	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	17	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	18	0	2789	-107.509	-101.223	D	8.162	7.593	**0.57**	3.3	45.47	54.3	0	0	0	0.23	1	0
2001	19	0	2789	-107.509	-101.223	D	8.157	7.593	**0.564**	3.3	40.02	59.7	0	0	0	0.28	1	0
2001	20	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	21	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	22	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	23	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	24	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	25	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	26	0	2789	-107.509	-101.223	D	7.636	7.593	0.044	3.3	33.75	66.03	0	0	0	0.22	0	0
2001	27	0	2781	-108.101	-100.123	D	7.595	7.593	0.003	3.3	31.97	67.88	0	0	0	0.14	0	0
2001	28	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	29	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	30	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	31	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	32	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	33	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	34	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	35	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	36	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	37	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	38	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	39	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	40	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	41	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	42	0	2787	-107.911	-101.199	D	7.453	7.453	0	3	37.78	61.58	0	0	0	0.29	0	0
2001	43	0	2589	-130.538	-119.059	D	7.533	7.453	0.08	3	42.69	57.06	0	0	0	0.26	0	0
2001	44	0	2041	-113.982	-99.303	D	7.453	7.453	0	3	49.6	50.07	0	0	0	0.16	0	0
2001	45	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	46	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	47	0	2789	-107.509	-101.223	D	7.453	7.453	0.001	3	27.26	73.39	0	0	0	0	0	0
2001	48	0	201	-127.558	-119.042	D	7.453	7.453	0	3	11.02	79.76	0	0	0	0	0	0
2001	49	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	50	0	2789	-107.509	-101.223	D	7.462	7.453	0.009	3	57.07	42.66	0	0	0	0.31	0	0
2001	51	0	2789	-107.509	-101.223	D	7.454	7.453	0.001	3	52.37	47.35	0	0	0	0.24	0	0
2001	52	0	2710	-117.428	-99.19	D	7.467	7.453	0.014	3	47.48	52.22	0	0	0	0.31	0	0
2001	53	0	2704	-118.811	-99.252	D	7.546	7.453	0.093	3	44.44	55.3	0	0	0	0.26	0	0
2001	54	0	2711	-117.197	-99.18	D	7.587	7.453	0.134	3	60.63	39.17	0	0	0	0.2	0	0
2001	55	0	2704	-118.811	-99.252	D	7.485	7.453	0.033	3	64.34	35.51	0	0	0	0.16	0	0
2001	56	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	57	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	58	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	59	0	2704	-118.811	-99.252	D	7.459	7.453	0.006	3	59.04	40.79	0	0	0	0.2	0	0
2001	60	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2001	61	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	62	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	63	0	2789	-107.509	-101.223	D	7.311	7.311	0	2.7	60.26	40.37	0	0	0	0.22	0	0
2001	64	0	2789	-107.509	-101.223	D	7.411	7.311	0.1	2.7	48.37	51.31	0	0	0	0.32	0	0
2001	65	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	66	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	67	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	68	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	69	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	70	0	2789	-107.509	-101.223	D	7.33	7.311	0.019	2.7	73.87	25.7	0	0	0	0.44	0	0
2001	71	0	2781	-108.101	-100.123	D	7.312	7.311	0.001	2.7	72.8	27.01	0	0	0	0.29	0	0
2001	72	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	73	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	74	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	75	0	2628	-127.536	-110.65	D	7.311	7.311	0	2.7	32.02	68.07	0	0	0	0.08	0	0
2001	76	0	2682	-121.287	-101.495	D	7.318	7.311	0.007	2.7	34.73	65.12	0	0	0	0.15	0	0
2001	77	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	78	0	2789	-107.509	-101.223	D	7.37	7.311	0.06	2.7	62.26	37.22	0	0	0	0.52	0	0
2001	79	0	2589	-130.538	-119.059	D	7.343	7.311	0.032	2.7	63.77	35.83	0	0	0	0.41	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	80	0	2704	-118.811	-99.252	D	7.362	7.311	0.051	2.7	54.71	44.83	0	0	0	0.46	0	0
2001	81	0	2571	-126.292	-119.174	D	7.511	7.311	0.201	2.7	60.42	39.18	0	0	0	0.4	0	0
2001	82	0	2781	-108.101	-100.123	D	7.366	7.311	0.056	2.7	75.84	23.85	0	0	0	0.31	0	0
2001	83	0	2781	-108.101	-100.123	D	7.414	7.311	0.103	2.7	83.31	16.38	0	0	0	0.31	0	0
2001	84	0	2789	-107.509	-101.223	D	7.368	7.311	0.058	2.7	85.83	13.99	0	0	0	0.19	0	0
2001	85	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	86	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	87	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	88	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	89	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	90	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	91	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2001	92	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	93	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	94	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	95	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	96	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	97	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	98	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	99	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	100	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	101	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	102	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	103	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	104	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	105	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	106	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	107	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	108	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	109	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	110	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	111	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	112	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	113	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	114	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	115	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	116	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	117	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	118	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	119	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	120	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	121	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2001	122	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	123	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	124	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	125	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	126	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	127	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	128	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	129	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	71.61	28.19	0	0	0	0.24	0	0
2001	130	0	2789	-107.509	-101.223	D	7.647	7.639	0.008	3.4	86.37	13.42	0	0	0	0.23	0	0
2001	131	0	2789	-107.509	-101.223	D	7.641	7.639	0.002	3.4	94.86	4.95	0	0	0	0.2	0	0
2001	132	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	133	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	134	0	2789	-107.509	-101.223	D	7.639	7.639	0	3.4	95.49	3.88	0	0	0	0.21	0	0
2001	135	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	136	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	137	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	138	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	139	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	140	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	141	0	2789	-107.509	-101.223	D	7.639	7.639	0	3.4	94.7	4.99	0	0	0	0.32	0	0
2001	142	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	143	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	144	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	145	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	146	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	147	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	148	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	149	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	150	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	151	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	152	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	153	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	154	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	155	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	156	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	157	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001											% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	158	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	159	0	2781	-108.101	-100.123	D	7.653	7.639	0.014	3.4	87.78	11.94	0	0	0	0.27	0	0
2001	160	0	2789	-107.509	-101.223	D	8.336	7.639	**0.697**	3.4	88.22	11.52	0	0	0	0.26	1	0
2001	161	0	2571	-126.292	-119.174	D	7.925	7.639	0.286	3.4	97.86	1.9	0	0	0	0.24	0	0
2001	162	0	2781	-108.101	-100.123	D	7.709	7.639	0.07	3.4	96.31	3.52	0	0	0	0.17	0	0
2001	163	0	2417	-108.302	-100.358	D	7.639	7.639	0	3.4	97.07	1.13	0	0	0	0.13	0	0
2001	164	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	165	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	166	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	167	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	168	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	169	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	170	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	171	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	172	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	173	0	2788	-107.71	-101.211	D	7.639	7.639	0	3.4	99.62	0.14	0	0	0	0	0	0
2001	174	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	175	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	176	0	2789	-107.509	-101.223	D	7.654	7.639	0.015	3.4	95.99	3.76	0	0	0	0.25	0	0
2001	177	0	2789	-107.509	-101.223	D	7.687	7.639	0.049	3.4	98.31	1.46	0	0	0	0.22	0	0
2001	178	0	2758	-112.009	-98.987	D	7.674	7.639	0.035	3.4	98.96	0.84	0	0	0	0.2	0	0
2001	179	0	1415	-118.683	-99.252	D	7.64	7.639	0.001	3.4	96.57	3.45	0	0	0	0.14	0	0
2001	180	0	2756	-112.473	-99.022	D	7.639	7.639	0	3.4	94.59	5.16	0	0	0	0.07	0	0
2001	181	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	182	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	183	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	95.52	4.39	0	0	0	0.25	0	0
2001	184	0	2781	-108.101	-100.123	D	7.694	7.639	0.055	3.4	97.39	2.38	0	0	0	0.23	0	0
2001	185	0	2781	-108.101	-100.123	D	7.643	7.639	0.004	3.4	77.76	22.12	0	0	0	0.14	0	0
2001	186	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	187	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	188	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	99.5	0.57	0	0	0	0	0	0
2001	189	0	2403	-109.049	-100.847	D	7.639	7.639	0	3.4	82.15	1.61	0	0	0	0	0	0
2001	190	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	191	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	192	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	193	0	2789	-107.509	-101.223	D	7.659	7.639	0.02	3.4	99.27	0.34	0	0	0	0.4	0	0
2001	194	0	2789	-107.509	-101.223	D	7.642	7.639	0.003	3.4	98.58	1.1	0	0	0	0.34	0	0
2001	195	0	2789	-107.509	-101.223	D	7.639	7.639	0	3.4	99.8	0.14	0	0	0	0.01	0	0
2001	196	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	96.53	0.03	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	197	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	198	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	199	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	200	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	201	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	202	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	203	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	204	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	205	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	206	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	207	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	208	0	2758	-112.009	-98.987	D	7.64	7.639	0.001	3.4	95.93	4	0	0	0	0.07	0	0
2001	209	0	2781	-108.101	-100.123	D	7.64	7.639	0.001	3.4	91.66	8.35	0	0	0	0.09	0	0
2001	210	0	2401	-109.291	-100.348	D	7.639	7.639	0	3.4	96.57	2.64	0	0	0	0.02	0	0
2001	211	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	212	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	213	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	214	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	215	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	216	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	217	0	2789	-107.509	-101.223	D	7.671	7.639	0.032	3.4	99.49	0.16	0	0	0	0.35	0	0
2001	218	0	2694	-120.047	-100.054	D	7.649	7.639	0.01	3.4	99.47	0.27	0	0	0	0.26	0	0
2001	219	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	220	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	221	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	222	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	223	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	224	0	2789	-107.509	-101.223	D	7.875	7.639	0.236	3.4	96.87	2.83	0	0	0	0.3	0	0
2001	225	0	2789	-107.509	-101.223	D	8.197	7.639	**0.558**	3.4	88.22	11.53	0	0	0	0.25	1	0
2001	226	0	2589	-130.538	-119.059	D	7.933	7.639	0.294	3.4	94.53	5.21	0	0	0	0.26	0	0
2001	227	0	2571	-126.292	-119.174	D	7.665	7.639	0.027	3.4	93.14	6.47	0	0	0	0.39	0	0
2001	228	0	2468	-114.425	-109.261	D	7.698	7.639	0.06	3.4	98.03	1.66	0	0	0	0.31	0	0
2001	229	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	230	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	231	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	232	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	233	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	234	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	235	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	236	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	237	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	238	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	239	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	240	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	241	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	99.54	0.34	0	0	0	0.24	0	0
2001	242	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	243	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	244	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2001	245	0	2758	-112.009	-98.987	D	7.779	7.731	0.049	3.6	98.44	1.31	0	0	0	0.26	0	0
2001	246	0	2704	-118.811	-99.252	D	7.734	7.731	0.003	3.6	91.88	7.92	0	0	0	0.19	0	0
2001	247	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	248	0	2757	-112.241	-99.005	D	7.731	7.731	0	3.6	97.93	1.31	0	0	0	0.32	0	0
2001	249	0	2182	-112.742	-99.068	D	7.731	7.731	0	3.6	98.27	1.21	0	0	0	0.27	0	0
2001	250	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	251	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	252	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	253	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	254	0	2362	-110.066	-103.322	D	7.731	7.731	0	3.6	79.17	13.98	0	0	0	0.28	0	0
2001	255	0	2781	-108.101	-100.123	D	7.79	7.731	0.06	3.6	85.81	13.91	0	0	0	0.29	0	0
2001	256	0	1415	-118.683	-99.252	D	7.731	7.731	0	3.6	97.88	1.93	0	0	0	0.16	0	0
2001	257	0	2781	-108.101	-100.123	D	7.753	7.731	0.022	3.6	88.7	11.08	0	0	0	0.22	0	0
2001	258	0	2704	-118.811	-99.252	D	7.804	7.731	0.073	3.6	93.77	6	0	0	0	0.22	0	0
2001	259	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	260	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	261	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	262	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	263	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	264	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	265	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	266	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	267	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	268	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2001	269	0	2789	-107.509	-101.223	D	7.953	7.731	0.223	3.6	74.63	24.83	0	0	0	0.54	0	0
2001	270	0	2571	-126.292	-119.174	D	7.907	7.731	0.176	3.6	79.12	20.58	0	0	0	0.29	0	0
2001	271	0	2588	-130.481	-119.268	D	7.812	7.731	0.081	3.6	86.42	13.35	0	0	0	0.23	0	0
2001	272	0	2789	-107.509	-101.223	D	7.836	7.731	0.106	3.6	98.15	1.38	0	0	0	0.47	0	0
2001	273	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	85.02	12.48	0	0	0	0.26	0	0
2001	274	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	275	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	276	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	277	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	278	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	279	0	2781	-108.101	-100.123	D	7.61	7.593	0.017	3.3	32.4	67.6	0	0	0	0	0	0
2001	280	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	281	0	2789	-107.509	-101.223	D	7.599	7.593	0.006	3.3	75.93	23.79	0	0	0	0.29	0	0
2001	282	0	2781	-108.101	-100.123	D	7.595	7.593	0.002	3.3	72.74	27.01	0	0	0	0.25	0	0
2001	283	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	284	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	285	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	286	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	287	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	288	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	289	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	290	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	291	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	292	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	71.99	27.45	0	0	0	0.34	0	0
2001	293	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	294	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	295	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	296	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	297	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	298	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	299	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	300	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	301	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	302	0	2789	-107.509	-101.223	D	7.61	7.593	0.017	3.3	86.27	13.45	0	0	0	0.28	0	0
2001	303	0	2780	-108.33	-100.15	D	7.593	7.593	0	3.3	74.37	25.41	0	0	0	0.14	0	0
2001	304	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	305	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	306	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	307	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	308	0	2781	-108.101	-100.123	D	7.621	7.546	0.075	3.2	82.9	16.87	0	0	0	0.24	0	0
2001	309	0	2758	-112.009	-98.987	D	7.558	7.546	0.012	3.2	86.16	13.65	0	0	0	0.21	0	0
2001	310	0	2781	-108.101	-100.123	D	7.591	7.546	0.045	3.2	75.36	24.32	0	0	0	0.32	0	0
2001	311	0	2789	-107.509	-101.223	D	7.572	7.546	0.026	3.2	71.29	28.38	0	0	0	0.34	0	0
2001	312	0	2789	-107.509	-101.223	D	7.555	7.546	0.009	3.2	76.7	23.08	0	0	0	0.26	0	0
2001	313	0	2789	-107.509	-101.223	D	7.547	7.546	0.001	3.2	88.94	11.01	0	0	0	0.17	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001											% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	314	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	315	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	316	0	2789	-107.509	-101.223	D	7.58	7.546	0.034	3.2	60.26	39.16	0	0	0	0.58	0	0
2001	317	0	2589	-130.538	-119.059	D	7.589	7.546	0.043	3.2	58.66	40.92	0	0	0	0.42	0	0
2001	318	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	319	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	320	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	321	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	322	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	323	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	324	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	325	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	326	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	327	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	328	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	329	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	330	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	331	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	332	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2001	333	0	2789	-107.509	-101.223	D	7.574	7.546	0.027	3.2	40.28	59.6	0	0	0	0.12	0	0
2001	334	0	2789	-107.509	-101.223	D	7.905	7.546	0.358	3.2	39.51	60.31	0	0	0	0.17	0	0
2001	335	0	1800	-115.823	-109.474	D	7.546	7.546	0	3.2	16.06	70.12	0	0	0	0	0	0
2001	336	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	337	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	338	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	339	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	340	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	341	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	342	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	343	0	2704	-118.811	-99.252	D	7.705	7.593	0.112	3.3	40.09	59.64	0	0	0	0.28	0	0
2001	344	0	2789	-107.509	-101.223	D	7.595	7.593	0.003	3.3	34.35	65.33	0	0	0	0.32	0	0
2001	345	0	2789	-107.509	-101.223	D	7.615	7.593	0.022	3.3	40.95	58.79	0	0	0	0.27	0	0
2001	346	0	2789	-107.509	-101.223	D	7.614	7.593	0.022	3.3	57.59	42.17	0	0	0	0.24	0	0
2001	347	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	348	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	349	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	350	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	351	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	352	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2001												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2001	353	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	354	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	355	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	356	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	357	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	358	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	359	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	360	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	361	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	362	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	363	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	364	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2001	365	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									0.697								**4**	**0**

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002											% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	2	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	3	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	4	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	5	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	6	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	7	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	8	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	9	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	10	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	11	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	12	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	13	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	14	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	15	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	16	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	17	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	18	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	19	0	2789	-107.509	-101.223	D	7.639	7.593	0.046	3.3	57.85	41.97	0	0	0	0.19	0	0
2002	20	0	2781	-108.101	-100.123	D	7.629	7.593	0.036	3.3	62.68	37.16	0	0	0	0.16	0	0
2002	21	0	2789	-107.509	-101.223	D	7.603	7.593	0.01	3.3	66.95	32.94	0	0	0	0.12	0	0
2002	22	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	23	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	24	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	25	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	26	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	27	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	28	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	29	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	30	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	31	0	1415	-118.683	-99.252	D	7.593	7.593	0	3.3	47.3	53.07	0	0	0	0.04	0	0
2002	32	0	2694	-120.047	-100.054	D	7.597	7.593	0.004	3.3	11.33	88.7	0	0	0	0	0	0
2002	33	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	34	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	35	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	36	0	2789	-107.509	-101.223	D	7.453	7.453	0.001	3	38.55	61.18	0	0	0	0.37	0	0
2002	37	0	2781	-108.101	-100.123	D	7.499	7.453	0.047	3	38.75	60.92	0	0	0	0.33	0	0
2002	38	0	2694	-120.047	-100.054	D	7.453	7.453	0	3	48.06	53.25	0	0	0	0.21	0	0
2002	39	0	2781	-108.101	-100.123	D	7.453	7.453	0	3	67.09	33.99	0	0	0	0.18	0	0
2002	40	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	41	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	42	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	43	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	44	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	45	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	46	0	2789	-107.509	-101.223	D	7.455	7.453	0.002	3	67.19	32.6	0	0	0	0.36	0	0
2002	47	0	2405	-109.044	-100.35	D	7.453	7.453	0	3	57.71	32.97	0	0	0	0.28	0	0
2002	48	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	49	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	50	0	2789	-107.509	-101.223	D	7.457	7.453	0.004	3	42.13	57.48	0	0	0	0.42	0	0
2002	51	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	52	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	53	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	54	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	55	0	2789	-107.509	-101.223	D	7.456	7.453	0.003	3	65.76	33.97	0	0	0	0.34	0	0
2002	56	0	2789	-107.509	-101.223	D	7.453	7.453	0	3	62.37	37.44	0	0	0	0.22	0	0
2002	57	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	58	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	59	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	60	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2002	61	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	62	0	2781	-108.101	-100.123	D	7.314	7.311	0.003	2.7	50.77	49.15	0	0	0	0.09	0	0
2002	63	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	64	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	65	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	66	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	67	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	68	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	69	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	70	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	71	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	72	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	73	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	74	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	75	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	76	0	2789	-107.509	-101.223	D	7.442	7.311	0.131	2.7	49.88	49.44	0	0	0	0.68	0	0
2002	77	0	2781	-108.101	-100.123	D	7.322	7.311	0.011	2.7	37.71	62.28	0	0	0	0.01	0	0
2002	78	0	2781	-108.101	-100.123	D	7.312	7.311	0.002	2.7	67.63	32.44	0	0	0	0.01	0	0
2002	79	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	80	0	2789	-107.509	-101.223	D	7.492	7.311	0.181	2.7	66.7	33.16	0	0	0	0.13	0	0
2002	81	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	82	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	83	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	84	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	85	0	2781	-108.101	-100.123	D	7.576	7.311	0.265	2.7	69.35	30.49	0	0	0	0.16	0	0
2002	86	0	2789	-107.509	-101.223	D	7.32	7.311	0.01	2.7	61.9	37.91	0	0	0	0.2	0	0
2002	87	0	2789	-107.509	-101.223	D	7.32	7.311	0.009	2.7	72.99	26.8	0	0	0	0.22	0	0
2002	88	0	2789	-107.509	-101.223	D	7.317	7.311	0.007	2.7	71.29	28.52	0	0	0	0.2	0	0
2002	89	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2002	90	0	2758	-112.009	-98.987	D	7.319	7.311	0.008	2.7	74.58	25.11	0	0	0	0.35	0	0
2002	91	0	2758	-112.009	-98.987	D	7.382	7.311	0.071	2.7	76.35	23.17	0	0	0	0.48	0	0
2002	92	0	2781	-108.101	-100.123	D	7.412	7.358	0.054	2.8	67.4	32.26	0	0	0	0.34	0	0
2002	93	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	94	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	95	0	2781	-108.101	-100.123	D	7.376	7.358	0.018	2.8	56.67	43.03	0	0	0	0.32	0	0
2002	96	0	2789	-107.509	-101.223	D	7.554	7.358	0.196	2.8	76.39	23.3	0	0	0	0.31	0	0
2002	97	0	2789	-107.509	-101.223	D	7.578	7.358	0.219	2.8	83.56	16.19	0	0	0	0.26	0	0
2002	98	0	2781	-108.101	-100.123	D	7.36	7.358	0.002	2.8	87.84	11.96	0	0	0	0.22	0	0
2002	99	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	100	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	101	0	2789	-107.509	-101.223	D	7.412	7.358	0.054	2.8	72.41	27.23	0	0	0	0.36	0	0
2002	102	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	103	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	104	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	105	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	106	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	107	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	108	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	109	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	110	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	111	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	112	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	113	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	114	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	115	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	116	0	2571	-126.292	-119.174	D	7.358	7.358	0	2.8	85.49	14.12	0	0	0	0.57	0	0
2002	117	0	2588	-130.481	-119.268	D	7.366	7.358	0.008	2.8	76.49	23.23	0	0	0	0.3	0	0
2002	118	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0

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Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002											% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	119	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2002	120	0	2789	-107.509	-101.223	D	7.359	7.358	0	2.8	97.26	2.92	0	0	0	0.42	0	0
2002	121	0	2781	-108.101	-100.123	D	7.36	7.358	0.002	2.8	92.23	7.41	0	0	0	0.38	0	0
2002	122	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	123	0	2789	-107.509	-101.223	D	7.641	7.639	0.002	3.4	84.93	14.97	0	0	0	0.16	0	0
2002	124	0	2781	-108.101	-100.123	D	7.719	7.639	0.08	3.4	78.84	20.8	0	0	0	0.36	0	0
2002	125	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	126	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	127	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	128	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	129	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	130	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	131	0	2781	-108.101	-100.123	D	7.644	7.639	0.005	3.4	91.37	8.13	0	0	0	0.48	0	0
2002	132	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	133	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	134	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	135	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	136	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	137	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	138	0	2781	-108.101	-100.123	D	7.849	7.639	0.21	3.4	68.46	31.45	0	0	0	0.09	0	0
2002	139	0	2789	-107.509	-101.223	D	7.826	7.639	0.187	3.4	46.08	53.56	0	0	0	0.36	0	0
2002	140	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	141	0	2788	-107.71	-101.211	D	7.639	7.639	0	3.4	90.55	7.66	0	0	0	0.36	0	0
2002	142	0	2789	-107.509	-101.223	D	7.663	7.639	0.024	3.4	96.21	3.54	0	0	0	0.26	0	0
2002	143	0	2781	-108.101	-100.123	D	7.65	7.639	0.011	3.4	91.36	8.47	0	0	0	0.17	0	0
2002	144	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	145	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	146	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	147	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	148	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	149	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	150	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	151	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	152	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	153	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	154	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	155	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	156	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	157	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

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Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	158	0	2468	-114.425	-109.261	D	7.642	7.639	0.003	3.4	92.32	7.41	0	0	0	0.26	0	0
2002	159	0	2571	-126.292	-119.174	D	7.964	7.639	0.325	3.4	94.69	5.07	0	0	0	0.24	0	0
2002	160	0	2694	-120.047	-100.054	D	7.818	7.639	0.179	3.4	96.85	2.94	0	0	0	0.21	0	0
2002	161	0	2182	-112.742	-99.068	D	7.639	7.639	0	3.4	94.25	5.15	0	0	0	0.16	0	0
2002	162	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	163	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	164	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	165	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	166	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	167	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	168	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	169	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	99.09	0.92	0	0	0	0.11	0	0
2002	170	0	2781	-108.101	-100.123	D	7.639	7.639	0	3.4	101.85	1.28	0	0	0	0.04	0	0
2002	171	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	172	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	173	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	174	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	175	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	176	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	177	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	178	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	179	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	180	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	181	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	182	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	183	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	184	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	185	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	186	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	187	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	188	0	2758	-112.009	-98.987	D	7.641	7.639	0.002	3.4	99.93	0.08	0	0	0	0.01	0	0
2002	189	0	1483	-118.188	-99.258	D	7.639	7.639	0	3.4	99.88	0.41	0	0	0	0.01	0	0
2002	190	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	191	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	192	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	193	0	2781	-108.101	-100.123	D	7.64	7.639	0.001	3.4	98.85	1.04	0	0	0	0.14	0	0
2002	194	0	2781	-108.101	-100.123	D	7.64	7.639	0.001	3.4	96.87	3.12	0	0	0	0.1	0	0
2002	195	0	2755	-112.705	-99.039	D	7.639	7.639	0	3.4	98.06	1.63	0	0	0	0.05	0	0
2002	196	0	2694	-120.047	-100.054	D	7.64	7.639	0.001	3.4	99.24	0.41	0	0	0	0.34	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	197	0	2704	-118.811	-99.252	D	7.647	7.639	0.009	3.4	94.87	4.86	0	0	0	0.27	0	0
2002	198	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	199	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	200	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	201	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	202	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	203	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	204	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	205	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	206	0	2789	-107.509	-101.223	D	7.734	7.639	0.095	3.4	96.16	3.57	0	0	0	0.27	0	0
2002	207	0	2571	-126.292	-119.174	D	7.718	7.639	0.08	3.4	97.25	2.56	0	0	0	0.19	0	0
2002	208	0	2789	-107.509	-101.223	D	7.654	7.639	0.015	3.4	97.2	2.65	0	0	0	0.16	0	0
2002	209	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	210	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	211	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	212	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	213	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	214	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	215	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	216	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	217	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	218	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	219	0	2789	-107.509	-101.223	D	7.801	7.639	0.162	3.4	95.13	4.61	0	0	0	0.26	0	0
2002	220	0	2588	-130.481	-119.268	D	7.695	7.639	0.056	3.4	98.55	1.21	0	0	0	0.24	0	0
2002	221	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	222	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	223	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	224	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	225	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	226	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	227	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	228	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	229	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	230	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	231	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	232	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	233	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	234	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	235	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	236	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	237	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	238	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	239	0	2789	-107.509	-101.223	D	7.826	7.639	0.187	3.4	95.25	4.39	0	0	0	0.36	0	0
2002	240	0	2704	-118.811	-99.252	D	8.031	7.639	0.392	3.4	95.86	3.84	0	0	0	0.29	0	0
2002	241	0	2628	-127.536	-110.65	D	7.643	7.639	0.004	3.4	92.62	7.2	0	0	0	0.19	0	0
2002	242	0	1048	-121.178	-101.214	D	7.639	7.639	0	3.4	101.06	0.44	0	0	0	0.36	0	0
2002	243	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	244	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2002	245	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	246	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	247	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	248	0	2789	-107.509	-101.223	D	7.738	7.731	0.007	3.6	97.68	2.05	0	0	0	0.27	0	0
2002	249	0	2789	-107.509	-101.223	D	7.948	7.731	0.218	3.6	93.8	5.96	0	0	0	0.25	0	0
2002	250	0	2628	-127.536	-110.65	D	7.737	7.731	0.007	3.6	96.08	3.68	0	0	0	0.24	0	0
2002	251	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	252	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	253	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	254	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	255	0	2781	-108.101	-100.123	D	7.817	7.731	0.087	3.6	79.94	19.65	0	0	0	0.41	0	0
2002	256	0	2588	-130.481	-119.268	D	7.84	7.731	0.109	3.6	90.55	9.03	0	0	0	0.42	0	0
2002	257	0	2588	-130.481	-119.268	D	7.74	7.731	0.009	3.6	98.92	0.81	0	0	0	0.27	0	0
2002	258	0	2758	-112.009	-98.987	D	7.734	7.731	0.003	3.6	98.58	1.17	0	0	0	0.23	0	0
2002	259	0	2781	-108.101	-100.123	D	7.731	7.731	0	3.6	94.16	5.59	0	0	0	0.16	0	0
2002	260	0	2789	-107.509	-101.223	D	7.759	7.731	0.028	3.6	98.05	1.67	0	0	0	0.28	0	0
2002	261	0	2781	-108.101	-100.123	D	7.731	7.731	0	3.6	91.22	8.78	0	0	0	0.07	0	0
2002	262	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	263	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	264	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	265	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	266	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	267	0	2468	-114.425	-109.261	D	7.743	7.731	0.013	3.6	95.69	3.85	0	0	0	0.45	0	0
2002	268	0	2789	-107.509	-101.223	D	7.796	7.731	0.065	3.6	85.1	14.6	0	0	0	0.3	0	0
2002	269	0	2704	-118.811	-99.252	D	7.731	7.731	0.001	3.6	92.15	7.57	0	0	0	0.23	0	0
2002	270	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2002	271	0	2758	-112.009	-98.987	D	7.921	7.731	0.191	3.6	96.14	3.55	0	0	0	0.31	0	0
2002	272	0	2781	-108.101	-100.123	D	8.042	7.731	0.312	3.6	94.65	5.07	0	0	0	0.28	0	0
2002	273	0	2781	-108.101	-100.123	D	7.749	7.731	0.019	3.6	96.76	3.02	0	0	0	0.22	0	0
2002	274	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0

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Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	275	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	276	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	277	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	278	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	279	0	2789	-107.509	-101.223	D	7.595	7.593	0.003	3.3	93.64	5.93	0	0	0	0.46	0	0
2002	280	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	92.31	7.57	0	0	0	0.4	0	0
2002	281	0	2789	-107.509	-101.223	D	7.6	7.593	0.007	3.3	73.83	25.8	0	0	0	0.37	0	0
2002	282	0	2468	-114.425	-109.261	D	7.669	7.593	0.077	3.3	82.93	16.68	0	0	0	0.39	0	0
2002	283	0	1415	-118.683	-99.252	D	7.593	7.593	0	3.3	96.92	3.08	0	0	0	0.28	0	0
2002	284	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	285	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	286	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	287	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	288	0	2573	-126.785	-119.186	D	7.751	7.593	0.158	3.3	64.91	34.71	0	0	0	0.38	0	0
2002	289	0	2790	-107.59	-101.331	D	7.619	7.593	0.027	3.3	63.52	36.21	0	0	0	0.28	0	0
2002	290	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	291	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	292	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	293	0	2468	-114.425	-109.261	D	7.601	7.593	0.009	3.3	50.1	49.7	0	0	0	0.21	0	0
2002	294	0	2571	-126.292	-119.174	D	7.893	7.593	0.3	3.3	65.98	33.64	0	0	0	0.38	0	0
2002	295	0	2628	-127.536	-110.65	D	7.696	7.593	0.104	3.3	75.45	24.25	0	0	0	0.29	0	0
2002	296	0	2704	-118.811	-99.252	D	7.655	7.593	0.063	3.3	84.49	15.23	0	0	0	0.28	0	0
2002	297	0	2758	-112.009	-98.987	D	7.699	7.593	0.106	3.3	84.82	14.93	0	0	0	0.25	0	0
2002	298	0	2704	-118.811	-99.252	D	7.604	7.593	0.011	3.3	80.63	19.19	0	0	0	0.19	0	0
2002	299	0	2781	-108.101	-100.123	D	7.611	7.593	0.019	3.3	89.58	10.35	0	0	0	0.08	0	0
2002	300	0	2789	-107.509	-101.223	D	7.622	7.593	0.03	3.3	91.86	8.04	0	0	0	0.1	0	0
2002	301	0	2781	-108.101	-100.123	D	8.143	7.593	**0.55**	3.3	66.99	32.79	0	0	0	0.22	1	0
2002	302	0	2694	-120.047	-100.054	D	7.605	7.593	0.013	3.3	79.26	20.63	0	0	0	0.11	0	0
2002	303	0	2781	-108.101	-100.123	D	8.071	7.593	0.478	3.3	53.61	46.35	0	0	0	0.04	0	0
2002	304	0	2758	-112.009	-98.987	D	8.886	7.593	**1.293**	3.3	67.29	32.57	0	0	0	0.14	1	1
2002	305	0	2468	-114.425	-109.261	D	7.665	7.593	0.072	3.3	58	41.86	0	0	0	0.14	0	0
2002	306	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	307	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	308	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	309	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	310	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	311	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	312	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	313	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0

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Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	314	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	315	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	316	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	317	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	318	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	319	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	320	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	321	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	322	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	323	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	324	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	325	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	326	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	327	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	328	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	329	0	2789	-107.509	-101.223	D	7.641	7.546	0.094	3.2	43.81	56	0	0	0	0.18	0	0
2002	330	0	2789	-107.509	-101.223	D	7.592	7.546	0.046	3.2	42.49	57.27	0	0	0	0.24	0	0
2002	331	0	2781	-108.101	-100.123	D	8.063	7.546	**0.517**	3.2	39.66	60.06	0	0	0	0.27	1	0
2002	332	0	2588	-130.481	-119.268	D	7.647	7.546	0.101	3.2	36.54	63.18	0	0	0	0.28	0	0
2002	333	0	2571	-126.292	-119.174	D	7.554	7.546	0.008	3.2	48.47	51.39	0	0	0	0.17	0	0
2002	334	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	335	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2002	336	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	337	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	338	0	2704	-118.811	-99.252	D	7.661	7.593	0.068	3.3	18.68	80.78	0	0	0	0.54	0	0
2002	339	0	2704	-118.811	-99.252	D	7.633	7.593	0.041	3.3	51.93	47.79	0	0	0	0.28	0	0
2002	340	0	2789	-107.509	-101.223	D	7.837	7.593	0.244	3.3	44.04	55.68	0	0	0	0.29	0	0
2002	341	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	342	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	343	0	2781	-108.101	-100.123	D	7.678	7.593	0.085	3.3	54.15	45.57	0	0	0	0.27	0	0
2002	344	0	2684	-121.246	-101.035	D	7.698	7.593	0.106	3.3	57.91	41.85	0	0	0	0.25	0	0
2002	345	0	2754	-112.938	-99.057	D	7.594	7.593	0.001	3.3	59	40.91	0	0	0	0.14	0	0
2002	346	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	347	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	348	0	2781	-108.101	-100.123	D	7.751	7.593	0.158	3.3	49.54	50.21	0	0	0	0.25	0	0
2002	349	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	350	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	351	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	352	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2002												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2002	353	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	354	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	355	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	356	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	357	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	358	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	359	0	2589	-130.538	-119.059	D	7.736	7.593	0.144	3.3	39.77	59.92	0	0	0	0.31	0	0
2002	360	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	361	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	362	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	363	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	364	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2002	365	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									1.293								**3**	**1**

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003											% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	2	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	3	0	2704	-118.811	-99.252	D	7.638	7.593	0.045	3.3	16.74	82.95	0	0	0	0.31	0	0
2003	4	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	5	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	6	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	7	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	8	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	9	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	10	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	11	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	12	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	13	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	14	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	15	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	16	0	2789	-107.509	-101.223	D	7.615	7.593	0.022	3.3	32.97	66.77	0	0	0	0.26	0	0
2003	17	0	2704	-118.811	-99.252	D	7.818	7.593	0.226	3.3	40.92	58.85	0	0	0	0.23	0	0
2003	18	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	19	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	20	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	21	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	22	0	2704	-118.811	-99.252	D	7.627	7.593	0.034	3.3	43.11	56.68	0	0	0	0.21	0	0
2003	23	0	2704	-118.811	-99.252	D	7.927	7.593	0.335	3.3	20.51	78.98	0	0	0	0.51	0	0
2003	24	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	25	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	26	0	2418	-108.065	-101.355	D	7.593	7.593	0	3.3	55.15	44.64	0	0	0	0.27	0	0
2003	27	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	28	0	2788	-107.71	-101.211	D	7.593	7.593	0	3.3	60.33	44.34	0	0	0	0.24	0	0
2003	29	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	30	0	2789	-107.509	-101.223	D	7.704	7.593	0.111	3.3	60.75	39.01	0	0	0	0.25	0	0
2003	31	0	2684	-121.246	-101.035	D	7.752	7.593	0.159	3.3	60.93	38.86	0	0	0	0.21	0	0
2003	32	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	33	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	34	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	35	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	36	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	37	0	2789	-107.509	-101.223	D	7.453	7.453	0	3	29.77	69.66	0	0	0	0.36	0	0
2003	38	0	2781	-108.101	-100.123	D	7.52	7.453	0.067	3	46.05	53.73	0	0	0	0.23	0	0
2003	39	0	2468	-114.425	-109.261	D	7.453	7.453	0	3	59.19	40.73	0	0	0	0.12	0	0
2003	40	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003											% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	41	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	42	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	43	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	44	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	45	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	46	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	47	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	48	0	2789	-107.509	-101.223	D	7.888	7.453	0.436	3	48.16	51.53	0	0	0	0.31	0	0
2003	49	0	2468	-114.425	-109.261	D	7.47	7.453	0.017	3	44.64	55.02	0	0	0	0.34	0	0
2003	50	0	2789	-107.509	-101.223	D	7.453	7.453	0	3	82.09	19.75	0	0	0	0.18	0	0
2003	51	0	2781	-108.101	-100.123	D	7.456	7.453	0.003	3	54.41	45.54	0	0	0	0.13	0	0
2003	52	0	2704	-118.811	-99.252	D	7.604	7.453	0.151	3	49.75	50.16	0	0	0	0.09	0	0
2003	53	0	1	-130.283	-119.261	D	7.453	7.453	0	3	0	0	0	0	0	0	0	0
2003	54	0	2789	-107.509	-101.223	D	7.476	7.453	0.023	3	53.06	46.72	0	0	0	0.23	0	0
2003	55	0	2781	-108.101	-100.123	D	7.492	7.453	0.039	3	48.3	51.51	0	0	0	0.19	0	0
2003	56	0	2789	-107.509	-101.223	D	7.456	7.453	0.003	3	49.74	50.14	0	0	0	0.14	0	0
2003	57	0	2789	-107.509	-101.223	D	7.618	7.453	0.165	3	32.53	67.1	0	0	0	0.37	0	0
2003	58	0	2694	-120.047	-100.054	D	7.57	7.453	0.117	3	43.9	55.86	0	0	0	0.25	0	0
2003	59	0	2684	-121.246	-101.035	D	7.462	7.453	0.009	3	53.25	46.6	0	0	0	0.18	0	0
2003	60	0	2600	-129.838	-116.63	D	7.456	7.453	0.004	3	66.73	33.23	0	0	0	0.14	0	0
2003	61	0	2781	-108.101	-100.123	D	7.316	7.311	0.006	2.7	71.85	28.07	0	0	0	0.13	0	0
2003	62	0	2789	-107.509	-101.223	D	7.314	7.311	0.004	2.7	77.14	22.73	0	0	0	0.11	0	0
2003	63	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	64	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	65	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	66	0	2789	-107.509	-101.223	D	7.357	7.311	0.046	2.7	56.11	43.63	0	0	0	0.26	0	0
2003	67	0	2789	-107.509	-101.223	D	7.354	7.311	0.044	2.7	69.22	30.56	0	0	0	0.22	0	0
2003	68	0	2781	-108.101	-100.123	D	7.312	7.311	0.001	2.7	75.59	24.26	0	0	0	0.13	0	0
2003	69	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	70	0	2789	-107.509	-101.223	D	7.49	7.311	0.18	2.7	37.1	62.46	0	0	0	0.44	0	0
2003	71	0	2789	-107.509	-101.223	D	7.483	7.311	0.172	2.7	56.66	43.03	0	0	0	0.3	0	0
2003	72	0	2781	-108.101	-100.123	D	7.311	7.311	0	2.7	65.21	34.67	0	0	0	0.16	0	0
2003	73	0	2789	-107.509	-101.223	D	7.342	7.311	0.031	2.7	68.23	31.38	0	0	0	0.39	0	0
2003	74	0	2628	-127.536	-110.65	D	7.519	7.311	0.208	2.7	71.25	28.44	0	0	0	0.32	0	0
2003	75	0	2684	-121.246	-101.035	D	7.336	7.311	0.026	2.7	81.07	18.75	0	0	0	0.19	0	0
2003	76	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	77	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	78	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	79	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003											% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	80	0	2781	-108.101	-100.123	D	7.321	7.311	0.01	2.7	51.26	48.68	0	0	0	0.08	0	0
2003	81	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	82	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	83	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	84	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	85	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	86	0	2781	-108.101	-100.123	D	7.361	7.311	0.051	2.7	51.73	47.67	0	0	0	0.61	0	0
2003	87	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	88	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	89	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	90	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	91	0	1	-130.283	-119.261	D	7.311	7.311	0	2.7	0	0	0	0	0	0	0	0
2003	92	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	93	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	94	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	95	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	96	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	97	0	2758	-112.009	-98.987	D	7.359	7.358	0	2.8	52.01	47.91	0	0	0	0.19	0	0
2003	98	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	99	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	100	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	101	0	2789	-107.509	-101.223	D	7.384	7.358	0.025	2.8	65.55	33.93	0	0	0	0.53	0	0
2003	102	0	2789	-107.509	-101.223	D	7.406	7.358	0.047	2.8	85.48	14.15	0	0	0	0.37	0	0
2003	103	0	2789	-107.509	-101.223	D	7.368	7.358	0.01	2.8	83.38	16.34	0	0	0	0.29	0	0
2003	104	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	105	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	106	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	107	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	108	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	109	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	110	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	111	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	112	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	113	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	114	0	2789	-107.509	-101.223	D	7.411	7.358	0.053	2.8	89.83	9.72	0	0	0	0.46	0	0
2003	115	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	116	0	2781	-108.101	-100.123	D	7.484	7.358	0.126	2.8	66.11	33.77	0	0	0	0.12	0	0
2003	117	0	2789	-107.509	-101.223	D	7.503	7.358	0.145	2.8	61.36	38.15	0	0	0	0.48	0	0
2003	118	0	2684	-121.246	-101.035	D	7.395	7.358	0.037	2.8	86.4	13.38	0	0	0	0.23	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003											% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	119	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	120	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	121	0	1	-130.283	-119.261	D	7.358	7.358	0	2.8	0	0	0	0	0	0	0	0
2003	122	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	123	0	2789	-107.509	-101.223	D	7.664	7.639	0.025	3.4	67.64	32.16	0	0	0	0.2	0	0
2003	124	0	2781	-108.101	-100.123	D	8.277	7.639	**0.638**	3.4	85.67	14.1	0	0	0	0.24	1	0
2003	125	0	2684	-121.246	-101.035	D	7.64	7.639	0.001	3.4	98.17	1.72	0	0	0	0.04	0	0
2003	126	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	127	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	128	0	2704	-118.811	-99.252	D	7.705	7.639	0.066	3.4	94.21	5.55	0	0	0	0.24	0	0
2003	129	0	2781	-108.101	-100.123	D	7.64	7.639	0.001	3.4	96.11	3.8	0	0	0	0.17	0	0
2003	130	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	131	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	132	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	133	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	134	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	135	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	136	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	137	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	138	0	2704	-118.811	-99.252	D	7.681	7.639	0.042	3.4	72.1	27.62	0	0	0	0.28	0	0
2003	139	0	2608	-129.2	-114.866	D	7.791	7.639	0.152	3.4	80.26	19.4	0	0	0	0.34	0	0
2003	140	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	141	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	142	0	2589	-130.538	-119.059	D	7.745	7.639	0.106	3.4	83.03	16.44	0	0	0	0.53	0	0
2003	143	0	2781	-108.101	-100.123	D	7.914	7.639	0.275	3.4	93.57	6.05	0	0	0	0.38	0	0
2003	144	0	2781	-108.101	-100.123	D	8.163	7.639	**0.524**	3.4	92.45	7.26	0	0	0	0.29	1	0
2003	145	0	2789	-107.509	-101.223	D	7.962	7.639	0.323	3.4	92.31	7.47	0	0	0	0.22	0	0
2003	146	0	2758	-112.009	-98.987	D	7.739	7.639	0.1	3.4	91.96	7.91	0	0	0	0.14	0	0
2003	147	0	2704	-118.811	-99.252	D	7.692	7.639	0.054	3.4	86.88	12.78	0	0	0	0.33	0	0
2003	148	0	2789	-107.509	-101.223	D	7.931	7.639	0.292	3.4	66.87	32.89	0	0	0	0.24	0	0
2003	149	0	2588	-130.481	-119.268	D	7.656	7.639	0.017	3.4	95	4.81	0	0	0	0.2	0	0
2003	150	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	151	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	152	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	153	0	2758	-112.009	-98.987	D	7.705	7.639	0.066	3.4	86.85	12.84	0	0	0	0.3	0	0
2003	154	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	155	0	2789	-107.509	-101.223	D	7.824	7.639	0.185	3.4	92.88	6.98	0	0	0	0.15	0	0
2003	156	0	2588	-130.481	-119.268	D	7.709	7.639	0.07	3.4	88.71	11.19	0	0	0	0.1	0	0
2003	157	0	2571	-126.292	-119.174	D	7.641	7.639	0.003	3.4	87.31	12.58	0	0	0	0.16	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003											% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	158	0	2791	-107.739	-101.384	D	7.648	7.639	0.009	3.4	84.47	15.39	0	0	0	0.13	0	0
2003	159	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	90.16	9.79	0	0	0	0.1	0	0
2003	160	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	161	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	162	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	163	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	164	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	165	0	2704	-118.811	-99.252	D	7.643	7.639	0.005	3.4	91.54	8.43	0	0	0	0.02	0	0
2003	166	0	2758	-112.009	-98.987	D	7.681	7.639	0.042	3.4	87.24	12.73	0	0	0	0.03	0	0
2003	167	0	2468	-114.425	-109.261	D	7.973	7.639	0.334	3.4	94.59	5.14	0	0	0	0.27	0	0
2003	168	0	2589	-130.538	-119.059	D	7.65	7.639	0.012	3.4	93.39	6.45	0	0	0	0.17	0	0
2003	169	0	2628	-127.536	-110.65	D	7.639	7.639	0	3.4	84.05	15.88	0	0	0	0.15	0	0
2003	170	0	2781	-108.101	-100.123	D	7.642	7.639	0.004	3.4	96.09	3.77	0	0	0	0.18	0	0
2003	171	0	2789	-107.509	-101.223	D	7.874	7.639	0.235	3.4	97.68	2.13	0	0	0	0.18	0	0
2003	172	0	2571	-126.292	-119.174	D	7.96	7.639	0.321	3.4	95.2	4.65	0	0	0	0.15	0	0
2003	173	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	174	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	175	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	176	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	177	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	178	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	179	0	2468	-114.425	-109.261	D	7.642	7.639	0.003	3.4	79.35	20.43	0	0	0	0.21	0	0
2003	180	0	2468	-114.425	-109.261	D	7.718	7.639	0.079	3.4	95.06	4.7	0	0	0	0.25	0	0
2003	181	0	2704	-118.811	-99.252	D	7.678	7.639	0.039	3.4	97.75	2.05	0	0	0	0.19	0	0
2003	182	0	2705	-118.581	-99.242	D	7.643	7.639	0.004	3.4	98.05	1.79	0	0	0	0.16	0	0
2003	183	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	150	4.73	0	0	0	0.03	0	0
2003	184	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	185	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	186	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	187	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	188	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	189	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	190	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	191	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	192	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	193	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	194	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	195	0	2781	-108.101	-100.123	D	7.645	7.639	0.006	3.4	99.33	0.42	0	0	0	0.25	0	0
2003	196	0	2781	-108.101	-100.123	D	7.641	7.639	0.002	3.4	98	1.81	0	0	0	0.23	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003													% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	197	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	198	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	199	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	200	0	2789	-107.509	-101.223	D	7.645	7.639	0.006	3.4	99.62	0.19	0	0	0	0.19	0	0
2003	201	0	2789	-107.509	-101.223	D	7.64	7.639	0.001	3.4	99.37	0.58	0	0	0	0.16	0	0
2003	202	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	203	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	204	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	205	0	2789	-107.509	-101.223	D	7.665	7.639	0.026	3.4	83.83	15.81	0	0	0	0.36	0	0
2003	206	0	2781	-108.101	-100.123	D	7.899	7.639	0.26	3.4	93.03	6.65	0	0	0	0.31	0	0
2003	207	0	2684	-121.246	-101.035	D	7.671	7.639	0.033	3.4	97.43	2.34	0	0	0	0.23	0	0
2003	208	0	1043	-121.192	-102.457	D	7.639	7.639	0	3.4	19.18	0.04	0	0	0	0.03	0	0
2003	209	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	210	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	211	0	2758	-112.009	-98.987	D	7.659	7.639	0.02	3.4	99.35	0.6	0	0	0	0.05	0	0
2003	212	0	2758	-112.009	-98.987	D	7.667	7.639	0.028	3.4	99.32	0.66	0	0	0	0.02	0	0
2003	213	0	2468	-114.425	-109.261	D	7.655	7.639	0.016	3.4	97.6	2.4	0	0	0	0.01	0	0
2003	214	0	2789	-107.509	-101.223	D	7.642	7.639	0.004	3.4	98.65	1.38	0	0	0	0.01	0	0
2003	215	0	1980	-114.331	-108.745	D	7.639	7.639	0	3.4	93.5	0.07	0	0	0	0.01	0	0
2003	216	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	217	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	218	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	219	0	2781	-108.101	-100.123	D	7.988	7.639	0.349	3.4	94.13	5.62	0	0	0	0.25	0	0
2003	220	0	2571	-126.292	-119.174	D	8.463	7.639	**0.825**	3.4	94.41	5.31	0	0	0	0.28	1	0
2003	221	0	2588	-130.481	-119.268	D	7.771	7.639	0.132	3.4	92.84	6.89	0	0	0	0.27	0	0
2003	222	0	2474	-115.824	-109.567	D	8.009	7.639	0.37	3.4	97.32	2.38	0	0	0	0.3	0	0
2003	223	0	2468	-114.425	-109.261	D	7.905	7.639	0.266	3.4	95.8	3.95	0	0	0	0.26	0	0
2003	224	0	2571	-126.292	-119.174	D	7.857	7.639	0.218	3.4	94.01	5.77	0	0	0	0.22	0	0
2003	225	0	2684	-121.246	-101.035	D	7.743	7.639	0.104	3.4	80.06	19.66	0	0	0	0.28	0	0
2003	226	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	227	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	228	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	229	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	230	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	231	0	2789	-107.509	-101.223	D	7.646	7.639	0.007	3.4	89.5	10.3	0	0	0	0.2	0	0
2003	232	0	2789	-107.509	-101.223	D	7.683	7.639	0.044	3.4	94.9	4.9	0	0	0	0.2	0	0
2003	233	0	2790	-107.59	-101.331	D	7.688	7.639	0.049	3.4	91.51	8.33	0	0	0	0.16	0	0
2003	234	0	2789	-107.509	-101.223	D	7.663	7.639	0.024	3.4	97.21	2.63	0	0	0	0.16	0	0
2003	235	0	2789	-107.509	-101.223	D	7.648	7.639	0.009	3.4	96.76	3.13	0	0	0	0.13	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003											% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	236	0	2781	-108.101	-100.123	D	7.793	7.639	0.154	3.4	99.29	0.44	0	0	0	0.27	0	0
2003	237	0	2758	-112.009	-98.987	D	7.835	7.639	0.196	3.4	97.3	2.47	0	0	0	0.23	0	0
2003	238	0	2704	-118.811	-99.252	D	7.708	7.639	0.069	3.4	99.27	0.54	0	0	0	0.19	0	0
2003	239	0	2781	-108.101	-100.123	D	7.652	7.639	0.014	3.4	99.27	0.56	0	0	0	0.17	0	0
2003	240	0	2780	-108.33	-100.15	D	7.639	7.639	0	3.4	97.97	1.25	0	0	0	0.14	0	0
2003	241	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	242	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	243	0	1	-130.283	-119.261	D	7.639	7.639	0	3.4	0	0	0	0	0	0	0	0
2003	244	0	1414	-118.685	-99.501	D	7.639	7.639	0	3.4	88.52	11.42	0	0	0	0.07	0	0
2003	245	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	4.26	0	0	0	0	0	0	0
2003	246	0	2628	-127.536	-110.65	D	7.91	7.731	0.179	3.6	62.96	36.9	0	0	0	0.14	0	0
2003	247	0	2588	-130.481	-119.268	D	8.208	7.731	0.477	3.6	72.96	26.9	0	0	0	0.14	0	0
2003	248	0	2571	-126.292	-119.174	D	7.8	7.731	0.069	3.6	64.35	35.54	0	0	0	0.11	0	0
2003	249	0	2571	-126.292	-119.174	D	7.886	7.731	0.156	3.6	96.37	3.09	0	0	0	0.54	0	0
2003	250	0	2609	-129.12	-114.645	D	7.732	7.731	0.001	3.6	88.76	10.88	0	0	0	0.33	0	0
2003	251	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	252	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	253	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	254	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	255	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	256	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	257	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	258	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	259	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	260	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	261	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	262	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	263	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	264	0	2789	-107.509	-101.223	D	7.738	7.731	0.007	3.6	94.87	4.86	0	0	0	0.27	0	0
2003	265	0	2600	-129.838	-116.63	D	7.783	7.731	0.053	3.6	95.92	3.82	0	0	0	0.26	0	0
2003	266	0	2074	-113.734	-99.306	D	7.731	7.731	0	3.6	92.59	1.62	0	0	0	0.01	0	0
2003	267	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	268	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	269	0	2789	-107.509	-101.223	D	7.793	7.731	0.062	3.6	94.67	4.79	0	0	0	0.54	0	0
2003	270	0	2789	-107.509	-101.223	D	7.786	7.731	0.055	3.6	85.57	14.19	0	0	0	0.25	0	0
2003	271	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	272	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	273	0	1	-130.283	-119.261	D	7.731	7.731	0	3.6	0	0	0	0	0	0	0	0
2003	274	0	2781	-108.101	-100.123	D	7.773	7.731	0.042	3.6	70.43	29.28	0	0	0	0.28	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003											% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	275	0	2789	-107.509	-101.223	D	7.645	7.593	0.052	3.3	69.62	30.16	0	0	0	0.22	0	0
2003	276	0	2704	-118.811	-99.252	D	7.738	7.593	0.145	3.3	44.93	54.43	0	0	0	0.64	0	0
2003	277	0	2684	-121.246	-101.035	D	7.613	7.593	0.02	3.3	83.78	15.88	0	0	0	0.34	0	0
2003	278	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	279	0	2468	-114.425	-109.261	D	7.593	7.593	0.001	3.3	83.87	15.84	0	0	0	0.28	0	0
2003	280	0	2571	-126.292	-119.174	D	7.606	7.593	0.014	3.3	91.52	8.23	0	0	0	0.26	0	0
2003	281	0	2588	-130.481	-119.268	D	7.594	7.593	0.001	3.3	92.49	7.38	0	0	0	0.2	0	0
2003	282	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	283	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	284	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	285	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	286	0	2789	-107.509	-101.223	D	7.597	7.593	0.004	3.3	69.97	29.75	0	0	0	0.31	0	0
2003	287	0	2789	-107.509	-101.223	D	7.621	7.593	0.029	3.3	87.49	12.22	0	0	0	0.3	0	0
2003	288	0	1240	-119.936	-100.73	D	7.593	7.593	0	3.3	24.73	9.89	0	0	0	0.02	0	0
2003	289	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	290	0	2758	-112.009	-98.987	D	7.595	7.593	0.002	3.3	37.49	62.36	0	0	0	0.12	0	0
2003	291	0	2781	-108.101	-100.123	D	7.853	7.593	0.261	3.3	64.23	35.32	0	0	0	0.45	0	0
2003	292	0	2571	-126.292	-119.174	D	7.797	7.593	0.204	3.3	78.5	21.19	0	0	0	0.32	0	0
2003	293	0	2468	-114.425	-109.261	D	7.598	7.593	0.005	3.3	83.05	16.74	0	0	0	0.24	0	0
2003	294	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	98.95	1.11	0	0	0	0.24	0	0
2003	295	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	296	0	2611	-128.961	-114.204	D	7.692	7.593	0.099	3.3	96.16	3.1	0	0	0	0.74	0	0
2003	297	0	2571	-126.292	-119.174	D	7.631	7.593	0.038	3.3	74.64	24.87	0	0	0	0.49	0	0
2003	298	0	2789	-107.509	-101.223	D	7.594	7.593	0.001	3.3	97.85	1.91	0	0	0	0.39	0	0
2003	299	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	300	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	301	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	302	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	303	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	304	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	305	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	306	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	307	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	308	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	309	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	310	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	311	0	2789	-107.509	-101.223	D	7.937	7.546	0.39	3.2	42.65	57.17	0	0	0	0.18	0	0
2003	312	0	2704	-118.811	-99.252	D	7.944	7.546	0.398	3.2	51.28	48.35	0	0	0	0.37	0	0
2003	313	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003												% Modeled Extinction by Species						
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	314	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	315	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	316	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	317	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	318	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	319	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	320	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	321	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	322	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	323	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	324	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	325	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	326	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	327	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	328	0	1046	-121.184	-101.711	D	7.546	7.546	0	3.2	50.46	28.68	0	0	0	0.11	0	0
2003	329	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	330	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	331	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	332	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	333	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	334	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	335	0	1	-130.283	-119.261	D	7.546	7.546	0	3.2	0	0	0	0	0	0	0	0
2003	336	0	2571	-126.292	-119.174	D	7.593	7.593	0	3.3	42.06	57.47	0	0	0	0.49	0	0
2003	337	0	2789	-107.509	-101.223	D	7.649	7.593	0.056	3.3	48.38	51.11	0	0	0	0.51	0	0
2003	338	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	339	0	2781	-108.101	-100.123	D	7.604	7.593	0.011	3.3	63.16	36.71	0	0	0	0.13	0	0
2003	340	0	2789	-107.509	-101.223	D	7.593	7.593	0	3.3	68	31.92	0	0	0	0.11	0	0
2003	341	0	2789	-107.509	-101.223	D	7.597	7.593	0.004	3.3	37.46	62.28	0	0	0	0.24	0	0
2003	342	0	2789	-107.509	-101.223	D	7.612	7.593	0.019	3.3	36.89	62.87	0	0	0	0.24	0	0
2003	343	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	344	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	345	0	2781	-108.101	-100.123	D	7.597	7.593	0.004	3.3	16.64	83.37	0	0	0	0.01	0	0
2003	346	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	347	0	2781	-108.101	-100.123	D	7.631	7.593	0.038	3.3	55.65	44.08	0	0	0	0.28	0	0
2003	348	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	349	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	350	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	351	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	352	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0

Appendix K, Part 6

Holcim Clarksville - Upper Buffalo June 2008 Refined Analysis Method 6 - 2003											% Modeled Extinction by Species							
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	**DELTA DV**	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF	Delta DV above .5	Delta DV above 1
2003	353	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	354	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	355	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	356	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	357	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	358	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	359	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	360	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	361	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	362	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	363	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	364	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
2003	365	0	1	-130.283	-119.261	D	7.593	7.593	0	3.3	0	0	0	0	0	0	0	0
									0.825								**3**	**0**

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                                               CALPOST  Version 5.6392        Level 051130
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 Internal Coordinate Transformations by
  ---  COORDLIB   Version: 1.95   Level: 050126



  Run Title:
     CALPUFF 2002 BART Evaluation (Mingo)
     HOLCIM JUNE 2008 CONTROL (Max 30-day avg, 20/27%)
     UMC 6km MET FIELD

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 INPUT GROUP: 1 -- General run control parameters
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      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   1  !

          METRUN = 0 - Run period explicitly defined below
          METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  2002   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                        Hour  (ISHR) --    No default   ! ISHR  =  0   !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Species & Concentration/Deposition Information
 ----------------------------------------------

       Species to process (ASPEC)       -- No default   ! ASPEC = VISIB  !
       (ASPEC = VISIB for visibility processing)

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes,
         '-3' for wet+dry deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
             X(new) = X(old) * A + B         A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations/Fluxes?
                                 (LBACK)  -- Default: F   ! LBACK =  F !

 Source information
 ------------------
```

```
  Option to process source contributions:
         0 =  Process only total reported contributions
         1 =  Sum all individual source contributions and process
         2 =  Run in TRACEBACK mode to identify source
              contributions at a SINGLE receptor
                             (MSOURCE) -- Default: 0   ! MSOURCE =  0  !

Receptor information
--------------------

  Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                                 (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):

  Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                                OR
  Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
     0 = discrete receptor not processed
     1 = discrete receptor processed
  using repeated value notation to select blocks of receptors:
     23*1, 15*0, 12*1
  Flag for all receptors after the last one assigned is set to 0
  (NDRECP) -- Default: -1
                                                 ! NDRECP =  -1  !


--Select range of GRIDDED receptors (only used when LG = T):

       X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
           (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
           (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
           (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
           (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1


--Specific gridded receptors can also be excluded from CALPOST
  processing by filling a processing grid array with 0s and 1s.  If the
  processing flag for receptor index (i,j) is 1 (ON), that receptor
  will be processed if it lies within the range delineated by IBGRID,
  JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be
  processed in the run.  By default, all array values are set to 1 (ON).

  Number of gridded receptor rows provided in Subgroup (1a) to
  identify specific gridded receptors to process
                           (NGONOFF) -- Default: 0      ! NGONOFF =  0  !

!END!
```

```
--------------
Subgroup (1a) -- Specific gridded receptors included/excluded
--------------

    Specific gridded receptors are excluded from CALPOST processing
    by filling a processing grid array with 0s and 1s.  A total of
    NGONOFF lines are read here.  Each line corresponds to one 'row'
    in the sampling grid, starting with the NORTHERNMOST row that
    contains receptors that you wish to exclude, and finishing with
    row 1 to the SOUTH (no intervening rows may be skipped).  Within
    a row, each receptor position is assigned either a 0 or 1,
    starting with the westernmost receptor.
       0 = gridded receptor not processed
       1 = gridded receptor processed

    Repeated value notation may be used to select blocks of receptors:
       23*1, 15*0, 12*1

    Because all values are initially set to 1, any receptors north of
    the first row entered, or east of the last value provided in a row,
    remain ON.

    (NGXRECP) -- Default: 1


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Identify the Base Time Zone for the CALPUFF simulation
                          (BTZONE) -- No default   * BTZONE =  0.*

    Particle growth curve f(RH) for hygroscopic species
                            (MFRH) -- Default: 2   ! MFRH   =  2  !

         1 =  IWAQM (1998) f(RH) curve (originally used with MVISBK=1)
         2 =  FLAG (2000) f(RH) tabulation
         3 =  EPA (2003) f(RH) tabulation

    Maximum relative humidity (%) used in particle growth curve
                           (RHMAX) -- Default: 98  ! RHMAX  = 95.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = F  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
     Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                   COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                   FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PM10 !

Extinction Efficiency (1/Mm per ug/m**3)
----------------------------------------
    MODELED particulate species:
              PM  COARSE       (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
```

```
           PM  FINE       (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
           PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
          AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
          AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
          ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
          SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
          ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for the 24h-average of percent change of light extinction:
    Hourly ratio of source light extinction / background light extinction
    is averaged?               (LAVER) -- Default: F   ! LAVER = F  !


    Method used for background light extinction
                              (MVISBK) -- Default: 2   ! MVISBK =  6  !

         1 =  Supply single light extinction and hygroscopic fraction
              - Hourly F(RH) adjustment applied to hygroscopic background
                and modeled sulfate and nitrate
         2 =  Compute extinction from speciated PM measurements (A)
              - Hourly F(RH) adjustment applied to observed and modeled sulfate
                and nitrate
              - F(RH) factor is capped at F(RHMAX)
         3 =  Compute extinction from speciated PM measurements (B)
              - Hourly F(RH) adjustment applied to observed and modeled sulfate
                and nitrate
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         4 =  Read hourly transmissometer background extinction measurements
              - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
              - Hour excluded if measurement invalid (missing, interference,
                or large RH)
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         5 =  Read hourly nephelometer background extinction measurements
              - Rayleigh extinction value (BEXTRAY) added to measurement
              - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
              - Hour excluded if measurement invalid (missing, interference,
                or large RH)
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         6 =  Compute extinction from speciated PM measurements
              - FLAG monthly RH adjustment factor applied to observed and
                modeled sulfate and nitrate
         7 =  Use observed weather or prognostic weather information for
              background extinction during weather events; otherwise, use Method 2
              - Hourly F(RH) adjustment applied to modeled sulfate and nitrate
              - F(RH) factor is capped at F(RHMAX)
              - During observed weather events, compute Bext from visual range
                if using an observed weather data file, or
              - During prognostic weather events, use Bext from the prognostic
                weather file
              - Use Method 2 for hours without a weather event

    Additional inputs used for MVISBK = 1:
    --------------------------------------
     Background light extinction (1/Mm)
                              (BEXTBK) -- No default   ! BEXTBK = 12.0 !
```

```
 Percentage of particles affected by relative humidity
                          (RHFRAC) -- No default   ! RHFRAC = 10.0 !

Additional inputs used for MVISBK = 6:
--------------------------------------
 Extinction coefficients for hygroscopic species (modeled and
 background) are computed using a monthly RH adjustment factor
 in place of an hourly RH factor (VISB.DAT file is NOT needed).
 Enter the 12 monthly factors here (RHFAC).  Month 1 is January.

 (RHFAC)  -- No default     ! RHFAC = 3.3, 3.0, 2.8, 2.6,
                                      3.0, 3.2, 3.3, 3.5,
                                      3.5, 3.1, 3.1, 3.3 !

Additional inputs used for MVISBK = 7:
--------------------------------------
 The weather data file (DATSAV abbreviated space-delimited) that
 is identified as VSRN.DAT may contain data for more than one
 station.  Identify the stations that are needed in the order in
 which they will be used to obtain valid weather and visual range.
 The first station that contains valid data for an hour will be
 used.  Enter up to MXWSTA (set in PARAMS file) integer station IDs
 of up to 6 digits each as variable IDWSTA, and enter the corresponding
 time zone for each, as variable TZONE (= UTC-LST).

 A prognostic weather data file with Bext for weather events may be used
 in place of the observed weather file.  Identify this as the VSRN.DAT
 file and use a station ID of IDWSTA = 999999, and TZONE = 0.

 NOTE:  TZONE identifies the time zone used in the dataset.  The
        DATSAV abbreviated space-delimited data usually are prepared
        with UTC time rather than local time, so TZONE is typically
        set to zero.

 (IDWSTA)   -- No default
! IDWSTA = 690230 ,80020 ,80140 !
 (TZONE)    -- No default
! TZONE  = 0.0 ,0.0 ,0.0 !

Additional inputs used for MVISBK = 2,3,6,7:
--------------------------------------------
 Background extinction coefficients are computed from monthly
 CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
 coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
 elemental carbon (BKEC).  Month 1 is January.
 (ug/m**3)

 (BKSO4)  -- No default     ! BKSO4 = 0.23, 0.23, 0.23, 0.23,
                                      0.23, 0.23, 0.23, 0.23,
                                      0.23, 0.23, 0.23, 0.23 !
 (BKNO3)  -- No default     ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
                                      0.1, 0.1, 0.1, 0.1,
                                      0.1, 0.1, 0.1, 0.1 !
 (BKPMC)  -- No default     ! BKPMC = 3.0, 3.0, 3.0, 3.0,
                                      3.0, 3.0, 3.0, 3.0,
                                      3.0, 3.0, 3.0, 3.0 !
 (BKOC)   -- No default     ! BKOC  = 1.4, 1.4, 1.4, 1.4,
                                      1.4, 1.4, 1.4, 1.4,
                                      1.4, 1.4, 1.4, 1.4 !
 (BKSOIL) -- No default     ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                                      0.5, 0.5, 0.5, 0.5,
                                      0.5, 0.5, 0.5, 0.5 !
 (BKEC)   -- No default     ! BKEC  = 0.02, 0.02, 0.02, 0.02,
```

```
                                          0.02, 0.02, 0.02, 0.02,
                                          0.02, 0.02, 0.02, 0.02 !

    Additional inputs used for MVISBK = 2,3,5,6,7:
    ----------------------------------------------
     Extinction due to Rayleigh scattering is added (1/Mm)
                            (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Documentation
-------------

    Documentation records contained in the header of the
    CALPUFF output file may be written to the list file.
    Print documentation image?
                               (LDOC) -- Default: F   !  LDOC = F !

Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                     for             for
                Concentration    Deposition
       1 =         g/m**3         g/m**2/s
       2 =        mg/m**3        mg/m**2/s
       3 =        ug/m**3        ug/m**2/s
       4 =        ng/m**3        ng/m**2/s
       5 =      Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

    1-hr averages           (L1HR) -- Default: T   !   L1HR = F  !

    3-hr averages           (L3HR) -- Default: T   !   L3HR = F  !

    24-hr averages         (L24HR) -- Default: T   !  L24HR = F  !

    Run-length averages    (LRUNL) -- Default: T   !  LRUNL = F  !

    User-specified averaging time in hours - results for
    an averaging time of NAVG hours are reported for
    NAVG greater than 0:
                            (NAVG) -- Default: 0   !   NAVG =  0  !


Types of tabulations reported
------------------------------

   1) Visibility: daily visibility tabulations are always reported
                  for the selected receptors when ASPEC = VISIB.
                  In addition, any of the other tabulations listed
                  below may be chosen to characterize the light
                  extinction coefficients.
                  [List file or Plot/Analysis File]
```

```
2) Top 50 table for each averaging time selected
   [List file only]
                      (LT50) -- Default: T   !   LT50 = F  !

3) Top 'N' table for each averaging time selected
   [List file or Plot file]
                     (LTOPN) -- Default: F   !  LTOPN = T  !

     -- Number of 'Top-N' values at each receptor
        selected (NTOP must be <= 4)
                      (NTOP) -- Default: 4   ! NTOP =  1   !

     -- Specific ranks of 'Top-N' values reported
        (NTOP values must be entered)
               (ITOP(4) array) -- Default:     ! ITOP =  1   !
                                  1,2,3,4


4) Threshold exceedance counts for each receptor and each averaging
   time selected
   [List file or Plot file]
                     (LEXCD) -- Default: F   !  LEXCD = T  !

     -- Identify the threshold for each averaging time by assigning a
        non-negative value (output units).

                                 -- Default: 0.5
        Threshold for  1-hr averages   (THRESH1) !  THRESH1 = 1.000E01 !
        Threshold for  3-hr averages   (THRESH3) !  THRESH3 = -1.0  !
        Threshold for 24-hr averages  (THRESH24) ! THRESH24 = -1.0  !
        Threshold for NAVG-hr averages (THRESHN) !  THRESHN = -1.0  !


     -- Counts for the shortest averaging period selected can be
        tallied daily, and receptors that experience more than NCOUNT
        counts over any NDAY period will be reported.  This type of
        exceedance violation output is triggered only if NDAY > 0.

        Accumulation period(Days)
                      (NDAY) -- Default: 0   !    NDAY =  0  !
        Number of exceedances allowed
                    (NCOUNT) -- Default: 1   !  NCOUNT =  1  !


5) Selected day table(s)

   Echo Option -- Many records are written each averaging period
   selected and output is grouped by day
   [List file or Plot file]
                     (LECHO) -- Default: F   !  LECHO = F  !

   Timeseries Option -- Averages at all selected receptors for
   each selected averaging period are written to timeseries files.
   Each file contains one averaging period, and all receptors are
   written to a single record each averaging time.
   [TSERIES_ASPEC_ttHR_CONC_TSUNAM.DAT files]
                     (LTIME) -- Default: F   !  LTIME = F  !

   Peak Value Option -- Averages at all selected receptors for
   each selected averaging period are screened and the peak value
   each period is written to timeseries files.
   Each file contains one averaging period.
```

```
      [PEAKVAL_ASPEC_ttHR_CONC_TSUNAM.DAT files]
                           (LPEAK) -- Default: F   !  LPEAK = F  !

        -- Days selected for output
                      (IECHO(366)) -- Default: 366*0
           ! IECHO  = 366*0  !
           (366 values must be entered)
```

Plot output options

Plot files can be created for the Top-N, Exceedance, and Echo tables selected above. Two formats for these files are available, DATA and GRID. In the DATA format, results at all receptors are listed along with the receptor location [x,y,val1,val2,...]. In the GRID format, results at only gridded receptors are written, using a compact representation. The gridded values are written in rows (x varies), starting with the most southern row of the grid. The GRID format is given the .GRD extension, and includes headers compatible with the SURFER(R) plotting software.

A plotting and analysis file can also be created for the daily peak visibility summary output, in DATA format only.

```
     Generate Plot file output in addition to writing tables
     to List file?
                                 (LPLT) -- Default: F   ! LPLT  = F !

     Use GRID format rather than DATA format,
     when available?
                                 (LGRD) -- Default: F   ! LGRD  = F !
```

Auxiliary Output Files (for subsequent analyses)

Visibility

A separate output file may be requested that contains the change in visibility at each selected receptor when ASPEC = VISIB. This file can be processed to construct visibility measures that are not available in CALPOST.

```
      Output file with the visibility change at each receptor?
                                (MDVIS) -- Default: 0   ! MDVIS  = 0 !

           0 =  Do Not create file
           1 =  Create file of DAILY (24 hour) Delta-Deciview
           2 =  Create file of DAILY (24 hour) Extinction Change (%)
           3 =  Create file of HOURLY Delta-Deciview
           4 =  Create file of HOURLY Extinction Change (%)
```

Additional Debug Output

```
   Output selected information to List file
    for debugging?
                              (LDEBUG) -- Default: F  ! LDEBUG  = F !

   Output hourly extinction information to REPORT.HRV?
    (Visibility Method 7)
```

```
                                    (LVEXTHR) -- Default: F  ! LVEXTHR = F !

 !END!

 -------------------------------------------------
 NOTICE: Starting year in control file sets the
         expected century for the simulation.  All
         YY years are converted to YYYY years in
         the range:          1952        2051
 -------------------------------------------------


****************************************************************************************
****************************************
                                                CALPOST  Version 5.6392        Level 051130
****************************************************************************************
****************************************




  CALPOST Control File Input Summary ------------------------

     Replace run data with data in Puff file 1=Y:    1
                       Run starting date -- year: 2002
                                           month:    0
                                             day:    0
                                      Julian day:    0
         Time at beginning of run  -  hour(0-23):    0
                                   -      second:    0
                             Run length (hours):    0


 Every hour of data processed -- NREP = 1


  Species & Concentration/Deposition Information
                                           Species: VISIB
                         Layer of processed data:    1
     (>0=conc, -1=dry flux, -2=wet flux, -3=wet & dry flux)
                   Multiplicative scaling factor: 0.0000E+00
                         Additive scaling factor: 0.0000E+00
                  Hourly background values used?: F


  Source information
                  Source contribution processing: 0
                   0= No source contributions
                   1= Contributions are summed
                   2= TRACEBACK mode for 1 receptor
                   3= Reported TOTAL is processed


  Receptor information
                    Gridded receptors processed?: F
                   Discrete receptors processed?: T
      CTSG Complex terrain receptors processed?: F

  Discrete Receptors Processed

   (All Discrete Receptors are Used)
```

Visibility Processing Selected

Extinction Computation includes:
SULFATES
NITRATES
FINE PARTICLES
BACKGROUND
Particle f(RH) growth curve : FLAG (2000) Tabulation
Max. RH % for particle growth (%): 95.000

Species name for modeled particulates
fine: PM10

Extinction Efficiency (1/Mm per ug/m**3)

ammonium sulfate:	3.00
ammonium nitrate:	3.00
organic carbon:	4.00
soil:	1.00
elemental carbon:	10.00
MODELED coarse PM:	0.60
MODELED fine PM:	1.00
BACKGRND coarse PM:	0.60

Background Extinction Calculation Method 6

Rayleigh scattering extinction (1/Mm): 10.00

Monthly background conc. (ug/m**3):

	(NH4)2SO4	(NH4)NO3	PM-C	OC	SOIL	EC
1	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
2	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
3	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
4	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
5	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
6	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
7	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
8	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
9	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
10	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
11	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01
12	.2300E+00	.1000E+00	.3000E+01	.1400E+01	.5000E+00	.2000E-01

Monthly RH factor for hygroscopic species:

1	.3300E+01
2	.3000E+01
3	.2800E+01
4	.2600E+01
5	.3000E+01
6	.3200E+01
7	.3300E+01
8	.3500E+01
9	.3500E+01
10	.3100E+01
11	.3100E+01
12	.3300E+01

Optional output file for visibility 0

Do Not create file

```
 Output options
                    Units requested for output:   (1/Mega-m)

 Averaging time(s) selected
     User-specified averaging time (NAVG hours):     0
                                 1-hr averages:     F
                                 3-hr averages:     F
                                24-hr averages:     F
                              NAVG-hr averages:     F
                        Length of run averages:     F

 Output components selected
                                        Top-50:     F
                 Top-N values at each receptor:     T
            Exceedance counts at each receptor:     T
      Output selected information for debugging:     F
                 Echo tables for selected days:     F
                 Time-series for selected days:     F
       Peak value Time-series for selected days:     F

 Top "n" table control
       Number of "top" values at each receptor:     1
       Specific ranks of "top" values reported:   1


 Plot file option
                           Plot files created:     F


 Threshold Exceedance control
      Exceedances of a specified value will be counted for --



IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF     5.753       051130

HOL BART CLASS I ANALYSIS (MINGO)
JUNE 2008 CONTROL B (Max 30-day avg, 20% NOx, 27% SO2)
6KM UMC REFINED CALMET METEOROLOGICAL DATA

Averaging time for values reported from model:
                 1    HOUR

Number of averaging periods in file from model:
              8760

Chemical species names for each layer in model:
SO2           1
SO4           1
NOX           1
HNO3          1
NO3           1
PM10          1



**************    NOTICE    ***************
NDRECP array reset to full range: all 1s
```

```
-----------------------------------------------------------------------------------------
---------------------------------------
          INPUT FILES

 Default Name     Unit No.     File Name and Path
 ------------     --------     ------------------
  CALPOST.INP         5        calpost.inp.mdnr6.mingo
    MODEL.DAT         4        ../../calpuff/outputs/2002/holcon608/holm2002conb608.con



-----------------------------------------------------------------------------------------
---------------------------------------
          OUTPUT FILES

 Default Name     Unit No.     File Name and Path
 ------------     --------     ------------------
  CALPOST.LST         8        holm2002conb608m6.lst

*****************************************************************************************
***************************************
                                              CALPOST  Version 5.6392        Level 051130
*****************************************************************************************
***************************************


                                                        24HR VISIBILITY


                                                        VISIB   B _SN_F


                                                          (1/Mega-m)



Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE BEXT(Model) BEXT(BKG) BEXT(Total) %CHANGE
F(RH)  bxSO4  bxNO3   bxOC   bxEC  bxPMC  bxPMF
2002   2  0   517        160.051     5.115   D      0.545     21.367     21.912     2.55
3.300  0.162  0.380  0.000  0.000  0.000  0.002
2002   3  0   637        152.992    -4.475   D      2.854     21.367     24.221    13.36
3.300  0.810  2.032  0.000  0.000  0.000  0.011
2002   4  0   557        158.110    -3.116   D      1.302     21.367     22.669     6.09
3.300  0.314  0.981  0.000  0.000  0.000  0.007
2002   5  0   548        160.098    -2.544   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002   6  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002   7  0   517        160.051     5.115   D      0.148     21.367     21.515     0.69
3.300  0.054  0.093  0.000  0.000  0.000  0.001
2002   8  0   517        160.051     5.115   D      0.250     21.367     21.617     1.17
3.300  0.043  0.205  0.000  0.000  0.000  0.002
2002   9  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  10  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  11  0   517        160.051     5.115   D      0.524     21.367     21.891     2.45
3.300  0.322  0.198  0.000  0.000  0.000  0.003
2002  12  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  13  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
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3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  14  0    1       153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  15  0    1       153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  16  0    1       153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  17  0    1       153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  18  0   548      160.098    -2.544   D      0.758     21.367     22.125     3.55
3.300  0.236  0.518  0.000  0.000  0.000  0.004
2002  19  0   548      160.098    -2.544   D      0.372     21.367     21.739     1.74
3.300  0.154  0.217  0.000  0.000  0.000  0.001
2002  20  0   637      152.992    -4.475   D      0.227     21.367     21.594     1.06
3.300  0.142  0.084  0.000  0.000  0.000  0.000
2002  21  0   517      160.051     5.115   D      0.246     21.367     21.613     1.15
3.300  0.157  0.089  0.000  0.000  0.000  0.000
2002  22  0    1       153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  23  0    1       153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  24  0   517      160.051     5.115   D      0.003     21.367     21.370     0.01
3.300  0.000  0.003  0.000  0.000  0.000  0.000
2002  25  0   517      160.051     5.115   D      1.260     21.367     22.627     5.90
3.300  0.568  0.686  0.000  0.000  0.000  0.006
2002  26  0    1       153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  27  0   603      155.328    -5.781   D      0.008     21.367     21.375     0.04
3.300  0.006  0.002  0.000  0.000  0.000  0.000
2002  28  0   548      160.098    -2.544   D      0.001     21.367     21.368     0.01
3.300  0.001  0.000  0.000  0.000  0.000  0.000
2002  29  0    1       153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  30  0    1       153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002  31  0   517      160.051     5.115   D      0.388     21.367     21.755     1.82
3.300  0.069  0.319  0.000  0.000  0.000  0.000
2002  32  0   517      160.051     5.115   D      0.002     21.367     21.369     0.01
3.300  0.000  0.001  0.000  0.000  0.000  0.000
2002  33  0    1       153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  34  0   517      160.051     5.115   D      0.013     21.070     21.083     0.06
3.000  0.006  0.007  0.000  0.000  0.000  0.000
2002  35  0    1       153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  36  0   637      152.992    -4.475   D      0.316     21.070     21.386     1.50
3.000  0.089  0.225  0.000  0.000  0.000  0.002
2002  37  0    1       153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  38  0   517      160.051     5.115   D      0.001     21.070     21.071     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  39  0   517      160.051     5.115   D      0.109     21.070     21.179     0.52
3.000  0.043  0.065  0.000  0.000  0.000  0.001
2002  40  0    1       153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  41  0    1       153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  42  0    1       153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  43  0   517      160.051     5.115   D      0.250     21.070     21.320     1.19
3.000  0.068  0.180  0.000  0.000  0.000  0.002
2002  44  0    1       153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
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2002  45  0   632        152.976    -4.828   D      0.406     21.070     21.476     1.93
3.000  0.126  0.276  0.000  0.000  0.000  0.004
2002  46  0   548        160.098    -2.544   D      0.159     21.070     21.229     0.75
3.000  0.086  0.072  0.000  0.000  0.000  0.001
2002  47  0   517        160.051     5.115   D      0.025     21.070     21.095     0.12
3.000  0.015  0.010  0.000  0.000  0.000  0.000
2002  48  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  49  0   517        160.051     5.115   D      0.424     21.070     21.494     2.01
3.000  0.196  0.225  0.000  0.000  0.000  0.003
2002  50  0   637        152.992    -4.475   D      0.235     21.070     21.305     1.11
3.000  0.099  0.134  0.000  0.000  0.000  0.001
2002  51  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  52  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  53  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  54  0   637        152.992    -4.475   D      0.741     21.070     21.811     3.52
3.000  0.256  0.480  0.000  0.000  0.000  0.005
2002  55  0   637        152.992    -4.475   D      0.352     21.070     21.422     1.67
3.000  0.178  0.173  0.000  0.000  0.000  0.001
2002  56  0   517        160.051     5.115   D      0.007     21.070     21.077     0.03
3.000  0.004  0.003  0.000  0.000  0.000  0.000
2002  57  0   517        160.051     5.115   D      0.003     21.070     21.073     0.01
3.000  0.002  0.001  0.000  0.000  0.000  0.000
2002  58  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  59  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  60  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002  61  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  62  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  63  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  64  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  65  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  66  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  67  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  68  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  69  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  70  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  71  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  72  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  73  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  74  0     1        153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  75  0   517        160.051     5.115   D      0.104     20.872     20.976     0.50
2.800  0.065  0.039  0.000  0.000  0.000  0.000
2002  76  0   624        152.982    -5.684   D      0.000     20.872     20.872     0.00
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2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  77  0   637       152.992    -4.475   D      0.008     20.872     20.880     0.04
2.800  0.004  0.004  0.000  0.000  0.000  0.000
2002  78  0   517       160.051     5.115   D      0.014     20.872     20.886     0.07
2.800  0.008  0.007  0.000  0.000  0.000  0.000
2002  79  0     1       153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  80  0   624       152.982    -5.684   D      0.830     20.872     21.702     3.98
2.800  0.465  0.361  0.000  0.000  0.000  0.004
2002  81  0   521       160.057     4.126   D      0.269     20.872     21.141     1.29
2.800  0.099  0.169  0.000  0.000  0.000  0.001
2002  82  0     1       153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  83  0     1       153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  84  0     1       153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  85  0     1       153.225    -5.521   D      0.000     20.872     20.872     0.00
2.800  0.000  0.000  0.000  0.000  0.000  0.000
2002  86  0   603       155.328    -5.781   D      0.323     20.872     21.195     1.55
2.800  0.178  0.144  0.000  0.000  0.000  0.001
2002  87  0   548       160.098    -2.544   D      0.392     20.872     21.264     1.88
2.800  0.226  0.165  0.000  0.000  0.000  0.002
2002  88  0   517       160.051     5.115   D      0.061     20.872     20.933     0.29
2.800  0.041  0.020  0.000  0.000  0.000  0.000
2002  89  0   517       160.051     5.115   D      0.527     20.872     21.399     2.53
2.800  0.463  0.062  0.000  0.000  0.000  0.002
2002  90  0   517       160.051     5.115   D      0.326     20.872     21.198     1.56
2.800  0.151  0.173  0.000  0.000  0.000  0.001
2002  91  0   517       160.051     5.115   D      0.228     20.872     21.100     1.09
2.800  0.148  0.079  0.000  0.000  0.000  0.001
2002  92  0   527       160.066     2.645   D      0.730     20.674     21.404     3.53
2.600  0.432  0.295  0.000  0.000  0.000  0.003
2002  93  0   548       160.098    -2.544   D      0.063     20.674     20.737     0.30
2.600  0.035  0.028  0.000  0.000  0.000  0.001
2002  94  0   517       160.051     5.115   D      0.421     20.674     21.095     2.04
2.600  0.200  0.219  0.000  0.000  0.000  0.002
2002  95  0   517       160.051     5.115   D      0.601     20.674     21.275     2.91
2.600  0.278  0.320  0.000  0.000  0.000  0.002
2002  96  0   624       152.982    -5.684   D      0.651     20.674     21.325     3.15
2.600  0.287  0.361  0.000  0.000  0.000  0.003
2002  97  0   626       152.979    -5.287   D      0.208     20.674     20.882     1.01
2.600  0.135  0.072  0.000  0.000  0.000  0.001
2002  98  0   637       152.992    -4.475   D      0.004     20.674     20.678     0.02
2.600  0.003  0.001  0.000  0.000  0.000  0.000
2002  99  0     1       153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 100  0   676       156.899     0.996   D      0.457     20.674     21.131     2.21
2.600  0.401  0.051  0.000  0.000  0.000  0.004
2002 101  0   637       152.992    -4.475   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 102  0     1       153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 103  0     1       153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 104  0   517       160.051     5.115   D      0.076     20.674     20.750     0.37
2.600  0.055  0.021  0.000  0.000  0.000  0.000
2002 105  0     1       153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 106  0     1       153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 107  0     1       153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
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2002 108  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 109  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 110  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 111  0    517       160.051     5.115   D      0.070     20.674     20.744     0.34
2.600  0.036  0.034  0.000  0.000  0.000  0.000
2002 112  0    517       160.051     5.115   D      0.029     20.674     20.703     0.14
2.600  0.026  0.003  0.000  0.000  0.000  0.000
2002 113  0    546       160.095    -2.050   D      0.001     20.674     20.675     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 114  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 115  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 116  0    638       153.140    -4.311   D      0.227     20.674     20.901     1.10
2.600  0.119  0.105  0.000  0.000  0.000  0.004
2002 117  0    517       160.051     5.115   D      0.001     20.674     20.675     0.00
2.600  0.001  0.000  0.000  0.000  0.000  0.000
2002 118  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 119  0     1        153.225    -5.521   D      0.000     20.674     20.674     0.00
2.600  0.000  0.000  0.000  0.000  0.000  0.000
2002 120  0    517       160.051     5.115   D      0.721     20.674     21.395     3.49
2.600  0.562  0.154  0.000  0.000  0.000  0.005
2002 121  0    517       160.051     5.115   D      0.138     20.674     20.812     0.67
2.600  0.098  0.040  0.000  0.000  0.000  0.000
2002 122  0    637       152.992    -4.475   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 123  0    637       152.992    -4.475   D      1.229     21.070     22.299     5.83
3.000  0.968  0.257  0.000  0.000  0.000  0.004
2002 124  0    637       152.992    -4.475   D      0.021     21.070     21.091     0.10
3.000  0.010  0.011  0.000  0.000  0.000  0.000
2002 125  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 126  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 127  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 128  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 129  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 130  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 131  0    517       160.051     5.115   D      0.080     21.070     21.150     0.38
3.000  0.043  0.036  0.000  0.000  0.000  0.001
2002 132  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 133  0    517       160.051     5.115   D      0.000     21.070     21.071     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 134  0    632       152.976    -4.828   D      0.237     21.070     21.307     1.12
3.000  0.138  0.098  0.000  0.000  0.000  0.001
2002 135  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 136  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 137  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 138  0     1        153.225    -5.521   D      0.000     21.070     21.070     0.00
3.000  0.000  0.000  0.000  0.000  0.000  0.000
2002 139  0    637       152.992    -4.475   D      0.097     21.070     21.167     0.46
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2002 140 0 603 155.328 -5.781 D 0.335 21.070 21.405 1.59
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2002 141 0 517 160.051 5.115 D 0.199 21.070 21.269 0.94
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2002 142 0 637 152.992 -4.475 D 0.027 21.070 21.097 0.13
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2002 143 0 637 152.992 -4.475 D 0.011 21.070 21.081 0.05
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3.000 0.000 0.000 0.000 0.000 0.000 0.000
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2002 146 0 1 153.225 -5.521 D 0.000 21.070 21.070 0.00
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2002 147 0 517 160.051 5.115 D 0.390 21.070 21.460 1.85
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2002 148 0 517 160.051 5.115 D 0.000 21.070 21.070 0.00
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2002 149 0 1 153.225 -5.521 D 0.000 21.070 21.070 0.00
3.000 0.000 0.000 0.000 0.000 0.000 0.000
2002 150 0 1 153.225 -5.521 D 0.000 21.070 21.070 0.00
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2002 151 0 1 153.225 -5.521 D 0.000 21.070 21.070 0.00
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2002 152 0 1 153.225 -5.521 D 0.000 21.070 21.070 0.00
3.000 0.000 0.000 0.000 0.000 0.000 0.000
2002 153 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 154 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 155 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 156 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
3.200 0.000 0.000 0.000 0.000 0.000 0.000
2002 157 0 695 159.463 4.375 D 0.300 21.268 21.568 1.41
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2002 158 0 632 152.976 -4.828 D 1.161 21.268 22.429 5.46
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2002 159 0 632 152.976 -4.828 D 0.054 21.268 21.322 0.25
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2002 160 0 637 152.992 -4.475 D 0.019 21.268 21.287 0.09
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2002 161 0 517 160.051 5.115 D 0.001 21.268 21.269 0.00
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2002 164 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
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2002 165 0 517 160.051 5.115 D 0.104 21.268 21.372 0.49
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2002 166 0 548 160.098 -2.544 D 0.054 21.268 21.322 0.25
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2002 167 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
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2002 170 0 517 160.051 5.115 D 0.086 21.268 21.354 0.40
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2002 179 0 1 153.225 -5.521 D 0.000 21.268 21.268 0.00
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2002 188 0 517 160.051 5.115 D 0.007 21.367 21.374 0.03
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2002 193 0 637 152.992 -4.475 D 0.001 21.367 21.368 0.00
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2002 194 0 631 152.975 -4.958 D 0.001 21.367 21.368 0.00
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3.300 0.000 0.000 0.000 0.000 0.000 0.000
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2002 232 0 1 153.225 -5.521 D 0.000 21.565 21.565 0.00
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2002 233 0 461 159.471 4.295 D 0.000 21.565 21.565 0.00
3.500 0.000 0.000 0.000 0.000 0.000 0.000

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2002 234  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 235  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 236  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 237  0    517       160.051     5.115   D       1.029     21.565     22.594     4.77
3.500  0.920  0.105  0.000  0.000  0.000  0.004
2002 238  0    624       152.982    -5.684   D       1.790     21.565     23.355     8.30
3.500  1.181  0.601  0.000  0.000  0.000  0.008
2002 239  0    637       152.992    -4.475   D       0.001     21.565     21.566     0.01
3.500  0.001  0.000  0.000  0.000  0.000  0.000
2002 240  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 241  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 242  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 243  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 244  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 245  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 246  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 247  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 248  0    688       158.434     3.081   D       0.707     21.565     22.272     3.28
3.500  0.686  0.018  0.000  0.000  0.000  0.003
2002 249  0    624       152.982    -5.684   D       0.003     21.565     21.568     0.01
3.500  0.003  0.000  0.000  0.000  0.000  0.000
2002 250  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 251  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 252  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 253  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 254  0    517       160.051     5.115   D       0.001     21.565     21.566     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 255  0    624       152.982    -5.684   D       0.034     21.565     21.599     0.16
3.500  0.027  0.007  0.000  0.000  0.000  0.001
2002 256  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 257  0     3        153.214    -5.024   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 258  0    490       159.714     4.549   D       0.004     21.565     21.569     0.02
3.500  0.004  0.000  0.000  0.000  0.000  0.000
2002 259  0    697       159.757     4.745   D       0.566     21.565     22.131     2.62
3.500  0.519  0.045  0.000  0.000  0.000  0.002
2002 260  0    624       152.982    -5.684   D       0.260     21.565     21.825     1.21
3.500  0.211  0.049  0.000  0.000  0.000  0.001
2002 261  0    657       154.951    -1.737   D       0.002     21.565     21.567     0.01
3.500  0.002  0.000  0.000  0.000  0.000  0.000
2002 262  0    515       159.962     4.554   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 263  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 264  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 265  0     1        153.225    -5.521   D       0.000     21.565     21.565     0.00
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3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 266  0   637      152.992   -4.475   D      0.226     21.565     21.791     1.05
3.500  0.138  0.087  0.000  0.000  0.000  0.001
2002 267  0   637      152.992   -4.475   D      0.422     21.565     21.987     1.96
3.500  0.165  0.255  0.000  0.000  0.000  0.002
2002 268  0   517      160.051    5.115   D      0.134     21.565     21.699     0.62
3.500  0.107  0.026  0.000  0.000  0.000  0.001
2002 269  0     1      153.225   -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 270  0     1      153.225   -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 271  0   684      157.943    2.298   D      1.088     21.565     22.653     5.05
3.500  0.825  0.260  0.000  0.000  0.000  0.004
2002 272  0   624      152.982   -5.684   D      0.610     21.565     22.175     2.83
3.500  0.363  0.245  0.000  0.000  0.000  0.002
2002 273  0   517      160.051    5.115   D      0.261     21.565     21.826     1.21
3.500  0.250  0.011  0.000  0.000  0.000  0.001
2002 274  0     1      153.225   -5.521   D      0.000     21.565     21.565     0.00
3.500  0.000  0.000  0.000  0.000  0.000  0.000
2002 275  0     1      153.225   -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 276  0     1      153.225   -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 277  0     1      153.225   -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 278  0     1      153.225   -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 279  0   681      157.591    1.704   D      0.178     21.169     21.347     0.84
3.100  0.047  0.129  0.000  0.000  0.000  0.002
2002 280  0   603      155.328   -5.781   D      0.090     21.169     21.259     0.42
3.100  0.074  0.015  0.000  0.000  0.000  0.000
2002 281  0   632      152.976   -4.828   D      0.161     21.169     21.330     0.76
3.100  0.046  0.112  0.000  0.000  0.000  0.003
2002 282  0     1      153.225   -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 283  0   517      160.051    5.115   D      0.002     21.169     21.171     0.01
3.100  0.001  0.000  0.000  0.000  0.000  0.000
2002 284  0     1      153.225   -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 285  0     1      153.225   -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 286  0   525      160.063    3.138   D      0.047     21.169     21.216     0.22
3.100  0.014  0.033  0.000  0.000  0.000  0.000
2002 287  0   548      160.098   -2.544   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 288  0     1      153.225   -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 289  0   517      160.051    5.115   D      0.234     21.169     21.403     1.11
3.100  0.150  0.082  0.000  0.000  0.000  0.002
2002 290  0   517      160.051    5.115   D      0.595     21.169     21.764     2.81
3.100  0.365  0.227  0.000  0.000  0.000  0.003
2002 291  0   517      160.051    5.115   D      0.279     21.169     21.448     1.32
3.100  0.121  0.156  0.000  0.000  0.000  0.001
2002 292  0     1      153.225   -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 293  0   517      160.051    5.115   D      0.147     21.169     21.316     0.70
3.100  0.089  0.058  0.000  0.000  0.000  0.000
2002 294  0     1      153.225   -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 295  0     1      153.225   -5.521   D      0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 296  0   517      160.051    5.115   D      0.152     21.169     21.321     0.72
3.100  0.090  0.061  0.000  0.000  0.000  0.000
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2002 297  0   517        160.051     5.115   D       0.285     21.169     21.454     1.34
3.100  0.156  0.128  0.000  0.000  0.000  0.001
2002 298  0   656        154.842    -1.810   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 299  0   637        152.992    -4.475   D       0.025     21.169     21.194     0.12
3.100  0.020  0.005  0.000  0.000  0.000  0.000
2002 300  0   517        160.051     5.115   D       2.647     21.169     23.816    12.50
3.100  1.687  0.955  0.000  0.000  0.000  0.004
2002 301  0   637        152.992    -4.475   D       0.293     21.169     21.462     1.39
3.100  0.127  0.165  0.000  0.000  0.000  0.001
2002 302  0   624        152.982    -5.684   D       0.001     21.169     21.170     0.01
3.100  0.001  0.000  0.000  0.000  0.000  0.000
2002 303  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 304  0   692        159.022     3.820   D       0.034     21.169     21.203     0.16
3.100  0.020  0.014  0.000  0.000  0.000  0.000
2002 305  0   517        160.051     5.115   D       1.322     21.169     22.491     6.25
3.100  0.769  0.549  0.000  0.000  0.000  0.004
2002 306  0   548        160.098    -2.544   D       0.095     21.169     21.264     0.45
3.100  0.040  0.054  0.000  0.000  0.000  0.001
2002 307  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 308  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 309  0   517        160.051     5.115   D       0.049     21.169     21.218     0.23
3.100  0.026  0.022  0.000  0.000  0.000  0.000
2002 310  0   516        159.957     4.802   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 311  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 312  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 313  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 314  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 315  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 316  0   517        160.051     5.115   D       0.065     21.169     21.234     0.31
3.100  0.026  0.038  0.000  0.000  0.000  0.000
2002 317  0   637        152.992    -4.475   D       0.894     21.169     22.063     4.22
3.100  0.376  0.513  0.000  0.000  0.000  0.005
2002 318  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 319  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 320  0   624        152.982    -5.684   D       0.247     21.169     21.416     1.17
3.100  0.132  0.114  0.000  0.000  0.000  0.001
2002 321  0   517        160.051     5.115   D       0.899     21.169     22.068     4.25
3.100  0.463  0.432  0.000  0.000  0.000  0.004
2002 322  0   517        160.051     5.115   D       0.884     21.169     22.053     4.17
3.100  0.342  0.538  0.000  0.000  0.000  0.004
2002 323  0   517        160.051     5.115   D       0.003     21.169     21.172     0.01
3.100  0.001  0.002  0.000  0.000  0.000  0.000
2002 324  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 325  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
3.100  0.000  0.000  0.000  0.000  0.000  0.000
2002 326  0   517        160.051     5.115   D       0.006     21.169     21.175     0.03
3.100  0.001  0.004  0.000  0.000  0.000  0.000
2002 327  0   517        160.051     5.115   D       0.004     21.169     21.173     0.02
3.100  0.001  0.003  0.000  0.000  0.000  0.000
2002 328  0     1        153.225    -5.521   D       0.000     21.169     21.169     0.00
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3.100 0.000 0.000 0.000 0.000 0.000 0.000
2002 329 0 637 152.992 -4.475 D 0.026 21.169 21.195 0.12
3.100 0.011 0.014 0.000 0.000 0.000 0.000
2002 330 0 624 152.982 -5.684 D 0.018 21.169 21.187 0.09
3.100 0.007 0.011 0.000 0.000 0.000 0.000
2002 331 0 637 152.992 -4.475 D 0.021 21.169 21.190 0.10
3.100 0.008 0.013 0.000 0.000 0.000 0.000
2002 332 0 637 152.992 -4.475 D 0.519 21.169 21.688 2.45
3.100 0.187 0.330 0.000 0.000 0.000 0.002
2002 333 0 548 160.098 -2.544 D 0.171 21.169 21.340 0.81
3.100 0.064 0.106 0.000 0.000 0.000 0.000
2002 334 0 1 153.225 -5.521 D 0.000 21.169 21.169 0.00
3.100 0.000 0.000 0.000 0.000 0.000 0.000
2002 335 0 1 153.225 -5.521 D 0.000 21.169 21.169 0.00
3.100 0.000 0.000 0.000 0.000 0.000 0.000
2002 336 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 337 0 548 160.098 -2.544 D 0.173 21.367 21.540 0.81
3.300 0.066 0.107 0.000 0.000 0.000 0.001
2002 338 0 603 155.328 -5.781 D 0.002 21.367 21.369 0.01
3.300 0.001 0.001 0.000 0.000 0.000 0.000
2002 339 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 340 0 517 160.051 5.115 D 0.282 21.367 21.649 1.32
3.300 0.106 0.176 0.000 0.000 0.000 0.001
2002 341 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 342 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 343 0 517 160.051 5.115 D 0.243 21.367 21.610 1.14
3.300 0.132 0.110 0.000 0.000 0.000 0.001
2002 344 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 345 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 346 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 347 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 348 0 637 152.992 -4.475 D 0.175 21.367 21.542 0.82
3.300 0.043 0.131 0.000 0.000 0.000 0.001
2002 349 0 517 160.051 5.115 D 0.124 21.367 21.491 0.58
3.300 0.018 0.105 0.000 0.000 0.000 0.001
2002 350 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 351 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 352 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 353 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 354 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 355 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 356 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 357 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 358 0 1 153.225 -5.521 D 0.000 21.367 21.367 0.00
3.300 0.000 0.000 0.000 0.000 0.000 0.000
2002 359 0 631 152.975 -4.958 D 0.199 21.367 21.566 0.93
3.300 0.086 0.112 0.000 0.000 0.000 0.001

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2002 360  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 361  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 362  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 363  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 364  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000
2002 365  0     1        153.225    -5.521   D      0.000     21.367     21.367     0.00
3.300  0.000  0.000  0.000  0.000  0.000  0.000


 --- Ranked Daily Visibility Change ---

Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE BEXT(Model) BEXT(BKG) BEXT(Total) %CHANGE
F(RH)  bxSO4  bxNO3   bxOC   bxEC  bxPMC  bxPMF
2002   3  0   637        152.992    -4.475   D      2.854     21.367     24.221    13.36
3.300  0.810  2.032  0.000  0.000  0.000  0.011    1
2002 300  0   517        160.051     5.115   D      2.647     21.169     23.816    12.50
3.100  1.687  0.955  0.000  0.000  0.000  0.004    2
2002 238  0   624        152.982    -5.684   D      1.790     21.565     23.355     8.30
3.500  1.181  0.601  0.000  0.000  0.000  0.008    3
2002 305  0   517        160.051     5.115   D      1.322     21.169     22.491     6.25
3.100  0.769  0.549  0.000  0.000  0.000  0.004    4
2002   4  0   557        158.110    -3.116   D      1.302     21.367     22.669     6.09
3.300  0.314  0.981  0.000  0.000  0.000  0.007    5
2002  25  0   517        160.051     5.115   D      1.260     21.367     22.627     5.90
3.300  0.568  0.686  0.000  0.000  0.000  0.006    6
2002 123  0   637        152.992    -4.475   D      1.229     21.070     22.299     5.83
3.000  0.968  0.257  0.000  0.000  0.000  0.004    7
2002 158  0   632        152.976    -4.828   D      1.161     21.268     22.429     5.46
3.200  0.910  0.247  0.000  0.000  0.000  0.004    8
2002 271  0   684        157.943     2.298   D      1.088     21.565     22.653     5.05
3.500  0.825  0.260  0.000  0.000  0.000  0.004    9
2002 237  0   517        160.051     5.115   D      1.029     21.565     22.594     4.77
3.500  0.920  0.105  0.000  0.000  0.000  0.004   10
2002 321  0   517        160.051     5.115   D      0.899     21.169     22.068     4.25
3.100  0.463  0.432  0.000  0.000  0.000  0.004   11
2002 317  0   637        152.992    -4.475   D      0.894     21.169     22.063     4.22
3.100  0.376  0.513  0.000  0.000  0.000  0.005   12
2002 322  0   517        160.051     5.115   D      0.884     21.169     22.053     4.17
3.100  0.342  0.538  0.000  0.000  0.000  0.004   13
2002  80  0   624        152.982    -5.684   D      0.830     20.872     21.702     3.98
2.800  0.465  0.361  0.000  0.000  0.000  0.004   14
2002  18  0   548        160.098    -2.544   D      0.758     21.367     22.125     3.55
3.300  0.236  0.518  0.000  0.000  0.000  0.004   15
2002  92  0   527        160.066     2.645   D      0.730     20.674     21.404     3.53
2.600  0.432  0.295  0.000  0.000  0.000  0.003   16
2002  54  0   637        152.992    -4.475   D      0.741     21.070     21.811     3.52
3.000  0.256  0.480  0.000  0.000  0.000  0.005   17
2002 120  0   517        160.051     5.115   D      0.721     20.674     21.395     3.49
2.600  0.562  0.154  0.000  0.000  0.000  0.005   18
2002 248  0   688        158.434     3.081   D      0.707     21.565     22.272     3.28
3.500  0.686  0.018  0.000  0.000  0.000  0.003   19
2002  96  0   624        152.982    -5.684   D      0.651     20.674     21.325     3.15
2.600  0.287  0.361  0.000  0.000  0.000  0.003   20
2002 205  0   624        152.982    -5.684   D      0.625     21.367     21.992     2.93
3.300  0.621  0.003  0.000  0.000  0.000  0.002   21
2002  95  0   517        160.051     5.115   D      0.601     20.674     21.275     2.91
2.600  0.278  0.320  0.000  0.000  0.000  0.002   22
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 --- Number of days with Extinction Change  =>   5.0 % :         9
 --- Number of days with Extinction Change  =>  10.0 % :         2
 ---             Largest Extinction Change  =               13.36 %

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                                              CALPOST  Version 5.6392        Level 051130
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                                                     Run-Length VISIBILITY

                                                        VISIB   B _SN_F

                                                          (1/Mega-m)


             RECEPTOR    COORDINATES (km)  TYPE BEXT(Model) BEXT(BKG) BEXT(Total) %CHANGE
F(RH)

              517        160.051     5.115   D      0.114     21.211     21.324     0.54
3.143

 --- Number of recs with Extinction Change  >    1.0 % :         0
 ---             Largest Extinction Change  =                0.54 %

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                                              CALPOST  Version 5.6392        Level 051130
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                                                        24HR VISIBILITY

                                                        VISIB   B _SN_F

                                                           (deciview)


                                                                                         %
of Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE  DV(Total)    DV(BKG)  DELTA DV  F(RH)  %
_SO4  %_NO3   %_OC   %_EC  %_PMC  %_PMF
2002   2  0   517        160.051     5.115   D      7.844      7.593      0.252  3.300
29.75  69.85   0.00   0.00   0.00   0.39
2002   3  0   637        152.992    -4.475   D      8.846      7.593      1.254  3.300
28.39  71.21   0.00   0.00   0.00   0.40
2002   4  0   557        158.110    -3.116   D      8.184      7.593      0.591  3.300
24.10  75.38   0.00   0.00   0.00   0.51
2002   5  0   548        160.098    -2.544   D      7.593      7.593      0.000  3.300
32.61  67.12   0.00   0.00   0.00   0.20
2002   6  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00  0.00   0.00   0.00   0.00   0.00
2002   7  0   517        160.051     5.115   D      7.662      7.593      0.069  3.300
36.66  62.60   0.00   0.00   0.00   0.74
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2002	8	0	517	160.051	5.115	D	7.709	7.593	0.116	3.300	17.20	81.89	0.00	0.00	0.00	0.91
2002	9	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	10	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	11	0	517	160.051	5.115	D	7.835	7.593	0.242	3.300	61.51	37.85	0.00	0.00	0.00	0.64
2002	12	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	13	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	14	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	15	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	16	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	17	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	18	0	548	160.098	-2.544	D	7.941	7.593	0.349	3.300	31.18	68.32	0.00	0.00	0.00	0.50
2002	19	0	548	160.098	-2.544	D	7.765	7.593	0.173	3.300	41.28	58.39	0.00	0.00	0.00	0.33
2002	20	0	637	152.992	-4.475	D	7.698	7.593	0.106	3.300	62.60	37.23	0.00	0.00	0.00	0.17
2002	21	0	517	160.051	5.115	D	7.707	7.593	0.115	3.300	63.83	36.03	0.00	0.00	0.00	0.15
2002	22	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	23	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	24	0	517	160.051	5.115	D	7.594	7.593	0.001	3.300	10.61	89.19	0.00	0.00	0.00	0.16
2002	25	0	517	160.051	5.115	D	8.166	7.593	0.573	3.300	45.04	54.45	0.00	0.00	0.00	0.51
2002	26	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	27	0	603	155.328	-5.781	D	7.597	7.593	0.004	3.300	75.01	24.75	0.00	0.00	0.00	0.27
2002	28	0	548	160.098	-2.544	D	7.593	7.593	0.001	3.300	67.66	32.07	0.00	0.00	0.00	0.21
2002	29	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	30	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	0.00	0.00	0.00	0.00	0.00	0.00
2002	31	0	517	160.051	5.115	D	7.773	7.593	0.180	3.300	17.87	82.07	0.00	0.00	0.00	0.05
2002	32	0	517	160.051	5.115	D	7.593	7.593	0.001	3.300	24.60	75.52	0.00	0.00	0.00	0.00
2002	33	0	1	153.225	-5.521	D	7.453	7.453	0.000	3.000	0.00	0.00	0.00	0.00	0.00	0.00
2002	34	0	517	160.051	5.115	D	7.459	7.453	0.006	3.000	44.08	55.54	0.00	0.00	0.00	0.41
2002	35	0	1	153.225	-5.521	D	7.453	7.453	0.000	3.000	0.00	0.00	0.00	0.00	0.00	0.00
2002	36	0	637	152.992	-4.475	D	7.602	7.453	0.149	3.000	28.22	71.18	0.00	0.00	0.00	0.60
2002	37	0	1	153.225	-5.521	D	7.453	7.453	0.000	3.000	0.00	0.00	0.00	0.00	0.00	0.00
2002	38	0	517	160.051	5.115	D	7.453	7.453	0.000	3.000	63.45	37.02	0.00	0.00	0.00	0.17
2002	39	0	517	160.051	5.115	D	7.504	7.453	0.052	3.000						

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39.60  59.85   0.00   0.00   0.00   0.56
2002  40  0     1        153.225    -5.521   D      7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002  41  0     1        153.225    -5.521   D      7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002  42  0     1        153.225    -5.521   D      7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002  43  0   517        160.051     5.115   D      7.571      7.453      0.118  3.000
27.37  71.87   0.00   0.00   0.00   0.76
2002  44  0     1        153.225    -5.521   D      7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002  45  0   632        152.976    -4.828   D      7.644      7.453      0.191  3.000
31.07  67.90   0.00   0.00   0.00   1.03
2002  46  0   548        160.098    -2.544   D      7.528      7.453      0.075  3.000
53.95  45.67   0.00   0.00   0.00   0.38
2002  47  0   517        160.051     5.115   D      7.465      7.453      0.012  3.000
61.05  38.64   0.00   0.00   0.00   0.31
2002  48  0     1        153.225    -5.521   D      7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002  49  0   517        160.051     5.115   D      7.652      7.453      0.199  3.000
46.15  53.09   0.00   0.00   0.00   0.76
2002  50  0   637        152.992    -4.475   D      7.563      7.453      0.111  3.000
42.31  57.29   0.00   0.00   0.00   0.40
2002  51  0     1        153.225    -5.521   D      7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002  52  0     1        153.225    -5.521   D      7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002  53  0     1        153.225    -5.521   D      7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002  54  0   637        152.992    -4.475   D      7.798      7.453      0.346  3.000
34.61  64.76   0.00   0.00   0.00   0.62
2002  55  0   637        152.992    -4.475   D      7.619      7.453      0.166  3.000
50.56  49.11   0.00   0.00   0.00   0.32
2002  56  0   517        160.051     5.115   D      7.456      7.453      0.003  3.000
62.56  37.23   0.00   0.00   0.00   0.22
2002  57  0   517        160.051     5.115   D      7.454      7.453      0.001  3.000
66.05  33.85   0.00   0.00   0.00   0.15
2002  58  0     1        153.225    -5.521   D      7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002  59  0     1        153.225    -5.521   D      7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002  60  0     1        153.225    -5.521   D      7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002  61  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  62  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  63  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  64  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  65  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  66  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  67  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  68  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  69  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  70  0     1        153.225    -5.521   D      7.358      7.358      0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
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2002  71  0     1        153.225    -5.521   D       7.358       7.358       0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  72  0     1        153.225    -5.521   D       7.358       7.358       0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  73  0     1        153.225    -5.521   D       7.358       7.358       0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  74  0     1        153.225    -5.521   D       7.358       7.358       0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  75  0   517        160.051     5.115   D       7.408       7.358       0.050  2.800
62.03  37.80   0.00   0.00   0.00   0.17
2002  76  0   624        152.982    -5.684   D       7.358       7.358       0.000  2.800
18.67  90.44   0.00   0.00   0.00   0.00
2002  77  0   637        152.992    -4.475   D       7.362       7.358       0.004  2.800
49.06  50.96   0.00   0.00   0.00   0.01
2002  78  0   517        160.051     5.115   D       7.365       7.358       0.007  2.800
52.90  47.11   0.00   0.00   0.00   0.01
2002  79  0     1        153.225    -5.521   D       7.358       7.358       0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  80  0   624        152.982    -5.684   D       7.748       7.358       0.390  2.800
56.00  43.46   0.00   0.00   0.00   0.54
2002  81  0   521        160.057     4.126   D       7.486       7.358       0.128  2.800
36.72  62.73   0.00   0.00   0.00   0.55
2002  82  0     1        153.225    -5.521   D       7.358       7.358       0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  83  0     1        153.225    -5.521   D       7.358       7.358       0.000  2.800
137.43  23.55   0.00   0.00   0.00   0.78
2002  84  0     1        153.225    -5.521   D       7.358       7.358       0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  85  0     1        153.225    -5.521   D       7.358       7.358       0.000  2.800
0.00   0.00   0.00   0.00   0.00   0.00
2002  86  0   603        155.328    -5.781   D       7.512       7.358       0.154  2.800
54.99  44.56   0.00   0.00   0.00   0.45
2002  87  0   548        160.098    -2.544   D       7.545       7.358       0.186  2.800
57.62  41.97   0.00   0.00   0.00   0.41
2002  88  0   517        160.051     5.115   D       7.388       7.358       0.029  2.800
67.43  32.32   0.00   0.00   0.00   0.24
2002  89  0   517        160.051     5.115   D       7.608       7.358       0.249  2.800
87.84  11.70   0.00   0.00   0.00   0.47
2002  90  0   517        160.051     5.115   D       7.513       7.358       0.155  2.800
46.45  53.11   0.00   0.00   0.00   0.45
2002  91  0   517        160.051     5.115   D       7.467       7.358       0.109  2.800
64.97  34.50   0.00   0.00   0.00   0.53
2002  92  0   527        160.066     2.645   D       7.610       7.263       0.347  2.600
59.16  40.37   0.00   0.00   0.00   0.47
2002  93  0   548        160.098    -2.544   D       7.293       7.263       0.030  2.600
55.48  43.65   0.00   0.00   0.00   0.87
2002  94  0   517        160.051     5.115   D       7.465       7.263       0.202  2.600
47.51  51.91   0.00   0.00   0.00   0.58
2002  95  0   517        160.051     5.115   D       7.549       7.263       0.286  2.600
46.30  53.29   0.00   0.00   0.00   0.40
2002  96  0   624        152.982    -5.684   D       7.573       7.263       0.310  2.600
44.16  55.43   0.00   0.00   0.00   0.41
2002  97  0   626        152.979    -5.287   D       7.363       7.263       0.100  2.600
64.94  34.60   0.00   0.00   0.00   0.46
2002  98  0   637        152.992    -4.475   D       7.265       7.263       0.002  2.600
85.96  13.79   0.00   0.00   0.00   0.23
2002  99  0     1        153.225    -5.521   D       7.263       7.263       0.000  2.600
0.00   0.00   0.00   0.00   0.00   0.00
2002 100  0   676        156.899     0.996   D       7.482       7.263       0.219  2.600
87.83  11.22   0.00   0.00   0.00   0.95
2002 101  0   637        152.992    -4.475   D       7.263       7.263       0.000  2.600
67.13  31.98   0.00   0.00   0.00   0.35
2002 102  0     1        153.225    -5.521   D       7.263       7.263       0.000  2.600
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0.00 0.00 0.00 0.00 0.00 0.00
2002 103 0 1 153.225 -5.521 D 7.263 7.263 0.000 2.600
0.00 0.00 0.00 0.00 0.00 0.00
2002 104 0 517 160.051 5.115 D 7.300 7.263 0.037 2.600
72.43 27.27 0.00 0.00 0.00 0.31
2002 105 0 1 153.225 -5.521 D 7.263 7.263 0.000 2.600
0.00 0.00 0.00 0.00 0.00 0.00
2002 106 0 1 153.225 -5.521 D 7.263 7.263 0.000 2.600
0.00 0.00 0.00 0.00 0.00 0.00
2002 107 0 1 153.225 -5.521 D 7.263 7.263 0.000 2.600
0.00 0.00 0.00 0.00 0.00 0.00
2002 108 0 1 153.225 -5.521 D 7.263 7.263 0.000 2.600
0.00 0.00 0.00 0.00 0.00 0.00
2002 109 0 1 153.225 -5.521 D 7.263 7.263 0.000 2.600
0.00 0.00 0.00 0.00 0.00 0.00
2002 110 0 1 153.225 -5.521 D 7.263 7.263 0.000 2.600
0.00 0.00 0.00 0.00 0.00 0.00
2002 111 0 517 160.051 5.115 D 7.297 7.263 0.034 2.600
51.81 48.16 0.00 0.00 0.00 0.03
2002 112 0 517 160.051 5.115 D 7.277 7.263 0.014 2.600
91.21 8.79 0.00 0.00 0.00 0.01
2002 113 0 546 160.095 -2.050 D 7.263 7.263 0.000 2.600
83.29 16.38 0.00 0.00 0.00 0.00
2002 114 0 1 153.225 -5.521 D 7.263 7.263 0.000 2.600
0.00 0.00 0.00 0.00 0.00 0.00
2002 115 0 1 153.225 -5.521 D 7.263 7.263 0.000 2.600
0.00 0.00 0.00 0.00 0.00 0.00
2002 116 0 638 153.140 -4.311 D 7.372 7.263 0.109 2.600
52.14 46.27 0.00 0.00 0.00 1.60
2002 117 0 517 160.051 5.115 D 7.263 7.263 0.000 2.600
85.49 14.22 0.00 0.00 0.00 0.63
2002 118 0 1 153.225 -5.521 D 7.263 7.263 0.000 2.600
0.00 0.00 0.00 0.00 0.00 0.00
2002 119 0 1 153.225 -5.521 D 7.263 7.263 0.000 2.600
0.00 0.00 0.00 0.00 0.00 0.00
2002 120 0 517 160.051 5.115 D 7.606 7.263 0.343 2.600
77.99 21.38 0.00 0.00 0.00 0.63
2002 121 0 517 160.051 5.115 D 7.330 7.263 0.067 2.600
70.93 28.76 0.00 0.00 0.00 0.32
2002 122 0 637 152.992 -4.475 D 7.453 7.453 0.000 3.000
86.18 13.92 0.00 0.00 0.00 0.14
2002 123 0 637 152.992 -4.475 D 8.020 7.453 0.567 3.000
78.75 20.94 0.00 0.00 0.00 0.30
2002 124 0 637 152.992 -4.475 D 7.463 7.453 0.010 3.000
46.70 52.82 0.00 0.00 0.00 0.48
2002 125 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 126 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 127 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 128 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 129 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 130 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 131 0 517 160.051 5.115 D 7.491 7.453 0.038 3.000
53.88 44.69 0.00 0.00 0.00 1.43
2002 132 0 1 153.225 -5.521 D 7.453 7.453 0.000 3.000
0.00 0.00 0.00 0.00 0.00 0.00
2002 133 0 517 160.051 5.115 D 7.453 7.453 0.000 3.000
27.66 72.80 0.00 0.00 0.00 0.01

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2002 134  0   632        152.976    -4.828   D       7.564      7.453      0.112  3.000
58.33  41.23   0.00   0.00   0.00   0.45
2002 135  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 136  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 137  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 138  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 139  0   637        152.992    -4.475   D       7.499      7.453      0.046  3.000
55.42  44.27   0.00   0.00   0.00   0.31
2002 140  0   603        155.328    -5.781   D       7.610      7.453      0.158  3.000
45.90  53.79   0.00   0.00   0.00   0.31
2002 141  0   517        160.051     5.115   D       7.547      7.453      0.094  3.000
75.65  23.67   0.00   0.00   0.00   0.69
2002 142  0   637        152.992    -4.475   D       7.465      7.453      0.013  3.000
77.96  21.73   0.00   0.00   0.00   0.33
2002 143  0   637        152.992    -4.475   D       7.458      7.453      0.005  3.000
93.04   6.80   0.00   0.00   0.00   0.19
2002 144  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 145  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 146  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 147  0   517        160.051     5.115   D       7.636      7.453      0.183  3.000
88.54  10.83   0.00   0.00   0.00   0.63
2002 148  0   517        160.051     5.115   D       7.453      7.453      0.000  3.000
96.51   3.30   0.00   0.00   0.00   0.29
2002 149  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 150  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 151  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 152  0     1        153.225    -5.521   D       7.453      7.453      0.000  3.000
0.00   0.00   0.00   0.00   0.00   0.00
2002 153  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 154  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 155  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 156  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 157  0   695        159.463     4.375   D       7.686      7.546      0.140  3.200
79.79  20.12   0.00   0.00   0.00   0.09
2002 158  0   632        152.976    -4.828   D       8.078      7.546      0.532  3.200
78.36  21.26   0.00   0.00   0.00   0.38
2002 159  0   632        152.976    -4.828   D       7.571      7.546      0.025  3.200
74.53  25.16   0.00   0.00   0.00   0.31
2002 160  0   637        152.992    -4.475   D       7.555      7.546      0.009  3.200
97.06   2.72   0.00   0.00   0.00   0.24
2002 161  0   517        160.051     5.115   D       7.547      7.546      0.000  3.200
91.10   8.81   0.00   0.00   0.00   0.17
2002 162  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 163  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 164  0     1        153.225    -5.521   D       7.546      7.546      0.000  3.200
0.00   0.00   0.00   0.00   0.00   0.00
2002 165  0   517        160.051     5.115   D       7.595      7.546      0.049  3.200
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95.50	3.56	0.00	0.00	0.00	0.95					
2002 166	0	548	160.098	-2.544	D	7.571	7.546	0.025	3.200	
78.27	20.77	0.00	0.00	0.00	0.96					
2002 167	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 168	0	637	152.992	-4.475	D	7.596	7.546	0.049	3.200	
76.11	23.66	0.00	0.00	0.00	0.23					
2002 169	0	637	152.992	-4.475	D	7.796	7.546	0.249	3.200	
90.44	9.29	0.00	0.00	0.00	0.27					
2002 170	0	517	160.051	5.115	D	7.587	7.546	0.040	3.200	
98.90	0.93	0.00	0.00	0.00	0.18					
2002 171	0	432	159.228	4.041	D	7.546	7.546	0.000	3.200	
98.32	0.07	0.00	0.00	0.00	0.01					
2002 172	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 173	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 174	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 175	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 176	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 177	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 178	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 179	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 180	0	517	160.051	5.115	D	7.576	7.546	0.030	3.200	
97.95	1.63	0.00	0.00	0.00	0.43					
2002 181	0	517	160.051	5.115	D	7.548	7.546	0.002	3.200	
94.73	5.05	0.00	0.00	0.00	0.24					
2002 182	0	1	153.225	-5.521	D	7.546	7.546	0.000	3.200	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 183	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 184	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 185	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 186	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 187	0	517	160.051	5.115	D	7.594	7.593	0.002	3.300	
99.91	0.07	0.00	0.00	0.00	0.01					
2002 188	0	517	160.051	5.115	D	7.596	7.593	0.003	3.300	
99.93	0.14	0.00	0.00	0.00	0.01					
2002 189	0	490	159.714	4.549	D	7.593	7.593	0.000	3.300	
99.74	0.49	0.00	0.00	0.00	0.01					
2002 190	0	517	160.051	5.115	D	7.594	7.593	0.002	3.300	
99.76	0.07	0.00	0.00	0.00	0.25					
2002 191	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	
0.00	0.00	0.00	0.00	0.00	0.00					
2002 192	0	517	160.051	5.115	D	7.600	7.593	0.008	3.300	
95.38	4.21	0.00	0.00	0.00	0.43					
2002 193	0	637	152.992	-4.475	D	7.593	7.593	0.000	3.300	
82.46	17.28	0.00	0.00	0.00	0.19					
2002 194	0	631	152.975	-4.958	D	7.593	7.593	0.000	3.300	
97.25	2.58	0.00	0.00	0.00	0.10					
2002 195	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	
104.80	1.73	0.00	0.00	0.00	0.06					
2002 196	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300	
0.00	0.00	0.00	0.00	0.00	0.00					

2002	197	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	198	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	199	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	200	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	201	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	202	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	203	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	204	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	205	0	624	152.982	-5.684	D	7.881	7.593	0.289	3.300
99.28	0.41	0.00	0.00	0.00	0.30					
2002	206	0	624	152.982	-5.684	D	7.593	7.593	0.000	3.300
70.47	28.70	0.00	0.00	0.00	0.16					
2002	207	0	631	152.975	-4.958	D	7.599	7.593	0.006	3.300
99.56	0.25	0.00	0.00	0.00	0.19					
2002	208	0	637	152.992	-4.475	D	7.624	7.593	0.031	3.300
99.02	0.81	0.00	0.00	0.00	0.17					
2002	209	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	210	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	211	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	212	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	213	0	1	153.225	-5.521	D	7.593	7.593	0.000	3.300
0.00	0.00	0.00	0.00	0.00	0.00					
2002	214	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	215	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	216	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	217	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	218	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	219	0	637	152.992	-4.475	D	7.685	7.685	0.000	3.500
95.04	4.83	0.00	0.00	0.00	0.08					
2002	220	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	221	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	222	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	223	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	224	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	225	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	226	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	227	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500
0.00	0.00	0.00	0.00	0.00	0.00					
2002	228	0	1	153.225	-5.521	D	7.685	7.685	0.000	3.500

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2002 229 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
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2002 233 0 461 159.471 4.295 D 7.685 7.685 0.000 3.500
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2002 237 0 517 160.051 5.115 D 8.151 7.685 0.466 3.500
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2002 238 0 624 152.982 -5.684 D 8.482 7.685 0.797 3.500
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2002 249 0 624 152.982 -5.684 D 7.686 7.685 0.001 3.500
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2002 258 0 490 159.714 4.549 D 7.687 7.685 0.002 3.500
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2002 259 0 697 159.757 4.745 D 7.944 7.685 0.259 3.500
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2002 260 0 624 152.982 -5.684 D 7.805 7.685 0.120 3.500
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2002 261 0 657 154.951 -1.737 D 7.686 7.685 0.001 3.500
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2002 272 0 624 152.982 -5.684 D 7.964 7.685 0.279 3.500
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2002 273 0 517 160.051 5.115 D 7.805 7.685 0.120 3.500
95.69 4.08 0.00 0.00 0.00 0.23
2002 274 0 1 153.225 -5.521 D 7.685 7.685 0.000 3.500
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2002 280 0 603 155.328 -5.781 D 7.542 7.500 0.042 3.100
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2002 281 0 632 152.976 -4.828 D 7.575 7.500 0.076 3.100
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2002 287 0 548 160.098 -2.544 D 7.500 7.500 0.000 3.100
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2002 288 0 1 153.225 -5.521 D 7.500 7.500 0.000 3.100
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64.11 34.95 0.00 0.00 0.00 0.94
2002 290 0 517 160.051 5.115 D 7.777 7.500 0.277 3.100
61.38 38.16 0.00 0.00 0.00 0.46
2002 291 0 517 160.051 5.115 D 7.630 7.500 0.131 3.100

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43.60  55.91   0.00   0.00   0.00   0.49
2002 292  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 293  0   517        160.051     5.115   D       7.569      7.500      0.069  3.100
60.39  39.40   0.00   0.00   0.00   0.21
2002 294  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 295  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
94.86   9.19   0.00   0.00   0.00   0.28
2002 296  0   517        160.051     5.115   D       7.571      7.500      0.072  3.100
59.46  40.28   0.00   0.00   0.00   0.27
2002 297  0   517        160.051     5.115   D       7.633      7.500      0.134  3.100
54.93  44.87   0.00   0.00   0.00   0.21
2002 298  0   656        154.842    -1.810   D       7.500      7.500      0.000  3.100
77.71  21.85   0.00   0.00   0.00   0.18
2002 299  0   637        152.992    -4.475   D       7.511      7.500      0.012  3.100
78.57  21.32   0.00   0.00   0.00   0.11
2002 300  0   517        160.051     5.115   D       8.678      7.500      1.178  3.100
63.73  36.10   0.00   0.00   0.00   0.17
2002 301  0   637        152.992    -4.475   D       7.637      7.500      0.138  3.100
43.22  56.41   0.00   0.00   0.00   0.37
2002 302  0   624        152.982    -5.684   D       7.500      7.500      0.001  3.100
82.23  18.12   0.00   0.00   0.00   0.14
2002 303  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 304  0   692        159.022     3.820   D       7.516      7.500      0.016  3.100
59.35  40.41   0.00   0.00   0.00   0.24
2002 305  0   517        160.051     5.115   D       8.106      7.500      0.606  3.100
58.15  41.52   0.00   0.00   0.00   0.33
2002 306  0   548        160.098    -2.544   D       7.544      7.500      0.045  3.100
42.47  56.68   0.00   0.00   0.00   0.85
2002 307  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 308  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 309  0   517        160.051     5.115   D       7.523      7.500      0.023  3.100
54.09  45.55   0.00   0.00   0.00   0.37
2002 310  0   516        159.957     4.802   D       7.500      7.500      0.000  3.100
74.87  25.51   0.00   0.00   0.00   0.07
2002 311  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 312  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 313  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 314  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 315  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 316  0   517        160.051     5.115   D       7.530      7.500      0.031  3.100
40.72  58.80   0.00   0.00   0.00   0.49
2002 317  0   637        152.992    -4.475   D       7.913      7.500      0.414  3.100
42.10  57.37   0.00   0.00   0.00   0.54
2002 318  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 319  0     1        153.225    -5.521   D       7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 320  0   624        152.982    -5.684   D       7.615      7.500      0.116  3.100
53.58  46.09   0.00   0.00   0.00   0.33
2002 321  0   517        160.051     5.115   D       7.915      7.500      0.416  3.100
51.49  48.05   0.00   0.00   0.00   0.46
2002 322  0   517        160.051     5.115   D       7.908      7.500      0.409  3.100
38.66  60.88   0.00   0.00   0.00   0.46
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2002 323  0   517        160.051     5.115   D      7.501      7.500      0.001  3.100
40.50  59.26   0.00   0.00   0.00   0.28
2002 324  0     1        153.225    -5.521   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 325  0     1        153.225    -5.521   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 326  0   517        160.051     5.115   D      7.502      7.500      0.003  3.100
21.56  76.69   0.00   0.00   0.00   1.78
2002 327  0   517        160.051     5.115   D      7.502      7.500      0.002  3.100
21.10  77.18   0.00   0.00   0.00   1.72
2002 328  0     1        153.225    -5.521   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 329  0   637        152.992    -4.475   D      7.512      7.500      0.012  3.100
44.32  55.55   0.00   0.00   0.00   0.15
2002 330  0   624        152.982    -5.684   D      7.508      7.500      0.009  3.100
41.39  58.41   0.00   0.00   0.00   0.21
2002 331  0   637        152.992    -4.475   D      7.509      7.500      0.010  3.100
37.41  62.17   0.00   0.00   0.00   0.44
2002 332  0   637        152.992    -4.475   D      7.742      7.500      0.242  3.100
36.10  63.53   0.00   0.00   0.00   0.37
2002 333  0   548        160.098    -2.544   D      7.580      7.500      0.080  3.100
37.55  62.21   0.00   0.00   0.00   0.24
2002 334  0     1        153.225    -5.521   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 335  0     1        153.225    -5.521   D      7.500      7.500      0.000  3.100
0.00   0.00   0.00   0.00   0.00   0.00
2002 336  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 337  0   548        160.098    -2.544   D      7.673      7.593      0.081  3.300
37.82  61.59   0.00   0.00   0.00   0.59
2002 338  0   603        155.328    -5.781   D      7.593      7.593      0.001  3.300
35.03  64.61   0.00   0.00   0.00   0.34
2002 339  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 340  0   517        160.051     5.115   D      7.724      7.593      0.131  3.300
37.44  62.16   0.00   0.00   0.00   0.41
2002 341  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 342  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 343  0   517        160.051     5.115   D      7.706      7.593      0.113  3.300
54.49  45.19   0.00   0.00   0.00   0.31
2002 344  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 345  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 346  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 347  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 348  0   637        152.992    -4.475   D      7.674      7.593      0.082  3.300
24.61  74.66   0.00   0.00   0.00   0.73
2002 349  0   517        160.051     5.115   D      7.651      7.593      0.058  3.300
14.41  84.83   0.00   0.00   0.00   0.76
2002 350  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 351  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 352  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 353  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 354  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
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0.00   0.00   0.00   0.00   0.00   0.00
2002 355  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 356  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 357  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 358  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 359  0   631        152.975    -4.958   D      7.685      7.593      0.093  3.300
43.26  56.13   0.00   0.00   0.00   0.62
2002 360  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 361  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 362  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 363  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 364  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00
2002 365  0     1        153.225    -5.521   D      7.593      7.593      0.000  3.300
0.00   0.00   0.00   0.00   0.00   0.00


 --- Ranked Daily Visibility Change ---
                                                                                          %
of Modeled Extinction by Species
YEAR DAY HR  RECEPTOR    COORDINATES (km)  TYPE  DV(Total)    DV(BKG)  DELTA DV  F(RH)  %
_SO4  %_NO3   %_OC   %_EC  %_PMC  %_PMF
2002   3  0   637        152.992    -4.475   D      8.846      7.593      1.254  3.300
28.39  71.21   0.00   0.00   0.00   0.40    1
2002 300  0   517        160.051     5.115   D      8.678      7.500      1.178  3.100
63.73  36.10   0.00   0.00   0.00   0.17    2
2002 238  0   624        152.982    -5.684   D      8.482      7.685      0.797  3.500
65.98  33.56   0.00   0.00   0.00   0.46    3
2002 305  0   517        160.051     5.115   D      8.106      7.500      0.606  3.100
58.15  41.52   0.00   0.00   0.00   0.33    4
2002   4  0   557        158.110    -3.116   D      8.184      7.593      0.591  3.300
24.10  75.38   0.00   0.00   0.00   0.51    5
2002  25  0   517        160.051     5.115   D      8.166      7.593      0.573  3.300
45.04  54.45   0.00   0.00   0.00   0.51    6
2002 123  0   637        152.992    -4.475   D      8.020      7.453      0.567  3.000
78.75  20.94   0.00   0.00   0.00   0.30    7
2002 158  0   632        152.976    -4.828   D      8.078      7.546      0.532  3.200
78.36  21.26   0.00   0.00   0.00   0.38    8
2002 271  0   684        157.943     2.298   D      8.177      7.685      0.492  3.500
75.78  23.89   0.00   0.00   0.00   0.33    9
2002 237  0   517        160.051     5.115   D      8.151      7.685      0.466  3.500
89.46  10.17   0.00   0.00   0.00   0.37   10
2002 321  0   517        160.051     5.115   D      7.915      7.500      0.416  3.100
51.49  48.05   0.00   0.00   0.00   0.46   11
2002 317  0   637        152.992    -4.475   D      7.913      7.500      0.414  3.100
42.10  57.37   0.00   0.00   0.00   0.54   12
2002 322  0   517        160.051     5.115   D      7.908      7.500      0.409  3.100
38.66  60.88   0.00   0.00   0.00   0.46   13
2002  80  0   624        152.982    -5.684   D      7.748      7.358      0.390  2.800
56.00  43.46   0.00   0.00   0.00   0.54   14
2002  18  0   548        160.098    -2.544   D      7.941      7.593      0.349  3.300
31.18  68.32   0.00   0.00   0.00   0.50   15
2002  92  0   527        160.066     2.645   D      7.610      7.263      0.347  2.600
59.16  40.37   0.00   0.00   0.00   0.47   16
2002  54  0   637        152.992    -4.475   D      7.798      7.453      0.346  3.000
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34.61  64.76   0.00   0.00   0.00   0.62   17
2002 120  0   517        160.051     5.115   D      7.606      7.263      0.343  2.600
77.99  21.38   0.00   0.00   0.00   0.63   18
2002 248  0   688        158.434     3.081   D      8.007      7.685      0.322  3.500
97.03   2.53   0.00   0.00   0.00   0.44   19
2002  96  0   624        152.982    -5.684   D      7.573      7.263      0.310  2.600
44.16  55.43   0.00   0.00   0.00   0.41   20
2002 205  0   624        152.982    -5.684   D      7.881      7.593      0.289  3.300
99.28   0.41   0.00   0.00   0.00   0.30   21
2002  95  0   517        160.051     5.115   D      7.549      7.263      0.286  2.600
46.30  53.29   0.00   0.00   0.00   0.40   22

 --- Number of days with Delta-Deciview  =>   0.50:         8
 --- Number of days with Delta-Deciview  =>   1.00:         2
 ---             Largest Delta-Deciview  =             1.254

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                                              CALPOST  Version 5.6392        Level 051130
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                                                     Run-Length VISIBILITY

                                                        VISIB   B _SN_F

                                                           (deciview)


             RECEPTOR    COORDINATES (km)  TYPE  DV(Total)    DV(BKG)  DELTA DV  F(RH)

              108        155.368    -1.254   D      7.572      7.519      0.053  3.143

 --- Number of recs with Delta-Deciview  >    0.10:         0
 ---             Largest Delta-Deciview  =             0.053

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                                              CALPOST  Version 5.6392        Level 051130
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                                                        SUMMARY SECTION

                                                        VISIB   B _SN_F

                                                          (1/Mega-m)


 RECEPTOR    COORDINATES (km)    TYPE      PEAK (YEAR,DAY,ENDING TIME)     FOR RANK
FOR AVERAGE PERIOD
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Appendix L

Refined Meteorological and Land Use Data Sources

NORANDA LAND USE DATA

Dyersburg	Rolla
Paducah	Poplar Bluff

NORANDA TERRAIN DATA

Poplar Bluff – E	Rolla – E
Paducah – W	Paducah – E
Dyersburg – E	Dyersburg – W

UMC LAND USE DATA

Decatur	Belleville	Paducah	Dyersburg
Blytheville	Tupelo	Quincy	St. Louis
Rolla	Poplar Bluff	Memphis	Helena
Moberly	Jefferson City	Springfield	Harrison
Russellville	Little Rock	Kansas City	Lawrence
Joplin	Tulsa	Fort Smith	McAlester

UMC TERRAIN DATA

Decatur – W	Belleville – W	Paducah – W	Dyersburg – W
Blytheville – W	Tupelo – W	Quincy – E	Saint Louis – E
Rolla – E	Poplar Bluff – E	Memphis – E	Helena – E
Quincy – W	Saint Louis – W	Rolla – W	Poplar Bluff – W
Memphis – W	Helena – W	Moberly – E	Jefferson City – E
Springfield – E	Harrison – E	Russellville – E	Little Rock – E
Moberly – W	Jefferson City – W	Springfield – W	Harrison – W
Russellville – W	Little Rock – W	Kansas City – E	Lawrence – E
Joplin – E	Tulsa – E	Fort Smith – E	McAlester – E

NORANDA LIST OF SURFACE METEOROLOGICAL STATIONS

Station ID	Name	ID	Latitude	Longitude	LCC X (km)	LCC Y (km)
11111	Walnut Ridge	KARG	36.133	-90.917	-6.093	5.072
22222	Jonesboro	KJBR	35.833	-90.633	19.484	-28.262
72330	Poplar Bluff	KPOF	36.767	-90.467	34.021	75.609
72348	Cape Girardeau	KCGI	37.233	-89.567	113.429	128.106
55555	Marion	KMWA	37.750	-89.017	160.951	186.355
66666	Carbondale, IL	KMDH	37.767	-89.250	140.452	187.867
72435	Paducah/Barkley	KPAH	37.050	-88.767	184.650	109.055
72334	Dyersburg	KDYR	36.017	-89.400	130.307	-6.812
72423	Henderson City	KEHR	37.817	-87.683	277.852	196.943
74671	Fort Campbell	KHOP	36.667	-87.500	298.503	69.798

NORANDA LIST OF UPPER AIR METEOROLOGICAL STATIONS

Station ID	Name	ID	Latitude	Longitude	LCC X (km)	LCC Y (km)
3952	Little Rock, AR	KLIT	34.83	-92.97	-129.781	-138.858
13995	Springfield, MO	KSGF	37.23	-93.40	-225.660	130.085

ORIGINAL NORANDA LIST OF PRECIPITATION METEOROLOGICAL STATIONS

Station ID	Name	ID	Latitude	Longitude	LCC X (km)	LCC Y (km)
30064	Alicia	ALIC	35.54	-91.05	-18.177	-60.846
30458	Batesville	BATE	35.50	-91.46	-55.308	-65.133
31632	Corning	CORN	36.26	-90.35	44.740	19.307
33132	Hardy	HARD	36.17	-91.28	-38.666	9.272
111166	Cairo	CAIR	37.03	-89.11	154.277	106.208
111302	Carmi 3	CARM	38.04	-88.11	239.662	220.521
112353	Dixon Springs	DIXO	37.26	-88.40	216.575	133.175
113879	Harrisburg	HARR	37.44	-88.31	223.986	153.382
114629	Kaskaskia Riv	KASK	37.59	-89.57	112.619	167.767
115983	Murphysboro	MURP	37.46	-89.22	143.684	153.806
117072	Quincy/Baldwin	QUIB	39.56	-91.12	-23.211	385.934
117077	Quincy	QUIN	39.54	-91.26	-35.217	383.755
117187	Rend Lake	REND	38.02	-88.59	197.727	217.171
118020	Smithland	SMIT	37.10	-88.26	229.447	115.738
118147	Sparta	SPAR	38.07	-89.43	124.130	221.273
150611	Benton	BENT	36.51	-88.20	236.629	50.345
151631	Clinton	CLIN	36.37	-88.58	203.073	33.891
153798	Herndon	HERN	36.40	-87.34	313.876	40.669
155067	Madisonville	MADI	37.21	-87.31	313.135	130.725
156110	Paducah/Barkley	PADU	37.03	-88.46	211.927	107.488
156580	Princeton	PRIN	37.07	-87.52	295.119	114.492
230022	Advance	ADVA	37.06	-89.54	116.088	108.917
231289	Cape Girardeau	CAPE	37.14	-89.35	132.792	118.060
231674	Clearwater	CLEA	37.08	-90.46	34.499	110.395
233999	Hornersville	HORN	36.03	-90.07	70.051	-6.088
234544	Kirksville	KIRK	40.12	-92.34	-126.753	449.170
235207	Malden	MALD	36.37	-89.59	112.693	32.177
238609	Viburnum	VIBU	37.43	-91.08	-20.370	149.240
238700	Wappapello	WAPP	36.56	-90.17	60.630	52.754
402489	Dickson	DICK	36.04	-87.23	325.267	1.057
402680	Dyersburg	DYER	36.02	-89.23	145.587	-6.226
403697	Greenfield	GREE	36.10	-88.47	213.683	4.133
404556	Jackson/McKell	JACM	35.36	-88.55	208.532	-78.309
404561	Jackson	JACK	35.37	-88.50	213.038	-77.084
405210	Lexington	LEXI	35.39	-88.24	236.549	-74.232
406750	Oak Ridge	OAK	36.00	-84.15	602.030	11.966
408065	Samburg Wild	SAMB	36.27	-89.19	148.687	21.625
409219	Union City	UNIO	36.24	-89.02	163.986	18.576

REVISED NORANDA LIST OF PRECIPITATION METEOROLOGICAL STATIONS

Station ID	Name	ID	Latitude	Longitude	LCC X (km)	LCC Y (km)
30064	Alicia	ALIC	35.933	-91.067	-19.583	-17.106
30458	Batesville	BATE	35.083	-91.800	-86.565	-111.219
31632	Corning	CORN	36.417	-90.583	23.775	36.636
33132	Hardy	HARD	36.267	-91.500	-58.333	20.132
111166	Cairo	CAIR	37.050	-89.183	147.733	108.312
111302	Carmi 3	CARM	38.067	-88.183	233.162	223.296
112353	Dixon Springs	DIXO	37.433	-88.067	245.468	153.256
113879	Harrisburg	HARR	37.733	-88.517	204.943	185.488
114629	Kaskaskia Riv	KASK	37.983	-89.950	78.741	211.077
115983	Murphysboro	MURP	37.767	-89.367	130.207	187.660
117072	Quincy/Baldwin	QUIN	39.933	-91.200	-29.910	427.457
117077	Quincy	QUIN	39.900	-91.433	-49.823	423.852
117187	Rend Lake	REND	38.033	-88.983	163.277	217.889
118020	Smithland	SMIT	37.167	-88.433	213.898	122.730
118147	Sparta	SPAR	38.117	-89.717	98.994	226.114
150611	Benton	BENT	36.850	-88.033	250.369	88.552
151631	Clinton	CLIN	36.633	-88.967	167.882	62.382
153798	Herndon	HERN	36.667	-87.567	292.565	69.550
155067	Madisonville	MADI	37.350	-87.517	294.301	145.596
156110	Paducah/Barkley	PADU	37.050	-88.767	184.679	109.056
156580	Princeton	PRIN	37.117	-87.867	264.233	118.633
230022	Advance	ADVA	37.100	-89.917	82.644	112.959
231289	Cape Girardeau	CAPE	37.233	-89.567	113.458	128.143
231674	Clearwater	CLEA	37.133	-90.783	5.830	116.251
233999	Hornersville	HORN	36.050	-90.117	65.837	-3.899
234544	Kirksville	KIRK	40.200	-92.567	-145.858	458.396
235207	Malden	MALD	36.600	-89.983	77.253	57.338
238609	Viburnum	VIBU	37.717	-91.133	-24.979	181.105
238700	Wappapello	WAPP	36.917	-90.283	50.271	92.325
402489	Dickson	DICK	36.067	-87.400	309.885	3.439
402680	Dyersburg	DYER	36.050	-89.367	133.246	-3.096
403697	Greenfield	GREE	36.167	-88.783	185.381	10.870
404556	Jackson/McKell	JACK	35.600	-88.917	174.726	-52.379
404561	Jackson	JACK	35.617	-88.850	180.713	-50.398
405210	Lexington	LEXI	35.650	-88.400	221.285	-45.721
406750	Oak Ridge	OAK	36.000	-84.250	593.059	11.323
408065	Samburg Wild	SAMB	36.450	-89.300	138.497	41.460
409219	Union City	UNIO	36.400	-89.033	162.444	36.334

UMC LIST OF SURFACE METEOROLOGICAL STATIONS

WMO#	Name	Latitude	Longitude	LCC X (km)	LCC Y (km)
723340	Memphis	35.050	-89.983	182.576	-212.645
723405	Little Rock	34.733	-92.233	-21.228	-249.450
723440	Ft. Smith	35.333	-94.367	-213.500	-180.721
723489	Cape Girardeau	37.233	-89.567	214.668	61.497
723560	Tulsa	35.200	-95.900	-352.361	-190.769
724340	St. Louis	38.750	-90.383	139.350	193.798
724400	Springfield, MO	37.230	-93.400	-121.724	26.580
724450	Columbia, MO	38.817	-92.217	-18.675	199.958
724460	Kansas City	39.300	-94.717	-232.427	256.517

UMC LIST OF UPPER AIR METEOROLOGICAL STATIONS

Station ID	Name	Latitude	Longitude	LCC X (km)	LCC Y (km)
723405	Little Rock, AR	34.83	-92.97	-21.228	-249.450
724400	Springfield, MO	37.23	-93.40	-121.724	26.580

UMC LIST OF PRECIPITATION METEOROLOGICAL STATIONS

Station ID	Name	Latitude(DMS)	Longitude (DMS)	LCC X (km)	LCC Y (km)
230022	Advance	37 06	-89 54	185.072	13.083
230088	Alley Spring	37 09	-91 27	48.433	16.655
030458	Batesville	35 50	-91 48	17.912	-128.358
231383	Cassville	36 40	-93 51	-164.008	-35.054
231791	Columbia	38 49	-92 13	-18.675	199.958
032574	Ft. Smith	35 20	-94 22	-213.500	-180.721
033165	Harrison	36 16	-93 09	-102.499	-80.060
233999	Hornersville	36 03	-90 07	168.297	-102.843
234271	Jefferson City	38 34	-92 10	-14.417	172.429
234315	Joplin	37 09	-94 30	-220.199	19.446
234358	Kansas City	39 18	-94 44	-233.852	256.559
035320	N. Little Rock	34 50	-92 16	-24.227	-238.429
405954	Memphis	35 03	-89 59	182.576	-212.645
236402	Osceola	38 11	-94 02	-176.64	132.138
236826	Potosi	37 54	-90 50	101.723	99.676
237976	Springfield	37 14	-93 23	-121.724	26.580
237455	St. Louis	38 45	-90 22	140.786	193.823
238880	West Plains	36 45	-91 50	14.745	-27.488

Appendix M

Screen-Modeling Analyses

Appendix M
Mingo
2001 M2

EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	517	602.805	-305.061	D	7.133	7.124	0.009	2.313	0	0	0	0	0	99.97
2001	2	23	557	601.32	-313.419	D	7.24	7.191	0.049	2.45	0	0	0	0	0	100
2001	3	23	676	599.876	-309.365	D	7.708	7.694	0.014	3.519	0	0	0	0	0	99.99
2001	4	23	557	601.32	-313.419	D	7.781	7.773	0.008	3.693	0	0	0	0	0	100
2001	5	23	6	596.462	-314.859	D	7.737	7.729	0.008	3.596	0	0	0	0	0	99.99
2001	6	23	631	596.276	-315.551	D	7.23	7.228	0.003	2.527	0	0	0	0	0	99.94
2001	7	23	548	603.28	-312.734	D	7.214	7.183	0.031	2.433	0	0	0	0	0	100
2001	8	23	517	602.805	-305.061	D	7.385	7.374	0.011	2.834	0	0	0	0	0	99.99
2001	9	23	632	596.27	-315.421	D	7.394	7.366	0.028	2.816	0	0	0	0	0	100
2001	10	23	521	602.866	-306.052	D	7.444	7.427	0.017	2.946	0	0	0	0	0	99.99
2001	11	23	517	602.805	-305.061	D	7.925	7.924	0.001	4.027	0	0	0	0	0	99.83
2001	12	23	557	601.32	-313.419	D	9.393	9.378	0.016	7.518	0	0	0	0	0	99.99
2001	13	23	557	601.32	-313.419	D	8.737	8.729	0.007	5.898	0	0	0	0	0	99.97
2001	14	23	517	602.805	-305.061	D	9.759	9.759	0	8.521	0	0	0	0	0	96.05
2001	15	23	517	602.805	-305.061	D	7.335	7.329	0.006	2.739	0	0	0	0	0	100
2001	16	23	517	602.805	-305.061	D	6.721	6.695	0.025	1.447	0	0	0	0	0	100
2001	17	23	637	596.267	-315.066	D	6.945	6.909	0.036	1.873	0	0	0	0	0	100
2001	18	23	517	602.805	-305.061	D	7.158	7.128	0.029	2.321	0	0	0	0	0	99.99
2001	19	23	557	601.32	-313.419	D	6.79	6.728	0.061	1.513	0	0	0	0	0	100
2001	20	23	626	596.299	-315.88	D	6.756	6.731	0.025	1.519	0	0	0	0	0	100
2001	21	23	545	603.234	-311.991	D	6.562	6.551	0.011	1.166	0	0	0	0	0	99.99
2001	22	23	548	603.28	-312.734	D	6.528	6.515	0.013	1.095	0	0	0	0	0	99.99
2001	23	23	517	602.805	-305.061	D	6.697	6.687	0.01	1.431	0	0	0	0	0	99.99
2001	24	23	603	598.68	-316.244	D	6.91	6.905	0.005	1.865	0	0	0	0	0	99.98
2001	25	23	632	596.27	-315.421	D	6.596	6.589	0.007	1.239	0	0	0	0	0	99.99
2001	26	23	548	603.28	-312.734	D	6.498	6.496	0.002	1.059	0	0	0	0	0	100.05
2001	27	23	525	602.928	-307.042	D	6.641	6.636	0.005	1.331	0	0	0	0	0	99.96
2001	28	23	540	603.158	-310.755	D	6.538	6.511	0.027	1.087	0	0	0	0	0	100
2001	29	23	517	602.805	-305.061	D	8.177	8.175	0.002	4.593	0	0	0	0	0	99.9
2001	30	23	517	602.805	-305.061	D	9.205	9.205	0.001	7.076	0	0	0	0	0	99.78
2001	31	23	625	596.311	-316.079	D	6.903	6.895	0.009	1.845	0	0	0	0	0	100.01
2001	32	23	557	601.32	-313.419	D	6.576	6.572	0.004	1.205	0	0	0	0	0	99.98
2001	33	23	517	602.805	-305.061	D	6.545	6.543	0.002	1.148	0	0	0	0	0	100.02
2001	34	23	517	602.805	-305.061	D	6.471	6.469	0.002	1.006	0	0	0	0	0	100.05
2001	35	23	557	601.32	-313.419	D	6.494	6.49	0.004	1.047	0	0	0	0	0	100
2001	36	23	623	596.511	-316.262	D	6.677	6.677	0	1.412	0	0	0	0	0	99.07
2001	37	23	517	602.805	-305.061	D	6.505	6.502	0.003	1.07	0	0	0	0	0	99.97
2001	38	23	676	599.876	-309.365	D	6.623	6.611	0.012	1.282	0	0	0	0	0	99.99

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	39	23	1	596.558	-316.101	D	7.981	7.981	0	4.155	0	0	0	0	0	0
2001	40	23	657	598.077	-312.213	D	9.319	9.317	0.002	7.361	0	0	0	0	0	99.91
2001	41	23	517	602.805	-305.061	D	6.572	6.56	0.012	1.182	0	0	0	0	0	100.01
2001	42	23	642	596.914	-314.17	D	6.47	6.47	0	1.007	0	0	0	0	0	100.06
2001	43	23	557	601.32	-313.419	D	6.522	6.52	0.002	1.105	0	0	0	0	0	100.02
2001	44	23	1	596.558	-316.101	D	7.622	7.622	0	3.364	0	0	0	0	0	0
2001	45	23	461	602.269	-305.916	D	10.218	10.218	0	9.779	0	0	0	0	0	94.44
2001	46	23	662	598.404	-311.683	D	8.685	8.607	0.078	5.605	0	0	0	0	0	100
2001	47	23	682	600.626	-308.407	D	6.779	6.721	0.057	1.499	0	0	0	0	0	100
2001	48	23	548	603.28	-312.734	D	6.549	6.499	0.05	1.064	0	0	0	0	0	100
2001	49	23	281	600.703	-308.285	D	6.5	6.469	0.031	1.006	0	0	0	0	0	99.99
2001	50	23	548	603.28	-312.734	D	6.479	6.473	0.006	1.014	0	0	0	0	0	99.99
2001	51	23	517	602.805	-305.061	D	6.63	6.626	0.004	1.312	0	0	0	0	0	99.99
2001	52	23	637	596.267	-315.066	D	6.549	6.539	0.01	1.141	0	0	0	0	0	99.99
2001	53	23	637	596.267	-315.066	D	7.317	7.301	0.015	2.68	0	0	0	0	0	99.99
2001	54	23	548	603.28	-312.734	D	6.729	6.712	0.017	1.481	0	0	0	0	0	100
2001	55	23	517	602.805	-305.061	D	8.108	8.106	0.002	4.438	0	0	0	0	0	99.99
2001	56	23	625	596.311	-316.079	D	8.438	8.437	0.001	5.201	0	0	0	0	0	99.88
2001	57	23	557	601.32	-313.419	D	6.507	6.506	0.001	1.078	0	0	0	0	0	99.99
2001	58	23	632	596.27	-315.421	D	6.532	6.528	0.003	1.121	0	0	0	0	0	100.02
2001	59	23	1	596.558	-316.101	D	6.638	6.638	0	1.335	0	0	0	0	0	0
2001	60	23	517	602.805	-305.061	D	6.493	6.473	0.02	1.013	0	0	0	0	0	100
2001	61	23	517	602.805	-305.061	D	6.901	6.895	0.006	1.846	0	0	0	0	0	100
2001	62	23	517	602.805	-305.061	D	6.679	6.66	0.019	1.377	0	0	0	0	0	100
2001	63	23	632	596.27	-315.421	D	6.632	6.621	0.012	1.301	0	0	0	0	0	99.99
2001	64	23	632	596.27	-315.421	D	6.586	6.57	0.016	1.202	0	0	0	0	0	100
2001	65	23	632	596.27	-315.421	D	6.547	6.53	0.017	1.124	0	0	0	0	0	100
2001	66	23	632	596.27	-315.421	D	6.503	6.477	0.026	1.022	0	0	0	0	0	100
2001	67	23	624	596.324	-316.278	D	6.534	6.533	0.001	1.13	0	0	0	0	0	100.09
2001	68	23	638	596.406	-314.894	D	6.538	6.525	0.013	1.115	0	0	0	0	0	100
2001	69	23	517	602.805	-305.061	D	6.514	6.494	0.02	1.055	0	0	0	0	0	100
2001	70	23	517	602.805	-305.061	D	6.476	6.474	0.002	1.015	0	0	0	0	0	99.96
2001	71	23	517	602.805	-305.061	D	8.243	8.243	0	4.75	0	0	0	0	0	100.17
2001	72	23	632	596.27	-315.421	D	6.835	6.83	0.005	1.715	0	0	0	0	0	100.01
2001	73	23	626	596.299	-315.88	D	6.507	6.485	0.022	1.037	0	0	0	0	0	100
2001	74	23	517	602.805	-305.061	D	8.834	8.834	0	6.153	0	0	0	0	0	100.27
2001	75	23	521	602.866	-306.052	D	8.487	8.477	0.01	5.296	0	0	0	0	0	100.01
2001	76	23	517	602.805	-305.061	D	6.803	6.794	0.009	1.643	0	0	0	0	0	99.99
2001	77	23	624	596.324	-316.278	D	6.561	6.553	0.008	1.168	0	0	0	0	0	100.01

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	78	23	1	596.558	-316.101	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	6.474	6.474	0	1.015	0	0	0	0	0	0
2001	80	23	637	596.267	-315.066	D	6.492	6.485	0.007	1.037	0	0	0	0	0	100.01
2001	81	23	625	596.311	-316.079	D	6.534	6.513	0.021	1.091	0	0	0	0	0	99.99
2001	82	23	517	602.805	-305.061	D	7.454	7.426	0.028	2.943	0	0	0	0	0	100
2001	83	23	637	596.267	-315.066	D	6.713	6.665	0.048	1.389	0	0	0	0	0	100
2001	84	23	632	596.27	-315.421	D	6.534	6.489	0.045	1.045	0	0	0	0	0	100
2001	85	23	557	601.32	-313.419	D	6.516	6.485	0.031	1.036	0	0	0	0	0	100
2001	86	23	517	602.805	-305.061	D	6.478	6.469	0.009	1.007	0	0	0	0	0	100.01
2001	87	23	517	602.805	-305.061	D	6.477	6.469	0.008	1.005	0	0	0	0	0	99.99
2001	88	23	557	601.32	-313.419	D	7.181	7.18	0.001	2.427	0	0	0	0	0	99.99
2001	89	23	280	600.722	-308.534	D	8.757	8.757	0	5.965	0	0	0	0	0	86.4
2001	90	23	517	602.805	-305.061	D	8.42	8.409	0.011	5.135	0	0	0	0	0	99.99
2001	91	23	517	602.805	-305.061	D	7.066	7.057	0.009	2.174	0	0	0	0	0	99.98
2001	92	23	517	602.805	-305.061	D	6.947	6.946	0.001	1.948	0	0	0	0	0	99.93
2001	93	23	557	601.32	-313.419	D	9.41	9.409	0.001	7.599	0	0	0	0	0	99.92
2001	94	23	623	596.511	-316.262	D	8.144	8.143	0.001	4.52	0	0	0	0	0	99.89
2001	95	23	681	600.53	-308.617	D	7.195	7.195	0	2.458	0	0	0	0	0	99.42
2001	96	23	1	596.558	-316.101	D	8.925	8.925	0	6.376	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	6.895	6.895	0	1.846	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.116	7.116	0	2.295	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.053	7.053	0	2.166	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.448	7.448	0	2.991	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	9.215	9.215	0	7.101	0	0	0	0	0	0
2001	102	23	624	596.324	-316.278	D	7.385	7.38	0.005	2.846	0	0	0	0	0	99.97
2001	103	23	626	596.299	-315.88	D	6.552	6.546	0.006	1.155	0	0	0	0	0	99.99
2001	104	23	637	596.267	-315.066	D	6.614	6.611	0.003	1.281	0	0	0	0	0	100.03
2001	105	23	517	602.805	-305.061	D	7.61	7.604	0.006	3.326	0	0	0	0	0	99.99
2001	106	23	557	601.32	-313.419	D	6.617	6.607	0.009	1.275	0	0	0	0	0	100.01
2001	107	23	689	601.435	-306.997	D	6.507	6.478	0.029	1.024	0	0	0	0	0	100
2001	108	23	669	599.263	-310.777	D	6.504	6.478	0.025	1.024	0	0	0	0	0	100
2001	109	23	517	602.805	-305.061	D	6.495	6.494	0.001	1.054	0	0	0	0	0	100.05
2001	110	23	1	596.558	-316.101	D	6.79	6.79	0	1.636	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.389	7.389	0	2.866	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	113	23	461	602.269	-305.916	D	7.342	7.342	0	2.766	0	0	0	0	0	65.38
2001	114	23	517	602.805	-305.061	D	6.529	6.516	0.012	1.098	0	0	0	0	0	100
2001	115	23	632	596.27	-315.421	D	6.489	6.477	0.012	1.022	0	0	0	0	0	100
2001	116	23	517	602.805	-305.061	D	6.539	6.536	0.004	1.135	0	0	0	0	0	100.03

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	117	23	517	602.805	-305.061	D	6.702	6.696	0.006	1.449	0	0	0	0	0	100
2001	118	23	517	602.805	-305.061	D	6.682	6.676	0.006	1.409	0	0	0	0	0	100.01
2001	119	23	557	601.32	-313.419	D	6.595	6.588	0.008	1.236	0	0	0	0	0	99.99
2001	120	23	548	603.28	-312.734	D	6.72	6.718	0.002	1.492	0	0	0	0	0	100.04
2001	121	23	1	596.558	-316.101	D	6.826	6.826	0	1.708	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.186	7.186	0	2.441	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	6.778	6.778	0	1.612	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	6.933	6.933	0	1.921	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	6.946	6.946	0	1.948	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.82	7.82	0	3.797	0	0	0	0	0	0
2001	127	23	432	602.04	-306.183	D	7.584	7.584	0	3.281	0	0	0	0	0	99.75
2001	128	23	676	599.876	-309.365	D	6.884	6.875	0.009	1.805	0	0	0	0	0	99.99
2001	129	23	517	602.805	-305.061	D	6.527	6.513	0.014	1.092	0	0	0	0	0	100
2001	130	23	521	602.866	-306.052	D	6.58	6.574	0.005	1.21	0	0	0	0	0	99.98
2001	131	23	517	602.805	-305.061	D	7.48	7.48	0	3.058	0	0	0	0	0	99.57
2001	132	23	517	602.805	-305.061	D	7.919	7.91	0.009	3.997	0	0	0	0	0	99.99
2001	133	23	603	598.68	-316.244	D	6.535	6.526	0.009	1.117	0	0	0	0	0	99.99
2001	134	23	516	602.728	-305.38	D	6.592	6.591	0.001	1.243	0	0	0	0	0	99.83
2001	135	23	107	598.487	-311.954	D	6.931	6.931	0	1.918	0	0	0	0	0	81.37
2001	136	23	1	596.558	-316.101	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.223	7.223	0	2.516	0	0	0	0	0	0
2001	138	23	517	602.805	-305.061	D	7.448	7.448	0	2.989	0	0	0	0	0	99.89
2001	139	23	640	596.683	-314.55	D	8.01	7.968	0.042	4.126	0	0	0	0	0	100
2001	140	23	626	596.299	-315.88	D	7.302	7.289	0.013	2.655	0	0	0	0	0	100
2001	141	23	462	603.035	-312.603	D	8.6	8.599	0.001	5.585	0	0	0	0	0	99.89
2001	142	23	517	602.805	-305.061	D	6.577	6.577	0	1.215	0	0	0	0	0	100.07
2001	143	23	624	596.324	-316.278	D	6.525	6.523	0.002	1.11	0	0	0	0	0	99.99
2001	144	23	517	602.805	-305.061	D	6.569	6.568	0.001	1.198	0	0	0	0	0	99.98
2001	145	23	517	602.805	-305.061	D	6.613	6.612	0.002	1.283	0	0	0	0	0	100.04
2001	146	23	517	602.805	-305.061	D	6.645	6.64	0.005	1.339	0	0	0	0	0	99.99
2001	147	23	624	596.324	-316.278	D	6.593	6.582	0.011	1.225	0	0	0	0	0	99.99
2001	148	23	603	598.68	-316.244	D	6.776	6.773	0.003	1.601	0	0	0	0	0	100.05
2001	149	23	637	596.267	-315.066	D	6.753	6.749	0.004	1.553	0	0	0	0	0	99.98
2001	150	23	517	602.805	-305.061	D	7.596	7.594	0.002	3.303	0	0	0	0	0	100.01
2001	151	23	517	602.805	-305.061	D	8.634	8.632	0.002	5.665	0	0	0	0	0	99.98
2001	152	23	624	596.324	-316.278	D	6.966	6.961	0.005	1.98	0	0	0	0	0	99.97
2001	153	23	637	596.267	-315.066	D	6.846	6.843	0.003	1.741	0	0	0	0	0	100.01
2001	154	23	517	602.805	-305.061	D	6.76	6.748	0.011	1.553	0	0	0	0	0	100
2001	155	23	626	596.299	-315.88	D	7.275	7.274	0.001	2.623	0	0	0	0	0	99.99

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	156	23	136	598.946	-311.42	D	8.339	8.339	0	4.973	0	0	0	0	0	86.19
2001	157	23	1	596.558	-316.101	D	8.193	8.193	0	4.636	0	0	0	0	0	0
2001	158	23	517	602.805	-305.061	D	7.667	7.645	0.022	3.414	0	0	0	0	0	100
2001	159	23	624	596.324	-316.278	D	6.977	6.953	0.024	1.963	0	0	0	0	0	100
2001	160	23	631	596.276	-315.551	D	6.639	6.637	0.002	1.333	0	0	0	0	0	99.92
2001	161	23	517	602.805	-305.061	D	6.668	6.663	0.006	1.384	0	0	0	0	0	100
2001	162	23	525	602.928	-307.042	D	6.871	6.868	0.003	1.791	0	0	0	0	0	99.95
2001	163	23	548	603.28	-312.734	D	6.981	6.979	0.002	2.015	0	0	0	0	0	100.02
2001	164	23	517	602.805	-305.061	D	7.479	7.479	0	3.056	0	0	0	0	0	100.2
2001	165	23	1	596.558	-316.101	D	7.35	7.35	0	2.784	0	0	0	0	0	0
2001	166	23	624	596.324	-316.278	D	8.841	8.84	0	6.168	0	0	0	0	0	99.58
2001	167	23	517	602.805	-305.061	D	6.558	6.556	0.001	1.175	0	0	0	0	0	100.05
2001	168	23	517	602.805	-305.061	D	6.63	6.627	0.003	1.314	0	0	0	0	0	100.02
2001	169	23	548	603.28	-312.734	D	6.87	6.867	0.003	1.789	0	0	0	0	0	100.02
2001	170	23	431	602.059	-306.432	D	6.877	6.877	0	1.809	0	0	0	0	0	96.16
2001	171	23	1	596.558	-316.101	D	7.198	7.198	0	2.465	0	0	0	0	0	0
2001	172	23	624	596.324	-316.278	D	7.87	7.865	0.005	3.895	0	0	0	0	0	99.98
2001	173	23	632	596.27	-315.421	D	6.98	6.956	0.024	1.969	0	0	0	0	0	100
2001	174	23	517	602.805	-305.061	D	6.747	6.717	0.029	1.491	0	0	0	0	0	100
2001	175	23	517	602.805	-305.061	D	6.854	6.818	0.036	1.691	0	0	0	0	0	100
2001	176	23	624	596.324	-316.278	D	6.754	6.751	0.003	1.558	0	0	0	0	0	99.98
2001	177	23	624	596.324	-316.278	D	6.786	6.785	0.001	1.625	0	0	0	0	0	99.95
2001	178	23	548	603.28	-312.734	D	7.051	7.047	0.004	2.153	0	0	0	0	0	99.96
2001	179	23	432	602.04	-306.183	D	7.341	7.34	0.001	2.762	0	0	0	0	0	99.82
2001	180	23	517	602.805	-305.061	D	8.204	8.203	0.001	4.657	0	0	0	0	0	99.97
2001	181	23	1	596.558	-316.101	D	7.515	7.515	0	3.134	0	0	0	0	0	0
2001	182	23	517	602.805	-305.061	D	8.698	8.694	0.004	5.813	0	0	0	0	0	99.95
2001	183	23	637	596.267	-315.066	D	7.451	7.42	0.031	2.931	0	0	0	0	0	100
2001	184	23	624	596.324	-316.278	D	6.792	6.777	0.015	1.61	0	0	0	0	0	100
2001	185	23	517	602.805	-305.061	D	7.631	7.625	0.006	3.37	0	0	0	0	0	100
2001	186	23	548	603.28	-312.734	D	7.079	7.064	0.014	2.189	0	0	0	0	0	99.99
2001	187	23	637	596.267	-315.066	D	6.62	6.603	0.017	1.266	0	0	0	0	0	100
2001	188	23	517	602.805	-305.061	D	6.948	6.941	0.006	1.939	0	0	0	0	0	100.01
2001	189	23	517	602.805	-305.061	D	7.639	7.639	0	3.4	0	0	0	0	0	102.85
2001	190	23	624	596.324	-316.278	D	7.188	7.181	0.007	2.43	0	0	0	0	0	100.02
2001	191	23	694	602.12	-306.029	D	7.804	7.768	0.035	3.683	0	0	0	0	0	100
2001	192	23	624	596.324	-316.278	D	7.683	7.646	0.037	3.417	0	0	0	0	0	100
2001	193	23	631	596.276	-315.551	D	6.806	6.802	0.004	1.66	0	0	0	0	0	99.95
2001	194	23	624	596.324	-316.278	D	6.67	6.668	0.002	1.395	0	0	0	0	0	99.99

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	195	23	1	596.558	-316.101	D	6.647	6.647	0	1.352	0	0	0	0	0	0
2001	196	23	624	596.324	-316.278	D	6.628	6.628	0.001	1.314	0	0	0	0	0	99.77
2001	197	23	580	599.723	-314.87	D	6.875	6.873	0.002	1.802	0	0	0	0	0	99.97
2001	198	23	1	596.558	-316.101	D	9.096	9.096	0	6.802	0	0	0	0	0	0
2001	199	23	517	602.805	-305.061	D	7.826	7.826	0	3.81	0	0	0	0	0	94.23
2001	200	23	517	602.805	-305.061	D	9.277	9.276	0	7.258	0	0	0	0	0	99.61
2001	201	23	517	602.805	-305.061	D	8.501	8.495	0.006	5.338	0	0	0	0	0	99.94
2001	202	23	193	600.016	-312.336	D	8.358	8.294	0.063	4.869	0	0	0	0	0	99.99
2001	203	23	193	600.016	-312.336	D	8.137	8.111	0.026	4.448	0	0	0	0	0	99.99
2001	204	23	521	602.866	-306.052	D	7.602	7.593	0.009	3.3	0	0	0	0	0	99.99
2001	205	23	517	602.805	-305.061	D	7.242	7.241	0.002	2.553	0	0	0	0	0	100.01
2001	206	23	517	602.805	-305.061	D	7.709	7.706	0.003	3.546	0	0	0	0	0	100
2001	207	23	517	602.805	-305.061	D	8.745	8.741	0.004	5.927	0	0	0	0	0	99.95
2001	208	23	520	602.851	-305.804	D	8.307	8.298	0.009	4.878	0	0	0	0	0	100
2001	209	23	548	603.28	-312.734	D	8.618	8.604	0.014	5.596	0	0	0	0	0	99.99
2001	210	23	517	602.805	-305.061	D	8.74	8.732	0.008	5.905	0	0	0	0	0	99.98
2001	211	23	517	602.805	-305.061	D	7.846	7.828	0.018	3.815	0	0	0	0	0	99.99
2001	212	23	624	596.324	-316.278	D	6.897	6.884	0.014	1.823	0	0	0	0	0	100
2001	213	23	624	596.324	-316.278	D	7.424	7.422	0.002	2.935	0	0	0	0	0	99.97
2001	214	23	517	602.805	-305.061	D	6.943	6.942	0.001	1.94	0	0	0	0	0	99.94
2001	215	23	517	602.805	-305.061	D	7.607	7.602	0.005	3.32	0	0	0	0	0	99.96
2001	216	23	660	598.316	-311.922	D	7.971	7.962	0.009	4.112	0	0	0	0	0	100
2001	217	23	1	596.558	-316.101	D	6.844	6.844	0	1.744	0	0	0	0	0	0
2001	218	23	603	598.68	-316.244	D	6.969	6.966	0.003	1.989	0	0	0	0	0	100.02
2001	219	23	1	596.558	-316.101	D	7.474	7.474	0	3.046	0	0	0	0	0	0
2001	220	23	610	597.453	-316.177	D	8.07	8.07	0	4.354	0	0	0	0	0	98.4
2001	221	23	521	602.866	-306.052	D	8.077	8.065	0.012	4.344	0	0	0	0	0	100.01
2001	222	23	517	602.805	-305.061	D	8.446	8.435	0.011	5.197	0	0	0	0	0	99.99
2001	223	23	624	596.324	-316.278	D	8.09	8.076	0.014	4.368	0	0	0	0	0	100
2001	224	23	637	596.267	-315.066	D	7.129	7.104	0.025	2.271	0	0	0	0	0	100
2001	225	23	676	599.876	-309.365	D	6.948	6.929	0.019	1.914	0	0	0	0	0	99.99
2001	226	23	624	596.324	-316.278	D	6.851	6.841	0.01	1.737	0	0	0	0	0	99.99
2001	227	23	604	598.599	-316.246	D	6.65	6.643	0.007	1.345	0	0	0	0	0	99.99
2001	228	23	694	602.12	-306.029	D	7.006	7.004	0.002	2.066	0	0	0	0	0	99.92
2001	229	23	637	596.267	-315.066	D	6.954	6.953	0.001	1.963	0	0	0	0	0	99.8
2001	230	23	517	602.805	-305.061	D	7.29	7.287	0.003	2.65	0	0	0	0	0	99.97
2001	231	23	557	601.32	-313.419	D	6.963	6.953	0.01	1.963	0	0	0	0	0	100
2001	232	23	637	596.267	-315.066	D	6.76	6.739	0.021	1.535	0	0	0	0	0	100
2001	233	23	557	601.32	-313.419	D	6.854	6.845	0.009	1.746	0	0	0	0	0	99.98

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	234	23	509	602.862	-307.119	D	8.129	8.128	0	4.488	0	0	0	0	0	98.94
2001	235	23	7	596.806	-316.082	D	7.249	7.248	0	2.57	0	0	0	0	0	89.26
2001	236	23	517	602.805	-305.061	D	7.957	7.957	0	4.1	0	0	0	0	0	40.19
2001	237	23	1	596.558	-316.101	D	7.35	7.35	0	2.783	0	0	0	0	0	0
2001	238	23	517	602.805	-305.061	D	8.295	8.291	0.004	4.861	0	0	0	0	0	99.93
2001	239	23	624	596.324	-316.278	D	7.288	7.25	0.037	2.573	0	0	0	0	0	100
2001	240	23	563	600.143	-314.135	D	7.385	7.369	0.016	2.823	0	0	0	0	0	100.01
2001	241	23	517	602.805	-305.061	D	7.263	7.245	0.017	2.563	0	0	0	0	0	99.99
2001	242	23	517	602.805	-305.061	D	8.843	8.841	0.002	6.169	0	0	0	0	0	99.95
2001	243	23	517	602.805	-305.061	D	8.885	8.884	0.001	6.275	0	0	0	0	0	99.94
2001	244	23	637	596.267	-315.066	D	8.281	8.266	0.015	4.803	0	0	0	0	0	100
2001	245	23	624	596.324	-316.278	D	7.187	7.184	0.002	2.437	0	0	0	0	0	99.96
2001	246	23	517	602.805	-305.061	D	8.002	8.002	0	4.201	0	0	0	0	0	99.34
2001	247	23	637	596.267	-315.066	D	7.557	7.546	0.012	3.199	0	0	0	0	0	100.01
2001	248	23	517	602.805	-305.061	D	6.943	6.938	0.004	1.933	0	0	0	0	0	100
2001	249	23	681	600.53	-308.617	D	7.417	7.416	0	2.922	0	0	0	0	0	100.11
2001	250	23	1	596.558	-316.101	D	9.131	9.131	0	6.889	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	9.542	9.542	0	7.946	0	0	0	0	0	0
2001	252	23	624	596.324	-316.278	D	9.397	9.397	0	7.568	0	0	0	0	0	99.71
2001	253	23	632	596.27	-315.421	D	7.519	7.501	0.019	3.102	0	0	0	0	0	100
2001	254	23	637	596.267	-315.066	D	6.776	6.775	0.001	1.605	0	0	0	0	0	99.95
2001	255	23	1	596.558	-316.101	D	7.065	7.065	0	2.191	0	0	0	0	0	0
2001	256	23	656	597.971	-312.292	D	7.257	7.199	0.059	2.466	0	0	0	0	0	100
2001	257	23	624	596.324	-316.278	D	6.878	6.873	0.004	1.802	0	0	0	0	0	100
2001	258	23	1	596.558	-316.101	D	6.636	6.636	0	1.33	0	0	0	0	0	81.21
2001	259	23	624	596.324	-316.278	D	6.702	6.702	0	1.46	0	0	0	0	0	101.22
2001	260	23	557	601.32	-313.419	D	7.074	7.071	0.004	2.202	0	0	0	0	0	99.99
2001	261	23	405	602.557	-312.89	D	7.429	7.428	0	2.949	0	0	0	0	0	99.66
2001	262	23	557	601.32	-313.419	D	9.173	9.17	0.003	6.989	0	0	0	0	0	99.92
2001	263	23	1	596.558	-316.101	D	7.114	7.114	0	2.292	0	0	0	0	0	99.05
2001	264	23	624	596.324	-316.278	D	7.141	7.134	0.007	2.332	0	0	0	0	0	100
2001	265	23	557	601.32	-313.419	D	7.049	7.047	0.003	2.153	0	0	0	0	0	99.98
2001	266	23	548	603.28	-312.734	D	7.237	7.23	0.007	2.532	0	0	0	0	0	99.99
2001	267	23	637	596.267	-315.066	D	8.03	8.006	0.024	4.211	0	0	0	0	0	100
2001	268	23	698	602.668	-305.255	D	6.561	6.547	0.013	1.158	0	0	0	0	0	100
2001	269	23	517	602.805	-305.061	D	6.573	6.534	0.039	1.132	0	0	0	0	0	100
2001	270	23	517	602.805	-305.061	D	6.579	6.572	0.006	1.207	0	0	0	0	0	99.99
2001	271	23	517	602.805	-305.061	D	6.875	6.858	0.016	1.772	0	0	0	0	0	100
2001	272	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	273	23	1	596.558	-316.101	D	7.133	7.133	0	2.33	0	0	0	0	0	0
2001	274	23	527	602.958	-307.536	D	7.03	7.008	0.022	2.074	0	0	0	0	0	100
2001	275	23	676	599.876	-309.365	D	7.245	7.206	0.039	2.482	0	0	0	0	0	100
2001	276	23	491	603.207	-311.591	D	7.339	7.336	0.003	2.753	0	0	0	0	0	99.97
2001	277	23	1	596.558	-316.101	D	7.843	7.843	0	3.848	0	0	0	0	0	0
2001	278	23	517	602.805	-305.061	D	9.854	9.843	0.012	8.747	0	0	0	0	0	99.99
2001	279	23	557	601.32	-313.419	D	7.702	7.679	0.023	3.487	0	0	0	0	0	100
2001	280	23	548	603.28	-312.734	D	6.539	6.531	0.008	1.126	0	0	0	0	0	100
2001	281	23	517	602.805	-305.061	D	6.597	6.594	0.003	1.248	0	0	0	0	0	99.97
2001	282	23	1	596.558	-316.101	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	8.133	8.133	0	4.498	0	0	0	0	0	0
2001	284	23	548	603.28	-312.734	D	10.122	10.121	0.001	9.508	0	0	0	0	0	99.92
2001	285	23	624	596.324	-316.278	D	9.945	9.943	0.003	9.018	0	0	0	0	0	99.96
2001	286	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	63.74
2001	287	23	521	602.866	-306.052	D	8.814	8.806	0.008	6.084	0	0	0	0	0	100.01
2001	288	23	517	602.805	-305.061	D	6.539	6.537	0.002	1.138	0	0	0	0	0	100.03
2001	289	23	632	596.27	-315.421	D	7.521	7.506	0.015	3.114	0	0	0	0	0	100
2001	290	23	557	601.32	-313.419	D	6.504	6.493	0.012	1.052	0	0	0	0	0	100
2001	291	23	688	601.298	-307.191	D	6.505	6.499	0.006	1.064	0	0	0	0	0	99.97
2001	292	23	517	602.805	-305.061	D	6.585	6.585	0.001	1.23	0	0	0	0	0	99.83
2001	293	23	517	602.805	-305.061	D	7.008	7.008	0.001	2.073	0	0	0	0	0	100.06
2001	294	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.564	7.564	0	3.239	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	9.63	9.63	0	8.178	0	0	0	0	0	0
2001	297	23	517	602.805	-305.061	D	9.627	9.627	0.001	8.168	0	0	0	0	0	100.09
2001	298	23	517	602.805	-305.061	D	6.867	6.866	0.001	1.788	0	0	0	0	0	100.15
2001	299	23	626	596.299	-315.88	D	6.472	6.471	0.001	1.01	0	0	0	0	0	99.87
2001	300	23	632	596.27	-315.421	D	6.513	6.485	0.028	1.036	0	0	0	0	0	100
2001	301	23	637	596.267	-315.066	D	6.524	6.508	0.017	1.081	0	0	0	0	0	100.01
2001	302	23	222	600.034	-309.336	D	6.499	6.499	0	1.064	0	0	0	0	0	100.11
2001	303	23	1	596.558	-316.101	D	6.516	6.516	0	1.098	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	6.796	6.796	0	1.647	0	0	0	0	0	0
2001	306	23	517	602.805	-305.061	D	8.951	8.951	0.001	6.439	0	0	0	0	0	100.08
2001	307	23	662	598.404	-311.683	D	8.527	8.519	0.008	5.396	0	0	0	0	0	100
2001	308	23	517	602.805	-305.061	D	6.594	6.594	0.001	1.248	0	0	0	0	0	100.22
2001	309	23	517	602.805	-305.061	D	7.783	7.766	0.017	3.677	0	0	0	0	0	100
2001	310	23	624	596.324	-316.278	D	6.478	6.476	0.002	1.02	0	0	0	0	0	100.02
2001	311	23	548	603.28	-312.734	D	6.527	6.515	0.012	1.095	0	0	0	0	0	100

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	312	23	517	602.805	-305.061	D	6.794	6.781	0.013	1.618	0	0	0	0	0	99.99
2001	313	23	632	596.27	-315.421	D	6.681	6.673	0.009	1.403	0	0	0	0	0	99.98
2001	314	23	517	602.805	-305.061	D	6.659	6.639	0.02	1.336	0	0	0	0	0	100
2001	315	23	557	601.32	-313.419	D	6.741	6.732	0.009	1.521	0	0	0	0	0	100
2001	316	23	624	596.324	-316.278	D	6.563	6.562	0.001	1.186	0	0	0	0	0	100.01
2001	317	23	557	601.32	-313.419	D	6.567	6.566	0.001	1.194	0	0	0	0	0	100
2001	318	23	1	596.558	-316.101	D	7.603	7.603	0	3.322	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	6.973	6.973	0	2.004	0	0	0	0	0	0
2001	320	23	517	602.805	-305.061	D	7.355	7.353	0.002	2.789	0	0	0	0	0	100.05
2001	321	23	521	602.866	-306.052	D	7.759	7.742	0.017	3.626	0	0	0	0	0	99.99
2001	322	23	603	598.68	-316.244	D	7.908	7.892	0.016	3.955	0	0	0	0	0	100
2001	323	23	517	602.805	-305.061	D	7.868	7.864	0.004	3.894	0	0	0	0	0	99.98
2001	324	23	557	601.32	-313.419	D	6.497	6.474	0.023	1.016	0	0	0	0	0	100
2001	325	23	548	603.28	-312.734	D	6.487	6.477	0.01	1.022	0	0	0	0	0	100.03
2001	326	23	548	603.28	-312.734	D	6.521	6.52	0.001	1.105	0	0	0	0	0	99.92
2001	327	23	1	596.558	-316.101	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	9.336	9.336	0	7.411	0	0	0	0	0	0
2001	329	23	624	596.324	-316.278	D	6.67	6.663	0.008	1.383	0	0	0	0	0	99.99
2001	330	23	432	602.04	-306.183	D	6.958	6.956	0.002	1.969	0	0	0	0	0	99.97
2001	331	23	632	596.27	-315.421	D	7.457	7.453	0.003	3.002	0	0	0	0	0	99.98
2001	332	23	632	596.27	-315.421	D	8.711	8.706	0.005	5.842	0	0	0	0	0	99.97
2001	333	23	623	596.511	-316.262	D	10.098	10.097	0	9.443	0	0	0	0	0	98.48
2001	334	23	548	603.28	-312.734	D	8.824	8.801	0.023	6.073	0	0	0	0	0	100
2001	335	23	557	601.32	-313.419	D	6.625	6.621	0.004	1.301	0	0	0	0	0	99.99
2001	336	23	517	602.805	-305.061	D	6.682	6.672	0.011	1.401	0	0	0	0	0	99.99
2001	337	23	548	603.28	-312.734	D	6.725	6.72	0.005	1.497	0	0	0	0	0	99.97
2001	338	23	521	602.866	-306.052	D	6.832	6.832	0	1.719	0	0	0	0	0	98.67
2001	339	23	1	596.558	-316.101	D	8.689	8.689	0	5.801	0	0	0	0	0	0
2001	340	23	517	602.805	-305.061	D	9.807	9.806	0.001	8.646	0	0	0	0	0	99.85
2001	341	23	517	602.805	-305.061	D	9.901	9.879	0.022	8.844	0	0	0	0	0	99.99
2001	342	23	517	602.805	-305.061	D	8.846	8.814	0.033	6.103	0	0	0	0	0	100
2001	343	23	557	601.32	-313.419	D	6.648	6.634	0.014	1.327	0	0	0	0	0	100
2001	344	23	632	596.27	-315.421	D	6.52	6.518	0.002	1.101	0	0	0	0	0	99.95
2001	345	23	548	603.28	-312.734	D	6.6	6.582	0.018	1.226	0	0	0	0	0	100
2001	346	23	517	602.805	-305.061	D	8.917	8.916	0.001	6.353	0	0	0	0	0	100.06
2001	347	23	625	596.311	-316.079	D	9.364	9.345	0.019	7.433	0	0	0	0	0	100
2001	348	23	626	596.299	-315.88	D	8.745	8.693	0.052	5.811	0	0	0	0	0	100
2001	349	23	517	602.805	-305.061	D	7.186	7.172	0.014	2.41	0	0	0	0	0	99.99
2001	350	23	13	596.691	-314.592	D	10.109	10.1	0.008	9.451	0	0	0	0	0	99.98

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	351	23	517	602.805	-305.061	D	10.232	10.218	0.014	9.779	0	0	0	0	0	99.97
2001	352	23	626	596.299	-315.88	D	7.319	7.315	0.004	2.709	0	0	0	0	0	99.98
2001	353	23	517	602.805	-305.061	D	6.685	6.681	0.004	1.42	0	0	0	0	0	99.98
2001	354	23	637	596.267	-315.066	D	6.472	6.471	0.001	1.01	0	0	0	0	0	100.09
2001	355	23	624	596.324	-316.278	D	6.5	6.485	0.015	1.037	0	0	0	0	0	100.01
2001	356	23	488	602.537	-306.145	D	7.368	7.368	0	2.821	0	0	0	0	0	99.28
2001	357	23	624	596.324	-316.278	D	7.903	7.901	0.003	3.975	0	0	0	0	0	99.91
2001	358	23	624	596.324	-316.278	D	6.493	6.492	0.001	1.051	0	0	0	0	0	99.95
2001	359	23	186	600.15	-314.075	D	6.491	6.491	0	1.049	0	0	0	0	0	62.85
2001	360	23	78	598.564	-316.197	D	6.499	6.497	0.002	1.06	0	0	0	0	0	99.91
2001	361	23	676	599.876	-309.365	D	6.544	6.536	0.008	1.135	0	0	0	0	0	99.99
2001	362	23	517	602.805	-305.061	D	6.892	6.871	0.021	1.797	0	0	0	0	0	100
2001	363	23	517	602.805	-305.061	D	6.636	6.628	0.008	1.316	0	0	0	0	0	99.98
2001	364	23	1	596.558	-316.101	D	6.52	6.52	0	1.105	0	0	0	0	0	0
2001	365	23	186	600.15	-314.075	D	6.558	6.558	0	1.179	0	0	0	0	0	39.1
									0.078							
DYNO NOBEL											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	596.558	-316.101	D	7.097	7.097	0	2.257	0	0	0	0	0	0
2001	2	23	548	603.28	-312.734	D	7.223	7.191	0.032	2.45	0	100	0	0	0	0
2001	3	23	548	603.28	-312.734	D	8.011	7.997	0.015	4.19	0	100.01	0	0	0	0
2001	4	23	1	596.558	-316.101	D	7.818	7.818	0	3.792	0	0	0	0	0	0
2001	5	23	1	596.558	-316.101	D	7.729	7.729	0	3.596	0	0	0	0	0	0
2001	6	23	1	596.558	-316.101	D	7.228	7.228	0	2.527	0	0	0	0	0	0
2001	7	23	1	596.558	-316.101	D	7.192	7.192	0	2.452	0	0	0	0	0	0
2001	8	23	517	602.805	-305.061	D	7.38	7.374	0.005	2.834	0	99.99	0	0	0	0
2001	9	23	637	596.267	-315.066	D	7.419	7.366	0.053	2.816	0	100	0	0	0	0
2001	10	23	698	602.668	-305.255	D	7.478	7.46	0.017	3.017	0	99.99	0	0	0	0
2001	11	23	517	602.805	-305.061	D	7.924	7.924	0	4.027	0	99.26	0	0	0	0
2001	12	23	1	596.558	-316.101	D	9.4	9.4	0	7.577	0	0	0	0	0	0
2001	13	23	1	596.558	-316.101	D	8.916	8.916	0	6.353	0	0	0	0	0	0
2001	14	23	1	596.558	-316.101	D	9.712	9.712	0	8.396	0	0	0	0	0	0
2001	15	23	1	596.558	-316.101	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2001	16	23	461	602.269	-305.916	D	6.695	6.695	0	1.447	0	52.71	0	0	0	0
2001	17	23	517	602.805	-305.061	D	6.965	6.94	0.025	1.936	0	100	0	0	0	0
2001	18	23	697	602.531	-305.449	D	7.133	7.128	0.005	2.321	0	99.97	0	0	0	0
2001	19	23	695	602.257	-305.836	D	6.778	6.746	0.032	1.549	0	99.99	0	0	0	0
2001	20	23	517	602.805	-305.061	D	6.777	6.754	0.023	1.564	0	100	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	21	23	1	596.558	-316.101	D	6.552	6.552	0	1.166	0	0	0	0	0	0
2001	22	23	1	596.558	-316.101	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2001	23	23	1	596.558	-316.101	D	6.682	6.682	0	1.422	0	0	0	0	0	0
2001	24	23	1	596.558	-316.101	D	6.905	6.905	0	1.865	0	0	0	0	0	0
2001	25	23	632	596.27	-315.421	D	6.592	6.589	0.003	1.239	0	99.99	0	0	0	0
2001	26	23	1	596.558	-316.101	D	6.498	6.498	0	1.062	0	0	0	0	0	0
2001	27	23	1	596.558	-316.101	D	6.636	6.636	0	1.331	0	0	0	0	0	0
2001	28	23	548	603.28	-312.734	D	6.511	6.509	0.002	1.083	0	100.05	0	0	0	0
2001	29	23	461	602.269	-305.916	D	8.175	8.175	0	4.593	0	98.41	0	0	0	0
2001	30	23	1	596.558	-316.101	D	9.187	9.187	0	7.032	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	6.895	6.895	0	1.845	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2001	33	23	1	596.558	-316.101	D	6.535	6.535	0	1.134	0	0	0	0	0	0
2001	34	23	1	596.558	-316.101	D	6.469	6.469	0	1.006	0	0	0	0	0	0
2001	35	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	36	23	1	596.558	-316.101	D	6.677	6.677	0	1.412	0	0	0	0	0	0
2001	37	23	302	600.951	-308.266	D	6.502	6.502	0	1.07	0	47.07	0	0	0	0
2001	38	23	517	602.805	-305.061	D	6.621	6.617	0.004	1.293	0	99.99	0	0	0	0
2001	39	23	1	596.558	-316.101	D	7.981	7.981	0	4.155	0	0	0	0	0	0
2001	40	23	1	596.558	-316.101	D	9.317	9.317	0	7.361	0	0	0	0	0	0
2001	41	23	517	602.805	-305.061	D	6.562	6.56	0.002	1.182	0	100.06	0	0	0	0
2001	42	23	624	596.324	-316.278	D	6.47	6.47	0	1.007	0	99.9	0	0	0	0
2001	43	23	1	596.558	-316.101	D	6.521	6.521	0	1.107	0	0	0	0	0	0
2001	44	23	1	596.558	-316.101	D	7.622	7.622	0	3.364	0	0	0	0	0	0
2001	45	23	516	602.728	-305.38	D	10.218	10.218	0	9.779	0	99.02	0	0	0	0
2001	46	23	624	596.324	-316.278	D	9.002	8.818	0.185	6.113	0	100	0	0	0	0
2001	47	23	517	602.805	-305.061	D	6.752	6.728	0.024	1.511	0	100	0	0	0	0
2001	48	23	287	601.239	-311.992	D	6.508	6.501	0.007	1.068	0	99.99	0	0	0	0
2001	49	23	518	602.82	-305.309	D	6.477	6.469	0.008	1.007	0	100	0	0	0	0
2001	50	23	517	602.805	-305.061	D	6.475	6.473	0.001	1.015	0	99.96	0	0	0	0
2001	51	23	517	602.805	-305.061	D	6.626	6.626	0	1.312	0	99.55	0	0	0	0
2001	52	23	624	596.324	-316.278	D	6.539	6.539	0	1.141	0	99.58	0	0	0	0
2001	53	23	1	596.558	-316.101	D	7.301	7.301	0	2.68	0	97.74	0	0	0	0
2001	54	23	517	602.805	-305.061	D	6.723	6.721	0.002	1.499	0	99.91	0	0	0	0
2001	55	23	517	602.805	-305.061	D	8.106	8.106	0	4.438	0	96.87	0	0	0	0
2001	56	23	1	596.558	-316.101	D	8.437	8.437	0	5.201	0	0	0	0	0	0
2001	57	23	517	602.805	-305.061	D	6.51	6.51	0	1.085	0	99.98	0	0	0	0
2001	58	23	637	596.267	-315.066	D	6.529	6.528	0.001	1.121	0	100.12	0	0	0	0
2001	59	23	1	596.558	-316.101	D	6.638	6.638	0	1.335	0	100.37	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	60	23	461	602.269	-305.916	D	6.473	6.473	0	1.013	0	103.48	0	0	0	0
2001	61	23	1	596.558	-316.101	D	6.924	6.924	0	1.905	0	0	0	0	0	0
2001	62	23	517	602.805	-305.061	D	6.66	6.66	0	1.377	0	99.63	0	0	0	0
2001	63	23	637	596.267	-315.066	D	6.624	6.621	0.003	1.301	0	100	0	0	0	0
2001	64	23	517	602.805	-305.061	D	6.587	6.58	0.006	1.222	0	99.99	0	0	0	0
2001	65	23	517	602.805	-305.061	D	6.536	6.535	0.001	1.134	0	100.1	0	0	0	0
2001	66	23	517	602.805	-305.061	D	6.49	6.481	0.009	1.029	0	99.99	0	0	0	0
2001	67	23	1	596.558	-316.101	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2001	68	23	637	596.267	-315.066	D	6.532	6.525	0.006	1.115	0	99.99	0	0	0	0
2001	69	23	517	602.805	-305.061	D	6.5	6.494	0.005	1.055	0	100.02	0	0	0	0
2001	70	23	490	602.499	-305.648	D	6.474	6.474	0	1.015	0	99.91	0	0	0	0
2001	71	23	107	598.487	-311.954	D	8.245	8.245	0	4.755	0	41.28	0	0	0	0
2001	72	23	1	596.558	-316.101	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2001	73	23	461	602.269	-305.916	D	6.486	6.486	0	1.039	0	70.34	0	0	0	0
2001	74	23	1	596.558	-316.101	D	9.017	9.017	0	6.605	0	0	0	0	0	0
2001	75	23	461	602.269	-305.916	D	8.621	8.613	0.008	5.619	0	99.99	0	0	0	0
2001	76	23	517	602.805	-305.061	D	6.794	6.794	0	1.643	0	99.51	0	0	0	0
2001	77	23	637	596.267	-315.066	D	6.555	6.553	0.002	1.168	0	100	0	0	0	0
2001	78	23	1	596.558	-316.101	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	6.474	6.474	0	1.015	0	0	0	0	0	0
2001	80	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	93.22	0	0	0	0
2001	81	23	625	596.311	-316.079	D	6.515	6.513	0.002	1.091	0	99.99	0	0	0	0
2001	82	23	563	600.143	-314.135	D	7.442	7.434	0.008	2.96	0	100	0	0	0	0
2001	83	23	637	596.267	-315.066	D	6.676	6.665	0.011	1.389	0	100	0	0	0	0
2001	84	23	520	602.851	-305.804	D	6.503	6.492	0.011	1.051	0	100.01	0	0	0	0
2001	85	23	517	602.805	-305.061	D	6.489	6.487	0.002	1.041	0	99.98	0	0	0	0
2001	86	23	1	596.558	-316.101	D	6.469	6.469	0	1.007	0	0	0	0	0	0
2001	87	23	547	603.265	-312.487	D	6.469	6.468	0	1.005	0	99.73	0	0	0	0
2001	88	23	489	602.518	-305.896	D	7.079	7.079	0	2.22	0	97.5	0	0	0	0
2001	89	23	1	596.558	-316.101	D	8.796	8.796	0	6.06	0	0	0	0	0	0
2001	90	23	1	596.558	-316.101	D	8.559	8.559	0	5.491	0	0	0	0	0	0
2001	91	23	517	602.805	-305.061	D	7.057	7.057	0	2.174	0	100.01	0	0	0	0
2001	92	23	1	596.558	-316.101	D	7.04	7.04	0	2.141	0	0	0	0	0	0
2001	93	23	1	596.558	-316.101	D	9.416	9.416	0	7.617	0	0	0	0	0	0
2001	94	23	1	596.558	-316.101	D	8.143	8.143	0	4.52	0	0	0	0	0	0
2001	95	23	1	596.558	-316.101	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2001	96	23	1	596.558	-316.101	D	8.925	8.925	0	6.376	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	6.895	6.895	0	1.846	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.116	7.116	0	2.295	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	99	23	1	596.558	-316.101	D	7.053	7.053	0	2.166	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.448	7.448	0	2.991	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	9.215	9.215	0	7.101	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.38	7.38	0	2.846	0	0	0	0	0	0
2001	103	23	517	602.805	-305.061	D	6.545	6.545	0	1.154	0	99.63	0	0	0	0
2001	104	23	212	600.226	-311.82	D	6.615	6.615	0	1.29	0	93.5	0	0	0	0
2001	105	23	517	602.805	-305.061	D	7.605	7.604	0	3.326	0	100.28	0	0	0	0
2001	106	23	521	602.866	-306.052	D	6.61	6.605	0.004	1.271	0	100	0	0	0	0
2001	107	23	517	602.805	-305.061	D	6.479	6.478	0	1.024	0	100.04	0	0	0	0
2001	108	23	557	601.32	-313.419	D	6.485	6.477	0.008	1.021	0	100.01	0	0	0	0
2001	109	23	1	596.558	-316.101	D	6.495	6.495	0	1.056	0	0	0	0	0	0
2001	110	23	1	596.558	-316.101	D	6.79	6.79	0	1.636	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.389	7.389	0	2.866	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.362	7.362	0	2.809	0	0	0	0	0	0
2001	114	23	517	602.805	-305.061	D	6.517	6.516	0	1.098	0	98.6	0	0	0	0
2001	115	23	494	603.149	-310.845	D	6.478	6.477	0.001	1.022	0	99.95	0	0	0	0
2001	116	23	521	602.866	-306.052	D	6.535	6.535	0	1.134	0	96.14	0	0	0	0
2001	117	23	1	596.558	-316.101	D	6.69	6.69	0	1.437	0	0	0	0	0	0
2001	118	23	1	596.558	-316.101	D	6.673	6.673	0	1.404	0	0	0	0	0	0
2001	119	23	1	596.558	-316.101	D	6.596	6.596	0	1.252	0	0	0	0	0	0
2001	120	23	1	596.558	-316.101	D	6.721	6.721	0	1.497	0	0	0	0	0	0
2001	121	23	1	596.558	-316.101	D	6.826	6.826	0	1.708	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.186	7.186	0	2.441	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	6.778	6.778	0	1.612	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	6.933	6.933	0	1.921	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	6.946	6.946	0	1.948	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.82	7.82	0	3.797	0	0	0	0	0	0
2001	127	23	1	596.558	-316.101	D	7.56	7.56	0	3.229	0	0	0	0	0	0
2001	128	23	461	602.269	-305.916	D	6.86	6.86	0	1.775	0	92.24	0	0	0	0
2001	129	23	153	599.71	-314.859	D	6.515	6.515	0	1.094	0	92.84	0	0	0	0
2001	130	23	520	602.851	-305.804	D	6.575	6.575	0	1.212	0	94.88	0	0	0	0
2001	131	23	1	596.558	-316.101	D	7.502	7.502	0	3.106	0	0	0	0	0	0
2001	132	23	194	599.997	-312.088	D	8.06	8.057	0.003	4.326	0	99.98	0	0	0	0
2001	133	23	637	596.267	-315.066	D	6.526	6.526	0	1.117	0	99.47	0	0	0	0
2001	134	23	437	602.729	-311.878	D	6.59	6.59	0	1.24	0	83.93	0	0	0	0
2001	135	23	1	596.558	-316.101	D	6.924	6.924	0	1.904	0	0	0	0	0	0
2001	136	23	1	596.558	-316.101	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.223	7.223	0	2.516	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	138	23	212	600.226	-311.82	D	7.417	7.417	0	2.924	0	20.85	0	0	0	0
2001	139	23	461	602.269	-305.916	D	8.116	8.095	0.021	4.412	0	100.01	0	0	0	0
2001	140	23	1	596.558	-316.101	D	7.289	7.289	0	2.655	0	98.28	0	0	0	0
2001	141	23	212	600.226	-311.82	D	8.602	8.602	0	5.592	0	82.93	0	0	0	0
2001	142	23	1	596.558	-316.101	D	6.575	6.575	0	1.213	0	0	0	0	0	0
2001	143	23	1	596.558	-316.101	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	144	23	1	596.558	-316.101	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	145	23	1	596.558	-316.101	D	6.601	6.601	0	1.263	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	6.634	6.634	0	1.327	0	0	0	0	0	0
2001	147	23	1	596.558	-316.101	D	6.582	6.582	0	1.225	0	0	0	0	0	0
2001	148	23	461	602.269	-305.916	D	6.752	6.752	0	1.56	0	141.67	0	0	0	0
2001	149	23	624	596.324	-316.278	D	6.749	6.749	0	1.553	0	96.56	0	0	0	0
2001	150	23	220	600.073	-309.833	D	7.574	7.574	0	3.26	0	79.19	0	0	0	0
2001	151	23	1	596.558	-316.101	D	8.688	8.688	0	5.799	0	0	0	0	0	0
2001	152	23	1	596.558	-316.101	D	6.961	6.961	0	1.98	0	0	0	0	0	0
2001	153	23	1	596.558	-316.101	D	6.843	6.843	0	1.741	0	0	0	0	0	0
2001	154	23	517	602.805	-305.061	D	6.749	6.748	0	1.553	0	100.13	0	0	0	0
2001	155	23	516	602.728	-305.38	D	7.392	7.392	0	2.872	0	99.18	0	0	0	0
2001	156	23	1	596.558	-316.101	D	8.339	8.339	0	4.973	0	0	0	0	0	0
2001	157	23	1	596.558	-316.101	D	8.193	8.193	0	4.636	0	0	0	0	0	0
2001	158	23	517	602.805	-305.061	D	7.646	7.645	0.001	3.414	0	99.87	0	0	0	0
2001	159	23	624	596.324	-316.278	D	6.953	6.953	0	1.963	0	100.3	0	0	0	0
2001	160	23	212	600.226	-311.82	D	6.637	6.637	0	1.333	0	31.01	0	0	0	0
2001	161	23	107	598.487	-311.954	D	6.668	6.668	0	1.395	0	100.86	0	0	0	0
2001	162	23	212	600.226	-311.82	D	6.868	6.868	0	1.791	0	76.63	0	0	0	0
2001	163	23	162	599.519	-312.374	D	6.989	6.989	0	2.037	0	36.17	0	0	0	0
2001	164	23	1	596.558	-316.101	D	7.456	7.456	0	3.006	0	0	0	0	0	0
2001	165	23	1	596.558	-316.101	D	7.35	7.35	0	2.784	0	0	0	0	0	0
2001	166	23	1	596.558	-316.101	D	8.84	8.84	0	6.168	0	0	0	0	0	0
2001	167	23	1	596.558	-316.101	D	6.554	6.554	0	1.171	0	0	0	0	0	0
2001	168	23	1	596.558	-316.101	D	6.63	6.63	0	1.319	0	0	0	0	0	0
2001	169	23	1	596.558	-316.101	D	6.885	6.885	0	1.825	0	63.71	0	0	0	0
2001	170	23	1	596.558	-316.101	D	6.859	6.859	0	1.773	0	0	0	0	0	0
2001	171	23	1	596.558	-316.101	D	7.198	7.198	0	2.465	0	0	0	0	0	0
2001	172	23	517	602.805	-305.061	D	7.918	7.917	0.001	4.011	0	100.12	0	0	0	0
2001	173	23	186	600.15	-314.075	D	6.966	6.966	0.001	1.989	0	99.92	0	0	0	0
2001	174	23	521	602.866	-306.052	D	6.714	6.714	0	1.485	0	99.28	0	0	0	0
2001	175	23	517	602.805	-305.061	D	6.818	6.818	0	1.691	0	99.08	0	0	0	0
2001	176	23	1	596.558	-316.101	D	6.751	6.751	0	1.558	0	97.72	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	177	23	1	596.558	-316.101	D	6.785	6.785	0	1.625	0	82.88	0	0	0	0
2001	178	23	212	600.226	-311.82	D	7.08	7.08	0	2.221	0	79.96	0	0	0	0
2001	179	23	215	600.169	-311.075	D	7.34	7.34	0	2.762	0	94.63	0	0	0	0
2001	180	23	1	596.558	-316.101	D	8.232	8.232	0	4.724	0	0	0	0	0	0
2001	181	23	1	596.558	-316.101	D	7.515	7.515	0	3.134	0	0	0	0	0	0
2001	182	23	694	602.12	-306.029	D	8.667	8.667	0	5.747	0	100.6	0	0	0	0
2001	183	23	517	602.805	-305.061	D	7.455	7.441	0.015	2.974	0	100	0	0	0	0
2001	184	23	107	598.487	-311.954	D	6.773	6.773	0	1.602	0	99.66	0	0	0	0
2001	185	23	1	596.558	-316.101	D	7.622	7.622	0	3.363	0	75	0	0	0	0
2001	186	23	521	602.866	-306.052	D	7.051	7.051	0	2.163	0	98.35	0	0	0	0
2001	187	23	692	601.846	-306.417	D	6.6	6.6	0	1.26	0	99.19	0	0	0	0
2001	188	23	352	601.372	-307.234	D	6.936	6.936	0	1.927	0	95.9	0	0	0	0
2001	189	23	1	596.558	-316.101	D	7.464	7.464	0	3.025	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.181	7.181	0	2.43	0	0	0	0	0	0
2001	191	23	517	602.805	-305.061	D	7.811	7.806	0.006	3.765	0	99.97	0	0	0	0
2001	192	23	624	596.324	-316.278	D	7.651	7.646	0.004	3.417	0	99.97	0	0	0	0
2001	193	23	461	602.269	-305.916	D	6.926	6.926	0	1.908	0	99.61	0	0	0	0
2001	194	23	624	596.324	-316.278	D	6.668	6.668	0	1.395	0	98.44	0	0	0	0
2001	195	23	1	596.558	-316.101	D	6.647	6.647	0	1.352	0	0	0	0	0	0
2001	196	23	1	596.558	-316.101	D	6.628	6.628	0	1.314	0	0	0	0	0	0
2001	197	23	1	596.558	-316.101	D	6.873	6.873	0	1.802	0	0	0	0	0	0
2001	198	23	1	596.558	-316.101	D	9.096	9.096	0	6.802	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.762	7.762	0	3.669	0	0	0	0	0	0
2001	200	23	1	596.558	-316.101	D	9.024	9.024	0	6.622	0	0	0	0	0	0
2001	201	23	194	599.997	-312.088	D	8.44	8.44	0	5.209	0	91.92	0	0	0	0
2001	202	23	517	602.805	-305.061	D	8.317	8.316	0.001	4.92	0	99.65	0	0	0	0
2001	203	23	517	602.805	-305.061	D	8.321	8.321	0	4.931	0	99.77	0	0	0	0
2001	204	23	516	602.728	-305.38	D	7.714	7.714	0	3.564	0	100.22	0	0	0	0
2001	205	23	186	600.15	-314.075	D	7.154	7.154	0	2.373	0	41.36	0	0	0	0
2001	206	23	1	596.558	-316.101	D	7.675	7.675	0	3.478	0	105.02	0	0	0	0
2001	207	23	517	602.805	-305.061	D	8.741	8.741	0	5.927	0	99.04	0	0	0	0
2001	208	23	186	600.15	-314.075	D	8.791	8.783	0.007	6.029	0	99.97	0	0	0	0
2001	209	23	432	602.04	-306.183	D	8.676	8.672	0.004	5.76	0	99.95	0	0	0	0
2001	210	23	517	602.805	-305.061	D	8.732	8.732	0	5.905	0	95.8	0	0	0	0
2001	211	23	517	602.805	-305.061	D	7.829	7.828	0.001	3.815	0	100.19	0	0	0	0
2001	212	23	212	600.226	-311.82	D	6.897	6.897	0	1.849	0	93.4	0	0	0	0
2001	213	23	1	596.558	-316.101	D	7.422	7.422	0	2.935	0	99.91	0	0	0	0
2001	214	23	461	602.269	-305.916	D	6.942	6.942	0	1.94	0	41.67	0	0	0	0
2001	215	23	1	596.558	-316.101	D	7.509	7.509	0	3.119	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	216	23	603	598.68	-316.244	D	8.124	8.123	0.001	4.475	0	99.89	0	0	0	0
2001	217	23	1	596.558	-316.101	D	6.844	6.844	0	1.744	0	0	0	0	0	0
2001	218	23	1	596.558	-316.101	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2001	219	23	1	596.558	-316.101	D	7.474	7.474	0	3.046	0	0	0	0	0	0
2001	220	23	1	596.558	-316.101	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2001	221	23	1	596.558	-316.101	D	8.036	8.036	0	4.279	0	0	0	0	0	0
2001	222	23	461	602.269	-305.916	D	8.435	8.435	0	5.197	0	97.7	0	0	0	0
2001	223	23	624	596.324	-316.278	D	8.078	8.076	0.003	4.368	0	99.91	0	0	0	0
2001	224	23	624	596.324	-316.278	D	7.105	7.104	0	2.271	0	100.29	0	0	0	0
2001	225	23	222	600.034	-309.336	D	6.916	6.916	0	1.887	0	95.82	0	0	0	0
2001	226	23	1	596.558	-316.101	D	6.841	6.841	0	1.737	0	98.42	0	0	0	0
2001	227	23	461	602.269	-305.916	D	6.655	6.655	0	1.368	0	19.2	0	0	0	0
2001	228	23	1	596.558	-316.101	D	7.007	7.007	0	2.073	0	0	0	0	0	0
2001	229	23	1	596.558	-316.101	D	6.953	6.953	0	1.963	0	0	0	0	0	0
2001	230	23	1	596.558	-316.101	D	7.258	7.258	0	2.589	0	0	0	0	0	0
2001	231	23	521	602.866	-306.052	D	6.965	6.964	0	1.985	0	100.17	0	0	0	0
2001	232	23	517	602.805	-305.061	D	6.759	6.758	0	1.573	0	100.04	0	0	0	0
2001	233	23	515	602.747	-305.629	D	6.859	6.859	0	1.773	0	97.91	0	0	0	0
2001	234	23	212	600.226	-311.82	D	8.128	8.128	0	4.488	0	49.11	0	0	0	0
2001	235	23	1	596.558	-316.101	D	7.248	7.248	0	2.57	0	0	0	0	0	0
2001	236	23	1	596.558	-316.101	D	8.023	8.023	0	4.248	0	0	0	0	0	0
2001	237	23	1	596.558	-316.101	D	7.35	7.35	0	2.783	0	0	0	0	0	0
2001	238	23	1	596.558	-316.101	D	8.139	8.139	0	4.512	0	0	0	0	0	0
2001	239	23	624	596.324	-316.278	D	7.251	7.25	0.001	2.573	0	100.01	0	0	0	0
2001	240	23	676	599.876	-309.365	D	7.56	7.557	0.002	3.224	0	100.02	0	0	0	0
2001	241	23	517	602.805	-305.061	D	7.249	7.245	0.004	2.563	0	99.92	0	0	0	0
2001	242	23	517	602.805	-305.061	D	8.841	8.841	0	6.169	0	97.25	0	0	0	0
2001	243	23	1	596.558	-316.101	D	8.837	8.837	0	6.161	0	0	0	0	0	0
2001	244	23	464	602.997	-312.107	D	8.275	8.269	0.006	4.81	0	99.98	0	0	0	0
2001	245	23	5	596.481	-315.108	D	7.185	7.184	0	2.437	0	99.6	0	0	0	0
2001	246	23	214	600.188	-311.323	D	8.017	8.017	0	4.236	0	73.92	0	0	0	0
2001	247	23	152	599.175	-311.152	D	7.623	7.623	0	3.367	0	94.47	0	0	0	0
2001	248	23	517	602.805	-305.061	D	6.939	6.938	0	1.933	0	100.28	0	0	0	0
2001	249	23	432	602.04	-306.183	D	7.416	7.416	0	2.922	0	97.22	0	0	0	0
2001	250	23	1	596.558	-316.101	D	9.131	9.131	0	6.889	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	9.542	9.542	0	7.946	0	0	0	0	0	0
2001	252	23	1	596.558	-316.101	D	9.397	9.397	0	7.568	0	0	0	0	0	0
2001	253	23	548	603.28	-312.734	D	7.495	7.495	0	3.09	0	98.78	0	0	0	0
2001	254	23	550	602.865	-312.914	D	6.784	6.783	0	1.622	0	97.92	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	255	23	624	596.324	-316.278	D	7.065	7.065	0	2.191	0	100.07	0	0	0	0
2001	256	23	516	602.728	-305.38	D	7.241	7.241	0	2.554	0	98.53	0	0	0	0
2001	257	23	637	596.267	-315.066	D	6.874	6.873	0.001	1.802	0	100.02	0	0	0	0
2001	258	23	1	596.558	-316.101	D	6.636	6.636	0	1.33	0	0	0	0	0	0
2001	259	23	1	596.558	-316.101	D	6.702	6.702	0	1.46	0	0	0	0	0	0
2001	260	23	1	596.558	-316.101	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2001	261	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	262	23	517	602.805	-305.061	D	9.155	9.154	0.001	6.947	0	99.99	0	0	0	0
2001	263	23	1	596.558	-316.101	D	7.114	7.114	0	2.292	0	0	0	0	0	0
2001	264	23	1	596.558	-316.101	D	7.134	7.134	0	2.332	0	0	0	0	0	0
2001	265	23	517	602.805	-305.061	D	7.084	7.081	0.004	2.223	0	99.94	0	0	0	0
2001	266	23	517	602.805	-305.061	D	7.247	7.247	0	2.566	0	99.82	0	0	0	0
2001	267	23	637	596.267	-315.066	D	8.019	8.006	0.013	4.211	0	100	0	0	0	0
2001	268	23	517	602.805	-305.061	D	6.548	6.547	0	1.158	0	100.01	0	0	0	0
2001	269	23	517	602.805	-305.061	D	6.537	6.534	0.002	1.132	0	99.98	0	0	0	0
2001	270	23	1	596.558	-316.101	D	6.568	6.568	0	1.198	0	0	0	0	0	0
2001	271	23	624	596.324	-316.278	D	6.828	6.827	0	1.71	0	99.88	0	0	0	0
2001	272	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	273	23	1	596.558	-316.101	D	7.133	7.133	0	2.33	0	0	0	0	0	0
2001	274	23	517	602.805	-305.061	D	7.008	7.007	0.001	2.073	0	100.07	0	0	0	0
2001	275	23	517	602.805	-305.061	D	7.233	7.233	0.001	2.537	0	100.15	0	0	0	0
2001	276	23	1	596.558	-316.101	D	7.307	7.307	0	2.693	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.843	7.843	0	3.848	0	0	0	0	0	0
2001	278	23	695	602.257	-305.836	D	9.845	9.843	0.002	8.747	0	99.94	0	0	0	0
2001	279	23	517	602.805	-305.061	D	7.899	7.893	0.005	3.959	0	100.01	0	0	0	0
2001	280	23	548	603.28	-312.734	D	6.531	6.531	0	1.126	0	100	0	0	0	0
2001	281	23	4	596.5	-315.356	D	6.595	6.595	0	1.25	0	99.15	0	0	0	0
2001	282	23	1	596.558	-316.101	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	8.133	8.133	0	4.498	0	0	0	0	0	0
2001	284	23	1	596.558	-316.101	D	10.095	10.095	0	9.436	0	0	0	0	0	0
2001	285	23	1	596.558	-316.101	D	9.943	9.943	0	9.018	0	0	0	0	0	0
2001	286	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	287	23	1	596.558	-316.101	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2001	288	23	1	596.558	-316.101	D	6.542	6.542	0	1.147	0	0	0	0	0	0
2001	289	23	517	602.805	-305.061	D	7.575	7.561	0.013	3.233	0	100.01	0	0	0	0
2001	290	23	517	602.805	-305.061	D	6.494	6.493	0	1.053	0	100.94	0	0	0	0
2001	291	23	514	602.766	-305.877	D	6.5	6.5	0	1.066	0	99.66	0	0	0	0
2001	292	23	1	596.558	-316.101	D	6.578	6.578	0	1.218	0	0	0	0	0	0
2001	293	23	1	596.558	-316.101	D	6.945	6.945	0	1.947	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	294	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.564	7.564	0	3.239	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	9.63	9.63	0	8.178	0	0	0	0	0	0
2001	297	23	1	596.558	-316.101	D	9.546	9.546	0	7.957	0	0	0	0	0	0
2001	298	23	1	596.558	-316.101	D	6.813	6.813	0	1.68	0	0	0	0	0	0
2001	299	23	1	596.558	-316.101	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	300	23	517	602.805	-305.061	D	6.495	6.487	0.009	1.04	0	99.99	0	0	0	0
2001	301	23	517	602.805	-305.061	D	6.512	6.509	0.003	1.083	0	99.99	0	0	0	0
2001	302	23	697	602.531	-305.449	D	6.499	6.499	0	1.064	0	100.71	0	0	0	0
2001	303	23	1	596.558	-316.101	D	6.516	6.516	0	1.098	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	6.796	6.796	0	1.647	0	0	0	0	0	0
2001	306	23	1	596.558	-316.101	D	8.756	8.756	0	5.963	0	0	0	0	0	0
2001	307	23	648	597.332	-313.53	D	8.56	8.537	0.023	5.438	0	100	0	0	0	0
2001	308	23	461	602.269	-305.916	D	6.594	6.594	0	1.248	0	97.83	0	0	0	0
2001	309	23	626	596.299	-315.88	D	7.888	7.859	0.029	3.882	0	100	0	0	0	0
2001	310	23	1	596.558	-316.101	D	6.476	6.476	0	1.02	0	103.95	0	0	0	0
2001	311	23	1	596.558	-316.101	D	6.517	6.517	0	1.1	0	99.18	0	0	0	0
2001	312	23	517	602.805	-305.061	D	6.781	6.781	0	1.618	0	100.24	0	0	0	0
2001	313	23	625	596.311	-316.079	D	6.675	6.673	0.002	1.403	0	99.91	0	0	0	0
2001	314	23	544	603.219	-311.745	D	6.639	6.639	0	1.337	0	99.65	0	0	0	0
2001	315	23	631	596.276	-315.551	D	6.736	6.732	0.004	1.52	0	99.96	0	0	0	0
2001	316	23	1	596.558	-316.101	D	6.562	6.562	0	1.186	0	0	0	0	0	0
2001	317	23	1	596.558	-316.101	D	6.567	6.567	0	1.196	0	0	0	0	0	0
2001	318	23	1	596.558	-316.101	D	7.603	7.603	0	3.322	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	6.973	6.973	0	2.004	0	0	0	0	0	0
2001	320	23	1	596.558	-316.101	D	7.309	7.309	0	2.697	0	0	0	0	0	0
2001	321	23	1	596.558	-316.101	D	7.623	7.623	0	3.366	0	0	0	0	0	0
2001	322	23	382	602.251	-312.164	D	7.933	7.933	0	4.048	0	68.03	0	0	0	0
2001	323	23	1	596.558	-316.101	D	7.858	7.858	0	3.881	0	0	0	0	0	0
2001	324	23	517	602.805	-305.061	D	6.475	6.474	0.001	1.015	0	99.94	0	0	0	0
2001	325	23	548	603.28	-312.734	D	6.478	6.477	0.001	1.022	0	100.13	0	0	0	0
2001	326	23	405	602.557	-312.89	D	6.52	6.52	0	1.105	0	97.12	0	0	0	0
2001	327	23	1	596.558	-316.101	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	9.336	9.336	0	7.411	0	0	0	0	0	0
2001	329	23	1	596.558	-316.101	D	6.663	6.663	0	1.383	0	0	0	0	0	0
2001	330	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	331	23	1	596.558	-316.101	D	7.453	7.453	0	3.002	0	0	0	0	0	0
2001	332	23	637	596.267	-315.066	D	8.728	8.706	0.022	5.842	0	99.99	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	333	23	1	596.558	-316.101	D	10.097	10.097	0	9.443	0	101.12	0	0	0	0
2001	334	23	287	601.239	-311.992	D	8.908	8.857	0.051	6.209	0	100	0	0	0	0
2001	335	23	1	596.558	-316.101	D	6.626	6.626	0	1.311	0	0	0	0	0	0
2001	336	23	1	596.558	-316.101	D	6.665	6.665	0	1.388	0	0	0	0	0	0
2001	337	23	1	596.558	-316.101	D	6.735	6.735	0	1.527	0	0	0	0	0	0
2001	338	23	1	596.558	-316.101	D	6.817	6.817	0	1.69	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	8.689	8.689	0	5.801	0	0	0	0	0	0
2001	340	23	1	596.558	-316.101	D	9.828	9.828	0	8.705	0	0	0	0	0	0
2001	341	23	517	602.805	-305.061	D	9.879	9.879	0	8.844	0	99.98	0	0	0	0
2001	342	23	517	602.805	-305.061	D	8.826	8.814	0.013	6.103	0	99.99	0	0	0	0
2001	343	23	517	602.805	-305.061	D	6.662	6.638	0.024	1.335	0	100.01	0	0	0	0
2001	344	23	632	596.27	-315.421	D	6.519	6.518	0.001	1.101	0	99.99	0	0	0	0
2001	345	23	631	596.276	-315.551	D	6.575	6.575	0.001	1.211	0	100.05	0	0	0	0
2001	346	23	107	598.487	-311.954	D	8.935	8.935	0	6.4	0	71.68	0	0	0	0
2001	347	23	1	596.558	-316.101	D	9.345	9.345	0	7.433	0	0	0	0	0	0
2001	348	23	517	602.805	-305.061	D	8.719	8.681	0.038	5.781	0	100	0	0	0	0
2001	349	23	517	602.805	-305.061	D	7.172	7.172	0.001	2.41	0	99.71	0	0	0	0
2001	350	23	521	602.866	-306.052	D	10.101	10.099	0.002	9.449	0	99.86	0	0	0	0
2001	351	23	517	602.805	-305.061	D	10.236	10.218	0.018	9.779	0	99.98	0	0	0	0
2001	352	23	1	596.558	-316.101	D	7.315	7.315	0	2.709	0	0	0	0	0	0
2001	353	23	1	596.558	-316.101	D	6.671	6.671	0	1.401	0	0	0	0	0	0
2001	354	23	1	596.558	-316.101	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	355	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	356	23	1	596.558	-316.101	D	7.376	7.376	0	2.837	0	0	0	0	0	0
2001	357	23	1	596.558	-316.101	D	7.901	7.901	0	3.975	0	0	0	0	0	0
2001	358	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	359	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	360	23	1	596.558	-316.101	D	6.497	6.497	0	1.06	0	0	0	0	0	0
2001	361	23	1	596.558	-316.101	D	6.534	6.534	0	1.133	0	0	0	0	0	0
2001	362	23	1	596.558	-316.101	D	6.849	6.849	0	1.753	0	0	0	0	0	0
2001	363	23	1	596.558	-316.101	D	6.626	6.626	0	1.312	0	0	0	0	0	0
2001	364	23	1	596.558	-316.101	D	6.52	6.52	0	1.105	0	0	0	0	0	0
2001	365	23	1	596.558	-316.101	D	6.562	6.562	0	1.187	0	0	0	0	0	0
									0.185							
MLC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDIN	ATES (km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	596.558	-316.101	D	7.097	7.097	0	2.257	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	2	23	548	603.28	-312.734	D	7.193	7.191	0.002	2.45	22.43	71.05	0	0	0	6.51
2001	3	23	548	603.28	-312.734	D	7.998	7.997	0.001	4.19	27.66	70.45	0	0	0	1.93
2001	4	23	1	596.558	-316.101	D	7.818	7.818	0	3.792	0	0	0	0	0	0
2001	5	23	1	596.558	-316.101	D	7.729	7.729	0	3.596	0	0	0	0	0	0
2001	6	23	1	596.558	-316.101	D	7.228	7.228	0	2.527	0	0	0	0	0	0
2001	7	23	1	596.558	-316.101	D	7.192	7.192	0	2.452	0	0	0	0	0	0
2001	8	23	1	596.558	-316.101	D	7.373	7.373	0	2.831	0	0	0	0	0	0
2001	9	23	548	603.28	-312.734	D	7.392	7.385	0.007	2.857	6.1	86.89	0	0	0	7.01
2001	10	23	545	603.234	-311.991	D	7.44	7.427	0.012	2.946	22.86	74.51	0	0	0	2.64
2001	11	23	517	602.805	-305.061	D	7.924	7.924	0	4.027	24.81	68.56	0	0	0	6.71
2001	12	23	1	596.558	-316.101	D	9.4	9.4	0	7.577	0	0	0	0	0	0
2001	13	23	1	596.558	-316.101	D	8.916	8.916	0	6.353	0	0	0	0	0	0
2001	14	23	1	596.558	-316.101	D	9.712	9.712	0	8.396	0	0	0	0	0	0
2001	15	23	1	596.558	-316.101	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2001	16	23	517	602.805	-305.061	D	6.697	6.695	0.002	1.447	22.55	62.04	0	0	0	15.41
2001	17	23	637	596.267	-315.066	D	6.93	6.909	0.021	1.873	14.76	75.85	0	0	0	9.4
2001	18	23	517	602.805	-305.061	D	7.259	7.128	0.13	2.321	12.51	79.49	0	0	0	7.99
2001	19	23	548	603.28	-312.734	D	6.742	6.728	0.013	1.513	22.02	66.78	0	0	0	11.2
2001	20	23	1	596.558	-316.101	D	6.731	6.731	0	1.519	0	0	0	0	0	0
2001	21	23	1	596.558	-316.101	D	6.552	6.552	0	1.166	0	0	0	0	0	0
2001	22	23	1	596.558	-316.101	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2001	23	23	1	596.558	-316.101	D	6.682	6.682	0	1.422	0	0	0	0	0	0
2001	24	23	1	596.558	-316.101	D	6.905	6.905	0	1.865	0	0	0	0	0	0
2001	25	23	548	603.28	-312.734	D	6.609	6.587	0.022	1.235	6.89	75.91	0	0	0	17.19
2001	26	23	637	596.267	-315.066	D	6.498	6.498	0	1.062	14.29	75.05	0	0	0	10.37
2001	27	23	548	603.28	-312.734	D	6.634	6.633	0	1.326	18.69	66.58	0	0	0	14.54
2001	28	23	548	603.28	-312.734	D	6.516	6.509	0.007	1.083	19.38	71.18	0	0	0	9.44
2001	29	23	432	602.04	-306.183	D	8.128	8.128	0	4.486	23.85	67.38	0	0	0	5.18
2001	30	23	1	596.558	-316.101	D	9.187	9.187	0	7.032	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	6.895	6.895	0	1.845	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2001	33	23	1	596.558	-316.101	D	6.535	6.535	0	1.134	0	0	0	0	0	0
2001	34	23	1	596.558	-316.101	D	6.469	6.469	0	1.006	0	0	0	0	0	0
2001	35	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	36	23	1	596.558	-316.101	D	6.677	6.677	0	1.412	0	0	0	0	0	0
2001	37	23	517	602.805	-305.061	D	6.502	6.502	0	1.07	33.58	30.58	0	0	0	36.99
2001	38	23	517	602.805	-305.061	D	6.622	6.617	0.005	1.293	24.8	61.44	0	0	0	13.75
2001	39	23	1	596.558	-316.101	D	7.981	7.981	0	4.155	0	0	0	0	0	0
2001	40	23	1	596.558	-316.101	D	9.317	9.317	0	7.361	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	41	23	637	596.267	-315.066	D	6.56	6.555	0.004	1.174	14.06	69.67	0	0	0	16.25
2001	42	23	637	596.267	-315.066	D	6.47	6.47	0	1.007	13.72	72.99	0	0	0	12.76
2001	43	23	1	596.558	-316.101	D	6.521	6.521	0	1.107	0	0	0	0	0	0
2001	44	23	1	596.558	-316.101	D	7.622	7.622	0	3.364	0	0	0	0	0	0
2001	45	23	517	602.805	-305.061	D	10.218	10.218	0	9.779	43.26	56.13	0	0	0	0.71
2001	46	23	656	597.971	-312.292	D	8.884	8.818	0.066	6.113	31.58	62.81	0	0	0	5.61
2001	47	23	548	603.28	-312.734	D	6.733	6.718	0.015	1.492	34.44	55.64	0	0	0	9.92
2001	48	23	1	596.558	-316.101	D	6.499	6.499	0	1.064	0	0	0	0	0	0
2001	49	23	637	596.267	-315.066	D	6.49	6.469	0.021	1.006	6.15	75.51	0	0	0	18.34
2001	50	23	6	596.462	-314.859	D	6.473	6.473	0	1.014	20.35	73.55	0	0	0	6.43
2001	51	23	517	602.805	-305.061	D	6.629	6.626	0.002	1.312	31.22	48.05	0	0	0	20.74
2001	52	23	637	596.267	-315.066	D	6.545	6.539	0.006	1.141	28.3	57.66	0	0	0	14.04
2001	53	23	517	602.805	-305.061	D	7.344	7.33	0.014	2.741	9.28	80.88	0	0	0	9.83
2001	54	23	545	603.234	-311.991	D	6.723	6.721	0.002	1.499	30.43	57.76	0	0	0	11.76
2001	55	23	517	602.805	-305.061	D	8.106	8.106	0	4.438	32.77	59.73	0	0	0	7.59
2001	56	23	1	596.558	-316.101	D	8.437	8.437	0	5.201	0	0	0	0	0	0
2001	57	23	557	601.32	-313.419	D	6.521	6.506	0.015	1.078	6.83	70.55	0	0	0	22.61
2001	58	23	5	596.481	-315.108	D	6.529	6.528	0	1.121	25.73	64.62	0	0	0	10.07
2001	59	23	637	596.267	-315.066	D	6.638	6.638	0.001	1.335	21.5	60.69	0	0	0	17.86
2001	60	23	656	597.971	-312.292	D	6.496	6.473	0.023	1.014	14.78	71.35	0	0	0	13.87
2001	61	23	516	602.728	-305.38	D	6.895	6.895	0	1.846	29.27	64.38	0	0	0	3.89
2001	62	23	557	601.32	-313.419	D	6.656	6.653	0.003	1.365	17.6	71.76	0	0	0	10.66
2001	63	23	557	601.32	-313.419	D	6.649	6.633	0.016	1.325	7.07	70.35	0	0	0	22.58
2001	64	23	1	596.558	-316.101	D	6.57	6.57	0	1.202	0	0	0	0	0	0
2001	65	23	1	596.558	-316.101	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	66	23	1	596.558	-316.101	D	6.477	6.477	0	1.022	0	0	0	0	0	0
2001	67	23	1	596.558	-316.101	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2001	68	23	517	602.805	-305.061	D	6.596	6.53	0.066	1.123	7.94	71.91	0	0	0	20.15
2001	69	23	545	603.234	-311.991	D	6.507	6.494	0.012	1.055	24.22	63.94	0	0	0	11.83
2001	70	23	517	602.805	-305.061	D	6.474	6.474	0.001	1.015	46.66	44.15	0	0	0	9.12
2001	71	23	107	598.487	-311.954	D	8.245	8.245	0	4.755	32.26	16.19	0	0	0	5.04
2001	72	23	1	596.558	-316.101	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2001	73	23	517	602.805	-305.061	D	6.493	6.486	0.006	1.039	12.78	62.82	0	0	0	24.38
2001	74	23	513	602.785	-306.126	D	8.912	8.912	0	6.344	35.43	16.63	0	0	0	16.38
2001	75	23	520	602.851	-305.804	D	8.622	8.613	0.009	5.619	25.03	74.01	0	0	0	0.95
2001	76	23	1	596.558	-316.101	D	6.791	6.791	0	1.638	0	0	0	0	0	0
2001	77	23	637	596.267	-315.066	D	6.557	6.553	0.004	1.168	7.33	72.57	0	0	0	20.1
2001	78	23	1	596.558	-316.101	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	79	23	637	596.267	-315.066	D	6.485	6.474	0.012	1.015	6.87	63.86	0	0	0	29.26

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	80	23	557	601.32	-313.419	D	6.495	6.485	0.01	1.037	9.06	57.69	0	0	0	33.23
2001	81	23	637	596.267	-315.066	D	6.518	6.513	0.006	1.091	8.91	56.94	0	0	0	34.15
2001	82	23	548	603.28	-312.734	D	7.705	7.434	0.271	2.96	15.63	81.24	0	0	0	3.12
2001	83	23	545	603.234	-311.991	D	6.704	6.67	0.034	1.399	32.41	52.76	0	0	0	14.83
2001	84	23	1	596.558	-316.101	D	6.489	6.489	0	1.045	0	0	0	0	0	0
2001	85	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	86	23	517	602.805	-305.061	D	6.507	6.469	0.038	1.007	7.53	75.87	0	0	0	16.6
2001	87	23	517	602.805	-305.061	D	6.471	6.469	0.003	1.005	25.01	63.27	0	0	0	11.67
2001	88	23	461	602.269	-305.916	D	7.079	7.079	0	2.22	37.87	44.56	0	0	0	6.57
2001	89	23	1	596.558	-316.101	D	8.796	8.796	0	6.06	0	0	0	0	0	0
2001	90	23	517	602.805	-305.061	D	8.483	8.409	0.074	5.135	38.67	59.7	0	0	0	1.62
2001	91	23	520	602.851	-305.804	D	7.06	7.057	0.003	2.174	61.88	36.25	0	0	0	1.83
2001	92	23	1	596.558	-316.101	D	7.04	7.04	0	2.141	0	0	0	0	0	0
2001	93	23	1	596.558	-316.101	D	9.416	9.416	0	7.617	0	0	0	0	0	0
2001	94	23	1	596.558	-316.101	D	8.143	8.143	0	4.52	0	0	0	0	0	0
2001	95	23	1	596.558	-316.101	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2001	96	23	1	596.558	-316.101	D	8.925	8.925	0	6.376	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	6.895	6.895	0	1.846	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.116	7.116	0	2.295	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.053	7.053	0	2.166	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.448	7.448	0	2.991	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	9.215	9.215	0	7.101	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.38	7.38	0	2.846	0	0	0	0	0	0
2001	103	23	557	601.32	-313.419	D	6.555	6.543	0.012	1.15	18.44	26.91	0	0	0	54.65
2001	104	23	78	598.564	-316.197	D	6.611	6.611	0.001	1.281	74.2	8.1	0	0	0	17.56
2001	105	23	517	602.805	-305.061	D	7.605	7.604	0	3.326	82.56	6.55	0	0	0	10.59
2001	106	23	409	602.481	-311.897	D	6.605	6.605	0	1.271	82.33	5.35	0	0	0	9.05
2001	107	23	1	596.558	-316.101	D	6.477	6.477	0	1.022	0	0	0	0	0	0
2001	108	23	546	603.249	-312.239	D	6.477	6.477	0	1.021	12.17	66.12	0	0	0	14.79
2001	109	23	1	596.558	-316.101	D	6.495	6.495	0	1.056	0	0	0	0	0	0
2001	110	23	1	596.558	-316.101	D	6.79	6.79	0	1.636	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.389	7.389	0	2.866	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.362	7.362	0	2.809	0	0	0	0	0	0
2001	114	23	548	603.28	-312.734	D	6.523	6.523	0	1.111	36.39	14.9	0	0	0	32.6
2001	115	23	517	602.805	-305.061	D	6.481	6.477	0.003	1.023	15.99	50.67	0	0	0	33.34
2001	116	23	1	596.558	-316.101	D	6.536	6.536	0	1.135	0	0	0	0	0	0
2001	117	23	1	596.558	-316.101	D	6.69	6.69	0	1.437	0	0	0	0	0	0
2001	118	23	327	601.142	-307.502	D	6.672	6.672	0	1.401	73.69	1.47	0	0	0	12.5

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	119	23	461	602.269	-305.916	D	6.586	6.586	0	1.234	93.37	1.59	0	0	0	9.89
2001	120	23	1	596.558	-316.101	D	6.721	6.721	0	1.497	0	0	0	0	0	0
2001	121	23	1	596.558	-316.101	D	6.826	6.826	0	1.708	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.186	7.186	0	2.441	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	6.778	6.778	0	1.612	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	6.933	6.933	0	1.921	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	6.946	6.946	0	1.948	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.82	7.82	0	3.797	0	0	0	0	0	0
2001	127	23	1	596.558	-316.101	D	7.56	7.56	0	3.229	0	0	0	0	0	0
2001	128	23	548	603.28	-312.734	D	6.958	6.951	0.007	1.959	43.46	25.6	0	0	0	30.95
2001	129	23	521	602.866	-306.052	D	6.516	6.514	0.003	1.092	76.63	6.2	0	0	0	17.13
2001	130	23	545	603.234	-311.991	D	6.575	6.574	0.001	1.21	85.01	2.92	0	0	0	12.16
2001	131	23	461	602.269	-305.916	D	7.48	7.48	0	3.058	89.16	1.04	0	0	0	7.57
2001	132	23	548	603.28	-312.734	D	8.044	8.041	0.003	4.291	37.65	26.57	0	0	0	35.76
2001	133	23	548	603.28	-312.734	D	6.526	6.525	0.001	1.115	37.25	17.31	0	0	0	45.29
2001	134	23	624	596.324	-316.278	D	6.592	6.592	0	1.244	78.69	4.71	0	0	0	15.43
2001	135	23	1	596.558	-316.101	D	6.924	6.924	0	1.904	0	0	0	0	0	0
2001	136	23	1	596.558	-316.101	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.223	7.223	0	2.516	0	0	0	0	0	0
2001	138	23	1	596.558	-316.101	D	7.412	7.412	0	2.914	0	0	0	0	0	0
2001	139	23	517	602.805	-305.061	D	8.175	8.095	0.08	4.412	21.61	74.3	0	0	0	4.09
2001	140	23	548	603.28	-312.734	D	7.305	7.301	0.004	2.681	65.73	9.41	0	0	0	24.85
2001	141	23	461	602.269	-305.916	D	8.573	8.573	0	5.523	93.11	1.78	0	0	0	3.84
2001	142	23	1	596.558	-316.101	D	6.575	6.575	0	1.213	0	0	0	0	0	0
2001	143	23	1	596.558	-316.101	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	144	23	1	596.558	-316.101	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	145	23	1	596.558	-316.101	D	6.601	6.601	0	1.263	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	6.634	6.634	0	1.327	0	0	0	0	0	0
2001	147	23	1	596.558	-316.101	D	6.582	6.582	0	1.225	0	0	0	0	0	0
2001	148	23	517	602.805	-305.061	D	6.752	6.752	0	1.56	48.61	28.86	0	0	0	22.46
2001	149	23	517	602.805	-305.061	D	6.744	6.742	0.002	1.54	76.77	7.51	0	0	0	15.65
2001	150	23	517	602.805	-305.061	D	7.595	7.594	0	3.303	87.74	2.07	0	0	0	10.33
2001	151	23	1	596.558	-316.101	D	8.688	8.688	0	5.799	0	0	0	0	0	0
2001	152	23	1	596.558	-316.101	D	6.961	6.961	0	1.98	0	0	0	0	0	0
2001	153	23	1	596.558	-316.101	D	6.843	6.843	0	1.741	0	0	0	0	0	0
2001	154	23	681	600.53	-308.617	D	6.748	6.744	0.004	1.544	21.91	30.92	0	0	0	47.15
2001	155	23	517	602.805	-305.061	D	7.392	7.392	0	2.872	66.07	26.2	0	0	0	6.76
2001	156	23	1	596.558	-316.101	D	8.339	8.339	0	4.973	0	0	0	0	0	0
2001	157	23	1	596.558	-316.101	D	8.193	8.193	0	4.636	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	158	23	521	602.866	-306.052	D	7.659	7.647	0.013	3.417	85.3	1.72	0	0	0	12.97
2001	159	23	632	596.27	-315.421	D	6.966	6.953	0.013	1.963	66.61	7.48	0	0	0	25.9
2001	160	23	637	596.267	-315.066	D	6.638	6.637	0.001	1.333	65.43	3.03	0	0	0	31.52
2001	161	23	517	602.805	-305.061	D	6.666	6.663	0.003	1.384	85.28	3.32	0	0	0	11.38
2001	162	23	624	596.324	-316.278	D	6.871	6.869	0.002	1.793	93.68	0.81	0	0	0	5.54
2001	163	23	517	602.805	-305.061	D	7.016	7.014	0.002	2.086	95.24	1.04	0	0	0	3.68
2001	164	23	516	602.728	-305.38	D	7.479	7.479	0	3.056	96.92	0.57	0	0	0	2.58
2001	165	23	1	596.558	-316.101	D	7.35	7.35	0	2.784	0	0	0	0	0	0
2001	166	23	1	596.558	-316.101	D	8.84	8.84	0	6.168	0	0	0	0	0	0
2001	167	23	1	596.558	-316.101	D	6.554	6.554	0	1.171	0	0	0	0	0	0
2001	168	23	1	596.558	-316.101	D	6.63	6.63	0	1.319	0	0	0	0	0	0
2001	169	23	465	602.978	-311.858	D	6.883	6.882	0	1.82	89.77	1.32	0	0	0	8.72
2001	170	23	675	599.827	-309.554	D	6.865	6.865	0	1.786	73.41	0.27	0	0	0	6.4
2001	171	23	517	602.805	-305.061	D	7.274	7.272	0.001	2.62	67.63	18.43	0	0	0	13.88
2001	172	23	517	602.805	-305.061	D	7.918	7.917	0.001	4.011	92.88	2.52	0	0	0	4.74
2001	173	23	517	602.805	-305.061	D	6.968	6.965	0.003	1.987	74.05	2.53	0	0	0	23.44
2001	174	23	517	602.805	-305.061	D	6.726	6.717	0.009	1.491	34.23	16.69	0	0	0	49.08
2001	175	23	548	603.28	-312.734	D	6.831	6.825	0.006	1.705	74.34	12.35	0	0	0	13.31
2001	176	23	625	596.311	-316.079	D	6.751	6.751	0	1.558	85.95	3.32	0	0	0	10.24
2001	177	23	1	596.558	-316.101	D	6.785	6.785	0	1.625	85.78	2.33	0	0	0	6.05
2001	178	23	107	598.487	-311.954	D	7.098	7.097	0	2.257	90.15	2.92	0	0	0	3.65
2001	179	23	107	598.487	-311.954	D	7.36	7.36	0	2.803	87.94	9.06	0	0	0	2.27
2001	180	23	216	600.149	-310.826	D	8.199	8.199	0	4.648	96.75	0.67	0	0	0	2.69
2001	181	23	1	596.558	-316.101	D	7.515	7.515	0	3.134	0	0	0	0	0	0
2001	182	23	517	602.805	-305.061	D	8.694	8.694	0	5.813	87.08	7.71	0	0	0	4.85
2001	183	23	603	598.68	-316.244	D	7.445	7.42	0.025	2.931	73.86	22.22	0	0	0	3.92
2001	184	23	624	596.324	-316.278	D	6.789	6.777	0.012	1.61	92.81	1.44	0	0	0	5.74
2001	185	23	517	602.805	-305.061	D	7.628	7.625	0.003	3.37	95.33	1.04	0	0	0	3.66
2001	186	23	517	602.805	-305.061	D	7.055	7.055	0	2.171	70.98	1.08	0	0	0	28.22
2001	187	23	624	596.324	-316.278	D	6.605	6.603	0.002	1.266	66.41	2.28	0	0	0	31.28
2001	188	23	661	598.396	-311.717	D	6.936	6.934	0.002	1.925	91.18	0.74	0	0	0	7.98
2001	189	23	1	596.558	-316.101	D	7.464	7.464	0	3.025	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.181	7.181	0	2.43	0	0	0	0	0	0
2001	191	23	517	602.805	-305.061	D	7.888	7.806	0.082	3.765	52.67	36.33	0	0	0	10.99
2001	192	23	548	603.28	-312.734	D	7.661	7.653	0.008	3.43	80.4	3.86	0	0	0	15.73
2001	193	23	695	602.257	-305.836	D	6.93	6.926	0.004	1.908	81.32	11.96	0	0	0	6.71
2001	194	23	624	596.324	-316.278	D	6.669	6.668	0.001	1.395	91.15	2.44	0	0	0	6.32
2001	195	23	517	602.805	-305.061	D	6.654	6.647	0.007	1.352	56.72	9.54	0	0	0	33.76
2001	196	23	1	596.558	-316.101	D	6.628	6.628	0	1.314	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	197	23	1	596.558	-316.101	D	6.873	6.873	0	1.802	0	0	0	0	0	0
2001	198	23	1	596.558	-316.101	D	9.096	9.096	0	6.802	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.762	7.762	0	3.669	0	0	0	0	0	0
2001	200	23	1	596.558	-316.101	D	9.024	9.024	0	6.622	0	0	0	0	0	0
2001	201	23	521	602.866	-306.052	D	8.453	8.452	0.001	5.237	93.85	2.43	0	0	0	3.64
2001	202	23	548	603.28	-312.734	D	8.324	8.294	0.029	4.869	85.14	11.35	0	0	0	3.51
2001	203	23	461	602.269	-305.916	D	8.328	8.321	0.007	4.931	94.73	3.53	0	0	0	1.71
2001	204	23	517	602.805	-305.061	D	7.719	7.714	0.005	3.564	93.41	4.74	0	0	0	1.86
2001	205	23	517	602.805	-305.061	D	7.242	7.241	0.001	2.553	96.21	1.35	0	0	0	2.43
2001	206	23	460	602.289	-306.164	D	7.729	7.729	0	3.596	96.69	1.75	0	0	0	1.63
2001	207	23	517	602.805	-305.061	D	8.741	8.741	0	5.927	84.93	9.87	0	0	0	4.74
2001	208	23	548	603.28	-312.734	D	8.789	8.783	0.006	6.029	81.6	16.76	0	0	0	1.61
2001	209	23	517	602.805	-305.061	D	8.669	8.663	0.006	5.739	87.42	11.18	0	0	0	1.38
2001	210	23	517	602.805	-305.061	D	8.733	8.732	0.001	5.905	90.87	7.57	0	0	0	1.31
2001	211	23	517	602.805	-305.061	D	7.839	7.828	0.01	3.815	79.72	15.85	0	0	0	4.42
2001	212	23	517	602.805	-305.061	D	6.928	6.923	0.005	1.902	93.99	0.78	0	0	0	5.23
2001	213	23	1	596.558	-316.101	D	7.422	7.422	0	2.935	94.73	0.85	0	0	0	3.32
2001	214	23	212	600.226	-311.82	D	6.951	6.951	0	1.96	58.11	0.16	0	0	0	2.4
2001	215	23	1	596.558	-316.101	D	7.509	7.509	0	3.119	0	0	0	0	0	0
2001	216	23	637	596.267	-315.066	D	8.124	8.123	0.002	4.475	63.63	23.51	0	0	0	12.84
2001	217	23	1	596.558	-316.101	D	6.844	6.844	0	1.744	0	0	0	0	0	0
2001	218	23	1	596.558	-316.101	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2001	219	23	1	596.558	-316.101	D	7.474	7.474	0	3.046	0	0	0	0	0	0
2001	220	23	632	596.27	-315.421	D	8.07	8.07	0	4.354	91.35	1.93	0	0	0	6.39
2001	221	23	517	602.805	-305.061	D	8.114	8.088	0.026	4.396	84.9	12.58	0	0	0	2.51
2001	222	23	517	602.805	-305.061	D	8.438	8.435	0.003	5.197	91.21	2.77	0	0	0	5.97
2001	223	23	632	596.27	-315.421	D	8.174	8.076	0.098	4.368	64.87	27.23	0	0	0	7.9
2001	224	23	637	596.267	-315.066	D	7.133	7.104	0.029	2.271	76.69	9.89	0	0	0	13.41
2001	225	23	517	602.805	-305.061	D	6.904	6.899	0.005	1.854	71.84	3.56	0	0	0	24.59
2001	226	23	637	596.267	-315.066	D	6.849	6.841	0.008	1.737	28.1	19.54	0	0	0	52.34
2001	227	23	637	596.267	-315.066	D	6.646	6.643	0.003	1.345	78.07	3.83	0	0	0	18.08
2001	228	23	694	602.12	-306.029	D	7.006	7.004	0.002	2.066	92.94	1.02	0	0	0	5.97
2001	229	23	1	596.558	-316.101	D	6.953	6.953	0	1.963	0	0	0	0	0	0
2001	230	23	1	596.558	-316.101	D	7.258	7.258	0	2.589	0	0	0	0	0	0
2001	231	23	1	596.558	-316.101	D	6.931	6.931	0	1.917	0	0	0	0	0	0
2001	232	23	517	602.805	-305.061	D	6.767	6.758	0.008	1.573	47.27	25.17	0	0	0	27.57
2001	233	23	517	602.805	-305.061	D	6.86	6.859	0.001	1.773	87.23	2.61	0	0	0	10.17
2001	234	23	461	602.269	-305.916	D	8.18	8.18	0	4.606	92.31	1.28	0	0	0	2.75
2001	235	23	1	596.558	-316.101	D	7.248	7.248	0	2.57	91.7	0.76	0	0	0	2.26

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	236	23	1	596.558	-316.101	D	8.023	8.023	0	4.248	0	0	0	0	0	0
2001	237	23	1	596.558	-316.101	D	7.35	7.35	0	2.783	0	0	0	0	0	0
2001	238	23	1	596.558	-316.101	D	8.139	8.139	0	4.512	0	0	0	0	0	0
2001	239	23	662	598.404	-311.683	D	7.283	7.273	0.01	2.622	52.36	25.76	0	0	0	21.87
2001	240	23	565	599.921	-314.038	D	7.53	7.525	0.005	3.154	90.12	2.39	0	0	0	7.52
2001	241	23	517	602.805	-305.061	D	7.248	7.245	0.003	2.563	63.63	23.97	0	0	0	12.33
2001	242	23	517	602.805	-305.061	D	8.841	8.841	0.001	6.169	90.63	7.2	0	0	0	2
2001	243	23	1	596.558	-316.101	D	8.837	8.837	0	6.161	0	0	0	0	0	0
2001	244	23	656	597.971	-312.292	D	8.331	8.266	0.065	4.803	36.46	60.07	0	0	0	3.46
2001	245	23	624	596.324	-316.278	D	7.187	7.184	0.003	2.437	90.61	5.6	0	0	0	3.74
2001	246	23	694	602.12	-306.029	D	8.019	8.017	0.002	4.236	84.38	1.05	0	0	0	14.52
2001	247	23	637	596.267	-315.066	D	7.567	7.546	0.021	3.199	74.97	16.85	0	0	0	8.17
2001	248	23	517	602.805	-305.061	D	6.941	6.938	0.003	1.933	89.16	5.05	0	0	0	5.85
2001	249	23	517	602.805	-305.061	D	7.452	7.452	0	2.999	95.16	1.21	0	0	0	3.83
2001	250	23	1	596.558	-316.101	D	9.131	9.131	0	6.889	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	9.542	9.542	0	7.946	0	0	0	0	0	0
2001	252	23	1	596.558	-316.101	D	9.397	9.397	0	7.568	0	0	0	0	0	0
2001	253	23	548	603.28	-312.734	D	7.5	7.495	0.005	3.09	67.43	13.55	0	0	0	18.99
2001	254	23	637	596.267	-315.066	D	6.779	6.775	0.004	1.605	67.03	11.4	0	0	0	21.58
2001	255	23	517	602.805	-305.061	D	7.061	7.06	0	2.181	78.75	1.4	0	0	0	19.96
2001	256	23	545	603.234	-311.991	D	7.309	7.238	0.07	2.549	65.11	24.65	0	0	0	10.23
2001	257	23	624	596.324	-316.278	D	6.877	6.873	0.004	1.802	85.37	1.78	0	0	0	12.89
2001	258	23	1	596.558	-316.101	D	6.636	6.636	0	1.33	0	0	0	0	0	0
2001	259	23	1	596.558	-316.101	D	6.702	6.702	0	1.46	0	0	0	0	0	0
2001	260	23	461	602.269	-305.916	D	7.06	7.06	0	2.181	68.06	15.24	0	0	0	5.36
2001	261	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	262	23	1	596.558	-316.101	D	9.122	9.122	0	6.867	0	0	0	0	0	0
2001	263	23	1	596.558	-316.101	D	7.114	7.114	0	2.292	0	0	0	0	0	0
2001	264	23	1	596.558	-316.101	D	7.134	7.134	0	2.332	0	0	0	0	0	0
2001	265	23	548	603.28	-312.734	D	7.052	7.047	0.006	2.153	66.76	9.34	0	0	0	23.87
2001	266	23	637	596.267	-315.066	D	7.238	7.232	0.006	2.535	73.29	19.19	0	0	0	7.5
2001	267	23	548	603.28	-312.734	D	8.034	8.031	0.003	4.267	37.54	42.47	0	0	0	19.99
2001	268	23	557	601.32	-313.419	D	6.575	6.548	0.027	1.159	9.09	57.54	0	0	0	33.36
2001	269	23	1	596.558	-316.101	D	6.531	6.531	0	1.126	0	0	0	0	0	0
2001	270	23	1	596.558	-316.101	D	6.568	6.568	0	1.198	0	0	0	0	0	0
2001	271	23	632	596.27	-315.421	D	6.845	6.827	0.017	1.71	23.2	36.37	0	0	0	40.43
2001	272	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	273	23	637	596.267	-315.066	D	7.137	7.133	0.004	2.33	71	8.8	0	0	0	20.22
2001	274	23	557	601.32	-313.419	D	7.031	7.007	0.024	2.072	18.37	58.24	0	0	0	23.39

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	275	23	1	596.558	-316.101	D	7.187	7.187	0	2.442	0	0	0	0	0	0
2001	276	23	1	596.558	-316.101	D	7.307	7.307	0	2.693	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.843	7.843	0	3.848	0	0	0	0	0	0
2001	278	23	517	602.805	-305.061	D	9.925	9.843	0.082	8.747	29.27	69.86	0	0	0	0.86
2001	279	23	545	603.234	-311.991	D	7.785	7.784	0.001	3.716	52.36	46.9	0	0	0	0.74
2001	280	23	656	597.971	-312.292	D	6.545	6.533	0.012	1.13	11.85	68.65	0	0	0	19.49
2001	281	23	1	596.558	-316.101	D	6.595	6.595	0	1.25	53.42	32.83	0	0	0	10.01
2001	282	23	1	596.558	-316.101	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	8.133	8.133	0	4.498	0	0	0	0	0	0
2001	284	23	1	596.558	-316.101	D	10.095	10.095	0	9.436	0	0	0	0	0	0
2001	285	23	1	596.558	-316.101	D	9.943	9.943	0	9.018	0	0	0	0	0	0
2001	286	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	287	23	1	596.558	-316.101	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2001	288	23	1	596.558	-316.101	D	6.542	6.542	0	1.147	0	0	0	0	0	0
2001	289	23	517	602.805	-305.061	D	7.586	7.561	0.025	3.233	25.4	74.07	0	0	0	0.54
2001	290	23	1	596.558	-316.101	D	6.492	6.492	0	1.05	0	0	0	0	0	0
2001	291	23	548	603.28	-312.734	D	6.498	6.497	0.001	1.06	40.95	45.91	0	0	0	12.99
2001	292	23	1	596.558	-316.101	D	6.578	6.578	0	1.218	0	0	0	0	0	0
2001	293	23	1	596.558	-316.101	D	6.945	6.945	0	1.947	0	0	0	0	0	0
2001	294	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.564	7.564	0	3.239	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	9.63	9.63	0	8.178	0	0	0	0	0	0
2001	297	23	1	596.558	-316.101	D	9.546	9.546	0	7.957	0	0	0	0	0	0
2001	298	23	1	596.558	-316.101	D	6.813	6.813	0	1.68	0	0	0	0	0	0
2001	299	23	1	596.558	-316.101	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	300	23	548	603.28	-312.734	D	6.485	6.485	0	1.037	22.79	55.34	0	0	0	17.98
2001	301	23	624	596.324	-316.278	D	6.514	6.508	0.007	1.081	18.08	69.48	0	0	0	12.45
2001	302	23	6	596.462	-314.859	D	6.499	6.499	0	1.065	58.57	33.34	0	0	0	6.87
2001	303	23	1	596.558	-316.101	D	6.516	6.516	0	1.098	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	6.796	6.796	0	1.647	0	0	0	0	0	0
2001	306	23	517	602.805	-305.061	D	8.951	8.951	0	6.439	59.74	33.13	0	0	0	4.36
2001	307	23	663	598.532	-311.657	D	8.548	8.519	0.028	5.396	36.32	61.91	0	0	0	1.77
2001	308	23	461	602.269	-305.916	D	6.594	6.594	0	1.248	63.81	12.22	0	0	0	22.8
2001	309	23	557	601.32	-313.419	D	7.865	7.8	0.065	3.752	10.39	81.29	0	0	0	8.32
2001	310	23	2	596.539	-315.853	D	6.476	6.476	0	1.02	57.19	17.47	0	0	0	24.76
2001	311	23	517	602.805	-305.061	D	6.519	6.519	0	1.103	65.31	19.26	0	0	0	15.01
2001	312	23	461	602.269	-305.916	D	6.781	6.781	0	1.618	76.47	11.99	0	0	0	11.2
2001	313	23	681	600.53	-308.617	D	6.709	6.679	0.03	1.416	11.52	64.5	0	0	0	23.97

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	314	23	548	603.28	-312.734	D	6.644	6.643	0	1.345	41.21	39.26	0	0	0	19.39
2001	315	23	557	601.32	-313.419	D	6.745	6.732	0.013	1.521	10.02	60.6	0	0	0	29.39
2001	316	23	1	596.558	-316.101	D	6.562	6.562	0	1.186	0	0	0	0	0	0
2001	317	23	1	596.558	-316.101	D	6.567	6.567	0	1.196	0	0	0	0	0	0
2001	318	23	1	596.558	-316.101	D	7.603	7.603	0	3.322	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	6.973	6.973	0	2.004	0	0	0	0	0	0
2001	320	23	433	602.806	-312.871	D	7.304	7.304	0	2.685	72.35	12.92	0	0	0	17.83
2001	321	23	517	602.805	-305.061	D	8.011	7.82	0.191	3.796	29.23	67.94	0	0	0	2.84
2001	322	23	517	602.805	-305.061	D	7.987	7.956	0.031	4.098	64.52	30.62	0	0	0	4.86
2001	323	23	490	602.499	-305.648	D	7.864	7.864	0	3.894	78.6	12.27	0	0	0	5.04
2001	324	23	524	602.912	-306.794	D	6.474	6.474	0	1.016	23.47	48.53	0	0	0	27.79
2001	325	23	548	603.28	-312.734	D	6.477	6.477	0	1.022	25.44	59.67	0	0	0	16.52
2001	326	23	433	602.806	-312.871	D	6.52	6.52	0	1.105	40.31	43.58	0	0	0	13.29
2001	327	23	1	596.558	-316.101	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	9.336	9.336	0	7.411	0	0	0	0	0	0
2001	329	23	1	596.558	-316.101	D	6.663	6.663	0	1.383	0	0	0	0	0	0
2001	330	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	331	23	1	596.558	-316.101	D	7.453	7.453	0	3.002	0	0	0	0	0	0
2001	332	23	548	603.28	-312.734	D	8.716	8.699	0.017	5.824	11.99	67.31	0	0	0	20.69
2001	333	23	637	596.267	-315.066	D	10.101	10.097	0.004	9.443	13.65	83.28	0	0	0	3.05
2001	334	23	603	598.68	-316.244	D	8.85	8.806	0.044	6.083	19.53	78.78	0	0	0	1.69
2001	335	23	1	596.558	-316.101	D	6.626	6.626	0	1.311	0	0	0	0	0	0
2001	336	23	517	602.805	-305.061	D	6.672	6.672	0.001	1.401	33.9	56.53	0	0	0	9.53
2001	337	23	403	601.849	-306.947	D	6.732	6.732	0	1.52	51.99	24.16	0	0	0	15.03
2001	338	23	1	596.558	-316.101	D	6.817	6.817	0	1.69	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	8.689	8.689	0	5.801	0	0	0	0	0	0
2001	340	23	517	602.805	-305.061	D	9.813	9.806	0.007	8.646	11.64	86.57	0	0	0	1.77
2001	341	23	517	602.805	-305.061	D	10.063	9.879	0.184	8.844	23.6	75.08	0	0	0	1.33
2001	342	23	517	602.805	-305.061	D	8.905	8.814	0.092	6.103	42.12	56.67	0	0	0	1.21
2001	343	23	517	602.805	-305.061	D	6.644	6.638	0.007	1.335	15.71	63.32	0	0	0	20.97
2001	344	23	637	596.267	-315.066	D	6.519	6.518	0.001	1.101	22.7	65.07	0	0	0	12.24
2001	345	23	637	596.267	-315.066	D	6.576	6.575	0.001	1.211	32.36	59.4	0	0	0	8.23
2001	346	23	107	598.487	-311.954	D	8.935	8.935	0	6.4	43.47	49.38	0	0	0	6.07
2001	347	23	517	602.805	-305.061	D	9.35	9.349	0.001	7.444	51.11	42.76	0	0	0	6.07
2001	348	23	548	603.28	-312.734	D	8.773	8.724	0.048	5.886	33.34	65.33	0	0	0	1.33
2001	349	23	516	602.728	-305.38	D	7.172	7.172	0	2.41	57.5	34.23	0	0	0	7.05
2001	350	23	521	602.866	-306.052	D	10.1	10.099	0	9.449	52.5	46.16	0	0	0	1.37
2001	351	23	637	596.267	-315.066	D	10.23	10.218	0.012	9.779	24.16	73.26	0	0	0	2.56
2001	352	23	1	596.558	-316.101	D	7.315	7.315	0	2.709	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	353	23	1	596.558	-316.101	D	6.671	6.671	0	1.401	0	0	0	0	0	0
2001	354	23	1	596.558	-316.101	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	355	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	356	23	1	596.558	-316.101	D	7.376	7.376	0	2.837	0	0	0	0	0	0
2001	357	23	1	596.558	-316.101	D	7.901	7.901	0	3.975	0	0	0	0	0	0
2001	358	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	359	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	360	23	1	596.558	-316.101	D	6.497	6.497	0	1.06	0	0	0	0	0	0
2001	361	23	1	596.558	-316.101	D	6.534	6.534	0	1.133	0	0	0	0	0	0
2001	362	23	1	596.558	-316.101	D	6.849	6.849	0	1.753	0	0	0	0	0	0
2001	363	23	1	596.558	-316.101	D	6.626	6.626	0	1.312	0	0	0	0	0	0
2001	364	23	1	596.558	-316.101	D	6.52	6.52	0	1.105	0	0	0	0	0	0
2001	365	23	1	596.558	-316.101	D	6.562	6.562	0	1.187	0	0	0	0	0	0
									0.271							
UMC											% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	660	598.316	-311.922	D	7.222	7.113	0.11	2.289	73.91	25.98	0	0	0	0.11
2001	2	23	624	596.324	-316.278	D	7.21	7.176	0.033	2.42	88.38	11.6	0	0	0	0.03
2001	3	23	211	600.245	-312.069	D	8.167	7.997	0.17	4.19	88.15	11.84	0	0	0	0.01
2001	4	23	545	603.234	-311.991	D	7.836	7.835	0.001	3.829	94.09	5.83	0	0	0	0.01
2001	5	23	1	596.558	-316.101	D	7.729	7.729	0	3.596	0	0	0	0	0	0
2001	6	23	517	602.805	-305.061	D	7.314	7.31	0.003	2.699	88.52	11.42	0	0	0	0.07
2001	7	23	545	603.234	-311.991	D	7.301	7.209	0.091	2.489	79.48	20.46	0	0	0	0.05
2001	8	23	624	596.324	-316.278	D	7.391	7.373	0.017	2.831	89.77	10.19	0	0	0	0.04
2001	9	23	624	596.324	-316.278	D	7.37	7.366	0.004	2.816	91.21	8.76	0	0	0	0.03
2001	10	23	517	602.805	-305.061	D	7.464	7.46	0.004	3.017	84.3	15.67	0	0	0	0.03
2001	11	23	517	602.805	-305.061	D	7.924	7.924	0	4.027	89	11	0	0	0	0.05
2001	12	23	1	596.558	-316.101	D	9.4	9.4	0	7.577	0	0	0	0	0	0
2001	13	23	1	596.558	-316.101	D	8.916	8.916	0	6.353	0	0	0	0	0	0
2001	14	23	1	596.558	-316.101	D	9.712	9.712	0	8.396	0	0	0	0	0	0
2001	15	23	1	596.558	-316.101	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2001	16	23	682	600.626	-308.407	D	6.733	6.695	0.038	1.447	75.59	24.22	0	0	0	0.2
2001	17	23	624	596.324	-316.278	D	6.909	6.909	0	1.873	86.09	14.02	0	0	0	0.12
2001	18	23	656	597.971	-312.292	D	7.081	7.077	0.005	2.214	90.14	9.75	0	0	0	0.09
2001	19	23	545	603.234	-311.991	D	6.807	6.739	0.068	1.534	83.55	16.35	0	0	0	0.1
2001	20	23	637	596.267	-315.066	D	6.741	6.731	0.01	1.519	73.79	26.03	0	0	0	0.18
2001	21	23	517	602.805	-305.061	D	6.554	6.553	0.001	1.169	78.47	21.46	0	0	0	0.11

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	22	23	517	602.805	-305.061	D	6.515	6.515	0	1.096	79.01	22.16	0	0	0	0.19
2001	23	23	694	602.12	-306.029	D	6.683	6.683	0	1.424	76.62	13.6	0	0	0	0.12
2001	24	23	557	601.32	-313.419	D	7.01	6.896	0.114	1.848	80.36	19.53	0	0	0	0.1
2001	25	23	624	596.324	-316.278	D	6.591	6.589	0.002	1.239	87.37	12.49	0	0	0	0.14
2001	26	23	1	596.558	-316.101	D	6.498	6.498	0	1.062	0	0	0	0	0	0
2001	27	23	662	598.404	-311.683	D	6.659	6.637	0.023	1.333	70.44	29.36	0	0	0	0.2
2001	28	23	517	602.805	-305.061	D	6.524	6.511	0.013	1.087	84.87	15.03	0	0	0	0.09
2001	29	23	1	596.558	-316.101	D	8.131	8.131	0	4.495	0	0	0	0	0	0
2001	30	23	1	596.558	-316.101	D	9.187	9.187	0	7.032	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	6.895	6.895	0	1.845	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2001	33	23	517	602.805	-305.061	D	6.581	6.543	0.039	1.148	69.18	30.62	0	0	0	0.2
2001	34	23	517	602.805	-305.061	D	6.472	6.469	0.003	1.006	80.05	19.89	0	0	0	0.09
2001	35	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	36	23	517	602.805	-305.061	D	6.692	6.692	0	1.44	67.67	31.5	0	0	0	0.17
2001	37	23	517	602.805	-305.061	D	6.503	6.502	0.001	1.07	95.48	4.29	0	0	0	0.22
2001	38	23	517	602.805	-305.061	D	6.636	6.617	0.019	1.293	86.53	13.37	0	0	0	0.09
2001	39	23	1	596.558	-316.101	D	7.981	7.981	0	4.155	0	0	0	0	0	0
2001	40	23	1	596.558	-316.101	D	9.317	9.317	0	7.361	0	0	0	0	0	0
2001	41	23	626	596.299	-315.88	D	6.566	6.555	0.01	1.174	63.59	36.15	0	0	0	0.26
2001	42	23	1	596.558	-316.101	D	6.47	6.47	0	1.007	0	0	0	0	0	0
2001	43	23	1	596.558	-316.101	D	6.521	6.521	0	1.107	0	0	0	0	0	0
2001	44	23	1	596.558	-316.101	D	7.622	7.622	0	3.364	0	0	0	0	0	0
2001	45	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	46	23	624	596.324	-316.278	D	9.08	8.818	0.262	6.113	95.95	4.04	0	0	0	0.01
2001	47	23	624	596.324	-316.278	D	6.858	6.712	0.146	1.48	91.89	8.06	0	0	0	0.05
2001	48	23	1	596.558	-316.101	D	6.499	6.499	0	1.064	0	0	0	0	0	0
2001	49	23	637	596.267	-315.066	D	6.478	6.469	0.009	1.006	86.8	13.08	0	0	0	0.12
2001	50	23	637	596.267	-315.066	D	6.476	6.473	0.003	1.014	92.65	7.35	0	0	0	0.05
2001	51	23	517	602.805	-305.061	D	6.627	6.626	0	1.312	96.83	3.07	0	0	0	0.09
2001	52	23	548	603.28	-312.734	D	6.544	6.538	0.006	1.14	91.61	8.34	0	0	0	0.05
2001	53	23	624	596.324	-316.278	D	7.302	7.301	0.001	2.68	91.32	8.69	0	0	0	0.01
2001	54	23	517	602.805	-305.061	D	6.781	6.721	0.06	1.499	87.56	12.39	0	0	0	0.05
2001	55	23	517	602.805	-305.061	D	8.107	8.106	0.001	4.438	94.27	5.56	0	0	0	0.05
2001	56	23	1	596.558	-316.101	D	8.437	8.437	0	5.201	0	0	0	0	0	0
2001	57	23	517	602.805	-305.061	D	6.518	6.51	0.008	1.085	73.37	26.3	0	0	0	0.33
2001	58	23	637	596.267	-315.066	D	6.529	6.528	0.001	1.121	91.38	8.7	0	0	0	0.08
2001	59	23	6	596.462	-314.859	D	6.638	6.638	0	1.335	90.31	7.8	0	0	0	0.02
2001	60	23	1	596.558	-316.101	D	6.473	6.473	0	1.014	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	61	23	1	596.558	-316.101	D	6.924	6.924	0	1.905	0	0	0	0	0	0
2001	62	23	517	602.805	-305.061	D	6.688	6.66	0.028	1.377	95.84	4.1	0	0	0	0.06
2001	63	23	637	596.267	-315.066	D	6.64	6.621	0.02	1.301	95.71	4.26	0	0	0	0.04
2001	64	23	624	596.324	-316.278	D	6.573	6.57	0.003	1.202	85.04	14.74	0	0	0	0.16
2001	65	23	624	596.324	-316.278	D	6.54	6.53	0.01	1.124	85.72	14.14	0	0	0	0.14
2001	66	23	624	596.324	-316.278	D	6.478	6.477	0	1.022	93.34	7.01	0	0	0	0.18
2001	67	23	632	596.27	-315.421	D	6.566	6.533	0.033	1.13	86.39	13.43	0	0	0	0.19
2001	68	23	517	602.805	-305.061	D	6.533	6.53	0.003	1.123	81.88	17.92	0	0	0	0.19
2001	69	23	662	598.404	-311.683	D	6.503	6.495	0.009	1.056	91	8.92	0	0	0	0.09
2001	70	23	517	602.805	-305.061	D	6.475	6.474	0.001	1.015	94.53	5.32	0	0	0	0.06
2001	71	23	490	602.499	-305.648	D	8.243	8.243	0	4.75	97.28	2.66	0	0	0	0.05
2001	72	23	1	596.558	-316.101	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2001	73	23	557	601.32	-313.419	D	6.496	6.485	0.01	1.038	84.03	15.62	0	0	0	0.33
2001	74	23	516	602.728	-305.38	D	8.834	8.834	0	6.153	97.45	1.63	0	0	0	0.08
2001	75	23	545	603.234	-311.991	D	8.622	8.477	0.144	5.296	94.35	5.64	0	0	0	0.02
2001	76	23	624	596.324	-316.278	D	6.838	6.791	0.047	1.638	87.02	12.88	0	0	0	0.1
2001	77	23	1	596.558	-316.101	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	78	23	1	596.558	-316.101	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	6.474	6.474	0	1.015	0	0	0	0	0	0
2001	80	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	81	23	624	596.324	-316.278	D	6.519	6.513	0.006	1.091	96.72	3.2	0	0	0	0.07
2001	82	23	624	596.324	-316.278	D	7.398	7.358	0.04	2.799	96.22	3.76	0	0	0	0.02
2001	83	23	624	596.324	-316.278	D	6.678	6.665	0.012	1.389	96.21	3.75	0	0	0	0.04
2001	84	23	1	596.558	-316.101	D	6.489	6.489	0	1.045	0	0	0	0	0	0
2001	85	23	624	596.324	-316.278	D	6.486	6.485	0.001	1.037	87.79	12.08	0	0	0	0.14
2001	86	23	624	596.324	-316.278	D	6.52	6.469	0.05	1.007	87.18	12.68	0	0	0	0.14
2001	87	23	517	602.805	-305.061	D	6.501	6.469	0.033	1.005	93.85	6.08	0	0	0	0.07
2001	88	23	490	602.499	-305.648	D	7.079	7.079	0	2.22	93.52	2.73	0	0	0	0.04
2001	89	23	1	596.558	-316.101	D	8.796	8.796	0	6.06	0	0	0	0	0	0
2001	90	23	1	596.558	-316.101	D	8.559	8.559	0	5.491	0	0	0	0	0	0
2001	91	23	695	602.257	-305.836	D	7.085	7.057	0.028	2.174	91.23	8.68	0	0	0	0.08
2001	92	23	1	596.558	-316.101	D	7.04	7.04	0	2.141	0	0	0	0	0	0
2001	93	23	1	596.558	-316.101	D	9.416	9.416	0	7.617	0	0	0	0	0	0
2001	94	23	1	596.558	-316.101	D	8.143	8.143	0	4.52	0	0	0	0	0	0
2001	95	23	1	596.558	-316.101	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2001	96	23	1	596.558	-316.101	D	8.925	8.925	0	6.376	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	6.895	6.895	0	1.846	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.116	7.116	0	2.295	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.053	7.053	0	2.166	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	100	23	1	596.558	-316.101	D	7.448	7.448	0	2.991	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	9.215	9.215	0	7.101	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.38	7.38	0	2.846	0	0	0	0	0	0
2001	103	23	545	603.234	-311.991	D	6.551	6.545	0.006	1.154	99.3	0.61	0	0	0	0.08
2001	104	23	545	603.234	-311.991	D	6.62	6.615	0.005	1.29	99.72	0.23	0	0	0	0.04
2001	105	23	694	602.12	-306.029	D	7.646	7.59	0.056	3.295	99.19	0.76	0	0	0	0.05
2001	106	23	624	596.324	-316.278	D	6.627	6.605	0.022	1.27	97.7	2.2	0	0	0	0.1
2001	107	23	557	601.32	-313.419	D	6.48	6.477	0.003	1.022	71.61	28.02	0	0	0	0.34
2001	108	23	637	596.267	-315.066	D	6.483	6.479	0.004	1.025	98.84	1.04	0	0	0	0.1
2001	109	23	548	603.28	-312.734	D	6.495	6.491	0.004	1.05	99.11	0.81	0	0	0	0.07
2001	110	23	1	596.558	-316.101	D	6.79	6.79	0	1.636	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.389	7.389	0	2.866	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.362	7.362	0	2.809	0	0	0	0	0	0
2001	114	23	548	603.28	-312.734	D	6.527	6.523	0.004	1.111	94.55	5.18	0	0	0	0.26
2001	115	23	624	596.324	-316.278	D	6.482	6.477	0.004	1.022	93.39	6.47	0	0	0	0.16
2001	116	23	517	602.805	-305.061	D	6.556	6.536	0.02	1.135	98.7	1.24	0	0	0	0.07
2001	117	23	1	596.558	-316.101	D	6.69	6.69	0	1.437	0	0	0	0	0	0
2001	118	23	517	602.805	-305.061	D	6.676	6.676	0.001	1.409	99.63	0.15	0	0	0	0.04
2001	119	23	517	602.805	-305.061	D	6.587	6.586	0.001	1.234	99.85	0.16	0	0	0	0.02
2001	120	23	1	596.558	-316.101	D	6.721	6.721	0	1.497	0	0	0	0	0	0
2001	121	23	1	596.558	-316.101	D	6.826	6.826	0	1.708	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.186	7.186	0	2.441	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	6.778	6.778	0	1.612	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	6.933	6.933	0	1.921	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	6.946	6.946	0	1.948	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.82	7.82	0	3.797	0	0	0	0	0	0
2001	127	23	1	596.558	-316.101	D	7.56	7.56	0	3.229	0	0	0	0	0	0
2001	128	23	624	596.324	-316.278	D	6.946	6.916	0.03	1.887	98.54	1.4	0	0	0	0.05
2001	129	23	624	596.324	-316.278	D	6.521	6.515	0.007	1.094	99.62	0.31	0	0	0	0.05
2001	130	23	545	603.234	-311.991	D	6.58	6.574	0.005	1.21	99.84	0.13	0	0	0	0.03
2001	131	23	517	602.805	-305.061	D	7.48	7.48	0	3.058	99.94	0.05	0	0	0	0.02
2001	132	23	546	603.249	-312.239	D	8.149	8.041	0.108	4.291	96.51	3.49	0	0	0	0.01
2001	133	23	625	596.311	-316.079	D	6.538	6.526	0.012	1.117	99.75	0.17	0	0	0	0.08
2001	134	23	603	598.68	-316.244	D	6.632	6.592	0.041	1.244	99.77	0.19	0	0	0	0.04
2001	135	23	1	596.558	-316.101	D	6.924	6.924	0	1.904	0	0	0	0	0	0
2001	136	23	1	596.558	-316.101	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.223	7.223	0	2.516	0	0	0	0	0	0
2001	138	23	517	602.805	-305.061	D	7.45	7.448	0.003	2.989	99.88	0.07	0	0	0	0.02

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	139	23	517	602.805	-305.061	D	9.03	8.095	0.935	4.412	98.35	1.65	0	0	0	0
2001	140	23	548	603.28	-312.734	D	7.309	7.301	0.007	2.681	99.84	0.12	0	0	0	0.02
2001	141	23	517	602.805	-305.061	D	8.574	8.573	0.001	5.523	99.83	0.22	0	0	0	0.01
2001	142	23	1	596.558	-316.101	D	6.575	6.575	0	1.213	0	0	0	0	0	0
2001	143	23	1	596.558	-316.101	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	144	23	517	602.805	-305.061	D	6.569	6.568	0.002	1.198	94.37	5.44	0	0	0	0.19
2001	145	23	1	596.558	-316.101	D	6.601	6.601	0	1.263	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	6.634	6.634	0	1.327	0	0	0	0	0	0
2001	147	23	1	596.558	-316.101	D	6.582	6.582	0	1.225	0	0	0	0	0	0
2001	148	23	546	603.249	-312.239	D	6.788	6.767	0.022	1.589	99.68	0.25	0	0	0	0.06
2001	149	23	624	596.324	-316.278	D	6.754	6.749	0.006	1.553	99.79	0.15	0	0	0	0.03
2001	150	23	637	596.267	-315.066	D	7.576	7.573	0.002	3.259	99.87	0.15	0	0	0	0.02
2001	151	23	1	596.558	-316.101	D	8.688	8.688	0	5.799	0	0	0	0	0	0
2001	152	23	1	596.558	-316.101	D	6.961	6.961	0	1.98	0	0	0	0	0	0
2001	153	23	1	596.558	-316.101	D	6.843	6.843	0	1.741	0	0	0	0	0	0
2001	154	23	517	602.805	-305.061	D	6.765	6.748	0.017	1.553	97.77	2.11	0	0	0	0.13
2001	155	23	1	596.558	-316.101	D	7.274	7.274	0	2.623	0	0	0	0	0	0
2001	156	23	1	596.558	-316.101	D	8.339	8.339	0	4.973	0	0	0	0	0	0
2001	157	23	1	596.558	-316.101	D	8.193	8.193	0	4.636	0	0	0	0	0	0
2001	158	23	517	602.805	-305.061	D	7.803	7.645	0.158	3.414	99.11	0.87	0	0	0	0.02
2001	159	23	603	598.68	-316.244	D	7.047	6.953	0.094	1.963	99.89	0.1	0	0	0	0.01
2001	160	23	1	596.558	-316.101	D	6.637	6.637	0	1.333	0	0	0	0	0	0
2001	161	23	517	602.805	-305.061	D	6.674	6.663	0.011	1.384	99.92	0.06	0	0	0	0.02
2001	162	23	517	602.805	-305.061	D	6.888	6.885	0.002	1.826	99.97	0.03	0	0	0	0.02
2001	163	23	1	596.558	-316.101	D	6.989	6.989	0	2.037	0	0	0	0	0	0
2001	164	23	1	596.558	-316.101	D	7.456	7.456	0	3.006	0	0	0	0	0	0
2001	165	23	1	596.558	-316.101	D	7.35	7.35	0	2.784	0	0	0	0	0	0
2001	166	23	1	596.558	-316.101	D	8.84	8.84	0	6.168	0	0	0	0	0	0
2001	167	23	548	603.28	-312.734	D	6.571	6.556	0.015	1.174	99.25	0.6	0	0	0	0.16
2001	168	23	1	596.558	-316.101	D	6.63	6.63	0	1.319	0	0	0	0	0	0
2001	169	23	604	598.599	-316.246	D	6.89	6.885	0.005	1.825	99.92	0.05	0	0	0	0.03
2001	170	23	517	602.805	-305.061	D	6.895	6.895	0	1.846	100.15	0.01	0	0	0	0.02
2001	171	23	1	596.558	-316.101	D	7.198	7.198	0	2.465	0	0	0	0	0	0
2001	172	23	517	602.805	-305.061	D	8.174	7.917	0.257	4.011	99.72	0.27	0	0	0	0.01
2001	173	23	563	600.143	-314.135	D	7.017	6.966	0.052	1.989	99.63	0.35	0	0	0	0.02
2001	174	23	624	596.324	-316.278	D	6.805	6.708	0.097	1.472	99.79	0.17	0	0	0	0.04
2001	175	23	637	596.267	-315.066	D	6.875	6.821	0.053	1.698	99.73	0.24	0	0	0	0.03
2001	176	23	637	596.267	-315.066	D	6.789	6.751	0.038	1.558	99.85	0.12	0	0	0	0.02
2001	177	23	637	596.267	-315.066	D	6.79	6.785	0.005	1.625	99.9	0.08	0	0	0	0.02

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	178	23	461	602.269	-305.916	D	7.151	7.147	0.004	2.36	99.87	0.08	0	0	0	0.01
2001	179	23	517	602.805	-305.061	D	7.373	7.369	0.004	2.822	99.76	0.25	0	0	0	0.01
2001	180	23	461	602.269	-305.916	D	8.203	8.203	0	4.657	100.07	0.02	0	0	0	0.01
2001	181	23	1	596.558	-316.101	D	7.515	7.515	0	3.134	0	0	0	0	0	0
2001	182	23	692	601.846	-306.417	D	8.672	8.667	0.006	5.747	99.94	0.03	0	0	0	0.01
2001	183	23	637	596.267	-315.066	D	7.451	7.42	0.03	2.931	99.29	0.7	0	0	0	0.01
2001	184	23	517	602.805	-305.061	D	6.773	6.755	0.018	1.566	99.93	0.05	0	0	0	0.01
2001	185	23	517	602.805	-305.061	D	7.626	7.625	0.001	3.37	99.99	0.03	0	0	0	0.01
2001	186	23	521	602.866	-306.052	D	7.094	7.051	0.042	2.163	99.9	0.06	0	0	0	0.03
2001	187	23	624	596.324	-316.278	D	6.616	6.603	0.013	1.266	99.92	0.04	0	0	0	0.03
2001	188	23	676	599.876	-309.365	D	6.966	6.934	0.032	1.925	99.95	0.03	0	0	0	0.02
2001	189	23	1	596.558	-316.101	D	7.464	7.464	0	3.025	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.181	7.181	0	2.43	0	0	0	0	0	0
2001	191	23	514	602.766	-305.877	D	8.27	7.806	0.464	3.765	99.56	0.43	0	0	0	0.01
2001	192	23	624	596.324	-316.278	D	7.646	7.646	0	3.417	104.95	0.04	0	0	0	0.02
2001	193	23	461	602.269	-305.916	D	6.992	6.926	0.066	1.908	99.86	0.13	0	0	0	0.01
2001	194	23	624	596.324	-316.278	D	6.709	6.668	0.041	1.395	99.64	0.34	0	0	0	0.01
2001	195	23	1	596.558	-316.101	D	6.647	6.647	0	1.352	80.58	0.01	0	0	0	0.01
2001	196	23	1	596.558	-316.101	D	6.628	6.628	0	1.314	0	0	0	0	0	0
2001	197	23	1	596.558	-316.101	D	6.873	6.873	0	1.802	0	0	0	0	0	0
2001	198	23	1	596.558	-316.101	D	9.096	9.096	0	6.802	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.762	7.762	0	3.669	0	0	0	0	0	0
2001	200	23	517	602.805	-305.061	D	9.277	9.276	0.001	7.258	100	0.02	0	0	0	0.01
2001	201	23	521	602.866	-306.052	D	8.498	8.452	0.046	5.237	99.89	0.1	0	0	0	0.01
2001	202	23	517	602.805	-305.061	D	8.874	8.316	0.558	4.92	99.58	0.41	0	0	0	0.01
2001	203	23	517	602.805	-305.061	D	8.665	8.321	0.344	4.931	99.85	0.15	0	0	0	0
2001	204	23	517	602.805	-305.061	D	7.812	7.714	0.098	3.564	99.78	0.22	0	0	0	0.01
2001	205	23	517	602.805	-305.061	D	7.252	7.241	0.011	2.553	99.96	0.04	0	0	0	0.01
2001	206	23	517	602.805	-305.061	D	7.714	7.706	0.008	3.546	99.47	0.52	0	0	0	0.01
2001	207	23	517	602.805	-305.061	D	8.97	8.741	0.229	5.927	99.69	0.3	0	0	0	0.01
2001	208	23	193	600.016	-312.336	D	9.805	8.783	1.021	6.029	99.4	0.6	0	0	0	0
2001	209	23	694	602.12	-306.029	D	9.219	8.672	0.547	5.76	99.38	0.62	0	0	0	0
2001	210	23	521	602.866	-306.052	D	8.787	8.738	0.049	5.918	99.82	0.17	0	0	0	0.01
2001	211	23	517	602.805	-305.061	D	8.046	7.828	0.217	3.815	99.57	0.42	0	0	0	0.01
2001	212	23	517	602.805	-305.061	D	7.01	6.923	0.087	1.902	99.96	0.03	0	0	0	0.01
2001	213	23	656	597.971	-312.292	D	7.432	7.422	0.01	2.935	99.94	0.03	0	0	0	0.01
2001	214	23	517	602.805	-305.061	D	6.942	6.942	0	1.94	99.86	0.01	0	0	0	0.01
2001	215	23	517	602.805	-305.061	D	7.614	7.602	0.012	3.32	99.85	0.14	0	0	0	0.02
2001	216	23	563	600.143	-314.135	D	8.375	8.139	0.236	4.511	99.87	0.12	0	0	0	0.01

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	217	23	1	596.558	-316.101	D	6.844	6.844	0	1.744	0	0	0	0	0	0
2001	218	23	1	596.558	-316.101	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2001	219	23	1	596.558	-316.101	D	7.474	7.474	0	3.046	0	0	0	0	0	0
2001	220	23	1	596.558	-316.101	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2001	221	23	1	596.558	-316.101	D	8.036	8.036	0	4.279	0	0	0	0	0	0
2001	222	23	517	602.805	-305.061	D	8.443	8.435	0.008	5.197	99.83	0.13	0	0	0	0.02
2001	223	23	624	596.324	-316.278	D	8.125	8.076	0.049	4.368	99.38	0.61	0	0	0	0.01
2001	224	23	603	598.68	-316.244	D	7.115	7.104	0.01	2.271	99.76	0.23	0	0	0	0.01
2001	225	23	603	598.68	-316.244	D	6.933	6.929	0.005	1.914	99.52	0.45	0	0	0	0.01
2001	226	23	1	596.558	-316.101	D	6.841	6.841	0	1.737	0	0	0	0	0	0
2001	227	23	37	597.36	-313.541	D	6.643	6.643	0	1.345	99.23	0.02	0	0	0	0.03
2001	228	23	517	602.805	-305.061	D	7.043	7.023	0.02	2.105	99.9	0.05	0	0	0	0.06
2001	229	23	517	602.805	-305.061	D	7.006	6.993	0.013	2.043	99.16	0.77	0	0	0	0.06
2001	230	23	517	602.805	-305.061	D	7.287	7.287	0	2.65	100.28	0.03	0	0	0	0.04
2001	231	23	624	596.324	-316.278	D	6.957	6.931	0.026	1.917	99.7	0.18	0	0	0	0.11
2001	232	23	624	596.324	-316.278	D	6.75	6.739	0.01	1.535	99.91	0.05	0	0	0	0.04
2001	233	23	662	598.404	-311.683	D	6.895	6.859	0.036	1.772	99.89	0.09	0	0	0	0.02
2001	234	23	517	602.805	-305.061	D	8.184	8.18	0.004	4.606	99.9	0.05	0	0	0	0.01
2001	235	23	149	599.232	-311.897	D	7.243	7.243	0	2.558	96.17	0.01	0	0	0	0.01
2001	236	23	1	596.558	-316.101	D	8.023	8.023	0	4.248	0	0	0	0	0	0
2001	237	23	1	596.558	-316.101	D	7.35	7.35	0	2.783	0	0	0	0	0	0
2001	238	23	694	602.12	-306.029	D	8.237	8.222	0.015	4.702	98.88	1.08	0	0	0	0.02
2001	239	23	624	596.324	-316.278	D	7.259	7.25	0.009	2.573	99.81	0.18	0	0	0	0.02
2001	240	23	624	596.324	-316.278	D	7.584	7.525	0.059	3.154	99.73	0.26	0	0	0	0.01
2001	241	23	517	602.805	-305.061	D	7.402	7.245	0.156	2.563	99.83	0.15	0	0	0	0.02
2001	242	23	517	602.805	-305.061	D	8.951	8.841	0.111	6.169	99.73	0.26	0	0	0	0
2001	243	23	517	602.805	-305.061	D	8.938	8.884	0.054	6.275	99.61	0.38	0	0	0	0
2001	244	23	637	596.267	-315.066	D	8.499	8.266	0.234	4.803	98.14	1.85	0	0	0	0.01
2001	245	23	624	596.324	-316.278	D	7.193	7.184	0.008	2.437	99.7	0.28	0	0	0	0.01
2001	246	23	222	600.034	-309.336	D	8.017	8.017	0	4.236	99.49	0.12	0	0	0	0.01
2001	247	23	517	602.805	-305.061	D	7.629	7.626	0.004	3.371	99.94	0.05	0	0	0	0.03
2001	248	23	517	602.805	-305.061	D	6.968	6.938	0.03	1.933	99.66	0.32	0	0	0	0.02
2001	249	23	517	602.805	-305.061	D	7.457	7.452	0.005	2.999	99.93	0.08	0	0	0	0.01
2001	250	23	1	596.558	-316.101	D	9.131	9.131	0	6.889	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	9.542	9.542	0	7.946	0	0	0	0	0	0
2001	252	23	517	602.805	-305.061	D	9.411	9.411	0	7.604	99.8	0.3	0	0	0	0.03
2001	253	23	637	596.267	-315.066	D	7.595	7.501	0.095	3.102	95.47	4.48	0	0	0	0.04
2001	254	23	517	602.805	-305.061	D	6.777	6.77	0.008	1.595	99.58	0.35	0	0	0	0.05
2001	255	23	1	596.558	-316.101	D	7.065	7.065	0	2.191	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	256	23	517	602.805	-305.061	D	7.241	7.241	0.001	2.554	99.85	0.03	0	0	0	0.04
2001	257	23	688	601.298	-307.191	D	6.912	6.881	0.032	1.817	99.52	0.47	0	0	0	0.02
2001	258	23	1	596.558	-316.101	D	6.636	6.636	0	1.33	0	0	0	0	0	0
2001	259	23	1	596.558	-316.101	D	6.702	6.702	0	1.46	0	0	0	0	0	0
2001	260	23	1	596.558	-316.101	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2001	261	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	262	23	517	602.805	-305.061	D	9.63	9.154	0.476	6.947	96.26	3.74	0	0	0	0
2001	263	23	517	602.805	-305.061	D	7.198	7.161	0.037	2.388	95.54	4.39	0	0	0	0.07
2001	264	23	694	602.12	-306.029	D	7.186	7.167	0.019	2.4	99.89	0.06	0	0	0	0.05
2001	265	23	624	596.324	-316.278	D	7.11	7.046	0.064	2.152	99.72	0.25	0	0	0	0.04
2001	266	23	624	596.324	-316.278	D	7.259	7.232	0.027	2.535	99.31	0.66	0	0	0	0.02
2001	267	23	514	602.766	-305.877	D	8.206	8.108	0.098	4.441	98.34	1.65	0	0	0	0.01
2001	268	23	1	596.558	-316.101	D	6.547	6.547	0	1.158	0	0	0	0	0	0
2001	269	23	517	602.805	-305.061	D	6.535	6.534	0.001	1.132	99.25	0.73	0	0	0	0.11
2001	270	23	517	602.805	-305.061	D	6.629	6.572	0.057	1.207	98.42	1.48	0	0	0	0.09
2001	271	23	545	603.234	-311.991	D	6.879	6.847	0.032	1.75	99.41	0.54	0	0	0	0.06
2001	272	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	273	23	1	596.558	-316.101	D	7.133	7.133	0	2.33	0	0	0	0	0	0
2001	274	23	517	602.805	-305.061	D	7.03	7.007	0.023	2.073	99.79	0.17	0	0	0	0.03
2001	275	23	517	602.805	-305.061	D	7.272	7.233	0.04	2.537	99.19	0.79	0	0	0	0.01
2001	276	23	1	596.558	-316.101	D	7.307	7.307	0	2.693	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.843	7.843	0	3.848	0	0	0	0	0	0
2001	278	23	637	596.267	-315.066	D	9.761	9.73	0.031	8.443	95.86	4.13	0	0	0	0
2001	279	23	517	602.805	-305.061	D	7.917	7.893	0.023	3.959	96.43	3.46	0	0	0	0.1
2001	280	23	637	596.267	-315.066	D	6.577	6.533	0.044	1.13	96.49	3.42	0	0	0	0.09
2001	281	23	637	596.267	-315.066	D	6.598	6.595	0.003	1.25	98.43	1.49	0	0	0	0.04
2001	282	23	1	596.558	-316.101	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	8.133	8.133	0	4.498	0	0	0	0	0	0
2001	284	23	1	596.558	-316.101	D	10.095	10.095	0	9.436	0	0	0	0	0	0
2001	285	23	662	598.404	-311.683	D	9.945	9.943	0.002	9.018	93.73	6.22	0	0	0	0
2001	286	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	287	23	1	596.558	-316.101	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2001	288	23	1	596.558	-316.101	D	6.542	6.542	0	1.147	0	0	0	0	0	0
2001	289	23	517	602.805	-305.061	D	7.622	7.561	0.06	3.233	89.25	10.72	0	0	0	0.02
2001	290	23	626	596.299	-315.88	D	6.504	6.492	0.012	1.05	92.94	6.97	0	0	0	0.09
2001	291	23	637	596.267	-315.066	D	6.501	6.5	0.002	1.066	97.32	2.66	0	0	0	0.05
2001	292	23	1	596.558	-316.101	D	6.578	6.578	0	1.218	0	0	0	0	0	0
2001	293	23	1	596.558	-316.101	D	6.945	6.945	0	1.947	0	0	0	0	0	0
2001	294	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	295	23	1	596.558	-316.101	D	7.564	7.564	0	3.239	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	9.63	9.63	0	8.178	0	0	0	0	0	0
2001	297	23	517	602.805	-305.061	D	9.651	9.627	0.025	8.168	97.73	2.24	0	0	0	0.03
2001	298	23	517	602.805	-305.061	D	6.873	6.866	0.007	1.788	96.42	3.55	0	0	0	0.03
2001	299	23	517	602.805	-305.061	D	6.471	6.471	0	1.011	95.38	3.95	0	0	0	0.08
2001	300	23	517	602.805	-305.061	D	6.492	6.487	0.005	1.04	90.4	9.48	0	0	0	0.11
2001	301	23	4	596.5	-315.356	D	6.508	6.508	0	1.081	98.68	1.63	0	0	0	0.06
2001	302	23	1	596.558	-316.101	D	6.499	6.499	0	1.065	0	0	0	0	0	0
2001	303	23	1	596.558	-316.101	D	6.516	6.516	0	1.098	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	6.796	6.796	0	1.647	0	0	0	0	0	0
2001	306	23	517	602.805	-305.061	D	8.954	8.951	0.003	6.439	96.77	3.25	0	0	0	0.01
2001	307	23	545	603.234	-311.991	D	8.778	8.519	0.259	5.395	93.89	6.1	0	0	0	0.01
2001	308	23	517	602.805	-305.061	D	6.595	6.594	0.001	1.248	99.39	0.49	0	0	0	0.03
2001	309	23	624	596.324	-316.278	D	7.945	7.859	0.086	3.882	97.6	2.38	0	0	0	0.02
2001	310	23	624	596.324	-316.278	D	6.477	6.476	0.001	1.02	99.21	0.67	0	0	0	0.05
2001	311	23	637	596.267	-315.066	D	6.535	6.517	0.018	1.1	99.06	0.9	0	0	0	0.03
2001	312	23	517	602.805	-305.061	D	6.796	6.781	0.015	1.618	99.43	0.52	0	0	0	0.05
2001	313	23	1	596.558	-316.101	D	6.673	6.673	0	1.403	0	0	0	0	0	0
2001	314	23	562	600.324	-313.988	D	6.649	6.643	0.005	1.345	92.02	7.85	0	0	0	0.1
2001	315	23	603	598.68	-316.244	D	6.744	6.732	0.012	1.52	87.43	12.38	0	0	0	0.17
2001	316	23	1	596.558	-316.101	D	6.562	6.562	0	1.186	0	0	0	0	0	0
2001	317	23	1	596.558	-316.101	D	6.567	6.567	0	1.196	0	0	0	0	0	0
2001	318	23	1	596.558	-316.101	D	7.603	7.603	0	3.322	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	6.973	6.973	0	2.004	0	0	0	0	0	0
2001	320	23	1	596.558	-316.101	D	7.309	7.309	0	2.697	0	0	0	0	0	0
2001	321	23	1	596.558	-316.101	D	7.623	7.623	0	3.366	0	0	0	0	0	0
2001	322	23	517	602.805	-305.061	D	7.959	7.956	0.004	4.098	97.44	2.5	0	0	0	0.01
2001	323	23	624	596.324	-316.278	D	7.913	7.858	0.054	3.881	86.25	13.73	0	0	0	0.02
2001	324	23	632	596.27	-315.421	D	6.477	6.474	0.003	1.016	77.06	22.56	0	0	0	0.39
2001	325	23	624	596.324	-316.278	D	6.487	6.476	0.011	1.02	88.5	11.35	0	0	0	0.16
2001	326	23	547	603.265	-312.487	D	6.521	6.52	0.001	1.105	94.57	5.07	0	0	0	0.1
2001	327	23	1	596.558	-316.101	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	9.336	9.336	0	7.411	0	0	0	0	0	0
2001	329	23	1	596.558	-316.101	D	6.663	6.663	0	1.383	0	0	0	0	0	0
2001	330	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	331	23	1	596.558	-316.101	D	7.453	7.453	0	3.002	0	0	0	0	0	0
2001	332	23	603	598.68	-316.244	D	8.726	8.706	0.02	5.842	87.96	11.98	0	0	0	0.05
2001	333	23	624	596.324	-316.278	D	10.099	10.097	0.001	9.443	94.42	5.63	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	334	23	603	598.68	-316.244	D	9.075	8.806	0.269	6.083	92.47	7.51	0	0	0	0.01
2001	335	23	1	596.558	-316.101	D	6.626	6.626	0	1.311	0	0	0	0	0	0
2001	336	23	1	596.558	-316.101	D	6.665	6.665	0	1.388	0	0	0	0	0	0
2001	337	23	1	596.558	-316.101	D	6.735	6.735	0	1.527	0	0	0	0	0	0
2001	338	23	1	596.558	-316.101	D	6.817	6.817	0	1.69	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	8.689	8.689	0	5.801	0	0	0	0	0	0
2001	340	23	517	602.805	-305.061	D	9.807	9.806	0.002	8.646	64.36	35.53	0	0	0	0.03
2001	341	23	517	602.805	-305.061	D	9.974	9.879	0.096	8.844	92.07	7.92	0	0	0	0.01
2001	342	23	517	602.805	-305.061	D	8.947	8.814	0.134	6.103	94.33	5.66	0	0	0	0
2001	343	23	1	596.558	-316.101	D	6.627	6.627	0	1.313	97.41	1.2	0	0	0	0.02
2001	344	23	632	596.27	-315.421	D	6.519	6.518	0.001	1.101	88.83	11.07	0	0	0	0.12
2001	345	23	637	596.267	-315.066	D	6.578	6.575	0.003	1.211	90.3	9.61	0	0	0	0.07
2001	346	23	1	596.558	-316.101	D	8.987	8.987	0	6.529	0	0	0	0	0	0
2001	347	23	517	602.805	-305.061	D	9.5	9.349	0.151	7.444	95.24	4.74	0	0	0	0.02
2001	348	23	193	600.016	-312.336	D	9.766	8.724	1.042	5.886	93.81	6.18	0	0	0	0.01
2001	349	23	517	602.805	-305.061	D	7.214	7.172	0.042	2.41	97.29	2.69	0	0	0	0.02
2001	350	23	694	602.12	-306.029	D	10.123	10.099	0.024	9.449	96.64	3.35	0	0	0	0
2001	351	23	624	596.324	-316.278	D	10.265	10.218	0.047	9.779	94.86	5.13	0	0	0	0
2001	352	23	461	602.269	-305.916	D	7.607	7.458	0.149	3.012	91.14	8.84	0	0	0	0.02
2001	353	23	632	596.27	-315.421	D	6.69	6.671	0.019	1.401	75.63	24.25	0	0	0	0.13
2001	354	23	662	598.404	-311.683	D	6.478	6.471	0.007	1.01	77.29	22.5	0	0	0	0.23
2001	355	23	517	602.805	-305.061	D	6.489	6.486	0.003	1.039	79.3	20.45	0	0	0	0.2
2001	356	23	1	596.558	-316.101	D	7.376	7.376	0	2.837	0	0	0	0	0	0
2001	357	23	1	596.558	-316.101	D	7.901	7.901	0	3.975	0	0	0	0	0	0
2001	358	23	517	602.805	-305.061	D	6.5	6.495	0.005	1.056	79.3	20.54	0	0	0	0.18
2001	359	23	557	601.32	-313.419	D	6.537	6.491	0.046	1.049	66.55	33.14	0	0	0	0.31
2001	360	23	517	602.805	-305.061	D	6.51	6.498	0.012	1.063	70.42	29.36	0	0	0	0.22
2001	361	23	1	596.558	-316.101	D	6.534	6.534	0	1.133	0	0	0	0	0	0
2001	362	23	1	596.558	-316.101	D	6.849	6.849	0	1.753	0	0	0	0	0	0
2001	363	23	624	596.324	-316.278	D	6.634	6.626	0.008	1.312	75.33	24.51	0	0	0	0.16
2001	364	23	632	596.27	-315.421	D	6.618	6.52	0.098	1.105	72.36	27.4	0	0	0	0.24
2001	365	23	517	602.805	-305.061	D	6.591	6.565	0.026	1.192	75.91	23.9	0	0	0	0.19
									1.042							
NORANDA									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	596.558	-316.101	D	7.097	7.097	0	2.257	0	0	0	0	0	0
2001	2	23	1	596.558	-316.101	D	7.176	7.176	0	2.42	0	0	0	0	0	0

Appendix M
Mingo
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YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	3	23	1	596.558	-316.101	D	7.744	7.744	0	3.63	0	0	0	0	0	0
2001	4	23	1	596.558	-316.101	D	7.818	7.818	0	3.792	0	0	0	0	0	0
2001	5	23	1	596.558	-316.101	D	7.729	7.729	0	3.596	0	0	0	0	0	0
2001	6	23	1	596.558	-316.101	D	7.228	7.228	0	2.527	0	0	0	0	0	0
2001	7	23	1	596.558	-316.101	D	7.192	7.192	0	2.452	0	0	0	0	0	0
2001	8	23	1	596.558	-316.101	D	7.373	7.373	0	2.831	0	0	0	0	0	0
2001	9	23	1	596.558	-316.101	D	7.366	7.366	0	2.816	0	0	0	0	0	0
2001	10	23	545	603.234	-311.991	D	7.448	7.427	0.021	2.946	93.65	0.31	0	0	0.61	5.44
2001	11	23	548	603.28	-312.734	D	8.762	7.923	0.839	4.026	98.57	0.16	0	0	0.21	1.06
2001	12	23	603	598.68	-316.244	D	10.519	9.4	1.118	7.577	98.82	0.15	0	0	0.12	0.92
2001	13	23	632	596.27	-315.421	D	9.505	8.916	0.589	6.353	89.73	0.82	0	0	1.46	7.99
2001	14	23	517	602.805	-305.061	D	9.759	9.759	0	8.521	98.46	0.11	0	0	0.02	1.62
2001	15	23	1	596.558	-316.101	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2001	16	23	1	596.558	-316.101	D	6.689	6.689	0	1.436	0	0	0	0	0	0
2001	17	23	1	596.558	-316.101	D	6.909	6.909	0	1.873	0	0	0	0	0	0
2001	18	23	1	596.558	-316.101	D	7.077	7.077	0	2.214	0	0	0	0	0	0
2001	19	23	1	596.558	-316.101	D	6.727	6.727	0	1.511	0	0	0	0	0	0
2001	20	23	1	596.558	-316.101	D	6.731	6.731	0	1.519	0	0	0	0	0	0
2001	21	23	519	602.836	-305.557	D	6.553	6.553	0	1.169	7.2	7.74	0	0	0.44	81.97
2001	22	23	261	601.086	-313.253	D	6.515	6.515	0	1.095	52.9	0.06	0	0	1.85	35.56
2001	23	23	1	596.558	-316.101	D	6.682	6.682	0	1.422	0	0	0	0	0	0
2001	24	23	1	596.558	-316.101	D	6.905	6.905	0	1.865	0	0	0	0	0	0
2001	25	23	1	596.558	-316.101	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	26	23	517	602.805	-305.061	D	6.523	6.498	0.025	1.063	26.56	0.78	0	0	9.66	63
2001	27	23	1	596.558	-316.101	D	6.636	6.636	0	1.331	0	0	0	0	0	0
2001	28	23	582	599.649	-315.031	D	6.556	6.51	0.046	1.085	66.18	0.33	0	0	3.95	29.54
2001	29	23	517	602.805	-305.061	D	8.196	8.175	0.022	4.593	59.41	0.61	0	0	5.44	34.53
2001	30	23	1	596.558	-316.101	D	9.187	9.187	0	7.032	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	6.895	6.895	0	1.845	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2001	33	23	1	596.558	-316.101	D	6.535	6.535	0	1.134	0	0	0	0	0	0
2001	34	23	517	602.805	-305.061	D	6.469	6.469	0	1.006	0.31	5.99	0	0	0.08	94.01
2001	35	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	36	23	1	596.558	-316.101	D	6.677	6.677	0	1.412	0	0	0	0	0	0
2001	37	23	1	596.558	-316.101	D	6.501	6.501	0	1.068	0	0	0	0	0	0
2001	38	23	603	598.68	-316.244	D	6.639	6.606	0.033	1.272	73.6	0.13	0	0	4.21	22.06
2001	39	23	1	596.558	-316.101	D	7.981	7.981	0	4.155	0	0	0	0	0	0
2001	40	23	1	596.558	-316.101	D	9.317	9.317	0	7.361	0	0	0	0	0	0
2001	41	23	1	596.558	-316.101	D	6.555	6.555	0	1.174	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	42	23	1	596.558	-316.101	D	6.47	6.47	0	1.007	0	0	0	0	0	0
2001	43	23	557	601.32	-313.419	D	6.59	6.52	0.07	1.105	31.84	0.78	0	0	8.52	58.86
2001	44	23	632	596.27	-315.421	D	7.735	7.622	0.113	3.364	90.92	0.15	0	0	2.08	6.85
2001	45	23	517	602.805	-305.061	D	10.219	10.218	0.001	9.779	94.74	0.77	0	0	0.1	4.23
2001	46	23	521	602.866	-306.052	D	8.729	8.714	0.015	5.86	92.7	0.91	0	0	0.19	6.21
2001	47	23	603	598.68	-316.244	D	6.713	6.712	0.002	1.48	76.38	0.69	0	0	1.64	21.22
2001	48	23	1	596.558	-316.101	D	6.499	6.499	0	1.064	0	0	0	0	0	0
2001	49	23	603	598.68	-316.244	D	6.47	6.469	0.001	1.006	78.18	0.28	0	0	3.02	18.55
2001	50	23	548	603.28	-312.734	D	6.503	6.473	0.03	1.014	83.05	0.21	0	0	0.94	15.8
2001	51	23	1	596.558	-316.101	D	6.625	6.625	0	1.31	0	0	0	0	0	0
2001	52	23	1	596.558	-316.101	D	6.539	6.539	0	1.141	0	0	0	0	0	0
2001	53	23	1	596.558	-316.101	D	7.301	7.301	0	2.68	67.49	0.01	0	0	6.93	21.74
2001	54	23	562	600.324	-313.988	D	6.741	6.712	0.029	1.481	63.46	0.16	0	0	8.2	28.19
2001	55	23	548	603.28	-312.734	D	8.021	8.006	0.014	4.211	25.82	0.19	0	0	15.38	58.61
2001	56	23	1	596.558	-316.101	D	8.437	8.437	0	5.201	0	0	0	0	0	0
2001	57	23	1	596.558	-316.101	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	58	23	625	596.311	-316.079	D	6.547	6.528	0.019	1.121	74.46	0.21	0	0	4.28	21.06
2001	59	23	624	596.324	-316.278	D	6.638	6.638	0	1.335	55.8	0.01	0	0	14.11	29.46
2001	60	23	548	603.28	-312.734	D	6.493	6.473	0.021	1.013	64.37	0.22	0	0	6.1	29.31
2001	61	23	632	596.27	-315.421	D	6.978	6.924	0.053	1.905	82.31	0.19	0	0	1.91	15.6
2001	62	23	1	596.558	-316.101	D	6.655	6.655	0	1.368	0	0	0	0	0	0
2001	63	23	1	596.558	-316.101	D	6.621	6.621	0	1.301	0	0	0	0	0	0
2001	64	23	1	596.558	-316.101	D	6.57	6.57	0	1.202	0	0	0	0	0	0
2001	65	23	1	596.558	-316.101	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	66	23	1	596.558	-316.101	D	6.477	6.477	0	1.022	0	0	0	0	0	0
2001	67	23	1	596.558	-316.101	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2001	68	23	1	596.558	-316.101	D	6.525	6.525	0	1.115	0	0	0	0	0	0
2001	69	23	548	603.28	-312.734	D	6.535	6.493	0.043	1.052	65.47	0.25	0	0	4.85	29.43
2001	70	23	517	602.805	-305.061	D	6.48	6.474	0.006	1.015	86.71	0.12	0	0	0.71	12.47
2001	71	23	517	602.805	-305.061	D	8.264	8.243	0.021	4.75	16.43	0.15	0	0	9.7	73.72
2001	72	23	1	596.558	-316.101	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2001	73	23	624	596.324	-316.278	D	6.495	6.485	0.01	1.037	69.99	0.04	0	0	2.74	27.23
2001	74	23	517	602.805	-305.061	D	9.237	8.834	0.403	6.153	92.55	0.69	0	0	0.69	6.07
2001	75	23	517	602.805	-305.061	D	8.697	8.613	0.084	5.619	98.27	0.19	0	0	0.05	1.49
2001	76	23	1	596.558	-316.101	D	6.791	6.791	0	1.638	0	0	0	0	0	0
2001	77	23	1	596.558	-316.101	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	78	23	1	596.558	-316.101	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	6.474	6.474	0	1.015	0	0	0	0	0	0
2001	80	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	81	23	1	596.558	-316.101	D	6.513	6.513	0	1.091	0	0	0	0	0	0
2001	82	23	603	598.68	-316.244	D	7.359	7.358	0.002	2.799	87.71	0.02	0	0	1.95	10.35
2001	83	23	603	598.68	-316.244	D	6.684	6.665	0.019	1.389	92.03	0.02	0	0	0.44	7.52
2001	84	23	1	596.558	-316.101	D	6.489	6.489	0	1.045	0	0	0	0	0	0
2001	85	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	86	23	604	598.599	-316.246	D	6.469	6.469	0	1.007	96.63	0.01	0	0	1.21	2.22
2001	87	23	517	602.805	-305.061	D	6.553	6.469	0.084	1.005	79.79	0.16	0	0	4.08	15.96
2001	88	23	632	596.27	-315.421	D	7.314	7.169	0.144	2.406	94.1	0.24	0	0	0.82	4.84
2001	89	23	281	600.703	-308.285	D	8.757	8.757	0	5.965	91.08	0.01	0	0	1.93	4.57
2001	90	23	632	596.27	-315.421	D	8.582	8.559	0.022	5.491	99.01	0.05	0	0	0.09	0.83
2001	91	23	517	602.805	-305.061	D	7.062	7.057	0.005	2.174	98.59	0.07	0	0	0.03	1.29
2001	92	23	557	601.32	-313.419	D	7.072	7.009	0.064	2.076	28.14	0.19	0	0	11.77	59.9
2001	93	23	603	598.68	-316.244	D	9.634	9.416	0.218	7.617	86.62	1.14	0	0	1.61	10.63
2001	94	23	624	596.324	-316.278	D	8.264	8.143	0.122	4.52	99.21	0.02	0	0	0.05	0.73
2001	95	23	557	601.32	-313.419	D	7.251	7.218	0.033	2.506	70.87	0.43	0	0	6.16	22.54
2001	96	23	1	596.558	-316.101	D	8.925	8.925	0	6.376	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	6.895	6.895	0	1.846	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.116	7.116	0	2.295	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.053	7.053	0	2.166	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.448	7.448	0	2.991	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	9.215	9.215	0	7.101	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.38	7.38	0	2.846	0	0	0	0	0	0
2001	103	23	1	596.558	-316.101	D	6.546	6.546	0	1.155	0	0	0	0	0	0
2001	104	23	548	603.28	-312.734	D	6.605	6.604	0.001	1.269	1.29	0.68	0	0	2.11	95.97
2001	105	23	517	602.805	-305.061	D	7.605	7.604	0	3.326	94.91	0.01	0	0	0.21	5.17
2001	106	23	1	596.558	-316.101	D	6.605	6.605	0	1.27	0	0	0	0	0	0
2001	107	23	1	596.558	-316.101	D	6.477	6.477	0	1.022	0	0	0	0	0	0
2001	108	23	1	596.558	-316.101	D	6.479	6.479	0	1.025	0	0	0	0	0	0
2001	109	23	1	596.558	-316.101	D	6.495	6.495	0	1.056	0	0	0	0	0	0
2001	110	23	1	596.558	-316.101	D	6.79	6.79	0	1.636	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.389	7.389	0	2.866	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.362	7.362	0	2.809	0	0	0	0	0	0
2001	114	23	1	596.558	-316.101	D	6.52	6.52	0	1.104	0	0	0	0	0	0
2001	115	23	1	596.558	-316.101	D	6.477	6.477	0	1.022	0	0	0	0	0	0
2001	116	23	557	601.32	-313.419	D	6.698	6.53	0.168	1.125	7.42	0.13	0	0	13.26	79.19
2001	117	23	1	596.558	-316.101	D	6.69	6.69	0	1.437	0	0	0	0	0	0
2001	118	23	548	603.28	-312.734	D	6.693	6.664	0.029	1.386	89.27	0	0	0	1.21	9.51
2001	119	23	624	596.324	-316.278	D	6.676	6.596	0.08	1.252	91.36	0	0	0	1.62	7.02

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	120	23	557	601.32	-313.419	D	6.837	6.718	0.119	1.492	31.25	0.06	0	0	10.99	57.69
2001	121	23	1	596.558	-316.101	D	6.826	6.826	0	1.708	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.186	7.186	0	2.441	0	0	0	0	0	0
2001	123	23	517	602.805	-305.061	D	6.78	6.77	0.01	1.596	4.46	0.52	0	0	7.63	87.39
2001	124	23	517	602.805	-305.061	D	6.954	6.952	0.003	1.96	2.37	0.86	0	0	3.8	92.99
2001	125	23	537	603.112	-310.012	D	7.147	6.938	0.208	1.933	24.33	0.23	0	0	10.82	64.61
2001	126	23	626	596.299	-315.88	D	7.907	7.82	0.087	3.797	39.06	0.59	0	0	10.85	49.49
2001	127	23	517	602.805	-305.061	D	7.723	7.707	0.016	3.547	18.67	2.11	0	0	5.59	73.64
2001	128	23	1	596.558	-316.101	D	6.916	6.916	0	1.887	0	0	0	0	0	0
2001	129	23	603	598.68	-316.244	D	6.515	6.515	0	1.094	68.53	0.01	0	0	9.91	21.01
2001	130	23	548	603.28	-312.734	D	6.577	6.57	0.006	1.203	94.6	0	0	0	0.56	4.85
2001	131	23	517	602.805	-305.061	D	7.48	7.48	0	3.058	95.19	0	0	0	0.27	4.58
2001	132	23	1	596.558	-316.101	D	8.057	8.057	0	4.326	0	0	0	0	0	0
2001	133	23	1	596.558	-316.101	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	134	23	517	602.805	-305.061	D	6.592	6.591	0.001	1.243	6.19	0.63	0	0	0.8	92.4
2001	135	23	548	603.28	-312.734	D	6.937	6.937	0	1.93	98.54	0	0	0	0.07	0.51
2001	136	23	1	596.558	-316.101	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.223	7.223	0	2.516	0	0	0	0	0	0
2001	138	23	1	596.558	-316.101	D	7.412	7.412	0	2.914	0	0	0	0	0	0
2001	139	23	547	603.265	-312.487	D	8.029	8.019	0.009	4.24	95.38	0.06	0	0	0.73	3.82
2001	140	23	548	603.28	-312.734	D	7.303	7.301	0.001	2.681	98.19	0	0	0	0.34	1.37
2001	141	23	545	603.234	-311.991	D	8.602	8.602	0	5.592	78.08	0	0	0	0.06	1.33
2001	142	23	1	596.558	-316.101	D	6.575	6.575	0	1.213	0	0	0	0	0	0
2001	143	23	1	596.558	-316.101	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	144	23	1	596.558	-316.101	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	145	23	1	596.558	-316.101	D	6.601	6.601	0	1.263	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	6.634	6.634	0	1.327	0	0	0	0	0	0
2001	147	23	1	596.558	-316.101	D	6.582	6.582	0	1.225	0	0	0	0	0	0
2001	148	23	603	598.68	-316.244	D	6.773	6.773	0	1.601	88.41	0.02	0	0	2.07	10
2001	149	23	624	596.324	-316.278	D	6.75	6.749	0.002	1.553	96.7	0	0	0	0.78	2.52
2001	150	23	626	596.299	-315.88	D	7.717	7.573	0.144	3.259	53.43	0.13	0	0	6.12	40.31
2001	151	23	583	599.621	-315.062	D	8.72	8.688	0.032	5.799	43.41	0.83	0	0	10.7	45.05
2001	152	23	517	602.805	-305.061	D	6.984	6.983	0	2.024	93.55	0	0	0	0.18	6.33
2001	153	23	1	596.558	-316.101	D	6.843	6.843	0	1.741	0	0	0	0	0	0
2001	154	23	517	602.805	-305.061	D	6.773	6.748	0.025	1.553	90.53	0.01	0	0	1.85	7.61
2001	155	23	517	602.805	-305.061	D	7.482	7.392	0.09	2.872	92.68	0.08	0	0	1.57	5.67
2001	156	23	186	600.15	-314.075	D	8.337	8.337	0	4.968	24.16	0	0	0	0.04	2.6
2001	157	23	1	596.558	-316.101	D	8.193	8.193	0	4.636	0	0	0	0	0	0
2001	158	23	517	602.805	-305.061	D	7.813	7.645	0.167	3.414	58.79	1.21	0	0	5.12	34.88

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	159	23	603	598.68	-316.244	D	6.959	6.953	0.006	1.963	98.33	0	0	0	0.21	1.48
2001	160	23	1	596.558	-316.101	D	6.637	6.637	0	1.333	0	0	0	0	0	0
2001	161	23	557	601.32	-313.419	D	6.729	6.656	0.073	1.37	91.89	0	0	0	1.95	6.16
2001	162	23	520	602.851	-305.804	D	6.921	6.885	0.035	1.826	97.24	0	0	0	0.24	2.52
2001	163	23	545	603.234	-311.991	D	7.074	7.007	0.066	2.073	97.57	0	0	0	0.5	1.94
2001	164	23	517	602.805	-305.061	D	7.505	7.479	0.027	3.056	97.93	0	0	0	0.3	1.77
2001	165	23	1	596.558	-316.101	D	7.35	7.35	0	2.784	0	0	0	0	0	0
2001	166	23	1	596.558	-316.101	D	8.84	8.84	0	6.168	0	0	0	0	0	0
2001	167	23	1	596.558	-316.101	D	6.554	6.554	0	1.171	0	0	0	0	0	0
2001	168	23	1	596.558	-316.101	D	6.63	6.63	0	1.319	54.9	0	0	0	13.84	22.95
2001	169	23	545	603.234	-311.991	D	6.93	6.882	0.047	1.82	95.88	0	0	0	0.64	3.48
2001	170	23	520	602.851	-305.804	D	6.901	6.895	0.005	1.846	2.27	0.18	0	0	3.31	94.26
2001	171	23	1	596.558	-316.101	D	7.198	7.198	0	2.465	0	0	0	0	0	0
2001	172	23	603	598.68	-316.244	D	7.932	7.865	0.067	3.895	98.44	0.01	0	0	0.36	1.19
2001	173	23	1	596.558	-316.101	D	6.956	6.956	0	1.969	0	0	0	0	0	0
2001	174	23	1	596.558	-316.101	D	6.708	6.708	0	1.472	0	0	0	0	0	0
2001	175	23	1	596.558	-316.101	D	6.821	6.821	0	1.698	37.63	0	0	0	1.18	17.34
2001	176	23	623	596.511	-316.262	D	6.751	6.751	0	1.558	99.16	0	0	0	0.04	0.43
2001	177	23	624	596.324	-316.278	D	6.805	6.785	0.02	1.625	94.45	0	0	0	1.29	4.25
2001	178	23	520	602.851	-305.804	D	7.704	7.147	0.557	2.36	95.95	0.02	0	0	0.63	3.41
2001	179	23	517	602.805	-305.061	D	7.44	7.369	0.072	2.822	73.14	0.67	0	0	2.16	24.04
2001	180	23	582	599.649	-315.031	D	8.858	8.232	0.627	4.724	98.23	0.01	0	0	0.47	1.28
2001	181	23	517	602.805	-305.061	D	7.573	7.57	0.003	3.25	66.07	0.51	0	0	3.98	29.42
2001	182	23	517	602.805	-305.061	D	8.699	8.694	0.005	5.813	96.59	0.03	0	0	0.15	3.25
2001	183	23	517	602.805	-305.061	D	7.451	7.441	0.01	2.974	96.47	0.02	0	0	0.11	3.39
2001	184	23	548	603.28	-312.734	D	6.97	6.76	0.211	1.575	93.17	0.01	0	0	1.01	5.81
2001	185	23	545	603.234	-311.991	D	7.692	7.626	0.066	3.372	97.34	0	0	0	0.21	2.45
2001	186	23	1	596.558	-316.101	D	7.061	7.061	0	2.183	0	0	0	0	0	0
2001	187	23	1	596.558	-316.101	D	6.603	6.603	0	1.266	63.94	0	0	0	12.27	26.17
2001	188	23	517	602.805	-305.061	D	7.003	6.941	0.062	1.939	82.65	0	0	0	1.4	15.94
2001	189	23	1	596.558	-316.101	D	7.464	7.464	0	3.025	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.181	7.181	0	2.43	0	0	0	0	0	0
2001	191	23	1	596.558	-316.101	D	7.718	7.718	0	3.571	0	0	0	0	0	0
2001	192	23	1	596.558	-316.101	D	7.646	7.646	0	3.417	0	0	0	0	0	0
2001	193	23	1	596.558	-316.101	D	6.802	6.802	0	1.66	0	0	0	0	0	0
2001	194	23	1	596.558	-316.101	D	6.668	6.668	0	1.395	0	0	0	0	0	0
2001	195	23	1	596.558	-316.101	D	6.647	6.647	0	1.352	0	0	0	0	0	0
2001	196	23	624	596.324	-316.278	D	6.648	6.628	0.021	1.314	87.89	0	0	0	2.97	9.13
2001	197	23	557	601.32	-313.419	D	6.982	6.879	0.104	1.813	67.09	0.04	0	0	5.37	27.51

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	198	23	1	596.558	-316.101	D	9.096	9.096	0	6.802	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.762	7.762	0	3.669	0	0	0	0	0	0
2001	200	23	1	596.558	-316.101	D	9.024	9.024	0	6.622	0	0	0	0	0	0
2001	201	23	521	602.866	-306.052	D	8.455	8.452	0.003	5.237	98.76	0	0	0	0.1	1.09
2001	202	23	548	603.28	-312.734	D	8.326	8.294	0.031	4.869	99.31	0.02	0	0	0.02	0.64
2001	203	23	624	596.324	-316.278	D	9.068	8.202	0.866	4.656	98.87	0.01	0	0	0.13	0.99
2001	204	23	517	602.805	-305.061	D	7.777	7.714	0.063	3.564	98.58	0	0	0	0.28	1.13
2001	205	23	515	602.747	-305.629	D	7.241	7.241	0	2.553	92.08	0	0	0	0.55	7.24
2001	206	23	516	602.728	-305.38	D	7.706	7.706	0	3.546	93.32	0	0	0	0.26	5.17
2001	207	23	522	602.882	-306.299	D	8.763	8.738	0.026	5.918	74.8	1.07	0	0	2.86	21.27
2001	208	23	548	603.28	-312.734	D	9.288	8.783	0.504	6.029	99.02	0.01	0	0	0.11	0.87
2001	209	23	545	603.234	-311.991	D	9.558	8.672	0.886	5.76	99.4	0.01	0	0	0.04	0.54
2001	210	23	548	603.28	-312.734	D	8.799	8.783	0.016	6.029	99.51	0	0	0	0.01	0.47
2001	211	23	603	598.68	-316.244	D	8.05	7.872	0.178	3.912	95.74	0.08	0	0	0.65	3.53
2001	212	23	557	601.32	-313.419	D	7.246	6.881	0.365	1.817	59.71	0.02	0	0	5.77	34.49
2001	213	23	626	596.299	-315.88	D	7.513	7.422	0.091	2.935	60.31	0.4	0	0	6.6	32.69
2001	214	23	548	603.28	-312.734	D	7.119	6.956	0.163	1.968	39.71	0.02	0	0	8.2	52.07
2001	215	23	517	602.805	-305.061	D	7.615	7.602	0.013	3.32	81.65	0.01	0	0	1.04	17.3
2001	216	23	1	596.558	-316.101	D	8.123	8.123	0	4.475	0	0	0	0	0	0
2001	217	23	1	596.558	-316.101	D	6.844	6.844	0	1.744	0	0	0	0	0	0
2001	218	23	603	598.68	-316.244	D	6.97	6.966	0.004	1.989	61.46	0	0	0	13.19	25.34
2001	219	23	1	596.558	-316.101	D	7.474	7.474	0	3.046	0	0	0	0	0	0
2001	220	23	624	596.324	-316.278	D	8.075	8.07	0.005	4.354	98.68	0	0	0	0.14	1.19
2001	221	23	548	603.28	-312.734	D	8.17	8.082	0.089	4.382	99.35	0.01	0	0	0.03	0.61
2001	222	23	520	602.851	-305.804	D	8.435	8.435	0	5.197	98.28	0	0	0	0.1	1.43
2001	223	23	603	598.68	-316.244	D	8.077	8.076	0.001	4.368	96.51	0	0	0	0.39	3.07
2001	224	23	603	598.68	-316.244	D	7.121	7.104	0.017	2.271	98	0.03	0	0	0.16	1.81
2001	225	23	603	598.68	-316.244	D	6.933	6.929	0.004	1.914	97.93	0.01	0	0	0.09	1.93
2001	226	23	1	596.558	-316.101	D	6.841	6.841	0	1.737	0	0	0	0	0	0
2001	227	23	548	603.28	-312.734	D	6.684	6.646	0.038	1.351	98.18	0	0	0	0.53	1.29
2001	228	23	517	602.805	-305.061	D	7.053	7.023	0.03	2.105	96.32	0	0	0	0.21	3.47
2001	229	23	1	596.558	-316.101	D	6.953	6.953	0	1.963	0	0	0	0	0	0
2001	230	23	548	603.28	-312.734	D	7.308	7.296	0.011	2.67	97.52	0	0	0	0.11	2.36
2001	231	23	1	596.558	-316.101	D	6.931	6.931	0	1.917	0	0	0	0	0	0
2001	232	23	603	598.68	-316.244	D	6.748	6.739	0.008	1.535	91.65	0	0	0	1.61	6.76
2001	233	23	520	602.851	-305.804	D	7.051	6.859	0.193	1.773	88.82	0.01	0	0	1.8	9.38
2001	234	23	545	603.234	-311.991	D	8.13	8.128	0.002	4.488	99.26	0	0	0	0.03	0.61
2001	235	23	1	596.558	-316.101	D	7.248	7.248	0	2.57	57.31	0	0	0	0.51	6.15
2001	236	23	557	601.32	-313.419	D	8.156	7.951	0.206	4.087	58.8	0.7	0	0	5.3	35.2

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	237	23	517	602.805	-305.061	D	7.39	7.386	0.004	2.858	33.84	0.07	0	0	3.55	62.55
2001	238	23	1	596.558	-316.101	D	8.139	8.139	0	4.512	0	0	0	0	0	0
2001	239	23	623	596.511	-316.262	D	7.25	7.25	0	2.573	95.07	0	0	0	0.82	4.35
2001	240	23	603	598.68	-316.244	D	7.548	7.525	0.023	3.154	96.32	0.01	0	0	0.12	3.55
2001	241	23	548	603.28	-312.734	D	7.136	7.132	0.003	2.329	98.22	0	0	0	0.13	1.64
2001	242	23	545	603.234	-311.991	D	8.824	8.81	0.015	6.093	99.65	0.01	0	0	0.01	0.33
2001	243	23	1	596.558	-316.101	D	8.837	8.837	0	6.161	0	0	0	0	0	0
2001	244	23	603	598.68	-316.244	D	8.283	8.266	0.017	4.803	97.74	0	0	0	0.37	1.89
2001	245	23	624	596.324	-316.278	D	7.232	7.184	0.048	2.437	98.3	0.01	0	0	0.19	1.51
2001	246	23	624	596.324	-316.278	D	7.87	7.869	0.001	3.905	98.87	0	0	0	0.07	0.89
2001	247	23	108	598.468	-311.706	D	7.624	7.623	0	3.367	99.23	0	0	0	0.03	0.23
2001	248	23	4	596.5	-315.356	D	6.919	6.919	0	1.894	97.8	0	0	0	0.02	0.36
2001	249	23	621	596.885	-316.228	D	7.544	7.402	0.142	2.892	21.43	0.13	0	0	12.03	66.4
2001	250	23	1	596.558	-316.101	D	9.131	9.131	0	6.889	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	9.542	9.542	0	7.946	0	0	0	0	0	0
2001	252	23	517	602.805	-305.061	D	9.411	9.411	0	7.604	0.03	26.7	0	0	0	70.52
2001	253	23	1	596.558	-316.101	D	7.501	7.501	0	3.102	0	0	0	0	0	0
2001	254	23	1	596.558	-316.101	D	6.775	6.775	0	1.605	0	0	0	0	0	0
2001	255	23	1	596.558	-316.101	D	7.065	7.065	0	2.191	0	0	0	0	0	0
2001	256	23	1	596.558	-316.101	D	7.199	7.199	0	2.466	0	0	0	0	0	0
2001	257	23	1	596.558	-316.101	D	6.873	6.873	0	1.802	0	0	0	0	0	0
2001	258	23	1	596.558	-316.101	D	6.636	6.636	0	1.33	0	0	0	0	0	0
2001	259	23	631	596.276	-315.551	D	6.702	6.702	0	1.46	37.01	0	0	0	18.03	28.06
2001	260	23	632	596.27	-315.421	D	7.248	7.081	0.167	2.223	90.67	0.1	0	0	1.48	7.75
2001	261	23	545	603.234	-311.991	D	7.542	7.522	0.02	3.148	97.53	0	0	0	0.1	2.36
2001	262	23	517	602.805	-305.061	D	9.154	9.154	0	6.947	97.62	0	0	0	0.02	0.32
2001	263	23	1	596.558	-316.101	D	7.114	7.114	0	2.292	0	0	0	0	0	0
2001	264	23	1	596.558	-316.101	D	7.134	7.134	0	2.332	0	0	0	0	0	0
2001	265	23	1	596.558	-316.101	D	7.046	7.046	0	2.152	0	0	0	0	0	0
2001	266	23	557	601.32	-313.419	D	7.433	7.23	0.203	2.532	82.67	0.13	0	0	3.12	14.08
2001	267	23	545	603.234	-311.991	D	8.075	8.074	0	4.365	98.67	0.01	0	0	0.04	1.27
2001	268	23	1	596.558	-316.101	D	6.547	6.547	0	1.158	0	0	0	0	0	0
2001	269	23	1	596.558	-316.101	D	6.531	6.531	0	1.126	0	0	0	0	0	0
2001	270	23	1	596.558	-316.101	D	6.568	6.568	0	1.198	0	0	0	0	0	0
2001	271	23	1	596.558	-316.101	D	6.827	6.827	0	1.71	0	0	0	0	0	0
2001	272	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	273	23	1	596.558	-316.101	D	7.133	7.133	0	2.33	0	0	0	0	0	0
2001	274	23	1	596.558	-316.101	D	7.005	7.005	0	2.068	0	0	0	0	0	0
2001	275	23	1	596.558	-316.101	D	7.187	7.187	0	2.442	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	276	23	1	596.558	-316.101	D	7.307	7.307	0	2.693	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.843	7.843	0	3.848	0	0	0	0	0	0
2001	278	23	517	602.805	-305.061	D	9.843	9.843	0	8.747	84.78	4.55	0	0	0.06	10.13
2001	279	23	1	596.558	-316.101	D	7.63	7.63	0	3.381	0	0	0	0	0	0
2001	280	23	624	596.324	-316.278	D	6.583	6.533	0.051	1.13	86.39	0.02	0	0	3.01	10.58
2001	281	23	632	596.27	-315.421	D	6.686	6.595	0.091	1.25	68.95	0.05	0	0	6.97	24.02
2001	282	23	517	602.805	-305.061	D	6.924	6.924	0	1.903	0.01	0.68	0	0	0	100.67
2001	283	23	1	596.558	-316.101	D	8.133	8.133	0	4.498	0	0	0	0	0	0
2001	284	23	603	598.68	-316.244	D	10.426	10.095	0.331	9.436	98.34	0.21	0	0	0.28	1.17
2001	285	23	624	596.324	-316.278	D	10.438	9.943	0.495	9.018	98.51	0.14	0	0	0.34	1.01
2001	286	23	557	601.32	-313.419	D	10.302	10.218	0.084	9.779	51.18	2.4	0	0	8.85	37.57
2001	287	23	515	602.747	-305.629	D	8.847	8.847	0	6.185	50.36	18.01	0	0	0.05	23.18
2001	288	23	211	600.245	-312.069	D	6.556	6.543	0.013	1.149	67.31	0.03	0	0	5.91	26.74
2001	289	23	517	602.805	-305.061	D	7.681	7.561	0.12	3.233	98.24	0.15	0	0	0.02	1.58
2001	290	23	1	596.558	-316.101	D	6.492	6.492	0	1.05	0	0	0	0	0	0
2001	291	23	545	603.234	-311.991	D	6.528	6.499	0.029	1.064	85.6	0.2	0	0	0.89	13.32
2001	292	23	1	596.558	-316.101	D	6.578	6.578	0	1.218	0	0	0	0	0	0
2001	293	23	1	596.558	-316.101	D	6.945	6.945	0	1.947	0	0	0	0	0	0
2001	294	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.564	7.564	0	3.239	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	9.63	9.63	0	8.178	0	0	0	0	0	0
2001	297	23	1	596.558	-316.101	D	9.546	9.546	0	7.957	0	0	0	0	0	0
2001	298	23	1	596.558	-316.101	D	6.813	6.813	0	1.68	0	0	0	0	0	0
2001	299	23	1	596.558	-316.101	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	300	23	1	596.558	-316.101	D	6.485	6.485	0	1.036	0	0	0	0	0	0
2001	301	23	557	601.32	-313.419	D	6.54	6.507	0.033	1.08	52.91	0.35	0	0	9.83	36.91
2001	302	23	637	596.267	-315.066	D	6.5	6.499	0	1.065	90.02	0.07	0	0	0.25	9.48
2001	303	23	1	596.558	-316.101	D	6.516	6.516	0	1.098	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	6.796	6.796	0	1.647	0	0	0	0	0	0
2001	306	23	1	596.558	-316.101	D	8.756	8.756	0	5.963	0	0	0	0	0	0
2001	307	23	1	596.558	-316.101	D	8.537	8.537	0	5.438	0	0	0	0	0	0
2001	308	23	1	596.558	-316.101	D	6.593	6.593	0	1.246	0	0	0	0	0	0
2001	309	23	1	596.558	-316.101	D	7.859	7.859	0	3.882	0	0	0	0	0	0
2001	310	23	603	598.68	-316.244	D	6.478	6.476	0.002	1.02	95	0	0	0	0.78	4.22
2001	311	23	557	601.32	-313.419	D	6.748	6.515	0.233	1.095	45.21	0.43	0	0	5.9	48.46
2001	312	23	517	602.805	-305.061	D	6.791	6.781	0.009	1.618	91.56	0.01	0	0	0.14	8.28
2001	313	23	1	596.558	-316.101	D	6.673	6.673	0	1.403	14.93	0.02	0	0	0.14	12.59
2001	314	23	1	596.558	-316.101	D	6.637	6.637	0	1.334	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	315	23	1	596.558	-316.101	D	6.732	6.732	0	1.52	0	0	0	0	0	0
2001	316	23	1	596.558	-316.101	D	6.562	6.562	0	1.186	0	0	0	0	0	0
2001	317	23	557	601.32	-313.419	D	6.598	6.566	0.032	1.194	32.58	0.11	0	0	15.2	52.11
2001	318	23	1	596.558	-316.101	D	7.603	7.603	0	3.322	0	0	0	0	0	0
2001	319	23	517	602.805	-305.061	D	7.094	6.982	0.111	2.022	23.06	1.33	0	0	9.1	66.51
2001	320	23	548	603.28	-312.734	D	7.305	7.304	0.002	2.685	64.71	0.15	0	0	1.08	34.09
2001	321	23	603	598.68	-316.244	D	7.63	7.623	0.007	3.366	92.66	0.06	0	0	1	6.25
2001	322	23	557	601.32	-313.419	D	8.148	7.933	0.215	4.048	62.34	2.26	0	0	5.63	29.77
2001	323	23	517	602.805	-305.061	D	7.864	7.864	0	3.894	95.34	0.01	0	0	0.06	4.11
2001	324	23	1	596.558	-316.101	D	6.474	6.474	0	1.016	0	0	0	0	0	0
2001	325	23	548	603.28	-312.734	D	6.478	6.477	0.001	1.022	6.5	3.19	0	0	1.35	89.08
2001	326	23	548	603.28	-312.734	D	6.52	6.52	0	1.105	86.4	0.14	0	0	0.68	11.41
2001	327	23	517	602.805	-305.061	D	6.89	6.889	0.001	1.833	0.23	3.46	0	0	0.13	96.06
2001	328	23	517	602.805	-305.061	D	9.342	9.342	0	7.427	0.05	7.88	0	0	0	92.58
2001	329	23	1	596.558	-316.101	D	6.663	6.663	0	1.383	0	0	0	0	0	0
2001	330	23	626	596.299	-315.88	D	7.176	6.956	0.219	1.97	11.03	0.55	0	0	12.48	75.94
2001	331	23	1	596.558	-316.101	D	7.453	7.453	0	3.002	0	0	0	0	0	0
2001	332	23	603	598.68	-316.244	D	8.707	8.706	0.001	5.842	98.13	0.12	0	0	0.12	1.27
2001	333	23	624	596.324	-316.278	D	10.101	10.097	0.004	9.443	83.36	0	0	0	6.4	10.25
2001	334	23	603	598.68	-316.244	D	8.807	8.806	0.001	6.083	58.2	0.01	0	0	15.43	26.47
2001	335	23	1	596.558	-316.101	D	6.626	6.626	0	1.311	0	0	0	0	0	0
2001	336	23	603	598.68	-316.244	D	6.788	6.665	0.123	1.388	82.22	0.07	0	0	2.37	15.35
2001	337	23	517	602.805	-305.061	D	6.752	6.734	0.018	1.524	91.71	0.04	0	0	0.31	7.94
2001	338	23	1	596.558	-316.101	D	6.817	6.817	0	1.69	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	8.689	8.689	0	5.801	0	0	0	0	0	0
2001	340	23	1	596.558	-316.101	D	9.828	9.828	0	8.705	0	0	0	0	0	0
2001	341	23	624	596.324	-316.278	D	9.968	9.927	0.041	8.975	97.97	0.24	0	0	0.09	1.69
2001	342	23	624	596.324	-316.278	D	9.419	8.799	0.62	6.067	99.15	0.09	0	0	0.1	0.65
2001	343	23	1	596.558	-316.101	D	6.627	6.627	0	1.313	0	0	0	0	0	0
2001	344	23	624	596.324	-316.278	D	6.531	6.518	0.013	1.101	81.39	0.1	0	0	5.01	13.49
2001	345	23	624	596.324	-316.278	D	6.661	6.575	0.087	1.211	89.53	0.15	0	0	0.96	9.36
2001	346	23	517	602.805	-305.061	D	9.116	8.916	0.2	6.353	68.38	1.35	0	0	3.63	26.64
2001	347	23	517	602.805	-305.061	D	9.351	9.349	0.002	7.444	47.39	11.22	0	0	0.85	40.51
2001	348	23	548	603.28	-312.734	D	8.739	8.724	0.015	5.886	98.69	0.13	0	0	0.15	1.03
2001	349	23	557	601.32	-313.419	D	7.439	7.121	0.319	2.305	28.83	1.23	0	0	11.3	58.64
2001	350	23	604	598.599	-316.246	D	10.469	10.1	0.369	9.451	98.41	0.07	0	0	0.34	1.18
2001	351	23	624	596.324	-316.278	D	10.433	10.218	0.215	9.779	99	0.01	0	0	0.3	0.68
2001	352	23	1	596.558	-316.101	D	7.315	7.315	0	2.709	0	0	0	0	0	0
2001	353	23	1	596.558	-316.101	D	6.671	6.671	0	1.401	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	354	23	1	596.558	-316.101	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	355	23	517	602.805	-305.061	D	6.548	6.486	0.062	1.039	66.67	0.24	0	0	4.73	28.35
2001	356	23	517	602.805	-305.061	D	7.399	7.399	0	2.885	97.97	0.01	0	0	0.3	3.47
2001	357	23	1	596.558	-316.101	D	7.901	7.901	0	3.975	0	0	0	0	0	0
2001	358	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	359	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	360	23	1	596.558	-316.101	D	6.497	6.497	0	1.06	0	0	0	0	0	0
2001	361	23	1	596.558	-316.101	D	6.534	6.534	0	1.133	0	0	0	0	0	0
2001	362	23	1	596.558	-316.101	D	6.849	6.849	0	1.753	0	0	0	0	0	0
2001	363	23	1	596.558	-316.101	D	6.626	6.626	0	1.312	0	0	0	0	0	0
2001	364	23	1	596.558	-316.101	D	6.52	6.52	0	1.105	0	0	0	0	0	0
2001	365	23	1	596.558	-316.101	D	6.562	6.562	0	1.187	0	0	0	0	0	0
									1.118							
MLC (REV)									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	596.558	-316.101	D	7.097	7.097	0.000	2.257	0	0	0	0	0	0
2001	2	23	547	603.265	-312.487	D	7.194	7.191	0.003	2.45	23.88	74.95	0	0	0	1.18
2001	3	23	548	603.28	-312.734	D	7.999	7.997	0.002	4.19	28.05	71.61	0	0	0	0.35
2001	4	23	1	596.558	-316.101	D	7.818	7.818	0.000	3.792	0	0	0	0	0	0
2001	5	23	1	596.558	-316.101	D	7.729	7.729	0.000	3.596	0	0	0	0	0	0
2001	6	23	1	596.558	-316.101	D	7.228	7.228	0.000	2.527	0	0	0	0	0	0
2001	7	23	1	596.558	-316.101	D	7.192	7.192	0.000	2.452	0	0	0	0	0	0
2001	8	23	1	596.558	-316.101	D	7.373	7.373	0.000	2.831	0	0	0	0	0	0
2001	9	23	548	603.28	-312.734	D	7.395	7.385	0.010	2.857	6.47	92.2	0	0	0	1.33
2001	10	23	545	603.234	-311.991	D	7.446	7.427	0.018	2.946	23.34	76.17	0	0	0	0.49
2001	11	23	517	602.805	-305.061	D	7.925	7.924	0.001	4.027	25.73	72.76	0	0	0	1.26
2001	12	23	1	596.558	-316.101	D	9.4	9.4	0.000	7.577	0	0	0	0	0	0
2001	13	23	1	596.558	-316.101	D	8.916	8.916	0.000	6.353	0	0	0	0	0	0
2001	14	23	1	596.558	-316.101	D	9.712	9.712	0.000	8.396	0	0	0	0	0	0
2001	15	23	1	596.558	-316.101	D	7.217	7.217	0.000	2.505	0	0	0	0	0	0
2001	16	23	517	602.805	-305.061	D	6.697	6.695	0.002	1.447	25.82	71.05	0	0	0	3.16
2001	17	23	637	596.267	-315.066	D	6.937	6.909	0.029	1.873	16.06	82.04	0	0	0	1.9
2001	18	23	517	602.805	-305.061	D	7.312	7.128	0.184	2.321	13.32	85.12	0	0	0	1.56
2001	19	23	548	603.28	-312.734	D	6.747	6.728	0.018	1.513	24.37	73.41	0	0	0	2.22
2001	20	23	1	596.558	-316.101	D	6.731	6.731	0.000	1.519	0	0	0	0	0	0
2001	21	23	1	596.558	-316.101	D	6.552	6.552	0.000	1.166	0	0	0	0	0	0
2001	22	23	1	596.558	-316.101	D	6.515	6.515	0.000	1.095	0	0	0	0	0	0
2001	23	23	1	596.558	-316.101	D	6.682	6.682	0.000	1.422	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	24	23	1	596.558	-316.101	D	6.905	6.905	0.000	1.865	0	0	0	0	0	0
2001	25	23	548	603.28	-312.734	D	6.615	6.587	0.028	1.235	8.05	88.35	0	0	0	3.59
2001	26	23	637	596.267	-315.066	D	6.498	6.498	0.000	1.062	15.58	81.96	0	0	0	2.03
2001	27	23	548	603.28	-312.734	D	6.634	6.633	0.000	1.326	21.11	75.25	0	0	0	2.98
2001	28	23	548	603.28	-312.734	D	6.519	6.509	0.010	1.083	20.97	77.18	0	0	0	1.85
2001	29	23	490	602.499	-305.648	D	8.175	8.175	0.000	4.593	24.35	68.87	0	0	0	0.98
2001	30	23	1	596.558	-316.101	D	9.187	9.187	0.000	7.032	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	6.895	6.895	0.000	1.845	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	6.569	6.569	0.000	1.2	0	0	0	0	0	0
2001	33	23	1	596.558	-316.101	D	6.535	6.535	0.000	1.134	0	0	0	0	0	0
2001	34	23	1	596.558	-316.101	D	6.469	6.469	0.000	1.006	0	0	0	0	0	0
2001	35	23	1	596.558	-316.101	D	6.492	6.492	0.000	1.051	0	0	0	0	0	0
2001	36	23	1	596.558	-316.101	D	6.677	6.677	0.000	1.412	0	0	0	0	0	0
2001	37	23	517	602.805	-305.061	D	6.502	6.502	0.000	1.07	48.11	42.92	0	0	0	9.57
2001	38	23	696	602.394	-305.643	D	6.624	6.617	0.007	1.293	27.84	69.39	0	0	0	2.76
2001	39	23	1	596.558	-316.101	D	7.981	7.981	0.000	4.155	0	0	0	0	0	0
2001	40	23	1	596.558	-316.101	D	9.317	9.317	0.000	7.361	0	0	0	0	0	0
2001	41	23	637	596.267	-315.066	D	6.561	6.555	0.006	1.174	16.26	80.37	0	0	0	3.36
2001	42	23	637	596.267	-315.066	D	6.47	6.47	0.000	1.007	15.73	81.64	0	0	0	2.54
2001	43	23	1	596.558	-316.101	D	6.521	6.521	0.000	1.107	0	0	0	0	0	0
2001	44	23	1	596.558	-316.101	D	7.622	7.622	0.000	3.364	0	0	0	0	0	0
2001	45	23	517	602.805	-305.061	D	10.218	10.218	0.000	9.779	43.46	56.24	0	0	0	0.13
2001	46	23	656	597.971	-312.292	D	8.912	8.818	0.095	6.113	33.18	65.75	0	0	0	1.07
2001	47	23	548	603.28	-312.734	D	6.739	6.718	0.021	1.492	37.78	60.17	0	0	0	2.04
2001	48	23	1	596.558	-316.101	D	6.499	6.499	0.000	1.064	0	0	0	0	0	0
2001	49	23	637	596.267	-315.066	D	6.495	6.469	0.026	1.006	7.23	88.85	0	0	0	3.92
2001	50	23	637	596.267	-315.066	D	6.473	6.473	0.000	1.014	21.44	77.45	0	0	0	1.23
2001	51	23	517	602.805	-305.061	D	6.629	6.626	0.003	1.312	37.64	57.87	0	0	0	4.51
2001	52	23	637	596.267	-315.066	D	6.547	6.539	0.008	1.141	31.9	65.23	0	0	0	2.87
2001	53	23	517	602.805	-305.061	D	7.349	7.33	0.018	2.741	10.09	87.98	0	0	0	1.94
2001	54	23	545	603.234	-311.991	D	6.724	6.721	0.003	1.499	33.76	63.89	0	0	0	2.35
2001	55	23	517	602.805	-305.061	D	8.106	8.106	0.000	4.438	34.9	63.43	0	0	0	1.45
2001	56	23	1	596.558	-316.101	D	8.437	8.437	0.000	5.201	0	0	0	0	0	0
2001	57	23	557	601.32	-313.419	D	6.525	6.506	0.018	1.078	8.4	86.6	0	0	0	5
2001	58	23	637	596.267	-315.066	D	6.529	6.528	0.000	1.121	27.95	70.31	0	0	0	1.97
2001	59	23	637	596.267	-315.066	D	6.639	6.638	0.001	1.335	25.4	70.7	0	0	0	3.79
2001	60	23	637	596.267	-315.066	D	6.503	6.473	0.030	1.014	17.02	80.2	0	0	0	2.77
2001	61	23	517	602.805	-305.061	D	6.895	6.895	0.000	1.846	30.54	67.37	0	0	0	0.73
2001	62	23	557	601.32	-313.419	D	6.657	6.653	0.004	1.365	19.33	78.54	0	0	0	2.15

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	63	23	548	603.28	-312.734	D	6.653	6.633	0.020	1.325	8.57	86.39	0	0	0	5.04
2001	64	23	1	596.558	-316.101	D	6.57	6.57	0.000	1.202	0	0	0	0	0	0
2001	65	23	1	596.558	-316.101	D	6.53	6.53	0.000	1.124	0	0	0	0	0	0
2001	66	23	1	596.558	-316.101	D	6.477	6.477	0.000	1.022	0	0	0	0	0	0
2001	67	23	1	596.558	-316.101	D	6.533	6.533	0.000	1.13	0	0	0	0	0	0
2001	68	23	517	602.805	-305.061	D	6.612	6.53	0.083	1.123	9.48	86.15	0	0	0	4.37
2001	69	23	548	603.28	-312.734	D	6.51	6.493	0.017	1.052	26.84	70.8	0	0	0	2.37
2001	70	23	517	602.805	-305.061	D	6.475	6.474	0.001	1.015	50.52	47.73	0	0	0	1.79
2001	71	23	107	598.487	-311.954	D	8.245	8.245	0.000	4.755	47.64	23.91	0	0	0	1.34
2001	72	23	1	596.558	-316.101	D	6.83	6.83	0.000	1.715	0	0	0	0	0	0
2001	73	23	517	602.805	-305.061	D	6.494	6.486	0.007	1.039	16.07	78.46	0	0	0	5.45
2001	74	23	325	601.181	-307.998	D	8.912	8.912	0.000	6.344	44.35	20.86	0	0	0	3.8
2001	75	23	520	602.851	-305.804	D	8.626	8.613	0.013	5.619	25.23	74.59	0	0	0	0.17
2001	76	23	1	596.558	-316.101	D	6.791	6.791	0.000	1.638	0	0	0	0	0	0
2001	77	23	637	596.267	-315.066	D	6.558	6.553	0.005	1.168	8.73	86.37	0	0	0	4.9
2001	78	23	1	596.558	-316.101	D	6.471	6.471	0.000	1.011	0	0	0	0	0	0
2001	79	23	637	596.267	-315.066	D	6.487	6.474	0.013	1.015	9.01	83.94	0	0	0	7.04
2001	80	23	557	601.32	-313.419	D	6.496	6.485	0.011	1.037	12.33	79.47	0	0	0	8.2
2001	81	23	632	596.27	-315.421	D	6.519	6.513	0.006	1.091	12.29	79.07	0	0	0	8.63
2001	82	23	548	603.28	-312.734	D	7.819	7.434	0.385	2.96	16.22	83.2	0	0	0	0.58
2001	83	23	545	603.234	-311.991	D	6.715	6.67	0.044	1.399	37.14	59.85	0	0	0	3.01
2001	84	23	1	596.558	-316.101	D	6.489	6.489	0.000	1.045	0	0	0	0	0	0
2001	85	23	1	596.558	-316.101	D	6.485	6.485	0.000	1.037	0	0	0	0	0	0
2001	86	23	517	602.805	-305.061	D	6.517	6.469	0.047	1.007	8.74	87.76	0	0	0	3.49
2001	87	23	517	602.805	-305.061	D	6.472	6.469	0.004	1.005	27.66	69.98	0	0	0	2.31
2001	88	23	461	602.269	-305.916	D	7.079	7.079	0.000	2.22	40.79	48.08	0	0	0	1.27
2001	89	23	1	596.558	-316.101	D	8.796	8.796	0.000	6.06	0	0	0	0	0	0
2001	90	23	517	602.805	-305.061	D	8.518	8.409	0.109	5.135	39.22	60.48	0	0	0	0.3
2001	91	23	520	602.851	-305.804	D	7.061	7.057	0.004	2.174	62.75	36.89	0	0	0	0.33
2001	92	23	1	596.558	-316.101	D	7.04	7.04	0.000	2.141	0	0	0	0	0	0
2001	93	23	1	596.558	-316.101	D	9.416	9.416	0.000	7.617	0	0	0	0	0	0
2001	94	23	1	596.558	-316.101	D	8.143	8.143	0.000	4.52	0	0	0	0	0	0
2001	95	23	1	596.558	-316.101	D	7.239	7.239	0.000	2.549	0	0	0	0	0	0
2001	96	23	1	596.558	-316.101	D	8.925	8.925	0.000	6.376	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	6.895	6.895	0.000	1.846	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.116	7.116	0.000	2.295	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.053	7.053	0.000	2.166	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.448	7.448	0.000	2.991	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	9.215	9.215	0.000	7.101	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	102	23	1	596.558	-316.101	D	7.38	7.38	0.000	2.846	0	0	0	0	0	0
2001	103	23	557	601.32	-313.419	D	6.553	6.543	0.010	1.15	33.36	48.59	0	0	0	18.04
2001	104	23	603	598.68	-316.244	D	6.612	6.611	0.001	1.281	86.83	9.48	0	0	0	3.73
2001	105	23	517	602.805	-305.061	D	7.605	7.604	0.000	3.326	90.99	7.2	0	0	0	2.11
2001	106	23	545	603.234	-311.991	D	6.605	6.605	0.000	1.271	90.58	5.88	0	0	0	1.8
2001	107	23	1	596.558	-316.101	D	6.477	6.477	0.000	1.022	0	0	0	0	0	0
2001	108	23	1	596.558	-316.101	D	6.479	6.479	0.000	1.025	0	0	0	0	0	0
2001	109	23	1	596.558	-316.101	D	6.495	6.495	0.000	1.056	0	0	0	0	0	0
2001	110	23	1	596.558	-316.101	D	6.79	6.79	0.000	1.636	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.389	7.389	0.000	2.866	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	8.597	8.597	0.000	5.581	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.362	7.362	0.000	2.809	0	0	0	0	0	0
2001	114	23	491	603.207	-311.591	D	6.52	6.52	0.000	1.104	37.39	15.71	0	0	0	6.21
2001	115	23	517	602.805	-305.061	D	6.481	6.477	0.004	1.023	22.08	69.74	0	0	0	8.18
2001	116	23	1	596.558	-316.101	D	6.536	6.536	0.000	1.135	0	0	0	0	0	0
2001	117	23	1	596.558	-316.101	D	6.69	6.69	0.000	1.437	0	0	0	0	0	0
2001	118	23	490	602.499	-305.648	D	6.676	6.676	0.000	1.409	86.62	1.79	0	0	0	2.53
2001	119	23	461	602.269	-305.916	D	6.586	6.586	0.000	1.234	92.87	1.5	0	0	0	1.67
2001	120	23	1	596.558	-316.101	D	6.721	6.721	0.000	1.497	0	0	0	0	0	0
2001	121	23	1	596.558	-316.101	D	6.826	6.826	0.000	1.708	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.186	7.186	0.000	2.441	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	6.778	6.778	0.000	1.612	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	6.933	6.933	0.000	1.921	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	6.946	6.946	0.000	1.948	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.82	7.82	0.000	3.797	0	0	0	0	0	0
2001	127	23	1	596.558	-316.101	D	7.56	7.56	0.000	3.229	0	0	0	0	0	0
2001	128	23	548	603.28	-312.734	D	6.958	6.951	0.007	1.959	59.27	33.3	0	0	0	7.45
2001	129	23	513	602.785	-306.126	D	6.517	6.514	0.004	1.092	89.2	7.16	0	0	0	3.59
2001	130	23	491	603.207	-311.591	D	6.575	6.574	0.001	1.21	94.11	3.23	0	0	0	2.4
2001	131	23	489	602.518	-305.896	D	7.48	7.48	0.000	3.058	95.58	1.14	0	0	0	1.41
2001	132	23	548	603.28	-312.734	D	8.044	8.041	0.003	4.291	53.76	37.23	0	0	0	8.96
2001	133	23	548	603.28	-312.734	D	6.526	6.525	0.001	1.115	58.98	27.94	0	0	0	12.97
2001	134	23	1	596.558	-316.101	D	6.592	6.592	0.000	1.244	90.98	5.43	0	0	0	3.22
2001	135	23	1	596.558	-316.101	D	6.924	6.924	0.000	1.904	0	0	0	0	0	0
2001	136	23	1	596.558	-316.101	D	6.896	6.896	0.000	1.848	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.223	7.223	0.000	2.516	0	0	0	0	0	0
2001	138	23	1	596.558	-316.101	D	7.412	7.412	0.000	2.914	0	0	0	0	0	0
2001	139	23	517	602.805	-305.061	D	8.209	8.095	0.114	4.412	22.42	76.82	0	0	0	0.77
2001	140	23	548	603.28	-312.734	D	7.306	7.301	0.005	2.681	82.43	11.9	0	0	0	5.64

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	141	23	461	602.269	-305.916	D	8.573	8.573	0.000	5.523	94.22	1.95	0	0	0	0.88
2001	142	23	1	596.558	-316.101	D	6.575	6.575	0.000	1.213	0	0	0	0	0	0
2001	143	23	1	596.558	-316.101	D	6.523	6.523	0.000	1.11	0	0	0	0	0	0
2001	144	23	1	596.558	-316.101	D	6.562	6.562	0.000	1.187	0	0	0	0	0	0
2001	145	23	1	596.558	-316.101	D	6.601	6.601	0.000	1.263	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	6.634	6.634	0.000	1.327	0	0	0	0	0	0
2001	147	23	1	596.558	-316.101	D	6.582	6.582	0.000	1.225	0	0	0	0	0	0
2001	148	23	517	602.805	-305.061	D	6.752	6.752	0.000	1.56	59.76	35.45	0	0	0	4.95
2001	149	23	517	602.805	-305.061	D	6.745	6.742	0.003	1.54	88.11	8.61	0	0	0	3.24
2001	150	23	517	602.805	-305.061	D	7.595	7.594	0.001	3.303	95.78	2.27	0	0	0	2.03
2001	151	23	1	596.558	-316.101	D	8.688	8.688	0.000	5.799	0	0	0	0	0	0
2001	152	23	1	596.558	-316.101	D	6.961	6.961	0.000	1.98	0	0	0	0	0	0
2001	153	23	1	596.558	-316.101	D	6.843	6.843	0.000	1.741	0	0	0	0	0	0
2001	154	23	681	600.53	-308.617	D	6.748	6.744	0.004	1.544	35.61	50.38	0	0	0	13.96
2001	155	23	517	602.805	-305.061	D	7.392	7.392	0.000	2.872	69.16	28.24	0	0	0	1.29
2001	156	23	1	596.558	-316.101	D	8.339	8.339	0.000	4.973	0	0	0	0	0	0
2001	157	23	1	596.558	-316.101	D	8.193	8.193	0.000	4.636	0	0	0	0	0	0
2001	158	23	521	602.866	-306.052	D	7.663	7.647	0.017	3.417	95.45	1.92	0	0	0	2.62
2001	159	23	632	596.27	-315.421	D	6.968	6.953	0.015	1.963	84.4	9.38	0	0	0	6.22
2001	160	23	637	596.267	-315.066	D	6.638	6.637	0.001	1.333	88.22	4.16	0	0	0	7.67
2001	161	23	517	602.805	-305.061	D	6.667	6.663	0.005	1.384	94.03	3.68	0	0	0	2.29
2001	162	23	623	596.511	-316.262	D	6.872	6.869	0.003	1.793	98.1	0.85	0	0	0	1.05
2001	163	23	517	602.805	-305.061	D	7.017	7.014	0.003	2.086	98.23	1.07	0	0	0	0.68
2001	164	23	517	602.805	-305.061	D	7.479	7.479	0.001	3.056	98.82	0.57	0	0	0	0.48
2001	165	23	1	596.558	-316.101	D	7.35	7.35	0.000	2.784	0	0	0	0	0	0
2001	166	23	1	596.558	-316.101	D	8.84	8.84	0.000	6.168	0	0	0	0	0	0
2001	167	23	1	596.558	-316.101	D	6.554	6.554	0.000	1.171	0	0	0	0	0	0
2001	168	23	1	596.558	-316.101	D	6.63	6.63	0.000	1.319	0	0	0	0	0	0
2001	169	23	545	603.234	-311.991	D	6.883	6.882	0.001	1.82	96.85	1.42	0	0	0	1.63
2001	170	23	674	599.777	-309.742	D	6.865	6.865	0.000	1.786	82.64	0.3	0	0	0	1.3
2001	171	23	517	602.805	-305.061	D	7.274	7.272	0.002	2.62	76.64	20.41	0	0	0	2.91
2001	172	23	517	602.805	-305.061	D	7.919	7.917	0.002	4.011	96.56	2.64	0	0	0	0.88
2001	173	23	521	602.866	-306.052	D	6.969	6.965	0.004	1.988	91.82	3.06	0	0	0	5.13
2001	174	23	517	602.805	-305.061	D	6.725	6.717	0.008	1.491	57.07	27.96	0	0	0	14.96
2001	175	23	548	603.28	-312.734	D	6.833	6.825	0.008	1.705	83.44	13.86	0	0	0	2.68
2001	176	23	624	596.324	-316.278	D	6.751	6.751	0.000	1.558	93.36	3.71	0	0	0	2.23
2001	177	23	1	596.558	-316.101	D	6.785	6.785	0.000	1.625	96.78	2.51	0	0	0	1.31
2001	178	23	107	598.487	-311.954	D	7.098	7.097	0.000	2.257	94.7	3.46	0	0	0	0.69
2001	179	23	461	602.269	-305.916	D	7.369	7.369	0.000	2.822	90.5	8.87	0	0	0	0.41

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	180	23	220	600.073	-309.833	D	8.199	8.199	0.000	4.648	94.89	0.65	0	0	0	0.46
2001	181	23	1	596.558	-316.101	D	7.515	7.515	0.000	3.134	0	0	0	0	0	0
2001	182	23	517	602.805	-305.061	D	8.694	8.694	0.000	5.813	91.55	7.68	0	0	0	0.95
2001	183	23	603	598.68	-316.244	D	7.456	7.42	0.036	2.931	76.29	22.98	0	0	0	0.73
2001	184	23	624	596.324	-316.278	D	6.795	6.777	0.017	1.61	97.4	1.52	0	0	0	1.09
2001	185	23	517	602.805	-305.061	D	7.629	7.625	0.004	3.37	98.26	1.08	0	0	0	0.68
2001	186	23	517	602.805	-305.061	D	7.055	7.055	0.000	2.171	91.96	1.38	0	0	0	6.62
2001	187	23	624	596.324	-316.278	D	6.605	6.603	0.003	1.266	89.29	3.1	0	0	0	7.58
2001	188	23	108	598.468	-311.706	D	6.937	6.934	0.002	1.925	97.64	0.8	0	0	0	1.54
2001	189	23	1	596.558	-316.101	D	7.464	7.464	0.000	3.025	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.181	7.181	0.000	2.43	0	0	0	0	0	0
2001	191	23	517	602.805	-305.061	D	7.917	7.806	0.111	3.765	57.85	39.97	0	0	0	2.19
2001	192	23	548	603.28	-312.734	D	7.663	7.653	0.011	3.43	92.4	4.35	0	0	0	3.26
2001	193	23	695	602.257	-305.836	D	6.931	6.926	0.005	1.908	86.15	12.56	0	0	0	1.28
2001	194	23	624	596.324	-316.278	D	6.67	6.668	0.002	1.395	96.12	2.61	0	0	0	1.2
2001	195	23	517	602.805	-305.061	D	6.654	6.647	0.007	1.352	78.6	13.12	0	0	0	8.27
2001	196	23	1	596.558	-316.101	D	6.628	6.628	0.000	1.314	0	0	0	0	0	0
2001	197	23	1	596.558	-316.101	D	6.873	6.873	0.000	1.802	0	0	0	0	0	0
2001	198	23	1	596.558	-316.101	D	9.096	9.096	0.000	6.802	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.762	7.762	0.000	3.669	0	0	0	0	0	0
2001	200	23	1	596.558	-316.101	D	9.024	9.024	0.000	6.622	0	0	0	0	0	0
2001	201	23	521	602.866	-306.052	D	8.453	8.452	0.001	5.237	96.81	2.47	0	0	0	0.68
2001	202	23	548	603.28	-312.734	D	8.337	8.294	0.043	4.869	87.7	11.65	0	0	0	0.65
2001	203	23	461	602.269	-305.916	D	8.331	8.321	0.010	4.931	96.08	3.58	0	0	0	0.32
2001	204	23	517	602.805	-305.061	D	7.721	7.714	0.007	3.564	94.94	4.72	0	0	0	0.34
2001	205	23	517	602.805	-305.061	D	7.242	7.241	0.002	2.553	98.32	1.29	0	0	0	0.45
2001	206	23	202	599.844	-310.101	D	7.735	7.734	0.001	3.607	96.04	3.36	0	0	0	0.29
2001	207	23	517	602.805	-305.061	D	8.742	8.741	0.001	5.927	89.95	9.18	0	0	0	0.71
2001	208	23	548	603.28	-312.734	D	8.792	8.783	0.009	6.029	82.56	17.15	0	0	0	0.29
2001	209	23	517	602.805	-305.061	D	8.672	8.663	0.009	5.739	88.32	11.4	0	0	0	0.25
2001	210	23	517	602.805	-305.061	D	8.733	8.732	0.001	5.905	91.68	7.74	0	0	0	0.24
2001	211	23	517	602.805	-305.061	D	7.843	7.828	0.014	3.815	82.88	16.28	0	0	0	0.83
2001	212	23	517	602.805	-305.061	D	6.93	6.923	0.007	1.902	98.19	0.81	0	0	0	0.99
2001	213	23	4	596.5	-315.356	D	7.422	7.422	0.000	2.935	98.02	0.54	0	0	0	0.7
2001	214	23	1	596.558	-316.101	D	6.962	6.962	0.000	1.981	0	0	0	0	0	0
2001	215	23	1	596.558	-316.101	D	7.509	7.509	0.000	3.119	0	0	0	0	0	0
2001	216	23	545	603.234	-311.991	D	7.983	7.981	0.002	4.155	83.2	13.98	0	0	0	2.84
2001	217	23	1	596.558	-316.101	D	6.844	6.844	0.000	1.744	0	0	0	0	0	0
2001	218	23	1	596.558	-316.101	D	6.966	6.966	0.000	1.989	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	219	23	1	596.558	-316.101	D	7.474	7.474	0.000	3.046	0	0	0	0	0	0
2001	220	23	637	596.267	-315.066	D	8.07	8.07	0.001	4.354	96.85	2.03	0	0	0	1.23
2001	221	23	517	602.805	-305.061	D	8.126	8.088	0.038	4.396	86.71	12.83	0	0	0	0.46
2001	222	23	517	602.805	-305.061	D	8.44	8.435	0.005	5.197	95.94	2.92	0	0	0	1.13
2001	223	23	626	596.299	-315.88	D	8.213	8.076	0.138	4.368	69.43	29.07	0	0	0	1.5
2001	224	23	637	596.267	-315.066	D	7.143	7.104	0.038	2.271	86.28	11.01	0	0	0	2.71
2001	225	23	517	602.805	-305.061	D	6.905	6.899	0.006	1.854	90.04	4.39	0	0	0	5.57
2001	226	23	637	596.267	-315.066	D	6.848	6.841	0.007	1.737	48.77	34.24	0	0	0	16.97
2001	227	23	632	596.27	-315.421	D	6.647	6.643	0.004	1.345	92.14	4.06	0	0	0	3.78
2001	228	23	517	602.805	-305.061	D	7.026	7.023	0.002	2.105	97.8	1.08	0	0	0	1.13
2001	229	23	1	596.558	-316.101	D	6.953	6.953	0.000	1.963	0	0	0	0	0	0
2001	230	23	1	596.558	-316.101	D	7.258	7.258	0.000	2.589	0	0	0	0	0	0
2001	231	23	1	596.558	-316.101	D	6.931	6.931	0.000	1.917	0	0	0	0	0	0
2001	232	23	517	602.805	-305.061	D	6.768	6.758	0.009	1.573	60.73	32.95	0	0	0	6.31
2001	233	23	517	602.805	-305.061	D	6.861	6.859	0.002	1.773	95.14	2.85	0	0	0	2
2001	234	23	520	602.851	-305.804	D	8.18	8.18	0.000	4.606	95.19	1.59	0	0	0	0.46
2001	235	23	1	596.558	-316.101	D	7.248	7.248	0.000	2.57	0	0	0	0	0	0
2001	236	23	1	596.558	-316.101	D	8.023	8.023	0.000	4.248	0	0	0	0	0	0
2001	237	23	1	596.558	-316.101	D	7.35	7.35	0.000	2.783	0	0	0	0	0	0
2001	238	23	1	596.558	-316.101	D	8.139	8.139	0.000	4.512	0	0	0	0	0	0
2001	239	23	637	596.267	-315.066	D	7.262	7.25	0.012	2.573	62.05	33.13	0	0	0	4.82
2001	240	23	565	599.921	-314.038	D	7.532	7.525	0.008	3.154	96.01	2.55	0	0	0	1.44
2001	241	23	517	602.805	-305.061	D	7.249	7.245	0.003	2.563	70.19	27.09	0	0	0	2.64
2001	242	23	517	602.805	-305.061	D	8.842	8.841	0.001	6.169	91.56	7.94	0	0	0	0.35
2001	243	23	1	596.558	-316.101	D	8.837	8.837	0.000	6.161	0	0	0	0	0	0
2001	244	23	656	597.971	-312.292	D	8.359	8.266	0.093	4.803	37.71	61.66	0	0	0	0.63
2001	245	23	624	596.324	-316.278	D	7.188	7.184	0.004	2.437	93.64	5.63	0	0	0	0.71
2001	246	23	694	602.12	-306.029	D	8.02	8.017	0.003	4.236	95.78	1.19	0	0	0	2.99
2001	247	23	637	596.267	-315.066	D	7.576	7.546	0.030	3.199	80.14	18.29	0	0	0	1.57
2001	248	23	517	602.805	-305.061	D	6.942	6.938	0.004	1.933	93.57	5.38	0	0	0	1.1
2001	249	23	517	602.805	-305.061	D	7.453	7.452	0.001	2.999	98.05	1.22	0	0	0	0.72
2001	250	23	1	596.558	-316.101	D	9.131	9.131	0.000	6.889	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	9.542	9.542	0.000	7.946	0	0	0	0	0	0
2001	252	23	1	596.558	-316.101	D	9.397	9.397	0.000	7.568	0	0	0	0	0	0
2001	253	23	548	603.28	-312.734	D	7.501	7.495	0.006	3.09	80.73	15.16	0	0	0	4.1
2001	254	23	637	596.267	-315.066	D	6.779	6.775	0.005	1.605	81.83	13.29	0	0	0	4.88
2001	255	23	517	602.805	-305.061	D	7.061	7.06	0.000	2.181	94.2	1.68	0	0	0	4.31
2001	256	23	545	603.234	-311.991	D	7.334	7.238	0.096	2.549	71.07	26.93	0	0	0	2
2001	257	23	624	596.324	-316.278	D	6.878	6.873	0.005	1.802	95.4	1.97	0	0	0	2.63

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	258	23	1	596.558	-316.101	D	6.636	6.636	0.000	1.33	0	0	0	0	0	0
2001	259	23	1	596.558	-316.101	D	6.702	6.702	0.000	1.46	0	0	0	0	0	0
2001	260	23	461	602.269	-305.916	D	7.06	7.06	0.000	2.181	75.02	16.89	0	0	0	1.09
2001	261	23	1	596.558	-316.101	D	7.459	7.459	0.000	3.013	0	0	0	0	0	0
2001	262	23	1	596.558	-316.101	D	9.122	9.122	0.000	6.867	0	0	0	0	0	0
2001	263	23	1	596.558	-316.101	D	7.114	7.114	0.000	2.292	0	0	0	0	0	0
2001	264	23	1	596.558	-316.101	D	7.134	7.134	0.000	2.332	0	0	0	0	0	0
2001	265	23	548	603.28	-312.734	D	7.054	7.047	0.007	2.153	83.19	11.47	0	0	0	5.34
2001	266	23	632	596.27	-315.421	D	7.24	7.232	0.009	2.535	78.18	20.36	0	0	0	1.45
2001	267	23	548	603.28	-312.734	D	8.035	8.031	0.004	4.267	45.94	49.72	0	0	0	4.33
2001	268	23	557	601.32	-313.419	D	6.578	6.548	0.030	1.159	12.5	79.25	0	0	0	8.25
2001	269	23	1	596.558	-316.101	D	6.531	6.531	0.000	1.126	0	0	0	0	0	0
2001	270	23	1	596.558	-316.101	D	6.568	6.568	0.000	1.198	0	0	0	0	0	0
2001	271	23	632	596.27	-315.421	D	6.845	6.827	0.018	1.71	34.7	54.06	0	0	0	11.24
2001	272	23	1	596.558	-316.101	D	6.956	6.956	0.000	1.97	0	0	0	0	0	0
2001	273	23	637	596.267	-315.066	D	7.138	7.133	0.005	2.33	84.92	10.52	0	0	0	4.53
2001	274	23	557	601.32	-313.419	D	7.036	7.007	0.029	2.072	22.7	72.01	0	0	0	5.29
2001	275	23	1	596.558	-316.101	D	7.187	7.187	0.000	2.442	0	0	0	0	0	0
2001	276	23	1	596.558	-316.101	D	7.307	7.307	0.000	2.693	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.843	7.843	0.000	3.848	0	0	0	0	0	0
2001	278	23	517	602.805	-305.061	D	9.964	9.843	0.121	8.747	29.47	70.37	0	0	0	0.16
2001	279	23	545	603.234	-311.991	D	7.785	7.784	0.001	3.716	52.62	47.22	0	0	0	0.13
2001	280	23	676	599.876	-309.365	D	6.546	6.532	0.015	1.128	14.28	81.27	0	0	0	4.45
2001	281	23	1	596.558	-316.101	D	6.595	6.595	0.000	1.25	58.02	35.51	0	0	0	2
2001	282	23	1	596.558	-316.101	D	6.918	6.918	0.000	1.892	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	8.133	8.133	0.000	4.498	0	0	0	0	0	0
2001	284	23	1	596.558	-316.101	D	10.095	10.095	0.000	9.436	0	0	0	0	0	0
2001	285	23	1	596.558	-316.101	D	9.943	9.943	0.000	9.018	0	0	0	0	0	0
2001	286	23	1	596.558	-316.101	D	10.218	10.218	0.000	9.779	0	0	0	0	0	0
2001	287	23	1	596.558	-316.101	D	8.789	8.789	0.000	6.042	0	0	0	0	0	0
2001	288	23	1	596.558	-316.101	D	6.542	6.542	0.000	1.147	0	0	0	0	0	0
2001	289	23	517	602.805	-305.061	D	7.598	7.561	0.037	3.233	25.45	74.45	0	0	0	0.1
2001	290	23	1	596.558	-316.101	D	6.492	6.492	0.000	1.05	0	0	0	0	0	0
2001	291	23	545	603.234	-311.991	D	6.5	6.499	0.001	1.064	45.88	51.47	0	0	0	2.61
2001	292	23	1	596.558	-316.101	D	6.578	6.578	0.000	1.218	0	0	0	0	0	0
2001	293	23	1	596.558	-316.101	D	6.945	6.945	0.000	1.947	0	0	0	0	0	0
2001	294	23	1	596.558	-316.101	D	7.577	7.577	0.000	3.267	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.564	7.564	0.000	3.239	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	9.63	9.63	0.000	8.178	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	297	23	1	596.558	-316.101	D	9.546	9.546	0.000	7.957	0	0	0	0	0	0
2001	298	23	1	596.558	-316.101	D	6.813	6.813	0.000	1.68	0	0	0	0	0	0
2001	299	23	1	596.558	-316.101	D	6.471	6.471	0.000	1.01	0	0	0	0	0	0
2001	300	23	546	603.249	-312.239	D	6.485	6.485	0.000	1.037	30.14	69.19	0	0	0	4.25
2001	301	23	624	596.324	-316.278	D	6.517	6.508	0.009	1.081	20.14	77.35	0	0	0	2.5
2001	302	23	432	602.04	-306.183	D	6.499	6.499	0.000	1.064	62.77	36.32	0	0	0	1.31
2001	303	23	1	596.558	-316.101	D	6.516	6.516	0.000	1.098	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	6.541	6.541	0.000	1.146	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	6.796	6.796	0.000	1.647	0	0	0	0	0	0
2001	306	23	517	602.805	-305.061	D	8.951	8.951	0.000	6.439	65.55	36.32	0	0	0	0.85
2001	307	23	632	596.27	-315.421	D	8.578	8.537	0.041	5.438	35.63	64.06	0	0	0	0.31
2001	308	23	517	602.805	-305.061	D	6.594	6.594	0.000	1.248	78.97	15.28	0	0	0	5.22
2001	309	23	557	601.32	-313.419	D	7.888	7.8	0.088	3.752	11.2	87.17	0	0	0	1.63
2001	310	23	1	596.558	-316.101	D	6.476	6.476	0.000	1.02	70.69	21.67	0	0	0	5.49
2001	311	23	517	602.805	-305.061	D	6.519	6.519	0.000	1.103	75.12	21.89	0	0	0	3.05
2001	312	23	461	602.269	-305.916	D	6.782	6.781	0.000	1.618	84.05	13.03	0	0	0	2.19
2001	313	23	676	599.876	-309.365	D	6.715	6.678	0.037	1.414	14.38	80.27	0	0	0	5.35
2001	314	23	545	603.234	-311.991	D	6.64	6.639	0.001	1.337	49.04	46.67	0	0	0	4.15
2001	315	23	557	601.32	-313.419	D	6.747	6.732	0.015	1.521	13.19	79.77	0	0	0	7.04
2001	316	23	1	596.558	-316.101	D	6.562	6.562	0.000	1.186	0	0	0	0	0	0
2001	317	23	1	596.558	-316.101	D	6.567	6.567	0.000	1.196	0	0	0	0	0	0
2001	318	23	1	596.558	-316.101	D	7.603	7.603	0.000	3.322	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	6.973	6.973	0.000	2.004	0	0	0	0	0	0
2001	320	23	186	600.15	-314.075	D	7.304	7.304	0.000	2.685	71.46	11.8	0	0	0	2.95
2001	321	23	517	602.805	-305.061	D	8.09	7.82	0.270	3.796	30.01	69.47	0	0	0	0.52
2001	322	23	517	602.805	-305.061	D	8	7.956	0.045	4.098	67.18	31.91	0	0	0	0.91
2001	323	23	461	602.269	-305.916	D	7.864	7.864	0.000	3.894	83.64	13.01	0	0	0	0.96
2001	324	23	526	602.943	-307.29	D	6.474	6.474	0.000	1.016	30.65	62.88	0	0	0	6.45
2001	325	23	548	603.28	-312.734	D	6.477	6.477	0.000	1.022	29.17	67.94	0	0	0	3.38
2001	326	23	433	602.806	-312.871	D	6.52	6.52	0.000	1.105	45.49	48.93	0	0	0	2.76
2001	327	23	1	596.558	-316.101	D	6.86	6.86	0.000	1.776	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	9.336	9.336	0.000	7.411	0	0	0	0	0	0
2001	329	23	1	596.558	-316.101	D	6.663	6.663	0.000	1.383	0	0	0	0	0	0
2001	330	23	1	596.558	-316.101	D	6.956	6.956	0.000	1.97	0	0	0	0	0	0
2001	331	23	1	596.558	-316.101	D	7.453	7.453	0.000	3.002	0	0	0	0	0	0
2001	332	23	548	603.28	-312.734	D	8.72	8.699	0.021	5.824	14.18	81.29	0	0	0	4.52
2001	333	23	637	596.267	-315.066	D	10.102	10.097	0.005	9.443	14.58	84.67	0	0	0	0.74
2001	334	23	603	598.68	-316.244	D	8.871	8.806	0.065	6.083	19.95	79.74	0	0	0	0.31
2001	335	23	1	596.558	-316.101	D	6.626	6.626	0.000	1.311	0	0	0	0	0	0

Appendix M
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2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	336	23	517	602.805	-305.061	D	6.673	6.672	0.001	1.401	36.93	61.29	0	0	0	1.77
2001	337	23	461	602.269	-305.916	D	6.734	6.734	0.000	1.524	60.43	28.06	0	0	0	2.9
2001	338	23	1	596.558	-316.101	D	6.817	6.817	0.000	1.69	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	8.689	8.689	0.000	5.801	0	0	0	0	0	0
2001	340	23	517	602.805	-305.061	D	9.816	9.806	0.010	8.646	12.01	87.65	0	0	0	0.33
2001	341	23	517	602.805	-305.061	D	10.144	9.879	0.266	8.844	23.94	75.82	0	0	0	0.24
2001	342	23	517	602.805	-305.061	D	8.948	8.814	0.135	6.103	42.59	57.19	0	0	0	0.22
2001	343	23	517	602.805	-305.061	D	6.646	6.638	0.008	1.335	19.07	76.38	0	0	0	4.57
2001	344	23	637	596.267	-315.066	D	6.52	6.518	0.002	1.101	25.2	72.23	0	0	0	2.48
2001	345	23	6	596.462	-314.859	D	6.576	6.575	0.001	1.211	34.69	63.71	0	0	0	1.59
2001	346	23	461	602.269	-305.916	D	8.916	8.916	0.000	6.353	52.11	59.26	0	0	0	1.29
2001	347	23	517	602.805	-305.061	D	9.35	9.349	0.001	7.444	53.88	44.95	0	0	0	1.15
2001	348	23	548	603.28	-312.734	D	8.796	8.724	0.072	5.886	33.71	66.05	0	0	0	0.24
2001	349	23	517	602.805	-305.061	D	7.172	7.172	0.000	2.41	62	36.29	0	0	0	1.36
2001	350	23	521	602.866	-306.052	D	10.1	10.099	0.001	9.449	52.13	47.63	0	0	0	0.23
2001	351	23	637	596.267	-315.066	D	10.235	10.218	0.017	9.779	24.31	75.18	0	0	0	0.49
2001	352	23	1	596.558	-316.101	D	7.315	7.315	0.000	2.709	0	0	0	0	0	0
2001	353	23	1	596.558	-316.101	D	6.671	6.671	0.000	1.401	0	0	0	0	0	0
2001	354	23	1	596.558	-316.101	D	6.471	6.471	0.000	1.01	0	0	0	0	0	0
2001	355	23	1	596.558	-316.101	D	6.485	6.485	0.000	1.037	0	0	0	0	0	0
2001	356	23	1	596.558	-316.101	D	7.376	7.376	0.000	2.837	0	0	0	0	0	0
2001	357	23	1	596.558	-316.101	D	7.901	7.901	0.000	3.975	0	0	0	0	0	0
2001	358	23	1	596.558	-316.101	D	6.492	6.492	0.000	1.051	0	0	0	0	0	0
2001	359	23	1	596.558	-316.101	D	6.492	6.492	0.000	1.051	0	0	0	0	0	0
2001	360	23	1	596.558	-316.101	D	6.497	6.497	0.000	1.06	0	0	0	0	0	0
2001	361	23	1	596.558	-316.101	D	6.534	6.534	0.000	1.133	0	0	0	0	0	0
2001	362	23	1	596.558	-316.101	D	6.849	6.849	0.000	1.753	0	0	0	0	0	0
2001	363	23	1	596.558	-316.101	D	6.626	6.626	0.000	1.312	0	0	0	0	0	0
2001	364	23	1	596.558	-316.101	D	6.52	6.52	0.000	1.105	0	0	0	0	0	0
2001	365	23	1	596.558	-316.101	D	6.562	6.562	0.000	1.187	0	0	0	0	0	0
									0.385							
INDEPENDENCE									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	596.558	-316.101	D	7.097	7.097	0	2.257	0	0	0	0	0	0
2001	2	23	1	596.558	-316.101	D	7.176	7.176	0	2.42	0	0	0	0	0	0
2001	3	23	193	600.016	-312.336	D	8.133	7.997	0.136	4.19	92.57	7.3	0	0	0	0.13
2001	4	23	517	602.805	-305.061	D	7.853	7.848	0.004	3.859	91.78	8.03	0	0	0	0.19

Appendix M
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2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	5	23	626	596.299	-315.88	D	7.734	7.729	0.006	3.596	59.69	38.08	0	0	0	2.24
2001	6	23	514	602.766	-305.877	D	7.365	7.31	0.055	2.699	83.08	16.33	0	0	0	0.59
2001	7	23	545	603.234	-311.991	D	7.273	7.209	0.063	2.489	88.7	10.89	0	0	0	0.41
2001	8	23	1	596.558	-316.101	D	7.373	7.373	0	2.831	0	0	0	0	0	0
2001	9	23	1	596.558	-316.101	D	7.366	7.366	0	2.816	0	0	0	0	0	0
2001	10	23	695	602.257	-305.836	D	7.474	7.46	0.013	3.017	91.27	8.51	0	0	0	0.22
2001	11	23	517	602.805	-305.061	D	7.926	7.924	0.002	4.027	93.75	5.84	0	0	0	0.44
2001	12	23	1	596.558	-316.101	D	9.4	9.4	0	7.577	0	0	0	0	0	0
2001	13	23	1	596.558	-316.101	D	8.916	8.916	0	6.353	0	0	0	0	0	0
2001	14	23	1	596.558	-316.101	D	9.712	9.712	0	8.396	0	0	0	0	0	0
2001	15	23	1	596.558	-316.101	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2001	16	23	517	602.805	-305.061	D	6.712	6.695	0.017	1.447	79.27	18.93	0	0	0	1.8
2001	17	23	1	596.558	-316.101	D	6.909	6.909	0	1.873	0	0	0	0	0	0
2001	18	23	37	597.36	-313.541	D	7.077	7.077	0	2.214	88.76	8.78	0	0	0	1.06
2001	19	23	520	602.851	-305.804	D	6.849	6.746	0.103	1.549	87.18	12.03	0	0	0	0.78
2001	20	23	1	596.558	-316.101	D	6.731	6.731	0	1.519	0	0	0	0	0	0
2001	21	23	266	600.99	-312.011	D	6.577	6.554	0.022	1.171	77.21	21.46	0	0	0	1.33
2001	22	23	517	602.805	-305.061	D	6.534	6.515	0.019	1.096	86.38	12.12	0	0	0	1.5
2001	23	23	517	602.805	-305.061	D	6.69	6.687	0.003	1.431	89.91	9.11	0	0	0	0.95
2001	24	23	517	602.805	-305.061	D	6.99	6.91	0.08	1.876	86.49	13.02	0	0	0	0.49
2001	25	23	1	596.558	-316.101	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	26	23	1	596.558	-316.101	D	6.498	6.498	0	1.062	0	0	0	0	0	0
2001	27	23	517	602.805	-305.061	D	6.642	6.635	0.008	1.329	76.89	21.5	0	0	0	1.62
2001	28	23	1	596.558	-316.101	D	6.51	6.51	0	1.085	0	0	0	0	0	0
2001	29	23	1	596.558	-316.101	D	8.131	8.131	0	4.495	0	0	0	0	0	0
2001	30	23	1	596.558	-316.101	D	9.187	9.187	0	7.032	0	0	0	0	0	0
2001	31	23	517	602.805	-305.061	D	6.986	6.962	0.024	1.982	86.78	11.97	0	0	0	1.25
2001	32	23	545	603.234	-311.991	D	6.632	6.575	0.056	1.212	78.7	19.06	0	0	0	2.24
2001	33	23	517	602.805	-305.061	D	6.583	6.543	0.04	1.148	84.65	14.63	0	0	0	0.72
2001	34	23	517	602.805	-305.061	D	6.476	6.469	0.007	1.006	78.09	20.35	0	0	0	1.59
2001	35	23	517	602.805	-305.061	D	6.496	6.495	0.001	1.056	88.46	10.03	0	0	0	1.68
2001	36	23	624	596.324	-316.278	D	6.692	6.677	0.015	1.412	81.66	16.32	0	0	0	2
2001	37	23	517	602.805	-305.061	D	6.512	6.502	0.011	1.07	88.05	9.84	0	0	0	2.11
2001	38	23	517	602.805	-305.061	D	6.636	6.617	0.02	1.293	86.54	12.28	0	0	0	1.18
2001	39	23	1	596.558	-316.101	D	7.981	7.981	0	4.155	0	0	0	0	0	0
2001	40	23	693	601.983	-306.223	D	9.673	9.334	0.338	7.406	91.61	8.26	0	0	0	0.13
2001	41	23	517	602.805	-305.061	D	6.577	6.56	0.017	1.182	89.82	9.56	0	0	0	0.62
2001	42	23	1	596.558	-316.101	D	6.47	6.47	0	1.007	0	0	0	0	0	0
2001	43	23	1	596.558	-316.101	D	6.521	6.521	0	1.107	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	44	23	1	596.558	-316.101	D	7.622	7.622	0	3.364	0	0	0	0	0	0
2001	45	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	46	23	1	596.558	-316.101	D	8.818	8.818	0	6.113	0	0	0	0	0	0
2001	47	23	624	596.324	-316.278	D	6.718	6.712	0.006	1.48	84.14	15.19	0	0	0	0.66
2001	48	23	1	596.558	-316.101	D	6.499	6.499	0	1.064	0	0	0	0	0	0
2001	49	23	1	596.558	-316.101	D	6.469	6.469	0	1.006	0	0	0	0	0	0
2001	50	23	1	596.558	-316.101	D	6.473	6.473	0	1.014	0	0	0	0	0	0
2001	51	23	517	602.805	-305.061	D	6.628	6.626	0.001	1.312	96.8	2.19	0	0	0	0.92
2001	52	23	656	597.971	-312.292	D	6.546	6.539	0.007	1.141	94.32	5.15	0	0	0	0.5
2001	53	23	624	596.324	-316.278	D	7.303	7.301	0.001	2.68	94.4	5.37	0	0	0	0.21
2001	54	23	186	600.15	-314.075	D	6.712	6.712	0	1.481	92.17	2.33	0	0	0	0.29
2001	55	23	1	596.558	-316.101	D	8.03	8.03	0	4.264	0	0	0	0	0	0
2001	56	23	1	596.558	-316.101	D	8.437	8.437	0	5.201	0	0	0	0	0	0
2001	57	23	624	596.324	-316.278	D	6.513	6.507	0.006	1.08	84.05	14.47	0	0	0	1.48
2001	58	23	637	596.267	-315.066	D	6.529	6.528	0.001	1.121	93.47	6.09	0	0	0	0.62
2001	59	23	1	596.558	-316.101	D	6.638	6.638	0	1.335	96	6.16	0	0	0	0.16
2001	60	23	1	596.558	-316.101	D	6.473	6.473	0	1.014	0	0	0	0	0	0
2001	61	23	517	602.805	-305.061	D	6.897	6.895	0.002	1.846	85.22	13.2	0	0	0	1.5
2001	62	23	517	602.805	-305.061	D	6.699	6.66	0.039	1.377	92.79	6.3	0	0	0	0.91
2001	63	23	637	596.267	-315.066	D	6.666	6.621	0.045	1.301	94.57	4.93	0	0	0	0.5
2001	64	23	1	596.558	-316.101	D	6.57	6.57	0	1.202	0	0	0	0	0	0
2001	65	23	1	596.558	-316.101	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	66	23	1	596.558	-316.101	D	6.477	6.477	0	1.022	0	0	0	0	0	0
2001	67	23	624	596.324	-316.278	D	6.653	6.533	0.12	1.13	88.43	10.36	0	0	0	1.21
2001	68	23	1	596.558	-316.101	D	6.525	6.525	0	1.115	0	0	0	0	0	0
2001	69	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	70	23	1	596.558	-316.101	D	6.474	6.474	0	1.015	0	0	0	0	0	0
2001	71	23	1	596.558	-316.101	D	8.246	8.246	0	4.757	0	0	0	0	0	0
2001	72	23	1	596.558	-316.101	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2001	73	23	632	596.27	-315.421	D	6.491	6.485	0.006	1.037	89.48	8.31	0	0	0	2.21
2001	74	23	517	602.805	-305.061	D	8.834	8.834	0	6.153	97.85	1.54	0	0	0	0.64
2001	75	23	603	598.68	-316.244	D	8.346	8.307	0.039	4.898	90.12	9.61	0	0	0	0.27
2001	76	23	1	596.558	-316.101	D	6.791	6.791	0	1.638	0	0	0	0	0	0
2001	77	23	1	596.558	-316.101	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	78	23	1	596.558	-316.101	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	6.474	6.474	0	1.015	0	0	0	0	0	0
2001	80	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	81	23	1	596.558	-316.101	D	6.513	6.513	0	1.091	0	0	0	0	0	0
2001	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.799	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	83	23	1	596.558	-316.101	D	6.665	6.665	0	1.389	0	0	0	0	0	0
2001	84	23	1	596.558	-316.101	D	6.489	6.489	0	1.045	0	0	0	0	0	0
2001	85	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	86	23	1	596.558	-316.101	D	6.469	6.469	0	1.007	0	0	0	0	0	0
2001	87	23	1	596.558	-316.101	D	6.468	6.468	0	1.005	0	0	0	0	0	0
2001	88	23	1	596.558	-316.101	D	7.169	7.169	0	2.406	0	0	0	0	0	0
2001	89	23	1	596.558	-316.101	D	8.796	8.796	0	6.06	0	0	0	0	0	0
2001	90	23	637	596.267	-315.066	D	8.56	8.559	0	5.491	96.26	3.62	0	0	0	0.09
2001	91	23	461	602.269	-305.916	D	7.167	7.057	0.11	2.174	96.33	3.55	0	0	0	0.12
2001	92	23	548	603.28	-312.734	D	7.013	7.009	0.005	2.076	96.93	1.92	0	0	0	1.14
2001	93	23	1	596.558	-316.101	D	9.416	9.416	0	7.617	0	0	0	0	0	0
2001	94	23	1	596.558	-316.101	D	8.143	8.143	0	4.52	0	0	0	0	0	0
2001	95	23	1	596.558	-316.101	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2001	96	23	1	596.558	-316.101	D	8.925	8.925	0	6.376	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	6.895	6.895	0	1.846	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.116	7.116	0	2.295	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.053	7.053	0	2.166	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.448	7.448	0	2.991	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	9.215	9.215	0	7.101	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.38	7.38	0	2.846	0	0	0	0	0	0
2001	103	23	517	602.805	-305.061	D	6.547	6.545	0.002	1.154	98.44	0.6	0	0	0	0.93
2001	104	23	517	602.805	-305.061	D	6.627	6.625	0.001	1.31	99.32	0.28	0	0	0	0.48
2001	105	23	624	596.324	-316.278	D	7.663	7.656	0.007	3.437	99.24	0.26	0	0	0	0.5
2001	106	23	624	596.324	-316.278	D	6.608	6.605	0.003	1.27	99.42	0.16	0	0	0	0.44
2001	107	23	624	596.324	-316.278	D	6.479	6.477	0.002	1.022	92.29	6.07	0	0	0	1.63
2001	108	23	637	596.267	-315.066	D	6.479	6.479	0.001	1.025	98.7	0.54	0	0	0	0.76
2001	109	23	517	602.805	-305.061	D	6.505	6.494	0.011	1.054	97.81	1.69	0	0	0	0.5
2001	110	23	1	596.558	-316.101	D	6.79	6.79	0	1.636	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.389	7.389	0	2.866	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.362	7.362	0	2.809	0	0	0	0	0	0
2001	114	23	632	596.27	-315.421	D	6.526	6.52	0.006	1.104	88.67	9.11	0	0	0	2.21
2001	115	23	624	596.324	-316.278	D	6.499	6.477	0.022	1.022	97.96	1.03	0	0	0	1.01
2001	116	23	517	602.805	-305.061	D	6.536	6.536	0	1.135	98.16	1.1	0	0	0	0.93
2001	117	23	1	596.558	-316.101	D	6.69	6.69	0	1.437	0	0	0	0	0	0
2001	118	23	517	602.805	-305.061	D	6.677	6.676	0.001	1.409	99.26	0.15	0	0	0	0.5
2001	119	23	517	602.805	-305.061	D	6.586	6.586	0	1.234	99.59	0.08	0	0	0	0.33
2001	120	23	1	596.558	-316.101	D	6.721	6.721	0	1.497	0	0	0	0	0	0
2001	121	23	1	596.558	-316.101	D	6.826	6.826	0	1.708	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	122	23	1	596.558	-316.101	D	7.186	7.186	0	2.441	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	6.778	6.778	0	1.612	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	6.933	6.933	0	1.921	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	6.946	6.946	0	1.948	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.82	7.82	0	3.797	0	0	0	0	0	0
2001	127	23	694	602.12	-306.029	D	7.601	7.584	0.017	3.281	99.16	0.43	0	0	0	0.41
2001	128	23	548	603.28	-312.734	D	6.968	6.951	0.017	1.959	98.68	1.02	0	0	0	0.31
2001	129	23	676	599.876	-309.365	D	6.562	6.515	0.047	1.096	99.1	0.24	0	0	0	0.65
2001	130	23	517	602.805	-305.061	D	6.6	6.575	0.025	1.212	99.43	0.11	0	0	0	0.45
2001	131	23	516	602.728	-305.38	D	7.48	7.48	0	3.058	99.49	0.04	0	0	0	0.28
2001	132	23	624	596.324	-316.278	D	8.329	8.057	0.272	4.326	95.57	4.36	0	0	0	0.07
2001	133	23	1	596.558	-316.101	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	134	23	1	596.558	-316.101	D	6.592	6.592	0	1.244	0	0	0	0	0	0
2001	135	23	1	596.558	-316.101	D	6.924	6.924	0	1.904	0	0	0	0	0	0
2001	136	23	1	596.558	-316.101	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.223	7.223	0	2.516	0	0	0	0	0	0
2001	138	23	517	602.805	-305.061	D	7.449	7.448	0.001	2.989	99.66	0.07	0	0	0	0.22
2001	139	23	545	603.234	-311.991	D	8.151	8.057	0.094	4.325	98.88	1.06	0	0	0	0.06
2001	140	23	548	603.28	-312.734	D	7.304	7.301	0.002	2.681	99.66	0.13	0	0	0	0.16
2001	141	23	563	600.143	-314.135	D	8.625	8.599	0.026	5.585	98.05	1.55	0	0	0	0.4
2001	142	23	557	601.32	-313.419	D	6.616	6.578	0.038	1.218	96.61	2.15	0	0	0	1.25
2001	143	23	1	596.558	-316.101	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	144	23	624	596.324	-316.278	D	6.569	6.562	0.007	1.187	92.96	4.03	0	0	0	3
2001	145	23	517	602.805	-305.061	D	6.631	6.612	0.02	1.283	87.62	10.36	0	0	0	2.01
2001	146	23	517	602.805	-305.061	D	6.641	6.64	0.001	1.339	93.81	3.03	0	0	0	3.04
2001	147	23	517	602.805	-305.061	D	6.585	6.581	0.004	1.224	97.34	0.77	0	0	0	1.92
2001	148	23	521	602.866	-306.052	D	6.872	6.762	0.11	1.58	98.89	0.56	0	0	0	0.54
2001	149	23	624	596.324	-316.278	D	6.761	6.749	0.012	1.553	99.26	0.32	0	0	0	0.4
2001	150	23	637	596.267	-315.066	D	7.579	7.573	0.005	3.259	99.52	0.2	0	0	0	0.26
2001	151	23	1	596.558	-316.101	D	8.688	8.688	0	5.799	0	0	0	0	0	0
2001	152	23	624	596.324	-316.278	D	6.995	6.961	0.034	1.98	97.17	1.97	0	0	0	0.86
2001	153	23	624	596.324	-316.278	D	6.85	6.843	0.007	1.741	98.23	0.72	0	0	0	1.06
2001	154	23	624	596.324	-316.278	D	6.761	6.74	0.021	1.536	99.09	0.5	0	0	0	0.41
2001	155	23	517	602.805	-305.061	D	7.404	7.392	0.012	2.872	98.44	1.34	0	0	0	0.22
2001	156	23	517	602.805	-305.061	D	8.389	8.389	0	5.089	99.59	0.33	0	0	0	0.09
2001	157	23	1	596.558	-316.101	D	8.193	8.193	0	4.636	0	0	0	0	0	0
2001	158	23	694	602.12	-306.029	D	7.677	7.647	0.031	3.417	98.92	0.88	0	0	0	0.19
2001	159	23	624	596.324	-316.278	D	6.974	6.953	0.021	1.963	99.71	0.13	0	0	0	0.15
2001	160	23	1	596.558	-316.101	D	6.637	6.637	0	1.333	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	161	23	1	596.558	-316.101	D	6.668	6.668	0	1.394	0	0	0	0	0	0
2001	162	23	1	596.558	-316.101	D	6.869	6.869	0	1.793	0	0	0	0	0	0
2001	163	23	1	596.558	-316.101	D	6.989	6.989	0	2.037	0	0	0	0	0	0
2001	164	23	1	596.558	-316.101	D	7.456	7.456	0	3.006	0	0	0	0	0	0
2001	165	23	1	596.558	-316.101	D	7.35	7.35	0	2.784	0	0	0	0	0	0
2001	166	23	517	602.805	-305.061	D	8.919	8.914	0.004	6.35	99.06	0.05	0	0	0	0.92
2001	167	23	624	596.324	-316.278	D	6.586	6.554	0.032	1.171	98.66	0.31	0	0	0	1.03
2001	168	23	548	603.28	-312.734	D	6.64	6.64	0.001	1.339	99.03	0.03	0	0	0	0.69
2001	169	23	520	602.851	-305.804	D	6.908	6.899	0.009	1.854	99.67	0.06	0	0	0	0.26
2001	170	23	517	602.805	-305.061	D	6.895	6.895	0	1.846	99.65	0.01	0	0	0	0.28
2001	171	23	1	596.558	-316.101	D	7.198	7.198	0	2.465	0	0	0	0	0	0
2001	172	23	624	596.324	-316.278	D	7.928	7.865	0.063	3.895	99.66	0.18	0	0	0	0.16
2001	173	23	548	603.28	-312.734	D	7.006	6.966	0.04	1.989	99.5	0.38	0	0	0	0.12
2001	174	23	1	596.558	-316.101	D	6.708	6.708	0	1.472	93.19	0.23	0	0	0	0.42
2001	175	23	637	596.267	-315.066	D	6.823	6.821	0.002	1.698	99.33	0.2	0	0	0	0.45
2001	176	23	662	598.404	-311.683	D	6.754	6.752	0.002	1.56	99.54	0.11	0	0	0	0.29
2001	177	23	516	602.728	-305.38	D	6.8	6.8	0	1.654	99.15	0.04	0	0	0	0.28
2001	178	23	1	596.558	-316.101	D	7.061	7.061	0	2.184	0	0	0	0	0	0
2001	179	23	1	596.558	-316.101	D	7.332	7.332	0	2.744	0	0	0	0	0	0
2001	180	23	1	596.558	-316.101	D	8.232	8.232	0	4.724	0	0	0	0	0	0
2001	181	23	1	596.558	-316.101	D	7.515	7.515	0	3.134	0	0	0	0	0	0
2001	182	23	6	596.462	-314.859	D	8.682	8.682	0	5.783	99.59	0.01	0	0	0	0.26
2001	183	23	637	596.267	-315.066	D	7.421	7.42	0	2.931	99.75	0.05	0	0	0	0.21
2001	184	23	517	602.805	-305.061	D	6.756	6.755	0.001	1.566	99.52	0.05	0	0	0	0.2
2001	185	23	212	600.226	-311.82	D	7.626	7.626	0	3.372	89.59	0.07	0	0	0	0.16
2001	186	23	521	602.866	-306.052	D	7.126	7.051	0.075	2.163	99.62	0.05	0	0	0	0.33
2001	187	23	624	596.324	-316.278	D	6.629	6.603	0.026	1.266	99.6	0.06	0	0	0	0.33
2001	188	23	195	599.978	-311.84	D	6.978	6.934	0.043	1.925	99.79	0.02	0	0	0	0.19
2001	189	23	1	596.558	-316.101	D	7.464	7.464	0	3.025	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.181	7.181	0	2.43	0	0	0	0	0	0
2001	191	23	660	598.316	-311.922	D	7.819	7.761	0.058	3.667	99.53	0.32	0	0	0	0.15
2001	192	23	624	596.324	-316.278	D	7.647	7.646	0.001	3.417	99.87	0.04	0	0	0	0.17
2001	193	23	1	596.558	-316.101	D	6.802	6.802	0	1.66	0	0	0	0	0	0
2001	194	23	1	596.558	-316.101	D	6.668	6.668	0	1.395	0	0	0	0	0	0
2001	195	23	1	596.558	-316.101	D	6.647	6.647	0	1.352	0	0	0	0	0	0
2001	196	23	1	596.558	-316.101	D	6.628	6.628	0	1.314	0	0	0	0	0	0
2001	197	23	1	596.558	-316.101	D	6.873	6.873	0	1.802	0	0	0	0	0	0
2001	198	23	1	596.558	-316.101	D	9.096	9.096	0	6.802	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.762	7.762	0	3.669	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	200	23	1	596.558	-316.101	D	9.024	9.024	0	6.622	0	0	0	0	0	0
2001	201	23	1	596.558	-316.101	D	8.44	8.44	0	5.209	0	0	0	0	0	0
2001	202	23	517	602.805	-305.061	D	8.343	8.316	0.027	4.92	98.59	1.29	0	0	0	0.11
2001	203	23	517	602.805	-305.061	D	8.353	8.321	0.032	4.931	99.66	0.25	0	0	0	0.08
2001	204	23	517	602.805	-305.061	D	7.721	7.714	0.007	3.564	99.44	0.47	0	0	0	0.09
2001	205	23	517	602.805	-305.061	D	7.241	7.241	0	2.553	99.69	0.02	0	0	0	0.12
2001	206	23	517	602.805	-305.061	D	7.706	7.706	0	3.546	99.57	0.13	0	0	0	0.19
2001	207	23	517	602.805	-305.061	D	8.794	8.741	0.053	5.927	99.51	0.41	0	0	0	0.08
2001	208	23	211	600.245	-312.069	D	8.921	8.783	0.138	6.029	99.46	0.49	0	0	0	0.05
2001	209	23	660	598.316	-311.922	D	8.762	8.684	0.077	5.789	99.35	0.6	0	0	0	0.04
2001	210	23	694	602.12	-306.029	D	8.916	8.738	0.179	5.918	99.74	0.08	0	0	0	0.18
2001	211	23	517	602.805	-305.061	D	9.111	7.828	1.282	3.815	99.41	0.48	0	0	0	0.1
2001	212	23	517	602.805	-305.061	D	7.05	6.923	0.127	1.902	99.8	0.02	0	0	0	0.18
2001	213	23	517	602.805	-305.061	D	7.273	7.271	0.001	2.618	99.88	0.01	0	0	0	0.14
2001	214	23	1	596.558	-316.101	D	6.962	6.962	0	1.981	0	0	0	0	0	0
2001	215	23	517	602.805	-305.061	D	7.616	7.602	0.014	3.32	99.79	0.04	0	0	0	0.18
2001	216	23	624	596.324	-316.278	D	8.61	8.123	0.487	4.475	99.58	0.34	0	0	0	0.08
2001	217	23	1	596.558	-316.101	D	6.844	6.844	0	1.744	0	0	0	0	0	0
2001	218	23	1	596.558	-316.101	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2001	219	23	1	596.558	-316.101	D	7.474	7.474	0	3.046	0	0	0	0	0	0
2001	220	23	1	596.558	-316.101	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2001	221	23	1	596.558	-316.101	D	8.036	8.036	0	4.279	0	0	0	0	0	0
2001	222	23	517	602.805	-305.061	D	8.561	8.435	0.126	5.197	99.6	0.14	0	0	0	0.26
2001	223	23	603	598.68	-316.244	D	8.362	8.076	0.287	4.368	99.21	0.7	0	0	0	0.09
2001	224	23	603	598.68	-316.244	D	7.12	7.104	0.015	2.271	99.4	0.43	0	0	0	0.16
2001	225	23	603	598.68	-316.244	D	6.941	6.929	0.012	1.914	99.25	0.61	0	0	0	0.13
2001	226	23	1	596.558	-316.101	D	6.841	6.841	0	1.737	0	0	0	0	0	0
2001	227	23	1	596.558	-316.101	D	6.643	6.643	0	1.345	0	0	0	0	0	0
2001	228	23	624	596.324	-316.278	D	7.021	7.007	0.013	2.073	98.8	0.47	0	0	0	0.73
2001	229	23	195	599.978	-311.84	D	7.166	6.974	0.192	2.006	98.85	0.59	0	0	0	0.56
2001	230	23	548	603.28	-312.734	D	7.301	7.296	0.004	2.67	99.62	0.05	0	0	0	0.31
2001	231	23	514	602.766	-305.877	D	7	6.977	0.022	2.011	99.25	0.49	0	0	0	0.26
2001	232	23	624	596.324	-316.278	D	6.741	6.739	0.002	1.535	99.41	0.03	0	0	0	0.58
2001	233	23	662	598.404	-311.683	D	6.874	6.859	0.015	1.772	99.53	0.2	0	0	0	0.27
2001	234	23	1	596.558	-316.101	D	8.154	8.154	0	4.546	0	0	0	0	0	0
2001	235	23	1	596.558	-316.101	D	7.248	7.248	0	2.57	0	0	0	0	0	0
2001	236	23	1	596.558	-316.101	D	8.023	8.023	0	4.248	0	0	0	0	0	0
2001	237	23	1	596.558	-316.101	D	7.35	7.35	0	2.783	0	0	0	0	0	0
2001	238	23	694	602.12	-306.029	D	8.294	8.222	0.072	4.702	98.77	0.93	0	0	0	0.29

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	239	23	603	598.68	-316.244	D	7.273	7.25	0.023	2.573	99.55	0.14	0	0	0	0.31
2001	240	23	517	602.805	-305.061	D	7.513	7.456	0.056	3.008	99.45	0.15	0	0	0	0.4
2001	241	23	517	602.805	-305.061	D	7.466	7.245	0.221	2.563	99.62	0.14	0	0	0	0.24
2001	242	23	517	602.805	-305.061	D	8.929	8.841	0.089	6.169	99.7	0.22	0	0	0	0.07
2001	243	23	517	602.805	-305.061	D	8.895	8.884	0.011	6.275	99.65	0.08	0	0	0	0.27
2001	244	23	632	596.27	-315.421	D	8.509	8.266	0.243	4.803	98.85	1.06	0	0	0	0.09
2001	245	23	624	596.324	-316.278	D	7.242	7.184	0.058	2.437	99.56	0.3	0	0	0	0.14
2001	246	23	677	600.05	-309.264	D	8.024	8.017	0.007	4.236	99.83	0.07	0	0	0	0.08
2001	247	23	517	602.805	-305.061	D	7.64	7.626	0.015	3.371	99.78	0.04	0	0	0	0.18
2001	248	23	517	602.805	-305.061	D	6.951	6.938	0.012	1.933	99.23	0.52	0	0	0	0.27
2001	249	23	461	602.269	-305.916	D	7.452	7.452	0	2.999	100	0.04	0	0	0	0.16
2001	250	23	1	596.558	-316.101	D	9.131	9.131	0	6.889	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	9.542	9.542	0	7.946	0	0	0	0	0	0
2001	252	23	637	596.267	-315.066	D	9.407	9.397	0.01	7.568	99.53	0.21	0	0	0	0.26
2001	253	23	548	603.28	-312.734	D	7.503	7.495	0.008	3.09	99.57	0.21	0	0	0	0.21
2001	254	23	517	602.805	-305.061	D	6.785	6.77	0.015	1.595	99.16	0.09	0	0	0	0.75
2001	255	23	517	602.805	-305.061	D	7.09	7.06	0.03	2.181	99.35	0.24	0	0	0	0.41
2001	256	23	695	602.257	-305.836	D	7.29	7.241	0.049	2.554	99.51	0.3	0	0	0	0.19
2001	257	23	637	596.267	-315.066	D	6.885	6.873	0.012	1.802	99.65	0.14	0	0	0	0.21
2001	258	23	1	596.558	-316.101	D	6.636	6.636	0	1.33	100.47	0.01	0	0	0	0.27
2001	259	23	1	596.558	-316.101	D	6.702	6.702	0	1.46	0	0	0	0	0	0
2001	260	23	1	596.558	-316.101	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2001	261	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	262	23	563	600.143	-314.135	D	9.693	9.17	0.522	6.989	95.61	4.3	0	0	0	0.09
2001	263	23	624	596.324	-316.278	D	7.137	7.114	0.023	2.292	99.21	0.32	0	0	0	0.47
2001	264	23	517	602.805	-305.061	D	7.232	7.165	0.068	2.396	99.39	0.17	0	0	0	0.44
2001	265	23	603	598.68	-316.244	D	7.069	7.046	0.023	2.152	99.3	0.14	0	0	0	0.56
2001	266	23	517	602.805	-305.061	D	7.261	7.247	0.014	2.566	98.42	1.38	0	0	0	0.2
2001	267	23	520	602.851	-305.804	D	8.557	8.108	0.45	4.441	95.69	4.23	0	0	0	0.08
2001	268	23	1	596.558	-316.101	D	6.547	6.547	0	1.158	0	0	0	0	0	0
2001	269	23	1	596.558	-316.101	D	6.531	6.531	0	1.126	0	0	0	0	0	0
2001	270	23	517	602.805	-305.061	D	6.601	6.572	0.029	1.207	98.91	0.27	0	0	0	0.82
2001	271	23	624	596.324	-316.278	D	6.957	6.827	0.13	1.71	99.15	0.39	0	0	0	0.46
2001	272	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	273	23	1	596.558	-316.101	D	7.133	7.133	0	2.33	0	0	0	0	0	0
2001	274	23	1	596.558	-316.101	D	7.005	7.005	0	2.068	0	0	0	0	0	0
2001	275	23	517	602.805	-305.061	D	7.24	7.233	0.008	2.537	98.11	1.68	0	0	0	0.21
2001	276	23	1	596.558	-316.101	D	7.307	7.307	0	2.693	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.843	7.843	0	3.848	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	278	23	517	602.805	-305.061	D	9.884	9.843	0.041	8.747	97.14	2.81	0	0	0	0.04
2001	279	23	545	603.234	-311.991	D	7.789	7.784	0.005	3.716	97.46	2.45	0	0	0	0.12
2001	280	23	631	596.276	-315.551	D	6.558	6.533	0.026	1.13	95.25	3.69	0	0	0	1.06
2001	281	23	517	602.805	-305.061	D	6.597	6.594	0.003	1.248	97.96	1.38	0	0	0	0.62
2001	282	23	1	596.558	-316.101	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	8.133	8.133	0	4.498	0	0	0	0	0	0
2001	284	23	1	596.558	-316.101	D	10.095	10.095	0	9.436	0	0	0	0	0	0
2001	285	23	637	596.267	-315.066	D	9.944	9.943	0.002	9.018	96.28	3.63	0	0	0	0.07
2001	286	23	222	600.034	-309.336	D	10.218	10.218	0	9.779	98.68	0.71	0	0	0	0.04
2001	287	23	626	596.299	-315.88	D	9.04	8.789	0.252	6.042	89.45	10.35	0	0	0	0.2
2001	288	23	517	602.805	-305.061	D	6.538	6.537	0	1.138	96.75	1.66	0	0	0	1.51
2001	289	23	624	596.324	-316.278	D	7.565	7.506	0.059	3.114	87	12.61	0	0	0	0.39
2001	290	23	1	596.558	-316.101	D	6.492	6.492	0	1.05	0	0	0	0	0	0
2001	291	23	222	600.034	-309.336	D	6.499	6.499	0	1.064	97.3	3.5	0	0	0	0.56
2001	292	23	517	602.805	-305.061	D	6.586	6.585	0.002	1.23	97.42	1.14	0	0	0	1.42
2001	293	23	517	602.805	-305.061	D	7.011	7.008	0.003	2.073	97.2	2.25	0	0	0	0.52
2001	294	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.564	7.564	0	3.239	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	9.63	9.63	0	8.178	0	0	0	0	0	0
2001	297	23	695	602.257	-305.836	D	9.793	9.627	0.166	8.168	96.65	3.21	0	0	0	0.14
2001	298	23	517	602.805	-305.061	D	6.889	6.866	0.022	1.788	87.4	11.2	0	0	0	1.4
2001	299	23	517	602.805	-305.061	D	6.498	6.471	0.026	1.011	77.32	18.35	0	0	0	4.32
2001	300	23	1	596.558	-316.101	D	6.485	6.485	0	1.036	0	0	0	0	0	0
2001	301	23	1	596.558	-316.101	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	302	23	1	596.558	-316.101	D	6.499	6.499	0	1.065	0	0	0	0	0	0
2001	303	23	1	596.558	-316.101	D	6.516	6.516	0	1.098	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	6.796	6.796	0	1.647	0	0	0	0	0	0
2001	306	23	517	602.805	-305.061	D	8.958	8.951	0.007	6.439	95.52	4.31	0	0	0	0.18
2001	307	23	545	603.234	-311.991	D	8.688	8.519	0.169	5.395	92.38	7.55	0	0	0	0.08
2001	308	23	517	602.805	-305.061	D	6.597	6.594	0.003	1.248	98.9	0.49	0	0	0	0.63
2001	309	23	107	598.487	-311.954	D	8.3	7.85	0.45	3.862	96.68	3.2	0	0	0	0.12
2001	310	23	637	596.267	-315.066	D	6.482	6.476	0.006	1.02	99.02	0.41	0	0	0	0.58
2001	311	23	662	598.404	-311.683	D	6.577	6.52	0.058	1.104	98.77	0.8	0	0	0	0.43
2001	312	23	517	602.805	-305.061	D	6.826	6.781	0.045	1.618	98.84	0.67	0	0	0	0.49
2001	313	23	603	598.68	-316.244	D	6.673	6.673	0	1.403	97.82	0.94	0	0	0	0.72
2001	314	23	517	602.805	-305.061	D	6.639	6.639	0	1.336	88.31	10.56	0	0	0	1.1
2001	315	23	603	598.68	-316.244	D	6.766	6.732	0.034	1.52	90.75	7.74	0	0	0	1.51
2001	316	23	1	596.558	-316.101	D	6.562	6.562	0	1.186	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	317	23	1	596.558	-316.101	D	6.567	6.567	0	1.196	0	0	0	0	0	0
2001	318	23	1	596.558	-316.101	D	7.603	7.603	0	3.322	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	6.973	6.973	0	2.004	0	0	0	0	0	0
2001	320	23	1	596.558	-316.101	D	7.309	7.309	0	2.697	0	0	0	0	0	0
2001	321	23	1	596.558	-316.101	D	7.623	7.623	0	3.366	0	0	0	0	0	0
2001	322	23	517	602.805	-305.061	D	7.958	7.956	0.002	4.098	96.56	3.27	0	0	0	0.13
2001	323	23	625	596.311	-316.079	D	7.957	7.858	0.099	3.881	87.1	12.75	0	0	0	0.15
2001	324	23	1	596.558	-316.101	D	6.474	6.474	0	1.016	0	0	0	0	0	0
2001	325	23	698	602.668	-305.255	D	6.491	6.477	0.014	1.021	87.24	10.92	0	0	0	1.83
2001	326	23	517	602.805	-305.061	D	6.522	6.521	0.002	1.106	93.79	5	0	0	0	1.21
2001	327	23	1	596.558	-316.101	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	9.336	9.336	0	7.411	0	0	0	0	0	0
2001	329	23	1	596.558	-316.101	D	6.663	6.663	0	1.383	0	0	0	0	0	0
2001	330	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	331	23	1	596.558	-316.101	D	7.453	7.453	0	3.002	0	0	0	0	0	0
2001	332	23	603	598.68	-316.244	D	8.731	8.706	0.025	5.842	83.05	16.34	0	0	0	0.6
2001	333	23	624	596.324	-316.278	D	10.098	10.097	0	9.443	93.17	6.79	0	0	0	0.05
2001	334	23	624	596.324	-316.278	D	8.828	8.806	0.023	6.083	93.7	5.74	0	0	0	0.56
2001	335	23	517	602.805	-305.061	D	6.626	6.625	0.001	1.309	94	5.57	0	0	0	0.47
2001	336	23	1	596.558	-316.101	D	6.665	6.665	0	1.388	0	0	0	0	0	0
2001	337	23	1	596.558	-316.101	D	6.735	6.735	0	1.527	0	0	0	0	0	0
2001	338	23	1	596.558	-316.101	D	6.817	6.817	0	1.69	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	8.689	8.689	0	5.801	0	0	0	0	0	0
2001	340	23	517	602.805	-305.061	D	9.807	9.806	0.001	8.646	87.97	11.82	0	0	0	0.14
2001	341	23	517	602.805	-305.061	D	10.08	9.879	0.201	8.844	90.39	9.51	0	0	0	0.1
2001	342	23	517	602.805	-305.061	D	8.946	8.814	0.132	6.103	94.6	5.35	0	0	0	0.05
2001	343	23	1	596.558	-316.101	D	6.627	6.627	0	1.313	0	0	0	0	0	0
2001	344	23	5	596.481	-315.108	D	6.518	6.518	0	1.101	87.65	7.41	0	0	0	1.13
2001	345	23	637	596.267	-315.066	D	6.575	6.575	0	1.211	90.29	8.91	0	0	0	0.96
2001	346	23	1	596.558	-316.101	D	8.987	8.987	0	6.529	0	0	0	0	0	0
2001	347	23	1	596.558	-316.101	D	9.345	9.345	0	7.433	0	0	0	0	0	0
2001	348	23	624	596.324	-316.278	D	8.76	8.693	0.066	5.811	96.19	3.5	0	0	0	0.31
2001	349	23	517	602.805	-305.061	D	7.476	7.172	0.305	2.41	96.38	3.41	0	0	0	0.2
2001	350	23	694	602.12	-306.029	D	10.111	10.099	0.012	9.449	96.48	3.47	0	0	0	0.04
2001	351	23	624	596.324	-316.278	D	10.222	10.218	0.004	9.779	92.76	7.14	0	0	0	0.07
2001	352	23	624	596.324	-316.278	D	7.378	7.315	0.063	2.709	85.97	13.21	0	0	0	0.82
2001	353	23	548	603.28	-312.734	D	6.681	6.673	0.008	1.403	90.07	9.13	0	0	0	0.8
2001	354	23	603	598.68	-316.244	D	6.477	6.471	0.006	1.01	86.73	11.39	0	0	0	1.88
2001	355	23	517	602.805	-305.061	D	6.491	6.486	0.004	1.039	84.38	13.73	0	0	0	1.84

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	356	23	514	602.766	-305.877	D	7.399	7.399	0	2.885	93.69	6.31	0	0	0	0.27
2001	357	23	517	602.805	-305.061	D	7.957	7.938	0.019	4.058	66.21	32.74	0	0	0	1.05
2001	358	23	517	602.805	-305.061	D	6.502	6.495	0.008	1.056	60.93	35.05	0	0	0	4.01
2001	359	23	631	596.276	-315.551	D	6.493	6.492	0.001	1.051	71.78	25.67	0	0	0	2.43
2001	360	23	517	602.805	-305.061	D	6.569	6.498	0.071	1.063	75.48	22.33	0	0	0	2.19
2001	361	23	660	598.316	-311.922	D	6.559	6.536	0.023	1.135	76.68	21.06	0	0	0	2.25
2001	362	23	517	602.805	-305.061	D	6.88	6.871	0.009	1.797	81.78	16.56	0	0	0	1.66
2001	363	23	698	602.668	-305.255	D	6.642	6.628	0.013	1.316	84.17	14.78	0	0	0	1.04
2001	364	23	1	596.558	-316.101	D	6.52	6.52	0	1.105	0	0	0	0	0	0
2001	365	23	624	596.324	-316.278	D	6.562	6.562	0	1.187	71.86	26	0	0	0	2.27
									1.282							
MARSHALL									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	624	596.324	-316.278	D	7.142	7.097	0.045	2.257	56.21	42.3	0	0	0	1.49
2001	2	23	624	596.324	-316.278	D	7.184	7.176	0.007	2.42	77.88	21.63	0	0	0	0.49
2001	3	23	193	600.016	-312.336	D	8.073	7.997	0.076	4.19	85.94	13.87	0	0	0	0.19
2001	4	23	545	603.234	-311.991	D	7.836	7.835	0.002	3.829	88.02	11.72	0	0	0	0.18
2001	5	23	517	602.805	-305.061	D	7.917	7.834	0.083	3.828	84.45	15.15	0	0	0	0.4
2001	6	23	582	599.649	-315.031	D	7.33	7.228	0.102	2.527	78.18	21.04	0	0	0	0.78
2001	7	23	624	596.324	-316.278	D	7.312	7.192	0.12	2.452	63.53	35.73	0	0	0	0.74
2001	8	23	1	596.558	-316.101	D	7.373	7.373	0	2.831	0	0	0	0	0	0
2001	9	23	1	596.558	-316.101	D	7.366	7.366	0	2.816	0	0	0	0	0	0
2001	10	23	660	598.316	-311.922	D	7.408	7.407	0.001	2.902	79.33	20.16	0	0	0	0.37
2001	11	23	517	602.805	-305.061	D	7.924	7.924	0	4.027	84.8	14.44	0	0	0	0.63
2001	12	23	1	596.558	-316.101	D	9.4	9.4	0	7.577	0	0	0	0	0	0
2001	13	23	1	596.558	-316.101	D	8.916	8.916	0	6.353	0	0	0	0	0	0
2001	14	23	1	596.558	-316.101	D	9.712	9.712	0	8.396	0	0	0	0	0	0
2001	15	23	1	596.558	-316.101	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2001	16	23	682	600.626	-308.407	D	6.733	6.695	0.039	1.447	51.8	45.56	0	0	0	2.64
2001	17	23	1	596.558	-316.101	D	6.909	6.909	0	1.873	71.25	27.48	0	0	0	2.13
2001	18	23	687	601.186	-307.393	D	7.108	7.108	0.001	2.278	83.31	15.2	0	0	0	1.42
2001	19	23	545	603.234	-311.991	D	6.786	6.739	0.047	1.534	75.15	23.54	0	0	0	1.3
2001	20	23	624	596.324	-316.278	D	6.734	6.731	0.003	1.519	58.97	38.63	0	0	0	2.35
2001	21	23	517	602.805	-305.061	D	6.564	6.553	0.011	1.169	61.37	36.98	0	0	0	1.66
2001	22	23	462	603.035	-312.603	D	6.515	6.515	0	1.095	74.9	23.66	0	0	0	1.05
2001	23	23	545	603.234	-311.991	D	6.683	6.683	0	1.424	80.98	17.09	0	0	0	0.57
2001	24	23	662	598.404	-311.683	D	6.986	6.91	0.076	1.876	79.06	20.37	0	0	0	0.57

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	25	23	1	596.558	-316.101	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	26	23	1	596.558	-316.101	D	6.498	6.498	0	1.062	0	0	0	0	0	0
2001	27	23	624	596.324	-316.278	D	6.641	6.636	0.005	1.331	43.86	52.75	0	0	0	3.39
2001	28	23	698	602.668	-305.255	D	6.511	6.511	0	1.087	68.19	29.77	0	0	0	1.47
2001	29	23	1	596.558	-316.101	D	8.131	8.131	0	4.495	0	0	0	0	0	0
2001	30	23	1	596.558	-316.101	D	9.187	9.187	0	7.032	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	6.895	6.895	0	1.845	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2001	33	23	624	596.324	-316.278	D	6.541	6.535	0.006	1.134	59.94	37.76	0	0	0	2.29
2001	34	23	517	602.805	-305.061	D	6.478	6.469	0.009	1.006	63.51	34.76	0	0	0	1.74
2001	35	23	267	600.971	-311.763	D	6.493	6.493	0	1.053	59.11	11.93	0	0	0	0.44
2001	36	23	517	602.805	-305.061	D	6.732	6.692	0.04	1.44	55.72	41.88	0	0	0	2.4
2001	37	23	517	602.805	-305.061	D	6.504	6.502	0.003	1.07	82.88	13.78	0	0	0	3.36
2001	38	23	517	602.805	-305.061	D	6.642	6.617	0.025	1.293	75.13	23.3	0	0	0	1.57
2001	39	23	1	596.558	-316.101	D	7.981	7.981	0	4.155	0	0	0	0	0	0
2001	40	23	517	602.805	-305.061	D	9.342	9.335	0.007	7.408	85.3	14.62	0	0	0	0.07
2001	41	23	624	596.324	-316.278	D	6.56	6.555	0.004	1.174	59.51	38.04	0	0	0	2.41
2001	42	23	1	596.558	-316.101	D	6.47	6.47	0	1.007	0	0	0	0	0	0
2001	43	23	1	596.558	-316.101	D	6.521	6.521	0	1.107	0	0	0	0	0	0
2001	44	23	1	596.558	-316.101	D	7.622	7.622	0	3.364	0	0	0	0	0	0
2001	45	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	46	23	626	596.299	-315.88	D	8.86	8.818	0.042	6.113	91.26	8.61	0	0	0	0.13
2001	47	23	637	596.267	-315.066	D	6.769	6.712	0.058	1.48	77.39	21.61	0	0	0	0.99
2001	48	23	1	596.558	-316.101	D	6.499	6.499	0	1.064	0	0	0	0	0	0
2001	49	23	637	596.267	-315.066	D	6.47	6.469	0.001	1.006	79.45	18.88	0	0	0	1.65
2001	50	23	637	596.267	-315.066	D	6.475	6.473	0.002	1.014	82.54	16.82	0	0	0	0.68
2001	51	23	517	602.805	-305.061	D	6.627	6.626	0.001	1.312	93.02	5.58	0	0	0	1.39
2001	52	23	656	597.971	-312.292	D	6.545	6.539	0.006	1.141	87.32	11.96	0	0	0	0.72
2001	53	23	624	596.324	-316.278	D	7.302	7.301	0.001	2.68	87.67	12.03	0	0	0	0.31
2001	54	23	517	602.805	-305.061	D	6.723	6.721	0.002	1.499	82.91	15.85	0	0	0	1.21
2001	55	23	517	602.805	-305.061	D	8.106	8.106	0	4.438	86.84	12.83	0	0	0	1.04
2001	56	23	1	596.558	-316.101	D	8.437	8.437	0	5.201	0	0	0	0	0	0
2001	57	23	637	596.267	-315.066	D	6.514	6.507	0.008	1.08	61.3	35.01	0	0	0	3.68
2001	58	23	637	596.267	-315.066	D	6.529	6.528	0.001	1.121	83.7	15.36	0	0	0	1.19
2001	59	23	1	596.558	-316.101	D	6.638	6.638	0	1.335	83.87	13.98	0	0	0	0.28
2001	60	23	1	596.558	-316.101	D	6.473	6.473	0	1.014	0	0	0	0	0	0
2001	61	23	1	596.558	-316.101	D	6.924	6.924	0	1.905	0	0	0	0	0	0
2001	62	23	517	602.805	-305.061	D	6.674	6.66	0.014	1.377	88.61	10.11	0	0	0	1.26
2001	63	23	637	596.267	-315.066	D	6.648	6.621	0.027	1.301	90.79	8.55	0	0	0	0.67

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	64	23	1	596.558	-316.101	D	6.57	6.57	0	1.202	0	0	0	0	0	0
2001	65	23	1	596.558	-316.101	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	66	23	623	596.511	-316.262	D	6.478	6.477	0	1.022	91.9	5.57	0	0	0	2.41
2001	67	23	517	602.805	-305.061	D	6.578	6.54	0.038	1.143	79.67	18.31	0	0	0	2.02
2001	68	23	624	596.324	-316.278	D	6.535	6.525	0.01	1.115	80.95	16.92	0	0	0	2.14
2001	69	23	661	598.396	-311.717	D	6.496	6.495	0.001	1.056	83.39	14.76	0	0	0	1.88
2001	70	23	517	602.805	-305.061	D	6.474	6.474	0	1.015	88.35	10.48	0	0	0	1.2
2001	71	23	517	602.805	-305.061	D	8.243	8.243	0	4.75	93.07	5.95	0	0	0	0.94
2001	72	23	1	596.558	-316.101	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2001	73	23	626	596.299	-315.88	D	6.494	6.485	0.009	1.037	68.98	25.63	0	0	0	5.38
2001	74	23	516	602.728	-305.38	D	8.834	8.834	0	6.153	94.41	3.13	0	0	0	1.03
2001	75	23	517	602.805	-305.061	D	8.843	8.613	0.23	5.619	88.2	11.6	0	0	0	0.2
2001	76	23	624	596.324	-316.278	D	6.816	6.791	0.025	1.638	87.34	11.85	0	0	0	0.82
2001	77	23	1	596.558	-316.101	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	78	23	1	596.558	-316.101	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	6.474	6.474	0	1.015	0	0	0	0	0	0
2001	80	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	81	23	6	596.462	-314.859	D	6.513	6.513	0	1.091	84.33	11.95	0	0	0	1.23
2001	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.799	0	0	0	0	0	0
2001	83	23	1	596.558	-316.101	D	6.665	6.665	0	1.389	90.62	7.26	0	0	0	0.38
2001	84	23	1	596.558	-316.101	D	6.489	6.489	0	1.045	0	0	0	0	0	0
2001	85	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	86	23	631	596.276	-315.551	D	6.478	6.469	0.009	1.007	85.57	12.74	0	0	0	1.68
2001	87	23	637	596.267	-315.066	D	6.48	6.468	0.012	1.005	88.31	10.66	0	0	0	1.02
2001	88	23	461	602.269	-305.916	D	7.079	7.079	0	2.22	36.65	2.52	0	0	0	0.38
2001	89	23	1	596.558	-316.101	D	8.796	8.796	0	6.06	0	0	0	0	0	0
2001	90	23	1	596.558	-316.101	D	8.559	8.559	0	5.491	0	0	0	0	0	0
2001	91	23	517	602.805	-305.061	D	7.094	7.057	0.037	2.174	91.25	8.14	0	0	0	0.61
2001	92	23	516	602.728	-305.38	D	6.946	6.946	0	1.948	93.36	3.38	0	0	0	2.31
2001	93	23	1	596.558	-316.101	D	9.416	9.416	0	7.617	0	0	0	0	0	0
2001	94	23	1	596.558	-316.101	D	8.143	8.143	0	4.52	0	0	0	0	0	0
2001	95	23	1	596.558	-316.101	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2001	96	23	1	596.558	-316.101	D	8.925	8.925	0	6.376	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	6.895	6.895	0	1.846	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.116	7.116	0	2.295	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.053	7.053	0	2.166	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.448	7.448	0	2.991	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	9.215	9.215	0	7.101	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.38	7.38	0	2.846	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	103	23	544	603.219	-311.745	D	6.553	6.545	0.008	1.154	97.43	1.42	0	0	0	1.15
2001	104	23	517	602.805	-305.061	D	6.63	6.625	0.005	1.31	98.98	0.47	0	0	0	0.55
2001	105	23	624	596.324	-316.278	D	7.665	7.656	0.009	3.437	98.39	0.8	0	0	0	0.8
2001	106	23	153	599.71	-314.859	D	6.611	6.605	0.006	1.27	94.71	4.03	0	0	0	1.25
2001	107	23	517	602.805	-305.061	D	6.482	6.478	0.003	1.024	71.07	26.85	0	0	0	2.1
2001	108	23	624	596.324	-316.278	D	6.483	6.479	0.005	1.025	97.22	1.36	0	0	0	1.45
2001	109	23	548	603.28	-312.734	D	6.502	6.491	0.011	1.05	97.31	1.7	0	0	0	0.99
2001	110	23	1	596.558	-316.101	D	6.79	6.79	0	1.636	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.389	7.389	0	2.866	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.362	7.362	0	2.809	0	0	0	0	0	0
2001	114	23	517	602.805	-305.061	D	6.522	6.516	0.006	1.098	74.56	20.48	0	0	0	4.97
2001	115	23	624	596.324	-316.278	D	6.484	6.477	0.007	1.022	92.75	5.6	0	0	0	1.66
2001	116	23	517	602.805	-305.061	D	6.544	6.536	0.008	1.135	96.29	2.48	0	0	0	1.25
2001	117	23	351	601.391	-307.483	D	6.689	6.689	0	1.435	33.89	0.05	0	0	0	0.23
2001	118	23	517	602.805	-305.061	D	6.676	6.676	0.001	1.409	98.93	0.24	0	0	0	0.76
2001	119	23	517	602.805	-305.061	D	6.587	6.586	0.001	1.234	99.27	0.27	0	0	0	0.46
2001	120	23	1	596.558	-316.101	D	6.721	6.721	0	1.497	0	0	0	0	0	0
2001	121	23	1	596.558	-316.101	D	6.826	6.826	0	1.708	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.186	7.186	0	2.441	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	6.778	6.778	0	1.612	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	6.933	6.933	0	1.921	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	6.946	6.946	0	1.948	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.82	7.82	0	3.797	0	0	0	0	0	0
2001	127	23	694	602.12	-306.029	D	7.589	7.584	0.005	3.281	98.5	0.85	0	0	0	0.64
2001	128	23	563	600.143	-314.135	D	6.979	6.951	0.028	1.959	97.64	1.66	0	0	0	0.7
2001	129	23	624	596.324	-316.278	D	6.527	6.515	0.012	1.094	98.46	0.58	0	0	0	0.94
2001	130	23	545	603.234	-311.991	D	6.591	6.574	0.017	1.21	99.15	0.26	0	0	0	0.58
2001	131	23	517	602.805	-305.061	D	7.48	7.48	0.001	3.058	99.44	0.08	0	0	0	0.37
2001	132	23	546	603.249	-312.239	D	8.131	8.041	0.09	4.291	92.97	6.93	0	0	0	0.09
2001	133	23	517	602.805	-305.061	D	6.524	6.523	0	1.111	97.73	0.31	0	0	0	1.72
2001	134	23	517	602.805	-305.061	D	6.592	6.591	0.001	1.243	98.77	0.36	0	0	0	0.76
2001	135	23	1	596.558	-316.101	D	6.924	6.924	0	1.904	0	0	0	0	0	0
2001	136	23	1	596.558	-316.101	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.223	7.223	0	2.516	0	0	0	0	0	0
2001	138	23	517	602.805	-305.061	D	7.448	7.448	0	2.989	99.58	0.1	0	0	0	0.32
2001	139	23	545	603.234	-311.991	D	8.124	8.057	0.068	4.325	97.83	2.08	0	0	0	0.09
2001	140	23	548	603.28	-312.734	D	7.309	7.301	0.008	2.681	99.34	0.3	0	0	0	0.34
2001	141	23	517	602.805	-305.061	D	8.574	8.573	0.001	5.523	99.19	0.59	0	0	0	0.26

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	142	23	1	596.558	-316.101	D	6.575	6.575	0	1.213	0	0	0	0	0	0
2001	143	23	1	596.558	-316.101	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	144	23	677	600.05	-309.264	D	6.569	6.564	0.005	1.19	89.62	7.36	0	0	0	3.02
2001	145	23	1	596.558	-316.101	D	6.601	6.601	0	1.263	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	6.634	6.634	0	1.327	0	0	0	0	0	0
2001	147	23	517	602.805	-305.061	D	6.581	6.581	0	1.224	97.63	0.43	0	0	0	1.83
2001	148	23	521	602.866	-306.052	D	6.793	6.762	0.031	1.58	98.17	1.01	0	0	0	0.83
2001	149	23	624	596.324	-316.278	D	6.76	6.749	0.011	1.553	98.34	1.09	0	0	0	0.56
2001	150	23	637	596.267	-315.066	D	7.58	7.573	0.007	3.259	98.95	0.69	0	0	0	0.36
2001	151	23	1	596.558	-316.101	D	8.688	8.688	0	5.799	0	0	0	0	0	0
2001	152	23	517	602.805	-305.061	D	6.995	6.983	0.011	2.024	96.29	1.96	0	0	0	1.75
2001	153	23	517	602.805	-305.061	D	6.856	6.855	0	1.766	98.11	0.35	0	0	0	1.46
2001	154	23	624	596.324	-316.278	D	6.778	6.74	0.038	1.536	97.15	1.7	0	0	0	1.14
2001	155	23	517	602.805	-305.061	D	7.393	7.392	0	2.872	96.18	3.4	0	0	0	0.44
2001	156	23	404	601.83	-306.699	D	8.364	8.364	0	5.03	97.27	0.58	0	0	0	0.21
2001	157	23	1	596.558	-316.101	D	8.193	8.193	0	4.636	0	0	0	0	0	0
2001	158	23	517	602.805	-305.061	D	7.656	7.645	0.011	3.414	99.03	0.74	0	0	0	0.23
2001	159	23	548	603.28	-312.734	D	6.964	6.956	0.007	1.97	99.21	0.58	0	0	0	0.2
2001	160	23	1	596.558	-316.101	D	6.637	6.637	0	1.333	0	0	0	0	0	0
2001	161	23	517	602.805	-305.061	D	6.675	6.663	0.012	1.384	99.43	0.12	0	0	0	0.45
2001	162	23	517	602.805	-305.061	D	6.889	6.885	0.004	1.826	99.6	0.07	0	0	0	0.3
2001	163	23	1	596.558	-316.101	D	6.989	6.989	0	2.037	0	0	0	0	0	0
2001	164	23	1	596.558	-316.101	D	7.456	7.456	0	3.006	0	0	0	0	0	0
2001	165	23	1	596.558	-316.101	D	7.35	7.35	0	2.784	0	0	0	0	0	0
2001	166	23	517	602.805	-305.061	D	8.915	8.914	0	6.35	98.79	0.11	0	0	0	1.38
2001	167	23	27	597.551	-316.024	D	6.574	6.554	0.02	1.171	97.48	0.67	0	0	0	1.86
2001	168	23	462	603.035	-312.603	D	6.64	6.64	0	1.339	95.98	0.08	0	0	0	1.22
2001	169	23	545	603.234	-311.991	D	6.887	6.882	0.004	1.82	99.45	0.09	0	0	0	0.46
2001	170	23	516	602.728	-305.38	D	6.895	6.895	0	1.846	99.59	0.03	0	0	0	0.41
2001	171	23	1	596.558	-316.101	D	7.198	7.198	0	2.465	0	0	0	0	0	0
2001	172	23	624	596.324	-316.278	D	7.955	7.865	0.09	3.895	99.26	0.45	0	0	0	0.28
2001	173	23	603	598.68	-316.244	D	6.97	6.956	0.014	1.969	98.92	0.84	0	0	0	0.24
2001	174	23	624	596.324	-316.278	D	6.725	6.708	0.018	1.472	99.02	0.29	0	0	0	0.67
2001	175	23	624	596.324	-316.278	D	6.823	6.821	0.002	1.698	98.9	0.39	0	0	0	0.56
2001	176	23	624	596.324	-316.278	D	6.752	6.751	0.001	1.558	99.27	0.2	0	0	0	0.43
2001	177	23	637	596.267	-315.066	D	6.785	6.785	0	1.625	99.2	0.15	0	0	0	0.34
2001	178	23	461	602.269	-305.916	D	7.148	7.147	0	2.36	99.62	0.12	0	0	0	0.21
2001	179	23	461	602.269	-305.916	D	7.369	7.369	0.001	2.822	99.34	0.62	0	0	0	0.15
2001	180	23	461	602.269	-305.916	D	8.203	8.203	0	4.657	98.8	0.04	0	0	0	0.16

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	181	23	1	596.558	-316.101	D	7.515	7.515	0	3.134	0	0	0	0	0	0
2001	182	23	694	602.12	-306.029	D	8.669	8.667	0.002	5.747	99.71	0.05	0	0	0	0.27
2001	183	23	695	602.257	-305.836	D	7.447	7.441	0.007	2.974	97.99	1.83	0	0	0	0.17
2001	184	23	694	602.12	-306.029	D	6.762	6.76	0.002	1.576	99.57	0.08	0	0	0	0.28
2001	185	23	461	602.269	-305.916	D	7.625	7.625	0	3.37	100.51	0.2	0	0	0	0.25
2001	186	23	656	597.971	-312.292	D	7.09	7.061	0.029	2.183	99.39	0.1	0	0	0	0.52
2001	187	23	624	596.324	-316.278	D	6.61	6.603	0.007	1.266	99.31	0.17	0	0	0	0.52
2001	188	23	603	598.68	-316.244	D	6.962	6.938	0.024	1.933	99.67	0.05	0	0	0	0.28
2001	189	23	1	596.558	-316.101	D	7.464	7.464	0	3.025	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.181	7.181	0	2.43	0	0	0	0	0	0
2001	191	23	624	596.324	-316.278	D	7.857	7.718	0.14	3.571	99.24	0.56	0	0	0	0.2
2001	192	23	603	598.68	-316.244	D	7.648	7.646	0.002	3.417	99.67	0.08	0	0	0	0.23
2001	193	23	695	602.257	-305.836	D	6.951	6.926	0.025	1.908	98.95	0.83	0	0	0	0.22
2001	194	23	624	596.324	-316.278	D	6.684	6.668	0.016	1.395	99.34	0.38	0	0	0	0.27
2001	195	23	623	596.511	-316.262	D	6.647	6.647	0	1.352	97.49	0.03	0	0	0	0.29
2001	196	23	1	596.558	-316.101	D	6.628	6.628	0	1.314	0	0	0	0	0	0
2001	197	23	1	596.558	-316.101	D	6.873	6.873	0	1.802	0	0	0	0	0	0
2001	198	23	1	596.558	-316.101	D	9.096	9.096	0	6.802	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.762	7.762	0	3.669	0	0	0	0	0	0
2001	200	23	1	596.558	-316.101	D	9.024	9.024	0	6.622	0	0	0	0	0	0
2001	201	23	694	602.12	-306.029	D	8.453	8.452	0.001	5.237	99.61	0.06	0	0	0	0.31
2001	202	23	676	599.876	-309.365	D	8.535	8.36	0.175	5.021	98.39	1.48	0	0	0	0.12
2001	203	23	517	602.805	-305.061	D	8.445	8.321	0.124	4.931	99.33	0.57	0	0	0	0.1
2001	204	23	517	602.805	-305.061	D	7.739	7.714	0.025	3.564	99.25	0.64	0	0	0	0.11
2001	205	23	517	602.805	-305.061	D	7.244	7.241	0.003	2.553	99.51	0.05	0	0	0	0.46
2001	206	23	517	602.805	-305.061	D	7.765	7.706	0.06	3.546	98.34	1.52	0	0	0	0.14
2001	207	23	517	602.805	-305.061	D	8.779	8.741	0.038	5.927	99.27	0.61	0	0	0	0.11
2001	208	23	193	600.016	-312.336	D	8.856	8.783	0.073	6.029	98.84	1.08	0	0	0	0.07
2001	209	23	694	602.12	-306.029	D	8.715	8.672	0.043	5.76	99.1	0.84	0	0	0	0.06
2001	210	23	521	602.866	-306.052	D	8.78	8.738	0.043	5.918	99.54	0.23	0	0	0	0.23
2001	211	23	517	602.805	-305.061	D	8.175	7.828	0.347	3.815	99.08	0.77	0	0	0	0.16
2001	212	23	517	602.805	-305.061	D	7.051	6.923	0.128	1.902	99.71	0.05	0	0	0	0.24
2001	213	23	517	602.805	-305.061	D	7.273	7.271	0.002	2.618	99.74	0.01	0	0	0	0.19
2001	214	23	1	596.558	-316.101	D	6.962	6.962	0	1.981	0	0	0	0	0	0
2001	215	23	517	602.805	-305.061	D	7.614	7.602	0.012	3.32	99.6	0.11	0	0	0	0.28
2001	216	23	563	600.143	-314.135	D	8.237	8.139	0.098	4.511	99.45	0.4	0	0	0	0.16
2001	217	23	1	596.558	-316.101	D	6.844	6.844	0	1.744	0	0	0	0	0	0
2001	218	23	1	596.558	-316.101	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2001	219	23	1	596.558	-316.101	D	7.474	7.474	0	3.046	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	220	23	1	596.558	-316.101	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2001	221	23	1	596.558	-316.101	D	8.036	8.036	0	4.279	0	0	0	0	0	0
2001	222	23	517	602.805	-305.061	D	8.454	8.435	0.019	5.197	99.41	0.19	0	0	0	0.4
2001	223	23	624	596.324	-316.278	D	8.136	8.076	0.06	4.368	98.51	1.36	0	0	0	0.13
2001	224	23	603	598.68	-316.244	D	7.116	7.104	0.012	2.271	98.9	0.88	0	0	0	0.22
2001	225	23	603	598.68	-316.244	D	6.935	6.929	0.006	1.914	98.64	1.15	0	0	0	0.18
2001	226	23	1	596.558	-316.101	D	6.841	6.841	0	1.737	0	0	0	0	0	0
2001	227	23	1	596.558	-316.101	D	6.643	6.643	0	1.345	0	0	0	0	0	0
2001	228	23	624	596.324	-316.278	D	7.018	7.007	0.011	2.073	98.65	0.12	0	0	0	1.24
2001	229	23	517	602.805	-305.061	D	7.032	6.993	0.04	2.043	95.51	3.54	0	0	0	0.95
2001	230	23	517	602.805	-305.061	D	7.288	7.287	0.001	2.65	99.48	0.05	0	0	0	0.6
2001	231	23	517	602.805	-305.061	D	6.99	6.977	0.013	2.011	96.31	3.04	0	0	0	0.65
2001	232	23	624	596.324	-316.278	D	6.742	6.739	0.003	1.535	99.12	0.08	0	0	0	0.81
2001	233	23	637	596.267	-315.066	D	6.875	6.857	0.018	1.77	99.37	0.19	0	0	0	0.44
2001	234	23	519	602.836	-305.557	D	8.184	8.18	0.004	4.606	99.66	0.14	0	0	0	0.15
2001	235	23	38	597.8	-316.005	D	7.249	7.248	0	2.57	97.06	0.04	0	0	0	0.19
2001	236	23	1	596.558	-316.101	D	8.023	8.023	0	4.248	0	0	0	0	0	0
2001	237	23	1	596.558	-316.101	D	7.35	7.35	0	2.783	0	0	0	0	0	0
2001	238	23	656	597.971	-312.292	D	8.142	8.139	0.003	4.512	99.03	0.22	0	0	0	0.72
2001	239	23	624	596.324	-316.278	D	7.258	7.25	0.008	2.573	99.21	0.35	0	0	0	0.46
2001	240	23	624	596.324	-316.278	D	7.557	7.525	0.032	3.154	99.16	0.56	0	0	0	0.29
2001	241	23	517	602.805	-305.061	D	7.347	7.245	0.102	2.563	99.11	0.5	0	0	0	0.38
2001	242	23	517	602.805	-305.061	D	8.899	8.841	0.058	6.169	99.34	0.54	0	0	0	0.11
2001	243	23	517	602.805	-305.061	D	8.899	8.884	0.015	6.275	99	0.94	0	0	0	0.07
2001	244	23	637	596.267	-315.066	D	8.299	8.266	0.034	4.803	97.07	2.76	0	0	0	0.16
2001	245	23	624	596.324	-316.278	D	7.199	7.184	0.015	2.437	99.13	0.66	0	0	0	0.2
2001	246	23	222	600.034	-309.336	D	8.018	8.017	0.001	4.236	99.57	0.22	0	0	0	0.12
2001	247	23	517	602.805	-305.061	D	7.628	7.626	0.003	3.371	99.61	0.09	0	0	0	0.3
2001	248	23	517	602.805	-305.061	D	6.964	6.938	0.026	1.933	98.79	0.82	0	0	0	0.4
2001	249	23	517	602.805	-305.061	D	7.454	7.452	0.002	2.999	99.63	0.12	0	0	0	0.25
2001	250	23	1	596.558	-316.101	D	9.131	9.131	0	6.889	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	9.542	9.542	0	7.946	0	0	0	0	0	0
2001	252	23	656	597.971	-312.292	D	9.45	9.397	0.053	7.568	99.06	0.43	0	0	0	0.51
2001	253	23	624	596.324	-316.278	D	7.572	7.501	0.072	3.102	98.84	0.7	0	0	0	0.46
2001	254	23	517	602.805	-305.061	D	6.783	6.77	0.013	1.595	98.71	0.26	0	0	0	1.02
2001	255	23	656	597.971	-312.292	D	7.091	7.065	0.026	2.191	98.89	0.57	0	0	0	0.54
2001	256	23	662	598.404	-311.683	D	7.253	7.233	0.02	2.537	99.24	0.46	0	0	0	0.3
2001	257	23	688	601.298	-307.191	D	6.895	6.881	0.015	1.817	98.84	0.87	0	0	0	0.28
2001	258	23	1	596.558	-316.101	D	6.636	6.636	0	1.33	100.49	0.04	0	0	0	0.37

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	259	23	1	596.558	-316.101	D	6.702	6.702	0	1.46	0	0	0	0	0	0
2001	260	23	1	596.558	-316.101	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2001	261	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	262	23	517	602.805	-305.061	D	9.424	9.154	0.27	6.947	94.91	4.97	0	0	0	0.11
2001	263	23	624	596.324	-316.278	D	7.165	7.114	0.051	2.292	95.46	3.63	0	0	0	0.91
2001	264	23	521	602.866	-306.052	D	7.182	7.167	0.016	2.4	98.97	0.21	0	0	0	0.81
2001	265	23	603	598.68	-316.244	D	7.059	7.046	0.013	2.152	98.97	0.23	0	0	0	0.81
2001	266	23	624	596.324	-316.278	D	7.26	7.232	0.028	2.535	98.07	1.57	0	0	0	0.36
2001	267	23	520	602.851	-305.804	D	8.212	8.108	0.104	4.441	96.16	3.74	0	0	0	0.1
2001	268	23	1	596.558	-316.101	D	6.547	6.547	0	1.158	0	0	0	0	0	0
2001	269	23	1	596.558	-316.101	D	6.531	6.531	0	1.126	0	0	0	0	0	0
2001	270	23	517	602.805	-305.061	D	6.643	6.572	0.071	1.207	96.89	1.94	0	0	0	1.16
2001	271	23	624	596.324	-316.278	D	6.879	6.827	0.052	1.71	98.24	0.95	0	0	0	0.81
2001	272	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	273	23	1	596.558	-316.101	D	7.133	7.133	0	2.33	0	0	0	0	0	0
2001	274	23	516	602.728	-305.38	D	7.007	7.007	0	2.073	97.75	0.19	0	0	0	0.54
2001	275	23	517	602.805	-305.061	D	7.233	7.233	0	2.537	98.83	0.92	0	0	0	0.29
2001	276	23	1	596.558	-316.101	D	7.307	7.307	0	2.693	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.843	7.843	0	3.848	0	0	0	0	0	0
2001	278	23	517	602.805	-305.061	D	9.859	9.843	0.016	8.747	93.11	6.84	0	0	0	0.06
2001	279	23	517	602.805	-305.061	D	7.899	7.893	0.005	3.959	94.05	4.66	0	0	0	1.28
2001	280	23	637	596.267	-315.066	D	6.571	6.533	0.038	1.13	91.27	7.23	0	0	0	1.5
2001	281	23	637	596.267	-315.066	D	6.599	6.595	0.005	1.25	95.4	3.74	0	0	0	0.85
2001	282	23	1	596.558	-316.101	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	8.133	8.133	0	4.498	0	0	0	0	0	0
2001	284	23	1	596.558	-316.101	D	10.095	10.095	0	9.436	0	0	0	0	0	0
2001	285	23	637	596.267	-315.066	D	9.95	9.943	0.007	9.018	88.96	10.92	0	0	0	0.1
2001	286	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	87.38	1.84	0	0	0	0.06
2001	287	23	517	602.805	-305.061	D	8.869	8.847	0.022	6.185	62.3	37.25	0	0	0	0.44
2001	288	23	1	596.558	-316.101	D	6.542	6.542	0	1.147	0	0	0	0	0	0
2001	289	23	517	602.805	-305.061	D	7.63	7.561	0.069	3.233	77.11	22.32	0	0	0	0.57
2001	290	23	624	596.324	-316.278	D	6.492	6.492	0	1.05	92.31	6.37	0	0	0	1.37
2001	291	23	637	596.267	-315.066	D	6.5	6.5	0	1.066	94.59	5.19	0	0	0	0.65
2001	292	23	1	596.558	-316.101	D	6.578	6.578	0	1.218	0	0	0	0	0	0
2001	293	23	490	602.499	-305.648	D	7.008	7.008	0	2.073	106.03	4.14	0	0	0	0.57
2001	294	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.564	7.564	0	3.239	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	9.63	9.63	0	8.178	0	0	0	0	0	0
2001	297	23	517	602.805	-305.061	D	9.649	9.627	0.022	8.168	93.93	5.91	0	0	0	0.16

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	298	23	212	600.226	-311.82	D	6.857	6.853	0.005	1.76	90.33	8.9	0	0	0	0.77
2001	299	23	517	602.805	-305.061	D	6.476	6.471	0.005	1.011	93.01	5.45	0	0	0	1.53
2001	300	23	624	596.324	-316.278	D	6.489	6.485	0.005	1.036	91.12	7.22	0	0	0	1.67
2001	301	23	1	596.558	-316.101	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	302	23	1	596.558	-316.101	D	6.499	6.499	0	1.065	0	0	0	0	0	0
2001	303	23	1	596.558	-316.101	D	6.516	6.516	0	1.098	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	6.796	6.796	0	1.647	0	0	0	0	0	0
2001	306	23	517	602.805	-305.061	D	8.955	8.951	0.005	6.439	92.6	7.13	0	0	0	0.27
2001	307	23	688	601.298	-307.191	D	8.686	8.519	0.167	5.395	84.89	15	0	0	0	0.12
2001	308	23	517	602.805	-305.061	D	6.598	6.594	0.004	1.248	97.66	1.62	0	0	0	0.72
2001	309	23	624	596.324	-316.278	D	8.125	7.859	0.267	3.882	84.43	15.39	0	0	0	0.18
2001	310	23	637	596.267	-315.066	D	6.479	6.476	0.003	1.02	98.16	1.03	0	0	0	0.8
2001	311	23	637	596.267	-315.066	D	6.545	6.517	0.027	1.1	98.12	1.3	0	0	0	0.58
2001	312	23	517	602.805	-305.061	D	6.798	6.781	0.016	1.618	98.27	0.96	0	0	0	0.76
2001	313	23	63	598.297	-315.967	D	6.673	6.673	0	1.403	89.77	1.46	0	0	0	0.92
2001	314	23	563	600.143	-314.135	D	6.649	6.643	0.005	1.345	85.53	13.14	0	0	0	1.31
2001	315	23	603	598.68	-316.244	D	6.748	6.732	0.016	1.52	82.06	15.82	0	0	0	2.12
2001	316	23	1	596.558	-316.101	D	6.562	6.562	0	1.186	0	0	0	0	0	0
2001	317	23	1	596.558	-316.101	D	6.567	6.567	0	1.196	0	0	0	0	0	0
2001	318	23	1	596.558	-316.101	D	7.603	7.603	0	3.322	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	6.973	6.973	0	2.004	0	0	0	0	0	0
2001	320	23	1	596.558	-316.101	D	7.309	7.309	0	2.697	0	0	0	0	0	0
2001	321	23	1	596.558	-316.101	D	7.623	7.623	0	3.366	0	0	0	0	0	0
2001	322	23	1	596.558	-316.101	D	7.892	7.892	0	3.955	0	0	0	0	0	0
2001	323	23	624	596.324	-316.278	D	7.931	7.858	0.073	3.881	69.84	29.92	0	0	0	0.24
2001	324	23	624	596.324	-316.278	D	6.474	6.474	0	1.016	82.6	13.83	0	0	0	3.79
2001	325	23	637	596.267	-315.066	D	6.483	6.476	0.007	1.02	75.94	21.36	0	0	0	2.72
2001	326	23	546	603.249	-312.239	D	6.52	6.52	0	1.105	87.56	10.17	0	0	0	1.9
2001	327	23	1	596.558	-316.101	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	9.336	9.336	0	7.411	0	0	0	0	0	0
2001	329	23	1	596.558	-316.101	D	6.663	6.663	0	1.383	0	0	0	0	0	0
2001	330	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	331	23	1	596.558	-316.101	D	7.453	7.453	0	3.002	0	0	0	0	0	0
2001	332	23	603	598.68	-316.244	D	8.722	8.706	0.016	5.842	69.44	29.89	0	0	0	0.64
2001	333	23	624	596.324	-316.278	D	10.098	10.097	0	9.443	88.31	11.88	0	0	0	0.06
2001	334	23	624	596.324	-316.278	D	8.878	8.806	0.072	6.083	86.71	12.79	0	0	0	0.51
2001	335	23	516	602.728	-305.38	D	6.625	6.625	0	1.309	90.88	9.26	0	0	0	0.58
2001	336	23	1	596.558	-316.101	D	6.665	6.665	0	1.388	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	337	23	1	596.558	-316.101	D	6.735	6.735	0	1.527	0	0	0	0	0	0
2001	338	23	1	596.558	-316.101	D	6.817	6.817	0	1.69	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	8.689	8.689	0	5.801	0	0	0	0	0	0
2001	340	23	517	602.805	-305.061	D	9.807	9.806	0.001	8.646	68.19	31.42	0	0	0	0.26
2001	341	23	517	602.805	-305.061	D	10.004	9.879	0.125	8.844	81.82	18.02	0	0	0	0.15
2001	342	23	517	602.805	-305.061	D	8.899	8.814	0.085	6.103	88.84	11.08	0	0	0	0.08
2001	343	23	1	596.558	-316.101	D	6.627	6.627	0	1.313	96.93	2.61	0	0	0	0.36
2001	344	23	6	596.462	-314.859	D	6.519	6.518	0.001	1.101	76.57	21.02	0	0	0	2.09
2001	345	23	637	596.267	-315.066	D	6.576	6.575	0.002	1.211	78.95	19.75	0	0	0	1.32
2001	346	23	1	596.558	-316.101	D	8.987	8.987	0	6.529	0	0	0	0	0	0
2001	347	23	517	602.805	-305.061	D	9.711	9.349	0.362	7.444	85.64	13.95	0	0	0	0.41
2001	348	23	624	596.324	-316.278	D	9.015	8.693	0.322	5.811	87.58	12.22	0	0	0	0.21
2001	349	23	517	602.805	-305.061	D	7.241	7.172	0.069	2.41	93.71	5.99	0	0	0	0.3
2001	350	23	694	602.12	-306.029	D	10.134	10.099	0.035	9.449	92.88	7.06	0	0	0	0.05
2001	351	23	624	596.324	-316.278	D	10.231	10.218	0.013	9.779	89.89	10.03	0	0	0	0.06
2001	352	23	624	596.324	-316.278	D	7.425	7.315	0.11	2.709	75.53	23.8	0	0	0	0.68
2001	353	23	624	596.324	-316.278	D	6.678	6.671	0.006	1.401	75.79	23.2	0	0	0	1.01
2001	354	23	624	596.324	-316.278	D	6.473	6.471	0.002	1.01	74.81	23.43	0	0	0	1.77
2001	355	23	517	602.805	-305.061	D	6.489	6.486	0.002	1.039	71.46	26.21	0	0	0	2.32
2001	356	23	1	596.558	-316.101	D	7.376	7.376	0	2.837	0	0	0	0	0	0
2001	357	23	1	596.558	-316.101	D	7.901	7.901	0	3.975	0	0	0	0	0	0
2001	358	23	676	599.876	-309.365	D	6.503	6.494	0.009	1.054	59.35	38.2	0	0	0	2.42
2001	359	23	624	596.324	-316.278	D	6.516	6.492	0.023	1.051	58.19	38.9	0	0	0	2.92
2001	360	23	517	602.805	-305.061	D	6.521	6.498	0.022	1.063	54.86	42.82	0	0	0	2.31
2001	361	23	548	603.28	-312.734	D	6.535	6.535	0	1.134	58.21	40.19	0	0	0	1.47
2001	362	23	1	596.558	-316.101	D	6.849	6.849	0	1.753	0	0	0	0	0	0
2001	363	23	520	602.851	-305.804	D	6.637	6.628	0.008	1.316	71.94	26.73	0	0	0	1.32
2001	364	23	624	596.324	-316.278	D	6.532	6.52	0.013	1.105	54.93	42.17	0	0	0	2.89
2001	365	23	230	600.474	-311.801	D	6.66	6.564	0.096	1.19	60.2	37.34	0	0	0	2.45
									0.362							
COLUMBIA									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	517	602.805	-305.061	D	7.198	7.124	0.074	2.313	41.45	58.55	0	0	0	0
2001	2	23	624	596.324	-316.278	D	7.2	7.176	0.023	2.42	65.23	34.77	0	0	0	0
2001	3	23	211	600.245	-312.069	D	8.083	7.997	0.086	4.19	64.66	35.35	0	0	0	0
2001	4	23	545	603.234	-311.991	D	7.835	7.835	0.001	3.829	79.84	19.98	0	0	0	0
2001	5	23	1	596.558	-316.101	D	7.729	7.729	0	3.596	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	6	23	517	602.805	-305.061	D	7.311	7.31	0.001	2.699	65.8	34.25	0	0	0	0
2001	7	23	545	603.234	-311.991	D	7.259	7.209	0.049	2.489	50.43	49.57	0	0	0	0
2001	8	23	624	596.324	-316.278	D	7.386	7.373	0.013	2.831	68.06	31.95	0	0	0	0
2001	9	23	624	596.324	-316.278	D	7.369	7.366	0.003	2.816	71.91	28.08	0	0	0	0
2001	10	23	517	602.805	-305.061	D	7.463	7.46	0.002	3.017	57.07	42.9	0	0	0	0
2001	11	23	516	602.728	-305.38	D	7.924	7.924	0	4.027	65.75	33.14	0	0	0	0
2001	12	23	490	602.499	-305.648	D	9.445	9.445	0	7.691	72.47	26.06	0	0	0	0
2001	13	23	461	602.269	-305.916	D	9.133	9.133	0	6.895	79.95	22.34	0	0	0	0
2001	14	23	1	596.558	-316.101	D	9.712	9.712	0	8.396	0	0	0	0	0	0
2001	15	23	1	596.558	-316.101	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2001	16	23	517	602.805	-305.061	D	6.72	6.695	0.025	1.447	46.6	53.4	0	0	0	0
2001	17	23	624	596.324	-316.278	D	6.909	6.909	0.001	1.873	61.63	38.34	0	0	0	0
2001	18	23	694	602.12	-306.029	D	7.11	7.108	0.002	2.278	68.66	31.29	0	0	0	0
2001	19	23	545	603.234	-311.991	D	6.776	6.739	0.037	1.534	55.84	44.16	0	0	0	0
2001	20	23	631	596.276	-315.551	D	6.738	6.731	0.007	1.519	40.82	59.15	0	0	0	0
2001	21	23	517	602.805	-305.061	D	6.554	6.553	0.001	1.169	47.49	52.42	0	0	0	0
2001	22	23	1	596.558	-316.101	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2001	23	23	1	596.558	-316.101	D	6.682	6.682	0	1.422	0	0	0	0	0	0
2001	24	23	517	602.805	-305.061	D	6.988	6.91	0.078	1.876	49.85	50.15	0	0	0	0
2001	25	23	624	596.324	-316.278	D	6.59	6.589	0.001	1.239	62.91	37.04	0	0	0	0
2001	26	23	1	596.558	-316.101	D	6.498	6.498	0	1.062	0	0	0	0	0	0
2001	27	23	682	600.626	-308.407	D	6.652	6.636	0.016	1.331	37.95	62.05	0	0	0	0
2001	28	23	637	596.267	-315.066	D	6.518	6.51	0.009	1.085	58.54	41.48	0	0	0	0
2001	29	23	461	602.269	-305.916	D	8.175	8.175	0	4.593	55.64	31.91	0	0	0	0
2001	30	23	1	596.558	-316.101	D	9.187	9.187	0	7.032	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	6.895	6.895	0	1.845	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2001	33	23	517	602.805	-305.061	D	6.572	6.543	0.029	1.148	35.99	64	0	0	0	0
2001	34	23	517	602.805	-305.061	D	6.471	6.469	0.001	1.006	49.85	50.19	0	0	0	0
2001	35	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	36	23	517	602.805	-305.061	D	6.692	6.692	0	1.44	31.84	55.46	0	0	0	0
2001	37	23	517	602.805	-305.061	D	6.502	6.502	0	1.07	81.03	18.98	0	0	0	0
2001	38	23	517	602.805	-305.061	D	6.629	6.617	0.013	1.293	61.42	38.58	0	0	0	0
2001	39	23	1	596.558	-316.101	D	7.981	7.981	0	4.155	0	0	0	0	0	0
2001	40	23	517	602.805	-305.061	D	9.337	9.335	0.002	7.408	75.54	24.4	0	0	0	0
2001	41	23	626	596.299	-315.88	D	6.564	6.555	0.008	1.174	30.43	69.56	0	0	0	0
2001	42	23	1	596.558	-316.101	D	6.47	6.47	0	1.007	0	0	0	0	0	0
2001	43	23	1	596.558	-316.101	D	6.521	6.521	0	1.107	0	0	0	0	0	0
2001	44	23	1	596.558	-316.101	D	7.622	7.622	0	3.364	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	45	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	46	23	632	596.27	-315.421	D	8.982	8.818	0.164	6.113	84.91	15.09	0	0	0	0
2001	47	23	660	598.316	-311.922	D	6.793	6.718	0.075	1.493	75.4	24.6	0	0	0	0
2001	48	23	1	596.558	-316.101	D	6.499	6.499	0	1.064	0	0	0	0	0	0
2001	49	23	637	596.267	-315.066	D	6.474	6.469	0.005	1.006	62.3	37.72	0	0	0	0
2001	50	23	637	596.267	-315.066	D	6.475	6.473	0.002	1.014	75.58	24.47	0	0	0	0
2001	51	23	517	602.805	-305.061	D	6.626	6.626	0	1.312	88.39	11.32	0	0	0	0
2001	52	23	548	603.28	-312.734	D	6.541	6.538	0.003	1.14	72.79	27.18	0	0	0	0
2001	53	23	624	596.324	-316.278	D	7.302	7.301	0.001	2.68	74.53	25.46	0	0	0	0
2001	54	23	517	602.805	-305.061	D	6.75	6.721	0.029	1.499	63.73	36.27	0	0	0	0
2001	55	23	517	602.805	-305.061	D	8.107	8.106	0	4.438	80.73	19.2	0	0	0	0
2001	56	23	1	596.558	-316.101	D	8.437	8.437	0	5.201	0	0	0	0	0	0
2001	57	23	517	602.805	-305.061	D	6.515	6.51	0.006	1.085	40.61	59.39	0	0	0	0
2001	58	23	632	596.27	-315.421	D	6.529	6.528	0.001	1.121	72.11	28.02	0	0	0	0
2001	59	23	632	596.27	-315.421	D	6.638	6.638	0	1.335	67.93	23.99	0	0	0	0
2001	60	23	1	596.558	-316.101	D	6.473	6.473	0	1.014	85.02	12.39	0	0	0	0
2001	61	23	170	599.901	-314.094	D	6.932	6.924	0.008	1.905	81.37	18.62	0	0	0	0
2001	62	23	517	602.805	-305.061	D	6.671	6.66	0.012	1.377	85.57	14.43	0	0	0	0
2001	63	23	637	596.267	-315.066	D	6.63	6.621	0.009	1.301	84.57	15.43	0	0	0	0
2001	64	23	624	596.324	-316.278	D	6.573	6.57	0.003	1.202	54.41	45.54	0	0	0	0
2001	65	23	624	596.324	-316.278	D	6.536	6.53	0.006	1.124	59.83	40.18	0	0	0	0
2001	66	23	624	596.324	-316.278	D	6.478	6.477	0	1.022	76.42	23.63	0	0	0	0
2001	67	23	632	596.27	-315.421	D	6.553	6.533	0.02	1.13	58.53	41.47	0	0	0	0
2001	68	23	517	602.805	-305.061	D	6.531	6.53	0.002	1.123	52	48.01	0	0	0	0
2001	69	23	661	598.396	-311.717	D	6.499	6.495	0.004	1.056	71.5	28.5	0	0	0	0
2001	70	23	517	602.805	-305.061	D	6.475	6.474	0.001	1.015	81.88	18.17	0	0	0	0
2001	71	23	517	602.805	-305.061	D	8.243	8.243	0	4.75	90.11	9.42	0	0	0	0
2001	72	23	1	596.558	-316.101	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2001	73	23	557	601.32	-313.419	D	6.491	6.485	0.006	1.038	58.14	41.84	0	0	0	0
2001	74	23	431	602.059	-306.432	D	8.912	8.912	0	6.344	80.19	5.39	0	0	0	0
2001	75	23	545	603.234	-311.991	D	8.566	8.477	0.089	5.296	83.79	16.21	0	0	0	0
2001	76	23	624	596.324	-316.278	D	6.819	6.791	0.028	1.638	60.29	39.71	0	0	0	0
2001	77	23	1	596.558	-316.101	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	78	23	1	596.558	-316.101	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	6.474	6.474	0	1.015	0	0	0	0	0	0
2001	80	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	81	23	624	596.324	-316.278	D	6.516	6.513	0.004	1.091	89.01	10.99	0	0	0	0
2001	82	23	624	596.324	-316.278	D	7.382	7.358	0.024	2.799	86.71	13.29	0	0	0	0
2001	83	23	624	596.324	-316.278	D	6.672	6.665	0.007	1.389	87.35	12.66	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	84	23	1	596.558	-316.101	D	6.489	6.489	0	1.045	39.18	17.76	0	0	0	0
2001	85	23	624	596.324	-316.278	D	6.486	6.485	0.001	1.037	64.25	35.81	0	0	0	0
2001	86	23	624	596.324	-316.278	D	6.496	6.469	0.027	1.007	62.63	37.37	0	0	0	0
2001	87	23	517	602.805	-305.061	D	6.483	6.469	0.015	1.005	79.13	20.86	0	0	0	0
2001	88	23	461	602.269	-305.916	D	7.079	7.079	0	2.22	83.51	9.91	0	0	0	0
2001	89	23	1	596.558	-316.101	D	8.796	8.796	0	6.06	0	0	0	0	0	0
2001	90	23	1	596.558	-316.101	D	8.559	8.559	0	5.491	0	0	0	0	0	0
2001	91	23	695	602.257	-305.836	D	7.07	7.057	0.013	2.174	72.27	27.72	0	0	0	0
2001	92	23	1	596.558	-316.101	D	7.04	7.04	0	2.141	0	0	0	0	0	0
2001	93	23	1	596.558	-316.101	D	9.416	9.416	0	7.617	0	0	0	0	0	0
2001	94	23	1	596.558	-316.101	D	8.143	8.143	0	4.52	0	0	0	0	0	0
2001	95	23	1	596.558	-316.101	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2001	96	23	1	596.558	-316.101	D	8.925	8.925	0	6.376	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	6.895	6.895	0	1.846	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.116	7.116	0	2.295	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.053	7.053	0	2.166	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.448	7.448	0	2.991	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	9.215	9.215	0	7.101	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.38	7.38	0	2.846	0	0	0	0	0	0
2001	103	23	545	603.234	-311.991	D	6.549	6.545	0.003	1.154	98.03	1.97	0	0	0	0
2001	104	23	518	602.82	-305.309	D	6.628	6.625	0.003	1.31	99.03	0.99	0	0	0	0
2001	105	23	694	602.12	-306.029	D	7.611	7.59	0.021	3.295	97.06	2.94	0	0	0	0
2001	106	23	624	596.324	-316.278	D	6.615	6.605	0.01	1.27	91.41	8.59	0	0	0	0
2001	107	23	631	596.276	-315.551	D	6.479	6.477	0.002	1.022	36.8	63.21	0	0	0	0
2001	108	23	637	596.267	-315.066	D	6.48	6.479	0.002	1.025	95.76	4.26	0	0	0	0
2001	109	23	548	603.28	-312.734	D	6.493	6.491	0.001	1.05	96.76	3.24	0	0	0	0
2001	110	23	1	596.558	-316.101	D	6.79	6.79	0	1.636	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.389	7.389	0	2.866	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.362	7.362	0	2.809	0	0	0	0	0	0
2001	114	23	548	603.28	-312.734	D	6.525	6.523	0.002	1.111	83.96	16.02	0	0	0	0
2001	115	23	624	596.324	-316.278	D	6.479	6.477	0.002	1.022	78.52	21.49	0	0	0	0
2001	116	23	517	602.805	-305.061	D	6.543	6.536	0.008	1.135	95.01	5.01	0	0	0	0
2001	117	23	1	596.558	-316.101	D	6.69	6.69	0	1.437	0	0	0	0	0	0
2001	118	23	517	602.805	-305.061	D	6.676	6.676	0	1.409	98.94	0.61	0	0	0	0
2001	119	23	517	602.805	-305.061	D	6.587	6.586	0	1.234	99.19	0.85	0	0	0	0
2001	120	23	1	596.558	-316.101	D	6.721	6.721	0	1.497	0	0	0	0	0	0
2001	121	23	1	596.558	-316.101	D	6.826	6.826	0	1.708	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.186	7.186	0	2.441	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	123	23	1	596.558	-316.101	D	6.778	6.778	0	1.612	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	6.933	6.933	0	1.921	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	6.946	6.946	0	1.948	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.82	7.82	0	3.797	0	0	0	0	0	0
2001	127	23	1	596.558	-316.101	D	7.56	7.56	0	3.229	0	0	0	0	0	0
2001	128	23	624	596.324	-316.278	D	6.928	6.916	0.013	1.887	94.44	5.56	0	0	0	0
2001	129	23	624	596.324	-316.278	D	6.517	6.515	0.002	1.094	98.59	1.29	0	0	0	0
2001	130	23	603	598.68	-316.244	D	6.579	6.576	0.003	1.213	99.49	0.52	0	0	0	0
2001	131	23	517	602.805	-305.061	D	7.48	7.48	0	3.058	99.87	0.21	0	0	0	0
2001	132	23	548	603.28	-312.734	D	8.086	8.041	0.045	4.291	86.55	13.46	0	0	0	0
2001	133	23	626	596.299	-315.88	D	6.531	6.526	0.005	1.117	99.28	0.7	0	0	0	0
2001	134	23	603	598.68	-316.244	D	6.609	6.592	0.017	1.244	99.22	0.78	0	0	0	0
2001	135	23	465	602.978	-311.858	D	6.932	6.932	0	1.92	99.15	0.1	0	0	0	0
2001	136	23	1	596.558	-316.101	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.223	7.223	0	2.516	0	0	0	0	0	0
2001	138	23	517	602.805	-305.061	D	7.449	7.448	0.001	2.989	99.72	0.26	0	0	0	0
2001	139	23	517	602.805	-305.061	D	8.485	8.095	0.39	4.412	93.43	6.57	0	0	0	0
2001	140	23	548	603.28	-312.734	D	7.308	7.301	0.007	2.681	99.42	0.56	0	0	0	0
2001	141	23	676	599.876	-309.365	D	8.635	8.634	0.001	5.67	99.33	0.73	0	0	0	0
2001	142	23	1	596.558	-316.101	D	6.575	6.575	0	1.213	0	0	0	0	0	0
2001	143	23	1	596.558	-316.101	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	144	23	517	602.805	-305.061	D	6.568	6.568	0.001	1.198	80.63	19.31	0	0	0	0
2001	145	23	1	596.558	-316.101	D	6.601	6.601	0	1.263	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	6.634	6.634	0	1.327	0	0	0	0	0	0
2001	147	23	1	596.558	-316.101	D	6.582	6.582	0	1.225	0	0	0	0	0	0
2001	148	23	546	603.249	-312.239	D	6.775	6.767	0.008	1.589	99.06	0.95	0	0	0	0
2001	149	23	624	596.324	-316.278	D	6.751	6.749	0.002	1.553	99.33	0.62	0	0	0	0
2001	150	23	637	596.267	-315.066	D	7.575	7.573	0.001	3.259	98.51	1.5	0	0	0	0
2001	151	23	637	596.267	-315.066	D	8.69	8.688	0.002	5.799	99.5	0.56	0	0	0	0
2001	152	23	563	600.143	-314.135	D	7.016	6.997	0.018	2.053	98.26	1.74	0	0	0	0
2001	153	23	1	596.558	-316.101	D	6.843	6.843	0	1.741	0	0	0	0	0	0
2001	154	23	517	602.805	-305.061	D	6.754	6.748	0.006	1.553	91.71	8.28	0	0	0	0
2001	155	23	1	596.558	-316.101	D	7.274	7.274	0	2.623	0	0	0	0	0	0
2001	156	23	1	596.558	-316.101	D	8.339	8.339	0	4.973	0	0	0	0	0	0
2001	157	23	1	596.558	-316.101	D	8.193	8.193	0	4.636	0	0	0	0	0	0
2001	158	23	517	602.805	-305.061	D	7.708	7.645	0.062	3.414	96.61	3.38	0	0	0	0
2001	159	23	624	596.324	-316.278	D	6.997	6.953	0.044	1.963	99.5	0.5	0	0	0	0
2001	160	23	624	596.324	-316.278	D	6.638	6.637	0.001	1.333	99.75	0.14	0	0	0	0
2001	161	23	676	599.876	-309.365	D	6.678	6.668	0.01	1.395	99.8	0.2	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	162	23	517	602.805	-305.061	D	6.893	6.885	0.007	1.826	99.88	0.13	0	0	0	0
2001	163	23	516	602.728	-305.38	D	7.014	7.014	0	2.086	99.72	0.08	0	0	0	0
2001	164	23	1	596.558	-316.101	D	7.456	7.456	0	3.006	0	0	0	0	0	0
2001	165	23	1	596.558	-316.101	D	7.35	7.35	0	2.784	0	0	0	0	0	0
2001	166	23	1	596.558	-316.101	D	8.84	8.84	0	6.168	0	0	0	0	0	0
2001	167	23	540	603.158	-310.755	D	6.562	6.556	0.006	1.175	97.56	2.44	0	0	0	0
2001	168	23	1	596.558	-316.101	D	6.63	6.63	0	1.319	0	0	0	0	0	0
2001	169	23	624	596.324	-316.278	D	6.887	6.885	0.002	1.825	99.84	0.17	0	0	0	0
2001	170	23	694	602.12	-306.029	D	6.877	6.877	0	1.809	98.73	0.05	0	0	0	0
2001	171	23	1	596.558	-316.101	D	7.198	7.198	0	2.465	0	0	0	0	0	0
2001	172	23	517	602.805	-305.061	D	8.019	7.917	0.102	4.011	98.89	1.11	0	0	0	0
2001	173	23	563	600.143	-314.135	D	6.987	6.966	0.021	1.989	98.69	1.31	0	0	0	0
2001	174	23	624	596.324	-316.278	D	6.749	6.708	0.041	1.472	99.32	0.68	0	0	0	0
2001	175	23	637	596.267	-315.066	D	6.842	6.821	0.02	1.698	99.06	0.93	0	0	0	0
2001	176	23	637	596.267	-315.066	D	6.765	6.751	0.014	1.558	99.52	0.48	0	0	0	0
2001	177	23	637	596.267	-315.066	D	6.787	6.785	0.002	1.625	99.64	0.32	0	0	0	0
2001	178	23	695	602.257	-305.836	D	7.149	7.147	0.002	2.36	99.61	0.34	0	0	0	0
2001	179	23	461	602.269	-305.916	D	7.371	7.369	0.002	2.822	98.98	1.05	0	0	0	0
2001	180	23	490	602.499	-305.648	D	8.203	8.203	0	4.657	99.15	0.26	0	0	0	0
2001	181	23	1	596.558	-316.101	D	7.515	7.515	0	3.134	0	0	0	0	0	0
2001	182	23	694	602.12	-306.029	D	8.669	8.667	0.002	5.747	99.87	0.13	0	0	0	0
2001	183	23	637	596.267	-315.066	D	7.433	7.42	0.013	2.931	96.96	3.04	0	0	0	0
2001	184	23	517	602.805	-305.061	D	6.762	6.755	0.008	1.566	99.8	0.19	0	0	0	0
2001	185	23	517	602.805	-305.061	D	7.626	7.625	0.001	3.37	99.94	0.35	0	0	0	0
2001	186	23	521	602.866	-306.052	D	7.068	7.051	0.016	2.163	99.74	0.26	0	0	0	0
2001	187	23	624	596.324	-316.278	D	6.608	6.603	0.005	1.266	99.81	0.17	0	0	0	0
2001	188	23	676	599.876	-309.365	D	6.946	6.934	0.012	1.925	99.88	0.11	0	0	0	0
2001	189	23	186	600.15	-314.075	D	7.446	7.446	0	2.986	86.76	0.04	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.181	7.181	0	2.43	0	0	0	0	0	0
2001	191	23	520	602.851	-305.804	D	8.008	7.806	0.202	3.765	98.18	1.82	0	0	0	0
2001	192	23	623	596.511	-316.262	D	7.646	7.646	0	3.417	93.25	0.13	0	0	0	0
2001	193	23	461	602.269	-305.916	D	6.952	6.926	0.026	1.908	99.44	0.55	0	0	0	0
2001	194	23	624	596.324	-316.278	D	6.685	6.668	0.016	1.395	98.62	1.39	0	0	0	0
2001	195	23	1	596.558	-316.101	D	6.647	6.647	0	1.352	86.12	0.05	0	0	0	0
2001	196	23	1	596.558	-316.101	D	6.628	6.628	0	1.314	0	0	0	0	0	0
2001	197	23	1	596.558	-316.101	D	6.873	6.873	0	1.802	0	0	0	0	0	0
2001	198	23	1	596.558	-316.101	D	9.096	9.096	0	6.802	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.762	7.762	0	3.669	0	0	0	0	0	0
2001	200	23	517	602.805	-305.061	D	9.277	9.276	0	7.258	99.72	0.08	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	201	23	521	602.866	-306.052	D	8.468	8.452	0.016	5.237	99.62	0.37	0	0	0	0
2001	202	23	517	602.805	-305.061	D	8.542	8.316	0.226	4.92	98.32	1.68	0	0	0	0
2001	203	23	517	602.805	-305.061	D	8.457	8.321	0.135	4.931	99.38	0.62	0	0	0	0
2001	204	23	517	602.805	-305.061	D	7.757	7.714	0.043	3.564	99.16	0.84	0	0	0	0
2001	205	23	517	602.805	-305.061	D	7.247	7.241	0.007	2.553	99.84	0.16	0	0	0	0
2001	206	23	517	602.805	-305.061	D	7.712	7.706	0.006	3.546	98.66	1.32	0	0	0	0
2001	207	23	517	602.805	-305.061	D	8.841	8.741	0.1	5.927	98.81	1.19	0	0	0	0
2001	208	23	193	600.016	-312.336	D	9.178	8.783	0.395	6.029	97.63	2.37	0	0	0	0
2001	209	23	676	599.876	-309.365	D	8.897	8.684	0.213	5.789	97.51	2.49	0	0	0	0
2001	210	23	521	602.866	-306.052	D	8.791	8.738	0.054	5.918	99.19	0.8	0	0	0	0
2001	211	23	517	602.805	-305.061	D	7.96	7.828	0.131	3.815	98.76	1.24	0	0	0	0
2001	212	23	517	602.805	-305.061	D	6.967	6.923	0.044	1.902	99.91	0.09	0	0	0	0
2001	213	23	656	597.971	-312.292	D	7.426	7.422	0.004	2.935	99.77	0.19	0	0	0	0
2001	214	23	517	602.805	-305.061	D	6.942	6.942	0	1.94	99.91	0.08	0	0	0	0
2001	215	23	517	602.805	-305.061	D	7.606	7.602	0.004	3.32	99.45	0.53	0	0	0	0
2001	216	23	624	596.324	-316.278	D	8.217	8.123	0.094	4.475	99.46	0.54	0	0	0	0
2001	217	23	1	596.558	-316.101	D	6.844	6.844	0	1.744	0	0	0	0	0	0
2001	218	23	1	596.558	-316.101	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2001	219	23	1	596.558	-316.101	D	7.474	7.474	0	3.046	0	0	0	0	0	0
2001	220	23	1	596.558	-316.101	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2001	221	23	1	596.558	-316.101	D	8.036	8.036	0	4.279	0	0	0	0	0	0
2001	222	23	517	602.805	-305.061	D	8.438	8.435	0.003	5.197	99.41	0.55	0	0	0	0
2001	223	23	624	596.324	-316.278	D	8.094	8.076	0.018	4.368	97.55	2.44	0	0	0	0
2001	224	23	603	598.68	-316.244	D	7.108	7.104	0.004	2.271	99.09	0.89	0	0	0	0
2001	225	23	603	598.68	-316.244	D	6.931	6.929	0.003	1.914	96.84	3.09	0	0	0	0
2001	226	23	1	596.558	-316.101	D	6.841	6.841	0	1.737	0	0	0	0	0	0
2001	227	23	637	596.267	-315.066	D	6.643	6.643	0	1.345	99.41	0.08	0	0	0	0
2001	228	23	517	602.805	-305.061	D	7.03	7.023	0.007	2.105	99.82	0.21	0	0	0	0
2001	229	23	517	602.805	-305.061	D	6.997	6.993	0.004	2.043	96.96	3.06	0	0	0	0
2001	230	23	521	602.866	-306.052	D	7.281	7.281	0	2.638	98.08	0.14	0	0	0	0
2001	231	23	624	596.324	-316.278	D	6.942	6.931	0.011	1.917	99.13	0.85	0	0	0	0
2001	232	23	624	596.324	-316.278	D	6.744	6.739	0.004	1.535	99.8	0.22	0	0	0	0
2001	233	23	637	596.267	-315.066	D	6.872	6.857	0.014	1.77	99.61	0.38	0	0	0	0
2001	234	23	519	602.836	-305.557	D	8.182	8.18	0.002	4.606	99.72	0.22	0	0	0	0
2001	235	23	433	602.806	-312.871	D	7.277	7.277	0	2.63	99.77	0.13	0	0	0	0
2001	236	23	1	596.558	-316.101	D	8.023	8.023	0	4.248	0	0	0	0	0	0
2001	237	23	1	596.558	-316.101	D	7.35	7.35	0	2.783	0	0	0	0	0	0
2001	238	23	694	602.12	-306.029	D	8.228	8.222	0.006	4.702	95.58	4.38	0	0	0	0
2001	239	23	624	596.324	-316.278	D	7.254	7.25	0.004	2.573	99.3	0.73	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	240	23	624	596.324	-316.278	D	7.548	7.525	0.023	3.154	98.93	1.07	0	0	0	0
2001	241	23	517	602.805	-305.061	D	7.303	7.245	0.058	2.563	99.31	0.69	0	0	0	0
2001	242	23	517	602.805	-305.061	D	8.884	8.841	0.043	6.169	98.76	1.24	0	0	0	0
2001	243	23	517	602.805	-305.061	D	8.904	8.884	0.02	6.275	98.4	1.6	0	0	0	0
2001	244	23	637	596.267	-315.066	D	8.361	8.266	0.095	4.803	92.89	7.11	0	0	0	0
2001	245	23	624	596.324	-316.278	D	7.188	7.184	0.004	2.437	98.84	1.17	0	0	0	0
2001	246	23	694	602.12	-306.029	D	8.018	8.017	0.001	4.236	99.62	0.25	0	0	0	0
2001	247	23	517	602.805	-305.061	D	7.642	7.626	0.016	3.371	99.67	0.33	0	0	0	0
2001	248	23	517	602.805	-305.061	D	6.962	6.938	0.023	1.933	99.01	1	0	0	0	0
2001	249	23	517	602.805	-305.061	D	7.458	7.452	0.006	2.999	99.81	0.21	0	0	0	0
2001	250	23	1	596.558	-316.101	D	9.131	9.131	0	6.889	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	9.542	9.542	0	7.946	0	0	0	0	0	0
2001	252	23	517	602.805	-305.061	D	9.411	9.411	0	7.604	99.17	1.35	0	0	0	0
2001	253	23	637	596.267	-315.066	D	7.544	7.501	0.043	3.102	83.23	16.77	0	0	0	0
2001	254	23	517	602.805	-305.061	D	6.774	6.77	0.004	1.595	98.54	1.41	0	0	0	0
2001	255	23	1	596.558	-316.101	D	7.065	7.065	0	2.191	0	0	0	0	0	0
2001	256	23	517	602.805	-305.061	D	7.244	7.241	0.003	2.554	98.94	1.09	0	0	0	0
2001	257	23	688	601.298	-307.191	D	6.904	6.881	0.023	1.817	98.28	1.72	0	0	0	0
2001	258	23	5	596.481	-315.108	D	6.636	6.636	0	1.33	98.84	0.18	0	0	0	0
2001	259	23	461	602.269	-305.916	D	6.702	6.702	0	1.46	97.89	0.98	0	0	0	0
2001	260	23	1	596.558	-316.101	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2001	261	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	262	23	517	602.805	-305.061	D	9.362	9.154	0.208	6.947	86.85	13.14	0	0	0	0
2001	263	23	517	602.805	-305.061	D	7.176	7.161	0.015	2.388	83.54	16.46	0	0	0	0
2001	264	23	694	602.12	-306.029	D	7.173	7.167	0.007	2.4	99.77	0.25	0	0	0	0
2001	265	23	624	596.324	-316.278	D	7.075	7.046	0.029	2.152	98.89	1.12	0	0	0	0
2001	266	23	603	598.68	-316.244	D	7.245	7.232	0.013	2.535	97.55	2.44	0	0	0	0
2001	267	23	603	598.68	-316.244	D	8.048	8.006	0.042	4.211	92.61	7.39	0	0	0	0
2001	268	23	1	596.558	-316.101	D	6.547	6.547	0	1.158	0	0	0	0	0	0
2001	269	23	636	596.437	-315.061	D	6.532	6.531	0.001	1.126	96.97	2.89	0	0	0	0
2001	270	23	517	602.805	-305.061	D	6.595	6.572	0.022	1.207	94.14	5.86	0	0	0	0
2001	271	23	514	602.766	-305.877	D	6.87	6.858	0.012	1.772	97.8	2.21	0	0	0	0
2001	272	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	273	23	1	596.558	-316.101	D	7.133	7.133	0	2.33	0	0	0	0	0	0
2001	274	23	517	602.805	-305.061	D	7.016	7.007	0.009	2.073	99.3	0.69	0	0	0	0
2001	275	23	517	602.805	-305.061	D	7.298	7.233	0.065	2.537	97.21	2.79	0	0	0	0
2001	276	23	517	602.805	-305.061	D	7.332	7.332	0	2.745	99.47	0.19	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.843	7.843	0	3.848	0	0	0	0	0	0
2001	278	23	695	602.257	-305.836	D	9.854	9.843	0.012	8.747	85.2	14.79	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	279	23	517	602.805	-305.061	D	7.901	7.893	0.008	3.959	86.55	13.45	0	0	0	0
2001	280	23	631	596.276	-315.551	D	6.552	6.533	0.019	1.13	86.46	13.53	0	0	0	0
2001	281	23	637	596.267	-315.066	D	6.596	6.595	0.002	1.25	93.65	6.3	0	0	0	0
2001	282	23	1	596.558	-316.101	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	8.133	8.133	0	4.498	0	0	0	0	0	0
2001	284	23	1	596.558	-316.101	D	10.095	10.095	0	9.436	0	0	0	0	0	0
2001	285	23	662	598.404	-311.683	D	9.944	9.943	0.001	9.018	78.97	20.96	0	0	0	0
2001	286	23	637	596.267	-315.066	D	10.219	10.218	0.001	9.779	96.31	3.56	0	0	0	0
2001	287	23	517	602.805	-305.061	D	8.881	8.847	0.034	6.185	91.25	8.75	0	0	0	0
2001	288	23	1	596.558	-316.101	D	6.542	6.542	0	1.147	0	0	0	0	0	0
2001	289	23	517	602.805	-305.061	D	7.592	7.561	0.031	3.233	67.01	32.99	0	0	0	0
2001	290	23	632	596.27	-315.421	D	6.498	6.492	0.006	1.05	75.29	24.71	0	0	0	0
2001	291	23	637	596.267	-315.066	D	6.501	6.5	0.001	1.066	89.88	10.24	0	0	0	0
2001	292	23	1	596.558	-316.101	D	6.578	6.578	0	1.218	0	0	0	0	0	0
2001	293	23	1	596.558	-316.101	D	6.945	6.945	0	1.947	0	0	0	0	0	0
2001	294	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.564	7.564	0	3.239	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	9.63	9.63	0	8.178	0	0	0	0	0	0
2001	297	23	517	602.805	-305.061	D	9.639	9.627	0.012	8.168	90.95	9.05	0	0	0	0
2001	298	23	517	602.805	-305.061	D	6.869	6.866	0.002	1.788	86.93	13.1	0	0	0	0
2001	299	23	517	602.805	-305.061	D	6.471	6.471	0	1.011	85.7	14.65	0	0	0	0
2001	300	23	517	602.805	-305.061	D	6.489	6.487	0.003	1.04	68.37	31.65	0	0	0	0
2001	301	23	631	596.276	-315.551	D	6.508	6.508	0	1.081	96.26	7.38	0	0	0	0
2001	302	23	1	596.558	-316.101	D	6.499	6.499	0	1.065	0	0	0	0	0	0
2001	303	23	1	596.558	-316.101	D	6.516	6.516	0	1.098	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	6.796	6.796	0	1.647	0	0	0	0	0	0
2001	306	23	517	602.805	-305.061	D	8.952	8.951	0.001	6.439	87.98	12.02	0	0	0	0
2001	307	23	604	598.599	-316.246	D	8.654	8.537	0.117	5.438	78.71	21.29	0	0	0	0
2001	308	23	517	602.805	-305.061	D	6.594	6.594	0.001	1.248	97.89	1.94	0	0	0	0
2001	309	23	624	596.324	-316.278	D	7.896	7.859	0.038	3.882	90.33	9.67	0	0	0	0
2001	310	23	637	596.267	-315.066	D	6.477	6.476	0.001	1.02	97.14	2.89	0	0	0	0
2001	311	23	637	596.267	-315.066	D	6.526	6.517	0.008	1.1	96.55	3.44	0	0	0	0
2001	312	23	517	602.805	-305.061	D	6.789	6.781	0.007	1.618	98.02	1.98	0	0	0	0
2001	313	23	1	596.558	-316.101	D	6.673	6.673	0	1.403	0	0	0	0	0	0
2001	314	23	490	602.499	-305.648	D	6.641	6.639	0.002	1.336	74.02	25.9	0	0	0	0
2001	315	23	603	598.68	-316.244	D	6.738	6.732	0.006	1.52	63.28	36.72	0	0	0	0
2001	316	23	1	596.558	-316.101	D	6.562	6.562	0	1.186	0	0	0	0	0	0
2001	317	23	1	596.558	-316.101	D	6.567	6.567	0	1.196	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	318	23	1	596.558	-316.101	D	7.603	7.603	0	3.322	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	6.973	6.973	0	2.004	0	0	0	0	0	0
2001	320	23	1	596.558	-316.101	D	7.309	7.309	0	2.697	0	0	0	0	0	0
2001	321	23	1	596.558	-316.101	D	7.623	7.623	0	3.366	0	0	0	0	0	0
2001	322	23	517	602.805	-305.061	D	7.956	7.956	0.001	4.098	90.57	9.29	0	0	0	0
2001	323	23	624	596.324	-316.278	D	7.888	7.858	0.03	3.881	61.42	38.58	0	0	0	0
2001	324	23	632	596.27	-315.421	D	6.477	6.474	0.003	1.016	45.44	54.54	0	0	0	0
2001	325	23	634	596.488	-315.264	D	6.482	6.476	0.006	1.02	65.78	34.21	0	0	0	0
2001	326	23	546	603.249	-312.239	D	6.521	6.52	0.001	1.105	80.45	19.1	0	0	0	0
2001	327	23	1	596.558	-316.101	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	9.336	9.336	0	7.411	0	0	0	0	0	0
2001	329	23	1	596.558	-316.101	D	6.663	6.663	0	1.383	0	0	0	0	0	0
2001	330	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	331	23	1	596.558	-316.101	D	7.453	7.453	0	3.002	0	0	0	0	0	0
2001	332	23	603	598.68	-316.244	D	8.713	8.706	0.007	5.842	59.17	40.82	0	0	0	0
2001	333	23	624	596.324	-316.278	D	10.098	10.097	0.001	9.443	80.34	19.72	0	0	0	0
2001	334	23	604	598.599	-316.246	D	8.917	8.806	0.112	6.083	75.38	24.62	0	0	0	0
2001	335	23	1	596.558	-316.101	D	6.626	6.626	0	1.311	0	0	0	0	0	0
2001	336	23	1	596.558	-316.101	D	6.665	6.665	0	1.388	0	0	0	0	0	0
2001	337	23	1	596.558	-316.101	D	6.735	6.735	0	1.527	0	0	0	0	0	0
2001	338	23	1	596.558	-316.101	D	6.817	6.817	0	1.69	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	8.689	8.689	0	5.801	0	0	0	0	0	0
2001	340	23	517	602.805	-305.061	D	9.807	9.806	0.001	8.646	31.19	68.6	0	0	0	0
2001	341	23	517	602.805	-305.061	D	9.923	9.879	0.044	8.844	74.53	25.46	0	0	0	0
2001	342	23	517	602.805	-305.061	D	8.893	8.814	0.08	6.103	81.58	18.42	0	0	0	0
2001	343	23	603	598.68	-316.244	D	6.627	6.627	0	1.313	94.44	5.16	0	0	0	0
2001	344	23	625	596.311	-316.079	D	6.519	6.518	0.001	1.101	66.09	33.55	0	0	0	0
2001	345	23	637	596.267	-315.066	D	6.576	6.575	0.002	1.211	70.19	29.75	0	0	0	0
2001	346	23	1	596.558	-316.101	D	8.987	8.987	0	6.529	0	0	0	0	0	0
2001	347	23	517	602.805	-305.061	D	9.417	9.349	0.068	7.444	83.3	16.7	0	0	0	0
2001	348	23	193	600.016	-312.336	D	9.216	8.724	0.492	5.886	78.85	21.15	0	0	0	0
2001	349	23	517	602.805	-305.061	D	7.189	7.172	0.018	2.41	90.21	9.78	0	0	0	0
2001	350	23	694	602.12	-306.029	D	10.118	10.099	0.019	9.449	88.02	11.97	0	0	0	0
2001	351	23	624	596.324	-316.278	D	10.257	10.218	0.039	9.779	81.42	18.57	0	0	0	0
2001	352	23	520	602.851	-305.804	D	7.529	7.458	0.071	3.012	72.72	27.28	0	0	0	0
2001	353	23	632	596.27	-315.421	D	6.685	6.671	0.013	1.401	43.69	56.3	0	0	0	0
2001	354	23	637	596.267	-315.066	D	6.475	6.471	0.005	1.01	45.65	54.37	0	0	0	0
2001	355	23	517	602.805	-305.061	D	6.488	6.486	0.002	1.039	48.64	51.33	0	0	0	0
2001	356	23	1	596.558	-316.101	D	7.376	7.376	0	2.837	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	357	23	1	596.558	-316.101	D	7.901	7.901	0	3.975	0	0	0	0	0	0
2001	358	23	517	602.805	-305.061	D	6.497	6.495	0.002	1.056	48.59	51.43	0	0	0	0
2001	359	23	557	601.32	-313.419	D	6.525	6.491	0.033	1.049	33.01	66.98	0	0	0	0
2001	360	23	517	602.805	-305.061	D	6.505	6.498	0.006	1.063	37.68	62.31	0	0	0	0
2001	361	23	1	596.558	-316.101	D	6.534	6.534	0	1.133	0	0	0	0	0	0
2001	362	23	1	596.558	-316.101	D	6.849	6.849	0	1.753	0	0	0	0	0	0
2001	363	23	626	596.299	-315.88	D	6.632	6.626	0.006	1.312	42.97	57.04	0	0	0	0
2001	364	23	557	601.32	-313.419	D	6.585	6.519	0.066	1.103	39.68	60.32	0	0	0	0
2001	365	23	517	602.805	-305.061	D	6.578	6.565	0.013	1.192	43.87	56.14	0	0	0	0
									0.492							
HOLCIM									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	596.558	-316.101	D	7.097	7.097	0	2.257	0	0	0	0	0	0
2001	2	23	548	603.28	-312.734	D	8.21	7.191	1.019	2.45	34.47	65.12	0	0	0	0.41
2001	3	23	548	603.28	-312.734	D	8.733	7.997	0.736	4.19	44.38	55.52	0	0	0	0.1
2001	4	23	1	596.558	-316.101	D	7.818	7.818	0	3.792	0	0	0	0	0	0
2001	5	23	1	596.558	-316.101	D	7.729	7.729	0	3.596	0	0	0	0	0	0
2001	6	23	1	596.558	-316.101	D	7.228	7.228	0	2.527	0	0	0	0	0	0
2001	7	23	1	596.558	-316.101	D	7.192	7.192	0	2.452	0	0	0	0	0	0
2001	8	23	517	602.805	-305.061	D	7.418	7.374	0.044	2.834	21.88	77.44	0	0	0	0.68
2001	9	23	632	596.27	-315.421	D	8.078	7.366	0.711	2.816	25.74	73.82	0	0	0	0.44
2001	10	23	517	602.805	-305.061	D	7.858	7.46	0.397	3.017	40.2	59.6	0	0	0	0.2
2001	11	23	517	602.805	-305.061	D	7.929	7.924	0.005	4.027	54.35	45.26	0	0	0	0.4
2001	12	23	1	596.558	-316.101	D	9.4	9.4	0	7.577	0	0	0	0	0	0
2001	13	23	1	596.558	-316.101	D	8.916	8.916	0	6.353	0	0	0	0	0	0
2001	14	23	1	596.558	-316.101	D	9.712	9.712	0	8.396	0	0	0	0	0	0
2001	15	23	1	596.558	-316.101	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2001	16	23	517	602.805	-305.061	D	6.699	6.695	0.004	1.447	54.07	45.08	0	0	0	0.86
2001	17	23	517	602.805	-305.061	D	7.722	6.94	0.782	1.936	47.9	51.73	0	0	0	0.37
2001	18	23	695	602.257	-305.836	D	7.312	7.128	0.183	2.321	49.26	50.29	0	0	0	0.45
2001	19	23	632	596.27	-315.421	D	7.205	6.727	0.477	1.511	30.77	68.33	0	0	0	0.9
2001	20	23	695	602.257	-305.836	D	7.227	6.754	0.473	1.564	30.47	68.65	0	0	0	0.89
2001	21	23	1	596.558	-316.101	D	6.552	6.552	0	1.166	0	0	0	0	0	0
2001	22	23	1	596.558	-316.101	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2001	23	23	1	596.558	-316.101	D	6.682	6.682	0	1.422	0	0	0	0	0	0
2001	24	23	1	596.558	-316.101	D	6.905	6.905	0	1.865	0	0	0	0	0	0
2001	25	23	632	596.27	-315.421	D	6.623	6.589	0.035	1.239	18.75	79.47	0	0	0	1.78

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	26	23	1	596.558	-316.101	D	6.498	6.498	0	1.062	0	0	0	0	0	0
2001	27	23	1	596.558	-316.101	D	6.636	6.636	0	1.331	0	0	0	0	0	0
2001	28	23	548	603.28	-312.734	D	6.561	6.509	0.053	1.083	45.6	53.7	0	0	0	0.7
2001	29	23	517	602.805	-305.061	D	8.177	8.175	0.002	4.593	52.37	47.16	0	0	0	0.45
2001	30	23	1	596.558	-316.101	D	9.187	9.187	0	7.032	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	6.895	6.895	0	1.845	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2001	33	23	1	596.558	-316.101	D	6.535	6.535	0	1.134	0	0	0	0	0	0
2001	34	23	1	596.558	-316.101	D	6.469	6.469	0	1.006	0	0	0	0	0	0
2001	35	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	36	23	1	596.558	-316.101	D	6.677	6.677	0	1.412	0	0	0	0	0	0
2001	37	23	517	602.805	-305.061	D	6.502	6.502	0	1.07	66.68	31.14	0	0	0	2.23
2001	38	23	517	602.805	-305.061	D	6.676	6.617	0.059	1.293	46.27	53.01	0	0	0	0.72
2001	39	23	1	596.558	-316.101	D	7.981	7.981	0	4.155	0	0	0	0	0	0
2001	40	23	1	596.558	-316.101	D	9.317	9.317	0	7.361	0	0	0	0	0	0
2001	41	23	676	599.876	-309.365	D	6.608	6.558	0.05	1.179	32.73	66.08	0	0	0	1.19
2001	42	23	624	596.324	-316.278	D	6.473	6.47	0.004	1.007	39.77	59.45	0	0	0	0.77
2001	43	23	1	596.558	-316.101	D	6.521	6.521	0	1.107	0	0	0	0	0	0
2001	44	23	1	596.558	-316.101	D	7.622	7.622	0	3.364	0	0	0	0	0	0
2001	45	23	517	602.805	-305.061	D	10.222	10.218	0.005	9.779	60.15	39.8	0	0	0	0.06
2001	46	23	624	596.324	-316.278	D	14.778	8.818	5.96	6.113	59.96	39.96	0	0	0	0.08
2001	47	23	520	602.851	-305.804	D	7.398	6.728	0.67	1.511	49.12	50.24	0	0	0	0.64
2001	48	23	609	597.655	-316.162	D	6.616	6.499	0.117	1.064	25.58	72.65	0	0	0	1.76
2001	49	23	548	603.28	-312.734	D	6.632	6.469	0.163	1.006	37.28	61.77	0	0	0	0.95
2001	50	23	517	602.805	-305.061	D	6.514	6.473	0.041	1.015	54.54	44.82	0	0	0	0.64
2001	51	23	517	602.805	-305.061	D	6.627	6.626	0.001	1.312	71.43	27.57	0	0	0	0.99
2001	52	23	548	603.28	-312.734	D	6.553	6.538	0.015	1.14	53.64	45.94	0	0	0	0.41
2001	53	23	624	596.324	-316.278	D	7.303	7.301	0.002	2.68	53.17	46.67	0	0	0	0.12
2001	54	23	517	602.805	-305.061	D	6.813	6.721	0.092	1.499	49.92	49.76	0	0	0	0.32
2001	55	23	517	602.805	-305.061	D	8.108	8.106	0.002	4.438	64.86	34.73	0	0	0	0.42
2001	56	23	1	596.558	-316.101	D	8.437	8.437	0	5.201	0	0	0	0	0	0
2001	57	23	517	602.805	-305.061	D	6.55	6.51	0.04	1.085	49.53	48.74	0	0	0	1.73
2001	58	23	637	596.267	-315.066	D	6.555	6.528	0.026	1.121	53.56	45.54	0	0	0	0.91
2001	59	23	631	596.276	-315.551	D	6.639	6.638	0.001	1.335	56.87	42.89	0	0	0	0.16
2001	60	23	517	602.805	-305.061	D	6.473	6.473	0	1.013	44.71	55.02	0	0	0	0.59
2001	61	23	1	596.558	-316.101	D	6.924	6.924	0	1.905	0	0	0	0	0	0
2001	62	23	517	602.805	-305.061	D	6.677	6.66	0.018	1.377	74.07	25.19	0	0	0	0.73
2001	63	23	637	596.267	-315.066	D	6.759	6.621	0.138	1.301	62.83	36.69	0	0	0	0.48
2001	64	23	517	602.805	-305.061	D	6.663	6.58	0.083	1.222	22.96	75.26	0	0	0	1.78

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	65	23	517	602.805	-305.061	D	6.573	6.535	0.037	1.134	45.26	53.29	0	0	0	1.45
2001	66	23	517	602.805	-305.061	D	6.747	6.481	0.266	1.029	24.02	74.19	0	0	0	1.79
2001	67	23	1	596.558	-316.101	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2001	68	23	637	596.267	-315.066	D	6.672	6.525	0.147	1.115	34.6	64.07	0	0	0	1.33
2001	69	23	637	596.267	-315.066	D	6.663	6.492	0.171	1.051	52.57	46.67	0	0	0	0.77
2001	70	23	517	602.805	-305.061	D	6.482	6.474	0.008	1.015	70.15	29.31	0	0	0	0.54
2001	71	23	461	602.269	-305.916	D	8.243	8.243	0	4.75	82.91	17.08	0	0	0	0.48
2001	72	23	1	596.558	-316.101	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2001	73	23	517	602.805	-305.061	D	6.486	6.486	0	1.039	76.72	21.03	0	0	0	2.28
2001	74	23	1	596.558	-316.101	D	9.017	9.017	0	6.605	0	0	0	0	0	0
2001	75	23	461	602.269	-305.916	D	8.731	8.613	0.118	5.619	41.42	58.31	0	0	0	0.27
2001	76	23	517	602.805	-305.061	D	6.796	6.794	0.002	1.643	63.63	35.08	0	0	0	1.25
2001	77	23	698	602.668	-305.255	D	6.613	6.556	0.057	1.175	51.96	46.96	0	0	0	1.08
2001	78	23	1	596.558	-316.101	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	6.474	6.474	0	1.015	0	0	0	0	0	0
2001	80	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	81	23	637	596.267	-315.066	D	6.703	6.513	0.19	1.091	68.01	31.05	0	0	0	0.94
2001	82	23	563	600.143	-314.135	D	8.052	7.434	0.618	2.96	70.44	29.34	0	0	0	0.22
2001	83	23	660	598.316	-311.922	D	7.229	6.672	0.557	1.402	65.98	33.6	0	0	0	0.42
2001	84	23	517	602.805	-305.061	D	6.619	6.492	0.127	1.051	21.01	77.48	0	0	0	1.51
2001	85	23	517	602.805	-305.061	D	6.492	6.487	0.005	1.041	18.2	80.07	0	0	0	1.72
2001	86	23	1	596.558	-316.101	D	6.469	6.469	0	1.007	0	0	0	0	0	0
2001	87	23	548	603.28	-312.734	D	6.485	6.468	0.017	1.005	69.44	29.87	0	0	0	0.69
2001	88	23	517	602.805	-305.061	D	7.081	7.079	0.001	2.22	76.01	23.46	0	0	0	0.51
2001	89	23	1	596.558	-316.101	D	8.796	8.796	0	6.06	0	0	0	0	0	0
2001	90	23	1	596.558	-316.101	D	8.559	8.559	0	5.491	0	0	0	0	0	0
2001	91	23	517	602.805	-305.061	D	7.058	7.057	0.001	2.174	23.69	75.47	0	0	0	0.8
2001	92	23	1	596.558	-316.101	D	7.04	7.04	0	2.141	0	0	0	0	0	0
2001	93	23	1	596.558	-316.101	D	9.416	9.416	0	7.617	0	0	0	0	0	0
2001	94	23	1	596.558	-316.101	D	8.143	8.143	0	4.52	0	0	0	0	0	0
2001	95	23	1	596.558	-316.101	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2001	96	23	1	596.558	-316.101	D	8.925	8.925	0	6.376	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	6.895	6.895	0	1.846	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.116	7.116	0	2.295	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.053	7.053	0	2.166	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.448	7.448	0	2.991	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	9.215	9.215	0	7.101	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.38	7.38	0	2.846	0	0	0	0	0	0
2001	103	23	676	599.876	-309.365	D	6.576	6.547	0.029	1.156	85.28	12.92	0	0	0	1.79

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	104	23	517	602.805	-305.061	D	6.638	6.625	0.012	1.31	96.3	2.99	0	0	0	0.71
2001	105	23	625	596.311	-316.079	D	7.72	7.656	0.064	3.437	95.49	3.98	0	0	0	0.53
2001	106	23	521	602.866	-306.052	D	6.668	6.605	0.063	1.271	34.43	62.39	0	0	0	3.18
2001	107	23	517	602.805	-305.061	D	6.489	6.478	0.011	1.024	55.34	43.33	0	0	0	1.33
2001	108	23	169	599.385	-310.635	D	6.66	6.478	0.182	1.024	32.86	65.27	0	0	0	1.87
2001	109	23	546	603.249	-312.239	D	6.492	6.491	0	1.05	89.69	8.57	0	0	0	1.1
2001	110	23	1	596.558	-316.101	D	6.79	6.79	0	1.636	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.389	7.389	0	2.866	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.362	7.362	0	2.809	0	0	0	0	0	0
2001	114	23	517	602.805	-305.061	D	6.531	6.516	0.015	1.098	91.17	7.33	0	0	0	1.5
2001	115	23	517	602.805	-305.061	D	6.565	6.477	0.087	1.023	78.9	19.98	0	0	0	1.11
2001	116	23	517	602.805	-305.061	D	6.537	6.536	0.001	1.135	67.96	30.38	0	0	0	1.72
2001	117	23	1	596.558	-316.101	D	6.69	6.69	0	1.437	0	0	0	0	0	0
2001	118	23	1	596.558	-316.101	D	6.673	6.673	0	1.404	0	0	0	0	0	0
2001	119	23	1	596.558	-316.101	D	6.596	6.596	0	1.252	0	0	0	0	0	0
2001	120	23	1	596.558	-316.101	D	6.721	6.721	0	1.497	0	0	0	0	0	0
2001	121	23	1	596.558	-316.101	D	6.826	6.826	0	1.708	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.186	7.186	0	2.441	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	6.778	6.778	0	1.612	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	6.933	6.933	0	1.921	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	6.946	6.946	0	1.948	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.82	7.82	0	3.797	0	0	0	0	0	0
2001	127	23	1	596.558	-316.101	D	7.56	7.56	0	3.229	0	0	0	0	0	0
2001	128	23	517	602.805	-305.061	D	6.876	6.86	0.016	1.775	94.95	3.67	0	0	0	1.37
2001	129	23	603	598.68	-316.244	D	6.552	6.515	0.038	1.094	96.55	2.79	0	0	0	0.65
2001	130	23	545	603.234	-311.991	D	6.589	6.574	0.015	1.21	98.03	1.57	0	0	0	0.4
2001	131	23	514	602.766	-305.877	D	7.48	7.48	0	3.058	99.41	0.26	0	0	0	0.26
2001	132	23	659	598.307	-312.069	D	8.145	8.057	0.088	4.326	50.56	48.22	0	0	0	1.21
2001	133	23	624	596.324	-316.278	D	6.585	6.526	0.059	1.117	89.75	9.07	0	0	0	1.18
2001	134	23	548	603.28	-312.734	D	6.589	6.586	0.003	1.234	97.78	1.56	0	0	0	0.65
2001	135	23	1	596.558	-316.101	D	6.924	6.924	0	1.904	0	0	0	0	0	0
2001	136	23	1	596.558	-316.101	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.223	7.223	0	2.516	0	0	0	0	0	0
2001	138	23	517	602.805	-305.061	D	7.45	7.448	0.002	2.989	99.37	0.44	0	0	0	0.19
2001	139	23	287	601.239	-311.992	D	9.75	8.057	1.693	4.325	81.92	18.04	0	0	0	0.04
2001	140	23	624	596.324	-316.278	D	7.324	7.289	0.035	2.655	98.1	1.61	0	0	0	0.29
2001	141	23	517	602.805	-305.061	D	8.578	8.573	0.005	5.523	98.26	1.6	0	0	0	0.15
2001	142	23	1	596.558	-316.101	D	6.575	6.575	0	1.213	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	143	23	1	596.558	-316.101	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	144	23	1	596.558	-316.101	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	145	23	1	596.558	-316.101	D	6.601	6.601	0	1.263	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	6.634	6.634	0	1.327	0	0	0	0	0	0
2001	147	23	1	596.558	-316.101	D	6.582	6.582	0	1.225	0	0	0	0	0	0
2001	148	23	517	602.805	-305.061	D	6.753	6.752	0.001	1.56	98.3	0.88	0	0	0	0.9
2001	149	23	517	602.805	-305.061	D	6.774	6.742	0.033	1.54	95.28	4.23	0	0	0	0.5
2001	150	23	517	602.805	-305.061	D	7.603	7.594	0.009	3.303	97.12	2.56	0	0	0	0.32
2001	151	23	1	596.558	-316.101	D	8.688	8.688	0	5.799	0	0	0	0	0	0
2001	152	23	1	596.558	-316.101	D	6.961	6.961	0	1.98	0	0	0	0	0	0
2001	153	23	1	596.558	-316.101	D	6.843	6.843	0	1.741	0	0	0	0	0	0
2001	154	23	517	602.805	-305.061	D	6.765	6.748	0.017	1.553	89.24	9.84	0	0	0	0.93
2001	155	23	517	602.805	-305.061	D	7.393	7.392	0.001	2.872	83.26	16.43	0	0	0	0.33
2001	156	23	517	602.805	-305.061	D	8.389	8.389	0	5.089	97.43	2.61	0	0	0	0.12
2001	157	23	1	596.558	-316.101	D	8.193	8.193	0	4.636	0	0	0	0	0	0
2001	158	23	517	602.805	-305.061	D	7.797	7.645	0.152	3.414	94.33	5.41	0	0	0	0.26
2001	159	23	624	596.324	-316.278	D	7.218	6.953	0.265	1.963	96	3.78	0	0	0	0.22
2001	160	23	624	596.324	-316.278	D	6.638	6.637	0.001	1.333	98.18	1.22	0	0	0	0.5
2001	161	23	637	596.267	-315.066	D	6.691	6.668	0.024	1.394	99.11	0.6	0	0	0	0.31
2001	162	23	517	602.805	-305.061	D	6.906	6.885	0.021	1.826	99.48	0.33	0	0	0	0.18
2001	163	23	517	602.805	-305.061	D	7.017	7.014	0.003	2.086	99.61	0.22	0	0	0	0.15
2001	164	23	517	602.805	-305.061	D	7.48	7.479	0.001	3.056	99.63	0.31	0	0	0	0.08
2001	165	23	1	596.558	-316.101	D	7.35	7.35	0	2.784	0	0	0	0	0	0
2001	166	23	1	596.558	-316.101	D	8.84	8.84	0	6.168	0	0	0	0	0	0
2001	167	23	1	596.558	-316.101	D	6.554	6.554	0	1.171	0	0	0	0	0	0
2001	168	23	1	596.558	-316.101	D	6.63	6.63	0	1.319	0	0	0	0	0	0
2001	169	23	545	603.234	-311.991	D	6.888	6.882	0.006	1.82	99.12	0.49	0	0	0	0.38
2001	170	23	517	602.805	-305.061	D	6.895	6.895	0	1.846	99.62	0.18	0	0	0	0.31
2001	171	23	1	596.558	-316.101	D	7.198	7.198	0	2.465	0	0	0	0	0	0
2001	172	23	517	602.805	-305.061	D	8.425	7.917	0.508	4.011	97.53	2.32	0	0	0	0.15
2001	173	23	548	603.28	-312.734	D	7.304	6.966	0.338	1.989	95.55	4.12	0	0	0	0.32
2001	174	23	520	602.851	-305.804	D	6.933	6.717	0.215	1.491	97.69	1.77	0	0	0	0.53
2001	175	23	637	596.267	-315.066	D	7.048	6.821	0.226	1.698	97.66	1.91	0	0	0	0.43
2001	176	23	624	596.324	-316.278	D	6.819	6.751	0.069	1.558	98.86	0.81	0	0	0	0.33
2001	177	23	637	596.267	-315.066	D	6.798	6.785	0.013	1.625	99.08	0.67	0	0	0	0.25
2001	178	23	695	602.257	-305.836	D	7.165	7.147	0.018	2.36	99.08	0.76	0	0	0	0.16
2001	179	23	695	602.257	-305.836	D	7.387	7.369	0.018	2.822	97.75	2.14	0	0	0	0.11
2001	180	23	517	602.805	-305.061	D	8.204	8.203	0.001	4.657	99.64	0.23	0	0	0	0.13
2001	181	23	1	596.558	-316.101	D	7.515	7.515	0	3.134	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	182	23	517	602.805	-305.061	D	8.712	8.694	0.018	5.813	99.22	0.4	0	0	0	0.39
2001	183	23	517	602.805	-305.061	D	8.797	7.441	1.357	2.974	85.54	14.34	0	0	0	0.12
2001	184	23	656	597.971	-312.292	D	7.136	6.777	0.359	1.61	99.11	0.67	0	0	0	0.22
2001	185	23	517	602.805	-305.061	D	7.645	7.625	0.02	3.37	99.6	0.24	0	0	0	0.16
2001	186	23	517	602.805	-305.061	D	7.117	7.055	0.061	2.171	99	0.26	0	0	0	0.74
2001	187	23	637	596.267	-315.066	D	6.857	6.603	0.254	1.266	98.51	0.82	0	0	0	0.67
2001	188	23	517	602.805	-305.061	D	7.098	6.941	0.157	1.939	99.4	0.25	0	0	0	0.34
2001	189	23	1	596.558	-316.101	D	7.464	7.464	0	3.025	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.181	7.181	0	2.43	0	0	0	0	0	0
2001	191	23	517	602.805	-305.061	D	8.924	7.806	1.118	3.765	94.17	5.69	0	0	0	0.15
2001	192	23	624	596.324	-316.278	D	9.039	7.646	1.393	3.417	94.11	5.74	0	0	0	0.15
2001	193	23	461	602.269	-305.916	D	6.972	6.926	0.046	1.908	93.95	5.84	0	0	0	0.21
2001	194	23	624	596.324	-316.278	D	6.692	6.668	0.024	1.395	96.79	2.96	0	0	0	0.24
2001	195	23	1	596.558	-316.101	D	6.647	6.647	0	1.352	88.48	0.14	0	0	0	0.26
2001	196	23	1	596.558	-316.101	D	6.628	6.628	0	1.314	0	0	0	0	0	0
2001	197	23	1	596.558	-316.101	D	6.873	6.873	0	1.802	0	0	0	0	0	0
2001	198	23	1	596.558	-316.101	D	9.096	9.096	0	6.802	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.762	7.762	0	3.669	0	0	0	0	0	0
2001	200	23	517	602.805	-305.061	D	9.276	9.276	0	7.258	99.4	0.26	0	0	0	0.12
2001	201	23	517	602.805	-305.061	D	8.514	8.495	0.019	5.338	99.01	0.92	0	0	0	0.07
2001	202	23	517	602.805	-305.061	D	8.699	8.316	0.382	4.92	95.58	4.28	0	0	0	0.13
2001	203	23	517	602.805	-305.061	D	9.002	8.321	0.68	4.931	98.68	1.24	0	0	0	0.08
2001	204	23	517	602.805	-305.061	D	7.755	7.714	0.041	3.564	96.4	3.52	0	0	0	0.08
2001	205	23	517	602.805	-305.061	D	7.242	7.241	0.001	2.553	99.69	0.21	0	0	0	0.11
2001	206	23	1	596.558	-316.101	D	7.675	7.675	0	3.478	0	0	0	0	0	0
2001	207	23	517	602.805	-305.061	D	8.867	8.741	0.126	5.927	98.46	1.38	0	0	0	0.16
2001	208	23	546	603.249	-312.239	D	10.435	8.783	1.652	6.029	94.3	5.65	0	0	0	0.05
2001	209	23	521	602.866	-306.052	D	9.601	8.672	0.929	5.76	94.81	5.15	0	0	0	0.04
2001	210	23	517	602.805	-305.061	D	8.787	8.732	0.055	5.905	97.69	2.25	0	0	0	0.05
2001	211	23	517	602.805	-305.061	D	8.179	7.828	0.351	3.815	95.67	4.21	0	0	0	0.12
2001	212	23	517	602.805	-305.061	D	7.085	6.923	0.162	1.902	99.59	0.23	0	0	0	0.17
2001	213	23	656	597.971	-312.292	D	7.458	7.422	0.036	2.935	99.38	0.51	0	0	0	0.11
2001	214	23	517	602.805	-305.061	D	6.945	6.942	0.003	1.94	99.75	0.16	0	0	0	0.13
2001	215	23	517	602.805	-305.061	D	7.603	7.602	0.001	3.32	99.14	0.59	0	0	0	0.19
2001	216	23	563	600.143	-314.135	D	8.375	8.139	0.236	4.511	98.41	1.43	0	0	0	0.16
2001	217	23	1	596.558	-316.101	D	6.844	6.844	0	1.744	0	0	0	0	0	0
2001	218	23	1	596.558	-316.101	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2001	219	23	1	596.558	-316.101	D	7.474	7.474	0	3.046	0	0	0	0	0	0
2001	220	23	1	596.558	-316.101	D	8.07	8.07	0	4.354	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	221	23	1	596.558	-316.101	D	8.036	8.036	0	4.279	0	0	0	0	0	0
2001	222	23	517	602.805	-305.061	D	8.457	8.435	0.022	5.197	97.93	1.84	0	0	0	0.22
2001	223	23	624	596.324	-316.278	D	8.512	8.076	0.437	4.368	92.38	7.53	0	0	0	0.09
2001	224	23	624	596.324	-316.278	D	7.225	7.104	0.121	2.271	93.54	6.21	0	0	0	0.24
2001	225	23	694	602.12	-306.029	D	7.157	6.916	0.241	1.887	98.69	0.72	0	0	0	0.59
2001	226	23	548	603.28	-312.734	D	7.037	6.862	0.174	1.78	99.02	0.53	0	0	0	0.45
2001	227	23	631	596.276	-315.551	D	6.646	6.643	0.002	1.345	99.25	0.22	0	0	0	0.48
2001	228	23	517	602.805	-305.061	D	7.025	7.023	0.002	2.105	99.59	0.26	0	0	0	0.21
2001	229	23	1	596.558	-316.101	D	6.953	6.953	0	1.963	0	0	0	0	0	0
2001	230	23	1	596.558	-316.101	D	7.258	7.258	0	2.589	0	0	0	0	0	0
2001	231	23	521	602.866	-306.052	D	6.986	6.964	0.022	1.985	66.6	30.13	0	0	0	3.27
2001	232	23	520	602.851	-305.804	D	6.94	6.758	0.182	1.573	94.72	4.53	0	0	0	0.75
2001	233	23	517	602.805	-305.061	D	6.974	6.859	0.115	1.773	98.63	1.02	0	0	0	0.35
2001	234	23	520	602.851	-305.804	D	8.187	8.18	0.007	4.606	99.31	0.6	0	0	0	0.09
2001	235	23	545	603.234	-311.991	D	7.28	7.28	0	2.635	99.74	0.21	0	0	0	0.09
2001	236	23	1	596.558	-316.101	D	8.023	8.023	0	4.248	0	0	0	0	0	0
2001	237	23	1	596.558	-316.101	D	7.35	7.35	0	2.783	0	0	0	0	0	0
2001	238	23	517	602.805	-305.061	D	8.293	8.291	0.002	4.861	98.88	0.54	0	0	0	0.53
2001	239	23	624	596.324	-316.278	D	8.105	7.25	0.854	2.573	97.57	2.2	0	0	0	0.22
2001	240	23	107	598.487	-311.954	D	8.42	7.557	0.863	3.224	95.45	4.42	0	0	0	0.13
2001	241	23	517	602.805	-305.061	D	7.918	7.245	0.673	2.563	88.23	11.51	0	0	0	0.26
2001	242	23	517	602.805	-305.061	D	8.972	8.841	0.131	6.169	98.98	0.92	0	0	0	0.1
2001	243	23	1	596.558	-316.101	D	8.837	8.837	0	6.161	0	0	0	0	0	0
2001	244	23	464	602.997	-312.107	D	8.893	8.269	0.624	4.81	88.23	11.66	0	0	0	0.1
2001	245	23	624	596.324	-316.278	D	7.324	7.184	0.14	2.437	97.06	2.78	0	0	0	0.16
2001	246	23	694	602.12	-306.029	D	8.027	8.017	0.01	4.236	98.9	0.98	0	0	0	0.1
2001	247	23	517	602.805	-305.061	D	7.663	7.626	0.037	3.371	99.45	0.44	0	0	0	0.1
2001	248	23	517	602.805	-305.061	D	7.111	6.938	0.173	1.933	94.98	4.74	0	0	0	0.28
2001	249	23	517	602.805	-305.061	D	7.475	7.452	0.023	2.999	99.03	0.82	0	0	0	0.15
2001	250	23	1	596.558	-316.101	D	9.131	9.131	0	6.889	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	9.542	9.542	0	7.946	0	0	0	0	0	0
2001	252	23	1	596.558	-316.101	D	9.397	9.397	0	7.568	0	0	0	0	0	0
2001	253	23	546	603.249	-312.239	D	7.508	7.495	0.014	3.09	92.13	6.97	0	0	0	0.89
2001	254	23	548	603.28	-312.734	D	6.941	6.783	0.157	1.622	97.19	2.24	0	0	0	0.58
2001	255	23	624	596.324	-316.278	D	7.247	7.065	0.182	2.191	97.04	2.65	0	0	0	0.31
2001	256	23	517	602.805	-305.061	D	7.32	7.241	0.079	2.554	97.27	2.44	0	0	0	0.29
2001	257	23	677	600.05	-309.264	D	7.11	6.881	0.23	1.817	96.97	2.79	0	0	0	0.23
2001	258	23	1	596.558	-316.101	D	6.636	6.636	0	1.33	96.34	0.15	0	0	0	0.28
2001	259	23	1	596.558	-316.101	D	6.702	6.702	0	1.46	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	260	23	1	596.558	-316.101	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2001	261	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	262	23	517	602.805	-305.061	D	9.161	9.154	0.008	6.947	84.45	15.49	0	0	0	0.05
2001	263	23	1	596.558	-316.101	D	7.114	7.114	0	2.292	0	0	0	0	0	0
2001	264	23	1	596.558	-316.101	D	7.134	7.134	0	2.332	0	0	0	0	0	0
2001	265	23	661	598.396	-311.717	D	7.217	7.075	0.142	2.212	61.71	37.7	0	0	0	0.59
2001	266	23	660	598.316	-311.922	D	7.307	7.245	0.061	2.563	89.56	10.2	0	0	0	0.24
2001	267	23	676	599.876	-309.365	D	8.329	8.035	0.295	4.276	38.84	60.96	0	0	0	0.2
2001	268	23	517	602.805	-305.061	D	6.561	6.547	0.014	1.158	89.69	8.77	0	0	0	1.54
2001	269	23	545	603.234	-311.991	D	6.626	6.534	0.092	1.132	73	25.68	0	0	0	1.32
2001	270	23	1	596.558	-316.101	D	6.568	6.568	0	1.198	0	0	0	0	0	0
2001	271	23	461	602.269	-305.916	D	6.926	6.858	0.068	1.772	91.72	7.66	0	0	0	0.62
2001	272	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	273	23	1	596.558	-316.101	D	7.133	7.133	0	2.33	0	0	0	0	0	0
2001	274	23	517	602.805	-305.061	D	7.089	7.007	0.081	2.073	91.72	7.84	0	0	0	0.44
2001	275	23	517	602.805	-305.061	D	7.31	7.233	0.078	2.537	92.86	7	0	0	0	0.14
2001	276	23	1	596.558	-316.101	D	7.307	7.307	0	2.693	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.843	7.843	0	3.848	0	0	0	0	0	0
2001	278	23	517	602.805	-305.061	D	10.003	9.843	0.16	8.747	76.15	23.81	0	0	0	0.04
2001	279	23	660	598.316	-311.922	D	7.842	7.731	0.111	3.601	29.7	70.02	0	0	0	0.28
2001	280	23	603	598.68	-316.244	D	6.563	6.533	0.03	1.13	78.27	20.56	0	0	0	1.17
2001	281	23	637	596.267	-315.066	D	6.61	6.595	0.016	1.25	85.66	13.71	0	0	0	0.63
2001	282	23	1	596.558	-316.101	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	8.133	8.133	0	4.498	0	0	0	0	0	0
2001	284	23	1	596.558	-316.101	D	10.095	10.095	0	9.436	0	0	0	0	0	0
2001	285	23	1	596.558	-316.101	D	9.943	9.943	0	9.018	0	0	0	0	0	0
2001	286	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	287	23	1	596.558	-316.101	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2001	288	23	1	596.558	-316.101	D	6.542	6.542	0	1.147	0	0	0	0	0	0
2001	289	23	517	602.805	-305.061	D	8.14	7.561	0.579	3.233	51.17	48.69	0	0	0	0.14
2001	290	23	517	602.805	-305.061	D	6.51	6.493	0.017	1.053	30.05	68.24	0	0	0	1.72
2001	291	23	517	602.805	-305.061	D	6.532	6.5	0.032	1.066	71.03	28.21	0	0	0	0.76
2001	292	23	1	596.558	-316.101	D	6.578	6.578	0	1.218	0	0	0	0	0	0
2001	293	23	1	596.558	-316.101	D	6.945	6.945	0	1.947	0	0	0	0	0	0
2001	294	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.564	7.564	0	3.239	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	9.63	9.63	0	8.178	0	0	0	0	0	0
2001	297	23	1	596.558	-316.101	D	9.546	9.546	0	7.957	0	0	0	0	0	0
2001	298	23	1	596.558	-316.101	D	6.813	6.813	0	1.68	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	299	23	1	596.558	-316.101	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	300	23	517	602.805	-305.061	D	6.629	6.487	0.142	1.04	28.09	69.72	0	0	0	2.18
2001	301	23	517	602.805	-305.061	D	6.618	6.509	0.109	1.083	58.26	40.99	0	0	0	0.75
2001	302	23	517	602.805	-305.061	D	6.503	6.499	0.004	1.064	80.62	19.05	0	0	0	0.36
2001	303	23	1	596.558	-316.101	D	6.516	6.516	0	1.098	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	6.796	6.796	0	1.647	0	0	0	0	0	0
2001	306	23	1	596.558	-316.101	D	8.756	8.756	0	5.963	0	0	0	0	0	0
2001	307	23	637	596.267	-315.066	D	9.205	8.537	0.668	5.438	69.37	30.57	0	0	0	0.05
2001	308	23	517	602.805	-305.061	D	6.599	6.594	0.005	1.248	96.65	2.95	0	0	0	0.39
2001	309	23	624	596.324	-316.278	D	8.708	7.859	0.849	3.882	53.75	46.14	0	0	0	0.11
2001	310	23	637	596.267	-315.066	D	6.478	6.476	0.002	1.02	90.08	9.09	0	0	0	0.84
2001	311	23	662	598.404	-311.683	D	6.536	6.52	0.017	1.104	89.29	10.15	0	0	0	0.56
2001	312	23	517	602.805	-305.061	D	6.789	6.781	0.008	1.618	92.59	6.69	0	0	0	0.72
2001	313	23	632	596.27	-315.421	D	6.723	6.673	0.051	1.403	48.66	49.18	0	0	0	2.16
2001	314	23	548	603.28	-312.734	D	6.653	6.643	0.01	1.345	66.44	32.58	0	0	0	0.97
2001	315	23	603	598.68	-316.244	D	6.786	6.732	0.054	1.52	34.63	63.79	0	0	0	1.58
2001	316	23	1	596.558	-316.101	D	6.562	6.562	0	1.186	0	0	0	0	0	0
2001	317	23	1	596.558	-316.101	D	6.567	6.567	0	1.196	0	0	0	0	0	0
2001	318	23	1	596.558	-316.101	D	7.603	7.603	0	3.322	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	6.973	6.973	0	2.004	0	0	0	0	0	0
2001	320	23	1	596.558	-316.101	D	7.309	7.309	0	2.697	0	0	0	0	0	0
2001	321	23	1	596.558	-316.101	D	7.623	7.623	0	3.366	0	0	0	0	0	0
2001	322	23	517	602.805	-305.061	D	7.963	7.956	0.008	4.098	82.78	17.1	0	0	0	0.11
2001	323	23	1	596.558	-316.101	D	7.858	7.858	0	3.881	0	0	0	0	0	0
2001	324	23	517	602.805	-305.061	D	6.545	6.474	0.072	1.015	38.39	59.51	0	0	0	2.1
2001	325	23	548	603.28	-312.734	D	6.501	6.477	0.023	1.022	49.42	49.49	0	0	0	1.1
2001	326	23	548	603.28	-312.734	D	6.522	6.52	0.002	1.105	70.37	28.79	0	0	0	0.85
2001	327	23	1	596.558	-316.101	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	9.336	9.336	0	7.411	0	0	0	0	0	0
2001	329	23	1	596.558	-316.101	D	6.663	6.663	0	1.383	0	0	0	0	0	0
2001	330	23	1	596.558	-316.101	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	331	23	1	596.558	-316.101	D	7.453	7.453	0	3.002	0	0	0	0	0	0
2001	332	23	626	596.299	-315.88	D	8.981	8.706	0.275	5.842	20.24	79.58	0	0	0	0.17
2001	333	23	624	596.324	-316.278	D	10.098	10.097	0	9.443	64.89	35.27	0	0	0	0.03
2001	334	23	545	603.234	-311.991	D	10.527	8.857	1.67	6.209	63.17	36.76	0	0	0	0.07
2001	335	23	1	596.558	-316.101	D	6.626	6.626	0	1.311	0	0	0	0	0	0
2001	336	23	1	596.558	-316.101	D	6.665	6.665	0	1.388	0	0	0	0	0	0
2001	337	23	1	596.558	-316.101	D	6.735	6.735	0	1.527	0	0	0	0	0	0

Appendix M
Mingo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINA	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	338	23	1	596.558	-316.101	D	6.817	6.817	0	1.69	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	8.689	8.689	0	5.801	0	0	0	0	0	0
2001	340	23	1	596.558	-316.101	D	9.828	9.828	0	8.705	0	0	0	0	0	0
2001	341	23	517	602.805	-305.061	D	9.881	9.879	0.002	8.844	67.95	32.03	0	0	0	0.07
2001	342	23	517	602.805	-305.061	D	9.387	8.814	0.574	6.103	67.06	32.76	0	0	0	0.18
2001	343	23	677	600.05	-309.264	D	7.007	6.634	0.373	1.328	21.58	76.91	0	0	0	1.51
2001	344	23	637	596.267	-315.066	D	6.531	6.518	0.013	1.101	46.36	52.8	0	0	0	0.83
2001	345	23	632	596.27	-315.421	D	6.592	6.575	0.018	1.211	57.25	42.19	0	0	0	0.55
2001	346	23	490	602.499	-305.648	D	8.916	8.916	0	6.353	69.17	31.65	0	0	0	0.37
2001	347	23	1	596.558	-316.101	D	9.345	9.345	0	7.433	0	0	0	0	0	0
2001	348	23	517	602.805	-305.061	D	9.926	8.681	1.246	5.781	56.77	43.16	0	0	0	0.07
2001	349	23	517	602.805	-305.061	D	7.218	7.172	0.046	2.41	76	23.74	0	0	0	0.26
2001	350	23	521	602.866	-306.052	D	10.218	10.099	0.119	9.449	74.79	25.17	0	0	0	0.04
2001	351	23	517	602.805	-305.061	D	10.942	10.218	0.725	9.779	68.05	31.88	0	0	0	0.07
2001	352	23	1	596.558	-316.101	D	7.315	7.315	0	2.709	0	0	0	0	0	0
2001	353	23	517	602.805	-305.061	D	6.682	6.681	0	1.42	31.16	67.5	0	0	0	1.28
2001	354	23	1	596.558	-316.101	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	355	23	1	596.558	-316.101	D	6.485	6.485	0	1.037	0	0	0	0	0	0
2001	356	23	1	596.558	-316.101	D	7.376	7.376	0	2.837	0	0	0	0	0	0
2001	357	23	1	596.558	-316.101	D	7.901	7.901	0	3.975	0	0	0	0	0	0
2001	358	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	359	23	1	596.558	-316.101	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	360	23	1	596.558	-316.101	D	6.497	6.497	0	1.06	0	0	0	0	0	0
2001	361	23	1	596.558	-316.101	D	6.534	6.534	0	1.133	0	0	0	0	0	0
2001	362	23	1	596.558	-316.101	D	6.849	6.849	0	1.753	0	0	0	0	0	0
2001	363	23	1	596.558	-316.101	D	6.626	6.626	0	1.312	0	0	0	0	0	0
2001	364	23	1	596.558	-316.101	D	6.52	6.52	0	1.105	0	0	0	0	0	0
2001	365	23	1	596.558	-316.101	D	6.562	6.562	0	1.187	0	0	0	0	0	0
									5.96							

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EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	517	602.805	-305.061	D	6.891	6.85	0.041	1.755	0	0	0	0	0	100
2002	2	23	637	596.267	-315.066	D	6.835	6.793	0.043	1.641	0	0	0	0	0	99.99
2002	3	23	557	601.32	-313.419	D	6.96	6.917	0.043	1.89	0	0	0	0	0	100
2002	4	23	548	603.28	-312.734	D	6.696	6.691	0.005	1.439	0	0	0	0	0	100
2002	5	23	376	601.639	-307.464	D	6.783	6.783	0	1.621	0	0	0	0	0	97.79
2002	6	23	517	602.805	-305.061	D	9.697	9.685	0.013	8.322	0	0	0	0	0	99.98
2002	7	23	557	601.32	-313.419	D	8.321	8.265	0.056	4.801	0	0	0	0	0	100
2002	8	23	517	602.805	-305.061	D	7.391	7.388	0.003	2.862	0	0	0	0	0	99.99
2002	9	23	1	596.558	-316.101	D	7.714	7.714	0	3.563	0	0	0	0	0	0
2002	10	23	517	602.805	-305.061	D	9.599	9.561	0.038	7.994	0	0	0	0	0	99.99
2002	11	23	632	596.27	-315.421	D	8.252	8.234	0.018	4.73	0	0	0	0	0	100
2002	12	23	517	602.805	-305.061	D	7	6.989	0.011	2.036	0	0	0	0	0	100
2002	13	23	632	596.27	-315.421	D	7.196	7.192	0.004	2.453	0	0	0	0	0	99.96
2002	14	23	557	601.32	-313.419	D	7.524	7.521	0.002	3.147	0	0	0	0	0	99.98
2002	15	23	6	596.462	-314.859	D	6.811	6.81	0.001	1.676	0	0	0	0	0	99.87
2002	16	23	624	596.324	-316.278	D	6.675	6.675	0.001	1.407	0	0	0	0	0	99.82
2002	17	23	638	596.406	-314.894	D	6.987	6.961	0.026	1.979	0	0	0	0	0	100
2002	18	23	517	602.805	-305.061	D	9.256	9.242	0.014	7.171	0	0	0	0	0	100
2002	19	23	517	602.805	-305.061	D	9.625	9.621	0.005	8.152	0	0	0	0	0	99.94
2002	20	23	624	596.324	-316.278	D	9.91	9.894	0.016	8.884	0	0	0	0	0	100
2002	21	23	557	601.32	-313.419	D	8.358	8.356	0.002	5.012	0	0	0	0	0	99.96
2002	22	23	517	602.805	-305.061	D	7.096	7.093	0.003	2.248	0	0	0	0	0	100.03
2002	23	23	1	596.558	-316.101	D	9.964	9.964	0	9.076	0	0	0	0	0	0
2002	24	23	632	596.27	-315.421	D	9.095	9.066	0.029	6.726	0	0	0	0	0	100
2002	25	23	517	602.805	-305.061	D	8.57	8.56	0.01	5.493	0	0	0	0	0	100
2002	26	23	548	603.28	-312.734	D	6.871	6.868	0.003	1.791	0	0	0	0	0	99.96
2002	27	23	547	603.265	-312.487	D	6.984	6.984	0	2.025	0	0	0	0	0	99.71
2002	28	23	1	596.558	-316.101	D	7.059	7.059	0	2.178	0	0	0	0	0	0
2002	29	23	517	602.805	-305.061	D	10.109	10.109	0	9.476	0	0	0	0	0	97.94
2002	30	23	637	596.267	-315.066	D	10.19	10.155	0.035	9.603	0	0	0	0	0	99.99
2002	31	23	517	602.805	-305.061	D	10.221	10.218	0.003	9.779	0	0	0	0	0	99.85
2002	32	23	624	596.324	-316.278	D	7.683	7.677	0.006	3.482	0	0	0	0	0	99.99
2002	33	23	632	596.27	-315.421	D	7.288	7.283	0.005	2.642	0	0	0	0	0	99.98
2002	34	23	624	596.324	-316.278	D	6.828	6.82	0.008	1.695	0	0	0	0	0	99.99
2002	35	23	517	602.805	-305.061	D	7.101	7.085	0.016	2.232	0	0	0	0	0	100
2002	36	23	624	596.324	-316.278	D	6.625	6.624	0.002	1.307	0	0	0	0	0	99.98
2002	37	23	637	596.267	-315.066	D	6.928	6.925	0.002	1.906	0	0	0	0	0	99.99
2002	38	23	517	602.805	-305.061	D	9.295	9.271	0.024	7.243	0	0	0	0	0	99.98

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	39	23	603	598.68	-316.244	D	8.454	8.447	0.007	5.226	0	0	0	0	0	99.99
2002	40	23	546	603.249	-312.239	D	7.906	7.906	0.001	3.986	0	0	0	0	0	99.56
2002	41	23	655	597.944	-312.459	D	7.879	7.876	0.003	3.92	0	0	0	0	0	99.92
2002	42	23	517	602.805	-305.061	D	7.803	7.791	0.013	3.732	0	0	0	0	0	99.99
2002	43	23	557	601.32	-313.419	D	6.92	6.915	0.004	1.887	0	0	0	0	0	99.99
2002	44	23	632	596.27	-315.421	D	6.669	6.649	0.021	1.356	0	0	0	0	0	100
2002	45	23	517	602.805	-305.061	D	6.553	6.55	0.003	1.164	0	0	0	0	0	100.01
2002	46	23	548	603.28	-312.734	D	6.785	6.783	0.002	1.621	0	0	0	0	0	99.96
2002	47	23	624	596.324	-316.278	D	6.643	6.627	0.016	1.313	0	0	0	0	0	100
2002	48	23	632	596.27	-315.421	D	6.571	6.549	0.022	1.162	0	0	0	0	0	99.99
2002	49	23	637	596.267	-315.066	D	6.63	6.623	0.007	1.306	0	0	0	0	0	100
2002	50	23	1	596.558	-316.101	D	7.503	7.503	0	3.107	0	0	0	0	0	0
2002	51	23	624	596.324	-316.278	D	9.343	9.342	0.001	7.426	0	0	0	0	0	99.71
2002	52	23	603	598.68	-316.244	D	7.236	7.235	0.001	2.542	0	0	0	0	0	99.94
2002	53	23	637	596.267	-315.066	D	7.033	7.013	0.02	2.084	0	0	0	0	0	99.99
2002	54	23	548	603.28	-312.734	D	6.645	6.618	0.028	1.295	0	0	0	0	0	100
2002	55	23	548	603.28	-312.734	D	6.675	6.668	0.007	1.394	0	0	0	0	0	99.96
2002	56	23	517	602.805	-305.061	D	7.478	7.473	0.005	3.043	0	0	0	0	0	99.98
2002	57	23	517	602.805	-305.061	D	7.936	7.921	0.014	4.021	0	0	0	0	0	100
2002	58	23	624	596.324	-316.278	D	6.792	6.791	0.001	1.638	0	0	0	0	0	99.87
2002	59	23	626	596.299	-315.88	D	6.54	6.538	0.003	1.139	0	0	0	0	0	100.01
2002	60	23	517	602.805	-305.061	D	6.548	6.548	0	1.16	0	0	0	0	0	96.18
2002	61	23	624	596.324	-316.278	D	8.394	8.391	0.003	5.093	0	0	0	0	0	99.98
2002	62	23	548	603.28	-312.734	D	7.122	7.121	0.001	2.305	0	0	0	0	0	99.96
2002	63	23	631	596.276	-315.551	D	6.89	6.887	0.003	1.829	0	0	0	0	0	99.95
2002	64	23	517	602.805	-305.061	D	6.669	6.669	0	1.395	0	0	0	0	0	100.07
2002	65	23	1	596.558	-316.101	D	6.726	6.726	0	1.509	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.26	7.26	0	2.593	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.571	7.571	0	3.254	0	0	0	0	0	0
2002	68	23	517	602.805	-305.061	D	8.005	8.004	0.001	4.206	0	0	0	0	0	100.09
2002	69	23	1	596.558	-316.101	D	6.923	6.922	0	1.901	0	0	0	0	0	99.53
2002	70	23	517	602.805	-305.061	D	6.726	6.721	0.005	1.498	0	0	0	0	0	99.95
2002	71	23	656	597.971	-312.292	D	9.523	9.522	0.001	7.893	0	0	0	0	0	99.99
2002	72	23	656	597.971	-312.292	D	9.481	9.462	0.02	7.736	0	0	0	0	0	99.98
2002	73	23	517	602.805	-305.061	D	8.253	8.251	0.002	4.769	0	0	0	0	0	99.99
2002	74	23	517	602.805	-305.061	D	9.076	9.07	0.007	6.736	0	0	0	0	0	99.99
2002	75	23	626	596.299	-315.88	D	8.085	8.079	0.006	4.375	0	0	0	0	0	100
2002	76	23	548	603.28	-312.734	D	8.829	8.825	0.003	6.132	0	0	0	0	0	99.98
2002	77	23	517	602.805	-305.061	D	9.496	9.482	0.013	7.789	0	0	0	0	0	99.99

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	78	23	624	596.324	-316.278	D	10.204	10.197	0.007	9.721	0	0	0	0	0	99.97
2002	79	23	637	596.267	-315.066	D	9.362	9.338	0.024	7.417	0	0	0	0	0	100
2002	80	23	682	600.626	-308.407	D	9.149	9.132	0.016	6.893	0	0	0	0	0	99.99
2002	81	23	517	602.805	-305.061	D	6.58	6.558	0.022	1.178	0	0	0	0	0	100
2002	82	23	517	602.805	-305.061	D	6.669	6.664	0.004	1.387	0	0	0	0	0	99.99
2002	83	23	517	602.805	-305.061	D	6.845	6.845	0	1.745	0	0	0	0	0	99.67
2002	84	23	546	603.249	-312.239	D	9.368	9.368	0	7.493	0	0	0	0	0	97.29
2002	85	23	624	596.324	-316.278	D	8.712	8.698	0.014	5.823	0	0	0	0	0	100
2002	86	23	517	602.805	-305.061	D	7.667	7.65	0.017	3.423	0	0	0	0	0	99.99
2002	87	23	624	596.324	-316.278	D	6.91	6.905	0.005	1.866	0	0	0	0	0	99.99
2002	88	23	517	602.805	-305.061	D	8.004	8	0.005	4.196	0	0	0	0	0	99.98
2002	89	23	548	603.28	-312.734	D	8.318	8.31	0.008	4.905	0	0	0	0	0	99.98
2002	90	23	517	602.805	-305.061	D	6.991	6.99	0.001	2.038	0	0	0	0	0	100.01
2002	91	23	548	603.28	-312.734	D	6.695	6.682	0.013	1.421	0	0	0	0	0	99.99
2002	92	23	517	602.805	-305.061	D	7.36	7.357	0.003	2.798	0	0	0	0	0	100
2002	93	23	557	601.32	-313.419	D	7.214	7.166	0.048	2.398	0	0	0	0	0	100
2002	94	23	517	602.805	-305.061	D	6.888	6.871	0.017	1.797	0	0	0	0	0	100
2002	95	23	520	602.851	-305.804	D	6.594	6.578	0.016	1.218	0	0	0	0	0	100
2002	96	23	632	596.27	-315.421	D	6.519	6.517	0.003	1.098	0	0	0	0	0	100.01
2002	97	23	557	601.32	-313.419	D	6.651	6.648	0.003	1.354	0	0	0	0	0	100.03
2002	98	23	557	601.32	-313.419	D	8.926	8.925	0.001	6.377	0	0	0	0	0	100
2002	99	23	676	599.876	-309.365	D	9.006	8.987	0.019	6.531	0	0	0	0	0	99.98
2002	100	23	637	596.267	-315.066	D	6.917	6.913	0.004	1.882	0	0	0	0	0	100.02
2002	101	23	624	596.324	-316.278	D	6.618	6.617	0.002	1.293	0	0	0	0	0	99.97
2002	102	23	517	602.805	-305.061	D	8.501	8.501	0	5.352	0	0	0	0	0	91
2002	103	23	632	596.27	-315.421	D	8.68	8.673	0.007	5.763	0	0	0	0	0	99.99
2002	104	23	517	602.805	-305.061	D	8.876	8.874	0.002	6.251	0	0	0	0	0	99.84
2002	105	23	1	596.558	-316.101	D	8.3	8.3	0	4.881	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.54	7.54	0	3.186	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.065	7.065	0	2.191	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.176	7.176	0	2.419	0	0	0	0	0	0
2002	110	23	637	596.267	-315.066	D	8.342	8.338	0.004	4.969	0	0	0	0	0	99.98
2002	111	23	517	602.805	-305.061	D	9.196	9.194	0.002	7.048	0	0	0	0	0	99.93
2002	112	23	517	602.805	-305.061	D	6.972	6.969	0.002	1.995	0	0	0	0	0	100.05
2002	113	23	517	602.805	-305.061	D	6.662	6.66	0.002	1.379	0	0	0	0	0	99.98
2002	114	23	546	603.249	-312.239	D	7.221	7.22	0.001	2.511	0	0	0	0	0	100.03
2002	115	23	557	601.32	-313.419	D	7.139	7.127	0.012	2.317	0	0	0	0	0	100
2002	116	23	626	596.299	-315.88	D	6.737	6.732	0.005	1.521	0	0	0	0	0	99.98

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	117	23	517	602.805	-305.061	D	8.142	8.139	0.004	4.512	0	0	0	0	0	99.98
2002	118	23	6	596.462	-314.859	D	8.848	8.846	0.001	6.183	0	0	0	0	0	99.9
2002	119	23	632	596.27	-315.421	D	6.835	6.802	0.032	1.66	0	0	0	0	0	100
2002	120	23	517	602.805	-305.061	D	6.792	6.768	0.025	1.591	0	0	0	0	0	100
2002	121	23	517	602.805	-305.061	D	9.666	9.666	0	8.272	0	0	0	0	0	99.46
2002	122	23	694	602.12	-306.029	D	8.834	8.801	0.033	6.072	0	0	0	0	0	100
2002	123	23	662	598.404	-311.683	D	6.773	6.758	0.015	1.572	0	0	0	0	0	100
2002	124	23	624	596.324	-316.278	D	6.695	6.693	0.001	1.444	0	0	0	0	0	100.1
2002	125	23	517	602.805	-305.061	D	6.828	6.823	0.004	1.702	0	0	0	0	0	99.98
2002	126	23	327	601.142	-307.502	D	7.974	7.973	0	4.138	0	0	0	0	0	99.17
2002	127	23	1	596.558	-316.101	D	7.777	7.777	0	3.702	0	0	0	0	0	0
2002	128	23	517	602.805	-305.061	D	9.233	9.233	0	7.147	0	0	0	0	0	99.91
2002	129	23	517	602.805	-305.061	D	8.088	8.087	0.001	4.394	0	0	0	0	0	99.85
2002	130	23	557	601.32	-313.419	D	6.591	6.589	0.002	1.238	0	0	0	0	0	100.09
2002	131	23	632	596.27	-315.421	D	7.019	7.018	0.001	2.095	0	0	0	0	0	99.91
2002	132	23	1	596.558	-316.101	D	8.587	8.587	0	5.555	0	0	0	0	0	0
2002	133	23	557	601.32	-313.419	D	8.601	8.578	0.023	5.536	0	0	0	0	0	100
2002	134	23	517	602.805	-305.061	D	6.806	6.806	0	1.667	0	0	0	0	0	97.9
2002	135	23	631	596.276	-315.551	D	6.705	6.704	0.001	1.465	0	0	0	0	0	99.82
2002	136	23	461	602.269	-305.916	D	6.882	6.882	0	1.819	0	0	0	0	0	98.22
2002	137	23	603	598.68	-316.244	D	9.413	9.41	0.004	7.601	0	0	0	0	0	99.96
2002	138	23	637	596.267	-315.066	D	7.275	7.274	0.001	2.623	0	0	0	0	0	100.16
2002	139	23	637	596.267	-315.066	D	6.74	6.729	0.01	1.515	0	0	0	0	0	99.99
2002	140	23	656	597.971	-312.292	D	6.626	6.614	0.012	1.288	0	0	0	0	0	100.01
2002	141	23	624	596.324	-316.278	D	6.996	6.969	0.028	1.995	0	0	0	0	0	100
2002	142	23	517	602.805	-305.061	D	6.624	6.619	0.005	1.297	0	0	0	0	0	100
2002	143	23	517	602.805	-305.061	D	6.712	6.712	0	1.48	0	0	0	0	0	99.82
2002	144	23	1	596.558	-316.101	D	7.086	7.086	0	2.235	0	0	0	0	0	0
2002	145	23	517	602.805	-305.061	D	7.555	7.554	0.001	3.218	0	0	0	0	0	99.97
2002	146	23	632	596.27	-315.421	D	8.272	8.262	0.01	4.795	0	0	0	0	0	99.97
2002	147	23	517	602.805	-305.061	D	8.153	8.151	0.002	4.54	0	0	0	0	0	100.03
2002	148	23	1	596.558	-316.101	D	7.42	7.42	0	2.93	0	0	0	0	0	29.62
2002	149	23	557	601.32	-313.419	D	9.154	9.154	0	6.948	0	0	0	0	0	100.36
2002	150	23	624	596.324	-316.278	D	9.05	9.048	0.002	6.682	0	0	0	0	0	99.91
2002	151	23	517	602.805	-305.061	D	7.199	7.198	0	2.465	0	0	0	0	0	99.58
2002	152	23	516	602.728	-305.38	D	7.175	7.175	0	2.418	0	0	0	0	0	99.24
2002	153	23	1	596.558	-316.101	D	7.435	7.435	0	2.963	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.374	7.374	0	2.832	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.172	7.172	0	2.41	0	0	0	0	0	0

Appendix M
Mingo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	156	23	517	602.805	-305.061	D	7.45	7.438	0.011	2.969	0	0	0	0	0	100
2002	157	23	638	596.406	-314.894	D	8.092	8.067	0.024	4.349	0	0	0	0	0	100
2002	158	23	626	596.299	-315.88	D	6.911	6.903	0.008	1.861	0	0	0	0	0	100.01
2002	159	23	557	601.32	-313.419	D	7.194	7.188	0.005	2.445	0	0	0	0	0	100.01
2002	160	23	521	602.866	-306.052	D	7.714	7.711	0.003	3.558	0	0	0	0	0	99.93
2002	161	23	1	596.558	-316.101	D	8.273	8.273	0	4.819	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	9.06	9.06	0	6.712	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.783	7.783	0	3.715	0	0	0	0	0	0
2002	164	23	517	602.805	-305.061	D	8.202	8.201	0.001	4.654	0	0	0	0	0	99.94
2002	165	23	637	596.267	-315.066	D	6.983	6.972	0.011	2.001	0	0	0	0	0	100
2002	166	23	517	602.805	-305.061	D	6.788	6.788	0	1.631	0	0	0	0	0	97.04
2002	167	23	517	602.805	-305.061	D	6.676	6.672	0.003	1.402	0	0	0	0	0	99.98
2002	168	23	624	596.324	-316.278	D	7.716	7.69	0.026	3.511	0	0	0	0	0	99.99
2002	169	23	603	598.68	-316.244	D	6.809	6.792	0.017	1.639	0	0	0	0	0	99.99
2002	170	23	517	602.805	-305.061	D	7.062	7.056	0.005	2.173	0	0	0	0	0	99.99
2002	171	23	528	602.974	-307.784	D	7.343	7.341	0.003	2.763	0	0	0	0	0	99.96
2002	172	23	624	596.324	-316.278	D	6.98	6.979	0.001	2.016	0	0	0	0	0	99.83
2002	173	23	1	596.558	-316.101	D	6.977	6.977	0	2.011	0	0	0	0	0	0
2002	174	23	604	598.599	-316.246	D	6.852	6.851	0.001	1.757	0	0	0	0	0	100.05
2002	175	23	603	598.68	-316.244	D	7.709	7.707	0.003	3.547	0	0	0	0	0	99.99
2002	176	23	548	603.28	-312.734	D	8.214	8.208	0.006	4.67	0	0	0	0	0	100.02
2002	177	23	517	602.805	-305.061	D	7.387	7.385	0.002	2.856	0	0	0	0	0	100.02
2002	178	23	517	602.805	-305.061	D	7.77	7.767	0.002	3.681	0	0	0	0	0	100.03
2002	179	23	517	602.805	-305.061	D	8.294	8.288	0.006	4.855	0	0	0	0	0	99.99
2002	180	23	637	596.267	-315.066	D	7.938	7.933	0.005	4.048	0	0	0	0	0	100.02
2002	181	23	517	602.805	-305.061	D	7.362	7.362	0	2.807	0	0	0	0	0	100.29
2002	182	23	517	602.805	-305.061	D	6.878	6.877	0.001	1.81	0	0	0	0	0	99.97
2002	183	23	517	602.805	-305.061	D	6.932	6.919	0.013	1.895	0	0	0	0	0	99.99
2002	184	23	624	596.324	-316.278	D	7.647	7.639	0.008	3.401	0	0	0	0	0	99.97
2002	185	23	624	596.324	-316.278	D	7.138	7.135	0.003	2.334	0	0	0	0	0	99.99
2002	186	23	517	602.805	-305.061	D	7.132	7.13	0.002	2.325	0	0	0	0	0	99.94
2002	187	23	516	602.728	-305.38	D	6.976	6.974	0.002	2.005	0	0	0	0	0	99.95
2002	188	23	624	596.324	-316.278	D	6.895	6.895	0	1.845	0	0	0	0	0	99.28
2002	189	23	637	596.267	-315.066	D	6.715	6.714	0.001	1.484	0	0	0	0	0	99.88
2002	190	23	517	602.805	-305.061	D	6.856	6.846	0.01	1.747	0	0	0	0	0	99.99
2002	191	23	533	603.05	-309.022	D	7.055	7.038	0.017	2.136	0	0	0	0	0	100
2002	192	23	688	601.298	-307.191	D	9.082	9.071	0.011	6.739	0	0	0	0	0	100
2002	193	23	637	596.267	-315.066	D	7.663	7.662	0.001	3.451	0	0	0	0	0	99.93
2002	194	23	624	596.324	-316.278	D	8.493	8.493	0	5.333	0	0	0	0	0	100.33

Appendix M
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2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	195	23	1	596.558	-316.101	D	7.123	7.123	0	2.31	0	0	0	0	0	98.71
2002	196	23	1	596.558	-316.101	D	7.456	7.456	0	3.006	0	0	0	0	0	62.79
2002	197	23	624	596.324	-316.278	D	7.623	7.62	0.003	3.36	0	0	0	0	0	99.97
2002	198	23	517	602.805	-305.061	D	7.918	7.918	0.001	4.013	0	0	0	0	0	99.64
2002	199	23	517	602.805	-305.061	D	8.554	8.553	0.001	5.476	0	0	0	0	0	99.53
2002	200	23	624	596.324	-316.278	D	8.657	8.653	0.004	5.714	0	0	0	0	0	99.97
2002	201	23	517	602.805	-305.061	D	9.054	9.044	0.01	6.672	0	0	0	0	0	99.97
2002	202	23	521	602.866	-306.052	D	8.73	8.727	0.004	5.892	0	0	0	0	0	99.94
2002	203	23	516	602.728	-305.38	D	7.829	7.829	0	3.815	0	0	0	0	0	99.52
2002	204	23	637	596.267	-315.066	D	7.782	7.76	0.022	3.663	0	0	0	0	0	99.99
2002	205	23	624	596.324	-316.278	D	8.434	8.428	0.006	5.18	0	0	0	0	0	100.01
2002	206	23	603	598.68	-316.244	D	7.452	7.451	0.002	2.996	0	0	0	0	0	99.99
2002	207	23	211	600.245	-312.069	D	7.462	7.457	0.004	3.01	0	0	0	0	0	100
2002	208	23	517	602.805	-305.061	D	8.133	8.133	0	4.498	0	0	0	0	0	99.84
2002	209	23	1	596.558	-316.101	D	7.569	7.569	0	3.249	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.525	7.525	0	3.154	0	0	0	0	0	0
2002	211	23	517	602.805	-305.061	D	8.019	8.019	0.001	4.239	0	0	0	0	0	100.08
2002	212	23	624	596.324	-316.278	D	9.441	9.435	0.006	7.667	0	0	0	0	0	99.95
2002	213	23	517	602.805	-305.061	D	8.748	8.736	0.012	5.914	0	0	0	0	0	100
2002	214	23	517	602.805	-305.061	D	7.097	7.09	0.006	2.242	0	0	0	0	0	99.99
2002	215	23	624	596.324	-316.278	D	7.059	7.057	0.003	2.174	0	0	0	0	0	99.96
2002	216	23	517	602.805	-305.061	D	7.257	7.255	0.002	2.583	0	0	0	0	0	99.97
2002	217	23	517	602.805	-305.061	D	7.323	7.321	0.001	2.722	0	0	0	0	0	99.89
2002	218	23	637	596.267	-315.066	D	7.49	7.476	0.014	3.05	0	0	0	0	0	99.99
2002	219	23	624	596.324	-316.278	D	7.246	7.245	0.001	2.563	0	0	0	0	0	99.75
2002	220	23	107	598.487	-311.954	D	6.67	6.67	0	1.398	0	0	0	0	0	98.1
2002	221	23	624	596.324	-316.278	D	6.678	6.676	0.003	1.409	0	0	0	0	0	99.98
2002	222	23	517	602.805	-305.061	D	6.716	6.713	0.003	1.482	0	0	0	0	0	100.01
2002	223	23	517	602.805	-305.061	D	7.474	7.473	0	3.044	0	0	0	0	0	99.39
2002	224	23	461	602.269	-305.916	D	7.16	7.16	0	2.387	0	0	0	0	0	60.16
2002	225	23	1	596.558	-316.101	D	8.494	8.494	0	5.336	0	0	0	0	0	0
2002	226	23	517	602.805	-305.061	D	9.43	9.43	0	7.652	0	0	0	0	0	98.41
2002	227	23	517	602.805	-305.061	D	8.56	8.56	0	5.492	0	0	0	0	0	99.74
2002	228	23	1	596.558	-316.101	D	9.393	9.393	0	7.557	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	9.238	9.238	0	7.159	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	9.148	9.148	0	6.931	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	9.118	9.118	0	6.856	0	0	0	0	0	0
2002	232	23	548	603.28	-312.734	D	8.35	8.349	0.001	4.997	0	0	0	0	0	99.89
2002	233	23	517	602.805	-305.061	D	7.592	7.59	0.002	3.295	0	0	0	0	0	100.05

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	234	23	357	602.003	-312.183	D	7.318	7.318	0	2.716	0	0	0	0	0	96.85
2002	235	23	1	596.558	-316.101	D	7.551	7.551	0	3.211	0	0	0	0	0	0
2002	236	23	517	602.805	-305.061	D	8.123	8.112	0.011	4.451	0	0	0	0	0	99.99
2002	237	23	517	602.805	-305.061	D	7.733	7.715	0.018	3.566	0	0	0	0	0	100
2002	238	23	637	596.267	-315.066	D	8.378	8.368	0.009	5.041	0	0	0	0	0	100
2002	239	23	637	596.267	-315.066	D	8.024	8.023	0.001	4.25	0	0	0	0	0	99.91
2002	240	23	1	596.558	-316.101	D	7.102	7.102	0	2.266	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.132	7.132	0	2.329	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.093	7.093	0	2.247	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	244	23	517	602.805	-305.061	D	6.898	6.898	0	1.852	0	0	0	0	0	100.01
2002	245	23	517	602.805	-305.061	D	7.262	7.262	0	2.598	0	0	0	0	0	99.14
2002	246	23	1	596.558	-316.101	D	6.993	6.993	0	2.044	0	0	0	0	0	0
2002	247	23	513	602.785	-306.126	D	7.139	7.135	0.004	2.334	0	0	0	0	0	99.91
2002	248	23	624	596.324	-316.278	D	6.636	6.635	0	1.33	0	0	0	0	0	100.46
2002	249	23	3	596.519	-315.604	D	6.682	6.682	0	1.421	0	0	0	0	0	53.49
2002	250	23	548	603.28	-312.734	D	6.766	6.764	0.002	1.584	0	0	0	0	0	99.94
2002	251	23	517	602.805	-305.061	D	7.288	7.286	0.002	2.648	0	0	0	0	0	99.99
2002	252	23	624	596.324	-316.278	D	6.967	6.966	0.001	1.99	0	0	0	0	0	99.94
2002	253	23	637	596.267	-315.066	D	7.071	7.056	0.015	2.173	0	0	0	0	0	99.99
2002	254	23	548	603.28	-312.734	D	7.621	7.613	0.009	3.343	0	0	0	0	0	99.99
2002	255	23	1	596.558	-316.101	D	6.755	6.755	0	1.566	0	0	0	0	0	0
2002	256	23	637	596.267	-315.066	D	6.672	6.672	0.001	1.402	0	0	0	0	0	100.19
2002	257	23	603	598.68	-316.244	D	6.753	6.75	0.003	1.556	0	0	0	0	0	99.95
2002	258	23	517	602.805	-305.061	D	7.439	7.426	0.014	2.943	0	0	0	0	0	100
2002	259	23	624	596.324	-316.278	D	8.685	8.635	0.05	5.672	0	0	0	0	0	100
2002	260	23	624	596.324	-316.278	D	8.379	8.358	0.021	5.017	0	0	0	0	0	100
2002	261	23	517	602.805	-305.061	D	9.084	9.082	0.003	6.765	0	0	0	0	0	99.97
2002	262	23	1	596.558	-316.101	D	9.447	9.447	0	7.698	0	0	0	0	0	0
2002	263	23	656	597.971	-312.292	D	9.65	9.65	0	8.23	0	0	0	0	0	99.19
2002	264	23	624	596.324	-316.278	D	9.01	9.006	0.004	6.578	0	0	0	0	0	99.94
2002	265	23	682	600.626	-308.407	D	7.217	7.18	0.037	2.428	0	0	0	0	0	100
2002	266	23	632	596.27	-315.421	D	6.741	6.731	0.01	1.518	0	0	0	0	0	100
2002	267	23	517	602.805	-305.061	D	6.681	6.659	0.022	1.377	0	0	0	0	0	100
2002	268	23	623	596.511	-316.262	D	6.74	6.74	0	1.535	0	0	0	0	0	96.85
2002	269	23	1	596.558	-316.101	D	8.299	8.299	0	4.879	0	0	0	0	0	0
2002	270	23	517	602.805	-305.061	D	9.229	9.223	0.006	7.122	0	0	0	0	0	99.97
2002	271	23	624	596.324	-316.278	D	8.268	8.247	0.021	4.761	0	0	0	0	0	99.99
2002	272	23	625	596.311	-316.079	D	8.05	8.041	0.009	4.289	0	0	0	0	0	99.98

Appendix M
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2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	273	23	637	596.267	-315.066	D	7.234	7.231	0.003	2.533	0	0	0	0	0	99.99
2002	274	23	1	596.558	-316.101	D	8.21	8.21	0	4.674	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	8.804	8.804	0	6.079	0	0	0	0	0	0
2002	276	23	517	602.805	-305.061	D	8.563	8.563	0	5.5	0	0	0	0	0	100.21
2002	277	23	694	602.12	-306.029	D	8.978	8.973	0.005	6.494	0	0	0	0	0	100.01
2002	278	23	557	601.32	-313.419	D	7.166	7.165	0.002	2.396	0	0	0	0	0	99.99
2002	279	23	632	596.27	-315.421	D	6.764	6.76	0.005	1.575	0	0	0	0	0	100
2002	280	23	632	596.27	-315.421	D	6.891	6.882	0.009	1.819	0	0	0	0	0	99.98
2002	281	23	1	596.558	-316.101	D	6.614	6.614	0	1.287	0	0	0	0	0	0
2002	282	23	517	602.805	-305.061	D	7.338	7.338	0	2.757	0	0	0	0	0	99.89
2002	283	23	516	602.728	-305.38	D	10.218	10.218	0	9.779	0	0	0	0	0	92.62
2002	284	23	405	602.557	-312.89	D	9.827	9.827	0	8.704	0	0	0	0	0	82.65
2002	285	23	632	596.27	-315.421	D	9.294	9.291	0.003	7.296	0	0	0	0	0	99.95
2002	286	23	656	597.971	-312.292	D	7.543	7.504	0.039	3.109	0	0	0	0	0	100
2002	287	23	637	596.267	-315.066	D	6.55	6.546	0.005	1.155	0	0	0	0	0	99.99
2002	288	23	548	603.28	-312.734	D	6.567	6.538	0.029	1.139	0	0	0	0	0	100
2002	289	23	639	596.544	-314.722	D	6.659	6.631	0.028	1.321	0	0	0	0	0	100
2002	290	23	517	602.805	-305.061	D	6.548	6.538	0.01	1.14	0	0	0	0	0	100
2002	291	23	517	602.805	-305.061	D	6.721	6.715	0.006	1.486	0	0	0	0	0	100.01
2002	292	23	694	602.12	-306.029	D	9.264	9.256	0.008	7.205	0	0	0	0	0	99.97
2002	293	23	637	596.267	-315.066	D	7.588	7.582	0.006	3.278	0	0	0	0	0	99.95
2002	294	23	517	602.805	-305.061	D	6.691	6.69	0.001	1.437	0	0	0	0	0	99.94
2002	295	23	517	602.805	-305.061	D	6.648	6.599	0.05	1.258	0	0	0	0	0	100
2002	296	23	637	596.267	-315.066	D	6.866	6.842	0.024	1.739	0	0	0	0	0	100
2002	297	23	107	598.487	-311.954	D	6.705	6.705	0	1.466	0	0	0	0	0	86.22
2002	298	23	694	602.12	-306.029	D	8.68	8.678	0.002	5.774	0	0	0	0	0	99.9
2002	299	23	521	602.866	-306.052	D	8.958	8.917	0.041	6.356	0	0	0	0	0	100
2002	300	23	632	596.27	-315.421	D	8.399	8.379	0.02	5.067	0	0	0	0	0	99.99
2002	301	23	631	596.276	-315.551	D	9.222	9.22	0.001	7.115	0	0	0	0	0	99.73
2002	302	23	632	596.27	-315.421	D	9.5	9.498	0.002	7.831	0	0	0	0	0	100.02
2002	303	23	637	596.267	-315.066	D	8.079	8.076	0.003	4.369	0	0	0	0	0	99.94
2002	304	23	521	602.866	-306.052	D	8.098	8.068	0.031	4.35	0	0	0	0	0	100
2002	305	23	557	601.32	-313.419	D	7.409	7.37	0.038	2.825	0	0	0	0	0	100
2002	306	23	548	603.28	-312.734	D	6.647	6.647	0	1.352	0	0	0	0	0	100.18
2002	307	23	517	602.805	-305.061	D	10.22	10.218	0.002	9.779	0	0	0	0	0	99.81
2002	308	23	517	602.805	-305.061	D	9.49	9.456	0.034	7.721	0	0	0	0	0	99.99
2002	309	23	626	596.299	-315.88	D	9.285	9.264	0.021	7.226	0	0	0	0	0	99.99
2002	310	23	521	602.866	-306.052	D	7.642	7.634	0.008	3.389	0	0	0	0	0	100
2002	311	23	624	596.324	-316.278	D	6.822	6.819	0.003	1.693	0	0	0	0	0	99.98

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	312	23	517	602.805	-305.061	D	7.295	7.294	0.001	2.665	0	0	0	0	0	99.97
2002	313	23	1	596.558	-316.101	D	7.97	7.97	0	4.131	0	0	0	0	0	0
2002	314	23	624	596.324	-316.278	D	9.43	9.429	0.001	7.651	0	0	0	0	0	100.23
2002	315	23	625	596.311	-316.079	D	7.16	7.159	0	2.385	0	0	0	0	0	98.95
2002	316	23	694	602.12	-306.029	D	7.035	7.01	0.025	2.078	0	0	0	0	0	100
2002	317	23	603	598.68	-316.244	D	6.599	6.591	0.007	1.244	0	0	0	0	0	100.02
2002	318	23	518	602.82	-305.309	D	6.797	6.797	0	1.65	0	0	0	0	0	98.77
2002	319	23	681	600.53	-308.617	D	8.257	8.243	0.014	4.75	0	0	0	0	0	100
2002	320	23	637	596.267	-315.066	D	7.93	7.911	0.019	3.999	0	0	0	0	0	100
2002	321	23	517	602.805	-305.061	D	7.013	6.978	0.035	2.012	0	0	0	0	0	100
2002	322	23	517	602.805	-305.061	D	6.983	6.981	0.002	2.02	0	0	0	0	0	99.95
2002	323	23	548	603.28	-312.734	D	7.292	7.286	0.006	2.648	0	0	0	0	0	99.99
2002	324	23	548	603.28	-312.734	D	6.794	6.778	0.015	1.612	0	0	0	0	0	100.01
2002	325	23	623	596.511	-316.262	D	6.644	6.641	0.002	1.342	0	0	0	0	0	99.99
2002	326	23	557	601.32	-313.419	D	7.079	7.059	0.02	2.179	0	0	0	0	0	99.99
2002	327	23	603	598.68	-316.244	D	6.693	6.691	0.002	1.439	0	0	0	0	0	99.97
2002	328	23	517	602.805	-305.061	D	6.664	6.664	0	1.386	0	0	0	0	0	99.79
2002	329	23	637	596.267	-315.066	D	7.226	7.208	0.018	2.485	0	0	0	0	0	99.99
2002	330	23	637	596.267	-315.066	D	6.794	6.788	0.006	1.631	0	0	0	0	0	100.02
2002	331	23	673	599.727	-309.93	D	6.903	6.874	0.029	1.803	0	0	0	0	0	100
2002	332	23	517	602.805	-305.061	D	6.686	6.672	0.014	1.403	0	0	0	0	0	99.99
2002	333	23	517	602.805	-305.061	D	6.663	6.661	0.002	1.38	0	0	0	0	0	99.95
2002	334	23	624	596.324	-316.278	D	6.681	6.678	0.004	1.413	0	0	0	0	0	100.02
2002	335	23	517	602.805	-305.061	D	6.518	6.518	0	1.1	0	0	0	0	0	99.87
2002	336	23	517	602.805	-305.061	D	6.523	6.522	0.001	1.108	0	0	0	0	0	99.96
2002	337	23	548	603.28	-312.734	D	6.974	6.967	0.007	1.991	0	0	0	0	0	99.99
2002	338	23	1	596.558	-316.101	D	9.023	9.023	0	6.619	0	0	0	0	0	0
2002	339	23	637	596.267	-315.066	D	8.127	8.116	0.011	4.46	0	0	0	0	0	99.98
2002	340	23	632	596.27	-315.421	D	8.011	8.009	0.002	4.217	0	0	0	0	0	99.89
2002	341	23	694	602.12	-306.029	D	7.628	7.624	0.004	3.368	0	0	0	0	0	99.99
2002	342	23	637	596.267	-315.066	D	9.89	9.878	0.012	8.842	0	0	0	0	0	99.98
2002	343	23	603	598.68	-316.244	D	7.697	7.696	0	3.524	0	0	0	0	0	100.05
2002	344	23	1	596.558	-316.101	D	6.909	6.909	0	1.873	0	0	0	0	0	0
2002	345	23	517	602.805	-305.061	D	7.161	7.148	0.012	2.362	0	0	0	0	0	100.01
2002	346	23	517	602.805	-305.061	D	8.113	8.11	0.003	4.447	0	0	0	0	0	99.93
2002	347	23	603	598.68	-316.244	D	10.221	10.218	0.003	9.779	0	0	0	0	0	99.89
2002	348	23	632	596.27	-315.421	D	9.454	9.446	0.008	7.694	0	0	0	0	0	99.99
2002	349	23	632	596.27	-315.421	D	8.395	8.394	0.002	5.1	0	0	0	0	0	100.01
2002	350	23	517	602.805	-305.061	D	9.536	9.536	0	7.93	0	0	0	0	0	99

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	351	23	517	602.805	-305.061	D	10.176	10.176	0	9.662	0	0	0	0	0	99.57
2002	352	23	1	596.558	-316.101	D	8.161	8.161	0	4.563	0	0	0	0	0	0
2002	353	23	637	596.267	-315.066	D	10.135	10.134	0.001	9.545	0	0	0	0	0	99.57
2002	354	23	603	598.68	-316.244	D	7.659	7.656	0.002	3.438	0	0	0	0	0	100
2002	355	23	517	602.805	-305.061	D	6.702	6.694	0.008	1.445	0	0	0	0	0	100.02
2002	356	23	632	596.27	-315.421	D	7.361	7.357	0.003	2.798	0	0	0	0	0	100
2002	357	23	517	602.805	-305.061	D	6.709	6.665	0.044	1.387	0	0	0	0	0	100
2002	358	23	637	596.267	-315.066	D	9.901	9.889	0.011	8.873	0	0	0	0	0	99.99
2002	359	23	517	602.805	-305.061	D	7.838	7.831	0.007	3.82	0	0	0	0	0	100
2002	360	23	625	596.311	-316.079	D	7.578	7.577	0.001	3.267	0	0	0	0	0	99.81
2002	361	23	625	596.311	-316.079	D	7.292	7.286	0.006	2.648	0	0	0	0	0	99.98
2002	362	23	517	602.805	-305.061	D	7.632	7.622	0.01	3.364	0	0	0	0	0	100.01
2002	363	23	1	596.558	-316.101	D	7.719	7.719	0	3.575	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	9.318	9.318	0	7.366	0	0	0	0	0	0
2002	365	23	517	602.805	-305.061	D	10.225	10.218	0.007	9.779	0	0	0	0	0	99.96
									0.056							
DYNO NOBEL											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	1	596.558	-316.101	D	6.843	6.843	0	1.741	0	0	0	0	0	0
2002	2	23	193	600.016	-312.336	D	6.851	6.81	0.04	1.676	0	100	0	0	0	0
2002	3	23	660	598.316	-311.922	D	6.987	6.932	0.055	1.919	0	100	0	0	0	0
2002	4	23	433	602.806	-312.871	D	6.691	6.691	0	1.439	0	97.38	0	0	0	0
2002	5	23	241	600.857	-313.521	D	6.783	6.783	0	1.621	0	67.46	0	0	0	0
2002	6	23	517	602.805	-305.061	D	9.685	9.685	0	8.322	0	100.11	0	0	0	0
2002	7	23	517	602.805	-305.061	D	8.331	8.323	0.008	4.935	0	100	0	0	0	0
2002	8	23	1	596.558	-316.101	D	7.367	7.367	0	2.819	0	0	0	0	0	0
2002	9	23	1	596.558	-316.101	D	7.714	7.714	0	3.563	0	0	0	0	0	0
2002	10	23	517	602.805	-305.061	D	9.576	9.561	0.015	7.994	0	99.99	0	0	0	0
2002	11	23	545	603.234	-311.991	D	8.341	8.319	0.023	4.926	0	100	0	0	0	0
2002	12	23	1	596.558	-316.101	D	6.98	6.98	0	2.017	0	0	0	0	0	0
2002	13	23	1	596.558	-316.101	D	7.192	7.192	0	2.453	0	0	0	0	0	0
2002	14	23	1	596.558	-316.101	D	7.524	7.524	0	3.152	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	6.81	6.81	0	1.676	0	0	0	0	0	0
2002	16	23	1	596.558	-316.101	D	6.675	6.675	0	1.407	0	0	0	0	0	0
2002	17	23	545	603.234	-311.991	D	6.994	6.969	0.025	1.994	0	99.99	0	0	0	0
2002	18	23	548	603.28	-312.734	D	9.275	9.254	0.022	7.2	0	99.98	0	0	0	0
2002	19	23	517	602.805	-305.061	D	9.655	9.621	0.034	8.152	0	99.99	0	0	0	0
2002	20	23	624	596.324	-316.278	D	9.932	9.894	0.039	8.884	0	100	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	21	23	517	602.805	-305.061	D	8.615	8.614	0.001	5.62	0	100	0	0	0	0
2002	22	23	1	596.558	-316.101	D	7.074	7.074	0	2.208	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	9.964	9.964	0	9.076	0	0	0	0	0	0
2002	24	23	517	602.805	-305.061	D	9.162	9.099	0.063	6.81	0	100	0	0	0	0
2002	25	23	548	603.28	-312.734	D	8.665	8.656	0.009	5.722	0	100	0	0	0	0
2002	26	23	548	603.28	-312.734	D	6.868	6.868	0	1.791	0	99.7	0	0	0	0
2002	27	23	352	601.372	-307.234	D	6.988	6.988	0	2.034	0	95.56	0	0	0	0
2002	28	23	1	596.558	-316.101	D	7.059	7.059	0	2.178	0	0	0	0	0	0
2002	29	23	1	596.558	-316.101	D	10.051	10.051	0	9.316	0	0	0	0	0	0
2002	30	23	548	603.28	-312.734	D	10.361	10.155	0.206	9.603	0	100	0	0	0	0
2002	31	23	517	602.805	-305.061	D	10.274	10.218	0.056	9.779	0	99.99	0	0	0	0
2002	32	23	517	602.805	-305.061	D	7.727	7.718	0.009	3.573	0	99.99	0	0	0	0
2002	33	23	517	602.805	-305.061	D	7.37	7.369	0.001	2.823	0	99.97	0	0	0	0
2002	34	23	517	602.805	-305.061	D	6.839	6.838	0.001	1.732	0	99.92	0	0	0	0
2002	35	23	517	602.805	-305.061	D	7.087	7.085	0.002	2.232	0	100.02	0	0	0	0
2002	36	23	1	596.558	-316.101	D	6.624	6.624	0	1.307	0	0	0	0	0	0
2002	37	23	461	602.269	-305.916	D	6.808	6.808	0	1.672	0	96.25	0	0	0	0
2002	38	23	517	602.805	-305.061	D	9.276	9.271	0.006	7.243	0	99.97	0	0	0	0
2002	39	23	563	600.143	-314.135	D	8.464	8.463	0	5.263	0	98.66	0	0	0	0
2002	40	23	490	602.499	-305.648	D	7.917	7.917	0	4.012	0	99.56	0	0	0	0
2002	41	23	1	596.558	-316.101	D	7.876	7.876	0	3.92	0	0	0	0	0	0
2002	42	23	517	602.805	-305.061	D	7.793	7.791	0.002	3.732	0	99.9	0	0	0	0
2002	43	23	492	603.188	-311.342	D	6.901	6.901	0	1.857	0	90.16	0	0	0	0
2002	44	23	637	596.267	-315.066	D	6.667	6.649	0.018	1.356	0	100	0	0	0	0
2002	45	23	548	603.28	-312.734	D	6.554	6.554	0.001	1.17	0	99.96	0	0	0	0
2002	46	23	462	603.035	-312.603	D	6.783	6.783	0	1.621	0	99.55	0	0	0	0
2002	47	23	1	596.558	-316.101	D	6.627	6.627	0	1.313	0	0	0	0	0	0
2002	48	23	548	603.28	-312.734	D	6.555	6.553	0.002	1.17	0	100.01	0	0	0	0
2002	49	23	548	603.28	-312.734	D	6.633	6.63	0.004	1.319	0	99.98	0	0	0	0
2002	50	23	1	596.558	-316.101	D	7.503	7.503	0	3.107	0	0	0	0	0	0
2002	51	23	1	596.558	-316.101	D	9.342	9.342	0	7.426	0	0	0	0	0	0
2002	52	23	1	596.558	-316.101	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2002	53	23	517	602.805	-305.061	D	7.058	7.041	0.017	2.142	0	100	0	0	0	0
2002	54	23	624	596.324	-316.278	D	6.62	6.614	0.005	1.288	0	99.99	0	0	0	0
2002	55	23	517	602.805	-305.061	D	6.661	6.66	0.001	1.378	0	99.98	0	0	0	0
2002	56	23	1	596.558	-316.101	D	7.494	7.494	0	3.088	0	0	0	0	0	0
2002	57	23	517	602.805	-305.061	D	7.922	7.921	0	4.021	0	100.59	0	0	0	0
2002	58	23	1	596.558	-316.101	D	6.791	6.791	0	1.638	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	6.538	6.538	0	1.139	0	0	0	0	0	0

Appendix M
Mingo
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	60	23	1	596.558	-316.101	D	6.555	6.555	0	1.174	0	0	0	0	0	0
2002	61	23	517	602.805	-305.061	D	8.377	8.373	0.004	5.052	0	99.99	0	0	0	0
2002	62	23	520	602.851	-305.804	D	7.152	7.15	0.002	2.366	0	99.99	0	0	0	0
2002	63	23	1	596.558	-316.101	D	6.887	6.887	0	1.829	0	0	0	0	0	0
2002	64	23	1	596.558	-316.101	D	6.674	6.674	0	1.406	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	6.726	6.726	0	1.509	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.26	7.26	0	2.593	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.571	7.571	0	3.254	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.988	7.988	0	4.17	0	0	0	0	0	0
2002	69	23	1	596.558	-316.101	D	6.922	6.922	0	1.901	0	0	0	0	0	0
2002	70	23	1	596.558	-316.101	D	6.742	6.742	0	1.54	0	0	0	0	0	0
2002	71	23	1	596.558	-316.101	D	9.522	9.522	0	7.893	0	0	0	0	0	0
2002	72	23	1	596.558	-316.101	D	9.462	9.462	0	7.736	0	0	0	0	0	0
2002	73	23	1	596.558	-316.101	D	8.251	8.251	0	4.768	0	0	0	0	0	0
2002	74	23	521	602.866	-306.052	D	9.201	9.189	0.011	7.037	0	99.97	0	0	0	0
2002	75	23	624	596.324	-316.278	D	8.121	8.079	0.042	4.375	0	100	0	0	0	0
2002	76	23	548	603.28	-312.734	D	8.826	8.825	0	6.132	0	99.66	0	0	0	0
2002	77	23	517	602.805	-305.061	D	9.483	9.482	0.001	7.789	0	99.79	0	0	0	0
2002	78	23	517	602.805	-305.061	D	10.198	10.176	0.022	9.662	0	99.99	0	0	0	0
2002	79	23	694	602.12	-306.029	D	9.395	9.365	0.03	7.486	0	100	0	0	0	0
2002	80	23	517	602.805	-305.061	D	9.145	9.134	0.011	6.896	0	99.99	0	0	0	0
2002	81	23	548	603.28	-312.734	D	6.567	6.567	0.001	1.195	0	99.95	0	0	0	0
2002	82	23	1	596.558	-316.101	D	6.667	6.667	0	1.393	0	0	0	0	0	0
2002	83	23	1	596.558	-316.101	D	6.853	6.853	0	1.762	0	0	0	0	0	0
2002	84	23	1	596.558	-316.101	D	9.454	9.454	0	7.715	0	0	0	0	0	0
2002	85	23	624	596.324	-316.278	D	8.705	8.698	0.007	5.823	0	100	0	0	0	0
2002	86	23	517	602.805	-305.061	D	7.662	7.65	0.013	3.423	0	99.99	0	0	0	0
2002	87	23	674	599.777	-309.742	D	6.91	6.909	0.001	1.874	0	99.9	0	0	0	0
2002	88	23	517	602.805	-305.061	D	8.003	8	0.003	4.196	0	100	0	0	0	0
2002	89	23	545	603.234	-311.991	D	8.402	8.395	0.008	5.102	0	99.99	0	0	0	0
2002	90	23	521	602.866	-306.052	D	7.025	7.024	0	2.108	0	99.56	0	0	0	0
2002	91	23	547	603.265	-312.487	D	6.682	6.682	0.001	1.421	0	99.72	0	0	0	0
2002	92	23	517	602.805	-305.061	D	7.358	7.357	0	2.798	0	99.88	0	0	0	0
2002	93	23	548	603.28	-312.734	D	7.18	7.166	0.014	2.398	0	100	0	0	0	0
2002	94	23	186	600.15	-314.075	D	6.899	6.887	0.012	1.829	0	99.99	0	0	0	0
2002	95	23	546	603.249	-312.239	D	6.6	6.593	0.007	1.247	0	99.97	0	0	0	0
2002	96	23	698	602.668	-305.255	D	6.521	6.52	0.001	1.105	0	99.84	0	0	0	0
2002	97	23	489	602.518	-305.896	D	6.645	6.644	0	1.348	0	98.6	0	0	0	0
2002	98	23	1	596.558	-316.101	D	9.086	9.086	0	6.776	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	99	23	517	602.805	-305.061	D	8.968	8.963	0.005	6.47	0	99.97	0	0	0	0
2002	100	23	631	596.276	-315.551	D	6.913	6.913	0	1.882	0	99.72	0	0	0	0
2002	101	23	1	596.558	-316.101	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2002	102	23	1	596.558	-316.101	D	8.449	8.449	0	5.229	0	0	0	0	0	0
2002	103	23	1	596.558	-316.101	D	8.673	8.673	0	5.763	0	0	0	0	0	0
2002	104	23	1	596.558	-316.101	D	8.895	8.895	0	6.302	0	0	0	0	0	0
2002	105	23	1	596.558	-316.101	D	8.3	8.3	0	4.881	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.54	7.54	0	3.186	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.065	7.065	0	2.191	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.176	7.176	0	2.419	0	0	0	0	0	0
2002	110	23	517	602.805	-305.061	D	8.596	8.596	0.001	5.577	0	99.74	0	0	0	0
2002	111	23	517	602.805	-305.061	D	9.2	9.194	0.006	7.048	0	99.98	0	0	0	0
2002	112	23	517	602.805	-305.061	D	6.97	6.969	0.001	1.995	0	100.08	0	0	0	0
2002	113	23	1	596.558	-316.101	D	6.657	6.657	0	1.372	0	0	0	0	0	0
2002	114	23	1	596.558	-316.101	D	7.203	7.203	0	2.475	0	0	0	0	0	0
2002	115	23	517	602.805	-305.061	D	7.201	7.199	0.002	2.466	0	100.01	0	0	0	0
2002	116	23	282	601.335	-313.234	D	6.703	6.703	0	1.463	0	77.14	0	0	0	0
2002	117	23	461	602.269	-305.916	D	8.139	8.139	0	4.512	0	98.53	0	0	0	0
2002	118	23	1	596.558	-316.101	D	8.846	8.846	0	6.183	0	0	0	0	0	0
2002	119	23	517	602.805	-305.061	D	6.82	6.816	0.004	1.687	0	99.95	0	0	0	0
2002	120	23	515	602.747	-305.629	D	6.768	6.768	0	1.591	0	99.08	0	0	0	0
2002	121	23	461	602.269	-305.916	D	9.666	9.666	0	8.272	0	91.96	0	0	0	0
2002	122	23	631	596.276	-315.551	D	8.828	8.8	0.028	6.069	0	100	0	0	0	0
2002	123	23	694	602.12	-306.029	D	6.754	6.752	0.002	1.56	0	99.91	0	0	0	0
2002	124	23	186	600.15	-314.075	D	6.688	6.688	0	1.433	0	97.89	0	0	0	0
2002	125	23	222	600.034	-309.336	D	6.824	6.824	0	1.703	0	92.93	0	0	0	0
2002	126	23	1	596.558	-316.101	D	7.956	7.956	0	4.098	0	0	0	0	0	0
2002	127	23	1	596.558	-316.101	D	7.777	7.777	0	3.702	0	0	0	0	0	0
2002	128	23	1	596.558	-316.101	D	9.206	9.206	0	7.08	0	0	0	0	0	0
2002	129	23	1	596.558	-316.101	D	8.119	8.119	0	4.466	0	0	0	0	0	0
2002	130	23	327	601.142	-307.502	D	6.587	6.586	0	1.234	0	99.97	0	0	0	0
2002	131	23	1	596.558	-316.101	D	7.018	7.018	0	2.095	0	97.01	0	0	0	0
2002	132	23	1	596.558	-316.101	D	8.587	8.587	0	5.555	0	0	0	0	0	0
2002	133	23	637	596.267	-315.066	D	8.634	8.616	0.018	5.626	0	100	0	0	0	0
2002	134	23	1	596.558	-316.101	D	6.791	6.791	0	1.637	0	0	0	0	0	0
2002	135	23	1	596.558	-316.101	D	6.704	6.704	0	1.465	0	0	0	0	0	0
2002	136	23	1	596.558	-316.101	D	6.865	6.865	0	1.786	0	0	0	0	0	0
2002	137	23	517	602.805	-305.061	D	9.474	9.473	0.001	7.766	0	99.6	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	138	23	631	596.276	-315.551	D	7.274	7.274	0	2.623	0	100.55	0	0	0	0
2002	139	23	513	602.785	-306.126	D	6.737	6.734	0.003	1.525	0	99.94	0	0	0	0
2002	140	23	515	602.747	-305.629	D	6.612	6.612	0	1.283	0	99.43	0	0	0	0
2002	141	23	517	602.805	-305.061	D	6.988	6.977	0.011	2.011	0	100	0	0	0	0
2002	142	23	1	596.558	-316.101	D	6.615	6.615	0	1.289	0	100.62	0	0	0	0
2002	143	23	517	602.805	-305.061	D	6.712	6.712	0	1.48	0	99.15	0	0	0	0
2002	144	23	1	596.558	-316.101	D	7.086	7.086	0	2.235	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.459	7.459	0	3.014	0	0	0	0	0	0
2002	146	23	1	596.558	-316.101	D	8.262	8.262	0	4.795	0	0	0	0	0	0
2002	147	23	1	596.558	-316.101	D	8.114	8.114	0	4.455	0	0	0	0	0	0
2002	148	23	1	596.558	-316.101	D	7.42	7.42	0	2.93	0	0	0	0	0	0
2002	149	23	1	596.558	-316.101	D	9.172	9.172	0	6.994	0	0	0	0	0	0
2002	150	23	1	596.558	-316.101	D	9.048	9.048	0	6.682	0	0	0	0	0	0
2002	151	23	1	596.558	-316.101	D	7.238	7.238	0	2.548	0	0	0	0	0	0
2002	152	23	1	596.558	-316.101	D	7.178	7.178	0	2.423	0	0	0	0	0	0
2002	153	23	1	596.558	-316.101	D	7.435	7.435	0	2.963	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.374	7.374	0	2.832	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.172	7.172	0	2.41	0	0	0	0	0	0
2002	156	23	517	602.805	-305.061	D	7.439	7.438	0	2.969	0	99.83	0	0	0	0
2002	157	23	521	602.866	-306.052	D	7.998	7.991	0.007	4.177	0	100	0	0	0	0
2002	158	23	626	596.299	-315.88	D	6.903	6.903	0	1.861	0	99.52	0	0	0	0
2002	159	23	1	596.558	-316.101	D	7.183	7.183	0	2.433	0	101.26	0	0	0	0
2002	160	23	108	598.468	-311.706	D	7.678	7.678	0	3.486	0	61.93	0	0	0	0
2002	161	23	1	596.558	-316.101	D	8.273	8.273	0	4.819	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	9.06	9.06	0	6.712	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.783	7.783	0	3.715	0	0	0	0	0	0
2002	164	23	461	602.269	-305.916	D	8.201	8.201	0	4.654	0	5.62	0	0	0	0
2002	165	23	544	603.219	-311.745	D	6.948	6.948	0	1.953	0	99.63	0	0	0	0
2002	166	23	1	596.558	-316.101	D	6.783	6.783	0	1.621	0	0	0	0	0	0
2002	167	23	107	598.487	-311.954	D	6.669	6.669	0	1.397	0	60.9	0	0	0	0
2002	168	23	624	596.324	-316.278	D	7.699	7.69	0.009	3.511	0	99.99	0	0	0	0
2002	169	23	1	596.558	-316.101	D	6.792	6.792	0	1.639	0	99.78	0	0	0	0
2002	170	23	281	600.703	-308.285	D	7.046	7.046	0	2.153	0	90.02	0	0	0	0
2002	171	23	1	596.558	-316.101	D	7.345	7.345	0	2.772	0	0	0	0	0	0
2002	172	23	1	596.558	-316.101	D	6.979	6.979	0	2.016	0	0	0	0	0	0
2002	173	23	1	596.558	-316.101	D	6.977	6.977	0	2.011	0	0	0	0	0	0
2002	174	23	1	596.558	-316.101	D	6.851	6.851	0	1.757	0	0	0	0	0	0
2002	175	23	1	596.558	-316.101	D	7.707	7.707	0	3.547	0	0	0	0	0	0
2002	176	23	1	596.558	-316.101	D	8.293	8.293	0	4.866	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	177	23	1	596.558	-316.101	D	7.355	7.355	0	2.794	0	0	0	0	0	0
2002	178	23	1	596.558	-316.101	D	7.797	7.797	0	3.745	0	0	0	0	0	0
2002	179	23	517	602.805	-305.061	D	8.289	8.288	0	4.855	0	99.89	0	0	0	0
2002	180	23	490	602.499	-305.648	D	7.901	7.901	0	3.976	0	92.13	0	0	0	0
2002	181	23	1	596.558	-316.101	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2002	182	23	1	596.558	-316.101	D	6.874	6.874	0	1.804	0	0	0	0	0	0
2002	183	23	1	596.558	-316.101	D	6.896	6.896	0	1.847	0	0	0	0	0	0
2002	184	23	327	601.142	-307.502	D	7.661	7.661	0	3.449	0	54.77	0	0	0	0
2002	185	23	461	602.269	-305.916	D	7.136	7.136	0	2.336	0	76.38	0	0	0	0
2002	186	23	186	600.15	-314.075	D	7.146	7.146	0	2.357	0	75.8	0	0	0	0
2002	187	23	186	600.15	-314.075	D	7.012	7.012	0	2.083	0	101.85	0	0	0	0
2002	188	23	221	600.054	-309.585	D	6.881	6.881	0	1.817	0	68.93	0	0	0	0
2002	189	23	1	596.558	-316.101	D	6.714	6.714	0	1.484	0	17.21	0	0	0	0
2002	190	23	1	596.558	-316.101	D	6.831	6.831	0	1.718	0	0	0	0	0	0
2002	191	23	461	602.269	-305.916	D	7.018	7.018	0	2.094	0	84.86	0	0	0	0
2002	192	23	623	596.511	-316.262	D	9.088	9.087	0.001	6.779	0	99.79	0	0	0	0
2002	193	23	216	600.149	-310.826	D	7.631	7.631	0	3.382	0	95.28	0	0	0	0
2002	194	23	1	596.558	-316.101	D	8.493	8.493	0	5.333	0	97.71	0	0	0	0
2002	195	23	1	596.558	-316.101	D	7.123	7.123	0	2.31	0	0	0	0	0	0
2002	196	23	1	596.558	-316.101	D	7.456	7.456	0	3.006	0	0	0	0	0	0
2002	197	23	1	596.558	-316.101	D	7.62	7.62	0	3.36	0	0	0	0	0	0
2002	198	23	1	596.558	-316.101	D	7.918	7.918	0	4.014	0	0	0	0	0	0
2002	199	23	1	596.558	-316.101	D	8.594	8.594	0	5.573	0	0	0	0	0	0
2002	200	23	1	596.558	-316.101	D	8.653	8.653	0	5.714	0	0	0	0	0	0
2002	201	23	1	596.558	-316.101	D	9.114	9.114	0	6.847	0	0	0	0	0	0
2002	202	23	461	602.269	-305.916	D	8.774	8.774	0	6.005	0	67.83	0	0	0	0
2002	203	23	212	600.226	-311.82	D	7.855	7.855	0	3.875	0	66.46	0	0	0	0
2002	204	23	692	601.846	-306.417	D	7.753	7.753	0	3.648	0	99.52	0	0	0	0
2002	205	23	548	603.28	-312.734	D	8.491	8.486	0.005	5.316	0	99.98	0	0	0	0
2002	206	23	107	598.487	-311.954	D	7.439	7.439	0	2.971	0	69.71	0	0	0	0
2002	207	23	461	602.269	-305.916	D	7.53	7.53	0	3.165	0	98.02	0	0	0	0
2002	208	23	107	598.487	-311.954	D	8.074	8.074	0	4.365	0	75.8	0	0	0	0
2002	209	23	1	596.558	-316.101	D	7.569	7.569	0	3.249	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.525	7.525	0	3.154	0	0	0	0	0	0
2002	211	23	1	596.558	-316.101	D	8	8	0	4.198	0	0	0	0	0	0
2002	212	23	1	596.558	-316.101	D	9.435	9.435	0	7.667	0	0	0	0	0	0
2002	213	23	1	596.558	-316.101	D	8.781	8.781	0	6.024	0	0	0	0	0	0
2002	214	23	1	596.558	-316.101	D	7.094	7.094	0	2.251	0	0	0	0	0	0
2002	215	23	1	596.558	-316.101	D	7.057	7.057	0	2.174	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	216	23	1	596.558	-316.101	D	7.274	7.274	0	2.622	0	0	0	0	0	0
2002	217	23	1	596.558	-316.101	D	7.283	7.283	0	2.643	0	0	0	0	0	0
2002	218	23	517	602.805	-305.061	D	7.558	7.557	0.001	3.222	0	99.94	0	0	0	0
2002	219	23	1	596.558	-316.101	D	7.245	7.245	0	2.563	0	97.08	0	0	0	0
2002	220	23	1	596.558	-316.101	D	6.671	6.671	0	1.4	0	0	0	0	0	0
2002	221	23	1	596.558	-316.101	D	6.676	6.676	0	1.409	0	0	0	0	0	0
2002	222	23	1	596.558	-316.101	D	6.727	6.727	0	1.511	0	0	0	0	0	0
2002	223	23	1	596.558	-316.101	D	7.359	7.359	0	2.802	0	0	0	0	0	0
2002	224	23	1	596.558	-316.101	D	7.126	7.126	0	2.315	0	0	0	0	0	0
2002	225	23	1	596.558	-316.101	D	8.494	8.494	0	5.336	0	0	0	0	0	0
2002	226	23	1	596.558	-316.101	D	9.449	9.449	0	7.702	0	0	0	0	0	0
2002	227	23	1	596.558	-316.101	D	8.62	8.62	0	5.634	0	0	0	0	0	0
2002	228	23	1	596.558	-316.101	D	9.393	9.393	0	7.557	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	9.238	9.238	0	7.159	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	9.148	9.148	0	6.931	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	9.118	9.118	0	6.856	0	0	0	0	0	0
2002	232	23	461	602.269	-305.916	D	8.457	8.457	0	5.249	0	41.14	0	0	0	0
2002	233	23	213	600.207	-311.572	D	7.586	7.586	0	3.285	0	76.33	0	0	0	0
2002	234	23	1	596.558	-316.101	D	7.343	7.343	0	2.768	0	0	0	0	0	0
2002	235	23	1	596.558	-316.101	D	7.551	7.551	0	3.211	0	0	0	0	0	0
2002	236	23	521	602.866	-306.052	D	8.186	8.186	0	4.618	0	97.14	0	0	0	0
2002	237	23	637	596.267	-315.066	D	7.841	7.831	0.01	3.821	0	100.02	0	0	0	0
2002	238	23	624	596.324	-316.278	D	8.369	8.368	0	5.041	0	99.44	0	0	0	0
2002	239	23	212	600.226	-311.82	D	8.016	8.016	0	4.234	0	72.29	0	0	0	0
2002	240	23	1	596.558	-316.101	D	7.102	7.102	0	2.266	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.132	7.132	0	2.329	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.093	7.093	0	2.247	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	244	23	1	596.558	-316.101	D	6.917	6.917	0	1.891	0	0	0	0	0	0
2002	245	23	1	596.558	-316.101	D	7.267	7.267	0	2.608	0	0	0	0	0	0
2002	246	23	1	596.558	-316.101	D	6.993	6.993	0	2.044	0	0	0	0	0	0
2002	247	23	517	602.805	-305.061	D	7.16	7.16	0	2.386	0	99.59	0	0	0	0
2002	248	23	461	602.269	-305.916	D	6.641	6.641	0	1.341	0	70.48	0	0	0	0
2002	249	23	1	596.558	-316.101	D	6.682	6.682	0	1.421	0	0	0	0	0	0
2002	250	23	1	596.558	-316.101	D	6.755	6.755	0	1.565	0	0	0	0	0	0
2002	251	23	1	596.558	-316.101	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2002	252	23	1	596.558	-316.101	D	6.966	6.966	0	1.99	0	0	0	0	0	0
2002	253	23	1	596.558	-316.101	D	7.056	7.056	0	2.173	0	0	0	0	0	0
2002	254	23	195	599.978	-311.84	D	7.653	7.652	0	3.429	0	99.63	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	255	23	1	596.558	-316.101	D	6.755	6.755	0	1.566	0	0	0	0	0	0
2002	256	23	1	596.558	-316.101	D	6.672	6.672	0	1.402	0	0	0	0	0	0
2002	257	23	461	602.269	-305.916	D	6.735	6.735	0	1.527	0	51.15	0	0	0	0
2002	258	23	490	602.499	-305.648	D	7.426	7.426	0	2.943	0	99.34	0	0	0	0
2002	259	23	631	596.276	-315.551	D	8.673	8.635	0.037	5.672	0	99.99	0	0	0	0
2002	260	23	247	600.742	-312.031	D	8.353	8.347	0.005	4.992	0	99.95	0	0	0	0
2002	261	23	517	602.805	-305.061	D	9.083	9.082	0.002	6.765	0	100	0	0	0	0
2002	262	23	1	596.558	-316.101	D	9.447	9.447	0	7.698	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	9.65	9.65	0	8.23	0	0	0	0	0	0
2002	264	23	1	596.558	-316.101	D	9.006	9.006	0	6.578	0	0	0	0	0	0
2002	265	23	517	602.805	-305.061	D	7.174	7.173	0.001	2.413	0	100.14	0	0	0	0
2002	266	23	521	602.866	-306.052	D	6.737	6.734	0.003	1.525	0	99.95	0	0	0	0
2002	267	23	431	602.059	-306.432	D	6.669	6.668	0	1.395	0	97.78	0	0	0	0
2002	268	23	1	596.558	-316.101	D	6.74	6.74	0	1.535	0	98.15	0	0	0	0
2002	269	23	1	596.558	-316.101	D	8.299	8.299	0	4.879	0	0	0	0	0	0
2002	270	23	516	602.728	-305.38	D	9.223	9.223	0	7.122	0	99.36	0	0	0	0
2002	271	23	624	596.324	-316.278	D	8.263	8.247	0.016	4.761	0	99.99	0	0	0	0
2002	272	23	637	596.267	-315.066	D	8.042	8.041	0.001	4.289	0	100	0	0	0	0
2002	273	23	1	596.558	-316.101	D	7.231	7.231	0	2.533	0	63.98	0	0	0	0
2002	274	23	1	596.558	-316.101	D	8.21	8.21	0	4.674	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	8.804	8.804	0	6.079	0	0	0	0	0	0
2002	276	23	1	596.558	-316.101	D	8.532	8.532	0	5.425	0	0	0	0	0	0
2002	277	23	1	596.558	-316.101	D	8.966	8.966	0	6.477	0	0	0	0	0	0
2002	278	23	517	602.805	-305.061	D	7.212	7.209	0.002	2.488	0	100.03	0	0	0	0
2002	279	23	1	596.558	-316.101	D	6.76	6.76	0	1.575	0	99.39	0	0	0	0
2002	280	23	695	602.257	-305.836	D	6.894	6.89	0.004	1.836	0	99.99	0	0	0	0
2002	281	23	107	598.487	-311.954	D	6.612	6.612	0	1.284	0	48.44	0	0	0	0
2002	282	23	212	600.226	-311.82	D	7.364	7.364	0	2.811	0	62.73	0	0	0	0
2002	283	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	44.49	0	0	0	0
2002	284	23	1	596.558	-316.101	D	9.827	9.827	0	8.704	0	0	0	0	0	0
2002	285	23	1	596.558	-316.101	D	9.291	9.291	0	7.296	0	0	0	0	0	0
2002	286	23	637	596.267	-315.066	D	7.524	7.504	0.02	3.109	0	100	0	0	0	0
2002	287	23	1	596.558	-316.101	D	6.546	6.546	0	1.155	0	0	0	0	0	0
2002	288	23	461	602.269	-305.916	D	6.532	6.532	0	1.127	0	99.25	0	0	0	0
2002	289	23	637	596.267	-315.066	D	6.634	6.631	0.004	1.321	0	99.99	0	0	0	0
2002	290	23	517	602.805	-305.061	D	6.54	6.538	0.002	1.14	0	100.01	0	0	0	0
2002	291	23	1	596.558	-316.101	D	6.712	6.712	0	1.48	0	0	0	0	0	0
2002	292	23	517	602.805	-305.061	D	9.298	9.282	0.016	7.273	0	100	0	0	0	0
2002	293	23	624	596.324	-316.278	D	7.587	7.582	0.005	3.278	0	99.96	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	294	23	186	600.15	-314.075	D	6.689	6.689	0	1.435	0	94.18	0	0	0	0
2002	295	23	517	602.805	-305.061	D	6.599	6.599	0	1.258	0	99.45	0	0	0	0
2002	296	23	695	602.257	-305.836	D	6.872	6.861	0.011	1.777	0	99.99	0	0	0	0
2002	297	23	660	598.316	-311.922	D	6.705	6.705	0	1.466	0	96.8	0	0	0	0
2002	298	23	1	596.558	-316.101	D	8.66	8.66	0	5.731	0	0	0	0	0	0
2002	299	23	517	602.805	-305.061	D	9.109	8.998	0.111	6.555	0	100	0	0	0	0
2002	300	23	660	598.316	-311.922	D	8.506	8.431	0.075	5.188	0	100	0	0	0	0
2002	301	23	631	596.276	-315.551	D	9.221	9.22	0	7.115	0	99.68	0	0	0	0
2002	302	23	107	598.487	-311.954	D	9.561	9.561	0	7.995	0	97.87	0	0	0	0
2002	303	23	1	596.558	-316.101	D	8.076	8.076	0	4.369	0	0	0	0	0	0
2002	304	23	517	602.805	-305.061	D	8.3	8.256	0.044	4.78	0	100	0	0	0	0
2002	305	23	517	602.805	-305.061	D	7.553	7.547	0.006	3.201	0	100	0	0	0	0
2002	306	23	1	596.558	-316.101	D	6.658	6.658	0	1.373	0	0	0	0	0	0
2002	307	23	1	596.558	-316.101	D	10.176	10.176	0	9.662	0	0	0	0	0	0
2002	308	23	1	596.558	-316.101	D	9.264	9.264	0	7.225	0	0	0	0	0	0
2002	309	23	1	596.558	-316.101	D	9.264	9.264	0	7.226	0	0	0	0	0	0
2002	310	23	517	602.805	-305.061	D	7.697	7.682	0.015	3.494	0	100	0	0	0	0
2002	311	23	1	596.558	-316.101	D	6.819	6.819	0	1.693	0	0	0	0	0	0
2002	312	23	1	596.558	-316.101	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.97	7.97	0	4.131	0	0	0	0	0	0
2002	314	23	1	596.558	-316.101	D	9.429	9.429	0	7.651	0	0	0	0	0	0
2002	315	23	1	596.558	-316.101	D	7.159	7.159	0	2.385	0	0	0	0	0	0
2002	316	23	637	596.267	-315.066	D	7.009	6.997	0.012	2.051	0	99.99	0	0	0	0
2002	317	23	548	603.28	-312.734	D	6.599	6.599	0	1.258	0	99.59	0	0	0	0
2002	318	23	1	596.558	-316.101	D	6.799	6.799	0	1.654	0	0	0	0	0	0
2002	319	23	692	601.846	-306.417	D	8.256	8.243	0.013	4.75	0	99.99	0	0	0	0
2002	320	23	631	596.276	-315.551	D	7.915	7.911	0.003	3.999	0	100.02	0	0	0	0
2002	321	23	517	602.805	-305.061	D	6.993	6.978	0.015	2.012	0	100.01	0	0	0	0
2002	322	23	517	602.805	-305.061	D	6.981	6.981	0	2.02	0	98.94	0	0	0	0
2002	323	23	1	596.558	-316.101	D	7.29	7.29	0	2.656	0	0	0	0	0	0
2002	324	23	544	603.219	-311.745	D	6.765	6.765	0	1.586	0	96.68	0	0	0	0
2002	325	23	1	596.558	-316.101	D	6.641	6.641	0	1.342	0	0	0	0	0	0
2002	326	23	517	602.805	-305.061	D	7.117	7.116	0.002	2.295	0	99.98	0	0	0	0
2002	327	23	1	596.558	-316.101	D	6.691	6.691	0	1.439	0	0	0	0	0	0
2002	328	23	461	602.269	-305.916	D	6.664	6.664	0	1.386	0	32.05	0	0	0	0
2002	329	23	624	596.324	-316.278	D	7.21	7.208	0.002	2.485	0	99.95	0	0	0	0
2002	330	23	624	596.324	-316.278	D	6.788	6.788	0	1.631	0	100.58	0	0	0	0
2002	331	23	637	596.267	-315.066	D	6.868	6.858	0.01	1.772	0	99.98	0	0	0	0
2002	332	23	517	602.805	-305.061	D	6.675	6.672	0.003	1.403	0	99.96	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	333	23	1	596.558	-316.101	D	6.659	6.659	0	1.377	0	0	0	0	0	0
2002	334	23	1	596.558	-316.101	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2002	335	23	1	596.558	-316.101	D	6.517	6.517	0	1.099	0	0	0	0	0	0
2002	336	23	1	596.558	-316.101	D	6.524	6.524	0	1.112	0	0	0	0	0	0
2002	337	23	545	603.234	-311.991	D	6.983	6.979	0.004	2.015	0	99.97	0	0	0	0
2002	338	23	1	596.558	-316.101	D	9.023	9.023	0	6.619	0	0	0	0	0	0
2002	339	23	660	598.316	-311.922	D	8.124	8.12	0.004	4.468	0	100.02	0	0	0	0
2002	340	23	545	603.234	-311.991	D	8.029	8.028	0.001	4.261	0	99.87	0	0	0	0
2002	341	23	1	596.558	-316.101	D	7.608	7.608	0	3.334	0	0	0	0	0	0
2002	342	23	517	602.805	-305.061	D	10.058	10.049	0.009	9.31	0	100	0	0	0	0
2002	343	23	624	596.324	-316.278	D	7.704	7.696	0.008	3.524	0	100	0	0	0	0
2002	344	23	1	596.558	-316.101	D	6.909	6.909	0	1.873	0	0	0	0	0	0
2002	345	23	1	596.558	-316.101	D	7.227	7.227	0	2.526	0	0	0	0	0	0
2002	346	23	1	596.558	-316.101	D	8.002	8.002	0	4.202	0	0	0	0	0	0
2002	347	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	348	23	517	602.805	-305.061	D	9.529	9.499	0.03	7.834	0	100	0	0	0	0
2002	349	23	1	596.558	-316.101	D	8.394	8.394	0	5.1	0	0	0	0	0	0
2002	350	23	1	596.558	-316.101	D	9.473	9.473	0	7.765	0	0	0	0	0	0
2002	351	23	1	596.558	-316.101	D	10.076	10.076	0	9.385	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	8.161	8.161	0	4.563	0	0	0	0	0	0
2002	353	23	1	596.558	-316.101	D	10.134	10.134	0	9.545	0	0	0	0	0	0
2002	354	23	1	596.558	-316.101	D	7.656	7.656	0	3.438	0	0	0	0	0	0
2002	355	23	1	596.558	-316.101	D	6.703	6.703	0	1.463	0	0	0	0	0	0
2002	356	23	517	602.805	-305.061	D	7.372	7.372	0	2.83	0	99.56	0	0	0	0
2002	357	23	1	596.558	-316.101	D	6.682	6.682	0	1.421	0	0	0	0	0	0
2002	358	23	517	602.805	-305.061	D	9.927	9.911	0.016	8.931	0	99.98	0	0	0	0
2002	359	23	517	602.805	-305.061	D	7.834	7.831	0.004	3.82	0	100	0	0	0	0
2002	360	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0
2002	361	23	1	596.558	-316.101	D	7.286	7.286	0	2.648	0	0	0	0	0	0
2002	362	23	1	596.558	-316.101	D	7.545	7.545	0	3.197	0	0	0	0	0	0
2002	363	23	1	596.558	-316.101	D	7.719	7.719	0	3.575	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	9.318	9.318	0	7.366	0	0	0	0	0	0
2002	365	23	548	603.28	-312.734	D	10.225	10.218	0.007	9.779	0	99.98	0	0	0	0
									0.206							
MLC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDIN	ATES (km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	521	602.866	-306.052	D	6.845	6.845	0	1.746	16.69	70.92	0	0	0	9.1

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	2	23	557	601.32	-313.419	D	6.977	6.81	0.167	1.676	8.33	79.6	0	0	0	12.07
2002	3	23	548	603.28	-312.734	D	6.919	6.917	0.002	1.89	11.47	75.51	0	0	0	13.04
2002	4	23	1	596.558	-316.101	D	6.686	6.686	0	1.429	0	0	0	0	0	0
2002	5	23	1	596.558	-316.101	D	6.788	6.788	0	1.631	0	0	0	0	0	0
2002	6	23	1	596.558	-316.101	D	9.622	9.622	0	8.155	0	0	0	0	0	0
2002	7	23	1	596.558	-316.101	D	8.26	8.26	0	4.79	0	0	0	0	0	0
2002	8	23	1	596.558	-316.101	D	7.367	7.367	0	2.819	0	0	0	0	0	0
2002	9	23	1	596.558	-316.101	D	7.714	7.714	0	3.563	0	0	0	0	0	0
2002	10	23	548	603.28	-312.734	D	9.558	9.557	0.001	7.984	48.83	45.87	0	0	0	5.21
2002	11	23	548	603.28	-312.734	D	8.236	8.236	0	4.734	40.46	56.14	0	0	0	3.74
2002	12	23	1	596.558	-316.101	D	6.98	6.98	0	2.017	0	0	0	0	0	0
2002	13	23	1	596.558	-316.101	D	7.192	7.192	0	2.453	0	0	0	0	0	0
2002	14	23	1	596.558	-316.101	D	7.524	7.524	0	3.152	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	6.81	6.81	0	1.676	0	0	0	0	0	0
2002	16	23	1	596.558	-316.101	D	6.675	6.675	0	1.407	0	0	0	0	0	0
2002	17	23	548	603.28	-312.734	D	6.979	6.959	0.02	1.974	15.62	72.05	0	0	0	12.32
2002	18	23	548	603.28	-312.734	D	9.344	9.254	0.09	7.2	14.51	83.51	0	0	0	1.98
2002	19	23	637	596.267	-315.066	D	9.697	9.632	0.065	8.183	38.8	59.58	0	0	0	1.61
2002	20	23	660	598.316	-311.922	D	10.062	9.966	0.096	9.081	39.85	59.44	0	0	0	0.7
2002	21	23	517	602.805	-305.061	D	8.615	8.614	0.002	5.62	41.22	58.19	0	0	0	0.59
2002	22	23	1	596.558	-316.101	D	7.074	7.074	0	2.208	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	9.964	9.964	0	9.076	0	0	0	0	0	0
2002	24	23	1	596.558	-316.101	D	9.066	9.066	0	6.726	0	0	0	0	0	0
2002	25	23	304	601.583	-313.215	D	8.656	8.656	0	5.722	23.1	62.06	0	0	0	6.7
2002	26	23	545	603.234	-311.991	D	6.869	6.869	0	1.794	26.37	67.38	0	0	0	5.52
2002	27	23	333	601.736	-311.954	D	6.988	6.988	0	2.034	36.66	52.6	0	0	0	5.57
2002	28	23	1	596.558	-316.101	D	7.059	7.059	0	2.178	0	0	0	0	0	0
2002	29	23	1	596.558	-316.101	D	10.051	10.051	0	9.316	0	0	0	0	0	0
2002	30	23	637	596.267	-315.066	D	10.258	10.155	0.103	9.603	10.42	87.3	0	0	0	2.28
2002	31	23	517	602.805	-305.061	D	10.235	10.218	0.017	9.779	32.33	67.1	0	0	0	0.56
2002	32	23	517	602.805	-305.061	D	7.72	7.718	0.002	3.573	44.68	55.04	0	0	0	0.34
2002	33	23	517	602.805	-305.061	D	7.474	7.369	0.105	2.823	7.75	88.35	0	0	0	3.9
2002	34	23	517	602.805	-305.061	D	6.84	6.838	0.002	1.732	20.57	75.01	0	0	0	4.34
2002	35	23	517	602.805	-305.061	D	7.091	7.085	0.006	2.232	13.11	69.91	0	0	0	16.98
2002	36	23	637	596.267	-315.066	D	6.627	6.624	0.003	1.307	11.25	74.62	0	0	0	14.13
2002	37	23	461	602.269	-305.916	D	6.808	6.808	0	1.672	43.64	45.5	0	0	0	3.52
2002	38	23	638	596.406	-314.894	D	9.436	9.279	0.157	7.264	8.4	89.68	0	0	0	1.92
2002	39	23	547	603.265	-312.487	D	8.464	8.463	0.001	5.263	52.48	46.01	0	0	0	0.95
2002	40	23	489	602.518	-305.896	D	7.917	7.917	0	4.012	60.54	35.94	0	0	0	0.96

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	41	23	1	596.558	-316.101	D	7.876	7.876	0	3.92	0	0	0	0	0	0
2002	42	23	1	596.558	-316.101	D	7.716	7.716	0	3.567	0	0	0	0	0	0
2002	43	23	1	596.558	-316.101	D	6.89	6.89	0	1.836	0	0	0	0	0	0
2002	44	23	548	603.28	-312.734	D	6.676	6.659	0.017	1.376	6.66	75.43	0	0	0	17.91
2002	45	23	517	602.805	-305.061	D	6.562	6.55	0.012	1.164	7.06	78.09	0	0	0	14.86
2002	46	23	547	603.265	-312.487	D	6.783	6.783	0	1.621	27.47	64.06	0	0	0	7.33
2002	47	23	1	596.558	-316.101	D	6.627	6.627	0	1.313	0	0	0	0	0	0
2002	48	23	517	602.805	-305.061	D	6.551	6.549	0.002	1.162	31.37	42.92	0	0	0	25.7
2002	49	23	517	602.805	-305.061	D	6.631	6.625	0.006	1.309	27.61	60.27	0	0	0	12.11
2002	50	23	186	600.15	-314.075	D	7.437	7.437	0	2.966	22.44	13.95	0	0	0	5.52
2002	51	23	1	596.558	-316.101	D	9.342	9.342	0	7.426	0	0	0	0	0	0
2002	52	23	1	596.558	-316.101	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2002	53	23	548	603.28	-312.734	D	7.019	7.007	0.013	2.072	20.74	66.04	0	0	0	13.2
2002	54	23	548	603.28	-312.734	D	6.623	6.618	0.005	1.295	11.57	76.36	0	0	0	12.06
2002	55	23	548	603.28	-312.734	D	6.669	6.668	0.001	1.394	35.53	56.67	0	0	0	7.51
2002	56	23	548	603.28	-312.734	D	7.504	7.482	0.021	3.064	35.13	63.18	0	0	0	1.69
2002	57	23	547	603.265	-312.487	D	7.769	7.769	0	3.683	33.19	49.62	0	0	0	1.93
2002	58	23	1	596.558	-316.101	D	6.791	6.791	0	1.638	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	6.538	6.538	0	1.139	0	0	0	0	0	0
2002	60	23	1	596.558	-316.101	D	6.555	6.555	0	1.174	0	0	0	0	0	0
2002	61	23	517	602.805	-305.061	D	8.374	8.373	0.001	5.052	35.57	63.6	0	0	0	0.8
2002	62	23	517	602.805	-305.061	D	7.151	7.15	0.001	2.366	37.91	61.16	0	0	0	0.88
2002	63	23	1	596.558	-316.101	D	6.887	6.887	0	1.829	0	0	0	0	0	0
2002	64	23	1	596.558	-316.101	D	6.674	6.674	0	1.406	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	6.726	6.726	0	1.509	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.26	7.26	0	2.593	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.571	7.571	0	3.254	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.988	7.988	0	4.17	0	0	0	0	0	0
2002	69	23	1	596.558	-316.101	D	6.922	6.922	0	1.901	0	0	0	0	0	0
2002	70	23	517	602.805	-305.061	D	6.724	6.721	0.003	1.498	24.58	68.33	0	0	0	7
2002	71	23	688	601.298	-307.191	D	9.545	9.532	0.013	7.919	40.46	57.07	0	0	0	2.48
2002	72	23	624	596.324	-316.278	D	9.747	9.462	0.285	7.736	35.12	64.06	0	0	0	0.82
2002	73	23	517	602.805	-305.061	D	8.258	8.251	0.007	4.769	68.35	29.43	0	0	0	2.21
2002	74	23	656	597.971	-312.292	D	9.281	9.229	0.053	7.136	44.18	54.07	0	0	0	1.75
2002	75	23	676	599.876	-309.365	D	8.183	8.101	0.082	4.426	13.53	80.8	0	0	0	5.67
2002	76	23	461	602.269	-305.916	D	8.969	8.963	0.006	6.47	50.99	47.63	0	0	0	1.35
2002	77	23	521	602.866	-306.052	D	9.53	9.504	0.026	7.846	52.74	45.17	0	0	0	2.08
2002	78	23	624	596.324	-316.278	D	10.23	10.197	0.033	9.721	53.29	46.09	0	0	0	0.61
2002	79	23	517	602.805	-305.061	D	9.388	9.351	0.037	7.449	17.82	78.39	0	0	0	3.79

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	80	23	557	601.32	-313.419	D	9.289	9.109	0.181	6.833	10.22	87.1	0	0	0	2.68
2002	81	23	1	596.558	-316.101	D	6.551	6.551	0	1.165	0	0	0	0	0	0
2002	82	23	1	596.558	-316.101	D	6.667	6.667	0	1.393	0	0	0	0	0	0
2002	83	23	1	596.558	-316.101	D	6.853	6.853	0	1.762	0	0	0	0	0	0
2002	84	23	637	596.267	-315.066	D	9.497	9.454	0.043	7.715	40.31	58.77	0	0	0	0.92
2002	85	23	517	602.805	-305.061	D	8.746	8.729	0.017	5.898	6.2	89.34	0	0	0	4.47
2002	86	23	517	602.805	-305.061	D	7.682	7.65	0.032	3.423	13.3	83.2	0	0	0	3.5
2002	87	23	637	596.267	-315.066	D	6.905	6.905	0	1.866	37.21	57.48	0	0	0	5.14
2002	88	23	517	602.805	-305.061	D	8.003	8	0.003	4.196	44.45	53.79	0	0	0	1.72
2002	89	23	557	601.32	-313.419	D	8.408	8.31	0.098	4.905	7.32	89.44	0	0	0	3.24
2002	90	23	517	602.805	-305.061	D	6.991	6.99	0.001	2.038	57.14	11.67	0	0	0	31.29
2002	91	23	637	596.267	-315.066	D	6.677	6.674	0.003	1.405	28.98	46.77	0	0	0	24.24
2002	92	23	517	602.805	-305.061	D	7.358	7.357	0.001	2.798	82.65	10.15	0	0	0	7.07
2002	93	23	548	603.28	-312.734	D	7.166	7.166	0	2.398	21.87	62.93	0	0	0	14.86
2002	94	23	637	596.267	-315.066	D	6.862	6.849	0.013	1.753	25.66	62.55	0	0	0	11.77
2002	95	23	637	596.267	-315.066	D	6.582	6.579	0.003	1.219	11.29	66.62	0	0	0	22.12
2002	96	23	517	602.805	-305.061	D	6.527	6.52	0.006	1.105	14.87	70.5	0	0	0	14.62
2002	97	23	624	596.324	-316.278	D	6.648	6.648	0.001	1.354	47.85	39.02	0	0	0	12.98
2002	98	23	1	596.558	-316.101	D	9.086	9.086	0	6.776	0	0	0	0	0	0
2002	99	23	545	603.234	-311.991	D	8.986	8.983	0.003	6.518	62.38	18.17	0	0	0	19.42
2002	100	23	582	599.649	-315.031	D	6.916	6.913	0.003	1.882	54.51	25.25	0	0	0	20.24
2002	101	23	1	596.558	-316.101	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2002	102	23	1	596.558	-316.101	D	8.449	8.449	0	5.229	0	0	0	0	0	0
2002	103	23	637	596.267	-315.066	D	8.698	8.673	0.025	5.763	16.11	82.14	0	0	0	1.75
2002	104	23	517	602.805	-305.061	D	8.875	8.874	0	6.251	74.48	23.15	0	0	0	2.43
2002	105	23	1	596.558	-316.101	D	8.3	8.3	0	4.881	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.54	7.54	0	3.186	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.065	7.065	0	2.191	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.176	7.176	0	2.419	0	0	0	0	0	0
2002	110	23	1	596.558	-316.101	D	8.338	8.338	0	4.969	0	0	0	0	0	0
2002	111	23	517	602.805	-305.061	D	9.195	9.194	0.001	7.048	38.93	59.97	0	0	0	1.1
2002	112	23	1	596.558	-316.101	D	6.936	6.936	0	1.928	0	0	0	0	0	0
2002	113	23	14	597.055	-316.063	D	6.657	6.657	0	1.372	78.17	1.12	0	0	0	11.97
2002	114	23	489	602.518	-305.896	D	7.243	7.243	0	2.559	85.65	5.78	0	0	0	8.54
2002	115	23	548	603.28	-312.734	D	7.127	7.127	0	2.317	42.78	25.47	0	0	0	31.43
2002	116	23	521	602.866	-306.052	D	6.713	6.708	0.006	1.472	17.67	74.67	0	0	0	7.62
2002	117	23	624	596.324	-316.278	D	7.863	7.862	0.001	3.889	67.26	26.55	0	0	0	6.17
2002	118	23	1	596.558	-316.101	D	8.846	8.846	0	6.183	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	119	23	676	599.876	-309.365	D	6.872	6.811	0.06	1.677	16.37	67.07	0	0	0	16.56
2002	120	23	517	602.805	-305.061	D	6.773	6.768	0.005	1.591	74.96	10.08	0	0	0	14.97
2002	121	23	517	602.805	-305.061	D	9.666	9.666	0	8.272	84.4	8.17	0	0	0	1.92
2002	122	23	548	603.28	-312.734	D	8.812	8.784	0.028	6.031	55.63	43.27	0	0	0	1.1
2002	123	23	694	602.12	-306.029	D	6.755	6.752	0.003	1.56	30.52	51.28	0	0	0	18.19
2002	124	23	1	596.558	-316.101	D	6.694	6.693	0	1.444	82.09	15.37	0	0	0	2.82
2002	125	23	517	602.805	-305.061	D	6.824	6.823	0.001	1.702	76	16.81	0	0	0	7.17
2002	126	23	461	602.269	-305.916	D	8.005	8.005	0	4.208	92.94	0.5	0	0	0	1.38
2002	127	23	1	596.558	-316.101	D	7.777	7.777	0	3.702	0	0	0	0	0	0
2002	128	23	1	596.558	-316.101	D	9.206	9.206	0	7.08	0	0	0	0	0	0
2002	129	23	1	596.558	-316.101	D	8.119	8.119	0	4.466	0	0	0	0	0	0
2002	130	23	557	601.32	-313.419	D	6.596	6.589	0.008	1.238	16.18	33.86	0	0	0	49.97
2002	131	23	623	596.511	-316.262	D	7.018	7.018	0	2.095	86.07	7.79	0	0	0	5.51
2002	132	23	1	596.558	-316.101	D	8.587	8.587	0	5.555	0	0	0	0	0	0
2002	133	23	548	603.28	-312.734	D	8.596	8.578	0.018	5.536	7.78	87.67	0	0	0	4.55
2002	134	23	1	596.558	-316.101	D	6.791	6.791	0	1.637	0	0	0	0	0	0
2002	135	23	1	596.558	-316.101	D	6.704	6.704	0	1.465	0	0	0	0	0	0
2002	136	23	1	596.558	-316.101	D	6.865	6.865	0	1.786	0	0	0	0	0	0
2002	137	23	517	602.805	-305.061	D	9.477	9.473	0.004	7.766	49.7	49.39	0	0	0	0.84
2002	138	23	520	602.851	-305.804	D	7.387	7.343	0.044	2.767	11.46	78.05	0	0	0	10.49
2002	139	23	517	602.805	-305.061	D	6.74	6.734	0.006	1.525	28.78	49.6	0	0	0	21.61
2002	140	23	517	602.805	-305.061	D	6.619	6.612	0.008	1.283	52	23.06	0	0	0	24.93
2002	141	23	603	598.68	-316.244	D	6.973	6.969	0.005	1.995	29.29	61.22	0	0	0	9.5
2002	142	23	107	598.487	-311.954	D	6.621	6.621	0	1.301	70.49	21.05	0	0	0	7.48
2002	143	23	1	596.558	-316.101	D	6.708	6.708	0	1.472	72.79	3.66	0	0	0	4.04
2002	144	23	1	596.558	-316.101	D	7.086	7.086	0	2.235	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.459	7.459	0	3.014	0	0	0	0	0	0
2002	146	23	548	603.28	-312.734	D	8.276	8.261	0.014	4.793	17.56	73.02	0	0	0	9.41
2002	147	23	517	602.805	-305.061	D	8.153	8.151	0.002	4.54	73.63	24.32	0	0	0	2.08
2002	148	23	1	596.558	-316.101	D	7.42	7.42	0	2.93	0	0	0	0	0	0
2002	149	23	1	596.558	-316.101	D	9.172	9.172	0	6.994	0	0	0	0	0	0
2002	150	23	1	596.558	-316.101	D	9.048	9.048	0	6.682	0	0	0	0	0	0
2002	151	23	1	596.558	-316.101	D	7.238	7.238	0	2.548	0	0	0	0	0	0
2002	152	23	1	596.558	-316.101	D	7.178	7.178	0	2.423	0	0	0	0	0	0
2002	153	23	1	596.558	-316.101	D	7.435	7.435	0	2.963	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.374	7.374	0	2.832	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.172	7.172	0	2.41	0	0	0	0	0	0
2002	156	23	1	596.558	-316.101	D	7.381	7.381	0	2.848	0	0	0	0	0	0
2002	157	23	548	603.28	-312.734	D	8.043	8.033	0.01	4.271	43.9	44.56	0	0	0	11.55

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2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	158	23	548	603.28	-312.734	D	6.91	6.908	0.001	1.872	53.12	15.3	0	0	0	31.59
2002	159	23	1	596.558	-316.101	D	7.183	7.183	0	2.433	84.61	9.85	0	0	0	5.05
2002	160	23	107	598.487	-311.954	D	7.678	7.678	0	3.486	54.56	0.34	0	0	0	3.51
2002	161	23	1	596.558	-316.101	D	8.273	8.273	0	4.819	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	9.06	9.06	0	6.712	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.783	7.783	0	3.715	0	0	0	0	0	0
2002	164	23	1	596.558	-316.101	D	8.148	8.148	0	4.534	0	0	0	0	0	0
2002	165	23	676	599.876	-309.365	D	6.97	6.966	0.004	1.989	36.61	18.02	0	0	0	45.36
2002	166	23	1	596.558	-316.101	D	6.783	6.783	0	1.621	0	0	0	0	0	0
2002	167	23	507	602.9	-307.616	D	6.671	6.671	0	1.399	34.23	0.94	0	0	0	4.51
2002	168	23	548	603.28	-312.734	D	7.71	7.701	0.01	3.534	51.71	42.59	0	0	0	5.7
2002	169	23	603	598.68	-316.244	D	6.797	6.792	0.005	1.639	91	2.09	0	0	0	6.86
2002	170	23	517	602.805	-305.061	D	7.06	7.056	0.004	2.173	93.99	2.1	0	0	0	3.83
2002	171	23	186	600.15	-314.075	D	7.338	7.338	0	2.757	32.22	0.1	0	0	0	1.52
2002	172	23	1	596.558	-316.101	D	6.979	6.979	0	2.016	0	0	0	0	0	0
2002	173	23	1	596.558	-316.101	D	6.977	6.977	0	2.011	0	0	0	0	0	0
2002	174	23	1	596.558	-316.101	D	6.851	6.851	0	1.757	0	0	0	0	0	0
2002	175	23	1	596.558	-316.101	D	7.707	7.707	0	3.547	0	0	0	0	0	0
2002	176	23	1	596.558	-316.101	D	8.293	8.293	0	4.866	0	0	0	0	0	0
2002	177	23	1	596.558	-316.101	D	7.355	7.355	0	2.794	0	0	0	0	0	0
2002	178	23	1	596.558	-316.101	D	7.797	7.797	0	3.745	0	0	0	0	0	0
2002	179	23	517	602.805	-305.061	D	8.288	8.288	0	4.855	87.58	4.09	0	0	0	8.49
2002	180	23	517	602.805	-305.061	D	7.901	7.901	0	3.976	93.35	1.5	0	0	0	4.58
2002	181	23	1	596.558	-316.101	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2002	182	23	465	602.978	-311.858	D	6.878	6.878	0	1.812	83.89	0.28	0	0	0	14.76
2002	183	23	517	602.805	-305.061	D	6.929	6.919	0.009	1.895	90.92	2.21	0	0	0	6.86
2002	184	23	548	603.28	-312.734	D	7.677	7.665	0.012	3.457	93.78	3.97	0	0	0	2.25
2002	185	23	517	602.805	-305.061	D	7.166	7.136	0.03	2.336	67.82	15.32	0	0	0	16.86
2002	186	23	637	596.267	-315.066	D	7.148	7.143	0.005	2.352	90.9	1.47	0	0	0	7.62
2002	187	23	186	600.15	-314.075	D	7.013	7.012	0.001	2.083	95.7	0.97	0	0	0	3.3
2002	188	23	1	596.558	-316.101	D	6.895	6.895	0	1.845	95.34	0.67	0	0	0	3.19
2002	189	23	632	596.27	-315.421	D	6.714	6.714	0	1.484	79.46	1.37	0	0	0	18.11
2002	190	23	624	596.324	-316.278	D	6.835	6.831	0.004	1.718	91.26	0.85	0	0	0	7.87
2002	191	23	548	603.28	-312.734	D	7.056	7.054	0.002	2.169	92.18	1.9	0	0	0	5.9
2002	192	23	517	602.805	-305.061	D	9.224	9.073	0.151	6.745	34.28	63.65	0	0	0	2.07
2002	193	23	637	596.267	-315.066	D	7.665	7.662	0.003	3.451	81.5	14.36	0	0	0	4.1
2002	194	23	632	596.27	-315.421	D	8.494	8.493	0.002	5.333	76.07	23.13	0	0	0	0.85
2002	195	23	557	601.32	-313.419	D	7.167	7.124	0.043	2.311	36.34	31.74	0	0	0	31.92
2002	196	23	517	602.805	-305.061	D	7.438	7.438	0	2.969	61.33	26.42	0	0	0	12.01

Appendix M
Mingo
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	197	23	1	596.558	-316.101	D	7.62	7.62	0	3.36	87.48	0.4	0	0	0	7.85
2002	198	23	517	602.805	-305.061	D	7.918	7.918	0.001	4.013	92.82	3.57	0	0	0	3.19
2002	199	23	513	602.785	-306.126	D	8.583	8.581	0.001	5.543	93.9	4.25	0	0	0	1.71
2002	200	23	513	602.785	-306.126	D	8.656	8.655	0	5.72	84.61	13.47	0	0	0	1.19
2002	201	23	517	602.805	-305.061	D	9.044	9.044	0	6.672	35.26	62.2	0	0	0	1.74
2002	202	23	517	602.805	-305.061	D	8.774	8.774	0	6.005	95.11	2.02	0	0	0	1.94
2002	203	23	521	602.866	-306.052	D	7.856	7.855	0	3.875	90.58	6.48	0	0	0	1.91
2002	204	23	517	602.805	-305.061	D	7.771	7.771	0	3.688	82.61	4.08	0	0	0	13.41
2002	205	23	517	602.805	-305.061	D	8.383	8.379	0.004	5.066	75.28	11.64	0	0	0	13.06
2002	206	23	637	596.267	-315.066	D	7.452	7.451	0.001	2.996	88.64	2.7	0	0	0	8.64
2002	207	23	517	602.805	-305.061	D	7.534	7.53	0.004	3.165	94.38	1.81	0	0	0	3.79
2002	208	23	490	602.499	-305.648	D	8.133	8.133	0	4.498	96.54	0.54	0	0	0	2.27
2002	209	23	1	596.558	-316.101	D	7.569	7.569	0	3.249	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.525	7.525	0	3.154	0	0	0	0	0	0
2002	211	23	1	596.558	-316.101	D	8	8	0	4.198	0	0	0	0	0	0
2002	212	23	1	596.558	-316.101	D	9.435	9.435	0	7.667	0	0	0	0	0	0
2002	213	23	515	602.747	-305.629	D	8.736	8.736	0	5.914	90.7	4.38	0	0	0	1.82
2002	214	23	517	602.805	-305.061	D	7.09	7.09	0	2.242	89.97	1.03	0	0	0	8.03
2002	215	23	432	602.04	-306.183	D	7.05	7.05	0	2.16	92.18	1.12	0	0	0	6.2
2002	216	23	214	600.188	-311.323	D	7.224	7.224	0	2.519	90.54	0.47	0	0	0	2.99
2002	217	23	212	600.226	-311.82	D	7.263	7.263	0	2.6	87.24	0.81	0	0	0	2.46
2002	218	23	624	596.324	-316.278	D	7.489	7.476	0.013	3.05	90.11	4.82	0	0	0	5.05
2002	219	23	623	596.511	-316.262	D	7.245	7.245	0	2.563	82.1	1.68	0	0	0	1.79
2002	220	23	1	596.558	-316.101	D	6.671	6.671	0	1.4	0	0	0	0	0	0
2002	221	23	1	596.558	-316.101	D	6.676	6.676	0	1.409	0	0	0	0	0	0
2002	222	23	461	602.269	-305.916	D	6.713	6.713	0	1.482	89.64	0.26	0	0	0	8
2002	223	23	517	602.805	-305.061	D	7.474	7.473	0	3.044	96.81	0.89	0	0	0	2.76
2002	224	23	1	596.558	-316.101	D	7.126	7.126	0	2.315	0	0	0	0	0	0
2002	225	23	1	596.558	-316.101	D	8.494	8.494	0	5.336	0	0	0	0	0	0
2002	226	23	1	596.558	-316.101	D	9.449	9.449	0	7.702	0	0	0	0	0	0
2002	227	23	1	596.558	-316.101	D	8.62	8.62	0	5.634	0	0	0	0	0	0
2002	228	23	1	596.558	-316.101	D	9.393	9.393	0	7.557	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	9.238	9.238	0	7.159	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	9.148	9.148	0	6.931	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	9.118	9.118	0	6.856	0	0	0	0	0	0
2002	232	23	1	596.558	-316.101	D	8.365	8.365	0	5.033	0	0	0	0	0	0
2002	233	23	517	602.805	-305.061	D	7.591	7.59	0	3.295	95.67	1.84	0	0	0	2.65
2002	234	23	1	596.558	-316.101	D	7.343	7.343	0	2.768	0	0	0	0	0	0
2002	235	23	1	596.558	-316.101	D	7.551	7.551	0	3.211	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	236	23	520	602.851	-305.804	D	8.112	8.112	0	4.451	65.74	0.88	0	0	0	11.24
2002	237	23	548	603.28	-312.734	D	7.743	7.729	0.014	3.595	42.21	38.79	0	0	0	19
2002	238	23	681	600.53	-308.617	D	8.574	8.356	0.218	5.012	18.69	75.43	0	0	0	5.87
2002	239	23	637	596.267	-315.066	D	8.027	8.023	0.003	4.25	84.54	5.7	0	0	0	9.72
2002	240	23	637	596.267	-315.066	D	7.103	7.102	0.001	2.266	30.65	48.82	0	0	0	20.43
2002	241	23	1	596.558	-316.101	D	7.132	7.132	0	2.329	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.093	7.093	0	2.247	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	244	23	107	598.487	-311.954	D	6.91	6.91	0	1.877	77.13	1.91	0	0	0	15.87
2002	245	23	461	602.269	-305.916	D	7.262	7.262	0	2.598	82.5	0.87	0	0	0	11.17
2002	246	23	1	596.558	-316.101	D	6.993	6.993	0	2.044	0	0	0	0	0	0
2002	247	23	632	596.27	-315.421	D	7.132	7.129	0.003	2.322	49.18	20	0	0	0	30.79
2002	248	23	623	596.511	-316.262	D	6.635	6.635	0	1.33	40.64	19.96	0	0	0	37.74
2002	249	23	1	596.558	-316.101	D	6.682	6.682	0	1.421	0	0	0	0	0	0
2002	250	23	1	596.558	-316.101	D	6.755	6.755	0	1.565	0	0	0	0	0	0
2002	251	23	1	596.558	-316.101	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2002	252	23	303	600.932	-308.017	D	6.954	6.954	0	1.966	80.41	0.78	0	0	0	17.03
2002	253	23	548	603.28	-312.734	D	7.061	7.054	0.007	2.168	66.93	13.05	0	0	0	20
2002	254	23	548	603.28	-312.734	D	7.675	7.613	0.062	3.343	20.56	70.46	0	0	0	8.98
2002	255	23	637	596.267	-315.066	D	6.756	6.755	0	1.566	22.58	16.08	0	0	0	61.32
2002	256	23	637	596.267	-315.066	D	6.675	6.672	0.003	1.402	76.05	7.95	0	0	0	16.03
2002	257	23	694	602.12	-306.029	D	6.757	6.756	0.002	1.567	83.99	3.64	0	0	0	12.36
2002	258	23	517	602.805	-305.061	D	7.428	7.426	0.002	2.943	79.27	6.93	0	0	0	13.74
2002	259	23	681	600.53	-308.617	D	8.873	8.63	0.243	5.66	12.46	83.95	0	0	0	3.59
2002	260	23	545	603.234	-311.991	D	8.371	8.35	0.021	4.998	72.61	25.83	0	0	0	1.55
2002	261	23	517	602.805	-305.061	D	9.085	9.082	0.003	6.765	70.32	28.89	0	0	0	0.83
2002	262	23	1	596.558	-316.101	D	9.447	9.447	0	7.698	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	9.65	9.65	0	8.23	0	0	0	0	0	0
2002	264	23	1	596.558	-316.101	D	9.006	9.006	0	6.578	0	0	0	0	0	0
2002	265	23	548	603.28	-312.734	D	7.226	7.198	0.028	2.465	53.85	37.67	0	0	0	8.48
2002	266	23	681	600.53	-308.617	D	6.78	6.734	0.046	1.525	16.58	62.14	0	0	0	21.28
2002	267	23	681	600.53	-308.617	D	6.693	6.668	0.025	1.395	29.79	42.83	0	0	0	27.38
2002	268	23	1	596.558	-316.101	D	6.74	6.74	0	1.535	0	0	0	0	0	0
2002	269	23	1	596.558	-316.101	D	8.299	8.299	0	4.879	0	0	0	0	0	0
2002	270	23	548	603.28	-312.734	D	9.242	9.205	0.037	7.077	13.16	83.05	0	0	0	3.78
2002	271	23	557	601.32	-313.419	D	8.651	8.349	0.302	4.996	11.76	84.4	0	0	0	3.85
2002	272	23	637	596.267	-315.066	D	8.045	8.041	0.004	4.289	68.52	28	0	0	0	3.46
2002	273	23	327	601.142	-307.502	D	7.235	7.235	0	2.543	90.62	1.06	0	0	0	5.68
2002	274	23	1	596.558	-316.101	D	8.21	8.21	0	4.674	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	275	23	1	596.558	-316.101	D	8.804	8.804	0	6.079	0	0	0	0	0	0
2002	276	23	1	596.558	-316.101	D	8.532	8.532	0	5.425	0	0	0	0	0	0
2002	277	23	1	596.558	-316.101	D	8.966	8.966	0	6.477	0	0	0	0	0	0
2002	278	23	521	602.866	-306.052	D	7.184	7.181	0.003	2.43	50.85	24.6	0	0	0	24.51
2002	279	23	353	602.08	-313.177	D	6.763	6.762	0.001	1.58	76.13	13.81	0	0	0	10.04
2002	280	23	548	603.28	-312.734	D	6.894	6.888	0.007	1.831	26.69	43.66	0	0	0	29.63
2002	281	23	637	596.267	-315.066	D	6.614	6.614	0	1.287	55.79	21.02	0	0	0	23.36
2002	282	23	431	602.059	-306.432	D	7.364	7.364	0	2.811	82.6	8.97	0	0	0	5.2
2002	283	23	431	602.059	-306.432	D	10.218	10.218	0	9.779	84.79	11.02	0	0	0	1.5
2002	284	23	637	596.267	-315.066	D	9.899	9.827	0.072	8.704	33.06	64.9	0	0	0	2.04
2002	285	23	637	596.267	-315.066	D	9.343	9.291	0.052	7.296	56.3	42.22	0	0	0	1.48
2002	286	23	521	602.866	-306.052	D	7.544	7.535	0.009	3.175	49.64	37.56	0	0	0	12.78
2002	287	23	557	601.32	-313.419	D	6.566	6.545	0.021	1.153	8.47	64.33	0	0	0	27.19
2002	288	23	521	602.866	-306.052	D	6.537	6.535	0.002	1.133	49.08	35	0	0	0	16
2002	289	23	548	603.28	-312.734	D	6.632	6.631	0.001	1.321	39.05	29.59	0	0	0	31.3
2002	290	23	520	602.851	-305.804	D	6.538	6.538	0	1.14	10.64	62.59	0	0	0	26.44
2002	291	23	1	596.558	-316.101	D	6.712	6.712	0	1.48	0	0	0	0	0	0
2002	292	23	694	602.12	-306.029	D	9.362	9.256	0.106	7.205	34.04	64.84	0	0	0	1.11
2002	293	23	662	598.404	-311.683	D	7.728	7.581	0.148	3.274	9.23	81.98	0	0	0	8.79
2002	294	23	517	602.805	-305.061	D	6.692	6.69	0.002	1.437	43.28	44.82	0	0	0	11.87
2002	295	23	517	602.805	-305.061	D	6.625	6.599	0.026	1.258	51.4	35.8	0	0	0	12.79
2002	296	23	624	596.324	-316.278	D	6.845	6.842	0.003	1.739	69.92	16.91	0	0	0	13.15
2002	297	23	1	596.558	-316.101	D	6.696	6.696	0	1.45	0	0	0	0	0	0
2002	298	23	517	602.805	-305.061	D	8.686	8.684	0.002	5.789	49	48.16	0	0	0	2.92
2002	299	23	517	602.805	-305.061	D	9.064	8.998	0.067	6.555	46.7	51.36	0	0	0	1.93
2002	300	23	637	596.267	-315.066	D	8.422	8.379	0.043	5.067	33.42	63.33	0	0	0	3.25
2002	301	23	624	596.324	-316.278	D	9.221	9.22	0.001	7.115	64.55	34.57	0	0	0	0.69
2002	302	23	676	599.876	-309.365	D	9.711	9.561	0.15	7.995	34.27	63.79	0	0	0	1.94
2002	303	23	695	602.257	-305.836	D	8.507	8.223	0.284	4.704	13.71	81.28	0	0	0	5
2002	304	23	517	602.805	-305.061	D	8.263	8.256	0.007	4.78	45.5	52.2	0	0	0	2.3
2002	305	23	1	596.558	-316.101	D	7.437	7.437	0	2.966	0	0	0	0	0	0
2002	306	23	1	596.558	-316.101	D	6.658	6.658	0	1.373	0	0	0	0	0	0
2002	307	23	548	603.28	-312.734	D	10.176	10.176	0	9.662	31.25	64.75	0	0	0	0.68
2002	308	23	517	602.805	-305.061	D	9.468	9.456	0.011	7.721	37.02	60.02	0	0	0	2.96
2002	309	23	517	602.805	-305.061	D	9.347	9.285	0.061	7.28	36.03	62.71	0	0	0	1.26
2002	310	23	517	602.805	-305.061	D	7.69	7.682	0.008	3.494	43.23	55.42	0	0	0	1.36
2002	311	23	1	596.558	-316.101	D	6.819	6.819	0	1.693	0	0	0	0	0	0
2002	312	23	1	596.558	-316.101	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.97	7.97	0	4.131	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	314	23	1	596.558	-316.101	D	9.429	9.429	0	7.651	0	0	0	0	0	0
2002	315	23	1	596.558	-316.101	D	7.159	7.159	0	2.385	0	0	0	0	0	0
2002	316	23	632	596.27	-315.421	D	7.071	6.997	0.075	2.051	7.2	80.83	0	0	0	11.97
2002	317	23	1	596.558	-316.101	D	6.591	6.591	0	1.244	0	0	0	0	0	0
2002	318	23	1	596.558	-316.101	D	6.799	6.799	0	1.654	0	0	0	0	0	0
2002	319	23	637	596.267	-315.066	D	8.314	8.227	0.087	4.713	16.32	81.6	0	0	0	2.08
2002	320	23	548	603.28	-312.734	D	7.883	7.856	0.027	3.876	9.25	81.46	0	0	0	9.28
2002	321	23	548	603.28	-312.734	D	6.953	6.951	0.002	1.958	7.1	78.28	0	0	0	14.62
2002	322	23	1	596.558	-316.101	D	7.024	7.024	0	2.107	0	0	0	0	0	0
2002	323	23	261	601.086	-313.253	D	7.286	7.286	0	2.648	41.43	11.07	0	0	0	5.76
2002	324	23	547	603.265	-312.487	D	6.779	6.778	0.001	1.612	40.99	52.72	0	0	0	6.11
2002	325	23	354	602.061	-312.928	D	6.642	6.642	0	1.344	22.32	5.66	0	0	0	4.83
2002	326	23	1	596.558	-316.101	D	7.078	7.078	0	2.218	0	0	0	0	0	0
2002	327	23	1	596.558	-316.101	D	6.691	6.691	0	1.439	0	0	0	0	0	0
2002	328	23	461	602.269	-305.916	D	6.664	6.664	0	1.386	42.54	40.6	0	0	0	11.27
2002	329	23	520	602.851	-305.804	D	7.323	7.291	0.032	2.659	19.79	65.97	0	0	0	14.24
2002	330	23	637	596.267	-315.066	D	6.798	6.788	0.01	1.631	16.01	68.84	0	0	0	15.15
2002	331	23	557	601.32	-313.419	D	6.914	6.855	0.059	1.765	5.79	77.97	0	0	0	16.24
2002	332	23	545	603.234	-311.991	D	6.669	6.669	0	1.396	22.72	72.6	0	0	0	4.79
2002	333	23	1	596.558	-316.101	D	6.659	6.659	0	1.377	0	0	0	0	0	0
2002	334	23	1	596.558	-316.101	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2002	335	23	1	596.558	-316.101	D	6.517	6.517	0	1.099	0	0	0	0	0	0
2002	336	23	1	596.558	-316.101	D	6.524	6.524	0	1.112	0	0	0	0	0	0
2002	337	23	681	600.53	-308.617	D	6.982	6.979	0.003	2.015	7.23	60.88	0	0	0	31.87
2002	338	23	1	596.558	-316.101	D	9.023	9.023	0	6.619	0	0	0	0	0	0
2002	339	23	517	602.805	-305.061	D	8.154	8.128	0.026	4.487	6.08	89.14	0	0	0	4.78
2002	340	23	1	596.558	-316.101	D	8.009	8.009	0	4.217	0	0	0	0	0	0
2002	341	23	1	596.558	-316.101	D	7.608	7.608	0	3.334	0	0	0	0	0	0
2002	342	23	694	602.12	-306.029	D	10.001	9.894	0.107	8.884	32.11	66.86	0	0	0	1.03
2002	343	23	603	598.68	-316.244	D	7.699	7.696	0.003	3.524	32.19	67.23	0	0	0	0.62
2002	344	23	1	596.558	-316.101	D	6.909	6.909	0	1.873	0	0	0	0	0	0
2002	345	23	557	601.32	-313.419	D	7.464	7.354	0.109	2.792	10.34	80.32	0	0	0	9.34
2002	346	23	517	602.805	-305.061	D	8.139	8.11	0.029	4.447	22.32	75.41	0	0	0	2.27
2002	347	23	517	602.805	-305.061	D	10.236	10.218	0.019	9.779	42.48	55.43	0	0	0	2.08
2002	348	23	624	596.324	-316.278	D	9.449	9.446	0.003	7.694	43.69	55.84	0	0	0	0.47
2002	349	23	1	596.558	-316.101	D	8.394	8.394	0	5.1	0	0	0	0	0	0
2002	350	23	1	596.558	-316.101	D	9.473	9.473	0	7.765	0	0	0	0	0	0
2002	351	23	1	596.558	-316.101	D	10.076	10.076	0	9.385	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	8.161	8.161	0	4.563	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	353	23	1	596.558	-316.101	D	10.134	10.134	0	9.545	0	0	0	0	0	0
2002	354	23	1	596.558	-316.101	D	7.656	7.656	0	3.438	0	0	0	0	0	0
2002	355	23	1	596.558	-316.101	D	6.703	6.703	0	1.463	0	0	0	0	0	0
2002	356	23	1	596.558	-316.101	D	7.357	7.357	0	2.798	0	0	0	0	0	0
2002	357	23	518	602.82	-305.309	D	6.688	6.665	0.023	1.387	17.45	73.33	0	0	0	9.22
2002	358	23	517	602.805	-305.061	D	10.003	9.911	0.092	8.931	18.26	80.49	0	0	0	1.25
2002	359	23	1	596.558	-316.101	D	7.819	7.819	0	3.793	0	0	0	0	0	0
2002	360	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0
2002	361	23	1	596.558	-316.101	D	7.286	7.286	0	2.648	0	0	0	0	0	0
2002	362	23	1	596.558	-316.101	D	7.545	7.545	0	3.197	0	0	0	0	0	0
2002	363	23	1	596.558	-316.101	D	7.719	7.719	0	3.575	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	9.318	9.318	0	7.366	0	0	0	0	0	0
2002	365	23	517	602.805	-305.061	D	10.233	10.218	0.015	9.779	18.75	78.13	0	0	0	3.11
									0.302							
UMC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	624	596.324	-316.278	D	6.846	6.843	0.003	1.741	73	26.88	0	0	0	0.14
2002	2	23	624	596.324	-316.278	D	6.794	6.793	0.001	1.641	83.63	16.26	0	0	0	0.09
2002	3	23	632	596.27	-315.421	D	6.969	6.928	0.042	1.911	72.63	27.25	0	0	0	0.11
2002	4	23	548	603.28	-312.734	D	6.711	6.691	0.021	1.439	82.49	17.43	0	0	0	0.07
2002	5	23	491	603.207	-311.591	D	6.783	6.783	0	1.621	91.6	9.16	0	0	0	0.03
2002	6	23	626	596.299	-315.88	D	10.146	9.622	0.525	8.155	85.72	14.26	0	0	0	0.02
2002	7	23	637	596.267	-315.066	D	8.277	8.26	0.016	4.79	85.93	14.03	0	0	0	0.05
2002	8	23	517	602.805	-305.061	D	7.401	7.388	0.014	2.862	87.42	12.55	0	0	0	0.03
2002	9	23	1	596.558	-316.101	D	7.714	7.714	0	3.563	0	0	0	0	0	0
2002	10	23	517	602.805	-305.061	D	9.704	9.561	0.143	7.994	90.45	9.53	0	0	0	0.02
2002	11	23	624	596.324	-316.278	D	8.284	8.234	0.05	4.73	87.9	12.03	0	0	0	0.07
2002	12	23	548	603.28	-312.734	D	7.031	7.026	0.005	2.112	91.37	8.56	0	0	0	0.05
2002	13	23	1	596.558	-316.101	D	7.192	7.192	0	2.453	0	0	0	0	0	0
2002	14	23	1	596.558	-316.101	D	7.524	7.524	0	3.152	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	6.81	6.81	0	1.676	0	0	0	0	0	0
2002	16	23	1	596.558	-316.101	D	6.675	6.675	0	1.407	0	0	0	0	0	0
2002	17	23	624	596.324	-316.278	D	6.988	6.961	0.027	1.979	80.38	19.55	0	0	0	0.07
2002	18	23	694	602.12	-306.029	D	9.269	9.248	0.021	7.185	83.84	16.14	0	0	0	0.03
2002	19	23	517	602.805	-305.061	D	9.7	9.621	0.079	8.152	90.23	9.76	0	0	0	0.01
2002	20	23	694	602.12	-306.029	D	10.415	9.944	0.47	9.022	92.93	7.07	0	0	0	0
2002	21	23	516	602.728	-305.38	D	8.614	8.614	0	5.62	94.9	4.19	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	22	23	1	596.558	-316.101	D	7.074	7.074	0	2.208	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	9.964	9.964	0	9.076	0	0	0	0	0	0
2002	24	23	517	602.805	-305.061	D	9.266	9.099	0.167	6.81	90.83	9.16	0	0	0	0.01
2002	25	23	624	596.324	-316.278	D	8.811	8.581	0.23	5.542	84.77	15.21	0	0	0	0.02
2002	26	23	545	603.234	-311.991	D	6.889	6.869	0.019	1.794	93.62	6.34	0	0	0	0.04
2002	27	23	517	602.805	-305.061	D	6.992	6.991	0.001	2.04	97.32	2.67	0	0	0	0.03
2002	28	23	1	596.558	-316.101	D	7.059	7.059	0	2.178	0	0	0	0	0	0
2002	29	23	517	602.805	-305.061	D	10.118	10.109	0.009	9.476	90.76	9.23	0	0	0	0.01
2002	30	23	656	597.971	-312.292	D	11.907	10.155	1.752	9.603	91.67	8.32	0	0	0	0.01
2002	31	23	517	602.805	-305.061	D	10.457	10.218	0.239	9.779	94.09	5.91	0	0	0	0
2002	32	23	517	602.805	-305.061	D	7.86	7.718	0.142	3.573	95.1	4.9	0	0	0	0
2002	33	23	517	602.805	-305.061	D	7.494	7.369	0.125	2.823	84.22	15.74	0	0	0	0.04
2002	34	23	698	602.668	-305.255	D	6.86	6.838	0.022	1.732	91.45	8.51	0	0	0	0.04
2002	35	23	632	596.27	-315.421	D	7.064	7.054	0.01	2.167	69.8	29.93	0	0	0	0.26
2002	36	23	1	596.558	-316.101	D	6.624	6.624	0	1.307	0	0	0	0	0	0
2002	37	23	461	602.269	-305.916	D	6.808	6.808	0	1.672	91.69	4.46	0	0	0	0.03
2002	38	23	521	602.866	-306.052	D	9.418	9.279	0.139	7.264	92.59	7.37	0	0	0	0.04
2002	39	23	548	603.28	-312.734	D	8.491	8.463	0.028	5.263	93.64	6.34	0	0	0	0.02
2002	40	23	517	602.805	-305.061	D	7.932	7.917	0.014	4.012	96.35	3.64	0	0	0	0.01
2002	41	23	517	602.805	-305.061	D	8.027	8.015	0.013	4.231	94.69	5.29	0	0	0	0.02
2002	42	23	624	596.324	-316.278	D	7.754	7.716	0.038	3.567	89.04	10.89	0	0	0	0.07
2002	43	23	517	602.805	-305.061	D	6.894	6.884	0.01	1.824	92.89	6.92	0	0	0	0.17
2002	44	23	517	602.805	-305.061	D	6.67	6.65	0.02	1.359	90.16	9.68	0	0	0	0.17
2002	45	23	637	596.267	-315.066	D	6.597	6.551	0.046	1.165	88.06	11.85	0	0	0	0.09
2002	46	23	517	602.805	-305.061	D	6.769	6.765	0.004	1.585	94.14	5.81	0	0	0	0.04
2002	47	23	1	596.558	-316.101	D	6.627	6.627	0	1.313	0	0	0	0	0	0
2002	48	23	517	602.805	-305.061	D	6.554	6.549	0.005	1.162	89.05	10.79	0	0	0	0.17
2002	49	23	1	596.558	-316.101	D	6.623	6.623	0	1.306	0	0	0	0	0	0
2002	50	23	1	596.558	-316.101	D	7.503	7.503	0	3.107	0	0	0	0	0	0
2002	51	23	1	596.558	-316.101	D	9.342	9.342	0	7.426	0	0	0	0	0	0
2002	52	23	517	602.805	-305.061	D	7.28	7.279	0	2.634	93.96	5.8	0	0	0	0.08
2002	53	23	517	602.805	-305.061	D	7.066	7.041	0.024	2.142	92.9	7.03	0	0	0	0.07
2002	54	23	637	596.267	-315.066	D	6.618	6.614	0.004	1.288	94.28	5.64	0	0	0	0.06
2002	55	23	461	602.269	-305.916	D	6.664	6.66	0.004	1.378	93.75	6.17	0	0	0	0.04
2002	56	23	624	596.324	-316.278	D	7.596	7.494	0.102	3.088	89.55	10.43	0	0	0	0.02
2002	57	23	624	596.324	-316.278	D	7.814	7.789	0.025	3.728	64.38	35.53	0	0	0	0.1
2002	58	23	1	596.558	-316.101	D	6.791	6.791	0	1.638	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	6.538	6.538	0	1.139	0	0	0	0	0	0
2002	60	23	1	596.558	-316.101	D	6.555	6.555	0	1.174	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	61	23	517	602.805	-305.061	D	8.588	8.373	0.215	5.052	93.98	6.01	0	0	0	0.01
2002	62	23	517	602.805	-305.061	D	7.292	7.15	0.142	2.366	89.98	9.99	0	0	0	0.03
2002	63	23	1	596.558	-316.101	D	6.887	6.887	0	1.829	0	0	0	0	0	0
2002	64	23	1	596.558	-316.101	D	6.674	6.674	0	1.406	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	6.726	6.726	0	1.509	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.26	7.26	0	2.593	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.571	7.571	0	3.254	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.988	7.988	0	4.17	0	0	0	0	0	0
2002	69	23	517	602.805	-305.061	D	6.92	6.92	0	1.895	88.96	10.48	0	0	0	0.15
2002	70	23	517	602.805	-305.061	D	6.726	6.721	0.005	1.498	87.72	12.21	0	0	0	0.06
2002	71	23	517	602.805	-305.061	D	9.534	9.534	0	7.925	95.52	4.31	0	0	0	0
2002	72	23	694	602.12	-306.029	D	9.503	9.481	0.022	7.785	92.85	7.13	0	0	0	0.01
2002	73	23	517	602.805	-305.061	D	8.252	8.251	0	4.769	98.59	1.34	0	0	0	0.01
2002	74	23	637	596.267	-315.066	D	9.354	9.229	0.125	7.136	91.97	8.02	0	0	0	0.01
2002	75	23	603	598.68	-316.244	D	8.088	8.079	0.009	4.375	94.79	5.2	0	0	0	0.01
2002	76	23	548	603.28	-312.734	D	8.831	8.825	0.005	6.132	95.7	4.27	0	0	0	0
2002	77	23	694	602.12	-306.029	D	9.505	9.504	0.001	7.846	96.91	2.92	0	0	0	0.02
2002	78	23	694	602.12	-306.029	D	10.197	10.197	0	9.721	95	5.28	0	0	0	0.01
2002	79	23	1	596.558	-316.101	D	9.338	9.338	0	7.417	0	0	0	0	0	0
2002	80	23	526	602.943	-307.29	D	9.216	9.132	0.084	6.893	85.56	14.41	0	0	0	0.02
2002	81	23	637	596.267	-315.066	D	6.57	6.551	0.019	1.165	84.28	15.58	0	0	0	0.14
2002	82	23	548	603.28	-312.734	D	6.69	6.676	0.014	1.409	88.01	11.93	0	0	0	0.07
2002	83	23	517	602.805	-305.061	D	6.845	6.845	0.001	1.745	95.11	4.76	0	0	0	0.04
2002	84	23	1	596.558	-316.101	D	9.454	9.454	0	7.715	0	0	0	0	0	0
2002	85	23	1	596.558	-316.101	D	8.698	8.698	0	5.823	0	0	0	0	0	0
2002	86	23	631	596.276	-315.551	D	7.611	7.575	0.036	3.263	88.07	11.89	0	0	0	0.03
2002	87	23	637	596.267	-315.066	D	6.909	6.905	0.004	1.866	97.02	2.96	0	0	0	0.02
2002	88	23	517	602.805	-305.061	D	8.035	8	0.036	4.196	97.58	2.41	0	0	0	0.01
2002	89	23	624	596.324	-316.278	D	8.367	8.292	0.075	4.864	98.17	1.82	0	0	0	0.01
2002	90	23	1	596.558	-316.101	D	7.026	7.026	0	2.112	92.86	0.68	0	0	0	0.08
2002	91	23	563	600.143	-314.135	D	6.704	6.682	0.022	1.421	97.61	2.33	0	0	0	0.06
2002	92	23	517	602.805	-305.061	D	7.382	7.357	0.025	2.798	98.59	1.39	0	0	0	0.02
2002	93	23	603	598.68	-316.244	D	7.153	7.15	0.003	2.366	98.69	1.29	0	0	0	0.02
2002	94	23	624	596.324	-316.278	D	6.849	6.849	0.001	1.753	79.51	20.26	0	0	0	0.06
2002	95	23	632	596.27	-315.421	D	6.579	6.579	0	1.219	99.23	0.79	0	0	0	0.07
2002	96	23	624	596.324	-316.278	D	6.537	6.517	0.021	1.098	95.84	4.1	0	0	0	0.07
2002	97	23	637	596.267	-315.066	D	6.652	6.648	0.004	1.354	98.02	1.96	0	0	0	0.03
2002	98	23	1	596.558	-316.101	D	9.086	9.086	0	6.776	0	0	0	0	0	0
2002	99	23	563	600.143	-314.135	D	9.24	9.002	0.238	6.567	91.45	8.54	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	100	23	1	596.558	-316.101	D	6.913	6.913	0	1.882	0	0	0	0	0	0
2002	101	23	1	596.558	-316.101	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2002	102	23	1	596.558	-316.101	D	8.449	8.449	0	5.229	0	0	0	0	0	0
2002	103	23	517	602.805	-305.061	D	8.994	8.772	0.222	6.003	95.25	4.75	0	0	0	0.01
2002	104	23	517	602.805	-305.061	D	8.893	8.874	0.018	6.251	99.64	0.34	0	0	0	0.01
2002	105	23	1	596.558	-316.101	D	8.3	8.3	0	4.881	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.54	7.54	0	3.186	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.065	7.065	0	2.191	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.176	7.176	0	2.419	0	0	0	0	0	0
2002	110	23	517	602.805	-305.061	D	8.659	8.596	0.063	5.577	98.73	1.26	0	0	0	0.01
2002	111	23	517	602.805	-305.061	D	9.403	9.194	0.209	7.048	96.47	3.52	0	0	0	0
2002	112	23	517	602.805	-305.061	D	7.067	6.969	0.098	1.995	95.03	4.88	0	0	0	0.09
2002	113	23	517	602.805	-305.061	D	6.704	6.66	0.044	1.379	99.08	0.87	0	0	0	0.05
2002	114	23	517	602.805	-305.061	D	7.244	7.243	0.001	2.559	99.56	0.36	0	0	0	0.02
2002	115	23	694	602.12	-306.029	D	7.205	7.168	0.037	2.404	96.41	3.58	0	0	0	0.01
2002	116	23	548	603.28	-312.734	D	6.724	6.703	0.021	1.463	98.42	1.51	0	0	0	0.06
2002	117	23	624	596.324	-316.278	D	7.888	7.862	0.026	3.889	98.78	1.18	0	0	0	0.03
2002	118	23	1	596.558	-316.101	D	8.846	8.846	0	6.183	0	0	0	0	0	0
2002	119	23	517	602.805	-305.061	D	6.833	6.816	0.017	1.687	85.67	14.23	0	0	0	0.09
2002	120	23	603	598.68	-316.244	D	6.808	6.779	0.029	1.613	99.59	0.38	0	0	0	0.03
2002	121	23	517	602.805	-305.061	D	9.685	9.666	0.019	8.272	99.52	0.46	0	0	0	0
2002	122	23	603	598.68	-316.244	D	9.286	8.8	0.487	6.069	96.21	3.78	0	0	0	0
2002	123	23	603	598.68	-316.244	D	6.76	6.759	0.001	1.574	99.27	0.7	0	0	0	0.01
2002	124	23	1	596.558	-316.101	D	6.693	6.693	0	1.444	0	0	0	0	0	0
2002	125	23	1	596.558	-316.101	D	6.833	6.833	0	1.721	0	0	0	0	0	0
2002	126	23	1	596.558	-316.101	D	7.956	7.956	0	4.098	0	0	0	0	0	0
2002	127	23	1	596.558	-316.101	D	7.777	7.777	0	3.702	0	0	0	0	0	0
2002	128	23	1	596.558	-316.101	D	9.206	9.206	0	7.08	0	0	0	0	0	0
2002	129	23	517	602.805	-305.061	D	8.089	8.087	0.002	4.394	99.73	0.21	0	0	0	0.07
2002	130	23	548	603.28	-312.734	D	6.603	6.589	0.014	1.238	98.38	1.54	0	0	0	0.09
2002	131	23	637	596.267	-315.066	D	7.02	7.018	0.002	2.095	99.46	0.48	0	0	0	0.04
2002	132	23	1	596.558	-316.101	D	8.587	8.587	0	5.555	0	0	0	0	0	0
2002	133	23	656	597.971	-312.292	D	9.369	8.616	0.753	5.626	95.41	4.58	0	0	0	0
2002	134	23	222	600.034	-309.336	D	6.818	6.793	0.025	1.642	99.05	0.83	0	0	0	0.11
2002	135	23	517	602.805	-305.061	D	6.739	6.706	0.032	1.469	99.47	0.48	0	0	0	0.05
2002	136	23	514	602.766	-305.877	D	6.882	6.882	0	1.819	99.36	0.14	0	0	0	0.03
2002	137	23	637	596.267	-315.066	D	9.432	9.41	0.022	7.601	97.37	2.63	0	0	0	0
2002	138	23	624	596.324	-316.278	D	7.274	7.274	0	2.623	98.85	1.28	0	0	0	0

Appendix M
Mingo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	139	23	637	596.267	-315.066	D	6.733	6.729	0.004	1.515	98.95	0.89	0	0	0	0.09
2002	140	23	521	602.866	-306.052	D	6.658	6.616	0.042	1.292	98.31	1.61	0	0	0	0.08
2002	141	23	624	596.324	-316.278	D	6.994	6.969	0.025	1.995	94.66	5.32	0	0	0	0.03
2002	142	23	624	596.324	-316.278	D	6.646	6.615	0.032	1.289	99.21	0.77	0	0	0	0.03
2002	143	23	517	602.805	-305.061	D	6.715	6.712	0.003	1.48	99.74	0.23	0	0	0	0.01
2002	144	23	1	596.558	-316.101	D	7.086	7.086	0	2.235	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.459	7.459	0	3.014	0	0	0	0	0	0
2002	146	23	517	602.805	-305.061	D	8.151	8.15	0.001	4.537	100.1	0.16	0	0	0	0.02
2002	147	23	517	602.805	-305.061	D	8.151	8.151	0	4.54	100.1	0.1	0	0	0	0.01
2002	148	23	1	596.558	-316.101	D	7.42	7.42	0	2.93	0	0	0	0	0	0
2002	149	23	1	596.558	-316.101	D	9.172	9.172	0	6.994	0	0	0	0	0	0
2002	150	23	1	596.558	-316.101	D	9.048	9.048	0	6.682	0	0	0	0	0	0
2002	151	23	1	596.558	-316.101	D	7.238	7.238	0	2.548	0	0	0	0	0	0
2002	152	23	1	596.558	-316.101	D	7.178	7.178	0	2.423	0	0	0	0	0	0
2002	153	23	1	596.558	-316.101	D	7.435	7.435	0	2.963	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.374	7.374	0	2.832	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.172	7.172	0	2.41	0	0	0	0	0	0
2002	156	23	517	602.805	-305.061	D	7.44	7.438	0.001	2.969	99.71	0.26	0	0	0	0.02
2002	157	23	660	598.316	-311.922	D	8.122	8.082	0.04	4.382	98.05	1.95	0	0	0	0
2002	158	23	624	596.324	-316.278	D	6.904	6.903	0.001	1.861	99.15	0.77	0	0	0	0.02
2002	159	23	637	596.267	-315.066	D	7.198	7.183	0.015	2.433	99.67	0.32	0	0	0	0.01
2002	160	23	517	602.805	-305.061	D	7.716	7.713	0.003	3.561	99.87	0.07	0	0	0	0.01
2002	161	23	1	596.558	-316.101	D	8.273	8.273	0	4.819	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	9.06	9.06	0	6.712	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.783	7.783	0	3.715	0	0	0	0	0	0
2002	164	23	517	602.805	-305.061	D	8.217	8.201	0.016	4.654	99.93	0.05	0	0	0	0.02
2002	165	23	624	596.324	-316.278	D	7.017	6.972	0.045	2.001	99.63	0.33	0	0	0	0.04
2002	166	23	517	602.805	-305.061	D	6.826	6.788	0.038	1.631	98.62	1.25	0	0	0	0.12
2002	167	23	517	602.805	-305.061	D	6.68	6.672	0.008	1.402	99.81	0.13	0	0	0	0.05
2002	168	23	624	596.324	-316.278	D	7.825	7.69	0.135	3.511	98.95	1.03	0	0	0	0.02
2002	169	23	624	596.324	-316.278	D	6.887	6.792	0.095	1.639	99.87	0.11	0	0	0	0.02
2002	170	23	517	602.805	-305.061	D	7.086	7.056	0.03	2.173	99.93	0.05	0	0	0	0.01
2002	171	23	186	600.15	-314.075	D	7.338	7.338	0	2.757	81.22	0.01	0	0	0	0.01
2002	172	23	1	596.558	-316.101	D	6.979	6.979	0	2.016	0	0	0	0	0	0
2002	173	23	1	596.558	-316.101	D	6.977	6.977	0	2.011	0	0	0	0	0	0
2002	174	23	1	596.558	-316.101	D	6.851	6.851	0	1.757	0	0	0	0	0	0
2002	175	23	1	596.558	-316.101	D	7.707	7.707	0	3.547	0	0	0	0	0	0
2002	176	23	1	596.558	-316.101	D	8.293	8.293	0	4.866	0	0	0	0	0	0
2002	177	23	1	596.558	-316.101	D	7.355	7.355	0	2.794	0	0	0	0	0	0

Appendix M
Mingo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	178	23	1	596.558	-316.101	D	7.797	7.797	0	3.745	0	0	0	0	0	0
2002	179	23	517	602.805	-305.061	D	8.53	8.288	0.242	4.855	98.41	1.58	0	0	0	0.01
2002	180	23	517	602.805	-305.061	D	8.154	7.901	0.253	3.976	99.63	0.36	0	0	0	0.01
2002	181	23	517	602.805	-305.061	D	7.363	7.362	0.001	2.807	100	0.02	0	0	0	0.01
2002	182	23	1	596.558	-316.101	D	6.874	6.874	0	1.804	0	0	0	0	0	0
2002	183	23	1	596.558	-316.101	D	6.896	6.896	0	1.847	0	0	0	0	0	0
2002	184	23	517	602.805	-305.061	D	7.616	7.615	0.001	3.349	99.91	0.07	0	0	0	0.01
2002	185	23	517	602.805	-305.061	D	7.138	7.136	0.002	2.336	99.8	0.06	0	0	0	0.01
2002	186	23	517	602.805	-305.061	D	7.136	7.13	0.005	2.325	99.93	0.04	0	0	0	0.01
2002	187	23	193	600.016	-312.336	D	7.022	7.012	0.01	2.083	99.97	0.02	0	0	0	0.01
2002	188	23	637	596.267	-315.066	D	6.896	6.895	0.002	1.845	99.91	0.03	0	0	0	0.01
2002	189	23	222	600.034	-309.336	D	6.71	6.71	0	1.476	91.95	0.01	0	0	0	0.01
2002	190	23	1	596.558	-316.101	D	6.831	6.831	0	1.718	0	0	0	0	0	0
2002	191	23	521	602.866	-306.052	D	7.042	7.038	0.004	2.136	99.89	0.07	0	0	0	0.02
2002	192	23	637	596.267	-315.066	D	9.112	9.087	0.025	6.779	98.51	1.49	0	0	0	0
2002	193	23	624	596.324	-316.278	D	7.664	7.662	0.002	3.451	99.51	0.49	0	0	0	0.01
2002	194	23	624	596.324	-316.278	D	8.495	8.493	0.003	5.333	99.15	0.88	0	0	0	0
2002	195	23	623	596.511	-316.262	D	7.123	7.123	0	2.31	98.78	0.1	0	0	0	0.01
2002	196	23	1	596.558	-316.101	D	7.456	7.456	0	3.006	0	0	0	0	0	0
2002	197	23	1	596.558	-316.101	D	7.62	7.62	0	3.36	0	0	0	0	0	0
2002	198	23	1	596.558	-316.101	D	7.918	7.918	0	4.014	0	0	0	0	0	0
2002	199	23	1	596.558	-316.101	D	8.594	8.594	0	5.573	0	0	0	0	0	0
2002	200	23	1	596.558	-316.101	D	8.653	8.653	0	5.714	0	0	0	0	0	0
2002	201	23	517	602.805	-305.061	D	9.049	9.044	0.005	6.672	99.9	0.04	0	0	0	0
2002	202	23	517	602.805	-305.061	D	8.786	8.774	0.013	6.005	99.9	0.08	0	0	0	0
2002	203	23	517	602.805	-305.061	D	7.83	7.829	0.002	3.815	99.79	0.14	0	0	0	0.01
2002	204	23	521	602.866	-306.052	D	7.781	7.753	0.029	3.648	99.71	0.27	0	0	0	0.02
2002	205	23	548	603.28	-312.734	D	8.622	8.486	0.136	5.316	98.6	1.4	0	0	0	0
2002	206	23	624	596.324	-316.278	D	7.454	7.451	0.003	2.996	99.98	0.02	0	0	0	0.01
2002	207	23	676	599.876	-309.365	D	7.565	7.549	0.016	3.206	99.85	0.14	0	0	0	0.01
2002	208	23	517	602.805	-305.061	D	8.135	8.133	0.002	4.498	99.93	0.03	0	0	0	0.01
2002	209	23	1	596.558	-316.101	D	7.569	7.569	0	3.249	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.525	7.525	0	3.154	0	0	0	0	0	0
2002	211	23	521	602.866	-306.052	D	7.972	7.969	0.003	4.127	99.93	0.01	0	0	0	0.02
2002	212	23	517	602.805	-305.061	D	9.367	9.365	0.002	7.485	99.87	0.09	0	0	0	0
2002	213	23	517	602.805	-305.061	D	8.737	8.736	0.001	5.914	99.96	0.16	0	0	0	0
2002	214	23	548	603.28	-312.734	D	7.093	7.092	0.001	2.246	99.99	0.05	0	0	0	0.01
2002	215	23	1	596.558	-316.101	D	7.057	7.057	0	2.174	0	0	0	0	0	0
2002	216	23	1	596.558	-316.101	D	7.274	7.274	0	2.622	0	0	0	0	0	0

Appendix M
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2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	217	23	1	596.558	-316.101	D	7.283	7.283	0	2.643	0	0	0	0	0	0
2002	218	23	517	602.805	-305.061	D	7.676	7.557	0.119	3.222	99.43	0.56	0	0	0	0.01
2002	219	23	563	600.143	-314.135	D	7.327	7.292	0.035	2.661	99.76	0.23	0	0	0	0
2002	220	23	1	596.558	-316.101	D	6.671	6.671	0	1.4	0	0	0	0	0	0
2002	221	23	1	596.558	-316.101	D	6.676	6.676	0	1.409	0	0	0	0	0	0
2002	222	23	1	596.558	-316.101	D	6.727	6.727	0	1.511	0	0	0	0	0	0
2002	223	23	1	596.558	-316.101	D	7.359	7.359	0	2.802	0	0	0	0	0	0
2002	224	23	1	596.558	-316.101	D	7.126	7.126	0	2.315	0	0	0	0	0	0
2002	225	23	1	596.558	-316.101	D	8.494	8.494	0	5.336	0	0	0	0	0	0
2002	226	23	1	596.558	-316.101	D	9.449	9.449	0	7.702	0	0	0	0	0	0
2002	227	23	1	596.558	-316.101	D	8.62	8.62	0	5.634	0	0	0	0	0	0
2002	228	23	1	596.558	-316.101	D	9.393	9.393	0	7.557	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	9.238	9.238	0	7.159	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	9.148	9.148	0	6.931	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	9.118	9.118	0	6.856	0	0	0	0	0	0
2002	232	23	517	602.805	-305.061	D	8.459	8.457	0.001	5.249	99.95	0.04	0	0	0	0.01
2002	233	23	517	602.805	-305.061	D	7.592	7.59	0.001	3.295	99.92	0.07	0	0	0	0.01
2002	234	23	1	596.558	-316.101	D	7.343	7.343	0	2.768	0	0	0	0	0	0
2002	235	23	1	596.558	-316.101	D	7.551	7.551	0	3.211	0	0	0	0	0	0
2002	236	23	521	602.866	-306.052	D	8.211	8.186	0.025	4.618	99.59	0.39	0	0	0	0.02
2002	237	23	548	603.28	-312.734	D	7.742	7.729	0.014	3.595	99.33	0.66	0	0	0	0.01
2002	238	23	1	596.558	-316.101	D	8.368	8.368	0	5.041	0	0	0	0	0	0
2002	239	23	1	596.558	-316.101	D	8.023	8.023	0	4.25	0	0	0	0	0	0
2002	240	23	1	596.558	-316.101	D	7.102	7.102	0	2.266	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.132	7.132	0	2.329	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.093	7.093	0	2.247	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	244	23	1	596.558	-316.101	D	6.917	6.917	0	1.891	0	0	0	0	0	0
2002	245	23	1	596.558	-316.101	D	7.267	7.267	0	2.608	0	0	0	0	0	0
2002	246	23	1	596.558	-316.101	D	6.993	6.993	0	2.044	0	0	0	0	0	0
2002	247	23	517	602.805	-305.061	D	7.2	7.16	0.04	2.386	99.68	0.3	0	0	0	0.02
2002	248	23	624	596.324	-316.278	D	6.637	6.635	0.002	1.33	99.98	0.03	0	0	0	0.03
2002	249	23	6	596.462	-314.859	D	6.682	6.682	0	1.421	96.8	0.03	0	0	0	0.02
2002	250	23	461	602.269	-305.916	D	6.724	6.724	0	1.505	34.68	0	0	0	0	0.01
2002	251	23	1	596.558	-316.101	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2002	252	23	1	596.558	-316.101	D	6.966	6.966	0	1.99	0	0	0	0	0	0
2002	253	23	1	596.558	-316.101	D	7.056	7.056	0	2.173	0	0	0	0	0	0
2002	254	23	624	596.324	-316.278	D	7.637	7.605	0.032	3.327	99.28	0.68	0	0	0	0.04
2002	255	23	1	596.558	-316.101	D	6.755	6.755	0	1.566	0	0	0	0	0	0

Appendix M
Mingo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	256	23	1	596.558	-316.101	D	6.672	6.672	0	1.402	98.09	0.01	0	0	0	0.03
2002	257	23	694	602.12	-306.029	D	6.758	6.756	0.002	1.567	99.92	0.07	0	0	0	0.02
2002	258	23	517	602.805	-305.061	D	7.442	7.426	0.016	2.943	99.8	0.18	0	0	0	0.02
2002	259	23	461	602.269	-305.916	D	9.456	8.664	0.792	5.741	98.19	1.8	0	0	0	0.01
2002	260	23	624	596.324	-316.278	D	8.844	8.358	0.486	5.017	99.28	0.71	0	0	0	0.01
2002	261	23	517	602.805	-305.061	D	9.255	9.082	0.173	6.765	98.76	1.24	0	0	0	0
2002	262	23	1	596.558	-316.101	D	9.447	9.447	0	7.698	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	9.65	9.65	0	8.23	0	0	0	0	0	0
2002	264	23	1	596.558	-316.101	D	9.006	9.006	0	6.578	0	0	0	0	0	0
2002	265	23	637	596.267	-315.066	D	7.239	7.193	0.046	2.455	99.15	0.83	0	0	0	0.02
2002	266	23	78	598.564	-316.197	D	6.731	6.731	0	1.518	99.32	0.5	0	0	0	0.03
2002	267	23	694	602.12	-306.029	D	6.691	6.668	0.023	1.395	98.81	1.13	0	0	0	0.05
2002	268	23	624	596.324	-316.278	D	6.754	6.74	0.014	1.535	99.51	0.46	0	0	0	0.03
2002	269	23	1	596.558	-316.101	D	8.299	8.299	0	4.879	0	0	0	0	0	0
2002	270	23	461	602.269	-305.916	D	9.224	9.223	0.001	7.122	99.22	0.45	0	0	0	0.01
2002	271	23	637	596.267	-315.066	D	8.28	8.247	0.033	4.761	99.04	0.94	0	0	0	0.01
2002	272	23	517	602.805	-305.061	D	8.061	8.042	0.018	4.293	99.23	0.75	0	0	0	0.01
2002	273	23	517	602.805	-305.061	D	7.247	7.246	0	2.566	99.84	0.05	0	0	0	0.01
2002	274	23	1	596.558	-316.101	D	8.21	8.21	0	4.674	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	8.804	8.804	0	6.079	0	0	0	0	0	0
2002	276	23	1	596.558	-316.101	D	8.532	8.532	0	5.425	0	0	0	0	0	0
2002	277	23	1	596.558	-316.101	D	8.966	8.966	0	6.477	0	0	0	0	0	0
2002	278	23	660	598.316	-311.922	D	7.214	7.2	0.014	2.469	87.59	12.25	0	0	0	0.15
2002	279	23	694	602.12	-306.029	D	6.765	6.757	0.009	1.569	99.35	0.61	0	0	0	0.04
2002	280	23	637	596.267	-315.066	D	6.891	6.882	0.009	1.819	94.14	5.71	0	0	0	0.13
2002	281	23	1	596.558	-316.101	D	6.614	6.614	0	1.287	0	0	0	0	0	0
2002	282	23	517	602.805	-305.061	D	7.338	7.338	0	2.757	96.78	0.63	0	0	0	0.02
2002	283	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	284	23	1	596.558	-316.101	D	9.827	9.827	0	8.704	0	0	0	0	0	0
2002	285	23	1	596.558	-316.101	D	9.291	9.291	0	7.296	0	0	0	0	0	0
2002	286	23	520	602.851	-305.804	D	7.808	7.546	0.262	3.2	95.26	4.73	0	0	0	0.01
2002	287	23	1	596.558	-316.101	D	6.546	6.546	0	1.155	0	0	0	0	0	0
2002	288	23	517	602.805	-305.061	D	6.549	6.532	0.017	1.127	98.52	1.35	0	0	0	0.12
2002	289	23	548	603.28	-312.734	D	6.632	6.631	0.001	1.321	98.95	0.96	0	0	0	0.08
2002	290	23	632	596.27	-315.421	D	6.604	6.543	0.061	1.149	84.78	15.02	0	0	0	0.19
2002	291	23	603	598.68	-316.244	D	6.712	6.712	0	1.48	99.1	0.94	0	0	0	0.04
2002	292	23	694	602.12	-306.029	D	9.444	9.256	0.188	7.205	92.21	7.79	0	0	0	0.01
2002	293	23	603	598.68	-316.244	D	7.607	7.582	0.025	3.278	93.26	6.73	0	0	0	0.01
2002	294	23	1	596.558	-316.101	D	6.692	6.692	0	1.441	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	295	23	517	602.805	-305.061	D	6.602	6.599	0.004	1.258	98.78	1.1	0	0	0	0.06
2002	296	23	695	602.257	-305.836	D	6.886	6.861	0.025	1.777	96.51	3.47	0	0	0	0.02
2002	297	23	5	596.481	-315.108	D	6.697	6.696	0	1.45	98.6	1.28	0	0	0	0.03
2002	298	23	1	596.558	-316.101	D	8.66	8.66	0	5.731	0	0	0	0	0	0
2002	299	23	517	602.805	-305.061	D	11.854	8.998	2.857	6.555	93.77	6.22	0	0	0	0.01
2002	300	23	624	596.324	-316.278	D	8.517	8.379	0.138	5.067	97.56	2.43	0	0	0	0.01
2002	301	23	637	596.267	-315.066	D	9.232	9.22	0.011	7.115	97.37	2.63	0	0	0	0
2002	302	23	660	598.316	-311.922	D	9.562	9.561	0	7.995	97.51	2.29	0	0	0	0
2002	303	23	1	596.558	-316.101	D	8.076	8.076	0	4.369	0	0	0	0	0	0
2002	304	23	624	596.324	-316.278	D	8.019	8.015	0.004	4.232	67.31	32.63	0	0	0	0.07
2002	305	23	624	596.324	-316.278	D	7.437	7.437	0	2.966	86.14	13.79	0	0	0	0.03
2002	306	23	517	602.805	-305.061	D	6.678	6.646	0.032	1.35	83.28	16.57	0	0	0	0.16
2002	307	23	548	603.28	-312.734	D	10.273	10.176	0.098	9.662	94.73	5.27	0	0	0	0
2002	308	23	517	602.805	-305.061	D	9.762	9.456	0.306	7.721	87.65	12.33	0	0	0	0.02
2002	309	23	517	602.805	-305.061	D	9.549	9.285	0.264	7.28	94.3	5.7	0	0	0	0.01
2002	310	23	517	602.805	-305.061	D	8.567	7.682	0.885	3.494	93.76	6.23	0	0	0	0.02
2002	311	23	1	596.558	-316.101	D	6.819	6.819	0	1.693	0	0	0	0	0	0
2002	312	23	1	596.558	-316.101	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.97	7.97	0	4.131	0	0	0	0	0	0
2002	314	23	689	601.435	-306.997	D	9.54	9.506	0.034	7.85	98.11	1.87	0	0	0	0.02
2002	315	23	517	602.805	-305.061	D	7.278	7.186	0.092	2.441	83.49	16.41	0	0	0	0.1
2002	316	23	563	600.143	-314.135	D	7.029	7.011	0.018	2.08	90.72	9.2	0	0	0	0.08
2002	317	23	517	602.805	-305.061	D	6.618	6.594	0.024	1.249	92.22	7.69	0	0	0	0.09
2002	318	23	1	596.558	-316.101	D	6.799	6.799	0	1.654	0	0	0	0	0	0
2002	319	23	637	596.267	-315.066	D	8.292	8.227	0.065	4.713	89.68	10.3	0	0	0	0.01
2002	320	23	548	603.28	-312.734	D	7.856	7.856	0	3.876	91.23	4.82	0	0	0	0.01
2002	321	23	624	596.324	-316.278	D	6.97	6.959	0.011	1.976	85.2	14.71	0	0	0	0.1
2002	322	23	517	602.805	-305.061	D	6.992	6.981	0.011	2.02	90.16	9.78	0	0	0	0.06
2002	323	23	557	601.32	-313.419	D	7.363	7.286	0.077	2.648	77.85	22.03	0	0	0	0.12
2002	324	23	548	603.28	-312.734	D	6.824	6.778	0.046	1.612	95.38	4.58	0	0	0	0.04
2002	325	23	517	602.805	-305.061	D	6.652	6.648	0.004	1.354	89.13	10.74	0	0	0	0.14
2002	326	23	624	596.324	-316.278	D	7.086	7.078	0.008	2.218	89.38	10.47	0	0	0	0.13
2002	327	23	624	596.324	-316.278	D	6.707	6.691	0.016	1.439	92.23	7.69	0	0	0	0.08
2002	328	23	490	602.499	-305.648	D	6.664	6.664	0	1.386	94.13	4.77	0	0	0	0.05
2002	329	23	514	602.766	-305.877	D	7.301	7.291	0.01	2.659	93.71	6.26	0	0	0	0.01
2002	330	23	549	603.073	-312.824	D	6.808	6.807	0.001	1.669	95.34	4.54	0	0	0	0.02
2002	331	23	624	596.324	-316.278	D	6.858	6.858	0	1.772	91.31	5.41	0	0	0	0.05
2002	332	23	517	602.805	-305.061	D	6.685	6.672	0.012	1.403	84.4	15.53	0	0	0	0.06
2002	333	23	491	603.207	-311.591	D	6.664	6.664	0	1.386	89.83	9.68	0	0	0	0.08

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	334	23	691	601.709	-306.61	D	6.689	6.679	0.01	1.415	83.31	16.5	0	0	0	0.2
2002	335	23	632	596.27	-315.421	D	6.542	6.517	0.025	1.099	68.08	31.57	0	0	0	0.36
2002	336	23	491	603.207	-311.591	D	6.525	6.525	0	1.114	81.2	16.98	0	0	0	0.14
2002	337	23	603	598.68	-316.244	D	6.988	6.965	0.023	1.986	85.83	14.09	0	0	0	0.07
2002	338	23	1	596.558	-316.101	D	9.023	9.023	0	6.619	0	0	0	0	0	0
2002	339	23	1	596.558	-316.101	D	8.116	8.116	0	4.46	0	0	0	0	0	0
2002	340	23	624	596.324	-316.278	D	8.05	8.009	0.042	4.217	89.21	10.76	0	0	0	0.04
2002	341	23	1	596.558	-316.101	D	7.608	7.608	0	3.334	0	0	0	0	0	0
2002	342	23	694	602.12	-306.029	D	10.18	9.894	0.286	8.884	91.06	8.94	0	0	0	0.01
2002	343	23	624	596.324	-316.278	D	7.771	7.696	0.075	3.524	93.1	6.9	0	0	0	0
2002	344	23	1	596.558	-316.101	D	6.909	6.909	0	1.873	0	0	0	0	0	0
2002	345	23	1	596.558	-316.101	D	7.227	7.227	0	2.526	0	0	0	0	0	0
2002	346	23	1	596.558	-316.101	D	8.002	8.002	0	4.202	0	0	0	0	0	0
2002	347	23	1	596.558	-316.101	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	348	23	624	596.324	-316.278	D	9.672	9.446	0.226	7.694	86.08	13.89	0	0	0	0.03
2002	349	23	517	602.805	-305.061	D	8.447	8.44	0.007	5.209	91.23	8.73	0	0	0	0.02
2002	350	23	517	602.805	-305.061	D	9.537	9.536	0	7.93	93.65	6.25	0	0	0	0.01
2002	351	23	1	596.558	-316.101	D	10.076	10.076	0	9.385	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	8.161	8.161	0	4.563	0	0	0	0	0	0
2002	353	23	637	596.267	-315.066	D	10.228	10.134	0.094	9.545	91.94	8.04	0	0	0	0.01
2002	354	23	548	603.28	-312.734	D	7.816	7.711	0.105	3.557	93.28	6.71	0	0	0	0.01
2002	355	23	1	596.558	-316.101	D	6.703	6.703	0	1.463	0	0	0	0	0	0
2002	356	23	624	596.324	-316.278	D	7.383	7.357	0.026	2.798	79.09	20.88	0	0	0	0.03
2002	357	23	517	602.805	-305.061	D	6.687	6.665	0.023	1.387	82.18	17.72	0	0	0	0.1
2002	358	23	660	598.316	-311.922	D	9.955	9.911	0.044	8.931	80.86	19.13	0	0	0	0.01
2002	359	23	517	602.805	-305.061	D	7.946	7.831	0.116	3.82	71.99	27.91	0	0	0	0.1
2002	360	23	517	602.805	-305.061	D	7.727	7.708	0.019	3.55	85.6	14.34	0	0	0	0.05
2002	361	23	517	602.805	-305.061	D	7.342	7.335	0.007	2.751	92.34	7.64	0	0	0	0.02
2002	362	23	517	602.805	-305.061	D	7.622	7.622	0	3.364	96.73	3.51	0	0	0	0.01
2002	363	23	1	596.558	-316.101	D	7.719	7.719	0	3.575	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	9.318	9.318	0	7.366	0	0	0	0	0	0
2002	365	23	548	603.28	-312.734	D	10.234	10.218	0.016	9.779	89.54	10.43	0	0	0	0.01
									2.857							
NORANDA									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	1	596.558	-316.101	D	6.843	6.843	0	1.741	0	0	0	0	0	0
2002	2	23	1	596.558	-316.101	D	6.793	6.793	0	1.641	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	3	23	1	596.558	-316.101	D	6.928	6.928	0	1.911	0	0	0	0	0	0
2002	4	23	1	596.558	-316.101	D	6.686	6.686	0	1.429	0	0	0	0	0	0
2002	5	23	1	596.558	-316.101	D	6.788	6.788	0	1.631	0	0	0	0	0	0
2002	6	23	1	596.558	-316.101	D	9.622	9.622	0	8.155	0	0	0	0	0	0
2002	7	23	1	596.558	-316.101	D	8.26	8.26	0	4.79	0	0	0	0	0	0
2002	8	23	1	596.558	-316.101	D	7.367	7.367	0	2.819	0	0	0	0	0	0
2002	9	23	1	596.558	-316.101	D	7.714	7.714	0	3.563	0	0	0	0	0	0
2002	10	23	1	596.558	-316.101	D	9.547	9.547	0	7.957	0	0	0	0	0	0
2002	11	23	1	596.558	-316.101	D	8.234	8.234	0	4.73	0	0	0	0	0	0
2002	12	23	1	596.558	-316.101	D	6.98	6.98	0	2.017	0	0	0	0	0	0
2002	13	23	1	596.558	-316.101	D	7.192	7.192	0	2.453	0	0	0	0	0	0
2002	14	23	1	596.558	-316.101	D	7.524	7.524	0	3.152	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	6.81	6.81	0	1.676	0	0	0	0	0	0
2002	16	23	632	596.27	-315.421	D	6.815	6.675	0.14	1.407	9.39	0.88	0	0	15.94	73.79
2002	17	23	1	596.558	-316.101	D	6.961	6.961	0	1.979	0	0	0	0	0	0
2002	18	23	1	596.558	-316.101	D	9.246	9.246	0	7.179	0	0	0	0	0	0
2002	19	23	557	601.32	-313.419	D	9.63	9.63	0	8.176	71.98	0	0	0	2.73	4.29
2002	20	23	520	602.851	-305.804	D	10.085	10.028	0.057	9.251	98.8	0.12	0	0	0.14	0.94
2002	21	23	517	602.805	-305.061	D	8.618	8.614	0.005	5.62	99.03	0.16	0	0	0.01	0.8
2002	22	23	1	596.558	-316.101	D	7.074	7.074	0	2.208	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	9.964	9.964	0	9.076	0	0	0	0	0	0
2002	24	23	1	596.558	-316.101	D	9.066	9.066	0	6.726	0	0	0	0	0	0
2002	25	23	1	596.558	-316.101	D	8.581	8.581	0	5.542	0	0	0	0	0	0
2002	26	23	548	603.28	-312.734	D	6.868	6.868	0	1.791	93.13	0.11	0	0	0.49	6.09
2002	27	23	545	603.234	-311.991	D	6.988	6.988	0	2.034	95.3	0.05	0	0	0.13	4.04
2002	28	23	1	596.558	-316.101	D	7.059	7.059	0	2.178	0	0	0	0	0	0
2002	29	23	1	596.558	-316.101	D	10.051	10.051	0	9.316	0	0	0	0	0	0
2002	30	23	548	603.28	-312.734	D	10.645	10.155	0.49	9.603	99.62	0.05	0	0	0.05	0.29
2002	31	23	517	602.805	-305.061	D	11.773	10.218	1.555	9.779	98.63	0.16	0	0	0.13	1.08
2002	32	23	1	596.558	-316.101	D	7.677	7.677	0	3.482	0	0	0	0	0	0
2002	33	23	1	596.558	-316.101	D	7.283	7.283	0	2.642	0	0	0	0	0	0
2002	34	23	548	603.28	-312.734	D	6.822	6.817	0.005	1.689	90.08	0.19	0	0	0.36	9.38
2002	35	23	1	596.558	-316.101	D	7.054	7.054	0	2.167	0	0	0	0	0	0
2002	36	23	624	596.324	-316.278	D	6.624	6.624	0	1.307	91.09	0.02	0	0	3.25	5.85
2002	37	23	637	596.267	-315.066	D	6.947	6.925	0.022	1.906	66.36	0.38	0	0	4.1	29.16
2002	38	23	624	596.324	-316.278	D	9.301	9.279	0.022	7.264	99.79	0.01	0	0	0.02	0.18
2002	39	23	622	596.698	-316.245	D	8.449	8.447	0.002	5.226	99.76	0	0	0	0.01	0.23
2002	40	23	519	602.836	-305.557	D	7.917	7.917	0	4.012	98.13	0.01	0	0	0.13	0.62
2002	41	23	1	596.558	-316.101	D	7.876	7.876	0	3.92	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	42	23	1	596.558	-316.101	D	7.716	7.716	0	3.567	0	0	0	0	0	0
2002	43	23	1	596.558	-316.101	D	6.89	6.89	0	1.836	0	0	0	0	0	0
2002	44	23	1	596.558	-316.101	D	6.649	6.649	0	1.356	0	0	0	0	0	0
2002	45	23	557	601.32	-313.419	D	6.583	6.554	0.029	1.17	82.5	0.15	0	0	3.02	14.34
2002	46	23	517	602.805	-305.061	D	6.766	6.765	0.001	1.585	81.75	0.56	0	0	0.13	17.52
2002	47	23	1	596.558	-316.101	D	6.627	6.627	0	1.313	0	0	0	0	0	0
2002	48	23	1	596.558	-316.101	D	6.549	6.549	0	1.162	0	0	0	0	0	0
2002	49	23	557	601.32	-313.419	D	6.741	6.63	0.111	1.319	29.93	0.58	0	0	12.21	57.29
2002	50	23	1	596.558	-316.101	D	7.503	7.503	0	3.107	0	0	0	0	0	0
2002	51	23	1	596.558	-316.101	D	9.342	9.342	0	7.426	0	0	0	0	0	0
2002	52	23	1	596.558	-316.101	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2002	53	23	1	596.558	-316.101	D	7.013	7.013	0	2.084	0	0	0	0	0	0
2002	54	23	548	603.28	-312.734	D	6.671	6.618	0.054	1.295	88.58	0.09	0	0	1.9	9.44
2002	55	23	517	602.805	-305.061	D	6.672	6.66	0.013	1.378	88.3	0.19	0	0	0.32	11.19
2002	56	23	1	596.558	-316.101	D	7.494	7.494	0	3.088	0	0	0	0	0	0
2002	57	23	1	596.558	-316.101	D	7.789	7.789	0	3.728	0	0	0	0	0	0
2002	58	23	1	596.558	-316.101	D	6.791	6.791	0	1.638	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	6.538	6.538	0	1.139	0	0	0	0	0	0
2002	60	23	517	602.805	-305.061	D	6.556	6.548	0.008	1.16	8.59	1.66	0	0	11.88	77.86
2002	61	23	517	602.805	-305.061	D	8.387	8.373	0.014	5.052	3.89	0.52	0	0	11.35	84.25
2002	62	23	1	596.558	-316.101	D	7.119	7.119	0	2.302	0	0	0	0	0	0
2002	63	23	1	596.558	-316.101	D	6.887	6.887	0	1.829	0	0	0	0	0	0
2002	64	23	1	596.558	-316.101	D	6.674	6.674	0	1.406	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	6.726	6.726	0	1.509	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.26	7.26	0	2.593	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.571	7.571	0	3.254	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.988	7.988	0	4.17	0	0	0	0	0	0
2002	69	23	1	596.558	-316.101	D	6.922	6.922	0	1.901	0	0	0	0	0	0
2002	70	23	626	596.299	-315.88	D	6.969	6.742	0.226	1.54	11.87	0.79	0	0	14.89	72.45
2002	71	23	603	598.68	-316.244	D	9.594	9.522	0.072	7.893	89.19	1.83	0	0	0.48	8.49
2002	72	23	517	602.805	-305.061	D	9.638	9.465	0.173	7.745	99.55	0.05	0	0	0.03	0.37
2002	73	23	517	602.805	-305.061	D	8.259	8.251	0.007	4.769	99.44	0.01	0	0	0.03	0.5
2002	74	23	1	596.558	-316.101	D	9.229	9.229	0	7.136	0	0	0	0	0	0
2002	75	23	1	596.558	-316.101	D	8.079	8.079	0	4.375	0	0	0	0	0	0
2002	76	23	603	598.68	-316.244	D	8.979	8.884	0.095	6.275	98.16	0.08	0	0	0.27	1.48
2002	77	23	603	598.68	-316.244	D	10.036	9.533	0.503	7.921	99.48	0.01	0	0	0.03	0.48
2002	78	23	624	596.324	-316.278	D	10.453	10.197	0.256	9.721	99.7	0.04	0	0	0.01	0.26
2002	79	23	624	596.324	-316.278	D	9.522	9.338	0.184	7.417	99.72	0.04	0	0	0.02	0.22
2002	80	23	1	596.558	-316.101	D	9.095	9.095	0	6.798	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	81	23	1	596.558	-316.101	D	6.551	6.551	0	1.165	0	0	0	0	0	0
2002	82	23	1	596.558	-316.101	D	6.667	6.667	0	1.393	0	0	0	0	0	0
2002	83	23	1	596.558	-316.101	D	6.853	6.853	0	1.762	0	0	0	0	0	0
2002	84	23	548	603.28	-312.734	D	9.379	9.368	0.011	7.493	94.56	1.38	0	0	0.11	3.95
2002	85	23	548	603.28	-312.734	D	8.912	8.698	0.214	5.823	99.18	0.15	0	0	0.02	0.65
2002	86	23	186	600.15	-314.075	D	7.522	7.522	0	3.149	34.58	0	0	0	0.41	3.05
2002	87	23	632	596.27	-315.421	D	7.036	6.905	0.131	1.866	41.94	0.45	0	0	8.85	48.76
2002	88	23	490	602.499	-305.648	D	8	8	0	4.196	0	0	0	0	0	23.7
2002	89	23	1	596.558	-316.101	D	8.292	8.292	0	4.864	0	0	0	0	0	0
2002	90	23	624	596.324	-316.278	D	7.027	7.026	0	2.112	18.7	2.22	0	0	4.01	74.89
2002	91	23	624	596.324	-316.278	D	6.709	6.674	0.035	1.405	81.94	0.06	0	0	2.63	15.37
2002	92	23	517	602.805	-305.061	D	7.358	7.357	0.001	2.798	97.89	0.01	0	0	0.12	1.97
2002	93	23	1	596.558	-316.101	D	7.15	7.15	0	2.366	0	0	0	0	0	0
2002	94	23	1	596.558	-316.101	D	6.849	6.849	0	1.753	0	0	0	0	0	0
2002	95	23	1	596.558	-316.101	D	6.579	6.579	0	1.219	0	0	0	0	0	0
2002	96	23	1	596.558	-316.101	D	6.517	6.517	0	1.098	0	0	0	0	0	0
2002	97	23	625	596.311	-316.079	D	6.684	6.648	0.037	1.354	35.74	0.2	0	0	12.54	51.52
2002	98	23	624	596.324	-316.278	D	9.114	9.086	0.028	6.776	74.37	1.14	0	0	5.21	19.28
2002	99	23	1	596.558	-316.101	D	8.983	8.983	0	6.521	0	0	0	0	0	0
2002	100	23	1	596.558	-316.101	D	6.913	6.913	0	1.882	0	0	0	0	0	0
2002	101	23	625	596.311	-316.079	D	6.686	6.617	0.069	1.293	41.26	0.09	0	0	12.18	46.46
2002	102	23	1	596.558	-316.101	D	8.449	8.449	0	5.229	0	0	0	0	0	0
2002	103	23	517	602.805	-305.061	D	8.864	8.772	0.092	6.003	94.98	0.21	0	0	0.76	4.05
2002	104	23	521	602.866	-306.052	D	9.24	8.89	0.35	6.289	97.39	0.27	0	0	0.18	2.16
2002	105	23	1	596.558	-316.101	D	8.3	8.3	0	4.881	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.54	7.54	0	3.186	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.065	7.065	0	2.191	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.176	7.176	0	2.419	0	0	0	0	0	0
2002	110	23	1	596.558	-316.101	D	8.338	8.338	0	4.969	0	0	0	0	0	0
2002	111	23	548	603.28	-312.734	D	9.229	9.151	0.079	6.938	75.94	2.66	0	0	2.23	19.17
2002	112	23	1	596.558	-316.101	D	6.936	6.936	0	1.928	0	0	0	0	0	0
2002	113	23	626	596.299	-315.88	D	6.682	6.657	0.025	1.372	70.33	0.12	0	0	6.58	22.98
2002	114	23	517	602.805	-305.061	D	7.254	7.243	0.011	2.559	70.31	1.12	0	0	2.32	26.26
2002	115	23	1	596.558	-316.101	D	7.164	7.164	0	2.394	0	0	0	0	0	0
2002	116	23	1	596.558	-316.101	D	6.732	6.732	0	1.521	0	0	0	0	0	0
2002	117	23	545	603.234	-311.991	D	8.156	7.956	0.199	4.1	92.66	0.65	0	0	1.08	5.61
2002	118	23	1	596.558	-316.101	D	8.846	8.846	0	6.183	0	0	0	0	0	0
2002	119	23	1	596.558	-316.101	D	6.802	6.802	0	1.66	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	120	23	517	602.805	-305.061	D	7.12	6.768	0.353	1.591	91.8	0.02	0	0	1.52	6.66
2002	121	23	517	602.805	-305.061	D	10.034	9.666	0.369	8.272	84.96	1.92	0	0	1.89	11.23
2002	122	23	521	602.866	-306.052	D	9.155	8.801	0.354	6.072	99.25	0.04	0	0	0.02	0.69
2002	123	23	603	598.68	-316.244	D	6.767	6.759	0.008	1.574	97.99	0.02	0	0	0.02	1.97
2002	124	23	1	596.558	-316.101	D	6.693	6.693	0	1.444	0	0	0	0	0	0
2002	125	23	548	603.28	-312.734	D	6.932	6.813	0.119	1.681	90.02	0.01	0	0	1.49	8.49
2002	126	23	695	602.257	-305.836	D	8.008	8.005	0.003	4.208	97.44	0	0	0	0.07	2.51
2002	127	23	1	596.558	-316.101	D	7.777	7.777	0	3.702	0	0	0	0	0	0
2002	128	23	557	601.32	-313.419	D	9.297	9.148	0.15	6.932	90.52	0.41	0	0	1.88	7.19
2002	129	23	1	596.558	-316.101	D	8.119	8.119	0	4.466	0	0	0	0	0	0
2002	130	23	1	596.558	-316.101	D	6.59	6.59	0	1.241	0	0	0	0	0	0
2002	131	23	548	603.28	-312.734	D	7.1	7.006	0.094	2.071	89.74	0.1	0	0	2.03	8.13
2002	132	23	1	596.558	-316.101	D	8.587	8.587	0	5.555	0	0	0	0	0	0
2002	133	23	1	596.558	-316.101	D	8.616	8.616	0	5.626	0	0	0	0	0	0
2002	134	23	1	596.558	-316.101	D	6.791	6.791	0	1.637	0	0	0	0	0	0
2002	135	23	632	596.27	-315.421	D	6.749	6.704	0.045	1.465	36.82	0.24	0	0	12.13	50.81
2002	136	23	517	602.805	-305.061	D	6.882	6.882	0	1.819	93.47	0	0	0	0.36	3.82
2002	137	23	603	598.68	-316.244	D	9.555	9.41	0.145	7.601	98.97	0.09	0	0	0.18	0.76
2002	138	23	1	596.558	-316.101	D	7.274	7.274	0	2.623	0	0	0	0	0	0
2002	139	23	1	596.558	-316.101	D	6.729	6.729	0	1.515	0	0	0	0	0	0
2002	140	23	1	596.558	-316.101	D	6.614	6.614	0	1.288	0	0	0	0	0	0
2002	141	23	1	596.558	-316.101	D	6.969	6.969	0	1.995	0	0	0	0	0	0
2002	142	23	517	602.805	-305.061	D	6.72	6.619	0.102	1.297	76.28	0.08	0	0	4.31	19.34
2002	143	23	517	602.805	-305.061	D	6.715	6.712	0.004	1.48	77.56	0.02	0	0	4.83	17.61
2002	144	23	1	596.558	-316.101	D	7.086	7.086	0	2.235	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.459	7.459	0	3.014	0	0	0	0	0	0
2002	146	23	603	598.68	-316.244	D	8.285	8.262	0.022	4.795	97.82	0	0	0	0.35	1.82
2002	147	23	520	602.851	-305.804	D	8.392	8.151	0.241	4.54	97.32	0.45	0	0	0.06	2.17
2002	148	23	517	602.805	-305.061	D	7.417	7.406	0.011	2.901	61.7	0.03	0	0	4.91	33.36
2002	149	23	557	601.32	-313.419	D	9.266	9.154	0.112	6.948	69.99	2.18	0	0	4.22	23.61
2002	150	23	517	602.805	-305.061	D	9.732	9.05	0.682	6.687	95.54	0.34	0	0	0.52	3.6
2002	151	23	521	602.866	-306.052	D	7.397	7.224	0.172	2.52	96.36	0.01	0	0	0.28	3.36
2002	152	23	517	602.805	-305.061	D	7.234	7.175	0.059	2.418	98.73	0	0	0	0.06	1.21
2002	153	23	1	596.558	-316.101	D	7.435	7.435	0	2.963	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.374	7.374	0	2.832	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.172	7.172	0	2.41	0	0	0	0	0	0
2002	156	23	1	596.558	-316.101	D	7.381	7.381	0	2.848	0	0	0	0	0	0
2002	157	23	1	596.558	-316.101	D	8.067	8.067	0	4.349	0	0	0	0	0	0
2002	158	23	1	596.558	-316.101	D	6.903	6.903	0	1.861	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	159	23	624	596.324	-316.278	D	7.319	7.183	0.137	2.433	93.63	0.2	0	0	0.99	5.18
2002	160	23	517	602.805	-305.061	D	7.857	7.713	0.144	3.561	85.56	0.05	0	0	1.84	12.55
2002	161	23	517	602.805	-305.061	D	8.321	8.321	0	4.931	0.28	5.68	0	0	0.07	94.26
2002	162	23	517	602.805	-305.061	D	9.093	9.086	0.008	6.776	29.81	7.2	0	0	9.41	53.58
2002	163	23	1	596.558	-316.101	D	7.783	7.783	0	3.715	0	0	0	0	0	0
2002	164	23	1	596.558	-316.101	D	8.148	8.148	0	4.534	0	0	0	0	0	0
2002	165	23	1	596.558	-316.101	D	6.972	6.972	0	2.001	0	0	0	0	0	0
2002	166	23	1	596.558	-316.101	D	6.783	6.783	0	1.621	0	0	0	0	0	0
2002	167	23	1	596.558	-316.101	D	6.668	6.668	0	1.393	0	0	0	0	0	0
2002	168	23	624	596.324	-316.278	D	7.69	7.69	0	3.511	96.97	0	0	0	0.34	0.95
2002	169	23	517	602.805	-305.061	D	7.051	6.776	0.275	1.608	93.23	0.01	0	0	1.17	5.59
2002	170	23	517	602.805	-305.061	D	7.362	7.056	0.306	2.173	93.19	0	0	0	1.48	5.33
2002	171	23	548	603.28	-312.734	D	7.585	7.338	0.247	2.757	65.72	0.13	0	0	5.72	28.43
2002	172	23	624	596.324	-316.278	D	6.991	6.979	0.012	2.016	84.29	0	0	0	5.31	10.41
2002	173	23	624	596.324	-316.278	D	6.977	6.977	0	2.011	61.12	0	0	0	12.89	25.4
2002	174	23	624	596.324	-316.278	D	6.898	6.851	0.047	1.757	85.43	0	0	0	4.47	10.1
2002	175	23	557	601.32	-313.419	D	8.087	7.724	0.363	3.586	67.81	0.13	0	0	5.04	27.02
2002	176	23	607	598.057	-316.133	D	8.834	8.293	0.541	4.866	95.2	0.23	0	0	0.88	3.69
2002	177	23	517	602.805	-305.061	D	7.537	7.385	0.152	2.856	97.31	0	0	0	0.3	2.39
2002	178	23	1	596.558	-316.101	D	7.797	7.797	0	3.745	0	0	0	0	0	0
2002	179	23	1	596.558	-316.101	D	8.26	8.26	0	4.79	0	0	0	0	0	0
2002	180	23	1	596.558	-316.101	D	7.933	7.933	0	4.048	0	0	0	0	0	0
2002	181	23	1	596.558	-316.101	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2002	182	23	603	598.68	-316.244	D	6.875	6.874	0	1.804	83.71	0	0	0	1.11	8.67
2002	183	23	624	596.324	-316.278	D	6.969	6.896	0.073	1.847	95.5	0	0	0	1.27	3.23
2002	184	23	624	596.324	-316.278	D	7.969	7.639	0.33	3.401	98.36	0	0	0	0.2	1.44
2002	185	23	624	596.324	-316.278	D	7.21	7.135	0.075	2.334	98.22	0	0	0	0.19	1.58
2002	186	23	631	596.276	-315.551	D	7.151	7.143	0.008	2.352	98.65	0	0	0	0.09	1.25
2002	187	23	193	600.016	-312.336	D	7.013	7.012	0.001	2.083	99.59	0	0	0	0.04	0.46
2002	188	23	2	596.539	-315.853	D	6.895	6.895	0	1.845	99.64	0	0	0	0.01	0.2
2002	189	23	220	600.073	-309.833	D	6.71	6.71	0	1.476	97.62	0	0	0	0.01	0.26
2002	190	23	603	598.68	-316.244	D	6.834	6.831	0.003	1.718	96.46	0	0	0	0.6	2.91
2002	191	23	603	598.68	-316.244	D	7.039	7.023	0.016	2.105	98.19	0	0	0	0.15	1.65
2002	192	23	603	598.68	-316.244	D	9.09	9.087	0.003	6.779	99.61	0	0	0	0.01	0.29
2002	193	23	622	596.698	-316.245	D	7.662	7.662	0	3.451	79	0	0	0	6.22	10.37
2002	194	23	623	596.511	-316.262	D	8.493	8.493	0	5.333	94.19	0	0	0	0.82	3.6
2002	195	23	624	596.324	-316.278	D	7.123	7.123	0	2.31	93.72	0.01	0	0	1.36	5.6
2002	196	23	626	596.299	-315.88	D	7.456	7.456	0	3.006	91.44	0.04	0	0	1.76	6.72
2002	197	23	624	596.324	-316.278	D	8.013	7.62	0.393	3.36	98.31	0.01	0	0	0.3	1.39

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	198	23	517	602.805	-305.061	D	8.181	7.918	0.264	4.013	99.32	0	0	0	0.05	0.62
2002	199	23	517	602.805	-305.061	D	8.606	8.553	0.053	5.476	99.75	0	0	0	0.02	0.23
2002	200	23	521	602.866	-306.052	D	8.659	8.655	0.003	5.72	99.81	0	0	0	0	0.12
2002	201	23	517	602.805	-305.061	D	9.044	9.044	0	6.672	78.69	0.02	0	0	0.99	10.45
2002	202	23	548	603.28	-312.734	D	8.707	8.707	0	5.844	97.8	0	0	0	0.43	2.06
2002	203	23	548	603.28	-312.734	D	7.874	7.865	0.008	3.897	99.13	0	0	0	0.07	0.79
2002	204	23	548	603.28	-312.734	D	7.775	7.775	0	3.698	98.59	0	0	0	0.09	1.12
2002	205	23	548	603.28	-312.734	D	8.486	8.486	0	5.316	94.46	0.26	0	0	0.33	4.24
2002	206	23	603	598.68	-316.244	D	7.459	7.451	0.008	2.996	98.8	0	0	0	0.34	0.85
2002	207	23	195	599.978	-311.84	D	7.814	7.549	0.265	3.206	99.05	0	0	0	0.09	0.86
2002	208	23	517	602.805	-305.061	D	8.139	8.133	0.006	4.498	99.32	0	0	0	0.06	0.63
2002	209	23	1	596.558	-316.101	D	7.569	7.569	0	3.249	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.525	7.525	0	3.154	0	0	0	0	0	0
2002	211	23	1	596.558	-316.101	D	8	8	0	4.198	0	0	0	0	0	0
2002	212	23	1	596.558	-316.101	D	9.435	9.435	0	7.667	0	0	0	0	0	0
2002	213	23	547	603.265	-312.487	D	8.758	8.757	0.001	5.965	68.84	0.22	0	0	3.36	27.16
2002	214	23	548	603.28	-312.734	D	7.189	7.092	0.097	2.246	98.08	0	0	0	0.2	1.72
2002	215	23	624	596.324	-316.278	D	7.112	7.057	0.055	2.174	97.31	0	0	0	0.67	2.02
2002	216	23	624	596.324	-316.278	D	7.513	7.274	0.24	2.622	96.95	0	0	0	0.78	2.26
2002	217	23	517	602.805	-305.061	D	7.596	7.321	0.275	2.722	97.71	0	0	0	0.24	2.05
2002	218	23	461	602.269	-305.916	D	7.695	7.557	0.138	3.222	98.93	0	0	0	0.06	1
2002	219	23	563	600.143	-314.135	D	7.311	7.292	0.019	2.661	99.48	0	0	0	0.01	0.5
2002	220	23	1	596.558	-316.101	D	6.671	6.671	0	1.4	0	0	0	0	0	0
2002	221	23	624	596.324	-316.278	D	6.679	6.676	0.003	1.409	93.26	0	0	0	2.4	4.31
2002	222	23	548	603.28	-312.734	D	6.882	6.723	0.159	1.503	95.03	0	0	0	0.48	4.49
2002	223	23	517	602.805	-305.061	D	7.485	7.473	0.011	3.044	99.12	0	0	0	0.05	0.83
2002	224	23	514	602.766	-305.877	D	7.16	7.16	0	2.387	92.4	0	0	0	0.01	3.65
2002	225	23	1	596.558	-316.101	D	8.494	8.494	0	5.336	0	0	0	0	0	0
2002	226	23	1	596.558	-316.101	D	9.449	9.449	0	7.702	0	0	0	0	0	0
2002	227	23	1	596.558	-316.101	D	8.62	8.62	0	5.634	0	0	0	0	0	0
2002	228	23	1	596.558	-316.101	D	9.393	9.393	0	7.557	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	9.238	9.238	0	7.159	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	9.148	9.148	0	6.931	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	9.118	9.118	0	6.856	0	0	0	0	0	0
2002	232	23	548	603.28	-312.734	D	8.733	8.349	0.384	4.997	98.39	0.01	0	0	0.29	1.31
2002	233	23	517	602.805	-305.061	D	7.85	7.59	0.259	3.295	97.85	0	0	0	0.16	1.99
2002	234	23	517	602.805	-305.061	D	7.374	7.371	0.003	2.826	98.34	0	0	0	0.11	1.57
2002	235	23	1	596.558	-316.101	D	7.551	7.551	0	3.211	0	0	0	0	0	0
2002	236	23	1	596.558	-316.101	D	8.169	8.169	0	4.581	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	237	23	1	596.558	-316.101	D	7.831	7.831	0	3.821	0	0	0	0	0	0
2002	238	23	1	596.558	-316.101	D	8.368	8.368	0	5.041	0	0	0	0	0	0
2002	239	23	1	596.558	-316.101	D	8.023	8.023	0	4.25	0	0	0	0	0	0
2002	240	23	1	596.558	-316.101	D	7.102	7.102	0	2.266	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.132	7.132	0	2.329	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.093	7.093	0	2.247	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	244	23	528	602.974	-307.784	D	7.057	6.906	0.151	1.867	94.6	0	0	0	1.62	3.78
2002	245	23	517	602.805	-305.061	D	7.32	7.262	0.058	2.598	92.59	0	0	0	0.47	6.93
2002	246	23	517	602.805	-305.061	D	7.022	7.022	0	2.103	61.82	0	0	0	0.44	16.7
2002	247	23	1	596.558	-316.101	D	7.129	7.129	0	2.322	0	0	0	0	0	0
2002	248	23	1	596.558	-316.101	D	6.635	6.635	0	1.33	0	0	0	0	0	0
2002	249	23	1	596.558	-316.101	D	6.682	6.682	0	1.421	0	0	0	0	0	0
2002	250	23	694	602.12	-306.029	D	6.848	6.745	0.103	1.546	87.32	0	0	0	2.92	9.76
2002	251	23	548	603.28	-312.734	D	8.167	7.339	0.829	2.759	95.06	0.01	0	0	1.07	3.87
2002	252	23	624	596.324	-316.278	D	6.992	6.966	0.026	1.99	92	0	0	0	1.52	6.48
2002	253	23	517	602.805	-305.061	D	7.078	7.077	0.001	2.214	96.31	0	0	0	0.45	3.19
2002	254	23	520	602.851	-305.804	D	7.695	7.67	0.025	3.469	98.98	0	0	0	0.05	0.96
2002	255	23	1	596.558	-316.101	D	6.755	6.755	0	1.566	0	0	0	0	0	0
2002	256	23	548	603.28	-312.734	D	6.674	6.673	0	1.405	40.01	0	0	0	22.65	37.19
2002	257	23	548	603.28	-312.734	D	6.894	6.77	0.124	1.595	72.72	0.05	0	0	2.45	24.78
2002	258	23	548	603.28	-312.734	D	7.53	7.431	0.099	2.953	98.39	0	0	0	0.12	1.48
2002	259	23	517	602.805	-305.061	D	8.716	8.664	0.052	5.741	99.56	0.01	0	0	0.02	0.41
2002	260	23	517	602.805	-305.061	D	8.999	8.334	0.665	4.962	97.06	0.22	0	0	0.47	2.26
2002	261	23	517	602.805	-305.061	D	9.124	9.082	0.043	6.765	99.59	0.02	0	0	0.02	0.38
2002	262	23	1	596.558	-316.101	D	9.447	9.447	0	7.698	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	9.65	9.65	0	8.23	0	0	0	0	0	0
2002	264	23	548	603.28	-312.734	D	9.045	9.045	0	6.673	41.05	0.07	0	0	0.43	41.09
2002	265	23	603	598.68	-316.244	D	7.193	7.193	0	2.455	67.15	0.27	0	0	0.11	58.08
2002	266	23	1	596.558	-316.101	D	6.731	6.731	0	1.518	0	0	0	0	0	0
2002	267	23	1	596.558	-316.101	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2002	268	23	1	596.558	-316.101	D	6.74	6.74	0	1.535	0	0	0	0	0	0
2002	269	23	1	596.558	-316.101	D	8.299	8.299	0	4.879	0	0	0	0	0	0
2002	270	23	1	596.558	-316.101	D	9.187	9.187	0	7.031	0	0	0	0	0	0
2002	271	23	1	596.558	-316.101	D	8.247	8.247	0	4.761	0	0	0	0	0	0
2002	272	23	632	596.27	-315.421	D	8.732	8.041	0.692	4.289	96.28	0.06	0	0	0.8	2.86
2002	273	23	517	602.805	-305.061	D	7.42	7.246	0.173	2.566	45.48	0.54	0	0	6.3	47.68
2002	274	23	1	596.558	-316.101	D	8.21	8.21	0	4.674	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	8.804	8.804	0	6.079	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	276	23	517	602.805	-305.061	D	8.587	8.563	0.024	5.5	93.71	0.01	0	0	1.46	4.81
2002	277	23	645	597.253	-313.835	D	9.089	8.966	0.123	6.477	74.69	0.15	0	0	4.31	20.85
2002	278	23	1	596.558	-316.101	D	7.17	7.17	0	2.408	0	0	0	0	0	0
2002	279	23	557	601.32	-313.419	D	6.851	6.762	0.089	1.58	77.7	0.07	0	0	3.83	18.41
2002	280	23	548	603.28	-312.734	D	6.892	6.888	0.004	1.831	94.23	0.01	0	0	0.11	5.63
2002	281	23	1	596.558	-316.101	D	6.614	6.614	0	1.287	0	0	0	0	0	0
2002	282	23	638	596.406	-314.894	D	7.399	7.397	0.001	2.883	84.91	0.01	0	0	5.85	9.19
2002	283	23	632	596.27	-315.421	D	10.219	10.218	0.001	9.779	78.92	0.01	0	0	8.17	12.83
2002	284	23	548	603.28	-312.734	D	9.845	9.827	0.018	8.704	99.27	0.13	0	0	0.08	0.51
2002	285	23	548	603.28	-312.734	D	9.41	9.309	0.101	7.342	99.43	0.04	0	0	0.1	0.42
2002	286	23	545	603.234	-311.991	D	7.536	7.535	0.001	3.175	97.15	0.02	0	0	0.13	2.54
2002	287	23	1	596.558	-316.101	D	6.546	6.546	0	1.155	0	0	0	0	0	0
2002	288	23	1	596.558	-316.101	D	6.534	6.534	0	1.132	0	0	0	0	0	0
2002	289	23	1	596.558	-316.101	D	6.631	6.631	0	1.321	0	0	0	0	0	0
2002	290	23	1	596.558	-316.101	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2002	291	23	1	596.558	-316.101	D	6.712	6.712	0	1.48	0	0	0	0	0	0
2002	292	23	1	596.558	-316.101	D	9.273	9.273	0	7.25	0	0	0	0	0	0
2002	293	23	1	596.558	-316.101	D	7.582	7.582	0	3.278	0	0	0	0	0	0
2002	294	23	603	598.68	-316.244	D	6.692	6.692	0	1.441	93.75	0.04	0	0	1.94	4.33
2002	295	23	1	596.558	-316.101	D	6.608	6.608	0	1.277	60.33	0	0	0	9.56	30.1
2002	296	23	1	596.558	-316.101	D	6.842	6.842	0	1.739	60.73	0	0	0	3.41	21.05
2002	297	23	461	602.269	-305.916	D	6.715	6.715	0	1.487	33.17	0	0	0	5.08	7.9
2002	298	23	557	601.32	-313.419	D	8.739	8.669	0.07	5.752	84.98	0.7	0	0	3.13	11.19
2002	299	23	517	602.805	-305.061	D	9.015	8.998	0.017	6.555	99.33	0.05	0	0	0.04	0.58
2002	300	23	27	597.551	-316.024	D	8.379	8.379	0	5.067	74.97	0	0	0	4.61	9.42
2002	301	23	624	596.324	-316.278	D	9.221	9.22	0.001	7.115	94.81	0	0	0	1.35	3.84
2002	302	23	603	598.68	-316.244	D	9.581	9.498	0.083	7.831	97.05	0.04	0	0	0.96	1.95
2002	303	23	624	596.324	-316.278	D	8.076	8.076	0	4.369	96.75	0	0	0	0.42	3
2002	304	23	1	596.558	-316.101	D	8.015	8.015	0	4.232	0	0	0	0	0	0
2002	305	23	1	596.558	-316.101	D	7.437	7.437	0	2.966	0	0	0	0	0	0
2002	306	23	1	596.558	-316.101	D	6.658	6.658	0	1.373	0	0	0	0	0	0
2002	307	23	548	603.28	-312.734	D	10.286	10.176	0.11	9.662	94.86	1.68	0	0	0.18	3.27
2002	308	23	548	603.28	-312.734	D	9.349	9.322	0.027	7.375	99.49	0.06	0	0	0.01	0.43
2002	309	23	624	596.324	-316.278	D	9.54	9.264	0.276	7.226	98.46	0.27	0	0	0.11	1.16
2002	310	23	545	603.234	-311.991	D	7.658	7.634	0.024	3.389	98.74	0.09	0	0	0.04	1.13
2002	311	23	1	596.558	-316.101	D	6.819	6.819	0	1.693	0	0	0	0	0	0
2002	312	23	1	596.558	-316.101	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.97	7.97	0	4.131	0	0	0	0	0	0
2002	314	23	1	596.558	-316.101	D	9.429	9.429	0	7.651	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	315	23	1	596.558	-316.101	D	7.159	7.159	0	2.385	0	0	0	0	0	0
2002	316	23	1	596.558	-316.101	D	6.997	6.997	0	2.051	0	0	0	0	0	0
2002	317	23	1	596.558	-316.101	D	6.591	6.591	0	1.244	0	0	0	0	0	0
2002	318	23	1	596.558	-316.101	D	6.799	6.799	0	1.654	0	0	0	0	0	0
2002	319	23	548	603.28	-312.734	D	8.314	8.201	0.112	4.655	85.28	1.07	0	0	1.92	11.73
2002	320	23	1	596.558	-316.101	D	7.911	7.911	0	3.999	0	0	0	0	0	0
2002	321	23	1	596.558	-316.101	D	6.959	6.959	0	1.976	0	0	0	0	0	0
2002	322	23	557	601.32	-313.419	D	7.072	7.009	0.063	2.076	31.09	0.66	0	0	12.47	55.78
2002	323	23	1	596.558	-316.101	D	7.29	7.29	0	2.656	0	0	0	0	0	0
2002	324	23	548	603.28	-312.734	D	6.813	6.778	0.035	1.612	87.08	0.82	0	0	0.26	11.84
2002	325	23	548	603.28	-312.734	D	6.642	6.642	0	1.344	87.19	0.03	0	0	0.24	11.78
2002	326	23	1	596.558	-316.101	D	7.078	7.078	0	2.218	0	0	0	0	0	0
2002	327	23	517	602.805	-305.061	D	6.696	6.694	0.001	1.446	16.12	4.36	0	0	5.99	73.56
2002	328	23	1	596.558	-316.101	D	6.664	6.664	0	1.386	0	0	0	0	0	0
2002	329	23	545	603.234	-311.991	D	7.235	7.234	0.001	2.54	48.2	2.11	0	0	0.76	48.93
2002	330	23	548	603.28	-312.734	D	6.807	6.807	0	1.669	90.21	0.36	0	0	0.01	7.06
2002	331	23	1	596.558	-316.101	D	6.858	6.858	0	1.772	0	0	0	0	0	0
2002	332	23	548	603.28	-312.734	D	6.667	6.666	0.001	1.39	23.51	3.89	0	0	8.17	64.45
2002	333	23	1	596.558	-316.101	D	6.659	6.659	0	1.377	0	0	0	0	0	0
2002	334	23	1	596.558	-316.101	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2002	335	23	1	596.558	-316.101	D	6.517	6.517	0	1.099	0	0	0	0	0	0
2002	336	23	1	596.558	-316.101	D	6.524	6.524	0	1.112	0	0	0	0	0	0
2002	337	23	1	596.558	-316.101	D	6.965	6.965	0	1.986	0	0	0	0	0	0
2002	338	23	1	596.558	-316.101	D	9.023	9.023	0	6.619	0	0	0	0	0	0
2002	339	23	1	596.558	-316.101	D	8.116	8.116	0	4.46	0	0	0	0	0	0
2002	340	23	1	596.558	-316.101	D	8.009	8.009	0	4.217	0	0	0	0	0	0
2002	341	23	1	596.558	-316.101	D	7.608	7.608	0	3.334	0	0	0	0	0	0
2002	342	23	548	603.28	-312.734	D	9.795	9.795	0	8.619	25.87	18.01	0	0	0.09	25.42
2002	343	23	548	603.28	-312.734	D	7.711	7.711	0	3.557	68.34	11.32	0	0	0.18	22.81
2002	344	23	1	596.558	-316.101	D	6.909	6.909	0	1.873	0	0	0	0	0	0
2002	345	23	1	596.558	-316.101	D	7.227	7.227	0	2.526	0	0	0	0	0	0
2002	346	23	545	603.234	-311.991	D	8.089	8.052	0.037	4.316	96.18	0.76	0	0	0.09	2.97
2002	347	23	545	603.234	-311.991	D	10.761	10.218	0.544	9.779	99.07	0.15	0	0	0.06	0.72
2002	348	23	624	596.324	-316.278	D	9.512	9.446	0.066	7.694	99.67	0.05	0	0	0	0.27
2002	349	23	1	596.558	-316.101	D	8.394	8.394	0	5.1	0	0	0	0	0	0
2002	350	23	1	596.558	-316.101	D	9.473	9.473	0	7.765	0	0	0	0	0	0
2002	351	23	1	596.558	-316.101	D	10.076	10.076	0	9.385	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	8.161	8.161	0	4.563	0	0	0	0	0	0
2002	353	23	517	602.805	-305.061	D	10.135	10.134	0.001	9.545	79.64	3.57	0	0	0.51	16.08

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	354	23	1	596.558	-316.101	D	7.656	7.656	0	3.438	0	0	0	0	0	0
2002	355	23	1	596.558	-316.101	D	6.703	6.703	0	1.463	0	0	0	0	0	0
2002	356	23	1	596.558	-316.101	D	7.357	7.357	0	2.798	0	0	0	0	0	0
2002	357	23	1	596.558	-316.101	D	6.682	6.682	0	1.421	0	0	0	0	0	0
2002	358	23	1	596.558	-316.101	D	9.889	9.889	0	8.873	0	0	0	0	0	0
2002	359	23	1	596.558	-316.101	D	7.819	7.819	0	3.793	0	0	0	0	0	0
2002	360	23	1	596.558	-316.101	D	7.577	7.577	0	3.267	0	0	0	0	0	0
2002	361	23	548	603.28	-312.734	D	7.377	7.291	0.086	2.659	44.48	4.32	0	0	5.26	45.93
2002	362	23	517	602.805	-305.061	D	7.622	7.622	0	3.364	98.43	0.06	0	0	0.04	1.14
2002	363	23	1	596.558	-316.101	D	7.719	7.719	0	3.575	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	9.318	9.318	0	7.366	0	0	0	0	0	0
2002	365	23	548	603.28	-312.734	D	10.227	10.218	0.009	9.779	68.2	2.32	0	0	4.43	25
									1.555							

Appendix M
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EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	8.203	8.203	0	4.658	0	0	0	0	0	0
2003	2	23	632	596.27	-315.421	D	9.699	9.687	0.011	8.329	0	0	0	0	0	100
2003	3	23	517	602.805	-305.061	D	8.232	8.213	0.019	4.68	0	0	0	0	0	100
2003	4	23	637	596.267	-315.066	D	7.112	7.108	0.004	2.278	0	0	0	0	0	100
2003	5	23	623	596.511	-316.262	D	7.435	7.432	0.003	2.955	0	0	0	0	0	100.05
2003	6	23	517	602.805	-305.061	D	7.934	7.908	0.026	3.991	0	0	0	0	0	100
2003	7	23	521	602.866	-306.052	D	8.306	8.285	0.021	4.847	0	0	0	0	0	100
2003	8	23	681	600.53	-308.617	D	7.047	7.028	0.019	2.115	0	0	0	0	0	99.99
2003	9	23	676	599.876	-309.365	D	6.966	6.935	0.031	1.925	0	0	0	0	0	100
2003	10	23	1	596.558	-316.101	D	6.784	6.784	0	1.623	0	0	0	0	0	0
2003	11	23	1	596.558	-316.101	D	6.589	6.589	0	1.238	0	0	0	0	0	0
2003	12	23	676	599.876	-309.365	D	6.541	6.532	0.009	1.128	0	0	0	0	0	100
2003	13	23	603	598.68	-316.244	D	6.705	6.685	0.02	1.427	0	0	0	0	0	100
2003	14	23	517	602.805	-305.061	D	7.702	7.68	0.022	3.49	0	0	0	0	0	100
2003	15	23	548	603.28	-312.734	D	6.723	6.703	0.02	1.463	0	0	0	0	0	99.99
2003	16	23	637	596.267	-315.066	D	7.867	7.857	0.011	3.877	0	0	0	0	0	99.98
2003	17	23	517	602.805	-305.061	D	7.508	7.497	0.012	3.094	0	0	0	0	0	100
2003	18	23	518	602.82	-305.309	D	7.338	7.335	0.003	2.75	0	0	0	0	0	99.95
2003	19	23	624	596.324	-316.278	D	7.455	7.45	0.005	2.995	0	0	0	0	0	99.97
2003	20	23	517	602.805	-305.061	D	6.94	6.921	0.02	1.897	0	0	0	0	0	100
2003	21	23	603	598.68	-316.244	D	6.94	6.929	0.011	1.915	0	0	0	0	0	100.01
2003	22	23	517	602.805	-305.061	D	7.428	7.419	0.009	2.928	0	0	0	0	0	100
2003	23	23	517	602.805	-305.061	D	7.363	7.314	0.05	2.706	0	0	0	0	0	100
2003	24	23	517	602.805	-305.061	D	7.005	6.973	0.032	2.003	0	0	0	0	0	100
2003	25	23	521	602.866	-306.052	D	6.605	6.597	0.007	1.255	0	0	0	0	0	100
2003	26	23	693	601.983	-306.223	D	7.045	7.001	0.044	2.059	0	0	0	0	0	100
2003	27	23	676	599.876	-309.365	D	6.988	6.968	0.02	1.993	0	0	0	0	0	99.99
2003	28	23	517	602.805	-305.061	D	7.199	7.197	0.001	2.464	0	0	0	0	0	99.89
2003	29	23	676	599.876	-309.365	D	9.38	9.363	0.017	7.479	0	0	0	0	0	100
2003	30	23	78	598.564	-316.197	D	8.757	8.757	0	5.966	0	0	0	0	0	99.75
2003	31	23	546	603.249	-312.239	D	8.663	8.661	0.003	5.733	0	0	0	0	0	99.94
2003	32	23	624	596.324	-316.278	D	8.684	8.682	0.001	5.785	0	0	0	0	0	99.94
2003	33	23	517	602.805	-305.061	D	7.387	7.387	0.001	2.86	0	0	0	0	0	99.89
2003	34	23	517	602.805	-305.061	D	10.218	10.218	0	9.779	0	0	0	0	0	100.26
2003	35	23	603	598.68	-316.244	D	7.151	7.15	0.001	2.365	0	0	0	0	0	100.02
2003	36	23	662	598.404	-311.683	D	6.572	6.558	0.013	1.179	0	0	0	0	0	100
2003	37	23	632	596.27	-315.421	D	8.766	8.763	0.003	5.98	0	0	0	0	0	99.94
2003	38	23	557	601.32	-313.419	D	8.202	8.183	0.019	4.612	0	0	0	0	0	100

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	39	23	557	601.32	-313.419	D	7.125	7.123	0.001	2.31	0	0	0	0	0	100.03
2003	40	23	517	602.805	-305.061	D	7.589	7.577	0.012	3.265	0	0	0	0	0	99.99
2003	41	23	624	596.324	-316.278	D	9.469	9.464	0.004	7.743	0	0	0	0	0	99.93
2003	42	23	517	602.805	-305.061	D	8.344	8.332	0.012	4.957	0	0	0	0	0	99.99
2003	43	23	548	603.28	-312.734	D	6.729	6.723	0.005	1.503	0	0	0	0	0	99.99
2003	44	23	517	602.805	-305.061	D	6.533	6.529	0.003	1.123	0	0	0	0	0	99.93
2003	45	23	517	602.805	-305.061	D	9.433	9.432	0.001	7.66	0	0	0	0	0	99.66
2003	46	23	548	603.28	-312.734	D	9.888	9.886	0.002	8.864	0	0	0	0	0	99.87
2003	47	23	1	596.558	-316.101	D	8.415	8.415	0	5.15	0	0	0	0	0	0
2003	48	23	656	597.971	-312.292	D	7.799	7.785	0.013	3.72	0	0	0	0	0	100
2003	49	23	521	602.866	-306.052	D	9.017	8.995	0.022	6.55	0	0	0	0	0	99.99
2003	50	23	517	602.805	-305.061	D	9.179	9.175	0.003	7.001	0	0	0	0	0	99.94
2003	51	23	623	596.511	-316.262	D	9.516	9.511	0.005	7.865	0	0	0	0	0	99.98
2003	52	23	632	596.27	-315.421	D	9.594	9.592	0.002	8.077	0	0	0	0	0	99.92
2003	53	23	632	596.27	-315.421	D	9.782	9.778	0.004	8.571	0	0	0	0	0	100.01
2003	54	23	557	601.32	-313.419	D	7.77	7.75	0.02	3.642	0	0	0	0	0	99.99
2003	55	23	548	603.28	-312.734	D	8.646	8.635	0.011	5.672	0	0	0	0	0	100.01
2003	56	23	557	601.32	-313.419	D	6.93	6.921	0.009	1.897	0	0	0	0	0	100
2003	57	23	516	602.728	-305.38	D	7.126	7.126	0	2.316	0	0	0	0	0	93.57
2003	58	23	695	602.257	-305.836	D	8.155	8.154	0	4.547	0	0	0	0	0	98.92
2003	59	23	637	596.267	-315.066	D	9.049	9.036	0.013	6.651	0	0	0	0	0	99.99
2003	60	23	694	602.12	-306.029	D	7.944	7.926	0.017	4.032	0	0	0	0	0	100
2003	61	23	517	602.805	-305.061	D	8.796	8.778	0.018	6.016	0	0	0	0	0	99.99
2003	62	23	548	603.28	-312.734	D	7.755	7.754	0.002	3.651	0	0	0	0	0	99.99
2003	63	23	517	602.805	-305.061	D	6.974	6.973	0.001	2.004	0	0	0	0	0	99.99
2003	64	23	662	598.404	-311.683	D	8.805	8.784	0.021	6.031	0	0	0	0	0	99.99
2003	65	23	632	596.27	-315.421	D	7.572	7.519	0.053	3.142	0	0	0	0	0	100
2003	66	23	603	598.68	-316.244	D	7.942	7.935	0.007	4.052	0	0	0	0	0	99.99
2003	67	23	517	602.805	-305.061	D	6.966	6.962	0.004	1.981	0	0	0	0	0	99.99
2003	68	23	637	596.267	-315.066	D	6.956	6.929	0.028	1.914	0	0	0	0	0	99.99
2003	69	23	637	596.267	-315.066	D	6.637	6.622	0.015	1.304	0	0	0	0	0	100
2003	70	23	676	599.876	-309.365	D	6.534	6.525	0.009	1.114	0	0	0	0	0	99.98
2003	71	23	517	602.805	-305.061	D	6.726	6.724	0.002	1.505	0	0	0	0	0	100.03
2003	72	23	548	603.28	-312.734	D	7.959	7.948	0.011	4.08	0	0	0	0	0	99.99
2003	73	23	603	598.68	-316.244	D	8.021	8.021	0	4.244	0	0	0	0	0	100.06
2003	74	23	517	602.805	-305.061	D	8.603	8.6	0.002	5.588	0	0	0	0	0	99.87
2003	75	23	517	602.805	-305.061	D	8.643	8.643	0	5.69	0	0	0	0	0	99.33
2003	76	23	603	598.68	-316.244	D	8.801	8.799	0.002	6.066	0	0	0	0	0	99.98
2003	77	23	624	596.324	-316.278	D	8.797	8.797	0	6.063	0	0	0	0	0	98.51

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	78	23	557	601.32	-313.419	D	9.023	9.02	0.003	6.61	0	0	0	0	0	99.93
2003	79	23	624	596.324	-316.278	D	7.789	7.788	0	3.727	0	0	0	0	0	99.9
2003	80	23	548	603.28	-312.734	D	8.852	8.84	0.013	6.166	0	0	0	0	0	100.01
2003	81	23	517	602.805	-305.061	D	6.548	6.547	0	1.158	0	0	0	0	0	99.74
2003	82	23	624	596.324	-316.278	D	6.539	6.525	0.015	1.114	0	0	0	0	0	99.99
2003	83	23	517	602.805	-305.061	D	6.661	6.66	0.001	1.378	0	0	0	0	0	100.01
2003	84	23	517	602.805	-305.061	D	7.671	7.653	0.018	3.431	0	0	0	0	0	100
2003	85	23	548	603.28	-312.734	D	8.248	8.243	0.005	4.751	0	0	0	0	0	99.98
2003	86	23	624	596.324	-316.278	D	6.643	6.643	0.001	1.344	0	0	0	0	0	99.91
2003	87	23	625	596.311	-316.079	D	8.456	8.454	0.002	5.242	0	0	0	0	0	99.95
2003	88	23	1	596.558	-316.101	D	7.65	7.65	0	3.423	0	0	0	0	0	98.42
2003	89	23	517	602.805	-305.061	D	6.892	6.884	0.008	1.823	0	0	0	0	0	99.99
2003	90	23	661	598.396	-311.717	D	6.49	6.489	0.001	1.045	0	0	0	0	0	99.98
2003	91	23	1	596.558	-316.101	D	6.687	6.687	0	1.43	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	6.835	6.835	0	1.725	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	6.998	6.998	0	2.054	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.194	7.194	0	2.457	0	0	0	0	0	0
2003	95	23	517	602.805	-305.061	D	7.292	7.288	0.004	2.652	0	0	0	0	0	99.97
2003	96	23	624	596.324	-316.278	D	8.02	8.015	0.004	4.232	0	0	0	0	0	100.03
2003	97	23	656	597.971	-312.292	D	9.072	9.066	0.006	6.726	0	0	0	0	0	99.99
2003	98	23	638	596.406	-314.894	D	8.542	8.482	0.06	5.307	0	0	0	0	0	100
2003	99	23	557	601.32	-313.419	D	7.294	7.252	0.042	2.577	0	0	0	0	0	100
2003	100	23	637	596.267	-315.066	D	6.756	6.749	0.007	1.554	0	0	0	0	0	99.99
2003	101	23	637	596.267	-315.066	D	6.506	6.499	0.007	1.063	0	0	0	0	0	100.01
2003	102	23	603	598.68	-316.244	D	6.547	6.499	0.048	1.064	0	0	0	0	0	100
2003	103	23	517	602.805	-305.061	D	6.589	6.578	0.01	1.218	0	0	0	0	0	100
2003	104	23	557	601.32	-313.419	D	6.762	6.755	0.006	1.566	0	0	0	0	0	99.96
2003	105	23	212	600.226	-311.82	D	6.589	6.589	0	1.239	0	0	0	0	0	73.54
2003	106	23	1	596.558	-316.101	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2003	107	23	603	598.68	-316.244	D	8.091	8.086	0.005	4.391	0	0	0	0	0	99.97
2003	108	23	548	603.28	-312.734	D	7.36	7.346	0.013	2.775	0	0	0	0	0	99.99
2003	109	23	517	602.805	-305.061	D	7.541	7.538	0.003	3.181	0	0	0	0	0	100.01
2003	110	23	517	602.805	-305.061	D	8.914	8.913	0.002	6.346	0	0	0	0	0	100.06
2003	111	23	603	598.68	-316.244	D	7.031	7.023	0.008	2.105	0	0	0	0	0	99.98
2003	112	23	517	602.805	-305.061	D	6.998	6.981	0.017	2.02	0	0	0	0	0	99.99
2003	113	23	624	596.324	-316.278	D	6.518	6.512	0.007	1.089	0	0	0	0	0	100
2003	114	23	625	596.311	-316.079	D	8.948	8.947	0.001	6.43	0	0	0	0	0	100.02
2003	115	23	6	596.462	-314.859	D	9.539	9.525	0.014	7.902	0	0	0	0	0	99.99
2003	116	23	548	603.28	-312.734	D	7.168	7.163	0.006	2.391	0	0	0	0	0	99.99

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	117	23	517	602.805	-305.061	D	6.721	6.716	0.005	1.489	0	0	0	0	0	100
2003	118	23	516	602.728	-305.38	D	7.032	7.032	0	2.124	0	0	0	0	0	99.63
2003	119	23	694	602.12	-306.029	D	7.945	7.938	0.007	4.059	0	0	0	0	0	100
2003	120	23	517	602.805	-305.061	D	7.653	7.652	0.001	3.428	0	0	0	0	0	100.03
2003	121	23	220	600.073	-309.833	D	7.206	7.206	0	2.482	0	0	0	0	0	42.21
2003	122	23	517	602.805	-305.061	D	8.55	8.526	0.024	5.412	0	0	0	0	0	99.99
2003	123	23	624	596.324	-316.278	D	8.213	8.197	0.016	4.644	0	0	0	0	0	100
2003	124	23	557	601.32	-313.419	D	7.745	7.739	0.007	3.617	0	0	0	0	0	100
2003	125	23	186	600.15	-314.075	D	8.291	8.291	0	4.862	0	0	0	0	0	80.63
2003	126	23	517	602.805	-305.061	D	8.67	8.669	0	5.753	0	0	0	0	0	99.65
2003	127	23	517	602.805	-305.061	D	8.537	8.534	0.003	5.431	0	0	0	0	0	99.95
2003	128	23	542	603.188	-311.249	D	7.815	7.802	0.012	3.757	0	0	0	0	0	99.98
2003	129	23	210	600.264	-312.318	D	8.645	8.645	0	5.694	0	0	0	0	0	90.07
2003	130	23	1	596.558	-316.101	D	8.133	8.133	0	4.497	0	0	0	0	0	0
2003	131	23	624	596.324	-316.278	D	7.391	7.39	0.001	2.868	0	0	0	0	0	100.15
2003	132	23	517	602.805	-305.061	D	6.585	6.585	0	1.23	0	0	0	0	0	99.68
2003	133	23	517	602.805	-305.061	D	6.549	6.547	0.002	1.158	0	0	0	0	0	99.94
2003	134	23	517	602.805	-305.061	D	7.333	7.332	0.001	2.746	0	0	0	0	0	99.8
2003	135	23	517	602.805	-305.061	D	8.889	8.884	0.005	6.275	0	0	0	0	0	99.97
2003	136	23	517	602.805	-305.061	D	8.714	8.706	0.008	5.842	0	0	0	0	0	100
2003	137	23	557	601.32	-313.419	D	9.972	9.966	0.007	9.081	0	0	0	0	0	99.96
2003	138	23	660	598.316	-311.922	D	9.188	9.188	0	7.032	0	0	0	0	0	97.45
2003	139	23	632	596.27	-315.421	D	8.713	8.711	0.002	5.854	0	0	0	0	0	99.92
2003	140	23	548	603.28	-312.734	D	8.684	8.66	0.024	5.731	0	0	0	0	0	99.99
2003	141	23	517	602.805	-305.061	D	6.773	6.769	0.004	1.594	0	0	0	0	0	100.01
2003	142	23	637	596.267	-315.066	D	6.843	6.836	0.008	1.727	0	0	0	0	0	100
2003	143	23	637	596.267	-315.066	D	6.698	6.683	0.015	1.423	0	0	0	0	0	100
2003	144	23	624	596.324	-316.278	D	6.771	6.728	0.043	1.512	0	0	0	0	0	100
2003	145	23	548	603.28	-312.734	D	8.482	8.461	0.021	5.257	0	0	0	0	0	99.99
2003	146	23	624	596.324	-316.278	D	7.339	7.338	0.001	2.757	0	0	0	0	0	99.95
2003	147	23	517	602.805	-305.061	D	6.868	6.852	0.016	1.759	0	0	0	0	0	100
2003	148	23	548	603.28	-312.734	D	6.66	6.653	0.008	1.363	0	0	0	0	0	100
2003	149	23	632	596.27	-315.421	D	7.299	7.285	0.014	2.647	0	0	0	0	0	99.99
2003	150	23	1	596.558	-316.101	D	6.657	6.656	0	1.371	0	0	0	0	0	100.15
2003	151	23	517	602.805	-305.061	D	7.058	7.048	0.01	2.156	0	0	0	0	0	100
2003	152	23	637	596.267	-315.066	D	7.223	7.216	0.006	2.503	0	0	0	0	0	99.98
2003	153	23	626	596.299	-315.88	D	7.679	7.678	0.001	3.485	0	0	0	0	0	99.99
2003	154	23	637	596.267	-315.066	D	9.282	9.251	0.031	7.192	0	0	0	0	0	100
2003	155	23	557	601.32	-313.419	D	7.934	7.905	0.029	3.985	0	0	0	0	0	100

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	156	23	517	602.805	-305.061	D	6.976	6.961	0.015	1.978	0	0	0	0	0	100.01
2003	157	23	624	596.324	-316.278	D	6.855	6.846	0.009	1.748	0	0	0	0	0	100
2003	158	23	526	602.943	-307.29	D	8.455	8.431	0.023	5.188	0	0	0	0	0	100
2003	159	23	517	602.805	-305.061	D	6.838	6.829	0.009	1.713	0	0	0	0	0	100
2003	160	23	624	596.324	-316.278	D	6.631	6.628	0.003	1.315	0	0	0	0	0	99.95
2003	161	23	517	602.805	-305.061	D	7.049	7.048	0.001	2.156	0	0	0	0	0	100.02
2003	162	23	1	596.558	-316.101	D	8.113	8.113	0	4.453	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	9.399	9.381	0.017	7.527	0	0	0	0	0	99.98
2003	164	23	517	602.805	-305.061	D	9.316	9.316	0	7.36	0	0	0	0	0	98.83
2003	165	23	517	602.805	-305.061	D	9.111	9.092	0.019	6.791	0	0	0	0	0	99.99
2003	166	23	624	596.324	-316.278	D	8.178	8.166	0.013	4.573	0	0	0	0	0	99.98
2003	167	23	603	598.68	-316.244	D	8.292	8.291	0.001	4.862	0	0	0	0	0	99.87
2003	168	23	1	596.558	-316.101	D	7.28	7.28	0	2.635	0	0	0	0	0	99.57
2003	169	23	78	598.564	-316.197	D	7.188	7.188	0	2.445	0	0	0	0	0	100.58
2003	170	23	695	602.257	-305.836	D	7.132	7.098	0.034	2.258	0	0	0	0	0	100
2003	171	23	624	596.324	-316.278	D	7.782	7.781	0.001	3.709	0	0	0	0	0	100.09
2003	172	23	624	596.324	-316.278	D	6.706	6.706	0	1.469	0	0	0	0	0	96.85
2003	173	23	603	598.68	-316.244	D	6.724	6.717	0.008	1.49	0	0	0	0	0	99.98
2003	174	23	624	596.324	-316.278	D	6.702	6.7	0.002	1.456	0	0	0	0	0	99.97
2003	175	23	517	602.805	-305.061	D	6.74	6.739	0.001	1.534	0	0	0	0	0	100.08
2003	176	23	517	602.805	-305.061	D	7.076	7.074	0.001	2.21	0	0	0	0	0	100
2003	177	23	5	596.481	-315.108	D	8.459	8.459	0.001	5.252	0	0	0	0	0	99.4
2003	178	23	517	602.805	-305.061	D	6.913	6.902	0.011	1.86	0	0	0	0	0	99.99
2003	179	23	669	599.263	-310.777	D	6.658	6.643	0.014	1.346	0	0	0	0	0	99.99
2003	180	23	517	602.805	-305.061	D	6.636	6.631	0.005	1.32	0	0	0	0	0	99.96
2003	181	23	517	602.805	-305.061	D	7.213	7.212	0.001	2.495	0	0	0	0	0	99.99
2003	182	23	624	596.324	-316.278	D	8.276	8.272	0.004	4.817	0	0	0	0	0	99.94
2003	183	23	432	602.04	-306.183	D	8.61	8.61	0	5.612	0	0	0	0	0	99.46
2003	184	23	547	603.265	-312.487	D	7.424	7.423	0.001	2.937	0	0	0	0	0	100.1
2003	185	23	511	602.824	-306.623	D	7.513	7.512	0.001	3.128	0	0	0	0	0	99.92
2003	186	23	490	602.499	-305.648	D	7.887	7.887	0	3.945	0	0	0	0	0	92.45
2003	187	23	1	596.558	-316.101	D	8.088	8.088	0	4.396	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	8.182	8.182	0	4.611	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.198	7.198	0	2.466	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2003	191	23	624	596.324	-316.278	D	7.671	7.669	0.002	3.465	0	0	0	0	0	99.9
2003	192	23	623	596.511	-316.262	D	6.901	6.901	0	1.858	0	0	0	0	0	99.43
2003	193	23	517	602.805	-305.061	D	6.975	6.969	0.006	1.995	0	0	0	0	0	99.98
2003	194	23	517	602.805	-305.061	D	7.073	7.058	0.015	2.177	0	0	0	0	0	100

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	195	23	624	596.324	-316.278	D	7.007	7	0.007	2.058	0	0	0	0	0	100.03
2003	196	23	517	602.805	-305.061	D	7.657	7.655	0.001	3.436	0	0	0	0	0	100.08
2003	197	23	517	602.805	-305.061	D	7.476	7.461	0.015	3.017	0	0	0	0	0	100.01
2003	198	23	548	603.28	-312.734	D	6.934	6.902	0.032	1.86	0	0	0	0	0	100
2003	199	23	624	596.324	-316.278	D	7.263	7.25	0.013	2.573	0	0	0	0	0	100
2003	200	23	548	603.28	-312.734	D	8.814	8.797	0.017	6.062	0	0	0	0	0	99.99
2003	201	23	603	598.68	-316.244	D	7.897	7.89	0.007	3.951	0	0	0	0	0	100.01
2003	202	23	545	603.234	-311.991	D	8.081	8.077	0.004	4.371	0	0	0	0	0	99.97
2003	203	23	625	596.311	-316.079	D	7.098	7.074	0.024	2.209	0	0	0	0	0	100
2003	204	23	624	596.324	-316.278	D	7.263	7.251	0.011	2.576	0	0	0	0	0	100
2003	205	23	548	603.28	-312.734	D	6.758	6.752	0.007	1.559	0	0	0	0	0	99.99
2003	206	23	604	598.599	-316.246	D	6.792	6.787	0.005	1.63	0	0	0	0	0	99.96
2003	207	23	517	602.805	-305.061	D	6.841	6.841	0	1.737	0	0	0	0	0	101.73
2003	208	23	517	602.805	-305.061	D	7.378	7.378	0	2.842	0	0	0	0	0	100.02
2003	209	23	517	602.805	-305.061	D	8.042	8.03	0.012	4.265	0	0	0	0	0	100.02
2003	210	23	548	603.28	-312.734	D	9.166	9.163	0.004	6.969	0	0	0	0	0	99.98
2003	211	23	620	597.072	-316.212	D	8.034	8.027	0.007	4.258	0	0	0	0	0	100
2003	212	23	517	602.805	-305.061	D	8.555	8.545	0.01	5.457	0	0	0	0	0	99.98
2003	213	23	517	602.805	-305.061	D	8.237	8.227	0.011	4.712	0	0	0	0	0	100
2003	214	23	548	603.28	-312.734	D	8.166	8.166	0.001	4.573	0	0	0	0	0	99.78
2003	215	23	631	596.276	-315.551	D	9.154	9.149	0.005	6.935	0	0	0	0	0	99.98
2003	216	23	624	596.324	-316.278	D	9.106	9.097	0.008	6.805	0	0	0	0	0	100
2003	217	23	517	602.805	-305.061	D	8.509	8.493	0.016	5.333	0	0	0	0	0	99.98
2003	218	23	637	596.267	-315.066	D	8.123	8.104	0.019	4.433	0	0	0	0	0	100
2003	219	23	637	596.267	-315.066	D	8.058	8.044	0.014	4.297	0	0	0	0	0	99.98
2003	220	23	517	602.805	-305.061	D	7.267	7.255	0.012	2.583	0	0	0	0	0	100.01
2003	221	23	637	596.267	-315.066	D	7.515	7.507	0.008	3.116	0	0	0	0	0	100
2003	222	23	625	596.311	-316.079	D	7.341	7.339	0.002	2.758	0	0	0	0	0	99.93
2003	223	23	632	596.27	-315.421	D	7.088	7.083	0.005	2.228	0	0	0	0	0	100
2003	224	23	1	596.558	-316.101	D	7.389	7.389	0	2.864	0	0	0	0	0	0
2003	225	23	1	596.558	-316.101	D	8.096	8.096	0	4.413	0	0	0	0	0	206.67
2003	226	23	557	601.32	-313.419	D	9.236	9.235	0.001	7.152	0	0	0	0	0	99.93
2003	227	23	698	602.668	-305.255	D	7.923	7.922	0.001	4.024	0	0	0	0	0	99.49
2003	228	23	517	602.805	-305.061	D	7.03	7.021	0.009	2.101	0	0	0	0	0	100
2003	229	23	624	596.324	-316.278	D	7.131	7.124	0.007	2.312	0	0	0	0	0	100
2003	230	23	517	602.805	-305.061	D	7.656	7.623	0.033	3.366	0	0	0	0	0	100
2003	231	23	624	596.324	-316.278	D	7.748	7.733	0.014	3.606	0	0	0	0	0	100
2003	232	23	682	600.626	-308.407	D	8.335	8.322	0.013	4.933	0	0	0	0	0	99.98
2003	233	23	548	603.28	-312.734	D	7.905	7.894	0.011	3.961	0	0	0	0	0	99.99

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	234	23	517	602.805	-305.061	D	7.774	7.766	0.008	3.678	0	0	0	0	0	100
2003	235	23	637	596.267	-315.066	D	7.771	7.753	0.018	3.649	0	0	0	0	0	99.99
2003	236	23	624	596.324	-316.278	D	6.982	6.982	0	2.021	0	0	0	0	0	99.37
2003	237	23	631	596.276	-315.551	D	6.773	6.772	0.001	1.599	0	0	0	0	0	99.88
2003	238	23	632	596.27	-315.421	D	7.037	7.035	0.001	2.13	0	0	0	0	0	99.86
2003	239	23	517	602.805	-305.061	D	7.877	7.871	0.006	3.91	0	0	0	0	0	100
2003	240	23	517	602.805	-305.061	D	8.731	8.729	0.001	5.898	0	0	0	0	0	99.86
2003	241	23	1	596.558	-316.101	D	8.88	8.88	0	6.264	0	0	0	0	0	0
2003	242	23	517	602.805	-305.061	D	9.223	9.222	0.001	7.12	0	0	0	0	0	99.71
2003	243	23	557	601.32	-313.419	D	9.536	9.535	0.001	7.927	0	0	0	0	0	99.85
2003	244	23	632	596.27	-315.421	D	8.837	8.824	0.012	6.129	0	0	0	0	0	100
2003	245	23	661	598.396	-311.717	D	10.056	10.049	0.007	9.31	0	0	0	0	0	99.94
2003	246	23	517	602.805	-305.061	D	9.243	9.226	0.017	7.13	0	0	0	0	0	99.99
2003	247	23	637	596.267	-315.066	D	7.589	7.563	0.026	3.235	0	0	0	0	0	99.99
2003	248	23	637	596.267	-315.066	D	6.918	6.911	0.007	1.879	0	0	0	0	0	100.02
2003	249	23	1	596.558	-316.101	D	6.941	6.941	0	1.937	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.013	7.013	0	2.084	0	0	0	0	0	0
2003	251	23	186	600.15	-314.075	D	6.968	6.968	0	1.994	0	0	0	0	0	76.51
2003	252	23	624	596.324	-316.278	D	7.201	7.199	0.002	2.468	0	0	0	0	0	100
2003	253	23	517	602.805	-305.061	D	7.053	7.051	0.003	2.161	0	0	0	0	0	100.02
2003	254	23	603	598.68	-316.244	D	7.142	7.138	0.004	2.34	0	0	0	0	0	100
2003	255	23	517	602.805	-305.061	D	7.631	7.63	0.001	3.381	0	0	0	0	0	100.07
2003	256	23	1	596.558	-316.101	D	8.172	8.172	0	4.586	0	0	0	0	0	0
2003	257	23	517	602.805	-305.061	D	9.312	9.311	0.001	7.345	0	0	0	0	0	99.84
2003	258	23	548	603.28	-312.734	D	6.897	6.896	0.001	1.847	0	0	0	0	0	99.84
2003	259	23	603	598.68	-316.244	D	6.661	6.653	0.009	1.364	0	0	0	0	0	100
2003	260	23	624	596.324	-316.278	D	6.749	6.743	0.006	1.541	0	0	0	0	0	99.97
2003	261	23	624	596.324	-316.278	D	7.155	7.152	0.003	2.371	0	0	0	0	0	100.02
2003	262	23	517	602.805	-305.061	D	7.292	7.284	0.008	2.644	0	0	0	0	0	99.99
2003	263	23	548	603.28	-312.734	D	6.671	6.663	0.007	1.385	0	0	0	0	0	100.01
2003	264	23	624	596.324	-316.278	D	6.724	6.714	0.01	1.485	0	0	0	0	0	100.02
2003	265	23	625	596.311	-316.079	D	9.107	9.105	0.002	6.825	0	0	0	0	0	99.86
2003	266	23	632	596.27	-315.421	D	7.161	7.156	0.005	2.379	0	0	0	0	0	99.97
2003	267	23	637	596.267	-315.066	D	6.726	6.724	0.002	1.504	0	0	0	0	0	100.03
2003	268	23	638	596.406	-314.894	D	6.993	6.986	0.007	2.03	0	0	0	0	0	100
2003	269	23	517	602.805	-305.061	D	6.68	6.674	0.007	1.405	0	0	0	0	0	99.98
2003	270	23	557	601.32	-313.419	D	7.655	7.641	0.013	3.406	0	0	0	0	0	99.98
2003	271	23	557	601.32	-313.419	D	6.949	6.947	0.002	1.95	0	0	0	0	0	99.99
2003	272	23	517	602.805	-305.061	D	6.606	6.599	0.007	1.258	0	0	0	0	0	99.99

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	273	23	548	603.28	-312.734	D	6.607	6.576	0.032	1.213	0	0	0	0	0	100
2003	274	23	557	601.32	-313.419	D	9.06	9.048	0.012	6.682	0	0	0	0	0	99.99
2003	275	23	557	601.32	-313.419	D	6.57	6.568	0.002	1.198	0	0	0	0	0	100
2003	276	23	517	602.805	-305.061	D	6.523	6.522	0.001	1.108	0	0	0	0	0	99.91
2003	277	23	557	601.32	-313.419	D	6.963	6.955	0.009	1.966	0	0	0	0	0	99.99
2003	278	23	548	603.28	-312.734	D	6.658	6.655	0.003	1.367	0	0	0	0	0	99.94
2003	279	23	517	602.805	-305.061	D	8.706	8.693	0.013	5.811	0	0	0	0	0	99.98
2003	280	23	624	596.324	-316.278	D	6.918	6.912	0.007	1.879	0	0	0	0	0	99.99
2003	281	23	557	601.32	-313.419	D	6.895	6.887	0.007	1.83	0	0	0	0	0	99.99
2003	282	23	517	602.805	-305.061	D	8.302	8.298	0.004	4.877	0	0	0	0	0	99.94
2003	283	23	624	596.324	-316.278	D	9.541	9.541	0	7.942	0	0	0	0	0	99.66
2003	284	23	517	602.805	-305.061	D	8.504	8.497	0.006	5.344	0	0	0	0	0	100.03
2003	285	23	632	596.27	-315.421	D	7.54	7.531	0.01	3.167	0	0	0	0	0	100
2003	286	23	624	596.324	-316.278	D	6.67	6.668	0.002	1.394	0	0	0	0	0	100.03
2003	287	23	517	602.805	-305.061	D	7.991	7.986	0.005	4.165	0	0	0	0	0	99.99
2003	288	23	557	601.32	-313.419	D	6.798	6.79	0.008	1.636	0	0	0	0	0	99.99
2003	289	23	539	603.142	-310.507	D	6.669	6.667	0.002	1.391	0	0	0	0	0	100.01
2003	290	23	688	601.298	-307.191	D	8.83	8.823	0.007	6.127	0	0	0	0	0	99.98
2003	291	23	637	596.267	-315.066	D	6.632	6.62	0.012	1.299	0	0	0	0	0	99.99
2003	292	23	632	596.27	-315.421	D	6.771	6.743	0.028	1.541	0	0	0	0	0	100
2003	293	23	547	603.265	-312.487	D	6.855	6.84	0.015	1.736	0	0	0	0	0	99.99
2003	294	23	632	596.27	-315.421	D	7.142	7.126	0.016	2.316	0	0	0	0	0	100
2003	295	23	517	602.805	-305.061	D	6.633	6.63	0.003	1.319	0	0	0	0	0	100.02
2003	296	23	624	596.324	-316.278	D	6.686	6.668	0.018	1.394	0	0	0	0	0	99.99
2003	297	23	517	602.805	-305.061	D	6.722	6.705	0.017	1.467	0	0	0	0	0	100
2003	298	23	548	603.28	-312.734	D	7.494	7.465	0.029	3.026	0	0	0	0	0	100
2003	299	23	637	596.267	-315.066	D	7.565	7.545	0.02	3.197	0	0	0	0	0	100
2003	300	23	548	603.28	-312.734	D	6.739	6.728	0.012	1.512	0	0	0	0	0	100
2003	301	23	517	602.805	-305.061	D	7.506	7.503	0.003	3.108	0	0	0	0	0	99.98
2003	302	23	548	603.28	-312.734	D	6.977	6.976	0.001	2.01	0	0	0	0	0	99.77
2003	303	23	517	602.805	-305.061	D	7.216	7.215	0	2.501	0	0	0	0	0	100.14
2003	304	23	1	596.558	-316.101	D	8.474	8.474	0	5.289	0	0	0	0	0	0
2003	305	23	656	597.971	-312.292	D	7.823	7.804	0.019	3.761	0	0	0	0	0	100
2003	306	23	517	602.805	-305.061	D	7.714	7.713	0.001	3.562	0	0	0	0	0	99.91
2003	307	23	1	596.558	-316.101	D	7.022	7.022	0	2.102	0	0	0	0	0	0
2003	308	23	5	596.481	-315.108	D	6.963	6.963	0	1.983	0	0	0	0	0	98.05
2003	309	23	517	602.805	-305.061	D	7.64	7.607	0.033	3.331	0	0	0	0	0	100
2003	310	23	632	596.27	-315.421	D	8.25	8.246	0.004	4.758	0	0	0	0	0	99.98
2003	311	23	632	596.27	-315.421	D	7.607	7.606	0.001	3.33	0	0	0	0	0	99.99

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	312	23	1	596.558	-316.101	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	6.522	6.522	0	1.109	0	0	0	0	0	0
2003	314	23	6	596.462	-314.859	D	6.536	6.536	0	1.136	0	0	0	0	0	97.23
2003	315	23	1	596.558	-316.101	D	8.014	8.014	0	4.229	0	0	0	0	0	0
2003	316	23	517	602.805	-305.061	D	9.178	9.177	0.001	7.004	0	0	0	0	0	100.13
2003	317	23	632	596.27	-315.421	D	6.543	6.529	0.014	1.122	0	0	0	0	0	100
2003	318	23	548	603.28	-312.734	D	6.573	6.561	0.013	1.184	0	0	0	0	0	100
2003	319	23	546	603.249	-312.239	D	9.164	9.163	0.001	6.97	0	0	0	0	0	99.66
2003	320	23	517	602.805	-305.061	D	9.53	9.516	0.014	7.877	0	0	0	0	0	100
2003	321	23	624	596.324	-316.278	D	9.749	9.739	0.009	8.468	0	0	0	0	0	99.98
2003	322	23	1	596.558	-316.101	D	10.113	10.113	0	9.486	0	0	0	0	0	0
2003	323	23	632	596.27	-315.421	D	7.904	7.879	0.025	3.928	0	0	0	0	0	100
2003	324	23	557	601.32	-313.419	D	6.993	6.986	0.007	2.029	0	0	0	0	0	99.98
2003	325	23	1	596.558	-316.101	D	7.219	7.219	0	2.508	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	9.046	9.046	0	6.676	0	0	0	0	0	0
2003	327	23	632	596.27	-315.421	D	9.204	9.203	0.001	7.072	0	0	0	0	0	99.53
2003	328	23	624	596.324	-316.278	D	7.245	7.244	0.001	2.56	0	0	0	0	0	99.91
2003	329	23	624	596.324	-316.278	D	6.842	6.84	0.002	1.735	0	0	0	0	0	99.95
2003	330	23	489	602.518	-305.896	D	7.105	7.105	0	2.273	0	0	0	0	0	98.63
2003	331	23	521	602.866	-306.052	D	8.853	8.84	0.014	6.166	0	0	0	0	0	99.99
2003	332	23	517	602.805	-305.061	D	7.544	7.514	0.03	3.131	0	0	0	0	0	100
2003	333	23	624	596.324	-316.278	D	6.822	6.821	0.002	1.696	0	0	0	0	0	99.86
2003	334	23	458	602.327	-306.661	D	6.834	6.834	0	1.723	0	0	0	0	0	97.17
2003	335	23	681	600.53	-308.617	D	6.797	6.786	0.011	1.628	0	0	0	0	0	100
2003	336	23	637	596.267	-315.066	D	6.506	6.496	0.011	1.057	0	0	0	0	0	99.99
2003	337	23	517	602.805	-305.061	D	7.714	7.709	0.005	3.552	0	0	0	0	0	99.97
2003	338	23	682	600.626	-308.407	D	9.636	9.623	0.013	8.157	0	0	0	0	0	99.99
2003	339	23	548	603.28	-312.734	D	8.238	8.236	0.002	4.734	0	0	0	0	0	100.01
2003	340	23	637	596.267	-315.066	D	8.075	8.065	0.01	4.344	0	0	0	0	0	100.02
2003	341	23	517	602.805	-305.061	D	6.713	6.706	0.007	1.468	0	0	0	0	0	99.99
2003	342	23	1	596.558	-316.101	D	7.207	7.207	0	2.484	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	9.465	9.465	0	7.743	0	0	0	0	0	0
2003	344	23	557	601.32	-313.419	D	8.973	8.964	0.009	6.472	0	0	0	0	0	99.98
2003	345	23	517	602.805	-305.061	D	7.801	7.8	0.001	3.753	0	0	0	0	0	100.07
2003	346	23	517	602.805	-305.061	D	7.229	7.197	0.032	2.462	0	0	0	0	0	100
2003	347	23	624	596.324	-316.278	D	8.391	8.391	0	5.094	0	0	0	0	0	98.62
2003	348	23	517	602.805	-305.061	D	9.531	9.519	0.012	7.884	0	0	0	0	0	99.99
2003	349	23	464	602.997	-312.107	D	8.617	8.609	0.007	5.61	0	0	0	0	0	99.96
2003	350	23	624	596.324	-316.278	D	8.204	8.203	0.001	4.659	0	0	0	0	0	99.77

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	351	23	603	598.68	-316.244	D	7.455	7.45	0.005	2.994	0	0	0	0	0	99.99
2003	352	23	626	596.299	-315.88	D	8.028	8.024	0.004	4.251	0	0	0	0	0	100
2003	353	23	624	596.324	-316.278	D	8.047	8.047	0	4.304	0	0	0	0	0	99.97
2003	354	23	557	601.32	-313.419	D	7.066	7.051	0.015	2.163	0	0	0	0	0	100.01
2003	355	23	517	602.805	-305.061	D	6.665	6.662	0.003	1.381	0	0	0	0	0	99.99
2003	356	23	1	596.558	-316.101	D	8.674	8.674	0	5.764	0	0	0	0	0	0
2003	357	23	626	596.299	-315.88	D	8.934	8.915	0.019	6.352	0	0	0	0	0	100
2003	358	23	517	602.805	-305.061	D	7.497	7.497	0	3.095	0	0	0	0	0	99.8
2003	359	23	517	602.805	-305.061	D	6.781	6.778	0.003	1.612	0	0	0	0	0	100.01
2003	360	23	548	603.28	-312.734	D	6.822	6.816	0.006	1.688	0	0	0	0	0	99.98
2003	361	23	517	602.805	-305.061	D	6.853	6.851	0.002	1.757	0	0	0	0	0	99.99
2003	362	23	1	596.558	-316.101	D	8.349	8.349	0	4.997	0	0	0	0	0	0
2003	363	23	626	596.299	-315.88	D	9.596	9.594	0.002	8.083	0	0	0	0	0	99.86
2003	364	23	682	600.626	-308.407	D	7.197	7.191	0.006	2.45	0	0	0	0	0	99.99
									0.06							
DYNO NOBEL											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	8.203	8.203	0	4.658	0	0	0	0	0	0
2003	2	23	624	596.324	-316.278	D	9.692	9.687	0.005	8.329	0	100	0	0	0	0
2003	3	23	555	601.772	-313.289	D	8.081	8.06	0.02	4.333	0	100	0	0	0	0
2003	4	23	1	596.558	-316.101	D	7.108	7.108	0	2.278	0	0	0	0	0	0
2003	5	23	1	596.558	-316.101	D	7.432	7.432	0	2.955	0	0	0	0	0	0
2003	6	23	521	602.866	-306.052	D	7.824	7.821	0.003	3.798	0	99.99	0	0	0	0
2003	7	23	545	603.234	-311.991	D	8.292	8.285	0.008	4.847	0	99.99	0	0	0	0
2003	8	23	1	596.558	-316.101	D	7.013	7.013	0	2.085	0	0	0	0	0	0
2003	9	23	517	602.805	-305.061	D	6.933	6.933	0	1.923	0	31.31	0	0	0	0
2003	10	23	1	596.558	-316.101	D	6.784	6.784	0	1.623	0	0	0	0	0	0
2003	11	23	1	596.558	-316.101	D	6.589	6.589	0	1.238	0	0	0	0	0	0
2003	12	23	521	602.866	-306.052	D	6.535	6.533	0.002	1.13	0	99.97	0	0	0	0
2003	13	23	491	603.207	-311.591	D	6.689	6.689	0	1.435	0	99.84	0	0	0	0
2003	14	23	517	602.805	-305.061	D	7.687	7.68	0.007	3.49	0	99.99	0	0	0	0
2003	15	23	548	603.28	-312.734	D	6.704	6.703	0.001	1.463	0	100.19	0	0	0	0
2003	16	23	688	601.298	-307.191	D	7.865	7.855	0.01	3.874	0	99.99	0	0	0	0
2003	17	23	517	602.805	-305.061	D	7.499	7.497	0.003	3.094	0	99.98	0	0	0	0
2003	18	23	521	602.866	-306.052	D	7.341	7.341	0	2.764	0	108.73	0	0	0	0
2003	19	23	1	596.558	-316.101	D	7.45	7.45	0	2.995	0	0	0	0	0	0
2003	20	23	517	602.805	-305.061	D	6.924	6.921	0.004	1.897	0	100.03	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	21	23	211	600.245	-312.069	D	6.975	6.962	0.012	1.982	0	100	0	0	0	0
2003	22	23	625	596.311	-316.079	D	7.394	7.394	0	2.876	0	98.02	0	0	0	0
2003	23	23	624	596.324	-316.278	D	7.297	7.283	0.014	2.642	0	100	0	0	0	0
2003	24	23	548	603.28	-312.734	D	6.961	6.956	0.005	1.969	0	99.98	0	0	0	0
2003	25	23	548	603.28	-312.734	D	6.599	6.598	0.001	1.257	0	100.05	0	0	0	0
2003	26	23	517	602.805	-305.061	D	7.049	7.027	0.022	2.112	0	100	0	0	0	0
2003	27	23	677	600.05	-309.264	D	6.996	6.985	0.011	2.028	0	99.97	0	0	0	0
2003	28	23	517	602.805	-305.061	D	7.198	7.197	0	2.464	0	99.74	0	0	0	0
2003	29	23	637	596.267	-315.066	D	9.389	9.363	0.026	7.479	0	100	0	0	0	0
2003	30	23	1	596.558	-316.101	D	8.757	8.757	0	5.966	0	0	0	0	0	0
2003	31	23	1	596.558	-316.101	D	8.624	8.624	0	5.646	0	0	0	0	0	0
2003	32	23	1	596.558	-316.101	D	8.682	8.682	0	5.785	0	0	0	0	0	0
2003	33	23	1	596.558	-316.101	D	7.359	7.359	0	2.802	0	0	0	0	0	0
2003	34	23	1	596.558	-316.101	D	10.197	10.197	0	9.721	0	0	0	0	0	0
2003	35	23	1	596.558	-316.101	D	7.15	7.15	0	2.365	0	0	0	0	0	0
2003	36	23	520	602.851	-305.804	D	6.573	6.565	0.008	1.192	0	100.02	0	0	0	0
2003	37	23	517	602.805	-305.061	D	8.768	8.748	0.02	5.944	0	99.98	0	0	0	0
2003	38	23	517	602.805	-305.061	D	8.246	8.207	0.039	4.668	0	100	0	0	0	0
2003	39	23	1	596.558	-316.101	D	7.124	7.124	0	2.312	0	0	0	0	0	0
2003	40	23	517	602.805	-305.061	D	7.577	7.577	0	3.265	0	99.79	0	0	0	0
2003	41	23	1	596.558	-316.101	D	9.464	9.464	0	7.743	0	0	0	0	0	0
2003	42	23	517	602.805	-305.061	D	8.333	8.332	0	4.957	0	99.81	0	0	0	0
2003	43	23	548	603.28	-312.734	D	6.724	6.723	0	1.503	0	99.83	0	0	0	0
2003	44	23	1	596.558	-316.101	D	6.533	6.533	0	1.131	0	0	0	0	0	0
2003	45	23	1	596.558	-316.101	D	9.459	9.459	0	7.729	0	0	0	0	0	0
2003	46	23	1	596.558	-316.101	D	9.839	9.839	0	8.736	0	0	0	0	0	0
2003	47	23	1	596.558	-316.101	D	8.415	8.415	0	5.15	0	0	0	0	0	0
2003	48	23	637	596.267	-315.066	D	7.789	7.785	0.004	3.72	0	100.02	0	0	0	0
2003	49	23	517	602.805	-305.061	D	9.078	9.051	0.027	6.69	0	99.99	0	0	0	0
2003	50	23	517	602.805	-305.061	D	9.176	9.175	0.001	7.001	0	99.99	0	0	0	0
2003	51	23	517	602.805	-305.061	D	9.481	9.465	0.016	7.743	0	99.99	0	0	0	0
2003	52	23	624	596.324	-316.278	D	9.593	9.592	0.001	8.077	0	99.47	0	0	0	0
2003	53	23	517	602.805	-305.061	D	9.842	9.84	0.002	8.738	0	99.97	0	0	0	0
2003	54	23	517	602.805	-305.061	D	7.834	7.821	0.014	3.798	0	99.99	0	0	0	0
2003	55	23	624	596.324	-316.278	D	8.661	8.632	0.029	5.664	0	100	0	0	0	0
2003	56	23	637	596.267	-315.066	D	6.926	6.921	0.005	1.898	0	99.98	0	0	0	0
2003	57	23	1	596.558	-316.101	D	7.16	7.16	0	2.386	0	95.52	0	0	0	0
2003	58	23	1	596.558	-316.101	D	8.135	8.135	0	4.503	0	99.65	0	0	0	0
2003	59	23	1	596.558	-316.101	D	9.036	9.036	0	6.651	0	99.24	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	60	23	674	599.777	-309.742	D	8.006	8.005	0.001	4.209	0	99.92	0	0	0	0
2003	61	23	521	602.866	-306.052	D	8.891	8.869	0.022	6.239	0	99.99	0	0	0	0
2003	62	23	544	603.219	-311.745	D	7.767	7.767	0	3.679	0	98.85	0	0	0	0
2003	63	23	1	596.558	-316.101	D	6.957	6.957	0	1.97	0	0	0	0	0	0
2003	64	23	694	602.12	-306.029	D	8.9	8.827	0.073	6.135	0	100	0	0	0	0
2003	65	23	545	603.234	-311.991	D	7.581	7.544	0.037	3.195	0	99.99	0	0	0	0
2003	66	23	637	596.267	-315.066	D	7.943	7.935	0.008	4.052	0	99.97	0	0	0	0
2003	67	23	514	602.766	-305.877	D	6.962	6.962	0	1.981	0	99.5	0	0	0	0
2003	68	23	637	596.267	-315.066	D	6.932	6.929	0.003	1.914	0	99.95	0	0	0	0
2003	69	23	637	596.267	-315.066	D	6.633	6.622	0.01	1.304	0	100	0	0	0	0
2003	70	23	432	602.04	-306.183	D	6.529	6.528	0.001	1.121	0	99.94	0	0	0	0
2003	71	23	490	602.499	-305.648	D	6.724	6.724	0	1.505	0	99.77	0	0	0	0
2003	72	23	517	602.805	-305.061	D	8.144	8.138	0.006	4.511	0	99.98	0	0	0	0
2003	73	23	1	596.558	-316.101	D	8.021	8.021	0	4.244	0	96.09	0	0	0	0
2003	74	23	1	596.558	-316.101	D	8.547	8.547	0	5.462	0	79.1	0	0	0	0
2003	75	23	1	596.558	-316.101	D	8.614	8.614	0	5.621	0	0	0	0	0	0
2003	76	23	1	596.558	-316.101	D	8.799	8.799	0	6.066	0	0	0	0	0	0
2003	77	23	1	596.558	-316.101	D	8.797	8.797	0	6.063	0	0	0	0	0	0
2003	78	23	1	596.558	-316.101	D	9.039	9.039	0	6.66	0	0	0	0	0	0
2003	79	23	1	596.558	-316.101	D	7.788	7.788	0	3.727	0	0	0	0	0	0
2003	80	23	517	602.805	-305.061	D	8.906	8.892	0.014	6.294	0	100	0	0	0	0
2003	81	23	1	596.558	-316.101	D	6.548	6.548	0	1.159	0	0	0	0	0	0
2003	82	23	1	596.558	-316.101	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2003	83	23	1	596.558	-316.101	D	6.66	6.66	0	1.378	0	0	0	0	0	0
2003	84	23	660	598.316	-311.922	D	7.664	7.645	0.019	3.413	0	100.01	0	0	0	0
2003	85	23	623	596.511	-316.262	D	8.222	8.221	0.001	4.7	0	99.74	0	0	0	0
2003	86	23	186	600.15	-314.075	D	6.652	6.652	0	1.362	0	95.45	0	0	0	0
2003	87	23	461	602.269	-305.916	D	8.497	8.497	0	5.342	0	1.57	0	0	0	0
2003	88	23	1	596.558	-316.101	D	7.65	7.65	0	3.423	0	0	0	0	0	0
2003	89	23	517	602.805	-305.061	D	6.885	6.884	0.001	1.823	0	100	0	0	0	0
2003	90	23	1	596.558	-316.101	D	6.49	6.49	0	1.046	0	0	0	0	0	0
2003	91	23	1	596.558	-316.101	D	6.687	6.687	0	1.43	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	6.835	6.835	0	1.725	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	6.998	6.998	0	2.054	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.194	7.194	0	2.457	0	0	0	0	0	0
2003	95	23	460	602.289	-306.164	D	7.244	7.244	0	2.56	0	87.45	0	0	0	0
2003	96	23	624	596.324	-316.278	D	8.019	8.015	0.004	4.232	0	100	0	0	0	0
2003	97	23	1	596.558	-316.101	D	9.066	9.066	0	6.726	0	0	0	0	0	0
2003	98	23	637	596.267	-315.066	D	8.6	8.482	0.118	5.307	0	100	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	99	23	624	596.324	-316.278	D	7.233	7.222	0.01	2.515	0	100	0	0	0	0
2003	100	23	1	596.558	-316.101	D	6.749	6.749	0	1.554	0	0	0	0	0	0
2003	101	23	624	596.324	-316.278	D	6.499	6.499	0	1.063	0	100.08	0	0	0	0
2003	102	23	517	602.805	-305.061	D	6.5	6.499	0.001	1.065	0	100.04	0	0	0	0
2003	103	23	490	602.499	-305.648	D	6.578	6.578	0	1.218	0	95.4	0	0	0	0
2003	104	23	308	601.506	-312.221	D	6.755	6.755	0	1.566	0	69.16	0	0	0	0
2003	105	23	1	596.558	-316.101	D	6.586	6.586	0	1.233	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2003	107	23	517	602.805	-305.061	D	8.16	8.159	0	4.559	0	99.65	0	0	0	0
2003	108	23	517	602.805	-305.061	D	7.42	7.419	0.001	2.928	0	99.97	0	0	0	0
2003	109	23	516	602.728	-305.38	D	7.538	7.538	0	3.181	0	100.09	0	0	0	0
2003	110	23	1	596.558	-316.101	D	8.832	8.832	0	6.148	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.023	7.023	0	2.105	0	0	0	0	0	0
2003	112	23	517	602.805	-305.061	D	6.996	6.981	0.015	2.02	0	99.99	0	0	0	0
2003	113	23	624	596.324	-316.278	D	6.512	6.512	0.001	1.089	0	100.07	0	0	0	0
2003	114	23	1	596.558	-316.101	D	8.947	8.947	0	6.43	0	0	0	0	0	0
2003	115	23	1	596.558	-316.101	D	9.525	9.525	0	7.902	0	0	0	0	0	0
2003	116	23	1	596.558	-316.101	D	7.167	7.167	0	2.401	0	0	0	0	0	0
2003	117	23	1	596.558	-316.101	D	6.723	6.723	0	1.502	0	0	0	0	0	0
2003	118	23	1	596.558	-316.101	D	6.997	6.997	0	2.052	0	0	0	0	0	0
2003	119	23	461	602.269	-305.916	D	8.041	8.041	0	4.291	0	101.12	0	0	0	0
2003	120	23	1	596.558	-316.101	D	7.553	7.553	0	3.215	0	0	0	0	0	0
2003	121	23	1	596.558	-316.101	D	7.209	7.209	0	2.487	0	0	0	0	0	0
2003	122	23	632	596.27	-315.421	D	8.604	8.604	0	5.598	0	98.03	0	0	0	0
2003	123	23	624	596.324	-316.278	D	8.205	8.197	0.008	4.644	0	99.99	0	0	0	0
2003	124	23	461	602.269	-305.916	D	8.002	8.002	0	4.201	0	99.62	0	0	0	0
2003	125	23	186	600.15	-314.075	D	8.291	8.291	0	4.862	0	60.16	0	0	0	0
2003	126	23	1	596.558	-316.101	D	8.709	8.709	0	5.849	0	0	0	0	0	0
2003	127	23	219	600.092	-310.082	D	8.525	8.525	0	5.409	0	91.87	0	0	0	0
2003	128	23	517	602.805	-305.061	D	7.805	7.804	0.001	3.761	0	99.95	0	0	0	0
2003	129	23	675	599.827	-309.554	D	8.769	8.769	0	5.994	0	69.12	0	0	0	0
2003	130	23	1	596.558	-316.101	D	8.133	8.133	0	4.497	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.39	7.39	0	2.868	0	0	0	0	0	0
2003	132	23	1	596.558	-316.101	D	6.586	6.586	0	1.233	0	0	0	0	0	0
2003	133	23	1	596.558	-316.101	D	6.546	6.546	0	1.156	0	0	0	0	0	0
2003	134	23	1	596.558	-316.101	D	7.377	7.377	0	2.84	0	0	0	0	0	0
2003	135	23	1	596.558	-316.101	D	8.809	8.809	0	6.091	0	0	0	0	0	0
2003	136	23	517	602.805	-305.061	D	8.706	8.706	0	5.842	0	99.66	0	0	0	0
2003	137	23	461	602.269	-305.916	D	9.978	9.978	0	9.113	0	78.44	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	138	23	107	598.487	-311.954	D	9.188	9.188	0	7.032	0	96.25	0	0	0	0
2003	139	23	1	596.558	-316.101	D	8.711	8.711	0	5.854	0	0	0	0	0	0
2003	140	23	521	602.866	-306.052	D	8.696	8.656	0.04	5.721	0	100	0	0	0	0
2003	141	23	623	596.511	-316.262	D	6.778	6.778	0	1.612	0	99.49	0	0	0	0
2003	142	23	1	596.558	-316.101	D	6.836	6.836	0	1.727	0	0	0	0	0	0
2003	143	23	1	596.558	-316.101	D	6.683	6.683	0	1.423	0	91.12	0	0	0	0
2003	144	23	517	602.805	-305.061	D	6.735	6.735	0	1.526	0	100.41	0	0	0	0
2003	145	23	517	602.805	-305.061	D	8.523	8.513	0.01	5.381	0	99.99	0	0	0	0
2003	146	23	1	596.558	-316.101	D	7.338	7.338	0	2.757	0	99.62	0	0	0	0
2003	147	23	107	598.487	-311.954	D	6.85	6.85	0	1.755	0	57.08	0	0	0	0
2003	148	23	517	602.805	-305.061	D	6.658	6.658	0	1.375	0	98.74	0	0	0	0
2003	149	23	525	602.928	-307.042	D	7.303	7.295	0.008	2.667	0	100	0	0	0	0
2003	150	23	1	596.558	-316.101	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	151	23	513	602.785	-306.126	D	7.03	7.03	0	2.119	0	96.49	0	0	0	0
2003	152	23	1	596.558	-316.101	D	7.216	7.216	0	2.503	0	32.89	0	0	0	0
2003	153	23	1	596.558	-316.101	D	7.678	7.678	0	3.485	0	0	0	0	0	0
2003	154	23	623	596.511	-316.262	D	9.251	9.251	0	7.192	0	96.39	0	0	0	0
2003	155	23	676	599.876	-309.365	D	8.023	7.983	0.039	4.16	0	100	0	0	0	0
2003	156	23	517	602.805	-305.061	D	6.961	6.961	0	1.978	0	100.03	0	0	0	0
2003	157	23	461	602.269	-305.916	D	6.841	6.841	0	1.737	0	99.95	0	0	0	0
2003	158	23	517	602.805	-305.061	D	8.418	8.418	0.001	5.156	0	99.8	0	0	0	0
2003	159	23	186	600.15	-314.075	D	6.813	6.813	0	1.681	0	101.15	0	0	0	0
2003	160	23	1	596.558	-316.101	D	6.628	6.628	0	1.315	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.047	7.047	0	2.154	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	8.113	8.113	0	4.453	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	9.405	9.381	0.024	7.527	0	99.99	0	0	0	0
2003	164	23	1	596.558	-316.101	D	9.343	9.343	0	7.429	0	0	0	0	0	0
2003	165	23	517	602.805	-305.061	D	9.108	9.092	0.016	6.791	0	99.99	0	0	0	0
2003	166	23	620	597.072	-316.212	D	8.166	8.166	0	4.573	0	99.42	0	0	0	0
2003	167	23	186	600.15	-314.075	D	8.298	8.298	0	4.878	0	98.26	0	0	0	0
2003	168	23	1	596.558	-316.101	D	7.28	7.28	0	2.635	0	101.78	0	0	0	0
2003	169	23	1	596.558	-316.101	D	7.188	7.188	0	2.445	0	0	0	0	0	0
2003	170	23	191	600.054	-312.833	D	7.168	7.168	0	2.402	0	99.62	0	0	0	0
2003	171	23	603	598.68	-316.244	D	7.785	7.781	0.004	3.709	0	99.99	0	0	0	0
2003	172	23	1	596.558	-316.101	D	6.706	6.706	0	1.469	0	0	0	0	0	0
2003	173	23	1	596.558	-316.101	D	6.717	6.717	0	1.49	0	0	0	0	0	0
2003	174	23	1	596.558	-316.101	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2003	175	23	1	596.558	-316.101	D	6.722	6.722	0	1.501	0	0	0	0	0	0
2003	176	23	1	596.558	-316.101	D	7.078	7.078	0	2.217	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	177	23	1	596.558	-316.101	D	8.459	8.459	0	5.252	0	0	0	0	0	0
2003	178	23	548	603.28	-312.734	D	6.912	6.912	0	1.879	0	100.25	0	0	0	0
2003	179	23	212	600.226	-311.82	D	6.644	6.644	0	1.347	0	88.37	0	0	0	0
2003	180	23	186	600.15	-314.075	D	6.628	6.628	0	1.316	0	76.8	0	0	0	0
2003	181	23	326	601.161	-307.751	D	7.21	7.21	0	2.49	0	80.06	0	0	0	0
2003	182	23	108	598.468	-311.706	D	8.379	8.379	0	5.066	0	95.13	0	0	0	0
2003	183	23	517	602.805	-305.061	D	8.7	8.7	0	5.828	0	92.17	0	0	0	0
2003	184	23	378	601.601	-306.966	D	7.432	7.432	0	2.957	0	90.28	0	0	0	0
2003	185	23	1	596.558	-316.101	D	7.551	7.551	0	3.211	0	0	0	0	0	0
2003	186	23	1	596.558	-316.101	D	7.925	7.925	0	4.03	0	0	0	0	0	0
2003	187	23	1	596.558	-316.101	D	8.088	8.088	0	4.396	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	8.182	8.182	0	4.611	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.198	7.198	0	2.466	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.669	7.669	0	3.465	0	0	0	0	0	0
2003	192	23	1	596.558	-316.101	D	6.901	6.901	0	1.858	0	0	0	0	0	0
2003	193	23	1	596.558	-316.101	D	7.001	7.001	0	2.059	0	0	0	0	0	0
2003	194	23	694	602.12	-306.029	D	7.098	7.098	0	2.259	0	99.57	0	0	0	0
2003	195	23	1	596.558	-316.101	D	7	7	0	2.058	0	100.84	0	0	0	0
2003	196	23	521	602.866	-306.052	D	7.644	7.644	0	3.412	0	91.59	0	0	0	0
2003	197	23	521	602.866	-306.052	D	7.455	7.454	0.001	3.003	0	100.01	0	0	0	0
2003	198	23	517	602.805	-305.061	D	6.938	6.937	0	1.931	0	99.55	0	0	0	0
2003	199	23	516	602.728	-305.38	D	7.315	7.315	0	2.709	0	98.65	0	0	0	0
2003	200	23	433	602.806	-312.871	D	8.797	8.797	0	6.062	0	99.14	0	0	0	0
2003	201	23	1	596.558	-316.101	D	7.89	7.89	0	3.951	0	0	0	0	0	0
2003	202	23	1	596.558	-316.101	D	8.108	8.108	0	4.441	0	0	0	0	0	0
2003	203	23	517	602.805	-305.061	D	7.087	7.085	0.002	2.232	0	99.97	0	0	0	0
2003	204	23	624	596.324	-316.278	D	7.251	7.251	0	2.576	0	100.16	0	0	0	0
2003	205	23	107	598.487	-311.954	D	6.751	6.751	0	1.557	0	24.39	0	0	0	0
2003	206	23	5	596.481	-315.108	D	6.787	6.787	0	1.63	0	89.79	0	0	0	0
2003	207	23	1	596.558	-316.101	D	6.824	6.824	0	1.704	0	0	0	0	0	0
2003	208	23	1	596.558	-316.101	D	7.426	7.426	0	2.944	0	0	0	0	0	0
2003	209	23	1	596.558	-316.101	D	8.106	8.106	0	4.438	0	0	0	0	0	0
2003	210	23	517	602.805	-305.061	D	9.204	9.165	0.039	6.975	0	99.99	0	0	0	0
2003	211	23	624	596.324	-316.278	D	8.031	8.027	0.004	4.258	0	99.97	0	0	0	0
2003	212	23	623	596.511	-316.262	D	8.761	8.76	0.001	5.974	0	99.73	0	0	0	0
2003	213	23	433	602.806	-312.871	D	8.282	8.282	0	4.84	0	98.93	0	0	0	0
2003	214	23	461	602.269	-305.916	D	8.5	8.5	0	5.35	0	96.41	0	0	0	0
2003	215	23	1	596.558	-316.101	D	9.149	9.149	0	6.935	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	216	23	1	596.558	-316.101	D	9.097	9.097	0	6.805	0	0	0	0	0	0
2003	217	23	517	602.805	-305.061	D	8.499	8.493	0.006	5.333	0	100	0	0	0	0
2003	218	23	546	603.249	-312.239	D	8.043	8.042	0	4.293	0	100.1	0	0	0	0
2003	219	23	546	603.249	-312.239	D	8.026	8.025	0	4.255	0	99.96	0	0	0	0
2003	220	23	405	602.557	-312.89	D	7.275	7.275	0	2.625	0	98.45	0	0	0	0
2003	221	23	1	596.558	-316.101	D	7.507	7.507	0	3.116	0	0	0	0	0	0
2003	222	23	1	596.558	-316.101	D	7.339	7.339	0	2.758	0	0	0	0	0	0
2003	223	23	1	596.558	-316.101	D	7.083	7.083	0	2.228	0	0	0	0	0	0
2003	224	23	1	596.558	-316.101	D	7.389	7.389	0	2.864	0	0	0	0	0	0
2003	225	23	1	596.558	-316.101	D	8.096	8.096	0	4.413	0	0	0	0	0	0
2003	226	23	1	596.558	-316.101	D	9.248	9.248	0	7.185	0	0	0	0	0	0
2003	227	23	1	596.558	-316.101	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2003	228	23	512	602.805	-306.374	D	7.04	7.04	0	2.14	0	94.7	0	0	0	0
2003	229	23	461	602.269	-305.916	D	7.093	7.093	0	2.248	0	83.37	0	0	0	0
2003	230	23	516	602.728	-305.38	D	7.623	7.623	0	3.366	0	99.44	0	0	0	0
2003	231	23	5	596.481	-315.108	D	7.734	7.733	0.001	3.606	0	99.79	0	0	0	0
2003	232	23	624	596.324	-316.278	D	8.368	8.368	0.001	5.039	0	99.77	0	0	0	0
2003	233	23	107	598.487	-311.954	D	7.972	7.971	0	4.133	0	99.6	0	0	0	0
2003	234	23	462	603.035	-312.603	D	7.785	7.785	0	3.719	0	99.24	0	0	0	0
2003	235	23	563	600.143	-314.135	D	7.809	7.806	0.003	3.766	0	99.92	0	0	0	0
2003	236	23	624	596.324	-316.278	D	6.982	6.982	0	2.021	0	96.23	0	0	0	0
2003	237	23	212	600.226	-311.82	D	6.759	6.759	0	1.575	0	85.22	0	0	0	0
2003	238	23	461	602.269	-305.916	D	7.057	7.057	0	2.174	0	91.2	0	0	0	0
2003	239	23	461	602.269	-305.916	D	7.871	7.871	0	3.91	0	66.87	0	0	0	0
2003	240	23	1	596.558	-316.101	D	8.693	8.693	0	5.812	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	8.88	8.88	0	6.264	0	0	0	0	0	0
2003	242	23	490	602.499	-305.648	D	9.222	9.222	0	7.12	0	98.68	0	0	0	0
2003	243	23	461	602.269	-305.916	D	9.55	9.55	0	7.967	0	97.71	0	0	0	0
2003	244	23	1	596.558	-316.101	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2003	245	23	517	602.805	-305.061	D	10.018	10.018	0	9.225	0	96.38	0	0	0	0
2003	246	23	690	601.572	-306.804	D	9.233	9.231	0.002	7.142	0	99.81	0	0	0	0
2003	247	23	676	599.876	-309.365	D	7.594	7.562	0.032	3.234	0	100	0	0	0	0
2003	248	23	1	596.558	-316.101	D	6.911	6.911	0	1.879	0	0	0	0	0	0
2003	249	23	1	596.558	-316.101	D	6.941	6.941	0	1.937	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.013	7.013	0	2.084	0	0	0	0	0	0
2003	251	23	1	596.558	-316.101	D	6.958	6.958	0	1.973	0	0	0	0	0	0
2003	252	23	1	596.558	-316.101	D	7.199	7.199	0	2.468	0	0	0	0	0	0
2003	253	23	1	596.558	-316.101	D	7.08	7.08	0	2.221	0	0	0	0	0	0
2003	254	23	1	596.558	-316.101	D	7.138	7.138	0	2.34	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	255	23	1	596.558	-316.101	D	7.647	7.647	0	3.418	0	0	0	0	0	0
2003	256	23	1	596.558	-316.101	D	8.172	8.172	0	4.586	0	0	0	0	0	0
2003	257	23	517	602.805	-305.061	D	9.311	9.311	0	7.345	0	100	0	0	0	0
2003	258	23	1	596.558	-316.101	D	6.879	6.879	0	1.813	0	0	0	0	0	0
2003	259	23	186	600.15	-314.075	D	6.649	6.649	0	1.357	0	22.65	0	0	0	0
2003	260	23	107	598.487	-311.954	D	6.746	6.746	0	1.547	0	93.2	0	0	0	0
2003	261	23	107	598.487	-311.954	D	7.131	7.131	0	2.326	0	87.35	0	0	0	0
2003	262	23	186	600.15	-314.075	D	7.265	7.265	0	2.604	0	86.55	0	0	0	0
2003	263	23	517	602.805	-305.061	D	6.67	6.667	0.003	1.391	0	99.95	0	0	0	0
2003	264	23	624	596.324	-316.278	D	6.714	6.714	0	1.485	0	102.29	0	0	0	0
2003	265	23	517	602.805	-305.061	D	9.094	9.094	0	6.797	0	97.26	0	0	0	0
2003	266	23	517	602.805	-305.061	D	7.171	7.171	0	2.41	0	99.99	0	0	0	0
2003	267	23	511	602.824	-306.623	D	6.726	6.726	0	1.509	0	90.71	0	0	0	0
2003	268	23	517	602.805	-305.061	D	6.996	6.995	0.001	2.048	0	100.02	0	0	0	0
2003	269	23	212	600.226	-311.82	D	6.682	6.682	0	1.421	0	95.81	0	0	0	0
2003	270	23	517	602.805	-305.061	D	7.727	7.717	0.01	3.571	0	99.99	0	0	0	0
2003	271	23	1	596.558	-316.101	D	6.945	6.945	0	1.946	0	0	0	0	0	0
2003	272	23	632	596.27	-315.421	D	6.604	6.599	0.005	1.259	0	100	0	0	0	0
2003	273	23	517	602.805	-305.061	D	6.609	6.608	0.001	1.276	0	100.01	0	0	0	0
2003	274	23	517	602.805	-305.061	D	9.113	9.091	0.022	6.79	0	99.99	0	0	0	0
2003	275	23	637	596.267	-315.066	D	6.57	6.569	0	1.201	0	99.99	0	0	0	0
2003	276	23	326	601.161	-307.751	D	6.523	6.523	0	1.11	0	91.58	0	0	0	0
2003	277	23	1	596.558	-316.101	D	6.99	6.99	0	2.038	0	0	0	0	0	0
2003	278	23	405	602.557	-312.89	D	6.655	6.655	0	1.367	0	89.4	0	0	0	0
2003	279	23	548	603.28	-312.734	D	8.767	8.765	0.002	5.986	0	99.9	0	0	0	0
2003	280	23	461	602.269	-305.916	D	6.891	6.891	0	1.838	0	98.41	0	0	0	0
2003	281	23	203	599.824	-309.852	D	6.89	6.89	0	1.835	0	88.97	0	0	0	0
2003	282	23	187	600.131	-313.827	D	8.17	8.17	0	4.582	0	49.32	0	0	0	0
2003	283	23	1	596.558	-316.101	D	9.541	9.541	0	7.942	0	0	0	0	0	0
2003	284	23	1	596.558	-316.101	D	8.585	8.585	0	5.552	0	0	0	0	0	0
2003	285	23	211	600.245	-312.069	D	7.535	7.534	0.001	3.173	0	100.01	0	0	0	0
2003	286	23	623	596.511	-316.262	D	6.668	6.668	0	1.394	0	96.59	0	0	0	0
2003	287	23	521	602.866	-306.052	D	7.977	7.976	0.001	4.143	0	99.98	0	0	0	0
2003	288	23	505	602.939	-308.113	D	6.795	6.795	0	1.646	0	97.73	0	0	0	0
2003	289	23	1	596.558	-316.101	D	6.667	6.667	0	1.393	0	0	0	0	0	0
2003	290	23	517	602.805	-305.061	D	8.841	8.834	0.007	6.152	0	99.98	0	0	0	0
2003	291	23	691	601.709	-306.61	D	6.615	6.615	0	1.29	0	99.85	0	0	0	0
2003	292	23	1	596.558	-316.101	D	6.743	6.743	0	1.541	0	97.22	0	0	0	0
2003	293	23	1	596.558	-316.101	D	6.849	6.849	0	1.754	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	294	23	1	596.558	-316.101	D	7.126	7.126	0	2.316	0	0	0	0	0	0
2003	295	23	626	596.299	-315.88	D	6.63	6.629	0	1.318	0	99.5	0	0	0	0
2003	296	23	517	602.805	-305.061	D	6.676	6.676	0	1.41	0	99.58	0	0	0	0
2003	297	23	624	596.324	-316.278	D	6.702	6.701	0.001	1.459	0	99.99	0	0	0	0
2003	298	23	517	602.805	-305.061	D	7.581	7.56	0.021	3.23	0	99.99	0	0	0	0
2003	299	23	548	603.28	-312.734	D	7.54	7.54	0	3.186	0	98.02	0	0	0	0
2003	300	23	548	603.28	-312.734	D	6.729	6.728	0.001	1.512	0	100	0	0	0	0
2003	301	23	546	603.249	-312.239	D	7.354	7.354	0	2.792	0	94.9	0	0	0	0
2003	302	23	1	596.558	-316.101	D	6.957	6.957	0	1.971	0	0	0	0	0	0
2003	303	23	1	596.558	-316.101	D	7.168	7.168	0	2.404	0	0	0	0	0	0
2003	304	23	1	596.558	-316.101	D	8.474	8.474	0	5.289	0	0	0	0	0	0
2003	305	23	676	599.876	-309.365	D	7.896	7.878	0.018	3.926	0	100	0	0	0	0
2003	306	23	516	602.728	-305.38	D	7.713	7.713	0	3.562	0	100.04	0	0	0	0
2003	307	23	1	596.558	-316.101	D	7.022	7.022	0	2.102	0	0	0	0	0	0
2003	308	23	1	596.558	-316.101	D	6.963	6.963	0	1.983	0	0	0	0	0	0
2003	309	23	521	602.866	-306.052	D	7.607	7.598	0.008	3.313	0	100	0	0	0	0
2003	310	23	624	596.324	-316.278	D	8.247	8.246	0	4.758	0	98.44	0	0	0	0
2003	311	23	1	596.558	-316.101	D	7.606	7.606	0	3.33	0	0	0	0	0	0
2003	312	23	1	596.558	-316.101	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	6.522	6.522	0	1.109	0	0	0	0	0	0
2003	314	23	1	596.558	-316.101	D	6.536	6.536	0	1.136	0	0	0	0	0	0
2003	315	23	1	596.558	-316.101	D	8.014	8.014	0	4.229	0	0	0	0	0	0
2003	316	23	1	596.558	-316.101	D	9.179	9.179	0	7.011	0	0	0	0	0	0
2003	317	23	1	596.558	-316.101	D	6.529	6.529	0	1.122	0	0	0	0	0	0
2003	318	23	491	603.207	-311.591	D	6.582	6.582	0	1.225	0	99.11	0	0	0	0
2003	319	23	520	602.851	-305.804	D	9.323	9.323	0	7.376	0	99.52	0	0	0	0
2003	320	23	1	596.558	-316.101	D	9.542	9.542	0	7.944	0	0	0	0	0	0
2003	321	23	1	596.558	-316.101	D	9.739	9.739	0	8.468	0	0	0	0	0	0
2003	322	23	1	596.558	-316.101	D	10.113	10.113	0	9.486	0	0	0	0	0	0
2003	323	23	517	602.805	-305.061	D	8.001	7.977	0.025	4.145	0	100	0	0	0	0
2003	324	23	1	596.558	-316.101	D	6.99	6.99	0	2.039	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.219	7.219	0	2.508	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	9.046	9.046	0	6.676	0	0	0	0	0	0
2003	327	23	516	602.728	-305.38	D	9.23	9.23	0	7.139	0	97.69	0	0	0	0
2003	328	23	436	602.748	-312.126	D	7.238	7.238	0	2.549	0	13.4	0	0	0	0
2003	329	23	1	596.558	-316.101	D	6.84	6.84	0	1.735	0	0	0	0	0	0
2003	330	23	1	596.558	-316.101	D	7.124	7.124	0	2.311	0	0	0	0	0	0
2003	331	23	517	602.805	-305.061	D	8.974	8.956	0.018	6.452	0	100	0	0	0	0
2003	332	23	548	603.28	-312.734	D	7.561	7.535	0.025	3.177	0	100	0	0	0	0

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	333	23	1	596.558	-316.101	D	6.821	6.821	0	1.696	0	0	0	0	0	0
2003	334	23	1	596.558	-316.101	D	6.842	6.842	0	1.739	0	0	0	0	0	0
2003	335	23	637	596.267	-315.066	D	6.785	6.78	0.005	1.616	0	99.95	0	0	0	0
2003	336	23	548	603.28	-312.734	D	6.498	6.496	0.002	1.059	0	99.97	0	0	0	0
2003	337	23	624	596.324	-316.278	D	7.761	7.76	0.001	3.665	0	99.95	0	0	0	0
2003	338	23	517	602.805	-305.061	D	9.624	9.623	0.001	8.157	0	100.01	0	0	0	0
2003	339	23	517	602.805	-305.061	D	8.41	8.375	0.035	5.056	0	100	0	0	0	0
2003	340	23	517	602.805	-305.061	D	8.308	8.276	0.032	4.827	0	100	0	0	0	0
2003	341	23	517	602.805	-305.061	D	6.714	6.706	0.008	1.468	0	100	0	0	0	0
2003	342	23	1	596.558	-316.101	D	7.207	7.207	0	2.484	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	9.465	9.465	0	7.743	0	0	0	0	0	0
2003	344	23	514	602.766	-305.877	D	9.172	9.139	0.033	6.909	0	100	0	0	0	0
2003	345	23	1	596.558	-316.101	D	7.698	7.698	0	3.528	0	0	0	0	0	0
2003	346	23	517	602.805	-305.061	D	7.223	7.197	0.026	2.462	0	100	0	0	0	0
2003	347	23	631	596.276	-315.551	D	8.391	8.391	0	5.094	0	99.08	0	0	0	0
2003	348	23	624	596.324	-316.278	D	9.52	9.519	0.001	7.884	0	99.95	0	0	0	0
2003	349	23	1	596.558	-316.101	D	8.691	8.691	0	5.807	0	0	0	0	0	0
2003	350	23	1	596.558	-316.101	D	8.203	8.203	0	4.659	0	0	0	0	0	0
2003	351	23	1	596.558	-316.101	D	7.45	7.45	0	2.994	0	0	0	0	0	0
2003	352	23	1	596.558	-316.101	D	8.024	8.024	0	4.251	0	0	0	0	0	0
2003	353	23	1	596.558	-316.101	D	8.047	8.047	0	4.304	0	0	0	0	0	0
2003	354	23	517	602.805	-305.061	D	7.119	7.118	0.001	2.3	0	99.89	0	0	0	0
2003	355	23	430	602.079	-306.68	D	6.66	6.66	0	1.378	0	95.82	0	0	0	0
2003	356	23	1	596.558	-316.101	D	8.674	8.674	0	5.764	0	0	0	0	0	0
2003	357	23	637	596.267	-315.066	D	8.938	8.915	0.023	6.352	0	100	0	0	0	0
2003	358	23	1	596.558	-316.101	D	7.495	7.495	0	3.091	0	0	0	0	0	0
2003	359	23	517	602.805	-305.061	D	6.778	6.778	0	1.612	0	99.89	0	0	0	0
2003	360	23	520	602.851	-305.804	D	6.838	6.837	0.001	1.73	0	99.79	0	0	0	0
2003	361	23	517	602.805	-305.061	D	6.851	6.851	0	1.757	0	99.76	0	0	0	0
2003	362	23	1	596.558	-316.101	D	8.349	8.349	0	4.997	0	0	0	0	0	0
2003	363	23	1	596.558	-316.101	D	9.594	9.594	0	8.083	0	0	0	0	0	0
2003	364	23	1	596.558	-316.101	D	7.176	7.176	0	2.418	0	0	0	0	0	0
									0.118							
MLC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDIN	ATES (km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	637	596.267	-315.066	D	8.203	8.203	0	4.658	6.49	84.35	0	0	0	8.94

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	2	23	637	596.267	-315.066	D	9.723	9.687	0.036	8.329	17.47	80.17	0	0	0	2.36
2003	3	23	1	596.558	-316.101	D	8.04	8.04	0	4.288	0	0	0	0	0	0
2003	4	23	1	596.558	-316.101	D	7.108	7.108	0	2.278	0	0	0	0	0	0
2003	5	23	1	596.558	-316.101	D	7.432	7.432	0	2.955	0	0	0	0	0	0
2003	6	23	1	596.558	-316.101	D	7.788	7.788	0	3.726	0	0	0	0	0	0
2003	7	23	1	596.558	-316.101	D	8.223	8.223	0	4.703	0	0	0	0	0	0
2003	8	23	1	596.558	-316.101	D	7.013	7.013	0	2.085	0	0	0	0	0	0
2003	9	23	1	596.558	-316.101	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2003	10	23	1	596.558	-316.101	D	6.784	6.784	0	1.623	0	0	0	0	0	0
2003	11	23	1	596.558	-316.101	D	6.589	6.589	0	1.238	0	0	0	0	0	0
2003	12	23	557	601.32	-313.419	D	6.573	6.536	0.037	1.136	6.25	79.92	0	0	0	13.83
2003	13	23	517	602.805	-305.061	D	6.682	6.68	0.002	1.417	14.22	80.94	0	0	0	4.87
2003	14	23	1	596.558	-316.101	D	7.656	7.656	0	3.436	0	0	0	0	0	0
2003	15	23	548	603.28	-312.734	D	6.715	6.703	0.011	1.463	10.05	81.59	0	0	0	8.37
2003	16	23	517	602.805	-305.061	D	7.873	7.861	0.012	3.886	29.39	65.73	0	0	0	4.88
2003	17	23	1	596.558	-316.101	D	7.478	7.478	0	3.055	0	0	0	0	0	0
2003	18	23	1	596.558	-316.101	D	7.336	7.336	0	2.754	0	0	0	0	0	0
2003	19	23	1	596.558	-316.101	D	7.45	7.45	0	2.995	0	0	0	0	0	0
2003	20	23	517	602.805	-305.061	D	6.927	6.921	0.007	1.897	25.49	62.66	0	0	0	11.84
2003	21	23	564	600.138	-314.033	D	6.977	6.962	0.015	1.982	23.57	74.22	0	0	0	2.22
2003	22	23	637	596.267	-315.066	D	7.419	7.394	0.025	2.876	9.77	78.9	0	0	0	11.33
2003	23	23	1	596.558	-316.101	D	7.283	7.283	0	2.642	0	0	0	0	0	0
2003	24	23	557	601.32	-313.419	D	6.985	6.956	0.029	1.969	8.09	84.88	0	0	0	7.03
2003	25	23	548	603.28	-312.734	D	6.6	6.598	0.002	1.257	17.67	77.73	0	0	0	4.65
2003	26	23	437	602.729	-311.878	D	7.001	7.001	0	2.059	29.11	69.22	0	0	0	3.27
2003	27	23	681	600.53	-308.617	D	7.024	6.985	0.039	2.028	6.46	82.67	0	0	0	10.87
2003	28	23	517	602.805	-305.061	D	7.198	7.197	0.001	2.464	18.9	77.46	0	0	0	3.5
2003	29	23	637	596.267	-315.066	D	9.381	9.363	0.018	7.479	14.15	81.06	0	0	0	4.78
2003	30	23	637	596.267	-315.066	D	8.763	8.757	0.005	5.966	20.95	74.92	0	0	0	4.16
2003	31	23	5	596.481	-315.108	D	8.624	8.624	0	5.646	25.05	73.35	0	0	0	2.39
2003	32	23	1	596.558	-316.101	D	8.682	8.682	0	5.785	0	0	0	0	0	0
2003	33	23	1	596.558	-316.101	D	7.359	7.359	0	2.802	0	0	0	0	0	0
2003	34	23	1	596.558	-316.101	D	10.197	10.197	0	9.721	0	0	0	0	0	0
2003	35	23	1	596.558	-316.101	D	7.15	7.15	0	2.365	0	0	0	0	0	0
2003	36	23	548	603.28	-312.734	D	6.576	6.554	0.021	1.171	8.51	77.19	0	0	0	14.29
2003	37	23	517	602.805	-305.061	D	8.753	8.748	0.005	5.944	23.74	72.7	0	0	0	3.51
2003	38	23	656	597.971	-312.292	D	8.255	8.182	0.072	4.611	23.53	74.53	0	0	0	1.95
2003	39	23	1	596.558	-316.101	D	7.124	7.124	0	2.312	0	0	0	0	0	0
2003	40	23	517	602.805	-305.061	D	7.58	7.577	0.003	3.265	15.01	78.77	0	0	0	6.2

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	41	23	1	596.558	-316.101	D	9.464	9.464	0	7.743	0	0	0	0	0	0
2003	42	23	1	596.558	-316.101	D	8.22	8.22	0	4.698	0	0	0	0	0	0
2003	43	23	548	603.28	-312.734	D	6.725	6.723	0.002	1.503	12.09	78.19	0	0	0	9.71
2003	44	23	353	602.08	-313.177	D	6.538	6.538	0	1.139	27.4	59.21	0	0	0	8.98
2003	45	23	461	602.269	-305.916	D	9.432	9.432	0	7.66	27.79	39.58	0	0	0	0.46
2003	46	23	461	602.269	-305.916	D	9.807	9.807	0	8.651	10.47	12.93	0	0	0	0.1
2003	47	23	660	598.316	-311.922	D	8.513	8.448	0.065	5.228	35.48	61.1	0	0	0	3.43
2003	48	23	695	602.257	-305.836	D	7.993	7.869	0.124	3.904	10.53	83.3	0	0	0	6.17
2003	49	23	1	596.558	-316.101	D	9.022	9.022	0	6.617	0	0	0	0	0	0
2003	50	23	517	602.805	-305.061	D	9.181	9.175	0.006	7.001	35.84	62.93	0	0	0	1.25
2003	51	23	637	596.267	-315.066	D	9.548	9.511	0.037	7.865	29.69	69.44	0	0	0	0.87
2003	52	23	1	596.558	-316.101	D	9.592	9.592	0	8.077	0	0	0	0	0	0
2003	53	23	676	599.876	-309.365	D	9.782	9.778	0.004	8.571	7.57	86.9	0	0	0	5.53
2003	54	23	624	596.324	-316.278	D	7.814	7.801	0.013	3.755	23.55	70.17	0	0	0	6.27
2003	55	23	624	596.324	-316.278	D	8.664	8.632	0.032	5.664	16.88	81.07	0	0	0	2.05
2003	56	23	676	599.876	-309.365	D	6.959	6.93	0.029	1.916	5.85	80.58	0	0	0	13.56
2003	57	23	656	597.971	-312.292	D	7.163	7.16	0.003	2.386	25.74	70.95	0	0	0	3.34
2003	58	23	695	602.257	-305.836	D	8.159	8.154	0.004	4.547	33.99	64.73	0	0	0	1.24
2003	59	23	637	596.267	-315.066	D	9.174	9.036	0.138	6.651	19.9	77.21	0	0	0	2.9
2003	60	23	676	599.876	-309.365	D	8.11	8.005	0.105	4.209	38.4	59.96	0	0	0	1.65
2003	61	23	546	603.249	-312.239	D	8.987	8.939	0.048	6.41	51	48.37	0	0	0	0.62
2003	62	23	638	596.406	-314.894	D	7.871	7.776	0.094	3.7	8.39	88.23	0	0	0	3.38
2003	63	23	492	603.188	-311.342	D	6.966	6.966	0	1.99	44.23	50.38	0	0	0	4.77
2003	64	23	520	602.851	-305.804	D	8.812	8.79	0.022	6.044	33.04	61.96	0	0	0	4.99
2003	65	23	637	596.267	-315.066	D	7.599	7.519	0.08	3.142	27.35	68.25	0	0	0	4.41
2003	66	23	624	596.324	-316.278	D	7.943	7.935	0.008	4.052	29.6	68.95	0	0	0	1.43
2003	67	23	517	602.805	-305.061	D	6.962	6.962	0	1.981	58.42	36.04	0	0	0	5.54
2003	68	23	548	603.28	-312.734	D	6.973	6.955	0.018	1.966	13.54	71.24	0	0	0	15.2
2003	69	23	637	596.267	-315.066	D	6.663	6.622	0.041	1.304	6.26	78.97	0	0	0	14.76
2003	70	23	694	602.12	-306.029	D	6.533	6.528	0.005	1.121	26.66	66.85	0	0	0	6.48
2003	71	23	517	602.805	-305.061	D	6.724	6.724	0	1.505	43.58	51.21	0	0	0	5.21
2003	72	23	637	596.267	-315.066	D	8.024	8.018	0.006	4.238	50.91	40.26	0	0	0	8.82
2003	73	23	637	596.267	-315.066	D	8.022	8.021	0.001	4.244	26.31	66.69	0	0	0	7.01
2003	74	23	637	596.267	-315.066	D	8.548	8.547	0	5.462	33.56	64.3	0	0	0	0.85
2003	75	23	461	602.269	-305.916	D	8.643	8.643	0	5.69	51.1	27.95	0	0	0	0.83
2003	76	23	1	596.558	-316.101	D	8.799	8.799	0	6.066	0	0	0	0	0	0
2003	77	23	1	596.558	-316.101	D	8.797	8.797	0	6.063	0	0	0	0	0	0
2003	78	23	1	596.558	-316.101	D	9.039	9.039	0	6.66	0	0	0	0	0	0
2003	79	23	1	596.558	-316.101	D	7.788	7.788	0	3.727	0	0	0	0	0	0

Appendix M
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2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	80	23	624	596.324	-316.278	D	8.896	8.885	0.011	6.279	30.96	68.18	0	0	0	0.86
2003	81	23	1	596.558	-316.101	D	6.548	6.548	0	1.159	0	0	0	0	0	0
2003	82	23	1	596.558	-316.101	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2003	83	23	1	596.558	-316.101	D	6.66	6.66	0	1.378	0	0	0	0	0	0
2003	84	23	517	602.805	-305.061	D	7.662	7.653	0.009	3.431	54.8	42.8	0	0	0	2.4
2003	85	23	557	601.32	-313.419	D	8.332	8.243	0.089	4.751	8.75	87.91	0	0	0	3.34
2003	86	23	517	602.805	-305.061	D	6.642	6.641	0.001	1.341	61.67	18.68	0	0	0	19.69
2003	87	23	1	596.558	-316.101	D	8.454	8.454	0	5.242	0	0	0	0	0	0
2003	88	23	1	596.558	-316.101	D	7.65	7.65	0	3.423	0	0	0	0	0	0
2003	89	23	1	596.558	-316.101	D	6.845	6.845	0	1.745	0	0	0	0	0	0
2003	90	23	1	596.558	-316.101	D	6.49	6.49	0	1.046	0	0	0	0	0	0
2003	91	23	1	596.558	-316.101	D	6.687	6.687	0	1.43	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	6.835	6.835	0	1.725	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	6.998	6.998	0	2.054	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.194	7.194	0	2.457	0	0	0	0	0	0
2003	95	23	517	602.805	-305.061	D	7.288	7.288	0	2.652	52.3	20.77	0	0	0	26.83
2003	96	23	637	596.267	-315.066	D	8.017	8.015	0.002	4.232	39.18	48.65	0	0	0	12.17
2003	97	23	1	596.558	-316.101	D	9.066	9.066	0	6.726	0	0	0	0	0	0
2003	98	23	548	603.28	-312.734	D	8.676	8.541	0.135	5.447	12.74	83.97	0	0	0	3.29
2003	99	23	548	603.28	-312.734	D	7.263	7.252	0.012	2.577	22.19	69.49	0	0	0	8.31
2003	100	23	548	603.28	-312.734	D	6.776	6.753	0.023	1.561	12.11	66.6	0	0	0	21.3
2003	101	23	548	603.28	-312.734	D	6.538	6.502	0.037	1.069	16.32	49.28	0	0	0	34.4
2003	102	23	548	603.28	-312.734	D	6.499	6.499	0	1.064	70.2	4.67	0	0	0	24.93
2003	103	23	516	602.728	-305.38	D	6.578	6.578	0	1.218	72.81	5.89	0	0	0	20.72
2003	104	23	517	602.805	-305.061	D	6.771	6.771	0	1.597	81.73	6	0	0	0	12.35
2003	105	23	1	596.558	-316.101	D	6.586	6.586	0	1.233	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2003	107	23	623	596.511	-316.262	D	8.087	8.086	0.001	4.391	77	16.61	0	0	0	6.3
2003	108	23	695	602.257	-305.836	D	7.5	7.419	0.081	2.928	10.45	84.35	0	0	0	5.19
2003	109	23	517	602.805	-305.061	D	7.538	7.538	0.001	3.181	84.56	8.81	0	0	0	6.68
2003	110	23	1	596.558	-316.101	D	8.832	8.832	0	6.148	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.023	7.023	0	2.105	0	0	0	0	0	0
2003	112	23	513	602.785	-306.126	D	6.957	6.957	0	1.972	44.15	13.93	0	0	0	32.97
2003	113	23	517	602.805	-305.061	D	6.512	6.511	0.001	1.087	34.23	28.24	0	0	0	37.47
2003	114	23	1	596.558	-316.101	D	8.947	8.947	0	6.43	0	0	0	0	0	0
2003	115	23	517	602.805	-305.061	D	9.6	9.578	0.021	8.041	64.54	30.38	0	0	0	5.08
2003	116	23	517	602.805	-305.061	D	7.264	7.236	0.028	2.543	12.67	74.65	0	0	0	12.68
2003	117	23	2	596.539	-315.853	D	6.723	6.723	0	1.502	77.82	4	0	0	0	9.36
2003	118	23	107	598.487	-311.954	D	7.012	7.012	0	2.083	81	5.69	0	0	0	5.2

Appendix M
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2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	119	23	517	602.805	-305.061	D	8.042	8.041	0	4.291	34.81	63.12	0	0	0	1.78
2003	120	23	1	596.558	-316.101	D	7.553	7.553	0	3.215	0	0	0	0	0	0
2003	121	23	1	596.558	-316.101	D	7.209	7.209	0	2.487	0	0	0	0	0	0
2003	122	23	517	602.805	-305.061	D	8.536	8.526	0.01	5.412	44.26	49.87	0	0	0	5.86
2003	123	23	624	596.324	-316.278	D	8.202	8.197	0.005	4.644	26.97	69.59	0	0	0	3.44
2003	124	23	624	596.324	-316.278	D	7.79	7.79	0	3.73	80.15	14.16	0	0	0	3.64
2003	125	23	1	596.558	-316.101	D	8.34	8.34	0	4.974	0	0	0	0	0	0
2003	126	23	1	596.558	-316.101	D	8.709	8.709	0	5.849	0	0	0	0	0	0
2003	127	23	1	596.558	-316.101	D	8.491	8.491	0	5.329	0	0	0	0	0	0
2003	128	23	517	602.805	-305.061	D	7.808	7.804	0.004	3.761	20.57	71.34	0	0	0	8.11
2003	129	23	1	596.558	-316.101	D	8.692	8.692	0	5.807	0	0	0	0	0	0
2003	130	23	1	596.558	-316.101	D	8.133	8.133	0	4.497	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.39	7.39	0	2.868	0	0	0	0	0	0
2003	132	23	1	596.558	-316.101	D	6.586	6.586	0	1.233	0	0	0	0	0	0
2003	133	23	1	596.558	-316.101	D	6.546	6.546	0	1.156	0	0	0	0	0	0
2003	134	23	1	596.558	-316.101	D	7.377	7.377	0	2.84	0	0	0	0	0	0
2003	135	23	1	596.558	-316.101	D	8.809	8.809	0	6.091	0	0	0	0	0	0
2003	136	23	517	602.805	-305.061	D	8.71	8.706	0.004	5.842	31.85	64.39	0	0	0	3.76
2003	137	23	656	597.971	-312.292	D	9.966	9.966	0.001	9.081	62.32	34.62	0	0	0	2.7
2003	138	23	637	596.267	-315.066	D	9.338	9.206	0.132	7.078	26.9	71.21	0	0	0	1.89
2003	139	23	6	596.462	-314.859	D	8.711	8.711	0	5.854	95.21	1.61	0	0	0	6.24
2003	140	23	697	602.531	-305.449	D	8.715	8.701	0.013	5.83	59.33	39.89	0	0	0	0.77
2003	141	23	638	596.406	-314.894	D	6.79	6.778	0.012	1.612	21.51	32.18	0	0	0	46.3
2003	142	23	557	601.32	-313.419	D	6.904	6.839	0.065	1.732	22.83	57.77	0	0	0	19.4
2003	143	23	676	599.876	-309.365	D	6.72	6.68	0.04	1.418	26.99	42.6	0	0	0	30.4
2003	144	23	548	603.28	-312.734	D	6.733	6.724	0.009	1.505	63.1	18.28	0	0	0	18.61
2003	145	23	517	602.805	-305.061	D	8.545	8.513	0.032	5.381	62.35	36.05	0	0	0	1.6
2003	146	23	557	601.32	-313.419	D	7.417	7.403	0.014	2.895	30.56	60.33	0	0	0	9.11
2003	147	23	517	602.805	-305.061	D	6.856	6.852	0.005	1.759	28.84	38.04	0	0	0	33.14
2003	148	23	1	596.558	-316.101	D	6.655	6.655	0	1.369	0	0	0	0	0	0
2003	149	23	1	596.558	-316.101	D	7.285	7.285	0	2.647	0	0	0	0	0	0
2003	150	23	1	596.558	-316.101	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	151	23	491	603.207	-311.591	D	7.03	7.03	0	2.119	57.82	7.89	0	0	0	34
2003	152	23	662	598.404	-311.683	D	7.232	7.23	0.003	2.531	35.65	41.85	0	0	0	22.49
2003	153	23	326	601.161	-307.751	D	7.686	7.686	0	3.503	69.7	25.36	0	0	0	3.28
2003	154	23	517	602.805	-305.061	D	9.323	9.306	0.017	7.333	25.31	73.54	0	0	0	1.16
2003	155	23	1	596.558	-316.101	D	7.962	7.962	0	4.112	88.61	3.08	0	0	0	1.89
2003	156	23	517	602.805	-305.061	D	6.961	6.961	0.001	1.978	79.98	2.27	0	0	0	17.71
2003	157	23	517	602.805	-305.061	D	6.844	6.841	0.003	1.737	84.42	6.68	0	0	0	8.85

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	158	23	517	602.805	-305.061	D	8.445	8.418	0.027	5.156	37.83	55.24	0	0	0	6.92
2003	159	23	548	603.28	-312.734	D	6.814	6.813	0.001	1.681	83.27	1.31	0	0	0	15.47
2003	160	23	1	596.558	-316.101	D	6.628	6.628	0	1.315	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.047	7.047	0	2.154	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	8.113	8.113	0	4.453	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	9.399	9.381	0.018	7.527	47.62	51.67	0	0	0	0.7
2003	164	23	1	596.558	-316.101	D	9.343	9.343	0	7.429	0	0	0	0	0	0
2003	165	23	517	602.805	-305.061	D	9.102	9.092	0.01	6.791	66.56	32.01	0	0	0	1.41
2003	166	23	517	602.805	-305.061	D	8.176	8.127	0.05	4.484	48.73	43.41	0	0	0	7.86
2003	167	23	548	603.28	-312.734	D	8.302	8.298	0.003	4.878	80.57	18.34	0	0	0	1.08
2003	168	23	631	596.276	-315.551	D	7.28	7.28	0.001	2.635	84.52	12.44	0	0	0	2.67
2003	169	23	517	602.805	-305.061	D	7.211	7.211	0	2.491	85.19	6.6	0	0	0	7.87
2003	170	23	694	602.12	-306.029	D	7.16	7.136	0.024	2.337	80.5	11.01	0	0	0	8.5
2003	171	23	624	596.324	-316.278	D	7.782	7.781	0.001	3.709	81.48	11.72	0	0	0	6.86
2003	172	23	1	596.558	-316.101	D	6.706	6.706	0	1.469	0	0	0	0	0	0
2003	173	23	1	596.558	-316.101	D	6.717	6.717	0	1.49	0	0	0	0	0	0
2003	174	23	1	596.558	-316.101	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2003	175	23	1	596.558	-316.101	D	6.722	6.722	0	1.501	0	0	0	0	0	0
2003	176	23	1	596.558	-316.101	D	7.078	7.078	0	2.217	0	0	0	0	0	0
2003	177	23	1	596.558	-316.101	D	8.459	8.459	0	5.252	0	0	0	0	0	0
2003	178	23	548	603.28	-312.734	D	6.92	6.912	0.009	1.879	56.06	20.12	0	0	0	23.8
2003	179	23	548	603.28	-312.734	D	6.652	6.645	0.006	1.349	85.31	3.34	0	0	0	11.37
2003	180	23	517	602.805	-305.061	D	6.632	6.631	0.001	1.32	89.55	1.72	0	0	0	8.65
2003	181	23	517	602.805	-305.061	D	7.213	7.212	0	2.495	94.17	2.02	0	0	0	3.42
2003	182	23	517	602.805	-305.061	D	8.349	8.348	0	4.994	91.56	5.98	0	0	0	1.74
2003	183	23	517	602.805	-305.061	D	8.702	8.7	0.001	5.828	88.29	8.48	0	0	0	3.06
2003	184	23	517	602.805	-305.061	D	7.497	7.496	0.001	3.093	93.72	3.33	0	0	0	3.09
2003	185	23	1	596.558	-316.101	D	7.551	7.551	0	3.211	0	0	0	0	0	0
2003	186	23	1	596.558	-316.101	D	7.925	7.925	0	4.03	0	0	0	0	0	0
2003	187	23	1	596.558	-316.101	D	8.088	8.088	0	4.396	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	8.182	8.182	0	4.611	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.198	7.198	0	2.466	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.669	7.669	0	3.465	0	0	0	0	0	0
2003	192	23	1	596.558	-316.101	D	6.901	6.901	0	1.858	0	0	0	0	0	0
2003	193	23	1	596.558	-316.101	D	7.001	7.001	0	2.059	0	0	0	0	0	0
2003	194	23	548	603.28	-312.734	D	7.135	7.133	0.001	2.331	72.17	14.06	0	0	0	13.72
2003	195	23	624	596.324	-316.278	D	7.001	7	0.001	2.058	78.66	11.65	0	0	0	9.84
2003	196	23	491	603.207	-311.591	D	7.645	7.644	0	3.412	95.24	1.33	0	0	0	3.43

Appendix M
Mingo
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	197	23	656	597.971	-312.292	D	7.476	7.46	0.016	3.015	51.12	24.32	0	0	0	24.56
2003	198	23	545	603.234	-311.991	D	6.92	6.919	0.001	1.893	74.19	6.77	0	0	0	18.92
2003	199	23	517	602.805	-305.061	D	7.316	7.315	0.001	2.709	92.37	1.84	0	0	0	5.74
2003	200	23	517	602.805	-305.061	D	8.896	8.889	0.007	6.288	48.29	49.36	0	0	0	2.34
2003	201	23	624	596.324	-316.278	D	7.896	7.89	0.007	3.951	84.72	13.02	0	0	0	2.26
2003	202	23	517	602.805	-305.061	D	8.123	8.122	0	4.474	96.51	0.54	0	0	0	2.98
2003	203	23	1	596.558	-316.101	D	7.074	7.074	0	2.209	0	0	0	0	0	0
2003	204	23	520	602.851	-305.804	D	7.393	7.306	0.087	2.689	22.56	62.64	0	0	0	14.79
2003	205	23	548	603.28	-312.734	D	6.752	6.752	0	1.559	46.85	8.19	0	0	0	44.75
2003	206	23	1	596.558	-316.101	D	6.787	6.787	0	1.63	65.8	1	0	0	0	8.27
2003	207	23	62	597.819	-313.005	D	6.825	6.824	0	1.704	92.42	1.89	0	0	0	4.64
2003	208	23	461	602.269	-305.916	D	7.378	7.378	0	2.842	96.31	1.91	0	0	0	2.35
2003	209	23	1	596.558	-316.101	D	8.106	8.106	0	4.438	0	0	0	0	0	0
2003	210	23	637	596.267	-315.066	D	9.229	9.165	0.064	6.976	23.89	73.86	0	0	0	2.24
2003	211	23	624	596.324	-316.278	D	8.037	8.027	0.01	4.258	67.73	29.57	0	0	0	2.68
2003	212	23	521	602.866	-306.052	D	8.724	8.692	0.032	5.809	82.58	9.45	0	0	0	7.96
2003	213	23	548	603.28	-312.734	D	8.327	8.282	0.045	4.84	90.22	6.45	0	0	0	3.32
2003	214	23	520	602.851	-305.804	D	8.503	8.5	0.003	5.35	96.52	1.53	0	0	0	1.88
2003	215	23	1	596.558	-316.101	D	9.149	9.149	0	6.935	0	0	0	0	0	0
2003	216	23	1	596.558	-316.101	D	9.097	9.097	0	6.805	0	0	0	0	0	0
2003	217	23	517	602.805	-305.061	D	8.498	8.493	0.005	5.333	46.67	48.61	0	0	0	4.69
2003	218	23	694	602.12	-306.029	D	8.087	8.037	0.051	4.28	84.92	10.5	0	0	0	4.58
2003	219	23	517	602.805	-305.061	D	8.038	7.971	0.067	4.132	30.11	64.83	0	0	0	5.05
2003	220	23	548	603.28	-312.734	D	7.311	7.275	0.036	2.625	44.4	38.9	0	0	0	16.7
2003	221	23	637	596.267	-315.066	D	7.52	7.507	0.013	3.116	57.43	23.4	0	0	0	19.18
2003	222	23	637	596.267	-315.066	D	7.345	7.339	0.006	2.758	74.52	2.79	0	0	0	22.71
2003	223	23	637	596.267	-315.066	D	7.095	7.083	0.011	2.228	58.57	20.27	0	0	0	21.16
2003	224	23	632	596.27	-315.421	D	7.389	7.389	0	2.864	78.18	1.68	0	0	0	19.07
2003	225	23	1	596.558	-316.101	D	8.096	8.096	0	4.413	0	0	0	0	0	0
2003	226	23	1	596.558	-316.101	D	9.248	9.248	0	7.185	0	0	0	0	0	0
2003	227	23	1	596.558	-316.101	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2003	228	23	431	602.059	-306.432	D	7.04	7.04	0	2.14	90.04	3.02	0	0	0	3.8
2003	229	23	514	602.766	-305.877	D	7.093	7.093	0	2.248	87.21	1.76	0	0	0	3.44
2003	230	23	517	602.805	-305.061	D	7.632	7.623	0.009	3.366	82.62	9.51	0	0	0	7.87
2003	231	23	694	602.12	-306.029	D	7.732	7.715	0.018	3.565	87.06	7.89	0	0	0	5.04
2003	232	23	517	602.805	-305.061	D	8.371	8.349	0.022	4.997	93.94	3.47	0	0	0	2.57
2003	233	23	517	602.805	-305.061	D	8.008	7.999	0.009	4.195	95.32	2.49	0	0	0	2.19
2003	234	23	515	602.747	-305.629	D	7.767	7.766	0	3.678	95.12	2.43	0	0	0	2.56
2003	235	23	563	600.143	-314.135	D	7.824	7.806	0.018	3.766	69.94	24.71	0	0	0	5.35

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	236	23	1	596.558	-316.101	D	6.982	6.982	0	2.021	73.09	12.85	0	0	0	3.14
2003	237	23	623	596.511	-316.262	D	6.772	6.772	0	1.599	88.53	5.51	0	0	0	4.57
2003	238	23	516	602.728	-305.38	D	7.057	7.057	0	2.174	95.95	0.75	0	0	0	3.16
2003	239	23	517	602.805	-305.061	D	7.872	7.871	0	3.91	97.6	1.05	0	0	0	1.55
2003	240	23	1	596.558	-316.101	D	8.693	8.693	0	5.812	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	8.88	8.88	0	6.264	0	0	0	0	0	0
2003	242	23	694	602.12	-306.029	D	9.207	9.195	0.012	7.052	86.63	10.76	0	0	0	2.6
2003	243	23	517	602.805	-305.061	D	9.559	9.55	0.009	7.967	80.11	18.66	0	0	0	1.22
2003	244	23	536	603.096	-309.764	D	8.855	8.825	0.031	6.13	85.78	8.66	0	0	0	5.55
2003	245	23	517	602.805	-305.061	D	10.081	10.018	0.062	9.225	59.85	38.99	0	0	0	1.16
2003	246	23	517	602.805	-305.061	D	9.243	9.226	0.017	7.13	62.78	30.54	0	0	0	6.67
2003	247	23	548	603.28	-312.734	D	7.557	7.552	0.005	3.213	67.33	6.22	0	0	0	26.4
2003	248	23	638	596.406	-314.894	D	6.937	6.911	0.025	1.879	22.52	37.2	0	0	0	40.28
2003	249	23	1	596.558	-316.101	D	6.941	6.941	0	1.937	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.013	7.013	0	2.084	0	0	0	0	0	0
2003	251	23	191	600.054	-312.833	D	6.968	6.968	0	1.994	65.98	0.96	0	0	0	14.3
2003	252	23	1	596.558	-316.101	D	7.199	7.199	0	2.468	0	0	0	0	0	0
2003	253	23	1	596.558	-316.101	D	7.08	7.08	0	2.221	0	0	0	0	0	0
2003	254	23	1	596.558	-316.101	D	7.138	7.138	0	2.34	0	0	0	0	0	0
2003	255	23	1	596.558	-316.101	D	7.647	7.647	0	3.418	0	0	0	0	0	0
2003	256	23	1	596.558	-316.101	D	8.172	8.172	0	4.586	0	0	0	0	0	0
2003	257	23	1	596.558	-316.101	D	9.336	9.336	0	7.409	0	0	0	0	0	0
2003	258	23	1	596.558	-316.101	D	6.879	6.879	0	1.813	0	0	0	0	0	0
2003	259	23	603	598.68	-316.244	D	6.653	6.653	0.001	1.364	81.86	1.39	0	0	0	16.85
2003	260	23	637	596.267	-315.066	D	6.744	6.743	0.001	1.541	84.15	6.47	0	0	0	9.27
2003	261	23	1	596.558	-316.101	D	7.152	7.152	0	2.371	0	0	0	0	0	0
2003	262	23	1	596.558	-316.101	D	7.257	7.257	0	2.587	0	0	0	0	0	0
2003	263	23	557	601.32	-313.419	D	6.68	6.663	0.016	1.385	14.59	59.2	0	0	0	26.22
2003	264	23	624	596.324	-316.278	D	6.715	6.714	0	1.485	84.82	5.32	0	0	0	10.21
2003	265	23	517	602.805	-305.061	D	9.095	9.094	0.001	6.797	77	21.24	0	0	0	1.56
2003	266	23	438	602.71	-311.629	D	7.161	7.161	0	2.388	84.91	1.47	0	0	0	5.72
2003	267	23	546	603.249	-312.239	D	6.723	6.723	0	1.502	78.46	7	0	0	0	14.8
2003	268	23	637	596.267	-315.066	D	6.989	6.986	0.003	2.03	22.5	27.45	0	0	0	50.02
2003	269	23	517	602.805	-305.061	D	6.678	6.674	0.005	1.405	73.88	9.74	0	0	0	16.38
2003	270	23	490	602.499	-305.648	D	7.717	7.717	0	3.571	74.08	5.45	0	0	0	3.49
2003	271	23	1	596.558	-316.101	D	6.945	6.945	0	1.946	0	0	0	0	0	0
2003	272	23	1	596.558	-316.101	D	6.599	6.599	0	1.259	0	0	0	0	0	0
2003	273	23	557	601.32	-313.419	D	6.605	6.576	0.029	1.213	17.34	36.28	0	0	0	46.39
2003	274	23	548	603.28	-312.734	D	9.243	9.048	0.194	6.682	16.73	81.67	0	0	0	1.6

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	275	23	557	601.32	-313.419	D	6.575	6.568	0.007	1.198	11.56	45.74	0	0	0	42.7
2003	276	23	517	602.805	-305.061	D	6.525	6.522	0.003	1.108	51.56	35.45	0	0	0	12.95
2003	277	23	516	602.728	-305.38	D	7.052	7.052	0	2.165	81.56	9.59	0	0	0	9.63
2003	278	23	548	603.28	-312.734	D	6.655	6.655	0	1.367	70.16	14.41	0	0	0	13.35
2003	279	23	603	598.68	-316.244	D	8.754	8.751	0.003	5.95	51.11	47.26	0	0	0	1.58
2003	280	23	517	602.805	-305.061	D	6.892	6.891	0.001	1.838	86.35	7.21	0	0	0	6.16
2003	281	23	521	602.866	-306.052	D	6.878	6.878	0	1.812	88.77	5.04	0	0	0	4.92
2003	282	23	186	600.15	-314.075	D	8.17	8.17	0	4.582	72.1	2.05	0	0	0	3.78
2003	283	23	1	596.558	-316.101	D	9.541	9.541	0	7.942	0	0	0	0	0	0
2003	284	23	1	596.558	-316.101	D	8.585	8.585	0	5.552	0	0	0	0	0	0
2003	285	23	547	603.265	-312.487	D	7.535	7.534	0.001	3.173	56.24	20.01	0	0	0	23.73
2003	286	23	637	596.267	-315.066	D	6.669	6.668	0.001	1.394	74.73	10.23	0	0	0	15.06
2003	287	23	521	602.866	-306.052	D	7.978	7.976	0.002	4.143	53.23	44.47	0	0	0	2.3
2003	288	23	1	596.558	-316.101	D	6.794	6.794	0	1.642	0	0	0	0	0	0
2003	289	23	1	596.558	-316.101	D	6.667	6.667	0	1.393	0	0	0	0	0	0
2003	290	23	637	596.267	-315.066	D	8.831	8.795	0.036	6.057	37.8	59.7	0	0	0	2.5
2003	291	23	637	596.267	-315.066	D	6.627	6.62	0.007	1.299	21.4	43.48	0	0	0	35.11
2003	292	23	548	603.28	-312.734	D	6.731	6.731	0	1.518	66.8	11.54	0	0	0	21.49
2003	293	23	1	596.558	-316.101	D	6.849	6.849	0	1.754	0	0	0	0	0	0
2003	294	23	1	596.558	-316.101	D	7.126	7.126	0	2.316	0	0	0	0	0	0
2003	295	23	557	601.32	-313.419	D	6.626	6.621	0.005	1.302	34.74	24.68	0	0	0	40.61
2003	296	23	1	596.558	-316.101	D	6.668	6.668	0	1.394	0	0	0	0	0	0
2003	297	23	548	603.28	-312.734	D	6.702	6.7	0.002	1.457	57.01	14.93	0	0	0	28.06
2003	298	23	517	602.805	-305.061	D	7.629	7.56	0.068	3.23	44.77	48.91	0	0	0	6.32
2003	299	23	548	603.28	-312.734	D	7.543	7.54	0.003	3.186	29.12	67.41	0	0	0	3.45
2003	300	23	557	601.32	-313.419	D	6.793	6.728	0.065	1.512	10.35	74.52	0	0	0	15.13
2003	301	23	546	603.249	-312.239	D	7.354	7.354	0	2.792	68.38	19.2	0	0	0	11.66
2003	302	23	1	596.558	-316.101	D	6.957	6.957	0	1.971	0	0	0	0	0	0
2003	303	23	1	596.558	-316.101	D	7.168	7.168	0	2.404	0	0	0	0	0	0
2003	304	23	1	596.558	-316.101	D	8.474	8.474	0	5.289	0	0	0	0	0	0
2003	305	23	631	596.276	-315.551	D	7.831	7.804	0.027	3.761	17.01	72.41	0	0	0	10.58
2003	306	23	517	602.805	-305.061	D	7.715	7.713	0.002	3.562	73.02	18.64	0	0	0	8.36
2003	307	23	1	596.558	-316.101	D	7.022	7.022	0	2.102	0	0	0	0	0	0
2003	308	23	1	596.558	-316.101	D	6.963	6.963	0	1.983	0	0	0	0	0	0
2003	309	23	517	602.805	-305.061	D	7.611	7.607	0.004	3.331	46.04	30.58	0	0	0	23.36
2003	310	23	637	596.267	-315.066	D	8.302	8.246	0.055	4.758	32.4	62.05	0	0	0	5.54
2003	311	23	637	596.267	-315.066	D	7.693	7.606	0.086	3.33	12.05	80.57	0	0	0	7.37
2003	312	23	1	596.558	-316.101	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	6.522	6.522	0	1.109	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	314	23	1	596.558	-316.101	D	6.536	6.536	0	1.136	0	0	0	0	0	0
2003	315	23	1	596.558	-316.101	D	8.014	8.014	0	4.229	0	0	0	0	0	0
2003	316	23	1	596.558	-316.101	D	9.179	9.179	0	7.011	0	0	0	0	0	0
2003	317	23	1	596.558	-316.101	D	6.529	6.529	0	1.122	0	0	0	0	0	0
2003	318	23	521	602.866	-306.052	D	6.597	6.582	0.015	1.225	8.78	73.13	0	0	0	18.09
2003	319	23	520	602.851	-305.804	D	9.324	9.323	0.001	7.376	26.74	71.15	0	0	0	2.06
2003	320	23	517	602.805	-305.061	D	9.528	9.516	0.012	7.877	47.39	50.21	0	0	0	2.4
2003	321	23	517	602.805	-305.061	D	9.875	9.793	0.082	8.612	44.22	54.49	0	0	0	1.29
2003	322	23	1	596.558	-316.101	D	10.113	10.113	0	9.486	0	0	0	0	0	0
2003	323	23	517	602.805	-305.061	D	8.011	7.977	0.034	4.145	27.35	68.9	0	0	0	3.75
2003	324	23	1	596.558	-316.101	D	6.99	6.99	0	2.039	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.219	7.219	0	2.508	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	9.046	9.046	0	6.676	0	0	0	0	0	0
2003	327	23	1	596.558	-316.101	D	9.203	9.203	0	7.072	0	0	0	0	0	0
2003	328	23	1	596.558	-316.101	D	7.244	7.244	0	2.56	0	0	0	0	0	0
2003	329	23	1	596.558	-316.101	D	6.84	6.84	0	1.735	0	0	0	0	0	0
2003	330	23	1	596.558	-316.101	D	7.124	7.124	0	2.311	0	0	0	0	0	0
2003	331	23	517	602.805	-305.061	D	8.967	8.956	0.011	6.452	43.98	54.15	0	0	0	1.87
2003	332	23	517	602.805	-305.061	D	7.518	7.514	0.004	3.131	38.79	60.26	0	0	0	0.94
2003	333	23	1	596.558	-316.101	D	6.821	6.821	0	1.696	0	0	0	0	0	0
2003	334	23	1	596.558	-316.101	D	6.842	6.842	0	1.739	0	0	0	0	0	0
2003	335	23	548	603.28	-312.734	D	6.795	6.785	0.01	1.625	14.72	61.06	0	0	0	24.22
2003	336	23	517	602.805	-305.061	D	6.517	6.493	0.023	1.053	10.57	73.83	0	0	0	15.6
2003	337	23	1	596.558	-316.101	D	7.76	7.76	0	3.665	18.7	68.44	0	0	0	9.8
2003	338	23	517	602.805	-305.061	D	9.682	9.623	0.06	8.157	16.57	81.79	0	0	0	1.64
2003	339	23	624	596.324	-316.278	D	8.219	8.219	0	4.696	44.56	55.15	0	0	0	0.96
2003	340	23	548	603.28	-312.734	D	8.132	8.132	0.001	4.495	41.2	45.66	0	0	0	13.1
2003	341	23	517	602.805	-305.061	D	6.726	6.706	0.021	1.468	26.07	66.13	0	0	0	7.8
2003	342	23	1	596.558	-316.101	D	7.207	7.207	0	2.484	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	9.465	9.465	0	7.743	0	0	0	0	0	0
2003	344	23	624	596.324	-316.278	D	8.994	8.99	0.004	6.536	26.76	72.11	0	0	0	1.14
2003	345	23	1	596.558	-316.101	D	7.698	7.698	0	3.528	0	0	0	0	0	0
2003	346	23	637	596.267	-315.066	D	7.203	7.179	0.024	2.426	8.65	82.87	0	0	0	8.48
2003	347	23	1	596.558	-316.101	D	8.391	8.391	0	5.094	0	0	0	0	0	0
2003	348	23	517	602.805	-305.061	D	9.644	9.519	0.125	7.884	33.91	65.06	0	0	0	1.02
2003	349	23	517	602.805	-305.061	D	8.72	8.71	0.01	5.851	35.47	63.44	0	0	0	1.07
2003	350	23	1	596.558	-316.101	D	8.203	8.203	0	4.659	0	0	0	0	0	0
2003	351	23	1	596.558	-316.101	D	7.45	7.45	0	2.994	0	0	0	0	0	0
2003	352	23	1	596.558	-316.101	D	8.024	8.024	0	4.251	0	0	0	0	0	0

Appendix M
Mingo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	353	23	1	596.558	-316.101	D	8.047	8.047	0	4.304	0	0	0	0	0	0
2003	354	23	517	602.805	-305.061	D	7.118	7.118	0	2.3	19.9	68.77	0	0	0	11.14
2003	355	23	521	602.866	-306.052	D	6.66	6.66	0	1.378	16.57	58.83	0	0	0	7.55
2003	356	23	1	596.558	-316.101	D	8.674	8.674	0	5.764	0	0	0	0	0	0
2003	357	23	1	596.558	-316.101	D	8.915	8.915	0	6.352	0	0	0	0	0	0
2003	358	23	1	596.558	-316.101	D	7.495	7.495	0	3.091	0	0	0	0	0	0
2003	359	23	529	602.989	-308.032	D	6.769	6.765	0.004	1.586	10.83	81.81	0	0	0	7.34
2003	360	23	517	602.805	-305.061	D	6.838	6.837	0.001	1.73	27.91	66.5	0	0	0	5.44
2003	361	23	516	602.728	-305.38	D	6.851	6.851	0	1.757	39.6	54.72	0	0	0	5.46
2003	362	23	1	596.558	-316.101	D	8.349	8.349	0	4.997	0	0	0	0	0	0
2003	363	23	1	596.558	-316.101	D	9.594	9.594	0	8.083	0	0	0	0	0	0
2003	364	23	1	596.558	-316.101	D	7.176	7.176	0	2.418	0	0	0	0	0	0
									0.194							
UMC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	8.203	8.203	0	4.658	0	0	0	0	0	0
2003	2	23	1	596.558	-316.101	D	9.687	9.687	0	8.329	0	0	0	0	0	0
2003	3	23	632	596.27	-315.421	D	8.173	8.04	0.133	4.288	71.55	28.37	0	0	0	0.08
2003	4	23	517	602.805	-305.061	D	7.136	7.128	0.008	2.32	88.17	11.78	0	0	0	0.05
2003	5	23	517	602.805	-305.061	D	7.437	7.436	0.001	2.965	74.55	25.27	0	0	0	0.08
2003	6	23	517	602.805	-305.061	D	8.098	7.908	0.19	3.991	91.26	8.73	0	0	0	0.01
2003	7	23	517	602.805	-305.061	D	8.494	8.382	0.112	5.073	91.75	8.24	0	0	0	0.01
2003	8	23	1	596.558	-316.101	D	7.013	7.013	0	2.085	0	0	0	0	0	0
2003	9	23	557	601.32	-313.419	D	6.988	6.978	0.01	2.013	71.65	28.17	0	0	0	0.17
2003	10	23	517	602.805	-305.061	D	6.854	6.797	0.056	1.65	70.26	29.52	0	0	0	0.22
2003	11	23	626	596.299	-315.88	D	6.631	6.589	0.042	1.238	69.23	30.47	0	0	0	0.3
2003	12	23	624	596.324	-316.278	D	6.57	6.533	0.037	1.13	80.36	19.49	0	0	0	0.15
2003	13	23	517	602.805	-305.061	D	6.695	6.68	0.015	1.417	87.1	12.84	0	0	0	0.07
2003	14	23	517	602.805	-305.061	D	7.745	7.68	0.065	3.49	87.2	12.77	0	0	0	0.03
2003	15	23	1	596.558	-316.101	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2003	16	23	1	596.558	-316.101	D	7.857	7.857	0	3.877	0	0	0	0	0	0
2003	17	23	517	602.805	-305.061	D	7.55	7.497	0.053	3.094	75.76	24.15	0	0	0	0.09
2003	18	23	660	598.316	-311.922	D	7.35	7.334	0.016	2.749	87.3	12.65	0	0	0	0.05
2003	19	23	1	596.558	-316.101	D	7.45	7.45	0	2.995	0	0	0	0	0	0
2003	20	23	521	602.866	-306.052	D	6.949	6.924	0.026	1.903	86.41	13.48	0	0	0	0.1
2003	21	23	211	600.245	-312.069	D	7.049	6.962	0.087	1.982	86.04	13.94	0	0	0	0.02

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	22	23	1	596.558	-316.101	D	7.394	7.394	0	2.876	0	0	0	0	0	0
2003	23	23	1	596.558	-316.101	D	7.283	7.283	0	2.642	0	0	0	0	0	0
2003	24	23	637	596.267	-315.066	D	6.959	6.952	0.006	1.961	88.04	11.89	0	0	0	0.06
2003	25	23	517	602.805	-305.061	D	6.615	6.6	0.016	1.26	90.69	9.27	0	0	0	0.04
2003	26	23	520	602.851	-305.804	D	7.041	7.027	0.014	2.112	64.82	35.06	0	0	0	0.11
2003	27	23	637	596.267	-315.066	D	6.961	6.96	0.001	1.977	89.65	10.24	0	0	0	0.03
2003	28	23	517	602.805	-305.061	D	7.198	7.197	0.001	2.464	89.6	10.37	0	0	0	0.02
2003	29	23	637	596.267	-315.066	D	9.411	9.363	0.048	7.479	90.9	9.09	0	0	0	0
2003	30	23	1	596.558	-316.101	D	8.757	8.757	0	5.966	0	0	0	0	0	0
2003	31	23	1	596.558	-316.101	D	8.624	8.624	0	5.646	0	0	0	0	0	0
2003	32	23	517	602.805	-305.061	D	8.809	8.78	0.028	6.022	68.35	31.59	0	0	0	0.06
2003	33	23	1	596.558	-316.101	D	7.359	7.359	0	2.802	0	0	0	0	0	0
2003	34	23	1	596.558	-316.101	D	10.197	10.197	0	9.721	0	0	0	0	0	0
2003	35	23	1	596.558	-316.101	D	7.15	7.15	0	2.365	0	0	0	0	0	0
2003	36	23	632	596.27	-315.421	D	6.565	6.556	0.008	1.175	71.08	28.63	0	0	0	0.29
2003	37	23	517	602.805	-305.061	D	8.767	8.748	0.019	5.944	89.38	10.6	0	0	0	0.01
2003	38	23	637	596.267	-315.066	D	8.289	8.182	0.107	4.611	90.6	9.39	0	0	0	0.01
2003	39	23	1	596.558	-316.101	D	7.124	7.124	0	2.312	0	0	0	0	0	0
2003	40	23	517	602.805	-305.061	D	7.585	7.577	0.008	3.265	82.11	17.81	0	0	0	0.06
2003	41	23	517	602.805	-305.061	D	9.494	9.489	0.004	7.808	87.34	12.59	0	0	0	0.01
2003	42	23	694	602.12	-306.029	D	8.314	8.283	0.03	4.843	89.79	10.13	0	0	0	0.08
2003	43	23	637	596.267	-315.066	D	6.727	6.714	0.013	1.484	85.33	14.48	0	0	0	0.18
2003	44	23	548	603.28	-312.734	D	6.553	6.538	0.015	1.139	89.35	10.53	0	0	0	0.1
2003	45	23	517	602.805	-305.061	D	9.433	9.432	0	7.66	92.16	6.94	0	0	0	0
2003	46	23	516	602.728	-305.38	D	9.807	9.807	0	8.651	87.98	5.53	0	0	0	0
2003	47	23	1	596.558	-316.101	D	8.415	8.415	0	5.15	0	0	0	0	0	0
2003	48	23	1	596.558	-316.101	D	7.785	7.785	0	3.72	0	0	0	0	0	0
2003	49	23	517	602.805	-305.061	D	9.298	9.051	0.247	6.69	91.08	8.91	0	0	0	0.01
2003	50	23	517	602.805	-305.061	D	9.199	9.175	0.024	7.001	94.81	5.18	0	0	0	0.01
2003	51	23	517	602.805	-305.061	D	9.535	9.465	0.07	7.743	91.64	8.35	0	0	0	0
2003	52	23	1	596.558	-316.101	D	9.592	9.592	0	8.077	0	0	0	0	0	0
2003	53	23	1	596.558	-316.101	D	9.778	9.778	0	8.571	0	0	0	0	0	0
2003	54	23	1	596.558	-316.101	D	7.801	7.801	0	3.755	0	0	0	0	0	0
2003	55	23	637	596.267	-315.066	D	8.687	8.632	0.055	5.664	89.69	10.27	0	0	0	0.04
2003	56	23	624	596.324	-316.278	D	6.943	6.921	0.022	1.898	91.41	8.56	0	0	0	0.02
2003	57	23	1	596.558	-316.101	D	7.16	7.16	0	2.386	0	0	0	0	0	0
2003	58	23	624	596.324	-316.278	D	8.136	8.135	0.001	4.503	95.7	4.31	0	0	0	0.01
2003	59	23	624	596.324	-316.278	D	9.039	9.036	0.003	6.651	96.17	3.78	0	0	0	0
2003	60	23	676	599.876	-309.365	D	8.013	8.005	0.008	4.209	96.58	3.41	0	0	0	0.01

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	61	23	517	602.805	-305.061	D	9.706	8.778	0.928	6.016	90.25	9.74	0	0	0	0.01
2003	62	23	624	596.324	-316.278	D	8.098	7.776	0.322	3.7	91.22	8.76	0	0	0	0.02
2003	63	23	517	602.805	-305.061	D	6.992	6.973	0.019	2.004	96.7	3.28	0	0	0	0.02
2003	64	23	637	596.267	-315.066	D	9.033	8.823	0.209	6.127	91.43	8.57	0	0	0	0.01
2003	65	23	624	596.324	-316.278	D	7.896	7.519	0.377	3.142	94.51	5.49	0	0	0	0.01
2003	66	23	637	596.267	-315.066	D	7.967	7.935	0.032	4.052	93.54	6.45	0	0	0	0.01
2003	67	23	517	602.805	-305.061	D	6.968	6.962	0.006	1.981	97.47	2.51	0	0	0	0.02
2003	68	23	563	600.143	-314.135	D	6.971	6.955	0.017	1.966	91.12	8.86	0	0	0	0.02
2003	69	23	1	596.558	-316.101	D	6.622	6.622	0	1.304	0	0	0	0	0	0
2003	70	23	637	596.267	-315.066	D	6.538	6.527	0.011	1.119	95.12	4.82	0	0	0	0.05
2003	71	23	517	602.805	-305.061	D	6.73	6.724	0.006	1.505	96.8	3.18	0	0	0	0.02
2003	72	23	517	602.805	-305.061	D	8.432	8.138	0.294	4.511	90.57	9.41	0	0	0	0.02
2003	73	23	624	596.324	-316.278	D	8.021	8.021	0.001	4.244	99.1	0.84	0	0	0	0.01
2003	74	23	1	596.558	-316.101	D	8.547	8.547	0	5.462	0	0	0	0	0	0
2003	75	23	1	596.558	-316.101	D	8.614	8.614	0	5.621	0	0	0	0	0	0
2003	76	23	1	596.558	-316.101	D	8.799	8.799	0	6.066	0	0	0	0	0	0
2003	77	23	1	596.558	-316.101	D	8.797	8.797	0	6.063	0	0	0	0	0	0
2003	78	23	1	596.558	-316.101	D	9.039	9.039	0	6.66	0	0	0	0	0	0
2003	79	23	1	596.558	-316.101	D	7.788	7.788	0	3.727	0	0	0	0	0	0
2003	80	23	625	596.311	-316.079	D	8.915	8.885	0.029	6.279	97.59	2.35	0	0	0	0.07
2003	81	23	521	602.866	-306.052	D	6.552	6.548	0.003	1.16	98.66	1.29	0	0	0	0.06
2003	82	23	1	596.558	-316.101	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2003	83	23	1	596.558	-316.101	D	6.66	6.66	0	1.378	0	0	0	0	0	0
2003	84	23	517	602.805	-305.061	D	7.69	7.653	0.037	3.431	94.52	5.47	0	0	0	0.01
2003	85	23	520	602.851	-305.804	D	8.338	8.255	0.083	4.778	95.29	4.7	0	0	0	0
2003	86	23	547	603.265	-312.487	D	6.652	6.652	0.001	1.362	98.66	1.03	0	0	0	0.01
2003	87	23	461	602.269	-305.916	D	8.497	8.497	0	5.342	56.96	0.14	0	0	0	0.01
2003	88	23	517	602.805	-305.061	D	7.893	7.75	0.143	3.642	76.79	23.14	0	0	0	0.07
2003	89	23	624	596.324	-316.278	D	6.878	6.845	0.034	1.745	88.15	11.73	0	0	0	0.12
2003	90	23	548	603.28	-312.734	D	6.497	6.493	0.004	1.053	92.54	7.33	0	0	0	0.14
2003	91	23	1	596.558	-316.101	D	6.687	6.687	0	1.43	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	6.835	6.835	0	1.725	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	6.998	6.998	0	2.054	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.194	7.194	0	2.457	0	0	0	0	0	0
2003	95	23	632	596.27	-315.421	D	7.262	7.232	0.03	2.536	84.95	14.89	0	0	0	0.15
2003	96	23	1	596.558	-316.101	D	8.015	8.015	0	4.232	0	0	0	0	0	0
2003	97	23	1	596.558	-316.101	D	9.066	9.066	0	6.726	0	0	0	0	0	0
2003	98	23	517	602.805	-305.061	D	9.372	8.55	0.822	5.469	93.42	6.58	0	0	0	0
2003	99	23	1	596.558	-316.101	D	7.222	7.222	0	2.515	0	0	0	0	0	0

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	100	23	1	596.558	-316.101	D	6.749	6.749	0	1.554	0	0	0	0	0	0
2003	101	23	637	596.267	-315.066	D	6.499	6.499	0.001	1.063	99.83	0.13	0	0	0	0.06
2003	102	23	637	596.267	-315.066	D	6.65	6.499	0.151	1.064	99.44	0.5	0	0	0	0.06
2003	103	23	548	603.28	-312.734	D	6.723	6.578	0.146	1.217	99.54	0.42	0	0	0	0.04
2003	104	23	517	602.805	-305.061	D	6.823	6.771	0.052	1.597	99.59	0.39	0	0	0	0.02
2003	105	23	1	596.558	-316.101	D	6.586	6.586	0	1.233	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2003	107	23	632	596.27	-315.421	D	8.226	8.086	0.14	4.391	98.3	1.66	0	0	0	0.04
2003	108	23	624	596.324	-316.278	D	7.489	7.405	0.084	2.898	97.88	2.09	0	0	0	0.02
2003	109	23	517	602.805	-305.061	D	7.555	7.538	0.017	3.181	99.4	0.59	0	0	0	0.01
2003	110	23	1	596.558	-316.101	D	8.832	8.832	0	6.148	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.023	7.023	0	2.105	0	0	0	0	0	0
2003	112	23	517	602.805	-305.061	D	6.997	6.981	0.016	2.02	96.07	3.82	0	0	0	0.1
2003	113	23	1	596.558	-316.101	D	6.512	6.512	0	1.089	0	0	0	0	0	0
2003	114	23	1	596.558	-316.101	D	8.947	8.947	0	6.43	0	0	0	0	0	0
2003	115	23	1	596.558	-316.101	D	9.525	9.525	0	7.902	0	0	0	0	0	0
2003	116	23	1	596.558	-316.101	D	7.167	7.167	0	2.401	0	0	0	0	0	0
2003	117	23	1	596.558	-316.101	D	6.723	6.723	0	1.502	0	0	0	0	0	0
2003	118	23	37	597.36	-313.541	D	6.997	6.997	0	2.052	85.56	0.05	0	0	0	0.01
2003	119	23	1	596.558	-316.101	D	7.934	7.934	0	4.049	0	0	0	0	0	0
2003	120	23	1	596.558	-316.101	D	7.553	7.553	0	3.215	0	0	0	0	0	0
2003	121	23	1	596.558	-316.101	D	7.209	7.209	0	2.487	0	0	0	0	0	0
2003	122	23	517	602.805	-305.061	D	8.627	8.526	0.101	5.412	97.46	2.52	0	0	0	0.02
2003	123	23	603	598.68	-316.244	D	8.217	8.197	0.02	4.644	98.72	1.27	0	0	0	0.01
2003	124	23	517	602.805	-305.061	D	8.006	8.002	0.004	4.201	99.59	0.37	0	0	0	0
2003	125	23	517	602.805	-305.061	D	8.465	8.465	0	5.266	98.97	0.82	0	0	0	0
2003	126	23	1	596.558	-316.101	D	8.709	8.709	0	5.849	0	0	0	0	0	0
2003	127	23	517	602.805	-305.061	D	8.556	8.534	0.021	5.431	99.79	0.18	0	0	0	0.02
2003	128	23	517	602.805	-305.061	D	7.958	7.804	0.154	3.761	99.17	0.82	0	0	0	0.01
2003	129	23	517	602.805	-305.061	D	8.892	8.892	0	6.294	100.05	0.11	0	0	0	0
2003	130	23	1	596.558	-316.101	D	8.133	8.133	0	4.497	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.39	7.39	0	2.868	0	0	0	0	0	0
2003	132	23	517	602.805	-305.061	D	6.585	6.585	0	1.23	100.26	0.4	0	0	0	0.13
2003	133	23	517	602.805	-305.061	D	6.558	6.547	0.011	1.158	97.59	2.26	0	0	0	0.16
2003	134	23	514	602.766	-305.877	D	7.332	7.332	0	2.746	94.52	0.07	0	0	0	0.05
2003	135	23	490	602.499	-305.648	D	8.884	8.884	0	6.275	98.76	0.18	0	0	0	0.03
2003	136	23	517	602.805	-305.061	D	8.719	8.706	0.013	5.842	97.93	2.07	0	0	0	0.01
2003	137	23	517	602.805	-305.061	D	10.01	9.978	0.032	9.113	99.16	0.83	0	0	0	0
2003	138	23	637	596.267	-315.066	D	9.219	9.206	0.014	7.078	99.37	0.63	0	0	0	0

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	139	23	1	596.558	-316.101	D	8.711	8.711	0	5.854	0	0	0	0	0	0
2003	140	23	632	596.27	-315.421	D	8.751	8.646	0.105	5.698	96.88	3.12	0	0	0	0
2003	141	23	548	603.28	-312.734	D	6.792	6.792	0	1.639	98.01	1.66	0	0	0	0.01
2003	142	23	1	596.558	-316.101	D	6.836	6.836	0	1.727	0	0	0	0	0	0
2003	143	23	1	596.558	-316.101	D	6.683	6.683	0	1.423	97.99	0.09	0	0	0	0.03
2003	144	23	517	602.805	-305.061	D	6.766	6.735	0.031	1.526	99.45	0.51	0	0	0	0.03
2003	145	23	662	598.404	-311.683	D	8.61	8.495	0.115	5.339	98.21	1.78	0	0	0	0.01
2003	146	23	624	596.324	-316.278	D	7.341	7.338	0.003	2.757	99.58	0.39	0	0	0	0.01
2003	147	23	13	596.691	-314.592	D	6.851	6.851	0	1.758	99.97	0.07	0	0	0	0.07
2003	148	23	624	596.324	-316.278	D	6.702	6.655	0.047	1.369	99.34	0.6	0	0	0	0.06
2003	149	23	517	602.805	-305.061	D	7.323	7.318	0.005	2.715	99.04	0.91	0	0	0	0.06
2003	150	23	624	596.324	-316.278	D	6.666	6.656	0.009	1.371	98.88	1.03	0	0	0	0.08
2003	151	23	694	602.12	-306.029	D	7.036	7.03	0.006	2.119	87.14	12.71	0	0	0	0.15
2003	152	23	1	596.558	-316.101	D	7.216	7.216	0	2.503	0	0	0	0	0	0
2003	153	23	1	596.558	-316.101	D	7.678	7.678	0	3.485	0	0	0	0	0	0
2003	154	23	1	596.558	-316.101	D	9.251	9.251	0	7.192	0	0	0	0	0	0
2003	155	23	624	596.324	-316.278	D	7.964	7.962	0.002	4.112	99.52	0.37	0	0	0	0.05
2003	156	23	624	596.324	-316.278	D	7.059	6.947	0.112	1.951	99.33	0.64	0	0	0	0.03
2003	157	23	637	596.267	-315.066	D	6.858	6.846	0.011	1.748	99.59	0.41	0	0	0	0.02
2003	158	23	517	602.805	-305.061	D	8.448	8.418	0.03	5.156	98.54	1.42	0	0	0	0.03
2003	159	23	517	602.805	-305.061	D	6.84	6.829	0.011	1.713	99.93	0.05	0	0	0	0.03
2003	160	23	1	596.558	-316.101	D	6.628	6.628	0	1.315	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.047	7.047	0	2.154	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	8.113	8.113	0	4.453	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	10.393	9.381	1.012	7.527	96.1	3.9	0	0	0	0
2003	164	23	517	602.805	-305.061	D	9.323	9.316	0.007	7.36	99.92	0.08	0	0	0	0
2003	165	23	637	596.267	-315.066	D	9.515	9.015	0.5	6.6	97.14	2.85	0	0	0	0.01
2003	166	23	604	598.599	-316.246	D	8.427	8.166	0.262	4.573	99.36	0.64	0	0	0	0
2003	167	23	603	598.68	-316.244	D	8.388	8.291	0.096	4.862	99.55	0.44	0	0	0	0
2003	168	23	563	600.143	-314.135	D	7.319	7.305	0.014	2.688	99.39	0.6	0	0	0	0.01
2003	169	23	603	598.68	-316.244	D	7.192	7.188	0.004	2.445	99.76	0.26	0	0	0	0.01
2003	170	23	637	596.267	-315.066	D	7.196	7.14	0.056	2.345	99.89	0.08	0	0	0	0.03
2003	171	23	624	596.324	-316.278	D	7.819	7.781	0.039	3.709	99.17	0.82	0	0	0	0.01
2003	172	23	1	596.558	-316.101	D	6.706	6.706	0	1.469	0	0	0	0	0	0
2003	173	23	1	596.558	-316.101	D	6.717	6.717	0	1.49	0	0	0	0	0	0
2003	174	23	1	596.558	-316.101	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2003	175	23	1	596.558	-316.101	D	6.722	6.722	0	1.501	0	0	0	0	0	0
2003	176	23	1	596.558	-316.101	D	7.078	7.078	0	2.217	0	0	0	0	0	0
2003	177	23	694	602.12	-306.029	D	8.473	8.435	0.038	5.197	99.78	0.19	0	0	0	0.02

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	178	23	638	596.406	-314.894	D	6.912	6.912	0.001	1.879	99.65	0.14	0	0	0	0.08
2003	179	23	637	596.267	-315.066	D	6.648	6.644	0.004	1.347	99.8	0.14	0	0	0	0.04
2003	180	23	490	602.499	-305.648	D	6.634	6.631	0.004	1.32	99.86	0.05	0	0	0	0.02
2003	181	23	517	602.805	-305.061	D	7.218	7.212	0.005	2.495	99.89	0.06	0	0	0	0.01
2003	182	23	517	602.805	-305.061	D	8.349	8.348	0.001	4.994	99.38	0.23	0	0	0	0.01
2003	183	23	517	602.805	-305.061	D	8.704	8.7	0.004	5.828	99.58	0.36	0	0	0	0
2003	184	23	517	602.805	-305.061	D	7.498	7.496	0.002	3.093	99.83	0.13	0	0	0	0.01
2003	185	23	1	596.558	-316.101	D	7.551	7.551	0	3.211	0	0	0	0	0	0
2003	186	23	1	596.558	-316.101	D	7.925	7.925	0	4.03	0	0	0	0	0	0
2003	187	23	1	596.558	-316.101	D	8.088	8.088	0	4.396	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	8.182	8.182	0	4.611	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.198	7.198	0	2.466	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.669	7.669	0	3.465	0	0	0	0	0	0
2003	192	23	632	596.27	-315.421	D	6.912	6.901	0.011	1.858	97.97	1.87	0	0	0	0.15
2003	193	23	521	602.866	-306.052	D	6.996	6.984	0.011	2.026	99.92	0.05	0	0	0	0.04
2003	194	23	659	598.307	-312.069	D	7.333	7.15	0.183	2.365	99.7	0.28	0	0	0	0.02
2003	195	23	624	596.324	-316.278	D	7.055	7	0.055	2.058	99.74	0.24	0	0	0	0.02
2003	196	23	517	602.805	-305.061	D	7.667	7.655	0.012	3.436	99.95	0.04	0	0	0	0.01
2003	197	23	624	596.324	-316.278	D	7.525	7.46	0.065	3.015	99.51	0.47	0	0	0	0.02
2003	198	23	624	596.324	-316.278	D	6.923	6.916	0.007	1.888	99.89	0.05	0	0	0	0.03
2003	199	23	697	602.531	-305.449	D	7.32	7.315	0.005	2.709	99.82	0.11	0	0	0	0.01
2003	200	23	517	602.805	-305.061	D	8.894	8.889	0.005	6.288	98.49	1.45	0	0	0	0.01
2003	201	23	548	603.28	-312.734	D	7.876	7.86	0.016	3.884	99.65	0.34	0	0	0	0.01
2003	202	23	517	602.805	-305.061	D	8.13	8.122	0.007	4.474	99.94	0.03	0	0	0	0.03
2003	203	23	517	602.805	-305.061	D	7.162	7.085	0.077	2.232	99.7	0.25	0	0	0	0.05
2003	204	23	1	596.558	-316.101	D	7.251	7.251	0	2.576	0	0	0	0	0	0
2003	205	23	1	596.558	-316.101	D	6.753	6.753	0	1.562	0	0	0	0	0	0
2003	206	23	690	601.572	-306.804	D	6.79	6.789	0.001	1.634	99.69	0.23	0	0	0	0.02
2003	207	23	1	596.558	-316.101	D	6.824	6.824	0	1.704	0	0	0	0	0	0
2003	208	23	1	596.558	-316.101	D	7.426	7.426	0	2.944	0	0	0	0	0	0
2003	209	23	1	596.558	-316.101	D	8.106	8.106	0	4.438	0	0	0	0	0	0
2003	210	23	624	596.324	-316.278	D	9.979	9.165	0.814	6.976	97.42	2.58	0	0	0	0.01
2003	211	23	624	596.324	-316.278	D	8.55	8.027	0.523	4.258	99.05	0.95	0	0	0	0.01
2003	212	23	548	603.28	-312.734	D	9.203	8.782	0.421	6.026	99.49	0.51	0	0	0	0
2003	213	23	548	603.28	-312.734	D	8.383	8.282	0.101	4.84	99.67	0.33	0	0	0	0
2003	214	23	520	602.851	-305.804	D	8.528	8.5	0.028	5.35	99.95	0.04	0	0	0	0
2003	215	23	517	602.805	-305.061	D	9.202	9.198	0.004	7.059	96.76	3.18	0	0	0	0.01
2003	216	23	517	602.805	-305.061	D	9.143	9.096	0.047	6.802	94.93	5.06	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	217	23	637	596.267	-315.066	D	8.894	8.458	0.435	5.251	98.78	1.2	0	0	0	0.01
2003	218	23	603	598.68	-316.244	D	8.299	8.104	0.194	4.433	99.63	0.36	0	0	0	0.01
2003	219	23	603	598.68	-316.244	D	8.048	8.044	0.004	4.297	99.84	0.13	0	0	0	0.01
2003	220	23	1	596.558	-316.101	D	7.206	7.206	0	2.482	0	0	0	0	0	0
2003	221	23	1	596.558	-316.101	D	7.507	7.507	0	3.116	0	0	0	0	0	0
2003	222	23	1	596.558	-316.101	D	7.339	7.339	0	2.758	0	0	0	0	0	0
2003	223	23	1	596.558	-316.101	D	7.083	7.083	0	2.228	0	0	0	0	0	0
2003	224	23	1	596.558	-316.101	D	7.389	7.389	0	2.864	0	0	0	0	0	0
2003	225	23	1	596.558	-316.101	D	8.096	8.096	0	4.413	0	0	0	0	0	0
2003	226	23	1	596.558	-316.101	D	9.248	9.248	0	7.185	0	0	0	0	0	0
2003	227	23	1	596.558	-316.101	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2003	228	23	521	602.866	-306.052	D	7.092	7.04	0.052	2.14	99.81	0.17	0	0	0	0.02
2003	229	23	517	602.805	-305.061	D	7.106	7.093	0.013	2.248	99.87	0.1	0	0	0	0.02
2003	230	23	624	596.324	-316.278	D	7.619	7.549	0.07	3.206	99.87	0.12	0	0	0	0.01
2003	231	23	624	596.324	-316.278	D	7.79	7.733	0.057	3.606	99.71	0.28	0	0	0	0.01
2003	232	23	624	596.324	-316.278	D	8.444	8.368	0.077	5.039	99.79	0.2	0	0	0	0.01
2003	233	23	107	598.487	-311.954	D	8.026	7.971	0.055	4.133	99.72	0.28	0	0	0	0.01
2003	234	23	211	600.245	-312.069	D	7.817	7.785	0.032	3.719	99.86	0.12	0	0	0	0.01
2003	235	23	624	596.324	-316.278	D	7.819	7.753	0.066	3.649	99.38	0.61	0	0	0	0.01
2003	236	23	624	596.324	-316.278	D	6.984	6.982	0.002	2.021	98.56	1.38	0	0	0	0.01
2003	237	23	637	596.267	-315.066	D	6.779	6.772	0.007	1.599	99.83	0.12	0	0	0	0.02
2003	238	23	517	602.805	-305.061	D	7.07	7.057	0.013	2.174	99.97	0.02	0	0	0	0.01
2003	239	23	517	602.805	-305.061	D	7.876	7.871	0.005	3.91	99.95	0.03	0	0	0	0.01
2003	240	23	1	596.558	-316.101	D	8.693	8.693	0	5.812	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	8.88	8.88	0	6.264	0	0	0	0	0	0
2003	242	23	694	602.12	-306.029	D	9.202	9.195	0.007	7.052	98.62	1.36	0	0	0	0.01
2003	243	23	517	602.805	-305.061	D	9.552	9.55	0.002	7.967	99.4	0.57	0	0	0	0
2003	244	23	1	596.558	-316.101	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2003	245	23	517	602.805	-305.061	D	10.023	10.018	0.005	9.225	98.83	1.13	0	0	0	0
2003	246	23	637	596.267	-315.066	D	9.245	9.229	0.016	7.138	98.6	1.39	0	0	0	0
2003	247	23	186	600.15	-314.075	D	7.554	7.552	0.001	3.213	99.59	0.36	0	0	0	0.01
2003	248	23	1	596.558	-316.101	D	6.911	6.911	0	1.879	0	0	0	0	0	0
2003	249	23	1	596.558	-316.101	D	6.941	6.941	0	1.937	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.013	7.013	0	2.084	0	0	0	0	0	0
2003	251	23	1	596.558	-316.101	D	6.958	6.958	0	1.973	0	0	0	0	0	0
2003	252	23	1	596.558	-316.101	D	7.199	7.199	0	2.468	0	0	0	0	0	0
2003	253	23	1	596.558	-316.101	D	7.08	7.08	0	2.221	0	0	0	0	0	0
2003	254	23	1	596.558	-316.101	D	7.138	7.138	0	2.34	0	0	0	0	0	0
2003	255	23	1	596.558	-316.101	D	7.647	7.647	0	3.418	0	0	0	0	0	0

Appendix M
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2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	256	23	1	596.558	-316.101	D	8.172	8.172	0	4.586	0	0	0	0	0	0
2003	257	23	625	596.311	-316.079	D	9.854	9.336	0.519	7.409	86.89	13.1	0	0	0	0.01
2003	258	23	557	601.32	-313.419	D	6.934	6.896	0.038	1.847	96.95	2.91	0	0	0	0.13
2003	259	23	624	596.324	-316.278	D	6.657	6.653	0.004	1.364	99.76	0.17	0	0	0	0.05
2003	260	23	637	596.267	-315.066	D	6.756	6.743	0.014	1.541	99.63	0.34	0	0	0	0.03
2003	261	23	654	597.855	-312.645	D	7.153	7.152	0	2.371	99.86	0.16	0	0	0	0.02
2003	262	23	557	601.32	-313.419	D	7.308	7.265	0.043	2.604	82.86	17.09	0	0	0	0.05
2003	263	23	1	596.558	-316.101	D	6.662	6.662	0	1.382	0	0	0	0	0	0
2003	264	23	107	598.487	-311.954	D	6.707	6.707	0	1.471	99.68	0.56	0	0	0	0.02
2003	265	23	1	596.558	-316.101	D	9.105	9.105	0	6.825	0	0	0	0	0	0
2003	266	23	676	599.876	-309.365	D	7.191	7.165	0.027	2.396	90.46	9.37	0	0	0	0.17
2003	267	23	624	596.324	-316.278	D	6.73	6.724	0.006	1.504	99.24	0.72	0	0	0	0.04
2003	268	23	521	602.866	-306.052	D	6.995	6.983	0.012	2.024	95.71	4.22	0	0	0	0.06
2003	269	23	548	603.28	-312.734	D	6.699	6.689	0.01	1.435	99.79	0.18	0	0	0	0.03
2003	270	23	517	602.805	-305.061	D	7.729	7.717	0.012	3.571	95.8	4.13	0	0	0	0.07
2003	271	23	683	600.738	-308.205	D	6.97	6.954	0.016	1.964	98.27	1.59	0	0	0	0.14
2003	272	23	583	599.621	-315.062	D	6.608	6.599	0.009	1.259	97.17	2.72	0	0	0	0.11
2003	273	23	517	602.805	-305.061	D	6.668	6.608	0.06	1.276	97.59	2.34	0	0	0	0.08
2003	274	23	637	596.267	-315.066	D	9.34	9.046	0.294	6.676	88.02	11.95	0	0	0	0.03
2003	275	23	548	603.28	-312.734	D	6.582	6.568	0.014	1.198	98.36	1.58	0	0	0	0.06
2003	276	23	517	602.805	-305.061	D	6.522	6.522	0.001	1.108	99.17	0.99	0	0	0	0.05
2003	277	23	625	596.311	-316.079	D	7.031	6.99	0.041	2.038	85.16	14.77	0	0	0	0.07
2003	278	23	517	602.805	-305.061	D	6.695	6.634	0.061	1.328	98.8	1.13	0	0	0	0.07
2003	279	23	694	602.12	-306.029	D	8.79	8.749	0.041	5.945	97.63	2.35	0	0	0	0.01
2003	280	23	517	602.805	-305.061	D	6.911	6.891	0.02	1.838	99.73	0.25	0	0	0	0.02
2003	281	23	517	602.805	-305.061	D	6.875	6.866	0.008	1.788	99.85	0.14	0	0	0	0.02
2003	282	23	517	602.805	-305.061	D	8.298	8.298	0	4.877	99.01	0.04	0	0	0	0.02
2003	283	23	1	596.558	-316.101	D	9.541	9.541	0	7.942	0	0	0	0	0	0
2003	284	23	1	596.558	-316.101	D	8.585	8.585	0	5.552	0	0	0	0	0	0
2003	285	23	521	602.866	-306.052	D	7.556	7.538	0.018	3.182	76.5	23.44	0	0	0	0.06
2003	286	23	624	596.324	-316.278	D	6.669	6.668	0.001	1.394	99.78	0.16	0	0	0	0.04
2003	287	23	624	596.324	-316.278	D	8.036	7.986	0.05	4.166	92.98	6.99	0	0	0	0.02
2003	288	23	517	602.805	-305.061	D	6.806	6.792	0.015	1.639	97.14	2.75	0	0	0	0.12
2003	289	23	517	602.805	-305.061	D	6.671	6.667	0.004	1.392	99.02	0.89	0	0	0	0.07
2003	290	23	517	602.805	-305.061	D	8.868	8.834	0.034	6.152	96.65	3.34	0	0	0	0
2003	291	23	662	598.404	-311.683	D	6.623	6.617	0.006	1.294	99.36	0.56	0	0	0	0.07
2003	292	23	517	602.805	-305.061	D	6.788	6.76	0.028	1.576	98.95	0.97	0	0	0	0.08
2003	293	23	517	602.805	-305.061	D	6.873	6.87	0.003	1.796	99.75	0.21	0	0	0	0.05
2003	294	23	557	601.32	-313.419	D	7.122	7.112	0.01	2.288	88.9	10.91	0	0	0	0.18

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	295	23	624	596.324	-316.278	D	6.7	6.629	0.071	1.318	99.3	0.64	0	0	0	0.07
2003	296	23	517	602.805	-305.061	D	6.736	6.676	0.059	1.41	98.27	1.64	0	0	0	0.09
2003	297	23	624	596.324	-316.278	D	6.704	6.701	0.003	1.459	99.73	0.21	0	0	0	0.05
2003	298	23	624	596.324	-316.278	D	7.484	7.465	0.02	3.025	96.32	3.66	0	0	0	0.02
2003	299	23	697	602.531	-305.449	D	7.657	7.612	0.045	3.342	85.04	14.88	0	0	0	0.08
2003	300	23	624	596.324	-316.278	D	6.797	6.736	0.061	1.528	95.66	4.3	0	0	0	0.04
2003	301	23	548	603.28	-312.734	D	7.357	7.354	0.002	2.792	98.87	1.11	0	0	0	0.04
2003	302	23	517	602.805	-305.061	D	6.926	6.925	0.002	1.905	96.49	3.45	0	0	0	0.1
2003	303	23	517	602.805	-305.061	D	7.216	7.215	0.001	2.501	99.36	0.67	0	0	0	0.05
2003	304	23	1	596.558	-316.101	D	8.474	8.474	0	5.289	0	0	0	0	0	0
2003	305	23	517	602.805	-305.061	D	8.072	7.895	0.178	3.962	98.78	1.21	0	0	0	0.01
2003	306	23	517	602.805	-305.061	D	7.721	7.713	0.008	3.562	99.42	0.57	0	0	0	0.01
2003	307	23	1	596.558	-316.101	D	7.022	7.022	0	2.102	0	0	0	0	0	0
2003	308	23	1	596.558	-316.101	D	6.963	6.963	0	1.983	0	0	0	0	0	0
2003	309	23	529	602.989	-308.032	D	7.77	7.598	0.171	3.313	88.8	11.18	0	0	0	0.02
2003	310	23	78	598.564	-316.197	D	8.247	8.246	0	4.758	96.21	2.67	0	0	0	0.02
2003	311	23	1	596.558	-316.101	D	7.606	7.606	0	3.33	0	0	0	0	0	0
2003	312	23	1	596.558	-316.101	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	6.522	6.522	0	1.109	0	0	0	0	0	0
2003	314	23	1	596.558	-316.101	D	6.536	6.536	0	1.136	0	0	0	0	0	0
2003	315	23	1	596.558	-316.101	D	8.014	8.014	0	4.229	0	0	0	0	0	0
2003	316	23	1	596.558	-316.101	D	9.179	9.179	0	7.011	0	0	0	0	0	0
2003	317	23	517	602.805	-305.061	D	6.531	6.53	0.001	1.123	89.57	10.14	0	0	0	0.26
2003	318	23	624	596.324	-316.278	D	6.592	6.584	0.008	1.229	90.98	8.89	0	0	0	0.11
2003	319	23	517	602.805	-305.061	D	9.327	9.323	0.004	7.376	91.59	8.41	0	0	0	0.02
2003	320	23	1	596.558	-316.101	D	9.542	9.542	0	7.944	0	0	0	0	0	0
2003	321	23	1	596.558	-316.101	D	9.739	9.739	0	8.468	0	0	0	0	0	0
2003	322	23	1	596.558	-316.101	D	10.113	10.113	0	9.486	0	0	0	0	0	0
2003	323	23	517	602.805	-305.061	D	8.055	7.977	0.078	4.145	94.09	5.89	0	0	0	0.02
2003	324	23	1	596.558	-316.101	D	6.99	6.99	0	2.039	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.219	7.219	0	2.508	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	9.046	9.046	0	6.676	0	0	0	0	0	0
2003	327	23	517	602.805	-305.061	D	9.23	9.23	0	7.139	93.92	5.25	0	0	0	0
2003	328	23	1	596.558	-316.101	D	7.244	7.244	0	2.56	0	0	0	0	0	0
2003	329	23	1	596.558	-316.101	D	6.84	6.84	0	1.735	0	0	0	0	0	0
2003	330	23	1	596.558	-316.101	D	7.124	7.124	0	2.311	0	0	0	0	0	0
2003	331	23	624	596.324	-316.278	D	8.924	8.874	0.051	6.25	90.99	9	0	0	0	0.01
2003	332	23	557	601.32	-313.419	D	7.551	7.535	0.016	3.177	70.12	29.78	0	0	0	0.1
2003	333	23	517	602.805	-305.061	D	6.841	6.831	0.01	1.718	64.09	35.67	0	0	0	0.24

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	334	23	1	596.558	-316.101	D	6.842	6.842	0	1.739	0	0	0	0	0	0
2003	335	23	632	596.27	-315.421	D	6.784	6.78	0.004	1.616	79.29	20.43	0	0	0	0.27
2003	336	23	1	596.558	-316.101	D	6.496	6.496	0	1.057	0	0	0	0	0	0
2003	337	23	1	596.558	-316.101	D	7.76	7.76	0	3.665	0	0	0	0	0	0
2003	338	23	637	596.267	-315.066	D	9.646	9.586	0.061	8.06	93.32	6.67	0	0	0	0.02
2003	339	23	520	602.851	-305.804	D	8.938	8.375	0.563	5.056	94.33	5.66	0	0	0	0.01
2003	340	23	623	596.511	-316.262	D	8.065	8.065	0	4.344	95.04	5.36	0	0	0	0.03
2003	341	23	1	596.558	-316.101	D	6.693	6.693	0	1.444	0	0	0	0	0	0
2003	342	23	1	596.558	-316.101	D	7.207	7.207	0	2.484	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	9.465	9.465	0	7.743	0	0	0	0	0	0
2003	344	23	514	602.766	-305.877	D	9.37	9.139	0.231	6.909	88.97	11.01	0	0	0	0.01
2003	345	23	660	598.316	-311.922	D	7.918	7.76	0.158	3.665	77.69	22.25	0	0	0	0.06
2003	346	23	624	596.324	-316.278	D	7.21	7.179	0.03	2.426	89.72	10.23	0	0	0	0.05
2003	347	23	1	596.558	-316.101	D	8.391	8.391	0	5.094	0	0	0	0	0	0
2003	348	23	1	596.558	-316.101	D	9.519	9.519	0	7.884	0	0	0	0	0	0
2003	349	23	1	596.558	-316.101	D	8.691	8.691	0	5.807	0	0	0	0	0	0
2003	350	23	1	596.558	-316.101	D	8.203	8.203	0	4.659	0	0	0	0	0	0
2003	351	23	1	596.558	-316.101	D	7.45	7.45	0	2.994	0	0	0	0	0	0
2003	352	23	1	596.558	-316.101	D	8.024	8.024	0	4.251	0	0	0	0	0	0
2003	353	23	517	602.805	-305.061	D	8.081	8.042	0.039	4.292	90	9.92	0	0	0	0.08
2003	354	23	557	601.32	-313.419	D	7.12	7.051	0.069	2.163	70.16	29.71	0	0	0	0.13
2003	355	23	517	602.805	-305.061	D	6.669	6.662	0.007	1.381	84.93	14.99	0	0	0	0.09
2003	356	23	1	596.558	-316.101	D	8.674	8.674	0	5.764	0	0	0	0	0	0
2003	357	23	637	596.267	-315.066	D	8.982	8.915	0.066	6.352	90.99	9.01	0	0	0	0.01
2003	358	23	632	596.27	-315.421	D	7.64	7.495	0.145	3.091	77.24	22.67	0	0	0	0.09
2003	359	23	624	596.324	-316.278	D	6.833	6.759	0.074	1.574	91.61	8.34	0	0	0	0.05
2003	360	23	517	602.805	-305.061	D	6.886	6.837	0.048	1.73	93.55	6.42	0	0	0	0.03
2003	361	23	517	602.805	-305.061	D	6.851	6.851	0	1.757	94.38	5.43	0	0	0	0.02
2003	362	23	1	596.558	-316.101	D	8.349	8.349	0	4.997	0	0	0	0	0	0
2003	363	23	517	602.805	-305.061	D	9.617	9.616	0.001	8.141	90.75	9.13	0	0	0	0.05
2003	364	23	1	596.558	-316.101	D	7.176	7.176	0	2.418	0	0	0	0	0	0
									1.012							
NORANDA									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	8.203	8.203	0	4.658	0	0	0	0	0	0
2003	2	23	557	601.32	-313.419	D	9.727	9.726	0	8.434	83.04	0.01	0	0	6.22	9.69

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	3	23	1	596.558	-316.101	D	8.04	8.04	0	4.288	0	0	0	0	0	0
2003	4	23	1	596.558	-316.101	D	7.108	7.108	0	2.278	0	0	0	0	0	0
2003	5	23	1	596.558	-316.101	D	7.432	7.432	0	2.955	0	0	0	0	0	0
2003	6	23	1	596.558	-316.101	D	7.788	7.788	0	3.726	0	0	0	0	0	0
2003	7	23	1	596.558	-316.101	D	8.223	8.223	0	4.703	0	0	0	0	0	0
2003	8	23	1	596.558	-316.101	D	7.013	7.013	0	2.085	0	0	0	0	0	0
2003	9	23	1	596.558	-316.101	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2003	10	23	1	596.558	-316.101	D	6.784	6.784	0	1.623	0	0	0	0	0	0
2003	11	23	1	596.558	-316.101	D	6.589	6.589	0	1.238	0	0	0	0	0	0
2003	12	23	622	596.698	-316.245	D	6.541	6.533	0.008	1.13	88.94	0.12	0	0	1.67	9.28
2003	13	23	521	602.866	-306.052	D	6.709	6.689	0.02	1.435	81.96	0.31	0	0	0.77	16.95
2003	14	23	1	596.558	-316.101	D	7.656	7.656	0	3.436	0	0	0	0	0	0
2003	15	23	1	596.558	-316.101	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2003	16	23	624	596.324	-316.278	D	7.865	7.857	0.009	3.877	72.73	0.03	0	0	9.94	17.29
2003	17	23	186	600.15	-314.075	D	7.478	7.478	0	3.054	76.52	0	0	0	1.77	11.69
2003	18	23	1	596.558	-316.101	D	7.336	7.336	0	2.754	0	0	0	0	0	0
2003	19	23	1	596.558	-316.101	D	7.45	7.45	0	2.995	0	0	0	0	0	0
2003	20	23	1	596.558	-316.101	D	6.912	6.912	0	1.879	0	0	0	0	0	0
2003	21	23	603	598.68	-316.244	D	6.995	6.929	0.066	1.915	96.29	0.23	0	0	0.15	3.32
2003	22	23	1	596.558	-316.101	D	7.394	7.394	0	2.876	0	0	0	0	0	0
2003	23	23	1	596.558	-316.101	D	7.283	7.283	0	2.642	0	0	0	0	0	0
2003	24	23	603	598.68	-316.244	D	6.953	6.952	0.001	1.961	83.98	0.29	0	0	1.66	14.11
2003	25	23	548	603.28	-312.734	D	6.605	6.598	0.007	1.257	87.71	0.27	0	0	0.55	11.48
2003	26	23	545	603.234	-311.991	D	7.001	7.001	0	2.059	94.4	0.16	0	0	0.17	5.35
2003	27	23	637	596.267	-315.066	D	6.984	6.96	0.024	1.977	75.89	0.3	0	0	2.76	21.05
2003	28	23	517	602.805	-305.061	D	7.199	7.197	0.001	2.464	78.99	0.58	0	0	0.07	20.29
2003	29	23	1	596.558	-316.101	D	9.363	9.363	0	7.479	0	0	0	0	0	0
2003	30	23	603	598.68	-316.244	D	8.758	8.757	0	5.966	96.53	0.12	0	0	0.56	3.09
2003	31	23	519	602.836	-305.557	D	8.811	8.741	0.071	5.925	96.7	0.17	0	0	0.17	2.96
2003	32	23	1	596.558	-316.101	D	8.682	8.682	0	5.785	0	0	0	0	0	0
2003	33	23	1	596.558	-316.101	D	7.359	7.359	0	2.802	0	0	0	0	0	0
2003	34	23	1	596.558	-316.101	D	10.197	10.197	0	9.721	0	0	0	0	0	0
2003	35	23	1	596.558	-316.101	D	7.15	7.15	0	2.365	0	0	0	0	0	0
2003	36	23	1	596.558	-316.101	D	6.556	6.556	0	1.175	0	0	0	0	0	0
2003	37	23	632	596.27	-315.421	D	8.88	8.763	0.117	5.98	75.29	0.44	0	0	4.88	19.39
2003	38	23	624	596.324	-316.278	D	8.293	8.182	0.111	4.611	99.58	0.05	0	0	0.06	0.32
2003	39	23	1	596.558	-316.101	D	7.124	7.124	0	2.312	0	0	0	0	0	0
2003	40	23	517	602.805	-305.061	D	7.578	7.577	0.002	3.265	94.43	1.43	0	0	0.5	3.61
2003	41	23	517	602.805	-305.061	D	9.499	9.489	0.01	7.808	68.74	6.82	0	0	1	23.43

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	42	23	1	596.558	-316.101	D	8.22	8.22	0	4.698	0	0	0	0	0	0
2003	43	23	1	596.558	-316.101	D	6.714	6.714	0	1.484	0	0	0	0	0	0
2003	44	23	517	602.805	-305.061	D	6.53	6.529	0	1.123	0.01	5.57	0	0	0	92.71
2003	45	23	536	603.096	-309.764	D	9.543	9.438	0.104	7.675	68.99	1.26	0	0	5.06	24.7
2003	46	23	548	603.28	-312.734	D	10.207	9.886	0.321	8.864	97.64	0.35	0	0	0.14	1.87
2003	47	23	632	596.27	-315.421	D	8.416	8.415	0.001	5.15	84.98	0	0	0	4.92	9.98
2003	48	23	1	596.558	-316.101	D	7.785	7.785	0	3.72	0	0	0	0	0	0
2003	49	23	1	596.558	-316.101	D	9.022	9.022	0	6.617	0	0	0	0	0	0
2003	50	23	604	598.599	-316.246	D	9.259	9.146	0.113	6.927	82.08	0.76	0	0	2.54	14.62
2003	51	23	603	598.68	-316.244	D	9.617	9.511	0.106	7.865	99.58	0.06	0	0	0.02	0.33
2003	52	23	625	596.311	-316.079	D	9.738	9.592	0.146	8.077	98.8	0.12	0	0	0.23	0.85
2003	53	23	631	596.276	-315.551	D	9.779	9.778	0.001	8.571	97.61	0	0	0	0.57	1.67
2003	54	23	624	596.324	-316.278	D	7.806	7.801	0.005	3.755	94.52	0.15	0	0	1.44	3.88
2003	55	23	624	596.324	-316.278	D	8.672	8.632	0.04	5.664	97.92	0.27	0	0	0.18	1.62
2003	56	23	1	596.558	-316.101	D	6.921	6.921	0	1.898	0	0	0	0	0	0
2003	57	23	78	598.564	-316.197	D	7.16	7.16	0	2.386	87.11	0.02	0	0	3	8.67
2003	58	23	1	596.558	-316.101	D	8.135	8.135	0	4.503	0	0	0	0	0	0
2003	59	23	1	596.558	-316.101	D	9.036	9.036	0	6.651	81.49	0	0	0	4.01	6.91
2003	60	23	582	599.649	-315.031	D	8.436	7.978	0.458	4.148	97.52	0.21	0	0	0.24	2.03
2003	61	23	548	603.28	-312.734	D	9.006	8.939	0.067	6.41	99.17	0.08	0	0	0.03	0.71
2003	62	23	548	603.28	-312.734	D	7.812	7.754	0.058	3.651	90.46	0.14	0	0	1.39	8.01
2003	63	23	517	602.805	-305.061	D	6.99	6.973	0.017	2.004	92.2	0.19	0	0	0.17	7.45
2003	64	23	1	596.558	-316.101	D	8.823	8.823	0	6.127	0	0	0	0	0	0
2003	65	23	1	596.558	-316.101	D	7.519	7.519	0	3.142	0	0	0	0	0	0
2003	66	23	632	596.27	-315.421	D	8.137	7.935	0.202	4.052	81.06	0.67	0	0	3.53	14.73
2003	67	23	557	601.32	-313.419	D	7.123	6.987	0.136	2.033	17.02	1.24	0	0	11.23	70.51
2003	68	23	1	596.558	-316.101	D	6.929	6.929	0	1.914	0	0	0	0	0	0
2003	69	23	1	596.558	-316.101	D	6.622	6.622	0	1.304	0	0	0	0	0	0
2003	70	23	548	603.28	-312.734	D	6.573	6.532	0.041	1.128	75.4	0.08	0	0	4.87	19.64
2003	71	23	517	602.805	-305.061	D	6.741	6.724	0.017	1.505	86.16	0.1	0	0	0.46	13.28
2003	72	23	1	596.558	-316.101	D	8.018	8.018	0	4.238	0	0	0	0	0	0
2003	73	23	1	596.558	-316.101	D	8.021	8.021	0	4.244	0	0	0	0	0	0
2003	74	23	521	602.866	-306.052	D	9.443	8.555	0.889	5.479	98.35	0.09	0	0	0.32	1.25
2003	75	23	521	602.866	-306.052	D	8.879	8.649	0.23	5.704	74.48	2.17	0	0	2.93	20.42
2003	76	23	557	601.32	-313.419	D	9.386	8.813	0.574	6.101	79.26	2.29	0	0	2.52	15.93
2003	77	23	557	601.32	-313.419	D	8.824	8.784	0.041	6.03	92.07	0.4	0	0	1.17	6.37
2003	78	23	507	602.9	-307.616	D	9.099	9.04	0.059	6.661	91.22	0.19	0	0	2.41	6.18
2003	79	23	517	602.805	-305.061	D	7.726	7.725	0	3.588	24.2	7.2	0	0	4.11	64.68
2003	80	23	624	596.324	-316.278	D	8.997	8.885	0.112	6.279	99.17	0.09	0	0	0.02	0.72

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	81	23	1	596.558	-316.101	D	6.548	6.548	0	1.159	0	0	0	0	0	0
2003	82	23	1	596.558	-316.101	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2003	83	23	1	596.558	-316.101	D	6.66	6.66	0	1.378	0	0	0	0	0	0
2003	84	23	1	596.558	-316.101	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2003	85	23	1	596.558	-316.101	D	8.221	8.221	0	4.7	0	0	0	0	0	0
2003	86	23	632	596.27	-315.421	D	6.769	6.643	0.127	1.344	14.78	0.45	0	0	15.04	69.74
2003	87	23	1	596.558	-316.101	D	8.454	8.454	0	5.242	0	0	0	0	0	0
2003	88	23	1	596.558	-316.101	D	7.65	7.65	0	3.423	0	0	0	0	0	0
2003	89	23	1	596.558	-316.101	D	6.845	6.845	0	1.745	0	0	0	0	0	0
2003	90	23	1	596.558	-316.101	D	6.49	6.49	0	1.046	0	0	0	0	0	0
2003	91	23	1	596.558	-316.101	D	6.687	6.687	0	1.43	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	6.835	6.835	0	1.725	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	6.998	6.998	0	2.054	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.194	7.194	0	2.457	0	0	0	0	0	0
2003	95	23	1	596.558	-316.101	D	7.232	7.232	0	2.536	0	0	0	0	0	0
2003	96	23	1	596.558	-316.101	D	8.015	8.015	0	4.232	52.72	0.01	0	0	25.2	66.76
2003	97	23	638	596.406	-314.894	D	9.109	9.066	0.043	6.726	88.7	0.79	0	0	1.58	8.93
2003	98	23	517	602.805	-305.061	D	8.79	8.55	0.24	5.469	99.44	0.04	0	0	0.01	0.51
2003	99	23	186	600.15	-314.075	D	7.252	7.252	0	2.577	99.43	0	0	0	0.01	1.17
2003	100	23	1	596.558	-316.101	D	6.749	6.749	0	1.554	0	0	0	0	0	0
2003	101	23	1	596.558	-316.101	D	6.499	6.499	0	1.063	0	0	0	0	0	0
2003	102	23	1	596.558	-316.101	D	6.499	6.499	0	1.064	0	0	0	0	0	0
2003	103	23	624	596.324	-316.278	D	6.603	6.576	0.026	1.215	90.99	0.03	0	0	1.06	7.92
2003	104	23	557	601.32	-313.419	D	6.9	6.755	0.145	1.566	37.25	0.18	0	0	10.3	52.28
2003	105	23	1	596.558	-316.101	D	6.586	6.586	0	1.233	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2003	107	23	517	602.805	-305.061	D	8.161	8.159	0.002	4.559	96.58	0.01	0	0	0.21	3.14
2003	108	23	548	603.28	-312.734	D	7.424	7.346	0.078	2.775	90.92	0	0	0	1.45	7.63
2003	109	23	517	602.805	-305.061	D	7.61	7.538	0.073	3.181	57.72	0.24	0	0	8.12	33.91
2003	110	23	1	596.558	-316.101	D	8.832	8.832	0	6.148	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.023	7.023	0	2.105	0	0	0	0	0	0
2003	112	23	1	596.558	-316.101	D	6.947	6.947	0	1.951	0	0	0	0	0	0
2003	113	23	624	596.324	-316.278	D	6.52	6.512	0.008	1.089	78.9	0.02	0	0	4.05	17.04
2003	114	23	517	602.805	-305.061	D	9.086	8.967	0.119	6.48	83.31	1.9	0	0	1.95	12.85
2003	115	23	517	602.805	-305.061	D	9.733	9.578	0.154	8.041	91.76	0.44	0	0	1.63	6.16
2003	116	23	624	596.324	-316.278	D	7.17	7.167	0.003	2.401	92.8	0.01	0	0	1.6	5.61
2003	117	23	624	596.324	-316.278	D	6.837	6.723	0.114	1.502	90.71	0	0	0	1.66	7.62
2003	118	23	517	602.805	-305.061	D	7.054	7.032	0.022	2.124	50.9	0.72	0	0	3.75	44.63
2003	119	23	548	603.28	-312.734	D	7.847	7.844	0.003	3.85	68.35	0.3	0	0	2.61	28.67

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	120	23	557	601.32	-313.419	D	7.664	7.58	0.084	3.273	47.24	1.12	0	0	8.67	42.97
2003	121	23	1	596.558	-316.101	D	7.209	7.209	0	2.487	0	0	0	0	0	0
2003	122	23	78	598.564	-316.197	D	8.604	8.604	0	5.598	73.2	1.86	0	0	3.6	20.62
2003	123	23	1	596.558	-316.101	D	8.197	8.197	0	4.644	0	0	0	0	0	0
2003	124	23	638	596.406	-314.894	D	8.115	7.79	0.325	3.73	96.3	0.08	0	0	0.96	2.65
2003	125	23	1	596.558	-316.101	D	8.34	8.34	0	4.974	0	0	0	0	0	0
2003	126	23	1	596.558	-316.101	D	8.709	8.709	0	5.849	0	0	0	0	0	0
2003	127	23	517	602.805	-305.061	D	8.97	8.534	0.436	5.431	96.16	0.29	0	0	0.51	3.04
2003	128	23	603	598.68	-316.244	D	7.966	7.839	0.127	3.838	97.53	0.02	0	0	0.27	2.18
2003	129	23	1	596.558	-316.101	D	8.692	8.692	0	5.807	0	0	0	0	0	0
2003	130	23	1	596.558	-316.101	D	8.133	8.133	0	4.497	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.39	7.39	0	2.868	0	0	0	0	0	0
2003	132	23	1	596.558	-316.101	D	6.586	6.586	0	1.233	0	0	0	0	0	0
2003	133	23	548	603.28	-312.734	D	6.544	6.543	0.001	1.149	97.29	0	0	0	0.8	1.89
2003	134	23	548	603.28	-312.734	D	7.331	7.321	0.01	2.723	57.79	0.23	0	0	5.71	36.26
2003	135	23	1	596.558	-316.101	D	8.809	8.809	0	6.091	0	0	0	0	0	0
2003	136	23	624	596.324	-316.278	D	8.876	8.742	0.133	5.929	99.16	0.03	0	0	0.13	0.68
2003	137	23	624	596.324	-316.278	D	10.916	9.966	0.95	9.081	99.26	0.05	0	0	0.15	0.54
2003	138	23	637	596.267	-315.066	D	9.207	9.206	0.002	7.078	99.47	0.01	0	0	0.06	0.49
2003	139	23	548	603.28	-312.734	D	9.073	8.685	0.388	5.791	97.89	0.1	0	0	0.43	1.57
2003	140	23	517	602.805	-305.061	D	9.062	8.701	0.361	5.83	98.94	0.03	0	0	0.08	0.96
2003	141	23	603	598.68	-316.244	D	6.779	6.778	0	1.612	97.21	0.04	0	0	0.17	2.58
2003	142	23	1	596.558	-316.101	D	6.836	6.836	0	1.727	0	0	0	0	0	0
2003	143	23	1	596.558	-316.101	D	6.683	6.683	0	1.423	0	0	0	0	0	0
2003	144	23	603	598.68	-316.244	D	6.77	6.728	0.042	1.512	93.36	0	0	0	1.16	5.48
2003	145	23	548	603.28	-312.734	D	8.881	8.461	0.42	5.257	97.93	0.16	0	0	0.26	1.66
2003	146	23	624	596.324	-316.278	D	7.34	7.338	0.002	2.757	97.41	0.01	0	0	0.25	2.31
2003	147	23	1	596.558	-316.101	D	6.851	6.851	0	1.758	0	0	0	0	0	0
2003	148	23	1	596.558	-316.101	D	6.655	6.655	0	1.369	0	0	0	0	0	0
2003	149	23	1	596.558	-316.101	D	7.285	7.285	0	2.647	0	0	0	0	0	0
2003	150	23	1	596.558	-316.101	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	151	23	1	596.558	-316.101	D	7.026	7.026	0	2.111	0	0	0	0	0	0
2003	152	23	1	596.558	-316.101	D	7.216	7.216	0	2.503	0	0	0	0	0	0
2003	153	23	517	602.805	-305.061	D	7.828	7.724	0.103	3.586	85.08	0.58	0	0	2.2	12.14
2003	154	23	695	602.257	-305.836	D	9.42	9.306	0.114	7.333	99.03	0.1	0	0	0.07	0.81
2003	155	23	621	596.885	-316.228	D	7.962	7.962	0	4.112	89.03	0.01	0	0	1.72	8.67
2003	156	23	186	600.15	-314.075	D	6.941	6.941	0	1.938	71.83	0	0	0	0.39	5.06
2003	157	23	517	602.805	-305.061	D	6.916	6.841	0.075	1.737	78.38	0.02	0	0	3.43	18.17
2003	158	23	527	602.958	-307.536	D	8.778	8.431	0.347	5.188	97.88	0.06	0	0	0.12	1.94

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	159	23	304	601.583	-313.215	D	6.813	6.813	0	1.681	72.29	0.02	0	0	0.68	24.22
2003	160	23	1	596.558	-316.101	D	6.628	6.628	0	1.315	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.047	7.047	0	2.154	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	8.113	8.113	0	4.453	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	9.39	9.381	0.009	7.527	97.41	0.39	0	0	0.06	2.13
2003	164	23	1	596.558	-316.101	D	9.343	9.343	0	7.429	0	0	0	0	0	0
2003	165	23	517	602.805	-305.061	D	9.092	9.092	0	6.791	97.32	0	0	0	0.07	2.04
2003	166	23	517	602.805	-305.061	D	8.174	8.127	0.048	4.484	99.49	0.02	0	0	0.02	0.46
2003	167	23	548	603.28	-312.734	D	8.363	8.298	0.064	4.878	99.5	0.02	0	0	0.02	0.46
2003	168	23	548	603.28	-312.734	D	7.327	7.305	0.022	2.688	99.42	0.01	0	0	0.04	0.53
2003	169	23	623	596.511	-316.262	D	7.203	7.188	0.014	2.445	96.39	0.02	0	0	0.82	2.78
2003	170	23	621	596.885	-316.228	D	7.143	7.14	0.003	2.345	98.88	0.01	0	0	0.08	0.98
2003	171	23	514	602.766	-305.877	D	7.803	7.802	0	3.757	99.95	0	0	0	0.01	0.24
2003	172	23	1	596.558	-316.101	D	6.706	6.706	0	1.469	0	0	0	0	0	0
2003	173	23	632	596.27	-315.421	D	6.949	6.717	0.232	1.49	90.36	0	0	0	2.74	6.9
2003	174	23	557	601.32	-313.419	D	6.94	6.692	0.248	1.442	29.23	0.06	0	0	10.9	59.82
2003	175	23	517	602.805	-305.061	D	6.837	6.739	0.098	1.534	52.63	0.07	0	0	6.63	40.68
2003	176	23	625	596.311	-316.079	D	7.235	7.078	0.157	2.217	24.8	0.14	0	0	11.7	63.35
2003	177	23	1	596.558	-316.101	D	8.459	8.459	0	5.252	0	0	0	0	0	0
2003	178	23	1	596.558	-316.101	D	6.912	6.912	0	1.879	0	0	0	0	0	0
2003	179	23	638	596.406	-314.894	D	6.782	6.644	0.138	1.347	95.39	0	0	0	1.66	2.95
2003	180	23	517	602.805	-305.061	D	6.781	6.631	0.15	1.32	90.2	0.01	0	0	1.12	8.67
2003	181	23	517	602.805	-305.061	D	7.548	7.212	0.335	2.495	95.22	0	0	0	0.92	3.85
2003	182	23	517	602.805	-305.061	D	8.542	8.348	0.194	4.994	93.82	0.07	0	0	0.82	5.28
2003	183	23	517	602.805	-305.061	D	8.771	8.7	0.071	5.828	99.52	0.01	0	0	0.05	0.42
2003	184	23	548	603.28	-312.734	D	7.632	7.423	0.209	2.937	98.6	0	0	0	0.19	1.21
2003	185	23	520	602.851	-305.804	D	7.806	7.579	0.227	3.271	99.04	0	0	0	0.09	0.87
2003	186	23	517	602.805	-305.061	D	7.898	7.887	0.011	3.945	98.32	0	0	0	0.11	1.54
2003	187	23	325	601.181	-307.998	D	8.091	8.091	0	4.402	87.28	0	0	0	0.82	3.67
2003	188	23	1	596.558	-316.101	D	8.182	8.182	0	4.611	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.198	7.198	0	2.466	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.669	7.669	0	3.465	0	0	0	0	0	0
2003	192	23	1	596.558	-316.101	D	6.901	6.901	0	1.858	0	0	0	0	0	0
2003	193	23	1	596.558	-316.101	D	7.001	7.001	0	2.059	0	0	0	0	0	0
2003	194	23	603	598.68	-316.244	D	7.151	7.15	0.001	2.365	72.87	0.17	0	0	1.97	25.09
2003	195	23	624	596.324	-316.278	D	7.14	7	0.14	2.058	95.13	0	0	0	0.77	4.1
2003	196	23	517	602.805	-305.061	D	7.726	7.655	0.07	3.436	97.52	0	0	0	0.24	2.23
2003	197	23	1	596.558	-316.101	D	7.46	7.46	0	3.015	0	0	0	0	0	0

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	198	23	624	596.324	-316.278	D	6.962	6.916	0.046	1.888	96.02	0	0	0	1.17	2.8
2003	199	23	551	602.657	-313.003	D	7.382	7.271	0.111	2.617	77.73	0.05	0	0	1.89	20.34
2003	200	23	545	603.234	-311.991	D	8.926	8.846	0.079	6.183	99.06	0.01	0	0	0.06	0.88
2003	201	23	603	598.68	-316.244	D	8.148	7.89	0.258	3.951	97.52	0.01	0	0	0.54	1.93
2003	202	23	517	602.805	-305.061	D	8.157	8.122	0.034	4.474	98.14	0	0	0	0.22	1.65
2003	203	23	1	596.558	-316.101	D	7.074	7.074	0	2.209	0	0	0	0	0	0
2003	204	23	1	596.558	-316.101	D	7.251	7.251	0	2.576	0	0	0	0	0	0
2003	205	23	1	596.558	-316.101	D	6.753	6.753	0	1.562	0	0	0	0	0	0
2003	206	23	624	596.324	-316.278	D	6.908	6.787	0.12	1.63	92.95	0	0	0	1	6.04
2003	207	23	517	602.805	-305.061	D	6.867	6.841	0.026	1.737	32.59	0.2	0	0	8.51	58.71
2003	208	23	1	596.558	-316.101	D	7.426	7.426	0	2.944	0	0	0	0	0	0
2003	209	23	1	596.558	-316.101	D	8.106	8.106	0	4.438	0	0	0	0	0	0
2003	210	23	624	596.324	-316.278	D	9.167	9.165	0.001	6.976	98.35	0.02	0	0	0.34	1.34
2003	211	23	548	603.28	-312.734	D	8.399	8.022	0.376	4.248	98.47	0.01	0	0	0.39	1.13
2003	212	23	521	602.866	-306.052	D	10.508	8.692	1.816	5.809	99.45	0.01	0	0	0.06	0.49
2003	213	23	548	603.28	-312.734	D	8.467	8.282	0.185	4.84	99.33	0.04	0	0	0.04	0.59
2003	214	23	545	603.234	-311.991	D	8.321	8.317	0.004	4.922	99.46	0	0	0	0.05	0.48
2003	215	23	1	596.558	-316.101	D	9.149	9.149	0	6.935	0	0	0	0	0	0
2003	216	23	1	596.558	-316.101	D	9.097	9.097	0	6.805	0	0	0	0	0	0
2003	217	23	1	596.558	-316.101	D	8.458	8.458	0	5.251	0	0	0	0	0	0
2003	218	23	603	598.68	-316.244	D	8.255	8.104	0.15	4.433	97.59	0.02	0	0	0.69	1.7
2003	219	23	624	596.324	-316.278	D	8.044	8.044	0	4.297	100.09	0	0	0	0.07	0.17
2003	220	23	1	596.558	-316.101	D	7.206	7.206	0	2.482	0	0	0	0	0	0
2003	221	23	1	596.558	-316.101	D	7.507	7.507	0	3.116	0	0	0	0	0	0
2003	222	23	1	596.558	-316.101	D	7.339	7.339	0	2.758	0	0	0	0	0	0
2003	223	23	1	596.558	-316.101	D	7.083	7.083	0	2.228	0	0	0	0	0	0
2003	224	23	1	596.558	-316.101	D	7.389	7.389	0	2.864	0	0	0	0	0	0
2003	225	23	1	596.558	-316.101	D	8.096	8.096	0	4.413	0	0	0	0	0	0
2003	226	23	557	601.32	-313.419	D	9.525	9.235	0.29	7.152	79.79	1.09	0	0	3.63	15.49
2003	227	23	548	603.28	-312.734	D	7.988	7.948	0.041	4.08	97.59	0.03	0	0	0.11	2.26
2003	228	23	521	602.866	-306.052	D	7.095	7.04	0.055	2.14	97.97	0	0	0	0.1	1.93
2003	229	23	548	603.28	-312.734	D	7.145	7.133	0.012	2.331	98.65	0	0	0	0.04	1.31
2003	230	23	548	603.28	-312.734	D	7.557	7.556	0	3.221	56.18	1.18	0	0	1.46	41.04
2003	231	23	624	596.324	-316.278	D	7.858	7.733	0.125	3.606	98.16	0	0	0	0.4	1.44
2003	232	23	517	602.805	-305.061	D	9.66	8.349	1.311	4.997	97.82	0.03	0	0	0.37	1.78
2003	233	23	520	602.851	-305.804	D	8.891	7.999	0.892	4.195	95.18	0.11	0	0	0.22	4.49
2003	234	23	520	602.851	-305.804	D	7.79	7.766	0.024	3.678	98.23	0	0	0	0.2	1.58
2003	235	23	563	600.143	-314.135	D	7.817	7.806	0.01	3.766	99.21	0	0	0	0.04	0.73
2003	236	23	1	596.558	-316.101	D	6.982	6.982	0	2.021	0	0	0	0	0	0

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	237	23	632	596.27	-315.421	D	6.861	6.772	0.089	1.599	68.55	0.03	0	0	5.1	26.32
2003	238	23	517	602.805	-305.061	D	7.144	7.057	0.087	2.174	96.11	0	0	0	0.24	3.65
2003	239	23	517	602.805	-305.061	D	7.947	7.871	0.076	3.91	99.17	0	0	0	0.03	0.8
2003	240	23	1	596.558	-316.101	D	8.693	8.693	0	5.812	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	8.88	8.88	0	6.264	0	0	0	0	0	0
2003	242	23	603	598.68	-316.244	D	9.205	9.195	0.009	7.052	99.19	0.01	0	0	0.16	0.61
2003	243	23	557	601.32	-313.419	D	10.586	9.535	1.051	7.927	93.77	0.56	0	0	0.83	4.84
2003	244	23	1	596.558	-316.101	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2003	245	23	624	596.324	-316.278	D	10.164	10.113	0.051	9.486	98.92	0.09	0	0	0.13	0.86
2003	246	23	548	603.28	-312.734	D	10.808	9.255	1.552	7.205	98.64	0.08	0	0	0.18	1.1
2003	247	23	548	603.28	-312.734	D	7.554	7.552	0.002	3.213	99.59	0.01	0	0	0.03	0.39
2003	248	23	1	596.558	-316.101	D	6.911	6.911	0	1.879	0	0	0	0	0	0
2003	249	23	1	596.558	-316.101	D	6.941	6.941	0	1.937	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.013	7.013	0	2.084	0	0	0	0	0	0
2003	251	23	624	596.324	-316.278	D	6.958	6.958	0	1.973	96.12	0	0	0	0.48	3.31
2003	252	23	624	596.324	-316.278	D	7.202	7.199	0.002	2.468	98.41	0.01	0	0	0.24	1.31
2003	253	23	624	596.324	-316.278	D	7.301	7.08	0.221	2.221	94.37	0	0	0	1.36	4.26
2003	254	23	632	596.27	-315.421	D	7.329	7.138	0.191	2.34	58.32	0.17	0	0	7.54	33.97
2003	255	23	517	602.805	-305.061	D	7.66	7.63	0.03	3.381	67.38	0.05	0	0	4.81	27.76
2003	256	23	517	602.805	-305.061	D	8.215	8.207	0.008	4.668	3.25	0.3	0	0	8.7	87.75
2003	257	23	517	602.805	-305.061	D	9.311	9.311	0	7.345	7.62	30.94	0	0	0	61.03
2003	258	23	1	596.558	-316.101	D	6.879	6.879	0	1.813	0	0	0	0	0	0
2003	259	23	521	602.866	-306.052	D	6.772	6.653	0.119	1.365	91.42	0	0	0	1.49	7.09
2003	260	23	624	596.324	-316.278	D	6.808	6.743	0.066	1.541	88.34	0	0	0	2.67	8.98
2003	261	23	624	596.324	-316.278	D	7.251	7.152	0.098	2.371	77.55	0.01	0	0	4.42	18.01
2003	262	23	545	603.234	-311.991	D	7.268	7.26	0.008	2.593	71.5	0.01	0	0	0.83	27.64
2003	263	23	1	596.558	-316.101	D	6.662	6.662	0	1.382	0	0	0	0	0	0
2003	264	23	624	596.324	-316.278	D	6.774	6.714	0.06	1.485	93.64	0.01	0	0	0.9	5.45
2003	265	23	517	602.805	-305.061	D	9.125	9.094	0.03	6.797	95.41	0.6	0	0	0.17	3.82
2003	266	23	433	602.806	-312.871	D	7.156	7.156	0	2.378	80.55	0.01	0	0	0.15	19.49
2003	267	23	548	603.28	-312.734	D	6.723	6.723	0	1.502	97.71	0	0	0	0.3	2.42
2003	268	23	545	603.234	-311.991	D	6.983	6.983	0	2.024	96.97	0	0	0	0.08	2.3
2003	269	23	557	601.32	-313.419	D	6.751	6.689	0.063	1.435	82.9	0.01	0	0	2.9	14.18
2003	270	23	517	602.805	-305.061	D	7.718	7.717	0	3.571	94.85	0	0	0	0.07	2.45
2003	271	23	1	596.558	-316.101	D	6.945	6.945	0	1.946	0	0	0	0	0	0
2003	272	23	1	596.558	-316.101	D	6.599	6.599	0	1.259	0	0	0	0	0	0
2003	273	23	1	596.558	-316.101	D	6.583	6.583	0	1.227	0	0	0	0	0	0
2003	274	23	1	596.558	-316.101	D	9.046	9.046	0	6.676	0	0	0	0	0	0
2003	275	23	1	596.558	-316.101	D	6.569	6.569	0	1.201	0	0	0	0	0	0

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	276	23	557	601.32	-313.419	D	6.571	6.524	0.047	1.113	24.48	0.49	0	0	14.12	60.91
2003	277	23	548	603.28	-312.734	D	6.955	6.955	0	1.966	94.8	0.01	0	0	0.31	5.36
2003	278	23	548	603.28	-312.734	D	6.676	6.655	0.022	1.367	84.79	0.02	0	0	3.2	11.99
2003	279	23	548	603.28	-312.734	D	9.2	8.765	0.434	5.986	97.34	0.4	0	0	0.19	2.08
2003	280	23	624	596.324	-316.278	D	6.983	6.912	0.071	1.879	95.26	0	0	0	0.79	3.95
2003	281	23	624	596.324	-316.278	D	7.031	6.894	0.137	1.844	95.03	0	0	0	1.18	3.78
2003	282	23	517	602.805	-305.061	D	8.689	8.298	0.391	4.877	62.68	0.47	0	0	5.26	31.59
2003	283	23	624	596.324	-316.278	D	9.557	9.541	0.016	7.942	75.69	0.02	0	0	9.17	15.1
2003	284	23	624	596.324	-316.278	D	9.023	8.585	0.438	5.552	97.58	0.01	0	0	0.65	1.76
2003	285	23	517	602.805	-305.061	D	7.551	7.538	0.012	3.183	94.04	0.22	0	0	0.26	5.48
2003	286	23	624	596.324	-316.278	D	6.687	6.668	0.019	1.394	96.06	0	0	0	0.79	3.15
2003	287	23	517	602.805	-305.061	D	8.012	7.986	0.027	4.165	93.83	0.01	0	0	0.3	5.87
2003	288	23	1	596.558	-316.101	D	6.794	6.794	0	1.642	0	0	0	0	0	0
2003	289	23	1	596.558	-316.101	D	6.667	6.667	0	1.393	0	0	0	0	0	0
2003	290	23	548	603.28	-312.734	D	8.88	8.827	0.053	6.136	95.73	0.39	0	0	0.55	3.33
2003	291	23	78	598.564	-316.197	D	6.62	6.62	0	1.299	91.71	0.05	0	0	0.18	7.65
2003	292	23	1	596.558	-316.101	D	6.743	6.743	0	1.541	0	0	0	0	0	0
2003	293	23	405	602.557	-312.89	D	6.84	6.84	0	1.736	95.73	0	0	0	0.11	1.31
2003	294	23	1	596.558	-316.101	D	7.126	7.126	0	2.316	0	0	0	0	0	0
2003	295	23	1	596.558	-316.101	D	6.629	6.629	0	1.318	0	0	0	0	0	0
2003	296	23	1	596.558	-316.101	D	6.668	6.668	0	1.394	0	0	0	0	0	0
2003	297	23	624	596.324	-316.278	D	6.75	6.701	0.049	1.459	83.05	0.02	0	0	3.59	13.35
2003	298	23	520	602.851	-305.804	D	7.697	7.56	0.136	3.23	97.05	0.04	0	0	0.06	2.84
2003	299	23	603	598.68	-316.244	D	7.556	7.545	0.011	3.197	98.21	0.07	0	0	0.02	1.71
2003	300	23	548	603.28	-312.734	D	6.735	6.728	0.007	1.512	96.18	0	0	0	1.09	2.72
2003	301	23	548	603.28	-312.734	D	7.355	7.354	0.001	2.792	94.18	0.01	0	0	0.36	5.34
2003	302	23	545	603.234	-311.991	D	6.97	6.952	0.019	1.96	89.08	0.01	0	0	1.45	9.46
2003	303	23	517	602.805	-305.061	D	7.22	7.215	0.005	2.501	96.33	0	0	0	0.17	3.5
2003	304	23	1	596.558	-316.101	D	8.474	8.474	0	5.289	0	0	0	0	0	0
2003	305	23	548	603.28	-312.734	D	7.746	7.745	0.001	3.632	93.73	0	0	0	0.21	6.04
2003	306	23	517	602.805	-305.061	D	7.843	7.713	0.13	3.562	71.86	0.29	0	0	3.81	24.04
2003	307	23	1	596.558	-316.101	D	7.022	7.022	0	2.102	0	0	0	0	0	0
2003	308	23	1	596.558	-316.101	D	6.963	6.963	0	1.983	0	0	0	0	0	0
2003	309	23	1	596.558	-316.101	D	7.592	7.592	0	3.299	0	0	0	0	0	0
2003	310	23	1	596.558	-316.101	D	8.246	8.246	0	4.758	0	0	0	0	0	0
2003	311	23	1	596.558	-316.101	D	7.606	7.606	0	3.33	0	0	0	0	0	0
2003	312	23	1	596.558	-316.101	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	6.522	6.522	0	1.109	0	0	0	0	0	0
2003	314	23	517	602.805	-305.061	D	6.557	6.536	0.021	1.136	65.89	0.04	0	0	6.71	27.36

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	315	23	326	601.161	-307.751	D	8.061	8.061	0	4.334	15.44	0.63	0	0	0.14	69.6
2003	316	23	1	596.558	-316.101	D	9.179	9.179	0	7.011	0	0	0	0	0	0
2003	317	23	1	596.558	-316.101	D	6.529	6.529	0	1.122	0	0	0	0	0	0
2003	318	23	557	601.32	-313.419	D	6.603	6.561	0.043	1.184	61.73	0.24	0	0	7.04	30.99
2003	319	23	517	602.805	-305.061	D	9.327	9.323	0.004	7.376	95.81	0.41	0	0	0.06	3.73
2003	320	23	548	603.28	-312.734	D	9.53	9.519	0.011	7.886	76.13	5.04	0	0	0.78	18.07
2003	321	23	557	601.32	-313.419	D	10.327	9.692	0.636	8.341	96.9	0.24	0	0	0.5	2.37
2003	322	23	1	596.558	-316.101	D	10.113	10.113	0	9.486	0	0	0	0	0	0
2003	323	23	1	596.558	-316.101	D	7.879	7.879	0	3.928	0	0	0	0	0	0
2003	324	23	1	596.558	-316.101	D	6.99	6.99	0	2.039	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.219	7.219	0	2.508	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	9.046	9.046	0	6.676	0	0	0	0	0	0
2003	327	23	1	596.558	-316.101	D	9.203	9.203	0	7.072	0	0	0	0	0	0
2003	328	23	1	596.558	-316.101	D	7.244	7.244	0	2.56	0	0	0	0	0	0
2003	329	23	517	602.805	-305.061	D	6.869	6.869	0.001	1.792	81.68	0.93	0	0	1.87	15.4
2003	330	23	1	596.558	-316.101	D	7.124	7.124	0	2.311	0	0	0	0	0	0
2003	331	23	548	603.28	-312.734	D	8.79	8.79	0	6.046	0.16	32.13	0	0	0	65.25
2003	332	23	1	596.558	-316.101	D	7.456	7.456	0	3.007	0	0	0	0	0	0
2003	333	23	1	596.558	-316.101	D	6.821	6.821	0	1.696	0	0	0	0	0	0
2003	334	23	1	596.558	-316.101	D	6.842	6.842	0	1.739	0	0	0	0	0	0
2003	335	23	1	596.558	-316.101	D	6.78	6.78	0	1.616	0	0	0	0	0	0
2003	336	23	1	596.558	-316.101	D	6.496	6.496	0	1.057	0	0	0	0	0	0
2003	337	23	517	602.805	-305.061	D	8.273	7.709	0.564	3.552	97.53	0.07	0	0	0.61	1.79
2003	338	23	624	596.324	-316.278	D	9.817	9.586	0.232	8.06	97.25	0.04	0	0	0.87	1.84
2003	339	23	623	596.511	-316.262	D	8.221	8.219	0.001	4.696	92.7	0.01	0	0	1.04	6.24
2003	340	23	1	596.558	-316.101	D	8.065	8.065	0	4.344	0	0	0	0	0	0
2003	341	23	557	601.32	-313.419	D	6.772	6.707	0.065	1.471	78.3	0.38	0	0	3.19	18.13
2003	342	23	517	602.805	-305.061	D	7.19	7.19	0	2.448	0.29	1.97	0	0	1.27	96.13
2003	343	23	1	596.558	-316.101	D	9.465	9.465	0	7.743	0	0	0	0	0	0
2003	344	23	517	602.805	-305.061	D	9.149	9.139	0.01	6.909	90.21	0.63	0	0	0.22	8.91
2003	345	23	1	596.558	-316.101	D	7.698	7.698	0	3.528	0	0	0	0	0	0
2003	346	23	1	596.558	-316.101	D	7.179	7.179	0	2.426	0	0	0	0	0	0
2003	347	23	1	596.558	-316.101	D	8.391	8.391	0	5.094	0	0	0	0	0	0
2003	348	23	625	596.311	-316.079	D	9.523	9.519	0.004	7.884	96.67	0.08	0	0	1.1	2.13
2003	349	23	545	603.234	-311.991	D	8.703	8.7	0.003	5.828	99.14	0.16	0	0	0.01	0.65
2003	350	23	1	596.558	-316.101	D	8.203	8.203	0	4.659	0	0	0	0	0	0
2003	351	23	1	596.558	-316.101	D	7.45	7.45	0	2.994	0	0	0	0	0	0
2003	352	23	1	596.558	-316.101	D	8.024	8.024	0	4.251	0	0	0	0	0	0
2003	353	23	1	596.558	-316.101	D	8.047	8.047	0	4.304	0	0	0	0	0	0

Appendix M
Mingo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	354	23	1	596.558	-316.101	D	7.07	7.07	0	2.202	0	0	0	0	0	0
2003	355	23	1	596.558	-316.101	D	6.659	6.659	0	1.375	0	0	0	0	0	0
2003	356	23	1	596.558	-316.101	D	8.674	8.674	0	5.764	0	0	0	0	0	0
2003	357	23	1	596.558	-316.101	D	8.915	8.915	0	6.352	0	0	0	0	0	0
2003	358	23	1	596.558	-316.101	D	7.495	7.495	0	3.091	0	0	0	0	0	0
2003	359	23	548	603.28	-312.734	D	6.822	6.75	0.071	1.557	78.05	0.24	0	0	3.39	18.33
2003	360	23	517	602.805	-305.061	D	6.905	6.837	0.067	1.73	58.68	1.55	0	0	4.17	35.6
2003	361	23	632	596.27	-315.421	D	6.924	6.852	0.072	1.759	9.06	0.57	0	0	12.63	77.75
2003	362	23	517	602.805	-305.061	D	8.302	8.302	0	4.887	0	1.4	0	0	0	98.34
2003	363	23	465	602.978	-311.858	D	9.618	9.618	0	8.146	53.61	10.37	0	0	0.19	27.43
2003	364	23	437	602.729	-311.878	D	7.191	7.191	0	2.45	97.25	0.01	0	0	0.12	1.07
									1.816							

Appendix M
Mingo
2001 M6

EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	517	602.805	-305.061	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.02
2001	2	23	557	601.32	-313.419	D	7.64	7.593	0.047	3.3	0	0	0	0	0	100
2001	3	23	517	602.805	-305.061	D	7.607	7.593	0.014	3.3	0	0	0	0	0	100
2001	4	23	557	601.32	-313.419	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.01
2001	5	23	638	596.406	-314.894	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100
2001	6	23	631	596.276	-315.551	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.01
2001	7	23	548	603.28	-312.734	D	7.623	7.593	0.03	3.3	0	0	0	0	0	100
2001	8	23	517	602.805	-305.061	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100.01
2001	9	23	632	596.27	-315.421	D	7.62	7.593	0.027	3.3	0	0	0	0	0	100
2001	10	23	517	602.805	-305.061	D	7.61	7.593	0.017	3.3	0	0	0	0	0	100.01
2001	11	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.17
2001	12	23	557	601.32	-313.419	D	7.611	7.593	0.019	3.3	0	0	0	0	0	100.01
2001	13	23	603	598.68	-316.244	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.01
2001	14	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	0	0	0	0	96.05
2001	15	23	517	602.805	-305.061	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.03
2001	16	23	517	602.805	-305.061	D	7.616	7.593	0.023	3.3	0	0	0	0	0	100.01
2001	17	23	637	596.267	-315.066	D	7.626	7.593	0.034	3.3	0	0	0	0	0	100
2001	18	23	517	602.805	-305.061	D	7.621	7.593	0.028	3.3	0	0	0	0	0	100
2001	19	23	557	601.32	-313.419	D	7.649	7.593	0.056	3.3	0	0	0	0	0	100
2001	20	23	626	596.299	-315.88	D	7.616	7.593	0.023	3.3	0	0	0	0	0	100.01
2001	21	23	553	602.224	-313.158	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100
2001	22	23	548	603.28	-312.734	D	7.604	7.593	0.011	3.3	0	0	0	0	0	99.99
2001	23	23	517	602.805	-305.061	D	7.602	7.593	0.009	3.3	0	0	0	0	0	99.99
2001	24	23	603	598.68	-316.244	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.04
2001	25	23	632	596.27	-315.421	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100
2001	26	23	548	603.28	-312.734	D	7.594	7.593	0.002	3.3	0	0	0	0	0	99.99
2001	27	23	525	602.928	-307.042	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.02
2001	28	23	539	603.142	-310.507	D	7.617	7.593	0.024	3.3	0	0	0	0	0	100
2001	29	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.98
2001	30	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100
2001	31	23	625	596.311	-316.079	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.03
2001	32	23	557	601.32	-313.419	D	7.463	7.459	0.004	3.013	0	0	0	0	0	100.02
2001	33	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	0	0	0	0	0	100.02
2001	34	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	0	0	0	0	0	100.1
2001	35	23	557	601.32	-313.419	D	7.456	7.453	0.003	3	0	0	0	0	0	100.08
2001	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	101.05
2001	37	23	517	602.805	-305.061	D	7.456	7.453	0.003	3	0	0	0	0	0	100.03
2001	38	23	676	599.876	-309.365	D	7.464	7.453	0.011	3	0	0	0	0	0	100.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	39	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	169	599.385	-310.635	D	7.455	7.453	0.003	3	0	0	0	0	0	100.08
2001	41	23	517	602.805	-305.061	D	7.464	7.453	0.011	3	0	0	0	0	0	100.03
2001	42	23	642	596.914	-314.17	D	7.453	7.453	0	3	0	0	0	0	0	101.21
2001	43	23	557	601.32	-313.419	D	7.454	7.453	0.001	3	0	0	0	0	0	100.15
2001	44	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	102.05
2001	46	23	656	597.971	-312.292	D	7.54	7.453	0.088	3	0	0	0	0	0	100
2001	47	23	682	600.626	-308.407	D	7.506	7.453	0.053	3	0	0	0	0	0	100.01
2001	48	23	548	603.28	-312.734	D	7.498	7.453	0.046	3	0	0	0	0	0	100.01
2001	49	23	281	600.703	-308.285	D	7.481	7.453	0.028	3	0	0	0	0	0	100.01
2001	50	23	548	603.28	-312.734	D	7.458	7.453	0.006	3	0	0	0	0	0	100.01
2001	51	23	517	602.805	-305.061	D	7.456	7.453	0.003	3	0	0	0	0	0	100.02
2001	52	23	637	596.267	-315.066	D	7.462	7.453	0.009	3	0	0	0	0	0	100.02
2001	53	23	637	596.267	-315.066	D	7.468	7.453	0.015	3	0	0	0	0	0	100.02
2001	54	23	548	603.28	-312.734	D	7.469	7.453	0.016	3	0	0	0	0	0	100.02
2001	55	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	0	0	0	0	0	100.04
2001	56	23	503	602.977	-308.61	D	7.454	7.453	0.001	3	0	0	0	0	0	100.11
2001	57	23	557	601.32	-313.419	D	7.453	7.453	0.001	3	0	0	0	0	0	100.31
2001	58	23	632	596.27	-315.421	D	7.456	7.453	0.003	3	0	0	0	0	0	100.05
2001	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	60	23	517	602.805	-305.061	D	7.38	7.362	0.018	2.808	0	0	0	0	0	100.01
2001	61	23	517	602.805	-305.061	D	7.364	7.358	0.006	2.8	0	0	0	0	0	100.05
2001	62	23	517	602.805	-305.061	D	7.376	7.358	0.018	2.8	0	0	0	0	0	100.01
2001	63	23	631	596.276	-315.551	D	7.369	7.358	0.011	2.8	0	0	0	0	0	100.01
2001	64	23	632	596.27	-315.421	D	7.373	7.358	0.014	2.8	0	0	0	0	0	100
2001	65	23	632	596.27	-315.421	D	7.374	7.358	0.016	2.8	0	0	0	0	0	100.02
2001	66	23	632	596.27	-315.421	D	7.382	7.358	0.024	2.8	0	0	0	0	0	100.01
2001	67	23	624	596.324	-316.278	D	7.359	7.358	0.001	2.8	0	0	0	0	0	100.09
2001	68	23	638	596.406	-314.894	D	7.37	7.358	0.012	2.8	0	0	0	0	0	100.02
2001	69	23	517	602.805	-305.061	D	7.376	7.358	0.018	2.8	0	0	0	0	0	100.02
2001	70	23	517	602.805	-305.061	D	7.36	7.358	0.002	2.8	0	0	0	0	0	100.12
2001	71	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	0	0	0	0	0	99.94
2001	72	23	632	596.27	-315.421	D	7.363	7.358	0.005	2.8	0	0	0	0	0	100.01
2001	73	23	626	596.299	-315.88	D	7.378	7.358	0.02	2.8	0	0	0	0	0	100.01
2001	74	23	517	602.805	-305.061	D	7.358	7.358	0	2.8	0	0	0	0	0	101.63
2001	75	23	517	602.805	-305.061	D	7.369	7.358	0.011	2.8	0	0	0	0	0	100.01
2001	76	23	517	602.805	-305.061	D	7.367	7.358	0.008	2.8	0	0	0	0	0	100.01
2001	77	23	624	596.324	-316.278	D	7.366	7.358	0.007	2.8	0	0	0	0	0	99.99

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	80	23	637	596.267	-315.066	D	7.365	7.358	0.007	2.8	0	0	0	0	0	100.02
2001	81	23	624	596.324	-316.278	D	7.377	7.358	0.019	2.8	0	0	0	0	0	100.01
2001	82	23	517	602.805	-305.061	D	7.387	7.358	0.029	2.8	0	0	0	0	0	100.01
2001	83	23	637	596.267	-315.066	D	7.403	7.358	0.045	2.8	0	0	0	0	0	100.01
2001	84	23	632	596.27	-315.421	D	7.399	7.358	0.041	2.8	0	0	0	0	0	100.01
2001	85	23	557	601.32	-313.419	D	7.387	7.358	0.029	2.8	0	0	0	0	0	100
2001	86	23	517	602.805	-305.061	D	7.366	7.358	0.008	2.8	0	0	0	0	0	100.02
2001	87	23	517	602.805	-305.061	D	7.366	7.358	0.008	2.8	0	0	0	0	0	100.03
2001	88	23	557	601.32	-313.419	D	7.36	7.358	0.001	2.8	0	0	0	0	0	100.06
2001	89	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	103.17
2001	90	23	517	602.805	-305.061	D	7.37	7.358	0.012	2.8	0	0	0	0	0	100.01
2001	91	23	517	602.805	-305.061	D	7.276	7.267	0.009	2.608	0	0	0	0	0	100
2001	92	23	517	602.805	-305.061	D	7.264	7.263	0.001	2.6	0	0	0	0	0	99.93
2001	93	23	281	600.703	-308.285	D	7.264	7.263	0.001	2.6	0	0	0	0	0	100.17
2001	94	23	624	596.324	-316.278	D	7.264	7.263	0.001	2.6	0	0	0	0	0	99.94
2001	95	23	632	596.27	-315.421	D	7.263	7.263	0	2.6	0	0	0	0	0	100.12
2001	96	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	102	23	624	596.324	-316.278	D	7.268	7.263	0.005	2.6	0	0	0	0	0	100.05
2001	103	23	626	596.299	-315.88	D	7.269	7.263	0.006	2.6	0	0	0	0	0	100
2001	104	23	637	596.267	-315.066	D	7.266	7.263	0.003	2.6	0	0	0	0	0	100.06
2001	105	23	517	602.805	-305.061	D	7.269	7.263	0.006	2.6	0	0	0	0	0	100.03
2001	106	23	557	601.32	-313.419	D	7.272	7.263	0.009	2.6	0	0	0	0	0	100
2001	107	23	689	601.435	-306.997	D	7.29	7.263	0.027	2.6	0	0	0	0	0	100
2001	108	23	670	599.379	-310.565	D	7.286	7.263	0.024	2.6	0	0	0	0	0	100
2001	109	23	517	602.805	-305.061	D	7.264	7.263	0.001	2.6	0	0	0	0	0	100.05
2001	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	113	23	432	602.04	-306.183	D	7.263	7.263	0	2.6	0	0	0	0	0	63.85
2001	114	23	517	602.805	-305.061	D	7.274	7.263	0.011	2.6	0	0	0	0	0	100.01
2001	115	23	632	596.27	-315.421	D	7.274	7.263	0.011	2.6	0	0	0	0	0	100.03
2001	116	23	517	602.805	-305.061	D	7.266	7.263	0.003	2.6	0	0	0	0	0	100.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	117	23	517	602.805	-305.061	D	7.269	7.263	0.006	2.6	0	0	0	0	0	100.03
2001	118	23	517	602.805	-305.061	D	7.269	7.263	0.006	2.6	0	0	0	0	0	100.03
2001	119	23	557	601.32	-313.419	D	7.27	7.263	0.007	2.6	0	0	0	0	0	100.04
2001	120	23	548	603.28	-312.734	D	7.265	7.263	0.002	2.6	0	0	0	0	0	100.04
2001	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	127	23	461	602.269	-305.916	D	7.453	7.453	0	3	0	0	0	0	0	100.3
2001	128	23	676	599.876	-309.365	D	7.462	7.453	0.009	3	0	0	0	0	0	100.04
2001	129	23	517	602.805	-305.061	D	7.465	7.453	0.012	3	0	0	0	0	0	100.03
2001	130	23	517	602.805	-305.061	D	7.458	7.453	0.005	3	0	0	0	0	0	100.03
2001	131	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	100.36
2001	132	23	517	602.805	-305.061	D	7.462	7.453	0.009	3	0	0	0	0	0	100.02
2001	133	23	603	598.68	-316.244	D	7.461	7.453	0.008	3	0	0	0	0	0	100.04
2001	134	23	518	602.82	-305.309	D	7.453	7.453	0.001	3	0	0	0	0	0	100.27
2001	135	23	50	598.048	-315.987	D	7.453	7.453	0	3	0	0	0	0	0	86.44
2001	136	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	138	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	103.46
2001	139	23	640	596.683	-314.55	D	7.497	7.453	0.044	3	0	0	0	0	0	100.01
2001	140	23	626	596.299	-315.88	D	7.465	7.453	0.013	3	0	0	0	0	0	100.01
2001	141	23	603	598.68	-316.244	D	7.454	7.453	0.001	3	0	0	0	0	0	100.24
2001	142	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	100.75
2001	143	23	623	596.511	-316.262	D	7.455	7.453	0.002	3	0	0	0	0	0	100.07
2001	144	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	0	0	0	0	0	100.21
2001	145	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	0	0	0	0	0	100.15
2001	146	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	0	0	0	0	0	100.06
2001	147	23	624	596.324	-316.278	D	7.463	7.453	0.01	3	0	0	0	0	0	100.01
2001	148	23	603	598.68	-316.244	D	7.456	7.453	0.003	3	0	0	0	0	0	100.11
2001	149	23	632	596.27	-315.421	D	7.456	7.453	0.004	3	0	0	0	0	0	100.05
2001	150	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	0	0	0	0	0	100.09
2001	151	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	0	0	0	0	0	100.07
2001	152	23	624	596.324	-316.278	D	7.547	7.542	0.005	3.192	0	0	0	0	0	100.02
2001	153	23	637	596.267	-315.066	D	7.549	7.546	0.003	3.2	0	0	0	0	0	100.05
2001	154	23	517	602.805	-305.061	D	7.557	7.546	0.01	3.2	0	0	0	0	0	100.02
2001	155	23	626	596.299	-315.88	D	7.548	7.546	0.001	3.2	0	0	0	0	0	100.19

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	156	23	378	601.601	-306.966	D	7.546	7.546	0	3.2	0	0	0	0	0	97.14
2001	157	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	158	23	517	602.805	-305.061	D	7.569	7.546	0.022	3.2	0	0	0	0	0	100.01
2001	159	23	624	596.324	-316.278	D	7.569	7.546	0.023	3.2	0	0	0	0	0	100
2001	160	23	632	596.27	-315.421	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.06
2001	161	23	517	602.805	-305.061	D	7.551	7.546	0.005	3.2	0	0	0	0	0	100.02
2001	162	23	517	602.805	-305.061	D	7.549	7.546	0.003	3.2	0	0	0	0	0	100.06
2001	163	23	548	603.28	-312.734	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.12
2001	164	23	517	602.805	-305.061	D	7.547	7.546	0	3.2	0	0	0	0	0	100.49
2001	165	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	166	23	623	596.511	-316.262	D	7.547	7.546	0	3.2	0	0	0	0	0	100.28
2001	167	23	517	602.805	-305.061	D	7.548	7.546	0.001	3.2	0	0	0	0	0	100.12
2001	168	23	517	602.805	-305.061	D	7.549	7.546	0.002	3.2	0	0	0	0	0	100.06
2001	169	23	548	603.28	-312.734	D	7.549	7.546	0.003	3.2	0	0	0	0	0	100.02
2001	170	23	404	601.83	-306.699	D	7.546	7.546	0	3.2	0	0	0	0	0	98.48
2001	171	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	172	23	624	596.324	-316.278	D	7.551	7.546	0.005	3.2	0	0	0	0	0	100.03
2001	173	23	632	596.27	-315.421	D	7.569	7.546	0.023	3.2	0	0	0	0	0	100.01
2001	174	23	517	602.805	-305.061	D	7.573	7.546	0.027	3.2	0	0	0	0	0	100
2001	175	23	517	602.805	-305.061	D	7.579	7.546	0.033	3.2	0	0	0	0	0	100.01
2001	176	23	624	596.324	-316.278	D	7.549	7.546	0.003	3.2	0	0	0	0	0	100.06
2001	177	23	625	596.311	-316.079	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.02
2001	178	23	548	603.28	-312.734	D	7.55	7.546	0.004	3.2	0	0	0	0	0	100.05
2001	179	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.13
2001	180	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.32
2001	181	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	182	23	517	602.805	-305.061	D	7.595	7.591	0.005	3.296	0	0	0	0	0	100
2001	183	23	631	596.276	-315.551	D	7.623	7.593	0.031	3.3	0	0	0	0	0	100
2001	184	23	624	596.324	-316.278	D	7.606	7.593	0.014	3.3	0	0	0	0	0	100
2001	185	23	517	602.805	-305.061	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.02
2001	186	23	548	603.28	-312.734	D	7.606	7.593	0.014	3.3	0	0	0	0	0	100
2001	187	23	637	596.267	-315.066	D	7.608	7.593	0.016	3.3	0	0	0	0	0	100.01
2001	188	23	517	602.805	-305.061	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.02
2001	189	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	0	0	0	0	99.17
2001	190	23	624	596.324	-316.278	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100.02
2001	191	23	517	602.805	-305.061	D	7.629	7.593	0.036	3.3	0	0	0	0	0	100
2001	192	23	624	596.324	-316.278	D	7.63	7.593	0.037	3.3	0	0	0	0	0	100
2001	193	23	624	596.324	-316.278	D	7.596	7.593	0.004	3.3	0	0	0	0	0	99.98
2001	194	23	624	596.324	-316.278	D	7.594	7.593	0.002	3.3	0	0	0	0	0	99.99

Appendix M
Mingo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	195	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	196	23	624	596.324	-316.278	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.08
2001	197	23	153	599.71	-314.859	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.01
2001	198	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	432	602.04	-306.183	D	7.593	7.593	0	3.3	0	0	0	0	0	89.55
2001	200	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	0	0	0	0	99.84
2001	201	23	517	602.805	-305.061	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100
2001	202	23	656	597.971	-312.292	D	7.661	7.593	0.068	3.3	0	0	0	0	0	100
2001	203	23	632	596.27	-315.421	D	7.62	7.593	0.028	3.3	0	0	0	0	0	100
2001	204	23	517	602.805	-305.061	D	7.602	7.593	0.009	3.3	0	0	0	0	0	100
2001	205	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.01
2001	206	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.06
2001	207	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.01
2001	208	23	548	603.28	-312.734	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100
2001	209	23	548	603.28	-312.734	D	7.609	7.593	0.016	3.3	0	0	0	0	0	100
2001	210	23	517	602.805	-305.061	D	7.601	7.593	0.009	3.3	0	0	0	0	0	100.01
2001	211	23	517	602.805	-305.061	D	7.611	7.593	0.018	3.3	0	0	0	0	0	99.99
2001	212	23	624	596.324	-316.278	D	7.605	7.593	0.013	3.3	0	0	0	0	0	100
2001	213	23	624	596.324	-316.278	D	7.683	7.681	0.002	3.492	0	0	0	0	0	100.01
2001	214	23	517	602.805	-305.061	D	7.685	7.685	0.001	3.5	0	0	0	0	0	100.24
2001	215	23	517	602.805	-305.061	D	7.689	7.685	0.005	3.5	0	0	0	0	0	100
2001	216	23	624	596.324	-316.278	D	7.694	7.685	0.009	3.5	0	0	0	0	0	100
2001	217	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	218	23	603	598.68	-316.244	D	7.688	7.685	0.003	3.5	0	0	0	0	0	99.99
2001	219	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	220	23	603	598.68	-316.244	D	7.685	7.685	0	3.5	0	0	0	0	0	96.22
2001	221	23	517	602.805	-305.061	D	7.697	7.685	0.012	3.5	0	0	0	0	0	100
2001	222	23	517	602.805	-305.061	D	7.697	7.685	0.012	3.5	0	0	0	0	0	100.01
2001	223	23	624	596.324	-316.278	D	7.7	7.685	0.015	3.5	0	0	0	0	0	100
2001	224	23	637	596.267	-315.066	D	7.708	7.685	0.023	3.5	0	0	0	0	0	100
2001	225	23	676	599.876	-309.365	D	7.703	7.685	0.018	3.5	0	0	0	0	0	100
2001	226	23	624	596.324	-316.278	D	7.694	7.685	0.01	3.5	0	0	0	0	0	100
2001	227	23	603	598.68	-316.244	D	7.691	7.685	0.006	3.5	0	0	0	0	0	100
2001	228	23	698	602.668	-305.255	D	7.687	7.685	0.002	3.5	0	0	0	0	0	99.92
2001	229	23	637	596.267	-315.066	D	7.686	7.685	0.001	3.5	0	0	0	0	0	100.06
2001	230	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	0	0	0	0	0	100.01
2001	231	23	557	601.32	-313.419	D	7.694	7.685	0.009	3.5	0	0	0	0	0	99.99
2001	232	23	637	596.267	-315.066	D	7.704	7.685	0.019	3.5	0	0	0	0	0	100
2001	233	23	477	602.748	-308.877	D	7.693	7.685	0.008	3.5	0	0	0	0	0	99.98

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	234	23	496	603.111	-310.349	D	7.685	7.685	0	3.5	0	0	0	0	0	99.63
2001	235	23	241	600.857	-313.521	D	7.685	7.685	0	3.5	0	0	0	0	0	99.77
2001	236	23	169	599.385	-310.635	D	7.685	7.685	0	3.5	0	0	0	0	0	2.66
2001	237	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	238	23	517	602.805	-305.061	D	7.69	7.685	0.005	3.5	0	0	0	0	0	99.99
2001	239	23	624	596.324	-316.278	D	7.721	7.685	0.036	3.5	0	0	0	0	0	100
2001	240	23	603	598.68	-316.244	D	7.7	7.685	0.016	3.5	0	0	0	0	0	100
2001	241	23	517	602.805	-305.061	D	7.701	7.685	0.017	3.5	0	0	0	0	0	100
2001	242	23	517	602.805	-305.061	D	7.687	7.685	0.002	3.5	0	0	0	0	0	99.99
2001	243	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	0	0	0	0	100.07
2001	244	23	637	596.267	-315.066	D	7.701	7.685	0.016	3.5	0	0	0	0	0	100
2001	245	23	624	596.324	-316.278	D	7.687	7.685	0.002	3.5	0	0	0	0	0	100
2001	246	23	378	601.601	-306.966	D	7.685	7.685	0	3.5	0	0	0	0	0	98.87
2001	247	23	637	596.267	-315.066	D	7.696	7.685	0.011	3.5	0	0	0	0	0	100.01
2001	248	23	517	602.805	-305.061	D	7.689	7.685	0.004	3.5	0	0	0	0	0	100
2001	249	23	681	600.53	-308.617	D	7.685	7.685	0	3.5	0	0	0	0	0	99.92
2001	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	252	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	0	0	0	0	0	100.15
2001	253	23	632	596.27	-315.421	D	7.703	7.685	0.018	3.5	0	0	0	0	0	100
2001	254	23	637	596.267	-315.066	D	7.686	7.685	0.001	3.5	0	0	0	0	0	100.05
2001	255	23	26	597.15	-314.056	D	7.685	7.685	0	3.5	0	0	0	0	0	3.36
2001	256	23	676	599.876	-309.365	D	7.741	7.685	0.056	3.5	0	0	0	0	0	100
2001	257	23	624	596.324	-316.278	D	7.689	7.685	0.004	3.5	0	0	0	0	0	99.98
2001	258	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	94.75
2001	259	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	0	0	0	0	0	102.66
2001	260	23	557	601.32	-313.419	D	7.688	7.685	0.003	3.5	0	0	0	0	0	100.02
2001	261	23	405	602.557	-312.89	D	7.685	7.685	0	3.5	0	0	0	0	0	99.92
2001	262	23	557	601.32	-313.419	D	7.688	7.685	0.003	3.5	0	0	0	0	0	99.97
2001	263	23	622	596.698	-316.245	D	7.685	7.685	0	3.5	0	0	0	0	0	99.9
2001	264	23	624	596.324	-316.278	D	7.691	7.685	0.006	3.5	0	0	0	0	0	100
2001	265	23	557	601.32	-313.419	D	7.687	7.685	0.002	3.5	0	0	0	0	0	99.95
2001	266	23	548	603.28	-312.734	D	7.691	7.685	0.006	3.5	0	0	0	0	0	99.99
2001	267	23	637	596.267	-315.066	D	7.709	7.685	0.025	3.5	0	0	0	0	0	99.99
2001	268	23	698	602.668	-305.255	D	7.697	7.685	0.012	3.5	0	0	0	0	0	99.99
2001	269	23	517	602.805	-305.061	D	7.72	7.685	0.035	3.5	0	0	0	0	0	100
2001	270	23	517	602.805	-305.061	D	7.691	7.685	0.006	3.5	0	0	0	0	0	100.02
2001	271	23	517	602.805	-305.061	D	7.7	7.685	0.015	3.5	0	0	0	0	0	100
2001	272	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	273	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	274	23	525	602.928	-307.042	D	7.529	7.507	0.021	3.117	0	0	0	0	0	100
2001	275	23	682	600.626	-308.407	D	7.537	7.5	0.037	3.1	0	0	0	0	0	100.01
2001	276	23	544	603.219	-311.745	D	7.502	7.5	0.003	3.1	0	0	0	0	0	100.01
2001	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	517	602.805	-305.061	D	7.514	7.5	0.015	3.1	0	0	0	0	0	100
2001	279	23	557	601.32	-313.419	D	7.523	7.5	0.024	3.1	0	0	0	0	0	100.01
2001	280	23	548	603.28	-312.734	D	7.507	7.5	0.008	3.1	0	0	0	0	0	100.02
2001	281	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	0	0	0	0	0	100.03
2001	282	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	548	603.28	-312.734	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.04
2001	285	23	624	596.324	-316.278	D	7.503	7.5	0.003	3.1	0	0	0	0	0	100.07
2001	286	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	127.48
2001	287	23	517	602.805	-305.061	D	7.509	7.5	0.009	3.1	0	0	0	0	0	100.02
2001	288	23	517	602.805	-305.061	D	7.502	7.5	0.002	3.1	0	0	0	0	0	100.07
2001	289	23	632	596.27	-315.421	D	7.514	7.5	0.015	3.1	0	0	0	0	0	100
2001	290	23	557	601.32	-313.419	D	7.51	7.5	0.011	3.1	0	0	0	0	0	100.03
2001	291	23	676	599.876	-309.365	D	7.505	7.5	0.005	3.1	0	0	0	0	0	100.02
2001	292	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.19
2001	293	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.24
2001	294	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.09
2001	298	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.4
2001	299	23	626	596.299	-315.88	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.21
2001	300	23	632	596.27	-315.421	D	7.525	7.5	0.025	3.1	0	0	0	0	0	100.01
2001	301	23	637	596.267	-315.066	D	7.515	7.5	0.015	3.1	0	0	0	0	0	100.01
2001	302	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	0	0	0	0	100.3
2001	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.08
2001	307	23	637	596.267	-315.066	D	7.509	7.5	0.009	3.1	0	0	0	0	0	100.01
2001	308	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.06
2001	309	23	637	596.267	-315.066	D	7.517	7.5	0.018	3.1	0	0	0	0	0	100.01
2001	310	23	624	596.324	-316.278	D	7.502	7.5	0.002	3.1	0	0	0	0	0	100.11
2001	311	23	548	603.28	-312.734	D	7.511	7.5	0.011	3.1	0	0	0	0	0	100.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	312	23	517	602.805	-305.061	D	7.511	7.5	0.012	3.1	0	0	0	0	0	100.02
2001	313	23	632	596.27	-315.421	D	7.508	7.5	0.008	3.1	0	0	0	0	0	100
2001	314	23	517	602.805	-305.061	D	7.518	7.5	0.018	3.1	0	0	0	0	0	100.01
2001	315	23	557	601.32	-313.419	D	7.508	7.5	0.008	3.1	0	0	0	0	0	100.01
2001	316	23	624	596.324	-316.278	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.24
2001	317	23	557	601.32	-313.419	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100
2001	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	517	602.805	-305.061	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.16
2001	321	23	517	602.805	-305.061	D	7.517	7.5	0.017	3.1	0	0	0	0	0	100.01
2001	322	23	603	598.68	-316.244	D	7.516	7.5	0.017	3.1	0	0	0	0	0	100.02
2001	323	23	517	602.805	-305.061	D	7.503	7.5	0.004	3.1	0	0	0	0	0	100
2001	324	23	557	601.32	-313.419	D	7.52	7.5	0.021	3.1	0	0	0	0	0	100.01
2001	325	23	548	603.28	-312.734	D	7.509	7.5	0.009	3.1	0	0	0	0	0	100.02
2001	326	23	546	603.249	-312.239	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.13
2001	327	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	624	596.324	-316.278	D	7.506	7.5	0.007	3.1	0	0	0	0	0	100.04
2001	330	23	432	602.04	-306.183	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.02
2001	331	23	632	596.27	-315.421	D	7.503	7.5	0.003	3.1	0	0	0	0	0	100.03
2001	332	23	632	596.27	-315.421	D	7.505	7.5	0.005	3.1	0	0	0	0	0	100.04
2001	333	23	624	596.324	-316.278	D	7.5	7.5	0	3.1	0	0	0	0	0	100.84
2001	334	23	548	603.28	-312.734	D	7.526	7.5	0.026	3.1	0	0	0	0	0	100.01
2001	335	23	557	601.32	-313.419	D	7.592	7.589	0.004	3.292	0	0	0	0	0	99.99
2001	336	23	517	602.805	-305.061	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100.02
2001	337	23	548	603.28	-312.734	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.02
2001	338	23	460	602.289	-306.164	D	7.593	7.593	0	3.3	0	0	0	0	0	99.51
2001	339	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	0	0	0	0	0	99.96
2001	341	23	517	602.805	-305.061	D	7.62	7.593	0.028	3.3	0	0	0	0	0	100.01
2001	342	23	517	602.805	-305.061	D	7.63	7.593	0.037	3.3	0	0	0	0	0	100
2001	343	23	557	601.32	-313.419	D	7.605	7.593	0.013	3.3	0	0	0	0	0	100.01
2001	344	23	632	596.27	-315.421	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100
2001	345	23	548	603.28	-312.734	D	7.609	7.593	0.016	3.3	0	0	0	0	0	100
2001	346	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.99
2001	347	23	625	596.311	-316.079	D	7.616	7.593	0.023	3.3	0	0	0	0	0	100
2001	348	23	626	596.299	-315.88	D	7.651	7.593	0.058	3.3	0	0	0	0	0	100
2001	349	23	517	602.805	-305.061	D	7.606	7.593	0.014	3.3	0	0	0	0	0	100
2001	350	23	13	596.691	-314.592	D	7.603	7.593	0.011	3.3	0	0	0	0	0	100.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	351	23	517	602.805	-305.061	D	7.611	7.593	0.018	3.3	0	0	0	0	0	100.01
2001	352	23	626	596.299	-315.88	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100
2001	353	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.04
2001	354	23	637	596.267	-315.066	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.09
2001	355	23	624	596.324	-316.278	D	7.606	7.593	0.014	3.3	0	0	0	0	0	100.01
2001	356	23	516	602.728	-305.38	D	7.593	7.593	0	3.3	0	0	0	0	0	99.49
2001	357	23	624	596.324	-316.278	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.01
2001	358	23	624	596.324	-316.278	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.11
2001	359	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	83.93
2001	360	23	604	598.599	-316.246	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.02
2001	361	23	676	599.876	-309.365	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.01
2001	362	23	517	602.805	-305.061	D	7.612	7.593	0.019	3.3	0	0	0	0	0	100
2001	363	23	517	602.805	-305.061	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100
2001	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	57.66
									0.088							
DYNO NOBEL											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	2	23	548	603.28	-312.734	D	7.637	7.593	0.044	3.3	0	100	0	0	0	0
2001	3	23	548	603.28	-312.734	D	7.604	7.593	0.012	3.3	0	100.01	0	0	0	0
2001	4	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	5	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	8	23	517	602.805	-305.061	D	7.599	7.593	0.006	3.3	0	100.03	0	0	0	0
2001	9	23	637	596.267	-315.066	D	7.654	7.593	0.061	3.3	0	100	0	0	0	0
2001	10	23	656	597.971	-312.292	D	7.612	7.593	0.02	3.3	0	100	0	0	0	0
2001	11	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	99.77	0	0	0	0
2001	12	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	13	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	515	602.747	-305.629	D	7.593	7.593	0	3.3	0	73.25	0	0	0	0
2001	17	23	517	602.805	-305.061	D	7.63	7.593	0.037	3.3	0	100	0	0	0	0
2001	18	23	517	602.805	-305.061	D	7.602	7.593	0.009	3.3	0	100.01	0	0	0	0
2001	19	23	682	600.626	-308.407	D	7.646	7.593	0.053	3.3	0	100	0	0	0	0
2001	20	23	517	602.805	-305.061	D	7.63	7.593	0.037	3.3	0	100	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	21	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	25	23	637	596.267	-315.066	D	7.6	7.593	0.007	3.3	0	100	0	0	0	0
2001	26	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	27	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	28	23	548	603.28	-312.734	D	7.597	7.593	0.005	3.3	0	100	0	0	0	0
2001	29	23	516	602.728	-305.38	D	7.593	7.593	0	3.3	0	99.72	0	0	0	0
2001	30	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	34	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	116.76	0	0	0	0
2001	38	23	517	602.805	-305.061	D	7.461	7.453	0.008	3	0	100.02	0	0	0	0
2001	39	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	41	23	517	602.805	-305.061	D	7.458	7.453	0.006	3	0	100.02	0	0	0	0
2001	42	23	624	596.324	-316.278	D	7.454	7.453	0.001	3	0	100	0	0	0	0
2001	43	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	44	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	99.43	0	0	0	0
2001	46	23	624	596.324	-316.278	D	7.534	7.453	0.081	3	0	100	0	0	0	0
2001	47	23	517	602.805	-305.061	D	7.496	7.453	0.044	3	0	100.01	0	0	0	0
2001	48	23	557	601.32	-313.419	D	7.471	7.453	0.019	3	0	100.01	0	0	0	0
2001	49	23	517	602.805	-305.061	D	7.473	7.453	0.02	3	0	100.01	0	0	0	0
2001	50	23	517	602.805	-305.061	D	7.456	7.453	0.003	3	0	100.04	0	0	0	0
2001	51	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	100.3	0	0	0	0
2001	52	23	624	596.324	-316.278	D	7.453	7.453	0	3	0	100.29	0	0	0	0
2001	53	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	105.08	0	0	0	0
2001	54	23	517	602.805	-305.061	D	7.455	7.453	0.003	3	0	100.11	0	0	0	0
2001	55	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	100.12	0	0	0	0
2001	56	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	0	100.09	0	0	0	0
2001	58	23	637	596.267	-315.066	D	7.455	7.453	0.002	3	0	100.11	0	0	0	0
2001	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	99.99	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	60	23	490	602.499	-305.648	D	7.362	7.362	0	2.808	0	91.57	0	0	0	0
2001	61	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	62	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	0	100.22	0	0	0	0
2001	63	23	637	596.267	-315.066	D	7.365	7.358	0.007	2.8	0	100	0	0	0	0
2001	64	23	517	602.805	-305.061	D	7.372	7.358	0.014	2.8	0	100	0	0	0	0
2001	65	23	517	602.805	-305.061	D	7.361	7.358	0.002	2.8	0	100.07	0	0	0	0
2001	66	23	517	602.805	-305.061	D	7.381	7.358	0.022	2.8	0	100	0	0	0	0
2001	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	68	23	637	596.267	-315.066	D	7.373	7.358	0.014	2.8	0	100.01	0	0	0	0
2001	69	23	517	602.805	-305.061	D	7.371	7.358	0.013	2.8	0	100.02	0	0	0	0
2001	70	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	0	100.27	0	0	0	0
2001	71	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	99.8	0	0	0	0
2001	72	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	73	23	432	602.04	-306.183	D	7.358	7.358	0	2.8	0	105.98	0	0	0	0
2001	74	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	75	23	603	598.68	-316.244	D	7.364	7.358	0.006	2.8	0	100.01	0	0	0	0
2001	76	23	517	602.805	-305.061	D	7.358	7.358	0	2.8	0	100.01	0	0	0	0
2001	77	23	656	597.971	-312.292	D	7.363	7.358	0.004	2.8	0	100.01	0	0	0	0
2001	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	80	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	103.86	0	0	0	0
2001	81	23	625	596.311	-316.079	D	7.364	7.358	0.006	2.8	0	100.06	0	0	0	0
2001	82	23	624	596.324	-316.278	D	7.365	7.358	0.006	2.8	0	100.02	0	0	0	0
2001	83	23	662	598.404	-311.683	D	7.375	7.358	0.017	2.8	0	100.01	0	0	0	0
2001	84	23	520	602.851	-305.804	D	7.383	7.358	0.025	2.8	0	100.01	0	0	0	0
2001	85	23	517	602.805	-305.061	D	7.362	7.358	0.004	2.8	0	100.04	0	0	0	0
2001	86	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	87	23	548	603.28	-312.734	D	7.359	7.358	0.001	2.8	0	100.19	0	0	0	0
2001	88	23	517	602.805	-305.061	D	7.358	7.358	0	2.8	0	100.36	0	0	0	0
2001	89	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	90	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	91	23	517	602.805	-305.061	D	7.267	7.267	0	2.608	0	99.8	0	0	0	0
2001	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	95	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	96	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	99	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	103	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	0	100.76	0	0	0	0
2001	104	23	461	602.269	-305.916	D	7.263	7.263	0	2.6	0	97.31	0	0	0	0
2001	105	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	0	100.69	0	0	0	0
2001	106	23	517	602.805	-305.061	D	7.271	7.263	0.009	2.6	0	100.01	0	0	0	0
2001	107	23	517	602.805	-305.061	D	7.264	7.263	0.001	2.6	0	100.16	0	0	0	0
2001	108	23	557	601.32	-313.419	D	7.282	7.263	0.019	2.6	0	100.01	0	0	0	0
2001	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	30.72	0	0	0	0
2001	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	114	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	0	100.24	0	0	0	0
2001	115	23	521	602.866	-306.052	D	7.266	7.263	0.003	2.6	0	99.96	0	0	0	0
2001	116	23	490	602.499	-305.648	D	7.263	7.263	0	2.6	0	96.17	0	0	0	0
2001	117	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	118	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	119	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	120	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	128	23	487	602.556	-306.393	D	7.453	7.453	0	3	0	101.63	0	0	0	0
2001	129	23	78	598.564	-316.197	D	7.453	7.453	0	3	0	102.63	0	0	0	0
2001	130	23	261	601.086	-313.253	D	7.453	7.453	0	3	0	106.92	0	0	0	0
2001	131	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	132	23	624	596.324	-316.278	D	7.455	7.453	0.002	3	0	100.07	0	0	0	0
2001	133	23	631	596.276	-315.551	D	7.453	7.453	0.001	3	0	100.36	0	0	0	0
2001	134	23	547	603.265	-312.487	D	7.453	7.453	0	3	0	103.82	0	0	0	0
2001	135	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	136	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	138	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	139	23	637	596.267	-315.066	D	7.461	7.453	0.008	3	0	100.01	0	0	0	0
2001	140	23	624	596.324	-316.278	D	7.453	7.453	0	3	0	106.06	0	0	0	0
2001	141	23	327	601.142	-307.502	D	7.453	7.453	0	3	0	96.04	0	0	0	0
2001	142	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	143	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	147	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	148	23	76	598.048	-312.738	D	7.453	7.453	0	3	0	142.08	0	0	0	0
2001	149	23	624	596.324	-316.278	D	7.453	7.453	0	3	0	105.53	0	0	0	0
2001	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	118.53	0	0	0	0
2001	151	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2001	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	154	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	0	101.08	0	0	0	0
2001	155	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	0	99.71	0	0	0	0
2001	156	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	157	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	158	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	0	100.52	0	0	0	0
2001	159	23	624	596.324	-316.278	D	7.547	7.546	0.001	3.2	0	100.1	0	0	0	0
2001	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	116.94	0	0	0	0
2001	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	118.04	0	0	0	0
2001	163	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	90.37	0	0	0	0
2001	164	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	165	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	166	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	167	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	168	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	169	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	170	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	171	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	172	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	0	100.08	0	0	0	0
2001	173	23	623	596.511	-316.262	D	7.547	7.546	0.001	3.2	0	100.08	0	0	0	0
2001	174	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	0	100.41	0	0	0	0
2001	175	23	517	602.805	-305.061	D	7.547	7.546	0	3.2	0	100.64	0	0	0	0
2001	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	105	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	129.03	0	0	0	0
2001	178	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	113.25	0	0	0	0
2001	179	23	6	596.462	-314.859	D	7.546	7.546	0	3.2	0	107.49	0	0	0	0
2001	180	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	181	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	182	23	516	602.728	-305.38	D	7.591	7.591	0	3.296	0	91.36	0	0	0	0
2001	183	23	676	599.876	-309.365	D	7.601	7.593	0.008	3.3	0	100	0	0	0	0
2001	184	23	62	597.819	-313.005	D	7.593	7.593	0	3.3	0	99.99	0	0	0	0
2001	185	23	94	598.258	-312.222	D	7.593	7.593	0	3.3	0	83.87	0	0	0	0
2001	186	23	490	602.499	-305.648	D	7.593	7.593	0	3.3	0	99	0	0	0	0
2001	187	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	99.9	0	0	0	0
2001	188	23	516	602.728	-305.38	D	7.593	7.593	0	3.3	0	101.09	0	0	0	0
2001	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	517	602.805	-305.061	D	7.595	7.593	0.003	3.3	0	100.03	0	0	0	0
2001	192	23	624	596.324	-316.278	D	7.595	7.593	0.002	3.3	0	100.04	0	0	0	0
2001	193	23	637	596.267	-315.066	D	7.593	7.593	0	3.3	0	99.64	0	0	0	0
2001	194	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	100.46	0	0	0	0
2001	195	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	196	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	197	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	198	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	97.78	0	0	0	0
2001	202	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	100.32	0	0	0	0
2001	203	23	516	602.728	-305.38	D	7.593	7.593	0	3.3	0	100.03	0	0	0	0
2001	204	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	102.57	0	0	0	0
2001	205	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	206	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	130.83	0	0	0	0
2001	207	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	99.82	0	0	0	0
2001	208	23	637	596.267	-315.066	D	7.596	7.593	0.003	3.3	0	100.01	0	0	0	0
2001	209	23	351	601.391	-307.483	D	7.594	7.593	0.002	3.3	0	99.94	0	0	0	0
2001	210	23	351	601.391	-307.483	D	7.593	7.593	0	3.3	0	102.02	0	0	0	0
2001	211	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	100.7	0	0	0	0
2001	212	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	104.89	0	0	0	0
2001	213	23	1	596.558	-316.101	D	7.681	7.681	0	3.492	0	91.87	0	0	0	0
2001	214	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	68.3	0	0	0	0
2001	215	23	516	602.728	-305.38	D	7.685	7.685	0	3.5	0	5.22	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	216	23	603	598.68	-316.244	D	7.685	7.685	0.001	3.5	0	99.97	0	0	0	0
2001	217	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	218	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	219	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	222	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	96.32	0	0	0	0
2001	223	23	624	596.324	-316.278	D	7.686	7.685	0.001	3.5	0	100	0	0	0	0
2001	224	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	0	99.73	0	0	0	0
2001	225	23	490	602.499	-305.648	D	7.685	7.685	0	3.5	0	99.05	0	0	0	0
2001	226	23	63	598.297	-315.967	D	7.685	7.685	0	3.5	0	99.09	0	0	0	0
2001	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	118.29	0	0	0	0
2001	228	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	39.17	0	0	0	0
2001	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	230	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	231	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	100.07	0	0	0	0
2001	232	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	99.88	0	0	0	0
2001	233	23	516	602.728	-305.38	D	7.685	7.685	0	3.5	0	100.02	0	0	0	0
2001	234	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	159.83	0	0	0	0
2001	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	236	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	237	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	238	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	239	23	626	596.299	-315.88	D	7.686	7.685	0.001	3.5	0	99.85	0	0	0	0
2001	240	23	676	599.876	-309.365	D	7.686	7.685	0.001	3.5	0	99.94	0	0	0	0
2001	241	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	0	100	0	0	0	0
2001	242	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	98.39	0	0	0	0
2001	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	244	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	0	100.02	0	0	0	0
2001	245	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	0	99.76	0	0	0	0
2001	246	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	105.13	0	0	0	0
2001	247	23	202	599.844	-310.101	D	7.685	7.685	0	3.5	0	93.44	0	0	0	0
2001	248	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	100.26	0	0	0	0
2001	249	23	327	601.142	-307.502	D	7.685	7.685	0	3.5	0	93.26	0	0	0	0
2001	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	253	23	462	603.035	-312.603	D	7.685	7.685	0	3.5	0	95.36	0	0	0	0
2001	254	23	516	602.728	-305.38	D	7.685	7.685	0	3.5	0	99.35	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	255	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	0	99.79	0	0	0	0
2001	256	23	490	602.499	-305.648	D	7.685	7.685	0	3.5	0	99.83	0	0	0	0
2001	257	23	637	596.267	-315.066	D	7.686	7.685	0.001	3.5	0	100.04	0	0	0	0
2001	258	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	259	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	260	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	261	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	262	23	517	602.805	-305.061	D	7.685	7.685	0.001	3.5	0	99.89	0	0	0	0
2001	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	264	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	265	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	0	100.03	0	0	0	0
2001	266	23	490	602.499	-305.648	D	7.685	7.685	0	3.5	0	99.73	0	0	0	0
2001	267	23	637	596.267	-315.066	D	7.691	7.685	0.006	3.5	0	100.02	0	0	0	0
2001	268	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	100.11	0	0	0	0
2001	269	23	517	602.805	-305.061	D	7.691	7.685	0.006	3.5	0	100	0	0	0	0
2001	270	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	271	23	6	596.462	-314.859	D	7.686	7.685	0.001	3.5	0	99.91	0	0	0	0
2001	272	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	273	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	274	23	517	602.805	-305.061	D	7.508	7.507	0.001	3.117	0	100.07	0	0	0	0
2001	275	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	0	100.19	0	0	0	0
2001	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	637	596.267	-315.066	D	7.501	7.5	0.001	3.1	0	100.11	0	0	0	0
2001	279	23	517	602.805	-305.061	D	7.502	7.5	0.002	3.1	0	100.08	0	0	0	0
2001	280	23	548	603.28	-312.734	D	7.501	7.5	0.001	3.1	0	100.24	0	0	0	0
2001	281	23	637	596.267	-315.066	D	7.5	7.5	0	3.1	0	100.27	0	0	0	0
2001	282	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	285	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	286	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	287	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	288	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	289	23	517	602.805	-305.061	D	7.509	7.5	0.01	3.1	0	100.01	0	0	0	0
2001	290	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	100.74	0	0	0	0
2001	291	23	491	603.207	-311.591	D	7.501	7.5	0.001	3.1	0	100.12	0	0	0	0
2001	292	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	293	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	294	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	298	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	23	517	602.805	-305.061	D	7.522	7.5	0.023	3.1	0	100.01	0	0	0	0
2001	301	23	517	602.805	-305.061	D	7.508	7.5	0.008	3.1	0	100.03	0	0	0	0
2001	302	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	100.08	0	0	0	0
2001	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	23	637	596.267	-315.066	D	7.508	7.5	0.008	3.1	0	100.01	0	0	0	0
2001	308	23	260	600.493	-308.801	D	7.5	7.5	0	3.1	0	101.26	0	0	0	0
2001	309	23	637	596.267	-315.066	D	7.51	7.5	0.01	3.1	0	100.01	0	0	0	0
2001	310	23	13	596.691	-314.592	D	7.5	7.5	0	3.1	0	101.45	0	0	0	0
2001	311	23	626	596.299	-315.88	D	7.5	7.5	0	3.1	0	100.12	0	0	0	0
2001	312	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	101.68	0	0	0	0
2001	313	23	637	596.267	-315.066	D	7.505	7.5	0.005	3.1	0	100.04	0	0	0	0
2001	314	23	547	603.265	-312.487	D	7.5	7.5	0.001	3.1	0	100.07	0	0	0	0
2001	315	23	637	596.267	-315.066	D	7.506	7.5	0.007	3.1	0	100.02	0	0	0	0
2001	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	317	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	322	23	377	601.62	-307.215	D	7.5	7.5	0	3.1	0	88.98	0	0	0	0
2001	323	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	324	23	517	602.805	-305.061	D	7.502	7.5	0.002	3.1	0	100.04	0	0	0	0
2001	325	23	548	603.28	-312.734	D	7.501	7.5	0.001	3.1	0	100.1	0	0	0	0
2001	326	23	547	603.265	-312.487	D	7.5	7.5	0	3.1	0	101.61	0	0	0	0
2001	327	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	637	596.267	-315.066	D	7.508	7.5	0.008	3.1	0	100.02	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	333	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	102.58	0	0	0	0
2001	334	23	603	598.68	-316.244	D	7.523	7.5	0.023	3.1	0	100.01	0	0	0	0
2001	335	23	1	596.558	-316.101	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2001	336	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	100.51	0	0	0	0
2001	342	23	517	602.805	-305.061	D	7.605	7.593	0.012	3.3	0	100.02	0	0	0	0
2001	343	23	517	602.805	-305.061	D	7.643	7.593	0.051	3.3	0	100	0	0	0	0
2001	344	23	637	596.267	-315.066	D	7.595	7.593	0.002	3.3	0	100	0	0	0	0
2001	345	23	637	596.267	-315.066	D	7.594	7.593	0.002	3.3	0	99.99	0	0	0	0
2001	346	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	94.3	0	0	0	0
2001	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	23	517	602.805	-305.061	D	7.613	7.593	0.02	3.3	0	100.01	0	0	0	0
2001	349	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	0	100.28	0	0	0	0
2001	350	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	0	100.12	0	0	0	0
2001	351	23	517	602.805	-305.061	D	7.601	7.593	0.008	3.3	0	100.02	0	0	0	0
2001	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	353	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.081							
MLC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	2	23	548	603.28	-312.734	D	7.596	7.593	0.003	3.3	22.97	72.81	0	0	0	4.2
2001	3	23	548	603.28	-312.734	D	7.594	7.593	0.001	3.3	27.52	70.13	0	0	0	2.35
2001	4	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	5	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	9	23	548	603.28	-312.734	D	7.598	7.593	0.006	3.3	6.03	85.94	0	0	0	8.02
2001	10	23	548	603.28	-312.734	D	7.606	7.593	0.013	3.3	22.96	74.63	0	0	0	2.42
2001	11	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	26.04	71.86	0	0	0	2.21
2001	12	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	13	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	25.07	68.95	0	0	0	5.99
2001	17	23	637	596.267	-315.066	D	7.628	7.593	0.035	3.3	16.8	77.98	0	0	0	5.22
2001	18	23	517	602.805	-305.061	D	7.764	7.593	0.172	3.3	15.71	78.52	0	0	0	5.77
2001	19	23	548	603.28	-312.734	D	7.623	7.593	0.031	3.3	23.77	71.76	0	0	0	4.47
2001	20	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	21	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	25	23	548	603.28	-312.734	D	7.638	7.593	0.045	3.3	8.08	84.25	0	0	0	7.67
2001	26	23	637	596.267	-315.066	D	7.593	7.593	0	3.3	15.44	81.08	0	0	0	3.44
2001	27	23	548	603.28	-312.734	D	7.593	7.593	0	3.3	20.89	74.43	0	0	0	4.99
2001	28	23	548	603.28	-312.734	D	7.611	7.593	0.019	3.3	20.69	75.96	0	0	0	3.35
2001	29	23	352	601.372	-307.234	D	7.593	7.593	0	3.3	25.46	71.91	0	0	0	1.77
2001	30	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	34	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	23	517	602.805	-305.061	D	7.453	7.453	0	3	44.22	40.28	0	0	0	16.75
2001	38	23	517	602.805	-305.061	D	7.463	7.453	0.01	3	27.2	66.48	0	0	0	6.34
2001	39	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	41	23	637	596.267	-315.066	D	7.463	7.453	0.01	3	15.78	78.16	0	0	0	6.08
2001	42	23	637	596.267	-315.066	D	7.453	7.453	0	3	15.08	80.19	0	0	0	4.67
2001	43	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	44	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	461	602.269	-305.916	D	7.453	7.453	0	3	42.45	55.12	0	0	0	2.28
2001	46	23	637	596.267	-315.066	D	7.519	7.453	0.066	3	28.51	65.22	0	0	0	6.28
2001	47	23	548	603.28	-312.734	D	7.478	7.453	0.025	3	35.86	58.51	0	0	0	5.64
2001	48	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	49	23	637	596.267	-315.066	D	7.501	7.453	0.049	3	7	85.97	0	0	0	7.03
2001	50	23	637	596.267	-315.066	D	7.453	7.453	0.001	3	21.21	76.67	0	0	0	2.26
2001	51	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	35.02	53.91	0	0	0	11.1
2001	52	23	637	596.267	-315.066	D	7.463	7.453	0.01	3	30.55	62.27	0	0	0	7.18
2001	53	23	517	602.805	-305.061	D	7.472	7.453	0.02	3	10.11	83.23	0	0	0	6.68
2001	54	23	548	603.28	-312.734	D	7.457	7.453	0.004	3	33.16	62.17	0	0	0	4.72
2001	55	23	517	602.805	-305.061	D	7.453	7.453	0	3	34.37	62.62	0	0	0	3.02
2001	56	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	557	601.32	-313.419	D	7.482	7.453	0.03	3	7.91	81.65	0	0	0	10.45
2001	58	23	637	596.267	-315.066	D	7.453	7.453	0.001	3	27.33	69.13	0	0	0	3.85
2001	59	23	637	596.267	-315.066	D	7.454	7.453	0.001	3	24.41	68.85	0	0	0	6.86
2001	60	23	656	597.971	-312.292	D	7.416	7.362	0.053	2.808	16.23	78.26	0	0	0	5.51
2001	61	23	516	602.728	-305.38	D	7.358	7.358	0	2.8	30.34	66.86	0	0	0	1.75
2001	62	23	557	601.32	-313.419	D	7.363	7.358	0.005	2.8	19.38	74.9	0	0	0	5.77
2001	63	23	557	601.32	-313.419	D	7.382	7.358	0.024	2.8	7.86	78.01	0	0	0	14.13
2001	64	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	68	23	517	602.805	-305.061	D	7.482	7.358	0.124	2.8	9.44	80.72	0	0	0	9.84
2001	69	23	548	603.28	-312.734	D	7.386	7.358	0.028	2.8	26.38	68.84	0	0	0	4.78
2001	70	23	517	602.805	-305.061	D	7.36	7.358	0.001	2.8	49.61	46.93	0	0	0	3.5
2001	71	23	430	602.079	-306.68	D	7.358	7.358	0	2.8	61.69	30.78	0	0	0	3.61
2001	72	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	73	23	517	602.805	-305.061	D	7.371	7.358	0.013	2.8	15.26	73.49	0	0	0	11.28
2001	74	23	327	601.142	-307.502	D	7.358	7.358	0	2.8	56.37	26.45	0	0	0	9.79
2001	75	23	548	603.28	-312.734	D	7.362	7.358	0.003	2.8	26.33	70.99	0	0	0	2.69
2001	76	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	77	23	637	596.267	-315.066	D	7.366	7.358	0.008	2.8	8.44	81.06	0	0	0	10.5
2001	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	79	23	637	596.267	-315.066	D	7.382	7.358	0.024	2.8	8.45	78.44	0	0	0	13.12

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	80	23	557	601.32	-313.419	D	7.378	7.358	0.019	2.8	11.57	72.44	0	0	0	16.01
2001	81	23	637	596.267	-315.066	D	7.369	7.358	0.011	2.8	11.33	72.56	0	0	0	16.11
2001	82	23	557	601.32	-313.419	D	7.506	7.358	0.148	2.8	22.13	72.01	0	0	0	5.87
2001	83	23	548	603.28	-312.734	D	7.405	7.358	0.047	2.8	38.22	51.64	0	0	0	10.14
2001	84	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	85	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	86	23	517	602.805	-305.061	D	7.443	7.358	0.085	2.8	8.43	84.85	0	0	0	6.72
2001	87	23	517	602.805	-305.061	D	7.364	7.358	0.006	2.8	27.06	68.45	0	0	0	4.52
2001	88	23	516	602.728	-305.38	D	7.358	7.358	0	2.8	43.63	51.22	0	0	0	2.91
2001	89	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	90	23	517	602.805	-305.061	D	7.392	7.358	0.034	2.8	42.28	53.73	0	0	0	3.99
2001	91	23	548	603.28	-312.734	D	7.269	7.267	0.002	2.608	60.31	36.71	0	0	0	2.93
2001	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	95	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	96	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	103	23	557	601.32	-313.419	D	7.28	7.263	0.017	2.6	25.98	37.89	0	0	0	36.14
2001	104	23	603	598.68	-316.244	D	7.264	7.263	0.001	2.6	82.29	8.71	0	0	0	9.01
2001	105	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	88.16	6.91	0	0	0	5.27
2001	106	23	547	603.265	-312.487	D	7.263	7.263	0	2.6	88.42	5.71	0	0	0	4.58
2001	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	108	23	548	603.28	-312.734	D	7.263	7.263	0	2.6	15.03	83.17	0	0	0	7.18
2001	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	114	23	547	603.265	-312.487	D	7.263	7.263	0	2.6	59.64	24.48	0	0	0	20.6
2001	115	23	517	602.805	-305.061	D	7.269	7.263	0.006	2.6	20.1	63.45	0	0	0	16.46
2001	116	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	117	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	118	23	461	602.269	-305.916	D	7.263	7.263	0	2.6	96.96	1.85	0	0	0	7.82

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	119	23	168	599.404	-310.884	D	7.263	7.263	0	2.6	77.58	1.3	0	0	0	4.94
2001	120	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	128	23	548	603.28	-312.734	D	7.464	7.453	0.011	3	59.88	23.05	0	0	0	17.11
2001	129	23	517	602.805	-305.061	D	7.459	7.453	0.007	3	86.33	6.78	0	0	0	6.93
2001	130	23	548	603.28	-312.734	D	7.454	7.453	0.001	3	91.94	2.96	0	0	0	5.23
2001	131	23	490	602.499	-305.648	D	7.453	7.453	0	3	94.94	0.99	0	0	0	4.36
2001	132	23	548	603.28	-312.734	D	7.457	7.453	0.005	3	50.75	26.7	0	0	0	22.61
2001	133	23	548	603.28	-312.734	D	7.454	7.453	0.001	3	52.16	23.76	0	0	0	24.37
2001	134	23	1	596.558	-316.101	D	7.453	7.453	0	3	88.63	5.24	0	0	0	6.75
2001	135	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	136	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	138	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	139	23	517	602.805	-305.061	D	7.487	7.453	0.034	3	31.6	58.19	0	0	0	10.21
2001	140	23	548	603.28	-312.734	D	7.458	7.453	0.005	3	72.58	8.14	0	0	0	19.35
2001	141	23	298	601.028	-309.26	D	7.453	7.453	0	3	83.79	1.43	0	0	0	2.99
2001	142	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	143	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	147	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	148	23	517	602.805	-305.061	D	7.453	7.453	0	3	54.84	30.62	0	0	0	14.77
2001	149	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	85.82	6.55	0	0	0	7.68
2001	150	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	92.4	2.19	0	0	0	5.55
2001	151	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2001	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	154	23	681	600.53	-308.617	D	7.551	7.546	0.005	3.2	28.68	40.19	0	0	0	31.17
2001	155	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	68.89	26.97	0	0	0	3.86
2001	156	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	157	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	158	23	517	602.805	-305.061	D	7.571	7.546	0.025	3.2	91.52	1.68	0	0	0	6.8
2001	159	23	632	596.27	-315.421	D	7.565	7.546	0.019	3.2	77.26	6.28	0	0	0	16.47
2001	160	23	637	596.267	-315.066	D	7.548	7.546	0.002	3.2	80.85	3.69	0	0	0	15.45
2001	161	23	517	602.805	-305.061	D	7.553	7.546	0.006	3.2	91.43	3.12	0	0	0	5.5
2001	162	23	624	596.324	-316.278	D	7.55	7.546	0.004	3.2	96.12	0.71	0	0	0	3.2
2001	163	23	517	602.805	-305.061	D	7.549	7.546	0.003	3.2	96.7	0.83	0	0	0	2.51
2001	164	23	517	602.805	-305.061	D	7.547	7.546	0	3.2	97.39	0.4	0	0	0	2.48
2001	165	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	166	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	167	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	168	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	169	23	548	603.28	-312.734	D	7.547	7.546	0.001	3.2	93.82	1.1	0	0	0	5.29
2001	170	23	352	601.372	-307.234	D	7.546	7.546	0	3.2	94.37	0.34	0	0	0	3.65
2001	171	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	70.34	15.51	0	0	0	14.22
2001	172	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	91.09	2.49	0	0	0	6.48
2001	173	23	517	602.805	-305.061	D	7.553	7.546	0.006	3.2	86.37	2.9	0	0	0	10.74
2001	174	23	682	600.626	-308.407	D	7.558	7.546	0.012	3.2	46.39	21.66	0	0	0	31.96
2001	175	23	548	603.28	-312.734	D	7.555	7.546	0.009	3.2	80.16	11.46	0	0	0	8.41
2001	176	23	624	596.324	-316.278	D	7.547	7.546	0	3.2	92.58	2.8	0	0	0	5.15
2001	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	96.15	2.06	0	0	0	3.57
2001	178	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	96.84	2.27	0	0	0	2.73
2001	179	23	281	600.703	-308.285	D	7.546	7.546	0	3.2	91.14	7.07	0	0	0	2.18
2001	180	23	13	596.691	-314.592	D	7.546	7.546	0	3.2	90.88	0.5	0	0	0	2
2001	181	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	182	23	517	602.805	-305.061	D	7.591	7.591	0	3.296	93.36	3.08	0	0	0	3.88
2001	183	23	603	598.68	-316.244	D	7.614	7.593	0.021	3.3	82.5	12.92	0	0	0	4.59
2001	184	23	624	596.324	-316.278	D	7.614	7.593	0.022	3.3	95.74	1.34	0	0	0	2.92
2001	185	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	96.82	0.71	0	0	0	2.49
2001	186	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	83.87	1.28	0	0	0	14.11
2001	187	23	624	596.324	-316.278	D	7.597	7.593	0.005	3.3	81.63	2.84	0	0	0	15.59
2001	188	23	637	596.267	-315.066	D	7.596	7.593	0.003	3.3	95.34	0.77	0	0	0	3.93
2001	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	517	602.805	-305.061	D	7.647	7.593	0.054	3.3	59.05	23.98	0	0	0	16.98
2001	192	23	548	603.28	-312.734	D	7.603	7.593	0.01	3.3	83.77	3.7	0	0	0	12.55
2001	193	23	637	596.267	-315.066	D	7.598	7.593	0.005	3.3	86.06	8.59	0	0	0	5.39
2001	194	23	624	596.324	-316.278	D	7.595	7.593	0.002	3.3	94.23	2.62	0	0	0	3.17
2001	195	23	517	602.805	-305.061	D	7.603	7.593	0.011	3.3	70.79	9.8	0	0	0	19.41
2001	196	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	197	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	198	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	95.22	1.46	0	0	0	3.44
2001	202	23	548	603.28	-312.734	D	7.614	7.593	0.021	3.3	86.94	7.81	0	0	0	5.26
2001	203	23	624	596.324	-316.278	D	7.598	7.593	0.005	3.3	95.36	2.21	0	0	0	2.44
2001	204	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	94.25	3.68	0	0	0	2.08
2001	205	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	96.9	1.13	0	0	0	1.94
2001	206	23	515	602.747	-305.629	D	7.593	7.593	0	3.3	97.26	1.08	0	0	0	1.74
2001	207	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	87.22	7.28	0	0	0	5.4
2001	208	23	548	603.28	-312.734	D	7.596	7.593	0.004	3.3	85.36	11.71	0	0	0	2.96
2001	209	23	517	602.805	-305.061	D	7.596	7.593	0.004	3.3	89.6	7.93	0	0	0	2.5
2001	210	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	92.2	5.45	0	0	0	2.31
2001	211	23	517	602.805	-305.061	D	7.603	7.593	0.011	3.3	89.72	6.06	0	0	0	4.23
2001	212	23	517	602.805	-305.061	D	7.6	7.593	0.008	3.3	96.29	0.7	0	0	0	3.03
2001	213	23	6	596.462	-314.859	D	7.681	7.681	0	3.492	95.87	0.65	0	0	0	2.41
2001	214	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	95.68	0.27	0	0	0	2.27
2001	215	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	216	23	548	603.28	-312.734	D	7.686	7.685	0.001	3.5	73.58	11.49	0	0	0	14.89
2001	217	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	218	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	219	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	220	23	631	596.276	-315.551	D	7.685	7.685	0	3.5	92	1.93	0	0	0	6
2001	221	23	517	602.805	-305.061	D	7.703	7.685	0.018	3.5	87.38	8.85	0	0	0	3.76
2001	222	23	517	602.805	-305.061	D	7.689	7.685	0.004	3.5	92.16	2.76	0	0	0	5.09
2001	223	23	637	596.267	-315.066	D	7.747	7.685	0.062	3.5	66.47	20.44	0	0	0	13.1
2001	224	23	637	596.267	-315.066	D	7.723	7.685	0.038	3.5	82.84	7.67	0	0	0	9.49
2001	225	23	517	602.805	-305.061	D	7.695	7.685	0.01	3.5	85.52	3.04	0	0	0	11.44
2001	226	23	637	596.267	-315.066	D	7.694	7.685	0.009	3.5	35.61	23.41	0	0	0	40.98
2001	227	23	637	596.267	-315.066	D	7.692	7.685	0.007	3.5	88.69	3.76	0	0	0	7.54
2001	228	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	95.61	1.04	0	0	0	3.36
2001	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	230	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	231	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	232	23	517	602.805	-305.061	D	7.697	7.685	0.012	3.5	58.17	25.03	0	0	0	16.8
2001	233	23	517	602.805	-305.061	D	7.687	7.685	0.003	3.5	91.87	2.72	0	0	0	5.43
2001	234	23	491	603.207	-311.591	D	7.685	7.685	0	3.5	91.52	0.95	0	0	0	3.06
2001	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	98.73	0.8	0	0	0	2.26

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	236	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	237	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	238	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	239	23	676	599.876	-309.365	D	7.696	7.685	0.011	3.5	61.88	19.49	0	0	0	18.63
2001	240	23	517	602.805	-305.061	D	7.692	7.685	0.007	3.5	92.09	1.68	0	0	0	6.24
2001	241	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	71.97	17.88	0	0	0	10.21
2001	242	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	91.6	4.95	0	0	0	3.39
2001	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	244	23	676	599.876	-309.365	D	7.718	7.685	0.033	3.5	41.64	50.95	0	0	0	7.42
2001	245	23	624	596.324	-316.278	D	7.688	7.685	0.003	3.5	92.84	4.42	0	0	0	2.74
2001	246	23	517	602.805	-305.061	D	7.69	7.685	0.005	3.5	91.94	1.14	0	0	0	6.95
2001	247	23	637	596.267	-315.066	D	7.709	7.685	0.024	3.5	82.25	10.65	0	0	0	7.09
2001	248	23	517	602.805	-305.061	D	7.689	7.685	0.004	3.5	92.65	4	0	0	0	3.36
2001	249	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	95.68	1.17	0	0	0	3.1
2001	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	253	23	517	602.805	-305.061	D	7.697	7.685	0.012	3.5	87.22	4.62	0	0	0	8.16
2001	254	23	637	596.267	-315.066	D	7.692	7.685	0.008	3.5	80.62	9.46	0	0	0	9.93
2001	255	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	90.06	1.6	0	0	0	8.33
2001	256	23	548	603.28	-312.734	D	7.779	7.685	0.094	3.5	76.13	16.56	0	0	0	7.31
2001	257	23	624	596.324	-316.278	D	7.691	7.685	0.006	3.5	91.19	1.87	0	0	0	6.95
2001	258	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	259	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	260	23	431	602.059	-306.432	D	7.685	7.685	0	3.5	74.98	16.3	0	0	0	4.95
2001	261	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	264	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	265	23	548	603.28	-312.734	D	7.696	7.685	0.012	3.5	81.76	7.23	0	0	0	11.02
2001	266	23	625	596.311	-316.079	D	7.693	7.685	0.008	3.5	78.08	16.36	0	0	0	5.54
2001	267	23	548	603.28	-312.734	D	7.69	7.685	0.005	3.5	43.35	43.45	0	0	0	13.19
2001	268	23	557	601.32	-313.419	D	7.739	7.685	0.055	3.5	11.63	73.37	0	0	0	15
2001	269	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	270	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	271	23	632	596.27	-315.421	D	7.707	7.685	0.022	3.5	28.53	41.79	0	0	0	29.68
2001	272	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	273	23	637	596.267	-315.066	D	7.695	7.685	0.01	3.5	82.18	9.47	0	0	0	8.35
2001	274	23	557	601.32	-313.419	D	7.533	7.507	0.025	3.117	19.46	59.58	0	0	0	20.95

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	517	602.805	-305.061	D	7.533	7.5	0.034	3.1	28.63	68.72	0	0	0	2.65
2001	279	23	603	598.68	-316.244	D	7.5	7.5	0.001	3.1	52.18	46.6	0	0	0	1.22
2001	280	23	656	597.971	-312.292	D	7.524	7.5	0.024	3.1	13.56	77.82	0	0	0	8.63
2001	281	23	631	596.276	-315.551	D	7.5	7.5	0	3.1	60.74	36.64	0	0	0	4.53
2001	282	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	285	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	286	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	287	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	288	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	289	23	517	602.805	-305.061	D	7.508	7.5	0.009	3.1	25.5	72.96	0	0	0	1.55
2001	290	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	291	23	548	603.28	-312.734	D	7.502	7.5	0.002	3.1	44.97	50.05	0	0	0	5.06
2001	292	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	293	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	294	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	298	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	27.43	66.63	0	0	0	7.06
2001	301	23	624	596.324	-316.278	D	7.516	7.5	0.016	3.1	19.78	75.45	0	0	0	4.78
2001	302	23	692	601.846	-306.417	D	7.5	7.5	0	3.1	61.92	35.67	0	0	0	2.36
2001	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	63.45	35.19	0	0	0	7.93
2001	307	23	490	602.499	-305.648	D	7.51	7.5	0.01	3.1	37.58	56.68	0	0	0	5.74
2001	308	23	656	597.971	-312.292	D	7.5	7.5	0	3.1	76.38	13.83	0	0	0	10.49
2001	309	23	557	601.32	-313.419	D	7.537	7.5	0.037	3.1	10.42	74.55	0	0	0	15.03
2001	310	23	637	596.267	-315.066	D	7.5	7.5	0	3.1	69.4	21.05	0	0	0	9.89
2001	311	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	72.96	21.23	0	0	0	6.03
2001	312	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	83.62	12	0	0	0	5.04
2001	313	23	681	600.53	-308.617	D	7.546	7.5	0.046	3.1	13.69	72.12	0	0	0	14.19

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	314	23	548	603.28	-312.734	D	7.5	7.5	0.001	3.1	47.36	44.26	0	0	0	8.43
2001	315	23	557	601.32	-313.419	D	7.519	7.5	0.019	3.1	11.6	70.18	0	0	0	18.22
2001	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	317	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	409	602.481	-311.897	D	7.5	7.5	0	3.1	76.26	13.61	0	0	0	8.79
2001	321	23	517	602.805	-305.061	D	7.604	7.5	0.104	3.1	41.18	53.42	0	0	0	5.4
2001	322	23	517	602.805	-305.061	D	7.532	7.5	0.032	3.1	71.9	23.22	0	0	0	4.89
2001	323	23	431	602.059	-306.432	D	7.5	7.5	0	3.1	82.21	12.5	0	0	0	3.31
2001	324	23	533	603.05	-309.022	D	7.5	7.5	0.001	3.1	29.18	59.85	0	0	0	11.02
2001	325	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	28.27	66.3	0	0	0	5.98
2001	326	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	46.27	49.05	0	0	0	5.4
2001	327	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	548	603.28	-312.734	D	7.537	7.5	0.038	3.1	9.13	80.17	0	0	0	10.7
2001	333	23	637	596.267	-315.066	D	7.501	7.5	0.002	3.1	12.73	78.39	0	0	0	8.93
2001	334	23	603	598.68	-316.244	D	7.516	7.5	0.017	3.1	18.84	76.01	0	0	0	5.15
2001	335	23	1	596.558	-316.101	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2001	336	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	37.22	57.95	0	0	0	4.8
2001	337	23	461	602.269	-305.916	D	7.593	7.593	0	3.3	60.45	28.11	0	0	0	6.38
2001	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	11.26	83.69	0	0	0	5.06
2001	341	23	517	602.805	-305.061	D	7.679	7.593	0.087	3.3	23.75	72.69	0	0	0	3.56
2001	342	23	517	602.805	-305.061	D	7.639	7.593	0.046	3.3	41.26	56.02	0	0	0	2.72
2001	343	23	517	602.805	-305.061	D	7.609	7.593	0.016	3.3	18.43	73.99	0	0	0	7.58
2001	344	23	637	596.267	-315.066	D	7.596	7.593	0.003	3.3	25.13	70.49	0	0	0	4.38
2001	345	23	637	596.267	-315.066	D	7.595	7.593	0.003	3.3	34.23	62.67	0	0	0	3.11
2001	346	23	203	599.824	-309.852	D	7.593	7.593	0	3.3	39.03	44.3	0	0	0	2.33
2001	347	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	52	43.51	0	0	0	4.41
2001	348	23	517	602.805	-305.061	D	7.614	7.593	0.021	3.3	34.41	62.09	0	0	0	3.5
2001	349	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	60.45	35.92	0	0	0	3.97
2001	350	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	52.94	44.07	0	0	0	2.97
2001	351	23	637	596.267	-315.066	D	7.598	7.593	0.006	3.3	23.01	69.78	0	0	0	7.22
2001	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	353	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.172							
UMC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	651	597.588	-313.158	D	7.766	7.593	0.173	3.3	74.91	25.03	0	0	0	0.07
2001	2	23	624	596.324	-316.278	D	7.636	7.593	0.043	3.3	88.32	11.66	0	0	0	0.02
2001	3	23	676	599.876	-309.365	D	7.709	7.593	0.116	3.3	88.29	11.7	0	0	0	0.02
2001	4	23	548	603.28	-312.734	D	7.594	7.593	0.001	3.3	94.11	5.83	0	0	0	0.01
2001	5	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	517	602.805	-305.061	D	7.596	7.593	0.004	3.3	88.51	11.42	0	0	0	0.07
2001	7	23	548	603.28	-312.734	D	7.667	7.593	0.075	3.3	79.44	20.5	0	0	0	0.06
2001	8	23	624	596.324	-316.278	D	7.615	7.593	0.023	3.3	89.61	10.36	0	0	0	0.03
2001	9	23	624	596.324	-316.278	D	7.597	7.593	0.005	3.3	91.22	8.75	0	0	0	0.02
2001	10	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	84.29	15.68	0	0	0	0.02
2001	11	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	89	10.99	0	0	0	0.01
2001	12	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	13	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	632	596.27	-315.421	D	7.669	7.593	0.076	3.3	78.48	21.44	0	0	0	0.08
2001	17	23	624	596.324	-316.278	D	7.593	7.593	0.001	3.3	86.37	13.58	0	0	0	0.05
2001	18	23	517	602.805	-305.061	D	7.606	7.593	0.013	3.3	89.95	10.01	0	0	0	0.03
2001	19	23	548	603.28	-312.734	D	7.748	7.593	0.155	3.3	83.63	16.32	0	0	0	0.04
2001	20	23	517	602.805	-305.061	D	7.621	7.593	0.028	3.3	75.28	24.66	0	0	0	0.06
2001	21	23	517	602.805	-305.061	D	7.596	7.593	0.004	3.3	78.5	21.47	0	0	0	0.04

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	22	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	78.46	21.78	0	0	0	0.06
2001	23	23	490	602.499	-305.648	D	7.593	7.593	0	3.3	81.07	14.39	0	0	0	0.04
2001	24	23	624	596.324	-316.278	D	7.794	7.593	0.202	3.3	83.66	16.28	0	0	0	0.06
2001	25	23	624	596.324	-316.278	D	7.598	7.593	0.006	3.3	87.5	12.45	0	0	0	0.04
2001	26	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	27	23	656	597.971	-312.292	D	7.646	7.593	0.053	3.3	71.73	28.2	0	0	0	0.08
2001	28	23	517	602.805	-305.061	D	7.628	7.593	0.035	3.3	84.95	15.03	0	0	0	0.03
2001	29	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	30	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	517	602.805	-305.061	D	7.546	7.453	0.093	3	69.6	30.32	0	0	0	0.08
2001	34	23	517	602.805	-305.061	D	7.461	7.453	0.008	3	80.08	19.89	0	0	0	0.03
2001	35	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	517	602.805	-305.061	D	7.453	7.453	0	3	68.94	31.48	0	0	0	0.1
2001	37	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	95.68	4.3	0	0	0	0.08
2001	38	23	517	602.805	-305.061	D	7.492	7.453	0.039	3	86.71	13.25	0	0	0	0.04
2001	39	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	41	23	626	596.299	-315.88	D	7.475	7.453	0.023	3	63.69	36.2	0	0	0	0.11
2001	42	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	43	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	44	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	46	23	632	596.27	-315.421	D	7.637	7.453	0.185	3	96.63	3.36	0	0	0	0.01
2001	47	23	624	596.324	-316.278	D	7.709	7.453	0.256	3	91.64	8.34	0	0	0	0.02
2001	48	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	49	23	637	596.267	-315.066	D	7.477	7.453	0.024	3	86.89	13.08	0	0	0	0.04
2001	50	23	637	596.267	-315.066	D	7.461	7.453	0.009	3	92.64	7.35	0	0	0	0.02
2001	51	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	96.99	3.07	0	0	0	0.04
2001	52	23	548	603.28	-312.734	D	7.466	7.453	0.013	3	91.57	8.42	0	0	0	0.02
2001	53	23	624	596.324	-316.278	D	7.453	7.453	0.001	3	91.74	8.51	0	0	0	0.01
2001	54	23	517	602.805	-305.061	D	7.559	7.453	0.107	3	88.16	11.81	0	0	0	0.03
2001	55	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	94.44	5.56	0	0	0	0.02
2001	56	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	517	602.805	-305.061	D	7.472	7.453	0.019	3	73.53	26.35	0	0	0	0.13
2001	58	23	637	596.267	-315.066	D	7.455	7.453	0.003	3	91.29	8.75	0	0	0	0.03
2001	59	23	624	596.324	-316.278	D	7.453	7.453	0	3	90.09	7.77	0	0	0	0.01
2001	60	23	1	596.558	-316.101	D	7.362	7.362	0	2.808	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	61	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	62	23	517	602.805	-305.061	D	7.417	7.358	0.058	2.8	96.06	3.91	0	0	0	0.03
2001	63	23	637	596.267	-315.066	D	7.397	7.358	0.039	2.8	95.77	4.21	0	0	0	0.02
2001	64	23	624	596.324	-316.278	D	7.365	7.358	0.006	2.8	86.33	13.65	0	0	0	0.06
2001	65	23	624	596.324	-316.278	D	7.384	7.358	0.025	2.8	85.82	14.13	0	0	0	0.05
2001	66	23	624	596.324	-316.278	D	7.359	7.358	0.001	2.8	93.01	6.99	0	0	0	0.07
2001	67	23	632	596.27	-315.421	D	7.436	7.358	0.078	2.8	87.11	12.82	0	0	0	0.07
2001	68	23	517	602.805	-305.061	D	7.367	7.358	0.009	2.8	82.03	17.9	0	0	0	0.07
2001	69	23	656	597.971	-312.292	D	7.379	7.358	0.02	2.8	91.26	8.72	0	0	0	0.03
2001	70	23	517	602.805	-305.061	D	7.362	7.358	0.004	2.8	94.69	5.33	0	0	0	0.02
2001	71	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	97.33	2.64	0	0	0	0.02
2001	72	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	73	23	557	601.32	-313.419	D	7.383	7.358	0.025	2.8	84.48	15.4	0	0	0	0.13
2001	74	23	517	602.805	-305.061	D	7.358	7.358	0	2.8	98.95	1.65	0	0	0	0.03
2001	75	23	517	602.805	-305.061	D	7.466	7.358	0.108	2.8	93.77	6.21	0	0	0	0.03
2001	76	23	625	596.311	-316.079	D	7.424	7.358	0.066	2.8	87.3	12.64	0	0	0	0.06
2001	77	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	80	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	81	23	624	596.324	-316.278	D	7.372	7.358	0.014	2.8	96.75	3.23	0	0	0	0.03
2001	82	23	624	596.324	-316.278	D	7.397	7.358	0.039	2.8	96.75	3.23	0	0	0	0.02
2001	83	23	624	596.324	-316.278	D	7.378	7.358	0.019	2.8	97.08	2.9	0	0	0	0.02
2001	84	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	85	23	624	596.324	-316.278	D	7.362	7.358	0.004	2.8	87.88	12.09	0	0	0	0.05
2001	86	23	624	596.324	-316.278	D	7.486	7.358	0.127	2.8	87.28	12.67	0	0	0	0.05
2001	87	23	517	602.805	-305.061	D	7.441	7.358	0.083	2.8	93.9	6.08	0	0	0	0.03
2001	88	23	517	602.805	-305.061	D	7.358	7.358	0	2.8	97.14	2.83	0	0	0	0.02
2001	89	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	90	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	91	23	632	596.27	-315.421	D	7.294	7.267	0.027	2.608	85.75	14.17	0	0	0	0.09
2001	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	95	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	96	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	103	23	548	603.28	-312.734	D	7.277	7.263	0.014	2.6	99.4	0.58	0	0	0	0.03
2001	104	23	548	603.28	-312.734	D	7.274	7.263	0.011	2.6	99.75	0.23	0	0	0	0.02
2001	105	23	625	596.311	-316.079	D	7.366	7.263	0.103	2.6	99.45	0.53	0	0	0	0.03
2001	106	23	624	596.324	-316.278	D	7.303	7.263	0.04	2.6	97.86	2.08	0	0	0	0.05
2001	107	23	557	601.32	-313.419	D	7.27	7.263	0.007	2.6	71.78	28.09	0	0	0	0.13
2001	108	23	637	596.267	-315.066	D	7.273	7.263	0.01	2.6	98.93	1.04	0	0	0	0.04
2001	109	23	548	603.28	-312.734	D	7.271	7.263	0.008	2.6	99.15	0.81	0	0	0	0.03
2001	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	114	23	548	603.28	-312.734	D	7.273	7.263	0.01	2.6	94.8	5.11	0	0	0	0.1
2001	115	23	624	596.324	-316.278	D	7.273	7.263	0.01	2.6	93.52	6.42	0	0	0	0.07
2001	116	23	517	602.805	-305.061	D	7.304	7.263	0.041	2.6	98.74	1.23	0	0	0	0.03
2001	117	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	118	23	517	602.805	-305.061	D	7.264	7.263	0.001	2.6	100.03	0.12	0	0	0	0.02
2001	119	23	517	602.805	-305.061	D	7.264	7.263	0.001	2.6	99.73	0.17	0	0	0	0.01
2001	120	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	123	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	124	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	128	23	624	596.324	-316.278	D	7.494	7.453	0.041	3	98.6	1.37	0	0	0	0.04
2001	129	23	624	596.324	-316.278	D	7.469	7.453	0.017	3	99.7	0.3	0	0	0	0.02
2001	130	23	548	603.28	-312.734	D	7.465	7.453	0.012	3	99.89	0.12	0	0	0	0.01
2001	131	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	100.01	0.04	0	0	0	0.01
2001	132	23	517	602.805	-305.061	D	7.49	7.453	0.038	3	97.03	2.95	0	0	0	0.02
2001	133	23	625	596.311	-316.079	D	7.484	7.453	0.031	3	99.81	0.17	0	0	0	0.03
2001	134	23	624	596.324	-316.278	D	7.547	7.453	0.094	3	99.8	0.18	0	0	0	0.02
2001	135	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	136	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	138	23	517	602.805	-305.061	D	7.456	7.453	0.004	3	99.94	0.07	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	139	23	517	602.805	-305.061	D	7.888	7.453	0.436	3	98.52	1.47	0	0	0	0.01
2001	140	23	548	603.28	-312.734	D	7.464	7.453	0.011	3	99.9	0.11	0	0	0	0.01
2001	141	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	99.82	0.15	0	0	0	0.01
2001	142	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	143	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	144	23	517	602.805	-305.061	D	7.456	7.453	0.003	3	94.53	5.41	0	0	0	0.08
2001	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	147	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	148	23	540	603.158	-310.755	D	7.497	7.453	0.044	3	99.77	0.21	0	0	0	0.03
2001	149	23	624	596.324	-316.278	D	7.465	7.453	0.012	3	99.88	0.12	0	0	0	0.01
2001	150	23	637	596.267	-315.066	D	7.457	7.453	0.005	3	99.87	0.15	0	0	0	0.01
2001	151	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2001	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	154	23	517	602.805	-305.061	D	7.58	7.546	0.033	3.2	97.9	2.05	0	0	0	0.06
2001	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	156	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	157	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	158	23	517	602.805	-305.061	D	7.796	7.546	0.25	3.2	99.55	0.44	0	0	0	0.01
2001	159	23	603	598.68	-316.244	D	7.682	7.546	0.136	3.2	99.91	0.08	0	0	0	0.01
2001	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	161	23	517	602.805	-305.061	D	7.57	7.546	0.024	3.2	99.95	0.05	0	0	0	0.01
2001	162	23	517	602.805	-305.061	D	7.55	7.546	0.004	3.2	99.97	0.03	0	0	0	0.01
2001	163	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	164	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	165	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	166	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	167	23	548	603.28	-312.734	D	7.584	7.546	0.038	3.2	99.37	0.58	0	0	0	0.06
2001	168	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	169	23	623	596.511	-316.262	D	7.556	7.546	0.01	3.2	99.97	0.03	0	0	0	0.01
2001	170	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	100.02	0.01	0	0	0	0.01
2001	171	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	172	23	517	602.805	-305.061	D	7.814	7.546	0.267	3.2	99.71	0.27	0	0	0	0.01
2001	173	23	624	596.324	-316.278	D	7.613	7.546	0.067	3.2	99.7	0.29	0	0	0	0.01
2001	174	23	624	596.324	-316.278	D	7.734	7.546	0.187	3.2	99.82	0.16	0	0	0	0.02
2001	175	23	637	596.267	-315.066	D	7.645	7.546	0.099	3.2	99.81	0.18	0	0	0	0.02
2001	176	23	637	596.267	-315.066	D	7.616	7.546	0.07	3.2	99.89	0.1	0	0	0	0.01
2001	177	23	637	596.267	-315.066	D	7.555	7.546	0.009	3.2	99.95	0.06	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	178	23	637	596.267	-315.066	D	7.551	7.546	0.005	3.2	99.98	0.06	0	0	0	0.01
2001	179	23	690	601.572	-306.804	D	7.55	7.546	0.004	3.2	99.82	0.18	0	0	0	0.01
2001	180	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	99.87	0.02	0	0	0	0.01
2001	181	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	182	23	517	602.805	-305.061	D	7.599	7.591	0.008	3.296	99.97	0.02	0	0	0	0.01
2001	183	23	637	596.267	-315.066	D	7.628	7.593	0.035	3.3	99.61	0.39	0	0	0	0.01
2001	184	23	517	602.805	-305.061	D	7.626	7.593	0.033	3.3	99.95	0.04	0	0	0	0.01
2001	185	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	99.96	0.03	0	0	0	0.01
2001	186	23	517	602.805	-305.061	D	7.668	7.593	0.076	3.3	99.93	0.06	0	0	0	0.02
2001	187	23	624	596.324	-316.278	D	7.625	7.593	0.032	3.3	99.95	0.04	0	0	0	0.01
2001	188	23	517	602.805	-305.061	D	7.655	7.593	0.062	3.3	99.97	0.03	0	0	0	0.01
2001	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	548	603.28	-312.734	D	7.875	7.593	0.283	3.3	99.63	0.35	0	0	0	0.01
2001	192	23	624	596.324	-316.278	D	7.593	7.593	0	3.3	100.15	0.04	0	0	0	0.02
2001	193	23	624	596.324	-316.278	D	7.693	7.593	0.1	3.3	99.88	0.11	0	0	0	0.01
2001	194	23	624	596.324	-316.278	D	7.672	7.593	0.08	3.3	99.65	0.35	0	0	0	0.01
2001	195	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	86.01	0.01	0	0	0	0.01
2001	196	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	197	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	198	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	99.96	0.02	0	0	0	0.01
2001	201	23	517	602.805	-305.061	D	7.643	7.593	0.05	3.3	99.93	0.07	0	0	0	0.01
2001	202	23	517	602.805	-305.061	D	8.011	7.593	0.418	3.3	99.76	0.23	0	0	0	0.01
2001	203	23	517	602.805	-305.061	D	7.846	7.593	0.253	3.3	99.9	0.1	0	0	0	0.01
2001	204	23	517	602.805	-305.061	D	7.682	7.593	0.089	3.3	99.83	0.17	0	0	0	0.01
2001	205	23	517	602.805	-305.061	D	7.607	7.593	0.015	3.3	99.95	0.04	0	0	0	0.01
2001	206	23	517	602.805	-305.061	D	7.599	7.593	0.006	3.3	99.68	0.33	0	0	0	0.01
2001	207	23	517	602.805	-305.061	D	7.795	7.593	0.203	3.3	99.84	0.16	0	0	0	0.01
2001	208	23	637	596.267	-315.066	D	8.21	7.593	0.617	3.3	99.55	0.45	0	0	0	0.01
2001	209	23	517	602.805	-305.061	D	7.917	7.593	0.325	3.3	99.53	0.46	0	0	0	0.01
2001	210	23	517	602.805	-305.061	D	7.639	7.593	0.046	3.3	99.88	0.11	0	0	0	0.01
2001	211	23	517	602.805	-305.061	D	7.79	7.593	0.197	3.3	99.8	0.19	0	0	0	0.01
2001	212	23	517	602.805	-305.061	D	7.731	7.593	0.139	3.3	99.97	0.02	0	0	0	0.01
2001	213	23	517	602.805	-305.061	D	7.694	7.681	0.013	3.492	99.97	0.02	0	0	0	0.01
2001	214	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	99.89	0.01	0	0	0	0.01
2001	215	23	517	602.805	-305.061	D	7.698	7.685	0.013	3.5	99.85	0.13	0	0	0	0.02
2001	216	23	624	596.324	-316.278	D	7.912	7.685	0.227	3.5	99.89	0.1	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	217	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	218	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	219	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	222	23	517	602.805	-305.061	D	7.697	7.685	0.012	3.5	99.84	0.13	0	0	0	0.01
2001	223	23	624	596.324	-316.278	D	7.721	7.685	0.037	3.5	99.54	0.45	0	0	0	0.01
2001	224	23	603	598.68	-316.244	D	7.701	7.685	0.016	3.5	99.81	0.19	0	0	0	0.01
2001	225	23	603	598.68	-316.244	D	7.692	7.685	0.007	3.5	99.56	0.44	0	0	0	0.01
2001	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	227	23	637	596.267	-315.066	D	7.685	7.685	0.001	3.5	99.79	0.02	0	0	0	0.01
2001	228	23	517	602.805	-305.061	D	7.741	7.685	0.056	3.5	99.93	0.05	0	0	0	0.02
2001	229	23	517	602.805	-305.061	D	7.714	7.685	0.029	3.5	99.67	0.3	0	0	0	0.03
2001	230	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	99.61	0.03	0	0	0	0.02
2001	231	23	624	596.324	-316.278	D	7.758	7.685	0.073	3.5	99.81	0.16	0	0	0	0.04
2001	232	23	624	596.324	-316.278	D	7.71	7.685	0.025	3.5	99.94	0.05	0	0	0	0.02
2001	233	23	637	596.267	-315.066	D	7.75	7.685	0.065	3.5	99.9	0.09	0	0	0	0.01
2001	234	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	99.91	0.04	0	0	0	0.01
2001	235	23	204	600.379	-313.808	D	7.685	7.685	0	3.5	95.42	0.01	0	0	0	0.01
2001	236	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	237	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	238	23	637	596.267	-315.066	D	7.704	7.685	0.019	3.5	99.67	0.3	0	0	0	0.02
2001	239	23	624	596.324	-316.278	D	7.699	7.685	0.014	3.5	99.86	0.14	0	0	0	0.01
2001	240	23	624	596.324	-316.278	D	7.752	7.685	0.067	3.5	99.85	0.13	0	0	0	0.01
2001	241	23	517	602.805	-305.061	D	7.877	7.685	0.192	3.5	99.87	0.12	0	0	0	0.01
2001	242	23	517	602.805	-305.061	D	7.76	7.685	0.075	3.5	99.82	0.18	0	0	0	0.01
2001	243	23	517	602.805	-305.061	D	7.715	7.685	0.03	3.5	99.69	0.3	0	0	0	0.01
2001	244	23	656	597.971	-312.292	D	7.828	7.685	0.143	3.5	98.58	1.41	0	0	0	0.01
2001	245	23	624	596.324	-316.278	D	7.697	7.685	0.012	3.5	99.78	0.21	0	0	0	0.01
2001	246	23	5	596.481	-315.108	D	7.685	7.685	0	3.5	99.48	0.07	0	0	0	0.01
2001	247	23	517	602.805	-305.061	D	7.692	7.685	0.007	3.5	99.94	0.04	0	0	0	0.01
2001	248	23	517	602.805	-305.061	D	7.735	7.685	0.05	3.5	99.74	0.25	0	0	0	0.01
2001	249	23	517	602.805	-305.061	D	7.691	7.685	0.006	3.5	99.91	0.08	0	0	0	0.01
2001	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	252	23	517	602.805	-305.061	D	7.685	7.685	0.001	3.5	99.57	0.3	0	0	0	0.02
2001	253	23	517	602.805	-305.061	D	7.785	7.685	0.1	3.5	97.57	2.39	0	0	0	0.03
2001	254	23	517	602.805	-305.061	D	7.7	7.685	0.015	3.5	99.68	0.31	0	0	0	0.02
2001	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	256	23	517	602.805	-305.061	D	7.687	7.685	0.002	3.5	99.96	0.03	0	0	0	0.02
2001	257	23	517	602.805	-305.061	D	7.727	7.685	0.043	3.5	99.57	0.42	0	0	0	0.01
2001	258	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	259	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	260	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	261	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	262	23	517	602.805	-305.061	D	7.91	7.685	0.225	3.5	96.62	3.37	0	0	0	0.01
2001	263	23	517	602.805	-305.061	D	7.73	7.685	0.045	3.5	96.14	3.81	0	0	0	0.05
2001	264	23	517	602.805	-305.061	D	7.728	7.685	0.043	3.5	99.92	0.06	0	0	0	0.02
2001	265	23	624	596.324	-316.278	D	7.815	7.685	0.13	3.5	99.76	0.22	0	0	0	0.02
2001	266	23	603	598.68	-316.244	D	7.72	7.685	0.035	3.5	99.48	0.51	0	0	0	0.01
2001	267	23	527	602.958	-307.536	D	7.737	7.685	0.052	3.5	98.42	1.57	0	0	0	0.01
2001	268	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	269	23	517	602.805	-305.061	D	7.687	7.685	0.003	3.5	99.21	0.73	0	0	0	0.03
2001	270	23	517	602.805	-305.061	D	7.827	7.685	0.142	3.5	98.66	1.3	0	0	0	0.03
2001	271	23	548	603.28	-312.734	D	7.762	7.685	0.077	3.5	99.47	0.51	0	0	0	0.02
2001	272	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	273	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	274	23	517	602.805	-305.061	D	7.557	7.507	0.049	3.117	99.81	0.17	0	0	0	0.02
2001	275	23	517	602.805	-305.061	D	7.545	7.5	0.046	3.1	99.38	0.61	0	0	0	0.01
2001	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	637	596.267	-315.066	D	7.513	7.5	0.013	3.1	95.85	4.14	0	0	0	0.01
2001	279	23	517	602.805	-305.061	D	7.563	7.5	0.064	3.1	97.38	2.59	0	0	0	0.04
2001	280	23	637	596.267	-315.066	D	7.61	7.5	0.111	3.1	96.69	3.28	0	0	0	0.03
2001	281	23	637	596.267	-315.066	D	7.507	7.5	0.007	3.1	98.54	1.46	0	0	0	0.01
2001	282	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	285	23	661	598.396	-311.717	D	7.5	7.5	0.001	3.1	93.85	6.23	0	0	0	0.02
2001	286	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	287	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	288	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	289	23	517	602.805	-305.061	D	7.55	7.5	0.051	3.1	91.41	8.56	0	0	0	0.03
2001	290	23	626	596.299	-315.88	D	7.532	7.5	0.033	3.1	93.01	6.96	0	0	0	0.03
2001	291	23	637	596.267	-315.066	D	7.504	7.5	0.004	3.1	97.36	2.64	0	0	0	0.02
2001	292	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	293	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	294	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	295	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	517	602.805	-305.061	D	7.532	7.5	0.032	3.1	97.87	2.11	0	0	0	0.02
2001	298	23	517	602.805	-305.061	D	7.507	7.5	0.007	3.1	96.42	3.55	0	0	0	0.03
2001	299	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	96.21	3.99	0	0	0	0.03
2001	300	23	517	602.805	-305.061	D	7.515	7.5	0.015	3.1	90.48	9.49	0	0	0	0.04
2001	301	23	637	596.267	-315.066	D	7.5	7.5	0	3.1	100.05	1.62	0	0	0	0.02
2001	302	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	517	602.805	-305.061	D	7.502	7.5	0.002	3.1	96.75	3.24	0	0	0	0.02
2001	307	23	603	598.68	-316.244	D	7.594	7.5	0.094	3.1	93.81	6.17	0	0	0	0.02
2001	308	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	99.56	0.46	0	0	0	0.01
2001	309	23	637	596.267	-315.066	D	7.564	7.5	0.064	3.1	97.88	2.09	0	0	0	0.03
2001	310	23	632	596.27	-315.421	D	7.503	7.5	0.004	3.1	99.36	0.67	0	0	0	0.02
2001	311	23	637	596.267	-315.066	D	7.544	7.5	0.045	3.1	99.11	0.88	0	0	0	0.01
2001	312	23	517	602.805	-305.061	D	7.533	7.5	0.034	3.1	99.49	0.49	0	0	0	0.02
2001	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	314	23	624	596.324	-316.278	D	7.51	7.5	0.011	3.1	92.2	7.76	0	0	0	0.04
2001	315	23	603	598.68	-316.244	D	7.522	7.5	0.023	3.1	87.5	12.42	0	0	0	0.09
2001	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	317	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	322	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	98.05	1.97	0	0	0	0.01
2001	323	23	624	596.324	-316.278	D	7.517	7.5	0.018	3.1	86.23	13.72	0	0	0	0.06
2001	324	23	632	596.27	-315.421	D	7.507	7.5	0.007	3.1	77.36	22.53	0	0	0	0.13
2001	325	23	624	596.324	-316.278	D	7.53	7.5	0.031	3.1	88.61	11.35	0	0	0	0.05
2001	326	23	548	603.28	-312.734	D	7.501	7.5	0.002	3.1	95.03	5	0	0	0	0.03
2001	327	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	548	603.28	-312.734	D	7.519	7.5	0.019	3.1	82.91	17.04	0	0	0	0.06
2001	333	23	624	596.324	-316.278	D	7.5	7.5	0.001	3.1	94.3	5.62	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	334	23	603	598.68	-316.244	D	7.742	7.5	0.243	3.1	92.58	7.4	0	0	0	0.02
2001	335	23	1	596.558	-316.101	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2001	336	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	64.3	35.5	0	0	0	0.1
2001	341	23	517	602.805	-305.061	D	7.643	7.593	0.05	3.3	92.54	7.45	0	0	0	0.02
2001	342	23	637	596.267	-315.066	D	7.674	7.593	0.081	3.3	94.95	5.04	0	0	0	0.01
2001	343	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	97.49	1.2	0	0	0	0.01
2001	344	23	631	596.276	-315.551	D	7.595	7.593	0.003	3.3	89.14	10.86	0	0	0	0.04
2001	345	23	637	596.267	-315.066	D	7.6	7.593	0.007	3.3	90.42	9.57	0	0	0	0.03
2001	346	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	347	23	517	602.805	-305.061	D	7.79	7.593	0.197	3.3	95.44	4.55	0	0	0	0.02
2001	348	23	517	602.805	-305.061	D	8.137	7.593	0.545	3.3	94.41	5.58	0	0	0	0.01
2001	349	23	517	602.805	-305.061	D	7.651	7.593	0.059	3.3	97.36	2.63	0	0	0	0.01
2001	350	23	517	602.805	-305.061	D	7.604	7.593	0.012	3.3	96.8	3.19	0	0	0	0.01
2001	351	23	624	596.324	-316.278	D	7.613	7.593	0.021	3.3	94.86	5.14	0	0	0	0.01
2001	352	23	548	603.28	-312.734	D	7.686	7.593	0.094	3.3	90.99	8.97	0	0	0	0.03
2001	353	23	632	596.27	-315.421	D	7.626	7.593	0.033	3.3	75.72	24.21	0	0	0	0.07
2001	354	23	662	598.404	-311.683	D	7.612	7.593	0.02	3.3	77.42	22.51	0	0	0	0.07
2001	355	23	517	602.805	-305.061	D	7.601	7.593	0.008	3.3	79.52	20.41	0	0	0	0.07
2001	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	517	602.805	-305.061	D	7.607	7.593	0.015	3.3	79.39	20.56	0	0	0	0.06
2001	359	23	557	601.32	-313.419	D	7.717	7.593	0.124	3.3	66.82	33.08	0	0	0	0.1
2001	360	23	517	602.805	-305.061	D	7.623	7.593	0.031	3.3	70.66	29.27	0	0	0	0.07
2001	361	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	624	596.324	-316.278	D	7.614	7.593	0.021	3.3	75.75	24.19	0	0	0	0.05
2001	364	23	632	596.27	-315.421	D	7.852	7.593	0.259	3.3	72.69	27.23	0	0	0	0.08
2001	365	23	517	602.805	-305.061	D	7.656	7.593	0.064	3.3	76.31	23.62	0	0	0	0.07
									0.617							
NORANDA									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	2	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	3	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	4	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	5	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	10	23	548	603.28	-312.734	D	7.615	7.593	0.022	3.3	94.58	0.31	0	0	0	5.11
2001	11	23	548	603.28	-312.734	D	7.902	7.593	0.31	3.3	96.79	0.16	0	0	0	3.06
2001	12	23	603	598.68	-316.244	D	8.068	7.593	0.476	3.3	97.19	0.14	0	0	0	2.67
2001	13	23	632	596.27	-315.421	D	7.909	7.593	0.316	3.3	82.13	0.62	0	0	0	17.25
2001	14	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	98.67	0.11	0	0	0	1.2
2001	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	17	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	18	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	19	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	20	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	21	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	14.35	15.39	0	0	0	70.01
2001	22	23	282	601.335	-313.234	D	7.593	7.593	0	3.3	85.46	0.09	0	0	0	19.81
2001	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	25	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	26	23	517	602.805	-305.061	D	7.626	7.593	0.034	3.3	56.38	1.6	0	0	0	42.03
2001	27	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	28	23	562	600.324	-313.988	D	7.69	7.593	0.097	3.3	87.13	0.42	0	0	0	12.45
2001	29	23	517	602.805	-305.061	D	7.625	7.593	0.032	3.3	74.98	0.37	0	0	0	24.65
2001	30	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	34	23	517	602.805	-305.061	D	7.453	7.453	0	3	0.82	15.89	0	0	0	84.09
2001	35	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	38	23	603	598.68	-316.244	D	7.513	7.453	0.06	3	88.64	0.15	0	0	0	11.21
2001	39	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	41	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	42	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	43	23	557	601.32	-313.419	D	7.552	7.453	0.099	3	60.63	1.46	0	0	0	37.91
2001	44	23	632	596.27	-315.421	D	7.612	7.453	0.159	3	94.91	0.15	0	0	0	4.94
2001	45	23	517	602.805	-305.061	D	7.453	7.453	0	3	86.97	0.71	0	0	0	12.64
2001	46	23	517	602.805	-305.061	D	7.461	7.453	0.009	3	86.9	0.84	0	0	0	12.28
2001	47	23	603	598.68	-316.244	D	7.455	7.453	0.003	3	86.26	0.77	0	0	0	13.05
2001	48	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	49	23	603	598.68	-316.244	D	7.456	7.453	0.003	3	92.37	0.33	0	0	0	7.33
2001	50	23	548	603.28	-312.734	D	7.525	7.453	0.072	3	93.76	0.23	0	0	0	6.01
2001	51	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	52	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	53	23	6	596.462	-314.859	D	7.453	7.453	0	3	78.94	0.01	0	0	0	28.38
2001	54	23	580	599.723	-314.87	D	7.509	7.453	0.057	3	86.48	0.22	0	0	0	13.31
2001	55	23	548	603.28	-312.734	D	7.472	7.453	0.019	3	53.04	0.36	0	0	0	46.61
2001	56	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	58	23	625	596.311	-316.079	D	7.493	7.453	0.04	3	90.78	0.25	0	0	0	8.98
2001	59	23	625	596.311	-316.079	D	7.453	7.453	0	3	74.22	0.01	0	0	0	25.7
2001	60	23	548	603.28	-312.734	D	7.402	7.362	0.039	2.808	85.63	0.3	0	0	0	14.07
2001	61	23	637	596.267	-315.066	D	7.452	7.358	0.093	2.8	91.31	0.2	0	0	0	8.49
2001	62	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	63	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	64	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	68	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	69	23	548	603.28	-312.734	D	7.438	7.358	0.08	2.8	85.25	0.33	0	0	0	14.43
2001	70	23	517	602.805	-305.061	D	7.373	7.358	0.015	2.8	94.94	0.13	0	0	0	4.93
2001	71	23	517	602.805	-305.061	D	7.386	7.358	0.028	2.8	37.21	0.34	0	0	0	62.45
2001	72	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	73	23	624	596.324	-316.278	D	7.379	7.358	0.021	2.8	87.63	0.05	0	0	0	12.33
2001	74	23	517	602.805	-305.061	D	7.516	7.358	0.157	2.8	81.13	0.61	0	0	0	18.26
2001	75	23	603	598.68	-316.244	D	7.393	7.358	0.035	2.8	97.34	0.1	0	0	0	2.55
2001	76	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	77	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	80	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	81	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	82	23	623	596.511	-316.262	D	7.362	7.358	0.004	2.8	96.16	0.02	0	0	0	3.86
2001	83	23	603	598.68	-316.244	D	7.398	7.358	0.039	2.8	96.58	0.02	0	0	0	3.41
2001	84	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	85	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	86	23	604	598.599	-316.246	D	7.359	7.358	0	2.8	99.41	0.01	0	0	0	0.82
2001	87	23	517	602.805	-305.061	D	7.54	7.358	0.182	2.8	93.11	0.18	0	0	0	6.71
2001	88	23	632	596.27	-315.421	D	7.473	7.358	0.114	2.8	93.79	0.22	0	0	0	5.99
2001	89	23	690	601.572	-306.804	D	7.358	7.358	0	2.8	96.02	0.01	0	0	0	6.72
2001	90	23	632	596.27	-315.421	D	7.37	7.358	0.012	2.8	98.19	0.04	0	0	0	1.79
2001	91	23	517	602.805	-305.061	D	7.27	7.267	0.003	2.608	97.93	0.07	0	0	0	1.97
2001	92	23	557	601.32	-313.419	D	7.345	7.263	0.082	2.6	54.39	0.36	0	0	0	45.25
2001	93	23	604	598.599	-316.246	D	7.363	7.263	0.1	2.6	70.26	0.83	0	0	0	28.92
2001	94	23	624	596.324	-316.278	D	7.344	7.263	0.081	2.6	98.79	0.02	0	0	0	1.2
2001	95	23	557	601.32	-313.419	D	7.291	7.263	0.028	2.6	72.63	0.33	0	0	0	27.04
2001	96	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	99	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	103	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	104	23	548	603.28	-312.734	D	7.264	7.263	0.001	2.6	2.73	1.32	0	0	0	95.97
2001	105	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	98.67	0.01	0	0	0	2.46
2001	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	108	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	112	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	113	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	114	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	115	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	116	23	557	601.32	-313.419	D	7.413	7.263	0.15	2.6	17.36	0.31	0	0	0	82.33
2001	117	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	118	23	548	603.28	-312.734	D	7.318	7.263	0.055	2.6	95.33	0	0	0	0	4.68
2001	119	23	624	596.324	-316.278	D	7.396	7.263	0.133	2.6	96.03	0	0	0	0	3.97

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	120	23	557	601.32	-313.419	D	7.404	7.263	0.141	2.6	53.65	0.08	0	0	0	46.27
2001	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2001	122	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	123	23	517	602.805	-305.061	D	7.461	7.453	0.009	3	6.61	0.73	0	0	0	92.67
2001	124	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	2.77	0.93	0	0	0	96.35
2001	125	23	533	603.05	-309.022	D	7.632	7.453	0.179	3	28.36	0.26	0	0	0	71.39
2001	126	23	626	596.299	-315.88	D	7.522	7.453	0.069	3	34.61	0.5	0	0	0	64.88
2001	127	23	517	602.805	-305.061	D	7.467	7.453	0.014	3	12.42	1.42	0	0	0	86.17
2001	128	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	129	23	603	598.68	-316.244	D	7.453	7.453	0	3	90.36	0.01	0	0	0	10.4
2001	130	23	548	603.28	-312.734	D	7.467	7.453	0.014	3	98.03	0	0	0	0	1.99
2001	131	23	517	602.805	-305.061	D	7.453	7.453	0	3	97.59	0	0	0	0	2.43
2001	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	133	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	134	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	14.19	1.41	0	0	0	84.68
2001	135	23	548	603.28	-312.734	D	7.453	7.453	0	3	99.58	0	0	0	0	0.27
2001	136	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	137	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	138	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	139	23	548	603.28	-312.734	D	7.467	7.453	0.014	3	97.26	0.04	0	0	0	2.72
2001	140	23	548	603.28	-312.734	D	7.455	7.453	0.002	3	99.28	0	0	0	0	0.79
2001	141	23	405	602.557	-312.89	D	7.453	7.453	0	3	88	0	0	0	0	1.25
2001	142	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	143	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	146	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	147	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	148	23	603	598.68	-316.244	D	7.453	7.453	0	3	94.68	0.02	0	0	0	6.16
2001	149	23	624	596.324	-316.278	D	7.457	7.453	0.004	3	98.91	0	0	0	0	1.13
2001	150	23	626	596.299	-315.88	D	7.656	7.453	0.203	3	71.14	0.07	0	0	0	28.78
2001	151	23	603	598.68	-316.244	D	7.487	7.453	0.034	3	50.35	0.31	0	0	0	49.34
2001	152	23	517	602.805	-305.061	D	7.542	7.542	0	3.192	94.01	0	0	0	0	6.12
2001	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	154	23	517	602.805	-305.061	D	7.596	7.546	0.05	3.2	96.46	0.01	0	0	0	3.53
2001	155	23	517	602.805	-305.061	D	7.624	7.546	0.077	3.2	93.47	0.06	0	0	0	6.48
2001	156	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	157	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	158	23	538	603.127	-310.259	D	7.715	7.546	0.169	3.2	64.04	0.6	0	0	0	35.36

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	159	23	603	598.68	-316.244	D	7.556	7.546	0.01	3.2	99.16	0	0	0	0	0.85
2001	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	161	23	557	601.32	-313.419	D	7.684	7.546	0.137	3.2	97.01	0	0	0	0	2.99
2001	162	23	548	603.28	-312.734	D	7.605	7.546	0.059	3.2	98.57	0	0	0	0	1.43
2001	163	23	548	603.28	-312.734	D	7.646	7.546	0.1	3.2	98.79	0	0	0	0	1.22
2001	164	23	517	602.805	-305.061	D	7.573	7.546	0.026	3.2	98.23	0	0	0	0	1.78
2001	165	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	166	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	167	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	168	23	3	596.519	-315.604	D	7.546	7.546	0	3.2	86.27	0	0	0	0	13.85
2001	169	23	548	603.28	-312.734	D	7.619	7.546	0.073	3.2	97.88	0	0	0	0	2.12
2001	170	23	520	602.851	-305.804	D	7.551	7.546	0.005	3.2	3.59	0.28	0	0	0	96.17
2001	171	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	172	23	548	603.28	-312.734	D	7.597	7.546	0.051	3.2	98.44	0.01	0	0	0	1.55
2001	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	96.37	0	0	0	0	17.34
2001	176	23	624	596.324	-316.278	D	7.547	7.546	0.001	3.2	99.83	0	0	0	0	0.29
2001	177	23	624	596.324	-316.278	D	7.582	7.546	0.036	3.2	97.85	0	0	0	0	2.16
2001	178	23	517	602.805	-305.061	D	8.209	7.546	0.663	3.2	97.27	0.01	0	0	0	2.72
2001	179	23	517	602.805	-305.061	D	7.621	7.546	0.075	3.2	77.11	0.37	0	0	0	22.52
2001	180	23	557	601.32	-313.419	D	7.915	7.546	0.369	3.2	97.48	0.01	0	0	0	2.51
2001	181	23	517	602.805	-305.061	D	7.55	7.546	0.004	3.2	73.67	0.28	0	0	0	26.06
2001	182	23	517	602.805	-305.061	D	7.594	7.591	0.003	3.296	95.2	0.02	0	0	0	4.78
2001	183	23	546	603.249	-312.239	D	7.604	7.593	0.011	3.3	96.91	0.01	0	0	0	3.07
2001	184	23	548	603.28	-312.734	D	7.927	7.593	0.335	3.3	96.65	0.01	0	0	0	3.34
2001	185	23	548	603.28	-312.734	D	7.678	7.593	0.085	3.3	98.09	0	0	0	0	1.91
2001	186	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	187	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	84.39	0	0	0	0	13.09
2001	188	23	548	603.28	-312.734	D	7.706	7.593	0.114	3.3	94.19	0	0	0	0	5.81
2001	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	192	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	193	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	194	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	195	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	196	23	624	596.324	-316.278	D	7.641	7.593	0.048	3.3	96.43	0	0	0	0	3.57
2001	197	23	557	601.32	-313.419	D	7.752	7.593	0.16	3.3	83.36	0.04	0	0	0	16.6

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	198	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	99.18	0	0	0	0	0.83
2001	202	23	548	603.28	-312.734	D	7.614	7.593	0.022	3.3	99	0.01	0	0	0	0.99
2001	203	23	624	596.324	-316.278	D	8.169	7.593	0.576	3.3	98.39	0.01	0	0	0	1.6
2001	204	23	517	602.805	-305.061	D	7.656	7.593	0.064	3.3	98.86	0	0	0	0	1.14
2001	205	23	404	601.83	-306.699	D	7.593	7.593	0.001	3.3	94.11	0	0	0	0	5.87
2001	206	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	94.68	0	0	0	0	5.54
2001	207	23	548	603.28	-312.734	D	7.611	7.593	0.018	3.3	58.78	0.76	0	0	0	40.46
2001	208	23	548	603.28	-312.734	D	7.919	7.593	0.327	3.3	98.47	0.01	0	0	0	1.52
2001	209	23	548	603.28	-312.734	D	8.08	7.593	0.487	3.3	98.87	0.01	0	0	0	1.12
2001	210	23	548	603.28	-312.734	D	7.605	7.593	0.012	3.3	99.31	0	0	0	0	0.7
2001	211	23	624	596.324	-316.278	D	7.861	7.593	0.268	3.3	97.6	0.02	0	0	0	2.38
2001	212	23	603	598.68	-316.244	D	8.122	7.593	0.529	3.3	78.53	0.02	0	0	0	21.45
2001	213	23	626	596.299	-315.88	D	7.747	7.681	0.066	3.492	55.65	0.26	0	0	0	44.08
2001	214	23	521	602.866	-306.052	D	7.867	7.685	0.182	3.5	66.09	0.02	0	0	0	33.89
2001	215	23	517	602.805	-305.061	D	7.699	7.685	0.014	3.5	84.14	0.01	0	0	0	15.84
2001	216	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	217	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	218	23	603	598.68	-316.244	D	7.69	7.685	0.005	3.5	81.51	0	0	0	0	18.48
2001	219	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	220	23	624	596.324	-316.278	D	7.691	7.685	0.006	3.5	98.94	0	0	0	0	1.06
2001	221	23	603	598.68	-316.244	D	7.748	7.685	0.063	3.5	99.08	0.01	0	0	0	0.91
2001	222	23	548	603.28	-312.734	D	7.685	7.685	0.001	3.5	98.88	0	0	0	0	1.06
2001	223	23	548	603.28	-312.734	D	7.687	7.685	0.002	3.5	98.12	0	0	0	0	1.88
2001	224	23	603	598.68	-316.244	D	7.709	7.685	0.024	3.5	98.78	0.03	0	0	0	1.2
2001	225	23	603	598.68	-316.244	D	7.691	7.685	0.006	3.5	98.82	0.01	0	0	0	1.17
2001	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	227	23	548	603.28	-312.734	D	7.779	7.685	0.094	3.5	99.53	0	0	0	0	0.47
2001	228	23	517	602.805	-305.061	D	7.736	7.685	0.051	3.5	98.08	0	0	0	0	1.92
2001	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	230	23	548	603.28	-312.734	D	7.7	7.685	0.015	3.5	98.29	0	0	0	0	1.71
2001	231	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	232	23	603	598.68	-316.244	D	7.704	7.685	0.019	3.5	97.32	0	0	0	0	2.68
2001	233	23	557	601.32	-313.419	D	8.005	7.685	0.32	3.5	93.39	0.01	0	0	0	6.6
2001	234	23	548	603.28	-312.734	D	7.686	7.685	0.001	3.5	99.28	0	0	0	0	0.76
2001	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	97.72	0	0	0	0	9.22
2001	236	23	557	601.32	-313.419	D	7.836	7.685	0.151	3.5	50.12	0.38	0	0	0	49.5

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	237	23	517	602.805	-305.061	D	7.69	7.685	0.005	3.5	47	0.08	0	0	0	52.92
2001	238	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	239	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	98.09	0	0	0	0	1.87
2001	240	23	603	598.68	-316.244	D	7.714	7.685	0.029	3.5	97.19	0.01	0	0	0	2.8
2001	241	23	548	603.28	-312.734	D	7.69	7.685	0.005	3.5	99.09	0	0	0	0	0.9
2001	242	23	548	603.28	-312.734	D	7.692	7.685	0.008	3.5	99.27	0.01	0	0	0	0.71
2001	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	244	23	604	598.599	-316.246	D	7.721	7.685	0.036	3.5	99.03	0	0	0	0	0.97
2001	245	23	624	596.324	-316.278	D	7.745	7.685	0.06	3.5	98.85	0	0	0	0	1.15
2001	246	23	624	596.324	-316.278	D	7.685	7.685	0.001	3.5	99.2	0	0	0	0	0.91
2001	247	23	5	596.481	-315.108	D	7.685	7.685	0	3.5	99.58	0	0	0	0	0.23
2001	248	23	631	596.276	-315.551	D	7.685	7.685	0	3.5	99.33	0	0	0	0	0.19
2001	249	23	620	597.072	-316.212	D	7.809	7.685	0.124	3.5	25.38	0.16	0	0	0	74.46
2001	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	252	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0.01	11.79	0	0	0	86.98
2001	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	254	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	257	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	258	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	259	23	632	596.27	-315.421	D	7.685	7.685	0	3.5	65.84	0	0	0	0	23.58
2001	260	23	632	596.27	-315.421	D	7.901	7.685	0.216	3.5	94.32	0.07	0	0	0	5.61
2001	261	23	548	603.28	-312.734	D	7.714	7.685	0.029	3.5	98.41	0	0	0	0	1.59
2001	262	23	460	602.289	-306.164	D	7.685	7.685	0	3.5	95.7	0	0	0	0	0.87
2001	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	264	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	265	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	266	23	557	601.32	-313.419	D	7.889	7.685	0.204	3.5	86.53	0.12	0	0	0	13.34
2001	267	23	548	603.28	-312.734	D	7.685	7.685	0	3.5	98.31	0.01	0	0	0	1.66
2001	268	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	269	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	270	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	271	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	272	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	273	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	274	23	1	596.558	-316.101	D	7.507	7.507	0	3.117	0	0	0	0	0	0
2001	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	70.71	3.83	0	0	0	26.65
2001	279	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	280	23	624	596.324	-316.278	D	7.619	7.5	0.12	3.1	95.93	0.02	0	0	0	4.05
2001	281	23	639	596.544	-314.722	D	7.661	7.5	0.162	3.1	87.97	0.07	0	0	0	11.96
2001	282	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0.01	1.03	0	0	0	97.71
2001	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	603	598.68	-316.244	D	7.64	7.5	0.141	3.1	96.19	0.21	0	0	0	3.6
2001	285	23	624	596.324	-316.278	D	7.707	7.5	0.207	3.1	96.74	0.13	0	0	0	3.13
2001	286	23	557	601.32	-313.419	D	7.56	7.5	0.06	3.1	29.74	1.39	0	0	0	68.87
2001	287	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	36.51	12.71	0	0	0	51.72
2001	288	23	624	596.324	-316.278	D	7.528	7.5	0.028	3.1	90.18	0.04	0	0	0	9.79
2001	289	23	517	602.805	-305.061	D	7.548	7.5	0.049	3.1	95.93	0.13	0	0	0	3.94
2001	290	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	291	23	548	603.28	-312.734	D	7.566	7.5	0.066	3.1	94.59	0.22	0	0	0	5.19
2001	292	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	293	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	294	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	298	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	301	23	557	601.32	-313.419	D	7.553	7.5	0.053	3.1	78.95	0.57	0	0	0	20.48
2001	302	23	637	596.267	-315.066	D	7.501	7.5	0.001	3.1	96.67	0.07	0	0	0	3.41
2001	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	308	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	309	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	310	23	603	598.68	-316.244	D	7.506	7.5	0.007	3.1	98.57	0	0	0	0	1.43
2001	311	23	557	601.32	-313.419	D	7.878	7.5	0.378	3.1	72.51	0.65	0	0	0	26.85
2001	312	23	517	602.805	-305.061	D	7.519	7.5	0.019	3.1	96.29	0.01	0	0	0	3.71
2001	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	317	23	557	601.32	-313.419	D	7.54	7.5	0.04	3.1	61.71	0.2	0	0	0	38.1
2001	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	23	517	602.805	-305.061	D	7.603	7.5	0.104	3.1	30.6	1.62	0	0	0	67.78
2001	320	23	548	603.28	-312.734	D	7.502	7.5	0.002	3.1	77.23	0.14	0	0	0	22.69
2001	321	23	603	598.68	-316.244	D	7.505	7.5	0.006	3.1	92.91	0.04	0	0	0	7.08
2001	322	23	632	596.27	-315.421	D	7.676	7.5	0.177	3.1	64.63	0.9	0	0	0	34.47
2001	323	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	97.28	0.01	0	0	0	2.67
2001	324	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	325	23	548	603.28	-312.734	D	7.501	7.5	0.001	3.1	16.4	8.02	0	0	0	75.66
2001	326	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	95.12	0.16	0	0	0	4.69
2001	327	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	0.29	4.51	0	0	0	95.33
2001	328	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0.02	3.4	0	0	0	96.52
2001	329	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	626	596.299	-315.88	D	7.697	7.5	0.197	3.1	19.09	0.92	0	0	0	79.99
2001	331	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	78	598.564	-316.197	D	7.5	7.5	0	3.1	96.23	0.12	0	0	0	3.93
2001	333	23	624	596.324	-316.278	D	7.501	7.5	0.002	3.1	72.03	0	0	0	0	27.93
2001	334	23	603	598.68	-316.244	D	7.5	7.5	0.001	3.1	41.05	0.01	0	0	0	58.89
2001	335	23	1	596.558	-316.101	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2001	336	23	548	603.28	-312.734	D	7.855	7.593	0.263	3.3	93.55	0.06	0	0	0	6.39
2001	337	23	517	602.805	-305.061	D	7.633	7.593	0.04	3.3	96.69	0.04	0	0	0	3.28
2001	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	23.68	0.36	0	0	0	15.51
2001	339	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	624	596.324	-316.278	D	7.623	7.593	0.03	3.3	96.83	0.23	0	0	0	2.94
2001	342	23	624	596.324	-316.278	D	7.842	7.593	0.249	3.3	98.05	0.1	0	0	0	1.86
2001	343	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	344	23	624	596.324	-316.278	D	7.623	7.593	0.03	3.3	94.71	0.1	0	0	0	5.18
2001	345	23	624	596.324	-316.278	D	7.784	7.593	0.191	3.3	96.04	0.15	0	0	0	3.81
2001	346	23	517	602.805	-305.061	D	7.748	7.593	0.156	3.3	59.86	1	0	0	0	39.15
2001	347	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	26.52	6.28	0	0	0	67.18
2001	348	23	548	603.28	-312.734	D	7.598	7.593	0.006	3.3	96.87	0.12	0	0	0	3
2001	349	23	517	602.805	-305.061	D	7.919	7.593	0.326	3.3	61.58	0.99	0	0	0	37.43
2001	350	23	603	598.68	-316.244	D	7.766	7.593	0.173	3.3	96.65	0.07	0	0	0	3.28
2001	351	23	624	596.324	-316.278	D	7.689	7.593	0.096	3.3	97.99	0.01	0	0	0	2
2001	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	353	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	354	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	23	517	602.805	-305.061	D	7.728	7.593	0.136	3.3	88.15	0.32	0	0	0	11.52
2001	356	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	99.04	0.01	0	0	0	1.29
2001	357	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.663							

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EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	517	602.805	-305.061	D	7.631	7.593	0.038	3.3	0	0	0	0	0	100
2002	2	23	637	596.267	-315.066	D	7.632	7.593	0.04	3.3	0	0	0	0	0	100
2002	3	23	557	601.32	-313.419	D	7.633	7.593	0.04	3.3	0	0	0	0	0	100
2002	4	23	548	603.28	-312.734	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.04
2002	5	23	404	601.83	-306.699	D	7.593	7.593	0	3.3	0	0	0	0	0	94.02
2002	6	23	517	602.805	-305.061	D	7.608	7.593	0.015	3.3	0	0	0	0	0	100
2002	7	23	557	601.32	-313.419	D	7.652	7.593	0.06	3.3	0	0	0	0	0	100
2002	8	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.05
2002	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	517	602.805	-305.061	D	7.639	7.593	0.046	3.3	0	0	0	0	0	100
2002	11	23	632	596.27	-315.421	D	7.612	7.593	0.019	3.3	0	0	0	0	0	100
2002	12	23	517	602.805	-305.061	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100.01
2002	13	23	631	596.276	-315.551	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100.04
2002	14	23	557	601.32	-313.419	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.01
2002	15	23	631	596.276	-315.551	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.09
2002	16	23	625	596.311	-316.079	D	7.593	7.593	0	3.3	0	0	0	0	0	100.07
2002	17	23	638	596.406	-314.894	D	7.617	7.593	0.025	3.3	0	0	0	0	0	100
2002	18	23	694	602.12	-306.029	D	7.609	7.593	0.016	3.3	0	0	0	0	0	100.01
2002	19	23	517	602.805	-305.061	D	7.598	7.593	0.006	3.3	0	0	0	0	0	100.02
2002	20	23	624	596.324	-316.278	D	7.613	7.593	0.02	3.3	0	0	0	0	0	100.01
2002	21	23	557	601.32	-313.419	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100
2002	22	23	517	602.805	-305.061	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.03
2002	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	632	596.27	-315.421	D	7.627	7.593	0.034	3.3	0	0	0	0	0	100
2002	25	23	517	602.805	-305.061	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2002	26	23	548	603.28	-312.734	D	7.596	7.593	0.003	3.3	0	0	0	0	0	99.99
2002	27	23	548	603.28	-312.734	D	7.593	7.593	0	3.3	0	0	0	0	0	100.23
2002	28	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	0	0	0	0	99.79
2002	30	23	637	596.267	-315.066	D	7.638	7.593	0.046	3.3	0	0	0	0	0	100
2002	31	23	517	602.805	-305.061	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100.04
2002	32	23	624	596.324	-316.278	D	7.465	7.459	0.006	3.013	0	0	0	0	0	100.02
2002	33	23	632	596.27	-315.421	D	7.457	7.453	0.005	3	0	0	0	0	0	100.04
2002	34	23	624	596.324	-316.278	D	7.461	7.453	0.008	3	0	0	0	0	0	100.04
2002	35	23	517	602.805	-305.061	D	7.468	7.453	0.016	3	0	0	0	0	0	100.01
2002	36	23	624	596.324	-316.278	D	7.454	7.453	0.001	3	0	0	0	0	0	100.23
2002	37	23	632	596.27	-315.421	D	7.455	7.453	0.002	3	0	0	0	0	0	100.03
2002	38	23	517	602.805	-305.061	D	7.482	7.453	0.029	3	0	0	0	0	0	100.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	39	23	603	598.68	-316.244	D	7.46	7.453	0.008	3	0	0	0	0	0	100.04
2002	40	23	491	603.207	-311.591	D	7.453	7.453	0.001	3	0	0	0	0	0	100.31
2002	41	23	656	597.971	-312.292	D	7.456	7.453	0.003	3	0	0	0	0	0	100.06
2002	42	23	517	602.805	-305.061	D	7.466	7.453	0.013	3	0	0	0	0	0	100.02
2002	43	23	557	601.32	-313.419	D	7.457	7.453	0.004	3	0	0	0	0	0	100.08
2002	44	23	632	596.27	-315.421	D	7.472	7.453	0.019	3	0	0	0	0	0	100
2002	45	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	0	0	0	0	0	100.13
2002	46	23	548	603.28	-312.734	D	7.455	7.453	0.002	3	0	0	0	0	0	100.13
2002	47	23	624	596.324	-316.278	D	7.468	7.453	0.015	3	0	0	0	0	0	100.03
2002	48	23	632	596.27	-315.421	D	7.472	7.453	0.02	3	0	0	0	0	0	100.01
2002	49	23	637	596.267	-315.066	D	7.459	7.453	0.007	3	0	0	0	0	0	100.04
2002	50	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	624	596.324	-316.278	D	7.454	7.453	0.001	3	0	0	0	0	0	100.17
2002	52	23	603	598.68	-316.244	D	7.454	7.453	0.001	3	0	0	0	0	0	100.25
2002	53	23	637	596.267	-315.066	D	7.472	7.453	0.019	3	0	0	0	0	0	100.02
2002	54	23	548	603.28	-312.734	D	7.478	7.453	0.025	3	0	0	0	0	0	100.01
2002	55	23	547	603.265	-312.487	D	7.459	7.453	0.006	3	0	0	0	0	0	100.04
2002	56	23	517	602.805	-305.061	D	7.457	7.453	0.005	3	0	0	0	0	0	100.06
2002	57	23	517	602.805	-305.061	D	7.467	7.453	0.015	3	0	0	0	0	0	100
2002	58	23	624	596.324	-316.278	D	7.454	7.453	0.001	3	0	0	0	0	0	100.26
2002	59	23	632	596.27	-315.421	D	7.455	7.453	0.003	3	0	0	0	0	0	100.07
2002	60	23	517	602.805	-305.061	D	7.362	7.362	0	2.808	0	0	0	0	0	104.92
2002	61	23	624	596.324	-316.278	D	7.362	7.358	0.004	2.8	0	0	0	0	0	100.03
2002	62	23	548	603.28	-312.734	D	7.359	7.358	0.001	2.8	0	0	0	0	0	100.05
2002	63	23	637	596.267	-315.066	D	7.361	7.358	0.003	2.8	0	0	0	0	0	100.01
2002	64	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	0	0	0	0	0	100.35
2002	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	68	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	0	0	0	0	0	100.29
2002	69	23	624	596.324	-316.278	D	7.358	7.358	0	2.8	0	0	0	0	0	100.57
2002	70	23	517	602.805	-305.061	D	7.363	7.358	0.005	2.8	0	0	0	0	0	100.05
2002	71	23	656	597.971	-312.292	D	7.36	7.358	0.001	2.8	0	0	0	0	0	100.21
2002	72	23	676	599.876	-309.365	D	7.383	7.358	0.024	2.8	0	0	0	0	0	100.01
2002	73	23	517	602.805	-305.061	D	7.361	7.358	0.002	2.8	0	0	0	0	0	100.03
2002	74	23	517	602.805	-305.061	D	7.366	7.358	0.008	2.8	0	0	0	0	0	100.02
2002	75	23	626	596.299	-315.88	D	7.365	7.358	0.006	2.8	0	0	0	0	0	100.01
2002	76	23	548	603.28	-312.734	D	7.362	7.358	0.004	2.8	0	0	0	0	0	100.03
2002	77	23	517	602.805	-305.061	D	7.375	7.358	0.017	2.8	0	0	0	0	0	100.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	78	23	624	596.324	-316.278	D	7.367	7.358	0.009	2.8	0	0	0	0	0	100.01
2002	79	23	637	596.267	-315.066	D	7.387	7.358	0.029	2.8	0	0	0	0	0	100.01
2002	80	23	682	600.626	-308.407	D	7.378	7.358	0.02	2.8	0	0	0	0	0	100
2002	81	23	517	602.805	-305.061	D	7.379	7.358	0.021	2.8	0	0	0	0	0	100
2002	82	23	517	602.805	-305.061	D	7.362	7.358	0.004	2.8	0	0	0	0	0	100.06
2002	83	23	517	602.805	-305.061	D	7.358	7.358	0	2.8	0	0	0	0	0	100.54
2002	84	23	547	603.265	-312.487	D	7.358	7.358	0	2.8	0	0	0	0	0	101.35
2002	85	23	624	596.324	-316.278	D	7.374	7.358	0.016	2.8	0	0	0	0	0	100.01
2002	86	23	517	602.805	-305.061	D	7.376	7.358	0.017	2.8	0	0	0	0	0	100
2002	87	23	624	596.324	-316.278	D	7.363	7.358	0.005	2.8	0	0	0	0	0	100
2002	88	23	517	602.805	-305.061	D	7.363	7.358	0.005	2.8	0	0	0	0	0	100.02
2002	89	23	548	603.28	-312.734	D	7.367	7.358	0.009	2.8	0	0	0	0	0	100.02
2002	90	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	0	0	0	0	0	100.31
2002	91	23	548	603.28	-312.734	D	7.28	7.267	0.013	2.608	0	0	0	0	0	100.02
2002	92	23	517	602.805	-305.061	D	7.266	7.263	0.003	2.6	0	0	0	0	0	100
2002	93	23	557	601.32	-313.419	D	7.311	7.263	0.048	2.6	0	0	0	0	0	100
2002	94	23	517	602.805	-305.061	D	7.279	7.263	0.017	2.6	0	0	0	0	0	100.01
2002	95	23	521	602.866	-306.052	D	7.278	7.263	0.015	2.6	0	0	0	0	0	100
2002	96	23	632	596.27	-315.421	D	7.265	7.263	0.003	2.6	0	0	0	0	0	100.08
2002	97	23	557	601.32	-313.419	D	7.266	7.263	0.003	2.6	0	0	0	0	0	99.99
2002	98	23	557	601.32	-313.419	D	7.264	7.263	0.001	2.6	0	0	0	0	0	99.92
2002	99	23	676	599.876	-309.365	D	7.285	7.263	0.022	2.6	0	0	0	0	0	100.01
2002	100	23	637	596.267	-315.066	D	7.267	7.263	0.004	2.6	0	0	0	0	0	99.97
2002	101	23	624	596.324	-316.278	D	7.264	7.263	0.001	2.6	0	0	0	0	0	99.97
2002	102	23	516	602.728	-305.38	D	7.263	7.263	0	2.6	0	0	0	0	0	98.35
2002	103	23	632	596.27	-315.421	D	7.271	7.263	0.008	2.6	0	0	0	0	0	100.02
2002	104	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	0	0	0	0	0	100.07
2002	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	110	23	637	596.267	-315.066	D	7.267	7.263	0.005	2.6	0	0	0	0	0	100.08
2002	111	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	0	0	0	0	0	100.02
2002	112	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	0	0	0	0	0	99.93
2002	113	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	0	0	0	0	0	100.14
2002	114	23	522	602.882	-306.299	D	7.264	7.263	0.001	2.6	0	0	0	0	0	99.82
2002	115	23	557	601.32	-313.419	D	7.275	7.263	0.012	2.6	0	0	0	0	0	100.01
2002	116	23	632	596.27	-315.421	D	7.268	7.263	0.005	2.6	0	0	0	0	0	100.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	117	23	517	602.805	-305.061	D	7.267	7.263	0.004	2.6	0	0	0	0	0	99.98
2002	118	23	637	596.267	-315.066	D	7.264	7.263	0.001	2.6	0	0	0	0	0	100.15
2002	119	23	632	596.27	-315.421	D	7.294	7.263	0.031	2.6	0	0	0	0	0	100
2002	120	23	517	602.805	-305.061	D	7.286	7.263	0.023	2.6	0	0	0	0	0	100.02
2002	121	23	517	602.805	-305.061	D	7.445	7.445	0	2.983	0	0	0	0	0	100.69
2002	122	23	694	602.12	-306.029	D	7.49	7.453	0.037	3	0	0	0	0	0	100.01
2002	123	23	661	598.396	-311.717	D	7.466	7.453	0.014	3	0	0	0	0	0	100.01
2002	124	23	624	596.324	-316.278	D	7.454	7.453	0.001	3	0	0	0	0	0	100.24
2002	125	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	0	0	0	0	0	100.09
2002	126	23	327	601.142	-307.502	D	7.453	7.453	0	3	0	0	0	0	0	100.36
2002	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	128	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	100.54
2002	129	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	0	0	0	0	0	100.19
2002	130	23	557	601.32	-313.419	D	7.454	7.453	0.002	3	0	0	0	0	0	100.09
2002	131	23	632	596.27	-315.421	D	7.454	7.453	0.001	3	0	0	0	0	0	100.15
2002	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	133	23	638	596.406	-314.894	D	7.478	7.453	0.025	3	0	0	0	0	0	100.01
2002	134	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	100.23
2002	135	23	637	596.267	-315.066	D	7.454	7.453	0.001	3	0	0	0	0	0	100.19
2002	136	23	490	602.499	-305.648	D	7.453	7.453	0	3	0	0	0	0	0	99
2002	137	23	603	598.68	-316.244	D	7.457	7.453	0.004	3	0	0	0	0	0	100.04
2002	138	23	637	596.267	-315.066	D	7.454	7.453	0.001	3	0	0	0	0	0	100.16
2002	139	23	637	596.267	-315.066	D	7.462	7.453	0.009	3	0	0	0	0	0	100.02
2002	140	23	656	597.971	-312.292	D	7.464	7.453	0.011	3	0	0	0	0	0	100.02
2002	141	23	624	596.324	-316.278	D	7.479	7.453	0.026	3	0	0	0	0	0	100.01
2002	142	23	517	602.805	-305.061	D	7.457	7.453	0.005	3	0	0	0	0	0	100.06
2002	143	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	100.49
2002	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	145	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	0	0	0	0	0	100.14
2002	146	23	632	596.27	-315.421	D	7.464	7.453	0.011	3	0	0	0	0	0	100.02
2002	147	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	0	0	0	0	0	100.16
2002	148	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	149	23	557	601.32	-313.419	D	7.453	7.453	0	3	0	0	0	0	0	100.36
2002	150	23	624	596.324	-316.278	D	7.455	7.453	0.002	3	0	0	0	0	0	100.17
2002	151	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	100.55
2002	152	23	515	602.747	-305.629	D	7.543	7.542	0	3.192	0	0	0	0	0	100.29
2002	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	156	23	517	602.805	-305.061	D	7.557	7.546	0.011	3.2	0	0	0	0	0	100.01
2002	157	23	638	596.406	-314.894	D	7.572	7.546	0.026	3.2	0	0	0	0	0	100
2002	158	23	626	596.299	-315.88	D	7.554	7.546	0.007	3.2	0	0	0	0	0	100.03
2002	159	23	557	601.32	-313.419	D	7.551	7.546	0.005	3.2	0	0	0	0	0	100.05
2002	160	23	520	602.851	-305.804	D	7.549	7.546	0.003	3.2	0	0	0	0	0	100.05
2002	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	164	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.27
2002	165	23	637	596.267	-315.066	D	7.557	7.546	0.01	3.2	0	0	0	0	0	100.01
2002	166	23	515	602.747	-305.629	D	7.546	7.546	0	3.2	0	0	0	0	0	93.89
2002	167	23	517	602.805	-305.061	D	7.549	7.546	0.003	3.2	0	0	0	0	0	100.04
2002	168	23	624	596.324	-316.278	D	7.573	7.546	0.027	3.2	0	0	0	0	0	100
2002	169	23	603	598.68	-316.244	D	7.562	7.546	0.016	3.2	0	0	0	0	0	100.02
2002	170	23	517	602.805	-305.061	D	7.551	7.546	0.005	3.2	0	0	0	0	0	100.04
2002	171	23	528	602.974	-307.784	D	7.549	7.546	0.003	3.2	0	0	0	0	0	99.99
2002	172	23	624	596.324	-316.278	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.21
2002	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	174	23	604	598.599	-316.246	D	7.548	7.546	0.001	3.2	0	0	0	0	0	100.05
2002	175	23	603	598.68	-316.244	D	7.549	7.546	0.003	3.2	0	0	0	0	0	99.99
2002	176	23	548	603.28	-312.734	D	7.553	7.546	0.007	3.2	0	0	0	0	0	100.02
2002	177	23	517	602.805	-305.061	D	7.549	7.546	0.002	3.2	0	0	0	0	0	100.02
2002	178	23	517	602.805	-305.061	D	7.549	7.546	0.002	3.2	0	0	0	0	0	100.03
2002	179	23	517	602.805	-305.061	D	7.552	7.546	0.006	3.2	0	0	0	0	0	100
2002	180	23	637	596.267	-315.066	D	7.551	7.546	0.005	3.2	0	0	0	0	0	100.05
2002	181	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	0	0	0	0	0	100.29
2002	182	23	517	602.805	-305.061	D	7.591	7.591	0.001	3.296	0	0	0	0	0	99.81
2002	183	23	517	602.805	-305.061	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100
2002	184	23	624	596.324	-316.278	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.02
2002	185	23	632	596.27	-315.421	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.01
2002	186	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.06
2002	187	23	516	602.728	-305.38	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100
2002	188	23	637	596.267	-315.066	D	7.593	7.593	0	3.3	0	0	0	0	0	99.8
2002	189	23	637	596.267	-315.066	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.01
2002	190	23	517	602.805	-305.061	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100
2002	191	23	532	603.035	-308.774	D	7.608	7.593	0.016	3.3	0	0	0	0	0	99.99
2002	192	23	688	601.298	-307.191	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100
2002	193	23	637	596.267	-315.066	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100
2002	194	23	624	596.324	-316.278	D	7.593	7.593	0	3.3	0	0	0	0	0	100.07

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	195	23	623	596.511	-316.262	D	7.593	7.593	0	3.3	0	0	0	0	0	102.63
2002	196	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	188.37
2002	197	23	624	596.324	-316.278	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.03
2002	198	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.96
2002	199	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.19
2002	200	23	624	596.324	-316.278	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.03
2002	201	23	517	602.805	-305.061	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100
2002	202	23	520	602.851	-305.804	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100
2002	203	23	516	602.728	-305.38	D	7.593	7.593	0	3.3	0	0	0	0	0	100.3
2002	204	23	637	596.267	-315.066	D	7.615	7.593	0.023	3.3	0	0	0	0	0	100
2002	205	23	624	596.324	-316.278	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100
2002	206	23	603	598.68	-316.244	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.1
2002	207	23	697	602.531	-305.449	D	7.597	7.593	0.004	3.3	0	0	0	0	0	99.99
2002	208	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	0	0	0	0	100.05
2002	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.08
2002	212	23	624	596.324	-316.278	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100.01
2002	213	23	517	602.805	-305.061	D	7.695	7.681	0.014	3.492	0	0	0	0	0	99.99
2002	214	23	517	602.805	-305.061	D	7.691	7.685	0.006	3.5	0	0	0	0	0	99.99
2002	215	23	624	596.324	-316.278	D	7.688	7.685	0.003	3.5	0	0	0	0	0	99.99
2002	216	23	517	602.805	-305.061	D	7.687	7.685	0.002	3.5	0	0	0	0	0	99.97
2002	217	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	0	0	0	0	99.96
2002	218	23	637	596.267	-315.066	D	7.698	7.685	0.013	3.5	0	0	0	0	0	100
2002	219	23	624	596.324	-316.278	D	7.686	7.685	0.001	3.5	0	0	0	0	0	100.04
2002	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	99.92
2002	221	23	624	596.324	-316.278	D	7.687	7.685	0.002	3.5	0	0	0	0	0	99.98
2002	222	23	517	602.805	-305.061	D	7.687	7.685	0.002	3.5	0	0	0	0	0	100.01
2002	223	23	432	602.04	-306.183	D	7.685	7.685	0	3.5	0	0	0	0	0	99.92
2002	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	93.02
2002	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	226	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	0	0	0	0	100.19
2002	227	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	0	0	0	0	100.21
2002	228	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	232	23	548	603.28	-312.734	D	7.685	7.685	0.001	3.5	0	0	0	0	0	100.2
2002	233	23	517	602.805	-305.061	D	7.686	7.685	0.002	3.5	0	0	0	0	0	99.93

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	234	23	326	601.161	-307.751	D	7.685	7.685	0	3.5	0	0	0	0	0	98.32
2002	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	236	23	517	602.805	-305.061	D	7.696	7.685	0.011	3.5	0	0	0	0	0	100
2002	237	23	517	602.805	-305.061	D	7.703	7.685	0.018	3.5	0	0	0	0	0	99.99
2002	238	23	637	596.267	-315.066	D	7.695	7.685	0.01	3.5	0	0	0	0	0	100
2002	239	23	637	596.267	-315.066	D	7.686	7.685	0.001	3.5	0	0	0	0	0	99.98
2002	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	244	23	490	602.499	-305.648	D	7.685	7.685	0	3.5	0	0	0	0	0	99.56
2002	245	23	490	602.499	-305.648	D	7.685	7.685	0	3.5	0	0	0	0	0	99.03
2002	246	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	247	23	512	602.805	-306.374	D	7.689	7.685	0.004	3.5	0	0	0	0	0	99.98
2002	248	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	0	0	0	0	0	100.04
2002	249	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	0	0	0	0	81.77
2002	250	23	548	603.28	-312.734	D	7.686	7.685	0.002	3.5	0	0	0	0	0	99.99
2002	251	23	517	602.805	-305.061	D	7.687	7.685	0.002	3.5	0	0	0	0	0	100.03
2002	252	23	624	596.324	-316.278	D	7.686	7.685	0.001	3.5	0	0	0	0	0	99.94
2002	253	23	637	596.267	-315.066	D	7.699	7.685	0.014	3.5	0	0	0	0	0	100.01
2002	254	23	548	603.28	-312.734	D	7.693	7.685	0.008	3.5	0	0	0	0	0	99.99
2002	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	256	23	637	596.267	-315.066	D	7.685	7.685	0	3.5	0	0	0	0	0	100.01
2002	257	23	63	598.297	-315.967	D	7.687	7.685	0.003	3.5	0	0	0	0	0	99.97
2002	258	23	517	602.805	-305.061	D	7.698	7.685	0.013	3.5	0	0	0	0	0	100
2002	259	23	624	596.324	-316.278	D	7.739	7.685	0.054	3.5	0	0	0	0	0	100
2002	260	23	624	596.324	-316.278	D	7.707	7.685	0.022	3.5	0	0	0	0	0	100
2002	261	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	0	0	0	0	0	100
2002	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	263	23	655	597.944	-312.459	D	7.685	7.685	0	3.5	0	0	0	0	0	99.4
2002	264	23	623	596.511	-316.262	D	7.689	7.685	0.004	3.5	0	0	0	0	0	100.01
2002	265	23	682	600.626	-308.407	D	7.72	7.685	0.035	3.5	0	0	0	0	0	100
2002	266	23	632	596.27	-315.421	D	7.694	7.685	0.009	3.5	0	0	0	0	0	100
2002	267	23	517	602.805	-305.061	D	7.704	7.685	0.02	3.5	0	0	0	0	0	100
2002	268	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	100.92
2002	269	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	270	23	517	602.805	-305.061	D	7.692	7.685	0.007	3.5	0	0	0	0	0	100
2002	271	23	624	596.324	-316.278	D	7.707	7.685	0.022	3.5	0	0	0	0	0	100
2002	272	23	626	596.299	-315.88	D	7.694	7.685	0.009	3.5	0	0	0	0	0	100

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	273	23	637	596.267	-315.066	D	7.688	7.685	0.003	3.5	0	0	0	0	0	99.99
2002	274	23	1	596.558	-316.101	D	7.507	7.507	0	3.117	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	0	0	0	0	100.21
2002	277	23	694	602.12	-306.029	D	7.506	7.5	0.006	3.1	0	0	0	0	0	100.01
2002	278	23	557	601.32	-313.419	D	7.501	7.5	0.001	3.1	0	0	0	0	0	99.99
2002	279	23	632	596.27	-315.421	D	7.504	7.5	0.004	3.1	0	0	0	0	0	100.05
2002	280	23	632	596.27	-315.421	D	7.508	7.5	0.009	3.1	0	0	0	0	0	100.02
2002	281	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	282	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	0	0	0	0	101.33
2002	283	23	78	598.564	-316.197	D	7.5	7.5	0	3.1	0	0	0	0	0	100.6
2002	284	23	328	601.831	-313.196	D	7.5	7.5	0	3.1	0	0	0	0	0	100.12
2002	285	23	637	596.267	-315.066	D	7.503	7.5	0.003	3.1	0	0	0	0	0	100.07
2002	286	23	656	597.971	-312.292	D	7.539	7.5	0.039	3.1	0	0	0	0	0	100
2002	287	23	637	596.267	-315.066	D	7.504	7.5	0.004	3.1	0	0	0	0	0	100.01
2002	288	23	548	603.28	-312.734	D	7.526	7.5	0.026	3.1	0	0	0	0	0	100.01
2002	289	23	639	596.544	-314.722	D	7.525	7.5	0.026	3.1	0	0	0	0	0	100.01
2002	290	23	517	602.805	-305.061	D	7.509	7.5	0.009	3.1	0	0	0	0	0	100.01
2002	291	23	517	602.805	-305.061	D	7.505	7.5	0.006	3.1	0	0	0	0	0	100.03
2002	292	23	517	602.805	-305.061	D	7.509	7.5	0.01	3.1	0	0	0	0	0	100.01
2002	293	23	637	596.267	-315.066	D	7.505	7.5	0.006	3.1	0	0	0	0	0	100.01
2002	294	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.26
2002	295	23	517	602.805	-305.061	D	7.545	7.5	0.045	3.1	0	0	0	0	0	100.01
2002	296	23	637	596.267	-315.066	D	7.522	7.5	0.022	3.1	0	0	0	0	0	100.01
2002	297	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	103.75
2002	298	23	694	602.12	-306.029	D	7.502	7.5	0.003	3.1	0	0	0	0	0	100.12
2002	299	23	517	602.805	-305.061	D	7.547	7.5	0.048	3.1	0	0	0	0	0	100
2002	300	23	632	596.27	-315.421	D	7.521	7.5	0.021	3.1	0	0	0	0	0	100.01
2002	301	23	625	596.311	-316.079	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100
2002	302	23	632	596.27	-315.421	D	7.502	7.5	0.002	3.1	0	0	0	0	0	100.09
2002	303	23	637	596.267	-315.066	D	7.503	7.5	0.003	3.1	0	0	0	0	0	100.06
2002	304	23	517	602.805	-305.061	D	7.532	7.5	0.033	3.1	0	0	0	0	0	100
2002	305	23	632	596.27	-315.421	D	7.538	7.5	0.038	3.1	0	0	0	0	0	100
2002	306	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	0	0	0	0	0	100.18
2002	307	23	517	602.805	-305.061	D	7.502	7.5	0.002	3.1	0	0	0	0	0	100.1
2002	308	23	517	602.805	-305.061	D	7.541	7.5	0.042	3.1	0	0	0	0	0	100.01
2002	309	23	626	596.299	-315.88	D	7.524	7.5	0.025	3.1	0	0	0	0	0	100
2002	310	23	517	602.805	-305.061	D	7.508	7.5	0.009	3.1	0	0	0	0	0	100.01
2002	311	23	624	596.324	-316.278	D	7.503	7.5	0.003	3.1	0	0	0	0	0	100.07

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	312	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	0	0	0	0	0	99.97
2002	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	624	596.324	-316.278	D	7.501	7.5	0.001	3.1	0	0	0	0	0	100.07
2002	315	23	631	596.276	-315.551	D	7.5	7.5	0	3.1	0	0	0	0	0	100.23
2002	316	23	517	602.805	-305.061	D	7.524	7.5	0.024	3.1	0	0	0	0	0	100.01
2002	317	23	603	598.68	-316.244	D	7.506	7.5	0.007	3.1	0	0	0	0	0	100.02
2002	318	23	498	603.073	-309.852	D	7.5	7.5	0	3.1	0	0	0	0	0	99.57
2002	319	23	681	600.53	-308.617	D	7.515	7.5	0.015	3.1	0	0	0	0	0	100.01
2002	320	23	637	596.267	-315.066	D	7.52	7.5	0.02	3.1	0	0	0	0	0	100.01
2002	321	23	517	602.805	-305.061	D	7.533	7.5	0.033	3.1	0	0	0	0	0	100
2002	322	23	517	602.805	-305.061	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.06
2002	323	23	548	603.28	-312.734	D	7.506	7.5	0.006	3.1	0	0	0	0	0	100.03
2002	324	23	548	603.28	-312.734	D	7.514	7.5	0.014	3.1	0	0	0	0	0	100.01
2002	325	23	622	596.698	-316.245	D	7.502	7.5	0.002	3.1	0	0	0	0	0	100.06
2002	326	23	557	601.32	-313.419	D	7.518	7.5	0.019	3.1	0	0	0	0	0	100
2002	327	23	603	598.68	-316.244	D	7.502	7.5	0.002	3.1	0	0	0	0	0	100.05
2002	328	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	0	0	0	0	100.48
2002	329	23	637	596.267	-315.066	D	7.517	7.5	0.018	3.1	0	0	0	0	0	100.01
2002	330	23	637	596.267	-315.066	D	7.505	7.5	0.006	3.1	0	0	0	0	0	100.02
2002	331	23	673	599.727	-309.93	D	7.527	7.5	0.027	3.1	0	0	0	0	0	100.01
2002	332	23	517	602.805	-305.061	D	7.512	7.5	0.013	3.1	0	0	0	0	0	100.01
2002	333	23	517	602.805	-305.061	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.05
2002	334	23	624	596.324	-316.278	D	7.503	7.5	0.004	3.1	0	0	0	0	0	100.02
2002	335	23	517	602.805	-305.061	D	7.589	7.589	0	3.292	0	0	0	0	0	99.39
2002	336	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.96
2002	337	23	548	603.28	-312.734	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100.02
2002	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	637	596.267	-315.066	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2002	340	23	632	596.27	-315.421	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.11
2002	341	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100
2002	342	23	637	596.267	-315.066	D	7.607	7.593	0.015	3.3	0	0	0	0	0	100.01
2002	343	23	603	598.68	-316.244	D	7.593	7.593	0	3.3	0	0	0	0	0	100.05
2002	344	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	517	602.805	-305.061	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100.01
2002	346	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.02
2002	347	23	603	598.68	-316.244	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.02
2002	348	23	632	596.27	-315.421	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100.01
2002	349	23	626	596.299	-315.88	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.96
2002	350	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	0	0	0	0	100.72

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	351	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	0	0	0	0	100.84
2002	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	631	596.276	-315.551	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.92
2002	354	23	603	598.68	-316.244	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.96
2002	355	23	517	602.805	-305.061	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100.02
2002	356	23	632	596.27	-315.421	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.05
2002	357	23	517	602.805	-305.061	D	7.633	7.593	0.04	3.3	0	0	0	0	0	100
2002	358	23	637	596.267	-315.066	D	7.607	7.593	0.014	3.3	0	0	0	0	0	100
2002	359	23	517	602.805	-305.061	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100
2002	360	23	624	596.324	-316.278	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.14
2002	361	23	624	596.324	-316.278	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.02
2002	362	23	517	602.805	-305.061	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100.01
2002	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	517	602.805	-305.061	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100.01
									0.06							
DYNO NOBEL											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	2	23	517	602.805	-305.061	D	7.653	7.593	0.06	3.3	0	100	0	0	0	0
2002	3	23	637	596.267	-315.066	D	7.672	7.593	0.079	3.3	0	100	0	0	0	0
2002	4	23	547	603.265	-312.487	D	7.593	7.593	0	3.3	0	98.71	0	0	0	0
2002	5	23	241	600.857	-313.521	D	7.593	7.593	0	3.3	0	74.13	0	0	0	0
2002	6	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	101.03	0	0	0	0
2002	7	23	517	602.805	-305.061	D	7.596	7.593	0.004	3.3	0	100.04	0	0	0	0
2002	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	517	602.805	-305.061	D	7.605	7.593	0.012	3.3	0	100.01	0	0	0	0
2002	11	23	548	603.28	-312.734	D	7.604	7.593	0.011	3.3	0	100	0	0	0	0
2002	12	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	13	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	548	603.28	-312.734	D	7.624	7.593	0.031	3.3	0	100.01	0	0	0	0
2002	18	23	548	603.28	-312.734	D	7.607	7.593	0.015	3.3	0	100	0	0	0	0
2002	19	23	517	602.805	-305.061	D	7.612	7.593	0.02	3.3	0	100	0	0	0	0
2002	20	23	624	596.324	-316.278	D	7.61	7.593	0.017	3.3	0	100.01	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	21	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	0	100.09	0	0	0	0
2002	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	517	602.805	-305.061	D	7.634	7.593	0.041	3.3	0	100	0	0	0	0
2002	25	23	548	603.28	-312.734	D	7.597	7.593	0.005	3.3	0	100.01	0	0	0	0
2002	26	23	548	603.28	-312.734	D	7.593	7.593	0	3.3	0	100.18	0	0	0	0
2002	27	23	380	602.29	-312.661	D	7.593	7.593	0	3.3	0	98.69	0	0	0	0
2002	28	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	30	23	548	603.28	-312.734	D	7.686	7.593	0.093	3.3	0	100	0	0	0	0
2002	31	23	517	602.805	-305.061	D	7.617	7.593	0.025	3.3	0	100.01	0	0	0	0
2002	32	23	517	602.805	-305.061	D	7.462	7.459	0.003	3.013	0	100.02	0	0	0	0
2002	33	23	517	602.805	-305.061	D	7.455	7.453	0.003	3	0	100.08	0	0	0	0
2002	34	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	0	100.09	0	0	0	0
2002	35	23	517	602.805	-305.061	D	7.457	7.453	0.005	3	0	100.06	0	0	0	0
2002	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	37	23	202	599.844	-310.101	D	7.453	7.453	0	3	0	131.09	0	0	0	0
2002	38	23	517	602.805	-305.061	D	7.459	7.453	0.006	3	0	100.02	0	0	0	0
2002	39	23	78	598.564	-316.197	D	7.453	7.453	0	3	0	101.98	0	0	0	0
2002	40	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	100.4	0	0	0	0
2002	41	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	42	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	0	100.27	0	0	0	0
2002	43	23	548	603.28	-312.734	D	7.453	7.453	0	3	0	98.39	0	0	0	0
2002	44	23	656	597.971	-312.292	D	7.482	7.453	0.029	3	0	100.01	0	0	0	0
2002	45	23	548	603.28	-312.734	D	7.454	7.453	0.001	3	0	100.2	0	0	0	0
2002	46	23	547	603.265	-312.487	D	7.453	7.453	0	3	0	100.19	0	0	0	0
2002	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	545	603.234	-311.991	D	7.457	7.453	0.004	3	0	100.02	0	0	0	0
2002	49	23	548	603.28	-312.734	D	7.459	7.453	0.006	3	0	100.02	0	0	0	0
2002	50	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	681	600.53	-308.617	D	7.474	7.453	0.021	3	0	100.01	0	0	0	0
2002	54	23	624	596.324	-316.278	D	7.464	7.453	0.012	3	0	100.02	0	0	0	0
2002	55	23	548	603.28	-312.734	D	7.455	7.453	0.002	3	0	100.05	0	0	0	0
2002	56	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	57	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	99.57	0	0	0	0
2002	58	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	60	23	1	596.558	-316.101	D	7.362	7.362	0	2.808	0	0	0	0	0	0
2002	61	23	517	602.805	-305.061	D	7.36	7.358	0.002	2.8	0	100.1	0	0	0	0
2002	62	23	548	603.28	-312.734	D	7.359	7.358	0.001	2.8	0	100.04	0	0	0	0
2002	63	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	64	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	69	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	70	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	71	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	72	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	73	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	74	23	517	602.805	-305.061	D	7.363	7.358	0.005	2.8	0	100.04	0	0	0	0
2002	75	23	631	596.276	-315.551	D	7.375	7.358	0.017	2.8	0	100	0	0	0	0
2002	76	23	439	602.691	-311.38	D	7.358	7.358	0	2.8	0	100.22	0	0	0	0
2002	77	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	0	100.08	0	0	0	0
2002	78	23	517	602.805	-305.061	D	7.367	7.358	0.009	2.8	0	100.02	0	0	0	0
2002	79	23	697	602.531	-305.449	D	7.374	7.358	0.016	2.8	0	100.01	0	0	0	0
2002	80	23	517	602.805	-305.061	D	7.365	7.358	0.006	2.8	0	100.03	0	0	0	0
2002	81	23	548	603.28	-312.734	D	7.36	7.358	0.001	2.8	0	100.05	0	0	0	0
2002	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	84	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	85	23	624	596.324	-316.278	D	7.367	7.358	0.009	2.8	0	100.03	0	0	0	0
2002	86	23	517	602.805	-305.061	D	7.369	7.358	0.011	2.8	0	100.02	0	0	0	0
2002	87	23	676	599.876	-309.365	D	7.36	7.358	0.002	2.8	0	99.99	0	0	0	0
2002	88	23	517	602.805	-305.061	D	7.36	7.358	0.002	2.8	0	100.05	0	0	0	0
2002	89	23	548	603.28	-312.734	D	7.363	7.358	0.004	2.8	0	100.04	0	0	0	0
2002	90	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	0	100.6	0	0	0	0
2002	91	23	548	603.28	-312.734	D	7.268	7.267	0.001	2.608	0	100.28	0	0	0	0
2002	92	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	0	99.91	0	0	0	0
2002	93	23	548	603.28	-312.734	D	7.272	7.263	0.01	2.6	0	100.01	0	0	0	0
2002	94	23	517	602.805	-305.061	D	7.275	7.263	0.012	2.6	0	100.02	0	0	0	0
2002	95	23	517	602.805	-305.061	D	7.276	7.263	0.014	2.6	0	100.01	0	0	0	0
2002	96	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	0	100.09	0	0	0	0
2002	97	23	407	602.519	-312.393	D	7.263	7.263	0	2.6	0	99.54	0	0	0	0
2002	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	99	23	517	602.805	-305.061	D	7.266	7.263	0.003	2.6	0	100.05	0	0	0	0
2002	100	23	631	596.276	-315.551	D	7.263	7.263	0	2.6	0	99.66	0	0	0	0
2002	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	103	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	104	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	110	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	0	100.4	0	0	0	0
2002	111	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	0	100.01	0	0	0	0
2002	112	23	517	602.805	-305.061	D	7.264	7.263	0.001	2.6	0	99.98	0	0	0	0
2002	113	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	114	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	115	23	517	602.805	-305.061	D	7.267	7.263	0.004	2.6	0	100.06	0	0	0	0
2002	116	23	15	597.035	-315.814	D	7.263	7.263	0	2.6	0	99.43	0	0	0	0
2002	117	23	168	599.404	-310.884	D	7.263	7.263	0	2.6	0	97.59	0	0	0	0
2002	118	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	119	23	517	602.805	-305.061	D	7.267	7.263	0.004	2.6	0	100.07	0	0	0	0
2002	120	23	515	602.747	-305.629	D	7.263	7.263	0	2.6	0	100.19	0	0	0	0
2002	121	23	490	602.499	-305.648	D	7.445	7.445	0	2.983	0	120.22	0	0	0	0
2002	122	23	631	596.276	-315.551	D	7.465	7.453	0.012	3	0	100.02	0	0	0	0
2002	123	23	517	602.805	-305.061	D	7.455	7.453	0.003	3	0	100.15	0	0	0	0
2002	124	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	107.75	0	0	0	0
2002	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	108.06	0	0	0	0
2002	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	128	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	129	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	130	23	327	601.142	-307.502	D	7.454	7.453	0.001	3	0	100.2	0	0	0	0
2002	131	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	101.23	0	0	0	0
2002	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	133	23	637	596.267	-315.066	D	7.461	7.453	0.009	3	0	100.02	0	0	0	0
2002	134	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	135	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	136	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	137	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	100.61	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	138	23	637	596.267	-315.066	D	7.453	7.453	0	3	0	100.95	0	0	0	0
2002	139	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	0	100.05	0	0	0	0
2002	140	23	490	602.499	-305.648	D	7.453	7.453	0	3	0	100.39	0	0	0	0
2002	141	23	517	602.805	-305.061	D	7.464	7.453	0.012	3	0	100.03	0	0	0	0
2002	142	23	624	596.324	-316.278	D	7.453	7.453	0	3	0	100.43	0	0	0	0
2002	143	23	516	602.728	-305.38	D	7.453	7.453	0	3	0	100.69	0	0	0	0
2002	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	146	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	147	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	148	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	149	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	151	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2002	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	156	23	517	602.805	-305.061	D	7.547	7.546	0	3.2	0	100.22	0	0	0	0
2002	157	23	517	602.805	-305.061	D	7.551	7.546	0.005	3.2	0	100.03	0	0	0	0
2002	158	23	624	596.324	-316.278	D	7.547	7.546	0	3.2	0	100.16	0	0	0	0
2002	159	23	3	596.519	-315.604	D	7.546	7.546	0	3.2	0	107.74	0	0	0	0
2002	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	142.16	0	0	0	0
2002	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	164	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	165	23	548	603.28	-312.734	D	7.546	7.546	0	3.2	0	99.99	0	0	0	0
2002	166	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	167	23	107	598.487	-311.954	D	7.546	7.546	0	3.2	0	99.76	0	0	0	0
2002	168	23	624	596.324	-316.278	D	7.551	7.546	0.005	3.2	0	100.04	0	0	0	0
2002	169	23	1	596.558	-316.101	D	7.547	7.546	0	3.2	0	100.08	0	0	0	0
2002	170	23	432	602.04	-306.183	D	7.546	7.546	0	3.2	0	102.98	0	0	0	0
2002	171	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	178	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	179	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	0	100.94	0	0	0	0
2002	180	23	461	602.269	-305.916	D	7.546	7.546	0	3.2	0	97.7	0	0	0	0
2002	181	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	182	23	1	596.558	-316.101	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2002	183	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	147.17	0	0	0	0
2002	185	23	185	599.614	-310.369	D	7.593	7.593	0	3.3	0	108.3	0	0	0	0
2002	186	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	114.74	0	0	0	0
2002	187	23	46	597.647	-314.019	D	7.593	7.593	0	3.3	0	101.18	0	0	0	0
2002	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	141.17	0	0	0	0
2002	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	23	490	602.499	-305.648	D	7.593	7.593	0	3.3	0	111.47	0	0	0	0
2002	192	23	623	596.511	-316.262	D	7.593	7.593	0	3.3	0	100.02	0	0	0	0
2002	193	23	4	596.5	-315.356	D	7.593	7.593	0	3.3	0	109.75	0	0	0	0
2002	194	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	106.33	0	0	0	0
2002	195	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	196	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	197	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	198	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	199	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	125.45	0	0	0	0
2002	203	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	86.51	0	0	0	0
2002	204	23	327	601.142	-307.502	D	7.593	7.593	0	3.3	0	99.76	0	0	0	0
2002	205	23	548	603.28	-312.734	D	7.595	7.593	0.002	3.3	0	99.97	0	0	0	0
2002	206	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	287.78	0	0	0	0
2002	207	23	5	596.481	-315.108	D	7.593	7.593	0	3.3	0	104.63	0	0	0	0
2002	208	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	23	1	596.558	-316.101	D	7.681	7.681	0	3.492	0	0	0	0	0	0
2002	214	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	215	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	216	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	217	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	218	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	100.03	0	0	0	0
2002	219	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	102.7	0	0	0	0
2002	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	228	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	232	23	461	602.269	-305.916	D	7.685	7.685	0	3.5	0	65.64	0	0	0	0
2002	233	23	352	601.372	-307.234	D	7.685	7.685	0	3.5	0	74.14	0	0	0	0
2002	234	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	236	23	516	602.728	-305.38	D	7.685	7.685	0	3.5	0	97.57	0	0	0	0
2002	237	23	637	596.267	-315.066	D	7.69	7.685	0.005	3.5	0	100	0	0	0	0
2002	238	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	0	100.2	0	0	0	0
2002	239	23	5	596.481	-315.108	D	7.685	7.685	0	3.5	0	81.26	0	0	0	0
2002	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	245	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	246	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	247	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	99.89	0	0	0	0
2002	248	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	107.53	0	0	0	0
2002	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	254	23	620	597.072	-316.212	D	7.685	7.685	0	3.5	0	99.56	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	257	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	109.07	0	0	0	0
2002	258	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	102.1	0	0	0	0
2002	259	23	637	596.267	-315.066	D	7.701	7.685	0.016	3.5	0	100	0	0	0	0
2002	260	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	0	99.96	0	0	0	0
2002	261	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	99.95	0	0	0	0
2002	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	264	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	265	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	99.95	0	0	0	0
2002	266	23	517	602.805	-305.061	D	7.689	7.685	0.005	3.5	0	99.98	0	0	0	0
2002	267	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	100.13	0	0	0	0
2002	268	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	100.03	0	0	0	0
2002	269	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	270	23	490	602.499	-305.648	D	7.685	7.685	0	3.5	0	99.3	0	0	0	0
2002	271	23	624	596.324	-316.278	D	7.692	7.685	0.008	3.5	0	100	0	0	0	0
2002	272	23	637	596.267	-315.066	D	7.686	7.685	0.001	3.5	0	99.94	0	0	0	0
2002	273	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	107.32	0	0	0	0
2002	274	23	1	596.558	-316.101	D	7.507	7.507	0	3.117	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	517	602.805	-305.061	D	7.502	7.5	0.002	3.1	0	100.06	0	0	0	0
2002	279	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	100.64	0	0	0	0
2002	280	23	693	601.983	-306.223	D	7.506	7.5	0.007	3.1	0	100.03	0	0	0	0
2002	281	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	106.48	0	0	0	0
2002	282	23	202	599.844	-310.101	D	7.5	7.5	0	3.1	0	162.75	0	0	0	0
2002	283	23	2	596.539	-315.853	D	7.5	7.5	0	3.1	0	115.87	0	0	0	0
2002	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	285	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	23	637	596.267	-315.066	D	7.51	7.5	0.011	3.1	0	100.01	0	0	0	0
2002	287	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	100.52	0	0	0	0
2002	289	23	637	596.267	-315.066	D	7.508	7.5	0.008	3.1	0	100.02	0	0	0	0
2002	290	23	517	602.805	-305.061	D	7.504	7.5	0.005	3.1	0	100.03	0	0	0	0
2002	291	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	292	23	517	602.805	-305.061	D	7.506	7.5	0.006	3.1	0	100.02	0	0	0	0
2002	293	23	624	596.324	-316.278	D	7.502	7.5	0.003	3.1	0	100.01	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	294	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	108.92	0	0	0	0
2002	295	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	100.3	0	0	0	0
2002	296	23	517	602.805	-305.061	D	7.512	7.5	0.013	3.1	0	100.02	0	0	0	0
2002	297	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	104.43	0	0	0	0
2002	298	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	299	23	517	602.805	-305.061	D	7.562	7.5	0.062	3.1	0	100	0	0	0	0
2002	300	23	637	596.267	-315.066	D	7.539	7.5	0.039	3.1	0	100	0	0	0	0
2002	301	23	5	596.481	-315.108	D	7.5	7.5	0	3.1	0	101.13	0	0	0	0
2002	302	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	99.95	0	0	0	0
2002	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	304	23	517	602.805	-305.061	D	7.517	7.5	0.018	3.1	0	100.01	0	0	0	0
2002	305	23	517	602.805	-305.061	D	7.506	7.5	0.007	3.1	0	100.02	0	0	0	0
2002	306	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	307	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	308	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	309	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	310	23	517	602.805	-305.061	D	7.509	7.5	0.01	3.1	0	100	0	0	0	0
2002	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	316	23	517	602.805	-305.061	D	7.515	7.5	0.016	3.1	0	100.01	0	0	0	0
2002	317	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	0	100.13	0	0	0	0
2002	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	637	596.267	-315.066	D	7.506	7.5	0.006	3.1	0	100	0	0	0	0
2002	320	23	631	596.276	-315.551	D	7.504	7.5	0.005	3.1	0	100.02	0	0	0	0
2002	321	23	517	602.805	-305.061	D	7.519	7.5	0.02	3.1	0	100	0	0	0	0
2002	322	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	100.04	0	0	0	0
2002	323	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	324	23	434	602.787	-312.622	D	7.5	7.5	0	3.1	0	100.38	0	0	0	0
2002	325	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	326	23	517	602.805	-305.061	D	7.501	7.5	0.002	3.1	0	100.07	0	0	0	0
2002	327	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	328	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	329	23	637	596.267	-315.066	D	7.502	7.5	0.003	3.1	0	100.06	0	0	0	0
2002	330	23	624	596.324	-316.278	D	7.5	7.5	0	3.1	0	100.43	0	0	0	0
2002	331	23	637	596.267	-315.066	D	7.513	7.5	0.013	3.1	0	100.02	0	0	0	0
2002	332	23	517	602.805	-305.061	D	7.506	7.5	0.006	3.1	0	100.03	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	333	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	335	23	1	596.558	-316.101	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2002	336	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	548	603.28	-312.734	D	7.6	7.593	0.007	3.3	0	100.01	0	0	0	0
2002	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	637	596.267	-315.066	D	7.601	7.593	0.008	3.3	0	100	0	0	0	0
2002	340	23	548	603.28	-312.734	D	7.594	7.593	0.001	3.3	0	99.93	0	0	0	0
2002	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	0	100.01	0	0	0	0
2002	343	23	624	596.324	-316.278	D	7.596	7.593	0.003	3.3	0	99.99	0	0	0	0
2002	344	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	348	23	517	602.805	-305.061	D	7.605	7.593	0.012	3.3	0	100	0	0	0	0
2002	349	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	100.4	0	0	0	0
2002	357	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	358	23	517	602.805	-305.061	D	7.599	7.593	0.007	3.3	0	100	0	0	0	0
2002	359	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	0	100.03	0	0	0	0
2002	360	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	548	603.28	-312.734	D	7.596	7.593	0.003	3.3	0	100.02	0	0	0	0
									0.093							
MLC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	515	602.747	-305.629	D	7.593	7.593	0	3.3	18.57	78.57	0	0	0	3.37

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	2	23	557	601.32	-313.419	D	7.855	7.593	0.263	3.3	9.37	83.56	0	0	0	7.07
2002	3	23	548	603.28	-312.734	D	7.598	7.593	0.006	3.3	12.54	82.43	0	0	0	5.02
2002	4	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	5	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	6	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	7	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	548	603.28	-312.734	D	7.594	7.593	0.002	3.3	48.65	45.7	0	0	0	5.62
2002	11	23	548	603.28	-312.734	D	7.593	7.593	0	3.3	38.58	53.53	0	0	0	5.05
2002	12	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	13	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	548	603.28	-312.734	D	7.627	7.593	0.035	3.3	19.57	73.83	0	0	0	6.59
2002	18	23	548	603.28	-312.734	D	7.66	7.593	0.067	3.3	18.07	78.8	0	0	0	3.13
2002	19	23	637	596.267	-315.066	D	7.638	7.593	0.045	3.3	33.25	63.9	0	0	0	2.84
2002	20	23	624	596.324	-316.278	D	7.64	7.593	0.048	3.3	39.62	58.56	0	0	0	1.82
2002	21	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	41.03	57.91	0	0	0	1.06
2002	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	25	23	433	602.806	-312.871	D	7.593	7.593	0	3.3	25.64	69.17	0	0	0	3.84
2002	26	23	548	603.28	-312.734	D	7.593	7.593	0	3.3	28.18	68.72	0	0	0	3.05
2002	27	23	328	601.831	-313.196	D	7.593	7.593	0	3.3	40.84	56.01	0	0	0	3.29
2002	28	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	30	23	637	596.267	-315.066	D	7.64	7.593	0.047	3.3	10.02	83.55	0	0	0	6.43
2002	31	23	517	602.805	-305.061	D	7.6	7.593	0.008	3.3	31.98	66.37	0	0	0	1.65
2002	32	23	517	602.805	-305.061	D	7.459	7.459	0.001	3.013	44.32	54.72	0	0	0	1.01
2002	33	23	557	601.32	-313.419	D	7.533	7.453	0.08	3	8.94	86.01	0	0	0	5.06
2002	34	23	517	602.805	-305.061	D	7.456	7.453	0.003	3	21	76.32	0	0	0	2.7
2002	35	23	517	602.805	-305.061	D	7.468	7.453	0.015	3	14.77	78.76	0	0	0	6.48
2002	36	23	637	596.267	-315.066	D	7.461	7.453	0.008	3	12.4	82.06	0	0	0	5.54
2002	37	23	378	601.601	-306.966	D	7.453	7.453	0	3	64.28	67.02	0	0	0	3.49
2002	38	23	638	596.406	-314.894	D	7.515	7.453	0.062	3	8.63	85.5	0	0	0	5.87
2002	39	23	433	602.806	-312.871	D	7.453	7.453	0	3	54.2	44.78	0	0	0	1.53
2002	40	23	405	602.557	-312.89	D	7.453	7.453	0	3	64.71	35.26	0	0	0	1.37

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	41	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	42	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	43	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	44	23	548	603.28	-312.734	D	7.475	7.453	0.022	3	7.12	80.39	0	0	0	12.49
2002	45	23	517	602.805	-305.061	D	7.478	7.453	0.025	3	7.76	85.8	0	0	0	6.44
2002	46	23	545	603.234	-311.991	D	7.453	7.453	0	3	28.83	67.41	0	0	0	3.61
2002	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	37.82	51.74	0	0	0	10.46
2002	49	23	517	602.805	-305.061	D	7.465	7.453	0.013	3	30.47	64.19	0	0	0	5.36
2002	50	23	432	602.04	-306.183	D	7.453	7.453	0	3	45.82	28.84	0	0	0	4.37
2002	51	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	548	603.28	-312.734	D	7.477	7.453	0.024	3	23.49	69.99	0	0	0	6.53
2002	54	23	548	603.28	-312.734	D	7.462	7.453	0.009	3	12.67	81.58	0	0	0	5.77
2002	55	23	548	603.28	-312.734	D	7.454	7.453	0.002	3	37.19	59.29	0	0	0	3.66
2002	56	23	548	603.28	-312.734	D	7.459	7.453	0.007	3	33.84	60.86	0	0	0	5.3
2002	57	23	547	603.265	-312.487	D	7.453	7.453	0	3	42.9	64.14	0	0	0	5.78
2002	58	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	596.558	-316.101	D	7.362	7.362	0	2.808	0	0	0	0	0	0
2002	61	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	35.57	62.96	0	0	0	1.65
2002	62	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	37.89	61.04	0	0	0	1.18
2002	63	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	64	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	69	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	70	23	517	602.805	-305.061	D	7.363	7.358	0.005	2.8	26.31	69.66	0	0	0	4.1
2002	71	23	688	601.298	-307.191	D	7.371	7.358	0.012	2.8	40.04	56.59	0	0	0	3.38
2002	72	23	632	596.27	-315.421	D	7.471	7.358	0.112	2.8	35.62	61.78	0	0	0	2.61
2002	73	23	517	602.805	-305.061	D	7.365	7.358	0.007	2.8	68.87	28.66	0	0	0	2.47
2002	74	23	656	597.971	-312.292	D	7.378	7.358	0.02	2.8	42.51	51.88	0	0	0	5.61
2002	75	23	694	602.12	-306.029	D	7.404	7.358	0.046	2.8	14.19	74.49	0	0	0	11.32
2002	76	23	603	598.68	-316.244	D	7.362	7.358	0.004	2.8	53.16	44.41	0	0	0	2.47
2002	77	23	517	602.805	-305.061	D	7.376	7.358	0.018	2.8	57.68	38.58	0	0	0	3.74
2002	78	23	624	596.324	-316.278	D	7.371	7.358	0.013	2.8	52.55	45.42	0	0	0	2.05
2002	79	23	548	603.28	-312.734	D	7.378	7.358	0.02	2.8	25.57	65.93	0	0	0	8.5

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	80	23	557	601.32	-313.419	D	7.429	7.358	0.07	2.8	11.04	80.72	0	0	0	8.24
2002	81	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	84	23	637	596.267	-315.066	D	7.374	7.358	0.016	2.8	39.41	57.46	0	0	0	3.14
2002	85	23	517	602.805	-305.061	D	7.365	7.358	0.007	2.8	5.73	81.96	0	0	0	12.32
2002	86	23	517	602.805	-305.061	D	7.381	7.358	0.023	2.8	14.94	79.95	0	0	0	5.11
2002	87	23	637	596.267	-315.066	D	7.359	7.358	0.001	2.8	38.99	57.85	0	0	0	3.14
2002	88	23	517	602.805	-305.061	D	7.36	7.358	0.002	2.8	45.31	51.7	0	0	0	3.06
2002	89	23	557	601.32	-313.419	D	7.398	7.358	0.04	2.8	7.36	83.88	0	0	0	8.77
2002	90	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	71.18	14.52	0	0	0	14.45
2002	91	23	632	596.27	-315.421	D	7.272	7.267	0.005	2.608	34.64	51.27	0	0	0	14.1
2002	92	23	491	603.207	-311.591	D	7.264	7.263	0.001	2.6	84.72	9.84	0	0	0	5.32
2002	93	23	548	603.28	-312.734	D	7.263	7.263	0.001	2.6	24.13	69.4	0	0	0	6.59
2002	94	23	637	596.267	-315.066	D	7.287	7.263	0.024	2.6	30.8	63.26	0	0	0	5.95
2002	95	23	637	596.267	-315.066	D	7.269	7.263	0.006	2.6	13.35	75.77	0	0	0	10.89
2002	96	23	517	602.805	-305.061	D	7.273	7.263	0.01	2.6	17.98	73.25	0	0	0	8.78
2002	97	23	624	596.324	-316.278	D	7.264	7.263	0.001	2.6	52.65	41.51	0	0	0	5.82
2002	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	99	23	548	603.28	-312.734	D	7.269	7.263	0.007	2.6	68.97	18.9	0	0	0	12.16
2002	100	23	353	602.08	-313.177	D	7.268	7.263	0.005	2.6	60.79	25.79	0	0	0	13.4
2002	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	103	23	637	596.267	-315.066	D	7.271	7.263	0.008	2.6	17.4	76.59	0	0	0	6.04
2002	104	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	79.71	15.84	0	0	0	4.64
2002	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	111	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	37.69	58.06	0	0	0	4.01
2002	112	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	113	23	353	602.08	-313.177	D	7.263	7.263	0	2.6	95.34	1.36	0	0	0	6.57
2002	114	23	462	603.035	-312.603	D	7.263	7.263	0	2.6	88.48	5.64	0	0	0	5.08
2002	115	23	548	603.28	-312.734	D	7.264	7.263	0.001	2.6	53.5	31.82	0	0	0	15.16
2002	116	23	517	602.805	-305.061	D	7.268	7.263	0.005	2.6	19.68	72.66	0	0	0	7.74
2002	117	23	624	596.324	-316.278	D	7.264	7.263	0.001	2.6	69.91	25.73	0	0	0	4.29
2002	118	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	119	23	676	599.876	-309.365	D	7.331	7.263	0.068	2.6	22.1	63.88	0	0	0	14.03
2002	120	23	517	602.805	-305.061	D	7.272	7.263	0.009	2.6	81.16	10.39	0	0	0	8.47
2002	121	23	432	602.04	-306.183	D	7.445	7.445	0	2.983	90.61	7.6	0	0	0	4.9
2002	122	23	548	603.28	-312.734	D	7.466	7.453	0.014	3	55.51	41.98	0	0	0	2.52
2002	123	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	33.98	53.52	0	0	0	12.58
2002	124	23	623	596.511	-316.262	D	7.453	7.453	0.001	3	84.35	14.53	0	0	0	1.43
2002	125	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	80.06	15.71	0	0	0	4.43
2002	126	23	36	597.379	-313.789	D	7.453	7.453	0	3	96.51	0.48	0	0	0	1.02
2002	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	128	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	129	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	130	23	557	601.32	-313.419	D	7.464	7.453	0.011	3	22.17	46.27	0	0	0	31.57
2002	131	23	623	596.511	-316.262	D	7.453	7.453	0	3	88.94	8.11	0	0	0	3.21
2002	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	133	23	548	603.28	-312.734	D	7.459	7.453	0.007	3	7.09	79.64	0	0	0	13.28
2002	134	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	135	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	136	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	137	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	49.12	48.35	0	0	0	2.65
2002	138	23	517	602.805	-305.061	D	7.495	7.453	0.042	3	15.63	73.38	0	0	0	10.99
2002	139	23	517	602.805	-305.061	D	7.462	7.453	0.01	3	33.58	54.1	0	0	0	12.33
2002	140	23	517	602.805	-305.061	D	7.469	7.453	0.016	3	63.71	25.27	0	0	0	11.04
2002	141	23	603	598.68	-316.244	D	7.458	7.453	0.005	3	36.71	55.61	0	0	0	7.7
2002	142	23	632	596.27	-315.421	D	7.453	7.453	0	3	76.69	20.62	0	0	0	3.66
2002	143	23	168	599.404	-310.884	D	7.453	7.453	0	3	87.03	4.39	0	0	0	2.13
2002	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	146	23	548	603.28	-312.734	D	7.462	7.453	0.009	3	19.12	64.61	0	0	0	16.29
2002	147	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	78.61	18.29	0	0	0	3.19
2002	148	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	149	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	151	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2002	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	156	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	157	23	548	603.28	-312.734	D	7.557	7.546	0.01	3.2	66.85	21.04	0	0	0	12.14

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	158	23	548	603.28	-312.734	D	7.549	7.546	0.002	3.2	64.51	17.5	0	0	0	18
2002	159	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	95.93	7.46	0	0	0	5.05
2002	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	91.51	0.56	0	0	0	3.53
2002	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	164	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	165	23	681	600.53	-308.617	D	7.55	7.546	0.004	3.2	39.14	19.05	0	0	0	41.83
2002	166	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	167	23	514	602.766	-305.877	D	7.546	7.546	0	3.2	128.03	3.71	0	0	0	10.47
2002	168	23	548	603.28	-312.734	D	7.554	7.546	0.007	3.2	56.26	36.21	0	0	0	7.55
2002	169	23	603	598.68	-316.244	D	7.555	7.546	0.009	3.2	94.67	1.83	0	0	0	3.52
2002	170	23	517	602.805	-305.061	D	7.551	7.546	0.005	3.2	95.26	1.91	0	0	0	2.89
2002	171	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	83.91	0.27	0	0	0	2.9
2002	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	178	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	179	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	91.29	3.09	0	0	0	6.43
2002	180	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	94.16	1.51	0	0	0	4.69
2002	181	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	182	23	465	602.978	-311.858	D	7.591	7.591	0	3.296	87.49	0.3	0	0	0	5.68
2002	183	23	517	602.805	-305.061	D	7.607	7.593	0.014	3.3	94	1.77	0	0	0	4.24
2002	184	23	603	598.68	-316.244	D	7.604	7.593	0.012	3.3	95.32	2.29	0	0	0	2.4
2002	185	23	517	602.805	-305.061	D	7.629	7.593	0.036	3.3	76.02	10.63	0	0	0	13.35
2002	186	23	637	596.267	-315.066	D	7.6	7.593	0.008	3.3	94.01	1.14	0	0	0	4.88
2002	187	23	624	596.324	-316.278	D	7.594	7.593	0.002	3.3	97.07	0.75	0	0	0	2.23
2002	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	97.41	0.64	0	0	0	1.98
2002	189	23	637	596.267	-315.066	D	7.593	7.593	0	3.3	90.89	1.08	0	0	0	7.97
2002	190	23	624	596.324	-316.278	D	7.599	7.593	0.006	3.3	95.05	0.67	0	0	0	4.29
2002	191	23	548	603.28	-312.734	D	7.596	7.593	0.003	3.3	95.06	1.66	0	0	0	3.27
2002	192	23	517	602.805	-305.061	D	7.657	7.593	0.064	3.3	34.62	59.69	0	0	0	5.69
2002	193	23	637	596.267	-315.066	D	7.596	7.593	0.004	3.3	85.21	11.28	0	0	0	3.52
2002	194	23	632	596.27	-315.421	D	7.593	7.593	0.001	3.3	75.64	22.35	0	0	0	2.23
2002	195	23	681	600.53	-308.617	D	7.637	7.593	0.045	3.3	41.09	29.32	0	0	0	29.6
2002	196	23	698	602.668	-305.255	D	7.593	7.593	0	3.3	63.99	23.66	0	0	0	12.81

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	197	23	624	596.324	-316.278	D	7.593	7.593	0	3.3	94.71	0.42	0	0	0	4.57
2002	198	23	432	602.04	-306.183	D	7.593	7.593	0.001	3.3	94.4	1.93	0	0	0	3.79
2002	199	23	516	602.728	-305.38	D	7.593	7.593	0.001	3.3	93.98	2.9	0	0	0	3.17
2002	200	23	514	602.766	-305.877	D	7.593	7.593	0	3.3	87.03	10.66	0	0	0	2.7
2002	201	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	48.87	47.03	0	0	0	3.89
2002	202	23	521	602.866	-306.052	D	7.593	7.593	0	3.3	95.35	1.21	0	0	0	2.84
2002	203	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	93.38	3.95	0	0	0	2.31
2002	204	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	84.28	4.1	0	0	0	11.39
2002	205	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	75.55	10.56	0	0	0	13.89
2002	206	23	637	596.267	-315.066	D	7.595	7.593	0.002	3.3	93.73	1.26	0	0	0	5.04
2002	207	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	95.09	1.26	0	0	0	3.66
2002	208	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	97.4	0.38	0	0	0	2.31
2002	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	23	303	600.932	-308.017	D	7.681	7.681	0	3.492	86.82	2.39	0	0	0	2.66
2002	214	23	490	602.499	-305.648	D	7.685	7.685	0	3.5	94.64	0.7	0	0	0	4.14
2002	215	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	95.56	1.01	0	0	0	3.36
2002	216	23	431	602.059	-306.432	D	7.685	7.685	0	3.5	95.03	0.39	0	0	0	2.29
2002	217	23	260	600.493	-308.801	D	7.685	7.685	0	3.5	87.26	0.58	0	0	0	1.88
2002	218	23	624	596.324	-316.278	D	7.698	7.685	0.013	3.5	91.14	3.9	0	0	0	4.96
2002	219	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	96.82	2.35	0	0	0	2.36
2002	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	222	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	96.11	0.3	0	0	0	3.68
2002	223	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	95.58	0.77	0	0	0	2.95
2002	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	228	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	232	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	233	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	95.81	1.62	0	0	0	2.43
2002	234	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	4.25	0.04	0	0	0	0.11
2002	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	236	23	510	602.843	-306.871	D	7.685	7.685	0	3.5	89.32	1.2	0	0	0	7.41
2002	237	23	548	603.28	-312.734	D	7.698	7.685	0.013	3.5	53.62	24.85	0	0	0	21.53
2002	238	23	681	600.53	-308.617	D	7.799	7.685	0.114	3.5	30.11	57.84	0	0	0	12.05
2002	239	23	637	596.267	-315.066	D	7.689	7.685	0.004	3.5	85.72	5.76	0	0	0	8.51
2002	240	23	637	596.267	-315.066	D	7.685	7.685	0.001	3.5	31.61	47.33	0	0	0	20.93
2002	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	244	23	5	596.481	-315.108	D	7.685	7.685	0	3.5	87.12	1.75	0	0	0	9.73
2002	245	23	281	600.703	-308.285	D	7.685	7.685	0	3.5	85.07	0.78	0	0	0	7.01
2002	246	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	247	23	632	596.27	-315.421	D	7.688	7.685	0.003	3.5	48.38	19.36	0	0	0	32.3
2002	248	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	52.81	26.9	0	0	0	19.42
2002	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	252	23	490	602.499	-305.648	D	7.685	7.685	0	3.5	89.53	0.89	0	0	0	8.21
2002	253	23	548	603.28	-312.734	D	7.695	7.685	0.01	3.5	77.32	9.58	0	0	0	13.11
2002	254	23	548	603.28	-312.734	D	7.716	7.685	0.032	3.5	27.31	55.03	0	0	0	17.65
2002	255	23	637	596.267	-315.066	D	7.685	7.685	0.001	3.5	32.86	23.39	0	0	0	43.71
2002	256	23	637	596.267	-315.066	D	7.691	7.685	0.007	3.5	84.82	7.79	0	0	0	7.38
2002	257	23	517	602.805	-305.061	D	7.689	7.685	0.004	3.5	90.59	3.85	0	0	0	5.56
2002	258	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	85.13	5.67	0	0	0	9.15
2002	259	23	681	600.53	-308.617	D	7.789	7.685	0.104	3.5	12.78	77.97	0	0	0	9.24
2002	260	23	548	603.28	-312.734	D	7.698	7.685	0.013	3.5	74.79	22.46	0	0	0	2.75
2002	261	23	517	602.805	-305.061	D	7.686	7.685	0.002	3.5	70.06	28.03	0	0	0	1.84
2002	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	264	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	265	23	517	602.805	-305.061	D	7.713	7.685	0.028	3.5	58.35	33.44	0	0	0	8.21
2002	266	23	681	600.53	-308.617	D	7.755	7.685	0.07	3.5	20.29	66.96	0	0	0	12.76
2002	267	23	557	601.32	-313.419	D	7.725	7.685	0.04	3.5	38.29	46.81	0	0	0	14.89
2002	268	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	269	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	270	23	548	603.28	-312.734	D	7.702	7.685	0.017	3.5	14.86	75.84	0	0	0	9.3
2002	271	23	557	601.32	-313.419	D	7.82	7.685	0.135	3.5	14.34	76.43	0	0	0	9.24
2002	272	23	637	596.267	-315.066	D	7.688	7.685	0.003	3.5	77.48	17.51	0	0	0	5.01
2002	273	23	432	602.04	-306.183	D	7.685	7.685	0	3.5	95.26	1.05	0	0	0	3.51
2002	274	23	1	596.558	-316.101	D	7.507	7.507	0	3.117	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	517	602.805	-305.061	D	7.504	7.5	0.005	3.1	59.58	27.53	0	0	0	12.91
2002	279	23	548	603.28	-312.734	D	7.501	7.5	0.002	3.1	80.48	13.49	0	0	0	6.12
2002	280	23	548	603.28	-312.734	D	7.511	7.5	0.012	3.1	33.57	50.15	0	0	0	16.31
2002	281	23	637	596.267	-315.066	D	7.5	7.5	0.001	3.1	65.51	24.58	0	0	0	9.86
2002	282	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	84.62	12.3	0	0	0	6.55
2002	283	23	516	602.728	-305.38	D	7.5	7.5	0	3.1	85.37	11.07	0	0	0	4.77
2002	284	23	637	596.267	-315.066	D	7.536	7.5	0.037	3.1	36.96	57.98	0	0	0	5.06
2002	285	23	637	596.267	-315.066	D	7.526	7.5	0.026	3.1	61.18	35.35	0	0	0	3.48
2002	286	23	517	602.805	-305.061	D	7.515	7.5	0.015	3.1	43.13	48.92	0	0	0	7.96
2002	287	23	557	601.32	-313.419	D	7.542	7.5	0.042	3.1	10.32	77.26	0	0	0	12.42
2002	288	23	517	602.805	-305.061	D	7.504	7.5	0.005	3.1	56.48	36.98	0	0	0	6.6
2002	289	23	548	603.28	-312.734	D	7.503	7.5	0.003	3.1	49.54	37.44	0	0	0	13.06
2002	290	23	520	602.851	-305.804	D	7.5	7.5	0	3.1	13.05	75.61	0	0	0	11.48
2002	291	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	292	23	694	602.12	-306.029	D	7.541	7.5	0.041	3.1	33.24	63.34	0	0	0	3.42
2002	293	23	662	598.404	-311.683	D	7.627	7.5	0.127	3.1	9.08	80.6	0	0	0	10.32
2002	294	23	517	602.805	-305.061	D	7.503	7.5	0.004	3.1	51.15	43.11	0	0	0	5.8
2002	295	23	517	602.805	-305.061	D	7.552	7.5	0.052	3.1	58.11	36.07	0	0	0	5.83
2002	296	23	624	596.324	-316.278	D	7.505	7.5	0.006	3.1	77.5	16.77	0	0	0	5.74
2002	297	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	298	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	49.13	46.43	0	0	0	4.48
2002	299	23	517	602.805	-305.061	D	7.538	7.5	0.039	3.1	48.48	47.63	0	0	0	3.89
2002	300	23	637	596.267	-315.066	D	7.53	7.5	0.031	3.1	36.01	59	0	0	0	5
2002	301	23	624	596.324	-316.278	D	7.5	7.5	0.001	3.1	64.81	33.82	0	0	0	1.52
2002	302	23	682	600.626	-308.407	D	7.601	7.5	0.102	3.1	33.23	63.26	0	0	0	3.51
2002	303	23	676	599.876	-309.365	D	7.692	7.5	0.193	3.1	15.16	76.81	0	0	0	8.04
2002	304	23	517	602.805	-305.061	D	7.506	7.5	0.007	3.1	45.43	52.15	0	0	0	2.42
2002	305	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	306	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	307	23	433	602.806	-312.871	D	7.5	7.5	0	3.1	32.85	68.13	0	0	0	2.21
2002	308	23	521	602.866	-306.052	D	7.511	7.5	0.012	3.1	36.6	59.95	0	0	0	3.45
2002	309	23	517	602.805	-305.061	D	7.539	7.5	0.039	3.1	36.99	60.65	0	0	0	2.37
2002	310	23	517	602.805	-305.061	D	7.506	7.5	0.006	3.1	43.27	54.88	0	0	0	1.87
2002	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	316	23	638	596.406	-314.894	D	7.578	7.5	0.078	3.1	7.57	81.57	0	0	0	10.86
2002	317	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	637	596.267	-315.066	D	7.533	7.5	0.033	3.1	16.8	77.33	0	0	0	5.87
2002	320	23	548	603.28	-312.734	D	7.523	7.5	0.024	3.1	13.36	75.68	0	0	0	10.96
2002	321	23	548	603.28	-312.734	D	7.502	7.5	0.003	3.1	7.54	82.2	0	0	0	10.25
2002	322	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	323	23	109	598.946	-314.668	D	7.5	7.5	0	3.1	71.32	18.98	0	0	0	4.28
2002	324	23	548	603.28	-312.734	D	7.501	7.5	0.001	3.1	43.06	53.14	0	0	0	3.91
2002	325	23	252	600.646	-310.789	D	7.5	7.5	0	3.1	60.21	15.17	0	0	0	4.46
2002	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	327	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	328	23	516	602.728	-305.38	D	7.5	7.5	0	3.1	49.58	46.81	0	0	0	4.94
2002	329	23	517	602.805	-305.061	D	7.552	7.5	0.052	3.1	20.65	70.63	0	0	0	8.72
2002	330	23	637	596.267	-315.066	D	7.519	7.5	0.02	3.1	17.95	75.07	0	0	0	6.98
2002	331	23	557	601.32	-313.419	D	7.59	7.5	0.091	3.1	6.25	83.83	0	0	0	9.92
2002	332	23	548	603.28	-312.734	D	7.5	7.5	0.001	3.1	23.27	74.51	0	0	0	2.39
2002	333	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	335	23	1	596.558	-316.101	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2002	336	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	681	600.53	-308.617	D	7.599	7.593	0.007	3.3	9	75.56	0	0	0	15.45
2002	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	548	603.28	-312.734	D	7.608	7.593	0.016	3.3	6.04	86.08	0	0	0	7.87
2002	340	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	517	602.805	-305.061	D	7.639	7.593	0.047	3.3	31.35	65.63	0	0	0	3.02
2002	343	23	603	598.68	-316.244	D	7.594	7.593	0.001	3.3	31.65	66.62	0	0	0	1.7
2002	344	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	557	601.32	-313.419	D	7.76	7.593	0.168	3.3	11.86	82.21	0	0	0	5.93
2002	346	23	517	602.805	-305.061	D	7.621	7.593	0.028	3.3	22.39	75.16	0	0	0	2.45
2002	347	23	517	602.805	-305.061	D	7.601	7.593	0.008	3.3	40.82	53.27	0	0	0	5.93
2002	348	23	624	596.324	-316.278	D	7.594	7.593	0.001	3.3	43.34	55.38	0	0	0	1.27
2002	349	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	353	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	357	23	517	602.805	-305.061	D	7.633	7.593	0.04	3.3	18.03	77.06	0	0	0	4.91
2002	358	23	517	602.805	-305.061	D	7.634	7.593	0.041	3.3	18.43	78.07	0	0	0	3.5
2002	359	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	360	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	517	602.805	-305.061	D	7.6	7.593	0.007	3.3	17.68	73.66	0	0	0	8.68
									0.263							
UMC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	624	596.324	-316.278	D	7.599	7.593	0.006	3.3	75.11	24.84	0	0	0	0.07
2002	2	23	624	596.324	-316.278	D	7.596	7.593	0.003	3.3	83.6	16.39	0	0	0	0.04
2002	3	23	637	596.267	-315.066	D	7.665	7.593	0.072	3.3	75.21	24.73	0	0	0	0.06
2002	4	23	548	603.28	-312.734	D	7.641	7.593	0.048	3.3	82.19	17.78	0	0	0	0.03
2002	5	23	491	603.207	-311.591	D	7.593	7.593	0	3.3	90.59	9.04	0	0	0	0.02
2002	6	23	624	596.324	-316.278	D	7.93	7.593	0.337	3.3	88.07	11.89	0	0	0	0.03
2002	7	23	637	596.267	-315.066	D	7.617	7.593	0.024	3.3	85.83	14.14	0	0	0	0.03
2002	8	23	517	602.805	-305.061	D	7.609	7.593	0.017	3.3	87.43	12.55	0	0	0	0.03
2002	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	517	602.805	-305.061	D	7.687	7.593	0.094	3.3	92.11	7.86	0	0	0	0.03
2002	11	23	637	596.267	-315.066	D	7.669	7.593	0.077	3.3	88.75	11.2	0	0	0	0.05
2002	12	23	548	603.28	-312.734	D	7.601	7.593	0.009	3.3	91.47	8.5	0	0	0	0.03
2002	13	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	632	596.27	-315.421	D	7.628	7.593	0.035	3.3	80.23	19.72	0	0	0	0.05
2002	18	23	517	602.805	-305.061	D	7.614	7.593	0.022	3.3	87.22	12.75	0	0	0	0.03
2002	19	23	517	602.805	-305.061	D	7.628	7.593	0.035	3.3	90.32	9.66	0	0	0	0.02
2002	20	23	517	602.805	-305.061	D	7.799	7.593	0.206	3.3	92.93	7.06	0	0	0	0.01
2002	21	23	461	602.269	-305.916	D	7.593	7.593	0	3.3	94.98	4.19	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	517	602.805	-305.061	D	7.658	7.593	0.066	3.3	90.82	9.16	0	0	0	0.02
2002	25	23	624	596.324	-316.278	D	7.692	7.593	0.099	3.3	84.54	15.42	0	0	0	0.04
2002	26	23	548	603.28	-312.734	D	7.626	7.593	0.034	3.3	93.75	6.24	0	0	0	0.02
2002	27	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	97.4	2.62	0	0	0	0.01
2002	28	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	517	602.805	-305.061	D	7.596	7.593	0.004	3.3	90.74	9.22	0	0	0	0.03
2002	30	23	656	597.971	-312.292	D	8.399	7.593	0.807	3.3	91.66	8.31	0	0	0	0.02
2002	31	23	517	602.805	-305.061	D	7.698	7.593	0.106	3.3	94.09	5.9	0	0	0	0.01
2002	32	23	517	602.805	-305.061	D	7.521	7.459	0.062	3.013	94.79	5.21	0	0	0	0.01
2002	33	23	517	602.805	-305.061	D	7.568	7.453	0.115	3	85.5	14.47	0	0	0	0.04
2002	34	23	517	602.805	-305.061	D	7.487	7.453	0.034	3	91.49	8.5	0	0	0	0.02
2002	35	23	632	596.27	-315.421	D	7.468	7.453	0.016	3	70.13	29.71	0	0	0	0.17
2002	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	37	23	203	599.824	-309.852	D	7.453	7.453	0	3	96.8	4.7	0	0	0	0.02
2002	38	23	517	602.805	-305.061	D	7.674	7.453	0.222	3	92.74	7.23	0	0	0	0.03
2002	39	23	548	603.28	-312.734	D	7.483	7.453	0.031	3	93.71	6.29	0	0	0	0.02
2002	40	23	548	603.28	-312.734	D	7.466	7.453	0.013	3	96.41	3.59	0	0	0	0.01
2002	41	23	517	602.805	-305.061	D	7.467	7.453	0.015	3	94.69	5.29	0	0	0	0.02
2002	42	23	624	596.324	-316.278	D	7.51	7.453	0.057	3	88.98	10.97	0	0	0	0.05
2002	43	23	517	602.805	-305.061	D	7.478	7.453	0.025	3	93.55	6.39	0	0	0	0.06
2002	44	23	517	602.805	-305.061	D	7.504	7.453	0.052	3	90.43	9.51	0	0	0	0.06
2002	45	23	637	596.267	-315.066	D	7.555	7.453	0.102	3	88.37	11.59	0	0	0	0.04
2002	46	23	517	602.805	-305.061	D	7.462	7.453	0.009	3	94.18	5.8	0	0	0	0.02
2002	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	517	602.805	-305.061	D	7.465	7.453	0.012	3	89.18	10.76	0	0	0	0.06
2002	49	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	50	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	94.24	5.82	0	0	0	0.03
2002	53	23	517	602.805	-305.061	D	7.494	7.453	0.041	3	93.01	6.95	0	0	0	0.04
2002	54	23	637	596.267	-315.066	D	7.46	7.453	0.008	3	94.84	5.17	0	0	0	0.03
2002	55	23	637	596.267	-315.066	D	7.461	7.453	0.008	3	93.98	6.02	0	0	0	0.02
2002	56	23	637	596.267	-315.066	D	7.499	7.453	0.046	3	89.31	10.65	0	0	0	0.04
2002	57	23	624	596.324	-316.278	D	7.474	7.453	0.021	3	63.7	36.18	0	0	0	0.12
2002	58	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	596.558	-316.101	D	7.362	7.362	0	2.808	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	61	23	517	602.805	-305.061	D	7.481	7.358	0.123	2.8	94.16	5.83	0	0	0	0.01
2002	62	23	517	602.805	-305.061	D	7.472	7.358	0.113	2.8	88.93	11.03	0	0	0	0.04
2002	63	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	64	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	69	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	89.64	10.56	0	0	0	0.05
2002	70	23	517	602.805	-305.061	D	7.367	7.358	0.009	2.8	88.25	11.73	0	0	0	0.03
2002	71	23	515	602.747	-305.629	D	7.358	7.358	0	2.8	94.53	4.25	0	0	0	0.01
2002	72	23	517	602.805	-305.061	D	7.37	7.358	0.012	2.8	94.84	5.15	0	0	0	0.02
2002	73	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	98.73	1.29	0	0	0	0.01
2002	74	23	637	596.267	-315.066	D	7.403	7.358	0.045	2.8	92.03	7.94	0	0	0	0.03
2002	75	23	603	598.68	-316.244	D	7.364	7.358	0.005	2.8	94.85	5.14	0	0	0	0.02
2002	76	23	548	603.28	-312.734	D	7.36	7.358	0.002	2.8	95.78	4.26	0	0	0	0.01
2002	77	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	97.1	2.98	0	0	0	0.03
2002	78	23	517	602.805	-305.061	D	7.358	7.358	0	2.8	94.7	5.26	0	0	0	0.02
2002	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	80	23	548	603.28	-312.734	D	7.407	7.358	0.048	2.8	87.51	12.45	0	0	0	0.04
2002	81	23	637	596.267	-315.066	D	7.407	7.358	0.048	2.8	84.41	15.55	0	0	0	0.05
2002	82	23	548	603.28	-312.734	D	7.389	7.358	0.031	2.8	88.14	11.83	0	0	0	0.03
2002	83	23	517	602.805	-305.061	D	7.36	7.358	0.001	2.8	95.23	4.73	0	0	0	0.01
2002	84	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	85	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	86	23	632	596.27	-315.421	D	7.39	7.358	0.032	2.8	89.28	10.69	0	0	0	0.04
2002	87	23	637	596.267	-315.066	D	7.366	7.358	0.008	2.8	97.06	2.93	0	0	0	0.01
2002	88	23	517	602.805	-305.061	D	7.382	7.358	0.024	2.8	97.7	2.29	0	0	0	0.01
2002	89	23	624	596.324	-316.278	D	7.424	7.358	0.066	2.8	98.26	1.73	0	0	0	0.01
2002	90	23	637	596.267	-315.066	D	7.358	7.358	0	2.8	100.3	0.74	0	0	0	0.03
2002	91	23	603	598.68	-316.244	D	7.308	7.267	0.041	2.608	97.81	2.16	0	0	0	0.03
2002	92	23	517	602.805	-305.061	D	7.287	7.263	0.024	2.6	98.66	1.32	0	0	0	0.02
2002	93	23	603	598.68	-316.244	D	7.266	7.263	0.003	2.6	98.69	1.29	0	0	0	0.02
2002	94	23	624	596.324	-316.278	D	7.264	7.263	0.001	2.6	79.73	20.19	0	0	0	0.08
2002	95	23	637	596.267	-315.066	D	7.264	7.263	0.001	2.6	99.27	0.79	0	0	0	0.03
2002	96	23	624	596.324	-316.278	D	7.308	7.263	0.045	2.6	96.12	3.85	0	0	0	0.03
2002	97	23	637	596.267	-315.066	D	7.272	7.263	0.009	2.6	98.21	1.77	0	0	0	0.01
2002	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	99	23	624	596.324	-316.278	D	7.343	7.263	0.08	2.6	91.59	8.39	0	0	0	0.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	103	23	517	602.805	-305.061	D	7.36	7.263	0.097	2.6	96.46	3.53	0	0	0	0.02
2002	104	23	517	602.805	-305.061	D	7.279	7.263	0.016	2.6	99.73	0.25	0	0	0	0.01
2002	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	110	23	517	602.805	-305.061	D	7.289	7.263	0.026	2.6	98.87	1.12	0	0	0	0.02
2002	111	23	517	602.805	-305.061	D	7.334	7.263	0.071	2.6	96.58	3.4	0	0	0	0.02
2002	112	23	694	602.12	-306.029	D	7.399	7.263	0.136	2.6	95.4	4.53	0	0	0	0.06
2002	113	23	517	602.805	-305.061	D	7.346	7.263	0.083	2.6	99.19	0.79	0	0	0	0.02
2002	114	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	99.58	0.36	0	0	0	0.01
2002	115	23	518	602.82	-305.309	D	7.277	7.263	0.014	2.6	96.46	3.52	0	0	0	0.02
2002	116	23	548	603.28	-312.734	D	7.303	7.263	0.041	2.6	98.85	1.13	0	0	0	0.03
2002	117	23	624	596.324	-316.278	D	7.311	7.263	0.048	2.6	98.88	1.1	0	0	0	0.02
2002	118	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	119	23	517	602.805	-305.061	D	7.281	7.263	0.018	2.6	85.95	13.97	0	0	0	0.08
2002	120	23	603	598.68	-316.244	D	7.305	7.263	0.042	2.6	99.62	0.37	0	0	0	0.02
2002	121	23	517	602.805	-305.061	D	7.454	7.445	0.009	2.983	99.6	0.43	0	0	0	0.01
2002	122	23	603	598.68	-316.244	D	7.65	7.453	0.197	3	96.29	3.7	0	0	0	0.01
2002	123	23	603	598.68	-316.244	D	7.454	7.453	0.001	3	99.39	0.72	0	0	0	0.01
2002	124	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	128	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	129	23	517	602.805	-305.061	D	7.459	7.453	0.006	3	99.79	0.21	0	0	0	0.03
2002	130	23	548	603.28	-312.734	D	7.486	7.453	0.033	3	98.55	1.42	0	0	0	0.03
2002	131	23	637	596.267	-315.066	D	7.458	7.453	0.005	3	99.52	0.48	0	0	0	0.02
2002	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	133	23	656	597.971	-312.292	D	7.719	7.453	0.267	3	95.41	4.58	0	0	0	0.01
2002	134	23	656	597.971	-312.292	D	7.516	7.453	0.063	3	99.3	0.66	0	0	0	0.04
2002	135	23	517	602.805	-305.061	D	7.518	7.453	0.066	3	99.55	0.44	0	0	0	0.02
2002	136	23	517	602.805	-305.061	D	7.453	7.453	0	3	99.97	0.14	0	0	0	0.01
2002	137	23	637	596.267	-315.066	D	7.462	7.453	0.009	3	97.44	2.57	0	0	0	0.01
2002	138	23	623	596.511	-316.262	D	7.453	7.453	0	3	98.55	1.27	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	139	23	626	596.299	-315.88	D	7.462	7.453	0.01	3	99.14	0.84	0	0	0	0.03
2002	140	23	517	602.805	-305.061	D	7.546	7.453	0.093	3	98.45	1.52	0	0	0	0.03
2002	141	23	624	596.324	-316.278	D	7.483	7.453	0.03	3	95.33	4.66	0	0	0	0.02
2002	142	23	624	596.324	-316.278	D	7.521	7.453	0.068	3	99.31	0.68	0	0	0	0.01
2002	143	23	517	602.805	-305.061	D	7.46	7.453	0.007	3	99.77	0.23	0	0	0	0.01
2002	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	146	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	100.01	0.16	0	0	0	0.02
2002	147	23	517	602.805	-305.061	D	7.453	7.453	0	3	100.09	0.1	0	0	0	0.01
2002	148	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	149	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	151	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2002	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	156	23	517	602.805	-305.061	D	7.548	7.546	0.002	3.2	99.79	0.25	0	0	0	0.01
2002	157	23	637	596.267	-315.066	D	7.565	7.546	0.019	3.2	98.15	1.85	0	0	0	0.01
2002	158	23	624	596.324	-316.278	D	7.548	7.546	0.001	3.2	99.31	0.69	0	0	0	0.02
2002	159	23	637	596.267	-315.066	D	7.562	7.546	0.016	3.2	99.78	0.22	0	0	0	0.01
2002	160	23	688	601.298	-307.191	D	7.55	7.546	0.004	3.2	99.96	0.05	0	0	0	0.01
2002	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	164	23	517	602.805	-305.061	D	7.572	7.546	0.026	3.2	99.94	0.05	0	0	0	0.02
2002	165	23	624	596.324	-316.278	D	7.601	7.546	0.055	3.2	99.55	0.42	0	0	0	0.03
2002	166	23	517	602.805	-305.061	D	7.629	7.546	0.083	3.2	99.22	0.73	0	0	0	0.05
2002	167	23	517	602.805	-305.061	D	7.56	7.546	0.014	3.2	99.85	0.13	0	0	0	0.03
2002	168	23	624	596.324	-316.278	D	7.676	7.546	0.129	3.2	99.29	0.69	0	0	0	0.02
2002	169	23	624	596.324	-316.278	D	7.72	7.546	0.174	3.2	99.9	0.09	0	0	0	0.01
2002	170	23	517	602.805	-305.061	D	7.586	7.546	0.04	3.2	99.94	0.05	0	0	0	0.01
2002	171	23	25	597.169	-314.305	D	7.546	7.546	0	3.2	93.78	0.01	0	0	0	0.01
2002	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	178	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	179	23	517	602.805	-305.061	D	7.747	7.546	0.201	3.2	99.25	0.74	0	0	0	0.01
2002	180	23	517	602.805	-305.061	D	7.744	7.546	0.198	3.2	99.79	0.2	0	0	0	0.01
2002	181	23	517	602.805	-305.061	D	7.548	7.546	0.001	3.2	99.99	0.02	0	0	0	0.01
2002	182	23	1	596.558	-316.101	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2002	183	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	99.99	0.05	0	0	0	0.01
2002	185	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	100.02	0.04	0	0	0	0.01
2002	186	23	517	602.805	-305.061	D	7.6	7.593	0.008	3.3	99.97	0.03	0	0	0	0.01
2002	187	23	432	602.04	-306.183	D	7.607	7.593	0.015	3.3	99.98	0.02	0	0	0	0.01
2002	188	23	637	596.267	-315.066	D	7.595	7.593	0.002	3.3	99.99	0.02	0	0	0	0.01
2002	189	23	94	598.258	-312.222	D	7.593	7.593	0	3.3	98.86	0.01	0	0	0	0.01
2002	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	23	517	602.805	-305.061	D	7.597	7.593	0.005	3.3	99.93	0.07	0	0	0	0.02
2002	192	23	637	596.267	-315.066	D	7.603	7.593	0.01	3.3	98.58	1.41	0	0	0	0.01
2002	193	23	625	596.311	-316.079	D	7.595	7.593	0.003	3.3	99.64	0.38	0	0	0	0.01
2002	194	23	624	596.324	-316.278	D	7.594	7.593	0.001	3.3	99.28	0.77	0	0	0	0.01
2002	195	23	623	596.511	-316.262	D	7.593	7.593	0	3.3	99.99	0.09	0	0	0	0.01
2002	196	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	197	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	198	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	199	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	517	602.805	-305.061	D	7.595	7.593	0.003	3.3	99.95	0.04	0	0	0	0.01
2002	202	23	517	602.805	-305.061	D	7.599	7.593	0.007	3.3	99.95	0.06	0	0	0	0.01
2002	203	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	99.92	0.09	0	0	0	0.01
2002	204	23	517	602.805	-305.061	D	7.63	7.593	0.038	3.3	99.83	0.15	0	0	0	0.02
2002	205	23	548	603.28	-312.734	D	7.662	7.593	0.07	3.3	98.93	1.07	0	0	0	0.01
2002	206	23	624	596.324	-316.278	D	7.598	7.593	0.005	3.3	100.02	0.01	0	0	0	0.01
2002	207	23	517	602.805	-305.061	D	7.608	7.593	0.015	3.3	99.92	0.08	0	0	0	0.01
2002	208	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	100.04	0.02	0	0	0	0.01
2002	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	517	602.805	-305.061	D	7.595	7.593	0.003	3.3	99.99	0.02	0	0	0	0.02
2002	212	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	99.92	0.08	0	0	0	0.01
2002	213	23	517	602.805	-305.061	D	7.682	7.681	0.001	3.492	99.71	0.1	0	0	0	0.01
2002	214	23	548	603.28	-312.734	D	7.686	7.685	0.001	3.5	100.01	0.04	0	0	0	0.01
2002	215	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	216	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	217	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	218	23	517	602.805	-305.061	D	7.8	7.685	0.115	3.5	99.61	0.39	0	0	0	0.01
2002	219	23	624	596.324	-316.278	D	7.711	7.685	0.026	3.5	99.73	0.26	0	0	0	0.01
2002	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	228	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	232	23	517	602.805	-305.061	D	7.686	7.685	0.002	3.5	99.91	0.04	0	0	0	0.01
2002	233	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	99.97	0.07	0	0	0	0.01
2002	234	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	236	23	517	602.805	-305.061	D	7.725	7.685	0.04	3.5	99.85	0.14	0	0	0	0.01
2002	237	23	548	603.28	-312.734	D	7.7	7.685	0.016	3.5	99.61	0.39	0	0	0	0.01
2002	238	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	239	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	245	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	246	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	247	23	517	602.805	-305.061	D	7.74	7.685	0.055	3.5	99.79	0.19	0	0	0	0.02
2002	248	23	624	596.324	-316.278	D	7.689	7.685	0.004	3.5	99.95	0.03	0	0	0	0.01
2002	249	23	637	596.267	-315.066	D	7.685	7.685	0	3.5	99.52	0.03	0	0	0	0.01
2002	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	76.21	0	0	0	0	0.01
2002	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	254	23	624	596.324	-316.278	D	7.719	7.685	0.034	3.5	99.39	0.58	0	0	0	0.03
2002	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	102.62	0.02	0	0	0	0.01
2002	257	23	517	602.805	-305.061	D	7.689	7.685	0.005	3.5	99.91	0.07	0	0	0	0.01
2002	258	23	517	602.805	-305.061	D	7.712	7.685	0.027	3.5	99.82	0.17	0	0	0	0.01
2002	259	23	631	596.276	-315.551	D	8.172	7.685	0.487	3.5	98.74	1.25	0	0	0	0.01
2002	260	23	624	596.324	-316.278	D	8.041	7.685	0.356	3.5	99.5	0.49	0	0	0	0.01
2002	261	23	517	602.805	-305.061	D	7.768	7.685	0.083	3.5	98.81	1.18	0	0	0	0.01
2002	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	264	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	265	23	624	596.324	-316.278	D	7.754	7.685	0.069	3.5	99.43	0.56	0	0	0	0.01
2002	266	23	603	598.68	-316.244	D	7.685	7.685	0	3.5	99.42	0.43	0	0	0	0.01
2002	267	23	517	602.805	-305.061	D	7.736	7.685	0.051	3.5	99.08	0.9	0	0	0	0.02
2002	268	23	624	596.324	-316.278	D	7.715	7.685	0.03	3.5	99.54	0.45	0	0	0	0.01
2002	269	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	270	23	6	596.462	-314.859	D	7.686	7.685	0.001	3.5	99.68	0.22	0	0	0	0.01
2002	271	23	637	596.267	-315.066	D	7.71	7.685	0.025	3.5	99.45	0.53	0	0	0	0.02
2002	272	23	517	602.805	-305.061	D	7.701	7.685	0.017	3.5	99.54	0.45	0	0	0	0.01
2002	273	23	517	602.805	-305.061	D	7.685	7.685	0.001	3.5	99.79	0.05	0	0	0	0.01
2002	274	23	1	596.558	-316.101	D	7.507	7.507	0	3.117	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	557	601.32	-313.419	D	7.512	7.5	0.012	3.1	88.19	11.66	0	0	0	0.16
2002	279	23	517	602.805	-305.061	D	7.515	7.5	0.015	3.1	99.45	0.55	0	0	0	0.02
2002	280	23	626	596.299	-315.88	D	7.509	7.5	0.009	3.1	94.49	5.4	0	0	0	0.12
2002	281	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	282	23	461	602.269	-305.916	D	7.5	7.5	0	3.1	99.54	0.64	0	0	0	0.02
2002	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	285	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	23	517	602.805	-305.061	D	7.604	7.5	0.105	3.1	95.31	4.68	0	0	0	0.01
2002	287	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	517	602.805	-305.061	D	7.546	7.5	0.047	3.1	98.66	1.3	0	0	0	0.04
2002	289	23	548	603.28	-312.734	D	7.503	7.5	0.004	3.1	99.02	0.96	0	0	0	0.03
2002	290	23	632	596.27	-315.421	D	7.633	7.5	0.134	3.1	85.51	14.41	0	0	0	0.08
2002	291	23	603	598.68	-316.244	D	7.5	7.5	0.001	3.1	99.19	0.9	0	0	0	0.02
2002	292	23	694	602.12	-306.029	D	7.573	7.5	0.073	3.1	92.22	7.76	0	0	0	0.02
2002	293	23	603	598.68	-316.244	D	7.511	7.5	0.011	3.1	93.26	6.74	0	0	0	0.01
2002	294	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	295	23	517	602.805	-305.061	D	7.509	7.5	0.01	3.1	99.01	0.99	0	0	0	0.02
2002	296	23	517	602.805	-305.061	D	7.537	7.5	0.037	3.1	96.93	3.06	0	0	0	0.01
2002	297	23	624	596.324	-316.278	D	7.5	7.5	0	3.1	99.02	1.16	0	0	0	0.01
2002	298	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	299	23	517	602.805	-305.061	D	9.117	7.5	1.618	3.1	94.04	5.93	0	0	0	0.02
2002	300	23	624	596.324	-316.278	D	7.598	7.5	0.098	3.1	97.68	2.31	0	0	0	0.01
2002	301	23	637	596.267	-315.066	D	7.505	7.5	0.006	3.1	97.41	2.61	0	0	0	0.01
2002	302	23	637	596.267	-315.066	D	7.5	7.5	0	3.1	97.56	2.29	0	0	0	0.01
2002	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	304	23	624	596.324	-316.278	D	7.502	7.5	0.002	3.1	67.54	32.37	0	0	0	0.13
2002	305	23	624	596.324	-316.278	D	7.5	7.5	0	3.1	86.36	13.84	0	0	0	0.05
2002	306	23	517	602.805	-305.061	D	7.571	7.5	0.071	3.1	83.81	16.13	0	0	0	0.06
2002	307	23	548	603.28	-312.734	D	7.541	7.5	0.041	3.1	94.73	5.26	0	0	0	0.01
2002	308	23	517	602.805	-305.061	D	7.749	7.5	0.25	3.1	89.42	10.55	0	0	0	0.03
2002	309	23	517	602.805	-305.061	D	7.687	7.5	0.188	3.1	94.24	5.74	0	0	0	0.01
2002	310	23	517	602.805	-305.061	D	8.109	7.5	0.609	3.1	93.71	6.27	0	0	0	0.02
2002	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	687	601.186	-307.393	D	7.528	7.5	0.028	3.1	98.1	1.88	0	0	0	0.03
2002	315	23	517	602.805	-305.061	D	7.592	7.5	0.092	3.1	83.01	16.9	0	0	0	0.1
2002	316	23	637	596.267	-315.066	D	7.53	7.5	0.03	3.1	90.75	9.21	0	0	0	0.04
2002	317	23	517	602.805	-305.061	D	7.558	7.5	0.059	3.1	92.28	7.68	0	0	0	0.03
2002	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	624	596.324	-316.278	D	7.53	7.5	0.03	3.1	90.65	9.33	0	0	0	0.03
2002	320	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	95.84	5.07	0	0	0	0.01
2002	321	23	624	596.324	-316.278	D	7.52	7.5	0.02	3.1	87.41	12.54	0	0	0	0.05
2002	322	23	527	602.958	-307.536	D	7.519	7.5	0.02	3.1	90.42	9.55	0	0	0	0.03
2002	323	23	557	601.32	-313.419	D	7.59	7.5	0.09	3.1	82.03	17.87	0	0	0	0.1
2002	324	23	548	603.28	-312.734	D	7.58	7.5	0.08	3.1	95.7	4.28	0	0	0	0.02
2002	325	23	517	602.805	-305.061	D	7.507	7.5	0.008	3.1	90.29	9.65	0	0	0	0.07
2002	326	23	624	596.324	-316.278	D	7.518	7.5	0.018	3.1	90.29	9.66	0	0	0	0.05
2002	327	23	624	596.324	-316.278	D	7.537	7.5	0.038	3.1	92.34	7.63	0	0	0	0.03
2002	328	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	95.31	4.82	0	0	0	0.02
2002	329	23	548	603.28	-312.734	D	7.51	7.5	0.01	3.1	93.78	6.22	0	0	0	0.01
2002	330	23	604	598.599	-316.246	D	7.501	7.5	0.002	3.1	95.51	4.6	0	0	0	0.01
2002	331	23	624	596.324	-316.278	D	7.5	7.5	0	3.1	94.17	5.58	0	0	0	0.02
2002	332	23	637	596.267	-315.066	D	7.522	7.5	0.022	3.1	84.37	15.6	0	0	0	0.03
2002	333	23	547	603.265	-312.487	D	7.5	7.5	0	3.1	90.11	9.7	0	0	0	0.03

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	334	23	682	600.626	-308.407	D	7.526	7.5	0.027	3.1	83.84	16.09	0	0	0	0.07
2002	335	23	632	596.27	-315.421	D	7.656	7.589	0.067	3.292	68.51	31.37	0	0	0	0.12
2002	336	23	548	603.28	-312.734	D	7.593	7.593	0	3.3	82.68	17.24	0	0	0	0.04
2002	337	23	603	598.68	-316.244	D	7.632	7.593	0.04	3.3	86.11	13.85	0	0	0	0.04
2002	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	340	23	624	596.324	-316.278	D	7.641	7.593	0.049	3.3	89.25	10.72	0	0	0	0.03
2002	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	517	602.805	-305.061	D	7.716	7.593	0.123	3.3	91.02	8.96	0	0	0	0.02
2002	343	23	624	596.324	-316.278	D	7.621	7.593	0.028	3.3	93.12	6.88	0	0	0	0.01
2002	344	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	348	23	624	596.324	-316.278	D	7.788	7.593	0.195	3.3	88.53	11.44	0	0	0	0.04
2002	349	23	517	602.805	-305.061	D	7.6	7.593	0.008	3.3	91.25	8.73	0	0	0	0.02
2002	350	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	94.35	6.12	0	0	0	0.01
2002	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	637	596.267	-315.066	D	7.64	7.593	0.048	3.3	91.94	8.04	0	0	0	0.02
2002	354	23	548	603.28	-312.734	D	7.63	7.593	0.037	3.3	93.28	6.71	0	0	0	0.02
2002	355	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	624	596.324	-316.278	D	7.615	7.593	0.022	3.3	79.05	20.91	0	0	0	0.04
2002	357	23	517	602.805	-305.061	D	7.632	7.593	0.04	3.3	82.1	17.85	0	0	0	0.05
2002	358	23	624	596.324	-316.278	D	7.613	7.593	0.02	3.3	80.83	19.14	0	0	0	0.03
2002	359	23	517	602.805	-305.061	D	7.72	7.593	0.128	3.3	74.85	25.06	0	0	0	0.09
2002	360	23	517	602.805	-305.061	D	7.619	7.593	0.026	3.3	86	13.96	0	0	0	0.04
2002	361	23	517	602.805	-305.061	D	7.602	7.593	0.009	3.3	92.08	7.92	0	0	0	0.01
2002	362	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	96.25	3.49	0	0	0	0.01
2002	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	548	603.28	-312.734	D	7.6	7.593	0.007	3.3	89.55	10.44	0	0	0	0.02
									1.618							
NORANDA									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	2	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	3	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	4	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	5	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	6	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	7	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	11	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	12	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	13	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	632	596.27	-315.421	D	7.716	7.593	0.124	3.3	21.76	1.82	0	0	0	76.42
2002	17	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	18	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	19	23	202	599.844	-310.101	D	7.593	7.593	0	3.3	77.94	0.01	0	0	0	12.77
2002	20	23	546	603.249	-312.239	D	7.623	7.593	0.031	3.3	97.71	0.11	0	0	0	2.19
2002	21	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	98.39	0.16	0	0	0	1.43
2002	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	25	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	26	23	548	603.28	-312.734	D	7.593	7.593	0.001	3.3	96.92	0.1	0	0	0	3.13
2002	27	23	547	603.265	-312.487	D	7.593	7.593	0.001	3.3	97.78	0.05	0	0	0	2.12
2002	28	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	30	23	548	603.28	-312.734	D	7.81	7.593	0.218	3.3	99.11	0.05	0	0	0	0.84
2002	31	23	517	602.805	-305.061	D	8.319	7.593	0.726	3.3	96.7	0.16	0	0	0	3.14
2002	32	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2002	33	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	34	23	548	603.28	-312.734	D	7.461	7.453	0.008	3	94.39	0.2	0	0	0	5.42
2002	35	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	36	23	624	596.324	-316.278	D	7.453	7.453	0	3	98.16	0.02	0	0	0	2.33
2002	37	23	637	596.267	-315.066	D	7.495	7.453	0.042	3	84.91	0.49	0	0	0	14.61
2002	38	23	624	596.324	-316.278	D	7.465	7.453	0.013	3	99.64	0.01	0	0	0	0.38
2002	39	23	624	596.324	-316.278	D	7.455	7.453	0.002	3	99.77	0	0	0	0	0.26
2002	40	23	462	603.035	-312.603	D	7.453	7.453	0	3	101.7	0.01	0	0	0	0.95
2002	41	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	42	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	43	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	44	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	45	23	557	601.32	-313.419	D	7.508	7.453	0.055	3	92.87	0.19	0	0	0	6.95
2002	46	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	90.44	0.62	0	0	0	8.98
2002	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	49	23	557	601.32	-313.419	D	7.571	7.453	0.118	3	49.53	0.86	0	0	0	49.62
2002	50	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	54	23	548	603.28	-312.734	D	7.566	7.453	0.113	3	95.79	0.1	0	0	0	4.11
2002	55	23	517	602.805	-305.061	D	7.479	7.453	0.027	3	94.91	0.2	0	0	0	4.89
2002	56	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	57	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	58	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	517	602.805	-305.061	D	7.369	7.362	0.007	2.808	16.54	2.96	0	0	0	80.5
2002	61	23	517	602.805	-305.061	D	7.372	7.358	0.014	2.8	8.93	1.18	0	0	0	89.88
2002	62	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	63	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	64	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	69	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	70	23	632	596.27	-315.421	D	7.561	7.358	0.203	2.8	23.2	1.32	0	0	0	75.48
2002	71	23	603	598.68	-316.244	D	7.394	7.358	0.036	2.8	77.56	1.31	0	0	0	21.14
2002	72	23	517	602.805	-305.061	D	7.425	7.358	0.067	2.8	98.75	0.05	0	0	0	1.21
2002	73	23	517	602.805	-305.061	D	7.364	7.358	0.006	2.8	99.33	0.01	0	0	0	0.67
2002	74	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	75	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	76	23	548	603.28	-312.734	D	7.411	7.358	0.052	2.8	96.79	0.07	0	0	0	3.14
2002	77	23	603	598.68	-316.244	D	7.569	7.358	0.21	2.8	98.55	0.01	0	0	0	1.44
2002	78	23	624	596.324	-316.278	D	7.457	7.358	0.099	2.8	99.08	0.04	0	0	0	0.88
2002	79	23	624	596.324	-316.278	D	7.423	7.358	0.065	2.8	99.18	0.04	0	0	0	0.78
2002	80	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	81	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	84	23	518	602.82	-305.309	D	7.363	7.358	0.004	2.8	82.99	1.5	0	0	0	15.56
2002	85	23	548	603.28	-312.734	D	7.437	7.358	0.079	2.8	97.85	0.14	0	0	0	2.01
2002	86	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	87	23	632	596.27	-315.421	D	7.512	7.358	0.154	2.8	59.58	0.61	0	0	0	39.81
2002	88	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	89	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	90	23	624	596.324	-316.278	D	7.359	7.358	0	2.8	23.06	2.64	0	0	0	74.37
2002	91	23	624	596.324	-316.278	D	7.319	7.267	0.052	2.608	90.12	0.07	0	0	0	9.81
2002	92	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	98.73	0.01	0	0	0	1.28
2002	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	95	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	96	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	97	23	625	596.311	-316.079	D	7.306	7.263	0.043	2.6	58.86	0.29	0	0	0	40.85
2002	98	23	603	598.68	-316.244	D	7.276	7.263	0.013	2.6	49.64	0.75	0	0	0	49.61
2002	99	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	101	23	626	596.299	-315.88	D	7.348	7.263	0.085	2.6	64.4	0.11	0	0	0	35.49
2002	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	103	23	541	603.173	-311.001	D	7.361	7.263	0.098	2.6	94.43	0.09	0	0	0	5.48
2002	104	23	517	602.805	-305.061	D	7.435	7.263	0.172	2.6	94.68	0.18	0	0	0	5.14
2002	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	111	23	548	603.28	-312.734	D	7.301	7.263	0.038	2.6	50.4	1.77	0	0	0	47.84
2002	112	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	113	23	603	598.68	-316.244	D	7.295	7.263	0.032	2.6	83.65	0.14	0	0	0	16.22
2002	114	23	517	602.805	-305.061	D	7.279	7.263	0.016	2.6	81.93	0.37	0	0	0	17.7
2002	115	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	116	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	117	23	582	599.649	-315.031	D	7.352	7.263	0.089	2.6	80.41	0.5	0	0	0	19.09
2002	118	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	119	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	120	23	517	602.805	-305.061	D	7.753	7.263	0.49	2.6	95.46	0.01	0	0	0	4.53
2002	121	23	517	602.805	-305.061	D	7.627	7.445	0.182	2.983	69.78	1.51	0	0	0	28.72
2002	122	23	517	602.805	-305.061	D	7.638	7.453	0.185	3	98.44	0.03	0	0	0	1.53
2002	123	23	603	598.68	-316.244	D	7.465	7.453	0.012	3	98.84	0.02	0	0	0	1.17
2002	124	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	125	23	545	603.234	-311.991	D	7.671	7.453	0.218	3	95.71	0.01	0	0	0	4.29
2002	126	23	637	596.267	-315.066	D	7.457	7.453	0.004	3	98.36	0	0	0	0	1.65
2002	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	128	23	557	601.32	-313.419	D	7.515	7.453	0.062	3	79.16	0.36	0	0	0	20.49
2002	129	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	130	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	131	23	548	603.28	-312.734	D	7.535	7.453	0.082	3	90.98	0.09	0	0	0	8.93
2002	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	133	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	134	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	135	23	632	596.27	-315.421	D	7.498	7.453	0.045	3	52.33	0.3	0	0	0	47.37
2002	136	23	515	602.747	-305.629	D	7.453	7.453	0	3	97.82	0	0	0	0	1.96
2002	137	23	603	598.68	-316.244	D	7.508	7.453	0.055	3	97.48	0.09	0	0	0	2.43
2002	138	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	139	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	140	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	141	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	142	23	517	602.805	-305.061	D	7.645	7.453	0.192	3	90.57	0.07	0	0	0	9.36
2002	143	23	517	602.805	-305.061	D	7.459	7.453	0.007	3	90.98	0.02	0	0	0	8.99
2002	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	146	23	603	598.68	-316.244	D	7.484	7.453	0.031	3	98.58	0	0	0	0	1.42
2002	147	23	548	603.28	-312.734	D	7.636	7.453	0.183	3	96.9	0.17	0	0	0	2.94
2002	148	23	517	602.805	-305.061	D	7.467	7.453	0.014	3	75.09	0.03	0	0	0	24.89
2002	149	23	517	602.805	-305.061	D	7.528	7.453	0.076	3	57.96	1.35	0	0	0	40.7
2002	150	23	517	602.805	-305.061	D	7.882	7.453	0.429	3	92.99	0.2	0	0	0	6.8
2002	151	23	517	602.805	-305.061	D	7.648	7.453	0.196	3	97.13	0	0	0	0	2.86
2002	152	23	517	602.805	-305.061	D	7.608	7.542	0.066	3.192	98.96	0	0	0	0	1.04
2002	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	156	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	157	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	158	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	159	23	632	596.27	-315.421	D	7.728	7.546	0.182	3.2	96.2	0.09	0	0	0	3.71
2002	160	23	520	602.851	-305.804	D	7.769	7.546	0.223	3.2	92.01	0.02	0	0	0	7.97
2002	161	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	0.13	2.22	0	0	0	98.08
2002	162	23	517	602.805	-305.061	D	7.552	7.546	0.006	3.2	14.85	3.59	0	0	0	81.58
2002	163	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	164	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	165	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	166	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	167	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	168	23	624	596.324	-316.278	D	7.546	7.546	0	3.2	100.7	0	0	0	0	0.42
2002	169	23	517	602.805	-305.061	D	8.004	7.546	0.457	3.2	96.91	0.01	0	0	0	3.08
2002	170	23	517	602.805	-305.061	D	7.913	7.546	0.366	3.2	95.78	0	0	0	0	4.22
2002	171	23	548	603.28	-312.734	D	7.873	7.546	0.327	3.2	78.99	0.07	0	0	0	20.94
2002	172	23	624	596.324	-316.278	D	7.563	7.546	0.017	3.2	93.28	0	0	0	0	6.73
2002	173	23	624	596.324	-316.278	D	7.546	7.546	0	3.2	84.3	0	0	0	0	16.03
2002	174	23	624	596.324	-316.278	D	7.636	7.546	0.09	3.2	95.04	0	0	0	0	4.96
2002	175	23	557	601.32	-313.419	D	7.957	7.546	0.411	3.2	75.72	0.06	0	0	0	24.21
2002	176	23	604	598.599	-316.246	D	8.304	7.546	0.758	3.2	97.01	0.07	0	0	0	2.92
2002	177	23	517	602.805	-305.061	D	7.776	7.546	0.23	3.2	98.45	0	0	0	0	1.55
2002	178	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	179	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	180	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	181	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	182	23	78	598.564	-316.197	D	7.591	7.591	0	3.296	97.63	0	0	0	0	3.72
2002	183	23	624	596.324	-316.278	D	7.704	7.593	0.112	3.3	98.03	0	0	0	0	1.97
2002	184	23	624	596.324	-316.278	D	7.928	7.593	0.336	3.3	98.58	0	0	0	0	1.42
2002	185	23	624	596.324	-316.278	D	7.696	7.593	0.103	3.3	98.91	0	0	0	0	1.09
2002	186	23	631	596.276	-315.551	D	7.603	7.593	0.01	3.3	99.12	0	0	0	0	0.87
2002	187	23	689	601.435	-306.997	D	7.594	7.593	0.001	3.3	99.68	0	0	0	0	0.3
2002	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	99.95	0	0	0	0	0.12
2002	189	23	432	602.04	-306.183	D	7.593	7.593	0	3.3	100.01	0	0	0	0	0.11
2002	190	23	603	598.68	-316.244	D	7.599	7.593	0.006	3.3	98.85	0	0	0	0	1.18
2002	191	23	603	598.68	-316.244	D	7.619	7.593	0.026	3.3	99.09	0	0	0	0	0.92
2002	192	23	603	598.68	-316.244	D	7.594	7.593	0.001	3.3	99.26	0	0	0	0	0.8
2002	193	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	91.51	0	0	0	0	9.59
2002	194	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	91.98	0	0	0	0	8.13
2002	195	23	624	596.324	-316.278	D	7.593	7.593	0	3.3	94.88	0.01	0	0	0	4.67
2002	196	23	624	596.324	-316.278	D	7.593	7.593	0	3.3	92.18	0.04	0	0	0	7.81
2002	197	23	624	596.324	-316.278	D	8.034	7.593	0.441	3.3	98.76	0	0	0	0	1.23

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	198	23	517	602.805	-305.061	D	7.814	7.593	0.222	3.3	99.23	0	0	0	0	0.77
2002	199	23	517	602.805	-305.061	D	7.624	7.593	0.031	3.3	99.57	0	0	0	0	0.43
2002	200	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	99.79	0	0	0	0	0.26
2002	201	23	508	602.881	-307.367	D	7.593	7.593	0	3.3	77.34	0.02	0	0	0	22.6
2002	202	23	548	603.28	-312.734	D	7.594	7.593	0.001	3.3	98.9	0	0	0	0	1.13
2002	203	23	548	603.28	-312.734	D	7.602	7.593	0.009	3.3	99.25	0	0	0	0	0.75
2002	204	23	491	603.207	-311.591	D	7.593	7.593	0	3.3	99.18	0	0	0	0	0.79
2002	205	23	603	598.68	-316.244	D	7.593	7.593	0	3.3	98.01	0.06	0	0	0	3.1
2002	206	23	603	598.68	-316.244	D	7.607	7.593	0.014	3.3	99.53	0	0	0	0	0.47
2002	207	23	548	603.28	-312.734	D	7.827	7.593	0.234	3.3	99	0	0	0	0	1
2002	208	23	517	602.805	-305.061	D	7.6	7.593	0.007	3.3	99.44	0	0	0	0	0.56
2002	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	23	548	603.28	-312.734	D	7.682	7.681	0.001	3.492	83.76	0.05	0	0	0	15.99
2002	214	23	548	603.28	-312.734	D	7.832	7.685	0.148	3.5	98.93	0	0	0	0	1.07
2002	215	23	624	596.324	-316.278	D	7.775	7.685	0.09	3.5	98.84	0	0	0	0	1.16
2002	216	23	624	596.324	-316.278	D	8.077	7.685	0.392	3.5	98.68	0	0	0	0	1.32
2002	217	23	517	602.805	-305.061	D	8.028	7.685	0.344	3.5	98.42	0	0	0	0	1.58
2002	218	23	603	598.68	-316.244	D	7.841	7.685	0.157	3.5	99.1	0	0	0	0	0.9
2002	219	23	624	596.324	-316.278	D	7.701	7.685	0.016	3.5	99.41	0	0	0	0	0.59
2002	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	221	23	624	596.324	-316.278	D	7.694	7.685	0.009	3.5	98.51	0	0	0	0	1.49
2002	222	23	548	603.28	-312.734	D	8.022	7.685	0.337	3.5	98.09	0	0	0	0	1.91
2002	223	23	517	602.805	-305.061	D	7.698	7.685	0.014	3.5	99.34	0	0	0	0	0.67
2002	224	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	95.39	0	0	0	0	3.94
2002	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	228	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	232	23	548	603.28	-312.734	D	8.034	7.685	0.349	3.5	98.46	0	0	0	0	1.54
2002	233	23	517	602.805	-305.061	D	7.968	7.685	0.283	3.5	98.2	0	0	0	0	1.8
2002	234	23	517	602.805	-305.061	D	7.689	7.685	0.004	3.5	98.81	0	0	0	0	1.18
2002	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	236	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	237	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	238	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	239	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	244	23	522	602.882	-306.299	D	7.938	7.685	0.253	3.5	98.03	0	0	0	0	1.97
2002	245	23	517	602.805	-305.061	D	7.773	7.685	0.088	3.5	95.61	0	0	0	0	4.39
2002	246	23	461	602.269	-305.916	D	7.685	7.685	0	3.5	70.85	0	0	0	0	9.56
2002	247	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	248	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	250	23	517	602.805	-305.061	D	7.833	7.685	0.148	3.5	93.9	0	0	0	0	6.1
2002	251	23	548	603.28	-312.734	D	8.578	7.685	0.893	3.5	96.54	0	0	0	0	3.45
2002	252	23	624	596.324	-316.278	D	7.735	7.685	0.05	3.5	96.88	0	0	0	0	3.12
2002	253	23	517	602.805	-305.061	D	7.688	7.685	0.004	3.5	98.81	0	0	0	0	1.15
2002	254	23	517	602.805	-305.061	D	7.707	7.685	0.022	3.5	98.93	0	0	0	0	1.07
2002	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	256	23	548	603.28	-312.734	D	7.685	7.685	0	3.5	76.39	0	0	0	0	23.61
2002	257	23	548	603.28	-312.734	D	7.899	7.685	0.214	3.5	86.88	0.05	0	0	0	13.08
2002	258	23	535	603.081	-309.517	D	7.797	7.685	0.112	3.5	98.69	0	0	0	0	1.3
2002	259	23	517	602.805	-305.061	D	7.716	7.685	0.031	3.5	99.25	0.01	0	0	0	0.75
2002	260	23	517	602.805	-305.061	D	8.067	7.685	0.382	3.5	95.6	0.15	0	0	0	4.25
2002	261	23	517	602.805	-305.061	D	7.708	7.685	0.023	3.5	99.17	0.02	0	0	0	0.81
2002	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	264	23	78	598.564	-316.197	D	7.685	7.685	0	3.5	66.71	0.11	0	0	0	30.24
2002	265	23	50	598.048	-315.987	D	7.685	7.685	0	3.5	50.97	0.19	0	0	0	26.21
2002	266	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	267	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	268	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	269	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	270	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	271	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	272	23	632	596.27	-315.421	D	8.293	7.685	0.608	3.5	96.59	0.03	0	0	0	3.38
2002	273	23	681	600.53	-308.617	D	7.886	7.685	0.202	3.5	68.12	0.31	0	0	0	31.57
2002	274	23	1	596.558	-316.101	D	7.507	7.507	0	3.117	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	276	23	517	602.805	-305.061	D	7.517	7.5	0.018	3.1	92.7	0.01	0	0	0	7.29
2002	277	23	583	599.621	-315.062	D	7.581	7.5	0.081	3.1	62.95	0.09	0	0	0	36.96
2002	278	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	279	23	557	601.32	-313.419	D	7.622	7.5	0.123	3.1	87.59	0.07	0	0	0	12.34
2002	280	23	548	603.28	-312.734	D	7.504	7.5	0.005	3.1	95.19	0.01	0	0	0	4.81
2002	281	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	282	23	6	596.462	-314.859	D	7.5	7.5	0	3.1	76.11	0.01	0	0	0	23.94
2002	283	23	632	596.27	-315.421	D	7.5	7.5	0.001	3.1	66.22	0.01	0	0	0	33.97
2002	284	23	548	603.28	-312.734	D	7.507	7.5	0.007	3.1	98.32	0.13	0	0	0	1.57
2002	285	23	548	603.28	-312.734	D	7.541	7.5	0.042	3.1	98.73	0.04	0	0	0	1.23
2002	286	23	548	603.28	-312.734	D	7.5	7.5	0.001	3.1	97.5	0.02	0	0	0	2.59
2002	287	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	289	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	290	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	291	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	292	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	293	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	294	23	603	598.68	-316.244	D	7.5	7.5	0.001	3.1	97.66	0.04	0	0	0	2.47
2002	295	23	624	596.324	-316.278	D	7.5	7.5	0	3.1	84.14	0	0	0	0	16.46
2002	296	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	81.9	0	0	0	0	10.52
2002	297	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	184.62	0	0	0	0	17.42
2002	298	23	557	601.32	-313.419	D	7.532	7.5	0.032	3.1	71.96	0.56	0	0	0	27.48
2002	299	23	517	602.805	-305.061	D	7.507	7.5	0.008	3.1	98.45	0.05	0	0	0	1.53
2002	300	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	94.24	0	0	0	0	8.88
2002	301	23	626	596.299	-315.88	D	7.5	7.5	0.001	3.1	91.69	0	0	0	0	8.57
2002	302	23	603	598.68	-316.244	D	7.534	7.5	0.035	3.1	94.29	0.04	0	0	0	5.68
2002	303	23	624	596.324	-316.278	D	7.5	7.5	0	3.1	95.59	0	0	0	0	4.68
2002	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	305	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	306	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	307	23	548	603.28	-312.734	D	7.549	7.5	0.049	3.1	88.93	1.56	0	0	0	9.51
2002	308	23	548	603.28	-312.734	D	7.51	7.5	0.01	3.1	98.6	0.06	0	0	0	1.35
2002	309	23	624	596.324	-316.278	D	7.656	7.5	0.156	3.1	97.31	0.23	0	0	0	2.46
2002	310	23	548	603.28	-312.734	D	7.521	7.5	0.021	3.1	98.59	0.08	0	0	0	1.32
2002	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	317	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	548	603.28	-312.734	D	7.548	7.5	0.049	3.1	69.77	1.01	0	0	0	29.23
2002	320	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	321	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	322	23	557	601.32	-313.419	D	7.566	7.5	0.066	3.1	48.85	0.82	0	0	0	50.33
2002	323	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	324	23	548	603.28	-312.734	D	7.553	7.5	0.053	3.1	92.06	0.75	0	0	0	7.2
2002	325	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	95.45	0.04	0	0	0	4.48
2002	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	327	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	23.77	6.28	0	0	0	70.05
2002	328	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	329	23	548	603.28	-312.734	D	7.501	7.5	0.001	3.1	55.57	2.73	0	0	0	41.75
2002	330	23	462	603.035	-312.603	D	7.5	7.5	0	3.1	99.73	0.4	0	0	0	5.03
2002	331	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	332	23	548	603.28	-312.734	D	7.501	7.5	0.001	3.1	35.19	5.89	0	0	0	58.91
2002	333	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	335	23	1	596.558	-316.101	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2002	336	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	340	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	63	598.297	-315.967	D	7.593	7.593	0	3.3	11.79	13.22	0	0	0	53.1
2002	343	23	548	603.28	-312.734	D	7.593	7.593	0	3.3	46.57	8.39	0	0	0	43.09
2002	344	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	548	603.28	-312.734	D	7.61	7.593	0.017	3.3	92.27	1.1	0	0	0	6.63
2002	347	23	548	603.28	-312.734	D	7.839	7.593	0.246	3.3	97.72	0.15	0	0	0	2.13
2002	348	23	624	596.324	-316.278	D	7.622	7.593	0.029	3.3	99.21	0.05	0	0	0	0.74
2002	349	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	60.89	2.73	0	0	0	36.44

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	354	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	357	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	358	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	359	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	360	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	548	603.28	-312.734	D	7.675	7.593	0.082	3.3	48.79	4.56	0	0	0	46.65
2002	362	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	98.39	0.06	0	0	0	1.24
2002	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	548	603.28	-312.734	D	7.598	7.593	0.006	3.3	47.17	1.61	0	0	0	51.24
									0.893							
MLC (REV)									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	511	602.824	-306.623	D	7.593	7.593	0.000	3.3	17.91	75.26	0	0	0	0.56
2002	2	23	557	601.32	-313.419	D	7.96	7.593	0.367	3.3	9.92	88.73	0	0	0	1.35
2002	3	23	548	603.28	-312.734	D	7.601	7.593	0.008	3.3	13.13	85.92	0	0	0	0.94
2002	4	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	5	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	6	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	7	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	8	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	9	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	10	23	548	603.28	-312.734	D	7.595	7.593	0.002	3.3	50.69	48.28	0	0	0	1.04
2002	11	23	548	603.28	-312.734	D	7.593	7.593	0.000	3.3	43.56	54.5	0	0	0	0.97
2002	12	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	13	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	14	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	16	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	17	23	548	603.28	-312.734	D	7.64	7.593	0.048	3.3	20.88	77.87	0	0	0	1.25
2002	18	23	548	603.28	-312.734	D	7.69	7.593	0.098	3.3	18.57	80.86	0	0	0	0.57
2002	19	23	637	596.267	-315.066	D	7.659	7.593	0.067	3.3	33.93	65.55	0	0	0	0.52
2002	20	23	624	596.324	-316.278	D	7.665	7.593	0.072	3.3	40	59.67	0	0	0	0.33
2002	21	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	41.17	58.63	0	0	0	0.2
2002	22	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	23	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	24	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	25	23	546	603.249	-312.239	D	7.593	7.593	0.000	3.3	26.75	72.25	0	0	0	0.72
2002	26	23	548	603.28	-312.734	D	7.593	7.593	0.000	3.3	29.07	70.3	0	0	0	0.55
2002	27	23	462	603.035	-312.603	D	7.593	7.593	0.000	3.3	42.03	56.5	0	0	0	0.59
2002	28	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	29	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	30	23	637	596.267	-315.066	D	7.66	7.593	0.067	3.3	10.56	88.2	0	0	0	1.24
2002	31	23	517	602.805	-305.061	D	7.604	7.593	0.011	3.3	32.48	67.23	0	0	0	0.3
2002	32	23	517	602.805	-305.061	D	7.459	7.459	0.001	3.013	44.56	55.22	0	0	0	0.18
2002	33	23	681	600.53	-308.617	D	7.567	7.453	0.115	3	9.45	89.59	0	0	0	0.96
2002	34	23	517	602.805	-305.061	D	7.457	7.453	0.005	3	21.47	78.05	0	0	0	0.49
2002	35	23	517	602.805	-305.061	D	7.474	7.453	0.021	3	15.61	83.16	0	0	0	1.23
2002	36	23	637	596.267	-315.066	D	7.464	7.453	0.011	3	13.03	85.93	0	0	0	1.04
2002	37	23	222	600.034	-309.336	D	7.453	7.453	0.000	3	54.64	55.46	0	0	0	0.58
2002	38	23	638	596.406	-314.894	D	7.542	7.453	0.089	3	9.08	89.83	0	0	0	1.1
2002	39	23	547	603.265	-312.487	D	7.453	7.453	0.001	3	53.95	46.1	0	0	0	0.28
2002	40	23	414	602.385	-310.654	D	7.453	7.453	0.000	3	64.36	36.8	0	0	0	0.24
2002	41	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	42	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	43	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	44	23	548	603.28	-312.734	D	7.481	7.453	0.029	3	7.93	89.63	0	0	0	2.45
2002	45	23	517	602.805	-305.061	D	7.488	7.453	0.035	3	8.19	90.59	0	0	0	1.23
2002	46	23	546	603.249	-312.239	D	7.453	7.453	0.000	3	29.77	69.56	0	0	0	0.67
2002	47	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	48	23	517	602.805	-305.061	D	7.458	7.453	0.006	3	41.38	56.58	0	0	0	2.07
2002	49	23	517	602.805	-305.061	D	7.471	7.453	0.018	3	31.81	67.19	0	0	0	1.01
2002	50	23	93	598.277	-312.47	D	7.453	7.453	0.000	3	48.17	30.07	0	0	0	0.92
2002	51	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	52	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	53	23	548	603.28	-312.734	D	7.486	7.453	0.034	3	24.93	73.84	0	0	0	1.23
2002	54	23	548	603.28	-312.734	D	7.466	7.453	0.014	3	13.23	85.71	0	0	0	1.09
2002	55	23	548	603.28	-312.734	D	7.455	7.453	0.003	3	37.94	61.44	0	0	0	0.68
2002	56	23	548	603.28	-312.734	D	7.462	7.453	0.009	3	35.31	63.7	0	0	0	1
2002	57	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	58	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	60	23	1	596.558	-316.101	D	7.362	7.362	0.000	2.808	0	0	0	0	0	0
2002	61	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	36.07	63.75	0	0	0	0.3

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	62	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	38.29	61.47	0	0	0	0.23
2002	63	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2002	64	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2002	69	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2002	70	23	517	602.805	-305.061	D	7.366	7.358	0.007	2.8	27.09	72.14	0	0	0	0.77
2002	71	23	688	601.298	-307.191	D	7.376	7.358	0.017	2.8	41.15	58.22	0	0	0	0.63
2002	72	23	632	596.27	-315.421	D	7.522	7.358	0.164	2.8	36.42	63.1	0	0	0	0.48
2002	73	23	517	602.805	-305.061	D	7.368	7.358	0.010	2.8	70.34	29.2	0	0	0	0.46
2002	74	23	656	597.971	-312.292	D	7.387	7.358	0.028	2.8	44.49	54.44	0	0	0	1.07
2002	75	23	682	600.626	-308.407	D	7.422	7.358	0.063	2.8	16.7	81.11	0	0	0	2.19
2002	76	23	79	598.545	-315.948	D	7.364	7.358	0.006	2.8	54.11	45.43	0	0	0	0.46
2002	77	23	517	602.805	-305.061	D	7.384	7.358	0.026	2.8	59.62	39.69	0	0	0	0.7
2002	78	23	624	596.324	-316.278	D	7.377	7.358	0.019	2.8	53.28	46.35	0	0	0	0.38
2002	79	23	548	603.28	-312.734	D	7.385	7.358	0.027	2.8	27.02	71.32	0	0	0	1.66
2002	80	23	557	601.32	-313.419	D	7.456	7.358	0.098	2.8	11.91	86.5	0	0	0	1.59
2002	81	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2002	82	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2002	83	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2002	84	23	637	596.267	-315.066	D	7.38	7.358	0.022	2.8	40.51	58.89	0	0	0	0.6
2002	85	23	517	602.805	-305.061	D	7.368	7.358	0.009	2.8	6.37	91.18	0	0	0	2.46
2002	86	23	517	602.805	-305.061	D	7.39	7.358	0.032	2.8	15.64	83.4	0	0	0	0.96
2002	87	23	637	596.267	-315.066	D	7.359	7.358	0.001	2.8	39.96	59.42	0	0	0	0.57
2002	88	23	517	602.805	-305.061	D	7.361	7.358	0.003	2.8	46.67	52.77	0	0	0	0.58
2002	89	23	557	601.32	-313.419	D	7.414	7.358	0.056	2.8	7.94	90.38	0	0	0	1.69
2002	90	23	517	602.805	-305.061	D	7.36	7.358	0.002	2.8	80.69	16.44	0	0	0	3
2002	91	23	632	596.27	-315.421	D	7.273	7.267	0.006	2.608	39.88	57.32	0	0	0	2.83
2002	92	23	491	603.207	-311.591	D	7.264	7.263	0.001	2.6	88.8	10.22	0	0	0	0.96
2002	93	23	548	603.28	-312.734	D	7.264	7.263	0.001	2.6	25.54	73.4	0	0	0	1.27
2002	94	23	637	596.267	-315.066	D	7.298	7.263	0.035	2.6	32.52	66.3	0	0	0	1.18
2002	95	23	637	596.267	-315.066	D	7.271	7.263	0.008	2.6	14.82	83.04	0	0	0	2.16
2002	96	23	517	602.805	-305.061	D	7.277	7.263	0.014	2.6	19.49	78.81	0	0	0	1.72
2002	97	23	624	596.324	-316.278	D	7.264	7.263	0.002	2.6	55.39	43.49	0	0	0	1.08
2002	98	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2002	99	23	548	603.28	-312.734	D	7.271	7.263	0.009	2.6	76.78	20.81	0	0	0	2.44
2002	100	23	552	602.45	-313.092	D	7.27	7.263	0.007	2.6	68.54	28.74	0	0	0	2.71

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	101	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2002	102	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2002	103	23	638	596.406	-314.894	D	7.275	7.263	0.012	2.6	18.29	80.58	0	0	0	1.15
2002	104	23	517	602.805	-305.061	D	7.263	7.263	0.000	2.6	82.69	16.49	0	0	0	0.87
2002	105	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2002	110	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2002	111	23	517	602.805	-305.061	D	7.263	7.263	0.000	2.6	39.7	59.67	0	0	0	0.73
2002	112	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2002	113	23	78	598.564	-316.197	D	7.263	7.263	0.000	2.6	98	1.4	0	0	0	1.2
2002	114	23	547	603.265	-312.487	D	7.263	7.263	0.000	2.6	92.6	5.93	0	0	0	0.95
2002	115	23	548	603.28	-312.734	D	7.264	7.263	0.001	2.6	61.75	35.51	0	0	0	3.03
2002	116	23	517	602.805	-305.061	D	7.27	7.263	0.007	2.6	21.25	77.35	0	0	0	1.42
2002	117	23	624	596.324	-316.278	D	7.265	7.263	0.002	2.6	72.53	26.67	0	0	0	0.8
2002	118	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2002	119	23	682	600.626	-308.407	D	7.354	7.263	0.091	2.6	25.23	71.9	0	0	0	2.87
2002	120	23	517	602.805	-305.061	D	7.276	7.263	0.013	2.6	87.19	11.18	0	0	0	1.65
2002	121	23	461	602.269	-305.916	D	7.445	7.445	0.000	2.983	93.79	6.07	0	0	0	1
2002	122	23	548	603.28	-312.734	D	7.472	7.453	0.019	3	57.26	42.31	0	0	0	0.44
2002	123	23	693	601.983	-306.223	D	7.459	7.453	0.006	3	38.25	59.32	0	0	0	2.48
2002	124	23	624	596.324	-316.278	D	7.454	7.453	0.001	3	85.61	14.38	0	0	0	0.26
2002	125	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	83.05	16.24	0	0	0	0.84
2002	126	23	77	598.029	-312.49	D	7.453	7.453	0.000	3	97.91	0.5	0	0	0	0.19
2002	127	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	128	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	129	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	130	23	557	601.32	-313.419	D	7.465	7.453	0.013	3	29.79	62.39	0	0	0	7.82
2002	131	23	625	596.311	-316.079	D	7.453	7.453	0.001	3	91.11	8.33	0	0	0	0.6
2002	132	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	133	23	548	603.28	-312.734	D	7.461	7.453	0.009	3	7.79	89.51	0	0	0	2.72
2002	134	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	135	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	136	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	137	23	517	602.805	-305.061	D	7.455	7.453	0.003	3	49.43	50.2	0	0	0	0.47
2002	138	23	548	603.28	-312.734	D	7.509	7.453	0.057	3	15.79	82.11	0	0	0	2.1
2002	139	23	517	602.805	-305.061	D	7.466	7.453	0.013	3	36.71	60.86	0	0	0	2.44

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	140	23	517	602.805	-305.061	D	7.474	7.453	0.022	3	70.1	27.71	0	0	0	2.2
2002	141	23	603	598.68	-316.244	D	7.46	7.453	0.008	3	39.08	59.47	0	0	0	1.48
2002	142	23	632	596.27	-315.421	D	7.453	7.453	0.000	3	78.87	21.12	0	0	0	0.68
2002	143	23	327	601.142	-307.502	D	7.453	7.453	0.000	3	92.27	4.69	0	0	0	0.39
2002	144	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	146	23	548	603.28	-312.734	D	7.464	7.453	0.012	3	21.78	74.83	0	0	0	3.39
2002	147	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	81.02	18.47	0	0	0	0.59
2002	148	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	149	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	150	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	151	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2002	152	23	1	596.558	-316.101	D	7.542	7.542	0.000	3.192	0	0	0	0	0	0
2002	153	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	156	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	157	23	548	603.28	-312.734	D	7.56	7.546	0.014	3.2	74.76	22.87	0	0	0	2.4
2002	158	23	548	603.28	-312.734	D	7.549	7.546	0.003	3.2	75.49	20.73	0	0	0	3.8
2002	159	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	101.34	6.76	0	0	0	0.96
2002	160	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	102.24	0.61	0	0	0	0.71
2002	161	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	164	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	165	23	681	600.53	-308.617	D	7.55	7.546	0.004	3.2	59.8	28.77	0	0	0	11.44
2002	166	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	167	23	514	602.766	-305.877	D	7.546	7.546	0.000	3.2	154.26	4.15	0	0	0	2.16
2002	168	23	548	603.28	-312.734	D	7.556	7.546	0.010	3.2	62.27	36.3	0	0	0	1.44
2002	169	23	603	598.68	-316.244	D	7.559	7.546	0.013	3.2	97.49	1.87	0	0	0	0.65
2002	170	23	517	602.805	-305.061	D	7.553	7.546	0.007	3.2	97.53	1.96	0	0	0	0.53
2002	171	23	280	600.722	-308.534	D	7.546	7.546	0.000	3.2	73.05	0.23	0	0	0	0.44
2002	172	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	173	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	174	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	175	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	176	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	177	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	178	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	179	23	517	602.805	-305.061	D	7.546	7.546	0.000	3.2	96.97	3.23	0	0	0	1.22
2002	180	23	517	602.805	-305.061	D	7.546	7.546	0.000	3.2	97.55	1.56	0	0	0	0.89
2002	181	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2002	182	23	414	602.385	-310.654	D	7.591	7.591	0.000	3.296	95.29	0.31	0	0	0	1.1
2002	183	23	517	602.805	-305.061	D	7.613	7.593	0.020	3.3	97.37	1.84	0	0	0	0.79
2002	184	23	603	598.68	-316.244	D	7.61	7.593	0.017	3.3	97.24	2.33	0	0	0	0.44
2002	185	23	517	602.805	-305.061	D	7.641	7.593	0.048	3.3	85.56	11.81	0	0	0	2.64
2002	186	23	637	596.267	-315.066	D	7.604	7.593	0.011	3.3	97.9	1.18	0	0	0	0.93
2002	187	23	625	596.311	-316.079	D	7.595	7.593	0.002	3.3	98.79	0.77	0	0	0	0.44
2002	188	23	3	596.519	-315.604	D	7.593	7.593	0.000	3.3	98.82	0.61	0	0	0	0.42
2002	189	23	631	596.276	-315.551	D	7.593	7.593	0.001	3.3	97.28	1.16	0	0	0	1.51
2002	190	23	624	596.324	-316.278	D	7.602	7.593	0.009	3.3	98.51	0.7	0	0	0	0.8
2002	191	23	548	603.28	-312.734	D	7.598	7.593	0.005	3.3	97.73	1.71	0	0	0	0.61
2002	192	23	517	602.805	-305.061	D	7.683	7.593	0.091	3.3	36.54	62.39	0	0	0	1.07
2002	193	23	637	596.267	-315.066	D	7.598	7.593	0.005	3.3	87.79	11.55	0	0	0	0.65
2002	194	23	632	596.27	-315.421	D	7.594	7.593	0.001	3.3	76.8	22.84	0	0	0	0.44
2002	195	23	676	599.876	-309.365	D	7.644	7.593	0.051	3.3	54.29	38.84	0	0	0	6.87
2002	196	23	689	601.435	-306.997	D	7.593	7.593	0.000	3.3	72.45	25.11	0	0	0	2.75
2002	197	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	99.16	0.44	0	0	0	0.88
2002	198	23	432	602.04	-306.183	D	7.593	7.593	0.001	3.3	97.37	1.99	0	0	0	0.71
2002	199	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	96.56	2.97	0	0	0	0.59
2002	200	23	515	602.747	-305.629	D	7.593	7.593	0.000	3.3	88.93	10.73	0	0	0	0.5
2002	201	23	517	602.805	-305.061	D	7.593	7.593	0.000	3.3	56.22	43.06	0	0	0	0.77
2002	202	23	517	602.805	-305.061	D	7.593	7.593	0.000	3.3	98.73	1.29	0	0	0	0.55
2002	203	23	502	602.996	-308.859	D	7.593	7.593	0.000	3.3	95.02	4.03	0	0	0	0.43
2002	204	23	517	602.805	-305.061	D	7.593	7.593	0.000	3.3	93.11	4.71	0	0	0	2.3
2002	205	23	517	602.805	-305.061	D	7.598	7.593	0.005	3.3	85.06	12.08	0	0	0	2.88
2002	206	23	637	596.267	-315.066	D	7.595	7.593	0.003	3.3	97.71	1.33	0	0	0	0.94
2002	207	23	517	602.805	-305.061	D	7.599	7.593	0.006	3.3	98.03	1.29	0	0	0	0.69
2002	208	23	517	602.805	-305.061	D	7.593	7.593	0.000	3.3	99.49	0.39	0	0	0	0.42
2002	209	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	211	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	212	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	213	23	403	601.849	-306.947	D	7.681	7.681	0.000	3.492	95.15	2.64	0	0	0	0.51
2002	214	23	516	602.728	-305.38	D	7.685	7.685	0.000	3.5	98.47	0.68	0	0	0	0.8
2002	215	23	517	602.805	-305.061	D	7.685	7.685	0.000	3.5	98.22	1.36	0	0	0	0.64
2002	216	23	326	601.161	-307.751	D	7.685	7.685	0.000	3.5	95.01	0.4	0	0	0	0.44
2002	217	23	302	600.951	-308.266	D	7.685	7.685	0.000	3.5	92.44	0.27	0	0	0	0.35

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	218	23	624	596.324	-316.278	D	7.704	7.685	0.019	3.5	94.96	4.1	0	0	0	0.94
2002	219	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	91.84	1.07	0	0	0	0.65
2002	220	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	221	23	624	596.324	-316.278	D	7.685	7.685	0.000	3.5	0	0	0	0	0	82.75
2002	222	23	431	602.059	-306.432	D	7.685	7.685	0.000	3.5	96.37	0.26	0	0	0	0.69
2002	223	23	516	602.728	-305.38	D	7.685	7.685	0.000	3.5	99.16	0.81	0	0	0	0.56
2002	224	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	225	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	226	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	227	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	228	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	232	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	233	23	517	602.805	-305.061	D	7.685	7.685	0.001	3.5	98.01	1.67	0	0	0	0.46
2002	234	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	12.49	0.12	0	0	0	0.05
2002	235	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	236	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	237	23	548	603.28	-312.734	D	7.7	7.685	0.015	3.5	65	30.3	0	0	0	4.7
2002	238	23	681	600.53	-308.617	D	7.839	7.685	0.154	3.5	33.44	64.15	0	0	0	2.41
2002	239	23	637	596.267	-315.066	D	7.69	7.685	0.005	3.5	92.11	6.16	0	0	0	1.74
2002	240	23	637	596.267	-315.066	D	7.686	7.685	0.001	3.5	36.95	55.33	0	0	0	7.74
2002	241	23	3	596.519	-315.604	D	7.685	7.685	0.000	3.5	0	0	0	0	0	91.72
2002	242	23	6	596.462	-314.859	D	7.685	7.685	0.000	3.5	0	0	0	0	0	41.36
2002	243	23	2	596.539	-315.853	D	7.685	7.685	0.000	3.5	0	0	0	0	0	4.11
2002	244	23	77	598.029	-312.49	D	7.685	7.685	0.000	3.5	92.89	1.72	0	0	0	1.96
2002	245	23	202	599.844	-310.101	D	7.685	7.685	0.000	3.5	83.48	0.73	0	0	0	1.38
2002	246	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	247	23	632	596.27	-315.421	D	7.688	7.685	0.003	3.5	65.39	26.23	0	0	0	8.4
2002	248	23	625	596.311	-316.079	D	7.685	7.685	0.000	3.5	32.87	1.33	0	0	0	52.53
2002	249	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	250	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	251	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	252	23	461	602.269	-305.916	D	7.685	7.685	0.000	3.5	96.33	0.94	0	0	0	1.84
2002	253	23	548	603.28	-312.734	D	7.699	7.685	0.014	3.5	86.73	10.68	0	0	0	2.58
2002	254	23	548	603.28	-312.734	D	7.724	7.685	0.040	3.5	32.44	63.92	0	0	0	3.64
2002	255	23	637	596.267	-315.066	D	7.685	7.685	0.000	3.5	49.9	35.44	0	0	0	14.58
2002	256	23	637	596.267	-315.066	D	7.694	7.685	0.009	3.5	90.18	8.02	0	0	0	1.79

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	257	23	517	602.805	-305.061	D	7.69	7.685	0.005	3.5	94.93	4.02	0	0	0	1.06
2002	258	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	92.05	6.21	0	0	0	1.76
2002	259	23	681	600.53	-308.617	D	7.829	7.685	0.144	3.5	13.75	84.42	0	0	0	1.83
2002	260	23	548	603.28	-312.734	D	7.704	7.685	0.019	3.5	76.49	23.01	0	0	0	0.51
2002	261	23	517	602.805	-305.061	D	7.687	7.685	0.002	3.5	71.07	28.59	0	0	0	0.34
2002	262	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	264	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	265	23	517	602.805	-305.061	D	7.724	7.685	0.039	3.5	62.49	35.93	0	0	0	1.58
2002	266	23	682	600.626	-308.407	D	7.777	7.685	0.092	3.5	22.7	74.75	0	0	0	2.55
2002	267	23	557	601.32	-313.419	D	7.738	7.685	0.053	3.5	43.51	53.39	0	0	0	3.1
2002	268	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	269	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2002	270	23	548	603.28	-312.734	D	7.707	7.685	0.022	3.5	16.05	82.17	0	0	0	1.78
2002	271	23	557	601.32	-313.419	D	7.872	7.685	0.187	3.5	15.58	82.64	0	0	0	1.78
2002	272	23	637	596.267	-315.066	D	7.689	7.685	0.004	3.5	80.69	18.35	0	0	0	0.95
2002	273	23	517	602.805	-305.061	D	7.685	7.685	0.000	3.5	97.89	1.09	0	0	0	0.65
2002	274	23	1	596.558	-316.101	D	7.507	7.507	0.000	3.117	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	276	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	277	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	278	23	517	602.805	-305.061	D	7.506	7.5	0.006	3.1	67.03	30.37	0	0	0	2.6
2002	279	23	604	598.599	-316.246	D	7.502	7.5	0.002	3.1	84.3	14.64	0	0	0	1.15
2002	280	23	548	603.28	-312.734	D	7.514	7.5	0.015	3.1	39.15	57.54	0	0	0	3.34
2002	281	23	637	596.267	-315.066	D	7.501	7.5	0.001	3.1	71.4	26.67	0	0	0	1.93
2002	282	23	517	602.805	-305.061	D	7.5	7.5	0.000	3.1	88.1	12.92	0	0	0	1.22
2002	283	23	517	602.805	-305.061	D	7.5	7.5	0.000	3.1	88.83	11.8	0	0	0	0.89
2002	284	23	637	596.267	-315.066	D	7.551	7.5	0.051	3.1	38.68	60.36	0	0	0	0.96
2002	285	23	637	596.267	-315.066	D	7.537	7.5	0.038	3.1	62.95	36.41	0	0	0	0.65
2002	286	23	517	602.805	-305.061	D	7.522	7.5	0.022	3.1	45.6	52.84	0	0	0	1.57
2002	287	23	557	601.32	-313.419	D	7.557	7.5	0.057	3.1	11.49	85.97	0	0	0	2.54
2002	288	23	517	602.805	-305.061	D	7.506	7.5	0.006	3.1	60.01	38.74	0	0	0	1.28
2002	289	23	548	603.28	-312.734	D	7.503	7.5	0.004	3.1	55.56	41.87	0	0	0	2.62
2002	290	23	548	603.28	-312.734	D	7.5	7.5	0.000	3.1	19.23	78.62	0	0	0	2.23
2002	291	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	292	23	694	602.12	-306.029	D	7.56	7.5	0.060	3.1	34.2	65.16	0	0	0	0.64
2002	293	23	662	598.404	-311.683	D	7.674	7.5	0.175	3.1	9.87	88.09	0	0	0	2.04
2002	294	23	517	602.805	-305.061	D	7.505	7.5	0.005	3.1	53.71	45.22	0	0	0	1.11
2002	295	23	517	602.805	-305.061	D	7.575	7.5	0.075	3.1	60.96	37.94	0	0	0	1.1

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	296	23	624	596.324	-316.278	D	7.508	7.5	0.008	3.1	81.36	17.53	0	0	0	1.12
2002	297	23	5	596.481	-315.108	D	7.5	7.5	0.000	3.1	0	0	0	0	0	101.97
2002	298	23	517	602.805	-305.061	D	7.501	7.5	0.002	3.1	50.84	48.39	0	0	0	0.85
2002	299	23	517	602.805	-305.061	D	7.555	7.5	0.056	3.1	50.07	49.21	0	0	0	0.72
2002	300	23	637	596.267	-315.066	D	7.543	7.5	0.044	3.1	37.53	61.52	0	0	0	0.96
2002	301	23	624	596.324	-316.278	D	7.5	7.5	0.001	3.1	65.64	34.29	0	0	0	0.28
2002	302	23	682	600.626	-308.407	D	7.648	7.5	0.149	3.1	34.22	65.13	0	0	0	0.65
2002	303	23	676	599.876	-309.365	D	7.774	7.5	0.274	3.1	16.19	82.27	0	0	0	1.54
2002	304	23	517	602.805	-305.061	D	7.509	7.5	0.010	3.1	46.34	53.21	0	0	0	0.45
2002	305	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	306	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	307	23	491	603.207	-311.591	D	7.5	7.5	0.000	3.1	33.09	68.19	0	0	0	0.4
2002	308	23	517	602.805	-305.061	D	7.517	7.5	0.017	3.1	37.7	61.66	0	0	0	0.64
2002	309	23	517	602.805	-305.061	D	7.557	7.5	0.057	3.1	37.64	61.92	0	0	0	0.44
2002	310	23	517	602.805	-305.061	D	7.508	7.5	0.009	3.1	43.81	55.86	0	0	0	0.34
2002	311	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	312	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	314	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	315	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	316	23	638	596.406	-314.894	D	7.607	7.5	0.107	3.1	8.3	89.49	0	0	0	2.21
2002	317	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	318	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	319	23	637	596.267	-315.066	D	7.547	7.5	0.047	3.1	17.51	81.39	0	0	0	1.1
2002	320	23	548	603.28	-312.734	D	7.532	7.5	0.032	3.1	15.07	82.78	0	0	0	2.15
2002	321	23	548	603.28	-312.734	D	7.503	7.5	0.004	3.1	8.23	89.79	0	0	0	2
2002	322	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	323	23	491	603.207	-311.591	D	7.5	7.5	0.000	3.1	89.07	23.79	0	0	0	3.64
2002	324	23	548	603.28	-312.734	D	7.501	7.5	0.002	3.1	44.36	55.01	0	0	0	0.73
2002	325	23	459	602.308	-306.413	D	7.5	7.5	0.000	3.1	57.48	14.74	0	0	0	0.74
2002	326	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	327	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	328	23	490	602.499	-305.648	D	7.5	7.5	0.000	3.1	50.76	48.86	0	0	0	0.92
2002	329	23	517	602.805	-305.061	D	7.572	7.5	0.072	3.1	22.27	76.03	0	0	0	1.7
2002	330	23	637	596.267	-315.066	D	7.527	7.5	0.028	3.1	19.01	79.65	0	0	0	1.34
2002	331	23	557	601.32	-313.419	D	7.625	7.5	0.125	3.1	6.8	91.27	0	0	0	1.92
2002	332	23	548	603.28	-312.734	D	7.501	7.5	0.001	3.1	23.74	75.85	0	0	0	0.43
2002	333	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2002	334	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	335	23	1	596.558	-316.101	D	7.589	7.589	0.000	3.292	0	0	0	0	0	0
2002	336	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	337	23	676	599.876	-309.365	D	7.601	7.593	0.008	3.3	10.26	86.56	0	0	0	3.18
2002	338	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	339	23	548	603.28	-312.734	D	7.614	7.593	0.022	3.3	6.37	92.11	0	0	0	1.52
2002	340	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	341	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	342	23	517	602.805	-305.061	D	7.661	7.593	0.068	3.3	32.15	67.29	0	0	0	0.56
2002	343	23	603	598.68	-316.244	D	7.594	7.593	0.002	3.3	32.1	67.58	0	0	0	0.33
2002	344	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	345	23	557	601.32	-313.419	D	7.83	7.593	0.238	3.3	12.5	86.4	0	0	0	1.1
2002	346	23	517	602.805	-305.061	D	7.633	7.593	0.041	3.3	22.8	76.75	0	0	0	0.45
2002	347	23	517	602.805	-305.061	D	7.605	7.593	0.012	3.3	42.92	55.96	0	0	0	1.13
2002	348	23	624	596.324	-316.278	D	7.595	7.593	0.002	3.3	43.86	55.91	0	0	0	0.24
2002	349	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	350	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	351	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	353	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	354	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	355	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	356	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	357	23	517	602.805	-305.061	D	7.648	7.593	0.055	3.3	18.81	80.3	0	0	0	0.89
2002	358	23	517	602.805	-305.061	D	7.653	7.593	0.060	3.3	18.81	80.53	0	0	0	0.66
2002	359	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	360	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	361	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	362	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	363	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2002	365	23	519	602.836	-305.557	D	7.602	7.593	0.010	3.3	19.14	79.2	0	0	0	1.67
									0.367							
INDEPENDENCE									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	2	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	3	23	637	596.267	-315.066	D	7.593	7.593	0	3.3	83.8	15.75	0	0	0	0.43

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	4	23	637	596.267	-315.066	D	7.684	7.593	0.091	3.3	88.65	11.03	0	0	0	0.32
2002	5	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	92.5	7.28	0	0	0	0.2
2002	6	23	624	596.324	-316.278	D	7.648	7.593	0.056	3.3	88.22	11.42	0	0	0	0.36
2002	7	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	8	23	517	602.805	-305.061	D	7.621	7.593	0.029	3.3	81.72	17.89	0	0	0	0.39
2002	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	517	602.805	-305.061	D	7.728	7.593	0.135	3.3	93.6	6.09	0	0	0	0.31
2002	11	23	603	598.68	-316.244	D	7.606	7.593	0.014	3.3	94.98	4.84	0	0	0	0.18
2002	12	23	624	596.324	-316.278	D	7.646	7.593	0.054	3.3	86.49	12.93	0	0	0	0.58
2002	13	23	517	602.805	-305.061	D	7.642	7.593	0.05	3.3	79.87	19.48	0	0	0	0.65
2002	14	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	92.71	6.38	0	0	0	0.13
2002	15	23	557	601.32	-313.419	D	7.728	7.593	0.136	3.3	70.72	28.03	0	0	0	1.25
2002	16	23	517	602.805	-305.061	D	7.623	7.593	0.03	3.3	86.27	13.24	0	0	0	0.49
2002	17	23	548	603.28	-312.734	D	7.653	7.593	0.06	3.3	82.22	17.26	0	0	0	0.53
2002	18	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	87.98	11.59	0	0	0	0.42
2002	19	23	656	597.971	-312.292	D	7.597	7.593	0.005	3.3	93.7	6.11	0	0	0	0.18
2002	20	23	517	602.805	-305.061	D	7.72	7.593	0.127	3.3	93.53	6.32	0	0	0	0.15
2002	21	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	637	596.267	-315.066	D	7.906	7.593	0.314	3.3	92.71	7.14	0	0	0	0.14
2002	25	23	517	602.805	-305.061	D	7.747	7.593	0.155	3.3	84.9	14.47	0	0	0	0.63
2002	26	23	548	603.28	-312.734	D	7.647	7.593	0.054	3.3	93.12	6.55	0	0	0	0.33
2002	27	23	489	602.518	-305.896	D	7.593	7.593	0	3.3	94.78	3.06	0	0	0	0.21
2002	28	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	89.26	10.25	0	0	0	0.39
2002	30	23	517	602.805	-305.061	D	7.767	7.593	0.174	3.3	89.27	10.47	0	0	0	0.25
2002	31	23	517	602.805	-305.061	D	7.698	7.593	0.105	3.3	93.11	6.76	0	0	0	0.13
2002	32	23	624	596.324	-316.278	D	7.474	7.459	0.016	3.013	85.84	13.5	0	0	0	0.67
2002	33	23	624	596.324	-316.278	D	7.457	7.453	0.005	3	91.18	8.48	0	0	0	0.41
2002	34	23	631	596.276	-315.551	D	7.484	7.453	0.031	3	93.81	5.92	0	0	0	0.28
2002	35	23	517	602.805	-305.061	D	7.477	7.453	0.025	3	88.17	11.36	0	0	0	0.47
2002	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	37	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	38	23	517	602.805	-305.061	D	7.51	7.453	0.058	3	95.02	4.69	0	0	0	0.29
2002	39	23	517	602.805	-305.061	D	7.9	7.453	0.447	3	92.33	7.44	0	0	0	0.24
2002	40	23	517	602.805	-305.061	D	7.488	7.453	0.036	3	95.14	4.7	0	0	0	0.16
2002	41	23	517	602.805	-305.061	D	7.492	7.453	0.04	3	90.76	8.79	0	0	0	0.46
2002	42	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	43	23	603	598.68	-316.244	D	7.484	7.453	0.031	3	90.27	8.96	0	0	0	0.77
2002	44	23	603	598.68	-316.244	D	7.454	7.453	0.001	3	94.79	4.64	0	0	0	0.6
2002	45	23	517	602.805	-305.061	D	7.455	7.453	0.003	3	87.64	11.98	0	0	0	0.42
2002	46	23	637	596.267	-315.066	D	7.468	7.453	0.015	3	94.34	4.91	0	0	0	0.76
2002	47	23	603	598.68	-316.244	D	7.459	7.453	0.006	3	86.63	12.34	0	0	0	1.04
2002	48	23	624	596.324	-316.278	D	7.458	7.453	0.005	3	95.87	3.37	0	0	0	0.76
2002	49	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	50	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	517	602.805	-305.061	D	7.477	7.453	0.024	3	82.98	16.41	0	0	0	0.62
2002	52	23	517	602.805	-305.061	D	7.504	7.453	0.051	3	86.13	13.03	0	0	0	0.84
2002	53	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	54	23	631	596.276	-315.551	D	7.454	7.453	0.002	3	96.58	3.07	0	0	0	0.41
2002	55	23	637	596.267	-315.066	D	7.458	7.453	0.005	3	93.2	6.6	0	0	0	0.22
2002	56	23	637	596.267	-315.066	D	7.492	7.453	0.039	3	85.15	14.33	0	0	0	0.53
2002	57	23	624	596.324	-316.278	D	7.512	7.453	0.059	3	89.12	10.66	0	0	0	0.22
2002	58	23	517	602.805	-305.061	D	7.654	7.453	0.201	3	78.08	21.26	0	0	0	0.66
2002	59	23	517	602.805	-305.061	D	7.482	7.453	0.029	3	81.37	18.2	0	0	0	0.43
2002	60	23	1	596.558	-316.101	D	7.362	7.362	0	2.808	0	0	0	0	0	0
2002	61	23	624	596.324	-316.278	D	7.359	7.358	0.001	2.8	91.35	8.53	0	0	0	0.22
2002	62	23	624	596.324	-316.278	D	7.374	7.358	0.016	2.8	82.59	17.13	0	0	0	0.29
2002	63	23	517	602.805	-305.061	D	7.465	7.358	0.107	2.8	83.42	16.02	0	0	0	0.57
2002	64	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	69	23	517	602.805	-305.061	D	7.363	7.358	0.005	2.8	84.57	14.63	0	0	0	0.84
2002	70	23	517	602.805	-305.061	D	7.379	7.358	0.021	2.8	86.36	13.16	0	0	0	0.48
2002	71	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	94.58	6.07	0	0	0	0.2
2002	72	23	637	596.267	-315.066	D	7.382	7.358	0.024	2.8	97.32	2.41	0	0	0	0.28
2002	73	23	517	602.805	-305.061	D	7.37	7.358	0.012	2.8	97.81	2.04	0	0	0	0.14
2002	74	23	637	596.267	-315.066	D	7.393	7.358	0.035	2.8	89.59	10.02	0	0	0	0.41
2002	75	23	603	598.68	-316.244	D	7.365	7.358	0.007	2.8	93.56	6.22	0	0	0	0.22
2002	76	23	548	603.28	-312.734	D	7.36	7.358	0.002	2.8	95.36	4.59	0	0	0	0.09
2002	77	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	80	23	624	596.324	-316.278	D	7.361	7.358	0.002	2.8	83.59	15.8	0	0	0	0.63
2002	81	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	82	23	517	602.805	-305.061	D	7.405	7.358	0.047	2.8	88.54	11.04	0	0	0	0.43
2002	83	23	517	602.805	-305.061	D	7.361	7.358	0.003	2.8	94.72	5.03	0	0	0	0.23
2002	84	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	94.08	5.87	0	0	0	0.07
2002	85	23	625	596.311	-316.079	D	7.359	7.358	0.001	2.8	95.21	4.7	0	0	0	0.05
2002	86	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	87	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	88	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	89	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	90	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	91	23	603	598.68	-316.244	D	7.334	7.267	0.067	2.608	94.3	5.06	0	0	0	0.65
2002	92	23	517	602.805	-305.061	D	7.298	7.263	0.035	2.6	97.93	1.82	0	0	0	0.24
2002	93	23	603	598.68	-316.244	D	7.276	7.263	0.013	2.6	98.19	1.65	0	0	0	0.16
2002	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	95	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	96	23	517	602.805	-305.061	D	7.331	7.263	0.068	2.6	95.24	4.45	0	0	0	0.31
2002	97	23	624	596.324	-316.278	D	7.276	7.263	0.013	2.6	97.23	2.58	0	0	0	0.2
2002	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	99	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	103	23	517	602.805	-305.061	D	7.438	7.263	0.175	2.6	96.46	3.28	0	0	0	0.27
2002	104	23	517	602.805	-305.061	D	7.305	7.263	0.042	2.6	99.32	0.49	0	0	0	0.19
2002	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	110	23	517	602.805	-305.061	D	7.404	7.263	0.142	2.6	98.8	0.94	0	0	0	0.27
2002	111	23	517	602.805	-305.061	D	7.379	7.263	0.116	2.6	97.29	2.55	0	0	0	0.16
2002	112	23	517	602.805	-305.061	D	7.437	7.263	0.174	2.6	98.01	1.8	0	0	0	0.19
2002	113	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	114	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	115	23	624	596.324	-316.278	D	7.283	7.263	0.02	2.6	97.29	2.54	0	0	0	0.16
2002	116	23	637	596.267	-315.066	D	7.269	7.263	0.006	2.6	93.01	6.65	0	0	0	0.37
2002	117	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	118	23	517	602.805	-305.061	D	7.305	7.263	0.042	2.6	99.07	0.52	0	0	0	0.42
2002	119	23	624	596.324	-316.278	D	7.277	7.263	0.014	2.6	99.14	0.51	0	0	0	0.34
2002	120	23	632	596.27	-315.421	D	7.266	7.263	0.003	2.6	99.56	0.3	0	0	0	0.16

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	121	23	490	602.499	-305.648	D	7.445	7.445	0	2.983	99.84	0.35	0	0	0	0.1
2002	122	23	624	596.324	-316.278	D	7.475	7.453	0.022	3	94.43	5.27	0	0	0	0.31
2002	123	23	547	603.265	-312.487	D	7.453	7.453	0	3	99.11	0.84	0	0	0	0.05
2002	124	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	128	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	129	23	624	596.324	-316.278	D	7.462	7.453	0.01	3	85.6	13.85	0	0	0	0.56
2002	130	23	1	596.558	-316.101	D	7.453	7.453	0	3	99.92	0.65	0	0	0	0.1
2002	131	23	624	596.324	-316.278	D	7.455	7.453	0.002	3	99.43	0.55	0	0	0	0.08
2002	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	133	23	626	596.299	-315.88	D	7.556	7.453	0.104	3	94.36	5.48	0	0	0	0.16
2002	134	23	624	596.324	-316.278	D	7.453	7.453	0	3	99.79	0.14	0	0	0	0.44
2002	135	23	637	596.267	-315.066	D	7.485	7.453	0.032	3	98.92	0.8	0	0	0	0.29
2002	136	23	107	598.487	-311.954	D	7.453	7.453	0	3	77.96	0.08	0	0	0	0.14
2002	137	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	138	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	139	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	140	23	624	596.324	-316.278	D	7.458	7.453	0.005	3	97.61	2.13	0	0	0	0.28
2002	141	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	142	23	1	596.558	-316.101	D	7.453	7.453	0	3	100.14	0.82	0	0	0	0.12
2002	143	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	145	23	517	602.805	-305.061	D	7.453	7.453	0	3	105.91	0.5	0	0	0	0.25
2002	146	23	517	602.805	-305.061	D	7.485	7.453	0.032	3	98.29	1.54	0	0	0	0.18
2002	147	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	99.78	0.09	0	0	0	0.14
2002	148	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	149	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	151	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2002	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	156	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	99.6	0.26	0	0	0	0.19
2002	157	23	517	602.805	-305.061	D	7.567	7.546	0.021	3.2	98.55	1.32	0	0	0	0.14
2002	158	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	159	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	164	23	517	602.805	-305.061	D	7.59	7.546	0.044	3.2	99.77	0.04	0	0	0	0.19
2002	165	23	624	596.324	-316.278	D	7.618	7.546	0.071	3.2	99.61	0.11	0	0	0	0.28
2002	166	23	624	596.324	-316.278	D	7.549	7.546	0.003	3.2	99.57	0.1	0	0	0	0.35
2002	167	23	517	602.805	-305.061	D	7.699	7.546	0.153	3.2	99.55	0.16	0	0	0	0.29
2002	168	23	624	596.324	-316.278	D	7.719	7.546	0.173	3.2	99.32	0.46	0	0	0	0.21
2002	169	23	624	596.324	-316.278	D	7.725	7.546	0.179	3.2	99.8	0.06	0	0	0	0.15
2002	170	23	517	602.805	-305.061	D	7.652	7.546	0.106	3.2	99.79	0.08	0	0	0	0.12
2002	171	23	517	602.805	-305.061	D	7.547	7.546	0	3.2	99.77	0.02	0	0	0	0.13
2002	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	178	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	99.66	0.07	0	0	0	0.26
2002	179	23	688	601.298	-307.191	D	7.793	7.546	0.247	3.2	99.19	0.63	0	0	0	0.18
2002	180	23	637	596.267	-315.066	D	7.87	7.546	0.324	3.2	99.64	0.23	0	0	0	0.13
2002	181	23	517	602.805	-305.061	D	7.558	7.546	0.012	3.2	99.87	0.02	0	0	0	0.12
2002	182	23	1	596.558	-316.101	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2002	183	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	185	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	186	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	187	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	23	517	602.805	-305.061	D	7.821	7.593	0.229	3.3	99.69	0.08	0	0	0	0.23
2002	192	23	603	598.68	-316.244	D	7.645	7.593	0.052	3.3	98.55	1.27	0	0	0	0.19
2002	193	23	624	596.324	-316.278	D	7.599	7.593	0.007	3.3	99.68	0.2	0	0	0	0.11
2002	194	23	624	596.324	-316.278	D	7.594	7.593	0.001	3.3	99.24	0.71	0	0	0	0.1
2002	195	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	196	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	197	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	198	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	199	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	99.92	0.03	0	0	0	0.12
2002	202	23	517	602.805	-305.061	D	7.602	7.593	0.009	3.3	99.86	0.05	0	0	0	0.1
2002	203	23	517	602.805	-305.061	D	7.596	7.593	0.004	3.3	99.83	0.06	0	0	0	0.09
2002	204	23	637	596.267	-315.066	D	7.725	7.593	0.132	3.3	99.72	0.1	0	0	0	0.18
2002	205	23	624	596.324	-316.278	D	7.664	7.593	0.072	3.3	99.78	0.1	0	0	0	0.12
2002	206	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	207	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	208	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	517	602.805	-305.061	D	7.603	7.593	0.01	3.3	99.69	0.13	0	0	0	0.19
2002	212	23	517	602.805	-305.061	D	7.597	7.593	0.005	3.3	99.62	0.28	0	0	0	0.14
2002	213	23	517	602.805	-305.061	D	7.683	7.681	0.001	3.492	99.68	0.1	0	0	0	0.09
2002	214	23	501	603.015	-309.106	D	7.688	7.685	0.003	3.5	99.85	0.04	0	0	0	0.08
2002	215	23	695	602.257	-305.836	D	7.686	7.685	0.001	3.5	99.96	0.03	0	0	0	0.08
2002	216	23	631	596.276	-315.551	D	7.686	7.685	0.001	3.5	99.85	0.02	0	0	0	0.07
2002	217	23	517	602.805	-305.061	D	7.685	7.685	0.001	3.5	99.84	0.01	0	0	0	0.07
2002	218	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	99.63	0.17	0	0	0	0.06
2002	219	23	1	596.558	-316.101	D	7.685	7.685	0.001	3.5	99.82	0.09	0	0	0	0.06
2002	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	226	23	517	602.805	-305.061	D	7.695	7.685	0.01	3.5	99.61	0.21	0	0	0	0.18
2002	227	23	517	602.805	-305.061	D	7.7	7.685	0.015	3.5	99.69	0.16	0	0	0	0.15
2002	228	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	232	23	517	602.805	-305.061	D	7.694	7.685	0.009	3.5	99.8	0.07	0	0	0	0.12
2002	233	23	517	602.805	-305.061	D	7.7	7.685	0.015	3.5	99.82	0.08	0	0	0	0.09
2002	234	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	236	23	517	602.805	-305.061	D	7.961	7.685	0.276	3.5	99.7	0.15	0	0	0	0.15
2002	237	23	548	603.28	-312.734	D	7.765	7.685	0.08	3.5	99.57	0.31	0	0	0	0.11

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	238	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	239	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	245	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	246	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	247	23	637	596.267	-315.066	D	7.718	7.685	0.033	3.5	99.56	0.19	0	0	0	0.25
2002	248	23	624	596.324	-316.278	D	7.695	7.685	0.01	3.5	99.75	0.05	0	0	0	0.19
2002	249	23	637	596.267	-315.066	D	7.687	7.685	0.002	3.5	99.82	0.03	0	0	0	0.17
2002	250	23	6	596.462	-314.859	D	7.685	7.685	0	3.5	98.97	0.01	0	0	0	0.15
2002	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	254	23	603	598.68	-316.244	D	7.741	7.685	0.056	3.5	99	0.68	0	0	0	0.32
2002	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	257	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	258	23	517	602.805	-305.061	D	7.704	7.685	0.019	3.5	99.7	0.12	0	0	0	0.18
2002	259	23	624	596.324	-316.278	D	7.981	7.685	0.296	3.5	98.68	1.18	0	0	0	0.14
2002	260	23	637	596.267	-315.066	D	7.828	7.685	0.143	3.5	99.56	0.32	0	0	0	0.12
2002	261	23	517	602.805	-305.061	D	7.721	7.685	0.036	3.5	98.81	1.11	0	0	0	0.09
2002	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	264	23	517	602.805	-305.061	D	7.691	7.685	0.006	3.5	99.53	0.1	0	0	0	0.36
2002	265	23	517	602.805	-305.061	D	7.833	7.685	0.148	3.5	99.01	0.77	0	0	0	0.21
2002	266	23	603	598.68	-316.244	D	7.685	7.685	0.001	3.5	99.86	0.06	0	0	0	0.08
2002	267	23	517	602.805	-305.061	D	7.763	7.685	0.078	3.5	99.13	0.55	0	0	0	0.32
2002	268	23	624	596.324	-316.278	D	7.693	7.685	0.008	3.5	99.56	0.23	0	0	0	0.21
2002	269	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	270	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	271	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	272	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	273	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	274	23	1	596.558	-316.101	D	7.507	7.507	0	3.117	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	624	596.324	-316.278	D	7.516	7.5	0.016	3.1	95.04	4.28	0	0	0	0.69
2002	279	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	98.98	0.8	0	0	0	0.28
2002	280	23	517	602.805	-305.061	D	7.512	7.5	0.013	3.1	97.31	2.25	0	0	0	0.44
2002	281	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	282	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	285	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	23	625	596.311	-316.079	D	7.5	7.5	0	3.1	94.64	6.29	0	0	0	0.24
2002	287	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	517	602.805	-305.061	D	7.552	7.5	0.052	3.1	97.99	1.39	0	0	0	0.62
2002	289	23	603	598.68	-316.244	D	7.507	7.5	0.007	3.1	98.14	1.38	0	0	0	0.48
2002	290	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	291	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	292	23	517	602.805	-305.061	D	7.521	7.5	0.021	3.1	95.08	4.69	0	0	0	0.23
2002	293	23	603	598.68	-316.244	D	7.515	7.5	0.015	3.1	95.85	4.01	0	0	0	0.15
2002	294	23	603	598.68	-316.244	D	7.5	7.5	0.001	3.1	97.75	2.33	0	0	0	0.11
2002	295	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	296	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	297	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	298	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	299	23	624	596.324	-316.278	D	7.866	7.5	0.366	3.1	94.17	5.56	0	0	0	0.27
2002	300	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	301	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	302	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	305	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	306	23	637	596.267	-315.066	D	7.568	7.5	0.069	3.1	87.87	11.53	0	0	0	0.6
2002	307	23	517	602.805	-305.061	D	7.832	7.5	0.333	3.1	90.9	8.83	0	0	0	0.27
2002	308	23	517	602.805	-305.061	D	8.201	7.5	0.701	3.1	94.12	5.66	0	0	0	0.22
2002	309	23	517	602.805	-305.061	D	7.607	7.5	0.108	3.1	95.1	4.76	0	0	0	0.14
2002	310	23	517	602.805	-305.061	D	7.823	7.5	0.323	3.1	95.47	4.4	0	0	0	0.13
2002	311	23	548	603.28	-312.734	D	7.587	7.5	0.088	3.1	92.8	6.83	0	0	0	0.37
2002	312	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	98.23	1.42	0	0	0	0.23
2002	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	517	602.805	-305.061	D	7.514	7.5	0.014	3.1	97	2.59	0	0	0	0.42
2002	315	23	624	596.324	-316.278	D	7.512	7.5	0.013	3.1	85.42	13.42	0	0	0	1.17

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	317	23	603	598.68	-316.244	D	7.533	7.5	0.034	3.1	87.78	11.64	0	0	0	0.59
2002	318	23	548	603.28	-312.734	D	7.5	7.5	0.001	3.1	94.27	5.43	0	0	0	0.37
2002	319	23	517	602.805	-305.061	D	7.51	7.5	0.011	3.1	89.43	10.19	0	0	0	0.39
2002	320	23	547	603.265	-312.487	D	7.5	7.5	0	3.1	92.89	6.87	0	0	0	0.19
2002	321	23	624	596.324	-316.278	D	7.517	7.5	0.018	3.1	91.65	7.83	0	0	0	0.53
2002	322	23	548	603.28	-312.734	D	7.529	7.5	0.029	3.1	91.42	8.2	0	0	0	0.39
2002	323	23	624	596.324	-316.278	D	7.609	7.5	0.109	3.1	90.77	8.86	0	0	0	0.38
2002	324	23	631	596.276	-315.551	D	7.523	7.5	0.023	3.1	93.01	6.49	0	0	0	0.51
2002	325	23	624	596.324	-316.278	D	7.585	7.5	0.085	3.1	90.91	8.18	0	0	0	0.91
2002	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	327	23	624	596.324	-316.278	D	7.575	7.5	0.076	3.1	87.87	11.67	0	0	0	0.47
2002	328	23	517	602.805	-305.061	D	7.502	7.5	0.003	3.1	95.33	4.39	0	0	0	0.33
2002	329	23	631	596.276	-315.551	D	7.542	7.5	0.043	3.1	93.62	6.21	0	0	0	0.18
2002	330	23	548	603.28	-312.734	D	7.501	7.5	0.001	3.1	93.92	6	0	0	0	0.16
2002	331	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	332	23	517	602.805	-305.061	D	7.542	7.5	0.042	3.1	86	13.58	0	0	0	0.42
2002	333	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	90.49	9.19	0	0	0	0.32
2002	334	23	517	602.805	-305.061	D	7.555	7.5	0.055	3.1	71.62	26.57	0	0	0	1.81
2002	335	23	624	596.324	-316.278	D	7.591	7.589	0.002	3.292	82.83	16.53	0	0	0	0.56
2002	336	23	517	602.805	-305.061	D	7.61	7.593	0.017	3.3	81.59	17.97	0	0	0	0.44
2002	337	23	637	596.267	-315.066	D	7.611	7.593	0.018	3.3	81.6	18.09	0	0	0	0.31
2002	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	340	23	603	598.68	-316.244	D	7.746	7.593	0.153	3.3	80.05	19.24	0	0	0	0.72
2002	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	517	602.805	-305.061	D	7.685	7.593	0.093	3.3	93.35	6.43	0	0	0	0.22
2002	343	23	624	596.324	-316.278	D	7.624	7.593	0.031	3.3	93.97	5.88	0	0	0	0.15
2002	344	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	348	23	624	596.324	-316.278	D	7.595	7.593	0.002	3.3	92.35	7.32	0	0	0	0.28
2002	349	23	656	597.971	-312.292	D	7.628	7.593	0.035	3.3	91.48	8.31	0	0	0	0.22
2002	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	637	596.267	-315.066	D	7.61	7.593	0.018	3.3	89.13	10.57	0	0	0	0.31
2002	354	23	624	596.324	-316.278	D	7.675	7.593	0.082	3.3	82.68	16.49	0	0	0	0.84

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	355	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	632	596.27	-315.421	D	7.651	7.593	0.059	3.3	85.79	13.59	0	0	0	0.63
2002	357	23	517	602.805	-305.061	D	7.637	7.593	0.044	3.3	81.8	17.52	0	0	0	0.69
2002	358	23	603	598.68	-316.244	D	7.61	7.593	0.018	3.3	81.02	18.62	0	0	0	0.36
2002	359	23	624	596.324	-316.278	D	7.594	7.593	0.001	3.3	85.72	13.87	0	0	0	0.39
2002	360	23	624	596.324	-316.278	D	8.061	7.593	0.469	3.3	88.72	10.92	0	0	0	0.35
2002	361	23	603	598.68	-316.244	D	7.809	7.593	0.216	3.3	92.56	7.24	0	0	0	0.2
2002	362	23	517	602.805	-305.061	D	7.603	7.593	0.01	3.3	95.15	4.72	0	0	0	0.14
2002	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	548	603.28	-312.734	D	7.605	7.593	0.012	3.3	92.97	6.86	0	0	0	0.16
									0.701							
MARSHALL									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	624	596.324	-316.278	D	7.593	7.593	0	3.3	60.01	39.27	0	0	0	0.79
2002	2	23	624	596.324	-316.278	D	7.593	7.593	0	3.3	59.23	37.03	0	0	0	0.64
2002	3	23	637	596.267	-315.066	D	7.628	7.593	0.035	3.3	66.06	33.21	0	0	0	0.73
2002	4	23	603	598.68	-316.244	D	7.68	7.593	0.088	3.3	72.67	26.89	0	0	0	0.44
2002	5	23	516	602.728	-305.38	D	7.593	7.593	0	3.3	86.73	12.68	0	0	0	0.25
2002	6	23	624	596.324	-316.278	D	7.848	7.593	0.255	3.3	77.32	22.24	0	0	0	0.44
2002	7	23	603	598.68	-316.244	D	7.593	7.593	0.001	3.3	81.55	18.12	0	0	0	0.29
2002	8	23	632	596.27	-315.421	D	7.623	7.593	0.03	3.3	70.28	29.24	0	0	0	0.47
2002	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	517	602.805	-305.061	D	7.731	7.593	0.138	3.3	89.35	10.24	0	0	0	0.41
2002	11	23	624	596.324	-316.278	D	7.625	7.593	0.033	3.3	85.24	14.2	0	0	0	0.56
2002	12	23	517	602.805	-305.061	D	7.639	7.593	0.047	3.3	81.22	18.15	0	0	0	0.63
2002	13	23	517	602.805	-305.061	D	7.613	7.593	0.02	3.3	80.4	18.89	0	0	0	0.71
2002	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	604	598.599	-316.246	D	7.62	7.593	0.028	3.3	67.68	31.6	0	0	0	0.71
2002	18	23	517	602.805	-305.061	D	7.633	7.593	0.041	3.3	79.24	20.24	0	0	0	0.52
2002	19	23	517	602.805	-305.061	D	7.61	7.593	0.017	3.3	84.08	15.61	0	0	0	0.31
2002	20	23	517	602.805	-305.061	D	7.701	7.593	0.109	3.3	87.77	12.04	0	0	0	0.2
2002	21	23	281	600.703	-308.285	D	7.593	7.593	0	3.3	86.81	9.11	0	0	0	0.1
2002	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	24	23	517	602.805	-305.061	D	7.741	7.593	0.149	3.3	87.98	11.78	0	0	0	0.24
2002	25	23	548	603.28	-312.734	D	7.66	7.593	0.067	3.3	71.09	28.21	0	0	0	0.7
2002	26	23	548	603.28	-312.734	D	7.624	7.593	0.032	3.3	88.77	10.86	0	0	0	0.37
2002	27	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	94.56	5.23	0	0	0	0.23
2002	28	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	80.46	19.03	0	0	0	0.49
2002	30	23	631	596.276	-315.551	D	7.767	7.593	0.174	3.3	81.41	18.21	0	0	0	0.38
2002	31	23	637	596.267	-315.066	D	7.62	7.593	0.027	3.3	86.94	12.9	0	0	0	0.17
2002	32	23	517	602.805	-305.061	D	7.514	7.459	0.056	3.013	83.41	16.22	0	0	0	0.38
2002	33	23	637	596.267	-315.066	D	7.553	7.453	0.1	3	79.17	20.32	0	0	0	0.52
2002	34	23	637	596.267	-315.066	D	7.471	7.453	0.019	3	87.35	12.3	0	0	0	0.36
2002	35	23	631	596.276	-315.551	D	7.494	7.453	0.041	3	78.94	20.31	0	0	0	0.75
2002	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	37	23	281	600.703	-308.285	D	7.453	7.453	0	3	90.68	10.21	0	0	0	0.38
2002	38	23	637	596.267	-315.066	D	7.585	7.453	0.133	3	87.8	11.8	0	0	0	0.4
2002	39	23	548	603.28	-312.734	D	7.542	7.453	0.089	3	86.29	13.41	0	0	0	0.3
2002	40	23	517	602.805	-305.061	D	7.453	7.453	0	3	93.28	6.84	0	0	0	0.17
2002	41	23	640	596.683	-314.55	D	7.505	7.453	0.052	3	90.42	9.22	0	0	0	0.36
2002	42	23	637	596.267	-315.066	D	7.457	7.453	0.004	3	76.75	22.42	0	0	0	0.88
2002	43	23	517	602.805	-305.061	D	7.473	7.453	0.02	3	85.36	13.55	0	0	0	1.1
2002	44	23	624	596.324	-316.278	D	7.459	7.453	0.007	3	88.65	10.33	0	0	0	1.02
2002	45	23	688	601.298	-307.191	D	7.506	7.453	0.054	3	79.77	19.68	0	0	0	0.55
2002	46	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	86.81	12.76	0	0	0	0.48
2002	47	23	517	602.805	-305.061	D	7.474	7.453	0.021	3	79.57	19.63	0	0	0	0.81
2002	48	23	624	596.324	-316.278	D	7.458	7.453	0.005	3	84.01	14.77	0	0	0	1.22
2002	49	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	50	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	517	602.805	-305.061	D	7.475	7.453	0.022	3	88.93	10.61	0	0	0	0.47
2002	53	23	624	596.324	-316.278	D	7.468	7.453	0.016	3	88.56	10.96	0	0	0	0.48
2002	54	23	637	596.267	-315.066	D	7.454	7.453	0.001	3	89.13	10.36	0	0	0	0.62
2002	55	23	637	596.267	-315.066	D	7.455	7.453	0.002	3	86.66	13.06	0	0	0	0.33
2002	56	23	632	596.27	-315.421	D	7.483	7.453	0.031	3	75.88	23.42	0	0	0	0.7
2002	57	23	517	602.805	-305.061	D	7.475	7.453	0.022	3	61.24	37.82	0	0	0	0.95
2002	58	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	596.558	-316.101	D	7.362	7.362	0	2.808	0	0	0	0	0	0
2002	61	23	631	596.276	-315.551	D	7.511	7.358	0.153	2.8	86.23	13.49	0	0	0	0.28
2002	62	23	517	602.805	-305.061	D	7.386	7.358	0.028	2.8	61.95	37.04	0	0	0	1.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	63	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	64	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	69	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	76.57	22.5	0	0	0	0.91
2002	70	23	517	602.805	-305.061	D	7.363	7.358	0.005	2.8	75.23	24.21	0	0	0	0.59
2002	71	23	326	601.161	-307.751	D	7.358	7.358	0	2.8	85.47	8.92	0	0	0	0.28
2002	72	23	689	601.435	-306.997	D	7.371	7.358	0.012	2.8	92.68	6.97	0	0	0	0.36
2002	73	23	517	602.805	-305.061	D	7.36	7.358	0.001	2.8	97.72	2.12	0	0	0	0.2
2002	74	23	632	596.27	-315.421	D	7.382	7.358	0.024	2.8	82.54	16.94	0	0	0	0.52
2002	75	23	603	598.68	-316.244	D	7.362	7.358	0.004	2.8	88.52	11.2	0	0	0	0.3
2002	76	23	548	603.28	-312.734	D	7.359	7.358	0.001	2.8	90.93	9.02	0	0	0	0.13
2002	77	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	80	23	624	596.324	-316.278	D	7.419	7.358	0.061	2.8	74.69	24.64	0	0	0	0.67
2002	81	23	624	596.324	-316.278	D	7.359	7.358	0.001	2.8	77.25	21.93	0	0	0	0.83
2002	82	23	637	596.267	-315.066	D	7.401	7.358	0.043	2.8	75.48	24.01	0	0	0	0.51
2002	83	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	88.87	10.8	0	0	0	0.26
2002	84	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	85	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	86	23	632	596.27	-315.421	D	7.359	7.358	0	2.8	82.77	17.05	0	0	0	0.55
2002	87	23	517	602.805	-305.061	D	7.358	7.358	0	2.8	97.38	5.67	0	0	0	0.22
2002	88	23	637	596.267	-315.066	D	7.367	7.358	0.009	2.8	97.38	2.37	0	0	0	0.26
2002	89	23	624	596.324	-316.278	D	7.366	7.358	0.008	2.8	97.45	2.34	0	0	0	0.2
2002	90	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	91	23	603	598.68	-316.244	D	7.292	7.267	0.025	2.608	94.03	5.33	0	0	0	0.65
2002	92	23	517	602.805	-305.061	D	7.312	7.263	0.049	2.6	95.59	4.04	0	0	0	0.37
2002	93	23	603	598.68	-316.244	D	7.279	7.263	0.016	2.6	96.2	3.54	0	0	0	0.27
2002	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	95	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	96	23	689	601.435	-306.997	D	7.311	7.263	0.048	2.6	91.31	8.25	0	0	0	0.44
2002	97	23	632	596.27	-315.421	D	7.271	7.263	0.008	2.6	94.7	5.04	0	0	0	0.26
2002	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	99	23	517	602.805	-305.061	D	7.38	7.263	0.117	2.6	87.41	12.21	0	0	0	0.37
2002	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	103	23	517	602.805	-305.061	D	7.42	7.263	0.157	2.6	93.84	5.82	0	0	0	0.33
2002	104	23	517	602.805	-305.061	D	7.291	7.263	0.028	2.6	99.21	0.54	0	0	0	0.25
2002	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	110	23	517	602.805	-305.061	D	7.381	7.263	0.118	2.6	97.99	1.65	0	0	0	0.36
2002	111	23	517	602.805	-305.061	D	7.405	7.263	0.142	2.6	94.76	5.01	0	0	0	0.23
2002	112	23	517	602.805	-305.061	D	7.308	7.263	0.045	2.6	95.42	4.23	0	0	0	0.36
2002	113	23	698	602.668	-305.255	D	7.308	7.263	0.045	2.6	95.19	4.28	0	0	0	0.52
2002	114	23	432	602.04	-306.183	D	7.263	7.263	0	2.6	93.75	0.49	0	0	0	0.24
2002	115	23	517	602.805	-305.061	D	7.334	7.263	0.071	2.6	94.39	5.42	0	0	0	0.19
2002	116	23	548	603.28	-312.734	D	7.336	7.263	0.073	2.6	95.17	4.21	0	0	0	0.63
2002	117	23	631	596.276	-315.551	D	7.286	7.263	0.023	2.6	97.19	2.46	0	0	0	0.35
2002	118	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	98.47	1.5	0	0	0	0.41
2002	119	23	688	601.298	-307.191	D	7.314	7.263	0.051	2.6	87.97	11.25	0	0	0	0.78
2002	120	23	637	596.267	-315.066	D	7.317	7.263	0.054	2.6	98.72	0.9	0	0	0	0.38
2002	121	23	517	602.805	-305.061	D	7.453	7.445	0.009	2.983	98.91	0.89	0	0	0	0.23
2002	122	23	517	602.805	-305.061	D	7.61	7.453	0.157	3	90.95	8.8	0	0	0	0.25
2002	123	23	548	603.28	-312.734	D	7.457	7.453	0.004	3	98.43	1.51	0	0	0	0.1
2002	124	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	128	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	129	23	522	602.882	-306.299	D	7.503	7.453	0.05	3	96.28	3.22	0	0	0	0.51
2002	130	23	625	596.311	-316.079	D	7.525	7.453	0.073	3	95.19	4.21	0	0	0	0.6
2002	131	23	624	596.324	-316.278	D	7.461	7.453	0.009	3	99.1	0.81	0	0	0	0.11
2002	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	133	23	637	596.267	-315.066	D	7.606	7.453	0.154	3	90.64	9.11	0	0	0	0.25
2002	134	23	624	596.324	-316.278	D	7.499	7.453	0.047	3	93.92	4.97	0	0	0	1.11
2002	135	23	603	598.68	-316.244	D	7.488	7.453	0.035	3	98.4	1.17	0	0	0	0.44
2002	136	23	517	602.805	-305.061	D	7.453	7.453	0	3	99.67	0.27	0	0	0	0.3
2002	137	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	138	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	139	23	517	602.805	-305.061	D	7.457	7.453	0.005	3	98.23	1.27	0	0	0	0.52
2002	140	23	603	598.68	-316.244	D	7.579	7.453	0.126	3	97.18	2.38	0	0	0	0.44

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	141	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	142	23	517	602.805	-305.061	D	7.463	7.453	0.01	3	96.52	3.31	0	0	0	0.18
2002	143	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	146	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	99.38	0.45	0	0	0	0.3
2002	147	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	99.66	0.19	0	0	0	0.22
2002	148	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	149	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	151	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2002	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	156	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	99.96	0.43	0	0	0	0.29
2002	157	23	624	596.324	-316.278	D	7.549	7.546	0.003	3.2	95.24	4.64	0	0	0	0.18
2002	158	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	97.72	1.91	0	0	0	0.26
2002	159	23	6	596.462	-314.859	D	7.546	7.546	0	3.2	99.26	0.24	0	0	0	0.18
2002	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	164	23	517	602.805	-305.061	D	7.557	7.546	0.011	3.2	99.6	0.12	0	0	0	0.29
2002	165	23	624	596.324	-316.278	D	7.579	7.546	0.033	3.2	99.14	0.43	0	0	0	0.44
2002	166	23	637	596.267	-315.066	D	7.574	7.546	0.027	3.2	99.02	0.36	0	0	0	0.63
2002	167	23	517	602.805	-305.061	D	7.556	7.546	0.01	3.2	99.36	0.17	0	0	0	0.49
2002	168	23	624	596.324	-316.278	D	7.581	7.546	0.035	3.2	98.14	1.54	0	0	0	0.32
2002	169	23	624	596.324	-316.278	D	7.637	7.546	0.091	3.2	99.58	0.19	0	0	0	0.22
2002	170	23	517	602.805	-305.061	D	7.574	7.546	0.028	3.2	99.72	0.11	0	0	0	0.18
2002	171	23	490	602.499	-305.648	D	7.546	7.546	0	3.2	99.48	0.02	0	0	0	0.16
2002	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	178	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	179	23	517	602.805	-305.061	D	7.717	7.546	0.171	3.2	98.37	1.39	0	0	0	0.25

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	180	23	517	602.805	-305.061	D	7.741	7.546	0.195	3.2	99.36	0.47	0	0	0	0.17
2002	181	23	517	602.805	-305.061	D	7.55	7.546	0.004	3.2	99.81	0.04	0	0	0	0.16
2002	182	23	1	596.558	-316.101	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2002	183	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	185	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	186	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	187	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	23	517	602.805	-305.061	D	7.614	7.593	0.021	3.3	99.48	0.14	0	0	0	0.38
2002	192	23	624	596.324	-316.278	D	7.606	7.593	0.013	3.3	96.84	2.95	0	0	0	0.23
2002	193	23	624	596.324	-316.278	D	7.595	7.593	0.002	3.3	99.21	0.7	0	0	0	0.15
2002	194	23	624	596.324	-316.278	D	7.593	7.593	0.001	3.3	98.03	1.97	0	0	0	0.13
2002	195	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	196	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	197	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	198	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	199	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	515	602.747	-305.629	D	7.593	7.593	0	3.3	96.18	0.06	0	0	0	0.17
2002	202	23	517	602.805	-305.061	D	7.605	7.593	0.013	3.3	99.75	0.14	0	0	0	0.13
2002	203	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	99.79	0.11	0	0	0	0.12
2002	204	23	517	602.805	-305.061	D	7.659	7.593	0.066	3.3	99.55	0.21	0	0	0	0.24
2002	205	23	603	598.68	-316.244	D	7.621	7.593	0.028	3.3	98.9	0.93	0	0	0	0.17
2002	206	23	603	598.68	-316.244	D	7.593	7.593	0	3.3	99.72	0.07	0	0	0	0.12
2002	207	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	208	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	517	602.805	-305.061	D	7.595	7.593	0.003	3.3	99.66	0.04	0	0	0	0.3
2002	212	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	99.65	0.36	0	0	0	0.22
2002	213	23	517	602.805	-305.061	D	7.682	7.681	0.001	3.492	99.62	0.24	0	0	0	0.14
2002	214	23	489	602.518	-305.896	D	7.687	7.685	0.002	3.5	99.74	0.1	0	0	0	0.12
2002	215	23	623	596.511	-316.262	D	7.686	7.685	0.001	3.5	99.79	0.03	0	0	0	0.1
2002	216	23	1	596.558	-316.101	D	7.685	7.685	0.001	3.5	99.67	0.06	0	0	0	0.1
2002	217	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	99.81	0.03	0	0	0	0.1
2002	218	23	637	596.267	-315.066	D	7.686	7.685	0.001	3.5	99.5	0.34	0	0	0	0.19

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	219	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	99.74	0.2	0	0	0	0.08
2002	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	226	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	99	0.77	0	0	0	0.23
2002	227	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	99.33	0.47	0	0	0	0.17
2002	228	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	232	23	517	602.805	-305.061	D	7.688	7.685	0.004	3.5	99.74	0.1	0	0	0	0.16
2002	233	23	517	602.805	-305.061	D	7.689	7.685	0.004	3.5	99.72	0.15	0	0	0	0.13
2002	234	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	236	23	517	602.805	-305.061	D	7.853	7.685	0.168	3.5	99.47	0.25	0	0	0	0.28
2002	237	23	548	603.28	-312.734	D	7.72	7.685	0.035	3.5	99.21	0.62	0	0	0	0.17
2002	238	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	239	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	245	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	246	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	247	23	698	602.668	-305.255	D	7.74	7.685	0.055	3.5	99.19	0.45	0	0	0	0.36
2002	248	23	624	596.324	-316.278	D	7.694	7.685	0.009	3.5	99.63	0.09	0	0	0	0.26
2002	249	23	637	596.267	-315.066	D	7.686	7.685	0.001	3.5	99.79	0.06	0	0	0	0.21
2002	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	95.09	0.01	0	0	0	0.19
2002	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	254	23	624	596.324	-316.278	D	7.708	7.685	0.023	3.5	98.09	1.43	0	0	0	0.49
2002	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	257	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	99.61	0.17	0	0	0	0.21

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	258	23	517	602.805	-305.061	D	7.709	7.685	0.024	3.5	99.38	0.38	0	0	0	0.24
2002	259	23	624	596.324	-316.278	D	8.033	7.685	0.348	3.5	97.3	2.52	0	0	0	0.18
2002	260	23	637	596.267	-315.066	D	7.834	7.685	0.149	3.5	99.02	0.82	0	0	0	0.16
2002	261	23	517	602.805	-305.061	D	7.715	7.685	0.03	3.5	97.5	2.37	0	0	0	0.13
2002	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	264	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	265	23	603	598.68	-316.244	D	7.716	7.685	0.031	3.5	98.57	1.12	0	0	0	0.3
2002	266	23	603	598.68	-316.244	D	7.685	7.685	0	3.5	99.4	0.23	0	0	0	0.19
2002	267	23	517	602.805	-305.061	D	7.719	7.685	0.034	3.5	98.08	1.47	0	0	0	0.46
2002	268	23	624	596.324	-316.278	D	7.721	7.685	0.036	3.5	98.32	1.4	0	0	0	0.28
2002	269	23	625	596.311	-316.079	D	7.685	7.685	0	3.5	95.12	0.1	0	0	0	0.2
2002	270	23	637	596.267	-315.066	D	7.685	7.685	0	3.5	98.81	0.68	0	0	0	0.18
2002	271	23	662	598.404	-311.683	D	7.688	7.685	0.003	3.5	98.39	1.26	0	0	0	0.35
2002	272	23	637	596.267	-315.066	D	7.697	7.685	0.012	3.5	99.16	0.64	0	0	0	0.21
2002	273	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	99.72	0.1	0	0	0	0.15
2002	274	23	1	596.558	-316.101	D	7.507	7.507	0	3.117	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	626	596.299	-315.88	D	7.51	7.5	0.011	3.1	84.81	13.49	0	0	0	1.7
2002	279	23	517	602.805	-305.061	D	7.504	7.5	0.005	3.1	98.26	1.34	0	0	0	0.44
2002	280	23	517	602.805	-305.061	D	7.509	7.5	0.009	3.1	89.38	9.48	0	0	0	1.15
2002	281	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	282	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	285	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	23	632	596.27	-315.421	D	7.505	7.5	0.006	3.1	88.94	10.75	0	0	0	0.31
2002	287	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	517	602.805	-305.061	D	7.518	7.5	0.019	3.1	96.45	2.67	0	0	0	0.89
2002	289	23	548	603.28	-312.734	D	7.506	7.5	0.006	3.1	96.1	3.16	0	0	0	0.74
2002	290	23	624	596.324	-316.278	D	7.566	7.5	0.066	3.1	92.23	7.2	0	0	0	0.57
2002	291	23	548	603.28	-312.734	D	7.509	7.5	0.01	3.1	97.5	2.21	0	0	0	0.3
2002	292	23	517	602.805	-305.061	D	7.521	7.5	0.021	3.1	84.8	14.86	0	0	0	0.34
2002	293	23	603	598.68	-316.244	D	7.51	7.5	0.011	3.1	87.89	11.91	0	0	0	0.22
2002	294	23	78	598.564	-316.197	D	7.5	7.5	0	3.1	94.83	5.38	0	0	0	0.13
2002	295	23	50	598.048	-315.987	D	7.5	7.5	0	3.1	72.79	1.27	0	0	0	0.08
2002	296	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	297	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	298	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	299	23	637	596.267	-315.066	D	8.493	7.5	0.994	3.1	88.26	11.37	0	0	0	0.37
2002	300	23	624	596.324	-316.278	D	7.509	7.5	0.01	3.1	94.34	5.32	0	0	0	0.34
2002	301	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	90.58	7.92	0	0	0	0.18
2002	302	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	305	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	306	23	624	596.324	-316.278	D	7.638	7.5	0.139	3.1	70.32	28.71	0	0	0	0.98
2002	307	23	548	603.28	-312.734	D	7.608	7.5	0.109	3.1	86.13	13.57	0	0	0	0.3
2002	308	23	517	602.805	-305.061	D	8.019	7.5	0.52	3.1	86.44	13.2	0	0	0	0.36
2002	309	23	517	602.805	-305.061	D	7.611	7.5	0.112	3.1	90.32	9.47	0	0	0	0.21
2002	310	23	624	596.324	-316.278	D	7.864	7.5	0.364	3.1	89.12	10.54	0	0	0	0.35
2002	311	23	517	602.805	-305.061	D	7.508	7.5	0.009	3.1	86.83	12.73	0	0	0	0.44
2002	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	517	602.805	-305.061	D	7.509	7.5	0.01	3.1	94.88	4.58	0	0	0	0.55
2002	315	23	624	596.324	-316.278	D	7.611	7.5	0.111	3.1	74.04	24.56	0	0	0	1.4
2002	316	23	603	598.68	-316.244	D	7.535	7.5	0.035	3.1	80.86	18.37	0	0	0	0.77
2002	317	23	603	598.68	-316.244	D	7.533	7.5	0.034	3.1	80.3	19.03	0	0	0	0.67
2002	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	517	602.805	-305.061	D	7.508	7.5	0.009	3.1	82.31	17.19	0	0	0	0.51
2002	320	23	547	603.265	-312.487	D	7.5	7.5	0	3.1	87.79	11.77	0	0	0	0.25
2002	321	23	624	596.324	-316.278	D	7.502	7.5	0.002	3.1	78.8	20.46	0	0	0	0.77
2002	322	23	548	603.28	-312.734	D	7.502	7.5	0.003	3.1	80.99	18.46	0	0	0	0.55
2002	323	23	637	596.267	-315.066	D	7.622	7.5	0.122	3.1	79.02	20.15	0	0	0	0.84
2002	324	23	603	598.68	-316.244	D	7.537	7.5	0.038	3.1	88.6	10.89	0	0	0	0.51
2002	325	23	517	602.805	-305.061	D	7.548	7.5	0.049	3.1	67.19	31.2	0	0	0	1.61
2002	326	23	624	596.324	-316.278	D	7.501	7.5	0.002	3.1	82.88	16.36	0	0	0	0.79
2002	327	23	624	596.324	-316.278	D	7.526	7.5	0.027	3.1	81.55	17.89	0	0	0	0.57
2002	328	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	92.08	7.92	0	0	0	0.38
2002	329	23	548	603.28	-312.734	D	7.52	7.5	0.021	3.1	89.56	10.19	0	0	0	0.27
2002	330	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	90.72	9.75	0	0	0	0.21
2002	331	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	332	23	603	598.68	-316.244	D	7.522	7.5	0.022	3.1	73.59	25.89	0	0	0	0.53
2002	333	23	548	603.28	-312.734	D	7.5	7.5	0.001	3.1	83.9	15.74	0	0	0	0.4
2002	334	23	624	596.324	-316.278	D	7.508	7.5	0.008	3.1	65.36	32.96	0	0	0	1.69
2002	335	23	624	596.324	-316.278	D	7.645	7.589	0.057	3.292	63.31	35.72	0	0	0	0.98

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	336	23	548	603.28	-312.734	D	7.594	7.593	0.002	3.3	69.57	29.77	0	0	0	0.65
2002	337	23	637	596.267	-315.066	D	7.61	7.593	0.018	3.3	70.65	28.96	0	0	0	0.4
2002	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	340	23	517	602.805	-305.061	D	7.635	7.593	0.042	3.3	77.68	21.78	0	0	0	0.55
2002	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	517	602.805	-305.061	D	7.672	7.593	0.08	3.3	86.34	13.37	0	0	0	0.29
2002	343	23	624	596.324	-316.278	D	7.617	7.593	0.024	3.3	89.18	10.63	0	0	0	0.19
2002	344	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	348	23	637	596.267	-315.066	D	7.623	7.593	0.03	3.3	80.37	19.07	0	0	0	0.56
2002	349	23	517	602.805	-305.061	D	7.615	7.593	0.022	3.3	82.07	17.53	0	0	0	0.4
2002	350	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	84.85	14.96	0	0	0	0.24
2002	351	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	86.61	12.66	0	0	0	0.15
2002	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	517	602.805	-305.061	D	7.612	7.593	0.02	3.3	79.46	20.13	0	0	0	0.42
2002	354	23	517	602.805	-305.061	D	7.633	7.593	0.041	3.3	82.85	16.83	0	0	0	0.32
2002	355	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	517	602.805	-305.061	D	7.678	7.593	0.085	3.3	52.98	46.11	0	0	0	0.91
2002	357	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	66.35	32.83	0	0	0	0.81
2002	358	23	517	602.805	-305.061	D	7.615	7.593	0.022	3.3	64.2	35.26	0	0	0	0.54
2002	359	23	624	596.324	-316.278	D	7.695	7.593	0.103	3.3	69.31	29.95	0	0	0	0.74
2002	360	23	517	602.805	-305.061	D	7.822	7.593	0.229	3.3	79.83	19.71	0	0	0	0.46
2002	361	23	548	603.28	-312.734	D	7.69	7.593	0.098	3.3	86.9	12.88	0	0	0	0.22
2002	362	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	91.46	8.36	0	0	0	0.17
2002	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	548	603.28	-312.734	D	7.598	7.593	0.006	3.3	82.88	16.91	0	0	0	0.24
									0.994							
COLUMBIA									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	624	596.324	-316.278	D	7.603	7.593	0.011	3.3	42.39	57.63	0	0	0	0
2002	2	23	624	596.324	-316.278	D	7.597	7.593	0.004	3.3	55.19	44.84	0	0	0	0
2002	3	23	637	596.267	-315.066	D	7.644	7.593	0.051	3.3	42.63	57.37	0	0	0	0
2002	4	23	548	603.28	-312.734	D	7.618	7.593	0.026	3.3	53.78	46.22	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	5	23	548	603.28	-312.734	D	7.593	7.593	0	3.3	71.29	28.64	0	0	0	0
2002	6	23	626	596.299	-315.88	D	7.785	7.593	0.192	3.3	62.7	37.3	0	0	0	0
2002	7	23	637	596.267	-315.066	D	7.605	7.593	0.013	3.3	59.83	40.16	0	0	0	0
2002	8	23	517	602.805	-305.061	D	7.6	7.593	0.007	3.3	63.27	36.74	0	0	0	0
2002	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	517	602.805	-305.061	D	7.636	7.593	0.043	3.3	74.12	25.88	0	0	0	0
2002	11	23	637	596.267	-315.066	D	7.634	7.593	0.042	3.3	63.63	36.37	0	0	0	0
2002	12	23	548	603.28	-312.734	D	7.596	7.593	0.003	3.3	72.46	27.55	0	0	0	0
2002	13	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	632	596.27	-315.421	D	7.617	7.593	0.025	3.3	50.69	49.32	0	0	0	0
2002	18	23	517	602.805	-305.061	D	7.612	7.593	0.019	3.3	65.85	34.15	0	0	0	0
2002	19	23	517	602.805	-305.061	D	7.611	7.593	0.018	3.3	70.34	29.66	0	0	0	0
2002	20	23	517	602.805	-305.061	D	7.689	7.593	0.097	3.3	76.78	23.23	0	0	0	0
2002	21	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	83.63	16.43	0	0	0	0
2002	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	517	602.805	-305.061	D	7.625	7.593	0.032	3.3	71.03	28.97	0	0	0	0
2002	25	23	603	598.68	-316.244	D	7.647	7.593	0.055	3.3	57.87	42.13	0	0	0	0
2002	26	23	548	603.28	-312.734	D	7.608	7.593	0.016	3.3	79.38	20.62	0	0	0	0
2002	27	23	547	603.265	-312.487	D	7.595	7.593	0.002	3.3	90.24	9.75	0	0	0	0
2002	28	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	71.03	28.98	0	0	0	0
2002	30	23	656	597.971	-312.292	D	7.985	7.593	0.393	3.3	73.1	26.9	0	0	0	0
2002	31	23	656	597.971	-312.292	D	7.646	7.593	0.054	3.3	79.84	20.16	0	0	0	0
2002	32	23	517	602.805	-305.061	D	7.523	7.459	0.064	3.013	82.48	17.52	0	0	0	0
2002	33	23	517	602.805	-305.061	D	7.514	7.453	0.061	3	58.84	41.17	0	0	0	0
2002	34	23	517	602.805	-305.061	D	7.469	7.453	0.016	3	72.6	27.4	0	0	0	0
2002	35	23	632	596.27	-315.421	D	7.465	7.453	0.012	3	36.01	63.99	0	0	0	0
2002	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	37	23	169	599.385	-310.635	D	7.453	7.453	0	3	78.7	15.93	0	0	0	0
2002	38	23	517	602.805	-305.061	D	7.555	7.453	0.102	3	75.79	24.21	0	0	0	0
2002	39	23	548	603.28	-312.734	D	7.466	7.453	0.014	3	78.21	21.8	0	0	0	0
2002	40	23	544	603.219	-311.745	D	7.459	7.453	0.006	3	85.99	14.04	0	0	0	0
2002	41	23	517	602.805	-305.061	D	7.458	7.453	0.005	3	81.61	18.4	0	0	0	0
2002	42	23	626	596.299	-315.88	D	7.485	7.453	0.032	3	64.8	35.21	0	0	0	0
2002	43	23	517	602.805	-305.061	D	7.461	7.453	0.008	3	76.56	23.45	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	44	23	517	602.805	-305.061	D	7.475	7.453	0.022	3	69.18	30.82	0	0	0	0
2002	45	23	637	596.267	-315.066	D	7.506	7.453	0.054	3	65.47	34.53	0	0	0	0
2002	46	23	517	602.805	-305.061	D	7.458	7.453	0.005	3	79.79	20.24	0	0	0	0
2002	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	517	602.805	-305.061	D	7.459	7.453	0.006	3	66.4	33.6	0	0	0	0
2002	49	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	50	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	517	602.805	-305.061	D	7.453	7.453	0	3	80.23	20.05	0	0	0	0
2002	53	23	517	602.805	-305.061	D	7.471	7.453	0.019	3	76.67	23.33	0	0	0	0
2002	54	23	637	596.267	-315.066	D	7.456	7.453	0.004	3	81.9	18.19	0	0	0	0
2002	55	23	637	596.267	-315.066	D	7.457	7.453	0.005	3	79.04	21.04	0	0	0	0
2002	56	23	637	596.267	-315.066	D	7.476	7.453	0.023	3	67.61	32.4	0	0	0	0
2002	57	23	624	596.324	-316.278	D	7.47	7.453	0.017	3	30.66	69.35	0	0	0	0
2002	58	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	596.558	-316.101	D	7.362	7.362	0	2.808	0	0	0	0	0	0
2002	61	23	517	602.805	-305.061	D	7.408	7.358	0.05	2.8	79.61	20.39	0	0	0	0
2002	62	23	517	602.805	-305.061	D	7.405	7.358	0.046	2.8	65.82	34.18	0	0	0	0
2002	63	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	64	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	69	23	517	602.805	-305.061	D	7.358	7.358	0	2.8	68.54	32.07	0	0	0	0
2002	70	23	517	602.805	-305.061	D	7.362	7.358	0.004	2.8	64.48	35.56	0	0	0	0
2002	71	23	403	601.849	-306.947	D	7.358	7.358	0	2.8	79.43	14.7	0	0	0	0
2002	72	23	432	602.04	-306.183	D	7.358	7.358	0	2.8	72.86	30.02	0	0	0	0
2002	73	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	74	23	637	596.267	-315.066	D	7.38	7.358	0.022	2.8	74.36	25.65	0	0	0	0
2002	75	23	603	598.68	-316.244	D	7.361	7.358	0.002	2.8	82.07	17.93	0	0	0	0
2002	76	23	517	602.805	-305.061	D	7.361	7.358	0.003	2.8	89.32	10.74	0	0	0	0
2002	77	23	517	602.805	-305.061	D	7.365	7.358	0.006	2.8	87.7	12.34	0	0	0	0
2002	78	23	432	602.04	-306.183	D	7.361	7.358	0.002	2.8	90.16	9.88	0	0	0	0
2002	79	23	624	596.324	-316.278	D	7.359	7.358	0.001	2.8	91.32	8.76	0	0	0	0
2002	80	23	522	602.882	-306.299	D	7.381	7.358	0.023	2.8	62.9	37.1	0	0	0	0
2002	81	23	637	596.267	-315.066	D	7.387	7.358	0.029	2.8	56.13	43.88	0	0	0	0
2002	82	23	548	603.28	-312.734	D	7.372	7.358	0.014	2.8	65.28	34.73	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	83	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	83.27	16.73	0	0	0	0
2002	84	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	85	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	86	23	624	596.324	-316.278	D	7.376	7.358	0.018	2.8	67.91	32.1	0	0	0	0
2002	87	23	637	596.267	-315.066	D	7.362	7.358	0.003	2.8	89.08	10.94	0	0	0	0
2002	88	23	517	602.805	-305.061	D	7.372	7.358	0.014	2.8	92.31	7.7	0	0	0	0
2002	89	23	624	596.324	-316.278	D	7.395	7.358	0.036	2.8	93.86	6.15	0	0	0	0
2002	90	23	637	596.267	-315.066	D	7.358	7.358	0	2.8	102.9	3.02	0	0	0	0
2002	91	23	624	596.324	-316.278	D	7.285	7.267	0.018	2.608	92.19	7.81	0	0	0	0
2002	92	23	517	602.805	-305.061	D	7.272	7.263	0.01	2.6	94.73	5.28	0	0	0	0
2002	93	23	603	598.68	-316.244	D	7.264	7.263	0.001	2.6	94.87	5.09	0	0	0	0
2002	94	23	624	596.324	-316.278	D	7.263	7.263	0	2.6	49.13	50.79	0	0	0	0
2002	95	23	637	596.267	-315.066	D	7.263	7.263	0	2.6	96.95	3.24	0	0	0	0
2002	96	23	624	596.324	-316.278	D	7.282	7.263	0.019	2.6	86.35	13.65	0	0	0	0
2002	97	23	632	596.27	-315.421	D	7.267	7.263	0.004	2.6	93.02	6.97	0	0	0	0
2002	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	99	23	624	596.324	-316.278	D	7.31	7.263	0.047	2.6	73.96	26.05	0	0	0	0
2002	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	103	23	517	602.805	-305.061	D	7.302	7.263	0.039	2.6	86.79	13.21	0	0	0	0
2002	104	23	517	602.805	-305.061	D	7.269	7.263	0.006	2.6	99	1	0	0	0	0
2002	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	110	23	517	602.805	-305.061	D	7.274	7.263	0.011	2.6	95.83	4.19	0	0	0	0
2002	111	23	517	602.805	-305.061	D	7.293	7.263	0.03	2.6	87.95	12.05	0	0	0	0
2002	112	23	517	602.805	-305.061	D	7.367	7.263	0.105	2.6	89.13	10.87	0	0	0	0
2002	113	23	517	602.805	-305.061	D	7.292	7.263	0.029	2.6	97.19	2.82	0	0	0	0
2002	114	23	517	602.805	-305.061	D	7.264	7.263	0.001	2.6	98.46	1.46	0	0	0	0
2002	115	23	517	602.805	-305.061	D	7.269	7.263	0.006	2.6	86.82	13.19	0	0	0	0
2002	116	23	548	603.28	-312.734	D	7.277	7.263	0.014	2.6	95.3	4.71	0	0	0	0
2002	117	23	624	596.324	-316.278	D	7.284	7.263	0.021	2.6	95.55	4.45	0	0	0	0
2002	118	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	119	23	517	602.805	-305.061	D	7.272	7.263	0.009	2.6	59.12	40.88	0	0	0	0
2002	120	23	603	598.68	-316.244	D	7.281	7.263	0.018	2.6	98.57	1.45	0	0	0	0
2002	121	23	517	602.805	-305.061	D	7.449	7.445	0.004	2.983	98.31	1.74	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	122	23	624	596.324	-316.278	D	7.536	7.453	0.084	3	86.86	13.15	0	0	0	0
2002	123	23	624	596.324	-316.278	D	7.454	7.453	0.001	3	97.77	2.42	0	0	0	0
2002	124	23	624	596.324	-316.278	D	7.458	7.453	0.005	3	96.88	3.19	0	0	0	0
2002	125	23	631	596.276	-315.551	D	7.458	7.453	0.006	3	98.19	1.84	0	0	0	0
2002	126	23	517	602.805	-305.061	D	7.453	7.453	0	3	99.95	0.16	0	0	0	0
2002	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	128	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	129	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	99.23	0.83	0	0	0	0
2002	130	23	603	598.68	-316.244	D	7.463	7.453	0.01	3	90.03	10	0	0	0	0
2002	131	23	631	596.276	-315.551	D	7.454	7.453	0.002	3	98.34	1.77	0	0	0	0
2002	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	133	23	662	598.404	-311.683	D	7.571	7.453	0.118	3	83.34	16.67	0	0	0	0
2002	134	23	689	601.435	-306.997	D	7.477	7.453	0.024	3	97.3	2.71	0	0	0	0
2002	135	23	517	602.805	-305.061	D	7.478	7.453	0.025	3	98.27	1.74	0	0	0	0
2002	136	23	517	602.805	-305.061	D	7.453	7.453	0	3	99.44	0.57	0	0	0	0
2002	137	23	637	596.267	-315.066	D	7.457	7.453	0.005	3	90.05	9.98	0	0	0	0
2002	138	23	624	596.324	-316.278	D	7.453	7.453	0	3	95.18	5.22	0	0	0	0
2002	139	23	624	596.324	-316.278	D	7.457	7.453	0.004	3	96.6	3.44	0	0	0	0
2002	140	23	517	602.805	-305.061	D	7.487	7.453	0.034	3	93.65	6.35	0	0	0	0
2002	141	23	624	596.324	-316.278	D	7.466	7.453	0.014	3	83.03	16.98	0	0	0	0
2002	142	23	624	596.324	-316.278	D	7.479	7.453	0.027	3	97.23	2.78	0	0	0	0
2002	143	23	517	602.805	-305.061	D	7.455	7.453	0.003	3	99.08	0.96	0	0	0	0
2002	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	146	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	99.89	0.4	0	0	0	0
2002	147	23	517	602.805	-305.061	D	7.453	7.453	0	3	99.76	0.36	0	0	0	0
2002	148	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	149	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	151	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2002	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	156	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	99.02	1.02	0	0	0	0
2002	157	23	632	596.27	-315.421	D	7.554	7.546	0.008	3.2	92.7	7.32	0	0	0	0
2002	158	23	624	596.324	-316.278	D	7.547	7.546	0.001	3.2	97.22	2.86	0	0	0	0
2002	159	23	637	596.267	-315.066	D	7.553	7.546	0.007	3.2	99.12	0.91	0	0	0	0
2002	160	23	517	602.805	-305.061	D	7.548	7.546	0.001	3.2	99.8	0.19	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	164	23	517	602.805	-305.061	D	7.56	7.546	0.014	3.2	99.85	0.16	0	0	0	0
2002	165	23	624	596.324	-316.278	D	7.591	7.546	0.045	3.2	98.62	1.38	0	0	0	0
2002	166	23	517	602.805	-305.061	D	7.573	7.546	0.026	3.2	96.91	3.1	0	0	0	0
2002	167	23	517	602.805	-305.061	D	7.55	7.546	0.004	3.2	99.47	0.56	0	0	0	0
2002	168	23	624	596.324	-316.278	D	7.592	7.546	0.046	3.2	97.08	2.92	0	0	0	0
2002	169	23	624	596.324	-316.278	D	7.612	7.546	0.066	3.2	99.62	0.38	0	0	0	0
2002	170	23	517	602.805	-305.061	D	7.56	7.546	0.014	3.2	99.8	0.2	0	0	0	0
2002	171	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	93.05	0.04	0	0	0	0
2002	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	178	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	179	23	517	602.805	-305.061	D	7.623	7.546	0.077	3.2	96.97	3.03	0	0	0	0
2002	180	23	517	602.805	-305.061	D	7.621	7.546	0.075	3.2	99.17	0.83	0	0	0	0
2002	181	23	517	602.805	-305.061	D	7.547	7.546	0	3.2	100.03	0.07	0	0	0	0
2002	182	23	1	596.558	-316.101	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2002	183	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	99.96	0.2	0	0	0	0
2002	185	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	99.87	0.18	0	0	0	0
2002	186	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	99.92	0.1	0	0	0	0
2002	187	23	517	602.805	-305.061	D	7.612	7.593	0.019	3.3	99.84	0.16	0	0	0	0
2002	188	23	656	597.971	-312.292	D	7.599	7.593	0.006	3.3	99.89	0.14	0	0	0	0
2002	189	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	99.97	0.07	0	0	0	0
2002	190	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	100	0.06	0	0	0	0
2002	191	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	99.76	0.27	0	0	0	0
2002	192	23	637	596.267	-315.066	D	7.596	7.593	0.003	3.3	94.17	5.89	0	0	0	0
2002	193	23	624	596.324	-316.278	D	7.595	7.593	0.002	3.3	98.99	1.02	0	0	0	0
2002	194	23	604	598.599	-316.246	D	7.595	7.593	0.003	3.3	97.33	2.69	0	0	0	0
2002	195	23	548	603.28	-312.734	D	7.593	7.593	0	3.3	99.25	0.67	0	0	0	0
2002	196	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	197	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	198	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	199	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	200	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	99.94	0.15	0	0	0	0
2002	202	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	99.75	0.26	0	0	0	0
2002	203	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	99.72	0.33	0	0	0	0
2002	204	23	517	602.805	-305.061	D	7.608	7.593	0.016	3.3	99.42	0.58	0	0	0	0
2002	205	23	548	603.28	-312.734	D	7.633	7.593	0.04	3.3	96.14	3.86	0	0	0	0
2002	206	23	624	596.324	-316.278	D	7.601	7.593	0.009	3.3	99.49	0.52	0	0	0	0
2002	207	23	603	598.68	-316.244	D	7.628	7.593	0.035	3.3	99.57	0.43	0	0	0	0
2002	208	23	517	602.805	-305.061	D	7.6	7.593	0.007	3.3	99.92	0.08	0	0	0	0
2002	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	100.02	0.06	0	0	0	0
2002	212	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	99.77	0.31	0	0	0	0
2002	213	23	517	602.805	-305.061	D	7.681	7.681	0	3.492	99.63	0.2	0	0	0	0
2002	214	23	431	602.059	-306.432	D	7.685	7.685	0	3.5	88.2	0.04	0	0	0	0
2002	215	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	216	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	217	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	218	23	517	602.805	-305.061	D	7.761	7.685	0.076	3.5	98.62	1.38	0	0	0	0
2002	219	23	624	596.324	-316.278	D	7.704	7.685	0.019	3.5	99.02	0.98	0	0	0	0
2002	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	228	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	232	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	99.81	0.15	0	0	0	0
2002	233	23	517	602.805	-305.061	D	7.687	7.685	0.002	3.5	99.73	0.28	0	0	0	0
2002	234	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	236	23	517	602.805	-305.061	D	7.704	7.685	0.02	3.5	99.44	0.56	0	0	0	0
2002	237	23	548	603.28	-312.734	D	7.696	7.685	0.011	3.5	98.56	1.44	0	0	0	0
2002	238	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	239	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	245	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	246	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	247	23	517	602.805	-305.061	D	7.707	7.685	0.023	3.5	99.23	0.78	0	0	0	0
2002	248	23	624	596.324	-316.278	D	7.687	7.685	0.002	3.5	99.9	0.13	0	0	0	0
2002	249	23	13	596.691	-314.592	D	7.685	7.685	0	3.5	99.18	0.11	0	0	0	0
2002	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	56.55	0.01	0	0	0	0
2002	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	254	23	624	596.324	-316.278	D	7.698	7.685	0.014	3.5	97.19	2.82	0	0	0	0
2002	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	256	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	96	0.06	0	0	0	0
2002	257	23	517	602.805	-305.061	D	7.687	7.685	0.002	3.5	99.71	0.26	0	0	0	0
2002	258	23	517	602.805	-305.061	D	7.699	7.685	0.014	3.5	99.14	0.86	0	0	0	0
2002	259	23	662	598.404	-311.683	D	7.927	7.685	0.242	3.5	94.97	5.03	0	0	0	0
2002	260	23	624	596.324	-316.278	D	7.85	7.685	0.165	3.5	98.09	1.91	0	0	0	0
2002	261	23	517	602.805	-305.061	D	7.724	7.685	0.039	3.5	95.27	4.73	0	0	0	0
2002	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	264	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	265	23	624	596.324	-316.278	D	7.711	7.685	0.026	3.5	97.78	2.22	0	0	0	0
2002	266	23	603	598.68	-316.244	D	7.685	7.685	0	3.5	96.06	3.46	0	0	0	0
2002	267	23	517	602.805	-305.061	D	7.705	7.685	0.02	3.5	96.03	3.96	0	0	0	0
2002	268	23	624	596.324	-316.278	D	7.699	7.685	0.014	3.5	97.78	2.22	0	0	0	0
2002	269	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	270	23	631	596.276	-315.551	D	7.686	7.685	0.001	3.5	99.49	0.64	0	0	0	0
2002	271	23	637	596.267	-315.066	D	7.696	7.685	0.011	3.5	98.1	1.89	0	0	0	0
2002	272	23	517	602.805	-305.061	D	7.696	7.685	0.011	3.5	98.31	1.69	0	0	0	0
2002	273	23	517	602.805	-305.061	D	7.685	7.685	0.001	3.5	99.77	0.23	0	0	0	0
2002	274	23	1	596.558	-316.101	D	7.507	7.507	0	3.117	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	278	23	632	596.27	-315.421	D	7.506	7.5	0.006	3.1	62.63	37.38	0	0	0	0
2002	279	23	693	601.983	-306.223	D	7.506	7.5	0.006	3.1	97.97	2.05	0	0	0	0
2002	280	23	624	596.324	-316.278	D	7.504	7.5	0.005	3.1	83.47	16.55	0	0	0	0
2002	281	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	282	23	203	599.824	-309.852	D	7.5	7.5	0	3.1	100.45	2.81	0	0	0	0
2002	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	285	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	23	517	602.805	-305.061	D	7.551	7.5	0.051	3.1	83.02	16.98	0	0	0	0
2002	287	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	517	602.805	-305.061	D	7.516	7.5	0.017	3.1	94.91	5.11	0	0	0	0
2002	289	23	548	603.28	-312.734	D	7.501	7.5	0.001	3.1	96.25	3.81	0	0	0	0
2002	290	23	638	596.406	-314.894	D	7.569	7.5	0.069	3.1	59.9	40.1	0	0	0	0
2002	291	23	603	598.68	-316.244	D	7.5	7.5	0.001	3.1	95.86	4.38	0	0	0	0
2002	292	23	517	602.805	-305.061	D	7.531	7.5	0.032	3.1	74.73	25.27	0	0	0	0
2002	293	23	603	598.68	-316.244	D	7.505	7.5	0.005	3.1	77.53	22.47	0	0	0	0
2002	294	23	603	598.68	-316.244	D	7.5	7.5	0	3.1	85.96	14.42	0	0	0	0
2002	295	23	517	602.805	-305.061	D	7.504	7.5	0.004	3.1	96.62	3.4	0	0	0	0
2002	296	23	517	602.805	-305.061	D	7.548	7.5	0.049	3.1	90.54	9.46	0	0	0	0
2002	297	23	624	596.324	-316.278	D	7.505	7.5	0.005	3.1	97.55	2.49	0	0	0	0
2002	298	23	624	596.324	-316.278	D	7.504	7.5	0.004	3.1	94.17	5.86	0	0	0	0
2002	299	23	517	602.805	-305.061	D	8.308	7.5	0.808	3.1	80.37	19.63	0	0	0	0
2002	300	23	624	596.324	-316.278	D	7.547	7.5	0.047	3.1	92.06	7.95	0	0	0	0
2002	301	23	637	596.267	-315.066	D	7.504	7.5	0.005	3.1	90.33	9.7	0	0	0	0
2002	302	23	624	596.324	-316.278	D	7.501	7.5	0.002	3.1	92.47	7.61	0	0	0	0
2002	303	23	624	596.324	-316.278	D	7.5	7.5	0.001	3.1	93.64	6.49	0	0	0	0
2002	304	23	624	596.324	-316.278	D	7.505	7.5	0.005	3.1	42.2	57.81	0	0	0	0
2002	305	23	624	596.324	-316.278	D	7.5	7.5	0	3.1	60.32	39.86	0	0	0	0
2002	306	23	517	602.805	-305.061	D	7.535	7.5	0.036	3.1	59.25	40.75	0	0	0	0
2002	307	23	603	598.68	-316.244	D	7.525	7.5	0.026	3.1	81.56	18.45	0	0	0	0
2002	308	23	517	602.805	-305.061	D	7.621	7.5	0.121	3.1	69.04	30.96	0	0	0	0
2002	309	23	517	602.805	-305.061	D	7.587	7.5	0.087	3.1	80.31	19.69	0	0	0	0
2002	310	23	517	602.805	-305.061	D	7.78	7.5	0.28	3.1	78.14	21.86	0	0	0	0
2002	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	517	602.805	-305.061	D	7.511	7.5	0.012	3.1	92.7	7.3	0	0	0	0
2002	315	23	517	602.805	-305.061	D	7.541	7.5	0.041	3.1	57.15	42.86	0	0	0	0
2002	316	23	624	596.324	-316.278	D	7.514	7.5	0.015	3.1	70.5	29.51	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	317	23	517	602.805	-305.061	D	7.526	7.5	0.027	3.1	74.79	25.22	0	0	0	0
2002	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	637	596.267	-315.066	D	7.515	7.5	0.015	3.1	70.38	29.62	0	0	0	0
2002	320	23	462	603.035	-312.603	D	7.5	7.5	0	3.1	75.38	16.38	0	0	0	0
2002	321	23	624	596.324	-316.278	D	7.511	7.5	0.012	3.1	62.56	37.46	0	0	0	0
2002	322	23	517	602.805	-305.061	D	7.509	7.5	0.01	3.1	69.8	30.2	0	0	0	0
2002	323	23	557	601.32	-313.419	D	7.551	7.5	0.052	3.1	53.27	46.74	0	0	0	0
2002	324	23	548	603.28	-312.734	D	7.541	7.5	0.041	3.1	85.99	14.02	0	0	0	0
2002	325	23	517	602.805	-305.061	D	7.502	7.5	0.003	3.1	80.41	19.65	0	0	0	0
2002	326	23	624	596.324	-316.278	D	7.513	7.5	0.014	3.1	66.95	33.06	0	0	0	0
2002	327	23	624	596.324	-316.278	D	7.517	7.5	0.018	3.1	74.96	25.04	0	0	0	0
2002	328	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	83.38	17.27	0	0	0	0
2002	329	23	548	603.28	-312.734	D	7.505	7.5	0.005	3.1	78.81	21.24	0	0	0	0
2002	330	23	603	598.68	-316.244	D	7.501	7.5	0.001	3.1	83.37	16.77	0	0	0	0
2002	331	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	79.68	19.36	0	0	0	0
2002	332	23	637	596.267	-315.066	D	7.512	7.5	0.013	3.1	57.24	42.77	0	0	0	0
2002	333	23	547	603.265	-312.487	D	7.5	7.5	0	3.1	69.07	29.89	0	0	0	0
2002	334	23	517	602.805	-305.061	D	7.514	7.5	0.015	3.1	56.21	43.81	0	0	0	0
2002	335	23	632	596.27	-315.421	D	7.644	7.589	0.055	3.292	34.38	65.62	0	0	0	0
2002	336	23	547	603.265	-312.487	D	7.593	7.593	0	3.3	53.67	45	0	0	0	0
2002	337	23	603	598.68	-316.244	D	7.615	7.593	0.022	3.3	60.31	39.7	0	0	0	0
2002	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	340	23	624	596.324	-316.278	D	7.618	7.593	0.026	3.3	67.51	32.49	0	0	0	0
2002	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	517	602.805	-305.061	D	7.65	7.593	0.058	3.3	71.51	28.49	0	0	0	0
2002	343	23	624	596.324	-316.278	D	7.606	7.593	0.013	3.3	76.75	23.25	0	0	0	0
2002	344	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	637	596.267	-315.066	D	7.595	7.593	0.002	3.3	84.43	15.55	0	0	0	0
2002	346	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	88.06	12.03	0	0	0	0
2002	347	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	88.57	11.54	0	0	0	0
2002	348	23	624	596.324	-316.278	D	7.699	7.593	0.107	3.3	63.55	36.45	0	0	0	0
2002	349	23	517	602.805	-305.061	D	7.595	7.593	0.003	3.3	71.88	28.1	0	0	0	0
2002	350	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	79.89	20.88	0	0	0	0
2002	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	637	596.267	-315.066	D	7.618	7.593	0.025	3.3	73.67	26.33	0	0	0	0
2002	354	23	548	603.28	-312.734	D	7.609	7.593	0.016	3.3	77.2	22.8	0	0	0	0
2002	355	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	356	23	624	596.324	-316.278	D	7.607	7.593	0.014	3.3	48.32	51.67	0	0	0	0
2002	357	23	517	602.805	-305.061	D	7.609	7.593	0.016	3.3	53.94	46.05	0	0	0	0
2002	358	23	624	596.324	-316.278	D	7.609	7.593	0.016	3.3	51.47	48.53	0	0	0	0
2002	359	23	517	602.805	-305.061	D	7.659	7.593	0.067	3.3	40.2	59.8	0	0	0	0
2002	360	23	517	602.805	-305.061	D	7.605	7.593	0.013	3.3	59.41	40.59	0	0	0	0
2002	361	23	517	602.805	-305.061	D	7.596	7.593	0.004	3.3	74.72	25.32	0	0	0	0
2002	362	23	489	602.518	-305.896	D	7.593	7.593	0	3.3	84.89	12.52	0	0	0	0
2002	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	548	603.28	-312.734	D	7.596	7.593	0.003	3.3	68.24	31.81	0	0	0	0
									0.808							
HOLCIM									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	517	602.805	-305.061	D	7.617	7.593	0.024	3.3	35.16	64.6	0	0	0	0.24
2002	2	23	548	603.28	-312.734	D	8.97	7.593	1.378	3.3	36.1	63.65	0	0	0	0.26
2002	3	23	632	596.27	-315.421	D	9.13	7.593	1.538	3.3	34.64	65.1	0	0	0	0.26
2002	4	23	548	603.28	-312.734	D	7.601	7.593	0.008	3.3	39.39	60.46	0	0	0	0.16
2002	5	23	462	603.035	-312.603	D	7.593	7.593	0	3.3	53.91	45.45	0	0	0	0.11
2002	6	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	70.49	29.38	0	0	0	0.16
2002	7	23	517	602.805	-305.061	D	7.703	7.593	0.11	3.3	48.5	51.08	0	0	0	0.42
2002	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	517	602.805	-305.061	D	8.028	7.593	0.435	3.3	60.22	39.53	0	0	0	0.25
2002	11	23	548	603.28	-312.734	D	7.962	7.593	0.369	3.3	67.18	32.67	0	0	0	0.15
2002	12	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	13	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	548	603.28	-312.734	D	8.187	7.593	0.594	3.3	34.97	64.72	0	0	0	0.31
2002	18	23	548	603.28	-312.734	D	8.277	7.593	0.684	3.3	48.14	51.65	0	0	0	0.21
2002	19	23	517	602.805	-305.061	D	8.118	7.593	0.525	3.3	59.29	40.56	0	0	0	0.15
2002	20	23	624	596.324	-316.278	D	8.292	7.593	0.7	3.3	67.75	32.16	0	0	0	0.09
2002	21	23	517	602.805	-305.061	D	7.603	7.593	0.01	3.3	71.36	28.59	0	0	0	0.06
2002	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	517	602.805	-305.061	D	8.774	7.593	1.181	3.3	49.17	50.51	0	0	0	0.32

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	25	23	548	603.28	-312.734	D	7.748	7.593	0.156	3.3	64.04	35.79	0	0	0	0.17
2002	26	23	548	603.28	-312.734	D	7.617	7.593	0.024	3.3	65.02	34.83	0	0	0	0.16
2002	27	23	545	603.234	-311.991	D	7.595	7.593	0.003	3.3	77.48	22.37	0	0	0	0.14
2002	28	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	30	23	548	603.28	-312.734	D	9.245	7.593	1.653	3.3	51.21	48.59	0	0	0	0.2
2002	31	23	517	602.805	-305.061	D	8.626	7.593	1.033	3.3	62.71	37.19	0	0	0	0.1
2002	32	23	517	602.805	-305.061	D	7.564	7.459	0.106	3.013	71.07	28.87	0	0	0	0.06
2002	33	23	518	602.82	-305.309	D	7.539	7.453	0.086	3	48.54	51.17	0	0	0	0.29
2002	34	23	548	603.28	-312.734	D	7.514	7.453	0.062	3	54.19	45.63	0	0	0	0.18
2002	35	23	517	602.805	-305.061	D	7.543	7.453	0.09	3	35.07	64.49	0	0	0	0.44
2002	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	37	23	517	602.805	-305.061	D	7.453	7.453	0	3	72.71	28.97	0	0	0	0.19
2002	38	23	603	598.68	-316.244	D	7.731	7.453	0.278	3	43.28	56.46	0	0	0	0.26
2002	39	23	603	598.68	-316.244	D	7.46	7.453	0.007	3	74.42	25.5	0	0	0	0.1
2002	40	23	538	603.127	-310.259	D	7.459	7.453	0.007	3	74.1	25.84	0	0	0	0.08
2002	41	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	42	23	520	602.851	-305.804	D	7.506	7.453	0.054	3	27.78	71.72	0	0	0	0.51
2002	43	23	548	603.28	-312.734	D	7.454	7.453	0.001	3	52.79	46.98	0	0	0	0.27
2002	44	23	637	596.267	-315.066	D	7.798	7.453	0.345	3	27.77	71.54	0	0	0	0.7
2002	45	23	548	603.28	-312.734	D	7.487	7.453	0.034	3	53.53	46.19	0	0	0	0.29
2002	46	23	548	603.28	-312.734	D	7.464	7.453	0.011	3	68.61	31.17	0	0	0	0.23
2002	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	517	602.805	-305.061	D	7.561	7.453	0.108	3	40.19	59.02	0	0	0	0.8
2002	49	23	517	602.805	-305.061	D	7.696	7.453	0.243	3	52.45	47.24	0	0	0	0.31
2002	50	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	632	596.27	-315.421	D	7.826	7.453	0.373	3	31.13	68.4	0	0	0	0.47
2002	54	23	632	596.27	-315.421	D	7.815	7.453	0.363	3	58.01	41.75	0	0	0	0.24
2002	55	23	548	603.28	-312.734	D	7.552	7.453	0.099	3	68.46	31.34	0	0	0	0.2
2002	56	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	57	23	517	602.805	-305.061	D	7.453	7.453	0	3	62.34	37.52	0	0	0	0.3
2002	58	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	596.558	-316.101	D	7.362	7.362	0	2.808	0	0	0	0	0	0
2002	61	23	517	602.805	-305.061	D	7.412	7.358	0.054	2.8	55.94	43.94	0	0	0	0.11
2002	62	23	548	603.28	-312.734	D	7.392	7.358	0.034	2.8	58.4	41.5	0	0	0	0.1
2002	63	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	64	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	68	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	69	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	70	23	517	602.805	-305.061	D	7.358	7.358	0	2.8	52.71	48.16	0	0	0	0.28
2002	71	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	72	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	73	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	74	23	517	602.805	-305.061	D	7.488	7.358	0.13	2.8	64.83	34.89	0	0	0	0.28
2002	75	23	637	596.267	-315.066	D	7.998	7.358	0.64	2.8	61.72	38.15	0	0	0	0.14
2002	76	23	520	602.851	-305.804	D	7.383	7.358	0.024	2.8	69.13	30.75	0	0	0	0.12
2002	77	23	517	602.805	-305.061	D	7.427	7.358	0.069	2.8	81.92	17.87	0	0	0	0.22
2002	78	23	517	602.805	-305.061	D	7.811	7.358	0.453	2.8	69.1	30.77	0	0	0	0.13
2002	79	23	624	596.324	-316.278	D	7.886	7.358	0.528	2.8	60.58	39.04	0	0	0	0.37
2002	80	23	517	602.805	-305.061	D	7.503	7.358	0.145	2.8	49.56	50.18	0	0	0	0.26
2002	81	23	548	603.28	-312.734	D	7.366	7.358	0.007	2.8	44.7	54.97	0	0	0	0.34
2002	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	84	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	85	23	624	596.324	-316.278	D	7.701	7.358	0.343	2.8	64.37	35.36	0	0	0	0.27
2002	86	23	517	602.805	-305.061	D	7.736	7.358	0.378	2.8	61.67	38.09	0	0	0	0.24
2002	87	23	637	596.267	-315.066	D	7.46	7.358	0.102	2.8	75.73	24.09	0	0	0	0.18
2002	88	23	517	602.805	-305.061	D	7.625	7.358	0.266	2.8	88.73	11.04	0	0	0	0.23
2002	89	23	603	598.68	-316.244	D	7.582	7.358	0.224	2.8	76.07	23.68	0	0	0	0.26
2002	90	23	517	602.805	-305.061	D	7.416	7.358	0.058	2.8	88.59	11.15	0	0	0	0.26
2002	91	23	548	603.28	-312.734	D	7.394	7.267	0.127	2.608	86.12	13.58	0	0	0	0.3
2002	92	23	517	602.805	-305.061	D	7.27	7.263	0.007	2.6	90.11	9.67	0	0	0	0.22
2002	93	23	548	603.28	-312.734	D	7.381	7.263	0.118	2.6	43.57	55.84	0	0	0	0.58
2002	94	23	548	603.28	-312.734	D	7.59	7.263	0.327	2.6	43.98	55.71	0	0	0	0.31
2002	95	23	517	602.805	-305.061	D	7.639	7.263	0.376	2.6	49.99	49.72	0	0	0	0.3
2002	96	23	637	596.267	-315.066	D	7.321	7.263	0.058	2.6	69.54	30.11	0	0	0	0.36
2002	97	23	624	596.324	-316.278	D	7.276	7.263	0.013	2.6	74.25	25.51	0	0	0	0.24
2002	98	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	99	23	676	599.876	-309.365	D	7.502	7.263	0.239	2.6	87.38	12.17	0	0	0	0.45
2002	100	23	637	596.267	-315.066	D	7.324	7.263	0.061	2.6	94.8	4.88	0	0	0	0.31
2002	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	103	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	104	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	108	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	109	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	110	23	517	602.805	-305.061	D	7.271	7.263	0.008	2.6	87.19	12.55	0	0	0	0.27
2002	111	23	517	602.805	-305.061	D	7.343	7.263	0.08	2.6	76.45	23.39	0	0	0	0.16
2002	112	23	517	602.805	-305.061	D	7.407	7.263	0.144	2.6	89.43	10.48	0	0	0	0.09
2002	113	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	114	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	115	23	517	602.805	-305.061	D	7.422	7.263	0.159	2.6	47.85	51	0	0	0	1.15
2002	116	23	548	603.28	-312.734	D	7.271	7.263	0.009	2.6	94.43	5.2	0	0	0	0.39
2002	117	23	517	602.805	-305.061	D	7.27	7.263	0.007	2.6	90.08	9.71	0	0	0	0.21
2002	118	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	119	23	517	602.805	-305.061	D	7.373	7.263	0.11	2.6	76.19	23.26	0	0	0	0.56
2002	120	23	517	602.805	-305.061	D	7.425	7.263	0.162	2.6	95.18	4.52	0	0	0	0.3
2002	121	23	517	602.805	-305.061	D	7.45	7.445	0.005	2.983	96.74	3.11	0	0	0	0.19
2002	122	23	624	596.324	-316.278	D	8.203	7.453	0.75	3	78.6	21.23	0	0	0	0.17
2002	123	23	548	603.28	-312.734	D	7.674	7.453	0.221	3	81.2	18.45	0	0	0	0.35
2002	124	23	624	596.324	-316.278	D	7.463	7.453	0.011	3	94.86	5.09	0	0	0	0.07
2002	125	23	632	596.27	-315.421	D	7.461	7.453	0.008	3	95.49	4.46	0	0	0	0.07
2002	126	23	432	602.04	-306.183	D	7.453	7.453	0	3	99.79	0.09	0	0	0	0.05
2002	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	128	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	129	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	130	23	603	598.68	-316.244	D	7.497	7.453	0.044	3	77.99	21.41	0	0	0	0.61
2002	131	23	637	596.267	-315.066	D	7.482	7.453	0.029	3	94.47	5.25	0	0	0	0.28
2002	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	133	23	632	596.27	-315.421	D	7.87	7.453	0.417	3	63.49	36.24	0	0	0	0.27
2002	134	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	135	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	136	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	137	23	517	602.805	-305.061	D	7.478	7.453	0.025	3	79.06	20.82	0	0	0	0.12
2002	138	23	603	598.68	-316.244	D	7.453	7.453	0	3	88.43	11.49	0	0	0	0.11
2002	139	23	637	596.267	-315.066	D	7.633	7.453	0.181	3	63.68	36.04	0	0	0	0.28
2002	140	23	698	602.668	-305.255	D	7.474	7.453	0.021	3	85.17	14.36	0	0	0	0.48
2002	141	23	637	596.267	-315.066	D	8.059	7.453	0.606	3	72.46	27.33	0	0	0	0.22

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	142	23	624	596.324	-316.278	D	7.628	7.453	0.175	3	94.65	5.18	0	0	0	0.16
2002	143	23	517	602.805	-305.061	D	7.517	7.453	0.065	3	97.38	2.52	0	0	0	0.1
2002	144	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	146	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	147	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	148	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	149	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	151	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2002	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	156	23	517	602.805	-305.061	D	7.834	7.546	0.288	3.2	97.78	1.97	0	0	0	0.25
2002	157	23	517	602.805	-305.061	D	8.06	7.546	0.514	3.2	88.9	10.78	0	0	0	0.32
2002	158	23	624	596.324	-316.278	D	7.751	7.546	0.205	3.2	97.03	2.73	0	0	0	0.24
2002	159	23	637	596.267	-315.066	D	7.567	7.546	0.021	3.2	97.79	2.07	0	0	0	0.15
2002	160	23	637	596.267	-315.066	D	7.553	7.546	0.007	3.2	99.26	0.65	0	0	0	0.12
2002	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	163	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	164	23	516	602.728	-305.38	D	7.546	7.546	0	3.2	100.08	0.3	0	0	0	0.12
2002	165	23	517	602.805	-305.061	D	7.606	7.546	0.06	3.2	94.83	4.63	0	0	0	0.55
2002	166	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	167	23	517	602.805	-305.061	D	7.554	7.546	0.008	3.2	98.56	1.17	0	0	0	0.29
2002	168	23	624	596.324	-316.278	D	8.19	7.546	0.643	3.2	91.37	8.45	0	0	0	0.19
2002	169	23	637	596.267	-315.066	D	8.084	7.546	0.537	3.2	98.99	0.87	0	0	0	0.14
2002	170	23	517	602.805	-305.061	D	7.617	7.546	0.071	3.2	99.42	0.47	0	0	0	0.11
2002	171	23	432	602.04	-306.183	D	7.546	7.546	0	3.2	98.49	0.11	0	0	0	0.12
2002	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	178	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	179	23	517	602.805	-305.061	D	7.575	7.546	0.029	3.2	93.26	6.5	0	0	0	0.24
2002	180	23	517	602.805	-305.061	D	7.571	7.546	0.025	3.2	99.38	0.48	0	0	0	0.15

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	181	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	182	23	1	596.558	-316.101	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2002	183	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	517	602.805	-305.061	D	7.626	7.593	0.033	3.3	99.36	0.51	0	0	0	0.13
2002	185	23	517	602.805	-305.061	D	7.66	7.593	0.067	3.3	99.43	0.48	0	0	0	0.1
2002	186	23	517	602.805	-305.061	D	7.661	7.593	0.068	3.3	99.65	0.26	0	0	0	0.09
2002	187	23	637	596.267	-315.066	D	7.851	7.593	0.259	3.3	99.45	0.45	0	0	0	0.1
2002	188	23	637	596.267	-315.066	D	7.613	7.593	0.021	3.3	99.61	0.3	0	0	0	0.09
2002	189	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	99.7	0.21	0	0	0	0.08
2002	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	23	517	602.805	-305.061	D	7.609	7.593	0.016	3.3	99.21	0.57	0	0	0	0.24
2002	192	23	624	596.324	-316.278	D	7.645	7.593	0.052	3.3	86.75	13.12	0	0	0	0.13
2002	193	23	637	596.267	-315.066	D	7.601	7.593	0.008	3.3	96.12	3.8	0	0	0	0.11
2002	194	23	624	596.324	-316.278	D	7.596	7.593	0.004	3.3	91.53	8.38	0	0	0	0.09
2002	195	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	99.66	0.31	0	0	0	0.09
2002	196	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	197	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	198	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	199	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	99.71	0.13	0	0	0	0.15
2002	202	23	517	602.805	-305.061	D	7.598	7.593	0.005	3.3	99.37	0.53	0	0	0	0.11
2002	203	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	99.07	0.86	0	0	0	0.09
2002	204	23	656	597.971	-312.292	D	8.145	7.593	0.552	3.3	98.78	0.92	0	0	0	0.31
2002	205	23	603	598.68	-316.244	D	8.042	7.593	0.449	3.3	93.01	6.82	0	0	0	0.16
2002	206	23	624	596.324	-316.278	D	7.614	7.593	0.022	3.3	99.61	0.3	0	0	0	0.09
2002	207	23	637	596.267	-315.066	D	7.631	7.593	0.038	3.3	99.22	0.69	0	0	0	0.09
2002	208	23	517	602.805	-305.061	D	7.598	7.593	0.006	3.3	99.78	0.14	0	0	0	0.08
2002	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	515	602.747	-305.629	D	7.593	7.593	0	3.3	96.09	0.06	0	0	0	0.13
2002	213	23	517	602.805	-305.061	D	7.682	7.681	0.001	3.492	99.41	0.62	0	0	0	0.08
2002	214	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	98.62	0.14	0	0	0	0.08
2002	215	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	216	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	217	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	218	23	637	596.267	-315.066	D	8.059	7.685	0.374	3.5	94.88	4.98	0	0	0	0.15
2002	219	23	624	596.324	-316.278	D	7.714	7.685	0.029	3.5	97.92	1.97	0	0	0	0.1

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	228	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	230	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	231	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	232	23	517	602.805	-305.061	D	7.69	7.685	0.005	3.5	99.5	0.37	0	0	0	0.12
2002	233	23	517	602.805	-305.061	D	7.7	7.685	0.015	3.5	99.31	0.59	0	0	0	0.1
2002	234	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	235	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	236	23	517	602.805	-305.061	D	7.818	7.685	0.133	3.5	99.26	0.53	0	0	0	0.21
2002	237	23	548	603.28	-312.734	D	8.315	7.685	0.63	3.5	88.93	10.77	0	0	0	0.3
2002	238	23	624	596.324	-316.278	D	7.724	7.685	0.039	3.5	97.8	1.97	0	0	0	0.23
2002	239	23	637	596.267	-315.066	D	7.686	7.685	0.001	3.5	99.1	0.69	0	0	0	0.22
2002	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	242	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	245	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	246	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	247	23	517	602.805	-305.061	D	7.98	7.685	0.295	3.5	98.57	1.17	0	0	0	0.26
2002	248	23	624	596.324	-316.278	D	7.723	7.685	0.038	3.5	99.34	0.48	0	0	0	0.19
2002	249	23	637	596.267	-315.066	D	7.686	7.685	0.001	3.5	99.59	0.26	0	0	0	0.15
2002	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	253	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	99.48	0.14	0	0	0	0.34
2002	254	23	517	602.805	-305.061	D	7.707	7.685	0.022	3.5	83.29	15.98	0	0	0	0.74
2002	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	256	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	99.51	0.15	0	0	0	0.15
2002	257	23	517	602.805	-305.061	D	7.694	7.685	0.009	3.5	99.27	0.61	0	0	0	0.12
2002	258	23	517	602.805	-305.061	D	7.776	7.685	0.091	3.5	98.4	1.36	0	0	0	0.24

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	259	23	688	601.298	-307.191	D	9.343	7.685	1.658	3.5	86.44	13.4	0	0	0	0.16
2002	260	23	517	602.805	-305.061	D	8.486	7.685	0.801	3.5	94.53	5.35	0	0	0	0.12
2002	261	23	517	602.805	-305.061	D	7.788	7.685	0.103	3.5	88.47	11.45	0	0	0	0.08
2002	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	264	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	265	23	548	603.28	-312.734	D	7.945	7.685	0.26	3.5	93.04	6.66	0	0	0	0.3
2002	266	23	637	596.267	-315.066	D	7.895	7.685	0.21	3.5	65.1	34.47	0	0	0	0.43
2002	267	23	517	602.805	-305.061	D	7.773	7.685	0.088	3.5	93.28	6.41	0	0	0	0.32
2002	268	23	624	596.324	-316.278	D	7.765	7.685	0.08	3.5	93.51	6.28	0	0	0	0.21
2002	269	23	631	596.276	-315.551	D	7.685	7.685	0	3.5	98.69	0.83	0	0	0	0.14
2002	270	23	695	602.257	-305.836	D	7.902	7.685	0.217	3.5	98.96	0.77	0	0	0	0.27
2002	271	23	624	596.324	-316.278	D	8.682	7.685	0.997	3.5	87.04	12.74	0	0	0	0.22
2002	272	23	637	596.267	-315.066	D	7.993	7.685	0.308	3.5	96.11	3.76	0	0	0	0.14
2002	273	23	517	602.805	-305.061	D	7.697	7.685	0.012	3.5	99.55	0.35	0	0	0	0.09
2002	274	23	1	596.558	-316.101	D	7.507	7.507	0	3.117	0	0	0	0	0	0
2002	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	655	597.944	-312.459	D	7.619	7.5	0.12	3.1	49.63	49.64	0	0	0	0.74
2002	279	23	548	603.28	-312.734	D	7.578	7.5	0.079	3.1	94.44	5.3	0	0	0	0.26
2002	280	23	637	596.267	-315.066	D	7.686	7.5	0.186	3.1	46.27	52.47	0	0	0	1.26
2002	281	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	282	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	95.03	4.94	0	0	0	0.21
2002	283	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	97.8	1.85	0	0	0	0.17
2002	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	285	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	23	632	596.27	-315.421	D	7.63	7.5	0.13	3.1	40.8	58.59	0	0	0	0.61
2002	287	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	517	602.805	-305.061	D	7.552	7.5	0.052	3.1	84.3	15.4	0	0	0	0.3
2002	289	23	637	596.267	-315.066	D	7.666	7.5	0.167	3.1	58.07	41.26	0	0	0	0.68
2002	290	23	517	602.805	-305.061	D	7.734	7.5	0.235	3.1	71.25	28.44	0	0	0	0.31
2002	291	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	292	23	517	602.805	-305.061	D	7.714	7.5	0.215	3.1	65.29	34.53	0	0	0	0.19
2002	293	23	624	596.324	-316.278	D	7.619	7.5	0.12	3.1	45.53	54.21	0	0	0	0.26
2002	294	23	603	598.68	-316.244	D	7.5	7.5	0.001	3.1	76.96	22.99	0	0	0	0.11
2002	295	23	517	602.805	-305.061	D	7.55	7.5	0.051	3.1	89.75	10.03	0	0	0	0.22
2002	296	23	517	602.805	-305.061	D	8.251	7.5	0.751	3.1	73.45	26.39	0	0	0	0.16
2002	297	23	624	596.324	-316.278	D	7.509	7.5	0.01	3.1	95.12	4.76	0	0	0	0.13

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	298	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	88.13	12.65	0	0	0	0.09
2002	299	23	517	602.805	-305.061	D	9.583	7.5	2.084	3.1	74.02	25.81	0	0	0	0.17
2002	300	23	637	596.267	-315.066	D	9.272	7.5	1.773	3.1	68.36	31.46	0	0	0	0.18
2002	301	23	637	596.267	-315.066	D	7.528	7.5	0.028	3.1	79.02	20.91	0	0	0	0.08
2002	302	23	637	596.267	-315.066	D	7.501	7.5	0.001	3.1	80.41	19.52	0	0	0	0.08
2002	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	304	23	517	602.805	-305.061	D	8.123	7.5	0.623	3.1	62.2	37.61	0	0	0	0.19
2002	305	23	517	602.805	-305.061	D	7.862	7.5	0.363	3.1	68.25	31.56	0	0	0	0.19
2002	306	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	307	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	308	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	309	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	59.83	40.3	0	0	0	0.14
2002	310	23	517	602.805	-305.061	D	7.782	7.5	0.282	3.1	60.63	39.22	0	0	0	0.15
2002	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	316	23	676	599.876	-309.365	D	7.905	7.5	0.406	3.1	42.73	56.85	0	0	0	0.43
2002	317	23	548	603.28	-312.734	D	7.503	7.5	0.004	3.1	57.41	42.26	0	0	0	0.33
2002	318	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	631	596.276	-315.551	D	7.656	7.5	0.156	3.1	48.34	51.41	0	0	0	0.25
2002	320	23	624	596.324	-316.278	D	7.622	7.5	0.122	3.1	64.01	35.74	0	0	0	0.26
2002	321	23	517	602.805	-305.061	D	7.901	7.5	0.401	3.1	45.83	53.8	0	0	0	0.37
2002	322	23	517	602.805	-305.061	D	7.506	7.5	0.006	3.1	47.17	52.57	0	0	0	0.26
2002	323	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	324	23	548	603.28	-312.734	D	7.503	7.5	0.003	3.1	66.63	33.2	0	0	0	0.24
2002	325	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	326	23	517	602.805	-305.061	D	7.521	7.5	0.022	3.1	20.58	78.37	0	0	0	1.05
2002	327	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	328	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	55.53	44.44	0	0	0	0.13
2002	329	23	624	596.324	-316.278	D	7.601	7.5	0.101	3.1	51.15	48.69	0	0	0	0.16
2002	330	23	624	596.324	-316.278	D	7.508	7.5	0.009	3.1	67.44	32.37	0	0	0	0.21
2002	331	23	637	596.267	-315.066	D	7.778	7.5	0.278	3.1	34.33	65.32	0	0	0	0.35
2002	332	23	517	602.805	-305.061	D	7.702	7.5	0.202	3.1	40.82	58.99	0	0	0	0.18
2002	333	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	335	23	1	596.558	-316.101	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2002	336	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	337	23	548	603.28	-312.734	D	7.706	7.593	0.113	3.3	38.78	60.86	0	0	0	0.36
2002	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	637	596.267	-315.066	D	7.779	7.593	0.186	3.3	51.04	48.72	0	0	0	0.25
2002	340	23	548	603.28	-312.734	D	7.623	7.593	0.03	3.3	53.03	46.77	0	0	0	0.2
2002	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	517	602.805	-305.061	D	8.132	7.593	0.539	3.3	56.03	43.81	0	0	0	0.15
2002	343	23	624	596.324	-316.278	D	7.743	7.593	0.15	3.3	56.95	42.94	0	0	0	0.11
2002	344	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	348	23	517	602.805	-305.061	D	7.727	7.593	0.134	3.3	21.5	77.85	0	0	0	0.66
2002	349	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	26.34	73.33	0	0	0	0.22
2002	357	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	358	23	517	602.805	-305.061	D	7.767	7.593	0.174	3.3	40.81	59.03	0	0	0	0.16
2002	359	23	517	602.805	-305.061	D	7.689	7.593	0.097	3.3	49.22	50.35	0	0	0	0.42
2002	360	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	548	603.28	-312.734	D	7.646	7.593	0.053	3.3	24.42	75.27	0	0	0	0.31
									2.084							

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EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	632	596.27	-315.421	D	7.607	7.593	0.014	3.3	0	0	0	0	0	100
2003	3	23	517	602.805	-305.061	D	7.613	7.593	0.02	3.3	0	0	0	0	0	100
2003	4	23	637	596.267	-315.066	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100
2003	5	23	623	596.511	-316.262	D	7.596	7.593	0.003	3.3	0	0	0	0	0	99.99
2003	6	23	517	602.805	-305.061	D	7.62	7.593	0.027	3.3	0	0	0	0	0	100
2003	7	23	517	602.805	-305.061	D	7.616	7.593	0.023	3.3	0	0	0	0	0	100
2003	8	23	557	601.32	-313.419	D	7.61	7.593	0.018	3.3	0	0	0	0	0	100.01
2003	9	23	676	599.876	-309.365	D	7.622	7.593	0.029	3.3	0	0	0	0	0	100.01
2003	10	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	11	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	23	676	599.876	-309.365	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.01
2003	13	23	603	598.68	-316.244	D	7.611	7.593	0.018	3.3	0	0	0	0	0	100
2003	14	23	517	602.805	-305.061	D	7.615	7.593	0.022	3.3	0	0	0	0	0	100.01
2003	15	23	548	603.28	-312.734	D	7.611	7.593	0.018	3.3	0	0	0	0	0	100
2003	16	23	637	596.267	-315.066	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2003	17	23	517	602.805	-305.061	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2003	18	23	519	602.836	-305.557	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100
2003	19	23	624	596.324	-316.278	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.03
2003	20	23	517	602.805	-305.061	D	7.611	7.593	0.018	3.3	0	0	0	0	0	100.01
2003	21	23	603	598.68	-316.244	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100.01
2003	22	23	517	602.805	-305.061	D	7.601	7.593	0.009	3.3	0	0	0	0	0	99.98
2003	23	23	517	602.805	-305.061	D	7.641	7.593	0.048	3.3	0	0	0	0	0	100
2003	24	23	517	602.805	-305.061	D	7.623	7.593	0.03	3.3	0	0	0	0	0	100
2003	25	23	518	602.82	-305.309	D	7.599	7.593	0.007	3.3	0	0	0	0	0	99.99
2003	26	23	693	601.983	-306.223	D	7.634	7.593	0.042	3.3	0	0	0	0	0	100
2003	27	23	676	599.876	-309.365	D	7.611	7.593	0.019	3.3	0	0	0	0	0	100
2003	28	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.96
2003	29	23	676	599.876	-309.365	D	7.613	7.593	0.02	3.3	0	0	0	0	0	100
2003	30	23	603	598.68	-316.244	D	7.593	7.593	0	3.3	0	0	0	0	0	96.98
2003	31	23	545	603.234	-311.991	D	7.596	7.593	0.003	3.3	0	0	0	0	0	99.97
2003	32	23	624	596.324	-316.278	D	7.46	7.459	0.001	3.013	0	0	0	0	0	100.13
2003	33	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	0	0	0	0	0	100.04
2003	34	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	100.26
2003	35	23	603	598.68	-316.244	D	7.453	7.453	0.001	3	0	0	0	0	0	100.02
2003	36	23	662	598.404	-311.683	D	7.465	7.453	0.012	3	0	0	0	0	0	100.03
2003	37	23	632	596.27	-315.421	D	7.456	7.453	0.003	3	0	0	0	0	0	100.1
2003	38	23	557	601.32	-313.419	D	7.473	7.453	0.02	3	0	0	0	0	0	100

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	39	23	557	601.32	-313.419	D	7.454	7.453	0.001	3	0	0	0	0	0	100.32
2003	40	23	517	602.805	-305.061	D	7.465	7.453	0.012	3	0	0	0	0	0	100.02
2003	41	23	624	596.324	-316.278	D	7.458	7.453	0.005	3	0	0	0	0	0	100.07
2003	42	23	517	602.805	-305.061	D	7.465	7.453	0.013	3	0	0	0	0	0	100.02
2003	43	23	548	603.28	-312.734	D	7.458	7.453	0.005	3	0	0	0	0	0	100.05
2003	44	23	517	602.805	-305.061	D	7.456	7.453	0.003	3	0	0	0	0	0	100.05
2003	45	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	0	0	0	0	0	100.49
2003	46	23	548	603.28	-312.734	D	7.455	7.453	0.002	3	0	0	0	0	0	100.1
2003	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	23	656	597.971	-312.292	D	7.467	7.453	0.014	3	0	0	0	0	0	100.02
2003	49	23	517	602.805	-305.061	D	7.478	7.453	0.025	3	0	0	0	0	0	100.01
2003	50	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	0	0	0	0	0	100.08
2003	51	23	624	596.324	-316.278	D	7.459	7.453	0.006	3	0	0	0	0	0	100.03
2003	52	23	632	596.27	-315.421	D	7.455	7.453	0.002	3	0	0	0	0	0	100.08
2003	53	23	632	596.27	-315.421	D	7.458	7.453	0.005	3	0	0	0	0	0	100.07
2003	54	23	557	601.32	-313.419	D	7.474	7.453	0.021	3	0	0	0	0	0	100.01
2003	55	23	517	602.805	-305.061	D	7.465	7.453	0.012	3	0	0	0	0	0	100.02
2003	56	23	557	601.32	-313.419	D	7.462	7.453	0.009	3	0	0	0	0	0	100.01
2003	57	23	281	600.703	-308.285	D	7.453	7.453	0	3	0	0	0	0	0	111.68
2003	58	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	101.11
2003	59	23	637	596.267	-315.066	D	7.468	7.453	0.015	3	0	0	0	0	0	100.02
2003	60	23	517	602.805	-305.061	D	7.381	7.362	0.019	2.808	0	0	0	0	0	100.01
2003	61	23	517	602.805	-305.061	D	7.379	7.358	0.021	2.8	0	0	0	0	0	100.01
2003	62	23	548	603.28	-312.734	D	7.36	7.358	0.002	2.8	0	0	0	0	0	100.22
2003	63	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	0	0	0	0	0	100.07
2003	64	23	656	597.971	-312.292	D	7.382	7.358	0.024	2.8	0	0	0	0	0	100.01
2003	65	23	632	596.27	-315.421	D	7.412	7.358	0.054	2.8	0	0	0	0	0	100.01
2003	66	23	604	598.599	-316.246	D	7.366	7.358	0.008	2.8	0	0	0	0	0	100.01
2003	67	23	517	602.805	-305.061	D	7.362	7.358	0.004	2.8	0	0	0	0	0	99.99
2003	68	23	637	596.267	-315.066	D	7.385	7.358	0.027	2.8	0	0	0	0	0	100.01
2003	69	23	637	596.267	-315.066	D	7.373	7.358	0.014	2.8	0	0	0	0	0	100
2003	70	23	676	599.876	-309.365	D	7.367	7.358	0.008	2.8	0	0	0	0	0	100.02
2003	71	23	517	602.805	-305.061	D	7.36	7.358	0.002	2.8	0	0	0	0	0	100.03
2003	72	23	548	603.28	-312.734	D	7.37	7.358	0.012	2.8	0	0	0	0	0	100.02
2003	73	23	603	598.68	-316.244	D	7.359	7.358	0	2.8	0	0	0	0	0	100.06
2003	74	23	517	602.805	-305.061	D	7.361	7.358	0.003	2.8	0	0	0	0	0	100.1
2003	75	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	0	0	0	0	0	100.35
2003	76	23	603	598.68	-316.244	D	7.361	7.358	0.003	2.8	0	0	0	0	0	100.08
2003	77	23	624	596.324	-316.278	D	7.358	7.358	0	2.8	0	0	0	0	0	100.18

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	78	23	557	601.32	-313.419	D	7.362	7.358	0.004	2.8	0	0	0	0	0	100
2003	79	23	623	596.511	-316.262	D	7.358	7.358	0	2.8	0	0	0	0	0	100.2
2003	80	23	548	603.28	-312.734	D	7.373	7.358	0.015	2.8	0	0	0	0	0	100.01
2003	81	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	0	0	0	0	0	100.52
2003	82	23	624	596.324	-316.278	D	7.372	7.358	0.014	2.8	0	0	0	0	0	100.01
2003	83	23	517	602.805	-305.061	D	7.36	7.358	0.001	2.8	0	0	0	0	0	100.15
2003	84	23	517	602.805	-305.061	D	7.376	7.358	0.018	2.8	0	0	0	0	0	100.01
2003	85	23	548	603.28	-312.734	D	7.363	7.358	0.005	2.8	0	0	0	0	0	100.05
2003	86	23	624	596.324	-316.278	D	7.359	7.358	0.001	2.8	0	0	0	0	0	100.44
2003	87	23	626	596.299	-315.88	D	7.361	7.358	0.003	2.8	0	0	0	0	0	100.09
2003	88	23	623	596.511	-316.262	D	7.358	7.358	0	2.8	0	0	0	0	0	103.32
2003	89	23	517	602.805	-305.061	D	7.366	7.358	0.007	2.8	0	0	0	0	0	100.02
2003	90	23	637	596.267	-315.066	D	7.359	7.358	0.001	2.8	0	0	0	0	0	100
2003	91	23	1	596.558	-316.101	D	7.267	7.267	0	2.608	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	95	23	517	602.805	-305.061	D	7.267	7.263	0.004	2.6	0	0	0	0	0	100.02
2003	96	23	624	596.324	-316.278	D	7.268	7.263	0.005	2.6	0	0	0	0	0	100.05
2003	97	23	656	597.971	-312.292	D	7.27	7.263	0.007	2.6	0	0	0	0	0	100.03
2003	98	23	637	596.267	-315.066	D	7.331	7.263	0.068	2.6	0	0	0	0	0	100
2003	99	23	557	601.32	-313.419	D	7.305	7.263	0.042	2.6	0	0	0	0	0	100
2003	100	23	637	596.267	-315.066	D	7.269	7.263	0.006	2.6	0	0	0	0	0	100.02
2003	101	23	637	596.267	-315.066	D	7.27	7.263	0.007	2.6	0	0	0	0	0	100.03
2003	102	23	603	598.68	-316.244	D	7.308	7.263	0.045	2.6	0	0	0	0	0	100
2003	103	23	517	602.805	-305.061	D	7.272	7.263	0.01	2.6	0	0	0	0	0	100.02
2003	104	23	557	601.32	-313.419	D	7.269	7.263	0.006	2.6	0	0	0	0	0	100.02
2003	105	23	184	599.633	-310.616	D	7.263	7.263	0	2.6	0	0	0	0	0	73.6
2003	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	107	23	603	598.68	-316.244	D	7.268	7.263	0.005	2.6	0	0	0	0	0	100.06
2003	108	23	534	603.066	-309.269	D	7.276	7.263	0.013	2.6	0	0	0	0	0	100.02
2003	109	23	517	602.805	-305.061	D	7.266	7.263	0.003	2.6	0	0	0	0	0	99.98
2003	110	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	0	0	0	0	0	100.11
2003	111	23	603	598.68	-316.244	D	7.271	7.263	0.008	2.6	0	0	0	0	0	100.03
2003	112	23	517	602.805	-305.061	D	7.279	7.263	0.016	2.6	0	0	0	0	0	100.01
2003	113	23	624	596.324	-316.278	D	7.269	7.263	0.006	2.6	0	0	0	0	0	100.02
2003	114	23	625	596.311	-316.079	D	7.264	7.263	0.001	2.6	0	0	0	0	0	99.94
2003	115	23	6	596.462	-314.859	D	7.28	7.263	0.017	2.6	0	0	0	0	0	100.01
2003	116	23	548	603.28	-312.734	D	7.269	7.263	0.006	2.6	0	0	0	0	0	99.99

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	117	23	517	602.805	-305.061	D	7.267	7.263	0.004	2.6	0	0	0	0	0	100.03
2003	118	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	0	0	0	0	0	100.96
2003	119	23	517	602.805	-305.061	D	7.27	7.263	0.007	2.6	0	0	0	0	0	100.01
2003	120	23	517	602.805	-305.061	D	7.264	7.263	0.001	2.6	0	0	0	0	0	99.93
2003	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2003	122	23	517	602.805	-305.061	D	7.479	7.453	0.026	3	0	0	0	0	0	100.01
2003	123	23	624	596.324	-316.278	D	7.47	7.453	0.017	3	0	0	0	0	0	100.02
2003	124	23	557	601.32	-313.419	D	7.46	7.453	0.007	3	0	0	0	0	0	100.05
2003	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	113.2
2003	126	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	100.86
2003	127	23	517	602.805	-305.061	D	7.456	7.453	0.003	3	0	0	0	0	0	100.1
2003	128	23	542	603.188	-311.249	D	7.465	7.453	0.013	3	0	0	0	0	0	100.02
2003	129	23	431	602.059	-306.432	D	7.453	7.453	0	3	0	0	0	0	0	97.12
2003	130	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	131	23	624	596.324	-316.278	D	7.453	7.453	0.001	3	0	0	0	0	0	100.29
2003	132	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	0	0	0	0	100.27
2003	133	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	0	0	0	0	0	100.19
2003	134	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	0	0	0	0	0	100.46
2003	135	23	517	602.805	-305.061	D	7.458	7.453	0.005	3	0	0	0	0	0	100.07
2003	136	23	517	602.805	-305.061	D	7.462	7.453	0.009	3	0	0	0	0	0	100.03
2003	137	23	557	601.32	-313.419	D	7.461	7.453	0.008	3	0	0	0	0	0	100.03
2003	138	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	102.58
2003	139	23	632	596.27	-315.421	D	7.455	7.453	0.002	3	0	0	0	0	0	100.1
2003	140	23	548	603.28	-312.734	D	7.479	7.453	0.027	3	0	0	0	0	0	100.01
2003	141	23	517	602.805	-305.061	D	7.456	7.453	0.003	3	0	0	0	0	0	100.06
2003	142	23	637	596.267	-315.066	D	7.46	7.453	0.007	3	0	0	0	0	0	100.04
2003	143	23	637	596.267	-315.066	D	7.467	7.453	0.014	3	0	0	0	0	0	100.02
2003	144	23	624	596.324	-316.278	D	7.493	7.453	0.04	3	0	0	0	0	0	100.01
2003	145	23	548	603.28	-312.734	D	7.476	7.453	0.023	3	0	0	0	0	0	100.02
2003	146	23	624	596.324	-316.278	D	7.454	7.453	0.001	3	0	0	0	0	0	100.21
2003	147	23	517	602.805	-305.061	D	7.468	7.453	0.015	3	0	0	0	0	0	100.01
2003	148	23	548	603.28	-312.734	D	7.46	7.453	0.007	3	0	0	0	0	0	100.05
2003	149	23	632	596.27	-315.421	D	7.466	7.453	0.014	3	0	0	0	0	0	100.02
2003	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	101.06
2003	151	23	517	602.805	-305.061	D	7.462	7.453	0.01	3	0	0	0	0	0	100.03
2003	152	23	637	596.267	-315.066	D	7.549	7.542	0.006	3.192	0	0	0	0	0	99.98
2003	153	23	626	596.299	-315.88	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.21
2003	154	23	637	596.267	-315.066	D	7.583	7.546	0.037	3.2	0	0	0	0	0	100
2003	155	23	557	601.32	-313.419	D	7.577	7.546	0.03	3.2	0	0	0	0	0	100.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	156	23	517	602.805	-305.061	D	7.561	7.546	0.014	3.2	0	0	0	0	0	100.01
2003	157	23	625	596.311	-316.079	D	7.555	7.546	0.009	3.2	0	0	0	0	0	100.02
2003	158	23	526	602.943	-307.29	D	7.572	7.546	0.025	3.2	0	0	0	0	0	100.01
2003	159	23	517	602.805	-305.061	D	7.555	7.546	0.009	3.2	0	0	0	0	0	100.03
2003	160	23	624	596.324	-316.278	D	7.549	7.546	0.003	3.2	0	0	0	0	0	100.06
2003	161	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.15
2003	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	7.567	7.546	0.021	3.2	0	0	0	0	0	100
2003	164	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	0	0	0	0	0	100.56
2003	165	23	517	602.805	-305.061	D	7.569	7.546	0.022	3.2	0	0	0	0	0	100.01
2003	166	23	624	596.324	-316.278	D	7.56	7.546	0.013	3.2	0	0	0	0	0	100.02
2003	167	23	78	598.564	-316.197	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.23
2003	168	23	78	598.564	-316.197	D	7.546	7.546	0	3.2	0	0	0	0	0	100.42
2003	169	23	78	598.564	-316.197	D	7.546	7.546	0	3.2	0	0	0	0	0	100.58
2003	170	23	696	602.394	-305.643	D	7.579	7.546	0.033	3.2	0	0	0	0	0	100
2003	171	23	624	596.324	-316.278	D	7.548	7.546	0.001	3.2	0	0	0	0	0	100.09
2003	172	23	624	596.324	-316.278	D	7.546	7.546	0	3.2	0	0	0	0	0	103.3
2003	173	23	603	598.68	-316.244	D	7.553	7.546	0.007	3.2	0	0	0	0	0	100.03
2003	174	23	624	596.324	-316.278	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.06
2003	175	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100
2003	176	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100
2003	177	23	637	596.267	-315.066	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.18
2003	178	23	517	602.805	-305.061	D	7.557	7.546	0.01	3.2	0	0	0	0	0	100.02
2003	179	23	669	599.263	-310.777	D	7.559	7.546	0.013	3.2	0	0	0	0	0	100.01
2003	180	23	517	602.805	-305.061	D	7.551	7.546	0.005	3.2	0	0	0	0	0	100.06
2003	181	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.33
2003	182	23	624	596.324	-316.278	D	7.595	7.591	0.004	3.296	0	0	0	0	0	100.03
2003	183	23	516	602.728	-305.38	D	7.593	7.593	0	3.3	0	0	0	0	0	100.09
2003	184	23	548	603.28	-312.734	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.07
2003	185	23	518	602.82	-305.309	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100
2003	186	23	222	600.034	-309.336	D	7.593	7.593	0	3.3	0	0	0	0	0	93.81
2003	187	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	624	596.324	-316.278	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100
2003	192	23	50	598.048	-315.987	D	7.593	7.593	0	3.3	0	0	0	0	0	99.36
2003	193	23	517	602.805	-305.061	D	7.598	7.593	0.006	3.3	0	0	0	0	0	100
2003	194	23	517	602.805	-305.061	D	7.607	7.593	0.014	3.3	0	0	0	0	0	100.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	195	23	624	596.324	-316.278	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100
2003	196	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.08
2003	197	23	517	602.805	-305.061	D	7.608	7.593	0.015	3.3	0	0	0	0	0	100
2003	198	23	548	603.28	-312.734	D	7.623	7.593	0.03	3.3	0	0	0	0	0	100
2003	199	23	624	596.324	-316.278	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100.02
2003	200	23	548	603.28	-312.734	D	7.611	7.593	0.019	3.3	0	0	0	0	0	100.01
2003	201	23	603	598.68	-316.244	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100.03
2003	202	23	547	603.265	-312.487	D	7.597	7.593	0.004	3.3	0	0	0	0	0	99.99
2003	203	23	625	596.311	-316.079	D	7.615	7.593	0.023	3.3	0	0	0	0	0	100
2003	204	23	624	596.324	-316.278	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2003	205	23	548	603.28	-312.734	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.02
2003	206	23	603	598.68	-316.244	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.02
2003	207	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	0	0	0	0	102.76
2003	208	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	0	0	0	0	100.02
2003	209	23	517	602.805	-305.061	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100.02
2003	210	23	548	603.28	-312.734	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.02
2003	211	23	620	597.072	-316.212	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.02
2003	212	23	517	602.805	-305.061	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2003	213	23	517	602.805	-305.061	D	7.692	7.681	0.011	3.492	0	0	0	0	0	99.99
2003	214	23	548	603.28	-312.734	D	7.686	7.685	0.001	3.5	0	0	0	0	0	99.78
2003	215	23	631	596.276	-315.551	D	7.69	7.685	0.006	3.5	0	0	0	0	0	100
2003	216	23	624	596.324	-316.278	D	7.694	7.685	0.01	3.5	0	0	0	0	0	100.01
2003	217	23	517	602.805	-305.061	D	7.702	7.685	0.017	3.5	0	0	0	0	0	100
2003	218	23	637	596.267	-315.066	D	7.704	7.685	0.02	3.5	0	0	0	0	0	99.99
2003	219	23	637	596.267	-315.066	D	7.699	7.685	0.015	3.5	0	0	0	0	0	100.01
2003	220	23	517	602.805	-305.061	D	7.697	7.685	0.012	3.5	0	0	0	0	0	100
2003	221	23	637	596.267	-315.066	D	7.693	7.685	0.008	3.5	0	0	0	0	0	100.01
2003	222	23	624	596.324	-316.278	D	7.687	7.685	0.002	3.5	0	0	0	0	0	99.96
2003	223	23	632	596.27	-315.421	D	7.689	7.685	0.005	3.5	0	0	0	0	0	100
2003	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	103.33
2003	226	23	557	601.32	-313.419	D	7.686	7.685	0.001	3.5	0	0	0	0	0	100.06
2003	227	23	516	602.728	-305.38	D	7.685	7.685	0.001	3.5	0	0	0	0	0	99.6
2003	228	23	517	602.805	-305.061	D	7.694	7.685	0.009	3.5	0	0	0	0	0	100.01
2003	229	23	624	596.324	-316.278	D	7.692	7.685	0.007	3.5	0	0	0	0	0	100.01
2003	230	23	517	602.805	-305.061	D	7.717	7.685	0.033	3.5	0	0	0	0	0	100
2003	231	23	624	596.324	-316.278	D	7.699	7.685	0.014	3.5	0	0	0	0	0	100
2003	232	23	676	599.876	-309.365	D	7.699	7.685	0.014	3.5	0	0	0	0	0	100
2003	233	23	548	603.28	-312.734	D	7.696	7.685	0.011	3.5	0	0	0	0	0	99.98

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	234	23	517	602.805	-305.061	D	7.693	7.685	0.008	3.5	0	0	0	0	0	100
2003	235	23	637	596.267	-315.066	D	7.703	7.685	0.018	3.5	0	0	0	0	0	100
2003	236	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	0	0	0	0	0	99.37
2003	237	23	632	596.27	-315.421	D	7.686	7.685	0.001	3.5	0	0	0	0	0	99.96
2003	238	23	631	596.276	-315.551	D	7.686	7.685	0.001	3.5	0	0	0	0	0	99.92
2003	239	23	517	602.805	-305.061	D	7.691	7.685	0.006	3.5	0	0	0	0	0	100.02
2003	240	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	0	0	0	0	100.12
2003	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	242	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	0	0	0	0	99.94
2003	243	23	557	601.32	-313.419	D	7.686	7.685	0.001	3.5	0	0	0	0	0	100.05
2003	244	23	632	596.27	-315.421	D	7.699	7.685	0.014	3.5	0	0	0	0	0	100.01
2003	245	23	637	596.267	-315.066	D	7.693	7.685	0.009	3.5	0	0	0	0	0	99.99
2003	246	23	517	602.805	-305.061	D	7.704	7.685	0.019	3.5	0	0	0	0	0	100
2003	247	23	637	596.267	-315.066	D	7.71	7.685	0.026	3.5	0	0	0	0	0	100
2003	248	23	637	596.267	-315.066	D	7.691	7.685	0.006	3.5	0	0	0	0	0	99.99
2003	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	199.91
2003	252	23	624	596.324	-316.278	D	7.687	7.685	0.002	3.5	0	0	0	0	0	100
2003	253	23	517	602.805	-305.061	D	7.687	7.685	0.003	3.5	0	0	0	0	0	100.02
2003	254	23	603	598.68	-316.244	D	7.689	7.685	0.004	3.5	0	0	0	0	0	100
2003	255	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	0	0	0	0	99.99
2003	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	257	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	0	0	0	0	100
2003	258	23	548	603.28	-312.734	D	7.686	7.685	0.001	3.5	0	0	0	0	0	100.02
2003	259	23	603	598.68	-316.244	D	7.693	7.685	0.008	3.5	0	0	0	0	0	100.01
2003	260	23	624	596.324	-316.278	D	7.69	7.685	0.006	3.5	0	0	0	0	0	100.01
2003	261	23	624	596.324	-316.278	D	7.687	7.685	0.003	3.5	0	0	0	0	0	100.02
2003	262	23	517	602.805	-305.061	D	7.693	7.685	0.008	3.5	0	0	0	0	0	100.01
2003	263	23	548	603.28	-312.734	D	7.692	7.685	0.007	3.5	0	0	0	0	0	100.01
2003	264	23	624	596.324	-316.278	D	7.694	7.685	0.009	3.5	0	0	0	0	0	100
2003	265	23	624	596.324	-316.278	D	7.687	7.685	0.002	3.5	0	0	0	0	0	99.98
2003	266	23	632	596.27	-315.421	D	7.689	7.685	0.004	3.5	0	0	0	0	0	100.01
2003	267	23	637	596.267	-315.066	D	7.687	7.685	0.002	3.5	0	0	0	0	0	99.95
2003	268	23	637	596.267	-315.066	D	7.691	7.685	0.006	3.5	0	0	0	0	0	100
2003	269	23	517	602.805	-305.061	D	7.691	7.685	0.006	3.5	0	0	0	0	0	100.01
2003	270	23	557	601.32	-313.419	D	7.698	7.685	0.013	3.5	0	0	0	0	0	100.01
2003	271	23	557	601.32	-313.419	D	7.687	7.685	0.002	3.5	0	0	0	0	0	99.99
2003	272	23	517	602.805	-305.061	D	7.691	7.685	0.006	3.5	0	0	0	0	0	100

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	273	23	548	603.28	-312.734	D	7.713	7.685	0.028	3.5	0	0	0	0	0	100
2003	274	23	557	601.32	-313.419	D	7.521	7.507	0.014	3.117	0	0	0	0	0	100.01
2003	275	23	557	601.32	-313.419	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100
2003	276	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	0	0	0	0	0	100.13
2003	277	23	557	601.32	-313.419	D	7.508	7.5	0.008	3.1	0	0	0	0	0	100.03
2003	278	23	548	603.28	-312.734	D	7.502	7.5	0.003	3.1	0	0	0	0	0	100.04
2003	279	23	517	602.805	-305.061	D	7.514	7.5	0.014	3.1	0	0	0	0	0	100.02
2003	280	23	624	596.324	-316.278	D	7.506	7.5	0.006	3.1	0	0	0	0	0	100.03
2003	281	23	557	601.32	-313.419	D	7.506	7.5	0.007	3.1	0	0	0	0	0	100.03
2003	282	23	517	602.805	-305.061	D	7.504	7.5	0.004	3.1	0	0	0	0	0	100.05
2003	283	23	624	596.324	-316.278	D	7.5	7.5	0	3.1	0	0	0	0	0	100.03
2003	284	23	517	602.805	-305.061	D	7.507	7.5	0.007	3.1	0	0	0	0	0	100.03
2003	285	23	632	596.27	-315.421	D	7.509	7.5	0.01	3.1	0	0	0	0	0	100.02
2003	286	23	624	596.324	-316.278	D	7.502	7.5	0.002	3.1	0	0	0	0	0	100.07
2003	287	23	517	602.805	-305.061	D	7.505	7.5	0.006	3.1	0	0	0	0	0	100.02
2003	288	23	557	601.32	-313.419	D	7.507	7.5	0.007	3.1	0	0	0	0	0	100.01
2003	289	23	496	603.111	-310.349	D	7.502	7.5	0.002	3.1	0	0	0	0	0	100.02
2003	290	23	688	601.298	-307.191	D	7.507	7.5	0.008	3.1	0	0	0	0	0	100.02
2003	291	23	637	596.267	-315.066	D	7.51	7.5	0.011	3.1	0	0	0	0	0	100.02
2003	292	23	632	596.27	-315.421	D	7.526	7.5	0.026	3.1	0	0	0	0	0	100.01
2003	293	23	492	603.188	-311.342	D	7.514	7.5	0.014	3.1	0	0	0	0	0	100.01
2003	294	23	632	596.27	-315.421	D	7.515	7.5	0.016	3.1	0	0	0	0	0	100.01
2003	295	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	0	0	0	0	0	100.05
2003	296	23	624	596.324	-316.278	D	7.516	7.5	0.017	3.1	0	0	0	0	0	100.01
2003	297	23	517	602.805	-305.061	D	7.515	7.5	0.015	3.1	0	0	0	0	0	100.01
2003	298	23	548	603.28	-312.734	D	7.528	7.5	0.029	3.1	0	0	0	0	0	100.01
2003	299	23	637	596.267	-315.066	D	7.52	7.5	0.02	3.1	0	0	0	0	0	100.01
2003	300	23	548	603.28	-312.734	D	7.51	7.5	0.011	3.1	0	0	0	0	0	100.02
2003	301	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	0	0	0	0	0	100.04
2003	302	23	548	603.28	-312.734	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.07
2003	303	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	0	0	0	0	99.81
2003	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	656	597.971	-312.292	D	7.519	7.5	0.019	3.1	0	0	0	0	0	100.02
2003	306	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.05
2003	307	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	6	596.462	-314.859	D	7.5	7.5	0	3.1	0	0	0	0	0	100.85
2003	309	23	517	602.805	-305.061	D	7.533	7.5	0.034	3.1	0	0	0	0	0	100
2003	310	23	631	596.276	-315.551	D	7.504	7.5	0.004	3.1	0	0	0	0	0	100.05
2003	311	23	632	596.27	-315.421	D	7.5	7.5	0.001	3.1	0	0	0	0	0	99.99

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	6	596.462	-314.859	D	7.5	7.5	0	3.1	0	0	0	0	0	104.53
2003	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	0	0	0	0	0	100.05
2003	317	23	632	596.27	-315.421	D	7.512	7.5	0.013	3.1	0	0	0	0	0	100
2003	318	23	548	603.28	-312.734	D	7.511	7.5	0.011	3.1	0	0	0	0	0	100.02
2003	319	23	546	603.249	-312.239	D	7.5	7.5	0.001	3.1	0	0	0	0	0	99.97
2003	320	23	517	602.805	-305.061	D	7.516	7.5	0.017	3.1	0	0	0	0	0	100
2003	321	23	624	596.324	-316.278	D	7.511	7.5	0.011	3.1	0	0	0	0	0	100.01
2003	322	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	632	596.27	-315.421	D	7.525	7.5	0.026	3.1	0	0	0	0	0	100.01
2003	324	23	557	601.32	-313.419	D	7.506	7.5	0.007	3.1	0	0	0	0	0	100.01
2003	325	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	637	596.267	-315.066	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.18
2003	328	23	625	596.311	-316.079	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.1
2003	329	23	624	596.324	-316.278	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.07
2003	330	23	486	602.575	-306.642	D	7.5	7.5	0	3.1	0	0	0	0	0	98.28
2003	331	23	517	602.805	-305.061	D	7.515	7.5	0.016	3.1	0	0	0	0	0	100.01
2003	332	23	517	602.805	-305.061	D	7.53	7.5	0.03	3.1	0	0	0	0	0	100
2003	333	23	624	596.324	-316.278	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.09
2003	334	23	512	602.805	-306.374	D	7.5	7.5	0	3.1	0	0	0	0	0	98.89
2003	335	23	681	600.53	-308.617	D	7.599	7.589	0.01	3.292	0	0	0	0	0	100
2003	336	23	637	596.267	-315.066	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100.01
2003	337	23	517	602.805	-305.061	D	7.598	7.593	0.005	3.3	0	0	0	0	0	100.01
2003	338	23	682	600.626	-308.407	D	7.609	7.593	0.016	3.3	0	0	0	0	0	100
2003	339	23	548	603.28	-312.734	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.01
2003	340	23	637	596.267	-315.066	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2003	341	23	517	602.805	-305.061	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100.01
2003	342	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	517	602.805	-305.061	D	7.603	7.593	0.011	3.3	0	0	0	0	0	100.01
2003	345	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100
2003	346	23	517	602.805	-305.061	D	7.623	7.593	0.031	3.3	0	0	0	0	0	100
2003	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	97.4
2003	348	23	517	602.805	-305.061	D	7.608	7.593	0.015	3.3	0	0	0	0	0	100.01
2003	349	23	516	602.728	-305.38	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100
2003	350	23	624	596.324	-316.278	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.1

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	351	23	603	598.68	-316.244	D	7.597	7.593	0.005	3.3	0	0	0	0	0	99.99
2003	352	23	626	596.299	-315.88	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.02
2003	353	23	623	596.511	-316.262	D	7.593	7.593	0	3.3	0	0	0	0	0	100.25
2003	354	23	557	601.32	-313.419	D	7.607	7.593	0.014	3.3	0	0	0	0	0	100
2003	355	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.02
2003	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	626	596.299	-315.88	D	7.614	7.593	0.021	3.3	0	0	0	0	0	100
2003	358	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	0	0	0	0	99.8
2003	359	23	517	602.805	-305.061	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.04
2003	360	23	548	603.28	-312.734	D	7.598	7.593	0.005	3.3	0	0	0	0	0	100.01
2003	361	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.03
2003	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	626	596.299	-315.88	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.98
2003	364	23	517	602.805	-305.061	D	7.598	7.593	0.006	3.3	0	0	0	0	0	100.02
									0.068							
DYNO NOBEL											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	624	596.324	-316.278	D	7.598	7.593	0.005	3.3	0	100	0	0	0	0
2003	3	23	555	601.772	-313.289	D	7.608	7.593	0.016	3.3	0	100	0	0	0	0
2003	4	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	5	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	6	23	517	602.805	-305.061	D	7.601	7.593	0.008	3.3	0	100.01	0	0	0	0
2003	7	23	548	603.28	-312.734	D	7.603	7.593	0.01	3.3	0	100	0	0	0	0
2003	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	23	513	602.785	-306.126	D	7.593	7.593	0	3.3	0	54.92	0	0	0	0
2003	10	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	11	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	0	100.01	0	0	0	0
2003	13	23	491	603.207	-311.591	D	7.593	7.593	0	3.3	0	99.84	0	0	0	0
2003	14	23	517	602.805	-305.061	D	7.607	7.593	0.014	3.3	0	100.01	0	0	0	0
2003	15	23	548	603.28	-312.734	D	7.595	7.593	0.002	3.3	0	100	0	0	0	0
2003	16	23	637	596.267	-315.066	D	7.603	7.593	0.01	3.3	0	100.01	0	0	0	0
2003	17	23	517	602.805	-305.061	D	7.595	7.593	0.003	3.3	0	100.01	0	0	0	0
2003	18	23	515	602.747	-305.629	D	7.593	7.593	0	3.3	0	76.76	0	0	0	0
2003	19	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	517	602.805	-305.061	D	7.6	7.593	0.007	3.3	0	100.01	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	21	23	687	601.186	-307.393	D	7.604	7.593	0.012	3.3	0	100	0	0	0	0
2003	22	23	626	596.299	-315.88	D	7.593	7.593	0	3.3	0	93.66	0	0	0	0
2003	23	23	624	596.324	-316.278	D	7.604	7.593	0.012	3.3	0	100	0	0	0	0
2003	24	23	548	603.28	-312.734	D	7.601	7.593	0.009	3.3	0	100.01	0	0	0	0
2003	25	23	548	603.28	-312.734	D	7.595	7.593	0.002	3.3	0	100.03	0	0	0	0
2003	26	23	517	602.805	-305.061	D	7.615	7.593	0.023	3.3	0	100.01	0	0	0	0
2003	27	23	691	601.709	-306.61	D	7.61	7.593	0.018	3.3	0	100.01	0	0	0	0
2003	28	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	0	99.93	0	0	0	0
2003	29	23	637	596.267	-315.066	D	7.604	7.593	0.011	3.3	0	100	0	0	0	0
2003	30	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	32	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	33	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	523	602.897	-306.547	D	7.47	7.453	0.017	3	0	100.01	0	0	0	0
2003	37	23	688	601.298	-307.191	D	7.467	7.453	0.014	3	0	100.01	0	0	0	0
2003	38	23	517	602.805	-305.061	D	7.476	7.453	0.023	3	0	100	0	0	0	0
2003	39	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	100.24	0	0	0	0
2003	41	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	42	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	0	100.14	0	0	0	0
2003	43	23	548	603.28	-312.734	D	7.453	7.453	0.001	3	0	100.13	0	0	0	0
2003	44	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	45	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	46	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	23	637	596.267	-315.066	D	7.457	7.453	0.004	3	0	100.03	0	0	0	0
2003	49	23	517	602.805	-305.061	D	7.468	7.453	0.015	3	0	100.02	0	0	0	0
2003	50	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	100.6	0	0	0	0
2003	51	23	517	602.805	-305.061	D	7.459	7.453	0.006	3	0	100.06	0	0	0	0
2003	52	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	101.1	0	0	0	0
2003	53	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	0	100.15	0	0	0	0
2003	54	23	517	602.805	-305.061	D	7.467	7.453	0.014	3	0	100.01	0	0	0	0
2003	55	23	603	598.68	-316.244	D	7.467	7.453	0.014	3	0	100.02	0	0	0	0
2003	56	23	637	596.267	-315.066	D	7.459	7.453	0.007	3	0	100.01	0	0	0	0
2003	57	23	6	596.462	-314.859	D	7.453	7.453	0	3	0	103.79	0	0	0	0
2003	58	23	4	596.5	-315.356	D	7.453	7.453	0	3	0	102.34	0	0	0	0
2003	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	102.06	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	60	23	517	602.805	-305.061	D	7.363	7.362	0	2.808	0	100.07	0	0	0	0
2003	61	23	517	602.805	-305.061	D	7.368	7.358	0.009	2.8	0	100.03	0	0	0	0
2003	62	23	433	602.806	-312.871	D	7.358	7.358	0	2.8	0	99.7	0	0	0	0
2003	63	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	64	23	517	602.805	-305.061	D	7.405	7.358	0.047	2.8	0	100	0	0	0	0
2003	65	23	624	596.324	-316.278	D	7.385	7.358	0.027	2.8	0	100.01	0	0	0	0
2003	66	23	637	596.267	-315.066	D	7.362	7.358	0.004	2.8	0	100.04	0	0	0	0
2003	67	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	0	99.77	0	0	0	0
2003	68	23	637	596.267	-315.066	D	7.362	7.358	0.003	2.8	0	100.08	0	0	0	0
2003	69	23	637	596.267	-315.066	D	7.378	7.358	0.02	2.8	0	100	0	0	0	0
2003	70	23	517	602.805	-305.061	D	7.361	7.358	0.002	2.8	0	100.11	0	0	0	0
2003	71	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	0	100.13	0	0	0	0
2003	72	23	517	602.805	-305.061	D	7.363	7.358	0.005	2.8	0	100.05	0	0	0	0
2003	73	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	136.37	0	0	0	0
2003	74	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	75	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	76	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	77	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	80	23	517	602.805	-305.061	D	7.363	7.358	0.005	2.8	0	99.99	0	0	0	0
2003	81	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	84	23	656	597.971	-312.292	D	7.37	7.358	0.011	2.8	0	100.02	0	0	0	0
2003	85	23	624	596.324	-316.278	D	7.359	7.358	0	2.8	0	100.61	0	0	0	0
2003	86	23	472	602.844	-310.119	D	7.358	7.358	0	2.8	0	102.01	0	0	0	0
2003	87	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	88	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	89	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	0	99.99	0	0	0	0
2003	90	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	91	23	1	596.558	-316.101	D	7.267	7.267	0	2.608	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	95	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	0	103.03	0	0	0	0
2003	96	23	624	596.324	-316.278	D	7.268	7.263	0.005	2.6	0	100.02	0	0	0	0
2003	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	98	23	637	596.267	-315.066	D	7.312	7.263	0.049	2.6	0	100	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	99	23	624	596.324	-316.278	D	7.273	7.263	0.01	2.6	0	100	0	0	0	0
2003	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	101	23	625	596.311	-316.079	D	7.263	7.263	0	2.6	0	100.53	0	0	0	0
2003	102	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	0	100.06	0	0	0	0
2003	103	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	0	104.99	0	0	0	0
2003	104	23	431	602.059	-306.432	D	7.263	7.263	0	2.6	0	86.97	0	0	0	0
2003	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	107	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	0	100.45	0	0	0	0
2003	108	23	517	602.805	-305.061	D	7.264	7.263	0.001	2.6	0	100.34	0	0	0	0
2003	109	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	0	98.66	0	0	0	0
2003	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	112	23	517	602.805	-305.061	D	7.273	7.263	0.01	2.6	0	100.02	0	0	0	0
2003	113	23	624	596.324	-316.278	D	7.264	7.263	0.001	2.6	0	100.06	0	0	0	0
2003	114	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	115	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	116	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	117	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	118	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	119	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	102.2	0	0	0	0
2003	120	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	28.44	0	0	0	0
2003	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2003	122	23	637	596.267	-315.066	D	7.453	7.453	0	3	0	100.85	0	0	0	0
2003	123	23	624	596.324	-316.278	D	7.456	7.453	0.003	3	0	100.06	0	0	0	0
2003	124	23	508	602.881	-307.367	D	7.453	7.453	0	3	0	100.98	0	0	0	0
2003	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	86.7	0	0	0	0
2003	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	127	23	6	596.462	-314.859	D	7.453	7.453	0	3	0	104.9	0	0	0	0
2003	128	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	0	100.27	0	0	0	0
2003	129	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	130	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	133	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	134	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	135	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	136	23	516	602.728	-305.38	D	7.453	7.453	0	3	0	103.36	0	0	0	0
2003	137	23	461	602.269	-305.916	D	7.453	7.453	0	3	0	395.3	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	138	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	189.72	0	0	0	0
2003	139	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	140	23	517	602.805	-305.061	D	7.469	7.453	0.016	3	0	100.01	0	0	0	0
2003	141	23	623	596.511	-316.262	D	7.453	7.453	0	3	0	102.94	0	0	0	0
2003	142	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	143	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	101.91	0	0	0	0
2003	144	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	0	100.67	0	0	0	0
2003	145	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	0	100.07	0	0	0	0
2003	146	23	623	596.511	-316.262	D	7.453	7.453	0	3	0	100.83	0	0	0	0
2003	147	23	36	597.379	-313.789	D	7.453	7.453	0	3	0	118.84	0	0	0	0
2003	148	23	517	602.805	-305.061	D	7.453	7.453	0	3	0	100.39	0	0	0	0
2003	149	23	525	602.928	-307.042	D	7.458	7.453	0.006	3	0	100.04	0	0	0	0
2003	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	151	23	490	602.499	-305.648	D	7.453	7.453	0	3	0	100.73	0	0	0	0
2003	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	67.18	0	0	0	0
2003	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	104	0	0	0	0
2003	155	23	662	598.404	-311.683	D	7.562	7.546	0.016	3.2	0	100	0	0	0	0
2003	156	23	517	602.805	-305.061	D	7.547	7.546	0	3.2	0	100.24	0	0	0	0
2003	157	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	0	100.35	0	0	0	0
2003	158	23	517	602.805	-305.061	D	7.547	7.546	0	3.2	0	100.52	0	0	0	0
2003	159	23	186	600.15	-314.075	D	7.546	7.546	0	3.2	0	104.82	0	0	0	0
2003	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	7.556	7.546	0.009	3.2	0	100.01	0	0	0	0
2003	164	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	165	23	517	602.805	-305.061	D	7.553	7.546	0.006	3.2	0	100.02	0	0	0	0
2003	166	23	603	598.68	-316.244	D	7.546	7.546	0	3.2	0	101.1	0	0	0	0
2003	167	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	102.93	0	0	0	0
2003	168	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	112.27	0	0	0	0
2003	169	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	170	23	5	596.481	-315.108	D	7.546	7.546	0	3.2	0	100.45	0	0	0	0
2003	171	23	603	598.68	-316.244	D	7.548	7.546	0.002	3.2	0	100	0	0	0	0
2003	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	178	23	548	603.28	-312.734	D	7.546	7.546	0	3.2	0	100.73	0	0	0	0
2003	179	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	114.42	0	0	0	0
2003	180	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	137.09	0	0	0	0
2003	181	23	152	599.175	-311.152	D	7.546	7.546	0	3.2	0	133.37	0	0	0	0
2003	182	23	1	596.558	-316.101	D	7.591	7.591	0	3.296	0	101.67	0	0	0	0
2003	183	23	185	599.614	-310.369	D	7.593	7.593	0	3.3	0	99.88	0	0	0	0
2003	184	23	221	600.054	-309.585	D	7.593	7.593	0	3.3	0	136.99	0	0	0	0
2003	185	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	193	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	194	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	100.38	0	0	0	0
2003	195	23	620	597.072	-316.212	D	7.593	7.593	0	3.3	0	99.84	0	0	0	0
2003	196	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	100.07	0	0	0	0
2003	197	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	0	100.24	0	0	0	0
2003	198	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	100.17	0	0	0	0
2003	199	23	432	602.04	-306.183	D	7.593	7.593	0	3.3	0	99.63	0	0	0	0
2003	200	23	353	602.08	-313.177	D	7.593	7.593	0	3.3	0	100.8	0	0	0	0
2003	201	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	202	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	203	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	0	99.96	0	0	0	0
2003	204	23	624	596.324	-316.278	D	7.593	7.593	0	3.3	0	100.05	0	0	0	0
2003	205	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	88.22	0	0	0	0
2003	206	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	106.46	0	0	0	0
2003	207	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	517	602.805	-305.061	D	7.608	7.593	0.016	3.3	0	100	0	0	0	0
2003	211	23	624	596.324	-316.278	D	7.595	7.593	0.002	3.3	0	100.05	0	0	0	0
2003	212	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	100.5	0	0	0	0
2003	213	23	433	602.806	-312.871	D	7.681	7.681	0	3.492	0	97.84	0	0	0	0
2003	214	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	95.62	0	0	0	0
2003	215	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	216	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	2.15	0	0	0	0
2003	217	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	0	100.03	0	0	0	0
2003	218	23	548	603.28	-312.734	D	7.685	7.685	0	3.5	0	99.89	0	0	0	0
2003	219	23	528	602.974	-307.784	D	7.685	7.685	0	3.5	0	99.24	0	0	0	0
2003	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	99.54	0	0	0	0
2003	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	228	23	475	602.786	-309.374	D	7.685	7.685	0	3.5	0	95.79	0	0	0	0
2003	229	23	63	598.297	-315.967	D	7.685	7.685	0	3.5	0	132.42	0	0	0	0
2003	230	23	685	600.962	-307.799	D	7.685	7.685	0	3.5	0	98.64	0	0	0	0
2003	231	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	0	99.61	0	0	0	0
2003	232	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	100.06	0	0	0	0
2003	233	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	99.89	0	0	0	0
2003	234	23	510	602.843	-306.871	D	7.685	7.685	0	3.5	0	99.49	0	0	0	0
2003	235	23	603	598.68	-316.244	D	7.686	7.685	0.001	3.5	0	99.96	0	0	0	0
2003	236	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	99.99	0	0	0	0
2003	237	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	99.36	0	0	0	0
2003	238	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	230.74	0	0	0	0
2003	239	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	165.28	0	0	0	0
2003	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	242	23	515	602.747	-305.629	D	7.685	7.685	0	3.5	0	95.88	0	0	0	0
2003	243	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	95.35	0	0	0	0
2003	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	245	23	461	602.269	-305.916	D	7.685	7.685	0	3.5	0	106.16	0	0	0	0
2003	246	23	690	601.572	-306.804	D	7.686	7.685	0.001	3.5	0	100.12	0	0	0	0
2003	247	23	656	597.971	-312.292	D	7.699	7.685	0.014	3.5	0	100	0	0	0	0
2003	248	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	254	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	257	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	100.47	0	0	0	0
2003	258	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	259	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	60.61	0	0	0	0
2003	260	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	103.36	0	0	0	0
2003	261	23	432	602.04	-306.183	D	7.685	7.685	0	3.5	0	95.72	0	0	0	0
2003	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	97.02	0	0	0	0
2003	263	23	517	602.805	-305.061	D	7.69	7.685	0.005	3.5	0	99.99	0	0	0	0
2003	264	23	6	596.462	-314.859	D	7.685	7.685	0	3.5	0	99.3	0	0	0	0
2003	265	23	490	602.499	-305.648	D	7.685	7.685	0	3.5	0	99.11	0	0	0	0
2003	266	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	0	99.95	0	0	0	0
2003	267	23	486	602.575	-306.642	D	7.685	7.685	0	3.5	0	92.26	0	0	0	0
2003	268	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	100.01	0	0	0	0
2003	269	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	99.64	0	0	0	0
2003	270	23	557	601.32	-313.419	D	7.691	7.685	0.006	3.5	0	99.99	0	0	0	0
2003	271	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	272	23	632	596.27	-315.421	D	7.696	7.685	0.011	3.5	0	100	0	0	0	0
2003	273	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	0	99.87	0	0	0	0
2003	274	23	517	602.805	-305.061	D	7.516	7.507	0.008	3.117	0	100.01	0	0	0	0
2003	275	23	637	596.267	-315.066	D	7.5	7.5	0.001	3.1	0	100.11	0	0	0	0
2003	276	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	106.06	0	0	0	0
2003	277	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	278	23	137	599.462	-314.878	D	7.5	7.5	0	3.1	0	98.8	0	0	0	0
2003	279	23	548	603.28	-312.734	D	7.5	7.5	0.001	3.1	0	100.18	0	0	0	0
2003	280	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	101.09	0	0	0	0
2003	281	23	327	601.142	-307.502	D	7.5	7.5	0	3.1	0	105.61	0	0	0	0
2003	282	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	146.26	0	0	0	0
2003	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	637	596.267	-315.066	D	7.501	7.5	0.001	3.1	0	99.98	0	0	0	0
2003	286	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	104.23	0	0	0	0
2003	287	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	0	100.26	0	0	0	0
2003	288	23	525	602.928	-307.042	D	7.5	7.5	0	3.1	0	99.68	0	0	0	0
2003	289	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	290	23	517	602.805	-305.061	D	7.502	7.5	0.003	3.1	0	100.08	0	0	0	0
2003	291	23	691	601.709	-306.61	D	7.5	7.5	0.001	3.1	0	100.1	0	0	0	0
2003	292	23	328	601.831	-313.196	D	7.5	7.5	0	3.1	0	100.41	0	0	0	0
2003	293	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	294	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	295	23	28	597.532	-315.777	D	7.5	7.5	0	3.1	0	100.06	0	0	0	0
2003	296	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	100.52	0	0	0	0
2003	297	23	624	596.324	-316.278	D	7.501	7.5	0.001	3.1	0	100.07	0	0	0	0
2003	298	23	517	602.805	-305.061	D	7.516	7.5	0.016	3.1	0	100.01	0	0	0	0
2003	299	23	518	602.82	-305.309	D	7.5	7.5	0	3.1	0	100.69	0	0	0	0
2003	300	23	548	603.28	-312.734	D	7.501	7.5	0.002	3.1	0	100.13	0	0	0	0
2003	301	23	462	603.035	-312.603	D	7.5	7.5	0	3.1	0	100.03	0	0	0	0
2003	302	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	637	596.267	-315.066	D	7.51	7.5	0.01	3.1	0	100.03	0	0	0	0
2003	306	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	0	99.62	0	0	0	0
2003	307	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	309	23	517	602.805	-305.061	D	7.505	7.5	0.005	3.1	0	100.02	0	0	0	0
2003	310	23	624	596.324	-316.278	D	7.5	7.5	0	3.1	0	100.48	0	0	0	0
2003	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	318	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	0	100.71	0	0	0	0
2003	319	23	462	603.035	-312.603	D	7.5	7.5	0	3.1	0	99.96	0	0	0	0
2003	320	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	517	602.805	-305.061	D	7.51	7.5	0.01	3.1	0	100.01	0	0	0	0
2003	324	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	461	602.269	-305.916	D	7.5	7.5	0	3.1	0	100.73	0	0	0	0
2003	328	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	517	602.805	-305.061	D	7.506	7.5	0.007	3.1	0	100.01	0	0	0	0
2003	332	23	548	603.28	-312.734	D	7.509	7.5	0.01	3.1	0	99.99	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	333	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	637	596.267	-315.066	D	7.599	7.589	0.01	3.292	0	99.99	0	0	0	0
2003	336	23	548	603.28	-312.734	D	7.598	7.593	0.005	3.3	0	100.01	0	0	0	0
2003	337	23	624	596.324	-316.278	D	7.595	7.593	0.003	3.3	0	100.01	0	0	0	0
2003	338	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	0	100	0	0	0	0
2003	339	23	517	602.805	-305.061	D	7.611	7.593	0.018	3.3	0	100	0	0	0	0
2003	340	23	517	602.805	-305.061	D	7.615	7.593	0.023	3.3	0	100	0	0	0	0
2003	341	23	519	602.836	-305.557	D	7.609	7.593	0.016	3.3	0	100	0	0	0	0
2003	342	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	548	603.28	-312.734	D	7.613	7.593	0.021	3.3	0	100	0	0	0	0
2003	345	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	517	602.805	-305.061	D	7.618	7.593	0.025	3.3	0	100	0	0	0	0
2003	347	23	637	596.267	-315.066	D	7.593	7.593	0	3.3	0	99.93	0	0	0	0
2003	348	23	623	596.511	-316.262	D	7.593	7.593	0.001	3.3	0	100.14	0	0	0	0
2003	349	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	0	99.98	0	0	0	0
2003	355	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	100.2	0	0	0	0
2003	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	637	596.267	-315.066	D	7.603	7.593	0.01	3.3	0	100	0	0	0	0
2003	358	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0	100.24	0	0	0	0
2003	360	23	546	603.249	-312.239	D	7.594	7.593	0.001	3.3	0	100.1	0	0	0	0
2003	361	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	0	100.15	0	0	0	0
2003	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.049							
MLC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	637	596.267	-315.066	D	7.593	7.593	0	3.3	6.31	82.09	0	0	0	10.13

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	2	23	637	596.267	-315.066	D	7.609	7.593	0.016	3.3	16.96	76.55	0	0	0	6.49
2003	3	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	4	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	5	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	6	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	7	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	10	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	11	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	23	557	601.32	-313.419	D	7.678	7.593	0.085	3.3	6.86	87.73	0	0	0	5.42
2003	13	23	517	602.805	-305.061	D	7.597	7.593	0.004	3.3	14.55	83.58	0	0	0	1.88
2003	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	15	23	548	603.28	-312.734	D	7.616	7.593	0.024	3.3	11.13	85.19	0	0	0	3.69
2003	16	23	517	602.805	-305.061	D	7.611	7.593	0.018	3.3	22.4	74.21	0	0	0	3.38
2003	17	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	18	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	19	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	517	602.805	-305.061	D	7.605	7.593	0.013	3.3	27.18	66.9	0	0	0	5.93
2003	21	23	626	596.299	-315.88	D	7.607	7.593	0.014	3.3	23.63	74.2	0	0	0	2.17
2003	22	23	637	596.267	-315.066	D	7.627	7.593	0.035	3.3	12.01	80.08	0	0	0	7.91
2003	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	24	23	517	602.805	-305.061	D	7.638	7.593	0.046	3.3	8.88	86.91	0	0	0	4.21
2003	25	23	548	603.28	-312.734	D	7.597	7.593	0.004	3.3	18.19	80.02	0	0	0	1.81
2003	26	23	405	602.557	-312.89	D	7.593	7.593	0	3.3	28.86	68.61	0	0	0	1.61
2003	27	23	681	600.53	-308.617	D	7.643	7.593	0.051	3.3	6.81	85.35	0	0	0	7.84
2003	28	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	19.32	79.32	0	0	0	1.35
2003	29	23	637	596.267	-315.066	D	7.604	7.593	0.011	3.3	16.28	74.55	0	0	0	9.18
2003	30	23	637	596.267	-315.066	D	7.597	7.593	0.004	3.3	21.73	72.2	0	0	0	6.09
2003	31	23	637	596.267	-315.066	D	7.593	7.593	0	3.3	24.69	71.66	0	0	0	1.78
2003	32	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	33	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	548	603.28	-312.734	D	7.496	7.453	0.043	3	9.8	83.76	0	0	0	6.44
2003	37	23	688	601.298	-307.191	D	7.458	7.453	0.006	3	18.3	78.39	0	0	0	3.36
2003	38	23	676	599.876	-309.365	D	7.478	7.453	0.026	3	21.98	71.78	0	0	0	6.24
2003	39	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	15.29	79.97	0	0	0	4.76

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	41	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	42	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	43	23	548	603.28	-312.734	D	7.454	7.453	0.002	3	12.51	79.24	0	0	0	8.29
2003	44	23	405	602.557	-312.89	D	7.453	7.453	0	3	30.54	65.92	0	0	0	4.38
2003	45	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	46	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	23	647	597.234	-313.631	D	7.501	7.453	0.048	3	34.74	60.14	0	0	0	5.12
2003	48	23	557	601.32	-313.419	D	7.547	7.453	0.094	3	10.24	81.65	0	0	0	8.11
2003	49	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	50	23	517	602.805	-305.061	D	7.456	7.453	0.004	3	35.32	62.18	0	0	0	2.51
2003	51	23	637	596.267	-315.066	D	7.467	7.453	0.014	3	29.12	68.11	0	0	0	2.77
2003	52	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	53	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	9.19	77.09	0	0	0	13.78
2003	54	23	688	601.298	-307.191	D	7.47	7.453	0.017	3	22.44	71.83	0	0	0	5.73
2003	55	23	624	596.324	-316.278	D	7.465	7.453	0.013	3	15.54	78.7	0	0	0	5.77
2003	56	23	638	596.406	-314.894	D	7.49	7.453	0.037	3	6.13	84.3	0	0	0	9.58
2003	57	23	656	597.971	-312.292	D	7.456	7.453	0.004	3	25.91	71.61	0	0	0	2.53
2003	58	23	637	596.267	-315.066	D	7.456	7.453	0.003	3	33.74	64.41	0	0	0	1.92
2003	59	23	637	596.267	-315.066	D	7.546	7.453	0.093	3	20.4	74.55	0	0	0	5.05
2003	60	23	688	601.298	-307.191	D	7.439	7.362	0.077	2.808	38.57	59.03	0	0	0	2.4
2003	61	23	517	602.805	-305.061	D	7.38	7.358	0.022	2.8	50.82	47.58	0	0	0	1.61
2003	62	23	676	599.876	-309.365	D	7.41	7.358	0.052	2.8	8.53	84.65	0	0	0	6.82
2003	63	23	548	603.28	-312.734	D	7.358	7.358	0	2.8	45.28	51.68	0	0	0	2.92
2003	64	23	548	603.28	-312.734	D	7.381	7.358	0.022	2.8	33.36	61.11	0	0	0	5.54
2003	65	23	638	596.406	-314.894	D	7.422	7.358	0.064	2.8	27.27	67.09	0	0	0	5.64
2003	66	23	624	596.324	-316.278	D	7.363	7.358	0.004	2.8	35.33	61.86	0	0	0	2.83
2003	67	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	61.55	35.37	0	0	0	3.06
2003	68	23	548	603.28	-312.734	D	7.391	7.358	0.033	2.8	15.74	76.45	0	0	0	7.81
2003	69	23	637	596.267	-315.066	D	7.425	7.358	0.066	2.8	6.88	84.75	0	0	0	8.38
2003	70	23	517	602.805	-305.061	D	7.369	7.358	0.011	2.8	28.28	68.89	0	0	0	2.84
2003	71	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	45.57	52.28	0	0	0	2.21
2003	72	23	637	596.267	-315.066	D	7.364	7.358	0.005	2.8	50.09	39.62	0	0	0	10.31
2003	73	23	637	596.267	-315.066	D	7.359	7.358	0.001	2.8	27.01	64.81	0	0	0	8.19
2003	74	23	637	596.267	-315.066	D	7.358	7.358	0	2.8	43.24	57.25	0	0	0	2.46
2003	75	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	68.69	26.38	0	0	0	2.55
2003	76	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	77	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	80	23	624	596.324	-316.278	D	7.362	7.358	0.004	2.8	30.31	66.75	0	0	0	2.94
2003	81	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	84	23	517	602.805	-305.061	D	7.362	7.358	0.004	2.8	53.02	41.3	0	0	0	5.71
2003	85	23	557	601.32	-313.419	D	7.392	7.358	0.034	2.8	12.78	77.59	0	0	0	9.64
2003	86	23	517	602.805	-305.061	D	7.36	7.358	0.002	2.8	70.63	21.17	0	0	0	8.24
2003	87	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	88	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	89	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	90	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	91	23	1	596.558	-316.101	D	7.267	7.267	0	2.608	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	95	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	62.64	24.88	0	0	0	12.61
2003	96	23	637	596.267	-315.066	D	7.267	7.263	0.004	2.6	42.51	51.62	0	0	0	5.87
2003	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	98	23	548	603.28	-312.734	D	7.311	7.263	0.048	2.6	12.58	76.9	0	0	0	10.52
2003	99	23	548	603.28	-312.734	D	7.281	7.263	0.018	2.6	23.18	71.49	0	0	0	5.34
2003	100	23	548	603.28	-312.734	D	7.294	7.263	0.031	2.6	16.34	68.38	0	0	0	15.29
2003	101	23	548	603.28	-312.734	D	7.327	7.263	0.064	2.6	21.32	60.34	0	0	0	18.34
2003	102	23	548	603.28	-312.734	D	7.263	7.263	0	2.6	82.97	5.52	0	0	0	11.44
2003	103	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	85.64	5.25	0	0	0	9.95
2003	104	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	86.78	6.08	0	0	0	6.98
2003	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	107	23	624	596.324	-316.278	D	7.264	7.263	0.001	2.6	78.42	16.5	0	0	0	5.26
2003	108	23	281	600.703	-308.285	D	7.311	7.263	0.048	2.6	14.22	76.85	0	0	0	8.93
2003	109	23	222	600.034	-309.336	D	7.264	7.263	0.001	2.6	87.87	7.21	0	0	0	4.79
2003	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	112	23	493	603.169	-311.093	D	7.263	7.263	0	2.6	60.87	18.25	0	0	0	16.82
2003	113	23	548	603.28	-312.734	D	7.265	7.263	0.002	2.6	44.53	37.54	0	0	0	17.93
2003	114	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	115	23	517	602.805	-305.061	D	7.285	7.263	0.022	2.6	63.75	29.95	0	0	0	6.31
2003	116	23	526	602.943	-307.29	D	7.288	7.263	0.025	2.6	12.94	72.56	0	0	0	14.5
2003	117	23	6	596.462	-314.859	D	7.263	7.263	0	2.6	95.01	4.5	0	0	0	5.42
2003	118	23	37	597.36	-313.541	D	7.263	7.263	0	2.6	84.77	5.43	0	0	0	3.22

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	119	23	516	602.728	-305.38	D	7.263	7.263	0	2.6	43.53	57.59	0	0	0	4.64
2003	120	23	461	602.269	-305.916	D	7.263	7.263	0	2.6	9.71	0.19	0	0	0	0.63
2003	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2003	122	23	517	602.805	-305.061	D	7.46	7.453	0.008	3	62.75	29.01	0	0	0	8.26
2003	123	23	548	603.28	-312.734	D	7.455	7.453	0.003	3	31.18	60.6	0	0	0	8.27
2003	124	23	631	596.276	-315.551	D	7.453	7.453	0	3	84.52	13.51	0	0	0	2.79
2003	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	127	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	128	23	517	602.805	-305.061	D	7.456	7.453	0.003	3	19.73	67.59	0	0	0	12.71
2003	129	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	130	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	133	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	134	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	135	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	136	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	34.96	56.97	0	0	0	8.13
2003	137	23	637	596.267	-315.066	D	7.453	7.453	0	3	61.37	32.79	0	0	0	6.1
2003	138	23	637	596.267	-315.066	D	7.504	7.453	0.051	3	26.05	68.07	0	0	0	5.87
2003	139	23	6	596.462	-314.859	D	7.453	7.453	0	3	105.32	1.78	0	0	0	4.99
2003	140	23	548	603.28	-312.734	D	7.458	7.453	0.005	3	59.62	38.1	0	0	0	2.33
2003	141	23	638	596.406	-314.894	D	7.468	7.453	0.015	3	26.61	39.32	0	0	0	34.08
2003	142	23	557	601.32	-313.419	D	7.528	7.453	0.075	3	30.23	53.95	0	0	0	15.83
2003	143	23	676	599.876	-309.365	D	7.511	7.453	0.058	3	36.98	43.94	0	0	0	19.09
2003	144	23	548	603.28	-312.734	D	7.47	7.453	0.017	3	73.51	17.03	0	0	0	9.46
2003	145	23	517	602.805	-305.061	D	7.471	7.453	0.018	3	69.42	27.5	0	0	0	3.11
2003	146	23	632	596.27	-315.421	D	7.466	7.453	0.014	3	57.5	33.03	0	0	0	9.48
2003	147	23	637	596.267	-315.066	D	7.458	7.453	0.005	3	40.49	37.32	0	0	0	22.21
2003	148	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	149	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	151	23	491	603.207	-311.591	D	7.453	7.453	0	3	72.14	9.82	0	0	0	18.16
2003	152	23	517	602.805	-305.061	D	7.545	7.542	0.003	3.192	41.68	39.61	0	0	0	18.69
2003	153	23	3	596.519	-315.604	D	7.546	7.546	0	3.2	71.97	24.62	0	0	0	3.33
2003	154	23	517	602.805	-305.061	D	7.553	7.546	0.007	3.2	26.38	70.36	0	0	0	3.29
2003	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	90.41	2.98	0	0	0	1.74
2003	156	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	90.27	2.45	0	0	0	7.36
2003	157	23	517	602.805	-305.061	D	7.552	7.546	0.006	3.2	88.82	6.36	0	0	0	4.84

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	158	23	517	602.805	-305.061	D	7.573	7.546	0.027	3.2	66.77	25.58	0	0	0	7.66
2003	159	23	548	603.28	-312.734	D	7.548	7.546	0.002	3.2	91.59	1.42	0	0	0	6.99
2003	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	7.553	7.546	0.007	3.2	46.96	50.95	0	0	0	2.11
2003	164	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	165	23	517	602.805	-305.061	D	7.552	7.546	0.006	3.2	75.74	21.48	0	0	0	2.8
2003	166	23	517	602.805	-305.061	D	7.591	7.546	0.045	3.2	68.16	22.57	0	0	0	9.27
2003	167	23	603	598.68	-316.244	D	7.548	7.546	0.002	3.2	85.79	12.2	0	0	0	2.1
2003	168	23	637	596.267	-315.066	D	7.547	7.546	0.001	3.2	89.4	8.28	0	0	0	2.43
2003	169	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	91.51	3.85	0	0	0	4.88
2003	170	23	517	602.805	-305.061	D	7.576	7.546	0.03	3.2	85.62	7.83	0	0	0	6.56
2003	171	23	624	596.324	-316.278	D	7.547	7.546	0.001	3.2	85	7.18	0	0	0	7.91
2003	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	178	23	548	603.28	-312.734	D	7.561	7.546	0.014	3.2	71	15.8	0	0	0	13.21
2003	179	23	548	603.28	-312.734	D	7.559	7.546	0.013	3.2	91.83	3.08	0	0	0	5.12
2003	180	23	517	602.805	-305.061	D	7.549	7.546	0.003	3.2	94.7	1.67	0	0	0	3.69
2003	181	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	96.14	1.51	0	0	0	2.59
2003	182	23	517	602.805	-305.061	D	7.591	7.591	0	3.296	93.26	4.23	0	0	0	2.59
2003	183	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	91.83	4.59	0	0	0	3.63
2003	184	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	94.29	2.64	0	0	0	3.13
2003	185	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	193	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	194	23	547	603.265	-312.487	D	7.594	7.593	0.002	3.3	80.44	9.88	0	0	0	9.68
2003	195	23	624	596.324	-316.278	D	7.594	7.593	0.002	3.3	84.98	8.97	0	0	0	6.12
2003	196	23	492	603.188	-311.342	D	7.593	7.593	0.001	3.3	96.27	0.88	0	0	0	2.82

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	197	23	676	599.876	-309.365	D	7.61	7.593	0.018	3.3	63.05	14.8	0	0	0	22.15
2003	198	23	548	603.28	-312.734	D	7.594	7.593	0.002	3.3	81.82	6.23	0	0	0	12.09
2003	199	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	94.27	1.41	0	0	0	4.42
2003	200	23	525	602.928	-307.042	D	7.598	7.593	0.005	3.3	68.11	28.1	0	0	0	3.78
2003	201	23	603	598.68	-316.244	D	7.598	7.593	0.006	3.3	90.63	6.64	0	0	0	2.76
2003	202	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	96.97	0.48	0	0	0	2.62
2003	203	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	204	23	557	601.32	-313.419	D	7.657	7.593	0.064	3.3	28.92	50.39	0	0	0	20.69
2003	205	23	548	603.28	-312.734	D	7.593	7.593	0.001	3.3	63.44	10.98	0	0	0	25.53
2003	206	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	96.79	1.24	0	0	0	5.52
2003	207	23	694	602.12	-306.029	D	7.593	7.593	0	3.3	95.83	1.53	0	0	0	2.49
2003	208	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	97.33	1.37	0	0	0	1.87
2003	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	637	596.267	-315.066	D	7.622	7.593	0.029	3.3	28.41	65.92	0	0	0	5.67
2003	211	23	624	596.324	-316.278	D	7.6	7.593	0.007	3.3	76.96	19.27	0	0	0	3.79
2003	212	23	517	602.805	-305.061	D	7.637	7.593	0.044	3.3	89.88	3.58	0	0	0	6.53
2003	213	23	548	603.28	-312.734	D	7.721	7.681	0.04	3.492	92.16	3.9	0	0	0	3.94
2003	214	23	548	603.28	-312.734	D	7.687	7.685	0.002	3.5	95.99	1.26	0	0	0	2.75
2003	215	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	216	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	217	23	517	602.805	-305.061	D	7.689	7.685	0.004	3.5	68.45	25.26	0	0	0	6.29
2003	218	23	697	602.531	-305.449	D	7.731	7.685	0.046	3.5	87.85	6.93	0	0	0	5.22
2003	219	23	676	599.876	-309.365	D	7.72	7.685	0.036	3.5	42.21	47.77	0	0	0	10.03
2003	220	23	548	603.28	-312.734	D	7.722	7.685	0.037	3.5	58.47	25.65	0	0	0	15.88
2003	221	23	637	596.267	-315.066	D	7.704	7.685	0.019	3.5	78.53	9.03	0	0	0	12.45
2003	222	23	637	596.267	-315.066	D	7.697	7.685	0.013	3.5	86.66	2.58	0	0	0	10.75
2003	223	23	637	596.267	-315.066	D	7.702	7.685	0.017	3.5	74.51	12.24	0	0	0	13.26
2003	224	23	631	596.276	-315.551	D	7.685	7.685	0	3.5	88.25	1.89	0	0	0	9.26
2003	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	227	23	490	602.499	-305.648	D	7.685	7.685	0	3.5	3.11	0.01	0	0	0	0.11
2003	228	23	508	602.881	-307.367	D	7.685	7.685	0	3.5	95	2.25	0	0	0	2.5
2003	229	23	63	598.297	-315.967	D	7.685	7.685	0	3.5	94.59	1.7	0	0	0	2.12
2003	230	23	517	602.805	-305.061	D	7.694	7.685	0.009	3.5	85.97	6.62	0	0	0	7.41
2003	231	23	517	602.805	-305.061	D	7.704	7.685	0.019	3.5	90.45	4.72	0	0	0	4.83
2003	232	23	517	602.805	-305.061	D	7.702	7.685	0.017	3.5	93.64	2.91	0	0	0	3.46
2003	233	23	517	602.805	-305.061	D	7.692	7.685	0.007	3.5	95.37	1.81	0	0	0	2.82
2003	234	23	517	602.805	-305.061	D	7.685	7.685	0.001	3.5	95.92	1.46	0	0	0	2.49
2003	235	23	691	601.709	-306.61	D	7.7	7.685	0.015	3.5	79.54	13.17	0	0	0	7.29

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	236	23	620	597.072	-316.212	D	7.685	7.685	0	3.5	82.59	12.94	0	0	0	2.5
2003	237	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	93.17	4.67	0	0	0	2.36
2003	238	23	432	602.04	-306.183	D	7.685	7.685	0.001	3.5	97.14	0.6	0	0	0	2.03
2003	239	23	516	602.728	-305.38	D	7.685	7.685	0	3.5	97.21	0.81	0	0	0	1.8
2003	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	242	23	517	602.805	-305.061	D	7.693	7.685	0.008	3.5	85.08	10.39	0	0	0	4.54
2003	243	23	517	602.805	-305.061	D	7.689	7.685	0.004	3.5	78.4	18.26	0	0	0	3.33
2003	244	23	536	603.096	-309.764	D	7.715	7.685	0.03	3.5	85.43	8.27	0	0	0	6.3
2003	245	23	517	602.805	-305.061	D	7.714	7.685	0.029	3.5	58.92	37.95	0	0	0	3.13
2003	246	23	517	602.805	-305.061	D	7.704	7.685	0.019	3.5	76.42	16.55	0	0	0	7.03
2003	247	23	548	603.28	-312.734	D	7.694	7.685	0.009	3.5	79.08	6.42	0	0	0	14.5
2003	248	23	638	596.406	-314.894	D	7.714	7.685	0.029	3.5	26.74	40.85	0	0	0	32.42
2003	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	87.81	1.24	0	0	0	7.6
2003	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	254	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	257	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	258	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	259	23	603	598.68	-316.244	D	7.686	7.685	0.001	3.5	91.46	1.56	0	0	0	6.96
2003	260	23	637	596.267	-315.066	D	7.687	7.685	0.002	3.5	89.35	6.25	0	0	0	4.4
2003	261	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	262	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	263	23	557	601.32	-313.419	D	7.709	7.685	0.024	3.5	16.73	67.02	0	0	0	16.24
2003	264	23	624	596.324	-316.278	D	7.685	7.685	0.001	3.5	89.3	5.55	0	0	0	5.02
2003	265	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	83.46	14.13	0	0	0	2.56
2003	266	23	464	602.997	-312.107	D	7.685	7.685	0	3.5	93.33	1.8	0	0	0	3.92
2003	267	23	491	603.207	-311.591	D	7.685	7.685	0	3.5	83.15	7.5	0	0	0	6.01
2003	268	23	637	596.267	-315.066	D	7.689	7.685	0.004	3.5	35.95	32.48	0	0	0	31.56
2003	269	23	517	602.805	-305.061	D	7.695	7.685	0.01	3.5	81.87	11.37	0	0	0	6.75
2003	270	23	281	600.703	-308.285	D	7.685	7.685	0	3.5	76.07	5.46	0	0	0	2.68
2003	271	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	272	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	273	23	557	601.32	-313.419	D	7.739	7.685	0.054	3.5	24.75	52.83	0	0	0	22.42
2003	274	23	548	603.28	-312.734	D	7.583	7.507	0.076	3.117	16.32	78.86	0	0	0	4.82

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	275	23	557	601.32	-313.419	D	7.511	7.5	0.011	3.1	15.3	60.32	0	0	0	24.38
2003	276	23	517	602.805	-305.061	D	7.506	7.5	0.007	3.1	56.03	38.96	0	0	0	5.04
2003	277	23	490	602.499	-305.648	D	7.5	7.5	0	3.1	84.35	9.91	0	0	0	4.32
2003	278	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	77.11	16.03	0	0	0	8.08
2003	279	23	603	598.68	-316.244	D	7.501	7.5	0.001	3.1	60.05	36.59	0	0	0	3.43
2003	280	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	89.58	6.67	0	0	0	3.95
2003	281	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	92.31	4.81	0	0	0	3.16
2003	282	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	101.56	2.68	0	0	0	2.86
2003	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	624	596.324	-316.278	D	7.502	7.5	0.002	3.1	66.54	20.38	0	0	0	13.13
2003	286	23	637	596.267	-315.066	D	7.501	7.5	0.002	3.1	81.83	10.77	0	0	0	7.57
2003	287	23	517	602.805	-305.061	D	7.501	7.5	0.002	3.1	63.81	33.07	0	0	0	3.2
2003	288	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	289	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	290	23	637	596.267	-315.066	D	7.52	7.5	0.02	3.1	43.05	52	0	0	0	4.96
2003	291	23	637	596.267	-315.066	D	7.512	7.5	0.012	3.1	27.62	53.32	0	0	0	19.07
2003	292	23	548	603.28	-312.734	D	7.5	7.5	0.001	3.1	76.57	13.23	0	0	0	10.26
2003	293	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	294	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	295	23	557	601.32	-313.419	D	7.507	7.5	0.007	3.1	46.71	29.76	0	0	0	23.56
2003	296	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	297	23	548	603.28	-312.734	D	7.503	7.5	0.004	3.1	69.52	17.23	0	0	0	13.29
2003	298	23	517	602.805	-305.061	D	7.551	7.5	0.052	3.1	46.36	45.26	0	0	0	8.39
2003	299	23	548	603.28	-312.734	D	7.501	7.5	0.002	3.1	27.87	65.89	0	0	0	6.26
2003	300	23	557	601.32	-313.419	D	7.599	7.5	0.099	3.1	11.59	79.28	0	0	0	9.13
2003	301	23	491	603.207	-311.591	D	7.5	7.5	0	3.1	74.54	20.78	0	0	0	4.66
2003	302	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	632	596.27	-315.421	D	7.517	7.5	0.018	3.1	19.44	63.95	0	0	0	16.62
2003	306	23	517	602.805	-305.061	D	7.502	7.5	0.002	3.1	74.18	18.32	0	0	0	7.52
2003	307	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	309	23	517	602.805	-305.061	D	7.507	7.5	0.008	3.1	52.19	34.82	0	0	0	13
2003	310	23	637	596.267	-315.066	D	7.548	7.5	0.048	3.1	35.3	57.88	0	0	0	6.83
2003	311	23	637	596.267	-315.066	D	7.57	7.5	0.07	3.1	10.66	80.13	0	0	0	9.21
2003	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	318	23	517	602.805	-305.061	D	7.536	7.5	0.037	3.1	9.87	83.21	0	0	0	6.92
2003	319	23	548	603.28	-312.734	D	7.501	7.5	0.001	3.1	27.56	69.12	0	0	0	3.38
2003	320	23	517	602.805	-305.061	D	7.509	7.5	0.01	3.1	47.09	49.4	0	0	0	3.52
2003	321	23	517	602.805	-305.061	D	7.551	7.5	0.052	3.1	45.59	51.83	0	0	0	2.58
2003	322	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	517	602.805	-305.061	D	7.512	7.5	0.012	3.1	25.31	63.76	0	0	0	10.93
2003	324	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	328	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	517	602.805	-305.061	D	7.504	7.5	0.004	3.1	42.28	52.07	0	0	0	5.68
2003	332	23	517	602.805	-305.061	D	7.502	7.5	0.002	3.1	38.24	60.1	0	0	0	1.67
2003	333	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	548	603.28	-312.734	D	7.607	7.589	0.018	3.292	18.57	68.86	0	0	0	12.57
2003	336	23	517	602.805	-305.061	D	7.646	7.593	0.053	3.3	11.89	81.95	0	0	0	6.16
2003	337	23	624	596.324	-316.278	D	7.593	7.593	0	3.3	20.49	75	0	0	0	3.32
2003	338	23	517	602.805	-305.061	D	7.624	7.593	0.032	3.3	17.59	78.62	0	0	0	3.8
2003	339	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	42.7	52.88	0	0	0	1.54
2003	340	23	548	603.28	-312.734	D	7.594	7.593	0.002	3.3	45.05	49.96	0	0	0	5.01
2003	341	23	517	602.805	-305.061	D	7.633	7.593	0.04	3.3	26.82	69.47	0	0	0	3.72
2003	342	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	624	596.324	-316.278	D	7.596	7.593	0.003	3.3	26.34	71.95	0	0	0	1.72
2003	345	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	638	596.406	-314.894	D	7.623	7.593	0.03	3.3	8.84	84.75	0	0	0	6.41
2003	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	348	23	548	603.28	-312.734	D	7.65	7.593	0.058	3.3	34.09	63.32	0	0	0	2.59
2003	349	23	548	603.28	-312.734	D	7.6	7.593	0.007	3.3	35.21	63.15	0	0	0	1.66
2003	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	353	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	21.36	73.83	0	0	0	3.88
2003	355	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	21.69	77.03	0	0	0	3.35
2003	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	358	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	529	602.989	-308.032	D	7.6	7.593	0.007	3.3	12.01	84.21	0	0	0	3.77
2003	360	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	29.93	67.15	0	0	0	2.87
2003	361	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	41.07	56.44	0	0	0	2.42
2003	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.099							
UMC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	3	23	632	596.27	-315.421	D	7.728	7.593	0.135	3.3	76.63	23.29	0	0	0	0.08
2003	4	23	517	602.805	-305.061	D	7.608	7.593	0.016	3.3	88.19	11.78	0	0	0	0.03
2003	5	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	74.72	25.33	0	0	0	0.1
2003	6	23	517	602.805	-305.061	D	7.676	7.593	0.083	3.3	91.09	8.88	0	0	0	0.03
2003	7	23	517	602.805	-305.061	D	7.637	7.593	0.045	3.3	91.89	8.09	0	0	0	0.02
2003	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	23	557	601.32	-313.419	D	7.605	7.593	0.013	3.3	71.82	28.06	0	0	0	0.12
2003	10	23	517	602.805	-305.061	D	7.693	7.593	0.1	3.3	72.26	27.63	0	0	0	0.11
2003	11	23	626	596.299	-315.88	D	7.694	7.593	0.102	3.3	70.08	29.81	0	0	0	0.11
2003	12	23	624	596.324	-316.278	D	7.689	7.593	0.096	3.3	80.55	19.4	0	0	0	0.05
2003	13	23	517	602.805	-305.061	D	7.629	7.593	0.037	3.3	87.08	12.9	0	0	0	0.02
2003	14	23	624	596.324	-316.278	D	7.655	7.593	0.062	3.3	88.34	11.63	0	0	0	0.03
2003	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	16	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	17	23	517	602.805	-305.061	D	7.646	7.593	0.053	3.3	76.66	23.26	0	0	0	0.08
2003	18	23	624	596.324	-316.278	D	7.62	7.593	0.027	3.3	87.29	12.68	0	0	0	0.03
2003	19	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	517	602.805	-305.061	D	7.642	7.593	0.049	3.3	86.48	13.47	0	0	0	0.05
2003	21	23	647	597.234	-313.631	D	7.673	7.593	0.08	3.3	86.11	13.87	0	0	0	0.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	24	23	637	596.267	-315.066	D	7.608	7.593	0.015	3.3	88.35	11.63	0	0	0	0.02
2003	25	23	517	602.805	-305.061	D	7.629	7.593	0.037	3.3	90.72	9.27	0	0	0	0.01
2003	26	23	548	603.28	-312.734	D	7.605	7.593	0.012	3.3	66.61	33.27	0	0	0	0.12
2003	27	23	637	596.267	-315.066	D	7.596	7.593	0.004	3.3	89.75	10.24	0	0	0	0.01
2003	28	23	517	602.805	-305.061	D	7.595	7.593	0.003	3.3	89.63	10.38	0	0	0	0.01
2003	29	23	637	596.267	-315.066	D	7.613	7.593	0.02	3.3	90.9	9.09	0	0	0	0.01
2003	30	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	32	23	517	602.805	-305.061	D	7.473	7.459	0.014	3.013	68.2	31.66	0	0	0	0.15
2003	33	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	632	596.27	-315.421	D	7.472	7.453	0.019	3	71.23	28.66	0	0	0	0.12
2003	37	23	517	602.805	-305.061	D	7.459	7.453	0.007	3	89.33	10.68	0	0	0	0.02
2003	38	23	624	596.324	-316.278	D	7.508	7.453	0.055	3	88.59	11.39	0	0	0	0.02
2003	39	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	517	602.805	-305.061	D	7.461	7.453	0.009	3	80.62	19.35	0	0	0	0.06
2003	41	23	517	602.805	-305.061	D	7.454	7.453	0.002	3	87.45	12.59	0	0	0	0.03
2003	42	23	517	602.805	-305.061	D	7.524	7.453	0.071	3	90	9.96	0	0	0	0.04
2003	43	23	637	596.267	-315.066	D	7.484	7.453	0.032	3	86.2	13.74	0	0	0	0.07
2003	44	23	548	603.28	-312.734	D	7.492	7.453	0.039	3	89.47	10.5	0	0	0	0.04
2003	45	23	517	602.805	-305.061	D	7.453	7.453	0	3	93.63	7.04	0	0	0	0.02
2003	46	23	461	602.269	-305.916	D	7.453	7.453	0	3	90.6	5.7	0	0	0	0.01
2003	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	49	23	517	602.805	-305.061	D	7.55	7.453	0.097	3	91.43	8.55	0	0	0	0.02
2003	50	23	517	602.805	-305.061	D	7.467	7.453	0.015	3	95.27	4.74	0	0	0	0.01
2003	51	23	517	602.805	-305.061	D	7.479	7.453	0.026	3	91.64	8.35	0	0	0	0.01
2003	52	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	53	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	54	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	55	23	637	596.267	-315.066	D	7.539	7.453	0.086	3	89.6	10.37	0	0	0	0.03
2003	56	23	624	596.324	-316.278	D	7.479	7.453	0.026	3	91.36	8.63	0	0	0	0.02
2003	57	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	58	23	624	596.324	-316.278	D	7.453	7.453	0.001	3	95.9	4.36	0	0	0	0.01
2003	59	23	624	596.324	-316.278	D	7.454	7.453	0.002	3	96.51	3.62	0	0	0	0.01
2003	60	23	517	602.805	-305.061	D	7.368	7.362	0.006	2.808	96.6	3.41	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	61	23	517	602.805	-305.061	D	7.748	7.358	0.39	2.8	91.19	8.78	0	0	0	0.03
2003	62	23	624	596.324	-316.278	D	7.606	7.358	0.248	2.8	92.12	7.85	0	0	0	0.02
2003	63	23	517	602.805	-305.061	D	7.388	7.358	0.03	2.8	96.72	3.27	0	0	0	0.01
2003	64	23	637	596.267	-315.066	D	7.517	7.358	0.159	2.8	92.52	7.47	0	0	0	0.01
2003	65	23	624	596.324	-316.278	D	7.613	7.358	0.255	2.8	94.5	5.49	0	0	0	0.01
2003	66	23	637	596.267	-315.066	D	7.383	7.358	0.025	2.8	95.53	4.46	0	0	0	0.02
2003	67	23	517	602.805	-305.061	D	7.369	7.358	0.011	2.8	97.58	2.41	0	0	0	0.01
2003	68	23	631	596.276	-315.551	D	7.375	7.358	0.017	2.8	91.08	8.9	0	0	0	0.02
2003	69	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	70	23	637	596.267	-315.066	D	7.384	7.358	0.026	2.8	95.45	4.53	0	0	0	0.02
2003	71	23	517	602.805	-305.061	D	7.371	7.358	0.013	2.8	96.9	3.09	0	0	0	0.01
2003	72	23	603	598.68	-316.244	D	7.531	7.358	0.173	2.8	94.14	5.82	0	0	0	0.04
2003	73	23	624	596.324	-316.278	D	7.359	7.358	0.001	2.8	99.29	0.84	0	0	0	0.01
2003	74	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	75	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	76	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	77	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	80	23	642	596.914	-314.17	D	7.428	7.358	0.07	2.8	98.06	1.91	0	0	0	0.03
2003	81	23	517	602.805	-305.061	D	7.365	7.358	0.007	2.8	98.68	1.29	0	0	0	0.03
2003	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	84	23	517	602.805	-305.061	D	7.375	7.358	0.017	2.8	94.48	5.51	0	0	0	0.02
2003	85	23	548	603.28	-312.734	D	7.4	7.358	0.042	2.8	95.29	4.69	0	0	0	0.01
2003	86	23	546	603.249	-312.239	D	7.359	7.358	0.001	2.8	99.09	0.96	0	0	0	0.01
2003	87	23	326	601.161	-307.751	D	7.358	7.358	0	2.8	91.86	0.23	0	0	0	0.01
2003	88	23	517	602.805	-305.061	D	7.441	7.358	0.083	2.8	76.96	22.91	0	0	0	0.12
2003	89	23	624	596.324	-316.278	D	7.427	7.358	0.068	2.8	89.23	10.72	0	0	0	0.05
2003	90	23	548	603.28	-312.734	D	7.369	7.358	0.01	2.8	92.62	7.34	0	0	0	0.05
2003	91	23	1	596.558	-316.101	D	7.267	7.267	0	2.608	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	95	23	626	596.299	-315.88	D	7.299	7.263	0.036	2.6	86.06	13.83	0	0	0	0.12
2003	96	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	98	23	548	603.28	-312.734	D	7.542	7.263	0.279	2.6	93.69	6.29	0	0	0	0.02
2003	99	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	101	23	637	596.267	-315.066	D	7.265	7.263	0.002	2.6	99.95	0.12	0	0	0	0.02
2003	102	23	637	596.267	-315.066	D	7.601	7.263	0.338	2.6	99.51	0.46	0	0	0	0.03
2003	103	23	548	603.28	-312.734	D	7.558	7.263	0.295	2.6	99.61	0.37	0	0	0	0.02
2003	104	23	517	602.805	-305.061	D	7.342	7.263	0.079	2.6	99.64	0.35	0	0	0	0.02
2003	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	107	23	625	596.311	-316.079	D	7.438	7.263	0.175	2.6	98.43	1.54	0	0	0	0.03
2003	108	23	624	596.324	-316.278	D	7.348	7.263	0.085	2.6	98.34	1.64	0	0	0	0.02
2003	109	23	548	603.28	-312.734	D	7.281	7.263	0.018	2.6	99.53	0.45	0	0	0	0.01
2003	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	112	23	517	602.805	-305.061	D	7.284	7.263	0.021	2.6	96.09	3.83	0	0	0	0.08
2003	113	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	114	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	115	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	116	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	117	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	118	23	37	597.36	-313.541	D	7.263	7.263	0	2.6	122.19	0.07	0	0	0	0.01
2003	119	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	120	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2003	122	23	517	602.805	-305.061	D	7.559	7.453	0.106	3	98.94	1.04	0	0	0	0.02
2003	123	23	603	598.68	-316.244	D	7.468	7.453	0.015	3	99.2	0.81	0	0	0	0.01
2003	124	23	545	603.234	-311.991	D	7.455	7.453	0.002	3	99.72	0.35	0	0	0	0.01
2003	125	23	517	602.805	-305.061	D	7.453	7.453	0	3	98.75	0.83	0	0	0	0
2003	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	127	23	517	602.805	-305.061	D	7.495	7.453	0.042	3	99.89	0.1	0	0	0	0.01
2003	128	23	517	602.805	-305.061	D	7.604	7.453	0.152	3	99.42	0.57	0	0	0	0.01
2003	129	23	517	602.805	-305.061	D	7.453	7.453	0	3	100.22	0.1	0	0	0	0.01
2003	130	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	132	23	517	602.805	-305.061	D	7.453	7.453	0	3	100.41	0.4	0	0	0	0.04
2003	133	23	517	602.805	-305.061	D	7.477	7.453	0.024	3	97.78	2.17	0	0	0	0.07
2003	134	23	511	602.824	-306.623	D	7.453	7.453	0	3	99.3	0.07	0	0	0	0.02
2003	135	23	517	602.805	-305.061	D	7.453	7.453	0	3	100.23	0.18	0	0	0	0.02
2003	136	23	517	602.805	-305.061	D	7.461	7.453	0.009	3	98.48	1.55	0	0	0	0.01
2003	137	23	517	602.805	-305.061	D	7.467	7.453	0.015	3	99.27	0.73	0	0	0	0.01
2003	138	23	637	596.267	-315.066	D	7.458	7.453	0.005	3	99.42	0.6	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	139	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	140	23	624	596.324	-316.278	D	7.493	7.453	0.04	3	97.06	2.94	0	0	0	0.01
2003	141	23	603	598.68	-316.244	D	7.453	7.453	0.001	3	98.46	1.68	0	0	0	0.01
2003	142	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	143	23	624	596.324	-316.278	D	7.453	7.453	0	3	100.92	0.08	0	0	0	0.01
2003	144	23	517	602.805	-305.061	D	7.512	7.453	0.06	3	99.56	0.43	0	0	0	0.02
2003	145	23	517	602.805	-305.061	D	7.528	7.453	0.075	3	98.35	1.64	0	0	0	0.01
2003	146	23	624	596.324	-316.278	D	7.457	7.453	0.004	3	99.76	0.3	0	0	0	0.01
2003	147	23	13	596.691	-314.592	D	7.453	7.453	0.001	3	100.02	0.07	0	0	0	0.02
2003	148	23	624	596.324	-316.278	D	7.552	7.453	0.099	3	99.49	0.48	0	0	0	0.03
2003	149	23	517	602.805	-305.061	D	7.458	7.453	0.005	3	99.05	0.9	0	0	0	0.05
2003	150	23	624	596.324	-316.278	D	7.471	7.453	0.018	3	99.05	0.93	0	0	0	0.04
2003	151	23	557	601.32	-313.419	D	7.457	7.453	0.004	3	88.58	11.23	0	0	0	0.22
2003	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2003	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	155	23	624	596.324	-316.278	D	7.552	7.546	0.006	3.2	99.62	0.37	0	0	0	0.02
2003	156	23	624	596.324	-316.278	D	7.722	7.546	0.176	3.2	99.52	0.47	0	0	0	0.02
2003	157	23	637	596.267	-315.066	D	7.568	7.546	0.022	3.2	99.64	0.36	0	0	0	0.01
2003	158	23	517	602.805	-305.061	D	7.614	7.546	0.068	3.2	99.53	0.46	0	0	0	0.02
2003	159	23	517	602.805	-305.061	D	7.571	7.546	0.024	3.2	99.95	0.05	0	0	0	0.01
2003	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	8.023	7.546	0.477	3.2	96.6	3.39	0	0	0	0.01
2003	164	23	517	602.805	-305.061	D	7.55	7.546	0.003	3.2	99.92	0.08	0	0	0	0.01
2003	165	23	625	596.311	-316.079	D	7.872	7.546	0.325	3.2	98.3	1.7	0	0	0	0.01
2003	166	23	603	598.68	-316.244	D	7.74	7.546	0.194	3.2	99.6	0.39	0	0	0	0.01
2003	167	23	603	598.68	-316.244	D	7.609	7.546	0.062	3.2	99.71	0.29	0	0	0	0.01
2003	168	23	624	596.324	-316.278	D	7.562	7.546	0.015	3.2	99.6	0.41	0	0	0	0.01
2003	169	23	623	596.511	-316.262	D	7.551	7.546	0.005	3.2	99.86	0.17	0	0	0	0.01
2003	170	23	637	596.267	-315.066	D	7.659	7.546	0.113	3.2	99.93	0.06	0	0	0	0.01
2003	171	23	624	596.324	-316.278	D	7.577	7.546	0.031	3.2	99.44	0.55	0	0	0	0.01
2003	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	177	23	624	596.324	-316.278	D	7.603	7.546	0.057	3.2	99.85	0.14	0	0	0	0.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	178	23	637	596.267	-315.066	D	7.548	7.546	0.002	3.2	99.96	0.12	0	0	0	0.03
2003	179	23	637	596.267	-315.066	D	7.554	7.546	0.008	3.2	99.88	0.12	0	0	0	0.02
2003	180	23	516	602.728	-305.38	D	7.554	7.546	0.008	3.2	99.96	0.04	0	0	0	0.01
2003	181	23	517	602.805	-305.061	D	7.553	7.546	0.007	3.2	99.97	0.05	0	0	0	0.01
2003	182	23	517	602.805	-305.061	D	7.591	7.591	0	3.296	100.04	0.16	0	0	0	0.01
2003	183	23	517	602.805	-305.061	D	7.595	7.593	0.003	3.3	99.79	0.22	0	0	0	0.01
2003	184	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	99.94	0.1	0	0	0	0.01
2003	185	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	517	602.805	-305.061	D	7.607	7.593	0.015	3.3	98.39	1.52	0	0	0	0.1
2003	193	23	517	602.805	-305.061	D	7.61	7.593	0.018	3.3	99.93	0.05	0	0	0	0.02
2003	194	23	517	602.805	-305.061	D	7.842	7.593	0.249	3.3	99.78	0.2	0	0	0	0.01
2003	195	23	624	596.324	-316.278	D	7.678	7.593	0.086	3.3	99.8	0.19	0	0	0	0.01
2003	196	23	517	602.805	-305.061	D	7.608	7.593	0.016	3.3	99.98	0.03	0	0	0	0.01
2003	197	23	624	596.324	-316.278	D	7.651	7.593	0.058	3.3	99.61	0.38	0	0	0	0.02
2003	198	23	624	596.324	-316.278	D	7.605	7.593	0.012	3.3	99.94	0.05	0	0	0	0.02
2003	199	23	637	596.267	-315.066	D	7.598	7.593	0.006	3.3	99.93	0.08	0	0	0	0.01
2003	200	23	517	602.805	-305.061	D	7.596	7.593	0.004	3.3	99.27	0.71	0	0	0	0.01
2003	201	23	548	603.28	-312.734	D	7.606	7.593	0.014	3.3	99.83	0.17	0	0	0	0.01
2003	202	23	517	602.805	-305.061	D	7.606	7.593	0.013	3.3	99.96	0.03	0	0	0	0.02
2003	203	23	517	602.805	-305.061	D	7.707	7.593	0.115	3.3	99.75	0.22	0	0	0	0.03
2003	204	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	205	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	206	23	689	601.435	-306.997	D	7.593	7.593	0.001	3.3	99.89	0.23	0	0	0	0.01
2003	207	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	624	596.324	-316.278	D	8.105	7.593	0.512	3.3	98.26	1.73	0	0	0	0.01
2003	211	23	624	596.324	-316.278	D	8.012	7.593	0.42	3.3	99.41	0.59	0	0	0	0.01
2003	212	23	548	603.28	-312.734	D	7.838	7.593	0.245	3.3	99.62	0.37	0	0	0	0.01
2003	213	23	548	603.28	-312.734	D	7.755	7.681	0.074	3.492	99.81	0.18	0	0	0	0
2003	214	23	548	603.28	-312.734	D	7.705	7.685	0.02	3.5	99.96	0.04	0	0	0	0
2003	215	23	517	602.805	-305.061	D	7.688	7.685	0.003	3.5	98.14	1.86	0	0	0	0.01
2003	216	23	517	602.805	-305.061	D	7.712	7.685	0.027	3.5	96.26	3.72	0	0	0	0.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	217	23	624	596.324	-316.278	D	8.147	7.685	0.462	3.5	99.49	0.49	0	0	0	0.01
2003	218	23	603	598.68	-316.244	D	7.845	7.685	0.16	3.5	99.74	0.25	0	0	0	0.01
2003	219	23	603	598.68	-316.244	D	7.689	7.685	0.004	3.5	99.85	0.13	0	0	0	0.01
2003	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	228	23	517	602.805	-305.061	D	7.764	7.685	0.079	3.5	99.87	0.12	0	0	0	0.01
2003	229	23	517	602.805	-305.061	D	7.702	7.685	0.017	3.5	99.89	0.1	0	0	0	0.01
2003	230	23	624	596.324	-316.278	D	7.754	7.685	0.069	3.5	99.9	0.08	0	0	0	0.01
2003	231	23	624	596.324	-316.278	D	7.742	7.685	0.057	3.5	99.82	0.17	0	0	0	0.01
2003	232	23	624	596.324	-316.278	D	7.743	7.685	0.058	3.5	99.85	0.15	0	0	0	0.01
2003	233	23	603	598.68	-316.244	D	7.733	7.685	0.048	3.5	99.82	0.17	0	0	0	0.01
2003	234	23	517	602.805	-305.061	D	7.717	7.685	0.032	3.5	99.92	0.07	0	0	0	0.01
2003	235	23	624	596.324	-316.278	D	7.737	7.685	0.052	3.5	99.63	0.36	0	0	0	0.01
2003	236	23	624	596.324	-316.278	D	7.687	7.685	0.003	3.5	98.73	1.24	0	0	0	0.01
2003	237	23	637	596.267	-315.066	D	7.698	7.685	0.013	3.5	99.9	0.1	0	0	0	0.01
2003	238	23	517	602.805	-305.061	D	7.705	7.685	0.02	3.5	99.98	0.02	0	0	0	0.01
2003	239	23	517	602.805	-305.061	D	7.69	7.685	0.005	3.5	99.97	0.02	0	0	0	0.01
2003	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	242	23	517	602.805	-305.061	D	7.69	7.685	0.005	3.5	99.06	0.95	0	0	0	0.01
2003	243	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	99.4	0.57	0	0	0	0.01
2003	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	245	23	517	602.805	-305.061	D	7.687	7.685	0.002	3.5	98.88	1.06	0	0	0	0.01
2003	246	23	637	596.267	-315.066	D	7.695	7.685	0.01	3.5	99.07	0.92	0	0	0	0.01
2003	247	23	623	596.511	-316.262	D	7.687	7.685	0.002	3.5	99.7	0.25	0	0	0	0
2003	248	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	254	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	257	23	624	596.324	-316.278	D	7.921	7.685	0.237	3.5	87.34	12.62	0	0	0	0.04
2003	258	23	557	601.32	-313.419	D	7.744	7.685	0.059	3.5	96.98	2.94	0	0	0	0.08
2003	259	23	624	596.324	-316.278	D	7.696	7.685	0.011	3.5	99.82	0.15	0	0	0	0.02
2003	260	23	637	596.267	-315.066	D	7.712	7.685	0.027	3.5	99.69	0.3	0	0	0	0.01
2003	261	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	99.69	0.14	0	0	0	0.01
2003	262	23	557	601.32	-313.419	D	7.704	7.685	0.019	3.5	82.82	17.08	0	0	0	0.1
2003	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	264	23	4	596.5	-315.356	D	7.685	7.685	0	3.5	94.07	0.52	0	0	0	0.01
2003	265	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	266	23	281	600.703	-308.285	D	7.709	7.685	0.025	3.5	90.64	9.19	0	0	0	0.17
2003	267	23	624	596.324	-316.278	D	7.699	7.685	0.014	3.5	99.27	0.71	0	0	0	0.02
2003	268	23	548	603.28	-312.734	D	7.698	7.685	0.013	3.5	95.91	4.04	0	0	0	0.05
2003	269	23	603	598.68	-316.244	D	7.704	7.685	0.019	3.5	99.78	0.21	0	0	0	0.01
2003	270	23	517	602.805	-305.061	D	7.705	7.685	0.02	3.5	98.2	1.77	0	0	0	0.04
2003	271	23	684	600.85	-308.002	D	7.733	7.685	0.048	3.5	98.47	1.48	0	0	0	0.04
2003	272	23	583	599.621	-315.062	D	7.707	7.685	0.022	3.5	97.26	2.69	0	0	0	0.04
2003	273	23	517	602.805	-305.061	D	7.798	7.685	0.113	3.5	97.94	2.02	0	0	0	0.04
2003	274	23	637	596.267	-315.066	D	7.816	7.507	0.309	3.117	92.15	7.81	0	0	0	0.03
2003	275	23	548	603.28	-312.734	D	7.533	7.5	0.034	3.1	98.42	1.56	0	0	0	0.02
2003	276	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	99.12	0.96	0	0	0	0.02
2003	277	23	624	596.324	-316.278	D	7.532	7.5	0.032	3.1	87.13	12.78	0	0	0	0.09
2003	278	23	517	602.805	-305.061	D	7.626	7.5	0.127	3.1	98.82	1.15	0	0	0	0.03
2003	279	23	517	602.805	-305.061	D	7.526	7.5	0.027	3.1	98.5	1.49	0	0	0	0.02
2003	280	23	517	602.805	-305.061	D	7.53	7.5	0.031	3.1	99.77	0.22	0	0	0	0.01
2003	281	23	517	602.805	-305.061	D	7.512	7.5	0.013	3.1	99.87	0.12	0	0	0	0.01
2003	282	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	100.05	0.04	0	0	0	0.01
2003	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	517	602.805	-305.061	D	7.507	7.5	0.007	3.1	76.54	23.31	0	0	0	0.16
2003	286	23	624	596.324	-316.278	D	7.502	7.5	0.003	3.1	99.86	0.16	0	0	0	0.02
2003	287	23	624	596.324	-316.278	D	7.548	7.5	0.048	3.1	95.32	4.65	0	0	0	0.03
2003	288	23	517	602.805	-305.061	D	7.525	7.5	0.025	3.1	97.41	2.53	0	0	0	0.06
2003	289	23	517	602.805	-305.061	D	7.509	7.5	0.01	3.1	99.08	0.89	0	0	0	0.03
2003	290	23	517	602.805	-305.061	D	7.514	7.5	0.015	3.1	96.93	3.07	0	0	0	0.01
2003	291	23	637	596.267	-315.066	D	7.514	7.5	0.014	3.1	99.42	0.57	0	0	0	0.03
2003	292	23	517	602.805	-305.061	D	7.554	7.5	0.055	3.1	99.11	0.86	0	0	0	0.04
2003	293	23	517	602.805	-305.061	D	7.505	7.5	0.006	3.1	99.78	0.21	0	0	0	0.03
2003	294	23	557	601.32	-313.419	D	7.508	7.5	0.008	3.1	88.88	10.92	0	0	0	0.21

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	295	23	631	596.276	-315.551	D	7.652	7.5	0.152	3.1	99.37	0.61	0	0	0	0.03
2003	296	23	517	602.805	-305.061	D	7.602	7.5	0.103	3.1	98.39	1.57	0	0	0	0.05
2003	297	23	624	596.324	-316.278	D	7.506	7.5	0.007	3.1	99.83	0.18	0	0	0	0.02
2003	298	23	624	596.324	-316.278	D	7.516	7.5	0.017	3.1	96.32	3.66	0	0	0	0.03
2003	299	23	624	596.324	-316.278	D	7.572	7.5	0.073	3.1	88.52	11.43	0	0	0	0.05
2003	300	23	624	596.324	-316.278	D	7.607	7.5	0.107	3.1	95.96	4.02	0	0	0	0.02
2003	301	23	548	603.28	-312.734	D	7.505	7.5	0.006	3.1	98.94	1.08	0	0	0	0.01
2003	302	23	517	602.805	-305.061	D	7.505	7.5	0.005	3.1	97.71	2.27	0	0	0	0.04
2003	303	23	517	602.805	-305.061	D	7.501	7.5	0.002	3.1	99.33	0.67	0	0	0	0.02
2003	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	517	602.805	-305.061	D	7.654	7.5	0.154	3.1	98.9	1.09	0	0	0	0.01
2003	306	23	517	602.805	-305.061	D	7.509	7.5	0.009	3.1	99.42	0.57	0	0	0	0.01
2003	307	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	309	23	548	603.28	-312.734	D	7.565	7.5	0.065	3.1	89.27	10.68	0	0	0	0.05
2003	310	23	603	598.68	-316.244	D	7.5	7.5	0	3.1	97.46	2.43	0	0	0	0.01
2003	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	89.7	10.2	0	0	0	0.1
2003	318	23	624	596.324	-316.278	D	7.518	7.5	0.018	3.1	90.58	9.39	0	0	0	0.05
2003	319	23	528	602.974	-307.784	D	7.503	7.5	0.004	3.1	91.73	8.24	0	0	0	0.03
2003	320	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	548	603.28	-312.734	D	7.545	7.5	0.045	3.1	95.48	4.49	0	0	0	0.03
2003	324	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	95.46	5.34	0	0	0	0.02
2003	328	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	624	596.324	-316.278	D	7.518	7.5	0.019	3.1	90.97	9.01	0	0	0	0.02
2003	332	23	557	601.32	-313.419	D	7.512	7.5	0.012	3.1	67.1	32.77	0	0	0	0.12
2003	333	23	517	602.805	-305.061	D	7.514	7.5	0.015	3.1	64.13	35.71	0	0	0	0.16

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	632	596.27	-315.421	D	7.596	7.589	0.007	3.292	79.4	20.46	0	0	0	0.14
2003	336	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	637	596.267	-315.066	D	7.65	7.593	0.058	3.3	93.3	6.68	0	0	0	0.02
2003	339	23	548	603.28	-312.734	D	7.931	7.593	0.339	3.3	94.21	5.78	0	0	0	0.02
2003	340	23	624	596.324	-316.278	D	7.593	7.593	0	3.3	93.5	5.27	0	0	0	0.02
2003	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	342	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	548	603.28	-312.734	D	7.754	7.593	0.161	3.3	89.73	10.25	0	0	0	0.02
2003	345	23	682	600.626	-308.407	D	7.796	7.593	0.203	3.3	83.82	16.13	0	0	0	0.05
2003	346	23	624	596.324	-316.278	D	7.649	7.593	0.056	3.3	89.79	10.18	0	0	0	0.03
2003	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	348	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	349	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	517	602.805	-305.061	D	7.688	7.593	0.095	3.3	90.72	9.24	0	0	0	0.04
2003	354	23	557	601.32	-313.419	D	7.675	7.593	0.082	3.3	73.34	26.56	0	0	0	0.11
2003	355	23	517	602.805	-305.061	D	7.611	7.593	0.019	3.3	84.97	15.01	0	0	0	0.03
2003	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	624	596.324	-316.278	D	7.622	7.593	0.029	3.3	91.23	8.76	0	0	0	0.01
2003	358	23	632	596.27	-315.421	D	7.813	7.593	0.22	3.3	80.02	19.92	0	0	0	0.06
2003	359	23	624	596.324	-316.278	D	7.746	7.593	0.153	3.3	91.95	8.03	0	0	0	0.02
2003	360	23	517	602.805	-305.061	D	7.677	7.593	0.084	3.3	93.65	6.34	0	0	0	0.02
2003	361	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	94.57	5.44	0	0	0	0.01
2003	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	90.9	9.09	0	0	0	0.03
2003	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.512							
NORANDA									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	557	601.32	-313.419	D	7.593	7.593	0	3.3	74.45	0.01	0	0	0	25.71

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	3	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	4	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	5	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	6	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	7	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	10	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	11	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	23	622	596.698	-316.245	D	7.613	7.593	0.02	3.3	96.45	0.13	0	0	0	3.42
2003	13	23	517	602.805	-305.061	D	7.636	7.593	0.044	3.3	92.65	0.35	0	0	0	7
2003	14	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	16	23	624	596.324	-316.278	D	7.606	7.593	0.014	3.3	88.65	0.05	0	0	0	11.3
2003	17	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	66.17	0	0	0	0	10.32
2003	18	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	19	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	21	23	603	598.68	-316.244	D	7.663	7.593	0.071	3.3	96.88	0.22	0	0	0	2.9
2003	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	24	23	603	598.68	-316.244	D	7.595	7.593	0.002	3.3	94.12	0.32	0	0	0	5.55
2003	25	23	548	603.28	-312.734	D	7.608	7.593	0.016	3.3	95	0.29	0	0	0	4.72
2003	26	23	548	603.28	-312.734	D	7.594	7.593	0.001	3.3	97.11	0.17	0	0	0	2.73
2003	27	23	662	598.404	-311.683	D	7.642	7.593	0.05	3.3	90.11	0.36	0	0	0	9.53
2003	28	23	517	602.805	-305.061	D	7.595	7.593	0.003	3.3	90.55	0.66	0	0	0	8.76
2003	29	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	30	23	603	598.68	-316.244	D	7.593	7.593	0	3.3	97.92	0.12	0	0	0	1.82
2003	31	23	548	603.28	-312.734	D	7.692	7.593	0.1	3.3	97.41	0.16	0	0	0	2.43
2003	32	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	33	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	37	23	632	596.27	-315.421	D	7.545	7.453	0.093	3	71.62	0.45	0	0	0	27.94
2003	38	23	624	596.324	-316.278	D	7.49	7.453	0.037	3	98.93	0.05	0	0	0	1.03
2003	39	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	87.8	1.33	0	0	0	10.95
2003	41	23	517	602.805	-305.061	D	7.458	7.453	0.006	3	45.25	4.49	0	0	0	50.27

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	42	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	43	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	44	23	517	602.805	-305.061	D	7.453	7.453	0	3	0.01	13.94	0	0	0	88.15
2003	45	23	548	603.28	-312.734	D	7.515	7.453	0.062	3	39.19	1.14	0	0	0	59.67
2003	46	23	548	603.28	-312.734	D	7.597	7.453	0.144	3	94.35	0.31	0	0	0	5.34
2003	47	23	632	596.27	-315.421	D	7.454	7.453	0.001	3	81.47	0	0	0	0	18.9
2003	48	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	49	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	50	23	603	598.68	-316.244	D	7.513	7.453	0.06	3	66.39	0.83	0	0	0	32.78
2003	51	23	603	598.68	-316.244	D	7.493	7.453	0.041	3	98.88	0.06	0	0	0	1.06
2003	52	23	625	596.311	-316.079	D	7.517	7.453	0.065	3	97.52	0.11	0	0	0	2.37
2003	53	23	631	596.276	-315.551	D	7.453	7.453	0	3	94.85	0	0	0	0	5.28
2003	54	23	624	596.324	-316.278	D	7.455	7.453	0.002	3	89.77	0.15	0	0	0	10.12
2003	55	23	624	596.324	-316.278	D	7.467	7.453	0.015	3	94.69	0.27	0	0	0	5.05
2003	56	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	57	23	78	598.564	-316.197	D	7.453	7.453	0	3	98.94	0.02	0	0	0	7.12
2003	58	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	98.77	0	0	0	0	9.95
2003	60	23	557	601.32	-313.419	D	7.684	7.362	0.322	2.808	96.5	0.2	0	0	0	3.3
2003	61	23	548	603.28	-312.734	D	7.393	7.358	0.035	2.8	98.31	0.09	0	0	0	1.61
2003	62	23	548	603.28	-312.734	D	7.448	7.358	0.09	2.8	94.46	0.16	0	0	0	5.39
2003	63	23	517	602.805	-305.061	D	7.385	7.358	0.026	2.8	95.13	0.19	0	0	0	4.68
2003	64	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	65	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	66	23	632	596.27	-315.421	D	7.497	7.358	0.138	2.8	76.55	0.59	0	0	0	22.86
2003	67	23	557	601.32	-313.419	D	7.486	7.358	0.128	2.8	26.35	1.51	0	0	0	72.14
2003	68	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	69	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	70	23	548	603.28	-312.734	D	7.435	7.358	0.077	2.8	90.3	0.1	0	0	0	9.6
2003	71	23	517	602.805	-305.061	D	7.394	7.358	0.036	2.8	94	0.11	0	0	0	5.89
2003	72	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	73	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	74	23	534	603.066	-309.269	D	8.11	7.358	0.751	2.8	98.22	0.04	0	0	0	1.74
2003	75	23	517	602.805	-305.061	D	7.548	7.358	0.19	2.8	71.72	0.86	0	0	0	27.41
2003	76	23	557	601.32	-313.419	D	7.741	7.358	0.383	2.8	71.01	1.15	0	0	0	27.85
2003	77	23	557	601.32	-313.419	D	7.375	7.358	0.016	2.8	81.43	0.39	0	0	0	18.2
2003	78	23	529	602.989	-308.032	D	7.381	7.358	0.023	2.8	80.3	0.17	0	0	0	19.53
2003	79	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	15.19	4.42	0	0	0	80.64
2003	80	23	624	596.324	-316.278	D	7.397	7.358	0.039	2.8	97.49	0.09	0	0	0	2.43

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	81	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	84	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	85	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	86	23	632	596.27	-315.421	D	7.476	7.358	0.118	2.8	29.42	0.76	0	0	0	69.83
2003	87	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	88	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	89	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	90	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	91	23	1	596.558	-316.101	D	7.267	7.267	0	2.608	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	95	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	96	23	624	596.324	-316.278	D	7.263	7.263	0	2.6	31.58	0.01	0	0	0	37.65
2003	97	23	557	601.32	-313.419	D	7.282	7.263	0.019	2.6	74.9	0.85	0	0	0	24.26
2003	98	23	517	602.805	-305.061	D	7.376	7.263	0.113	2.6	98.74	0.03	0	0	0	1.24
2003	99	23	603	598.68	-316.244	D	7.263	7.263	0	2.6	98.59	0	0	0	0	1.08
2003	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	102	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	103	23	624	596.324	-316.278	D	7.32	7.263	0.057	2.6	96.61	0.02	0	0	0	3.38
2003	104	23	557	601.32	-313.419	D	7.424	7.263	0.161	2.6	55.21	0.18	0	0	0	44.61
2003	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	107	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	97.41	0.01	0	0	0	2.66
2003	108	23	548	603.28	-312.734	D	7.425	7.263	0.163	2.6	96.34	0	0	0	0	3.66
2003	109	23	517	602.805	-305.061	D	7.351	7.263	0.088	2.6	71.01	0.12	0	0	0	28.87
2003	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	112	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	113	23	624	596.324	-316.278	D	7.28	7.263	0.017	2.6	92.25	0.02	0	0	0	7.74
2003	114	23	517	602.805	-305.061	D	7.32	7.263	0.057	2.6	66.64	1.26	0	0	0	32.11
2003	115	23	517	602.805	-305.061	D	7.325	7.263	0.062	2.6	80.29	0.37	0	0	0	19.35
2003	116	23	624	596.324	-316.278	D	7.265	7.263	0.002	2.6	92.62	0.01	0	0	0	7.35
2003	117	23	624	596.324	-316.278	D	7.474	7.263	0.211	2.6	96.13	0	0	0	0	3.87
2003	118	23	517	602.805	-305.061	D	7.29	7.263	0.027	2.6	63.81	0.51	0	0	0	35.67
2003	119	23	548	603.28	-312.734	D	7.266	7.263	0.004	2.6	74.68	0.08	0	0	0	25.31

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	120	23	557	601.32	-313.419	D	7.323	7.263	0.06	2.6	37.75	0.54	0	0	0	61.71
2003	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2003	122	23	603	598.68	-316.244	D	7.453	7.453	0	3	74.46	1.87	0	0	0	24.33
2003	123	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	124	23	632	596.27	-315.421	D	7.612	7.453	0.159	3	94.38	0.07	0	0	0	5.55
2003	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	127	23	517	602.805	-305.061	D	7.615	7.453	0.162	3	90.49	0.27	0	0	0	9.24
2003	128	23	603	598.68	-316.244	D	7.563	7.453	0.11	3	97.37	0.02	0	0	0	2.61
2003	129	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	130	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	133	23	548	603.28	-312.734	D	7.455	7.453	0.002	3	99.4	0	0	0	0	0.66
2003	134	23	548	603.28	-312.734	D	7.462	7.453	0.01	3	63.82	0.2	0	0	0	35.98
2003	135	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	136	23	624	596.324	-316.278	D	7.549	7.453	0.097	3	98.91	0.02	0	0	0	1.08
2003	137	23	624	596.324	-316.278	D	7.876	7.453	0.423	3	98.35	0.05	0	0	0	1.61
2003	138	23	637	596.267	-315.066	D	7.453	7.453	0.001	3	98.68	0.01	0	0	0	1.43
2003	139	23	548	603.28	-312.734	D	7.733	7.453	0.28	3	97.48	0.05	0	0	0	2.47
2003	140	23	517	602.805	-305.061	D	7.662	7.453	0.209	3	98.1	0.02	0	0	0	1.88
2003	141	23	603	598.68	-316.244	D	7.453	7.453	0.001	3	98.69	0.04	0	0	0	1.55
2003	142	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	143	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	144	23	603	598.68	-316.244	D	7.542	7.453	0.089	3	97.6	0	0	0	0	2.4
2003	145	23	548	603.28	-312.734	D	7.675	7.453	0.222	3	96.39	0.11	0	0	0	3.5
2003	146	23	624	596.324	-316.278	D	7.456	7.453	0.004	3	98.68	0.01	0	0	0	1.31
2003	147	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	148	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	149	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	150	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	151	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2003	153	23	517	602.805	-305.061	D	7.646	7.546	0.1	3.2	86.91	0.29	0	0	0	12.8
2003	154	23	624	596.324	-316.278	D	7.613	7.546	0.067	3.2	98.19	0.07	0	0	0	1.74
2003	155	23	622	596.698	-316.245	D	7.546	7.546	0	3.2	92.85	0.01	0	0	0	7.66
2003	156	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	157	23	517	602.805	-305.061	D	7.655	7.546	0.109	3.2	88.29	0.02	0	0	0	11.69
2003	158	23	517	602.805	-305.061	D	7.778	7.546	0.232	3.2	96.77	0.04	0	0	0	3.19

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	159	23	405	602.557	-312.89	D	7.546	7.546	0	3.2	86.88	0.01	0	0	0	13.3
2003	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	7.55	7.546	0.004	3.2	93.39	0.37	0	0	0	6.25
2003	164	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	165	23	517	602.805	-305.061	D	7.546	7.546	0	3.2	98.93	0	0	0	0	1.55
2003	166	23	517	602.805	-305.061	D	7.579	7.546	0.032	3.2	99.27	0.01	0	0	0	0.72
2003	167	23	548	603.28	-312.734	D	7.589	7.546	0.043	3.2	99.24	0.01	0	0	0	0.75
2003	168	23	603	598.68	-316.244	D	7.569	7.546	0.023	3.2	99.51	0	0	0	0	0.49
2003	169	23	623	596.511	-316.262	D	7.562	7.546	0.016	3.2	97.6	0.01	0	0	0	2.4
2003	170	23	621	596.885	-316.228	D	7.551	7.546	0.005	3.2	99.3	0	0	0	0	0.71
2003	171	23	353	602.08	-313.177	D	7.546	7.546	0	3.2	99.45	0	0	0	0	0.35
2003	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	173	23	626	596.299	-315.88	D	7.992	7.546	0.446	3.2	96.71	0	0	0	0	3.29
2003	174	23	557	601.32	-313.419	D	7.831	7.546	0.285	3.2	52.23	0.08	0	0	0	47.69
2003	175	23	517	602.805	-305.061	D	7.683	7.546	0.137	3.2	73.02	0.07	0	0	0	26.91
2003	176	23	625	596.311	-316.079	D	7.684	7.546	0.138	3.2	30.95	0.16	0	0	0	68.89
2003	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	178	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	179	23	669	599.263	-310.777	D	7.841	7.546	0.295	3.2	98.88	0	0	0	0	1.12
2003	180	23	637	596.267	-315.066	D	7.864	7.546	0.318	3.2	96.29	0	0	0	0	3.7
2003	181	23	517	602.805	-305.061	D	7.939	7.546	0.392	3.2	96.82	0	0	0	0	3.18
2003	182	23	517	602.805	-305.061	D	7.713	7.591	0.123	3.296	90.91	0.06	0	0	0	9.03
2003	183	23	517	602.805	-305.061	D	7.642	7.593	0.049	3.3	99.33	0	0	0	0	0.67
2003	184	23	548	603.28	-312.734	D	7.841	7.593	0.248	3.3	99	0	0	0	0	1
2003	185	23	548	603.28	-312.734	D	7.811	7.593	0.219	3.3	99.09	0	0	0	0	0.91
2003	186	23	517	602.805	-305.061	D	7.606	7.593	0.013	3.3	98.65	0	0	0	0	1.36
2003	187	23	352	601.372	-307.234	D	7.593	7.593	0	3.3	91.86	0	0	0	0	5.72
2003	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	193	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	194	23	604	598.599	-316.246	D	7.594	7.593	0.001	3.3	83.59	0.1	0	0	0	16.26
2003	195	23	603	598.68	-316.244	D	7.864	7.593	0.271	3.3	97.98	0	0	0	0	2.01
2003	196	23	517	602.805	-305.061	D	7.695	7.593	0.103	3.3	98.46	0	0	0	0	1.54
2003	197	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	198	23	624	596.324	-316.278	D	7.673	7.593	0.081	3.3	98.53	0	0	0	0	1.47
2003	199	23	551	602.657	-313.003	D	7.718	7.593	0.125	3.3	82.43	0.05	0	0	0	17.52
2003	200	23	603	598.68	-316.244	D	7.635	7.593	0.042	3.3	98.27	0.01	0	0	0	1.73
2003	201	23	603	598.68	-316.244	D	7.95	7.593	0.357	3.3	98.57	0	0	0	0	1.42
2003	202	23	517	602.805	-305.061	D	7.636	7.593	0.043	3.3	98.62	0	0	0	0	1.37
2003	203	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	204	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	205	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	206	23	624	596.324	-316.278	D	7.819	7.593	0.226	3.3	97.04	0	0	0	0	2.95
2003	207	23	517	602.805	-305.061	D	7.619	7.593	0.026	3.3	45.43	0.25	0	0	0	54.33
2003	208	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	623	596.511	-316.262	D	7.593	7.593	0.001	3.3	97.43	0.02	0	0	0	2.51
2003	211	23	548	603.28	-312.734	D	8.028	7.593	0.436	3.3	98.98	0	0	0	0	1.02
2003	212	23	517	602.805	-305.061	D	8.673	7.593	1.08	3.3	99.05	0.01	0	0	0	0.95
2003	213	23	548	603.28	-312.734	D	7.791	7.681	0.11	3.492	98.92	0.03	0	0	0	1.05
2003	214	23	548	603.28	-312.734	D	7.689	7.685	0.004	3.5	99.41	0	0	0	0	0.58
2003	215	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	216	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	217	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	218	23	624	596.324	-316.278	D	7.794	7.685	0.109	3.5	97.61	0.01	0	0	0	2.38
2003	219	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	98.22	0	0	0	0	0.21
2003	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	225	23	623	596.511	-316.262	D	7.685	7.685	0	3.5	4.1	0	0	0	0	2.55
2003	226	23	557	601.32	-313.419	D	7.847	7.685	0.162	3.5	66.57	0.83	0	0	0	32.59
2003	227	23	548	603.28	-312.734	D	7.714	7.685	0.029	3.5	96.68	0.02	0	0	0	3.3
2003	228	23	517	602.805	-305.061	D	7.769	7.685	0.084	3.5	98.83	0	0	0	0	1.17
2003	229	23	548	603.28	-312.734	D	7.702	7.685	0.018	3.5	99.19	0	0	0	0	0.82
2003	230	23	548	603.28	-312.734	D	7.686	7.685	0.001	3.5	70.67	0.37	0	0	0	28.9
2003	231	23	624	596.324	-316.278	D	7.872	7.685	0.187	3.5	99.04	0	0	0	0	0.96
2003	232	23	517	602.805	-305.061	D	8.511	7.685	0.826	3.5	96.88	0.02	0	0	0	3.09
2003	233	23	548	603.28	-312.734	D	8.432	7.685	0.748	3.5	95.15	0.03	0	0	0	4.83
2003	234	23	548	603.28	-312.734	D	7.71	7.685	0.025	3.5	98.44	0	0	0	0	1.55
2003	235	23	623	596.511	-316.262	D	7.694	7.685	0.009	3.5	99.12	0	0	0	0	0.88
2003	236	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	237	23	632	596.27	-315.421	D	7.822	7.685	0.138	3.5	84.39	0.03	0	0	0	15.58
2003	238	23	517	602.805	-305.061	D	7.816	7.685	0.131	3.5	97.72	0	0	0	0	2.28
2003	239	23	517	602.805	-305.061	D	7.757	7.685	0.073	3.5	99.15	0	0	0	0	0.85
2003	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	242	23	603	598.68	-316.244	D	7.691	7.685	0.006	3.5	98.98	0.01	0	0	0	1.03
2003	243	23	557	601.32	-313.419	D	8.187	7.685	0.502	3.5	86.93	0.52	0	0	0	12.55
2003	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	245	23	624	596.324	-316.278	D	7.709	7.685	0.024	3.5	97.58	0.09	0	0	0	2.33
2003	246	23	548	603.28	-312.734	D	8.409	7.685	0.724	3.5	97.04	0.08	0	0	0	2.88
2003	247	23	548	603.28	-312.734	D	7.687	7.685	0.002	3.5	99.67	0.01	0	0	0	0.28
2003	248	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	251	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	98.65	0	0	0	0	1.46
2003	252	23	624	596.324	-316.278	D	7.687	7.685	0.003	3.5	98.81	0.01	0	0	0	1.17
2003	253	23	624	596.324	-316.278	D	8.02	7.685	0.335	3.5	97.36	0	0	0	0	2.63
2003	254	23	632	596.27	-315.421	D	7.909	7.685	0.224	3.5	72.43	0.13	0	0	0	27.44
2003	255	23	517	602.805	-305.061	D	7.717	7.685	0.032	3.5	74.46	0.04	0	0	0	25.5
2003	256	23	517	602.805	-305.061	D	7.693	7.685	0.008	3.5	5.31	0.45	0	0	0	94.25
2003	257	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	3.99	14.86	0	0	0	81.47
2003	258	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	259	23	517	602.805	-305.061	D	7.971	7.685	0.286	3.5	97.36	0	0	0	0	2.64
2003	260	23	624	596.324	-316.278	D	7.836	7.685	0.151	3.5	96.46	0	0	0	0	3.54
2003	261	23	624	596.324	-316.278	D	7.84	7.685	0.155	3.5	89.17	0.01	0	0	0	10.82
2003	262	23	548	603.28	-312.734	D	7.697	7.685	0.012	3.5	81.61	0.01	0	0	0	18.39
2003	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	264	23	624	596.324	-316.278	D	7.796	7.685	0.112	3.5	97.34	0.01	0	0	0	2.65
2003	265	23	517	602.805	-305.061	D	7.701	7.685	0.016	3.5	91.35	0.51	0	0	0	8.13
2003	266	23	353	602.08	-313.177	D	7.685	7.685	0	3.5	83.37	0.01	0	0	0	13.78
2003	267	23	548	603.28	-312.734	D	7.685	7.685	0	3.5	98.84	0	0	0	0	1.13
2003	268	23	548	603.28	-312.734	D	7.685	7.685	0	3.5	98.44	0	0	0	0	1.81
2003	269	23	557	601.32	-313.419	D	7.799	7.685	0.114	3.5	92.94	0.02	0	0	0	7.04
2003	270	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	95.72	0	0	0	0	1.84
2003	271	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	272	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	273	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	274	23	1	596.558	-316.101	D	7.507	7.507	0	3.117	0	0	0	0	0	0
2003	275	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	276	23	557	601.32	-313.419	D	7.554	7.5	0.054	3.1	50.84	0.95	0	0	0	48.21
2003	277	23	548	603.28	-312.734	D	7.5	7.5	0	3.1	97.52	0.01	0	0	0	2.34
2003	278	23	548	603.28	-312.734	D	7.533	7.5	0.034	3.1	92.99	0.03	0	0	0	6.99
2003	279	23	548	603.28	-312.734	D	7.773	7.5	0.273	3.1	95.99	0.24	0	0	0	3.78
2003	280	23	624	596.324	-316.278	D	7.62	7.5	0.121	3.1	97.82	0	0	0	0	2.18
2003	281	23	624	596.324	-316.278	D	7.751	7.5	0.252	3.1	98.07	0	0	0	0	1.93
2003	282	23	682	600.626	-308.407	D	7.859	7.5	0.359	3.1	59.6	0.32	0	0	0	40.07
2003	283	23	624	596.324	-316.278	D	7.507	7.5	0.008	3.1	61.39	0.02	0	0	0	38.61
2003	284	23	624	596.324	-316.278	D	7.893	7.5	0.394	3.1	97.81	0.01	0	0	0	2.19
2003	285	23	517	602.805	-305.061	D	7.511	7.5	0.012	3.1	94.08	0.13	0	0	0	5.8
2003	286	23	624	596.324	-316.278	D	7.534	7.5	0.034	3.1	98.35	0	0	0	0	1.65
2003	287	23	517	602.805	-305.061	D	7.536	7.5	0.036	3.1	95.45	0.01	0	0	0	4.54
2003	288	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	289	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	290	23	548	603.28	-312.734	D	7.524	7.5	0.025	3.1	91.55	0.31	0	0	0	8.15
2003	291	23	603	598.68	-316.244	D	7.5	7.5	0	3.1	96.22	0.05	0	0	0	3.65
2003	292	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	293	23	465	602.978	-311.858	D	7.5	7.5	0	3.1	98.69	0	0	0	0	0.76
2003	294	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	295	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	296	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	297	23	582	599.649	-315.031	D	7.579	7.5	0.08	3.1	93.16	0.02	0	0	0	6.82
2003	298	23	517	602.805	-305.061	D	7.606	7.5	0.107	3.1	96.26	0.04	0	0	0	3.7
2003	299	23	603	598.68	-316.244	D	7.506	7.5	0.007	3.1	97.03	0.07	0	0	0	2.93
2003	300	23	548	603.28	-312.734	D	7.517	7.5	0.018	3.1	99.03	0	0	0	0	0.97
2003	301	23	548	603.28	-312.734	D	7.501	7.5	0.001	3.1	97.98	0.01	0	0	0	2
2003	302	23	548	603.28	-312.734	D	7.55	7.5	0.05	3.1	96.67	0.01	0	0	0	3.33
2003	303	23	517	602.805	-305.061	D	7.512	7.5	0.013	3.1	98.72	0	0	0	0	1.28
2003	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	548	603.28	-312.734	D	7.5	7.5	0.001	3.1	95.39	0.01	0	0	0	4.67
2003	306	23	517	602.805	-305.061	D	7.635	7.5	0.135	3.1	76.21	0.19	0	0	0	23.6
2003	307	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	309	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	310	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	517	602.805	-305.061	D	7.538	7.5	0.038	3.1	86.23	0.05	0	0	0	13.73

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	315	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	33.02	1.25	0	0	0	64.51
2003	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	318	23	557	601.32	-313.419	D	7.572	7.5	0.072	3.1	83.11	0.33	0	0	0	16.57
2003	319	23	517	602.805	-305.061	D	7.503	7.5	0.004	3.1	94.63	0.4	0	0	0	4.96
2003	320	23	548	603.28	-312.734	D	7.506	7.5	0.006	3.1	58.43	3.54	0	0	0	38.07
2003	321	23	557	601.32	-313.419	D	7.77	7.5	0.271	3.1	92.74	0.22	0	0	0	7.04
2003	322	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	324	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	328	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	89.96	0.77	0	0	0	9.42
2003	330	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	547	603.265	-312.487	D	7.5	7.5	0	3.1	0.08	15.44	0	0	0	86.73
2003	332	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	333	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	1	596.558	-316.101	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2003	336	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	515	602.747	-305.629	D	7.817	7.593	0.225	3.3	95.18	0.07	0	0	0	4.75
2003	338	23	624	596.324	-316.278	D	7.697	7.593	0.105	3.3	94.96	0.05	0	0	0	4.99
2003	339	23	621	596.885	-316.228	D	7.593	7.593	0.001	3.3	88.24	0.01	0	0	0	11.72
2003	340	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	341	23	557	601.32	-313.419	D	7.675	7.593	0.082	3.3	86.48	0.46	0	0	0	13.07
2003	342	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0.73	4.9	0	0	0	95.22
2003	343	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	517	602.805	-305.061	D	7.601	7.593	0.008	3.3	86.87	0.4	0	0	0	12.75
2003	345	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	348	23	626	596.299	-315.88	D	7.595	7.593	0.002	3.3	94.44	0.1	0	0	0	5.46
2003	349	23	548	603.28	-312.734	D	7.594	7.593	0.002	3.3	98.51	0.18	0	0	0	1.31
2003	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	354	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	355	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	358	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	548	603.28	-312.734	D	7.742	7.593	0.149	3.3	91.68	0.29	0	0	0	8.03
2003	360	23	517	602.805	-305.061	D	7.686	7.593	0.093	3.3	74.68	1.64	0	0	0	23.68
2003	361	23	517	602.805	-305.061	D	7.664	7.593	0.072	3.3	45.7	1.15	0	0	0	53.15
2003	362	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	0.01	3.37	0	0	0	96.33
2003	363	23	433	602.806	-312.871	D	7.593	7.593	0	3.3	35.23	6.84	0	0	0	54.58
2003	364	23	491	603.207	-311.591	D	7.593	7.593	0	3.3	93.91	0.01	0	0	0	0.77
									1.08							
MLC (REV)									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	637	596.267	-315.066	D	7.593	7.593	0.000	3.3	6.84	88.78	0	0	0	3.73
2003	2	23	637	596.267	-315.066	D	7.615	7.593	0.023	3.3	17.78	80.97	0	0	0	1.25
2003	3	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	4	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	5	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	6	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	7	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	8	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	9	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	10	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	11	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	12	23	557	601.32	-313.419	D	7.714	7.593	0.121	3.3	7.18	91.8	0	0	0	1.02
2003	13	23	517	602.805	-305.061	D	7.599	7.593	0.007	3.3	14.77	84.89	0	0	0	0.34
2003	14	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	15	23	548	603.28	-312.734	D	7.627	7.593	0.034	3.3	11.49	87.81	0	0	0	0.7
2003	16	23	517	602.805	-305.061	D	7.619	7.593	0.026	3.3	22.83	76.55	0	0	0	0.62
2003	17	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	18	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	19	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	20	23	517	602.805	-305.061	D	7.61	7.593	0.018	3.3	28.6	70.3	0	0	0	1.11
2003	21	23	625	596.311	-316.079	D	7.613	7.593	0.021	3.3	24.05	75.55	0	0	0	0.4
2003	22	23	637	596.267	-315.066	D	7.641	7.593	0.049	3.3	12.87	85.54	0	0	0	1.59

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	23	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	24	23	517	602.805	-305.061	D	7.656	7.593	0.064	3.3	9.17	90.04	0	0	0	0.79
2003	25	23	548	603.28	-312.734	D	7.599	7.593	0.006	3.3	18.46	81.23	0	0	0	0.33
2003	26	23	548	603.28	-312.734	D	7.593	7.593	0.000	3.3	29.43	69.94	0	0	0	0.3
2003	27	23	681	600.53	-308.617	D	7.663	7.593	0.071	3.3	7.27	91.22	0	0	0	1.51
2003	28	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	19.55	80.22	0	0	0	0.25
2003	29	23	637	596.267	-315.066	D	7.607	7.593	0.015	3.3	16.82	81.34	0	0	0	1.84
2003	30	23	637	596.267	-315.066	D	7.598	7.593	0.006	3.3	23.05	75.78	0	0	0	1.17
2003	31	23	631	596.276	-315.551	D	7.593	7.593	0.000	3.3	25.17	73	0	0	0	0.34
2003	32	23	1	596.558	-316.101	D	7.459	7.459	0.000	3.013	0	0	0	0	0	0
2003	33	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	34	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	35	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	36	23	527	602.958	-307.536	D	7.513	7.453	0.060	3	10.55	88.23	0	0	0	1.23
2003	37	23	688	601.298	-307.191	D	7.461	7.453	0.008	3	18.81	80.59	0	0	0	0.63
2003	38	23	662	598.404	-311.683	D	7.489	7.453	0.036	3	23.76	75.11	0	0	0	1.13
2003	39	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	40	23	517	602.805	-305.061	D	7.459	7.453	0.006	3	15.9	83.28	0	0	0	0.85
2003	41	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	42	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	43	23	548	603.28	-312.734	D	7.455	7.453	0.002	3	13.64	84.83	0	0	0	1.6
2003	44	23	462	603.035	-312.603	D	7.453	7.453	0.000	3	31.76	68.58	0	0	0	0.81
2003	45	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	46	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	47	23	647	597.234	-313.631	D	7.523	7.453	0.071	3	36.28	62.76	0	0	0	0.96
2003	48	23	557	601.32	-313.419	D	7.585	7.453	0.133	3	10.97	87.48	0	0	0	1.55
2003	49	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	50	23	517	602.805	-305.061	D	7.458	7.453	0.005	3	36.06	63.51	0	0	0	0.45
2003	51	23	637	596.267	-315.066	D	7.473	7.453	0.021	3	29.9	69.47	0	0	0	0.64
2003	52	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	53	23	689	601.435	-306.997	D	7.456	7.453	0.003	3	8.49	88.79	0	0	0	2.75
2003	54	23	688	601.298	-307.191	D	7.477	7.453	0.024	3	23.57	75.36	0	0	0	1.08
2003	55	23	624	596.324	-316.278	D	7.471	7.453	0.018	3	16.32	82.59	0	0	0	1.09
2003	56	23	638	596.406	-314.894	D	7.504	7.453	0.051	3	6.65	91.47	0	0	0	1.89
2003	57	23	688	601.298	-307.191	D	7.458	7.453	0.006	3	26.41	73.17	0	0	0	0.47
2003	58	23	637	596.267	-315.066	D	7.457	7.453	0.004	3	34.32	65.43	0	0	0	0.36
2003	59	23	637	596.267	-315.066	D	7.585	7.453	0.132	3	21.22	77.78	0	0	0	1
2003	60	23	688	601.298	-307.191	D	7.474	7.362	0.112	2.808	39.37	60.19	0	0	0	0.44
2003	61	23	517	602.805	-305.061	D	7.39	7.358	0.032	2.8	51.5	48.21	0	0	0	0.29

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	62	23	557	601.32	-313.419	D	7.433	7.358	0.074	2.8	9.39	89.34	0	0	0	1.27
2003	63	23	547	603.265	-312.487	D	7.359	7.358	0.000	2.8	46.68	52.73	0	0	0	0.54
2003	64	23	548	603.28	-312.734	D	7.39	7.358	0.032	2.8	34.94	64.03	0	0	0	1.04
2003	65	23	637	596.267	-315.066	D	7.449	7.358	0.091	2.8	28.71	70.23	0	0	0	1.06
2003	66	23	624	596.324	-316.278	D	7.365	7.358	0.006	2.8	36.13	63.37	0	0	0	0.52
2003	67	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	63.17	36.27	0	0	0	0.56
2003	68	23	548	603.28	-312.734	D	7.405	7.358	0.046	2.8	16.93	81.6	0	0	0	1.48
2003	69	23	637	596.267	-315.066	D	7.451	7.358	0.092	2.8	7.37	91.01	0	0	0	1.62
2003	70	23	517	602.805	-305.061	D	7.374	7.358	0.016	2.8	28.82	70.67	0	0	0	0.52
2003	71	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	46.1	53.57	0	0	0	0.4
2003	72	23	637	596.267	-315.066	D	7.366	7.358	0.007	2.8	54.69	43.31	0	0	0	2.02
2003	73	23	637	596.267	-315.066	D	7.359	7.358	0.001	2.8	29.14	69.23	0	0	0	1.63
2003	74	23	2	596.539	-315.853	D	7.358	7.358	0.000	2.8	42.61	56.44	0	0	0	0.44
2003	75	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	74.45	26.96	0	0	0	0.49
2003	76	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2003	77	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2003	78	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2003	79	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2003	80	23	624	596.324	-316.278	D	7.364	7.358	0.005	2.8	31.06	68.37	0	0	0	0.54
2003	81	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2003	82	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2003	83	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2003	84	23	517	602.805	-305.061	D	7.363	7.358	0.005	2.8	55.93	43.03	0	0	0	1.08
2003	85	23	557	601.32	-313.419	D	7.404	7.358	0.046	2.8	13.74	84.38	0	0	0	1.88
2003	86	23	517	602.805	-305.061	D	7.36	7.358	0.002	2.8	75.56	22.84	0	0	0	1.6
2003	87	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2003	88	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2003	89	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2003	90	23	1	596.558	-316.101	D	7.358	7.358	0.000	2.8	0	0	0	0	0	0
2003	91	23	1	596.558	-316.101	D	7.267	7.267	0.000	2.608	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2003	95	23	517	602.805	-305.061	D	7.263	7.263	0.000	2.6	69.66	27.76	0	0	0	2.55
2003	96	23	637	596.267	-315.066	D	7.269	7.263	0.006	2.6	44.49	54.4	0	0	0	1.11
2003	97	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2003	98	23	548	603.28	-312.734	D	7.329	7.263	0.066	2.6	13.86	84.1	0	0	0	2.04
2003	99	23	548	603.28	-312.734	D	7.289	7.263	0.026	2.6	24.32	74.69	0	0	0	1
2003	100	23	548	603.28	-312.734	D	7.301	7.263	0.038	2.6	19.3	77.63	0	0	0	3.07

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	101	23	548	603.28	-312.734	D	7.343	7.263	0.080	2.6	25.21	71	0	0	0	3.79
2003	102	23	548	603.28	-312.734	D	7.263	7.263	0.000	2.6	91.56	6.1	0	0	0	2.26
2003	103	23	517	602.805	-305.061	D	7.263	7.263	0.000	2.6	93.45	5.64	0	0	0	1.97
2003	104	23	517	602.805	-305.061	D	7.263	7.263	0.001	2.6	92.13	6.43	0	0	0	1.34
2003	105	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2003	107	23	624	596.324	-316.278	D	7.264	7.263	0.001	2.6	81.88	17.27	0	0	0	0.99
2003	108	23	694	602.12	-306.029	D	7.331	7.263	0.068	2.6	15.07	83.18	0	0	0	1.75
2003	109	23	431	602.059	-306.432	D	7.264	7.263	0.002	2.6	91.29	7.77	0	0	0	0.89
2003	110	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2003	112	23	460	602.289	-306.164	D	7.263	7.263	0.000	2.6	68.84	21.77	0	0	0	3.61
2003	113	23	548	603.28	-312.734	D	7.265	7.263	0.003	2.6	51.95	44.22	0	0	0	3.78
2003	114	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	0	0	0	0	0	0
2003	115	23	517	602.805	-305.061	D	7.293	7.263	0.030	2.6	67.3	31.5	0	0	0	1.2
2003	116	23	525	602.928	-307.042	D	7.296	7.263	0.033	2.6	14.81	82.28	0	0	0	2.91
2003	117	23	1	596.558	-316.101	D	7.263	7.263	0.000	2.6	96.77	4.57	0	0	0	1
2003	118	23	280	600.722	-308.534	D	7.263	7.263	0.000	2.6	88.6	6.38	0	0	0	0.59
2003	119	23	517	602.805	-305.061	D	7.263	7.263	0.000	2.6	44.11	55.38	0	0	0	0.83
2003	120	23	517	602.805	-305.061	D	7.263	7.263	0.000	2.6	26.62	0.52	0	0	0	0.29
2003	121	23	1	596.558	-316.101	D	7.445	7.445	0.000	2.983	0	0	0	0	0	0
2003	122	23	517	602.805	-305.061	D	7.462	7.453	0.010	3	69.16	29.25	0	0	0	1.61
2003	123	23	548	603.28	-312.734	D	7.456	7.453	0.004	3	33.22	65.21	0	0	0	1.59
2003	124	23	624	596.324	-316.278	D	7.453	7.453	0.000	3	87.06	13.7	0	0	0	0.51
2003	125	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	126	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	127	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	128	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	21.93	75.28	0	0	0	2.81
2003	129	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	130	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	132	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	133	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	134	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	135	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	136	23	517	602.805	-305.061	D	7.455	7.453	0.003	3	37.38	61.08	0	0	0	1.58
2003	137	23	637	596.267	-315.066	D	7.453	7.453	0.000	3	64.63	34.46	0	0	0	1.21
2003	138	23	637	596.267	-315.066	D	7.526	7.453	0.073	3	27.41	71.46	0	0	0	1.13
2003	139	23	4	596.5	-315.356	D	7.453	7.453	0.000	3	102.24	1.64	0	0	0	0.87

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	140	23	642	596.914	-314.17	D	7.46	7.453	0.008	3	61.37	38.25	0	0	0	0.41
2003	141	23	638	596.406	-314.894	D	7.469	7.453	0.017	3	36.83	54.55	0	0	0	8.65
2003	142	23	557	601.32	-313.419	D	7.552	7.453	0.099	3	34.65	62.1	0	0	0	3.26
2003	143	23	676	599.876	-309.365	D	7.527	7.453	0.074	3	43.64	52.27	0	0	0	4.1
2003	144	23	548	603.28	-312.734	D	7.476	7.453	0.023	3	79.77	18.39	0	0	0	1.85
2003	145	23	517	602.805	-305.061	D	7.479	7.453	0.027	3	71.21	28.22	0	0	0	0.58
2003	146	23	557	601.32	-313.419	D	7.471	7.453	0.019	3	61.2	36.99	0	0	0	1.83
2003	147	23	637	596.267	-315.066	D	7.459	7.453	0.007	3	49.6	45.57	0	0	0	4.85
2003	148	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	149	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	150	23	1	596.558	-316.101	D	7.453	7.453	0.000	3	0	0	0	0	0	0
2003	151	23	548	603.28	-312.734	D	7.453	7.453	0.000	3	85.04	11.39	0	0	0	3.97
2003	152	23	517	602.805	-305.061	D	7.546	7.542	0.004	3.192	48.84	47.21	0	0	0	3.95
2003	153	23	6	596.462	-314.859	D	7.546	7.546	0.000	3.2	78.33	21.93	0	0	0	0.64
2003	154	23	517	602.805	-305.061	D	7.557	7.546	0.010	3.2	26.77	72.63	0	0	0	0.61
2003	155	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	94.1	3.29	0	0	0	0.32
2003	156	23	517	602.805	-305.061	D	7.548	7.546	0.002	3.2	96.05	2.63	0	0	0	1.4
2003	157	23	517	602.805	-305.061	D	7.555	7.546	0.008	3.2	92.52	6.6	0	0	0	0.91
2003	158	23	517	602.805	-305.061	D	7.582	7.546	0.036	3.2	72.16	26.32	0	0	0	1.52
2003	159	23	548	603.28	-312.734	D	7.549	7.546	0.003	3.2	97.13	1.52	0	0	0	1.35
2003	160	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	7.557	7.546	0.010	3.2	47.73	51.88	0	0	0	0.39
2003	164	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2003	165	23	517	602.805	-305.061	D	7.554	7.546	0.008	3.2	77.25	22.27	0	0	0	0.51
2003	166	23	517	602.805	-305.061	D	7.607	7.546	0.061	3.2	74.11	24.09	0	0	0	1.8
2003	167	23	603	598.68	-316.244	D	7.549	7.546	0.003	3.2	87.04	12.6	0	0	0	0.45
2003	168	23	637	596.267	-315.066	D	7.547	7.546	0.001	3.2	90.86	8.87	0	0	0	0.54
2003	169	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	95.21	3.99	0	0	0	0.91
2003	170	23	517	602.805	-305.061	D	7.589	7.546	0.043	3.2	90.51	8.25	0	0	0	1.24
2003	171	23	624	596.324	-316.278	D	7.547	7.546	0.001	3.2	90.88	7.61	0	0	0	1.51
2003	172	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2003	173	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2003	174	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2003	175	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2003	176	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2003	177	23	1	596.558	-316.101	D	7.546	7.546	0.000	3.2	0	0	0	0	0	0
2003	178	23	548	603.28	-312.734	D	7.565	7.546	0.019	3.2	79.95	17.44	0	0	0	2.62

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	179	23	548	603.28	-312.734	D	7.564	7.546	0.018	3.2	95.84	3.2	0	0	0	0.97
2003	180	23	517	602.805	-305.061	D	7.55	7.546	0.004	3.2	97.65	1.71	0	0	0	0.69
2003	181	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	98.14	1.53	0	0	0	0.47
2003	182	23	517	602.805	-305.061	D	7.591	7.591	0.000	3.296	95.14	4.25	0	0	0	0.48
2003	183	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	94.75	4.72	0	0	0	0.67
2003	184	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	96.83	2.73	0	0	0	0.58
2003	185	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	186	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	187	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	192	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	193	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	194	23	548	603.28	-312.734	D	7.595	7.593	0.002	3.3	87.49	10.65	0	0	0	1.88
2003	195	23	624	596.324	-316.278	D	7.595	7.593	0.002	3.3	89.29	9.59	0	0	0	1.16
2003	196	23	492	603.188	-311.342	D	7.593	7.593	0.001	3.3	98.5	0.9	0	0	0	0.52
2003	197	23	676	599.876	-309.365	D	7.614	7.593	0.022	3.3	77.04	17.93	0	0	0	5.04
2003	198	23	548	603.28	-312.734	D	7.595	7.593	0.002	3.3	90.76	6.84	0	0	0	2.41
2003	199	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	97.82	1.49	0	0	0	0.82
2003	200	23	538	603.127	-310.259	D	7.6	7.593	0.007	3.3	71.97	27.32	0	0	0	0.71
2003	201	23	603	598.68	-316.244	D	7.601	7.593	0.008	3.3	92.6	6.91	0	0	0	0.49
2003	202	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	99.04	0.48	0	0	0	0.48
2003	203	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	204	23	557	601.32	-313.419	D	7.672	7.593	0.080	3.3	34.76	60.78	0	0	0	4.46
2003	205	23	548	603.28	-312.734	D	7.594	7.593	0.001	3.3	79.37	14.05	0	0	0	6.7
2003	206	23	4	596.5	-315.356	D	7.593	7.593	0.000	3.3	94.32	0.96	0	0	0	1.55
2003	207	23	432	602.04	-306.183	D	7.593	7.593	0.000	3.3	97.59	1.56	0	0	0	0.46
2003	208	23	516	602.728	-305.38	D	7.593	7.593	0.000	3.3	99.09	1.39	0	0	0	0.34
2003	209	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	210	23	637	596.267	-315.066	D	7.634	7.593	0.042	3.3	29.7	69.23	0	0	0	1.08
2003	211	23	624	596.324	-316.278	D	7.603	7.593	0.011	3.3	79.44	19.87	0	0	0	0.7
2003	212	23	517	602.805	-305.061	D	7.654	7.593	0.062	3.3	94.99	3.77	0	0	0	1.24
2003	213	23	548	603.28	-312.734	D	7.74	7.681	0.058	3.492	95.23	4.03	0	0	0	0.73
2003	214	23	548	603.28	-312.734	D	7.688	7.685	0.003	3.5	98.22	1.3	0	0	0	0.5
2003	215	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	216	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	217	23	517	602.805	-305.061	D	7.691	7.685	0.006	3.5	71.96	26.84	0	0	0	1.2

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	218	23	517	602.805	-305.061	D	7.751	7.685	0.066	3.5	91.72	7.29	0	0	0	0.99
2003	219	23	693	601.983	-306.223	D	7.734	7.685	0.049	3.5	43.48	54.57	0	0	0	1.96
2003	220	23	548	603.28	-312.734	D	7.732	7.685	0.048	3.5	67.18	29.66	0	0	0	3.16
2003	221	23	637	596.267	-315.066	D	7.71	7.685	0.026	3.5	87.46	9.86	0	0	0	2.68
2003	222	23	637	596.267	-315.066	D	7.702	7.685	0.017	3.5	94.99	2.74	0	0	0	2.28
2003	223	23	637	596.267	-315.066	D	7.708	7.685	0.023	3.5	83.56	13.69	0	0	0	2.75
2003	224	23	631	596.276	-315.551	D	7.685	7.685	0.000	3.5	95.08	2.03	0	0	0	2.61
2003	225	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	226	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	227	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	228	23	516	602.728	-305.38	D	7.685	7.685	0.000	3.5	97.22	2.28	0	0	0	0.47
2003	229	23	122	599.214	-314.897	D	7.685	7.685	0.000	3.5	90.7	1.59	0	0	0	0.37
2003	230	23	517	602.805	-305.061	D	7.698	7.685	0.013	3.5	91.54	7.06	0	0	0	1.41
2003	231	23	517	602.805	-305.061	D	7.712	7.685	0.027	3.5	94.23	4.87	0	0	0	0.9
2003	232	23	517	602.805	-305.061	D	7.71	7.685	0.025	3.5	96.38	2.98	0	0	0	0.64
2003	233	23	517	602.805	-305.061	D	7.695	7.685	0.010	3.5	97.68	1.79	0	0	0	0.52
2003	234	23	514	602.766	-305.877	D	7.686	7.685	0.001	3.5	98.19	1.35	0	0	0	0.47
2003	235	23	432	602.04	-306.183	D	7.706	7.685	0.021	3.5	84.85	13.75	0	0	0	1.4
2003	236	23	620	597.072	-316.212	D	7.685	7.685	0.000	3.5	85.78	13.6	0	0	0	0.46
2003	237	23	624	596.324	-316.278	D	7.685	7.685	0.000	3.5	94.74	4.74	0	0	0	0.43
2003	238	23	490	602.499	-305.648	D	7.686	7.685	0.001	3.5	98.81	0.62	0	0	0	0.37
2003	239	23	517	602.805	-305.061	D	7.685	7.685	0.000	3.5	98.69	0.87	0	0	0	0.33
2003	240	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	242	23	517	602.805	-305.061	D	7.697	7.685	0.012	3.5	88.44	10.7	0	0	0	0.86
2003	243	23	517	602.805	-305.061	D	7.69	7.685	0.005	3.5	80.7	18.69	0	0	0	0.62
2003	244	23	530	603.004	-308.28	D	7.729	7.685	0.044	3.5	90	8.8	0	0	0	1.19
2003	245	23	517	602.805	-305.061	D	7.728	7.685	0.044	3.5	60.09	39.33	0	0	0	0.57
2003	246	23	517	602.805	-305.061	D	7.711	7.685	0.026	3.5	81.05	17.6	0	0	0	1.35
2003	247	23	548	603.28	-312.734	D	7.697	7.685	0.012	3.5	89.79	7.23	0	0	0	2.96
2003	248	23	638	596.406	-314.894	D	7.717	7.685	0.032	3.5	36.29	55.66	0	0	0	8.06
2003	249	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	251	23	5	596.481	-315.108	D	7.685	7.685	0.000	3.5	89.67	1.2	0	0	0	4.17
2003	252	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	253	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	254	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	255	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	256	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	257	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	258	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	259	23	78	598.564	-316.197	D	7.686	7.685	0.002	3.5	97.01	1.62	0	0	0	1.31
2003	260	23	637	596.267	-315.066	D	7.688	7.685	0.003	3.5	92.69	6.47	0	0	0	0.82
2003	261	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	262	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	263	23	557	601.32	-313.419	D	7.715	7.685	0.030	3.5	19.27	77.45	0	0	0	3.28
2003	264	23	624	596.324	-316.278	D	7.686	7.685	0.001	3.5	93.31	5.78	0	0	0	0.94
2003	265	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	85.34	14.35	0	0	0	0.47
2003	266	23	491	603.207	-311.591	D	7.685	7.685	0.000	3.5	95.03	1.76	0	0	0	0.63
2003	267	23	548	603.28	-312.734	D	7.685	7.685	0.000	3.5	89.05	8.05	0	0	0	1.12
2003	268	23	637	596.267	-315.066	D	7.69	7.685	0.005	3.5	48.35	43.82	0	0	0	7.83
2003	269	23	517	602.805	-305.061	D	7.699	7.685	0.014	3.5	86.73	11.98	0	0	0	1.29
2003	270	23	430	602.079	-306.68	D	7.685	7.685	0.000	3.5	85.91	6.16	0	0	0	0.57
2003	271	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	272	23	1	596.558	-316.101	D	7.685	7.685	0.000	3.5	0	0	0	0	0	0
2003	273	23	557	601.32	-313.419	D	7.751	7.685	0.066	3.5	30.32	64.84	0	0	0	4.85
2003	274	23	548	603.28	-312.734	D	7.617	7.507	0.110	3.117	17.24	81.86	0	0	0	0.91
2003	275	23	557	601.32	-313.419	D	7.513	7.5	0.014	3.1	19.03	75.41	0	0	0	5.56
2003	276	23	517	602.805	-305.061	D	7.509	7.5	0.010	3.1	58.38	40.69	0	0	0	0.95
2003	277	23	490	602.499	-305.648	D	7.5	7.5	0.000	3.1	88.06	10.32	0	0	0	0.87
2003	278	23	548	603.28	-312.734	D	7.5	7.5	0.000	3.1	81.82	16.9	0	0	0	1.57
2003	279	23	603	598.68	-316.244	D	7.502	7.5	0.002	3.1	61.57	37.83	0	0	0	0.63
2003	280	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	92.54	6.87	0	0	0	0.73
2003	281	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	94.89	4.91	0	0	0	0.59
2003	282	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	89.06	2.07	0	0	0	0.45
2003	283	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	284	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	285	23	624	596.324	-316.278	D	7.503	7.5	0.003	3.1	74.63	22.77	0	0	0	2.66
2003	286	23	637	596.267	-315.066	D	7.502	7.5	0.003	3.1	87.2	11.42	0	0	0	1.45
2003	287	23	517	602.805	-305.061	D	7.502	7.5	0.002	3.1	65.46	34.05	0	0	0	0.59
2003	288	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	289	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	290	23	637	596.267	-315.066	D	7.527	7.5	0.028	3.1	44.28	54.8	0	0	0	0.93
2003	291	23	637	596.267	-315.066	D	7.515	7.5	0.015	3.1	32.63	63.07	0	0	0	4.32
2003	292	23	548	603.28	-312.734	D	7.5	7.5	0.001	3.1	83.68	14.42	0	0	0	1.97
2003	293	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	294	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	295	23	557	601.32	-313.419	D	7.508	7.5	0.009	3.1	57.84	36.94	0	0	0	5.23

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	296	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	297	23	548	603.28	-312.734	D	7.505	7.5	0.005	3.1	78.25	19.11	0	0	0	2.67
2003	298	23	517	602.805	-305.061	D	7.57	7.5	0.070	3.1	49.9	48.48	0	0	0	1.62
2003	299	23	548	603.28	-312.734	D	7.502	7.5	0.002	3.1	30.31	68.61	0	0	0	1.11
2003	300	23	517	602.805	-305.061	D	7.636	7.5	0.136	3.1	12.51	85.63	0	0	0	1.86
2003	301	23	491	603.207	-311.591	D	7.5	7.5	0.000	3.1	77.59	21.54	0	0	0	0.88
2003	302	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	303	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	304	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	305	23	625	596.311	-316.079	D	7.523	7.5	0.023	3.1	22.47	74.06	0	0	0	3.47
2003	306	23	517	602.805	-305.061	D	7.502	7.5	0.003	3.1	79	19.56	0	0	0	1.45
2003	307	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	308	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	309	23	517	602.805	-305.061	D	7.51	7.5	0.011	3.1	58.33	39.04	0	0	0	2.63
2003	310	23	637	596.267	-315.066	D	7.569	7.5	0.069	3.1	37.74	60.94	0	0	0	1.32
2003	311	23	637	596.267	-315.066	D	7.6	7.5	0.101	3.1	11.37	86.74	0	0	0	1.89
2003	312	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	314	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	315	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	316	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	317	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	318	23	517	602.805	-305.061	D	7.551	7.5	0.052	3.1	10.46	88.23	0	0	0	1.32
2003	319	23	548	603.28	-312.734	D	7.501	7.5	0.002	3.1	28.35	71.08	0	0	0	0.62
2003	320	23	517	602.805	-305.061	D	7.513	7.5	0.014	3.1	48.49	50.89	0	0	0	0.63
2003	321	23	517	602.805	-305.061	D	7.574	7.5	0.074	3.1	46.59	52.94	0	0	0	0.47
2003	322	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	323	23	517	602.805	-305.061	D	7.517	7.5	0.018	3.1	28.23	69.61	0	0	0	2.16
2003	324	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	327	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	328	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	329	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	330	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	331	23	517	602.805	-305.061	D	7.505	7.5	0.005	3.1	44.38	54.56	0	0	0	1.07
2003	332	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	38.76	60.94	0	0	0	0.31
2003	333	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0
2003	334	23	1	596.558	-316.101	D	7.5	7.5	0.000	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	335	23	548	603.28	-312.734	D	7.613	7.589	0.024	3.292	21.14	76.38	0	0	0	2.49
2003	336	23	517	602.805	-305.061	D	7.667	7.593	0.075	3.3	12.58	86.27	0	0	0	1.15
2003	337	23	631	596.276	-315.551	D	7.593	7.593	0.000	3.3	21.03	77.12	0	0	0	0.84
2003	338	23	517	602.805	-305.061	D	7.638	7.593	0.046	3.3	18.18	81.11	0	0	0	0.71
2003	339	23	624	596.324	-316.278	D	7.593	7.593	0.000	3.3	44.33	54.92	0	0	0	0.28
2003	340	23	547	603.265	-312.487	D	7.595	7.593	0.002	3.3	47.03	52.05	0	0	0	0.92
2003	341	23	517	602.805	-305.061	D	7.65	7.593	0.058	3.3	27.75	71.56	0	0	0	0.69
2003	342	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	344	23	624	596.324	-316.278	D	7.597	7.593	0.005	3.3	26.02	73.67	0	0	0	0.32
2003	345	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	346	23	638	596.406	-314.894	D	7.636	7.593	0.043	3.3	9.34	89.39	0	0	0	1.27
2003	347	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	348	23	557	601.32	-313.419	D	7.677	7.593	0.084	3.3	34.99	64.53	0	0	0	0.48
2003	349	23	548	603.28	-312.734	D	7.604	7.593	0.011	3.3	35.71	63.99	0	0	0	0.3
2003	350	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	351	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	352	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	353	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	354	23	517	602.805	-305.061	D	7.593	7.593	0.000	3.3	22.29	77.17	0	0	0	0.7
2003	355	23	517	602.805	-305.061	D	7.593	7.593	0.000	3.3	21.6	76.63	0	0	0	0.57
2003	356	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	357	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	358	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	359	23	491	603.207	-311.591	D	7.603	7.593	0.010	3.3	12.2	87.11	0	0	0	0.7
2003	360	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	30.39	69.14	0	0	0	0.53
2003	361	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	41.71	57.86	0	0	0	0.44
2003	362	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	363	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	364	23	1	596.558	-316.101	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
									0.136							
INDEPENDENCE									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	3	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	4	23	637	596.267	-315.066	D	7.675	7.593	0.082	3.3	81.65	17.91	0	0	0	0.45
2003	5	23	624	596.324	-316.278	D	7.746	7.593	0.153	3.3	89.64	10.03	0	0	0	0.34
2003	6	23	624	596.324	-316.278	D	7.741	7.593	0.148	3.3	91.7	8.01	0	0	0	0.29
2003	7	23	517	602.805	-305.061	D	7.618	7.593	0.025	3.3	94.68	5.1	0	0	0	0.22
2003	8	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	94.83	4.93	0	0	0	0.11
2003	9	23	557	601.32	-313.419	D	7.615	7.593	0.023	3.3	70.86	27.82	0	0	0	1.32
2003	10	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	11	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	23	637	596.267	-315.066	D	7.593	7.593	0.001	3.3	87.21	12.36	0	0	0	0.43
2003	13	23	517	602.805	-305.061	D	7.609	7.593	0.016	3.3	84.48	15.2	0	0	0	0.33
2003	14	23	517	602.805	-305.061	D	7.635	7.593	0.042	3.3	85.9	13.69	0	0	0	0.42
2003	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	16	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	17	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	18	23	624	596.324	-316.278	D	7.633	7.593	0.04	3.3	87.37	12.19	0	0	0	0.44
2003	19	23	517	602.805	-305.061	D	7.71	7.593	0.118	3.3	79.36	19.73	0	0	0	0.91
2003	20	23	517	602.805	-305.061	D	7.65	7.593	0.058	3.3	83.89	15.42	0	0	0	0.7
2003	21	23	603	598.68	-316.244	D	7.782	7.593	0.19	3.3	89.03	10.75	0	0	0	0.23
2003	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	24	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	25	23	517	602.805	-305.061	D	7.622	7.593	0.029	3.3	87.6	12.18	0	0	0	0.23
2003	26	23	624	596.324	-316.278	D	7.642	7.593	0.049	3.3	76.97	22.35	0	0	0	0.67
2003	27	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	86.93	12.91	0	0	0	0.18
2003	28	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	86.26	13.65	0	0	0	0.13
2003	29	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	30	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	517	602.805	-305.061	D	7.613	7.593	0.021	3.3	94.27	5.47	0	0	0	0.26
2003	32	23	624	596.324	-316.278	D	7.563	7.459	0.104	3.013	93.04	6.67	0	0	0	0.3
2003	33	23	517	602.805	-305.061	D	7.453	7.453	0.001	3	93.06	6.76	0	0	0	0.25
2003	34	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	517	602.805	-305.061	D	7.478	7.453	0.025	3	91.51	8.16	0	0	0	0.33
2003	36	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	37	23	517	602.805	-305.061	D	7.462	7.453	0.009	3	91.01	8.76	0	0	0	0.24
2003	38	23	637	596.267	-315.066	D	7.492	7.453	0.039	3	93.23	6.64	0	0	0	0.13
2003	39	23	517	602.805	-305.061	D	7.51	7.453	0.058	3	84.23	15.31	0	0	0	0.46
2003	40	23	517	602.805	-305.061	D	7.48	7.453	0.028	3	87.13	12.41	0	0	0	0.47
2003	41	23	517	602.805	-305.061	D	7.455	7.453	0.003	3	88.15	11.64	0	0	0	0.32
2003	42	23	517	602.805	-305.061	D	7.475	7.453	0.022	3	89.98	9.62	0	0	0	0.41

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	43	23	517	602.805	-305.061	D	7.462	7.453	0.01	3	78.34	20.36	0	0	0	1.31
2003	44	23	517	602.805	-305.061	D	7.47	7.453	0.017	3	90.69	8.81	0	0	0	0.51
2003	45	23	517	602.805	-305.061	D	7.458	7.453	0.006	3	92.45	7.22	0	0	0	0.37
2003	46	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	49	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	50	23	517	602.805	-305.061	D	7.457	7.453	0.004	3	92.63	7.13	0	0	0	0.26
2003	51	23	656	597.971	-312.292	D	7.52	7.453	0.067	3	93.61	6.21	0	0	0	0.18
2003	52	23	1	596.558	-316.101	D	7.453	7.453	0	3	96.77	2.72	0	0	0	0.13
2003	53	23	1	596.558	-316.101	D	7.453	7.453	0	3	100.12	1.8	0	0	0	0.12
2003	54	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	55	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	56	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	57	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	58	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	60	23	1	596.558	-316.101	D	7.362	7.362	0	2.808	0	0	0	0	0	0
2003	61	23	603	598.68	-316.244	D	7.782	7.358	0.424	2.8	93.1	6.68	0	0	0	0.22
2003	62	23	637	596.267	-315.066	D	7.368	7.358	0.01	2.8	95.07	4.73	0	0	0	0.23
2003	63	23	517	602.805	-305.061	D	7.365	7.358	0.007	2.8	94	5.85	0	0	0	0.15
2003	64	23	637	596.267	-315.066	D	7.37	7.358	0.012	2.8	92.86	7	0	0	0	0.15
2003	65	23	624	596.324	-316.278	D	7.4	7.358	0.042	2.8	93.46	6.43	0	0	0	0.11
2003	66	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	67	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	68	23	517	602.805	-305.061	D	7.425	7.358	0.067	2.8	92.06	7.74	0	0	0	0.2
2003	69	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	70	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	71	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	72	23	637	596.267	-315.066	D	7.369	7.358	0.011	2.8	95.92	3.84	0	0	0	0.26
2003	73	23	624	596.324	-316.278	D	7.358	7.358	0	2.8	98.76	1.29	0	0	0	0.18
2003	74	23	637	596.267	-315.066	D	7.362	7.358	0.004	2.8	98.9	1.03	0	0	0	0.14
2003	75	23	517	602.805	-305.061	D	7.359	7.358	0.001	2.8	99.63	0.3	0	0	0	0.11
2003	76	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	77	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	80	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	81	23	624	596.324	-316.278	D	7.537	7.358	0.179	2.8	93.6	5.82	0	0	0	0.58

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	82	23	603	598.68	-316.244	D	7.359	7.358	0.001	2.8	98.82	0.85	0	0	0	0.33
2003	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	84	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	97.05	3.19	0	0	0	0.22
2003	85	23	624	596.324	-316.278	D	7.359	7.358	0.001	2.8	96.11	3.71	0	0	0	0.15
2003	86	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	87	23	517	602.805	-305.061	D	7.61	7.358	0.252	2.8	93.37	6.33	0	0	0	0.29
2003	88	23	624	596.324	-316.278	D	7.428	7.358	0.069	2.8	89.56	9.9	0	0	0	0.55
2003	89	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	90	23	517	602.805	-305.061	D	7.391	7.358	0.033	2.8	87.54	11.79	0	0	0	0.67
2003	91	23	1	596.558	-316.101	D	7.267	7.267	0	2.608	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	95	23	517	602.805	-305.061	D	7.301	7.263	0.038	2.6	94.83	4.97	0	0	0	0.21
2003	96	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	98	23	637	596.267	-315.066	D	7.531	7.263	0.268	2.6	93.82	5.99	0	0	0	0.19
2003	99	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	102	23	517	602.805	-305.061	D	7.328	7.263	0.065	2.6	99.45	0.23	0	0	0	0.32
2003	103	23	517	602.805	-305.061	D	7.815	7.263	0.552	2.6	99.11	0.63	0	0	0	0.26
2003	104	23	517	602.805	-305.061	D	7.414	7.263	0.151	2.6	99.5	0.28	0	0	0	0.22
2003	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	107	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	108	23	624	596.324	-316.278	D	7.279	7.263	0.016	2.6	99.04	0.78	0	0	0	0.2
2003	109	23	624	596.324	-316.278	D	7.267	7.263	0.005	2.6	99.63	0.26	0	0	0	0.11
2003	110	23	517	602.805	-305.061	D	7.271	7.263	0.008	2.6	98.58	1.04	0	0	0	0.39
2003	111	23	676	599.876	-309.365	D	7.361	7.263	0.098	2.6	97.52	1.87	0	0	0	0.61
2003	112	23	624	596.324	-316.278	D	7.323	7.263	0.06	2.6	98.38	1.15	0	0	0	0.47
2003	113	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	114	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	115	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	116	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	117	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	118	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	119	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	120	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2003	122	23	692	601.846	-306.417	D	7.598	7.453	0.146	3	98.81	1	0	0	0	0.19
2003	123	23	624	596.324	-316.278	D	7.48	7.453	0.027	3	99.25	0.61	0	0	0	0.15
2003	124	23	631	596.276	-315.551	D	7.455	7.453	0.003	3	99.7	0.25	0	0	0	0.07
2003	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	127	23	637	596.267	-315.066	D	7.477	7.453	0.024	3	99.7	0.12	0	0	0	0.19
2003	128	23	517	602.805	-305.061	D	7.612	7.453	0.159	3	99.02	0.82	0	0	0	0.16
2003	129	23	517	602.805	-305.061	D	7.453	7.453	0	3	99.95	0.11	0	0	0	0.09
2003	130	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	132	23	632	596.27	-315.421	D	7.487	7.453	0.035	3	87.75	10.4	0	0	0	1.86
2003	133	23	624	596.324	-316.278	D	7.521	7.453	0.068	3	99.49	0.23	0	0	0	0.28
2003	134	23	517	602.805	-305.061	D	7.464	7.453	0.011	3	99.68	0.12	0	0	0	0.21
2003	135	23	517	602.805	-305.061	D	7.572	7.453	0.119	3	99.58	0.22	0	0	0	0.2
2003	136	23	517	602.805	-305.061	D	7.763	7.453	0.31	3	98.05	1.8	0	0	0	0.16
2003	137	23	517	602.805	-305.061	D	7.529	7.453	0.076	3	99.01	0.87	0	0	0	0.12
2003	138	23	637	596.267	-315.066	D	7.459	7.453	0.006	3	99.37	0.55	0	0	0	0.11
2003	139	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	140	23	624	596.324	-316.278	D	7.456	7.453	0.003	3	96.41	3.51	0	0	0	0.14
2003	141	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	142	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	143	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	144	23	516	602.728	-305.38	D	7.453	7.453	0	3	99.33	0.59	0	0	0	0.2
2003	145	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	146	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	147	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	148	23	603	598.68	-316.244	D	7.536	7.453	0.083	3	99.39	0.29	0	0	0	0.32
2003	149	23	517	602.805	-305.061	D	7.464	7.453	0.011	3	99.34	0.28	0	0	0	0.37
2003	150	23	632	596.27	-315.421	D	7.472	7.453	0.019	3	99.72	0.05	0	0	0	0.24
2003	151	23	517	602.805	-305.061	D	7.496	7.453	0.043	3	96.84	2.7	0	0	0	0.46
2003	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2003	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	156	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	157	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	158	23	517	602.805	-305.061	D	7.628	7.546	0.082	3.2	99.39	0.43	0	0	0	0.18
2003	159	23	517	602.805	-305.061	D	7.581	7.546	0.035	3.2	99.8	0.06	0	0	0	0.14

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	7.588	7.546	0.042	3.2	96.91	2.95	0	0	0	0.14
2003	164	23	517	602.805	-305.061	D	7.548	7.546	0.001	3.2	99.9	0.13	0	0	0	0.11
2003	165	23	631	596.276	-315.551	D	7.548	7.546	0.001	3.2	99.49	0.46	0	0	0	0.09
2003	166	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	97.13	0.04	0	0	0	0.07
2003	167	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	168	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	169	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	170	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	171	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	177	23	624	596.324	-316.278	D	7.562	7.546	0.015	3.2	99.41	0.34	0	0	0	0.24
2003	178	23	78	598.564	-316.197	D	7.546	7.546	0	3.2	98.71	0.25	0	0	0	0.18
2003	179	23	637	596.267	-315.066	D	7.548	7.546	0.002	3.2	99.69	0.13	0	0	0	0.22
2003	180	23	517	602.805	-305.061	D	7.551	7.546	0.005	3.2	99.77	0.1	0	0	0	0.16
2003	181	23	517	602.805	-305.061	D	7.547	7.546	0	3.2	100.06	0.07	0	0	0	0.13
2003	182	23	517	602.805	-305.061	D	7.591	7.591	0	3.296	99.43	0.02	0	0	0	0.14
2003	183	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	99.77	0.16	0	0	0	0.11
2003	184	23	516	602.728	-305.38	D	7.593	7.593	0	3.3	99.61	0.06	0	0	0	0.09
2003	185	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	624	596.324	-316.278	D	7.643	7.593	0.05	3.3	99.65	0.09	0	0	0	0.26
2003	193	23	517	602.805	-305.061	D	7.633	7.593	0.04	3.3	99.67	0.07	0	0	0	0.27
2003	194	23	632	596.27	-315.421	D	7.604	7.593	0.012	3.3	99.57	0.24	0	0	0	0.18
2003	195	23	624	596.324	-316.278	D	7.603	7.593	0.011	3.3	99.52	0.37	0	0	0	0.12
2003	196	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	99.88	0.03	0	0	0	0.09
2003	197	23	624	596.324	-316.278	D	7.685	7.593	0.092	3.3	99.48	0.31	0	0	0	0.21
2003	198	23	624	596.324	-316.278	D	7.598	7.593	0.006	3.3	99.83	0.04	0	0	0	0.14

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	199	23	624	596.324	-316.278	D	7.594	7.593	0.001	3.3	99.84	0.01	0	0	0	0.1
2003	200	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	201	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	202	23	517	602.805	-305.061	D	7.66	7.593	0.067	3.3	99.68	0.03	0	0	0	0.29
2003	203	23	603	598.68	-316.244	D	7.598	7.593	0.005	3.3	99.66	0.08	0	0	0	0.26
2003	204	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	205	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	206	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	207	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	98.8	0.16	0	0	0	0.18
2003	210	23	517	602.805	-305.061	D	7.726	7.593	0.133	3.3	98.78	1.09	0	0	0	0.13
2003	211	23	624	596.324	-316.278	D	7.699	7.593	0.107	3.3	99.65	0.25	0	0	0	0.1
2003	212	23	603	598.68	-316.244	D	7.646	7.593	0.054	3.3	99.76	0.15	0	0	0	0.09
2003	213	23	548	603.28	-312.734	D	7.705	7.681	0.023	3.492	99.81	0.1	0	0	0	0.08
2003	214	23	548	603.28	-312.734	D	7.693	7.685	0.008	3.5	99.9	0.02	0	0	0	0.08
2003	215	23	517	602.805	-305.061	D	7.793	7.685	0.108	3.5	99.3	0.55	0	0	0	0.15
2003	216	23	624	596.324	-316.278	D	8.314	7.685	0.629	3.5	99.13	0.69	0	0	0	0.18
2003	217	23	548	603.28	-312.734	D	7.841	7.685	0.156	3.5	99.56	0.29	0	0	0	0.14
2003	218	23	548	603.28	-312.734	D	7.685	7.685	0	3.5	99.41	0.11	0	0	0	0.09
2003	219	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	98.78	0.05	0	0	0	0.12
2003	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	228	23	517	602.805	-305.061	D	7.69	7.685	0.005	3.5	99.76	0.01	0	0	0	0.23
2003	229	23	517	602.805	-305.061	D	7.967	7.685	0.282	3.5	99.7	0.06	0	0	0	0.24
2003	230	23	548	603.28	-312.734	D	7.926	7.685	0.241	3.5	99.67	0.16	0	0	0	0.16
2003	231	23	624	596.324	-316.278	D	7.925	7.685	0.24	3.5	99.73	0.13	0	0	0	0.14
2003	232	23	624	596.324	-316.278	D	7.888	7.685	0.203	3.5	99.76	0.13	0	0	0	0.11
2003	233	23	603	598.68	-316.244	D	7.852	7.685	0.168	3.5	99.69	0.21	0	0	0	0.1
2003	234	23	517	602.805	-305.061	D	7.927	7.685	0.242	3.5	99.74	0.07	0	0	0	0.19
2003	235	23	603	598.68	-316.244	D	7.775	7.685	0.09	3.5	99.83	0.05	0	0	0	0.11
2003	236	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	98.82	0.78	0	0	0	0.14
2003	237	23	625	596.311	-316.079	D	7.688	7.685	0.003	3.5	99.76	0.1	0	0	0	0.12

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	238	23	676	599.876	-309.365	D	7.696	7.685	0.011	3.5	99.86	0.03	0	0	0	0.1
2003	239	23	517	602.805	-305.061	D	7.696	7.685	0.011	3.5	99.85	0.05	0	0	0	0.1
2003	240	23	517	602.805	-305.061	D	7.687	7.685	0.003	3.5	99.8	0.02	0	0	0	0.18
2003	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	242	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	97.63	2.3	0	0	0	0.13
2003	243	23	77	598.029	-312.49	D	7.685	7.685	0	3.5	84.74	0.31	0	0	0	0.1
2003	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	245	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	246	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	247	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	248	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	254	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	257	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	258	23	517	602.805	-305.061	D	7.695	7.685	0.01	3.5	99.25	0.24	0	0	0	0.51
2003	259	23	624	596.324	-316.278	D	7.711	7.685	0.026	3.5	99.43	0.29	0	0	0	0.27
2003	260	23	637	596.267	-315.066	D	7.692	7.685	0.008	3.5	99.4	0.4	0	0	0	0.2
2003	261	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	262	23	517	602.805	-305.061	D	7.753	7.685	0.068	3.5	96.08	3.63	0	0	0	0.3
2003	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	264	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	265	23	517	602.805	-305.061	D	7.799	7.685	0.114	3.5	99.32	0.42	0	0	0	0.26
2003	266	23	624	596.324	-316.278	D	7.822	7.685	0.137	3.5	98.98	0.76	0	0	0	0.27
2003	267	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	98.97	0.86	0	0	0	0.2
2003	268	23	548	603.28	-312.734	D	7.703	7.685	0.018	3.5	97.82	1.86	0	0	0	0.32
2003	269	23	624	596.324	-316.278	D	7.735	7.685	0.05	3.5	99.69	0.15	0	0	0	0.16
2003	270	23	637	596.267	-315.066	D	7.759	7.685	0.074	3.5	97.57	2.1	0	0	0	0.33
2003	271	23	547	603.265	-312.487	D	7.729	7.685	0.044	3.5	98.44	1.16	0	0	0	0.41
2003	272	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	273	23	637	596.267	-315.066	D	7.69	7.685	0.005	3.5	95.27	4.45	0	0	0	0.3
2003	274	23	624	596.324	-316.278	D	7.616	7.507	0.109	3.117	94.44	5.38	0	0	0	0.18
2003	275	23	632	596.27	-315.421	D	7.663	7.5	0.164	3.1	98.89	0.87	0	0	0	0.25
2003	276	23	517	602.805	-305.061	D	7.508	7.5	0.008	3.1	98.76	1.02	0	0	0	0.23

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	277	23	624	596.324	-316.278	D	7.507	7.5	0.007	3.1	88.26	10.18	0	0	0	1.56
2003	278	23	517	602.805	-305.061	D	7.575	7.5	0.076	3.1	98.3	1.26	0	0	0	0.44
2003	279	23	517	602.805	-305.061	D	7.545	7.5	0.046	3.1	97.91	1.84	0	0	0	0.25
2003	280	23	517	602.805	-305.061	D	7.599	7.5	0.1	3.1	99.6	0.24	0	0	0	0.17
2003	281	23	517	602.805	-305.061	D	7.53	7.5	0.031	3.1	99.71	0.16	0	0	0	0.14
2003	282	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	99.54	0.07	0	0	0	0.16
2003	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	548	603.28	-312.734	D	7.543	7.5	0.043	3.1	94.38	5.27	0	0	0	0.35
2003	286	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	287	23	624	596.324	-316.278	D	7.503	7.5	0.003	3.1	69.86	29.08	0	0	0	1.06
2003	288	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	289	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	98.51	1.23	0	0	0	0.3
2003	290	23	517	602.805	-305.061	D	7.525	7.5	0.025	3.1	95.44	4.43	0	0	0	0.14
2003	291	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	292	23	517	602.805	-305.061	D	7.87	7.5	0.37	3.1	98.58	0.82	0	0	0	0.6
2003	293	23	517	602.805	-305.061	D	7.596	7.5	0.097	3.1	99.45	0.2	0	0	0	0.34
2003	294	23	624	596.324	-316.278	D	7.51	7.5	0.011	3.1	90.39	7.87	0	0	0	1.73
2003	295	23	624	596.324	-316.278	D	7.502	7.5	0.003	3.1	98.65	0.97	0	0	0	0.38
2003	296	23	517	602.805	-305.061	D	7.536	7.5	0.037	3.1	95.98	3.11	0	0	0	0.92
2003	297	23	637	596.267	-315.066	D	7.5	7.5	0.001	3.1	98.11	1.57	0	0	0	0.36
2003	298	23	637	596.267	-315.066	D	7.544	7.5	0.044	3.1	97.7	2.14	0	0	0	0.16
2003	299	23	624	596.324	-316.278	D	7.502	7.5	0.002	3.1	98.6	1.31	0	0	0	0.09
2003	300	23	517	602.805	-305.061	D	7.613	7.5	0.113	3.1	93.69	5.89	0	0	0	0.42
2003	301	23	517	602.805	-305.061	D	7.507	7.5	0.008	3.1	98.37	1.37	0	0	0	0.26
2003	302	23	624	596.324	-316.278	D	7.588	7.5	0.089	3.1	94.76	4.82	0	0	0	0.43
2003	303	23	517	602.805	-305.061	D	7.508	7.5	0.008	3.1	99.11	0.71	0	0	0	0.19
2003	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	517	602.805	-305.061	D	7.647	7.5	0.147	3.1	97.77	2	0	0	0	0.23
2003	306	23	517	602.805	-305.061	D	7.515	7.5	0.015	3.1	99.02	0.83	0	0	0	0.16
2003	307	23	378	601.601	-306.966	D	7.5	7.5	0	3.1	96.9	2.8	0	0	0	0.15
2003	308	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	309	23	548	603.28	-312.734	D	7.685	7.5	0.186	3.1	96.27	3.49	0	0	0	0.24
2003	310	23	603	598.68	-316.244	D	7.502	7.5	0.003	3.1	98.72	1.17	0	0	0	0.14
2003	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	316	23	517	602.805	-305.061	D	7.51	7.5	0.01	3.1	98.86	0.63	0	0	0	0.52
2003	317	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	318	23	517	602.805	-305.061	D	7.507	7.5	0.007	3.1	89.37	10.27	0	0	0	0.38
2003	319	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	91.65	7.54	0	0	0	0.2
2003	320	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	637	596.267	-315.066	D	7.522	7.5	0.023	3.1	97.75	1.56	0	0	0	0.69
2003	324	23	548	603.28	-312.734	D	7.502	7.5	0.002	3.1	97.66	1.72	0	0	0	0.61
2003	325	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	119.22	14.39	0	0	0	0.36
2003	328	23	517	602.805	-305.061	D	7.621	7.5	0.122	3.1	74.13	25.04	0	0	0	0.83
2003	329	23	548	603.28	-312.734	D	7.501	7.5	0.002	3.1	89.66	10.24	0	0	0	0.21
2003	330	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	90.99	9.05	0	0	0	0.15
2003	331	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	332	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	333	23	624	596.324	-316.278	D	7.534	7.5	0.034	3.1	77.74	21.35	0	0	0	0.92
2003	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	547	603.265	-312.487	D	7.611	7.589	0.022	3.292	87.97	11.37	0	0	0	0.66
2003	336	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	339	23	624	596.324	-316.278	D	7.721	7.593	0.129	3.3	77.52	21.59	0	0	0	0.88
2003	340	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	342	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	517	602.805	-305.061	D	7.642	7.593	0.05	3.3	75.83	23.57	0	0	0	0.6
2003	345	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	348	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	349	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	624	596.324	-316.278	D	7.697	7.593	0.104	3.3	84.57	15.01	0	0	0	0.42
2003	351	23	517	602.805	-305.061	D	7.723	7.593	0.13	3.3	72.07	26.73	0	0	0	1.2
2003	352	23	517	602.805	-305.061	D	7.602	7.593	0.009	3.3	60.35	37.93	0	0	0	1.74
2003	353	23	624	596.324	-316.278	D	7.725	7.593	0.133	3.3	89.96	9.56	0	0	0	0.47
2003	354	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	355	23	637	596.267	-315.066	D	7.602	7.593	0.009	3.3	88.16	11.6	0	0	0	0.25
2003	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	517	602.805	-305.061	D	7.602	7.593	0.01	3.3	88.32	11.47	0	0	0	0.22
2003	358	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	637	596.267	-315.066	D	7.594	7.593	0.002	3.3	91.87	7.85	0	0	0	0.31
2003	360	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	89.41	10.4	0	0	0	0.2
2003	361	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	517	602.805	-305.061	D	7.605	7.593	0.012	3.3	87.62	11.87	0	0	0	0.51
2003	364	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	87.41	12.25	0	0	0	0.41
									0.629							
MARSHALL									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	3	23	624	596.324	-316.278	D	7.627	7.593	0.035	3.3	68.3	30.86	0	0	0	0.85
2003	4	23	517	602.805	-305.061	D	7.632	7.593	0.04	3.3	72.78	26.71	0	0	0	0.5
2003	5	23	517	602.805	-305.061	D	7.741	7.593	0.148	3.3	64.04	35.02	0	0	0	0.94
2003	6	23	517	602.805	-305.061	D	7.711	7.593	0.119	3.3	87.2	12.46	0	0	0	0.34
2003	7	23	517	602.805	-305.061	D	7.64	7.593	0.048	3.3	83.7	15.92	0	0	0	0.39
2003	8	23	548	603.28	-312.734	D	7.593	7.593	0	3.3	83.82	16.1	0	0	0	0.29
2003	9	23	557	601.32	-313.419	D	7.609	7.593	0.016	3.3	55.95	42.64	0	0	0	1.41
2003	10	23	624	596.324	-316.278	D	7.664	7.593	0.072	3.3	62.51	36.61	0	0	0	0.89
2003	11	23	603	598.68	-316.244	D	7.657	7.593	0.065	3.3	64.86	34.41	0	0	0	0.73
2003	12	23	676	599.876	-309.365	D	7.632	7.593	0.039	3.3	69.19	30.1	0	0	0	0.71
2003	13	23	517	602.805	-305.061	D	7.612	7.593	0.02	3.3	74.06	25.55	0	0	0	0.39
2003	14	23	517	602.805	-305.061	D	7.618	7.593	0.026	3.3	76.3	23.17	0	0	0	0.53
2003	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	16	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	17	23	557	601.32	-313.419	D	7.707	7.593	0.114	3.3	49.82	48.97	0	0	0	1.21
2003	18	23	517	602.805	-305.061	D	7.631	7.593	0.038	3.3	79.57	19.91	0	0	0	0.53
2003	19	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	79.14	20.21	0	0	0	0.62
2003	20	23	517	602.805	-305.061	D	7.642	7.593	0.05	3.3	72.92	26.22	0	0	0	0.86
2003	21	23	603	598.68	-316.244	D	7.638	7.593	0.046	3.3	76.92	22.76	0	0	0	0.32
2003	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	24	23	637	596.267	-315.066	D	7.594	7.593	0.001	3.3	80.15	19.47	0	0	0	0.37
2003	25	23	517	602.805	-305.061	D	7.624	7.593	0.031	3.3	80.24	19.51	0	0	0	0.26
2003	26	23	624	596.324	-316.278	D	7.599	7.593	0.006	3.3	50.87	47.92	0	0	0	1.2
2003	27	23	656	597.971	-312.292	D	7.595	7.593	0.002	3.3	78.32	21.49	0	0	0	0.16
2003	28	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	77.68	22.23	0	0	0	0.11
2003	29	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	30	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	32	23	517	602.805	-305.061	D	7.577	7.459	0.118	3.013	67.95	30.95	0	0	0	1.11
2003	33	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	517	602.805	-305.061	D	7.492	7.453	0.039	3	73.97	25.32	0	0	0	0.71
2003	36	23	517	602.805	-305.061	D	7.491	7.453	0.038	3	69.53	29.64	0	0	0	0.83
2003	37	23	517	602.805	-305.061	D	7.458	7.453	0.006	3	81.17	18.53	0	0	0	0.34
2003	38	23	637	596.267	-315.066	D	7.49	7.453	0.038	3	78.65	21.01	0	0	0	0.35
2003	39	23	517	602.805	-305.061	D	7.456	7.453	0.004	3	74.16	25.35	0	0	0	0.52
2003	40	23	517	602.805	-305.061	D	7.464	7.453	0.012	3	69.65	29.63	0	0	0	0.74
2003	41	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	73.53	26.04	0	0	0	0.49
2003	42	23	517	602.805	-305.061	D	7.459	7.453	0.006	3	81.11	18.31	0	0	0	0.6
2003	43	23	517	602.805	-305.061	D	7.477	7.453	0.025	3	71.6	27.51	0	0	0	0.9
2003	44	23	517	602.805	-305.061	D	7.498	7.453	0.045	3	76.53	22.84	0	0	0	0.63
2003	45	23	517	602.805	-305.061	D	7.453	7.453	0	3	89.85	15.4	0	0	0	0.27
2003	46	23	432	602.04	-306.183	D	7.453	7.453	0	3	85.15	12.72	0	0	0	0.12
2003	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	49	23	517	602.805	-305.061	D	7.496	7.453	0.044	3	86.83	12.88	0	0	0	0.3
2003	50	23	517	602.805	-305.061	D	7.467	7.453	0.014	3	90.34	9.48	0	0	0	0.21
2003	51	23	517	602.805	-305.061	D	7.468	7.453	0.015	3	85.96	13.82	0	0	0	0.23
2003	52	23	1	596.558	-316.101	D	7.453	7.453	0	3	95.65	5.58	0	0	0	0.13
2003	53	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	54	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	55	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	56	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	57	23	1	596.558	-316.101	D	7.453	7.453	0	3	90.72	14.48	0	0	0	0.3
2003	58	23	6	596.462	-314.859	D	7.453	7.453	0	3	100.39	14.85	0	0	0	0.26
2003	59	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	60	23	222	600.034	-309.336	D	7.362	7.362	0	2.808	89.53	6.88	0	0	0	0.2
2003	61	23	517	602.805	-305.061	D	7.673	7.358	0.314	2.8	86.66	13.03	0	0	0	0.31
2003	62	23	637	596.267	-315.066	D	7.448	7.358	0.089	2.8	87.34	12.33	0	0	0	0.32

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	63	23	517	602.805	-305.061	D	7.387	7.358	0.028	2.8	92.46	7.36	0	0	0	0.19
2003	64	23	632	596.27	-315.421	D	7.385	7.358	0.027	2.8	88.21	11.57	0	0	0	0.22
2003	65	23	624	596.324	-316.278	D	7.485	7.358	0.127	2.8	89.58	10.27	0	0	0	0.15
2003	66	23	517	602.805	-305.061	D	7.379	7.358	0.021	2.8	92.47	7.28	0	0	0	0.26
2003	67	23	517	602.805	-305.061	D	7.364	7.358	0.005	2.8	96	3.79	0	0	0	0.21
2003	68	23	517	602.805	-305.061	D	7.371	7.358	0.013	2.8	83.72	16	0	0	0	0.28
2003	69	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	70	23	517	602.805	-305.061	D	7.359	7.358	0	2.8	82.48	17.59	0	0	0	0.48
2003	71	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	72	23	632	596.27	-315.421	D	7.399	7.358	0.041	2.8	94.56	5.1	0	0	0	0.34
2003	73	23	624	596.324	-316.278	D	7.358	7.358	0	2.8	97.78	2.07	0	0	0	0.25
2003	74	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	75	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	76	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	77	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	80	23	624	596.324	-316.278	D	7.36	7.358	0.002	2.8	96.36	3.02	0	0	0	0.66
2003	81	23	517	602.805	-305.061	D	7.39	7.358	0.032	2.8	95.05	4.44	0	0	0	0.5
2003	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	84	23	637	596.267	-315.066	D	7.362	7.358	0.004	2.8	90.66	9.11	0	0	0	0.28
2003	85	23	624	596.324	-316.278	D	7.377	7.358	0.019	2.8	91.42	8.41	0	0	0	0.18
2003	86	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	87	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	88	23	625	596.311	-316.079	D	7.435	7.358	0.077	2.8	77.16	21.9	0	0	0	0.95
2003	89	23	624	596.324	-316.278	D	7.369	7.358	0.01	2.8	85.51	13.71	0	0	0	0.79
2003	90	23	517	602.805	-305.061	D	7.376	7.358	0.018	2.8	81.62	17.52	0	0	0	0.86
2003	91	23	1	596.558	-316.101	D	7.267	7.267	0	2.608	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	95	23	517	602.805	-305.061	D	7.276	7.263	0.013	2.6	79.39	19.95	0	0	0	0.65
2003	96	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	98	23	637	596.267	-315.066	D	7.481	7.263	0.218	2.6	87.08	12.64	0	0	0	0.28
2003	99	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	101	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	101.49	0.14	0	0	0	0.41

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	102	23	517	602.805	-305.061	D	7.435	7.263	0.172	2.6	98.74	0.82	0	0	0	0.44
2003	103	23	533	603.05	-309.022	D	7.641	7.263	0.378	2.6	98.66	0.98	0	0	0	0.36
2003	104	23	517	602.805	-305.061	D	7.365	7.263	0.102	2.6	99.11	0.62	0	0	0	0.27
2003	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	107	23	624	596.324	-316.278	D	7.305	7.263	0.042	2.6	91.56	7.49	0	0	0	0.96
2003	108	23	624	596.324	-316.278	D	7.279	7.263	0.016	2.6	96.14	3.55	0	0	0	0.32
2003	109	23	624	596.324	-316.278	D	7.272	7.263	0.009	2.6	99.11	0.72	0	0	0	0.17
2003	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	112	23	517	602.805	-305.061	D	7.288	7.263	0.025	2.6	94.32	4.7	0	0	0	0.98
2003	113	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	114	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	115	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	116	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	117	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	118	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	119	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	120	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2003	122	23	517	602.805	-305.061	D	7.562	7.453	0.109	3	98.4	1.35	0	0	0	0.26
2003	123	23	624	596.324	-316.278	D	7.476	7.453	0.023	3	98.6	1.21	0	0	0	0.2
2003	124	23	624	596.324	-316.278	D	7.456	7.453	0.004	3	99.13	0.86	0	0	0	0.11
2003	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	110.92	2.7	0	0	0	0.09
2003	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	127	23	517	602.805	-305.061	D	7.498	7.453	0.045	3	99.54	0.18	0	0	0	0.28
2003	128	23	517	602.805	-305.061	D	7.744	7.453	0.292	3	98.24	1.52	0	0	0	0.24
2003	129	23	517	602.805	-305.061	D	7.453	7.453	0	3	99.61	0.23	0	0	0	0.13
2003	130	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	132	23	517	602.805	-305.061	D	7.485	7.453	0.033	3	97.6	1.48	0	0	0	0.93
2003	133	23	683	600.738	-308.205	D	7.553	7.453	0.1	3	97.62	1.74	0	0	0	0.64
2003	134	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	99.51	0.15	0	0	0	0.36
2003	135	23	517	602.805	-305.061	D	7.46	7.453	0.007	3	99.48	0.3	0	0	0	0.25
2003	136	23	517	602.805	-305.061	D	7.513	7.453	0.06	3	96.36	3.44	0	0	0	0.21
2003	137	23	517	602.805	-305.061	D	7.491	7.453	0.038	3	97.99	1.86	0	0	0	0.16
2003	138	23	631	596.276	-315.551	D	7.459	7.453	0.006	3	98.22	1.64	0	0	0	0.14
2003	139	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	140	23	624	596.324	-316.278	D	7.461	7.453	0.009	3	93.42	6.37	0	0	0	0.23

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	141	23	603	598.68	-316.244	D	7.453	7.453	0	3	94.43	5.87	0	0	0	0.14
2003	142	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	143	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	144	23	690	601.572	-306.804	D	7.46	7.453	0.007	3	98.62	1.07	0	0	0	0.34
2003	145	23	637	596.267	-315.066	D	7.455	7.453	0.003	3	96.46	3.44	0	0	0	0.19
2003	146	23	1	596.558	-316.101	D	7.453	7.453	0	3	99.54	0.18	0	0	0	0.15
2003	147	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	148	23	624	596.324	-316.278	D	7.501	7.453	0.049	3	97.65	1.78	0	0	0	0.57
2003	149	23	638	596.406	-314.894	D	7.459	7.453	0.006	3	98.45	0.85	0	0	0	0.7
2003	150	23	624	596.324	-316.278	D	7.488	7.453	0.035	3	99.57	0.1	0	0	0	0.33
2003	151	23	632	596.27	-315.421	D	7.458	7.453	0.006	3	85.69	12.65	0	0	0	1.68
2003	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2003	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	154	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	155	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	156	23	637	596.267	-315.066	D	7.599	7.546	0.052	3.2	98.63	1.05	0	0	0	0.33
2003	157	23	656	597.971	-312.292	D	7.551	7.546	0.005	3.2	99.14	0.65	0	0	0	0.23
2003	158	23	517	602.805	-305.061	D	7.565	7.546	0.019	3.2	98.5	1.3	0	0	0	0.21
2003	159	23	517	602.805	-305.061	D	7.551	7.546	0.005	3.2	99.72	0.12	0	0	0	0.16
2003	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	7.56	7.546	0.014	3.2	92.48	7.33	0	0	0	0.2
2003	164	23	517	602.805	-305.061	D	7.548	7.546	0.002	3.2	99.35	0.6	0	0	0	0.17
2003	165	23	517	602.805	-305.061	D	7.557	7.546	0.011	3.2	97.74	2.14	0	0	0	0.14
2003	166	23	548	603.28	-312.734	D	7.55	7.546	0.004	3.2	98.65	1.24	0	0	0	0.12
2003	167	23	78	598.564	-316.197	D	7.548	7.546	0.002	3.2	99.36	0.53	0	0	0	0.11
2003	168	23	624	596.324	-316.278	D	7.547	7.546	0.001	3.2	98.91	1.01	0	0	0	0.11
2003	169	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	99.15	0.2	0	0	0	0.12
2003	170	23	637	596.267	-315.066	D	7.558	7.546	0.011	3.2	99.64	0.11	0	0	0	0.27
2003	171	23	624	596.324	-316.278	D	7.548	7.546	0.002	3.2	99.21	0.55	0	0	0	0.22
2003	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	177	23	517	602.805	-305.061	D	7.615	7.546	0.069	3.2	98.42	1.14	0	0	0	0.45
2003	178	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	99.5	0.14	0	0	0	0.49
2003	179	23	517	602.805	-305.061	D	7.552	7.546	0.006	3.2	99.39	0.33	0	0	0	0.31

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	180	23	517	602.805	-305.061	D	7.548	7.546	0.002	3.2	99.75	0.16	0	0	0	0.22
2003	181	23	517	602.805	-305.061	D	7.547	7.546	0	3.2	100.18	0.29	0	0	0	0.16
2003	182	23	517	602.805	-305.061	D	7.591	7.591	0.001	3.296	99.52	0.35	0	0	0	0.14
2003	183	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	99.43	0.37	0	0	0	0.16
2003	184	23	516	602.728	-305.38	D	7.593	7.593	0	3.3	99.43	0.17	0	0	0	0.15
2003	185	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	517	602.805	-305.061	D	7.601	7.593	0.008	3.3	98.77	0.38	0	0	0	0.85
2003	193	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	99.44	0.12	0	0	0	0.44
2003	194	23	637	596.267	-315.066	D	7.601	7.593	0.009	3.3	99.36	0.38	0	0	0	0.27
2003	195	23	637	596.267	-315.066	D	7.607	7.593	0.014	3.3	99.29	0.53	0	0	0	0.19
2003	196	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	99.87	0.06	0	0	0	0.14
2003	197	23	624	596.324	-316.278	D	7.646	7.593	0.053	3.3	99.47	0.27	0	0	0	0.26
2003	198	23	624	596.324	-316.278	D	7.607	7.593	0.015	3.3	99.58	0.12	0	0	0	0.31
2003	199	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	99.8	0.13	0	0	0	0.22
2003	200	23	517	602.805	-305.061	D	7.605	7.593	0.012	3.3	98.38	1.44	0	0	0	0.18
2003	201	23	548	603.28	-312.734	D	7.635	7.593	0.042	3.3	99.4	0.47	0	0	0	0.13
2003	202	23	517	602.805	-305.061	D	7.622	7.593	0.03	3.3	99.59	0.06	0	0	0	0.35
2003	203	23	624	596.324	-316.278	D	7.616	7.593	0.024	3.3	99.18	0.36	0	0	0	0.46
2003	204	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	205	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	206	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	207	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	490	602.499	-305.648	D	7.593	7.593	0	3.3	96.87	0.42	0	0	0	0.27
2003	210	23	517	602.805	-305.061	D	7.692	7.593	0.1	3.3	97.66	2.17	0	0	0	0.17
2003	211	23	624	596.324	-316.278	D	7.743	7.593	0.15	3.3	98.86	1	0	0	0	0.14
2003	212	23	548	603.28	-312.734	D	7.698	7.593	0.105	3.3	99.32	0.56	0	0	0	0.12
2003	213	23	548	603.28	-312.734	D	7.72	7.681	0.039	3.492	99.6	0.29	0	0	0	0.1
2003	214	23	548	603.28	-312.734	D	7.693	7.685	0.009	3.5	99.84	0.05	0	0	0	0.1
2003	215	23	517	602.805	-305.061	D	7.83	7.685	0.145	3.5	98.16	1.58	0	0	0	0.26
2003	216	23	517	602.805	-305.061	D	8	7.685	0.315	3.5	96.26	3.44	0	0	0	0.29
2003	217	23	624	596.324	-316.278	D	7.809	7.685	0.124	3.5	99.12	0.61	0	0	0	0.27
2003	218	23	624	596.324	-316.278	D	7.951	7.685	0.266	3.5	98.86	0.96	0	0	0	0.18

Appendix M
Mingo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	219	23	624	596.324	-316.278	D	7.69	7.685	0.005	3.5	99.66	0.17	0	0	0	0.15
2003	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	228	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	99.81	0.04	0	0	0	0.32
2003	229	23	517	602.805	-305.061	D	7.697	7.685	0.012	3.5	99.4	0.23	0	0	0	0.36
2003	230	23	525	602.928	-307.042	D	7.752	7.685	0.067	3.5	99.48	0.29	0	0	0	0.23
2003	231	23	631	596.276	-315.551	D	7.747	7.685	0.062	3.5	99.4	0.4	0	0	0	0.2
2003	232	23	624	596.324	-316.278	D	7.742	7.685	0.057	3.5	99.55	0.29	0	0	0	0.15
2003	233	23	603	598.68	-316.244	D	7.728	7.685	0.043	3.5	99.47	0.4	0	0	0	0.13
2003	234	23	517	602.805	-305.061	D	7.716	7.685	0.031	3.5	99.64	0.15	0	0	0	0.21
2003	235	23	603	598.68	-316.244	D	7.703	7.685	0.018	3.5	99.55	0.28	0	0	0	0.17
2003	236	23	624	596.324	-316.278	D	7.686	7.685	0.001	3.5	97.49	2.25	0	0	0	0.21
2003	237	23	637	596.267	-315.066	D	7.691	7.685	0.006	3.5	99.58	0.2	0	0	0	0.19
2003	238	23	517	602.805	-305.061	D	7.693	7.685	0.008	3.5	99.79	0.05	0	0	0	0.16
2003	239	23	517	602.805	-305.061	D	7.687	7.685	0.002	3.5	99.77	0.08	0	0	0	0.13
2003	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	242	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	97.15	2.67	0	0	0	0.18
2003	243	23	108	598.468	-311.706	D	7.685	7.685	0	3.5	98.22	1.07	0	0	0	0.15
2003	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	245	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	246	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	247	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	248	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	254	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	257	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	258	23	624	596.324	-316.278	D	7.694	7.685	0.009	3.5	93.72	5.07	0	0	0	1.21
2003	259	23	603	598.68	-316.244	D	7.691	7.685	0.006	3.5	99.32	0.29	0	0	0	0.37
2003	260	23	637	596.267	-315.066	D	7.699	7.685	0.014	3.5	99.09	0.65	0	0	0	0.27
2003	261	23	461	602.269	-305.916	D	7.685	7.685	0	3.5	98.52	0.43	0	0	0	0.17
2003	262	23	517	602.805	-305.061	D	7.716	7.685	0.031	3.5	84.14	15.13	0	0	0	0.73
2003	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	264	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	265	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	99.11	0.47	0	0	0	0.36
2003	266	23	517	602.805	-305.061	D	7.705	7.685	0.021	3.5	97.46	2.06	0	0	0	0.48
2003	267	23	637	596.267	-315.066	D	7.689	7.685	0.004	3.5	97.84	1.8	0	0	0	0.35
2003	268	23	548	603.28	-312.734	D	7.696	7.685	0.011	3.5	93.53	5.72	0	0	0	0.75
2003	269	23	548	603.28	-312.734	D	7.7	7.685	0.015	3.5	99.32	0.45	0	0	0	0.24
2003	270	23	517	602.805	-305.061	D	7.695	7.685	0.01	3.5	91.51	7.91	0	0	0	0.57
2003	271	23	624	596.324	-316.278	D	7.695	7.685	0.01	3.5	93.74	5.18	0	0	0	1.07
2003	272	23	624	596.324	-316.278	D	7.686	7.685	0.001	3.5	96.82	2.61	0	0	0	0.52
2003	273	23	625	596.311	-316.079	D	7.783	7.685	0.099	3.5	95.29	4.19	0	0	0	0.51
2003	274	23	517	602.805	-305.061	D	7.642	7.507	0.135	3.117	93	6.55	0	0	0	0.45
2003	275	23	548	603.28	-312.734	D	7.554	7.5	0.054	3.1	97.65	2.03	0	0	0	0.32
2003	276	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	97.92	1.77	0	0	0	0.34
2003	277	23	517	602.805	-305.061	D	7.537	7.5	0.037	3.1	76.39	22.44	0	0	0	1.17
2003	278	23	517	602.805	-305.061	D	7.55	7.5	0.051	3.1	96.71	2.67	0	0	0	0.62
2003	279	23	517	602.805	-305.061	D	7.511	7.5	0.011	3.1	96.23	3.45	0	0	0	0.34
2003	280	23	517	602.805	-305.061	D	7.518	7.5	0.019	3.1	99.27	0.5	0	0	0	0.24
2003	281	23	517	602.805	-305.061	D	7.507	7.5	0.008	3.1	99.48	0.35	0	0	0	0.21
2003	282	23	516	602.728	-305.38	D	7.5	7.5	0	3.1	99.36	0.14	0	0	0	0.21
2003	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	548	603.28	-312.734	D	7.519	7.5	0.02	3.1	80.54	18.5	0	0	0	0.97
2003	286	23	626	596.299	-315.88	D	7.501	7.5	0.001	3.1	99.42	0.36	0	0	0	0.27
2003	287	23	656	597.971	-312.292	D	7.545	7.5	0.046	3.1	91.62	7.83	0	0	0	0.55
2003	288	23	624	596.324	-316.278	D	7.508	7.5	0.009	3.1	96.37	2.92	0	0	0	0.72
2003	289	23	517	602.805	-305.061	D	7.502	7.5	0.002	3.1	97.25	2.3	0	0	0	0.47
2003	290	23	517	602.805	-305.061	D	7.514	7.5	0.015	3.1	92.01	7.81	0	0	0	0.19
2003	291	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	99.69	0.29	0	0	0	0.37
2003	292	23	517	602.805	-305.061	D	7.503	7.5	0.004	3.1	97.2	1.92	0	0	0	0.92
2003	293	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	98.6	1.05	0	0	0	0.42
2003	294	23	632	596.27	-315.421	D	7.51	7.5	0.011	3.1	78.86	18.46	0	0	0	2.69
2003	295	23	632	596.27	-315.421	D	7.561	7.5	0.062	3.1	98.23	1.22	0	0	0	0.55
2003	296	23	517	602.805	-305.061	D	7.54	7.5	0.041	3.1	95.83	3.05	0	0	0	1.13

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	297	23	624	596.324	-316.278	D	7.511	7.5	0.011	3.1	99.03	0.52	0	0	0	0.46
2003	298	23	517	602.805	-305.061	D	7.512	7.5	0.013	3.1	96.71	3.07	0	0	0	0.24
2003	299	23	637	596.267	-315.066	D	7.545	7.5	0.046	3.1	91.45	8.05	0	0	0	0.5
2003	300	23	624	596.324	-316.278	D	7.612	7.5	0.112	3.1	91.57	7.99	0	0	0	0.43
2003	301	23	548	603.28	-312.734	D	7.51	7.5	0.01	3.1	96.23	3.47	0	0	0	0.31
2003	302	23	517	602.805	-305.061	D	7.534	7.5	0.034	3.1	79.99	18.71	0	0	0	1.32
2003	303	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	98.4	1.27	0	0	0	0.3
2003	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	517	602.805	-305.061	D	7.582	7.5	0.082	3.1	96.56	3.13	0	0	0	0.31
2003	306	23	517	602.805	-305.061	D	7.506	7.5	0.007	3.1	98.35	1.43	0	0	0	0.21
2003	307	23	431	602.059	-306.432	D	7.5	7.5	0	3.1	98.46	5.69	0	0	0	0.23
2003	308	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	309	23	548	603.28	-312.734	D	7.557	7.5	0.057	3.1	88.61	10.89	0	0	0	0.5
2003	310	23	603	598.68	-316.244	D	7.5	7.5	0	3.1	97.37	2.66	0	0	0	0.21
2003	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	517	602.805	-305.061	D	7.504	7.5	0.004	3.1	96.62	2.32	0	0	0	1.08
2003	317	23	624	596.324	-316.278	D	7.504	7.5	0.004	3.1	94.49	4.37	0	0	0	1.14
2003	318	23	637	596.267	-315.066	D	7.512	7.5	0.013	3.1	81.9	17.38	0	0	0	0.74
2003	319	23	517	602.805	-305.061	D	7.502	7.5	0.003	3.1	80.53	19.03	0	0	0	0.44
2003	320	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	549	603.073	-312.824	D	7.51	7.5	0.011	3.1	95.57	3.4	0	0	0	1.04
2003	324	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	328	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	332	23	689	601.435	-306.997	D	7.591	7.5	0.091	3.1	75.76	23.56	0	0	0	0.68
2003	333	23	517	602.805	-305.061	D	7.559	7.5	0.06	3.1	50.68	47.68	0	0	0	1.64
2003	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	622	596.698	-316.245	D	7.599	7.589	0.01	3.292	72.42	26.4	0	0	0	1.17

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	336	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	339	23	624	596.324	-316.278	D	7.776	7.593	0.183	3.3	87.09	12.56	0	0	0	0.34
2003	340	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	342	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	624	596.324	-316.278	D	7.668	7.593	0.076	3.3	79.65	19.99	0	0	0	0.37
2003	345	23	624	596.324	-316.278	D	7.643	7.593	0.051	3.3	77.15	22.26	0	0	0	0.59
2003	346	23	624	596.324	-316.278	D	7.594	7.593	0.002	3.3	77.52	21.94	0	0	0	0.51
2003	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	348	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	349	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	517	602.805	-305.061	D	7.605	7.593	0.012	3.3	82.88	16.67	0	0	0	0.45
2003	352	23	517	602.805	-305.061	D	7.669	7.593	0.077	3.3	82	17.33	0	0	0	0.67
2003	353	23	517	602.805	-305.061	D	7.656	7.593	0.063	3.3	64.78	34.15	0	0	0	1.07
2003	354	23	624	596.324	-316.278	D	7.64	7.593	0.047	3.3	77.01	22.29	0	0	0	0.7
2003	355	23	637	596.267	-315.066	D	7.6	7.593	0.007	3.3	76.3	23.3	0	0	0	0.41
2003	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	637	596.267	-315.066	D	7.607	7.593	0.014	3.3	79.32	20.43	0	0	0	0.24
2003	358	23	624	596.324	-316.278	D	7.602	7.593	0.009	3.3	70.26	29.01	0	0	0	0.73
2003	359	23	624	596.324	-316.278	D	7.622	7.593	0.03	3.3	83.01	16.56	0	0	0	0.44
2003	360	23	676	599.876	-309.365	D	7.633	7.593	0.04	3.3	81.58	18.07	0	0	0	0.36
2003	361	23	461	602.269	-305.916	D	7.593	7.593	0	3.3	80.89	16.97	0	0	0	0.22
2003	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	77.95	20.46	0	0	0	0.73
2003	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.378							
COLUMBIA									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	3	23	632	596.27	-315.421	D	7.696	7.593	0.104	3.3	43.8	56.2	0	0	0	0
2003	4	23	517	602.805	-305.061	D	7.599	7.593	0.006	3.3	64.91	35.08	0	0	0	0

Appendix M
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2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	5	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	54.96	45.07	0	0	0	0
2003	6	23	517	602.805	-305.061	D	7.631	7.593	0.038	3.3	71.26	28.74	0	0	0	0
2003	7	23	517	602.805	-305.061	D	7.614	7.593	0.022	3.3	73.65	26.35	0	0	0	0
2003	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	23	557	601.32	-313.419	D	7.602	7.593	0.009	3.3	39.52	60.49	0	0	0	0
2003	10	23	517	602.805	-305.061	D	7.65	7.593	0.058	3.3	38.28	61.72	0	0	0	0
2003	11	23	632	596.27	-315.421	D	7.688	7.593	0.095	3.3	36.06	63.94	0	0	0	0
2003	12	23	624	596.324	-316.278	D	7.658	7.593	0.065	3.3	50.29	49.71	0	0	0	0
2003	13	23	517	602.805	-305.061	D	7.612	7.593	0.019	3.3	62.27	37.73	0	0	0	0
2003	14	23	624	596.324	-316.278	D	7.625	7.593	0.032	3.3	64.97	35.03	0	0	0	0
2003	15	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	16	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	68.95	26.96	0	0	0	0
2003	17	23	517	602.805	-305.061	D	7.619	7.593	0.026	3.3	47.5	52.5	0	0	0	0
2003	18	23	624	596.324	-316.278	D	7.607	7.593	0.015	3.3	62.8	37.21	0	0	0	0
2003	19	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	517	602.805	-305.061	D	7.619	7.593	0.026	3.3	61.5	38.5	0	0	0	0
2003	21	23	656	597.971	-312.292	D	7.634	7.593	0.041	3.3	60.35	39.66	0	0	0	0
2003	22	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	23	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	24	23	637	596.267	-315.066	D	7.601	7.593	0.008	3.3	65.16	34.86	0	0	0	0
2003	25	23	517	602.805	-305.061	D	7.611	7.593	0.019	3.3	70.86	29.15	0	0	0	0
2003	26	23	548	603.28	-312.734	D	7.603	7.593	0.011	3.3	35.06	64.94	0	0	0	0
2003	27	23	637	596.267	-315.066	D	7.594	7.593	0.002	3.3	68.31	31.68	0	0	0	0
2003	28	23	517	602.805	-305.061	D	7.594	7.593	0.002	3.3	68.61	31.39	0	0	0	0
2003	29	23	637	596.267	-315.066	D	7.608	7.593	0.015	3.3	69.51	30.49	0	0	0	0
2003	30	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	32	23	517	602.805	-305.061	D	7.466	7.459	0.007	3.013	34.78	65.24	0	0	0	0
2003	33	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	84.1	15.93	0	0	0	0
2003	35	23	517	602.805	-305.061	D	7.453	7.453	0	3	83.71	16.4	0	0	0	0
2003	36	23	632	596.27	-315.421	D	7.466	7.453	0.013	3	37.9	62.1	0	0	0	0
2003	37	23	517	602.805	-305.061	D	7.456	7.453	0.003	3	67.23	32.82	0	0	0	0
2003	38	23	625	596.311	-316.079	D	7.484	7.453	0.031	3	66.29	33.72	0	0	0	0
2003	39	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	517	602.805	-305.061	D	7.458	7.453	0.005	3	50.65	49.39	0	0	0	0
2003	41	23	517	602.805	-305.061	D	7.454	7.453	0.001	3	64.06	36.09	0	0	0	0
2003	42	23	517	602.805	-305.061	D	7.486	7.453	0.034	3	69.12	30.88	0	0	0	0
2003	43	23	637	596.267	-315.066	D	7.47	7.453	0.018	3	60.86	39.15	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	44	23	548	603.28	-312.734	D	7.472	7.453	0.02	3	68.06	31.95	0	0	0	0
2003	45	23	517	602.805	-305.061	D	7.453	7.453	0	3	77.58	24.15	0	0	0	0
2003	46	23	378	601.601	-306.966	D	7.453	7.453	0	3	72.81	18.43	0	0	0	0
2003	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	49	23	517	602.805	-305.061	D	7.504	7.453	0.051	3	75	25	0	0	0	0
2003	50	23	517	602.805	-305.061	D	7.465	7.453	0.012	3	83.7	16.32	0	0	0	0
2003	51	23	517	602.805	-305.061	D	7.473	7.453	0.02	3	72.86	27.15	0	0	0	0
2003	52	23	1	596.558	-316.101	D	7.453	7.453	0	3	92.65	11.11	0	0	0	0
2003	53	23	624	596.324	-316.278	D	7.453	7.453	0	3	87.57	13.49	0	0	0	0
2003	54	23	1	596.558	-316.101	D	7.453	7.453	0	3	92.88	11.24	0	0	0	0
2003	55	23	637	596.267	-315.066	D	7.496	7.453	0.043	3	68	32.01	0	0	0	0
2003	56	23	624	596.324	-316.278	D	7.467	7.453	0.014	3	73.71	26.29	0	0	0	0
2003	57	23	1	596.558	-316.101	D	7.453	7.453	0	3	82.43	26.18	0	0	0	0
2003	58	23	1	596.558	-316.101	D	7.453	7.453	0	3	84.42	16.1	0	0	0	0
2003	59	23	624	596.324	-316.278	D	7.455	7.453	0.002	3	86.25	13.9	0	0	0	0
2003	60	23	656	597.971	-312.292	D	7.379	7.362	0.016	2.808	86.05	13.96	0	0	0	0
2003	61	23	517	602.805	-305.061	D	7.686	7.358	0.328	2.8	79.02	20.99	0	0	0	0
2003	62	23	624	596.324	-316.278	D	7.484	7.358	0.126	2.8	75.13	24.87	0	0	0	0
2003	63	23	535	603.081	-309.517	D	7.376	7.358	0.018	2.8	87.82	12.18	0	0	0	0
2003	64	23	637	596.267	-315.066	D	7.43	7.358	0.072	2.8	75.49	24.51	0	0	0	0
2003	65	23	624	596.324	-316.278	D	7.465	7.358	0.107	2.8	81.36	18.64	0	0	0	0
2003	66	23	624	596.324	-316.278	D	7.374	7.358	0.016	2.8	85.19	14.82	0	0	0	0
2003	67	23	517	602.805	-305.061	D	7.369	7.358	0.01	2.8	91.5	8.51	0	0	0	0
2003	68	23	632	596.27	-315.421	D	7.367	7.358	0.008	2.8	71.69	28.3	0	0	0	0
2003	69	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	70	23	637	596.267	-315.066	D	7.37	7.358	0.012	2.8	84.33	15.68	0	0	0	0
2003	71	23	517	602.805	-305.061	D	7.366	7.358	0.008	2.8	88.34	11.66	0	0	0	0
2003	72	23	624	596.324	-316.278	D	7.439	7.358	0.08	2.8	79.32	20.68	0	0	0	0
2003	73	23	624	596.324	-316.278	D	7.359	7.358	0.001	2.8	95.13	4.94	0	0	0	0
2003	74	23	637	596.267	-315.066	D	7.359	7.358	0.001	2.8	94.81	5.36	0	0	0	0
2003	75	23	517	602.805	-305.061	D	7.358	7.358	0	2.8	97.43	2.95	0	0	0	0
2003	76	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	77	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	79	23	624	596.324	-316.278	D	7.359	7.358	0.001	2.8	89.67	10.33	0	0	0	0
2003	80	23	548	603.28	-312.734	D	7.419	7.358	0.061	2.8	91.1	8.9	0	0	0	0
2003	81	23	517	602.805	-305.061	D	7.36	7.358	0.002	2.8	94.99	5.03	0	0	0	0
2003	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	84	23	517	602.805	-305.061	D	7.364	7.358	0.006	2.8	81.71	18.32	0	0	0	0
2003	85	23	548	603.28	-312.734	D	7.377	7.358	0.019	2.8	83.51	16.49	0	0	0	0
2003	86	23	548	603.28	-312.734	D	7.359	7.358	0.001	2.8	97	3.25	0	0	0	0
2003	87	23	203	599.824	-309.852	D	7.358	7.358	0	2.8	91.98	0.87	0	0	0	0
2003	88	23	517	602.805	-305.061	D	7.404	7.358	0.045	2.8	44.78	55.23	0	0	0	0
2003	89	23	624	596.324	-316.278	D	7.397	7.358	0.039	2.8	65.67	34.33	0	0	0	0
2003	90	23	538	603.127	-310.259	D	7.363	7.358	0.005	2.8	75.41	24.59	0	0	0	0
2003	91	23	1	596.558	-316.101	D	7.267	7.267	0	2.608	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	95	23	632	596.27	-315.421	D	7.284	7.263	0.021	2.6	62.76	37.26	0	0	0	0
2003	96	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	98	23	623	596.511	-316.262	D	7.397	7.263	0.134	2.6	77.94	22.06	0	0	0	0
2003	99	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	74.62	10.92	0	0	0	0
2003	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	101	23	637	596.267	-315.066	D	7.264	7.263	0.001	2.6	99.62	0.58	0	0	0	0
2003	102	23	637	596.267	-315.066	D	7.392	7.263	0.13	2.6	98.11	1.9	0	0	0	0
2003	103	23	548	603.28	-312.734	D	7.37	7.263	0.107	2.6	98.5	1.5	0	0	0	0
2003	104	23	517	602.805	-305.061	D	7.291	7.263	0.028	2.6	98.55	1.46	0	0	0	0
2003	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	107	23	632	596.27	-315.421	D	7.336	7.263	0.073	2.6	94.27	5.74	0	0	0	0
2003	108	23	624	596.324	-316.278	D	7.297	7.263	0.034	2.6	94.48	5.53	0	0	0	0
2003	109	23	548	603.28	-312.734	D	7.27	7.263	0.007	2.6	98.18	1.82	0	0	0	0
2003	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	112	23	517	602.805	-305.061	D	7.272	7.263	0.009	2.6	85.68	14.31	0	0	0	0
2003	113	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	114	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	115	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	116	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	117	23	6	596.462	-314.859	D	7.263	7.263	0	2.6	95.85	0.16	0	0	0	0
2003	118	23	694	602.12	-306.029	D	7.263	7.263	0	2.6	101.08	0.56	0	0	0	0
2003	119	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	97.99	2.57	0	0	0	0
2003	120	23	490	602.499	-305.648	D	7.263	7.263	0	2.6	97.8	0.35	0	0	0	0
2003	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	122	23	517	602.805	-305.061	D	7.507	7.453	0.054	3	95.87	4.13	0	0	0	0
2003	123	23	603	598.68	-316.244	D	7.468	7.453	0.016	3	97.15	2.87	0	0	0	0
2003	124	23	623	596.511	-316.262	D	7.463	7.453	0.01	3	97.97	2.04	0	0	0	0
2003	125	23	378	601.601	-306.966	D	7.453	7.453	0	3	91.63	4.1	0	0	0	0
2003	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	127	23	517	602.805	-305.061	D	7.468	7.453	0.016	3	99.59	0.42	0	0	0	0
2003	128	23	517	602.805	-305.061	D	7.516	7.453	0.063	3	97.6	2.4	0	0	0	0
2003	129	23	517	602.805	-305.061	D	7.453	7.453	0	3	99.74	0.44	0	0	0	0
2003	130	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	133	23	517	602.805	-305.061	D	7.461	7.453	0.008	3	91.58	8.45	0	0	0	0
2003	134	23	516	602.728	-305.38	D	7.453	7.453	0	3	90.58	0.27	0	0	0	0
2003	135	23	516	602.728	-305.38	D	7.453	7.453	0	3	99.11	0.76	0	0	0	0
2003	136	23	517	602.805	-305.061	D	7.456	7.453	0.003	3	93.8	6.27	0	0	0	0
2003	137	23	517	602.805	-305.061	D	7.458	7.453	0.006	3	97.09	2.97	0	0	0	0
2003	138	23	637	596.267	-315.066	D	7.455	7.453	0.002	3	97.62	2.45	0	0	0	0
2003	139	23	639	596.544	-314.722	D	7.453	7.453	0.001	3	97.45	2.75	0	0	0	0
2003	140	23	632	596.27	-315.421	D	7.471	7.453	0.018	3	90.72	9.29	0	0	0	0
2003	141	23	603	598.68	-316.244	D	7.453	7.453	0.001	3	97.07	3.21	0	0	0	0
2003	142	23	1	596.558	-316.101	D	7.453	7.453	0	3	100.73	1.89	0	0	0	0
2003	143	23	624	596.324	-316.278	D	7.453	7.453	0.001	3	100.25	0.14	0	0	0	0
2003	144	23	517	602.805	-305.061	D	7.483	7.453	0.031	3	98.3	1.71	0	0	0	0
2003	145	23	637	596.267	-315.066	D	7.505	7.453	0.052	3	94.82	5.18	0	0	0	0
2003	146	23	624	596.324	-316.278	D	7.459	7.453	0.007	3	98.88	1.18	0	0	0	0
2003	147	23	624	596.324	-316.278	D	7.453	7.453	0	3	100.48	0.32	0	0	0	0
2003	148	23	624	596.324	-316.278	D	7.493	7.453	0.04	3	98.01	1.99	0	0	0	0
2003	149	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	96.52	3.5	0	0	0	0
2003	150	23	624	596.324	-316.278	D	7.462	7.453	0.009	3	96.19	3.84	0	0	0	0
2003	151	23	557	601.32	-313.419	D	7.455	7.453	0.002	3	67.9	32.12	0	0	0	0
2003	152	23	1	596.558	-316.101	D	7.542	7.542	0	3.192	0	0	0	0	0	0
2003	153	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	154	23	623	596.511	-316.262	D	7.547	7.546	0.001	3.2	96.63	3.55	0	0	0	0
2003	155	23	624	596.324	-316.278	D	7.549	7.546	0.003	3.2	98.53	1.54	0	0	0	0
2003	156	23	624	596.324	-316.278	D	7.622	7.546	0.075	3.2	98.08	1.92	0	0	0	0
2003	157	23	637	596.267	-315.066	D	7.556	7.546	0.01	3.2	98.5	1.53	0	0	0	0
2003	158	23	517	602.805	-305.061	D	7.568	7.546	0.021	3.2	98.25	1.77	0	0	0	0
2003	159	23	517	602.805	-305.061	D	7.553	7.546	0.007	3.2	99.81	0.2	0	0	0	0
2003	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix M
Mingo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	7.748	7.546	0.202	3.2	87.4	12.6	0	0	0	0
2003	164	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	99.78	0.32	0	0	0	0
2003	165	23	637	596.267	-315.066	D	7.68	7.546	0.134	3.2	93.12	6.88	0	0	0	0
2003	166	23	603	598.68	-316.244	D	7.634	7.546	0.088	3.2	98.42	1.58	0	0	0	0
2003	167	23	603	598.68	-316.244	D	7.578	7.546	0.032	3.2	98.8	1.2	0	0	0	0
2003	168	23	624	596.324	-316.278	D	7.555	7.546	0.009	3.2	98.58	1.43	0	0	0	0
2003	169	23	624	596.324	-316.278	D	7.549	7.546	0.003	3.2	98.76	1.28	0	0	0	0
2003	170	23	637	596.267	-315.066	D	7.594	7.546	0.047	3.2	99.77	0.24	0	0	0	0
2003	171	23	624	596.324	-316.278	D	7.561	7.546	0.014	3.2	97.85	2.15	0	0	0	0
2003	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	177	23	624	596.324	-316.278	D	7.568	7.546	0.022	3.2	99.49	0.52	0	0	0	0
2003	178	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	99.65	0.6	0	0	0	0
2003	179	23	631	596.276	-315.551	D	7.55	7.546	0.004	3.2	99.54	0.51	0	0	0	0
2003	180	23	1	596.558	-316.101	D	7.55	7.546	0.003	3.2	99.88	0.16	0	0	0	0
2003	181	23	517	602.805	-305.061	D	7.549	7.546	0.003	3.2	99.84	0.2	0	0	0	0
2003	182	23	431	602.059	-306.432	D	7.591	7.591	0	3.296	99.15	0.36	0	0	0	0
2003	183	23	517	602.805	-305.061	D	7.594	7.593	0.001	3.3	99.18	0.96	0	0	0	0
2003	184	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	99.72	0.42	0	0	0	0
2003	185	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	557	601.32	-313.419	D	7.598	7.593	0.006	3.3	93.44	6.57	0	0	0	0
2003	193	23	517	602.805	-305.061	D	7.599	7.593	0.006	3.3	99.81	0.2	0	0	0	0
2003	194	23	517	602.805	-305.061	D	7.69	7.593	0.097	3.3	99.19	0.81	0	0	0	0
2003	195	23	624	596.324	-316.278	D	7.626	7.593	0.033	3.3	99.23	0.78	0	0	0	0
2003	196	23	517	602.805	-305.061	D	7.599	7.593	0.006	3.3	99.9	0.12	0	0	0	0
2003	197	23	624	596.324	-316.278	D	7.615	7.593	0.023	3.3	98.32	1.68	0	0	0	0
2003	198	23	624	596.324	-316.278	D	7.597	7.593	0.005	3.3	99.82	0.2	0	0	0	0
2003	199	23	6	596.462	-314.859	D	7.595	7.593	0.002	3.3	99.67	0.31	0	0	0	0

Appendix M
Mingo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	200	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	96.85	3.17	0	0	0	0
2003	201	23	517	602.805	-305.061	D	7.602	7.593	0.009	3.3	99.2	0.8	0	0	0	0
2003	202	23	517	602.805	-305.061	D	7.596	7.593	0.004	3.3	99.83	0.14	0	0	0	0
2003	203	23	517	602.805	-305.061	D	7.63	7.593	0.037	3.3	99.05	0.95	0	0	0	0
2003	204	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	205	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	206	23	655	597.944	-312.459	D	7.593	7.593	0	3.3	98.8	1.02	0	0	0	0
2003	207	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	624	596.324	-316.278	D	7.805	7.593	0.212	3.3	93.39	6.61	0	0	0	0
2003	211	23	624	596.324	-316.278	D	7.762	7.593	0.169	3.3	97.54	2.46	0	0	0	0
2003	212	23	548	603.28	-312.734	D	7.69	7.593	0.097	3.3	98.57	1.43	0	0	0	0
2003	213	23	548	603.28	-312.734	D	7.719	7.681	0.038	3.492	99.25	0.75	0	0	0	0
2003	214	23	548	603.28	-312.734	D	7.698	7.685	0.013	3.5	99.85	0.15	0	0	0	0
2003	215	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	93.56	6.34	0	0	0	0
2003	216	23	517	602.805	-305.061	D	7.695	7.685	0.01	3.5	87.07	12.93	0	0	0	0
2003	217	23	624	596.324	-316.278	D	7.87	7.685	0.185	3.5	98.2	1.8	0	0	0	0
2003	218	23	603	598.68	-316.244	D	7.756	7.685	0.071	3.5	98.82	1.18	0	0	0	0
2003	219	23	603	598.68	-316.244	D	7.687	7.685	0.002	3.5	99.01	0.96	0	0	0	0
2003	220	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	222	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	228	23	517	602.805	-305.061	D	7.713	7.685	0.028	3.5	99.51	0.49	0	0	0	0
2003	229	23	517	602.805	-305.061	D	7.69	7.685	0.005	3.5	99.63	0.39	0	0	0	0
2003	230	23	624	596.324	-316.278	D	7.711	7.685	0.026	3.5	99.6	0.4	0	0	0	0
2003	231	23	624	596.324	-316.278	D	7.707	7.685	0.022	3.5	99.33	0.67	0	0	0	0
2003	232	23	624	596.324	-316.278	D	7.712	7.685	0.027	3.5	99.43	0.58	0	0	0	0
2003	233	23	603	598.68	-316.244	D	7.708	7.685	0.023	3.5	99.43	0.58	0	0	0	0
2003	234	23	517	602.805	-305.061	D	7.697	7.685	0.012	3.5	99.68	0.31	0	0	0	0
2003	235	23	624	596.324	-316.278	D	7.703	7.685	0.018	3.5	98.62	1.38	0	0	0	0
2003	236	23	624	596.324	-316.278	D	7.686	7.685	0.001	3.5	95.93	4.07	0	0	0	0
2003	237	23	637	596.267	-315.066	D	7.691	7.685	0.006	3.5	99.66	0.33	0	0	0	0
2003	238	23	517	602.805	-305.061	D	7.694	7.685	0.009	3.5	99.92	0.08	0	0	0	0

Appendix M
Mingo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	239	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	100	0.06	0	0	0	0
2003	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	242	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	97.32	2.63	0	0	0	0
2003	243	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	97.73	2.13	0	0	0	0
2003	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	245	23	517	602.805	-305.061	D	7.685	7.685	0	3.5	93.97	6.54	0	0	0	0
2003	246	23	626	596.299	-315.88	D	7.686	7.685	0.001	3.5	94.68	5.28	0	0	0	0
2003	247	23	623	596.511	-316.262	D	7.685	7.685	0	3.5	98.94	0.13	0	0	0	0
2003	248	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	254	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	257	23	624	596.324	-316.278	D	7.824	7.685	0.139	3.5	62.62	37.38	0	0	0	0
2003	258	23	548	603.28	-312.734	D	7.708	7.685	0.023	3.5	89.66	10.34	0	0	0	0
2003	259	23	624	596.324	-316.278	D	7.688	7.685	0.003	3.5	99.4	0.58	0	0	0	0
2003	260	23	631	596.276	-315.551	D	7.695	7.685	0.011	3.5	98.82	1.17	0	0	0	0
2003	261	23	656	597.971	-312.292	D	7.685	7.685	0	3.5	99.2	0.77	0	0	0	0
2003	262	23	557	601.32	-313.419	D	7.696	7.685	0.011	3.5	53.95	46.04	0	0	0	0
2003	263	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	264	23	632	596.27	-315.421	D	7.686	7.685	0.001	3.5	99.09	0.69	0	0	0	0
2003	265	23	517	602.805	-305.061	D	7.687	7.685	0.003	3.5	96.78	3.21	0	0	0	0
2003	266	23	681	600.53	-308.617	D	7.696	7.685	0.011	3.5	70.35	29.66	0	0	0	0
2003	267	23	624	596.324	-316.278	D	7.69	7.685	0.005	3.5	97.29	2.7	0	0	0	0
2003	268	23	548	603.28	-312.734	D	7.69	7.685	0.005	3.5	85.6	14.39	0	0	0	0
2003	269	23	624	596.324	-316.278	D	7.694	7.685	0.009	3.5	99.16	0.85	0	0	0	0
2003	270	23	517	602.805	-305.061	D	7.693	7.685	0.008	3.5	92.81	7.16	0	0	0	0
2003	271	23	517	602.805	-305.061	D	7.704	7.685	0.019	3.5	93.98	6.01	0	0	0	0
2003	272	23	557	601.32	-313.419	D	7.694	7.685	0.009	3.5	89.77	10.23	0	0	0	0
2003	273	23	517	602.805	-305.061	D	7.729	7.685	0.044	3.5	91.87	8.13	0	0	0	0
2003	274	23	676	599.876	-309.365	D	7.673	7.507	0.166	3.117	73.72	26.28	0	0	0	0
2003	275	23	548	603.28	-312.734	D	7.512	7.5	0.013	3.1	93.58	6.42	0	0	0	0
2003	276	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	95.94	4.49	0	0	0	0
2003	277	23	557	601.32	-313.419	D	7.523	7.5	0.024	3.1	64.35	35.65	0	0	0	0

Appendix M
Mingo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	278	23	517	602.805	-305.061	D	7.549	7.5	0.049	3.1	95.67	4.33	0	0	0	0
2003	279	23	517	602.805	-305.061	D	7.51	7.5	0.01	3.1	94.22	5.8	0	0	0	0
2003	280	23	517	602.805	-305.061	D	7.511	7.5	0.012	3.1	99.1	0.92	0	0	0	0
2003	281	23	517	602.805	-305.061	D	7.505	7.5	0.005	3.1	99.46	0.58	0	0	0	0
2003	282	23	516	602.728	-305.38	D	7.5	7.5	0	3.1	99.92	0.39	0	0	0	0
2003	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	517	602.805	-305.061	D	7.504	7.5	0.004	3.1	44.82	55.19	0	0	0	0
2003	286	23	624	596.324	-316.278	D	7.501	7.5	0.001	3.1	99.55	0.62	0	0	0	0
2003	287	23	624	596.324	-316.278	D	7.523	7.5	0.023	3.1	81.44	18.57	0	0	0	0
2003	288	23	517	602.805	-305.061	D	7.51	7.5	0.01	3.1	90.59	9.42	0	0	0	0
2003	289	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	96.58	3.44	0	0	0	0
2003	290	23	517	602.805	-305.061	D	7.506	7.5	0.007	3.1	88.46	11.56	0	0	0	0
2003	291	23	637	596.267	-315.066	D	7.505	7.5	0.006	3.1	97.6	2.41	0	0	0	0
2003	292	23	517	602.805	-305.061	D	7.519	7.5	0.019	3.1	96.83	3.18	0	0	0	0
2003	293	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	99.46	0.58	0	0	0	0
2003	294	23	557	601.32	-313.419	D	7.504	7.5	0.005	3.1	69.22	30.8	0	0	0	0
2003	295	23	625	596.311	-316.079	D	7.559	7.5	0.059	3.1	97.58	2.42	0	0	0	0
2003	296	23	517	602.805	-305.061	D	7.539	7.5	0.04	3.1	94.11	5.89	0	0	0	0
2003	297	23	624	596.324	-316.278	D	7.505	7.5	0.005	3.1	99.52	0.51	0	0	0	0
2003	298	23	632	596.27	-315.421	D	7.51	7.5	0.01	3.1	90.26	9.76	0	0	0	0
2003	299	23	624	596.324	-316.278	D	7.545	7.5	0.046	3.1	69.35	30.66	0	0	0	0
2003	300	23	624	596.324	-316.278	D	7.549	7.5	0.05	3.1	85.53	14.47	0	0	0	0
2003	301	23	548	603.28	-312.734	D	7.502	7.5	0.003	3.1	95.46	4.57	0	0	0	0
2003	302	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	95.68	4.36	0	0	0	0
2003	303	23	517	602.805	-305.061	D	7.5	7.5	0.001	3.1	97.25	2.71	0	0	0	0
2003	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	517	602.805	-305.061	D	7.557	7.5	0.057	3.1	95.42	4.58	0	0	0	0
2003	306	23	517	602.805	-305.061	D	7.503	7.5	0.003	3.1	97.69	2.31	0	0	0	0
2003	307	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	90.21	9.92	0	0	0	0
2003	309	23	517	602.805	-305.061	D	7.605	7.5	0.106	3.1	82.94	17.06	0	0	0	0
2003	310	23	603	598.68	-316.244	D	7.53	7.5	0.031	3.1	94.12	5.89	0	0	0	0
2003	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	317	23	624	596.324	-316.278	D	7.502	7.5	0.002	3.1	56.56	43.56	0	0	0	0
2003	318	23	624	596.324	-316.278	D	7.509	7.5	0.009	3.1	70.03	29.98	0	0	0	0
2003	319	23	546	603.249	-312.239	D	7.502	7.5	0.002	3.1	73.14	26.85	0	0	0	0
2003	320	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	537	603.112	-310.012	D	7.516	7.5	0.016	3.1	84.89	15.11	0	0	0	0
2003	324	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	517	602.805	-305.061	D	7.507	7.5	0.007	3.1	81.05	18.97	0	0	0	0
2003	328	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	82.78	17.36	0	0	0	0
2003	329	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	624	596.324	-316.278	D	7.508	7.5	0.009	3.1	71.76	28.25	0	0	0	0
2003	332	23	557	601.32	-313.419	D	7.51	7.5	0.011	3.1	37.13	62.88	0	0	0	0
2003	333	23	517	602.805	-305.061	D	7.505	7.5	0.005	3.1	30.82	69.18	0	0	0	0
2003	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	631	596.276	-315.551	D	7.594	7.589	0.005	3.292	48.65	51.33	0	0	0	0
2003	336	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	637	596.267	-315.066	D	7.618	7.593	0.025	3.3	77.28	22.72	0	0	0	0
2003	339	23	540	603.158	-310.755	D	7.746	7.593	0.154	3.3	79.9	20.1	0	0	0	0
2003	340	23	624	596.324	-316.278	D	7.593	7.593	0	3.3	79.45	18.84	0	0	0	0
2003	341	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	342	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	517	602.805	-305.061	D	7.727	7.593	0.135	3.3	68.03	31.97	0	0	0	0
2003	345	23	517	602.805	-305.061	D	7.698	7.593	0.105	3.3	57.53	42.47	0	0	0	0
2003	346	23	624	596.324	-316.278	D	7.628	7.593	0.036	3.3	68.6	31.4	0	0	0	0
2003	347	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	348	23	624	596.324	-316.278	D	7.594	7.593	0.002	3.3	81.83	18.24	0	0	0	0
2003	349	23	637	596.267	-315.066	D	7.595	7.593	0.003	3.3	83.31	16.7	0	0	0	0
2003	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	517	602.805	-305.061	D	7.634	7.593	0.041	3.3	70.98	29.02	0	0	0	0
2003	354	23	557	601.32	-313.419	D	7.651	7.593	0.059	3.3	41.02	58.98	0	0	0	0
2003	355	23	517	602.805	-305.061	D	7.602	7.593	0.009	3.3	58.35	41.66	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	624	596.324	-316.278	D	7.607	7.593	0.015	3.3	72.75	27.25	0	0	0	0
2003	358	23	632	596.27	-315.421	D	7.737	7.593	0.144	3.3	50.71	49.29	0	0	0	0
2003	359	23	624	596.324	-316.278	D	7.678	7.593	0.085	3.3	73.36	26.65	0	0	0	0
2003	360	23	517	602.805	-305.061	D	7.634	7.593	0.041	3.3	78.82	21.18	0	0	0	0
2003	361	23	517	602.805	-305.061	D	7.593	7.593	0.001	3.3	81.45	18.61	0	0	0	0
2003	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	71.39	28.7	0	0	0	0
2003	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.328							
HOLCIM									DELTA		% of Modeled Exinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	624	596.324	-316.278	D	7.783	7.593	0.191	3.3	67.29	32.52	0	0	0	0.19
2003	3	23	557	601.32	-313.419	D	8.091	7.593	0.499	3.3	64.39	35.4	0	0	0	0.21
2003	4	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	5	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	6	23	517	602.805	-305.061	D	7.901	7.593	0.308	3.3	60.9	38.75	0	0	0	0.35
2003	7	23	548	603.28	-312.734	D	7.908	7.593	0.315	3.3	60.73	39.04	0	0	0	0.23
2003	8	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	23	548	603.28	-312.734	D	7.65	7.593	0.057	3.3	49.39	49.91	0	0	0	0.7
2003	10	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	11	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	23	541	603.173	-311.001	D	7.715	7.593	0.122	3.3	26.37	73.33	0	0	0	0.3
2003	13	23	548	603.28	-312.734	D	7.612	7.593	0.019	3.3	35.3	64.52	0	0	0	0.18
2003	14	23	624	596.324	-316.278	D	7.866	7.593	0.273	3.3	42.69	57.01	0	0	0	0.29
2003	15	23	548	603.28	-312.734	D	7.622	7.593	0.029	3.3	35.2	64.56	0	0	0	0.24
2003	16	23	637	596.267	-315.066	D	7.927	7.593	0.335	3.3	45.82	54.03	0	0	0	0.15
2003	17	23	557	601.32	-313.419	D	7.687	7.593	0.094	3.3	64.07	35.72	0	0	0	0.21
2003	18	23	517	602.805	-305.061	D	7.593	7.593	0	3.3	41.03	58.45	0	0	0	0.28
2003	19	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	517	602.805	-305.061	D	7.724	7.593	0.131	3.3	49.61	50.02	0	0	0	0.37
2003	21	23	580	599.723	-314.87	D	7.892	7.593	0.299	3.3	45.65	54.19	0	0	0	0.15
2003	22	23	637	596.267	-315.066	D	7.594	7.593	0.001	3.3	57.93	41.84	0	0	0	0.14
2003	23	23	624	596.324	-316.278	D	7.937	7.593	0.344	3.3	49.74	50	0	0	0	0.26
2003	24	23	548	603.28	-312.734	D	7.786	7.593	0.193	3.3	37.75	62.01	0	0	0	0.24

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	25	23	548	603.28	-312.734	D	7.648	7.593	0.055	3.3	50.82	49.05	0	0	0	0.14
2003	26	23	517	602.805	-305.061	D	7.891	7.593	0.298	3.3	39.09	60.51	0	0	0	0.4
2003	27	23	517	602.805	-305.061	D	8.023	7.593	0.431	3.3	39.89	59.8	0	0	0	0.31
2003	28	23	517	602.805	-305.061	D	7.606	7.593	0.014	3.3	53.13	46.79	0	0	0	0.09
2003	29	23	548	603.28	-312.734	D	7.922	7.593	0.329	3.3	50.84	49	0	0	0	0.15
2003	30	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	32	23	1	596.558	-316.101	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	33	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	532	603.035	-308.774	D	7.745	7.453	0.292	3	25.47	74.08	0	0	0	0.45
2003	37	23	637	596.267	-315.066	D	7.767	7.453	0.314	3	41.79	58.01	0	0	0	0.19
2003	38	23	557	601.32	-313.419	D	7.816	7.453	0.363	3	41.18	58.51	0	0	0	0.31
2003	39	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	517	602.805	-305.061	D	7.478	7.453	0.025	3	30.16	69.49	0	0	0	0.36
2003	41	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	42	23	517	602.805	-305.061	D	7.459	7.453	0.006	3	48	51.73	0	0	0	0.28
2003	43	23	548	603.28	-312.734	D	7.455	7.453	0.002	3	30.47	69.07	0	0	0	0.51
2003	44	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	45	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	46	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	23	637	596.267	-315.066	D	7.517	7.453	0.065	3	49.12	50.66	0	0	0	0.22
2003	49	23	517	602.805	-305.061	D	7.88	7.453	0.428	3	53.43	46.41	0	0	0	0.16
2003	50	23	517	602.805	-305.061	D	7.474	7.453	0.021	3	69.21	30.71	0	0	0	0.09
2003	51	23	517	602.805	-305.061	D	7.772	7.453	0.319	3	62.97	36.9	0	0	0	0.13
2003	52	23	624	596.324	-316.278	D	7.467	7.453	0.014	3	75.38	24.58	0	0	0	0.06
2003	53	23	639	596.544	-314.722	D	7.528	7.453	0.075	3	65.61	34.12	0	0	0	0.26
2003	54	23	517	602.805	-305.061	D	7.859	7.453	0.406	3	47.5	52.08	0	0	0	0.42
2003	55	23	624	596.324	-316.278	D	7.722	7.453	0.269	3	33.72	65.97	0	0	0	0.31
2003	56	23	637	596.267	-315.066	D	7.56	7.453	0.107	3	37.02	62.51	0	0	0	0.47
2003	57	23	4	596.5	-315.356	D	7.453	7.453	0	3	53.08	47	0	0	0	0.16
2003	58	23	624	596.324	-316.278	D	7.453	7.453	0.001	3	64.45	35.72	0	0	0	0.09
2003	59	23	624	596.324	-316.278	D	7.455	7.453	0.003	3	68.77	31.28	0	0	0	0.07
2003	60	23	517	602.805	-305.061	D	7.373	7.362	0.011	2.808	71.91	28.01	0	0	0	0.09
2003	61	23	517	602.805	-305.061	D	7.938	7.358	0.58	2.8	75.01	24.89	0	0	0	0.1
2003	62	23	548	603.28	-312.734	D	7.368	7.358	0.01	2.8	79.33	20.6	0	0	0	0.08
2003	63	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	64	23	517	602.805	-305.061	D	8.618	7.358	1.259	2.8	61.58	38.28	0	0	0	0.15
2003	65	23	624	596.324	-316.278	D	8.382	7.358	1.024	2.8	61.93	37.92	0	0	0	0.16
2003	66	23	624	596.324	-316.278	D	7.522	7.358	0.164	2.8	69.93	29.92	0	0	0	0.14
2003	67	23	517	602.805	-305.061	D	7.403	7.358	0.045	2.8	85.68	14.19	0	0	0	0.13
2003	68	23	637	596.267	-315.066	D	7.415	7.358	0.057	2.8	29.73	69.57	0	0	0	0.71
2003	69	23	637	596.267	-315.066	D	7.815	7.358	0.457	2.8	32.97	66.74	0	0	0	0.29
2003	70	23	517	602.805	-305.061	D	7.442	7.358	0.084	2.8	53.68	46.1	0	0	0	0.22
2003	71	23	517	602.805	-305.061	D	7.4	7.358	0.042	2.8	73.93	25.91	0	0	0	0.16
2003	72	23	548	603.28	-312.734	D	7.638	7.358	0.28	2.8	79.8	19.89	0	0	0	0.32
2003	73	23	624	596.324	-316.278	D	7.359	7.358	0.001	2.8	92.58	7.38	0	0	0	0.16
2003	74	23	631	596.276	-315.551	D	7.358	7.358	0	2.8	89.6	10.87	0	0	0	0.13
2003	75	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	76	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	77	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	78	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	79	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	80	23	624	596.324	-316.278	D	7.433	7.358	0.075	2.8	32.13	67.33	0	0	0	0.54
2003	81	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	82	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	83	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	84	23	517	602.805	-305.061	D	7.967	7.358	0.609	2.8	70.31	29.42	0	0	0	0.27
2003	85	23	603	598.68	-316.244	D	7.387	7.358	0.028	2.8	79.24	20.61	0	0	0	0.15
2003	86	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	87	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	88	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	89	23	517	602.805	-305.061	D	7.381	7.358	0.023	2.8	19.59	79.71	0	0	0	0.7
2003	90	23	1	596.558	-316.101	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	91	23	1	596.558	-316.101	D	7.267	7.267	0	2.608	0	0	0	0	0	0
2003	92	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	93	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	94	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	95	23	517	602.805	-305.061	D	7.264	7.263	0.001	2.6	88.74	10.78	0	0	0	0.48
2003	96	23	624	596.324	-316.278	D	7.453	7.263	0.19	2.6	65.22	34.61	0	0	0	0.17
2003	97	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	98	23	517	602.805	-305.061	D	8.62	7.263	1.357	2.6	59.59	40.18	0	0	0	0.23
2003	99	23	624	596.324	-316.278	D	7.608	7.263	0.345	2.6	56.43	43.33	0	0	0	0.24
2003	100	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	101	23	637	596.267	-315.066	D	7.363	7.263	0.1	2.6	93.67	5.96	0	0	0	0.37
2003	102	23	517	602.805	-305.061	D	7.914	7.263	0.651	2.6	90.83	8.86	0	0	0	0.31

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	103	23	517	602.805	-305.061	D	7.311	7.263	0.048	2.6	96.34	3.32	0	0	0	0.34
2003	104	23	517	602.805	-305.061	D	7.283	7.263	0.02	2.6	97.35	2.38	0	0	0	0.26
2003	105	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	106	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	107	23	517	602.805	-305.061	D	7.329	7.263	0.066	2.6	87.38	12.29	0	0	0	0.33
2003	108	23	517	602.805	-305.061	D	7.274	7.263	0.011	2.6	66.09	33.58	0	0	0	0.34
2003	109	23	517	602.805	-305.061	D	7.271	7.263	0.008	2.6	94.5	5.33	0	0	0	0.16
2003	110	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	111	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	112	23	517	602.805	-305.061	D	7.548	7.263	0.285	2.6	58.79	40.48	0	0	0	0.73
2003	113	23	624	596.324	-316.278	D	7.403	7.263	0.14	2.6	88.2	11.5	0	0	0	0.3
2003	114	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	115	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	116	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	117	23	1	596.558	-316.101	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	118	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	99.24	1.08	0	0	0	0.14
2003	119	23	517	602.805	-305.061	D	7.265	7.263	0.002	2.6	94.71	5.3	0	0	0	0.11
2003	120	23	517	602.805	-305.061	D	7.263	7.263	0	2.6	98.81	0.84	0	0	0	0.1
2003	121	23	1	596.558	-316.101	D	7.445	7.445	0	2.983	0	0	0	0	0	0
2003	122	23	637	596.267	-315.066	D	7.496	7.453	0.043	3	96.61	3.13	0	0	0	0.26
2003	123	23	624	596.324	-316.278	D	7.714	7.453	0.262	3	71.71	28.14	0	0	0	0.15
2003	124	23	548	603.28	-312.734	D	7.522	7.453	0.07	3	92.88	7.03	0	0	0	0.09
2003	125	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	126	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	127	23	517	602.805	-305.061	D	7.496	7.453	0.043	3	99.01	0.84	0	0	0	0.16
2003	128	23	517	602.805	-305.061	D	7.643	7.453	0.19	3	94.91	4.97	0	0	0	0.13
2003	129	23	517	602.805	-305.061	D	7.453	7.453	0	3	99.08	0.91	0	0	0	0.1
2003	130	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	131	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	132	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	133	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	134	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	135	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	136	23	517	602.805	-305.061	D	7.453	7.453	0	3	91.23	8.72	0	0	0	0.16
2003	137	23	517	602.805	-305.061	D	7.455	7.453	0.002	3	91.59	8.47	0	0	0	0.11
2003	138	23	625	596.311	-316.079	D	7.453	7.453	0	3	91.86	8.06	0	0	0	0.09
2003	139	23	1	596.558	-316.101	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	140	23	470	602.882	-310.616	D	8.242	7.453	0.789	3	73.45	26.22	0	0	0	0.33
2003	141	23	624	596.324	-316.278	D	7.474	7.453	0.021	3	93.83	5.88	0	0	0	0.3

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	142	23	624	596.324	-316.278	D	7.453	7.453	0.001	3	84.02	15.69	0	0	0	0.52
2003	143	23	624	596.324	-316.278	D	7.466	7.453	0.013	3	93.7	6.02	0	0	0	0.3
2003	144	23	517	602.805	-305.061	D	7.787	7.453	0.334	3	94.05	5.73	0	0	0	0.22
2003	145	23	517	602.805	-305.061	D	8.082	7.453	0.629	3	86.12	13.75	0	0	0	0.13
2003	146	23	624	596.324	-316.278	D	7.507	7.453	0.054	3	95.53	4.37	0	0	0	0.11
2003	147	23	517	602.805	-305.061	D	7.478	7.453	0.026	3	98.81	0.83	0	0	0	0.36
2003	148	23	517	602.805	-305.061	D	7.526	7.453	0.073	3	97.08	2.64	0	0	0	0.28
2003	149	23	632	596.27	-315.421	D	7.681	7.453	0.229	3	68.09	30.9	0	0	0	1.02
2003	150	23	548	603.28	-312.734	D	7.453	7.453	0	3	99.69	0.62	0	0	0	0.41
2003	151	23	624	596.324	-316.278	D	7.51	7.453	0.058	3	97.9	1.7	0	0	0	0.41
2003	152	23	624	596.324	-316.278	D	7.543	7.542	0.001	3.192	97.8	1.86	0	0	0	0.33
2003	153	23	656	597.971	-312.292	D	7.546	7.546	0	3.2	83.99	14.67	0	0	0	0.07
2003	154	23	624	596.324	-316.278	D	7.553	7.546	0.007	3.2	92.85	7.04	0	0	0	0.15
2003	155	23	632	596.27	-315.421	D	8.454	7.546	0.907	3.2	57.74	41.98	0	0	0	0.28
2003	156	23	517	602.805	-305.061	D	7.638	7.546	0.091	3.2	96.64	3.08	0	0	0	0.27
2003	157	23	517	602.805	-305.061	D	7.955	7.546	0.409	3.2	97.82	2.01	0	0	0	0.17
2003	158	23	517	602.805	-305.061	D	7.588	7.546	0.041	3.2	92.75	7.15	0	0	0	0.11
2003	159	23	548	603.28	-312.734	D	7.552	7.546	0.006	3.2	98.31	1.62	0	0	0	0.08
2003	160	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	161	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	162	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	163	23	517	602.805	-305.061	D	7.93	7.546	0.384	3.2	62.23	37.66	0	0	0	0.12
2003	164	23	517	602.805	-305.061	D	7.547	7.546	0.001	3.2	99.41	0.62	0	0	0	0.13
2003	165	23	517	602.805	-305.061	D	8.014	7.546	0.468	3.2	80.71	19.13	0	0	0	0.16
2003	166	23	624	596.324	-316.278	D	7.635	7.546	0.089	3.2	95.54	4.36	0	0	0	0.11
2003	167	23	603	598.68	-316.244	D	7.56	7.546	0.014	3.2	95.05	4.87	0	0	0	0.08
2003	168	23	624	596.324	-316.278	D	7.552	7.546	0.006	3.2	95.3	4.66	0	0	0	0.08
2003	169	23	687	601.186	-307.393	D	7.552	7.546	0.005	3.2	97.88	2.06	0	0	0	0.1
2003	170	23	637	596.267	-315.066	D	7.945	7.546	0.399	3.2	98.42	1.42	0	0	0	0.16
2003	171	23	603	598.68	-316.244	D	7.824	7.546	0.278	3.2	90.28	9.56	0	0	0	0.16
2003	172	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	173	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	174	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	175	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	176	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	177	23	1	596.558	-316.101	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	178	23	548	603.28	-312.734	D	7.675	7.546	0.129	3.2	94.9	4.64	0	0	0	0.47
2003	179	23	624	596.324	-316.278	D	7.608	7.546	0.061	3.2	98.78	1.01	0	0	0	0.21
2003	180	23	637	596.267	-315.066	D	7.577	7.546	0.031	3.2	99.22	0.66	0	0	0	0.13

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	181	23	517	602.805	-305.061	D	7.567	7.546	0.02	3.2	99.23	0.68	0	0	0	0.09
2003	182	23	517	602.805	-305.061	D	7.595	7.591	0.004	3.296	98.09	1.84	0	0	0	0.1
2003	183	23	517	602.805	-305.061	D	7.6	7.593	0.008	3.3	97.74	2.18	0	0	0	0.09
2003	184	23	517	602.805	-305.061	D	7.596	7.593	0.003	3.3	99.03	0.88	0	0	0	0.08
2003	185	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	193	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	194	23	517	602.805	-305.061	D	7.785	7.593	0.192	3.3	97.44	2.32	0	0	0	0.24
2003	195	23	624	596.324	-316.278	D	7.769	7.593	0.177	3.3	98.04	1.81	0	0	0	0.14
2003	196	23	517	602.805	-305.061	D	7.629	7.593	0.036	3.3	99.53	0.37	0	0	0	0.11
2003	197	23	637	596.267	-315.066	D	7.728	7.593	0.136	3.3	94.87	4.7	0	0	0	0.43
2003	198	23	517	602.805	-305.061	D	8.553	7.593	0.961	3.3	99.15	0.66	0	0	0	0.2
2003	199	23	517	602.805	-305.061	D	8.333	7.593	0.74	3.3	99.5	0.37	0	0	0	0.13
2003	200	23	548	603.28	-312.734	D	7.74	7.593	0.148	3.3	98.43	1.47	0	0	0	0.1
2003	201	23	517	602.805	-305.061	D	7.599	7.593	0.006	3.3	97.94	2	0	0	0	0.09
2003	202	23	515	602.747	-305.629	D	7.593	7.593	0	3.3	97.8	0.11	0	0	0	0.09
2003	203	23	517	602.805	-305.061	D	8.128	7.593	0.535	3.3	91.97	7.51	0	0	0	0.53
2003	204	23	603	598.68	-316.244	D	7.751	7.593	0.158	3.3	98.47	1.21	0	0	0	0.31
2003	205	23	631	596.276	-315.551	D	7.6	7.593	0.007	3.3	99.38	0.38	0	0	0	0.23
2003	206	23	637	596.267	-315.066	D	7.607	7.593	0.014	3.3	98.46	1.39	0	0	0	0.15
2003	207	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	517	602.805	-305.061	D	8.871	7.593	1.278	3.3	80.3	19.56	0	0	0	0.14
2003	211	23	624	596.324	-316.278	D	8.217	7.593	0.624	3.3	94.23	5.68	0	0	0	0.1
2003	212	23	548	603.28	-312.734	D	7.886	7.593	0.294	3.3	97.23	2.69	0	0	0	0.08
2003	213	23	548	603.28	-312.734	D	7.744	7.681	0.063	3.492	98.39	1.54	0	0	0	0.07
2003	214	23	548	603.28	-312.734	D	7.709	7.685	0.025	3.5	99.62	0.31	0	0	0	0.07
2003	215	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	216	23	516	602.728	-305.38	D	7.685	7.685	0	3.5	98.48	0.63	0	0	0	0.21
2003	217	23	517	602.805	-305.061	D	8.867	7.685	1.182	3.5	95.02	4.81	0	0	0	0.17
2003	218	23	548	603.28	-312.734	D	8.115	7.685	0.43	3.5	98.87	1	0	0	0	0.13
2003	219	23	517	602.805	-305.061	D	7.975	7.685	0.29	3.5	98.61	1.15	0	0	0	0.23

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	220	23	6	596.462	-314.859	D	7.935	7.685	0.25	3.5	98.94	0.86	0	0	0	0.2
2003	221	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	222	23	624	596.324	-316.278	D	7.685	7.685	0	3.5	95.86	3.89	0	0	0	0.23
2003	223	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	224	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	225	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	226	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	227	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	228	23	491	603.207	-311.591	D	7.686	7.685	0.001	3.5	97.21	2.64	0	0	0	0.21
2003	229	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	230	23	637	596.267	-315.066	D	8.214	7.685	0.529	3.5	98.81	0.99	0	0	0	0.2
2003	231	23	624	596.324	-316.278	D	8.252	7.685	0.567	3.5	98.58	1.29	0	0	0	0.13
2003	232	23	624	596.324	-316.278	D	8.19	7.685	0.505	3.5	98.67	1.23	0	0	0	0.1
2003	233	23	548	603.28	-312.734	D	8.121	7.685	0.436	3.5	98.5	1.41	0	0	0	0.09
2003	234	23	517	602.805	-305.061	D	7.877	7.685	0.193	3.5	99.17	0.72	0	0	0	0.1
2003	235	23	624	596.324	-316.278	D	7.931	7.685	0.246	3.5	97.4	2.43	0	0	0	0.17
2003	236	23	624	596.324	-316.278	D	7.69	7.685	0.005	3.5	92.81	7.07	0	0	0	0.12
2003	237	23	637	596.267	-315.066	D	7.697	7.685	0.012	3.5	99.14	0.76	0	0	0	0.11
2003	238	23	517	602.805	-305.061	D	7.698	7.685	0.013	3.5	99.77	0.14	0	0	0	0.09
2003	239	23	517	602.805	-305.061	D	7.689	7.685	0.004	3.5	99.65	0.26	0	0	0	0.09
2003	240	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	241	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	242	23	517	602.805	-305.061	D	7.761	7.685	0.076	3.5	95.07	4.81	0	0	0	0.13
2003	243	23	517	602.805	-305.061	D	7.717	7.685	0.032	3.5	95.45	4.45	0	0	0	0.1
2003	244	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	245	23	517	602.805	-305.061	D	7.686	7.685	0.001	3.5	94.74	5.11	0	0	0	0.13
2003	246	23	517	602.805	-305.061	D	7.734	7.685	0.049	3.5	92.11	7.78	0	0	0	0.11
2003	247	23	632	596.27	-315.421	D	8.337	7.685	0.653	3.5	77.05	22.6	0	0	0	0.35
2003	248	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	249	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	250	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	251	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	252	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	253	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	254	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	255	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	256	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	257	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	258	23	1	596.558	-316.101	D	7.685	7.685	0	3.5	0	0	0	0	0	0

Appendix M
Mingo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	259	23	548	603.28	-312.734	D	7.688	7.685	0.004	3.5	99.38	0.36	0	0	0	0.24
2003	260	23	624	596.324	-316.278	D	7.716	7.685	0.031	3.5	97.94	1.89	0	0	0	0.17
2003	261	23	656	597.971	-312.292	D	7.688	7.685	0.003	3.5	97.08	2.8	0	0	0	0.12
2003	262	23	517	602.805	-305.061	D	7.685	7.685	0.001	3.5	92.64	7.38	0	0	0	0.1
2003	263	23	637	596.267	-315.066	D	8.013	7.685	0.329	3.5	66.27	33.17	0	0	0	0.56
2003	264	23	637	596.267	-315.066	D	7.77	7.685	0.086	3.5	96.84	2.95	0	0	0	0.21
2003	265	23	517	602.805	-305.061	D	7.705	7.685	0.02	3.5	94.25	5.64	0	0	0	0.1
2003	266	23	517	602.805	-305.061	D	7.878	7.685	0.193	3.5	83.9	15.47	0	0	0	0.63
2003	267	23	547	603.265	-312.487	D	7.716	7.685	0.031	3.5	97.16	2.56	0	0	0	0.29
2003	268	23	517	602.805	-305.061	D	7.709	7.685	0.024	3.5	53.83	44.76	0	0	0	1.41
2003	269	23	548	603.28	-312.734	D	7.743	7.685	0.058	3.5	96.64	3.15	0	0	0	0.22
2003	270	23	557	601.32	-313.419	D	7.874	7.685	0.19	3.5	48.82	50.12	0	0	0	1.06
2003	271	23	517	602.805	-305.061	D	7.692	7.685	0.007	3.5	24.54	74.61	0	0	0	0.85
2003	272	23	632	596.27	-315.421	D	7.815	7.685	0.13	3.5	49.44	49.76	0	0	0	0.8
2003	273	23	517	602.805	-305.061	D	7.741	7.685	0.056	3.5	74.62	25.03	0	0	0	0.35
2003	274	23	624	596.324	-316.278	D	7.762	7.507	0.255	3.117	61.54	38.3	0	0	0	0.17
2003	275	23	676	599.876	-309.365	D	7.518	7.5	0.018	3.1	39.37	59.83	0	0	0	0.8
2003	276	23	517	602.805	-305.061	D	7.503	7.5	0.004	3.1	88.29	11.48	0	0	0	0.26
2003	277	23	517	602.805	-305.061	D	7.506	7.5	0.007	3.1	72.56	26.89	0	0	0	0.56
2003	278	23	548	603.28	-312.734	D	7.508	7.5	0.008	3.1	95.7	4.04	0	0	0	0.28
2003	279	23	548	603.28	-312.734	D	7.612	7.5	0.113	3.1	89.34	10.49	0	0	0	0.17
2003	280	23	517	602.805	-305.061	D	7.589	7.5	0.089	3.1	97.4	2.45	0	0	0	0.16
2003	281	23	517	602.805	-305.061	D	7.522	7.5	0.022	3.1	98.47	1.41	0	0	0	0.13
2003	282	23	517	602.805	-305.061	D	7.501	7.5	0.001	3.1	99.11	0.81	0	0	0	0.12
2003	283	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	637	596.267	-315.066	D	7.52	7.5	0.021	3.1	48.56	49.91	0	0	0	1.53
2003	286	23	624	596.324	-316.278	D	7.519	7.5	0.019	3.1	97.84	1.92	0	0	0	0.25
2003	287	23	517	602.805	-305.061	D	7.55	7.5	0.051	3.1	73.17	26.65	0	0	0	0.18
2003	288	23	548	603.28	-312.734	D	7.597	7.5	0.098	3.1	37.62	61.3	0	0	0	1.09
2003	289	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	290	23	517	602.805	-305.061	D	7.613	7.5	0.113	3.1	64.97	34.92	0	0	0	0.11
2003	291	23	637	596.267	-315.066	D	7.582	7.5	0.083	3.1	75.32	24.32	0	0	0	0.37
2003	292	23	548	603.28	-312.734	D	7.541	7.5	0.041	3.1	96.71	3.06	0	0	0	0.23
2003	293	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	294	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	295	23	624	596.324	-316.278	D	7.545	7.5	0.045	3.1	76.14	23.09	0	0	0	0.77
2003	296	23	637	596.267	-315.066	D	7.679	7.5	0.18	3.1	95.8	3.6	0	0	0	0.6
2003	297	23	624	596.324	-316.278	D	7.761	7.5	0.261	3.1	93.56	6.11	0	0	0	0.33

Appendix M
Mingo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	298	23	535	603.081	-309.517	D	7.958	7.5	0.458	3.1	70.49	29.07	0	0	0	0.44
2003	299	23	517	602.805	-305.061	D	7.58	7.5	0.081	3.1	68.92	30.71	0	0	0	0.37
2003	300	23	548	603.28	-312.734	D	7.691	7.5	0.191	3.1	77.75	22.03	0	0	0	0.23
2003	301	23	548	603.28	-312.734	D	7.51	7.5	0.011	3.1	91.54	8.28	0	0	0	0.18
2003	302	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	689	601.435	-306.997	D	8.072	7.5	0.572	3.1	71.99	27.7	0	0	0	0.32
2003	306	23	517	602.805	-305.061	D	7.55	7.5	0.051	3.1	93.06	6.75	0	0	0	0.19
2003	307	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	309	23	548	603.28	-312.734	D	7.718	7.5	0.219	3.1	74.38	25.16	0	0	0	0.47
2003	310	23	624	596.324	-316.278	D	7.528	7.5	0.028	3.1	63.38	36.46	0	0	0	0.16
2003	311	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	312	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	318	23	548	603.28	-312.734	D	7.509	7.5	0.009	3.1	51.68	47.98	0	0	0	0.34
2003	319	23	548	603.28	-312.734	D	7.504	7.5	0.005	3.1	63.64	36.12	0	0	0	0.26
2003	320	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	517	602.805	-305.061	D	7.877	7.5	0.378	3.1	59.43	40.2	0	0	0	0.37
2003	324	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	517	602.805	-305.061	D	7.521	7.5	0.021	3.1	68.93	30.96	0	0	0	0.12
2003	328	23	517	602.805	-305.061	D	7.5	7.5	0	3.1	72.25	27.9	0	0	0	0.06
2003	329	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	517	602.805	-305.061	D	7.866	7.5	0.367	3.1	65.24	34.57	0	0	0	0.18
2003	332	23	548	603.28	-312.734	D	7.774	7.5	0.274	3.1	59.25	40.61	0	0	0	0.14
2003	333	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	334	23	1	596.558	-316.101	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	637	596.267	-315.066	D	7.777	7.589	0.188	3.292	48.03	51.32	0	0	0	0.65
2003	336	23	517	602.805	-305.061	D	7.901	7.593	0.309	3.3	41.34	58.2	0	0	0	0.46

Appendix M
Mingo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	337	23	624	596.324	-316.278	D	7.663	7.593	0.07	3.3	42.89	56.82	0	0	0	0.29
2003	338	23	517	602.805	-305.061	D	7.628	7.593	0.035	3.3	58.45	41.37	0	0	0	0.18
2003	339	23	517	602.805	-305.061	D	8.151	7.593	0.558	3.3	56.48	43.37	0	0	0	0.15
2003	340	23	281	600.703	-308.285	D	8.286	7.593	0.693	3.3	50.14	49.54	0	0	0	0.33
2003	341	23	517	602.805	-305.061	D	8.341	7.593	0.748	3.3	66.16	33.68	0	0	0	0.16
2003	342	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	548	603.28	-312.734	D	8.097	7.593	0.505	3.3	54.72	45.14	0	0	0	0.14
2003	345	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	517	602.805	-305.061	D	8.294	7.593	0.701	3.3	46.81	52.97	0	0	0	0.22
2003	347	23	637	596.267	-315.066	D	7.607	7.593	0.014	3.3	45.14	54.72	0	0	0	0.14
2003	348	23	624	596.324	-316.278	D	7.612	7.593	0.019	3.3	72.04	27.88	0	0	0	0.09
2003	349	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	517	602.805	-305.061	D	7.667	7.593	0.075	3.3	36.7	62.96	0	0	0	0.34
2003	355	23	517	602.805	-305.061	D	7.6	7.593	0.008	3.3	43.73	56.03	0	0	0	0.23
2003	356	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	637	596.267	-315.066	D	7.847	7.593	0.254	3.3	53.32	46.49	0	0	0	0.19
2003	358	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	517	602.805	-305.061	D	7.595	7.593	0.002	3.3	42.05	57.72	0	0	0	0.27
2003	360	23	548	603.28	-312.734	D	7.648	7.593	0.055	3.3	59.32	40.49	0	0	0	0.19
2003	361	23	517	602.805	-305.061	D	7.643	7.593	0.05	3.3	67.81	32.04	0	0	0	0.15
2003	362	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	596.558	-316.101	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									1.357							

Appendix M
Hercules Glade
2001 M2

EGU												% of Modeled Extinction by Species				
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	78	358.239	-356.385	D	7.341	7.162	0.179	2.39	0	0	0	0	0	100
2001	2	23	822	358.021	-361.607	D	7.256	7.249	0.007	2.571	0	0	0	0	0	99.99
2001	3	23	1008	358.048	-354.775	D	8.563	8.553	0.01	5.476	0	0	0	0	0	99.99
2001	4	23	773	365.4	-355.32	D	8.457	8.419	0.038	5.159	0	0	0	0	0	100
2001	5	23	754	365.229	-357.075	D	7.473	7.376	0.097	2.837	0	0	0	0	0	100
2001	6	23	773	365.4	-355.32	D	6.781	6.772	0.008	1.6	0	0	0	0	0	100
2001	7	23	78	358.239	-356.385	D	7.429	7.4	0.029	2.888	0	0	0	0	0	100
2001	8	23	78	358.239	-356.385	D	8.47	8.31	0.159	4.906	0	0	0	0	0	100
2001	9	23	823	358.24	-361.604	D	9.323	9.313	0.009	7.352	0	0	0	0	0	100.01
2001	10	23	44	358.21	-361.379	D	7.331	7.331	0.001	2.742	0	0	0	0	0	99.52
2001	11	23	785	365.637	-355.06	D	8.857	8.856	0	6.207	0	0	0	0	0	98.98
2001	12	23	1	356.546	-357.458	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	13	23	949	365.722	-354.966	D	10.075	10.075	0.001	9.38	0	0	0	0	0	99.87
2001	14	23	15	357.659	-360.155	D	9.564	9.564	0	8.003	0	0	0	0	0	5.36
2001	15	23	78	358.239	-356.385	D	7.245	7.24	0.004	2.553	0	0	0	0	0	100.02
2001	16	23	78	358.239	-356.385	D	6.809	6.751	0.058	1.558	0	0	0	0	0	100
2001	17	23	907	365.051	-359.809	D	6.766	6.764	0.002	1.584	0	0	0	0	0	99.98
2001	18	23	822	358.021	-361.607	D	6.806	6.741	0.065	1.538	0	0	0	0	0	100
2001	19	23	823	358.24	-361.604	D	6.917	6.886	0.032	1.827	0	0	0	0	0	100.01
2001	20	23	78	358.239	-356.385	D	6.789	6.59	0.198	1.242	0	0	0	0	0	100
2001	21	23	569	362.875	-354.433	D	6.485	6.484	0	1.036	0	0	0	0	0	99.67
2001	22	23	927	365.912	-357.454	D	6.835	6.756	0.079	1.567	0	0	0	0	0	100
2001	23	23	746	364.882	-354.843	D	6.644	6.644	0	1.346	0	0	0	0	0	99.76
2001	24	23	714	364.799	-358.592	D	6.809	6.769	0.041	1.593	0	0	0	0	0	100
2001	25	23	822	358.021	-361.607	D	6.596	6.594	0.003	1.248	0	0	0	0	0	99.99
2001	26	23	949	365.722	-354.966	D	6.527	6.525	0.003	1.114	0	0	0	0	0	100.03
2001	27	23	714	364.799	-358.592	D	6.727	6.638	0.089	1.334	0	0	0	0	0	100
2001	28	23	933	366.169	-356.524	D	6.5	6.499	0.001	1.064	0	0	0	0	0	100.05
2001	29	23	1017	356.894	-355.206	D	8.264	8.263	0.002	4.796	0	0	0	0	0	99.92
2001	30	23	930	366.19	-357.232	D	6.979	6.979	0	2.015	0	0	0	0	0	94.97
2001	31	23	982	361.822	-354.666	D	7.149	7.148	0.001	2.361	0	0	0	0	0	99.9
2001	32	23	927	365.912	-357.454	D	6.488	6.488	0.001	1.042	0	0	0	0	0	99.95
2001	33	23	78	358.239	-356.385	D	6.722	6.535	0.187	1.133	0	0	0	0	0	100
2001	34	23	1017	356.894	-355.206	D	6.472	6.472	0	1.011	0	0	0	0	0	99.83
2001	35	23	949	365.722	-354.966	D	6.701	6.691	0.009	1.44	0	0	0	0	0	100
2001	36	23	927	365.912	-357.454	D	6.717	6.677	0.04	1.412	0	0	0	0	0	100
2001	37	23	955	364.92	-354.582	D	6.503	6.489	0.014	1.044	0	0	0	0	0	100
2001	38	23	832	359.493	-362.061	D	6.679	6.676	0.003	1.41	0	0	0	0	0	100

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	39	23	1	356.546	-357.458	D	9.678	9.678	0	8.304	0	0	0	0	0	0
2001	40	23	78	358.239	-356.385	D	9.265	9.263	0.002	7.224	0	0	0	0	0	99.95
2001	41	23	78	358.239	-356.385	D	6.68	6.621	0.059	1.301	0	0	0	0	0	100
2001	42	23	949	365.722	-354.966	D	6.477	6.47	0.007	1.008	0	0	0	0	0	100.03
2001	43	23	10	356.954	-355.443	D	6.623	6.623	0	1.305	0	0	0	0	0	99.4
2001	44	23	1	356.546	-357.458	D	8.565	8.565	0	5.504	0	0	0	0	0	0
2001	45	23	1017	356.894	-355.206	D	10.198	10.197	0.001	9.721	0	0	0	0	0	99.89
2001	46	23	1039	356.522	-357.599	D	7.371	7.281	0.09	2.638	0	0	0	0	0	100
2001	47	23	846	360.93	-362.178	D	6.661	6.622	0.039	1.304	0	0	0	0	0	100
2001	48	23	822	358.021	-361.607	D	6.522	6.521	0	1.107	0	0	0	0	0	99.75
2001	49	23	822	358.021	-361.607	D	6.489	6.471	0.018	1.011	0	0	0	0	0	99.99
2001	50	23	932	366.176	-356.761	D	6.484	6.482	0.002	1.031	0	0	0	0	0	99.94
2001	51	23	1017	356.894	-355.206	D	7.236	7.229	0.006	2.53	0	0	0	0	0	99.98
2001	52	23	907	365.051	-359.809	D	6.754	6.706	0.048	1.468	0	0	0	0	0	100
2001	53	23	927	365.912	-357.454	D	7.454	7.369	0.085	2.823	0	0	0	0	0	100
2001	54	23	1039	356.522	-357.599	D	6.837	6.804	0.033	1.664	0	0	0	0	0	100
2001	55	23	643	363.609	-354.151	D	9.604	9.604	0	8.107	0	0	0	0	0	100.47
2001	56	23	949	365.722	-354.966	D	7.369	7.366	0.002	2.817	0	0	0	0	0	99.96
2001	57	23	1017	356.894	-355.206	D	6.515	6.502	0.013	1.07	0	0	0	0	0	100.01
2001	58	23	930	366.19	-357.232	D	6.539	6.532	0.007	1.128	0	0	0	0	0	99.99
2001	59	23	1017	356.894	-355.206	D	6.895	6.848	0.048	1.751	0	0	0	0	0	100
2001	60	23	1017	356.894	-355.206	D	6.619	6.611	0.008	1.281	0	0	0	0	0	99.99
2001	61	23	927	365.912	-357.454	D	8.009	7.93	0.079	4.04	0	0	0	0	0	100
2001	62	23	986	360.908	-354.689	D	6.761	6.694	0.067	1.445	0	0	0	0	0	100
2001	63	23	822	358.021	-361.607	D	6.632	6.584	0.048	1.229	0	0	0	0	0	100
2001	64	23	823	358.24	-361.604	D	6.68	6.561	0.119	1.184	0	0	0	0	0	100
2001	65	23	78	358.239	-356.385	D	6.587	6.53	0.057	1.124	0	0	0	0	0	100
2001	66	23	1017	356.894	-355.206	D	6.51	6.471	0.039	1.009	0	0	0	0	0	100.01
2001	67	23	824	358.459	-361.601	D	6.609	6.559	0.05	1.181	0	0	0	0	0	100
2001	68	23	822	358.021	-361.607	D	6.51	6.501	0.01	1.067	0	0	0	0	0	100
2001	69	23	1008	358.048	-354.775	D	6.487	6.471	0.016	1.01	0	0	0	0	0	100
2001	70	23	947	365.801	-355.162	D	6.481	6.48	0.001	1.028	0	0	0	0	0	100
2001	71	23	309	360.636	-360.024	D	8.58	8.58	0	5.54	0	0	0	0	0	66.39
2001	72	23	1	356.546	-357.458	D	6.535	6.535	0	1.135	0	0	0	0	0	0
2001	73	23	861	361.895	-361.506	D	7.17	7.134	0.036	2.332	0	0	0	0	0	100
2001	74	23	1	356.546	-357.458	D	9.86	9.86	0	8.793	0	0	0	0	0	59.98
2001	75	23	949	365.722	-354.966	D	7.185	7.161	0.024	2.388	0	0	0	0	0	99.99
2001	76	23	869	361.064	-360.714	D	6.771	6.654	0.117	1.367	0	0	0	0	0	100
2001	77	23	949	365.722	-354.966	D	6.51	6.503	0.007	1.072	0	0	0	0	0	100

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	78	23	1017	356.894	-355.206	D	6.486	6.472	0.014	1.012	0	0	0	0	0	100.02
2001	79	23	1005	358.679	-354.752	D	6.508	6.484	0.024	1.035	0	0	0	0	0	100
2001	80	23	2	356.535	-357.209	D	6.473	6.473	0	1.014	0	0	0	0	0	99.27
2001	81	23	1017	356.894	-355.206	D	6.493	6.492	0.001	1.05	0	0	0	0	0	100.15
2001	82	23	907	365.051	-359.809	D	6.725	6.721	0.004	1.499	0	0	0	0	0	99.97
2001	83	23	930	366.19	-357.232	D	6.701	6.69	0.011	1.437	0	0	0	0	0	99.99
2001	84	23	822	358.021	-361.607	D	6.492	6.482	0.011	1.031	0	0	0	0	0	100
2001	85	23	822	358.021	-361.607	D	6.491	6.489	0.002	1.044	0	0	0	0	0	99.98
2001	86	23	822	358.021	-361.607	D	6.482	6.468	0.013	1.005	0	0	0	0	0	100
2001	87	23	949	365.722	-354.966	D	6.484	6.482	0.002	1.031	0	0	0	0	0	99.93
2001	88	23	14	357.202	-355.432	D	6.911	6.911	0	1.878	0	0	0	0	0	89.21
2001	89	23	1017	356.894	-355.206	D	7.246	7.242	0.004	2.556	0	0	0	0	0	100
2001	90	23	966	363.538	-354.124	D	7.605	7.56	0.045	3.229	0	0	0	0	0	100
2001	91	23	102	358.487	-356.374	D	6.539	6.473	0.067	1.013	0	0	0	0	0	100
2001	92	23	929	366.032	-357.239	D	7.416	7.416	0	2.922	0	0	0	0	0	90.55
2001	93	23	747	364.871	-354.594	D	9.646	9.646	0	8.218	0	0	0	0	0	66.76
2001	94	23	949	365.722	-354.966	D	9.459	9.456	0.002	7.722	0	0	0	0	0	99.97
2001	95	23	62	357.925	-354.901	D	7.581	7.581	0	3.275	0	0	0	0	0	99.77
2001	96	23	1	356.546	-357.458	D	7.559	7.559	0	3.228	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	6.813	6.813	0	1.682	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.171	7.171	0	2.41	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	6.874	6.874	0	1.802	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.375	7.375	0	2.834	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2001	102	23	543	362.627	-354.444	D	6.528	6.528	0	1.12	0	0	0	0	0	53.83
2001	103	23	78	358.239	-356.385	D	6.608	6.559	0.048	1.181	0	0	0	0	0	100
2001	104	23	643	363.609	-354.151	D	6.699	6.699	0	1.455	0	0	0	0	0	100.29
2001	105	23	1002	359.309	-354.73	D	8.411	8.379	0.031	5.066	0	0	0	0	0	99.99
2001	106	23	1041	356.936	-357.592	D	6.528	6.489	0.038	1.045	0	0	0	0	0	100
2001	107	23	78	358.239	-356.385	D	6.526	6.477	0.049	1.021	0	0	0	0	0	100
2001	108	23	78	358.239	-356.385	D	6.52	6.479	0.041	1.026	0	0	0	0	0	100
2001	109	23	930	366.19	-357.232	D	6.54	6.54	0	1.143	0	0	0	0	0	100.11
2001	110	23	1	356.546	-357.458	D	8.502	8.502	0	5.355	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.602	7.602	0	3.321	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	8.495	8.495	0	5.339	0	0	0	0	0	0
2001	113	23	643	363.609	-354.151	D	7.671	7.671	0	3.469	0	0	0	0	0	99.24
2001	114	23	927	365.912	-357.454	D	6.551	6.508	0.043	1.081	0	0	0	0	0	100
2001	115	23	949	365.722	-354.966	D	6.484	6.482	0.002	1.031	0	0	0	0	0	99.9
2001	116	23	1037	356.5	-357.195	D	6.597	6.587	0.01	1.236	0	0	0	0	0	100.01

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	117	23	1	356.546	-357.458	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2001	118	23	955	364.92	-354.582	D	6.587	6.585	0.002	1.231	0	0	0	0	0	99.98
2001	119	23	948	365.727	-355.056	D	6.848	6.847	0	1.75	0	0	0	0	0	100.04
2001	120	23	930	366.19	-357.232	D	7.105	7.105	0	2.274	0	0	0	0	0	95.92
2001	121	23	1	356.546	-357.458	D	6.852	6.852	0	1.759	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	6.96	6.96	0	1.977	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	6.988	6.988	0	2.033	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.28	7.28	0	2.635	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	9.077	9.077	0	6.754	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2001	127	23	955	364.92	-354.582	D	8.257	8.213	0.044	4.681	0	0	0	0	0	100
2001	128	23	1017	356.894	-355.206	D	6.507	6.506	0.001	1.078	0	0	0	0	0	100.02
2001	129	23	966	363.538	-354.124	D	6.636	6.633	0.003	1.326	0	0	0	0	0	99.98
2001	130	23	929	366.032	-357.239	D	6.841	6.841	0	1.737	0	0	0	0	0	98.96
2001	131	23	643	363.609	-354.151	D	7.457	7.457	0	3.009	0	0	0	0	0	102.96
2001	132	23	714	364.799	-358.592	D	8.657	8.603	0.054	5.595	0	0	0	0	0	100
2001	133	23	1008	358.048	-354.775	D	6.552	6.549	0.002	1.162	0	0	0	0	0	99.96
2001	134	23	774	365.389	-355.071	D	6.771	6.771	0	1.598	0	0	0	0	0	99.88
2001	135	23	1	356.546	-357.458	D	6.856	6.856	0	1.768	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	6.774	6.774	0	1.603	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.638	7.638	0	3.398	0	0	0	0	0	0
2001	138	23	1007	358.259	-354.768	D	8.017	8.015	0.002	4.231	0	0	0	0	0	99.96
2001	139	23	764	365.499	-357.562	D	8.806	8.695	0.111	5.816	0	0	0	0	0	100
2001	140	23	1039	356.522	-357.599	D	7.562	7.557	0.005	3.224	0	0	0	0	0	99.99
2001	141	23	990	360.933	-355.487	D	8.672	8.644	0.029	5.692	0	0	0	0	0	100
2001	142	23	927	365.912	-357.454	D	6.56	6.55	0.01	1.163	0	0	0	0	0	100.01
2001	143	23	714	364.799	-358.592	D	6.533	6.512	0.021	1.089	0	0	0	0	0	100
2001	144	23	78	358.239	-356.385	D	6.565	6.508	0.058	1.081	0	0	0	0	0	100
2001	145	23	861	361.895	-361.506	D	6.589	6.586	0.002	1.234	0	0	0	0	0	99.92
2001	146	23	2	356.535	-357.209	D	6.573	6.572	0	1.207	0	0	0	0	0	100.06
2001	147	23	963	363.809	-354.192	D	6.758	6.757	0	1.571	0	0	0	0	0	99.5
2001	148	23	714	364.799	-358.592	D	7.009	6.974	0.035	2.005	0	0	0	0	0	100
2001	149	23	837	360.197	-362.01	D	6.86	6.858	0.002	1.77	0	0	0	0	0	99.89
2001	150	23	730	364.623	-354.605	D	8.54	8.54	0	5.445	0	0	0	0	0	99.18
2001	151	23	1008	358.048	-354.775	D	8.83	8.828	0.002	6.138	0	0	0	0	0	99.97
2001	152	23	927	365.912	-357.454	D	7.013	6.938	0.075	1.932	0	0	0	0	0	100
2001	153	23	78	358.239	-356.385	D	7.066	7.018	0.048	2.095	0	0	0	0	0	100
2001	154	23	1039	356.522	-357.599	D	7.193	7.181	0.012	2.429	0	0	0	0	0	99.99
2001	155	23	406	361.15	-354.758	D	8.881	8.881	0	6.268	0	0	0	0	0	71.14

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	156	23	1	356.546	-357.458	D	7.529	7.529	0	3.162	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.846	7.846	0	3.853	0	0	0	0	0	0
2001	158	23	1017	356.894	-355.206	D	7.491	7.49	0.001	3.08	0	0	0	0	0	100.03
2001	159	23	931	366.183	-356.996	D	7.13	7.126	0.004	2.316	0	0	0	0	0	99.95
2001	160	23	907	365.051	-359.809	D	7.372	7.356	0.016	2.795	0	0	0	0	0	100
2001	161	23	964	363.678	-354.148	D	7.041	7.029	0.011	2.118	0	0	0	0	0	99.98
2001	162	23	900	364.265	-360.243	D	7.114	7.113	0.001	2.29	0	0	0	0	0	99.69
2001	163	23	949	365.722	-354.966	D	6.925	6.924	0	1.904	0	0	0	0	0	100.22
2001	164	23	933	366.169	-356.524	D	6.976	6.976	0	2.01	0	0	0	0	0	95.82
2001	165	23	1	356.546	-357.458	D	7.214	7.214	0	2.497	0	0	0	0	0	0
2001	166	23	967	363.478	-354.116	D	8.221	8.17	0.051	4.582	0	0	0	0	0	100
2001	167	23	949	365.722	-354.966	D	6.535	6.531	0.005	1.126	0	0	0	0	0	100.01
2001	168	23	930	366.19	-357.232	D	6.57	6.569	0	1.201	0	0	0	0	0	98.93
2001	169	23	930	366.19	-357.232	D	6.669	6.668	0.001	1.394	0	0	0	0	0	99.81
2001	170	23	247	360.217	-361.79	D	6.941	6.941	0	1.938	0	0	0	0	0	57.64
2001	171	23	1	356.546	-357.458	D	6.83	6.83	0	1.716	0	0	0	0	0	0
2001	172	23	1017	356.894	-355.206	D	7.754	7.742	0.012	3.625	0	0	0	0	0	100
2001	173	23	78	358.239	-356.385	D	6.844	6.768	0.076	1.592	0	0	0	0	0	100
2001	174	23	949	365.722	-354.966	D	6.665	6.64	0.025	1.338	0	0	0	0	0	100
2001	175	23	949	365.722	-354.966	D	6.678	6.668	0.01	1.394	0	0	0	0	0	100
2001	176	23	930	366.19	-357.232	D	7.086	7.083	0.003	2.228	0	0	0	0	0	100.02
2001	177	23	407	361.716	-361.973	D	6.928	6.922	0.005	1.901	0	0	0	0	0	99.98
2001	178	23	1008	358.048	-354.775	D	7.077	7.074	0.004	2.209	0	0	0	0	0	100.01
2001	179	23	643	363.609	-354.151	D	8.965	8.963	0.001	6.471	0	0	0	0	0	99.97
2001	180	23	1007	358.259	-354.768	D	8.357	8.357	0	5.014	0	0	0	0	0	98.73
2001	181	23	3	356.524	-356.959	D	7.862	7.862	0	3.889	0	0	0	0	0	82.7
2001	182	23	1017	356.894	-355.206	D	8.532	8.52	0.012	5.397	0	0	0	0	0	100
2001	183	23	949	365.722	-354.966	D	7.449	7.441	0.007	2.976	0	0	0	0	0	100
2001	184	23	947	365.801	-355.162	D	8.667	8.664	0.003	5.741	0	0	0	0	0	99.96
2001	185	23	770	365.433	-356.067	D	7.041	7.041	0	2.143	0	0	0	0	0	98.31
2001	186	23	1008	358.048	-354.775	D	7.056	7.048	0.009	2.156	0	0	0	0	0	100.01
2001	187	23	822	358.021	-361.607	D	6.956	6.95	0.006	1.957	0	0	0	0	0	99.98
2001	188	23	930	366.19	-357.232	D	7.737	7.736	0.001	3.612	0	0	0	0	0	100.01
2001	189	23	1	356.546	-357.458	D	6.907	6.907	0	1.869	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	6.865	6.865	0	1.785	0	0	0	0	0	0
2001	191	23	949	365.722	-354.966	D	7.132	7.115	0.017	2.293	0	0	0	0	0	99.99
2001	192	23	1041	356.936	-357.592	D	7.072	7.053	0.02	2.166	0	0	0	0	0	100
2001	193	23	933	366.169	-356.524	D	7.163	7.158	0.006	2.381	0	0	0	0	0	99.99
2001	194	23	932	366.176	-356.761	D	7.7	7.696	0.003	3.525	0	0	0	0	0	99.98

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	195	23	966	363.538	-354.124	D	6.607	6.603	0.004	1.267	0	0	0	0	0	99.99
2001	196	23	961	364.092	-354.289	D	6.718	6.71	0.008	1.478	0	0	0	0	0	99.99
2001	197	23	10	356.954	-355.443	D	6.982	6.982	0	2.021	0	0	0	0	0	103.99
2001	198	23	1	356.546	-357.458	D	9.025	9.025	0	6.623	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.494	7.494	0	3.089	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.083	7.083	0	2.227	0	0	0	0	0	0
2001	201	23	730	364.623	-354.605	D	7.413	7.413	0	2.915	0	0	0	0	0	94.12
2001	202	23	941	365.977	-355.774	D	6.968	6.967	0.001	1.991	0	0	0	0	0	99.78
2001	203	23	941	365.977	-355.774	D	7.112	7.108	0.004	2.28	0	0	0	0	0	100
2001	204	23	786	365.973	-357.042	D	7.627	7.624	0.002	3.368	0	0	0	0	0	99.99
2001	205	23	1008	358.048	-354.775	D	7.756	7.753	0.002	3.65	0	0	0	0	0	99.94
2001	206	23	1017	356.894	-355.206	D	8.072	8.069	0.002	4.353	0	0	0	0	0	99.9
2001	207	23	964	363.678	-354.148	D	8.766	8.765	0.001	5.983	0	0	0	0	0	99.89
2001	208	23	964	363.678	-354.148	D	8.933	8.924	0.009	6.374	0	0	0	0	0	100
2001	209	23	964	363.678	-354.148	D	8.285	8.271	0.013	4.815	0	0	0	0	0	100
2001	210	23	949	365.722	-354.966	D	8.866	8.866	0	6.231	0	0	0	0	0	100.12
2001	211	23	949	365.722	-354.966	D	7.686	7.685	0.001	3.501	0	0	0	0	0	100.05
2001	212	23	947	365.801	-355.162	D	9.286	9.284	0.002	7.276	0	0	0	0	0	99.91
2001	213	23	785	365.637	-355.06	D	9.068	9.066	0.001	6.727	0	0	0	0	0	99.86
2001	214	23	642	363.62	-354.4	D	7.863	7.862	0	3.89	0	0	0	0	0	98.9
2001	215	23	1017	356.894	-355.206	D	6.922	6.91	0.011	1.877	0	0	0	0	0	100
2001	216	23	1039	356.522	-357.599	D	7.077	7.003	0.075	2.063	0	0	0	0	0	100
2001	217	23	1008	358.048	-354.775	D	7.018	6.999	0.019	2.056	0	0	0	0	0	99.99
2001	218	23	1035	356.477	-356.792	D	7.069	7.068	0.001	2.197	0	0	0	0	0	99.89
2001	219	23	907	365.051	-359.809	D	7.289	7.285	0.004	2.646	0	0	0	0	0	99.98
2001	220	23	961	364.092	-354.289	D	7.308	7.296	0.012	2.67	0	0	0	0	0	100
2001	221	23	949	365.722	-354.966	D	7.391	7.381	0.01	2.848	0	0	0	0	0	99.99
2001	222	23	822	358.021	-361.607	D	8.221	8.206	0.015	4.666	0	0	0	0	0	99.99
2001	223	23	822	358.021	-361.607	D	8.656	8.637	0.019	5.676	0	0	0	0	0	100
2001	224	23	822	358.021	-361.607	D	6.975	6.955	0.02	1.966	0	0	0	0	0	100
2001	225	23	930	366.19	-357.232	D	7.18	7.165	0.015	2.396	0	0	0	0	0	100
2001	226	23	731	365.047	-358.581	D	6.866	6.855	0.011	1.766	0	0	0	0	0	100
2001	227	23	853	361.666	-362.175	D	6.718	6.715	0.003	1.486	0	0	0	0	0	99.98
2001	228	23	1037	356.5	-357.195	D	7.834	7.815	0.019	3.785	0	0	0	0	0	100.01
2001	229	23	949	365.722	-354.966	D	6.767	6.761	0.006	1.578	0	0	0	0	0	99.97
2001	230	23	906	364.982	-359.812	D	6.897	6.897	0.001	1.849	0	0	0	0	0	99.83
2001	231	23	823	358.24	-361.604	D	6.939	6.917	0.022	1.891	0	0	0	0	0	100
2001	232	23	822	358.021	-361.607	D	6.744	6.741	0.003	1.537	0	0	0	0	0	100.01
2001	233	23	933	366.169	-356.524	D	7.207	7.207	0.001	2.483	0	0	0	0	0	100.14

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	234	23	1	356.546	-357.458	D	7.053	7.053	0	2.167	0	0	0	0	0	0
2001	235	23	255	360.129	-359.796	D	6.937	6.937	0	1.93	0	0	0	0	0	51.93
2001	236	23	1	356.546	-357.458	D	6.927	6.927	0	1.91	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.112	7.112	0	2.287	0	0	0	0	0	0
2001	238	23	102	358.487	-356.374	D	8.276	8.255	0.021	4.778	0	0	0	0	0	100
2001	239	23	823	358.24	-361.604	D	7.25	7.235	0.015	2.543	0	0	0	0	0	100
2001	240	23	955	364.92	-354.582	D	7.159	7.114	0.045	2.292	0	0	0	0	0	100
2001	241	23	964	363.678	-354.148	D	6.876	6.846	0.03	1.747	0	0	0	0	0	100
2001	242	23	1008	358.048	-354.775	D	7.49	7.487	0.003	3.073	0	0	0	0	0	99.99
2001	243	23	1017	356.894	-355.206	D	7.689	7.675	0.014	3.479	0	0	0	0	0	99.99
2001	244	23	102	358.487	-356.374	D	8.28	8.257	0.022	4.784	0	0	0	0	0	100
2001	245	23	1037	356.5	-357.195	D	7.419	7.408	0.01	2.906	0	0	0	0	0	100
2001	246	23	1017	356.894	-355.206	D	7.437	7.436	0.001	2.965	0	0	0	0	0	100.02
2001	247	23	1017	356.894	-355.206	D	6.866	6.826	0.04	1.708	0	0	0	0	0	100
2001	248	23	822	358.021	-361.607	D	7.228	7.216	0.012	2.502	0	0	0	0	0	100
2001	249	23	967	363.478	-354.116	D	8.947	8.946	0.001	6.429	0	0	0	0	0	99.84
2001	250	23	1	356.546	-357.458	D	7.43	7.43	0	2.952	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	8.474	8.474	0	5.287	0	0	0	0	0	0
2001	252	23	986	360.908	-354.689	D	8.596	8.568	0.028	5.511	0	0	0	0	0	99.99
2001	253	23	811	357.434	-360.225	D	7.001	6.975	0.027	2.007	0	0	0	0	0	100
2001	254	23	747	364.871	-354.594	D	6.701	6.697	0.004	1.451	0	0	0	0	0	99.99
2001	255	23	822	358.021	-361.607	D	6.821	6.82	0	1.696	0	0	0	0	0	99.93
2001	256	23	949	365.722	-354.966	D	6.928	6.926	0.001	1.909	0	0	0	0	0	99.93
2001	257	23	78	358.239	-356.385	D	7.09	7.051	0.039	2.162	0	0	0	0	0	100
2001	258	23	1017	356.894	-355.206	D	6.734	6.732	0.001	1.521	0	0	0	0	0	99.83
2001	259	23	1018	356.892	-355.39	D	6.687	6.686	0	1.43	0	0	0	0	0	99.55
2001	260	23	906	364.982	-359.812	D	6.93	6.929	0	1.915	0	0	0	0	0	98.93
2001	261	23	135	358.669	-354.868	D	8.862	8.862	0	6.222	0	0	0	0	0	92.47
2001	262	23	602	363.547	-358.397	D	8.226	8.103	0.123	4.43	0	0	0	0	0	100
2001	263	23	949	365.722	-354.966	D	7.053	7.045	0.008	2.149	0	0	0	0	0	99.99
2001	264	23	1039	356.522	-357.599	D	7.26	7.242	0.018	2.556	0	0	0	0	0	99.99
2001	265	23	931	366.183	-356.996	D	6.949	6.949	0	1.955	0	0	0	0	0	99.51
2001	266	23	949	365.722	-354.966	D	7.685	7.681	0.005	3.491	0	0	0	0	0	99.99
2001	267	23	191	359.732	-362.061	D	7.513	7.513	0	3.129	0	0	0	0	0	98.6
2001	268	23	907	365.051	-359.809	D	6.594	6.593	0.001	1.246	0	0	0	0	0	99.93
2001	269	23	822	358.021	-361.607	D	6.54	6.539	0.001	1.142	0	0	0	0	0	99.79
2001	270	23	949	365.722	-354.966	D	6.627	6.609	0.018	1.277	0	0	0	0	0	100
2001	271	23	102	358.487	-356.374	D	6.702	6.668	0.034	1.395	0	0	0	0	0	100
2001	272	23	853	361.666	-362.175	D	6.998	6.993	0.006	2.043	0	0	0	0	0	99.99

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	273	23	1017	356.894	-355.206	D	7.006	6.998	0.008	2.053	0	0	0	0	0	99.99
2001	274	23	927	365.912	-357.454	D	7.343	7.265	0.078	2.604	0	0	0	0	0	100
2001	275	23	907	365.051	-359.809	D	7.01	7.001	0.009	2.061	0	0	0	0	0	99.99
2001	276	23	930	366.19	-357.232	D	7.269	7.268	0	2.611	0	0	0	0	0	99.88
2001	277	23	1	356.546	-357.458	D	7.764	7.764	0	3.673	0	0	0	0	0	0
2001	278	23	1039	356.522	-357.599	D	8.911	8.902	0.009	6.32	0	0	0	0	0	99.98
2001	279	23	927	365.912	-357.454	D	7.334	7.214	0.12	2.497	0	0	0	0	0	100
2001	280	23	1037	356.5	-357.195	D	6.571	6.552	0.018	1.168	0	0	0	0	0	100.01
2001	281	23	930	366.19	-357.232	D	6.654	6.652	0.003	1.362	0	0	0	0	0	100.01
2001	282	23	1	356.546	-357.458	D	7.318	7.318	0	2.716	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	9.666	9.666	0	8.274	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	10.22	10.218	0.002	9.779	0	0	0	0	0	99.85
2001	285	23	78	358.239	-356.385	D	9.622	9.591	0.031	8.074	0	0	0	0	0	99.99
2001	286	23	823	358.24	-361.604	D	9.837	9.836	0	8.729	0	0	0	0	0	99.41
2001	287	23	927	365.912	-357.454	D	7.059	7.052	0.007	2.163	0	0	0	0	0	99.99
2001	288	23	78	358.239	-356.385	D	6.939	6.921	0.018	1.899	0	0	0	0	0	100
2001	289	23	773	365.4	-355.32	D	7.272	7.171	0.102	2.408	0	0	0	0	0	100
2001	290	23	78	358.239	-356.385	D	6.529	6.492	0.037	1.051	0	0	0	0	0	100
2001	291	23	1016	357.1	-355.198	D	6.558	6.558	0	1.178	0	0	0	0	0	100.02
2001	292	23	955	364.92	-354.582	D	6.739	6.737	0.002	1.531	0	0	0	0	0	100.04
2001	293	23	62	357.925	-354.901	D	7.888	7.888	0	3.946	0	0	0	0	0	97.99
2001	294	23	1	356.546	-357.458	D	8.995	8.995	0	6.548	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	8.986	8.986	0	6.528	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	10.007	10.007	0	9.193	0	0	0	0	0	0
2001	297	23	811	357.434	-360.225	D	9.526	9.514	0.012	7.873	0	0	0	0	0	100
2001	298	23	861	361.895	-361.506	D	6.535	6.53	0.005	1.124	0	0	0	0	0	99.99
2001	299	23	537	362.693	-355.939	D	6.55	6.48	0.07	1.027	0	0	0	0	0	100
2001	300	23	78	358.239	-356.385	D	6.503	6.472	0.031	1.011	0	0	0	0	0	100
2001	301	23	1017	356.894	-355.206	D	6.483	6.481	0.002	1.03	0	0	0	0	0	99.99
2001	302	23	947	365.801	-355.162	D	6.504	6.503	0.001	1.073	0	0	0	0	0	99.93
2001	303	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	6.64	6.64	0	1.34	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	8.087	8.087	0	4.394	0	0	0	0	0	0
2001	306	23	1017	356.894	-355.206	D	9.443	9.437	0.006	7.673	0	0	0	0	0	100
2001	307	23	784	365.648	-355.309	D	9.201	9.195	0.006	7.05	0	0	0	0	0	99.96
2001	308	23	1017	356.894	-355.206	D	6.712	6.66	0.052	1.378	0	0	0	0	0	100
2001	309	23	822	358.021	-361.607	D	8.894	8.853	0.041	6.199	0	0	0	0	0	100
2001	310	23	986	360.908	-354.689	D	7.061	7.045	0.016	2.15	0	0	0	0	0	100
2001	311	23	933	366.169	-356.524	D	7.311	7.304	0.007	2.686	0	0	0	0	0	99.99

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	312	23	949	365.722	-354.966	D	7.537	7.529	0.008	3.163	0	0	0	0	0	100
2001	313	23	1017	356.894	-355.206	D	6.594	6.589	0.005	1.238	0	0	0	0	0	99.96
2001	314	23	930	366.19	-357.232	D	6.668	6.665	0.002	1.389	0	0	0	0	0	100
2001	315	23	869	361.064	-360.714	D	6.826	6.744	0.082	1.544	0	0	0	0	0	100
2001	316	23	78	358.239	-356.385	D	6.667	6.663	0.004	1.383	0	0	0	0	0	99.97
2001	317	23	929	366.032	-357.239	D	6.733	6.733	0	1.522	0	0	0	0	0	52.09
2001	318	23	1	356.546	-357.458	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	319	23	1	356.546	-357.458	D	8.659	8.659	0	5.728	0	0	0	0	0	0
2001	320	23	967	363.478	-354.116	D	8.25	8.222	0.028	4.702	0	0	0	0	0	100
2001	321	23	1017	356.894	-355.206	D	7.286	7.265	0.02	2.605	0	0	0	0	0	100
2001	322	23	941	365.977	-355.774	D	7.665	7.663	0.001	3.453	0	0	0	0	0	99.95
2001	323	23	966	363.538	-354.124	D	7.808	7.802	0.006	3.757	0	0	0	0	0	99.99
2001	324	23	869	361.064	-360.714	D	6.589	6.475	0.114	1.018	0	0	0	0	0	100
2001	325	23	933	366.169	-356.524	D	6.474	6.47	0.004	1.008	0	0	0	0	0	100.03
2001	326	23	386	361.369	-359.742	D	6.517	6.517	0	1.099	0	0	0	0	0	54.86
2001	327	23	1	356.546	-357.458	D	7.077	7.077	0	2.216	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	9.009	9.009	0	6.585	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	6.691	6.691	0	1.44	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	6.906	6.906	0	1.868	0	0	0	0	0	0
2001	331	23	966	363.538	-354.124	D	7.015	7.008	0.006	2.075	0	0	0	0	0	99.98
2001	332	23	78	358.239	-356.385	D	8.667	8.642	0.025	5.687	0	0	0	0	0	100
2001	333	23	930	366.19	-357.232	D	10.126	10.113	0.013	9.486	0	0	0	0	0	99.99
2001	334	23	955	364.92	-354.582	D	8.842	8.823	0.019	6.127	0	0	0	0	0	100
2001	335	23	927	365.912	-357.454	D	6.662	6.637	0.025	1.334	0	0	0	0	0	100
2001	336	23	949	365.722	-354.966	D	6.676	6.669	0.007	1.396	0	0	0	0	0	99.99
2001	337	23	930	366.19	-357.232	D	7.02	7.02	0	2.099	0	0	0	0	0	91.27
2001	338	23	929	366.032	-357.239	D	6.991	6.991	0	2.04	0	0	0	0	0	13.12
2001	339	23	1	356.546	-357.458	D	8.996	8.996	0	6.551	0	0	0	0	0	0
2001	340	23	907	365.051	-359.809	D	9.632	9.609	0.023	8.12	0	0	0	0	0	100.01
2001	341	23	731	365.047	-358.581	D	7.986	7.938	0.049	4.058	0	0	0	0	0	100
2001	342	23	1041	356.936	-357.592	D	7.973	7.919	0.054	4.017	0	0	0	0	0	100
2001	343	23	822	358.021	-361.607	D	6.616	6.603	0.013	1.267	0	0	0	0	0	100.02
2001	344	23	1035	356.477	-356.792	D	6.517	6.512	0.005	1.09	0	0	0	0	0	99.97
2001	345	23	930	366.19	-357.232	D	6.56	6.557	0.002	1.178	0	0	0	0	0	99.96
2001	346	23	929	366.032	-357.239	D	9.498	9.498	0	7.831	0	0	0	0	0	90.18
2001	347	23	811	357.434	-360.225	D	9.633	9.604	0.029	8.109	0	0	0	0	0	100
2001	348	23	102	358.487	-356.374	D	8.866	8.779	0.087	6.019	0	0	0	0	0	100
2001	349	23	947	365.801	-355.162	D	8.789	8.789	0	6.043	0	0	0	0	0	99.28
2001	350	23	947	365.801	-355.162	D	10.116	10.116	0	9.495	0	0	0	0	0	98.38

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	351	23	811	357.434	-360.225	D	9.433	9.409	0.023	7.599	0	0	0	0	0	99.99
2001	352	23	822	358.021	-361.607	D	6.563	6.562	0.001	1.186	0	0	0	0	0	100.08
2001	353	23	8	357.031	-357.187	D	6.868	6.769	0.099	1.594	0	0	0	0	0	100
2001	354	23	78	358.239	-356.385	D	6.569	6.471	0.098	1.01	0	0	0	0	0	100
2001	355	23	927	365.912	-357.454	D	6.504	6.495	0.009	1.055	0	0	0	0	0	100
2001	356	23	1	356.546	-357.458	D	7.254	7.254	0	2.582	0	0	0	0	0	0
2001	357	23	927	365.912	-357.454	D	6.709	6.707	0.002	1.472	0	0	0	0	0	99.94
2001	358	23	986	360.908	-354.689	D	6.555	6.481	0.074	1.029	0	0	0	0	0	100
2001	359	23	78	358.239	-356.385	D	6.611	6.5	0.11	1.067	0	0	0	0	0	100
2001	360	23	78	358.239	-356.385	D	6.618	6.533	0.084	1.131	0	0	0	0	0	100
2001	361	23	949	365.722	-354.966	D	6.595	6.585	0.01	1.232	0	0	0	0	0	99.98
2001	362	23	773	365.4	-355.32	D	7.036	7.036	0.001	2.131	0	0	0	0	0	100.06
2001	363	23	78	358.239	-356.385	D	6.647	6.604	0.042	1.269	0	0	0	0	0	100
2001	364	23	78	358.239	-356.385	D	6.68	6.55	0.13	1.163	0	0	0	0	0	100
2001	365	23	78	358.239	-356.385	D	7.016	6.616	0.4	1.292	0	0	0	0	0	100
									0.4							
EXIDE												**% of Modeled Extinction by Species**				
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	947	365.801	-355.162	D	7.158	7.158	0	2.381	77.46	9.38	0	0	0	3.61
2001	2	23	949	365.722	-354.966	D	7.27	7.265	0.006	2.603	90.01	7.4	0	0	0	2.57
2001	3	23	941	365.977	-355.774	D	8.569	8.568	0.001	5.511	93.45	5.27	0	0	0	1.19
2001	4	23	1	356.546	-357.458	D	8.279	8.279	0	4.833	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	7	23	808	357.43	-359.686	D	7.404	7.4	0.004	2.888	81.18	14.77	0	0	0	4.04
2001	8	23	949	365.722	-354.966	D	8.251	8.24	0.011	4.743	86.35	10.35	0	0	0	3.3
2001	9	23	822	358.021	-361.607	D	9.327	9.313	0.014	7.352	95.25	4.21	0	0	0	0.53
2001	10	23	809	357.432	-359.845	D	7.372	7.368	0.004	2.82	96.02	2.87	0	0	0	1.08
2001	11	23	1006	358.469	-354.76	D	8.859	8.858	0.001	6.211	95.79	2.59	0	0	0	1.2
2001	12	23	1	356.546	-357.458	D	10.218	10.218	0	9.779	54.23	1.7	0	0	0	0.14
2001	13	23	1	356.546	-357.458	D	10.094	10.094	0	9.433	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	9.682	9.682	0	8.316	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.24	7.24	0	2.553	0	0	0	0	0	0
2001	16	23	643	363.609	-354.151	D	6.748	6.747	0	1.551	79.53	9.27	0	0	0	10.9
2001	17	23	821	358.053	-361.416	D	6.756	6.755	0.001	1.566	82.57	9.7	0	0	0	7.69
2001	18	23	1016	357.1	-355.198	D	6.741	6.74	0	1.536	87.04	5.43	0	0	0	6.96
2001	19	23	1039	356.522	-357.599	D	6.895	6.894	0.001	1.843	82.26	11.95	0	0	0	5.85
2001	20	23	1038	356.511	-357.396	D	6.591	6.59	0.001	1.242	80.74	9.99	0	0	0	9.09

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	21	23	930	366.19	-357.232	D	6.487	6.486	0	1.04	83.83	9	0	0	0	6.96
2001	22	23	955	364.92	-354.582	D	6.756	6.756	0	1.567	88.3	6.95	0	0	0	4.25
2001	23	23	619	363.872	-360.131	D	6.636	6.636	0	1.332	82.52	3.66	0	0	0	5.15
2001	24	23	643	363.609	-354.151	D	6.769	6.769	0.001	1.593	88.69	7.41	0	0	0	3.58
2001	25	23	1	356.546	-357.458	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2001	26	23	1	356.546	-357.458	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	27	23	1	356.546	-357.458	D	6.637	6.637	0	1.333	62.58	21.32	0	0	0	15.26
2001	28	23	15	357.659	-360.155	D	6.501	6.501	0	1.067	85.5	7.95	0	0	0	3.41
2001	29	23	929	366.032	-357.239	D	8.327	8.327	0	4.946	22.85	0.97	0	0	0	0.28
2001	30	23	1	356.546	-357.458	D	6.894	6.894	0	1.843	52.04	2.04	0	0	0	0.4
2001	31	23	1	356.546	-357.458	D	7.146	7.146	0	2.358	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	6.485	6.485	0	1.036	0	0	0	0	0	0
2001	33	23	947	365.801	-355.162	D	6.534	6.534	0.001	1.131	75.18	13.07	0	0	0	11.62
2001	34	23	929	366.032	-357.239	D	6.47	6.47	0	1.009	68.72	12.18	0	0	0	8.87
2001	35	23	1	356.546	-357.458	D	6.691	6.691	0	1.439	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	6.677	6.677	0	1.411	0	0	0	0	0	0
2001	37	23	966	363.538	-354.124	D	6.489	6.489	0	1.044	82.23	3.9	0	0	0	12.72
2001	38	23	62	357.925	-354.901	D	6.686	6.686	0	1.429	87.2	5.56	0	0	0	6.89
2001	39	23	1	356.546	-357.458	D	9.678	9.678	0	8.304	0	0	0	0	0	0
2001	40	23	836	360.07	-362.066	D	9.307	9.295	0.013	7.304	95.03	4.44	0	0	0	0.53
2001	41	23	16	357.648	-359.906	D	6.621	6.621	0.001	1.301	80.39	10.37	0	0	0	9.15
2001	42	23	1	356.546	-357.458	D	6.47	6.47	0	1.008	0	0	0	0	0	0
2001	43	23	1	356.546	-357.458	D	6.623	6.623	0	1.305	0	0	0	0	0	0
2001	44	23	1	356.546	-357.458	D	8.565	8.565	0	5.504	0	0	0	0	0	0
2001	45	23	1	356.546	-357.458	D	10.197	10.197	0	9.721	0	0	0	0	0	0
2001	46	23	934	366.01	-356.526	D	7.483	7.477	0.006	3.052	95.21	3.11	0	0	0	1.69
2001	47	23	1035	356.477	-356.792	D	6.627	6.626	0.001	1.312	85.21	8.72	0	0	0	6.03
2001	48	23	1	356.546	-357.458	D	6.522	6.522	0	1.108	0	0	0	0	0	0
2001	49	23	1	356.546	-357.458	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	50	23	929	366.032	-357.239	D	6.482	6.482	0	1.031	65.45	3.35	0	0	0	2.39
2001	51	23	299	360.19	-355.549	D	7.205	7.205	0	2.48	87.13	1.22	0	0	0	2.73
2001	52	23	15	357.659	-360.155	D	6.729	6.729	0	1.514	95.61	3.09	0	0	0	1.79
2001	53	23	16	357.648	-359.906	D	7.366	7.366	0	2.816	94.72	3.44	0	0	0	0.7
2001	54	23	1	356.546	-357.458	D	6.804	6.804	0	1.664	0	0	0	0	0	0
2001	55	23	1	356.546	-357.458	D	9.629	9.629	0	8.175	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.355	7.355	0	2.792	0	0	0	0	0	0
2001	57	23	929	366.032	-357.239	D	6.502	6.502	0	1.069	92.68	1.78	0	0	0	5
2001	58	23	929	366.032	-357.239	D	6.532	6.532	0	1.128	94.26	2.83	0	0	0	2.7
2001	59	23	1	356.546	-357.458	D	6.848	6.848	0	1.751	96.23	3.03	0	0	0	0.8

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	60	23	15	357.659	-360.155	D	6.605	6.605	0	1.27	94.34	1.9	0	0	0	1
2001	61	23	746	364.882	-354.843	D	7.93	7.93	0	4.04	94.64	1.4	0	0	0	0.37
2001	62	23	2	356.535	-357.209	D	6.693	6.693	0	1.444	74.98	1.57	0	0	0	4.55
2001	63	23	1035	356.477	-356.792	D	6.588	6.586	0.001	1.234	94.26	2.72	0	0	0	2.95
2001	64	23	1	356.546	-357.458	D	6.563	6.562	0	1.187	81.72	6.37	0	0	0	11.89
2001	65	23	810	357.434	-360.005	D	6.528	6.527	0.001	1.119	86.29	5.91	0	0	0	7.76
2001	66	23	1035	356.477	-356.792	D	6.471	6.471	0	1.009	91.6	1.64	0	0	0	6.72
2001	67	23	949	365.722	-354.966	D	6.567	6.565	0.002	1.192	91.05	3.6	0	0	0	5.33
2001	68	23	811	357.434	-360.225	D	6.501	6.501	0.001	1.067	82.6	6.31	0	0	0	11.15
2001	69	23	1	356.546	-357.458	D	6.471	6.471	0	1.01	80.11	3.44	0	0	0	5.88
2001	70	23	929	366.032	-357.239	D	6.48	6.48	0	1.028	101	1.75	0	0	0	4.59
2001	71	23	247	360.217	-361.79	D	8.58	8.58	0	5.54	79.33	1.1	0	0	0	1.26
2001	72	23	1	356.546	-357.458	D	6.535	6.535	0	1.135	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.113	7.113	0	2.29	0	0	0	0	0	0
2001	74	23	247	360.217	-361.79	D	9.85	9.85	0	8.766	56.62	1.78	0	0	0	0.21
2001	75	23	16	357.648	-359.906	D	7.165	7.165	0.001	2.396	83.24	8.13	0	0	0	8.35
2001	76	23	1	356.546	-357.458	D	6.656	6.655	0	1.369	84.31	7.01	0	0	0	8.32
2001	77	23	1	356.546	-357.458	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	78	23	1	356.546	-357.458	D	6.472	6.472	0	1.012	0	0	0	0	0	0
2001	79	23	1	356.546	-357.458	D	6.484	6.484	0	1.035	0	0	0	0	0	0
2001	80	23	1	356.546	-357.458	D	6.473	6.473	0	1.014	0	0	0	0	0	0
2001	81	23	1	356.546	-357.458	D	6.492	6.492	0	1.05	0	0	0	0	0	0
2001	82	23	1	356.546	-357.458	D	6.712	6.712	0	1.48	0	0	0	0	0	0
2001	83	23	1	356.546	-357.458	D	6.686	6.686	0	1.43	0	0	0	0	0	0
2001	84	23	1	356.546	-357.458	D	6.483	6.483	0	1.034	0	0	0	0	0	0
2001	85	23	1	356.546	-357.458	D	6.491	6.491	0	1.048	0	0	0	0	0	0
2001	86	23	1	356.546	-357.458	D	6.468	6.468	0	1.005	0	0	0	0	0	0
2001	87	23	3	356.524	-356.959	D	6.483	6.483	0	1.034	94.48	1.85	0	0	0	2.22
2001	88	23	254	360.14	-360.046	D	6.978	6.978	0	2.013	97.05	1.32	0	0	0	0.96
2001	89	23	810	357.434	-360.005	D	7.266	7.266	0	2.605	98.52	0.75	0	0	0	0.65
2001	90	23	932	366.176	-356.761	D	7.727	7.726	0.001	3.59	96.99	1.11	0	0	0	1.95
2001	91	23	822	358.021	-361.607	D	6.473	6.473	0	1.014	86.64	3.96	0	0	0	9.23
2001	92	23	1	356.546	-357.458	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	9.648	9.648	0	8.226	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	9.432	9.432	0	7.657	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.559	7.559	0	3.228	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	6.813	6.813	0	1.682	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.171	7.171	0	2.41	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	99	23	1	356.546	-357.458	D	6.874	6.874	0	1.802	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.375	7.375	0	2.834	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	6.559	6.559	0	1.181	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	6.687	6.687	0	1.431	0	0	0	0	0	0
2001	105	23	1016	357.1	-355.198	D	8.379	8.379	0	5.066	93.49	0.37	0	0	0	5.7
2001	106	23	934	366.01	-356.526	D	6.493	6.491	0.001	1.049	93.66	0.81	0	0	0	5.49
2001	107	23	775	365.747	-357.551	D	6.477	6.477	0	1.022	83.22	5.49	0	0	0	10.9
2001	108	23	10	356.954	-355.443	D	6.48	6.479	0	1.026	94.41	0.64	0	0	0	4.55
2001	109	23	518	362.39	-354.704	D	6.54	6.54	0	1.143	96.56	0.7	0	0	0	2.69
2001	110	23	1	356.546	-357.458	D	8.502	8.502	0	5.355	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.602	7.602	0	3.321	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	8.495	8.495	0	5.339	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.659	7.659	0	3.445	0	0	0	0	0	0
2001	114	23	172	359.363	-359.331	D	6.507	6.507	0	1.08	82.97	2.36	0	0	0	13.61
2001	115	23	1	356.546	-357.458	D	6.482	6.482	0	1.03	92.61	1.02	0	0	0	5.83
2001	116	23	1	356.546	-357.458	D	6.587	6.587	0	1.236	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	6.583	6.583	0	1.227	0	0	0	0	0	0
2001	119	23	1	356.546	-357.458	D	6.862	6.862	0	1.778	0	0	0	0	0	0
2001	120	23	1	356.546	-357.458	D	7.272	7.272	0	2.618	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	6.852	6.852	0	1.759	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	6.96	6.96	0	1.977	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	6.988	6.988	0	2.033	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.28	7.28	0	2.635	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	9.077	9.077	0	6.754	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2001	127	23	811	357.434	-360.225	D	8.16	8.16	0	4.56	93.57	0.32	0	0	0	6.01
2001	128	23	62	357.925	-354.901	D	6.507	6.506	0.001	1.078	93.89	0.32	0	0	0	5.8
2001	129	23	933	366.169	-356.524	D	6.637	6.636	0.001	1.33	96.82	0.15	0	0	0	2.87
2001	130	23	929	366.032	-357.239	D	6.841	6.841	0	1.737	97.61	0.08	0	0	0	1.28
2001	131	23	247	360.217	-361.79	D	7.43	7.43	0	2.951	30.67	0	0	0	0	0.4
2001	132	23	3	356.524	-356.959	D	8.548	8.544	0.005	5.453	97.52	2.05	0	0	0	0.39
2001	133	23	2	356.535	-357.209	D	6.55	6.549	0	1.162	97.2	0.04	0	0	0	2.27
2001	134	23	929	366.032	-357.239	D	6.785	6.785	0	1.626	97.55	0.05	0	0	0	1.24
2001	135	23	1	356.546	-357.458	D	6.856	6.856	0	1.768	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	6.774	6.774	0	1.603	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.638	7.638	0	3.398	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	138	23	1	356.546	-357.458	D	8.015	8.015	0	4.231	0	0	0	0	0	0
2001	139	23	1	356.546	-357.458	D	8.652	8.652	0	5.713	0	0	0	0	0	0
2001	140	23	1	356.546	-357.458	D	7.557	7.557	0	3.224	0	0	0	0	0	0
2001	141	23	747	364.871	-354.594	D	8.644	8.644	0	5.692	87.14	1.41	0	0	0	5.44
2001	142	23	1	356.546	-357.458	D	6.546	6.546	0	1.154	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	6.512	6.512	0	1.09	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	6.593	6.593	0	1.248	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	6.768	6.768	0	1.591	0	0	0	0	0	0
2001	148	23	747	364.871	-354.594	D	6.974	6.974	0	2.005	95.3	0.03	0	0	0	4.05
2001	149	23	949	365.722	-354.966	D	6.85	6.848	0.002	1.752	97.67	0.17	0	0	0	2.14
2001	150	23	642	363.62	-354.4	D	8.54	8.54	0	5.445	94.64	0.39	0	0	0	1.04
2001	151	23	1	356.546	-357.458	D	8.828	8.828	0	6.138	0	0	0	0	0	0
2001	152	23	3	356.524	-356.959	D	6.94	6.939	0.001	1.934	96.68	1.01	0	0	0	2.21
2001	153	23	1035	356.477	-356.792	D	7.018	7.018	0	2.095	90.26	2.55	0	0	0	6.91
2001	154	23	785	365.637	-355.06	D	7.159	7.158	0.001	2.383	97.64	0.61	0	0	0	1.39
2001	155	23	62	357.925	-354.901	D	8.898	8.898	0	6.309	66.33	0.61	0	0	0	0.31
2001	156	23	1	356.546	-357.458	D	7.529	7.529	0	3.162	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.846	7.846	0	3.853	0	0	0	0	0	0
2001	158	23	643	363.609	-354.151	D	7.493	7.492	0.001	3.084	98.38	0.17	0	0	0	1.42
2001	159	23	934	366.01	-356.526	D	7.133	7.126	0.007	2.316	98.92	0.15	0	0	0	0.91
2001	160	23	996	360.121	-355.113	D	7.362	7.356	0.006	2.795	99.09	0.1	0	0	0	0.8
2001	161	23	1017	356.894	-355.206	D	7.049	7.047	0.002	2.153	99.02	0.03	0	0	0	0.88
2001	162	23	933	366.169	-356.524	D	7.179	7.179	0.001	2.424	99.34	0.02	0	0	0	0.58
2001	163	23	933	366.169	-356.524	D	6.949	6.949	0	1.955	98.14	0.01	0	0	0	0.57
2001	164	23	1	356.546	-357.458	D	6.969	6.969	0	1.995	0	0	0	0	0	0
2001	165	23	1	356.546	-357.458	D	7.214	7.214	0	2.497	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	8.124	8.124	0	4.479	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	6.529	6.529	0	1.123	0	0	0	0	0	0
2001	168	23	28	357.918	-360.393	D	6.557	6.557	0	1.176	96.27	0.01	0	0	0	3.1
2001	169	23	1	356.546	-357.458	D	6.665	6.664	0	1.387	97.38	0.02	0	0	0	1.86
2001	170	23	1	356.546	-357.458	D	6.958	6.958	0	1.972	0	0	0	0	0	0
2001	171	23	1	356.546	-357.458	D	6.83	6.83	0	1.716	0	0	0	0	0	0
2001	172	23	299	360.19	-355.549	D	7.73	7.73	0	3.598	97.43	0.19	0	0	0	0.78
2001	173	23	1	356.546	-357.458	D	6.768	6.768	0	1.592	93.74	0.07	0	0	0	6.55
2001	174	23	822	358.021	-361.607	D	6.638	6.637	0.001	1.333	95.37	0.05	0	0	0	4.58
2001	175	23	927	365.912	-357.454	D	6.669	6.668	0.001	1.394	96.93	0.05	0	0	0	2.82
2001	176	23	191	359.732	-362.061	D	7.127	7.125	0.002	2.313	98.86	0.08	0	0	0	1.11

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	177	23	1017	356.894	-355.206	D	6.936	6.935	0.001	1.926	98.71	0.05	0	0	0	1.12
2001	178	23	1017	356.894	-355.206	D	7.075	7.074	0.001	2.209	99.38	0.04	0	0	0	0.91
2001	179	23	406	361.15	-354.758	D	8.964	8.963	0.001	6.471	99.54	0.1	0	0	0	0.26
2001	180	23	296	360.223	-356.297	D	8.433	8.433	0	5.191	98.06	0.04	0	0	0	0.36
2001	181	23	1	356.546	-357.458	D	7.862	7.862	0	3.889	0	0	0	0	0	0
2001	182	23	10	356.954	-355.443	D	8.52	8.52	0	5.397	93.79	0.01	0	0	0	2.06
2001	183	23	1017	356.894	-355.206	D	7.426	7.425	0.001	2.942	98.15	0.43	0	0	0	1.11
2001	184	23	933	366.169	-356.524	D	8.781	8.781	0	6.023	99.12	0.02	0	0	0	0.41
2001	185	23	1	356.546	-357.458	D	7.034	7.034	0	2.127	0	0	0	0	0	0
2001	186	23	1	356.546	-357.458	D	7.048	7.048	0	2.156	0	0	0	0	0	0
2001	187	23	255	360.129	-359.796	D	6.95	6.95	0	1.956	81.79	0	0	0	0	1
2001	188	23	645	364.109	-359.871	D	7.748	7.748	0	3.637	99.13	0.01	0	0	0	0.5
2001	189	23	1	356.546	-357.458	D	6.907	6.907	0	1.869	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	6.865	6.865	0	1.785	0	0	0	0	0	0
2001	191	23	949	365.722	-354.966	D	7.119	7.115	0.005	2.293	98.96	0.12	0	0	0	0.91
2001	192	23	822	358.021	-361.607	D	7.061	7.06	0.001	2.181	98.72	0.04	0	0	0	0.97
2001	193	23	191	359.732	-362.061	D	7.437	7.437	0	2.967	99.15	0.03	0	0	0	0.56
2001	194	23	191	359.732	-362.061	D	7.801	7.801	0	3.754	98.38	0.24	0	0	0	0.37
2001	195	23	1	356.546	-357.458	D	6.6	6.6	0	1.261	0	0	0	0	0	0
2001	196	23	1	356.546	-357.458	D	6.705	6.705	0	1.466	0	0	0	0	0	0
2001	197	23	1	356.546	-357.458	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	9.025	9.025	0	6.623	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.494	7.494	0	3.089	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.083	7.083	0	2.227	0	0	0	0	0	0
2001	201	23	1	356.546	-357.458	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2001	202	23	1	356.546	-357.458	D	6.931	6.931	0	1.918	0	0	0	0	0	0
2001	203	23	1	356.546	-357.458	D	7.051	7.051	0	2.163	0	0	0	0	0	0
2001	204	23	1	356.546	-357.458	D	7.546	7.546	0	3.199	0	0	0	0	0	0
2001	205	23	1	356.546	-357.458	D	7.753	7.753	0	3.65	0	0	0	0	0	0
2001	206	23	1	356.546	-357.458	D	8.069	8.069	0	4.353	0	0	0	0	0	0
2001	207	23	406	361.15	-354.758	D	8.765	8.765	0	5.983	85.07	0.27	0	0	0	0.64
2001	208	23	1	356.546	-357.458	D	8.924	8.924	0	6.374	0	0	0	0	0	0
2001	209	23	1	356.546	-357.458	D	8.225	8.225	0	4.71	0	0	0	0	0	0
2001	210	23	785	365.637	-355.06	D	8.866	8.866	0	6.231	99.33	0.01	0	0	0	1.58
2001	211	23	948	365.727	-355.056	D	7.685	7.685	0	3.501	98.46	0.02	0	0	0	0.74
2001	212	23	1	356.546	-357.458	D	9.208	9.208	0	7.085	0	0	0	0	0	0
2001	213	23	1	356.546	-357.458	D	9.041	9.041	0	6.663	0	0	0	0	0	0
2001	214	23	1	356.546	-357.458	D	7.804	7.804	0	3.76	0	0	0	0	0	0
2001	215	23	1	356.546	-357.458	D	6.91	6.91	0	1.877	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	216	23	1	356.546	-357.458	D	7.003	7.003	0	2.063	0	0	0	0	0	0
2001	217	23	1	356.546	-357.458	D	6.999	6.999	0	2.056	0	0	0	0	0	0
2001	218	23	1	356.546	-357.458	D	7.068	7.068	0	2.197	0	0	0	0	0	0
2001	219	23	1	356.546	-357.458	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.358	7.358	0	2.799	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.346	7.346	0	2.775	0	0	0	0	0	0
2001	222	23	1017	356.894	-355.206	D	8.295	8.294	0.002	4.868	98.39	0.06	0	0	0	1.47
2001	223	23	853	361.666	-362.175	D	8.659	8.646	0.013	5.699	99.14	0.51	0	0	0	0.36
2001	224	23	929	366.032	-357.239	D	7.018	7.018	0	2.095	98.26	0.13	0	0	0	0.91
2001	225	23	899	364.071	-360.247	D	7.158	7.158	0	2.382	98.31	0.38	0	0	0	0.65
2001	226	23	1	356.546	-357.458	D	6.843	6.843	0	1.74	15.78	0	0	0	0	0.23
2001	227	23	1	356.546	-357.458	D	6.725	6.725	0	1.506	0	0	0	0	0	0
2001	228	23	955	364.92	-354.582	D	7.884	7.883	0.001	3.937	98.2	1.29	0	0	0	0.37
2001	229	23	1	356.546	-357.458	D	6.757	6.757	0	1.569	0	0	0	0	0	0
2001	230	23	544	363.15	-360.662	D	6.898	6.898	0	1.853	85.41	0.05	0	0	0	1
2001	231	23	949	365.722	-354.966	D	6.914	6.913	0.001	1.881	95.24	0.77	0	0	0	4.16
2001	232	23	1	356.546	-357.458	D	6.739	6.739	0	1.533	0	0	0	0	0	0
2001	233	23	1	356.546	-357.458	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	234	23	1	356.546	-357.458	D	7.053	7.053	0	2.167	0	0	0	0	0	0
2001	235	23	1	356.546	-357.458	D	6.921	6.921	0	1.898	0	0	0	0	0	0
2001	236	23	1	356.546	-357.458	D	6.927	6.927	0	1.91	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.112	7.112	0	2.287	0	0	0	0	0	0
2001	238	23	967	363.478	-354.116	D	8.265	8.259	0.006	4.788	97.3	1.92	0	0	0	0.75
2001	239	23	852	361.595	-362.148	D	7.22	7.22	0	2.511	98.03	0.04	0	0	0	1.85
2001	240	23	985	361.137	-354.683	D	7.115	7.114	0	2.292	98.34	0.04	0	0	0	1.49
2001	241	23	948	365.727	-355.056	D	6.847	6.846	0.001	1.747	98.24	0.05	0	0	0	1.55
2001	242	23	933	366.169	-356.524	D	7.54	7.539	0.001	3.185	99.2	0.17	0	0	0	0.68
2001	243	23	406	361.15	-354.758	D	7.675	7.675	0	3.479	97.5	0.07	0	0	0	0.97
2001	244	23	933	366.169	-356.524	D	8.592	8.589	0.003	5.561	99.29	0.21	0	0	0	0.47
2001	245	23	933	366.169	-356.524	D	7.443	7.44	0.004	2.972	99.07	0.28	0	0	0	0.63
2001	246	23	1017	356.894	-355.206	D	7.437	7.436	0.001	2.965	99.17	0.03	0	0	0	0.69
2001	247	23	1008	358.048	-354.775	D	6.828	6.826	0.001	1.708	97.95	0.02	0	0	0	1.92
2001	248	23	1017	356.894	-355.206	D	7.211	7.209	0.002	2.488	98.56	0.05	0	0	0	1.37
2001	249	23	10	356.954	-355.443	D	8.956	8.956	0	6.452	99.32	0.02	0	0	0	0.25
2001	250	23	1	356.546	-357.458	D	7.43	7.43	0	2.952	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	8.474	8.474	0	5.287	0	0	0	0	0	0
2001	252	23	1006	358.469	-354.76	D	8.548	8.546	0.002	5.459	94.24	0.27	0	0	0	5.42
2001	253	23	930	366.19	-357.232	D	6.949	6.946	0.002	1.949	96.1	0.37	0	0	0	3.51
2001	254	23	3	356.524	-356.959	D	6.7	6.7	0	1.456	96.26	0.11	0	0	0	3.51

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	255	23	929	366.032	-357.239	D	6.848	6.848	0	1.75	97.09	0.19	0	0	0	1.82
2001	256	23	946	365.798	-355.322	D	6.927	6.926	0	1.909	98.09	0.09	0	0	0	1.45
2001	257	23	247	360.217	-361.79	D	7.075	7.075	0	2.211	98.06	0.09	0	0	0	1.11
2001	258	23	1	356.546	-357.458	D	6.732	6.732	0	1.521	94.32	0.03	0	0	0	1.31
2001	259	23	929	366.032	-357.239	D	6.677	6.677	0	1.412	78.34	0.08	0	0	0	1.48
2001	260	23	1	356.546	-357.458	D	6.958	6.958	0	1.972	0	0	0	0	0	0
2001	261	23	1	356.546	-357.458	D	8.862	8.862	0	6.222	0	0	0	0	0	0
2001	262	23	811	357.434	-360.225	D	7.998	7.998	0	4.192	93.8	0.27	0	0	0	5.23
2001	263	23	16	357.648	-359.906	D	7.025	7.025	0	2.109	95.95	0.03	0	0	0	2.23
2001	264	23	965	363.588	-354.142	D	7.246	7.244	0.001	2.561	97.95	0.16	0	0	0	1.73
2001	265	23	1035	356.477	-356.792	D	6.946	6.945	0.001	1.947	97.22	0.36	0	0	0	2.42
2001	266	23	254	360.14	-360.046	D	7.618	7.616	0.002	3.35	98.18	0.72	0	0	0	1.03
2001	267	23	853	361.666	-362.175	D	7.568	7.568	0	3.246	97.8	1.47	0	0	0	0.73
2001	268	23	1	356.546	-357.458	D	6.594	6.594	0	1.249	0	0	0	0	0	0
2001	269	23	1	356.546	-357.458	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	270	23	1	356.546	-357.458	D	6.613	6.613	0	1.287	0	0	0	0	0	0
2001	271	23	62	357.925	-354.901	D	6.669	6.668	0	1.395	97.97	0.29	0	0	0	2.13
2001	272	23	929	366.032	-357.239	D	6.976	6.976	0	2.01	21.83	0.01	0	0	0	0.53
2001	273	23	1	356.546	-357.458	D	6.998	6.998	0	2.053	0	0	0	0	0	0
2001	274	23	1	356.546	-357.458	D	7.263	7.263	0	2.601	0	0	0	0	0	0
2001	275	23	1	356.546	-357.458	D	6.99	6.99	0	2.038	0	0	0	0	0	0
2001	276	23	1	356.546	-357.458	D	7.261	7.261	0	2.596	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.764	7.764	0	3.673	0	0	0	0	0	0
2001	278	23	810	357.434	-360.005	D	8.916	8.915	0.001	6.351	98.01	1.42	0	0	0	0.3
2001	279	23	709	364.375	-354.616	D	7.214	7.214	0	2.497	90.07	1.55	0	0	0	7.23
2001	280	23	929	366.032	-357.239	D	6.55	6.55	0	1.163	94.18	0.92	0	0	0	4.6
2001	281	23	406	361.15	-354.758	D	6.654	6.653	0	1.365	95.59	0.39	0	0	0	2.81
2001	282	23	1	356.546	-357.458	D	7.318	7.318	0	2.716	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	9.666	9.666	0	8.274	0	0	0	0	0	0
2001	284	23	10	356.954	-355.443	D	10.218	10.218	0	9.779	97.21	0.45	0	0	0	0.52
2001	285	23	1017	356.894	-355.206	D	9.594	9.591	0.003	8.074	97.73	1.78	0	0	0	0.45
2001	286	23	934	366.01	-356.526	D	9.93	9.927	0.003	8.975	98.22	1.02	0	0	0	0.69
2001	287	23	930	366.19	-357.232	D	7.147	7.144	0.003	2.354	97.67	1.59	0	0	0	0.76
2001	288	23	929	366.032	-357.239	D	6.942	6.942	0	1.941	68.93	5.49	0	0	0	0.52
2001	289	23	810	357.434	-360.005	D	7.209	7.204	0.005	2.477	95.3	3.67	0	0	0	1.06
2001	290	23	1	356.546	-357.458	D	6.493	6.492	0.001	1.051	88.36	3.38	0	0	0	8.27
2001	291	23	929	366.032	-357.239	D	6.559	6.559	0	1.18	96.14	1.19	0	0	0	2.52
2001	292	23	10	356.954	-355.443	D	6.741	6.741	0	1.537	93.15	1.99	0	0	0	7.49
2001	293	23	995	360.315	-355.11	D	7.994	7.994	0	4.184	97.41	1.11	0	0	0	1

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	294	23	1	356.546	-357.458	D	8.995	8.995	0	6.548	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	8.986	8.986	0	6.528	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	10.007	10.007	0	9.193	0	0	0	0	0	0
2001	297	23	934	366.01	-356.526	D	9.579	9.577	0.001	8.039	95.61	2.45	0	0	0	1.85
2001	298	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	300	23	679	364.226	-356.87	D	6.472	6.472	0	1.012	81.28	7.3	0	0	0	10.91
2001	301	23	10	356.954	-355.443	D	6.481	6.481	0	1.03	86.17	0.57	0	0	0	2.69
2001	302	23	247	360.217	-361.79	D	6.503	6.503	0	1.071	86.81	0.17	0	0	0	1.28
2001	303	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	6.64	6.64	0	1.34	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	8.087	8.087	0	4.394	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	9.437	9.437	0	7.673	0	0	0	0	0	0
2001	307	23	949	365.722	-354.966	D	9.199	9.195	0.005	7.05	96.92	2.53	0	0	0	0.5
2001	308	23	1007	358.259	-354.768	D	6.66	6.66	0	1.378	97.56	0.33	0	0	0	2.23
2001	309	23	949	365.722	-354.966	D	8.883	8.864	0.019	6.227	96.67	2.55	0	0	0	0.78
2001	310	23	1017	356.894	-355.206	D	7.121	7.115	0.006	2.293	97.75	0.86	0	0	0	1.41
2001	311	23	228	359.881	-359.807	D	7.378	7.375	0.003	2.836	98.64	0.34	0	0	0	1.06
2001	312	23	933	366.169	-356.524	D	7.602	7.601	0.001	3.318	97.8	0.33	0	0	0	1.94
2001	313	23	115	358.889	-359.851	D	6.589	6.589	0	1.238	90.72	0.09	0	0	0	1.84
2001	314	23	247	360.217	-361.79	D	6.673	6.672	0	1.402	92.94	2.44	0	0	0	4.21
2001	315	23	949	365.722	-354.966	D	6.729	6.729	0	1.514	89.87	2.15	0	0	0	7.53
2001	316	23	822	358.021	-361.607	D	6.665	6.664	0	1.387	92.34	1.35	0	0	0	5.35
2001	317	23	1	356.546	-357.458	D	6.761	6.761	0	1.578	95.72	0.82	0	0	0	2.51
2001	318	23	929	366.032	-357.239	D	7.178	7.178	0	2.424	24.55	0.03	0	0	0	0.29
2001	319	23	1	356.546	-357.458	D	8.659	8.659	0	5.728	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	8.223	8.223	0	4.704	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.265	7.265	0	2.605	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.614	7.614	0	3.346	0	0	0	0	0	0
2001	323	23	1017	356.894	-355.206	D	7.829	7.828	0.001	3.814	70.54	24.86	0	0	0	4.33
2001	324	23	608	363.481	-356.902	D	6.475	6.474	0.001	1.016	72.16	10.56	0	0	0	17.12
2001	325	23	906	364.982	-359.812	D	6.47	6.47	0	1.008	89.7	3.67	0	0	0	6.35
2001	326	23	564	362.93	-355.678	D	6.517	6.517	0	1.099	93.86	1.59	0	0	0	2.58
2001	327	23	1	356.546	-357.458	D	7.077	7.077	0	2.216	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	9.009	9.009	0	6.585	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	6.691	6.691	0	1.44	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	6.906	6.906	0	1.868	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	6.949	6.949	0	1.955	0	0	0	0	0	0
2001	332	23	852	361.595	-362.148	D	8.702	8.7	0.002	5.828	87.6	9.52	0	0	0	2.7

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	333	23	710	364.843	-359.589	D	10.036	10.036	0	9.273	83.64	3.49	0	0	0	0.16
2001	334	23	16	357.648	-359.906	D	8.824	8.823	0.001	6.126	86.71	10.59	0	0	0	2.43
2001	335	23	1	356.546	-357.458	D	6.638	6.638	0	1.335	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	6.673	6.673	0	1.403	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.004	7.004	0	2.066	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.019	7.019	0	2.097	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	8.996	8.996	0	6.551	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	9.441	9.441	0	7.681	0	0	0	0	0	0
2001	341	23	785	365.637	-355.06	D	7.938	7.938	0	4.058	92.26	4.1	0	0	0	1.34
2001	342	23	934	366.01	-356.526	D	8.095	8.094	0.002	4.409	95.12	3.99	0	0	0	0.89
2001	343	23	1039	356.522	-357.599	D	6.6	6.6	0	1.26	82.11	6.91	0	0	0	12.29
2001	344	23	1	356.546	-357.458	D	6.512	6.512	0	1.09	90.54	4.49	0	0	0	5.39
2001	345	23	1	356.546	-357.458	D	6.558	6.558	0	1.178	93.6	3.24	0	0	0	3.5
2001	346	23	1	356.546	-357.458	D	9.566	9.566	0	8.007	0	0	0	0	0	0
2001	347	23	3	356.524	-356.959	D	9.597	9.597	0	8.089	93.32	4.42	0	0	0	0.48
2001	348	23	822	358.021	-361.607	D	8.798	8.785	0.013	6.033	94.15	4.92	0	0	0	0.92
2001	349	23	949	365.722	-354.966	D	8.8	8.789	0.01	6.043	96.96	2.46	0	0	0	0.56
2001	350	23	1	356.546	-357.458	D	10.116	10.116	0	9.495	0	0	0	0	0	0
2001	351	23	1035	356.477	-356.792	D	9.421	9.409	0.012	7.599	92.42	6.2	0	0	0	1.37
2001	352	23	774	365.389	-355.071	D	6.57	6.57	0	1.203	82.59	6.7	0	0	0	7.86
2001	353	23	1	356.546	-357.458	D	6.77	6.769	0	1.594	87.4	8.74	0	0	0	3.7
2001	354	23	44	358.21	-361.379	D	6.471	6.471	0	1.009	76.9	10.45	0	0	0	11.56
2001	355	23	1	356.546	-357.458	D	6.493	6.493	0	1.052	0	0	0	0	0	0
2001	356	23	255	360.129	-359.796	D	7.222	7.222	0	2.514	18.48	0.62	0	0	0	0.23
2001	357	23	1	356.546	-357.458	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2001	358	23	747	364.871	-354.594	D	6.481	6.481	0	1.029	73.08	13.18	0	0	0	13.52
2001	359	23	158	358.961	-355.853	D	6.501	6.5	0.001	1.067	69.59	14.5	0	0	0	15.98
2001	360	23	1	356.546	-357.458	D	6.534	6.533	0.001	1.131	62.28	19.4	0	0	0	18.16
2001	361	23	1	356.546	-357.458	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.034	7.034	0	2.128	0	0	0	0	0	0
2001	363	23	822	358.021	-361.607	D	6.604	6.604	0.001	1.268	77.32	11.73	0	0	0	10.58
2001	364	23	926	365.787	-357.56	D	6.552	6.55	0.002	1.163	71.65	13.99	0	0	0	14.29
2001	365	23	931	366.183	-356.996	D	6.616	6.616	0	1.292	73.86	14.47	0	0	0	11.49
									0.019							

TRIGEN KC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	784	365.648	-355.309	D	7.162	7.158	0.005	2.381	85.31	13.58	0	0	0	1.09

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	2	23	949	365.722	-354.966	D	7.304	7.265	0.039	2.603	94.68	5.08	0	0	0	0.23
2001	3	23	941	365.977	-355.774	D	8.585	8.568	0.017	5.511	96.66	3.24	0	0	0	0.08
2001	4	23	1	356.546	-357.458	D	8.279	8.279	0	4.833	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	7	23	809	357.432	-359.845	D	7.407	7.4	0.008	2.888	84.61	14.79	0	0	0	0.59
2001	8	23	949	365.722	-354.966	D	8.283	8.24	0.043	4.743	89.3	10.26	0	0	0	0.44
2001	9	23	822	358.021	-361.607	D	9.371	9.313	0.058	7.352	97.11	2.83	0	0	0	0.06
2001	10	23	809	357.432	-359.845	D	7.392	7.368	0.024	2.82	97.24	2.66	0	0	0	0.1
2001	11	23	966	363.538	-354.124	D	8.858	8.856	0.001	6.207	98.08	1.73	0	0	0	0.14
2001	12	23	1	356.546	-357.458	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	13	23	1	356.546	-357.458	D	10.094	10.094	0	9.433	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	9.682	9.682	0	8.316	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.24	7.24	0	2.553	0	0	0	0	0	0
2001	16	23	930	366.19	-357.232	D	6.752	6.746	0.006	1.549	84.7	13.82	0	0	0	1.43
2001	17	23	822	358.021	-361.607	D	6.755	6.755	0	1.566	90.62	9.01	0	0	0	0.77
2001	18	23	1017	356.894	-355.206	D	6.742	6.74	0.002	1.536	95.91	3.46	0	0	0	0.62
2001	19	23	906	364.982	-359.812	D	6.876	6.873	0.002	1.802	92.67	6.53	0	0	0	0.74
2001	20	23	809	357.432	-359.845	D	6.593	6.59	0.003	1.242	82.49	15.79	0	0	0	1.76
2001	21	23	941	365.977	-355.774	D	6.484	6.484	0	1.036	86.63	11.43	0	0	0	1.02
2001	22	23	949	365.722	-354.966	D	6.756	6.756	0	1.567	88.2	10.52	0	0	0	0.62
2001	23	23	1	356.546	-357.458	D	6.646	6.646	0	1.35	0	0	0	0	0	0
2001	24	23	1017	356.894	-355.206	D	6.774	6.768	0.005	1.592	94.98	4.66	0	0	0	0.31
2001	25	23	1	356.546	-357.458	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2001	26	23	1	356.546	-357.458	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	27	23	1035	356.477	-356.792	D	6.638	6.637	0.001	1.333	79.08	18.03	0	0	0	2.78
2001	28	23	1	356.546	-357.458	D	6.503	6.503	0	1.072	90.03	8.97	0	0	0	0.54
2001	29	23	1	356.546	-357.458	D	8.263	8.263	0	4.796	0	0	0	0	0	0
2001	30	23	1	356.546	-357.458	D	6.894	6.894	0	1.843	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.146	7.146	0	2.358	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	6.485	6.485	0	1.036	0	0	0	0	0	0
2001	33	23	949	365.722	-354.966	D	6.538	6.534	0.004	1.131	82.43	15.18	0	0	0	2.41
2001	34	23	930	366.19	-357.232	D	6.47	6.47	0	1.009	88.81	9.92	0	0	0	1.08
2001	35	23	1	356.546	-357.458	D	6.691	6.691	0	1.439	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	6.677	6.677	0	1.411	0	0	0	0	0	0
2001	37	23	966	363.538	-354.124	D	6.489	6.489	0	1.044	95.99	2.53	0	0	0	1.59
2001	38	23	966	363.538	-354.124	D	6.685	6.684	0.001	1.426	93.35	5.72	0	0	0	0.84
2001	39	23	1	356.546	-357.458	D	9.678	9.678	0	8.304	0	0	0	0	0	0
2001	40	23	986	360.908	-354.689	D	9.319	9.296	0.023	7.308	95.58	4.33	0	0	0	0.08

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	41	23	1039	356.522	-357.599	D	6.622	6.621	0.002	1.301	84.5	13.26	0	0	0	2.2
2001	42	23	1	356.546	-357.458	D	6.47	6.47	0	1.008	0	0	0	0	0	0
2001	43	23	1	356.546	-357.458	D	6.623	6.623	0	1.305	0	0	0	0	0	0
2001	44	23	1	356.546	-357.458	D	8.565	8.565	0	5.504	0	0	0	0	0	0
2001	45	23	10	356.954	-355.443	D	10.197	10.197	0	9.721	96.91	2.66	0	0	0	0.03
2001	46	23	836	360.07	-362.066	D	7.498	7.421	0.076	2.934	97.81	2.04	0	0	0	0.16
2001	47	23	1038	356.511	-357.396	D	6.652	6.626	0.026	1.312	94.78	4.83	0	0	0	0.38
2001	48	23	1	356.546	-357.458	D	6.522	6.522	0	1.108	0	0	0	0	0	0
2001	49	23	1	356.546	-357.458	D	6.472	6.471	0	1.011	94.89	4.38	0	0	0	0.68
2001	50	23	1	356.546	-357.458	D	6.483	6.483	0	1.034	92.94	4.09	0	0	0	0.42
2001	51	23	642	363.62	-354.4	D	7.205	7.205	0	2.48	97.92	0.85	0	0	0	0.29
2001	52	23	810	357.434	-360.005	D	6.73	6.729	0.001	1.514	97.74	2.14	0	0	0	0.17
2001	53	23	1035	356.477	-356.792	D	7.367	7.366	0.001	2.816	96.99	2.57	0	0	0	0.19
2001	54	23	1017	356.894	-355.206	D	6.805	6.804	0.001	1.664	94.01	5.27	0	0	0	0.48
2001	55	23	1	356.546	-357.458	D	9.629	9.629	0	8.175	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.355	7.355	0	2.792	0	0	0	0	0	0
2001	57	23	947	365.801	-355.162	D	6.502	6.502	0.001	1.07	95.6	3.48	0	0	0	0.84
2001	58	23	252	360.162	-360.544	D	6.532	6.531	0.001	1.126	97.31	2.29	0	0	0	0.36
2001	59	23	2	356.535	-357.209	D	6.848	6.848	0	1.751	96.71	2.23	0	0	0	0.11
2001	60	23	1	356.546	-357.458	D	6.611	6.611	0	1.281	98.4	1.4	0	0	0	0.13
2001	61	23	300	360.18	-355.3	D	7.93	7.93	0	4.04	96.36	1.02	0	0	0	0.05
2001	62	23	1008	358.048	-354.775	D	6.693	6.693	0	1.444	96.41	2.51	0	0	0	0.81
2001	63	23	1017	356.894	-355.206	D	6.595	6.586	0.009	1.234	97.25	2.39	0	0	0	0.34
2001	64	23	1035	356.477	-356.792	D	6.565	6.562	0.003	1.187	93.95	4.76	0	0	0	1.27
2001	65	23	270	359.964	-356.059	D	6.534	6.53	0.004	1.124	93.66	5.34	0	0	0	0.98
2001	66	23	1017	356.894	-355.206	D	6.474	6.471	0.004	1.009	97.47	1.72	0	0	0	0.85
2001	67	23	947	365.801	-355.162	D	6.582	6.565	0.017	1.192	94.54	4.5	0	0	0	0.96
2001	68	23	914	365.435	-358.584	D	6.507	6.503	0.004	1.072	94.16	4.66	0	0	0	1.17
2001	69	23	1	356.546	-357.458	D	6.471	6.471	0	1.01	92.67	1.65	0	0	0	0.59
2001	70	23	300	360.18	-355.3	D	6.48	6.48	0	1.028	95.72	1.66	0	0	0	0.41
2001	71	23	1	356.546	-357.458	D	8.688	8.688	0	5.798	92.86	1.22	0	0	0	0.11
2001	72	23	1	356.546	-357.458	D	6.535	6.535	0	1.135	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.113	7.113	0	2.29	0	0	0	0	0	0
2001	74	23	1	356.546	-357.458	D	9.86	9.86	0	8.793	0	0	0	0	0	0
2001	75	23	929	366.032	-357.239	D	7.211	7.209	0.002	2.488	93.36	5.42	0	0	0	1.07
2001	76	23	933	366.169	-356.524	D	6.669	6.668	0.001	1.394	88.95	8.94	0	0	0	2.04
2001	77	23	1	356.546	-357.458	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	78	23	1	356.546	-357.458	D	6.472	6.472	0	1.012	0	0	0	0	0	0
2001	79	23	1	356.546	-357.458	D	6.484	6.484	0	1.035	96.33	1.32	0	0	0	0.32

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	80	23	1	356.546	-357.458	D	6.473	6.473	0	1.014	97.51	1.01	0	0	0	0.41
2001	81	23	1017	356.894	-355.206	D	6.494	6.492	0.002	1.05	98.79	0.94	0	0	0	0.33
2001	82	23	933	366.169	-356.524	D	6.752	6.75	0.002	1.556	98.81	0.97	0	0	0	0.19
2001	83	23	933	366.169	-356.524	D	6.692	6.69	0.002	1.437	98.96	0.84	0	0	0	0.1
2001	84	23	247	360.217	-361.79	D	6.482	6.482	0	1.031	98.97	0.24	0	0	0	0.08
2001	85	23	811	357.434	-360.225	D	6.489	6.489	0	1.044	92.42	5.26	0	0	0	1.21
2001	86	23	1	356.546	-357.458	D	6.468	6.468	0	1.005	0	0	0	0	0	0
2001	87	23	1017	356.894	-355.206	D	6.484	6.483	0.001	1.034	97.8	1.89	0	0	0	0.27
2001	88	23	643	363.609	-354.151	D	6.936	6.936	0.001	1.928	98.9	1.2	0	0	0	0.14
2001	89	23	1017	356.894	-355.206	D	7.242	7.242	0.001	2.556	98.92	0.78	0	0	0	0.08
2001	90	23	933	366.169	-356.524	D	7.727	7.726	0.001	3.59	98.36	1.16	0	0	0	0.45
2001	91	23	899	364.071	-360.247	D	6.475	6.474	0.002	1.015	94.39	3.79	0	0	0	1.85
2001	92	23	929	366.032	-357.239	D	7.416	7.416	0	2.922	42.19	0.15	0	0	0	0.13
2001	93	23	1	356.546	-357.458	D	9.648	9.648	0	8.226	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	9.432	9.432	0	7.657	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.559	7.559	0	3.228	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	6.813	6.813	0	1.682	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.171	7.171	0	2.41	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	6.874	6.874	0	1.802	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.375	7.375	0	2.834	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	6.559	6.559	0	1.181	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	6.687	6.687	0	1.431	0	0	0	0	0	0
2001	105	23	986	360.908	-354.689	D	8.421	8.405	0.016	5.126	98.46	1.16	0	0	0	0.37
2001	106	23	543	362.627	-354.444	D	6.494	6.49	0.003	1.047	97.68	1.23	0	0	0	1.08
2001	107	23	836	360.07	-362.066	D	6.476	6.476	0.001	1.019	86.04	10.42	0	0	0	3.38
2001	108	23	1017	356.894	-355.206	D	6.481	6.479	0.002	1.026	98.68	0.83	0	0	0	0.48
2001	109	23	930	366.19	-357.232	D	6.541	6.54	0.001	1.143	99.3	0.43	0	0	0	0.25
2001	110	23	1	356.546	-357.458	D	8.502	8.502	0	5.355	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.602	7.602	0	3.321	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	8.495	8.495	0	5.339	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.659	7.659	0	3.445	0	0	0	0	0	0
2001	114	23	1039	356.522	-357.599	D	6.508	6.507	0.001	1.08	95.69	2.28	0	0	0	1.86
2001	115	23	1017	356.894	-355.206	D	6.484	6.482	0.002	1.03	98.52	0.95	0	0	0	0.48
2001	116	23	1	356.546	-357.458	D	6.587	6.587	0	1.236	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	6.583	6.583	0	1.227	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	119	23	931	366.183	-356.996	D	6.841	6.841	0	1.738	78.31	0.07	0	0	0	0.11
2001	120	23	1	356.546	-357.458	D	7.272	7.272	0	2.618	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	6.852	6.852	0	1.759	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	6.96	6.96	0	1.977	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	6.988	6.988	0	2.033	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.28	7.28	0	2.635	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	9.077	9.077	0	6.754	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2001	127	23	811	357.434	-360.225	D	8.163	8.16	0.003	4.56	99.22	0.22	0	0	0	0.54
2001	128	23	1017	356.894	-355.206	D	6.508	6.506	0.002	1.078	99.19	0.28	0	0	0	0.61
2001	129	23	967	363.478	-354.116	D	6.637	6.633	0.004	1.326	99.58	0.11	0	0	0	0.25
2001	130	23	930	366.19	-357.232	D	6.841	6.841	0	1.737	99.34	0.06	0	0	0	0.11
2001	131	23	929	366.032	-357.239	D	7.424	7.424	0	2.94	79.35	0.01	0	0	0	0.09
2001	132	23	932	366.176	-356.761	D	8.601	8.583	0.018	5.547	98.58	1.38	0	0	0	0.04
2001	133	23	1	356.546	-357.458	D	6.55	6.549	0.001	1.162	99.64	0.01	0	0	0	0.19
2001	134	23	933	366.169	-356.524	D	6.787	6.785	0.002	1.626	99.86	0.04	0	0	0	0.1
2001	135	23	1	356.546	-357.458	D	6.856	6.856	0	1.768	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	6.774	6.774	0	1.603	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.638	7.638	0	3.398	0	0	0	0	0	0
2001	138	23	1039	356.522	-357.599	D	8.018	8.015	0.003	4.231	99.7	0.28	0	0	0	0.05
2001	139	23	16	357.648	-359.906	D	8.679	8.652	0.026	5.713	99.74	0.24	0	0	0	0.02
2001	140	23	1009	357.941	-354.82	D	7.564	7.557	0.007	3.224	99.56	0.35	0	0	0	0.06
2001	141	23	949	365.722	-354.966	D	8.646	8.644	0.002	5.692	98.91	0.77	0	0	0	0.25
2001	142	23	1	356.546	-357.458	D	6.546	6.546	0	1.154	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	6.512	6.512	0	1.09	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	6.593	6.593	0	1.248	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	6.768	6.768	0	1.591	0	0	0	0	0	0
2001	148	23	948	365.727	-355.056	D	6.975	6.974	0.001	2.005	99.59	0.02	0	0	0	0.31
2001	149	23	227	359.892	-360.057	D	6.874	6.863	0.011	1.781	99.76	0.09	0	0	0	0.16
2001	150	23	949	365.722	-354.966	D	8.543	8.54	0.003	5.445	99.69	0.21	0	0	0	0.09
2001	151	23	298	360.201	-355.799	D	8.942	8.942	0	6.417	93.79	0.45	0	0	0	0.04
2001	152	23	773	365.4	-355.32	D	6.941	6.938	0.003	1.932	95.16	3.88	0	0	0	0.91
2001	153	23	810	357.434	-360.005	D	7.004	7.002	0.002	2.062	97.69	1.38	0	0	0	0.9
2001	154	23	949	365.722	-354.966	D	7.165	7.158	0.007	2.383	99.38	0.47	0	0	0	0.13
2001	155	23	543	362.627	-354.444	D	8.881	8.881	0	6.268	94.26	0.63	0	0	0	0.06
2001	156	23	255	360.129	-359.796	D	7.611	7.611	0	3.34	15.34	0.01	0	0	0	0.01
2001	157	23	1	356.546	-357.458	D	7.846	7.846	0	3.853	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	158	23	643	363.609	-354.151	D	7.5	7.492	0.008	3.084	99.58	0.29	0	0	0	0.11
2001	159	23	1017	356.894	-355.206	D	7.153	7.106	0.047	2.275	99.79	0.13	0	0	0	0.07
2001	160	23	822	358.021	-361.607	D	7.352	7.339	0.013	2.76	99.92	0.02	0	0	0	0.06
2001	161	23	1017	356.894	-355.206	D	7.061	7.047	0.015	2.153	99.89	0.03	0	0	0	0.07
2001	162	23	949	365.722	-354.966	D	7.165	7.161	0.004	2.389	99.89	0.01	0	0	0	0.05
2001	163	23	929	366.032	-357.239	D	6.949	6.949	0	1.955	100.92	0.01	0	0	0	0.05
2001	164	23	1	356.546	-357.458	D	6.969	6.969	0	1.995	0	0	0	0	0	0
2001	165	23	1	356.546	-357.458	D	7.214	7.214	0	2.497	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	8.124	8.124	0	4.479	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	6.529	6.529	0	1.123	0	0	0	0	0	0
2001	168	23	853	361.666	-362.175	D	6.561	6.56	0.001	1.182	99.59	0.01	0	0	0	0.26
2001	169	23	906	364.982	-359.812	D	6.668	6.665	0.003	1.388	99.78	0.01	0	0	0	0.18
2001	170	23	747	364.871	-354.594	D	6.957	6.956	0.001	1.969	99.77	0.01	0	0	0	0.11
2001	171	23	1	356.546	-357.458	D	6.83	6.83	0	1.716	0	0	0	0	0	0
2001	172	23	1017	356.894	-355.206	D	7.783	7.742	0.041	3.625	99.64	0.24	0	0	0	0.12
2001	173	23	1039	356.522	-357.599	D	6.774	6.768	0.006	1.592	99.39	0.05	0	0	0	0.55
2001	174	23	822	358.021	-361.607	D	6.639	6.637	0.002	1.333	99.35	0.11	0	0	0	0.53
2001	175	23	301	360.724	-362.017	D	6.67	6.67	0	1.397	95.67	0.03	0	0	0	0.27
2001	176	23	822	358.021	-361.607	D	7.127	7.125	0.002	2.313	99.82	0.04	0	0	0	0.11
2001	177	23	1017	356.894	-355.206	D	6.936	6.935	0.001	1.926	99.65	0.04	0	0	0	0.1
2001	178	23	10	356.954	-355.443	D	7.074	7.074	0	2.209	101.21	0.05	0	0	0	0.08
2001	179	23	3	356.524	-356.959	D	8.961	8.961	0	6.466	99.01	0.01	0	0	0	0.02
2001	180	23	1	356.546	-357.458	D	8.357	8.357	0	5.014	0	0	0	0	0	0
2001	181	23	1	356.546	-357.458	D	7.862	7.862	0	3.889	0	0	0	0	0	0
2001	182	23	973	362.512	-354.246	D	8.544	8.543	0.001	5.452	99.81	0.01	0	0	0	0.1
2001	183	23	934	366.01	-356.526	D	7.577	7.569	0.008	3.248	99.76	0.18	0	0	0	0.06
2001	184	23	933	366.169	-356.524	D	8.783	8.781	0.002	6.023	99.92	0.01	0	0	0	0.02
2001	185	23	1	356.546	-357.458	D	7.034	7.034	0	2.127	0	0	0	0	0	0
2001	186	23	964	363.678	-354.148	D	7.065	7.063	0.003	2.186	99.73	0.01	0	0	0	0.21
2001	187	23	900	364.265	-360.243	D	6.968	6.957	0.011	1.97	99.86	0.02	0	0	0	0.12
2001	188	23	941	365.977	-355.774	D	7.752	7.748	0.004	3.637	100	0.01	0	0	0	0.05
2001	189	23	1	356.546	-357.458	D	6.907	6.907	0	1.869	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	6.865	6.865	0	1.785	0	0	0	0	0	0
2001	191	23	949	365.722	-354.966	D	7.155	7.115	0.04	2.293	99.71	0.18	0	0	0	0.1
2001	192	23	836	360.07	-362.066	D	7.071	7.059	0.012	2.178	99.85	0.02	0	0	0	0.13
2001	193	23	1	356.546	-357.458	D	7.318	7.318	0	2.716	0	0	0	0	0	0
2001	194	23	1	356.546	-357.458	D	7.743	7.743	0	3.628	0	0	0	0	0	0
2001	195	23	1	356.546	-357.458	D	6.6	6.6	0	1.261	0	0	0	0	0	0
2001	196	23	1	356.546	-357.458	D	6.705	6.705	0	1.466	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	197	23	1	356.546	-357.458	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	9.025	9.025	0	6.623	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.494	7.494	0	3.089	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.083	7.083	0	2.227	0	0	0	0	0	0
2001	201	23	1	356.546	-357.458	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2001	202	23	1	356.546	-357.458	D	6.931	6.931	0	1.918	0	0	0	0	0	0
2001	203	23	1	356.546	-357.458	D	7.051	7.051	0	2.163	0	0	0	0	0	0
2001	204	23	1	356.546	-357.458	D	7.546	7.546	0	3.199	0	0	0	0	0	0
2001	205	23	1	356.546	-357.458	D	7.753	7.753	0	3.65	0	0	0	0	0	0
2001	206	23	1	356.546	-357.458	D	8.069	8.069	0	4.353	0	0	0	0	0	0
2001	207	23	964	363.678	-354.148	D	8.766	8.765	0.001	5.983	99.61	0.05	0	0	0	0.06
2001	208	23	643	363.609	-354.151	D	8.928	8.924	0.004	6.374	99.8	0.15	0	0	0	0.02
2001	209	23	932	366.176	-356.761	D	8.287	8.286	0.001	4.85	99.8	0.12	0	0	0	0.03
2001	210	23	784	365.648	-355.309	D	8.866	8.866	0	6.231	99.56	0.08	0	0	0	0.03
2001	211	23	933	366.169	-356.524	D	7.709	7.702	0.006	3.538	99.78	0.13	0	0	0	0.07
2001	212	23	933	366.169	-356.524	D	9.353	9.344	0.009	7.431	99.95	0.01	0	0	0	0.02
2001	213	23	931	366.183	-356.996	D	9.115	9.115	0	6.849	99.48	0	0	0	0	0.01
2001	214	23	1	356.546	-357.458	D	7.804	7.804	0	3.76	0	0	0	0	0	0
2001	215	23	1	356.546	-357.458	D	6.91	6.91	0	1.877	0	0	0	0	0	0
2001	216	23	930	366.19	-357.232	D	7.063	7.058	0.005	2.177	99.76	0.15	0	0	0	0.09
2001	217	23	2	356.535	-357.209	D	6.999	6.999	0	2.056	93.71	0.02	0	0	0	0.1
2001	218	23	266	360.008	-357.056	D	7.047	7.047	0	2.155	36.67	0.01	0	0	0	0.03
2001	219	23	1	356.546	-357.458	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.358	7.358	0	2.799	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.346	7.346	0	2.775	0	0	0	0	0	0
2001	222	23	933	366.169	-356.524	D	8.288	8.281	0.007	4.838	99.75	0.07	0	0	0	0.15
2001	223	23	853	361.666	-362.175	D	8.676	8.646	0.03	5.699	99.46	0.5	0	0	0	0.03
2001	224	23	905	364.788	-359.816	D	6.979	6.979	0	2.015	98.97	0.11	0	0	0	0.12
2001	225	23	906	364.982	-359.812	D	7.161	7.16	0.002	2.385	99.57	0.31	0	0	0	0.06
2001	226	23	1	356.546	-357.458	D	6.843	6.843	0	1.74	29.02	0	0	0	0	0.03
2001	227	23	1	356.546	-357.458	D	6.725	6.725	0	1.506	0	0	0	0	0	0
2001	228	23	949	365.722	-354.966	D	7.885	7.883	0.001	3.937	99.05	0.66	0	0	0	0.15
2001	229	23	247	360.217	-361.79	D	6.743	6.743	0	1.542	57.76	0.01	0	0	0	0.15
2001	230	23	930	366.19	-357.232	D	6.91	6.91	0	1.876	98.32	0.03	0	0	0	0.13
2001	231	23	1017	356.894	-355.206	D	6.929	6.929	0	1.914	97.9	1.21	0	0	0	1.03
2001	232	23	1035	356.477	-356.792	D	6.745	6.739	0.006	1.533	99.65	0.1	0	0	0	0.26
2001	233	23	643	363.609	-354.151	D	7.215	7.214	0.001	2.499	99.8	0.02	0	0	0	0.1
2001	234	23	1	356.546	-357.458	D	7.053	7.053	0	2.167	0	0	0	0	0	0
2001	235	23	1	356.546	-357.458	D	6.921	6.921	0	1.898	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	236	23	1	356.546	-357.458	D	6.927	6.927	0	1.91	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.112	7.112	0	2.287	0	0	0	0	0	0
2001	238	23	900	364.265	-360.243	D	8.266	8.253	0.013	4.774	97.25	2.62	0	0	0	0.12
2001	239	23	832	359.493	-362.061	D	7.236	7.235	0.001	2.543	99.47	0.16	0	0	0	0.15
2001	240	23	836	360.07	-362.066	D	7.115	7.113	0.002	2.289	99.72	0.04	0	0	0	0.11
2001	241	23	1002	359.309	-354.73	D	6.875	6.868	0.007	1.792	99.8	0.06	0	0	0	0.14
2001	242	23	901	364.256	-360.039	D	7.591	7.584	0.006	3.282	99.75	0.2	0	0	0	0.06
2001	243	23	966	363.538	-354.124	D	7.676	7.675	0.001	3.479	99.67	0.1	0	0	0	0.09
2001	244	23	934	366.01	-356.526	D	8.619	8.589	0.03	5.561	99.68	0.28	0	0	0	0.04
2001	245	23	996	360.121	-355.113	D	7.437	7.426	0.012	2.943	99.8	0.16	0	0	0	0.06
2001	246	23	1017	356.894	-355.206	D	7.44	7.436	0.004	2.965	99.95	0.03	0	0	0	0.06
2001	247	23	1009	357.941	-354.82	D	6.831	6.826	0.005	1.708	99.81	0.02	0	0	0	0.16
2001	248	23	1017	356.894	-355.206	D	7.218	7.209	0.009	2.488	99.83	0.06	0	0	0	0.1
2001	249	23	1008	358.048	-354.775	D	8.957	8.956	0.001	6.452	99.89	0.01	0	0	0	0.02
2001	250	23	1	356.546	-357.458	D	7.43	7.43	0	2.952	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	8.474	8.474	0	5.287	0	0	0	0	0	0
2001	252	23	811	357.434	-360.225	D	8.546	8.535	0.011	5.432	99.36	0.27	0	0	0	0.35
2001	253	23	930	366.19	-357.232	D	6.959	6.946	0.013	1.949	98.43	1.05	0	0	0	0.52
2001	254	23	1	356.546	-357.458	D	6.7	6.7	0	1.456	99.44	0.1	0	0	0	0.46
2001	255	23	84	358.173	-354.889	D	6.821	6.821	0	1.697	99.12	0.08	0	0	0	0.18
2001	256	23	643	363.609	-354.151	D	6.928	6.926	0.002	1.909	99.73	0.09	0	0	0	0.14
2001	257	23	974	362.281	-354.249	D	7.073	7.069	0.004	2.198	99.73	0.15	0	0	0	0.09
2001	258	23	1035	356.477	-356.792	D	6.733	6.732	0	1.521	99.23	0.03	0	0	0	0.1
2001	259	23	1	356.546	-357.458	D	6.687	6.686	0	1.43	98.13	0.15	0	0	0	0.11
2001	260	23	1	356.546	-357.458	D	6.958	6.958	0	1.972	0	0	0	0	0	0
2001	261	23	2	356.535	-357.209	D	8.862	8.862	0	6.222	102.11	1.03	0	0	0	0.11
2001	262	23	1017	356.894	-355.206	D	8.21	8.123	0.086	4.476	98.1	1.81	0	0	0	0.1
2001	263	23	930	366.19	-357.232	D	7.05	7.05	0	2.16	99.06	0.46	0	0	0	0.3
2001	264	23	643	363.609	-354.151	D	7.247	7.244	0.002	2.561	99.52	0.04	0	0	0	0.36
2001	265	23	853	361.666	-362.175	D	6.962	6.962	0	1.981	99.87	0.06	0	0	0	0.28
2001	266	23	845	360.851	-362.181	D	7.627	7.616	0.011	3.35	99.52	0.38	0	0	0	0.09
2001	267	23	853	361.666	-362.175	D	7.568	7.568	0.001	3.246	99.42	0.42	0	0	0	0.04
2001	268	23	1	356.546	-357.458	D	6.594	6.594	0	1.249	0	0	0	0	0	0
2001	269	23	1	356.546	-357.458	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	270	23	643	363.609	-354.151	D	6.61	6.609	0.001	1.277	99.35	0.19	0	0	0	0.31
2001	271	23	966	363.538	-354.124	D	6.681	6.665	0.016	1.388	99.59	0.17	0	0	0	0.23
2001	272	23	822	358.021	-361.607	D	6.988	6.987	0.002	2.031	99.78	0.07	0	0	0	0.16
2001	273	23	1	356.546	-357.458	D	6.998	6.998	0	2.053	0	0	0	0	0	0
2001	274	23	996	360.121	-355.113	D	7.265	7.265	0	2.604	97.95	0.17	0	0	0	0.23

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	275	23	948	365.727	-355.056	D	7.001	7.001	0	2.061	96.37	0.23	0	0	0	0.11
2001	276	23	1	356.546	-357.458	D	7.261	7.261	0	2.596	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.764	7.764	0	3.673	0	0	0	0	0	0
2001	278	23	810	357.434	-360.005	D	8.92	8.915	0.005	6.351	98.79	1.16	0	0	0	0.02
2001	279	23	822	358.021	-361.607	D	7.256	7.256	0	2.585	94.55	4.24	0	0	0	0.99
2001	280	23	941	365.977	-355.774	D	6.554	6.552	0.002	1.167	98.41	1.1	0	0	0	0.49
2001	281	23	643	363.609	-354.151	D	6.654	6.653	0	1.365	99.23	0.47	0	0	0	0.3
2001	282	23	1	356.546	-357.458	D	7.318	7.318	0	2.716	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	9.666	9.666	0	8.274	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	10.218	10.218	0	9.779	99.59	0.33	0	0	0	0.05
2001	285	23	1017	356.894	-355.206	D	9.609	9.591	0.018	8.074	98.33	1.61	0	0	0	0.04
2001	286	23	934	366.01	-356.526	D	9.948	9.927	0.021	8.975	99.47	0.48	0	0	0	0.04
2001	287	23	930	366.19	-357.232	D	7.165	7.144	0.021	2.354	98.95	1	0	0	0	0.05
2001	288	23	996	360.121	-355.113	D	6.946	6.945	0.001	1.947	94.6	5.31	0	0	0	0.06
2001	289	23	227	359.892	-360.057	D	7.215	7.204	0.011	2.477	95.53	4.3	0	0	0	0.17
2001	290	23	822	358.021	-361.607	D	6.495	6.492	0.003	1.05	95.02	3.79	0	0	0	1.21
2001	291	23	932	366.176	-356.761	D	6.56	6.559	0.001	1.18	99.07	0.6	0	0	0	0.35
2001	292	23	1017	356.894	-355.206	D	6.742	6.741	0.001	1.537	95.9	3.37	0	0	0	0.85
2001	293	23	974	362.281	-354.249	D	7.997	7.994	0.003	4.184	98.61	1.32	0	0	0	0.09
2001	294	23	1	356.546	-357.458	D	8.995	8.995	0	6.548	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	8.986	8.986	0	6.528	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	10.007	10.007	0	9.193	0	0	0	0	0	0
2001	297	23	934	366.01	-356.526	D	9.583	9.577	0.005	8.039	97.07	2.75	0	0	0	0.16
2001	298	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	300	23	949	365.722	-354.966	D	6.472	6.472	0.001	1.012	89.79	7.51	0	0	0	2.53
2001	301	23	15	357.659	-360.155	D	6.48	6.48	0	1.028	93.13	0.42	0	0	0	0.44
2001	302	23	1	356.546	-357.458	D	6.503	6.503	0	1.072	0	0	0	0	0	0
2001	303	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	6.64	6.64	0	1.34	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	8.087	8.087	0	4.394	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	9.437	9.437	0	7.673	0	0	0	0	0	0
2001	307	23	949	365.722	-354.966	D	9.2	9.195	0.005	7.05	96.77	3.15	0	0	0	0.06
2001	308	23	1037	356.5	-357.195	D	6.66	6.66	0.001	1.378	99.07	0.66	0	0	0	0.2
2001	309	23	1017	356.894	-355.206	D	9.088	8.902	0.186	6.319	97.65	2.31	0	0	0	0.05
2001	310	23	811	357.434	-360.225	D	7.174	7.133	0.041	2.331	99.34	0.55	0	0	0	0.12
2001	311	23	228	359.881	-359.807	D	7.402	7.375	0.027	2.836	99.55	0.37	0	0	0	0.08
2001	312	23	933	366.169	-356.524	D	7.608	7.601	0.007	3.318	99.6	0.23	0	0	0	0.17
2001	313	23	710	364.843	-359.589	D	6.589	6.589	0	1.239	98.87	0.07	0	0	0	0.14

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	314	23	380	361.468	-361.984	D	6.675	6.672	0.003	1.402	96.46	2.93	0	0	0	0.53
2001	315	23	643	363.609	-354.151	D	6.735	6.729	0.006	1.514	97.25	2	0	0	0	0.74
2001	316	23	1037	356.5	-357.195	D	6.664	6.663	0.001	1.383	98.7	0.7	0	0	0	0.51
2001	317	23	1035	356.477	-356.792	D	6.762	6.761	0.001	1.578	98.96	0.66	0	0	0	0.23
2001	318	23	929	366.032	-357.239	D	7.178	7.178	0	2.424	94.08	0.13	0	0	0	0.16
2001	319	23	1	356.546	-357.458	D	8.659	8.659	0	5.728	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	8.223	8.223	0	4.704	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.265	7.265	0	2.605	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.614	7.614	0	3.346	0	0	0	0	0	0
2001	323	23	934	366.01	-356.526	D	7.801	7.795	0.006	3.742	79.05	20.59	0	0	0	0.31
2001	324	23	1017	356.894	-355.206	D	6.479	6.474	0.005	1.017	86.27	11.23	0	0	0	2.5
2001	325	23	907	365.051	-359.809	D	6.472	6.47	0.002	1.008	95.35	3.79	0	0	0	0.86
2001	326	23	788	365.951	-356.544	D	6.517	6.517	0	1.099	97.84	1.5	0	0	0	0.35
2001	327	23	1	356.546	-357.458	D	7.077	7.077	0	2.216	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	9.009	9.009	0	6.585	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	6.691	6.691	0	1.44	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	6.906	6.906	0	1.868	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	6.949	6.949	0	1.955	0	0	0	0	0	0
2001	332	23	907	365.051	-359.809	D	8.645	8.638	0.007	5.678	84.05	15.71	0	0	0	0.25
2001	333	23	851	361.512	-362.072	D	10.092	10.092	0	9.427	96.41	2.55	0	0	0	0.02
2001	334	23	907	365.051	-359.809	D	8.826	8.823	0.003	6.127	93.48	6.29	0	0	0	0.19
2001	335	23	1	356.546	-357.458	D	6.638	6.638	0	1.335	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	6.673	6.673	0	1.403	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.004	7.004	0	2.066	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.019	7.019	0	2.097	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	8.996	8.996	0	6.551	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	9.441	9.441	0	7.681	0	0	0	0	0	0
2001	341	23	949	365.722	-354.966	D	7.939	7.938	0.002	4.058	94.98	4.83	0	0	0	0.14
2001	342	23	934	366.01	-356.526	D	8.106	8.094	0.012	4.409	96.87	3.06	0	0	0	0.07
2001	343	23	1039	356.522	-357.599	D	6.6	6.6	0	1.26	89.04	10.33	0	0	0	1.69
2001	344	23	10	356.954	-355.443	D	6.513	6.512	0	1.09	94.38	4.58	0	0	0	0.66
2001	345	23	1017	356.894	-355.206	D	6.558	6.558	0.001	1.178	96.35	3.05	0	0	0	0.41
2001	346	23	1	356.546	-357.458	D	9.566	9.566	0	8.007	0	0	0	0	0	0
2001	347	23	1035	356.477	-356.792	D	9.99	9.597	0.393	8.089	94.96	4.96	0	0	0	0.08
2001	348	23	836	360.07	-362.066	D	8.999	8.841	0.158	6.169	96.6	3.35	0	0	0	0.05
2001	349	23	949	365.722	-354.966	D	8.808	8.789	0.019	6.043	98.46	1.5	0	0	0	0.04
2001	350	23	1	356.546	-357.458	D	10.116	10.116	0	9.495	0	0	0	0	0	0
2001	351	23	1035	356.477	-356.792	D	9.46	9.409	0.051	7.599	96.36	3.56	0	0	0	0.08
2001	352	23	1	356.546	-357.458	D	6.564	6.564	0	1.19	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	353	23	1017	356.894	-355.206	D	6.771	6.769	0.002	1.594	93.49	6.02	0	0	0	0.41
2001	354	23	811	357.434	-360.225	D	6.471	6.471	0	1.009	89.73	8.63	0	0	0	1.69
2001	355	23	1	356.546	-357.458	D	6.493	6.493	0	1.052	0	0	0	0	0	0
2001	356	23	775	365.747	-357.551	D	7.222	7.222	0	2.514	76.39	1.6	0	0	0	0.14
2001	357	23	1	356.546	-357.458	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2001	358	23	949	365.722	-354.966	D	6.482	6.481	0.001	1.029	86.99	10.81	0	0	0	2.24
2001	359	23	494	362.175	-355.462	D	6.504	6.5	0.004	1.065	83.29	14.12	0	0	0	2.58
2001	360	23	1041	356.936	-357.592	D	6.538	6.533	0.004	1.131	79.15	18.54	0	0	0	2.32
2001	361	23	1	356.546	-357.458	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.034	7.034	0	2.128	0	0	0	0	0	0
2001	363	23	811	357.434	-360.225	D	6.606	6.604	0.002	1.268	90.64	8.26	0	0	0	1.02
2001	364	23	949	365.722	-354.966	D	6.557	6.55	0.007	1.163	85.28	12.93	0	0	0	1.76
2001	365	23	941	365.977	-355.774	D	6.621	6.617	0.003	1.294	86.66	11.98	0	0	0	1.38
									0.393							
UMC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	356.546	-357.458	D	7.162	7.162	0	2.39	0	0	0	0	0	0
2001	2	23	930	366.19	-357.232	D	7.273	7.27	0.003	2.615	88.79	11.12	0	0	0	0.05
2001	3	23	930	366.19	-357.232	D	8.576	8.576	0	5.529	90.86	9.31	0	0	0	0.03
2001	4	23	1	356.546	-357.458	D	8.279	8.279	0	4.833	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	7	23	1	356.546	-357.458	D	7.4	7.4	0	2.888	0	0	0	0	0	0
2001	8	23	1	356.546	-357.458	D	8.31	8.31	0	4.906	0	0	0	0	0	0
2001	9	23	786	365.973	-357.042	D	9.259	9.216	0.043	7.105	77.8	22.16	0	0	0	0.04
2001	10	23	941	365.977	-355.774	D	7.356	7.328	0.028	2.736	84.92	15.04	0	0	0	0.03
2001	11	23	1008	358.048	-354.775	D	8.863	8.858	0.005	6.211	90.23	9.68	0	0	0	0.02
2001	12	23	948	365.727	-355.056	D	10.218	10.218	0	9.779	91.69	7.55	0	0	0	0
2001	13	23	1	356.546	-357.458	D	10.094	10.094	0	9.433	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	9.682	9.682	0	8.316	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.24	7.24	0	2.553	0	0	0	0	0	0
2001	16	23	1	356.546	-357.458	D	6.751	6.751	0	1.558	0	0	0	0	0	0
2001	17	23	78	358.239	-356.385	D	6.929	6.762	0.167	1.58	79.55	20.33	0	0	0	0.12
2001	18	23	1017	356.894	-355.206	D	6.835	6.74	0.095	1.536	87.27	12.66	0	0	0	0.07
2001	19	23	907	365.051	-359.809	D	6.876	6.873	0.002	1.802	92.85	7.04	0	0	0	0.06
2001	20	23	1	356.546	-357.458	D	6.59	6.59	0	1.242	0	0	0	0	0	0
2001	21	23	1	356.546	-357.458	D	6.481	6.481	0	1.03	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	22	23	1	356.546	-357.458	D	6.759	6.759	0	1.574	0	0	0	0	0	0
2001	23	23	1	356.546	-357.458	D	6.646	6.646	0	1.35	0	0	0	0	0	0
2001	24	23	1	356.546	-357.458	D	6.768	6.768	0	1.592	0	0	0	0	0	0
2001	25	23	930	366.19	-357.232	D	6.633	6.607	0.026	1.274	66.08	33.68	0	0	0	0.23
2001	26	23	1035	356.477	-356.792	D	6.529	6.526	0.002	1.117	80.09	19.85	0	0	0	0.08
2001	27	23	1	356.546	-357.458	D	6.637	6.637	0	1.333	0	0	0	0	0	0
2001	28	23	930	366.19	-357.232	D	6.505	6.499	0.006	1.064	85.5	14.43	0	0	0	0.06
2001	29	23	929	366.032	-357.239	D	8.327	8.327	0	4.946	79.86	9.37	0	0	0	0.03
2001	30	23	1	356.546	-357.458	D	6.894	6.894	0	1.843	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.146	7.146	0	2.358	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	6.485	6.485	0	1.036	0	0	0	0	0	0
2001	33	23	1	356.546	-357.458	D	6.535	6.535	0	1.133	0	0	0	0	0	0
2001	34	23	1	356.546	-357.458	D	6.472	6.472	0	1.011	0	0	0	0	0	0
2001	35	23	1	356.546	-357.458	D	6.691	6.691	0	1.439	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	6.677	6.677	0	1.411	0	0	0	0	0	0
2001	37	23	1	356.546	-357.458	D	6.489	6.489	0	1.045	0	0	0	0	0	0
2001	38	23	967	363.478	-354.116	D	6.685	6.684	0.001	1.426	89.31	10.44	0	0	0	0.13
2001	39	23	1	356.546	-357.458	D	9.678	9.678	0	8.304	0	0	0	0	0	0
2001	40	23	1	356.546	-357.458	D	9.263	9.263	0	7.224	0	0	0	0	0	0
2001	41	23	785	365.637	-355.06	D	6.618	6.618	0	1.296	82.38	16.43	0	0	0	0.17
2001	42	23	964	363.678	-354.148	D	6.481	6.47	0.011	1.008	82.77	17.13	0	0	0	0.1
2001	43	23	62	357.925	-354.901	D	6.623	6.623	0	1.305	88.02	11.59	0	0	0	0.04
2001	44	23	1	356.546	-357.458	D	8.565	8.565	0	5.504	0	0	0	0	0	0
2001	45	23	974	362.281	-354.249	D	10.232	10.176	0.056	9.662	93.49	6.5	0	0	0	0.01
2001	46	23	933	366.169	-356.524	D	8.104	7.477	**0.627**	3.052	94.42	5.57	0	0	0	0.01
2001	47	23	907	365.051	-359.809	D	6.634	6.627	0.008	1.312	96.43	3.55	0	0	0	0.02
2001	48	23	1	356.546	-357.458	D	6.522	6.522	0	1.108	0	0	0	0	0	0
2001	49	23	930	366.19	-357.232	D	6.472	6.471	0.001	1.011	92.43	7.44	0	0	0	0.09
2001	50	23	930	366.19	-357.232	D	6.483	6.482	0.001	1.031	92.97	6.89	0	0	0	0.06
2001	51	23	1017	356.894	-355.206	D	7.23	7.229	0	2.53	97.03	3.01	0	0	0	0.06
2001	52	23	810	357.434	-360.005	D	6.732	6.729	0.003	1.514	91.89	8.1	0	0	0	0.04
2001	53	23	16	357.648	-359.906	D	7.379	7.366	0.013	2.816	91.86	8.11	0	0	0	0.03
2001	54	23	963	363.809	-354.192	D	6.826	6.803	0.023	1.661	88.65	11.31	0	0	0	0.04
2001	55	23	1	356.546	-357.458	D	9.629	9.629	0	8.175	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.355	7.355	0	2.792	0	0	0	0	0	0
2001	57	23	930	366.19	-357.232	D	6.502	6.502	0	1.069	96.85	3.31	0	0	0	0.15
2001	58	23	900	364.265	-360.243	D	6.538	6.531	0.007	1.126	92.55	7.37	0	0	0	0.07
2001	59	23	1035	356.477	-356.792	D	6.852	6.848	0.005	1.751	92.54	7.41	0	0	0	0.02
2001	60	23	1017	356.894	-355.206	D	6.613	6.611	0.002	1.281	94.9	5	0	0	0	0.03

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	61	23	928	365.945	-357.303	D	7.949	7.93	0.019	4.04	94.28	5.7	0	0	0	0.01
2001	62	23	906	364.982	-359.812	D	6.694	6.694	0	1.445	96.96	2.4	0	0	0	0.02
2001	63	23	78	358.239	-356.385	D	6.707	6.586	0.121	1.234	81.46	18.36	0	0	0	0.18
2001	64	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	65	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	66	23	927	365.912	-357.454	D	6.471	6.471	0	1.009	69.17	30.76	0	0	0	0.36
2001	67	23	1	356.546	-357.458	D	6.565	6.565	0	1.193	0	0	0	0	0	0
2001	68	23	930	366.19	-357.232	D	6.512	6.504	0.008	1.074	78.72	21.01	0	0	0	0.24
2001	69	23	930	366.19	-357.232	D	6.475	6.472	0.004	1.011	92.48	7.38	0	0	0	0.1
2001	70	23	949	365.722	-354.966	D	6.483	6.48	0.003	1.028	95.25	4.69	0	0	0	0.06
2001	71	23	190	359.165	-354.846	D	8.688	8.688	0	5.798	96.95	2.83	0	0	0	0.02
2001	72	23	1	356.546	-357.458	D	6.535	6.535	0	1.135	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.113	7.113	0	2.29	0	0	0	0	0	0
2001	74	23	10	356.954	-355.443	D	9.86	9.86	0	8.793	93.34	5.6	0	0	0	0.01
2001	75	23	933	366.169	-356.524	D	7.77	7.209	0.56	2.488	95.33	4.66	0	0	0	0.01
2001	76	23	1	356.546	-357.458	D	6.655	6.655	0	1.369	0	0	0	0	0	0
2001	77	23	931	366.183	-356.996	D	6.529	6.503	0.025	1.073	85.57	14.3	0	0	0	0.12
2001	78	23	1	356.546	-357.458	D	6.472	6.472	0	1.012	95.11	5.82	0	0	0	0.09
2001	79	23	1037	356.5	-357.195	D	6.486	6.484	0.002	1.035	90.31	9.56	0	0	0	0.1
2001	80	23	1038	356.511	-357.396	D	6.499	6.473	0.026	1.014	89.52	10.3	0	0	0	0.17
2001	81	23	907	365.051	-359.809	D	6.525	6.493	0.032	1.052	97.38	2.55	0	0	0	0.07
2001	82	23	930	366.19	-357.232	D	6.791	6.75	0.041	1.556	97.5	2.46	0	0	0	0.04
2001	83	23	1037	356.5	-357.195	D	6.767	6.686	0.081	1.43	90.52	9.43	0	0	0	0.05
2001	84	23	1	356.546	-357.458	D	6.483	6.483	0	1.034	0	0	0	0	0	0
2001	85	23	1	356.546	-357.458	D	6.491	6.491	0	1.048	0	0	0	0	0	0
2001	86	23	191	359.732	-362.061	D	6.468	6.468	0	1.005	103.87	2.07	0	0	0	0.06
2001	87	23	930	366.19	-357.232	D	6.492	6.481	0.011	1.03	94.11	5.85	0	0	0	0.05
2001	88	23	973	362.512	-354.246	D	6.936	6.936	0.001	1.928	95.51	4.5	0	0	0	0.02
2001	89	23	1016	357.1	-355.198	D	7.243	7.242	0.001	2.556	97.44	2.52	0	0	0	0.01
2001	90	23	933	366.169	-356.524	D	7.727	7.726	0.001	3.59	97.21	2.8	0	0	0	0
2001	91	23	1	356.546	-357.458	D	6.473	6.473	0	1.013	0	0	0	0	0	0
2001	92	23	1	356.546	-357.458	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	9.648	9.648	0	8.226	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	9.432	9.432	0	7.657	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.559	7.559	0	3.228	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	6.813	6.813	0	1.682	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.171	7.171	0	2.41	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	6.874	6.874	0	1.802	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	100	23	1	356.546	-357.458	D	7.375	7.375	0	2.834	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	6.559	6.559	0	1.181	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	6.687	6.687	0	1.431	0	0	0	0	0	0
2001	105	23	949	365.722	-354.966	D	8.411	8.405	0.007	5.126	98.58	1.4	0	0	0	0.04
2001	106	23	930	366.19	-357.232	D	6.491	6.491	0	1.049	91.03	8.86	0	0	0	0.31
2001	107	23	1	356.546	-357.458	D	6.477	6.477	0	1.021	0	0	0	0	0	0
2001	108	23	1	356.546	-357.458	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	109	23	1	356.546	-357.458	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	110	23	1	356.546	-357.458	D	8.502	8.502	0	5.355	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.602	7.602	0	3.321	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	8.495	8.495	0	5.339	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.659	7.659	0	3.445	0	0	0	0	0	0
2001	114	23	1	356.546	-357.458	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	115	23	1	356.546	-357.458	D	6.482	6.482	0	1.03	0	0	0	0	0	0
2001	116	23	1	356.546	-357.458	D	6.587	6.587	0	1.236	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	6.583	6.583	0	1.227	0	0	0	0	0	0
2001	119	23	1	356.546	-357.458	D	6.862	6.862	0	1.778	0	0	0	0	0	0
2001	120	23	1	356.546	-357.458	D	7.272	7.272	0	2.618	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	6.852	6.852	0	1.759	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	6.96	6.96	0	1.977	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	6.988	6.988	0	2.033	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.28	7.28	0	2.635	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	9.077	9.077	0	6.754	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2001	127	23	1	356.546	-357.458	D	8.162	8.162	0	4.564	0	0	0	0	0	0
2001	128	23	1	356.546	-357.458	D	6.506	6.506	0	1.078	0	0	0	0	0	0
2001	129	23	907	365.051	-359.809	D	6.634	6.633	0	1.326	99.62	0.34	0	0	0	0.05
2001	130	23	907	365.051	-359.809	D	6.84	6.838	0.002	1.731	99.83	0.15	0	0	0	0.02
2001	131	23	932	366.176	-356.761	D	7.424	7.424	0	2.94	99.3	0.04	0	0	0	0.01
2001	132	23	958	364.309	-354.601	D	8.68	8.603	0.076	5.595	87.26	12.7	0	0	0	0.05
2001	133	23	961	364.092	-354.289	D	6.635	6.55	0.086	1.163	99.49	0.45	0	0	0	0.06
2001	134	23	930	366.19	-357.232	D	6.79	6.785	0.004	1.626	99.82	0.11	0	0	0	0.03
2001	135	23	247	360.217	-361.79	D	6.852	6.852	0	1.758	84.34	0.01	0	0	0	0.02
2001	136	23	1	356.546	-357.458	D	6.774	6.774	0	1.603	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.638	7.638	0	3.398	0	0	0	0	0	0
2001	138	23	1017	356.894	-355.206	D	8.069	8.015	0.054	4.231	96.64	3.35	0	0	0	0.01

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	139	23	949	365.722	-354.966	D	9.391	8.695	0.696	5.816	95.95	4.04	0	0	0	0.01
2001	140	23	961	364.092	-354.289	D	7.566	7.544	0.022	3.196	99.78	0.16	0	0	0	0.06
2001	141	23	1	356.546	-357.458	D	8.617	8.617	0	5.629	0	0	0	0	0	0
2001	142	23	1	356.546	-357.458	D	6.546	6.546	0	1.154	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	6.512	6.512	0	1.09	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	6.593	6.593	0	1.248	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	6.768	6.768	0	1.591	0	0	0	0	0	0
2001	148	23	770	365.433	-356.067	D	6.974	6.974	0	2.005	97.99	0.05	0	0	0	0.06
2001	149	23	930	366.19	-357.232	D	6.879	6.849	0.031	1.753	99.66	0.31	0	0	0	0.02
2001	150	23	949	365.722	-354.966	D	8.548	8.54	0.007	5.445	99.46	0.51	0	0	0	0.01
2001	151	23	1017	356.894	-355.206	D	8.886	8.828	0.058	6.138	99.45	0.53	0	0	0	0.01
2001	152	23	930	366.19	-357.232	D	6.949	6.935	0.014	1.927	99.73	0.26	0	0	0	0.01
2001	153	23	1	356.546	-357.458	D	7.018	7.018	0	2.095	0	0	0	0	0	0
2001	154	23	1	356.546	-357.458	D	7.181	7.181	0	2.429	0	0	0	0	0	0
2001	155	23	1	356.546	-357.458	D	8.898	8.898	0	6.309	0	0	0	0	0	0
2001	156	23	1	356.546	-357.458	D	7.529	7.529	0	3.162	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.846	7.846	0	3.853	0	0	0	0	0	0
2001	158	23	933	366.169	-356.524	D	7.557	7.51	0.048	3.122	99.85	0.12	0	0	0	0.03
2001	159	23	1035	356.477	-356.792	D	7.402	7.106	0.296	2.275	99.37	0.61	0	0	0	0.02
2001	160	23	1017	356.894	-355.206	D	7.459	7.332	0.127	2.745	99.66	0.32	0	0	0	0.02
2001	161	23	1017	356.894	-355.206	D	7.128	7.047	0.081	2.153	99.88	0.11	0	0	0	0.01
2001	162	23	949	365.722	-354.966	D	7.17	7.161	0.008	2.389	99.95	0.03	0	0	0	0.01
2001	163	23	929	366.032	-357.239	D	6.949	6.949	0	1.955	99.57	0.02	0	0	0	0.01
2001	164	23	1	356.546	-357.458	D	6.969	6.969	0	1.995	0	0	0	0	0	0
2001	165	23	1	356.546	-357.458	D	7.214	7.214	0	2.497	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	8.124	8.124	0	4.479	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	6.529	6.529	0	1.123	0	0	0	0	0	0
2001	168	23	822	358.021	-361.607	D	6.557	6.557	0.001	1.176	99.96	0.01	0	0	0	0.04
2001	169	23	906	364.982	-359.812	D	6.672	6.665	0.007	1.388	99.94	0.03	0	0	0	0.03
2001	170	23	1004	358.889	-354.745	D	6.958	6.958	0	1.972	99.77	0.01	0	0	0	0.02
2001	171	23	1	356.546	-357.458	D	6.83	6.83	0	1.716	0	0	0	0	0	0
2001	172	23	1008	358.048	-354.775	D	7.884	7.742	0.142	3.625	98.86	1.13	0	0	0	0.01
2001	173	23	907	365.051	-359.809	D	6.773	6.772	0.001	1.599	99.75	0.16	0	0	0	0.02
2001	174	23	949	365.722	-354.966	D	6.643	6.64	0.004	1.338	99.81	0.07	0	0	0	0.07
2001	175	23	941	365.977	-355.774	D	6.687	6.668	0.019	1.394	99.84	0.12	0	0	0	0.04
2001	176	23	949	365.722	-354.966	D	7.145	7.104	0.041	2.271	99.88	0.1	0	0	0	0.02
2001	177	23	967	363.478	-354.116	D	6.963	6.935	0.028	1.927	99.91	0.07	0	0	0	0.02

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	178	23	1017	356.894	-355.206	D	7.086	7.074	0.012	2.209	99.92	0.08	0	0	0	0.01
2001	179	23	967	363.478	-354.116	D	8.978	8.963	0.014	6.471	99.8	0.19	0	0	0	0
2001	180	23	973	362.512	-354.246	D	8.434	8.433	0.001	5.191	99.78	0.07	0	0	0	0.01
2001	181	23	1	356.546	-357.458	D	7.862	7.862	0	3.889	0	0	0	0	0	0
2001	182	23	1017	356.894	-355.206	D	8.73	8.52	0.21	5.397	99.12	0.87	0	0	0	0.01
2001	183	23	933	366.169	-356.524	D	8.114	7.569	**0.546**	3.248	98.57	1.42	0	0	0	0.01
2001	184	23	933	366.169	-356.524	D	8.859	8.781	0.078	6.023	99.94	0.05	0	0	0	0
2001	185	23	774	365.389	-355.071	D	7.042	7.041	0	2.143	98.82	0.01	0	0	0	0.01
2001	186	23	789	365.918	-355.796	D	7.063	7.063	0	2.186	95.49	0.03	0	0	0	0.04
2001	187	23	949	365.722	-354.966	D	7.11	6.95	0.16	1.956	99.9	0.08	0	0	0	0.02
2001	188	23	941	365.977	-355.774	D	7.758	7.748	0.011	3.637	99.97	0.03	0	0	0	0.01
2001	189	23	1	356.546	-357.458	D	6.907	6.907	0	1.869	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	6.865	6.865	0	1.785	0	0	0	0	0	0
2001	191	23	941	365.977	-355.774	D	7.115	7.115	0	2.293	99.07	0.15	0	0	0	0.03
2001	192	23	930	366.19	-357.232	D	7.175	7.056	0.119	2.172	99.63	0.34	0	0	0	0.03
2001	193	23	219	359.98	-362.05	D	7.655	7.437	0.218	2.967	99.82	0.17	0	0	0	0.01
2001	194	23	900	364.265	-360.243	D	7.96	7.763	0.197	3.671	99.45	0.54	0	0	0	0.01
2001	195	23	822	358.021	-361.607	D	6.611	6.601	0.01	1.263	99.96	0.03	0	0	0	0.01
2001	196	23	808	357.43	-359.686	D	6.705	6.705	0.001	1.466	99.71	0.02	0	0	0	0.01
2001	197	23	1	356.546	-357.458	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	9.025	9.025	0	6.623	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.494	7.494	0	3.089	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.083	7.083	0	2.227	0	0	0	0	0	0
2001	201	23	933	366.169	-356.524	D	7.469	7.469	0	3.034	99.95	0.02	0	0	0	0.02
2001	202	23	933	366.169	-356.524	D	7.057	7.045	0.012	2.15	99.78	0.21	0	0	0	0.01
2001	203	23	930	366.19	-357.232	D	7.411	7.367	0.043	2.819	99.88	0.11	0	0	0	0.01
2001	204	23	930	366.19	-357.232	D	7.781	7.741	0.04	3.622	99.92	0.07	0	0	0	0
2001	205	23	929	366.032	-357.239	D	7.876	7.854	0.022	3.871	99.96	0.04	0	0	0	0
2001	206	23	986	360.908	-354.689	D	8.138	8.118	0.02	4.465	99.86	0.13	0	0	0	0
2001	207	23	933	366.169	-356.524	D	8.792	8.77	0.022	5.997	99.92	0.07	0	0	0	0.01
2001	208	23	949	365.722	-354.966	D	9.44	8.924	**0.516**	6.374	99.34	0.66	0	0	0	0
2001	209	23	933	366.169	-356.524	D	8.503	8.286	0.217	4.85	99.35	0.64	0	0	0	0
2001	210	23	949	365.722	-354.966	D	8.9	8.866	0.034	6.231	99.8	0.2	0	0	0	0
2001	211	23	933	366.169	-356.524	D	7.745	7.702	0.043	3.538	99.92	0.07	0	0	0	0.01
2001	212	23	933	366.169	-356.524	D	9.445	9.344	0.101	7.431	99.97	0.02	0	0	0	0
2001	213	23	933	366.169	-356.524	D	9.158	9.115	0.042	6.849	99.94	0.06	0	0	0	0
2001	214	23	933	366.169	-356.524	D	7.9	7.893	0.006	3.959	99.97	0.02	0	0	0	0
2001	215	23	747	364.871	-354.594	D	6.915	6.915	0	1.885	99.81	0.03	0	0	0	0.01
2001	216	23	933	366.169	-356.524	D	7.121	7.058	0.063	2.177	99.52	0.45	0	0	0	0.04

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	217	23	1039	356.522	-357.599	D	7.003	6.999	0.004	2.056	99.85	0.05	0	0	0	0.03
2001	218	23	1	356.546	-357.458	D	7.068	7.068	0	2.197	96.96	0	0	0	0	0.03
2001	219	23	1	356.546	-357.458	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.358	7.358	0	2.799	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.346	7.346	0	2.775	0	0	0	0	0	0
2001	222	23	949	365.722	-354.966	D	8.34	8.292	0.047	4.864	99.86	0.12	0	0	0	0.02
2001	223	23	933	366.169	-356.524	D	9.631	8.635	**0.996**	5.672	99.12	0.87	0	0	0	0.01
2001	224	23	836	360.07	-362.066	D	7.301	6.979	0.322	2.015	99.78	0.2	0	0	0	0.03
2001	225	23	1035	356.477	-356.792	D	7.269	7.146	0.124	2.356	99.63	0.34	0	0	0	0.04
2001	226	23	907	365.051	-359.809	D	6.999	6.855	0.144	1.766	99.5	0.45	0	0	0	0.05
2001	227	23	1017	356.894	-355.206	D	6.752	6.725	0.027	1.506	99.86	0.11	0	0	0	0.03
2001	228	23	948	365.727	-355.056	D	7.884	7.883	0	3.937	98.9	0.02	0	0	0	0.02
2001	229	23	1	356.546	-357.458	D	6.757	6.757	0	1.569	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	6.883	6.883	0	1.821	0	0	0	0	0	0
2001	231	23	1	356.546	-357.458	D	6.929	6.929	0	1.914	0	0	0	0	0	0
2001	232	23	947	365.801	-355.162	D	6.736	6.732	0.003	1.521	99.55	0.41	0	0	0	0.04
2001	233	23	941	365.977	-355.774	D	7.217	7.214	0.002	2.499	99.93	0.04	0	0	0	0.02
2001	234	23	1	356.546	-357.458	D	7.053	7.053	0	2.167	0	0	0	0	0	0
2001	235	23	929	366.032	-357.239	D	6.939	6.939	0	1.934	99.43	0.07	0	0	0	0.01
2001	236	23	1	356.546	-357.458	D	6.927	6.927	0	1.91	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.112	7.112	0	2.287	0	0	0	0	0	0
2001	238	23	1	356.546	-357.458	D	8.255	8.255	0	4.778	0	0	0	0	0	0
2001	239	23	955	364.92	-354.582	D	7.59	7.265	0.325	2.604	99.27	0.71	0	0	0	0.02
2001	240	23	929	366.032	-357.239	D	7.45	7.15	0.3	2.365	99.83	0.15	0	0	0	0.01
2001	241	23	832	359.493	-362.061	D	6.982	6.878	0.103	1.812	99.87	0.11	0	0	0	0.02
2001	242	23	810	357.434	-360.005	D	7.692	7.591	0.102	3.296	99.68	0.31	0	0	0	0.01
2001	243	23	901	364.256	-360.039	D	7.787	7.779	0.008	3.706	99.74	0.25	0	0	0	0.01
2001	244	23	933	366.169	-356.524	D	8.758	8.589	0.169	5.561	99.25	0.74	0	0	0	0.01
2001	245	23	1035	356.477	-356.792	D	7.49	7.408	0.082	2.906	99.39	0.6	0	0	0	0.01
2001	246	23	1017	356.894	-355.206	D	7.447	7.436	0.011	2.965	99.91	0.09	0	0	0	0.01
2001	247	23	967	363.478	-354.116	D	6.861	6.823	0.038	1.701	99.92	0.06	0	0	0	0.02
2001	248	23	967	363.478	-354.116	D	7.269	7.197	0.072	2.463	99.76	0.22	0	0	0	0.01
2001	249	23	966	363.538	-354.124	D	8.973	8.946	0.027	6.429	99.94	0.05	0	0	0	0
2001	250	23	1	356.546	-357.458	D	7.43	7.43	0	2.952	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	8.474	8.474	0	5.287	0	0	0	0	0	0
2001	252	23	1	356.546	-357.458	D	8.546	8.546	0	5.459	0	0	0	0	0	0
2001	253	23	1	356.546	-357.458	D	6.969	6.969	0	1.996	0	0	0	0	0	0
2001	254	23	1008	358.048	-354.775	D	6.712	6.7	0.012	1.456	99.26	0.7	0	0	0	0.04
2001	255	23	1035	356.477	-356.792	D	6.822	6.821	0.001	1.697	99.74	0.22	0	0	0	0.03

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	256	23	970	363.145	-354.231	D	6.927	6.926	0.001	1.909	99.58	0.16	0	0	0	0.02
2001	257	23	966	363.538	-354.124	D	7.125	7.069	0.057	2.198	99.36	0.62	0	0	0	0.02
2001	258	23	811	357.434	-360.225	D	6.745	6.74	0.005	1.535	99.94	0.07	0	0	0	0.02
2001	259	23	1035	356.477	-356.792	D	6.688	6.686	0.002	1.43	99.78	0.12	0	0	0	0.02
2001	260	23	62	357.925	-354.901	D	6.959	6.958	0.002	1.972	99.74	0.11	0	0	0	0.01
2001	261	23	948	365.727	-355.056	D	8.905	8.904	0.001	6.324	99.53	0.44	0	0	0	0
2001	262	23	949	365.722	-354.966	D	8.136	8.103	0.033	4.43	97.43	2.57	0	0	0	0
2001	263	23	1	356.546	-357.458	D	7.025	7.025	0	2.109	0	0	0	0	0	0
2001	264	23	1	356.546	-357.458	D	7.242	7.242	0	2.556	0	0	0	0	0	0
2001	265	23	930	366.19	-357.232	D	6.955	6.949	0.006	1.955	99.07	0.83	0	0	0	0.08
2001	266	23	907	365.051	-359.809	D	7.69	7.681	0.01	3.491	99.39	0.58	0	0	0	0.02
2001	267	23	930	366.19	-357.232	D	7.712	7.662	0.05	3.449	89.54	10.34	0	0	0	0.12
2001	268	23	930	366.19	-357.232	D	6.607	6.59	0.017	1.24	94.63	5.23	0	0	0	0.14
2001	269	23	907	365.051	-359.809	D	6.618	6.54	0.078	1.144	97.24	2.7	0	0	0	0.06
2001	270	23	835	359.911	-362.063	D	6.678	6.615	0.063	1.29	99.36	0.6	0	0	0	0.04
2001	271	23	219	359.98	-362.05	D	6.732	6.678	0.054	1.413	99.51	0.45	0	0	0	0.04
2001	272	23	822	358.021	-361.607	D	6.988	6.987	0.001	2.031	99.89	0.11	0	0	0	0.03
2001	273	23	1	356.546	-357.458	D	6.998	6.998	0	2.053	0	0	0	0	0	0
2001	274	23	1008	358.048	-354.775	D	7.293	7.263	0.03	2.601	98.51	1.47	0	0	0	0.02
2001	275	23	949	365.722	-354.966	D	7.016	7.001	0.015	2.061	99.63	0.35	0	0	0	0.01
2001	276	23	1	356.546	-357.458	D	7.261	7.261	0	2.596	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.764	7.764	0	3.673	0	0	0	0	0	0
2001	278	23	811	357.434	-360.225	D	9.245	8.915	0.33	6.351	94.19	5.8	0	0	0	0.01
2001	279	23	930	366.19	-357.232	D	7.204	7.202	0.003	2.472	90.4	9.53	0	0	0	0.04
2001	280	23	907	365.051	-359.809	D	6.554	6.552	0.002	1.167	99.41	0.55	0	0	0	0.06
2001	281	23	900	364.265	-360.243	D	6.689	6.657	0.033	1.371	97.78	2.19	0	0	0	0.03
2001	282	23	1	356.546	-357.458	D	7.318	7.318	0	2.716	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	9.666	9.666	0	8.274	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	10.23	10.218	0.012	9.779	94.93	5.06	0	0	0	0.01
2001	285	23	1017	356.894	-355.206	D	10.167	9.591	**0.576**	8.074	93.37	6.63	0	0	0	0.01
2001	286	23	934	366.01	-356.526	D	9.988	9.927	0.061	8.975	99.36	0.64	0	0	0	0
2001	287	23	930	366.19	-357.232	D	7.192	7.144	0.048	2.354	98.34	1.65	0	0	0	0.01
2001	288	23	1	356.546	-357.458	D	6.921	6.921	0	1.899	0	0	0	0	0	0
2001	289	23	949	365.722	-354.966	D	7.171	7.171	0	2.408	90.61	9.34	0	0	0	0.01
2001	290	23	710	364.843	-359.589	D	6.492	6.492	0	1.05	40.4	0.38	0	0	0	0.03
2001	291	23	930	366.19	-357.232	D	6.562	6.559	0.003	1.18	97.43	2.54	0	0	0	0.02
2001	292	23	1	356.546	-357.458	D	6.741	6.741	0	1.537	0	0	0	0	0	0
2001	293	23	1	356.546	-357.458	D	7.888	7.888	0	3.946	0	0	0	0	0	0
2001	294	23	1	356.546	-357.458	D	8.995	8.995	0	6.548	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	295	23	1	356.546	-357.458	D	8.986	8.986	0	6.528	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	10.007	10.007	0	9.193	0	0	0	0	0	0
2001	297	23	1	356.546	-357.458	D	9.504	9.504	0	7.846	0	0	0	0	0	0
2001	298	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	300	23	1	356.546	-357.458	D	6.472	6.472	0	1.011	0	0	0	0	0	0
2001	301	23	933	366.169	-356.524	D	6.499	6.482	0.016	1.032	93.76	6.16	0	0	0	0.08
2001	302	23	1017	356.894	-355.206	D	6.504	6.503	0.001	1.072	97.56	2.43	0	0	0	0.03
2001	303	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	6.64	6.64	0	1.34	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	8.087	8.087	0	4.394	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	9.437	9.437	0	7.673	0	0	0	0	0	0
2001	307	23	927	365.912	-357.454	D	9.35	9.195	0.155	7.05	94.98	5.01	0	0	0	0.01
2001	308	23	1035	356.477	-356.792	D	6.674	6.66	0.015	1.378	99.03	0.95	0	0	0	0.03
2001	309	23	927	365.912	-357.454	D	9.078	8.864	0.214	6.227	93.54	6.45	0	0	0	0.01
2001	310	23	832	359.493	-362.061	D	7.228	7.133	0.095	2.331	97.81	2.17	0	0	0	0.02
2001	311	23	228	359.881	-359.807	D	7.464	7.375	0.089	2.836	99.15	0.84	0	0	0	0.01
2001	312	23	933	366.169	-356.524	D	7.615	7.601	0.014	3.318	99.61	0.37	0	0	0	0.01
2001	313	23	927	365.912	-357.454	D	6.636	6.589	0.047	1.239	79.05	20.66	0	0	0	0.29
2001	314	23	930	366.19	-357.232	D	6.666	6.665	0	1.389	96.88	2.81	0	0	0	0.12
2001	315	23	773	365.4	-355.32	D	6.755	6.729	0.025	1.514	91.8	8.01	0	0	0	0.19
2001	316	23	822	358.021	-361.607	D	6.672	6.664	0.008	1.387	97.02	2.85	0	0	0	0.1
2001	317	23	1035	356.477	-356.792	D	6.771	6.761	0.01	1.578	98.75	1.21	0	0	0	0.03
2001	318	23	62	357.925	-354.901	D	7.181	7.18	0.001	2.428	99.5	0.29	0	0	0	0.02
2001	319	23	1	356.546	-357.458	D	8.659	8.659	0	5.728	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	8.223	8.223	0	4.704	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.265	7.265	0	2.605	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.614	7.614	0	3.346	0	0	0	0	0	0
2001	323	23	1	356.546	-357.458	D	7.828	7.828	0	3.814	0	0	0	0	0	0
2001	324	23	1	356.546	-357.458	D	6.474	6.474	0	1.017	0	0	0	0	0	0
2001	325	23	1	356.546	-357.458	D	6.47	6.47	0	1.008	0	0	0	0	0	0
2001	326	23	907	365.051	-359.809	D	6.517	6.517	0	1.099	93.66	5.59	0	0	0	0.07
2001	327	23	1	356.546	-357.458	D	7.077	7.077	0	2.216	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	9.009	9.009	0	6.585	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	6.691	6.691	0	1.44	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	6.906	6.906	0	1.868	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	6.949	6.949	0	1.955	0	0	0	0	0	0
2001	332	23	930	366.19	-357.232	D	8.911	8.674	0.236	5.765	83.23	16.75	0	0	0	0.02
2001	333	23	1035	356.477	-356.792	D	10.422	10.026	0.396	9.247	88.49	11.5	0	0	0	0.01

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	334	23	822	358.021	-361.607	D	9.612	8.714	**0.898**	5.861	92.91	7.08	0	0	0	0.01
2001	335	23	1	356.546	-357.458	D	6.638	6.638	0	1.335	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	6.673	6.673	0	1.403	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.004	7.004	0	2.066	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.019	7.019	0	2.097	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	8.996	8.996	0	6.551	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	9.441	9.441	0	7.681	0	0	0	0	0	0
2001	341	23	948	365.727	-355.056	D	7.938	7.938	0	4.058	95.09	3.41	0	0	0	0.02
2001	342	23	934	366.01	-356.526	D	8.282	8.094	0.188	4.409	91.05	8.93	0	0	0	0.02
2001	343	23	930	366.19	-357.232	D	6.599	6.598	0.001	1.257	84.93	14.8	0	0	0	0.22
2001	344	23	930	366.19	-357.232	D	6.521	6.513	0.008	1.091	83.49	16.38	0	0	0	0.13
2001	345	23	930	366.19	-357.232	D	6.563	6.557	0.005	1.178	91.13	8.81	0	0	0	0.06
2001	346	23	299	360.19	-355.549	D	9.529	9.529	0	7.91	93.53	5.11	0	0	0	0.03
2001	347	23	1	356.546	-357.458	D	9.597	9.597	0	8.089	0	0	0	0	0	0
2001	348	23	933	366.169	-356.524	D	8.899	8.856	0.043	6.206	95.23	4.77	0	0	0	0
2001	349	23	786	365.973	-357.042	D	8.79	8.789	0.001	6.043	98.66	1.08	0	0	0	0.01
2001	350	23	949	365.722	-354.966	D	10.126	10.116	0.01	9.495	96.6	3.37	0	0	0	0
2001	351	23	930	366.19	-357.232	D	9.777	9.443	0.334	7.687	86.35	13.63	0	0	0	0.01
2001	352	23	519	362.902	-360.673	D	6.568	6.568	0	1.198	92.98	2.23	0	0	0	0.01
2001	353	23	1	356.546	-357.458	D	6.769	6.769	0	1.594	0	0	0	0	0	0
2001	354	23	1	356.546	-357.458	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	355	23	1	356.546	-357.458	D	6.493	6.493	0	1.052	0	0	0	0	0	0
2001	356	23	786	365.973	-357.042	D	7.222	7.222	0	2.514	89.64	4.79	0	0	0	0.01
2001	357	23	1	356.546	-357.458	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	6.481	6.481	0	1.029	0	0	0	0	0	0
2001	359	23	1	356.546	-357.458	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	360	23	1	356.546	-357.458	D	6.533	6.533	0	1.131	0	0	0	0	0	0
2001	361	23	1	356.546	-357.458	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.034	7.034	0	2.128	0	0	0	0	0	0
2001	363	23	1	356.546	-357.458	D	6.604	6.604	0	1.269	0	0	0	0	0	0
2001	364	23	1	356.546	-357.458	D	6.55	6.55	0	1.163	0	0	0	0	0	0
2001	365	23	1	356.546	-357.458	D	6.616	6.616	0	1.292	0	0	0	0	0	0
									0.996							
NORANDA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	356.546	-357.458	D	7.162	7.162	0	2.39	0	0	0	0	0	0
2001	2	23	1	356.546	-357.458	D	7.263	7.263	0	2.599	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	3	23	1	356.546	-357.458	D	8.553	8.553	0	5.476	0	0	0	0	0	0
2001	4	23	1	356.546	-357.458	D	8.279	8.279	0	4.833	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	7	23	1	356.546	-357.458	D	7.4	7.4	0	2.888	0	0	0	0	0	0
2001	8	23	1	356.546	-357.458	D	8.31	8.31	0	4.906	0	0	0	0	0	0
2001	9	23	1	356.546	-357.458	D	9.291	9.291	0	7.294	0	0	0	0	0	0
2001	10	23	927	365.912	-357.454	D	7.328	7.328	0	2.736	98.28	0.01	0	0	0.07	0.71
2001	11	23	932	366.176	-356.761	D	8.856	8.855	0	6.204	96.95	0.06	0	0	0.08	2.74
2001	12	23	1	356.546	-357.458	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	13	23	930	366.19	-357.232	D	10.088	10.079	0.008	9.394	99.35	0.08	0	0	0.02	0.53
2001	14	23	941	365.977	-355.774	D	9.693	9.689	0.003	8.335	99.63	0.04	0	0	0	0.31
2001	15	23	1	356.546	-357.458	D	7.24	7.24	0	2.553	0	0	0	0	0	0
2001	16	23	1	356.546	-357.458	D	6.751	6.751	0	1.558	0	0	0	0	0	0
2001	17	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	18	23	1	356.546	-357.458	D	6.74	6.74	0	1.536	0	0	0	0	0	0
2001	19	23	1	356.546	-357.458	D	6.894	6.894	0	1.843	0	0	0	0	0	0
2001	20	23	1	356.546	-357.458	D	6.59	6.59	0	1.242	0	0	0	0	0	0
2001	21	23	1	356.546	-357.458	D	6.481	6.481	0	1.03	0	0	0	0	0	0
2001	22	23	1	356.546	-357.458	D	6.759	6.759	0	1.574	0	0	0	0	0	0
2001	23	23	1	356.546	-357.458	D	6.646	6.646	0	1.35	0	0	0	0	0	0
2001	24	23	1	356.546	-357.458	D	6.768	6.768	0	1.592	0	0	0	0	0	0
2001	25	23	1	356.546	-357.458	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2001	26	23	930	366.19	-357.232	D	6.522	6.522	0	1.108	86.77	0.21	0	0	0.19	12.96
2001	27	23	1	356.546	-357.458	D	6.637	6.637	0	1.333	0	0	0	0	0	0
2001	28	23	933	366.169	-356.524	D	6.51	6.499	0.011	1.064	75.32	0.31	0	0	1.41	22.97
2001	29	23	62	357.925	-354.901	D	8.263	8.263	0	4.796	85.85	0.35	0	0	0.02	10.69
2001	30	23	1	356.546	-357.458	D	6.894	6.894	0	1.843	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.146	7.146	0	2.358	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	6.485	6.485	0	1.036	0	0	0	0	0	0
2001	33	23	1	356.546	-357.458	D	6.535	6.535	0	1.133	0	0	0	0	0	0
2001	34	23	1	356.546	-357.458	D	6.472	6.472	0	1.011	0	0	0	0	0	0
2001	35	23	1	356.546	-357.458	D	6.691	6.691	0	1.439	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	6.677	6.677	0	1.411	0	0	0	0	0	0
2001	37	23	1	356.546	-357.458	D	6.489	6.489	0	1.045	0	0	0	0	0	0
2001	38	23	947	365.801	-355.162	D	6.693	6.684	0.008	1.426	65.21	0.43	0	0	1.32	33.03
2001	39	23	1	356.546	-357.458	D	9.678	9.678	0	8.304	0	0	0	0	0	0
2001	40	23	1	356.546	-357.458	D	9.263	9.263	0	7.224	0	0	0	0	0	0
2001	41	23	1	356.546	-357.458	D	6.621	6.621	0	1.301	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	42	23	853	361.666	-362.175	D	6.472	6.47	0.002	1.008	95.14	0.03	0	0	0.3	4.57
2001	43	23	965	363.588	-354.142	D	6.642	6.63	0.012	1.318	80.85	0.36	0	0	0.11	18.67
2001	44	23	1	356.546	-357.458	D	8.565	8.565	0	5.504	0	0	0	0	0	0
2001	45	23	1	356.546	-357.458	D	10.197	10.197	0	9.721	0	0	0	0	0	0
2001	46	23	930	366.19	-357.232	D	7.477	7.477	0	3.052	86.05	0.15	0	0	0.34	18.39
2001	47	23	668	364.346	-359.61	D	6.627	6.627	0	1.312	77.35	0.75	0	0	0.09	20.13
2001	48	23	1	356.546	-357.458	D	6.522	6.522	0	1.108	0	0	0	0	0	0
2001	49	23	1	356.546	-357.458	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	50	23	907	365.051	-359.809	D	6.483	6.482	0.001	1.032	89.21	0.13	0	0	0.21	10.38
2001	51	23	1	356.546	-357.458	D	7.229	7.229	0	2.53	0	0	0	0	0	0
2001	52	23	310	360.625	-359.775	D	6.706	6.706	0	1.468	22.98	0	0	0	10.19	30.88
2001	53	23	906	364.982	-359.812	D	7.369	7.369	0	2.823	76.91	0.01	0	0	3.84	19.08
2001	54	23	900	364.265	-360.243	D	6.815	6.813	0.003	1.681	87.51	0.16	0	0	1.71	10.63
2001	55	23	997	359.928	-355.117	D	9.648	9.629	0.019	8.175	98.06	0.18	0	0	0.03	1.73
2001	56	23	1	356.546	-357.458	D	7.355	7.355	0	2.792	0	0	0	0	0	0
2001	57	23	1	356.546	-357.458	D	6.502	6.502	0	1.07	0	0	0	0	0	0
2001	58	23	853	361.666	-362.175	D	6.552	6.531	0.021	1.126	88.45	0.11	0	0	0.54	10.9
2001	59	23	809	357.432	-359.845	D	6.866	6.848	0.019	1.751	93.41	0.1	0	0	0.2	6.3
2001	60	23	853	361.666	-362.175	D	6.604	6.599	0.005	1.259	91.18	0.05	0	0	0.99	7.8
2001	61	23	907	365.051	-359.809	D	7.944	7.93	0.014	4.04	98.03	0.04	0	0	0.04	1.87
2001	62	23	907	365.051	-359.809	D	6.694	6.694	0	1.445	96.85	0.02	0	0	0.03	2.84
2001	63	23	15	357.659	-360.155	D	6.584	6.584	0	1.229	61.59	0.26	0	0	0.02	15.07
2001	64	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	65	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	66	23	1	356.546	-357.458	D	6.471	6.471	0	1.009	0	0	0	0	0	0
2001	67	23	1	356.546	-357.458	D	6.565	6.565	0	1.193	0	0	0	0	0	0
2001	68	23	1	356.546	-357.458	D	6.503	6.503	0	1.072	0	0	0	0	0	0
2001	69	23	44	358.21	-361.379	D	6.471	6.471	0	1.01	65.22	0.02	0	0	1.17	7.73
2001	70	23	907	365.051	-359.809	D	6.482	6.48	0.002	1.028	90.01	0.07	0	0	0.22	9.68
2001	71	23	747	364.871	-354.594	D	8.659	8.659	0	5.728	99.29	0.03	0	0	0.05	2.69
2001	72	23	1	356.546	-357.458	D	6.535	6.535	0	1.135	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.113	7.113	0	2.29	0	0	0	0	0	0
2001	74	23	1	356.546	-357.458	D	9.86	9.86	0	8.793	0	0	0	0	0	0
2001	75	23	934	366.01	-356.526	D	7.242	7.209	0.033	2.488	98.26	0.13	0	0	0.03	1.58
2001	76	23	1	356.546	-357.458	D	6.655	6.655	0	1.369	0	0	0	0	0	0
2001	77	23	1	356.546	-357.458	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	78	23	1	356.546	-357.458	D	6.472	6.472	0	1.012	0	0	0	0	0	0
2001	79	23	1	356.546	-357.458	D	6.484	6.484	0	1.035	0	0	0	0	0	0
2001	80	23	1	356.546	-357.458	D	6.473	6.473	0	1.014	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	81	23	1	356.546	-357.458	D	6.492	6.492	0	1.05	0	0	0	0	0	0
2001	82	23	907	365.051	-359.809	D	6.737	6.721	0.015	1.499	93.95	0.01	0	0	0.46	5.58
2001	83	23	907	365.051	-359.809	D	6.749	6.689	0.06	1.435	95.26	0.02	0	0	0.11	4.61
2001	84	23	1	356.546	-357.458	D	6.483	6.483	0	1.034	0	0	0	0	0	0
2001	85	23	1	356.546	-357.458	D	6.491	6.491	0	1.048	0	0	0	0	0	0
2001	86	23	1	356.546	-357.458	D	6.468	6.468	0	1.005	0	0	0	0	0	0
2001	87	23	191	359.732	-362.061	D	6.488	6.483	0.005	1.034	89.73	0.12	0	0	0.97	9.14
2001	88	23	643	363.609	-354.151	D	6.938	6.936	0.002	1.928	94.75	0.07	0	0	0.2	4.99
2001	89	23	219	359.98	-362.05	D	7.331	7.266	0.065	2.605	98.71	0.05	0	0	0.06	1.18
2001	90	23	930	366.19	-357.232	D	7.749	7.726	0.023	3.59	98.73	0.07	0	0	0.05	1.15
2001	91	23	642	363.62	-354.4	D	6.473	6.473	0	1.014	90.76	0.15	0	0	0.07	7.04
2001	92	23	1	356.546	-357.458	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2001	93	23	949	365.722	-354.966	D	9.647	9.646	0.001	8.218	96.84	0.04	0	0	0.06	2.96
2001	94	23	949	365.722	-354.966	D	9.968	9.456	**0.512**	7.722	98.9	0.09	0	0	0.07	0.94
2001	95	23	964	363.678	-354.148	D	7.709	7.631	0.078	3.384	98.11	0.04	0	0	0.03	1.82
2001	96	23	1	356.546	-357.458	D	7.559	7.559	0	3.228	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	6.813	6.813	0	1.682	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.171	7.171	0	2.41	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	6.874	6.874	0	1.802	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.375	7.375	0	2.834	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	6.559	6.559	0	1.181	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	6.687	6.687	0	1.431	0	0	0	0	0	0
2001	105	23	1	356.546	-357.458	D	8.379	8.379	0	5.066	0	0	0	0	0	0
2001	106	23	1	356.546	-357.458	D	6.489	6.489	0	1.045	0	0	0	0	0	0
2001	107	23	1	356.546	-357.458	D	6.477	6.477	0	1.021	0	0	0	0	0	0
2001	108	23	1	356.546	-357.458	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	109	23	1	356.546	-357.458	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	110	23	1	356.546	-357.458	D	8.502	8.502	0	5.355	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.602	7.602	0	3.321	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	8.495	8.495	0	5.339	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.659	7.659	0	3.445	0	0	0	0	0	0
2001	114	23	1	356.546	-357.458	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	115	23	1	356.546	-357.458	D	6.482	6.482	0	1.03	0	0	0	0	0	0
2001	116	23	1	356.546	-357.458	D	6.587	6.587	0	1.236	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	6.583	6.583	0	1.227	0	0	0	0	0	0
2001	119	23	941	365.977	-355.774	D	6.848	6.847	0.001	1.75	82.61	0.01	0	0	0.49	16.94

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	120	23	947	365.801	-355.162	D	7.203	7.198	0.004	2.466	97.91	0	0	0	0.06	1.99
2001	121	23	1	356.546	-357.458	D	6.852	6.852	0	1.759	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	6.96	6.96	0	1.977	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	6.988	6.988	0	2.033	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.28	7.28	0	2.635	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	9.077	9.077	0	6.754	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2001	127	23	1	356.546	-357.458	D	8.162	8.162	0	4.564	0	0	0	0	0	0
2001	128	23	1	356.546	-357.458	D	6.506	6.506	0	1.078	0	0	0	0	0	0
2001	129	23	1	356.546	-357.458	D	6.631	6.631	0	1.321	0	0	0	0	0	0
2001	130	23	1	356.546	-357.458	D	6.846	6.846	0	1.747	0	0	0	0	0	0
2001	131	23	1	356.546	-357.458	D	7.488	7.488	0	3.075	0	0	0	0	0	0
2001	132	23	1	356.546	-357.458	D	8.544	8.544	0	5.453	0	0	0	0	0	0
2001	133	23	1	356.546	-357.458	D	6.549	6.549	0	1.162	0	0	0	0	0	0
2001	134	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	135	23	1	356.546	-357.458	D	6.856	6.856	0	1.768	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	6.774	6.774	0	1.603	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.638	7.638	0	3.398	0	0	0	0	0	0
2001	138	23	1	356.546	-357.458	D	8.015	8.015	0	4.231	0	0	0	0	0	0
2001	139	23	1	356.546	-357.458	D	8.652	8.652	0	5.713	0	0	0	0	0	0
2001	140	23	1	356.546	-357.458	D	7.557	7.557	0	3.224	0	0	0	0	0	0
2001	141	23	1	356.546	-357.458	D	8.617	8.617	0	5.629	0	0	0	0	0	0
2001	142	23	1	356.546	-357.458	D	6.546	6.546	0	1.154	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	6.512	6.512	0	1.09	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	6.593	6.593	0	1.248	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	6.768	6.768	0	1.591	0	0	0	0	0	0
2001	148	23	1	356.546	-357.458	D	6.979	6.979	0	2.016	0	0	0	0	0	0
2001	149	23	1039	356.522	-357.599	D	6.877	6.847	0.03	1.748	94.63	0	0	0	0.54	4.83
2001	150	23	955	364.92	-354.582	D	8.543	8.54	0.003	5.445	94.42	0.01	0	0	0.34	5.23
2001	151	23	1017	356.894	-355.206	D	8.84	8.828	0.012	6.138	96.78	0.02	0	0	0.08	3.1
2001	152	23	933	366.169	-356.524	D	6.969	6.935	0.034	1.927	98.33	0.01	0	0	0.03	1.63
2001	153	23	1	356.546	-357.458	D	7.018	7.018	0	2.095	0	0	0	0	0	0
2001	154	23	822	358.021	-361.607	D	7.248	7.18	0.068	2.427	96.36	0.03	0	0	0.13	3.47
2001	155	23	967	363.478	-354.116	D	8.882	8.881	0	6.268	98.79	0.01	0	0	0.03	0.94
2001	156	23	1	356.546	-357.458	D	7.529	7.529	0	3.162	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.846	7.846	0	3.853	0	0	0	0	0	0
2001	158	23	1	356.546	-357.458	D	7.49	7.49	0	3.08	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	159	23	301	360.724	-362.017	D	7.102	7.102	0	2.266	84.18	0.07	0	0	0.12	10.21
2001	160	23	852	361.595	-362.148	D	7.349	7.349	0	2.78	98.71	0	0	0	0.22	0.93
2001	161	23	219	359.98	-362.05	D	7.102	7.06	0.042	2.18	97.85	0	0	0	0.14	2.01
2001	162	23	930	366.19	-357.232	D	7.252	7.179	0.074	2.424	98.06	0	0	0	0.1	1.84
2001	163	23	934	366.01	-356.526	D	6.977	6.949	0.028	1.955	98.15	0	0	0	0.13	1.72
2001	164	23	785	365.637	-355.06	D	6.971	6.971	0	2	97.63	0	0	0	0.06	1.36
2001	165	23	1	356.546	-357.458	D	7.214	7.214	0	2.497	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	8.124	8.124	0	4.479	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	6.529	6.529	0	1.123	0	0	0	0	0	0
2001	168	23	380	361.468	-361.984	D	6.56	6.56	0	1.182	58.62	0	0	0	11.92	25.51
2001	169	23	1035	356.477	-356.792	D	6.696	6.664	0.031	1.387	97.57	0	0	0	0.17	2.25
2001	170	23	265	360.019	-357.305	D	6.956	6.956	0	1.969	72.02	0	0	0	0.05	2.56
2001	171	23	1	356.546	-357.458	D	6.83	6.83	0	1.716	0	0	0	0	0	0
2001	172	23	1	356.546	-357.458	D	7.742	7.742	0	3.625	0	0	0	0	0	0
2001	173	23	1	356.546	-357.458	D	6.768	6.768	0	1.592	0	0	0	0	0	0
2001	174	23	1	356.546	-357.458	D	6.633	6.633	0	1.326	0	0	0	0	0	0
2001	175	23	1	356.546	-357.458	D	6.679	6.679	0	1.415	0	0	0	0	0	0
2001	176	23	907	365.051	-359.809	D	7.114	7.104	0.01	2.271	99.01	0	0	0	0.15	0.83
2001	177	23	930	366.19	-357.232	D	7.055	6.949	0.107	1.954	97.47	0	0	0	0.2	2.32
2001	178	23	933	366.169	-356.524	D	7.203	7.08	0.123	2.222	98.28	0	0	0	0.12	1.6
2001	179	23	964	363.678	-354.148	D	9.172	8.963	0.208	6.471	99.51	0.01	0	0	0.02	0.46
2001	180	23	974	362.281	-354.249	D	8.449	8.433	0.016	5.191	99.28	0	0	0	0.02	0.68
2001	181	23	255	360.129	-359.796	D	7.767	7.767	0	3.68	29.15	0	0	0	0.01	2.43
2001	182	23	785	365.637	-355.06	D	8.543	8.543	0.001	5.452	93.11	0.04	0	0	0.21	6.28
2001	183	23	932	366.176	-356.761	D	7.571	7.569	0.003	3.248	95.66	0.03	0	0	0.11	4.19
2001	184	23	930	366.19	-357.232	D	8.787	8.781	0.006	6.023	98.6	0	0	0	0.03	1.35
2001	185	23	775	365.747	-357.551	D	7.042	7.041	0	2.143	95.24	0	0	0	0.38	4.02
2001	186	23	1	356.546	-357.458	D	7.048	7.048	0	2.156	0	0	0	0	0	0
2001	187	23	1	356.546	-357.458	D	6.943	6.943	0	1.943	0	0	0	0	0	0
2001	188	23	928	365.945	-357.303	D	7.749	7.748	0.001	3.637	99.5	0	0	0	0.02	0.48
2001	189	23	1	356.546	-357.458	D	6.907	6.907	0	1.869	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	6.865	6.865	0	1.785	0	0	0	0	0	0
2001	191	23	1	356.546	-357.458	D	7.127	7.127	0	2.318	0	0	0	0	0	0
2001	192	23	1	356.546	-357.458	D	7.053	7.053	0	2.166	0	0	0	0	0	0
2001	193	23	947	365.801	-355.162	D	7.331	7.253	0.078	2.578	95.48	0	0	0	0.22	4.31
2001	194	23	811	357.434	-360.225	D	8.018	7.801	0.217	3.754	98.49	0.02	0	0	0.03	1.46
2001	195	23	821	358.053	-361.416	D	6.601	6.601	0	1.263	87.89	0	0	0	0.3	13.75
2001	196	23	809	357.432	-359.845	D	6.73	6.705	0.025	1.466	93.59	0	0	0	0.98	5.42
2001	197	23	1009	357.941	-354.82	D	6.984	6.982	0.003	2.021	87.75	0	0	0	0.43	11.78

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	198	23	618	363.371	-354.411	D	9.01	9.01	0	6.587	90.84	0.03	0	0	0.05	8.59
2001	199	23	1	356.546	-357.458	D	7.494	7.494	0	3.089	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.083	7.083	0	2.227	0	0	0	0	0	0
2001	201	23	1	356.546	-357.458	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2001	202	23	900	364.265	-360.243	D	6.947	6.947	0	1.95	86.73	0.01	0	0	0.17	6.15
2001	203	23	930	366.19	-357.232	D	7.368	7.367	0.001	2.819	98.45	0	0	0	0.07	1.42
2001	204	23	930	366.19	-357.232	D	7.807	7.741	0.067	3.622	99.13	0	0	0	0.05	0.82
2001	205	23	255	360.129	-359.796	D	7.928	7.821	0.107	3.799	99.31	0	0	0	0.03	0.66
2001	206	23	996	360.121	-355.113	D	8.221	8.118	0.103	4.465	99.46	0	0	0	0.02	0.52
2001	207	23	901	364.256	-360.039	D	8.872	8.807	0.065	6.087	99.62	0	0	0	0.01	0.37
2001	208	23	947	365.801	-355.162	D	8.976	8.924	0.052	6.374	99.55	0.01	0	0	0.01	0.43
2001	209	23	930	366.19	-357.232	D	8.336	8.286	0.05	4.85	99.42	0.01	0	0	0.02	0.55
2001	210	23	930	366.19	-357.232	D	8.838	8.838	0	6.161	98.57	0	0	0	0.01	0.94
2001	211	23	15	357.659	-360.155	D	7.65	7.65	0	3.424	29.48	0	0	0	0.03	1.27
2001	212	23	933	366.169	-356.524	D	9.383	9.344	0.039	7.431	99.52	0	0	0	0.06	0.41
2001	213	23	930	366.19	-357.232	D	9.224	9.115	0.109	6.849	99.42	0	0	0	0.03	0.54
2001	214	23	934	366.01	-356.526	D	7.915	7.893	0.021	3.959	99.4	0	0	0	0.03	0.58
2001	215	23	933	366.169	-356.524	D	6.931	6.93	0.002	1.915	99.04	0	0	0	0.04	0.91
2001	216	23	930	366.19	-357.232	D	7.058	7.058	0	2.177	98.2	0	0	0	0.04	1.44
2001	217	23	310	360.625	-359.775	D	6.982	6.982	0	2.022	84.42	0	0	0	0.1	0.69
2001	218	23	63	358.458	-361.368	D	7.069	7.069	0	2.198	34.02	0	0	0	12.6	24.7
2001	219	23	853	361.666	-362.175	D	7.706	7.277	0.429	2.63	98.01	0	0	0	0.28	1.7
2001	220	23	822	358.021	-361.607	D	7.462	7.385	0.078	2.856	98.59	0	0	0	0.14	1.27
2001	221	23	900	364.265	-360.243	D	7.402	7.378	0.024	2.842	99	0	0	0	0.05	0.95
2001	222	23	929	366.032	-357.239	D	8.281	8.281	0	4.838	98.85	0	0	0	0.04	0.72
2001	223	23	1	356.546	-357.458	D	8.634	8.634	0	5.668	0	0	0	0	0	0
2001	224	23	907	365.051	-359.809	D	6.979	6.979	0	2.015	94.42	0	0	0	0.52	4.72
2001	225	23	853	361.666	-362.175	D	7.16	7.158	0.002	2.382	98.35	0.02	0	0	0.08	1.53
2001	226	23	1	356.546	-357.458	D	6.843	6.843	0	1.74	54.82	0	0	0	0.14	3.32
2001	227	23	1	356.546	-357.458	D	6.725	6.725	0	1.506	0	0	0	0	0	0
2001	228	23	1	356.546	-357.458	D	7.815	7.815	0	3.785	0	0	0	0	0	0
2001	229	23	1	356.546	-357.458	D	6.757	6.757	0	1.569	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	6.883	6.883	0	1.821	0	0	0	0	0	0
2001	231	23	1	356.546	-357.458	D	6.929	6.929	0	1.914	0	0	0	0	0	0
2001	232	23	1	356.546	-357.458	D	6.739	6.739	0	1.533	0	0	0	0	0	0
2001	233	23	1	356.546	-357.458	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	234	23	1	356.546	-357.458	D	7.053	7.053	0	2.167	0	0	0	0	0	0
2001	235	23	329	360.972	-362.006	D	6.929	6.929	0	1.915	93.22	0	0	0	0.01	0.37
2001	236	23	1	356.546	-357.458	D	6.927	6.927	0	1.91	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	237	23	1	356.546	-357.458	D	7.112	7.112	0	2.287	0	0	0	0	0	0
2001	238	23	1	356.546	-357.458	D	8.255	8.255	0	4.778	0	0	0	0	0	0
2001	239	23	1	356.546	-357.458	D	7.264	7.264	0	2.603	0	0	0	0	0	0
2001	240	23	1	356.546	-357.458	D	7.063	7.063	0	2.187	0	0	0	0	0	0
2001	241	23	1	356.546	-357.458	D	6.868	6.868	0	1.792	0	0	0	0	0	0
2001	242	23	1	356.546	-357.458	D	7.487	7.487	0	3.073	0	0	0	0	0	0
2001	243	23	1	356.546	-357.458	D	7.675	7.675	0	3.479	0	0	0	0	0	0
2001	244	23	1	356.546	-357.458	D	8.257	8.257	0	4.784	0	0	0	0	0	0
2001	245	23	836	360.07	-362.066	D	7.794	7.434	0.36	2.961	97.3	0.05	0	0	0.2	2.45
2001	246	23	822	358.021	-361.607	D	7.484	7.442	0.042	2.978	98.78	0	0	0	0.09	1.13
2001	247	23	1035	356.477	-356.792	D	6.83	6.826	0.004	1.708	98.48	0	0	0	0.12	1.38
2001	248	23	219	359.98	-362.05	D	7.331	7.216	0.115	2.502	97.35	0	0	0	0.47	2.17
2001	249	23	967	363.478	-354.116	D	9.155	8.946	0.208	6.429	98.87	0.01	0	0	0.04	1.07
2001	250	23	1	356.546	-357.458	D	7.43	7.43	0	2.952	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	8.474	8.474	0	5.287	0	0	0	0	0	0
2001	252	23	1	356.546	-357.458	D	8.546	8.546	0	5.459	0	0	0	0	0	0
2001	253	23	1	356.546	-357.458	D	6.969	6.969	0	1.996	0	0	0	0	0	0
2001	254	23	907	365.051	-359.809	D	6.697	6.697	0	1.451	44.24	0	0	0	13.22	41.09
2001	255	23	822	358.021	-361.607	D	6.824	6.82	0.003	1.696	79.95	0	0	0	2.38	17.64
2001	256	23	822	358.021	-361.607	D	6.939	6.939	0.001	1.934	81.25	0	0	0	2.4	16.49
2001	257	23	15	357.659	-360.155	D	7.063	7.063	0	2.187	80.08	0	0	0	1.82	16.25
2001	258	23	1017	356.894	-355.206	D	6.733	6.732	0	1.521	97.54	0	0	0	0.12	2.26
2001	259	23	822	358.021	-361.607	D	6.696	6.688	0.008	1.434	96.82	0	0	0	0.24	2.93
2001	260	23	228	359.881	-359.807	D	7.013	6.958	0.055	1.972	97.94	0	0	0	0.07	1.99
2001	261	23	930	366.19	-357.232	D	8.965	8.93	0.036	6.388	99.3	0	0	0	0.02	0.69
2001	262	23	774	365.389	-355.071	D	8.103	8.103	0	4.43	89.71	0.04	0	0	0.06	3.87
2001	263	23	1	356.546	-357.458	D	7.025	7.025	0	2.109	0	0	0	0	0	0
2001	264	23	1	356.546	-357.458	D	7.242	7.242	0	2.556	0	0	0	0	0	0
2001	265	23	1	356.546	-357.458	D	6.945	6.945	0	1.947	0	0	0	0	0	0
2001	266	23	1	356.546	-357.458	D	7.683	7.683	0	3.495	0	0	0	0	0	0
2001	267	23	1	356.546	-357.458	D	7.433	7.433	0	2.957	0	0	0	0	0	0
2001	268	23	1	356.546	-357.458	D	6.594	6.594	0	1.249	0	0	0	0	0	0
2001	269	23	1	356.546	-357.458	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	270	23	1	356.546	-357.458	D	6.613	6.613	0	1.287	0	0	0	0	0	0
2001	271	23	1	356.546	-357.458	D	6.668	6.668	0	1.395	0	0	0	0	0	0
2001	272	23	1	356.546	-357.458	D	6.969	6.969	0	1.995	0	0	0	0	0	0
2001	273	23	1	356.546	-357.458	D	6.998	6.998	0	2.053	0	0	0	0	0	0
2001	274	23	1	356.546	-357.458	D	7.263	7.263	0	2.601	0	0	0	0	0	0
2001	275	23	1	356.546	-357.458	D	6.99	6.99	0	2.038	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	276	23	1	356.546	-357.458	D	7.261	7.261	0	2.596	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.764	7.764	0	3.673	0	0	0	0	0	0
2001	278	23	1	356.546	-357.458	D	8.902	8.902	0	6.32	0	0	0	0	0	0
2001	279	23	1	356.546	-357.458	D	7.211	7.211	0	2.492	0	0	0	0	0	0
2001	280	23	1	356.546	-357.458	D	6.552	6.552	0	1.168	0	0	0	0	0	0
2001	281	23	930	366.19	-357.232	D	6.67	6.652	0.018	1.362	95.45	0.03	0	0	0.22	4.29
2001	282	23	974	362.281	-354.249	D	7.315	7.315	0	2.709	61.34	0.06	0	0	0.11	27.58
2001	283	23	1	356.546	-357.458	D	9.666	9.666	0	8.274	0	0	0	0	0	0
2001	284	23	1	356.546	-357.458	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	285	23	1	356.546	-357.458	D	9.591	9.591	0	8.074	0	0	0	0	0	0
2001	286	23	1	356.546	-357.458	D	9.874	9.874	0	8.83	0	0	0	0	0	0
2001	287	23	1	356.546	-357.458	D	6.998	6.998	0	2.054	0	0	0	0	0	0
2001	288	23	1	356.546	-357.458	D	6.921	6.921	0	1.899	0	0	0	0	0	0
2001	289	23	1	356.546	-357.458	D	7.189	7.189	0	2.446	0	0	0	0	0	0
2001	290	23	1	356.546	-357.458	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	291	23	930	366.19	-357.232	D	6.559	6.559	0	1.18	93.68	0.01	0	0	0.26	6
2001	292	23	1	356.546	-357.458	D	6.741	6.741	0	1.537	0	0	0	0	0	0
2001	293	23	1	356.546	-357.458	D	7.888	7.888	0	3.946	0	0	0	0	0	0
2001	294	23	1	356.546	-357.458	D	8.995	8.995	0	6.548	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	8.986	8.986	0	6.528	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	10.007	10.007	0	9.193	0	0	0	0	0	0
2001	297	23	1	356.546	-357.458	D	9.504	9.504	0	7.846	0	0	0	0	0	0
2001	298	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	300	23	1	356.546	-357.458	D	6.472	6.472	0	1.011	0	0	0	0	0	0
2001	301	23	906	364.982	-359.812	D	6.483	6.482	0	1.032	89.72	0.02	0	0	0.97	9.12
2001	302	23	930	366.19	-357.232	D	6.511	6.503	0.008	1.072	91.87	0.05	0	0	0.25	7.83
2001	303	23	931	366.183	-356.996	D	6.562	6.562	0	1.186	94.08	0.01	0	0	0.04	5.21
2001	304	23	1	356.546	-357.458	D	6.64	6.64	0	1.34	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	8.087	8.087	0	4.394	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	9.437	9.437	0	7.673	0	0	0	0	0	0
2001	307	23	900	364.265	-360.243	D	9.238	9.238	0	7.161	50	0	0	0	8.33	37.58
2001	308	23	832	359.493	-362.061	D	6.668	6.667	0.001	1.392	48.89	0	0	0	4.78	46.29
2001	309	23	15	357.659	-360.155	D	8.853	8.853	0	6.199	69.35	0	0	0	2.34	27.16
2001	310	23	822	358.021	-361.607	D	7.133	7.133	0	2.331	94.3	0	0	0	0.5	5.3
2001	311	23	907	365.051	-359.809	D	7.365	7.349	0.016	2.78	97.97	0.01	0	0	0.1	1.93
2001	312	23	933	366.169	-356.524	D	7.603	7.601	0.002	3.318	95.11	0.02	0	0	0.08	4.74
2001	313	23	1	356.546	-357.458	D	6.589	6.589	0	1.238	0	0	0	0	0	0
2001	314	23	1	356.546	-357.458	D	6.664	6.664	0	1.385	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	315	23	1	356.546	-357.458	D	6.73	6.73	0	1.517	0	0	0	0	0	0
2001	316	23	861	361.895	-361.506	D	6.677	6.656	0.022	1.369	88.55	0.01	0	0	2.52	8.93
2001	317	23	1017	356.894	-355.206	D	6.771	6.761	0.009	1.578	71.92	0.21	0	0	0.32	27.54
2001	318	23	62	357.925	-354.901	D	7.181	7.18	0	2.428	94.55	0.01	0	0	0.02	5.25
2001	319	23	1	356.546	-357.458	D	8.659	8.659	0	5.728	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	8.223	8.223	0	4.704	0	0	0	0	0	0
2001	321	23	853	361.666	-362.175	D	7.282	7.276	0.007	2.626	93.92	0.03	0	0	0.48	5.57
2001	322	23	933	366.169	-356.524	D	8.19	7.801	0.389	3.755	98.42	0.04	0	0	0.06	1.48
2001	323	23	643	363.609	-354.151	D	7.802	7.802	0	3.757	99.67	0	0	0	0.03	0.9
2001	324	23	1	356.546	-357.458	D	6.474	6.474	0	1.017	0	0	0	0	0	0
2001	325	23	1	356.546	-357.458	D	6.47	6.47	0	1.008	0	0	0	0	0	0
2001	326	23	1	356.546	-357.458	D	6.515	6.515	0	1.096	0	0	0	0	0	0
2001	327	23	1	356.546	-357.458	D	7.077	7.077	0	2.216	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	9.009	9.009	0	6.585	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	6.691	6.691	0	1.44	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	6.906	6.906	0	1.868	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	6.949	6.949	0	1.955	0	0	0	0	0	0
2001	332	23	905	364.788	-359.816	D	8.638	8.638	0	5.678	94.69	0.12	0	0	0.34	1.11
2001	333	23	853	361.666	-362.175	D	10.092	10.092	0	9.427	98.89	0.11	0	0	0.02	0.72
2001	334	23	853	361.666	-362.175	D	8.716	8.716	0	5.865	99.2	0.08	0	0	0	0.5
2001	335	23	1	356.546	-357.458	D	6.638	6.638	0	1.335	0	0	0	0	0	0
2001	336	23	932	366.176	-356.761	D	6.668	6.668	0	1.394	95.9	0.01	0	0	0.24	3.38
2001	337	23	932	366.176	-356.761	D	7.021	7.02	0	2.099	96.09	0.01	0	0	0.18	3.07
2001	338	23	930	366.19	-357.232	D	6.991	6.991	0	2.04	85.07	0.03	0	0	0.23	13.89
2001	339	23	1	356.546	-357.458	D	8.996	8.996	0	6.551	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	9.441	9.441	0	7.681	0	0	0	0	0	0
2001	341	23	1	356.546	-357.458	D	7.947	7.947	0	4.078	0	0	0	0	0	0
2001	342	23	933	366.169	-356.524	D	8.273	8.094	0.18	4.409	99.68	0.04	0	0	0.01	0.27
2001	343	23	1	356.546	-357.458	D	6.6	6.6	0	1.26	0	0	0	0	0	0
2001	344	23	1	356.546	-357.458	D	6.512	6.512	0	1.09	0	0	0	0	0	0
2001	345	23	930	366.19	-357.232	D	6.572	6.557	0.015	1.178	90.96	0.11	0	0	0.63	8.3
2001	346	23	949	365.722	-354.966	D	9.531	9.529	0.002	7.91	65.81	0.61	0	0	0.34	33.24
2001	347	23	1	356.546	-357.458	D	9.597	9.597	0	8.089	0	0	0	0	0	0
2001	348	23	1	356.546	-357.458	D	8.779	8.779	0	6.019	0	0	0	0	0	0
2001	349	23	1	356.546	-357.458	D	8.813	8.813	0	6.101	0	0	0	0	0	0
2001	350	23	907	365.051	-359.809	D	10.592	10.116	0.476	9.495	99.55	0.03	0	0	0.05	0.37
2001	351	23	907	365.051	-359.809	D	9.557	9.424	0.133	7.638	99.81	0.02	0	0	0.01	0.15
2001	352	23	1	356.546	-357.458	D	6.564	6.564	0	1.19	0	0	0	0	0	0
2001	353	23	1	356.546	-357.458	D	6.769	6.769	0	1.594	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	354	23	1	356.546	-357.458	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	355	23	1	356.546	-357.458	D	6.493	6.493	0	1.052	0	0	0	0	0	0
2001	356	23	1	356.546	-357.458	D	7.254	7.254	0	2.582	0	0	0	0	0	0
2001	357	23	1	356.546	-357.458	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	6.481	6.481	0	1.029	0	0	0	0	0	0
2001	359	23	1	356.546	-357.458	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	360	23	1	356.546	-357.458	D	6.533	6.533	0	1.131	0	0	0	0	0	0
2001	361	23	1	356.546	-357.458	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.034	7.034	0	2.128	0	0	0	0	0	0
2001	363	23	1	356.546	-357.458	D	6.604	6.604	0	1.269	0	0	0	0	0	0
2001	364	23	1	356.546	-357.458	D	6.55	6.55	0	1.163	0	0	0	0	0	0
2001	365	23	1	356.546	-357.458	D	6.616	6.616	0	1.292	0	0	0	0	0	0
									0.512							
INDEPENDENCE									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	947	365.801	-355.162	D	7.16	7.158	0.002	2.381	80.84	18.01	0	0	0	1.14
2001	2	23	949	365.722	-354.966	D	7.6	7.265	0.335	2.603	89.01	10.56	0	0	0	0.44
2001	3	23	947	365.801	-355.162	D	8.655	8.568	0.087	5.511	92.19	7.6	0	0	0	0.21
2001	4	23	1	356.546	-357.458	D	8.279	8.279	0	4.833	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	7	23	645	364.109	-359.871	D	7.732	7.39	0.343	2.867	65.53	33.27	0	0	0	1.2
2001	8	23	784	365.648	-355.309	D	8.544	8.24	0.305	4.743	73.15	25.55	0	0	0	1.3
2001	9	23	822	358.021	-361.607	D	10.236	9.313	**0.923**	7.352	92.75	7.15	0	0	0	0.11
2001	10	23	16	357.648	-359.906	D	7.403	7.368	0.035	2.82	90.66	9.07	0	0	0	0.27
2001	11	23	949	365.722	-354.966	D	8.857	8.856	0	6.207	93.78	5.55	0	0	0	0.36
2001	12	23	1	356.546	-357.458	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	13	23	1	356.546	-357.458	D	10.094	10.094	0	9.433	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	9.682	9.682	0	8.316	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.24	7.24	0	2.553	0	0	0	0	0	0
2001	16	23	1006	358.469	-354.76	D	6.816	6.751	0.064	1.558	73.16	24.36	0	0	0	2.48
2001	17	23	822	358.021	-361.607	D	6.756	6.755	0.001	1.566	79.66	18.77	0	0	0	1.57
2001	18	23	1017	356.894	-355.206	D	6.764	6.74	0.023	1.536	89.92	8.88	0	0	0	1.2
2001	19	23	822	358.021	-361.607	D	6.915	6.886	0.029	1.827	79.07	18.95	0	0	0	1.98
2001	20	23	102	358.487	-356.374	D	6.721	6.59	0.13	1.242	68.32	28.59	0	0	0	3.09
2001	21	23	787	365.962	-356.793	D	6.484	6.484	0	1.036	71.85	23.07	0	0	0	1.88
2001	22	23	747	364.871	-354.594	D	6.756	6.756	0	1.567	67.25	29.62	0	0	0	1.76

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	23	23	1	356.546	-357.458	D	6.646	6.646	0	1.35	0	0	0	0	0	0
2001	24	23	1011	357.717	-354.92	D	6.843	6.768	0.074	1.592	89.22	10.21	0	0	0	0.57
2001	25	23	1	356.546	-357.458	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2001	26	23	1	356.546	-357.458	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	27	23	624	363.817	-358.885	D	6.677	6.638	0.04	1.334	64.31	32.16	0	0	0	3.53
2001	28	23	1035	356.477	-356.792	D	6.511	6.503	0.007	1.072	79.31	18.96	0	0	0	1.73
2001	29	23	1	356.546	-357.458	D	8.263	8.263	0	4.796	0	0	0	0	0	0
2001	30	23	1	356.546	-357.458	D	6.894	6.894	0	1.843	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.146	7.146	0	2.358	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	6.485	6.485	0	1.036	0	0	0	0	0	0
2001	33	23	949	365.722	-354.966	D	6.57	6.534	0.036	1.131	61.96	33.53	0	0	0	4.51
2001	34	23	931	366.183	-356.996	D	6.47	6.47	0	1.009	76.47	21.3	0	0	0	1.95
2001	35	23	1	356.546	-357.458	D	6.691	6.691	0	1.439	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	6.677	6.677	0	1.411	0	0	0	0	0	0
2001	37	23	1008	358.048	-354.775	D	6.491	6.489	0.002	1.045	91.06	5.8	0	0	0	3.17
2001	38	23	966	363.538	-354.124	D	6.693	6.684	0.009	1.426	85.02	13.55	0	0	0	1.43
2001	39	23	1	356.546	-357.458	D	9.678	9.678	0	8.304	0	0	0	0	0	0
2001	40	23	986	360.908	-354.689	D	9.655	9.296	0.359	7.308	80.96	18.77	0	0	0	0.28
2001	41	23	1039	356.522	-357.599	D	6.643	6.621	0.023	1.301	59.62	35.97	0	0	0	4.4
2001	42	23	1	356.546	-357.458	D	6.47	6.47	0	1.008	0	0	0	0	0	0
2001	43	23	1	356.546	-357.458	D	6.623	6.623	0	1.305	0	0	0	0	0	0
2001	44	23	1	356.546	-357.458	D	8.565	8.565	0	5.504	0	0	0	0	0	0
2001	45	23	1	356.546	-357.458	D	10.197	10.197	0	9.721	0	0	0	0	0	0
2001	46	23	836	360.07	-362.066	D	7.739	7.421	0.317	2.934	92.43	6.89	0	0	0	0.68
2001	47	23	645	364.109	-359.871	D	6.901	6.627	0.275	1.312	88.05	11.14	0	0	0	0.81
2001	48	23	1	356.546	-357.458	D	6.522	6.522	0	1.108	0	0	0	0	0	0
2001	49	23	1017	356.894	-355.206	D	6.495	6.471	0.023	1.011	83.9	14.66	0	0	0	1.44
2001	50	23	643	363.609	-354.151	D	6.483	6.482	0	1.032	89.82	9.39	0	0	0	0.85
2001	51	23	643	363.609	-354.151	D	7.206	7.205	0	2.48	97.1	2.23	0	0	0	0.59
2001	52	23	810	357.434	-360.005	D	6.748	6.729	0.019	1.514	94.25	5.43	0	0	0	0.33
2001	53	23	1017	356.894	-355.206	D	7.371	7.366	0.005	2.816	94.07	5.8	0	0	0	0.13
2001	54	23	1	356.546	-357.458	D	6.804	6.804	0	1.664	33.74	0.85	0	0	0	0.11
2001	55	23	1	356.546	-357.458	D	9.629	9.629	0	8.175	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.355	7.355	0	2.792	0	0	0	0	0	0
2001	57	23	933	366.169	-356.524	D	6.507	6.502	0.005	1.069	92.44	6.16	0	0	0	1.41
2001	58	23	933	366.169	-356.524	D	6.543	6.532	0.011	1.128	93.83	5.55	0	0	0	0.61
2001	59	23	1017	356.894	-355.206	D	6.852	6.848	0.004	1.751	94.01	5.83	0	0	0	0.17
2001	60	23	1	356.546	-357.458	D	6.611	6.611	0	1.281	0	0	0	0	0	0
2001	61	23	1	356.546	-357.458	D	7.906	7.906	0	3.988	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	62	23	1017	356.894	-355.206	D	6.694	6.693	0.001	1.444	91.37	6.64	0	0	0	1.83
2001	63	23	1017	356.894	-355.206	D	6.678	6.586	0.092	1.234	92.66	6.65	0	0	0	0.69
2001	64	23	1039	356.522	-357.599	D	6.628	6.562	0.066	1.187	74.72	21.79	0	0	0	3.49
2001	65	23	949	365.722	-354.966	D	6.561	6.527	0.034	1.119	80.92	16.53	0	0	0	2.54
2001	66	23	1008	358.048	-354.775	D	6.526	6.471	0.056	1.009	93.17	5.16	0	0	0	1.68
2001	67	23	927	365.912	-357.454	D	6.703	6.565	0.138	1.192	80.09	17.49	0	0	0	2.42
2001	68	23	949	365.722	-354.966	D	6.514	6.503	0.011	1.072	82.67	14.17	0	0	0	3.17
2001	69	23	1	356.546	-357.458	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	70	23	1	356.546	-357.458	D	6.483	6.483	0	1.032	0	0	0	0	0	0
2001	71	23	1	356.546	-357.458	D	8.688	8.688	0	5.798	0	0	0	0	0	0
2001	72	23	1	356.546	-357.458	D	6.535	6.535	0	1.135	0	0	0	0	0	0
2001	73	23	949	365.722	-354.966	D	7.113	7.112	0.001	2.287	83.52	13.84	0	0	0	2.87
2001	74	23	1	356.546	-357.458	D	9.86	9.86	0	8.793	0	0	0	0	0	0
2001	75	23	1002	359.309	-354.73	D	7.388	7.165	0.224	2.396	90.51	9.07	0	0	0	0.42
2001	76	23	1039	356.522	-357.599	D	6.672	6.655	0.017	1.369	73.87	22.99	0	0	0	3.14
2001	77	23	1	356.546	-357.458	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	78	23	1	356.546	-357.458	D	6.472	6.472	0	1.012	0	0	0	0	0	0
2001	79	23	1	356.546	-357.458	D	6.484	6.484	0	1.035	0	0	0	0	0	0
2001	80	23	1	356.546	-357.458	D	6.473	6.473	0	1.014	0	0	0	0	0	0
2001	81	23	1	356.546	-357.458	D	6.492	6.492	0	1.05	0	0	0	0	0	0
2001	82	23	1	356.546	-357.458	D	6.712	6.712	0	1.48	0	0	0	0	0	0
2001	83	23	1	356.546	-357.458	D	6.686	6.686	0	1.43	0	0	0	0	0	0
2001	84	23	1039	356.522	-357.599	D	6.485	6.483	0.002	1.034	85.69	11.54	0	0	0	2.71
2001	85	23	822	358.021	-361.607	D	6.498	6.489	0.009	1.044	85.54	12.23	0	0	0	2.23
2001	86	23	1017	356.894	-355.206	D	6.469	6.468	0.001	1.005	87.84	10.57	0	0	0	1.46
2001	87	23	1017	356.894	-355.206	D	6.483	6.483	0	1.034	95.3	3.28	0	0	0	1.1
2001	88	23	1	356.546	-357.458	D	6.911	6.911	0	1.878	0	0	0	0	0	0
2001	89	23	1	356.546	-357.458	D	7.242	7.242	0	2.556	0	0	0	0	0	0
2001	90	23	949	365.722	-354.966	D	7.56	7.56	0	3.229	91.97	6.42	0	0	0	1.89
2001	91	23	949	365.722	-354.966	D	6.488	6.473	0.014	1.014	88.45	8.73	0	0	0	2.82
2001	92	23	1	356.546	-357.458	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	9.648	9.648	0	8.226	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	9.432	9.432	0	7.657	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.559	7.559	0	3.228	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	6.813	6.813	0	1.682	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.171	7.171	0	2.41	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	6.874	6.874	0	1.802	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.375	7.375	0	2.834	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	101	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	6.559	6.559	0	1.181	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	6.687	6.687	0	1.431	0	0	0	0	0	0
2001	105	23	949	365.722	-354.966	D	8.48	8.405	0.076	5.126	97.52	1.58	0	0	0	0.9
2001	106	23	933	366.169	-356.524	D	6.521	6.491	0.03	1.049	88.76	8.33	0	0	0	2.91
2001	107	23	907	365.051	-359.809	D	6.483	6.477	0.006	1.022	68.88	24.69	0	0	0	6.42
2001	108	23	1035	356.477	-356.792	D	6.507	6.479	0.027	1.026	95.8	3.22	0	0	0	0.98
2001	109	23	933	366.169	-356.524	D	6.543	6.54	0.004	1.143	98.84	0.62	0	0	0	0.54
2001	110	23	1	356.546	-357.458	D	8.502	8.502	0	5.355	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.602	7.602	0	3.321	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	8.495	8.495	0	5.339	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.659	7.659	0	3.445	0	0	0	0	0	0
2001	114	23	1035	356.477	-356.792	D	6.521	6.507	0.013	1.08	95.91	1.68	0	0	0	2.4
2001	115	23	1017	356.894	-355.206	D	6.512	6.482	0.03	1.03	96.82	2.21	0	0	0	0.97
2001	116	23	1	356.546	-357.458	D	6.587	6.587	0	1.236	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	6.583	6.583	0	1.227	0	0	0	0	0	0
2001	119	23	1	356.546	-357.458	D	6.862	6.862	0	1.778	0	0	0	0	0	0
2001	120	23	1	356.546	-357.458	D	7.272	7.272	0	2.618	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	6.852	6.852	0	1.759	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	6.96	6.96	0	1.977	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	6.988	6.988	0	2.033	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.28	7.28	0	2.635	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	9.077	9.077	0	6.754	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2001	127	23	933	366.169	-356.524	D	8.237	8.205	0.032	4.663	98.31	0.37	0	0	0	1.31
2001	128	23	1035	356.477	-356.792	D	6.538	6.506	0.032	1.078	97.95	0.8	0	0	0	1.25
2001	129	23	933	366.169	-356.524	D	6.679	6.636	0.043	1.33	99.14	0.3	0	0	0	0.56
2001	130	23	932	366.176	-356.761	D	6.842	6.841	0.001	1.737	99.5	0.08	0	0	0	0.29
2001	131	23	1	356.546	-357.458	D	7.488	7.488	0	3.075	0	0	0	0	0	0
2001	132	23	930	366.19	-357.232	D	8.729	8.583	0.146	5.547	95.53	4.38	0	0	0	0.09
2001	133	23	1	356.546	-357.458	D	6.549	6.549	0	1.162	0	0	0	0	0	0
2001	134	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	135	23	1	356.546	-357.458	D	6.856	6.856	0	1.768	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	6.774	6.774	0	1.603	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.638	7.638	0	3.398	0	0	0	0	0	0
2001	138	23	1035	356.477	-356.792	D	8.023	8.015	0.008	4.231	98.4	1.49	0	0	0	0.11
2001	139	23	907	365.051	-359.809	D	8.781	8.695	0.086	5.816	98.86	1.1	0	0	0	0.04

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	140	23	519	362.902	-360.673	D	7.504	7.504	0	3.11	95.47	0.03	0	0	0	0.31
2001	141	23	1	356.546	-357.458	D	8.617	8.617	0	5.629	0	0	0	0	0	0
2001	142	23	1	356.546	-357.458	D	6.546	6.546	0	1.154	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	6.512	6.512	0	1.09	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	6.593	6.593	0	1.248	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	6.768	6.768	0	1.591	0	0	0	0	0	0
2001	148	23	949	365.722	-354.966	D	6.985	6.974	0.011	2.005	99.29	0.05	0	0	0	0.65
2001	149	23	901	364.256	-360.039	D	6.974	6.858	0.117	1.77	99.42	0.27	0	0	0	0.31
2001	150	23	963	363.809	-354.192	D	8.557	8.54	0.016	5.445	99.56	0.23	0	0	0	0.21
2001	151	23	1	356.546	-357.458	D	8.828	8.828	0	6.138	0	0	0	0	0	0
2001	152	23	1	356.546	-357.458	D	6.939	6.939	0	1.934	0	0	0	0	0	0
2001	153	23	967	363.478	-354.116	D	7.045	7.019	0.026	2.097	95.62	2.43	0	0	0	1.95
2001	154	23	947	365.801	-355.162	D	7.164	7.158	0.005	2.383	98.23	1.52	0	0	0	0.24
2001	155	23	1	356.546	-357.458	D	8.898	8.898	0	6.309	0	0	0	0	0	0
2001	156	23	542	362.638	-354.693	D	7.611	7.611	0	3.34	76.25	0.14	0	0	0	0.12
2001	157	23	1	356.546	-357.458	D	7.846	7.846	0	3.853	0	0	0	0	0	0
2001	158	23	949	365.722	-354.966	D	7.551	7.492	0.059	3.084	98.79	0.97	0	0	0	0.24
2001	159	23	1039	356.522	-357.599	D	7.293	7.106	0.187	2.275	99.64	0.21	0	0	0	0.15
2001	160	23	836	360.07	-362.066	D	7.349	7.349	0	2.78	99.78	0.01	0	0	0	0.21
2001	161	23	1	356.546	-357.458	D	7.047	7.047	0	2.153	0	0	0	0	0	0
2001	162	23	1	356.546	-357.458	D	7.16	7.16	0	2.387	0	0	0	0	0	0
2001	163	23	1	356.546	-357.458	D	6.91	6.91	0	1.876	0	0	0	0	0	0
2001	164	23	1	356.546	-357.458	D	6.969	6.969	0	1.995	0	0	0	0	0	0
2001	165	23	1	356.546	-357.458	D	7.214	7.214	0	2.497	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	8.124	8.124	0	4.479	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	6.529	6.529	0	1.123	0	0	0	0	0	0
2001	168	23	852	361.595	-362.148	D	6.562	6.56	0.002	1.182	99.36	0.02	0	0	0	0.56
2001	169	23	930	366.19	-357.232	D	6.671	6.668	0.003	1.394	99.57	0.03	0	0	0	0.36
2001	170	23	747	364.871	-354.594	D	6.956	6.956	0	1.969	96.96	0.01	0	0	0	0.28
2001	171	23	1	356.546	-357.458	D	6.83	6.83	0	1.716	0	0	0	0	0	0
2001	172	23	949	365.722	-354.966	D	7.944	7.73	0.215	3.598	99.22	0.49	0	0	0	0.28
2001	173	23	949	365.722	-354.966	D	6.834	6.772	0.063	1.599	98.65	0.16	0	0	0	1.19
2001	174	23	822	358.021	-361.607	D	6.711	6.637	0.074	1.333	98.65	0.36	0	0	0	0.99
2001	175	23	907	365.051	-359.809	D	6.671	6.668	0.003	1.394	99.23	0.09	0	0	0	0.62
2001	176	23	789	365.918	-355.796	D	7.107	7.104	0.002	2.271	99.64	0.08	0	0	0	0.2
2001	177	23	618	363.371	-354.411	D	6.936	6.935	0	1.927	99.68	0.04	0	0	0	0.2
2001	178	23	1	356.546	-357.458	D	7.074	7.074	0	2.209	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	179	23	1	356.546	-357.458	D	8.961	8.961	0	6.466	0	0	0	0	0	0
2001	180	23	1	356.546	-357.458	D	8.357	8.357	0	5.014	0	0	0	0	0	0
2001	181	23	1	356.546	-357.458	D	7.862	7.862	0	3.889	0	0	0	0	0	0
2001	182	23	974	362.281	-354.249	D	8.556	8.543	0.014	5.452	99.8	0.02	0	0	0	0.18
2001	183	23	1017	356.894	-355.206	D	7.466	7.425	0.04	2.942	99.53	0.31	0	0	0	0.15
2001	184	23	934	366.01	-356.526	D	8.785	8.781	0.004	6.023	99.94	0.03	0	0	0	0.05
2001	185	23	1	356.546	-357.458	D	7.034	7.034	0	2.127	0	0	0	0	0	0
2001	186	23	964	363.678	-354.148	D	7.097	7.063	0.034	2.186	99.49	0.04	0	0	0	0.47
2001	187	23	853	361.666	-362.175	D	7.085	6.957	0.128	1.97	99.68	0.06	0	0	0	0.26
2001	188	23	941	365.977	-355.774	D	7.796	7.748	0.049	3.637	99.89	0.02	0	0	0	0.09
2001	189	23	1	356.546	-357.458	D	6.907	6.907	0	1.869	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	6.865	6.865	0	1.785	0	0	0	0	0	0
2001	191	23	949	365.722	-354.966	D	7.56	7.115	0.445	2.293	99.33	0.44	0	0	0	0.23
2001	192	23	853	361.666	-362.175	D	7.091	7.059	0.032	2.178	99.63	0.03	0	0	0	0.33
2001	193	23	1	356.546	-357.458	D	7.318	7.318	0	2.716	0	0	0	0	0	0
2001	194	23	1	356.546	-357.458	D	7.743	7.743	0	3.628	0	0	0	0	0	0
2001	195	23	1	356.546	-357.458	D	6.6	6.6	0	1.261	0	0	0	0	0	0
2001	196	23	1	356.546	-357.458	D	6.705	6.705	0	1.466	0	0	0	0	0	0
2001	197	23	1	356.546	-357.458	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	9.025	9.025	0	6.623	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.494	7.494	0	3.089	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.083	7.083	0	2.227	0	0	0	0	0	0
2001	201	23	1	356.546	-357.458	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2001	202	23	780	365.692	-356.306	D	6.967	6.967	0	1.991	98.96	0.01	0	0	0	0.39
2001	203	23	933	366.169	-356.524	D	7.368	7.367	0.001	2.819	99.65	0.21	0	0	0	0.15
2001	204	23	1	356.546	-357.458	D	7.546	7.546	0	3.199	0	0	0	0	0	0
2001	205	23	1	356.546	-357.458	D	7.753	7.753	0	3.65	0	0	0	0	0	0
2001	206	23	1	356.546	-357.458	D	8.069	8.069	0	4.353	0	0	0	0	0	0
2001	207	23	961	364.092	-354.289	D	8.772	8.765	0.008	5.983	99.69	0.11	0	0	0	0.16
2001	208	23	949	365.722	-354.966	D	8.994	8.924	0.07	6.374	99.46	0.49	0	0	0	0.05
2001	209	23	933	366.169	-356.524	D	8.323	8.286	0.037	4.85	99.33	0.62	0	0	0	0.05
2001	210	23	929	366.032	-357.239	D	8.838	8.838	0	6.161	100.35	0.1	0	0	0	0.11
2001	211	23	933	366.169	-356.524	D	7.745	7.702	0.042	3.538	99.52	0.32	0	0	0	0.16
2001	212	23	933	366.169	-356.524	D	9.435	9.344	0.091	7.431	99.93	0.02	0	0	0	0.04
2001	213	23	933	366.169	-356.524	D	9.118	9.115	0.003	6.849	99.97	0.01	0	0	0	0.03
2001	214	23	1	356.546	-357.458	D	7.804	7.804	0	3.76	0	0	0	0	0	0
2001	215	23	1	356.546	-357.458	D	6.91	6.91	0	1.877	0	0	0	0	0	0
2001	216	23	930	366.19	-357.232	D	7.091	7.058	0.033	2.177	99.25	0.55	0	0	0	0.2
2001	217	23	822	358.021	-361.607	D	6.996	6.996	0.001	2.049	99.8	0.02	0	0	0	0.24

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	218	23	1	356.546	-357.458	D	7.068	7.068	0	2.197	0	0	0	0	0	0
2001	219	23	1	356.546	-357.458	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.358	7.358	0	2.799	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.346	7.346	0	2.775	0	0	0	0	0	0
2001	222	23	822	358.021	-361.607	D	8.232	8.206	0.026	4.666	99.38	0.21	0	0	0	0.41
2001	223	23	846	360.93	-362.178	D	8.881	8.646	0.234	5.699	98.22	1.7	0	0	0	0.07
2001	224	23	930	366.19	-357.232	D	7.021	7.018	0.003	2.095	99.34	0.42	0	0	0	0.22
2001	225	23	907	365.051	-359.809	D	7.165	7.16	0.006	2.385	99.17	0.72	0	0	0	0.1
2001	226	23	1	356.546	-357.458	D	6.843	6.843	0	1.74	0	0	0	0	0	0
2001	227	23	1	356.546	-357.458	D	6.725	6.725	0	1.506	0	0	0	0	0	0
2001	228	23	1	356.546	-357.458	D	7.815	7.815	0	3.785	0	0	0	0	0	0
2001	229	23	1	356.546	-357.458	D	6.757	6.757	0	1.569	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	6.883	6.883	0	1.821	0	0	0	0	0	0
2001	231	23	1017	356.894	-355.206	D	6.972	6.929	0.043	1.914	98.38	0.25	0	0	0	1.36
2001	232	23	822	358.021	-361.607	D	6.891	6.741	0.151	1.537	99.17	0.18	0	0	0	0.65
2001	233	23	949	365.722	-354.966	D	7.244	7.214	0.029	2.499	99.68	0.08	0	0	0	0.25
2001	234	23	1	356.546	-357.458	D	7.053	7.053	0	2.167	0	0	0	0	0	0
2001	235	23	1	356.546	-357.458	D	6.921	6.921	0	1.898	0	0	0	0	0	0
2001	236	23	1	356.546	-357.458	D	6.927	6.927	0	1.91	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.112	7.112	0	2.287	0	0	0	0	0	0
2001	238	23	933	366.169	-356.524	D	8.321	8.271	0.05	4.814	94	5.73	0	0	0	0.27
2001	239	23	822	358.021	-361.607	D	7.249	7.235	0.014	2.543	98.96	0.81	0	0	0	0.23
2001	240	23	932	366.176	-356.761	D	7.156	7.15	0.006	2.365	99.57	0.12	0	0	0	0.31
2001	241	23	949	365.722	-354.966	D	6.884	6.846	0.038	1.747	99.44	0.16	0	0	0	0.4
2001	242	23	949	365.722	-354.966	D	7.517	7.503	0.014	3.108	99.6	0.2	0	0	0	0.2
2001	243	23	933	366.169	-356.524	D	7.672	7.672	0	3.473	99.28	0.08	0	0	0	0.22
2001	244	23	933	366.169	-356.524	D	8.845	8.589	0.255	5.561	99.05	0.86	0	0	0	0.09
2001	245	23	934	366.01	-356.526	D	7.553	7.44	0.114	2.972	99.36	0.52	0	0	0	0.12
2001	246	23	996	360.121	-355.113	D	7.484	7.454	0.031	3.002	99.84	0.05	0	0	0	0.11
2001	247	23	1017	356.894	-355.206	D	6.85	6.826	0.024	1.708	99.47	0.07	0	0	0	0.46
2001	248	23	1017	356.894	-355.206	D	7.254	7.209	0.045	2.488	99.45	0.28	0	0	0	0.27
2001	249	23	1007	358.259	-354.768	D	8.957	8.956	0.001	6.452	99.74	0.08	0	0	0	0.09
2001	250	23	1	356.546	-357.458	D	7.43	7.43	0	2.952	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	8.474	8.474	0	5.287	0	0	0	0	0	0
2001	252	23	1017	356.894	-355.206	D	8.702	8.546	0.156	5.459	98.26	1.13	0	0	0	0.61
2001	253	23	930	366.19	-357.232	D	6.99	6.946	0.044	1.949	95.94	2.95	0	0	0	1.11
2001	254	23	1036	356.488	-356.993	D	6.704	6.7	0.004	1.456	98.88	0.24	0	0	0	0.87
2001	255	23	949	365.722	-354.966	D	6.851	6.84	0.011	1.735	99.25	0.32	0	0	0	0.44
2001	256	23	949	365.722	-354.966	D	6.962	6.926	0.036	1.909	99.49	0.24	0	0	0	0.27

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	257	23	996	360.121	-355.113	D	7.102	7.069	0.033	2.198	99.6	0.19	0	0	0	0.2
2001	258	23	821	358.053	-361.416	D	6.74	6.74	0	1.535	99.76	0.01	0	0	0	0.19
2001	259	23	1	356.546	-357.458	D	6.686	6.686	0	1.43	0	0	0	0	0	0
2001	260	23	1	356.546	-357.458	D	6.958	6.958	0	1.972	0	0	0	0	0	0
2001	261	23	1	356.546	-357.458	D	8.862	8.862	0	6.222	0	0	0	0	0	0
2001	262	23	949	365.722	-354.966	D	8.354	8.103	0.251	4.43	90.58	8.89	0	0	0	0.53
2001	263	23	947	365.801	-355.162	D	7.046	7.045	0.001	2.149	95.49	3.49	0	0	0	0.89
2001	264	23	1017	356.894	-355.206	D	7.256	7.242	0.015	2.556	99.13	0.09	0	0	0	0.78
2001	265	23	1035	356.477	-356.792	D	7.024	6.945	0.079	1.947	99.02	0.53	0	0	0	0.46
2001	266	23	836	360.07	-362.066	D	7.749	7.616	0.133	3.35	98.75	1.05	0	0	0	0.2
2001	267	23	853	361.666	-362.175	D	7.573	7.568	0.006	3.246	97.32	2.53	0	0	0	0.14
2001	268	23	1	356.546	-357.458	D	6.594	6.594	0	1.249	0	0	0	0	0	0
2001	269	23	1	356.546	-357.458	D	6.541	6.541	0	1.146	0	0	0	0	0	0
2001	270	23	967	363.478	-354.116	D	6.633	6.609	0.024	1.277	98.65	0.73	0	0	0	0.61
2001	271	23	955	364.92	-354.582	D	6.861	6.665	0.196	1.388	99.13	0.42	0	0	0	0.44
2001	272	23	822	358.021	-361.607	D	6.994	6.987	0.007	2.031	99.54	0.11	0	0	0	0.36
2001	273	23	1	356.546	-357.458	D	6.998	6.998	0	2.053	0	0	0	0	0	0
2001	274	23	1	356.546	-357.458	D	7.263	7.263	0	2.601	0	0	0	0	0	0
2001	275	23	1	356.546	-357.458	D	6.99	6.99	0	2.038	0	0	0	0	0	0
2001	276	23	1	356.546	-357.458	D	7.261	7.261	0	2.596	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.764	7.764	0	3.673	0	0	0	0	0	0
2001	278	23	810	357.434	-360.005	D	8.984	8.915	0.069	6.351	96.58	3.37	0	0	0	0.05
2001	279	23	811	357.434	-360.225	D	7.259	7.256	0.003	2.585	87.15	11.09	0	0	0	1.73
2001	280	23	930	366.19	-357.232	D	6.568	6.55	0.018	1.163	96.86	2.16	0	0	0	0.98
2001	281	23	949	365.722	-354.966	D	6.66	6.653	0.007	1.365	97.98	1.39	0	0	0	0.63
2001	282	23	1	356.546	-357.458	D	7.318	7.318	0	2.716	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	9.666	9.666	0	8.274	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	10.229	10.218	0.012	9.779	96.88	3	0	0	0	0.11
2001	285	23	1017	356.894	-355.206	D	9.897	9.591	0.307	8.074	95.17	4.75	0	0	0	0.08
2001	286	23	1008	358.048	-354.775	D	9.88	9.874	0.006	8.83	99.16	0.78	0	0	0	0.07
2001	287	23	1	356.546	-357.458	D	6.998	6.998	0	2.054	0	0	0	0	0	0
2001	288	23	996	360.121	-355.113	D	6.953	6.945	0.008	1.947	88.54	11.35	0	0	0	0.1
2001	289	23	226	359.903	-360.306	D	7.325	7.204	0.121	2.477	90.66	9.09	0	0	0	0.25
2001	290	23	102	358.487	-356.374	D	6.542	6.492	0.05	1.051	87.62	10.22	0	0	0	2.16
2001	291	23	949	365.722	-354.966	D	6.566	6.559	0.007	1.18	98.41	1.09	0	0	0	0.5
2001	292	23	1008	358.048	-354.775	D	6.744	6.741	0.004	1.537	93.36	4.94	0	0	0	1.71
2001	293	23	966	363.538	-354.124	D	8.001	7.994	0.006	4.184	96.55	3.26	0	0	0	0.19
2001	294	23	1	356.546	-357.458	D	8.995	8.995	0	6.548	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	8.986	8.986	0	6.528	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	296	23	1	356.546	-357.458	D	10.007	10.007	0	9.193	0	0	0	0	0	0
2001	297	23	934	366.01	-356.526	D	9.625	9.577	0.048	8.039	94.11	5.48	0	0	0	0.4
2001	298	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	300	23	78	358.239	-356.385	D	6.481	6.472	0.009	1.011	74.41	21.15	0	0	0	4.45
2001	301	23	1	356.546	-357.458	D	6.481	6.481	0	1.03	0	0	0	0	0	0
2001	302	23	1	356.546	-357.458	D	6.503	6.503	0	1.072	0	0	0	0	0	0
2001	303	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	6.64	6.64	0	1.34	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	8.087	8.087	0	4.394	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	9.437	9.437	0	7.673	0	0	0	0	0	0
2001	307	23	947	365.801	-355.162	D	9.284	9.195	0.089	7.05	92.89	7	0	0	0	0.11
2001	308	23	811	357.434	-360.225	D	6.673	6.667	0.006	1.392	98.3	1.34	0	0	0	0.35
2001	309	23	1017	356.894	-355.206	D	10.25	8.902	**1.348**	6.319	93.96	5.94	0	0	0	0.1
2001	310	23	811	357.434	-360.225	D	7.392	7.133	0.259	2.331	98.23	1.52	0	0	0	0.25
2001	311	23	997	359.928	-355.117	D	7.59	7.375	0.215	2.836	98.73	1.11	0	0	0	0.16
2001	312	23	933	366.169	-356.524	D	7.63	7.601	0.029	3.318	98.57	0.75	0	0	0	0.67
2001	313	23	10	356.954	-355.443	D	6.589	6.589	0	1.238	93.42	3.37	0	0	0	2.31
2001	314	23	1008	358.048	-354.775	D	6.664	6.664	0	1.385	91.53	6.61	0	0	0	1.89
2001	315	23	966	363.538	-354.124	D	6.799	6.729	0.07	1.514	92.97	5.5	0	0	0	1.53
2001	316	23	1039	356.522	-357.599	D	6.677	6.663	0.015	1.383	97.03	1.92	0	0	0	1.05
2001	317	23	1	356.546	-357.458	D	6.761	6.761	0	1.578	0	0	0	0	0	0
2001	318	23	1	356.546	-357.458	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	319	23	1	356.546	-357.458	D	8.659	8.659	0	5.728	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	8.223	8.223	0	4.704	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.265	7.265	0	2.605	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.614	7.614	0	3.346	0	0	0	0	0	0
2001	323	23	933	366.169	-356.524	D	7.851	7.795	0.056	3.742	60.46	38.71	0	0	0	0.83
2001	324	23	927	365.912	-357.454	D	6.547	6.474	0.073	1.016	68.03	26.52	0	0	0	5.45
2001	325	23	930	366.19	-357.232	D	6.474	6.47	0.004	1.008	87.35	10.48	0	0	0	2.17
2001	326	23	722	364.711	-356.599	D	6.517	6.517	0	1.099	82.9	2.5	0	0	0	1.11
2001	327	23	1	356.546	-357.458	D	7.077	7.077	0	2.216	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	9.009	9.009	0	6.585	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	6.691	6.691	0	1.44	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	6.906	6.906	0	1.868	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	6.949	6.949	0	1.955	0	0	0	0	0	0
2001	332	23	907	365.051	-359.809	D	8.79	8.638	0.152	5.678	66.69	32.89	0	0	0	0.42
2001	333	23	1	356.546	-357.458	D	10.026	10.026	0	9.247	0	0	0	0	0	0
2001	334	23	710	364.843	-359.589	D	8.824	8.823	0	6.127	89.13	9.72	0	0	0	0.22

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	335	23	1	356.546	-357.458	D	6.638	6.638	0	1.335	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	6.673	6.673	0	1.403	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.004	7.004	0	2.066	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.019	7.019	0	2.097	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	8.996	8.996	0	6.551	0	0	0	0	0	0
2001	340	23	965	363.588	-354.142	D	9.616	9.609	0.008	8.12	72.7	26.85	0	0	0	0.45
2001	341	23	949	365.722	-354.966	D	7.952	7.938	0.015	4.058	90.35	9.36	0	0	0	0.27
2001	342	23	996	360.121	-355.113	D	8.161	7.99	0.171	4.174	91.55	7.81	0	0	0	0.63
2001	343	23	1039	356.522	-357.599	D	6.628	6.6	0.028	1.26	77.82	18.92	0	0	0	3.26
2001	344	23	1017	356.894	-355.206	D	6.52	6.512	0.008	1.09	86.37	12.3	0	0	0	1.34
2001	345	23	1008	358.048	-354.775	D	6.561	6.558	0.003	1.178	90.29	8.78	0	0	0	0.92
2001	346	23	1	356.546	-357.458	D	9.566	9.566	0	8.007	0	0	0	0	0	0
2001	347	23	949	365.722	-354.966	D	12.903	9.571	**3.332**	8.021	91.71	8.15	0	0	0	0.14
2001	348	23	822	358.021	-361.607	D	10.043	8.785	**1.258**	6.033	91.43	8.46	0	0	0	0.11
2001	349	23	949	365.722	-354.966	D	8.842	8.789	0.053	6.043	97.04	2.89	0	0	0	0.07
2001	350	23	949	365.722	-354.966	D	10.121	10.116	0.005	9.495	96.57	3.38	0	0	0	0.04
2001	351	23	1035	356.477	-356.792	D	10.041	9.409	**0.632**	7.599	89.89	9.95	0	0	0	0.16
2001	352	23	1	356.546	-357.458	D	6.564	6.564	0	1.19	0	0	0	0	0	0
2001	353	23	1039	356.522	-357.599	D	6.818	6.769	0.049	1.594	82.36	15.32	0	0	0	2.32
2001	354	23	845	360.851	-362.181	D	6.494	6.471	0.023	1.009	79.39	17.26	0	0	0	3.35
2001	355	23	1	356.546	-357.458	D	6.493	6.493	0	1.052	0	0	0	0	0	0
2001	356	23	1	356.546	-357.458	D	7.254	7.254	0	2.582	0	0	0	0	0	0
2001	357	23	1	356.546	-357.458	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	6.481	6.481	0	1.029	0	0	0	0	0	0
2001	359	23	927	365.912	-357.454	D	6.569	6.5	0.069	1.065	62.3	32.81	0	0	0	4.89
2001	360	23	927	365.912	-357.454	D	6.604	6.533	0.071	1.131	60.61	35.26	0	0	0	4.13
2001	361	23	1	356.546	-357.458	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.034	7.034	0	2.128	0	0	0	0	0	0
2001	363	23	822	358.021	-361.607	D	6.652	6.604	0.049	1.268	71.89	24.94	0	0	0	3.17
2001	364	23	927	365.912	-357.454	D	6.678	6.55	0.129	1.163	65.62	30.92	0	0	0	3.46
2001	365	23	931	366.183	-356.996	D	6.618	6.616	0.002	1.292	70.53	27.06	0	0	0	2.41
									3.332							
MARSHALL									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	356.546	-357.458	D	7.162	7.162	0	2.39	0	0	0	0	0	0
2001	2	23	933	366.169	-356.524	D	7.286	7.27	0.016	2.615	82.35	17.01	0	0	0	0.64
2001	3	23	930	366.19	-357.232	D	8.579	8.576	0.003	5.529	85.6	14.09	0	0	0	0.33

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	4	23	1	356.546	-357.458	D	8.279	8.279	0	4.833	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	7	23	933	366.169	-356.524	D	7.465	7.362	0.103	2.809	86.31	13.34	0	0	0	0.35
2001	8	23	1	356.546	-357.458	D	8.31	8.31	0	4.906	0	0	0	0	0	0
2001	9	23	103	358.476	-356.124	D	9.388	9.291	0.097	7.294	69.43	30.23	0	0	0	0.34
2001	10	23	1002	359.309	-354.73	D	7.381	7.368	0.013	2.82	80.83	18.89	0	0	0	0.28
2001	11	23	929	366.032	-357.239	D	8.855	8.855	0	6.204	84.11	13.61	0	0	0	0.53
2001	12	23	1	356.546	-357.458	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	13	23	1	356.546	-357.458	D	10.094	10.094	0	9.433	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	9.682	9.682	0	8.316	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.24	7.24	0	2.553	0	0	0	0	0	0
2001	16	23	1	356.546	-357.458	D	6.751	6.751	0	1.558	0	0	0	0	0	0
2001	17	23	1017	356.894	-355.206	D	6.904	6.762	0.142	1.58	73.7	25.12	0	0	0	1.18
2001	18	23	1017	356.894	-355.206	D	6.774	6.74	0.034	1.536	79.01	19.71	0	0	0	1.27
2001	19	23	930	366.19	-357.232	D	6.847	6.842	0.005	1.74	77.51	21.01	0	0	0	1.46
2001	20	23	1	356.546	-357.458	D	6.59	6.59	0	1.242	0	0	0	0	0	0
2001	21	23	1	356.546	-357.458	D	6.481	6.481	0	1.03	0	0	0	0	0	0
2001	22	23	1	356.546	-357.458	D	6.759	6.759	0	1.574	0	0	0	0	0	0
2001	23	23	1	356.546	-357.458	D	6.646	6.646	0	1.35	0	0	0	0	0	0
2001	24	23	947	365.801	-355.162	D	6.771	6.769	0.002	1.593	59.63	37.77	0	0	0	2.62
2001	25	23	1041	356.936	-357.592	D	6.617	6.601	0.016	1.262	45.46	50.02	0	0	0	4.52
2001	26	23	1035	356.477	-356.792	D	6.526	6.526	0	1.117	67.93	30.72	0	0	0	1.6
2001	27	23	1	356.546	-357.458	D	6.637	6.637	0	1.333	0	0	0	0	0	0
2001	28	23	931	366.183	-356.996	D	6.505	6.499	0.006	1.064	70	28.85	0	0	0	1.12
2001	29	23	1	356.546	-357.458	D	8.263	8.263	0	4.796	0	0	0	0	0	0
2001	30	23	1	356.546	-357.458	D	6.894	6.894	0	1.843	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.146	7.146	0	2.358	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	6.485	6.485	0	1.036	0	0	0	0	0	0
2001	33	23	1	356.546	-357.458	D	6.535	6.535	0	1.133	0	0	0	0	0	0
2001	34	23	1	356.546	-357.458	D	6.472	6.472	0	1.011	0	0	0	0	0	0
2001	35	23	1	356.546	-357.458	D	6.691	6.691	0	1.439	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	6.677	6.677	0	1.411	0	0	0	0	0	0
2001	37	23	973	362.512	-354.246	D	6.489	6.489	0	1.044	83.35	12.81	0	0	0	3.85
2001	38	23	964	363.678	-354.148	D	6.687	6.684	0.002	1.426	74.1	24.01	0	0	0	1.86
2001	39	23	1	356.546	-357.458	D	9.678	9.678	0	8.304	0	0	0	0	0	0
2001	40	23	996	360.121	-355.113	D	9.371	9.296	0.075	7.308	85.88	14.06	0	0	0	0.06
2001	41	23	949	365.722	-354.966	D	6.621	6.618	0.003	1.296	64.53	32.7	0	0	0	2.75
2001	42	23	1017	356.894	-355.206	D	6.477	6.47	0.007	1.008	66.17	31.91	0	0	0	1.9

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	43	23	15	357.659	-360.155	D	6.62	6.62	0	1.3	42.45	11.52	0	0	0	0.5
2001	44	23	1	356.546	-357.458	D	8.565	8.565	0	5.504	0	0	0	0	0	0
2001	45	23	1017	356.894	-355.206	D	10.379	10.197	0.182	9.721	86.42	13.45	0	0	0	0.13
2001	46	23	933	366.169	-356.524	D	9.443	7.477	**1.966**	3.052	89.2	10.59	0	0	0	0.21
2001	47	23	930	366.19	-357.232	D	6.712	6.625	0.087	1.31	82.84	16.01	0	0	0	1.15
2001	48	23	930	366.19	-357.232	D	6.563	6.519	0.044	1.103	50.07	46.68	0	0	0	3.25
2001	49	23	933	366.169	-356.524	D	6.489	6.471	0.017	1.011	72.09	26.16	0	0	0	1.76
2001	50	23	930	366.19	-357.232	D	6.486	6.482	0.004	1.031	83.12	16.17	0	0	0	0.69
2001	51	23	643	363.609	-354.151	D	7.205	7.205	0	2.48	93.79	6.79	0	0	0	1.02
2001	52	23	810	357.434	-360.005	D	6.745	6.729	0.016	1.514	84.68	14.83	0	0	0	0.48
2001	53	23	1017	356.894	-355.206	D	7.376	7.366	0.011	2.816	84.79	14.44	0	0	0	0.76
2001	54	23	986	360.908	-354.689	D	6.813	6.803	0.01	1.661	78.61	20.48	0	0	0	0.9
2001	55	23	1	356.546	-357.458	D	9.629	9.629	0	8.175	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.355	7.355	0	2.792	0	0	0	0	0	0
2001	57	23	933	366.169	-356.524	D	6.502	6.502	0.001	1.069	90.03	7.58	0	0	0	2.46
2001	58	23	930	366.19	-357.232	D	6.538	6.532	0.006	1.128	85.75	13.17	0	0	0	1.08
2001	59	23	1035	356.477	-356.792	D	6.851	6.848	0.003	1.751	87.13	12.59	0	0	0	0.31
2001	60	23	1017	356.894	-355.206	D	6.612	6.611	0.001	1.281	89.69	9.65	0	0	0	0.55
2001	61	23	949	365.722	-354.966	D	7.944	7.93	0.014	4.04	88.41	11.42	0	0	0	0.16
2001	62	23	904	364.594	-359.819	D	6.694	6.694	0	1.445	93.72	4.9	0	0	0	0.38
2001	63	23	1017	356.894	-355.206	D	6.654	6.586	0.068	1.234	72.33	25.54	0	0	0	2.13
2001	64	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	65	23	773	365.4	-355.32	D	6.576	6.527	0.048	1.119	52.42	43.6	0	0	0	3.98
2001	66	23	947	365.801	-355.162	D	6.5	6.471	0.03	1.009	78.92	18.79	0	0	0	2.29
2001	67	23	949	365.722	-354.966	D	6.565	6.565	0	1.192	82.59	14.62	0	0	0	2.58
2001	68	23	1041	356.936	-357.592	D	6.522	6.503	0.019	1.072	49.27	46.14	0	0	0	4.58
2001	69	23	1019	356.891	-355.575	D	6.481	6.471	0.01	1.01	80.76	17.09	0	0	0	2.12
2001	70	23	643	363.609	-354.151	D	6.481	6.48	0	1.028	92.61	6.11	0	0	0	1.21
2001	71	23	997	359.928	-355.117	D	8.688	8.688	0	5.798	93.37	7.12	0	0	0	0.28
2001	72	23	1	356.546	-357.458	D	6.535	6.535	0	1.135	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.113	7.113	0	2.29	0	0	0	0	0	0
2001	74	23	1	356.546	-357.458	D	9.86	9.86	0	8.793	89.18	10.84	0	0	0	0.13
2001	75	23	997	359.928	-355.117	D	7.347	7.165	0.183	2.396	91.3	8.53	0	0	0	0.17
2001	76	23	949	365.722	-354.966	D	6.663	6.662	0.001	1.381	82.56	14.92	0	0	0	2.47
2001	77	23	1039	356.522	-357.599	D	6.518	6.5	0.018	1.067	81.94	16.15	0	0	0	1.91
2001	78	23	810	357.434	-360.005	D	6.472	6.472	0	1.012	89.94	7.84	0	0	0	1.38
2001	79	23	1	356.546	-357.458	D	6.484	6.484	0	1.035	90.34	8.72	0	0	0	1.11
2001	80	23	1035	356.477	-356.792	D	6.483	6.473	0.01	1.014	90.02	7.73	0	0	0	2.24
2001	81	23	1017	356.894	-355.206	D	6.504	6.492	0.012	1.05	93.9	4.62	0	0	0	1.49

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	82	23	1017	356.894	-355.206	D	6.713	6.712	0.002	1.48	93.51	5.83	0	0	0	0.64
2001	83	23	1017	356.894	-355.206	D	6.725	6.686	0.039	1.43	90.66	8.83	0	0	0	0.51
2001	84	23	906	364.982	-359.812	D	6.542	6.483	0.059	1.034	53.57	42.55	0	0	0	3.88
2001	85	23	933	366.169	-356.524	D	6.523	6.491	0.033	1.048	48.08	48.13	0	0	0	3.79
2001	86	23	930	366.19	-357.232	D	6.471	6.468	0.003	1.005	86.75	11.7	0	0	0	1.49
2001	87	23	941	365.977	-355.774	D	6.491	6.482	0.009	1.031	87.62	11.38	0	0	0	0.99
2001	88	23	1	356.546	-357.458	D	6.911	6.911	0	1.878	0	0	0	0	0	0
2001	89	23	1	356.546	-357.458	D	7.242	7.242	0	2.556	0	0	0	0	0	0
2001	90	23	1	356.546	-357.458	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	91	23	1	356.546	-357.458	D	6.473	6.473	0	1.013	0	0	0	0	0	0
2001	92	23	1	356.546	-357.458	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	9.648	9.648	0	8.226	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	9.432	9.432	0	7.657	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.559	7.559	0	3.228	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	6.813	6.813	0	1.682	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.171	7.171	0	2.41	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	6.874	6.874	0	1.802	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.375	7.375	0	2.834	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	6.559	6.559	0	1.181	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	6.687	6.687	0	1.431	0	0	0	0	0	0
2001	105	23	955	364.92	-354.582	D	8.428	8.405	0.023	5.126	94.08	5.27	0	0	0	0.65
2001	106	23	900	364.265	-360.243	D	6.502	6.492	0.01	1.051	74.33	20.06	0	0	0	5.62
2001	107	23	933	366.169	-356.524	D	6.483	6.477	0.006	1.022	79.95	17.99	0	0	0	2.07
2001	108	23	933	366.169	-356.524	D	6.498	6.48	0.018	1.028	81.38	16.41	0	0	0	2.2
2001	109	23	906	364.982	-359.812	D	6.54	6.54	0	1.143	99	1	0	0	0	0.61
2001	110	23	1	356.546	-357.458	D	8.502	8.502	0	5.355	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.602	7.602	0	3.321	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	8.495	8.495	0	5.339	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.659	7.659	0	3.445	0	0	0	0	0	0
2001	114	23	949	365.722	-354.966	D	6.509	6.508	0.001	1.081	96.07	1.61	0	0	0	2.16
2001	115	23	930	366.19	-357.232	D	6.485	6.482	0.004	1.031	96.58	1.86	0	0	0	1.58
2001	116	23	1	356.546	-357.458	D	6.587	6.587	0	1.236	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	6.583	6.583	0	1.227	0	0	0	0	0	0
2001	119	23	929	366.032	-357.239	D	6.841	6.841	0	1.738	95.87	0.5	0	0	0	0.42
2001	120	23	1	356.546	-357.458	D	7.272	7.272	0	2.618	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	121	23	1	356.546	-357.458	D	6.852	6.852	0	1.759	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	6.96	6.96	0	1.977	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	6.988	6.988	0	2.033	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.28	7.28	0	2.635	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	9.077	9.077	0	6.754	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2001	127	23	1	356.546	-357.458	D	8.162	8.162	0	4.564	0	0	0	0	0	0
2001	128	23	930	366.19	-357.232	D	6.51	6.506	0.003	1.079	95.59	2.37	0	0	0	2.04
2001	129	23	907	365.051	-359.809	D	6.641	6.633	0.008	1.326	98.63	0.65	0	0	0	0.72
2001	130	23	930	366.19	-357.232	D	6.845	6.841	0.004	1.737	99.41	0.23	0	0	0	0.37
2001	131	23	929	366.032	-357.239	D	7.424	7.424	0	2.94	83.26	0.03	0	0	0	0.28
2001	132	23	930	366.19	-357.232	D	8.671	8.583	0.088	5.547	72.94	26.75	0	0	0	0.31
2001	133	23	1039	356.522	-357.599	D	6.556	6.549	0.007	1.162	98.97	0.28	0	0	0	0.74
2001	134	23	933	366.169	-356.524	D	6.788	6.785	0.002	1.626	99.4	0.17	0	0	0	0.43
2001	135	23	1	356.546	-357.458	D	6.856	6.856	0	1.768	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	6.774	6.774	0	1.603	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.638	7.638	0	3.398	0	0	0	0	0	0
2001	138	23	1035	356.477	-356.792	D	8.034	8.015	0.019	4.231	95.41	4.42	0	0	0	0.17
2001	139	23	809	357.432	-359.845	D	8.916	8.652	0.264	5.713	96.33	3.49	0	0	0	0.18
2001	140	23	974	362.281	-354.249	D	7.567	7.544	0.023	3.196	98.15	0.93	0	0	0	0.92
2001	141	23	84	358.173	-354.889	D	8.617	8.617	0	5.629	85.74	0.28	0	0	0	0.13
2001	142	23	1	356.546	-357.458	D	6.546	6.546	0	1.154	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	6.512	6.512	0	1.09	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	6.593	6.593	0	1.248	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	6.768	6.768	0	1.591	0	0	0	0	0	0
2001	148	23	947	365.801	-355.162	D	6.975	6.974	0.001	2.005	98.76	0.11	0	0	0	1.04
2001	149	23	930	366.19	-357.232	D	6.893	6.849	0.045	1.753	98.93	0.61	0	0	0	0.46
2001	150	23	949	365.722	-354.966	D	8.561	8.54	0.02	5.445	98.7	1.09	0	0	0	0.21
2001	151	23	1008	358.048	-354.775	D	8.861	8.828	0.033	6.138	97.43	2.33	0	0	0	0.24
2001	152	23	930	366.19	-357.232	D	6.937	6.935	0.001	1.927	99.44	0.41	0	0	0	0.19
2001	153	23	1	356.546	-357.458	D	7.018	7.018	0	2.095	0	0	0	0	0	0
2001	154	23	1	356.546	-357.458	D	7.181	7.181	0	2.429	0	0	0	0	0	0
2001	155	23	1	356.546	-357.458	D	8.898	8.898	0	6.309	0	0	0	0	0	0
2001	156	23	1	356.546	-357.458	D	7.529	7.529	0	3.162	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.846	7.846	0	3.853	0	0	0	0	0	0
2001	158	23	967	363.478	-354.116	D	7.549	7.492	0.057	3.084	99.18	0.38	0	0	0	0.44
2001	159	23	1039	356.522	-357.599	D	7.235	7.106	0.129	2.275	98.97	0.76	0	0	0	0.27

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	160	23	1035	356.477	-356.792	D	7.427	7.332	0.095	2.745	98.97	0.73	0	0	0	0.31
2001	161	23	1017	356.894	-355.206	D	7.13	7.047	0.083	2.153	99.47	0.27	0	0	0	0.26
2001	162	23	949	365.722	-354.966	D	7.169	7.161	0.007	2.389	99.79	0.07	0	0	0	0.13
2001	163	23	930	366.19	-357.232	D	6.949	6.949	0	1.955	99.73	0.03	0	0	0	0.12
2001	164	23	1	356.546	-357.458	D	6.969	6.969	0	1.995	0	0	0	0	0	0
2001	165	23	1	356.546	-357.458	D	7.214	7.214	0	2.497	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	8.124	8.124	0	4.479	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	6.529	6.529	0	1.123	0	0	0	0	0	0
2001	168	23	1	356.546	-357.458	D	6.563	6.563	0	1.189	0	0	0	0	0	0
2001	169	23	931	366.183	-356.996	D	6.669	6.668	0.001	1.394	99.14	0.04	0	0	0	0.6
2001	170	23	642	363.62	-354.4	D	6.956	6.956	0	1.969	95.39	0.02	0	0	0	0.41
2001	171	23	1	356.546	-357.458	D	6.83	6.83	0	1.716	0	0	0	0	0	0
2001	172	23	1017	356.894	-355.206	D	7.836	7.742	0.095	3.625	98.03	1.76	0	0	0	0.21
2001	173	23	907	365.051	-359.809	D	6.798	6.772	0.027	1.599	94.9	3.05	0	0	0	2.05
2001	174	23	783	365.659	-355.558	D	6.644	6.64	0.005	1.338	97.18	1.13	0	0	0	1.66
2001	175	23	786	365.973	-357.042	D	6.671	6.668	0.003	1.394	98.89	0.22	0	0	0	0.81
2001	176	23	927	365.912	-357.454	D	7.107	7.104	0.003	2.271	99.53	0.18	0	0	0	0.29
2001	177	23	1017	356.894	-355.206	D	6.937	6.935	0.002	1.926	99.46	0.17	0	0	0	0.28
2001	178	23	10	356.954	-355.443	D	7.075	7.074	0.001	2.209	99.68	0.14	0	0	0	0.22
2001	179	23	785	365.637	-355.06	D	8.965	8.963	0.001	6.471	99.23	0.54	0	0	0	0.06
2001	180	23	455	361.646	-354.736	D	8.433	8.433	0	5.191	99.76	0.07	0	0	0	0.11
2001	181	23	1	356.546	-357.458	D	7.862	7.862	0	3.889	0	0	0	0	0	0
2001	182	23	1017	356.894	-355.206	D	8.556	8.52	0.036	5.397	99.18	0.65	0	0	0	0.17
2001	183	23	1017	356.894	-355.206	D	7.58	7.425	0.155	2.942	98.22	1.49	0	0	0	0.29
2001	184	23	933	366.169	-356.524	D	8.798	8.781	0.017	6.023	99.86	0.08	0	0	0	0.06
2001	185	23	774	365.389	-355.071	D	7.041	7.041	0	2.143	98.81	0.04	0	0	0	0.26
2001	186	23	955	364.92	-354.582	D	7.065	7.063	0.002	2.186	99.02	0.06	0	0	0	0.94
2001	187	23	900	364.265	-360.243	D	7.002	6.957	0.046	1.97	99.42	0.14	0	0	0	0.44
2001	188	23	786	365.973	-357.042	D	7.766	7.748	0.018	3.637	99.82	0.05	0	0	0	0.14
2001	189	23	1	356.546	-357.458	D	6.907	6.907	0	1.869	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	6.865	6.865	0	1.785	0	0	0	0	0	0
2001	191	23	949	365.722	-354.966	D	7.153	7.115	0.039	2.293	98.62	0.96	0	0	0	0.42
2001	192	23	974	362.281	-354.249	D	7.361	7.053	0.307	2.167	99.18	0.45	0	0	0	0.37
2001	193	23	227	359.892	-360.057	D	7.55	7.437	0.113	2.967	99.3	0.53	0	0	0	0.17
2001	194	23	227	359.892	-360.057	D	7.876	7.801	0.075	3.754	99.46	0.44	0	0	0	0.1
2001	195	23	811	357.434	-360.225	D	6.604	6.601	0.003	1.263	99.67	0.03	0	0	0	0.29
2001	196	23	1039	356.522	-357.599	D	6.705	6.705	0	1.466	93.54	0.02	0	0	0	0.3
2001	197	23	1	356.546	-357.458	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	9.025	9.025	0	6.623	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	199	23	1	356.546	-357.458	D	7.494	7.494	0	3.089	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.083	7.083	0	2.227	0	0	0	0	0	0
2001	201	23	1	356.546	-357.458	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2001	202	23	786	365.973	-357.042	D	6.968	6.967	0.001	1.991	99.5	0.03	0	0	0	0.5
2001	203	23	933	366.169	-356.524	D	7.375	7.367	0.007	2.819	99.17	0.65	0	0	0	0.17
2001	204	23	929	366.032	-357.239	D	7.741	7.741	0	3.622	96.65	0.28	0	0	0	0.11
2001	205	23	1	356.546	-357.458	D	7.753	7.753	0	3.65	0	0	0	0	0	0
2001	206	23	1	356.546	-357.458	D	8.069	8.069	0	4.353	0	0	0	0	0	0
2001	207	23	964	363.678	-354.148	D	8.791	8.765	0.027	5.983	99.63	0.17	0	0	0	0.18
2001	208	23	967	363.478	-354.116	D	9.006	8.924	0.082	6.374	99.09	0.84	0	0	0	0.07
2001	209	23	933	366.169	-356.524	D	8.306	8.286	0.02	4.85	99.09	0.83	0	0	0	0.08
2001	210	23	949	365.722	-354.966	D	8.895	8.866	0.029	6.231	99.51	0.42	0	0	0	0.07
2001	211	23	933	366.169	-356.524	D	7.739	7.702	0.037	3.538	99.7	0.17	0	0	0	0.12
2001	212	23	933	366.169	-356.524	D	9.441	9.344	0.097	7.431	99.9	0.05	0	0	0	0.05
2001	213	23	933	366.169	-356.524	D	9.123	9.115	0.008	6.849	99.91	0.03	0	0	0	0.05
2001	214	23	933	366.169	-356.524	D	7.894	7.893	0.001	3.959	99.81	0.06	0	0	0	0.08
2001	215	23	294	360.245	-356.795	D	6.915	6.915	0	1.885	95	0.03	0	0	0	0.19
2001	216	23	996	360.121	-355.113	D	7.274	7.034	0.24	2.127	99.15	0.48	0	0	0	0.36
2001	217	23	822	358.021	-361.607	D	7.002	6.996	0.007	2.049	99.52	0.09	0	0	0	0.39
2001	218	23	1037	356.5	-357.195	D	7.068	7.068	0	2.197	98.85	0.01	0	0	0	0.37
2001	219	23	1	356.546	-357.458	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.358	7.358	0	2.799	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.346	7.346	0	2.775	0	0	0	0	0	0
2001	222	23	809	357.432	-359.845	D	8.482	8.294	0.189	4.868	99.06	0.36	0	0	0	0.58
2001	223	23	853	361.666	-362.175	D	9.218	8.646	**0.571**	5.699	96.42	3.48	0	0	0	0.11
2001	224	23	1035	356.477	-356.792	D	7.038	6.948	0.091	1.952	98.93	0.38	0	0	0	0.69
2001	225	23	809	357.432	-359.845	D	7.161	7.146	0.015	2.356	98.74	0.77	0	0	0	0.49
2001	226	23	1	356.546	-357.458	D	6.843	6.843	0	1.74	0	0	0	0	0	0
2001	227	23	1	356.546	-357.458	D	6.725	6.725	0	1.506	0	0	0	0	0	0
2001	228	23	1	356.546	-357.458	D	7.815	7.815	0	3.785	0	0	0	0	0	0
2001	229	23	1	356.546	-357.458	D	6.757	6.757	0	1.569	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	6.883	6.883	0	1.821	0	0	0	0	0	0
2001	231	23	931	366.183	-356.996	D	6.889	6.889	0	1.833	89.4	5.51	0	0	0	5.43
2001	232	23	949	365.722	-354.966	D	6.791	6.732	0.058	1.521	98.71	0.56	0	0	0	0.74
2001	233	23	947	365.801	-355.162	D	7.219	7.214	0.005	2.499	99.54	0.11	0	0	0	0.34
2001	234	23	170	359.385	-359.829	D	7.053	7.053	0	2.167	78.13	0.02	0	0	0	0.45
2001	235	23	191	359.732	-362.061	D	6.912	6.912	0	1.881	88.05	0.05	0	0	0	0.31
2001	236	23	1	356.546	-357.458	D	6.927	6.927	0	1.91	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.112	7.112	0	2.287	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	238	23	967	363.478	-354.116	D	8.31	8.259	0.051	4.788	92.24	7.15	0	0	0	0.61
2001	239	23	809	357.432	-359.845	D	7.549	7.264	0.285	2.603	98.6	1.07	0	0	0	0.34
2001	240	23	836	360.07	-362.066	D	7.215	7.113	0.102	2.289	99.34	0.35	0	0	0	0.3
2001	241	23	811	357.434	-360.225	D	6.942	6.878	0.064	1.812	99.43	0.22	0	0	0	0.35
2001	242	23	227	359.892	-360.057	D	7.653	7.591	0.062	3.296	98.89	0.96	0	0	0	0.15
2001	243	23	901	364.256	-360.039	D	7.784	7.779	0.005	3.706	99.3	0.55	0	0	0	0.15
2001	244	23	986	360.908	-354.689	D	8.47	8.4	0.07	5.115	98.44	1.41	0	0	0	0.15
2001	245	23	996	360.121	-355.113	D	7.453	7.426	0.027	2.943	98.62	1.19	0	0	0	0.19
2001	246	23	1017	356.894	-355.206	D	7.446	7.436	0.01	2.965	99.66	0.17	0	0	0	0.18
2001	247	23	1008	358.048	-354.775	D	6.842	6.826	0.015	1.708	99.54	0.14	0	0	0	0.33
2001	248	23	967	363.478	-354.116	D	7.23	7.197	0.033	2.463	99.22	0.49	0	0	0	0.29
2001	249	23	967	363.478	-354.116	D	8.963	8.946	0.016	6.429	99.78	0.12	0	0	0	0.09
2001	250	23	1	356.546	-357.458	D	7.43	7.43	0	2.952	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	8.474	8.474	0	5.287	0	0	0	0	0	0
2001	252	23	1	356.546	-357.458	D	8.546	8.546	0	5.459	0	0	0	0	0	0
2001	253	23	907	365.051	-359.809	D	6.953	6.952	0.001	1.961	97.87	0.35	0	0	0	1.7
2001	254	23	1016	357.1	-355.198	D	6.703	6.7	0.003	1.456	98.07	1	0	0	0	0.95
2001	255	23	949	365.722	-354.966	D	6.855	6.84	0.015	1.735	98.52	0.95	0	0	0	0.54
2001	256	23	949	365.722	-354.966	D	6.961	6.926	0.035	1.909	99.24	0.38	0	0	0	0.38
2001	257	23	967	363.478	-354.116	D	7.118	7.069	0.049	2.198	98.92	0.79	0	0	0	0.29
2001	258	23	810	357.434	-360.005	D	6.745	6.74	0.005	1.535	99.47	0.15	0	0	0	0.35
2001	259	23	10	356.954	-355.443	D	6.687	6.686	0	1.43	98.66	0.54	0	0	0	0.38
2001	260	23	929	366.032	-357.239	D	6.904	6.904	0	1.863	80.23	0.31	0	0	0	0.31
2001	261	23	1	356.546	-357.458	D	8.862	8.862	0	6.222	0	0	0	0	0	0
2001	262	23	1008	358.048	-354.775	D	8.503	8.123	0.38	4.476	93.21	6.72	0	0	0	0.08
2001	263	23	644	364.12	-360.12	D	7.015	7.015	0	2.089	91.97	0.09	0	0	0	0.34
2001	264	23	1	356.546	-357.458	D	7.242	7.242	0	2.556	0	0	0	0	0	0
2001	265	23	907	365.051	-359.809	D	6.977	6.947	0.029	1.951	91.36	7.14	0	0	0	1.5
2001	266	23	907	365.051	-359.809	D	7.717	7.681	0.036	3.491	98.22	1.46	0	0	0	0.32
2001	267	23	929	366.032	-357.239	D	7.743	7.662	0.081	3.449	81.01	18.43	0	0	0	0.56
2001	268	23	1	356.546	-357.458	D	6.594	6.594	0	1.249	0	0	0	0	0	0
2001	269	23	1017	356.894	-355.206	D	6.629	6.541	0.087	1.146	94.02	4.7	0	0	0	1.28
2001	270	23	947	365.801	-355.162	D	6.748	6.609	0.139	1.277	97.78	1.44	0	0	0	0.78
2001	271	23	219	359.98	-362.05	D	6.78	6.678	0.102	1.413	98.37	0.95	0	0	0	0.68
2001	272	23	822	358.021	-361.607	D	6.993	6.987	0.006	2.031	99.18	0.34	0	0	0	0.48
2001	273	23	1	356.546	-357.458	D	6.998	6.998	0	2.053	0	0	0	0	0	0
2001	274	23	1008	358.048	-354.775	D	7.267	7.263	0.004	2.601	97.57	1.91	0	0	0	0.53
2001	275	23	949	365.722	-354.966	D	7.004	7.001	0.002	2.061	98.82	0.83	0	0	0	0.3
2001	276	23	1	356.546	-357.458	D	7.261	7.261	0	2.596	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	277	23	1	356.546	-357.458	D	7.764	7.764	0	3.673	0	0	0	0	0	0
2001	278	23	1035	356.477	-356.792	D	8.935	8.902	0.033	6.32	90.63	9.21	0	0	0	0.16
2001	279	23	901	364.256	-360.039	D	7.266	7.251	0.015	2.575	68.25	30.43	0	0	0	1.31
2001	280	23	930	366.19	-357.232	D	6.553	6.55	0.003	1.163	96.82	1.78	0	0	0	1.38
2001	281	23	947	365.801	-355.162	D	6.661	6.653	0.008	1.365	94.94	4.28	0	0	0	0.78
2001	282	23	1	356.546	-357.458	D	7.318	7.318	0	2.716	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	9.666	9.666	0	8.274	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	10.245	10.218	0.027	9.779	90.79	9.06	0	0	0	0.14
2001	285	23	1017	356.894	-355.206	D	10.134	9.591	**0.543**	8.074	86.72	13.16	0	0	0	0.11
2001	286	23	996	360.121	-355.113	D	9.935	9.909	0.026	8.926	97.59	2.29	0	0	0	0.11
2001	287	23	932	366.176	-356.761	D	7.167	7.144	0.023	2.354	93.9	5.96	0	0	0	0.14
2001	288	23	1	356.546	-357.458	D	6.921	6.921	0	1.899	0	0	0	0	0	0
2001	289	23	1039	356.522	-357.599	D	7.331	7.189	0.142	2.446	85.39	14.41	0	0	0	0.2
2001	290	23	932	366.176	-356.761	D	6.493	6.492	0.001	1.05	82.56	14.87	0	0	0	2.46
2001	291	23	930	366.19	-357.232	D	6.561	6.559	0.002	1.18	94.92	4.48	0	0	0	0.6
2001	292	23	1	356.546	-357.458	D	6.741	6.741	0	1.537	0	0	0	0	0	0
2001	293	23	1	356.546	-357.458	D	7.888	7.888	0	3.946	0	0	0	0	0	0
2001	294	23	1	356.546	-357.458	D	8.995	8.995	0	6.548	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	8.986	8.986	0	6.528	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	10.007	10.007	0	9.193	0	0	0	0	0	0
2001	297	23	1	356.546	-357.458	D	9.504	9.504	0	7.846	0	0	0	0	0	0
2001	298	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	300	23	990	360.933	-355.487	D	6.516	6.472	0.045	1.012	67.57	27.99	0	0	0	4.43
2001	301	23	1017	356.894	-355.206	D	6.509	6.481	0.028	1.03	85.5	12.68	0	0	0	1.82
2001	302	23	1002	359.309	-354.73	D	6.503	6.503	0	1.072	86.11	1.53	0	0	0	0.46
2001	303	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	6.64	6.64	0	1.34	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	8.087	8.087	0	4.394	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	9.437	9.437	0	7.673	0	0	0	0	0	0
2001	307	23	949	365.722	-354.966	D	9.348	9.195	0.154	7.05	84.87	15.01	0	0	0	0.12
2001	308	23	1008	358.048	-354.775	D	6.67	6.66	0.01	1.378	97.01	2.39	0	0	0	0.6
2001	309	23	949	365.722	-354.966	D	9.677	8.864	**0.813**	6.227	91.41	8.44	0	0	0	0.15
2001	310	23	822	358.021	-361.607	D	7.313	7.133	0.18	2.331	96.25	3.46	0	0	0	0.29
2001	311	23	928	365.945	-357.303	D	7.432	7.349	0.083	2.78	98.23	1.55	0	0	0	0.22
2001	312	23	949	365.722	-354.966	D	7.546	7.529	0.017	3.163	95.83	2.34	0	0	0	1.83
2001	313	23	1039	356.522	-357.599	D	6.6	6.589	0.011	1.238	82.23	14.79	0	0	0	2.97
2001	314	23	907	365.051	-359.809	D	6.67	6.665	0.005	1.388	91.81	6.32	0	0	0	1.88
2001	315	23	955	364.92	-354.582	D	6.769	6.729	0.04	1.514	83.45	14.08	0	0	0	2.47

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	316	23	1039	356.522	-357.599	D	6.671	6.663	0.008	1.383	93.83	4.58	0	0	0	1.58
2001	317	23	1016	357.1	-355.198	D	6.761	6.761	0	1.578	96.15	1.04	0	0	0	0.95
2001	318	23	1	356.546	-357.458	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	319	23	1	356.546	-357.458	D	8.659	8.659	0	5.728	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	8.223	8.223	0	4.704	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.265	7.265	0	2.605	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.614	7.614	0	3.346	0	0	0	0	0	0
2001	323	23	1	356.546	-357.458	D	7.828	7.828	0	3.814	0	0	0	0	0	0
2001	324	23	1	356.546	-357.458	D	6.474	6.474	0	1.017	0	0	0	0	0	0
2001	325	23	1	356.546	-357.458	D	6.47	6.47	0	1.008	0	0	0	0	0	0
2001	326	23	413	361.618	-359.731	D	6.517	6.517	0	1.099	77.61	6.27	0	0	0	1.65
2001	327	23	1	356.546	-357.458	D	7.077	7.077	0	2.216	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	9.009	9.009	0	6.585	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	6.691	6.691	0	1.44	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	6.906	6.906	0	1.868	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	6.949	6.949	0	1.955	0	0	0	0	0	0
2001	332	23	836	360.07	-362.066	D	8.81	8.7	0.11	5.828	56.73	42.59	0	0	0	0.68
2001	333	23	1035	356.477	-356.792	D	10.027	10.026	0.001	9.247	77.39	22.5	0	0	0	0.13
2001	334	23	809	357.432	-359.845	D	9.21	8.823	0.387	6.126	79.6	20.19	0	0	0	0.21
2001	335	23	1	356.546	-357.458	D	6.638	6.638	0	1.335	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	6.673	6.673	0	1.403	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.004	7.004	0	2.066	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.019	7.019	0	2.097	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	8.996	8.996	0	6.551	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	9.441	9.441	0	7.681	0	0	0	0	0	0
2001	341	23	949	365.722	-354.966	D	7.939	7.938	0.001	4.058	90	9.49	0	0	0	0.47
2001	342	23	934	366.01	-356.526	D	8.227	8.094	0.133	4.409	83.01	16.55	0	0	0	0.44
2001	343	23	931	366.183	-356.996	D	6.61	6.598	0.012	1.257	52.53	43.57	0	0	0	3.91
2001	344	23	930	366.19	-357.232	D	6.522	6.513	0.01	1.091	69.76	28.13	0	0	0	2.09
2001	345	23	930	366.19	-357.232	D	6.561	6.557	0.003	1.178	79.87	18.93	0	0	0	1.17
2001	346	23	1	356.546	-357.458	D	9.566	9.566	0	8.007	0	0	0	0	0	0
2001	347	23	949	365.722	-354.966	D	9.655	9.571	0.084	8.021	89.91	9.9	0	0	0	0.18
2001	348	23	933	366.169	-356.524	D	9.275	8.856	0.419	6.206	88.88	11.03	0	0	0	0.09
2001	349	23	941	365.977	-355.774	D	8.797	8.789	0.008	6.043	95.36	4.51	0	0	0	0.12
2001	350	23	949	365.722	-354.966	D	10.14	10.116	0.024	9.495	93.57	6.37	0	0	0	0.05
2001	351	23	1002	359.309	-354.73	D	9.754	9.409	0.345	7.599	73.92	25.84	0	0	0	0.24
2001	352	23	929	366.032	-357.239	D	6.578	6.578	0	1.217	87.27	3.5	0	0	0	0.13
2001	353	23	933	366.169	-356.524	D	6.782	6.763	0.019	1.581	52.17	44.46	0	0	0	3.37
2001	354	23	1	356.546	-357.458	D	6.471	6.471	0	1.01	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	355	23	1	356.546	-357.458	D	6.493	6.493	0	1.052	0	0	0	0	0	0
2001	356	23	1	356.546	-357.458	D	7.254	7.254	0	2.582	0	0	0	0	0	0
2001	357	23	1	356.546	-357.458	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	6.481	6.481	0	1.029	0	0	0	0	0	0
2001	359	23	1	356.546	-357.458	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	360	23	1	356.546	-357.458	D	6.533	6.533	0	1.131	0	0	0	0	0	0
2001	361	23	1	356.546	-357.458	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.034	7.034	0	2.128	0	0	0	0	0	0
2001	363	23	929	366.032	-357.239	D	6.609	6.609	0	1.277	40.49	40.91	0	0	0	2.67
2001	364	23	1	356.546	-357.458	D	6.55	6.55	0	1.163	0	0	0	0	0	0
2001	365	23	1	356.546	-357.458	D	6.616	6.616	0	1.292	0	0	0	0	0	0
									1.966							
COLUMBIA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	356.546	-357.458	D	7.162	7.162	0	2.39	0	0	0	0	0	0
2001	2	23	932	366.176	-356.761	D	7.271	7.27	0.001	2.615	66.88	33.14	0	0	0	0
2001	3	23	930	366.19	-357.232	D	8.576	8.576	0	5.529	70.7	29.59	0	0	0	0
2001	4	23	1	356.546	-357.458	D	8.279	8.279	0	4.833	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	7	23	1	356.546	-357.458	D	7.4	7.4	0	2.888	0	0	0	0	0	0
2001	8	23	1	356.546	-357.458	D	8.31	8.31	0	4.906	0	0	0	0	0	0
2001	9	23	927	365.912	-357.454	D	9.234	9.216	0.017	7.105	47.42	52.58	0	0	0	0
2001	10	23	941	365.977	-355.774	D	7.34	7.328	0.012	2.736	57.68	42.3	0	0	0	0
2001	11	23	643	363.609	-354.151	D	8.857	8.856	0	6.207	65.83	33.96	0	0	0	0
2001	12	23	730	364.623	-354.605	D	10.218	10.218	0	9.779	67.47	24.6	0	0	0	0
2001	13	23	1	356.546	-357.458	D	10.094	10.094	0	9.433	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	9.682	9.682	0	8.316	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.24	7.24	0	2.553	0	0	0	0	0	0
2001	16	23	1	356.546	-357.458	D	6.751	6.751	0	1.558	0	0	0	0	0	0
2001	17	23	78	358.239	-356.385	D	6.869	6.762	0.107	1.58	49.32	50.68	0	0	0	0
2001	18	23	1017	356.894	-355.206	D	6.796	6.74	0.056	1.536	62.57	37.43	0	0	0	0
2001	19	23	907	365.051	-359.809	D	6.874	6.873	0.001	1.802	76.35	23.59	0	0	0	0
2001	20	23	1	356.546	-357.458	D	6.59	6.59	0	1.242	0	0	0	0	0	0
2001	21	23	1	356.546	-357.458	D	6.481	6.481	0	1.03	0	0	0	0	0	0
2001	22	23	1	356.546	-357.458	D	6.759	6.759	0	1.574	0	0	0	0	0	0
2001	23	23	1	356.546	-357.458	D	6.646	6.646	0	1.35	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	24	23	1	356.546	-357.458	D	6.768	6.768	0	1.592	0	0	0	0	0	0
2001	25	23	930	366.19	-357.232	D	6.626	6.607	0.019	1.274	32.94	67.05	0	0	0	0
2001	26	23	1035	356.477	-356.792	D	6.527	6.526	0.001	1.117	49.64	50.44	0	0	0	0
2001	27	23	1	356.546	-357.458	D	6.637	6.637	0	1.333	0	0	0	0	0	0
2001	28	23	930	366.19	-357.232	D	6.502	6.499	0.003	1.064	59.53	40.5	0	0	0	0
2001	29	23	15	357.659	-360.155	D	8.236	8.236	0	4.735	5.84	3.04	0	0	0	0
2001	30	23	1	356.546	-357.458	D	6.894	6.894	0	1.843	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.146	7.146	0	2.358	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	6.485	6.485	0	1.036	0	0	0	0	0	0
2001	33	23	1	356.546	-357.458	D	6.535	6.535	0	1.133	0	0	0	0	0	0
2001	34	23	1	356.546	-357.458	D	6.472	6.472	0	1.011	0	0	0	0	0	0
2001	35	23	1	356.546	-357.458	D	6.691	6.691	0	1.439	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	6.677	6.677	0	1.411	0	0	0	0	0	0
2001	37	23	1	356.546	-357.458	D	6.489	6.489	0	1.045	0	0	0	0	0	0
2001	38	23	966	363.538	-354.124	D	6.685	6.684	0	1.426	64.87	34.93	0	0	0	0
2001	39	23	1	356.546	-357.458	D	9.678	9.678	0	8.304	0	0	0	0	0	0
2001	40	23	967	363.478	-354.116	D	9.299	9.296	0.003	7.308	71.99	27.94	0	0	0	0
2001	41	23	949	365.722	-354.966	D	6.618	6.618	0	1.296	53.24	42.95	0	0	0	0
2001	42	23	955	364.92	-354.582	D	6.476	6.47	0.006	1.008	54.49	45.53	0	0	0	0
2001	43	23	62	357.925	-354.901	D	6.623	6.623	0	1.305	64.85	34.31	0	0	0	0
2001	44	23	1	356.546	-357.458	D	8.565	8.565	0	5.504	0	0	0	0	0	0
2001	45	23	967	363.478	-354.116	D	10.202	10.176	0.026	9.662	77.28	22.72	0	0	0	0
2001	46	23	933	366.169	-356.524	D	7.736	7.477	0.259	3.052	80.7	19.3	0	0	0	0
2001	47	23	907	365.051	-359.809	D	6.63	6.627	0.004	1.312	85.01	14.97	0	0	0	0
2001	48	23	1	356.546	-357.458	D	6.522	6.522	0	1.108	0	0	0	0	0	0
2001	49	23	930	366.19	-357.232	D	6.472	6.471	0	1.011	75.71	24.37	0	0	0	0
2001	50	23	930	366.19	-357.232	D	6.482	6.482	0	1.031	76.59	22.98	0	0	0	0
2001	51	23	1017	356.894	-355.206	D	7.23	7.229	0	2.53	88.81	11.16	0	0	0	0
2001	52	23	810	357.434	-360.005	D	6.73	6.729	0.001	1.514	73.56	26.4	0	0	0	0
2001	53	23	809	357.432	-359.845	D	7.371	7.366	0.006	2.816	73.04	26.93	0	0	0	0
2001	54	23	955	364.92	-354.582	D	6.813	6.803	0.011	1.661	65.96	34.05	0	0	0	0
2001	55	23	1	356.546	-357.458	D	9.629	9.629	0	8.175	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.355	7.355	0	2.792	0	0	0	0	0	0
2001	57	23	930	366.19	-357.232	D	6.502	6.502	0	1.069	89.47	12.26	0	0	0	0
2001	58	23	930	366.19	-357.232	D	6.535	6.532	0.003	1.128	75.34	24.64	0	0	0	0
2001	59	23	1035	356.477	-356.792	D	6.85	6.848	0.002	1.751	75.11	24.85	0	0	0	0
2001	60	23	1017	356.894	-355.206	D	6.611	6.611	0.001	1.281	81.66	18.29	0	0	0	0
2001	61	23	947	365.801	-355.162	D	7.936	7.93	0.006	4.04	80.7	19.28	0	0	0	0
2001	62	23	521	362.869	-359.925	D	6.694	6.694	0	1.445	87.26	7.93	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	63	23	102	358.487	-356.374	D	6.648	6.586	0.061	1.234	54.65	45.35	0	0	0	0
2001	64	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	65	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	66	23	1	356.546	-357.458	D	6.471	6.471	0	1.009	0	0	0	0	0	0
2001	67	23	1	356.546	-357.458	D	6.565	6.565	0	1.193	0	0	0	0	0	0
2001	68	23	930	366.19	-357.232	D	6.508	6.504	0.004	1.074	49.47	50.48	0	0	0	0
2001	69	23	930	366.19	-357.232	D	6.473	6.472	0.002	1.011	75.33	24.64	0	0	0	0
2001	70	23	774	365.389	-355.071	D	6.481	6.48	0	1.028	85.05	14.79	0	0	0	0
2001	71	23	134	358.68	-355.117	D	8.688	8.688	0	5.798	86.18	12.56	0	0	0	0
2001	72	23	1	356.546	-357.458	D	6.535	6.535	0	1.135	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.113	7.113	0	2.29	0	0	0	0	0	0
2001	74	23	10	356.954	-355.443	D	9.86	9.86	0	8.793	74.96	18.23	0	0	0	0
2001	75	23	933	366.169	-356.524	D	7.457	7.209	0.248	2.488	83.19	16.81	0	0	0	0
2001	76	23	1	356.546	-357.458	D	6.655	6.655	0	1.369	0	0	0	0	0	0
2001	77	23	930	366.19	-357.232	D	6.517	6.503	0.013	1.073	59.68	40.32	0	0	0	0
2001	78	23	1	356.546	-357.458	D	6.472	6.472	0	1.012	82.39	20.33	0	0	0	0
2001	79	23	1035	356.477	-356.792	D	6.485	6.484	0.001	1.035	69.91	30.02	0	0	0	0
2001	80	23	1038	356.511	-357.396	D	6.486	6.473	0.013	1.014	66.03	33.96	0	0	0	0
2001	81	23	930	366.19	-357.232	D	6.502	6.493	0.009	1.052	89.35	10.64	0	0	0	0
2001	82	23	930	366.19	-357.232	D	6.76	6.75	0.01	1.556	89.05	10.95	0	0	0	0
2001	83	23	1037	356.5	-357.195	D	6.721	6.686	0.034	1.43	65.19	34.8	0	0	0	0
2001	84	23	1	356.546	-357.458	D	6.483	6.483	0	1.034	0	0	0	0	0	0
2001	85	23	1	356.546	-357.458	D	6.491	6.491	0	1.048	0	0	0	0	0	0
2001	86	23	30	357.896	-359.895	D	6.468	6.468	0	1.005	27	2.09	0	0	0	0
2001	87	23	930	366.19	-357.232	D	6.485	6.481	0.004	1.03	80.14	19.84	0	0	0	0
2001	88	23	1	356.546	-357.458	D	6.911	6.911	0	1.878	0	0	0	0	0	0
2001	89	23	1	356.546	-357.458	D	7.242	7.242	0	2.556	0	0	0	0	0	0
2001	90	23	1	356.546	-357.458	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	91	23	1	356.546	-357.458	D	6.473	6.473	0	1.013	0	0	0	0	0	0
2001	92	23	1	356.546	-357.458	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	9.648	9.648	0	8.226	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	9.432	9.432	0	7.657	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.559	7.559	0	3.228	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	6.813	6.813	0	1.682	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.171	7.171	0	2.41	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	6.874	6.874	0	1.802	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.375	7.375	0	2.834	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	102	23	1	356.546	-357.458	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	6.559	6.559	0	1.181	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	6.687	6.687	0	1.431	0	0	0	0	0	0
2001	105	23	949	365.722	-354.966	D	8.407	8.405	0.003	5.126	94.29	5.69	0	0	0	0
2001	106	23	748	365.295	-358.57	D	6.49	6.49	0	1.047	95.28	0.69	0	0	0	0
2001	107	23	1	356.546	-357.458	D	6.477	6.477	0	1.021	0	0	0	0	0	0
2001	108	23	1	356.546	-357.458	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	109	23	1	356.546	-357.458	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	110	23	1	356.546	-357.458	D	8.502	8.502	0	5.355	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.602	7.602	0	3.321	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	8.495	8.495	0	5.339	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.659	7.659	0	3.445	0	0	0	0	0	0
2001	114	23	1	356.546	-357.458	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	115	23	1	356.546	-357.458	D	6.482	6.482	0	1.03	0	0	0	0	0	0
2001	116	23	1	356.546	-357.458	D	6.587	6.587	0	1.236	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	6.583	6.583	0	1.227	0	0	0	0	0	0
2001	119	23	929	366.032	-357.239	D	6.841	6.841	0	1.738	43.42	0.63	0	0	0	0
2001	120	23	1	356.546	-357.458	D	7.272	7.272	0	2.618	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	6.852	6.852	0	1.759	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	6.96	6.96	0	1.977	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	6.988	6.988	0	2.033	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.28	7.28	0	2.635	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	9.077	9.077	0	6.754	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2001	127	23	1	356.546	-357.458	D	8.162	8.162	0	4.564	0	0	0	0	0	0
2001	128	23	1	356.546	-357.458	D	6.506	6.506	0	1.078	0	0	0	0	0	0
2001	129	23	907	365.051	-359.809	D	6.633	6.633	0	1.326	98.27	1.4	0	0	0	0
2001	130	23	906	364.982	-359.812	D	6.838	6.838	0	1.731	99.56	0.51	0	0	0	0
2001	131	23	929	366.032	-357.239	D	7.424	7.424	0	2.94	75.08	0.05	0	0	0	0
2001	132	23	773	365.4	-355.32	D	8.638	8.603	0.035	5.595	63.52	36.48	0	0	0	0
2001	133	23	955	364.92	-354.582	D	6.587	6.55	0.037	1.163	98.19	1.81	0	0	0	0
2001	134	23	932	366.176	-356.761	D	6.787	6.785	0.002	1.626	99.54	0.38	0	0	0	0
2001	135	23	1	356.546	-357.458	D	6.856	6.856	0	1.768	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	6.774	6.774	0	1.603	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.638	7.638	0	3.398	0	0	0	0	0	0
2001	138	23	1017	356.894	-355.206	D	8.037	8.015	0.022	4.231	87.45	12.55	0	0	0	0
2001	139	23	949	365.722	-354.966	D	8.995	8.695	0.299	5.816	85.45	14.55	0	0	0	0
2001	140	23	949	365.722	-354.966	D	7.553	7.544	0.009	3.196	99.33	0.68	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	141	23	1	356.546	-357.458	D	8.617	8.617	0	5.629	0	0	0	0	0	0
2001	142	23	1	356.546	-357.458	D	6.546	6.546	0	1.154	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	6.512	6.512	0	1.09	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	6.593	6.593	0	1.248	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	6.768	6.768	0	1.591	0	0	0	0	0	0
2001	148	23	725	364.678	-355.851	D	6.974	6.974	0	2.005	92.73	0.21	0	0	0	0
2001	149	23	930	366.19	-357.232	D	6.86	6.849	0.011	1.753	98.71	1.29	0	0	0	0
2001	150	23	949	365.722	-354.966	D	8.543	8.54	0.002	5.445	98.6	1.29	0	0	0	0
2001	151	23	1017	356.894	-355.206	D	8.848	8.828	0.02	6.138	97.87	2.12	0	0	0	0
2001	152	23	930	366.19	-357.232	D	6.941	6.935	0.006	1.927	98.88	1.12	0	0	0	0
2001	153	23	1	356.546	-357.458	D	7.018	7.018	0	2.095	0	0	0	0	0	0
2001	154	23	1	356.546	-357.458	D	7.181	7.181	0	2.429	0	0	0	0	0	0
2001	155	23	1	356.546	-357.458	D	8.898	8.898	0	6.309	0	0	0	0	0	0
2001	156	23	1	356.546	-357.458	D	7.529	7.529	0	3.162	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.846	7.846	0	3.853	0	0	0	0	0	0
2001	158	23	949	365.722	-354.966	D	7.509	7.492	0.017	3.084	99.59	0.41	0	0	0	0
2001	159	23	1017	356.894	-355.206	D	7.229	7.106	0.123	2.275	97.42	2.58	0	0	0	0
2001	160	23	1017	356.894	-355.206	D	7.384	7.332	0.052	2.745	98.89	1.11	0	0	0	0
2001	161	23	1017	356.894	-355.206	D	7.08	7.047	0.033	2.153	99.58	0.42	0	0	0	0
2001	162	23	949	365.722	-354.966	D	7.164	7.161	0.003	2.389	99.84	0.13	0	0	0	0
2001	163	23	932	366.176	-356.761	D	6.949	6.949	0	1.955	100.44	0.04	0	0	0	0
2001	164	23	1	356.546	-357.458	D	6.969	6.969	0	1.995	0	0	0	0	0	0
2001	165	23	1	356.546	-357.458	D	7.214	7.214	0	2.497	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	8.124	8.124	0	4.479	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	6.529	6.529	0	1.123	0	0	0	0	0	0
2001	168	23	1	356.546	-357.458	D	6.563	6.563	0	1.189	0	0	0	0	0	0
2001	169	23	930	366.19	-357.232	D	6.669	6.668	0.001	1.394	99.84	0.09	0	0	0	0
2001	170	23	455	361.646	-354.736	D	6.956	6.956	0	1.969	91.74	0.04	0	0	0	0
2001	171	23	1	356.546	-357.458	D	6.83	6.83	0	1.716	0	0	0	0	0	0
2001	172	23	1008	358.048	-354.775	D	7.798	7.742	0.056	3.625	95.66	4.34	0	0	0	0
2001	173	23	907	365.051	-359.809	D	6.772	6.772	0	1.599	99.13	0.71	0	0	0	0
2001	174	23	949	365.722	-354.966	D	6.641	6.64	0.001	1.338	99.64	0.28	0	0	0	0
2001	175	23	941	365.977	-355.774	D	6.675	6.668	0.007	1.394	99.51	0.47	0	0	0	0
2001	176	23	947	365.801	-355.162	D	7.119	7.104	0.015	2.271	99.6	0.41	0	0	0	0
2001	177	23	967	363.478	-354.116	D	6.945	6.935	0.01	1.927	99.7	0.29	0	0	0	0
2001	178	23	1017	356.894	-355.206	D	7.078	7.074	0.004	2.209	99.7	0.33	0	0	0	0
2001	179	23	643	363.609	-354.151	D	8.969	8.963	0.006	6.471	99.09	0.9	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	180	23	967	363.478	-354.116	D	8.433	8.433	0	5.191	99.36	0.27	0	0	0	0
2001	181	23	1	356.546	-357.458	D	7.862	7.862	0	3.889	0	0	0	0	0	0
2001	182	23	1017	356.894	-355.206	D	8.599	8.52	0.079	5.397	96.75	3.24	0	0	0	0
2001	183	23	933	366.169	-356.524	D	7.786	7.569	0.217	3.248	94.49	5.51	0	0	0	0
2001	184	23	933	366.169	-356.524	D	8.812	8.781	0.031	6.023	99.79	0.2	0	0	0	0
2001	185	23	595	363.624	-360.142	D	7.024	7.024	0	2.106	96.06	0.06	0	0	0	0
2001	186	23	1	356.546	-357.458	D	7.048	7.048	0	2.156	0	0	0	0	0	0
2001	187	23	949	365.722	-354.966	D	7.006	6.95	0.057	1.956	99.67	0.32	0	0	0	0
2001	188	23	941	365.977	-355.774	D	7.751	7.748	0.004	3.637	99.95	0.11	0	0	0	0
2001	189	23	1	356.546	-357.458	D	6.907	6.907	0	1.869	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	6.865	6.865	0	1.785	0	0	0	0	0	0
2001	191	23	933	366.169	-356.524	D	7.093	7.093	0	2.248	94.62	0.17	0	0	0	0
2001	192	23	930	366.19	-357.232	D	7.101	7.056	0.045	2.172	98.62	1.38	0	0	0	0
2001	193	23	219	359.98	-362.05	D	7.521	7.437	0.083	2.967	99.3	0.7	0	0	0	0
2001	194	23	900	364.265	-360.243	D	7.838	7.763	0.075	3.671	97.79	2.21	0	0	0	0
2001	195	23	822	358.021	-361.607	D	6.602	6.601	0.001	1.263	99.92	0.06	0	0	0	0
2001	196	23	1	356.546	-357.458	D	6.705	6.705	0	1.466	0	0	0	0	0	0
2001	197	23	1	356.546	-357.458	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	9.025	9.025	0	6.623	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.494	7.494	0	3.089	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.083	7.083	0	2.227	0	0	0	0	0	0
2001	201	23	784	365.648	-355.309	D	7.413	7.413	0	2.915	98.86	0.07	0	0	0	0
2001	202	23	932	366.176	-356.761	D	7.05	7.045	0.005	2.15	99.09	0.89	0	0	0	0
2001	203	23	930	366.19	-357.232	D	7.385	7.367	0.018	2.819	99.53	0.46	0	0	0	0
2001	204	23	930	366.19	-357.232	D	7.756	7.741	0.015	3.622	99.63	0.35	0	0	0	0
2001	205	23	930	366.19	-357.232	D	7.861	7.854	0.007	3.871	99.83	0.14	0	0	0	0
2001	206	23	932	366.176	-356.761	D	8.134	8.129	0.005	4.489	99.36	0.6	0	0	0	0
2001	207	23	933	366.169	-356.524	D	8.776	8.77	0.006	5.997	99.65	0.38	0	0	0	0
2001	208	23	949	365.722	-354.966	D	9.122	8.924	0.198	6.374	97.26	2.74	0	0	0	0
2001	209	23	933	366.169	-356.524	D	8.362	8.286	0.076	4.85	97.32	2.68	0	0	0	0
2001	210	23	949	365.722	-354.966	D	8.878	8.866	0.012	6.231	99.15	0.85	0	0	0	0
2001	211	23	933	366.169	-356.524	D	7.718	7.702	0.015	3.538	99.72	0.27	0	0	0	0
2001	212	23	933	366.169	-356.524	D	9.385	9.344	0.041	7.431	99.9	0.09	0	0	0	0
2001	213	23	933	366.169	-356.524	D	9.125	9.115	0.01	6.849	99.82	0.15	0	0	0	0
2001	214	23	933	366.169	-356.524	D	7.894	7.893	0	3.959	99.63	0.12	0	0	0	0
2001	215	23	188	359.187	-355.344	D	6.91	6.91	0	1.877	66.63	0.02	0	0	0	0
2001	216	23	933	366.169	-356.524	D	7.079	7.058	0.021	2.177	98.02	1.98	0	0	0	0
2001	217	23	1036	356.488	-356.993	D	7.001	6.999	0.002	2.056	99.49	0.31	0	0	0	0
2001	218	23	1	356.546	-357.458	D	7.068	7.068	0	2.197	98.12	0.02	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	219	23	1	356.546	-357.458	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.358	7.358	0	2.799	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.346	7.346	0	2.775	0	0	0	0	0	0
2001	222	23	949	365.722	-354.966	D	8.308	8.292	0.016	4.864	99.51	0.49	0	0	0	0
2001	223	23	933	366.169	-356.524	D	9.034	8.635	0.398	5.672	96.57	3.43	0	0	0	0
2001	224	23	929	366.032	-357.239	D	7.143	7.018	0.125	2.095	99.14	0.86	0	0	0	0
2001	225	23	1017	356.894	-355.206	D	7.201	7.146	0.056	2.356	97.41	2.59	0	0	0	0
2001	226	23	907	365.051	-359.809	D	6.911	6.855	0.055	1.766	97.73	2.27	0	0	0	0
2001	227	23	1017	356.894	-355.206	D	6.738	6.725	0.013	1.506	99.51	0.48	0	0	0	0
2001	228	23	594	363.123	-354.422	D	7.883	7.883	0	3.937	97.8	0.09	0	0	0	0
2001	229	23	1	356.546	-357.458	D	6.757	6.757	0	1.569	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	6.883	6.883	0	1.821	0	0	0	0	0	0
2001	231	23	1	356.546	-357.458	D	6.929	6.929	0	1.914	0	0	0	0	0	0
2001	232	23	947	365.801	-355.162	D	6.733	6.732	0.001	1.521	98.43	1.6	0	0	0	0
2001	233	23	933	366.169	-356.524	D	7.208	7.207	0.001	2.483	99.84	0.18	0	0	0	0
2001	234	23	1	356.546	-357.458	D	7.053	7.053	0	2.167	0	0	0	0	0	0
2001	235	23	929	366.032	-357.239	D	6.939	6.939	0	1.934	92.79	0.1	0	0	0	0
2001	236	23	1	356.546	-357.458	D	6.927	6.927	0	1.91	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.112	7.112	0	2.287	0	0	0	0	0	0
2001	238	23	1	356.546	-357.458	D	8.255	8.255	0	4.778	0	0	0	0	0	0
2001	239	23	955	364.92	-354.582	D	7.386	7.265	0.121	2.604	97.11	2.89	0	0	0	0
2001	240	23	930	366.19	-357.232	D	7.264	7.15	0.114	2.365	99.36	0.64	0	0	0	0
2001	241	23	822	358.021	-361.607	D	6.918	6.878	0.04	1.812	99.54	0.46	0	0	0	0
2001	242	23	810	357.434	-360.005	D	7.628	7.591	0.037	3.296	98.77	1.23	0	0	0	0
2001	243	23	901	364.256	-360.039	D	7.782	7.779	0.003	3.706	98.84	1.08	0	0	0	0
2001	244	23	933	366.169	-356.524	D	8.653	8.589	0.064	5.561	97.18	2.81	0	0	0	0
2001	245	23	1035	356.477	-356.792	D	7.441	7.408	0.032	2.906	97.63	2.37	0	0	0	0
2001	246	23	1017	356.894	-355.206	D	7.441	7.436	0.005	2.965	99.69	0.33	0	0	0	0
2001	247	23	967	363.478	-354.116	D	6.837	6.823	0.013	1.701	99.75	0.24	0	0	0	0
2001	248	23	967	363.478	-354.116	D	7.222	7.197	0.025	2.463	99.1	0.89	0	0	0	0
2001	249	23	964	363.678	-354.148	D	8.956	8.946	0.01	6.429	99.77	0.22	0	0	0	0
2001	250	23	1	356.546	-357.458	D	7.43	7.43	0	2.952	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	8.474	8.474	0	5.287	0	0	0	0	0	0
2001	252	23	1	356.546	-357.458	D	8.546	8.546	0	5.459	0	0	0	0	0	0
2001	253	23	1	356.546	-357.458	D	6.969	6.969	0	1.996	0	0	0	0	0	0
2001	254	23	1002	359.309	-354.73	D	6.704	6.7	0.004	1.456	97.26	2.76	0	0	0	0
2001	255	23	1035	356.477	-356.792	D	6.822	6.821	0.001	1.697	99.12	0.87	0	0	0	0
2001	256	23	643	363.609	-354.151	D	6.927	6.926	0	1.909	99.3	0.46	0	0	0	0
2001	257	23	964	363.678	-354.148	D	7.095	7.069	0.027	2.198	97.66	2.34	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	258	23	810	357.434	-360.005	D	6.742	6.74	0.003	1.535	99.73	0.21	0	0	0	0
2001	259	23	10	356.954	-355.443	D	6.687	6.686	0	1.43	98.77	1.25	0	0	0	0
2001	260	23	1	356.546	-357.458	D	6.958	6.958	0	1.972	0	0	0	0	0	0
2001	261	23	1	356.546	-357.458	D	8.862	8.862	0	6.222	0	0	0	0	0	0
2001	262	23	955	364.92	-354.582	D	8.121	8.103	0.018	4.43	90.4	9.59	0	0	0	0
2001	263	23	1	356.546	-357.458	D	7.025	7.025	0	2.109	0	0	0	0	0	0
2001	264	23	1	356.546	-357.458	D	7.242	7.242	0	2.556	0	0	0	0	0	0
2001	265	23	930	366.19	-357.232	D	6.951	6.949	0.002	1.955	96.96	2.97	0	0	0	0
2001	266	23	907	365.051	-359.809	D	7.684	7.681	0.004	3.491	97.67	2.33	0	0	0	0
2001	267	23	930	366.19	-357.232	D	7.684	7.662	0.022	3.449	69.69	30.3	0	0	0	0
2001	268	23	907	365.051	-359.809	D	6.6	6.593	0.007	1.246	80.26	19.75	0	0	0	0
2001	269	23	907	365.051	-359.809	D	6.572	6.54	0.031	1.144	89.75	10.25	0	0	0	0
2001	270	23	835	359.911	-362.063	D	6.638	6.615	0.023	1.29	97.56	2.44	0	0	0	0
2001	271	23	227	359.892	-360.057	D	6.698	6.678	0.02	1.413	98.06	1.94	0	0	0	0
2001	272	23	822	358.021	-361.607	D	6.987	6.987	0	2.031	99.59	0.49	0	0	0	0
2001	273	23	1	356.546	-357.458	D	6.998	6.998	0	2.053	0	0	0	0	0	0
2001	274	23	1008	358.048	-354.775	D	7.274	7.263	0.011	2.601	94.13	5.87	0	0	0	0
2001	275	23	949	365.722	-354.966	D	7.007	7.001	0.005	2.061	98.54	1.43	0	0	0	0
2001	276	23	1	356.546	-357.458	D	7.261	7.261	0	2.596	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.764	7.764	0	3.673	0	0	0	0	0	0
2001	278	23	811	357.434	-360.225	D	9.057	8.915	0.142	6.351	80.4	19.6	0	0	0	0
2001	279	23	930	366.19	-357.232	D	7.203	7.202	0.001	2.472	69.67	30.21	0	0	0	0
2001	280	23	907	365.051	-359.809	D	6.553	6.552	0.001	1.167	97.86	2.26	0	0	0	0
2001	281	23	786	365.973	-357.042	D	6.66	6.653	0.007	1.365	92.11	7.89	0	0	0	0
2001	282	23	1	356.546	-357.458	D	7.318	7.318	0	2.716	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	9.666	9.666	0	8.274	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	10.222	10.218	0.004	9.779	81.71	18.26	0	0	0	0
2001	285	23	1008	358.048	-354.775	D	9.821	9.591	0.23	8.074	77.76	22.24	0	0	0	0
2001	286	23	934	366.01	-356.526	D	9.951	9.927	0.024	8.975	97.42	2.57	0	0	0	0
2001	287	23	930	366.19	-357.232	D	7.164	7.144	0.019	2.354	93.51	6.5	0	0	0	0
2001	288	23	1	356.546	-357.458	D	6.921	6.921	0	1.899	0	0	0	0	0	0
2001	289	23	947	365.801	-355.162	D	7.171	7.171	0	2.408	70.37	29.85	0	0	0	0
2001	290	23	1	356.546	-357.458	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	291	23	930	366.19	-357.232	D	6.559	6.559	0	1.18	88.87	11.21	0	0	0	0
2001	292	23	1	356.546	-357.458	D	6.741	6.741	0	1.537	0	0	0	0	0	0
2001	293	23	1	356.546	-357.458	D	7.888	7.888	0	3.946	0	0	0	0	0	0
2001	294	23	1	356.546	-357.458	D	8.995	8.995	0	6.548	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	8.986	8.986	0	6.528	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	10.007	10.007	0	9.193	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	297	23	1	356.546	-357.458	D	9.504	9.504	0	7.846	0	0	0	0	0	0
2001	298	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	300	23	1	356.546	-357.458	D	6.472	6.472	0	1.011	0	0	0	0	0	0
2001	301	23	933	366.169	-356.524	D	6.489	6.482	0.007	1.032	78.78	21.23	0	0	0	0
2001	302	23	643	363.609	-354.151	D	6.504	6.503	0	1.073	96.27	3.83	0	0	0	0
2001	303	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	6.64	6.64	0	1.34	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	8.087	8.087	0	4.394	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	9.437	9.437	0	7.673	0	0	0	0	0	0
2001	307	23	927	365.912	-357.454	D	9.265	9.195	0.07	7.05	82.04	17.96	0	0	0	0
2001	308	23	1035	356.477	-356.792	D	6.666	6.66	0.006	1.378	96.45	3.57	0	0	0	0
2001	309	23	927	365.912	-357.454	D	8.964	8.864	0.1	6.227	78.72	21.28	0	0	0	0
2001	310	23	832	359.493	-362.061	D	7.173	7.133	0.04	2.331	91.75	8.25	0	0	0	0
2001	311	23	927	365.912	-357.454	D	7.378	7.349	0.029	2.78	96.39	3.62	0	0	0	0
2001	312	23	933	366.169	-356.524	D	7.603	7.601	0.002	3.318	98.74	1.25	0	0	0	0
2001	313	23	927	365.912	-357.454	D	6.61	6.589	0.021	1.239	48.81	51.19	0	0	0	0
2001	314	23	929	366.032	-357.239	D	6.666	6.665	0	1.389	89.08	10.14	0	0	0	0
2001	315	23	949	365.722	-354.966	D	6.739	6.729	0.01	1.514	74.67	25.33	0	0	0	0
2001	316	23	1039	356.522	-357.599	D	6.665	6.663	0.003	1.383	88.13	11.75	0	0	0	0
2001	317	23	929	366.032	-357.239	D	6.733	6.733	0	1.522	80.18	2.25	0	0	0	0
2001	318	23	1	356.546	-357.458	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	319	23	1	356.546	-357.458	D	8.659	8.659	0	5.728	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	8.223	8.223	0	4.704	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.265	7.265	0	2.605	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.614	7.614	0	3.346	0	0	0	0	0	0
2001	323	23	1	356.546	-357.458	D	7.828	7.828	0	3.814	0	0	0	0	0	0
2001	324	23	1	356.546	-357.458	D	6.474	6.474	0	1.017	0	0	0	0	0	0
2001	325	23	1	356.546	-357.458	D	6.47	6.47	0	1.008	0	0	0	0	0	0
2001	326	23	1	356.546	-357.458	D	6.515	6.515	0	1.096	0	0	0	0	0	0
2001	327	23	1	356.546	-357.458	D	7.077	7.077	0	2.216	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	9.009	9.009	0	6.585	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	6.691	6.691	0	1.44	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	6.906	6.906	0	1.868	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	6.949	6.949	0	1.955	0	0	0	0	0	0
2001	332	23	930	366.19	-357.232	D	8.806	8.674	0.132	5.765	55.65	44.35	0	0	0	0
2001	333	23	1035	356.477	-356.792	D	10.223	10.026	0.197	9.247	65.89	34.11	0	0	0	0
2001	334	23	822	358.021	-361.607	D	9.033	8.714	0.319	5.861	75.28	24.72	0	0	0	0
2001	335	23	1	356.546	-357.458	D	6.638	6.638	0	1.335	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	336	23	1	356.546	-357.458	D	6.673	6.673	0	1.403	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.004	7.004	0	2.066	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.019	7.019	0	2.097	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	8.996	8.996	0	6.551	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	9.441	9.441	0	7.681	0	0	0	0	0	0
2001	341	23	948	365.727	-355.056	D	7.938	7.938	0	4.058	84.56	12.42	0	0	0	0
2001	342	23	934	366.01	-356.526	D	8.182	8.094	0.088	4.409	71.58	28.42	0	0	0	0
2001	343	23	930	366.19	-357.232	D	6.599	6.598	0	1.257	59.52	40.8	0	0	0	0
2001	344	23	930	366.19	-357.232	D	6.517	6.513	0.004	1.091	55.55	44.46	0	0	0	0
2001	345	23	930	366.19	-357.232	D	6.559	6.557	0.002	1.178	71.11	28.85	0	0	0	0
2001	346	23	255	360.129	-359.796	D	9.529	9.529	0	7.91	59.83	15.12	0	0	0	0
2001	347	23	1	356.546	-357.458	D	9.597	9.597	0	8.089	0	0	0	0	0	0
2001	348	23	933	366.169	-356.524	D	8.876	8.856	0.02	6.206	83.04	16.96	0	0	0	0
2001	349	23	786	365.973	-357.042	D	8.79	8.789	0	6.043	95.06	4.45	0	0	0	0
2001	350	23	947	365.801	-355.162	D	10.122	10.116	0.006	9.495	87.98	11.93	0	0	0	0
2001	351	23	930	366.19	-357.232	D	9.61	9.443	0.167	7.687	61.26	38.74	0	0	0	0
2001	352	23	247	360.217	-361.79	D	6.568	6.568	0	1.198	54.41	2.89	0	0	0	0
2001	353	23	1	356.546	-357.458	D	6.769	6.769	0	1.594	0	0	0	0	0	0
2001	354	23	1	356.546	-357.458	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	355	23	1	356.546	-357.458	D	6.493	6.493	0	1.052	0	0	0	0	0	0
2001	356	23	1	356.546	-357.458	D	7.254	7.254	0	2.582	0	0	0	0	0	0
2001	357	23	1	356.546	-357.458	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	6.481	6.481	0	1.029	0	0	0	0	0	0
2001	359	23	1	356.546	-357.458	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	360	23	1	356.546	-357.458	D	6.533	6.533	0	1.131	0	0	0	0	0	0
2001	361	23	1	356.546	-357.458	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.034	7.034	0	2.128	0	0	0	0	0	0
2001	363	23	1	356.546	-357.458	D	6.604	6.604	0	1.269	0	0	0	0	0	0
2001	364	23	1	356.546	-357.458	D	6.55	6.55	0	1.163	0	0	0	0	0	0
2001	365	23	1	356.546	-357.458	D	6.616	6.616	0	1.292	0	0	0	0	0	0
									0.398							
HOLCIM									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	356.546	-357.458	D	7.162	7.162	0	2.39	0	0	0	0	0	0
2001	2	23	1	356.546	-357.458	D	7.263	7.263	0	2.599	0	0	0	0	0	0
2001	3	23	1	356.546	-357.458	D	8.553	8.553	0	5.476	0	0	0	0	0	0
2001	4	23	1	356.546	-357.458	D	8.279	8.279	0	4.833	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	5	23	1	356.546	-357.458	D	7.363	7.363	0	2.809	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	7	23	1	356.546	-357.458	D	7.4	7.4	0	2.888	0	0	0	0	0	0
2001	8	23	1	356.546	-357.458	D	8.31	8.31	0	4.906	0	0	0	0	0	0
2001	9	23	1	356.546	-357.458	D	9.291	9.291	0	7.294	0	0	0	0	0	0
2001	10	23	786	365.973	-357.042	D	7.333	7.328	0.005	2.736	40.67	59.06	0	0	0	0.23
2001	11	23	933	366.169	-356.524	D	8.855	8.855	0	6.204	54.05	44.92	0	0	0	0.38
2001	12	23	1	356.546	-357.458	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	13	23	1	356.546	-357.458	D	10.094	10.094	0	9.433	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	9.682	9.682	0	8.316	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.24	7.24	0	2.553	0	0	0	0	0	0
2001	16	23	1	356.546	-357.458	D	6.751	6.751	0	1.558	0	0	0	0	0	0
2001	17	23	933	366.169	-356.524	D	6.813	6.765	0.048	1.586	43.47	55.78	0	0	0	0.74
2001	18	23	907	365.051	-359.809	D	7.201	6.742	0.459	1.541	41.74	57.8	0	0	0	0.46
2001	19	23	907	365.051	-359.809	D	6.874	6.873	0.001	1.802	56.78	42.58	0	0	0	0.56
2001	20	23	1	356.546	-357.458	D	6.59	6.59	0	1.242	0	0	0	0	0	0
2001	21	23	1	356.546	-357.458	D	6.481	6.481	0	1.03	0	0	0	0	0	0
2001	22	23	1	356.546	-357.458	D	6.759	6.759	0	1.574	0	0	0	0	0	0
2001	23	23	1	356.546	-357.458	D	6.646	6.646	0	1.35	0	0	0	0	0	0
2001	24	23	1	356.546	-357.458	D	6.768	6.768	0	1.592	0	0	0	0	0	0
2001	25	23	930	366.19	-357.232	D	6.609	6.607	0.002	1.274	32.87	66.39	0	0	0	0.82
2001	26	23	930	366.19	-357.232	D	6.534	6.522	0.012	1.108	32.97	66.62	0	0	0	0.41
2001	27	23	1	356.546	-357.458	D	6.637	6.637	0	1.333	0	0	0	0	0	0
2001	28	23	949	365.722	-354.966	D	6.501	6.501	0	1.067	49.85	49.14	0	0	0	0.66
2001	29	23	929	366.032	-357.239	D	8.327	8.327	0	4.946	17.69	16.21	0	0	0	0.14
2001	30	23	1	356.546	-357.458	D	6.894	6.894	0	1.843	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.146	7.146	0	2.358	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	6.485	6.485	0	1.036	0	0	0	0	0	0
2001	33	23	1	356.546	-357.458	D	6.535	6.535	0	1.133	0	0	0	0	0	0
2001	34	23	1	356.546	-357.458	D	6.472	6.472	0	1.011	0	0	0	0	0	0
2001	35	23	1	356.546	-357.458	D	6.691	6.691	0	1.439	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	6.677	6.677	0	1.411	0	0	0	0	0	0
2001	37	23	1	356.546	-357.458	D	6.489	6.489	0	1.045	0	0	0	0	0	0
2001	38	23	1	356.546	-357.458	D	6.686	6.686	0	1.429	0	0	0	0	0	0
2001	39	23	1	356.546	-357.458	D	9.678	9.678	0	8.304	0	0	0	0	0	0
2001	40	23	1	356.546	-357.458	D	9.263	9.263	0	7.224	0	0	0	0	0	0
2001	41	23	1	356.546	-357.458	D	6.621	6.621	0	1.301	0	0	0	0	0	0
2001	42	23	949	365.722	-354.966	D	6.505	6.47	0.035	1.008	39.52	59.88	0	0	0	0.61
2001	43	23	1017	356.894	-355.206	D	6.624	6.623	0.001	1.305	50.32	49.19	0	0	0	0.41

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	44	23	1	356.546	-357.458	D	8.565	8.565	0	5.504	0	0	0	0	0	0
2001	45	23	1	356.546	-357.458	D	10.197	10.197	0	9.721	0	0	0	0	0	0
2001	46	23	907	365.051	-359.809	D	7.393	7.39	0.003	2.867	66.45	33.31	0	0	0	0.27
2001	47	23	907	365.051	-359.809	D	6.629	6.627	0.002	1.312	68.18	31.69	0	0	0	0.18
2001	48	23	1	356.546	-357.458	D	6.522	6.522	0	1.108	0	0	0	0	0	0
2001	49	23	1	356.546	-357.458	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	50	23	929	366.032	-357.239	D	6.482	6.482	0	1.031	60.9	36	0	0	0	0.63
2001	51	23	955	364.92	-354.582	D	7.206	7.205	0.001	2.48	67.55	31.86	0	0	0	0.71
2001	52	23	1017	356.894	-355.206	D	7.189	6.698	0.491	1.453	46.65	52.86	0	0	0	0.49
2001	53	23	1039	356.522	-357.599	D	7.381	7.366	0.015	2.816	52.71	47.21	0	0	0	0.09
2001	54	23	949	365.722	-354.966	D	6.804	6.803	0.001	1.661	61.29	38.53	0	0	0	0.35
2001	55	23	1	356.546	-357.458	D	9.629	9.629	0	8.175	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.355	7.355	0	2.792	0	0	0	0	0	0
2001	57	23	1	356.546	-357.458	D	6.502	6.502	0	1.07	0	0	0	0	0	0
2001	58	23	933	366.169	-356.524	D	6.542	6.532	0.01	1.128	58.27	41.12	0	0	0	0.6
2001	59	23	1017	356.894	-355.206	D	6.897	6.848	0.049	1.751	57.14	42.67	0	0	0	0.18
2001	60	23	643	363.609	-354.151	D	6.606	6.606	0	1.272	47.92	51.3	0	0	0	0.71
2001	61	23	1	356.546	-357.458	D	7.906	7.906	0	3.988	0	0	0	0	0	0
2001	62	23	1	356.546	-357.458	D	6.693	6.693	0	1.444	0	0	0	0	0	0
2001	63	23	786	365.973	-357.042	D	6.905	6.588	0.316	1.238	47.46	52.03	0	0	0	0.51
2001	64	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	65	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	66	23	1	356.546	-357.458	D	6.471	6.471	0	1.009	0	0	0	0	0	0
2001	67	23	1	356.546	-357.458	D	6.565	6.565	0	1.193	0	0	0	0	0	0
2001	68	23	1	356.546	-357.458	D	6.503	6.503	0	1.072	0	0	0	0	0	0
2001	69	23	907	365.051	-359.809	D	6.473	6.471	0.001	1.01	73.95	25.1	0	0	0	0.9
2001	70	23	933	366.169	-356.524	D	6.481	6.48	0.001	1.028	74.56	24.8	0	0	0	0.59
2001	71	23	1	356.546	-357.458	D	8.688	8.688	0	5.798	0	0	0	0	0	0
2001	72	23	1	356.546	-357.458	D	6.535	6.535	0	1.135	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.113	7.113	0	2.29	0	0	0	0	0	0
2001	74	23	1	356.546	-357.458	D	9.86	9.86	0	8.793	0	0	0	0	0	0
2001	75	23	809	357.432	-359.845	D	7.5	7.165	0.335	2.396	69.27	30.61	0	0	0	0.12
2001	76	23	1	356.546	-357.458	D	6.655	6.655	0	1.369	0	0	0	0	0	0
2001	77	23	930	366.19	-357.232	D	6.529	6.503	0.025	1.073	48.83	50.1	0	0	0	1.08
2001	78	23	1039	356.522	-357.599	D	6.483	6.472	0.011	1.012	56.93	42.3	0	0	0	0.78
2001	79	23	1017	356.894	-355.206	D	6.515	6.484	0.031	1.035	73.2	25.68	0	0	0	1.12
2001	80	23	907	365.051	-359.809	D	6.621	6.473	0.148	1.014	59.78	39.26	0	0	0	0.96
2001	81	23	949	365.722	-354.966	D	6.557	6.493	0.064	1.052	79.79	19.43	0	0	0	0.78
2001	82	23	933	366.169	-356.524	D	6.869	6.75	0.118	1.556	77.83	21.72	0	0	0	0.45

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	83	23	930	366.19	-357.232	D	6.857	6.69	0.167	1.437	84.08	15.69	0	0	0	0.23
2001	84	23	1	356.546	-357.458	D	6.483	6.483	0	1.034	0	0	0	0	0	0
2001	85	23	1	356.546	-357.458	D	6.491	6.491	0	1.048	0	0	0	0	0	0
2001	86	23	1	356.546	-357.458	D	6.468	6.468	0	1.005	0	0	0	0	0	0
2001	87	23	785	365.637	-355.06	D	6.482	6.482	0	1.031	75.43	21.56	0	0	0	0.62
2001	88	23	1	356.546	-357.458	D	6.911	6.911	0	1.878	0	0	0	0	0	0
2001	89	23	1	356.546	-357.458	D	7.242	7.242	0	2.556	0	0	0	0	0	0
2001	90	23	1	356.546	-357.458	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	91	23	1	356.546	-357.458	D	6.473	6.473	0	1.013	0	0	0	0	0	0
2001	92	23	1	356.546	-357.458	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	9.648	9.648	0	8.226	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	9.432	9.432	0	7.657	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.559	7.559	0	3.228	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	6.813	6.813	0	1.682	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.171	7.171	0	2.41	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	6.874	6.874	0	1.802	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.375	7.375	0	2.834	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	6.526	6.526	0	1.117	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	6.559	6.559	0	1.181	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	6.687	6.687	0	1.431	0	0	0	0	0	0
2001	105	23	1	356.546	-357.458	D	8.379	8.379	0	5.066	0	0	0	0	0	0
2001	106	23	1	356.546	-357.458	D	6.489	6.489	0	1.045	0	0	0	0	0	0
2001	107	23	1	356.546	-357.458	D	6.477	6.477	0	1.021	0	0	0	0	0	0
2001	108	23	1	356.546	-357.458	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	109	23	1	356.546	-357.458	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	110	23	1	356.546	-357.458	D	8.502	8.502	0	5.355	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.602	7.602	0	3.321	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	8.495	8.495	0	5.339	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.659	7.659	0	3.445	0	0	0	0	0	0
2001	114	23	1	356.546	-357.458	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	115	23	1	356.546	-357.458	D	6.482	6.482	0	1.03	0	0	0	0	0	0
2001	116	23	1	356.546	-357.458	D	6.587	6.587	0	1.236	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	6.583	6.583	0	1.227	0	0	0	0	0	0
2001	119	23	1	356.546	-357.458	D	6.862	6.862	0	1.778	0	0	0	0	0	0
2001	120	23	1	356.546	-357.458	D	7.272	7.272	0	2.618	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	6.852	6.852	0	1.759	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	122	23	1	356.546	-357.458	D	6.96	6.96	0	1.977	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	6.988	6.988	0	2.033	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.28	7.28	0	2.635	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	9.077	9.077	0	6.754	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.235	7.235	0	2.542	0	0	0	0	0	0
2001	127	23	1	356.546	-357.458	D	8.162	8.162	0	4.564	0	0	0	0	0	0
2001	128	23	1	356.546	-357.458	D	6.506	6.506	0	1.078	0	0	0	0	0	0
2001	129	23	1	356.546	-357.458	D	6.631	6.631	0	1.321	0	0	0	0	0	0
2001	130	23	929	366.032	-357.239	D	6.841	6.841	0	1.737	99.36	0.5	0	0	0	0.3
2001	131	23	1	356.546	-357.458	D	7.488	7.488	0	3.075	0	0	0	0	0	0
2001	132	23	1	356.546	-357.458	D	8.544	8.544	0	5.453	0	0	0	0	0	0
2001	133	23	1	356.546	-357.458	D	6.549	6.549	0	1.162	0	0	0	0	0	0
2001	134	23	1	356.546	-357.458	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2001	135	23	1	356.546	-357.458	D	6.856	6.856	0	1.768	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	6.774	6.774	0	1.603	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.638	7.638	0	3.398	0	0	0	0	0	0
2001	138	23	1	356.546	-357.458	D	8.015	8.015	0	4.231	0	0	0	0	0	0
2001	139	23	947	365.801	-355.162	D	8.713	8.695	0.018	5.816	67.52	32.42	0	0	0	0.05
2001	140	23	933	366.169	-356.524	D	7.52	7.52	0.001	3.143	96.49	2.84	0	0	0	0.59
2001	141	23	1	356.546	-357.458	D	8.617	8.617	0	5.629	0	0	0	0	0	0
2001	142	23	1	356.546	-357.458	D	6.546	6.546	0	1.154	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	6.512	6.512	0	1.09	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	6.593	6.593	0	1.248	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	6.768	6.768	0	1.591	0	0	0	0	0	0
2001	148	23	1	356.546	-357.458	D	6.979	6.979	0	2.016	0	0	0	0	0	0
2001	149	23	930	366.19	-357.232	D	6.849	6.849	0	1.753	97.61	2	0	0	0	0.43
2001	150	23	949	365.722	-354.966	D	8.542	8.54	0.002	5.445	95.37	4.42	0	0	0	0.14
2001	151	23	1	356.546	-357.458	D	8.828	8.828	0	6.138	0	0	0	0	0	0
2001	152	23	1	356.546	-357.458	D	6.939	6.939	0	1.934	0	0	0	0	0	0
2001	153	23	1	356.546	-357.458	D	7.018	7.018	0	2.095	0	0	0	0	0	0
2001	154	23	1	356.546	-357.458	D	7.181	7.181	0	2.429	0	0	0	0	0	0
2001	155	23	1	356.546	-357.458	D	8.898	8.898	0	6.309	0	0	0	0	0	0
2001	156	23	1	356.546	-357.458	D	7.529	7.529	0	3.162	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.846	7.846	0	3.853	0	0	0	0	0	0
2001	158	23	949	365.722	-354.966	D	7.493	7.492	0.001	3.084	98.99	0.38	0	0	0	0.61
2001	159	23	907	365.051	-359.809	D	7.461	7.112	0.349	2.286	96.89	2.89	0	0	0	0.22
2001	160	23	933	366.169	-356.524	D	7.464	7.367	0.096	2.82	96.96	2.8	0	0	0	0.24

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	161	23	227	359.892	-360.057	D	7.13	7.06	0.07	2.18	98.75	1.06	0	0	0	0.19
2001	162	23	933	366.169	-356.524	D	7.182	7.179	0.004	2.424	99.55	0.3	0	0	0	0.13
2001	163	23	929	366.032	-357.239	D	6.949	6.949	0	1.955	99.85	0.21	0	0	0	0.18
2001	164	23	785	365.637	-355.06	D	6.971	6.971	0	2	99.13	0.31	0	0	0	0.13
2001	165	23	1	356.546	-357.458	D	7.214	7.214	0	2.497	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	8.124	8.124	0	4.479	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	6.529	6.529	0	1.123	0	0	0	0	0	0
2001	168	23	1	356.546	-357.458	D	6.563	6.563	0	1.189	0	0	0	0	0	0
2001	169	23	928	365.945	-357.303	D	6.665	6.665	0	1.388	98.94	0.15	0	0	0	0.5
2001	170	23	785	365.637	-355.06	D	6.956	6.956	0	1.969	98.35	0.17	0	0	0	0.33
2001	171	23	1	356.546	-357.458	D	6.83	6.83	0	1.716	0	0	0	0	0	0
2001	172	23	961	364.092	-354.289	D	7.745	7.73	0.015	3.598	95.77	4.06	0	0	0	0.16
2001	173	23	907	365.051	-359.809	D	6.773	6.772	0.001	1.599	97.77	1.89	0	0	0	0.26
2001	174	23	1	356.546	-357.458	D	6.633	6.633	0	1.326	0	0	0	0	0	0
2001	175	23	932	366.176	-356.761	D	6.662	6.661	0.001	1.38	99.17	0.25	0	0	0	0.52
2001	176	23	927	365.912	-357.454	D	7.158	7.104	0.053	2.271	99.09	0.69	0	0	0	0.23
2001	177	23	933	366.169	-356.524	D	7.016	6.949	0.067	1.954	99.19	0.6	0	0	0	0.21
2001	178	23	1008	358.048	-354.775	D	7.116	7.074	0.042	2.209	99.07	0.76	0	0	0	0.17
2001	179	23	964	363.678	-354.148	D	9.016	8.963	0.053	6.471	98.09	1.86	0	0	0	0.05
2001	180	23	966	363.538	-354.124	D	8.434	8.433	0.002	5.191	99.62	0.26	0	0	0	0.11
2001	181	23	1	356.546	-357.458	D	7.862	7.862	0	3.889	0	0	0	0	0	0
2001	182	23	1	356.546	-357.458	D	8.52	8.52	0	5.397	0	0	0	0	0	0
2001	183	23	933	366.169	-356.524	D	7.875	7.569	0.306	3.248	87.01	12.87	0	0	0	0.12
2001	184	23	933	366.169	-356.524	D	9.081	8.781	0.3	6.023	99.19	0.76	0	0	0	0.05
2001	185	23	785	365.637	-355.06	D	7.042	7.041	0	2.143	99.32	0.14	0	0	0	0.2
2001	186	23	1	356.546	-357.458	D	7.048	7.048	0	2.156	0	0	0	0	0	0
2001	187	23	788	365.951	-356.544	D	6.957	6.95	0.007	1.956	99.41	0.26	0	0	0	0.3
2001	188	23	941	365.977	-355.774	D	7.756	7.748	0.008	3.637	99.66	0.2	0	0	0	0.15
2001	189	23	1	356.546	-357.458	D	6.907	6.907	0	1.869	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	6.865	6.865	0	1.785	0	0	0	0	0	0
2001	191	23	1	356.546	-357.458	D	7.127	7.127	0	2.318	0	0	0	0	0	0
2001	192	23	949	365.722	-354.966	D	7.089	7.053	0.035	2.167	98.88	0.2	0	0	0	0.92
2001	193	23	941	365.977	-355.774	D	7.392	7.253	0.139	2.578	98.63	1.03	0	0	0	0.34
2001	194	23	901	364.256	-360.039	D	7.866	7.763	0.103	3.671	97	2.91	0	0	0	0.09
2001	195	23	822	358.021	-361.607	D	6.602	6.601	0.001	1.263	99.62	0.15	0	0	0	0.29
2001	196	23	1	356.546	-357.458	D	6.705	6.705	0	1.466	0	0	0	0	0	0
2001	197	23	1	356.546	-357.458	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	9.025	9.025	0	6.623	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.494	7.494	0	3.089	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	200	23	1	356.546	-357.458	D	7.083	7.083	0	2.227	0	0	0	0	0	0
2001	201	23	933	366.169	-356.524	D	7.469	7.469	0	3.034	100.12	0.32	0	0	0	0.24
2001	202	23	930	366.19	-357.232	D	7.048	7.045	0.003	2.15	95.24	4.64	0	0	0	0.11
2001	203	23	933	366.169	-356.524	D	7.369	7.367	0.002	2.819	99.12	0.78	0	0	0	0.09
2001	204	23	933	366.169	-356.524	D	7.742	7.741	0.001	3.622	98.56	1.23	0	0	0	0.06
2001	205	23	947	365.801	-355.162	D	7.821	7.821	0	3.799	98.93	0.35	0	0	0	0.07
2001	206	23	1	356.546	-357.458	D	8.069	8.069	0	4.353	0	0	0	0	0	0
2001	207	23	949	365.722	-354.966	D	8.766	8.765	0.001	5.983	98.27	1.51	0	0	0	0.23
2001	208	23	949	365.722	-354.966	D	9.286	8.924	0.362	6.374	92.66	7.29	0	0	0	0.05
2001	209	23	933	366.169	-356.524	D	8.447	8.286	0.161	4.85	94.08	5.87	0	0	0	0.05
2001	210	23	949	365.722	-354.966	D	8.869	8.866	0.003	6.231	97.4	2.58	0	0	0	0.05
2001	211	23	930	366.19	-357.232	D	7.709	7.702	0.006	3.538	99	0.9	0	0	0	0.07
2001	212	23	933	366.169	-356.524	D	9.433	9.344	0.089	7.431	99.75	0.21	0	0	0	0.05
2001	213	23	933	366.169	-356.524	D	9.192	9.115	0.077	6.849	99.49	0.47	0	0	0	0.03
2001	214	23	933	366.169	-356.524	D	7.895	7.893	0.001	3.959	99.77	0.25	0	0	0	0.08
2001	215	23	497	362.142	-354.715	D	6.915	6.915	0	1.885	86.58	0.05	0	0	0	0.14
2001	216	23	933	366.169	-356.524	D	7.109	7.058	0.051	2.177	98.62	0.89	0	0	0	0.49
2001	217	23	1035	356.477	-356.792	D	7.03	6.999	0.031	2.056	99	0.63	0	0	0	0.36
2001	218	23	2	356.535	-357.209	D	7.068	7.068	0	2.197	98.23	0.05	0	0	0	0.4
2001	219	23	1	356.546	-357.458	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.358	7.358	0	2.799	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.346	7.346	0	2.775	0	0	0	0	0	0
2001	222	23	1	356.546	-357.458	D	8.294	8.294	0	4.868	0	0	0	0	0	0
2001	223	23	947	365.801	-355.162	D	9.044	8.608	0.435	5.608	97.09	2.78	0	0	0	0.14
2001	224	23	930	366.19	-357.232	D	7.387	7.018	0.369	2.095	92.15	7.53	0	0	0	0.33
2001	225	23	996	360.121	-355.113	D	7.788	7.16	**0.628**	2.385	95.16	4.63	0	0	0	0.2
2001	226	23	853	361.666	-362.175	D	6.865	6.849	0.016	1.753	97.34	1.74	0	0	0	0.91
2001	227	23	832	359.493	-362.061	D	6.74	6.724	0.016	1.504	98	1.54	0	0	0	0.45
2001	228	23	947	365.801	-355.162	D	7.884	7.883	0	3.937	99.11	0.25	0	0	0	0.26
2001	229	23	1	356.546	-357.458	D	6.757	6.757	0	1.569	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	6.883	6.883	0	1.821	0	0	0	0	0	0
2001	231	23	1	356.546	-357.458	D	6.929	6.929	0	1.914	0	0	0	0	0	0
2001	232	23	1	356.546	-357.458	D	6.739	6.739	0	1.533	0	0	0	0	0	0
2001	233	23	1	356.546	-357.458	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	234	23	1	356.546	-357.458	D	7.053	7.053	0	2.167	0	0	0	0	0	0
2001	235	23	1	356.546	-357.458	D	6.921	6.921	0	1.898	0	0	0	0	0	0
2001	236	23	1	356.546	-357.458	D	6.927	6.927	0	1.91	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.112	7.112	0	2.287	0	0	0	0	0	0
2001	238	23	1	356.546	-357.458	D	8.255	8.255	0	4.778	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	239	23	946	365.798	-355.322	D	7.265	7.265	0	2.604	98.8	0.53	0	0	0	0.42
2001	240	23	1	356.546	-357.458	D	7.063	7.063	0	2.187	0	0	0	0	0	0
2001	241	23	1	356.546	-357.458	D	6.868	6.868	0	1.792	0	0	0	0	0	0
2001	242	23	929	366.032	-357.239	D	7.539	7.539	0	3.185	98.16	1.62	0	0	0	0.1
2001	243	23	1	356.546	-357.458	D	7.675	7.675	0	3.479	0	0	0	0	0	0
2001	244	23	933	366.169	-356.524	D	8.884	8.589	0.295	5.561	94.4	5.36	0	0	0	0.23
2001	245	23	996	360.121	-355.113	D	7.834	7.426	0.409	2.943	94.5	5.38	0	0	0	0.12
2001	246	23	1017	356.894	-355.206	D	7.491	7.436	0.055	2.965	99.17	0.7	0	0	0	0.13
2001	247	23	1002	359.309	-354.73	D	6.851	6.826	0.025	1.708	99.52	0.3	0	0	0	0.18
2001	248	23	949	365.722	-354.966	D	7.23	7.197	0.033	2.463	98.38	1.48	0	0	0	0.14
2001	249	23	963	363.809	-354.192	D	8.976	8.946	0.03	6.429	99.05	0.88	0	0	0	0.06
2001	250	23	1	356.546	-357.458	D	7.43	7.43	0	2.952	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	8.474	8.474	0	5.287	0	0	0	0	0	0
2001	252	23	1	356.546	-357.458	D	8.546	8.546	0	5.459	0	0	0	0	0	0
2001	253	23	1	356.546	-357.458	D	6.969	6.969	0	1.996	0	0	0	0	0	0
2001	254	23	900	364.265	-360.243	D	6.725	6.706	0.019	1.469	96.27	3.19	0	0	0	0.53
2001	255	23	933	366.169	-356.524	D	7.108	6.848	0.26	1.75	96.27	3.42	0	0	0	0.31
2001	256	23	853	361.666	-362.175	D	7.194	6.941	0.252	1.939	98.08	1.69	0	0	0	0.23
2001	257	23	967	363.478	-354.116	D	8.018	7.069	**0.949**	2.198	88.91	10.9	0	0	0	0.19
2001	258	23	822	358.021	-361.607	D	6.741	6.74	0.001	1.535	99.57	0.19	0	0	0	0.2
2001	259	23	1	356.546	-357.458	D	6.686	6.686	0	1.43	0	0	0	0	0	0
2001	260	23	1	356.546	-357.458	D	6.958	6.958	0	1.972	0	0	0	0	0	0
2001	261	23	1	356.546	-357.458	D	8.862	8.862	0	6.222	0	0	0	0	0	0
2001	262	23	1	356.546	-357.458	D	8.123	8.123	0	4.476	0	0	0	0	0	0
2001	263	23	1	356.546	-357.458	D	7.025	7.025	0	2.109	0	0	0	0	0	0
2001	264	23	1	356.546	-357.458	D	7.242	7.242	0	2.556	0	0	0	0	0	0
2001	265	23	947	365.801	-355.162	D	6.947	6.947	0	1.951	93.92	0.8	0	0	0	0.79
2001	266	23	941	365.977	-355.774	D	7.681	7.681	0.001	3.491	96.72	2.76	0	0	0	0.45
2001	267	23	1	356.546	-357.458	D	7.433	7.433	0	2.957	0	0	0	0	0	0
2001	268	23	907	365.051	-359.809	D	6.62	6.593	0.027	1.246	38.01	60.37	0	0	0	1.63
2001	269	23	907	365.051	-359.809	D	6.54	6.54	0	1.144	92.66	6.25	0	0	0	1.19
2001	270	23	1	356.546	-357.458	D	6.613	6.613	0	1.287	0	0	0	0	0	0
2001	271	23	949	365.722	-354.966	D	6.774	6.665	0.109	1.388	90.94	8.06	0	0	0	1.01
2001	272	23	822	358.021	-361.607	D	6.991	6.987	0.004	2.031	96.5	2.97	0	0	0	0.55
2001	273	23	1	356.546	-357.458	D	6.998	6.998	0	2.053	0	0	0	0	0	0
2001	274	23	963	363.809	-354.192	D	7.266	7.265	0.001	2.604	93.16	6.6	0	0	0	0.26
2001	275	23	1	356.546	-357.458	D	6.99	6.99	0	2.038	0	0	0	0	0	0
2001	276	23	1	356.546	-357.458	D	7.261	7.261	0	2.596	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.764	7.764	0	3.673	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	278	23	811	357.434	-360.225	D	10.047	8.915	1.132	6.351	57.32	42.63	0	0	0	0.05
2001	279	23	905	364.788	-359.816	D	7.214	7.214	0	2.497	81.27	19.1	0	0	0	0.07
2001	280	23	930	366.19	-357.232	D	6.55	6.55	0	1.163	93.68	4.93	0	0	0	0.86
2001	281	23	932	366.176	-356.761	D	6.661	6.652	0.01	1.362	80.49	19.09	0	0	0	0.42
2001	282	23	1	356.546	-357.458	D	7.318	7.318	0	2.716	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	9.666	9.666	0	8.274	0	0	0	0	0	0
2001	284	23	1	356.546	-357.458	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	285	23	1010	357.824	-354.865	D	9.627	9.591	0.037	8.074	68.65	31.29	0	0	0	0.05
2001	286	23	1	356.546	-357.458	D	9.874	9.874	0	8.83	0	0	0	0	0	0
2001	287	23	1	356.546	-357.458	D	6.998	6.998	0	2.054	0	0	0	0	0	0
2001	288	23	1	356.546	-357.458	D	6.921	6.921	0	1.899	0	0	0	0	0	0
2001	289	23	1	356.546	-357.458	D	7.189	7.189	0	2.446	0	0	0	0	0	0
2001	290	23	1	356.546	-357.458	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	291	23	766	365.477	-357.064	D	6.559	6.559	0	1.18	60.32	29.89	0	0	0	0.54
2001	292	23	1	356.546	-357.458	D	6.741	6.741	0	1.537	0	0	0	0	0	0
2001	293	23	1	356.546	-357.458	D	7.888	7.888	0	3.946	0	0	0	0	0	0
2001	294	23	1	356.546	-357.458	D	8.995	8.995	0	6.548	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	8.986	8.986	0	6.528	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	10.007	10.007	0	9.193	0	0	0	0	0	0
2001	297	23	1	356.546	-357.458	D	9.504	9.504	0	7.846	0	0	0	0	0	0
2001	298	23	1	356.546	-357.458	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	300	23	1	356.546	-357.458	D	6.472	6.472	0	1.011	0	0	0	0	0	0
2001	301	23	930	366.19	-357.232	D	6.485	6.482	0.003	1.032	84.83	14.39	0	0	0	0.77
2001	302	23	947	365.801	-355.162	D	6.506	6.503	0.002	1.073	82.45	17.09	0	0	0	0.45
2001	303	23	1	356.546	-357.458	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	6.64	6.64	0	1.34	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	8.087	8.087	0	4.394	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	9.437	9.437	0	7.673	0	0	0	0	0	0
2001	307	23	947	365.801	-355.162	D	9.635	9.195	0.441	7.05	72.12	27.81	0	0	0	0.07
2001	308	23	1017	356.894	-355.206	D	6.691	6.66	0.031	1.378	94.67	5.01	0	0	0	0.32
2001	309	23	786	365.973	-357.042	D	9.024	8.864	0.159	6.227	85.25	14.58	0	0	0	0.16
2001	310	23	227	359.892	-360.057	D	7.267	7.133	0.134	2.331	79.5	20.2	0	0	0	0.3
2001	311	23	928	365.945	-357.303	D	7.405	7.349	0.056	2.78	87.43	12.37	0	0	0	0.2
2001	312	23	933	366.169	-356.524	D	7.603	7.601	0.002	3.318	96.15	3.61	0	0	0	0.18
2001	313	23	1	356.546	-357.458	D	6.589	6.589	0	1.238	0	0	0	0	0	0
2001	314	23	1	356.546	-357.458	D	6.664	6.664	0	1.385	0	0	0	0	0	0
2001	315	23	949	365.722	-354.966	D	6.742	6.729	0.013	1.514	80.79	17.01	0	0	0	2.19
2001	316	23	1037	356.5	-357.195	D	6.678	6.663	0.015	1.383	74.66	24.16	0	0	0	1.17

Appendix M
Hercules Glade
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	317	23	1	356.546	-357.458	D	6.761	6.761	0	1.578	0	0	0	0	0	0
2001	318	23	1	356.546	-357.458	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	319	23	1	356.546	-357.458	D	8.659	8.659	0	5.728	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	8.223	8.223	0	4.704	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.265	7.265	0	2.605	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.614	7.614	0	3.346	0	0	0	0	0	0
2001	323	23	1	356.546	-357.458	D	7.828	7.828	0	3.814	0	0	0	0	0	0
2001	324	23	1	356.546	-357.458	D	6.474	6.474	0	1.017	0	0	0	0	0	0
2001	325	23	1	356.546	-357.458	D	6.47	6.47	0	1.008	0	0	0	0	0	0
2001	326	23	1	356.546	-357.458	D	6.515	6.515	0	1.096	0	0	0	0	0	0
2001	327	23	1	356.546	-357.458	D	7.077	7.077	0	2.216	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	9.009	9.009	0	6.585	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	6.691	6.691	0	1.44	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	6.906	6.906	0	1.868	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	6.949	6.949	0	1.955	0	0	0	0	0	0
2001	332	23	907	365.051	-359.809	D	8.695	8.638	0.057	5.678	55.27	44.68	0	0	0	0.06
2001	333	23	930	366.19	-357.232	D	13.224	10.113	**3.111**	9.486	48.53	51.38	0	0	0	0.09
2001	334	23	930	366.19	-357.232	D	10.081	8.811	**1.27**	6.096	70.19	29.76	0	0	0	0.06
2001	335	23	1	356.546	-357.458	D	6.638	6.638	0	1.335	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	6.673	6.673	0	1.403	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.004	7.004	0	2.066	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.019	7.019	0	2.097	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	8.996	8.996	0	6.551	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	9.441	9.441	0	7.681	0	0	0	0	0	0
2001	341	23	1	356.546	-357.458	D	7.947	7.947	0	4.078	0	0	0	0	0	0
2001	342	23	934	366.01	-356.526	D	8.465	8.094	0.371	4.409	47.44	52.34	0	0	0	0.22
2001	343	23	710	364.843	-359.589	D	6.599	6.599	0	1.258	22.46	2.12	0	0	0	0.07
2001	344	23	930	366.19	-357.232	D	6.518	6.513	0.005	1.091	37.04	62.31	0	0	0	0.64
2001	345	23	930	366.19	-357.232	D	6.566	6.557	0.009	1.178	59.91	39.55	0	0	0	0.54
2001	346	23	543	362.627	-354.444	D	9.529	9.529	0	7.91	68.31	31.11	0	0	0	0.37
2001	347	23	1	356.546	-357.458	D	9.597	9.597	0	8.089	0	0	0	0	0	0
2001	348	23	1	356.546	-357.458	D	8.779	8.779	0	6.019	0	0	0	0	0	0
2001	349	23	789	365.918	-355.796	D	8.789	8.789	0	6.043	86.12	12.33	0	0	0	0.17
2001	350	23	947	365.801	-355.162	D	10.121	10.116	0.005	9.495	74.47	25.43	0	0	0	0.04
2001	351	23	1	356.546	-357.458	D	9.409	9.409	0	7.599	0	0	0	0	0	0
2001	352	23	1	356.546	-357.458	D	6.564	6.564	0	1.19	0	0	0	0	0	0
2001	353	23	1	356.546	-357.458	D	6.769	6.769	0	1.594	0	0	0	0	0	0
2001	354	23	1	356.546	-357.458	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	355	23	1	356.546	-357.458	D	6.493	6.493	0	1.052	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	356	23	1	356.546	-357.458	D	7.254	7.254	0	2.582	0	0	0	0	0	0
2001	357	23	1	356.546	-357.458	D	6.7	6.7	0	1.456	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	6.481	6.481	0	1.029	0	0	0	0	0	0
2001	359	23	1	356.546	-357.458	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	360	23	1	356.546	-357.458	D	6.533	6.533	0	1.131	0	0	0	0	0	0
2001	361	23	1	356.546	-357.458	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.034	7.034	0	2.128	0	0	0	0	0	0
2001	363	23	1	356.546	-357.458	D	6.604	6.604	0	1.269	0	0	0	0	0	0
2001	364	23	1	356.546	-357.458	D	6.55	6.55	0	1.163	0	0	0	0	0	0
2001	365	23	1	356.546	-357.458	D	6.616	6.616	0	1.292	0	0	0	0	0	0
									3.111							

Appendix M
Hercules Glade
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EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	823	358.24	-361.604	D	6.949	6.908	0.041	1.872	0	0	0	0	0	99.99
2002	2	23	822	358.021	-361.607	D	6.839	6.837	0.003	1.729	0	0	0	0	0	99.94
2002	3	23	927	365.912	-357.454	D	7.348	7.251	0.097	2.574	0	0	0	0	0	100
2002	4	23	947	365.801	-355.162	D	6.831	6.831	0	1.716	0	0	0	0	0	99.63
2002	5	23	1017	356.894	-355.206	D	7.129	7.121	0.008	2.306	0	0	0	0	0	99.99
2002	6	23	78	358.239	-356.385	D	9.757	9.639	0.118	8.201	0	0	0	0	0	100
2002	7	23	822	358.021	-361.607	D	7.845	7.796	0.049	3.744	0	0	0	0	0	100
2002	8	23	947	365.801	-355.162	D	6.846	6.846	0	1.747	0	0	0	0	0	99.87
2002	9	23	1	356.546	-357.458	D	6.822	6.822	0	1.699	0	0	0	0	0	0
2002	10	23	714	364.799	-358.592	D	8.431	8.421	0.011	5.163	0	0	0	0	0	99.98
2002	11	23	78	358.239	-356.385	D	7.58	7.545	0.035	3.198	0	0	0	0	0	100
2002	12	23	949	365.722	-354.966	D	6.819	6.8	0.019	1.656	0	0	0	0	0	100
2002	13	23	949	365.722	-354.966	D	7.078	7.076	0.002	2.212	0	0	0	0	0	99.98
2002	14	23	102	358.487	-356.374	D	7.038	7.035	0.003	2.129	0	0	0	0	0	99.98
2002	15	23	927	365.912	-357.454	D	6.724	6.698	0.026	1.453	0	0	0	0	0	100.01
2002	16	23	949	365.722	-354.966	D	6.624	6.624	0.001	1.307	0	0	0	0	0	99.93
2002	17	23	78	358.239	-356.385	D	6.939	6.914	0.025	1.884	0	0	0	0	0	100
2002	18	23	900	364.265	-360.243	D	8.796	8.788	0.008	6.041	0	0	0	0	0	100
2002	19	23	964	363.678	-354.148	D	9.201	9.148	0.053	6.931	0	0	0	0	0	100
2002	20	23	931	366.183	-356.996	D	9.383	9.371	0.012	7.5	0	0	0	0	0	99.98
2002	21	23	102	358.487	-356.374	D	7.367	7.365	0.002	2.815	0	0	0	0	0	99.89
2002	22	23	1	356.546	-357.458	D	6.995	6.995	0	2.048	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	9.601	9.601	0	8.101	0	0	0	0	0	0
2002	24	23	1039	356.522	-357.599	D	9.229	9.208	0.022	7.083	0	0	0	0	0	100
2002	25	23	927	365.912	-357.454	D	7.006	6.926	0.08	1.908	0	0	0	0	0	100
2002	26	23	255	360.129	-359.796	D	6.728	6.728	0	1.512	0	0	0	0	0	19.76
2002	27	23	1	356.546	-357.458	D	6.625	6.625	0	1.31	0	0	0	0	0	0
2002	28	23	1	356.546	-357.458	D	6.928	6.928	0	1.913	0	0	0	0	0	0
2002	29	23	966	363.538	-354.124	D	9.142	9.138	0.004	6.908	0	0	0	0	0	99.98
2002	30	23	78	358.239	-356.385	D	10.028	9.985	0.043	9.134	0	0	0	0	0	100
2002	31	23	1038	356.511	-357.396	D	10.205	10.119	0.086	9.502	0	0	0	0	0	100
2002	32	23	1017	356.894	-355.206	D	7.483	7.456	0.027	3.007	0	0	0	0	0	100
2002	33	23	78	358.239	-356.385	D	7.027	6.971	0.056	1.999	0	0	0	0	0	100
2002	34	23	967	363.478	-354.116	D	6.892	6.88	0.012	1.815	0	0	0	0	0	100.01
2002	35	23	78	358.239	-356.385	D	7.155	7.102	0.053	2.267	0	0	0	0	0	100
2002	36	23	930	366.19	-357.232	D	6.618	6.611	0.006	1.283	0	0	0	0	0	100
2002	37	23	949	365.722	-354.966	D	9.296	9.295	0.001	7.305	0	0	0	0	0	99.91
2002	38	23	927	365.912	-357.454	D	9.485	9.367	0.118	7.49	0	0	0	0	0	100

Appendix M
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2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	39	23	933	366.169	-356.524	D	8.342	8.341	0.001	4.978	0	0	0	0	0	99.65
2002	40	23	762	365.141	-355.082	D	9.075	9.075	0	6.748	0	0	0	0	0	95.92
2002	41	23	949	365.722	-354.966	D	8.313	8.293	0.021	4.865	0	0	0	0	0	100
2002	42	23	78	358.239	-356.385	D	7.778	7.661	0.118	3.447	0	0	0	0	0	100
2002	43	23	1007	358.259	-354.768	D	6.622	6.606	0.017	1.272	0	0	0	0	0	100.01
2002	44	23	822	358.021	-361.607	D	6.675	6.666	0.009	1.391	0	0	0	0	0	99.99
2002	45	23	823	358.24	-361.604	D	6.59	6.581	0.009	1.224	0	0	0	0	0	100
2002	46	23	1017	356.894	-355.206	D	6.903	6.86	0.044	1.775	0	0	0	0	0	100
2002	47	23	949	365.722	-354.966	D	6.667	6.646	0.021	1.352	0	0	0	0	0	100.01
2002	48	23	78	358.239	-356.385	D	6.581	6.558	0.023	1.179	0	0	0	0	0	100
2002	49	23	930	366.19	-357.232	D	6.607	6.606	0.001	1.272	0	0	0	0	0	100.04
2002	50	23	1	356.546	-357.458	D	8.514	8.514	0	5.384	0	0	0	0	0	0
2002	51	23	966	363.538	-354.124	D	8.993	8.993	0.001	6.544	0	0	0	0	0	99.72
2002	52	23	773	365.4	-355.32	D	7.156	7.089	0.067	2.239	0	0	0	0	0	100
2002	53	23	78	358.239	-356.385	D	6.999	6.964	0.035	1.986	0	0	0	0	0	100
2002	54	23	1035	356.477	-356.792	D	6.656	6.629	0.027	1.317	0	0	0	0	0	100
2002	55	23	930	366.19	-357.232	D	6.795	6.795	0	1.646	0	0	0	0	0	99.6
2002	56	23	78	358.239	-356.385	D	7.949	7.935	0.014	4.052	0	0	0	0	0	99.99
2002	57	23	949	365.722	-354.966	D	7.741	7.698	0.043	3.529	0	0	0	0	0	100
2002	58	23	773	365.4	-355.32	D	6.776	6.77	0.006	1.595	0	0	0	0	0	99.97
2002	59	23	785	365.637	-355.06	D	6.499	6.499	0	1.063	0	0	0	0	0	99.77
2002	60	23	1	356.546	-357.458	D	7.718	7.718	0	3.573	0	0	0	0	0	0
2002	61	23	985	361.137	-354.683	D	9.667	9.608	0.06	8.118	0	0	0	0	0	100
2002	62	23	773	365.4	-355.32	D	7.388	7.291	0.096	2.659	0	0	0	0	0	100
2002	63	23	861	361.895	-361.506	D	7.4	7.399	0.001	2.886	0	0	0	0	0	99.95
2002	64	23	1	356.546	-357.458	D	6.693	6.693	0	1.444	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	6.942	6.942	0	1.941	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	9.291	9.291	0	7.295	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	8.946	8.946	0	6.427	0	0	0	0	0	0
2002	68	23	822	358.021	-361.607	D	8.711	8.711	0	5.854	0	0	0	0	0	99.92
2002	69	23	927	365.912	-357.454	D	7.086	7.03	0.055	2.12	0	0	0	0	0	100
2002	70	23	1017	356.894	-355.206	D	7.127	7.125	0.002	2.314	0	0	0	0	0	100.02
2002	71	23	1041	356.936	-357.592	D	9.289	9.281	0.008	7.27	0	0	0	0	0	99.99
2002	72	23	1039	356.522	-357.599	D	7.03	7.01	0.02	2.078	0	0	0	0	0	99.99
2002	73	23	941	365.977	-355.774	D	8.133	8.133	0.001	4.497	0	0	0	0	0	100.23
2002	74	23	1037	356.5	-357.195	D	8.982	8.972	0.01	6.491	0	0	0	0	0	99.98
2002	75	23	907	365.051	-359.809	D	7.626	7.622	0.004	3.364	0	0	0	0	0	99.98
2002	76	23	1017	356.894	-355.206	D	8.093	8.088	0.005	4.396	0	0	0	0	0	100.01
2002	77	23	78	358.239	-356.385	D	9.023	9.013	0.01	6.594	0	0	0	0	0	99.97

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	78	23	907	365.051	-359.809	D	10.225	10.218	0.007	9.779	0	0	0	0	0	99.97
2002	79	23	1035	356.477	-356.792	D	9.274	9.252	0.023	7.195	0	0	0	0	0	99.99
2002	80	23	731	365.047	-358.581	D	7.902	7.826	0.076	3.81	0	0	0	0	0	100
2002	81	23	1035	356.477	-356.792	D	6.499	6.485	0.014	1.038	0	0	0	0	0	99.99
2002	82	23	941	365.977	-355.774	D	6.651	6.643	0.008	1.345	0	0	0	0	0	100
2002	83	23	1	356.546	-357.458	D	8.066	8.066	0	4.346	0	0	0	0	0	0
2002	84	23	78	358.239	-356.385	D	10.227	10.218	0.009	9.779	0	0	0	0	0	99.96
2002	85	23	822	358.021	-361.607	D	8.49	8.482	0.008	5.307	0	0	0	0	0	100
2002	86	23	78	358.239	-356.385	D	7.724	7.696	0.028	3.525	0	0	0	0	0	99.99
2002	87	23	1017	356.894	-355.206	D	7.323	7.322	0.001	2.724	0	0	0	0	0	99.99
2002	88	23	563	362.941	-355.928	D	8.354	8.349	0.005	4.995	0	0	0	0	0	100.01
2002	89	23	949	365.722	-354.966	D	7.405	7.4	0.004	2.889	0	0	0	0	0	100.01
2002	90	23	1017	356.894	-355.206	D	7.095	7.087	0.008	2.236	0	0	0	0	0	99.99
2002	91	23	78	358.239	-356.385	D	6.662	6.642	0.02	1.342	0	0	0	0	0	100
2002	92	23	1039	356.522	-357.599	D	7.434	7.431	0.003	2.954	0	0	0	0	0	99.99
2002	93	23	1	356.546	-357.458	D	6.652	6.652	0	1.363	0	0	0	0	0	0
2002	94	23	949	365.722	-354.966	D	6.546	6.541	0.005	1.145	0	0	0	0	0	100
2002	95	23	846	360.93	-362.178	D	6.528	6.518	0.01	1.101	0	0	0	0	0	100
2002	96	23	1017	356.894	-355.206	D	6.54	6.532	0.008	1.128	0	0	0	0	0	100
2002	97	23	933	366.169	-356.524	D	7.975	7.974	0.001	4.139	0	0	0	0	0	99.92
2002	98	23	2	356.535	-357.209	D	10.042	10.042	0	9.289	0	0	0	0	0	88.28
2002	99	23	974	362.281	-354.249	D	9.148	9.13	0.019	6.886	0	0	0	0	0	99.99
2002	100	23	930	366.19	-357.232	D	7.385	7.379	0.005	2.845	0	0	0	0	0	99.98
2002	101	23	785	365.637	-355.06	D	6.892	6.892	0	1.839	0	0	0	0	0	99.45
2002	102	23	643	363.609	-354.151	D	7.442	7.442	0	2.977	0	0	0	0	0	99.81
2002	103	23	949	365.722	-354.966	D	9.738	9.732	0.006	8.449	0	0	0	0	0	99.96
2002	104	23	1017	356.894	-355.206	D	9.331	9.329	0.003	7.392	0	0	0	0	0	99.85
2002	105	23	1	356.546	-357.458	D	8.09	8.09	0	4.401	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.575	7.575	0	3.262	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.511	7.511	0	3.124	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	8.475	8.475	0	5.29	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.611	7.611	0	3.34	0	0	0	0	0	0
2002	110	23	949	365.722	-354.966	D	9.536	9.512	0.024	7.867	0	0	0	0	0	100.01
2002	111	23	967	363.478	-354.116	D	9.439	9.438	0.001	7.675	0	0	0	0	0	99.95
2002	112	23	78	358.239	-356.385	D	6.991	6.941	0.05	1.938	0	0	0	0	0	100
2002	113	23	1017	356.894	-355.206	D	6.982	6.98	0.002	2.018	0	0	0	0	0	99.98
2002	114	23	78	358.239	-356.385	D	8.455	8.449	0.006	5.23	0	0	0	0	0	100.01
2002	115	23	822	358.021	-361.607	D	6.747	6.747	0	1.549	0	0	0	0	0	100.19
2002	116	23	853	361.666	-362.175	D	8.127	8.125	0.002	4.48	0	0	0	0	0	99.93

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	117	23	965	363.588	-354.142	D	8.241	8.241	0.001	4.745	0	0	0	0	0	99.84
2002	118	23	773	365.4	-355.32	D	8.363	8.314	0.049	4.914	0	0	0	0	0	100
2002	119	23	1038	356.511	-357.396	D	6.816	6.797	0.019	1.649	0	0	0	0	0	99.99
2002	120	23	710	364.843	-359.589	D	7.832	7.831	0.001	3.82	0	0	0	0	0	99.83
2002	121	23	295	360.234	-356.546	D	9.364	9.364	0	7.482	0	0	0	0	0	72.95
2002	122	23	78	358.239	-356.385	D	8.448	8.426	0.021	5.176	0	0	0	0	0	100
2002	123	23	845	360.851	-362.181	D	6.978	6.97	0.009	1.996	0	0	0	0	0	100.01
2002	124	23	1017	356.894	-355.206	D	7.391	7.379	0.012	2.844	0	0	0	0	0	99.98
2002	125	23	1035	356.477	-356.792	D	8.34	8.335	0.004	4.964	0	0	0	0	0	99.97
2002	126	23	643	363.609	-354.151	D	8.304	8.304	0	4.892	0	0	0	0	0	99.84
2002	127	23	1	356.546	-357.458	D	8.856	8.856	0	6.205	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	9.261	9.261	0	7.218	0	0	0	0	0	0
2002	129	23	78	358.239	-356.385	D	8.032	8.026	0.006	4.256	0	0	0	0	0	100.01
2002	130	23	907	365.051	-359.809	D	6.633	6.62	0.013	1.3	0	0	0	0	0	100
2002	131	23	947	365.801	-355.162	D	7.78	7.777	0.003	3.701	0	0	0	0	0	99.96
2002	132	23	966	363.538	-354.124	D	9.754	9.749	0.005	8.493	0	0	0	0	0	99.95
2002	133	23	822	358.021	-361.607	D	8.613	8.602	0.011	5.592	0	0	0	0	0	99.99
2002	134	23	1017	356.894	-355.206	D	6.873	6.849	0.024	1.753	0	0	0	0	0	99.99
2002	135	23	949	365.722	-354.966	D	6.781	6.777	0.004	1.609	0	0	0	0	0	99.99
2002	136	23	1	356.546	-357.458	D	7.383	7.383	0	2.852	0	0	0	0	0	0
2002	137	23	927	365.912	-357.454	D	9.957	9.941	0.017	9.012	0	0	0	0	0	99.99
2002	138	23	852	361.595	-362.148	D	8.259	8.259	0	4.786	0	0	0	0	0	100.28
2002	139	23	1009	357.941	-354.82	D	6.852	6.817	0.034	1.69	0	0	0	0	0	100
2002	140	23	78	358.239	-356.385	D	6.851	6.787	0.064	1.629	0	0	0	0	0	100
2002	141	23	822	358.021	-361.607	D	6.722	6.719	0.003	1.495	0	0	0	0	0	99.96
2002	142	23	946	365.798	-355.322	D	6.764	6.763	0.001	1.581	0	0	0	0	0	100
2002	143	23	930	366.19	-357.232	D	6.756	6.756	0	1.568	0	0	0	0	0	98.58
2002	144	23	1	356.546	-357.458	D	7.37	7.37	0	2.825	0	0	0	0	0	0
2002	145	23	643	363.609	-354.151	D	8.263	8.262	0.001	4.794	0	0	0	0	0	99.87
2002	146	23	966	363.538	-354.124	D	7.824	7.813	0.011	3.781	0	0	0	0	0	100.01
2002	147	23	730	364.623	-354.605	D	8.687	8.687	0	5.796	0	0	0	0	0	98.23
2002	148	23	1	356.546	-357.458	D	9.172	9.172	0	6.994	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2002	150	23	947	365.801	-355.162	D	8.4	8.4	0	5.115	0	0	0	0	0	100.3
2002	151	23	949	365.722	-354.966	D	7.08	7.079	0.001	2.22	0	0	0	0	0	100.04
2002	152	23	747	364.871	-354.594	D	7.168	7.167	0	2.402	0	0	0	0	0	98.34
2002	153	23	1	356.546	-357.458	D	7.677	7.677	0	3.483	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.825	7.825	0	3.807	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.059	7.059	0	2.178	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	156	23	78	358.239	-356.385	D	8.799	8.721	0.078	5.878	0	0	0	0	0	100
2002	157	23	835	359.911	-362.063	D	8.255	8.253	0.001	4.774	0	0	0	0	0	99.84
2002	158	23	1009	357.941	-354.82	D	6.887	6.887	0	1.829	0	0	0	0	0	99.89
2002	159	23	822	358.021	-361.607	D	6.891	6.884	0.007	1.824	0	0	0	0	0	99.98
2002	160	23	1009	357.941	-354.82	D	7.432	7.431	0.002	2.953	0	0	0	0	0	99.94
2002	161	23	1	356.546	-357.458	D	9.601	9.601	0	8.101	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	8.492	8.492	0	5.332	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	8.522	8.522	0	5.401	0	0	0	0	0	0
2002	164	23	1035	356.477	-356.792	D	7.941	7.933	0.007	4.048	0	0	0	0	0	100
2002	165	23	1017	356.894	-355.206	D	7.206	7.184	0.023	2.435	0	0	0	0	0	100
2002	166	23	927	365.912	-357.454	D	6.767	6.698	0.069	1.453	0	0	0	0	0	100
2002	167	23	927	365.912	-357.454	D	6.691	6.635	0.057	1.328	0	0	0	0	0	100
2002	168	23	822	358.021	-361.607	D	6.912	6.906	0.006	1.868	0	0	0	0	0	99.99
2002	169	23	930	366.19	-357.232	D	6.758	6.755	0.003	1.566	0	0	0	0	0	99.94
2002	170	23	948	365.727	-355.056	D	7.022	7.021	0.001	2.101	0	0	0	0	0	99.88
2002	171	23	247	360.217	-361.79	D	7.604	7.604	0	3.325	0	0	0	0	0	48.92
2002	172	23	1	356.546	-357.458	D	7.907	7.907	0	3.989	0	0	0	0	0	0
2002	173	23	949	365.722	-354.966	D	7.477	7.476	0.001	3.049	0	0	0	0	0	100.04
2002	174	23	822	358.021	-361.607	D	7.04	7.039	0.001	2.137	0	0	0	0	0	100.13
2002	175	23	10	356.954	-355.443	D	7.036	7.036	0	2.132	0	0	0	0	0	86.7
2002	176	23	1	356.546	-357.458	D	7.974	7.974	0	4.138	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.864	7.864	0	3.894	0	0	0	0	0	0
2002	178	23	949	365.722	-354.966	D	8.465	8.465	0.001	5.267	0	0	0	0	0	99.47
2002	179	23	963	363.809	-354.192	D	7.417	7.411	0.006	2.911	0	0	0	0	0	99.99
2002	180	23	955	364.92	-354.582	D	7.276	7.27	0.006	2.615	0	0	0	0	0	100.01
2002	181	23	255	360.129	-359.796	D	7.403	7.403	0	2.894	0	0	0	0	0	68.94
2002	182	23	1	356.546	-357.458	D	6.828	6.828	0	1.711	0	0	0	0	0	0
2002	183	23	930	366.19	-357.232	D	6.701	6.7	0.001	1.457	0	0	0	0	0	99.92
2002	184	23	947	365.801	-355.162	D	8.189	8.189	0.001	4.625	0	0	0	0	0	99.64
2002	185	23	930	366.19	-357.232	D	7.476	7.475	0.002	3.047	0	0	0	0	0	99.98
2002	186	23	844	360.75	-362.146	D	7.83	7.827	0.003	3.811	0	0	0	0	0	100.03
2002	187	23	846	360.93	-362.178	D	7.149	7.146	0.003	2.358	0	0	0	0	0	100.01
2002	188	23	967	363.478	-354.116	D	7.382	7.379	0.003	2.844	0	0	0	0	0	100.04
2002	189	23	941	365.977	-355.774	D	6.794	6.792	0.002	1.64	0	0	0	0	0	99.93
2002	190	23	930	366.19	-357.232	D	6.774	6.772	0.002	1.6	0	0	0	0	0	99.95
2002	191	23	955	364.92	-354.582	D	7.107	7.106	0	2.275	0	0	0	0	0	100.24
2002	192	23	832	359.493	-362.061	D	7.869	7.859	0.01	3.883	0	0	0	0	0	99.99
2002	193	23	966	363.538	-354.124	D	8.503	8.479	0.024	5.3	0	0	0	0	0	99.99
2002	194	23	1017	356.894	-355.206	D	9.234	9.211	0.023	7.091	0	0	0	0	0	99.99

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	195	23	966	363.538	-354.124	D	8.48	8.463	0.017	5.263	0	0	0	0	0	100
2002	196	23	1017	356.894	-355.206	D	7.226	7.214	0.013	2.497	0	0	0	0	0	99.99
2002	197	23	1017	356.894	-355.206	D	7.12	7.118	0.003	2.299	0	0	0	0	0	99.97
2002	198	23	785	365.637	-355.06	D	8.612	8.612	0	5.616	0	0	0	0	0	99.14
2002	199	23	520	362.88	-360.174	D	8.097	8.097	0	4.416	0	0	0	0	0	88.5
2002	200	23	255	360.129	-359.796	D	9.273	9.273	0	7.249	0	0	0	0	0	12.93
2002	201	23	1	356.546	-357.458	D	8.2	8.2	0	4.651	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	8.243	8.243	0	4.751	0	0	0	0	0	0
2002	203	23	929	366.032	-357.239	D	7.116	7.116	0	2.296	0	0	0	0	0	23.62
2002	204	23	78	358.239	-356.385	D	7.55	7.467	0.083	3.031	0	0	0	0	0	100
2002	205	23	930	366.19	-357.232	D	6.944	6.94	0.003	1.937	0	0	0	0	0	99.95
2002	206	23	643	363.609	-354.151	D	7.122	7.116	0.005	2.296	0	0	0	0	0	99.97
2002	207	23	931	366.183	-356.996	D	7.358	7.356	0.002	2.796	0	0	0	0	0	99.96
2002	208	23	929	366.032	-357.239	D	7.476	7.476	0	3.049	0	0	0	0	0	98.11
2002	209	23	1	356.546	-357.458	D	7.228	7.228	0	2.528	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.898	7.898	0	3.969	0	0	0	0	0	0
2002	211	23	967	363.478	-354.116	D	7.765	7.764	0.001	3.674	0	0	0	0	0	100.31
2002	212	23	949	365.722	-354.966	D	7.247	7.239	0.008	2.55	0	0	0	0	0	99.99
2002	213	23	929	366.032	-357.239	D	7.154	7.154	0	2.373	0	0	0	0	0	77.25
2002	214	23	927	365.912	-357.454	D	7.488	7.46	0.029	3.015	0	0	0	0	0	100
2002	215	23	836	360.07	-362.066	D	7.417	7.41	0.008	2.909	0	0	0	0	0	100
2002	216	23	1017	356.894	-355.206	D	7.548	7.546	0.002	3.2	0	0	0	0	0	99.98
2002	217	23	965	363.588	-354.142	D	7.293	7.292	0.001	2.662	0	0	0	0	0	99.67
2002	218	23	1008	358.048	-354.775	D	6.871	6.861	0.01	1.777	0	0	0	0	0	100.01
2002	219	23	78	358.239	-356.385	D	8.744	8.732	0.013	5.904	0	0	0	0	0	100.01
2002	220	23	1017	356.894	-355.206	D	6.73	6.723	0.007	1.503	0	0	0	0	0	100
2002	221	23	822	358.021	-361.607	D	6.69	6.689	0.001	1.435	0	0	0	0	0	99.88
2002	222	23	930	366.19	-357.232	D	6.843	6.843	0.001	1.74	0	0	0	0	0	99.93
2002	223	23	10	356.954	-355.443	D	7.168	7.168	0	2.402	0	0	0	0	0	96.88
2002	224	23	1	356.546	-357.458	D	7.094	7.094	0	2.251	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	9.125	9.125	0	6.875	0	0	0	0	0	0
2002	226	23	78	358.239	-356.385	D	9.614	9.597	0.017	8.09	0	0	0	0	0	99.98
2002	227	23	78	358.239	-356.385	D	8.495	8.49	0.005	5.327	0	0	0	0	0	100
2002	228	23	1	356.546	-357.458	D	8.55	8.55	0	5.468	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	8.018	8.018	0	4.237	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	8.407	8.407	0	5.131	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.437	7.437	0	2.967	0	0	0	0	0	0
2002	232	23	62	357.925	-354.901	D	7.015	7.015	0	2.089	0	0	0	0	0	96.21
2002	233	23	1	356.546	-357.458	D	7.361	7.361	0	2.805	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	234	23	1	356.546	-357.458	D	7.811	7.811	0	3.777	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.29	7.29	0	2.657	0	0	0	0	0	0
2002	236	23	1017	356.894	-355.206	D	7.952	7.915	0.036	4.008	0	0	0	0	0	100
2002	237	23	811	357.434	-360.225	D	7.796	7.787	0.009	3.724	0	0	0	0	0	99.98
2002	238	23	930	366.19	-357.232	D	7.413	7.411	0.002	2.911	0	0	0	0	0	100.04
2002	239	23	907	365.051	-359.809	D	6.93	6.918	0.012	1.892	0	0	0	0	0	100
2002	240	23	714	364.799	-358.592	D	7.328	7.307	0.021	2.692	0	0	0	0	0	99.99
2002	241	23	78	358.239	-356.385	D	7.162	7.135	0.027	2.334	0	0	0	0	0	99.99
2002	242	23	1017	356.894	-355.206	D	6.954	6.944	0.01	1.945	0	0	0	0	0	100
2002	243	23	845	360.851	-362.181	D	7.127	7.127	0.001	2.318	0	0	0	0	0	99.78
2002	244	23	775	365.747	-357.551	D	7.089	7.088	0.001	2.238	0	0	0	0	0	99.83
2002	245	23	618	363.371	-354.411	D	6.954	6.953	0	1.964	0	0	0	0	0	100.63
2002	246	23	1	356.546	-357.458	D	7.006	7.006	0	2.07	0	0	0	0	0	0
2002	247	23	949	365.722	-354.966	D	7.019	7.016	0.003	2.09	0	0	0	0	0	100.01
2002	248	23	967	363.478	-354.116	D	7.018	7.01	0.008	2.078	0	0	0	0	0	100
2002	249	23	1007	358.259	-354.768	D	6.771	6.766	0.005	1.587	0	0	0	0	0	99.95
2002	250	23	785	365.637	-355.06	D	6.713	6.713	0.001	1.482	0	0	0	0	0	100
2002	251	23	1	356.546	-357.458	D	8.576	8.576	0	5.53	0	0	0	0	0	0
2002	252	23	619	363.872	-360.131	D	7.235	7.235	0	2.542	0	0	0	0	0	87.95
2002	253	23	1035	356.477	-356.792	D	7.06	7.027	0.033	2.114	0	0	0	0	0	100
2002	254	23	811	357.434	-360.225	D	7.473	7.465	0.007	3.027	0	0	0	0	0	99.99
2002	255	23	731	365.047	-358.581	D	7.101	7.084	0.018	2.229	0	0	0	0	0	100
2002	256	23	1037	356.5	-357.195	D	6.629	6.623	0.005	1.306	0	0	0	0	0	99.98
2002	257	23	933	366.169	-356.524	D	6.672	6.67	0.002	1.397	0	0	0	0	0	99.99
2002	258	23	811	357.434	-360.225	D	8.047	8.04	0.007	4.287	0	0	0	0	0	100.02
2002	259	23	845	360.851	-362.181	D	8.052	8.045	0.007	4.298	0	0	0	0	0	100.01
2002	260	23	1008	358.048	-354.775	D	7.594	7.586	0.008	3.286	0	0	0	0	0	99.96
2002	261	23	948	365.727	-355.056	D	8.108	8.108	0	4.441	0	0	0	0	0	99.31
2002	262	23	1	356.546	-357.458	D	9.072	9.072	0	6.74	0	0	0	0	0	0
2002	263	23	773	365.4	-355.32	D	9.196	9.196	0.001	7.052	0	0	0	0	0	99.8
2002	264	23	773	365.4	-355.32	D	6.767	6.763	0.004	1.582	0	0	0	0	0	99.97
2002	265	23	78	358.239	-356.385	D	6.808	6.734	0.074	1.525	0	0	0	0	0	100
2002	266	23	930	366.19	-357.232	D	6.587	6.587	0	1.235	0	0	0	0	0	99.92
2002	267	23	907	365.051	-359.809	D	6.536	6.526	0.01	1.117	0	0	0	0	0	100
2002	268	23	78	358.239	-356.385	D	6.778	6.774	0.004	1.603	0	0	0	0	0	99.94
2002	269	23	853	361.666	-362.175	D	6.952	6.952	0	1.961	0	0	0	0	0	100.58
2002	270	23	846	360.93	-362.178	D	7.495	7.419	0.076	2.929	0	0	0	0	0	100
2002	271	23	949	365.722	-354.966	D	6.776	6.755	0.022	1.565	0	0	0	0	0	99.99
2002	272	23	930	366.19	-357.232	D	7.363	7.352	0.011	2.786	0	0	0	0	0	99.98

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	273	23	1017	356.894	-355.206	D	7.675	7.674	0.001	3.476	0	0	0	0	0	100.09
2002	274	23	1	356.546	-357.458	D	6.979	6.979	0	2.016	0	0	0	0	0	0
2002	275	23	1	356.546	-357.458	D	7.125	7.125	0	2.314	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.413	7.413	0	2.915	0	0	0	0	0	0
2002	277	23	643	363.609	-354.151	D	9.12	9.12	0	6.861	0	0	0	0	0	99.2
2002	278	23	78	358.239	-356.385	D	7.124	7.094	0.031	2.25	0	0	0	0	0	100
2002	279	23	964	363.678	-354.148	D	6.728	6.721	0.007	1.498	0	0	0	0	0	100
2002	280	23	822	358.021	-361.607	D	6.71	6.703	0.006	1.464	0	0	0	0	0	100.01
2002	281	23	933	366.169	-356.524	D	6.566	6.557	0.009	1.177	0	0	0	0	0	100
2002	282	23	1017	356.894	-355.206	D	8.754	8.753	0.002	5.954	0	0	0	0	0	99.94
2002	283	23	927	365.912	-357.454	D	9.539	9.537	0.002	7.932	0	0	0	0	0	99.78
2002	284	23	1017	356.894	-355.206	D	8.612	8.601	0.011	5.59	0	0	0	0	0	100
2002	285	23	78	358.239	-356.385	D	8.816	8.805	0.011	6.083	0	0	0	0	0	99.99
2002	286	23	907	365.051	-359.809	D	7.506	7.5	0.006	3.101	0	0	0	0	0	100.01
2002	287	23	78	358.239	-356.385	D	6.54	6.528	0.012	1.12	0	0	0	0	0	100
2002	288	23	78	358.239	-356.385	D	6.702	6.504	0.197	1.074	0	0	0	0	0	100
2002	289	23	1	356.546	-357.458	D	6.563	6.563	0	1.188	0	0	0	0	0	17.91
2002	290	23	822	358.021	-361.607	D	9.096	9.09	0.006	6.787	0	0	0	0	0	99.98
2002	291	23	949	365.722	-354.966	D	6.679	6.678	0	1.414	0	0	0	0	0	100.14
2002	292	23	1017	356.894	-355.206	D	9.45	9.439	0.012	7.676	0	0	0	0	0	99.99
2002	293	23	907	365.051	-359.809	D	7.699	7.693	0.006	3.517	0	0	0	0	0	99.97
2002	294	23	1017	356.894	-355.206	D	6.788	6.774	0.014	1.604	0	0	0	0	0	100
2002	295	23	78	358.239	-356.385	D	6.854	6.828	0.026	1.711	0	0	0	0	0	100
2002	296	23	955	364.92	-354.582	D	6.853	6.801	0.051	1.657	0	0	0	0	0	100
2002	297	23	1017	356.894	-355.206	D	6.681	6.678	0.003	1.413	0	0	0	0	0	100.01
2002	298	23	1017	356.894	-355.206	D	9.197	9.184	0.013	7.023	0	0	0	0	0	100.01
2002	299	23	78	358.239	-356.385	D	8.966	8.911	0.054	6.342	0	0	0	0	0	100
2002	300	23	900	364.265	-360.243	D	8.941	8.906	0.035	6.33	0	0	0	0	0	100
2002	301	23	1017	356.894	-355.206	D	10.189	10.176	0.013	9.662	0	0	0	0	0	99.98
2002	302	23	822	358.021	-361.607	D	9.775	9.753	0.022	8.504	0	0	0	0	0	100
2002	303	23	78	358.239	-356.385	D	8.548	8.512	0.037	5.377	0	0	0	0	0	100
2002	304	23	846	360.93	-362.178	D	8.92	8.899	0.021	6.312	0	0	0	0	0	100
2002	305	23	822	358.021	-361.607	D	7.943	7.941	0.002	4.066	0	0	0	0	0	100
2002	306	23	78	358.239	-356.385	D	7.611	7.559	0.051	3.229	0	0	0	0	0	100
2002	307	23	967	363.478	-354.116	D	10.117	10.113	0.005	9.486	0	0	0	0	0	99.93
2002	308	23	78	358.239	-356.385	D	9.216	9.16	0.056	6.962	0	0	0	0	0	100
2002	309	23	949	365.722	-354.966	D	9.137	9.129	0.008	6.883	0	0	0	0	0	99.98
2002	310	23	773	365.4	-355.32	D	8.021	7.879	0.142	3.927	0	0	0	0	0	100
2002	311	23	947	365.801	-355.162	D	6.549	6.549	0.001	1.161	0	0	0	0	0	100.03

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	312	23	1	356.546	-357.458	D	6.657	6.657	0	1.373	0	0	0	0	0	0
2002	313	23	1	356.546	-357.458	D	8.478	8.478	0	5.298	0	0	0	0	0	0
2002	314	23	1017	356.894	-355.206	D	8.619	8.593	0.026	5.57	0	0	0	0	0	100.01
2002	315	23	78	358.239	-356.385	D	6.952	6.852	0.1	1.759	0	0	0	0	0	100
2002	316	23	811	357.434	-360.225	D	6.729	6.706	0.022	1.47	0	0	0	0	0	99.99
2002	317	23	949	365.722	-354.966	D	6.644	6.644	0.001	1.346	0	0	0	0	0	99.92
2002	318	23	1	356.546	-357.458	D	6.68	6.68	0	1.417	0	0	0	0	0	0
2002	319	23	1017	356.894	-355.206	D	9.327	9.326	0.001	7.384	0	0	0	0	0	100
2002	320	23	811	357.434	-360.225	D	9.106	9.076	0.03	6.751	0	0	0	0	0	100
2002	321	23	78	358.239	-356.385	D	6.878	6.773	0.105	1.602	0	0	0	0	0	100
2002	322	23	730	364.623	-354.605	D	7.027	7.027	0	2.114	0	0	0	0	0	98.29
2002	323	23	102	358.487	-356.374	D	7.071	6.941	0.13	1.938	0	0	0	0	0	100
2002	324	23	949	365.722	-354.966	D	6.5	6.496	0.004	1.058	0	0	0	0	0	100.02
2002	325	23	927	365.912	-357.454	D	6.789	6.652	0.138	1.362	0	0	0	0	0	100
2002	326	23	1017	356.894	-355.206	D	7.139	7.086	0.053	2.233	0	0	0	0	0	100
2002	327	23	949	365.722	-354.966	D	6.56	6.558	0.002	1.178	0	0	0	0	0	100.01
2002	328	23	1039	356.522	-357.599	D	6.621	6.617	0.004	1.293	0	0	0	0	0	100.01
2002	329	23	907	365.051	-359.809	D	6.976	6.97	0.006	1.997	0	0	0	0	0	100
2002	330	23	1039	356.522	-357.599	D	6.649	6.582	0.068	1.225	0	0	0	0	0	100
2002	331	23	1039	356.522	-357.599	D	6.944	6.922	0.022	1.9	0	0	0	0	0	99.99
2002	332	23	933	366.169	-356.524	D	6.598	6.593	0.005	1.247	0	0	0	0	0	99.99
2002	333	23	329	360.972	-362.006	D	6.601	6.601	0	1.263	0	0	0	0	0	85.72
2002	334	23	78	358.239	-356.385	D	6.795	6.711	0.084	1.478	0	0	0	0	0	100
2002	335	23	869	361.064	-360.714	D	6.601	6.507	0.094	1.08	0	0	0	0	0	100
2002	336	23	10	356.954	-355.443	D	6.483	6.483	0	1.034	0	0	0	0	0	98.84
2002	337	23	78	358.239	-356.385	D	6.903	6.872	0.031	1.8	0	0	0	0	0	100
2002	338	23	295	360.234	-356.546	D	9.819	9.817	0.003	8.676	0	0	0	0	0	99.93
2002	339	23	955	364.92	-354.582	D	8.166	8.139	0.027	4.512	0	0	0	0	0	100
2002	340	23	931	366.183	-356.996	D	9.166	9.164	0.002	6.974	0	0	0	0	0	99.9
2002	341	23	1	356.546	-357.458	D	7.426	7.426	0	2.944	0	0	0	0	0	0
2002	342	23	1010	357.824	-354.865	D	8.157	8.131	0.027	4.493	0	0	0	0	0	100
2002	343	23	986	360.908	-354.689	D	8.192	8.173	0.018	4.591	0	0	0	0	0	99.99
2002	344	23	1008	358.048	-354.775	D	6.868	6.864	0.004	1.784	0	0	0	0	0	99.98
2002	345	23	967	363.478	-354.116	D	8.08	8.073	0.007	4.362	0	0	0	0	0	99.98
2002	346	23	929	366.032	-357.239	D	7.512	7.512	0	3.127	0	0	0	0	0	99.49
2002	347	23	1039	356.522	-357.599	D	9.055	9.015	0.04	6.599	0	0	0	0	0	100
2002	348	23	714	364.799	-358.592	D	9.681	9.528	0.153	7.908	0	0	0	0	0	100
2002	349	23	933	366.169	-356.524	D	7.206	7.206	0	2.482	0	0	0	0	0	99.41
2002	350	23	1	356.546	-357.458	D	8.634	8.634	0	5.669	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	351	23	1	356.546	-357.458	D	9.503	9.503	0	7.844	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	9.613	9.613	0	8.133	0	0	0	0	0	0
2002	353	23	78	358.239	-356.385	D	7.745	7.699	0.046	3.532	0	0	0	0	0	100
2002	354	23	78	358.239	-356.385	D	6.722	6.719	0.003	1.494	0	0	0	0	0	100.01
2002	355	23	1	356.546	-357.458	D	6.506	6.506	0	1.077	0	0	0	0	0	0
2002	356	23	958	364.309	-354.601	D	7.276	7.215	0.061	2.501	0	0	0	0	0	100
2002	357	23	927	365.912	-357.454	D	7.366	7.341	0.024	2.764	0	0	0	0	0	99.99
2002	358	23	811	357.434	-360.225	D	9.638	9.611	0.027	8.127	0	0	0	0	0	100
2002	359	23	927	365.912	-357.454	D	7.427	7.331	0.096	2.743	0	0	0	0	0	100
2002	360	23	931	366.183	-356.996	D	7.502	7.497	0.005	3.095	0	0	0	0	0	99.94
2002	361	23	930	366.19	-357.232	D	7.139	7.137	0.001	2.339	0	0	0	0	0	99.94
2002	362	23	1	356.546	-357.458	D	7.157	7.157	0	2.381	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.138	7.138	0	2.341	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	9.404	9.404	0	7.586	0	0	0	0	0	0
2002	365	23	78	358.239	-356.385	D	8.616	8.6	0.016	5.587	0	0	0	0	0	100
									0.197							
EXIDE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1017	356.894	-355.206	D	6.912	6.912	0	1.879	74.71	12.65	0	0	0	12.05
2002	2	23	1035	356.477	-356.792	D	6.843	6.838	0.005	1.731	85.49	9.32	0	0	0	5.14
2002	3	23	1017	356.894	-355.206	D	7.265	7.261	0.004	2.596	87.79	8.91	0	0	0	3.28
2002	4	23	927	365.912	-357.454	D	6.831	6.831	0.001	1.716	90.2	6.22	0	0	0	3.55
2002	5	23	255	360.129	-359.796	D	7.104	7.104	0	2.27	50.71	3.1	0	0	0	1.26
2002	6	23	1038	356.511	-357.396	D	9.648	9.639	0.009	8.201	91.24	7.63	0	0	0	1.1
2002	7	23	1	356.546	-357.458	D	7.799	7.799	0	3.751	83.39	11.18	0	0	0	6.86
2002	8	23	84	358.173	-354.889	D	6.845	6.845	0	1.745	83.23	11.38	0	0	0	4.7
2002	9	23	1	356.546	-357.458	D	6.822	6.822	0	1.699	0	0	0	0	0	0
2002	10	23	1017	356.894	-355.206	D	8.456	8.454	0.002	5.24	93.14	5.44	0	0	0	1.3
2002	11	23	1039	356.522	-357.599	D	7.548	7.545	0.003	3.198	77.17	16.78	0	0	0	6.02
2002	12	23	941	365.977	-355.774	D	6.8	6.8	0	1.656	86.81	5.52	0	0	0	6.59
2002	13	23	932	366.176	-356.761	D	7.067	7.067	0	2.194	86.87	5.39	0	0	0	5.71
2002	14	23	1	356.546	-357.458	D	7.035	7.035	0	2.129	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	6.685	6.685	0	1.428	0	0	0	0	0	0
2002	16	23	1	356.546	-357.458	D	6.622	6.622	0	1.304	55.23	2.65	0	0	0	2.38
2002	17	23	823	358.24	-361.604	D	6.916	6.913	0.003	1.882	83.47	10.08	0	0	0	6.41
2002	18	23	1005	358.679	-354.752	D	8.837	8.836	0	6.158	86.94	10.85	0	0	0	1.36
2002	19	23	746	364.882	-354.843	D	9.148	9.148	0	6.931	92.6	5.81	0	0	0	1
2002	20	23	932	366.176	-356.761	D	9.373	9.371	0.002	7.5	95.71	3.7	0	0	0	0.39

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	21	23	785	365.637	-355.06	D	7.385	7.385	0	2.856	95.68	2.65	0	0	0	0.71
2002	22	23	1	356.546	-357.458	D	6.995	6.995	0	2.048	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	9.601	9.601	0	8.101	0	0	0	0	0	0
2002	24	23	949	365.722	-354.966	D	9.212	9.204	0.008	7.073	94.23	5.39	0	0	0	0.37
2002	25	23	836	360.07	-362.066	D	6.935	6.935	0	1.926	83.91	11	0	0	0	5.26
2002	26	23	710	364.843	-359.589	D	6.728	6.728	0	1.512	87.16	3.63	0	0	0	3.85
2002	27	23	255	360.129	-359.796	D	6.624	6.624	0	1.308	68.27	1.85	0	0	0	3.17
2002	28	23	1	356.546	-357.458	D	6.928	6.928	0	1.913	0	0	0	0	0	0
2002	29	23	965	363.588	-354.142	D	9.14	9.138	0.001	6.908	93.97	5.25	0	0	0	0.54
2002	30	23	964	363.678	-354.148	D	10.036	9.985	0.051	9.134	94.68	4.89	0	0	0	0.43
2002	31	23	1035	356.477	-356.792	D	10.173	10.119	0.055	9.502	96.72	3.04	0	0	0	0.23
2002	32	23	949	365.722	-354.966	D	7.46	7.456	0.004	3.007	96.23	3.45	0	0	0	0.32
2002	33	23	775	365.747	-357.551	D	6.972	6.972	0	2.001	91.5	3.94	0	0	0	3.62
2002	34	23	929	366.032	-357.239	D	6.871	6.871	0	1.798	93.44	3.81	0	0	0	2
2002	35	23	929	366.032	-357.239	D	7.106	7.105	0.001	2.274	88.65	7.26	0	0	0	4.04
2002	36	23	1	356.546	-357.458	D	6.622	6.622	0	1.303	0	0	0	0	0	0
2002	37	23	1	356.546	-357.458	D	9.286	9.286	0	7.281	0	0	0	0	0	0
2002	38	23	1	356.546	-357.458	D	9.37	9.37	0	7.497	0	0	0	0	0	0
2002	39	23	1	356.546	-357.458	D	8.385	8.385	0	5.08	0	0	0	0	0	0
2002	40	23	1	356.546	-357.458	D	9.064	9.064	0	6.722	0	0	0	0	0	0
2002	41	23	822	358.021	-361.607	D	8.244	8.243	0.001	4.751	90.34	6.62	0	0	0	2.72
2002	42	23	822	358.021	-361.607	D	7.655	7.654	0	3.434	94.78	4.19	0	0	0	1.62
2002	43	23	1018	356.892	-355.39	D	6.606	6.606	0.001	1.272	82.28	4.56	0	0	0	13.19
2002	44	23	822	358.021	-361.607	D	6.667	6.666	0	1.391	83.64	5.75	0	0	0	11.4
2002	45	23	1016	357.1	-355.198	D	6.584	6.584	0	1.229	84.4	8.6	0	0	0	6.89
2002	46	23	255	360.129	-359.796	D	6.854	6.854	0	1.763	51.58	1.39	0	0	0	1.72
2002	47	23	1	356.546	-357.458	D	6.647	6.647	0	1.352	0	0	0	0	0	0
2002	48	23	822	358.021	-361.607	D	6.559	6.558	0.001	1.178	80.09	6.97	0	0	0	13.1
2002	49	23	1	356.546	-357.458	D	6.612	6.612	0	1.284	91.88	3.05	0	0	0	5.3
2002	50	23	1	356.546	-357.458	D	8.514	8.514	0	5.384	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	8.973	8.973	0	6.495	0	0	0	0	0	0
2002	52	23	643	363.609	-354.151	D	7.089	7.089	0	2.239	85.54	3.18	0	0	0	10.89
2002	53	23	16	357.648	-359.906	D	6.965	6.964	0	1.986	87.09	5.05	0	0	0	7.62
2002	54	23	1	356.546	-357.458	D	6.629	6.629	0	1.317	88.38	5.89	0	0	0	5.23
2002	55	23	929	366.032	-357.239	D	6.795	6.795	0	1.646	93.82	2.95	0	0	0	2.23
2002	56	23	200	359.633	-359.818	D	7.936	7.935	0.001	4.052	89.68	8.94	0	0	0	1.28
2002	57	23	822	358.021	-361.607	D	7.666	7.665	0.001	3.458	72.52	20.34	0	0	0	7.14
2002	58	23	1	356.546	-357.458	D	6.762	6.762	0	1.579	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	6.499	6.499	0	1.064	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	60	23	1	356.546	-357.458	D	7.718	7.718	0	3.573	0	0	0	0	0	0
2002	61	23	1	356.546	-357.458	D	9.578	9.578	0	8.04	89.92	3.99	0	0	0	0.37
2002	62	23	542	362.638	-354.693	D	7.293	7.291	0.002	2.659	87.04	9.68	0	0	0	3.23
2002	63	23	1	356.546	-357.458	D	7.413	7.413	0	2.917	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	6.693	6.693	0	1.444	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	6.942	6.942	0	1.941	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	9.291	9.291	0	7.295	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	8.946	8.946	0	6.427	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	8.713	8.713	0	5.859	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.022	7.022	0	2.104	0	0	0	0	0	0
2002	70	23	1	356.546	-357.458	D	7.125	7.125	0	2.314	0	0	0	0	0	0
2002	71	23	1	356.546	-357.458	D	9.281	9.281	0	7.27	0	0	0	0	0	0
2002	72	23	965	363.588	-354.142	D	7.029	7.028	0.001	2.115	93.36	3.57	0	0	0	2.64
2002	73	23	1	356.546	-357.458	D	8.052	8.052	0	4.314	0	0	0	0	0	0
2002	74	23	255	360.129	-359.796	D	8.966	8.964	0.002	6.472	91.4	7.15	0	0	0	1.36
2002	75	23	407	361.716	-361.973	D	7.648	7.648	0	3.42	93	4.59	0	0	0	0.56
2002	76	23	255	360.129	-359.796	D	8.261	8.26	0	4.79	96.29	2.59	0	0	0	0.48
2002	77	23	930	366.19	-357.232	D	9.111	9.111	0.001	6.838	97.19	1.91	0	0	0	0.32
2002	78	23	14	357.202	-355.432	D	10.218	10.218	0	9.779	96.67	1.64	0	0	0	0.12
2002	79	23	1	356.546	-357.458	D	9.252	9.252	0	7.195	99.76	1.63	0	0	0	0.11
2002	80	23	934	366.01	-356.526	D	7.978	7.976	0.002	4.143	90.31	7.39	0	0	0	2.27
2002	81	23	3	356.524	-356.959	D	6.485	6.485	0	1.038	77.76	9.61	0	0	0	11.51
2002	82	23	1017	356.894	-355.206	D	6.646	6.646	0.001	1.35	88.54	7.46	0	0	0	3.77
2002	83	23	929	366.032	-357.239	D	7.948	7.948	0	4.08	96.78	2.04	0	0	0	1.03
2002	84	23	643	363.609	-354.151	D	10.218	10.218	0.001	9.779	96.67	2.52	0	0	0	0.09
2002	85	23	643	363.609	-354.151	D	8.483	8.482	0.001	5.307	97.61	2.18	0	0	0	0.09
2002	86	23	1017	356.894	-355.206	D	7.697	7.696	0.001	3.525	93.32	5.56	0	0	0	0.94
2002	87	23	1	356.546	-357.458	D	7.322	7.322	0	2.724	0	0	0	0	0	0
2002	88	23	1017	356.894	-355.206	D	8.397	8.397	0	5.108	96.34	0.73	0	0	0	2.12
2002	89	23	1017	356.894	-355.206	D	7.436	7.436	0	2.964	89.5	6.62	0	0	0	3.1
2002	90	23	300	360.18	-355.3	D	7.079	7.079	0	2.219	83.28	0.32	0	0	0	6.88
2002	91	23	643	363.609	-354.151	D	6.641	6.641	0	1.34	93.04	2.2	0	0	0	4.67
2002	92	23	642	363.62	-354.4	D	7.441	7.441	0	2.974	95.19	1.88	0	0	0	2.25
2002	93	23	228	359.881	-359.807	D	6.652	6.652	0	1.363	44.77	0.33	0	0	0	0.86
2002	94	23	1	356.546	-357.458	D	6.542	6.542	0	1.147	0	0	0	0	0	0
2002	95	23	261	360.063	-358.301	D	6.514	6.514	0	1.094	22.95	0.05	0	0	0	0.91
2002	96	23	949	365.722	-354.966	D	6.529	6.528	0	1.121	94.52	0.73	0	0	0	3.41
2002	97	23	929	366.032	-357.239	D	7.974	7.974	0	4.139	91.66	0.66	0	0	0	2.15
2002	98	23	1	356.546	-357.458	D	10.042	10.042	0	9.289	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	99	23	1	356.546	-357.458	D	9.139	9.139	0	6.909	0	0	0	0	0	0
2002	100	23	1	356.546	-357.458	D	7.423	7.423	0	2.936	0	0	0	0	0	0
2002	101	23	1	356.546	-357.458	D	6.905	6.905	0	1.865	0	0	0	0	0	0
2002	102	23	1017	356.894	-355.206	D	7.411	7.41	0	2.91	98.03	0.54	0	0	0	1.22
2002	103	23	1010	357.824	-354.865	D	9.74	9.738	0.002	8.465	96.35	3.06	0	0	0	0.42
2002	104	23	62	357.925	-354.901	D	9.33	9.329	0.001	7.392	98.1	1.3	0	0	0	0.26
2002	105	23	1	356.546	-357.458	D	8.09	8.09	0	4.401	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.575	7.575	0	3.262	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.511	7.511	0	3.124	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	8.475	8.475	0	5.29	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.611	7.611	0	3.34	0	0	0	0	0	0
2002	110	23	1017	356.894	-355.206	D	9.53	9.529	0	7.912	97.15	1.68	0	0	0	0.66
2002	111	23	974	362.281	-354.249	D	9.441	9.438	0.002	7.675	98.25	1.37	0	0	0	0.36
2002	112	23	947	365.801	-355.162	D	6.943	6.942	0	1.941	96.94	0.83	0	0	0	1.74
2002	113	23	927	365.912	-357.454	D	6.97	6.968	0.003	1.992	98.56	0.38	0	0	0	1.02
2002	114	23	934	366.01	-356.526	D	8.321	8.318	0.003	4.923	98.34	0.54	0	0	0	1.12
2002	115	23	900	364.265	-360.243	D	6.752	6.751	0	1.559	97.92	0.81	0	0	0	1.91
2002	116	23	774	365.389	-355.071	D	8.168	8.168	0	4.578	95.07	1.64	0	0	0	1.13
2002	117	23	747	364.871	-354.594	D	8.241	8.241	0	4.745	96.76	0.72	0	0	0	1.23
2002	118	23	1	356.546	-357.458	D	8.205	8.205	0	4.662	0	0	0	0	0	0
2002	119	23	108	358.421	-354.879	D	6.798	6.797	0.001	1.649	95.05	1.31	0	0	0	3.46
2002	120	23	1002	359.309	-354.73	D	7.864	7.862	0.001	3.89	98.75	0.17	0	0	0	1.04
2002	121	23	967	363.478	-354.116	D	9.364	9.364	0	7.482	94.1	0.19	0	0	0	0.18
2002	122	23	1017	356.894	-355.206	D	8.428	8.426	0.001	5.176	98.71	0.8	0	0	0	0.36
2002	123	23	44	358.21	-361.379	D	6.976	6.975	0.001	2.007	98.98	0.31	0	0	0	0.83
2002	124	23	1	356.546	-357.458	D	7.38	7.379	0.001	2.844	98.77	0.44	0	0	0	0.54
2002	125	23	822	358.021	-361.607	D	8.337	8.336	0.001	4.966	99.23	0.35	0	0	0	0.28
2002	126	23	190	359.165	-354.846	D	8.355	8.355	0	5.01	98.17	0.07	0	0	0	0.21
2002	127	23	1	356.546	-357.458	D	8.856	8.856	0	6.205	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	9.261	9.261	0	7.218	0	0	0	0	0	0
2002	129	23	1017	356.894	-355.206	D	8.026	8.026	0	4.256	84.33	10.49	0	0	0	4.47
2002	130	23	1005	358.679	-354.752	D	6.625	6.624	0.001	1.308	94.46	0.78	0	0	0	4.64
2002	131	23	1002	359.309	-354.73	D	7.831	7.831	0	3.821	98.51	0.49	0	0	0	0.43
2002	132	23	1017	356.894	-355.206	D	9.674	9.673	0.001	8.29	97.8	1.82	0	0	0	0.31
2002	133	23	961	364.092	-354.289	D	8.626	8.601	0.025	5.59	97.31	2.44	0	0	0	0.25
2002	134	23	947	365.801	-355.162	D	6.866	6.866	0.001	1.786	92.69	1.86	0	0	0	5.17
2002	135	23	776	365.736	-357.302	D	6.777	6.777	0	1.609	96.96	0.29	0	0	0	1.96
2002	136	23	29	357.907	-360.144	D	7.379	7.379	0	2.843	6.17	0	0	0	0	0.09
2002	137	23	1	356.546	-357.458	D	9.931	9.931	0	8.986	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	138	23	1	356.546	-357.458	D	8.347	8.347	0	4.991	0	0	0	0	0	0
2002	139	23	1017	356.894	-355.206	D	6.818	6.817	0.001	1.69	95.1	0.21	0	0	0	4.88
2002	140	23	822	358.021	-361.607	D	6.791	6.789	0.001	1.634	96.39	0.39	0	0	0	3.15
2002	141	23	191	359.732	-362.061	D	6.719	6.719	0	1.495	96.53	0.14	0	0	0	1.74
2002	142	23	10	356.954	-355.443	D	6.761	6.761	0	1.577	98.8	0.13	0	0	0	1.02
2002	143	23	1	356.546	-357.458	D	6.755	6.755	0	1.566	0	0	0	0	0	0
2002	144	23	1	356.546	-357.458	D	7.37	7.37	0	2.825	0	0	0	0	0	0
2002	145	23	1017	356.894	-355.206	D	8.266	8.265	0.001	4.8	97.61	0.34	0	0	0	2.1
2002	146	23	822	358.021	-361.607	D	7.887	7.875	0.012	3.919	98.36	0.89	0	0	0	0.74
2002	147	23	1007	358.259	-354.768	D	8.688	8.687	0.002	5.796	99.31	0.09	0	0	0	0.5
2002	148	23	1	356.546	-357.458	D	9.172	9.172	0	6.994	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2002	150	23	1	356.546	-357.458	D	8.424	8.424	0	5.172	0	0	0	0	0	0
2002	151	23	1	356.546	-357.458	D	7.061	7.061	0	2.182	0	0	0	0	0	0
2002	152	23	1	356.546	-357.458	D	7.196	7.196	0	2.462	0	0	0	0	0	0
2002	153	23	1	356.546	-357.458	D	7.677	7.677	0	3.483	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.825	7.825	0	3.807	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.059	7.059	0	2.178	0	0	0	0	0	0
2002	156	23	1017	356.894	-355.206	D	8.721	8.721	0	5.878	99.26	0.1	0	0	0	0.66
2002	157	23	1017	356.894	-355.206	D	8.234	8.232	0.001	4.725	97.76	0.31	0	0	0	1.95
2002	158	23	1017	356.894	-355.206	D	6.888	6.887	0.002	1.829	97.93	0.09	0	0	0	1.93
2002	159	23	10	356.954	-355.443	D	6.884	6.884	0	1.824	90.76	0.04	0	0	0	0.76
2002	160	23	1	356.546	-357.458	D	7.431	7.431	0	2.953	0	0	0	0	0	0
2002	161	23	1	356.546	-357.458	D	9.601	9.601	0	8.101	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	8.492	8.492	0	5.332	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	8.522	8.522	0	5.401	0	0	0	0	0	0
2002	164	23	966	363.538	-354.124	D	7.939	7.939	0	4.06	97.64	0.01	0	0	0	1.82
2002	165	23	907	365.051	-359.809	D	7.207	7.204	0.004	2.476	98.53	0.34	0	0	0	1.09
2002	166	23	822	358.021	-361.607	D	6.691	6.69	0.001	1.437	91.6	0.5	0	0	0	7.67
2002	167	23	931	366.183	-356.996	D	6.635	6.635	0	1.329	95.96	0.05	0	0	0	3.85
2002	168	23	255	360.129	-359.796	D	6.933	6.932	0.002	1.92	97.8	0.15	0	0	0	2.07
2002	169	23	908	365.047	-359.568	D	6.754	6.753	0.001	1.562	97.96	0.04	0	0	0	1.76
2002	170	23	785	365.637	-355.06	D	7.022	7.021	0	2.101	98.71	0.05	0	0	0	1
2002	171	23	247	360.217	-361.79	D	7.604	7.604	0	3.325	25.13	0	0	0	0	0.39
2002	172	23	1	356.546	-357.458	D	7.907	7.907	0	3.989	0	0	0	0	0	0
2002	173	23	1	356.546	-357.458	D	7.545	7.545	0	3.198	0	0	0	0	0	0
2002	174	23	1	356.546	-357.458	D	7.039	7.039	0	2.137	0	0	0	0	0	0
2002	175	23	1	356.546	-357.458	D	7.036	7.036	0	2.132	0	0	0	0	0	0
2002	176	23	1	356.546	-357.458	D	7.974	7.974	0	4.138	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	177	23	1	356.546	-357.458	D	7.864	7.864	0	3.894	0	0	0	0	0	0
2002	178	23	1	356.546	-357.458	D	8.442	8.442	0	5.214	0	0	0	0	0	0
2002	179	23	933	366.169	-356.524	D	7.44	7.44	0	2.972	98.2	0.28	0	0	0	1.05
2002	180	23	946	365.798	-355.322	D	7.27	7.27	0	2.615	98.82	0.11	0	0	0	0.86
2002	181	23	255	360.129	-359.796	D	7.403	7.403	0	2.894	88.15	0.01	0	0	0	0.83
2002	182	23	1	356.546	-357.458	D	6.828	6.828	0	1.711	0	0	0	0	0	0
2002	183	23	1	356.546	-357.458	D	6.708	6.708	0	1.473	0	0	0	0	0	0
2002	184	23	1	356.546	-357.458	D	8.242	8.242	0	4.747	0	0	0	0	0	0
2002	185	23	1	356.546	-357.458	D	7.384	7.384	0	2.854	0	0	0	0	0	0
2002	186	23	1	356.546	-357.458	D	7.853	7.853	0	3.87	0	0	0	0	0	0
2002	187	23	1	356.546	-357.458	D	7.187	7.187	0	2.442	0	0	0	0	0	0
2002	188	23	1	356.546	-357.458	D	7.458	7.458	0	3.011	0	0	0	0	0	0
2002	189	23	1	356.546	-357.458	D	6.792	6.792	0	1.64	0	0	0	0	0	0
2002	190	23	1	356.546	-357.458	D	6.779	6.779	0	1.613	0	0	0	0	0	0
2002	191	23	61	357.936	-355.15	D	7.115	7.115	0	2.294	43.2	0.01	0	0	0	1.29
2002	192	23	947	365.801	-355.162	D	7.923	7.92	0.004	4.017	98.64	0.63	0	0	0	0.69
2002	193	23	907	365.051	-359.809	D	8.485	8.479	0.006	5.3	99.32	0.22	0	0	0	0.43
2002	194	23	1017	356.894	-355.206	D	9.215	9.211	0.005	7.091	99.25	0.49	0	0	0	0.25
2002	195	23	822	358.021	-361.607	D	8.646	8.645	0.001	5.695	99.65	0.08	0	0	0	0.29
2002	196	23	822	358.021	-361.607	D	7.228	7.228	0	2.527	97.75	0.34	0	0	0	0.81
2002	197	23	15	357.659	-360.155	D	7.118	7.118	0	2.299	98.43	0.18	0	0	0	0.76
2002	198	23	10	356.954	-355.443	D	8.619	8.619	0	5.633	98.41	0.03	0	0	0	0.33
2002	199	23	594	363.123	-354.422	D	8.168	8.168	0	4.578	96.67	0.04	0	0	0	0.37
2002	200	23	1	356.546	-357.458	D	9.235	9.235	0	7.153	0	0	0	0	0	0
2002	201	23	1	356.546	-357.458	D	8.2	8.2	0	4.651	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	8.243	8.243	0	4.751	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.104	7.104	0	2.27	0	0	0	0	0	0
2002	204	23	1	356.546	-357.458	D	7.467	7.467	0	3.031	0	0	0	0	0	0
2002	205	23	44	358.21	-361.379	D	6.947	6.947	0	1.951	90.01	0.07	0	0	0	1.56
2002	206	23	822	358.021	-361.607	D	7.134	7.134	0	2.333	98.21	0.21	0	0	0	1.07
2002	207	23	996	360.121	-355.113	D	7.354	7.353	0.001	2.788	99.27	0.04	0	0	0	0.72
2002	208	23	929	366.032	-357.239	D	7.476	7.476	0	3.049	98.13	0.08	0	0	0	0.71
2002	209	23	1	356.546	-357.458	D	7.228	7.228	0	2.528	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.898	7.898	0	3.969	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.793	7.793	0	3.737	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.19	7.19	0	2.449	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.191	7.191	0	2.45	0	0	0	0	0	0
2002	214	23	10	356.954	-355.443	D	7.458	7.458	0	3.011	141.8	0.01	0	0	0	1.26
2002	215	23	10	356.954	-355.443	D	7.448	7.448	0	2.99	94.72	0.01	0	0	0	1.07

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	216	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	217	23	1	356.546	-357.458	D	7.287	7.287	0	2.651	0	0	0	0	0	0
2002	218	23	1	356.546	-357.458	D	6.861	6.861	0	1.777	0	0	0	0	0	0
2002	219	23	1	356.546	-357.458	D	8.732	8.732	0	5.904	0	0	0	0	0	0
2002	220	23	1	356.546	-357.458	D	6.723	6.723	0	1.503	0	0	0	0	0	0
2002	221	23	1	356.546	-357.458	D	6.684	6.684	0	1.425	0	0	0	0	0	0
2002	222	23	1	356.546	-357.458	D	6.853	6.853	0	1.762	0	0	0	0	0	0
2002	223	23	1	356.546	-357.458	D	7.168	7.168	0	2.402	0	0	0	0	0	0
2002	224	23	1	356.546	-357.458	D	7.094	7.094	0	2.251	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	9.125	9.125	0	6.875	0	0	0	0	0	0
2002	226	23	643	363.609	-354.151	D	9.598	9.597	0.001	8.09	98.6	0.47	0	0	0	0.75
2002	227	23	1002	359.309	-354.73	D	8.49	8.49	0	5.327	98.65	0.04	0	0	0	0.63
2002	228	23	1	356.546	-357.458	D	8.55	8.55	0	5.468	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	8.018	8.018	0	4.237	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	8.407	8.407	0	5.131	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.437	7.437	0	2.967	0	0	0	0	0	0
2002	232	23	1	356.546	-357.458	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	233	23	1	356.546	-357.458	D	7.361	7.361	0	2.805	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.811	7.811	0	3.777	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.29	7.29	0	2.657	0	0	0	0	0	0
2002	236	23	1017	356.894	-355.206	D	7.919	7.915	0.003	4.008	98.09	0.39	0	0	0	1.45
2002	237	23	832	359.493	-362.061	D	7.794	7.787	0.007	3.724	98.82	0.44	0	0	0	0.72
2002	238	23	380	361.468	-361.984	D	7.404	7.404	0	2.898	99.35	0.03	0	0	0	0.94
2002	239	23	1	356.546	-357.458	D	6.915	6.915	0	1.887	0	0	0	0	0	0
2002	240	23	1	356.546	-357.458	D	7.329	7.329	0	2.739	0	0	0	0	0	0
2002	241	23	1	356.546	-357.458	D	7.135	7.135	0	2.334	0	0	0	0	0	0
2002	242	23	1	356.546	-357.458	D	6.944	6.944	0	1.945	0	0	0	0	0	0
2002	243	23	1	356.546	-357.458	D	7.131	7.131	0	2.327	0	0	0	0	0	0
2002	244	23	1	356.546	-357.458	D	7.078	7.078	0	2.217	0	0	0	0	0	0
2002	245	23	1	356.546	-357.458	D	6.939	6.939	0	1.934	0	0	0	0	0	0
2002	246	23	1	356.546	-357.458	D	7.006	7.006	0	2.07	0	0	0	0	0	0
2002	247	23	747	364.871	-354.594	D	7.016	7.016	0	2.09	96.59	0.11	0	0	0	2.5
2002	248	23	10	356.954	-355.443	D	7.033	7.033	0	2.125	97.89	0.04	0	0	0	1.41
2002	249	23	996	360.121	-355.113	D	6.76	6.76	0	1.576	92.37	0.01	0	0	0	1.57
2002	250	23	15	357.659	-360.155	D	6.717	6.717	0	1.49	69.44	0.01	0	0	0	1.23
2002	251	23	1	356.546	-357.458	D	8.576	8.576	0	5.53	0	0	0	0	0	0
2002	252	23	1	356.546	-357.458	D	7.266	7.266	0	2.606	0	0	0	0	0	0
2002	253	23	1	356.546	-357.458	D	7.027	7.027	0	2.114	0	0	0	0	0	0
2002	254	23	1035	356.477	-356.792	D	7.492	7.487	0.004	3.074	96.17	2.41	0	0	0	1.41

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	255	23	301	360.724	-362.017	D	7.12	7.12	0	2.303	91.81	0.03	0	0	0	2.07
2002	256	23	1	356.546	-357.458	D	6.623	6.623	0	1.306	0	0	0	0	0	0
2002	257	23	1	356.546	-357.458	D	6.68	6.68	0	1.417	0	0	0	0	0	0
2002	258	23	1	356.546	-357.458	D	8.041	8.041	0	4.289	0	0	0	0	0	0
2002	259	23	44	358.21	-361.379	D	8.159	8.159	0	4.557	92.14	0.1	0	0	0	1.66
2002	260	23	836	360.07	-362.066	D	7.696	7.69	0.006	3.512	98.84	0.36	0	0	0	0.8
2002	261	23	947	365.801	-355.162	D	8.11	8.108	0.002	4.441	98.83	0.54	0	0	0	0.57
2002	262	23	1	356.546	-357.458	D	9.072	9.072	0	6.74	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	9.195	9.195	0	7.052	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	6.755	6.755	0	1.565	0	0	0	0	0	0
2002	265	23	900	364.265	-360.243	D	6.737	6.737	0	1.531	94.66	0.25	0	0	0	2.74
2002	266	23	10	356.954	-355.443	D	6.581	6.581	0	1.224	91.5	0.07	0	0	0	7.76
2002	267	23	1015	357.306	-355.192	D	6.526	6.526	0	1.116	93.26	0.24	0	0	0	5.28
2002	268	23	569	362.875	-354.433	D	6.768	6.768	0	1.591	96.79	0.27	0	0	0	2.64
2002	269	23	15	357.659	-360.155	D	6.946	6.946	0	1.949	96.53	0.14	0	0	0	1.46
2002	270	23	1017	356.894	-355.206	D	7.361	7.361	0	2.805	96	0.07	0	0	0	4.32
2002	271	23	1017	356.894	-355.206	D	6.76	6.76	0	1.575	97.08	0.43	0	0	0	2.44
2002	272	23	255	360.129	-359.796	D	7.345	7.345	0	2.773	94.88	0.04	0	0	0	0.72
2002	273	23	15	357.659	-360.155	D	7.676	7.676	0	3.481	28.9	0	0	0	0	0.27
2002	274	23	1	356.546	-357.458	D	6.979	6.979	0	2.016	0	0	0	0	0	0
2002	275	23	1	356.546	-357.458	D	7.125	7.125	0	2.314	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.413	7.413	0	2.915	0	0	0	0	0	0
2002	277	23	1	356.546	-357.458	D	9.122	9.122	0	6.867	0	0	0	0	0	0
2002	278	23	1017	356.894	-355.206	D	7.094	7.094	0	2.25	86.05	9.35	0	0	0	4.56
2002	279	23	407	361.716	-361.973	D	6.726	6.726	0	1.507	97.83	0.36	0	0	0	2
2002	280	23	930	366.19	-357.232	D	6.703	6.702	0.001	1.462	90.84	1.56	0	0	0	7.55
2002	281	23	1	356.546	-357.458	D	6.555	6.555	0	1.172	0	0	0	0	0	0
2002	282	23	1	356.546	-357.458	D	8.753	8.753	0	5.954	28.91	0.29	0	0	0	0.12
2002	283	23	789	365.918	-355.796	D	9.537	9.537	0	7.932	89.72	0.82	0	0	0	0.28
2002	284	23	1	356.546	-357.458	D	8.601	8.601	0	5.59	92.67	0.52	0	0	0	0.27
2002	285	23	3	356.524	-356.959	D	8.806	8.805	0	6.083	93.03	3.93	0	0	0	1.73
2002	286	23	1039	356.522	-357.599	D	7.501	7.501	0	3.103	95.48	3.12	0	0	0	1.25
2002	287	23	1	356.546	-357.458	D	6.528	6.528	0	1.12	0	0	0	0	0	0
2002	288	23	737	364.981	-357.086	D	6.504	6.504	0	1.074	81.56	1.23	0	0	0	15.99
2002	289	23	1	356.546	-357.458	D	6.563	6.563	0	1.188	12.32	0.04	0	0	0	0.47
2002	290	23	1	356.546	-357.458	D	9.093	9.093	0	6.795	0	0	0	0	0	0
2002	291	23	1	356.546	-357.458	D	6.672	6.672	0	1.402	97.31	0.72	0	0	0	1.99
2002	292	23	901	364.256	-360.039	D	9.449	9.446	0.003	7.694	95.47	3.71	0	0	0	0.82
2002	293	23	852	361.595	-362.148	D	7.745	7.745	0	3.631	97.06	1.83	0	0	0	0.58

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	294	23	810	357.434	-360.005	D	6.776	6.776	0	1.608	97.03	0.76	0	0	0	1.33
2002	295	23	15	357.659	-360.155	D	6.841	6.841	0	1.736	96.73	0.48	0	0	0	1.02
2002	296	23	15	357.659	-360.155	D	6.806	6.806	0	1.668	90.35	0.2	0	0	0	1.05
2002	297	23	1	356.546	-357.458	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2002	298	23	1035	356.477	-356.792	D	9.188	9.184	0.004	7.023	94.67	4.44	0	0	0	0.92
2002	299	23	927	365.912	-357.454	D	8.955	8.911	0.043	6.342	94.74	4.54	0	0	0	0.71
2002	300	23	832	359.493	-362.061	D	8.96	8.956	0.005	6.451	97.74	1.67	0	0	0	0.59
2002	301	23	1035	356.477	-356.792	D	10.183	10.176	0.007	9.662	98.31	1.46	0	0	0	0.22
2002	302	23	811	357.434	-360.225	D	9.756	9.753	0.003	8.504	98.49	1.32	0	0	0	0.21
2002	303	23	44	358.21	-361.379	D	8.512	8.512	0	5.377	98.9	0.36	0	0	0	0.23
2002	304	23	44	358.21	-361.379	D	8.981	8.981	0	6.516	97.13	2.62	0	0	0	0.32
2002	305	23	1	356.546	-357.458	D	7.915	7.915	0	4.007	0	0	0	0	0	0
2002	306	23	1002	359.309	-354.73	D	7.563	7.559	0.004	3.229	92.22	5.66	0	0	0	2.09
2002	307	23	643	363.609	-354.151	D	10.114	10.113	0.002	9.486	95.11	4.18	0	0	0	0.38
2002	308	23	947	365.801	-355.162	D	9.162	9.16	0.002	6.962	96.63	2.94	0	0	0	0.38
2002	309	23	948	365.727	-355.056	D	9.131	9.129	0.003	6.883	97.11	2.51	0	0	0	0.29
2002	310	23	949	365.722	-354.966	D	7.885	7.879	0.006	3.927	96.03	3.33	0	0	0	0.66
2002	311	23	356	361.22	-361.995	D	6.548	6.548	0	1.159	93.6	0.96	0	0	0	2.23
2002	312	23	1	356.546	-357.458	D	6.657	6.657	0	1.373	19.67	0.25	0	0	0	0.32
2002	313	23	1	356.546	-357.458	D	8.478	8.478	0	5.298	0	0	0	0	0	0
2002	314	23	594	363.123	-354.422	D	8.617	8.617	0	5.629	32.94	0.38	0	0	0	3.19
2002	315	23	949	365.722	-354.966	D	6.856	6.855	0.001	1.765	89.96	3.32	0	0	0	6.43
2002	316	23	16	357.648	-359.906	D	6.715	6.715	0.001	1.486	84.46	7.4	0	0	0	7.94
2002	317	23	44	358.21	-361.379	D	6.644	6.644	0	1.346	82.51	3.75	0	0	0	9.49
2002	318	23	1	356.546	-357.458	D	6.68	6.68	0	1.417	0	0	0	0	0	0
2002	319	23	10	356.954	-355.443	D	9.327	9.326	0.001	7.384	92.42	6.87	0	0	0	0.64
2002	320	23	255	360.129	-359.796	D	9.09	9.09	0	6.786	37.72	2.56	0	0	0	3.91
2002	321	23	747	364.871	-354.594	D	6.786	6.786	0	1.627	84.47	9.98	0	0	0	5.07
2002	322	23	617	363.382	-354.66	D	7.027	7.027	0	2.114	71.28	3.81	0	0	0	3.32
2002	323	23	822	358.021	-361.607	D	6.942	6.939	0.003	1.934	81.74	9.85	0	0	0	8.42
2002	324	23	929	366.032	-357.239	D	6.495	6.495	0	1.056	89.33	2.5	0	0	0	9.22
2002	325	23	594	363.123	-354.422	D	6.652	6.652	0	1.362	84.66	2.36	0	0	0	11.82
2002	326	23	10	356.954	-355.443	D	7.086	7.086	0	2.233	82.67	5.25	0	0	0	11.43
2002	327	23	927	365.912	-357.454	D	6.558	6.558	0.001	1.178	86.1	6.65	0	0	0	7.04
2002	328	23	10	356.954	-355.443	D	6.617	6.617	0	1.293	86.74	2.77	0	0	0	4.65
2002	329	23	596	363.613	-359.892	D	6.97	6.97	0	1.997	93.56	4.4	0	0	0	1.45
2002	330	23	1	356.546	-357.458	D	6.582	6.582	0	1.225	86.62	5.96	0	0	0	7.23
2002	331	23	1035	356.477	-356.792	D	6.922	6.922	0	1.9	85.93	5.23	0	0	0	4.14
2002	332	23	84	358.173	-354.889	D	6.594	6.594	0	1.249	91.64	3.83	0	0	0	3.37

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	333	23	247	360.217	-361.79	D	6.601	6.601	0	1.263	92.8	2.35	0	0	0	3.29
2002	334	23	947	365.801	-355.162	D	6.713	6.713	0	1.482	72.01	10.86	0	0	0	17.02
2002	335	23	949	365.722	-354.966	D	6.511	6.511	0	1.087	68.97	14.24	0	0	0	16.68
2002	336	23	1	356.546	-357.458	D	6.483	6.483	0	1.034	0	0	0	0	0	0
2002	337	23	1017	356.894	-355.206	D	6.872	6.872	0	1.8	82.94	10.67	0	0	0	6.42
2002	338	23	1	356.546	-357.458	D	9.947	9.947	0	9.028	0	0	0	0	0	0
2002	339	23	1017	356.894	-355.206	D	8.163	8.163	0	4.566	90.12	8.72	0	0	0	3.31
2002	340	23	786	365.973	-357.042	D	9.24	9.238	0.003	7.159	90.66	8.23	0	0	0	1.1
2002	341	23	929	366.032	-357.239	D	7.38	7.38	0	2.845	95.92	5.63	0	0	0	2.27
2002	342	23	643	363.609	-354.151	D	8.164	8.164	0.001	4.568	95.76	3.6	0	0	0	0.53
2002	343	23	1017	356.894	-355.206	D	8.246	8.243	0.004	4.749	95.88	3.71	0	0	0	0.37
2002	344	23	3	356.524	-356.959	D	6.865	6.864	0	1.784	95.47	2.85	0	0	0	1.22
2002	345	23	10	356.954	-355.443	D	8.113	8.112	0	4.451	96.8	2.5	0	0	0	0.43
2002	346	23	406	361.15	-354.758	D	7.59	7.59	0	3.295	95.89	1.9	0	0	0	0.54
2002	347	23	1035	356.477	-356.792	D	9.016	9.015	0	6.599	97.3	2.27	0	0	0	0.49
2002	348	23	822	358.021	-361.607	D	9.524	9.513	0.011	7.869	95.32	4.04	0	0	0	0.6
2002	349	23	930	366.19	-357.232	D	7.206	7.206	0	2.482	96.71	2.12	0	0	0	1.15
2002	350	23	1	356.546	-357.458	D	8.634	8.634	0	5.669	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	9.503	9.503	0	7.844	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	9.613	9.613	0	8.133	0	0	0	0	0	0
2002	353	23	784	365.648	-355.309	D	7.835	7.835	0	3.83	89.64	4.85	0	0	0	2.07
2002	354	23	1	356.546	-357.458	D	6.719	6.719	0	1.494	0	0	0	0	0	0
2002	355	23	1	356.546	-357.458	D	6.506	6.506	0	1.077	0	0	0	0	0	0
2002	356	23	255	360.129	-359.796	D	7.216	7.215	0.001	2.501	75.23	17.27	0	0	0	7.46
2002	357	23	61	357.936	-355.15	D	7.34	7.34	0	2.761	86.27	9.51	0	0	0	1.57
2002	358	23	10	356.954	-355.443	D	9.58	9.579	0.001	8.042	87.52	11.69	0	0	0	0.81
2002	359	23	933	366.169	-356.524	D	7.348	7.347	0.001	2.776	72.32	17.93	0	0	0	9.66
2002	360	23	1	356.546	-357.458	D	7.523	7.523	0	3.15	0	0	0	0	0	0
2002	361	23	619	363.872	-360.131	D	7.123	7.123	0	2.309	52.04	3.07	0	0	0	0.91
2002	362	23	1	356.546	-357.458	D	7.157	7.157	0	2.381	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.138	7.138	0	2.341	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	9.404	9.404	0	7.586	0	0	0	0	0	0
2002	365	23	1017	356.894	-355.206	D	8.602	8.6	0.002	5.587	93.95	5.34	0	0	0	0.68
									0.055							
TRIGEN KC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1035	356.477	-356.792	D	6.913	6.912	0.001	1.879	88.99	9.65	0	0	0	1.21

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	2	23	1038	356.511	-357.396	D	6.861	6.838	0.024	1.731	92.31	7.1	0	0	0	0.57
2002	3	23	1017	356.894	-355.206	D	7.278	7.261	0.016	2.596	92.81	6.86	0	0	0	0.33
2002	4	23	927	365.912	-357.454	D	6.833	6.831	0.002	1.716	95.31	4.35	0	0	0	0.31
2002	5	23	929	366.032	-357.239	D	7.1	7.1	0	2.262	94.25	3.31	0	0	0	0.17
2002	6	23	103	358.476	-356.124	D	9.678	9.639	0.039	8.201	93.63	6.22	0	0	0	0.15
2002	7	23	1017	356.894	-355.206	D	7.8	7.799	0	3.751	91.23	7.86	0	0	0	0.64
2002	8	23	643	363.609	-354.151	D	6.847	6.846	0.001	1.747	91.93	7.59	0	0	0	0.46
2002	9	23	1	356.546	-357.458	D	6.822	6.822	0	1.699	0	0	0	0	0	0
2002	10	23	1017	356.894	-355.206	D	8.473	8.454	0.02	5.24	96.59	3.3	0	0	0	0.09
2002	11	23	1039	356.522	-357.599	D	7.554	7.545	0.008	3.198	86.69	12.5	0	0	0	0.79
2002	12	23	930	366.19	-357.232	D	6.785	6.785	0.001	1.625	94.99	4.49	0	0	0	0.7
2002	13	23	789	365.918	-355.796	D	7.076	7.076	0	2.212	90.36	4	0	0	0	0.65
2002	14	23	1	356.546	-357.458	D	7.035	7.035	0	2.129	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	6.685	6.685	0	1.428	0	0	0	0	0	0
2002	16	23	929	366.032	-357.239	D	6.621	6.621	0	1.301	92.22	5.46	0	0	0	0.46
2002	17	23	822	358.021	-361.607	D	6.918	6.913	0.005	1.882	89.33	9.71	0	0	0	0.92
2002	18	23	1017	356.894	-355.206	D	8.842	8.836	0.006	6.158	91.55	8.31	0	0	0	0.1
2002	19	23	996	360.121	-355.113	D	9.16	9.148	0.012	6.931	96.56	3.34	0	0	0	0.1
2002	20	23	949	365.722	-354.966	D	9.545	9.371	0.174	7.5	96.06	3.9	0	0	0	0.04
2002	21	23	643	363.609	-354.151	D	7.385	7.385	0	2.856	97.35	2.53	0	0	0	0.05
2002	22	23	1	356.546	-357.458	D	6.995	6.995	0	2.048	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	9.601	9.601	0	8.101	0	0	0	0	0	0
2002	24	23	949	365.722	-354.966	D	9.214	9.204	0.01	7.073	97	2.96	0	0	0	0.03
2002	25	23	836	360.07	-362.066	D	6.938	6.935	0.003	1.926	92.54	7	0	0	0	0.47
2002	26	23	710	364.843	-359.589	D	6.728	6.728	0	1.512	94.39	2.31	0	0	0	0.32
2002	27	23	247	360.217	-361.79	D	6.619	6.619	0	1.298	86.38	1.27	0	0	0	0.33
2002	28	23	1	356.546	-357.458	D	6.928	6.928	0	1.913	0	0	0	0	0	0
2002	29	23	1017	356.894	-355.206	D	9.145	9.139	0.006	6.909	95.27	4.67	0	0	0	0.05
2002	30	23	1017	356.894	-355.206	D	10.185	9.985	0.2	9.134	95.87	4.09	0	0	0	0.04
2002	31	23	836	360.07	-362.066	D	10.263	10.14	0.123	9.561	97.57	2.4	0	0	0	0.02
2002	32	23	949	365.722	-354.966	D	7.467	7.456	0.011	3.007	96.92	3.04	0	0	0	0.03
2002	33	23	786	365.973	-357.042	D	6.973	6.972	0.001	2.001	96.6	2.9	0	0	0	0.34
2002	34	23	786	365.973	-357.042	D	6.88	6.88	0	1.815	97.08	2.49	0	0	0	0.2
2002	35	23	933	366.169	-356.524	D	7.109	7.105	0.004	2.274	85.99	12.92	0	0	0	1.08
2002	36	23	257	360.107	-359.298	D	6.613	6.613	0	1.285	14.11	0.69	0	0	0	0.09
2002	37	23	1	356.546	-357.458	D	9.286	9.286	0	7.281	95.45	3.54	0	0	0	0.05
2002	38	23	949	365.722	-354.966	D	9.379	9.367	0.012	7.49	96.72	3.06	0	0	0	0.2
2002	39	23	927	365.912	-357.454	D	8.445	8.44	0.005	5.208	97.41	2.47	0	0	0	0.09
2002	40	23	642	363.62	-354.4	D	9.075	9.075	0	6.748	98.65	1.25	0	0	0	0.02

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	41	23	1007	358.259	-354.768	D	8.272	8.26	0.012	4.79	96.71	2.96	0	0	0	0.33
2002	42	23	822	358.021	-361.607	D	7.661	7.654	0.006	3.434	96.22	3.54	0	0	0	0.25
2002	43	23	822	358.021	-361.607	D	6.607	6.606	0.002	1.272	94.35	4.48	0	0	0	1.23
2002	44	23	16	357.648	-359.906	D	6.667	6.666	0	1.391	93.73	4.74	0	0	0	1.14
2002	45	23	1017	356.894	-355.206	D	6.587	6.584	0.004	1.229	93.26	6.14	0	0	0	0.62
2002	46	23	949	365.722	-354.966	D	6.854	6.854	0	1.763	95.06	3.65	0	0	0	1.2
2002	47	23	941	365.977	-355.774	D	6.647	6.646	0	1.352	94.86	3.44	0	0	0	0.83
2002	48	23	821	358.053	-361.416	D	6.559	6.558	0.001	1.178	88.61	9.01	0	0	0	2.33
2002	49	23	1	356.546	-357.458	D	6.613	6.612	0.001	1.284	95.87	3.52	0	0	0	0.49
2002	50	23	1	356.546	-357.458	D	8.514	8.514	0	5.384	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	8.973	8.973	0	6.495	0	0	0	0	0	0
2002	52	23	747	364.871	-354.594	D	7.089	7.089	0.001	2.239	95.85	2.67	0	0	0	1.4
2002	53	23	809	357.432	-359.845	D	6.966	6.964	0.001	1.986	92.97	5.54	0	0	0	1.42
2002	54	23	3	356.524	-356.959	D	6.631	6.629	0.002	1.317	94.73	4.76	0	0	0	0.46
2002	55	23	786	365.973	-357.042	D	6.8	6.799	0.001	1.653	97.33	2.47	0	0	0	0.22
2002	56	23	930	366.19	-357.232	D	7.882	7.879	0.003	3.927	91.7	8	0	0	0	0.26
2002	57	23	1	356.546	-357.458	D	7.673	7.67	0.002	3.468	80.01	18.74	0	0	0	1.23
2002	58	23	1	356.546	-357.458	D	6.762	6.762	0	1.579	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	6.499	6.499	0	1.064	0	0	0	0	0	0
2002	60	23	1	356.546	-357.458	D	7.718	7.718	0	3.573	0	0	0	0	0	0
2002	61	23	836	360.07	-362.066	D	9.59	9.55	0.04	7.966	92.9	6.99	0	0	0	0.11
2002	62	23	949	365.722	-354.966	D	7.298	7.291	0.007	2.659	90.76	8.52	0	0	0	0.72
2002	63	23	1	356.546	-357.458	D	7.413	7.413	0	2.917	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	6.693	6.693	0	1.444	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	6.942	6.942	0	1.941	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	9.291	9.291	0	7.295	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	8.946	8.946	0	6.427	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	8.713	8.713	0	5.859	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.022	7.022	0	2.104	0	0	0	0	0	0
2002	70	23	192	359.721	-361.812	D	7.13	7.129	0.001	2.322	94.03	5.48	0	0	0	0.33
2002	71	23	3	356.524	-356.959	D	9.281	9.281	0	7.27	97.92	0.48	0	0	0	0.37
2002	72	23	853	361.666	-362.175	D	7.048	7.042	0.006	2.143	97.63	2.16	0	0	0	0.21
2002	73	23	933	366.169	-356.524	D	8.198	8.197	0.001	4.645	99.22	0.71	0	0	0	0.11
2002	74	23	219	359.98	-362.05	D	8.931	8.927	0.004	6.381	93.33	6.38	0	0	0	0.26
2002	75	23	1	356.546	-357.458	D	7.621	7.621	0	3.362	0	0	0	0	0	0
2002	76	23	906	364.982	-359.812	D	8.26	8.26	0	4.79	97.29	2.14	0	0	0	0.02
2002	77	23	930	366.19	-357.232	D	9.111	9.111	0	6.838	90.64	1.02	0	0	0	0.04
2002	78	23	753	365.24	-357.324	D	10.218	10.218	0	9.779	97.83	1.22	0	0	0	0.01
2002	79	23	1035	356.477	-356.792	D	9.252	9.252	0	7.195	97.85	1.33	0	0	0	0.01

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	80	23	930	366.19	-357.232	D	7.99	7.976	0.014	4.143	93.82	5.97	0	0	0	0.22
2002	81	23	1017	356.894	-355.206	D	6.486	6.485	0.001	1.038	90.77	7.85	0	0	0	1.32
2002	82	23	1008	358.048	-354.775	D	6.65	6.646	0.005	1.35	93.17	6.32	0	0	0	0.47
2002	83	23	772	365.411	-355.569	D	8	8	0	4.197	96.99	1.69	0	0	0	0.14
2002	84	23	974	362.281	-354.249	D	10.22	10.218	0.002	9.779	97.6	2.2	0	0	0	0.01
2002	85	23	963	363.809	-354.192	D	8.485	8.482	0.003	5.307	98.03	1.88	0	0	0	0.01
2002	86	23	1017	356.894	-355.206	D	7.717	7.696	0.021	3.525	97.18	2.74	0	0	0	0.08
2002	87	23	1017	356.894	-355.206	D	7.322	7.322	0	2.724	98.88	0.8	0	0	0	0.13
2002	88	23	1017	356.894	-355.206	D	8.4	8.397	0.003	5.108	99.42	0.45	0	0	0	0.15
2002	89	23	836	360.07	-362.066	D	7.42	7.42	0.001	2.93	99.65	0.29	0	0	0	0.1
2002	90	23	1017	356.894	-355.206	D	7.087	7.087	0	2.236	98.62	0.35	0	0	0	0.83
2002	91	23	643	363.609	-354.151	D	6.646	6.641	0.005	1.34	97.25	2.14	0	0	0	0.59
2002	92	23	1035	356.477	-356.792	D	7.451	7.431	0.02	2.954	97.87	1.91	0	0	0	0.21
2002	93	23	1	356.546	-357.458	D	6.652	6.652	0	1.363	0	0	0	0	0	0
2002	94	23	1	356.546	-357.458	D	6.542	6.542	0	1.147	0	0	0	0	0	0
2002	95	23	1	356.546	-357.458	D	6.515	6.515	0	1.096	0	0	0	0	0	0
2002	96	23	949	365.722	-354.966	D	6.529	6.528	0.001	1.121	98.78	0.89	0	0	0	0.32
2002	97	23	930	366.19	-357.232	D	7.974	7.974	0	4.139	98.42	0.64	0	0	0	0.17
2002	98	23	1	356.546	-357.458	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2002	99	23	811	357.434	-360.225	D	9.147	9.14	0.007	6.911	97.88	2.08	0	0	0	0.03
2002	100	23	1	356.546	-357.458	D	7.423	7.423	0	2.936	0	0	0	0	0	0
2002	101	23	1	356.546	-357.458	D	6.905	6.905	0	1.865	0	0	0	0	0	0
2002	102	23	1007	358.259	-354.768	D	7.411	7.41	0	2.91	99.32	0.36	0	0	0	0.09
2002	103	23	1008	358.048	-354.775	D	9.779	9.738	0.04	8.465	98.06	1.9	0	0	0	0.04
2002	104	23	1008	358.048	-354.775	D	9.333	9.329	0.005	7.392	99.48	0.45	0	0	0	0.02
2002	105	23	1	356.546	-357.458	D	8.09	8.09	0	4.401	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.575	7.575	0	3.262	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.511	7.511	0	3.124	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	8.475	8.475	0	5.29	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.611	7.611	0	3.34	0	0	0	0	0	0
2002	110	23	964	363.678	-354.148	D	9.526	9.512	0.015	7.867	98.59	1.33	0	0	0	0.08
2002	111	23	974	362.281	-354.249	D	9.468	9.438	0.03	7.675	98.86	1.1	0	0	0	0.05
2002	112	23	961	364.092	-354.289	D	6.944	6.942	0.002	1.941	98.99	0.42	0	0	0	0.52
2002	113	23	947	365.801	-355.162	D	6.973	6.968	0.005	1.992	99.36	0.47	0	0	0	0.17
2002	114	23	933	366.169	-356.524	D	8.32	8.318	0.002	4.923	99.37	0.5	0	0	0	0.16
2002	115	23	191	359.732	-362.061	D	6.747	6.747	0	1.549	49.72	0.25	0	0	0	0.1
2002	116	23	964	363.678	-354.148	D	8.17	8.168	0.002	4.578	97.94	1.91	0	0	0	0.05
2002	117	23	1	356.546	-357.458	D	8.287	8.287	0	4.852	0	0	0	0	0	0
2002	118	23	1	356.546	-357.458	D	8.205	8.205	0	4.662	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	119	23	949	365.722	-354.966	D	6.806	6.797	0.009	1.65	97.83	1.85	0	0	0	0.3
2002	120	23	1017	356.894	-355.206	D	7.866	7.862	0.003	3.89	99.78	0.11	0	0	0	0.11
2002	121	23	643	363.609	-354.151	D	9.364	9.364	0	7.482	98.5	0.15	0	0	0	0.02
2002	122	23	1035	356.477	-356.792	D	8.548	8.426	0.122	5.176	97.76	2.2	0	0	0	0.04
2002	123	23	822	358.021	-361.607	D	6.978	6.975	0.003	2.007	99.68	0.23	0	0	0	0.1
2002	124	23	822	358.021	-361.607	D	7.398	7.379	0.019	2.844	99.36	0.6	0	0	0	0.04
2002	125	23	832	359.493	-362.061	D	8.355	8.336	0.019	4.966	99.62	0.35	0	0	0	0.02
2002	126	23	997	359.928	-355.117	D	8.359	8.355	0.004	5.01	99.92	0.05	0	0	0	0.02
2002	127	23	1	356.546	-357.458	D	8.856	8.856	0	6.205	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	9.261	9.261	0	7.218	0	0	0	0	0	0
2002	129	23	930	366.19	-357.232	D	8.053	8.051	0.001	4.313	89.77	9.97	0	0	0	0.28
2002	130	23	1017	356.894	-355.206	D	6.627	6.624	0.003	1.308	98.32	1.17	0	0	0	0.51
2002	131	23	162	358.917	-354.857	D	7.831	7.831	0	3.821	99.21	0.39	0	0	0	0.04
2002	132	23	1	356.546	-357.458	D	9.673	9.673	0	8.29	0	0	0	0	0	0
2002	133	23	949	365.722	-354.966	D	8.646	8.601	0.044	5.59	97.82	2.15	0	0	0	0.02
2002	134	23	947	365.801	-355.162	D	6.868	6.866	0.002	1.786	95.56	3.56	0	0	0	0.77
2002	135	23	927	365.912	-357.454	D	6.778	6.777	0.002	1.609	99.57	0.26	0	0	0	0.17
2002	136	23	226	359.903	-360.306	D	7.379	7.379	0	2.843	36.11	0.01	0	0	0	0.04
2002	137	23	1	356.546	-357.458	D	9.931	9.931	0	8.986	83.86	1.08	0	0	0	0.02
2002	138	23	1	356.546	-357.458	D	8.347	8.347	0	4.991	0	0	0	0	0	0
2002	139	23	1039	356.522	-357.599	D	6.82	6.817	0.003	1.69	99.21	0.26	0	0	0	0.55
2002	140	23	219	359.98	-362.05	D	6.812	6.789	0.022	1.634	98.41	1.35	0	0	0	0.24
2002	141	23	822	358.021	-361.607	D	6.721	6.719	0.002	1.495	99.59	0.19	0	0	0	0.19
2002	142	23	3	356.524	-356.959	D	6.763	6.761	0.002	1.577	99.64	0.17	0	0	0	0.11
2002	143	23	1	356.546	-357.458	D	6.755	6.755	0	1.566	0	0	0	0	0	0
2002	144	23	1	356.546	-357.458	D	7.37	7.37	0	2.825	0	0	0	0	0	0
2002	145	23	811	357.434	-360.225	D	8.256	8.241	0.015	4.745	99.59	0.26	0	0	0	0.14
2002	146	23	907	365.051	-359.809	D	7.827	7.813	0.014	3.781	99.45	0.5	0	0	0	0.06
2002	147	23	933	366.169	-356.524	D	8.73	8.727	0.003	5.892	99.69	0.26	0	0	0	0.02
2002	148	23	1	356.546	-357.458	D	9.172	9.172	0	6.994	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2002	150	23	1	356.546	-357.458	D	8.424	8.424	0	5.172	0	0	0	0	0	0
2002	151	23	1	356.546	-357.458	D	7.061	7.061	0	2.182	0	0	0	0	0	0
2002	152	23	1	356.546	-357.458	D	7.196	7.196	0	2.462	0	0	0	0	0	0
2002	153	23	1	356.546	-357.458	D	7.677	7.677	0	3.483	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.825	7.825	0	3.807	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.059	7.059	0	2.178	0	0	0	0	0	0
2002	156	23	1017	356.894	-355.206	D	8.723	8.721	0.002	5.878	99.88	0.1	0	0	0	0.06
2002	157	23	836	360.07	-362.066	D	8.355	8.346	0.009	4.99	99.42	0.53	0	0	0	0.05

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	158	23	1017	356.894	-355.206	D	6.887	6.887	0	1.829	99.54	0.06	0	0	0	0.2
2002	159	23	1	356.546	-357.458	D	6.884	6.884	0	1.824	99.46	0.03	0	0	0	0.07
2002	160	23	10	356.954	-355.443	D	7.431	7.431	0	2.953	77.32	0	0	0	0	0.06
2002	161	23	1	356.546	-357.458	D	9.601	9.601	0	8.101	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	8.492	8.492	0	5.332	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	8.522	8.522	0	5.401	0	0	0	0	0	0
2002	164	23	966	363.538	-354.124	D	7.94	7.939	0.001	4.06	99.77	0.01	0	0	0	0.18
2002	165	23	1039	356.522	-357.599	D	7.213	7.184	0.029	2.435	99.69	0.21	0	0	0	0.11
2002	166	23	768	365.455	-356.566	D	6.701	6.698	0.003	1.453	98	0.87	0	0	0	1.09
2002	167	23	961	364.092	-354.289	D	6.635	6.635	0	1.328	97.14	0.03	0	0	0	0.45
2002	168	23	822	358.021	-361.607	D	6.912	6.906	0.006	1.868	99.67	0.12	0	0	0	0.2
2002	169	23	930	366.19	-357.232	D	6.762	6.755	0.007	1.566	99.8	0.04	0	0	0	0.16
2002	170	23	949	365.722	-354.966	D	7.025	7.021	0.004	2.101	99.84	0.06	0	0	0	0.09
2002	171	23	929	366.032	-357.239	D	7.604	7.604	0	3.324	95.13	0.01	0	0	0	0.12
2002	172	23	1	356.546	-357.458	D	7.907	7.907	0	3.989	0	0	0	0	0	0
2002	173	23	1	356.546	-357.458	D	7.545	7.545	0	3.198	0	0	0	0	0	0
2002	174	23	1	356.546	-357.458	D	7.039	7.039	0	2.137	0	0	0	0	0	0
2002	175	23	1	356.546	-357.458	D	7.036	7.036	0	2.132	0	0	0	0	0	0
2002	176	23	1	356.546	-357.458	D	7.974	7.974	0	4.138	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.864	7.864	0	3.894	0	0	0	0	0	0
2002	178	23	1	356.546	-357.458	D	8.442	8.442	0	5.214	0	0	0	0	0	0
2002	179	23	949	365.722	-354.966	D	7.413	7.411	0.003	2.911	99.65	0.24	0	0	0	0.11
2002	180	23	949	365.722	-354.966	D	7.273	7.27	0.004	2.615	99.84	0.09	0	0	0	0.08
2002	181	23	785	365.637	-355.06	D	7.403	7.403	0	2.894	98.01	0	0	0	0	0.1
2002	182	23	1	356.546	-357.458	D	6.828	6.828	0	1.711	0	0	0	0	0	0
2002	183	23	1	356.546	-357.458	D	6.708	6.708	0	1.473	0	0	0	0	0	0
2002	184	23	1	356.546	-357.458	D	8.242	8.242	0	4.747	0	0	0	0	0	0
2002	185	23	1	356.546	-357.458	D	7.384	7.384	0	2.854	0	0	0	0	0	0
2002	186	23	1	356.546	-357.458	D	7.853	7.853	0	3.87	0	0	0	0	0	0
2002	187	23	1	356.546	-357.458	D	7.187	7.187	0	2.442	0	0	0	0	0	0
2002	188	23	1	356.546	-357.458	D	7.458	7.458	0	3.011	0	0	0	0	0	0
2002	189	23	1	356.546	-357.458	D	6.792	6.792	0	1.64	0	0	0	0	0	0
2002	190	23	1	356.546	-357.458	D	6.779	6.779	0	1.613	0	0	0	0	0	0
2002	191	23	1	356.546	-357.458	D	7.115	7.115	0	2.294	0	0	0	0	0	0
2002	192	23	930	366.19	-357.232	D	7.923	7.919	0.005	4.015	99.33	0.59	0	0	0	0.07
2002	193	23	907	365.051	-359.809	D	8.489	8.479	0.01	5.3	99.76	0.17	0	0	0	0.04
2002	194	23	907	365.051	-359.809	D	9.209	9.203	0.007	7.07	99.54	0.41	0	0	0	0.02
2002	195	23	407	361.716	-361.973	D	8.646	8.645	0.001	5.695	99.86	0.07	0	0	0	0.02
2002	196	23	853	361.666	-362.175	D	7.242	7.242	0	2.555	98.43	0.18	0	0	0	0.06

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	197	23	456	362.114	-359.709	D	7.113	7.113	0	2.288	98.14	0.02	0	0	0	0.05
2002	198	23	670	364.324	-359.112	D	8.612	8.612	0	5.616	97.73	0.03	0	0	0	0.02
2002	199	23	1	356.546	-357.458	D	8.138	8.138	0	4.509	0	0	0	0	0	0
2002	200	23	1	356.546	-357.458	D	9.235	9.235	0	7.153	0	0	0	0	0	0
2002	201	23	1	356.546	-357.458	D	8.2	8.2	0	4.651	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	8.243	8.243	0	4.751	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.104	7.104	0	2.27	0	0	0	0	0	0
2002	204	23	964	363.678	-354.148	D	7.482	7.476	0.006	3.05	99.56	0.31	0	0	0	0.13
2002	205	23	853	361.666	-362.175	D	6.954	6.95	0.004	1.956	99.85	0.05	0	0	0	0.1
2002	206	23	822	358.021	-361.607	D	7.135	7.134	0.001	2.333	99.7	0.09	0	0	0	0.09
2002	207	23	930	366.19	-357.232	D	7.361	7.356	0.005	2.796	99.9	0.03	0	0	0	0.05
2002	208	23	785	365.637	-355.06	D	7.48	7.48	0.001	3.058	99.73	0.04	0	0	0	0.06
2002	209	23	1	356.546	-357.458	D	7.228	7.228	0	2.528	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.898	7.898	0	3.969	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.793	7.793	0	3.737	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.19	7.19	0	2.449	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.191	7.191	0	2.45	0	0	0	0	0	0
2002	214	23	1017	356.894	-355.206	D	7.459	7.458	0.001	3.011	99.91	0	0	0	0	0.08
2002	215	23	1008	358.048	-354.775	D	7.448	7.448	0	2.99	99.77	0.02	0	0	0	0.08
2002	216	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	217	23	1	356.546	-357.458	D	7.287	7.287	0	2.651	0	0	0	0	0	0
2002	218	23	1017	356.894	-355.206	D	6.861	6.861	0	1.777	99.44	0.08	0	0	0	0.11
2002	219	23	1017	356.894	-355.206	D	8.732	8.732	0	5.904	99.66	0.06	0	0	0	0.03
2002	220	23	1	356.546	-357.458	D	6.723	6.723	0	1.503	0	0	0	0	0	0
2002	221	23	1	356.546	-357.458	D	6.684	6.684	0	1.425	0	0	0	0	0	0
2002	222	23	1	356.546	-357.458	D	6.853	6.853	0	1.762	0	0	0	0	0	0
2002	223	23	1	356.546	-357.458	D	7.168	7.168	0	2.402	0	0	0	0	0	0
2002	224	23	1	356.546	-357.458	D	7.094	7.094	0	2.251	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	9.125	9.125	0	6.875	0	0	0	0	0	0
2002	226	23	1006	358.469	-354.76	D	9.598	9.597	0.001	8.09	99.61	0.09	0	0	0	0.09
2002	227	23	1005	358.679	-354.752	D	8.49	8.49	0	5.327	99.69	0.03	0	0	0	0.07
2002	228	23	1	356.546	-357.458	D	8.55	8.55	0	5.468	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	8.018	8.018	0	4.237	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	8.407	8.407	0	5.131	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.437	7.437	0	2.967	0	0	0	0	0	0
2002	232	23	1	356.546	-357.458	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	233	23	1	356.546	-357.458	D	7.361	7.361	0	2.805	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.811	7.811	0	3.777	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.29	7.29	0	2.657	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	236	23	1017	356.894	-355.206	D	7.965	7.915	0.049	4.008	98.89	0.99	0	0	0	0.11
2002	237	23	853	361.666	-362.175	D	7.789	7.787	0.002	3.724	99.72	0.12	0	0	0	0.1
2002	238	23	1	356.546	-357.458	D	7.375	7.375	0	2.835	0	0	0	0	0	0
2002	239	23	1	356.546	-357.458	D	6.915	6.915	0	1.887	0	0	0	0	0	0
2002	240	23	1	356.546	-357.458	D	7.329	7.329	0	2.739	0	0	0	0	0	0
2002	241	23	1	356.546	-357.458	D	7.135	7.135	0	2.334	0	0	0	0	0	0
2002	242	23	1	356.546	-357.458	D	6.944	6.944	0	1.945	0	0	0	0	0	0
2002	243	23	1	356.546	-357.458	D	7.131	7.131	0	2.327	0	0	0	0	0	0
2002	244	23	1	356.546	-357.458	D	7.078	7.078	0	2.217	0	0	0	0	0	0
2002	245	23	1	356.546	-357.458	D	6.939	6.939	0	1.934	0	0	0	0	0	0
2002	246	23	1	356.546	-357.458	D	7.006	7.006	0	2.07	0	0	0	0	0	0
2002	247	23	967	363.478	-354.116	D	7.017	7.016	0.001	2.09	99.55	0.08	0	0	0	0.26
2002	248	23	1017	356.894	-355.206	D	7.034	7.033	0.001	2.125	99.85	0.02	0	0	0	0.15
2002	249	23	1	356.546	-357.458	D	6.766	6.766	0	1.587	97.15	0.01	0	0	0	0.14
2002	250	23	1	356.546	-357.458	D	6.715	6.715	0	1.487	0	0	0	0	0	0
2002	251	23	1	356.546	-357.458	D	8.576	8.576	0	5.53	0	0	0	0	0	0
2002	252	23	1	356.546	-357.458	D	7.266	7.266	0	2.606	0	0	0	0	0	0
2002	253	23	1	356.546	-357.458	D	7.027	7.027	0	2.114	0	0	0	0	0	0
2002	254	23	907	365.051	-359.809	D	7.513	7.489	0.024	3.078	97.88	1.98	0	0	0	0.13
2002	255	23	1	356.546	-357.458	D	7.113	7.113	0	2.288	0	0	0	0	0	0
2002	256	23	1	356.546	-357.458	D	6.623	6.623	0	1.306	100.39	0.01	0	0	0	0.26
2002	257	23	10	356.954	-355.443	D	6.68	6.68	0	1.417	99	0.04	0	0	0	0.15
2002	258	23	1017	356.894	-355.206	D	8.054	8.041	0.013	4.289	99.06	0.81	0	0	0	0.12
2002	259	23	907	365.051	-359.809	D	8.176	8.127	0.049	4.485	99.52	0.42	0	0	0	0.06
2002	260	23	996	360.121	-355.113	D	7.759	7.712	0.047	3.559	99.71	0.23	0	0	0	0.06
2002	261	23	949	365.722	-354.966	D	8.109	8.108	0.002	4.441	99.59	0.28	0	0	0	0.06
2002	262	23	1	356.546	-357.458	D	9.072	9.072	0	6.74	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	9.195	9.195	0	7.052	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	6.755	6.755	0	1.565	0	0	0	0	0	0
2002	265	23	1035	356.477	-356.792	D	6.738	6.734	0.004	1.525	99.46	0.39	0	0	0	0.17
2002	266	23	1017	356.894	-355.206	D	6.581	6.581	0	1.224	94.74	2.75	0	0	0	1.31
2002	267	23	643	363.609	-354.151	D	6.529	6.526	0.002	1.117	99.1	0.36	0	0	0	0.49
2002	268	23	1008	358.048	-354.775	D	6.776	6.774	0.003	1.603	99.57	0.18	0	0	0	0.23
2002	269	23	1	356.546	-357.458	D	6.932	6.932	0	1.92	0	0	0	0	0	0
2002	270	23	1035	356.477	-356.792	D	7.363	7.361	0.002	2.805	99.56	0.03	0	0	0	0.45
2002	271	23	1017	356.894	-355.206	D	6.776	6.76	0.016	1.575	99.6	0.19	0	0	0	0.21
2002	272	23	1	356.546	-357.458	D	7.34	7.34	0	2.762	42.26	0.01	0	0	0	0.08
2002	273	23	1	356.546	-357.458	D	7.674	7.674	0	3.476	0	0	0	0	0	0
2002	274	23	1	356.546	-357.458	D	6.979	6.979	0	2.016	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	275	23	1	356.546	-357.458	D	7.125	7.125	0	2.314	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.413	7.413	0	2.915	0	0	0	0	0	0
2002	277	23	1	356.546	-357.458	D	9.122	9.122	0	6.867	0	0	0	0	0	0
2002	278	23	941	365.977	-355.774	D	7.103	7.102	0.001	2.266	87.17	12.09	0	0	0	0.78
2002	279	23	852	361.595	-362.148	D	6.727	6.726	0.001	1.507	99.37	0.39	0	0	0	0.26
2002	280	23	1035	356.477	-356.792	D	6.704	6.702	0.002	1.462	98.19	0.97	0	0	0	0.79
2002	281	23	1	356.546	-357.458	D	6.555	6.555	0	1.172	0	0	0	0	0	0
2002	282	23	247	360.217	-361.79	D	8.807	8.807	0	6.086	81.68	0.55	0	0	0	0.02
2002	283	23	941	365.977	-355.774	D	9.537	9.537	0.001	7.932	98.33	0.54	0	0	0	0.02
2002	284	23	852	361.595	-362.148	D	8.635	8.634	0	5.67	98.24	0.33	0	0	0	0.02
2002	285	23	1017	356.894	-355.206	D	8.806	8.805	0	6.083	96.98	1.96	0	0	0	0.14
2002	286	23	928	365.945	-357.303	D	7.517	7.5	0.017	3.101	98.54	1.37	0	0	0	0.09
2002	287	23	1	356.546	-357.458	D	6.528	6.528	0	1.12	0	0	0	0	0	0
2002	288	23	947	365.801	-355.162	D	6.505	6.504	0.001	1.074	96.63	1.7	0	0	0	1.58
2002	289	23	1	356.546	-357.458	D	6.563	6.563	0	1.188	71.33	0.1	0	0	0	0.2
2002	290	23	247	360.217	-361.79	D	9.09	9.09	0	6.786	125.52	0.18	0	0	0	0.4
2002	291	23	906	364.982	-359.812	D	6.68	6.678	0.001	1.414	99.48	0.38	0	0	0	0.19
2002	292	23	1017	356.894	-355.206	D	9.45	9.439	0.012	7.676	93.13	6.74	0	0	0	0.1
2002	293	23	853	361.666	-362.175	D	7.746	7.745	0.002	3.631	98.25	1.74	0	0	0	0.05
2002	294	23	822	358.021	-361.607	D	6.777	6.776	0.001	1.608	98.85	0.69	0	0	0	0.11
2002	295	23	822	358.021	-361.607	D	6.841	6.841	0.001	1.736	99.16	0.43	0	0	0	0.08
2002	296	23	15	357.659	-360.155	D	6.807	6.806	0	1.668	99.23	0.25	0	0	0	0.08
2002	297	23	1	356.546	-357.458	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2002	298	23	1017	356.894	-355.206	D	9.232	9.184	0.048	7.023	96.58	3.33	0	0	0	0.1
2002	299	23	930	366.19	-357.232	D	9.029	8.903	0.126	6.322	96.23	3.68	0	0	0	0.09
2002	300	23	822	358.021	-361.607	D	8.958	8.956	0.003	6.451	97.6	2.27	0	0	0	0.1
2002	301	23	1035	356.477	-356.792	D	10.204	10.176	0.028	9.662	98.85	1.13	0	0	0	0.02
2002	302	23	811	357.434	-360.225	D	9.771	9.753	0.018	8.504	99.04	0.94	0	0	0	0.02
2002	303	23	822	358.021	-361.607	D	8.513	8.512	0.001	5.377	99.59	0.51	0	0	0	0.03
2002	304	23	822	358.021	-361.607	D	8.983	8.981	0.001	6.516	96.73	3.27	0	0	0	0.03
2002	305	23	1	356.546	-357.458	D	7.915	7.915	0	4.007	0	0	0	0	0	0
2002	306	23	997	359.928	-355.117	D	7.583	7.559	0.023	3.229	96.21	3.58	0	0	0	0.21
2002	307	23	964	363.678	-354.148	D	10.12	10.113	0.008	9.486	97.4	2.51	0	0	0	0.03
2002	308	23	933	366.169	-356.524	D	9.094	9.069	0.025	6.733	96.88	3	0	0	0	0.12
2002	309	23	949	365.722	-354.966	D	9.164	9.129	0.036	6.883	97.99	1.96	0	0	0	0.05
2002	310	23	949	365.722	-354.966	D	7.974	7.879	0.095	3.927	96.47	3.44	0	0	0	0.09
2002	311	23	929	366.032	-357.239	D	6.549	6.549	0	1.16	101.33	0.51	0	0	0	0.19
2002	312	23	228	359.881	-359.807	D	6.657	6.657	0	1.373	32.15	0.21	0	0	0	0.04
2002	313	23	1	356.546	-357.458	D	8.478	8.478	0	5.298	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	314	23	966	363.538	-354.124	D	8.621	8.617	0.003	5.629	98.49	0.54	0	0	0	0.95
2002	315	23	538	362.682	-355.689	D	6.863	6.855	0.008	1.765	87.52	11.09	0	0	0	1.4
2002	316	23	16	357.648	-359.906	D	6.717	6.715	0.003	1.486	94.06	4.9	0	0	0	1.01
2002	317	23	191	359.732	-362.061	D	6.645	6.644	0.001	1.346	94.52	4.44	0	0	0	1.01
2002	318	23	644	364.12	-360.12	D	6.675	6.675	0	1.408	106.81	1.86	0	0	0	0.54
2002	319	23	300	360.18	-355.3	D	9.321	9.317	0.005	7.361	94.33	5.59	0	0	0	0.06
2002	320	23	1	356.546	-357.458	D	9.078	9.078	0	6.755	95.56	5.52	0	0	0	0.96
2002	321	23	947	365.801	-355.162	D	6.79	6.786	0.004	1.627	92.75	6.59	0	0	0	0.63
2002	322	23	1	356.546	-357.458	D	7.009	7.009	0	2.076	0	0	0	0	0	0
2002	323	23	788	365.951	-356.544	D	6.955	6.947	0.008	1.951	88.69	10.16	0	0	0	1.13
2002	324	23	929	366.032	-357.239	D	6.495	6.495	0	1.056	97.34	1.87	0	0	0	0.94
2002	325	23	949	365.722	-354.966	D	6.652	6.652	0	1.362	89.66	8.29	0	0	0	2.12
2002	326	23	1017	356.894	-355.206	D	7.088	7.086	0.003	2.233	94.57	4.27	0	0	0	1.17
2002	327	23	930	366.19	-357.232	D	6.559	6.558	0.001	1.178	94.95	4.25	0	0	0	0.74
2002	328	23	10	356.954	-355.443	D	6.617	6.617	0	1.293	97.52	1.71	0	0	0	0.37
2002	329	23	907	365.051	-359.809	D	6.971	6.97	0.001	1.997	97.17	2.68	0	0	0	0.11
2002	330	23	822	358.021	-361.607	D	6.582	6.581	0	1.224	95.6	3.79	0	0	0	0.65
2002	331	23	810	357.434	-360.005	D	6.919	6.919	0	1.895	94.7	3.97	0	0	0	0.4
2002	332	23	1017	356.894	-355.206	D	6.601	6.594	0.007	1.249	95.03	4.6	0	0	0	0.36
2002	333	23	927	365.912	-357.454	D	6.611	6.611	0	1.281	96.88	1.64	0	0	0	0.3
2002	334	23	949	365.722	-354.966	D	6.715	6.713	0.002	1.482	88.05	9.24	0	0	0	2.71
2002	335	23	521	362.869	-359.925	D	6.513	6.511	0.003	1.087	80.18	16.89	0	0	0	2.87
2002	336	23	1	356.546	-357.458	D	6.483	6.483	0	1.034	0	0	0	0	0	0
2002	337	23	907	365.051	-359.809	D	6.874	6.869	0.005	1.793	93.43	5.92	0	0	0	0.64
2002	338	23	1	356.546	-357.458	D	9.947	9.947	0	9.028	0	0	0	0	0	0
2002	339	23	1017	356.894	-355.206	D	8.163	8.163	0	4.566	94.21	5.58	0	0	0	0.27
2002	340	23	907	365.051	-359.809	D	9.249	9.238	0.011	7.159	94.65	5.23	0	0	0	0.12
2002	341	23	1	356.546	-357.458	D	7.426	7.426	0	2.944	0	0	0	0	0	0
2002	342	23	966	363.538	-354.124	D	8.169	8.164	0.006	4.568	97.71	2.23	0	0	0	0.04
2002	343	23	811	357.434	-360.225	D	8.264	8.243	0.021	4.749	97.69	2.28	0	0	0	0.03
2002	344	23	1017	356.894	-355.206	D	6.866	6.864	0.002	1.784	98.1	1.77	0	0	0	0.09
2002	345	23	1017	356.894	-355.206	D	8.116	8.112	0.003	4.451	98.43	1.55	0	0	0	0.03
2002	346	23	643	363.609	-354.151	D	7.591	7.59	0.001	3.295	98.63	1.27	0	0	0	0.04
2002	347	23	1035	356.477	-356.792	D	9.019	9.015	0.004	6.599	98.02	1.94	0	0	0	0.05
2002	348	23	861	361.895	-361.506	D	9.563	9.535	0.029	7.926	95.6	4.34	0	0	0	0.07
2002	349	23	930	366.19	-357.232	D	7.206	7.206	0	2.482	96.12	3.08	0	0	0	0.14
2002	350	23	1	356.546	-357.458	D	8.634	8.634	0	5.669	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	9.503	9.503	0	7.844	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	9.613	9.613	0	8.133	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	353	23	996	360.121	-355.113	D	7.845	7.835	0.01	3.83	91.47	8.17	0	0	0	0.37
2002	354	23	620	363.861	-359.882	D	6.721	6.721	0	1.498	85.02	4.31	0	0	0	0.39
2002	355	23	1	356.546	-357.458	D	6.506	6.506	0	1.077	0	0	0	0	0	0
2002	356	23	934	366.01	-356.526	D	7.225	7.221	0.004	2.512	85.44	13.98	0	0	0	0.58
2002	357	23	1017	356.894	-355.206	D	7.342	7.34	0.002	2.761	91.37	8.48	0	0	0	0.09
2002	358	23	853	361.666	-362.175	D	9.644	9.639	0.004	8.202	93.55	6.39	0	0	0	0.04
2002	359	23	933	366.169	-356.524	D	7.35	7.347	0.003	2.776	79.93	18.49	0	0	0	1.57
2002	360	23	1	356.546	-357.458	D	7.523	7.523	0	3.15	0	0	0	0	0	0
2002	361	23	786	365.973	-357.042	D	7.165	7.165	0	2.396	96.94	3.36	0	0	0	0.12
2002	362	23	1	356.546	-357.458	D	7.157	7.157	0	2.381	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.138	7.138	0	2.341	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	9.404	9.404	0	7.586	0	0	0	0	0	0
2002	365	23	1017	356.894	-355.206	D	8.607	8.6	0.007	5.587	94.89	5.03	0	0	0	0.08
									0.2							
UMC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	356.546	-357.458	D	6.912	6.912	0	1.879	0	0	0	0	0	0
2002	2	23	941	365.977	-355.774	D	6.838	6.825	0.013	1.706	76.75	23.12	0	0	0	0.13
2002	3	23	930	366.19	-357.232	D	7.251	7.237	0.014	2.546	80.62	19.31	0	0	0	0.07
2002	4	23	1	356.546	-357.458	D	6.831	6.831	0	1.718	0	0	0	0	0	0
2002	5	23	1	356.546	-357.458	D	7.121	7.121	0	2.306	0	0	0	0	0	0
2002	6	23	1	356.546	-357.458	D	9.639	9.639	0	8.201	0	0	0	0	0	0
2002	7	23	1	356.546	-357.458	D	7.799	7.799	0	3.751	0	0	0	0	0	0
2002	8	23	1	356.546	-357.458	D	6.845	6.845	0	1.745	0	0	0	0	0	0
2002	9	23	1	356.546	-357.458	D	6.822	6.822	0	1.699	0	0	0	0	0	0
2002	10	23	933	366.169	-356.524	D	8.655	8.454	0.201	5.24	91.39	8.57	0	0	0	0.04
2002	11	23	1	356.546	-357.458	D	7.545	7.545	0	3.198	0	0	0	0	0	0
2002	12	23	1	356.546	-357.458	D	6.801	6.801	0	1.658	0	0	0	0	0	0
2002	13	23	1	356.546	-357.458	D	7.06	7.06	0	2.181	0	0	0	0	0	0
2002	14	23	1	356.546	-357.458	D	7.035	7.035	0	2.129	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	6.685	6.685	0	1.428	0	0	0	0	0	0
2002	16	23	1010	357.824	-354.865	D	6.622	6.622	0	1.304	81.76	15.11	0	0	0	0.1
2002	17	23	931	366.183	-356.996	D	6.935	6.913	0.023	1.881	80.29	19.65	0	0	0	0.06
2002	18	23	930	366.19	-357.232	D	8.929	8.811	0.118	6.096	84.76	15.22	0	0	0	0.02
2002	19	23	986	360.908	-354.689	D	9.23	9.148	0.082	6.931	92.34	7.65	0	0	0	0.01
2002	20	23	949	365.722	-354.966	D	9.79	9.371	0.419	7.5	92.05	7.94	0	0	0	0.01
2002	21	23	949	365.722	-354.966	D	7.388	7.385	0.003	2.856	95.31	4.66	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	22	23	1	356.546	-357.458	D	6.995	6.995	0	2.048	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	9.601	9.601	0	8.101	0	0	0	0	0	0
2002	24	23	1	356.546	-357.458	D	9.208	9.208	0	7.083	0	0	0	0	0	0
2002	25	23	1	356.546	-357.458	D	6.925	6.925	0	1.907	0	0	0	0	0	0
2002	26	23	710	364.843	-359.589	D	6.728	6.728	0	1.512	98.2	1.07	0	0	0	0.05
2002	27	23	927	365.912	-357.454	D	6.625	6.624	0	1.308	97.37	2.46	0	0	0	0.03
2002	28	23	1	356.546	-357.458	D	6.928	6.928	0	1.913	0	0	0	0	0	0
2002	29	23	1	356.546	-357.458	D	9.139	9.139	0	6.909	0	0	0	0	0	0
2002	30	23	900	364.265	-360.243	D	11.077	9.964	**1.113**	9.075	91.14	8.85	0	0	0	0.01
2002	31	23	1017	356.894	-355.206	D	12.001	10.119	**1.882**	9.502	94.17	5.83	0	0	0	0
2002	32	23	949	365.722	-354.966	D	7.498	7.456	0.043	3.007	94.61	5.39	0	0	0	0
2002	33	23	1	356.546	-357.458	D	6.971	6.971	0	1.999	0	0	0	0	0	0
2002	34	23	1	356.546	-357.458	D	6.879	6.879	0	1.814	0	0	0	0	0	0
2002	35	23	949	365.722	-354.966	D	7.107	7.103	0.004	2.268	86.83	12.99	0	0	0	0.16
2002	36	23	1035	356.477	-356.792	D	6.634	6.622	0.012	1.303	86.71	13.19	0	0	0	0.09
2002	37	23	1017	356.894	-355.206	D	9.287	9.286	0.001	7.281	92.42	7.47	0	0	0	0.01
2002	38	23	947	365.801	-355.162	D	9.388	9.367	0.021	7.49	88.04	11.94	0	0	0	0.01
2002	39	23	907	365.051	-359.809	D	8.441	8.44	0.001	5.208	95.91	3.86	0	0	0	0.01
2002	40	23	947	365.801	-355.162	D	9.075	9.075	0.001	6.748	96.7	3.03	0	0	0	0
2002	41	23	1	356.546	-357.458	D	8.26	8.26	0	4.79	0	0	0	0	0	0
2002	42	23	1	356.546	-357.458	D	7.661	7.661	0	3.447	0	0	0	0	0	0
2002	43	23	1	356.546	-357.458	D	6.606	6.606	0	1.272	0	0	0	0	0	0
2002	44	23	914	365.435	-358.584	D	6.703	6.666	0.038	1.389	69.07	30.71	0	0	0	0.22
2002	45	23	407	361.716	-361.973	D	6.576	6.576	0	1.214	94.31	5.32	0	0	0	0.08
2002	46	23	900	364.265	-360.243	D	6.851	6.849	0.002	1.753	93.42	6.54	0	0	0	0.05
2002	47	23	1	356.546	-357.458	D	6.647	6.647	0	1.352	0	0	0	0	0	0
2002	48	23	933	366.169	-356.524	D	6.559	6.557	0.002	1.176	94.23	5.56	0	0	0	0.23
2002	49	23	949	365.722	-354.966	D	6.617	6.607	0.01	1.274	91.22	8.71	0	0	0	0.07
2002	50	23	1	356.546	-357.458	D	8.514	8.514	0	5.384	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	8.973	8.973	0	6.495	0	0	0	0	0	0
2002	52	23	1	356.546	-357.458	D	7.073	7.073	0	2.207	0	0	0	0	0	0
2002	53	23	933	366.169	-356.524	D	7.004	6.992	0.013	2.041	84.91	14.95	0	0	0	0.13
2002	54	23	930	366.19	-357.232	D	6.632	6.621	0.011	1.302	91.52	8.4	0	0	0	0.07
2002	55	23	927	365.912	-357.454	D	6.8	6.799	0.001	1.653	94.22	5.67	0	0	0	0.04
2002	56	23	1	356.546	-357.458	D	7.935	7.935	0	4.052	0	0	0	0	0	0
2002	57	23	1	356.546	-357.458	D	7.67	7.67	0	3.468	0	0	0	0	0	0
2002	58	23	1	356.546	-357.458	D	6.762	6.762	0	1.579	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	6.499	6.499	0	1.064	0	0	0	0	0	0
2002	60	23	1	356.546	-357.458	D	7.718	7.718	0	3.573	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	61	23	974	362.281	-354.249	D	9.666	9.608	0.058	8.118	89.03	10.97	0	0	0	0.01
2002	62	23	301	360.724	-362.017	D	7.257	7.257	0	2.588	91.58	4.3	0	0	0	0
2002	63	23	1	356.546	-357.458	D	7.413	7.413	0	2.917	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	6.693	6.693	0	1.444	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	6.942	6.942	0	1.941	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	9.291	9.291	0	7.295	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	8.946	8.946	0	6.427	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	8.713	8.713	0	5.859	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.022	7.022	0	2.104	0	0	0	0	0	0
2002	70	23	1	356.546	-357.458	D	7.125	7.125	0	2.314	0	0	0	0	0	0
2002	71	23	966	363.538	-354.124	D	9.282	9.281	0.001	7.27	96.67	3.18	0	0	0	0.05
2002	72	23	964	363.678	-354.148	D	7.031	7.028	0.003	2.115	94.25	5.68	0	0	0	0.04
2002	73	23	1	356.546	-357.458	D	8.052	8.052	0	4.314	0	0	0	0	0	0
2002	74	23	932	366.176	-356.761	D	8.979	8.977	0.002	6.504	92.92	7	0	0	0	0.01
2002	75	23	78	358.239	-356.385	D	7.706	7.621	0.085	3.362	69.03	30.85	0	0	0	0.11
2002	76	23	996	360.121	-355.113	D	8.403	8.26	0.143	4.79	95.84	4.15	0	0	0	0.01
2002	77	23	967	363.478	-354.116	D	9.107	9.066	0.041	6.727	95.33	4.66	0	0	0	0.01
2002	78	23	949	365.722	-354.966	D	10.249	10.218	0.031	9.779	97.66	2.33	0	0	0	0
2002	79	23	1035	356.477	-356.792	D	9.99	9.252	**0.738**	7.195	92.91	7.08	0	0	0	0.01
2002	80	23	930	366.19	-357.232	D	8.06	7.976	0.084	4.143	93.95	6.03	0	0	0	0.02
2002	81	23	1	356.546	-357.458	D	6.485	6.485	0	1.038	0	0	0	0	0	0
2002	82	23	929	366.032	-357.239	D	6.65	6.65	0	1.358	94.31	3.23	0	0	0	0.04
2002	83	23	929	366.032	-357.239	D	7.948	7.948	0	4.08	96.18	4.17	0	0	0	0.02
2002	84	23	1	356.546	-357.458	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	85	23	1039	356.522	-357.599	D	8.619	8.482	0.137	5.307	85.05	14.92	0	0	0	0.03
2002	86	23	906	364.982	-359.812	D	7.698	7.698	0.001	3.528	98.4	1.34	0	0	0	0.05
2002	87	23	930	366.19	-357.232	D	7.364	7.32	0.044	2.72	97.27	2.72	0	0	0	0.01
2002	88	23	907	365.051	-359.809	D	8.434	8.349	0.085	4.995	98.68	1.29	0	0	0	0.03
2002	89	23	930	366.19	-357.232	D	7.409	7.403	0.006	2.894	94.43	5.5	0	0	0	0.05
2002	90	23	1017	356.894	-355.206	D	7.091	7.087	0.004	2.236	98.45	1.46	0	0	0	0.09
2002	91	23	219	359.98	-362.05	D	6.677	6.643	0.034	1.344	95.74	4.19	0	0	0	0.07
2002	92	23	929	366.032	-357.239	D	7.439	7.439	0	2.971	87.45	0.22	0	0	0	0.03
2002	93	23	1	356.546	-357.458	D	6.652	6.652	0	1.363	0	0	0	0	0	0
2002	94	23	930	366.19	-357.232	D	6.55	6.545	0.005	1.154	92.4	7.53	0	0	0	0.09
2002	95	23	949	365.722	-354.966	D	6.547	6.514	0.033	1.094	95.6	4.33	0	0	0	0.06
2002	96	23	930	366.19	-357.232	D	6.576	6.528	0.048	1.119	98.56	1.41	0	0	0	0.04
2002	97	23	949	365.722	-354.966	D	7.995	7.986	0.009	4.166	98.98	1	0	0	0	0.02
2002	98	23	1	356.546	-357.458	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2002	99	23	933	366.169	-356.524	D	9.148	9.128	0.02	6.881	99.31	0.63	0	0	0	0.05

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	100	23	1035	356.477	-356.792	D	7.458	7.423	0.036	2.936	99.09	0.87	0	0	0	0.03
2002	101	23	1035	356.477	-356.792	D	6.913	6.905	0.008	1.865	99.02	0.96	0	0	0	0.01
2002	102	23	785	365.637	-355.06	D	7.442	7.442	0	2.977	99.73	0.1	0	0	0	0.01
2002	103	23	1	356.546	-357.458	D	9.738	9.738	0	8.465	0	0	0	0	0	0
2002	104	23	1	356.546	-357.458	D	9.329	9.329	0	7.392	0	0	0	0	0	0
2002	105	23	1	356.546	-357.458	D	8.09	8.09	0	4.401	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.575	7.575	0	3.262	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.511	7.511	0	3.124	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	8.475	8.475	0	5.29	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.611	7.611	0	3.34	0	0	0	0	0	0
2002	110	23	1	356.546	-357.458	D	9.529	9.529	0	7.912	0	0	0	0	0	0
2002	111	23	643	363.609	-354.151	D	9.439	9.438	0.001	7.675	98.47	1.54	0	0	0	0.01
2002	112	23	1	356.546	-357.458	D	6.941	6.941	0	1.938	0	0	0	0	0	0
2002	113	23	748	365.295	-358.57	D	6.968	6.968	0	1.992	99.45	0.18	0	0	0	0.02
2002	114	23	785	365.637	-355.06	D	8.35	8.35	0	4.998	99.83	0.36	0	0	0	0.01
2002	115	23	907	365.051	-359.809	D	6.758	6.748	0.011	1.551	97.67	2.17	0	0	0	0.16
2002	116	23	219	359.98	-362.05	D	8.213	8.163	0.05	4.567	95.45	4.53	0	0	0	0.02
2002	117	23	949	365.722	-354.966	D	8.246	8.241	0.006	4.745	98.42	1.57	0	0	0	0.01
2002	118	23	1	356.546	-357.458	D	8.205	8.205	0	4.662	0	0	0	0	0	0
2002	119	23	949	365.722	-354.966	D	6.798	6.797	0.001	1.65	99.26	0.59	0	0	0	0.1
2002	120	23	949	365.722	-354.966	D	7.831	7.831	0	3.82	100.08	0.23	0	0	0	0.04
2002	121	23	1	356.546	-357.458	D	9.339	9.339	0	7.419	55.12	0.42	0	0	0	0.01
2002	122	23	928	365.945	-357.303	D	8.861	8.425	0.435	5.174	96.37	3.62	0	0	0	0.01
2002	123	23	832	359.493	-362.061	D	7.052	6.975	0.078	2.007	97.85	2.14	0	0	0	0.02
2002	124	23	822	358.021	-361.607	D	7.48	7.379	0.101	2.844	98.77	1.23	0	0	0	0.01
2002	125	23	822	358.021	-361.607	D	8.426	8.336	0.089	4.966	99.19	0.81	0	0	0	0
2002	126	23	1002	359.309	-354.73	D	8.363	8.355	0.008	5.01	99.9	0.09	0	0	0	0
2002	127	23	1	356.546	-357.458	D	8.856	8.856	0	6.205	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	9.261	9.261	0	7.218	0	0	0	0	0	0
2002	129	23	1	356.546	-357.458	D	8.026	8.026	0	4.256	0	0	0	0	0	0
2002	130	23	900	364.265	-360.243	D	6.645	6.624	0.02	1.308	99.33	0.63	0	0	0	0.04
2002	131	23	1002	359.309	-354.73	D	7.861	7.831	0.03	3.821	99.37	0.62	0	0	0	0.01
2002	132	23	1	356.546	-357.458	D	9.673	9.673	0	8.29	0	0	0	0	0	0
2002	133	23	933	366.169	-356.524	D	8.798	8.563	0.235	5.5	86.18	13.81	0	0	0	0.02
2002	134	23	1	356.546	-357.458	D	6.849	6.849	0	1.753	0	0	0	0	0	0
2002	135	23	1	356.546	-357.458	D	6.786	6.786	0	1.628	0	0	0	0	0	0
2002	136	23	1	356.546	-357.458	D	7.383	7.383	0	2.852	0	0	0	0	0	0
2002	137	23	1017	356.894	-355.206	D	10.09	9.931	0.159	8.986	97.43	2.57	0	0	0	0
2002	138	23	932	366.176	-356.761	D	8.281	8.239	0.042	4.741	98.68	1.29	0	0	0	0.04

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	139	23	907	365.051	-359.809	D	6.951	6.806	0.145	1.668	98.14	1.84	0	0	0	0.03
2002	140	23	949	365.722	-354.966	D	6.774	6.768	0.005	1.593	99.32	0.59	0	0	0	0.09
2002	141	23	300	360.18	-355.3	D	6.805	6.729	0.077	1.513	97.97	2	0	0	0	0.04
2002	142	23	930	366.19	-357.232	D	6.798	6.763	0.036	1.581	99.28	0.7	0	0	0	0.02
2002	143	23	947	365.801	-355.162	D	6.761	6.76	0.001	1.577	99.73	0.22	0	0	0	0.01
2002	144	23	1	356.546	-357.458	D	7.37	7.37	0	2.825	0	0	0	0	0	0
2002	145	23	1	356.546	-357.458	D	8.265	8.265	0	4.8	0	0	0	0	0	0
2002	146	23	1	356.546	-357.458	D	7.87	7.87	0	3.908	0	0	0	0	0	0
2002	147	23	1	356.546	-357.458	D	8.687	8.687	0	5.796	0	0	0	0	0	0
2002	148	23	1	356.546	-357.458	D	9.172	9.172	0	6.994	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2002	150	23	1	356.546	-357.458	D	8.424	8.424	0	5.172	0	0	0	0	0	0
2002	151	23	1	356.546	-357.458	D	7.061	7.061	0	2.182	0	0	0	0	0	0
2002	152	23	1	356.546	-357.458	D	7.196	7.196	0	2.462	0	0	0	0	0	0
2002	153	23	1	356.546	-357.458	D	7.677	7.677	0	3.483	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.825	7.825	0	3.807	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.059	7.059	0	2.178	0	0	0	0	0	0
2002	156	23	1010	357.824	-354.865	D	8.761	8.721	0.039	5.878	99.13	0.86	0	0	0	0.01
2002	157	23	1035	356.477	-356.792	D	8.679	8.232	0.447	4.725	94.72	5.26	0	0	0	0.01
2002	158	23	933	366.169	-356.524	D	6.968	6.897	0.071	1.85	99.53	0.44	0	0	0	0.03
2002	159	23	949	365.722	-354.966	D	6.964	6.869	0.095	1.794	99.76	0.22	0	0	0	0.02
2002	160	23	1002	359.309	-354.73	D	7.436	7.431	0.006	2.953	99.94	0.04	0	0	0	0.02
2002	161	23	1	356.546	-357.458	D	9.601	9.601	0	8.101	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	8.492	8.492	0	5.332	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	8.522	8.522	0	5.401	0	0	0	0	0	0
2002	164	23	1	356.546	-357.458	D	7.933	7.933	0	4.048	0	0	0	0	0	0
2002	165	23	930	366.19	-357.232	D	7.191	7.19	0	2.449	99.42	0.12	0	0	0	0.01
2002	166	23	1	356.546	-357.458	D	6.691	6.691	0	1.438	0	0	0	0	0	0
2002	167	23	1	356.546	-357.458	D	6.639	6.639	0	1.337	0	0	0	0	0	0
2002	168	23	933	366.169	-356.524	D	6.974	6.935	0.04	1.926	98.9	1.07	0	0	0	0.02
2002	169	23	933	366.169	-356.524	D	6.782	6.755	0.027	1.566	99.87	0.1	0	0	0	0.02
2002	170	23	949	365.722	-354.966	D	7.027	7.021	0.006	2.101	99.89	0.06	0	0	0	0.01
2002	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.301	0	0	0	0	0	0
2002	172	23	1	356.546	-357.458	D	7.907	7.907	0	3.989	0	0	0	0	0	0
2002	173	23	1	356.546	-357.458	D	7.545	7.545	0	3.198	0	0	0	0	0	0
2002	174	23	1	356.546	-357.458	D	7.039	7.039	0	2.137	0	0	0	0	0	0
2002	175	23	1	356.546	-357.458	D	7.036	7.036	0	2.132	0	0	0	0	0	0
2002	176	23	1	356.546	-357.458	D	7.974	7.974	0	4.138	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.864	7.864	0	3.894	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	178	23	1	356.546	-357.458	D	8.442	8.442	0	5.214	0	0	0	0	0	0
2002	179	23	730	364.623	-354.605	D	7.411	7.411	0	2.911	100.06	0.02	0	0	0	0.04
2002	180	23	941	365.977	-355.774	D	7.271	7.27	0.001	2.615	99.98	0.05	0	0	0	0.02
2002	181	23	1	356.546	-357.458	D	7.464	7.464	0	3.024	0	0	0	0	0	0
2002	182	23	1	356.546	-357.458	D	6.828	6.828	0	1.711	0	0	0	0	0	0
2002	183	23	1	356.546	-357.458	D	6.708	6.708	0	1.473	0	0	0	0	0	0
2002	184	23	1	356.546	-357.458	D	8.242	8.242	0	4.747	0	0	0	0	0	0
2002	185	23	1	356.546	-357.458	D	7.384	7.384	0	2.854	0	0	0	0	0	0
2002	186	23	933	366.169	-356.524	D	7.846	7.844	0.001	3.85	100.01	0.05	0	0	0	0.01
2002	187	23	949	365.722	-354.966	D	7.182	7.166	0.017	2.398	99.95	0.04	0	0	0	0.01
2002	188	23	1008	358.048	-354.775	D	7.489	7.458	0.032	3.011	99.93	0.06	0	0	0	0.01
2002	189	23	643	363.609	-354.151	D	6.798	6.792	0.005	1.64	99.96	0.02	0	0	0	0.01
2002	190	23	785	365.637	-355.06	D	6.78	6.778	0.001	1.612	99.92	0.01	0	0	0	0.01
2002	191	23	929	366.032	-357.239	D	7.102	7.101	0	2.265	100.16	0.06	0	0	0	0.01
2002	192	23	949	365.722	-354.966	D	7.929	7.92	0.009	4.017	98.72	1.27	0	0	0	0.01
2002	193	23	964	363.678	-354.148	D	8.511	8.479	0.032	5.3	99.56	0.42	0	0	0	0.01
2002	194	23	1017	356.894	-355.206	D	9.264	9.211	0.053	7.091	99.2	0.79	0	0	0	0
2002	195	23	822	358.021	-361.607	D	8.649	8.645	0.004	5.695	99.83	0.15	0	0	0	0
2002	196	23	1	356.546	-357.458	D	7.214	7.214	0	2.497	99.51	0.13	0	0	0	0.01
2002	197	23	1	356.546	-357.458	D	7.118	7.118	0	2.299	0	0	0	0	0	0
2002	198	23	1	356.546	-357.458	D	8.619	8.619	0	5.633	0	0	0	0	0	0
2002	199	23	1	356.546	-357.458	D	8.138	8.138	0	4.509	0	0	0	0	0	0
2002	200	23	1	356.546	-357.458	D	9.235	9.235	0	7.153	0	0	0	0	0	0
2002	201	23	1	356.546	-357.458	D	8.2	8.2	0	4.651	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	8.243	8.243	0	4.751	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.104	7.104	0	2.27	0	0	0	0	0	0
2002	204	23	1008	358.048	-354.775	D	7.503	7.467	0.036	3.031	99.74	0.22	0	0	0	0.04
2002	205	23	810	357.434	-360.005	D	7.23	6.947	0.283	1.951	99.81	0.17	0	0	0	0.02
2002	206	23	822	358.021	-361.607	D	7.18	7.134	0.046	2.333	99.89	0.09	0	0	0	0.01
2002	207	23	907	365.051	-359.809	D	7.456	7.353	0.104	2.788	99.92	0.07	0	0	0	0.01
2002	208	23	941	365.977	-355.774	D	7.485	7.48	0.005	3.058	99.94	0.04	0	0	0	0.01
2002	209	23	1	356.546	-357.458	D	7.228	7.228	0	2.528	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.898	7.898	0	3.969	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.793	7.793	0	3.737	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.19	7.19	0	2.449	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.191	7.191	0	2.45	0	0	0	0	0	0
2002	214	23	1008	358.048	-354.775	D	7.465	7.458	0.007	3.011	99.93	0.06	0	0	0	0.01
2002	215	23	1003	359.099	-354.737	D	7.449	7.448	0.001	2.99	99.91	0.07	0	0	0	0.01
2002	216	23	821	358.053	-361.416	D	7.539	7.539	0	3.184	99.91	0.01	0	0	0	0.01

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	217	23	10	356.954	-355.443	D	7.288	7.287	0	2.651	99.72	0.01	0	0	0	0.01
2002	218	23	930	366.19	-357.232	D	6.99	6.881	0.109	1.818	99.88	0.09	0	0	0	0.02
2002	219	23	219	359.98	-362.05	D	9.068	8.709	0.359	5.849	99.5	0.5	0	0	0	0
2002	220	23	822	358.021	-361.607	D	6.724	6.723	0.001	1.503	100.14	0.03	0	0	0	0.01
2002	221	23	1	356.546	-357.458	D	6.684	6.684	0	1.425	0	0	0	0	0	0
2002	222	23	1	356.546	-357.458	D	6.853	6.853	0	1.762	0	0	0	0	0	0
2002	223	23	1	356.546	-357.458	D	7.168	7.168	0	2.402	0	0	0	0	0	0
2002	224	23	1	356.546	-357.458	D	7.094	7.094	0	2.251	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	9.125	9.125	0	6.875	0	0	0	0	0	0
2002	226	23	1	356.546	-357.458	D	9.597	9.597	0	8.09	0	0	0	0	0	0
2002	227	23	1	356.546	-357.458	D	8.49	8.49	0	5.327	0	0	0	0	0	0
2002	228	23	1	356.546	-357.458	D	8.55	8.55	0	5.468	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	8.018	8.018	0	4.237	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	8.407	8.407	0	5.131	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.437	7.437	0	2.967	0	0	0	0	0	0
2002	232	23	62	357.925	-354.901	D	7.015	7.015	0	2.089	99.22	0.36	0	0	0	0.01
2002	233	23	1	356.546	-357.458	D	7.361	7.361	0	2.805	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.811	7.811	0	3.777	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.29	7.29	0	2.657	0	0	0	0	0	0
2002	236	23	1	356.546	-357.458	D	7.915	7.915	0	4.008	0	0	0	0	0	0
2002	237	23	933	366.169	-356.524	D	7.913	7.782	0.131	3.713	94.81	5.15	0	0	0	0.04
2002	238	23	1035	356.477	-356.792	D	7.591	7.375	0.216	2.835	99.21	0.77	0	0	0	0.02
2002	239	23	1017	356.894	-355.206	D	6.982	6.915	0.067	1.887	99.5	0.47	0	0	0	0.02
2002	240	23	1	356.546	-357.458	D	7.329	7.329	0	2.739	0	0	0	0	0	0
2002	241	23	1	356.546	-357.458	D	7.135	7.135	0	2.334	0	0	0	0	0	0
2002	242	23	1	356.546	-357.458	D	6.944	6.944	0	1.945	0	0	0	0	0	0
2002	243	23	1	356.546	-357.458	D	7.131	7.131	0	2.327	0	0	0	0	0	0
2002	244	23	1	356.546	-357.458	D	7.078	7.078	0	2.217	0	0	0	0	0	0
2002	245	23	1	356.546	-357.458	D	6.939	6.939	0	1.934	0	0	0	0	0	0
2002	246	23	1	356.546	-357.458	D	7.006	7.006	0	2.07	0	0	0	0	0	0
2002	247	23	961	364.092	-354.289	D	7.022	7.016	0.006	2.09	99.94	0.04	0	0	0	0.04
2002	248	23	1002	359.309	-354.73	D	7.073	7.033	0.04	2.125	99.87	0.11	0	0	0	0.02
2002	249	23	1017	356.894	-355.206	D	6.772	6.766	0.006	1.587	99.93	0.02	0	0	0	0.02
2002	250	23	10	356.954	-355.443	D	6.716	6.715	0	1.487	100.2	0.01	0	0	0	0.02
2002	251	23	1	356.546	-357.458	D	8.576	8.576	0	5.53	0	0	0	0	0	0
2002	252	23	1	356.546	-357.458	D	7.266	7.266	0	2.606	0	0	0	0	0	0
2002	253	23	1	356.546	-357.458	D	7.027	7.027	0	2.114	0	0	0	0	0	0
2002	254	23	78	358.239	-356.385	D	7.697	7.487	0.21	3.074	87.32	12.6	0	0	0	0.08
2002	255	23	822	358.021	-361.607	D	7.145	7.113	0.032	2.289	99.47	0.5	0	0	0	0.03

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	256	23	811	357.434	-360.225	D	6.63	6.624	0.006	1.308	99.9	0.07	0	0	0	0.03
2002	257	23	1017	356.894	-355.206	D	6.688	6.68	0.008	1.417	99.89	0.08	0	0	0	0.02
2002	258	23	949	365.722	-354.966	D	8.027	8.013	0.014	4.226	99.81	0.15	0	0	0	0.03
2002	259	23	786	365.973	-357.042	D	8.436	8.127	0.309	4.485	98.63	1.36	0	0	0	0.01
2002	260	23	949	365.722	-354.966	D	7.959	7.712	0.247	3.559	99.33	0.66	0	0	0	0.01
2002	261	23	949	365.722	-354.966	D	8.117	8.108	0.01	4.441	98.72	1.26	0	0	0	0.01
2002	262	23	1	356.546	-357.458	D	9.072	9.072	0	6.74	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	9.195	9.195	0	7.052	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	6.755	6.755	0	1.565	0	0	0	0	0	0
2002	265	23	930	366.19	-357.232	D	6.825	6.74	0.085	1.536	93.54	6.29	0	0	0	0.17
2002	266	23	930	366.19	-357.232	D	6.606	6.587	0.019	1.235	98.42	1.46	0	0	0	0.12
2002	267	23	933	366.169	-356.524	D	6.576	6.528	0.048	1.121	99.32	0.6	0	0	0	0.08
2002	268	23	1008	358.048	-354.775	D	6.808	6.774	0.034	1.603	99.41	0.55	0	0	0	0.03
2002	269	23	1017	356.894	-355.206	D	6.932	6.932	0	1.92	99.82	0.07	0	0	0	0.03
2002	270	23	811	357.434	-360.225	D	7.393	7.361	0.032	2.806	97.51	2.43	0	0	0	0.06
2002	271	23	933	366.169	-356.524	D	6.828	6.755	0.073	1.565	99.56	0.4	0	0	0	0.04
2002	272	23	1017	356.894	-355.206	D	7.409	7.34	0.07	2.762	99.59	0.4	0	0	0	0.01
2002	273	23	1017	356.894	-355.206	D	7.678	7.674	0.004	3.476	99.98	0.04	0	0	0	0.02
2002	274	23	1	356.546	-357.458	D	6.979	6.979	0	2.016	0	0	0	0	0	0
2002	275	23	1	356.546	-357.458	D	7.125	7.125	0	2.314	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.413	7.413	0	2.915	0	0	0	0	0	0
2002	277	23	1	356.546	-357.458	D	9.122	9.122	0	6.867	0	0	0	0	0	0
2002	278	23	930	366.19	-357.232	D	7.094	7.081	0.012	2.224	99.21	0.65	0	0	0	0.13
2002	279	23	832	359.493	-362.061	D	6.737	6.727	0.01	1.51	99.09	0.86	0	0	0	0.06
2002	280	23	930	366.19	-357.232	D	6.724	6.702	0.022	1.462	97.95	1.89	0	0	0	0.15
2002	281	23	1035	356.477	-356.792	D	6.56	6.555	0.005	1.172	98.69	1.25	0	0	0	0.08
2002	282	23	974	362.281	-354.249	D	8.745	8.744	0.001	5.933	99.38	0.51	0	0	0	0.02
2002	283	23	949	365.722	-354.966	D	9.539	9.537	0.003	7.932	98.74	1.11	0	0	0	0
2002	284	23	853	361.666	-362.175	D	8.637	8.634	0.003	5.67	99.07	0.91	0	0	0	0
2002	285	23	1	356.546	-357.458	D	8.805	8.805	0	6.083	0	0	0	0	0	0
2002	286	23	930	366.19	-357.232	D	7.534	7.512	0.022	3.127	87.13	12.75	0	0	0	0.12
2002	287	23	1017	356.894	-355.206	D	6.534	6.528	0.006	1.12	94.8	5.09	0	0	0	0.09
2002	288	23	1017	356.894	-355.206	D	6.52	6.504	0.016	1.074	96.9	3.06	0	0	0	0.04
2002	289	23	78	358.239	-356.385	D	6.622	6.563	0.059	1.188	79.19	20.46	0	0	0	0.35
2002	290	23	853	361.666	-362.175	D	9.091	9.09	0.001	6.786	95.31	4.55	0	0	0	0.02
2002	291	23	900	364.265	-360.243	D	6.665	6.665	0	1.388	98.01	0.52	0	0	0	0.04
2002	292	23	337	360.884	-360.013	D	9.547	9.446	0.101	7.694	92.56	7.43	0	0	0	0.01
2002	293	23	933	366.169	-356.524	D	8.061	7.732	0.329	3.603	90.55	9.43	0	0	0	0.02
2002	294	23	1039	356.522	-357.599	D	6.801	6.774	0.027	1.604	97.82	2.15	0	0	0	0.03

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	295	23	1017	356.894	-355.206	D	6.854	6.828	0.027	1.711	98.35	1.62	0	0	0	0.02
2002	296	23	967	363.478	-354.116	D	6.877	6.801	0.076	1.657	97.54	2.44	0	0	0	0.03
2002	297	23	822	358.021	-361.607	D	6.714	6.679	0.036	1.415	98.84	1.14	0	0	0	0.02
2002	298	23	1017	356.894	-355.206	D	9.34	9.184	0.156	7.023	97.01	2.99	0	0	0	0.01
2002	299	23	949	365.722	-354.966	D	9.534	8.911	**0.623**	6.342	96.42	3.58	0	0	0	0
2002	300	23	927	365.912	-357.454	D	9.859	8.948	**0.911**	6.433	94.4	5.59	0	0	0	0.01
2002	301	23	1017	356.894	-355.206	D	10.661	10.176	0.485	9.662	97.21	2.79	0	0	0	0
2002	302	23	1039	356.522	-357.599	D	10.399	9.753	**0.646**	8.504	95.35	4.64	0	0	0	0.01
2002	303	23	822	358.021	-361.607	D	8.854	8.512	0.343	5.377	96.1	3.89	0	0	0	0.01
2002	304	23	822	358.021	-361.607	D	9.685	8.981	**0.703**	6.516	93.79	6.21	0	0	0	0.01
2002	305	23	1	356.546	-357.458	D	7.915	7.915	0	4.007	0	0	0	0	0	0
2002	306	23	301	360.724	-362.017	D	7.51	7.51	0	3.123	92.72	6.81	0	0	0	0
2002	307	23	907	365.051	-359.809	D	10.235	10.113	0.122	9.486	93.54	6.45	0	0	0	0
2002	308	23	941	365.977	-355.774	D	9.164	9.16	0.004	6.962	95.47	4.5	0	0	0	0
2002	309	23	930	366.19	-357.232	D	9.165	9.132	0.033	6.891	96.6	3.39	0	0	0	0
2002	310	23	949	365.722	-354.966	D	7.931	7.879	0.052	3.927	93.38	6.61	0	0	0	0.01
2002	311	23	1	356.546	-357.458	D	6.548	6.548	0	1.16	0	0	0	0	0	0
2002	312	23	1	356.546	-357.458	D	6.657	6.657	0	1.373	0	0	0	0	0	0
2002	313	23	1	356.546	-357.458	D	8.478	8.478	0	5.298	0	0	0	0	0	0
2002	314	23	1	356.546	-357.458	D	8.593	8.593	0	5.57	0	0	0	0	0	0
2002	315	23	1	356.546	-357.458	D	6.852	6.852	0	1.759	0	0	0	0	0	0
2002	316	23	927	365.912	-357.454	D	6.836	6.723	0.114	1.502	68.63	31.19	0	0	0	0.18
2002	317	23	1	356.546	-357.458	D	6.644	6.644	0	1.347	0	0	0	0	0	0
2002	318	23	1	356.546	-357.458	D	6.68	6.68	0	1.417	0	0	0	0	0	0
2002	319	23	928	365.945	-357.303	D	9.34	9.317	0.024	7.361	69.5	30.46	0	0	0	0.04
2002	320	23	927	365.912	-357.454	D	9.753	9.09	**0.663**	6.786	70.95	29.01	0	0	0	0.04
2002	321	23	1	356.546	-357.458	D	6.773	6.773	0	1.602	0	0	0	0	0	0
2002	322	23	1	356.546	-357.458	D	7.009	7.009	0	2.076	0	0	0	0	0	0
2002	323	23	1	356.546	-357.458	D	6.941	6.941	0	1.938	0	0	0	0	0	0
2002	324	23	1	356.546	-357.458	D	6.495	6.495	0	1.057	0	0	0	0	0	0
2002	325	23	1	356.546	-357.458	D	6.648	6.648	0	1.354	0	0	0	0	0	0
2002	326	23	1	356.546	-357.458	D	7.086	7.086	0	2.233	0	0	0	0	0	0
2002	327	23	1	356.546	-357.458	D	6.556	6.556	0	1.175	0	0	0	0	0	0
2002	328	23	1008	358.048	-354.775	D	6.617	6.617	0.001	1.293	93.26	6.77	0	0	0	0.05
2002	329	23	930	366.19	-357.232	D	7.069	6.97	0.098	1.998	82.07	17.8	0	0	0	0.13
2002	330	23	1035	356.477	-356.792	D	6.633	6.582	0.051	1.225	90.07	9.86	0	0	0	0.07
2002	331	23	927	365.912	-357.454	D	6.997	6.922	0.075	1.9	72.75	27.12	0	0	0	0.13
2002	332	23	907	365.051	-359.809	D	6.595	6.594	0	1.249	87.5	12.62	0	0	0	0.06
2002	333	23	1	356.546	-357.458	D	6.608	6.608	0	1.277	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	334	23	1	356.546	-357.458	D	6.711	6.711	0	1.478	0	0	0	0	0	0
2002	335	23	1	356.546	-357.458	D	6.509	6.509	0	1.084	0	0	0	0	0	0
2002	336	23	1	356.546	-357.458	D	6.483	6.483	0	1.034	0	0	0	0	0	0
2002	337	23	824	358.459	-361.601	D	6.876	6.871	0.005	1.798	79.85	19.86	0	0	0	0.3
2002	338	23	822	358.021	-361.607	D	10.01	10.01	0	9.201	87.78	12.01	0	0	0	0
2002	339	23	900	364.265	-360.243	D	8.345	8.256	0.089	4.781	63.62	36.26	0	0	0	0.13
2002	340	23	1	356.546	-357.458	D	9.222	9.222	0	7.119	0	0	0	0	0	0
2002	341	23	1	356.546	-357.458	D	7.426	7.426	0	2.944	0	0	0	0	0	0
2002	342	23	964	363.678	-354.148	D	8.215	8.164	0.052	4.568	91.66	8.33	0	0	0	0.01
2002	343	23	822	358.021	-361.607	D	8.68	8.243	0.438	4.749	91.71	8.28	0	0	0	0
2002	344	23	1017	356.894	-355.206	D	6.886	6.864	0.022	1.784	94.01	5.97	0	0	0	0.01
2002	345	23	1017	356.894	-355.206	D	8.162	8.112	0.05	4.451	95.34	4.65	0	0	0	0
2002	346	23	1002	359.309	-354.73	D	7.622	7.612	0.01	3.342	96.75	3.25	0	0	0	0.01
2002	347	23	822	358.021	-361.607	D	9.204	9.036	0.168	6.652	92.88	7.11	0	0	0	0.01
2002	348	23	845	360.851	-362.181	D	9.651	9.535	0.116	7.926	92.24	7.75	0	0	0	0.01
2002	349	23	1	356.546	-357.458	D	7.203	7.203	0	2.475	0	0	0	0	0	0
2002	350	23	1	356.546	-357.458	D	8.634	8.634	0	5.669	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	9.503	9.503	0	7.844	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	9.613	9.613	0	8.133	0	0	0	0	0	0
2002	353	23	1	356.546	-357.458	D	7.699	7.699	0	3.532	0	0	0	0	0	0
2002	354	23	1	356.546	-357.458	D	6.719	6.719	0	1.494	0	0	0	0	0	0
2002	355	23	1	356.546	-357.458	D	6.506	6.506	0	1.077	0	0	0	0	0	0
2002	356	23	949	365.722	-354.966	D	7.216	7.215	0	2.501	81.42	18.73	0	0	0	0.03
2002	357	23	1	356.546	-357.458	D	7.34	7.34	0	2.761	0	0	0	0	0	0
2002	358	23	1017	356.894	-355.206	D	9.772	9.579	0.193	8.042	88.05	11.93	0	0	0	0.01
2002	359	23	1	356.546	-357.458	D	7.327	7.327	0	2.734	0	0	0	0	0	0
2002	360	23	1	356.546	-357.458	D	7.523	7.523	0	3.15	0	0	0	0	0	0
2002	361	23	1	356.546	-357.458	D	7.159	7.159	0	2.384	0	0	0	0	0	0
2002	362	23	1	356.546	-357.458	D	7.157	7.157	0	2.381	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.138	7.138	0	2.341	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	9.404	9.404	0	7.586	0	0	0	0	0	0
2002	365	23	1017	356.894	-355.206	D	8.647	8.6	0.047	5.587	67.96	31.94	0	0	0	0.1
									1.882							
NORANDA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	356.546	-357.458	D	6.912	6.912	0	1.879	0	0	0	0	0	0
2002	2	23	1	356.546	-357.458	D	6.838	6.838	0	1.731	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	3	23	1	356.546	-357.458	D	7.261	7.261	0	2.596	0	0	0	0	0	0
2002	4	23	1	356.546	-357.458	D	6.831	6.831	0	1.718	0	0	0	0	0	0
2002	5	23	1	356.546	-357.458	D	7.121	7.121	0	2.306	0	0	0	0	0	0
2002	6	23	1	356.546	-357.458	D	9.639	9.639	0	8.201	0	0	0	0	0	0
2002	7	23	1	356.546	-357.458	D	7.799	7.799	0	3.751	0	0	0	0	0	0
2002	8	23	1	356.546	-357.458	D	6.845	6.845	0	1.745	0	0	0	0	0	0
2002	9	23	1	356.546	-357.458	D	6.822	6.822	0	1.699	0	0	0	0	0	0
2002	10	23	1	356.546	-357.458	D	8.454	8.454	0	5.24	0	0	0	0	0	0
2002	11	23	1	356.546	-357.458	D	7.545	7.545	0	3.198	0	0	0	0	0	0
2002	12	23	1	356.546	-357.458	D	6.801	6.801	0	1.658	0	0	0	0	0	0
2002	13	23	1	356.546	-357.458	D	7.06	7.06	0	2.181	0	0	0	0	0	0
2002	14	23	1	356.546	-357.458	D	7.035	7.035	0	2.129	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	6.685	6.685	0	1.428	0	0	0	0	0	0
2002	16	23	1	356.546	-357.458	D	6.622	6.622	0	1.304	0	0	0	0	0	0
2002	17	23	1	356.546	-357.458	D	6.914	6.914	0	1.884	0	0	0	0	0	0
2002	18	23	1	356.546	-357.458	D	8.836	8.836	0	6.158	0	0	0	0	0	0
2002	19	23	967	363.478	-354.116	D	9.658	9.148	**0.51**	6.931	98.64	0.2	0	0	0.06	1.09
2002	20	23	907	365.051	-359.809	D	9.389	9.371	0.018	7.5	98.82	0.06	0	0	0.05	1.07
2002	21	23	947	365.801	-355.162	D	7.394	7.385	0.009	2.856	98.84	0.1	0	0	0	1.05
2002	22	23	1	356.546	-357.458	D	6.995	6.995	0	2.048	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	9.601	9.601	0	8.101	0	0	0	0	0	0
2002	24	23	1	356.546	-357.458	D	9.208	9.208	0	7.083	0	0	0	0	0	0
2002	25	23	1	356.546	-357.458	D	6.925	6.925	0	1.907	0	0	0	0	0	0
2002	26	23	1	356.546	-357.458	D	6.726	6.726	0	1.507	0	0	0	0	0	0
2002	27	23	572	363.365	-359.903	D	6.624	6.624	0	1.308	79.59	0.05	0	0	0.07	3.93
2002	28	23	1	356.546	-357.458	D	6.928	6.928	0	1.913	0	0	0	0	0	0
2002	29	23	1	356.546	-357.458	D	9.139	9.139	0	6.909	0	0	0	0	0	0
2002	30	23	1	356.546	-357.458	D	9.985	9.985	0	9.134	0	0	0	0	0	0
2002	31	23	1	356.546	-357.458	D	10.119	10.119	0	9.502	0	0	0	0	0	0
2002	32	23	1	356.546	-357.458	D	7.456	7.456	0	3.007	0	0	0	0	0	0
2002	33	23	1	356.546	-357.458	D	6.971	6.971	0	1.999	0	0	0	0	0	0
2002	34	23	1	356.546	-357.458	D	6.879	6.879	0	1.814	0	0	0	0	0	0
2002	35	23	1	356.546	-357.458	D	7.102	7.102	0	2.267	0	0	0	0	0	0
2002	36	23	853	361.666	-362.175	D	6.626	6.622	0.005	1.303	89	0.04	0	0	2.16	8.8
2002	37	23	1017	356.894	-355.206	D	9.343	9.286	0.058	7.281	96.91	0.4	0	0	0.07	2.62
2002	38	23	1017	356.894	-355.206	D	9.728	9.37	0.358	7.497	99.27	0.12	0	0	0.03	0.58
2002	39	23	907	365.051	-359.809	D	8.448	8.44	0.008	5.208	98.68	0.06	0	0	0.07	1.16
2002	40	23	786	365.973	-357.042	D	9.109	9.075	0.034	6.748	99.38	0.05	0	0	0.02	0.55
2002	41	23	1	356.546	-357.458	D	8.26	8.26	0	4.79	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	42	23	1	356.546	-357.458	D	7.661	7.661	0	3.447	0	0	0	0	0	0
2002	43	23	1	356.546	-357.458	D	6.606	6.606	0	1.272	0	0	0	0	0	0
2002	44	23	1	356.546	-357.458	D	6.666	6.666	0	1.391	0	0	0	0	0	0
2002	45	23	1	356.546	-357.458	D	6.584	6.584	0	1.229	0	0	0	0	0	0
2002	46	23	1	356.546	-357.458	D	6.86	6.86	0	1.775	0	0	0	0	0	0
2002	47	23	1	356.546	-357.458	D	6.647	6.647	0	1.352	0	0	0	0	0	0
2002	48	23	1	356.546	-357.458	D	6.558	6.558	0	1.179	0	0	0	0	0	0
2002	49	23	930	366.19	-357.232	D	6.609	6.606	0.004	1.272	92.84	0.14	0	0	0.14	6.89
2002	50	23	1	356.546	-357.458	D	8.514	8.514	0	5.384	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	8.973	8.973	0	6.495	0	0	0	0	0	0
2002	52	23	1	356.546	-357.458	D	7.073	7.073	0	2.207	0	0	0	0	0	0
2002	53	23	1	356.546	-357.458	D	6.964	6.964	0	1.986	0	0	0	0	0	0
2002	54	23	1	356.546	-357.458	D	6.629	6.629	0	1.317	0	0	0	0	0	0
2002	55	23	1	356.546	-357.458	D	6.809	6.809	0	1.674	0	0	0	0	0	0
2002	56	23	1	356.546	-357.458	D	7.935	7.935	0	4.052	0	0	0	0	0	0
2002	57	23	1	356.546	-357.458	D	7.67	7.67	0	3.468	0	0	0	0	0	0
2002	58	23	1	356.546	-357.458	D	6.762	6.762	0	1.579	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	6.499	6.499	0	1.064	0	0	0	0	0	0
2002	60	23	1	356.546	-357.458	D	7.718	7.718	0	3.573	0	0	0	0	0	0
2002	61	23	1	356.546	-357.458	D	9.578	9.578	0	8.04	0	0	0	0	0	0
2002	62	23	1	356.546	-357.458	D	7.29	7.29	0	2.657	0	0	0	0	0	0
2002	63	23	1	356.546	-357.458	D	7.413	7.413	0	2.917	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	6.693	6.693	0	1.444	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	6.942	6.942	0	1.941	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	9.291	9.291	0	7.295	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	8.946	8.946	0	6.427	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	8.713	8.713	0	5.859	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.022	7.022	0	2.104	0	0	0	0	0	0
2002	70	23	930	366.19	-357.232	D	7.155	7.152	0.003	2.369	91.52	0.19	0	0	0.17	8.08
2002	71	23	618	363.371	-354.411	D	9.281	9.281	0	7.27	94.7	0	0	0	0.04	1.48
2002	72	23	406	361.15	-354.758	D	7.028	7.028	0	2.115	93.93	0.01	0	0	0.01	2.03
2002	73	23	1	356.546	-357.458	D	8.052	8.052	0	4.314	0	0	0	0	0	0
2002	74	23	1	356.546	-357.458	D	8.972	8.972	0	6.491	0	0	0	0	0	0
2002	75	23	1	356.546	-357.458	D	7.621	7.621	0	3.362	0	0	0	0	0	0
2002	76	23	1	356.546	-357.458	D	8.088	8.088	0	4.396	0	0	0	0	0	0
2002	77	23	930	366.19	-357.232	D	9.119	9.111	0.008	6.838	99.3	0.07	0	0	0.03	0.59
2002	78	23	1017	356.894	-355.206	D	11.178	10.218	**0.96**	9.779	99.57	0.03	0	0	0.04	0.35
2002	79	23	907	365.051	-359.809	D	9.616	9.252	0.365	7.195	99.7	0.03	0	0	0.02	0.26
2002	80	23	1	356.546	-357.458	D	7.838	7.838	0	3.836	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	81	23	1	356.546	-357.458	D	6.485	6.485	0	1.038	0	0	0	0	0	0
2002	82	23	1	356.546	-357.458	D	6.646	6.646	0	1.35	0	0	0	0	0	0
2002	83	23	1	356.546	-357.458	D	8.066	8.066	0	4.346	0	0	0	0	0	0
2002	84	23	1017	356.894	-355.206	D	10.247	10.218	0.03	9.779	99.5	0.07	0	0	0.01	0.41
2002	85	23	1035	356.477	-356.792	D	8.648	8.482	0.166	5.307	99.53	0.06	0	0	0	0.41
2002	86	23	1	356.546	-357.458	D	7.696	7.696	0	3.525	0	0	0	0	0	0
2002	87	23	930	366.19	-357.232	D	7.322	7.32	0.001	2.72	97.33	0.13	0	0	0.06	2.42
2002	88	23	1	356.546	-357.458	D	8.397	8.397	0	5.108	0	0	0	0	0	0
2002	89	23	853	361.666	-362.175	D	7.425	7.42	0.005	2.93	98.04	0	0	0	0.29	1.64
2002	90	23	853	361.666	-362.175	D	7.205	7.117	0.088	2.298	95.48	0.17	0	0	0.17	4.18
2002	91	23	1035	356.477	-356.792	D	6.646	6.642	0.004	1.342	96.26	0	0	0	0.1	3.63
2002	92	23	933	366.169	-356.524	D	7.44	7.439	0.001	2.971	96.84	0.01	0	0	0.03	2.98
2002	93	23	1	356.546	-357.458	D	6.652	6.652	0	1.363	0	0	0	0	0	0
2002	94	23	1	356.546	-357.458	D	6.542	6.542	0	1.147	0	0	0	0	0	0
2002	95	23	1	356.546	-357.458	D	6.515	6.515	0	1.096	0	0	0	0	0	0
2002	96	23	822	358.021	-361.607	D	6.535	6.532	0.004	1.128	95.03	0.01	0	0	0.39	4.56
2002	97	23	822	358.021	-361.607	D	8.024	8.007	0.017	4.213	96.04	0.04	0	0	0.14	3.78
2002	98	23	1	356.546	-357.458	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2002	99	23	1	356.546	-357.458	D	9.139	9.139	0	6.909	0	0	0	0	0	0
2002	100	23	853	361.666	-362.175	D	7.41	7.379	0.031	2.845	98.15	0	0	0	0.22	1.63
2002	101	23	955	364.92	-354.582	D	6.91	6.892	0.019	1.839	93.84	0.03	0	0	0.12	6.02
2002	102	23	1	356.546	-357.458	D	7.41	7.41	0	2.91	0	0	0	0	0	0
2002	103	23	1	356.546	-357.458	D	9.738	9.738	0	8.465	0	0	0	0	0	0
2002	104	23	1	356.546	-357.458	D	9.329	9.329	0	7.392	0	0	0	0	0	0
2002	105	23	1	356.546	-357.458	D	8.09	8.09	0	4.401	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.575	7.575	0	3.262	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.511	7.511	0	3.124	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	8.475	8.475	0	5.29	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.611	7.611	0	3.34	0	0	0	0	0	0
2002	110	23	1	356.546	-357.458	D	9.529	9.529	0	7.912	0	0	0	0	0	0
2002	111	23	1	356.546	-357.458	D	9.293	9.293	0	7.301	0	0	0	0	0	0
2002	112	23	1	356.546	-357.458	D	6.941	6.941	0	1.938	0	0	0	0	0	0
2002	113	23	930	366.19	-357.232	D	6.965	6.964	0.002	1.985	96.66	0.02	0	0	0.14	3.03
2002	114	23	929	366.032	-357.239	D	8.318	8.318	0	4.923	102.95	0.01	0	0	0.04	3.15
2002	115	23	1	356.546	-357.458	D	6.747	6.747	0	1.549	0	0	0	0	0	0
2002	116	23	191	359.732	-362.061	D	8.169	8.163	0.006	4.567	94.09	0.18	0	0	0.5	5.23
2002	117	23	1017	356.894	-355.206	D	8.327	8.287	0.04	4.852	96.45	0.1	0	0	0.15	3.3
2002	118	23	1	356.546	-357.458	D	8.205	8.205	0	4.662	0	0	0	0	0	0
2002	119	23	1	356.546	-357.458	D	6.797	6.797	0	1.649	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	120	23	933	366.169	-356.524	D	7.867	7.857	0.009	3.879	97.79	0.01	0	0	0.03	2.16
2002	121	23	949	365.722	-354.966	D	9.364	9.364	0	7.482	99.19	0.02	0	0	0	0.57
2002	122	23	949	365.722	-354.966	D	8.621	8.425	0.196	5.174	99.54	0.03	0	0	0.01	0.43
2002	123	23	853	361.666	-362.175	D	6.992	6.97	0.022	1.996	98.98	0.01	0	0	0.02	0.99
2002	124	23	139	359.17	-360.588	D	7.868	7.379	0.489	2.844	96.8	0.07	0	0	0.21	2.92
2002	125	23	1035	356.477	-356.792	D	8.583	8.335	0.248	4.964	98.56	0.03	0	0	0.07	1.34
2002	126	23	949	365.722	-354.966	D	8.321	8.304	0.016	4.892	98.62	0	0	0	0.03	1.35
2002	127	23	1	356.546	-357.458	D	8.856	8.856	0	6.205	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	9.261	9.261	0	7.218	0	0	0	0	0	0
2002	129	23	1	356.546	-357.458	D	8.026	8.026	0	4.256	0	0	0	0	0	0
2002	130	23	853	361.666	-362.175	D	6.625	6.624	0	1.308	91.28	0.01	0	0	0.97	8.2
2002	131	23	997	359.928	-355.117	D	7.888	7.831	0.057	3.821	97.74	0.02	0	0	0.06	2.18
2002	132	23	1	356.546	-357.458	D	9.673	9.673	0	8.29	0	0	0	0	0	0
2002	133	23	1	356.546	-357.458	D	8.627	8.627	0	5.651	0	0	0	0	0	0
2002	134	23	1	356.546	-357.458	D	6.849	6.849	0	1.753	0	0	0	0	0	0
2002	135	23	1	356.546	-357.458	D	6.786	6.786	0	1.628	0	0	0	0	0	0
2002	136	23	1	356.546	-357.458	D	7.383	7.383	0	2.852	0	0	0	0	0	0
2002	137	23	930	366.19	-357.232	D	9.943	9.941	0.002	9.012	96.95	0.39	0	0	0.09	2.54
2002	138	23	1	356.546	-357.458	D	8.347	8.347	0	4.991	0	0	0	0	0	0
2002	139	23	1	356.546	-357.458	D	6.817	6.817	0	1.69	0	0	0	0	0	0
2002	140	23	1	356.546	-357.458	D	6.787	6.787	0	1.629	0	0	0	0	0	0
2002	141	23	853	361.666	-362.175	D	6.762	6.723	0.039	1.503	96.56	0	0	0	0.33	3.1
2002	142	23	949	365.722	-354.966	D	6.786	6.763	0.023	1.581	94.08	0.01	0	0	0.14	5.77
2002	143	23	930	366.19	-357.232	D	6.756	6.756	0	1.568	94.94	0.01	0	0	0.11	5.32
2002	144	23	1	356.546	-357.458	D	7.37	7.37	0	2.825	0	0	0	0	0	0
2002	145	23	1	356.546	-357.458	D	8.265	8.265	0	4.8	0	0	0	0	0	0
2002	146	23	1	356.546	-357.458	D	7.87	7.87	0	3.908	0	0	0	0	0	0
2002	147	23	1	356.546	-357.458	D	8.687	8.687	0	5.796	0	0	0	0	0	0
2002	148	23	1	356.546	-357.458	D	9.172	9.172	0	6.994	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	8.955	8.955	0	6.45	0	0	0	0	0	0
2002	150	23	949	365.722	-354.966	D	8.417	8.4	0.017	5.115	96.88	0.01	0	0	0.44	2.68
2002	151	23	949	365.722	-354.966	D	7.258	7.079	0.179	2.22	98.48	0.01	0	0	0.12	1.39
2002	152	23	949	365.722	-354.966	D	7.179	7.167	0.012	2.402	98.39	0	0	0	0.08	1.52
2002	153	23	1	356.546	-357.458	D	7.677	7.677	0	3.483	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.825	7.825	0	3.807	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.059	7.059	0	2.178	0	0	0	0	0	0
2002	156	23	1	356.546	-357.458	D	8.721	8.721	0	5.878	0	0	0	0	0	0
2002	157	23	1	356.546	-357.458	D	8.232	8.232	0	4.725	0	0	0	0	0	0
2002	158	23	1	356.546	-357.458	D	6.887	6.887	0	1.829	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	159	23	822	358.021	-361.607	D	6.921	6.884	0.037	1.824	98.12	0	0	0	0.2	1.67
2002	160	23	1008	358.048	-354.775	D	7.465	7.431	0.034	2.953	96.36	0	0	0	0.12	3.51
2002	161	23	1	356.546	-357.458	D	9.601	9.601	0	8.101	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	8.492	8.492	0	5.332	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	8.522	8.522	0	5.401	0	0	0	0	0	0
2002	164	23	1	356.546	-357.458	D	7.933	7.933	0	4.048	0	0	0	0	0	0
2002	165	23	1	356.546	-357.458	D	7.184	7.184	0	2.435	0	0	0	0	0	0
2002	166	23	1	356.546	-357.458	D	6.691	6.691	0	1.438	0	0	0	0	0	0
2002	167	23	1	356.546	-357.458	D	6.639	6.639	0	1.337	0	0	0	0	0	0
2002	168	23	1	356.546	-357.458	D	6.91	6.91	0	1.876	0	0	0	0	0	0
2002	169	23	947	365.801	-355.162	D	6.753	6.753	0	1.562	96.31	0	0	0	0.3	2.27
2002	170	23	941	365.977	-355.774	D	7.03	7.021	0.009	2.101	98.49	0	0	0	0.14	1.36
2002	171	23	62	357.925	-354.901	D	7.593	7.593	0	3.301	98.26	0	0	0	0.08	1.49
2002	172	23	929	366.032	-357.239	D	7.849	7.849	0	3.86	0.02	0.01	0	0	0	50.62
2002	173	23	949	365.722	-354.966	D	7.541	7.476	0.066	3.049	95.68	0.01	0	0	0.94	3.37
2002	174	23	822	358.021	-361.607	D	7.083	7.039	0.044	2.137	94.69	0.01	0	0	0.94	4.36
2002	175	23	949	365.722	-354.966	D	7.047	7.044	0.003	2.148	73.15	0.01	0	0	0.69	26.13
2002	176	23	1	356.546	-357.458	D	7.974	7.974	0	4.138	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.864	7.864	0	3.894	0	0	0	0	0	0
2002	178	23	1	356.546	-357.458	D	8.442	8.442	0	5.214	0	0	0	0	0	0
2002	179	23	1	356.546	-357.458	D	7.417	7.417	0	2.924	0	0	0	0	0	0
2002	180	23	1	356.546	-357.458	D	7.295	7.295	0	2.668	0	0	0	0	0	0
2002	181	23	1	356.546	-357.458	D	7.464	7.464	0	3.024	0	0	0	0	0	0
2002	182	23	247	360.217	-361.79	D	6.812	6.812	0	1.679	14.52	0	0	0	1.91	3.34
2002	183	23	900	364.265	-360.243	D	6.797	6.713	0.084	1.482	96.84	0	0	0	0.49	2.67
2002	184	23	949	365.722	-354.966	D	8.315	8.189	0.127	4.625	98.99	0	0	0	0.09	0.91
2002	185	23	933	366.169	-356.524	D	7.594	7.475	0.119	3.047	98.47	0	0	0	0.22	1.31
2002	186	23	822	358.021	-361.607	D	8.29	7.853	0.437	3.87	98.98	0	0	0	0.15	0.87
2002	187	23	1041	356.936	-357.592	D	7.325	7.187	0.138	2.442	97.5	0	0	0	0.4	2.1
2002	188	23	1017	356.894	-355.206	D	7.458	7.458	0.001	3.011	99.03	0	0	0	0.09	0.59
2002	189	23	1038	356.511	-357.396	D	6.796	6.792	0.003	1.64	96.99	0	0	0	0.42	2.54
2002	190	23	1039	356.522	-357.599	D	6.823	6.779	0.044	1.613	98.14	0	0	0	0.18	1.68
2002	191	23	907	365.051	-359.809	D	7.166	7.106	0.06	2.275	98.9	0	0	0	0.05	1.05
2002	192	23	907	365.051	-359.809	D	7.934	7.92	0.014	4.017	99.46	0	0	0	0.02	0.53
2002	193	23	907	365.051	-359.809	D	8.503	8.479	0.024	5.3	99.09	0	0	0	0.17	0.73
2002	194	23	907	365.051	-359.809	D	9.214	9.203	0.011	7.07	99.77	0	0	0	0.01	0.19
2002	195	23	853	361.666	-362.175	D	8.668	8.645	0.023	5.695	99.49	0.01	0	0	0.07	0.44
2002	196	23	853	361.666	-362.175	D	7.28	7.242	0.038	2.555	97.36	0.01	0	0	0.51	2.12
2002	197	23	833	359.603	-362.066	D	7.345	7.118	0.227	2.299	98.49	0	0	0	0.17	1.34

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	198	23	949	365.722	-354.966	D	8.853	8.612	0.241	5.616	99.58	0	0	0	0.03	0.39
2002	199	23	949	365.722	-354.966	D	8.19	8.168	0.023	4.578	99.57	0	0	0	0.01	0.41
2002	200	23	949	365.722	-354.966	D	9.276	9.273	0.003	7.249	99.7	0.01	0	0	0.01	0.24
2002	201	23	1	356.546	-357.458	D	8.2	8.2	0	4.651	0	0	0	0	0	0
2002	202	23	247	360.217	-361.79	D	8.224	8.224	0	4.706	11.71	0	0	0	0.14	0.23
2002	203	23	929	366.032	-357.239	D	7.116	7.116	0	2.296	17.67	0	0	0	0.83	1.4
2002	204	23	247	360.217	-361.79	D	7.375	7.375	0	2.836	59.21	0	0	0	1.12	3.26
2002	205	23	1	356.546	-357.458	D	6.939	6.939	0	1.934	0	0	0	0	0	0
2002	206	23	853	361.666	-362.175	D	7.106	7.104	0.001	2.271	98.93	0	0	0	0.1	0.76
2002	207	23	907	365.051	-359.809	D	7.413	7.353	0.06	2.788	99.53	0	0	0	0.03	0.44
2002	208	23	941	365.977	-355.774	D	7.48	7.48	0	3.058	98.53	0	0	0	0.07	1.27
2002	209	23	1	356.546	-357.458	D	7.228	7.228	0	2.528	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.898	7.898	0	3.969	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.793	7.793	0	3.737	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.19	7.19	0	2.449	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.191	7.191	0	2.45	0	0	0	0	0	0
2002	214	23	930	366.19	-357.232	D	7.466	7.465	0.001	3.026	99.01	0	0	0	0.16	0.82
2002	215	23	853	361.666	-362.175	D	7.553	7.41	0.143	2.909	98.08	0	0	0	0.3	1.61
2002	216	23	1017	356.894	-355.206	D	7.805	7.546	0.259	3.2	99.21	0	0	0	0.06	0.73
2002	217	23	1017	356.894	-355.206	D	7.295	7.287	0.007	2.651	99.19	0	0	0	0.04	0.76
2002	218	23	907	365.051	-359.809	D	6.91	6.881	0.029	1.818	97.85	0	0	0	0.17	1.98
2002	219	23	907	365.051	-359.809	D	8.788	8.719	0.069	5.873	99.67	0	0	0	0.01	0.32
2002	220	23	44	358.21	-361.379	D	6.724	6.723	0	1.503	98.67	0	0	0	0.02	1.18
2002	221	23	853	361.666	-362.175	D	6.707	6.688	0.019	1.433	94.37	0	0	0	0.96	4.67
2002	222	23	941	365.977	-355.774	D	6.898	6.838	0.06	1.731	96.85	0	0	0	0.18	2.97
2002	223	23	1002	359.309	-354.73	D	7.17	7.168	0.003	2.402	98.22	0	0	0	0.04	1.75
2002	224	23	543	362.627	-354.444	D	7.113	7.113	0	2.289	73.25	0	0	0	0.04	3.28
2002	225	23	1	356.546	-357.458	D	9.125	9.125	0	6.875	0	0	0	0	0	0
2002	226	23	1	356.546	-357.458	D	9.597	9.597	0	8.09	0	0	0	0	0	0
2002	227	23	1	356.546	-357.458	D	8.49	8.49	0	5.327	0	0	0	0	0	0
2002	228	23	1	356.546	-357.458	D	8.55	8.55	0	5.468	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	8.018	8.018	0	4.237	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	8.407	8.407	0	5.131	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.437	7.437	0	2.967	0	0	0	0	0	0
2002	232	23	1	356.546	-357.458	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	233	23	1	356.546	-357.458	D	7.361	7.361	0	2.805	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.811	7.811	0	3.777	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.29	7.29	0	2.657	0	0	0	0	0	0
2002	236	23	1	356.546	-357.458	D	7.915	7.915	0	4.008	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	237	23	1	356.546	-357.458	D	7.786	7.786	0	3.721	0	0	0	0	0	0
2002	238	23	1	356.546	-357.458	D	7.375	7.375	0	2.835	0	0	0	0	0	0
2002	239	23	1	356.546	-357.458	D	6.915	6.915	0	1.887	0	0	0	0	0	0
2002	240	23	1	356.546	-357.458	D	7.329	7.329	0	2.739	0	0	0	0	0	0
2002	241	23	1	356.546	-357.458	D	7.135	7.135	0	2.334	0	0	0	0	0	0
2002	242	23	1	356.546	-357.458	D	6.944	6.944	0	1.945	0	0	0	0	0	0
2002	243	23	822	358.021	-361.607	D	7.157	7.132	0.025	2.327	94.36	0.01	0	0	1.06	4.56
2002	244	23	930	366.19	-357.232	D	7.213	7.112	0.101	2.287	97.61	0	0	0	0.23	2.15
2002	245	23	967	363.478	-354.116	D	6.976	6.953	0.022	1.964	96.57	0	0	0	0.12	3.31
2002	246	23	1	356.546	-357.458	D	7.006	7.006	0	2.07	0	0	0	0	0	0
2002	247	23	1	356.546	-357.458	D	7.012	7.012	0	2.083	0	0	0	0	0	0
2002	248	23	1	356.546	-357.458	D	7.033	7.033	0	2.125	0	0	0	0	0	0
2002	249	23	861	361.895	-361.506	D	6.754	6.753	0.001	1.562	87.8	0	0	0	4.25	7.9
2002	250	23	949	365.722	-354.966	D	6.736	6.713	0.024	1.482	94.7	0	0	0	0.24	5.06
2002	251	23	949	365.722	-354.966	D	8.577	8.577	0	5.532	75.89	0.02	0	0	0.65	23.43
2002	252	23	949	365.722	-354.966	D	7.266	7.265	0	2.605	93.19	0	0	0	0.41	6.23
2002	253	23	966	363.538	-354.124	D	7.032	7.021	0.01	2.102	98.21	0	0	0	0.1	1.69
2002	254	23	907	365.051	-359.809	D	7.491	7.489	0.002	3.078	98.7	0	0	0	0.05	1.19
2002	255	23	191	359.732	-362.061	D	7.113	7.113	0	2.289	91.42	0	0	0	0.07	1.62
2002	256	23	44	358.21	-361.379	D	6.624	6.624	0	1.308	86.11	0	0	0	0.38	1.08
2002	257	23	907	365.051	-359.809	D	6.707	6.681	0.025	1.42	97.34	0	0	0	0.33	2.32
2002	258	23	907	365.051	-359.809	D	8.039	8.013	0.026	4.226	98.99	0	0	0	0.06	0.94
2002	259	23	786	365.973	-357.042	D	8.127	8.127	0	4.485	98.26	0	0	0	0.05	2.14
2002	260	23	929	366.032	-357.239	D	7.709	7.709	0	3.552	91.21	0.1	0	0	0.06	6.68
2002	261	23	520	362.88	-360.174	D	8.101	8.101	0	4.426	79.68	0.15	0	0	0.04	8.46
2002	262	23	1	356.546	-357.458	D	9.072	9.072	0	6.74	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	9.195	9.195	0	7.052	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	6.755	6.755	0	1.565	0	0	0	0	0	0
2002	265	23	1	356.546	-357.458	D	6.734	6.734	0	1.525	0	0	0	0	0	0
2002	266	23	1	356.546	-357.458	D	6.581	6.581	0	1.224	0	0	0	0	0	0
2002	267	23	1	356.546	-357.458	D	6.526	6.526	0	1.116	0	0	0	0	0	0
2002	268	23	822	358.021	-361.607	D	6.775	6.775	0	1.605	63.52	0.02	0	0	9.68	26.89
2002	269	23	853	361.666	-362.175	D	6.957	6.952	0.005	1.961	89.48	0.03	0	0	1.65	8.85
2002	270	23	907	365.051	-359.809	D	7.371	7.365	0.006	2.814	86.07	0	0	0	3.85	10.06
2002	271	23	1017	356.894	-355.206	D	6.761	6.76	0.001	1.575	97.51	0	0	0	0.05	2.43
2002	272	23	853	361.666	-362.175	D	7.396	7.347	0.049	2.776	98.31	0	0	0	0.23	1.46
2002	273	23	996	360.121	-355.113	D	7.807	7.756	0.051	3.655	98.25	0.01	0	0	0.09	1.65
2002	274	23	594	363.123	-354.422	D	6.998	6.998	0	2.054	95.87	0	0	0	0.15	3.05
2002	275	23	1	356.546	-357.458	D	7.125	7.125	0	2.314	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	276	23	1	356.546	-357.458	D	7.413	7.413	0	2.915	0	0	0	0	0	0
2002	277	23	1	356.546	-357.458	D	9.122	9.122	0	6.867	0	0	0	0	0	0
2002	278	23	1	356.546	-357.458	D	7.094	7.094	0	2.25	0	0	0	0	0	0
2002	279	23	1	356.546	-357.458	D	6.724	6.724	0	1.505	0	0	0	0	0	0
2002	280	23	1	356.546	-357.458	D	6.702	6.702	0	1.462	0	0	0	0	0	0
2002	281	23	1	356.546	-357.458	D	6.555	6.555	0	1.172	0	0	0	0	0	0
2002	282	23	853	361.666	-362.175	D	8.826	8.807	0.02	6.086	97.38	0.02	0	0	0.6	2
2002	283	23	853	361.666	-362.175	D	9.638	9.554	0.084	7.977	98.95	0.01	0	0	0.2	0.84
2002	284	23	822	358.021	-361.607	D	8.633	8.627	0.006	5.653	98.59	0	0	0	0.23	1.18
2002	285	23	811	357.434	-360.225	D	8.952	8.805	0.146	6.083	99.39	0.02	0	0	0.02	0.57
2002	286	23	219	359.98	-362.05	D	7.587	7.521	0.066	3.146	99.26	0.01	0	0	0.01	0.72
2002	287	23	1	356.546	-357.458	D	6.528	6.528	0	1.12	0	0	0	0	0	0
2002	288	23	1	356.546	-357.458	D	6.504	6.504	0	1.074	0	0	0	0	0	0
2002	289	23	1	356.546	-357.458	D	6.563	6.563	0	1.188	0	0	0	0	0	0
2002	290	23	1	356.546	-357.458	D	9.093	9.093	0	6.795	0	0	0	0	0	0
2002	291	23	1	356.546	-357.458	D	6.672	6.672	0	1.402	0	0	0	0	0	0
2002	292	23	1	356.546	-357.458	D	9.439	9.439	0	7.676	0	0	0	0	0	0
2002	293	23	1	356.546	-357.458	D	7.713	7.713	0	3.56	0	0	0	0	0	0
2002	294	23	907	365.051	-359.809	D	6.765	6.764	0.001	1.584	97.69	0	0	0	0.72	1.48
2002	295	23	900	364.265	-360.243	D	6.862	6.851	0.011	1.756	98.45	0	0	0	0.27	1.28
2002	296	23	822	358.021	-361.607	D	6.813	6.806	0.007	1.668	97.37	0.01	0	0	0.27	2.34
2002	297	23	836	360.07	-362.066	D	6.677	6.677	0	1.411	67.65	0	0	0	7.89	21.78
2002	298	23	907	365.051	-359.809	D	9.338	9.155	0.183	6.949	99.19	0.06	0	0	0.03	0.72
2002	299	23	853	361.666	-362.175	D	8.908	8.899	0.008	6.313	99.18	0.02	0	0	0.03	0.77
2002	300	23	853	361.666	-362.175	D	8.912	8.906	0.005	6.33	98.41	0.02	0	0	0.16	1.42
2002	301	23	900	364.265	-360.243	D	11.274	10.176	**1.098**	9.662	99.04	0.11	0	0	0.06	0.79
2002	302	23	1039	356.522	-357.599	D	10.384	9.753	**0.631**	8.504	99.38	0.06	0	0	0.03	0.53
2002	303	23	853	361.666	-362.175	D	8.494	8.469	0.025	5.277	99.34	0.01	0	0	0.04	0.61
2002	304	23	861	361.895	-361.506	D	8.9	8.899	0.001	6.312	97.6	0	0	0	0.28	2
2002	305	23	1	356.546	-357.458	D	7.915	7.915	0	4.007	0	0	0	0	0	0
2002	306	23	1	356.546	-357.458	D	7.559	7.559	0	3.229	0	0	0	0	0	0
2002	307	23	907	365.051	-359.809	D	10.143	10.113	0.03	9.486	99.43	0.08	0	0	0.05	0.42
2002	308	23	907	365.051	-359.809	D	9.162	9.16	0.002	6.962	99.55	0.06	0	0	0.01	0.37
2002	309	23	907	365.051	-359.809	D	9.157	9.129	0.028	6.883	99.4	0.17	0	0	0.02	0.41
2002	310	23	906	364.982	-359.812	D	7.879	7.879	0	3.927	99.78	0.02	0	0	0	0.34
2002	311	23	1	356.546	-357.458	D	6.548	6.548	0	1.16	0	0	0	0	0	0
2002	312	23	1	356.546	-357.458	D	6.657	6.657	0	1.373	0	0	0	0	0	0
2002	313	23	1	356.546	-357.458	D	8.478	8.478	0	5.298	0	0	0	0	0	0
2002	314	23	1	356.546	-357.458	D	8.593	8.593	0	5.57	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	315	23	1	356.546	-357.458	D	6.852	6.852	0	1.759	0	0	0	0	0	0
2002	316	23	1	356.546	-357.458	D	6.715	6.715	0	1.486	0	0	0	0	0	0
2002	317	23	1	356.546	-357.458	D	6.644	6.644	0	1.347	0	0	0	0	0	0
2002	318	23	1	356.546	-357.458	D	6.68	6.68	0	1.417	0	0	0	0	0	0
2002	319	23	1	356.546	-357.458	D	9.326	9.326	0	7.384	0	0	0	0	0	0
2002	320	23	1	356.546	-357.458	D	9.078	9.078	0	6.755	0	0	0	0	0	0
2002	321	23	1	356.546	-357.458	D	6.773	6.773	0	1.602	0	0	0	0	0	0
2002	322	23	1	356.546	-357.458	D	7.009	7.009	0	2.076	0	0	0	0	0	0
2002	323	23	1	356.546	-357.458	D	6.941	6.941	0	1.938	0	0	0	0	0	0
2002	324	23	1	356.546	-357.458	D	6.495	6.495	0	1.057	0	0	0	0	0	0
2002	325	23	1	356.546	-357.458	D	6.648	6.648	0	1.354	0	0	0	0	0	0
2002	326	23	1	356.546	-357.458	D	7.086	7.086	0	2.233	0	0	0	0	0	0
2002	327	23	1	356.546	-357.458	D	6.556	6.556	0	1.175	0	0	0	0	0	0
2002	328	23	1	356.546	-357.458	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2002	329	23	1	356.546	-357.458	D	6.97	6.97	0	1.998	0	0	0	0	0	0
2002	330	23	1	356.546	-357.458	D	6.582	6.582	0	1.225	0	0	0	0	0	0
2002	331	23	1	356.546	-357.458	D	6.922	6.922	0	1.9	0	0	0	0	0	0
2002	332	23	1	356.546	-357.458	D	6.594	6.594	0	1.249	0	0	0	0	0	0
2002	333	23	1	356.546	-357.458	D	6.608	6.608	0	1.277	0	0	0	0	0	0
2002	334	23	1	356.546	-357.458	D	6.711	6.711	0	1.478	0	0	0	0	0	0
2002	335	23	1	356.546	-357.458	D	6.509	6.509	0	1.084	0	0	0	0	0	0
2002	336	23	1	356.546	-357.458	D	6.483	6.483	0	1.034	0	0	0	0	0	0
2002	337	23	1	356.546	-357.458	D	6.872	6.872	0	1.8	0	0	0	0	0	0
2002	338	23	1	356.546	-357.458	D	9.947	9.947	0	9.028	0	0	0	0	0	0
2002	339	23	1	356.546	-357.458	D	8.163	8.163	0	4.566	0	0	0	0	0	0
2002	340	23	1	356.546	-357.458	D	9.222	9.222	0	7.119	0	0	0	0	0	0
2002	341	23	1	356.546	-357.458	D	7.426	7.426	0	2.944	0	0	0	0	0	0
2002	342	23	1	356.546	-357.458	D	8.131	8.131	0	4.493	0	0	0	0	0	0
2002	343	23	1	356.546	-357.458	D	8.243	8.243	0	4.749	0	0	0	0	0	0
2002	344	23	78	358.239	-356.385	D	6.864	6.864	0	1.784	72.58	0	0	0	8.83	17.13
2002	345	23	822	358.021	-361.607	D	8.114	8.11	0.004	4.447	95.8	0	0	0	0.65	3.45
2002	346	23	1005	358.679	-354.752	D	7.617	7.612	0.005	3.342	98.35	0	0	0	0.05	1.57
2002	347	23	930	366.19	-357.232	D	9.237	9.056	0.18	6.702	99.06	0.14	0	0	0.05	0.75
2002	348	23	900	364.265	-360.243	D	9.55	9.535	0.016	7.926	99.16	0.11	0	0	0.01	0.71
2002	349	23	1	356.546	-357.458	D	7.203	7.203	0	2.475	0	0	0	0	0	0
2002	350	23	1	356.546	-357.458	D	8.634	8.634	0	5.669	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	9.503	9.503	0	7.844	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	9.613	9.613	0	8.133	0	0	0	0	0	0
2002	353	23	1	356.546	-357.458	D	7.699	7.699	0	3.532	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	354	23	1	356.546	-357.458	D	6.719	6.719	0	1.494	0	0	0	0	0	0
2002	355	23	1	356.546	-357.458	D	6.506	6.506	0	1.077	0	0	0	0	0	0
2002	356	23	1	356.546	-357.458	D	7.19	7.19	0	2.447	0	0	0	0	0	0
2002	357	23	361	361.165	-360.749	D	7.342	7.342	0	2.767	86.83	0.01	0	0	3.69	6.33
2002	358	23	861	361.895	-361.506	D	9.639	9.639	0	8.202	87.19	0.01	0	0	3.58	6.28
2002	359	23	1	356.546	-357.458	D	7.327	7.327	0	2.734	0	0	0	0	0	0
2002	360	23	1	356.546	-357.458	D	7.523	7.523	0	3.15	0	0	0	0	0	0
2002	361	23	1	356.546	-357.458	D	7.159	7.159	0	2.384	0	0	0	0	0	0
2002	362	23	1	356.546	-357.458	D	7.157	7.157	0	2.381	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.138	7.138	0	2.341	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	9.404	9.404	0	7.586	0	0	0	0	0	0
2002	365	23	1	356.546	-357.458	D	8.6	8.6	0	5.587	0	0	0	0	0	0
									1.098							

Appendix M
Hercules Glade
2003 M2

EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	907	365.051	-359.809	D	7.091	7.07	0.02	2.201	0	0	0	0	0	99.99
2003	2	23	1039	356.522	-357.599	D	9.288	9.25	0.038	7.19	0	0	0	0	0	100
2003	3	23	927	365.912	-357.454	D	8.265	8.09	0.175	4.401	0	0	0	0	0	100
2003	4	23	949	365.722	-354.966	D	6.826	6.825	0.001	1.706	0	0	0	0	0	100.06
2003	5	23	927	365.912	-357.454	D	7.748	7.61	0.138	3.337	0	0	0	0	0	100
2003	6	23	731	365.047	-358.581	D	8.347	8.306	0.041	4.896	0	0	0	0	0	100
2003	7	23	78	358.239	-356.385	D	8.6	8.571	0.029	5.518	0	0	0	0	0	100
2003	8	23	1	356.546	-357.458	D	6.824	6.824	0	1.703	0	0	0	0	0	0
2003	9	23	861	361.895	-361.506	D	7.008	6.997	0.011	2.051	0	0	0	0	0	100
2003	10	23	764	365.499	-357.562	D	6.813	6.675	0.139	1.407	0	0	0	0	0	100
2003	11	23	78	358.239	-356.385	D	6.604	6.561	0.043	1.184	0	0	0	0	0	100
2003	12	23	822	358.021	-361.607	D	6.511	6.491	0.019	1.049	0	0	0	0	0	100
2003	13	23	947	365.801	-355.162	D	6.659	6.658	0.002	1.374	0	0	0	0	0	99.91
2003	14	23	764	365.499	-357.562	D	8.814	8.799	0.015	6.068	0	0	0	0	0	99.99
2003	15	23	822	358.021	-361.607	D	6.607	6.607	0	1.274	0	0	0	0	0	99.8
2003	16	23	78	358.239	-356.385	D	8.204	8.171	0.033	4.585	0	0	0	0	0	100
2003	17	23	927	365.912	-357.454	D	7.886	7.735	0.151	3.61	0	0	0	0	0	100
2003	18	23	949	365.722	-354.966	D	6.968	6.944	0.024	1.945	0	0	0	0	0	100
2003	19	23	861	361.895	-361.506	D	6.859	6.857	0.002	1.769	0	0	0	0	0	99.99
2003	20	23	1	356.546	-357.458	D	6.636	6.636	0	1.33	0	0	0	0	0	0
2003	21	23	1017	356.894	-355.206	D	7.117	7.097	0.02	2.257	0	0	0	0	0	100
2003	22	23	907	365.051	-359.809	D	7.192	7.165	0.027	2.397	0	0	0	0	0	100
2003	23	23	822	358.021	-361.607	D	7.146	7.144	0.002	2.353	0	0	0	0	0	99.89
2003	24	23	1039	356.522	-357.599	D	6.746	6.741	0.004	1.539	0	0	0	0	0	99.97
2003	25	23	785	365.637	-355.06	D	6.498	6.496	0.001	1.059	0	0	0	0	0	99.96
2003	26	23	102	358.487	-356.374	D	7.154	7.143	0.012	2.35	0	0	0	0	0	100
2003	27	23	844	360.75	-362.146	D	6.811	6.805	0.006	1.665	0	0	0	0	0	99.99
2003	28	23	929	366.032	-357.239	D	7.222	7.222	0	2.516	0	0	0	0	0	101.42
2003	29	23	78	358.239	-356.385	D	9.301	9.286	0.016	7.281	0	0	0	0	0	99.99
2003	30	23	907	365.051	-359.809	D	9.181	9.169	0.012	6.986	0	0	0	0	0	100
2003	31	23	1006	358.469	-354.76	D	7.231	7.23	0.001	2.531	0	0	0	0	0	99.93
2003	32	23	927	365.912	-357.454	D	8.377	8.306	0.07	4.896	0	0	0	0	0	100
2003	33	23	1	356.546	-357.458	D	6.734	6.734	0	1.525	0	0	0	0	0	0
2003	34	23	643	363.609	-354.151	D	9.387	9.387	0	7.543	0	0	0	0	0	98.96
2003	35	23	773	365.4	-355.32	D	7.148	7.087	0.062	2.235	0	0	0	0	0	100
2003	36	23	78	358.239	-356.385	D	6.594	6.578	0.016	1.218	0	0	0	0	0	99.99
2003	37	23	933	366.169	-356.524	D	8.984	8.978	0.006	6.507	0	0	0	0	0	99.98
2003	38	23	1039	356.522	-357.599	D	7.883	7.857	0.027	3.878	0	0	0	0	0	100

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	39	23	643	363.609	-354.151	D	7.112	7.112	0	2.286	0	0	0	0	0	100.17
2003	40	23	775	365.747	-357.551	D	7.756	7.756	0	3.655	0	0	0	0	0	98.75
2003	41	23	955	364.92	-354.582	D	9.516	9.516	0.001	7.877	0	0	0	0	0	99.78
2003	42	23	949	365.722	-354.966	D	7.039	7.025	0.014	2.108	0	0	0	0	0	100
2003	43	23	78	358.239	-356.385	D	6.57	6.547	0.024	1.157	0	0	0	0	0	100
2003	44	23	974	362.281	-354.249	D	6.56	6.551	0.009	1.165	0	0	0	0	0	100
2003	45	23	642	363.62	-354.4	D	9.967	9.967	0	9.085	0	0	0	0	0	96.7
2003	46	23	563	362.941	-355.928	D	10.022	9.991	0.031	9.15	0	0	0	0	0	100
2003	47	23	927	365.912	-357.454	D	8.275	8.257	0.018	4.782	0	0	0	0	0	100
2003	48	23	967	363.478	-354.116	D	8.574	8.525	0.049	5.408	0	0	0	0	0	99.99
2003	49	23	949	365.722	-354.966	D	7.564	7.556	0.007	3.222	0	0	0	0	0	100.01
2003	50	23	947	365.801	-355.162	D	9.167	9.167	0	6.979	0	0	0	0	0	99.04
2003	51	23	907	365.051	-359.809	D	9.265	9.253	0.012	7.199	0	0	0	0	0	100.01
2003	52	23	822	358.021	-361.607	D	9.019	9.015	0.004	6.6	0	0	0	0	0	99.96
2003	53	23	102	358.487	-356.374	D	9.249	9.211	0.037	7.093	0	0	0	0	0	99.99
2003	54	23	824	358.459	-361.601	D	8.646	8.617	0.03	5.627	0	0	0	0	0	100
2003	55	23	822	358.021	-361.607	D	8.302	8.25	0.052	4.766	0	0	0	0	0	100
2003	56	23	861	361.895	-361.506	D	7.162	7.15	0.012	2.365	0	0	0	0	0	99.99
2003	57	23	1039	356.522	-357.599	D	7.725	7.714	0.01	3.564	0	0	0	0	0	99.98
2003	58	23	1017	356.894	-355.206	D	8.271	8.268	0.004	4.807	0	0	0	0	0	99.99
2003	59	23	955	364.92	-354.582	D	8.462	8.404	0.058	5.124	0	0	0	0	0	100
2003	60	23	1008	358.048	-354.775	D	9.12	9.1	0.02	6.81	0	0	0	0	0	99.99
2003	61	23	714	364.799	-358.592	D	9.322	9.158	0.165	6.956	0	0	0	0	0	100
2003	62	23	822	358.021	-361.607	D	7.507	7.488	0.018	3.076	0	0	0	0	0	100
2003	63	23	930	366.19	-357.232	D	6.95	6.95	0	1.957	0	0	0	0	0	100.35
2003	64	23	822	358.021	-361.607	D	8.151	8.136	0.016	4.505	0	0	0	0	0	100
2003	65	23	869	361.064	-360.714	D	7.641	7.557	0.083	3.224	0	0	0	0	0	100
2003	66	23	907	365.051	-359.809	D	7.125	7.123	0.002	2.309	0	0	0	0	0	99.93
2003	67	23	966	363.538	-354.124	D	7.036	7.036	0	2.132	0	0	0	0	0	99.85
2003	68	23	1039	356.522	-357.599	D	6.915	6.909	0.006	1.874	0	0	0	0	0	100.01
2003	69	23	907	365.051	-359.809	D	6.571	6.56	0.011	1.182	0	0	0	0	0	100
2003	70	23	930	366.19	-357.232	D	6.534	6.518	0.016	1.102	0	0	0	0	0	99.99
2003	71	23	947	365.801	-355.162	D	6.957	6.956	0.001	1.969	0	0	0	0	0	99.93
2003	72	23	1039	356.522	-357.599	D	8.524	8.5	0.025	5.349	0	0	0	0	0	100
2003	73	23	78	358.239	-356.385	D	7.955	7.94	0.015	4.063	0	0	0	0	0	100.01
2003	74	23	1017	356.894	-355.206	D	8.291	8.288	0.003	4.853	0	0	0	0	0	99.92
2003	75	23	10	356.954	-355.443	D	7.317	7.316	0	2.712	0	0	0	0	0	99.75
2003	76	23	1	356.546	-357.458	D	8.57	8.57	0	5.516	0	0	0	0	0	0
2003	77	23	949	365.722	-354.966	D	8.743	8.743	0	5.93	0	0	0	0	0	100.26

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	78	23	643	363.609	-354.151	D	8.893	8.892	0.001	6.296	0	0	0	0	0	99.92
2003	79	23	773	365.4	-355.32	D	9.47	9.451	0.019	7.708	0	0	0	0	0	99.98
2003	80	23	78	358.239	-356.385	D	8.578	8.525	0.054	5.408	0	0	0	0	0	100
2003	81	23	78	358.239	-356.385	D	6.626	6.524	0.102	1.112	0	0	0	0	0	100
2003	82	23	356	361.22	-361.995	D	6.548	6.547	0	1.158	0	0	0	0	0	99.17
2003	83	23	1	356.546	-357.458	D	6.769	6.769	0	1.593	0	0	0	0	0	0
2003	84	23	1017	356.894	-355.206	D	7.453	7.434	0.019	2.96	0	0	0	0	0	100
2003	85	23	927	365.912	-357.454	D	8.935	8.932	0.004	6.392	0	0	0	0	0	99.98
2003	86	23	643	363.609	-354.151	D	6.567	6.567	0.001	1.195	0	0	0	0	0	99.94
2003	87	23	949	365.722	-354.966	D	8.54	8.509	0.031	5.371	0	0	0	0	0	100
2003	88	23	927	365.912	-357.454	D	7.597	7.478	0.119	3.054	0	0	0	0	0	100
2003	89	23	927	365.912	-357.454	D	6.71	6.554	0.157	1.171	0	0	0	0	0	100
2003	90	23	933	366.169	-356.524	D	6.476	6.475	0	1.019	0	0	0	0	0	99.9
2003	91	23	1	356.546	-357.458	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	6.806	6.806	0	1.667	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.057	7.057	0	2.175	0	0	0	0	0	0
2003	94	23	1016	357.1	-355.198	D	7.929	7.929	0	4.037	0	0	0	0	0	100.05
2003	95	23	824	358.459	-361.601	D	6.933	6.89	0.043	1.835	0	0	0	0	0	100
2003	96	23	900	364.265	-360.243	D	8.381	8.376	0.005	5.059	0	0	0	0	0	99.98
2003	97	23	955	364.92	-354.582	D	9.277	9.275	0.002	7.253	0	0	0	0	0	100.03
2003	98	23	1041	356.936	-357.592	D	7.946	7.828	0.119	3.813	0	0	0	0	0	100
2003	99	23	822	358.021	-361.607	D	7.331	7.323	0.008	2.725	0	0	0	0	0	100
2003	100	23	1	356.546	-357.458	D	6.576	6.576	0	1.213	0	0	0	0	0	0
2003	101	23	1017	356.894	-355.206	D	6.51	6.475	0.034	1.018	0	0	0	0	0	100
2003	102	23	927	365.912	-357.454	D	6.598	6.498	0.1	1.063	0	0	0	0	0	100
2003	103	23	949	365.722	-354.966	D	6.539	6.526	0.013	1.117	0	0	0	0	0	100
2003	104	23	931	366.183	-356.996	D	6.62	6.62	0	1.3	0	0	0	0	0	97.97
2003	105	23	1	356.546	-357.458	D	6.611	6.611	0	1.282	0	0	0	0	0	0
2003	106	23	1	356.546	-357.458	D	6.649	6.649	0	1.357	0	0	0	0	0	0
2003	107	23	955	364.92	-354.582	D	8.414	8.377	0.037	5.061	0	0	0	0	0	100
2003	108	23	949	365.722	-354.966	D	8.302	8.29	0.013	4.858	0	0	0	0	0	100
2003	109	23	946	365.798	-355.322	D	8.099	8.099	0	4.421	0	0	0	0	0	98.17
2003	110	23	822	358.021	-361.607	D	9.043	9.042	0.001	6.666	0	0	0	0	0	99.92
2003	111	23	949	365.722	-354.966	D	7.269	7.258	0.011	2.59	0	0	0	0	0	99.99
2003	112	23	78	358.239	-356.385	D	6.595	6.545	0.05	1.154	0	0	0	0	0	100
2003	113	23	927	365.912	-357.454	D	6.555	6.549	0.006	1.161	0	0	0	0	0	99.97
2003	114	23	1017	356.894	-355.206	D	8.459	8.459	0	5.252	0	0	0	0	0	100.48
2003	115	23	955	364.92	-354.582	D	9.198	9.157	0.041	6.955	0	0	0	0	0	100
2003	116	23	537	362.693	-355.939	D	7.661	7.621	0.04	3.361	0	0	0	0	0	100

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	117	23	930	366.19	-357.232	D	6.919	6.914	0.005	1.884	0	0	0	0	0	100.01
2003	118	23	594	363.123	-354.422	D	7.7	7.7	0	3.533	0	0	0	0	0	98.15
2003	119	23	927	365.912	-357.454	D	8.118	8.105	0.013	4.435	0	0	0	0	0	100.01
2003	120	23	929	366.032	-357.239	D	8.108	8.108	0	4.442	0	0	0	0	0	92.14
2003	121	23	1010	357.824	-354.865	D	8.057	8.057	0.001	4.325	0	0	0	0	0	99.9
2003	122	23	78	358.239	-356.385	D	8.683	8.672	0.01	5.761	0	0	0	0	0	99.96
2003	123	23	1039	356.522	-357.599	D	8.074	8.071	0.004	4.356	0	0	0	0	0	99.99
2003	124	23	930	366.19	-357.232	D	7.092	7.083	0.008	2.229	0	0	0	0	0	99.99
2003	125	23	1	356.546	-357.458	D	8.426	8.426	0	5.177	0	0	0	0	0	0
2003	126	23	255	360.129	-359.796	D	7.211	7.211	0	2.492	0	0	0	0	0	52.99
2003	127	23	78	358.239	-356.385	D	8.526	8.486	0.04	5.317	0	0	0	0	0	100
2003	128	23	961	364.092	-354.289	D	7.468	7.458	0.01	3.012	0	0	0	0	0	99.99
2003	129	23	1	356.546	-357.458	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	8.54	8.54	0	5.445	0	0	0	0	0	0
2003	131	23	822	358.021	-361.607	D	7.449	7.449	0	2.992	0	0	0	0	0	99.89
2003	132	23	773	365.4	-355.32	D	6.695	6.623	0.072	1.305	0	0	0	0	0	100
2003	133	23	1039	356.522	-357.599	D	6.716	6.709	0.007	1.475	0	0	0	0	0	99.99
2003	134	23	1	356.546	-357.458	D	9.435	9.435	0	7.667	0	0	0	0	0	4.28
2003	135	23	927	365.912	-357.454	D	8.556	8.554	0.001	5.479	0	0	0	0	0	99.93
2003	136	23	963	363.809	-354.192	D	9.463	9.456	0.007	7.721	0	0	0	0	0	99.98
2003	137	23	965	363.588	-354.142	D	9.255	9.253	0.002	7.197	0	0	0	0	0	99.85
2003	138	23	927	365.912	-357.454	D	8.898	8.865	0.032	6.23	0	0	0	0	0	100
2003	139	23	1035	356.477	-356.792	D	8.758	8.751	0.007	5.951	0	0	0	0	0	99.99
2003	140	23	730	364.623	-354.605	D	8.119	8.116	0.003	4.459	0	0	0	0	0	99.97
2003	141	23	102	358.487	-356.374	D	6.701	6.687	0.014	1.431	0	0	0	0	0	100
2003	142	23	822	358.021	-361.607	D	6.856	6.848	0.008	1.751	0	0	0	0	0	99.98
2003	143	23	822	358.021	-361.607	D	6.621	6.615	0.005	1.29	0	0	0	0	0	99.98
2003	144	23	1017	356.894	-355.206	D	7.576	7.56	0.016	3.229	0	0	0	0	0	99.99
2003	145	23	78	358.239	-356.385	D	9.19	9.15	0.04	6.938	0	0	0	0	0	100
2003	146	23	1017	356.894	-355.206	D	7.823	7.807	0.016	3.769	0	0	0	0	0	100
2003	147	23	773	365.4	-355.32	D	6.711	6.637	0.074	1.334	0	0	0	0	0	100
2003	148	23	102	358.487	-356.374	D	6.699	6.635	0.064	1.33	0	0	0	0	0	100
2003	149	23	927	365.912	-357.454	D	7.31	7.184	0.126	2.437	0	0	0	0	0	100
2003	150	23	1039	356.522	-357.599	D	6.616	6.608	0.008	1.277	0	0	0	0	0	99.99
2003	151	23	102	358.487	-356.374	D	7.181	7.158	0.024	2.382	0	0	0	0	0	100
2003	152	23	927	365.912	-357.454	D	7.218	7.212	0.007	2.493	0	0	0	0	0	99.97
2003	153	23	811	357.434	-360.225	D	8.534	8.532	0.002	5.425	0	0	0	0	0	99.96
2003	154	23	102	358.487	-356.374	D	9.241	9.092	0.149	6.79	0	0	0	0	0	100
2003	155	23	822	358.021	-361.607	D	8.012	8.01	0.003	4.219	0	0	0	0	0	99.9

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	156	23	1017	356.894	-355.206	D	6.733	6.722	0.011	1.5	0	0	0	0	0	99.99
2003	157	23	967	363.478	-354.116	D	7.995	7.985	0.011	4.163	0	0	0	0	0	100
2003	158	23	927	365.912	-357.454	D	7.547	7.489	0.057	3.078	0	0	0	0	0	100
2003	159	23	927	365.912	-357.454	D	7.724	7.715	0.009	3.566	0	0	0	0	0	100
2003	160	23	949	365.722	-354.966	D	6.621	6.621	0	1.301	0	0	0	0	0	97.47
2003	161	23	1	356.546	-357.458	D	7.537	7.537	0	3.181	0	0	0	0	0	0
2003	162	23	949	365.722	-354.966	D	8.978	8.977	0.001	6.505	0	0	0	0	0	99.93
2003	163	23	967	363.478	-354.116	D	8.892	8.884	0.008	6.275	0	0	0	0	0	100
2003	164	23	964	363.678	-354.148	D	8.872	8.869	0.003	6.239	0	0	0	0	0	99.95
2003	165	23	822	358.021	-361.607	D	8.232	8.223	0.009	4.704	0	0	0	0	0	99.98
2003	166	23	930	366.19	-357.232	D	7.913	7.899	0.015	3.971	0	0	0	0	0	99.99
2003	167	23	1017	356.894	-355.206	D	8.022	8.009	0.013	4.217	0	0	0	0	0	99.99
2003	168	23	1008	358.048	-354.775	D	6.955	6.946	0.009	1.949	0	0	0	0	0	99.99
2003	169	23	1008	358.048	-354.775	D	7.691	7.684	0.007	3.499	0	0	0	0	0	99.99
2003	170	23	964	363.678	-354.148	D	8.271	8.226	0.045	4.712	0	0	0	0	0	100
2003	171	23	78	358.239	-356.385	D	8.6	8.589	0.011	5.562	0	0	0	0	0	99.97
2003	172	23	927	365.912	-357.454	D	6.92	6.919	0.002	1.893	0	0	0	0	0	99.96
2003	173	23	62	357.925	-354.901	D	6.849	6.849	0	1.754	0	0	0	0	0	100.31
2003	174	23	1	356.546	-357.458	D	7.032	7.032	0	2.124	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.954	7.954	0	4.094	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	8.379	8.379	0	5.066	0	0	0	0	0	0
2003	177	23	927	365.912	-357.454	D	8.476	8.455	0.021	5.244	0	0	0	0	0	99.99
2003	178	23	78	358.239	-356.385	D	6.818	6.78	0.039	1.615	0	0	0	0	0	100
2003	179	23	1017	356.894	-355.206	D	6.656	6.642	0.014	1.343	0	0	0	0	0	99.99
2003	180	23	1008	358.048	-354.775	D	6.699	6.696	0.003	1.448	0	0	0	0	0	99.93
2003	181	23	62	357.925	-354.901	D	6.985	6.984	0.001	2.026	0	0	0	0	0	99.95
2003	182	23	476	361.894	-354.726	D	8.488	8.488	0	5.322	0	0	0	0	0	97.04
2003	183	23	1017	356.894	-355.206	D	7.869	7.864	0.005	3.893	0	0	0	0	0	100
2003	184	23	1008	358.048	-354.775	D	7.54	7.538	0.002	3.182	0	0	0	0	0	99.97
2003	185	23	932	366.176	-356.761	D	7.018	7.018	0	2.095	0	0	0	0	0	96.45
2003	186	23	1	356.546	-357.458	D	7.047	7.047	0	2.154	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.775	7.775	0	3.698	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.138	7.138	0	2.341	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.032	7.032	0	2.124	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.13	7.13	0	2.323	0	0	0	0	0	0
2003	191	23	949	365.722	-354.966	D	7.711	7.709	0.002	3.552	0	0	0	0	0	100.06
2003	192	23	102	358.487	-356.374	D	6.989	6.906	0.084	1.867	0	0	0	0	0	100
2003	193	23	949	365.722	-354.966	D	7.703	7.703	0.001	3.539	0	0	0	0	0	99.9
2003	194	23	949	365.722	-354.966	D	7.468	7.459	0.009	3.013	0	0	0	0	0	100

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	195	23	1017	356.894	-355.206	D	8.569	8.562	0.006	5.497	0	0	0	0	0	99.98
2003	196	23	774	365.389	-355.071	D	8.44	8.44	0	5.208	0	0	0	0	0	99.98
2003	197	23	869	361.064	-360.714	D	7.146	7.097	0.049	2.256	0	0	0	0	0	100
2003	198	23	941	365.977	-355.774	D	7.072	7.071	0.001	2.203	0	0	0	0	0	99.86
2003	199	23	930	366.19	-357.232	D	6.917	6.917	0	1.89	0	0	0	0	0	99.96
2003	200	23	932	366.176	-356.761	D	8.005	8.005	0	4.209	0	0	0	0	0	97.52
2003	201	23	949	365.722	-354.966	D	8.703	8.703	0.001	5.834	0	0	0	0	0	100.12
2003	202	23	949	365.722	-354.966	D	7.758	7.75	0.008	3.643	0	0	0	0	0	99.99
2003	203	23	822	358.021	-361.607	D	7.394	7.377	0.018	2.839	0	0	0	0	0	100
2003	204	23	822	358.021	-361.607	D	7.009	7.009	0	2.076	0	0	0	0	0	100.13
2003	205	23	846	360.93	-362.178	D	6.8	6.796	0.004	1.647	0	0	0	0	0	99.98
2003	206	23	852	361.595	-362.148	D	7.028	7.015	0.014	2.088	0	0	0	0	0	99.99
2003	207	23	1017	356.894	-355.206	D	6.96	6.959	0.001	1.976	0	0	0	0	0	99.84
2003	208	23	929	366.032	-357.239	D	6.964	6.964	0	1.985	0	0	0	0	0	56.95
2003	209	23	1	356.546	-357.458	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2003	210	23	1007	358.259	-354.768	D	8.44	8.429	0.011	5.183	0	0	0	0	0	100
2003	211	23	1017	356.894	-355.206	D	8.958	8.949	0.01	6.435	0	0	0	0	0	99.99
2003	212	23	949	365.722	-354.966	D	8.141	8.121	0.02	4.472	0	0	0	0	0	99.99
2003	213	23	933	366.169	-356.524	D	7.042	7.04	0.002	2.14	0	0	0	0	0	99.96
2003	214	23	785	365.637	-355.06	D	7.727	7.727	0	3.591	0	0	0	0	0	97.59
2003	215	23	955	364.92	-354.582	D	8.468	8.451	0.017	5.235	0	0	0	0	0	99.99
2003	216	23	949	365.722	-354.966	D	7.175	7.161	0.014	2.388	0	0	0	0	0	100
2003	217	23	78	358.239	-356.385	D	7.709	7.65	0.058	3.425	0	0	0	0	0	100
2003	218	23	1039	356.522	-357.599	D	8.393	8.359	0.033	5.02	0	0	0	0	0	99.99
2003	219	23	947	365.801	-355.162	D	8.136	8.127	0.008	4.485	0	0	0	0	0	99.98
2003	220	23	930	366.19	-357.232	D	6.881	6.878	0.003	1.811	0	0	0	0	0	99.97
2003	221	23	1039	356.522	-357.599	D	6.873	6.871	0.002	1.798	0	0	0	0	0	99.98
2003	222	23	949	365.722	-354.966	D	6.953	6.945	0.008	1.946	0	0	0	0	0	99.98
2003	223	23	907	365.051	-359.809	D	6.822	6.811	0.011	1.677	0	0	0	0	0	100
2003	224	23	1017	356.894	-355.206	D	7.121	7.101	0.02	2.265	0	0	0	0	0	99.99
2003	225	23	1017	356.894	-355.206	D	7.665	7.661	0.004	3.448	0	0	0	0	0	100
2003	226	23	15	357.659	-360.155	D	9.005	9.004	0	6.572	0	0	0	0	0	99.39
2003	227	23	949	365.722	-354.966	D	7.104	7.102	0.002	2.267	0	0	0	0	0	99.96
2003	228	23	949	365.722	-354.966	D	6.941	6.911	0.031	1.877	0	0	0	0	0	100
2003	229	23	949	365.722	-354.966	D	6.801	6.785	0.016	1.625	0	0	0	0	0	99.99
2003	230	23	955	364.92	-354.582	D	6.816	6.789	0.026	1.634	0	0	0	0	0	99.99
2003	231	23	949	365.722	-354.966	D	7.03	7.021	0.008	2.102	0	0	0	0	0	99.98
2003	232	23	930	366.19	-357.232	D	7.146	7.143	0.003	2.351	0	0	0	0	0	100
2003	233	23	930	366.19	-357.232	D	6.863	6.861	0.001	1.778	0	0	0	0	0	100.01

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	234	23	966	363.538	-354.124	D	7.06	7.045	0.015	2.15	0	0	0	0	0	100
2003	235	23	907	365.051	-359.809	D	7.026	7.019	0.007	2.097	0	0	0	0	0	100
2003	236	23	822	358.021	-361.607	D	7.866	7.855	0.011	3.873	0	0	0	0	0	100
2003	237	23	1017	356.894	-355.206	D	7.713	7.708	0.005	3.55	0	0	0	0	0	99.96
2003	238	23	931	366.183	-356.996	D	7.206	7.204	0.002	2.477	0	0	0	0	0	100.01
2003	239	23	782	365.67	-355.807	D	7.03	7.029	0	2.118	0	0	0	0	0	99.33
2003	240	23	1	356.546	-357.458	D	7.035	7.035	0	2.13	0	0	0	0	0	0
2003	241	23	1	356.546	-357.458	D	8.765	8.765	0	5.985	0	0	0	0	0	0
2003	242	23	906	364.982	-359.812	D	9.342	9.342	0	7.425	0	0	0	0	0	95.85
2003	243	23	906	364.982	-359.812	D	9.378	9.377	0.001	7.517	0	0	0	0	0	99.64
2003	244	23	1017	356.894	-355.206	D	9.054	9.054	0	6.695	0	0	0	0	0	97.33
2003	245	23	949	365.722	-354.966	D	9.652	9.651	0.001	8.234	0	0	0	0	0	100.01
2003	246	23	811	357.434	-360.225	D	9.185	9.147	0.038	6.93	0	0	0	0	0	100
2003	247	23	810	357.434	-360.005	D	7.728	7.727	0	3.593	0	0	0	0	0	99.92
2003	248	23	731	365.047	-358.581	D	6.755	6.743	0.012	1.542	0	0	0	0	0	100
2003	249	23	1017	356.894	-355.206	D	6.882	6.86	0.021	1.776	0	0	0	0	0	100
2003	250	23	1017	356.894	-355.206	D	6.921	6.92	0.002	1.895	0	0	0	0	0	99.96
2003	251	23	832	359.493	-362.061	D	6.832	6.831	0.002	1.717	0	0	0	0	0	99.93
2003	252	23	811	357.434	-360.225	D	7.108	7.107	0.001	2.276	0	0	0	0	0	99.83
2003	253	23	941	365.977	-355.774	D	7.304	7.303	0.001	2.683	0	0	0	0	0	99.85
2003	254	23	595	363.624	-360.142	D	8.306	8.306	0	4.895	0	0	0	0	0	80.18
2003	255	23	1	356.546	-357.458	D	9.772	9.772	0	8.557	0	0	0	0	0	0
2003	256	23	1	356.546	-357.458	D	9.293	9.293	0	7.301	0	0	0	0	0	0
2003	257	23	78	358.239	-356.385	D	8.501	8.451	0.051	5.234	0	0	0	0	0	100
2003	258	23	78	358.239	-356.385	D	6.789	6.72	0.069	1.496	0	0	0	0	0	100
2003	259	23	948	365.727	-355.056	D	6.7	6.697	0.003	1.452	0	0	0	0	0	99.94
2003	260	23	949	365.722	-354.966	D	6.864	6.862	0.002	1.78	0	0	0	0	0	99.97
2003	261	23	929	366.032	-357.239	D	6.901	6.901	0	1.857	0	0	0	0	0	101.77
2003	262	23	78	358.239	-356.385	D	7.682	7.657	0.025	3.439	0	0	0	0	0	100
2003	263	23	931	366.183	-356.996	D	6.603	6.593	0.01	1.247	0	0	0	0	0	100.01
2003	264	23	947	365.801	-355.162	D	6.885	6.876	0.009	1.807	0	0	0	0	0	100
2003	265	23	949	365.722	-354.966	D	9.18	9.139	0.041	6.909	0	0	0	0	0	99.99
2003	266	23	714	364.799	-358.592	D	6.948	6.917	0.03	1.89	0	0	0	0	0	100
2003	267	23	1017	356.894	-355.206	D	6.879	6.878	0.001	1.812	0	0	0	0	0	100.1
2003	268	23	731	365.047	-358.581	D	6.743	6.73	0.014	1.516	0	0	0	0	0	100
2003	269	23	907	365.051	-359.809	D	6.923	6.917	0.006	1.889	0	0	0	0	0	100
2003	270	23	78	358.239	-356.385	D	7.651	7.613	0.038	3.344	0	0	0	0	0	100
2003	271	23	102	358.487	-356.374	D	6.848	6.751	0.097	1.558	0	0	0	0	0	100
2003	272	23	1017	356.894	-355.206	D	6.559	6.538	0.022	1.139	0	0	0	0	0	100

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	273	23	822	358.021	-361.607	D	6.738	6.723	0.015	1.502	0	0	0	0	0	100
2003	274	23	845	360.851	-362.181	D	9.053	9.051	0.002	6.688	0	0	0	0	0	99.81
2003	275	23	78	358.239	-356.385	D	6.648	6.592	0.056	1.246	0	0	0	0	0	100
2003	276	23	929	366.032	-357.239	D	6.787	6.784	0.003	1.624	0	0	0	0	0	99.99
2003	277	23	78	358.239	-356.385	D	7.029	6.985	0.044	2.027	0	0	0	0	0	100
2003	278	23	811	357.434	-360.225	D	6.665	6.65	0.014	1.359	0	0	0	0	0	100
2003	279	23	822	358.021	-361.607	D	8.769	8.765	0.004	5.986	0	0	0	0	0	99.96
2003	280	23	907	365.051	-359.809	D	7.224	7.217	0.007	2.505	0	0	0	0	0	100.01
2003	281	23	1017	356.894	-355.206	D	7.328	7.326	0.001	2.733	0	0	0	0	0	100.03
2003	282	23	10	356.954	-355.443	D	8.877	8.877	0	6.259	0	0	0	0	0	98.24
2003	283	23	78	358.239	-356.385	D	9.665	9.663	0.002	8.265	0	0	0	0	0	99.86
2003	284	23	1	356.546	-357.458	D	9.486	9.486	0	7.798	0	0	0	0	0	83.69
2003	285	23	78	358.239	-356.385	D	7.661	7.649	0.012	3.421	0	0	0	0	0	99.99
2003	286	23	947	365.801	-355.162	D	6.732	6.728	0.004	1.512	0	0	0	0	0	99.97
2003	287	23	1039	356.522	-357.599	D	8.766	8.738	0.028	5.92	0	0	0	0	0	100
2003	288	23	102	358.487	-356.374	D	6.845	6.773	0.071	1.602	0	0	0	0	0	100
2003	289	23	932	366.176	-356.761	D	6.604	6.604	0	1.268	0	0	0	0	0	100.21
2003	290	23	907	365.051	-359.809	D	7.873	7.857	0.016	3.878	0	0	0	0	0	99.99
2003	291	23	1017	356.894	-355.206	D	6.587	6.586	0.001	1.234	0	0	0	0	0	99.95
2003	292	23	845	360.851	-362.181	D	6.63	6.629	0.001	1.318	0	0	0	0	0	100.06
2003	293	23	380	361.468	-361.984	D	6.78	6.78	0	1.615	0	0	0	0	0	88.4
2003	294	23	78	358.239	-356.385	D	6.786	6.763	0.022	1.582	0	0	0	0	0	100
2003	295	23	102	358.487	-356.374	D	6.84	6.701	0.139	1.459	0	0	0	0	0	100
2003	296	23	78	358.239	-356.385	D	6.689	6.652	0.037	1.362	0	0	0	0	0	99.99
2003	297	23	1039	356.522	-357.599	D	6.601	6.593	0.007	1.248	0	0	0	0	0	99.99
2003	298	23	927	365.912	-357.454	D	7.794	7.771	0.023	3.689	0	0	0	0	0	100
2003	299	23	927	365.912	-357.454	D	7.782	7.776	0.006	3.699	0	0	0	0	0	100.01
2003	300	23	927	365.912	-357.454	D	6.634	6.56	0.074	1.183	0	0	0	0	0	100
2003	301	23	961	364.092	-354.289	D	6.92	6.893	0.026	1.842	0	0	0	0	0	100
2003	302	23	714	364.799	-358.592	D	6.608	6.559	0.048	1.181	0	0	0	0	0	100
2003	303	23	247	360.217	-361.79	D	7.333	7.333	0	2.748	0	0	0	0	0	6.62
2003	304	23	1017	356.894	-355.206	D	8.922	8.921	0	6.367	0	0	0	0	0	100.07
2003	305	23	1017	356.894	-355.206	D	7.711	7.695	0.016	3.522	0	0	0	0	0	99.99
2003	306	23	10	356.954	-355.443	D	8.897	8.897	0	6.307	0	0	0	0	0	101.13
2003	307	23	1	356.546	-357.458	D	8.069	8.069	0	4.352	0	0	0	0	0	0
2003	308	23	1016	357.1	-355.198	D	7.395	7.394	0.001	2.876	0	0	0	0	0	99.98
2003	309	23	78	358.239	-356.385	D	7.883	7.856	0.027	3.876	0	0	0	0	0	100
2003	310	23	927	365.912	-357.454	D	8.429	8.406	0.023	5.128	0	0	0	0	0	100
2003	311	23	731	365.047	-358.581	D	7.113	7.066	0.047	2.192	0	0	0	0	0	100

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	312	23	78	358.239	-356.385	D	6.602	6.575	0.026	1.212	0	0	0	0	0	100
2003	313	23	754	365.229	-357.075	D	6.505	6.499	0.006	1.063	0	0	0	0	0	99.99
2003	314	23	907	365.051	-359.809	D	6.618	6.617	0.001	1.293	0	0	0	0	0	100
2003	315	23	1	356.546	-357.458	D	7.24	7.24	0	2.552	0	0	0	0	0	0
2003	316	23	102	358.487	-356.374	D	8.858	8.831	0.027	6.146	0	0	0	0	0	100
2003	317	23	1037	356.5	-357.195	D	6.55	6.511	0.039	1.087	0	0	0	0	0	100
2003	318	23	1039	356.522	-357.599	D	7.319	7.313	0.006	2.705	0	0	0	0	0	100.01
2003	319	23	900	364.265	-360.243	D	9.262	9.262	0	7.221	0	0	0	0	0	87.97
2003	320	23	1	356.546	-357.458	D	9.803	9.803	0	8.638	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	9.92	9.92	0	8.955	0	0	0	0	0	0
2003	322	23	811	357.434	-360.225	D	9.838	9.813	0.024	8.667	0	0	0	0	0	100
2003	323	23	78	358.239	-356.385	D	7.507	7.47	0.037	3.036	0	0	0	0	0	100
2003	324	23	1	356.546	-357.458	D	6.761	6.761	0	1.579	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.385	7.385	0	2.857	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	9.413	9.413	0	7.61	0	0	0	0	0	0
2003	327	23	1017	356.894	-355.206	D	8.917	8.915	0.002	6.352	0	0	0	0	0	99.73
2003	328	23	949	365.722	-354.966	D	7.281	7.278	0.002	2.632	0	0	0	0	0	99.95
2003	329	23	569	362.875	-354.433	D	6.537	6.537	0	1.138	0	0	0	0	0	87.01
2003	330	23	1	356.546	-357.458	D	7.139	7.139	0	2.342	0	0	0	0	0	0
2003	331	23	78	358.239	-356.385	D	8.574	8.565	0.009	5.504	0	0	0	0	0	99.97
2003	332	23	927	365.912	-357.454	D	6.797	6.753	0.044	1.561	0	0	0	0	0	100
2003	333	23	78	358.239	-356.385	D	6.587	6.508	0.079	1.082	0	0	0	0	0	100
2003	334	23	1	356.546	-357.458	D	6.569	6.569	0	1.199	0	0	0	0	0	0
2003	335	23	714	364.799	-358.592	D	6.67	6.65	0.02	1.358	0	0	0	0	0	100
2003	336	23	927	365.912	-357.454	D	6.513	6.505	0.008	1.075	0	0	0	0	0	99.98
2003	337	23	785	365.637	-355.06	D	8.549	8.549	0	5.465	0	0	0	0	0	99.69
2003	338	23	957	364.513	-354.595	D	9.52	9.316	0.204	7.358	0	0	0	0	0	100
2003	339	23	949	365.722	-354.966	D	7.818	7.767	0.051	3.68	0	0	0	0	0	100
2003	340	23	824	358.459	-361.601	D	8.15	8.077	0.072	4.371	0	0	0	0	0	100
2003	341	23	1017	356.894	-355.206	D	6.66	6.655	0.005	1.369	0	0	0	0	0	99.98
2003	342	23	1	356.546	-357.458	D	7.19	7.19	0	2.448	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	9.624	9.624	0	8.161	0	0	0	0	0	0
2003	344	23	949	365.722	-354.966	D	9.066	9.057	0.009	6.703	0	0	0	0	0	99.98
2003	345	23	869	361.064	-360.714	D	8.125	8.093	0.032	4.407	0	0	0	0	0	100
2003	346	23	836	360.07	-362.066	D	7.189	7.181	0.008	2.43	0	0	0	0	0	100
2003	347	23	714	364.799	-358.592	D	9.322	9.315	0.007	7.357	0	0	0	0	0	99.99
2003	348	23	927	365.912	-357.454	D	9.401	9.388	0.012	7.545	0	0	0	0	0	99.99
2003	349	23	933	366.169	-356.524	D	9.36	9.359	0.001	7.47	0	0	0	0	0	99.9
2003	350	23	955	364.92	-354.582	D	8.716	8.702	0.015	5.832	0	0	0	0	0	100

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	351	23	773	365.4	-355.32	D	7.999	7.989	0.01	4.174	0	0	0	0	0	100.01
2003	352	23	955	364.92	-354.582	D	7.421	7.408	0.012	2.906	0	0	0	0	0	100.01
2003	353	23	927	365.912	-357.454	D	8.442	8.398	0.044	5.11	0	0	0	0	0	100
2003	354	23	869	361.064	-360.714	D	6.939	6.89	0.049	1.836	0	0	0	0	0	100
2003	355	23	933	366.169	-356.524	D	6.683	6.682	0.001	1.421	0	0	0	0	0	99.96
2003	356	23	1	356.546	-357.458	D	9.006	9.006	0	6.576	0	0	0	0	0	0
2003	357	23	811	357.434	-360.225	D	9.435	9.409	0.026	7.598	0	0	0	0	0	99.99
2003	358	23	78	358.239	-356.385	D	8.467	8.405	0.063	5.125	0	0	0	0	0	100
2003	359	23	822	358.021	-361.607	D	6.69	6.678	0.012	1.413	0	0	0	0	0	99.99
2003	360	23	949	365.722	-354.966	D	7.323	7.321	0.001	2.722	0	0	0	0	0	99.93
2003	361	23	784	365.648	-355.309	D	6.82	6.82	0	1.695	0	0	0	0	0	99.85
2003	362	23	1	356.546	-357.458	D	8.396	8.396	0	5.106	0	0	0	0	0	0
2003	363	23	927	365.912	-357.454	D	7.246	7.222	0.024	2.514	0	0	0	0	0	100
2003	364	23	774	365.389	-355.071	D	6.64	6.64	0	1.34	0	0	0	0	0	100.99
									0.204							
EXIDE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES (km)**		**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	356.546	-357.458	D	7.068	7.068	0	2.196	0	0	0	0	0	0
2003	2	23	1	356.546	-357.458	D	9.25	9.25	0	7.19	0	0	0	0	0	0
2003	3	23	823	358.24	-361.604	D	8.008	8.005	0.003	4.209	82.99	12.33	0	0	0	4.65
2003	4	23	785	365.637	-355.06	D	6.825	6.825	0	1.706	87.28	7.66	0	0	0	5.46
2003	5	23	933	366.169	-356.524	D	7.597	7.595	0.002	3.304	75.57	19.09	0	0	0	5.4
2003	6	23	949	365.722	-354.966	D	8.31	8.306	0.004	4.896	93.02	6.22	0	0	0	0.76
2003	7	23	996	360.121	-355.113	D	8.596	8.596	0.001	5.577	91.58	6.88	0	0	0	1.21
2003	8	23	247	360.217	-361.79	D	6.82	6.82	0	1.695	80.36	2.91	0	0	0	2.95
2003	9	23	709	364.375	-354.616	D	6.997	6.997	0	2.051	81.64	11.55	0	0	0	6.97
2003	10	23	904	364.594	-359.819	D	6.675	6.675	0	1.407	60.14	21.1	0	0	0	18.78
2003	11	23	1	356.546	-357.458	D	6.561	6.561	0.001	1.184	72.51	13.44	0	0	0	14.24
2003	12	23	1017	356.894	-355.206	D	6.491	6.491	0	1.048	83.33	8.48	0	0	0	7.73
2003	13	23	724	364.689	-356.1	D	6.658	6.658	0	1.374	89.54	5.73	0	0	0	3.45
2003	14	23	1017	356.894	-355.206	D	8.813	8.811	0.002	6.098	89	9.76	0	0	0	1.28
2003	15	23	810	357.434	-360.005	D	6.607	6.607	0	1.274	90.79	4.34	0	0	0	3.85
2003	16	23	1	356.546	-357.458	D	8.171	8.171	0	4.585	93.61	4.99	0	0	0	0.56
2003	17	23	822	358.021	-361.607	D	7.736	7.735	0.001	3.609	84.85	9.3	0	0	0	5.92
2003	18	23	596	363.613	-359.892	D	6.945	6.944	0.001	1.945	84.74	9.49	0	0	0	5.73
2003	19	23	1	356.546	-357.458	D	6.858	6.858	0	1.771	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	6.636	6.636	0	1.33	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	21	23	1002	359.309	-354.73	D	7.1	7.097	0.002	2.257	93.8	5.16	0	0	0	1.04
2003	22	23	1	356.546	-357.458	D	7.178	7.178	0	2.424	0	0	0	0	0	0
2003	23	23	1	356.546	-357.458	D	7.144	7.144	0	2.353	0	0	0	0	0	0
2003	24	23	810	357.434	-360.005	D	6.733	6.733	0	1.522	81.09	9.78	0	0	0	6.06
2003	25	23	10	356.954	-355.443	D	6.497	6.496	0	1.059	86.07	9.42	0	0	0	3.99
2003	26	23	1039	356.522	-357.599	D	7.147	7.143	0.005	2.35	89.27	9.02	0	0	0	1.71
2003	27	23	44	358.21	-361.379	D	6.817	6.816	0	1.688	90.09	5.75	0	0	0	3.94
2003	28	23	932	366.176	-356.761	D	7.223	7.222	0	2.516	91.96	5.64	0	0	0	2.07
2003	29	23	1	356.546	-357.458	D	9.286	9.286	0	7.281	0	0	0	0	0	0
2003	30	23	1	356.546	-357.458	D	9.166	9.166	0	6.978	0	0	0	0	0	0
2003	31	23	1	356.546	-357.458	D	7.23	7.23	0	2.531	0	0	0	0	0	0
2003	32	23	1	356.546	-357.458	D	8.138	8.138	0	4.509	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	6.734	6.734	0	1.525	0	0	0	0	0	0
2003	34	23	1008	358.048	-354.775	D	9.354	9.353	0.001	7.455	96.31	3.17	0	0	0	0.48
2003	35	23	1	356.546	-357.458	D	7.087	7.087	0	2.235	0	0	0	0	0	0
2003	36	23	947	365.801	-355.162	D	6.58	6.579	0.001	1.219	87.25	6.04	0	0	0	6.64
2003	37	23	1017	356.894	-355.206	D	9.014	9.01	0.004	6.587	94.74	4.58	0	0	0	0.61
2003	38	23	900	364.265	-360.243	D	7.946	7.94	0.005	4.063	95.14	4.18	0	0	0	0.69
2003	39	23	929	366.032	-357.239	D	7.095	7.095	0	2.252	34.71	4.13	0	0	0	1.72
2003	40	23	929	366.032	-357.239	D	7.736	7.736	0	3.612	89.44	5.16	0	0	0	0.6
2003	41	23	929	366.032	-357.239	D	9.504	9.504	0	7.846	92.36	5.04	0	0	0	0.28
2003	42	23	1	356.546	-357.458	D	7.016	7.016	0	2.09	0	0	0	0	0	0
2003	43	23	821	358.053	-361.416	D	6.543	6.542	0	1.148	60.89	15.42	0	0	0	23.22
2003	44	23	693	364.551	-358.603	D	6.551	6.551	0	1.165	86.82	5.74	0	0	0	6.53
2003	45	23	298	360.201	-355.799	D	9.967	9.967	0	9.085	79.15	3.99	0	0	0	0.8
2003	46	23	404	361.172	-355.257	D	9.991	9.991	0	9.15	12.7	0.48	0	0	0	0.02
2003	47	23	1	356.546	-357.458	D	8.295	8.295	0	4.87	0	0	0	0	0	0
2003	48	23	1	356.546	-357.458	D	8.589	8.589	0	5.562	0	0	0	0	0	0
2003	49	23	810	357.434	-360.005	D	7.466	7.466	0	3.028	92.97	2.98	0	0	0	0.99
2003	50	23	10	356.954	-355.443	D	9.167	9.167	0	6.979	90.41	3.18	0	0	0	1.49
2003	51	23	44	358.21	-361.379	D	9.255	9.253	0.002	7.199	96.21	3.26	0	0	0	0.42
2003	52	23	10	356.954	-355.443	D	9.012	9.011	0	6.59	97.47	1.59	0	0	0	0.35
2003	53	23	1	356.546	-357.458	D	9.212	9.211	0	7.093	95.25	3	0	0	0	0.81
2003	54	23	1	356.546	-357.458	D	8.617	8.617	0	5.627	0	0	0	0	0	0
2003	55	23	10	356.954	-355.443	D	8.255	8.255	0	4.777	93.16	6.81	0	0	0	2.57
2003	56	23	822	358.021	-361.607	D	7.162	7.16	0.002	2.386	92.34	5.75	0	0	0	1.8
2003	57	23	1017	356.894	-355.206	D	7.716	7.714	0.002	3.564	95.37	3.77	0	0	0	0.77
2003	58	23	1005	358.679	-354.752	D	8.269	8.268	0.001	4.807	96.78	2.82	0	0	0	0.42
2003	59	23	961	364.092	-354.289	D	8.405	8.404	0.001	5.124	97.3	2.19	0	0	0	0.31

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	60	23	933	366.169	-356.524	D	9.165	9.164	0.001	6.972	97.95	1.84	0	0	0	0.19
2003	61	23	949	365.722	-354.966	D	9.165	9.158	0.007	6.956	95.19	3.84	0	0	0	0.95
2003	62	23	832	359.493	-362.061	D	7.492	7.488	0.004	3.076	93.45	5.09	0	0	0	1.43
2003	63	23	907	365.051	-359.809	D	6.964	6.96	0.004	1.978	97.61	1.39	0	0	0	0.98
2003	64	23	961	364.092	-354.289	D	8.112	8.111	0.001	4.448	96.66	2.68	0	0	0	0.55
2003	65	23	929	366.032	-357.239	D	7.645	7.645	0	3.413	96.31	2.94	0	0	0	0.44
2003	66	23	1017	356.894	-355.206	D	7.122	7.121	0.001	2.306	95.11	3.05	0	0	0	1.56
2003	67	23	62	357.925	-354.901	D	7.027	7.027	0	2.114	94.67	1.17	0	0	0	2.16
2003	68	23	822	358.021	-361.607	D	6.912	6.909	0.003	1.874	93.56	4.37	0	0	0	2.06
2003	69	23	15	357.659	-360.155	D	6.559	6.559	0	1.181	89.72	0.45	0	0	0	3.18
2003	70	23	44	358.21	-361.379	D	6.524	6.523	0	1.111	96.36	0.91	0	0	0	2.48
2003	71	23	643	363.609	-354.151	D	6.956	6.956	0	1.969	96.95	0.9	0	0	0	1.48
2003	72	23	1017	356.894	-355.206	D	8.501	8.5	0.002	5.349	95.81	2.94	0	0	0	1.11
2003	73	23	811	357.434	-360.225	D	7.941	7.94	0	4.063	97.53	1.41	0	0	0	1.04
2003	74	23	1017	356.894	-355.206	D	8.288	8.288	0	4.853	96.81	1.49	0	0	0	0.44
2003	75	23	1	356.546	-357.458	D	7.316	7.316	0	2.712	0	0	0	0	0	0
2003	76	23	1	356.546	-357.458	D	8.57	8.57	0	5.516	0	0	0	0	0	0
2003	77	23	1	356.546	-357.458	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2003	78	23	1	356.546	-357.458	D	8.895	8.895	0	6.301	0	0	0	0	0	0
2003	79	23	1	356.546	-357.458	D	9.446	9.446	0	7.695	0	0	0	0	0	0
2003	80	23	822	358.021	-361.607	D	8.5	8.499	0.001	5.349	93.72	4.32	0	0	0	2.35
2003	81	23	851	361.512	-362.072	D	6.522	6.522	0	1.109	89.29	1.95	0	0	0	8.34
2003	82	23	356	361.22	-361.995	D	6.548	6.547	0	1.158	93.96	0.57	0	0	0	3.86
2003	83	23	1	356.546	-357.458	D	6.769	6.769	0	1.593	0	0	0	0	0	0
2003	84	23	934	366.01	-356.526	D	7.491	7.491	0	3.082	96.66	2.21	0	0	0	1.08
2003	85	23	907	365.051	-359.809	D	8.932	8.932	0	6.392	96.83	2.39	0	0	0	0.35
2003	86	23	1	356.546	-357.458	D	6.566	6.566	0	1.193	0	0	0	0	0	0
2003	87	23	774	365.389	-355.071	D	8.509	8.509	0	5.371	90.98	6.92	0	0	0	0.76
2003	88	23	949	365.722	-354.966	D	7.479	7.478	0.001	3.054	82.39	13.8	0	0	0	3.71
2003	89	23	1	356.546	-357.458	D	6.549	6.548	0.001	1.16	79.17	8.7	0	0	0	11.62
2003	90	23	619	363.872	-360.131	D	6.475	6.475	0	1.018	74.03	4.81	0	0	0	9.83
2003	91	23	1	356.546	-357.458	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	6.806	6.806	0	1.667	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.057	7.057	0	2.175	0	0	0	0	0	0
2003	94	23	643	363.609	-354.151	D	7.941	7.941	0	4.064	93.68	0.95	0	0	0	3.18
2003	95	23	1017	356.894	-355.206	D	6.896	6.895	0.001	1.846	88.34	7.88	0	0	0	3.79
2003	96	23	784	365.648	-355.309	D	8.434	8.433	0	5.193	98.03	1.35	0	0	0	0.12
2003	97	23	476	361.894	-354.726	D	9.275	9.275	0	7.253	97.25	1.1	0	0	0	0.04
2003	98	23	933	366.169	-356.524	D	7.828	7.815	0.013	3.786	91.49	7.22	0	0	0	1.28

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	99	23	1	356.546	-357.458	D	7.347	7.347	0	2.776	0	0	0	0	0	0
2003	100	23	1	356.546	-357.458	D	6.576	6.576	0	1.213	0	0	0	0	0	0
2003	101	23	1	356.546	-357.458	D	6.475	6.475	0	1.018	91.74	0.46	0	0	0	3.44
2003	102	23	1	356.546	-357.458	D	6.498	6.498	0	1.062	92.72	0.19	0	0	0	2.69
2003	103	23	255	360.129	-359.796	D	6.526	6.526	0	1.117	96.31	0.12	0	0	0	2.32
2003	104	23	1	356.546	-357.458	D	6.619	6.619	0	1.299	90.77	0.13	0	0	0	1.69
2003	105	23	1	356.546	-357.458	D	6.611	6.611	0	1.282	0	0	0	0	0	0
2003	106	23	1	356.546	-357.458	D	6.649	6.649	0	1.357	0	0	0	0	0	0
2003	107	23	949	365.722	-354.966	D	8.382	8.377	0.005	5.061	88.01	9.8	0	0	0	2.16
2003	108	23	949	365.722	-354.966	D	8.294	8.29	0.004	4.858	97	2.23	0	0	0	0.78
2003	109	23	930	366.19	-357.232	D	8.078	8.078	0	4.374	97.47	0.2	0	0	0	0.73
2003	110	23	1017	356.894	-355.206	D	9.059	9.042	0.017	6.666	97.53	1.86	0	0	0	0.6
2003	111	23	519	362.902	-360.673	D	7.189	7.189	0	2.446	41.29	0.02	0	0	0	0.5
2003	112	23	905	364.788	-359.816	D	6.551	6.55	0	1.164	87.96	3.26	0	0	0	8.88
2003	113	23	1039	356.522	-357.599	D	6.556	6.556	0	1.174	96.22	0.79	0	0	0	2.84
2003	114	23	1	356.546	-357.458	D	8.459	8.459	0	5.252	0	0	0	0	0	0
2003	115	23	821	358.053	-361.416	D	9.147	9.147	0	6.929	98.34	1.84	0	0	0	2.3
2003	116	23	1	356.546	-357.458	D	7.741	7.741	0	3.624	0	0	0	0	0	0
2003	117	23	1	356.546	-357.458	D	6.934	6.934	0	1.924	93.27	0.28	0	0	0	1.3
2003	118	23	255	360.129	-359.796	D	7.7	7.7	0	3.533	60.3	0.1	0	0	0	0.35
2003	119	23	1	356.546	-357.458	D	8.099	8.099	0	4.421	0	0	0	0	0	0
2003	120	23	1	356.546	-357.458	D	8.15	8.15	0	4.536	0	0	0	0	0	0
2003	121	23	10	356.954	-355.443	D	8.057	8.057	0	4.325	98.58	0.24	0	0	0	1.32
2003	122	23	1017	356.894	-355.206	D	8.678	8.672	0.005	5.761	97.35	2.08	0	0	0	0.51
2003	123	23	853	361.666	-362.175	D	8.099	8.096	0.003	4.414	98.96	0.62	0	0	0	0.45
2003	124	23	900	364.265	-360.243	D	7.075	7.074	0.001	2.209	99.06	0.2	0	0	0	0.75
2003	125	23	1	356.546	-357.458	D	8.426	8.426	0	5.177	0	0	0	0	0	0
2003	126	23	1	356.546	-357.458	D	7.215	7.215	0	2.501	0	0	0	0	0	0
2003	127	23	1010	357.824	-354.865	D	8.487	8.486	0.001	5.317	97.68	1	0	0	0	1.14
2003	128	23	785	365.637	-355.06	D	7.459	7.458	0	3.012	98.07	0.26	0	0	0	1.44
2003	129	23	1	356.546	-357.458	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	8.54	8.54	0	5.445	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.463	7.463	0	3.022	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	6.616	6.616	0	1.291	0	0	0	0	0	0
2003	133	23	1	356.546	-357.458	D	6.709	6.709	0	1.475	0	0	0	0	0	0
2003	134	23	1	356.546	-357.458	D	9.435	9.435	0	7.667	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	8.531	8.531	0	5.425	0	0	0	0	0	0
2003	136	23	643	363.609	-354.151	D	9.456	9.456	0	7.721	96.26	0.35	0	0	0	1.49
2003	137	23	643	363.609	-354.151	D	9.253	9.253	0	7.197	98.88	0.18	0	0	0	0.67

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	138	23	1017	356.894	-355.206	D	8.868	8.865	0.002	6.23	99.22	0.5	0	0	0	0.26
2003	139	23	10	356.954	-355.443	D	8.752	8.751	0.001	5.951	99.18	0.38	0	0	0	0.3
2003	140	23	1017	356.894	-355.206	D	8.118	8.116	0.002	4.459	97.68	2	0	0	0	0.31
2003	141	23	929	366.032	-357.239	D	6.686	6.686	0	1.428	94.56	0.1	0	0	0	0.75
2003	142	23	1	356.546	-357.458	D	6.848	6.848	0	1.751	0	0	0	0	0	0
2003	143	23	263	360.041	-357.803	D	6.615	6.615	0	1.289	82.21	0.04	0	0	0	2.72
2003	144	23	965	363.588	-354.142	D	7.547	7.546	0.001	3.2	98.51	0.48	0	0	0	0.64
2003	145	23	1017	356.894	-355.206	D	9.155	9.15	0.004	6.938	98.53	1.1	0	0	0	0.33
2003	146	23	15	357.659	-360.155	D	7.836	7.836	0	3.832	99.01	0.12	0	0	0	0.68
2003	147	23	1	356.546	-357.458	D	6.637	6.637	0	1.333	0	0	0	0	0	0
2003	148	23	1	356.546	-357.458	D	6.635	6.635	0	1.33	0	0	0	0	0	0
2003	149	23	822	358.021	-361.607	D	7.214	7.213	0.001	2.497	95.17	0.99	0	0	0	3.81
2003	150	23	10	356.954	-355.443	D	6.608	6.608	0	1.277	94.45	0.2	0	0	0	3.92
2003	151	23	1035	356.477	-356.792	D	7.158	7.158	0	2.382	86.67	7.95	0	0	0	5.36
2003	152	23	1	356.546	-357.458	D	7.197	7.197	0	2.462	0	0	0	0	0	0
2003	153	23	15	357.659	-360.155	D	8.532	8.532	0	5.425	92.52	0.14	0	0	0	0.22
2003	154	23	44	358.21	-361.379	D	9.092	9.092	0	6.79	97.83	0.44	0	0	0	0.19
2003	155	23	1	356.546	-357.458	D	8.012	8.012	0	4.224	0	0	0	0	0	0
2003	156	23	1	356.546	-357.458	D	6.722	6.722	0	1.5	0	0	0	0	0	0
2003	157	23	10	356.954	-355.443	D	8.092	8.092	0	4.406	98.46	0.23	0	0	0	0.98
2003	158	23	247	360.217	-361.79	D	7.459	7.459	0	3.013	98.68	0.2	0	0	0	0.63
2003	159	23	16	357.648	-359.906	D	7.716	7.716	0	3.567	96.02	0.05	0	0	0	0.43
2003	160	23	255	360.129	-359.796	D	6.621	6.621	0	1.301	62.02	0.03	0	0	0	0.75
2003	161	23	1	356.546	-357.458	D	7.537	7.537	0	3.181	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	8.967	8.967	0	6.479	0	0	0	0	0	0
2003	163	23	948	365.727	-355.056	D	8.884	8.884	0	6.275	97.48	1.23	0	0	0	0.3
2003	164	23	10	356.954	-355.443	D	8.869	8.868	0	6.237	98.98	0.4	0	0	0	0.53
2003	165	23	10	356.954	-355.443	D	8.223	8.223	0	4.704	98.66	0.34	0	0	0	0.35
2003	166	23	477	362.362	-359.698	D	7.898	7.898	0	3.97	98.68	0.3	0	0	0	0.39
2003	167	23	929	366.032	-357.239	D	8.039	8.039	0	4.286	98.66	0.14	0	0	0	0.33
2003	168	23	255	360.129	-359.796	D	6.943	6.943	0	1.942	98.8	0.19	0	0	0	0.71
2003	169	23	247	360.217	-361.79	D	7.744	7.744	0	3.629	86.03	0.08	0	0	0	0.25
2003	170	23	1005	358.679	-354.752	D	8.228	8.227	0.001	4.715	97.93	0.11	0	0	0	1.78
2003	171	23	1017	356.894	-355.206	D	8.595	8.589	0.005	5.562	98.74	0.87	0	0	0	0.33
2003	172	23	1	356.546	-357.458	D	6.92	6.92	0	1.896	98.84	0.06	0	0	0	0.93
2003	173	23	1	356.546	-357.458	D	6.849	6.849	0	1.754	0	0	0	0	0	0
2003	174	23	1	356.546	-357.458	D	7.032	7.032	0	2.124	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.954	7.954	0	4.094	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	8.379	8.379	0	5.066	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	177	23	933	366.169	-356.524	D	8.474	8.47	0.004	5.28	95.85	3.43	0	0	0	0.67
2003	178	23	811	357.434	-360.225	D	6.789	6.786	0.002	1.628	96.09	0.43	0	0	0	3.48
2003	179	23	903	364.421	-359.827	D	6.647	6.646	0.001	1.35	97.06	0.06	0	0	0	2.74
2003	180	23	62	357.925	-354.901	D	6.696	6.696	0	1.448	98.17	0.04	0	0	0	1.92
2003	181	23	10	356.954	-355.443	D	6.984	6.984	0	2.026	97.91	0.12	0	0	0	1.27
2003	182	23	263	360.041	-357.803	D	8.488	8.488	0	5.322	14.39	0	0	0	0	0.18
2003	183	23	1	356.546	-357.458	D	7.864	7.864	0	3.893	83.31	0.14	0	0	0	0.34
2003	184	23	247	360.217	-361.79	D	7.506	7.506	0	3.113	105.6	0.07	0	0	0	0.53
2003	185	23	1	356.546	-357.458	D	7.012	7.012	0	2.084	0	0	0	0	0	0
2003	186	23	1	356.546	-357.458	D	7.047	7.047	0	2.154	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.775	7.775	0	3.698	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.138	7.138	0	2.341	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.032	7.032	0	2.124	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.13	7.13	0	2.323	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.724	7.724	0	3.585	0	0	0	0	0	0
2003	192	23	63	358.458	-361.368	D	6.913	6.913	0	1.881	94.13	0.16	0	0	0	5.42
2003	193	23	219	359.98	-362.05	D	7.79	7.789	0.001	3.728	98.37	0.38	0	0	0	1.28
2003	194	23	955	364.92	-354.582	D	7.46	7.459	0.001	3.013	98.6	0.18	0	0	0	1.16
2003	195	23	933	366.169	-356.524	D	8.6	8.597	0.003	5.581	99.34	0.17	0	0	0	0.36
2003	196	23	929	366.032	-357.239	D	8.453	8.453	0	5.24	98.64	0.01	0	0	0	0.56
2003	197	23	962	363.961	-354.255	D	7.09	7.09	0	2.242	96.16	0.02	0	0	0	1.79
2003	198	23	618	363.371	-354.411	D	7.071	7.071	0	2.203	96.61	0.02	0	0	0	1.27
2003	199	23	134	358.68	-355.117	D	6.923	6.923	0	1.903	86.16	0.01	0	0	0	1.07
2003	200	23	15	357.659	-360.155	D	7.955	7.955	0	4.096	64.78	0.01	0	0	0	0.41
2003	201	23	1017	356.894	-355.206	D	8.698	8.698	0	5.823	95.67	0.99	0	0	0	0.28
2003	202	23	963	363.809	-354.192	D	7.751	7.75	0	3.643	97.88	0.09	0	0	0	1.77
2003	203	23	852	361.595	-362.148	D	7.385	7.384	0.001	2.855	96.53	0.12	0	0	0	3.3
2003	204	23	1	356.546	-357.458	D	7.02	7.02	0	2.099	0	0	0	0	0	0
2003	205	23	1	356.546	-357.458	D	6.785	6.785	0	1.625	0	0	0	0	0	0
2003	206	23	1	356.546	-357.458	D	7.042	7.042	0	2.144	0	0	0	0	0	0
2003	207	23	1	356.546	-357.458	D	6.959	6.959	0	1.976	0	0	0	0	0	0
2003	208	23	1	356.546	-357.458	D	6.962	6.962	0	1.982	0	0	0	0	0	0
2003	209	23	618	363.371	-354.411	D	6.925	6.925	0	1.907	93.41	0.06	0	0	0	2.35
2003	210	23	974	362.281	-354.249	D	8.473	8.465	0.008	5.266	98.75	0.85	0	0	0	0.39
2003	211	23	822	358.021	-361.607	D	8.982	8.978	0.004	6.507	99.28	0.34	0	0	0	0.32
2003	212	23	929	366.032	-357.239	D	8.15	8.147	0.002	4.531	99.24	0.17	0	0	0	0.52
2003	213	23	762	365.141	-355.082	D	7.04	7.04	0	2.14	98.6	0.08	0	0	0	0.94
2003	214	23	689	364.595	-359.6	D	7.727	7.727	0	3.591	97.8	0.02	0	0	0	0.44
2003	215	23	967	363.478	-354.116	D	8.457	8.451	0.005	5.235	99.09	0.39	0	0	0	0.51

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	216	23	934	366.01	-356.526	D	7.202	7.196	0.006	2.461	98.7	0.15	0	0	0	1.13
2003	217	23	947	365.801	-355.162	D	7.623	7.622	0.001	3.363	98.84	0.12	0	0	0	0.87
2003	218	23	972	362.744	-354.242	D	8.454	8.453	0.001	5.239	98.98	0.25	0	0	0	0.57
2003	219	23	822	358.021	-361.607	D	8.265	8.263	0.002	4.797	99.34	0.23	0	0	0	0.41
2003	220	23	247	360.217	-361.79	D	6.896	6.896	0	1.847	96.78	0	0	0	0	1.01
2003	221	23	1	356.546	-357.458	D	6.871	6.871	0	1.798	0	0	0	0	0	0
2003	222	23	1	356.546	-357.458	D	6.955	6.955	0	1.966	0	0	0	0	0	0
2003	223	23	1	356.546	-357.458	D	6.817	6.817	0	1.689	0	0	0	0	0	0
2003	224	23	1	356.546	-357.458	D	7.101	7.101	0	2.265	0	0	0	0	0	0
2003	225	23	1	356.546	-357.458	D	7.661	7.661	0	3.448	0	0	0	0	0	0
2003	226	23	1	356.546	-357.458	D	9.004	9.004	0	6.572	0	0	0	0	0	0
2003	227	23	1	356.546	-357.458	D	7.091	7.091	0	2.245	0	0	0	0	0	0
2003	228	23	1	356.546	-357.458	D	6.939	6.939	0	1.935	0	0	0	0	0	0
2003	229	23	296	360.223	-356.297	D	6.785	6.785	0	1.625	43.26	0	0	0	0	1.69
2003	230	23	931	366.183	-356.996	D	6.798	6.797	0.001	1.65	97.16	0.03	0	0	0	2.29
2003	231	23	907	365.051	-359.809	D	7.022	7.021	0.001	2.102	98.51	0.04	0	0	0	1.28
2003	232	23	930	366.19	-357.232	D	7.143	7.143	0.001	2.351	99.09	0.05	0	0	0	0.93
2003	233	23	929	366.032	-357.239	D	6.862	6.861	0	1.778	98.7	0.12	0	0	0	1.14
2003	234	23	964	363.678	-354.148	D	7.047	7.045	0.002	2.15	97.4	0.02	0	0	0	2.55
2003	235	23	845	360.851	-362.181	D	7.023	7.017	0.006	2.093	98.55	0.04	0	0	0	1.39
2003	236	23	822	358.021	-361.607	D	7.858	7.855	0.004	3.873	99.15	0.18	0	0	0	0.69
2003	237	23	836	360.07	-362.066	D	7.756	7.752	0.004	3.646	99.32	0.05	0	0	0	0.63
2003	238	23	62	357.925	-354.901	D	7.216	7.215	0.001	2.499	99.05	0.02	0	0	0	0.76
2003	239	23	929	366.032	-357.239	D	7.033	7.033	0	2.125	99.14	0.02	0	0	0	0.71
2003	240	23	1	356.546	-357.458	D	7.035	7.035	0	2.13	0	0	0	0	0	0
2003	241	23	1	356.546	-357.458	D	8.765	8.765	0	5.985	0	0	0	0	0	0
2003	242	23	543	362.627	-354.444	D	9.342	9.342	0	7.425	78.56	1.1	0	0	0	0.26
2003	243	23	1	356.546	-357.458	D	9.398	9.398	0	7.571	0	0	0	0	0	0
2003	244	23	1	356.546	-357.458	D	9.054	9.054	0	6.695	0	0	0	0	0	0
2003	245	23	1	356.546	-357.458	D	9.604	9.604	0	8.109	0	0	0	0	0	0
2003	246	23	1	356.546	-357.458	D	9.148	9.148	0	6.931	0	0	0	0	0	0
2003	247	23	1035	356.477	-356.792	D	7.743	7.731	0.012	3.601	97.82	1.48	0	0	0	0.7
2003	248	23	1	356.546	-357.458	D	6.738	6.738	0	1.533	0	0	0	0	0	0
2003	249	23	1	356.546	-357.458	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	250	23	1	356.546	-357.458	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2003	251	23	1	356.546	-357.458	D	6.825	6.825	0	1.706	0	0	0	0	0	0
2003	252	23	1	356.546	-357.458	D	7.117	7.117	0	2.298	0	0	0	0	0	0
2003	253	23	1	356.546	-357.458	D	7.349	7.349	0	2.78	0	0	0	0	0	0
2003	254	23	1	356.546	-357.458	D	8.372	8.372	0	5.05	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	255	23	1	356.546	-357.458	D	9.772	9.772	0	8.557	0	0	0	0	0	0
2003	256	23	1	356.546	-357.458	D	9.293	9.293	0	7.301	0	0	0	0	0	0
2003	257	23	822	358.021	-361.607	D	8.451	8.451	0	5.234	90.56	2.75	0	0	0	5.82
2003	258	23	786	365.973	-357.042	D	6.719	6.718	0.001	1.493	94.71	0.56	0	0	0	4.73
2003	259	23	822	358.021	-361.607	D	6.691	6.69	0.001	1.436	97.01	0.16	0	0	0	2.8
2003	260	23	1016	357.1	-355.198	D	6.853	6.852	0	1.76	97.63	0.09	0	0	0	1.92
2003	261	23	1	356.546	-357.458	D	6.905	6.905	0	1.866	0	0	0	0	0	0
2003	262	23	1007	358.259	-354.768	D	7.659	7.657	0.002	3.439	95.36	3.89	0	0	0	0.73
2003	263	23	1017	356.894	-355.206	D	6.593	6.593	0	1.247	93.03	0.56	0	0	0	6.14
2003	264	23	44	358.21	-361.379	D	6.887	6.886	0.001	1.828	99.49	0.05	0	0	0	0.63
2003	265	23	783	365.659	-355.558	D	9.141	9.139	0.002	6.909	99.24	0.45	0	0	0	0.13
2003	266	23	907	365.051	-359.809	D	6.918	6.917	0.001	1.89	88.49	2.13	0	0	0	9.31
2003	267	23	247	360.217	-361.79	D	6.859	6.859	0	1.773	66.39	0.06	0	0	0	1.99
2003	268	23	1017	356.894	-355.206	D	6.729	6.728	0.001	1.512	97.16	0.62	0	0	0	2.16
2003	269	23	1010	357.824	-354.865	D	6.94	6.94	0.001	1.936	97.87	0.35	0	0	0	1.4
2003	270	23	786	365.973	-357.042	D	7.571	7.571	0.001	3.253	95.13	2.28	0	0	0	2.48
2003	271	23	948	365.727	-355.056	D	6.761	6.761	0	1.577	83.62	1.21	0	0	0	14.53
2003	272	23	1	356.546	-357.458	D	6.538	6.538	0	1.139	86.33	2.87	0	0	0	10.69
2003	273	23	643	363.609	-354.151	D	6.735	6.735	0.001	1.525	94.05	3.37	0	0	0	2.61
2003	274	23	947	365.801	-355.162	D	9.09	9.087	0.003	6.78	95.92	2.64	0	0	0	1.34
2003	275	23	219	359.98	-362.05	D	6.593	6.592	0.001	1.244	95.63	1.01	0	0	0	3.17
2003	276	23	3	356.524	-356.959	D	6.797	6.797	0.001	1.649	96.96	0.63	0	0	0	2.18
2003	277	23	776	365.736	-357.302	D	6.989	6.989	0	2.036	86.52	5.3	0	0	0	6.88
2003	278	23	543	362.627	-354.444	D	6.64	6.64	0	1.339	93.99	0.63	0	0	0	4.67
2003	279	23	302	360.713	-361.768	D	8.772	8.771	0.001	5.999	98.05	1.01	0	0	0	0.6
2003	280	23	44	358.21	-361.379	D	7.273	7.272	0	2.62	98.42	0.18	0	0	0	1.05
2003	281	23	1	356.546	-357.458	D	7.326	7.326	0	2.733	98.56	0.14	0	0	0	0.8
2003	282	23	1	356.546	-357.458	D	8.877	8.877	0	6.259	95.88	0.16	0	0	0	0.6
2003	283	23	1	356.546	-357.458	D	9.663	9.663	0	8.265	0	0	0	0	0	0
2003	284	23	1	356.546	-357.458	D	9.486	9.486	0	7.798	0	0	0	0	0	0
2003	285	23	933	366.169	-356.524	D	7.6	7.599	0.001	3.313	95.77	2.58	0	0	0	1.58
2003	286	23	836	360.07	-362.066	D	6.741	6.741	0	1.538	97.5	0.05	0	0	0	1.84
2003	287	23	931	366.183	-356.996	D	8.733	8.732	0.002	5.904	98.79	0.89	0	0	0	0.31
2003	288	23	933	366.169	-356.524	D	6.779	6.777	0.001	1.61	91.45	1.93	0	0	0	6.72
2003	289	23	906	364.982	-359.812	D	6.604	6.604	0	1.268	96.32	0.25	0	0	0	3.52
2003	290	23	929	366.032	-357.239	D	7.841	7.841	0	3.842	94.51	1.96	0	0	0	0.57
2003	291	23	191	359.732	-362.061	D	6.587	6.587	0	1.235	84.05	0.32	0	0	0	1.57
2003	292	23	1	356.546	-357.458	D	6.628	6.628	0	1.315	0	0	0	0	0	0
2003	293	23	1	356.546	-357.458	D	6.776	6.776	0	1.608	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	294	23	747	364.871	-354.594	D	6.77	6.769	0.001	1.594	86.46	1.09	0	0	0	12.31
2003	295	23	414	361.607	-359.482	D	6.703	6.701	0.002	1.46	92.79	1.02	0	0	0	6.08
2003	296	23	643	363.609	-354.151	D	6.657	6.657	0	1.372	92.54	0.26	0	0	0	6.27
2003	297	23	933	366.169	-356.524	D	6.596	6.595	0.001	1.251	95.93	0.2	0	0	0	3.72
2003	298	23	783	365.659	-355.558	D	7.773	7.771	0.002	3.689	98.72	0.57	0	0	0	0.57
2003	299	23	1039	356.522	-357.599	D	7.783	7.782	0.001	3.712	87.46	9.94	0	0	0	2.39
2003	300	23	772	365.411	-355.569	D	6.56	6.56	0	1.183	88.13	4.48	0	0	0	6.96
2003	301	23	1	356.546	-357.458	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	6.555	6.555	0	1.172	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.333	7.333	0	2.746	0	0	0	0	0	0
2003	304	23	1017	356.894	-355.206	D	8.922	8.921	0.001	6.367	96.11	1.55	0	0	0	2.33
2003	305	23	1017	356.894	-355.206	D	7.699	7.695	0.004	3.522	95.07	3.11	0	0	0	1.75
2003	306	23	1010	357.824	-354.865	D	8.897	8.897	0	6.307	96.23	2.39	0	0	0	0.79
2003	307	23	455	361.646	-354.736	D	8.153	8.153	0	4.544	94.67	2.54	0	0	0	0.43
2003	308	23	1017	356.894	-355.206	D	7.395	7.394	0	2.876	97.43	1.15	0	0	0	1.48
2003	309	23	253	360.151	-360.295	D	7.935	7.902	0.032	3.979	97.29	2.16	0	0	0	0.54
2003	310	23	835	359.911	-362.063	D	8.501	8.481	0.021	5.304	97.86	1.87	0	0	0	0.26
2003	311	23	191	359.732	-362.061	D	7.079	7.079	0	2.219	98.87	0.94	0	0	0	0.42
2003	312	23	1	356.546	-357.458	D	6.575	6.575	0	1.212	0	0	0	0	0	0
2003	313	23	1	356.546	-357.458	D	6.5	6.5	0	1.066	0	0	0	0	0	0
2003	314	23	1	356.546	-357.458	D	6.62	6.62	0	1.299	0	0	0	0	0	0
2003	315	23	1	356.546	-357.458	D	7.24	7.24	0	2.552	0	0	0	0	0	0
2003	316	23	1	356.546	-357.458	D	8.831	8.831	0	6.146	0	0	0	0	0	0
2003	317	23	949	365.722	-354.966	D	6.512	6.512	0	1.089	73.56	8.2	0	0	0	17.67
2003	318	23	787	365.962	-356.793	D	7.337	7.336	0.001	2.754	86.02	7.36	0	0	0	6.67
2003	319	23	1	356.546	-357.458	D	9.228	9.228	0	7.135	0	0	0	0	0	0
2003	320	23	1	356.546	-357.458	D	9.803	9.803	0	8.638	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	9.92	9.92	0	8.955	0	0	0	0	0	0
2003	322	23	1	356.546	-357.458	D	9.817	9.817	0	8.676	0	0	0	0	0	0
2003	323	23	611	363.448	-356.155	D	7.488	7.488	0.001	3.074	72.87	14.75	0	0	0	12.15
2003	324	23	1	356.546	-357.458	D	6.761	6.761	0	1.579	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.385	7.385	0	2.857	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	9.413	9.413	0	7.61	0	0	0	0	0	0
2003	327	23	1009	357.941	-354.82	D	8.919	8.915	0.004	6.352	92.62	6.68	0	0	0	0.65
2003	328	23	1	356.546	-357.458	D	7.277	7.277	0	2.629	0	0	0	0	0	0
2003	329	23	1	356.546	-357.458	D	6.534	6.534	0	1.132	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.139	7.139	0	2.342	0	0	0	0	0	0
2003	331	23	1	356.546	-357.458	D	8.565	8.565	0	5.504	93.32	3.27	0	0	0	2.32
2003	332	23	773	365.4	-355.32	D	6.753	6.753	0.001	1.561	62.08	20.29	0	0	0	17.51

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	333	23	1	356.546	-357.458	D	6.508	6.508	0	1.082	0	0	0	0	0	0
2003	334	23	1	356.546	-357.458	D	6.569	6.569	0	1.199	0	0	0	0	0	0
2003	335	23	1	356.546	-357.458	D	6.646	6.645	0	1.349	84.77	6.14	0	0	0	8.95
2003	336	23	1	356.546	-357.458	D	6.505	6.505	0	1.075	0	0	0	0	0	0
2003	337	23	1	356.546	-357.458	D	8.505	8.505	0	5.363	0	0	0	0	0	0
2003	338	23	1	356.546	-357.458	D	9.305	9.305	0	7.332	0	0	0	0	0	0
2003	339	23	1017	356.894	-355.206	D	7.771	7.767	0.004	3.68	91.96	6.61	0	0	0	1.44
2003	340	23	821	358.053	-361.416	D	8.077	8.077	0	4.371	81	4.6	0	0	0	2.33
2003	341	23	1	356.546	-357.458	D	6.655	6.655	0	1.369	0	0	0	0	0	0
2003	342	23	1	356.546	-357.458	D	7.19	7.19	0	2.448	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	9.624	9.624	0	8.161	0	0	0	0	0	0
2003	344	23	156	358.983	-356.352	D	8.994	8.993	0.001	6.543	92.44	5.5	0	0	0	1.94
2003	345	23	927	365.912	-357.454	D	8.344	8.339	0.005	4.972	87.5	10.05	0	0	0	2.43
2003	346	23	809	357.432	-359.845	D	7.203	7.202	0.001	2.473	90.39	7.17	0	0	0	2.47
2003	347	23	10	356.954	-355.443	D	9.343	9.343	0	7.429	95.02	4.66	0	0	0	1.71
2003	348	23	1	356.546	-357.458	D	9.404	9.404	0	7.587	0	0	0	0	0	0
2003	349	23	1	356.546	-357.458	D	9.34	9.34	0	7.422	0	0	0	0	0	0
2003	350	23	1	356.546	-357.458	D	8.7	8.7	0	5.827	0	0	0	0	0	0
2003	351	23	1	356.546	-357.458	D	7.958	7.958	0	4.104	0	0	0	0	0	0
2003	352	23	1	356.546	-357.458	D	7.348	7.348	0	2.779	0	0	0	0	0	0
2003	353	23	949	365.722	-354.966	D	8.398	8.398	0	5.11	84.82	6.15	0	0	0	8.94
2003	354	23	947	365.801	-355.162	D	6.92	6.919	0.001	1.894	89.01	6.91	0	0	0	4.42
2003	355	23	929	366.032	-357.239	D	6.682	6.682	0	1.421	92.86	3.65	0	0	0	3.26
2003	356	23	1	356.546	-357.458	D	9.006	9.006	0	6.576	0	0	0	0	0	0
2003	357	23	1008	358.048	-354.775	D	9.413	9.411	0.002	7.603	92.59	5.35	0	0	0	1.93
2003	358	23	809	357.432	-359.845	D	8.414	8.405	0.01	5.125	94.53	4.58	0	0	0	0.89
2003	359	23	255	360.129	-359.796	D	6.693	6.692	0.001	1.441	94.25	2.88	0	0	0	2.83
2003	360	23	643	363.609	-354.151	D	7.322	7.321	0.001	2.722	96.71	2.53	0	0	0	0.71
2003	361	23	1	356.546	-357.458	D	6.809	6.809	0	1.673	0	0	0	0	0	0
2003	362	23	1	356.546	-357.458	D	8.396	8.396	0	5.106	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.193	7.193	0	2.455	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	6.634	6.634	0	1.326	0	0	0	0	0	0
									0.032							
TRIGEN KC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	356.546	-357.458	D	7.068	7.068	0	2.196	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	2	23	821	358.053	-361.416	D	9.25	9.25	0	7.19	93.9	4.81	0	0	0	0.22
2003	3	23	1039	356.522	-357.599	D	8.038	8.021	0.018	4.244	86.39	13.01	0	0	0	0.61
2003	4	23	947	365.801	-355.162	D	6.825	6.825	0	1.706	92.16	7.12	0	0	0	0.61
2003	5	23	930	366.19	-357.232	D	7.601	7.595	0.006	3.304	80.02	19.18	0	0	0	0.81
2003	6	23	933	366.169	-356.524	D	8.318	8.304	0.013	4.892	90.61	9.23	0	0	0	0.16
2003	7	23	996	360.121	-355.113	D	8.6	8.596	0.004	5.577	95.43	4.42	0	0	0	0.08
2003	8	23	301	360.724	-362.017	D	6.82	6.82	0	1.695	85.52	1.86	0	0	0	0.28
2003	9	23	619	363.872	-360.131	D	6.998	6.997	0.001	2.051	87.5	11.68	0	0	0	0.79
2003	10	23	773	365.4	-355.32	D	6.677	6.675	0.002	1.407	77.96	19.45	0	0	0	2.6
2003	11	23	822	358.021	-361.607	D	6.561	6.56	0.001	1.183	83.34	14.05	0	0	0	2.57
2003	12	23	10	356.954	-355.443	D	6.491	6.491	0	1.048	92.16	6.6	0	0	0	0.79
2003	13	23	904	364.594	-359.819	D	6.659	6.658	0.001	1.374	94.01	5.4	0	0	0	0.41
2003	14	23	1017	356.894	-355.206	D	8.852	8.811	0.04	6.098	89.31	10.48	0	0	0	0.21
2003	15	23	1039	356.522	-357.599	D	6.607	6.607	0	1.274	95.99	3.6	0	0	0	0.39
2003	16	23	822	358.021	-361.607	D	8.175	8.172	0.003	4.586	95.78	4.2	0	0	0	0.03
2003	17	23	955	364.92	-354.582	D	7.745	7.735	0.009	3.61	86.77	12.41	0	0	0	0.83
2003	18	23	947	365.801	-355.162	D	6.948	6.944	0.003	1.945	93.01	6.38	0	0	0	0.58
2003	19	23	1	356.546	-357.458	D	6.858	6.858	0	1.771	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	6.636	6.636	0	1.33	0	0	0	0	0	0
2003	21	23	900	364.265	-360.243	D	7.1	7.097	0.004	2.255	94.19	5.7	0	0	0	0.11
2003	22	23	1	356.546	-357.458	D	7.178	7.178	0	2.424	0	0	0	0	0	0
2003	23	23	1	356.546	-357.458	D	7.144	7.144	0	2.353	0	0	0	0	0	0
2003	24	23	1018	356.892	-355.39	D	6.742	6.741	0.001	1.539	92.48	6.73	0	0	0	0.58
2003	25	23	946	365.798	-355.322	D	6.498	6.496	0.002	1.059	92.86	6.64	0	0	0	0.4
2003	26	23	927	365.912	-357.454	D	7.144	7.139	0.005	2.342	78.67	20.63	0	0	0	0.69
2003	27	23	907	365.051	-359.809	D	6.824	6.823	0.001	1.701	92.68	6.84	0	0	0	0.41
2003	28	23	930	366.19	-357.232	D	7.223	7.222	0	2.516	94.11	5.3	0	0	0	0.23
2003	29	23	1017	356.894	-355.206	D	9.293	9.286	0.008	7.281	94.51	5.43	0	0	0	0.04
2003	30	23	1	356.546	-357.458	D	9.166	9.166	0	6.978	0	0	0	0	0	0
2003	31	23	1	356.546	-357.458	D	7.23	7.23	0	2.531	0	0	0	0	0	0
2003	32	23	1	356.546	-357.458	D	8.138	8.138	0	4.509	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	6.734	6.734	0	1.525	0	0	0	0	0	0
2003	34	23	1008	358.048	-354.775	D	9.362	9.353	0.009	7.455	96.26	3.69	0	0	0	0.04
2003	35	23	949	365.722	-354.966	D	7.087	7.087	0.001	2.235	90.86	7.61	0	0	0	1.43
2003	36	23	949	365.722	-354.966	D	6.588	6.579	0.009	1.219	91.82	7.21	0	0	0	0.95
2003	37	23	1017	356.894	-355.206	D	9.034	9.01	0.024	6.587	96.59	3.35	0	0	0	0.05
2003	38	23	836	360.07	-362.066	D	7.979	7.94	0.039	4.063	96.84	3.11	0	0	0	0.05
2003	39	23	1	356.546	-357.458	D	7.088	7.088	0	2.237	0	0	0	0	0	0
2003	40	23	929	366.032	-357.239	D	7.736	7.736	0	3.612	92.3	3.54	0	0	0	0.04

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	41	23	949	365.722	-354.966	D	9.522	9.516	0.006	7.877	93.43	6.49	0	0	0	0.06
2003	42	23	1017	356.894	-355.206	D	7.016	7.016	0	2.09	93.9	4.71	0	0	0	1.16
2003	43	23	822	358.021	-361.607	D	6.543	6.542	0.001	1.148	88.79	9.37	0	0	0	1.88
2003	44	23	1011	357.717	-354.92	D	6.551	6.55	0.001	1.163	95.39	3.88	0	0	0	0.57
2003	45	23	1002	359.309	-354.73	D	9.98	9.979	0.001	9.117	97.06	2.71	0	0	0	0.04
2003	46	23	1	356.546	-357.458	D	10.049	10.049	0	9.31	0	0	0	0	0	0
2003	47	23	1	356.546	-357.458	D	8.295	8.295	0	4.87	0	0	0	0	0	0
2003	48	23	1	356.546	-357.458	D	8.589	8.589	0	5.562	0	0	0	0	0	0
2003	49	23	996	360.121	-355.113	D	7.56	7.556	0.004	3.222	96.36	3.47	0	0	0	0.18
2003	50	23	1017	356.894	-355.206	D	9.17	9.167	0.003	6.979	97.2	2.66	0	0	0	0.05
2003	51	23	1017	356.894	-355.206	D	9.285	9.253	0.032	7.199	97.25	2.71	0	0	0	0.04
2003	52	23	1017	356.894	-355.206	D	9.016	9.011	0.004	6.59	98.79	1.12	0	0	0	0.03
2003	53	23	1035	356.477	-356.792	D	9.214	9.211	0.003	7.093	97.32	2.51	0	0	0	0.07
2003	54	23	929	366.032	-357.239	D	8.641	8.641	0	5.685	15.88	0.41	0	0	0	0.01
2003	55	23	1039	356.522	-357.599	D	8.255	8.255	0	4.777	95.21	4.86	0	0	0	0.27
2003	56	23	1039	356.522	-357.599	D	7.165	7.164	0.001	2.394	96.02	3.81	0	0	0	0.18
2003	57	23	811	357.434	-360.225	D	7.72	7.72	0	3.576	96.68	2.2	0	0	0	0.08
2003	58	23	1	356.546	-357.458	D	8.268	8.268	0	4.807	98.93	1.65	0	0	0	0.04
2003	59	23	808	357.43	-359.686	D	8.398	8.398	0.001	5.109	98.41	1.25	0	0	0	0.03
2003	60	23	1017	356.894	-355.206	D	9.113	9.1	0.013	6.81	98.36	1.6	0	0	0	0.04
2003	61	23	949	365.722	-354.966	D	9.3	9.158	0.142	6.956	97.11	2.85	0	0	0	0.05
2003	62	23	1017	356.894	-355.206	D	7.556	7.514	0.042	3.13	96.44	3.43	0	0	0	0.12
2003	63	23	907	365.051	-359.809	D	6.973	6.96	0.012	1.978	98.55	1.37	0	0	0	0.09
2003	64	23	845	360.851	-362.181	D	8.151	8.144	0.008	4.523	97.87	2.03	0	0	0	0.08
2003	65	23	857	361.977	-361.782	D	7.562	7.557	0.005	3.224	96.98	2.86	0	0	0	0.11
2003	66	23	934	366.01	-356.526	D	7.19	7.184	0.006	2.435	97.91	1.97	0	0	0	0.1
2003	67	23	949	365.722	-354.966	D	7.037	7.036	0.001	2.132	98.98	0.78	0	0	0	0.13
2003	68	23	832	359.493	-362.061	D	6.919	6.909	0.01	1.874	96.82	3.05	0	0	0	0.12
2003	69	23	822	358.021	-361.607	D	6.559	6.559	0	1.181	98.33	0.68	0	0	0	0.18
2003	70	23	822	358.021	-361.607	D	6.525	6.523	0.002	1.111	99.05	0.75	0	0	0	0.17
2003	71	23	643	363.609	-354.151	D	6.957	6.956	0.001	1.969	98.77	0.8	0	0	0	0.11
2003	72	23	1017	356.894	-355.206	D	8.543	8.5	0.044	5.349	98.42	1.49	0	0	0	0.09
2003	73	23	822	358.021	-361.607	D	7.954	7.94	0.014	4.063	98.67	1.27	0	0	0	0.06
2003	74	23	1017	356.894	-355.206	D	8.301	8.288	0.014	4.853	99.18	0.78	0	0	0	0.04
2003	75	23	995	360.315	-355.11	D	7.392	7.392	0	2.871	99.11	0.37	0	0	0	0.07
2003	76	23	1	356.546	-357.458	D	8.57	8.57	0	5.516	0	0	0	0	0	0
2003	77	23	1	356.546	-357.458	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2003	78	23	1	356.546	-357.458	D	8.895	8.895	0	6.301	0	0	0	0	0	0
2003	79	23	845	360.851	-362.181	D	9.266	9.258	0.008	7.21	97.35	2.59	0	0	0	0.04

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	80	23	822	358.021	-361.607	D	8.511	8.499	0.012	5.349	95.1	4.67	0	0	0	0.25
2003	81	23	907	365.051	-359.809	D	6.525	6.524	0.001	1.112	98.05	1.04	0	0	0	0.87
2003	82	23	900	364.265	-360.243	D	6.548	6.547	0	1.158	96.42	0.27	0	0	0	0.34
2003	83	23	1	356.546	-357.458	D	6.769	6.769	0	1.593	0	0	0	0	0	0
2003	84	23	1038	356.511	-357.396	D	7.436	7.434	0.002	2.96	98.31	1.52	0	0	0	0.11
2003	85	23	852	361.595	-362.148	D	8.926	8.926	0.001	6.377	98.07	1.79	0	0	0	0.03
2003	86	23	729	364.634	-354.854	D	6.567	6.567	0	1.195	79.2	0.2	0	0	0	0.13
2003	87	23	247	360.217	-361.79	D	8.405	8.405	0	5.127	21.94	0.02	0	0	0	0.03
2003	88	23	949	365.722	-354.966	D	7.483	7.478	0.005	3.054	87.33	12.03	0	0	0	0.65
2003	89	23	251	360.173	-360.793	D	6.55	6.547	0.003	1.158	88.08	10.05	0	0	0	1.78
2003	90	23	930	366.19	-357.232	D	6.475	6.475	0	1.019	37.48	1.67	0	0	0	0.51
2003	91	23	1	356.546	-357.458	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	6.806	6.806	0	1.667	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.057	7.057	0	2.175	0	0	0	0	0	0
2003	94	23	1	356.546	-357.458	D	7.929	7.929	0	4.037	0	0	0	0	0	0
2003	95	23	1039	356.522	-357.599	D	6.897	6.895	0.002	1.846	88.07	10.76	0	0	0	1.15
2003	96	23	949	365.722	-354.966	D	8.435	8.433	0.002	5.193	98.65	1.22	0	0	0	0.01
2003	97	23	643	363.609	-354.151	D	9.275	9.275	0	7.253	98.97	0.96	0	0	0	0
2003	98	23	1035	356.477	-356.792	D	7.864	7.828	0.036	3.813	88.02	11.65	0	0	0	0.33
2003	99	23	1	356.546	-357.458	D	7.347	7.347	0	2.776	0	0	0	0	0	0
2003	100	23	1	356.546	-357.458	D	6.576	6.576	0	1.213	0	0	0	0	0	0
2003	101	23	1	356.546	-357.458	D	6.476	6.475	0	1.018	99.23	0.3	0	0	0	0.29
2003	102	23	949	365.722	-354.966	D	6.5	6.498	0.001	1.063	99.56	0.09	0	0	0	0.29
2003	103	23	947	365.801	-355.162	D	6.528	6.526	0.001	1.117	99.66	0.06	0	0	0	0.24
2003	104	23	947	365.801	-355.162	D	6.621	6.62	0	1.3	99.51	0.06	0	0	0	0.16
2003	105	23	15	357.659	-360.155	D	6.611	6.611	0	1.281	34.28	0	0	0	0	0.05
2003	106	23	1	356.546	-357.458	D	6.649	6.649	0	1.357	0	0	0	0	0	0
2003	107	23	949	365.722	-354.966	D	8.393	8.377	0.016	5.061	97.79	2.01	0	0	0	0.2
2003	108	23	949	365.722	-354.966	D	8.312	8.29	0.023	4.858	98.54	1.37	0	0	0	0.08
2003	109	23	933	366.169	-356.524	D	8.079	8.078	0	4.374	99.45	0.11	0	0	0	0.07
2003	110	23	963	363.809	-354.192	D	9.055	9.054	0.001	6.695	97.48	2.39	0	0	0	0.04
2003	111	23	1	356.546	-357.458	D	7.214	7.214	0	2.498	0	0	0	0	0	0
2003	112	23	836	360.07	-362.066	D	6.551	6.55	0.001	1.164	94.36	4.11	0	0	0	1.63
2003	113	23	1039	356.522	-357.599	D	6.557	6.556	0.001	1.174	98.97	0.68	0	0	0	0.27
2003	114	23	1	356.546	-357.458	D	8.459	8.459	0	5.252	0	0	0	0	0	0
2003	115	23	822	358.021	-361.607	D	9.153	9.147	0.007	6.929	98.72	1.11	0	0	0	0.19
2003	116	23	845	360.851	-362.181	D	7.694	7.694	0	3.519	76.27	0.5	0	0	0	0.11
2003	117	23	1039	356.522	-357.599	D	6.934	6.934	0	1.924	99.22	0.14	0	0	0	0.15
2003	118	23	967	363.478	-354.116	D	7.7	7.7	0	3.533	98.43	0.05	0	0	0	0.08

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	119	23	569	362.875	-354.433	D	8.105	8.105	0	4.435	97.8	0.32	0	0	0	0.03
2003	120	23	929	366.032	-357.239	D	8.108	8.108	0	4.442	90.47	0.11	0	0	0	0.04
2003	121	23	62	357.925	-354.901	D	8.057	8.057	0	4.325	99.32	0.21	0	0	0	0.12
2003	122	23	1017	356.894	-355.206	D	8.761	8.672	0.089	5.761	98.33	1.62	0	0	0	0.05
2003	123	23	845	360.851	-362.181	D	8.145	8.096	0.049	4.414	99.52	0.44	0	0	0	0.04
2003	124	23	1017	356.894	-355.206	D	7.083	7.076	0.006	2.214	99.8	0.1	0	0	0	0.07
2003	125	23	929	366.032	-357.239	D	8.451	8.451	0	5.236	49.1	0.21	0	0	0	0.01
2003	126	23	1	356.546	-357.458	D	7.215	7.215	0	2.501	0	0	0	0	0	0
2003	127	23	1035	356.477	-356.792	D	8.511	8.486	0.025	5.317	98.21	1.62	0	0	0	0.17
2003	128	23	1035	356.477	-356.792	D	7.519	7.511	0.008	3.125	99.68	0.14	0	0	0	0.18
2003	129	23	1	356.546	-357.458	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	8.54	8.54	0	5.445	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.463	7.463	0	3.022	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	6.616	6.616	0	1.291	0	0	0	0	0	0
2003	133	23	929	366.032	-357.239	D	6.703	6.703	0	1.463	87.61	0.13	0	0	0	0.43
2003	134	23	1	356.546	-357.458	D	9.435	9.435	0	7.667	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	8.531	8.531	0	5.425	0	0	0	0	0	0
2003	136	23	964	363.678	-354.148	D	9.457	9.456	0.001	7.721	99.54	0.31	0	0	0	0.13
2003	137	23	964	363.678	-354.148	D	9.258	9.253	0.006	7.197	99.77	0.14	0	0	0	0.05
2003	138	23	1035	356.477	-356.792	D	8.891	8.865	0.026	6.23	99.51	0.46	0	0	0	0.02
2003	139	23	1017	356.894	-355.206	D	8.756	8.751	0.005	5.951	99.63	0.35	0	0	0	0.02
2003	140	23	1017	356.894	-355.206	D	8.142	8.116	0.027	4.459	98.46	1.53	0	0	0	0.02
2003	141	23	301	360.724	-362.017	D	6.684	6.684	0	1.425	99.28	0.22	0	0	0	0.06
2003	142	23	1	356.546	-357.458	D	6.848	6.848	0	1.751	0	0	0	0	0	0
2003	143	23	1017	356.894	-355.206	D	6.615	6.615	0	1.29	99.59	0.04	0	0	0	0.27
2003	144	23	1008	358.048	-354.775	D	7.568	7.56	0.008	3.229	99.5	0.42	0	0	0	0.07
2003	145	23	1017	356.894	-355.206	D	9.188	9.15	0.038	6.938	99.15	0.82	0	0	0	0.03
2003	146	23	822	358.021	-361.607	D	7.843	7.836	0.007	3.832	99.8	0.14	0	0	0	0.03
2003	147	23	44	358.21	-361.379	D	6.638	6.638	0	1.334	100.2	0.02	0	0	0	0.11
2003	148	23	949	365.722	-354.966	D	6.645	6.64	0.004	1.339	99.44	0.22	0	0	0	0.34
2003	149	23	822	358.021	-361.607	D	7.216	7.213	0.002	2.497	98.53	0.81	0	0	0	0.65
2003	150	23	822	358.021	-361.607	D	6.61	6.608	0.002	1.276	99.43	0.19	0	0	0	0.36
2003	151	23	947	365.801	-355.162	D	7.159	7.158	0.001	2.382	90.42	9	0	0	0	0.66
2003	152	23	1	356.546	-357.458	D	7.197	7.197	0	2.462	0	0	0	0	0	0
2003	153	23	3	356.524	-356.959	D	8.538	8.537	0	5.438	99.03	0.14	0	0	0	0.02
2003	154	23	822	358.021	-361.607	D	9.093	9.092	0.002	6.79	97.6	2.22	0	0	0	0.05
2003	155	23	1	356.546	-357.458	D	8.012	8.012	0	4.224	0	0	0	0	0	0
2003	156	23	1	356.546	-357.458	D	6.722	6.722	0	1.5	99.66	0.19	0	0	0	0.11
2003	157	23	2	356.535	-357.209	D	8.093	8.092	0.001	4.406	99.58	0.36	0	0	0	0.05

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	158	23	836	360.07	-362.066	D	7.46	7.459	0.001	3.013	99.7	0.15	0	0	0	0.05
2003	159	23	710	364.843	-359.589	D	7.716	7.715	0	3.566	99.57	0.04	0	0	0	0.04
2003	160	23	255	360.129	-359.796	D	6.621	6.621	0	1.301	69.16	0	0	0	0	0.08
2003	161	23	1	356.546	-357.458	D	7.537	7.537	0	3.181	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	8.967	8.967	0	6.479	0	0	0	0	0	0
2003	163	23	949	365.722	-354.966	D	8.884	8.884	0.001	6.275	98.64	1.25	0	0	0	0.03
2003	164	23	1035	356.477	-356.792	D	8.869	8.868	0.001	6.237	99.58	0.29	0	0	0	0.06
2003	165	23	643	363.609	-354.151	D	8.223	8.221	0.002	4.699	99.54	0.38	0	0	0	0.03
2003	166	23	547	363.117	-359.914	D	7.899	7.898	0.001	3.97	99.67	0.24	0	0	0	0.03
2003	167	23	519	362.902	-360.673	D	8.049	8.049	0	4.307	99.54	0.11	0	0	0	0.03
2003	168	23	255	360.129	-359.796	D	6.943	6.943	0	1.942	98.26	0.16	0	0	0	0.05
2003	169	23	1	356.546	-357.458	D	7.684	7.684	0	3.499	0	0	0	0	0	0
2003	170	23	1017	356.894	-355.206	D	8.232	8.227	0.005	4.715	99.72	0.03	0	0	0	0.23
2003	171	23	1035	356.477	-356.792	D	8.603	8.589	0.014	5.562	99.85	0.09	0	0	0	0.05
2003	172	23	1	356.546	-357.458	D	6.92	6.92	0	1.896	0	0	0	0	0	0
2003	173	23	1	356.546	-357.458	D	6.849	6.849	0	1.754	0	0	0	0	0	0
2003	174	23	1	356.546	-357.458	D	7.032	7.032	0	2.124	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.954	7.954	0	4.094	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	8.379	8.379	0	5.066	0	0	0	0	0	0
2003	177	23	836	360.07	-362.066	D	8.474	8.458	0.017	5.251	94.99	4.9	0	0	0	0.09
2003	178	23	1035	356.477	-356.792	D	6.785	6.78	0.005	1.615	98.96	0.42	0	0	0	0.61
2003	179	23	1039	356.522	-357.599	D	6.647	6.642	0.005	1.343	99.65	0.06	0	0	0	0.28
2003	180	23	643	363.609	-354.151	D	6.695	6.694	0	1.445	99.67	0.01	0	0	0	0.21
2003	181	23	1	356.546	-357.458	D	6.984	6.984	0	2.026	0	0	0	0	0	0
2003	182	23	1	356.546	-357.458	D	8.485	8.485	0	5.314	0	0	0	0	0	0
2003	183	23	747	364.871	-354.594	D	7.932	7.932	0	4.044	99.1	0.22	0	0	0	0.04
2003	184	23	643	363.609	-354.151	D	7.642	7.642	0	3.406	99.82	0.05	0	0	0	0.04
2003	185	23	1	356.546	-357.458	D	7.012	7.012	0	2.084	0	0	0	0	0	0
2003	186	23	1	356.546	-357.458	D	7.047	7.047	0	2.154	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.775	7.775	0	3.698	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.138	7.138	0	2.341	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.032	7.032	0	2.124	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.13	7.13	0	2.323	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.724	7.724	0	3.585	0	0	0	0	0	0
2003	192	23	1002	359.309	-354.73	D	6.907	6.906	0.001	1.867	99.32	0.06	0	0	0	0.61
2003	193	23	219	359.98	-362.05	D	7.794	7.789	0.005	3.728	99.64	0.28	0	0	0	0.07
2003	194	23	1007	358.259	-354.768	D	7.439	7.438	0.001	2.97	99.73	0.1	0	0	0	0.11
2003	195	23	930	366.19	-357.232	D	8.602	8.597	0.005	5.581	99.65	0.23	0	0	0	0.03
2003	196	23	932	366.176	-356.761	D	8.454	8.453	0	5.24	100	0.01	0	0	0	0.04

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	197	23	949	365.722	-354.966	D	7.099	7.09	0.009	2.242	99.84	0.03	0	0	0	0.14
2003	198	23	933	366.169	-356.524	D	7.075	7.073	0.002	2.207	99.88	0.01	0	0	0	0.1
2003	199	23	900	364.265	-360.243	D	6.929	6.929	0	1.914	99.16	0	0	0	0	0.1
2003	200	23	949	365.722	-354.966	D	7.996	7.996	0	4.188	99.39	0.05	0	0	0	0.06
2003	201	23	970	363.145	-354.231	D	8.703	8.703	0.001	5.834	99.7	0.02	0	0	0	0.03
2003	202	23	643	363.609	-354.151	D	7.752	7.75	0.001	3.643	99.66	0.07	0	0	0	0.18
2003	203	23	832	359.493	-362.061	D	7.379	7.377	0.002	2.839	99.72	0.08	0	0	0	0.26
2003	204	23	1	356.546	-357.458	D	7.02	7.02	0	2.099	0	0	0	0	0	0
2003	205	23	1	356.546	-357.458	D	6.785	6.785	0	1.625	0	0	0	0	0	0
2003	206	23	1	356.546	-357.458	D	7.042	7.042	0	2.144	0	0	0	0	0	0
2003	207	23	1	356.546	-357.458	D	6.959	6.959	0	1.976	0	0	0	0	0	0
2003	208	23	1	356.546	-357.458	D	6.962	6.962	0	1.982	0	0	0	0	0	0
2003	209	23	1	356.546	-357.458	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2003	210	23	949	365.722	-354.966	D	8.47	8.465	0.005	5.266	99.65	0.28	0	0	0	0.04
2003	211	23	949	365.722	-354.966	D	8.951	8.93	0.021	6.389	99.78	0.18	0	0	0	0.03
2003	212	23	258	360.096	-359.049	D	8.132	8.121	0.011	4.472	99.86	0.07	0	0	0	0.06
2003	213	23	930	366.19	-357.232	D	7.049	7.04	0.009	2.14	99.84	0.08	0	0	0	0.08
2003	214	23	786	365.973	-357.042	D	7.728	7.727	0.001	3.591	99.86	0.02	0	0	0	0.05
2003	215	23	1017	356.894	-355.206	D	8.42	8.413	0.007	5.145	99.66	0.14	0	0	0	0.18
2003	216	23	933	366.169	-356.524	D	7.221	7.196	0.025	2.461	99.7	0.19	0	0	0	0.11
2003	217	23	949	365.722	-354.966	D	7.624	7.622	0.002	3.363	99.76	0.1	0	0	0	0.07
2003	218	23	1017	356.894	-355.206	D	8.366	8.359	0.007	5.02	99.75	0.16	0	0	0	0.07
2003	219	23	822	358.021	-361.607	D	8.288	8.263	0.024	4.797	99.87	0.09	0	0	0	0.04
2003	220	23	822	358.021	-361.607	D	6.895	6.895	0.001	1.845	99.92	0.01	0	0	0	0.08
2003	221	23	15	357.659	-360.155	D	6.876	6.876	0	1.807	96.18	0	0	0	0	0.1
2003	222	23	1	356.546	-357.458	D	6.955	6.955	0	1.966	0	0	0	0	0	0
2003	223	23	1	356.546	-357.458	D	6.817	6.817	0	1.689	0	0	0	0	0	0
2003	224	23	1	356.546	-357.458	D	7.101	7.101	0	2.265	0	0	0	0	0	0
2003	225	23	1	356.546	-357.458	D	7.661	7.661	0	3.448	0	0	0	0	0	0
2003	226	23	1	356.546	-357.458	D	9.004	9.004	0	6.572	0	0	0	0	0	0
2003	227	23	1	356.546	-357.458	D	7.091	7.091	0	2.245	0	0	0	0	0	0
2003	228	23	1	356.546	-357.458	D	6.939	6.939	0	1.935	0	0	0	0	0	0
2003	229	23	1	356.546	-357.458	D	6.787	6.787	0	1.63	0	0	0	0	0	0
2003	230	23	949	365.722	-354.966	D	6.79	6.789	0	1.634	99.42	0.01	0	0	0	0.17
2003	231	23	933	366.169	-356.524	D	7.025	7.022	0.003	2.102	99.8	0.05	0	0	0	0.12
2003	232	23	930	366.19	-357.232	D	7.148	7.143	0.005	2.351	99.86	0.07	0	0	0	0.08
2003	233	23	930	366.19	-357.232	D	6.865	6.861	0.004	1.778	99.83	0.09	0	0	0	0.09
2003	234	23	930	366.19	-357.232	D	7.063	7.058	0.005	2.177	99.77	0.03	0	0	0	0.18
2003	235	23	852	361.595	-362.148	D	7.022	7.017	0.005	2.093	99.83	0.03	0	0	0	0.12

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	236	23	822	358.021	-361.607	D	7.858	7.855	0.003	3.873	99.89	0.04	0	0	0	0.05
2003	237	23	836	360.07	-362.066	D	7.757	7.752	0.006	3.646	99.89	0.04	0	0	0	0.06
2003	238	23	961	364.092	-354.289	D	7.215	7.213	0.002	2.496	99.79	0.02	0	0	0	0.07
2003	239	23	930	366.19	-357.232	D	7.033	7.033	0	2.125	99.58	0.02	0	0	0	0.06
2003	240	23	1	356.546	-357.458	D	7.035	7.035	0	2.13	98.82	0.04	0	0	0	0.05
2003	241	23	1	356.546	-357.458	D	8.765	8.765	0	5.985	0	0	0	0	0	0
2003	242	23	955	364.92	-354.582	D	9.342	9.342	0	7.425	98.29	0.28	0	0	0	0.03
2003	243	23	965	363.588	-354.142	D	9.378	9.377	0.001	7.517	99.13	0.36	0	0	0	0.02
2003	244	23	1	356.546	-357.458	D	9.054	9.054	0	6.695	0	0	0	0	0	0
2003	245	23	1	356.546	-357.458	D	9.604	9.604	0	8.109	0	0	0	0	0	0
2003	246	23	1	356.546	-357.458	D	9.148	9.148	0	6.931	0	0	0	0	0	0
2003	247	23	1035	356.477	-356.792	D	7.741	7.731	0.01	3.601	99.41	0.52	0	0	0	0.08
2003	248	23	1	356.546	-357.458	D	6.738	6.738	0	1.533	0	0	0	0	0	0
2003	249	23	1	356.546	-357.458	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	250	23	1	356.546	-357.458	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2003	251	23	1	356.546	-357.458	D	6.825	6.825	0	1.706	0	0	0	0	0	0
2003	252	23	1	356.546	-357.458	D	7.117	7.117	0	2.298	0	0	0	0	0	0
2003	253	23	1	356.546	-357.458	D	7.349	7.349	0	2.78	0	0	0	0	0	0
2003	254	23	1	356.546	-357.458	D	8.372	8.372	0	5.05	0	0	0	0	0	0
2003	255	23	1	356.546	-357.458	D	9.772	9.772	0	8.557	0	0	0	0	0	0
2003	256	23	1	356.546	-357.458	D	9.293	9.293	0	7.301	0	0	0	0	0	0
2003	257	23	822	358.021	-361.607	D	8.457	8.451	0.006	5.234	94.16	5.38	0	0	0	0.41
2003	258	23	191	359.732	-362.061	D	6.725	6.72	0.005	1.496	99	0.46	0	0	0	0.53
2003	259	23	1038	356.511	-357.396	D	6.697	6.691	0.007	1.438	99.54	0.18	0	0	0	0.26
2003	260	23	961	364.092	-354.289	D	6.863	6.862	0	1.78	99.07	0.08	0	0	0	0.21
2003	261	23	1	356.546	-357.458	D	6.905	6.905	0	1.866	0	0	0	0	0	0
2003	262	23	1017	356.894	-355.206	D	7.665	7.657	0.008	3.439	95.48	4.39	0	0	0	0.12
2003	263	23	1	356.546	-357.458	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2003	264	23	822	358.021	-361.607	D	6.888	6.886	0.002	1.828	99.89	0.04	0	0	0	0.06
2003	265	23	948	365.727	-355.056	D	9.146	9.139	0.007	6.909	99.56	0.39	0	0	0	0.01
2003	266	23	822	358.021	-361.607	D	6.918	6.917	0.001	1.89	95.18	3.28	0	0	0	1.5
2003	267	23	930	366.19	-357.232	D	6.86	6.859	0	1.774	99.46	0.18	0	0	0	0.25
2003	268	23	1017	356.894	-355.206	D	6.73	6.728	0.002	1.512	98.89	0.86	0	0	0	0.28
2003	269	23	219	359.98	-362.05	D	6.943	6.939	0.004	1.935	99.66	0.21	0	0	0	0.12
2003	270	23	906	364.982	-359.812	D	7.573	7.571	0.002	3.253	97.54	2.11	0	0	0	0.3
2003	271	23	809	357.432	-359.845	D	6.752	6.751	0.001	1.558	96.66	1.42	0	0	0	1.75
2003	272	23	949	365.722	-354.966	D	6.54	6.539	0.001	1.142	97.54	1.25	0	0	0	1.28
2003	273	23	955	364.92	-354.582	D	6.743	6.735	0.008	1.525	97.8	2	0	0	0	0.18
2003	274	23	949	365.722	-354.966	D	9.118	9.087	0.03	6.78	98.28	1.67	0	0	0	0.04

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	275	23	620	363.861	-359.882	D	6.598	6.594	0.004	1.248	98.6	0.98	0	0	0	0.4
2003	276	23	1017	356.894	-355.206	D	6.801	6.797	0.004	1.649	99.36	0.49	0	0	0	0.16
2003	277	23	773	365.4	-355.32	D	6.998	6.989	0.009	2.036	93.91	5.39	0	0	0	0.69
2003	278	23	852	361.595	-362.148	D	6.65	6.65	0.001	1.358	99.07	0.49	0	0	0	0.37
2003	279	23	1017	356.894	-355.206	D	8.746	8.744	0.002	5.933	99.08	0.74	0	0	0	0.05
2003	280	23	997	359.928	-355.117	D	7.274	7.272	0.002	2.62	99.8	0.14	0	0	0	0.09
2003	281	23	1002	359.309	-354.73	D	7.327	7.326	0.001	2.733	99.48	0.17	0	0	0	0.07
2003	282	23	934	366.01	-356.526	D	8.851	8.85	0	6.193	97.9	0.07	0	0	0	0.08
2003	283	23	1	356.546	-357.458	D	9.663	9.663	0	8.265	0	0	0	0	0	0
2003	284	23	1	356.546	-357.458	D	9.486	9.486	0	7.798	0	0	0	0	0	0
2003	285	23	986	360.908	-354.689	D	7.671	7.668	0.003	3.464	96.45	3.35	0	0	0	0.22
2003	286	23	822	358.021	-361.607	D	6.739	6.738	0.001	1.532	99.7	0.1	0	0	0	0.21
2003	287	23	822	358.021	-361.607	D	8.75	8.738	0.012	5.92	97.17	2.78	0	0	0	0.05
2003	288	23	851	361.512	-362.072	D	6.779	6.775	0.004	1.605	96.12	2.77	0	0	0	1.04
2003	289	23	906	364.982	-359.812	D	6.605	6.604	0.001	1.268	99.38	0.26	0	0	0	0.38
2003	290	23	907	365.051	-359.809	D	7.861	7.857	0.004	3.878	97.97	1.97	0	0	0	0.03
2003	291	23	972	362.744	-354.242	D	6.587	6.587	0	1.235	98.82	0.23	0	0	0	0.29
2003	292	23	542	362.638	-354.693	D	6.632	6.632	0	1.323	91.72	0.18	0	0	0	0.23
2003	293	23	1	356.546	-357.458	D	6.776	6.776	0	1.608	0	0	0	0	0	0
2003	294	23	986	360.908	-354.689	D	6.771	6.769	0.002	1.594	97.17	1.44	0	0	0	1.41
2003	295	23	255	360.129	-359.796	D	6.723	6.701	0.021	1.46	98.33	1.05	0	0	0	0.61
2003	296	23	949	365.722	-354.966	D	6.661	6.657	0.004	1.372	98.95	0.16	0	0	0	0.87
2003	297	23	900	364.265	-360.243	D	6.602	6.597	0.005	1.254	99.1	0.4	0	0	0	0.49
2003	298	23	1039	356.522	-357.599	D	7.768	7.753	0.015	3.648	98.45	1.42	0	0	0	0.12
2003	299	23	1039	356.522	-357.599	D	7.789	7.782	0.007	3.712	84.19	15.43	0	0	0	0.34
2003	300	23	930	366.19	-357.232	D	6.561	6.559	0.001	1.182	96.51	2.93	0	0	0	0.6
2003	301	23	1	356.546	-357.458	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	6.555	6.555	0	1.172	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.333	7.333	0	2.746	0	0	0	0	0	0
2003	304	23	1017	356.894	-355.206	D	8.924	8.921	0.002	6.367	98.93	0.91	0	0	0	0.17
2003	305	23	1017	356.894	-355.206	D	7.718	7.695	0.023	3.522	97.56	2.31	0	0	0	0.13
2003	306	23	1017	356.894	-355.206	D	8.897	8.897	0.001	6.307	98.86	1.02	0	0	0	0.07
2003	307	23	967	363.478	-354.116	D	8.153	8.153	0	4.544	96.67	1.58	0	0	0	0.03
2003	308	23	1017	356.894	-355.206	D	7.396	7.394	0.002	2.876	98.83	1.01	0	0	0	0.13
2003	309	23	254	360.14	-360.046	D	7.986	7.902	0.084	3.979	97.77	2.17	0	0	0	0.06
2003	310	23	835	359.911	-362.063	D	8.55	8.481	0.069	5.304	98.35	1.63	0	0	0	0.02
2003	311	23	832	359.493	-362.061	D	7.08	7.079	0.001	2.219	99.12	0.8	0	0	0	0.03
2003	312	23	1	356.546	-357.458	D	6.575	6.575	0	1.212	0	0	0	0	0	0
2003	313	23	1	356.546	-357.458	D	6.5	6.5	0	1.066	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	314	23	1	356.546	-357.458	D	6.62	6.62	0	1.299	0	0	0	0	0	0
2003	315	23	1	356.546	-357.458	D	7.24	7.24	0	2.552	0	0	0	0	0	0
2003	316	23	947	365.801	-355.162	D	8.832	8.832	0	6.147	94.84	1.04	0	0	0	2.8
2003	317	23	1037	356.5	-357.195	D	6.512	6.511	0.001	1.087	91.31	6.13	0	0	0	2.32
2003	318	23	1017	356.894	-355.206	D	7.317	7.313	0.004	2.705	93.65	5.16	0	0	0	1.19
2003	319	23	1	356.546	-357.458	D	9.228	9.228	0	7.135	0	0	0	0	0	0
2003	320	23	1	356.546	-357.458	D	9.803	9.803	0	8.638	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	9.92	9.92	0	8.955	0	0	0	0	0	0
2003	322	23	1035	356.477	-356.792	D	9.819	9.817	0.003	8.676	97.03	2.96	0	0	0	0.04
2003	323	23	824	358.459	-361.601	D	7.47	7.466	0.003	3.029	87.79	10.89	0	0	0	1.29
2003	324	23	1	356.546	-357.458	D	6.761	6.761	0	1.579	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.385	7.385	0	2.857	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	9.413	9.413	0	7.61	0	0	0	0	0	0
2003	327	23	1008	358.048	-354.775	D	8.924	8.915	0.009	6.352	95.93	4.01	0	0	0	0.04
2003	328	23	785	365.637	-355.06	D	7.278	7.278	0	2.632	92.37	2.07	0	0	0	0.02
2003	329	23	1	356.546	-357.458	D	6.534	6.534	0	1.132	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.139	7.139	0	2.342	0	0	0	0	0	0
2003	331	23	1035	356.477	-356.792	D	8.566	8.565	0.001	5.504	94.96	4.8	0	0	0	0.16
2003	332	23	836	360.07	-362.066	D	6.757	6.756	0.002	1.567	77.42	19.9	0	0	0	2.66
2003	333	23	1	356.546	-357.458	D	6.508	6.508	0	1.082	0	0	0	0	0	0
2003	334	23	1	356.546	-357.458	D	6.569	6.569	0	1.199	0	0	0	0	0	0
2003	335	23	822	358.021	-361.607	D	6.648	6.647	0.001	1.352	93.34	5.43	0	0	0	1.23
2003	336	23	1	356.546	-357.458	D	6.505	6.505	0	1.075	0	0	0	0	0	0
2003	337	23	1	356.546	-357.458	D	8.505	8.505	0	5.363	0	0	0	0	0	0
2003	338	23	1017	356.894	-355.206	D	9.322	9.305	0.017	7.332	94.79	5.04	0	0	0	0.17
2003	339	23	928	365.945	-357.303	D	7.791	7.767	0.024	3.68	95.62	4.21	0	0	0	0.17
2003	340	23	822	358.021	-361.607	D	8.078	8.077	0.001	4.371	95.52	4.05	0	0	0	0.4
2003	341	23	1	356.546	-357.458	D	6.655	6.655	0	1.369	0	0	0	0	0	0
2003	342	23	1	356.546	-357.458	D	7.19	7.19	0	2.448	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	9.624	9.624	0	8.161	0	0	0	0	0	0
2003	344	23	947	365.801	-355.162	D	9.059	9.057	0.003	6.703	95.56	4.15	0	0	0	0.27
2003	345	23	907	365.051	-359.809	D	8.356	8.339	0.017	4.972	86.85	12.79	0	0	0	0.37
2003	346	23	809	357.432	-359.845	D	7.206	7.202	0.005	2.473	92.34	7.38	0	0	0	0.27
2003	347	23	10	356.954	-355.443	D	9.343	9.343	0	7.429	96.61	4.62	0	0	0	0.2
2003	348	23	1	356.546	-357.458	D	9.404	9.404	0	7.587	0	0	0	0	0	0
2003	349	23	1	356.546	-357.458	D	9.34	9.34	0	7.422	0	0	0	0	0	0
2003	350	23	1	356.546	-357.458	D	8.7	8.7	0	5.827	0	0	0	0	0	0
2003	351	23	1	356.546	-357.458	D	7.958	7.958	0	4.104	0	0	0	0	0	0
2003	352	23	1	356.546	-357.458	D	7.348	7.348	0	2.779	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	353	23	949	365.722	-354.966	D	8.398	8.398	0	5.11	94.16	4.66	0	0	0	0.93
2003	354	23	949	365.722	-354.966	D	6.926	6.919	0.007	1.894	89.97	9.28	0	0	0	0.76
2003	355	23	930	366.19	-357.232	D	6.682	6.682	0.001	1.421	95.91	3.65	0	0	0	0.36
2003	356	23	1	356.546	-357.458	D	9.006	9.006	0	6.576	0	0	0	0	0	0
2003	357	23	1017	356.894	-355.206	D	9.425	9.411	0.014	7.603	96.46	3.31	0	0	0	0.22
2003	358	23	809	357.432	-359.845	D	8.446	8.405	0.041	5.125	96	3.88	0	0	0	0.12
2003	359	23	853	361.666	-362.175	D	6.68	6.677	0.003	1.412	96.03	3.56	0	0	0	0.38
2003	360	23	643	363.609	-354.151	D	7.326	7.321	0.005	2.722	96.89	3	0	0	0	0.09
2003	361	23	1	356.546	-357.458	D	6.809	6.809	0	1.673	0	0	0	0	0	0
2003	362	23	1	356.546	-357.458	D	8.396	8.396	0	5.106	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.193	7.193	0	2.455	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	6.634	6.634	0	1.326	0	0	0	0	0	0
									0.142							
UMC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	356.546	-357.458	D	7.068	7.068	0	2.196	0	0	0	0	0	0
2003	2	23	102	358.487	-356.374	D	9.282	9.25	0.032	7.19	69.44	30.51	0	0	0	0.05
2003	3	23	1	356.546	-357.458	D	8.021	8.021	0	4.244	0	0	0	0	0	0
2003	4	23	1	356.546	-357.458	D	6.823	6.823	0	1.702	0	0	0	0	0	0
2003	5	23	1	356.546	-357.458	D	7.598	7.598	0	3.311	0	0	0	0	0	0
2003	6	23	1	356.546	-357.458	D	8.288	8.288	0	4.854	0	0	0	0	0	0
2003	7	23	930	366.19	-357.232	D	8.524	8.522	0.001	5.403	92.01	7.95	0	0	0	0.02
2003	8	23	1	356.546	-357.458	D	6.824	6.824	0	1.703	0	0	0	0	0	0
2003	9	23	930	366.19	-357.232	D	7.011	6.98	0.031	2.017	89.78	10.05	0	0	0	0.18
2003	10	23	1	356.546	-357.458	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	11	23	1	356.546	-357.458	D	6.561	6.561	0	1.184	0	0	0	0	0	0
2003	12	23	930	366.19	-357.232	D	6.491	6.491	0.001	1.048	85.98	13.9	0	0	0	0.11
2003	13	23	930	366.19	-357.232	D	6.648	6.648	0	1.354	87.13	11.99	0	0	0	0.08
2003	14	23	1	356.546	-357.458	D	8.811	8.811	0	6.098	0	0	0	0	0	0
2003	15	23	930	366.19	-357.232	D	6.611	6.606	0.005	1.272	80.62	19.25	0	0	0	0.14
2003	16	23	1035	356.477	-356.792	D	8.271	8.171	0.1	4.585	90.04	9.94	0	0	0	0.02
2003	17	23	1	356.546	-357.458	D	7.735	7.735	0	3.61	0	0	0	0	0	0
2003	18	23	1	356.546	-357.458	D	6.917	6.917	0	1.89	0	0	0	0	0	0
2003	19	23	1	356.546	-357.458	D	6.858	6.858	0	1.771	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	6.636	6.636	0	1.33	0	0	0	0	0	0
2003	21	23	900	364.265	-360.243	D	7.128	7.097	0.031	2.255	86.5	13.49	0	0	0	0.02

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	22	23	930	366.19	-357.232	D	7.192	7.165	0.026	2.397	83.58	16.29	0	0	0	0.14
2003	23	23	907	365.051	-359.809	D	7.152	7.151	0.002	2.367	91.38	8.58	0	0	0	0.02
2003	24	23	930	366.19	-357.232	D	6.743	6.742	0.001	1.54	89.06	10.6	0	0	0	0.05
2003	25	23	906	364.982	-359.812	D	6.497	6.496	0.001	1.059	90.36	9.34	0	0	0	0.04
2003	26	23	906	364.982	-359.812	D	7.139	7.139	0	2.342	92.11	6.8	0	0	0	0.02
2003	27	23	930	366.19	-357.232	D	6.831	6.823	0.008	1.701	85.78	14.16	0	0	0	0.05
2003	28	23	930	366.19	-357.232	D	7.223	7.222	0	2.516	91.11	8.9	0	0	0	0.02
2003	29	23	930	366.19	-357.232	D	9.445	9.296	0.149	7.308	75.24	24.73	0	0	0	0.03
2003	30	23	1017	356.894	-355.206	D	9.166	9.166	0	6.978	97.52	4.01	0	0	0	0.04
2003	31	23	1017	356.894	-355.206	D	7.23	7.23	0	2.531	94.33	5.5	0	0	0	0.01
2003	32	23	1	356.546	-357.458	D	8.138	8.138	0	4.509	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	6.734	6.734	0	1.525	0	0	0	0	0	0
2003	34	23	643	363.609	-354.151	D	9.387	9.387	0	7.543	143.5	7.19	0	0	0	0.02
2003	35	23	1	356.546	-357.458	D	7.087	7.087	0	2.235	0	0	0	0	0	0
2003	36	23	789	365.918	-355.796	D	6.579	6.579	0.001	1.219	81.3	18.35	0	0	0	0.2
2003	37	23	1017	356.894	-355.206	D	9.17	9.01	0.16	6.587	91.28	8.71	0	0	0	0.01
2003	38	23	1035	356.477	-356.792	D	8.569	7.857	**0.712**	3.878	93.32	6.67	0	0	0	0
2003	39	23	1	356.546	-357.458	D	7.088	7.088	0	2.237	0	0	0	0	0	0
2003	40	23	1	356.546	-357.458	D	7.753	7.753	0	3.649	0	0	0	0	0	0
2003	41	23	1	356.546	-357.458	D	9.515	9.515	0	7.875	0	0	0	0	0	0
2003	42	23	1	356.546	-357.458	D	7.016	7.016	0	2.09	0	0	0	0	0	0
2003	43	23	1	356.546	-357.458	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	44	23	907	365.051	-359.809	D	6.551	6.551	0.001	1.165	89.07	10.95	0	0	0	0.07
2003	45	23	1	356.546	-357.458	D	9.979	9.979	0	9.117	0	0	0	0	0	0
2003	46	23	255	360.129	-359.796	D	9.991	9.991	0	9.15	20.42	1.25	0	0	0	0
2003	47	23	1037	356.5	-357.195	D	8.501	8.295	0.206	4.87	92.23	7.75	0	0	0	0.02
2003	48	23	1039	356.522	-357.599	D	8.822	8.589	0.233	5.562	85.02	14.95	0	0	0	0.03
2003	49	23	930	366.19	-357.232	D	7.679	7.572	0.106	3.256	90.8	9.19	0	0	0	0.01
2003	50	23	949	365.722	-354.966	D	9.379	9.167	0.212	6.979	96.22	3.77	0	0	0	0
2003	51	23	1035	356.477	-356.792	D	9.714	9.253	0.461	7.199	92.43	7.57	0	0	0	0
2003	52	23	1017	356.894	-355.206	D	9.021	9.011	0.009	6.59	96.02	3.97	0	0	0	0
2003	53	23	1017	356.894	-355.206	D	9.338	9.211	0.127	7.093	89.75	10.23	0	0	0	0.02
2003	54	23	822	358.021	-361.607	D	8.796	8.617	0.179	5.627	87.04	12.95	0	0	0	0.01
2003	55	23	836	360.07	-362.066	D	8.445	8.288	0.158	4.854	91.04	8.95	0	0	0	0.01
2003	56	23	78	358.239	-356.385	D	7.246	7.164	0.082	2.394	73.93	25.97	0	0	0	0.1
2003	57	23	822	358.021	-361.607	D	7.794	7.72	0.075	3.576	92.49	7.5	0	0	0	0.01
2003	58	23	1039	356.522	-357.599	D	8.323	8.268	0.055	4.807	94.76	5.23	0	0	0	0.01
2003	59	23	1017	356.894	-355.206	D	8.486	8.398	0.089	5.109	95.14	4.85	0	0	0	0
2003	60	23	986	360.908	-354.689	D	9.349	9.098	0.25	6.807	95.7	4.3	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	61	23	949	365.722	-354.966	D	9.614	9.158	0.457	6.956	96.33	3.67	0	0	0	0
2003	62	23	907	365.051	-359.809	D	7.531	7.515	0.016	3.133	97.3	2.69	0	0	0	0.01
2003	63	23	907	365.051	-359.809	D	6.977	6.96	0.017	1.978	97.43	2.56	0	0	0	0.01
2003	64	23	933	366.169	-356.524	D	8.339	8.144	0.195	4.523	93.37	6.62	0	0	0	0.01
2003	65	23	949	365.722	-354.966	D	7.796	7.645	0.151	3.413	92.61	7.37	0	0	0	0.02
2003	66	23	930	366.19	-357.232	D	7.216	7.184	0.032	2.435	93.71	6.27	0	0	0	0.02
2003	67	23	932	366.176	-356.761	D	7.052	7.046	0.006	2.152	98.27	1.7	0	0	0	0.01
2003	68	23	930	366.19	-357.232	D	6.991	6.909	0.083	1.873	74.39	25.44	0	0	0	0.17
2003	69	23	832	359.493	-362.061	D	6.658	6.559	0.099	1.181	84.05	15.85	0	0	0	0.1
2003	70	23	1039	356.522	-357.599	D	6.59	6.523	0.066	1.111	94.03	5.92	0	0	0	0.05
2003	71	23	949	365.722	-354.966	D	6.962	6.956	0.006	1.969	97.83	2.15	0	0	0	0.02
2003	72	23	930	366.19	-357.232	D	8.54	8.444	0.096	5.218	98.22	1.76	0	0	0	0.02
2003	73	23	822	358.021	-361.607	D	7.975	7.94	0.035	4.063	97.4	2.59	0	0	0	0.01
2003	74	23	1039	356.522	-357.599	D	8.363	8.288	0.075	4.853	98	1.99	0	0	0	0.01
2003	75	23	1017	356.894	-355.206	D	7.326	7.316	0.009	2.712	99.37	0.62	0	0	0	0.01
2003	76	23	1	356.546	-357.458	D	8.57	8.57	0	5.516	0	0	0	0	0	0
2003	77	23	1	356.546	-357.458	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2003	78	23	1	356.546	-357.458	D	8.895	8.895	0	6.301	0	0	0	0	0	0
2003	79	23	809	357.432	-359.845	D	9.74	9.446	0.295	7.695	95.23	4.76	0	0	0	0
2003	80	23	853	361.666	-362.175	D	8.824	8.56	0.264	5.493	94.25	5.75	0	0	0	0
2003	81	23	1	356.546	-357.458	D	6.524	6.524	0	1.112	0	0	0	0	0	0
2003	82	23	1	356.546	-357.458	D	6.55	6.55	0	1.163	0	0	0	0	0	0
2003	83	23	1	356.546	-357.458	D	6.769	6.769	0	1.593	0	0	0	0	0	0
2003	84	23	933	366.169	-356.524	D	7.545	7.491	0.054	3.082	93.42	6.56	0	0	0	0.02
2003	85	23	1017	356.894	-355.206	D	8.989	8.931	0.058	6.39	78.47	21.51	0	0	0	0.02
2003	86	23	929	366.032	-357.239	D	6.573	6.572	0.001	1.205	99.37	0.52	0	0	0	0.02
2003	87	23	785	365.637	-355.06	D	8.509	8.509	0	5.371	97.64	0.19	0	0	0	0.02
2003	88	23	1	356.546	-357.458	D	7.417	7.417	0	2.925	0	0	0	0	0	0
2003	89	23	1	356.546	-357.458	D	6.548	6.548	0	1.16	0	0	0	0	0	0
2003	90	23	1	356.546	-357.458	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2003	91	23	1	356.546	-357.458	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	6.806	6.806	0	1.667	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.057	7.057	0	2.175	0	0	0	0	0	0
2003	94	23	1	356.546	-357.458	D	7.929	7.929	0	4.037	0	0	0	0	0	0
2003	95	23	1	356.546	-357.458	D	6.895	6.895	0	1.846	0	0	0	0	0	0
2003	96	23	1002	359.309	-354.73	D	8.491	8.458	0.033	5.251	94.81	5.18	0	0	0	0.01
2003	97	23	643	363.609	-354.151	D	9.275	9.275	0	7.253	97.18	3.11	0	0	0	0
2003	98	23	941	365.977	-355.774	D	7.94	7.855	0.085	3.874	94.99	5	0	0	0	0
2003	99	23	931	366.183	-356.996	D	7.374	7.324	0.05	2.727	89.93	9.99	0	0	0	0.08

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	100	23	900	364.265	-360.243	D	6.639	6.583	0.056	1.227	93.71	6.21	0	0	0	0.08
2003	101	23	955	364.92	-354.582	D	6.506	6.475	0.031	1.018	98.55	1.38	0	0	0	0.07
2003	102	23	931	366.183	-356.996	D	6.539	6.498	0.042	1.062	99.46	0.49	0	0	0	0.04
2003	103	23	930	366.19	-357.232	D	6.529	6.528	0.001	1.121	99.8	0.12	0	0	0	0.03
2003	104	23	930	366.19	-357.232	D	6.621	6.62	0	1.3	99.55	0.29	0	0	0	0.03
2003	105	23	1	356.546	-357.458	D	6.611	6.611	0	1.282	0	0	0	0	0	0
2003	106	23	1	356.546	-357.458	D	6.649	6.649	0	1.357	0	0	0	0	0	0
2003	107	23	949	365.722	-354.966	D	8.443	8.377	0.066	5.061	93.98	6.02	0	0	0	0
2003	108	23	947	365.801	-355.162	D	8.29	8.29	0.001	4.858	99.77	0.08	0	0	0	0.03
2003	109	23	948	365.727	-355.056	D	8.099	8.099	0	4.421	98.87	0.14	0	0	0	0.01
2003	110	23	1	356.546	-357.458	D	9.042	9.042	0	6.666	0	0	0	0	0	0
2003	111	23	1	356.546	-357.458	D	7.214	7.214	0	2.498	0	0	0	0	0	0
2003	112	23	773	365.4	-355.32	D	6.563	6.55	0.012	1.164	92.14	7.66	0	0	0	0.2
2003	113	23	1017	356.894	-355.206	D	6.56	6.556	0.004	1.174	98.67	1.26	0	0	0	0.07
2003	114	23	1	356.546	-357.458	D	8.459	8.459	0	5.252	0	0	0	0	0	0
2003	115	23	966	363.538	-354.124	D	9.195	9.157	0.038	6.955	96.2	3.78	0	0	0	0.02
2003	116	23	941	365.977	-355.774	D	7.803	7.621	0.182	3.361	93.59	6.39	0	0	0	0.02
2003	117	23	811	357.434	-360.225	D	6.942	6.934	0.008	1.925	98.92	1.06	0	0	0	0.02
2003	118	23	949	365.722	-354.966	D	7.704	7.7	0.004	3.533	99.78	0.2	0	0	0	0.01
2003	119	23	949	365.722	-354.966	D	8.106	8.105	0.001	4.435	98.76	0.96	0	0	0	0
2003	120	23	643	363.609	-354.151	D	8.167	8.166	0	4.575	99.93	0.32	0	0	0	0.01
2003	121	23	973	362.512	-354.246	D	8.019	8.019	0	4.239	99.39	0.47	0	0	0	0.02
2003	122	23	949	365.722	-354.966	D	8.85	8.666	0.185	5.745	97.83	2.13	0	0	0	0.03
2003	123	23	1037	356.5	-357.195	D	8.987	8.071	**0.917**	4.356	97.16	2.83	0	0	0	0.01
2003	124	23	901	364.256	-360.039	D	7.102	7.074	0.028	2.209	99.57	0.42	0	0	0	0.01
2003	125	23	1	356.546	-357.458	D	8.426	8.426	0	5.177	0	0	0	0	0	0
2003	126	23	1	356.546	-357.458	D	7.215	7.215	0	2.501	0	0	0	0	0	0
2003	127	23	1009	357.941	-354.82	D	8.559	8.486	0.073	5.317	97.65	2.34	0	0	0	0.01
2003	128	23	949	365.722	-354.966	D	7.472	7.458	0.013	3.012	99.66	0.32	0	0	0	0.02
2003	129	23	1	356.546	-357.458	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	8.54	8.54	0	5.445	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.463	7.463	0	3.022	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	6.616	6.616	0	1.291	0	0	0	0	0	0
2003	133	23	1	356.546	-357.458	D	6.709	6.709	0	1.475	0	0	0	0	0	0
2003	134	23	1	356.546	-357.458	D	9.435	9.435	0	7.667	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	8.531	8.531	0	5.425	0	0	0	0	0	0
2003	136	23	1	356.546	-357.458	D	9.441	9.441	0	7.682	0	0	0	0	0	0
2003	137	23	964	363.678	-354.148	D	9.259	9.253	0.007	7.197	99.79	0.17	0	0	0	0.01
2003	138	23	1035	356.477	-356.792	D	8.978	8.865	0.113	6.23	98.77	1.23	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	139	23	1017	356.894	-355.206	D	8.779	8.751	0.028	5.951	99.22	0.76	0	0	0	0
2003	140	23	949	365.722	-354.966	D	8.673	8.116	**0.557**	4.459	93.92	6.07	0	0	0	0.01
2003	141	23	930	366.19	-357.232	D	6.71	6.686	0.024	1.428	98.57	1.36	0	0	0	0.07
2003	142	23	1017	356.894	-355.206	D	6.899	6.848	0.051	1.751	99.26	0.68	0	0	0	0.06
2003	143	23	1017	356.894	-355.206	D	6.723	6.615	0.108	1.29	99.67	0.28	0	0	0	0.05
2003	144	23	949	365.722	-354.966	D	7.893	7.546	0.346	3.2	99.57	0.41	0	0	0	0.01
2003	145	23	967	363.478	-354.116	D	9.791	9.16	**0.631**	6.962	98.52	1.48	0	0	0	0
2003	146	23	822	358.021	-361.607	D	8.024	7.836	0.188	3.832	99.36	0.64	0	0	0	0.01
2003	147	23	1017	356.894	-355.206	D	6.649	6.637	0.012	1.333	99.37	0.59	0	0	0	0.05
2003	148	23	822	358.021	-361.607	D	6.649	6.635	0.015	1.329	99.79	0.18	0	0	0	0.03
2003	149	23	852	361.595	-362.148	D	7.204	7.203	0.001	2.476	99.99	0.03	0	0	0	0.02
2003	150	23	1	356.546	-357.458	D	6.608	6.608	0	1.277	0	0	0	0	0	0
2003	151	23	949	365.722	-354.966	D	7.162	7.158	0.004	2.382	99.84	0.13	0	0	0	0.06
2003	152	23	1039	356.522	-357.599	D	7.209	7.197	0.013	2.462	99.48	0.47	0	0	0	0.04
2003	153	23	1017	356.894	-355.206	D	8.556	8.537	0.018	5.438	99.14	0.85	0	0	0	0
2003	154	23	949	365.722	-354.966	D	9.453	9.102	0.351	6.816	95.19	4.81	0	0	0	0
2003	155	23	931	366.183	-356.996	D	8.049	8.022	0.028	4.246	93.48	6.51	0	0	0	0.01
2003	156	23	219	359.98	-362.05	D	6.747	6.722	0.026	1.5	99.83	0.14	0	0	0	0.02
2003	157	23	1002	359.309	-354.73	D	8.253	8.092	0.161	4.406	99.09	0.9	0	0	0	0.01
2003	158	23	929	366.032	-357.239	D	7.519	7.518	0.001	3.139	99.62	0.36	0	0	0	0
2003	159	23	644	364.12	-360.12	D	7.648	7.648	0	3.419	91.62	0.07	0	0	0	0.01
2003	160	23	1	356.546	-357.458	D	6.615	6.615	0	1.291	0	0	0	0	0	0
2003	161	23	1	356.546	-357.458	D	7.537	7.537	0	3.181	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	8.967	8.967	0	6.479	0	0	0	0	0	0
2003	163	23	1	356.546	-357.458	D	8.888	8.888	0	6.285	0	0	0	0	0	0
2003	164	23	1017	356.894	-355.206	D	8.869	8.868	0.001	6.237	100.1	0.06	0	0	0	0.02
2003	165	23	955	364.92	-354.582	D	9.024	8.221	**0.803**	4.699	95.22	4.77	0	0	0	0.01
2003	166	23	853	361.666	-362.175	D	8.061	7.884	0.177	3.937	99.06	0.93	0	0	0	0.01
2003	167	23	900	364.265	-360.243	D	8.14	8.049	0.091	4.307	99.54	0.46	0	0	0	0
2003	168	23	832	359.493	-362.061	D	6.984	6.955	0.029	1.966	99.39	0.6	0	0	0	0.01
2003	169	23	836	360.07	-362.066	D	7.756	7.744	0.012	3.629	99.73	0.26	0	0	0	0
2003	170	23	1017	356.894	-355.206	D	8.326	8.227	0.099	4.715	99.77	0.22	0	0	0	0.01
2003	171	23	853	361.666	-362.175	D	9.102	8.559	**0.543**	5.49	97.28	2.72	0	0	0	0
2003	172	23	1035	356.477	-356.792	D	6.936	6.92	0.017	1.896	99.78	0.2	0	0	0	0.01
2003	173	23	1	356.546	-357.458	D	6.849	6.849	0	1.754	0	0	0	0	0	0
2003	174	23	1	356.546	-357.458	D	7.032	7.032	0	2.124	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.954	7.954	0	4.094	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	8.379	8.379	0	5.066	0	0	0	0	0	0
2003	177	23	1	356.546	-357.458	D	8.457	8.457	0	5.25	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	178	23	929	366.032	-357.239	D	6.785	6.785	0	1.626	99.88	0.04	0	0	0	0.07
2003	179	23	907	365.051	-359.809	D	6.649	6.646	0.004	1.35	99.81	0.15	0	0	0	0.04
2003	180	23	1017	356.894	-355.206	D	6.702	6.696	0.006	1.448	99.9	0.07	0	0	0	0.02
2003	181	23	1017	356.894	-355.206	D	6.992	6.984	0.008	2.026	99.8	0.17	0	0	0	0.01
2003	182	23	967	363.478	-354.116	D	8.488	8.488	0	5.322	99.12	0.3	0	0	0	0.01
2003	183	23	949	365.722	-354.966	D	7.933	7.932	0.001	4.044	99.57	0.43	0	0	0	0.01
2003	184	23	785	365.637	-355.06	D	7.642	7.642	0	3.406	99.49	0.1	0	0	0	0.01
2003	185	23	1	356.546	-357.458	D	7.012	7.012	0	2.084	0	0	0	0	0	0
2003	186	23	1	356.546	-357.458	D	7.047	7.047	0	2.154	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.775	7.775	0	3.698	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.138	7.138	0	2.341	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.032	7.032	0	2.124	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.13	7.13	0	2.323	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.724	7.724	0	3.585	0	0	0	0	0	0
2003	192	23	1	356.546	-357.458	D	6.906	6.906	0	1.867	0	0	0	0	0	0
2003	193	23	1	356.546	-357.458	D	7.784	7.784	0	3.717	0	0	0	0	0	0
2003	194	23	949	365.722	-354.966	D	7.464	7.459	0.005	3.013	99.94	0.02	0	0	0	0.03
2003	195	23	933	366.169	-356.524	D	8.696	8.597	0.099	5.581	99.72	0.28	0	0	0	0
2003	196	23	933	366.169	-356.524	D	8.455	8.453	0.001	5.24	99.99	0.02	0	0	0	0.01
2003	197	23	1	356.546	-357.458	D	7.084	7.084	0	2.229	0	0	0	0	0	0
2003	198	23	930	366.19	-357.232	D	7.074	7.073	0.001	2.207	99.98	0.05	0	0	0	0.02
2003	199	23	930	366.19	-357.232	D	6.917	6.917	0	1.89	99.13	0.04	0	0	0	0.02
2003	200	23	931	366.183	-356.996	D	8.006	8.005	0	4.209	99.46	0.05	0	0	0	0.01
2003	201	23	941	365.977	-355.774	D	8.703	8.703	0	5.834	99.81	0.18	0	0	0	0
2003	202	23	1	356.546	-357.458	D	7.723	7.723	0	3.583	0	0	0	0	0	0
2003	203	23	1	356.546	-357.458	D	7.376	7.376	0	2.837	0	0	0	0	0	0
2003	204	23	1017	356.894	-355.206	D	7.057	7.02	0.037	2.099	99.1	0.82	0	0	0	0.08
2003	205	23	1035	356.477	-356.792	D	6.889	6.785	0.104	1.625	99.81	0.16	0	0	0	0.04
2003	206	23	1017	356.894	-355.206	D	7.098	7.042	0.056	2.144	99.8	0.18	0	0	0	0.02
2003	207	23	1	356.546	-357.458	D	6.959	6.959	0	1.976	0	0	0	0	0	0
2003	208	23	1	356.546	-357.458	D	6.962	6.962	0	1.982	0	0	0	0	0	0
2003	209	23	1	356.546	-357.458	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2003	210	23	933	366.169	-356.524	D	8.608	8.465	0.143	5.266	95.88	4.11	0	0	0	0.01
2003	211	23	930	366.19	-357.232	D	9.219	8.934	0.285	6.399	98.97	1.02	0	0	0	0
2003	212	23	930	366.19	-357.232	D	8.294	8.147	0.147	4.531	99.4	0.59	0	0	0	0
2003	213	23	907	365.051	-359.809	D	7.067	7.04	0.027	2.14	99.82	0.17	0	0	0	0.01
2003	214	23	930	366.19	-357.232	D	7.742	7.728	0.014	3.595	99.94	0.06	0	0	0	0
2003	215	23	1	356.546	-357.458	D	8.413	8.413	0	5.145	0	0	0	0	0	0
2003	216	23	1	356.546	-357.458	D	7.17	7.17	0	2.406	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	217	23	1	356.546	-357.458	D	7.65	7.65	0	3.425	0	0	0	0	0	0
2003	218	23	1035	356.477	-356.792	D	8.429	8.359	0.069	5.02	99.71	0.27	0	0	0	0.02
2003	219	23	1035	356.477	-356.792	D	8.547	8.242	0.305	4.747	96.26	3.73	0	0	0	0.01
2003	220	23	846	360.93	-362.178	D	7.082	6.896	0.186	1.847	99.67	0.3	0	0	0	0.03
2003	221	23	1035	356.477	-356.792	D	6.942	6.871	0.07	1.798	99.54	0.42	0	0	0	0.04
2003	222	23	1017	356.894	-355.206	D	7.04	6.955	0.086	1.966	99.47	0.49	0	0	0	0.04
2003	223	23	822	358.021	-361.607	D	6.827	6.817	0.01	1.689	99.77	0.2	0	0	0	0.02
2003	224	23	822	358.021	-361.607	D	7.082	7.082	0	2.225	99.72	0.33	0	0	0	0.02
2003	225	23	1	356.546	-357.458	D	7.661	7.661	0	3.448	0	0	0	0	0	0
2003	226	23	1	356.546	-357.458	D	9.004	9.004	0	6.572	0	0	0	0	0	0
2003	227	23	1	356.546	-357.458	D	7.091	7.091	0	2.245	0	0	0	0	0	0
2003	228	23	1	356.546	-357.458	D	6.939	6.939	0	1.935	0	0	0	0	0	0
2003	229	23	1	356.546	-357.458	D	6.787	6.787	0	1.63	0	0	0	0	0	0
2003	230	23	930	366.19	-357.232	D	6.801	6.797	0.004	1.65	99.95	0.02	0	0	0	0.03
2003	231	23	930	366.19	-357.232	D	7.048	7.022	0.026	2.102	99.87	0.11	0	0	0	0.02
2003	232	23	930	366.19	-357.232	D	7.168	7.143	0.025	2.351	99.84	0.15	0	0	0	0.01
2003	233	23	930	366.19	-357.232	D	6.877	6.861	0.016	1.778	99.8	0.18	0	0	0	0.01
2003	234	23	930	366.19	-357.232	D	7.079	7.058	0.021	2.177	99.91	0.08	0	0	0	0.01
2003	235	23	930	366.19	-357.232	D	7.128	7.032	0.096	2.123	99.84	0.14	0	0	0	0.02
2003	236	23	822	358.021	-361.607	D	8.009	7.855	0.154	3.873	99.09	0.9	0	0	0	0.01
2003	237	23	996	360.121	-355.113	D	7.916	7.754	0.162	3.651	99.85	0.14	0	0	0	0.01
2003	238	23	967	363.478	-354.116	D	7.234	7.213	0.021	2.496	99.96	0.02	0	0	0	0.01
2003	239	23	932	366.176	-356.761	D	7.034	7.033	0.001	2.125	99.85	0.02	0	0	0	0.01
2003	240	23	1	356.546	-357.458	D	7.035	7.035	0	2.13	0	0	0	0	0	0
2003	241	23	1	356.546	-357.458	D	8.765	8.765	0	5.985	0	0	0	0	0	0
2003	242	23	949	365.722	-354.966	D	9.342	9.342	0	7.425	99.77	0.21	0	0	0	0
2003	243	23	967	363.478	-354.116	D	9.381	9.377	0.004	7.517	98.91	1.07	0	0	0	0
2003	244	23	1	356.546	-357.458	D	9.054	9.054	0	6.695	0	0	0	0	0	0
2003	245	23	996	360.121	-355.113	D	9.739	9.651	0.088	8.234	99.67	0.32	0	0	0	0
2003	246	23	1039	356.522	-357.599	D	9.423	9.148	0.276	6.931	98.69	1.3	0	0	0	0
2003	247	23	927	365.912	-357.454	D	7.945	7.719	0.226	3.574	93.31	6.66	0	0	0	0.03
2003	248	23	1035	356.477	-356.792	D	6.822	6.738	0.083	1.533	98.34	1.59	0	0	0	0.07
2003	249	23	1	356.546	-357.458	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	250	23	1	356.546	-357.458	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2003	251	23	1	356.546	-357.458	D	6.825	6.825	0	1.706	0	0	0	0	0	0
2003	252	23	1	356.546	-357.458	D	7.117	7.117	0	2.298	0	0	0	0	0	0
2003	253	23	1	356.546	-357.458	D	7.349	7.349	0	2.78	0	0	0	0	0	0
2003	254	23	1	356.546	-357.458	D	8.372	8.372	0	5.05	0	0	0	0	0	0
2003	255	23	1	356.546	-357.458	D	9.772	9.772	0	8.557	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	256	23	1	356.546	-357.458	D	9.293	9.293	0	7.301	0	0	0	0	0	0
2003	257	23	906	364.982	-359.812	D	8.954	8.453	**0.501**	5.24	95.89	4.1	0	0	0	0.01
2003	258	23	1	356.546	-357.458	D	6.72	6.72	0	1.496	0	0	0	0	0	0
2003	259	23	930	366.19	-357.232	D	6.692	6.69	0.002	1.437	99.78	0.12	0	0	0	0.06
2003	260	23	941	365.977	-355.774	D	6.887	6.862	0.025	1.78	99.56	0.42	0	0	0	0.02
2003	261	23	643	363.609	-354.151	D	6.921	6.92	0.001	1.895	99.85	0.14	0	0	0	0.02
2003	262	23	1	356.546	-357.458	D	7.657	7.657	0	3.439	0	0	0	0	0	0
2003	263	23	933	366.169	-356.524	D	6.632	6.593	0.039	1.247	98.91	1.03	0	0	0	0.07
2003	264	23	1017	356.894	-355.206	D	6.941	6.887	0.055	1.829	99.77	0.21	0	0	0	0.02
2003	265	23	949	365.722	-354.966	D	9.194	9.139	0.055	6.909	98.75	1.24	0	0	0	0
2003	266	23	906	364.982	-359.812	D	6.917	6.917	0	1.89	99.83	0.07	0	0	0	0.01
2003	267	23	1	356.546	-357.458	D	6.878	6.878	0	1.812	0	0	0	0	0	0
2003	268	23	1017	356.894	-355.206	D	6.74	6.728	0.012	1.512	94.13	5.44	0	0	0	0.43
2003	269	23	219	359.98	-362.05	D	6.956	6.939	0.017	1.935	98.92	1.05	0	0	0	0.02
2003	270	23	930	366.19	-357.232	D	7.536	7.533	0.003	3.171	88.09	11.76	0	0	0	0.15
2003	271	23	1	356.546	-357.458	D	6.751	6.751	0	1.558	0	0	0	0	0	0
2003	272	23	779	365.703	-356.555	D	6.591	6.539	0.051	1.142	81.56	18.07	0	0	0	0.36
2003	273	23	949	365.722	-354.966	D	6.748	6.735	0.014	1.525	97.22	2.74	0	0	0	0.04
2003	274	23	972	362.744	-354.242	D	9.221	9.087	0.134	6.78	93.53	6.47	0	0	0	0.01
2003	275	23	255	360.129	-359.796	D	6.597	6.594	0.003	1.248	82.45	17.32	0	0	0	0.22
2003	276	23	832	359.493	-362.061	D	6.806	6.793	0.013	1.641	98.22	1.76	0	0	0	0.02
2003	277	23	907	365.051	-359.809	D	6.991	6.989	0.002	2.036	99.69	0.29	0	0	0	0.02
2003	278	23	930	366.19	-357.232	D	6.653	6.647	0.006	1.353	99.5	0.45	0	0	0	0.04
2003	279	23	900	364.265	-360.243	D	8.894	8.771	0.123	5.999	98.1	1.89	0	0	0	0.01
2003	280	23	811	357.434	-360.225	D	7.318	7.272	0.045	2.62	99.47	0.51	0	0	0	0.01
2003	281	23	1017	356.894	-355.206	D	7.338	7.326	0.012	2.733	99.62	0.37	0	0	0	0.01
2003	282	23	1007	358.259	-354.768	D	8.879	8.877	0.002	6.259	99.5	0.39	0	0	0	0.01
2003	283	23	108	358.421	-354.879	D	9.663	9.663	0	8.265	98.27	0.76	0	0	0	0
2003	284	23	1	356.546	-357.458	D	9.486	9.486	0	7.798	0	0	0	0	0	0
2003	285	23	846	360.93	-362.178	D	7.603	7.57	0.034	3.251	99.06	0.83	0	0	0	0.11
2003	286	23	1039	356.522	-357.599	D	6.777	6.738	0.039	1.532	99.3	0.65	0	0	0	0.05
2003	287	23	947	365.801	-355.162	D	8.787	8.738	0.049	5.919	97.44	2.56	0	0	0	0
2003	288	23	1	356.546	-357.458	D	6.773	6.773	0	1.602	0	0	0	0	0	0
2003	289	23	1	356.546	-357.458	D	6.605	6.605	0	1.27	0	0	0	0	0	0
2003	290	23	787	365.962	-356.793	D	7.877	7.857	0.02	3.878	95.71	4.28	0	0	0	0
2003	291	23	1017	356.894	-355.206	D	6.612	6.586	0.026	1.234	98.39	1.55	0	0	0	0.06
2003	292	23	853	361.666	-362.175	D	6.642	6.629	0.012	1.318	99.71	0.25	0	0	0	0.04
2003	293	23	907	365.051	-359.809	D	6.793	6.79	0.002	1.636	99.84	0.09	0	0	0	0.02
2003	294	23	929	366.032	-357.239	D	6.775	6.775	0	1.606	99.86	0.12	0	0	0	0.02

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	295	23	1035	356.477	-356.792	D	6.716	6.701	0.015	1.459	98.79	1.07	0	0	0	0.14
2003	296	23	963	363.809	-354.192	D	6.667	6.657	0.01	1.372	99.41	0.48	0	0	0	0.08
2003	297	23	949	365.722	-354.966	D	6.624	6.594	0.03	1.249	99.4	0.54	0	0	0	0.05
2003	298	23	806	357.415	-359.242	D	8.102	7.753	0.349	3.648	93.25	6.72	0	0	0	0.02
2003	299	23	907	365.051	-359.809	D	7.831	7.776	0.055	3.699	91.06	8.93	0	0	0	0.01
2003	300	23	619	363.872	-360.131	D	6.556	6.556	0	1.175	79.67	0.73	0	0	0	0.01
2003	301	23	1	356.546	-357.458	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	6.555	6.555	0	1.172	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.333	7.333	0	2.746	0	0	0	0	0	0
2003	304	23	1	356.546	-357.458	D	8.921	8.921	0	6.367	0	0	0	0	0	0
2003	305	23	949	365.722	-354.966	D	8.093	7.695	0.398	3.522	89.42	10.54	0	0	0	0.04
2003	306	23	964	363.678	-354.148	D	8.881	8.88	0.001	6.266	98.69	1.29	0	0	0	0.01
2003	307	23	1	356.546	-357.458	D	8.069	8.069	0	4.352	0	0	0	0	0	0
2003	308	23	1008	358.048	-354.775	D	7.397	7.394	0.003	2.876	96.94	3.07	0	0	0	0.01
2003	309	23	900	364.265	-360.243	D	7.968	7.902	0.066	3.979	93.65	6.3	0	0	0	0.04
2003	310	23	219	359.98	-362.05	D	8.731	8.481	0.25	5.304	92.27	7.71	0	0	0	0.02
2003	311	23	822	358.021	-361.607	D	7.172	7.079	0.093	2.219	93.57	6.4	0	0	0	0.02
2003	312	23	1	356.546	-357.458	D	6.575	6.575	0	1.212	0	0	0	0	0	0
2003	313	23	1	356.546	-357.458	D	6.5	6.5	0	1.066	0	0	0	0	0	0
2003	314	23	1	356.546	-357.458	D	6.62	6.62	0	1.299	0	0	0	0	0	0
2003	315	23	1	356.546	-357.458	D	7.24	7.24	0	2.552	0	0	0	0	0	0
2003	316	23	1	356.546	-357.458	D	8.831	8.831	0	6.146	0	0	0	0	0	0
2003	317	23	1	356.546	-357.458	D	6.511	6.511	0	1.087	0	0	0	0	0	0
2003	318	23	907	365.051	-359.809	D	7.337	7.336	0.001	2.754	95.83	4.42	0	0	0	0.01
2003	319	23	930	366.19	-357.232	D	9.349	9.349	0.001	7.444	93.07	6.93	0	0	0	0.01
2003	320	23	1	356.546	-357.458	D	9.803	9.803	0	8.638	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	9.92	9.92	0	8.955	0	0	0	0	0	0
2003	322	23	1	356.546	-357.458	D	9.817	9.817	0	8.676	0	0	0	0	0	0
2003	323	23	931	366.183	-356.996	D	7.555	7.536	0.019	3.178	96.63	3.37	0	0	0	0
2003	324	23	1	356.546	-357.458	D	6.761	6.761	0	1.579	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.385	7.385	0	2.857	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	9.413	9.413	0	7.61	0	0	0	0	0	0
2003	327	23	1008	358.048	-354.775	D	8.987	8.915	0.072	6.352	93.31	6.69	0	0	0	0
2003	328	23	1	356.546	-357.458	D	7.277	7.277	0	2.629	0	0	0	0	0	0
2003	329	23	1	356.546	-357.458	D	6.534	6.534	0	1.132	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.139	7.139	0	2.342	0	0	0	0	0	0
2003	331	23	933	366.169	-356.524	D	8.63	8.612	0.018	5.616	94.87	5.11	0	0	0	0.02
2003	332	23	930	366.19	-357.232	D	6.757	6.756	0.002	1.567	95.45	4.59	0	0	0	0.01
2003	333	23	1	356.546	-357.458	D	6.508	6.508	0	1.082	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	334	23	1	356.546	-357.458	D	6.569	6.569	0	1.199	0	0	0	0	0	0
2003	335	23	78	358.239	-356.385	D	6.694	6.645	0.049	1.349	75.45	24.2	0	0	0	0.35
2003	336	23	1017	356.894	-355.206	D	6.505	6.505	0	1.075	90.55	9.23	0	0	0	0.16
2003	337	23	1	356.546	-357.458	D	8.505	8.505	0	5.363	0	0	0	0	0	0
2003	338	23	1017	356.894	-355.206	D	9.521	9.305	0.216	7.332	92.02	7.97	0	0	0	0.01
2003	339	23	822	358.021	-361.607	D	7.769	7.767	0.001	3.68	96.48	3.52	0	0	0	0.01
2003	340	23	929	366.032	-357.239	D	8.09	8.09	0	4.4	92.15	8.02	0	0	0	0.06
2003	341	23	933	366.169	-356.524	D	6.665	6.658	0.007	1.374	89.06	10.89	0	0	0	0.05
2003	342	23	1	356.546	-357.458	D	7.19	7.19	0	2.448	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	9.624	9.624	0	8.161	0	0	0	0	0	0
2003	344	23	955	364.92	-354.582	D	9.187	9.057	0.13	6.703	91.3	8.7	0	0	0	0.01
2003	345	23	1	356.546	-357.458	D	8.216	8.216	0	4.687	0	0	0	0	0	0
2003	346	23	949	365.722	-354.966	D	7.257	7.218	0.039	2.507	90.24	9.73	0	0	0	0.02
2003	347	23	1039	356.522	-357.599	D	9.365	9.343	0.022	7.429	92.43	7.56	0	0	0	0.01
2003	348	23	822	358.021	-361.607	D	9.463	9.399	0.064	7.573	94.07	5.92	0	0	0	0
2003	349	23	933	366.169	-356.524	D	9.372	9.359	0.012	7.47	95.32	4.67	0	0	0	0
2003	350	23	594	363.123	-354.422	D	8.702	8.702	0	5.832	92.35	3.94	0	0	0	0
2003	351	23	1	356.546	-357.458	D	7.958	7.958	0	4.104	0	0	0	0	0	0
2003	352	23	1	356.546	-357.458	D	7.348	7.348	0	2.779	0	0	0	0	0	0
2003	353	23	1	356.546	-357.458	D	8.258	8.258	0	4.785	0	0	0	0	0	0
2003	354	23	1	356.546	-357.458	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	355	23	1	356.546	-357.458	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2003	356	23	1	356.546	-357.458	D	9.006	9.006	0	6.576	0	0	0	0	0	0
2003	357	23	933	366.169	-356.524	D	9.443	9.343	0.1	7.43	76.21	23.76	0	0	0	0.04
2003	358	23	1	356.546	-357.458	D	8.405	8.405	0	5.125	0	0	0	0	0	0
2003	359	23	1	356.546	-357.458	D	6.685	6.685	0	1.427	0	0	0	0	0	0
2003	360	23	786	365.973	-357.042	D	7.324	7.321	0.003	2.722	94.23	5.71	0	0	0	0.03
2003	361	23	933	366.169	-356.524	D	6.826	6.823	0.004	1.701	94.34	5.65	0	0	0	0.03
2003	362	23	1	356.546	-357.458	D	8.396	8.396	0	5.106	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.193	7.193	0	2.455	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	6.634	6.634	0	1.326	0	0	0	0	0	0
									0.917							
NORANDA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	356.546	-357.458	D	7.068	7.068	0	2.196	0	0	0	0	0	0
2003	2	23	1	356.546	-357.458	D	9.25	9.25	0	7.19	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	3	23	1	356.546	-357.458	D	8.021	8.021	0	4.244	0	0	0	0	0	0
2003	4	23	1	356.546	-357.458	D	6.823	6.823	0	1.702	0	0	0	0	0	0
2003	5	23	1	356.546	-357.458	D	7.598	7.598	0	3.311	0	0	0	0	0	0
2003	6	23	1	356.546	-357.458	D	8.288	8.288	0	4.854	0	0	0	0	0	0
2003	7	23	1	356.546	-357.458	D	8.571	8.571	0	5.518	0	0	0	0	0	0
2003	8	23	1	356.546	-357.458	D	6.824	6.824	0	1.703	0	0	0	0	0	0
2003	9	23	1	356.546	-357.458	D	7.007	7.007	0	2.072	0	0	0	0	0	0
2003	10	23	1	356.546	-357.458	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	11	23	1	356.546	-357.458	D	6.561	6.561	0	1.184	0	0	0	0	0	0
2003	12	23	930	366.19	-357.232	D	6.491	6.491	0	1.048	95.61	0.02	0	0	0.51	3.66
2003	13	23	930	366.19	-357.232	D	6.648	6.648	0	1.354	95.91	0.02	0	0	0.19	3.28
2003	14	23	1	356.546	-357.458	D	8.811	8.811	0	6.098	0	0	0	0	0	0
2003	15	23	1	356.546	-357.458	D	6.607	6.607	0	1.274	0	0	0	0	0	0
2003	16	23	1017	356.894	-355.206	D	8.303	8.171	0.132	4.585	96.53	0.32	0	0	0.14	3.01
2003	17	23	905	364.788	-359.816	D	7.735	7.735	0	3.61	52.05	0	0	0	1.28	7.52
2003	18	23	1	356.546	-357.458	D	6.917	6.917	0	1.89	0	0	0	0	0	0
2003	19	23	1	356.546	-357.458	D	6.858	6.858	0	1.771	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	6.636	6.636	0	1.33	0	0	0	0	0	0
2003	21	23	1	356.546	-357.458	D	7.097	7.097	0	2.257	0	0	0	0	0	0
2003	22	23	1	356.546	-357.458	D	7.178	7.178	0	2.424	0	0	0	0	0	0
2003	23	23	1	356.546	-357.458	D	7.144	7.144	0	2.353	0	0	0	0	0	0
2003	24	23	1	356.546	-357.458	D	6.741	6.741	0	1.539	0	0	0	0	0	0
2003	25	23	1	356.546	-357.458	D	6.496	6.496	0	1.059	0	0	0	0	0	0
2003	26	23	1	356.546	-357.458	D	7.143	7.143	0	2.35	0	0	0	0	0	0
2003	27	23	906	364.982	-359.812	D	6.823	6.823	0	1.701	94.01	0.04	0	0	0.22	5.08
2003	28	23	929	366.032	-357.239	D	7.223	7.222	0	2.516	86.19	0.47	0	0	0.08	14.21
2003	29	23	1	356.546	-357.458	D	9.286	9.286	0	7.281	0	0	0	0	0	0
2003	30	23	1	356.546	-357.458	D	9.166	9.166	0	6.978	0	0	0	0	0	0
2003	31	23	907	365.051	-359.809	D	7.293	7.28	0.013	2.636	98.66	0.05	0	0	0.02	1.26
2003	32	23	1	356.546	-357.458	D	8.138	8.138	0	4.509	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	6.734	6.734	0	1.525	0	0	0	0	0	0
2003	34	23	1	356.546	-357.458	D	9.353	9.353	0	7.455	0	0	0	0	0	0
2003	35	23	1	356.546	-357.458	D	7.087	7.087	0	2.235	0	0	0	0	0	0
2003	36	23	1	356.546	-357.458	D	6.578	6.578	0	1.218	0	0	0	0	0	0
2003	37	23	907	365.051	-359.809	D	9.235	9.007	0.229	6.578	98.4	0.22	0	0	0.07	1.31
2003	38	23	900	364.265	-360.243	D	7.977	7.94	0.037	4.063	99.36	0.1	0	0	0.01	0.53
2003	39	23	1	356.546	-357.458	D	7.088	7.088	0	2.237	0	0	0	0	0	0
2003	40	23	1	356.546	-357.458	D	7.753	7.753	0	3.649	0	0	0	0	0	0
2003	41	23	1	356.546	-357.458	D	9.515	9.515	0	7.875	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	42	23	1	356.546	-357.458	D	7.016	7.016	0	2.09	0	0	0	0	0	0
2003	43	23	1	356.546	-357.458	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	44	23	1	356.546	-357.458	D	6.55	6.55	0	1.163	0	0	0	0	0	0
2003	45	23	1	356.546	-357.458	D	9.979	9.979	0	9.117	0	0	0	0	0	0
2003	46	23	949	365.722	-354.966	D	10.024	9.991	0.033	9.15	98.97	0.1	0	0	0.01	0.92
2003	47	23	822	358.021	-361.607	D	8.335	8.295	0.04	4.87	99.15	0.1	0	0	0	0.74
2003	48	23	1	356.546	-357.458	D	8.589	8.589	0	5.562	0	0	0	0	0	0
2003	49	23	1	356.546	-357.458	D	7.467	7.467	0	3.031	0	0	0	0	0	0
2003	50	23	907	365.051	-359.809	D	9.175	9.167	0.008	6.979	94.03	0.8	0	0	0.1	5.02
2003	51	23	900	364.265	-360.243	D	9.274	9.242	0.032	7.17	99.14	0.07	0	0	0.11	0.68
2003	52	23	853	361.666	-362.175	D	9.534	9.039	0.495	6.659	99.26	0.05	0	0	0.06	0.63
2003	53	23	853	361.666	-362.175	D	9.278	9.207	0.071	7.081	99.65	0.03	0	0	0.02	0.29
2003	54	23	1	356.546	-357.458	D	8.617	8.617	0	5.627	0	0	0	0	0	0
2003	55	23	933	366.169	-356.524	D	8.294	8.294	0.001	4.868	99.91	0.01	0	0	0.01	0.13
2003	56	23	1	356.546	-357.458	D	7.164	7.164	0	2.394	0	0	0	0	0	0
2003	57	23	845	360.851	-362.181	D	7.689	7.689	0	3.509	96.54	0.11	0	0	0.36	3.14
2003	58	23	255	360.129	-359.796	D	8.261	8.255	0.006	4.778	98.94	0.06	0	0	0.1	0.9
2003	59	23	219	359.98	-362.05	D	8.39	8.381	0.009	5.071	99	0.05	0	0	0.06	0.88
2003	60	23	853	361.666	-362.175	D	9.234	9.158	0.077	6.957	99.39	0.05	0	0	0.03	0.53
2003	61	23	907	365.051	-359.809	D	9.193	9.158	0.035	6.956	99.57	0.05	0	0	0.01	0.37
2003	62	23	1	356.546	-357.458	D	7.514	7.514	0	3.13	0	0	0	0	0	0
2003	63	23	1	356.546	-357.458	D	6.958	6.958	0	1.972	0	0	0	0	0	0
2003	64	23	1	356.546	-357.458	D	8.11	8.11	0	4.446	0	0	0	0	0	0
2003	65	23	1	356.546	-357.458	D	7.645	7.645	0	3.413	0	0	0	0	0	0
2003	66	23	1	356.546	-357.458	D	7.121	7.121	0	2.306	0	0	0	0	0	0
2003	67	23	1	356.546	-357.458	D	7.027	7.027	0	2.114	0	0	0	0	0	0
2003	68	23	1	356.546	-357.458	D	6.909	6.909	0	1.874	0	0	0	0	0	0
2003	69	23	1	356.546	-357.458	D	6.56	6.56	0	1.183	0	0	0	0	0	0
2003	70	23	906	364.982	-359.812	D	6.521	6.521	0	1.107	91.39	0.01	0	0	0.56	7.7
2003	71	23	907	365.051	-359.809	D	6.961	6.956	0.005	1.969	93.14	0.05	0	0	0.06	6.73
2003	72	23	1	356.546	-357.458	D	8.5	8.5	0	5.349	0	0	0	0	0	0
2003	73	23	1	356.546	-357.458	D	7.94	7.94	0	4.063	0	0	0	0	0	0
2003	74	23	907	365.051	-359.809	D	8.318	8.294	0.024	4.868	98.57	0.03	0	0	0.09	1.3
2003	75	23	949	365.722	-354.966	D	7.408	7.392	0.016	2.871	97.41	0.06	0	0	0.03	2.48
2003	76	23	949	365.722	-354.966	D	8.543	8.539	0.005	5.441	98.83	0.04	0	0	0.01	1.05
2003	77	23	949	365.722	-354.966	D	8.765	8.743	0.022	5.93	99.25	0	0	0	0.12	0.62
2003	78	23	966	363.538	-354.124	D	9.095	8.892	0.203	6.296	98.02	0.23	0	0	0.09	1.66
2003	79	23	809	357.432	-359.845	D	9.504	9.446	0.058	7.695	99.7	0.05	0	0	0	0.24
2003	80	23	907	365.051	-359.809	D	8.624	8.614	0.009	5.621	99.48	0.08	0	0	0	0.45

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	81	23	1	356.546	-357.458	D	6.524	6.524	0	1.112	0	0	0	0	0	0
2003	82	23	1	356.546	-357.458	D	6.55	6.55	0	1.163	0	0	0	0	0	0
2003	83	23	1	356.546	-357.458	D	6.769	6.769	0	1.593	0	0	0	0	0	0
2003	84	23	1	356.546	-357.458	D	7.434	7.434	0	2.96	0	0	0	0	0	0
2003	85	23	1	356.546	-357.458	D	8.931	8.931	0	6.39	0	0	0	0	0	0
2003	86	23	930	366.19	-357.232	D	6.58	6.572	0.008	1.205	91.82	0.06	0	0	0.36	7.75
2003	87	23	1	356.546	-357.458	D	8.497	8.497	0	5.343	0	0	0	0	0	0
2003	88	23	1	356.546	-357.458	D	7.417	7.417	0	2.925	0	0	0	0	0	0
2003	89	23	1	356.546	-357.458	D	6.548	6.548	0	1.16	0	0	0	0	0	0
2003	90	23	1	356.546	-357.458	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2003	91	23	1	356.546	-357.458	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	6.806	6.806	0	1.667	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.057	7.057	0	2.175	0	0	0	0	0	0
2003	94	23	1	356.546	-357.458	D	7.929	7.929	0	4.037	0	0	0	0	0	0
2003	95	23	1	356.546	-357.458	D	6.895	6.895	0	1.846	0	0	0	0	0	0
2003	96	23	822	358.021	-361.607	D	8.528	8.427	0.101	5.179	97.59	0.05	0	0	0.14	2.22
2003	97	23	1017	356.894	-355.206	D	9.287	9.255	0.032	7.203	96.18	0.93	0	0	0.02	2.86
2003	98	23	933	366.169	-356.524	D	7.822	7.815	0.007	3.786	99.15	0.08	0	0	0	0.76
2003	99	23	1	356.546	-357.458	D	7.347	7.347	0	2.776	0	0	0	0	0	0
2003	100	23	1	356.546	-357.458	D	6.576	6.576	0	1.213	0	0	0	0	0	0
2003	101	23	1	356.546	-357.458	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2003	102	23	1	356.546	-357.458	D	6.498	6.498	0	1.062	0	0	0	0	0	0
2003	103	23	1	356.546	-357.458	D	6.527	6.527	0	1.118	0	0	0	0	0	0
2003	104	23	1	356.546	-357.458	D	6.619	6.619	0	1.299	0	0	0	0	0	0
2003	105	23	1	356.546	-357.458	D	6.611	6.611	0	1.282	0	0	0	0	0	0
2003	106	23	1	356.546	-357.458	D	6.649	6.649	0	1.357	0	0	0	0	0	0
2003	107	23	1	356.546	-357.458	D	8.358	8.358	0	5.017	0	0	0	0	0	0
2003	108	23	933	366.169	-356.524	D	8.294	8.29	0.005	4.858	98.23	0	0	0	0.16	1.61
2003	109	23	949	365.722	-354.966	D	8.101	8.099	0.002	4.421	95.92	0	0	0	0.13	3.91
2003	110	23	1	356.546	-357.458	D	9.042	9.042	0	6.666	0	0	0	0	0	0
2003	111	23	1	356.546	-357.458	D	7.214	7.214	0	2.498	0	0	0	0	0	0
2003	112	23	1	356.546	-357.458	D	6.545	6.545	0	1.154	0	0	0	0	0	0
2003	113	23	861	361.895	-361.506	D	6.566	6.554	0.012	1.17	79.34	0.02	0	0	2.66	17.97
2003	114	23	1039	356.522	-357.599	D	8.47	8.459	0.011	5.252	97.7	0.04	0	0	0.07	2.2
2003	115	23	1039	356.522	-357.599	D	9.205	9.147	0.058	6.929	98.76	0.03	0	0	0.02	1.19
2003	116	23	927	365.912	-357.454	D	7.696	7.621	0.075	3.361	99.1	0.01	0	0	0.02	0.87
2003	117	23	907	365.051	-359.809	D	6.914	6.914	0	1.884	94.69	0	0	0	0.66	4.51
2003	118	23	927	365.912	-357.454	D	7.703	7.7	0.003	3.533	97.7	0	0	0	0.1	2.16
2003	119	23	1	356.546	-357.458	D	8.099	8.099	0	4.421	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	120	23	1	356.546	-357.458	D	8.15	8.15	0	4.536	0	0	0	0	0	0
2003	121	23	1	356.546	-357.458	D	8.057	8.057	0	4.325	0	0	0	0	0	0
2003	122	23	1	356.546	-357.458	D	8.672	8.672	0	5.761	0	0	0	0	0	0
2003	123	23	1	356.546	-357.458	D	8.071	8.071	0	4.356	0	0	0	0	0	0
2003	124	23	900	364.265	-360.243	D	7.098	7.074	0.024	2.209	96.03	0.01	0	0	0.05	3.9
2003	125	23	1	356.546	-357.458	D	8.426	8.426	0	5.177	0	0	0	0	0	0
2003	126	23	1	356.546	-357.458	D	7.215	7.215	0	2.501	0	0	0	0	0	0
2003	127	23	1	356.546	-357.458	D	8.486	8.486	0	5.317	0	0	0	0	0	0
2003	128	23	947	365.801	-355.162	D	7.459	7.458	0.001	3.012	99.42	0	0	0	0.12	0.49
2003	129	23	1	356.546	-357.458	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	8.54	8.54	0	5.445	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.463	7.463	0	3.022	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	6.616	6.616	0	1.291	0	0	0	0	0	0
2003	133	23	1	356.546	-357.458	D	6.709	6.709	0	1.475	0	0	0	0	0	0
2003	134	23	1	356.546	-357.458	D	9.435	9.435	0	7.667	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	8.531	8.531	0	5.425	0	0	0	0	0	0
2003	136	23	949	365.722	-354.966	D	9.517	9.456	0.061	7.721	98.62	0.11	0	0	0.06	1.2
2003	137	23	930	366.19	-357.232	D	9.274	9.256	0.018	7.206	96.79	0.01	0	0	0.48	2.72
2003	138	23	1039	356.522	-357.599	D	8.911	8.865	0.046	6.23	99.41	0.02	0	0	0.03	0.53
2003	139	23	907	365.051	-359.809	D	8.776	8.752	0.024	5.953	98.14	0.01	0	0	0.28	1.57
2003	140	23	907	365.051	-359.809	D	8.333	8.116	0.217	4.459	99.34	0.02	0	0	0.04	0.6
2003	141	23	821	358.053	-361.416	D	6.685	6.685	0	1.427	96.4	0	0	0	0.03	2.48
2003	142	23	1	356.546	-357.458	D	6.848	6.848	0	1.751	0	0	0	0	0	0
2003	143	23	1	356.546	-357.458	D	6.615	6.615	0	1.29	0	0	0	0	0	0
2003	144	23	907	365.051	-359.809	D	7.581	7.546	0.034	3.2	99.75	0.01	0	0	0.03	0.2
2003	145	23	941	365.977	-355.774	D	9.294	9.16	0.134	6.962	99.48	0.02	0	0	0.03	0.47
2003	146	23	832	359.493	-362.061	D	7.87	7.836	0.034	3.832	99.1	0.02	0	0	0.03	0.86
2003	147	23	247	360.217	-361.79	D	6.64	6.64	0	1.34	81.83	0	0	0	0.09	5.93
2003	148	23	1	356.546	-357.458	D	6.635	6.635	0	1.33	0	0	0	0	0	0
2003	149	23	1	356.546	-357.458	D	7.194	7.194	0	2.457	0	0	0	0	0	0
2003	150	23	1	356.546	-357.458	D	6.608	6.608	0	1.277	0	0	0	0	0	0
2003	151	23	1	356.546	-357.458	D	7.158	7.158	0	2.382	0	0	0	0	0	0
2003	152	23	1	356.546	-357.458	D	7.197	7.197	0	2.462	0	0	0	0	0	0
2003	153	23	941	365.977	-355.774	D	8.581	8.527	0.054	5.415	98.66	0.02	0	0	0.03	1.29
2003	154	23	949	365.722	-354.966	D	9.572	9.102	0.47	6.816	99.27	0.03	0	0	0.03	0.67
2003	155	23	906	364.982	-359.812	D	8.023	8.022	0.001	4.246	95.51	0	0	0	0.34	4.14
2003	156	23	44	358.21	-361.379	D	6.722	6.722	0	1.5	85.45	0	0	0	0.91	12.1
2003	157	23	928	365.945	-357.303	D	8.026	7.985	0.041	4.163	98.54	0.01	0	0	0.1	1.35
2003	158	23	930	366.19	-357.232	D	7.523	7.518	0.005	3.139	98.47	0.01	0	0	0.07	1.46

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	159	23	929	366.032	-357.239	D	7.678	7.678	0	3.484	90.9	0	0	0	0.13	5.84
2003	160	23	1	356.546	-357.458	D	6.615	6.615	0	1.291	0	0	0	0	0	0
2003	161	23	1	356.546	-357.458	D	7.537	7.537	0	3.181	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	8.967	8.967	0	6.479	0	0	0	0	0	0
2003	163	23	1	356.546	-357.458	D	8.888	8.888	0	6.285	0	0	0	0	0	0
2003	164	23	1	356.546	-357.458	D	8.868	8.868	0	6.237	0	0	0	0	0	0
2003	165	23	1	356.546	-357.458	D	8.223	8.223	0	4.704	0	0	0	0	0	0
2003	166	23	1	356.546	-357.458	D	7.897	7.897	0	3.967	0	0	0	0	0	0
2003	167	23	900	364.265	-360.243	D	8.054	8.049	0.005	4.307	99.6	0.01	0	0	0.06	0.32
2003	168	23	845	360.851	-362.181	D	6.983	6.954	0.028	1.965	98.88	0.01	0	0	0.15	0.96
2003	169	23	853	361.666	-362.175	D	7.929	7.744	0.185	3.629	98.83	0.04	0	0	0.12	1.01
2003	170	23	853	361.666	-362.175	D	8.304	8.282	0.021	4.841	99.04	0.01	0	0	0.11	0.83
2003	171	23	906	364.982	-359.812	D	8.6	8.599	0.002	5.584	99.48	0	0	0	0.01	0.33
2003	172	23	927	365.912	-357.454	D	7.002	6.919	0.084	1.893	94.74	0.01	0	0	0.72	4.53
2003	173	23	955	364.92	-354.582	D	6.838	6.831	0.007	1.717	81.07	0.02	0	0	0.4	18.5
2003	174	23	929	366.032	-357.239	D	7.009	7.009	0	2.077	65.82	0	0	0	1.02	8.82
2003	175	23	1	356.546	-357.458	D	7.954	7.954	0	4.094	85.04	0	0	0	0.3	5.58
2003	176	23	1	356.546	-357.458	D	8.379	8.379	0	5.066	0	0	0	0	0	0
2003	177	23	1	356.546	-357.458	D	8.457	8.457	0	5.25	0	0	0	0	0	0
2003	178	23	1	356.546	-357.458	D	6.78	6.78	0	1.615	0	0	0	0	0	0
2003	179	23	853	361.666	-362.175	D	6.64	6.64	0	1.339	93.12	0	0	0	1.37	5.47
2003	180	23	219	359.98	-362.05	D	6.764	6.697	0.067	1.451	96.42	0	0	0	0.34	3.23
2003	181	23	933	366.169	-356.524	D	7.054	7.018	0.036	2.094	97.8	0	0	0	0.13	2.07
2003	182	23	974	362.281	-354.249	D	8.499	8.488	0.011	5.322	98.06	0.02	0	0	0.13	1.76
2003	183	23	930	366.19	-357.232	D	8.002	7.934	0.068	4.05	99.47	0.01	0	0	0.04	0.48
2003	184	23	907	365.051	-359.809	D	7.691	7.642	0.05	3.406	98.92	0	0	0	0.08	1
2003	185	23	786	365.973	-357.042	D	7.055	7.021	0.034	2.102	98.27	0	0	0	0.09	1.64
2003	186	23	933	366.169	-356.524	D	7.07	7.069	0.001	2.199	90.7	0	0	0	1.12	8.13
2003	187	23	516	362.412	-355.202	D	7.773	7.773	0	3.693	91.37	0	0	0	1.6	4.57
2003	188	23	1	356.546	-357.458	D	7.138	7.138	0	2.341	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.032	7.032	0	2.124	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.13	7.13	0	2.323	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.724	7.724	0	3.585	0	0	0	0	0	0
2003	192	23	1	356.546	-357.458	D	6.906	6.906	0	1.867	0	0	0	0	0	0
2003	193	23	1	356.546	-357.458	D	7.784	7.784	0	3.717	0	0	0	0	0	0
2003	194	23	1	356.546	-357.458	D	7.438	7.438	0	2.97	0	0	0	0	0	0
2003	195	23	930	366.19	-357.232	D	8.615	8.597	0.017	5.581	99.81	0	0	0	0.02	0.16
2003	196	23	933	366.169	-356.524	D	8.454	8.453	0.001	5.24	99.63	0	0	0	0.03	0.4
2003	197	23	1	356.546	-357.458	D	7.084	7.084	0	2.229	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	198	23	775	365.747	-357.551	D	7.071	7.071	0	2.203	43.76	0	0	0	0.91	17.27
2003	199	23	929	366.032	-357.239	D	6.917	6.917	0	1.89	94.32	0	0	0	0.41	4.72
2003	200	23	930	366.19	-357.232	D	8.005	8.005	0	4.209	91.86	0	0	0	0.22	6.9
2003	201	23	930	366.19	-357.232	D	8.708	8.708	0	5.847	92.85	0.44	0	0	0.24	5.57
2003	202	23	1	356.546	-357.458	D	7.723	7.723	0	3.583	0	0	0	0	0	0
2003	203	23	1	356.546	-357.458	D	7.376	7.376	0	2.837	0	0	0	0	0	0
2003	204	23	1	356.546	-357.458	D	7.02	7.02	0	2.099	0	0	0	0	0	0
2003	205	23	853	361.666	-362.175	D	6.796	6.796	0	1.647	98.11	0	0	0	0.44	1.25
2003	206	23	219	359.98	-362.05	D	7.098	7.044	0.054	2.148	97.83	0	0	0	0.25	1.92
2003	207	23	996	360.121	-355.113	D	7	6.98	0.02	2.018	97.75	0	0	0	0.12	2.13
2003	208	23	747	364.871	-354.594	D	6.962	6.962	0	1.98	98.36	0	0	0	0.06	1.65
2003	209	23	1	356.546	-357.458	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2003	210	23	900	364.265	-360.243	D	8.485	8.481	0.004	5.306	99.5	0	0	0	0.06	0.41
2003	211	23	900	364.265	-360.243	D	9.08	8.984	0.096	6.522	99.88	0	0	0	0.01	0.11
2003	212	23	930	366.19	-357.232	D	8.171	8.147	0.024	4.531	99.73	0	0	0	0.02	0.24
2003	213	23	907	365.051	-359.809	D	7.041	7.04	0.001	2.14	99.65	0	0	0	0.01	0.29
2003	214	23	786	365.973	-357.042	D	7.728	7.727	0.001	3.591	99.65	0	0	0	0.01	0.22
2003	215	23	1	356.546	-357.458	D	8.413	8.413	0	5.145	10.25	0	0	0	0	0.48
2003	216	23	1	356.546	-357.458	D	7.17	7.17	0	2.406	0	0	0	0	0	0
2003	217	23	1	356.546	-357.458	D	7.65	7.65	0	3.425	0	0	0	0	0	0
2003	218	23	1	356.546	-357.458	D	8.359	8.359	0	5.02	0	0	0	0	0	0
2003	219	23	1	356.546	-357.458	D	8.242	8.242	0	4.747	0	0	0	0	0	0
2003	220	23	1	356.546	-357.458	D	6.894	6.894	0	1.844	0	0	0	0	0	0
2003	221	23	1	356.546	-357.458	D	6.871	6.871	0	1.798	0	0	0	0	0	0
2003	222	23	1	356.546	-357.458	D	6.955	6.955	0	1.966	0	0	0	0	0	0
2003	223	23	1	356.546	-357.458	D	6.817	6.817	0	1.689	0	0	0	0	0	0
2003	224	23	1	356.546	-357.458	D	7.101	7.101	0	2.265	0	0	0	0	0	0
2003	225	23	1	356.546	-357.458	D	7.661	7.661	0	3.448	0	0	0	0	0	0
2003	226	23	1039	356.522	-357.599	D	9.184	9.004	0.18	6.572	98.88	0.08	0	0	0.04	0.99
2003	227	23	643	363.609	-354.151	D	7.103	7.102	0.001	2.267	96.05	0	0	0	0.11	3.68
2003	228	23	933	366.169	-356.524	D	6.917	6.915	0.002	1.887	97.27	0	0	0	0.07	2.7
2003	229	23	929	366.032	-357.239	D	6.789	6.789	0	1.634	93.25	0	0	0	0.08	6.18
2003	230	23	15	357.659	-360.155	D	6.789	6.789	0	1.634	10.24	0	0	0	0.01	2.18
2003	231	23	668	364.346	-359.61	D	7.021	7.021	0	2.102	38.95	0.13	0	0	2.07	51.12
2003	232	23	907	365.051	-359.809	D	7.119	7.117	0.003	2.297	96.22	0.01	0	0	0.26	3.5
2003	233	23	930	366.19	-357.232	D	6.873	6.861	0.012	1.778	97.59	0	0	0	0.21	2.19
2003	234	23	930	366.19	-357.232	D	7.082	7.058	0.024	2.177	98.55	0	0	0	0.12	1.32
2003	235	23	930	366.19	-357.232	D	7.057	7.032	0.025	2.123	98.6	0	0	0	0.09	1.3
2003	236	23	853	361.666	-362.175	D	7.9	7.857	0.043	3.879	99.23	0	0	0	0.07	0.7

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	237	23	907	365.051	-359.809	D	8.078	7.754	0.324	3.651	99.3	0.01	0	0	0.06	0.64
2003	238	23	928	365.945	-357.303	D	7.364	7.213	0.151	2.496	98.7	0	0	0	0.06	1.24
2003	239	23	933	366.169	-356.524	D	7.04	7.033	0.007	2.125	98.76	0	0	0	0.04	1.17
2003	240	23	786	365.973	-357.042	D	7.056	7.056	0	2.172	98.13	0	0	0	0.04	1.62
2003	241	23	1	356.546	-357.458	D	8.765	8.765	0	5.985	0	0	0	0	0	0
2003	242	23	219	359.98	-362.05	D	9.437	9.325	0.112	7.383	99.6	0.01	0	0	0.03	0.36
2003	243	23	822	358.021	-361.607	D	9.667	9.398	0.269	7.569	99.4	0.04	0	0	0.02	0.54
2003	244	23	1017	356.894	-355.206	D	9.056	9.054	0.002	6.695	99.42	0.01	0	0	0.06	0.42
2003	245	23	949	365.722	-354.966	D	9.666	9.651	0.015	8.234	99.79	0.01	0	0	0.01	0.18
2003	246	23	930	366.19	-357.232	D	9.367	9.148	0.219	6.933	99.75	0.02	0	0	0.01	0.22
2003	247	23	822	358.021	-361.607	D	7.728	7.727	0	3.593	99.85	0	0	0	0	0.16
2003	248	23	1	356.546	-357.458	D	6.738	6.738	0	1.533	0	0	0	0	0	0
2003	249	23	1	356.546	-357.458	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	250	23	836	360.07	-362.066	D	6.944	6.942	0.002	1.941	92.27	0.01	0	0	1.28	6.43
2003	251	23	822	358.021	-361.607	D	6.892	6.831	0.061	1.717	96.85	0	0	0	0.28	2.87
2003	252	23	809	357.432	-359.845	D	7.194	7.117	0.077	2.298	97.93	0	0	0	0.14	1.93
2003	253	23	949	365.722	-354.966	D	7.521	7.303	0.218	2.683	98.76	0.01	0	0	0.05	1.18
2003	254	23	949	365.722	-354.966	D	8.328	8.323	0.004	4.936	99.36	0	0	0	0.03	0.59
2003	255	23	929	366.032	-357.239	D	9.811	9.811	0	8.66	92.77	0	0	0	0.63	1.71
2003	256	23	1	356.546	-357.458	D	9.293	9.293	0	7.301	0	0	0	0	0	0
2003	257	23	1	356.546	-357.458	D	8.451	8.451	0	5.234	0	0	0	0	0	0
2003	258	23	1	356.546	-357.458	D	6.72	6.72	0	1.496	0	0	0	0	0	0
2003	259	23	930	366.19	-357.232	D	6.694	6.69	0.004	1.437	94.45	0	0	0	0.67	4.86
2003	260	23	949	365.722	-354.966	D	6.883	6.862	0.02	1.78	96.4	0.01	0	0	0.17	3.42
2003	261	23	1008	358.048	-354.775	D	6.905	6.905	0	1.866	87.67	0.01	0	0	0.62	11.39
2003	262	23	929	366.032	-357.239	D	7.622	7.622	0	3.363	99.35	0	0	0	0.81	6.06
2003	263	23	1	356.546	-357.458	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2003	264	23	784	365.648	-355.309	D	6.93	6.876	0.055	1.807	94.95	0.01	0	0	0.31	4.74
2003	265	23	949	365.722	-354.966	D	9.248	9.139	0.109	6.909	99.48	0.02	0	0	0.02	0.47
2003	266	23	906	364.982	-359.812	D	6.917	6.917	0	1.89	96.29	0	0	0	0.03	1.88
2003	267	23	1	356.546	-357.458	D	6.878	6.878	0	1.812	0	0	0	0	0	0
2003	268	23	1	356.546	-357.458	D	6.728	6.728	0	1.512	0	0	0	0	0	0
2003	269	23	914	365.435	-358.584	D	6.917	6.917	0	1.889	93.84	0.01	0	0	0.16	5.19
2003	270	23	929	366.032	-357.239	D	7.533	7.533	0	3.171	89.42	0.03	0	0	0.11	11.34
2003	271	23	1	356.546	-357.458	D	6.751	6.751	0	1.558	0	0	0	0	0	0
2003	272	23	1	356.546	-357.458	D	6.538	6.538	0	1.139	0	0	0	0	0	0
2003	273	23	1	356.546	-357.458	D	6.734	6.734	0	1.525	0	0	0	0	0	0
2003	274	23	1	356.546	-357.458	D	9.063	9.063	0	6.718	0	0	0	0	0	0
2003	275	23	1	356.546	-357.458	D	6.592	6.592	0	1.246	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	276	23	853	361.666	-362.175	D	6.788	6.788	0	1.631	97.76	0	0	0	0.14	1.44
2003	277	23	907	365.051	-359.809	D	6.989	6.989	0	2.036	97.89	0	0	0	0.05	1.99
2003	278	23	1	356.546	-357.458	D	6.649	6.649	0	1.356	0	0	0	0	0	0
2003	279	23	930	366.19	-357.232	D	8.771	8.744	0.027	5.933	98.05	0.03	0	0	0.26	1.65
2003	280	23	900	364.265	-360.243	D	7.687	7.27	0.417	2.614	97.6	0.02	0	0	0.25	2.13
2003	281	23	1017	356.894	-355.206	D	7.391	7.326	0.065	2.733	97.06	0.01	0	0	0.11	2.82
2003	282	23	1008	358.048	-354.775	D	8.882	8.877	0.005	6.259	98.93	0	0	0	0.03	0.98
2003	283	23	1017	356.894	-355.206	D	9.839	9.663	0.176	8.265	96.37	0.29	0	0	0.25	3.09
2003	284	23	1017	356.894	-355.206	D	9.486	9.486	0.001	7.798	93.86	1.19	0	0	0.05	4.52
2003	285	23	907	365.051	-359.809	D	7.689	7.668	0.021	3.464	99.04	0.04	0	0	0.01	0.91
2003	286	23	853	361.666	-362.175	D	6.743	6.741	0.002	1.538	98.04	0	0	0	0.03	1.97
2003	287	23	930	366.19	-357.232	D	8.743	8.732	0.012	5.904	99.65	0.01	0	0	0	0.34
2003	288	23	1	356.546	-357.458	D	6.773	6.773	0	1.602	0	0	0	0	0	0
2003	289	23	1	356.546	-357.458	D	6.605	6.605	0	1.27	0	0	0	0	0	0
2003	290	23	1	356.546	-357.458	D	7.943	7.943	0	4.069	0	0	0	0	0	0
2003	291	23	142	359.137	-359.84	D	6.586	6.586	0	1.234	72.75	0	0	0	0.02	0.46
2003	292	23	1	356.546	-357.458	D	6.628	6.628	0	1.315	0	0	0	0	0	0
2003	293	23	1	356.546	-357.458	D	6.776	6.776	0	1.608	0	0	0	0	0	0
2003	294	23	1	356.546	-357.458	D	6.763	6.763	0	1.582	0	0	0	0	0	0
2003	295	23	1	356.546	-357.458	D	6.701	6.701	0	1.459	0	0	0	0	0	0
2003	296	23	1	356.546	-357.458	D	6.652	6.652	0	1.362	0	0	0	0	0	0
2003	297	23	907	365.051	-359.809	D	6.614	6.594	0.02	1.249	72.85	0.04	0	0	2.01	25.09
2003	298	23	930	366.19	-357.232	D	7.764	7.747	0.018	3.635	98.64	0.01	0	0	0.01	1.34
2003	299	23	219	359.98	-362.05	D	7.782	7.782	0.001	3.712	98.21	0.02	0	0	0	1.65
2003	300	23	1	356.546	-357.458	D	6.556	6.556	0	1.174	0	0	0	0	0	0
2003	301	23	1	356.546	-357.458	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	6.555	6.555	0	1.172	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.333	7.333	0	2.746	0	0	0	0	0	0
2003	304	23	1	356.546	-357.458	D	8.921	8.921	0	6.367	0	0	0	0	0	0
2003	305	23	1	356.546	-357.458	D	7.695	7.695	0	3.522	0	0	0	0	0	0
2003	306	23	1	356.546	-357.458	D	8.897	8.897	0	6.307	0	0	0	0	0	0
2003	307	23	1	356.546	-357.458	D	8.069	8.069	0	4.352	0	0	0	0	0	0
2003	308	23	1	356.546	-357.458	D	7.394	7.394	0	2.876	0	0	0	0	0	0
2003	309	23	1	356.546	-357.458	D	7.856	7.856	0	3.876	0	0	0	0	0	0
2003	310	23	1	356.546	-357.458	D	8.481	8.481	0	5.304	0	0	0	0	0	0
2003	311	23	1	356.546	-357.458	D	7.071	7.071	0	2.203	0	0	0	0	0	0
2003	312	23	1	356.546	-357.458	D	6.575	6.575	0	1.212	0	0	0	0	0	0
2003	313	23	1	356.546	-357.458	D	6.5	6.5	0	1.066	0	0	0	0	0	0
2003	314	23	927	365.912	-357.454	D	6.629	6.617	0.012	1.293	88.26	0.06	0	0	0.56	11.12

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	315	23	730	364.623	-354.605	D	7.225	7.225	0	2.521	81.79	0.08	0	0	0.06	18.05
2003	316	23	1	356.546	-357.458	D	8.831	8.831	0	6.146	0	0	0	0	0	0
2003	317	23	1	356.546	-357.458	D	6.511	6.511	0	1.087	0	0	0	0	0	0
2003	318	23	929	366.032	-357.239	D	7.253	7.253	0	2.58	85.11	0.22	0	0	0.06	2.21
2003	319	23	927	365.912	-357.454	D	9.45	9.446	0.004	7.695	98.49	0.09	0	0	0.11	1.33
2003	320	23	1	356.546	-357.458	D	9.803	9.803	0	8.638	0	0	0	0	0	0
2003	321	23	933	366.169	-356.524	D	9.922	9.92	0.003	8.955	93.08	1.78	0	0	0.05	5.02
2003	322	23	1	356.546	-357.458	D	9.817	9.817	0	8.676	0	0	0	0	0	0
2003	323	23	1	356.546	-357.458	D	7.47	7.47	0	3.036	0	0	0	0	0	0
2003	324	23	1	356.546	-357.458	D	6.761	6.761	0	1.579	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.385	7.385	0	2.857	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	9.413	9.413	0	7.61	0	0	0	0	0	0
2003	327	23	1	356.546	-357.458	D	8.915	8.915	0	6.352	0	0	0	0	0	0
2003	328	23	1	356.546	-357.458	D	7.277	7.277	0	2.629	0	0	0	0	0	0
2003	329	23	1	356.546	-357.458	D	6.534	6.534	0	1.132	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.139	7.139	0	2.342	0	0	0	0	0	0
2003	331	23	1	356.546	-357.458	D	8.565	8.565	0	5.504	0	0	0	0	0	0
2003	332	23	1	356.546	-357.458	D	6.75	6.75	0	1.556	0	0	0	0	0	0
2003	333	23	1	356.546	-357.458	D	6.508	6.508	0	1.082	0	0	0	0	0	0
2003	334	23	1	356.546	-357.458	D	6.569	6.569	0	1.199	0	0	0	0	0	0
2003	335	23	1	356.546	-357.458	D	6.645	6.645	0	1.349	0	0	0	0	0	0
2003	336	23	907	365.051	-359.809	D	6.511	6.505	0.006	1.075	95.84	0.01	0	0	0.44	3.71
2003	337	23	949	365.722	-354.966	D	8.557	8.549	0.008	5.465	71.27	0.36	0	0	0.63	27.75
2003	338	23	966	363.538	-354.124	D	9.634	9.316	0.319	7.358	98.61	0.23	0	0	0.02	1.14
2003	339	23	625	363.806	-358.636	D	7.767	7.767	0	3.68	88.22	0.58	0	0	0.57	9.33
2003	340	23	1	356.546	-357.458	D	8.084	8.084	0	4.388	0	0	0	0	0	0
2003	341	23	930	366.19	-357.232	D	6.661	6.658	0.004	1.374	92.35	0.08	0	0	0.58	6.95
2003	342	23	747	364.871	-354.594	D	7.201	7.201	0	2.471	92.25	0.09	0	0	0.04	7.91
2003	343	23	1	356.546	-357.458	D	9.624	9.624	0	8.161	0	0	0	0	0	0
2003	344	23	255	360.129	-359.796	D	9.057	9.057	0	6.703	0.09	14.92	0	0	0	21.76
2003	345	23	1	356.546	-357.458	D	8.216	8.216	0	4.687	0	0	0	0	0	0
2003	346	23	832	359.493	-362.061	D	7.202	7.191	0.011	2.45	98.28	0.01	0	0	0.14	1.57
2003	347	23	822	358.021	-361.607	D	9.539	9.343	0.196	7.429	98.5	0.13	0	0	0.14	1.23
2003	348	23	809	357.432	-359.845	D	10.022	9.404	**0.617**	7.587	99.4	0.08	0	0	0.02	0.5
2003	349	23	933	366.169	-356.524	D	9.444	9.359	0.085	7.47	99.42	0.07	0	0	0.01	0.51
2003	350	23	933	366.169	-356.524	D	8.685	8.685	0	5.791	99.46	0.13	0	0	0	1.3
2003	351	23	1	356.546	-357.458	D	7.958	7.958	0	4.104	0	0	0	0	0	0
2003	352	23	1	356.546	-357.458	D	7.348	7.348	0	2.779	0	0	0	0	0	0
2003	353	23	1	356.546	-357.458	D	8.258	8.258	0	4.785	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	354	23	1	356.546	-357.458	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	355	23	1	356.546	-357.458	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2003	356	23	1	356.546	-357.458	D	9.006	9.006	0	6.576	0	0	0	0	0	0
2003	357	23	1	356.546	-357.458	D	9.411	9.411	0	7.603	0	0	0	0	0	0
2003	358	23	1	356.546	-357.458	D	8.405	8.405	0	5.125	0	0	0	0	0	0
2003	359	23	1	356.546	-357.458	D	6.685	6.685	0	1.427	0	0	0	0	0	0
2003	360	23	929	366.032	-357.239	D	7.293	7.293	0	2.662	94.89	0.02	0	0	0.75	3.86
2003	361	23	947	365.801	-355.162	D	6.821	6.82	0.001	1.695	95.06	0.07	0	0	0.2	4.64
2003	362	23	1	356.546	-357.458	D	8.396	8.396	0	5.106	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.193	7.193	0	2.455	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	6.634	6.634	0	1.326	0	0	0	0	0	0
									0.617							

Appendix M
Hercules Glade
2001 M6

EGU	EGU										% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	78	358.239	-356.385	D	7.721	7.548	0.172	3.204	0	0	0	0	0	100
2001	2	23	822	358.021	-361.607	D	7.553	7.546	0.006	3.2	0	0	0	0	0	100.04
2001	3	23	1008	358.048	-354.775	D	7.557	7.546	0.011	3.2	0	0	0	0	0	100.01
2001	4	23	773	365.4	-355.32	D	7.588	7.546	0.042	3.2	0	0	0	0	0	100
2001	5	23	754	365.229	-357.075	D	7.642	7.546	0.096	3.2	0	0	0	0	0	100
2001	6	23	773	365.4	-355.32	D	7.554	7.546	0.008	3.2	0	0	0	0	0	100.01
2001	7	23	78	358.239	-356.385	D	7.575	7.546	0.029	3.2	0	0	0	0	0	100
2001	8	23	78	358.239	-356.385	D	7.718	7.546	0.172	3.2	0	0	0	0	0	100
2001	9	23	823	358.24	-361.604	D	7.557	7.546	0.011	3.2	0	0	0	0	0	100.02
2001	10	23	821	358.053	-361.416	D	7.547	7.546	0	3.2	0	0	0	0	0	100.28
2001	11	23	949	365.722	-354.966	D	7.546	7.546	0	3.2	0	0	0	0	0	100.41
2001	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	13	23	947	365.801	-355.162	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.13
2001	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	15	23	78	358.239	-356.385	D	7.55	7.546	0.004	3.2	0	0	0	0	0	100.05
2001	16	23	78	358.239	-356.385	D	7.6	7.546	0.053	3.2	0	0	0	0	0	100
2001	17	23	907	365.051	-359.809	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.07
2001	18	23	822	358.021	-361.607	D	7.606	7.546	0.06	3.2	0	0	0	0	0	100
2001	19	23	823	358.24	-361.604	D	7.576	7.546	0.03	3.2	0	0	0	0	0	100.01
2001	20	23	78	358.239	-356.385	D	7.727	7.546	0.181	3.2	0	0	0	0	0	100
2001	21	23	956	364.717	-354.589	D	7.547	7.546	0	3.2	0	0	0	0	0	99.87
2001	22	23	927	365.912	-357.454	D	7.62	7.546	0.073	3.2	0	0	0	0	0	100
2001	23	23	785	365.637	-355.06	D	7.546	7.546	0	3.2	0	0	0	0	0	99.5
2001	24	23	714	364.799	-358.592	D	7.584	7.546	0.038	3.2	0	0	0	0	0	100
2001	25	23	822	358.021	-361.607	D	7.549	7.546	0.002	3.2	0	0	0	0	0	100.03
2001	26	23	949	365.722	-354.966	D	7.549	7.546	0.002	3.2	0	0	0	0	0	100.03
2001	27	23	714	364.799	-358.592	D	7.627	7.546	0.081	3.2	0	0	0	0	0	100
2001	28	23	933	366.169	-356.524	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.12
2001	29	23	1017	356.894	-355.206	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.08
2001	30	23	775	365.747	-357.551	D	7.546	7.546	0	3.2	0	0	0	0	0	92.51
2001	31	23	982	361.822	-354.666	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.09
2001	32	23	927	365.912	-357.454	D	7.412	7.411	0	2.913	0	0	0	0	0	100.15
2001	33	23	78	358.239	-356.385	D	7.578	7.406	0.172	2.9	0	0	0	0	0	100
2001	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	100.36
2001	35	23	949	365.722	-354.966	D	7.414	7.406	0.009	2.9	0	0	0	0	0	100.02
2001	36	23	927	365.912	-357.454	D	7.443	7.406	0.037	2.9	0	0	0	0	0	100.01
2001	37	23	955	364.92	-354.582	D	7.419	7.406	0.013	2.9	0	0	0	0	0	100
2001	38	23	832	359.493	-362.061	D	7.408	7.406	0.002	2.9	0	0	0	0	0	100.08

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	40	23	78	358.239	-356.385	D	7.408	7.406	0.002	2.9	0	0	0	0	0	100.16
2001	41	23	78	358.239	-356.385	D	7.46	7.406	0.055	2.9	0	0	0	0	0	100
2001	42	23	949	365.722	-354.966	D	7.412	7.406	0.007	2.9	0	0	0	0	0	100.05
2001	43	23	10	356.954	-355.443	D	7.406	7.406	0	2.9	0	0	0	0	0	100.08
2001	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	45	23	1017	356.894	-355.206	D	7.407	7.406	0.001	2.9	0	0	0	0	0	100.11
2001	46	23	1039	356.522	-357.599	D	7.494	7.406	0.088	2.9	0	0	0	0	0	100
2001	47	23	846	360.93	-362.178	D	7.442	7.406	0.036	2.9	0	0	0	0	0	100.01
2001	48	23	822	358.021	-361.607	D	7.406	7.406	0	2.9	0	0	0	0	0	100.27
2001	49	23	822	358.021	-361.607	D	7.422	7.406	0.016	2.9	0	0	0	0	0	100.02
2001	50	23	931	366.183	-356.996	D	7.407	7.406	0.001	2.9	0	0	0	0	0	100.04
2001	51	23	1017	356.894	-355.206	D	7.412	7.406	0.006	2.9	0	0	0	0	0	100.03
2001	52	23	907	365.051	-359.809	D	7.451	7.406	0.045	2.9	0	0	0	0	0	100.01
2001	53	23	927	365.912	-357.454	D	7.49	7.406	0.084	2.9	0	0	0	0	0	100
2001	54	23	1039	356.522	-357.599	D	7.436	7.406	0.031	2.9	0	0	0	0	0	100.01
2001	55	23	643	363.609	-354.151	D	7.406	7.406	0	2.9	0	0	0	0	0	99.94
2001	56	23	949	365.722	-354.966	D	7.408	7.406	0.002	2.9	0	0	0	0	0	100.08
2001	57	23	1017	356.894	-355.206	D	7.418	7.406	0.012	2.9	0	0	0	0	0	100.02
2001	58	23	930	366.19	-357.232	D	7.412	7.406	0.006	2.9	0	0	0	0	0	100.02
2001	59	23	1017	356.894	-355.206	D	7.451	7.406	0.045	2.9	0	0	0	0	0	100.01
2001	60	23	1017	356.894	-355.206	D	7.322	7.315	0.008	2.708	0	0	0	0	0	100.01
2001	61	23	927	365.912	-357.454	D	7.394	7.311	0.084	2.7	0	0	0	0	0	100
2001	62	23	986	360.908	-354.689	D	7.374	7.311	0.063	2.7	0	0	0	0	0	100
2001	63	23	822	358.021	-361.607	D	7.355	7.311	0.045	2.7	0	0	0	0	0	100
2001	64	23	823	358.24	-361.604	D	7.421	7.311	0.111	2.7	0	0	0	0	0	100
2001	65	23	78	358.239	-356.385	D	7.363	7.311	0.053	2.7	0	0	0	0	0	100
2001	66	23	1017	356.894	-355.206	D	7.347	7.311	0.036	2.7	0	0	0	0	0	100
2001	67	23	824	358.459	-361.601	D	7.357	7.311	0.046	2.7	0	0	0	0	0	100
2001	68	23	822	358.021	-361.607	D	7.32	7.311	0.009	2.7	0	0	0	0	0	100.01
2001	69	23	1008	358.048	-354.775	D	7.326	7.311	0.015	2.7	0	0	0	0	0	100.01
2001	70	23	947	365.801	-355.162	D	7.311	7.311	0.001	2.7	0	0	0	0	0	100
2001	71	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	97.44
2001	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	861	361.895	-361.506	D	7.346	7.311	0.036	2.7	0	0	0	0	0	100
2001	74	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	119.96
2001	75	23	949	365.722	-354.966	D	7.334	7.311	0.023	2.7	0	0	0	0	0	100.01
2001	76	23	869	361.064	-360.714	D	7.421	7.311	0.11	2.7	0	0	0	0	0	100
2001	77	23	949	365.722	-354.966	D	7.317	7.311	0.007	2.7	0	0	0	0	0	100.03

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	78	23	1017	356.894	-355.206	D	7.324	7.311	0.013	2.7	0	0	0	0	0	100.02
2001	79	23	1005	358.679	-354.752	D	7.333	7.311	0.023	2.7	0	0	0	0	0	100.01
2001	80	23	1039	356.522	-357.599	D	7.311	7.311	0	2.7	0	0	0	0	0	100.26
2001	81	23	1017	356.894	-355.206	D	7.312	7.311	0.001	2.7	0	0	0	0	0	100.25
2001	82	23	907	365.051	-359.809	D	7.314	7.311	0.004	2.7	0	0	0	0	0	100.04
2001	83	23	930	366.19	-357.232	D	7.321	7.311	0.011	2.7	0	0	0	0	0	100.01
2001	84	23	822	358.021	-361.607	D	7.321	7.311	0.01	2.7	0	0	0	0	0	100.01
2001	85	23	822	358.021	-361.607	D	7.312	7.311	0.002	2.7	0	0	0	0	0	100.03
2001	86	23	822	358.021	-361.607	D	7.323	7.311	0.012	2.7	0	0	0	0	0	100.02
2001	87	23	949	365.722	-354.966	D	7.312	7.311	0.002	2.7	0	0	0	0	0	100.14
2001	88	23	14	357.202	-355.432	D	7.311	7.311	0	2.7	0	0	0	0	0	89.21
2001	89	23	1017	356.894	-355.206	D	7.315	7.311	0.004	2.7	0	0	0	0	0	100.02
2001	90	23	966	363.538	-354.124	D	7.357	7.311	0.046	2.7	0	0	0	0	0	100.01
2001	91	23	102	358.487	-356.374	D	7.372	7.311	0.061	2.7	0	0	0	0	0	100
2001	92	23	595	363.624	-360.142	D	7.311	7.311	0	2.7	0	0	0	0	0	94.34
2001	93	23	569	362.875	-354.433	D	7.311	7.311	0	2.7	0	0	0	0	0	114.9
2001	94	23	948	365.727	-355.056	D	7.314	7.311	0.003	2.7	0	0	0	0	0	100.03
2001	95	23	62	357.925	-354.901	D	7.311	7.311	0	2.7	0	0	0	0	0	99.77
2001	96	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	103	23	78	358.239	-356.385	D	7.356	7.311	0.045	2.7	0	0	0	0	0	100
2001	104	23	643	363.609	-354.151	D	7.311	7.311	0	2.7	0	0	0	0	0	99.9
2001	105	23	1002	359.309	-354.73	D	7.346	7.311	0.035	2.7	0	0	0	0	0	100
2001	106	23	1041	356.936	-357.592	D	7.346	7.311	0.035	2.7	0	0	0	0	0	100
2001	107	23	78	358.239	-356.385	D	7.356	7.311	0.045	2.7	0	0	0	0	0	100
2001	108	23	78	358.239	-356.385	D	7.348	7.311	0.038	2.7	0	0	0	0	0	100
2001	109	23	933	366.169	-356.524	D	7.311	7.311	0	2.7	0	0	0	0	0	99.81
2001	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	113	23	643	363.609	-354.151	D	7.311	7.311	0	2.7	0	0	0	0	0	100.72
2001	114	23	927	365.912	-357.454	D	7.35	7.311	0.039	2.7	0	0	0	0	0	100
2001	115	23	949	365.722	-354.966	D	7.312	7.311	0.002	2.7	0	0	0	0	0	100.08
2001	116	23	1037	356.5	-357.195	D	7.32	7.311	0.009	2.7	0	0	0	0	0	100

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	118	23	955	364.92	-354.582	D	7.313	7.311	0.002	2.7	0	0	0	0	0	100.02
2001	119	23	949	365.722	-354.966	D	7.311	7.311	0	2.7	0	0	0	0	0	100.77
2001	120	23	941	365.977	-355.774	D	7.311	7.311	0	2.7	0	0	0	0	0	96.27
2001	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	127	23	955	364.92	-354.582	D	7.64	7.593	0.047	3.3	0	0	0	0	0	100
2001	128	23	1017	356.894	-355.206	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.08
2001	129	23	964	363.678	-354.148	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.01
2001	130	23	710	364.843	-359.589	D	7.593	7.593	0	3.3	0	0	0	0	0	100.71
2001	131	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	0	0	0	0	0	96.9
2001	132	23	714	364.799	-358.592	D	7.652	7.593	0.059	3.3	0	0	0	0	0	100
2001	133	23	1008	358.048	-354.775	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.01
2001	134	23	773	365.4	-355.32	D	7.593	7.593	0	3.3	0	0	0	0	0	99.78
2001	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	138	23	1007	358.259	-354.768	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.05
2001	139	23	764	365.499	-357.562	D	7.716	7.593	0.124	3.3	0	0	0	0	0	100
2001	140	23	1039	356.522	-357.599	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.01
2001	141	23	990	360.933	-355.487	D	7.625	7.593	0.032	3.3	0	0	0	0	0	100
2001	142	23	927	365.912	-357.454	D	7.602	7.593	0.009	3.3	0	0	0	0	0	100.01
2001	143	23	714	364.799	-358.592	D	7.612	7.593	0.019	3.3	0	0	0	0	0	100.01
2001	144	23	78	358.239	-356.385	D	7.644	7.593	0.052	3.3	0	0	0	0	0	100
2001	145	23	861	361.895	-361.506	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100
2001	146	23	2	356.535	-357.209	D	7.593	7.593	0	3.3	0	0	0	0	0	100.06
2001	147	23	961	364.092	-354.289	D	7.593	7.593	0	3.3	0	0	0	0	0	99.55
2001	148	23	714	364.799	-358.592	D	7.625	7.593	0.033	3.3	0	0	0	0	0	100.01
2001	149	23	191	359.732	-362.061	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.99
2001	150	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	0	0	0	0	0	99.95
2001	151	23	1008	358.048	-354.775	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.01
2001	152	23	927	365.912	-357.454	D	7.663	7.593	0.07	3.3	0	0	0	0	0	100
2001	153	23	78	358.239	-356.385	D	7.638	7.593	0.046	3.3	0	0	0	0	0	100
2001	154	23	1039	356.522	-357.599	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2001	155	23	405	361.161	-355.008	D	7.593	7.593	0	3.3	0	0	0	0	0	70.36

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	158	23	1017	356.894	-355.206	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.96
2001	159	23	931	366.183	-356.996	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.06
2001	160	23	907	365.051	-359.809	D	7.608	7.593	0.016	3.3	0	0	0	0	0	100
2001	161	23	643	363.609	-354.151	D	7.603	7.593	0.011	3.3	0	0	0	0	0	100.01
2001	162	23	906	364.982	-359.812	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.19
2001	163	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	0	0	0	0	0	100.35
2001	164	23	618	363.371	-354.411	D	7.593	7.593	0	3.3	0	0	0	0	0	99.64
2001	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	166	23	967	363.478	-354.116	D	7.647	7.593	0.054	3.3	0	0	0	0	0	100
2001	167	23	949	365.722	-354.966	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.03
2001	168	23	519	362.902	-360.673	D	7.593	7.593	0	3.3	0	0	0	0	0	99.74
2001	169	23	929	366.032	-357.239	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.97
2001	170	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	60.53
2001	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	172	23	1017	356.894	-355.206	D	7.604	7.593	0.012	3.3	0	0	0	0	0	100.02
2001	173	23	78	358.239	-356.385	D	7.663	7.593	0.07	3.3	0	0	0	0	0	100
2001	174	23	949	365.722	-354.966	D	7.615	7.593	0.023	3.3	0	0	0	0	0	100
2001	175	23	949	365.722	-354.966	D	7.602	7.593	0.009	3.3	0	0	0	0	0	100.01
2001	176	23	907	365.051	-359.809	D	7.596	7.593	0.003	3.3	0	0	0	0	0	99.98
2001	177	23	380	361.468	-361.984	D	7.598	7.593	0.005	3.3	0	0	0	0	0	99.99
2001	178	23	1009	357.941	-354.82	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100
2001	179	23	643	363.609	-354.151	D	7.594	7.593	0.002	3.3	0	0	0	0	0	99.97
2001	180	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	0	0	0	0	0	100.28
2001	181	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	0	0	0	0	0	112.16
2001	182	23	1017	356.894	-355.206	D	7.606	7.593	0.013	3.3	0	0	0	0	0	100
2001	183	23	949	365.722	-354.966	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100
2001	184	23	947	365.801	-355.162	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100.03
2001	185	23	728	364.645	-355.104	D	7.593	7.593	0	3.3	0	0	0	0	0	98.94
2001	186	23	1008	358.048	-354.775	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.02
2001	187	23	822	358.021	-361.607	D	7.598	7.593	0.005	3.3	0	0	0	0	0	100.05
2001	188	23	931	366.183	-356.996	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.94
2001	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	949	365.722	-354.966	D	7.609	7.593	0.017	3.3	0	0	0	0	0	100
2001	192	23	1041	356.936	-357.592	D	7.611	7.593	0.019	3.3	0	0	0	0	0	100
2001	193	23	933	366.169	-356.524	D	7.598	7.593	0.005	3.3	0	0	0	0	0	100.01
2001	194	23	933	366.169	-356.524	D	7.596	7.593	0.003	3.3	0	0	0	0	0	99.99

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	195	23	967	363.478	-354.116	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.02
2001	196	23	961	364.092	-354.289	D	7.6	7.593	0.007	3.3	0	0	0	0	0	99.99
2001	197	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	0	0	0	0	0	99.04
2001	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	475	361.905	-354.975	D	7.593	7.593	0	3.3	0	0	0	0	0	105.92
2001	202	23	933	366.169	-356.524	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.03
2001	203	23	933	366.169	-356.524	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100
2001	204	23	930	366.19	-357.232	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.06
2001	205	23	1008	358.048	-354.775	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.06
2001	206	23	1017	356.894	-355.206	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.01
2001	207	23	965	363.588	-354.142	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.03
2001	208	23	966	363.538	-354.124	D	7.603	7.593	0.011	3.3	0	0	0	0	0	100
2001	209	23	964	363.678	-354.148	D	7.607	7.593	0.014	3.3	0	0	0	0	0	100
2001	210	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	0	0	0	0	0	100.12
2001	211	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.98
2001	212	23	947	365.801	-355.162	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.99
2001	213	23	785	365.637	-355.06	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.03
2001	214	23	747	364.871	-354.594	D	7.593	7.593	0	3.3	0	0	0	0	0	99.33
2001	215	23	1017	356.894	-355.206	D	7.603	7.593	0.011	3.3	0	0	0	0	0	100
2001	216	23	1039	356.522	-357.599	D	7.663	7.593	0.07	3.3	0	0	0	0	0	100
2001	217	23	1008	358.048	-354.775	D	7.611	7.593	0.018	3.3	0	0	0	0	0	100
2001	218	23	1035	356.477	-356.792	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.17
2001	219	23	907	365.051	-359.809	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100.01
2001	220	23	961	364.092	-354.289	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2001	221	23	949	365.722	-354.966	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100
2001	222	23	822	358.021	-361.607	D	7.609	7.593	0.016	3.3	0	0	0	0	0	100.01
2001	223	23	822	358.021	-361.607	D	7.613	7.593	0.021	3.3	0	0	0	0	0	100
2001	224	23	822	358.021	-361.607	D	7.611	7.593	0.019	3.3	0	0	0	0	0	100.01
2001	225	23	930	366.19	-357.232	D	7.607	7.593	0.014	3.3	0	0	0	0	0	100.01
2001	226	23	731	365.047	-358.581	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100.01
2001	227	23	853	361.666	-362.175	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.03
2001	228	23	1037	356.5	-357.195	D	7.612	7.593	0.02	3.3	0	0	0	0	0	100.01
2001	229	23	949	365.722	-354.966	D	7.598	7.593	0.006	3.3	0	0	0	0	0	100.05
2001	230	23	907	365.051	-359.809	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.92
2001	231	23	823	358.24	-361.604	D	7.613	7.593	0.02	3.3	0	0	0	0	0	100
2001	232	23	822	358.021	-361.607	D	7.596	7.593	0.003	3.3	0	0	0	0	0	99.98
2001	233	23	933	366.169	-356.524	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.14

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	235	23	15	357.659	-360.155	D	7.593	7.593	0	3.3	0	0	0	0	0	48.95
2001	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	238	23	102	358.487	-356.374	D	7.615	7.593	0.023	3.3	0	0	0	0	0	100.01
2001	239	23	823	358.24	-361.604	D	7.607	7.593	0.014	3.3	0	0	0	0	0	100.01
2001	240	23	955	364.92	-354.582	D	7.635	7.593	0.043	3.3	0	0	0	0	0	100
2001	241	23	964	363.678	-354.148	D	7.621	7.593	0.028	3.3	0	0	0	0	0	100
2001	242	23	1008	358.048	-354.775	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.02
2001	243	23	1017	356.894	-355.206	D	7.607	7.593	0.015	3.3	0	0	0	0	0	100
2001	244	23	927	365.912	-357.454	D	7.661	7.637	0.024	3.396	0	0	0	0	0	100
2001	245	23	1039	356.522	-357.599	D	7.649	7.639	0.01	3.4	0	0	0	0	0	100
2001	246	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.02
2001	247	23	1017	356.894	-355.206	D	7.676	7.639	0.037	3.4	0	0	0	0	0	100
2001	248	23	822	358.021	-361.607	D	7.65	7.639	0.012	3.4	0	0	0	0	0	100
2001	249	23	643	363.609	-354.151	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.08
2001	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	252	23	986	360.908	-354.689	D	7.669	7.639	0.03	3.4	0	0	0	0	0	100
2001	253	23	811	357.434	-360.225	D	7.664	7.639	0.025	3.4	0	0	0	0	0	100.01
2001	254	23	955	364.92	-354.582	D	7.643	7.639	0.004	3.4	0	0	0	0	0	100.02
2001	255	23	822	358.021	-361.607	D	7.639	7.639	0	3.4	0	0	0	0	0	99.93
2001	256	23	949	365.722	-354.966	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100
2001	257	23	78	358.239	-356.385	D	7.675	7.639	0.037	3.4	0	0	0	0	0	100
2001	258	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	0	0	0	0	0	99.97
2001	259	23	1017	356.894	-355.206	D	7.639	7.639	0	3.4	0	0	0	0	0	100.37
2001	260	23	710	364.843	-359.589	D	7.639	7.639	0	3.4	0	0	0	0	0	100.26
2001	261	23	27	357.451	-355.421	D	7.639	7.639	0	3.4	0	0	0	0	0	100.64
2001	262	23	602	363.547	-358.397	D	7.767	7.639	0.128	3.4	0	0	0	0	0	100
2001	263	23	949	365.722	-354.966	D	7.647	7.639	0.008	3.4	0	0	0	0	0	100.01
2001	264	23	1039	356.522	-357.599	D	7.656	7.639	0.017	3.4	0	0	0	0	0	100
2001	265	23	941	365.977	-355.774	D	7.639	7.639	0	3.4	0	0	0	0	0	99.85
2001	266	23	949	365.722	-354.966	D	7.643	7.639	0.005	3.4	0	0	0	0	0	100.01
2001	267	23	329	360.972	-362.006	D	7.639	7.639	0	3.4	0	0	0	0	0	100.2
2001	268	23	907	365.051	-359.809	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.07
2001	269	23	822	358.021	-361.607	D	7.639	7.639	0	3.4	0	0	0	0	0	99.97
2001	270	23	949	365.722	-354.966	D	7.655	7.639	0.016	3.4	0	0	0	0	0	100
2001	271	23	102	358.487	-356.374	D	7.67	7.639	0.031	3.4	0	0	0	0	0	100
2001	272	23	853	361.666	-362.175	D	7.644	7.639	0.005	3.4	0	0	0	0	0	100.04

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	273	23	1017	356.894	-355.206	D	7.647	7.639	0.008	3.4	0	0	0	0	0	99.99
2001	274	23	927	365.912	-357.454	D	7.582	7.505	0.076	3.112	0	0	0	0	0	100
2001	275	23	907	365.051	-359.809	D	7.508	7.5	0.009	3.1	0	0	0	0	0	100.02
2001	276	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	0	0	0	0	0	100.07
2001	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	1039	356.522	-357.599	D	7.51	7.5	0.01	3.1	0	0	0	0	0	100.01
2001	279	23	927	365.912	-357.454	D	7.616	7.5	0.117	3.1	0	0	0	0	0	100
2001	280	23	1037	356.5	-357.195	D	7.516	7.5	0.017	3.1	0	0	0	0	0	100.01
2001	281	23	930	366.19	-357.232	D	7.502	7.5	0.003	3.1	0	0	0	0	0	100.04
2001	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	7.502	7.5	0.003	3.1	0	0	0	0	0	100.07
2001	285	23	78	358.239	-356.385	D	7.538	7.5	0.038	3.1	0	0	0	0	0	100
2001	286	23	822	358.021	-361.607	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.16
2001	287	23	927	365.912	-357.454	D	7.507	7.5	0.007	3.1	0	0	0	0	0	100.03
2001	288	23	927	365.912	-357.454	D	7.517	7.5	0.017	3.1	0	0	0	0	0	100.01
2001	289	23	773	365.4	-355.32	D	7.598	7.5	0.098	3.1	0	0	0	0	0	100
2001	290	23	78	358.239	-356.385	D	7.533	7.5	0.033	3.1	0	0	0	0	0	100.01
2001	291	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	0	0	0	0	0	99.85
2001	292	23	955	364.92	-354.582	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.04
2001	293	23	62	357.925	-354.901	D	7.5	7.5	0	3.1	0	0	0	0	0	103.15
2001	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	811	357.434	-360.225	D	7.514	7.5	0.015	3.1	0	0	0	0	0	100.01
2001	298	23	861	361.895	-361.506	D	7.504	7.5	0.005	3.1	0	0	0	0	0	100.05
2001	299	23	537	362.693	-355.939	D	7.563	7.5	0.063	3.1	0	0	0	0	0	100
2001	300	23	78	358.239	-356.385	D	7.527	7.5	0.028	3.1	0	0	0	0	0	100
2001	301	23	1017	356.894	-355.206	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.13
2001	302	23	947	365.801	-355.162	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.08
2001	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	1017	356.894	-355.206	D	7.507	7.5	0.007	3.1	0	0	0	0	0	100.03
2001	307	23	951	365.325	-354.979	D	7.507	7.5	0.007	3.1	0	0	0	0	0	100
2001	308	23	1017	356.894	-355.206	D	7.547	7.5	0.048	3.1	0	0	0	0	0	100
2001	309	23	822	358.021	-361.607	D	7.547	7.5	0.047	3.1	0	0	0	0	0	100
2001	310	23	1017	356.894	-355.206	D	7.515	7.5	0.015	3.1	0	0	0	0	0	100.01
2001	311	23	949	365.722	-354.966	D	7.506	7.5	0.007	3.1	0	0	0	0	0	100.03

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	312	23	949	365.722	-354.966	D	7.508	7.5	0.008	3.1	0	0	0	0	0	100.03
2001	313	23	1017	356.894	-355.206	D	7.504	7.5	0.005	3.1	0	0	0	0	0	100.02
2001	314	23	930	366.19	-357.232	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.05
2001	315	23	869	361.064	-360.714	D	7.575	7.5	0.076	3.1	0	0	0	0	0	100
2001	316	23	78	358.239	-356.385	D	7.504	7.5	0.004	3.1	0	0	0	0	0	100.02
2001	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	85.92
2001	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	967	363.478	-354.116	D	7.53	7.5	0.031	3.1	0	0	0	0	0	100.01
2001	321	23	1017	356.894	-355.206	D	7.519	7.5	0.02	3.1	0	0	0	0	0	100.01
2001	322	23	932	366.176	-356.761	D	7.501	7.5	0.001	3.1	0	0	0	0	0	100.09
2001	323	23	966	363.538	-354.124	D	7.506	7.5	0.007	3.1	0	0	0	0	0	100.02
2001	324	23	869	361.064	-360.714	D	7.603	7.5	0.103	3.1	0	0	0	0	0	100
2001	325	23	933	366.169	-356.524	D	7.503	7.5	0.004	3.1	0	0	0	0	0	100.03
2001	326	23	644	364.12	-360.12	D	7.5	7.5	0	3.1	0	0	0	0	0	65.25
2001	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	966	363.538	-354.124	D	7.505	7.5	0.006	3.1	0	0	0	0	0	100.01
2001	332	23	78	358.239	-356.385	D	7.527	7.5	0.028	3.1	0	0	0	0	0	100
2001	333	23	930	366.19	-357.232	D	7.516	7.5	0.017	3.1	0	0	0	0	0	100.01
2001	334	23	955	364.92	-354.582	D	7.521	7.5	0.022	3.1	0	0	0	0	0	100.01
2001	335	23	927	365.912	-357.454	D	7.611	7.589	0.023	3.292	0	0	0	0	0	100
2001	336	23	949	365.722	-354.966	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.01
2001	337	23	640	363.641	-354.898	D	7.593	7.593	0	3.3	0	0	0	0	0	97.92
2001	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	907	365.051	-359.809	D	7.621	7.593	0.029	3.3	0	0	0	0	0	100
2001	341	23	731	365.047	-358.581	D	7.643	7.593	0.05	3.3	0	0	0	0	0	100
2001	342	23	1041	356.936	-357.592	D	7.648	7.593	0.056	3.3	0	0	0	0	0	100
2001	343	23	822	358.021	-361.607	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100
2001	344	23	1036	356.488	-356.993	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.01
2001	345	23	932	366.176	-356.761	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.99
2001	346	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	0	0	0	0	0	91.03
2001	347	23	811	357.434	-360.225	D	7.628	7.593	0.036	3.3	0	0	0	0	0	100
2001	348	23	102	358.487	-356.374	D	7.691	7.593	0.098	3.3	0	0	0	0	0	100
2001	349	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	0	0	0	0	0	99.99
2001	350	23	773	365.4	-355.32	D	7.593	7.593	0	3.3	0	0	0	0	0	99.49

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	351	23	811	357.434	-360.225	D	7.621	7.593	0.028	3.3	0	0	0	0	0	100.01
2001	352	23	822	358.021	-361.607	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.08
2001	353	23	8	357.031	-357.187	D	7.684	7.593	0.091	3.3	0	0	0	0	0	100
2001	354	23	78	358.239	-356.385	D	7.68	7.593	0.087	3.3	0	0	0	0	0	100
2001	355	23	927	365.912	-357.454	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.02
2001	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	927	365.912	-357.454	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.03
2001	358	23	986	360.908	-354.689	D	7.659	7.593	0.066	3.3	0	0	0	0	0	100
2001	359	23	78	358.239	-356.385	D	7.692	7.593	0.099	3.3	0	0	0	0	0	100
2001	360	23	78	358.239	-356.385	D	7.668	7.593	0.076	3.3	0	0	0	0	0	100
2001	361	23	949	365.722	-354.966	D	7.601	7.593	0.009	3.3	0	0	0	0	0	100
2001	362	23	773	365.4	-355.32	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.92
2001	363	23	78	358.239	-356.385	D	7.631	7.593	0.038	3.3	0	0	0	0	0	100
2001	364	23	78	358.239	-356.385	D	7.71	7.593	0.118	3.3	0	0	0	0	0	100
2001	365	23	78	358.239	-356.385	D	7.956	7.593	0.363	3.3	0	0	0	0	0	100
									0.363							
EXIDE	**EXIDE**										**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATE**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	788	365.951	-356.544	D	7.548	7.548	0	3.204	83.37	10.11	0	0	0	2.43
2001	2	23	949	365.722	-354.966	D	7.553	7.546	0.007	3.2	90.84	7.14	0	0	0	2.04
2001	3	23	947	365.801	-355.162	D	7.548	7.546	0.001	3.2	93.51	5.21	0	0	0	1.41
2001	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	7	23	808	357.43	-359.686	D	7.549	7.546	0.003	3.2	80.8	13.91	0	0	0	5.3
2001	8	23	949	365.722	-354.966	D	7.556	7.546	0.01	3.2	85.88	9.98	0	0	0	4.17
2001	9	23	822	358.021	-361.607	D	7.553	7.546	0.006	3.2	94.42	4.21	0	0	0	1.4
2001	10	23	822	358.021	-361.607	D	7.551	7.546	0.005	3.2	96.22	2.91	0	0	0	0.92
2001	11	23	1008	358.048	-354.775	D	7.548	7.546	0.001	3.2	96.77	2.55	0	0	0	0.83
2001	12	23	406	361.15	-354.758	D	7.546	7.546	0	3.2	88.57	2.76	0	0	0	0.7
2001	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	16	23	966	363.538	-354.124	D	7.547	7.546	0.001	3.2	85.77	9.99	0	0	0	4.31
2001	17	23	822	358.021	-361.607	D	7.548	7.546	0.001	3.2	86.6	10.12	0	0	0	3.32
2001	18	23	1017	356.894	-355.206	D	7.547	7.546	0.001	3.2	91.92	5.57	0	0	0	2.75
2001	19	23	811	357.434	-360.225	D	7.548	7.546	0.002	3.2	87.45	8.93	0	0	0	3.68
2001	20	23	811	357.434	-360.225	D	7.548	7.546	0.002	3.2	85.98	10.51	0	0	0	3.59

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	21	23	930	366.19	-357.232	D	7.547	7.546	0	3.2	88.43	9.49	0	0	0	2.33
2001	22	23	948	365.727	-355.056	D	7.547	7.546	0	3.2	90.59	6.85	0	0	0	2.76
2001	23	23	569	362.875	-354.433	D	7.546	7.546	0	3.2	82.03	3.64	0	0	0	1.71
2001	24	23	642	363.62	-354.4	D	7.547	7.546	0.001	3.2	90.21	7.3	0	0	0	2.55
2001	25	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	26	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	27	23	1037	356.5	-357.195	D	7.546	7.546	0	3.2	68.89	23.39	0	0	0	8.06
2001	28	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	91.75	8.6	0	0	0	1.25
2001	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	113.55	4.8	0	0	0	0.65
2001	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	103.41	4.06	0	0	0	0.4
2001	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2001	33	23	949	365.722	-354.966	D	7.407	7.406	0.001	2.9	79.75	15.08	0	0	0	5.4
2001	34	23	747	364.871	-354.594	D	7.406	7.406	0	2.9	78.1	13.84	0	0	0	3.48
2001	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	37	23	62	357.925	-354.901	D	7.406	7.406	0	2.9	90.98	4.35	0	0	0	5.15
2001	38	23	973	362.512	-354.246	D	7.406	7.406	0	2.9	91.21	5.72	0	0	0	3.06
2001	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	40	23	833	359.603	-362.066	D	7.411	7.406	0.006	2.9	94.06	4.57	0	0	0	1.4
2001	41	23	822	358.021	-361.607	D	7.407	7.406	0.001	2.9	84.26	10.91	0	0	0	4.96
2001	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	46	23	1035	356.477	-356.792	D	7.414	7.406	0.008	2.9	95.65	3.09	0	0	0	1.29
2001	47	23	1035	356.477	-356.792	D	7.408	7.406	0.003	2.9	88.1	9.09	0	0	0	2.88
2001	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	49	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	106.36	5.15	0	0	0	2.1
2001	50	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	98.76	5.06	0	0	0	1.27
2001	51	23	14	357.202	-355.432	D	7.406	7.406	0	2.9	95.96	1.36	0	0	0	2.26
2001	52	23	2	356.535	-357.209	D	7.406	7.406	0	2.9	96.72	3.19	0	0	0	1.14
2001	53	23	15	357.659	-360.155	D	7.406	7.406	0	2.9	99	3.48	0	0	0	0.96
2001	54	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	55	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	57	23	930	366.19	-357.232	D	7.406	7.406	0	2.9	98.09	1.88	0	0	0	1.83
2001	58	23	907	365.051	-359.809	D	7.406	7.406	0	2.9	96.55	2.86	0	0	0	1.08
2001	59	23	1039	356.522	-357.599	D	7.406	7.406	0	2.9	97.66	3.01	0	0	0	0.54

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	99.77	1.98	0	0	0	0.5
2001	61	23	404	361.172	-355.257	D	7.311	7.311	0	2.7	96.48	1.43	0	0	0	0.4
2001	62	23	10	356.954	-355.443	D	7.311	7.311	0	2.7	104.33	2.19	0	0	0	2.38
2001	63	23	1017	356.894	-355.206	D	7.313	7.311	0.002	2.7	95.78	2.75	0	0	0	1.48
2001	64	23	1035	356.477	-356.792	D	7.312	7.311	0.001	2.7	88.41	6.87	0	0	0	4.86
2001	65	23	811	357.434	-360.225	D	7.313	7.311	0.002	2.7	90.52	6.19	0	0	0	3.28
2001	66	23	1035	356.477	-356.792	D	7.311	7.311	0	2.7	95.8	1.72	0	0	0	2.63
2001	67	23	747	364.871	-354.594	D	7.314	7.311	0.004	2.7	94.03	3.6	0	0	0	2.42
2001	68	23	822	358.021	-361.607	D	7.312	7.311	0.001	2.7	88.69	6.77	0	0	0	4.51
2001	69	23	6	356.772	-356.948	D	7.311	7.311	0	2.7	94.67	4.08	0	0	0	2.61
2001	70	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	129	2.14	0	0	0	2.24
2001	71	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	133.86	1.57	0	0	0	1.32
2001	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	158.81	4.96	0	0	0	0.48
2001	75	23	886	362.864	-360.485	D	7.312	7.311	0.001	2.7	87.73	7.68	0	0	0	4.71
2001	76	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	88.65	7.22	0	0	0	4.04
2001	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	79	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	80	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	82	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	84	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	85	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	86	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	87	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	98.82	1.97	0	0	0	0.93
2001	88	23	10	356.954	-355.443	D	7.311	7.311	0.001	2.7	98.21	1.25	0	0	0	0.71
2001	89	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	99.41	0.67	0	0	0	0.62
2001	90	23	949	365.722	-354.966	D	7.311	7.311	0.001	2.7	97.21	1.29	0	0	0	1.89
2001	91	23	822	358.021	-361.607	D	7.311	7.311	0.001	2.7	92.1	4.28	0	0	0	3.77
2001	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	105	23	1017	356.894	-355.206	D	7.311	7.311	0.001	2.7	97.42	0.39	0	0	0	2.4
2001	106	23	961	364.092	-354.289	D	7.314	7.311	0.003	2.7	96.72	0.87	0	0	0	2.4
2001	107	23	929	366.032	-357.239	D	7.311	7.311	0.001	2.7	89.49	5.98	0	0	0	4.4
2001	108	23	1016	357.1	-355.198	D	7.311	7.311	0.001	2.7	97.83	0.65	0	0	0	1.76
2001	109	23	966	363.538	-354.124	D	7.311	7.311	0.001	2.7	98.22	0.7	0	0	0	1.04
2001	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	114	23	172	359.363	-359.331	D	7.311	7.311	0	2.7	92.03	2.46	0	0	0	5.7
2001	115	23	1	356.546	-357.458	D	7.312	7.311	0.001	2.7	96.62	1.06	0	0	0	2.3
2001	116	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	119	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	127	23	822	358.021	-361.607	D	7.594	7.593	0.001	3.3	97.33	0.29	0	0	0	2.43
2001	128	23	1017	356.894	-355.206	D	7.595	7.593	0.002	3.3	97.76	0.31	0	0	0	1.97
2001	129	23	785	365.637	-355.06	D	7.595	7.593	0.002	3.3	98.76	0.14	0	0	0	1.13
2001	130	23	786	365.973	-357.042	D	7.593	7.593	0	3.3	99.96	0.07	0	0	0	0.72
2001	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	70.35	0.01	0	0	0	0.39
2001	132	23	3	356.524	-356.959	D	7.594	7.593	0.002	3.3	96.87	2.02	0	0	0	1.13
2001	133	23	1	356.546	-357.458	D	7.593	7.593	0.001	3.3	99.04	0.04	0	0	0	0.83
2001	134	23	746	364.882	-354.843	D	7.593	7.593	0	3.3	99.47	0.05	0	0	0	0.62
2001	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	138	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	139	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	140	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	141	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	96.37	1.47	0	0	0	3.76
2001	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	148	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	98.62	0.03	0	0	0	1.47
2001	149	23	949	365.722	-354.966	D	7.596	7.593	0.003	3.3	98.71	0.14	0	0	0	1.17
2001	150	23	642	363.62	-354.4	D	7.593	7.593	0	3.3	99.77	0.17	0	0	0	0.87
2001	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	152	23	1	356.546	-357.458	D	7.594	7.593	0.001	3.3	97.39	1.01	0	0	0	1.52
2001	153	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	95.49	0.99	0	0	0	3.64
2001	154	23	785	365.637	-355.06	D	7.593	7.593	0.001	3.3	98.31	0.54	0	0	0	1.22
2001	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	73.02	0.61	0	0	0	0.4
2001	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	158	23	643	363.609	-354.151	D	7.594	7.593	0.002	3.3	99.22	0.06	0	0	0	0.68
2001	159	23	1008	358.048	-354.775	D	7.602	7.593	0.01	3.3	99.24	0.1	0	0	0	0.66
2001	160	23	1017	356.894	-355.206	D	7.6	7.593	0.007	3.3	99.24	0.08	0	0	0	0.69
2001	161	23	1017	356.894	-355.206	D	7.596	7.593	0.003	3.3	99.39	0.03	0	0	0	0.59
2001	162	23	947	365.801	-355.162	D	7.593	7.593	0.001	3.3	99.64	0.01	0	0	0	0.45
2001	163	23	541	362.649	-354.942	D	7.593	7.593	0	3.3	99.84	0.01	0	0	0	0.4
2001	164	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	16.9	0	0	0	0	0.07
2001	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	168	23	821	358.053	-361.416	D	7.593	7.593	0	3.3	98.94	0.01	0	0	0	1.01
2001	169	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	99.6	0.02	0	0	0	0.78
2001	170	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	172	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	98.67	0.1	0	0	0	0.66
2001	173	23	1038	356.511	-357.396	D	7.593	7.593	0.001	3.3	97.64	0.06	0	0	0	2.31
2001	174	23	822	358.021	-361.607	D	7.595	7.593	0.002	3.3	98.25	0.05	0	0	0	1.74
2001	175	23	930	366.19	-357.232	D	7.595	7.593	0.002	3.3	98.86	0.05	0	0	0	1.17
2001	176	23	832	359.493	-362.061	D	7.595	7.593	0.003	3.3	99.18	0.06	0	0	0	0.78

Appendix M
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2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	177	23	1017	356.894	-355.206	D	7.595	7.593	0.002	3.3	99.3	0.04	0	0	0	0.67
2001	178	23	1017	356.894	-355.206	D	7.594	7.593	0.001	3.3	99.46	0.03	0	0	0	0.59
2001	179	23	62	357.925	-354.901	D	7.593	7.593	0	3.3	99.44	0.07	0	0	0	0.55
2001	180	23	62	357.925	-354.901	D	7.593	7.593	0	3.3	99.81	0.02	0	0	0	0.51
2001	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	182	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	98.5	0.01	0	0	0	1.15
2001	183	23	1017	356.894	-355.206	D	7.594	7.593	0.001	3.3	98.71	0.33	0	0	0	0.96
2001	184	23	406	361.15	-354.758	D	7.593	7.593	0	3.3	98.34	0.02	0	0	0	0.84
2001	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	99.8	0	0	0	0	0.71
2001	188	23	136	359.203	-361.335	D	7.593	7.593	0	3.3	99.46	0.01	0	0	0	0.61
2001	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	949	365.722	-354.966	D	7.598	7.593	0.005	3.3	99.1	0.11	0	0	0	0.82
2001	192	23	191	359.732	-362.061	D	7.594	7.593	0.001	3.3	99.34	0.03	0	0	0	0.7
2001	193	23	191	359.732	-362.061	D	7.593	7.593	0	3.3	99.31	0.02	0	0	0	0.59
2001	194	23	905	364.788	-359.816	D	7.593	7.593	0	3.3	99.43	0.29	0	0	0	0.55
2001	195	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	196	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	204	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	205	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	206	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	207	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	104.31	0.21	0	0	0	1.01
2001	208	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	210	23	747	364.871	-354.594	D	7.593	7.593	0	3.3	97.95	0.01	0	0	0	1.03
2001	211	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	100.99	0.02	0	0	0	0.83
2001	212	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	213	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	214	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	215	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	216	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	217	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	218	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	219	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	222	23	1017	356.894	-355.206	D	7.595	7.593	0.002	3.3	98.84	0.05	0	0	0	1.1
2001	223	23	853	361.666	-362.175	D	7.599	7.593	0.007	3.3	98.86	0.41	0	0	0	0.75
2001	224	23	906	364.982	-359.812	D	7.593	7.593	0	3.3	99.76	0.1	0	0	0	0.58
2001	225	23	906	364.982	-359.812	D	7.593	7.593	0	3.3	99.04	0.31	0	0	0	0.52
2001	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	39.14	0.01	0	0	0	0.23
2001	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	228	23	948	365.727	-355.056	D	7.593	7.593	0	3.3	97.88	1.23	0	0	0	0.99
2001	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	230	23	301	360.724	-362.017	D	7.593	7.593	0	3.3	98.95	0.05	0	0	0	0.82
2001	231	23	948	365.727	-355.056	D	7.594	7.593	0.001	3.3	96.09	0.77	0	0	0	3.13
2001	232	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	238	23	853	361.666	-362.175	D	7.596	7.593	0.004	3.3	97.67	1	0	0	0	1.35
2001	239	23	852	361.595	-362.148	D	7.593	7.593	0.001	3.3	99.08	0.03	0	0	0	1.02
2001	240	23	1011	357.717	-354.92	D	7.593	7.593	0.001	3.3	99.13	0.03	0	0	0	0.91
2001	241	23	949	365.722	-354.966	D	7.594	7.593	0.002	3.3	99.23	0.04	0	0	0	0.83
2001	242	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	99.3	0.12	0	0	0	0.61
2001	243	23	974	362.281	-354.249	D	7.593	7.593	0	3.3	99.24	0.06	0	0	0	0.85
2001	244	23	62	357.925	-354.901	D	7.639	7.637	0.002	3.396	99.16	0.14	0	0	0	0.75
2001	245	23	1008	358.048	-354.775	D	7.643	7.639	0.004	3.4	99.2	0.18	0	0	0	0.61
2001	246	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	99.35	0.02	0	0	0	0.58
2001	247	23	1008	358.048	-354.775	D	7.641	7.639	0.002	3.4	99.15	0.02	0	0	0	0.87
2001	248	23	1017	356.894	-355.206	D	7.642	7.639	0.003	3.4	99.17	0.05	0	0	0	0.81
2001	249	23	3	356.524	-356.959	D	7.639	7.639	0	3.4	98.89	0.02	0	0	0	0.47
2001	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	252	23	967	363.478	-354.116	D	7.643	7.639	0.004	3.4	97.01	0.21	0	0	0	2.78
2001	253	23	930	366.19	-357.232	D	7.643	7.639	0.004	3.4	97.89	0.3	0	0	0	1.87
2001	254	23	1035	356.477	-356.792	D	7.64	7.639	0.001	3.4	98.64	0.1	0	0	0	1.34

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	255	23	1005	358.679	-354.752	D	7.639	7.639	0	3.4	99.14	0.13	0	0	0	0.97
2001	256	23	962	363.961	-354.255	D	7.639	7.639	0	3.4	98.96	0.07	0	0	0	0.82
2001	257	23	15	357.659	-360.155	D	7.639	7.639	0	3.4	99.73	0.07	0	0	0	0.73
2001	258	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	101.02	0.03	0	0	0	0.65
2001	259	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	93.64	0.1	0	0	0	0.63
2001	260	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	261	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	262	23	15	357.659	-360.155	D	7.64	7.639	0.001	3.4	97.33	0.25	0	0	0	2.42
2001	263	23	822	358.021	-361.607	D	7.639	7.639	0	3.4	98.59	0.03	0	0	0	1.1
2001	264	23	1007	358.259	-354.768	D	7.641	7.639	0.002	3.4	98.68	0.13	0	0	0	1.18
2001	265	23	1035	356.477	-356.792	D	7.64	7.639	0.001	3.4	98.28	0.32	0	0	0	1.47
2001	266	23	1035	356.477	-356.792	D	7.64	7.639	0.002	3.4	98.01	0.66	0	0	0	1.38
2001	267	23	853	361.666	-362.175	D	7.639	7.639	0	3.4	97.74	1.46	0	0	0	1.12
2001	268	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	269	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	270	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	271	23	1006	358.469	-354.76	D	7.639	7.639	0	3.4	98.81	0.27	0	0	0	0.95
2001	272	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	86.41	0.06	0	0	0	0.85
2001	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2001	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	10	356.954	-355.443	D	7.5	7.5	0	3.1	98.05	1.39	0	0	0	0.84
2001	279	23	947	365.801	-355.162	D	7.5	7.5	0	3.1	95.68	1.26	0	0	0	2.88
2001	280	23	930	366.19	-357.232	D	7.5	7.5	0.001	3.1	97.52	0.9	0	0	0	1.76
2001	281	23	61	357.936	-355.15	D	7.5	7.5	0	3.1	98.46	0.38	0	0	0	1.18
2001	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	10	356.954	-355.443	D	7.5	7.5	0	3.1	103.33	0.48	0	0	0	1.73
2001	285	23	1017	356.894	-355.206	D	7.501	7.5	0.001	3.1	97.29	1.59	0	0	0	1.2
2001	286	23	1017	356.894	-355.206	D	7.501	7.5	0.002	3.1	97.72	0.94	0	0	0	1.43
2001	287	23	907	365.051	-359.809	D	7.501	7.5	0.002	3.1	97.38	1.57	0	0	0	1.1
2001	288	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	289	23	1037	356.5	-357.195	D	7.503	7.5	0.003	3.1	94.92	3.66	0	0	0	1.41
2001	290	23	1036	356.488	-356.993	D	7.501	7.5	0.002	3.1	93.52	3.48	0	0	0	3
2001	291	23	930	366.19	-357.232	D	7.5	7.5	0.001	3.1	98.08	1.2	0	0	0	0.96
2001	292	23	10	356.954	-355.443	D	7.5	7.5	0	3.1	95.56	1.81	0	0	0	3.98
2001	293	23	1011	357.717	-354.92	D	7.5	7.5	0	3.1	97.68	0.9	0	0	0	1.78

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	103	358.476	-356.124	D	7.5	7.5	0.001	3.1	95.03	2.05	0	0	0	3.04
2001	298	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	23	930	366.19	-357.232	D	7.5	7.5	0.001	3.1	88.33	7.84	0	0	0	3.83
2001	301	23	3	356.524	-356.959	D	7.5	7.5	0	3.1	98.64	0.64	0	0	0	1.02
2001	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	100.25	0.2	0	0	0	0.48
2001	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	23	955	364.92	-354.582	D	7.502	7.5	0.002	3.1	96.78	2.08	0	0	0	1.24
2001	308	23	1017	356.894	-355.206	D	7.501	7.5	0.001	3.1	98.74	0.33	0	0	0	1
2001	309	23	949	365.722	-354.966	D	7.509	7.5	0.01	3.1	96.24	2.08	0	0	0	1.7
2001	310	23	1017	356.894	-355.206	D	7.506	7.5	0.007	3.1	97.96	0.83	0	0	0	1.23
2001	311	23	851	361.512	-362.072	D	7.502	7.5	0.003	3.1	98.77	0.28	0	0	0	0.98
2001	312	23	932	366.176	-356.761	D	7.501	7.5	0.001	3.1	98	0.4	0	0	0	1.74
2001	313	23	136	359.203	-361.335	D	7.5	7.5	0	3.1	97.08	0.1	0	0	0	0.79
2001	314	23	219	359.98	-362.05	D	7.5	7.5	0.001	3.1	95.56	2.4	0	0	0	2.09
2001	315	23	949	365.722	-354.966	D	7.5	7.5	0.001	3.1	94.76	1.85	0	0	0	3.58
2001	316	23	1	356.546	-357.458	D	7.5	7.5	0.001	3.1	96.44	1.28	0	0	0	2.49
2001	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	99.29	0.79	0	0	0	1.37
2001	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	323	23	192	359.721	-361.812	D	7.5	7.5	0	3.1	65.99	22.89	0	0	0	10.97
2001	324	23	608	363.481	-356.902	D	7.502	7.5	0.002	3.1	81.77	11.9	0	0	0	6.4
2001	325	23	907	365.051	-359.809	D	7.5	7.5	0.001	3.1	94.19	3.85	0	0	0	2.17
2001	326	23	747	364.871	-354.594	D	7.5	7.5	0	3.1	97.6	1.66	0	0	0	0.88
2001	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	906	364.982	-359.812	D	7.501	7.5	0.002	3.1	86.29	10.58	0	0	0	3.22

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	333	23	109	358.954	-361.346	D	7.5	7.5	0	3.1	87.62	3.61	0	0	0	0.51
2001	334	23	434	361.954	-361.713	D	7.5	7.5	0	3.1	87.66	9.3	0	0	0	3.23
2001	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	95.24	2.95	0	0	0	1.62
2001	342	23	1039	356.522	-357.599	D	7.594	7.593	0.001	3.3	93.45	4.69	0	0	0	1.94
2001	343	23	1039	356.522	-357.599	D	7.593	7.593	0	3.3	88.12	7.34	0	0	0	4.78
2001	344	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	93.08	4.49	0	0	0	1.81
2001	345	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	95.56	3.33	0	0	0	1.28
2001	346	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	13.03	0.24	0	0	0	0.1
2001	347	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	94.22	4.46	0	0	0	1.43
2001	348	23	822	358.021	-361.607	D	7.603	7.593	0.01	3.3	94.65	4.03	0	0	0	1.32
2001	349	23	947	365.801	-355.162	D	7.601	7.593	0.008	3.3	96.84	2.34	0	0	0	0.82
2001	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	351	23	833	359.603	-362.066	D	7.6	7.593	0.007	3.3	91.22	6.13	0	0	0	2.63
2001	352	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	89.31	7.24	0	0	0	3.31
2001	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	88.91	8.9	0	0	0	2.26
2001	354	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	84.69	11.5	0	0	0	3.9
2001	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	80.82	14.58	0	0	0	4.68
2001	359	23	158	358.961	-355.853	D	7.595	7.593	0.003	3.3	77.9	16.16	0	0	0	5.9
2001	360	23	1	356.546	-357.458	D	7.594	7.593	0.001	3.3	70.25	21.82	0	0	0	7.95
2001	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	811	357.434	-360.225	D	7.594	7.593	0.001	3.3	82.35	13.32	0	0	0	4.38
2001	364	23	926	365.787	-357.56	D	7.597	7.593	0.004	3.3	78.9	15.45	0	0	0	5.69
2001	365	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	80.04	15.75	0	0	0	4.47
									0.01							
TRIGEN	**TRIGEN KC**										**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATE**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	947	365.801	-355.162	D	7.555	7.548	0.007	3.204	86.22	13.13	0	0	0	0.66

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	2	23	955	364.92	-354.582	D	7.592	7.546	0.046	3.2	94.9	4.92	0	0	0	0.19
2001	3	23	947	365.801	-355.162	D	7.559	7.546	0.013	3.2	96.66	3.23	0	0	0	0.12
2001	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	7	23	823	358.24	-361.604	D	7.553	7.546	0.006	3.2	85.45	13.88	0	0	0	0.69
2001	8	23	773	365.4	-355.32	D	7.576	7.546	0.03	3.2	87.68	11.63	0	0	0	0.69
2001	9	23	822	358.021	-361.607	D	7.579	7.546	0.033	3.2	97.08	2.81	0	0	0	0.12
2001	10	23	822	358.021	-361.607	D	7.574	7.546	0.028	3.2	97.21	2.71	0	0	0	0.09
2001	11	23	966	363.538	-354.124	D	7.55	7.546	0.004	3.2	98.25	1.73	0	0	0	0.06
2001	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	16	23	823	358.24	-361.604	D	7.558	7.546	0.012	3.2	86.9	12.48	0	0	0	0.63
2001	17	23	822	358.021	-361.607	D	7.546	7.546	0	3.2	91	9.05	0	0	0	0.3
2001	18	23	1017	356.894	-355.206	D	7.551	7.546	0.005	3.2	96.4	3.39	0	0	0	0.23
2001	19	23	907	365.051	-359.809	D	7.552	7.546	0.005	3.2	93.53	6.18	0	0	0	0.3
2001	20	23	845	360.851	-362.181	D	7.552	7.546	0.006	3.2	83.79	15.52	0	0	0	0.72
2001	21	23	941	365.977	-355.774	D	7.546	7.546	0	3.2	88.12	11.63	0	0	0	0.33
2001	22	23	949	365.722	-354.966	D	7.546	7.546	0	3.2	89.75	10.65	0	0	0	0.47
2001	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	24	23	1017	356.894	-355.206	D	7.553	7.546	0.007	3.2	95.24	4.58	0	0	0	0.23
2001	25	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	26	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	27	23	1035	356.477	-356.792	D	7.548	7.546	0.002	3.2	80.92	17.98	0	0	0	1.22
2001	28	23	1017	356.894	-355.206	D	7.546	7.546	0	3.2	91.09	9.1	0	0	0	0.19
2001	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2001	33	23	949	365.722	-354.966	D	7.415	7.406	0.009	2.9	83.54	15.51	0	0	0	0.97
2001	34	23	932	366.176	-356.761	D	7.406	7.406	0	2.9	89.6	10.01	0	0	0	0.37
2001	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	37	23	966	363.538	-354.124	D	7.406	7.406	0.001	2.9	97.14	2.56	0	0	0	0.57
2001	38	23	967	363.478	-354.116	D	7.407	7.406	0.002	2.9	94.11	5.61	0	0	0	0.37
2001	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	40	23	967	363.478	-354.116	D	7.418	7.406	0.012	2.9	95.31	4.52	0	0	0	0.19

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	41	23	1039	356.522	-357.599	D	7.408	7.406	0.003	2.9	85.35	13.52	0	0	0	1.17
2001	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	45	23	1017	356.894	-355.206	D	7.406	7.406	0	2.9	98.17	2.7	0	0	0	0.1
2001	46	23	822	358.021	-361.607	D	7.513	7.406	0.107	2.9	97.92	1.97	0	0	0	0.11
2001	47	23	1039	356.522	-357.599	D	7.456	7.406	0.051	2.9	94.97	4.85	0	0	0	0.18
2001	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	49	23	1017	356.894	-355.206	D	7.406	7.406	0	2.9	95.95	4.43	0	0	0	0.24
2001	50	23	10	356.954	-355.443	D	7.406	7.406	0	2.9	96.08	4.24	0	0	0	0.15
2001	51	23	643	363.609	-354.151	D	7.406	7.406	0	2.9	99.57	0.86	0	0	0	0.22
2001	52	23	1017	356.894	-355.206	D	7.408	7.406	0.002	2.9	97.87	2.16	0	0	0	0.11
2001	53	23	1017	356.894	-355.206	D	7.406	7.406	0.001	2.9	97.01	3.08	0	0	0	0.19
2001	54	23	1008	358.048	-354.775	D	7.407	7.406	0.001	2.9	94.73	5.2	0	0	0	0.24
2001	55	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	57	23	949	365.722	-354.966	D	7.407	7.406	0.002	2.9	96.42	3.37	0	0	0	0.31
2001	58	23	1017	356.894	-355.206	D	7.408	7.406	0.002	2.9	97.68	2.29	0	0	0	0.14
2001	59	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	98.35	2.26	0	0	0	0.07
2001	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	99.37	1.4	0	0	0	0.06
2001	61	23	747	364.871	-354.594	D	7.311	7.311	0	2.7	98.59	1.05	0	0	0	0.05
2001	62	23	1007	358.259	-354.768	D	7.311	7.311	0	2.7	97.09	2.53	0	0	0	0.31
2001	63	23	1017	356.894	-355.206	D	7.328	7.311	0.018	2.7	97.41	2.43	0	0	0	0.16
2001	64	23	1035	356.477	-356.792	D	7.318	7.311	0.007	2.7	94.8	4.75	0	0	0	0.48
2001	65	23	444	361.767	-357.477	D	7.32	7.311	0.01	2.7	94.35	5.25	0	0	0	0.39
2001	66	23	1017	356.894	-355.206	D	7.32	7.311	0.009	2.7	97.97	1.73	0	0	0	0.32
2001	67	23	949	365.722	-354.966	D	7.349	7.311	0.038	2.7	95.37	4.24	0	0	0	0.39
2001	68	23	914	365.435	-358.584	D	7.32	7.311	0.009	2.7	94.86	4.7	0	0	0	0.44
2001	69	23	3	356.524	-356.959	D	7.311	7.311	0	2.7	100.26	1.79	0	0	0	0.24
2001	70	23	618	363.371	-354.411	D	7.311	7.311	0	2.7	98.99	1.74	0	0	0	0.16
2001	71	23	643	363.609	-354.151	D	7.311	7.311	0	2.7	98.44	1	0	0	0	0.09
2001	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	75	23	947	365.801	-355.162	D	7.314	7.311	0.003	2.7	94.21	5.17	0	0	0	0.67
2001	76	23	949	365.722	-354.966	D	7.312	7.311	0.002	2.7	90.04	8.96	0	0	0	1.02
2001	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	79	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	99.66	1.33	0	0	0	0.13

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	80	23	1035	356.477	-356.792	D	7.311	7.311	0.001	2.7	98.98	1.02	0	0	0	0.16
2001	81	23	1017	356.894	-355.206	D	7.315	7.311	0.005	2.7	98.98	0.93	0	0	0	0.13
2001	82	23	949	365.722	-354.966	D	7.314	7.311	0.004	2.7	99.07	0.87	0	0	0	0.11
2001	83	23	929	366.032	-357.239	D	7.314	7.311	0.003	2.7	99.22	0.73	0	0	0	0.06
2001	84	23	907	365.051	-359.809	D	7.311	7.311	0	2.7	98.43	0.24	0	0	0	0.03
2001	85	23	822	358.021	-361.607	D	7.311	7.311	0	2.7	94.19	5.36	0	0	0	0.46
2001	86	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	87	23	1017	356.894	-355.206	D	7.312	7.311	0.001	2.7	98.08	1.93	0	0	0	0.1
2001	88	23	1006	358.469	-354.76	D	7.311	7.311	0.001	2.7	98.91	1.18	0	0	0	0.08
2001	89	23	10	356.954	-355.443	D	7.311	7.311	0.001	2.7	99.52	0.71	0	0	0	0.07
2001	90	23	949	365.722	-354.966	D	7.312	7.311	0.001	2.7	98.33	1.47	0	0	0	0.36
2001	91	23	900	364.265	-360.243	D	7.315	7.311	0.004	2.7	95.38	3.9	0	0	0	0.72
2001	92	23	544	363.15	-360.662	D	7.311	7.311	0	2.7	66.43	0.23	0	0	0	0.08
2001	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	105	23	964	363.678	-354.148	D	7.339	7.311	0.028	2.7	99.17	0.6	0	0	0	0.24
2001	106	23	972	362.744	-354.242	D	7.318	7.311	0.008	2.7	98.31	1.24	0	0	0	0.45
2001	107	23	845	360.851	-362.181	D	7.312	7.311	0.001	2.7	88.11	10.6	0	0	0	1.27
2001	108	23	1017	356.894	-355.206	D	7.316	7.311	0.005	2.7	99.04	0.81	0	0	0	0.18
2001	109	23	930	366.19	-357.232	D	7.314	7.311	0.003	2.7	99.47	0.42	0	0	0	0.1
2001	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	114	23	1038	356.511	-357.396	D	7.313	7.311	0.002	2.7	97.1	2.23	0	0	0	0.71
2001	115	23	1017	356.894	-355.206	D	7.315	7.311	0.005	2.7	98.87	0.95	0	0	0	0.18
2001	116	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	119	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	72.69	0.07	0	0	0	0.06
2001	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	127	23	822	358.021	-361.607	D	7.601	7.593	0.009	3.3	99.58	0.2	0	0	0	0.22
2001	128	23	1017	356.894	-355.206	D	7.598	7.593	0.006	3.3	99.57	0.25	0	0	0	0.2
2001	129	23	966	363.538	-354.124	D	7.602	7.593	0.01	3.3	99.79	0.1	0	0	0	0.1
2001	130	23	930	366.19	-357.232	D	7.593	7.593	0.001	3.3	100.03	0.05	0	0	0	0.06
2001	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	74.29	0.01	0	0	0	0.04
2001	132	23	933	366.169	-356.524	D	7.599	7.593	0.007	3.3	98.51	1.38	0	0	0	0.11
2001	133	23	1036	356.488	-356.993	D	7.595	7.593	0.002	3.3	99.87	0.01	0	0	0	0.07
2001	134	23	964	363.678	-354.148	D	7.596	7.593	0.003	3.3	99.92	0.03	0	0	0	0.05
2001	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	138	23	1039	356.522	-357.599	D	7.595	7.593	0.002	3.3	99.66	0.28	0	0	0	0.07
2001	139	23	832	359.493	-362.061	D	7.604	7.593	0.011	3.3	99.71	0.24	0	0	0	0.05
2001	140	23	1038	356.511	-357.396	D	7.599	7.593	0.007	3.3	99.69	0.24	0	0	0	0.07
2001	141	23	949	365.722	-354.966	D	7.595	7.593	0.002	3.3	98.98	0.78	0	0	0	0.29
2001	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	148	23	949	365.722	-354.966	D	7.596	7.593	0.004	3.3	99.87	0.02	0	0	0	0.11
2001	149	23	785	365.637	-355.06	D	7.612	7.593	0.019	3.3	99.85	0.07	0	0	0	0.08
2001	150	23	949	365.722	-354.966	D	7.596	7.593	0.004	3.3	99.87	0.11	0	0	0	0.06
2001	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	98.95	0.26	0	0	0	0.04
2001	152	23	773	365.4	-355.32	D	7.597	7.593	0.004	3.3	95.59	3.83	0	0	0	0.63
2001	153	23	822	358.021	-361.607	D	7.597	7.593	0.004	3.3	98.95	0.7	0	0	0	0.39
2001	154	23	949	365.722	-354.966	D	7.6	7.593	0.007	3.3	99.48	0.4	0	0	0	0.12
2001	155	23	518	362.39	-354.704	D	7.593	7.593	0	3.3	92.69	0.6	0	0	0	0.05
2001	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	51.2	0.04	0	0	0	0.02
2001	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	158	23	966	363.538	-354.124	D	7.608	7.593	0.016	3.3	99.82	0.12	0	0	0	0.06
2001	159	23	1017	356.894	-355.206	D	7.653	7.593	0.06	3.3	99.86	0.09	0	0	0	0.05
2001	160	23	822	358.021	-361.607	D	7.608	7.593	0.016	3.3	99.94	0.02	0	0	0	0.05
2001	161	23	1017	356.894	-355.206	D	7.614	7.593	0.021	3.3	99.93	0.03	0	0	0	0.05
2001	162	23	949	365.722	-354.966	D	7.597	7.593	0.005	3.3	99.99	0.01	0	0	0	0.04
2001	163	23	730	364.623	-354.605	D	7.593	7.593	0	3.3	100.24	0.01	0	0	0	0.03
2001	164	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	168	23	852	361.595	-362.148	D	7.595	7.593	0.002	3.3	99.95	0.01	0	0	0	0.09
2001	169	23	907	365.051	-359.809	D	7.599	7.593	0.006	3.3	99.94	0.01	0	0	0	0.07
2001	170	23	955	364.92	-354.582	D	7.594	7.593	0.002	3.3	99.94	0.01	0	0	0	0.05
2001	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	172	23	1035	356.477	-356.792	D	7.638	7.593	0.045	3.3	99.71	0.18	0	0	0	0.11
2001	173	23	1039	356.522	-357.599	D	7.608	7.593	0.015	3.3	99.76	0.05	0	0	0	0.19
2001	174	23	822	358.021	-361.607	D	7.598	7.593	0.005	3.3	99.73	0.1	0	0	0	0.2
2001	175	23	852	361.595	-362.148	D	7.593	7.593	0	3.3	99.72	0.03	0	0	0	0.11
2001	176	23	822	358.021	-361.607	D	7.596	7.593	0.003	3.3	99.92	0.03	0	0	0	0.07
2001	177	23	1017	356.894	-355.206	D	7.594	7.593	0.002	3.3	99.99	0.04	0	0	0	0.06
2001	178	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	100.14	0.03	0	0	0	0.05
2001	179	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	101.34	0.01	0	0	0	0.05
2001	180	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	182	23	1007	358.259	-354.768	D	7.594	7.593	0.002	3.3	99.85	0.01	0	0	0	0.08
2001	183	23	1017	356.894	-355.206	D	7.602	7.593	0.009	3.3	99.82	0.13	0	0	0	0.06
2001	184	23	643	363.609	-354.151	D	7.593	7.593	0.001	3.3	99.99	0.01	0	0	0	0.05
2001	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	186	23	963	363.809	-354.192	D	7.598	7.593	0.006	3.3	99.91	0.01	0	0	0	0.09
2001	187	23	907	365.051	-359.809	D	7.611	7.593	0.019	3.3	99.93	0.01	0	0	0	0.07
2001	188	23	930	366.19	-357.232	D	7.597	7.593	0.004	3.3	99.94	0.01	0	0	0	0.05
2001	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	949	365.722	-354.966	D	7.635	7.593	0.042	3.3	99.76	0.15	0	0	0	0.09
2001	192	23	822	358.021	-361.607	D	7.611	7.593	0.018	3.3	99.9	0.01	0	0	0	0.09
2001	193	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	194	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	195	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	196	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	204	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	205	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	206	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	207	23	643	363.609	-354.151	D	7.594	7.593	0.001	3.3	99.88	0.03	0	0	0	0.06
2001	208	23	643	363.609	-354.151	D	7.595	7.593	0.002	3.3	99.83	0.11	0	0	0	0.04
2001	209	23	785	365.637	-355.06	D	7.593	7.593	0.001	3.3	99.85	0.09	0	0	0	0.04
2001	210	23	948	365.727	-355.056	D	7.593	7.593	0	3.3	99.77	0.05	0	0	0	0.04
2001	211	23	949	365.722	-354.966	D	7.6	7.593	0.007	3.3	99.87	0.08	0	0	0	0.06
2001	212	23	949	365.722	-354.966	D	7.597	7.593	0.004	3.3	99.97	0.01	0	0	0	0.05
2001	213	23	955	364.92	-354.582	D	7.593	7.593	0	3.3	99.87	0	0	0	0	0.04
2001	214	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	215	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	216	23	930	366.19	-357.232	D	7.599	7.593	0.006	3.3	99.83	0.13	0	0	0	0.07
2001	217	23	821	358.053	-361.416	D	7.593	7.593	0	3.3	99.46	0.02	0	0	0	0.06
2001	218	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	73.62	0.01	0	0	0	0.04
2001	219	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	222	23	949	365.722	-354.966	D	7.602	7.593	0.009	3.3	99.84	0.06	0	0	0	0.12
2001	223	23	853	361.666	-362.175	D	7.607	7.593	0.015	3.3	99.51	0.41	0	0	0	0.07
2001	224	23	907	365.051	-359.809	D	7.593	7.593	0.001	3.3	100.07	0.08	0	0	0	0.05
2001	225	23	907	365.051	-359.809	D	7.595	7.593	0.002	3.3	99.75	0.24	0	0	0	0.04
2001	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	72.06	0.01	0	0	0	0.03
2001	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	228	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	99.61	0.29	0	0	0	0.17
2001	229	23	301	360.724	-362.017	D	7.593	7.593	0	3.3	96.66	0.01	0	0	0	0.09
2001	230	23	906	364.982	-359.812	D	7.593	7.593	0	3.3	100.24	0.03	0	0	0	0.08
2001	231	23	1038	356.511	-357.396	D	7.593	7.593	0.001	3.3	98.11	1.15	0	0	0	0.75
2001	232	23	1017	356.894	-355.206	D	7.605	7.593	0.012	3.3	99.79	0.09	0	0	0	0.13
2001	233	23	643	363.609	-354.151	D	7.594	7.593	0.001	3.3	100	0.02	0	0	0	0.07
2001	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	238	23	853	361.666	-362.175	D	7.6	7.593	0.008	3.3	98.24	1.56	0	0	0	0.22
2001	239	23	853	361.666	-362.175	D	7.594	7.593	0.001	3.3	99.72	0.1	0	0	0	0.1
2001	240	23	822	358.021	-361.607	D	7.596	7.593	0.003	3.3	99.93	0.03	0	0	0	0.07
2001	241	23	963	363.809	-354.192	D	7.605	7.593	0.012	3.3	99.88	0.04	0	0	0	0.08
2001	242	23	955	364.92	-354.582	D	7.6	7.593	0.007	3.3	99.84	0.13	0	0	0	0.05
2001	243	23	966	363.538	-354.124	D	7.594	7.593	0.001	3.3	99.94	0.07	0	0	0	0.08
2001	244	23	1017	356.894	-355.206	D	7.656	7.637	0.019	3.396	99.73	0.2	0	0	0	0.08
2001	245	23	1017	356.894	-355.206	D	7.652	7.639	0.013	3.4	99.86	0.1	0	0	0	0.05
2001	246	23	1017	356.894	-355.206	D	7.644	7.639	0.005	3.4	99.96	0.02	0	0	0	0.05
2001	247	23	1008	358.048	-354.775	D	7.649	7.639	0.01	3.4	99.92	0.02	0	0	0	0.07
2001	248	23	1017	356.894	-355.206	D	7.652	7.639	0.013	3.4	99.89	0.06	0	0	0	0.06
2001	249	23	62	357.925	-354.901	D	7.64	7.639	0.001	3.4	99.91	0.01	0	0	0	0.04
2001	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	252	23	853	361.666	-362.175	D	7.659	7.639	0.021	3.4	99.62	0.18	0	0	0	0.21
2001	253	23	930	366.19	-357.232	D	7.659	7.639	0.02	3.4	98.9	0.8	0	0	0	0.3
2001	254	23	1039	356.522	-357.599	D	7.64	7.639	0.001	3.4	99.8	0.1	0	0	0	0.16
2001	255	23	84	358.173	-354.889	D	7.64	7.639	0.001	3.4	99.73	0.07	0	0	0	0.09
2001	256	23	643	363.609	-354.151	D	7.642	7.639	0.003	3.4	99.89	0.07	0	0	0	0.08
2001	257	23	1007	358.259	-354.768	D	7.645	7.639	0.006	3.4	99.82	0.12	0	0	0	0.07
2001	258	23	10	356.954	-355.443	D	7.639	7.639	0.001	3.4	100.15	0.03	0	0	0	0.05
2001	259	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	100.99	0.14	0	0	0	0.05
2001	260	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	261	23	3	356.524	-356.959	D	7.639	7.639	0	3.4	92.73	0.93	0	0	0	0.07
2001	262	23	1017	356.894	-355.206	D	7.687	7.639	0.048	3.4	97.95	1.86	0	0	0	0.18
2001	263	23	930	366.19	-357.232	D	7.639	7.639	0	3.4	99.56	0.32	0	0	0	0.18
2001	264	23	967	363.478	-354.116	D	7.644	7.639	0.005	3.4	99.79	0.04	0	0	0	0.15
2001	265	23	853	361.666	-362.175	D	7.64	7.639	0.001	3.4	99.75	0.06	0	0	0	0.13
2001	266	23	822	358.021	-361.607	D	7.648	7.639	0.009	3.4	99.54	0.35	0	0	0	0.11
2001	267	23	852	361.595	-362.148	D	7.639	7.639	0	3.4	99.58	0.41	0	0	0	0.07
2001	268	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	269	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	270	23	967	363.478	-354.116	D	7.641	7.639	0.003	3.4	99.7	0.16	0	0	0	0.11
2001	271	23	966	363.538	-354.124	D	7.673	7.639	0.034	3.4	99.74	0.16	0	0	0	0.1
2001	272	23	822	358.021	-361.607	D	7.642	7.639	0.003	3.4	99.85	0.06	0	0	0	0.08
2001	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	274	23	62	357.925	-354.901	D	7.505	7.505	0	3.112	100.66	0.14	0	0	0	0.11

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	275	23	949	365.722	-354.966	D	7.5	7.5	0	3.1	99.69	0.2	0	0	0	0.07
2001	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	1006	358.469	-354.76	D	7.502	7.5	0.002	3.1	98.83	1.13	0	0	0	0.07
2001	279	23	822	358.021	-361.607	D	7.5	7.5	0.001	3.1	96.05	3.59	0	0	0	0.48
2001	280	23	933	366.169	-356.524	D	7.504	7.5	0.005	3.1	98.82	1.03	0	0	0	0.19
2001	281	23	961	364.092	-354.289	D	7.5	7.5	0.001	3.1	99.41	0.45	0	0	0	0.12
2001	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	100.08	0.33	0	0	0	0.15
2001	285	23	1017	356.894	-355.206	D	7.508	7.5	0.009	3.1	98.53	1.38	0	0	0	0.11
2001	286	23	1017	356.894	-355.206	D	7.513	7.5	0.013	3.1	99.45	0.47	0	0	0	0.09
2001	287	23	930	366.19	-357.232	D	7.514	7.5	0.014	3.1	98.93	1.01	0	0	0	0.07
2001	288	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	94.61	5.3	0	0	0	0.17
2001	289	23	948	365.727	-355.056	D	7.508	7.5	0.008	3.1	95.11	4.63	0	0	0	0.25
2001	290	23	822	358.021	-361.607	D	7.508	7.5	0.009	3.1	95.85	3.75	0	0	0	0.41
2001	291	23	930	366.19	-357.232	D	7.502	7.5	0.003	3.1	99.29	0.6	0	0	0	0.13
2001	292	23	1017	356.894	-355.206	D	7.501	7.5	0.002	3.1	96.65	3.02	0	0	0	0.45
2001	293	23	1010	357.824	-354.865	D	7.501	7.5	0.002	3.1	98.85	1.16	0	0	0	0.16
2001	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	402	361.194	-355.755	D	7.503	7.5	0.003	3.1	97.67	2.05	0	0	0	0.31
2001	298	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	23	949	365.722	-354.966	D	7.501	7.5	0.002	3.1	91.5	7.65	0	0	0	0.84
2001	301	23	10	356.954	-355.443	D	7.5	7.5	0	3.1	100.32	0.44	0	0	0	0.15
2001	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	132.66	0.25	0	0	0	0.1
2001	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	23	941	365.977	-355.774	D	7.503	7.5	0.003	3.1	97.74	2.19	0	0	0	0.11
2001	308	23	1017	356.894	-355.206	D	7.501	7.5	0.001	3.1	99.41	0.66	0	0	0	0.09
2001	309	23	1017	356.894	-355.206	D	7.584	7.5	0.085	3.1	97.81	2.07	0	0	0	0.13
2001	310	23	1035	356.477	-356.792	D	7.552	7.5	0.052	3.1	99.37	0.55	0	0	0	0.09
2001	311	23	930	366.19	-357.232	D	7.528	7.5	0.029	3.1	99.62	0.31	0	0	0	0.08
2001	312	23	933	366.169	-356.524	D	7.507	7.5	0.008	3.1	99.62	0.26	0	0	0	0.15
2001	313	23	710	364.843	-359.589	D	7.5	7.5	0	3.1	99.83	0.07	0	0	0	0.06

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	314	23	832	359.493	-362.061	D	7.505	7.5	0.005	3.1	96.82	2.93	0	0	0	0.25
2001	315	23	967	363.478	-354.116	D	7.511	7.5	0.012	3.1	98.01	1.65	0	0	0	0.35
2001	316	23	1039	356.522	-357.599	D	7.503	7.5	0.003	3.1	99.2	0.64	0	0	0	0.21
2001	317	23	1035	356.477	-356.792	D	7.501	7.5	0.002	3.1	99.38	0.62	0	0	0	0.12
2001	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	97.9	0.13	0	0	0	0.1
2001	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	323	23	930	366.19	-357.232	D	7.502	7.5	0.002	3.1	78.75	20.42	0	0	0	0.9
2001	324	23	1017	356.894	-355.206	D	7.512	7.5	0.013	3.1	87.85	11.34	0	0	0	0.83
2001	325	23	907	365.051	-359.809	D	7.504	7.5	0.005	3.1	95.92	3.81	0	0	0	0.28
2001	326	23	931	366.183	-356.996	D	7.5	7.5	0.001	3.1	98.41	1.51	0	0	0	0.12
2001	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	906	364.982	-359.812	D	7.502	7.5	0.003	3.1	83.81	15.46	0	0	0	0.75
2001	333	23	407	361.716	-361.973	D	7.5	7.5	0	3.1	97.61	2.6	0	0	0	0.05
2001	334	23	907	365.051	-359.809	D	7.502	7.5	0.002	3.1	94.02	5.76	0	0	0	0.27
2001	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	95.72	4.13	0	0	0	0.22
2001	342	23	1039	356.522	-357.599	D	7.602	7.593	0.009	3.3	96.79	3.08	0	0	0	0.14
2001	343	23	1038	356.511	-357.396	D	7.593	7.593	0	3.3	89.42	9.79	0	0	0	0.64
2001	344	23	1017	356.894	-355.206	D	7.593	7.593	0.001	3.3	95.36	4.49	0	0	0	0.22
2001	345	23	1035	356.477	-356.792	D	7.594	7.593	0.001	3.3	96.82	3.06	0	0	0	0.15
2001	346	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	31.51	0.49	0	0	0	0.03
2001	347	23	1039	356.522	-357.599	D	7.782	7.593	0.189	3.3	95.03	4.77	0	0	0	0.2
2001	348	23	832	359.493	-362.061	D	7.672	7.593	0.08	3.3	96.83	3.06	0	0	0	0.11
2001	349	23	947	365.801	-355.162	D	7.606	7.593	0.013	3.3	98.52	1.42	0	0	0	0.07
2001	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	351	23	1017	356.894	-355.206	D	7.619	7.593	0.026	3.3	95.98	3.84	0	0	0	0.18
2001	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	353	23	1	356.546	-357.458	D	7.595	7.593	0.002	3.3	93.69	6.06	0	0	0	0.25
2001	354	23	822	358.021	-361.607	D	7.593	7.593	0.001	3.3	90.91	8.71	0	0	0	0.53
2001	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	83.46	1.69	0	0	0	0.1
2001	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	949	365.722	-354.966	D	7.595	7.593	0.002	3.3	88.34	10.98	0	0	0	0.71
2001	359	23	516	362.412	-355.202	D	7.604	7.593	0.011	3.3	84.87	14.28	0	0	0	0.85
2001	360	23	824	358.459	-361.601	D	7.602	7.593	0.01	3.3	80.34	18.78	0	0	0	0.9
2001	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1039	356.522	-357.599	D	7.598	7.593	0.005	3.3	90.87	8.76	0	0	0	0.4
2001	364	23	949	365.722	-354.966	D	7.61	7.593	0.018	3.3	86.39	13	0	0	0	0.62
2001	365	23	933	366.169	-356.524	D	7.601	7.593	0.008	3.3	87.53	11.94	0	0	0	0.54
									0.189							
UMC	UMC										% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	2	23	930	366.19	-357.232	D	7.551	7.546	0.005	3.2	88.88	11.14	0	0	0	0.03
2001	3	23	930	366.19	-357.232	D	7.547	7.546	0.001	3.2	90.61	9.31	0	0	0	0.02
2001	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	7	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	9	23	933	366.169	-356.524	D	7.584	7.546	0.038	3.2	80.54	19.41	0	0	0	0.05
2001	10	23	941	365.977	-355.774	D	7.575	7.546	0.028	3.2	84.74	15.24	0	0	0	0.03
2001	11	23	1017	356.894	-355.206	D	7.553	7.546	0.006	3.2	90.29	9.72	0	0	0	0.02
2001	12	23	747	364.871	-354.594	D	7.546	7.546	0	3.2	92.63	7.63	0	0	0	0.01
2001	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	16	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	17	23	78	358.239	-356.385	D	7.843	7.546	0.297	3.2	80.93	19.01	0	0	0	0.06
2001	18	23	1017	356.894	-355.206	D	7.728	7.546	0.182	3.2	87.44	12.53	0	0	0	0.03
2001	19	23	907	365.051	-359.809	D	7.552	7.546	0.006	3.2	92.94	7.04	0	0	0	0.02
2001	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	21	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	24	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	25	23	927	365.912	-357.454	D	7.596	7.546	0.049	3.2	66.87	33.02	0	0	0	0.11
2001	26	23	1035	356.477	-356.792	D	7.553	7.546	0.007	3.2	80.13	19.86	0	0	0	0.03
2001	27	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	28	23	932	366.176	-356.761	D	7.561	7.546	0.015	3.2	85.55	14.44	0	0	0	0.02
2001	29	23	784	365.648	-355.309	D	7.546	7.546	0	3.2	89.12	10.48	0	0	0	0.01
2001	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2001	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	37	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	38	23	967	363.478	-354.116	D	7.407	7.406	0.002	2.9	89.67	10.34	0	0	0	0.06
2001	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	41	23	949	365.722	-354.966	D	7.406	7.406	0	2.9	83.62	16.68	0	0	0	0.06
2001	42	23	964	363.678	-354.148	D	7.434	7.406	0.028	2.9	82.82	17.15	0	0	0	0.04
2001	43	23	1017	356.894	-355.206	D	7.406	7.406	0.001	2.9	88.63	11.67	0	0	0	0.01
2001	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	45	23	1008	358.048	-354.775	D	7.427	7.406	0.022	2.9	93.62	6.36	0	0	0	0.02
2001	46	23	947	365.801	-355.162	D	7.817	7.406	0.411	2.9	94.65	5.34	0	0	0	0.01
2001	47	23	907	365.051	-359.809	D	7.42	7.406	0.015	2.9	96.45	3.55	0	0	0	0.01
2001	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	49	23	930	366.19	-357.232	D	7.407	7.406	0.002	2.9	92.59	7.45	0	0	0	0.03
2001	50	23	930	366.19	-357.232	D	7.407	7.406	0.002	2.9	93.11	6.9	0	0	0	0.02
2001	51	23	1017	356.894	-355.206	D	7.406	7.406	0	2.9	97.13	3.01	0	0	0	0.05
2001	52	23	1039	356.522	-357.599	D	7.41	7.406	0.004	2.9	91.98	8.06	0	0	0	0.02
2001	53	23	1008	358.048	-354.775	D	7.42	7.406	0.014	2.9	92.18	7.81	0	0	0	0.03
2001	54	23	964	363.678	-354.148	D	7.442	7.406	0.036	2.9	89.07	10.91	0	0	0	0.02
2001	55	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	57	23	933	366.169	-356.524	D	7.406	7.406	0.001	2.9	96.75	3.31	0	0	0	0.05
2001	58	23	907	365.051	-359.809	D	7.422	7.406	0.017	2.9	92.63	7.36	0	0	0	0.03
2001	59	23	1035	356.477	-356.792	D	7.412	7.406	0.007	2.9	92.72	7.3	0	0	0	0.01
2001	60	23	1017	356.894	-355.206	D	7.319	7.315	0.004	2.708	95.05	4.98	0	0	0	0.01

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	61	23	949	365.722	-354.966	D	7.325	7.311	0.015	2.7	94.55	5.45	0	0	0	0.01
2001	62	23	852	361.595	-362.148	D	7.311	7.311	0.001	2.7	97.88	2.36	0	0	0	0.01
2001	63	23	78	358.239	-356.385	D	7.535	7.311	0.224	2.7	82.65	17.26	0	0	0	0.09
2001	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	66	23	927	365.912	-357.454	D	7.311	7.311	0	2.7	69.24	30.79	0	0	0	0.14
2001	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	68	23	930	366.19	-357.232	D	7.329	7.311	0.018	2.7	79.7	20.22	0	0	0	0.1
2001	69	23	930	366.19	-357.232	D	7.32	7.311	0.009	2.7	92.58	7.39	0	0	0	0.04
2001	70	23	949	365.722	-354.966	D	7.317	7.311	0.007	2.7	95.31	4.7	0	0	0	0.02
2001	71	23	643	363.609	-354.151	D	7.311	7.311	0	2.7	98.16	1.94	0	0	0	0.01
2001	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	96.87	5.72	0	0	0	0.01
2001	75	23	974	362.281	-354.249	D	7.588	7.311	0.277	2.7	95.16	4.82	0	0	0	0.02
2001	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	77	23	931	366.183	-356.996	D	7.366	7.311	0.055	2.7	85.71	14.24	0	0	0	0.05
2001	78	23	1039	356.522	-357.599	D	7.311	7.311	0	2.7	94.83	5.79	0	0	0	0.03
2001	79	23	1038	356.511	-357.396	D	7.316	7.311	0.005	2.7	90.46	9.52	0	0	0	0.04
2001	80	23	1038	356.511	-357.396	D	7.375	7.311	0.064	2.7	89.67	10.27	0	0	0	0.07
2001	81	23	907	365.051	-359.809	D	7.386	7.311	0.075	2.7	97.45	2.52	0	0	0	0.03
2001	82	23	930	366.19	-357.232	D	7.384	7.311	0.073	2.7	97.8	2.19	0	0	0	0.02
2001	83	23	1017	356.894	-355.206	D	7.413	7.311	0.102	2.7	92.27	7.69	0	0	0	0.04
2001	84	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	85	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	86	23	191	359.732	-362.061	D	7.311	7.311	0	2.7	100.16	2	0	0	0	0.02
2001	87	23	930	366.19	-357.232	D	7.338	7.311	0.027	2.7	94.14	5.85	0	0	0	0.02
2001	88	23	1008	358.048	-354.775	D	7.312	7.311	0.001	2.7	95.76	4.35	0	0	0	0.01
2001	89	23	1016	357.1	-355.198	D	7.311	7.311	0.001	2.7	97.84	2.23	0	0	0	0.01
2001	90	23	4	356.794	-357.447	D	7.311	7.311	0.001	2.7	97.81	2.29	0	0	0	0.01
2001	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	105	23	949	365.722	-354.966	D	7.323	7.311	0.012	2.7	99.08	0.92	0	0	0	0.02
2001	106	23	930	366.19	-357.232	D	7.311	7.311	0	2.7	91.04	9.11	0	0	0	0.12
2001	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	115	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	116	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	119	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	129	23	907	365.051	-359.809	D	7.594	7.593	0.001	3.3	99.62	0.34	0	0	0	0.02
2001	130	23	907	365.051	-359.809	D	7.596	7.593	0.004	3.3	99.88	0.12	0	0	0	0.01
2001	131	23	789	365.918	-355.796	D	7.593	7.593	0	3.3	99.66	0.04	0	0	0	0.01
2001	132	23	1017	356.894	-355.206	D	7.649	7.593	0.056	3.3	93.36	6.57	0	0	0	0.08
2001	133	23	964	363.678	-354.148	D	7.814	7.593	0.221	3.3	99.54	0.44	0	0	0	0.02
2001	134	23	930	366.19	-357.232	D	7.601	7.593	0.009	3.3	99.9	0.1	0	0	0	0.01
2001	135	23	544	363.15	-360.662	D	7.593	7.593	0	3.3	88.71	0.01	0	0	0	0.01
2001	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	138	23	1017	356.894	-355.206	D	7.629	7.593	0.036	3.3	96.61	3.37	0	0	0	0.01

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	139	23	949	365.722	-354.966	D	7.899	7.593	0.306	3.3	96.24	3.75	0	0	0	0.02
2001	140	23	964	363.678	-354.148	D	7.648	7.593	0.056	3.3	99.82	0.16	0	0	0	0.02
2001	141	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	148	23	947	365.801	-355.162	D	7.593	7.593	0	3.3	98.63	0.05	0	0	0	0.02
2001	149	23	930	366.19	-357.232	D	7.644	7.593	0.052	3.3	99.75	0.24	0	0	0	0.01
2001	150	23	949	365.722	-354.966	D	7.603	7.593	0.01	3.3	99.76	0.25	0	0	0	0.01
2001	151	23	1017	356.894	-355.206	D	7.69	7.593	0.097	3.3	99.49	0.5	0	0	0	0.01
2001	152	23	907	365.051	-359.809	D	7.609	7.593	0.016	3.3	99.73	0.27	0	0	0	0.01
2001	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	158	23	933	366.169	-356.524	D	7.708	7.593	0.115	3.3	99.92	0.07	0	0	0	0.01
2001	159	23	1017	356.894	-355.206	D	7.992	7.593	0.399	3.3	99.57	0.41	0	0	0	0.02
2001	160	23	1017	356.894	-355.206	D	7.746	7.593	0.153	3.3	99.75	0.24	0	0	0	0.01
2001	161	23	1017	356.894	-355.206	D	7.706	7.593	0.113	3.3	99.9	0.1	0	0	0	0.01
2001	162	23	949	365.722	-354.966	D	7.603	7.593	0.01	3.3	99.98	0.03	0	0	0	0.01
2001	163	23	783	365.659	-355.558	D	7.593	7.593	0	3.3	100.21	0.02	0	0	0	0
2001	164	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	168	23	822	358.021	-361.607	D	7.594	7.593	0.002	3.3	100.01	0.01	0	0	0	0.01
2001	169	23	930	366.19	-357.232	D	7.609	7.593	0.016	3.3	99.96	0.03	0	0	0	0.01
2001	170	23	643	363.609	-354.151	D	7.594	7.593	0.001	3.3	99.9	0.01	0	0	0	0.01
2001	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	172	23	955	364.92	-354.582	D	7.738	7.593	0.145	3.3	99.41	0.59	0	0	0	0.01
2001	173	23	907	365.051	-359.809	D	7.595	7.593	0.002	3.3	99.81	0.16	0	0	0	0.01
2001	174	23	949	365.722	-354.966	D	7.602	7.593	0.01	3.3	99.91	0.07	0	0	0	0.02
2001	175	23	941	365.977	-355.774	D	7.636	7.593	0.044	3.3	99.87	0.11	0	0	0	0.02
2001	176	23	949	365.722	-354.966	D	7.651	7.593	0.058	3.3	99.91	0.08	0	0	0	0.01
2001	177	23	966	363.538	-354.124	D	7.636	7.593	0.044	3.3	99.93	0.06	0	0	0	0.01

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	178	23	1017	356.894	-355.206	D	7.611	7.593	0.018	3.3	99.93	0.06	0	0	0	0.01
2001	179	23	965	363.588	-354.142	D	7.6	7.593	0.008	3.3	99.84	0.15	0	0	0	0.01
2001	180	23	1006	358.469	-354.76	D	7.594	7.593	0.001	3.3	100.05	0.04	0	0	0	0.01
2001	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	182	23	1017	356.894	-355.206	D	7.738	7.593	0.145	3.3	99.51	0.48	0	0	0	0.01
2001	183	23	964	363.678	-354.148	D	8.123	7.593	**0.53**	3.3	99.02	0.97	0	0	0	0.01
2001	184	23	966	363.538	-354.124	D	7.637	7.593	0.044	3.3	99.95	0.05	0	0	0	0.01
2001	185	23	774	365.389	-355.071	D	7.593	7.593	0	3.3	99.65	0.01	0	0	0	0.01
2001	186	23	784	365.648	-355.309	D	7.593	7.593	0	3.3	98.46	0.03	0	0	0	0.02
2001	187	23	949	365.722	-354.966	D	7.832	7.593	0.239	3.3	99.91	0.07	0	0	0	0.01
2001	188	23	933	366.169	-356.524	D	7.604	7.593	0.012	3.3	99.96	0.03	0	0	0	0.01
2001	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	947	365.801	-355.162	D	7.593	7.593	0	3.3	99.58	0.09	0	0	0	0.02
2001	192	23	930	366.19	-357.232	D	7.762	7.593	0.169	3.3	99.77	0.21	0	0	0	0.02
2001	193	23	907	365.051	-359.809	D	7.782	7.593	0.189	3.3	99.84	0.15	0	0	0	0.01
2001	194	23	907	365.051	-359.809	D	7.758	7.593	0.166	3.3	99.63	0.36	0	0	0	0.01
2001	195	23	822	358.021	-361.607	D	7.616	7.593	0.023	3.3	99.97	0.03	0	0	0	0.01
2001	196	23	822	358.021	-361.607	D	7.594	7.593	0.001	3.3	99.94	0.01	0	0	0	0.01
2001	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	947	365.801	-355.162	D	7.593	7.593	0	3.3	99.74	0.02	0	0	0	0.01
2001	202	23	933	366.169	-356.524	D	7.612	7.593	0.019	3.3	99.85	0.14	0	0	0	0.01
2001	203	23	930	366.19	-357.232	D	7.642	7.593	0.049	3.3	99.93	0.07	0	0	0	0.01
2001	204	23	930	366.19	-357.232	D	7.629	7.593	0.036	3.3	99.93	0.07	0	0	0	0.01
2001	205	23	822	358.021	-361.607	D	7.613	7.593	0.02	3.3	99.97	0.03	0	0	0	0.01
2001	206	23	1007	358.259	-354.768	D	7.608	7.593	0.016	3.3	99.89	0.1	0	0	0	0
2001	207	23	949	365.722	-354.966	D	7.613	7.593	0.02	3.3	99.93	0.06	0	0	0	0.01
2001	208	23	949	365.722	-354.966	D	7.884	7.593	0.292	3.3	99.52	0.48	0	0	0	0.01
2001	209	23	933	366.169	-356.524	D	7.739	7.593	0.147	3.3	99.49	0.51	0	0	0	0.01
2001	210	23	949	365.722	-354.966	D	7.615	7.593	0.022	3.3	99.88	0.12	0	0	0	0.01
2001	211	23	949	365.722	-354.966	D	7.636	7.593	0.043	3.3	99.95	0.05	0	0	0	0.01
2001	212	23	949	365.722	-354.966	D	7.643	7.593	0.05	3.3	99.98	0.02	0	0	0	0.01
2001	213	23	947	365.801	-355.162	D	7.615	7.593	0.022	3.3	99.95	0.04	0	0	0	0.01
2001	214	23	949	365.722	-354.966	D	7.598	7.593	0.005	3.3	99.99	0.02	0	0	0	0.01
2001	215	23	747	364.871	-354.594	D	7.593	7.593	0	3.3	99.99	0.03	0	0	0	0.01
2001	216	23	967	363.478	-354.116	D	7.685	7.593	0.093	3.3	99.71	0.27	0	0	0	0.02

Appendix M
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2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	217	23	1039	356.522	-357.599	D	7.599	7.593	0.007	3.3	99.94	0.04	0	0	0	0.02
2001	218	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	97.34	0	0	0	0	0.01
2001	219	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	222	23	949	365.722	-354.966	D	7.655	7.593	0.063	3.3	99.87	0.12	0	0	0	0.02
2001	223	23	941	365.977	-355.774	D	8.193	7.593	**0.601**	3.3	99.36	0.62	0	0	0	0.01
2001	224	23	822	358.021	-361.607	D	8.089	7.593	0.496	3.3	99.84	0.15	0	0	0	0.02
2001	225	23	1017	356.894	-355.206	D	7.818	7.593	0.225	3.3	99.81	0.17	0	0	0	0.02
2001	226	23	907	365.051	-359.809	D	7.856	7.593	0.263	3.3	99.63	0.34	0	0	0	0.03
2001	227	23	1017	356.894	-355.206	D	7.641	7.593	0.048	3.3	99.89	0.1	0	0	0	0.01
2001	228	23	948	365.727	-355.056	D	7.593	7.593	0	3.3	99.81	0.02	0	0	0	0.01
2001	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	232	23	947	365.801	-355.162	D	7.599	7.593	0.006	3.3	99.6	0.4	0	0	0	0.02
2001	233	23	933	366.169	-356.524	D	7.596	7.593	0.003	3.3	99.95	0.04	0	0	0	0.01
2001	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	235	23	710	364.843	-359.589	D	7.593	7.593	0	3.3	100.44	0.06	0	0	0	0.01
2001	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	238	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	239	23	955	364.92	-354.582	D	7.975	7.593	0.383	3.3	99.48	0.51	0	0	0	0.02
2001	240	23	854	361.771	-362.091	D	7.984	7.593	0.391	3.3	99.88	0.11	0	0	0	0.01
2001	241	23	832	359.493	-362.061	D	7.772	7.593	0.18	3.3	99.91	0.08	0	0	0	0.01
2001	242	23	1008	358.048	-354.775	D	7.694	7.593	0.101	3.3	99.78	0.21	0	0	0	0.01
2001	243	23	949	365.722	-354.966	D	7.602	7.593	0.009	3.3	99.83	0.17	0	0	0	0.01
2001	244	23	967	363.478	-354.116	D	7.767	7.637	0.13	3.396	99.5	0.48	0	0	0	0.01
2001	245	23	1035	356.477	-356.792	D	7.726	7.639	0.087	3.4	99.56	0.43	0	0	0	0.01
2001	246	23	1017	356.894	-355.206	D	7.652	7.639	0.013	3.4	99.94	0.06	0	0	0	0.01
2001	247	23	967	363.478	-354.116	D	7.711	7.639	0.072	3.4	99.94	0.05	0	0	0	0.01
2001	248	23	967	363.478	-354.116	D	7.741	7.639	0.103	3.4	99.79	0.21	0	0	0	0.01
2001	249	23	966	363.538	-354.124	D	7.654	7.639	0.016	3.4	99.94	0.05	0	0	0	0.01
2001	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	254	23	955	364.92	-354.582	D	7.662	7.639	0.023	3.4	99.31	0.67	0	0	0	0.02
2001	255	23	1035	356.477	-356.792	D	7.64	7.639	0.001	3.4	99.83	0.17	0	0	0	0.01

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	256	23	974	362.281	-354.249	D	7.64	7.639	0.001	3.4	99.9	0.11	0	0	0	0.01
2001	257	23	966	363.538	-354.124	D	7.712	7.639	0.073	3.4	99.51	0.47	0	0	0	0.01
2001	258	23	1039	356.522	-357.599	D	7.648	7.639	0.009	3.4	99.94	0.07	0	0	0	0.01
2001	259	23	1035	356.477	-356.792	D	7.642	7.639	0.004	3.4	99.87	0.12	0	0	0	0.01
2001	260	23	1008	358.048	-354.775	D	7.642	7.639	0.003	3.4	99.91	0.11	0	0	0	0.01
2001	261	23	949	365.722	-354.966	D	7.64	7.639	0.001	3.4	99.69	0.33	0	0	0	0.01
2001	262	23	949	365.722	-354.966	D	7.655	7.639	0.016	3.4	97.58	2.42	0	0	0	0.01
2001	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	265	23	930	366.19	-357.232	D	7.652	7.639	0.013	3.4	99.47	0.51	0	0	0	0.03
2001	266	23	907	365.051	-359.809	D	7.652	7.639	0.013	3.4	99.52	0.47	0	0	0	0.02
2001	267	23	930	366.19	-357.232	D	7.73	7.639	0.091	3.4	93.31	6.62	0	0	0	0.07
2001	268	23	930	366.19	-357.232	D	7.678	7.639	0.039	3.4	94.84	5.1	0	0	0	0.06
2001	269	23	853	361.666	-362.175	D	7.838	7.639	0.199	3.4	97.39	2.59	0	0	0	0.02
2001	270	23	845	360.851	-362.181	D	7.787	7.639	0.148	3.4	99.44	0.55	0	0	0	0.01
2001	271	23	822	358.021	-361.607	D	7.753	7.639	0.115	3.4	99.58	0.4	0	0	0	0.02
2001	272	23	822	358.021	-361.607	D	7.642	7.639	0.003	3.4	99.89	0.11	0	0	0	0.01
2001	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	274	23	1008	358.048	-354.775	D	7.552	7.505	0.047	3.112	99.32	0.67	0	0	0	0.01
2001	275	23	949	365.722	-354.966	D	7.523	7.5	0.023	3.1	99.71	0.29	0	0	0	0.01
2001	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	822	358.021	-361.607	D	7.626	7.5	0.127	3.1	94.29	5.69	0	0	0	0.02
2001	279	23	930	366.19	-357.232	D	7.502	7.5	0.003	3.1	90.63	9.34	0	0	0	0.04
2001	280	23	907	365.051	-359.809	D	7.505	7.5	0.006	3.1	99.47	0.55	0	0	0	0.02
2001	281	23	930	366.19	-357.232	D	7.562	7.5	0.063	3.1	97.89	2.1	0	0	0	0.01
2001	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	7.505	7.5	0.005	3.1	94.93	5.06	0	0	0	0.02
2001	285	23	1008	358.048	-354.775	D	7.735	7.5	0.235	3.1	93.5	6.48	0	0	0	0.02
2001	286	23	1017	356.894	-355.206	D	7.533	7.5	0.034	3.1	99.32	0.67	0	0	0	0.01
2001	287	23	907	365.051	-359.809	D	7.533	7.5	0.034	3.1	98.32	1.67	0	0	0	0.01
2001	288	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	289	23	949	365.722	-354.966	D	7.5	7.5	0	3.1	90.65	9.35	0	0	0	0.01
2001	290	23	929	366.032	-357.239	D	7.5	7.5	0	3.1	112.05	1.05	0	0	0	0.03
2001	291	23	930	366.19	-357.232	D	7.506	7.5	0.007	3.1	97.47	2.55	0	0	0	0.01
2001	292	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	293	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	295	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	298	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	301	23	933	366.169	-356.524	D	7.544	7.5	0.044	3.1	93.86	6.12	0	0	0	0.03
2001	302	23	1017	356.894	-355.206	D	7.503	7.5	0.003	3.1	97.62	2.4	0	0	0	0.01
2001	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	23	853	361.666	-362.175	D	7.596	7.5	0.096	3.1	96.58	3.41	0	0	0	0.01
2001	308	23	1035	356.477	-356.792	D	7.53	7.5	0.03	3.1	99.05	0.94	0	0	0	0.01
2001	309	23	930	366.19	-357.232	D	7.623	7.5	0.124	3.1	94.62	5.36	0	0	0	0.03
2001	310	23	832	359.493	-362.061	D	7.616	7.5	0.117	3.1	97.98	2.01	0	0	0	0.01
2001	311	23	907	365.051	-359.809	D	7.593	7.5	0.094	3.1	99.28	0.71	0	0	0	0.01
2001	312	23	933	366.169	-356.524	D	7.513	7.5	0.014	3.1	99.68	0.33	0	0	0	0.01
2001	313	23	927	365.912	-357.454	D	7.597	7.5	0.098	3.1	79.73	20.15	0	0	0	0.13
2001	314	23	930	366.19	-357.232	D	7.5	7.5	0.001	3.1	97.22	2.81	0	0	0	0.04
2001	315	23	773	365.4	-355.32	D	7.553	7.5	0.054	3.1	93.42	6.5	0	0	0	0.09
2001	316	23	822	358.021	-361.607	D	7.516	7.5	0.017	3.1	97.33	2.64	0	0	0	0.04
2001	317	23	1035	356.477	-356.792	D	7.516	7.5	0.017	3.1	98.87	1.12	0	0	0	0.02
2001	318	23	965	363.588	-354.142	D	7.5	7.5	0.001	3.1	99.71	0.28	0	0	0	0.01
2001	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	323	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	326	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	94.62	5.62	0	0	0	0.03
2001	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	907	365.051	-359.809	D	7.616	7.5	0.116	3.1	82.98	16.97	0	0	0	0.05
2001	333	23	1035	356.477	-356.792	D	7.667	7.5	0.167	3.1	87.87	12.09	0	0	0	0.04

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	334	23	822	358.021	-361.607	D	7.83	7.5	0.331	3.1	92.89	7.08	0	0	0	0.03
2001	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	948	365.727	-355.056	D	7.593	7.593	0	3.3	96.02	3.43	0	0	0	0.02
2001	342	23	773	365.4	-355.32	D	7.728	7.593	0.135	3.3	90.41	9.57	0	0	0	0.03
2001	343	23	930	366.19	-357.232	D	7.596	7.593	0.003	3.3	85.08	14.83	0	0	0	0.07
2001	344	23	930	366.19	-357.232	D	7.615	7.593	0.022	3.3	83.66	16.3	0	0	0	0.04
2001	345	23	930	366.19	-357.232	D	7.605	7.593	0.013	3.3	91.22	8.76	0	0	0	0.02
2001	346	23	1008	358.048	-354.775	D	7.593	7.593	0	3.3	94.48	5.15	0	0	0	0.01
2001	347	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	23	933	366.169	-356.524	D	7.61	7.593	0.017	3.3	95.26	4.75	0	0	0	0.01
2001	349	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	99.1	0.95	0	0	0	0.01
2001	350	23	947	365.801	-355.162	D	7.597	7.593	0.005	3.3	96.74	3.28	0	0	0	0.01
2001	351	23	930	366.19	-357.232	D	7.73	7.593	0.137	3.3	86.35	13.6	0	0	0	0.04
2001	352	23	595	363.624	-360.142	D	7.593	7.593	0	3.3	95.83	2.3	0	0	0	0
2001	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	767	365.466	-356.815	D	7.593	7.593	0	3.3	90.76	4.82	0	0	0	0.01
2001	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.601							
NORAN	**NORANDA**								**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATE**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	2	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	3	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	7	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	10	23	930	366.19	-357.232	D	7.546	7.546	0	3.2	99.47	0.01	0	0	0.07	0.69
2001	11	23	933	366.169	-356.524	D	7.547	7.546	0.001	3.2	98.89	0.06	0	0	0.03	1.06
2001	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	13	23	930	366.19	-357.232	D	7.55	7.546	0.004	3.2	98.44	0.09	0	0	0.05	1.44
2001	14	23	933	366.169	-356.524	D	7.548	7.546	0.001	3.2	98.99	0.04	0	0	0.01	0.94
2001	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	16	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	17	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	18	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	19	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	21	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	24	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	25	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	26	23	930	366.19	-357.232	D	7.547	7.546	0.001	3.2	95.2	0.23	0	0	0.07	4.52
2001	27	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	28	23	933	366.169	-356.524	D	7.57	7.546	0.024	3.2	89.49	0.38	0	0	0.59	9.55
2001	29	23	643	363.609	-354.151	D	7.546	7.546	0	3.2	92.43	0.54	0	0	0.01	6.43
2001	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2001	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	37	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	38	23	949	365.722	-354.966	D	7.419	7.406	0.013	2.9	79.57	0.53	0	0	0.76	19.15
2001	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	42	23	853	361.666	-362.175	D	7.411	7.406	0.005	2.9	98.23	0.04	0	0	0.11	1.65
2001	43	23	967	363.478	-354.116	D	7.433	7.406	0.028	2.9	92.09	0.41	0	0	0.04	7.47
2001	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	46	23	786	365.973	-357.042	D	7.406	7.406	0	2.9	92.18	0.17	0	0	0.17	9.33
2001	47	23	906	364.982	-359.812	D	7.406	7.406	0	2.9	88.96	0.86	0	0	0.05	11.1
2001	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	49	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	50	23	907	365.051	-359.809	D	7.407	7.406	0.001	2.9	95.92	0.14	0	0	0.08	3.92
2001	51	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	52	23	407	361.716	-361.973	D	7.406	7.406	0	2.9	69.64	0.01	0	0	11.73	35.29
2001	53	23	861	361.895	-361.506	D	7.406	7.406	0	2.9	64.61	0.01	0	0	5.86	30.05
2001	54	23	907	365.051	-359.809	D	7.409	7.406	0.004	2.9	91.79	0.17	0	0	1.12	6.95
2001	55	23	949	365.722	-354.966	D	7.416	7.406	0.011	2.9	95.82	0.17	0	0	0.08	3.93
2001	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	57	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	58	23	853	361.666	-362.175	D	7.449	7.406	0.043	2.9	94.92	0.12	0	0	0.23	4.73
2001	59	23	822	358.021	-361.607	D	7.434	7.406	0.028	2.9	95.73	0.1	0	0	0.13	4.05
2001	60	23	853	361.666	-362.175	D	7.325	7.315	0.01	2.708	95.79	0.05	0	0	0.47	3.69
2001	61	23	907	365.051	-359.809	D	7.324	7.311	0.013	2.7	97.76	0.04	0	0	0.05	2.17
2001	62	23	852	361.595	-362.148	D	7.311	7.311	0.001	2.7	98.72	0.02	0	0	0.01	1.58
2001	63	23	44	358.21	-361.379	D	7.311	7.311	0	2.7	76.42	0.31	0	0	0.01	7.63
2001	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	69	23	301	360.724	-362.017	D	7.311	7.311	0	2.7	98.78	0.03	0	0	0.67	4.17
2001	70	23	907	365.051	-359.809	D	7.315	7.311	0.004	2.7	95.96	0.08	0	0	0.09	3.87
2001	71	23	774	365.389	-355.071	D	7.311	7.311	0	2.7	96.98	0.02	0	0	0.05	2.76
2001	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	75	23	1007	358.259	-354.768	D	7.335	7.311	0.024	2.7	97.7	0.11	0	0	0.04	2.15
2001	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	79	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	80	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	82	23	907	365.051	-359.809	D	7.342	7.311	0.031	2.7	97.19	0.01	0	0	0.21	2.6
2001	83	23	853	361.666	-362.175	D	7.415	7.311	0.104	2.7	97.44	0.01	0	0	0.06	2.49
2001	84	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	85	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	86	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	87	23	832	359.493	-362.061	D	7.322	7.311	0.011	2.7	95.72	0.13	0	0	0.4	3.77
2001	88	23	964	363.678	-354.148	D	7.314	7.311	0.003	2.7	96.98	0.07	0	0	0.12	2.9
2001	89	23	845	360.851	-362.181	D	7.368	7.311	0.057	2.7	98.53	0.05	0	0	0.07	1.35
2001	90	23	853	361.666	-362.175	D	7.326	7.311	0.015	2.7	98.12	0.06	0	0	0.07	1.76
2001	91	23	780	365.692	-356.306	D	7.311	7.311	0	2.7	95.13	0.16	0	0	0.03	2.91
2001	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	93	23	949	365.722	-354.966	D	7.312	7.311	0.001	2.7	96.02	0.04	0	0	0.09	4.02
2001	94	23	933	366.169	-356.524	D	7.58	7.311	0.269	2.7	97.52	0.06	0	0	0.17	2.25
2001	95	23	964	363.678	-354.148	D	7.371	7.311	0.06	2.7	97.48	0.04	0	0	0.04	2.45
2001	96	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	115	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	116	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	119	23	933	366.169	-356.524	D	7.313	7.311	0.002	2.7	91.53	0.01	0	0	0.24	8.39

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	120	23	933	366.169	-356.524	D	7.315	7.311	0.004	2.7	98.09	0	0	0	0.06	1.85
2001	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	130	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	138	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	139	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	140	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	141	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	149	23	1039	356.522	-357.599	D	7.659	7.593	0.067	3.3	97.77	0	0	0	0.23	2.01
2001	150	23	949	365.722	-354.966	D	7.598	7.593	0.005	3.3	96.93	0.01	0	0	0.19	2.88
2001	151	23	1017	356.894	-355.206	D	7.613	7.593	0.02	3.3	97.77	0.02	0	0	0.06	2.15
2001	152	23	933	366.169	-356.524	D	7.633	7.593	0.04	3.3	98.69	0.01	0	0	0.02	1.28
2001	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	154	23	822	358.021	-361.607	D	7.655	7.593	0.062	3.3	96.16	0.03	0	0	0.13	3.67
2001	155	23	963	363.809	-354.192	D	7.593	7.593	0.001	3.3	99.05	0.01	0	0	0.02	0.85
2001	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	158	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	159	23	301	360.724	-362.017	D	7.593	7.593	0	3.3	89.55	0.07	0	0	0.15	12.48
2001	160	23	852	361.595	-362.148	D	7.593	7.593	0	3.3	99.33	0	0	0	0.11	0.48
2001	161	23	853	361.666	-362.175	D	7.653	7.593	0.061	3.3	98.56	0	0	0	0.09	1.34
2001	162	23	853	361.666	-362.175	D	7.693	7.593	0.1	3.3	98.61	0	0	0	0.07	1.32
2001	163	23	1017	356.894	-355.206	D	7.632	7.593	0.039	3.3	98.73	0	0	0	0.09	1.18
2001	164	23	784	365.648	-355.309	D	7.593	7.593	0	3.3	98.84	0	0	0	0.04	0.8
2001	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	168	23	380	361.468	-361.984	D	7.593	7.593	0	3.3	84.07	0	0	0	5.35	11.45
2001	169	23	1035	356.477	-356.792	D	7.652	7.593	0.059	3.3	98.83	0	0	0	0.08	1.09
2001	170	23	433	361.398	-354.747	D	7.593	7.593	0	3.3	93.12	0	0	0	0.02	1.23
2001	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	176	23	907	365.051	-359.809	D	7.61	7.593	0.017	3.3	99.47	0	0	0	0.08	0.46
2001	177	23	931	366.183	-356.996	D	7.765	7.593	0.172	3.3	98.54	0	0	0	0.12	1.34
2001	178	23	949	365.722	-354.966	D	7.768	7.593	0.175	3.3	98.85	0	0	0	0.08	1.07
2001	179	23	966	363.538	-354.124	D	7.704	7.593	0.112	3.3	98.96	0.01	0	0	0.05	0.99
2001	180	23	1008	358.048	-354.775	D	7.606	7.593	0.013	3.3	99.06	0	0	0	0.03	0.91
2001	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	84.52	0	0	0	0.02	5.07
2001	182	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	90.22	0.02	0	0	0.32	9.53
2001	183	23	932	366.176	-356.761	D	7.595	7.593	0.003	3.3	95.4	0.02	0	0	0.12	4.5
2001	184	23	930	366.19	-357.232	D	7.596	7.593	0.003	3.3	96.95	0	0	0	0.08	2.97
2001	185	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	98.07	0	0	0	0.19	1.97
2001	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	188	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	99.54	0	0	0	0.02	0.49
2001	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	192	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	193	23	949	365.722	-354.966	D	7.708	7.593	0.115	3.3	97.04	0	0	0	0.14	2.81
2001	194	23	1039	356.522	-357.599	D	7.729	7.593	0.137	3.3	97.57	0.01	0	0	0.05	2.36
2001	195	23	821	358.053	-361.416	D	7.593	7.593	0	3.3	95.46	0	0	0	0.11	4.95
2001	196	23	1039	356.522	-357.599	D	7.651	7.593	0.058	3.3	97.48	0	0	0	0.38	2.13
2001	197	23	1009	357.941	-354.82	D	7.598	7.593	0.005	3.3	94.12	0	0	0	0.21	5.69

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Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	198	23	594	363.123	-354.422	D	7.593	7.593	0	3.3	85.95	0.04	0	0	0.08	12.97
2001	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	202	23	619	363.872	-360.131	D	7.593	7.593	0	3.3	90.51	0.01	0	0	0.07	2.52
2001	203	23	853	361.666	-362.175	D	7.595	7.593	0.002	3.3	98.96	0	0	0	0.05	0.95
2001	204	23	853	361.666	-362.175	D	7.661	7.593	0.069	3.3	99.12	0	0	0	0.05	0.82
2001	205	23	822	358.021	-361.607	D	7.692	7.593	0.099	3.3	99.23	0	0	0	0.03	0.74
2001	206	23	1017	356.894	-355.206	D	7.673	7.593	0.08	3.3	99.28	0	0	0	0.02	0.7
2001	207	23	947	365.801	-355.162	D	7.633	7.593	0.04	3.3	99.31	0	0	0	0.01	0.67
2001	208	23	933	366.169	-356.524	D	7.624	7.593	0.031	3.3	99.15	0	0	0	0.02	0.82
2001	209	23	907	365.051	-359.809	D	7.626	7.593	0.033	3.3	99.08	0.01	0	0	0.02	0.9
2001	210	23	930	366.19	-357.232	D	7.593	7.593	0.001	3.3	99.39	0	0	0	0.01	0.72
2001	211	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	58.4	0	0	0	0.05	2.54
2001	212	23	947	365.801	-355.162	D	7.619	7.593	0.026	3.3	99.16	0	0	0	0.11	0.73
2001	213	23	930	366.19	-357.232	D	7.655	7.593	0.063	3.3	98.83	0	0	0	0.07	1.09
2001	214	23	1008	358.048	-354.775	D	7.613	7.593	0.02	3.3	99.33	0	0	0	0.03	0.64
2001	215	23	949	365.722	-354.966	D	7.595	7.593	0.003	3.3	99.48	0	0	0	0.02	0.53
2001	216	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	98.76	0	0	0	0.03	0.94
2001	217	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	97.05	0	0	0	0.06	0.41
2001	218	23	28	357.918	-360.393	D	7.593	7.593	0	3.3	60.8	0	0	0	13.6	26.75
2001	219	23	853	361.666	-362.175	D	8.004	7.593	0.411	3.3	97.99	0	0	0	0.28	1.72
2001	220	23	822	358.021	-361.607	D	7.679	7.593	0.086	3.3	98.75	0	0	0	0.12	1.12
2001	221	23	907	365.051	-359.809	D	7.617	7.593	0.024	3.3	99.06	0	0	0	0.05	0.9
2001	222	23	782	365.67	-355.807	D	7.593	7.593	0	3.3	99.4	0	0	0	0.03	0.52
2001	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	224	23	907	365.051	-359.809	D	7.593	7.593	0.001	3.3	98.05	0	0	0	0.2	1.78
2001	225	23	853	361.666	-362.175	D	7.594	7.593	0.002	3.3	98.81	0.01	0	0	0.06	1.26
2001	226	23	15	357.659	-360.155	D	7.593	7.593	0	3.3	83.93	0	0	0	0.08	1.79
2001	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	232	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	235	23	644	364.12	-360.12	D	7.593	7.593	0	3.3	102.47	0	0	0	0.01	0.3
2001	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	237	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	238	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	239	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	242	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	243	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2001	245	23	845	360.851	-362.181	D	7.963	7.639	0.324	3.4	97.08	0.04	0	0	0.22	2.66
2001	246	23	822	358.021	-361.607	D	7.686	7.639	0.047	3.4	98.95	0	0	0	0.07	0.97
2001	247	23	1035	356.477	-356.792	D	7.646	7.639	0.007	3.4	99.3	0	0	0	0.05	0.66
2001	248	23	823	358.24	-361.604	D	7.782	7.639	0.143	3.4	97.97	0	0	0	0.36	1.67
2001	249	23	967	363.478	-354.116	D	7.768	7.639	0.13	3.4	97.94	0.01	0	0	0.08	1.97
2001	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	254	23	906	364.982	-359.812	D	7.639	7.639	0	3.4	70.41	0	0	0	7.17	22.29
2001	255	23	822	358.021	-361.607	D	7.644	7.639	0.005	3.4	87.87	0	0	0	1.45	10.73
2001	256	23	822	358.021	-361.607	D	7.64	7.639	0.001	3.4	88.08	0	0	0	1.53	10.51
2001	257	23	44	358.21	-361.379	D	7.639	7.639	0	3.4	89.6	0	0	0	1.08	9.64
2001	258	23	1017	356.894	-355.206	D	7.639	7.639	0.001	3.4	99.11	0	0	0	0.06	1.01
2001	259	23	822	358.021	-361.607	D	7.657	7.639	0.018	3.4	98.76	0	0	0	0.09	1.16
2001	260	23	832	359.493	-362.061	D	7.725	7.639	0.086	3.4	98.76	0	0	0	0.04	1.2
2001	261	23	930	366.19	-357.232	D	7.661	7.639	0.022	3.4	98.69	0	0	0	0.03	1.28
2001	262	23	641	363.631	-354.649	D	7.639	7.639	0	3.4	94.06	0.03	0	0	0.05	3.16
2001	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	265	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	266	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	267	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	268	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	269	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	270	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	271	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	272	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2001	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	279	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	280	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	281	23	930	366.19	-357.232	D	7.535	7.5	0.036	3.1	97.84	0.03	0	0	0.11	2.02
2001	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	81.02	0.08	0	0	0.07	16.4
2001	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	285	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	286	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	287	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	288	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	289	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	290	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	291	23	930	366.19	-357.232	D	7.5	7.5	0.001	3.1	97.57	0.01	0	0	0.11	2.42
2001	292	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	293	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	298	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	301	23	907	365.051	-359.809	D	7.5	7.5	0.001	3.1	96.44	0.02	0	0	0.34	3.2
2001	302	23	930	366.19	-357.232	D	7.518	7.5	0.019	3.1	97	0.06	0	0	0.09	2.86
2001	303	23	785	365.637	-355.06	D	7.5	7.5	0	3.1	97.49	0.01	0	0	0.02	1.97
2001	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	23	906	364.982	-359.812	D	7.5	7.5	0	3.1	71.79	0	0	0	5.61	25.42
2001	308	23	832	359.493	-362.061	D	7.502	7.5	0.002	3.1	68.11	0	0	0	2.99	28.99
2001	309	23	44	358.21	-361.379	D	7.5	7.5	0	3.1	75.21	0	0	0	1.44	16.72
2001	310	23	822	358.021	-361.607	D	7.5	7.5	0.001	3.1	96.91	0	0	0	0.28	2.97
2001	311	23	907	365.051	-359.809	D	7.516	7.5	0.017	3.1	98.05	0.01	0	0	0.09	1.86
2001	312	23	933	366.169	-356.524	D	7.502	7.5	0.002	3.1	95.66	0.02	0	0	0.07	4.3
2001	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	316	23	846	360.93	-362.178	D	7.548	7.5	0.048	3.1	95.48	0.01	0	0	0.97	3.55
2001	317	23	1017	356.894	-355.206	D	7.515	7.5	0.015	3.1	83.61	0.23	0	0	0.19	15.98
2001	318	23	62	357.925	-354.901	D	7.5	7.5	0.001	3.1	96.78	0.01	0	0	0.01	3.21
2001	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	23	853	361.666	-362.175	D	7.511	7.5	0.012	3.1	96.56	0.02	0	0	0.27	3.16
2001	322	23	930	366.19	-357.232	D	7.793	7.5	0.293	3.1	97.86	0.03	0	0	0.08	2.03
2001	323	23	955	364.92	-354.582	D	7.5	7.5	0	3.1	99.33	0	0	0	0.02	0.57
2001	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	892	363.354	-360.543	D	7.5	7.5	0	3.1	101.14	0.12	0	0	1.18	3.75
2001	333	23	850	361.371	-362.039	D	7.5	7.5	0	3.1	97.33	0.11	0	0	0.05	2.24
2001	334	23	407	361.716	-361.973	D	7.5	7.5	0	3.1	97.56	0.08	0	0	0.01	1.55
2001	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2001	336	23	932	366.176	-356.761	D	7.593	7.593	0	3.3	98.31	0.01	0	0	0.11	1.57
2001	337	23	931	366.183	-356.996	D	7.593	7.593	0.001	3.3	97.76	0.01	0	0	0.11	1.88
2001	338	23	779	365.703	-356.555	D	7.593	7.593	0	3.3	90.9	0.04	0	0	0.15	9.05
2001	339	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	342	23	933	366.169	-356.524	D	7.663	7.593	0.07	3.3	99.21	0.04	0	0	0.03	0.72
2001	343	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	344	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	345	23	930	366.19	-357.232	D	7.628	7.593	0.036	3.3	96.52	0.11	0	0	0.24	3.13
2001	346	23	949	365.722	-354.966	D	7.597	7.593	0.005	3.3	80.93	0.69	0	0	0.19	18.19
2001	347	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	349	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	350	23	907	365.051	-359.809	D	7.804	7.593	0.211	3.3	98.75	0.03	0	0	0.14	1.09
2001	351	23	907	365.051	-359.809	D	7.647	7.593	0.054	3.3	99.5	0.02	0	0	0.03	0.45
2001	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.411							
INDEPENDENCE									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATE**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	947	365.801	-355.162	D	7.552	7.548	0.004	3.204	81.01	18.34	0	0	0	0.66
2001	2	23	949	365.722	-354.966	D	7.955	7.546	0.409	3.2	89.45	10.2	0	0	0	0.35
2001	3	23	949	365.722	-354.966	D	7.631	7.546	0.084	3.2	92.18	7.58	0	0	0	0.24
2001	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	7	23	892	363.354	-360.543	D	7.813	7.546	0.267	3.2	65.65	32.84	0	0	0	1.52
2001	8	23	933	366.169	-356.524	D	7.819	7.546	0.273	3.2	72.68	25.77	0	0	0	1.55
2001	9	23	1017	356.894	-355.206	D	7.991	7.546	0.445	3.2	92.79	6.93	0	0	0	0.27
2001	10	23	853	361.666	-362.175	D	7.59	7.546	0.044	3.2	90.5	9.29	0	0	0	0.22
2001	11	23	949	365.722	-354.966	D	7.547	7.546	0.001	3.2	94.27	5.58	0	0	0	0.13
2001	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	16	23	1017	356.894	-355.206	D	7.681	7.546	0.135	3.2	75.34	23.58	0	0	0	1.08
2001	17	23	822	358.021	-361.607	D	7.548	7.546	0.002	3.2	80.46	18.95	0	0	0	0.61
2001	18	23	1017	356.894	-355.206	D	7.603	7.546	0.057	3.2	90.84	8.71	0	0	0	0.45
2001	19	23	822	358.021	-361.607	D	7.614	7.546	0.068	3.2	80.72	18.49	0	0	0	0.79
2001	20	23	102	358.487	-356.374	D	7.823	7.546	0.277	3.2	70.18	28.51	0	0	0	1.31
2001	21	23	931	366.183	-356.996	D	7.546	7.546	0	3.2	75.23	24.15	0	0	0	0.62
2001	22	23	955	364.92	-354.582	D	7.546	7.546	0	3.2	68.35	30.11	0	0	0	1.35

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	24	23	1016	357.1	-355.198	D	7.639	7.546	0.092	3.2	89.55	10.03	0	0	0	0.42
2001	25	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	26	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	27	23	1017	356.894	-355.206	D	7.634	7.546	0.088	3.2	68.51	30.08	0	0	0	1.41
2001	28	23	1035	356.477	-356.792	D	7.567	7.546	0.02	3.2	80.26	19.19	0	0	0	0.56
2001	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2001	33	23	949	365.722	-354.966	D	7.487	7.406	0.081	2.9	63.59	34.57	0	0	0	1.84
2001	34	23	932	366.176	-356.761	D	7.406	7.406	0	2.9	77.68	21.64	0	0	0	0.68
2001	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	37	23	1008	358.048	-354.775	D	7.411	7.406	0.005	2.9	92.94	5.92	0	0	0	1.16
2001	38	23	967	363.478	-354.116	D	7.423	7.406	0.018	2.9	86.17	13.18	0	0	0	0.66
2001	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	40	23	1007	358.259	-354.768	D	7.555	7.406	0.149	2.9	80.6	18.57	0	0	0	0.84
2001	41	23	1039	356.522	-357.599	D	7.448	7.406	0.042	2.9	61.04	36.78	0	0	0	2.19
2001	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	46	23	822	358.021	-361.607	D	7.941	7.406	**0.535**	2.9	92.45	7.14	0	0	0	0.41
2001	47	23	853	361.666	-362.175	D	7.931	7.406	**0.525**	2.9	88.53	11.09	0	0	0	0.39
2001	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	49	23	1017	356.894	-355.206	D	7.466	7.406	0.061	2.9	84.7	14.8	0	0	0	0.51
2001	50	23	643	363.609	-354.151	D	7.406	7.406	0.001	2.9	90.23	9.43	0	0	0	0.3
2001	51	23	643	363.609	-354.151	D	7.406	7.406	0	2.9	97.35	2.24	0	0	0	0.44
2001	52	23	1017	356.894	-355.206	D	7.434	7.406	0.028	2.9	94.31	5.48	0	0	0	0.22
2001	53	23	1	356.546	-357.458	D	7.41	7.406	0.004	2.9	94.25	5.65	0	0	0	0.17
2001	54	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	87.75	2.2	0	0	0	0.11
2001	55	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	57	23	933	366.169	-356.524	D	7.419	7.406	0.014	2.9	93.49	6.03	0	0	0	0.5
2001	58	23	955	364.92	-354.582	D	7.432	7.406	0.026	2.9	94.25	5.52	0	0	0	0.23
2001	59	23	1017	356.894	-355.206	D	7.412	7.406	0.006	2.9	94.06	5.85	0	0	0	0.11
2001	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	0	0	0	0	0	0
2001	61	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	62	23	1017	356.894	-355.206	D	7.312	7.311	0.001	2.7	92.67	6.73	0	0	0	0.7
2001	63	23	1017	356.894	-355.206	D	7.49	7.311	0.18	2.7	92.89	6.78	0	0	0	0.33
2001	64	23	1039	356.522	-357.599	D	7.446	7.311	0.135	2.7	78.08	20.35	0	0	0	1.57
2001	65	23	949	365.722	-354.966	D	7.388	7.311	0.077	2.7	82.34	16.63	0	0	0	1.03
2001	66	23	1008	358.048	-354.775	D	7.446	7.311	0.135	2.7	94.16	5.21	0	0	0	0.63
2001	67	23	927	365.912	-357.454	D	7.578	7.311	0.268	2.7	83.67	15.18	0	0	0	1.15
2001	68	23	949	365.722	-354.966	D	7.337	7.311	0.026	2.7	84.34	14.45	0	0	0	1.21
2001	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	70	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	71	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	949	365.722	-354.966	D	7.312	7.311	0.001	2.7	85.06	13.81	0	0	0	1.24
2001	74	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	75	23	1007	358.259	-354.768	D	7.415	7.311	0.105	2.7	87.46	11.66	0	0	0	0.89
2001	76	23	1039	356.522	-357.599	D	7.338	7.311	0.027	2.7	75.18	23.05	0	0	0	1.77
2001	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	79	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	80	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	82	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	84	23	1039	356.522	-357.599	D	7.315	7.311	0.004	2.7	87.26	11.75	0	0	0	1.02
2001	85	23	822	358.021	-361.607	D	7.333	7.311	0.023	2.7	86.76	12.4	0	0	0	0.84
2001	86	23	1017	356.894	-355.206	D	7.313	7.311	0.003	2.7	88.84	10.68	0	0	0	0.55
2001	87	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	97.58	3.35	0	0	0	0.42
2001	88	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	89	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	90	23	949	365.722	-354.966	D	7.311	7.311	0	2.7	92.75	6.47	0	0	0	0.87
2001	91	23	949	365.722	-354.966	D	7.345	7.311	0.034	2.7	89.98	8.93	0	0	0	1.09
2001	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	105	23	949	365.722	-354.966	D	7.46	7.311	0.149	2.7	98.33	1.16	0	0	0	0.51
2001	106	23	933	366.169	-356.524	D	7.378	7.311	0.068	2.7	90.4	8.41	0	0	0	1.19
2001	107	23	907	365.051	-359.809	D	7.326	7.311	0.015	2.7	71.71	25.79	0	0	0	2.5
2001	108	23	1035	356.477	-356.792	D	7.376	7.311	0.065	2.7	96.46	3.17	0	0	0	0.37
2001	109	23	933	366.169	-356.524	D	7.32	7.311	0.009	2.7	99.18	0.62	0	0	0	0.2
2001	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	114	23	1035	356.477	-356.792	D	7.343	7.311	0.033	2.7	97.4	1.7	0	0	0	0.9
2001	115	23	1017	356.894	-355.206	D	7.384	7.311	0.073	2.7	97.42	2.21	0	0	0	0.37
2001	116	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	119	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	127	23	949	365.722	-354.966	D	7.689	7.593	0.096	3.3	99.17	0.36	0	0	0	0.47
2001	128	23	1035	356.477	-356.792	D	7.679	7.593	0.087	3.3	98.84	0.75	0	0	0	0.41
2001	129	23	949	365.722	-354.966	D	7.698	7.593	0.105	3.3	99.51	0.28	0	0	0	0.21
2001	130	23	933	366.169	-356.524	D	7.595	7.593	0.002	3.3	99.83	0.07	0	0	0	0.14
2001	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	132	23	930	366.19	-357.232	D	7.647	7.593	0.055	3.3	95.37	4.37	0	0	0	0.25
2001	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	138	23	1035	356.477	-356.792	D	7.598	7.593	0.005	3.3	98.33	1.52	0	0	0	0.16
2001	139	23	853	361.666	-362.175	D	7.628	7.593	0.036	3.3	98.83	1.06	0	0	0	0.11

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	140	23	519	362.902	-360.673	D	7.593	7.593	0	3.3	97.53	0.03	0	0	0	0.11
2001	141	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	148	23	949	365.722	-354.966	D	7.622	7.593	0.03	3.3	99.72	0.05	0	0	0	0.23
2001	149	23	933	366.169	-356.524	D	7.798	7.593	0.205	3.3	99.63	0.2	0	0	0	0.17
2001	150	23	955	364.92	-354.582	D	7.622	7.593	0.03	3.3	99.72	0.15	0	0	0	0.13
2001	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	153	23	949	365.722	-354.966	D	7.646	7.593	0.053	3.3	97.07	2.03	0	0	0	0.9
2001	154	23	949	365.722	-354.966	D	7.597	7.593	0.005	3.3	98.34	1.42	0	0	0	0.26
2001	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	156	23	642	363.62	-354.4	D	7.593	7.593	0	3.3	107.93	0.19	0	0	0	0.11
2001	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	158	23	949	365.722	-354.966	D	7.708	7.593	0.115	3.3	99.48	0.39	0	0	0	0.12
2001	159	23	1035	356.477	-356.792	D	7.839	7.593	0.246	3.3	99.73	0.16	0	0	0	0.11
2001	160	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	99.89	0.01	0	0	0	0.11
2001	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	164	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	168	23	853	361.666	-362.175	D	7.597	7.593	0.005	3.3	99.79	0.02	0	0	0	0.19
2001	169	23	932	366.176	-356.761	D	7.6	7.593	0.008	3.3	99.84	0.03	0	0	0	0.14
2001	170	23	729	364.634	-354.854	D	7.593	7.593	0	3.3	98.37	0.01	0	0	0	0.12
2001	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	172	23	949	365.722	-354.966	D	7.833	7.593	0.24	3.3	99.3	0.45	0	0	0	0.25
2001	173	23	949	365.722	-354.966	D	7.762	7.593	0.169	3.3	99.46	0.13	0	0	0	0.4
2001	174	23	822	358.021	-361.607	D	7.766	7.593	0.174	3.3	99.29	0.33	0	0	0	0.38
2001	175	23	907	365.051	-359.809	D	7.6	7.593	0.008	3.3	99.65	0.09	0	0	0	0.25
2001	176	23	933	366.169	-356.524	D	7.596	7.593	0.003	3.3	99.8	0.07	0	0	0	0.15
2001	177	23	964	363.678	-354.148	D	7.593	7.593	0	3.3	99.88	0.04	0	0	0	0.12
2001	178	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	179	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	180	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	182	23	1008	358.048	-354.775	D	7.61	7.593	0.017	3.3	99.83	0.02	0	0	0	0.15
2001	183	23	1017	356.894	-355.206	D	7.642	7.593	0.05	3.3	99.67	0.21	0	0	0	0.12
2001	184	23	1007	358.259	-354.768	D	7.595	7.593	0.002	3.3	99.82	0.03	0	0	0	0.1
2001	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	186	23	964	363.678	-354.148	D	7.669	7.593	0.077	3.3	99.77	0.03	0	0	0	0.2
2001	187	23	853	361.666	-362.175	D	7.807	7.593	0.214	3.3	99.81	0.05	0	0	0	0.14
2001	188	23	933	366.169	-356.524	D	7.638	7.593	0.045	3.3	99.88	0.02	0	0	0	0.1
2001	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	949	365.722	-354.966	D	8.08	7.593	0.487	3.3	99.45	0.35	0	0	0	0.2
2001	192	23	853	361.666	-362.175	D	7.645	7.593	0.052	3.3	99.78	0.03	0	0	0	0.19
2001	193	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	194	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	195	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	196	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	202	23	933	366.169	-356.524	D	7.593	7.593	0	3.3	99.74	0.01	0	0	0	0.14
2001	203	23	947	365.801	-355.162	D	7.594	7.593	0.001	3.3	99.78	0.13	0	0	0	0.12
2001	204	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	205	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	206	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	207	23	964	363.678	-354.148	D	7.603	7.593	0.011	3.3	99.8	0.07	0	0	0	0.13
2001	208	23	949	365.722	-354.966	D	7.633	7.593	0.041	3.3	99.56	0.35	0	0	0	0.09
2001	209	23	933	366.169	-356.524	D	7.616	7.593	0.024	3.3	99.44	0.48	0	0	0	0.08
2001	210	23	771	365.422	-355.818	D	7.593	7.593	0	3.3	99.17	0.1	0	0	0	0.08
2001	211	23	947	365.801	-355.162	D	7.647	7.593	0.055	3.3	99.69	0.18	0	0	0	0.12
2001	212	23	949	365.722	-354.966	D	7.637	7.593	0.044	3.3	99.89	0.02	0	0	0	0.1
2001	213	23	643	363.609	-354.151	D	7.594	7.593	0.002	3.3	99.91	0.01	0	0	0	0.08
2001	214	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	215	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	216	23	930	366.19	-357.232	D	7.632	7.593	0.039	3.3	99.4	0.44	0	0	0	0.16
2001	217	23	822	358.021	-361.607	D	7.594	7.593	0.001	3.3	99.9	0.02	0	0	0	0.13

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	218	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	219	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	222	23	822	358.021	-361.607	D	7.628	7.593	0.036	3.3	99.53	0.15	0	0	0	0.32
2001	223	23	846	360.93	-362.178	D	7.697	7.593	0.104	3.3	98.3	1.52	0	0	0	0.18
2001	224	23	907	365.051	-359.809	D	7.598	7.593	0.006	3.3	99.61	0.3	0	0	0	0.1
2001	225	23	907	365.051	-359.809	D	7.6	7.593	0.007	3.3	99.28	0.64	0	0	0	0.08
2001	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	231	23	1017	356.894	-355.206	D	7.705	7.593	0.112	3.3	99.34	0.17	0	0	0	0.49
2001	232	23	822	358.021	-361.607	D	7.9	7.593	0.307	3.3	99.54	0.17	0	0	0	0.29
2001	233	23	949	365.722	-354.966	D	7.634	7.593	0.041	3.3	99.76	0.07	0	0	0	0.17
2001	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	238	23	907	365.051	-359.809	D	7.629	7.593	0.037	3.3	96.95	2.67	0	0	0	0.38
2001	239	23	822	358.021	-361.607	D	7.607	7.593	0.015	3.3	99.19	0.61	0	0	0	0.21
2001	240	23	949	365.722	-354.966	D	7.601	7.593	0.009	3.3	99.71	0.09	0	0	0	0.2
2001	241	23	949	365.722	-354.966	D	7.659	7.593	0.066	3.3	99.67	0.12	0	0	0	0.21
2001	242	23	949	365.722	-354.966	D	7.611	7.593	0.019	3.3	99.7	0.16	0	0	0	0.15
2001	243	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	99.78	0.08	0	0	0	0.21
2001	244	23	967	363.478	-354.116	D	7.799	7.637	0.162	3.396	99.2	0.64	0	0	0	0.16
2001	245	23	1017	356.894	-355.206	D	7.763	7.639	0.124	3.4	99.57	0.32	0	0	0	0.11
2001	246	23	1017	356.894	-355.206	D	7.674	7.639	0.035	3.4	99.87	0.04	0	0	0	0.09
2001	247	23	1017	356.894	-355.206	D	7.691	7.639	0.052	3.4	99.74	0.07	0	0	0	0.19
2001	248	23	1017	356.894	-355.206	D	7.713	7.639	0.074	3.4	99.61	0.23	0	0	0	0.16
2001	249	23	1008	358.048	-354.775	D	7.64	7.639	0.001	3.4	99.78	0.07	0	0	0	0.13
2001	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	252	23	907	365.051	-359.809	D	7.883	7.639	0.245	3.4	99.01	0.58	0	0	0	0.42
2001	253	23	930	366.19	-357.232	D	7.709	7.639	0.07	3.4	97.23	2.13	0	0	0	0.64
2001	254	23	1039	356.522	-357.599	D	7.649	7.639	0.01	3.4	99.46	0.23	0	0	0	0.31
2001	255	23	949	365.722	-354.966	D	7.66	7.639	0.022	3.4	99.55	0.26	0	0	0	0.2
2001	256	23	949	365.722	-354.966	D	7.7	7.639	0.061	3.4	99.68	0.17	0	0	0	0.15

Appendix M
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2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	257	23	1008	358.048	-354.775	D	7.686	7.639	0.048	3.4	99.72	0.15	0	0	0	0.13
2001	258	23	821	358.053	-361.416	D	7.639	7.639	0.001	3.4	99.86	0.01	0	0	0	0.11
2001	259	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	260	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	261	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	262	23	949	365.722	-354.966	D	7.786	7.639	0.147	3.4	89.08	9.97	0	0	0	0.96
2001	263	23	947	365.801	-355.162	D	7.64	7.639	0.001	3.4	96.53	2.89	0	0	0	0.66
2001	264	23	1017	356.894	-355.206	D	7.673	7.639	0.034	3.4	99.59	0.09	0	0	0	0.32
2001	265	23	1035	356.477	-356.792	D	7.773	7.639	0.134	3.4	99.26	0.49	0	0	0	0.25
2001	266	23	1035	356.477	-356.792	D	7.751	7.639	0.113	3.4	98.89	0.86	0	0	0	0.25
2001	267	23	853	361.666	-362.175	D	7.642	7.639	0.004	3.4	97.25	2.53	0	0	0	0.22
2001	268	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	269	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	270	23	967	363.478	-354.116	D	7.696	7.639	0.057	3.4	99.14	0.63	0	0	0	0.23
2001	271	23	955	364.92	-354.582	D	8.045	7.639	0.406	3.4	99.41	0.4	0	0	0	0.19
2001	272	23	822	358.021	-361.607	D	7.655	7.639	0.016	3.4	99.74	0.1	0	0	0	0.15
2001	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2001	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	1017	356.894	-355.206	D	7.528	7.5	0.029	3.1	96.56	3.3	0	0	0	0.14
2001	279	23	822	358.021	-361.607	D	7.506	7.5	0.007	3.1	90.59	8.56	0	0	0	0.85
2001	280	23	930	366.19	-357.232	D	7.542	7.5	0.043	3.1	97.61	2.03	0	0	0	0.37
2001	281	23	949	365.722	-354.966	D	7.514	7.5	0.015	3.1	98.4	1.34	0	0	0	0.26
2001	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	7.504	7.5	0.005	3.1	96.69	2.99	0	0	0	0.34
2001	285	23	1017	356.894	-355.206	D	7.637	7.5	0.138	3.1	95.49	4.28	0	0	0	0.23
2001	286	23	1008	358.048	-354.775	D	7.503	7.5	0.003	3.1	99.19	0.66	0	0	0	0.15
2001	287	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	288	23	1017	356.894	-355.206	D	7.502	7.5	0.003	3.1	88.39	11.31	0	0	0	0.32
2001	289	23	78	358.239	-356.385	D	7.584	7.5	0.085	3.1	90.58	9.07	0	0	0	0.35
2001	290	23	602	363.547	-358.397	D	7.628	7.5	0.129	3.1	89.36	9.91	0	0	0	0.73
2001	291	23	949	365.722	-354.966	D	7.516	7.5	0.017	3.1	98.73	1.09	0	0	0	0.18
2001	292	23	1008	358.048	-354.775	D	7.506	7.5	0.006	3.1	94.62	4.51	0	0	0	0.89
2001	293	23	966	363.538	-354.124	D	7.503	7.5	0.004	3.1	96.68	3.05	0	0	0	0.33
2001	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	296	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	822	358.021	-361.607	D	7.538	7.5	0.038	3.1	95.59	3.77	0	0	0	0.65
2001	298	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	23	78	358.239	-356.385	D	7.524	7.5	0.024	3.1	76.71	21.8	0	0	0	1.5
2001	301	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	23	855	361.854	-361.947	D	7.555	7.5	0.056	3.1	95.16	4.62	0	0	0	0.22
2001	308	23	1039	356.522	-357.599	D	7.512	7.5	0.012	3.1	98.5	1.34	0	0	0	0.16
2001	309	23	1017	356.894	-355.206	D	8.099	7.5	**0.6**	3.1	94.24	5.49	0	0	0	0.26
2001	310	23	1035	356.477	-356.792	D	7.84	7.5	0.341	3.1	98.35	1.47	0	0	0	0.18
2001	311	23	933	366.169	-356.524	D	7.727	7.5	0.228	3.1	98.92	0.92	0	0	0	0.15
2001	312	23	932	366.176	-356.761	D	7.545	7.5	0.045	3.1	98.74	0.83	0	0	0	0.44
2001	313	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	96.25	3.47	0	0	0	0.8
2001	314	23	1008	358.048	-354.775	D	7.5	7.5	0	3.1	92.72	6.57	0	0	0	0.69
2001	315	23	967	363.478	-354.116	D	7.634	7.5	0.135	3.1	94.7	4.57	0	0	0	0.74
2001	316	23	1039	356.522	-357.599	D	7.531	7.5	0.032	3.1	97.77	1.79	0	0	0	0.45
2001	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	323	23	930	366.19	-357.232	D	7.519	7.5	0.02	3.1	59.53	38.05	0	0	0	2.43
2001	324	23	927	365.912	-357.454	D	7.69	7.5	0.191	3.1	70.67	27.46	0	0	0	1.87
2001	325	23	930	366.19	-357.232	D	7.51	7.5	0.01	3.1	88.66	10.63	0	0	0	0.71
2001	326	23	722	364.711	-356.599	D	7.5	7.5	0	3.1	95.39	2.87	0	0	0	0.41
2001	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	930	366.19	-357.232	D	7.555	7.5	0.055	3.1	66.18	32.51	0	0	0	1.31
2001	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	334	23	907	365.051	-359.809	D	7.5	7.5	0	3.1	90.05	9.6	0	0	0	0.31

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	965	363.588	-354.142	D	7.596	7.593	0.004	3.3	72.16	26.62	0	0	0	1.23
2001	341	23	949	365.722	-354.966	D	7.603	7.593	0.01	3.3	92.13	7.49	0	0	0	0.4
2001	342	23	1039	356.522	-357.599	D	7.798	7.593	0.206	3.3	89.38	9.95	0	0	0	0.67
2001	343	23	1039	356.522	-357.599	D	7.66	7.593	0.067	3.3	79.83	18.94	0	0	0	1.23
2001	344	23	1017	356.894	-355.206	D	7.613	7.593	0.021	3.3	87.33	12.23	0	0	0	0.45
2001	345	23	1008	358.048	-354.775	D	7.602	7.593	0.009	3.3	90.9	8.8	0	0	0	0.31
2001	346	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	347	23	949	365.722	-354.966	D	9.565	7.593	**1.972**	3.3	91.72	7.97	0	0	0	0.32
2001	348	23	822	358.021	-361.607	D	8.247	7.593	**0.655**	3.3	91.71	8.05	0	0	0	0.24
2001	349	23	947	365.801	-355.162	D	7.624	7.593	0.031	3.3	97.09	2.78	0	0	0	0.13
2001	350	23	949	365.722	-354.966	D	7.595	7.593	0.003	3.3	96.68	3.27	0	0	0	0.09
2001	351	23	1017	356.894	-355.206	D	7.891	7.593	0.299	3.3	89.52	10.08	0	0	0	0.4
2001	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	353	23	1039	356.522	-357.599	D	7.691	7.593	0.098	3.3	83.44	15.49	0	0	0	1.06
2001	354	23	845	360.851	-362.181	D	7.658	7.593	0.065	3.3	81.28	17.67	0	0	0	1.05
2001	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	927	365.912	-357.454	D	7.77	7.593	0.178	3.3	64.46	33.85	0	0	0	1.69
2001	360	23	927	365.912	-357.454	D	7.75	7.593	0.158	3.3	62.19	36.15	0	0	0	1.66
2001	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	822	358.021	-361.607	D	7.707	7.593	0.115	3.3	72.64	26.15	0	0	0	1.21
2001	364	23	927	365.912	-357.454	D	7.9	7.593	0.308	3.3	67.21	31.5	0	0	0	1.29
2001	365	23	931	366.183	-356.996	D	7.598	7.593	0.005	3.3	72.03	27	0	0	0	0.97
									1.972							
MARSHALL									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATE**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	2	23	933	366.169	-356.524	D	7.569	7.546	0.022	3.2	82.95	16.62	0	0	0	0.44
2001	3	23	930	366.19	-357.232	D	7.55	7.546	0.004	3.2	85.61	14.1	0	0	0	0.31

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	7	23	933	366.169	-356.524	D	7.616	7.546	0.07	3.2	86.17	13.32	0	0	0	0.51
2001	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	9	23	78	358.239	-356.385	D	7.602	7.546	0.055	3.2	71.63	27.67	0	0	0	0.71
2001	10	23	967	363.478	-354.116	D	7.559	7.546	0.013	3.2	80.47	19.26	0	0	0	0.28
2001	11	23	948	365.727	-355.056	D	7.546	7.546	0	3.2	85.58	13.85	0	0	0	0.19
2001	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	16	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	17	23	1008	358.048	-354.775	D	7.784	7.546	0.238	3.2	74.19	25.16	0	0	0	0.65
2001	18	23	1017	356.894	-355.206	D	7.616	7.546	0.07	3.2	80.41	19.03	0	0	0	0.57
2001	19	23	930	366.19	-357.232	D	7.557	7.546	0.011	3.2	81.8	17.59	0	0	0	0.61
2001	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	21	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	24	23	933	366.169	-356.524	D	7.55	7.546	0.004	3.2	62.15	36.68	0	0	0	1.18
2001	25	23	824	358.459	-361.601	D	7.58	7.546	0.034	3.2	46.96	51.09	0	0	0	1.95
2001	26	23	1035	356.477	-356.792	D	7.547	7.546	0.001	3.2	68.57	31	0	0	0	0.51
2001	27	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	28	23	930	366.19	-357.232	D	7.562	7.546	0.015	3.2	70.55	29.07	0	0	0	0.38
2001	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2001	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	37	23	973	362.512	-354.246	D	7.406	7.406	0	2.9	85.45	13.13	0	0	0	1.42
2001	38	23	967	363.478	-354.116	D	7.41	7.406	0.005	2.9	75.68	23.45	0	0	0	0.88
2001	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	40	23	1017	356.894	-355.206	D	7.436	7.406	0.03	2.9	85.98	13.86	0	0	0	0.17
2001	41	23	949	365.722	-354.966	D	7.413	7.406	0.008	2.9	65.74	33.31	0	0	0	0.97
2001	42	23	1017	356.894	-355.206	D	7.423	7.406	0.017	2.9	67.03	32.33	0	0	0	0.66

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	81.66	22.3	0	0	0	0.33
2001	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	45	23	1017	356.894	-355.206	D	7.478	7.406	0.072	2.9	86.16	13.41	0	0	0	0.43
2001	46	23	949	365.722	-354.966	D	8.683	7.406	**1.277**	2.9	89.01	10.65	0	0	0	0.34
2001	47	23	930	366.19	-357.232	D	7.582	7.406	0.176	2.9	82.62	16.86	0	0	0	0.52
2001	48	23	930	366.19	-357.232	D	7.506	7.406	0.1	2.9	51.44	47.26	0	0	0	1.3
2001	49	23	933	366.169	-356.524	D	7.45	7.406	0.045	2.9	72.92	26.46	0	0	0	0.62
2001	50	23	930	366.19	-357.232	D	7.417	7.406	0.011	2.9	83.52	16.25	0	0	0	0.24
2001	51	23	643	363.609	-354.151	D	7.406	7.406	0	2.9	93.02	6.74	0	0	0	0.75
2001	52	23	1017	356.894	-355.206	D	7.43	7.406	0.024	2.9	84.96	14.75	0	0	0	0.3
2001	53	23	1017	356.894	-355.206	D	7.42	7.406	0.014	2.9	84.17	15.29	0	0	0	0.57
2001	54	23	1008	358.048	-354.775	D	7.423	7.406	0.017	2.9	79.5	20.03	0	0	0	0.48
2001	55	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	57	23	933	366.169	-356.524	D	7.407	7.406	0.002	2.9	91.52	7.69	0	0	0	0.87
2001	58	23	930	366.19	-357.232	D	7.42	7.406	0.014	2.9	86.44	13.14	0	0	0	0.43
2001	59	23	1035	356.477	-356.792	D	7.41	7.406	0.004	2.9	87.39	12.46	0	0	0	0.2
2001	60	23	1017	356.894	-355.206	D	7.317	7.315	0.002	2.708	90.12	9.68	0	0	0	0.26
2001	61	23	961	364.092	-354.289	D	7.321	7.311	0.011	2.7	88.82	10.97	0	0	0	0.23
2001	62	23	906	364.982	-359.812	D	7.311	7.311	0	2.7	95.25	4.92	0	0	0	0.21
2001	63	23	1017	356.894	-355.206	D	7.435	7.311	0.124	2.7	74.45	24.47	0	0	0	1.08
2001	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	65	23	773	365.4	-355.32	D	7.406	7.311	0.096	2.7	55.2	42.95	0	0	0	1.85
2001	66	23	947	365.801	-355.162	D	7.383	7.311	0.072	2.7	80.07	19.06	0	0	0	0.87
2001	67	23	949	365.722	-354.966	D	7.311	7.311	0.001	2.7	84.15	14.9	0	0	0	0.98
2001	68	23	1041	356.936	-357.592	D	7.351	7.311	0.04	2.7	50.95	47.04	0	0	0	2.01
2001	69	23	1017	356.894	-355.206	D	7.335	7.311	0.024	2.7	81.87	17.33	0	0	0	0.81
2001	70	23	643	363.609	-354.151	D	7.312	7.311	0.001	2.7	93.45	6.17	0	0	0	0.46
2001	71	23	594	363.123	-354.422	D	7.311	7.311	0	2.7	93.51	5.47	0	0	0	0.29
2001	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	90.74	10.81	0	0	0	0.11
2001	75	23	1017	356.894	-355.206	D	7.406	7.311	0.095	2.7	91.03	8.65	0	0	0	0.33
2001	76	23	949	365.722	-354.966	D	7.313	7.311	0.002	2.7	83.95	15.17	0	0	0	0.93
2001	77	23	1039	356.522	-357.599	D	7.354	7.311	0.043	2.7	82.98	16.3	0	0	0	0.73
2001	78	23	1039	356.522	-357.599	D	7.311	7.311	0	2.7	92.09	8.1	0	0	0	0.53
2001	79	23	1038	356.511	-357.396	D	7.311	7.311	0.001	2.7	91.06	8.61	0	0	0	0.43
2001	80	23	1035	356.477	-356.792	D	7.336	7.311	0.025	2.7	91.39	7.77	0	0	0	0.85
2001	81	23	1017	356.894	-355.206	D	7.341	7.311	0.03	2.7	94.81	4.63	0	0	0	0.57

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	82	23	1017	356.894	-355.206	D	7.314	7.311	0.003	2.7	94.31	5.39	0	0	0	0.32
2001	83	23	1017	356.894	-355.206	D	7.369	7.311	0.058	2.7	90.05	9.63	0	0	0	0.32
2001	84	23	907	365.051	-359.809	D	7.445	7.311	0.134	2.7	55.33	43.12	0	0	0	1.56
2001	85	23	933	366.169	-356.524	D	7.382	7.311	0.071	2.7	49.48	48.9	0	0	0	1.62
2001	86	23	930	366.19	-357.232	D	7.318	7.311	0.007	2.7	87.66	11.81	0	0	0	0.56
2001	87	23	941	365.977	-355.774	D	7.332	7.311	0.021	2.7	88.19	11.44	0	0	0	0.37
2001	88	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	89	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	90	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	105	23	949	365.722	-354.966	D	7.345	7.311	0.035	2.7	96.72	2.79	0	0	0	0.49
2001	106	23	907	365.051	-359.809	D	7.334	7.311	0.023	2.7	76.81	20.97	0	0	0	2.23
2001	107	23	933	366.169	-356.524	D	7.324	7.311	0.014	2.7	81.05	18.19	0	0	0	0.78
2001	108	23	933	366.169	-356.524	D	7.353	7.311	0.042	2.7	82.57	16.58	0	0	0	0.85
2001	109	23	907	365.051	-359.809	D	7.311	7.311	0	2.7	98.64	1	0	0	0	0.23
2001	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	114	23	949	365.722	-354.966	D	7.313	7.311	0.003	2.7	97.59	1.64	0	0	0	0.81
2001	115	23	930	366.19	-357.232	D	7.319	7.311	0.009	2.7	97.53	1.87	0	0	0	0.6
2001	116	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	119	23	642	363.62	-354.4	D	7.311	7.311	0	2.7	99.59	0.52	0	0	0	0.26
2001	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	128	23	930	366.19	-357.232	D	7.601	7.593	0.008	3.3	96.97	2.36	0	0	0	0.68
2001	129	23	907	365.051	-359.809	D	7.61	7.593	0.017	3.3	99.09	0.61	0	0	0	0.29
2001	130	23	930	366.19	-357.232	D	7.6	7.593	0.007	3.3	99.6	0.2	0	0	0	0.2
2001	131	23	476	361.894	-354.726	D	7.593	7.593	0	3.3	86.64	0.03	0	0	0	0.13
2001	132	23	930	366.19	-357.232	D	7.626	7.593	0.033	3.3	72.6	26.5	0	0	0	0.9
2001	133	23	1039	356.522	-357.599	D	7.609	7.593	0.017	3.3	99.47	0.27	0	0	0	0.27
2001	134	23	947	365.801	-355.162	D	7.598	7.593	0.005	3.3	99.66	0.16	0	0	0	0.2
2001	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	138	23	1035	356.477	-356.792	D	7.606	7.593	0.013	3.3	95.29	4.45	0	0	0	0.26
2001	139	23	833	359.603	-362.066	D	7.728	7.593	0.135	3.3	96.79	2.83	0	0	0	0.38
2001	140	23	1035	356.477	-356.792	D	7.639	7.593	0.046	3.3	99.06	0.47	0	0	0	0.47
2001	141	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	73.6	0.23	0	0	0	0.16
2001	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	148	23	949	365.722	-354.966	D	7.596	7.593	0.003	3.3	99.51	0.11	0	0	0	0.36
2001	149	23	933	366.169	-356.524	D	7.671	7.593	0.079	3.3	99.29	0.47	0	0	0	0.24
2001	150	23	949	365.722	-354.966	D	7.62	7.593	0.027	3.3	99.18	0.65	0	0	0	0.17
2001	151	23	1008	358.048	-354.775	D	7.641	7.593	0.048	3.3	98.28	1.54	0	0	0	0.19
2001	152	23	930	366.19	-357.232	D	7.594	7.593	0.002	3.3	99.41	0.41	0	0	0	0.15
2001	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	158	23	967	363.478	-354.116	D	7.724	7.593	0.132	3.3	99.63	0.18	0	0	0	0.19
2001	159	23	822	358.021	-361.607	D	7.78	7.593	0.187	3.3	99.42	0.4	0	0	0	0.17

Appendix M
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2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	160	23	1017	356.894	-355.206	D	7.713	7.593	0.12	3.3	99.25	0.52	0	0	0	0.24
2001	161	23	1017	356.894	-355.206	D	7.708	7.593	0.115	3.3	99.59	0.24	0	0	0	0.17
2001	162	23	949	365.722	-354.966	D	7.602	7.593	0.009	3.3	99.83	0.07	0	0	0	0.1
2001	163	23	784	365.648	-355.309	D	7.593	7.593	0	3.3	100	0.03	0	0	0	0.08
2001	164	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	168	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	169	23	931	366.183	-356.996	D	7.594	7.593	0.002	3.3	99.69	0.04	0	0	0	0.22
2001	170	23	730	364.623	-354.605	D	7.593	7.593	0	3.3	98.5	0.02	0	0	0	0.17
2001	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	172	23	1017	356.894	-355.206	D	7.694	7.593	0.102	3.3	98.67	1.13	0	0	0	0.2
2001	173	23	907	365.051	-359.809	D	7.642	7.593	0.049	3.3	96.56	2.42	0	0	0	1.03
2001	174	23	783	365.659	-355.558	D	7.603	7.593	0.011	3.3	98.41	0.93	0	0	0	0.66
2001	175	23	930	366.19	-357.232	D	7.598	7.593	0.006	3.3	99.47	0.21	0	0	0	0.33
2001	176	23	930	366.19	-357.232	D	7.596	7.593	0.004	3.3	99.67	0.14	0	0	0	0.2
2001	177	23	1017	356.894	-355.206	D	7.596	7.593	0.003	3.3	99.69	0.15	0	0	0	0.16
2001	178	23	10	356.954	-355.443	D	7.594	7.593	0.002	3.3	99.77	0.1	0	0	0	0.14
2001	179	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	99.41	0.41	0	0	0	0.13
2001	180	23	62	357.925	-354.901	D	7.593	7.593	0	3.3	99.56	0.05	0	0	0	0.12
2001	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	182	23	1017	356.894	-355.206	D	7.617	7.593	0.025	3.3	99.36	0.38	0	0	0	0.27
2001	183	23	1017	356.894	-355.206	D	7.76	7.593	0.168	3.3	98.67	1.07	0	0	0	0.26
2001	184	23	964	363.678	-354.148	D	7.602	7.593	0.009	3.3	99.8	0.07	0	0	0	0.14
2001	185	23	784	365.648	-355.309	D	7.593	7.593	0	3.3	99.39	0.04	0	0	0	0.12
2001	186	23	955	364.92	-354.582	D	7.599	7.593	0.006	3.3	99.6	0.06	0	0	0	0.36
2001	187	23	930	366.19	-357.232	D	7.667	7.593	0.074	3.3	99.63	0.12	0	0	0	0.26
2001	188	23	930	366.19	-357.232	D	7.609	7.593	0.016	3.3	99.8	0.05	0	0	0	0.16
2001	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	949	365.722	-354.966	D	7.636	7.593	0.043	3.3	98.88	0.76	0	0	0	0.36
2001	192	23	967	363.478	-354.116	D	7.965	7.593	0.372	3.3	99.38	0.34	0	0	0	0.28
2001	193	23	811	357.434	-360.225	D	7.698	7.593	0.106	3.3	99.4	0.42	0	0	0	0.18
2001	194	23	932	366.176	-356.761	D	7.654	7.593	0.061	3.3	99.53	0.34	0	0	0	0.13
2001	195	23	822	358.021	-361.607	D	7.6	7.593	0.007	3.3	99.88	0.03	0	0	0	0.11
2001	196	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	98.87	0.02	0	0	0	0.12
2001	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	202	23	930	366.19	-357.232	D	7.596	7.593	0.003	3.3	99.8	0.03	0	0	0	0.18
2001	203	23	933	366.169	-356.524	D	7.601	7.593	0.008	3.3	99.42	0.43	0	0	0	0.15
2001	204	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	97.85	0.32	0	0	0	0.12
2001	205	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	206	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	207	23	964	363.678	-354.148	D	7.628	7.593	0.035	3.3	99.73	0.12	0	0	0	0.16
2001	208	23	967	363.478	-354.116	D	7.644	7.593	0.051	3.3	99.24	0.63	0	0	0	0.13
2001	209	23	949	365.722	-354.966	D	7.606	7.593	0.014	3.3	99.26	0.63	0	0	0	0.12
2001	210	23	949	365.722	-354.966	D	7.611	7.593	0.019	3.3	99.62	0.27	0	0	0	0.12
2001	211	23	949	365.722	-354.966	D	7.63	7.593	0.038	3.3	99.76	0.12	0	0	0	0.12
2001	212	23	949	365.722	-354.966	D	7.639	7.593	0.046	3.3	99.83	0.04	0	0	0	0.13
2001	213	23	949	365.722	-354.966	D	7.597	7.593	0.004	3.3	99.88	0.02	0	0	0	0.11
2001	214	23	948	365.727	-355.056	D	7.593	7.593	0.001	3.3	99.89	0.04	0	0	0	0.1
2001	215	23	774	365.389	-355.071	D	7.593	7.593	0	3.3	98.81	0.03	0	0	0	0.1
2001	216	23	1017	356.894	-355.206	D	7.893	7.593	0.3	3.3	99.36	0.36	0	0	0	0.28
2001	217	23	822	358.021	-361.607	D	7.604	7.593	0.012	3.3	99.72	0.07	0	0	0	0.21
2001	218	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	99.97	0.01	0	0	0	0.18
2001	219	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	222	23	811	357.434	-360.225	D	7.869	7.593	0.276	3.3	99.29	0.28	0	0	0	0.43
2001	223	23	853	361.666	-362.175	D	7.873	7.593	0.28	3.3	96.87	2.89	0	0	0	0.24
2001	224	23	1035	356.477	-356.792	D	7.758	7.593	0.165	3.3	99.39	0.26	0	0	0	0.35
2001	225	23	822	358.021	-361.607	D	7.62	7.593	0.027	3.3	99.26	0.48	0	0	0	0.26
2001	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	231	23	931	366.183	-356.996	D	7.593	7.593	0	3.3	91.6	5.64	0	0	0	3.02
2001	232	23	949	365.722	-354.966	D	7.703	7.593	0.11	3.3	99.12	0.53	0	0	0	0.36
2001	233	23	949	365.722	-354.966	D	7.599	7.593	0.007	3.3	99.68	0.09	0	0	0	0.24
2001	234	23	85	358.706	-361.357	D	7.593	7.593	0	3.3	85.4	0.02	0	0	0	0.18
2001	235	23	301	360.724	-362.017	D	7.593	7.593	0	3.3	99.86	0.06	0	0	0	0.17
2001	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	238	23	964	363.678	-354.148	D	7.648	7.593	0.055	3.3	96.73	2.67	0	0	0	0.6
2001	239	23	844	360.75	-362.146	D	7.901	7.593	0.308	3.3	98.89	0.8	0	0	0	0.3
2001	240	23	822	358.021	-361.607	D	7.729	7.593	0.136	3.3	99.52	0.26	0	0	0	0.22
2001	241	23	1035	356.477	-356.792	D	7.705	7.593	0.113	3.3	99.65	0.16	0	0	0	0.19
2001	242	23	949	365.722	-354.966	D	7.655	7.593	0.062	3.3	99.2	0.65	0	0	0	0.15
2001	243	23	949	365.722	-354.966	D	7.598	7.593	0.006	3.3	99.52	0.35	0	0	0	0.13
2001	244	23	1017	356.894	-355.206	D	7.682	7.637	0.045	3.396	98.59	1.15	0	0	0	0.25
2001	245	23	1017	356.894	-355.206	D	7.669	7.639	0.031	3.4	99.08	0.75	0	0	0	0.17
2001	246	23	1017	356.894	-355.206	D	7.651	7.639	0.012	3.4	99.73	0.13	0	0	0	0.15
2001	247	23	1008	358.048	-354.775	D	7.668	7.639	0.029	3.4	99.73	0.12	0	0	0	0.16
2001	248	23	967	363.478	-354.116	D	7.686	7.639	0.047	3.4	99.35	0.45	0	0	0	0.19
2001	249	23	966	363.538	-354.124	D	7.649	7.639	0.01	3.4	99.72	0.12	0	0	0	0.16
2001	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	253	23	907	365.051	-359.809	D	7.64	7.639	0.002	3.4	99.08	0.34	0	0	0	0.56
2001	254	23	962	363.961	-354.255	D	7.645	7.639	0.006	3.4	98.68	0.91	0	0	0	0.4
2001	255	23	949	365.722	-354.966	D	7.666	7.639	0.027	3.4	99	0.72	0	0	0	0.28
2001	256	23	949	365.722	-354.966	D	7.696	7.639	0.057	3.4	99.5	0.29	0	0	0	0.21
2001	257	23	1008	358.048	-354.775	D	7.707	7.639	0.068	3.4	99.22	0.58	0	0	0	0.2
2001	258	23	1037	356.5	-357.195	D	7.649	7.639	0.01	3.4	99.67	0.16	0	0	0	0.17
2001	259	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	99.26	0.52	0	0	0	0.15
2001	260	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	90.98	0.35	0	0	0	0.14
2001	261	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	76.64	2.64	0	0	0	0.15
2001	262	23	967	363.478	-354.116	D	7.814	7.639	0.175	3.4	93.61	6.22	0	0	0	0.18
2001	263	23	710	364.843	-359.589	D	7.639	7.639	0	3.4	97.22	0.1	0	0	0	0.16
2001	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	265	23	907	365.051	-359.809	D	7.683	7.639	0.044	3.4	93.49	5.59	0	0	0	0.93
2001	266	23	853	361.666	-362.175	D	7.678	7.639	0.039	3.4	98.5	1.2	0	0	0	0.3
2001	267	23	824	358.459	-361.601	D	7.687	7.639	0.048	3.4	77.72	21.13	0	0	0	1.15
2001	268	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	269	23	1017	356.894	-355.206	D	7.867	7.639	0.228	3.4	95.3	4.27	0	0	0	0.43
2001	270	23	947	365.801	-355.162	D	7.971	7.639	0.332	3.4	98.36	1.35	0	0	0	0.29
2001	271	23	853	361.666	-362.175	D	7.858	7.639	0.219	3.4	98.86	0.85	0	0	0	0.29
2001	272	23	822	358.021	-361.607	D	7.652	7.639	0.013	3.4	99.46	0.32	0	0	0	0.22
2001	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	274	23	1008	358.048	-354.775	D	7.513	7.505	0.007	3.112	98.64	1.11	0	0	0	0.27
2001	275	23	949	365.722	-354.966	D	7.503	7.5	0.004	3.1	99.1	0.72	0	0	0	0.18
2001	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	1035	356.477	-356.792	D	7.519	7.5	0.02	3.1	90.57	9.13	0	0	0	0.31
2001	279	23	931	366.183	-356.996	D	7.515	7.5	0.015	3.1	69.18	29.52	0	0	0	1.31
2001	280	23	930	366.19	-357.232	D	7.507	7.5	0.008	3.1	97.75	1.77	0	0	0	0.49
2001	281	23	941	365.977	-355.774	D	7.515	7.5	0.016	3.1	95.56	4.1	0	0	0	0.35
2001	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	7.511	7.5	0.011	3.1	90.52	9.03	0	0	0	0.45
2001	285	23	1017	356.894	-355.206	D	7.727	7.5	0.227	3.1	87.02	12.64	0	0	0	0.34
2001	286	23	1017	356.894	-355.206	D	7.514	7.5	0.015	3.1	97.31	2.44	0	0	0	0.25
2001	287	23	930	366.19	-357.232	D	7.516	7.5	0.016	3.1	93.82	6	0	0	0	0.19
2001	288	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	289	23	1039	356.522	-357.599	D	7.59	7.5	0.091	3.1	85.32	14.37	0	0	0	0.31
2001	290	23	932	366.176	-356.761	D	7.503	7.5	0.004	3.1	84.71	14.49	0	0	0	0.86
2001	291	23	930	366.19	-357.232	D	7.505	7.5	0.006	3.1	95.31	4.47	0	0	0	0.22
2001	292	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	293	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	298	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	23	990	360.933	-355.487	D	7.619	7.5	0.119	3.1	69.77	28.74	0	0	0	1.49
2001	301	23	1017	356.894	-355.206	D	7.575	7.5	0.075	3.1	86.6	12.79	0	0	0	0.61
2001	302	23	3	356.524	-356.959	D	7.5	7.5	0	3.1	91.75	1.63	0	0	0	0.16
2001	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	23	963	363.809	-354.192	D	7.566	7.5	0.066	3.1	86.19	13.47	0	0	0	0.34
2001	308	23	967	363.478	-354.116	D	7.521	7.5	0.022	3.1	97.4	2.33	0	0	0	0.27
2001	309	23	933	366.169	-356.524	D	7.913	7.5	0.413	3.1	92.38	7.28	0	0	0	0.35
2001	310	23	822	358.021	-361.607	D	7.705	7.5	0.206	3.1	96.52	3.24	0	0	0	0.25
2001	311	23	930	366.19	-357.232	D	7.588	7.5	0.089	3.1	98.51	1.29	0	0	0	0.2
2001	312	23	949	365.722	-354.966	D	7.535	7.5	0.035	3.1	96.5	2.63	0	0	0	0.87
2001	313	23	1039	356.522	-357.599	D	7.526	7.5	0.026	3.1	84.47	14.38	0	0	0	1.15
2001	314	23	907	365.051	-359.809	D	7.512	7.5	0.012	3.1	93.05	6.25	0	0	0	0.7
2001	315	23	963	363.809	-354.192	D	7.579	7.5	0.079	3.1	87.15	11.7	0	0	0	1.15

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	316	23	1039	356.522	-357.599	D	7.517	7.5	0.018	3.1	95.03	4.31	0	0	0	0.67
2001	317	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	98.05	1.05	0	0	0	0.41
2001	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	323	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	326	23	748	365.295	-358.57	D	7.5	7.5	0	3.1	89.38	7.37	0	0	0	0.62
2001	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	1039	356.522	-357.599	D	7.575	7.5	0.075	3.1	56.83	41.99	0	0	0	1.17
2001	333	23	1035	356.477	-356.792	D	7.5	7.5	0	3.1	77.15	22.43	0	0	0	0.41
2001	334	23	822	358.021	-361.607	D	7.65	7.5	0.151	3.1	79.39	19.99	0	0	0	0.62
2001	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	92.16	7.39	0	0	0	0.44
2001	342	23	986	360.908	-354.689	D	7.694	7.593	0.101	3.3	80.08	19.28	0	0	0	0.64
2001	343	23	931	366.183	-356.996	D	7.62	7.593	0.028	3.3	55.66	42.8	0	0	0	1.54
2001	344	23	930	366.19	-357.232	D	7.618	7.593	0.026	3.3	70.96	28.35	0	0	0	0.69
2001	345	23	931	366.183	-356.996	D	7.6	7.593	0.008	3.3	80.6	18.99	0	0	0	0.42
2001	346	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	347	23	949	365.722	-354.966	D	7.666	7.593	0.073	3.3	91.29	8.45	0	0	0	0.26
2001	348	23	933	366.169	-356.524	D	7.803	7.593	0.21	3.3	89.65	10.14	0	0	0	0.21
2001	349	23	933	366.169	-356.524	D	7.599	7.593	0.006	3.3	96.03	3.79	0	0	0	0.18
2001	350	23	949	365.722	-354.966	D	7.604	7.593	0.011	3.3	93.6	6.27	0	0	0	0.13
2001	351	23	986	360.908	-354.689	D	7.735	7.593	0.142	3.3	73.64	25.64	0	0	0	0.72
2001	352	23	191	359.732	-362.061	D	7.593	7.593	0	3.3	92.87	3.73	0	0	0	0.05
2001	353	23	949	365.722	-354.966	D	7.624	7.593	0.032	3.3	52.9	45.16	0	0	0	1.94
2001	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	929	366.032	-357.239	D	7.593	7.593	0	3.3	47.99	48.49	0	0	0	1.48
2001	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									1.277							
COLUMBIA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATE**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	2	23	932	366.176	-356.761	D	7.548	7.546	0.002	3.2	66.89	33.14	0	0	0	0
2001	3	23	930	366.19	-357.232	D	7.546	7.546	0	3.2	70.48	29.62	0	0	0	0
2001	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	7	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	9	23	931	366.183	-356.996	D	7.561	7.546	0.015	3.2	50.95	49.06	0	0	0	0
2001	10	23	933	366.169	-356.524	D	7.559	7.546	0.012	3.2	57.34	42.68	0	0	0	0
2001	11	23	643	363.609	-354.151	D	7.547	7.546	0.001	3.2	65.75	34.3	0	0	0	0
2001	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	81.68	29.76	0	0	0	0
2001	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	16	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	17	23	78	358.239	-356.385	D	7.735	7.546	0.189	3.2	51.43	48.57	0	0	0	0
2001	18	23	1017	356.894	-355.206	D	7.654	7.546	0.108	3.2	62.77	37.23	0	0	0	0
2001	19	23	907	365.051	-359.809	D	7.549	7.546	0.003	3.2	76.42	23.57	0	0	0	0
2001	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	21	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	24	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	25	23	927	365.912	-357.454	D	7.583	7.546	0.036	3.2	33.67	66.34	0	0	0	0
2001	26	23	1035	356.477	-356.792	D	7.55	7.546	0.003	3.2	49.6	50.4	0	0	0	0
2001	27	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	28	23	930	366.19	-357.232	D	7.554	7.546	0.008	3.2	59.52	40.51	0	0	0	0
2001	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2001	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	37	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	38	23	966	363.538	-354.124	D	7.406	7.406	0.001	2.9	66.06	34.17	0	0	0	0
2001	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	40	23	967	363.478	-354.116	D	7.407	7.406	0.001	2.9	72.16	27.93	0	0	0	0
2001	41	23	784	365.648	-355.309	D	7.406	7.406	0	2.9	55.28	44.59	0	0	0	0
2001	42	23	955	364.92	-354.582	D	7.421	7.406	0.015	2.9	54.48	45.54	0	0	0	0
2001	43	23	1008	358.048	-354.775	D	7.406	7.406	0	2.9	65.35	34.58	0	0	0	0
2001	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	45	23	967	363.478	-354.116	D	7.416	7.406	0.01	2.9	77.28	22.72	0	0	0	0
2001	46	23	947	365.801	-355.162	D	7.571	7.406	0.165	2.9	81.48	18.52	0	0	0	0
2001	47	23	907	365.051	-359.809	D	7.413	7.406	0.007	2.9	85.07	14.97	0	0	0	0
2001	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	49	23	930	366.19	-357.232	D	7.406	7.406	0.001	2.9	75.76	24.39	0	0	0	0
2001	50	23	930	366.19	-357.232	D	7.406	7.406	0.001	2.9	77.05	23.12	0	0	0	0
2001	51	23	1017	356.894	-355.206	D	7.406	7.406	0	2.9	89.39	11.24	0	0	0	0
2001	52	23	1038	356.511	-357.396	D	7.408	7.406	0.002	2.9	73.8	26.32	0	0	0	0
2001	53	23	1017	356.894	-355.206	D	7.412	7.406	0.006	2.9	74.32	25.72	0	0	0	0
2001	54	23	955	364.92	-354.582	D	7.422	7.406	0.017	2.9	66.86	33.16	0	0	0	0
2001	55	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	57	23	930	366.19	-357.232	D	7.406	7.406	0	2.9	88.01	12.06	0	0	0	0
2001	58	23	907	365.051	-359.809	D	7.413	7.406	0.007	2.9	75.56	24.49	0	0	0	0
2001	59	23	1035	356.477	-356.792	D	7.409	7.406	0.003	2.9	75.5	24.58	0	0	0	0
2001	60	23	1017	356.894	-355.206	D	7.316	7.315	0.002	2.708	81.84	18.26	0	0	0	0
2001	61	23	949	365.722	-354.966	D	7.316	7.311	0.005	2.7	81.48	18.54	0	0	0	0
2001	62	23	407	361.716	-361.973	D	7.311	7.311	0	2.7	92.71	8.05	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	63	23	78	358.239	-356.385	D	7.423	7.311	0.113	2.7	56.67	43.33	0	0	0	0
2001	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	68	23	930	366.19	-357.232	D	7.32	7.311	0.009	2.7	50.72	49.3	0	0	0	0
2001	69	23	930	366.19	-357.232	D	7.315	7.311	0.004	2.7	75.37	24.66	0	0	0	0
2001	70	23	949	365.722	-354.966	D	7.312	7.311	0.001	2.7	85.2	14.83	0	0	0	0
2001	71	23	948	365.727	-355.056	D	7.311	7.311	0	2.7	87.19	9.56	0	0	0	0
2001	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	83.69	19.99	0	0	0	0
2001	75	23	967	363.478	-354.116	D	7.436	7.311	0.125	2.7	82.72	17.28	0	0	0	0
2001	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	77	23	930	366.19	-357.232	D	7.34	7.311	0.029	2.7	59.83	40.18	0	0	0	0
2001	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	80.85	19.94	0	0	0	0
2001	79	23	1035	356.477	-356.792	D	7.313	7.311	0.003	2.7	70.1	29.96	0	0	0	0
2001	80	23	1038	356.511	-357.396	D	7.342	7.311	0.032	2.7	66.13	33.88	0	0	0	0
2001	81	23	930	366.19	-357.232	D	7.332	7.311	0.021	2.7	89.5	10.51	0	0	0	0
2001	82	23	930	366.19	-357.232	D	7.329	7.311	0.018	2.7	90.13	9.88	0	0	0	0
2001	83	23	1017	356.894	-355.206	D	7.349	7.311	0.039	2.7	68.84	31.16	0	0	0	0
2001	84	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	85	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	86	23	853	361.666	-362.175	D	7.311	7.311	0	2.7	89.49	6.85	0	0	0	0
2001	87	23	930	366.19	-357.232	D	7.319	7.311	0.009	2.7	80.16	19.85	0	0	0	0
2001	88	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	89	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	90	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	105	23	949	365.722	-354.966	D	7.316	7.311	0.005	2.7	96.28	3.78	0	0	0	0
2001	106	23	929	366.032	-357.239	D	7.311	7.311	0	2.7	96.05	1.62	0	0	0	0
2001	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	115	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	116	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	119	23	784	365.648	-355.309	D	7.311	7.311	0	2.7	63.02	0.94	0	0	0	0
2001	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2001	122	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	129	23	907	365.051	-359.809	D	7.593	7.593	0	3.3	98.67	1.38	0	0	0	0
2001	130	23	907	365.051	-359.809	D	7.593	7.593	0	3.3	99.61	0.44	0	0	0	0
2001	131	23	634	363.707	-356.393	D	7.593	7.593	0	3.3	69.66	0.05	0	0	0	0
2001	132	23	1017	356.894	-355.206	D	7.621	7.593	0.028	3.3	83.47	16.54	0	0	0	0
2001	133	23	961	364.092	-354.289	D	7.688	7.593	0.096	3.3	98.24	1.76	0	0	0	0
2001	134	23	933	366.169	-356.524	D	7.596	7.593	0.004	3.3	99.65	0.36	0	0	0	0
2001	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	138	23	1017	356.894	-355.206	D	7.607	7.593	0.015	3.3	87.37	12.63	0	0	0	0
2001	139	23	949	365.722	-354.966	D	7.721	7.593	0.128	3.3	86.26	13.74	0	0	0	0
2001	140	23	955	364.92	-354.582	D	7.614	7.593	0.022	3.3	99.35	0.66	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	141	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	148	23	730	364.623	-354.605	D	7.593	7.593	0	3.3	97.39	0.22	0	0	0	0
2001	149	23	930	366.19	-357.232	D	7.612	7.593	0.019	3.3	99.03	0.98	0	0	0	0
2001	150	23	949	365.722	-354.966	D	7.596	7.593	0.004	3.3	99.29	0.75	0	0	0	0
2001	151	23	1017	356.894	-355.206	D	7.627	7.593	0.034	3.3	97.99	2.01	0	0	0	0
2001	152	23	907	365.051	-359.809	D	7.599	7.593	0.007	3.3	98.88	1.13	0	0	0	0
2001	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	158	23	949	365.722	-354.966	D	7.633	7.593	0.041	3.3	99.76	0.25	0	0	0	0
2001	159	23	1017	356.894	-355.206	D	7.755	7.593	0.162	3.3	98.25	1.75	0	0	0	0
2001	160	23	1017	356.894	-355.206	D	7.656	7.593	0.063	3.3	99.16	0.84	0	0	0	0
2001	161	23	1017	356.894	-355.206	D	7.639	7.593	0.046	3.3	99.63	0.37	0	0	0	0
2001	162	23	949	365.722	-354.966	D	7.596	7.593	0.004	3.3	99.93	0.12	0	0	0	0
2001	163	23	709	364.375	-354.616	D	7.593	7.593	0	3.3	98.4	0.04	0	0	0	0
2001	164	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	168	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	169	23	933	366.169	-356.524	D	7.594	7.593	0.002	3.3	99.9	0.08	0	0	0	0
2001	170	23	642	363.62	-354.4	D	7.593	7.593	0	3.3	98.43	0.05	0	0	0	0
2001	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	172	23	961	364.092	-354.289	D	7.649	7.593	0.056	3.3	97.67	2.33	0	0	0	0
2001	173	23	907	365.051	-359.809	D	7.594	7.593	0.001	3.3	99.31	0.7	0	0	0	0
2001	174	23	949	365.722	-354.966	D	7.596	7.593	0.003	3.3	99.73	0.28	0	0	0	0
2001	175	23	933	366.169	-356.524	D	7.608	7.593	0.015	3.3	99.56	0.45	0	0	0	0
2001	176	23	947	365.801	-355.162	D	7.614	7.593	0.021	3.3	99.67	0.33	0	0	0	0
2001	177	23	643	363.609	-354.151	D	7.608	7.593	0.015	3.3	99.74	0.26	0	0	0	0
2001	178	23	1009	357.941	-354.82	D	7.599	7.593	0.006	3.3	99.76	0.23	0	0	0	0
2001	179	23	643	363.609	-354.151	D	7.596	7.593	0.003	3.3	99.31	0.69	0	0	0	0

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	180	23	61	357.936	-355.15	D	7.593	7.593	0	3.3	99.8	0.16	0	0	0	0
2001	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	182	23	1017	356.894	-355.206	D	7.649	7.593	0.056	3.3	98.25	1.75	0	0	0	0
2001	183	23	964	363.678	-354.148	D	7.802	7.593	0.209	3.3	96.17	3.83	0	0	0	0
2001	184	23	966	363.538	-354.124	D	7.61	7.593	0.017	3.3	99.81	0.2	0	0	0	0
2001	185	23	783	365.659	-355.558	D	7.593	7.593	0	3.3	98.87	0.06	0	0	0	0
2001	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	187	23	949	365.722	-354.966	D	7.678	7.593	0.085	3.3	99.7	0.3	0	0	0	0
2001	188	23	941	365.977	-355.774	D	7.597	7.593	0.004	3.3	99.91	0.11	0	0	0	0
2001	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	784	365.648	-355.309	D	7.593	7.593	0	3.3	97.78	0.17	0	0	0	0
2001	192	23	930	366.19	-357.232	D	7.656	7.593	0.063	3.3	99.14	0.86	0	0	0	0
2001	193	23	907	365.051	-359.809	D	7.665	7.593	0.072	3.3	99.38	0.62	0	0	0	0
2001	194	23	907	365.051	-359.809	D	7.655	7.593	0.063	3.3	98.52	1.48	0	0	0	0
2001	195	23	822	358.021	-361.607	D	7.595	7.593	0.002	3.3	99.98	0.06	0	0	0	0
2001	196	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	774	365.389	-355.071	D	7.593	7.593	0	3.3	99.12	0.07	0	0	0	0
2001	202	23	932	366.176	-356.761	D	7.6	7.593	0.007	3.3	99.42	0.58	0	0	0	0
2001	203	23	930	366.19	-357.232	D	7.613	7.593	0.02	3.3	99.71	0.3	0	0	0	0
2001	204	23	930	366.19	-357.232	D	7.606	7.593	0.014	3.3	99.68	0.33	0	0	0	0
2001	205	23	930	366.19	-357.232	D	7.599	7.593	0.006	3.3	99.88	0.13	0	0	0	0
2001	206	23	948	365.727	-355.056	D	7.596	7.593	0.004	3.3	99.59	0.41	0	0	0	0
2001	207	23	949	365.722	-354.966	D	7.599	7.593	0.006	3.3	99.73	0.29	0	0	0	0
2001	208	23	949	365.722	-354.966	D	7.703	7.593	0.11	3.3	97.98	2.02	0	0	0	0
2001	209	23	933	366.169	-356.524	D	7.644	7.593	0.051	3.3	97.9	2.11	0	0	0	0
2001	210	23	949	365.722	-354.966	D	7.601	7.593	0.008	3.3	99.49	0.52	0	0	0	0
2001	211	23	949	365.722	-354.966	D	7.608	7.593	0.015	3.3	99.82	0.19	0	0	0	0
2001	212	23	949	365.722	-354.966	D	7.613	7.593	0.02	3.3	99.93	0.07	0	0	0	0
2001	213	23	949	365.722	-354.966	D	7.597	7.593	0.004	3.3	99.88	0.13	0	0	0	0
2001	214	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	100.02	0.08	0	0	0	0
2001	215	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	85.61	0.02	0	0	0	0
2001	216	23	949	365.722	-354.966	D	7.622	7.593	0.03	3.3	98.73	1.28	0	0	0	0
2001	217	23	1036	356.488	-356.993	D	7.596	7.593	0.003	3.3	99.74	0.24	0	0	0	0
2001	218	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	97.67	0.02	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	219	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	222	23	949	365.722	-354.966	D	7.614	7.593	0.021	3.3	99.51	0.49	0	0	0	0
2001	223	23	949	365.722	-354.966	D	7.829	7.593	0.236	3.3	97.52	2.48	0	0	0	0
2001	224	23	822	358.021	-361.607	D	7.784	7.593	0.191	3.3	99.39	0.62	0	0	0	0
2001	225	23	1017	356.894	-355.206	D	7.686	7.593	0.094	3.3	98.82	1.18	0	0	0	0
2001	226	23	907	365.051	-359.809	D	7.692	7.593	0.099	3.3	98.29	1.71	0	0	0	0
2001	227	23	1017	356.894	-355.206	D	7.615	7.593	0.022	3.3	99.57	0.44	0	0	0	0
2001	228	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	99.79	0.09	0	0	0	0
2001	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	232	23	947	365.801	-355.162	D	7.594	7.593	0.002	3.3	98.49	1.57	0	0	0	0
2001	233	23	933	366.169	-356.524	D	7.594	7.593	0.001	3.3	99.82	0.17	0	0	0	0
2001	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	235	23	191	359.732	-362.061	D	7.593	7.593	0	3.3	98.43	0.1	0	0	0	0
2001	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	238	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	239	23	955	364.92	-354.582	D	7.735	7.593	0.142	3.3	97.93	2.07	0	0	0	0
2001	240	23	907	365.051	-359.809	D	7.742	7.593	0.15	3.3	99.54	0.46	0	0	0	0
2001	241	23	822	358.021	-361.607	D	7.662	7.593	0.07	3.3	99.68	0.32	0	0	0	0
2001	242	23	1017	356.894	-355.206	D	7.63	7.593	0.037	3.3	99.17	0.83	0	0	0	0
2001	243	23	949	365.722	-354.966	D	7.596	7.593	0.003	3.3	99.29	0.71	0	0	0	0
2001	244	23	966	363.538	-354.124	D	7.686	7.637	0.049	3.396	98.14	1.86	0	0	0	0
2001	245	23	1035	356.477	-356.792	D	7.674	7.639	0.035	3.4	98.3	1.7	0	0	0	0
2001	246	23	1017	356.894	-355.206	D	7.645	7.639	0.006	3.4	99.77	0.24	0	0	0	0
2001	247	23	967	363.478	-354.116	D	7.664	7.639	0.025	3.4	99.8	0.2	0	0	0	0
2001	248	23	967	363.478	-354.116	D	7.674	7.639	0.035	3.4	99.2	0.8	0	0	0	0
2001	249	23	964	363.678	-354.148	D	7.645	7.639	0.006	3.4	99.8	0.2	0	0	0	0
2001	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	254	23	949	365.722	-354.966	D	7.647	7.639	0.008	3.4	97.37	2.64	0	0	0	0
2001	255	23	2	356.535	-357.209	D	7.64	7.639	0.001	3.4	99.44	0.67	0	0	0	0
2001	256	23	643	363.609	-354.151	D	7.64	7.639	0.001	3.4	99.75	0.3	0	0	0	0
2001	257	23	965	363.588	-354.142	D	7.673	7.639	0.034	3.4	98.23	1.78	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	258	23	1035	356.477	-356.792	D	7.644	7.639	0.005	3.4	99.78	0.22	0	0	0	0
2001	259	23	10	356.954	-355.443	D	7.639	7.639	0	3.4	99.64	1.16	0	0	0	0
2001	260	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	261	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	262	23	949	365.722	-354.966	D	7.647	7.639	0.009	3.4	90.95	9.07	0	0	0	0
2001	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	265	23	930	366.19	-357.232	D	7.644	7.639	0.005	3.4	98.16	1.87	0	0	0	0
2001	266	23	907	365.051	-359.809	D	7.644	7.639	0.005	3.4	98.13	1.88	0	0	0	0
2001	267	23	930	366.19	-357.232	D	7.676	7.639	0.037	3.4	78.88	21.12	0	0	0	0
2001	268	23	930	366.19	-357.232	D	7.655	7.639	0.017	3.4	80.93	19.07	0	0	0	0
2001	269	23	907	365.051	-359.809	D	7.719	7.639	0.081	3.4	90.04	9.96	0	0	0	0
2001	270	23	853	361.666	-362.175	D	7.692	7.639	0.054	3.4	97.76	2.24	0	0	0	0
2001	271	23	822	358.021	-361.607	D	7.681	7.639	0.043	3.4	98.32	1.69	0	0	0	0
2001	272	23	822	358.021	-361.607	D	7.64	7.639	0.001	3.4	99.62	0.48	0	0	0	0
2001	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	274	23	1008	358.048	-354.775	D	7.522	7.505	0.017	3.112	97.22	2.78	0	0	0	0
2001	275	23	949	365.722	-354.966	D	7.508	7.5	0.008	3.1	98.81	1.19	0	0	0	0
2001	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	278	23	930	366.19	-357.232	D	7.555	7.5	0.055	3.1	80.87	19.13	0	0	0	0
2001	279	23	930	366.19	-357.232	D	7.501	7.5	0.001	3.1	70.29	29.78	0	0	0	0
2001	280	23	907	365.051	-359.809	D	7.501	7.5	0.002	3.1	97.84	2.26	0	0	0	0
2001	281	23	930	366.19	-357.232	D	7.513	7.5	0.013	3.1	92.39	7.63	0	0	0	0
2001	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	1017	356.894	-355.206	D	7.501	7.5	0.002	3.1	81.8	18.28	0	0	0	0
2001	285	23	1008	358.048	-354.775	D	7.592	7.5	0.093	3.1	78.17	21.83	0	0	0	0
2001	286	23	1017	356.894	-355.206	D	7.513	7.5	0.013	3.1	97.32	2.69	0	0	0	0
2001	287	23	907	365.051	-359.809	D	7.513	7.5	0.014	3.1	93.44	6.57	0	0	0	0
2001	288	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	289	23	947	365.801	-355.162	D	7.5	7.5	0	3.1	70.46	29.89	0	0	0	0
2001	290	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	291	23	930	366.19	-357.232	D	7.501	7.5	0.001	3.1	88.92	11.18	0	0	0	0
2001	292	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	293	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	297	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	298	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	301	23	933	366.169	-356.524	D	7.518	7.5	0.019	3.1	78.92	21.09	0	0	0	0
2001	302	23	643	363.609	-354.151	D	7.5	7.5	0	3.1	96.12	3.82	0	0	0	0
2001	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	23	853	361.666	-362.175	D	7.54	7.5	0.04	3.1	86.92	13.08	0	0	0	0
2001	308	23	1035	356.477	-356.792	D	7.513	7.5	0.013	3.1	96.49	3.52	0	0	0	0
2001	309	23	930	366.19	-357.232	D	7.556	7.5	0.057	3.1	81.98	18.02	0	0	0	0
2001	310	23	832	359.493	-362.061	D	7.549	7.5	0.049	3.1	92.3	7.7	0	0	0	0
2001	311	23	930	366.19	-357.232	D	7.531	7.5	0.031	3.1	96.95	3.05	0	0	0	0
2001	312	23	947	365.801	-355.162	D	7.502	7.5	0.002	3.1	98.91	1.12	0	0	0	0
2001	313	23	927	365.912	-357.454	D	7.543	7.5	0.044	3.1	49.66	50.34	0	0	0	0
2001	314	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	89.61	10.17	0	0	0	0
2001	315	23	949	365.722	-354.966	D	7.52	7.5	0.021	3.1	78.69	21.32	0	0	0	0
2001	316	23	1039	356.522	-357.599	D	7.505	7.5	0.006	3.1	89.04	11.01	0	0	0	0
2001	317	23	10	356.954	-355.443	D	7.5	7.5	0	3.1	93.88	2.66	0	0	0	0
2001	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	323	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	930	366.19	-357.232	D	7.564	7.5	0.065	3.1	54.99	45.01	0	0	0	0
2001	333	23	1035	356.477	-356.792	D	7.583	7.5	0.084	3.1	64.65	35.36	0	0	0	0
2001	334	23	822	358.021	-361.607	D	7.615	7.5	0.115	3.1	75.28	24.72	0	0	0	0
2001	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	747	364.871	-354.594	D	7.593	7.593	0	3.3	85.97	12.58	0	0	0	0
2001	342	23	773	365.4	-355.32	D	7.657	7.593	0.064	3.3	69.96	30.04	0	0	0	0
2001	343	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	59.32	40.7	0	0	0	0
2001	344	23	930	366.19	-357.232	D	7.604	7.593	0.011	3.3	55.7	44.3	0	0	0	0
2001	345	23	930	366.19	-357.232	D	7.597	7.593	0.004	3.3	71.27	28.75	0	0	0	0
2001	346	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	81.72	20.7	0	0	0	0
2001	347	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	23	933	366.169	-356.524	D	7.601	7.593	0.008	3.3	83.15	16.85	0	0	0	0
2001	349	23	930	366.19	-357.232	D	7.593	7.593	0.001	3.3	96.31	3.84	0	0	0	0
2001	350	23	947	365.801	-355.162	D	7.595	7.593	0.003	3.3	88.3	11.71	0	0	0	0
2001	351	23	930	366.19	-357.232	D	7.661	7.593	0.068	3.3	61.28	38.72	0	0	0	0
2001	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	66.6	3.53	0	0	0	0
2001	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.236							
HOLCIM									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATE**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	2	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	3	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	7	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	10	23	930	366.19	-357.232	D	7.553	7.546	0.007	3.2	39.73	60.12	0	0	0	0.17
2001	11	23	947	365.801	-355.162	D	7.546	7.546	0	3.2	54.59	45.33	0	0	0	0.14
2001	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	16	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	17	23	933	366.169	-356.524	D	7.665	7.546	0.119	3.2	43.69	56.03	0	0	0	0.28
2001	18	23	907	365.051	-359.809	D	8.392	7.546	**0.845**	3.2	41.9	57.87	0	0	0	0.23
2001	19	23	907	365.051	-359.809	D	7.548	7.546	0.002	3.2	57.06	42.73	0	0	0	0.21
2001	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	21	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	24	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	25	23	930	366.19	-357.232	D	7.552	7.546	0.005	3.2	33.04	66.72	0	0	0	0.26
2001	26	23	930	366.19	-357.232	D	7.58	7.546	0.034	3.2	33.06	66.81	0	0	0	0.13
2001	27	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	28	23	947	365.801	-355.162	D	7.547	7.546	0.001	3.2	50.32	49.58	0	0	0	0.22
2001	29	23	746	364.882	-354.843	D	7.546	7.546	0	3.2	51.33	46.76	0	0	0	0.13
2001	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2001	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	37	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	38	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	42	23	949	365.722	-354.966	D	7.496	7.406	0.09	2.9	39.68	60.11	0	0	0	0.21
2001	43	23	1017	356.894	-355.206	D	7.408	7.406	0.003	2.9	50.5	49.37	0	0	0	0.15

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	46	23	907	365.051	-359.809	D	7.412	7.406	0.007	2.9	66.52	33.37	0	0	0	0.13
2001	47	23	907	365.051	-359.809	D	7.409	7.406	0.004	2.9	68.22	31.7	0	0	0	0.09
2001	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	49	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	50	23	930	366.19	-357.232	D	7.406	7.406	0	2.9	63.07	37.33	0	0	0	0.23
2001	51	23	955	364.92	-354.582	D	7.406	7.406	0.001	2.9	67.59	31.88	0	0	0	0.53
2001	52	23	1017	356.894	-355.206	D	8.159	7.406	**0.754**	2.9	42.98	56.73	0	0	0	0.29
2001	53	23	822	358.021	-361.607	D	7.417	7.406	0.011	2.9	53.41	46.5	0	0	0	0.12
2001	54	23	949	365.722	-354.966	D	7.407	7.406	0.002	2.9	61.9	38.04	0	0	0	0.18
2001	55	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	57	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	58	23	941	365.977	-355.774	D	7.429	7.406	0.023	2.9	58.6	41.18	0	0	0	0.24
2001	59	23	1017	356.894	-355.206	D	7.473	7.406	0.068	2.9	57.15	42.73	0	0	0	0.13
2001	60	23	643	363.609	-354.151	D	7.315	7.315	0	2.708	48.16	51.55	0	0	0	0.29
2001	61	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	62	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	63	23	931	366.183	-356.996	D	7.86	7.311	**0.549**	2.7	47.87	51.86	0	0	0	0.27
2001	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	69	23	907	365.051	-359.809	D	7.314	7.311	0.003	2.7	74.47	25.27	0	0	0	0.34
2001	70	23	933	366.169	-356.524	D	7.313	7.311	0.002	2.7	74.9	24.91	0	0	0	0.22
2001	71	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	75	23	822	358.021	-361.607	D	7.526	7.311	0.216	2.7	67.92	31.9	0	0	0	0.18
2001	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	77	23	930	366.19	-357.232	D	7.371	7.311	0.061	2.7	49.37	50.22	0	0	0	0.41
2001	78	23	1039	356.522	-357.599	D	7.338	7.311	0.027	2.7	57.21	42.5	0	0	0	0.29
2001	79	23	1017	356.894	-355.206	D	7.385	7.311	0.074	2.7	74.05	25.53	0	0	0	0.42
2001	80	23	907	365.051	-359.809	D	7.666	7.311	0.355	2.7	60.18	39.46	0	0	0	0.36
2001	81	23	949	365.722	-354.966	D	7.462	7.311	0.152	2.7	80.37	19.33	0	0	0	0.3
2001	82	23	947	365.801	-355.162	D	7.503	7.311	0.193	2.7	81.49	18.25	0	0	0	0.26

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	83	23	930	366.19	-357.232	D	7.55	7.311	0.239	2.7	85.68	14.17	0	0	0	0.15
2001	84	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	85	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	86	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	87	23	933	366.169	-356.524	D	7.311	7.311	0	2.7	77.81	22.36	0	0	0	0.26
2001	88	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	89	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	90	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	96	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	113	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	115	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	116	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	119	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	122	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	123	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	124	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	130	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	99.02	0.48	0	0	0	0.16
2001	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	138	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	139	23	947	365.801	-355.162	D	7.601	7.593	0.008	3.3	74.15	25.75	0	0	0	0.12
2001	140	23	933	366.169	-356.524	D	7.594	7.593	0.002	3.3	96.95	2.84	0	0	0	0.23
2001	141	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	149	23	930	366.19	-357.232	D	7.593	7.593	0.001	3.3	98.53	1.39	0	0	0	0.2
2001	150	23	933	366.169	-356.524	D	7.595	7.593	0.002	3.3	97.01	2.92	0	0	0	0.14
2001	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	158	23	949	365.722	-354.966	D	7.595	7.593	0.003	3.3	99.38	0.38	0	0	0	0.23
2001	159	23	907	365.051	-359.809	D	8.004	7.593	0.411	3.3	97.59	2.23	0	0	0	0.18
2001	160	23	947	365.801	-355.162	D	7.7	7.593	0.107	3.3	97.55	2.25	0	0	0	0.21

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	161	23	933	366.169	-356.524	D	7.688	7.593	0.096	3.3	98.9	0.97	0	0	0	0.13
2001	162	23	947	365.801	-355.162	D	7.597	7.593	0.004	3.3	99.65	0.27	0	0	0	0.1
2001	163	23	789	365.918	-355.796	D	7.593	7.593	0.001	3.3	99.79	0.17	0	0	0	0.1
2001	164	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	99.85	0.26	0	0	0	0.09
2001	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	168	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	169	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	99.74	0.14	0	0	0	0.17
2001	170	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	99.38	0.17	0	0	0	0.14
2001	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	172	23	949	365.722	-354.966	D	7.611	7.593	0.019	3.3	97.43	2.44	0	0	0	0.13
2001	173	23	907	365.051	-359.809	D	7.595	7.593	0.002	3.3	98.04	1.85	0	0	0	0.11
2001	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	175	23	932	366.176	-356.761	D	7.596	7.593	0.003	3.3	99.58	0.25	0	0	0	0.19
2001	176	23	930	366.19	-357.232	D	7.67	7.593	0.077	3.3	99.3	0.55	0	0	0	0.15
2001	177	23	947	365.801	-355.162	D	7.697	7.593	0.105	3.3	99.34	0.53	0	0	0	0.13
2001	178	23	1008	358.048	-354.775	D	7.653	7.593	0.06	3.3	99.35	0.54	0	0	0	0.11
2001	179	23	964	363.678	-354.148	D	7.62	7.593	0.027	3.3	98.46	1.44	0	0	0	0.1
2001	180	23	967	363.478	-354.116	D	7.595	7.593	0.002	3.3	99.74	0.18	0	0	0	0.1
2001	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	183	23	949	365.722	-354.966	D	7.86	7.593	0.267	3.3	90.51	9.35	0	0	0	0.14
2001	184	23	949	365.722	-354.966	D	7.745	7.593	0.153	3.3	99.19	0.7	0	0	0	0.11
2001	185	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	99.66	0.13	0	0	0	0.09
2001	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	187	23	930	366.19	-357.232	D	7.604	7.593	0.012	3.3	99.58	0.25	0	0	0	0.18
2001	188	23	930	366.19	-357.232	D	7.601	7.593	0.009	3.3	99.67	0.19	0	0	0	0.14
2001	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	192	23	947	365.801	-355.162	D	7.679	7.593	0.087	3.3	99.46	0.19	0	0	0	0.35
2001	193	23	941	365.977	-355.774	D	7.789	7.593	0.197	3.3	98.93	0.84	0	0	0	0.23
2001	194	23	949	365.722	-354.966	D	7.671	7.593	0.079	3.3	97.77	2.12	0	0	0	0.12
2001	195	23	822	358.021	-361.607	D	7.596	7.593	0.003	3.3	99.73	0.15	0	0	0	0.1
2001	196	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	201	23	774	365.389	-355.071	D	7.593	7.593	0	3.3	98.54	0.31	0	0	0	0.09
2001	202	23	930	366.19	-357.232	D	7.596	7.593	0.003	3.3	96.26	3.65	0	0	0	0.08
2001	203	23	941	365.977	-355.774	D	7.595	7.593	0.003	3.3	99.45	0.5	0	0	0	0.08
2001	204	23	947	365.801	-355.162	D	7.594	7.593	0.001	3.3	98.67	1.21	0	0	0	0.07
2001	205	23	729	364.634	-354.854	D	7.593	7.593	0	3.3	99.33	0.26	0	0	0	0.07
2001	206	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	207	23	949	365.722	-354.966	D	7.594	7.593	0.002	3.3	98.31	1.49	0	0	0	0.17
2001	208	23	949	365.722	-354.966	D	7.8	7.593	0.208	3.3	94.59	5.31	0	0	0	0.1
2001	209	23	933	366.169	-356.524	D	7.706	7.593	0.114	3.3	95.25	4.67	0	0	0	0.08
2001	210	23	947	365.801	-355.162	D	7.595	7.593	0.002	3.3	98.3	1.62	0	0	0	0.08
2001	211	23	930	366.19	-357.232	D	7.599	7.593	0.006	3.3	99.35	0.63	0	0	0	0.07
2001	212	23	947	365.801	-355.162	D	7.644	7.593	0.052	3.3	99.75	0.16	0	0	0	0.09
2001	213	23	949	365.722	-354.966	D	7.628	7.593	0.036	3.3	99.5	0.41	0	0	0	0.08
2001	214	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	99.72	0.16	0	0	0	0.08
2001	215	23	729	364.634	-354.854	D	7.593	7.593	0	3.3	95.87	0.06	0	0	0	0.07
2001	216	23	949	365.722	-354.966	D	7.69	7.593	0.097	3.3	99.2	0.56	0	0	0	0.25
2001	217	23	1035	356.477	-356.792	D	7.648	7.593	0.055	3.3	99.26	0.55	0	0	0	0.19
2001	218	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	99.75	0.05	0	0	0	0.15
2001	219	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	223	23	941	365.977	-355.774	D	7.922	7.593	0.329	3.3	98.03	1.77	0	0	0	0.2
2001	224	23	930	366.19	-357.232	D	8.126	7.593	**0.533**	3.3	94.22	5.56	0	0	0	0.21
2001	225	23	930	366.19	-357.232	D	8.288	7.593	**0.696**	3.3	96.74	3.09	0	0	0	0.17
2001	226	23	853	361.666	-362.175	D	7.628	7.593	0.035	3.3	98.34	1.28	0	0	0	0.38
2001	227	23	822	358.021	-361.607	D	7.624	7.593	0.031	3.3	98.4	1.39	0	0	0	0.22
2001	228	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	99.49	0.24	0	0	0	0.13
2001	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	232	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	237	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	238	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	239	23	947	365.801	-355.162	D	7.593	7.593	0	3.3	99.3	0.52	0	0	0	0.23
2001	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	242	23	767	365.466	-356.815	D	7.593	7.593	0	3.3	97.1	1.46	0	0	0	0.09
2001	243	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	244	23	955	364.92	-354.582	D	8.004	7.637	0.367	3.396	96.65	3.14	0	0	0	0.21
2001	245	23	1017	356.894	-355.206	D	8.068	7.639	0.429	3.4	96.15	3.73	0	0	0	0.12
2001	246	23	1017	356.894	-355.206	D	7.703	7.639	0.065	3.4	99.37	0.52	0	0	0	0.11
2001	247	23	967	363.478	-354.116	D	7.685	7.639	0.046	3.4	99.66	0.25	0	0	0	0.09
2001	248	23	949	365.722	-354.966	D	7.682	7.639	0.043	3.4	98.67	1.23	0	0	0	0.1
2001	249	23	955	364.92	-354.582	D	7.658	7.639	0.019	3.4	99.02	0.86	0	0	0	0.12
2001	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	254	23	930	366.19	-357.232	D	7.683	7.639	0.044	3.4	97.5	2.28	0	0	0	0.21
2001	255	23	933	366.169	-356.524	D	8.09	7.639	0.451	3.4	97.31	2.53	0	0	0	0.16
2001	256	23	853	361.666	-362.175	D	8.059	7.639	0.42	3.4	98.63	1.24	0	0	0	0.13
2001	257	23	967	363.478	-354.116	D	8.676	7.639	**1.037**	3.4	90.7	9.13	0	0	0	0.17
2001	258	23	822	358.021	-361.607	D	7.641	7.639	0.002	3.4	99.66	0.19	0	0	0	0.11
2001	259	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	260	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	261	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	265	23	947	365.801	-355.162	D	7.639	7.639	0	3.4	96.06	0.82	0	0	0	0.3
2001	266	23	933	366.169	-356.524	D	7.64	7.639	0.001	3.4	97.22	2.53	0	0	0	0.25
2001	267	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	268	23	907	365.051	-359.809	D	7.702	7.639	0.063	3.4	40.5	58.86	0	0	0	0.63
2001	269	23	907	365.051	-359.809	D	7.639	7.639	0	3.4	93.22	6.29	0	0	0	0.36
2001	270	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	271	23	963	363.809	-354.192	D	7.892	7.639	0.253	3.4	92.64	6.97	0	0	0	0.39
2001	272	23	822	358.021	-361.607	D	7.648	7.639	0.009	3.4	96.8	2.96	0	0	0	0.23
2001	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	274	23	963	363.809	-354.192	D	7.507	7.505	0.001	3.112	94.11	5.81	0	0	0	0.17
2001	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	278	23	811	357.434	-360.225	D	7.932	7.5	0.433	3.1	57.46	42.37	0	0	0	0.17
2001	279	23	905	364.788	-359.816	D	7.5	7.5	0	3.1	81.65	19.19	0	0	0	0.07
2001	280	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	95.07	5	0	0	0	0.32
2001	281	23	931	366.183	-356.996	D	7.519	7.5	0.019	3.1	81.05	18.75	0	0	0	0.2
2001	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	285	23	1010	357.824	-354.865	D	7.514	7.5	0.014	3.1	68.75	31.1	0	0	0	0.16
2001	286	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	287	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	288	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	289	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	290	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	291	23	763	365.51	-357.811	D	7.5	7.5	0	3.1	64.95	32.06	0	0	0	0.22
2001	292	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	293	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	295	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	296	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	297	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	298	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	299	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	300	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	301	23	930	366.19	-357.232	D	7.507	7.5	0.008	3.1	85.36	14.41	0	0	0	0.25
2001	302	23	947	365.801	-355.162	D	7.505	7.5	0.006	3.1	82.74	17.11	0	0	0	0.15
2001	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	307	23	931	366.183	-356.996	D	7.732	7.5	0.232	3.1	77.58	22.25	0	0	0	0.17
2001	308	23	1017	356.894	-355.206	D	7.563	7.5	0.064	3.1	94.92	4.95	0	0	0	0.14
2001	309	23	933	366.169	-356.524	D	7.606	7.5	0.106	3.1	87.48	12.23	0	0	0	0.28
2001	310	23	933	366.169	-356.524	D	7.654	7.5	0.154	3.1	79.92	19.82	0	0	0	0.25
2001	311	23	930	366.19	-357.232	D	7.557	7.5	0.058	3.1	89.19	10.62	0	0	0	0.19
2001	312	23	949	365.722	-354.966	D	7.502	7.5	0.002	3.1	96.51	3.39	0	0	0	0.15
2001	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	315	23	949	365.722	-354.966	D	7.531	7.5	0.031	3.1	82.64	16.55	0	0	0	0.82
2001	316	23	1036	356.488	-356.993	D	7.532	7.5	0.033	3.1	76.68	22.82	0	0	0	0.51

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	323	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	332	23	907	365.051	-359.809	D	7.522	7.5	0.022	3.1	54.81	45.03	0	0	0	0.17
2001	333	23	930	366.19	-357.232	D	8.92	7.5	**1.42**	3.1	48.02	51.71	0	0	0	0.27
2001	334	23	930	366.19	-357.232	D	7.978	7.5	0.478	3.1	70.1	29.72	0	0	0	0.17
2001	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2001	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	342	23	773	365.4	-355.32	D	7.936	7.593	0.343	3.3	43.38	56.37	0	0	0	0.26
2001	343	23	710	364.843	-359.589	D	7.593	7.593	0	3.3	62.65	5.9	0	0	0	0.07
2001	344	23	930	366.19	-357.232	D	7.606	7.593	0.014	3.3	37.22	62.57	0	0	0	0.22
2001	345	23	930	366.19	-357.232	D	7.614	7.593	0.021	3.3	60.26	39.54	0	0	0	0.2
2001	346	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	68.72	31.26	0	0	0	0.16
2001	347	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	349	23	786	365.973	-357.042	D	7.593	7.593	0	3.3	86.94	12.43	0	0	0	0.14
2001	350	23	947	365.801	-355.162	D	7.595	7.593	0.002	3.3	75.08	24.84	0	0	0	0.11
2001	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATE	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									1.42							

Appendix M
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EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	823	358.24	-361.604	D	7.586	7.548	0.038	3.204	0	0	0	0	0	100
2002	2	23	822	358.021	-361.607	D	7.549	7.546	0.002	3.2	0	0	0	0	0	100.05
2002	3	23	927	365.912	-357.454	D	7.641	7.546	0.094	3.2	0	0	0	0	0	100
2002	4	23	941	365.977	-355.774	D	7.547	7.546	0	3.2	0	0	0	0	0	100.4
2002	5	23	1017	356.894	-355.206	D	7.554	7.546	0.008	3.2	0	0	0	0	0	100
2002	6	23	78	358.239	-356.385	D	7.692	7.546	0.145	3.2	0	0	0	0	0	100
2002	7	23	822	358.021	-361.607	D	7.596	7.546	0.05	3.2	0	0	0	0	0	100
2002	8	23	948	365.727	-355.056	D	7.546	7.546	0	3.2	0	0	0	0	0	99.83
2002	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	10	23	714	364.799	-358.592	D	7.558	7.546	0.012	3.2	0	0	0	0	0	100.01
2002	11	23	78	358.239	-356.385	D	7.581	7.546	0.035	3.2	0	0	0	0	0	100
2002	12	23	949	365.722	-354.966	D	7.564	7.546	0.018	3.2	0	0	0	0	0	100.01
2002	13	23	949	365.722	-354.966	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.07
2002	14	23	102	358.487	-356.374	D	7.549	7.546	0.003	3.2	0	0	0	0	0	100.01
2002	15	23	927	365.912	-357.454	D	7.57	7.546	0.024	3.2	0	0	0	0	0	100.01
2002	16	23	949	365.722	-354.966	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.22
2002	17	23	78	358.239	-356.385	D	7.569	7.546	0.023	3.2	0	0	0	0	0	100.01
2002	18	23	907	365.051	-359.809	D	7.555	7.546	0.009	3.2	0	0	0	0	0	100.03
2002	19	23	964	363.678	-354.148	D	7.609	7.546	0.062	3.2	0	0	0	0	0	100
2002	20	23	931	366.183	-356.996	D	7.561	7.546	0.015	3.2	0	0	0	0	0	100.01
2002	21	23	102	358.487	-356.374	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.06
2002	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	24	23	1039	356.522	-357.599	D	7.572	7.546	0.026	3.2	0	0	0	0	0	100
2002	25	23	927	365.912	-357.454	D	7.622	7.546	0.075	3.2	0	0	0	0	0	100
2002	26	23	570	363.387	-360.402	D	7.546	7.546	0	3.2	0	0	0	0	0	86.26
2002	27	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	28	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	29	23	966	363.538	-354.124	D	7.551	7.546	0.005	3.2	0	0	0	0	0	100.02
2002	30	23	78	358.239	-356.385	D	7.601	7.546	0.055	3.2	0	0	0	0	0	100.01
2002	31	23	1038	356.511	-357.396	D	7.658	7.546	0.112	3.2	0	0	0	0	0	100
2002	32	23	1017	356.894	-355.206	D	7.439	7.411	0.027	2.913	0	0	0	0	0	100
2002	33	23	78	358.239	-356.385	D	7.459	7.406	0.054	2.9	0	0	0	0	0	100
2002	34	23	967	363.478	-354.116	D	7.417	7.406	0.011	2.9	0	0	0	0	0	100.02
2002	35	23	78	358.239	-356.385	D	7.457	7.406	0.051	2.9	0	0	0	0	0	100
2002	36	23	930	366.19	-357.232	D	7.411	7.406	0.006	2.9	0	0	0	0	0	100.03
2002	37	23	949	365.722	-354.966	D	7.407	7.406	0.001	2.9	0	0	0	0	0	100.16
2002	38	23	927	365.912	-357.454	D	7.549	7.406	0.143	2.9	0	0	0	0	0	100

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	39	23	933	366.169	-356.524	D	7.406	7.406	0.001	2.9	0	0	0	0	0	100.27
2002	40	23	726	364.667	-355.602	D	7.406	7.406	0	2.9	0	0	0	0	0	102.16
2002	41	23	949	365.722	-354.966	D	7.428	7.406	0.023	2.9	0	0	0	0	0	100.01
2002	42	23	78	358.239	-356.385	D	7.526	7.406	0.121	2.9	0	0	0	0	0	100
2002	43	23	1007	358.259	-354.768	D	7.421	7.406	0.015	2.9	0	0	0	0	0	100.01
2002	44	23	822	358.021	-361.607	D	7.414	7.406	0.008	2.9	0	0	0	0	0	100.02
2002	45	23	823	358.24	-361.604	D	7.414	7.406	0.008	2.9	0	0	0	0	0	100.02
2002	46	23	1017	356.894	-355.206	D	7.447	7.406	0.041	2.9	0	0	0	0	0	100
2002	47	23	949	365.722	-354.966	D	7.425	7.406	0.019	2.9	0	0	0	0	0	100.01
2002	48	23	78	358.239	-356.385	D	7.427	7.406	0.022	2.9	0	0	0	0	0	100.01
2002	49	23	930	366.19	-357.232	D	7.407	7.406	0.001	2.9	0	0	0	0	0	100.12
2002	50	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	51	23	966	363.538	-354.124	D	7.406	7.406	0.001	2.9	0	0	0	0	0	100.26
2002	52	23	773	365.4	-355.32	D	7.471	7.406	0.065	2.9	0	0	0	0	0	100
2002	53	23	78	358.239	-356.385	D	7.439	7.406	0.033	2.9	0	0	0	0	0	100
2002	54	23	1035	356.477	-356.792	D	7.431	7.406	0.025	2.9	0	0	0	0	0	100.01
2002	55	23	930	366.19	-357.232	D	7.406	7.406	0	2.9	0	0	0	0	0	100.64
2002	56	23	78	358.239	-356.385	D	7.421	7.406	0.015	2.9	0	0	0	0	0	100.01
2002	57	23	949	365.722	-354.966	D	7.45	7.406	0.045	2.9	0	0	0	0	0	100.01
2002	58	23	773	365.4	-355.32	D	7.411	7.406	0.006	2.9	0	0	0	0	0	100.07
2002	59	23	949	365.722	-354.966	D	7.406	7.406	0	2.9	0	0	0	0	0	99.94
2002	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	0	0	0	0	0	0
2002	61	23	985	361.137	-354.683	D	7.386	7.311	0.075	2.7	0	0	0	0	0	100
2002	62	23	773	365.4	-355.32	D	7.407	7.311	0.096	2.7	0	0	0	0	0	100
2002	63	23	861	361.895	-361.506	D	7.312	7.311	0.001	2.7	0	0	0	0	0	100.03
2002	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	822	358.021	-361.607	D	7.311	7.311	0.001	2.7	0	0	0	0	0	100.27
2002	69	23	927	365.912	-357.454	D	7.365	7.311	0.054	2.7	0	0	0	0	0	100
2002	70	23	1017	356.894	-355.206	D	7.312	7.311	0.002	2.7	0	0	0	0	0	100.02
2002	71	23	1041	356.936	-357.592	D	7.32	7.311	0.009	2.7	0	0	0	0	0	100.02
2002	72	23	1039	356.522	-357.599	D	7.33	7.311	0.019	2.7	0	0	0	0	0	100.01
2002	73	23	932	366.176	-356.761	D	7.311	7.311	0.001	2.7	0	0	0	0	0	99.89
2002	74	23	1037	356.5	-357.195	D	7.323	7.311	0.012	2.7	0	0	0	0	0	100.02
2002	75	23	907	365.051	-359.809	D	7.315	7.311	0.004	2.7	0	0	0	0	0	100.05
2002	76	23	1017	356.894	-355.206	D	7.316	7.311	0.005	2.7	0	0	0	0	0	100.03
2002	77	23	78	358.239	-356.385	D	7.323	7.311	0.012	2.7	0	0	0	0	0	100.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	78	23	907	365.051	-359.809	D	7.32	7.311	0.009	2.7	0	0	0	0	0	100.02
2002	79	23	1035	356.477	-356.792	D	7.338	7.311	0.027	2.7	0	0	0	0	0	100
2002	80	23	731	365.047	-358.581	D	7.39	7.311	0.08	2.7	0	0	0	0	0	100
2002	81	23	1035	356.477	-356.792	D	7.323	7.311	0.013	2.7	0	0	0	0	0	100.02
2002	82	23	933	366.169	-356.524	D	7.318	7.311	0.008	2.7	0	0	0	0	0	100.02
2002	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	23	78	358.239	-356.385	D	7.322	7.311	0.012	2.7	0	0	0	0	0	100.01
2002	85	23	822	358.021	-361.607	D	7.32	7.311	0.01	2.7	0	0	0	0	0	100.01
2002	86	23	78	358.239	-356.385	D	7.34	7.311	0.029	2.7	0	0	0	0	0	100
2002	87	23	1017	356.894	-355.206	D	7.312	7.311	0.001	2.7	0	0	0	0	0	99.99
2002	88	23	563	362.941	-355.928	D	7.317	7.311	0.006	2.7	0	0	0	0	0	100.02
2002	89	23	948	365.727	-355.056	D	7.315	7.311	0.004	2.7	0	0	0	0	0	100.03
2002	90	23	1017	356.894	-355.206	D	7.318	7.311	0.008	2.7	0	0	0	0	0	100.04
2002	91	23	78	358.239	-356.385	D	7.329	7.311	0.019	2.7	0	0	0	0	0	100.01
2002	92	23	1039	356.522	-357.599	D	7.314	7.311	0.003	2.7	0	0	0	0	0	100.05
2002	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	94	23	949	365.722	-354.966	D	7.316	7.311	0.005	2.7	0	0	0	0	0	100.04
2002	95	23	845	360.851	-362.181	D	7.32	7.311	0.009	2.7	0	0	0	0	0	100.02
2002	96	23	1017	356.894	-355.206	D	7.318	7.311	0.008	2.7	0	0	0	0	0	100.03
2002	97	23	785	365.637	-355.06	D	7.311	7.311	0.001	2.7	0	0	0	0	0	99.85
2002	98	23	10	356.954	-355.443	D	7.311	7.311	0	2.7	0	0	0	0	0	106.22
2002	99	23	974	362.281	-354.249	D	7.333	7.311	0.022	2.7	0	0	0	0	0	100
2002	100	23	930	366.19	-357.232	D	7.316	7.311	0.005	2.7	0	0	0	0	0	100.05
2002	101	23	949	365.722	-354.966	D	7.311	7.311	0	2.7	0	0	0	0	0	99.98
2002	102	23	964	363.678	-354.148	D	7.311	7.311	0	2.7	0	0	0	0	0	100.47
2002	103	23	949	365.722	-354.966	D	7.319	7.311	0.008	2.7	0	0	0	0	0	100.02
2002	104	23	1017	356.894	-355.206	D	7.314	7.311	0.003	2.7	0	0	0	0	0	100.02
2002	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	110	23	949	365.722	-354.966	D	7.34	7.311	0.03	2.7	0	0	0	0	0	100.01
2002	111	23	964	363.678	-354.148	D	7.312	7.311	0.001	2.7	0	0	0	0	0	100.15
2002	112	23	78	358.239	-356.385	D	7.359	7.311	0.049	2.7	0	0	0	0	0	100
2002	113	23	1017	356.894	-355.206	D	7.313	7.311	0.002	2.7	0	0	0	0	0	99.98
2002	114	23	78	358.239	-356.385	D	7.317	7.311	0.006	2.7	0	0	0	0	0	100.01
2002	115	23	822	358.021	-361.607	D	7.311	7.311	0	2.7	0	0	0	0	0	100.19
2002	116	23	853	361.666	-362.175	D	7.313	7.311	0.002	2.7	0	0	0	0	0	100.13

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	117	23	967	363.478	-354.116	D	7.312	7.311	0.001	2.7	0	0	0	0	0	99.89
2002	118	23	773	365.4	-355.32	D	7.365	7.311	0.054	2.7	0	0	0	0	0	100.01
2002	119	23	1038	356.511	-357.396	D	7.329	7.311	0.018	2.7	0	0	0	0	0	100
2002	120	23	830	359.486	-361.777	D	7.312	7.311	0.001	2.7	0	0	0	0	0	99.9
2002	121	23	10	356.954	-355.443	D	7.581	7.581	0	3.275	0	0	0	0	0	107.96
2002	122	23	78	358.239	-356.385	D	7.616	7.593	0.023	3.3	0	0	0	0	0	100
2002	123	23	846	360.93	-362.178	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100
2002	124	23	1017	356.894	-355.206	D	7.604	7.593	0.012	3.3	0	0	0	0	0	100
2002	125	23	1035	356.477	-356.792	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.01
2002	126	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	0	0	0	0	0	100.31
2002	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	129	23	78	358.239	-356.385	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100.01
2002	130	23	907	365.051	-359.809	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100
2002	131	23	947	365.801	-355.162	D	7.596	7.593	0.003	3.3	0	0	0	0	0	99.99
2002	132	23	966	363.538	-354.124	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.01
2002	133	23	822	358.021	-361.607	D	7.605	7.593	0.013	3.3	0	0	0	0	0	100.01
2002	134	23	1017	356.894	-355.206	D	7.615	7.593	0.022	3.3	0	0	0	0	0	100
2002	135	23	949	365.722	-354.966	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100.02
2002	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	137	23	927	365.912	-357.454	D	7.614	7.593	0.021	3.3	0	0	0	0	0	100
2002	138	23	852	361.595	-362.148	D	7.593	7.593	0	3.3	0	0	0	0	0	99.83
2002	139	23	1009	357.941	-354.82	D	7.624	7.593	0.032	3.3	0	0	0	0	0	100
2002	140	23	78	358.239	-356.385	D	7.652	7.593	0.059	3.3	0	0	0	0	0	100
2002	141	23	822	358.021	-361.607	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.03
2002	142	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.96
2002	143	23	709	364.375	-354.616	D	7.593	7.593	0	3.3	0	0	0	0	0	98.02
2002	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	145	23	964	363.678	-354.148	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.03
2002	146	23	966	363.538	-354.124	D	7.603	7.593	0.011	3.3	0	0	0	0	0	100
2002	147	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	0	0	0	0	0	101.1
2002	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	150	23	784	365.648	-355.309	D	7.593	7.593	0	3.3	0	0	0	0	0	99.68
2002	151	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.04
2002	152	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	0	0	0	0	0	98.61
2002	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	156	23	78	358.239	-356.385	D	7.68	7.593	0.087	3.3	0	0	0	0	0	100
2002	157	23	845	360.851	-362.181	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.07
2002	158	23	1008	358.048	-354.775	D	7.593	7.593	0	3.3	0	0	0	0	0	99.92
2002	159	23	822	358.021	-361.607	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.04
2002	160	23	1017	356.894	-355.206	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.01
2002	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	164	23	1035	356.477	-356.792	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.01
2002	165	23	1017	356.894	-355.206	D	7.614	7.593	0.022	3.3	0	0	0	0	0	100.01
2002	166	23	927	365.912	-357.454	D	7.656	7.593	0.063	3.3	0	0	0	0	0	100
2002	167	23	927	365.912	-357.454	D	7.644	7.593	0.052	3.3	0	0	0	0	0	100
2002	168	23	822	358.021	-361.607	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.02
2002	169	23	930	366.19	-357.232	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.03
2002	170	23	785	365.637	-355.06	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.99
2002	171	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	0	0	0	0	0	80.44
2002	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	173	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.13
2002	174	23	822	358.021	-361.607	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.25
2002	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	94.9
2002	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	178	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.03
2002	179	23	963	363.809	-354.192	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.02
2002	180	23	955	364.92	-354.582	D	7.598	7.593	0.006	3.3	0	0	0	0	0	100.02
2002	181	23	543	362.627	-354.444	D	7.593	7.593	0	3.3	0	0	0	0	0	84.65
2002	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	183	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.21
2002	184	23	948	365.727	-355.056	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.01
2002	185	23	930	366.19	-357.232	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.04
2002	186	23	845	360.851	-362.181	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.02
2002	187	23	846	360.93	-362.178	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.01
2002	188	23	966	363.538	-354.124	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.99
2002	189	23	933	366.169	-356.524	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100
2002	190	23	930	366.19	-357.232	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.01
2002	191	23	955	364.92	-354.582	D	7.593	7.593	0	3.3	0	0	0	0	0	100.24
2002	192	23	832	359.493	-362.061	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100.01
2002	193	23	967	363.478	-354.116	D	7.619	7.593	0.027	3.3	0	0	0	0	0	100
2002	194	23	1017	356.894	-355.206	D	7.619	7.593	0.027	3.3	0	0	0	0	0	100

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	195	23	966	363.538	-354.124	D	7.611	7.593	0.018	3.3	0	0	0	0	0	100
2002	196	23	1017	356.894	-355.206	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100.01
2002	197	23	1017	356.894	-355.206	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.08
2002	198	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	0	0	0	0	0	100.65
2002	199	23	542	362.638	-354.693	D	7.593	7.593	0	3.3	0	0	0	0	0	103.22
2002	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	24.41
2002	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	204	23	78	358.239	-356.385	D	7.675	7.593	0.082	3.3	0	0	0	0	0	100
2002	205	23	930	366.19	-357.232	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.01
2002	206	23	643	363.609	-354.151	D	7.598	7.593	0.005	3.3	0	0	0	0	0	100
2002	207	23	930	366.19	-357.232	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.03
2002	208	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	0	0	0	0	0	99.77
2002	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	967	363.478	-354.116	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.15
2002	212	23	949	365.722	-354.966	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.03
2002	213	23	663	363.912	-355.386	D	7.593	7.593	0	3.3	0	0	0	0	0	107.69
2002	214	23	927	365.912	-357.454	D	7.621	7.593	0.028	3.3	0	0	0	0	0	100.01
2002	215	23	822	358.021	-361.607	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100.01
2002	216	23	1016	357.1	-355.198	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.05
2002	217	23	966	363.538	-354.124	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.07
2002	218	23	1008	358.048	-354.775	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100.01
2002	219	23	78	358.239	-356.385	D	7.607	7.593	0.014	3.3	0	0	0	0	0	100
2002	220	23	1017	356.894	-355.206	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.02
2002	221	23	822	358.021	-361.607	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.02
2002	222	23	941	365.977	-355.774	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.14
2002	223	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	0	0	0	0	0	106.57
2002	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	226	23	78	358.239	-356.385	D	7.613	7.593	0.021	3.3	0	0	0	0	0	100.01
2002	227	23	78	358.239	-356.385	D	7.598	7.593	0.005	3.3	0	0	0	0	0	100.02
2002	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	10.24
2002	232	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	0	0	0	0	0	92.34
2002	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	236	23	1017	356.894	-355.206	D	7.63	7.593	0.038	3.3	0	0	0	0	0	100
2002	237	23	811	357.434	-360.225	D	7.602	7.593	0.009	3.3	0	0	0	0	0	100.01
2002	238	23	930	366.19	-357.232	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.04
2002	239	23	907	365.051	-359.809	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100
2002	240	23	714	364.799	-358.592	D	7.613	7.593	0.02	3.3	0	0	0	0	0	100
2002	241	23	78	358.239	-356.385	D	7.619	7.593	0.026	3.3	0	0	0	0	0	100.01
2002	242	23	1017	356.894	-355.206	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100.02
2002	243	23	845	360.851	-362.181	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.34
2002	244	23	930	366.19	-357.232	D	7.638	7.637	0.001	3.396	0	0	0	0	0	100.04
2002	245	23	543	362.627	-354.444	D	7.639	7.639	0	3.4	0	0	0	0	0	100.31
2002	246	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	247	23	949	365.722	-354.966	D	7.642	7.639	0.003	3.4	0	0	0	0	0	100.01
2002	248	23	966	363.538	-354.124	D	7.646	7.639	0.007	3.4	0	0	0	0	0	100.01
2002	249	23	1006	358.469	-354.76	D	7.644	7.639	0.005	3.4	0	0	0	0	0	100
2002	250	23	948	365.727	-355.056	D	7.639	7.639	0.001	3.4	0	0	0	0	0	100.07
2002	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	252	23	356	361.22	-361.995	D	7.639	7.639	0	3.4	0	0	0	0	0	89.59
2002	253	23	1035	356.477	-356.792	D	7.67	7.639	0.031	3.4	0	0	0	0	0	100
2002	254	23	811	357.434	-360.225	D	7.646	7.639	0.007	3.4	0	0	0	0	0	99.99
2002	255	23	731	365.047	-358.581	D	7.656	7.639	0.017	3.4	0	0	0	0	0	100.01
2002	256	23	1036	356.488	-356.993	D	7.644	7.639	0.005	3.4	0	0	0	0	0	100.01
2002	257	23	775	365.747	-357.551	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.01
2002	258	23	811	357.434	-360.225	D	7.646	7.639	0.007	3.4	0	0	0	0	0	100.02
2002	259	23	845	360.851	-362.181	D	7.646	7.639	0.007	3.4	0	0	0	0	0	100.02
2002	260	23	963	363.809	-354.192	D	7.647	7.639	0.008	3.4	0	0	0	0	0	100.01
2002	261	23	785	365.637	-355.06	D	7.639	7.639	0	3.4	0	0	0	0	0	100.15
2002	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	263	23	773	365.4	-355.32	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.22
2002	264	23	773	365.4	-355.32	D	7.643	7.639	0.004	3.4	0	0	0	0	0	100.04
2002	265	23	78	358.239	-356.385	D	7.707	7.639	0.068	3.4	0	0	0	0	0	100
2002	266	23	930	366.19	-357.232	D	7.639	7.639	0	3.4	0	0	0	0	0	99.92
2002	267	23	907	365.051	-359.809	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100.01
2002	268	23	78	358.239	-356.385	D	7.643	7.639	0.004	3.4	0	0	0	0	0	100.03
2002	269	23	853	361.666	-362.175	D	7.639	7.639	0	3.4	0	0	0	0	0	101.8
2002	270	23	846	360.93	-362.178	D	7.713	7.639	0.074	3.4	0	0	0	0	0	100
2002	271	23	949	365.722	-354.966	D	7.659	7.639	0.02	3.4	0	0	0	0	0	100.01
2002	272	23	930	366.19	-357.232	D	7.649	7.639	0.01	3.4	0	0	0	0	0	100.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	273	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	0	0	0	0	0	99.99
2002	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2002	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	643	363.609	-354.151	D	7.5	7.5	0	3.1	0	0	0	0	0	104.16
2002	278	23	78	358.239	-356.385	D	7.529	7.5	0.029	3.1	0	0	0	0	0	100
2002	279	23	964	363.678	-354.148	D	7.506	7.5	0.007	3.1	0	0	0	0	0	100.03
2002	280	23	822	358.021	-361.607	D	7.505	7.5	0.006	3.1	0	0	0	0	0	100
2002	281	23	933	366.169	-356.524	D	7.508	7.5	0.008	3.1	0	0	0	0	0	100.02
2002	282	23	1016	357.1	-355.198	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.04
2002	283	23	927	365.912	-357.454	D	7.502	7.5	0.003	3.1	0	0	0	0	0	100.09
2002	284	23	1017	356.894	-355.206	D	7.512	7.5	0.013	3.1	0	0	0	0	0	100.02
2002	285	23	78	358.239	-356.385	D	7.512	7.5	0.012	3.1	0	0	0	0	0	100.02
2002	286	23	907	365.051	-359.809	D	7.506	7.5	0.006	3.1	0	0	0	0	0	100
2002	287	23	78	358.239	-356.385	D	7.51	7.5	0.011	3.1	0	0	0	0	0	100.02
2002	288	23	78	358.239	-356.385	D	7.678	7.5	0.179	3.1	0	0	0	0	0	100
2002	289	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	290	23	822	358.021	-361.607	D	7.506	7.5	0.007	3.1	0	0	0	0	0	100.02
2002	291	23	785	365.637	-355.06	D	7.5	7.5	0	3.1	0	0	0	0	0	100.7
2002	292	23	1017	356.894	-355.206	D	7.514	7.5	0.014	3.1	0	0	0	0	0	100.01
2002	293	23	907	365.051	-359.809	D	7.506	7.5	0.006	3.1	0	0	0	0	0	100.01
2002	294	23	1017	356.894	-355.206	D	7.513	7.5	0.013	3.1	0	0	0	0	0	100.01
2002	295	23	78	358.239	-356.385	D	7.524	7.5	0.025	3.1	0	0	0	0	0	100.01
2002	296	23	955	364.92	-354.582	D	7.547	7.5	0.048	3.1	0	0	0	0	0	100.01
2002	297	23	1017	356.894	-355.206	D	7.502	7.5	0.003	3.1	0	0	0	0	0	100.11
2002	298	23	1017	356.894	-355.206	D	7.515	7.5	0.015	3.1	0	0	0	0	0	100.01
2002	299	23	78	358.239	-356.385	D	7.562	7.5	0.062	3.1	0	0	0	0	0	100
2002	300	23	900	364.265	-360.243	D	7.54	7.5	0.04	3.1	0	0	0	0	0	100
2002	301	23	1017	356.894	-355.206	D	7.517	7.5	0.017	3.1	0	0	0	0	0	100
2002	302	23	822	358.021	-361.607	D	7.527	7.5	0.027	3.1	0	0	0	0	0	100.01
2002	303	23	78	358.239	-356.385	D	7.54	7.5	0.04	3.1	0	0	0	0	0	100
2002	304	23	846	360.93	-362.178	D	7.523	7.5	0.024	3.1	0	0	0	0	0	100
2002	305	23	822	358.021	-361.607	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.1
2002	306	23	78	358.239	-356.385	D	7.551	7.5	0.052	3.1	0	0	0	0	0	100.01
2002	307	23	967	363.478	-354.116	D	7.506	7.5	0.006	3.1	0	0	0	0	0	100.02
2002	308	23	78	358.239	-356.385	D	7.565	7.5	0.066	3.1	0	0	0	0	0	100
2002	309	23	949	365.722	-354.966	D	7.509	7.5	0.009	3.1	0	0	0	0	0	100.03
2002	310	23	773	365.4	-355.32	D	7.647	7.5	0.148	3.1	0	0	0	0	0	100
2002	311	23	949	365.722	-354.966	D	7.5	7.5	0	3.1	0	0	0	0	0	99.98

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	1017	356.894	-355.206	D	7.529	7.5	0.029	3.1	0	0	0	0	0	100.01
2002	315	23	78	358.239	-356.385	D	7.594	7.5	0.094	3.1	0	0	0	0	0	100
2002	316	23	811	357.434	-360.225	D	7.52	7.5	0.021	3.1	0	0	0	0	0	100.01
2002	317	23	949	365.722	-354.966	D	7.5	7.5	0.001	3.1	0	0	0	0	0	99.92
2002	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	1017	356.894	-355.206	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.12
2002	320	23	811	357.434	-360.225	D	7.534	7.5	0.035	3.1	0	0	0	0	0	100
2002	321	23	78	358.239	-356.385	D	7.597	7.5	0.098	3.1	0	0	0	0	0	100
2002	322	23	747	364.871	-354.594	D	7.5	7.5	0	3.1	0	0	0	0	0	99.04
2002	323	23	102	358.487	-356.374	D	7.622	7.5	0.123	3.1	0	0	0	0	0	100
2002	324	23	949	365.722	-354.966	D	7.504	7.5	0.004	3.1	0	0	0	0	0	100.04
2002	325	23	927	365.912	-357.454	D	7.626	7.5	0.127	3.1	0	0	0	0	0	100
2002	326	23	1017	356.894	-355.206	D	7.551	7.5	0.051	3.1	0	0	0	0	0	100
2002	327	23	949	365.722	-354.966	D	7.501	7.5	0.002	3.1	0	0	0	0	0	100.06
2002	328	23	1039	356.522	-357.599	D	7.503	7.5	0.004	3.1	0	0	0	0	0	100.03
2002	329	23	907	365.051	-359.809	D	7.505	7.5	0.006	3.1	0	0	0	0	0	100.02
2002	330	23	1039	356.522	-357.599	D	7.561	7.5	0.062	3.1	0	0	0	0	0	100
2002	331	23	1039	356.522	-357.599	D	7.52	7.5	0.021	3.1	0	0	0	0	0	100
2002	332	23	933	366.169	-356.524	D	7.504	7.5	0.004	3.1	0	0	0	0	0	100.04
2002	333	23	710	364.843	-359.589	D	7.5	7.5	0	3.1	0	0	0	0	0	88.49
2002	334	23	78	358.239	-356.385	D	7.577	7.5	0.078	3.1	0	0	0	0	0	100
2002	335	23	869	361.064	-360.714	D	7.673	7.589	0.085	3.292	0	0	0	0	0	100
2002	336	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	0	0	0	0	0	98.84
2002	337	23	78	358.239	-356.385	D	7.621	7.593	0.028	3.3	0	0	0	0	0	100
2002	338	23	102	358.487	-356.374	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.01
2002	339	23	955	364.92	-354.582	D	7.621	7.593	0.028	3.3	0	0	0	0	0	100
2002	340	23	931	366.183	-356.996	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.03
2002	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	1010	357.824	-354.865	D	7.621	7.593	0.028	3.3	0	0	0	0	0	100
2002	343	23	1017	356.894	-355.206	D	7.612	7.593	0.02	3.3	0	0	0	0	0	100
2002	344	23	1008	358.048	-354.775	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100
2002	345	23	967	363.478	-354.116	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.02
2002	346	23	642	363.62	-354.4	D	7.593	7.593	0	3.3	0	0	0	0	0	99.84
2002	347	23	1039	356.522	-357.599	D	7.638	7.593	0.046	3.3	0	0	0	0	0	100
2002	348	23	714	364.799	-358.592	D	7.778	7.593	0.185	3.3	0	0	0	0	0	100
2002	349	23	762	365.141	-355.082	D	7.593	7.593	0	3.3	0	0	0	0	0	97.23
2002	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	78	358.239	-356.385	D	7.639	7.593	0.046	3.3	0	0	0	0	0	100
2002	354	23	78	358.239	-356.385	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.01
2002	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	958	364.309	-354.601	D	7.651	7.593	0.058	3.3	0	0	0	0	0	100
2002	357	23	927	365.912	-357.454	D	7.616	7.593	0.024	3.3	0	0	0	0	0	100.01
2002	358	23	811	357.434	-360.225	D	7.626	7.593	0.033	3.3	0	0	0	0	0	100
2002	359	23	927	365.912	-357.454	D	7.686	7.593	0.093	3.3	0	0	0	0	0	100
2002	360	23	931	366.183	-356.996	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.01
2002	361	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.14
2002	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	78	358.239	-356.385	D	7.61	7.593	0.017	3.3	0	0	0	0	0	100.01
									0.185							
EXIDE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1017	356.894	-355.206	D	7.549	7.548	0	3.204	81.53	13.81	0	0	0	4.63
2002	2	23	1035	356.477	-356.792	D	7.554	7.546	0.008	3.2	87.06	9.67	0	0	0	3.27
2002	3	23	1017	356.894	-355.206	D	7.551	7.546	0.005	3.2	88.94	8.28	0	0	0	2.79
2002	4	23	930	366.19	-357.232	D	7.548	7.546	0.001	3.2	92.06	6.3	0	0	0	1.77
2002	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	81.42	4.96	0	0	0	0.9
2002	6	23	1037	356.5	-357.195	D	7.551	7.546	0.005	3.2	90.36	7	0	0	0	2.62
2002	7	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	90.61	12.15	0	0	0	3.14
2002	8	23	1016	357.1	-355.198	D	7.547	7.546	0	3.2	85.66	11.73	0	0	0	2.59
2002	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	10	23	1016	357.1	-355.198	D	7.547	7.546	0.001	3.2	92.75	4.66	0	0	0	2.72
2002	11	23	811	357.434	-360.225	D	7.549	7.546	0.002	3.2	79.68	13.62	0	0	0	6.78
2002	12	23	930	366.19	-357.232	D	7.546	7.546	0	3.2	91.64	5.84	0	0	0	2.8
2002	13	23	931	366.183	-356.996	D	7.546	7.546	0	3.2	91.06	5.65	0	0	0	2.89
2002	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	16	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	131.57	6.32	0	0	0	2.38
2002	17	23	822	358.021	-361.607	D	7.55	7.546	0.004	3.2	85.5	10.22	0	0	0	4.32
2002	18	23	61	357.936	-355.15	D	7.546	7.546	0	3.2	88.26	9.4	0	0	0	2.44
2002	19	23	949	365.722	-354.966	D	7.546	7.546	0	3.2	92.97	5.47	0	0	0	1.63
2002	20	23	931	366.183	-356.996	D	7.547	7.546	0.001	3.2	95.63	3.55	0	0	0	0.94

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	21	23	747	364.871	-354.594	D	7.546	7.546	0	3.2	96.47	2.67	0	0	0	0.7
2002	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	24	23	949	365.722	-354.966	D	7.549	7.546	0.003	3.2	93.54	5.35	0	0	0	1.12
2002	25	23	821	358.053	-361.416	D	7.547	7.546	0	3.2	84.93	11.11	0	0	0	4.13
2002	26	23	619	363.872	-360.131	D	7.546	7.546	0	3.2	96.14	3.69	0	0	0	1.97
2002	27	23	605	363.514	-357.65	D	7.546	7.546	0	3.2	93.75	2.5	0	0	0	1.49
2002	28	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	29	23	964	363.678	-354.148	D	7.547	7.546	0.001	3.2	93.21	5.21	0	0	0	1.64
2002	30	23	967	363.478	-354.116	D	7.569	7.546	0.023	3.2	93.88	4.93	0	0	0	1.19
2002	31	23	1035	356.477	-356.792	D	7.571	7.546	0.024	3.2	96.3	3.02	0	0	0	0.68
2002	32	23	949	365.722	-354.966	D	7.414	7.411	0.003	2.913	96.01	3.5	0	0	0	0.52
2002	33	23	763	365.51	-357.811	D	7.406	7.406	0	2.9	94.5	4.07	0	0	0	2.34
2002	34	23	930	366.19	-357.232	D	7.406	7.406	0	2.9	96.42	3.91	0	0	0	1.61
2002	35	23	947	365.801	-355.162	D	7.407	7.406	0.001	2.9	89.55	7.21	0	0	0	3.37
2002	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	37	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	38	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	41	23	822	358.021	-361.607	D	7.406	7.406	0.001	2.9	90.81	6.4	0	0	0	3
2002	42	23	822	358.021	-361.607	D	7.406	7.406	0	2.9	95.2	4.25	0	0	0	1.74
2002	43	23	1017	356.894	-355.206	D	7.407	7.406	0.001	2.9	89.76	4.99	0	0	0	5.35
2002	44	23	822	358.021	-361.607	D	7.406	7.406	0	2.9	89.71	6.16	0	0	0	4.33
2002	45	23	1016	357.1	-355.198	D	7.406	7.406	0.001	2.9	88.33	8.89	0	0	0	3.19
2002	46	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	139.55	3.74	0	0	0	1.98
2002	47	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	48	23	822	358.021	-361.607	D	7.407	7.406	0.001	2.9	86.99	7.2	0	0	0	6.05
2002	49	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	95.14	3.09	0	0	0	2.18
2002	50	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	52	23	747	364.871	-354.594	D	7.406	7.406	0	2.9	92.51	3.41	0	0	0	4.27
2002	53	23	822	358.021	-361.607	D	7.406	7.406	0.001	2.9	91.35	5.24	0	0	0	3.38
2002	54	23	1035	356.477	-356.792	D	7.406	7.406	0	2.9	92.25	5.56	0	0	0	2.66
2002	55	23	763	365.51	-357.811	D	7.406	7.406	0	2.9	96.49	2.88	0	0	0	1.29
2002	56	23	906	364.982	-359.812	D	7.406	7.406	0	2.9	88.69	8.97	0	0	0	2.48
2002	57	23	821	358.053	-361.416	D	7.406	7.406	0.001	2.9	71.34	20.24	0	0	0	8.53
2002	58	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	0	0	0	0	0	0
2002	61	23	1038	356.511	-357.396	D	7.311	7.311	0	2.7	105.49	4.55	0	0	0	1.21
2002	62	23	965	363.588	-354.142	D	7.312	7.311	0.001	2.7	86.35	9.74	0	0	0	3.83
2002	63	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	72	23	966	363.538	-354.124	D	7.311	7.311	0.001	2.7	94.18	3.31	0	0	0	2.66
2002	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	23	822	358.021	-361.607	D	7.312	7.311	0.001	2.7	89.94	7.27	0	0	0	2.89
2002	75	23	844	360.75	-362.146	D	7.311	7.311	0	2.7	91.07	4.48	0	0	0	1.54
2002	76	23	44	358.21	-361.379	D	7.311	7.311	0	2.7	97.99	1.77	0	0	0	0.88
2002	77	23	777	365.725	-357.053	D	7.311	7.311	0	2.7	98.07	1.72	0	0	0	0.73
2002	78	23	27	357.451	-355.421	D	7.311	7.311	0	2.7	98.63	1.67	0	0	0	0.43
2002	79	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	96.4	1.57	0	0	0	0.37
2002	80	23	905	364.788	-359.816	D	7.312	7.311	0.001	2.7	87.34	8.38	0	0	0	4.26
2002	81	23	1036	356.488	-356.993	D	7.311	7.311	0	2.7	85.42	10.55	0	0	0	4.69
2002	82	23	1016	357.1	-355.198	D	7.312	7.311	0.001	2.7	90.41	7.69	0	0	0	1.99
2002	83	23	783	365.659	-355.558	D	7.311	7.311	0	2.7	96.33	1.94	0	0	0	0.6
2002	84	23	594	363.123	-354.422	D	7.311	7.311	0	2.7	97.51	2.54	0	0	0	0.33
2002	85	23	406	361.15	-354.758	D	7.311	7.311	0	2.7	97.7	2.12	0	0	0	0.21
2002	86	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	92.93	5.11	0	0	0	2.2
2002	87	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	88	23	1016	357.1	-355.198	D	7.311	7.311	0	2.7	98.11	0.62	0	0	0	1.67
2002	89	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	90.74	4.93	0	0	0	4
2002	90	23	62	357.925	-354.901	D	7.311	7.311	0	2.7	99.84	0.38	0	0	0	3.1
2002	91	23	643	363.609	-354.151	D	7.311	7.311	0.001	2.7	95.38	2.21	0	0	0	2.55
2002	92	23	711	364.832	-359.339	D	7.311	7.311	0	2.7	96.1	1.67	0	0	0	2.3
2002	93	23	15	357.659	-360.155	D	7.311	7.311	0	2.7	95.02	0.71	0	0	0	1.53
2002	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	96	23	785	365.637	-355.06	D	7.311	7.311	0	2.7	98.3	0.7	0	0	0	1.47
2002	97	23	947	365.801	-355.162	D	7.311	7.311	0	2.7	99.14	0.67	0	0	0	1.15
2002	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	102	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	98.65	0.55	0	0	0	2.02
2002	103	23	1017	356.894	-355.206	D	7.312	7.311	0.001	2.7	95.96	2.85	0	0	0	1.38
2002	104	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	98.17	1.25	0	0	0	0.91
2002	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	110	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	98.15	1.31	0	0	0	1.56
2002	111	23	643	363.609	-354.151	D	7.312	7.311	0.001	2.7	98.03	1.2	0	0	0	0.81
2002	112	23	949	365.722	-354.966	D	7.311	7.311	0	2.7	97.97	0.82	0	0	0	1.22
2002	113	23	930	366.19	-357.232	D	7.313	7.311	0.003	2.7	98.78	0.36	0	0	0	0.89
2002	114	23	643	363.609	-354.151	D	7.313	7.311	0.002	2.7	98.04	0.55	0	0	0	1.43
2002	115	23	906	364.982	-359.812	D	7.311	7.311	0	2.7	97.7	0.83	0	0	0	1.74
2002	116	23	784	365.648	-355.309	D	7.311	7.311	0	2.7	99.48	1.16	0	0	0	2.01
2002	117	23	785	365.637	-355.06	D	7.311	7.311	0	2.7	97.48	0.74	0	0	0	1.54
2002	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	119	23	1017	356.894	-355.206	D	7.313	7.311	0.002	2.7	97.09	0.88	0	0	0	2.07
2002	120	23	643	363.609	-354.151	D	7.312	7.311	0.002	2.7	99	0.18	0	0	0	0.94
2002	121	23	3	356.524	-356.959	D	7.581	7.581	0	3.275	101.04	0.23	0	0	0	0.52
2002	122	23	2	356.535	-357.209	D	7.594	7.593	0.001	3.3	98.75	0.65	0	0	0	0.58
2002	123	23	821	358.053	-361.416	D	7.594	7.593	0.001	3.3	99.22	0.26	0	0	0	0.51
2002	124	23	1	356.546	-357.458	D	7.594	7.593	0.001	3.3	99.24	0.34	0	0	0	0.46
2002	125	23	15	357.659	-360.155	D	7.593	7.593	0.001	3.3	99.57	0.21	0	0	0	0.42
2002	126	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	100.22	0.05	0	0	0	0.31
2002	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	129	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	92.86	3.39	0	0	0	3.57
2002	130	23	974	362.281	-354.249	D	7.595	7.593	0.002	3.3	97.46	0.77	0	0	0	1.79
2002	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	99.01	0.49	0	0	0	0.38
2002	132	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	97.44	1.81	0	0	0	0.91
2002	133	23	955	364.92	-354.582	D	7.602	7.593	0.01	3.3	96.84	2.42	0	0	0	0.73
2002	134	23	948	365.727	-355.056	D	7.594	7.593	0.001	3.3	96.14	1.22	0	0	0	2.57
2002	135	23	929	366.032	-357.239	D	7.593	7.593	0	3.3	98.61	0.26	0	0	0	1.13
2002	136	23	3	356.524	-356.959	D	7.593	7.593	0	3.3	10.33	0	0	0	0	0.09
2002	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	138	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	139	23	1017	356.894	-355.206	D	7.595	7.593	0.002	3.3	98.13	0.22	0	0	0	1.66
2002	140	23	822	358.021	-361.607	D	7.595	7.593	0.003	3.3	98.31	0.33	0	0	0	1.41
2002	141	23	44	358.21	-361.379	D	7.593	7.593	0	3.3	99.29	0.12	0	0	0	0.85
2002	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	99.51	0.13	0	0	0	0.55
2002	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	145	23	1017	356.894	-355.206	D	7.595	7.593	0.002	3.3	98.47	0.28	0	0	0	1.36
2002	146	23	822	358.021	-361.607	D	7.602	7.593	0.01	3.3	98.54	0.56	0	0	0	0.91
2002	147	23	1007	358.259	-354.768	D	7.594	7.593	0.001	3.3	99.28	0.06	0	0	0	0.73
2002	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	150	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	156	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	98.39	0.09	0	0	0	0.88
2002	157	23	1017	356.894	-355.206	D	7.595	7.593	0.002	3.3	98.59	0.12	0	0	0	1.29
2002	158	23	1017	356.894	-355.206	D	7.596	7.593	0.003	3.3	98.94	0.07	0	0	0	1.03
2002	159	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	102.36	0.03	0	0	0	0.5
2002	160	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	67.76	0	0	0	0	0.27
2002	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	164	23	967	363.478	-354.116	D	7.593	7.593	0	3.3	99	0.01	0	0	0	0.79
2002	165	23	906	364.982	-359.812	D	7.596	7.593	0.004	3.3	98.56	0.32	0	0	0	1.13
2002	166	23	822	358.021	-361.607	D	7.594	7.593	0.001	3.3	96.28	0.46	0	0	0	3.33
2002	167	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	98.52	0.05	0	0	0	1.46
2002	168	23	845	360.851	-362.181	D	7.595	7.593	0.003	3.3	98.62	0.12	0	0	0	1.26
2002	169	23	907	365.051	-359.809	D	7.595	7.593	0.002	3.3	99.09	0.03	0	0	0	0.84
2002	170	23	785	365.637	-355.06	D	7.593	7.593	0.001	3.3	99.43	0.04	0	0	0	0.65
2002	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	55.14	0	0	0	0	0.4
2002	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	178	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	179	23	946	365.798	-355.322	D	7.593	7.593	0	3.3	99.26	0.18	0	0	0	0.91
2002	180	23	774	365.389	-355.071	D	7.593	7.593	0	3.3	98.95	0.07	0	0	0	0.68
2002	181	23	84	358.173	-354.889	D	7.593	7.593	0	3.3	93.54	0.01	0	0	0	0.58
2002	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	183	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	23	84	358.173	-354.889	D	7.593	7.593	0	3.3	67.14	0.01	0	0	0	0.69
2002	192	23	941	365.977	-355.774	D	7.596	7.593	0.003	3.3	98.76	0.4	0	0	0	0.83
2002	193	23	930	366.19	-357.232	D	7.597	7.593	0.004	3.3	99.22	0.14	0	0	0	0.68
2002	194	23	3	356.524	-356.959	D	7.595	7.593	0.002	3.3	99.02	0.41	0	0	0	0.62
2002	195	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	99.18	0.06	0	0	0	0.57
2002	196	23	15	357.659	-360.155	D	7.593	7.593	0	3.3	99.57	0.23	0	0	0	0.59
2002	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	99.21	0.11	0	0	0	0.55
2002	198	23	3	356.524	-356.959	D	7.593	7.593	0	3.3	99.6	0.02	0	0	0	0.59
2002	199	23	405	361.161	-355.008	D	7.593	7.593	0	3.3	100.11	0.03	0	0	0	0.57
2002	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	204	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	205	23	44	358.21	-361.379	D	7.593	7.593	0	3.3	101.37	0.06	0	0	0	0.94
2002	206	23	821	358.053	-361.416	D	7.593	7.593	0	3.3	99.19	0.13	0	0	0	0.71
2002	207	23	10	356.954	-355.443	D	7.594	7.593	0.001	3.3	99.38	0.03	0	0	0	0.65
2002	208	23	618	363.371	-354.411	D	7.593	7.593	0	3.3	99.8	0.04	0	0	0	0.56
2002	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	214	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	35.77	0	0	0	0	0.4
2002	215	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	95.63	0.01	0	0	0	1

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	216	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	217	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	218	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	219	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	226	23	643	363.609	-354.151	D	7.593	7.593	0.001	3.3	98.56	0.3	0	0	0	1.18
2002	227	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	98.06	0.04	0	0	0	0.95
2002	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	232	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	236	23	1017	356.894	-355.206	D	7.598	7.593	0.005	3.3	98.89	0.15	0	0	0	0.97
2002	237	23	822	358.021	-361.607	D	7.6	7.593	0.007	3.3	98.99	0.26	0	0	0	0.76
2002	238	23	163	359.462	-361.573	D	7.593	7.593	0	3.3	98.93	0.03	0	0	0	0.67
2002	239	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	242	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	243	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2002	245	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	246	23	542	362.638	-354.693	D	7.639	7.639	0	3.4	79.81	0.01	0	0	0	1.7
2002	247	23	973	362.512	-354.246	D	7.639	7.639	0	3.4	98.08	0.08	0	0	0	1.38
2002	248	23	62	357.925	-354.901	D	7.639	7.639	0	3.4	99.16	0.03	0	0	0	0.97
2002	249	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	99.22	0.01	0	0	0	0.79
2002	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	109.15	0.01	0	0	0	0.76
2002	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	254	23	822	358.021	-361.607	D	7.642	7.639	0.003	3.4	96.33	1.52	0	0	0	2.15

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	255	23	301	360.724	-362.017	D	7.639	7.639	0	3.4	96.47	0.03	0	0	0	1.26
2002	256	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	257	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	258	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	259	23	822	358.021	-361.607	D	7.639	7.639	0	3.4	99.13	0.03	0	0	0	0.94
2002	260	23	822	358.021	-361.607	D	7.645	7.639	0.006	3.4	99	0.22	0	0	0	0.81
2002	261	23	789	365.918	-355.796	D	7.641	7.639	0.002	3.4	99.06	0.33	0	0	0	0.65
2002	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	265	23	775	365.747	-357.551	D	7.639	7.639	0	3.4	98.41	0.2	0	0	0	1.34
2002	266	23	10	356.954	-355.443	D	7.639	7.639	0	3.4	97.49	0.08	0	0	0	2.46
2002	267	23	1008	358.048	-354.775	D	7.639	7.639	0	3.4	97.73	0.24	0	0	0	1.78
2002	268	23	955	364.92	-354.582	D	7.639	7.639	0	3.4	98.46	0.23	0	0	0	1.23
2002	269	23	1017	356.894	-355.206	D	7.639	7.639	0	3.4	98.9	0.13	0	0	0	0.87
2002	270	23	1017	356.894	-355.206	D	7.639	7.639	0.001	3.4	98.81	0.05	0	0	0	1.55
2002	271	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	98.57	0.34	0	0	0	1.12
2002	272	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	96.41	0.03	0	0	0	0.61
2002	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	130.82	0.01	0	0	0	0.56
2002	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2002	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	85.8	8.83	0	0	0	5.54
2002	279	23	191	359.732	-362.061	D	7.5	7.5	0	3.1	98.65	0.35	0	0	0	1.07
2002	280	23	930	366.19	-357.232	D	7.501	7.5	0.002	3.1	94.2	1.66	0	0	0	4.17
2002	281	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	283	23	544	363.15	-360.662	D	7.5	7.5	0	3.1	103.57	0.74	0	0	0	0.7
2002	284	23	163	359.462	-361.573	D	7.5	7.5	0	3.1	107.32	0.58	0	0	0	0.6
2002	285	23	10	356.954	-355.443	D	7.5	7.5	0	3.1	95	4.02	0	0	0	1.86
2002	286	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	95.35	3.12	0	0	0	1.41
2002	287	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	92.78	1.38	0	0	0	5.91
2002	289	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	72.65	0.24	0	0	0	0.93
2002	290	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	291	23	1014	357.512	-355.186	D	7.5	7.5	0	3.1	98.31	0.72	0	0	0	1.02
2002	292	23	930	366.19	-357.232	D	7.501	7.5	0.001	3.1	94.74	3.42	0	0	0	2.02
2002	293	23	845	360.851	-362.181	D	7.5	7.5	0	3.1	98.34	1.83	0	0	0	0.76

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	99.33	0.7	0	0	0	0.73
2002	295	23	15	357.659	-360.155	D	7.5	7.5	0	3.1	99.7	0.43	0	0	0	0.58
2002	296	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	100.99	0.2	0	0	0	0.59
2002	297	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	298	23	1035	356.477	-356.792	D	7.502	7.5	0.003	3.1	93.95	4.38	0	0	0	1.7
2002	299	23	930	366.19	-357.232	D	7.522	7.5	0.023	3.1	94.52	3.94	0	0	0	1.55
2002	300	23	832	359.493	-362.061	D	7.503	7.5	0.003	3.1	97.5	1.53	0	0	0	1
2002	301	23	1035	356.477	-356.792	D	7.502	7.5	0.003	3.1	97.89	1.45	0	0	0	0.68
2002	302	23	811	357.434	-360.225	D	7.501	7.5	0.001	3.1	98.24	1.26	0	0	0	0.63
2002	303	23	822	358.021	-361.607	D	7.5	7.5	0	3.1	98.41	0.4	0	0	0	0.54
2002	304	23	44	358.21	-361.379	D	7.5	7.5	0	3.1	95.56	2.61	0	0	0	0.84
2002	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	306	23	1008	358.048	-354.775	D	7.503	7.5	0.003	3.1	90.95	6.44	0	0	0	2.64
2002	307	23	965	363.588	-354.142	D	7.5	7.5	0.001	3.1	94.85	4.15	0	0	0	1.17
2002	308	23	947	365.801	-355.162	D	7.501	7.5	0.001	3.1	96.61	2.7	0	0	0	0.82
2002	309	23	785	365.637	-355.06	D	7.501	7.5	0.001	3.1	97.04	2.41	0	0	0	0.68
2002	310	23	949	365.722	-354.966	D	7.503	7.5	0.003	3.1	95.8	3.15	0	0	0	1.11
2002	311	23	710	364.843	-359.589	D	7.5	7.5	0	3.1	95.07	0.98	0	0	0	0.8
2002	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	618	363.371	-354.411	D	7.5	7.5	0	3.1	88.5	1.01	0	0	0	3.36
2002	315	23	949	365.722	-354.966	D	7.5	7.5	0.001	3.1	93.48	3.08	0	0	0	3.46
2002	316	23	28	357.918	-360.393	D	7.501	7.5	0.001	3.1	88.48	7.71	0	0	0	3.77
2002	317	23	191	359.732	-362.061	D	7.5	7.5	0	3.1	91.68	4.15	0	0	0	3.66
2002	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	10	356.954	-355.443	D	7.5	7.5	0.001	3.1	91.47	6.73	0	0	0	1.93
2002	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	131.01	8.95	0	0	0	5.4
2002	321	23	947	365.801	-355.162	D	7.5	7.5	0.001	3.1	87.01	10.04	0	0	0	3.07
2002	322	23	642	363.62	-354.4	D	7.5	7.5	0	3.1	88.52	4.66	0	0	0	1.92
2002	323	23	822	358.021	-361.607	D	7.503	7.5	0.004	3.1	84.66	8.94	0	0	0	6.47
2002	324	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	95.23	2.65	0	0	0	3.25
2002	325	23	643	363.609	-354.151	D	7.5	7.5	0	3.1	93.38	2.22	0	0	0	4.65
2002	326	23	1017	356.894	-355.206	D	7.5	7.5	0.001	3.1	90.22	5.75	0	0	0	4.21
2002	327	23	930	366.19	-357.232	D	7.501	7.5	0.002	3.1	90.39	6.88	0	0	0	2.89
2002	328	23	10	356.954	-355.443	D	7.5	7.5	0	3.1	96.81	3.09	0	0	0	2.04
2002	329	23	301	360.724	-362.017	D	7.5	7.5	0	3.1	95.22	4.35	0	0	0	0.93
2002	330	23	822	358.021	-361.607	D	7.5	7.5	0	3.1	91.97	6.25	0	0	0	2.72
2002	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	93.38	5.56	0	0	0	1.84
2002	332	23	84	358.173	-354.889	D	7.5	7.5	0	3.1	94.87	3.92	0	0	0	1.48

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	333	23	710	364.843	-359.589	D	7.5	7.5	0	3.1	97.97	2.45	0	0	0	1.28
2002	334	23	948	365.727	-355.056	D	7.5	7.5	0.001	3.1	80.9	11.48	0	0	0	7.58
2002	335	23	949	365.722	-354.966	D	7.59	7.589	0.001	3.292	77.44	15.98	0	0	0	6.56
2002	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	1017	356.894	-355.206	D	7.593	7.593	0.001	3.3	85.71	11.17	0	0	0	3.09
2002	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	3	356.524	-356.959	D	7.593	7.593	0	3.3	83.87	8.14	0	0	0	2.66
2002	340	23	785	365.637	-355.06	D	7.594	7.593	0.001	3.3	89.43	8.13	0	0	0	2.45
2002	341	23	301	360.724	-362.017	D	7.593	7.593	0	3.3	96.01	5.6	0	0	0	1.73
2002	342	23	963	363.809	-354.192	D	7.593	7.593	0	3.3	94.89	3.58	0	0	0	1.27
2002	343	23	1037	356.5	-357.195	D	7.594	7.593	0.002	3.3	95.47	3.64	0	0	0	0.92
2002	344	23	1016	357.1	-355.198	D	7.593	7.593	0.001	3.3	96.42	2.83	0	0	0	0.67
2002	345	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	97.41	2.39	0	0	0	0.57
2002	346	23	747	364.871	-354.594	D	7.593	7.593	0	3.3	97.06	1.87	0	0	0	0.55
2002	347	23	1035	356.477	-356.792	D	7.593	7.593	0	3.3	96.64	2.25	0	0	0	0.92
2002	348	23	822	358.021	-361.607	D	7.598	7.593	0.005	3.3	94.71	3.79	0	0	0	1.52
2002	349	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	97.02	2.13	0	0	0	0.92
2002	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	93.48	4.87	0	0	0	1.95
2002	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	822	358.021	-361.607	D	7.594	7.593	0.001	3.3	75.54	17	0	0	0	7.53
2002	357	23	163	359.462	-361.573	D	7.593	7.593	0	3.3	86.41	8.66	0	0	0	2.01
2002	358	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	86.2	11.46	0	0	0	2.32
2002	359	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	72.87	18.72	0	0	0	8.43
2002	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	780	365.692	-356.306	D	7.593	7.593	0	3.3	75.72	4.46	0	0	0	0.99
2002	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	1017	356.894	-355.206	D	7.593	7.593	0.001	3.3	93.17	5.23	0	0	0	1.66
									0.024							
TRIGEN KC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1035	356.477	-356.792	D	7.55	7.548	0.002	3.204	89.85	9.75	0	0	0	0.43

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	2	23	1035	356.477	-356.792	D	7.585	7.546	0.039	3.2	92.52	7.16	0	0	0	0.33
2002	3	23	949	365.722	-354.966	D	7.564	7.546	0.018	3.2	93.1	6.6	0	0	0	0.3
2002	4	23	930	366.19	-357.232	D	7.55	7.546	0.004	3.2	95.43	4.45	0	0	0	0.16
2002	5	23	784	365.648	-355.309	D	7.546	7.546	0	3.2	95.83	3.36	0	0	0	0.08
2002	6	23	773	365.4	-355.32	D	7.57	7.546	0.024	3.2	94.43	5.28	0	0	0	0.3
2002	7	23	1017	356.894	-355.206	D	7.547	7.546	0.001	3.2	91.94	7.92	0	0	0	0.27
2002	8	23	643	363.609	-354.151	D	7.548	7.546	0.001	3.2	92.19	7.6	0	0	0	0.22
2002	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	10	23	1010	357.824	-354.865	D	7.556	7.546	0.01	3.2	96.9	2.89	0	0	0	0.21
2002	11	23	1039	356.522	-357.599	D	7.558	7.546	0.012	3.2	90.68	8.78	0	0	0	0.56
2002	12	23	930	366.19	-357.232	D	7.547	7.546	0.001	3.2	95.19	4.5	0	0	0	0.27
2002	13	23	946	365.798	-355.322	D	7.546	7.546	0	3.2	93.91	4.19	0	0	0	0.34
2002	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	16	23	746	364.882	-354.843	D	7.546	7.546	0	3.2	93.61	5.33	0	0	0	0.21
2002	17	23	822	358.021	-361.607	D	7.553	7.546	0.007	3.2	89.82	9.61	0	0	0	0.6
2002	18	23	1017	356.894	-355.206	D	7.549	7.546	0.003	3.2	92.43	7.42	0	0	0	0.23
2002	19	23	1017	356.894	-355.206	D	7.557	7.546	0.011	3.2	96.52	3.35	0	0	0	0.14
2002	20	23	949	365.722	-354.966	D	7.623	7.546	0.077	3.2	96.05	3.83	0	0	0	0.12
2002	21	23	643	363.609	-354.151	D	7.546	7.546	0	3.2	97.35	2.53	0	0	0	0.05
2002	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	24	23	949	365.722	-354.966	D	7.55	7.546	0.004	3.2	96.95	2.96	0	0	0	0.1
2002	25	23	822	358.021	-361.607	D	7.55	7.546	0.003	3.2	92.61	7.02	0	0	0	0.38
2002	26	23	906	364.982	-359.812	D	7.546	7.546	0	3.2	98.4	2.24	0	0	0	0.16
2002	27	23	709	364.375	-354.616	D	7.546	7.546	0	3.2	95.88	1.41	0	0	0	0.12
2002	28	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	29	23	1017	356.894	-355.206	D	7.549	7.546	0.002	3.2	95.2	4.66	0	0	0	0.17
2002	30	23	1017	356.894	-355.206	D	7.638	7.546	0.092	3.2	95.78	4.1	0	0	0	0.12
2002	31	23	1039	356.522	-357.599	D	7.601	7.546	0.055	3.2	97.55	2.39	0	0	0	0.06
2002	32	23	949	365.722	-354.966	D	7.418	7.411	0.007	2.913	96.78	3.16	0	0	0	0.05
2002	33	23	930	366.19	-357.232	D	7.406	7.406	0.001	2.9	97.12	2.9	0	0	0	0.22
2002	34	23	930	366.19	-357.232	D	7.406	7.406	0.001	2.9	97.69	2.49	0	0	0	0.15
2002	35	23	949	365.722	-354.966	D	7.412	7.406	0.006	2.9	89.35	9.95	0	0	0	0.71
2002	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	135.23	6.41	0	0	0	0.33
2002	37	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	98.59	3.63	0	0	0	0.13
2002	38	23	949	365.722	-354.966	D	7.421	7.406	0.016	2.9	96.84	2.98	0	0	0	0.19
2002	39	23	930	366.19	-357.232	D	7.41	7.406	0.004	2.9	97.48	2.47	0	0	0	0.12
2002	40	23	594	363.123	-354.422	D	7.406	7.406	0	2.9	98.87	1.2	0	0	0	0.04

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	41	23	1008	358.048	-354.775	D	7.421	7.406	0.015	2.9	96.8	2.91	0	0	0	0.28
2002	42	23	822	358.021	-361.607	D	7.411	7.406	0.006	2.9	96.17	3.58	0	0	0	0.29
2002	43	23	822	358.021	-361.607	D	7.409	7.406	0.004	2.9	95.15	4.42	0	0	0	0.49
2002	44	23	810	357.434	-360.005	D	7.406	7.406	0	2.9	95.43	4.83	0	0	0	0.41
2002	45	23	1017	356.894	-355.206	D	7.413	7.406	0.008	2.9	93.68	6.09	0	0	0	0.27
2002	46	23	949	365.722	-354.966	D	7.407	7.406	0.001	2.9	96.04	3.64	0	0	0	0.46
2002	47	23	941	365.977	-355.774	D	7.406	7.406	0	2.9	95.89	3.47	0	0	0	0.31
2002	48	23	822	358.021	-361.607	D	7.408	7.406	0.003	2.9	90.17	8.96	0	0	0	1.01
2002	49	23	1039	356.522	-357.599	D	7.407	7.406	0.002	2.9	96.37	3.49	0	0	0	0.21
2002	50	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	52	23	949	365.722	-354.966	D	7.407	7.406	0.002	2.9	96.86	2.67	0	0	0	0.52
2002	53	23	191	359.732	-362.061	D	7.408	7.406	0.003	2.9	93.95	5.47	0	0	0	0.59
2002	54	23	1035	356.477	-356.792	D	7.409	7.406	0.004	2.9	95.46	4.37	0	0	0	0.24
2002	55	23	930	366.19	-357.232	D	7.407	7.406	0.001	2.9	97.66	2.33	0	0	0	0.12
2002	56	23	907	365.051	-359.809	D	7.408	7.406	0.002	2.9	91.72	7.98	0	0	0	0.41
2002	57	23	947	365.801	-355.162	D	7.407	7.406	0.002	2.9	78.39	20	0	0	0	1.68
2002	58	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	0	0	0	0	0	0
2002	61	23	822	358.021	-361.607	D	7.327	7.311	0.016	2.7	92.76	6.89	0	0	0	0.36
2002	62	23	949	365.722	-354.966	D	7.317	7.311	0.006	2.7	90.58	8.57	0	0	0	0.86
2002	63	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	932	366.176	-356.761	D	7.312	7.311	0.002	2.7	94.25	5.53	0	0	0	0.19
2002	71	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	100.81	0.47	0	0	0	0.27
2002	72	23	852	361.595	-362.148	D	7.318	7.311	0.008	2.7	98.07	1.76	0	0	0	0.17
2002	73	23	947	365.801	-355.162	D	7.311	7.311	0.001	2.7	99.44	0.5	0	0	0	0.08
2002	74	23	853	361.666	-362.175	D	7.313	7.311	0.003	2.7	93.08	6.61	0	0	0	0.4
2002	75	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	76	23	710	364.843	-359.589	D	7.311	7.311	0	2.7	98.9	2.16	0	0	0	0.05
2002	77	23	403	361.183	-355.506	D	7.311	7.311	0	2.7	101.09	1.01	0	0	0	0.1
2002	78	23	775	365.747	-357.551	D	7.311	7.311	0	2.7	99.88	1.25	0	0	0	0.03
2002	79	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	100.73	1.32	0	0	0	0.03

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	80	23	930	366.19	-357.232	D	7.317	7.311	0.007	2.7	92.82	6.71	0	0	0	0.48
2002	81	23	1017	356.894	-355.206	D	7.313	7.311	0.002	2.7	91.67	7.93	0	0	0	0.49
2002	82	23	1017	356.894	-355.206	D	7.32	7.311	0.009	2.7	93.45	6.33	0	0	0	0.24
2002	83	23	785	365.637	-355.06	D	7.311	7.311	0	2.7	98.43	1.6	0	0	0	0.09
2002	84	23	643	363.609	-354.151	D	7.311	7.311	0.001	2.7	98.06	2.21	0	0	0	0.05
2002	85	23	777	365.725	-357.053	D	7.312	7.311	0.001	2.7	98.17	1.83	0	0	0	0.03
2002	86	23	1017	356.894	-355.206	D	7.323	7.311	0.012	2.7	97.63	2.24	0	0	0	0.14
2002	87	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	99.38	0.63	0	0	0	0.1
2002	88	23	1035	356.477	-356.792	D	7.315	7.311	0.004	2.7	99.57	0.36	0	0	0	0.12
2002	89	23	832	359.493	-362.061	D	7.311	7.311	0.001	2.7	99.64	0.27	0	0	0	0.08
2002	90	23	1017	356.894	-355.206	D	7.311	7.311	0.001	2.7	99.61	0.35	0	0	0	0.31
2002	91	23	964	363.678	-354.148	D	7.321	7.311	0.01	2.7	97.7	2.02	0	0	0	0.28
2002	92	23	1039	356.522	-357.599	D	7.329	7.311	0.019	2.7	97.95	1.84	0	0	0	0.23
2002	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	96	23	949	365.722	-354.966	D	7.312	7.311	0.002	2.7	99.15	0.82	0	0	0	0.13
2002	97	23	933	366.169	-356.524	D	7.311	7.311	0.001	2.7	99.37	0.58	0	0	0	0.09
2002	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	99	23	811	357.434	-360.225	D	7.313	7.311	0.002	2.7	97.79	2.08	0	0	0	0.12
2002	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	102	23	1007	358.259	-354.768	D	7.311	7.311	0	2.7	99.77	0.36	0	0	0	0.17
2002	103	23	1008	358.048	-354.775	D	7.326	7.311	0.015	2.7	98.08	1.82	0	0	0	0.12
2002	104	23	1007	358.259	-354.768	D	7.312	7.311	0.002	2.7	99.51	0.45	0	0	0	0.08
2002	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	110	23	964	363.678	-354.148	D	7.319	7.311	0.008	2.7	98.93	0.95	0	0	0	0.17
2002	111	23	967	363.478	-354.116	D	7.328	7.311	0.018	2.7	98.98	0.94	0	0	0	0.1
2002	112	23	964	363.678	-354.148	D	7.314	7.311	0.004	2.7	99.37	0.44	0	0	0	0.24
2002	113	23	949	365.722	-354.966	D	7.317	7.311	0.006	2.7	99.45	0.46	0	0	0	0.13
2002	114	23	947	365.801	-355.162	D	7.313	7.311	0.002	2.7	99.31	0.5	0	0	0	0.2
2002	115	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	116	23	643	363.609	-354.151	D	7.311	7.311	0.001	2.7	98.22	1.82	0	0	0	0.18
2002	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	119	23	822	358.021	-361.607	D	7.322	7.311	0.011	2.7	98.41	1.38	0	0	0	0.22
2002	120	23	1017	356.894	-355.206	D	7.314	7.311	0.004	2.7	99.84	0.12	0	0	0	0.1
2002	121	23	62	357.925	-354.901	D	7.581	7.581	0	3.275	99.6	0.17	0	0	0	0.06
2002	122	23	822	358.021	-361.607	D	7.641	7.593	0.049	3.3	97.79	2.11	0	0	0	0.1
2002	123	23	822	358.021	-361.607	D	7.598	7.593	0.005	3.3	99.76	0.23	0	0	0	0.05
2002	124	23	822	358.021	-361.607	D	7.612	7.593	0.02	3.3	99.43	0.53	0	0	0	0.04
2002	125	23	832	359.493	-362.061	D	7.607	7.593	0.015	3.3	99.78	0.19	0	0	0	0.03
2002	126	23	948	365.727	-355.056	D	7.596	7.593	0.003	3.3	99.94	0.04	0	0	0	0.02
2002	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	129	23	1017	356.894	-355.206	D	7.593	7.593	0.001	3.3	92.34	7.01	0	0	0	0.63
2002	130	23	1017	356.894	-355.206	D	7.599	7.593	0.007	3.3	98.71	1.12	0	0	0	0.2
2002	131	23	786	365.973	-357.042	D	7.593	7.593	0	3.3	99.42	0.38	0	0	0	0.04
2002	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	133	23	949	365.722	-354.966	D	7.609	7.593	0.017	3.3	97.79	2.15	0	0	0	0.06
2002	134	23	949	365.722	-354.966	D	7.597	7.593	0.004	3.3	97.32	2.32	0	0	0	0.41
2002	135	23	930	366.19	-357.232	D	7.595	7.593	0.002	3.3	99.68	0.25	0	0	0	0.11
2002	136	23	454	361.657	-354.986	D	7.593	7.593	0	3.3	72.16	0.03	0	0	0	0.05
2002	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	113.19	1.46	0	0	0	0.09
2002	138	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	139	23	1039	356.522	-357.599	D	7.6	7.593	0.007	3.3	99.56	0.26	0	0	0	0.18
2002	140	23	644	364.12	-360.12	D	7.624	7.593	0.031	3.3	98.64	1.2	0	0	0	0.16
2002	141	23	822	358.021	-361.607	D	7.596	7.593	0.003	3.3	99.8	0.15	0	0	0	0.09
2002	142	23	1035	356.477	-356.792	D	7.597	7.593	0.004	3.3	99.82	0.17	0	0	0	0.06
2002	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	145	23	822	358.021	-361.607	D	7.615	7.593	0.023	3.3	99.69	0.21	0	0	0	0.1
2002	146	23	907	365.051	-359.809	D	7.606	7.593	0.013	3.3	99.59	0.35	0	0	0	0.06
2002	147	23	949	365.722	-354.966	D	7.594	7.593	0.002	3.3	99.78	0.19	0	0	0	0.05
2002	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	150	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	156	23	1017	356.894	-355.206	D	7.594	7.593	0.001	3.3	99.91	0.1	0	0	0	0.09
2002	157	23	1035	356.477	-356.792	D	7.598	7.593	0.006	3.3	99.56	0.36	0	0	0	0.1

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	158	23	1017	356.894	-355.206	D	7.593	7.593	0.001	3.3	99.87	0.05	0	0	0	0.1
2002	159	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	99.64	0.02	0	0	0	0.04
2002	160	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	103.46	0	0	0	0	0.04
2002	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	164	23	966	363.538	-354.124	D	7.595	7.593	0.002	3.3	99.86	0.01	0	0	0	0.08
2002	165	23	1017	356.894	-355.206	D	7.622	7.593	0.029	3.3	99.72	0.18	0	0	0	0.1
2002	166	23	931	366.183	-356.996	D	7.598	7.593	0.006	3.3	98.82	0.7	0	0	0	0.5
2002	167	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	100.11	0.03	0	0	0	0.16
2002	168	23	822	358.021	-361.607	D	7.603	7.593	0.011	3.3	99.8	0.09	0	0	0	0.11
2002	169	23	930	366.19	-357.232	D	7.606	7.593	0.014	3.3	99.91	0.03	0	0	0	0.07
2002	170	23	949	365.722	-354.966	D	7.599	7.593	0.006	3.3	99.92	0.05	0	0	0	0.06
2002	171	23	618	363.371	-354.411	D	7.593	7.593	0	3.3	94.97	0.01	0	0	0	0.06
2002	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	178	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	179	23	949	365.722	-354.966	D	7.596	7.593	0.003	3.3	99.81	0.14	0	0	0	0.09
2002	180	23	949	365.722	-354.966	D	7.597	7.593	0.005	3.3	99.9	0.06	0	0	0	0.06
2002	181	23	947	365.801	-355.162	D	7.593	7.593	0	3.3	97.81	0	0	0	0	0.06
2002	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	183	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	192	23	930	366.19	-357.232	D	7.597	7.593	0.004	3.3	99.56	0.37	0	0	0	0.09
2002	193	23	907	365.051	-359.809	D	7.599	7.593	0.007	3.3	99.86	0.1	0	0	0	0.06
2002	194	23	907	365.051	-359.809	D	7.596	7.593	0.003	3.3	99.6	0.36	0	0	0	0.05
2002	195	23	219	359.98	-362.05	D	7.593	7.593	0.001	3.3	99.96	0.05	0	0	0	0.04
2002	196	23	407	361.716	-361.973	D	7.593	7.593	0	3.3	99.92	0.12	0	0	0	0.04

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	197	23	219	359.98	-362.05	D	7.593	7.593	0	3.3	99.4	0.02	0	0	0	0.04
2002	198	23	786	365.973	-357.042	D	7.593	7.593	0	3.3	100.65	0.03	0	0	0	0.04
2002	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	204	23	963	363.809	-354.192	D	7.601	7.593	0.008	3.3	99.78	0.12	0	0	0	0.09
2002	205	23	853	361.666	-362.175	D	7.599	7.593	0.006	3.3	99.92	0.05	0	0	0	0.07
2002	206	23	822	358.021	-361.607	D	7.594	7.593	0.002	3.3	99.93	0.05	0	0	0	0.05
2002	207	23	930	366.19	-357.232	D	7.598	7.593	0.005	3.3	99.94	0.02	0	0	0	0.05
2002	208	23	933	366.169	-356.524	D	7.594	7.593	0.001	3.3	100	0.03	0	0	0	0.04
2002	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	214	23	1017	356.894	-355.206	D	7.593	7.593	0.001	3.3	99.75	0	0	0	0	0.11
2002	215	23	1008	358.048	-354.775	D	7.593	7.593	0	3.3	99.9	0.02	0	0	0	0.08
2002	216	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	217	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	218	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	99.46	0.07	0	0	0	0.09
2002	219	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	99.48	0.06	0	0	0	0.08
2002	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	226	23	966	363.538	-354.124	D	7.594	7.593	0.001	3.3	99.82	0.08	0	0	0	0.13
2002	227	23	961	364.092	-354.289	D	7.593	7.593	0	3.3	98.41	0.03	0	0	0	0.1
2002	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	232	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	236	23	822	358.021	-361.607	D	7.647	7.593	0.054	3.3	99.55	0.35	0	0	0	0.11
2002	237	23	853	361.666	-362.175	D	7.596	7.593	0.003	3.3	99.86	0.09	0	0	0	0.08
2002	238	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	239	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	242	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	243	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2002	245	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	246	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	247	23	1007	358.259	-354.768	D	7.641	7.639	0.002	3.4	99.77	0.05	0	0	0	0.14
2002	248	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	100.06	0.01	0	0	0	0.1
2002	249	23	811	357.434	-360.225	D	7.639	7.639	0	3.4	99.88	0.01	0	0	0	0.07
2002	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	22.51	0	0	0	0	0.02
2002	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	254	23	930	366.19	-357.232	D	7.652	7.639	0.013	3.4	98.19	1.58	0	0	0	0.24
2002	255	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	256	23	1039	356.522	-357.599	D	7.639	7.639	0	3.4	99.86	0.01	0	0	0	0.08
2002	257	23	1016	357.1	-355.198	D	7.639	7.639	0	3.4	99.81	0.04	0	0	0	0.06
2002	258	23	1017	356.894	-355.206	D	7.656	7.639	0.017	3.4	99.58	0.32	0	0	0	0.1
2002	259	23	907	365.051	-359.809	D	7.681	7.639	0.043	3.4	99.68	0.25	0	0	0	0.08
2002	260	23	1017	356.894	-355.206	D	7.683	7.639	0.044	3.4	99.79	0.15	0	0	0	0.06
2002	261	23	949	365.722	-354.966	D	7.641	7.639	0.002	3.4	99.78	0.19	0	0	0	0.05
2002	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	265	23	1035	356.477	-356.792	D	7.644	7.639	0.005	3.4	99.54	0.37	0	0	0	0.12
2002	266	23	1017	356.894	-355.206	D	7.639	7.639	0	3.4	97.31	2.32	0	0	0	0.52
2002	267	23	966	363.538	-354.124	D	7.645	7.639	0.007	3.4	99.52	0.33	0	0	0	0.16
2002	268	23	1008	358.048	-354.775	D	7.644	7.639	0.006	3.4	99.73	0.16	0	0	0	0.1
2002	269	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	270	23	1035	356.477	-356.792	D	7.645	7.639	0.006	3.4	99.85	0.03	0	0	0	0.15
2002	271	23	1017	356.894	-355.206	D	7.669	7.639	0.03	3.4	99.74	0.16	0	0	0	0.1
2002	272	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	106.82	0.02	0	0	0	0.08
2002	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	933	366.169	-356.524	D	7.5	7.5	0.001	3.1	87.05	12.04	0	0	0	0.95
2002	279	23	852	361.595	-362.148	D	7.502	7.5	0.002	3.1	99.49	0.39	0	0	0	0.14
2002	280	23	1035	356.477	-356.792	D	7.503	7.5	0.003	3.1	98.52	1.02	0	0	0	0.45
2002	281	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	282	23	14	357.202	-355.432	D	7.5	7.5	0	3.1	110.11	0.75	0	0	0	0.08
2002	283	23	786	365.973	-357.042	D	7.5	7.5	0	3.1	99.94	0.44	0	0	0	0.06
2002	284	23	853	361.666	-362.175	D	7.5	7.5	0	3.1	99.65	0.31	0	0	0	0.05
2002	285	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	97.89	1.98	0	0	0	0.15
2002	286	23	931	366.183	-356.996	D	7.512	7.5	0.012	3.1	98.57	1.29	0	0	0	0.13
2002	287	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	947	365.801	-355.162	D	7.501	7.5	0.002	3.1	97.85	1.71	0	0	0	0.55
2002	289	23	380	361.468	-361.984	D	7.5	7.5	0	3.1	96.14	0.13	0	0	0	0.09
2002	290	23	44	358.21	-361.379	D	7.5	7.5	0	3.1	109.34	0.15	0	0	0	0.15
2002	291	23	853	361.666	-362.175	D	7.502	7.5	0.003	3.1	99.55	0.37	0	0	0	0.1
2002	292	23	941	365.977	-355.774	D	7.505	7.5	0.006	3.1	94.69	5.11	0	0	0	0.22
2002	293	23	853	361.666	-362.175	D	7.501	7.5	0.001	3.1	98.32	1.72	0	0	0	0.06
2002	294	23	822	358.021	-361.607	D	7.501	7.5	0.001	3.1	99.46	0.63	0	0	0	0.06
2002	295	23	811	357.434	-360.225	D	7.501	7.5	0.001	3.1	99.65	0.38	0	0	0	0.05
2002	296	23	821	358.053	-361.416	D	7.5	7.5	0	3.1	99.65	0.23	0	0	0	0.04
2002	297	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	298	23	1017	356.894	-355.206	D	7.532	7.5	0.032	3.1	96.45	3.38	0	0	0	0.17
2002	299	23	930	366.19	-357.232	D	7.569	7.5	0.069	3.1	96.01	3.81	0	0	0	0.18
2002	300	23	822	358.021	-361.607	D	7.502	7.5	0.003	3.1	97.85	2.11	0	0	0	0.12
2002	301	23	1035	356.477	-356.792	D	7.511	7.5	0.012	3.1	98.84	1.12	0	0	0	0.06
2002	302	23	822	358.021	-361.607	D	7.507	7.5	0.008	3.1	99.08	0.89	0	0	0	0.05
2002	303	23	822	358.021	-361.607	D	7.5	7.5	0.001	3.1	99.57	0.65	0	0	0	0.06
2002	304	23	822	358.021	-361.607	D	7.5	7.5	0.001	3.1	96.73	3.26	0	0	0	0.09
2002	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	306	23	967	363.478	-354.116	D	7.519	7.5	0.02	3.1	95.54	4.21	0	0	0	0.25
2002	307	23	963	363.809	-354.192	D	7.503	7.5	0.003	3.1	97.47	2.5	0	0	0	0.1
2002	308	23	933	366.169	-356.524	D	7.523	7.5	0.023	3.1	97.03	2.84	0	0	0	0.15
2002	309	23	949	365.722	-354.966	D	7.524	7.5	0.025	3.1	97.89	2.03	0	0	0	0.08
2002	310	23	949	365.722	-354.966	D	7.561	7.5	0.061	3.1	96.67	3.19	0	0	0	0.14
2002	311	23	748	365.295	-358.57	D	7.5	7.5	0	3.1	98.59	0.5	0	0	0	0.06
2002	312	23	63	358.458	-361.368	D	7.5	7.5	0	3.1	128.76	0.85	0	0	0	0.07
2002	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
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2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	314	23	966	363.538	-354.124	D	7.508	7.5	0.009	3.1	99.09	0.53	0	0	0	0.4
2002	315	23	931	366.183	-356.996	D	7.51	7.5	0.011	3.1	89.84	9.27	0	0	0	0.9
2002	316	23	947	365.801	-355.162	D	7.506	7.5	0.007	3.1	94.89	4.72	0	0	0	0.39
2002	317	23	832	359.493	-362.061	D	7.502	7.5	0.003	3.1	95.21	4.44	0	0	0	0.36
2002	318	23	710	364.843	-359.589	D	7.5	7.5	0	3.1	97.4	1.67	0	0	0	0.19
2002	319	23	5	356.783	-357.198	D	7.501	7.5	0.002	3.1	94.26	5.55	0	0	0	0.18
2002	320	23	3	356.524	-356.959	D	7.5	7.5	0	3.1	94.61	5.47	0	0	0	0.37
2002	321	23	949	365.722	-354.966	D	7.507	7.5	0.007	3.1	93.12	6.58	0	0	0	0.32
2002	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	323	23	933	366.169	-356.524	D	7.509	7.5	0.009	3.1	89.7	9.44	0	0	0	0.88
2002	324	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	98.61	1.89	0	0	0	0.31
2002	325	23	949	365.722	-354.966	D	7.5	7.5	0.001	3.1	92.39	6.79	0	0	0	0.99
2002	326	23	1009	357.941	-354.82	D	7.507	7.5	0.008	3.1	95.34	4.26	0	0	0	0.4
2002	327	23	930	366.19	-357.232	D	7.502	7.5	0.002	3.1	95.59	4.23	0	0	0	0.27
2002	328	23	62	357.925	-354.901	D	7.5	7.5	0	3.1	98.67	1.72	0	0	0	0.15
2002	329	23	930	366.19	-357.232	D	7.501	7.5	0.001	3.1	97.34	2.61	0	0	0	0.07
2002	330	23	822	358.021	-361.607	D	7.501	7.5	0.001	3.1	96.18	3.82	0	0	0	0.23
2002	331	23	809	357.432	-359.845	D	7.5	7.5	0.001	3.1	95.83	3.98	0	0	0	0.16
2002	332	23	1017	356.894	-355.206	D	7.514	7.5	0.015	3.1	95.23	4.63	0	0	0	0.16
2002	333	23	775	365.747	-357.551	D	7.5	7.5	0	3.1	98.03	1.64	0	0	0	0.11
2002	334	23	949	365.722	-354.966	D	7.505	7.5	0.005	3.1	90.21	8.69	0	0	0	1.13
2002	335	23	889	362.866	-360.687	D	7.596	7.589	0.007	3.292	81.82	17.18	0	0	0	1.01
2002	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	853	361.666	-362.175	D	7.602	7.593	0.009	3.3	93.79	5.89	0	0	0	0.33
2002	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	1017	356.894	-355.206	D	7.593	7.593	0.001	3.3	94.15	5.58	0	0	0	0.23
2002	340	23	930	366.19	-357.232	D	7.601	7.593	0.008	3.3	94.6	5.21	0	0	0	0.2
2002	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	11.4	0.23	0	0	0	0.01
2002	342	23	964	363.678	-354.148	D	7.595	7.593	0.003	3.3	97.64	2.26	0	0	0	0.1
2002	343	23	811	357.434	-360.225	D	7.601	7.593	0.009	3.3	97.7	2.26	0	0	0	0.07
2002	344	23	1017	356.894	-355.206	D	7.596	7.593	0.003	3.3	98.23	1.75	0	0	0	0.05
2002	345	23	1017	356.894	-355.206	D	7.595	7.593	0.003	3.3	98.47	1.48	0	0	0	0.04
2002	346	23	965	363.588	-354.142	D	7.593	7.593	0.001	3.3	98.79	1.25	0	0	0	0.04
2002	347	23	1035	356.477	-356.792	D	7.595	7.593	0.002	3.3	98.04	1.96	0	0	0	0.09
2002	348	23	861	361.895	-361.506	D	7.605	7.593	0.013	3.3	95.59	4.24	0	0	0	0.19
2002	349	23	931	366.183	-356.996	D	7.593	7.593	0	3.3	96.45	3.09	0	0	0	0.11
2002	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	353	23	1017	356.894	-355.206	D	7.602	7.593	0.01	3.3	93.03	6.59	0	0	0	0.38
2002	354	23	906	364.982	-359.812	D	7.593	7.593	0	3.3	92.44	4.68	0	0	0	0.16
2002	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	1007	358.259	-354.768	D	7.597	7.593	0.004	3.3	85.69	13.77	0	0	0	0.55
2002	357	23	1016	357.1	-355.198	D	7.594	7.593	0.001	3.3	91.59	8.14	0	0	0	0.24
2002	358	23	845	360.851	-362.181	D	7.594	7.593	0.002	3.3	93.52	6.35	0	0	0	0.12
2002	359	23	949	365.722	-354.966	D	7.596	7.593	0.003	3.3	79.76	18.76	0	0	0	1.49
2002	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	96.78	3.35	0	0	0	0.1
2002	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	1017	356.894	-355.206	D	7.596	7.593	0.003	3.3	94.94	4.89	0	0	0	0.2
									0.092							
UMC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2002	2	23	933	366.169	-356.524	D	7.576	7.546	0.03	3.2	77.05	22.91	0	0	0	0.05
2002	3	23	930	366.19	-357.232	D	7.572	7.546	0.026	3.2	80.47	19.5	0	0	0	0.04
2002	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	7	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	10	23	930	366.19	-357.232	D	7.761	7.546	0.215	3.2	92.63	7.33	0	0	0	0.04
2002	11	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	16	23	1017	356.894	-355.206	D	7.546	7.546	0	3.2	85.11	15.73	0	0	0	0.05
2002	17	23	931	366.183	-356.996	D	7.58	7.546	0.034	3.2	80.41	19.56	0	0	0	0.04
2002	18	23	933	366.169	-356.524	D	7.634	7.546	0.088	3.2	87.29	12.69	0	0	0	0.03
2002	19	23	1008	358.048	-354.775	D	7.612	7.546	0.066	3.2	92.51	7.47	0	0	0	0.02
2002	20	23	949	365.722	-354.966	D	7.745	7.546	0.199	3.2	92.21	7.77	0	0	0	0.01
2002	21	23	949	365.722	-354.966	D	7.549	7.546	0.003	3.2	95.35	4.66	0	0	0	0

Appendix M
Hercules Glade
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	24	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	25	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	26	23	906	364.982	-359.812	D	7.546	7.546	0	3.2	99.03	1.08	0	0	0	0.01
2002	27	23	930	366.19	-357.232	D	7.547	7.546	0.001	3.2	97.72	2.39	0	0	0	0.01
2002	28	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	30	23	907	365.051	-359.809	D	8.033	7.546	0.486	3.2	90.9	9.08	0	0	0	0.02
2002	31	23	1017	356.894	-355.206	D	8.413	7.546	**0.867**	3.2	94.17	5.82	0	0	0	0.01
2002	32	23	949	365.722	-354.966	D	7.435	7.411	0.024	2.913	94.62	5.38	0	0	0	0.01
2002	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	35	23	949	365.722	-354.966	D	7.417	7.406	0.011	2.9	86.94	13.01	0	0	0	0.06
2002	36	23	1035	356.477	-356.792	D	7.433	7.406	0.027	2.9	86.78	13.19	0	0	0	0.04
2002	37	23	1017	356.894	-355.206	D	7.406	7.406	0.001	2.9	93	7.5	0	0	0	0.02
2002	38	23	933	366.169	-356.524	D	7.416	7.406	0.01	2.9	89.05	10.95	0	0	0	0.03
2002	39	23	907	365.051	-359.809	D	7.406	7.406	0.001	2.9	96.74	3.58	0	0	0	0.01
2002	40	23	785	365.637	-355.06	D	7.406	7.406	0	2.9	97.44	3	0	0	0	0.01
2002	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	44	23	914	365.435	-358.584	D	7.459	7.406	0.054	2.9	70.18	29.69	0	0	0	0.14
2002	45	23	852	361.595	-362.148	D	7.406	7.406	0	2.9	94.79	5.34	0	0	0	0.03
2002	46	23	907	365.051	-359.809	D	7.41	7.406	0.004	2.9	93.48	6.52	0	0	0	0.02
2002	47	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	48	23	933	366.169	-356.524	D	7.412	7.406	0.006	2.9	94.36	5.56	0	0	0	0.08
2002	49	23	947	365.801	-355.162	D	7.427	7.406	0.022	2.9	91.31	8.67	0	0	0	0.03
2002	50	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	52	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	53	23	933	366.169	-356.524	D	7.432	7.406	0.027	2.9	87.69	12.26	0	0	0	0.06
2002	54	23	930	366.19	-357.232	D	7.43	7.406	0.025	2.9	91.75	8.23	0	0	0	0.03
2002	55	23	930	366.19	-357.232	D	7.407	7.406	0.002	2.9	94.8	5.41	0	0	0	0.02
2002	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	57	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	58	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	61	23	949	365.722	-354.966	D	7.335	7.311	0.024	2.7	89.42	10.57	0	0	0	0.02
2002	62	23	356	361.22	-361.995	D	7.311	7.311	0	2.7	94.87	4.46	0	0	0	0
2002	63	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	964	363.678	-354.148	D	7.312	7.311	0.001	2.7	97.01	3.03	0	0	0	0.03
2002	72	23	964	363.678	-354.148	D	7.314	7.311	0.004	2.7	94.71	5.27	0	0	0	0.03
2002	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	23	932	366.176	-356.761	D	7.311	7.311	0.001	2.7	92.98	7	0	0	0	0.03
2002	75	23	78	358.239	-356.385	D	7.37	7.311	0.06	2.7	68.79	31.05	0	0	0	0.17
2002	76	23	1017	356.894	-355.206	D	7.371	7.311	0.06	2.7	96.21	3.78	0	0	0	0.01
2002	77	23	967	363.478	-354.116	D	7.33	7.311	0.019	2.7	96.27	3.72	0	0	0	0.02
2002	78	23	949	365.722	-354.966	D	7.322	7.311	0.012	2.7	97.67	2.33	0	0	0	0.01
2002	79	23	1035	356.477	-356.792	D	7.569	7.311	0.258	2.7	92.96	7.01	0	0	0	0.03
2002	80	23	930	366.19	-357.232	D	7.378	7.311	0.067	2.7	94.09	5.88	0	0	0	0.03
2002	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	82	23	907	365.051	-359.809	D	7.311	7.311	0	2.7	98.12	3.42	0	0	0	0.02
2002	83	23	929	366.032	-357.239	D	7.311	7.311	0	2.7	95.79	3.91	0	0	0	0.01
2002	84	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	85	23	1039	356.522	-357.599	D	7.379	7.311	0.069	2.7	84.31	15.62	0	0	0	0.07
2002	86	23	907	365.051	-359.809	D	7.312	7.311	0.002	2.7	98.75	1.34	0	0	0	0.02
2002	87	23	930	366.19	-357.232	D	7.348	7.311	0.038	2.7	97.36	2.63	0	0	0	0.01
2002	88	23	900	364.265	-360.243	D	7.432	7.311	0.121	2.7	98.81	1.17	0	0	0	0.03
2002	89	23	930	366.19	-357.232	D	7.317	7.311	0.007	2.7	95.95	4.03	0	0	0	0.04
2002	90	23	1008	358.048	-354.775	D	7.32	7.311	0.009	2.7	98.85	1.12	0	0	0	0.04
2002	91	23	853	361.666	-362.175	D	7.37	7.311	0.06	2.7	96.08	3.88	0	0	0	0.03
2002	92	23	789	365.918	-355.796	D	7.311	7.311	0	2.7	94.23	0.24	0	0	0	0.02
2002	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	94	23	930	366.19	-357.232	D	7.322	7.311	0.011	2.7	92.79	7.19	0	0	0	0.04
2002	95	23	949	365.722	-354.966	D	7.386	7.311	0.075	2.7	95.89	4.08	0	0	0	0.02
2002	96	23	930	366.19	-357.232	D	7.421	7.311	0.11	2.7	98.65	1.33	0	0	0	0.02
2002	97	23	949	365.722	-354.966	D	7.334	7.311	0.023	2.7	99.11	0.88	0	0	0	0.01
2002	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	99	23	933	366.169	-356.524	D	7.357	7.311	0.047	2.7	99.36	0.62	0	0	0	0.03

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	100	23	1035	356.477	-356.792	D	7.364	7.311	0.054	2.7	99.28	0.7	0	0	0	0.02
2002	101	23	1035	356.477	-356.792	D	7.321	7.311	0.01	2.7	99.09	0.92	0	0	0	0.01
2002	102	23	947	365.801	-355.162	D	7.311	7.311	0	2.7	99.66	0.09	0	0	0	0.01
2002	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	111	23	643	363.609	-354.151	D	7.311	7.311	0	2.7	98.55	1.47	0	0	0	0.02
2002	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	113	23	930	366.19	-357.232	D	7.311	7.311	0	2.7	100.32	0.18	0	0	0	0.01
2002	114	23	947	365.801	-355.162	D	7.311	7.311	0	2.7	99.71	0.33	0	0	0	0.01
2002	115	23	907	365.051	-359.809	D	7.338	7.311	0.027	2.7	97.77	2.17	0	0	0	0.06
2002	116	23	822	358.021	-361.607	D	7.345	7.311	0.034	2.7	96.95	3.03	0	0	0	0.02
2002	117	23	949	365.722	-354.966	D	7.316	7.311	0.005	2.7	98.42	1.57	0	0	0	0.01
2002	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	119	23	949	365.722	-354.966	D	7.313	7.311	0.002	2.7	99.5	0.57	0	0	0	0.04
2002	120	23	955	364.92	-354.582	D	7.311	7.311	0	2.7	99.82	0.27	0	0	0	0.03
2002	121	23	1017	356.894	-355.206	D	7.581	7.581	0	3.275	86.19	0.67	0	0	0	0.01
2002	122	23	930	366.19	-357.232	D	7.82	7.593	0.227	3.3	96.48	3.51	0	0	0	0.01
2002	123	23	853	361.666	-362.175	D	7.701	7.593	0.108	3.3	98.2	1.79	0	0	0	0.01
2002	124	23	822	358.021	-361.607	D	7.702	7.593	0.109	3.3	98.96	1.04	0	0	0	0
2002	125	23	822	358.021	-361.607	D	7.656	7.593	0.064	3.3	99.53	0.47	0	0	0	0
2002	126	23	963	363.809	-354.192	D	7.6	7.593	0.007	3.3	99.93	0.07	0	0	0	0
2002	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	130	23	907	365.051	-359.809	D	7.635	7.593	0.043	3.3	99.33	0.65	0	0	0	0.02
2002	131	23	967	363.478	-354.116	D	7.633	7.593	0.041	3.3	99.39	0.6	0	0	0	0.01
2002	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	133	23	933	366.169	-356.524	D	7.685	7.593	0.093	3.3	85.89	14.06	0	0	0	0.05
2002	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	137	23	1017	356.894	-355.206	D	7.668	7.593	0.075	3.3	97.5	2.49	0	0	0	0.01
2002	138	23	941	365.977	-355.774	D	7.694	7.593	0.101	3.3	98.79	1.19	0	0	0	0.02

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	139	23	907	365.051	-359.809	D	7.842	7.593	0.25	3.3	98.26	1.72	0	0	0	0.01
2002	140	23	949	365.722	-354.966	D	7.608	7.593	0.016	3.3	99.39	0.58	0	0	0	0.03
2002	141	23	1035	356.477	-356.792	D	7.74	7.593	0.147	3.3	98.45	1.53	0	0	0	0.02
2002	142	23	930	366.19	-357.232	D	7.659	7.593	0.066	3.3	99.35	0.64	0	0	0	0.01
2002	143	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	99.75	0.22	0	0	0	0.01
2002	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	150	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	156	23	1010	357.824	-354.865	D	7.626	7.593	0.033	3.3	99.14	0.85	0	0	0	0.02
2002	157	23	1035	356.477	-356.792	D	7.829	7.593	0.236	3.3	95.24	4.73	0	0	0	0.03
2002	158	23	947	365.801	-355.162	D	7.717	7.593	0.124	3.3	99.69	0.29	0	0	0	0.01
2002	159	23	949	365.722	-354.966	D	7.75	7.593	0.157	3.3	99.83	0.16	0	0	0	0.01
2002	160	23	964	363.678	-354.148	D	7.603	7.593	0.011	3.3	99.96	0.04	0	0	0	0.01
2002	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	164	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	165	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	99.9	0.12	0	0	0	0.01
2002	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	168	23	933	366.169	-356.524	D	7.646	7.593	0.054	3.3	99.1	0.88	0	0	0	0.01
2002	169	23	933	366.169	-356.524	D	7.646	7.593	0.054	3.3	99.91	0.08	0	0	0	0.01
2002	170	23	949	365.722	-354.966	D	7.603	7.593	0.01	3.3	99.95	0.05	0	0	0	0.01
2002	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	178	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	179	23	730	364.623	-354.605	D	7.593	7.593	0	3.3	94.42	0.02	0	0	0	0.01
2002	180	23	941	365.977	-355.774	D	7.594	7.593	0.001	3.3	99.94	0.05	0	0	0	0.01
2002	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	183	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	186	23	949	365.722	-354.966	D	7.594	7.593	0.002	3.3	99.99	0.03	0	0	0	0.01
2002	187	23	949	365.722	-354.966	D	7.615	7.593	0.023	3.3	99.97	0.03	0	0	0	0.01
2002	188	23	1008	358.048	-354.775	D	7.625	7.593	0.032	3.3	99.96	0.04	0	0	0	0.01
2002	189	23	964	363.678	-354.148	D	7.603	7.593	0.01	3.3	99.98	0.02	0	0	0	0.01
2002	190	23	947	365.801	-355.162	D	7.595	7.593	0.003	3.3	100.01	0.01	0	0	0	0.01
2002	191	23	743	364.915	-355.591	D	7.593	7.593	0	3.3	99.71	0.05	0	0	0	0.01
2002	192	23	949	365.722	-354.966	D	7.601	7.593	0.009	3.3	99.35	0.67	0	0	0	0.01
2002	193	23	973	362.512	-354.246	D	7.62	7.593	0.027	3.3	99.76	0.23	0	0	0	0.01
2002	194	23	1017	356.894	-355.206	D	7.616	7.593	0.023	3.3	99.27	0.72	0	0	0	0.01
2002	195	23	822	358.021	-361.607	D	7.595	7.593	0.002	3.3	99.9	0.13	0	0	0	0.01
2002	196	23	15	357.659	-360.155	D	7.593	7.593	0	3.3	99.69	0.12	0	0	0	0.01
2002	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	204	23	1008	358.048	-354.775	D	7.665	7.593	0.072	3.3	99.87	0.11	0	0	0	0.02
2002	205	23	1035	356.477	-356.792	D	7.99	7.593	0.397	3.3	99.83	0.16	0	0	0	0.02
2002	206	23	822	358.021	-361.607	D	7.656	7.593	0.063	3.3	99.93	0.06	0	0	0	0.01
2002	207	23	907	365.051	-359.809	D	7.701	7.593	0.109	3.3	99.94	0.05	0	0	0	0.01
2002	208	23	941	365.977	-355.774	D	7.602	7.593	0.009	3.3	99.97	0.03	0	0	0	0.01
2002	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	214	23	1008	358.048	-354.775	D	7.597	7.593	0.005	3.3	99.94	0.06	0	0	0	0.02
2002	215	23	1003	359.099	-354.737	D	7.594	7.593	0.001	3.3	100.2	0.06	0	0	0	0.01
2002	216	23	15	357.659	-360.155	D	7.593	7.593	0.001	3.3	99.95	0.01	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	217	23	61	357.936	-355.15	D	7.593	7.593	0	3.3	100.04	0	0	0	0	0.01
2002	218	23	930	366.19	-357.232	D	7.743	7.593	0.151	3.3	99.9	0.08	0	0	0	0.01
2002	219	23	853	361.666	-362.175	D	7.76	7.593	0.167	3.3	99.55	0.44	0	0	0	0.01
2002	220	23	822	358.021	-361.607	D	7.594	7.593	0.001	3.3	99.9	0.03	0	0	0	0.01
2002	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	232	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	99.33	0.36	0	0	0	0.01
2002	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	237	23	933	366.169	-356.524	D	7.759	7.593	0.167	3.3	98.35	1.62	0	0	0	0.03
2002	238	23	1017	356.894	-355.206	D	7.836	7.593	0.243	3.3	99.45	0.53	0	0	0	0.02
2002	239	23	1017	356.894	-355.206	D	7.687	7.593	0.094	3.3	99.56	0.42	0	0	0	0.01
2002	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	242	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	243	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2002	245	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	246	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	247	23	966	363.538	-354.124	D	7.652	7.639	0.013	3.4	99.96	0.03	0	0	0	0.02
2002	248	23	963	363.809	-354.192	D	7.696	7.639	0.058	3.4	99.9	0.09	0	0	0	0.01
2002	249	23	1017	356.894	-355.206	D	7.651	7.639	0.012	3.4	99.99	0.02	0	0	0	0.01
2002	250	23	1017	356.894	-355.206	D	7.639	7.639	0.001	3.4	99.97	0.01	0	0	0	0.01
2002	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	254	23	78	358.239	-356.385	D	7.826	7.639	0.187	3.4	93.77	6.14	0	0	0	0.09
2002	255	23	822	358.021	-361.607	D	7.686	7.639	0.047	3.4	99.61	0.37	0	0	0	0.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	256	23	811	357.434	-360.225	D	7.653	7.639	0.014	3.4	99.93	0.06	0	0	0	0.01
2002	257	23	1017	356.894	-355.206	D	7.655	7.639	0.017	3.4	99.92	0.07	0	0	0	0.01
2002	258	23	949	365.722	-354.966	D	7.66	7.639	0.021	3.4	99.85	0.13	0	0	0	0.02
2002	259	23	933	366.169	-356.524	D	7.984	7.639	0.345	3.4	99.35	0.63	0	0	0	0.01
2002	260	23	949	365.722	-354.966	D	7.89	7.639	0.251	3.4	99.58	0.42	0	0	0	0.01
2002	261	23	949	365.722	-354.966	D	7.652	7.639	0.013	3.4	98.85	1.14	0	0	0	0.01
2002	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	265	23	930	366.19	-357.232	D	7.771	7.639	0.132	3.4	95.21	4.69	0	0	0	0.1
2002	266	23	907	365.051	-359.809	D	7.692	7.639	0.053	3.4	98.85	1.12	0	0	0	0.04
2002	267	23	933	366.169	-356.524	D	7.772	7.639	0.133	3.4	99.41	0.57	0	0	0	0.03
2002	268	23	1017	356.894	-355.206	D	7.703	7.639	0.064	3.4	99.52	0.46	0	0	0	0.01
2002	269	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	99.89	0.07	0	0	0	0.01
2002	270	23	822	358.021	-361.607	D	7.692	7.639	0.053	3.4	98.71	1.25	0	0	0	0.04
2002	271	23	941	365.977	-355.774	D	7.784	7.639	0.145	3.4	99.67	0.31	0	0	0	0.02
2002	272	23	1017	356.894	-355.206	D	7.725	7.639	0.086	3.4	99.75	0.24	0	0	0	0.01
2002	273	23	1017	356.894	-355.206	D	7.646	7.639	0.007	3.4	99.97	0.03	0	0	0	0.01
2002	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2002	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	930	366.19	-357.232	D	7.535	7.5	0.035	3.1	99.34	0.62	0	0	0	0.04
2002	279	23	822	358.021	-361.607	D	7.522	7.5	0.022	3.1	99.18	0.8	0	0	0	0.03
2002	280	23	930	366.19	-357.232	D	7.56	7.5	0.06	3.1	98.17	1.78	0	0	0	0.05
2002	281	23	1035	356.477	-356.792	D	7.512	7.5	0.012	3.1	98.83	1.15	0	0	0	0.03
2002	282	23	1010	357.824	-354.865	D	7.5	7.5	0.001	3.1	99.78	0.4	0	0	0	0.02
2002	283	23	949	365.722	-354.966	D	7.501	7.5	0.002	3.1	99.15	0.89	0	0	0	0.01
2002	284	23	900	364.265	-360.243	D	7.501	7.5	0.001	3.1	99.24	0.82	0	0	0	0.01
2002	285	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	23	1017	356.894	-355.206	D	7.544	7.5	0.045	3.1	93.4	6.55	0	0	0	0.05
2002	287	23	1017	356.894	-355.206	D	7.517	7.5	0.018	3.1	94.92	5.05	0	0	0	0.03
2002	288	23	1017	356.894	-355.206	D	7.538	7.5	0.039	3.1	96.97	3.02	0	0	0	0.02
2002	289	23	78	358.239	-356.385	D	7.628	7.5	0.128	3.1	80.68	19.17	0	0	0	0.15
2002	290	23	907	365.051	-359.809	D	7.5	7.5	0.001	3.1	97.34	2.79	0	0	0	0.03
2002	291	23	905	364.788	-359.816	D	7.5	7.5	0	3.1	101.12	0.53	0	0	0	0.02
2002	292	23	949	365.722	-354.966	D	7.548	7.5	0.048	3.1	92.44	7.53	0	0	0	0.03
2002	293	23	822	358.021	-361.607	D	7.758	7.5	0.259	3.1	91.62	8.35	0	0	0	0.03
2002	294	23	1039	356.522	-357.599	D	7.548	7.5	0.049	3.1	98.07	1.92	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	295	23	1017	356.894	-355.206	D	7.544	7.5	0.045	3.1	98.56	1.43	0	0	0	0.01
2002	296	23	967	363.478	-354.116	D	7.632	7.5	0.132	3.1	97.87	2.11	0	0	0	0.01
2002	297	23	822	358.021	-361.607	D	7.573	7.5	0.073	3.1	98.9	1.09	0	0	0	0.01
2002	298	23	1017	356.894	-355.206	D	7.59	7.5	0.09	3.1	96.91	3.08	0	0	0	0.01
2002	299	23	947	365.801	-355.162	D	7.795	7.5	0.296	3.1	96.74	3.25	0	0	0	0.01
2002	300	23	930	366.19	-357.232	D	7.937	7.5	0.438	3.1	95.05	4.93	0	0	0	0.01
2002	301	23	1017	356.894	-355.206	D	7.706	7.5	0.207	3.1	97.2	2.79	0	0	0	0.01
2002	302	23	1035	356.477	-356.792	D	7.879	7.5	0.38	3.1	94.89	5.09	0	0	0	0.02
2002	303	23	822	358.021	-361.607	D	7.722	7.5	0.222	3.1	96.35	3.64	0	0	0	0.02
2002	304	23	822	358.021	-361.607	D	7.792	7.5	0.293	3.1	93.82	6.16	0	0	0	0.02
2002	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	306	23	191	359.732	-362.061	D	7.5	7.5	0	3.1	93.8	6.89	0	0	0	0.02
2002	307	23	907	365.051	-359.809	D	7.551	7.5	0.051	3.1	93.56	6.43	0	0	0	0.01
2002	308	23	930	366.19	-357.232	D	7.502	7.5	0.002	3.1	95.87	4.2	0	0	0	0.01
2002	309	23	930	366.19	-357.232	D	7.516	7.5	0.016	3.1	96.71	3.29	0	0	0	0.01
2002	310	23	949	365.722	-354.966	D	7.537	7.5	0.038	3.1	93.31	6.68	0	0	0	0.01
2002	311	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	316	23	927	365.912	-357.454	D	7.641	7.5	0.141	3.1	69.1	30.76	0	0	0	0.14
2002	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	930	366.19	-357.232	D	7.51	7.5	0.01	3.1	71.3	28.57	0	0	0	0.13
2002	320	23	927	365.912	-357.454	D	7.785	7.5	0.285	3.1	72.91	26.99	0	0	0	0.11
2002	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	323	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	328	23	1008	358.048	-354.775	D	7.501	7.5	0.002	3.1	93.28	6.75	0	0	0	0.02
2002	329	23	930	366.19	-357.232	D	7.682	7.5	0.182	3.1	84.91	15.02	0	0	0	0.07
2002	330	23	1035	356.477	-356.792	D	7.619	7.5	0.119	3.1	90.26	9.71	0	0	0	0.03
2002	331	23	927	365.912	-357.454	D	7.603	7.5	0.103	3.1	75.98	23.93	0	0	0	0.09
2002	332	23	907	365.051	-359.809	D	7.5	7.5	0.001	3.1	87.26	12.88	0	0	0	0.03
2002	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2002	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	823	358.24	-361.604	D	7.603	7.593	0.01	3.3	79.88	20.01	0	0	0	0.13
2002	338	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	88.93	12.09	0	0	0	0.01
2002	339	23	927	365.912	-357.454	D	7.682	7.593	0.089	3.3	63.65	36.21	0	0	0	0.14
2002	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	964	363.678	-354.148	D	7.612	7.593	0.019	3.3	91.65	8.34	0	0	0	0.02
2002	343	23	822	358.021	-361.607	D	7.759	7.593	0.167	3.3	91.73	8.26	0	0	0	0.01
2002	344	23	1017	356.894	-355.206	D	7.631	7.593	0.038	3.3	94.12	5.87	0	0	0	0.01
2002	345	23	1017	356.894	-355.206	D	7.632	7.593	0.039	3.3	95.46	4.53	0	0	0	0.01
2002	346	23	966	363.538	-354.124	D	7.602	7.593	0.01	3.3	96.8	3.2	0	0	0	0.01
2002	347	23	811	357.434	-360.225	D	7.704	7.593	0.112	3.3	92.87	7.11	0	0	0	0.02
2002	348	23	832	359.493	-362.061	D	7.646	7.593	0.053	3.3	92.19	7.79	0	0	0	0.02
2002	349	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	81.24	18.69	0	0	0	0.03
2002	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	358	23	1017	356.894	-355.206	D	7.697	7.593	0.105	3.3	89.04	10.94	0	0	0	0.03
2002	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	1017	356.894	-355.206	D	7.628	7.593	0.035	3.3	71.46	28.39	0	0	0	0.15
									0.867							
NORANDA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2002	2	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	3	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	7	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	10	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	11	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	16	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	17	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	18	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	19	23	955	364.92	-354.582	D	7.776	7.546	0.23	3.2	96.76	0.19	0	0	0.15	2.89
2002	20	23	907	365.051	-359.809	D	7.566	7.546	0.02	3.2	98.73	0.06	0	0	0.05	1.17
2002	21	23	947	365.801	-355.162	D	7.555	7.546	0.009	3.2	98.9	0.1	0	0	0	1
2002	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	24	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	25	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	26	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	27	23	905	364.788	-359.816	D	7.546	7.546	0	3.2	100.73	0.06	0	0	0.04	2.25
2002	28	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2002	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	36	23	853	361.666	-362.175	D	7.416	7.406	0.011	2.9	95.55	0.04	0	0	0.87	3.55
2002	37	23	1015	357.306	-355.192	D	7.438	7.406	0.033	2.9	93.98	0.3	0	0	0.15	5.58
2002	38	23	1017	356.894	-355.206	D	7.544	7.406	0.139	2.9	97.95	0.11	0	0	0.1	1.84
2002	39	23	853	361.666	-362.175	D	7.412	7.406	0.007	2.9	98.25	0.05	0	0	0.1	1.66
2002	40	23	930	366.19	-357.232	D	7.421	7.406	0.015	2.9	98.45	0.05	0	0	0.04	1.47
2002	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	46	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	47	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	49	23	930	366.19	-357.232	D	7.411	7.406	0.005	2.9	95.44	0.14	0	0	0.09	4.36
2002	50	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	52	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	53	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	54	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	55	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	57	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	58	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	0	0	0	0	0	0
2002	61	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	62	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	63	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	930	366.19	-357.232	D	7.316	7.311	0.005	2.7	94.47	0.19	0	0	0.11	5.24
2002	71	23	618	363.371	-354.411	D	7.311	7.311	0	2.7	99.04	0	0	0	0.03	1.18
2002	72	23	455	361.646	-354.736	D	7.311	7.311	0	2.7	97.49	0.01	0	0	0.01	1.4
2002	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	75	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	77	23	930	366.19	-357.232	D	7.314	7.311	0.004	2.7	98.34	0.07	0	0	0.07	1.53
2002	78	23	1017	356.894	-355.206	D	7.68	7.311	0.369	2.7	98.56	0.03	0	0	0.16	1.25
2002	79	23	907	365.051	-359.809	D	7.436	7.311	0.125	2.7	98.98	0.03	0	0	0.07	0.93
2002	80	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	82	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	23	1017	356.894	-355.206	D	7.322	7.311	0.011	2.7	98.45	0.07	0	0	0.04	1.47
2002	85	23	1039	356.522	-357.599	D	7.377	7.311	0.066	2.7	98.78	0.05	0	0	0.01	1.16
2002	86	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	87	23	930	366.19	-357.232	D	7.312	7.311	0.001	2.7	95.75	0.13	0	0	0.1	3.93
2002	88	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	89	23	853	361.666	-362.175	D	7.322	7.311	0.012	2.7	99.15	0	0	0	0.13	0.74
2002	90	23	853	361.666	-362.175	D	7.393	7.311	0.083	2.7	95.32	0.15	0	0	0.18	4.35
2002	91	23	1017	356.894	-355.206	D	7.319	7.311	0.008	2.7	98.32	0	0	0	0.05	1.67
2002	92	23	949	365.722	-354.966	D	7.312	7.311	0.001	2.7	98.1	0.01	0	0	0.02	1.85
2002	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	96	23	822	358.021	-361.607	D	7.319	7.311	0.008	2.7	98.06	0.01	0	0	0.15	1.81
2002	97	23	822	358.021	-361.607	D	7.342	7.311	0.031	2.7	97.72	0.04	0	0	0.08	2.16
2002	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	100	23	853	361.666	-362.175	D	7.374	7.311	0.063	2.7	99.1	0	0	0	0.11	0.79
2002	101	23	955	364.92	-354.582	D	7.335	7.311	0.024	2.7	95.39	0.03	0	0	0.09	4.5
2002	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	113	23	930	366.19	-357.232	D	7.312	7.311	0.002	2.7	97.1	0.02	0	0	0.13	2.9
2002	114	23	404	361.172	-355.257	D	7.311	7.311	0	2.7	86.22	0.01	0	0	0.04	2.91
2002	115	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	116	23	853	361.666	-362.175	D	7.316	7.311	0.005	2.7	93.04	0.18	0	0	0.59	6.2
2002	117	23	1017	356.894	-355.206	D	7.343	7.311	0.033	2.7	95.26	0.1	0	0	0.2	4.44
2002	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	119	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	120	23	930	366.19	-357.232	D	7.317	7.311	0.006	2.7	96.48	0.01	0	0	0.04	3.51
2002	121	23	948	365.727	-355.056	D	7.581	7.581	0	3.275	98.4	0.02	0	0	0.01	1.67
2002	122	23	949	365.722	-354.966	D	7.707	7.593	0.114	3.3	99.16	0.02	0	0	0.02	0.8
2002	123	23	853	361.666	-362.175	D	7.627	7.593	0.035	3.3	99.39	0.01	0	0	0.01	0.6
2002	124	23	822	358.021	-361.607	D	8.126	7.593	**0.534**	3.3	97.18	0.05	0	0	0.19	2.59
2002	125	23	1035	356.477	-356.792	D	7.817	7.593	0.225	3.3	98.31	0.01	0	0	0.08	1.59
2002	126	23	949	365.722	-354.966	D	7.611	7.593	0.019	3.3	98.73	0	0	0	0.02	1.25
2002	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	130	23	853	361.666	-362.175	D	7.593	7.593	0.001	3.3	94.91	0.01	0	0	0.54	4.55
2002	131	23	933	366.169	-356.524	D	7.653	7.593	0.061	3.3	97.79	0.02	0	0	0.07	2.12
2002	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	137	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	92.22	0.37	0	0	0.26	7.16
2002	138	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	139	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	140	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	141	23	845	360.851	-362.181	D	7.679	7.593	0.087	3.3	98.6	0	0	0	0.13	1.26
2002	142	23	947	365.801	-355.162	D	7.635	7.593	0.043	3.3	97.06	0.01	0	0	0.07	2.87
2002	143	23	931	366.183	-356.996	D	7.593	7.593	0	3.3	97.35	0.01	0	0	0.05	2.52
2002	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	150	23	949	365.722	-354.966	D	7.634	7.593	0.042	3.3	98.63	0	0	0	0.19	1.18
2002	151	23	949	365.722	-354.966	D	7.825	7.593	0.232	3.3	98.89	0	0	0	0.09	1.01
2002	152	23	949	365.722	-354.966	D	7.612	7.593	0.019	3.3	99.07	0	0	0	0.05	0.88
2002	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	158	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	159	23	822	358.021	-361.607	D	7.663	7.593	0.07	3.3	99.09	0	0	0	0.1	0.81
2002	160	23	967	363.478	-354.116	D	7.647	7.593	0.055	3.3	97.79	0	0	0	0.07	2.13
2002	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	164	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	168	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	169	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	98.68	0	0	0	0.11	0.84
2002	170	23	941	365.977	-355.774	D	7.603	7.593	0.011	3.3	98.81	0	0	0	0.11	1.09
2002	171	23	966	363.538	-354.124	D	7.593	7.593	0	3.3	98.99	0	0	0	0.04	0.81
2002	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0.02	0.01	0	0	0	16.64
2002	173	23	955	364.92	-354.582	D	7.701	7.593	0.108	3.3	97.43	0	0	0	0.56	2.01
2002	174	23	1039	356.522	-357.599	D	7.656	7.593	0.063	3.3	96.63	0.01	0	0	0.61	2.76
2002	175	23	949	365.722	-354.966	D	7.598	7.593	0.005	3.3	84.32	0.01	0	0	0.4	15.28
2002	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	178	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	179	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	180	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	36.77	0	0	0	1.65	2.88
2002	183	23	907	365.051	-359.809	D	7.76	7.593	0.167	3.3	98.55	0	0	0	0.22	1.23
2002	184	23	949	365.722	-354.966	D	7.709	7.593	0.117	3.3	98.84	0	0	0	0.11	1.05
2002	185	23	931	366.183	-356.996	D	7.733	7.593	0.14	3.3	98.71	0	0	0	0.18	1.1
2002	186	23	822	358.021	-361.607	D	8.024	7.593	0.431	3.3	98.94	0	0	0	0.15	0.9
2002	187	23	1039	356.522	-357.599	D	7.749	7.593	0.156	3.3	97.87	0	0	0	0.34	1.79
2002	188	23	1017	356.894	-355.206	D	7.593	7.593	0.001	3.3	99.53	0	0	0	0.08	0.55
2002	189	23	1037	356.5	-357.195	D	7.601	7.593	0.009	3.3	98.91	0	0	0	0.16	0.95
2002	190	23	811	357.434	-360.225	D	7.675	7.593	0.082	3.3	99.09	0	0	0	0.09	0.83
2002	191	23	853	361.666	-362.175	D	7.673	7.593	0.08	3.3	99.21	0	0	0	0.04	0.75
2002	192	23	853	361.666	-362.175	D	7.605	7.593	0.012	3.3	99.39	0	0	0	0.02	0.61
2002	193	23	907	365.051	-359.809	D	7.616	7.593	0.023	3.3	98.99	0	0	0	0.19	0.82
2002	194	23	907	365.051	-359.809	D	7.598	7.593	0.005	3.3	99.5	0	0	0	0.03	0.48
2002	195	23	853	361.666	-362.175	D	7.607	7.593	0.014	3.3	99.08	0.01	0	0	0.12	0.8
2002	196	23	853	361.666	-362.175	D	7.652	7.593	0.059	3.3	98.35	0.01	0	0	0.32	1.32
2002	197	23	853	361.666	-362.175	D	7.901	7.593	0.308	3.3	98.94	0	0	0	0.12	0.94

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	198	23	949	365.722	-354.966	D	7.744	7.593	0.152	3.3	99.26	0	0	0	0.05	0.69
2002	199	23	949	365.722	-354.966	D	7.609	7.593	0.016	3.3	99.37	0	0	0	0.02	0.6
2002	200	23	947	365.801	-355.162	D	7.594	7.593	0.002	3.3	99.33	0.01	0	0	0.02	0.63
2002	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	204	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	205	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	206	23	853	361.666	-362.175	D	7.595	7.593	0.002	3.3	99.52	0	0	0	0.06	0.42
2002	207	23	907	365.051	-359.809	D	7.646	7.593	0.053	3.3	99.47	0	0	0	0.04	0.49
2002	208	23	947	365.801	-355.162	D	7.593	7.593	0.001	3.3	99.29	0	0	0	0.04	0.62
2002	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	214	23	930	366.19	-357.232	D	7.593	7.593	0.001	3.3	98.65	0	0	0	0.22	1.14
2002	215	23	853	361.666	-362.175	D	7.824	7.593	0.231	3.3	98.84	0	0	0	0.18	0.98
2002	216	23	1017	356.894	-355.206	D	7.81	7.593	0.217	3.3	99.06	0	0	0	0.08	0.86
2002	217	23	962	363.961	-354.255	D	7.6	7.593	0.007	3.3	99.23	0	0	0	0.05	0.72
2002	218	23	907	365.051	-359.809	D	7.639	7.593	0.046	3.3	98.74	0	0	0	0.1	1.17
2002	219	23	853	361.666	-362.175	D	7.626	7.593	0.034	3.3	99.23	0	0	0	0.02	0.75
2002	220	23	44	358.21	-361.379	D	7.593	7.593	0	3.3	99.21	0	0	0	0.01	0.64
2002	221	23	853	361.666	-362.175	D	7.639	7.593	0.047	3.3	97.89	0	0	0	0.36	1.75
2002	222	23	933	366.169	-356.524	D	7.697	7.593	0.105	3.3	98.33	0	0	0	0.09	1.57
2002	223	23	967	363.478	-354.116	D	7.596	7.593	0.004	3.3	98.73	0	0	0	0.03	1.28
2002	224	23	730	364.623	-354.605	D	7.593	7.593	0	3.3	86.95	0	0	0	0.02	2.08
2002	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	232	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	237	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	238	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	239	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	242	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	243	23	822	358.021	-361.607	D	7.634	7.593	0.041	3.3	96.7	0.01	0	0	0.62	2.67
2002	244	23	832	359.493	-362.061	D	7.776	7.637	0.139	3.396	98.32	0	0	0	0.16	1.52
2002	245	23	967	363.478	-354.116	D	7.68	7.639	0.041	3.4	98.25	0	0	0	0.06	1.68
2002	246	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	247	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	248	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	249	23	861	361.895	-361.506	D	7.641	7.639	0.003	3.4	94.19	0	0	0	2.05	3.82
2002	250	23	949	365.722	-354.966	D	7.68	7.639	0.042	3.4	97.25	0	0	0	0.12	2.62
2002	251	23	949	365.722	-354.966	D	7.639	7.639	0	3.4	79.44	0.02	0	0	0.55	19.78
2002	252	23	949	365.722	-354.966	D	7.64	7.639	0.001	3.4	97.51	0	0	0	0.15	2.31
2002	253	23	966	363.538	-354.124	D	7.655	7.639	0.016	3.4	98.95	0	0	0	0.06	0.98
2002	254	23	853	361.666	-362.175	D	7.643	7.639	0.004	3.4	99.25	0	0	0	0.03	0.73
2002	255	23	191	359.732	-362.061	D	7.639	7.639	0	3.4	100.48	0	0	0	0.04	0.97
2002	256	23	44	358.21	-361.379	D	7.639	7.639	0	3.4	101.23	0	0	0	0.15	0.42
2002	257	23	907	365.051	-359.809	D	7.692	7.639	0.054	3.4	98.86	0	0	0	0.14	1
2002	258	23	930	366.19	-357.232	D	7.663	7.639	0.024	3.4	98.88	0	0	0	0.07	1.05
2002	259	23	930	366.19	-357.232	D	7.639	7.639	0	3.4	97.7	0	0	0	0.05	2.23
2002	260	23	710	364.843	-359.589	D	7.639	7.639	0	3.4	90.57	0.07	0	0	0.06	6.46
2002	261	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	133.08	0.27	0	0	0.05	12.08
2002	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	265	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	266	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	267	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	268	23	822	358.021	-361.607	D	7.639	7.639	0	3.4	76.07	0.02	0	0	6.4	17.78
2002	269	23	853	361.666	-362.175	D	7.646	7.639	0.007	3.4	93.36	0.03	0	0	1.04	5.57
2002	270	23	907	365.051	-359.809	D	7.647	7.639	0.008	3.4	88.69	0	0	0	3.14	8.19
2002	271	23	1017	356.894	-355.206	D	7.641	7.639	0.002	3.4	98.85	0	0	0	0.02	1.18
2002	272	23	853	361.666	-362.175	D	7.72	7.639	0.081	3.4	99.01	0	0	0	0.13	0.86
2002	273	23	1017	356.894	-355.206	D	7.696	7.639	0.057	3.4	98.39	0	0	0	0.08	1.52
2002	274	23	643	363.609	-354.151	D	7.506	7.505	0	3.112	98.29	0	0	0	0.07	1.39
2002	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
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2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	279	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	280	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	281	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	282	23	853	361.666	-362.175	D	7.51	7.5	0.01	3.1	94.31	0.02	0	0	1.31	4.37
2002	283	23	853	361.666	-362.175	D	7.533	7.5	0.034	3.1	96.81	0.01	0	0	0.6	2.58
2002	284	23	822	358.021	-361.607	D	7.508	7.5	0.008	3.1	98.82	0	0	0	0.2	1
2002	285	23	822	358.021	-361.607	D	7.589	7.5	0.089	3.1	98.88	0.02	0	0	0.04	1.06
2002	286	23	907	365.051	-359.809	D	7.543	7.5	0.044	3.1	98.87	0.01	0	0	0.01	1.11
2002	287	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	289	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	290	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	291	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	292	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	293	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	294	23	907	365.051	-359.809	D	7.502	7.5	0.003	3.1	99.16	0	0	0	0.29	0.59
2002	295	23	907	365.051	-359.809	D	7.519	7.5	0.019	3.1	99.17	0	0	0	0.14	0.69
2002	296	23	822	358.021	-361.607	D	7.511	7.5	0.011	3.1	98.58	0.01	0	0	0.15	1.28
2002	297	23	63	358.458	-361.368	D	7.5	7.5	0	3.1	84.41	0	0	0	4.39	12.3
2002	298	23	907	365.051	-359.809	D	7.576	7.5	0.076	3.1	97.81	0.05	0	0	0.09	2.05
2002	299	23	853	361.666	-362.175	D	7.503	7.5	0.004	3.1	97.79	0.02	0	0	0.08	2.13
2002	300	23	853	361.666	-362.175	D	7.505	7.5	0.005	3.1	98.22	0.02	0	0	0.18	1.62
2002	301	23	907	365.051	-359.809	D	7.983	7.5	0.483	3.1	97.27	0.11	0	0	0.19	2.44
2002	302	23	811	357.434	-360.225	D	7.776	7.5	0.277	3.1	98.3	0.06	0	0	0.1	1.54
2002	303	23	853	361.666	-362.175	D	7.511	7.5	0.012	3.1	98.5	0.01	0	0	0.09	1.41
2002	304	23	861	361.895	-361.506	D	7.5	7.5	0	3.1	94.17	0	0	0	0.76	5.34
2002	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	307	23	907	365.051	-359.809	D	7.513	7.5	0.013	3.1	98.56	0.08	0	0	0.16	1.22
2002	308	23	930	366.19	-357.232	D	7.501	7.5	0.001	3.1	98.98	0.06	0	0	0.04	0.95
2002	309	23	907	365.051	-359.809	D	7.511	7.5	0.012	3.1	98.65	0.16	0	0	0.06	1.14
2002	310	23	906	364.982	-359.812	D	7.5	7.5	0	3.1	99.16	0.02	0	0	0	0.38
2002	311	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	316	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	323	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	332	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2002	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	343	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	344	23	78	358.239	-356.385	D	7.593	7.593	0	3.3	85.7	0	0	0	4.94	9.58
2002	345	23	811	357.434	-360.225	D	7.596	7.593	0.003	3.3	95.09	0	0	0	0.79	4.13
2002	346	23	1008	358.048	-354.775	D	7.597	7.593	0.005	3.3	98.32	0	0	0	0.05	1.62
2002	347	23	930	366.19	-357.232	D	7.682	7.593	0.089	3.3	97.99	0.13	0	0	0.11	1.77
2002	348	23	930	366.19	-357.232	D	7.6	7.593	0.007	3.3	98.02	0.11	0	0	0.01	1.85
2002	349	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	357	23	361	361.165	-360.749	D	7.593	7.593	0	3.3	68.37	0.01	0	0	8.61	14.77
2002	358	23	361	361.165	-360.749	D	7.593	7.593	0	3.3	70.63	0.01	0	0	8.55	14.99
2002	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.534							
INDEPENDENCE									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1037	356.5	-357.195	D	7.691	7.548	0.143	3.204	75.81	23.29	0	0	0	0.9
2002	2	23	383	361.435	-361.237	D	8.048	7.546	**0.502**	3.2	82.72	16.68	0	0	0	0.6
2002	3	23	955	364.92	-354.582	D	7.737	7.546	0.19	3.2	83.54	15.86	0	0	0	0.6
2002	4	23	930	366.19	-357.232	D	7.557	7.546	0.011	3.2	87.04	12.62	0	0	0	0.35
2002	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	6	23	927	365.912	-357.454	D	7.827	7.546	0.281	3.2	90.3	9.24	0	0	0	0.46
2002	7	23	822	358.021	-361.607	D	7.717	7.546	0.171	3.2	85.35	14.01	0	0	0	0.64
2002	8	23	933	366.169	-356.524	D	7.564	7.546	0.018	3.2	81.95	17.61	0	0	0	0.44
2002	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	10	23	949	365.722	-354.966	D	7.687	7.546	0.141	3.2	92.66	6.94	0	0	0	0.41
2002	11	23	279	360.41	-360.533	D	7.771	7.546	0.225	3.2	70.32	28.09	0	0	0	1.59
2002	12	23	907	365.051	-359.809	D	7.548	7.546	0.002	3.2	89.17	10.29	0	0	0	0.54
2002	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	16	23	10	356.954	-355.443	D	7.546	7.546	0	3.2	94.46	7.81	0	0	0	0.21
2002	17	23	1041	356.936	-357.592	D	7.615	7.546	0.069	3.2	68.86	29.41	0	0	0	1.73
2002	18	23	1008	358.048	-354.775	D	7.597	7.546	0.05	3.2	83.11	16.47	0	0	0	0.42
2002	19	23	974	362.281	-354.249	D	7.583	7.546	0.036	3.2	92.82	6.96	0	0	0	0.22
2002	20	23	949	365.722	-354.966	D	7.691	7.546	0.145	3.2	92.41	7.39	0	0	0	0.2
2002	21	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	24	23	1017	356.894	-355.206	D	7.643	7.546	0.097	3.2	91.1	8.63	0	0	0	0.28
2002	25	23	822	358.021	-361.607	D	7.614	7.546	0.068	3.2	86.25	13.16	0	0	0	0.59
2002	26	23	930	366.19	-357.232	D	7.546	7.546	0	3.2	94.08	5.42	0	0	0	0.31
2002	27	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	28	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	29	23	1017	356.894	-355.206	D	7.645	7.546	0.099	3.2	89.23	10.46	0	0	0	0.32
2002	30	23	1035	356.477	-356.792	D	9.046	7.546	**1.5**	3.2	90.4	9.36	0	0	0	0.24
2002	31	23	964	363.678	-354.148	D	7.597	7.546	0.051	3.2	92.14	7.75	0	0	0	0.12
2002	32	23	947	365.801	-355.162	D	7.413	7.411	0.001	2.913	93.43	6.48	0	0	0	0.07
2002	33	23	930	366.19	-357.232	D	7.414	7.406	0.008	2.9	93.02	6.58	0	0	0	0.42
2002	34	23	930	366.19	-357.232	D	7.409	7.406	0.004	2.9	93.83	5.88	0	0	0	0.3
2002	35	23	907	365.051	-359.809	D	7.47	7.406	0.064	2.9	60.45	37.02	0	0	0	2.54
2002	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	37	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	38	23	78	358.239	-356.385	D	7.493	7.406	0.087	2.9	89.01	10.53	0	0	0	0.46
2002	39	23	907	365.051	-359.809	D	7.423	7.406	0.017	2.9	92.62	7.13	0	0	0	0.26
2002	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	41	23	949	365.722	-354.966	D	7.406	7.406	0	2.9	93.02	6.92	0	0	0	0.44
2002	42	23	78	358.239	-356.385	D	7.573	7.406	0.167	2.9	81.33	17.73	0	0	0	0.95
2002	43	23	1035	356.477	-356.792	D	7.451	7.406	0.046	2.9	90.98	7.91	0	0	0	1.11
2002	44	23	822	358.021	-361.607	D	7.414	7.406	0.009	2.9	89.35	9.83	0	0	0	0.82
2002	45	23	1008	358.048	-354.775	D	7.506	7.406	0.1	2.9	85.98	13.52	0	0	0	0.5
2002	46	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	47	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	48	23	822	358.021	-361.607	D	7.444	7.406	0.039	2.9	78.21	19.95	0	0	0	1.85
2002	49	23	1036	356.488	-356.993	D	7.408	7.406	0.003	2.9	92.71	6.88	0	0	0	0.41
2002	50	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	52	23	949	365.722	-354.966	D	7.406	7.406	0.001	2.9	90.5	8.72	0	0	0	0.8
2002	53	23	949	365.722	-354.966	D	7.433	7.406	0.028	2.9	85.02	13.8	0	0	0	1.18
2002	54	23	1036	356.488	-356.993	D	7.451	7.406	0.046	2.9	88.95	10.58	0	0	0	0.48
2002	55	23	941	365.977	-355.774	D	7.41	7.406	0.005	2.9	94.5	5.29	0	0	0	0.25
2002	56	23	823	358.24	-361.604	D	7.423	7.406	0.017	2.9	64.92	33.12	0	0	0	1.98
2002	57	23	822	358.021	-361.607	D	7.447	7.406	0.041	2.9	75.65	23.14	0	0	0	1.21
2002	58	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	0	0	0	0	0	0
2002	61	23	1041	356.936	-357.592	D	7.753	7.311	0.443	2.7	89.87	9.66	0	0	0	0.47

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	62	23	949	365.722	-354.966	D	7.328	7.311	0.018	2.7	92.27	7.32	0	0	0	0.4
2002	63	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	1017	356.894	-355.206	D	7.313	7.311	0.002	2.7	98.16	1.29	0	0	0	0.57
2002	72	23	907	365.051	-359.809	D	7.392	7.311	0.081	2.7	94.35	5.3	0	0	0	0.35
2002	73	23	949	365.722	-354.966	D	7.316	7.311	0.005	2.7	98.25	1.61	0	0	0	0.15
2002	74	23	833	359.603	-362.066	D	7.337	7.311	0.026	2.7	75.7	22.82	0	0	0	1.49
2002	75	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	79	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	80	23	927	365.912	-357.454	D	7.377	7.311	0.067	2.7	85.14	13.98	0	0	0	0.87
2002	81	23	1035	356.477	-356.792	D	7.377	7.311	0.067	2.7	79.57	19.41	0	0	0	1.02
2002	82	23	933	366.169	-356.524	D	7.401	7.311	0.09	2.7	85.02	14.48	0	0	0	0.5
2002	83	23	784	365.648	-355.309	D	7.311	7.311	0	2.7	93.79	3.42	0	0	0	0.23
2002	84	23	643	363.609	-354.151	D	7.312	7.311	0.002	2.7	94.44	5.56	0	0	0	0.09
2002	85	23	10	356.954	-355.443	D	7.313	7.311	0.003	2.7	95.14	4.79	0	0	0	0.06
2002	86	23	1035	356.477	-356.792	D	7.573	7.311	0.262	2.7	94.87	4.86	0	0	0	0.27
2002	87	23	1017	356.894	-355.206	D	7.312	7.311	0.002	2.7	99.29	0.5	0	0	0	0.22
2002	88	23	1035	356.477	-356.792	D	7.421	7.311	0.11	2.7	98.88	0.88	0	0	0	0.24
2002	89	23	822	358.021	-361.607	D	7.335	7.311	0.025	2.7	94.57	4.92	0	0	0	0.5
2002	90	23	1017	356.894	-355.206	D	7.32	7.311	0.009	2.7	98.54	0.88	0	0	0	0.6
2002	91	23	949	365.722	-354.966	D	7.35	7.311	0.04	2.7	96.14	3.25	0	0	0	0.62
2002	92	23	930	366.19	-357.232	D	7.412	7.311	0.101	2.7	96.27	3.3	0	0	0	0.42
2002	93	23	907	365.051	-359.809	D	7.311	7.311	0	2.7	98.88	1.65	0	0	0	0.23
2002	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	96	23	949	365.722	-354.966	D	7.317	7.311	0.006	2.7	98.18	1.48	0	0	0	0.37
2002	97	23	933	366.169	-356.524	D	7.315	7.311	0.004	2.7	98.03	1.76	0	0	0	0.21
2002	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	99	23	1017	356.894	-355.206	D	7.933	7.311	**0.622**	2.7	93.44	6.24	0	0	0	0.32
2002	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	103	23	966	363.538	-354.124	D	7.402	7.311	0.091	2.7	95.54	4.21	0	0	0	0.25
2002	104	23	1008	358.048	-354.775	D	7.318	7.311	0.008	2.7	99.23	0.61	0	0	0	0.16
2002	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	110	23	964	363.678	-354.148	D	7.346	7.311	0.036	2.7	97.28	2.2	0	0	0	0.52
2002	111	23	955	364.92	-354.582	D	7.315	7.311	0.005	2.7	95.75	4.06	0	0	0	0.22
2002	112	23	949	365.722	-354.966	D	7.329	7.311	0.018	2.7	94.8	4.31	0	0	0	0.89
2002	113	23	949	365.722	-354.966	D	7.324	7.311	0.013	2.7	98.71	0.89	0	0	0	0.39
2002	114	23	949	365.722	-354.966	D	7.334	7.311	0.023	2.7	97.94	1.67	0	0	0	0.4
2002	115	23	822	358.021	-361.607	D	7.314	7.311	0.003	2.7	97.74	1.82	0	0	0	0.46
2002	116	23	949	365.722	-354.966	D	7.334	7.311	0.023	2.7	96.72	3	0	0	0	0.29
2002	117	23	965	363.588	-354.142	D	7.311	7.311	0	2.7	98.89	0.86	0	0	0	0.22
2002	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	119	23	822	358.021	-361.607	D	7.441	7.311	0.13	2.7	96.65	2.85	0	0	0	0.5
2002	120	23	1017	356.894	-355.206	D	7.406	7.311	0.096	2.7	99.45	0.35	0	0	0	0.2
2002	121	23	1006	358.469	-354.76	D	7.582	7.581	0.001	3.275	99.64	0.39	0	0	0	0.1
2002	122	23	1017	356.894	-355.206	D	7.678	7.593	0.085	3.3	91.25	8.27	0	0	0	0.48
2002	123	23	710	364.843	-359.589	D	7.593	7.593	0	3.3	94.98	0.76	0	0	0	0.04
2002	124	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	129	23	1035	356.477	-356.792	D	7.624	7.593	0.032	3.3	91.84	7.38	0	0	0	0.78
2002	130	23	974	362.281	-354.249	D	7.685	7.593	0.093	3.3	97.23	2.39	0	0	0	0.37
2002	131	23	931	366.183	-356.996	D	7.593	7.593	0	3.3	99.4	0.51	0	0	0	0.07
2002	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	133	23	1017	356.894	-355.206	D	7.806	7.593	0.214	3.3	95.27	4.54	0	0	0	0.19
2002	134	23	832	359.493	-362.061	D	7.631	7.593	0.039	3.3	98.54	0.99	0	0	0	0.48
2002	135	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	99.11	0.59	0	0	0	0.25
2002	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	137	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	138	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	139	23	811	357.434	-360.225	D	7.673	7.593	0.08	3.3	98.46	1.17	0	0	0	0.38

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	140	23	949	365.722	-354.966	D	7.807	7.593	0.214	3.3	95.57	4.03	0	0	0	0.4
2002	141	23	822	358.021	-361.607	D	7.596	7.593	0.004	3.3	99.04	0.74	0	0	0	0.23
2002	142	23	1035	356.477	-356.792	D	7.594	7.593	0.002	3.3	99.5	0.36	0	0	0	0.14
2002	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	150	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	156	23	967	363.478	-354.116	D	7.607	7.593	0.015	3.3	99.45	0.37	0	0	0	0.18
2002	157	23	1035	356.477	-356.792	D	7.693	7.593	0.101	3.3	98.73	1.05	0	0	0	0.22
2002	158	23	1017	356.894	-355.206	D	7.616	7.593	0.023	3.3	99.59	0.2	0	0	0	0.22
2002	159	23	1007	358.259	-354.768	D	7.593	7.593	0	3.3	99.33	0.03	0	0	0	0.16
2002	160	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	164	23	964	363.678	-354.148	D	7.6	7.593	0.008	3.3	99.7	0.06	0	0	0	0.24
2002	165	23	949	365.722	-354.966	D	7.9	7.593	0.307	3.3	99.26	0.5	0	0	0	0.24
2002	166	23	933	366.169	-356.524	D	7.621	7.593	0.028	3.3	94.27	3.97	0	0	0	1.75
2002	167	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	99.6	0.07	0	0	0	0.35
2002	168	23	822	358.021	-361.607	D	7.719	7.593	0.127	3.3	99.53	0.23	0	0	0	0.23
2002	169	23	930	366.19	-357.232	D	7.731	7.593	0.138	3.3	99.77	0.08	0	0	0	0.16
2002	170	23	949	365.722	-354.966	D	7.634	7.593	0.041	3.3	99.8	0.08	0	0	0	0.13
2002	171	23	730	364.623	-354.605	D	7.593	7.593	0	3.3	99.75	0.02	0	0	0	0.13
2002	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	178	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	179	23	949	365.722	-354.966	D	7.618	7.593	0.026	3.3	99.64	0.19	0	0	0	0.17
2002	180	23	949	365.722	-354.966	D	7.634	7.593	0.041	3.3	99.77	0.1	0	0	0	0.13
2002	181	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	99.33	0.01	0	0	0	0.12
2002	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	183	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	192	23	930	366.19	-357.232	D	7.604	7.593	0.011	3.3	98.92	0.91	0	0	0	0.17
2002	193	23	853	361.666	-362.175	D	7.609	7.593	0.016	3.3	99.68	0.2	0	0	0	0.12
2002	194	23	907	365.051	-359.809	D	7.596	7.593	0.003	3.3	98.96	0.95	0	0	0	0.1
2002	195	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	196	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	204	23	967	363.478	-354.116	D	7.673	7.593	0.08	3.3	99.45	0.37	0	0	0	0.18
2002	205	23	853	361.666	-362.175	D	7.647	7.593	0.055	3.3	99.76	0.11	0	0	0	0.14
2002	206	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	207	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	208	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	214	23	1008	358.048	-354.775	D	7.603	7.593	0.01	3.3	99.78	0.02	0	0	0	0.22
2002	215	23	1008	358.048	-354.775	D	7.601	7.593	0.008	3.3	99.81	0.06	0	0	0	0.15
2002	216	23	1	356.546	-357.458	D	7.594	7.593	0.001	3.3	99.98	0.02	0	0	0	0.08
2002	217	23	643	363.609	-354.151	D	7.593	7.593	0.001	3.3	99.92	0.01	0	0	0	0.07

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	218	23	1017	356.894	-355.206	D	7.609	7.593	0.016	3.3	99.73	0.11	0	0	0	0.17
2002	219	23	1017	356.894	-355.206	D	7.607	7.593	0.014	3.3	99.68	0.18	0	0	0	0.14
2002	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	226	23	972	362.744	-354.242	D	7.6	7.593	0.008	3.3	99.59	0.14	0	0	0	0.27
2002	227	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	99.61	0.09	0	0	0	0.22
2002	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	232	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	236	23	949	365.722	-354.966	D	8.01	7.593	0.417	3.3	97.78	1.96	0	0	0	0.26
2002	237	23	822	358.021	-361.607	D	7.6	7.593	0.007	3.3	98.69	1.18	0	0	0	0.17
2002	238	23	191	359.732	-362.061	D	7.593	7.593	0	3.3	99.66	0.06	0	0	0	0.15
2002	239	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	242	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	243	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2002	245	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	246	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	247	23	949	365.722	-354.966	D	7.669	7.639	0.03	3.4	99.58	0.16	0	0	0	0.27
2002	248	23	964	363.678	-354.148	D	7.731	7.639	0.092	3.4	99.71	0.1	0	0	0	0.19
2002	249	23	1017	356.894	-355.206	D	7.665	7.639	0.026	3.4	99.81	0.03	0	0	0	0.17
2002	250	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	99.84	0.01	0	0	0	0.15
2002	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	254	23	933	366.169	-356.524	D	7.695	7.639	0.056	3.4	94.19	5.32	0	0	0	0.49
2002	255	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	256	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	257	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	258	23	1017	356.894	-355.206	D	7.794	7.639	0.155	3.4	99.01	0.78	0	0	0	0.21
2002	259	23	907	365.051	-359.809	D	8.071	7.639	0.432	3.4	99.23	0.62	0	0	0	0.15
2002	260	23	949	365.722	-354.966	D	7.92	7.639	0.281	3.4	99.54	0.33	0	0	0	0.12
2002	261	23	949	365.722	-354.966	D	7.651	7.639	0.012	3.4	98.82	1.08	0	0	0	0.1
2002	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	265	23	1036	356.488	-356.993	D	7.719	7.639	0.08	3.4	98.94	0.81	0	0	0	0.25
2002	266	23	1039	356.522	-357.599	D	7.649	7.639	0.01	3.4	92.26	6.8	0	0	0	0.95
2002	267	23	1008	358.048	-354.775	D	7.709	7.639	0.071	3.4	98.8	0.86	0	0	0	0.34
2002	268	23	974	362.281	-354.249	D	7.701	7.639	0.062	3.4	99.27	0.53	0	0	0	0.21
2002	269	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	270	23	1035	356.477	-356.792	D	7.645	7.639	0.006	3.4	99.48	0.09	0	0	0	0.42
2002	271	23	1017	356.894	-355.206	D	7.717	7.639	0.078	3.4	99.17	0.54	0	0	0	0.29
2002	272	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2002	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	907	365.051	-359.809	D	7.532	7.5	0.033	3.1	72.85	25.28	0	0	0	1.87
2002	279	23	1035	356.477	-356.792	D	7.507	7.5	0.008	3.1	98.74	1.01	0	0	0	0.27
2002	280	23	773	365.4	-355.32	D	7.56	7.5	0.06	3.1	95.37	3.38	0	0	0	1.25
2002	281	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	285	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	23	78	358.239	-356.385	D	7.656	7.5	0.157	3.1	97.22	2.52	0	0	0	0.26
2002	287	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	853	361.666	-362.175	D	7.511	7.5	0.012	3.1	95.65	3.09	0	0	0	1.27
2002	289	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	290	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	291	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	292	23	941	365.977	-355.774	D	7.662	7.5	0.162	3.1	88.05	11.55	0	0	0	0.4
2002	293	23	853	361.666	-362.175	D	7.505	7.5	0.005	3.1	95.1	4.83	0	0	0	0.11
2002	294	23	822	358.021	-361.607	D	7.501	7.5	0.001	3.1	98.88	1.09	0	0	0	0.1
2002	295	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	99.42	0.48	0	0	0	0.11

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	296	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	96.21	3.4	0	0	0	0.23
2002	297	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	298	23	967	363.478	-354.116	D	7.512	7.5	0.013	3.1	91.01	8.72	0	0	0	0.27
2002	299	23	949	365.722	-354.966	D	7.928	7.5	0.429	3.1	90.84	8.78	0	0	0	0.38
2002	300	23	832	359.493	-362.061	D	7.544	7.5	0.045	3.1	93.37	6.37	0	0	0	0.27
2002	301	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	304	23	1039	356.522	-357.599	D	7.501	7.5	0.001	3.1	60.67	37.77	0	0	0	1.6
2002	305	23	1039	356.522	-357.599	D	7.5	7.5	0	3.1	93.49	6.33	0	0	0	0.27
2002	306	23	907	365.051	-359.809	D	7.711	7.5	0.212	3.1	89.97	9.57	0	0	0	0.46
2002	307	23	949	365.722	-354.966	D	7.537	7.5	0.038	3.1	93.48	6.3	0	0	0	0.22
2002	308	23	933	366.169	-356.524	D	7.547	7.5	0.047	3.1	92.89	6.83	0	0	0	0.28
2002	309	23	949	365.722	-354.966	D	7.571	7.5	0.072	3.1	93.76	6.05	0	0	0	0.2
2002	310	23	949	365.722	-354.966	D	7.568	7.5	0.069	3.1	92.74	7.01	0	0	0	0.25
2002	311	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	949	365.722	-354.966	D	7.555	7.5	0.056	3.1	97.94	1.23	0	0	0	0.82
2002	315	23	927	365.912	-357.454	D	7.616	7.5	0.117	3.1	74.11	23.96	0	0	0	1.93
2002	316	23	1039	356.522	-357.599	D	7.574	7.5	0.075	3.1	85.04	14.11	0	0	0	0.85
2002	317	23	930	366.19	-357.232	D	7.522	7.5	0.022	3.1	89.24	10.02	0	0	0	0.74
2002	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	747	364.871	-354.594	D	7.529	7.5	0.029	3.1	87.41	12.25	0	0	0	0.35
2002	320	23	1017	356.894	-355.206	D	7.501	7.5	0.002	3.1	86.91	12.4	0	0	0	0.74
2002	321	23	949	365.722	-354.966	D	7.57	7.5	0.071	3.1	84.82	14.54	0	0	0	0.65
2002	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	323	23	933	366.169	-356.524	D	7.505	7.5	0.005	3.1	74.52	23.35	0	0	0	2.15
2002	324	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	96.6	3.07	0	0	0	0.62
2002	325	23	949	365.722	-354.966	D	7.502	7.5	0.002	3.1	93.35	5.51	0	0	0	1.19
2002	326	23	949	365.722	-354.966	D	7.565	7.5	0.066	3.1	88.1	11.02	0	0	0	0.87
2002	327	23	930	366.19	-357.232	D	7.501	7.5	0.001	3.1	89.38	10.19	0	0	0	0.52
2002	328	23	1008	358.048	-354.775	D	7.502	7.5	0.002	3.1	95.72	4.01	0	0	0	0.29
2002	329	23	930	366.19	-357.232	D	7.513	7.5	0.014	3.1	93.99	5.87	0	0	0	0.14
2002	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	331	23	1017	356.894	-355.206	D	7.502	7.5	0.002	3.1	83.11	16.38	0	0	0	0.56
2002	332	23	1017	356.894	-355.206	D	7.538	7.5	0.039	3.1	83	16.61	0	0	0	0.39
2002	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	334	23	947	365.801	-355.162	D	7.5	7.5	0	3.1	80.5	18.5	0	0	0	1.5

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	335	23	927	365.912	-357.454	D	7.685	7.589	0.096	3.292	62.86	35.25	0	0	0	1.9
2002	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	853	361.666	-362.175	D	7.67	7.593	0.078	3.3	86.32	13.04	0	0	0	0.64
2002	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	1017	356.894	-355.206	D	7.621	7.593	0.028	3.3	86.44	13.1	0	0	0	0.46
2002	340	23	930	366.19	-357.232	D	7.668	7.593	0.075	3.3	87.42	12.18	0	0	0	0.4
2002	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	966	363.538	-354.124	D	7.623	7.593	0.03	3.3	94.08	5.72	0	0	0	0.2
2002	343	23	822	358.021	-361.607	D	7.703	7.593	0.11	3.3	94.57	5.3	0	0	0	0.14
2002	344	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	23	1035	356.477	-356.792	D	7.627	7.593	0.034	3.3	93.51	6.26	0	0	0	0.23
2002	348	23	78	358.239	-356.385	D	7.769	7.593	0.176	3.3	85.01	14.35	0	0	0	0.64
2002	349	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1017	356.894	-355.206	D	7.694	7.593	0.102	3.3	84.16	15.06	0	0	0	0.77
2002	354	23	644	364.12	-360.12	D	7.593	7.593	0	3.3	80.25	10.24	0	0	0	0.25
2002	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	964	363.678	-354.148	D	7.616	7.593	0.023	3.3	73.4	25.93	0	0	0	0.67
2002	357	23	1008	358.048	-354.775	D	7.602	7.593	0.01	3.3	80.51	19.04	0	0	0	0.45
2002	358	23	1039	356.522	-357.599	D	7.636	7.593	0.043	3.3	82.91	16.82	0	0	0	0.27
2002	359	23	949	365.722	-354.966	D	7.633	7.593	0.04	3.3	68.2	29.84	0	0	0	1.96
2002	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	933	366.169	-356.524	D	7.593	7.593	0	3.3	92.14	7.61	0	0	0	0.18
2002	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	1017	356.894	-355.206	D	7.623	7.593	0.03	3.3	86.44	13.14	0	0	0	0.43
									1.5							
MARSHALL									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2002	2	23	949	365.722	-354.966	D	7.713	7.546	0.167	3.2	63.02	36.09	0	0	0	0.89
2002	3	23	907	365.051	-359.809	D	7.669	7.546	0.122	3.2	68.78	30.57	0	0	0	0.65

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	6	23	930	366.19	-357.232	D	7.546	7.546	0	3.2	67.97	31.13	0	0	0	1.07
2002	7	23	931	366.183	-356.996	D	7.558	7.546	0.012	3.2	45.46	53.1	0	0	0	1.44
2002	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	10	23	1017	356.894	-355.206	D	7.67	7.546	0.124	3.2	82.02	17.3	0	0	0	0.69
2002	11	23	930	366.19	-357.232	D	7.609	7.546	0.063	3.2	88.5	11	0	0	0	0.5
2002	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	16	23	1017	356.894	-355.206	D	7.546	7.546	0	3.2	72.13	27.14	0	0	0	0.97
2002	17	23	930	366.19	-357.232	D	7.632	7.546	0.085	3.2	63.86	35.15	0	0	0	0.99
2002	18	23	974	362.281	-354.249	D	7.619	7.546	0.073	3.2	70.45	28.98	0	0	0	0.57
2002	19	23	1017	356.894	-355.206	D	7.617	7.546	0.071	3.2	82.7	16.95	0	0	0	0.36
2002	20	23	930	366.19	-357.232	D	7.832	7.546	0.286	3.2	81.79	17.93	0	0	0	0.28
2002	21	23	643	363.609	-354.151	D	7.546	7.546	0	3.2	89.62	10.31	0	0	0	0.1
2002	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	24	23	933	366.169	-356.524	D	7.643	7.546	0.097	3.2	65.63	33.5	0	0	0	0.87
2002	25	23	930	366.19	-357.232	D	7.547	7.546	0.001	3.2	83.95	15.71	0	0	0	0.36
2002	26	23	763	365.51	-357.811	D	7.546	7.546	0	3.2	92.52	5.43	0	0	0	0.32
2002	27	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	28	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	30	23	907	365.051	-359.809	D	8.179	7.546	**0.633**	3.2	83.38	16.29	0	0	0	0.33
2002	31	23	822	358.021	-361.607	D	7.992	7.546	0.446	3.2	87.29	12.53	0	0	0	0.18
2002	32	23	933	366.169	-356.524	D	7.454	7.411	0.043	2.913	87.98	11.92	0	0	0	0.1
2002	33	23	931	366.183	-356.996	D	7.406	7.406	0	2.9	89.2	10.72	0	0	0	0.52
2002	34	23	786	365.973	-357.042	D	7.406	7.406	0	2.9	87.9	11.34	0	0	0	0.4
2002	35	23	773	365.4	-355.32	D	7.447	7.406	0.041	2.9	61.54	36.95	0	0	0	1.51
2002	36	23	1035	356.477	-356.792	D	7.408	7.406	0.002	2.9	76.19	23.39	0	0	0	0.53
2002	37	23	1017	356.894	-355.206	D	7.406	7.406	0.001	2.9	84.66	15.4	0	0	0	0.35
2002	38	23	949	365.722	-354.966	D	7.409	7.406	0.003	2.9	87.15	12.55	0	0	0	0.36
2002	39	23	929	366.032	-357.239	D	7.406	7.406	0.001	2.9	90.72	9.31	0	0	0	0.2
2002	40	23	947	365.801	-355.162	D	7.406	7.406	0	2.9	94.78	6.89	0	0	0	0.17
2002	41	23	949	365.722	-354.966	D	7.406	7.406	0.001	2.9	83.48	16.35	0	0	0	0.3
2002	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	44	23	1037	356.5	-357.195	D	7.462	7.406	0.056	2.9	53.05	44.83	0	0	0	2.13
2002	45	23	907	365.051	-359.809	D	7.416	7.406	0.01	2.9	80.37	19	0	0	0	0.67
2002	46	23	949	365.722	-354.966	D	7.406	7.406	0.001	2.9	85.36	14.35	0	0	0	0.3
2002	47	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	48	23	937	365.757	-356.343	D	7.454	7.406	0.048	2.9	64.37	33.71	0	0	0	1.93
2002	49	23	1035	356.477	-356.792	D	7.416	7.406	0.01	2.9	84.2	15.19	0	0	0	0.62
2002	50	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	52	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	53	23	990	360.933	-355.487	D	7.51	7.406	0.105	2.9	56.11	42.06	0	0	0	1.83
2002	54	23	1003	359.099	-354.737	D	7.446	7.406	0.041	2.9	80	19.36	0	0	0	0.64
2002	55	23	930	366.19	-357.232	D	7.406	7.406	0.001	2.9	88.15	11.73	0	0	0	0.37
2002	56	23	933	366.169	-356.524	D	7.472	7.406	0.067	2.9	82.81	16.63	0	0	0	0.57
2002	57	23	930	366.19	-357.232	D	7.408	7.406	0.002	2.9	84.95	14.6	0	0	0	0.45
2002	58	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	0	0	0	0	0	0
2002	61	23	955	364.92	-354.582	D	7.336	7.311	0.026	2.7	74.49	24.97	0	0	0	0.55
2002	62	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	102.76	9.19	0	0	0	0.04
2002	63	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	1017	356.894	-355.206	D	7.313	7.311	0.002	2.7	95.36	4.02	0	0	0	0.72
2002	72	23	963	363.809	-354.192	D	7.324	7.311	0.013	2.7	88.07	11.48	0	0	0	0.45
2002	73	23	730	364.623	-354.605	D	7.311	7.311	0	2.7	97.93	1.2	0	0	0	0.18
2002	74	23	967	363.478	-354.116	D	7.437	7.311	0.126	2.7	81.97	17.36	0	0	0	0.67
2002	75	23	822	358.021	-361.607	D	7.442	7.311	0.131	2.7	82.95	16.51	0	0	0	0.54
2002	76	23	1017	356.894	-355.206	D	7.312	7.311	0.001	2.7	93.22	6.65	0	0	0	0.47
2002	77	23	967	363.478	-354.116	D	7.312	7.311	0.001	2.7	92.92	6.94	0	0	0	0.3
2002	78	23	10	356.954	-355.443	D	7.311	7.311	0	2.7	95.7	3.03	0	0	0	0.22
2002	79	23	1037	356.5	-357.195	D	7.381	7.311	0.071	2.7	70.5	28.18	0	0	0	1.32
2002	80	23	947	365.801	-355.162	D	7.363	7.311	0.052	2.7	81.34	18.11	0	0	0	0.55
2002	81	23	930	366.19	-357.232	D	7.314	7.311	0.004	2.7	57.81	40.87	0	0	0	1.29

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	82	23	906	364.982	-359.812	D	7.311	7.311	0	2.7	83.96	19.27	0	0	0	0.32
2002	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	85	23	949	365.722	-354.966	D	7.455	7.311	0.144	2.7	76.05	23.12	0	0	0	0.83
2002	86	23	930	366.19	-357.232	D	7.366	7.311	0.055	2.7	93.03	6.6	0	0	0	0.38
2002	87	23	966	363.538	-354.124	D	7.341	7.311	0.031	2.7	96.48	3.31	0	0	0	0.21
2002	88	23	822	358.021	-361.607	D	7.372	7.311	0.062	2.7	97.72	1.81	0	0	0	0.48
2002	89	23	907	365.051	-359.809	D	7.346	7.311	0.035	2.7	91.31	8.11	0	0	0	0.58
2002	90	23	1017	356.894	-355.206	D	7.321	7.311	0.01	2.7	97.4	1.81	0	0	0	0.8
2002	91	23	907	365.051	-359.809	D	7.37	7.311	0.059	2.7	91.38	7.95	0	0	0	0.67
2002	92	23	1035	356.477	-356.792	D	7.33	7.311	0.019	2.7	90.99	8.54	0	0	0	0.47
2002	93	23	933	366.169	-356.524	D	7.406	7.311	0.095	2.7	63.97	34.39	0	0	0	1.64
2002	94	23	1035	356.477	-356.792	D	7.464	7.311	0.153	2.7	84.33	15.11	0	0	0	0.56
2002	95	23	822	358.021	-361.607	D	7.36	7.311	0.049	2.7	94.66	4.98	0	0	0	0.36
2002	96	23	1017	356.894	-355.206	D	7.364	7.311	0.053	2.7	96.98	2.76	0	0	0	0.26
2002	97	23	933	366.169	-356.524	D	7.317	7.311	0.006	2.7	96.82	2.94	0	0	0	0.25
2002	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	99	23	930	366.19	-357.232	D	7.525	7.311	0.214	2.7	83.77	15.69	0	0	0	0.54
2002	100	23	1035	356.477	-356.792	D	7.311	7.311	0	2.7	93.52	6.28	0	0	0	0.35
2002	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	110	23	948	365.727	-355.056	D	7.311	7.311	0.001	2.7	98.86	0.89	0	0	0	0.33
2002	111	23	966	363.538	-354.124	D	7.315	7.311	0.004	2.7	95.91	3.79	0	0	0	0.33
2002	112	23	949	365.722	-354.966	D	7.311	7.311	0	2.7	98.83	1.66	0	0	0	0.16
2002	113	23	619	363.872	-360.131	D	7.311	7.311	0	2.7	97.19	2.33	0	0	0	0.39
2002	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	115	23	56	357.991	-356.395	D	7.342	7.311	0.031	2.7	61.9	34.94	0	0	0	3.17
2002	116	23	949	365.722	-354.966	D	7.328	7.311	0.017	2.7	92.61	6.91	0	0	0	0.5
2002	117	23	949	365.722	-354.966	D	7.316	7.311	0.005	2.7	96.42	3.26	0	0	0	0.3
2002	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	119	23	949	365.722	-354.966	D	7.316	7.311	0.005	2.7	97.26	1.91	0	0	0	0.86
2002	120	23	949	365.722	-354.966	D	7.313	7.311	0.003	2.7	99.07	0.58	0	0	0	0.43

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	121	23	961	364.092	-354.289	D	7.581	7.581	0	3.275	97.65	1.99	0	0	0	0.19
2002	122	23	1039	356.522	-357.599	D	7.74	7.593	0.148	3.3	91.9	7.8	0	0	0	0.3
2002	123	23	1035	356.477	-356.792	D	7.627	7.593	0.034	3.3	98.44	1.36	0	0	0	0.2
2002	124	23	822	358.021	-361.607	D	7.638	7.593	0.046	3.3	97.81	2.08	0	0	0	0.11
2002	125	23	822	358.021	-361.607	D	7.623	7.593	0.03	3.3	98.67	1.23	0	0	0	0.1
2002	126	23	643	363.609	-354.151	D	7.594	7.593	0.001	3.3	99.85	0.04	0	0	0	0.07
2002	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	130	23	853	361.666	-362.175	D	7.642	7.593	0.049	3.3	97.81	1.89	0	0	0	0.31
2002	131	23	967	363.478	-354.116	D	7.603	7.593	0.01	3.3	98.71	1.13	0	0	0	0.16
2002	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	133	23	949	365.722	-354.966	D	7.687	7.593	0.095	3.3	86.79	12.78	0	0	0	0.43
2002	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	137	23	1035	356.477	-356.792	D	7.619	7.593	0.026	3.3	94.06	5.78	0	0	0	0.16
2002	138	23	1007	358.259	-354.768	D	7.632	7.593	0.04	3.3	97.73	1.92	0	0	0	0.35
2002	139	23	1039	356.522	-357.599	D	7.864	7.593	0.271	3.3	94.97	4.73	0	0	0	0.29
2002	140	23	1036	356.488	-356.993	D	7.6	7.593	0.007	3.3	98.4	1.14	0	0	0	0.44
2002	141	23	949	365.722	-354.966	D	7.78	7.593	0.187	3.3	94.7	4.94	0	0	0	0.36
2002	142	23	947	365.801	-355.162	D	7.658	7.593	0.066	3.3	98.29	1.49	0	0	0	0.22
2002	143	23	27	357.451	-355.421	D	7.593	7.593	0	3.3	69.16	0.14	0	0	0	0.08
2002	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	145	23	964	363.678	-354.148	D	7.596	7.593	0.003	3.3	96.52	3.24	0	0	0	0.29
2002	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	150	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	156	23	1017	356.894	-355.206	D	7.598	7.593	0.005	3.3	98.58	1.14	0	0	0	0.29
2002	157	23	1039	356.522	-357.599	D	7.614	7.593	0.021	3.3	96.48	3.07	0	0	0	0.46
2002	158	23	949	365.722	-354.966	D	7.6	7.593	0.007	3.3	99.14	0.61	0	0	0	0.26
2002	159	23	964	363.678	-354.148	D	7.594	7.593	0.002	3.3	99.65	0.2	0	0	0	0.19

Appendix M
Hercules Glade
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	160	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	164	23	947	365.801	-355.162	D	7.593	7.593	0	3.3	100.14	0.05	0	0	0	0.15
2002	165	23	941	365.977	-355.774	D	7.74	7.593	0.147	3.3	96.61	2.96	0	0	0	0.43
2002	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	168	23	930	366.19	-357.232	D	7.815	7.593	0.222	3.3	98.23	1.43	0	0	0	0.33
2002	169	23	930	366.19	-357.232	D	7.742	7.593	0.149	3.3	99.53	0.26	0	0	0	0.21
2002	170	23	949	365.722	-354.966	D	7.603	7.593	0.01	3.3	99.74	0.09	0	0	0	0.18
2002	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	178	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	179	23	947	365.801	-355.162	D	7.596	7.593	0.003	3.3	99.65	0.09	0	0	0	0.26
2002	180	23	949	365.722	-354.966	D	7.603	7.593	0.01	3.3	99.66	0.15	0	0	0	0.19
2002	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	183	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	186	23	947	365.801	-355.162	D	7.594	7.593	0.002	3.3	99.79	0.05	0	0	0	0.16
2002	187	23	949	365.722	-354.966	D	7.602	7.593	0.009	3.3	99.82	0.05	0	0	0	0.13
2002	188	23	1017	356.894	-355.206	D	7.596	7.593	0.003	3.3	99.92	0.03	0	0	0	0.12
2002	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	95.33	0.03	0	0	0	0.13
2002	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	192	23	964	363.678	-354.148	D	7.599	7.593	0.007	3.3	98.06	1.74	0	0	0	0.21
2002	193	23	949	365.722	-354.966	D	7.607	7.593	0.014	3.3	99.31	0.53	0	0	0	0.16
2002	194	23	1017	356.894	-355.206	D	7.6	7.593	0.008	3.3	98.12	1.77	0	0	0	0.13
2002	195	23	832	359.493	-362.061	D	7.594	7.593	0.001	3.3	99.64	0.19	0	0	0	0.12
2002	196	23	15	357.659	-360.155	D	7.593	7.593	0	3.3	98.98	0.15	0	0	0	0.13
2002	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	204	23	964	363.678	-354.148	D	7.694	7.593	0.102	3.3	99.14	0.57	0	0	0	0.29
2002	205	23	853	361.666	-362.175	D	7.651	7.593	0.058	3.3	99.56	0.23	0	0	0	0.21
2002	206	23	1039	356.522	-357.599	D	7.655	7.593	0.063	3.3	99.72	0.08	0	0	0	0.21
2002	207	23	967	363.478	-354.116	D	7.655	7.593	0.063	3.3	99.69	0.15	0	0	0	0.16
2002	208	23	789	365.918	-355.796	D	7.593	7.593	0.001	3.3	99.82	0.04	0	0	0	0.12
2002	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	214	23	1017	356.894	-355.206	D	7.606	7.593	0.013	3.3	99.42	0.07	0	0	0	0.52
2002	215	23	1017	356.894	-355.206	D	7.599	7.593	0.006	3.3	99.54	0.2	0	0	0	0.27
2002	216	23	1006	358.469	-354.76	D	7.594	7.593	0.001	3.3	99.86	0.07	0	0	0	0.11
2002	217	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	100.02	0.02	0	0	0	0.1
2002	218	23	949	365.722	-354.966	D	7.717	7.593	0.124	3.3	99.56	0.18	0	0	0	0.26
2002	219	23	822	358.021	-361.607	D	7.666	7.593	0.074	3.3	99.12	0.69	0	0	0	0.19
2002	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	231	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	99.74	0.1	0	0	0	0.21
2002	232	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	99.67	0.19	0	0	0	0.19
2002	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	236	23	949	365.722	-354.966	D	7.68	7.593	0.087	3.3	99.11	0.41	0	0	0	0.48
2002	237	23	822	358.021	-361.607	D	7.971	7.593	0.379	3.3	97.42	2.32	0	0	0	0.26

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	238	23	1039	356.522	-357.599	D	7.595	7.593	0.003	3.3	99.46	0.13	0	0	0	0.42
2002	239	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	242	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	243	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2002	245	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	246	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	247	23	949	365.722	-354.966	D	7.652	7.639	0.014	3.4	99.5	0.16	0	0	0	0.35
2002	248	23	949	365.722	-354.966	D	7.707	7.639	0.068	3.4	99.55	0.2	0	0	0	0.26
2002	249	23	1017	356.894	-355.206	D	7.658	7.639	0.019	3.4	99.75	0.05	0	0	0	0.21
2002	250	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	99.81	0.03	0	0	0	0.19
2002	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	254	23	900	364.265	-360.243	D	7.65	7.639	0.011	3.4	80.6	18.32	0	0	0	1.08
2002	255	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	256	23	1039	356.522	-357.599	D	7.648	7.639	0.009	3.4	99.64	0.11	0	0	0	0.26
2002	257	23	1017	356.894	-355.206	D	7.648	7.639	0.009	3.4	99.62	0.18	0	0	0	0.21
2002	258	23	964	363.678	-354.148	D	7.74	7.639	0.101	3.4	98.94	0.61	0	0	0	0.44
2002	259	23	1008	358.048	-354.775	D	8.456	7.639	**0.817**	3.4	97.15	2.58	0	0	0	0.27
2002	260	23	967	363.478	-354.116	D	7.882	7.639	0.244	3.4	99.18	0.63	0	0	0	0.19
2002	261	23	949	365.722	-354.966	D	7.647	7.639	0.008	3.4	97.8	2.08	0	0	0	0.14
2002	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	265	23	1039	356.522	-357.599	D	7.717	7.639	0.078	3.4	96.79	2.73	0	0	0	0.47
2002	266	23	197	359.666	-360.566	D	7.692	7.639	0.053	3.4	91.31	7.8	0	0	0	0.89
2002	267	23	974	362.281	-354.249	D	7.699	7.639	0.06	3.4	97.62	1.82	0	0	0	0.57
2002	268	23	967	363.478	-354.116	D	7.696	7.639	0.057	3.4	98.66	1.05	0	0	0	0.29
2002	269	23	1017	356.894	-355.206	D	7.646	7.639	0.007	3.4	99.44	0.34	0	0	0	0.22
2002	270	23	822	358.021	-361.607	D	7.7	7.639	0.061	3.4	99.01	0.52	0	0	0	0.47
2002	271	23	822	358.021	-361.607	D	7.793	7.639	0.155	3.4	99.19	0.52	0	0	0	0.28
2002	272	23	1008	358.048	-354.775	D	7.728	7.639	0.09	3.4	99.02	0.78	0	0	0	0.2
2002	273	23	643	363.609	-354.151	D	7.642	7.639	0.003	3.4	99.8	0.07	0	0	0	0.14
2002	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2002	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
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2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	907	365.051	-359.809	D	7.52	7.5	0.021	3.1	92.83	6.07	0	0	0	1.12
2002	279	23	822	358.021	-361.607	D	7.507	7.5	0.008	3.1	97.67	1.87	0	0	0	0.48
2002	280	23	56	357.991	-356.395	D	7.529	7.5	0.029	3.1	76.14	20.19	0	0	0	3.67
2002	281	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	99.04	1.69	0	0	0	0.53
2002	282	23	1007	358.259	-354.768	D	7.5	7.5	0.001	3.1	98.41	1.35	0	0	0	0.35
2002	283	23	62	357.925	-354.901	D	7.5	7.5	0	3.1	98.96	0.57	0	0	0	0.25
2002	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	285	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	23	1037	356.5	-357.195	D	7.549	7.5	0.05	3.1	68.13	30.31	0	0	0	1.56
2002	287	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	288	23	933	366.169	-356.524	D	7.518	7.5	0.018	3.1	93.5	6.19	0	0	0	0.32
2002	289	23	55	358.002	-356.645	D	7.524	7.5	0.024	3.1	68.37	29.84	0	0	0	1.79
2002	290	23	949	365.722	-354.966	D	7.593	7.5	0.094	3.1	84.64	14.93	0	0	0	0.44
2002	291	23	907	365.051	-359.809	D	7.506	7.5	0.007	3.1	97.84	1.85	0	0	0	0.34
2002	292	23	930	366.19	-357.232	D	7.58	7.5	0.081	3.1	80.95	18.56	0	0	0	0.49
2002	293	23	853	361.666	-362.175	D	7.5	7.5	0.001	3.1	87.19	12.62	0	0	0	0.16
2002	294	23	822	358.021	-361.607	D	7.503	7.5	0.004	3.1	94.05	5.83	0	0	0	0.16
2002	295	23	1017	356.894	-355.206	D	7.503	7.5	0.004	3.1	95.58	4.15	0	0	0	0.29
2002	296	23	1017	356.894	-355.206	D	7.514	7.5	0.015	3.1	93.86	5.87	0	0	0	0.28
2002	297	23	1035	356.477	-356.792	D	7.504	7.5	0.004	3.1	96.53	3.26	0	0	0	0.23
2002	298	23	1008	358.048	-354.775	D	7.61	7.5	0.11	3.1	86.06	13.53	0	0	0	0.4
2002	299	23	933	366.169	-356.524	D	7.748	7.5	0.249	3.1	91.39	8.41	0	0	0	0.2
2002	300	23	822	358.021	-361.607	D	7.705	7.5	0.206	3.1	88.1	11.61	0	0	0	0.29
2002	301	23	1017	356.894	-355.206	D	7.54	7.5	0.04	3.1	91.34	8.48	0	0	0	0.19
2002	302	23	1035	356.477	-356.792	D	7.514	7.5	0.015	3.1	92.82	7.03	0	0	0	0.16
2002	303	23	822	358.021	-361.607	D	7.539	7.5	0.039	3.1	93.65	6.08	0	0	0	0.28
2002	304	23	930	366.19	-357.232	D	7.63	7.5	0.131	3.1	81.56	17.92	0	0	0	0.53
2002	305	23	930	366.19	-357.232	D	7.617	7.5	0.118	3.1	84.25	15.3	0	0	0	0.45
2002	306	23	853	361.666	-362.175	D	7.502	7.5	0.002	3.1	85.06	14.58	0	0	0	0.36
2002	307	23	930	366.19	-357.232	D	7.534	7.5	0.034	3.1	86.35	13.39	0	0	0	0.27
2002	308	23	746	364.882	-354.843	D	7.5	7.5	0	3.1	78.66	8.4	0	0	0	0.13
2002	309	23	947	365.801	-355.162	D	7.502	7.5	0.002	3.1	93.05	6.91	0	0	0	0.15
2002	310	23	949	365.722	-354.966	D	7.633	7.5	0.134	3.1	87.8	11.95	0	0	0	0.25
2002	311	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	316	23	1017	356.894	-355.206	D	7.58	7.5	0.08	3.1	58.91	39.39	0	0	0	1.7
2002	317	23	906	364.982	-359.812	D	7.5	7.5	0	3.1	88.2	10.63	0	0	0	1.08
2002	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	1035	356.477	-356.792	D	7.674	7.5	0.174	3.1	79.27	20.13	0	0	0	0.6
2002	320	23	1035	356.477	-356.792	D	7.64	7.5	0.14	3.1	76.44	22.81	0	0	0	0.76
2002	321	23	930	366.19	-357.232	D	7.502	7.5	0.003	3.1	79.48	19.83	0	0	0	0.68
2002	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	323	23	947	365.801	-355.162	D	7.505	7.5	0.005	3.1	74.79	24.66	0	0	0	0.56
2002	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	326	23	933	366.169	-356.524	D	7.532	7.5	0.032	3.1	45.18	52.33	0	0	0	2.49
2002	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	328	23	1017	356.894	-355.206	D	7.501	7.5	0.001	3.1	90.83	8.93	0	0	0	0.4
2002	329	23	1037	356.5	-357.195	D	7.511	7.5	0.012	3.1	72.98	26.27	0	0	0	0.76
2002	330	23	822	358.021	-361.607	D	7.549	7.5	0.05	3.1	80.4	19.01	0	0	0	0.6
2002	331	23	1037	356.5	-357.195	D	7.6	7.5	0.101	3.1	59.69	39.13	0	0	0	1.18
2002	332	23	853	361.666	-362.175	D	7.546	7.5	0.046	3.1	75.49	24.1	0	0	0	0.42
2002	333	23	907	365.051	-359.809	D	7.501	7.5	0.001	3.1	86.81	12.85	0	0	0	0.35
2002	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2002	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	907	365.051	-359.809	D	7.609	7.593	0.016	3.3	72.58	26.25	0	0	0	1.17
2002	338	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	75.47	23.13	0	0	0	0.21
2002	339	23	1039	356.522	-357.599	D	7.679	7.593	0.086	3.3	67.28	31.71	0	0	0	1
2002	340	23	907	365.051	-359.809	D	7.593	7.593	0	3.3	75.39	24.09	0	0	0	0.56
2002	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	964	363.678	-354.148	D	7.61	7.593	0.018	3.3	84.33	15.4	0	0	0	0.28
2002	343	23	811	357.434	-360.225	D	7.686	7.593	0.093	3.3	86.94	12.87	0	0	0	0.19
2002	344	23	1017	356.894	-355.206	D	7.62	7.593	0.027	3.3	90.94	8.94	0	0	0	0.13
2002	345	23	1017	356.894	-355.206	D	7.618	7.593	0.026	3.3	92.83	7.06	0	0	0	0.11
2002	346	23	747	364.871	-354.594	D	7.596	7.593	0.003	3.3	94.6	5.34	0	0	0	0.11
2002	347	23	1039	356.522	-357.599	D	7.614	7.593	0.021	3.3	83.73	15.88	0	0	0	0.4
2002	348	23	832	359.493	-362.061	D	7.767	7.593	0.174	3.3	86.03	13.61	0	0	0	0.37
2002	349	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	949	365.722	-354.966	D	7.597	7.593	0.005	3.3	73.11	26.07	0	0	0	0.83
2002	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	1017	356.894	-355.206	D	7.646	7.593	0.054	3.3	67.57	31.89	0	0	0	0.55
2002	357	23	1008	358.048	-354.775	D	7.593	7.593	0.001	3.3	70	29.38	0	0	0	0.46
2002	358	23	1017	356.894	-355.206	D	7.66	7.593	0.068	3.3	78.05	21.51	0	0	0	0.43
2002	359	23	930	366.19	-357.232	D	7.6	7.593	0.008	3.3	83.99	15.64	0	0	0	0.37
2002	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	1017	356.894	-355.206	D	7.629	7.593	0.036	3.3	61.19	37.46	0	0	0	1.35
									0.817							
COLUMBIA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2002	2	23	933	366.169	-356.524	D	7.562	7.546	0.016	3.2	45.56	54.46	0	0	0	0
2002	3	23	930	366.19	-357.232	D	7.559	7.546	0.012	3.2	50.39	49.62	0	0	0	0
2002	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	7	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	10	23	930	366.19	-357.232	D	7.623	7.546	0.077	3.2	76.91	23.09	0	0	0	0
2002	11	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	16	23	1017	356.894	-355.206	D	7.546	7.546	0	3.2	58.01	42.83	0	0	0	0
2002	17	23	931	366.183	-356.996	D	7.566	7.546	0.02	3.2	50.55	49.47	0	0	0	0
2002	18	23	930	366.19	-357.232	D	7.586	7.546	0.04	3.2	63.26	36.75	0	0	0	0
2002	19	23	1008	358.048	-354.775	D	7.575	7.546	0.029	3.2	75.46	24.55	0	0	0	0
2002	20	23	949	365.722	-354.966	D	7.633	7.546	0.087	3.2	73.79	26.21	0	0	0	0
2002	21	23	643	363.609	-354.151	D	7.546	7.546	0	3.2	83.44	16.15	0	0	0	0
2002	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	24	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	25	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	26	23	710	364.843	-359.589	D	7.546	7.546	0	3.2	103.45	4.47	0	0	0	0
2002	27	23	731	365.047	-358.581	D	7.546	7.546	0	3.2	90.85	5.77	0	0	0	0
2002	28	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	30	23	907	365.051	-359.809	D	7.782	7.546	0.236	3.2	71.03	28.97	0	0	0	0
2002	31	23	1017	356.894	-355.206	D	7.938	7.546	0.391	3.2	79.92	20.08	0	0	0	0
2002	32	23	949	365.722	-354.966	D	7.42	7.411	0.009	2.913	81.74	18.26	0	0	0	0
2002	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	35	23	947	365.801	-355.162	D	7.41	7.406	0.005	2.9	62.36	37.65	0	0	0	0
2002	36	23	1035	356.477	-356.792	D	7.42	7.406	0.015	2.9	61.8	38.22	0	0	0	0
2002	37	23	1017	356.894	-355.206	D	7.406	7.406	0	2.9	75.89	25.03	0	0	0	0
2002	38	23	933	366.169	-356.524	D	7.407	7.406	0.002	2.9	67.27	32.86	0	0	0	0
2002	39	23	775	365.747	-357.551	D	7.406	7.406	0	2.9	86.12	15.2	0	0	0	0
2002	40	23	930	366.19	-357.232	D	7.406	7.406	0	2.9	94.16	11.26	0	0	0	0
2002	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	44	23	927	365.912	-357.454	D	7.431	7.406	0.025	2.9	36.82	63.19	0	0	0	0
2002	45	23	644	364.12	-360.12	D	7.406	7.406	0	2.9	78.8	19.49	0	0	0	0
2002	46	23	748	365.295	-358.57	D	7.406	7.406	0	2.9	79.52	20.53	0	0	0	0
2002	47	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	48	23	932	366.176	-356.761	D	7.407	7.406	0.002	2.9	84.08	15.97	0	0	0	0
2002	49	23	941	365.977	-355.774	D	7.412	7.406	0.006	2.9	71.16	28.85	0	0	0	0
2002	50	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	52	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	53	23	933	366.169	-356.524	D	7.417	7.406	0.012	2.9	64.66	35.36	0	0	0	0
2002	54	23	930	366.19	-357.232	D	7.416	7.406	0.01	2.9	73.35	26.69	0	0	0	0
2002	55	23	930	366.19	-357.232	D	7.406	7.406	0.001	2.9	81.47	18.68	0	0	0	0
2002	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	57	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	58	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	0	0	0	0	0	0
2002	61	23	966	363.538	-354.124	D	7.324	7.311	0.013	2.7	66.87	33.14	0	0	0	0
2002	62	23	853	361.666	-362.175	D	7.311	7.311	0	2.7	77.05	14.78	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	63	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	23	930	366.19	-357.232	D	7.311	7.311	0	2.7	77.51	23.17	0	0	0	0
2002	75	23	78	358.239	-356.385	D	7.352	7.311	0.041	2.7	35.6	64.4	0	0	0	0
2002	76	23	1017	356.894	-355.206	D	7.319	7.311	0.008	2.7	87.44	12.58	0	0	0	0
2002	77	23	974	362.281	-354.249	D	7.319	7.311	0.008	2.7	86.21	13.8	0	0	0	0
2002	78	23	949	365.722	-354.966	D	7.313	7.311	0.002	2.7	90.39	9.71	0	0	0	0
2002	79	23	1035	356.477	-356.792	D	7.426	7.311	0.115	2.7	76.63	23.37	0	0	0	0
2002	80	23	930	366.19	-357.232	D	7.338	7.311	0.027	2.7	79.77	20.23	0	0	0	0
2002	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	82	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	85	23	1039	356.522	-357.599	D	7.342	7.311	0.031	2.7	55.78	44.22	0	0	0	0
2002	86	23	907	365.051	-359.809	D	7.311	7.311	0.001	2.7	94.9	5.3	0	0	0	0
2002	87	23	930	366.19	-357.232	D	7.321	7.311	0.01	2.7	90.36	9.64	0	0	0	0
2002	88	23	853	361.666	-362.175	D	7.358	7.311	0.047	2.7	95.44	4.56	0	0	0	0
2002	89	23	930	366.19	-357.232	D	7.314	7.311	0.003	2.7	87.13	12.98	0	0	0	0
2002	90	23	967	363.478	-354.116	D	7.314	7.311	0.003	2.7	95.78	4.27	0	0	0	0
2002	91	23	822	358.021	-361.607	D	7.341	7.311	0.03	2.7	84.6	15.41	0	0	0	0
2002	92	23	476	361.894	-354.726	D	7.311	7.311	0	2.7	91.41	1	0	0	0	0
2002	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	94	23	930	366.19	-357.232	D	7.315	7.311	0.005	2.7	76.63	23.38	0	0	0	0
2002	95	23	947	365.801	-355.162	D	7.342	7.311	0.032	2.7	85.18	14.83	0	0	0	0
2002	96	23	930	366.19	-357.232	D	7.353	7.311	0.043	2.7	94.81	5.19	0	0	0	0
2002	97	23	949	365.722	-354.966	D	7.319	7.311	0.009	2.7	96.69	3.31	0	0	0	0
2002	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	99	23	933	366.169	-356.524	D	7.327	7.311	0.016	2.7	97.56	2.43	0	0	0	0
2002	100	23	1035	356.477	-356.792	D	7.332	7.311	0.022	2.7	97.08	2.92	0	0	0	0
2002	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	111	23	963	363.809	-354.192	D	7.311	7.311	0	2.7	94.26	6.03	0	0	0	0
2002	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	113	23	475	361.905	-354.975	D	7.311	7.311	0	2.7	129.43	0.93	0	0	0	0
2002	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	115	23	907	365.051	-359.809	D	7.32	7.311	0.009	2.7	92.95	7.07	0	0	0	0
2002	116	23	832	359.493	-362.061	D	7.325	7.311	0.015	2.7	89.56	10.45	0	0	0	0
2002	117	23	949	365.722	-354.966	D	7.312	7.311	0.002	2.7	94	6.02	0	0	0	0
2002	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	119	23	949	365.722	-354.966	D	7.311	7.311	0.001	2.7	98.1	2.19	0	0	0	0
2002	120	23	948	365.727	-355.056	D	7.311	7.311	0	2.7	99.18	1.11	0	0	0	0
2002	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	96.15	3.01	0	0	0	0
2002	122	23	930	366.19	-357.232	D	7.689	7.593	0.096	3.3	87.73	12.27	0	0	0	0
2002	123	23	853	361.666	-362.175	D	7.631	7.593	0.039	3.3	92.59	7.41	0	0	0	0
2002	124	23	822	358.021	-361.607	D	7.621	7.593	0.028	3.3	96.47	3.53	0	0	0	0
2002	125	23	1039	356.522	-357.599	D	7.613	7.593	0.02	3.3	98.12	1.88	0	0	0	0
2002	126	23	543	362.627	-354.444	D	7.593	7.593	0	3.3	99.82	0.12	0	0	0	0
2002	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	130	23	907	365.051	-359.809	D	7.608	7.593	0.015	3.3	97.34	2.66	0	0	0	0
2002	131	23	967	363.478	-354.116	D	7.609	7.593	0.017	3.3	97.56	2.44	0	0	0	0
2002	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	133	23	933	366.169	-356.524	D	7.64	7.593	0.047	3.3	60.07	39.93	0	0	0	0
2002	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	137	23	1017	356.894	-355.206	D	7.624	7.593	0.031	3.3	90.5	9.5	0	0	0	0
2002	138	23	947	365.801	-355.162	D	7.62	7.593	0.027	3.3	95.05	4.95	0	0	0	0
2002	139	23	907	365.051	-359.809	D	7.688	7.593	0.096	3.3	93.25	6.75	0	0	0	0
2002	140	23	949	365.722	-354.966	D	7.598	7.593	0.005	3.3	97.68	2.32	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	141	23	949	365.722	-354.966	D	7.646	7.593	0.053	3.3	93.33	6.68	0	0	0	0
2002	142	23	930	366.19	-357.232	D	7.617	7.593	0.025	3.3	97.34	2.67	0	0	0	0
2002	143	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	98.9	0.9	0	0	0	0
2002	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	150	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	156	23	1017	356.894	-355.206	D	7.605	7.593	0.013	3.3	96.79	3.21	0	0	0	0
2002	157	23	1039	356.522	-357.599	D	7.692	7.593	0.099	3.3	84.35	15.65	0	0	0	0
2002	158	23	941	365.977	-355.774	D	7.64	7.593	0.047	3.3	98.81	1.19	0	0	0	0
2002	159	23	949	365.722	-354.966	D	7.656	7.593	0.063	3.3	99.31	0.69	0	0	0	0
2002	160	23	964	363.678	-354.148	D	7.597	7.593	0.005	3.3	99.83	0.15	0	0	0	0
2002	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	164	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	165	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	99.83	0.65	0	0	0	0
2002	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	168	23	933	366.169	-356.524	D	7.613	7.593	0.02	3.3	96.32	3.69	0	0	0	0
2002	169	23	933	366.169	-356.524	D	7.613	7.593	0.02	3.3	99.67	0.34	0	0	0	0
2002	170	23	949	365.722	-354.966	D	7.596	7.593	0.004	3.3	99.83	0.18	0	0	0	0
2002	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	178	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	179	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	180	23	933	366.169	-356.524	D	7.593	7.593	0	3.3	99.9	0.21	0	0	0	0
2002	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	183	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	186	23	947	365.801	-355.162	D	7.593	7.593	0.001	3.3	99.83	0.1	0	0	0	0
2002	187	23	949	365.722	-354.966	D	7.602	7.593	0.009	3.3	99.88	0.11	0	0	0	0
2002	188	23	1008	358.048	-354.775	D	7.606	7.593	0.013	3.3	99.83	0.18	0	0	0	0
2002	189	23	966	363.538	-354.124	D	7.597	7.593	0.004	3.3	99.94	0.07	0	0	0	0
2002	190	23	785	365.637	-355.06	D	7.594	7.593	0.001	3.3	99.92	0.06	0	0	0	0
2002	191	23	272	359.942	-355.56	D	7.593	7.593	0	3.3	94.24	0.07	0	0	0	0
2002	192	23	949	365.722	-354.966	D	7.596	7.593	0.003	3.3	97.02	2.99	0	0	0	0
2002	193	23	966	363.538	-354.124	D	7.603	7.593	0.01	3.3	99	1.01	0	0	0	0
2002	194	23	1017	356.894	-355.206	D	7.601	7.593	0.008	3.3	97.19	2.83	0	0	0	0
2002	195	23	821	358.053	-361.416	D	7.593	7.593	0.001	3.3	99.54	0.59	0	0	0	0
2002	196	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	204	23	974	362.281	-354.249	D	7.619	7.593	0.027	3.3	99.56	0.44	0	0	0	0
2002	205	23	1035	356.477	-356.792	D	7.74	7.593	0.148	3.3	99.35	0.65	0	0	0	0
2002	206	23	822	358.021	-361.607	D	7.613	7.593	0.02	3.3	99.77	0.24	0	0	0	0
2002	207	23	930	366.19	-357.232	D	7.609	7.593	0.017	3.3	99.72	0.29	0	0	0	0
2002	208	23	941	365.977	-355.774	D	7.593	7.593	0.001	3.3	100.01	0.06	0	0	0	0
2002	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	214	23	1008	358.048	-354.775	D	7.594	7.593	0.001	3.3	99.72	0.26	0	0	0	0
2002	215	23	974	362.281	-354.249	D	7.593	7.593	0	3.3	99.51	0.56	0	0	0	0
2002	216	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	217	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	218	23	930	366.19	-357.232	D	7.649	7.593	0.056	3.3	99.65	0.35	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	219	23	853	361.666	-362.175	D	7.655	7.593	0.062	3.3	98.2	1.8	0	0	0	0
2002	220	23	15	357.659	-360.155	D	7.593	7.593	0	3.3	98.24	0.09	0	0	0	0
2002	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	232	23	642	363.62	-354.4	D	7.593	7.593	0	3.3	98.74	1.49	0	0	0	0
2002	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	236	23	946	365.798	-355.322	D	7.593	7.593	0	3.3	93.69	0.06	0	0	0	0
2002	237	23	933	366.169	-356.524	D	7.649	7.593	0.057	3.3	93.36	6.64	0	0	0	0
2002	238	23	1017	356.894	-355.206	D	7.686	7.593	0.093	3.3	97.66	2.34	0	0	0	0
2002	239	23	1017	356.894	-355.206	D	7.632	7.593	0.039	3.3	98.3	1.71	0	0	0	0
2002	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	242	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	243	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2002	245	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	246	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	247	23	964	363.678	-354.148	D	7.643	7.639	0.005	3.4	99.88	0.11	0	0	0	0
2002	248	23	949	365.722	-354.966	D	7.662	7.639	0.023	3.4	99.63	0.37	0	0	0	0
2002	249	23	1017	356.894	-355.206	D	7.644	7.639	0.005	3.4	99.94	0.09	0	0	0	0
2002	250	23	1016	357.1	-355.198	D	7.639	7.639	0	3.4	100.05	0.05	0	0	0	0
2002	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	254	23	78	358.239	-356.385	D	7.73	7.639	0.091	3.4	76.35	23.65	0	0	0	0
2002	255	23	822	358.021	-361.607	D	7.659	7.639	0.02	3.4	98.3	1.7	0	0	0	0
2002	256	23	811	357.434	-360.225	D	7.644	7.639	0.005	3.4	99.76	0.24	0	0	0	0
2002	257	23	1017	356.894	-355.206	D	7.644	7.639	0.005	3.4	99.66	0.34	0	0	0	0

Appendix M
Hercules Glade
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	258	23	949	365.722	-354.966	D	7.644	7.639	0.006	3.4	99.43	0.57	0	0	0	0
2002	259	23	933	366.169	-356.524	D	7.766	7.639	0.128	3.4	97.51	2.49	0	0	0	0
2002	260	23	949	365.722	-354.966	D	7.738	7.639	0.099	3.4	98.35	1.65	0	0	0	0
2002	261	23	949	365.722	-354.966	D	7.644	7.639	0.005	3.4	95.68	4.35	0	0	0	0
2002	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	265	23	927	365.912	-357.454	D	7.7	7.639	0.061	3.4	82.8	17.2	0	0	0	0
2002	266	23	907	365.051	-359.809	D	7.658	7.639	0.019	3.4	95.76	4.24	0	0	0	0
2002	267	23	932	366.176	-356.761	D	7.688	7.639	0.049	3.4	97.8	2.2	0	0	0	0
2002	268	23	1017	356.894	-355.206	D	7.665	7.639	0.026	3.4	98.27	1.73	0	0	0	0
2002	269	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	99.56	0.48	0	0	0	0
2002	270	23	822	358.021	-361.607	D	7.665	7.639	0.026	3.4	96.94	3.07	0	0	0	0
2002	271	23	933	366.169	-356.524	D	7.7	7.639	0.061	3.4	98.83	1.17	0	0	0	0
2002	272	23	955	364.92	-354.582	D	7.665	7.639	0.026	3.4	98.77	1.23	0	0	0	0
2002	273	23	643	363.609	-354.151	D	7.64	7.639	0.001	3.4	99.87	0.12	0	0	0	0
2002	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2002	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	278	23	930	366.19	-357.232	D	7.511	7.5	0.011	3.1	98.05	1.96	0	0	0	0
2002	279	23	822	358.021	-361.607	D	7.508	7.5	0.009	3.1	96.96	3.06	0	0	0	0
2002	280	23	930	366.19	-357.232	D	7.522	7.5	0.022	3.1	94.62	5.38	0	0	0	0
2002	281	23	1035	356.477	-356.792	D	7.506	7.5	0.006	3.1	95.55	4.47	0	0	0	0
2002	282	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	98.52	1.61	0	0	0	0
2002	283	23	61	357.936	-355.15	D	7.5	7.5	0	3.1	98.7	1.09	0	0	0	0
2002	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	285	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	23	1017	356.894	-355.206	D	7.52	7.5	0.021	3.1	82.01	17.99	0	0	0	0
2002	287	23	1017	356.894	-355.206	D	7.51	7.5	0.011	3.1	83.27	16.74	0	0	0	0
2002	288	23	1017	356.894	-355.206	D	7.516	7.5	0.016	3.1	88.76	11.25	0	0	0	0
2002	289	23	78	358.239	-356.385	D	7.582	7.5	0.083	3.1	48.77	51.23	0	0	0	0
2002	290	23	906	364.982	-359.812	D	7.5	7.5	0	3.1	93.01	9.48	0	0	0	0
2002	291	23	689	364.595	-359.6	D	7.5	7.5	0	3.1	83.99	1.9	0	0	0	0
2002	292	23	949	365.722	-354.966	D	7.521	7.5	0.022	3.1	75.85	24.15	0	0	0	0
2002	293	23	854	361.771	-362.091	D	7.624	7.5	0.124	3.1	72.54	27.46	0	0	0	0
2002	294	23	1035	356.477	-356.792	D	7.519	7.5	0.019	3.1	92.45	7.56	0	0	0	0
2002	295	23	1017	356.894	-355.206	D	7.516	7.5	0.016	3.1	94.41	5.6	0	0	0	0
2002	296	23	967	363.478	-354.116	D	7.549	7.5	0.05	3.1	92.03	7.97	0	0	0	0

Appendix M
Hercules Glade
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	297	23	822	358.021	-361.607	D	7.525	7.5	0.026	3.1	95.62	4.38	0	0	0	0
2002	298	23	1017	356.894	-355.206	D	7.531	7.5	0.031	3.1	87.43	12.58	0	0	0	0
2002	299	23	949	365.722	-354.966	D	7.628	7.5	0.128	3.1	87.95	12.05	0	0	0	0
2002	300	23	930	366.19	-357.232	D	7.682	7.5	0.182	3.1	81.99	18.01	0	0	0	0
2002	301	23	1017	356.894	-355.206	D	7.559	7.5	0.06	3.1	87.67	12.33	0	0	0	0
2002	302	23	1035	356.477	-356.792	D	7.621	7.5	0.121	3.1	80.67	19.33	0	0	0	0
2002	303	23	822	358.021	-361.607	D	7.583	7.5	0.083	3.1	86.27	13.73	0	0	0	0
2002	304	23	822	358.021	-361.607	D	7.636	7.5	0.137	3.1	79.04	20.96	0	0	0	0
2002	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	307	23	930	366.19	-357.232	D	7.503	7.5	0.004	3.1	78.74	21.32	0	0	0	0
2002	308	23	789	365.918	-355.796	D	7.5	7.5	0	3.1	85.1	14.91	0	0	0	0
2002	309	23	933	366.169	-356.524	D	7.501	7.5	0.001	3.1	89.02	11.07	0	0	0	0
2002	310	23	949	365.722	-354.966	D	7.513	7.5	0.014	3.1	77.73	22.28	0	0	0	0
2002	311	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	316	23	927	365.912	-357.454	D	7.577	7.5	0.078	3.1	35.75	64.26	0	0	0	0
2002	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	930	366.19	-357.232	D	7.506	7.5	0.006	3.1	37.97	62.03	0	0	0	0
2002	320	23	927	365.912	-357.454	D	7.679	7.5	0.179	3.1	39.1	60.9	0	0	0	0
2002	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	323	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	328	23	1008	358.048	-354.775	D	7.5	7.5	0.001	3.1	77.24	22.82	0	0	0	0
2002	329	23	930	366.19	-357.232	D	7.594	7.5	0.094	3.1	58.62	41.39	0	0	0	0
2002	330	23	1017	356.894	-355.206	D	7.562	7.5	0.063	3.1	69.58	30.42	0	0	0	0
2002	331	23	927	365.912	-357.454	D	7.559	7.5	0.059	3.1	46.27	53.73	0	0	0	0
2002	332	23	907	365.051	-359.809	D	7.5	7.5	0	3.1	60.95	39.32	0	0	0	0
2002	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	78	358.239	-356.385	D	7.599	7.593	0.006	3.3	48.88	51.14	0	0	0	0
2002	338	23	191	359.732	-362.061	D	7.593	7.593	0	3.3	64.12	35.5	0	0	0	0
2002	339	23	927	365.912	-357.454	D	7.657	7.593	0.064	3.3	30.52	69.48	0	0	0	0
2002	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	961	364.092	-354.289	D	7.601	7.593	0.008	3.3	73.21	26.79	0	0	0	0
2002	343	23	1039	356.522	-357.599	D	7.667	7.593	0.075	3.3	73.35	26.65	0	0	0	0
2002	344	23	1017	356.894	-355.206	D	7.609	7.593	0.016	3.3	79.84	20.16	0	0	0	0
2002	345	23	1017	356.894	-355.206	D	7.608	7.593	0.015	3.3	83.63	16.36	0	0	0	0
2002	346	23	747	364.871	-354.594	D	7.595	7.593	0.002	3.3	87.99	11.99	0	0	0	0
2002	347	23	1039	356.522	-357.599	D	7.643	7.593	0.05	3.3	76.23	23.77	0	0	0	0
2002	348	23	832	359.493	-362.061	D	7.626	7.593	0.033	3.3	73.78	26.22	0	0	0	0
2002	349	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	747	364.871	-354.594	D	7.593	7.593	0	3.3	51.57	48.42	0	0	0	0
2002	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	358	23	1017	356.894	-355.206	D	7.648	7.593	0.056	3.3	66.58	33.42	0	0	0	0
2002	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	1017	356.894	-355.206	D	7.62	7.593	0.028	3.3	39.59	60.4	0	0	0	0
									0.391							
HOLCIM									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2002	2	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	3	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	7	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	10	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	11	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	16	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	17	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	18	23	907	365.051	-359.809	D	7.58	7.546	0.034	3.2	61.84	37.97	0	0	0	0.19
2002	19	23	963	363.809	-354.192	D	7.876	7.546	0.329	3.2	61.57	38.3	0	0	0	0.14
2002	20	23	930	366.19	-357.232	D	7.825	7.546	0.279	3.2	68.39	31.52	0	0	0	0.09
2002	21	23	949	365.722	-354.966	D	7.547	7.546	0.001	3.2	72.1	27.86	0	0	0	0.06
2002	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	24	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	25	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	26	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	27	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	28	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	30	23	967	363.478	-354.116	D	7.846	7.546	0.3	3.2	58.05	41.78	0	0	0	0.17
2002	31	23	1017	356.894	-355.206	D	8.609	7.546	**1.063**	3.2	61.99	37.89	0	0	0	0.12
2002	32	23	949	365.722	-354.966	D	7.422	7.411	0.01	2.913	71.74	28.21	0	0	0	0.06
2002	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	36	23	933	366.169	-356.524	D	7.486	7.406	0.08	2.9	46.94	52.85	0	0	0	0.22
2002	37	23	1017	356.894	-355.206	D	7.411	7.406	0.005	2.9	57.64	42.23	0	0	0	0.16
2002	38	23	949	365.722	-354.966	D	7.411	7.406	0.005	2.9	70.13	29.82	0	0	0	0.12
2002	39	23	907	365.051	-359.809	D	7.409	7.406	0.003	2.9	76.49	23.53	0	0	0	0.09
2002	40	23	789	365.918	-355.796	D	7.406	7.406	0.001	2.9	81.64	18.45	0	0	0	0.07
2002	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	46	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	47	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	49	23	930	366.19	-357.232	D	7.406	7.406	0.001	2.9	47.66	52.31	0	0	0	0.28
2002	50	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	51	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	52	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	53	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	54	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	55	23	930	366.19	-357.232	D	7.408	7.406	0.002	2.9	70.67	29.14	0	0	0	0.23
2002	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	57	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	58	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	59	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	0	0	0	0	0	0
2002	61	23	949	365.722	-354.966	D	7.351	7.311	0.041	2.7	54.33	45.53	0	0	0	0.14
2002	62	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	63	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	75	23	845	360.851	-362.181	D	7.42	7.311	0.109	2.7	53.07	46.49	0	0	0	0.44
2002	76	23	1039	356.522	-357.599	D	7.363	7.311	0.053	2.7	55	44.81	0	0	0	0.19
2002	77	23	949	365.722	-354.966	D	7.313	7.311	0.002	2.7	83.98	15.94	0	0	0	0.14
2002	78	23	964	363.678	-354.148	D	7.552	7.311	0.241	2.7	72.34	27.52	0	0	0	0.13
2002	79	23	949	365.722	-354.966	D	8.447	7.311	**1.136**	2.7	71.88	27.99	0	0	0	0.13
2002	80	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	82	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	23	1017	356.894	-355.206	D	7.336	7.311	0.025	2.7	72.05	27.77	0	0	0	0.19
2002	85	23	974	362.281	-354.249	D	8.056	7.311	**0.746**	2.7	66.51	33.26	0	0	0	0.23
2002	86	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	87	23	930	366.19	-357.232	D	7.313	7.311	0.002	2.7	79	20.82	0	0	0	0.18
2002	88	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	89	23	853	361.666	-362.175	D	7.372	7.311	0.061	2.7	84.43	15.22	0	0	0	0.35
2002	90	23	1017	356.894	-355.206	D	7.327	7.311	0.016	2.7	88.4	11.27	0	0	0	0.35
2002	91	23	930	366.19	-357.232	D	7.333	7.311	0.023	2.7	81.19	18.29	0	0	0	0.52
2002	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	94	23	964	363.678	-354.148	D	7.322	7.311	0.012	2.7	66.89	32.78	0	0	0	0.36
2002	95	23	974	362.281	-354.249	D	7.747	7.311	0.436	2.7	67.82	31.93	0	0	0	0.26
2002	96	23	949	365.722	-354.966	D	7.534	7.311	0.223	2.7	86.26	13.55	0	0	0	0.19
2002	97	23	967	363.478	-354.116	D	7.319	7.311	0.009	2.7	93.73	6.1	0	0	0	0.16
2002	98	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	100	23	933	366.169	-356.524	D	7.415	7.311	0.104	2.7	80.3	19.5	0	0	0	0.2
2002	101	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	98.83	0.79	0	0	0	0.18
2002	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	113	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	115	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	116	23	822	358.021	-361.607	D	7.324	7.311	0.013	2.7	78.16	21.65	0	0	0	0.2
2002	117	23	949	365.722	-354.966	D	7.323	7.311	0.012	2.7	87.69	12.15	0	0	0	0.15
2002	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	119	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	121	23	62	357.925	-354.901	D	7.581	7.581	0	3.275	88.73	10.6	0	0	0	0.12

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	122	23	949	365.722	-354.966	D	7.668	7.593	0.075	3.3	86.88	13.03	0	0	0	0.08
2002	123	23	822	358.021	-361.607	D	7.72	7.593	0.127	3.3	82.97	16.78	0	0	0	0.25
2002	124	23	1039	356.522	-357.599	D	7.703	7.593	0.11	3.3	90.38	9.52	0	0	0	0.1
2002	125	23	1035	356.477	-356.792	D	7.657	7.593	0.065	3.3	94.61	5.31	0	0	0	0.08
2002	126	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	99.89	0.09	0	0	0	0.05
2002	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	128	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	130	23	963	363.809	-354.192	D	7.605	7.593	0.012	3.3	88.09	11.41	0	0	0	0.49
2002	131	23	955	364.92	-354.582	D	7.593	7.593	0.001	3.3	93.42	6.17	0	0	0	0.27
2002	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	137	23	1017	356.894	-355.206	D	8.119	7.593	**0.526**	3.3	70.58	29.31	0	0	0	0.11
2002	138	23	907	365.051	-359.809	D	8.1	7.593	**0.507**	3.3	60.73	39.08	0	0	0	0.19
2002	139	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	140	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	141	23	931	366.183	-356.996	D	7.596	7.593	0.003	3.3	91.17	8.63	0	0	0	0.22
2002	142	23	930	366.19	-357.232	D	7.659	7.593	0.066	3.3	95.76	4.09	0	0	0	0.15
2002	143	23	947	365.801	-355.162	D	7.607	7.593	0.014	3.3	98.05	1.85	0	0	0	0.09
2002	144	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	145	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	149	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	150	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	158	23	930	366.19	-357.232	D	7.602	7.593	0.01	3.3	99.37	0.44	0	0	0	0.21
2002	159	23	907	365.051	-359.809	D	7.759	7.593	0.166	3.3	98.63	1.24	0	0	0	0.13
2002	160	23	1008	358.048	-354.775	D	7.643	7.593	0.05	3.3	99.41	0.48	0	0	0	0.11

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	164	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	168	23	933	366.169	-356.524	D	7.599	7.593	0.006	3.3	99.59	0.25	0	0	0	0.16
2002	169	23	947	365.801	-355.162	D	7.629	7.593	0.036	3.3	99.33	0.55	0	0	0	0.13
2002	170	23	949	365.722	-354.966	D	7.601	7.593	0.009	3.3	99.39	0.51	0	0	0	0.11
2002	171	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	178	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	179	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	180	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	183	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	184	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	185	23	949	365.722	-354.966	D	7.6	7.593	0.007	3.3	99.44	0.46	0	0	0	0.11
2002	186	23	955	364.92	-354.582	D	7.614	7.593	0.021	3.3	99.68	0.24	0	0	0	0.09
2002	187	23	933	366.169	-356.524	D	7.732	7.593	0.139	3.3	99.56	0.34	0	0	0	0.1
2002	188	23	1039	356.522	-357.599	D	7.69	7.593	0.098	3.3	99.58	0.33	0	0	0	0.09
2002	189	23	963	363.809	-354.192	D	7.594	7.593	0.001	3.3	99.63	0.19	0	0	0	0.08
2002	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	192	23	949	365.722	-354.966	D	7.617	7.593	0.024	3.3	92.68	7.19	0	0	0	0.14
2002	193	23	964	363.678	-354.148	D	7.65	7.593	0.057	3.3	97.38	2.51	0	0	0	0.11
2002	194	23	1017	356.894	-355.206	D	7.623	7.593	0.03	3.3	91.65	8.27	0	0	0	0.09
2002	195	23	1017	356.894	-355.206	D	7.611	7.593	0.019	3.3	99.36	0.38	0	0	0	0.25
2002	196	23	1017	356.894	-355.206	D	7.662	7.593	0.069	3.3	98.77	1.02	0	0	0	0.21
2002	197	23	1017	356.894	-355.206	D	7.597	7.593	0.004	3.3	99.44	0.42	0	0	0	0.16
2002	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	199	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	204	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	205	23	949	365.722	-354.966	D	7.704	7.593	0.112	3.3	97.96	1.86	0	0	0	0.19
2002	206	23	1010	357.824	-354.865	D	7.718	7.593	0.125	3.3	99.26	0.61	0	0	0	0.13
2002	207	23	930	366.19	-357.232	D	7.625	7.593	0.032	3.3	99.24	0.66	0	0	0	0.1
2002	208	23	947	365.801	-355.162	D	7.593	7.593	0.001	3.3	99.83	0.08	0	0	0	0.09
2002	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	210	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	211	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	212	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	213	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	214	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	215	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	216	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	217	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	218	23	930	366.19	-357.232	D	7.667	7.593	0.075	3.3	98.4	1.45	0	0	0	0.16
2002	219	23	853	361.666	-362.175	D	7.784	7.593	0.191	3.3	95.1	4.8	0	0	0	0.1
2002	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	231	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	232	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	233	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	234	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	235	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	236	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	237	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	238	23	930	366.19	-357.232	D	7.645	7.593	0.052	3.3	94.56	5.17	0	0	0	0.27

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	239	23	949	365.722	-354.966	D	8.365	7.593	**0.772**	3.3	97.86	1.94	0	0	0	0.2
2002	240	23	1035	356.477	-356.792	D	7.742	7.593	0.149	3.3	99.37	0.47	0	0	0	0.16
2002	241	23	1035	356.477	-356.792	D	7.594	7.593	0.001	3.3	95.64	4.14	0	0	0	0.24
2002	242	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	243	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2002	245	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	246	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	247	23	949	365.722	-354.966	D	7.639	7.639	0.001	3.4	99.38	0.35	0	0	0	0.27
2002	248	23	930	366.19	-357.232	D	7.831	7.639	0.192	3.4	98.99	0.83	0	0	0	0.18
2002	249	23	1039	356.522	-357.599	D	7.713	7.639	0.074	3.4	99.39	0.47	0	0	0	0.14
2002	250	23	1016	357.1	-355.198	D	7.639	7.639	0.001	3.4	99.71	0.1	0	0	0	0.12
2002	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	254	23	947	365.801	-355.162	D	7.642	7.639	0.003	3.4	98.6	1.01	0	0	0	0.38
2002	255	23	1039	356.522	-357.599	D	7.819	7.639	0.181	3.4	91	8.75	0	0	0	0.26
2002	256	23	1039	356.522	-357.599	D	7.677	7.639	0.038	3.4	99.09	0.75	0	0	0	0.16
2002	257	23	1017	356.894	-355.206	D	7.661	7.639	0.022	3.4	99.16	0.73	0	0	0	0.12
2002	258	23	947	365.801	-355.162	D	7.64	7.639	0.001	3.4	98.81	1.09	0	0	0	0.11
2002	259	23	933	366.169	-356.524	D	7.678	7.639	0.039	3.4	99.41	0.43	0	0	0	0.16
2002	260	23	941	365.977	-355.774	D	7.715	7.639	0.076	3.4	96.49	3.39	0	0	0	0.12
2002	261	23	949	365.722	-354.966	D	7.641	7.639	0.002	3.4	91.31	8.61	0	0	0	0.09
2002	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	265	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	266	23	907	365.051	-359.809	D	7.639	7.639	0	3.4	96.45	2.3	0	0	0	0.37
2002	267	23	949	365.722	-354.966	D	7.719	7.639	0.08	3.4	96.12	3.51	0	0	0	0.37
2002	268	23	967	363.478	-354.116	D	7.762	7.639	0.124	3.4	94.7	5.07	0	0	0	0.23
2002	269	23	1017	356.894	-355.206	D	7.653	7.639	0.014	3.4	98.28	1.58	0	0	0	0.15
2002	270	23	1008	358.048	-354.775	D	8.021	7.639	0.382	3.4	97.31	2.42	0	0	0	0.27
2002	271	23	949	365.722	-354.966	D	8.508	7.639	**0.869**	3.4	97.59	2.23	0	0	0	0.18
2002	272	23	933	366.169	-356.524	D	8.048	7.639	0.409	3.4	96.59	3.28	0	0	0	0.14
2002	273	23	955	364.92	-354.582	D	7.644	7.639	0.005	3.4	99.63	0.28	0	0	0	0.09
2002	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2002	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	276	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	278	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	279	23	932	366.176	-356.761	D	7.516	7.5	0.017	3.1	93.52	6.2	0	0	0	0.28
2002	280	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	281	23	933	366.169	-356.524	D	7.614	7.5	0.115	3.1	85.16	14.57	0	0	0	0.28
2002	282	23	1017	356.894	-355.206	D	7.513	7.5	0.014	3.1	94.97	4.83	0	0	0	0.22
2002	283	23	1008	358.048	-354.775	D	7.5	7.5	0.001	3.1	96.06	3.9	0	0	0	0.17
2002	284	23	10	356.954	-355.443	D	7.5	7.5	0	3.1	97.86	0.81	0	0	0	0.15
2002	285	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	286	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	287	23	1017	356.894	-355.206	D	7.66	7.5	0.161	3.1	56.4	43.29	0	0	0	0.31
2002	288	23	822	358.021	-361.607	D	7.559	7.5	0.06	3.1	79.96	19.84	0	0	0	0.21
2002	289	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	290	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	291	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	292	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	293	23	930	366.19	-357.232	D	7.671	7.5	0.171	3.1	63.65	36.03	0	0	0	0.32
2002	294	23	1039	356.522	-357.599	D	7.784	7.5	0.285	3.1	80.63	19.18	0	0	0	0.2
2002	295	23	1039	356.522	-357.599	D	7.765	7.5	0.265	3.1	90.19	9.67	0	0	0	0.15
2002	296	23	949	365.722	-354.966	D	8.078	7.5	**0.578**	3.1	81.2	18.61	0	0	0	0.19
2002	297	23	822	358.021	-361.607	D	7.683	7.5	0.183	3.1	92.88	6.98	0	0	0	0.14
2002	298	23	1008	358.048	-354.775	D	7.501	7.5	0.001	3.1	75.27	24.56	0	0	0	0.13
2002	299	23	949	365.722	-354.966	D	7.532	7.5	0.032	3.1	79.51	20.38	0	0	0	0.12
2002	300	23	853	361.666	-362.175	D	8.792	7.5	**1.293**	3.1	78.88	20.98	0	0	0	0.14
2002	301	23	1017	356.894	-355.206	D	8.383	7.5	**0.884**	3.1	74.68	25.22	0	0	0	0.1
2002	302	23	1008	358.048	-354.775	D	8.62	7.5	**1.12**	3.1	62	37.79	0	0	0	0.21
2002	303	23	1035	356.477	-356.792	D	10.03	7.5	**2.53**	3.1	68.17	31.65	0	0	0	0.17
2002	304	23	853	361.666	-362.175	D	8.62	7.5	**1.12**	3.1	60.75	39.09	0	0	0	0.16
2002	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	307	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	308	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	309	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	310	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	311	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	316	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	323	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	328	23	974	362.281	-354.249	D	7.504	7.5	0.005	3.1	56.27	43.6	0	0	0	0.15
2002	329	23	931	366.183	-356.996	D	7.932	7.5	0.433	3.1	52.91	46.97	0	0	0	0.12
2002	330	23	947	365.801	-355.162	D	7.811	7.5	0.312	3.1	56	43.8	0	0	0	0.2
2002	331	23	853	361.666	-362.175	D	7.721	7.5	0.222	3.1	42.06	57.76	0	0	0	0.19
2002	332	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2002	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	78	358.239	-356.385	D	7.705	7.593	0.112	3.3	25.23	74.22	0	0	0	0.56
2002	338	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	51.57	48.41	0	0	0	0.08
2002	339	23	78	358.239	-356.385	D	7.961	7.593	0.368	3.3	24.62	74.96	0	0	0	0.42
2002	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	963	363.809	-354.192	D	7.602	7.593	0.009	3.3	63.06	36.81	0	0	0	0.13
2002	343	23	822	358.021	-361.607	D	8.025	7.593	0.432	3.3	61.95	37.94	0	0	0	0.11
2002	344	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	23	955	364.92	-354.582	D	8.168	7.593	**0.576**	3.3	53.44	46.34	0	0	0	0.22
2002	348	23	907	365.051	-359.809	D	7.881	7.593	0.288	3.3	51.42	48.42	0	0	0	0.16
2002	349	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	358	23	1017	356.894	-355.206	D	7.991	7.593	0.399	3.3	32.64	67.11	0	0	0	0.25
2002	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	930	366.19	-357.232	D	7.707	7.593	0.115	3.3	61.87	37.85	0	0	0	0.29
									2.53							

Appendix M
Hercules Glade
2003 M6

EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	907	365.051	-359.809	D	7.568	7.548	0.019	3.204	0	0	0	0	0	100
2003	2	23	1039	356.522	-357.599	D	7.591	7.546	0.045	3.2	0	0	0	0	0	100.01
2003	3	23	927	365.912	-357.454	D	7.731	7.546	0.184	3.2	0	0	0	0	0	100
2003	4	23	949	365.722	-354.966	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.06
2003	5	23	927	365.912	-357.454	D	7.685	7.546	0.139	3.2	0	0	0	0	0	100
2003	6	23	731	365.047	-358.581	D	7.59	7.546	0.044	3.2	0	0	0	0	0	100
2003	7	23	78	358.239	-356.385	D	7.579	7.546	0.032	3.2	0	0	0	0	0	100
2003	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	9	23	861	361.895	-361.506	D	7.557	7.546	0.01	3.2	0	0	0	0	0	100.01
2003	10	23	764	365.499	-357.562	D	7.673	7.546	0.127	3.2	0	0	0	0	0	100
2003	11	23	78	358.239	-356.385	D	7.586	7.546	0.039	3.2	0	0	0	0	0	100
2003	12	23	822	358.021	-361.607	D	7.564	7.546	0.018	3.2	0	0	0	0	0	100.01
2003	13	23	941	365.977	-355.774	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100
2003	14	23	764	365.499	-357.562	D	7.563	7.546	0.017	3.2	0	0	0	0	0	100
2003	15	23	822	358.021	-361.607	D	7.546	7.546	0	3.2	0	0	0	0	0	104.55
2003	16	23	78	358.239	-356.385	D	7.581	7.546	0.035	3.2	0	0	0	0	0	100
2003	17	23	927	365.912	-357.454	D	7.7	7.546	0.153	3.2	0	0	0	0	0	100
2003	18	23	949	365.722	-354.966	D	7.568	7.546	0.022	3.2	0	0	0	0	0	100.01
2003	19	23	861	361.895	-361.506	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.03
2003	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	21	23	1017	356.894	-355.206	D	7.566	7.546	0.019	3.2	0	0	0	0	0	100.01
2003	22	23	907	365.051	-359.809	D	7.572	7.546	0.026	3.2	0	0	0	0	0	100
2003	23	23	822	358.021	-361.607	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.06
2003	24	23	1039	356.522	-357.599	D	7.55	7.546	0.004	3.2	0	0	0	0	0	100.04
2003	25	23	947	365.801	-355.162	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.06
2003	26	23	102	358.487	-356.374	D	7.558	7.546	0.011	3.2	0	0	0	0	0	100
2003	27	23	191	359.732	-362.061	D	7.552	7.546	0.006	3.2	0	0	0	0	0	100.03
2003	28	23	271	359.953	-355.81	D	7.546	7.546	0	3.2	0	0	0	0	0	73.08
2003	29	23	78	358.239	-356.385	D	7.565	7.546	0.019	3.2	0	0	0	0	0	100
2003	30	23	907	365.051	-359.809	D	7.56	7.546	0.014	3.2	0	0	0	0	0	100.01
2003	31	23	62	357.925	-354.901	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.09
2003	32	23	927	365.912	-357.454	D	7.488	7.411	0.077	2.913	0	0	0	0	0	100
2003	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	34	23	966	363.538	-354.124	D	7.406	7.406	0	2.9	0	0	0	0	0	101.12
2003	35	23	773	365.4	-355.32	D	7.465	7.406	0.06	2.9	0	0	0	0	0	100
2003	36	23	78	358.239	-356.385	D	7.42	7.406	0.015	2.9	0	0	0	0	0	100.03
2003	37	23	932	366.176	-356.761	D	7.412	7.406	0.007	2.9	0	0	0	0	0	100.03
2003	38	23	1039	356.522	-357.599	D	7.433	7.406	0.028	2.9	0	0	0	0	0	100

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	39	23	747	364.871	-354.594	D	7.406	7.406	0	2.9	0	0	0	0	0	99.89
2003	40	23	927	365.912	-357.454	D	7.406	7.406	0	2.9	0	0	0	0	0	104.92
2003	41	23	955	364.92	-354.582	D	7.406	7.406	0.001	2.9	0	0	0	0	0	100.24
2003	42	23	949	365.722	-354.966	D	7.419	7.406	0.014	2.9	0	0	0	0	0	100.01
2003	43	23	78	358.239	-356.385	D	7.427	7.406	0.022	2.9	0	0	0	0	0	100.01
2003	44	23	974	362.281	-354.249	D	7.414	7.406	0.008	2.9	0	0	0	0	0	100.03
2003	45	23	543	362.627	-354.444	D	7.406	7.406	0	2.9	0	0	0	0	0	100.18
2003	46	23	563	362.941	-355.928	D	7.446	7.406	0.04	2.9	0	0	0	0	0	100
2003	47	23	927	365.912	-357.454	D	7.425	7.406	0.02	2.9	0	0	0	0	0	100.01
2003	48	23	967	363.478	-354.116	D	7.46	7.406	0.055	2.9	0	0	0	0	0	100
2003	49	23	949	365.722	-354.966	D	7.413	7.406	0.007	2.9	0	0	0	0	0	100.03
2003	50	23	949	365.722	-354.966	D	7.406	7.406	0	2.9	0	0	0	0	0	100.51
2003	51	23	907	365.051	-359.809	D	7.42	7.406	0.014	2.9	0	0	0	0	0	100.02
2003	52	23	822	358.021	-361.607	D	7.41	7.406	0.005	2.9	0	0	0	0	0	100.06
2003	53	23	102	358.487	-356.374	D	7.45	7.406	0.044	2.9	0	0	0	0	0	100.01
2003	54	23	824	358.459	-361.601	D	7.439	7.406	0.033	2.9	0	0	0	0	0	100
2003	55	23	822	358.021	-361.607	D	7.462	7.406	0.057	2.9	0	0	0	0	0	100
2003	56	23	861	361.895	-361.506	D	7.417	7.406	0.012	2.9	0	0	0	0	0	100.02
2003	57	23	1039	356.522	-357.599	D	7.416	7.406	0.011	2.9	0	0	0	0	0	100.02
2003	58	23	1017	356.894	-355.206	D	7.409	7.406	0.004	2.9	0	0	0	0	0	100.08
2003	59	23	955	364.92	-354.582	D	7.469	7.406	0.064	2.9	0	0	0	0	0	100.01
2003	60	23	1008	358.048	-354.775	D	7.339	7.315	0.024	2.708	0	0	0	0	0	100.01
2003	61	23	714	364.799	-358.592	D	7.508	7.311	0.198	2.7	0	0	0	0	0	100
2003	62	23	822	358.021	-361.607	D	7.329	7.311	0.019	2.7	0	0	0	0	0	100.01
2003	63	23	789	365.918	-355.796	D	7.311	7.311	0	2.7	0	0	0	0	0	99.74
2003	64	23	822	358.021	-361.607	D	7.328	7.311	0.017	2.7	0	0	0	0	0	100.01
2003	65	23	869	361.064	-360.714	D	7.396	7.311	0.085	2.7	0	0	0	0	0	100
2003	66	23	906	364.982	-359.812	D	7.313	7.311	0.002	2.7	0	0	0	0	0	100.09
2003	67	23	966	363.538	-354.124	D	7.311	7.311	0	2.7	0	0	0	0	0	99.85
2003	68	23	1039	356.522	-357.599	D	7.317	7.311	0.006	2.7	0	0	0	0	0	100.01
2003	69	23	907	365.051	-359.809	D	7.321	7.311	0.01	2.7	0	0	0	0	0	100.01
2003	70	23	930	366.19	-357.232	D	7.325	7.311	0.015	2.7	0	0	0	0	0	100.01
2003	71	23	947	365.801	-355.162	D	7.312	7.311	0.001	2.7	0	0	0	0	0	99.93
2003	72	23	1039	356.522	-357.599	D	7.338	7.311	0.028	2.7	0	0	0	0	0	100.01
2003	73	23	78	358.239	-356.385	D	7.326	7.311	0.016	2.7	0	0	0	0	0	100.01
2003	74	23	1017	356.894	-355.206	D	7.314	7.311	0.004	2.7	0	0	0	0	0	100.05
2003	75	23	1016	357.1	-355.198	D	7.311	7.311	0	2.7	0	0	0	0	0	100.23
2003	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	947	365.801	-355.162	D	7.311	7.311	0	2.7	0	0	0	0	0	100.34

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	78	23	747	364.871	-354.594	D	7.312	7.311	0.001	2.7	0	0	0	0	0	99.97
2003	79	23	773	365.4	-355.32	D	7.335	7.311	0.024	2.7	0	0	0	0	0	100.01
2003	80	23	78	358.239	-356.385	D	7.371	7.311	0.06	2.7	0	0	0	0	0	100
2003	81	23	78	358.239	-356.385	D	7.405	7.311	0.094	2.7	0	0	0	0	0	100
2003	82	23	301	360.724	-362.017	D	7.311	7.311	0	2.7	0	0	0	0	0	98.26
2003	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	1017	356.894	-355.206	D	7.33	7.311	0.02	2.7	0	0	0	0	0	100.01
2003	85	23	927	365.912	-357.454	D	7.315	7.311	0.004	2.7	0	0	0	0	0	100.04
2003	86	23	643	363.609	-354.151	D	7.311	7.311	0.001	2.7	0	0	0	0	0	99.94
2003	87	23	949	365.722	-354.966	D	7.346	7.311	0.035	2.7	0	0	0	0	0	100.01
2003	88	23	927	365.912	-357.454	D	7.432	7.311	0.121	2.7	0	0	0	0	0	100
2003	89	23	927	365.912	-357.454	D	7.456	7.311	0.145	2.7	0	0	0	0	0	100
2003	90	23	788	365.951	-356.544	D	7.311	7.311	0	2.7	0	0	0	0	0	100.06
2003	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	94	23	1017	356.894	-355.206	D	7.311	7.311	0	2.7	0	0	0	0	0	104.14
2003	95	23	824	358.459	-361.601	D	7.352	7.311	0.041	2.7	0	0	0	0	0	100
2003	96	23	927	365.912	-357.454	D	7.316	7.311	0.006	2.7	0	0	0	0	0	100.02
2003	97	23	955	364.92	-354.582	D	7.314	7.311	0.003	2.7	0	0	0	0	0	100
2003	98	23	1041	356.936	-357.592	D	7.436	7.311	0.125	2.7	0	0	0	0	0	100
2003	99	23	822	358.021	-361.607	D	7.319	7.311	0.008	2.7	0	0	0	0	0	100.01
2003	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	101	23	1017	356.894	-355.206	D	7.342	7.311	0.032	2.7	0	0	0	0	0	100
2003	102	23	927	365.912	-357.454	D	7.403	7.311	0.092	2.7	0	0	0	0	0	100
2003	103	23	949	365.722	-354.966	D	7.322	7.311	0.012	2.7	0	0	0	0	0	100.01
2003	104	23	783	365.659	-355.558	D	7.311	7.311	0	2.7	0	0	0	0	0	100.46
2003	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	107	23	955	364.92	-354.582	D	7.351	7.311	0.041	2.7	0	0	0	0	0	100
2003	108	23	949	365.722	-354.966	D	7.325	7.311	0.014	2.7	0	0	0	0	0	100.01
2003	109	23	784	365.648	-355.309	D	7.311	7.311	0	2.7	0	0	0	0	0	99.75
2003	110	23	822	358.021	-361.607	D	7.312	7.311	0.001	2.7	0	0	0	0	0	100.19
2003	111	23	949	365.722	-354.966	D	7.321	7.311	0.011	2.7	0	0	0	0	0	100.02
2003	112	23	78	358.239	-356.385	D	7.357	7.311	0.046	2.7	0	0	0	0	0	100
2003	113	23	927	365.912	-357.454	D	7.316	7.311	0.006	2.7	0	0	0	0	0	100.04
2003	114	23	1016	357.1	-355.198	D	7.311	7.311	0	2.7	0	0	0	0	0	100.2
2003	115	23	955	364.92	-354.582	D	7.36	7.311	0.049	2.7	0	0	0	0	0	100
2003	116	23	537	362.693	-355.939	D	7.352	7.311	0.042	2.7	0	0	0	0	0	100.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	117	23	930	366.19	-357.232	D	7.315	7.311	0.005	2.7	0	0	0	0	0	100.03
2003	118	23	594	363.123	-354.422	D	7.311	7.311	0	2.7	0	0	0	0	0	101.06
2003	119	23	927	365.912	-357.454	D	7.325	7.311	0.014	2.7	0	0	0	0	0	100.02
2003	120	23	949	365.722	-354.966	D	7.311	7.311	0	2.7	0	0	0	0	0	98.94
2003	121	23	1008	358.048	-354.775	D	7.582	7.581	0.001	3.275	0	0	0	0	0	100.06
2003	122	23	78	358.239	-356.385	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2003	123	23	1039	356.522	-357.599	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.01
2003	124	23	930	366.19	-357.232	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.01
2003	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	91.47
2003	127	23	78	358.239	-356.385	D	7.636	7.593	0.044	3.3	0	0	0	0	0	100
2003	128	23	961	364.092	-354.289	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100.01
2003	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	131	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	0	0	0	0	0	100.14
2003	132	23	773	365.4	-355.32	D	7.658	7.593	0.065	3.3	0	0	0	0	0	100
2003	133	23	1039	356.522	-357.599	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100
2003	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	12.85
2003	135	23	927	365.912	-357.454	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.93
2003	136	23	963	363.809	-354.192	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.01
2003	137	23	967	363.478	-354.116	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.01
2003	138	23	927	365.912	-357.454	D	7.629	7.593	0.037	3.3	0	0	0	0	0	100
2003	139	23	1035	356.477	-356.792	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.02
2003	140	23	747	364.871	-354.594	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100.01
2003	141	23	102	358.487	-356.374	D	7.605	7.593	0.013	3.3	0	0	0	0	0	100.01
2003	142	23	822	358.021	-361.607	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100.03
2003	143	23	822	358.021	-361.607	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.05
2003	144	23	1017	356.894	-355.206	D	7.609	7.593	0.016	3.3	0	0	0	0	0	100.01
2003	145	23	78	358.239	-356.385	D	7.639	7.593	0.046	3.3	0	0	0	0	0	100.01
2003	146	23	1017	356.894	-355.206	D	7.609	7.593	0.016	3.3	0	0	0	0	0	100
2003	147	23	773	365.4	-355.32	D	7.66	7.593	0.067	3.3	0	0	0	0	0	100
2003	148	23	102	358.487	-356.374	D	7.651	7.593	0.058	3.3	0	0	0	0	0	100
2003	149	23	927	365.912	-357.454	D	7.714	7.593	0.121	3.3	0	0	0	0	0	100
2003	150	23	1039	356.522	-357.599	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100.02
2003	151	23	102	358.487	-356.374	D	7.615	7.593	0.023	3.3	0	0	0	0	0	100
2003	152	23	927	365.912	-357.454	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.04
2003	153	23	811	357.434	-360.225	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.02
2003	154	23	102	358.487	-356.374	D	7.766	7.593	0.173	3.3	0	0	0	0	0	100
2003	155	23	822	358.021	-361.607	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.03

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	156	23	1017	356.894	-355.206	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100.02
2003	157	23	967	363.478	-354.116	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2003	158	23	927	365.912	-357.454	D	7.649	7.593	0.057	3.3	0	0	0	0	0	100
2003	159	23	927	365.912	-357.454	D	7.601	7.593	0.009	3.3	0	0	0	0	0	100.02
2003	160	23	747	364.871	-354.594	D	7.593	7.593	0	3.3	0	0	0	0	0	99.23
2003	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	162	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100
2003	163	23	967	363.478	-354.116	D	7.602	7.593	0.009	3.3	0	0	0	0	0	100.01
2003	164	23	964	363.678	-354.148	D	7.596	7.593	0.003	3.3	0	0	0	0	0	99.98
2003	165	23	822	358.021	-361.607	D	7.602	7.593	0.009	3.3	0	0	0	0	0	100.02
2003	166	23	930	366.19	-357.232	D	7.608	7.593	0.015	3.3	0	0	0	0	0	100
2003	167	23	1017	356.894	-355.206	D	7.606	7.593	0.013	3.3	0	0	0	0	0	99.99
2003	168	23	1008	358.048	-354.775	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.01
2003	169	23	1008	358.048	-354.775	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100.03
2003	170	23	964	363.678	-354.148	D	7.64	7.593	0.048	3.3	0	0	0	0	0	100
2003	171	23	78	358.239	-356.385	D	7.604	7.593	0.012	3.3	0	0	0	0	0	100.02
2003	172	23	927	365.912	-357.454	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.02
2003	173	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	0	0	0	0	0	98.51
2003	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	177	23	927	365.912	-357.454	D	7.615	7.593	0.022	3.3	0	0	0	0	0	100
2003	178	23	78	358.239	-356.385	D	7.628	7.593	0.036	3.3	0	0	0	0	0	100
2003	179	23	1017	356.894	-355.206	D	7.605	7.593	0.013	3.3	0	0	0	0	0	100.01
2003	180	23	1017	356.894	-355.206	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.04
2003	181	23	1007	358.259	-354.768	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.14
2003	182	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	0	0	0	0	0	99.71
2003	183	23	1017	356.894	-355.206	D	7.598	7.593	0.006	3.3	0	0	0	0	0	100.01
2003	184	23	1007	358.259	-354.768	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.02
2003	185	23	771	365.422	-355.818	D	7.593	7.593	0	3.3	0	0	0	0	0	101.58
2003	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	949	365.722	-354.966	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.02
2003	192	23	102	358.487	-356.374	D	7.671	7.593	0.078	3.3	0	0	0	0	0	100
2003	193	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.02
2003	194	23	949	365.722	-354.966	D	7.601	7.593	0.009	3.3	0	0	0	0	0	100

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	195	23	1017	356.894	-355.206	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100.02
2003	196	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	0	0	0	0	0	98.31
2003	197	23	869	361.064	-360.714	D	7.64	7.593	0.047	3.3	0	0	0	0	0	100
2003	198	23	933	366.169	-356.524	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.11
2003	199	23	931	366.183	-356.996	D	7.593	7.593	0	3.3	0	0	0	0	0	101.5
2003	200	23	933	366.169	-356.524	D	7.593	7.593	0	3.3	0	0	0	0	0	100.94
2003	201	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.12
2003	202	23	949	365.722	-354.966	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.03
2003	203	23	822	358.021	-361.607	D	7.61	7.593	0.017	3.3	0	0	0	0	0	100
2003	204	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	0	0	0	0	0	99.72
2003	205	23	846	360.93	-362.178	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100.03
2003	206	23	851	361.512	-362.072	D	7.605	7.593	0.013	3.3	0	0	0	0	0	99.99
2003	207	23	1008	358.048	-354.775	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.97
2003	208	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	99.5
2003	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	1007	358.259	-354.768	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100.01
2003	211	23	1017	356.894	-355.206	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2003	212	23	949	365.722	-354.966	D	7.614	7.593	0.021	3.3	0	0	0	0	0	100
2003	213	23	933	366.169	-356.524	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.06
2003	214	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	0	0	0	0	0	100.42
2003	215	23	955	364.92	-354.582	D	7.611	7.593	0.018	3.3	0	0	0	0	0	100.01
2003	216	23	949	365.722	-354.966	D	7.606	7.593	0.013	3.3	0	0	0	0	0	100.01
2003	217	23	78	358.239	-356.385	D	7.651	7.593	0.059	3.3	0	0	0	0	0	100
2003	218	23	1039	356.522	-357.599	D	7.629	7.593	0.036	3.3	0	0	0	0	0	100
2003	219	23	947	365.801	-355.162	D	7.601	7.593	0.009	3.3	0	0	0	0	0	100.02
2003	220	23	930	366.19	-357.232	D	7.596	7.593	0.003	3.3	0	0	0	0	0	99.97
2003	221	23	1039	356.522	-357.599	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.04
2003	222	23	949	365.722	-354.966	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.01
2003	223	23	907	365.051	-359.809	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100.01
2003	224	23	1017	356.894	-355.206	D	7.612	7.593	0.019	3.3	0	0	0	0	0	100
2003	225	23	1017	356.894	-355.206	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100
2003	226	23	821	358.053	-361.416	D	7.593	7.593	0	3.3	0	0	0	0	0	99.88
2003	227	23	949	365.722	-354.966	D	7.594	7.593	0.002	3.3	0	0	0	0	0	99.96
2003	228	23	949	365.722	-354.966	D	7.621	7.593	0.029	3.3	0	0	0	0	0	100
2003	229	23	949	365.722	-354.966	D	7.608	7.593	0.015	3.3	0	0	0	0	0	100.01
2003	230	23	955	364.92	-354.582	D	7.617	7.593	0.024	3.3	0	0	0	0	0	100.01
2003	231	23	949	365.722	-354.966	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.01
2003	232	23	930	366.19	-357.232	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.03
2003	233	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.08

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	234	23	643	363.609	-354.151	D	7.607	7.593	0.014	3.3	0	0	0	0	0	100
2003	235	23	907	365.051	-359.809	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100.03
2003	236	23	822	358.021	-361.607	D	7.604	7.593	0.012	3.3	0	0	0	0	0	100
2003	237	23	1017	356.894	-355.206	D	7.598	7.593	0.006	3.3	0	0	0	0	0	100.03
2003	238	23	761	365.152	-355.331	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.94
2003	239	23	789	365.918	-355.796	D	7.593	7.593	0	3.3	0	0	0	0	0	100.59
2003	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	242	23	748	365.295	-358.57	D	7.593	7.593	0	3.3	0	0	0	0	0	98.82
2003	243	23	710	364.843	-359.589	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.02
2003	244	23	10	356.954	-355.443	D	7.637	7.637	0	3.396	0	0	0	0	0	101.61
2003	245	23	949	365.722	-354.966	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.01
2003	246	23	811	357.434	-360.225	D	7.683	7.639	0.044	3.4	0	0	0	0	0	100
2003	247	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	100.18
2003	248	23	912	365.028	-358.602	D	7.65	7.639	0.011	3.4	0	0	0	0	0	100
2003	249	23	1017	356.894	-355.206	D	7.658	7.639	0.02	3.4	0	0	0	0	0	100.01
2003	250	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	0	0	0	0	0	99.96
2003	251	23	191	359.732	-362.061	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.05
2003	252	23	44	358.21	-361.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	99.84
2003	253	23	932	366.176	-356.761	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.03
2003	254	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	96.48
2003	255	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	256	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	257	23	78	358.239	-356.385	D	7.694	7.639	0.055	3.4	0	0	0	0	0	100
2003	258	23	78	358.239	-356.385	D	7.702	7.639	0.063	3.4	0	0	0	0	0	100
2003	259	23	949	365.722	-354.966	D	7.641	7.639	0.003	3.4	0	0	0	0	0	99.96
2003	260	23	949	365.722	-354.966	D	7.641	7.639	0.002	3.4	0	0	0	0	0	99.97
2003	261	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	102.43
2003	262	23	78	358.239	-356.385	D	7.664	7.639	0.025	3.4	0	0	0	0	0	100
2003	263	23	931	366.183	-356.996	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100
2003	264	23	948	365.727	-355.056	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100
2003	265	23	949	365.722	-354.966	D	7.686	7.639	0.047	3.4	0	0	0	0	0	100
2003	266	23	714	364.799	-358.592	D	7.667	7.639	0.028	3.4	0	0	0	0	0	100
2003	267	23	1016	357.1	-355.198	D	7.639	7.639	0.001	3.4	0	0	0	0	0	99.96
2003	268	23	731	365.047	-358.581	D	7.651	7.639	0.013	3.4	0	0	0	0	0	100
2003	269	23	907	365.051	-359.809	D	7.645	7.639	0.006	3.4	0	0	0	0	0	100
2003	270	23	78	358.239	-356.385	D	7.677	7.639	0.038	3.4	0	0	0	0	0	100
2003	271	23	102	358.487	-356.374	D	7.728	7.639	0.089	3.4	0	0	0	0	0	100
2003	272	23	1017	356.894	-355.206	D	7.658	7.639	0.02	3.4	0	0	0	0	0	100

Appendix M
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2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	273	23	822	358.021	-361.607	D	7.653	7.639	0.014	3.4	0	0	0	0	0	100.01
2003	274	23	832	359.493	-362.061	D	7.508	7.505	0.003	3.112	0	0	0	0	0	100.07
2003	275	23	78	358.239	-356.385	D	7.551	7.5	0.051	3.1	0	0	0	0	0	100
2003	276	23	930	366.19	-357.232	D	7.503	7.5	0.003	3.1	0	0	0	0	0	100.04
2003	277	23	78	358.239	-356.385	D	7.542	7.5	0.042	3.1	0	0	0	0	0	100
2003	278	23	811	357.434	-360.225	D	7.513	7.5	0.013	3.1	0	0	0	0	0	100.01
2003	279	23	822	358.021	-361.607	D	7.504	7.5	0.004	3.1	0	0	0	0	0	100.07
2003	280	23	907	365.051	-359.809	D	7.507	7.5	0.007	3.1	0	0	0	0	0	100
2003	281	23	1017	356.894	-355.206	D	7.501	7.5	0.001	3.1	0	0	0	0	0	100.09
2003	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	101.16
2003	283	23	1017	356.894	-355.206	D	7.502	7.5	0.003	3.1	0	0	0	0	0	100.04
2003	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	125.53
2003	285	23	78	358.239	-356.385	D	7.512	7.5	0.012	3.1	0	0	0	0	0	100.02
2003	286	23	947	365.801	-355.162	D	7.503	7.5	0.004	3.1	0	0	0	0	0	100.04
2003	287	23	1039	356.522	-357.599	D	7.531	7.5	0.032	3.1	0	0	0	0	0	100
2003	288	23	102	358.487	-356.374	D	7.566	7.5	0.066	3.1	0	0	0	0	0	100
2003	289	23	788	365.951	-356.544	D	7.5	7.5	0	3.1	0	0	0	0	0	99.78
2003	290	23	907	365.051	-359.809	D	7.516	7.5	0.017	3.1	0	0	0	0	0	100.02
2003	291	23	10	356.954	-355.443	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.11
2003	292	23	845	360.851	-362.181	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.33
2003	293	23	775	365.747	-357.551	D	7.5	7.5	0	3.1	0	0	0	0	0	104.35
2003	294	23	78	358.239	-356.385	D	7.52	7.5	0.021	3.1	0	0	0	0	0	100.01
2003	295	23	102	358.487	-356.374	D	7.627	7.5	0.128	3.1	0	0	0	0	0	100
2003	296	23	78	358.239	-356.385	D	7.534	7.5	0.034	3.1	0	0	0	0	0	100.01
2003	297	23	1039	356.522	-357.599	D	7.506	7.5	0.007	3.1	0	0	0	0	0	100.02
2003	298	23	927	365.912	-357.454	D	7.523	7.5	0.024	3.1	0	0	0	0	0	100.01
2003	299	23	927	365.912	-357.454	D	7.506	7.5	0.006	3.1	0	0	0	0	0	100.01
2003	300	23	927	365.912	-357.454	D	7.567	7.5	0.068	3.1	0	0	0	0	0	100
2003	301	23	961	364.092	-354.289	D	7.524	7.5	0.025	3.1	0	0	0	0	0	100
2003	302	23	714	364.799	-358.592	D	7.544	7.5	0.044	3.1	0	0	0	0	0	100.01
2003	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	0	0	0	0	0	100.07
2003	305	23	1017	356.894	-355.206	D	7.516	7.5	0.016	3.1	0	0	0	0	0	100.01
2003	306	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	0	0	0	0	0	97.11
2003	307	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	1017	356.894	-355.206	D	7.5	7.5	0.001	3.1	0	0	0	0	0	100.22
2003	309	23	78	358.239	-356.385	D	7.527	7.5	0.028	3.1	0	0	0	0	0	100.01
2003	310	23	930	366.19	-357.232	D	7.525	7.5	0.025	3.1	0	0	0	0	0	100
2003	311	23	912	365.028	-358.602	D	7.545	7.5	0.045	3.1	0	0	0	0	0	100

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	312	23	78	358.239	-356.385	D	7.523	7.5	0.024	3.1	0	0	0	0	0	100.01
2003	313	23	754	365.229	-357.075	D	7.505	7.5	0.005	3.1	0	0	0	0	0	100.01
2003	314	23	907	365.051	-359.809	D	7.501	7.5	0.001	3.1	0	0	0	0	0	100.17
2003	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	102	358.487	-356.374	D	7.53	7.5	0.031	3.1	0	0	0	0	0	100
2003	317	23	1037	356.5	-357.195	D	7.535	7.5	0.036	3.1	0	0	0	0	0	100
2003	318	23	1039	356.522	-357.599	D	7.506	7.5	0.006	3.1	0	0	0	0	0	100.02
2003	319	23	775	365.747	-357.551	D	7.5	7.5	0	3.1	0	0	0	0	0	91.68
2003	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	811	357.434	-360.225	D	7.53	7.5	0.03	3.1	0	0	0	0	0	100
2003	323	23	78	358.239	-356.385	D	7.537	7.5	0.037	3.1	0	0	0	0	0	100.01
2003	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1017	356.894	-355.206	D	7.501	7.5	0.002	3.1	0	0	0	0	0	99.98
2003	328	23	949	365.722	-354.966	D	7.502	7.5	0.002	3.1	0	0	0	0	0	100.08
2003	329	23	517	362.401	-354.953	D	7.5	7.5	0	3.1	0	0	0	0	0	74.33
2003	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	78	358.239	-356.385	D	7.509	7.5	0.01	3.1	0	0	0	0	0	100.02
2003	332	23	927	365.912	-357.454	D	7.541	7.5	0.041	3.1	0	0	0	0	0	100
2003	333	23	78	358.239	-356.385	D	7.571	7.5	0.072	3.1	0	0	0	0	0	100
2003	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	714	364.799	-358.592	D	7.607	7.589	0.018	3.292	0	0	0	0	0	100
2003	336	23	927	365.912	-357.454	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100
2003	337	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	0	0	0	0	0	99.68
2003	338	23	957	364.513	-354.595	D	7.835	7.593	0.242	3.3	0	0	0	0	0	100
2003	339	23	949	365.722	-354.966	D	7.644	7.593	0.052	3.3	0	0	0	0	0	100
2003	340	23	824	358.459	-361.601	D	7.669	7.593	0.076	3.3	0	0	0	0	0	100
2003	341	23	1017	356.894	-355.206	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100
2003	342	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	949	365.722	-354.966	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100.01
2003	345	23	869	361.064	-360.714	D	7.626	7.593	0.034	3.3	0	0	0	0	0	100
2003	346	23	832	359.493	-362.061	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.01
2003	347	23	714	364.799	-358.592	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100
2003	348	23	731	365.047	-358.581	D	7.607	7.593	0.015	3.3	0	0	0	0	0	100
2003	349	23	933	366.169	-356.524	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.03
2003	350	23	955	364.92	-354.582	D	7.609	7.593	0.016	3.3	0	0	0	0	0	100

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	351	23	773	365.4	-355.32	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100
2003	352	23	955	364.92	-354.582	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100
2003	353	23	927	365.912	-357.454	D	7.641	7.593	0.048	3.3	0	0	0	0	0	100
2003	354	23	78	358.239	-356.385	D	7.638	7.593	0.046	3.3	0	0	0	0	0	100
2003	355	23	933	366.169	-356.524	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.96
2003	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	811	357.434	-360.225	D	7.624	7.593	0.031	3.3	0	0	0	0	0	100
2003	358	23	78	358.239	-356.385	D	7.661	7.593	0.068	3.3	0	0	0	0	0	100
2003	359	23	822	358.021	-361.607	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2003	360	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.99
2003	361	23	782	365.67	-355.807	D	7.593	7.593	0	3.3	0	0	0	0	0	100.44
2003	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	927	365.912	-357.454	D	7.616	7.593	0.023	3.3	0	0	0	0	0	100
2003	364	23	947	365.801	-355.162	D	7.593	7.593	0	3.3	0	0	0	0	0	92.99
									0.242							
EXIDE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2003	2	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	3	23	824	358.459	-361.601	D	7.549	7.546	0.003	3.2	83.26	11.87	0	0	0	4.95
2003	4	23	785	365.637	-355.06	D	7.546	7.546	0	3.2	89.67	7.85	0	0	0	2.41
2003	5	23	947	365.801	-355.162	D	7.547	7.546	0.001	3.2	72.61	18.78	0	0	0	8.67
2003	6	23	949	365.722	-354.966	D	7.548	7.546	0.001	3.2	91.59	6.13	0	0	0	2.28
2003	7	23	905	364.788	-359.816	D	7.547	7.546	0.001	3.2	92.7	5.5	0	0	0	1.92
2003	8	23	380	361.468	-361.984	D	7.546	7.546	0	3.2	90.93	3.29	0	0	0	1.28
2003	9	23	710	364.843	-359.589	D	7.547	7.546	0	3.2	83.36	10.57	0	0	0	6.09
2003	10	23	822	358.021	-361.607	D	7.547	7.546	0.001	3.2	64.97	22.7	0	0	0	12.39
2003	11	23	1037	356.5	-357.195	D	7.547	7.546	0.001	3.2	79.22	14.68	0	0	0	6.24
2003	12	23	1017	356.894	-355.206	D	7.547	7.546	0.001	3.2	88.59	8.95	0	0	0	2.72
2003	13	23	774	365.389	-355.071	D	7.547	7.546	0.001	3.2	92.97	5.99	0	0	0	1.29
2003	14	23	1	356.546	-357.458	D	7.547	7.546	0.001	3.2	89.07	8.5	0	0	0	2.53
2003	15	23	44	358.21	-361.379	D	7.546	7.546	0	3.2	94.92	4.46	0	0	0	1.44
2003	16	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	96.48	4.95	0	0	0	0.98
2003	17	23	811	357.434	-360.225	D	7.548	7.546	0.002	3.2	85.32	10.61	0	0	0	4.11
2003	18	23	853	361.666	-362.175	D	7.547	7.546	0.001	3.2	87.11	9.8	0	0	0	3.05
2003	19	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	21	23	955	364.92	-354.582	D	7.548	7.546	0.002	3.2	93.74	5.14	0	0	0	1.17
2003	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	24	23	10	356.954	-355.443	D	7.546	7.546	0	3.2	87.78	10.53	0	0	0	2.08
2003	25	23	970	363.145	-354.231	D	7.547	7.546	0.001	3.2	88.96	9.73	0	0	0	1.35
2003	26	23	811	357.434	-360.225	D	7.549	7.546	0.003	3.2	88.2	8.87	0	0	0	2.94
2003	27	23	821	358.053	-361.416	D	7.547	7.546	0.001	3.2	92.78	5.85	0	0	0	1.46
2003	28	23	785	365.637	-355.06	D	7.547	7.546	0	3.2	93.29	5.77	0	0	0	0.85
2003	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	34	23	1007	358.259	-354.768	D	7.406	7.406	0	2.9	95.8	3.09	0	0	0	1.38
2003	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	36	23	947	365.801	-355.162	D	7.408	7.406	0.002	2.9	91.16	6.05	0	0	0	2.9
2003	37	23	1017	356.894	-355.206	D	7.408	7.406	0.002	2.9	94.13	4.72	0	0	0	1.29
2003	38	23	907	365.051	-359.809	D	7.408	7.406	0.003	2.9	92.74	5.8	0	0	0	1.51
2003	39	23	570	363.387	-360.402	D	7.406	7.406	0	2.9	78.34	9.33	0	0	0	2.62
2003	40	23	899	364.071	-360.247	D	7.406	7.406	0	2.9	105.63	6.22	0	0	0	1.67
2003	41	23	748	365.295	-358.57	D	7.406	7.406	0	2.9	96.36	5.26	0	0	0	0.99
2003	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	43	23	822	358.021	-361.607	D	7.406	7.406	0	2.9	70.7	17.85	0	0	0	11.74
2003	44	23	906	364.982	-359.812	D	7.406	7.406	0	2.9	91.51	6.03	0	0	0	2.75
2003	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	92.21	4.58	0	0	0	1.87
2003	46	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	47	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	49	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	101.6	3.19	0	0	0	1.44
2003	50	23	10	356.954	-355.443	D	7.406	7.406	0	2.9	99.34	3.49	0	0	0	1.97
2003	51	23	1036	356.488	-356.993	D	7.406	7.406	0.001	2.9	96	3.04	0	0	0	1.13
2003	52	23	10	356.954	-355.443	D	7.406	7.406	0	2.9	99.61	1.41	0	0	0	0.81
2003	53	23	1038	356.511	-357.396	D	7.406	7.406	0	2.9	96.61	3.64	0	0	0	1.76
2003	54	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	55	23	10	356.954	-355.443	D	7.406	7.406	0	2.9	91.05	6.66	0	0	0	2.44
2003	56	23	822	358.021	-361.607	D	7.408	7.406	0.002	2.9	92.73	5.68	0	0	0	1.67
2003	57	23	3	356.524	-356.959	D	7.407	7.406	0.001	2.9	95.4	3.72	0	0	0	0.98
2003	58	23	643	363.609	-354.151	D	7.406	7.406	0.001	2.9	96.93	2.81	0	0	0	0.7
2003	59	23	62	357.925	-354.901	D	7.406	7.406	0.001	2.9	97.5	2.16	0	0	0	0.53

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	60	23	729	364.634	-354.854	D	7.315	7.315	0	2.708	97.94	1.83	0	0	0	0.48
2003	61	23	930	366.19	-357.232	D	7.314	7.311	0.004	2.7	93.43	4.5	0	0	0	2.09
2003	62	23	854	361.771	-362.091	D	7.314	7.311	0.003	2.7	94.37	4.09	0	0	0	1.58
2003	63	23	907	365.051	-359.809	D	7.316	7.311	0.005	2.7	97.97	1.32	0	0	0	0.74
2003	64	23	961	364.092	-354.289	D	7.312	7.311	0.001	2.7	96.68	2.7	0	0	0	0.73
2003	65	23	775	365.747	-357.551	D	7.311	7.311	0	2.7	96.44	2.94	0	0	0	0.62
2003	66	23	1017	356.894	-355.206	D	7.311	7.311	0.001	2.7	96.67	2.21	0	0	0	1.42
2003	67	23	62	357.925	-354.901	D	7.311	7.311	0	2.7	98.22	1.05	0	0	0	1.09
2003	68	23	822	358.021	-361.607	D	7.314	7.311	0.003	2.7	94.02	4.33	0	0	0	1.68
2003	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	118.41	0.6	0	0	0	1.58
2003	70	23	44	358.21	-361.379	D	7.312	7.311	0.001	2.7	98.17	0.88	0	0	0	1.02
2003	71	23	730	364.623	-354.605	D	7.311	7.311	0	2.7	98.36	0.83	0	0	0	0.74
2003	72	23	1017	356.894	-355.206	D	7.312	7.311	0.001	2.7	95.95	2.68	0	0	0	1.55
2003	73	23	1039	356.522	-357.599	D	7.311	7.311	0	2.7	97.95	1.2	0	0	0	1.18
2003	74	23	10	356.954	-355.443	D	7.311	7.311	0	2.7	100.04	1.09	0	0	0	1
2003	75	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	80	23	822	358.021	-361.607	D	7.311	7.311	0	2.7	93.77	3.01	0	0	0	3.66
2003	81	23	852	361.595	-362.148	D	7.311	7.311	0	2.7	94.5	2.04	0	0	0	3.41
2003	82	23	356	361.22	-361.995	D	7.311	7.311	0	2.7	97.88	0.57	0	0	0	1.61
2003	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	593	363.134	-354.671	D	7.311	7.311	0	2.7	96.98	2.09	0	0	0	1.75
2003	85	23	356	361.22	-361.995	D	7.311	7.311	0	2.7	95.14	2.24	0	0	0	0.99
2003	86	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	87	23	963	363.809	-354.192	D	7.311	7.311	0	2.7	86.96	6.58	0	0	0	2.43
2003	88	23	949	365.722	-354.966	D	7.311	7.311	0	2.7	79.87	13.44	0	0	0	6.69
2003	89	23	2	356.535	-357.209	D	7.312	7.311	0.001	2.7	85.5	9.22	0	0	0	5.29
2003	90	23	689	364.595	-359.6	D	7.311	7.311	0	2.7	86.78	5.66	0	0	0	4.27
2003	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	94	23	643	363.609	-354.151	D	7.311	7.311	0	2.7	99.04	1	0	0	0	1.74
2003	95	23	1017	356.894	-355.206	D	7.312	7.311	0.001	2.7	88.68	7.81	0	0	0	3.61
2003	96	23	706	364.408	-355.364	D	7.311	7.311	0	2.7	98.98	1.38	0	0	0	0.4
2003	97	23	543	362.627	-354.444	D	7.311	7.311	0	2.7	98.51	1.11	0	0	0	0.16
2003	98	23	905	364.788	-359.816	D	7.316	7.311	0.006	2.7	89.34	7.49	0	0	0	3.18

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	104.91	0.51	0	0	0	1.49
2003	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	100.39	0.19	0	0	0	1.15
2003	103	23	454	361.657	-354.986	D	7.311	7.311	0	2.7	100.36	0.11	0	0	0	0.99
2003	104	23	3	356.524	-356.959	D	7.311	7.311	0	2.7	98.85	0.13	0	0	0	0.85
2003	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	107	23	949	365.722	-354.966	D	7.314	7.311	0.003	2.7	91.66	5.12	0	0	0	3.24
2003	108	23	949	365.722	-354.966	D	7.313	7.311	0.003	2.7	97.25	1.51	0	0	0	1.29
2003	109	23	783	365.659	-355.558	D	7.311	7.311	0	2.7	98.98	0.16	0	0	0	0.62
2003	110	23	722	364.711	-356.599	D	7.32	7.311	0.009	2.7	97.42	1.3	0	0	0	1.3
2003	111	23	570	363.387	-360.402	D	7.311	7.311	0	2.7	75.76	0.04	0	0	0	0.61
2003	112	23	850	361.371	-362.039	D	7.311	7.311	0.001	2.7	92.57	3.32	0	0	0	4.33
2003	113	23	811	357.434	-360.225	D	7.311	7.311	0.001	2.7	97.98	0.75	0	0	0	1.37
2003	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	115	23	821	358.053	-361.416	D	7.311	7.311	0	2.7	99.92	1.85	0	0	0	2.51
2003	116	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	102.82	0.19	0	0	0	1.08
2003	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	119	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	121	23	3	356.524	-356.959	D	7.581	7.581	0	3.275	90.29	0.22	0	0	0	1
2003	122	23	1017	356.894	-355.206	D	7.596	7.593	0.003	3.3	97.56	1.43	0	0	0	0.98
2003	123	23	853	361.666	-362.175	D	7.595	7.593	0.003	3.3	99.03	0.37	0	0	0	0.63
2003	124	23	932	366.176	-356.761	D	7.595	7.593	0.002	3.3	99.41	0.17	0	0	0	0.39
2003	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	127	23	62	357.925	-354.901	D	7.594	7.593	0.001	3.3	98.48	0.47	0	0	0	1.06
2003	128	23	785	365.637	-355.06	D	7.593	7.593	0.001	3.3	99.19	0.17	0	0	0	0.86
2003	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	136	23	61	357.936	-355.15	D	7.593	7.593	0	3.3	97.05	0.26	0	0	0	1.59
2003	137	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	99.26	0.1	0	0	0	0.68

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	138	23	10	356.954	-355.443	D	7.594	7.593	0.001	3.3	99.09	0.4	0	0	0	0.57
2003	139	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	99.12	0.31	0	0	0	0.55
2003	140	23	1035	356.477	-356.792	D	7.594	7.593	0.001	3.3	97.65	1.71	0	0	0	0.72
2003	141	23	15	357.659	-360.155	D	7.593	7.593	0	3.3	100.85	0.11	0	0	0	0.36
2003	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	143	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	99.05	0.05	0	0	0	1.09
2003	144	23	643	363.609	-354.151	D	7.593	7.593	0.001	3.3	98.78	0.39	0	0	0	0.91
2003	145	23	1017	356.894	-355.206	D	7.595	7.593	0.002	3.3	98.51	0.86	0	0	0	0.7
2003	146	23	44	358.21	-361.379	D	7.593	7.593	0	3.3	100.25	0.08	0	0	0	0.66
2003	147	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	149	23	811	357.434	-360.225	D	7.594	7.593	0.001	3.3	96.11	0.81	0	0	0	3.11
2003	150	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	98.33	0.19	0	0	0	1.63
2003	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	81.86	7.24	0	0	0	11.05
2003	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	106.79	0.17	0	0	0	0.76
2003	154	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	98.95	0.44	0	0	0	0.57
2003	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	157	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	101.31	0.13	0	0	0	0.75
2003	158	23	44	358.21	-361.379	D	7.593	7.593	0	3.3	100.65	0.13	0	0	0	0.62
2003	159	23	853	361.666	-362.175	D	7.593	7.593	0	3.3	100.79	0.03	0	0	0	0.55
2003	160	23	109	358.954	-361.346	D	7.593	7.593	0	3.3	94.52	0.03	0	0	0	0.45
2003	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	163	23	730	364.623	-354.605	D	7.593	7.593	0	3.3	98.53	1.11	0	0	0	0.68
2003	164	23	62	357.925	-354.901	D	7.593	7.593	0	3.3	99.51	0.18	0	0	0	0.63
2003	165	23	40	357.732	-356.157	D	7.593	7.593	0	3.3	98.97	0.2	0	0	0	0.52
2003	166	23	356	361.22	-361.995	D	7.593	7.593	0	3.3	100.01	0.16	0	0	0	0.47
2003	167	23	163	359.462	-361.573	D	7.593	7.593	0	3.3	103.96	0.08	0	0	0	0.46
2003	168	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	99.77	0.15	0	0	0	0.42
2003	169	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	100.66	0.08	0	0	0	0.38
2003	170	23	1008	358.048	-354.775	D	7.594	7.593	0.001	3.3	99.09	0.06	0	0	0	0.88
2003	171	23	1017	356.894	-355.206	D	7.596	7.593	0.003	3.3	98.72	0.64	0	0	0	0.65
2003	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	99.47	0.05	0	0	0	0.55
2003	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	177	23	900	364.265	-360.243	D	7.594	7.593	0.001	3.3	94.99	3.17	0	0	0	1.81
2003	178	23	810	357.434	-360.005	D	7.597	7.593	0.004	3.3	97.7	0.37	0	0	0	1.92
2003	179	23	853	361.666	-362.175	D	7.595	7.593	0.002	3.3	98.83	0.05	0	0	0	1.11
2003	180	23	1011	357.717	-354.92	D	7.594	7.593	0.001	3.3	99.12	0.04	0	0	0	0.84
2003	181	23	642	363.62	-354.4	D	7.593	7.593	0	3.3	99.54	0.07	0	0	0	0.69
2003	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	76.32	0.01	0	0	0	0.55
2003	183	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	140.97	0.13	0	0	0	0.75
2003	184	23	455	361.646	-354.736	D	7.593	7.593	0	3.3	122.09	0.05	0	0	0	0.59
2003	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	41	357.721	-355.908	D	7.593	7.593	0.001	3.3	96.49	0.13	0	0	0	3.23
2003	193	23	852	361.595	-362.148	D	7.594	7.593	0.001	3.3	98.69	0.13	0	0	0	1.19
2003	194	23	747	364.871	-354.594	D	7.594	7.593	0.001	3.3	98.8	0.12	0	0	0	1.05
2003	195	23	948	365.727	-355.056	D	7.594	7.593	0.001	3.3	99.11	0.13	0	0	0	0.74
2003	196	23	497	362.142	-354.715	D	7.593	7.593	0	3.3	98.09	0.01	0	0	0	0.56
2003	197	23	568	362.886	-354.682	D	7.593	7.593	0	3.3	98.45	0.02	0	0	0	1.17
2003	198	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	99.95	0.02	0	0	0	0.9
2003	199	23	706	364.408	-355.364	D	7.593	7.593	0	3.3	101.27	0.01	0	0	0	0.71
2003	200	23	380	361.468	-361.984	D	7.593	7.593	0	3.3	121.98	0.01	0	0	0	0.66
2003	201	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	102.09	1.04	0	0	0	0.87
2003	202	23	965	363.588	-354.142	D	7.593	7.593	0	3.3	98.48	0.05	0	0	0	1.62
2003	203	23	853	361.666	-362.175	D	7.594	7.593	0.001	3.3	98.21	0.04	0	0	0	1.79
2003	204	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	205	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	206	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	207	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	518	362.39	-354.704	D	7.593	7.593	0	3.3	97.55	0.06	0	0	0	0.97
2003	210	23	967	363.478	-354.116	D	7.597	7.593	0.005	3.3	98.57	0.7	0	0	0	0.75
2003	211	23	822	358.021	-361.607	D	7.595	7.593	0.003	3.3	99.21	0.23	0	0	0	0.61
2003	212	23	916	365.407	-358.185	D	7.594	7.593	0.002	3.3	99.13	0.09	0	0	0	0.67
2003	213	23	770	365.433	-356.067	D	7.593	7.593	0	3.3	99.13	0.07	0	0	0	0.68
2003	214	23	407	361.716	-361.973	D	7.593	7.593	0	3.3	100.07	0.01	0	0	0	0.52
2003	215	23	964	363.678	-354.148	D	7.596	7.593	0.003	3.3	98.89	0.24	0	0	0	0.87

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	216	23	1007	358.259	-354.768	D	7.6	7.593	0.007	3.3	98.97	0.11	0	0	0	0.9
2003	217	23	947	365.801	-355.162	D	7.593	7.593	0.001	3.3	99	0.1	0	0	0	0.85
2003	218	23	61	357.936	-355.15	D	7.593	7.593	0.001	3.3	99.06	0.13	0	0	0	0.77
2003	219	23	822	358.021	-361.607	D	7.594	7.593	0.001	3.3	99.21	0.15	0	0	0	0.66
2003	220	23	15	357.659	-360.155	D	7.593	7.593	0	3.3	94.76	0	0	0	0	0.59
2003	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	229	23	688	364.127	-354.627	D	7.593	7.593	0	3.3	69.78	0	0	0	0	1.02
2003	230	23	933	366.169	-356.524	D	7.594	7.593	0.001	3.3	98.84	0.03	0	0	0	1.18
2003	231	23	907	365.051	-359.809	D	7.594	7.593	0.001	3.3	99.09	0.04	0	0	0	0.84
2003	232	23	906	364.982	-359.812	D	7.593	7.593	0.001	3.3	99.42	0.04	0	0	0	0.7
2003	233	23	906	364.982	-359.812	D	7.593	7.593	0.001	3.3	99.33	0.09	0	0	0	0.62
2003	234	23	967	363.478	-354.116	D	7.597	7.593	0.004	3.3	98.76	0.01	0	0	0	1.24
2003	235	23	853	361.666	-362.175	D	7.601	7.593	0.008	3.3	99.06	0.03	0	0	0	0.92
2003	236	23	822	358.021	-361.607	D	7.596	7.593	0.003	3.3	99.16	0.09	0	0	0	0.77
2003	237	23	810	357.434	-360.005	D	7.596	7.593	0.004	3.3	99.33	0.02	0	0	0	0.67
2003	238	23	543	362.627	-354.444	D	7.594	7.593	0.002	3.3	99.42	0.01	0	0	0	0.59
2003	239	23	784	365.648	-355.309	D	7.593	7.593	0	3.3	99.43	0.02	0	0	0	0.54
2003	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	242	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	94.65	1.29	0	0	0	0.79
2003	243	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	245	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	246	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	247	23	1017	356.894	-355.206	D	7.645	7.639	0.006	3.4	97.43	1.22	0	0	0	1.35
2003	248	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	28.54	0	0	0	0	0.25
2003	249	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	254	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	255	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	256	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	257	23	822	358.021	-361.607	D	7.639	7.639	0.001	3.4	95.23	1.32	0	0	0	3.44
2003	258	23	786	365.973	-357.042	D	7.64	7.639	0.002	3.4	97.03	0.57	0	0	0	2.39
2003	259	23	822	358.021	-361.607	D	7.642	7.639	0.003	3.4	98.65	0.14	0	0	0	1.22
2003	260	23	1011	357.717	-354.92	D	7.639	7.639	0.001	3.4	99.06	0.08	0	0	0	0.89
2003	261	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	262	23	950	365.524	-354.972	D	7.64	7.639	0.001	3.4	95.51	3.28	0	0	0	1.22
2003	263	23	1017	356.894	-355.206	D	7.639	7.639	0	3.4	97.39	0.59	0	0	0	2.13
2003	264	23	191	359.732	-362.061	D	7.64	7.639	0.001	3.4	99.61	0.05	0	0	0	0.4
2003	265	23	749	365.284	-358.321	D	7.64	7.639	0.001	3.4	99.18	0.4	0	0	0	0.33
2003	266	23	907	365.051	-359.809	D	7.64	7.639	0.001	3.4	93.11	1.78	0	0	0	5.19
2003	267	23	684	364.171	-355.624	D	7.639	7.639	0	3.4	84.37	0.08	0	0	0	1.1
2003	268	23	1039	356.522	-357.599	D	7.64	7.639	0.001	3.4	97.89	0.59	0	0	0	1.45
2003	269	23	1017	356.894	-355.206	D	7.64	7.639	0.001	3.4	98.68	0.33	0	0	0	1.03
2003	270	23	785	365.637	-355.06	D	7.64	7.639	0.001	3.4	95.61	1.62	0	0	0	2.81
2003	271	23	948	365.727	-355.056	D	7.639	7.639	0	3.4	93.32	1.33	0	0	0	4.94
2003	272	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	93.21	3.06	0	0	0	3.9
2003	273	23	643	363.609	-354.151	D	7.64	7.639	0.001	3.4	94.81	3.4	0	0	0	1.8
2003	274	23	947	365.801	-355.162	D	7.508	7.505	0.003	3.112	97.34	1.32	0	0	0	1.42
2003	275	23	852	361.595	-362.148	D	7.502	7.5	0.002	3.1	97.87	0.85	0	0	0	1.34
2003	276	23	1017	356.894	-355.206	D	7.501	7.5	0.001	3.1	98.29	0.62	0	0	0	1.18
2003	277	23	434	361.954	-361.713	D	7.5	7.5	0	3.1	89.56	4.19	0	0	0	6.31
2003	278	23	643	363.609	-354.151	D	7.5	7.5	0	3.1	98.16	0.65	0	0	0	2.27
2003	279	23	301	360.724	-362.017	D	7.5	7.5	0	3.1	98.18	0.72	0	0	0	1.25
2003	280	23	44	358.21	-361.379	D	7.5	7.5	0	3.1	99.25	0.14	0	0	0	0.86
2003	281	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	100.8	0.1	0	0	0	0.71
2003	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	102.07	0.13	0	0	0	0.63
2003	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	930	366.19	-357.232	D	7.5	7.5	0.001	3.1	95.02	2.49	0	0	0	2.55
2003	286	23	822	358.021	-361.607	D	7.5	7.5	0	3.1	99.55	0.04	0	0	0	0.99
2003	287	23	822	358.021	-361.607	D	7.5	7.5	0.001	3.1	97.99	1.1	0	0	0	1.01
2003	288	23	933	366.169	-356.524	D	7.502	7.5	0.002	3.1	94.62	1.81	0	0	0	3.65
2003	289	23	907	365.051	-359.809	D	7.5	7.5	0	3.1	98.56	0.26	0	0	0	1.43
2003	290	23	174	359.341	-358.832	D	7.5	7.5	0	3.1	96.58	1.62	0	0	0	0.79
2003	291	23	274	360.465	-361.779	D	7.5	7.5	0	3.1	99.11	0.37	0	0	0	0.73
2003	292	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	293	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	294	23	643	363.609	-354.151	D	7.5	7.5	0.001	3.1	92.72	0.9	0	0	0	6.55
2003	295	23	645	364.109	-359.871	D	7.502	7.5	0.003	3.1	95.66	0.82	0	0	0	3.54
2003	296	23	1007	358.259	-354.768	D	7.5	7.5	0.001	3.1	97.25	0.23	0	0	0	2.7
2003	297	23	931	366.183	-356.996	D	7.502	7.5	0.002	3.1	98.31	0.19	0	0	0	1.56
2003	298	23	707	364.397	-355.114	D	7.501	7.5	0.001	3.1	98.71	0.57	0	0	0	0.73
2003	299	23	1038	356.511	-357.396	D	7.5	7.5	0.001	3.1	87.52	7.99	0	0	0	4.6
2003	300	23	788	365.951	-356.544	D	7.5	7.5	0	3.1	92.42	4.69	0	0	0	2.81
2003	301	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	95.2	1.57	0	0	0	3.49
2003	305	23	1017	356.894	-355.206	D	7.503	7.5	0.003	3.1	94.92	3.04	0	0	0	2.11
2003	306	23	10	356.954	-355.443	D	7.5	7.5	0	3.1	96.72	2.37	0	0	0	1.21
2003	307	23	455	361.646	-354.736	D	7.5	7.5	0	3.1	95.78	2.57	0	0	0	0.76
2003	308	23	1017	356.894	-355.206	D	7.5	7.5	0.001	3.1	98.06	1.18	0	0	0	0.86
2003	309	23	822	358.021	-361.607	D	7.52	7.5	0.021	3.1	97.3	1.83	0	0	0	0.88
2003	310	23	853	361.666	-362.175	D	7.51	7.5	0.011	3.1	97.86	1.6	0	0	0	0.56
2003	311	23	832	359.493	-362.061	D	7.5	7.5	0	3.1	98.67	0.94	0	0	0	0.4
2003	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	23	949	365.722	-354.966	D	7.5	7.5	0.001	3.1	84.06	9.32	0	0	0	6.65
2003	318	23	933	366.169	-356.524	D	7.502	7.5	0.002	3.1	88.59	7.51	0	0	0	3.99
2003	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	586	363.211	-356.415	D	7.5	7.5	0.001	3.1	74.74	14.81	0	0	0	10.68
2003	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1008	358.048	-354.775	D	7.501	7.5	0.002	3.1	91.78	6.49	0	0	0	1.86
2003	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	1037	356.5	-357.195	D	7.5	7.5	0	3.1	94.89	3.05	0	0	0	2.2
2003	332	23	773	365.4	-355.32	D	7.5	7.5	0.001	3.1	66.88	21.69	0	0	0	11.55

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	10	356.954	-355.443	D	7.589	7.589	0.001	3.292	89.17	6.46	0	0	0	4.12
2003	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	339	23	2	356.535	-357.209	D	7.596	7.593	0.003	3.3	91.69	6.47	0	0	0	1.82
2003	340	23	821	358.053	-361.416	D	7.593	7.593	0	3.3	86.91	4.89	0	0	0	2.04
2003	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	342	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	102	358.487	-356.374	D	7.594	7.593	0.001	3.3	92.34	5.56	0	0	0	2.01
2003	345	23	822	358.021	-361.607	D	7.596	7.593	0.003	3.3	84.2	11.16	0	0	0	4.66
2003	346	23	822	358.021	-361.607	D	7.594	7.593	0.002	3.3	91	7.17	0	0	0	1.94
2003	347	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	92.82	4.55	0	0	0	1.03
2003	348	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	349	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	90.25	6.44	0	0	0	3.37
2003	354	23	947	365.801	-355.162	D	7.594	7.593	0.001	3.3	91.13	6.45	0	0	0	2.52
2003	355	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	95.1	3.71	0	0	0	1.28
2003	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	1017	356.894	-355.206	D	7.596	7.593	0.003	3.3	92.92	5.26	0	0	0	1.85
2003	358	23	22	357.527	-357.165	D	7.599	7.593	0.006	3.3	93.88	4.61	0	0	0	1.51
2003	359	23	822	358.021	-361.607	D	7.594	7.593	0.002	3.3	96.05	2.77	0	0	0	1.26
2003	360	23	643	363.609	-354.151	D	7.594	7.593	0.001	3.3	96.77	2.51	0	0	0	0.77
2003	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.021							
TRIGEN KC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	2	23	821	358.053	-361.416	D	7.546	7.546	0	3.2	99.01	5.07	0	0	0	0.24
2003	3	23	1017	356.894	-355.206	D	7.565	7.546	0.019	3.2	86.98	12.42	0	0	0	0.61
2003	4	23	947	365.801	-355.162	D	7.547	7.546	0	3.2	92.49	7.14	0	0	0	0.26
2003	5	23	930	366.19	-357.232	D	7.55	7.546	0.003	3.2	79.46	19.16	0	0	0	1.39
2003	6	23	933	366.169	-356.524	D	7.551	7.546	0.005	3.2	90.32	9.2	0	0	0	0.47
2003	7	23	789	365.918	-355.796	D	7.549	7.546	0.002	3.2	96.02	3.83	0	0	0	0.17
2003	8	23	907	365.051	-359.809	D	7.546	7.546	0	3.2	96.12	2.09	0	0	0	0.12
2003	9	23	619	363.872	-360.131	D	7.547	7.546	0.001	3.2	87.99	11.32	0	0	0	0.74
2003	10	23	933	366.169	-356.524	D	7.55	7.546	0.004	3.2	79.02	19.5	0	0	0	1.5
2003	11	23	822	358.021	-361.607	D	7.548	7.546	0.002	3.2	84.7	14.29	0	0	0	1.08
2003	12	23	1017	356.894	-355.206	D	7.547	7.546	0.001	3.2	93.32	6.6	0	0	0	0.27
2003	13	23	850	361.371	-362.039	D	7.548	7.546	0.002	3.2	94.43	5.46	0	0	0	0.16
2003	14	23	116	358.878	-359.602	D	7.569	7.546	0.023	3.2	90.45	9.13	0	0	0	0.43
2003	15	23	1039	356.522	-357.599	D	7.547	7.546	0.001	3.2	96.47	3.62	0	0	0	0.13
2003	16	23	822	358.021	-361.607	D	7.548	7.546	0.001	3.2	96.07	3.98	0	0	0	0.07
2003	17	23	811	357.434	-360.225	D	7.557	7.546	0.011	3.2	90.16	9.23	0	0	0	0.62
2003	18	23	948	365.727	-355.056	D	7.552	7.546	0.006	3.2	93.3	6.41	0	0	0	0.3
2003	19	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	21	23	930	366.19	-357.232	D	7.55	7.546	0.003	3.2	94.19	5.72	0	0	0	0.13
2003	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	24	23	1017	356.894	-355.206	D	7.548	7.546	0.002	3.2	93.09	6.76	0	0	0	0.19
2003	25	23	949	365.722	-354.966	D	7.552	7.546	0.005	3.2	93.23	6.66	0	0	0	0.13
2003	26	23	931	366.183	-356.996	D	7.549	7.546	0.003	3.2	78.49	20.25	0	0	0	1.27
2003	27	23	906	364.982	-359.812	D	7.549	7.546	0.003	3.2	93.27	6.6	0	0	0	0.18
2003	28	23	930	366.19	-357.232	D	7.546	7.546	0	3.2	94.66	5.31	0	0	0	0.1
2003	29	23	1017	356.894	-355.206	D	7.549	7.546	0.003	3.2	94.47	5.42	0	0	0	0.13
2003	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	34	23	1008	358.048	-354.775	D	7.409	7.406	0.004	2.9	96.33	3.59	0	0	0	0.11
2003	35	23	949	365.722	-354.966	D	7.407	7.406	0.001	2.9	92.18	7.44	0	0	0	0.59
2003	36	23	949	365.722	-354.966	D	7.426	7.406	0.02	2.9	92.65	6.95	0	0	0	0.41
2003	37	23	1017	356.894	-355.206	D	7.417	7.406	0.011	2.9	96.49	3.41	0	0	0	0.13
2003	38	23	408	361.706	-361.724	D	7.421	7.406	0.016	2.9	96.02	3.86	0	0	0	0.12
2003	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	117.09	4.49	0	0	0	0.15

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	41	23	955	364.92	-354.582	D	7.408	7.406	0.002	2.9	93.4	6.46	0	0	0	0.19
2003	42	23	1017	356.894	-355.206	D	7.407	7.406	0.001	2.9	94.93	4.75	0	0	0	0.41
2003	43	23	822	358.021	-361.607	D	7.408	7.406	0.002	2.9	90.28	9.08	0	0	0	0.71
2003	44	23	1017	356.894	-355.206	D	7.408	7.406	0.003	2.9	95.95	3.89	0	0	0	0.24
2003	45	23	643	363.609	-354.151	D	7.406	7.406	0	2.9	97.44	2.63	0	0	0	0.12
2003	46	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	47	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	49	23	1017	356.894	-355.206	D	7.41	7.406	0.005	2.9	97.07	2.83	0	0	0	0.15
2003	50	23	1017	356.894	-355.206	D	7.407	7.406	0.002	2.9	97.49	2.58	0	0	0	0.11
2003	51	23	1017	356.894	-355.206	D	7.419	7.406	0.014	2.9	97.33	2.59	0	0	0	0.1
2003	52	23	1017	356.894	-355.206	D	7.408	7.406	0.002	2.9	99.02	0.98	0	0	0	0.07
2003	53	23	1039	356.522	-357.599	D	7.407	7.406	0.002	2.9	97.12	2.87	0	0	0	0.13
2003	54	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	55	23	1039	356.522	-357.599	D	7.406	7.406	0.001	2.9	95.23	4.8	0	0	0	0.25
2003	56	23	1039	356.522	-357.599	D	7.407	7.406	0.001	2.9	96.02	3.81	0	0	0	0.17
2003	57	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	98.79	2.22	0	0	0	0.09
2003	58	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	99.59	1.66	0	0	0	0.06
2003	59	23	44	358.21	-361.379	D	7.406	7.406	0	2.9	99.69	1.23	0	0	0	0.05
2003	60	23	1017	356.894	-355.206	D	7.322	7.315	0.007	2.708	98.36	1.56	0	0	0	0.08
2003	61	23	949	365.722	-354.966	D	7.366	7.311	0.056	2.7	97.14	2.73	0	0	0	0.14
2003	62	23	1035	356.477	-356.792	D	7.344	7.311	0.033	2.7	96.65	3.19	0	0	0	0.16
2003	63	23	907	365.051	-359.809	D	7.327	7.311	0.016	2.7	98.63	1.31	0	0	0	0.07
2003	64	23	853	361.666	-362.175	D	7.318	7.311	0.008	2.7	97.75	2.18	0	0	0	0.09
2003	65	23	853	361.666	-362.175	D	7.315	7.311	0.004	2.7	97.07	2.84	0	0	0	0.13
2003	66	23	247	360.217	-361.79	D	7.316	7.311	0.006	2.7	98.35	1.55	0	0	0	0.11
2003	67	23	949	365.722	-354.966	D	7.312	7.311	0.002	2.7	99.32	0.68	0	0	0	0.07
2003	68	23	822	358.021	-361.607	D	7.321	7.311	0.01	2.7	96.77	3.13	0	0	0	0.11
2003	69	23	821	358.053	-361.416	D	7.311	7.311	0	2.7	99.49	0.65	0	0	0	0.08
2003	70	23	822	358.021	-361.607	D	7.315	7.311	0.004	2.7	99.27	0.72	0	0	0	0.07
2003	71	23	966	363.538	-354.124	D	7.312	7.311	0.002	2.7	99.23	0.74	0	0	0	0.06
2003	72	23	1017	356.894	-355.206	D	7.345	7.311	0.034	2.7	98.62	1.25	0	0	0	0.13
2003	73	23	822	358.021	-361.607	D	7.322	7.311	0.011	2.7	98.97	0.95	0	0	0	0.08
2003	74	23	1017	356.894	-355.206	D	7.318	7.311	0.007	2.7	99.41	0.52	0	0	0	0.07
2003	75	23	1017	356.894	-355.206	D	7.311	7.311	0.001	2.7	99.88	0.25	0	0	0	0.06
2003	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	845	360.851	-362.181	D	7.314	7.311	0.003	2.7	97.36	2.6	0	0	0	0.12

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	80	23	822	358.021	-361.607	D	7.318	7.311	0.007	2.7	96.37	3.18	0	0	0	0.45
2003	81	23	907	365.051	-359.809	D	7.313	7.311	0.002	2.7	98.64	1.04	0	0	0	0.33
2003	82	23	905	364.788	-359.816	D	7.311	7.311	0	2.7	99.22	0.27	0	0	0	0.13
2003	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	1038	356.511	-357.396	D	7.312	7.311	0.001	2.7	98.52	1.45	0	0	0	0.17
2003	85	23	853	361.666	-362.175	D	7.311	7.311	0	2.7	98.13	1.71	0	0	0	0.09
2003	86	23	434	361.954	-361.713	D	7.311	7.311	0	2.7	104.08	0.24	0	0	0	0.07
2003	87	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	23	949	365.722	-354.966	D	7.314	7.311	0.003	2.7	87.96	11.04	0	0	0	1.04
2003	89	23	251	360.173	-360.793	D	7.317	7.311	0.006	2.7	89.4	9.87	0	0	0	0.77
2003	90	23	763	365.51	-357.811	D	7.311	7.311	0	2.7	83.6	3.68	0	0	0	0.42
2003	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	95	23	1038	356.511	-357.396	D	7.313	7.311	0.002	2.7	88.22	10.68	0	0	0	1.06
2003	96	23	947	365.801	-355.162	D	7.311	7.311	0.001	2.7	98.88	1.24	0	0	0	0.04
2003	97	23	405	361.161	-355.008	D	7.311	7.311	0	2.7	98.16	0.96	0	0	0	0.02
2003	98	23	822	358.021	-361.607	D	7.331	7.311	0.021	2.7	89.84	9.58	0	0	0	0.59
2003	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	101	23	1035	356.477	-356.792	D	7.311	7.311	0.001	2.7	99.8	0.3	0	0	0	0.11
2003	102	23	949	365.722	-354.966	D	7.314	7.311	0.003	2.7	99.86	0.09	0	0	0	0.11
2003	103	23	949	365.722	-354.966	D	7.313	7.311	0.003	2.7	99.94	0.05	0	0	0	0.1
2003	104	23	949	365.722	-354.966	D	7.311	7.311	0.001	2.7	100.16	0.06	0	0	0	0.08
2003	105	23	245	359.694	-355.571	D	7.311	7.311	0	2.7	85.11	0.01	0	0	0	0.05
2003	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	107	23	949	365.722	-354.966	D	7.327	7.311	0.017	2.7	98.66	1.15	0	0	0	0.21
2003	108	23	949	365.722	-354.966	D	7.326	7.311	0.015	2.7	98.95	0.93	0	0	0	0.13
2003	109	23	947	365.801	-355.162	D	7.311	7.311	0	2.7	99.9	0.09	0	0	0	0.06
2003	110	23	747	364.871	-354.594	D	7.311	7.311	0	2.7	97.63	2.34	0	0	0	0.15
2003	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	112	23	822	358.021	-361.607	D	7.312	7.311	0.002	2.7	95.17	4.18	0	0	0	0.74
2003	113	23	1038	356.511	-357.396	D	7.313	7.311	0.002	2.7	99.21	0.65	0	0	0	0.13
2003	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	115	23	822	358.021	-361.607	D	7.318	7.311	0.007	2.7	98.72	1.09	0	0	0	0.21
2003	116	23	845	360.851	-362.181	D	7.311	7.311	0	2.7	104.38	0.68	0	0	0	0.17
2003	117	23	1038	356.511	-357.396	D	7.312	7.311	0.001	2.7	99.95	0.07	0	0	0	0.09
2003	118	23	84	358.173	-354.889	D	7.311	7.311	0	2.7	100.2	0.03	0	0	0	0.07

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	119	23	618	363.371	-354.411	D	7.311	7.311	0	2.7	101.13	0.22	0	0	0	0.06
2003	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	94.86	0.06	0	0	0	0.05
2003	121	23	62	357.925	-354.901	D	7.581	7.581	0	3.275	99.11	0.21	0	0	0	0.09
2003	122	23	1007	358.259	-354.768	D	7.648	7.593	0.055	3.3	98.87	1.04	0	0	0	0.09
2003	123	23	832	359.493	-362.061	D	7.63	7.593	0.037	3.3	99.68	0.27	0	0	0	0.05
2003	124	23	1036	356.488	-356.993	D	7.605	7.593	0.013	3.3	99.88	0.09	0	0	0	0.03
2003	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	42.13	0.17	0	0	0	0.02
2003	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	127	23	1039	356.522	-357.599	D	7.628	7.593	0.036	3.3	99.21	0.66	0	0	0	0.13
2003	128	23	1039	356.522	-357.599	D	7.608	7.593	0.015	3.3	99.81	0.11	0	0	0	0.09
2003	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	133	23	947	365.801	-355.162	D	7.593	7.593	0	3.3	98.58	0.14	0	0	0	0.15
2003	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	136	23	964	363.678	-354.148	D	7.594	7.593	0.001	3.3	99.64	0.25	0	0	0	0.13
2003	137	23	967	363.478	-354.116	D	7.6	7.593	0.007	3.3	99.88	0.08	0	0	0	0.05
2003	138	23	1035	356.477	-356.792	D	7.606	7.593	0.014	3.3	99.59	0.37	0	0	0	0.04
2003	139	23	1017	356.894	-355.206	D	7.596	7.593	0.003	3.3	99.67	0.31	0	0	0	0.04
2003	140	23	1017	356.894	-355.206	D	7.603	7.593	0.011	3.3	98.54	1.42	0	0	0	0.06
2003	141	23	407	361.716	-361.973	D	7.593	7.593	0	3.3	99.91	0.22	0	0	0	0.03
2003	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	143	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	99.94	0.04	0	0	0	0.09
2003	144	23	967	363.478	-354.116	D	7.601	7.593	0.008	3.3	99.59	0.35	0	0	0	0.08
2003	145	23	1035	356.477	-356.792	D	7.616	7.593	0.023	3.3	99.35	0.6	0	0	0	0.05
2003	146	23	822	358.021	-361.607	D	7.598	7.593	0.005	3.3	99.88	0.09	0	0	0	0.04
2003	147	23	44	358.21	-361.379	D	7.593	7.593	0	3.3	100	0.02	0	0	0	0.04
2003	148	23	949	365.722	-354.966	D	7.602	7.593	0.01	3.3	99.65	0.21	0	0	0	0.15
2003	149	23	822	358.021	-361.607	D	7.596	7.593	0.004	3.3	99.12	0.54	0	0	0	0.39
2003	150	23	822	358.021	-361.607	D	7.597	7.593	0.004	3.3	99.72	0.17	0	0	0	0.14
2003	151	23	933	366.169	-356.524	D	7.593	7.593	0	3.3	89.25	8.83	0	0	0	1.82
2003	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	153	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	99.84	0.15	0	0	0	0.06
2003	154	23	822	358.021	-361.607	D	7.593	7.593	0.001	3.3	97.78	2.25	0	0	0	0.14
2003	155	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	99.97	0.17	0	0	0	0.06
2003	157	23	1035	356.477	-356.792	D	7.594	7.593	0.001	3.3	99.91	0.21	0	0	0	0.05

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	158	23	822	358.021	-361.607	D	7.594	7.593	0.001	3.3	99.95	0.1	0	0	0	0.05
2003	159	23	329	360.972	-362.006	D	7.593	7.593	0	3.3	99.88	0.02	0	0	0	0.04
2003	160	23	619	363.872	-360.131	D	7.593	7.593	0	3.3	92.67	0.01	0	0	0	0.04
2003	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	163	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	98.68	1.17	0	0	0	0.06
2003	164	23	1037	356.5	-357.195	D	7.593	7.593	0.001	3.3	99.76	0.11	0	0	0	0.06
2003	165	23	643	363.609	-354.151	D	7.594	7.593	0.002	3.3	99.77	0.21	0	0	0	0.04
2003	166	23	858	362.053	-361.709	D	7.593	7.593	0.001	3.3	99.86	0.13	0	0	0	0.04
2003	167	23	356	361.22	-361.995	D	7.593	7.593	0	3.3	99.88	0.06	0	0	0	0.04
2003	168	23	15	357.659	-360.155	D	7.593	7.593	0	3.3	99.49	0.15	0	0	0	0.03
2003	169	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	170	23	1017	356.894	-355.206	D	7.604	7.593	0.012	3.3	99.87	0.03	0	0	0	0.1
2003	171	23	1035	356.477	-356.792	D	7.602	7.593	0.01	3.3	99.86	0.08	0	0	0	0.08
2003	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	177	23	191	359.732	-362.061	D	7.599	7.593	0.006	3.3	94.92	4.81	0	0	0	0.27
2003	178	23	1035	356.477	-356.792	D	7.604	7.593	0.011	3.3	99.45	0.29	0	0	0	0.27
2003	179	23	1039	356.522	-357.599	D	7.604	7.593	0.012	3.3	99.84	0.05	0	0	0	0.11
2003	180	23	966	363.538	-354.124	D	7.594	7.593	0.001	3.3	99.86	0.01	0	0	0	0.08
2003	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	183	23	406	361.15	-354.758	D	7.593	7.593	0	3.3	98.64	0.11	0	0	0	0.05
2003	184	23	730	364.623	-354.605	D	7.593	7.593	0	3.3	98.96	0.03	0	0	0	0.04
2003	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	966	363.538	-354.124	D	7.595	7.593	0.002	3.3	99.63	0.06	0	0	0	0.31
2003	193	23	853	361.666	-362.175	D	7.597	7.593	0.004	3.3	99.81	0.15	0	0	0	0.09
2003	194	23	1007	358.259	-354.768	D	7.594	7.593	0.001	3.3	99.89	0.06	0	0	0	0.09
2003	195	23	930	366.19	-357.232	D	7.595	7.593	0.003	3.3	99.77	0.15	0	0	0	0.06
2003	196	23	789	365.918	-355.796	D	7.593	7.593	0	3.3	99.84	0.01	0	0	0	0.05

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	197	23	949	365.722	-354.966	D	7.605	7.593	0.013	3.3	99.87	0.03	0	0	0	0.1
2003	198	23	933	366.169	-356.524	D	7.595	7.593	0.003	3.3	99.97	0.01	0	0	0	0.07
2003	199	23	906	364.982	-359.812	D	7.593	7.593	0	3.3	100.01	0	0	0	0	0.05
2003	200	23	569	362.875	-354.433	D	7.593	7.593	0	3.3	99.94	0.03	0	0	0	0.05
2003	201	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	99.79	0.02	0	0	0	0.06
2003	202	23	964	363.678	-354.148	D	7.595	7.593	0.002	3.3	99.84	0.03	0	0	0	0.13
2003	203	23	822	358.021	-361.607	D	7.597	7.593	0.004	3.3	99.85	0.03	0	0	0	0.13
2003	204	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	205	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	206	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	207	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	949	365.722	-354.966	D	7.596	7.593	0.004	3.3	99.8	0.14	0	0	0	0.07
2003	211	23	949	365.722	-354.966	D	7.604	7.593	0.011	3.3	99.82	0.13	0	0	0	0.05
2003	212	23	1039	356.522	-357.599	D	7.603	7.593	0.01	3.3	99.91	0.03	0	0	0	0.07
2003	213	23	929	366.032	-357.239	D	7.604	7.593	0.011	3.3	99.86	0.07	0	0	0	0.06
2003	214	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	99.91	0.01	0	0	0	0.04
2003	215	23	1017	356.894	-355.206	D	7.606	7.593	0.013	3.3	99.84	0.05	0	0	0	0.11
2003	216	23	949	365.722	-354.966	D	7.621	7.593	0.028	3.3	99.75	0.16	0	0	0	0.09
2003	217	23	949	365.722	-354.966	D	7.594	7.593	0.002	3.3	99.85	0.08	0	0	0	0.08
2003	218	23	1017	356.894	-355.206	D	7.6	7.593	0.007	3.3	99.88	0.07	0	0	0	0.07
2003	219	23	822	358.021	-361.607	D	7.609	7.593	0.016	3.3	99.88	0.06	0	0	0	0.06
2003	220	23	822	358.021	-361.607	D	7.593	7.593	0.001	3.3	100.06	0	0	0	0	0.05
2003	221	23	15	357.659	-360.155	D	7.593	7.593	0	3.3	99.82	0	0	0	0	0.04
2003	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	230	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	99.99	0.01	0	0	0	0.1
2003	231	23	933	366.169	-356.524	D	7.597	7.593	0.005	3.3	99.89	0.03	0	0	0	0.07
2003	232	23	930	366.19	-357.232	D	7.6	7.593	0.007	3.3	99.91	0.05	0	0	0	0.06
2003	233	23	930	366.19	-357.232	D	7.599	7.593	0.006	3.3	99.9	0.07	0	0	0	0.05
2003	234	23	930	366.19	-357.232	D	7.601	7.593	0.009	3.3	99.88	0.03	0	0	0	0.11
2003	235	23	853	361.666	-362.175	D	7.6	7.593	0.007	3.3	99.91	0.02	0	0	0	0.08

Appendix M
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2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	236	23	822	358.021	-361.607	D	7.596	7.593	0.003	3.3	99.94	0.02	0	0	0	0.06
2003	237	23	1	356.546	-357.458	D	7.598	7.593	0.005	3.3	99.91	0.02	0	0	0	0.06
2003	238	23	747	364.871	-354.594	D	7.595	7.593	0.002	3.3	99.9	0.01	0	0	0	0.05
2003	239	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	100.04	0.02	0	0	0	0.04
2003	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	100.21	0.03	0	0	0	0.04
2003	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	242	23	961	364.092	-354.289	D	7.593	7.593	0	3.3	98.73	0.26	0	0	0	0.06
2003	243	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	99.71	0.36	0	0	0	0.04
2003	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	245	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	246	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	247	23	1035	356.477	-356.792	D	7.647	7.639	0.008	3.4	99.46	0.45	0	0	0	0.1
2003	248	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	249	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	254	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	255	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	256	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	257	23	822	358.021	-361.607	D	7.646	7.639	0.007	3.4	96.64	2.97	0	0	0	0.39
2003	258	23	822	358.021	-361.607	D	7.649	7.639	0.01	3.4	99.35	0.42	0	0	0	0.24
2003	259	23	1038	356.511	-357.396	D	7.652	7.639	0.013	3.4	99.72	0.16	0	0	0	0.12
2003	260	23	967	363.478	-354.116	D	7.639	7.639	0	3.4	99.64	0.07	0	0	0	0.09
2003	261	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	262	23	1017	356.894	-355.206	D	7.642	7.639	0.003	3.4	95.49	4.21	0	0	0	0.29
2003	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	264	23	822	358.021	-361.607	D	7.641	7.639	0.002	3.4	99.97	0.04	0	0	0	0.04
2003	265	23	783	365.659	-355.558	D	7.642	7.639	0.003	3.4	99.61	0.34	0	0	0	0.03
2003	266	23	811	357.434	-360.225	D	7.64	7.639	0.001	3.4	96.68	2.46	0	0	0	0.83
2003	267	23	906	364.982	-359.812	D	7.639	7.639	0	3.4	99.63	0.16	0	0	0	0.13
2003	268	23	822	358.021	-361.607	D	7.641	7.639	0.002	3.4	99.03	0.79	0	0	0	0.22
2003	269	23	853	361.666	-362.175	D	7.644	7.639	0.005	3.4	99.74	0.2	0	0	0	0.09
2003	270	23	964	363.678	-354.148	D	7.641	7.639	0.002	3.4	98.09	1.57	0	0	0	0.31
2003	271	23	785	365.637	-355.06	D	7.641	7.639	0.002	3.4	98.25	1.2	0	0	0	0.52
2003	272	23	949	365.722	-354.966	D	7.64	7.639	0.001	3.4	98.32	1.25	0	0	0	0.42
2003	273	23	964	363.678	-354.148	D	7.649	7.639	0.01	3.4	97.87	2	0	0	0	0.13
2003	274	23	949	365.722	-354.966	D	7.52	7.505	0.015	3.112	98.38	1.53	0	0	0	0.1

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	275	23	906	364.982	-359.812	D	7.509	7.5	0.01	3.1	98.93	0.91	0	0	0	0.17
2003	276	23	1017	356.894	-355.206	D	7.507	7.5	0.007	3.1	99.45	0.48	0	0	0	0.1
2003	277	23	907	365.051	-359.809	D	7.511	7.5	0.011	3.1	96.13	3.37	0	0	0	0.51
2003	278	23	853	361.666	-362.175	D	7.501	7.5	0.001	3.1	99.46	0.45	0	0	0	0.16
2003	279	23	1016	357.1	-355.198	D	7.501	7.5	0.001	3.1	99.45	0.51	0	0	0	0.1
2003	280	23	949	365.722	-354.966	D	7.501	7.5	0.002	3.1	99.89	0.12	0	0	0	0.08
2003	281	23	972	362.744	-354.242	D	7.5	7.5	0.001	3.1	99.78	0.12	0	0	0	0.06
2003	282	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	99.6	0.06	0	0	0	0.06
2003	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	27	357.451	-355.421	D	7.501	7.5	0.002	3.1	96.22	3.33	0	0	0	0.45
2003	286	23	822	358.021	-361.607	D	7.502	7.5	0.002	3.1	99.86	0.09	0	0	0	0.11
2003	287	23	822	358.021	-361.607	D	7.504	7.5	0.005	3.1	97.18	2.67	0	0	0	0.16
2003	288	23	380	361.468	-361.984	D	7.507	7.5	0.007	3.1	97	2.48	0	0	0	0.54
2003	289	23	907	365.051	-359.809	D	7.502	7.5	0.002	3.1	99.59	0.26	0	0	0	0.15
2003	290	23	933	366.169	-356.524	D	7.502	7.5	0.002	3.1	98.04	1.89	0	0	0	0.06
2003	291	23	84	358.173	-354.889	D	7.5	7.5	0	3.1	100.18	0.23	0	0	0	0.11
2003	292	23	730	364.623	-354.605	D	7.5	7.5	0	3.1	99.92	0.19	0	0	0	0.1
2003	293	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	294	23	822	358.021	-361.607	D	7.504	7.5	0.004	3.1	98.44	0.89	0	0	0	0.68
2003	295	23	822	358.021	-361.607	D	7.532	7.5	0.032	3.1	98.83	0.8	0	0	0	0.37
2003	296	23	949	365.722	-354.966	D	7.508	7.5	0.009	3.1	99.54	0.15	0	0	0	0.33
2003	297	23	907	365.051	-359.809	D	7.512	7.5	0.012	3.1	99.42	0.39	0	0	0	0.2
2003	298	23	1039	356.522	-357.599	D	7.511	7.5	0.012	3.1	98.39	1.45	0	0	0	0.16
2003	299	23	1039	356.522	-357.599	D	7.503	7.5	0.004	3.1	87.48	11.81	0	0	0	0.7
2003	300	23	930	366.19	-357.232	D	7.502	7.5	0.003	3.1	96.83	2.94	0	0	0	0.23
2003	301	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1017	356.894	-355.206	D	7.501	7.5	0.002	3.1	98.83	0.93	0	0	0	0.28
2003	305	23	1017	356.894	-355.206	D	7.519	7.5	0.019	3.1	97.65	2.21	0	0	0	0.16
2003	306	23	1017	356.894	-355.206	D	7.5	7.5	0	3.1	98.77	1.01	0	0	0	0.11
2003	307	23	10	356.954	-355.443	D	7.5	7.5	0	3.1	98.12	1.61	0	0	0	0.06
2003	308	23	1017	356.894	-355.206	D	7.504	7.5	0.004	3.1	98.92	1.03	0	0	0	0.07
2003	309	23	853	361.666	-362.175	D	7.553	7.5	0.053	3.1	98.16	1.75	0	0	0	0.1
2003	310	23	853	361.666	-362.175	D	7.536	7.5	0.036	3.1	98.55	1.4	0	0	0	0.05
2003	311	23	191	359.732	-362.061	D	7.5	7.5	0.001	3.1	99.21	0.8	0	0	0	0.03
2003	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	949	365.722	-354.966	D	7.5	7.5	0	3.1	98.08	1.08	0	0	0	0.96
2003	317	23	1035	356.477	-356.792	D	7.503	7.5	0.003	3.1	93.04	6.24	0	0	0	0.77
2003	318	23	1017	356.894	-355.206	D	7.51	7.5	0.01	3.1	94.42	5.17	0	0	0	0.41
2003	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1035	356.477	-356.792	D	7.501	7.5	0.001	3.1	96.99	2.97	0	0	0	0.08
2003	323	23	824	358.459	-361.601	D	7.503	7.5	0.003	3.1	86.52	12.21	0	0	0	1.3
2003	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1010	357.824	-354.865	D	7.504	7.5	0.004	3.1	96.03	3.9	0	0	0	0.09
2003	328	23	773	365.4	-355.32	D	7.5	7.5	0	3.1	95.41	2.14	0	0	0	0.02
2003	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	3	356.524	-356.959	D	7.501	7.5	0.001	3.1	96.17	3.69	0	0	0	0.21
2003	332	23	824	358.459	-361.601	D	7.502	7.5	0.003	3.1	78.2	20.07	0	0	0	1.75
2003	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	1039	356.522	-357.599	D	7.591	7.589	0.002	3.292	93.95	5.5	0	0	0	0.52
2003	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	1017	356.894	-355.206	D	7.61	7.593	0.018	3.3	94.72	5.09	0	0	0	0.19
2003	339	23	900	364.265	-360.243	D	7.613	7.593	0.02	3.3	95.83	3.96	0	0	0	0.21
2003	340	23	822	358.021	-361.607	D	7.594	7.593	0.001	3.3	95.71	3.98	0	0	0	0.32
2003	341	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	342	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	949	365.722	-354.966	D	7.595	7.593	0.003	3.3	95.43	4.22	0	0	0	0.32
2003	345	23	907	365.051	-359.809	D	7.601	7.593	0.008	3.3	87.62	11.56	0	0	0	0.82
2003	346	23	822	358.021	-361.607	D	7.598	7.593	0.005	3.3	92.53	7.25	0	0	0	0.22
2003	347	23	3	356.524	-356.959	D	7.593	7.593	0	3.3	94.94	4.54	0	0	0	0.12
2003	348	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	349	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	774	365.389	-355.071	D	7.593	7.593	0	3.3	129.29	5.79	0	0	0	0.69

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	353	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	95.33	4.54	0	0	0	0.35
2003	354	23	949	365.722	-354.966	D	7.603	7.593	0.011	3.3	90.88	8.68	0	0	0	0.44
2003	355	23	930	366.19	-357.232	D	7.594	7.593	0.002	3.3	96.17	3.68	0	0	0	0.14
2003	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	1010	357.824	-354.865	D	7.614	7.593	0.021	3.3	96.65	3.17	0	0	0	0.18
2003	358	23	846	360.93	-362.178	D	7.621	7.593	0.028	3.3	96.18	3.64	0	0	0	0.18
2003	359	23	853	361.666	-362.175	D	7.598	7.593	0.006	3.3	96.5	3.35	0	0	0	0.16
2003	360	23	964	363.678	-354.148	D	7.597	7.593	0.005	3.3	96.92	2.99	0	0	0	0.1
2003	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.056							
UMC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2003	2	23	911	365.032	-358.843	D	7.563	7.546	0.017	3.2	73.2	26.7	0	0	0	0.11
2003	3	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	7	23	930	366.19	-357.232	D	7.548	7.546	0.001	3.2	92.17	7.83	0	0	0	0.02
2003	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	9	23	930	366.19	-357.232	D	7.605	7.546	0.058	3.2	91.13	8.79	0	0	0	0.09
2003	10	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	11	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	12	23	930	366.19	-357.232	D	7.548	7.546	0.002	3.2	86.22	13.83	0	0	0	0.04
2003	13	23	930	366.19	-357.232	D	7.546	7.546	0	3.2	88.16	12.13	0	0	0	0.02
2003	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	15	23	930	366.19	-357.232	D	7.561	7.546	0.015	3.2	80.72	19.23	0	0	0	0.04
2003	16	23	1037	356.5	-357.195	D	7.642	7.546	0.096	3.2	89.24	10.74	0	0	0	0.02
2003	17	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	18	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	19	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	21	23	930	366.19	-357.232	D	7.573	7.546	0.027	3.2	86.53	13.46	0	0	0	0.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	22	23	949	365.722	-354.966	D	7.609	7.546	0.063	3.2	82.67	17.27	0	0	0	0.06
2003	23	23	907	365.051	-359.809	D	7.548	7.546	0.002	3.2	91.38	8.58	0	0	0	0.02
2003	24	23	930	366.19	-357.232	D	7.548	7.546	0.002	3.2	89.58	10.55	0	0	0	0.02
2003	25	23	907	365.051	-359.809	D	7.548	7.546	0.002	3.2	90.65	9.38	0	0	0	0.01
2003	26	23	906	364.982	-359.812	D	7.546	7.546	0	3.2	92.98	6.8	0	0	0	0.01
2003	27	23	930	366.19	-357.232	D	7.558	7.546	0.012	3.2	86.1	13.88	0	0	0	0.03
2003	28	23	907	365.051	-359.809	D	7.547	7.546	0	3.2	91.16	8.81	0	0	0	0.01
2003	29	23	930	366.19	-357.232	D	7.605	7.546	0.059	3.2	75.2	24.71	0	0	0	0.08
2003	30	23	1017	356.894	-355.206	D	7.546	7.546	0	3.2	97.72	4.01	0	0	0	0.01
2003	31	23	1017	356.894	-355.206	D	7.546	7.546	0	3.2	94.79	5.52	0	0	0	0.01
2003	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	34	23	643	363.609	-354.151	D	7.406	7.406	0	2.9	116.41	5.83	0	0	0	0.02
2003	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	36	23	941	365.977	-355.774	D	7.407	7.406	0.002	2.9	81.68	18.34	0	0	0	0.07
2003	37	23	1008	358.048	-354.775	D	7.471	7.406	0.066	2.9	90.22	9.77	0	0	0	0.02
2003	38	23	1035	356.477	-356.792	D	7.648	7.406	0.242	2.9	93.23	6.75	0	0	0	0.01
2003	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	44	23	907	365.051	-359.809	D	7.407	7.406	0.001	2.9	89.19	10.96	0	0	0	0.03
2003	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	46	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	47	23	1037	356.5	-357.195	D	7.561	7.406	0.155	2.9	92.04	7.93	0	0	0	0.03
2003	48	23	811	357.434	-360.225	D	7.587	7.406	0.182	2.9	85.85	14.11	0	0	0	0.04
2003	49	23	930	366.19	-357.232	D	7.491	7.406	0.085	2.9	91.26	8.72	0	0	0	0.02
2003	50	23	949	365.722	-354.966	D	7.504	7.406	0.099	2.9	96.43	3.57	0	0	0	0.01
2003	51	23	1017	356.894	-355.206	D	7.593	7.406	0.187	2.9	92.59	7.4	0	0	0	0.01
2003	52	23	1017	356.894	-355.206	D	7.411	7.406	0.005	2.9	96.76	3.29	0	0	0	0.01
2003	53	23	1018	356.892	-355.39	D	7.494	7.406	0.088	2.9	89.95	10.02	0	0	0	0.03
2003	54	23	822	358.021	-361.607	D	7.481	7.406	0.075	2.9	86.43	13.54	0	0	0	0.03
2003	55	23	822	358.021	-361.607	D	7.473	7.406	0.067	2.9	90.47	9.52	0	0	0	0.02
2003	56	23	78	358.239	-356.385	D	7.484	7.406	0.079	2.9	74.19	25.71	0	0	0	0.1
2003	57	23	822	358.021	-361.607	D	7.473	7.406	0.067	2.9	92.62	7.37	0	0	0	0.01
2003	58	23	811	357.434	-360.225	D	7.442	7.406	0.036	2.9	94.78	5.22	0	0	0	0.01
2003	59	23	1017	356.894	-355.206	D	7.46	7.406	0.055	2.9	95.22	4.78	0	0	0	0.01
2003	60	23	1008	358.048	-354.775	D	7.434	7.315	0.119	2.708	95.81	4.18	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	61	23	949	365.722	-354.966	D	7.493	7.311	0.182	2.7	96.48	3.52	0	0	0	0.01
2003	62	23	907	365.051	-359.809	D	7.325	7.311	0.015	2.7	97.61	2.39	0	0	0	0.01
2003	63	23	930	366.19	-357.232	D	7.332	7.311	0.022	2.7	97.69	2.31	0	0	0	0.01
2003	64	23	933	366.169	-356.524	D	7.447	7.311	0.136	2.7	93.44	6.54	0	0	0	0.01
2003	65	23	949	365.722	-354.966	D	7.444	7.311	0.134	2.7	92.48	7.5	0	0	0	0.02
2003	66	23	930	366.19	-357.232	D	7.35	7.311	0.04	2.7	93.87	6.12	0	0	0	0.02
2003	67	23	930	366.19	-357.232	D	7.32	7.311	0.009	2.7	98.52	1.48	0	0	0	0.01
2003	68	23	930	366.19	-357.232	D	7.45	7.311	0.139	2.7	77.25	22.65	0	0	0	0.1
2003	69	23	832	359.493	-362.061	D	7.515	7.311	0.204	2.7	84.52	15.44	0	0	0	0.05
2003	70	23	811	357.434	-360.225	D	7.458	7.311	0.147	2.7	94.21	5.77	0	0	0	0.02
2003	71	23	949	365.722	-354.966	D	7.324	7.311	0.014	2.7	97.96	2.03	0	0	0	0.01
2003	72	23	933	366.169	-356.524	D	7.404	7.311	0.093	2.7	98.22	1.76	0	0	0	0.02
2003	73	23	822	358.021	-361.607	D	7.34	7.311	0.029	2.7	97.95	2.04	0	0	0	0.02
2003	74	23	1039	356.522	-357.599	D	7.357	7.311	0.047	2.7	98.88	1.11	0	0	0	0.01
2003	75	23	1017	356.894	-355.206	D	7.323	7.311	0.013	2.7	99.58	0.43	0	0	0	0.01
2003	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	822	358.021	-361.607	D	7.422	7.311	0.112	2.7	95.3	4.69	0	0	0	0.02
2003	80	23	907	365.051	-359.809	D	7.395	7.311	0.084	2.7	94.34	5.64	0	0	0	0.02
2003	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	82	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	949	365.722	-354.966	D	7.337	7.311	0.026	2.7	93.31	6.66	0	0	0	0.04
2003	85	23	1017	356.894	-355.206	D	7.331	7.311	0.02	2.7	79.43	20.5	0	0	0	0.07
2003	86	23	931	366.183	-356.996	D	7.313	7.311	0.002	2.7	99.61	0.44	0	0	0	0.01
2003	87	23	747	364.871	-354.594	D	7.311	7.311	0	2.7	99.44	0.19	0	0	0	0.01
2003	88	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	90	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	96	23	949	365.722	-354.966	D	7.344	7.311	0.033	2.7	94.06	5.94	0	0	0	0.01
2003	97	23	1003	359.099	-354.737	D	7.311	7.311	0	2.7	97.26	2.71	0	0	0	0
2003	98	23	949	365.722	-354.966	D	7.347	7.311	0.036	2.7	95.35	4.65	0	0	0	0.01
2003	99	23	955	364.92	-354.582	D	7.418	7.311	0.107	2.7	93.62	6.35	0	0	0	0.04

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	100	23	900	364.265	-360.243	D	7.429	7.311	0.118	2.7	94.02	5.94	0	0	0	0.04
2003	101	23	955	364.92	-354.582	D	7.387	7.311	0.076	2.7	98.62	1.36	0	0	0	0.02
2003	102	23	933	366.169	-356.524	D	7.409	7.311	0.098	2.7	99.5	0.48	0	0	0	0.02
2003	103	23	930	366.19	-357.232	D	7.314	7.311	0.003	2.7	99.93	0.12	0	0	0	0.01
2003	104	23	930	366.19	-357.232	D	7.311	7.311	0.001	2.7	99.78	0.27	0	0	0	0.01
2003	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	107	23	949	365.722	-354.966	D	7.334	7.311	0.023	2.7	93.98	6.01	0	0	0	0.01
2003	108	23	947	365.801	-355.162	D	7.313	7.311	0.002	2.7	100	0.07	0	0	0	0.01
2003	109	23	948	365.727	-355.056	D	7.311	7.311	0	2.7	99.69	0.13	0	0	0	0.01
2003	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	112	23	955	364.92	-354.582	D	7.336	7.311	0.026	2.7	93.37	6.56	0	0	0	0.09
2003	113	23	1017	356.894	-355.206	D	7.319	7.311	0.009	2.7	98.85	1.15	0	0	0	0.03
2003	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	115	23	966	363.538	-354.124	D	7.351	7.311	0.04	2.7	96.32	3.65	0	0	0	0.03
2003	116	23	947	365.801	-355.162	D	7.419	7.311	0.109	2.7	94.3	5.67	0	0	0	0.03
2003	117	23	811	357.434	-360.225	D	7.321	7.311	0.01	2.7	99.36	0.62	0	0	0	0.01
2003	118	23	947	365.801	-355.162	D	7.315	7.311	0.005	2.7	99.85	0.16	0	0	0	0.01
2003	119	23	643	363.609	-354.151	D	7.311	7.311	0	2.7	99.54	0.66	0	0	0	0.01
2003	120	23	569	362.875	-354.433	D	7.311	7.311	0	2.7	99.1	0.18	0	0	0	0.01
2003	121	23	1007	358.259	-354.768	D	7.582	7.581	0.001	3.275	99.38	0.48	0	0	0	0.01
2003	122	23	949	365.722	-354.966	D	7.891	7.593	0.298	3.3	99.03	0.95	0	0	0	0.02
2003	123	23	1017	356.894	-355.206	D	8.185	7.593	**0.593**	3.3	98.06	1.93	0	0	0	0.01
2003	124	23	930	366.19	-357.232	D	7.645	7.593	0.052	3.3	99.62	0.38	0	0	0	0.01
2003	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	127	23	967	363.478	-354.116	D	7.67	7.593	0.077	3.3	98.84	1.14	0	0	0	0.01
2003	128	23	949	365.722	-354.966	D	7.616	7.593	0.023	3.3	99.77	0.22	0	0	0	0.01
2003	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	137	23	964	363.678	-354.148	D	7.603	7.593	0.011	3.3	99.85	0.15	0	0	0	0.01
2003	138	23	1035	356.477	-356.792	D	7.649	7.593	0.057	3.3	98.97	1.03	0	0	0	0.01

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	139	23	1017	356.894	-355.206	D	7.609	7.593	0.017	3.3	99.36	0.64	0	0	0	0.01
2003	140	23	930	366.19	-357.232	D	7.831	7.593	0.238	3.3	94.77	5.21	0	0	0	0.02
2003	141	23	930	366.19	-357.232	D	7.649	7.593	0.056	3.3	98.65	1.32	0	0	0	0.03
2003	142	23	1017	356.894	-355.206	D	7.717	7.593	0.125	3.3	99.47	0.51	0	0	0	0.02
2003	143	23	1017	356.894	-355.206	D	7.857	7.593	0.265	3.3	99.74	0.25	0	0	0	0.02
2003	144	23	967	363.478	-354.116	D	8.006	7.593	0.414	3.3	99.63	0.36	0	0	0	0.01
2003	145	23	1017	356.894	-355.206	D	8.029	7.593	0.436	3.3	98.94	1.06	0	0	0	0.01
2003	146	23	822	358.021	-361.607	D	7.759	7.593	0.166	3.3	99.6	0.4	0	0	0	0.01
2003	147	23	1017	356.894	-355.206	D	7.621	7.593	0.028	3.3	99.51	0.47	0	0	0	0.02
2003	148	23	822	358.021	-361.607	D	7.625	7.593	0.033	3.3	99.85	0.15	0	0	0	0.01
2003	149	23	853	361.666	-362.175	D	7.594	7.593	0.002	3.3	100.01	0.03	0	0	0	0.01
2003	150	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	151	23	949	365.722	-354.966	D	7.604	7.593	0.011	3.3	99.85	0.13	0	0	0	0.02
2003	152	23	1038	356.511	-357.396	D	7.621	7.593	0.028	3.3	99.58	0.4	0	0	0	0.02
2003	153	23	1035	356.477	-356.792	D	7.607	7.593	0.014	3.3	99.31	0.7	0	0	0	0.01
2003	154	23	949	365.722	-354.966	D	7.736	7.593	0.144	3.3	95.32	4.67	0	0	0	0.01
2003	155	23	930	366.19	-357.232	D	7.608	7.593	0.015	3.3	95.33	4.66	0	0	0	0.02
2003	156	23	853	361.666	-362.175	D	7.647	7.593	0.055	3.3	99.88	0.11	0	0	0	0.01
2003	157	23	949	365.722	-354.966	D	7.718	7.593	0.125	3.3	99.32	0.67	0	0	0	0.01
2003	158	23	822	358.021	-361.607	D	7.594	7.593	0.001	3.3	99.8	0.26	0	0	0	0
2003	159	23	709	364.375	-354.616	D	7.593	7.593	0	3.3	99.52	0.05	0	0	0	0
2003	160	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	164	23	1017	356.894	-355.206	D	7.594	7.593	0.002	3.3	99.94	0.05	0	0	0	0.01
2003	165	23	949	365.722	-354.966	D	8.096	7.593	**0.503**	3.3	97.1	2.89	0	0	0	0.01
2003	166	23	853	361.666	-362.175	D	7.755	7.593	0.163	3.3	99.52	0.47	0	0	0	0.01
2003	167	23	853	361.666	-362.175	D	7.665	7.593	0.072	3.3	99.73	0.26	0	0	0	0.01
2003	168	23	832	359.493	-362.061	D	7.638	7.593	0.045	3.3	99.52	0.48	0	0	0	0
2003	169	23	822	358.021	-361.607	D	7.603	7.593	0.011	3.3	99.8	0.2	0	0	0	0
2003	170	23	1035	356.477	-356.792	D	7.684	7.593	0.092	3.3	99.88	0.11	0	0	0	0.01
2003	171	23	853	361.666	-362.175	D	7.869	7.593	0.276	3.3	97.88	2.11	0	0	0	0.01
2003	172	23	1039	356.522	-357.599	D	7.617	7.593	0.024	3.3	99.82	0.17	0	0	0	0.01
2003	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	178	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	99.76	0.04	0	0	0	0.02
2003	179	23	907	365.051	-359.809	D	7.601	7.593	0.008	3.3	99.87	0.12	0	0	0	0.01
2003	180	23	1017	356.894	-355.206	D	7.606	7.593	0.013	3.3	99.94	0.05	0	0	0	0.01
2003	181	23	1017	356.894	-355.206	D	7.605	7.593	0.012	3.3	99.87	0.12	0	0	0	0.01
2003	182	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	100.29	0.17	0	0	0	0.01
2003	183	23	747	364.871	-354.594	D	7.594	7.593	0.001	3.3	99.91	0.16	0	0	0	0.01
2003	184	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	99.82	0.07	0	0	0	0.01
2003	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	193	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	194	23	949	365.722	-354.966	D	7.604	7.593	0.012	3.3	99.96	0.02	0	0	0	0.01
2003	195	23	949	365.722	-354.966	D	7.647	7.593	0.054	3.3	99.79	0.2	0	0	0	0.01
2003	196	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	99.94	0.02	0	0	0	0.01
2003	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	198	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	100.02	0.04	0	0	0	0.01
2003	199	23	923	365.573	-357.889	D	7.593	7.593	0	3.3	99.74	0.03	0	0	0	0.01
2003	200	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	99.96	0.03	0	0	0	0.01
2003	201	23	941	365.977	-355.774	D	7.593	7.593	0	3.3	99.9	0.14	0	0	0	0.01
2003	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	204	23	1017	356.894	-355.206	D	7.681	7.593	0.088	3.3	99.55	0.42	0	0	0	0.03
2003	205	23	1035	356.477	-356.792	D	7.818	7.593	0.225	3.3	99.86	0.12	0	0	0	0.02
2003	206	23	1017	356.894	-355.206	D	7.665	7.593	0.073	3.3	99.84	0.15	0	0	0	0.01
2003	207	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	933	366.169	-356.524	D	7.679	7.593	0.086	3.3	97.21	2.78	0	0	0	0.01
2003	211	23	930	366.19	-357.232	D	7.748	7.593	0.155	3.3	99.24	0.75	0	0	0	0.01
2003	212	23	930	366.19	-357.232	D	7.695	7.593	0.103	3.3	99.62	0.38	0	0	0	0.01
2003	213	23	907	365.051	-359.809	D	7.629	7.593	0.036	3.3	99.85	0.14	0	0	0	0.01
2003	214	23	930	366.19	-357.232	D	7.605	7.593	0.012	3.3	99.98	0.03	0	0	0	0.01
2003	215	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	216	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	217	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	218	23	1035	356.477	-356.792	D	7.671	7.593	0.078	3.3	99.88	0.11	0	0	0	0.01
2003	219	23	1035	356.477	-356.792	D	7.779	7.593	0.186	3.3	97.49	2.49	0	0	0	0.03
2003	220	23	853	361.666	-362.175	D	7.862	7.593	0.269	3.3	99.71	0.28	0	0	0	0.02
2003	221	23	1035	356.477	-356.792	D	7.707	7.593	0.115	3.3	99.65	0.32	0	0	0	0.02
2003	222	23	1039	356.522	-357.599	D	7.735	7.593	0.143	3.3	99.67	0.3	0	0	0	0.02
2003	223	23	822	358.021	-361.607	D	7.611	7.593	0.019	3.3	99.86	0.14	0	0	0	0.01
2003	224	23	822	358.021	-361.607	D	7.593	7.593	0.001	3.3	99.74	0.27	0	0	0	0.01
2003	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	230	23	930	366.19	-357.232	D	7.599	7.593	0.006	3.3	99.98	0.02	0	0	0	0.02
2003	231	23	930	366.19	-357.232	D	7.631	7.593	0.038	3.3	99.91	0.09	0	0	0	0.01
2003	232	23	907	365.051	-359.809	D	7.624	7.593	0.032	3.3	99.88	0.12	0	0	0	0.01
2003	233	23	907	365.051	-359.809	D	7.621	7.593	0.028	3.3	99.86	0.14	0	0	0	0.01
2003	234	23	930	366.19	-357.232	D	7.623	7.593	0.03	3.3	99.94	0.06	0	0	0	0.01
2003	235	23	930	366.19	-357.232	D	7.729	7.593	0.137	3.3	99.89	0.1	0	0	0	0.01
2003	236	23	822	358.021	-361.607	D	7.731	7.593	0.138	3.3	99.55	0.44	0	0	0	0.01
2003	237	23	1035	356.477	-356.792	D	7.746	7.593	0.153	3.3	99.93	0.06	0	0	0	0.01
2003	238	23	967	363.478	-354.116	D	7.619	7.593	0.026	3.3	99.98	0.01	0	0	0	0.01
2003	239	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	100.01	0.02	0	0	0	0.01
2003	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	242	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	99.57	0.21	0	0	0	0.01
2003	243	23	967	363.478	-354.116	D	7.594	7.593	0.002	3.3	98.94	1.04	0	0	0	0.01
2003	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	245	23	1017	356.894	-355.206	D	7.7	7.639	0.061	3.4	99.75	0.24	0	0	0	0.01
2003	246	23	1039	356.522	-357.599	D	7.771	7.639	0.132	3.4	98.87	1.12	0	0	0	0.01
2003	247	23	931	366.183	-356.996	D	7.913	7.639	0.274	3.4	97.59	2.38	0	0	0	0.02
2003	248	23	1017	356.894	-355.206	D	7.789	7.639	0.151	3.4	98.53	1.43	0	0	0	0.04
2003	249	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	254	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	255	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	256	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	257	23	78	358.239	-356.385	D	7.845	7.639	0.206	3.4	95.95	4.04	0	0	0	0.01
2003	258	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	259	23	930	366.19	-357.232	D	7.645	7.639	0.006	3.4	99.9	0.1	0	0	0	0.02
2003	260	23	933	366.169	-356.524	D	7.68	7.639	0.041	3.4	99.64	0.35	0	0	0	0.01
2003	261	23	643	363.609	-354.151	D	7.641	7.639	0.002	3.4	99.88	0.12	0	0	0	0.01
2003	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	263	23	933	366.169	-356.524	D	7.742	7.639	0.103	3.4	99.18	0.8	0	0	0	0.02
2003	264	23	1017	356.894	-355.206	D	7.74	7.639	0.101	3.4	99.78	0.21	0	0	0	0.01
2003	265	23	949	365.722	-354.966	D	7.666	7.639	0.027	3.4	98.95	1.05	0	0	0	0
2003	266	23	907	365.051	-359.809	D	7.639	7.639	0	3.4	99.84	0.07	0	0	0	0
2003	267	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	268	23	1017	356.894	-355.206	D	7.659	7.639	0.02	3.4	94.86	4.9	0	0	0	0.24
2003	269	23	907	365.051	-359.809	D	7.661	7.639	0.022	3.4	99.12	0.87	0	0	0	0.01
2003	270	23	930	366.19	-357.232	D	7.642	7.639	0.003	3.4	89.87	9.93	0	0	0	0.17
2003	271	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	272	23	779	365.703	-356.555	D	7.765	7.639	0.126	3.4	82.48	17.39	0	0	0	0.13
2003	273	23	853	361.666	-362.175	D	7.66	7.639	0.022	3.4	98.43	1.55	0	0	0	0.02
2003	274	23	966	363.538	-354.124	D	7.557	7.505	0.052	3.112	93.56	6.43	0	0	0	0.02
2003	275	23	78	358.239	-356.385	D	7.505	7.5	0.005	3.1	82.49	17.39	0	0	0	0.12
2003	276	23	832	359.493	-362.061	D	7.518	7.5	0.019	3.1	98.41	1.59	0	0	0	0.02
2003	277	23	907	365.051	-359.809	D	7.502	7.5	0.003	3.1	99.69	0.29	0	0	0	0.01
2003	278	23	930	366.19	-357.232	D	7.511	7.5	0.011	3.1	99.54	0.45	0	0	0	0.02
2003	279	23	930	366.19	-357.232	D	7.571	7.5	0.071	3.1	98.66	1.33	0	0	0	0.01
2003	280	23	811	357.434	-360.225	D	7.552	7.5	0.052	3.1	99.58	0.41	0	0	0	0.01
2003	281	23	1017	356.894	-355.206	D	7.512	7.5	0.013	3.1	99.73	0.27	0	0	0	0.01
2003	282	23	1016	357.1	-355.198	D	7.501	7.5	0.002	3.1	99.78	0.25	0	0	0	0.01
2003	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	98.1	0.76	0	0	0	0.01
2003	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	838	360.316	-362.005	D	7.595	7.5	0.095	3.1	99.19	0.77	0	0	0	0.04
2003	286	23	1039	356.522	-357.599	D	7.578	7.5	0.079	3.1	99.37	0.61	0	0	0	0.02
2003	287	23	947	365.801	-355.162	D	7.519	7.5	0.02	3.1	97.43	2.57	0	0	0	0.01
2003	288	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	289	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	290	23	949	365.722	-354.966	D	7.509	7.5	0.01	3.1	95.79	4.22	0	0	0	0.01
2003	291	23	1017	356.894	-355.206	D	7.559	7.5	0.059	3.1	98.56	1.42	0	0	0	0.02
2003	292	23	853	361.666	-362.175	D	7.527	7.5	0.027	3.1	99.74	0.25	0	0	0	0.02
2003	293	23	853	361.666	-362.175	D	7.504	7.5	0.004	3.1	99.97	0.08	0	0	0	0.01
2003	294	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	99.97	0.11	0	0	0	0.01

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	295	23	1035	356.477	-356.792	D	7.535	7.5	0.036	3.1	99.16	0.79	0	0	0	0.05
2003	296	23	964	363.678	-354.148	D	7.521	7.5	0.021	3.1	99.52	0.46	0	0	0	0.03
2003	297	23	949	365.722	-354.966	D	7.566	7.5	0.066	3.1	99.46	0.52	0	0	0	0.02
2003	298	23	806	357.415	-359.242	D	7.74	7.5	0.24	3.1	93.32	6.65	0	0	0	0.03
2003	299	23	907	365.051	-359.809	D	7.54	7.5	0.04	3.1	91.06	8.92	0	0	0	0.02
2003	300	23	786	365.973	-357.042	D	7.5	7.5	0	3.1	97.75	0.91	0	0	0	0.01
2003	301	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	949	365.722	-354.966	D	7.828	7.5	0.329	3.1	90.78	9.17	0	0	0	0.05
2003	306	23	643	363.609	-354.151	D	7.5	7.5	0.001	3.1	98.62	1.29	0	0	0	0.02
2003	307	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	967	363.478	-354.116	D	7.505	7.5	0.005	3.1	97	3.01	0	0	0	0.01
2003	309	23	845	360.851	-362.181	D	7.583	7.5	0.084	3.1	93.74	6.22	0	0	0	0.04
2003	310	23	930	366.19	-357.232	D	7.712	7.5	0.213	3.1	93.24	6.73	0	0	0	0.02
2003	311	23	822	358.021	-361.607	D	7.597	7.5	0.097	3.1	93.64	6.34	0	0	0	0.02
2003	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	318	23	906	364.982	-359.812	D	7.5	7.5	0	3.1	95.79	4.08	0	0	0	0.03
2003	319	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	92.89	6.92	0	0	0	0.03
2003	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	930	366.19	-357.232	D	7.506	7.5	0.006	3.1	96.6	3.39	0	0	0	0.02
2003	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1017	356.894	-355.206	D	7.531	7.5	0.032	3.1	93.31	6.69	0	0	0	0.01
2003	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	949	365.722	-354.966	D	7.528	7.5	0.029	3.1	94.87	5.11	0	0	0	0.02
2003	332	23	930	366.19	-357.232	D	7.502	7.5	0.003	3.1	95.41	4.59	0	0	0	0.01
2003	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
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2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	78	358.239	-356.385	D	7.672	7.589	0.083	3.292	76.36	23.46	0	0	0	0.19
2003	336	23	1017	356.894	-355.206	D	7.594	7.593	0.001	3.3	90.72	9.25	0	0	0	0.05
2003	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	967	363.478	-354.116	D	7.767	7.593	0.174	3.3	92.49	7.49	0	0	0	0.02
2003	339	23	822	358.021	-361.607	D	7.593	7.593	0.001	3.3	96.45	3.53	0	0	0	0.01
2003	340	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	91.88	8	0	0	0	0.02
2003	341	23	933	366.169	-356.524	D	7.609	7.593	0.017	3.3	89.39	10.6	0	0	0	0.02
2003	342	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	955	364.92	-354.582	D	7.651	7.593	0.059	3.3	91.26	8.72	0	0	0	0.02
2003	345	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	949	365.722	-354.966	D	7.64	7.593	0.047	3.3	90.85	9.14	0	0	0	0.02
2003	347	23	1038	356.511	-357.396	D	7.607	7.593	0.015	3.3	92.46	7.53	0	0	0	0.01
2003	348	23	822	358.021	-361.607	D	7.624	7.593	0.031	3.3	94.25	5.75	0	0	0	0.01
2003	349	23	941	365.977	-355.774	D	7.599	7.593	0.007	3.3	95.36	4.65	0	0	0	0.01
2003	350	23	496	362.153	-354.964	D	7.593	7.593	0	3.3	93.03	3.96	0	0	0	0
2003	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	933	366.169	-356.524	D	7.633	7.593	0.04	3.3	76.15	23.74	0	0	0	0.11
2003	358	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	360	23	930	366.19	-357.232	D	7.597	7.593	0.005	3.3	94.91	5.05	0	0	0	0.02
2003	361	23	941	365.977	-355.774	D	7.6	7.593	0.007	3.3	94.46	5.53	0	0	0	0.01
2003	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.593							
NORANDA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2003	2	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	3	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	7	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	10	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	11	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	12	23	930	366.19	-357.232	D	7.547	7.546	0.001	3.2	98.7	0.02	0	0	0.17	1.19
2003	13	23	930	366.19	-357.232	D	7.546	7.546	0	3.2	98.83	0.02	0	0	0.06	1.07
2003	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	16	23	1017	356.894	-355.206	D	7.649	7.546	0.103	3.2	95.43	0.29	0	0	0.19	4.09
2003	17	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	18	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	19	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	21	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	24	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	25	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	26	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	27	23	907	365.051	-359.809	D	7.546	7.546	0	3.2	98.95	0.04	0	0	0.08	1.87
2003	28	23	930	366.19	-357.232	D	7.546	7.546	0	3.2	93.24	0.47	0	0	0.04	6.13
2003	29	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	31	23	907	365.051	-359.809	D	7.561	7.546	0.015	3.2	98.86	0.05	0	0	0.02	1.07
2003	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	37	23	907	365.051	-359.809	D	7.495	7.406	0.089	2.9	95.63	0.21	0	0	0.21	3.96
2003	38	23	907	365.051	-359.809	D	7.418	7.406	0.012	2.9	98.12	0.1	0	0	0.04	1.75
2003	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	46	23	949	365.722	-354.966	D	7.424	7.406	0.018	2.9	97.71	0.1	0	0	0.03	2.16
2003	47	23	822	358.021	-361.607	D	7.427	7.406	0.022	2.9	98.39	0.1	0	0	0.01	1.5
2003	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	49	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	50	23	907	365.051	-359.809	D	7.413	7.406	0.008	2.9	92.8	0.41	0	0	0.14	6.68
2003	51	23	853	361.666	-362.175	D	7.428	7.406	0.023	2.9	98.62	0.06	0	0	0.18	1.15
2003	52	23	853	361.666	-362.175	D	7.681	7.406	0.276	2.9	98.47	0.05	0	0	0.13	1.34
2003	53	23	853	361.666	-362.175	D	7.431	7.406	0.026	2.9	98.94	0.03	0	0	0.06	0.97
2003	54	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	55	23	932	366.176	-356.761	D	7.406	7.406	0	2.9	99.38	0.01	0	0	0.04	0.44
2003	56	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	57	23	853	361.666	-362.175	D	7.406	7.406	0	2.9	97.03	0.11	0	0	0.31	2.76
2003	58	23	832	359.493	-362.061	D	7.41	7.406	0.004	2.9	98.35	0.07	0	0	0.16	1.47
2003	59	23	853	361.666	-362.175	D	7.412	7.406	0.006	2.9	98.6	0.05	0	0	0.09	1.29
2003	60	23	853	361.666	-362.175	D	7.35	7.315	0.036	2.708	98.52	0.05	0	0	0.07	1.36
2003	61	23	907	365.051	-359.809	D	7.324	7.311	0.013	2.7	98.75	0.05	0	0	0.02	1.19
2003	62	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	63	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	65	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	70	23	907	365.051	-359.809	D	7.312	7.311	0.001	2.7	96.8	0.01	0	0	0.22	3.11
2003	71	23	907	365.051	-359.809	D	7.319	7.311	0.009	2.7	96.36	0.05	0	0	0.03	3.56
2003	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	73	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	74	23	930	366.19	-357.232	D	7.331	7.311	0.021	2.7	98.23	0.01	0	0	0.11	1.65
2003	75	23	949	365.722	-354.966	D	7.328	7.311	0.018	2.7	97.73	0.04	0	0	0.03	2.21
2003	76	23	949	365.722	-354.966	D	7.314	7.311	0.003	2.7	98.12	0.03	0	0	0.01	1.87
2003	77	23	949	365.722	-354.966	D	7.342	7.311	0.031	2.7	99.39	0	0	0	0.1	0.51
2003	78	23	78	358.239	-356.385	D	7.404	7.311	0.093	2.7	95.49	0.17	0	0	0.19	4.14
2003	79	23	822	358.021	-361.607	D	7.333	7.311	0.023	2.7	99.16	0.05	0	0	0.01	0.79
2003	80	23	907	365.051	-359.809	D	7.314	7.311	0.003	2.7	98.29	0.08	0	0	0.01	1.61

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	82	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	85	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	86	23	930	366.19	-357.232	D	7.324	7.311	0.013	2.7	95.43	0.06	0	0	0.2	4.31
2003	87	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	90	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	96	23	822	358.021	-361.607	D	7.373	7.311	0.062	2.7	95.61	0.1	0	0	0.26	4.04
2003	97	23	1017	356.894	-355.206	D	7.322	7.311	0.012	2.7	89.42	0.86	0	0	0.08	9.64
2003	98	23	930	366.19	-357.232	D	7.316	7.311	0.005	2.7	98.89	0.06	0	0	0	1.08
2003	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	102	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	108	23	933	366.169	-356.524	D	7.322	7.311	0.011	2.7	99.18	0	0	0	0.08	0.76
2003	109	23	949	365.722	-354.966	D	7.315	7.311	0.004	2.7	97.29	0	0	0	0.09	2.61
2003	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	113	23	861	361.895	-361.506	D	7.332	7.311	0.022	2.7	89.1	0.03	0	0	1.4	9.48
2003	114	23	1039	356.522	-357.599	D	7.321	7.311	0.01	2.7	97.21	0.04	0	0	0.08	2.68
2003	115	23	1039	356.522	-357.599	D	7.36	7.311	0.049	2.7	98.27	0.02	0	0	0.03	1.68
2003	116	23	930	366.19	-357.232	D	7.359	7.311	0.049	2.7	98.57	0.01	0	0	0.03	1.4
2003	117	23	907	365.051	-359.809	D	7.311	7.311	0.001	2.7	97.69	0	0	0	0.31	2.12
2003	118	23	930	366.19	-357.232	D	7.314	7.311	0.004	2.7	97.99	0	0	0	0.09	1.97
2003	119	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2003	122	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	123	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	124	23	930	366.19	-357.232	D	7.638	7.593	0.045	3.3	97.94	0.01	0	0	0.03	2.02
2003	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	127	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	128	23	947	365.801	-355.162	D	7.593	7.593	0.001	3.3	99.22	0	0	0	0.15	0.59
2003	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	136	23	949	365.722	-354.966	D	7.618	7.593	0.025	3.3	96.25	0.11	0	0	0.18	3.47
2003	137	23	907	365.051	-359.809	D	7.618	7.593	0.025	3.3	97.31	0	0	0	0.4	2.29
2003	138	23	1038	356.511	-357.396	D	7.617	7.593	0.024	3.3	98.76	0.01	0	0	0.08	1.15
2003	139	23	907	365.051	-359.809	D	7.626	7.593	0.033	3.3	98.52	0.01	0	0	0.22	1.26
2003	140	23	907	365.051	-359.809	D	7.731	7.593	0.138	3.3	98.92	0.01	0	0	0.06	1.01
2003	141	23	44	358.21	-361.379	D	7.593	7.593	0	3.3	99.49	0	0	0	0.01	1.07
2003	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	65.28	0	0	0	0.14	4.59
2003	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	144	23	907	365.051	-359.809	D	7.604	7.593	0.012	3.3	99.31	0.01	0	0	0.1	0.58
2003	145	23	933	366.169	-356.524	D	7.702	7.593	0.109	3.3	99.26	0.01	0	0	0.05	0.69
2003	146	23	832	359.493	-362.061	D	7.623	7.593	0.031	3.3	99	0.01	0	0	0.03	0.96
2003	147	23	821	358.053	-361.416	D	7.593	7.593	0	3.3	90.53	0	0	0	0.03	2.24
2003	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	149	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	150	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	153	23	907	365.051	-359.809	D	7.643	7.593	0.05	3.3	98.41	0.02	0	0	0.04	1.54
2003	154	23	949	365.722	-354.966	D	7.857	7.593	0.265	3.3	98.51	0.03	0	0	0.06	1.39
2003	155	23	853	361.666	-362.175	D	7.594	7.593	0.002	3.3	95.87	0	0	0	0.32	3.86
2003	156	23	44	358.21	-361.379	D	7.593	7.593	0	3.3	93.56	0	0	0	0.45	6.05
2003	157	23	930	366.19	-357.232	D	7.624	7.593	0.031	3.3	98.03	0.01	0	0	0.13	1.84
2003	158	23	907	365.051	-359.809	D	7.598	7.593	0.005	3.3	98.51	0.01	0	0	0.06	1.43

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	159	23	380	361.468	-361.984	D	7.593	7.593	0	3.3	95.82	0	0	0	0.12	5.31
2003	160	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	12.73	0	0	0	0.02	0.63
2003	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	164	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	165	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	166	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	167	23	907	365.051	-359.809	D	7.596	7.593	0.003	3.3	99.38	0.01	0	0	0.09	0.51
2003	168	23	832	359.493	-362.061	D	7.637	7.593	0.045	3.3	99.33	0.01	0	0	0.09	0.57
2003	169	23	845	360.851	-362.181	D	7.748	7.593	0.155	3.3	98.6	0.03	0	0	0.15	1.23
2003	170	23	853	361.666	-362.175	D	7.611	7.593	0.018	3.3	98.82	0.01	0	0	0.14	1.05
2003	171	23	329	360.972	-362.006	D	7.593	7.593	0.001	3.3	99.24	0	0	0	0.02	0.77
2003	172	23	773	365.4	-355.32	D	7.735	7.593	0.143	3.3	97.16	0.01	0	0	0.39	2.45
2003	173	23	955	364.92	-354.582	D	7.606	7.593	0.014	3.3	90.6	0.02	0	0	0.2	9.19
2003	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	118.05	0	0	0	1.17	10.1
2003	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	70.58	0	0	0	0.3	5.58
2003	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	178	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	179	23	853	361.666	-362.175	D	7.593	7.593	0.001	3.3	97.68	0	0	0	0.46	1.82
2003	180	23	853	361.666	-362.175	D	7.728	7.593	0.135	3.3	98.36	0	0	0	0.16	1.48
2003	181	23	966	363.538	-354.124	D	7.655	7.593	0.062	3.3	98.76	0	0	0	0.07	1.17
2003	182	23	966	363.538	-354.124	D	7.604	7.593	0.011	3.3	98.05	0.01	0	0	0.13	1.81
2003	183	23	907	365.051	-359.809	D	7.65	7.593	0.057	3.3	99.35	0	0	0	0.05	0.59
2003	184	23	907	365.051	-359.809	D	7.648	7.593	0.055	3.3	99.02	0	0	0	0.08	0.9
2003	185	23	930	366.19	-357.232	D	7.636	7.593	0.044	3.3	98.73	0	0	0	0.07	1.2
2003	186	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	95	0	0	0	0.6	4.4
2003	187	23	102	358.487	-356.374	D	7.593	7.593	0	3.3	93.35	0	0	0	1.86	5.19
2003	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	193	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	194	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	195	23	930	366.19	-357.232	D	7.603	7.593	0.01	3.3	99.68	0	0	0	0.03	0.31
2003	196	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	99.64	0	0	0	0.02	0.31
2003	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	198	23	748	365.295	-358.57	D	7.593	7.593	0	3.3	64.77	0	0	0	0.48	9.06
2003	199	23	927	365.912	-357.454	D	7.593	7.593	0	3.3	97.74	0	0	0	0.15	1.74
2003	200	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	94.69	0	0	0	0.15	4.53
2003	201	23	929	366.032	-357.239	D	7.593	7.593	0	3.3	85.97	0.35	0	0	0.56	12.87
2003	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	204	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	205	23	852	361.595	-362.148	D	7.593	7.593	0	3.3	99.02	0	0	0	0.19	0.53
2003	206	23	853	361.666	-362.175	D	7.687	7.593	0.095	3.3	98.83	0	0	0	0.14	1.04
2003	207	23	1017	356.894	-355.206	D	7.623	7.593	0.03	3.3	98.63	0	0	0	0.07	1.3
2003	208	23	949	365.722	-354.966	D	7.593	7.593	0.001	3.3	98.95	0	0	0	0.03	0.96
2003	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	907	365.051	-359.809	D	7.599	7.593	0.006	3.3	99.64	0	0	0	0.04	0.31
2003	211	23	907	365.051	-359.809	D	7.642	7.593	0.05	3.3	99.73	0	0	0	0.01	0.25
2003	212	23	907	365.051	-359.809	D	7.608	7.593	0.016	3.3	99.6	0	0	0	0.03	0.38
2003	213	23	907	365.051	-359.809	D	7.594	7.593	0.001	3.3	99.78	0	0	0	0.01	0.21
2003	214	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	99.83	0	0	0	0.01	0.21
2003	215	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	18.93	0	0	0	0.01	0.96
2003	216	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	217	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	218	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	219	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	226	23	1039	356.522	-357.599	D	7.668	7.593	0.076	3.3	97.07	0.08	0	0	0.12	2.74
2003	227	23	966	363.538	-354.124	D	7.594	7.593	0.001	3.3	97.53	0	0	0	0.07	2.4
2003	228	23	947	365.801	-355.162	D	7.595	7.593	0.003	3.3	98.22	0	0	0	0.04	1.71
2003	229	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	97.97	0	0	0	0.04	2.79
2003	230	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	231	23	905	364.788	-359.816	D	7.593	7.593	0	3.3	64.76	0.1	0	0	1.33	32.72
2003	232	23	907	365.051	-359.809	D	7.597	7.593	0.005	3.3	97.91	0	0	0	0.15	1.97
2003	233	23	907	365.051	-359.809	D	7.616	7.593	0.023	3.3	98.86	0	0	0	0.1	1.04
2003	234	23	907	365.051	-359.809	D	7.627	7.593	0.034	3.3	99.05	0	0	0	0.08	0.86
2003	235	23	907	365.051	-359.809	D	7.628	7.593	0.035	3.3	99.06	0	0	0	0.06	0.89
2003	236	23	853	361.666	-362.175	D	7.634	7.593	0.042	3.3	99.2	0	0	0	0.07	0.74

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	237	23	907	365.051	-359.809	D	7.864	7.593	0.271	3.3	99.15	0	0	0	0.07	0.78
2003	238	23	930	366.19	-357.232	D	7.762	7.593	0.169	3.3	98.88	0	0	0	0.05	1.07
2003	239	23	947	365.801	-355.162	D	7.603	7.593	0.01	3.3	99.15	0	0	0	0.03	0.83
2003	240	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	99.36	0	0	0	0.03	1.04
2003	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	33.73	0	0	0	0.13	1.33
2003	242	23	853	361.666	-362.175	D	7.652	7.593	0.059	3.3	99.08	0.01	0	0	0.07	0.85
2003	243	23	822	358.021	-361.607	D	7.707	7.593	0.115	3.3	98.37	0.04	0	0	0.05	1.54
2003	244	23	1017	356.894	-355.206	D	7.638	7.637	0.001	3.396	98.64	0.01	0	0	0.17	1.15
2003	245	23	949	365.722	-354.966	D	7.647	7.639	0.008	3.4	99.56	0.01	0	0	0.03	0.41
2003	246	23	930	366.19	-357.232	D	7.73	7.639	0.091	3.4	99.35	0.02	0	0	0.02	0.6
2003	247	23	821	358.053	-361.416	D	7.639	7.639	0	3.4	99.86	0	0	0	0	0.13
2003	248	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	249	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	250	23	832	359.493	-362.061	D	7.643	7.639	0.004	3.4	96.92	0	0	0	0.51	2.59
2003	251	23	822	358.021	-361.607	D	7.751	7.639	0.112	3.4	98.43	0	0	0	0.14	1.43
2003	252	23	822	358.021	-361.607	D	7.749	7.639	0.111	3.4	98.64	0	0	0	0.09	1.27
2003	253	23	933	366.169	-356.524	D	7.853	7.639	0.214	3.4	98.78	0.01	0	0	0.05	1.17
2003	254	23	947	365.801	-355.162	D	7.641	7.639	0.002	3.4	98.73	0	0	0	0.07	1.18
2003	255	23	328	360.427	-355.289	D	7.639	7.639	0	3.4	95.6	0	0	0	1.68	4.64
2003	256	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	257	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	258	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	259	23	930	366.19	-357.232	D	7.651	7.639	0.012	3.4	98.19	0	0	0	0.22	1.6
2003	260	23	949	365.722	-354.966	D	7.675	7.639	0.036	3.4	98.13	0.01	0	0	0.09	1.77
2003	261	23	1009	357.941	-354.82	D	7.639	7.639	0.001	3.4	93.29	0.01	0	0	0.34	6.35
2003	262	23	10	356.954	-355.443	D	7.639	7.639	0	3.4	78.03	0	0	0	0.76	5.66
2003	263	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	264	23	933	366.169	-356.524	D	7.721	7.639	0.082	3.4	96.86	0.01	0	0	0.19	2.94
2003	265	23	949	365.722	-354.966	D	7.689	7.639	0.05	3.4	98.73	0.02	0	0	0.04	1.21
2003	266	23	907	365.051	-359.809	D	7.639	7.639	0	3.4	98.67	0	0	0	0.02	1.02
2003	267	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	268	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	269	23	930	366.19	-357.232	D	7.639	7.639	0	3.4	96.8	0.01	0	0	0.11	3.35
2003	270	23	775	365.747	-357.551	D	7.639	7.639	0	3.4	92.69	0.01	0	0	0.08	8.34
2003	271	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	272	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2003	275	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	276	23	852	361.595	-362.148	D	7.5	7.5	0	3.1	99.12	0	0	0	0.08	0.86
2003	277	23	907	365.051	-359.809	D	7.5	7.5	0	3.1	98.57	0	0	0	0.03	1.32
2003	278	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	279	23	947	365.801	-355.162	D	7.526	7.5	0.027	3.1	97.8	0.01	0	0	0.3	1.9
2003	280	23	930	366.19	-357.232	D	8.019	7.5	**0.52**	3.1	98.13	0.01	0	0	0.2	1.66
2003	281	23	1017	356.894	-355.206	D	7.589	7.5	0.09	3.1	97.91	0.01	0	0	0.08	2
2003	282	23	1017	356.894	-355.206	D	7.504	7.5	0.005	3.1	98.85	0	0	0	0.04	1.16
2003	283	23	1017	356.894	-355.206	D	7.585	7.5	0.086	3.1	91.21	0.27	0	0	0.63	7.89
2003	284	23	1017	356.894	-355.206	D	7.5	7.5	0.001	3.1	94.76	0.45	0	0	0.05	4.87
2003	285	23	907	365.051	-359.809	D	7.514	7.5	0.014	3.1	98.6	0.04	0	0	0.01	1.37
2003	286	23	853	361.666	-362.175	D	7.503	7.5	0.004	3.1	98.97	0	0	0	0.02	1.07
2003	287	23	930	366.19	-357.232	D	7.504	7.5	0.004	3.1	98.96	0.01	0	0	0	1.03
2003	288	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	289	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	290	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	291	23	906	364.982	-359.812	D	7.5	7.5	0	3.1	94.58	0	0	0	0.01	0.23
2003	292	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	293	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	295	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	296	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	297	23	907	365.051	-359.809	D	7.532	7.5	0.032	3.1	84.87	0.05	0	0	1.12	13.97
2003	298	23	930	366.19	-357.232	D	7.511	7.5	0.012	3.1	97.95	0.01	0	0	0.01	2.04
2003	299	23	853	361.666	-362.175	D	7.5	7.5	0.001	3.1	97.61	0.02	0	0	0	2.32
2003	300	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	301	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	307	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	309	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	310	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	311	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	930	366.19	-357.232	D	7.523	7.5	0.024	3.1	94.46	0.07	0	0	0.27	5.21

Appendix M
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2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	315	23	747	364.871	-354.594	D	7.5	7.5	0.001	3.1	90.1	0.08	0	0	0.03	9.78
2003	316	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	318	23	595	363.624	-360.142	D	7.5	7.5	0	3.1	91.7	0.24	0	0	0.15	4.69
2003	319	23	930	366.19	-357.232	D	7.501	7.5	0.001	3.1	95.54	0.09	0	0	0.32	4.07
2003	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	931	366.183	-356.996	D	7.501	7.5	0.001	3.1	83.98	1.61	0	0	0.14	14.3
2003	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	332	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2003	336	23	907	365.051	-359.809	D	7.61	7.593	0.018	3.3	98.67	0.01	0	0	0.14	1.18
2003	337	23	949	365.722	-354.966	D	7.615	7.593	0.022	3.3	87.91	0.42	0	0	0.26	11.41
2003	338	23	955	364.92	-354.582	D	7.735	7.593	0.142	3.3	96.66	0.22	0	0	0.05	3.06
2003	339	23	608	363.481	-356.902	D	7.593	7.593	0	3.3	82.18	0.53	0	0	0.93	13.89
2003	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	341	23	933	366.169	-356.524	D	7.601	7.593	0.008	3.3	96.79	0.08	0	0	0.24	2.88
2003	342	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	96.1	0.09	0	0	0.02	3.2
2003	343	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	345	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	845	360.851	-362.181	D	7.614	7.593	0.022	3.3	99.17	0.01	0	0	0.07	0.75
2003	347	23	822	358.021	-361.607	D	7.712	7.593	0.119	3.3	97.2	0.1	0	0	0.28	2.42
2003	348	23	832	359.493	-362.061	D	7.906	7.593	0.313	3.3	98.69	0.07	0	0	0.05	1.2
2003	349	23	941	365.977	-355.774	D	7.643	7.593	0.05	3.3	98.91	0.06	0	0	0.01	1.02
2003	350	23	784	365.648	-355.309	D	7.593	7.593	0	3.3	75.36	0.1	0	0	0.01	2.6
2003	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	358	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	360	23	930	366.19	-357.232	D	7.593	7.593	0.001	3.3	98.27	0.02	0	0	0.28	1.45
2003	361	23	947	365.801	-355.162	D	7.594	7.593	0.001	3.3	97.81	0.06	0	0	0.09	2.07
2003	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.52							
INDEPENDENCE												**% of Modeled Extinction by Species**				
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2003	2	23	811	357.434	-360.225	D	7.552	7.546	0.006	3.2	89.78	9.81	0	0	0	0.41
2003	3	23	927	365.912	-357.454	D	7.819	7.546	0.273	3.2	71.11	27.62	0	0	0	1.27
2003	4	23	933	366.169	-356.524	D	7.547	7.546	0	3.2	83.35	16.12	0	0	0	0.53
2003	5	23	931	366.183	-356.996	D	7.598	7.546	0.052	3.2	60.54	37.22	0	0	0	2.25
2003	6	23	933	366.169	-356.524	D	7.563	7.546	0.017	3.2	75.16	23.58	0	0	0	1.26
2003	7	23	967	363.478	-354.116	D	7.553	7.546	0.007	3.2	89.56	10.14	0	0	0	0.32
2003	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	9	23	773	365.4	-355.32	D	7.564	7.546	0.018	3.2	75.47	23.17	0	0	0	1.36
2003	10	23	1041	356.936	-357.592	D	7.594	7.546	0.048	3.2	64.37	33.13	0	0	0	2.49
2003	11	23	1041	356.936	-357.592	D	7.615	7.546	0.069	3.2	67.11	31.03	0	0	0	1.87
2003	12	23	1017	356.894	-355.206	D	7.65	7.546	0.103	3.2	81.22	18.21	0	0	0	0.57
2003	13	23	949	365.722	-354.966	D	7.555	7.546	0.009	3.2	85.13	14.53	0	0	0	0.35
2003	14	23	1017	356.894	-355.206	D	7.795	7.546	0.249	3.2	80.77	18.55	0	0	0	0.68
2003	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	16	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	17	23	1017	356.894	-355.206	D	7.674	7.546	0.128	3.2	83.73	15.53	0	0	0	0.74
2003	18	23	949	365.722	-354.966	D	7.598	7.546	0.052	3.2	85.53	13.92	0	0	0	0.55
2003	19	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	21	23	930	366.19	-357.232	D	7.574	7.546	0.028	3.2	86.45	13.31	0	0	0	0.25
2003	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	23	23	811	357.434	-360.225	D	7.548	7.546	0.002	3.2	68.45	30.14	0	0	0	1.43
2003	24	23	1017	356.894	-355.206	D	7.589	7.546	0.043	3.2	85.6	14.03	0	0	0	0.38
2003	25	23	955	364.92	-354.582	D	7.565	7.546	0.019	3.2	86.42	13.32	0	0	0	0.26
2003	26	23	927	365.912	-357.454	D	7.581	7.546	0.035	3.2	59.51	38.35	0	0	0	2.15
2003	27	23	1017	356.894	-355.206	D	7.565	7.546	0.018	3.2	83.68	16	0	0	0	0.32
2003	28	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	29	23	1017	356.894	-355.206	D	7.59	7.546	0.044	3.2	88.2	11.57	0	0	0	0.23
2003	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	36	23	933	366.169	-356.524	D	7.475	7.406	0.07	2.9	82.7	16.5	0	0	0	0.8
2003	37	23	1008	358.048	-354.775	D	7.486	7.406	0.08	2.9	90.22	9.49	0	0	0	0.3
2003	38	23	930	366.19	-357.232	D	7.535	7.406	0.13	2.9	88.95	10.75	0	0	0	0.3
2003	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	43	23	78	358.239	-356.385	D	7.419	7.406	0.014	2.9	64.31	33.03	0	0	0	2.67
2003	44	23	822	358.021	-361.607	D	7.414	7.406	0.009	2.9	86.81	12.68	0	0	0	0.53
2003	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	46	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	47	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	48	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	49	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	50	23	1017	356.894	-355.206	D	7.407	7.406	0.001	2.9	91.16	8.46	0	0	0	0.41
2003	51	23	1039	356.522	-357.599	D	7.54	7.406	0.135	2.9	93.3	6.51	0	0	0	0.2
2003	52	23	1017	356.894	-355.206	D	7.419	7.406	0.013	2.9	97.23	2.65	0	0	0	0.14
2003	53	23	1039	356.522	-357.599	D	7.409	7.406	0.003	2.9	90.8	8.91	0	0	0	0.32
2003	54	23	822	358.021	-361.607	D	7.406	7.406	0.001	2.9	83.52	15.62	0	0	0	0.93
2003	55	23	1039	356.522	-357.599	D	7.522	7.406	0.117	2.9	88.62	10.94	0	0	0	0.44
2003	56	23	1039	356.522	-357.599	D	7.519	7.406	0.113	2.9	90.56	9.13	0	0	0	0.31
2003	57	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	58	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	59	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	60	23	1	356.546	-357.458	D	7.315	7.315	0	2.708	0	0	0	0	0	0
2003	61	23	811	357.434	-360.225	D	7.387	7.311	0.076	2.7	86.75	12.51	0	0	0	0.75

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	62	23	822	358.021	-361.607	D	7.654	7.311	0.343	2.7	92	7.69	0	0	0	0.31
2003	63	23	949	365.722	-354.966	D	7.313	7.311	0.002	2.7	95.07	4.77	0	0	0	0.18
2003	64	23	907	365.051	-359.809	D	7.396	7.311	0.086	2.7	92.2	7.58	0	0	0	0.22
2003	65	23	930	366.19	-357.232	D	7.322	7.311	0.011	2.7	93.69	6.2	0	0	0	0.12
2003	66	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	67	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	68	23	824	358.459	-361.601	D	7.327	7.311	0.016	2.7	89.48	9.73	0	0	0	0.79
2003	69	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	70	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	71	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	72	23	965	363.588	-354.142	D	7.668	7.311	0.358	2.7	96.9	2.83	0	0	0	0.27
2003	73	23	832	359.493	-362.061	D	7.388	7.311	0.078	2.7	98.13	1.7	0	0	0	0.17
2003	74	23	1035	356.477	-356.792	D	7.342	7.311	0.031	2.7	98.72	1.15	0	0	0	0.14
2003	75	23	1008	358.048	-354.775	D	7.313	7.311	0.002	2.7	99.64	0.23	0	0	0	0.12
2003	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	1035	356.477	-356.792	D	7.311	7.311	0	2.7	94.91	4.81	0	0	0	0.36
2003	80	23	824	358.459	-361.601	D	7.613	7.311	0.302	2.7	88.2	10.87	0	0	0	0.93
2003	81	23	907	365.051	-359.809	D	7.317	7.311	0.007	2.7	97.21	2.1	0	0	0	0.7
2003	82	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	1039	356.522	-357.599	D	7.339	7.311	0.028	2.7	96.14	3.52	0	0	0	0.34
2003	85	23	853	361.666	-362.175	D	7.317	7.311	0.007	2.7	95.86	3.96	0	0	0	0.18
2003	86	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	87	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	23	949	365.722	-354.966	D	7.315	7.311	0.004	2.7	73.7	24.56	0	0	0	1.73
2003	89	23	927	365.912	-357.454	D	7.444	7.311	0.133	2.7	71.32	27.05	0	0	0	1.63
2003	90	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	95	23	78	358.239	-356.385	D	7.381	7.311	0.07	2.7	72.35	25.97	0	0	0	1.68
2003	96	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	98	23	352	360.719	-356.275	D	7.655	7.311	0.344	2.7	77.73	21.04	0	0	0	1.24
2003	99	23	822	358.021	-361.607	D	7.315	7.311	0.004	2.7	85.84	13.49	0	0	0	0.67
2003	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	101	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	102	23	949	365.722	-354.966	D	7.318	7.311	0.007	2.7	99.48	0.15	0	0	0	0.4
2003	103	23	941	365.977	-355.774	D	7.319	7.311	0.008	2.7	99.67	0.08	0	0	0	0.26
2003	104	23	949	365.722	-354.966	D	7.313	7.311	0.002	2.7	99.67	0.13	0	0	0	0.19
2003	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	107	23	949	365.722	-354.966	D	7.338	7.311	0.027	2.7	97.63	2.07	0	0	0	0.31
2003	108	23	949	365.722	-354.966	D	7.408	7.311	0.098	2.7	97.25	2.5	0	0	0	0.25
2003	109	23	949	365.722	-354.966	D	7.313	7.311	0.003	2.7	99.7	0.18	0	0	0	0.11
2003	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	112	23	853	361.666	-362.175	D	7.326	7.311	0.015	2.7	84.64	13.93	0	0	0	1.44
2003	113	23	1039	356.522	-357.599	D	7.326	7.311	0.015	2.7	97.82	1.92	0	0	0	0.27
2003	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	115	23	822	358.021	-361.607	D	7.606	7.311	0.295	2.7	97.21	2.38	0	0	0	0.42
2003	116	23	832	359.493	-362.061	D	7.314	7.311	0.004	2.7	97.78	1.92	0	0	0	0.31
2003	117	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	118	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	119	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0
2003	122	23	949	365.722	-354.966	D	7.79	7.593	0.198	3.3	96.33	3.44	0	0	0	0.23
2003	123	23	832	359.493	-362.061	D	7.679	7.593	0.086	3.3	98.92	0.95	0	0	0	0.13
2003	124	23	1039	356.522	-357.599	D	7.641	7.593	0.049	3.3	99.74	0.18	0	0	0	0.07
2003	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	127	23	811	357.434	-360.225	D	7.654	7.593	0.062	3.3	97.69	2.03	0	0	0	0.28
2003	128	23	1039	356.522	-357.599	D	7.616	7.593	0.023	3.3	99.57	0.23	0	0	0	0.21
2003	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	136	23	964	363.678	-354.148	D	7.595	7.593	0.002	3.3	99.32	0.39	0	0	0	0.27
2003	137	23	967	363.478	-354.116	D	7.667	7.593	0.074	3.3	99.69	0.21	0	0	0	0.1
2003	138	23	1017	356.894	-355.206	D	7.658	7.593	0.065	3.3	99.31	0.6	0	0	0	0.09
2003	139	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	140	23	906	364.982	-359.812	D	7.627	7.593	0.035	3.3	97.05	2.82	0	0	0	0.13
2003	141	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	142	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	143	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	144	23	967	363.478	-354.116	D	7.615	7.593	0.022	3.3	98.83	0.98	0	0	0	0.19
2003	145	23	1017	356.894	-355.206	D	7.618	7.593	0.026	3.3	96.7	3.19	0	0	0	0.12
2003	146	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	147	23	986	360.908	-354.689	D	7.593	7.593	0	3.3	99.37	0.08	0	0	0	0.35
2003	148	23	949	365.722	-354.966	D	7.68	7.593	0.087	3.3	99.21	0.51	0	0	0	0.28
2003	149	23	1039	356.522	-357.599	D	7.704	7.593	0.111	3.3	96.69	2.48	0	0	0	0.83
2003	150	23	822	358.021	-361.607	D	7.679	7.593	0.086	3.3	99.44	0.27	0	0	0	0.3
2003	151	23	906	364.982	-359.812	D	7.607	7.593	0.014	3.3	84.88	11.79	0	0	0	3.33
2003	152	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	153	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	154	23	822	358.021	-361.607	D	7.608	7.593	0.015	3.3	83.39	15.99	0	0	0	0.62
2003	155	23	822	358.021	-361.607	D	7.621	7.593	0.028	3.3	96.19	3.52	0	0	0	0.29
2003	156	23	1039	356.522	-357.599	D	7.665	7.593	0.072	3.3	99.63	0.22	0	0	0	0.15
2003	157	23	1035	356.477	-356.792	D	7.593	7.593	0.001	3.3	99.81	0.1	0	0	0	0.14
2003	158	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	159	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	160	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	163	23	963	363.809	-354.192	D	7.593	7.593	0.001	3.3	96.49	3.41	0	0	0	0.13
2003	164	23	643	363.609	-354.151	D	7.595	7.593	0.003	3.3	99.4	0.44	0	0	0	0.11
2003	165	23	1017	356.894	-355.206	D	7.607	7.593	0.014	3.3	99.35	0.57	0	0	0	0.09
2003	166	23	822	358.021	-361.607	D	7.593	7.593	0.001	3.3	99.94	0.03	0	0	0	0.09
2003	167	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	168	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	169	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	170	23	1017	356.894	-355.206	D	7.782	7.593	0.189	3.3	99.72	0.07	0	0	0	0.21
2003	171	23	1035	356.477	-356.792	D	7.766	7.593	0.173	3.3	99.53	0.3	0	0	0	0.16
2003	172	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	177	23	845	360.851	-362.181	D	7.688	7.593	0.095	3.3	86.94	12.51	0	0	0	0.56
2003	178	23	1017	356.894	-355.206	D	7.688	7.593	0.095	3.3	97.6	1.79	0	0	0	0.61

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	179	23	933	366.169	-356.524	D	7.634	7.593	0.041	3.3	99.64	0.13	0	0	0	0.23
2003	180	23	1008	358.048	-354.775	D	7.597	7.593	0.005	3.3	99.81	0.05	0	0	0	0.17
2003	181	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	182	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	183	23	730	364.623	-354.605	D	7.593	7.593	0	3.3	99.33	0.25	0	0	0	0.1
2003	184	23	569	362.875	-354.433	D	7.593	7.593	0	3.3	99.6	0.06	0	0	0	0.09
2003	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	1017	356.894	-355.206	D	7.618	7.593	0.025	3.3	99.08	0.24	0	0	0	0.68
2003	193	23	907	365.051	-359.809	D	7.601	7.593	0.008	3.3	99.73	0.04	0	0	0	0.23
2003	194	23	930	366.19	-357.232	D	7.595	7.593	0.002	3.3	99.48	0.31	0	0	0	0.17
2003	195	23	930	366.19	-357.232	D	7.6	7.593	0.008	3.3	99.42	0.47	0	0	0	0.13
2003	196	23	785	365.637	-355.06	D	7.593	7.593	0.001	3.3	99.84	0.02	0	0	0	0.1
2003	197	23	949	365.722	-354.966	D	7.675	7.593	0.083	3.3	99.74	0.07	0	0	0	0.19
2003	198	23	930	366.19	-357.232	D	7.604	7.593	0.011	3.3	99.82	0.03	0	0	0	0.14
2003	199	23	907	365.051	-359.809	D	7.593	7.593	0.001	3.3	99.99	0.01	0	0	0	0.1
2003	200	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	201	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	202	23	961	364.092	-354.289	D	7.601	7.593	0.008	3.3	99.65	0.01	0	0	0	0.34
2003	203	23	822	358.021	-361.607	D	7.772	7.593	0.18	3.3	98.69	1	0	0	0	0.31
2003	204	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	205	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	206	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	207	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	949	365.722	-354.966	D	7.625	7.593	0.032	3.3	99.53	0.34	0	0	0	0.13
2003	211	23	949	365.722	-354.966	D	7.695	7.593	0.102	3.3	99.56	0.34	0	0	0	0.11
2003	212	23	907	365.051	-359.809	D	7.644	7.593	0.052	3.3	99.79	0.13	0	0	0	0.09
2003	213	23	907	365.051	-359.809	D	7.605	7.593	0.013	3.3	99.87	0.06	0	0	0	0.08
2003	214	23	930	366.19	-357.232	D	7.596	7.593	0.003	3.3	99.97	0.02	0	0	0	0.08
2003	215	23	964	363.678	-354.148	D	7.717	7.593	0.124	3.3	99.1	0.65	0	0	0	0.25
2003	216	23	949	365.722	-354.966	D	7.786	7.593	0.193	3.3	99.43	0.38	0	0	0	0.2
2003	217	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	99.65	0.15	0	0	0	0.12

Appendix M
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2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	218	23	1017	356.894	-355.206	D	7.649	7.593	0.057	3.3	99.68	0.15	0	0	0	0.17
2003	219	23	822	358.021	-361.607	D	7.648	7.593	0.055	3.3	99.79	0.08	0	0	0	0.12
2003	220	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	221	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	222	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	223	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	230	23	947	365.801	-355.162	D	7.614	7.593	0.022	3.3	99.76	0.02	0	0	0	0.23
2003	231	23	931	366.183	-356.996	D	7.697	7.593	0.105	3.3	99.74	0.11	0	0	0	0.15
2003	232	23	930	366.19	-357.232	D	7.686	7.593	0.094	3.3	99.76	0.13	0	0	0	0.11
2003	233	23	930	366.19	-357.232	D	7.662	7.593	0.07	3.3	99.72	0.18	0	0	0	0.1
2003	234	23	949	365.722	-354.966	D	7.703	7.593	0.111	3.3	99.71	0.07	0	0	0	0.21
2003	235	23	907	365.051	-359.809	D	7.718	7.593	0.125	3.3	99.75	0.09	0	0	0	0.16
2003	236	23	822	358.021	-361.607	D	7.621	7.593	0.028	3.3	99.58	0.28	0	0	0	0.15
2003	237	23	811	357.434	-360.225	D	7.625	7.593	0.033	3.3	99.81	0.07	0	0	0	0.12
2003	238	23	967	363.478	-354.116	D	7.609	7.593	0.017	3.3	99.87	0.03	0	0	0	0.11
2003	239	23	947	365.801	-355.162	D	7.596	7.593	0.004	3.3	99.87	0.04	0	0	0	0.1
2003	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	242	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	99.29	0.59	0	0	0	0.13
2003	243	23	62	357.925	-354.901	D	7.593	7.593	0	3.3	98.98	0.7	0	0	0	0.1
2003	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	245	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	246	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	247	23	1035	356.477	-356.792	D	7.73	7.639	0.091	3.4	99.03	0.78	0	0	0	0.19
2003	248	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	249	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	254	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	255	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	256	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	257	23	822	358.021	-361.607	D	7.842	7.639	0.203	3.4	93.14	6.11	0	0	0	0.75
2003	258	23	907	365.051	-359.809	D	7.718	7.639	0.08	3.4	98.75	0.82	0	0	0	0.43
2003	259	23	853	361.666	-362.175	D	7.658	7.639	0.019	3.4	99.38	0.36	0	0	0	0.26
2003	260	23	949	365.722	-354.966	D	7.645	7.639	0.007	3.4	99.43	0.38	0	0	0	0.2
2003	261	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	262	23	1035	356.477	-356.792	D	7.681	7.639	0.042	3.4	89.93	9.43	0	0	0	0.64
2003	263	23	1039	356.522	-357.599	D	7.651	7.639	0.012	3.4	98.96	0.69	0	0	0	0.35
2003	264	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	265	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	266	23	864	361.875	-360.901	D	7.72	7.639	0.081	3.4	91.76	6.51	0	0	0	1.73
2003	267	23	930	366.19	-357.232	D	7.643	7.639	0.005	3.4	99.41	0.34	0	0	0	0.25
2003	268	23	1017	356.894	-355.206	D	7.656	7.639	0.017	3.4	96.83	2.64	0	0	0	0.53
2003	269	23	907	365.051	-359.809	D	7.674	7.639	0.035	3.4	99.35	0.47	0	0	0	0.19
2003	270	23	961	364.092	-354.289	D	7.66	7.639	0.021	3.4	93.12	6.14	0	0	0	0.74
2003	271	23	949	365.722	-354.966	D	7.663	7.639	0.024	3.4	94.84	3.95	0	0	0	1.21
2003	272	23	949	365.722	-354.966	D	7.647	7.639	0.008	3.4	92.16	6.84	0	0	0	0.99
2003	273	23	967	363.478	-354.116	D	7.795	7.639	0.156	3.4	94.45	5.26	0	0	0	0.29
2003	274	23	949	365.722	-354.966	D	7.623	7.505	0.118	3.112	95.62	4.18	0	0	0	0.2
2003	275	23	907	365.051	-359.809	D	7.577	7.5	0.077	3.1	96.12	3.49	0	0	0	0.39
2003	276	23	1017	356.894	-355.206	D	7.535	7.5	0.036	3.1	98.19	1.57	0	0	0	0.25
2003	277	23	869	361.064	-360.714	D	7.599	7.5	0.1	3.1	90.03	8.8	0	0	0	1.18
2003	278	23	1008	358.048	-354.775	D	7.516	7.5	0.017	3.1	98.49	1.13	0	0	0	0.38
2003	279	23	1009	357.941	-354.82	D	7.515	7.5	0.016	3.1	98.26	1.52	0	0	0	0.22
2003	280	23	949	365.722	-354.966	D	7.508	7.5	0.008	3.1	99.63	0.23	0	0	0	0.17
2003	281	23	949	365.722	-354.966	D	7.502	7.5	0.002	3.1	99.78	0.15	0	0	0	0.13
2003	282	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	986	360.908	-354.689	D	7.514	7.5	0.014	3.1	88.19	10.63	0	0	0	1.18
2003	286	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	287	23	784	365.648	-355.309	D	7.519	7.5	0.02	3.1	79.78	18.71	0	0	0	1.52
2003	288	23	907	365.051	-359.809	D	7.531	7.5	0.032	3.1	90.95	7.74	0	0	0	1.32
2003	289	23	933	366.169	-356.524	D	7.504	7.5	0.005	3.1	98.92	0.75	0	0	0	0.33
2003	290	23	933	366.169	-356.524	D	7.525	7.5	0.025	3.1	95.3	4.59	0	0	0	0.11
2003	291	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	292	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	293	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	294	23	822	358.021	-361.607	D	7.559	7.5	0.059	3.1	97.63	1.28	0	0	0	1.1
2003	295	23	822	358.021	-361.607	D	7.783	7.5	0.284	3.1	96.88	2.34	0	0	0	0.78

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	296	23	949	365.722	-354.966	D	7.539	7.5	0.04	3.1	99.07	0.22	0	0	0	0.71
2003	297	23	930	366.19	-357.232	D	7.598	7.5	0.098	3.1	98.6	1.01	0	0	0	0.4
2003	298	23	833	359.603	-362.066	D	7.631	7.5	0.131	3.1	94.67	4.91	0	0	0	0.42
2003	299	23	754	365.229	-357.075	D	7.718	7.5	0.218	3.1	72.27	26.53	0	0	0	1.2
2003	300	23	930	366.19	-357.232	D	7.521	7.5	0.021	3.1	93.11	6.44	0	0	0	0.45
2003	301	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1017	356.894	-355.206	D	7.528	7.5	0.029	3.1	97.41	2.06	0	0	0	0.54
2003	305	23	1017	356.894	-355.206	D	7.749	7.5	0.25	3.1	95.25	4.41	0	0	0	0.34
2003	306	23	1008	358.048	-354.775	D	7.5	7.5	0.001	3.1	96.51	3.3	0	0	0	0.21
2003	307	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	309	23	907	365.051	-359.809	D	7.616	7.5	0.116	3.1	90.21	9.24	0	0	0	0.55
2003	310	23	832	359.493	-362.061	D	7.572	7.5	0.073	3.1	94.16	5.7	0	0	0	0.14
2003	311	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	23	949	365.722	-354.966	D	7.594	7.5	0.095	3.1	83.13	15.42	0	0	0	1.45
2003	318	23	930	366.19	-357.232	D	7.624	7.5	0.125	3.1	87.47	11.86	0	0	0	0.67
2003	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1039	356.522	-357.599	D	7.514	7.5	0.014	3.1	93.34	6.45	0	0	0	0.21
2003	323	23	78	358.239	-356.385	D	7.55	7.5	0.05	3.1	67.71	29.33	0	0	0	2.96
2003	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1008	358.048	-354.775	D	7.5	7.5	0.001	3.1	86.99	12.89	0	0	0	0.2
2003	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	1035	356.477	-356.792	D	7.533	7.5	0.034	3.1	83.3	16.05	0	0	0	0.65
2003	332	23	824	358.459	-361.601	D	7.549	7.5	0.049	3.1	61.51	35.65	0	0	0	2.84
2003	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	335	23	822	358.021	-361.607	D	7.615	7.589	0.026	3.292	84.23	14.67	0	0	0	1.1
2003	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	1010	357.824	-354.865	D	7.852	7.593	0.26	3.3	88.34	11.27	0	0	0	0.39
2003	339	23	947	365.801	-355.162	D	7.659	7.593	0.066	3.3	90.73	8.93	0	0	0	0.34
2003	340	23	102	358.487	-356.374	D	7.708	7.593	0.116	3.3	88.14	11.13	0	0	0	0.72
2003	341	23	1035	356.477	-356.792	D	7.593	7.593	0	3.3	87.18	12.97	0	0	0	0.34
2003	342	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	833	359.603	-362.066	D	7.65	7.593	0.057	3.3	71.74	26.73	0	0	0	1.52
2003	345	23	409	361.694	-361.475	D	7.705	7.593	0.112	3.3	64.94	33.32	0	0	0	1.74
2003	346	23	822	358.021	-361.607	D	7.666	7.593	0.073	3.3	84.17	15.41	0	0	0	0.42
2003	347	23	1017	356.894	-355.206	D	7.593	7.593	0	3.3	89.71	10.25	0	0	0	0.22
2003	348	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	349	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	927	365.912	-357.454	D	7.616	7.593	0.023	3.3	79.45	19.64	0	0	0	0.91
2003	355	23	932	366.176	-356.761	D	7.599	7.593	0.007	3.3	88.75	10.93	0	0	0	0.32
2003	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	949	365.722	-354.966	D	7.798	7.593	0.205	3.3	91.14	8.46	0	0	0	0.41
2003	358	23	947	365.801	-355.162	D	7.912	7.593	0.319	3.3	89.21	10.36	0	0	0	0.43
2003	359	23	832	359.493	-362.061	D	7.631	7.593	0.038	3.3	88.58	11.08	0	0	0	0.34
2003	360	23	949	365.722	-354.966	D	7.596	7.593	0.003	3.3	89.72	10.12	0	0	0	0.2
2003	361	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.358							
MARSHALL											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2003	2	23	941	365.977	-355.774	D	7.602	7.546	0.055	3.2	78.19	21.09	0	0	0	0.73
2003	3	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	6	23	990	360.933	-355.487	D	7.759	7.546	0.213	3.2	60.97	37.78	0	0	0	1.24
2003	7	23	1039	356.522	-357.599	D	7.684	7.546	0.137	3.2	80.89	18.67	0	0	0	0.44
2003	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	9	23	1017	356.894	-355.206	D	7.568	7.546	0.022	3.2	73.65	24.88	0	0	0	1.47
2003	10	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	11	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	12	23	930	366.19	-357.232	D	7.56	7.546	0.013	3.2	69.48	29.87	0	0	0	0.65
2003	13	23	907	365.051	-359.809	D	7.548	7.546	0.002	3.2	73.15	26.43	0	0	0	0.45
2003	14	23	947	365.801	-355.162	D	7.565	7.546	0.019	3.2	73.09	26.2	0	0	0	0.71
2003	15	23	853	361.666	-362.175	D	7.608	7.546	0.062	3.2	63.99	35.13	0	0	0	0.88
2003	16	23	1039	356.522	-357.599	D	7.602	7.546	0.056	3.2	84.16	15.4	0	0	0	0.44
2003	17	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	18	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	19	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	21	23	966	363.538	-354.124	D	7.568	7.546	0.022	3.2	72.22	27.44	0	0	0	0.35
2003	22	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	23	23	1038	356.511	-357.396	D	7.614	7.546	0.067	3.2	79.12	20.37	0	0	0	0.51
2003	24	23	930	366.19	-357.232	D	7.615	7.546	0.069	3.2	76.46	23.08	0	0	0	0.47
2003	25	23	930	366.19	-357.232	D	7.553	7.546	0.007	3.2	78.39	21.34	0	0	0	0.28
2003	26	23	949	365.722	-354.966	D	7.664	7.546	0.118	3.2	64.45	34.58	0	0	0	0.97
2003	27	23	833	359.603	-362.066	D	7.668	7.546	0.121	3.2	72.34	27.16	0	0	0	0.5
2003	28	23	947	365.801	-355.162	D	7.546	7.546	0	3.2	77.94	21.91	0	0	0	0.11
2003	29	23	1035	356.477	-356.792	D	7.671	7.546	0.125	3.2	81.26	18.42	0	0	0	0.32
2003	30	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	34	23	1008	358.048	-354.775	D	7.424	7.406	0.019	2.9	84.76	14.99	0	0	0	0.26
2003	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	36	23	958	364.309	-354.601	D	7.418	7.406	0.012	2.9	62.53	36.26	0	0	0	1.23
2003	37	23	955	364.92	-354.582	D	7.457	7.406	0.051	2.9	78.74	20.9	0	0	0	0.36
2003	38	23	930	366.19	-357.232	D	7.48	7.406	0.074	2.9	62.32	36.35	0	0	0	1.33
2003	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	42	23	967	363.478	-354.116	D	7.424	7.406	0.019	2.9	74.18	24.74	0	0	0	1.1

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	43	23	933	366.169	-356.524	D	7.437	7.406	0.032	2.9	56.74	41.27	0	0	0	1.99
2003	44	23	907	365.051	-359.809	D	7.408	7.406	0.003	2.9	78.82	20.49	0	0	0	0.71
2003	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	46	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	47	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	48	23	10	356.954	-355.443	D	7.406	7.406	0	2.9	82.99	18.09	0	0	0	0.51
2003	49	23	955	364.92	-354.582	D	7.466	7.406	0.06	2.9	86.14	13.56	0	0	0	0.3
2003	50	23	1017	356.894	-355.206	D	7.434	7.406	0.029	2.9	90.08	9.72	0	0	0	0.21
2003	51	23	1017	356.894	-355.206	D	7.479	7.406	0.074	2.9	83.69	16.01	0	0	0	0.31
2003	52	23	1017	356.894	-355.206	D	7.411	7.406	0.005	2.9	93.16	6.69	0	0	0	0.19
2003	53	23	1039	356.522	-357.599	D	7.476	7.406	0.071	2.9	85.25	14.17	0	0	0	0.58
2003	54	23	930	366.19	-357.232	D	7.435	7.406	0.03	2.9	57.2	41.07	0	0	0	1.73
2003	55	23	822	358.021	-361.607	D	7.422	7.406	0.016	2.9	72.4	26.73	0	0	0	0.87
2003	56	23	836	360.07	-362.066	D	7.468	7.406	0.062	2.9	74.13	25.19	0	0	0	0.68
2003	57	23	1035	356.477	-356.792	D	7.465	7.406	0.059	2.9	86.14	13.6	0	0	0	0.27
2003	58	23	1035	356.477	-356.792	D	7.43	7.406	0.024	2.9	89.95	9.87	0	0	0	0.19
2003	59	23	1039	356.522	-357.599	D	7.424	7.406	0.019	2.9	92.08	7.79	0	0	0	0.14
2003	60	23	1017	356.894	-355.206	D	7.407	7.315	0.093	2.708	92.06	7.76	0	0	0	0.18
2003	61	23	949	365.722	-354.966	D	7.517	7.311	0.206	2.7	92.68	7.17	0	0	0	0.15
2003	62	23	907	365.051	-359.809	D	7.315	7.311	0.004	2.7	94.69	5.14	0	0	0	0.2
2003	63	23	930	366.19	-357.232	D	7.315	7.311	0.005	2.7	92.26	7.5	0	0	0	0.25
2003	64	23	1039	356.522	-357.599	D	7.618	7.311	0.307	2.7	79.88	19.62	0	0	0	0.5
2003	65	23	822	358.021	-361.607	D	7.616	7.311	0.306	2.7	84.14	15.39	0	0	0	0.47
2003	66	23	907	365.051	-359.809	D	7.341	7.311	0.03	2.7	90.09	9.66	0	0	0	0.26
2003	67	23	933	366.169	-356.524	D	7.311	7.311	0	2.7	96.96	2.6	0	0	0	0.18
2003	68	23	933	366.169	-356.524	D	7.335	7.311	0.025	2.7	75.69	23.73	0	0	0	0.57
2003	69	23	1008	358.048	-354.775	D	7.315	7.311	0.004	2.7	59.41	39.32	0	0	0	1.29
2003	70	23	1017	356.894	-355.206	D	7.314	7.311	0.003	2.7	85.06	14.65	0	0	0	0.42
2003	71	23	1008	358.048	-354.775	D	7.311	7.311	0	2.7	92.13	7.49	0	0	0	0.24
2003	72	23	118	358.856	-359.103	D	7.542	7.311	0.231	2.7	85.13	14.13	0	0	0	0.75
2003	73	23	853	361.666	-362.175	D	7.325	7.311	0.015	2.7	95.01	4.78	0	0	0	0.23
2003	74	23	1017	356.894	-355.206	D	7.32	7.311	0.009	2.7	95.58	4.22	0	0	0	0.23
2003	75	23	62	357.925	-354.901	D	7.311	7.311	0	2.7	99.21	0.64	0	0	0	0.19
2003	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	822	358.021	-361.607	D	7.412	7.311	0.101	2.7	90.85	8.87	0	0	0	0.29
2003	80	23	907	365.051	-359.809	D	7.393	7.311	0.082	2.7	90.91	8.77	0	0	0	0.32
2003	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	82	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	1008	358.048	-354.775	D	7.422	7.311	0.112	2.7	86.18	13	0	0	0	0.83
2003	85	23	907	365.051	-359.809	D	7.32	7.311	0.01	2.7	91.7	8.02	0	0	0	0.27
2003	86	23	785	365.637	-355.06	D	7.311	7.311	0	2.7	103.98	1.24	0	0	0	0.2
2003	87	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	90	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	95	23	949	365.722	-354.966	D	7.316	7.311	0.006	2.7	97.02	2.39	0	0	0	0.59
2003	96	23	964	363.678	-354.148	D	7.336	7.311	0.025	2.7	93.47	6.16	0	0	0	0.38
2003	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	98	23	947	365.801	-355.162	D	7.331	7.311	0.021	2.7	88.1	11.7	0	0	0	0.21
2003	99	23	930	366.19	-357.232	D	7.374	7.311	0.064	2.7	65.52	33.48	0	0	0	1.01
2003	100	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	101	23	1035	356.477	-356.792	D	7.341	7.311	0.03	2.7	97.87	1.77	0	0	0	0.37
2003	102	23	832	359.493	-362.061	D	7.343	7.311	0.033	2.7	99.02	0.7	0	0	0	0.28
2003	103	23	907	365.051	-359.809	D	7.32	7.311	0.009	2.7	99.56	0.2	0	0	0	0.25
2003	104	23	933	366.169	-356.524	D	7.316	7.311	0.005	2.7	99.47	0.31	0	0	0	0.23
2003	105	23	475	361.905	-354.975	D	7.311	7.311	0	2.7	96.44	0.06	0	0	0	0.18
2003	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	107	23	822	358.021	-361.607	D	7.328	7.311	0.017	2.7	87.73	12	0	0	0	0.27
2003	108	23	933	366.169	-356.524	D	7.313	7.311	0.002	2.7	99.69	0.12	0	0	0	0.23
2003	109	23	949	365.722	-354.966	D	7.312	7.311	0.001	2.7	99.55	0.34	0	0	0	0.16
2003	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	112	23	824	358.459	-361.601	D	7.315	7.311	0.004	2.7	69.66	28.15	0	0	0	2.21
2003	113	23	822	358.021	-361.607	D	7.319	7.311	0.009	2.7	95.31	4.28	0	0	0	0.42
2003	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	115	23	955	364.92	-354.582	D	7.36	7.311	0.049	2.7	93.22	6.24	0	0	0	0.55
2003	116	23	949	365.722	-354.966	D	7.454	7.311	0.143	2.7	91.96	7.55	0	0	0	0.49
2003	117	23	1017	356.894	-355.206	D	7.314	7.311	0.003	2.7	98.2	1.6	0	0	0	0.27
2003	118	23	62	357.925	-354.901	D	7.311	7.311	0	2.7	100.64	0.17	0	0	0	0.22
2003	119	23	618	363.371	-354.411	D	7.311	7.311	0	2.7	100.42	0.57	0	0	0	0.18
2003	120	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	121	23	1017	356.894	-355.206	D	7.581	7.581	0	3.275	98.43	1.06	0	0	0	0.25
2003	122	23	1035	356.477	-356.792	D	7.834	7.593	0.242	3.3	95.99	3.55	0	0	0	0.47
2003	123	23	822	358.021	-361.607	D	7.718	7.593	0.126	3.3	97.01	2.74	0	0	0	0.25
2003	124	23	832	359.493	-362.061	D	7.636	7.593	0.043	3.3	99.38	0.53	0	0	0	0.1
2003	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	127	23	964	363.678	-354.148	D	7.674	7.593	0.081	3.3	96.72	3	0	0	0	0.28
2003	128	23	949	365.722	-354.966	D	7.616	7.593	0.024	3.3	99.25	0.55	0	0	0	0.2
2003	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	137	23	967	363.478	-354.116	D	7.626	7.593	0.034	3.3	99.4	0.47	0	0	0	0.14
2003	138	23	1036	356.488	-356.993	D	7.67	7.593	0.077	3.3	97.67	2.21	0	0	0	0.12
2003	139	23	1035	356.477	-356.792	D	7.618	7.593	0.026	3.3	98.4	1.49	0	0	0	0.11
2003	140	23	1035	356.477	-356.792	D	7.675	7.593	0.083	3.3	84.7	14.69	0	0	0	0.61
2003	141	23	905	364.788	-359.816	D	7.593	7.593	0.001	3.3	98.11	1.77	0	0	0	0.07
2003	142	23	1017	356.894	-355.206	D	7.593	7.593	0.001	3.3	97.66	1.84	0	0	0	0.38
2003	143	23	1017	356.894	-355.206	D	7.62	7.593	0.028	3.3	99.3	0.4	0	0	0	0.3
2003	144	23	1008	358.048	-354.775	D	7.743	7.593	0.151	3.3	98.56	1.19	0	0	0	0.24
2003	145	23	1017	356.894	-355.206	D	7.841	7.593	0.248	3.3	96.68	3.16	0	0	0	0.16
2003	146	23	822	358.021	-361.607	D	7.607	7.593	0.015	3.3	99.62	0.25	0	0	0	0.13
2003	147	23	966	363.538	-354.124	D	7.599	7.593	0.006	3.3	99.28	0.19	0	0	0	0.53
2003	148	23	1035	356.477	-356.792	D	7.686	7.593	0.093	3.3	99.16	0.58	0	0	0	0.26
2003	149	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	99.68	0.06	0	0	0	0.2
2003	150	23	947	365.801	-355.162	D	7.631	7.593	0.038	3.3	98.52	1.05	0	0	0	0.42
2003	151	23	822	358.021	-361.607	D	7.615	7.593	0.023	3.3	98.66	0.73	0	0	0	0.61
2003	152	23	2	356.535	-357.209	D	7.593	7.593	0	3.3	99.97	0.2	0	0	0	0.2
2003	153	23	1018	356.892	-355.39	D	7.594	7.593	0.001	3.3	99.19	0.69	0	0	0	0.11
2003	154	23	949	365.722	-354.966	D	7.932	7.593	0.339	3.3	89.09	10.45	0	0	0	0.46
2003	155	23	1035	356.477	-356.792	D	7.895	7.593	0.302	3.3	94.57	5.05	0	0	0	0.38
2003	156	23	1017	356.894	-355.206	D	7.815	7.593	0.222	3.3	99.16	0.58	0	0	0	0.25
2003	157	23	1008	358.048	-354.775	D	7.62	7.593	0.028	3.3	98.55	1.26	0	0	0	0.19
2003	158	23	949	365.722	-354.966	D	7.599	7.593	0.006	3.3	98.49	1.39	0	0	0	0.15
2003	159	23	930	366.19	-357.232	D	7.594	7.593	0.001	3.3	99.75	0.09	0	0	0	0.12

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	160	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	163	23	964	363.678	-354.148	D	7.599	7.593	0.007	3.3	93.01	6.81	0	0	0	0.19
2003	164	23	1017	356.894	-355.206	D	7.612	7.593	0.019	3.3	99.36	0.48	0	0	0	0.16
2003	165	23	1017	356.894	-355.206	D	7.626	7.593	0.034	3.3	99.24	0.63	0	0	0	0.15
2003	166	23	907	365.051	-359.809	D	7.595	7.593	0.003	3.3	98.96	0.93	0	0	0	0.12
2003	167	23	906	364.982	-359.812	D	7.596	7.593	0.004	3.3	99.37	0.54	0	0	0	0.11
2003	168	23	191	359.732	-362.061	D	7.595	7.593	0.002	3.3	98.79	1.13	0	0	0	0.11
2003	169	23	44	358.21	-361.379	D	7.593	7.593	0.001	3.3	99.57	0.42	0	0	0	0.09
2003	170	23	949	365.722	-354.966	D	7.695	7.593	0.102	3.3	99.59	0.15	0	0	0	0.26
2003	171	23	822	358.021	-361.607	D	7.967	7.593	0.374	3.3	95.92	3.9	0	0	0	0.19
2003	172	23	1035	356.477	-356.792	D	7.601	7.593	0.008	3.3	99.64	0.22	0	0	0	0.14
2003	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	177	23	947	365.801	-355.162	D	7.594	7.593	0.001	3.3	99.43	0.19	0	0	0	0.39
2003	178	23	930	366.19	-357.232	D	7.606	7.593	0.014	3.3	98.22	1.26	0	0	0	0.53
2003	179	23	853	361.666	-362.175	D	7.6	7.593	0.008	3.3	99.44	0.29	0	0	0	0.28
2003	180	23	1017	356.894	-355.206	D	7.603	7.593	0.01	3.3	99.6	0.18	0	0	0	0.21
2003	181	23	1017	356.894	-355.206	D	7.595	7.593	0.002	3.3	99.3	0.54	0	0	0	0.17
2003	182	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	99.75	0.32	0	0	0	0.14
2003	183	23	643	363.609	-354.151	D	7.593	7.593	0.001	3.3	99.3	0.54	0	0	0	0.14
2003	184	23	747	364.871	-354.594	D	7.593	7.593	0	3.3	100.16	0.13	0	0	0	0.14
2003	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	193	23	356	361.22	-361.995	D	7.593	7.593	0	3.3	98.83	0.13	0	0	0	0.33
2003	194	23	967	363.478	-354.116	D	7.725	7.593	0.132	3.3	99	0.71	0	0	0	0.29
2003	195	23	955	364.92	-354.582	D	7.696	7.593	0.103	3.3	99.17	0.63	0	0	0	0.2
2003	196	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	99.91	0.03	0	0	0	0.15
2003	197	23	949	365.722	-354.966	D	7.606	7.593	0.013	3.3	99.06	0.49	0	0	0	0.46
2003	198	23	907	365.051	-359.809	D	7.599	7.593	0.007	3.3	99.61	0.13	0	0	0	0.27

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	199	23	906	364.982	-359.812	D	7.593	7.593	0	3.3	99.53	0.01	0	0	0	0.21
2003	200	23	543	362.627	-354.444	D	7.593	7.593	0	3.3	94.14	2.36	0	0	0	0.18
2003	201	23	933	366.169	-356.524	D	7.594	7.593	0.001	3.3	99.05	0.83	0	0	0	0.13
2003	202	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	99.18	0.53	0	0	0	0.14
2003	203	23	949	365.722	-354.966	D	7.636	7.593	0.044	3.3	98.2	1	0	0	0	0.8
2003	204	23	933	366.169	-356.524	D	7.638	7.593	0.046	3.3	99.01	0.48	0	0	0	0.52
2003	205	23	1039	356.522	-357.599	D	7.604	7.593	0.011	3.3	99.57	0.1	0	0	0	0.34
2003	206	23	1017	356.894	-355.206	D	7.602	7.593	0.01	3.3	99.58	0.19	0	0	0	0.25
2003	207	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	966	363.538	-354.124	D	7.745	7.593	0.152	3.3	94.32	5.45	0	0	0	0.23
2003	211	23	907	365.051	-359.809	D	7.741	7.593	0.149	3.3	98.48	1.37	0	0	0	0.15
2003	212	23	907	365.051	-359.809	D	7.681	7.593	0.088	3.3	99.36	0.5	0	0	0	0.14
2003	213	23	930	366.19	-357.232	D	7.641	7.593	0.048	3.3	99.48	0.37	0	0	0	0.15
2003	214	23	930	366.19	-357.232	D	7.597	7.593	0.004	3.3	99.86	0.05	0	0	0	0.11
2003	215	23	955	364.92	-354.582	D	7.595	7.593	0.002	3.3	99.13	0.41	0	0	0	0.44
2003	216	23	949	365.722	-354.966	D	7.596	7.593	0.003	3.3	98.06	1.58	0	0	0	0.37
2003	217	23	949	365.722	-354.966	D	7.618	7.593	0.026	3.3	98.42	1.25	0	0	0	0.33
2003	218	23	933	366.169	-356.524	D	7.662	7.593	0.07	3.3	97.49	2.28	0	0	0	0.23
2003	219	23	822	358.021	-361.607	D	7.601	7.593	0.009	3.3	99.61	0.18	0	0	0	0.21
2003	220	23	2	356.535	-357.209	D	7.593	7.593	0	3.3	87.13	4.8	0	0	0	1.12
2003	221	23	2	356.535	-357.209	D	7.593	7.593	0	3.3	99.33	0.08	0	0	0	0.46
2003	222	23	1036	356.488	-356.993	D	7.593	7.593	0.001	3.3	99.51	0.16	0	0	0	0.36
2003	223	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	100.02	0.38	0	0	0	0.17
2003	224	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	230	23	931	366.183	-356.996	D	7.6	7.593	0.007	3.3	99.65	0.05	0	0	0	0.32
2003	231	23	930	366.19	-357.232	D	7.622	7.593	0.03	3.3	99.57	0.22	0	0	0	0.21
2003	232	23	930	366.19	-357.232	D	7.615	7.593	0.022	3.3	99.53	0.32	0	0	0	0.16
2003	233	23	930	366.19	-357.232	D	7.606	7.593	0.014	3.3	99.57	0.32	0	0	0	0.14
2003	234	23	964	363.678	-354.148	D	7.616	7.593	0.023	3.3	99.61	0.1	0	0	0	0.29
2003	235	23	1017	356.894	-355.206	D	7.758	7.593	0.165	3.3	99.51	0.16	0	0	0	0.33
2003	236	23	822	358.021	-361.607	D	7.656	7.593	0.064	3.3	98.83	0.93	0	0	0	0.24
2003	237	23	1017	356.894	-355.206	D	7.665	7.593	0.073	3.3	99.68	0.12	0	0	0	0.2

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	238	23	966	363.538	-354.124	D	7.605	7.593	0.013	3.3	99.8	0.03	0	0	0	0.17
2003	239	23	947	365.801	-355.162	D	7.593	7.593	0.001	3.3	99.94	0.07	0	0	0	0.13
2003	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	242	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	99.11	0.93	0	0	0	0.18
2003	243	23	966	363.538	-354.124	D	7.593	7.593	0.001	3.3	97.92	1.89	0	0	0	0.14
2003	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	245	23	1035	356.477	-356.792	D	7.639	7.639	0	3.4	95.68	4.05	0	0	0	0.19
2003	246	23	44	358.21	-361.379	D	7.639	7.639	0	3.4	97.26	2.38	0	0	0	0.15
2003	247	23	930	366.19	-357.232	D	8.041	7.639	0.402	3.4	94.64	4.96	0	0	0	0.4
2003	248	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	249	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	254	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	255	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	256	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	257	23	823	358.24	-361.604	D	7.824	7.639	0.185	3.4	88.15	11.44	0	0	0	0.41
2003	258	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	259	23	907	365.051	-359.809	D	7.644	7.639	0.005	3.4	99.22	0.47	0	0	0	0.33
2003	260	23	947	365.801	-355.162	D	7.648	7.639	0.009	3.4	98.99	0.74	0	0	0	0.26
2003	261	23	643	363.609	-354.151	D	7.639	7.639	0	3.4	99.3	0.37	0	0	0	0.18
2003	262	23	930	366.19	-357.232	D	7.639	7.639	0	3.4	95.17	5.36	0	0	0	0.85
2003	263	23	966	363.538	-354.124	D	7.791	7.639	0.152	3.4	96.15	3.49	0	0	0	0.36
2003	264	23	1017	356.894	-355.206	D	7.648	7.639	0.009	3.4	99.35	0.39	0	0	0	0.25
2003	265	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	266	23	949	365.722	-354.966	D	7.639	7.639	0	3.4	96.56	2.58	0	0	0	1.23
2003	267	23	710	364.843	-359.589	D	7.639	7.639	0	3.4	89.99	1.17	0	0	0	0.36
2003	268	23	930	366.19	-357.232	D	7.652	7.639	0.014	3.4	91.33	7.24	0	0	0	1.43
2003	269	23	907	365.051	-359.809	D	7.655	7.639	0.016	3.4	98.33	1.4	0	0	0	0.27
2003	270	23	197	359.666	-360.566	D	7.652	7.639	0.013	3.4	82.42	15.83	0	0	0	1.75
2003	271	23	933	366.169	-356.524	D	7.661	7.639	0.022	3.4	65.95	31.36	0	0	0	2.7
2003	272	23	1017	356.894	-355.206	D	7.644	7.639	0.005	3.4	66.22	31.82	0	0	0	1.97
2003	273	23	949	365.722	-354.966	D	7.648	7.639	0.009	3.4	93.01	6.48	0	0	0	0.51
2003	274	23	1035	356.477	-356.792	D	7.599	7.505	0.094	3.112	80.78	18.8	0	0	0	0.42
2003	275	23	907	365.051	-359.809	D	7.506	7.5	0.006	3.1	79.26	19.64	0	0	0	1.11
2003	276	23	1017	356.894	-355.206	D	7.52	7.5	0.02	3.1	95.08	4.57	0	0	0	0.36

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	277	23	949	365.722	-354.966	D	7.534	7.5	0.034	3.1	97.43	1.75	0	0	0	0.84
2003	278	23	930	366.19	-357.232	D	7.6	7.5	0.1	3.1	98.17	1.33	0	0	0	0.5
2003	279	23	832	359.493	-362.061	D	7.577	7.5	0.078	3.1	96.17	3.52	0	0	0	0.31
2003	280	23	811	357.434	-360.225	D	7.524	7.5	0.025	3.1	98.94	0.83	0	0	0	0.24
2003	281	23	1017	356.894	-355.206	D	7.507	7.5	0.008	3.1	99.02	0.82	0	0	0	0.19
2003	282	23	1016	357.1	-355.198	D	7.5	7.5	0	3.1	99.56	0.36	0	0	0	0.19
2003	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	1039	356.522	-357.599	D	7.534	7.5	0.034	3.1	68.97	28.71	0	0	0	2.32
2003	286	23	1039	356.522	-357.599	D	7.52	7.5	0.02	3.1	98.12	1.52	0	0	0	0.36
2003	287	23	1008	358.048	-354.775	D	7.542	7.5	0.042	3.1	87.53	12.28	0	0	0	0.19
2003	288	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	97.92	1.89	0	0	0	0.82
2003	289	23	930	366.19	-357.232	D	7.5	7.5	0	3.1	97.54	1.43	0	0	0	0.51
2003	290	23	932	366.176	-356.761	D	7.516	7.5	0.016	3.1	92.04	7.81	0	0	0	0.16
2003	291	23	1017	356.894	-355.206	D	7.507	7.5	0.008	3.1	98.33	1.22	0	0	0	0.47
2003	292	23	853	361.666	-362.175	D	7.51	7.5	0.011	3.1	98.94	0.75	0	0	0	0.32
2003	293	23	907	365.051	-359.809	D	7.501	7.5	0.002	3.1	99.69	0.19	0	0	0	0.24
2003	294	23	947	365.801	-355.162	D	7.507	7.5	0.007	3.1	98.5	0.4	0	0	0	1.13
2003	295	23	907	365.051	-359.809	D	7.53	7.5	0.03	3.1	95.7	3.43	0	0	0	0.88
2003	296	23	1017	356.894	-355.206	D	7.521	7.5	0.021	3.1	98.4	0.93	0	0	0	0.68
2003	297	23	949	365.722	-354.966	D	7.53	7.5	0.031	3.1	98.12	1.36	0	0	0	0.52
2003	298	23	907	365.051	-359.809	D	7.542	7.5	0.042	3.1	91.31	8.03	0	0	0	0.66
2003	299	23	949	365.722	-354.966	D	7.511	7.5	0.012	3.1	80.55	18.74	0	0	0	0.72
2003	300	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	301	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	565	362.919	-355.429	D	7.729	7.5	0.229	3.1	89.22	10.06	0	0	0	0.72
2003	306	23	963	363.809	-354.192	D	7.501	7.5	0.001	3.1	97.34	2.28	0	0	0	0.34
2003	307	23	14	357.202	-355.432	D	7.5	7.5	0	3.1	95.82	6.12	0	0	0	0.2
2003	308	23	1017	356.894	-355.206	D	7.575	7.5	0.075	3.1	95.25	4.58	0	0	0	0.16
2003	309	23	822	358.021	-361.607	D	7.967	7.5	0.468	3.1	95	4.84	0	0	0	0.16
2003	310	23	832	359.493	-362.061	D	7.743	7.5	0.244	3.1	94.13	5.76	0	0	0	0.11
2003	311	23	191	359.732	-362.061	D	7.5	7.5	0.001	3.1	97.42	2.59	0	0	0	0.08
2003	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	316	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	23	930	366.19	-357.232	D	7.514	7.5	0.014	3.1	55.66	41.63	0	0	0	2.72
2003	318	23	907	365.051	-359.809	D	7.5	7.5	0	3.1	87.4	12.22	0	0	0	0.63
2003	319	23	929	366.032	-357.239	D	7.5	7.5	0	3.1	81.6	16.41	0	0	0	0.44
2003	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	949	365.722	-354.966	D	7.569	7.5	0.069	3.1	93.98	5.67	0	0	0	0.35
2003	323	23	930	366.19	-357.232	D	7.592	7.5	0.092	3.1	91.02	8.63	0	0	0	0.35
2003	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1008	358.048	-354.775	D	7.516	7.5	0.017	3.1	85.45	14.35	0	0	0	0.19
2003	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	933	366.169	-356.524	D	7.721	7.5	0.221	3.1	83.65	15.84	0	0	0	0.52
2003	332	23	907	365.051	-359.809	D	7.503	7.5	0.003	3.1	89.86	10.04	0	0	0	0.11
2003	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	907	365.051	-359.809	D	7.61	7.589	0.021	3.292	58.4	39.02	0	0	0	2.58
2003	336	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	1017	356.894	-355.206	D	7.78	7.593	0.188	3.3	82.16	17.38	0	0	0	0.46
2003	339	23	644	364.12	-360.12	D	7.593	7.593	0	3.3	74.13	16.76	0	0	0	0.33
2003	340	23	941	365.977	-355.774	D	7.605	7.593	0.012	3.3	77.31	22.13	0	0	0	0.56
2003	341	23	949	365.722	-354.966	D	7.611	7.593	0.019	3.3	79.25	20.42	0	0	0	0.33
2003	342	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	966	363.538	-354.124	D	7.66	7.593	0.067	3.3	84.66	14.91	0	0	0	0.43
2003	345	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	949	365.722	-354.966	D	7.646	7.593	0.053	3.3	76.39	23.16	0	0	0	0.45
2003	347	23	1035	356.477	-356.792	D	7.596	7.593	0.003	3.3	83.64	16.15	0	0	0	0.22
2003	348	23	1039	356.522	-357.599	D	7.604	7.593	0.011	3.3	87.61	12.24	0	0	0	0.15
2003	349	23	948	365.727	-355.056	D	7.596	7.593	0.003	3.3	89.2	10.71	0	0	0	0.11
2003	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	773	365.4	-355.32	D	7.627	7.593	0.034	3.3	65.58	33.53	0	0	0	0.9
2003	358	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	947	365.801	-355.162	D	7.615	7.593	0.023	3.3	78.14	21.42	0	0	0	0.44
2003	360	23	933	366.169	-356.524	D	7.599	7.593	0.006	3.3	82.09	17.55	0	0	0	0.36
2003	361	23	569	362.875	-354.433	D	7.593	7.593	0	3.3	84.29	14.17	0	0	0	0.19
2003	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.468							
COLUMBIA											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	356.546	-357.458	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2003	2	23	1039	356.522	-357.599	D	7.56	7.546	0.014	3.2	37.24	62.77	0	0	0	0
2003	3	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	7	23	930	366.19	-357.232	D	7.547	7.546	0	3.2	74.24	25.74	0	0	0	0
2003	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	9	23	930	366.19	-357.232	D	7.559	7.546	0.013	3.2	76.25	23.76	0	0	0	0
2003	10	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	11	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	12	23	930	366.19	-357.232	D	7.547	7.546	0.001	3.2	60.73	39.47	0	0	0	0
2003	13	23	931	366.183	-356.996	D	7.546	7.546	0	3.2	64.24	35.84	0	0	0	0
2003	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	15	23	930	366.19	-357.232	D	7.554	7.546	0.008	3.2	51.56	48.46	0	0	0	0
2003	16	23	1039	356.522	-357.599	D	7.582	7.546	0.036	3.2	65.32	34.69	0	0	0	0
2003	17	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	18	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	19	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	21	23	930	366.19	-357.232	D	7.562	7.546	0.016	3.2	61.5	38.5	0	0	0	0
2003	22	23	967	363.478	-354.116	D	7.583	7.546	0.037	3.2	51.95	48.05	0	0	0	0
2003	23	23	907	365.051	-359.809	D	7.547	7.546	0.001	3.2	72.39	27.66	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	24	23	930	366.19	-357.232	D	7.547	7.546	0.001	3.2	68.04	32.17	0	0	0	0
2003	25	23	930	366.19	-357.232	D	7.547	7.546	0.001	3.2	69.35	30.79	0	0	0	0
2003	26	23	644	364.12	-360.12	D	7.546	7.546	0	3.2	61.79	18.34	0	0	0	0
2003	27	23	930	366.19	-357.232	D	7.552	7.546	0.006	3.2	60.31	39.72	0	0	0	0
2003	28	23	786	365.973	-357.042	D	7.546	7.546	0	3.2	69.56	29.59	0	0	0	0
2003	29	23	930	366.19	-357.232	D	7.584	7.546	0.038	3.2	42.62	57.39	0	0	0	0
2003	30	23	1017	356.894	-355.206	D	7.546	7.546	0	3.2	86.38	14.36	0	0	0	0
2003	31	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	34	23	964	363.678	-354.148	D	7.406	7.406	0	2.9	81	20.78	0	0	0	0
2003	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	36	23	933	366.169	-356.524	D	7.406	7.406	0.001	2.9	54.66	45.52	0	0	0	0
2003	37	23	1008	358.048	-354.775	D	7.434	7.406	0.028	2.9	69.22	30.78	0	0	0	0
2003	38	23	1035	356.477	-356.792	D	7.513	7.406	0.107	2.9	77.52	22.48	0	0	0	0
2003	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	44	23	906	364.982	-359.812	D	7.406	7.406	0	2.9	66.36	33.86	0	0	0	0
2003	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	46	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	47	23	1037	356.5	-357.195	D	7.465	7.406	0.06	2.9	74.32	25.68	0	0	0	0
2003	48	23	1008	358.048	-354.775	D	7.447	7.406	0.042	2.9	62.61	37.39	0	0	0	0
2003	49	23	933	366.169	-356.524	D	7.447	7.406	0.042	2.9	71.37	28.63	0	0	0	0
2003	50	23	966	363.538	-354.124	D	7.415	7.406	0.009	2.9	84.1	15.93	0	0	0	0
2003	51	23	1017	356.894	-355.206	D	7.49	7.406	0.084	2.9	75.71	24.3	0	0	0	0
2003	52	23	1017	356.894	-355.206	D	7.409	7.406	0.003	2.9	88.04	12.02	0	0	0	0
2003	53	23	1017	356.894	-355.206	D	7.451	7.406	0.045	2.9	69.94	30.07	0	0	0	0
2003	54	23	822	358.021	-361.607	D	7.446	7.406	0.04	2.9	61.91	38.09	0	0	0	0
2003	55	23	822	358.021	-361.607	D	7.438	7.406	0.032	2.9	69.55	30.45	0	0	0	0
2003	56	23	78	358.239	-356.385	D	7.46	7.406	0.054	2.9	41.53	58.48	0	0	0	0
2003	57	23	822	358.021	-361.607	D	7.437	7.406	0.032	2.9	75.04	24.97	0	0	0	0
2003	58	23	1039	356.522	-357.599	D	7.422	7.406	0.016	2.9	80.83	19.19	0	0	0	0
2003	59	23	1017	356.894	-355.206	D	7.429	7.406	0.023	2.9	82.74	17.26	0	0	0	0
2003	60	23	1008	358.048	-354.775	D	7.362	7.315	0.048	2.708	84.91	15.09	0	0	0	0
2003	61	23	949	365.722	-354.966	D	7.385	7.311	0.074	2.7	87.14	12.86	0	0	0	0
2003	62	23	907	365.051	-359.809	D	7.312	7.311	0.001	2.7	91.51	8.5	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	63	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	64	23	949	365.722	-354.966	D	7.367	7.311	0.056	2.7	77.29	22.71	0	0	0	0
2003	65	23	949	365.722	-354.966	D	7.36	7.311	0.049	2.7	76.64	23.36	0	0	0	0
2003	66	23	930	366.19	-357.232	D	7.329	7.311	0.018	2.7	77.53	22.48	0	0	0	0
2003	67	23	933	366.169	-356.524	D	7.312	7.311	0.001	2.7	93.44	6.53	0	0	0	0
2003	68	23	907	365.051	-359.809	D	7.386	7.311	0.075	2.7	46.73	53.27	0	0	0	0
2003	69	23	845	360.851	-362.181	D	7.423	7.311	0.112	2.7	57.5	42.5	0	0	0	0
2003	70	23	1039	356.522	-357.599	D	7.373	7.311	0.062	2.7	79.41	20.59	0	0	0	0
2003	71	23	949	365.722	-354.966	D	7.315	7.311	0.004	2.7	92.5	7.5	0	0	0	0
2003	72	23	933	366.169	-356.524	D	7.347	7.311	0.036	2.7	93.17	6.84	0	0	0	0
2003	73	23	822	358.021	-361.607	D	7.324	7.311	0.014	2.7	92.06	7.95	0	0	0	0
2003	74	23	1017	356.894	-355.206	D	7.32	7.311	0.01	2.7	94.55	5.46	0	0	0	0
2003	75	23	62	357.925	-354.901	D	7.312	7.311	0.001	2.7	98.6	1.58	0	0	0	0
2003	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	822	358.021	-361.607	D	7.36	7.311	0.05	2.7	83.21	16.79	0	0	0	0
2003	80	23	853	361.666	-362.175	D	7.351	7.311	0.04	2.7	80.02	19.98	0	0	0	0
2003	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	82	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	949	365.722	-354.966	D	7.32	7.311	0.009	2.7	77.78	22.23	0	0	0	0
2003	85	23	1017	356.894	-355.206	D	7.325	7.311	0.014	2.7	50.05	49.96	0	0	0	0
2003	86	23	10	356.954	-355.443	D	7.311	7.311	0	2.7	97.99	4.98	0	0	0	0
2003	87	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	90	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	96	23	949	365.722	-354.966	D	7.322	7.311	0.011	2.7	78.22	21.78	0	0	0	0
2003	97	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	98	23	933	366.169	-356.524	D	7.324	7.311	0.013	2.7	81.78	18.23	0	0	0	0
2003	99	23	949	365.722	-354.966	D	7.357	7.311	0.047	2.7	79.42	20.58	0	0	0	0
2003	100	23	853	361.666	-362.175	D	7.365	7.311	0.054	2.7	79.4	20.61	0	0	0	0
2003	101	23	955	364.92	-354.582	D	7.336	7.311	0.026	2.7	95.1	4.91	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	102	23	933	366.169	-356.524	D	7.348	7.311	0.037	2.7	98.06	1.94	0	0	0	0
2003	103	23	930	366.19	-357.232	D	7.312	7.311	0.001	2.7	99.63	0.48	0	0	0	0
2003	104	23	929	366.032	-357.239	D	7.311	7.311	0	2.7	98.59	1.1	0	0	0	0
2003	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	107	23	949	365.722	-354.966	D	7.32	7.311	0.01	2.7	78.62	21.39	0	0	0	0
2003	108	23	949	365.722	-354.966	D	7.311	7.311	0.001	2.7	99.85	0.32	0	0	0	0
2003	109	23	785	365.637	-355.06	D	7.311	7.311	0	2.7	99.63	0.56	0	0	0	0
2003	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	112	23	949	365.722	-354.966	D	7.322	7.311	0.011	2.7	78.68	21.34	0	0	0	0
2003	113	23	1017	356.894	-355.206	D	7.314	7.311	0.003	2.7	95.47	4.57	0	0	0	0
2003	114	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	115	23	966	363.538	-354.124	D	7.327	7.311	0.017	2.7	86.81	13.21	0	0	0	0
2003	116	23	947	365.801	-355.162	D	7.357	7.311	0.046	2.7	81.83	18.17	0	0	0	0
2003	117	23	1035	356.477	-356.792	D	7.314	7.311	0.003	2.7	96.9	3.13	0	0	0	0
2003	118	23	965	363.588	-354.142	D	7.311	7.311	0	2.7	100.35	0.3	0	0	0	0
2003	119	23	967	363.478	-354.116	D	7.311	7.311	0	2.7	98.87	1.77	0	0	0	0
2003	120	23	730	364.623	-354.605	D	7.311	7.311	0	2.7	94.33	0.73	0	0	0	0
2003	121	23	62	357.925	-354.901	D	7.581	7.581	0	3.275	98.19	2	0	0	0	0
2003	122	23	949	365.722	-354.966	D	7.692	7.593	0.099	3.3	96.55	3.45	0	0	0	0
2003	123	23	1002	359.309	-354.73	D	7.831	7.593	0.238	3.3	92.51	7.49	0	0	0	0
2003	124	23	846	360.93	-362.178	D	7.607	7.593	0.014	3.3	98.83	1.18	0	0	0	0
2003	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	127	23	967	363.478	-354.116	D	7.623	7.593	0.031	3.3	95.48	4.52	0	0	0	0
2003	128	23	949	365.722	-354.966	D	7.602	7.593	0.009	3.3	99.06	0.93	0	0	0	0
2003	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	137	23	966	363.538	-354.124	D	7.597	7.593	0.004	3.3	99.37	0.62	0	0	0	0
2003	138	23	1035	356.477	-356.792	D	7.615	7.593	0.022	3.3	95.88	4.12	0	0	0	0
2003	139	23	1017	356.894	-355.206	D	7.599	7.593	0.006	3.3	97.43	2.6	0	0	0	0
2003	140	23	930	366.19	-357.232	D	7.696	7.593	0.103	3.3	80.63	19.37	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	141	23	930	366.19	-357.232	D	7.614	7.593	0.021	3.3	94.54	5.47	0	0	0	0
2003	142	23	1017	356.894	-355.206	D	7.649	7.593	0.056	3.3	97.94	2.06	0	0	0	0
2003	143	23	1008	358.048	-354.775	D	7.694	7.593	0.102	3.3	99	1	0	0	0	0
2003	144	23	964	363.678	-354.148	D	7.751	7.593	0.159	3.3	98.52	1.48	0	0	0	0
2003	145	23	1008	358.048	-354.775	D	7.757	7.593	0.165	3.3	95.83	4.17	0	0	0	0
2003	146	23	822	358.021	-361.607	D	7.641	7.593	0.049	3.3	98.18	1.83	0	0	0	0
2003	147	23	1017	356.894	-355.206	D	7.601	7.593	0.009	3.3	96.22	3.79	0	0	0	0
2003	148	23	822	358.021	-361.607	D	7.604	7.593	0.011	3.3	99.4	0.61	0	0	0	0
2003	149	23	852	361.595	-362.148	D	7.593	7.593	0	3.3	99.95	0.1	0	0	0	0
2003	150	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	151	23	947	365.801	-355.162	D	7.596	7.593	0.004	3.3	99.44	0.55	0	0	0	0
2003	152	23	1037	356.5	-357.195	D	7.603	7.593	0.011	3.3	98.32	1.69	0	0	0	0
2003	153	23	1035	356.477	-356.792	D	7.594	7.593	0.002	3.3	98.54	1.48	0	0	0	0
2003	154	23	949	365.722	-354.966	D	7.653	7.593	0.06	3.3	81.96	18.04	0	0	0	0
2003	155	23	933	366.169	-356.524	D	7.597	7.593	0.004	3.3	78.88	21.17	0	0	0	0
2003	156	23	854	361.771	-362.091	D	7.606	7.593	0.014	3.3	99.62	0.38	0	0	0	0
2003	157	23	949	365.722	-354.966	D	7.627	7.593	0.035	3.3	97.71	2.29	0	0	0	0
2003	158	23	15	357.659	-360.155	D	7.593	7.593	0	3.3	96.28	0.11	0	0	0	0
2003	159	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	160	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	164	23	1017	356.894	-355.206	D	7.593	7.593	0.001	3.3	99.87	0.22	0	0	0	0
2003	165	23	949	365.722	-354.966	D	7.793	7.593	0.2	3.3	89.28	10.72	0	0	0	0
2003	166	23	853	361.666	-362.175	D	7.657	7.593	0.064	3.3	98.12	1.88	0	0	0	0
2003	167	23	907	365.051	-359.809	D	7.619	7.593	0.026	3.3	98.96	1.04	0	0	0	0
2003	168	23	853	361.666	-362.175	D	7.607	7.593	0.014	3.3	98.09	1.92	0	0	0	0
2003	169	23	822	358.021	-361.607	D	7.598	7.593	0.005	3.3	98.38	1.6	0	0	0	0
2003	170	23	1035	356.477	-356.792	D	7.632	7.593	0.039	3.3	99.49	0.51	0	0	0	0
2003	171	23	853	361.666	-362.175	D	7.697	7.593	0.105	3.3	91.77	8.23	0	0	0	0
2003	172	23	1039	356.522	-357.599	D	7.603	7.593	0.01	3.3	99.21	0.79	0	0	0	0
2003	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	178	23	775	365.747	-357.551	D	7.593	7.593	0	3.3	98.49	0.17	0	0	0	0
2003	179	23	907	365.051	-359.809	D	7.596	7.593	0.003	3.3	99.53	0.5	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	180	23	968	363.482	-354.216	D	7.596	7.593	0.003	3.3	99.72	0.28	0	0	0	0
2003	181	23	747	364.871	-354.594	D	7.594	7.593	0.001	3.3	99.58	0.38	0	0	0	0
2003	182	23	10	356.954	-355.443	D	7.593	7.593	0	3.3	99.9	0.69	0	0	0	0
2003	183	23	948	365.727	-355.056	D	7.593	7.593	0	3.3	99.39	0.72	0	0	0	0
2003	184	23	642	363.62	-354.4	D	7.593	7.593	0	3.3	98.92	0.22	0	0	0	0
2003	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	193	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	194	23	949	365.722	-354.966	D	7.597	7.593	0.004	3.3	99.91	0.1	0	0	0	0
2003	195	23	949	365.722	-354.966	D	7.613	7.593	0.02	3.3	99.18	0.83	0	0	0	0
2003	196	23	947	365.801	-355.162	D	7.593	7.593	0	3.3	99.95	0.07	0	0	0	0
2003	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	198	23	914	365.435	-358.584	D	7.593	7.593	0	3.3	99.96	0.17	0	0	0	0
2003	199	23	407	361.716	-361.973	D	7.593	7.593	0	3.3	98.46	0.09	0	0	0	0
2003	200	23	785	365.637	-355.06	D	7.593	7.593	0	3.3	100.27	0.08	0	0	0	0
2003	201	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	99.36	0.79	0	0	0	0
2003	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	204	23	1017	356.894	-355.206	D	7.631	7.593	0.038	3.3	98.14	1.87	0	0	0	0
2003	205	23	1035	356.477	-356.792	D	7.683	7.593	0.09	3.3	99.49	0.52	0	0	0	0
2003	206	23	1017	356.894	-355.206	D	7.617	7.593	0.024	3.3	99.42	0.59	0	0	0	0
2003	207	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	208	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	933	366.169	-356.524	D	7.637	7.593	0.045	3.3	89.32	10.68	0	0	0	0
2003	211	23	930	366.19	-357.232	D	7.663	7.593	0.07	3.3	96.76	3.24	0	0	0	0
2003	212	23	930	366.19	-357.232	D	7.634	7.593	0.042	3.3	98.51	1.5	0	0	0	0
2003	213	23	907	365.051	-359.809	D	7.606	7.593	0.014	3.3	99.42	0.57	0	0	0	0
2003	214	23	930	366.19	-357.232	D	7.596	7.593	0.003	3.3	99.86	0.15	0	0	0	0
2003	215	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	216	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	217	23	948	365.727	-355.056	D	7.593	7.593	0	3.3	99.73	0.16	0	0	0	0
2003	218	23	1017	356.894	-355.206	D	7.627	7.593	0.034	3.3	99.15	0.85	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	219	23	1035	356.477	-356.792	D	7.673	7.593	0.08	3.3	91.66	8.34	0	0	0	0
2003	220	23	853	361.666	-362.175	D	7.699	7.593	0.107	3.3	98.93	1.07	0	0	0	0
2003	221	23	1035	356.477	-356.792	D	7.639	7.593	0.047	3.3	98.99	1.01	0	0	0	0
2003	222	23	1039	356.522	-357.599	D	7.65	7.593	0.058	3.3	99	1	0	0	0	0
2003	223	23	822	358.021	-361.607	D	7.601	7.593	0.008	3.3	99.5	0.52	0	0	0	0
2003	224	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	98.86	1.01	0	0	0	0
2003	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	230	23	930	366.19	-357.232	D	7.595	7.593	0.002	3.3	99.92	0.06	0	0	0	0
2003	231	23	930	366.19	-357.232	D	7.607	7.593	0.014	3.3	99.64	0.37	0	0	0	0
2003	232	23	907	365.051	-359.809	D	7.603	7.593	0.01	3.3	99.5	0.51	0	0	0	0
2003	233	23	930	366.19	-357.232	D	7.599	7.593	0.006	3.3	99.47	0.51	0	0	0	0
2003	234	23	949	365.722	-354.966	D	7.598	7.593	0.005	3.3	99.72	0.29	0	0	0	0
2003	235	23	930	366.19	-357.232	D	7.645	7.593	0.052	3.3	99.55	0.45	0	0	0	0
2003	236	23	822	358.021	-361.607	D	7.646	7.593	0.054	3.3	98.15	1.86	0	0	0	0
2003	237	23	1017	356.894	-355.206	D	7.651	7.593	0.058	3.3	99.75	0.25	0	0	0	0
2003	238	23	967	363.478	-354.116	D	7.602	7.593	0.009	3.3	99.97	0.05	0	0	0	0
2003	239	23	747	364.871	-354.594	D	7.593	7.593	0	3.3	99.97	0.05	0	0	0	0
2003	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	242	23	730	364.623	-354.605	D	7.593	7.593	0	3.3	96.03	3.98	0	0	0	0
2003	243	23	643	363.609	-354.151	D	7.593	7.593	0	3.3	96.48	3.8	0	0	0	0
2003	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	245	23	1017	356.894	-355.206	D	7.664	7.639	0.025	3.4	98.98	1.03	0	0	0	0
2003	246	23	1039	356.522	-357.599	D	7.686	7.639	0.047	3.4	95.63	4.37	0	0	0	0
2003	247	23	931	366.183	-356.996	D	7.747	7.639	0.108	3.4	92.56	7.44	0	0	0	0
2003	248	23	1035	356.477	-356.792	D	7.7	7.639	0.061	3.4	94.76	5.24	0	0	0	0
2003	249	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	250	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	254	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	255	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	256	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	257	23	867	361.467	-360.706	D	7.737	7.639	0.099	3.4	85.33	14.67	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	258	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	259	23	930	366.19	-357.232	D	7.641	7.639	0.002	3.4	99.56	0.4	0	0	0	0
2003	260	23	930	366.19	-357.232	D	7.654	7.639	0.016	3.4	98.7	1.31	0	0	0	0
2003	261	23	643	363.609	-354.151	D	7.64	7.639	0.001	3.4	99.34	0.64	0	0	0	0
2003	262	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	263	23	933	366.169	-356.524	D	7.677	7.639	0.039	3.4	96.93	3.07	0	0	0	0
2003	264	23	1017	356.894	-355.206	D	7.665	7.639	0.026	3.4	99.03	0.98	0	0	0	0
2003	265	23	747	364.871	-354.594	D	7.64	7.639	0.001	3.4	96.79	3.35	0	0	0	0
2003	266	23	356	361.22	-361.995	D	7.639	7.639	0	3.4	71.18	0.16	0	0	0	0
2003	267	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	268	23	1017	356.894	-355.206	D	7.648	7.639	0.009	3.4	83.73	16.26	0	0	0	0
2003	269	23	930	366.19	-357.232	D	7.644	7.639	0.006	3.4	95.31	4.7	0	0	0	0
2003	270	23	930	366.19	-357.232	D	7.639	7.639	0	3.4	61.66	38.19	0	0	0	0
2003	271	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	272	23	927	365.912	-357.454	D	7.697	7.639	0.058	3.4	53.24	46.76	0	0	0	0
2003	273	23	907	365.051	-359.809	D	7.644	7.639	0.005	3.4	93.88	6.12	0	0	0	0
2003	274	23	1008	358.048	-354.775	D	7.528	7.505	0.023	3.112	77.59	22.41	0	0	0	0
2003	275	23	78	358.239	-356.385	D	7.502	7.5	0.003	3.1	53.76	46.28	0	0	0	0
2003	276	23	1017	356.894	-355.206	D	7.502	7.5	0.002	3.1	91.51	8.56	0	0	0	0
2003	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	278	23	932	366.176	-356.761	D	7.503	7.5	0.003	3.1	98.12	1.89	0	0	0	0
2003	279	23	930	366.19	-357.232	D	7.526	7.5	0.027	3.1	94.75	5.26	0	0	0	0
2003	280	23	811	357.434	-360.225	D	7.519	7.5	0.02	3.1	98.35	1.66	0	0	0	0
2003	281	23	1017	356.894	-355.206	D	7.504	7.5	0.004	3.1	98.93	1.11	0	0	0	0
2003	282	23	10	356.954	-355.443	D	7.5	7.5	0	3.1	100.06	0.55	0	0	0	0
2003	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	961	364.092	-354.289	D	7.533	7.5	0.034	3.1	96.96	3.04	0	0	0	0
2003	286	23	1035	356.477	-356.792	D	7.528	7.5	0.029	3.1	97.56	2.44	0	0	0	0
2003	287	23	949	365.722	-354.966	D	7.504	7.5	0.004	3.1	89.29	10.72	0	0	0	0
2003	288	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	289	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	290	23	1017	356.894	-355.206	D	7.504	7.5	0.004	3.1	84.48	15.55	0	0	0	0
2003	291	23	1017	356.894	-355.206	D	7.524	7.5	0.024	3.1	94.2	5.82	0	0	0	0
2003	292	23	853	361.666	-362.175	D	7.509	7.5	0.01	3.1	98.98	1.03	0	0	0	0
2003	293	23	907	365.051	-359.809	D	7.5	7.5	0	3.1	100.11	0.28	0	0	0	0
2003	294	23	595	363.624	-360.142	D	7.5	7.5	0	3.1	96	0.51	0	0	0	0
2003	295	23	1035	356.477	-356.792	D	7.508	7.5	0.008	3.1	98.21	1.8	0	0	0	0
2003	296	23	966	363.538	-354.124	D	7.508	7.5	0.008	3.1	98.17	1.82	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	297	23	949	365.722	-354.966	D	7.515	7.5	0.015	3.1	97.51	2.5	0	0	0	0
2003	298	23	352	360.719	-356.275	D	7.607	7.5	0.107	3.1	76.96	23.04	0	0	0	0
2003	299	23	907	365.051	-359.809	D	7.515	7.5	0.016	3.1	70.5	29.5	0	0	0	0
2003	300	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	301	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	955	364.92	-354.582	D	7.657	7.5	0.157	3.1	70.5	29.5	0	0	0	0
2003	306	23	643	363.609	-354.151	D	7.5	7.5	0	3.1	94.83	5.15	0	0	0	0
2003	307	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	1009	357.941	-354.82	D	7.505	7.5	0.006	3.1	87.69	12.33	0	0	0	0
2003	309	23	853	361.666	-362.175	D	7.551	7.5	0.051	3.1	82.05	17.96	0	0	0	0
2003	310	23	930	366.19	-357.232	D	7.606	7.5	0.107	3.1	78.15	21.86	0	0	0	0
2003	311	23	822	358.021	-361.607	D	7.545	7.5	0.045	3.1	78.23	21.77	0	0	0	0
2003	312	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	318	23	519	362.902	-360.673	D	7.5	7.5	0	3.1	80.15	14.97	0	0	0	0
2003	319	23	775	365.747	-357.551	D	7.5	7.5	0	3.1	73.41	19.44	0	0	0	0
2003	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	931	366.183	-356.996	D	7.501	7.5	0.002	3.1	87.57	12.45	0	0	0	0
2003	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1017	356.894	-355.206	D	7.516	7.5	0.016	3.1	77.39	22.62	0	0	0	0
2003	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	947	365.801	-355.162	D	7.51	7.5	0.011	3.1	81.65	18.37	0	0	0	0
2003	332	23	930	366.19	-357.232	D	7.501	7.5	0.001	3.1	83.32	16.69	0	0	0	0
2003	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	78	358.239	-356.385	D	7.648	7.589	0.059	3.292	45.83	54.16	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	336	23	1017	356.894	-355.206	D	7.594	7.593	0.001	3.3	70.64	29.41	0	0	0	0
2003	337	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	966	363.538	-354.124	D	7.67	7.593	0.077	3.3	75.8	24.19	0	0	0	0
2003	339	23	822	358.021	-361.607	D	7.593	7.593	0	3.3	86.86	13.29	0	0	0	0
2003	340	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	73.87	25.68	0	0	0	0
2003	341	23	931	366.183	-356.996	D	7.599	7.593	0.007	3.3	67.76	32.26	0	0	0	0
2003	342	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	955	364.92	-354.582	D	7.626	7.593	0.033	3.3	77.84	22.17	0	0	0	0
2003	345	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	949	365.722	-354.966	D	7.615	7.593	0.022	3.3	71.39	28.61	0	0	0	0
2003	347	23	1035	356.477	-356.792	D	7.597	7.593	0.004	3.3	75.15	24.88	0	0	0	0
2003	348	23	822	358.021	-361.607	D	7.602	7.593	0.009	3.3	80.65	19.38	0	0	0	0
2003	349	23	947	365.801	-355.162	D	7.595	7.593	0.002	3.3	83.35	16.68	0	0	0	0
2003	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	933	366.169	-356.524	D	7.619	7.593	0.026	3.3	49.55	50.45	0	0	0	0
2003	358	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	360	23	932	366.176	-356.761	D	7.594	7.593	0.001	3.3	80	19.93	0	0	0	0
2003	361	23	774	365.389	-355.071	D	7.593	7.593	0	3.3	81.33	18.3	0	0	0	0
2003	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.238							
HOLCIM									**DELTA**	**% of Modeled Extinction by Species**						
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1017	356.894	-355.206	D	7.549	7.548	0	3.204	18.81	80.45	0	0	0	0.58
2003	2	23	930	366.19	-357.232	D	7.665	7.546	0.119	3.2	18.17	81.36	0	0	0	0.47
2003	3	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	4	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	5	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	6	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	7	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	8	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	9	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	10	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	11	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	12	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	13	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	14	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	15	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	16	23	822	358.021	-361.607	D	7.88	7.546	0.333	3.2	50.51	49.31	0	0	0	0.18
2003	17	23	907	365.051	-359.809	D	7.547	7.546	0.001	3.2	58.71	41.26	0	0	0	0.07
2003	18	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	19	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	20	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	21	23	949	365.722	-354.966	D	7.652	7.546	0.106	3.2	45.17	54.68	0	0	0	0.15
2003	22	23	927	365.912	-357.454	D	8.195	7.546	**0.649**	3.2	22.98	76.62	0	0	0	0.4
2003	23	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	24	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	25	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	26	23	1	356.546	-357.458	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	27	23	930	366.19	-357.232	D	7.547	7.546	0	3.2	55.29	44.74	0	0	0	0.16
2003	28	23	710	364.843	-359.589	D	7.546	7.546	0	3.2	49.19	40.17	0	0	0	0.09
2003	29	23	907	365.051	-359.809	D	7.547	7.546	0.001	3.2	66.55	33.3	0	0	0	0.19
2003	30	23	1017	356.894	-355.206	D	8.013	7.546	0.466	3.2	64.2	35.65	0	0	0	0.15
2003	31	23	1017	356.894	-355.206	D	7.548	7.546	0.002	3.2	79.4	20.51	0	0	0	0.1
2003	32	23	1	356.546	-357.458	D	7.411	7.411	0	2.913	0	0	0	0	0	0
2003	33	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	34	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	35	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	36	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	37	23	941	365.977	-355.774	D	7.437	7.406	0.031	2.9	54.6	45.26	0	0	0	0.15
2003	38	23	907	365.051	-359.809	D	7.434	7.406	0.028	2.9	59.25	40.65	0	0	0	0.1
2003	39	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	40	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	41	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	42	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	43	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0

Appendix M
Hercules Glade
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	44	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	45	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	46	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	47	23	930	366.19	-357.232	D	7.664	7.406	0.259	2.9	37.01	62.6	0	0	0	0.39
2003	48	23	907	365.051	-359.809	D	7.794	7.406	0.388	2.9	60.1	39.69	0	0	0	0.21
2003	49	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	50	23	744	364.904	-355.342	D	7.406	7.406	0	2.9	72.24	27.34	0	0	0	0.09
2003	51	23	805	357.408	-359.021	D	8.061	7.406	**0.655**	2.9	65.86	34.01	0	0	0	0.14
2003	52	23	1008	358.048	-354.775	D	7.454	7.406	0.048	2.9	77.02	22.9	0	0	0	0.09
2003	53	23	933	366.169	-356.524	D	7.635	7.406	0.229	2.9	62.84	37	0	0	0	0.16
2003	54	23	1	356.546	-357.458	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	55	23	949	365.722	-354.966	D	7.776	7.406	0.371	2.9	57.62	42.27	0	0	0	0.1
2003	56	23	933	366.169	-356.524	D	7.623	7.406	0.218	2.9	33.07	66.66	0	0	0	0.27
2003	57	23	1003	359.099	-354.737	D	7.854	7.406	0.449	2.9	45.25	54.59	0	0	0	0.16
2003	58	23	1017	356.894	-355.206	D	7.555	7.406	0.149	2.9	57.86	42.02	0	0	0	0.12
2003	59	23	1017	356.894	-355.206	D	7.478	7.406	0.072	2.9	65.66	34.25	0	0	0	0.1
2003	60	23	967	363.478	-354.116	D	7.335	7.315	0.02	2.708	70.83	29.08	0	0	0	0.1
2003	61	23	949	365.722	-354.966	D	7.36	7.311	0.05	2.7	73.34	26.57	0	0	0	0.09
2003	62	23	930	366.19	-357.232	D	7.311	7.311	0	2.7	78.38	21.59	0	0	0	0.08
2003	63	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	64	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	65	23	933	366.169	-356.524	D	7.315	7.311	0.005	2.7	61.38	38.36	0	0	0	0.29
2003	66	23	933	366.169	-356.524	D	7.353	7.311	0.042	2.7	61.18	38.66	0	0	0	0.15
2003	67	23	933	366.169	-356.524	D	7.311	7.311	0.001	2.7	89.81	9.99	0	0	0	0.14
2003	68	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	69	23	930	366.19	-357.232	D	7.355	7.311	0.045	2.7	43.61	56.05	0	0	0	0.34
2003	70	23	907	365.051	-359.809	D	7.444	7.311	0.133	2.7	57.36	42.39	0	0	0	0.25
2003	71	23	947	365.801	-355.162	D	7.328	7.311	0.017	2.7	83.7	16.1	0	0	0	0.2
2003	72	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	73	23	1035	356.477	-356.792	D	7.507	7.311	0.196	2.7	68.59	31.24	0	0	0	0.17
2003	74	23	1017	356.894	-355.206	D	7.352	7.311	0.042	2.7	87.31	12.56	0	0	0	0.14
2003	75	23	1008	358.048	-354.775	D	7.311	7.311	0.001	2.7	98.56	1.35	0	0	0	0.12
2003	76	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	1017	356.894	-355.206	D	7.345	7.311	0.034	2.7	60.17	39.64	0	0	0	0.19
2003	80	23	947	365.801	-355.162	D	7.502	7.311	0.191	2.7	63.61	36.26	0	0	0	0.13
2003	81	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	82	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	83	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	85	23	853	361.666	-362.175	D	7.318	7.311	0.007	2.7	55.64	43.98	0	0	0	0.41
2003	86	23	1035	356.477	-356.792	D	7.331	7.311	0.02	2.7	78.09	21.66	0	0	0	0.25
2003	87	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	90	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	92	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	93	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	94	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	95	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	96	23	949	365.722	-354.966	D	7.384	7.311	0.073	2.7	65.18	34.7	0	0	0	0.12
2003	97	23	966	363.538	-354.124	D	7.311	7.311	0	2.7	72.52	27.53	0	0	0	0.05
2003	98	23	927	365.912	-357.454	D	7.33	7.311	0.019	2.7	64.11	35.72	0	0	0	0.16
2003	99	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	100	23	927	365.912	-357.454	D	7.338	7.311	0.027	2.7	45.73	53.65	0	0	0	0.63
2003	101	23	933	366.169	-356.524	D	7.425	7.311	0.114	2.7	87.43	12.25	0	0	0	0.33
2003	102	23	930	366.19	-357.232	D	7.323	7.311	0.013	2.7	98.1	1.68	0	0	0	0.22
2003	103	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	104	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	105	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	106	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	107	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	108	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	109	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	110	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	111	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	112	23	1	356.546	-357.458	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	113	23	930	366.19	-357.232	D	7.361	7.311	0.051	2.7	96.94	2.85	0	0	0	0.22
2003	114	23	1017	356.894	-355.206	D	7.315	7.311	0.004	2.7	90.74	9.09	0	0	0	0.18
2003	115	23	1007	358.259	-354.768	D	7.549	7.311	0.238	2.7	80.56	19.22	0	0	0	0.23
2003	116	23	927	365.912	-357.454	D	7.943	7.311	**0.632**	2.7	66.59	33.06	0	0	0	0.36
2003	117	23	1017	356.894	-355.206	D	7.33	7.311	0.02	2.7	89.11	10.71	0	0	0	0.18
2003	118	23	643	363.609	-354.151	D	7.311	7.311	0.001	2.7	99.14	0.88	0	0	0	0.14
2003	119	23	966	363.538	-354.124	D	7.312	7.311	0.002	2.7	95.34	4.66	0	0	0	0.11
2003	120	23	642	363.62	-354.4	D	7.311	7.311	0	2.7	98.18	1.22	0	0	0	0.1
2003	121	23	1	356.546	-357.458	D	7.581	7.581	0	3.275	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	122	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	123	23	907	365.051	-359.809	D	7.782	7.593	0.189	3.3	94.88	4.97	0	0	0	0.15
2003	124	23	949	365.722	-354.966	D	7.928	7.593	0.335	3.3	97.98	1.93	0	0	0	0.09
2003	125	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	126	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	127	23	955	364.92	-354.582	D	7.638	7.593	0.046	3.3	84.95	14.89	0	0	0	0.16
2003	128	23	932	366.176	-356.761	D	7.593	7.593	0	3.3	98.8	0.87	0	0	0	0.14
2003	129	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	130	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	131	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	132	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	133	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	134	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	135	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	136	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	137	23	963	363.809	-354.192	D	7.595	7.593	0.002	3.3	97.93	1.91	0	0	0	0.1
2003	138	23	1017	356.894	-355.206	D	7.691	7.593	0.098	3.3	78.59	21.21	0	0	0	0.2
2003	139	23	1017	356.894	-355.206	D	7.597	7.593	0.004	3.3	97.1	2.71	0	0	0	0.23
2003	140	23	1017	356.894	-355.206	D	7.63	7.593	0.038	3.3	89.2	10.73	0	0	0	0.08
2003	141	23	1017	356.894	-355.206	D	7.746	7.593	0.154	3.3	78.67	20.96	0	0	0	0.36
2003	142	23	1017	356.894	-355.206	D	7.917	7.593	0.324	3.3	93.61	6.14	0	0	0	0.26
2003	143	23	930	366.19	-357.232	D	8.306	7.593	**0.714**	3.3	94.93	4.83	0	0	0	0.24
2003	144	23	907	365.051	-359.809	D	7.823	7.593	0.23	3.3	97.34	2.5	0	0	0	0.16
2003	145	23	949	365.722	-354.966	D	8.152	7.593	**0.559**	3.3	91.42	8.46	0	0	0	0.11
2003	146	23	822	358.021	-361.607	D	7.991	7.593	0.399	3.3	92.79	7.11	0	0	0	0.1
2003	147	23	930	366.19	-357.232	D	7.915	7.593	0.323	3.3	92.52	7.25	0	0	0	0.23
2003	148	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	149	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	150	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	151	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	152	23	949	365.722	-354.966	D	7.739	7.593	0.147	3.3	81.49	18.29	0	0	0	0.23
2003	153	23	1017	356.894	-355.206	D	7.628	7.593	0.036	3.3	97.06	2.82	0	0	0	0.12
2003	154	23	822	358.021	-361.607	D	8.1	7.593	**0.508**	3.3	92.27	7.54	0	0	0	0.19
2003	155	23	853	361.666	-362.175	D	7.607	7.593	0.014	3.3	95.94	3.89	0	0	0	0.17
2003	156	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	157	23	933	366.169	-356.524	D	7.6	7.593	0.008	3.3	97.14	2.73	0	0	0	0.14
2003	158	23	931	366.183	-356.996	D	7.593	7.593	0.001	3.3	90.82	9.12	0	0	0	0.1
2003	159	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	160	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	161	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	162	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	163	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	164	23	1008	358.048	-354.775	D	7.603	7.593	0.01	3.3	99.33	0.54	0	0	0	0.13
2003	165	23	1017	356.894	-355.206	D	8.394	7.593	**0.801**	3.3	90.71	9.19	0	0	0	0.1
2003	166	23	907	365.051	-359.809	D	8.482	7.593	**0.889**	3.3	83.64	16.23	0	0	0	0.13
2003	167	23	1017	356.894	-355.206	D	7.619	7.593	0.026	3.3	98.43	1.38	0	0	0	0.19
2003	168	23	1017	356.894	-355.206	D	7.611	7.593	0.019	3.3	97.58	2.27	0	0	0	0.15
2003	169	23	967	363.478	-354.116	D	7.612	7.593	0.02	3.3	99.34	0.51	0	0	0	0.15
2003	170	23	949	365.722	-354.966	D	8.159	7.593	**0.567**	3.3	98.17	1.7	0	0	0	0.13
2003	171	23	822	358.021	-361.607	D	8.215	7.593	**0.622**	3.3	88.41	11.48	0	0	0	0.11
2003	172	23	822	358.021	-361.607	D	7.595	7.593	0.002	3.3	99.57	0.35	0	0	0	0.1
2003	173	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	174	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	175	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	176	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	177	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	178	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	179	23	907	365.051	-359.809	D	7.617	7.593	0.024	3.3	99.03	0.79	0	0	0	0.19
2003	180	23	949	365.722	-354.966	D	7.642	7.593	0.049	3.3	98.87	1	0	0	0	0.14
2003	181	23	964	363.678	-354.148	D	7.602	7.593	0.009	3.3	98.92	0.97	0	0	0	0.11
2003	182	23	966	363.538	-354.124	D	7.596	7.593	0.004	3.3	98.11	1.81	0	0	0	0.1
2003	183	23	962	363.961	-354.255	D	7.595	7.593	0.002	3.3	98.76	1.18	0	0	0	0.09
2003	184	23	747	364.871	-354.594	D	7.593	7.593	0.001	3.3	99.48	0.36	0	0	0	0.08
2003	185	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	186	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	187	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	188	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	189	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	190	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	191	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	192	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	193	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	194	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	195	23	949	365.722	-354.966	D	7.611	7.593	0.019	3.3	97.49	2.37	0	0	0	0.15
2003	196	23	949	365.722	-354.966	D	7.593	7.593	0	3.3	99.77	0.19	0	0	0	0.1
2003	197	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	198	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	199	23	930	366.19	-357.232	D	7.605	7.593	0.013	3.3	99.71	0.16	0	0	0	0.13

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	200	23	930	366.19	-357.232	D	7.597	7.593	0.005	3.3	99.67	0.25	0	0	0	0.12
2003	201	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	94.08	5.8	0	0	0	0.14
2003	202	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	203	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	204	23	931	366.183	-356.996	D	7.612	7.593	0.019	3.3	82.6	16.84	0	0	0	0.57
2003	205	23	907	365.051	-359.809	D	7.98	7.593	0.387	3.3	97.83	1.98	0	0	0	0.2
2003	206	23	949	365.722	-354.966	D	8.023	7.593	0.431	3.3	98.14	1.71	0	0	0	0.14
2003	207	23	1008	358.048	-354.775	D	7.598	7.593	0.006	3.3	99.75	0.15	0	0	0	0.12
2003	208	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	209	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	210	23	949	365.722	-354.966	D	7.677	7.593	0.084	3.3	93.39	6.43	0	0	0	0.17
2003	211	23	947	365.801	-355.162	D	7.945	7.593	0.352	3.3	94.31	5.59	0	0	0	0.1
2003	212	23	907	365.051	-359.809	D	7.813	7.593	0.22	3.3	97.34	2.58	0	0	0	0.08
2003	213	23	907	365.051	-359.809	D	7.622	7.593	0.03	3.3	99.41	0.51	0	0	0	0.07
2003	214	23	930	366.19	-357.232	D	7.601	7.593	0.008	3.3	99.69	0.26	0	0	0	0.07
2003	215	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	216	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	217	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	218	23	955	364.92	-354.582	D	7.822	7.593	0.229	3.3	99.29	0.54	0	0	0	0.17
2003	219	23	853	361.666	-362.175	D	8.344	7.593	**0.751**	3.3	93.87	5.95	0	0	0	0.19
2003	220	23	907	365.051	-359.809	D	7.68	7.593	0.087	3.3	99.14	0.63	0	0	0	0.23
2003	221	23	930	366.19	-357.232	D	8.183	7.593	**0.59**	3.3	97.98	1.81	0	0	0	0.21
2003	222	23	933	366.169	-356.524	D	7.999	7.593	0.406	3.3	98.37	1.44	0	0	0	0.2
2003	223	23	1036	356.488	-356.993	D	8.152	7.593	**0.56**	3.3	98.43	1.4	0	0	0	0.17
2003	224	23	1017	356.894	-355.206	D	7.991	7.593	0.398	3.3	96.82	2.98	0	0	0	0.19
2003	225	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	226	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	227	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	228	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	229	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	230	23	933	366.169	-356.524	D	7.614	7.593	0.021	3.3	99.63	0.19	0	0	0	0.18
2003	231	23	930	366.19	-357.232	D	7.828	7.593	0.236	3.3	99.02	0.85	0	0	0	0.13
2003	232	23	930	366.19	-357.232	D	7.811	7.593	0.218	3.3	98.6	1.31	0	0	0	0.1
2003	233	23	930	366.19	-357.232	D	7.714	7.593	0.121	3.3	98.9	1.01	0	0	0	0.09
2003	234	23	930	366.19	-357.232	D	7.65	7.593	0.057	3.3	99.28	0.63	0	0	0	0.09
2003	235	23	949	365.722	-354.966	D	7.991	7.593	0.398	3.3	98.86	0.93	0	0	0	0.21
2003	236	23	1039	356.522	-357.599	D	7.963	7.593	0.37	3.3	96.83	3.04	0	0	0	0.14
2003	237	23	1017	356.894	-355.206	D	7.675	7.593	0.083	3.3	99.25	0.64	0	0	0	0.11
2003	238	23	965	363.588	-354.142	D	7.607	7.593	0.014	3.3	99.78	0.12	0	0	0	0.1

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	239	23	785	365.637	-355.06	D	7.593	7.593	0.001	3.3	99.84	0.2	0	0	0	0.09
2003	240	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	241	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	242	23	949	365.722	-354.966	D	7.594	7.593	0.001	3.3	98.07	1.79	0	0	0	0.12
2003	243	23	964	363.678	-354.148	D	7.609	7.593	0.016	3.3	91.16	8.74	0	0	0	0.09
2003	244	23	1	356.546	-357.458	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	245	23	1017	356.894	-355.206	D	7.747	7.639	0.108	3.4	95.72	4.17	0	0	0	0.11
2003	246	23	1017	356.894	-355.206	D	8.25	7.639	**0.611**	3.4	93.27	6.55	0	0	0	0.18
2003	247	23	907	365.051	-359.809	D	7.747	7.639	0.108	3.4	98.05	1.77	0	0	0	0.17
2003	248	23	1008	358.048	-354.775	D	7.701	7.639	0.062	3.4	96.21	3.33	0	0	0	0.46
2003	249	23	1017	356.894	-355.206	D	7.72	7.639	0.081	3.4	95.57	4.17	0	0	0	0.27
2003	250	23	1017	356.894	-355.206	D	7.641	7.639	0.002	3.4	99.5	0.32	0	0	0	0.2
2003	251	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	252	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	253	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	254	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	255	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	256	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	257	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	258	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	259	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	260	23	930	366.19	-357.232	D	7.655	7.639	0.016	3.4	98.11	1.72	0	0	0	0.18
2003	261	23	643	363.609	-354.151	D	7.648	7.639	0.009	3.4	97.43	2.47	0	0	0	0.12
2003	262	23	730	364.623	-354.605	D	7.639	7.639	0	3.4	97.12	2.73	0	0	0	0.11
2003	263	23	941	365.977	-355.774	D	7.639	7.639	0	3.4	98.36	1.68	0	0	0	0.35
2003	264	23	933	366.169	-356.524	D	7.759	7.639	0.12	3.4	97.2	2.6	0	0	0	0.19
2003	265	23	949	365.722	-354.966	D	7.643	7.639	0.004	3.4	95.64	4.3	0	0	0	0.11
2003	266	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	267	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	268	23	930	366.19	-357.232	D	7.664	7.639	0.025	3.4	98.33	1.14	0	0	0	0.53
2003	269	23	930	366.19	-357.232	D	7.736	7.639	0.097	3.4	95.21	4.45	0	0	0	0.34
2003	270	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	271	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	272	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	273	23	1	356.546	-357.458	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	274	23	1	356.546	-357.458	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2003	275	23	78	358.239	-356.385	D	7.618	7.5	0.119	3.1	35.01	64.05	0	0	0	0.95
2003	276	23	1017	356.894	-355.206	D	7.517	7.5	0.018	3.1	80.32	19.42	0	0	0	0.27
2003	277	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	278	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	279	23	930	366.19	-357.232	D	7.507	7.5	0.008	3.1	98.58	1.25	0	0	0	0.18
2003	280	23	930	366.19	-357.232	D	7.601	7.5	0.101	3.1	97.07	2.79	0	0	0	0.14
2003	281	23	1017	356.894	-355.206	D	7.534	7.5	0.035	3.1	97.62	2.26	0	0	0	0.12
2003	282	23	1007	358.259	-354.768	D	7.502	7.5	0.002	3.1	99.06	0.84	0	0	0	0.11
2003	283	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	284	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	285	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	286	23	947	365.801	-355.162	D	7.523	7.5	0.024	3.1	94.65	5.1	0	0	0	0.25
2003	287	23	949	365.722	-354.966	D	7.503	7.5	0.003	3.1	81	18.98	0	0	0	0.05
2003	288	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	289	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	290	23	930	366.19	-357.232	D	7.714	7.5	0.215	3.1	62.71	36.92	0	0	0	0.37
2003	291	23	907	365.051	-359.809	D	7.637	7.5	0.137	3.1	82.13	17.61	0	0	0	0.26
2003	292	23	907	365.051	-359.809	D	7.504	7.5	0.005	3.1	98.04	1.75	0	0	0	0.21
2003	293	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	294	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	295	23	930	366.19	-357.232	D	7.501	7.5	0.001	3.1	93.74	5.59	0	0	0	0.67
2003	296	23	949	365.722	-354.966	D	7.577	7.5	0.077	3.1	94.86	4.74	0	0	0	0.4
2003	297	23	933	366.169	-356.524	D	7.502	7.5	0.003	3.1	86.22	13.5	0	0	0	0.32
2003	298	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	299	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	300	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	301	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	302	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	303	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	304	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	305	23	949	365.722	-354.966	D	7.501	7.5	0.001	3.1	91.17	8.53	0	0	0	0.35
2003	306	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	307	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	308	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	309	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	310	23	907	365.051	-359.809	D	8.354	7.5	**0.854**	3.1	34.62	65.11	0	0	0	0.27
2003	311	23	78	358.239	-356.385	D	8.583	7.5	**1.084**	3.1	24.42	75.07	0	0	0	0.51
2003	312	23	1017	356.894	-355.206	D	7.5	7.5	0.001	3.1	53.77	45.88	0	0	0	0.39
2003	313	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	314	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	315	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	316	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	317	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	318	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	319	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	320	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	321	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	322	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	323	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	324	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	325	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	326	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	327	23	1008	358.048	-354.775	D	7.548	7.5	0.049	3.1	63.8	36.11	0	0	0	0.1
2003	328	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	329	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	330	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	331	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	332	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	333	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	334	23	1	356.546	-357.458	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	335	23	1	356.546	-357.458	D	7.589	7.589	0	3.292	0	0	0	0	0	0
2003	336	23	933	366.169	-356.524	D	7.768	7.593	0.175	3.3	48.54	51.13	0	0	0	0.33
2003	337	23	949	365.722	-354.966	D	7.64	7.593	0.048	3.3	41.53	58.29	0	0	0	0.18
2003	338	23	964	363.678	-354.148	D	7.683	7.593	0.09	3.3	57.05	42.79	0	0	0	0.15
2003	339	23	933	366.169	-356.524	D	7.665	7.593	0.072	3.3	60.46	39.42	0	0	0	0.12
2003	340	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	341	23	930	366.19	-357.232	D	7.612	7.593	0.02	3.3	51.17	48.7	0	0	0	0.13
2003	342	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	1041	356.936	-357.592	D	8.09	7.593	0.497	3.3	63.25	36.62	0	0	0	0.13
2003	345	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	930	366.19	-357.232	D	7.613	7.593	0.021	3.3	66.29	33.56	0	0	0	0.15
2003	347	23	967	363.478	-354.116	D	7.858	7.593	0.265	3.3	61.63	38.25	0	0	0	0.12
2003	348	23	907	365.051	-359.809	D	7.638	7.593	0.045	3.3	71.81	28.11	0	0	0	0.09
2003	349	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	355	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Hercules Glade
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	356	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	358	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	360	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	361	23	930	366.19	-357.232	D	7.593	7.593	0	3.3	70.8	28.88	0	0	0	0.15
2003	362	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	356.546	-357.458	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									1.084							

Appendix M
Upper Buffalo
2001 M2

EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	2789	340.496	-426.449	D	7.5	7.495	0.005	3.09	0	0	0	0	0	99.98
2001	2	23	2628	320.933	-436.998	D	7.46	7.451	0.009	2.997	0	0	0	0	0	99.98
2001	3	23	2709	330.21	-424.978	D	7.815	7.81	0.005	3.774	0	0	0	0	0	100
2001	4	23	67	319.674	-440.741	D	7.083	7.081	0.001	2.224	0	0	0	0	0	99.83
2001	5	23	2588	318.452	-445.8	D	6.932	6.931	0.001	1.919	0	0	0	0	0	99.86
2001	6	23	2596	318.977	-444.095	D	6.552	6.551	0.001	1.165	0	0	0	0	0	100
2001	7	23	2758	335.862	-424.454	D	7.169	7.14	0.029	2.345	0	0	0	0	0	100
2001	8	23	2789	340.496	-426.449	D	8.339	8.335	0.004	4.964	0	0	0	0	0	99.99
2001	9	23	2758	335.862	-424.454	D	9.754	9.717	0.037	8.408	0	0	0	0	0	100
2001	10	23	1449	329.434	-425.075	D	7.001	7	0.001	2.059	0	0	0	0	0	99.67
2001	11	23	2781	339.842	-425.379	D	9.131	9.131	0	6.888	0	0	0	0	0	98.92
2001	12	23	1	318.65	-445.782	D	9.519	9.519	0	7.886	0	0	0	0	0	0
2001	13	23	2781	339.842	-425.379	D	9.126	9.126	0	6.876	0	0	0	0	0	99.04
2001	14	23	1	318.65	-445.782	D	9.396	9.396	0	7.566	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	6.74	6.74	0	1.537	0	0	0	0	0	0
2001	16	23	2711	330.671	-424.932	D	6.822	6.795	0.027	1.645	0	0	0	0	0	100
2001	17	23	2571	322.646	-445.476	D	6.873	6.869	0.004	1.793	0	0	0	0	0	100.02
2001	18	23	2789	340.496	-426.449	D	6.927	6.885	0.041	1.826	0	0	0	0	0	100
2001	19	23	2758	335.862	-424.454	D	6.929	6.907	0.023	1.87	0	0	0	0	0	100
2001	20	23	2789	340.496	-426.449	D	6.556	6.555	0.001	1.174	0	0	0	0	0	100.19
2001	21	23	2789	340.496	-426.449	D	6.474	6.474	0	1.015	0	0	0	0	0	100.6
2001	22	23	2758	335.862	-424.454	D	6.626	6.626	0	1.312	0	0	0	0	0	99.82
2001	23	23	1	318.65	-445.782	D	6.621	6.621	0	1.303	0	0	0	0	0	0
2001	24	23	2781	339.842	-425.379	D	6.751	6.723	0.029	1.502	0	0	0	0	0	100
2001	25	23	2684	326.713	-427.014	D	6.62	6.586	0.034	1.233	0	0	0	0	0	100
2001	26	23	2789	340.496	-426.449	D	6.538	6.536	0.002	1.136	0	0	0	0	0	100
2001	27	23	2758	335.862	-424.454	D	6.683	6.674	0.009	1.405	0	0	0	0	0	100
2001	28	23	2789	340.496	-426.449	D	6.516	6.516	0	1.097	0	0	0	0	0	99.73
2001	29	23	2588	318.452	-445.8	D	8.91	8.908	0.002	6.335	0	0	0	0	0	99.88
2001	30	23	2384	338.176	-425.941	D	6.773	6.773	0	1.601	0	0	0	0	0	59
2001	31	23	2781	339.842	-425.379	D	6.998	6.998	0	2.054	0	0	0	0	0	96.44
2001	32	23	2781	339.842	-425.379	D	6.48	6.48	0	1.028	0	0	0	0	0	99.67
2001	33	23	2	318.639	-445.533	D	6.561	6.561	0	1.185	0	0	0	0	0	99.58
2001	34	23	2571	322.646	-445.476	D	6.476	6.476	0	1.019	0	0	0	0	0	99.98
2001	35	23	2758	335.862	-424.454	D	6.61	6.609	0.001	1.279	0	0	0	0	0	100
2001	36	23	2758	335.862	-424.454	D	6.605	6.601	0.004	1.263	0	0	0	0	0	100
2001	37	23	2758	335.862	-424.454	D	6.52	6.52	0	1.104	0	0	0	0	0	100.01
2001	38	23	2709	330.21	-424.978	D	7.857	7.856	0.001	3.876	0	0	0	0	0	100.03

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	39	23	1	318.65	-445.782	D	10.07	10.07	0	9.369	0	0	0	0	0	0
2001	40	23	1415	329.185	-425.086	D	9.39	9.39	0	7.55	0	0	0	0	0	99.51
2001	41	23	2789	340.496	-426.449	D	6.659	6.651	0.008	1.361	0	0	0	0	0	99.99
2001	42	23	2789	340.496	-426.449	D	6.475	6.471	0.004	1.009	0	0	0	0	0	99.99
2001	43	23	2277	336.146	-425.03	D	6.792	6.792	0	1.639	0	0	0	0	0	99.53
2001	44	23	1	318.65	-445.782	D	9.412	9.412	0	7.606	0	0	0	0	0	0
2001	45	23	2694	327.861	-425.964	D	10.218	10.218	0	9.779	0	0	0	0	0	99.44
2001	46	23	2781	339.842	-425.379	D	8.301	8.271	0.03	4.814	0	0	0	0	0	99.99
2001	47	23	2758	335.862	-424.454	D	7.564	7.479	0.086	3.056	0	0	0	0	0	100
2001	48	23	2789	340.496	-426.449	D	6.591	6.527	0.064	1.119	0	0	0	0	0	100
2001	49	23	2789	340.496	-426.449	D	6.487	6.472	0.015	1.012	0	0	0	0	0	100
2001	50	23	2781	339.842	-425.379	D	6.494	6.493	0.001	1.052	0	0	0	0	0	100.08
2001	51	23	1	318.65	-445.782	D	9.197	9.197	0	7.056	0	0	0	0	0	0
2001	52	23	2704	329.056	-425.092	D	8.107	8.08	0.027	4.379	0	0	0	0	0	100
2001	53	23	2704	329.056	-425.092	D	7.041	7.029	0.012	2.117	0	0	0	0	0	100
2001	54	23	2789	340.496	-426.449	D	6.783	6.768	0.015	1.592	0	0	0	0	0	99.99
2001	55	23	2413	339.406	-425.637	D	9.379	9.379	0	7.522	0	0	0	0	0	97.89
2001	56	23	2780	339.614	-425.419	D	7.297	7.297	0	2.672	0	0	0	0	0	99.8
2001	57	23	2704	329.056	-425.092	D	6.507	6.499	0.009	1.063	0	0	0	0	0	100.01
2001	58	23	2781	339.842	-425.379	D	6.523	6.517	0.005	1.099	0	0	0	0	0	100.01
2001	59	23	2694	327.861	-425.964	D	7.153	7.142	0.012	2.348	0	0	0	0	0	99.99
2001	60	23	2781	339.842	-425.379	D	6.649	6.643	0.006	1.345	0	0	0	0	0	99.99
2001	61	23	2789	340.496	-426.449	D	8.446	8.444	0.002	5.218	0	0	0	0	0	99.98
2001	62	23	2758	335.862	-424.454	D	6.881	6.747	0.134	1.55	0	0	0	0	0	100
2001	63	23	2684	326.713	-427.014	D	6.664	6.613	0.051	1.285	0	0	0	0	0	100
2001	64	23	2789	340.496	-426.449	D	6.535	6.531	0.004	1.126	0	0	0	0	0	100.01
2001	65	23	2708	329.979	-425	D	6.567	6.529	0.038	1.123	0	0	0	0	0	99.99
2001	66	23	2758	335.862	-424.454	D	6.483	6.471	0.012	1.011	0	0	0	0	0	100.01
2001	67	23	2435	337.211	-428.786	D	6.559	6.539	0.02	1.142	0	0	0	0	0	99.99
2001	68	23	2684	326.713	-427.014	D	6.53	6.493	0.036	1.053	0	0	0	0	0	100
2001	69	23	2468	334.002	-434.887	D	6.478	6.471	0.007	1.009	0	0	0	0	0	100.01
2001	70	23	2781	339.842	-425.379	D	6.502	6.502	0	1.069	0	0	0	0	0	100.07
2001	71	23	1	318.65	-445.782	D	9.154	9.154	0	6.946	0	0	0	0	0	0
2001	72	23	1	318.65	-445.782	D	6.558	6.558	0	1.178	0	0	0	0	0	0
2001	73	23	2758	335.862	-424.454	D	7.577	7.577	0	3.267	0	0	0	0	0	97.01
2001	74	23	199	320.795	-437.944	D	9.731	9.731	0	8.446	0	0	0	0	0	95.54
2001	75	23	2781	339.842	-425.379	D	7.341	7.329	0.011	2.739	0	0	0	0	0	99.97
2001	76	23	2694	327.861	-425.964	D	6.598	6.586	0.012	1.234	0	0	0	0	0	99.98
2001	77	23	2789	340.496	-426.449	D	6.511	6.506	0.004	1.078	0	0	0	0	0	99.99

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	78	23	2628	320.933	-436.998	D	6.49	6.479	0.011	1.025	0	0	0	0	0	100
2001	79	23	2600	318.952	-443.12	D	6.525	6.496	0.029	1.058	0	0	0	0	0	100
2001	80	23	2628	320.933	-436.998	D	6.479	6.473	0.006	1.014	0	0	0	0	0	99.99
2001	81	23	2684	326.713	-427.014	D	6.491	6.49	0.001	1.048	0	0	0	0	0	99.88
2001	82	23	2789	340.496	-426.449	D	6.665	6.661	0.004	1.38	0	0	0	0	0	99.96
2001	83	23	2628	320.933	-436.998	D	6.788	6.77	0.018	1.596	0	0	0	0	0	99.99
2001	84	23	2708	329.979	-425	D	6.56	6.473	0.087	1.014	0	0	0	0	0	100
2001	85	23	2758	335.862	-424.454	D	6.571	6.482	0.089	1.031	0	0	0	0	0	100
2001	86	23	2781	339.842	-425.379	D	6.48	6.468	0.013	1.004	0	0	0	0	0	100
2001	87	23	2781	339.842	-425.379	D	6.504	6.503	0.001	1.073	0	0	0	0	0	99.75
2001	88	23	1	318.65	-445.782	D	7.559	7.559	0	3.227	0	0	0	0	0	0
2001	89	23	2628	320.933	-436.998	D	9.176	9.168	0.008	6.983	0	0	0	0	0	99.98
2001	90	23	2468	334.002	-434.887	D	7.481	7.468	0.013	3.033	0	0	0	0	0	100
2001	91	23	2588	318.452	-445.8	D	6.482	6.481	0.001	1.029	0	0	0	0	0	99.97
2001	92	23	2236	336.149	-430.776	D	7.049	7.049	0	2.157	0	0	0	0	0	60.84
2001	93	23	1	318.65	-445.782	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2001	94	23	2781	339.842	-425.379	D	9.901	9.9	0.001	8.9	0	0	0	0	0	100.05
2001	95	23	1	318.65	-445.782	D	9.747	9.747	0	8.488	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	8.549	8.549	0	5.467	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.507	7.507	0	3.115	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.503	7.503	0	3.108	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.145	7.145	0	2.355	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.606	7.606	0	3.329	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	9.338	9.338	0	7.417	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	103	23	2758	335.862	-424.454	D	6.58	6.576	0.003	1.215	0	0	0	0	0	100
2001	104	23	2417	339.654	-425.626	D	6.885	6.885	0	1.826	0	0	0	0	0	83.45
2001	105	23	2779	339.386	-425.461	D	8.944	8.943	0	6.422	0	0	0	0	0	98.95
2001	106	23	2758	335.862	-424.454	D	6.517	6.501	0.017	1.067	0	0	0	0	0	100
2001	107	23	2789	340.496	-426.449	D	6.489	6.478	0.011	1.024	0	0	0	0	0	100
2001	108	23	2704	329.056	-425.092	D	6.529	6.477	0.052	1.022	0	0	0	0	0	100
2001	109	23	2789	340.496	-426.449	D	6.568	6.568	0	1.198	0	0	0	0	0	99.02
2001	110	23	1	318.65	-445.782	D	10.01	10.01	0	9.202	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	8.281	8.281	0	4.837	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	8.135	8.135	0	4.503	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	8.008	8.008	0	4.216	0	0	0	0	0	0
2001	114	23	2711	330.671	-424.932	D	6.52	6.505	0.015	1.076	0	0	0	0	0	99.99
2001	115	23	2789	340.496	-426.449	D	6.482	6.477	0.005	1.021	0	0	0	0	0	100
2001	116	23	2413	339.406	-425.637	D	6.537	6.537	0	1.137	0	0	0	0	0	103.3

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	117	23	1	318.65	-445.782	D	6.586	6.586	0	1.232	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	6.585	6.585	0	1.231	0	0	0	0	0	0
2001	119	23	2286	336.471	-426.765	D	6.844	6.844	0	1.743	0	0	0	0	0	80.34
2001	120	23	2152	334.916	-425.334	D	7.005	7.005	0	2.069	0	0	0	0	0	87.7
2001	121	23	1	318.65	-445.782	D	6.839	6.839	0	1.734	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.129	7.129	0	2.323	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.25	7.25	0	2.573	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	8.868	8.868	0	6.236	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	8.924	8.924	0	6.374	0	0	0	0	0	0
2001	127	23	2781	339.842	-425.379	D	8.406	8.405	0	5.127	0	0	0	0	0	99.4
2001	128	23	2684	326.713	-427.014	D	6.563	6.552	0.011	1.166	0	0	0	0	0	99.99
2001	129	23	1552	330.178	-425.042	D	6.697	6.695	0.002	1.447	0	0	0	0	0	99.92
2001	130	23	2787	340.091	-426.447	D	6.953	6.953	0	1.963	0	0	0	0	0	97.8
2001	131	23	1	318.65	-445.782	D	8.246	8.246	0	4.756	0	0	0	0	0	0
2001	132	23	2758	335.862	-424.454	D	8.799	8.784	0.014	6.032	0	0	0	0	0	99.99
2001	133	23	2628	320.933	-436.998	D	6.56	6.559	0.001	1.181	0	0	0	0	0	99.93
2001	134	23	2789	340.496	-426.449	D	6.745	6.745	0	1.546	0	0	0	0	0	98.75
2001	135	23	1	318.65	-445.782	D	6.961	6.961	0	1.979	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.897	7.897	0	3.966	0	0	0	0	0	0
2001	138	23	1415	329.185	-425.086	D	7.574	7.574	0	3.259	0	0	0	0	0	100.64
2001	139	23	2789	340.496	-426.449	D	7.36	7.352	0.008	2.786	0	0	0	0	0	99.97
2001	140	23	2789	340.496	-426.449	D	7.47	7.462	0.008	3.019	0	0	0	0	0	99.99
2001	141	23	2781	339.842	-425.379	D	8.843	8.843	0	6.174	0	0	0	0	0	99.27
2001	142	23	2758	335.862	-424.454	D	6.534	6.533	0.001	1.131	0	0	0	0	0	100.01
2001	143	23	2758	335.862	-424.454	D	6.53	6.529	0.001	1.121	0	0	0	0	0	100.07
2001	144	23	1415	329.185	-425.086	D	6.506	6.505	0.001	1.076	0	0	0	0	0	99.99
2001	145	23	2758	335.862	-424.454	D	6.576	6.575	0.001	1.212	0	0	0	0	0	99.96
2001	146	23	1	318.65	-445.782	D	6.546	6.546	0	1.156	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	6.809	6.809	0	1.673	0	0	0	0	0	0
2001	148	23	2704	329.056	-425.092	D	8.101	8.089	0.011	4.399	0	0	0	0	0	99.98
2001	149	23	2588	318.452	-445.8	D	7.079	7.075	0.004	2.211	0	0	0	0	0	100.01
2001	150	23	2781	339.842	-425.379	D	8.428	8.428	0	5.181	0	0	0	0	0	97.34
2001	151	23	2155	334.883	-424.586	D	8.989	8.988	0	6.533	0	0	0	0	0	99.35
2001	152	23	2628	320.933	-436.998	D	7.199	7.197	0.002	2.462	0	0	0	0	0	100
2001	153	23	2781	339.842	-425.379	D	7.214	7.214	0	2.498	0	0	0	0	0	99.74
2001	154	23	2781	339.842	-425.379	D	7.58	7.58	0	3.273	0	0	0	0	0	99.84
2001	155	23	1	318.65	-445.782	D	8.894	8.894	0	6.3	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	156	23	1	318.65	-445.782	D	8.375	8.375	0	5.056	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.624	7.624	0	3.368	0	0	0	0	0	0
2001	158	23	2704	329.056	-425.092	D	8.14	8.139	0.001	4.512	0	0	0	0	0	99.83
2001	159	23	2468	334.002	-434.887	D	7.308	7.303	0.006	2.683	0	0	0	0	0	100.01
2001	160	23	2684	326.713	-427.014	D	7.414	7.396	0.018	2.879	0	0	0	0	0	99.99
2001	161	23	2784	339.87	-426.019	D	7.628	7.622	0.007	3.363	0	0	0	0	0	99.97
2001	162	23	2789	340.496	-426.449	D	7.013	7.011	0.001	2.081	0	0	0	0	0	99.87
2001	163	23	2781	339.842	-425.379	D	6.863	6.863	0	1.781	0	0	0	0	0	99.7
2001	164	23	2360	337.69	-426.212	D	7.053	7.053	0	2.166	0	0	0	0	0	88.26
2001	165	23	1	318.65	-445.782	D	7.321	7.321	0	2.721	0	0	0	0	0	0
2001	166	23	2182	335.131	-424.575	D	7.951	7.95	0.001	4.086	0	0	0	0	0	99.69
2001	167	23	2789	340.496	-426.449	D	6.522	6.521	0	1.107	0	0	0	0	0	100.63
2001	168	23	381	322.546	-443.863	D	6.545	6.545	0	1.153	0	0	0	0	0	99.23
2001	169	23	2789	340.496	-426.449	D	6.651	6.651	0	1.36	0	0	0	0	0	100.02
2001	170	23	1	318.65	-445.782	D	7.178	7.178	0	2.423	0	0	0	0	0	0
2001	171	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	172	23	2781	339.842	-425.379	D	7.188	7.187	0.001	2.441	0	0	0	0	0	99.91
2001	173	23	2758	335.862	-424.454	D	6.831	6.8	0.031	1.655	0	0	0	0	0	100.01
2001	174	23	2708	329.979	-425	D	6.631	6.604	0.028	1.268	0	0	0	0	0	100
2001	175	23	2789	340.496	-426.449	D	6.762	6.76	0.002	1.576	0	0	0	0	0	100
2001	176	23	2789	340.496	-426.449	D	7.64	7.636	0.003	3.395	0	0	0	0	0	100.01
2001	177	23	2362	338.048	-428.694	D	6.986	6.981	0.005	2.019	0	0	0	0	0	99.95
2001	178	23	1415	329.185	-425.086	D	6.923	6.921	0.003	1.897	0	0	0	0	0	99.97
2001	179	23	2411	339.428	-426.135	D	8.819	8.818	0.001	6.114	0	0	0	0	0	99.89
2001	180	23	2709	330.21	-424.978	D	8.611	8.611	0	5.614	0	0	0	0	0	98.17
2001	181	23	1	318.65	-445.782	D	8.968	8.968	0	6.482	0	0	0	0	0	0
2001	182	23	2704	329.056	-425.092	D	9.396	9.396	0.001	7.564	0	0	0	0	0	99.33
2001	183	23	2781	339.842	-425.379	D	7.174	7.171	0.003	2.409	0	0	0	0	0	99.93
2001	184	23	2781	339.842	-425.379	D	7.339	7.338	0.001	2.757	0	0	0	0	0	99.98
2001	185	23	2396	338.424	-425.93	D	7.064	7.064	0	2.189	0	0	0	0	0	97.27
2001	186	23	2757	335.63	-424.484	D	7.025	7.025	0	2.109	0	0	0	0	0	93.01
2001	187	23	2781	339.842	-425.379	D	7.606	7.597	0.01	3.308	0	0	0	0	0	99.99
2001	188	23	2781	339.842	-425.379	D	8.688	8.687	0	5.797	0	0	0	0	0	99.84
2001	189	23	1	318.65	-445.782	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.028	7.028	0	2.115	0	0	0	0	0	0
2001	191	23	2417	339.654	-425.626	D	7.241	7.241	0	2.555	0	0	0	0	0	98.81
2001	192	23	2758	335.862	-424.454	D	7.118	7.084	0.033	2.23	0	0	0	0	0	100
2001	193	23	2789	340.496	-426.449	D	7.906	7.903	0.003	3.981	0	0	0	0	0	99.91
2001	194	23	2789	340.496	-426.449	D	9.074	9.072	0.002	6.741	0	0	0	0	0	99.98

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	195	23	2588	318.452	-445.8	D	6.655	6.654	0	1.367	0	0	0	0	0	100.08
2001	196	23	2758	335.862	-424.454	D	6.686	6.685	0.001	1.427	0	0	0	0	0	99.87
2001	197	23	863	325.509	-431.992	D	6.994	6.994	0	2.046	0	0	0	0	0	80.58
2001	198	23	1	318.65	-445.782	D	7.972	7.972	0	4.135	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.881	7.881	0	3.931	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.405	7.405	0	2.898	0	0	0	0	0	0
2001	201	23	2236	336.149	-430.776	D	7.24	7.24	0	2.553	0	0	0	0	0	47.54
2001	202	23	2789	340.496	-426.449	D	6.808	6.808	0	1.67	0	0	0	0	0	99.99
2001	203	23	2789	340.496	-426.449	D	6.907	6.904	0.003	1.864	0	0	0	0	0	100
2001	204	23	2781	339.842	-425.379	D	7.452	7.45	0.002	2.994	0	0	0	0	0	99.89
2001	205	23	2416	339.665	-425.875	D	7.697	7.696	0	3.525	0	0	0	0	0	99.41
2001	206	23	2274	336.179	-425.778	D	7.597	7.597	0	3.309	0	0	0	0	0	99.45
2001	207	23	2414	339.687	-426.374	D	8.928	8.928	0	6.383	0	0	0	0	0	97.02
2001	208	23	2781	339.842	-425.379	D	8.847	8.846	0.001	6.181	0	0	0	0	0	99.86
2001	209	23	2781	339.842	-425.379	D	8.805	8.805	0.001	6.081	0	0	0	0	0	99.5
2001	210	23	2416	339.665	-425.875	D	8.646	8.646	0	5.698	0	0	0	0	0	98.26
2001	211	23	2781	339.842	-425.379	D	8.573	8.573	0.001	5.523	0	0	0	0	0	100.18
2001	212	23	2789	340.496	-426.449	D	8.497	8.496	0.001	5.339	0	0	0	0	0	99.92
2001	213	23	2781	339.842	-425.379	D	8.197	8.196	0.001	4.643	0	0	0	0	0	99.8
2001	214	23	2409	339.158	-425.648	D	7.533	7.533	0	3.172	0	0	0	0	0	99.07
2001	215	23	2385	338.165	-425.691	D	6.959	6.959	0	1.974	0	0	0	0	0	91.45
2001	216	23	2781	339.842	-425.379	D	7.067	7.048	0.019	2.157	0	0	0	0	0	99.99
2001	217	23	2704	329.056	-425.092	D	7.138	7.133	0.006	2.33	0	0	0	0	0	99.96
2001	218	23	2572	322.4	-445.495	D	7.211	7.208	0.003	2.485	0	0	0	0	0	99.96
2001	219	23	2758	335.862	-424.454	D	7.447	7.445	0.002	2.984	0	0	0	0	0	99.94
2001	220	23	2709	330.21	-424.978	D	7.763	7.76	0.003	3.664	0	0	0	0	0	99.97
2001	221	23	2781	339.842	-425.379	D	7.743	7.742	0.002	3.624	0	0	0	0	0	99.96
2001	222	23	2781	339.842	-425.379	D	7.372	7.371	0.001	2.826	0	0	0	0	0	100.1
2001	223	23	2704	329.056	-425.092	D	9.049	9.022	0.026	6.617	0	0	0	0	0	99.99
2001	224	23	2758	335.862	-424.454	D	7.435	7.394	0.041	2.876	0	0	0	0	0	100
2001	225	23	2789	340.496	-426.449	D	7.602	7.587	0.015	3.288	0	0	0	0	0	99.99
2001	226	23	2758	335.862	-424.454	D	6.94	6.932	0.008	1.92	0	0	0	0	0	99.99
2001	227	23	2789	340.496	-426.449	D	6.815	6.81	0.005	1.675	0	0	0	0	0	99.99
2001	228	23	2182	335.131	-424.575	D	7.72	7.72	0	3.577	0	0	0	0	0	99.01
2001	229	23	2468	334.002	-434.887	D	6.684	6.683	0.001	1.423	0	0	0	0	0	100.02
2001	230	23	2789	340.496	-426.449	D	6.949	6.948	0.001	1.953	0	0	0	0	0	99.82
2001	231	23	2758	335.862	-424.454	D	6.925	6.881	0.044	1.817	0	0	0	0	0	100
2001	232	23	2781	339.842	-425.379	D	6.975	6.964	0.011	1.985	0	0	0	0	0	99.98
2001	233	23	2789	340.496	-426.449	D	7.601	7.601	0	3.318	0	0	0	0	0	99.3

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	234	23	1	318.65	-445.782	D	6.991	6.991	0	2.041	0	0	0	0	0	0
2001	235	23	2037	333.945	-425.876	D	6.968	6.968	0	1.993	0	0	0	0	0	20.29
2001	236	23	1	318.65	-445.782	D	7.113	7.113	0	2.289	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2001	238	23	2781	339.842	-425.379	D	7.359	7.358	0.001	2.799	0	0	0	0	0	99.76
2001	239	23	2758	335.862	-424.454	D	7.333	7.301	0.032	2.68	0	0	0	0	0	100
2001	240	23	2704	329.056	-425.092	D	6.927	6.909	0.018	1.873	0	0	0	0	0	99.99
2001	241	23	2762	336.074	-425.006	D	7.322	7.312	0.01	2.703	0	0	0	0	0	100.01
2001	242	23	2708	329.979	-425	D	8.193	8.191	0.002	4.631	0	0	0	0	0	99.95
2001	243	23	2758	335.862	-424.454	D	8.155	8.154	0.001	4.547	0	0	0	0	0	100.06
2001	244	23	2709	330.21	-424.978	D	8.5	8.489	0.012	5.323	0	0	0	0	0	99.99
2001	245	23	2704	329.056	-425.092	D	8.795	8.788	0.007	6.04	0	0	0	0	0	99.99
2001	246	23	2589	318.383	-445.593	D	8.209	8.207	0.002	4.668	0	0	0	0	0	99.91
2001	247	23	2781	339.842	-425.379	D	7.141	7.137	0.003	2.339	0	0	0	0	0	99.97
2001	248	23	2618	320.301	-439.116	D	7.338	7.323	0.016	2.725	0	0	0	0	0	100
2001	249	23	2694	327.861	-425.964	D	7.395	7.394	0.001	2.876	0	0	0	0	0	99.87
2001	250	23	1	318.65	-445.782	D	8.117	8.117	0	4.462	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	9.202	9.202	0	7.068	0	0	0	0	0	0
2001	252	23	2694	327.861	-425.964	D	9.125	9.124	0.001	6.873	0	0	0	0	0	99.71
2001	253	23	2758	335.862	-424.454	D	7.045	7.008	0.037	2.075	0	0	0	0	0	100
2001	254	23	2628	320.933	-436.998	D	6.791	6.788	0.004	1.631	0	0	0	0	0	99.97
2001	255	23	2571	322.646	-445.476	D	6.856	6.853	0.003	1.761	0	0	0	0	0	99.96
2001	256	23	2588	318.452	-445.8	D	6.988	6.987	0.001	2.031	0	0	0	0	0	99.93
2001	257	23	2758	335.862	-424.454	D	7.434	7.405	0.029	2.898	0	0	0	0	0	99.99
2001	258	23	2571	322.646	-445.476	D	6.963	6.96	0.002	1.977	0	0	0	0	0	100
2001	259	23	2588	318.452	-445.8	D	6.743	6.742	0.001	1.541	0	0	0	0	0	99.95
2001	260	23	2789	340.496	-426.449	D	7.016	7.015	0	2.09	0	0	0	0	0	99.98
2001	261	23	2416	339.665	-425.875	D	8.747	8.747	0	5.94	0	0	0	0	0	92.15
2001	262	23	2614	319.957	-439.987	D	8.585	8.583	0.002	5.548	0	0	0	0	0	99.95
2001	263	23	2571	322.646	-445.476	D	6.894	6.893	0.001	1.841	0	0	0	0	0	99.89
2001	264	23	2781	339.842	-425.379	D	7.188	7.188	0	2.443	0	0	0	0	0	99.87
2001	265	23	2789	340.496	-426.449	D	7.153	7.146	0.007	2.357	0	0	0	0	0	99.98
2001	266	23	2781	339.842	-425.379	D	7.77	7.766	0.005	3.677	0	0	0	0	0	100.01
2001	267	23	2628	320.933	-436.998	D	8.691	8.658	0.033	5.727	0	0	0	0	0	100
2001	268	23	2789	340.496	-426.449	D	6.67	6.665	0.005	1.387	0	0	0	0	0	100
2001	269	23	2589	318.383	-445.593	D	6.554	6.543	0.011	1.15	0	0	0	0	0	99.98
2001	270	23	2600	318.952	-443.12	D	6.651	6.643	0.009	1.344	0	0	0	0	0	99.99
2001	271	23	2789	340.496	-426.449	D	6.742	6.718	0.024	1.492	0	0	0	0	0	99.99
2001	272	23	2589	318.383	-445.593	D	7.093	7.084	0.009	2.229	0	0	0	0	0	100

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	273	23	2684	326.713	-427.014	D	7.158	7.156	0.002	2.378	0	0	0	0	0	100.06
2001	274	23	2704	329.056	-425.092	D	7.234	7.203	0.031	2.474	0	0	0	0	0	100
2001	275	23	2790	340.421	-426.562	D	6.819	6.809	0.01	1.673	0	0	0	0	0	100
2001	276	23	2789	340.496	-426.449	D	7.373	7.373	0	2.831	0	0	0	0	0	100.04
2001	277	23	1	318.65	-445.782	D	8.468	8.468	0	5.274	0	0	0	0	0	0
2001	278	23	2789	340.496	-426.449	D	9.7	9.67	0.03	8.283	0	0	0	0	0	99.99
2001	279	23	2758	335.862	-424.454	D	7.258	7.238	0.02	2.548	0	0	0	0	0	99.99
2001	280	23	2789	340.496	-426.449	D	6.568	6.557	0.011	1.177	0	0	0	0	0	100
2001	281	23	2789	340.496	-426.449	D	6.615	6.613	0.002	1.286	0	0	0	0	0	99.93
2001	282	23	1	318.65	-445.782	D	7.968	7.968	0	4.125	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	284	23	2704	329.056	-425.092	D	10.219	10.218	0.001	9.779	0	0	0	0	0	99.87
2001	285	23	2758	335.862	-424.454	D	9.666	9.66	0.005	8.257	0	0	0	0	0	99.99
2001	286	23	1552	330.178	-425.042	D	9.891	9.89	0	8.876	0	0	0	0	0	96.23
2001	287	23	2758	335.862	-424.454	D	7.51	7.51	0	3.122	0	0	0	0	0	99.92
2001	288	23	2684	326.713	-427.014	D	6.929	6.928	0.001	1.913	0	0	0	0	0	100.01
2001	289	23	2711	330.671	-424.932	D	7.201	7.196	0.005	2.461	0	0	0	0	0	100.01
2001	290	23	2758	335.862	-424.454	D	6.505	6.488	0.017	1.043	0	0	0	0	0	100
2001	291	23	2155	334.883	-424.586	D	6.549	6.549	0	1.16	0	0	0	0	0	100.04
2001	292	23	1	318.65	-445.782	D	6.799	6.799	0	1.653	0	0	0	0	0	0
2001	293	23	1549	330.211	-425.79	D	8.254	8.254	0	4.776	0	0	0	0	0	51.59
2001	294	23	1	318.65	-445.782	D	9.362	9.362	0	7.476	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	9.29	9.29	0	7.294	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	297	23	2781	339.842	-425.379	D	9.448	9.447	0	7.699	0	0	0	0	0	100
2001	298	23	2781	339.842	-425.379	D	6.511	6.511	0	1.088	0	0	0	0	0	97.69
2001	299	23	2758	335.862	-424.454	D	6.477	6.476	0.001	1.02	0	0	0	0	0	99.97
2001	300	23	2758	335.862	-424.454	D	6.546	6.472	0.074	1.012	0	0	0	0	0	100
2001	301	23	1	318.65	-445.782	D	6.493	6.481	0.012	1.03	0	0	0	0	0	99.99
2001	302	23	2781	339.842	-425.379	D	6.5	6.5	0	1.066	0	0	0	0	0	99.68
2001	303	23	1	318.65	-445.782	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	6.695	6.695	0	1.447	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	9.032	9.032	0	6.64	0	0	0	0	0	0
2001	306	23	1415	329.185	-425.086	D	9.837	9.837	0	8.732	0	0	0	0	0	23.92
2001	307	23	2789	340.496	-426.449	D	9.692	9.685	0.006	8.324	0	0	0	0	0	99.93
2001	308	23	2588	318.452	-445.8	D	6.955	6.948	0.006	1.953	0	0	0	0	0	99.98
2001	309	23	2695	328.074	-426.025	D	8.367	8.311	0.057	4.907	0	0	0	0	0	100
2001	310	23	1548	330.222	-426.04	D	7.888	7.876	0.011	3.921	0	0	0	0	0	99.99
2001	311	23	2781	339.842	-425.379	D	7.137	7.131	0.005	2.327	0	0	0	0	0	100.01

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	312	23	2781	339.842	-425.379	D	7.255	7.247	0.007	2.567	0	0	0	0	0	100
2001	313	23	2704	329.056	-425.092	D	6.672	6.611	0.061	1.281	0	0	0	0	0	100
2001	314	23	2789	340.496	-426.449	D	6.748	6.746	0.001	1.549	0	0	0	0	0	100.15
2001	315	23	2758	335.862	-424.454	D	6.816	6.801	0.014	1.658	0	0	0	0	0	100.01
2001	316	23	2588	318.452	-445.8	D	6.633	6.627	0.006	1.314	0	0	0	0	0	99.99
2001	317	23	623	324.229	-442.54	D	6.703	6.703	0	1.462	0	0	0	0	0	6.15
2001	318	23	1	318.65	-445.782	D	7.492	7.492	0	3.083	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	8.023	8.023	0	4.249	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.729	7.729	0	3.597	0	0	0	0	0	0
2001	321	23	2758	335.862	-424.454	D	7.174	7.172	0.002	2.411	0	0	0	0	0	99.98
2001	322	23	2781	339.842	-425.379	D	7.371	7.37	0.001	2.826	0	0	0	0	0	99.84
2001	323	23	2789	340.496	-426.449	D	8.471	8.463	0.007	5.264	0	0	0	0	0	99.98
2001	324	23	2758	335.862	-424.454	D	6.494	6.475	0.02	1.017	0	0	0	0	0	100
2001	325	23	2789	340.496	-426.449	D	6.471	6.47	0.001	1.008	0	0	0	0	0	100.04
2001	326	23	1	318.65	-445.782	D	6.548	6.548	0	1.159	0	0	0	0	0	0
2001	327	23	1	318.65	-445.782	D	8.475	8.475	0	5.291	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	8.774	8.774	0	6.006	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	6.66	6.66	0	1.377	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.063	7.063	0	2.186	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.026	7.026	0	2.111	0	0	0	0	0	0
2001	332	23	2684	326.713	-427.014	D	9.308	9.291	0.017	7.296	0	0	0	0	0	99.98
2001	333	23	2572	322.4	-445.495	D	10.23	10.218	0.012	9.779	0	0	0	0	0	99.97
2001	334	23	2789	340.496	-426.449	D	8.364	8.348	0.016	4.993	0	0	0	0	0	100
2001	335	23	2781	339.842	-425.379	D	6.654	6.653	0	1.365	0	0	0	0	0	101.16
2001	336	23	2789	340.496	-426.449	D	6.655	6.654	0	1.367	0	0	0	0	0	100.08
2001	337	23	2361	337.679	-425.962	D	6.812	6.812	0	1.679	0	0	0	0	0	34.35
2001	338	23	1	318.65	-445.782	D	7.231	7.231	0	2.534	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	9.653	9.653	0	8.239	0	0	0	0	0	0
2001	340	23	2758	335.862	-424.454	D	9.727	9.725	0.002	8.429	0	0	0	0	0	100.02
2001	341	23	2758	335.862	-424.454	D	8.533	8.531	0.002	5.424	0	0	0	0	0	99.95
2001	342	23	2758	335.862	-424.454	D	8.493	8.46	0.034	5.255	0	0	0	0	0	100
2001	343	23	2758	335.862	-424.454	D	6.633	6.603	0.03	1.266	0	0	0	0	0	100
2001	344	23	1449	329.434	-425.075	D	6.518	6.513	0.005	1.092	0	0	0	0	0	99.98
2001	345	23	2789	340.496	-426.449	D	6.575	6.574	0.002	1.209	0	0	0	0	0	99.99
2001	346	23	976	326.436	-430.452	D	9.736	9.736	0	8.459	0	0	0	0	0	13.68
2001	347	23	2704	329.056	-425.092	D	9.775	9.768	0.008	8.544	0	0	0	0	0	99.98
2001	348	23	2758	335.862	-424.454	D	9.283	9.267	0.016	7.233	0	0	0	0	0	99.99
2001	349	23	2780	339.614	-425.419	D	9.009	9.008	0	6.582	0	0	0	0	0	97.6
2001	350	23	2781	339.842	-425.379	D	10.218	10.218	0	9.779	0	0	0	0	0	94.58

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	351	23	2628	320.933	-436.998	D	9.571	9.555	0.017	7.979	0	0	0	0	0	100
2001	352	23	199	320.795	-437.944	D	6.542	6.542	0	1.147	0	0	0	0	0	41.31
2001	353	23	2789	340.496	-426.449	D	6.75	6.749	0.001	1.554	0	0	0	0	0	99.99
2001	354	23	2588	318.452	-445.8	D	6.471	6.471	0	1.009	0	0	0	0	0	100.07
2001	355	23	1	318.65	-445.782	D	6.487	6.487	0	1.042	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	8.259	8.259	0	4.788	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	6.641	6.641	0	1.34	0	0	0	0	0	0
2001	358	23	2601	319.02	-442.895	D	6.481	6.481	0.001	1.029	0	0	0	0	0	99.97
2001	359	23	2435	337.211	-428.786	D	6.509	6.507	0.002	1.079	0	0	0	0	0	99.96
2001	360	23	2758	335.862	-424.454	D	6.538	6.536	0.001	1.137	0	0	0	0	0	100.02
2001	361	23	2781	339.842	-425.379	D	6.59	6.589	0	1.239	0	0	0	0	0	100
2001	362	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2001	363	23	2711	330.671	-424.932	D	6.653	6.624	0.029	1.308	0	0	0	0	0	100
2001	364	23	2308	337.055	-428.737	D	6.565	6.55	0.016	1.163	0	0	0	0	0	100
2001	365	23	2588	318.452	-445.8	D	6.619	6.619	0	1.298	0	0	0	0	0	98.61
									0.134							
EXIDE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	318.65	-445.782	D	7.785	7.785	0	3.719	0	0	0	0	0	0
2001	2	23	2789	340.496	-426.449	D	7.423	7.421	0.002	2.932	89.91	7.66	0	0	0	2.45
2001	3	23	2789	340.496	-426.449	D	7.762	7.761	0.001	3.667	93.01	5.65	0	0	0	1.19
2001	4	23	1	318.65	-445.782	D	7.031	7.031	0	2.121	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	6.931	6.931	0	1.919	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	6.551	6.551	0	1.165	0	0	0	0	0	0
2001	7	23	2781	339.842	-425.379	D	7.132	7.129	0.003	2.323	84.97	11.13	0	0	0	3.86
2001	8	23	2789	340.496	-426.449	D	8.338	8.335	0.003	4.964	92.72	5.47	0	0	0	1.8
2001	9	23	2783	339.861	-425.806	D	9.574	9.56	0.014	7.993	95.7	3.79	0	0	0	0.49
2001	10	23	2624	320.719	-437.835	D	6.953	6.949	0.004	1.954	95.48	2.98	0	0	0	1.49
2001	11	23	2707	329.748	-425.023	D	9.12	9.119	0	6.86	95.39	2.58	0	0	0	1.47
2001	12	23	1	318.65	-445.782	D	9.519	9.519	0	7.886	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	9.698	9.698	0	8.359	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	9.396	9.396	0	7.566	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	6.74	6.74	0	1.537	0	0	0	0	0	0
2001	16	23	2417	339.654	-425.626	D	6.786	6.786	0	1.627	74.48	8.1	0	0	0	9.05
2001	17	23	2684	326.713	-427.014	D	6.904	6.904	0.001	1.863	83.73	10.66	0	0	0	5.69
2001	18	23	2684	326.713	-427.014	D	6.909	6.909	0	1.874	87.56	5.6	0	0	0	6.57
2001	19	23	2704	329.056	-425.092	D	6.94	6.937	0.002	1.931	78.44	15.68	0	0	0	5.83
2001	20	23	2587	318.699	-445.781	D	6.554	6.553	0.002	1.168	80.87	9.95	0	0	0	9.27

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	21	23	2788	340.294	-426.448	D	6.474	6.474	0	1.015	87.48	7.85	0	0	0	5.76
2001	22	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	6.621	6.621	0	1.303	0	0	0	0	0	0
2001	24	23	2182	335.131	-424.575	D	6.736	6.736	0	1.527	89.4	6.06	0	0	0	4.37
2001	25	23	1	318.65	-445.782	D	6.568	6.568	0	1.197	82.38	6.41	0	0	0	8.37
2001	26	23	1	318.65	-445.782	D	6.538	6.538	0	1.139	0	0	0	0	0	0
2001	27	23	2755	335.167	-424.545	D	6.674	6.674	0	1.405	66.55	19.18	0	0	0	13.65
2001	28	23	2588	318.452	-445.8	D	6.528	6.528	0	1.12	86.1	8.77	0	0	0	4.7
2001	29	23	1	318.65	-445.782	D	8.908	8.908	0	6.335	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	6.819	6.819	0	1.692	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.016	7.016	0	2.09	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	6.478	6.478	0	1.025	0	0	0	0	0	0
2001	33	23	2417	339.654	-425.626	D	6.552	6.552	0	1.167	77.05	9.62	0	0	0	8.04
2001	34	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	6.583	6.583	0	1.226	0	0	0	0	0	0
2001	37	23	2274	336.179	-425.778	D	6.516	6.516	0	1.096	62.2	2.54	0	0	0	9.07
2001	38	23	1415	329.185	-425.086	D	8.001	8.001	0	4.2	81.4	5.39	0	0	0	7.55
2001	39	23	1	318.65	-445.782	D	10.07	10.07	0	9.369	0	0	0	0	0	0
2001	40	23	2704	329.056	-425.092	D	9.409	9.39	0.019	7.55	94.16	5.29	0	0	0	0.54
2001	41	23	2634	322.092	-436.482	D	6.683	6.683	0.001	1.423	76.68	12.55	0	0	0	10.75
2001	42	23	13	319.06	-443.766	D	6.471	6.471	0	1.01	92.21	7.42	0	0	0	6.92
2001	43	23	1	318.65	-445.782	D	6.879	6.879	0	1.812	0	0	0	0	0	0
2001	44	23	1	318.65	-445.782	D	9.412	9.412	0	7.606	0	0	0	0	0	0
2001	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	46	23	2589	318.383	-445.593	D	9.317	9.303	0.014	7.326	95.07	4.19	0	0	0	0.73
2001	47	23	2589	318.383	-445.593	D	8.471	8.464	0.007	5.266	92.53	5.96	0	0	0	1.5
2001	48	23	1	318.65	-445.782	D	6.531	6.531	0	1.127	0	0	0	0	0	0
2001	49	23	13	319.06	-443.766	D	6.473	6.473	0	1.013	81.18	3.75	0	0	0	4.41
2001	50	23	1549	330.211	-425.79	D	6.497	6.497	0	1.06	93.79	4.26	0	0	0	3.6
2001	51	23	1	318.65	-445.782	D	9.197	9.197	0	7.056	0	0	0	0	0	0
2001	52	23	2695	328.074	-426.025	D	8.125	8.125	0	4.479	95.13	3.19	0	0	0	0.72
2001	53	23	623	324.229	-442.54	D	7.106	7.106	0	2.275	93.66	3.21	0	0	0	0.95
2001	54	23	1	318.65	-445.782	D	6.752	6.752	0	1.56	0	0	0	0	0	0
2001	55	23	1	318.65	-445.782	D	9.447	9.447	0	7.697	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.222	7.222	0	2.515	0	0	0	0	0	0
2001	57	23	2129	335.167	-431.069	D	6.499	6.499	0	1.064	81.94	0.97	0	0	0	4.14
2001	58	23	2781	339.842	-425.379	D	6.517	6.517	0	1.099	94.67	2.65	0	0	0	2.71
2001	59	23	863	325.509	-431.992	D	7.147	7.146	0	2.358	95.79	2.96	0	0	0	0.63

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	60	23	863	325.509	-431.992	D	6.698	6.698	0	1.453	95.83	2.1	0	0	0	0.9
2001	61	23	1412	329.218	-425.834	D	8.571	8.571	0	5.518	88.87	1.31	0	0	0	0.21
2001	62	23	1	318.65	-445.782	D	6.735	6.735	0	1.527	0	0	0	0	0	0
2001	63	23	2597	318.971	-443.851	D	6.62	6.618	0.002	1.296	94.64	2.54	0	0	0	2.77
2001	64	23	2588	318.452	-445.8	D	6.523	6.523	0.001	1.11	84.01	6.52	0	0	0	9.51
2001	65	23	2788	340.294	-426.448	D	6.526	6.526	0.001	1.116	86.31	6.47	0	0	0	6.84
2001	66	23	2588	318.452	-445.8	D	6.472	6.471	0.001	1.011	92.17	1.66	0	0	0	5.96
2001	67	23	2412	339.417	-425.886	D	6.543	6.541	0.002	1.146	92.12	2.95	0	0	0	4.76
2001	68	23	2780	339.614	-425.419	D	6.494	6.493	0.001	1.052	81.23	7.73	0	0	0	10.95
2001	69	23	863	325.509	-431.992	D	6.471	6.471	0	1.009	83.95	2.44	0	0	0	5.89
2001	70	23	2274	336.179	-425.778	D	6.502	6.502	0	1.069	48.77	0.76	0	0	0	2.2
2001	71	23	2236	336.149	-430.776	D	8.884	8.884	0	6.276	10.04	0.13	0	0	0	0.15
2001	72	23	1	318.65	-445.782	D	6.558	6.558	0	1.178	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	74	23	13	319.06	-443.766	D	9.735	9.735	0	8.455	69.55	2.17	0	0	0	0.41
2001	75	23	1	318.65	-445.782	D	7.879	7.879	0	3.926	77.84	17.18	0	0	0	4.55
2001	76	23	13	319.06	-443.766	D	6.574	6.573	0	1.209	79.37	11.22	0	0	0	9.31
2001	77	23	1	318.65	-445.782	D	6.502	6.502	0	1.069	0	0	0	0	0	0
2001	78	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	79	23	1	318.65	-445.782	D	6.495	6.495	0	1.057	0	0	0	0	0	0
2001	80	23	1	318.65	-445.782	D	6.473	6.473	0	1.013	0	0	0	0	0	0
2001	81	23	1	318.65	-445.782	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	82	23	1	318.65	-445.782	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2001	83	23	1	318.65	-445.782	D	6.758	6.758	0	1.572	0	0	0	0	0	0
2001	84	23	1	318.65	-445.782	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	85	23	2588	318.452	-445.8	D	6.479	6.478	0	1.024	78.07	8.34	0	0	0	13.45
2001	86	23	1	318.65	-445.782	D	6.468	6.468	0	1.005	0	0	0	0	0	0
2001	87	23	2588	318.452	-445.8	D	6.53	6.529	0	1.123	96.22	2.05	0	0	0	1.93
2001	88	23	2693	327.829	-426.17	D	7.39	7.39	0	2.867	97.44	1.23	0	0	0	0.7
2001	89	23	2653	324.014	-433.36	D	9.21	9.21	0.001	7.088	98.64	0.76	0	0	0	0.24
2001	90	23	1	318.65	-445.782	D	7.628	7.628	0	3.376	98.83	0.93	0	0	0	0.41
2001	91	23	2781	339.842	-425.379	D	6.479	6.479	0	1.026	86.91	4.54	0	0	0	8.56
2001	92	23	1	318.65	-445.782	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	9.747	9.747	0	8.488	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	8.549	8.549	0	5.467	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.507	7.507	0	3.115	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.503	7.503	0	3.108	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	99	23	1	318.65	-445.782	D	7.145	7.145	0	2.355	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.606	7.606	0	3.329	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	9.338	9.338	0	7.417	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	6.571	6.571	0	1.204	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.079	7.079	0	2.219	0	0	0	0	0	0
2001	105	23	2274	336.179	-425.778	D	8.944	8.943	0	6.422	89.46	0.31	0	0	0	5.07
2001	106	23	2789	340.496	-426.449	D	6.504	6.503	0.001	1.073	92.71	1.62	0	0	0	5.65
2001	107	23	2275	336.168	-425.529	D	6.478	6.478	0	1.023	83.02	5.89	0	0	0	10.49
2001	108	23	2627	320.879	-437.207	D	6.476	6.476	0	1.02	94.42	0.87	0	0	0	4.48
2001	109	23	1551	330.189	-425.292	D	6.567	6.567	0	1.195	96.6	0.6	0	0	0	2.55
2001	110	23	1	318.65	-445.782	D	10.01	10.01	0	9.202	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	8.281	8.281	0	4.837	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	8.135	8.135	0	4.503	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	8.008	8.008	0	4.216	0	0	0	0	0	0
2001	114	23	2784	339.87	-426.019	D	6.504	6.504	0	1.073	88.87	0.68	0	0	0	9.21
2001	115	23	2417	339.654	-425.626	D	6.477	6.477	0	1.021	92.9	1.05	0	0	0	5.95
2001	116	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	6.586	6.586	0	1.232	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	6.585	6.585	0	1.231	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	6.867	6.867	0	1.788	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.147	7.147	0	2.358	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	6.839	6.839	0	1.734	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.129	7.129	0	2.323	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.25	7.25	0	2.573	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	8.868	8.868	0	6.236	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	8.924	8.924	0	6.374	0	0	0	0	0	0
2001	127	23	2781	339.842	-425.379	D	8.406	8.405	0	5.127	94.4	0.18	0	0	0	5.22
2001	128	23	2	318.639	-445.533	D	6.576	6.575	0.001	1.212	95.53	0.29	0	0	0	4.13
2001	129	23	23	319.319	-444.004	D	6.884	6.883	0.001	1.822	98.05	0.14	0	0	0	1.65
2001	130	23	2788	340.294	-426.448	D	6.953	6.953	0	1.963	96.24	0.09	0	0	0	1.04
2001	131	23	1	318.65	-445.782	D	8.246	8.246	0	4.756	0	0	0	0	0	0
2001	132	23	2684	326.713	-427.014	D	8.857	8.852	0.005	6.196	97.38	2.19	0	0	0	0.39
2001	133	23	67	319.674	-440.741	D	6.56	6.56	0	1.182	96.89	0.06	0	0	0	2.14
2001	134	23	2784	339.87	-426.019	D	6.745	6.745	0	1.546	97.77	0.05	0	0	0	1.36
2001	135	23	1	318.65	-445.782	D	6.961	6.961	0	1.979	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.897	7.897	0	3.966	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	138	23	1	318.65	-445.782	D	7.89	7.89	0	3.951	0	0	0	0	0	0
2001	139	23	1	318.65	-445.782	D	7.288	7.288	0	2.653	0	0	0	0	0	0
2001	140	23	1	318.65	-445.782	D	7.627	7.627	0	3.373	0	0	0	0	0	0
2001	141	23	1	318.65	-445.782	D	8.961	8.961	0	6.464	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	6.534	6.534	0	1.131	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	6.566	6.566	0	1.193	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	6.546	6.546	0	1.156	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	6.809	6.809	0	1.673	0	0	0	0	0	0
2001	148	23	2401	338.661	-425.669	D	8.048	8.048	0	4.305	94.16	0.02	0	0	0	3.66
2001	149	23	2784	339.87	-426.019	D	6.969	6.968	0.001	1.993	98.18	0.15	0	0	0	1.79
2001	150	23	2307	336.654	-425.258	D	8.428	8.428	0	5.181	90.5	0.38	0	0	0	0.71
2001	151	23	1	318.65	-445.782	D	9.068	9.068	0	6.73	0	0	0	0	0	0
2001	152	23	13	319.06	-443.766	D	7.159	7.157	0.001	2.381	95.31	1.37	0	0	0	3.15
2001	153	23	2209	335.38	-424.564	D	7.183	7.183	0	2.434	92.94	0.67	0	0	0	5.38
2001	154	23	2789	340.496	-426.449	D	7.576	7.576	0	3.264	97.98	0.43	0	0	0	1.5
2001	155	23	1	318.65	-445.782	D	8.894	8.894	0	6.3	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	8.375	8.375	0	5.056	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.624	7.624	0	3.368	0	0	0	0	0	0
2001	158	23	2780	339.614	-425.419	D	8.144	8.143	0	4.522	98.27	0.02	0	0	0	1.17
2001	159	23	1548	330.222	-426.04	D	7.299	7.292	0.007	2.661	99.11	0.11	0	0	0	0.76
2001	160	23	2704	329.056	-425.092	D	7.436	7.431	0.005	2.954	99.13	0.08	0	0	0	0.76
2001	161	23	2709	330.21	-424.978	D	7.765	7.761	0.003	3.667	99.53	0.03	0	0	0	0.46
2001	162	23	2784	339.87	-426.019	D	7.012	7.011	0	2.081	99.29	0.02	0	0	0	0.68
2001	163	23	2037	333.945	-425.876	D	6.864	6.864	0	1.782	92.05	0.01	0	0	0	0.6
2001	164	23	1	318.65	-445.782	D	7.137	7.137	0	2.339	0	0	0	0	0	0
2001	165	23	1	318.65	-445.782	D	7.321	7.321	0	2.721	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	8.275	8.275	0	4.824	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	6.521	6.521	0	1.108	0	0	0	0	0	0
2001	168	23	1	318.65	-445.782	D	6.545	6.545	0	1.153	96.5	0.01	0	0	0	3.13
2001	169	23	639	324.055	-438.55	D	6.675	6.675	0	1.407	96.71	0.02	0	0	0	1.83
2001	170	23	1	318.65	-445.782	D	7.178	7.178	0	2.423	0	0	0	0	0	0
2001	171	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	172	23	2589	318.383	-445.593	D	7.364	7.364	0	2.812	98.44	0.1	0	0	0	1.04
2001	173	23	2588	318.452	-445.8	D	6.845	6.844	0.001	1.744	95.39	0.1	0	0	0	4.47
2001	174	23	2588	318.452	-445.8	D	6.595	6.592	0.003	1.245	95.55	0.1	0	0	0	4.36
2001	175	23	2571	322.646	-445.476	D	6.774	6.773	0.001	1.602	97.98	0.04	0	0	0	2.06
2001	176	23	1	318.65	-445.782	D	8.457	8.451	0.006	5.235	99.38	0.11	0	0	0	0.48

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	177	23	2694	327.861	-425.964	D	7.157	7.155	0.002	2.376	99.11	0.04	0	0	0	0.87
2001	178	23	1242	327.988	-426.138	D	6.932	6.932	0	1.92	98.76	0.04	0	0	0	1.06
2001	179	23	1242	327.988	-426.138	D	9.023	9.022	0.001	6.616	99.36	0.1	0	0	0	0.26
2001	180	23	1046	326.812	-427.688	D	8.697	8.697	0	5.82	96.94	0.03	0	0	0	0.27
2001	181	23	1	318.65	-445.782	D	8.968	8.968	0	6.482	0	0	0	0	0	0
2001	182	23	1	318.65	-445.782	D	9.28	9.28	0	7.268	0	0	0	0	0	0
2001	183	23	2693	327.829	-426.17	D	7.243	7.243	0	2.559	97.98	0.45	0	0	0	1.13
2001	184	23	2036	333.956	-426.126	D	7.387	7.387	0	2.86	91.58	0.01	0	0	0	0.8
2001	185	23	1	318.65	-445.782	D	7.174	7.174	0	2.415	0	0	0	0	0	0
2001	186	23	1	318.65	-445.782	D	6.973	6.973	0	2.003	0	0	0	0	0	0
2001	187	23	2338	337.551	-428.716	D	7.635	7.635	0	3.392	80.53	0	0	0	0	0.78
2001	188	23	2416	339.665	-425.875	D	8.687	8.687	0	5.797	91.27	0.01	0	0	0	0.23
2001	189	23	1	318.65	-445.782	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.028	7.028	0	2.115	0	0	0	0	0	0
2001	191	23	2789	340.496	-426.449	D	7.25	7.248	0.002	2.57	99.17	0.07	0	0	0	0.75
2001	192	23	2416	339.665	-425.875	D	7.097	7.096	0.001	2.255	98.97	0.04	0	0	0	0.95
2001	193	23	2412	339.417	-425.886	D	7.983	7.982	0	4.158	99.45	0.03	0	0	0	0.4
2001	194	23	2788	340.294	-426.448	D	9.072	9.072	0	6.741	98.47	0.29	0	0	0	0.21
2001	195	23	1	318.65	-445.782	D	6.654	6.654	0	1.367	0	0	0	0	0	0
2001	196	23	1	318.65	-445.782	D	6.685	6.685	0	1.427	0	0	0	0	0	0
2001	197	23	1	318.65	-445.782	D	7.148	7.148	0	2.362	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.972	7.972	0	4.135	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.881	7.881	0	3.931	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.405	7.405	0	2.898	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.353	7.353	0	2.789	0	0	0	0	0	0
2001	202	23	1	318.65	-445.782	D	6.852	6.852	0	1.76	0	0	0	0	0	0
2001	203	23	1	318.65	-445.782	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	204	23	1	318.65	-445.782	D	7.813	7.813	0	3.782	0	0	0	0	0	0
2001	205	23	1	318.65	-445.782	D	8.301	8.301	0	4.884	0	0	0	0	0	0
2001	206	23	1	318.65	-445.782	D	8.028	8.028	0	4.26	0	0	0	0	0	0
2001	207	23	1	318.65	-445.782	D	9.042	9.042	0	6.666	0	0	0	0	0	0
2001	208	23	1	318.65	-445.782	D	9.026	9.026	0	6.625	0	0	0	0	0	0
2001	209	23	1	318.65	-445.782	D	9.225	9.225	0	7.126	0	0	0	0	0	0
2001	210	23	1	318.65	-445.782	D	9.071	9.071	0	6.738	0	0	0	0	0	0
2001	211	23	1	318.65	-445.782	D	9.169	9.169	0	6.985	0	0	0	0	0	0
2001	212	23	1	318.65	-445.782	D	8.473	8.473	0	5.286	0	0	0	0	0	0
2001	213	23	1	318.65	-445.782	D	8.245	8.245	0	4.754	0	0	0	0	0	0
2001	214	23	1	318.65	-445.782	D	7.764	7.764	0	3.674	0	0	0	0	0	0
2001	215	23	1	318.65	-445.782	D	7.135	7.135	0	2.335	0	0	0	0	0	0

Appendix M
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2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	216	23	1	318.65	-445.782	D	6.999	6.999	0	2.056	0	0	0	0	0	0
2001	217	23	1	318.65	-445.782	D	7.138	7.138	0	2.34	0	0	0	0	0	0
2001	218	23	1	318.65	-445.782	D	7.208	7.208	0	2.485	0	0	0	0	0	0
2001	219	23	1	318.65	-445.782	D	7.407	7.407	0	2.902	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.7	7.7	0	3.534	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.773	7.773	0	3.694	0	0	0	0	0	0
2001	222	23	1552	330.178	-425.042	D	7.394	7.393	0.001	2.874	98.05	0.03	0	0	0	1.94
2001	223	23	2781	339.842	-425.379	D	9.079	9.067	0.013	6.729	99.08	0.55	0	0	0	0.36
2001	224	23	2468	334.002	-434.887	D	7.417	7.417	0.001	2.923	99.27	0.1	0	0	0	0.63
2001	225	23	2789	340.496	-426.449	D	7.588	7.587	0.001	3.288	98.96	0.4	0	0	0	0.49
2001	226	23	1549	330.211	-425.79	D	6.932	6.932	0	1.92	34.17	0.01	0	0	0	0.44
2001	227	23	1	318.65	-445.782	D	6.848	6.848	0	1.751	0	0	0	0	0	0
2001	228	23	2413	339.406	-425.637	D	7.723	7.723	0	3.584	100.13	1.53	0	0	0	0.37
2001	229	23	623	324.229	-442.54	D	6.681	6.681	0	1.419	19.51	0	0	0	0	0.45
2001	230	23	2408	339.168	-425.897	D	6.933	6.933	0	1.921	100.28	0.04	0	0	0	1.17
2001	231	23	2416	339.665	-425.875	D	6.882	6.882	0	1.819	88.33	0.62	0	0	0	9.76
2001	232	23	1	318.65	-445.782	D	7.006	7.006	0	2.069	95.48	0.03	0	0	0	3.83
2001	233	23	2386	338.533	-428.423	D	7.601	7.601	0	3.318	27.94	0	0	0	0	0.31
2001	234	23	1	318.65	-445.782	D	6.991	6.991	0	2.041	0	0	0	0	0	0
2001	235	23	1	318.65	-445.782	D	7.076	7.076	0	2.213	0	0	0	0	0	0
2001	236	23	1	318.65	-445.782	D	7.113	7.113	0	2.289	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2001	238	23	1415	329.185	-425.086	D	7.345	7.342	0.002	2.767	97.36	0.45	0	0	0	2.17
2001	239	23	2571	322.646	-445.476	D	7.367	7.365	0.003	2.813	98.67	0.12	0	0	0	1.3
2001	240	23	1	318.65	-445.782	D	6.92	6.92	0	1.895	98.46	0.04	0	0	0	1.5
2001	241	23	1444	329.488	-426.322	D	7.525	7.524	0.001	3.152	98.87	0.07	0	0	0	0.76
2001	242	23	2415	339.676	-426.124	D	8.503	8.502	0.001	5.355	99.19	0.17	0	0	0	0.3
2001	243	23	73	320.074	-444.221	D	8.684	8.684	0	5.788	91.59	0.13	0	0	0	0.27
2001	244	23	1415	329.185	-425.086	D	8.522	8.52	0.002	5.397	99.17	0.19	0	0	0	0.48
2001	245	23	2695	328.074	-426.025	D	8.855	8.85	0.005	6.192	99.49	0.24	0	0	0	0.3
2001	246	23	2762	336.074	-425.006	D	8.291	8.29	0.001	4.859	99.16	0.04	0	0	0	0.46
2001	247	23	1552	330.178	-425.042	D	7.148	7.147	0.001	2.36	98.9	0.02	0	0	0	0.93
2001	248	23	2704	329.056	-425.092	D	7.445	7.444	0.001	2.981	99.06	0.04	0	0	0	0.91
2001	249	23	2275	336.168	-425.529	D	7.486	7.486	0	3.07	99.07	0.02	0	0	0	0.57
2001	250	23	1	318.65	-445.782	D	8.117	8.117	0	4.462	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	9.202	9.202	0	7.068	0	0	0	0	0	0
2001	252	23	1448	329.444	-425.324	D	9.126	9.124	0.001	6.873	96.24	0.18	0	0	0	3.36
2001	253	23	2789	340.496	-426.449	D	7.006	7.004	0.002	2.066	96.51	0.33	0	0	0	3.13
2001	254	23	16	319.027	-443.017	D	6.788	6.787	0.001	1.629	97.19	0.1	0	0	0	2.63

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	255	23	1412	329.218	-425.834	D	6.849	6.849	0	1.753	96.37	0.14	0	0	0	1.76
2001	256	23	2413	339.406	-425.637	D	7.004	7.004	0	2.066	98.26	0.09	0	0	0	1.36
2001	257	23	2236	336.149	-430.776	D	7.48	7.48	0	3.058	98.95	0.08	0	0	0	0.83
2001	258	23	1	318.65	-445.782	D	6.96	6.96	0	1.977	97.6	0.02	0	0	0	1.03
2001	259	23	623	324.229	-442.54	D	6.74	6.74	0	1.536	58.42	0.06	0	0	0	0.94
2001	260	23	1	318.65	-445.782	D	7.078	7.078	0	2.217	0	0	0	0	0	0
2001	261	23	1	318.65	-445.782	D	9.081	9.081	0	6.764	0	0	0	0	0	0
2001	262	23	2597	318.971	-443.851	D	8.584	8.583	0.001	5.548	97.34	0.32	0	0	0	2.36
2001	263	23	2588	318.452	-445.8	D	6.893	6.893	0	1.841	97.29	0.05	0	0	0	2.6
2001	264	23	2255	335.942	-426.039	D	7.207	7.206	0.001	2.481	98.54	0.14	0	0	0	1.18
2001	265	23	2588	318.452	-445.8	D	7.164	7.163	0.001	2.391	97.66	0.43	0	0	0	1.73
2001	266	23	1415	329.185	-425.086	D	7.987	7.986	0.001	4.165	98.16	0.98	0	0	0	0.65
2001	267	23	2588	318.452	-445.8	D	8.609	8.604	0.005	5.597	97.76	1.99	0	0	0	0.27
2001	268	23	1	318.65	-445.782	D	6.641	6.641	0	1.341	0	0	0	0	0	0
2001	269	23	1	318.65	-445.782	D	6.543	6.543	0	1.15	0	0	0	0	0	0
2001	270	23	1	318.65	-445.782	D	6.643	6.643	0	1.344	0	0	0	0	0	0
2001	271	23	1242	327.988	-426.138	D	6.712	6.712	0	1.48	90.69	0.3	0	0	0	1.57
2001	272	23	1	318.65	-445.782	D	7.084	7.084	0	2.229	0	0	0	0	0	0
2001	273	23	1	318.65	-445.782	D	7.066	7.066	0	2.193	0	0	0	0	0	0
2001	274	23	1	318.65	-445.782	D	7.111	7.111	0	2.285	0	0	0	0	0	0
2001	275	23	1	318.65	-445.782	D	6.85	6.85	0	1.755	0	0	0	0	0	0
2001	276	23	1	318.65	-445.782	D	7.64	7.64	0	3.401	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	8.468	8.468	0	5.274	0	0	0	0	0	0
2001	278	23	1483	329.682	-425.064	D	9.643	9.642	0.001	8.208	98.27	1.21	0	0	0	0.25
2001	279	23	14	319.049	-443.516	D	7.154	7.153	0	2.373	94.49	1.49	0	0	0	3.76
2001	280	23	2788	340.294	-426.448	D	6.558	6.557	0	1.177	94.77	1.01	0	0	0	4.18
2001	281	23	1047	326.802	-427.438	D	6.608	6.608	0	1.276	90.63	0.3	0	0	0	2.76
2001	282	23	1	318.65	-445.782	D	7.968	7.968	0	4.125	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	284	23	2276	336.157	-425.28	D	10.176	10.176	0	9.662	57.81	0.28	0	0	0	0.35
2001	285	23	2704	329.056	-425.092	D	9.669	9.667	0.001	8.276	97.55	1.85	0	0	0	0.43
2001	286	23	1548	330.222	-426.04	D	9.959	9.956	0.003	9.054	98.79	0.64	0	0	0	0.44
2001	287	23	2210	335.901	-430.787	D	7.512	7.507	0.005	3.115	98.13	1.51	0	0	0	0.37
2001	288	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2001	289	23	2781	339.842	-425.379	D	7.145	7.142	0.002	2.35	95.66	3.03	0	0	0	1.33
2001	290	23	2236	336.149	-430.776	D	6.489	6.488	0.001	1.043	89.34	2.9	0	0	0	7.93
2001	291	23	2789	340.496	-426.449	D	6.549	6.548	0	1.16	95.91	1.11	0	0	0	2.71
2001	292	23	1	318.65	-445.782	D	6.799	6.799	0	1.653	0	0	0	0	0	0
2001	293	23	2684	326.713	-427.014	D	8.385	8.385	0	5.079	96.08	1.09	0	0	0	0.63

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	294	23	1	318.65	-445.782	D	9.362	9.362	0	7.476	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	9.29	9.29	0	7.294	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	297	23	2415	339.676	-426.124	D	9.501	9.501	0	7.837	94.81	1.47	0	0	0	3.5
2001	298	23	1	318.65	-445.782	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	300	23	1048	326.791	-427.189	D	6.472	6.472	0	1.012	79.64	7.97	0	0	0	12.09
2001	301	23	199	320.795	-437.944	D	6.478	6.478	0	1.023	92.44	1.03	0	0	0	2.94
2001	302	23	1549	330.211	-425.79	D	6.499	6.499	0	1.065	26.2	0.05	0	0	0	0.4
2001	303	23	1	318.65	-445.782	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	6.695	6.695	0	1.447	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	9.032	9.032	0	6.64	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	9.835	9.835	0	8.726	0	0	0	0	0	0
2001	307	23	2781	339.842	-425.379	D	9.677	9.675	0.002	8.296	97.5	1.96	0	0	0	0.48
2001	308	23	1242	327.988	-426.138	D	6.938	6.937	0	1.931	98.17	0.32	0	0	0	1.45
2001	309	23	2781	339.842	-425.379	D	8.378	8.368	0.01	5.041	97.06	2.01	0	0	0	0.92
2001	310	23	2708	329.979	-425	D	8.056	8.048	0.008	4.305	98.49	0.74	0	0	0	0.75
2001	311	23	607	323.774	-437.813	D	7.216	7.213	0.003	2.497	98.54	0.3	0	0	0	1.22
2001	312	23	2789	340.496	-426.449	D	7.269	7.268	0.001	2.612	97.77	0.29	0	0	0	1.85
2001	313	23	201	321.37	-445.413	D	6.615	6.615	0	1.289	95.8	0.38	0	0	0	2.62
2001	314	23	1	318.65	-445.782	D	6.787	6.786	0.001	1.628	94.9	1.7	0	0	0	3.35
2001	315	23	2788	340.294	-426.448	D	6.799	6.799	0	1.653	94.24	0.8	0	0	0	4.39
2001	316	23	3	318.888	-445.522	D	6.628	6.627	0	1.314	92.86	1.49	0	0	0	5.1
2001	317	23	199	320.795	-437.944	D	6.698	6.698	0	1.453	94.77	0.64	0	0	0	2.76
2001	318	23	1	318.65	-445.782	D	7.492	7.492	0	3.083	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	8.023	8.023	0	4.249	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.729	7.729	0	3.597	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.103	7.103	0	2.268	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	8.032	8.032	0	4.27	0	0	0	0	0	0
2001	323	23	2788	340.294	-426.448	D	8.464	8.463	0.001	5.264	74.84	22.07	0	0	0	2.87
2001	324	23	2602	319.088	-442.669	D	6.476	6.475	0	1.018	76.39	9.54	0	0	0	14.22
2001	325	23	1951	333.842	-434.874	D	6.471	6.471	0	1.009	91.26	3.61	0	0	0	5.5
2001	326	23	2412	339.417	-425.886	D	6.53	6.53	0	1.125	95.84	1.43	0	0	0	2.7
2001	327	23	1	318.65	-445.782	D	8.475	8.475	0	5.291	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	8.774	8.774	0	6.006	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	6.66	6.66	0	1.377	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.063	7.063	0	2.186	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.026	7.026	0	2.111	0	0	0	0	0	0
2001	332	23	2571	322.646	-445.476	D	9.271	9.266	0.005	7.232	91.34	8.02	0	0	0	0.62

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	333	23	2571	322.646	-445.476	D	10.218	10.218	0	9.779	95.22	3.89	0	0	0	0.19
2001	334	23	2588	318.452	-445.8	D	8.544	8.541	0.002	5.448	87.68	10.76	0	0	0	1.57
2001	335	23	1	318.65	-445.782	D	6.625	6.625	0	1.31	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	6.688	6.688	0	1.434	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	6.971	6.971	0	1.999	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.231	7.231	0	2.534	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	9.653	9.653	0	8.239	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	9.943	9.943	0	9.018	0	0	0	0	0	0
2001	341	23	1550	330.2	-425.541	D	8.531	8.531	0	5.424	54.16	0.97	0	0	0	0.81
2001	342	23	2708	329.979	-425	D	8.446	8.445	0.001	5.22	90.77	5.1	0	0	0	4.14
2001	343	23	412	322.208	-436.133	D	6.601	6.601	0	1.262	84.51	7.38	0	0	0	7.91
2001	344	23	1	318.65	-445.782	D	6.522	6.522	0	1.109	91.07	4.2	0	0	0	4.96
2001	345	23	2588	318.452	-445.8	D	6.603	6.603	0	1.266	93.4	2.97	0	0	0	3.17
2001	346	23	1	318.65	-445.782	D	9.752	9.752	0	8.503	0	0	0	0	0	0
2001	347	23	2628	320.933	-436.998	D	9.791	9.791	0	8.607	95.59	3.77	0	0	0	0.5
2001	348	23	2588	318.452	-445.8	D	9.536	9.503	0.034	7.842	95.51	3.97	0	0	0	0.52
2001	349	23	2789	340.496	-426.449	D	9.086	9.077	0.009	6.753	97.47	2.13	0	0	0	0.39
2001	350	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	351	23	2758	335.862	-424.454	D	9.54	9.531	0.009	7.917	93.24	5.75	0	0	0	1.02
2001	352	23	1	318.65	-445.782	D	6.544	6.544	0	1.152	0	0	0	0	0	0
2001	353	23	2588	318.452	-445.8	D	6.816	6.815	0.001	1.686	82.95	9.08	0	0	0	7.81
2001	354	23	1553	330.82	-434.007	D	6.47	6.47	0	1.009	76.11	9.53	0	0	0	13.93
2001	355	23	1	318.65	-445.782	D	6.487	6.487	0	1.042	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	8.259	8.259	0	4.788	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	6.641	6.641	0	1.34	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	359	23	2781	339.842	-425.379	D	6.506	6.506	0.001	1.077	71.01	14.44	0	0	0	14.35
2001	360	23	2758	335.862	-424.454	D	6.537	6.536	0.001	1.137	64.47	18.98	0	0	0	16.49
2001	361	23	1	318.65	-445.782	D	6.605	6.605	0	1.269	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2001	363	23	2781	339.842	-425.379	D	6.617	6.617	0.001	1.293	73.56	14.78	0	0	0	11.54
2001	364	23	2789	340.496	-426.449	D	6.55	6.55	0.001	1.163	73.1	13.86	0	0	0	12.83
2001	365	23	2788	340.294	-426.448	D	6.615	6.615	0	1.29	75.13	14.38	0	0	0	10.27
									0.034							
TRIGEN KC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	2418	339.946	-426.612	D	7.495	7.495	0	3.09	46.48	4.03	0	0	0	0.17

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	2	23	2789	340.496	-426.449	D	7.441	7.421	0.02	2.932	94.72	5.06	0	0	0	0.22
2001	3	23	2789	340.496	-426.449	D	7.77	7.761	0.009	3.667	96.43	3.45	0	0	0	0.1
2001	4	23	1	318.65	-445.782	D	7.031	7.031	0	2.121	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	6.931	6.931	0	1.919	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	6.551	6.551	0	1.165	0	0	0	0	0	0
2001	7	23	2694	327.861	-425.964	D	7.159	7.147	0.011	2.36	86.18	13.15	0	0	0	0.67
2001	8	23	2781	339.842	-425.379	D	8.388	8.383	0.005	5.075	95.08	4.7	0	0	0	0.24
2001	9	23	2758	335.862	-424.454	D	9.796	9.717	0.079	8.408	96.37	3.57	0	0	0	0.06
2001	10	23	2694	327.861	-425.964	D	7.023	7	0.023	2.059	97.17	2.7	0	0	0	0.13
2001	11	23	2758	335.862	-424.454	D	9.136	9.135	0	6.9	98.07	1.74	0	0	0	0.17
2001	12	23	1	318.65	-445.782	D	9.519	9.519	0	7.886	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	9.698	9.698	0	8.359	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	9.396	9.396	0	7.566	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	6.74	6.74	0	1.537	0	0	0	0	0	0
2001	16	23	2781	339.842	-425.379	D	6.788	6.786	0.003	1.627	89.7	9.11	0	0	0	1.24
2001	17	23	2588	318.452	-445.8	D	6.87	6.869	0.002	1.793	90.74	8.55	0	0	0	0.69
2001	18	23	2684	326.713	-427.014	D	6.91	6.909	0.001	1.874	95.91	3.47	0	0	0	0.57
2001	19	23	2597	318.971	-443.851	D	6.908	6.902	0.005	1.861	86.81	12.25	0	0	0	0.9
2001	20	23	2117	334.766	-427.589	D	6.568	6.561	0.007	1.184	86.05	12.36	0	0	0	1.61
2001	21	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	22	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	6.621	6.621	0	1.303	0	0	0	0	0	0
2001	24	23	2704	329.056	-425.092	D	6.742	6.738	0.004	1.533	95.94	3.65	0	0	0	0.39
2001	25	23	2588	318.452	-445.8	D	6.568	6.568	0	1.197	89.03	9.15	0	0	0	1.54
2001	26	23	863	325.509	-431.992	D	6.552	6.552	0	1.166	18.42	1.05	0	0	0	0.13
2001	27	23	2682	326.697	-427.477	D	6.684	6.683	0.001	1.422	79.73	18.06	0	0	0	2.11
2001	28	23	2588	318.452	-445.8	D	6.528	6.528	0	1.12	90.74	7.97	0	0	0	0.48
2001	29	23	1	318.65	-445.782	D	8.908	8.908	0	6.335	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	6.819	6.819	0	1.692	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.016	7.016	0	2.09	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	6.478	6.478	0	1.025	0	0	0	0	0	0
2001	33	23	2417	339.654	-425.626	D	6.552	6.552	0	1.167	78.8	13.08	0	0	0	1.61
2001	34	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	6.583	6.583	0	1.226	0	0	0	0	0	0
2001	37	23	2239	336.117	-430.028	D	6.518	6.518	0	1.101	25.14	0.5	0	0	0	0.35
2001	38	23	1550	330.2	-425.541	D	7.856	7.856	0	3.876	88.64	4.45	0	0	0	0.9
2001	39	23	1	318.65	-445.782	D	10.07	10.07	0	9.369	0	0	0	0	0	0
2001	40	23	2704	329.056	-425.092	D	9.4	9.39	0.01	7.55	97.1	2.86	0	0	0	0.02

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	41	23	2514	327.388	-436.775	D	6.678	6.675	0.002	1.409	81.87	16.2	0	0	0	1.92
2001	42	23	2588	318.452	-445.8	D	6.471	6.471	0	1.01	91.07	7	0	0	0	0.83
2001	43	23	1	318.65	-445.782	D	6.879	6.879	0	1.812	0	0	0	0	0	0
2001	44	23	1	318.65	-445.782	D	9.412	9.412	0	7.606	0	0	0	0	0	0
2001	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	46	23	12	319.07	-444.015	D	9.526	9.303	0.223	7.326	97.44	2.51	0	0	0	0.05
2001	47	23	2456	334.644	-432.056	D	8.308	8.241	0.066	4.747	96.55	3.37	0	0	0	0.08
2001	48	23	1	318.65	-445.782	D	6.531	6.531	0	1.127	0	0	0	0	0	0
2001	49	23	200	320.784	-437.694	D	6.473	6.473	0	1.013	92.67	4.95	0	0	0	0.65
2001	50	23	1550	330.2	-425.541	D	6.497	6.497	0	1.06	90	3.53	0	0	0	0.41
2001	51	23	1	318.65	-445.782	D	9.197	9.197	0	7.056	0	0	0	0	0	0
2001	52	23	2695	328.074	-426.025	D	8.127	8.125	0.003	4.479	97.71	2.23	0	0	0	0.07
2001	53	23	660	324.477	-442.529	D	7.107	7.106	0.001	2.275	97.4	2.18	0	0	0	0.1
2001	54	23	1551	330.189	-425.292	D	6.793	6.793	0	1.642	93.5	4.05	0	0	0	0.54
2001	55	23	1	318.65	-445.782	D	9.447	9.447	0	7.697	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.222	7.222	0	2.515	0	0	0	0	0	0
2001	57	23	2781	339.842	-425.379	D	6.499	6.499	0	1.064	97.19	2.15	0	0	0	0.76
2001	58	23	1415	329.185	-425.086	D	6.523	6.522	0.001	1.108	97.41	2.17	0	0	0	0.37
2001	59	23	2624	320.719	-437.835	D	7.107	7.106	0	2.275	97.28	2.15	0	0	0	0.08
2001	60	23	199	320.795	-437.944	D	6.718	6.718	0	1.493	99.38	1.55	0	0	0	0.11
2001	61	23	2708	329.979	-425	D	8.571	8.571	0	5.518	94.78	1	0	0	0	0.03
2001	62	23	2788	340.294	-426.448	D	6.731	6.731	0	1.518	92.43	2.1	0	0	0	0.43
2001	63	23	2597	318.971	-443.851	D	6.628	6.618	0.01	1.296	96.92	2.71	0	0	0	0.37
2001	64	23	2651	323.652	-433.662	D	6.539	6.533	0.006	1.13	89.42	8.97	0	0	0	1.59
2001	65	23	2789	340.496	-426.449	D	6.527	6.526	0.002	1.116	88.08	10.35	0	0	0	1.47
2001	66	23	2684	326.713	-427.014	D	6.473	6.471	0.002	1.011	98.12	1.23	0	0	0	0.7
2001	67	23	2781	339.842	-425.379	D	6.551	6.541	0.01	1.146	96.66	2.75	0	0	0	0.59
2001	68	23	2789	340.496	-426.449	D	6.493	6.493	0.001	1.052	88.77	9.17	0	0	0	1.9
2001	69	23	13	319.06	-443.766	D	6.471	6.471	0	1.01	96.64	1.73	0	0	0	0.62
2001	70	23	1509	330.017	-427.048	D	6.506	6.506	0	1.077	84.94	1.36	0	0	0	0.36
2001	71	23	2274	336.179	-425.778	D	8.827	8.827	0	6.136	61.38	0.64	0	0	0	0.09
2001	72	23	1	318.65	-445.782	D	6.558	6.558	0	1.178	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	74	23	1	318.65	-445.782	D	9.736	9.736	0	8.459	0	0	0	0	0	0
2001	75	23	2588	318.452	-445.8	D	7.889	7.879	0.01	3.926	93.15	6.59	0	0	0	0.26
2001	76	23	2040	333.912	-425.128	D	6.588	6.587	0.001	1.235	83.68	14.04	0	0	0	2.18
2001	77	23	1	318.65	-445.782	D	6.502	6.502	0	1.069	0	0	0	0	0	0
2001	78	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	79	23	168	320.568	-438.453	D	6.496	6.496	0	1.058	99.01	1.3	0	0	0	0.33

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	80	23	2588	318.452	-445.8	D	6.473	6.473	0.001	1.013	98.28	1.03	0	0	0	0.44
2001	81	23	2704	329.056	-425.092	D	6.492	6.49	0.002	1.046	98.65	0.88	0	0	0	0.32
2001	82	23	2781	339.842	-425.379	D	6.667	6.665	0.001	1.388	98.86	0.88	0	0	0	0.21
2001	83	23	1445	329.477	-426.072	D	6.768	6.766	0.002	1.587	98.97	0.8	0	0	0	0.09
2001	84	23	2626	320.826	-437.417	D	6.472	6.472	0	1.012	93.5	5.02	0	0	0	1.23
2001	85	23	2588	318.452	-445.8	D	6.482	6.478	0.003	1.024	93.28	5.9	0	0	0	0.81
2001	86	23	1	318.65	-445.782	D	6.468	6.468	0	1.005	96.44	1.87	0	0	0	0.45
2001	87	23	2617	320.215	-439.334	D	6.527	6.527	0.001	1.118	97.52	2.19	0	0	0	0.25
2001	88	23	1242	327.988	-426.138	D	7.39	7.39	0	2.867	98.3	1.05	0	0	0	0.09
2001	89	23	1242	327.988	-426.138	D	9.158	9.157	0.001	6.956	99.11	0.78	0	0	0	0.03
2001	90	23	707	324.529	-438.03	D	7.576	7.576	0	3.264	99.19	0.71	0	0	0	0.05
2001	91	23	2789	340.496	-426.449	D	6.481	6.48	0	1.028	94.77	3.94	0	0	0	1.66
2001	92	23	1	318.65	-445.782	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	9.747	9.747	0	8.488	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	8.549	8.549	0	5.467	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.507	7.507	0	3.115	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.503	7.503	0	3.108	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.145	7.145	0	2.355	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.606	7.606	0	3.329	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	9.338	9.338	0	7.417	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	6.571	6.571	0	1.204	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.079	7.079	0	2.219	0	0	0	0	0	0
2001	105	23	2781	339.842	-425.379	D	8.945	8.943	0.002	6.422	98.87	0.71	0	0	0	0.31
2001	106	23	2789	340.496	-426.449	D	6.504	6.503	0.001	1.073	93.89	4.56	0	0	0	1.54
2001	107	23	1415	329.185	-425.086	D	6.48	6.479	0.001	1.026	94.09	4.26	0	0	0	1.64
2001	108	23	2684	326.713	-427.014	D	6.479	6.477	0.002	1.022	98.63	0.91	0	0	0	0.45
2001	109	23	2788	340.294	-426.448	D	6.569	6.568	0.001	1.198	99.25	0.37	0	0	0	0.24
2001	110	23	1	318.65	-445.782	D	10.01	10.01	0	9.202	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	8.281	8.281	0	4.837	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	8.135	8.135	0	4.503	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	8.008	8.008	0	4.216	0	0	0	0	0	0
2001	114	23	2684	326.713	-427.014	D	6.505	6.504	0.001	1.074	98.53	0.54	0	0	0	0.92
2001	115	23	2589	318.383	-445.593	D	6.48	6.478	0.002	1.024	98.75	0.72	0	0	0	0.52
2001	116	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	6.586	6.586	0	1.232	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	6.585	6.585	0	1.231	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	119	23	1	318.65	-445.782	D	6.867	6.867	0	1.788	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.147	7.147	0	2.358	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	6.839	6.839	0	1.734	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.129	7.129	0	2.323	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.25	7.25	0	2.573	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	8.868	8.868	0	6.236	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	8.924	8.924	0	6.374	0	0	0	0	0	0
2001	127	23	2781	339.842	-425.379	D	8.407	8.405	0.002	5.127	99.42	0.1	0	0	0	0.51
2001	128	23	2588	318.452	-445.8	D	6.582	6.575	0.007	1.212	99.42	0.2	0	0	0	0.39
2001	129	23	12	319.07	-444.015	D	6.887	6.883	0.004	1.822	99.75	0.1	0	0	0	0.14
2001	130	23	2788	340.294	-426.448	D	6.953	6.953	0	1.963	99.12	0.06	0	0	0	0.09
2001	131	23	1	318.65	-445.782	D	8.246	8.246	0	4.756	0	0	0	0	0	0
2001	132	23	2789	340.496	-426.449	D	8.784	8.769	0.015	5.994	98.25	1.72	0	0	0	0.04
2001	133	23	2588	318.452	-445.8	D	6.563	6.561	0.002	1.185	99.68	0.02	0	0	0	0.18
2001	134	23	1282	328.236	-426.127	D	6.759	6.758	0.001	1.572	99.68	0.03	0	0	0	0.11
2001	135	23	1	318.65	-445.782	D	6.961	6.961	0	1.979	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.897	7.897	0	3.966	0	0	0	0	0	0
2001	138	23	2628	320.933	-436.998	D	7.725	7.72	0.005	3.577	99.7	0.22	0	0	0	0.06
2001	139	23	2694	327.861	-425.964	D	7.751	7.713	0.038	3.561	99.8	0.15	0	0	0	0.04
2001	140	23	1282	328.236	-426.127	D	7.562	7.556	0.007	3.22	99.66	0.22	0	0	0	0.08
2001	141	23	2781	339.842	-425.379	D	8.844	8.843	0.001	6.174	99.18	0.69	0	0	0	0.02
2001	142	23	1	318.65	-445.782	D	6.534	6.534	0	1.131	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	6.566	6.566	0	1.193	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	6.546	6.546	0	1.156	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	6.809	6.809	0	1.673	0	0	0	0	0	0
2001	148	23	2781	339.842	-425.379	D	8.048	8.048	0	4.305	99.78	0.01	0	0	0	0.28
2001	149	23	2789	340.496	-426.449	D	6.978	6.968	0.01	1.993	99.76	0.09	0	0	0	0.13
2001	150	23	2758	335.862	-424.454	D	8.485	8.484	0.002	5.312	99.74	0.15	0	0	0	0.08
2001	151	23	1412	329.218	-425.834	D	9.006	9.006	0	6.576	96.84	0.29	0	0	0	0.05
2001	152	23	2789	340.496	-426.449	D	7.049	7.049	0	2.158	97.42	1.1	0	0	0	0.45
2001	153	23	2784	339.87	-426.019	D	7.14	7.138	0.002	2.341	99.1	0.21	0	0	0	0.69
2001	154	23	2789	340.496	-426.449	D	7.579	7.576	0.003	3.264	99.5	0.36	0	0	0	0.11
2001	155	23	1	318.65	-445.782	D	8.894	8.894	0	6.3	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	8.375	8.375	0	5.056	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.624	7.624	0	3.368	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	158	23	2781	339.842	-425.379	D	8.147	8.143	0.004	4.522	99.8	0.04	0	0	0	0.1
2001	159	23	2684	326.713	-427.014	D	7.331	7.283	0.048	2.642	99.83	0.11	0	0	0	0.06
2001	160	23	2589	318.383	-445.593	D	7.381	7.36	0.021	2.804	99.92	0.02	0	0	0	0.06
2001	161	23	2709	330.21	-424.978	D	7.783	7.761	0.022	3.667	99.94	0.03	0	0	0	0.04
2001	162	23	2784	339.87	-426.019	D	7.013	7.011	0.002	2.081	99.89	0.01	0	0	0	0.06
2001	163	23	2182	335.131	-424.575	D	6.864	6.864	0	1.782	97.43	0.01	0	0	0	0.05
2001	164	23	1	318.65	-445.782	D	7.137	7.137	0	2.339	0	0	0	0	0	0
2001	165	23	1	318.65	-445.782	D	7.321	7.321	0	2.721	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	8.275	8.275	0	4.824	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	6.521	6.521	0	1.108	0	0	0	0	0	0
2001	168	23	2571	322.646	-445.476	D	6.546	6.545	0.001	1.153	99.74	0.01	0	0	0	0.26
2001	169	23	2789	340.496	-426.449	D	6.653	6.651	0.003	1.36	99.83	0.01	0	0	0	0.18
2001	170	23	2758	335.862	-424.454	D	7.001	7.001	0.001	2.059	99.82	0.01	0	0	0	0.11
2001	171	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	172	23	1513	329.974	-426.051	D	7.34	7.314	0.027	2.706	99.83	0.09	0	0	0	0.08
2001	173	23	2588	318.452	-445.8	D	6.851	6.844	0.007	1.744	99.62	0.1	0	0	0	0.27
2001	174	23	2469	333.771	-434.951	D	6.62	6.606	0.015	1.271	99.37	0.16	0	0	0	0.46
2001	175	23	2571	322.646	-445.476	D	6.774	6.773	0.001	1.602	99.84	0.04	0	0	0	0.23
2001	176	23	2588	318.452	-445.8	D	8.461	8.451	0.01	5.235	99.89	0.05	0	0	0	0.04
2001	177	23	2694	327.861	-425.964	D	7.156	7.155	0.001	2.376	99.82	0.03	0	0	0	0.07
2001	178	23	1242	327.988	-426.138	D	6.932	6.932	0	1.92	99.35	0.04	0	0	0	0.09
2001	179	23	1040	326.878	-429.184	D	9.022	9.022	0	6.616	91.6	0.01	0	0	0	0.02
2001	180	23	1	318.65	-445.782	D	8.855	8.855	0	6.204	0	0	0	0	0	0
2001	181	23	1	318.65	-445.782	D	8.968	8.968	0	6.482	0	0	0	0	0	0
2001	182	23	1415	329.185	-425.086	D	9.396	9.396	0	7.564	98.6	0	0	0	0	0.17
2001	183	23	2695	328.074	-426.025	D	7.246	7.243	0.003	2.559	99.74	0.17	0	0	0	0.07
2001	184	23	2758	335.862	-424.454	D	7.355	7.355	0	2.793	99.4	0.01	0	0	0	0.05
2001	185	23	1	318.65	-445.782	D	7.174	7.174	0	2.415	0	0	0	0	0	0
2001	186	23	2781	339.842	-425.379	D	7.043	7.042	0	2.144	99.96	0	0	0	0	0.18
2001	187	23	2789	340.496	-426.449	D	7.651	7.635	0.015	3.392	99.92	0.02	0	0	0	0.06
2001	188	23	2789	340.496	-426.449	D	8.719	8.713	0.006	5.859	99.97	0.01	0	0	0	0.02
2001	189	23	1	318.65	-445.782	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.028	7.028	0	2.115	0	0	0	0	0	0
2001	191	23	2789	340.496	-426.449	D	7.259	7.248	0.011	2.57	99.84	0.07	0	0	0	0.09
2001	192	23	2781	339.842	-425.379	D	7.11	7.096	0.014	2.255	99.86	0.02	0	0	0	0.13
2001	193	23	2571	322.646	-445.476	D	7.59	7.589	0	3.293	99.98	0.01	0	0	0	0.07
2001	194	23	1	318.65	-445.782	D	9.103	9.103	0	6.82	0	0	0	0	0	0
2001	195	23	1	318.65	-445.782	D	6.654	6.654	0	1.367	0	0	0	0	0	0
2001	196	23	1	318.65	-445.782	D	6.685	6.685	0	1.427	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	197	23	1	318.65	-445.782	D	7.148	7.148	0	2.362	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.972	7.972	0	4.135	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.881	7.881	0	3.931	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.405	7.405	0	2.898	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.353	7.353	0	2.789	0	0	0	0	0	0
2001	202	23	1	318.65	-445.782	D	6.852	6.852	0	1.76	0	0	0	0	0	0
2001	203	23	1	318.65	-445.782	D	6.956	6.956	0	1.97	0	0	0	0	0	0
2001	204	23	1	318.65	-445.782	D	7.813	7.813	0	3.782	0	0	0	0	0	0
2001	205	23	1	318.65	-445.782	D	8.301	8.301	0	4.884	0	0	0	0	0	0
2001	206	23	1	318.65	-445.782	D	8.028	8.028	0	4.26	0	0	0	0	0	0
2001	207	23	2209	335.38	-424.564	D	8.965	8.965	0	6.475	99.09	0.02	0	0	0	0.07
2001	208	23	2784	339.87	-426.019	D	8.907	8.905	0.002	6.326	99.76	0.17	0	0	0	0.02
2001	209	23	1513	329.974	-426.051	D	9.157	9.156	0.001	6.952	99.65	0.12	0	0	0	0.02
2001	210	23	1989	333.97	-432.12	D	8.928	8.928	0	6.384	99.77	0.08	0	0	0	0.02
2001	211	23	2789	340.496	-426.449	D	8.622	8.621	0.001	5.638	99.87	0.04	0	0	0	0.06
2001	212	23	2781	339.842	-425.379	D	8.492	8.49	0.002	5.325	99.93	0.01	0	0	0	0.02
2001	213	23	2399	338.683	-426.168	D	8.238	8.238	0	4.738	99.31	0	0	0	0	0.02
2001	214	23	1	318.65	-445.782	D	7.764	7.764	0	3.674	0	0	0	0	0	0
2001	215	23	1	318.65	-445.782	D	7.135	7.135	0	2.335	0	0	0	0	0	0
2001	216	23	2789	340.496	-426.449	D	7.054	7.049	0.005	2.158	99.77	0.11	0	0	0	0.1
2001	217	23	2588	318.452	-445.8	D	7.138	7.138	0	2.34	99.64	0.02	0	0	0	0.07
2001	218	23	13	319.06	-443.766	D	7.255	7.255	0	2.583	17.47	0	0	0	0	0.02
2001	219	23	1	318.65	-445.782	D	7.407	7.407	0	2.902	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.7	7.7	0	3.534	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.773	7.773	0	3.694	0	0	0	0	0	0
2001	222	23	2709	330.21	-424.978	D	7.395	7.393	0.002	2.874	99.81	0.02	0	0	0	0.21
2001	223	23	2781	339.842	-425.379	D	9.104	9.067	0.037	6.729	99.45	0.51	0	0	0	0.03
2001	224	23	2588	318.452	-445.8	D	7.397	7.393	0.003	2.874	99.8	0.08	0	0	0	0.08
2001	225	23	2790	340.421	-426.562	D	7.59	7.587	0.003	3.288	99.57	0.33	0	0	0	0.04
2001	226	23	199	320.795	-437.944	D	6.929	6.929	0	1.914	59.82	0.01	0	0	0	0.06
2001	227	23	1	318.65	-445.782	D	6.848	6.848	0	1.751	0	0	0	0	0	0
2001	228	23	2784	339.87	-426.019	D	7.582	7.582	0	3.277	98.34	0.5	0	0	0	0.03
2001	229	23	1951	333.842	-434.874	D	6.683	6.683	0	1.423	97.65	0.01	0	0	0	0.24
2001	230	23	2789	340.496	-426.449	D	6.948	6.948	0	1.953	99.64	0.02	0	0	0	0.11
2001	231	23	2779	339.386	-425.461	D	6.882	6.882	0	1.819	96.9	1	0	0	0	1.64
2001	232	23	2694	327.861	-425.964	D	7.033	7.024	0.009	2.106	99.69	0.13	0	0	0	0.18
2001	233	23	2789	340.496	-426.449	D	7.601	7.601	0	3.318	99.41	0.01	0	0	0	0.07
2001	234	23	1	318.65	-445.782	D	6.991	6.991	0	2.041	0	0	0	0	0	0
2001	235	23	1	318.65	-445.782	D	7.076	7.076	0	2.213	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	236	23	1	318.65	-445.782	D	7.113	7.113	0	2.289	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2001	238	23	2781	339.842	-425.379	D	7.362	7.358	0.005	2.799	99.45	0.27	0	0	0	0.27
2001	239	23	2588	318.452	-445.8	D	7.373	7.365	0.008	2.813	99.71	0.18	0	0	0	0.13
2001	240	23	2588	318.452	-445.8	D	6.926	6.92	0.007	1.895	99.83	0.06	0	0	0	0.12
2001	241	23	2597	318.971	-443.851	D	7.657	7.646	0.011	3.415	99.84	0.08	0	0	0	0.06
2001	242	23	2784	339.87	-426.019	D	8.51	8.502	0.008	5.355	99.77	0.19	0	0	0	0.03
2001	243	23	1387	329.491	-432.067	D	8.449	8.448	0	5.228	99.31	0.17	0	0	0	0.03
2001	244	23	2704	329.056	-425.092	D	8.538	8.52	0.018	5.397	99.68	0.26	0	0	0	0.05
2001	245	23	2693	327.829	-426.17	D	8.867	8.85	0.017	6.192	99.84	0.13	0	0	0	0.03
2001	246	23	1548	330.222	-426.04	D	8.281	8.278	0.004	4.83	99.88	0.02	0	0	0	0.04
2001	247	23	2710	330.44	-424.955	D	7.151	7.147	0.003	2.36	99.86	0.02	0	0	0	0.08
2001	248	23	2762	336.074	-425.006	D	7.523	7.518	0.006	3.139	99.87	0.04	0	0	0	0.06
2001	249	23	2277	336.146	-425.03	D	7.486	7.486	0	3.07	99.82	0.01	0	0	0	0.05
2001	250	23	1	318.65	-445.782	D	8.117	8.117	0	4.462	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	9.202	9.202	0	7.068	0	0	0	0	0	0
2001	252	23	2704	329.056	-425.092	D	9.138	9.124	0.013	6.873	99.42	0.3	0	0	0	0.27
2001	253	23	2789	340.496	-426.449	D	7.012	7.004	0.008	2.066	98.91	0.61	0	0	0	0.47
2001	254	23	2589	318.383	-445.593	D	6.785	6.784	0.001	1.623	99.46	0.06	0	0	0	0.36
2001	255	23	2628	320.933	-436.998	D	6.844	6.844	0	1.744	98.97	0.08	0	0	0	0.14
2001	256	23	2781	339.842	-425.379	D	7.005	7.004	0.001	2.066	99.85	0.1	0	0	0	0.13
2001	257	23	2762	336.074	-425.006	D	7.477	7.473	0.004	3.044	99.77	0.14	0	0	0	0.07
2001	258	23	690	324.128	-434.55	D	6.983	6.983	0	2.024	99.67	0.02	0	0	0	0.07
2001	259	23	1509	330.017	-427.048	D	6.726	6.726	0	1.508	93.52	0.14	0	0	0	0.1
2001	260	23	1	318.65	-445.782	D	7.078	7.078	0	2.217	0	0	0	0	0	0
2001	261	23	1	318.65	-445.782	D	9.081	9.081	0	6.764	0	0	0	0	0	0
2001	262	23	2704	329.056	-425.092	D	8.487	8.427	0.06	5.179	99.07	0.89	0	0	0	0.04
2001	263	23	2789	340.496	-426.449	D	6.898	6.898	0	1.851	101.13	0.01	0	0	0	0.17
2001	264	23	2758	335.862	-424.454	D	7.201	7.201	0	2.471	99.73	0.03	0	0	0	0.27
2001	265	23	2588	318.452	-445.8	D	7.167	7.163	0.004	2.391	99.55	0.26	0	0	0	0.13
2001	266	23	2704	329.056	-425.092	D	8.001	7.986	0.015	4.165	99.07	0.87	0	0	0	0.05
2001	267	23	2588	318.452	-445.8	D	8.627	8.604	0.023	5.597	98.82	1.16	0	0	0	0.02
2001	268	23	1	318.65	-445.782	D	6.641	6.641	0	1.341	0	0	0	0	0	0
2001	269	23	1	318.65	-445.782	D	6.543	6.543	0	1.15	0	0	0	0	0	0
2001	270	23	2764	336.51	-425.05	D	6.646	6.646	0	1.351	97.84	0.05	0	0	0	0.3
2001	271	23	2781	339.842	-425.379	D	6.732	6.721	0.011	1.498	99.63	0.16	0	0	0	0.22
2001	272	23	2597	318.971	-443.851	D	7.116	7.112	0.004	2.287	99.78	0.07	0	0	0	0.12
2001	273	23	1	318.65	-445.782	D	7.066	7.066	0	2.193	0	0	0	0	0	0
2001	274	23	2415	339.676	-426.124	D	7.18	7.18	0	2.428	83.62	0.05	0	0	0	0.22

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	275	23	1	318.65	-445.782	D	6.85	6.85	0	1.755	0	0	0	0	0	0
2001	276	23	1	318.65	-445.782	D	7.64	7.64	0	3.401	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	8.468	8.468	0	5.274	0	0	0	0	0	0
2001	278	23	2704	329.056	-425.092	D	9.647	9.642	0.005	8.208	98.95	0.97	0	0	0	0.02
2001	279	23	2605	319.291	-441.992	D	7.155	7.153	0.001	2.373	97.99	1.12	0	0	0	0.7
2001	280	23	375	322.611	-445.359	D	6.56	6.558	0.001	1.18	98.56	0.88	0	0	0	0.45
2001	281	23	2155	334.883	-424.586	D	6.609	6.609	0	1.278	98.35	0.38	0	0	0	0.32
2001	282	23	1	318.65	-445.782	D	7.968	7.968	0	4.125	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	284	23	2684	326.713	-427.014	D	10.218	10.218	0	9.779	99.53	0.28	0	0	0	0.05
2001	285	23	2628	320.933	-436.998	D	9.755	9.734	0.021	8.454	97.9	2.06	0	0	0	0.04
2001	286	23	1548	330.222	-426.04	D	9.972	9.956	0.016	9.054	99.48	0.47	0	0	0	0.03
2001	287	23	2758	335.862	-424.454	D	7.538	7.51	0.029	3.122	98.97	1	0	0	0	0.03
2001	288	23	2628	320.933	-436.998	D	6.928	6.928	0	1.912	95.53	4.12	0	0	0	0.05
2001	289	23	2704	329.056	-425.092	D	7.238	7.231	0.007	2.533	96.39	3.51	0	0	0	0.12
2001	290	23	2441	336.336	-429.538	D	6.492	6.488	0.004	1.043	95.63	3.4	0	0	0	1.06
2001	291	23	2789	340.496	-426.449	D	6.549	6.548	0.001	1.16	99.23	0.47	0	0	0	0.37
2001	292	23	1	318.65	-445.782	D	6.799	6.799	0	1.653	0	0	0	0	0	0
2001	293	23	1449	329.434	-425.075	D	8.318	8.318	0	4.924	98.03	1.37	0	0	0	0.05
2001	294	23	1	318.65	-445.782	D	9.362	9.362	0	7.476	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	9.29	9.29	0	7.294	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	297	23	641	324.033	-438.052	D	9.621	9.618	0.003	8.147	98.32	1.48	0	0	0	0.23
2001	298	23	1	318.65	-445.782	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	300	23	2789	340.496	-426.449	D	6.472	6.472	0	1.012	86.92	9.85	0	0	0	2.95
2001	301	23	13	319.06	-443.766	D	6.479	6.479	0	1.025	94.09	0.97	0	0	0	0.46
2001	302	23	1	318.65	-445.782	D	6.511	6.511	0	1.086	0	0	0	0	0	0
2001	303	23	1	318.65	-445.782	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	6.695	6.695	0	1.447	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	9.032	9.032	0	6.64	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	9.835	9.835	0	8.726	0	0	0	0	0	0
2001	307	23	2789	340.496	-426.449	D	9.691	9.685	0.005	8.324	98	1.91	0	0	0	0.05
2001	308	23	2588	318.452	-445.8	D	6.951	6.948	0.002	1.953	99.15	0.69	0	0	0	0.08
2001	309	23	2758	335.862	-424.454	D	8.517	8.388	0.13	5.086	98	1.94	0	0	0	0.06
2001	310	23	2624	320.719	-437.835	D	8.138	8.052	0.086	4.315	99.35	0.59	0	0	0	0.06
2001	311	23	2758	335.862	-424.454	D	7.194	7.173	0.022	2.413	99.6	0.31	0	0	0	0.09
2001	312	23	2789	340.496	-426.449	D	7.273	7.268	0.005	2.612	99.64	0.2	0	0	0	0.16
2001	313	23	2571	322.646	-445.476	D	6.615	6.615	0	1.289	99.03	0.22	0	0	0	0.23

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	314	23	659	323.836	-433.564	D	6.786	6.783	0.003	1.622	97.26	2.3	0	0	0	0.42
2001	315	23	2781	339.842	-425.379	D	6.798	6.797	0.002	1.649	98.38	0.95	0	0	0	0.64
2001	316	23	2588	318.452	-445.8	D	6.63	6.627	0.003	1.314	98.65	0.84	0	0	0	0.46
2001	317	23	2589	318.383	-445.593	D	6.717	6.716	0.001	1.489	99.14	0.54	0	0	0	0.25
2001	318	23	2274	336.179	-425.778	D	7.234	7.234	0	2.539	58.46	0.08	0	0	0	0.11
2001	319	23	1	318.65	-445.782	D	8.023	8.023	0	4.249	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.729	7.729	0	3.597	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.103	7.103	0	2.268	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	8.032	8.032	0	4.27	0	0	0	0	0	0
2001	323	23	2789	340.496	-426.449	D	8.466	8.463	0.003	5.264	81.29	18.39	0	0	0	0.3
2001	324	23	2589	318.383	-445.593	D	6.476	6.474	0.002	1.016	86.1	11.45	0	0	0	2.44
2001	325	23	2571	322.646	-445.476	D	6.473	6.471	0.002	1.01	95.86	3.4	0	0	0	0.72
2001	326	23	2781	339.842	-425.379	D	6.53	6.53	0	1.125	98.6	1.36	0	0	0	0.36
2001	327	23	1	318.65	-445.782	D	8.475	8.475	0	5.291	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	8.774	8.774	0	6.006	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	6.66	6.66	0	1.377	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.063	7.063	0	2.186	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.026	7.026	0	2.111	0	0	0	0	0	0
2001	332	23	2571	322.646	-445.476	D	9.276	9.266	0.01	7.232	90.19	9.67	0	0	0	0.12
2001	333	23	375	322.611	-445.359	D	10.219	10.218	0.001	9.779	97.08	2.55	0	0	0	0.02
2001	334	23	2588	318.452	-445.8	D	8.559	8.541	0.018	5.448	92.93	6.94	0	0	0	0.14
2001	335	23	1	318.65	-445.782	D	6.625	6.625	0	1.31	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	6.688	6.688	0	1.434	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	6.971	6.971	0	1.999	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.231	7.231	0	2.534	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	9.653	9.653	0	8.239	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	9.943	9.943	0	9.018	0	0	0	0	0	0
2001	341	23	2781	339.842	-425.379	D	8.557	8.557	0	5.485	94.26	4.96	0	0	0	0.1
2001	342	23	2704	329.056	-425.092	D	8.456	8.445	0.011	5.22	95.96	3.72	0	0	0	0.33
2001	343	23	1530	330.418	-430.527	D	6.601	6.6	0.002	1.26	92.13	6.46	0	0	0	1.34
2001	344	23	2588	318.452	-445.8	D	6.523	6.522	0	1.109	95.59	4.03	0	0	0	0.6
2001	345	23	2589	318.383	-445.593	D	6.603	6.603	0.001	1.266	96.53	2.8	0	0	0	0.38
2001	346	23	1	318.65	-445.782	D	9.752	9.752	0	8.503	0	0	0	0	0	0
2001	347	23	1548	330.222	-426.04	D	10.034	9.803	0.231	8.639	96.72	3.21	0	0	0	0.07
2001	348	23	2602	319.088	-442.669	D	9.835	9.514	0.321	7.873	97.01	2.96	0	0	0	0.04
2001	349	23	2789	340.496	-426.449	D	9.087	9.077	0.01	6.753	98.63	1.32	0	0	0	0.03
2001	350	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	351	23	1478	329.736	-426.311	D	9.605	9.555	0.051	7.978	94.25	5.67	0	0	0	0.08
2001	352	23	1	318.65	-445.782	D	6.544	6.544	0	1.152	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	353	23	2588	318.452	-445.8	D	6.819	6.815	0.003	1.686	89.49	9.39	0	0	0	1.05
2001	354	23	2789	340.496	-426.449	D	6.471	6.47	0.001	1.008	90.45	7.48	0	0	0	2
2001	355	23	1	318.65	-445.782	D	6.487	6.487	0	1.042	0	0	0	0	0	0
2001	356	23	2236	336.149	-430.776	D	7.811	7.811	0	3.776	32.12	0.6	0	0	0	0.06
2001	357	23	1	318.65	-445.782	D	6.641	6.641	0	1.34	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	359	23	2789	340.496	-426.449	D	6.509	6.507	0.002	1.079	81.27	16.08	0	0	0	2.63
2001	360	23	2781	339.842	-425.379	D	6.534	6.531	0.002	1.127	78.75	18.83	0	0	0	2.39
2001	361	23	1	318.65	-445.782	D	6.605	6.605	0	1.269	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2001	363	23	2781	339.842	-425.379	D	6.62	6.617	0.004	1.293	85.07	13.04	0	0	0	1.87
2001	364	23	2781	339.842	-425.379	D	6.554	6.551	0.004	1.165	84.56	13.94	0	0	0	1.49
2001	365	23	2789	340.496	-426.449	D	6.616	6.615	0.001	1.29	86.82	12.08	0	0	0	1.08
									0.321							
UMC											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	318.65	-445.782	D	7.785	7.785	0	3.719	0	0	0	0	0	0
2001	2	23	2789	340.496	-426.449	D	7.421	7.421	0	2.932	91.12	8.89	0	0	0	0.04
2001	3	23	1	318.65	-445.782	D	8.207	8.207	0	4.667	0	0	0	0	0	0
2001	4	23	1	318.65	-445.782	D	7.031	7.031	0	2.121	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	6.931	6.931	0	1.919	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	6.551	6.551	0	1.165	0	0	0	0	0	0
2001	7	23	1	318.65	-445.782	D	7.026	7.026	0	2.11	0	0	0	0	0	0
2001	8	23	1	318.65	-445.782	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	9	23	2789	340.496	-426.449	D	9.485	9.48	0.004	7.784	83.07	16.9	0	0	0	0.02
2001	10	23	2783	339.861	-425.806	D	7.007	6.996	0.011	2.05	84.39	15.56	0	0	0	0.04
2001	11	23	2704	329.056	-425.092	D	9.121	9.119	0.002	6.86	90.61	9.27	0	0	0	0.03
2001	12	23	2784	339.87	-426.019	D	9.493	9.493	0	7.818	86.09	7.09	0	0	0	0
2001	13	23	1	318.65	-445.782	D	9.698	9.698	0	8.359	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	9.396	9.396	0	7.566	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	6.74	6.74	0	1.537	0	0	0	0	0	0
2001	16	23	1	318.65	-445.782	D	6.763	6.763	0	1.581	0	0	0	0	0	0
2001	17	23	2255	335.942	-426.039	D	7.017	6.892	0.125	1.839	87.28	12.66	0	0	0	0.06
2001	18	23	2628	320.933	-436.998	D	7.059	6.935	0.124	1.927	87.29	12.66	0	0	0	0.05
2001	19	23	2789	340.496	-426.449	D	6.865	6.861	0.004	1.778	92.89	7.06	0	0	0	0.05
2001	20	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	21	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	22	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	6.621	6.621	0	1.303	0	0	0	0	0	0
2001	24	23	1	318.65	-445.782	D	6.746	6.746	0	1.549	0	0	0	0	0	0
2001	25	23	2789	340.496	-426.449	D	6.592	6.584	0.008	1.23	72.09	27.72	0	0	0	0.2
2001	26	23	2684	326.713	-427.014	D	6.554	6.552	0.003	1.166	81.15	18.76	0	0	0	0.08
2001	27	23	1	318.65	-445.782	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2001	28	23	2789	340.496	-426.449	D	6.519	6.516	0.003	1.097	85.62	14.26	0	0	0	0.06
2001	29	23	1	318.65	-445.782	D	8.908	8.908	0	6.335	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	6.819	6.819	0	1.692	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.016	7.016	0	2.09	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	6.478	6.478	0	1.025	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	6.561	6.561	0	1.185	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	6.583	6.583	0	1.226	0	0	0	0	0	0
2001	37	23	1	318.65	-445.782	D	6.528	6.528	0	1.121	0	0	0	0	0	0
2001	38	23	1	318.65	-445.782	D	8.527	8.527	0	5.415	0	0	0	0	0	0
2001	39	23	1	318.65	-445.782	D	10.07	10.07	0	9.369	0	0	0	0	0	0
2001	40	23	1	318.65	-445.782	D	9.399	9.399	0	7.574	0	0	0	0	0	0
2001	41	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2001	42	23	2781	339.842	-425.379	D	6.476	6.47	0.006	1.009	83.07	16.88	0	0	0	0.08
2001	43	23	2704	329.056	-425.092	D	6.874	6.874	0	1.803	88.18	11.22	0	0	0	0.04
2001	44	23	1	318.65	-445.782	D	9.412	9.412	0	7.606	0	0	0	0	0	0
2001	45	23	2704	329.056	-425.092	D	10.222	10.218	0.004	9.779	95.71	4.28	0	0	0	0
2001	46	23	2789	340.496	-426.449	D	9.094	8.624	0.471	5.644	95.22	4.77	0	0	0	0.01
2001	47	23	2571	322.646	-445.476	D	8.554	8.464	0.09	5.266	95.36	4.64	0	0	0	0
2001	48	23	1	318.65	-445.782	D	6.531	6.531	0	1.127	0	0	0	0	0	0
2001	49	23	2789	340.496	-426.449	D	6.472	6.472	0	1.012	92.62	7.33	0	0	0	0.09
2001	50	23	2789	340.496	-426.449	D	6.495	6.494	0	1.055	93.56	6.63	0	0	0	0.06
2001	51	23	1	318.65	-445.782	D	9.197	9.197	0	7.056	0	0	0	0	0	0
2001	52	23	2693	327.829	-426.17	D	8.13	8.125	0.005	4.479	91.66	8.33	0	0	0	0.02
2001	53	23	639	324.055	-438.55	D	7.118	7.106	0.012	2.275	92.52	7.43	0	0	0	0.03
2001	54	23	2709	330.21	-424.978	D	6.799	6.793	0.006	1.642	90.78	9.16	0	0	0	0.05
2001	55	23	1	318.65	-445.782	D	9.447	9.447	0	7.697	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.222	7.222	0	2.515	0	0	0	0	0	0
2001	57	23	2789	340.496	-426.449	D	6.499	6.499	0	1.064	98	2.74	0	0	0	0.14
2001	58	23	2782	339.852	-425.592	D	6.525	6.517	0.007	1.099	93.07	6.86	0	0	0	0.06
2001	59	23	2662	325.404	-431.803	D	7.154	7.146	0.008	2.358	92.84	7.12	0	0	0	0.01
2001	60	23	2628	320.933	-436.998	D	6.721	6.718	0.002	1.493	94.94	5.1	0	0	0	0.03

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	61	23	1513	329.974	-426.051	D	8.587	8.564	0.023	5.502	94.29	5.7	0	0	0	0.01
2001	62	23	2563	323.259	-443.79	D	6.752	6.751	0.001	1.558	97.54	2.42	0	0	0	0.02
2001	63	23	2624	320.719	-437.835	D	6.738	6.618	0.121	1.295	88.49	11.45	0	0	0	0.06
2001	64	23	1	318.65	-445.782	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	65	23	1	318.65	-445.782	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2001	66	23	1	318.65	-445.782	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	67	23	1	318.65	-445.782	D	6.534	6.534	0	1.132	0	0	0	0	0	0
2001	68	23	2789	340.496	-426.449	D	6.494	6.493	0.002	1.052	86.32	13.42	0	0	0	0.19
2001	69	23	2789	340.496	-426.449	D	6.474	6.471	0.003	1.009	93.7	6.18	0	0	0	0.1
2001	70	23	2758	335.862	-424.454	D	6.506	6.504	0.001	1.074	95.75	4.12	0	0	0	0.06
2001	71	23	1381	328.981	-426.094	D	8.971	8.971	0	6.49	95.98	2.12	0	0	0	0.02
2001	72	23	1	318.65	-445.782	D	6.558	6.558	0	1.178	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	74	23	199	320.795	-437.944	D	9.731	9.731	0	8.446	93.47	5.54	0	0	0	0.02
2001	75	23	2708	329.979	-425	D	7.91	7.781	0.128	3.711	94.17	5.82	0	0	0	0
2001	76	23	1	318.65	-445.782	D	6.567	6.567	0	1.196	0	0	0	0	0	0
2001	77	23	2704	329.056	-425.092	D	6.527	6.505	0.022	1.076	89.76	10.14	0	0	0	0.09
2001	78	23	2589	318.383	-445.593	D	6.482	6.479	0.002	1.026	94.68	5.3	0	0	0	0.08
2001	79	23	2589	318.383	-445.593	D	6.51	6.495	0.014	1.057	94.03	5.88	0	0	0	0.1
2001	80	23	2588	318.452	-445.8	D	6.517	6.473	0.044	1.013	92.75	7.14	0	0	0	0.12
2001	81	23	2789	340.496	-426.449	D	6.52	6.487	0.032	1.042	97.92	2	0	0	0	0.07
2001	82	23	2781	339.842	-425.379	D	6.693	6.665	0.028	1.388	97.89	2.08	0	0	0	0.04
2001	83	23	2694	327.861	-425.964	D	6.849	6.761	0.087	1.578	89.56	10.39	0	0	0	0.05
2001	84	23	1	318.65	-445.782	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	85	23	1	318.65	-445.782	D	6.478	6.478	0	1.024	0	0	0	0	0	0
2001	86	23	2571	322.646	-445.476	D	6.469	6.468	0.001	1.005	97.83	2.3	0	0	0	0.06
2001	87	23	2789	340.496	-426.449	D	6.519	6.508	0.011	1.081	94.33	5.62	0	0	0	0.05
2001	88	23	2695	328.074	-426.025	D	7.391	7.39	0.001	2.867	95.67	4.16	0	0	0	0.01
2001	89	23	2684	326.713	-427.014	D	9.159	9.157	0.001	6.956	97.47	2.55	0	0	0	0
2001	90	23	11	319.081	-444.264	D	7.628	7.628	0.001	3.376	96.97	2.98	0	0	0	0
2001	91	23	1	318.65	-445.782	D	6.481	6.481	0	1.029	0	0	0	0	0	0
2001	92	23	1	318.65	-445.782	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	9.747	9.747	0	8.488	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	8.549	8.549	0	5.467	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.507	7.507	0	3.115	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.503	7.503	0	3.108	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.145	7.145	0	2.355	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	100	23	1	318.65	-445.782	D	7.606	7.606	0	3.329	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	9.338	9.338	0	7.417	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	6.571	6.571	0	1.204	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.079	7.079	0	2.219	0	0	0	0	0	0
2001	105	23	2781	339.842	-425.379	D	8.944	8.943	0	6.422	98.62	0.51	0	0	0	0.04
2001	106	23	2789	340.496	-426.449	D	6.504	6.503	0	1.073	95.3	3.89	0	0	0	0.22
2001	107	23	1	318.65	-445.782	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	108	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	109	23	1	318.65	-445.782	D	6.594	6.594	0	1.249	0	0	0	0	0	0
2001	110	23	1	318.65	-445.782	D	10.01	10.01	0	9.202	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	8.281	8.281	0	4.837	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	8.135	8.135	0	4.503	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	8.008	8.008	0	4.216	0	0	0	0	0	0
2001	114	23	1	318.65	-445.782	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	115	23	1	318.65	-445.782	D	6.478	6.478	0	1.024	0	0	0	0	0	0
2001	116	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	6.586	6.586	0	1.232	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	6.585	6.585	0	1.231	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	6.867	6.867	0	1.788	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.147	7.147	0	2.358	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	6.839	6.839	0	1.734	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.129	7.129	0	2.323	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.25	7.25	0	2.573	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	8.868	8.868	0	6.236	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	8.924	8.924	0	6.374	0	0	0	0	0	0
2001	127	23	1	318.65	-445.782	D	8.708	8.708	0	5.848	0	0	0	0	0	0
2001	128	23	1	318.65	-445.782	D	6.575	6.575	0	1.212	0	0	0	0	0	0
2001	129	23	2571	322.646	-445.476	D	6.885	6.883	0.001	1.822	99.7	0.28	0	0	0	0.02
2001	130	23	2467	334.065	-434.651	D	7.004	7.001	0.004	2.06	99.79	0.14	0	0	0	0.01
2001	131	23	2788	340.294	-426.448	D	7.675	7.675	0	3.479	99.6	0.03	0	0	0	0.01
2001	132	23	1513	329.974	-426.051	D	8.873	8.852	0.021	6.196	97.71	2.21	0	0	0	0.07
2001	133	23	2611	319.699	-440.64	D	6.575	6.56	0.015	1.182	99.64	0.3	0	0	0	0.06
2001	134	23	2789	340.496	-426.449	D	6.748	6.745	0.003	1.546	99.85	0.13	0	0	0	0.02
2001	135	23	2398	338.694	-426.417	D	6.85	6.85	0	1.756	9.19	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.897	7.897	0	3.966	0	0	0	0	0	0
2001	138	23	1415	329.185	-425.086	D	7.577	7.574	0.003	3.259	96.54	3.44	0	0	0	0.01

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	139	23	2781	339.842	-425.379	D	7.494	7.46	0.033	3.017	98.51	1.47	0	0	0	0.01
2001	140	23	2789	340.496	-426.449	D	7.465	7.462	0.003	3.019	99.76	0.16	0	0	0	0.04
2001	141	23	1	318.65	-445.782	D	8.961	8.961	0	6.464	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	6.534	6.534	0	1.131	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	6.566	6.566	0	1.193	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	6.546	6.546	0	1.156	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	6.809	6.809	0	1.673	0	0	0	0	0	0
2001	148	23	1	318.65	-445.782	D	8.364	8.364	0	5.03	0	0	0	0	0	0
2001	149	23	2789	340.496	-426.449	D	6.994	6.968	0.026	1.993	99.65	0.33	0	0	0	0.02
2001	150	23	2789	340.496	-426.449	D	8.463	8.459	0.004	5.254	99.58	0.4	0	0	0	0.01
2001	151	23	2706	329.518	-425.046	D	9.02	9.006	0.014	6.576	99.4	0.59	0	0	0	0.01
2001	152	23	2708	329.979	-425	D	7.166	7.155	0.011	2.375	99.72	0.28	0	0	0	0.01
2001	153	23	1	318.65	-445.782	D	6.992	6.992	0	2.042	0	0	0	0	0	0
2001	154	23	1	318.65	-445.782	D	7.218	7.218	0	2.506	0	0	0	0	0	0
2001	155	23	1	318.65	-445.782	D	8.894	8.894	0	6.3	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	8.375	8.375	0	5.056	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.624	7.624	0	3.368	0	0	0	0	0	0
2001	158	23	2781	339.842	-425.379	D	8.165	8.143	0.022	4.522	99.95	0.03	0	0	0	0.02
2001	159	23	2684	326.713	-427.014	D	7.613	7.283	0.33	2.642	99.57	0.41	0	0	0	0.01
2001	160	23	2694	327.861	-425.964	D	7.569	7.431	0.138	2.954	99.81	0.18	0	0	0	0.01
2001	161	23	2709	330.21	-424.978	D	7.862	7.761	0.101	3.667	99.9	0.09	0	0	0	0.01
2001	162	23	2789	340.496	-426.449	D	7.015	7.011	0.004	2.081	99.93	0.03	0	0	0	0.01
2001	163	23	2403	338.931	-426.157	D	6.866	6.866	0	1.787	98.64	0.02	0	0	0	0.01
2001	164	23	1	318.65	-445.782	D	7.137	7.137	0	2.339	0	0	0	0	0	0
2001	165	23	1	318.65	-445.782	D	7.321	7.321	0	2.721	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	8.275	8.275	0	4.824	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	6.521	6.521	0	1.108	0	0	0	0	0	0
2001	168	23	2588	318.452	-445.8	D	6.547	6.545	0.002	1.153	99.91	0.02	0	0	0	0.05
2001	169	23	2789	340.496	-426.449	D	6.657	6.651	0.007	1.36	99.95	0.03	0	0	0	0.03
2001	170	23	2155	334.883	-424.586	D	7.001	7.001	0	2.059	99.76	0.01	0	0	0	0.02
2001	171	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	172	23	1513	329.974	-426.051	D	7.377	7.314	0.063	2.706	99.73	0.26	0	0	0	0.01
2001	173	23	2552	324.659	-442.591	D	6.856	6.853	0.003	1.761	99.81	0.17	0	0	0	0.01
2001	174	23	2789	340.496	-426.449	D	6.611	6.611	0	1.283	98.57	0.04	0	0	0	0.06
2001	175	23	2789	340.496	-426.449	D	6.764	6.76	0.004	1.576	99.81	0.09	0	0	0	0.04
2001	176	23	2564	323.159	-444.002	D	8.485	8.451	0.033	5.235	99.91	0.08	0	0	0	0.01
2001	177	23	2708	329.979	-425	D	7.181	7.155	0.026	2.376	99.92	0.07	0	0	0	0.01

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	178	23	2695	328.074	-426.025	D	6.94	6.932	0.008	1.92	99.91	0.07	0	0	0	0.02
2001	179	23	2758	335.862	-424.454	D	8.98	8.971	0.009	6.49	99.81	0.19	0	0	0	0
2001	180	23	1242	327.988	-426.138	D	8.698	8.697	0.001	5.82	99.82	0.06	0	0	0	0
2001	181	23	1	318.65	-445.782	D	8.968	8.968	0	6.482	0	0	0	0	0	0
2001	182	23	2704	329.056	-425.092	D	9.447	9.396	0.051	7.564	99.39	0.6	0	0	0	0.01
2001	183	23	1513	329.974	-426.051	D	7.368	7.243	0.125	2.559	99.18	0.81	0	0	0	0.01
2001	184	23	2781	339.842	-425.379	D	7.349	7.338	0.011	2.757	99.94	0.04	0	0	0	0.01
2001	185	23	2415	339.676	-426.124	D	7.08	7.079	0	2.22	98.76	0.01	0	0	0	0.01
2001	186	23	1	318.65	-445.782	D	6.973	6.973	0	2.003	0	0	0	0	0	0
2001	187	23	2789	340.496	-426.449	D	7.66	7.635	0.025	3.392	99.91	0.08	0	0	0	0.01
2001	188	23	2789	340.496	-426.449	D	8.721	8.713	0.008	5.859	99.97	0.02	0	0	0	0
2001	189	23	1	318.65	-445.782	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.028	7.028	0	2.115	0	0	0	0	0	0
2001	191	23	1	318.65	-445.782	D	7.041	7.041	0	2.142	0	0	0	0	0	0
2001	192	23	2789	340.496	-426.449	D	7.123	7.063	0.06	2.187	99.82	0.15	0	0	0	0.03
2001	193	23	2783	339.861	-425.806	D	8.282	7.982	0.3	4.158	99.84	0.16	0	0	0	0.01
2001	194	23	2789	340.496	-426.449	D	9.404	9.072	0.332	6.741	99.54	0.46	0	0	0	0
2001	195	23	2588	318.452	-445.8	D	6.685	6.654	0.031	1.367	99.96	0.03	0	0	0	0.01
2001	196	23	2588	318.452	-445.8	D	6.686	6.685	0.001	1.427	99.96	0.01	0	0	0	0.01
2001	197	23	1	318.65	-445.782	D	7.148	7.148	0	2.362	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.972	7.972	0	4.135	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.881	7.881	0	3.931	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.405	7.405	0	2.898	0	0	0	0	0	0
2001	201	23	2395	338.435	-426.179	D	7.24	7.24	0	2.553	90.31	0.01	0	0	0	0.02
2001	202	23	2789	340.496	-426.449	D	6.813	6.808	0.005	1.67	99.79	0.19	0	0	0	0.01
2001	203	23	2789	340.496	-426.449	D	6.928	6.904	0.024	1.864	99.93	0.06	0	0	0	0.01
2001	204	23	2571	322.646	-445.476	D	7.852	7.813	0.038	3.782	99.92	0.07	0	0	0	0
2001	205	23	2588	318.452	-445.8	D	8.331	8.301	0.03	4.884	99.95	0.04	0	0	0	0
2001	206	23	2564	323.159	-444.002	D	8.045	8.028	0.017	4.26	99.86	0.12	0	0	0	0
2001	207	23	2789	340.496	-426.449	D	8.942	8.928	0.015	6.383	99.93	0.05	0	0	0	0
2001	208	23	2789	340.496	-426.449	D	9.182	8.905	0.277	6.326	99.32	0.68	0	0	0	0
2001	209	23	2789	340.496	-426.449	D	9.095	8.904	0.191	6.324	99.42	0.58	0	0	0	0
2001	210	23	2789	340.496	-426.449	D	8.722	8.71	0.012	5.852	99.84	0.18	0	0	0	0
2001	211	23	2456	334.644	-432.056	D	8.91	8.873	0.037	6.248	99.93	0.07	0	0	0	0
2001	212	23	2781	339.842	-425.379	D	8.534	8.49	0.044	5.325	99.97	0.02	0	0	0	0
2001	213	23	2789	340.496	-426.449	D	8.263	8.238	0.025	4.738	99.92	0.07	0	0	0	0
2001	214	23	2784	339.87	-426.019	D	7.551	7.548	0.003	3.204	99.99	0.02	0	0	0	0.01
2001	215	23	2413	339.406	-425.637	D	6.959	6.959	0	1.974	100.19	0.03	0	0	0	0.01
2001	216	23	2789	340.496	-426.449	D	7.075	7.049	0.026	2.158	99.88	0.08	0	0	0	0.04

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	217	23	2600	318.952	-443.12	D	7.163	7.141	0.021	2.348	99.94	0.04	0	0	0	0.02
2001	218	23	200	320.784	-437.694	D	7.324	7.324	0	2.728	98.5	0	0	0	0	0.02
2001	219	23	1	318.65	-445.782	D	7.407	7.407	0	2.902	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.7	7.7	0	3.534	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.773	7.773	0	3.694	0	0	0	0	0	0
2001	222	23	1	318.65	-445.782	D	7.664	7.664	0	3.455	0	0	0	0	0	0
2001	223	23	2781	339.842	-425.379	D	9.472	9.067	0.405	6.729	99.48	0.52	0	0	0	0.01
2001	224	23	2255	335.942	-426.039	D	7.866	7.408	0.458	2.906	99.77	0.21	0	0	0	0.02
2001	225	23	2589	318.383	-445.593	D	7.65	7.458	0.191	3.012	99.85	0.13	0	0	0	0.02
2001	226	23	2597	318.971	-443.851	D	7.12	6.923	0.197	1.902	99.51	0.46	0	0	0	0.03
2001	227	23	2589	318.383	-445.593	D	6.882	6.848	0.034	1.751	99.82	0.15	0	0	0	0.02
2001	228	23	2209	335.38	-424.564	D	7.72	7.72	0	3.577	95.16	0.02	0	0	0	0.02
2001	229	23	1	318.65	-445.782	D	6.675	6.675	0	1.407	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.046	7.046	0	2.151	0	0	0	0	0	0
2001	231	23	1	318.65	-445.782	D	6.857	6.857	0	1.768	0	0	0	0	0	0
2001	232	23	2789	340.496	-426.449	D	6.97	6.97	0	1.997	99.94	0.02	0	0	0	0.02
2001	233	23	2789	340.496	-426.449	D	7.601	7.601	0	3.318	99.92	0.02	0	0	0	0.01
2001	234	23	1219	328.239	-431.872	D	6.913	6.913	0	1.881	69.18	0.01	0	0	0	0.02
2001	235	23	2414	339.687	-426.374	D	6.992	6.992	0	2.042	98.66	0.07	0	0	0	0.01
2001	236	23	1	318.65	-445.782	D	7.113	7.113	0	2.289	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2001	238	23	1	318.65	-445.782	D	7.199	7.199	0	2.467	0	0	0	0	0	0
2001	239	23	2781	339.842	-425.379	D	7.322	7.272	0.05	2.619	99.72	0.26	0	0	0	0.02
2001	240	23	2781	339.842	-425.379	D	7.114	6.944	0.17	1.945	99.86	0.12	0	0	0	0.02
2001	241	23	606	323.785	-438.063	D	7.856	7.646	0.21	3.415	99.83	0.17	0	0	0	0.01
2001	242	23	2273	336.19	-426.028	D	8.652	8.502	0.15	5.355	99.75	0.24	0	0	0	0
2001	243	23	1455	329.987	-432.045	D	8.454	8.448	0.006	5.228	99.75	0.22	0	0	0	0
2001	244	23	2758	335.862	-424.454	D	8.556	8.489	0.067	5.323	99.46	0.52	0	0	0	0.01
2001	245	23	2693	327.829	-426.17	D	8.97	8.85	0.12	6.192	99.4	0.59	0	0	0	0
2001	246	23	2709	330.21	-424.978	D	8.221	8.214	0.007	4.683	99.88	0.11	0	0	0	0.01
2001	247	23	2709	330.21	-424.978	D	7.177	7.147	0.03	2.36	99.93	0.06	0	0	0	0.01
2001	248	23	2762	336.074	-425.006	D	7.571	7.518	0.053	3.139	99.87	0.12	0	0	0	0.01
2001	249	23	2762	336.074	-425.006	D	7.493	7.486	0.008	3.07	99.94	0.04	0	0	0	0.01
2001	250	23	1	318.65	-445.782	D	8.117	8.117	0	4.462	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	9.202	9.202	0	7.068	0	0	0	0	0	0
2001	252	23	1	318.65	-445.782	D	9.34	9.34	0	7.421	0	0	0	0	0	0
2001	253	23	1	318.65	-445.782	D	6.988	6.988	0	2.034	0	0	0	0	0	0
2001	254	23	2588	318.452	-445.8	D	6.797	6.784	0.013	1.623	99.42	0.54	0	0	0	0.04
2001	255	23	2589	318.383	-445.593	D	6.854	6.853	0.001	1.761	99.67	0.18	0	0	0	0.03

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	256	23	2682	326.697	-427.477	D	7.007	7.007	0	2.072	99.72	0.13	0	0	0	0.02
2001	257	23	2789	340.496	-426.449	D	7.531	7.48	0.051	3.058	99.49	0.5	0	0	0	0.01
2001	258	23	2588	318.452	-445.8	D	6.972	6.96	0.012	1.977	99.92	0.06	0	0	0	0.01
2001	259	23	67	319.674	-440.741	D	6.745	6.743	0.002	1.542	99.88	0.09	0	0	0	0.02
2001	260	23	2700	328.954	-426.032	D	7.06	7.059	0.001	2.178	99.69	0.11	0	0	0	0.01
2001	261	23	2784	339.87	-426.019	D	8.832	8.832	0.001	6.147	99.48	0.44	0	0	0	0
2001	262	23	2758	335.862	-424.454	D	8.34	8.332	0.009	4.955	97.52	2.45	0	0	0	0
2001	263	23	1	318.65	-445.782	D	6.893	6.893	0	1.841	0	0	0	0	0	0
2001	264	23	1	318.65	-445.782	D	7.236	7.236	0	2.544	0	0	0	0	0	0
2001	265	23	2781	339.842	-425.379	D	7.126	7.125	0.002	2.313	99.76	0.15	0	0	0	0.08
2001	266	23	2789	340.496	-426.449	D	7.768	7.757	0.012	3.657	99.55	0.42	0	0	0	0.02
2001	267	23	2789	340.496	-426.449	D	8.739	8.718	0.021	5.871	91.77	8.15	0	0	0	0.07
2001	268	23	2789	340.496	-426.449	D	6.686	6.665	0.021	1.387	92.92	6.99	0	0	0	0.09
2001	269	23	2781	339.842	-425.379	D	6.59	6.54	0.05	1.143	97.91	2.03	0	0	0	0.06
2001	270	23	2789	340.496	-426.449	D	6.722	6.647	0.076	1.352	99.42	0.54	0	0	0	0.04
2001	271	23	2783	339.861	-425.806	D	6.779	6.721	0.058	1.498	99.67	0.3	0	0	0	0.04
2001	272	23	2588	318.452	-445.8	D	7.094	7.084	0.011	2.229	99.85	0.14	0	0	0	0.02
2001	273	23	1	318.65	-445.782	D	7.066	7.066	0	2.193	0	0	0	0	0	0
2001	274	23	2758	335.862	-424.454	D	7.207	7.201	0.006	2.471	99.09	0.89	0	0	0	0.02
2001	275	23	2781	339.842	-425.379	D	6.818	6.816	0.003	1.687	99.67	0.34	0	0	0	0.01
2001	276	23	1	318.65	-445.782	D	7.64	7.64	0	3.401	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	8.468	8.468	0	5.274	0	0	0	0	0	0
2001	278	23	2781	339.842	-425.379	D	9.976	9.656	0.32	8.246	94.85	5.14	0	0	0	0
2001	279	23	2468	334.002	-434.887	D	7.19	7.183	0.006	2.434	96.12	3.87	0	0	0	0.01
2001	280	23	2468	334.002	-434.887	D	6.562	6.559	0.004	1.18	99.39	0.55	0	0	0	0.06
2001	281	23	2789	340.496	-426.449	D	6.643	6.613	0.029	1.286	97.92	2.03	0	0	0	0.03
2001	282	23	1	318.65	-445.782	D	7.968	7.968	0	4.125	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	284	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	285	23	2758	335.862	-424.454	D	9.688	9.66	0.028	8.257	93.22	6.77	0	0	0	0.01
2001	286	23	1548	330.222	-426.04	D	10.016	9.956	0.06	9.054	99.35	0.64	0	0	0	0
2001	287	23	1455	329.987	-432.045	D	7.621	7.541	0.08	3.188	98.41	1.59	0	0	0	0
2001	288	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2001	289	23	1	318.65	-445.782	D	7.071	7.071	0	2.203	0	0	0	0	0	0
2001	290	23	1	318.65	-445.782	D	6.486	6.486	0	1.04	0	0	0	0	0	0
2001	291	23	2789	340.496	-426.449	D	6.55	6.548	0.002	1.16	97.45	2.49	0	0	0	0.02
2001	292	23	1	318.65	-445.782	D	6.799	6.799	0	1.653	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	8.641	8.641	0	5.686	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	9.362	9.362	0	7.476	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	295	23	1	318.65	-445.782	D	9.29	9.29	0	7.294	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	297	23	1	318.65	-445.782	D	9.624	9.624	0	8.162	0	0	0	0	0	0
2001	298	23	1	318.65	-445.782	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	300	23	1	318.65	-445.782	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	301	23	2789	340.496	-426.449	D	6.487	6.477	0.011	1.021	94.2	5.74	0	0	0	0.07
2001	302	23	2684	326.713	-427.014	D	6.502	6.501	0.001	1.069	97.82	2.11	0	0	0	0.03
2001	303	23	1	318.65	-445.782	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	6.695	6.695	0	1.447	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	9.032	9.032	0	6.64	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	9.835	9.835	0	8.726	0	0	0	0	0	0
2001	307	23	2789	340.496	-426.449	D	9.821	9.685	0.136	8.324	96.29	3.7	0	0	0	0.01
2001	308	23	2623	320.666	-438.044	D	6.982	6.95	0.032	1.957	98.89	1.09	0	0	0	0.01
2001	309	23	2783	339.861	-425.806	D	8.481	8.368	0.112	5.041	96.65	3.34	0	0	0	0.02
2001	310	23	1456	329.977	-431.796	D	8.272	8.036	0.236	4.277	97.96	2.03	0	0	0	0.01
2001	311	23	2256	335.931	-425.789	D	7.25	7.173	0.078	2.413	99.31	0.68	0	0	0	0.01
2001	312	23	2789	340.496	-426.449	D	7.278	7.268	0.009	2.612	99.64	0.34	0	0	0	0.01
2001	313	23	2429	338.563	-428.651	D	6.614	6.605	0.01	1.27	83.46	16.29	0	0	0	0.23
2001	314	23	2789	340.496	-426.449	D	6.747	6.746	0	1.549	97.62	2.09	0	0	0	0.09
2001	315	23	2781	339.842	-425.379	D	6.802	6.797	0.005	1.649	97.8	2.03	0	0	0	0.15
2001	316	23	2588	318.452	-445.8	D	6.644	6.627	0.017	1.314	97.16	2.76	0	0	0	0.08
2001	317	23	2589	318.383	-445.593	D	6.728	6.716	0.012	1.489	98.93	1.03	0	0	0	0.04
2001	318	23	1517	329.93	-425.053	D	7.315	7.314	0	2.708	99.71	0.27	0	0	0	0.02
2001	319	23	1	318.65	-445.782	D	8.023	8.023	0	4.249	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.729	7.729	0	3.597	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.103	7.103	0	2.268	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	8.032	8.032	0	4.27	0	0	0	0	0	0
2001	323	23	1	318.65	-445.782	D	8.728	8.728	0	5.896	0	0	0	0	0	0
2001	324	23	1	318.65	-445.782	D	6.474	6.474	0	1.016	0	0	0	0	0	0
2001	325	23	1	318.65	-445.782	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	326	23	2789	340.496	-426.449	D	6.533	6.533	0	1.129	95	4.78	0	0	0	0.08
2001	327	23	1	318.65	-445.782	D	8.475	8.475	0	5.291	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	8.774	8.774	0	6.006	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	6.66	6.66	0	1.377	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.063	7.063	0	2.186	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.026	7.026	0	2.111	0	0	0	0	0	0
2001	332	23	2789	340.496	-426.449	D	9.493	9.227	0.267	7.131	86.28	13.71	0	0	0	0.01
2001	333	23	2589	318.383	-445.593	D	10.823	10.218	**0.605**	9.779	88.4	11.59	0	0	0	0.01

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	334	23	2789	340.496	-426.449	D	9.5	8.348	1.152	4.993	93.91	6.08	0	0	0	0.01
2001	335	23	1	318.65	-445.782	D	6.625	6.625	0	1.31	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	6.688	6.688	0	1.434	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	6.971	6.971	0	1.999	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.231	7.231	0	2.534	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	9.653	9.653	0	8.239	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	9.943	9.943	0	9.018	0	0	0	0	0	0
2001	341	23	1	318.65	-445.782	D	7.912	7.912	0	4	0	0	0	0	0	0
2001	342	23	2708	329.979	-425	D	8.546	8.445	0.101	5.22	88.9	11.07	0	0	0	0.03
2001	343	23	2789	340.496	-426.449	D	6.595	6.595	0	1.25	87.79	12.39	0	0	0	0.17
2001	344	23	2789	340.496	-426.449	D	6.519	6.513	0.006	1.092	83.73	16.15	0	0	0	0.11
2001	345	23	2789	340.496	-426.449	D	6.579	6.574	0.005	1.209	91.34	8.62	0	0	0	0.06
2001	346	23	1043	326.845	-428.436	D	9.736	9.736	0	8.459	90.52	4.86	0	0	0	0.02
2001	347	23	1	318.65	-445.782	D	9.808	9.808	0	8.653	0	0	0	0	0	0
2001	348	23	2789	340.496	-426.449	D	9.243	9.231	0.012	7.142	95.23	4.75	0	0	0	0
2001	349	23	2789	340.496	-426.449	D	9.077	9.077	0.001	6.753	98.97	0.88	0	0	0	0.01
2001	350	23	2789	340.496	-426.449	D	10.223	10.218	0.006	9.779	96.8	3.16	0	0	0	0
2001	351	23	2789	340.496	-426.449	D	9.6	9.458	0.142	7.727	88.5	11.49	0	0	0	0.01
2001	352	23	2305	336.675	-425.757	D	6.542	6.542	0	1.147	93.11	2.19	0	0	0	0.01
2001	353	23	1	318.65	-445.782	D	6.815	6.815	0	1.686	0	0	0	0	0	0
2001	354	23	1	318.65	-445.782	D	6.471	6.471	0	1.009	0	0	0	0	0	0
2001	355	23	1	318.65	-445.782	D	6.487	6.487	0	1.042	0	0	0	0	0	0
2001	356	23	2334	337.183	-425.984	D	7.654	7.654	0	3.434	29.68	1.49	0	0	0	0
2001	357	23	1	318.65	-445.782	D	6.641	6.641	0	1.34	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	359	23	1	318.65	-445.782	D	6.512	6.512	0	1.089	0	0	0	0	0	0
2001	360	23	1	318.65	-445.782	D	6.537	6.537	0	1.138	0	0	0	0	0	0
2001	361	23	1	318.65	-445.782	D	6.605	6.605	0	1.269	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2001	363	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	364	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	365	23	1	318.65	-445.782	D	6.619	6.619	0	1.298	0	0	0	0	0	0
									1.152							
NORANDA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	318.65	-445.782	D	7.785	7.785	0	3.719	0	0	0	0	0	0
2001	2	23	1	318.65	-445.782	D	7.39	7.39	0	2.868	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	3	23	1	318.65	-445.782	D	8.207	8.207	0	4.667	0	0	0	0	0	0
2001	4	23	1	318.65	-445.782	D	7.031	7.031	0	2.121	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	6.931	6.931	0	1.919	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	6.551	6.551	0	1.165	0	0	0	0	0	0
2001	7	23	1	318.65	-445.782	D	7.026	7.026	0	2.11	0	0	0	0	0	0
2001	8	23	1	318.65	-445.782	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	9	23	1	318.65	-445.782	D	9.208	9.208	0	7.084	0	0	0	0	0	0
2001	10	23	2789	340.496	-426.449	D	6.97	6.97	0	1.996	98.01	0.01	0	0	0.13	1.06
2001	11	23	2789	340.496	-426.449	D	9.129	9.129	0	6.885	98.47	0.03	0	0	0.1	2.27
2001	12	23	1	318.65	-445.782	D	9.519	9.519	0	7.886	0	0	0	0	0	0
2001	13	23	2789	340.496	-426.449	D	9.248	9.244	0.004	7.175	99.38	0.06	0	0	0.02	0.49
2001	14	23	2789	340.496	-426.449	D	9.316	9.315	0.001	7.357	99.61	0.03	0	0	0	0.23
2001	15	23	1	318.65	-445.782	D	6.74	6.74	0	1.537	0	0	0	0	0	0
2001	16	23	1	318.65	-445.782	D	6.763	6.763	0	1.581	0	0	0	0	0	0
2001	17	23	1	318.65	-445.782	D	6.869	6.869	0	1.793	33.56	0.01	0	0	31.19	48.99
2001	18	23	1	318.65	-445.782	D	6.924	6.924	0	1.904	0	0	0	0	0	0
2001	19	23	1	318.65	-445.782	D	6.87	6.87	0	1.795	0	0	0	0	0	0
2001	20	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	21	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	22	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	6.621	6.621	0	1.303	0	0	0	0	0	0
2001	24	23	1	318.65	-445.782	D	6.746	6.746	0	1.549	0	0	0	0	0	0
2001	25	23	1	318.65	-445.782	D	6.568	6.568	0	1.197	0	0	0	0	0	0
2001	26	23	2789	340.496	-426.449	D	6.536	6.536	0	1.136	86.62	0.19	0	0	0.14	12.54
2001	27	23	1	318.65	-445.782	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2001	28	23	2789	340.496	-426.449	D	6.518	6.516	0.002	1.097	82.96	0.24	0	0	0.69	16.11
2001	29	23	1	318.65	-445.782	D	8.908	8.908	0	6.335	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	6.819	6.819	0	1.692	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.016	7.016	0	2.09	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	6.478	6.478	0	1.025	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	6.561	6.561	0	1.185	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	6.583	6.583	0	1.226	0	0	0	0	0	0
2001	37	23	1	318.65	-445.782	D	6.528	6.528	0	1.121	0	0	0	0	0	0
2001	38	23	2789	340.496	-426.449	D	8.016	8.016	0	4.234	51.67	3.35	0	0	1.44	41.87
2001	39	23	1	318.65	-445.782	D	10.07	10.07	0	9.369	0	0	0	0	0	0
2001	40	23	1	318.65	-445.782	D	9.399	9.399	0	7.574	0	0	0	0	0	0
2001	41	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	42	23	2588	318.452	-445.8	D	6.48	6.471	0.009	1.01	89.61	0.13	0	0	0.42	9.81
2001	43	23	2704	329.056	-425.092	D	6.879	6.874	0.005	1.803	72.67	0.6	0	0	0.1	26.6
2001	44	23	1	318.65	-445.782	D	9.412	9.412	0	7.606	0	0	0	0	0	0
2001	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	46	23	2418	339.946	-426.612	D	8.624	8.624	0	5.644	92.26	0.04	0	0	0.05	2.68
2001	47	23	2466	334.129	-434.416	D	8.242	8.241	0.001	4.747	94.08	0.6	0	0	0.02	5.09
2001	48	23	1	318.65	-445.782	D	6.531	6.531	0	1.127	0	0	0	0	0	0
2001	49	23	1	318.65	-445.782	D	6.473	6.473	0	1.014	0	0	0	0	0	0
2001	50	23	2789	340.496	-426.449	D	6.495	6.494	0.001	1.055	89.12	0.12	0	0	0.25	10.61
2001	51	23	1	318.65	-445.782	D	9.197	9.197	0	7.056	0	0	0	0	0	0
2001	52	23	1	318.65	-445.782	D	8.177	8.177	0	4.598	37.15	0	0	0	8.4	52.05
2001	53	23	2526	325.887	-438.274	D	7.106	7.106	0	2.275	66.24	0.01	0	0	2.69	30.81
2001	54	23	2781	339.842	-425.379	D	6.789	6.785	0.004	1.626	94.41	0.15	0	0	0.67	4.73
2001	55	23	2781	339.842	-425.379	D	9.383	9.379	0.004	7.522	95.13	0.14	0	0	0.09	4.62
2001	56	23	1	318.65	-445.782	D	7.222	7.222	0	2.515	0	0	0	0	0	0
2001	57	23	1	318.65	-445.782	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	58	23	2783	339.861	-425.806	D	6.552	6.517	0.035	1.099	90.11	0.09	0	0	0.38	9.42
2001	59	23	2597	318.971	-443.851	D	7.117	7.069	0.048	2.2	94.63	0.1	0	0	0.13	5.14
2001	60	23	2571	322.646	-445.476	D	6.718	6.708	0.009	1.473	93.45	0.06	0	0	0.36	6.15
2001	61	23	2492	329.914	-433.384	D	8.571	8.551	0.02	5.471	98.81	0.04	0	0	0.02	1.12
2001	62	23	381	322.546	-443.863	D	6.752	6.751	0.001	1.558	97.01	0.02	0	0	0.02	2.82
2001	63	23	2236	336.149	-430.776	D	6.6	6.6	0	1.261	85.27	0.17	0	0	0.02	8.02
2001	64	23	1	318.65	-445.782	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	65	23	1	318.65	-445.782	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2001	66	23	1	318.65	-445.782	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	67	23	1	318.65	-445.782	D	6.534	6.534	0	1.132	0	0	0	0	0	0
2001	68	23	1	318.65	-445.782	D	6.488	6.488	0	1.042	0	0	0	0	0	0
2001	69	23	1951	333.842	-434.874	D	6.471	6.471	0	1.009	88.21	0.02	0	0	1.38	10.59
2001	70	23	2789	340.496	-426.449	D	6.504	6.502	0.002	1.07	90.04	0.06	0	0	0.23	9.68
2001	71	23	1	318.65	-445.782	D	9.154	9.154	0	6.946	0	0	0	0	0	0
2001	72	23	1	318.65	-445.782	D	6.558	6.558	0	1.178	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	74	23	199	320.795	-437.944	D	9.731	9.731	0	8.446	88.97	0.31	0	0	0.16	11.39
2001	75	23	2624	320.719	-437.835	D	8.053	7.98	0.073	4.152	99.02	0.11	0	0	0.01	0.85
2001	76	23	1	318.65	-445.782	D	6.567	6.567	0	1.196	0	0	0	0	0	0
2001	77	23	1	318.65	-445.782	D	6.502	6.502	0	1.069	0	0	0	0	0	0
2001	78	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	79	23	1	318.65	-445.782	D	6.495	6.495	0	1.057	0	0	0	0	0	0
2001	80	23	1	318.65	-445.782	D	6.473	6.473	0	1.013	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	81	23	1	318.65	-445.782	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	82	23	2789	340.496	-426.449	D	6.681	6.661	0.02	1.38	94.29	0.01	0	0	0.44	5.26
2001	83	23	2789	340.496	-426.449	D	6.82	6.747	0.073	1.549	95.65	0.02	0	0	0.11	4.22
2001	84	23	1	318.65	-445.782	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	85	23	1	318.65	-445.782	D	6.478	6.478	0	1.024	0	0	0	0	0	0
2001	86	23	1	318.65	-445.782	D	6.468	6.468	0	1.005	0	0	0	0	0	0
2001	87	23	380	322.557	-444.112	D	6.535	6.529	0.006	1.123	89.77	0.11	0	0	0.83	9.31
2001	88	23	2784	339.87	-426.019	D	7.422	7.421	0.001	2.932	96.38	0.06	0	0	0.15	3.28
2001	89	23	2571	322.646	-445.476	D	9.323	9.145	0.178	6.925	99.5	0.04	0	0	0.03	0.42
2001	90	23	2571	322.646	-445.476	D	7.653	7.628	0.025	3.376	99.09	0.04	0	0	0.02	0.85
2001	91	23	1412	329.218	-425.834	D	6.478	6.478	0	1.023	14.66	0.02	0	0	0	0.85
2001	92	23	1	318.65	-445.782	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2001	94	23	2789	340.496	-426.449	D	10.242	9.96	0.282	9.065	98.79	0.09	0	0	0.05	1.07
2001	95	23	2758	335.862	-424.454	D	9.611	9.608	0.003	8.119	97.44	0.23	0	0	0.02	2.3
2001	96	23	1	318.65	-445.782	D	8.549	8.549	0	5.467	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.507	7.507	0	3.115	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.503	7.503	0	3.108	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.145	7.145	0	2.355	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.606	7.606	0	3.329	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	9.338	9.338	0	7.417	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	6.571	6.571	0	1.204	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.079	7.079	0	2.219	0	0	0	0	0	0
2001	105	23	1	318.65	-445.782	D	9.107	9.107	0	6.828	0	0	0	0	0	0
2001	106	23	1	318.65	-445.782	D	6.498	6.498	0	1.063	0	0	0	0	0	0
2001	107	23	1	318.65	-445.782	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	108	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	109	23	1	318.65	-445.782	D	6.594	6.594	0	1.249	0	0	0	0	0	0
2001	110	23	1	318.65	-445.782	D	10.01	10.01	0	9.202	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	8.281	8.281	0	4.837	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	8.135	8.135	0	4.503	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	8.008	8.008	0	4.216	0	0	0	0	0	0
2001	114	23	1	318.65	-445.782	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	115	23	1	318.65	-445.782	D	6.478	6.478	0	1.024	0	0	0	0	0	0
2001	116	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	6.586	6.586	0	1.232	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	6.585	6.585	0	1.231	0	0	0	0	0	0
2001	119	23	2789	340.496	-426.449	D	6.844	6.844	0	1.743	96.27	0	0	0	0.33	3.21

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	120	23	2789	340.496	-426.449	D	7.081	7.079	0.003	2.219	98.56	0	0	0	0.06	1.41
2001	121	23	1	318.65	-445.782	D	6.839	6.839	0	1.734	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.129	7.129	0	2.323	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.25	7.25	0	2.573	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	8.868	8.868	0	6.236	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	8.924	8.924	0	6.374	0	0	0	0	0	0
2001	127	23	1	318.65	-445.782	D	8.708	8.708	0	5.848	0	0	0	0	0	0
2001	128	23	1	318.65	-445.782	D	6.575	6.575	0	1.212	0	0	0	0	0	0
2001	129	23	1	318.65	-445.782	D	6.883	6.883	0	1.822	0	0	0	0	0	0
2001	130	23	2788	340.294	-426.448	D	6.953	6.953	0	1.963	30.57	0	0	0	0.01	0.08
2001	131	23	1	318.65	-445.782	D	8.246	8.246	0	4.756	0	0	0	0	0	0
2001	132	23	1	318.65	-445.782	D	8.901	8.901	0	6.317	0	0	0	0	0	0
2001	133	23	1	318.65	-445.782	D	6.561	6.561	0	1.185	0	0	0	0	0	0
2001	134	23	1	318.65	-445.782	D	6.804	6.804	0	1.664	0	0	0	0	0	0
2001	135	23	1	318.65	-445.782	D	6.961	6.961	0	1.979	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.897	7.897	0	3.966	0	0	0	0	0	0
2001	138	23	1	318.65	-445.782	D	7.89	7.89	0	3.951	0	0	0	0	0	0
2001	139	23	1	318.65	-445.782	D	7.288	7.288	0	2.653	0	0	0	0	0	0
2001	140	23	1	318.65	-445.782	D	7.627	7.627	0	3.373	0	0	0	0	0	0
2001	141	23	1	318.65	-445.782	D	8.961	8.961	0	6.464	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	6.534	6.534	0	1.131	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	6.566	6.566	0	1.193	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	6.546	6.546	0	1.156	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	6.809	6.809	0	1.673	0	0	0	0	0	0
2001	148	23	2468	334.002	-434.887	D	8.168	8.167	0	4.577	99.08	0	0	0	0.1	1.1
2001	149	23	2588	318.452	-445.8	D	7.147	7.075	0.072	2.211	96.54	0.01	0	0	0.3	3.15
2001	150	23	2758	335.862	-424.454	D	8.485	8.484	0.001	5.312	95.03	0.01	0	0	0.19	4.79
2001	151	23	2704	329.056	-425.092	D	9.011	9.006	0.006	6.576	97.07	0.02	0	0	0.07	2.82
2001	152	23	2708	329.979	-425	D	7.185	7.155	0.03	2.375	99.15	0	0	0	0.01	0.83
2001	153	23	1	318.65	-445.782	D	6.992	6.992	0	2.042	0	0	0	0	0	0
2001	154	23	2781	339.842	-425.379	D	7.623	7.58	0.043	3.273	98.56	0.01	0	0	0.07	1.36
2001	155	23	1	318.65	-445.782	D	8.894	8.894	0	6.3	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	8.375	8.375	0	5.056	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.624	7.624	0	3.368	0	0	0	0	0	0
2001	158	23	1	318.65	-445.782	D	7.996	7.996	0	4.188	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	159	23	2552	324.659	-442.591	D	7.317	7.309	0.008	2.697	98.71	0.01	0	0	0.09	1.17
2001	160	23	2448	335.908	-431.021	D	7.402	7.395	0.006	2.878	98.91	0	0	0	0.18	0.89
2001	161	23	2783	339.861	-425.806	D	7.883	7.757	0.126	3.659	98.56	0	0	0	0.09	1.34
2001	162	23	2571	322.646	-445.476	D	7.214	7.124	0.09	2.312	97.7	0	0	0	0.17	2.13
2001	163	23	2684	326.713	-427.014	D	6.897	6.876	0.02	1.808	97.7	0	0	0	0.24	2.05
2001	164	23	2307	336.654	-425.258	D	7.037	7.037	0	2.133	84.35	0	0	0	0.01	0.67
2001	165	23	1	318.65	-445.782	D	7.321	7.321	0	2.721	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	8.275	8.275	0	4.824	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	6.521	6.521	0	1.108	0	0	0	0	0	0
2001	168	23	2588	318.452	-445.8	D	6.546	6.545	0.001	1.153	95.95	0	0	0	0.69	3.36
2001	169	23	2588	318.452	-445.8	D	6.721	6.686	0.035	1.429	97.53	0	0	0	0.13	2.34
2001	170	23	1	318.65	-445.782	D	7.178	7.178	0	2.423	0	0	0	0	0	0
2001	171	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	172	23	1	318.65	-445.782	D	7.364	7.364	0	2.812	0	0	0	0	0	0
2001	173	23	1	318.65	-445.782	D	6.844	6.844	0	1.744	0	0	0	0	0	0
2001	174	23	1	318.65	-445.782	D	6.592	6.592	0	1.245	0	0	0	0	0	0
2001	175	23	1	318.65	-445.782	D	6.773	6.773	0	1.602	0	0	0	0	0	0
2001	176	23	2789	340.496	-426.449	D	7.649	7.636	0.013	3.395	98.92	0	0	0	0.15	0.9
2001	177	23	607	323.774	-437.813	D	7.258	7.15	0.108	2.365	98.26	0	0	0	0.13	1.6
2001	178	23	1548	330.222	-426.04	D	7.024	6.936	0.088	1.929	98.09	0	0	0	0.13	1.77
2001	179	23	2758	335.862	-424.454	D	9.111	8.971	0.14	6.49	99.48	0.01	0	0	0.02	0.49
2001	180	23	2695	328.074	-426.025	D	8.708	8.697	0.011	5.82	99.48	0	0	0	0.02	0.52
2001	181	23	638	324.065	-438.8	D	8.982	8.982	0	6.517	98.78	0	0	0	0	0.16
2001	182	23	2781	339.842	-425.379	D	9.24	9.24	0	7.165	88.92	0.04	0	0	0.32	8.99
2001	183	23	2789	340.496	-426.449	D	7.184	7.182	0.001	2.432	93.5	0.02	0	0	0.17	6.24
2001	184	23	2789	340.496	-426.449	D	7.349	7.347	0.002	2.776	96.93	0	0	0	0.1	2.9
2001	185	23	2788	340.294	-426.448	D	7.08	7.079	0	2.22	96.27	0	0	0	0.36	3.87
2001	186	23	1	318.65	-445.782	D	6.973	6.973	0	2.003	0	0	0	0	0	0
2001	187	23	1	318.65	-445.782	D	7.872	7.872	0	3.911	0	0	0	0	0	0
2001	188	23	2789	340.496	-426.449	D	8.713	8.713	0	5.859	99.76	0	0	0	0.01	0.15
2001	189	23	1	318.65	-445.782	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.028	7.028	0	2.115	0	0	0	0	0	0
2001	191	23	1	318.65	-445.782	D	7.041	7.041	0	2.142	0	0	0	0	0	0
2001	192	23	1	318.65	-445.782	D	6.957	6.957	0	1.971	0	0	0	0	0	0
2001	193	23	2781	339.842	-425.379	D	7.983	7.982	0.001	4.158	69.27	0.03	0	0	0.55	30.13
2001	194	23	2781	339.842	-425.379	D	9.132	9.026	0.106	6.626	98.63	0.03	0	0	0.05	1.29
2001	195	23	2588	318.452	-445.8	D	6.655	6.654	0.001	1.367	95.9	0	0	0	0.18	3.99
2001	196	23	2588	318.452	-445.8	D	6.728	6.685	0.043	1.427	94.99	0	0	0	0.56	4.44
2001	197	23	2684	326.713	-427.014	D	6.995	6.994	0.001	2.046	81.05	0	0	0	0.31	18.53

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	198	23	2405	338.909	-425.659	D	7.85	7.85	0	3.863	68.43	0.04	0	0	0.08	11.71
2001	199	23	1	318.65	-445.782	D	7.881	7.881	0	3.931	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.405	7.405	0	2.898	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.353	7.353	0	2.789	0	0	0	0	0	0
2001	202	23	2386	338.533	-428.423	D	6.808	6.808	0	1.67	91.29	0	0	0	0.13	3.56
2001	203	23	2468	334.002	-434.887	D	6.928	6.926	0.002	1.907	97.97	0	0	0	0.14	1.83
2001	204	23	2571	322.646	-445.476	D	7.926	7.813	0.113	3.782	99.25	0	0	0	0.05	0.7
2001	205	23	2588	318.452	-445.8	D	8.466	8.301	0.165	4.884	99.48	0	0	0	0.02	0.5
2001	206	23	2564	323.159	-444.002	D	8.112	8.028	0.084	4.26	99.43	0	0	0	0.02	0.55
2001	207	23	2789	340.496	-426.449	D	8.985	8.928	0.057	6.383	99.67	0	0	0	0.01	0.32
2001	208	23	2789	340.496	-426.449	D	8.95	8.905	0.045	6.326	99.54	0	0	0	0.02	0.44
2001	209	23	2789	340.496	-426.449	D	8.974	8.904	0.07	6.324	99.61	0.01	0	0	0.01	0.37
2001	210	23	2229	335.693	-426.049	D	8.636	8.636	0.001	5.673	99.81	0	0	0	0.01	0.53
2001	211	23	2274	336.179	-425.778	D	8.573	8.573	0	5.523	87.46	0	0	0	0.05	2.28
2001	212	23	2789	340.496	-426.449	D	8.504	8.496	0.009	5.339	99.02	0	0	0	0.14	0.84
2001	213	23	2789	340.496	-426.449	D	8.313	8.238	0.075	4.738	99.24	0	0	0	0.05	0.71
2001	214	23	2273	336.19	-426.028	D	7.561	7.548	0.012	3.204	99.35	0	0	0	0.03	0.61
2001	215	23	2784	339.87	-426.019	D	6.987	6.986	0.001	2.029	98.84	0	0	0	0.04	0.92
2001	216	23	2789	340.496	-426.449	D	7.049	7.049	0	2.158	97.6	0	0	0	0.05	1.42
2001	217	23	1	318.65	-445.782	D	7.138	7.138	0	2.34	81.83	0	0	0	0.1	0.64
2001	218	23	2588	318.452	-445.8	D	7.24	7.208	0.032	2.485	93.25	0.01	0	0	1.42	5.31
2001	219	23	2708	329.979	-425	D	7.876	7.463	0.414	3.021	98.19	0	0	0	0.25	1.56
2001	220	23	2597	318.971	-443.851	D	8.14	7.759	0.381	3.663	98.96	0	0	0	0.1	0.94
2001	221	23	2789	340.496	-426.449	D	7.801	7.762	0.039	3.668	99.32	0	0	0	0.03	0.64
2001	222	23	2402	338.942	-426.406	D	7.387	7.387	0	2.861	96.45	0	0	0	0.02	0.59
2001	223	23	1	318.65	-445.782	D	8.854	8.854	0	6.202	0	0	0	0	0	0
2001	224	23	2789	340.496	-426.449	D	7.365	7.365	0.001	2.813	96.58	0	0	0	0.35	3.19
2001	225	23	2468	334.002	-434.887	D	7.579	7.573	0.006	3.257	98.95	0.02	0	0	0.06	0.98
2001	226	23	6	319.136	-445.511	D	6.915	6.915	0	1.885	91.05	0	0	0	0.16	3.52
2001	227	23	1	318.65	-445.782	D	6.848	6.848	0	1.751	0	0	0	0	0	0
2001	228	23	1	318.65	-445.782	D	7.783	7.783	0	3.714	0	0	0	0	0	0
2001	229	23	1	318.65	-445.782	D	6.675	6.675	0	1.407	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.046	7.046	0	2.151	0	0	0	0	0	0
2001	231	23	1	318.65	-445.782	D	6.857	6.857	0	1.768	0	0	0	0	0	0
2001	232	23	1	318.65	-445.782	D	7.006	7.006	0	2.069	0	0	0	0	0	0
2001	233	23	1	318.65	-445.782	D	8.165	8.165	0	4.572	0	0	0	0	0	0
2001	234	23	1	318.65	-445.782	D	6.991	6.991	0	2.041	0	0	0	0	0	0
2001	235	23	2412	339.417	-425.886	D	6.974	6.974	0	2.005	92.53	0	0	0	0.01	0.35
2001	236	23	1	318.65	-445.782	D	7.113	7.113	0	2.289	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	237	23	1	318.65	-445.782	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2001	238	23	1	318.65	-445.782	D	7.199	7.199	0	2.467	0	0	0	0	0	0
2001	239	23	1	318.65	-445.782	D	7.365	7.365	0	2.813	0	0	0	0	0	0
2001	240	23	1	318.65	-445.782	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2001	241	23	1	318.65	-445.782	D	7.628	7.628	0	3.376	0	0	0	0	0	0
2001	242	23	1	318.65	-445.782	D	8.243	8.243	0	4.749	0	0	0	0	0	0
2001	243	23	1	318.65	-445.782	D	8.684	8.684	0	5.788	0	0	0	0	0	0
2001	244	23	1	318.65	-445.782	D	8.7	8.7	0	5.827	0	0	0	0	0	0
2001	245	23	2704	329.056	-425.092	D	9.287	8.788	0.499	6.04	99.13	0.03	0	0	0.06	0.79
2001	246	23	2588	318.452	-445.8	D	8.466	8.207	0.259	4.668	98.68	0	0	0	0.05	1.26
2001	247	23	2589	318.383	-445.593	D	7.202	7.196	0.007	2.46	98.61	0	0	0	0.07	1.3
2001	248	23	2447	336.137	-430.956	D	7.828	7.519	0.309	3.141	97.91	0.01	0	0	0.24	1.84
2001	249	23	2704	329.056	-425.092	D	7.432	7.394	0.038	2.876	97.35	0	0	0	0.11	2.53
2001	250	23	1	318.65	-445.782	D	8.117	8.117	0	4.462	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	9.202	9.202	0	7.068	0	0	0	0	0	0
2001	252	23	1	318.65	-445.782	D	9.34	9.34	0	7.421	0	0	0	0	0	0
2001	253	23	1	318.65	-445.782	D	6.988	6.988	0	2.034	0	0	0	0	0	0
2001	254	23	1	318.65	-445.782	D	6.784	6.784	0	1.623	0	0	0	0	0	0
2001	255	23	2571	322.646	-445.476	D	6.963	6.853	0.11	1.761	94.53	0.01	0	0	0.54	4.92
2001	256	23	2588	318.452	-445.8	D	7.009	6.987	0.022	2.031	95.69	0	0	0	0.42	3.89
2001	257	23	2588	318.452	-445.8	D	7.244	7.243	0.001	2.559	92.88	0	0	0	0.69	6.35
2001	258	23	67	319.674	-440.741	D	6.964	6.963	0.001	1.984	97.59	0	0	0	0.06	2.1
2001	259	23	2588	318.452	-445.8	D	6.771	6.742	0.028	1.541	97.23	0	0	0	0.19	2.58
2001	260	23	2571	322.646	-445.476	D	7.155	7.078	0.077	2.217	97.98	0	0	0	0.06	1.95
2001	261	23	2789	340.496	-426.449	D	8.856	8.832	0.025	6.147	99.2	0	0	0	0.02	0.77
2001	262	23	1199	327.783	-427.146	D	8.451	8.451	0	5.235	88.28	0	0	0	0.09	3.3
2001	263	23	13	319.06	-443.766	D	6.89	6.89	0	1.835	27.05	0	0	0	0.05	3.44
2001	264	23	1	318.65	-445.782	D	7.236	7.236	0	2.544	0	0	0	0	0	0
2001	265	23	1	318.65	-445.782	D	7.163	7.163	0	2.391	0	0	0	0	0	0
2001	266	23	1	318.65	-445.782	D	7.936	7.936	0	4.053	0	0	0	0	0	0
2001	267	23	1	318.65	-445.782	D	8.604	8.604	0	5.597	0	0	0	0	0	0
2001	268	23	1	318.65	-445.782	D	6.641	6.641	0	1.341	0	0	0	0	0	0
2001	269	23	1	318.65	-445.782	D	6.543	6.543	0	1.15	0	0	0	0	0	0
2001	270	23	1	318.65	-445.782	D	6.643	6.643	0	1.344	0	0	0	0	0	0
2001	271	23	1	318.65	-445.782	D	6.708	6.708	0	1.473	0	0	0	0	0	0
2001	272	23	1	318.65	-445.782	D	7.084	7.084	0	2.229	0	0	0	0	0	0
2001	273	23	1	318.65	-445.782	D	7.066	7.066	0	2.193	0	0	0	0	0	0
2001	274	23	1	318.65	-445.782	D	7.111	7.111	0	2.285	0	0	0	0	0	0
2001	275	23	1	318.65	-445.782	D	6.85	6.85	0	1.755	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	276	23	1	318.65	-445.782	D	7.64	7.64	0	3.401	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	8.468	8.468	0	5.274	0	0	0	0	0	0
2001	278	23	1	318.65	-445.782	D	9.71	9.71	0	8.39	0	0	0	0	0	0
2001	279	23	1	318.65	-445.782	D	7.077	7.077	0	2.216	0	0	0	0	0	0
2001	280	23	2571	322.646	-445.476	D	6.559	6.558	0	1.18	97.63	0	0	0	0.63	1.66
2001	281	23	2789	340.496	-426.449	D	6.628	6.613	0.014	1.286	95.08	0.03	0	0	0.26	4.63
2001	282	23	642	324.022	-437.802	D	7.674	7.674	0	3.476	24.51	0.03	0	0	0.03	11.13
2001	283	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	284	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	285	23	1	318.65	-445.782	D	9.798	9.798	0	8.625	0	0	0	0	0	0
2001	286	23	1	318.65	-445.782	D	10.019	10.019	0	9.227	0	0	0	0	0	0
2001	287	23	1	318.65	-445.782	D	7.49	7.49	0	3.08	0	0	0	0	0	0
2001	288	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2001	289	23	1	318.65	-445.782	D	7.071	7.071	0	2.203	0	0	0	0	0	0
2001	290	23	1	318.65	-445.782	D	6.486	6.486	0	1.04	0	0	0	0	0	0
2001	291	23	2789	340.496	-426.449	D	6.548	6.548	0	1.16	93.34	0.01	0	0	0.34	5.82
2001	292	23	1	318.65	-445.782	D	6.799	6.799	0	1.653	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	8.641	8.641	0	5.686	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	9.362	9.362	0	7.476	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	9.29	9.29	0	7.294	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	297	23	1	318.65	-445.782	D	9.624	9.624	0	8.162	0	0	0	0	0	0
2001	298	23	1	318.65	-445.782	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	300	23	1	318.65	-445.782	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	301	23	2468	334.002	-434.887	D	6.479	6.478	0.001	1.023	89.9	0.02	0	0	1.06	9.07
2001	302	23	2789	340.496	-426.449	D	6.507	6.501	0.007	1.067	91.9	0.05	0	0	0.22	7.86
2001	303	23	2248	336.018	-427.784	D	6.554	6.554	0	1.171	67.53	0.01	0	0	0.02	3.91
2001	304	23	1	318.65	-445.782	D	6.695	6.695	0	1.447	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	9.032	9.032	0	6.64	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	9.835	9.835	0	8.726	0	0	0	0	0	0
2001	307	23	2414	339.687	-426.374	D	9.685	9.685	0	8.324	8.42	0	0	0	0.66	2.64
2001	308	23	2588	318.452	-445.8	D	6.969	6.948	0.021	1.953	88.84	0.01	0	0	1.23	9.91
2001	309	23	2588	318.452	-445.8	D	8.026	8.026	0.001	4.255	75.48	0	0	0	1.69	22.6
2001	310	23	2588	318.452	-445.8	D	7.881	7.88	0.002	3.928	96.82	0.01	0	0	0.25	2.98
2001	311	23	2448	335.908	-431.021	D	7.178	7.161	0.017	2.389	97.13	0.01	0	0	0.12	2.74
2001	312	23	2789	340.496	-426.449	D	7.27	7.268	0.001	2.612	93.45	0.03	0	0	0.14	6.34
2001	313	23	1	318.65	-445.782	D	6.615	6.615	0	1.289	0	0	0	0	0	0
2001	314	23	1	318.65	-445.782	D	6.786	6.786	0	1.628	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	315	23	1	318.65	-445.782	D	6.785	6.785	0	1.626	0	0	0	0	0	0
2001	316	23	2762	336.074	-425.006	D	6.687	6.661	0.026	1.381	85.19	0.02	0	0	2.33	12.45
2001	317	23	2589	318.383	-445.593	D	6.725	6.716	0.009	1.489	87.56	0.07	0	0	0.13	12.25
2001	318	23	1414	329.196	-425.335	D	7.315	7.314	0	2.708	94.55	0.02	0	0	0.02	5.34
2001	319	23	1	318.65	-445.782	D	8.023	8.023	0	4.249	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.729	7.729	0	3.597	0	0	0	0	0	0
2001	321	23	2571	322.646	-445.476	D	7.121	7.103	0.019	2.268	93.88	0.02	0	0	0.53	5.57
2001	322	23	2564	323.159	-444.002	D	8.332	8.032	0.3	4.27	98.43	0.03	0	0	0.05	1.49
2001	323	23	2399	338.683	-426.168	D	8.463	8.463	0	5.264	97.61	0	0	0	0.02	0.55
2001	324	23	1	318.65	-445.782	D	6.474	6.474	0	1.016	0	0	0	0	0	0
2001	325	23	1	318.65	-445.782	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	326	23	1	318.65	-445.782	D	6.548	6.548	0	1.159	0	0	0	0	0	0
2001	327	23	1	318.65	-445.782	D	8.475	8.475	0	5.291	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	8.774	8.774	0	6.006	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	6.66	6.66	0	1.377	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.063	7.063	0	2.186	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.026	7.026	0	2.111	0	0	0	0	0	0
2001	332	23	2571	322.646	-445.476	D	9.267	9.266	0.001	7.232	98.8	0.15	0	0	0.14	0.85
2001	333	23	2571	322.646	-445.476	D	10.225	10.218	0.007	9.779	98.72	0.29	0	0	0.01	0.93
2001	334	23	2468	334.002	-434.887	D	8.396	8.395	0.001	5.103	99.02	0.29	0	0	0	0.8
2001	335	23	1	318.65	-445.782	D	6.625	6.625	0	1.31	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	6.688	6.688	0	1.434	0	0	0	0	0	0
2001	337	23	2789	340.496	-426.449	D	6.841	6.841	0	1.737	90.79	0.01	0	0	0.54	8.29
2001	338	23	2396	338.424	-425.93	D	7.046	7.046	0	2.151	76.37	0.05	0	0	0.37	22.21
2001	339	23	1	318.65	-445.782	D	9.653	9.653	0	8.239	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	9.943	9.943	0	9.018	0	0	0	0	0	0
2001	341	23	1	318.65	-445.782	D	7.912	7.912	0	4	0	0	0	0	0	0
2001	342	23	2789	340.496	-426.449	D	8.497	8.487	0.01	5.32	99.47	0.06	0	0	0.01	0.47
2001	343	23	1	318.65	-445.782	D	6.589	6.589	0	1.239	0	0	0	0	0	0
2001	344	23	1	318.65	-445.782	D	6.522	6.522	0	1.109	0	0	0	0	0	0
2001	345	23	2789	340.496	-426.449	D	6.586	6.574	0.013	1.209	90.23	0.13	0	0	0.62	9.01
2001	346	23	2784	339.87	-426.019	D	9.733	9.732	0	8.45	76.03	0.49	0	0	0.19	23.6
2001	347	23	1	318.65	-445.782	D	9.808	9.808	0	8.653	0	0	0	0	0	0
2001	348	23	1	318.65	-445.782	D	9.503	9.503	0	7.842	0	0	0	0	0	0
2001	349	23	1	318.65	-445.782	D	9.319	9.319	0	7.367	0	0	0	0	0	0
2001	350	23	2781	339.842	-425.379	D	10.417	10.218	0.199	9.779	97.55	0.36	0	0	0.1	1.99
2001	351	23	2789	340.496	-426.449	D	9.62	9.458	0.162	7.727	99.65	0.05	0	0	0.01	0.3
2001	352	23	1	318.65	-445.782	D	6.544	6.544	0	1.152	0	0	0	0	0	0
2001	353	23	1	318.65	-445.782	D	6.815	6.815	0	1.686	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	354	23	1	318.65	-445.782	D	6.471	6.471	0	1.009	0	0	0	0	0	0
2001	355	23	1	318.65	-445.782	D	6.487	6.487	0	1.042	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	8.259	8.259	0	4.788	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	6.641	6.641	0	1.34	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	359	23	1	318.65	-445.782	D	6.512	6.512	0	1.089	0	0	0	0	0	0
2001	360	23	1	318.65	-445.782	D	6.537	6.537	0	1.138	0	0	0	0	0	0
2001	361	23	1	318.65	-445.782	D	6.605	6.605	0	1.269	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2001	363	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	364	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	365	23	1	318.65	-445.782	D	6.619	6.619	0	1.298	0	0	0	0	0	0
									0.499							
INDEPENDENCE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	318.65	-445.782	D	7.785	7.785	0	3.719	0	0	0	0	0	0
2001	2	23	2789	340.496	-426.449	D	7.543	7.421	0.122	2.932	88.67	10.92	0	0	0	0.41
2001	3	23	2789	340.496	-426.449	D	7.798	7.761	0.037	3.667	91.93	7.86	0	0	0	0.2
2001	4	23	1	318.65	-445.782	D	7.031	7.031	0	2.121	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	6.931	6.931	0	1.919	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	6.551	6.551	0	1.165	0	0	0	0	0	0
2001	7	23	2781	339.842	-425.379	D	7.273	7.129	0.144	2.323	77.13	22	0	0	0	0.87
2001	8	23	2611	319.699	-440.64	D	8.748	8.682	0.066	5.784	91.32	8.46	0	0	0	0.23
2001	9	23	2781	339.842	-425.379	D	10.025	9.56	0.464	7.993	91.26	8.62	0	0	0	0.12
2001	10	23	1514	329.963	-425.801	D	7.035	7	0.035	2.059	90.24	9.41	0	0	0	0.34
2001	11	23	2781	339.842	-425.379	D	9.131	9.131	0	6.888	88.97	5.31	0	0	0	0.38
2001	12	23	1	318.65	-445.782	D	9.519	9.519	0	7.886	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	9.698	9.698	0	8.359	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	9.396	9.396	0	7.566	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	6.74	6.74	0	1.537	0	0	0	0	0	0
2001	16	23	2758	335.862	-424.454	D	6.817	6.795	0.022	1.645	79.84	17.93	0	0	0	2.23
2001	17	23	2597	318.971	-443.851	D	6.92	6.897	0.023	1.849	80.28	18.43	0	0	0	1.29
2001	18	23	2704	329.056	-425.092	D	6.91	6.896	0.014	1.847	90.36	8.5	0	0	0	1.13
2001	19	23	2626	320.826	-437.417	D	7.106	6.925	0.181	1.907	65.64	32.46	0	0	0	1.9
2001	20	23	2789	340.496	-426.449	D	6.581	6.555	0.025	1.174	73.06	24.31	0	0	0	2.63
2001	21	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	22	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	23	23	1	318.65	-445.782	D	6.621	6.621	0	1.303	0	0	0	0	0	0
2001	24	23	2704	329.056	-425.092	D	6.787	6.738	0.049	1.533	90.99	8.24	0	0	0	0.77
2001	25	23	2589	318.383	-445.593	D	6.636	6.568	0.069	1.197	82.5	15.83	0	0	0	1.67
2001	26	23	1	318.65	-445.782	D	6.538	6.538	0	1.139	92.28	14.1	0	0	0	1.33
2001	27	23	2781	339.842	-425.379	D	6.678	6.66	0.018	1.378	73.37	23.87	0	0	0	2.76
2001	28	23	2684	326.713	-427.014	D	6.541	6.53	0.011	1.125	79.65	18.68	0	0	0	1.66
2001	29	23	1	318.65	-445.782	D	8.908	8.908	0	6.335	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	6.819	6.819	0	1.692	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.016	7.016	0	2.09	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	6.478	6.478	0	1.025	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	6.561	6.561	0	1.185	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	6.583	6.583	0	1.226	0	0	0	0	0	0
2001	37	23	2707	329.748	-425.023	D	6.522	6.522	0	1.108	92.73	4.65	0	0	0	2.8
2001	38	23	2711	330.671	-424.932	D	7.856	7.856	0	3.876	87.02	10.3	0	0	0	1.98
2001	39	23	1	318.65	-445.782	D	10.07	10.07	0	9.369	0	0	0	0	0	0
2001	40	23	2758	335.862	-424.454	D	9.357	9.356	0.001	7.463	90.19	9.66	0	0	0	0.05
2001	41	23	2223	335.759	-427.545	D	6.682	6.664	0.017	1.386	64.84	31.88	0	0	0	3.29
2001	42	23	2588	318.452	-445.8	D	6.474	6.471	0.002	1.01	81.33	17.05	0	0	0	1.62
2001	43	23	1	318.65	-445.782	D	6.879	6.879	0	1.812	0	0	0	0	0	0
2001	44	23	1	318.65	-445.782	D	9.412	9.412	0	7.606	0	0	0	0	0	0
2001	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	46	23	2695	328.074	-426.025	D	9.77	8.765	**1.004**	5.985	93.59	6.2	0	0	0	0.21
2001	47	23	2789	340.496	-426.449	D	8.799	8.052	**0.747**	4.315	92.42	7.44	0	0	0	0.14
2001	48	23	2589	318.383	-445.593	D	6.531	6.531	0	1.127	81.68	15.83	0	0	0	2.28
2001	49	23	2704	329.056	-425.092	D	6.486	6.472	0.014	1.012	82.35	16.24	0	0	0	1.4
2001	50	23	2041	333.901	-424.879	D	6.497	6.497	0	1.06	87.74	8.77	0	0	0	0.74
2001	51	23	1	318.65	-445.782	D	9.197	9.197	0	7.056	0	0	0	0	0	0
2001	52	23	2695	328.074	-426.025	D	8.156	8.125	0.032	4.479	94.2	5.68	0	0	0	0.12
2001	53	23	2415	339.676	-426.124	D	7.071	7.067	0.003	2.195	94.17	5.6	0	0	0	0.19
2001	54	23	13	319.06	-443.766	D	6.764	6.764	0	1.583	35.47	0.9	0	0	0	0.12
2001	55	23	1	318.65	-445.782	D	9.447	9.447	0	7.697	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.222	7.222	0	2.515	0	0	0	0	0	0
2001	57	23	2789	340.496	-426.449	D	6.501	6.499	0.002	1.064	94.67	4.16	0	0	0	1.21
2001	58	23	2781	339.842	-425.379	D	6.524	6.517	0.007	1.099	94.26	5.16	0	0	0	0.62
2001	59	23	2694	327.861	-425.964	D	7.146	7.142	0.004	2.348	93.97	5.87	0	0	0	0.13
2001	60	23	1	318.65	-445.782	D	6.708	6.708	0	1.473	0	0	0	0	0	0
2001	61	23	1	318.65	-445.782	D	8.524	8.524	0	5.407	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	62	23	2788	340.294	-426.448	D	6.731	6.731	0	1.518	89.56	5.41	0	0	0	0.86
2001	63	23	2628	320.933	-436.998	D	6.727	6.618	0.109	1.295	91.46	7.67	0	0	0	0.87
2001	64	23	2781	339.842	-425.379	D	6.626	6.535	0.091	1.134	70.4	25.9	0	0	0	3.7
2001	65	23	2789	340.496	-426.449	D	6.531	6.526	0.005	1.116	68.13	27.94	0	0	0	3.93
2001	66	23	2758	335.862	-424.454	D	6.485	6.471	0.014	1.011	95.37	3.22	0	0	0	1.42
2001	67	23	2781	339.842	-425.379	D	6.581	6.541	0.04	1.146	90.07	8.53	0	0	0	1.39
2001	68	23	2684	326.713	-427.014	D	6.504	6.493	0.011	1.053	73.98	22.56	0	0	0	3.46
2001	69	23	1	318.65	-445.782	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	70	23	1	318.65	-445.782	D	6.506	6.506	0	1.078	0	0	0	0	0	0
2001	71	23	1	318.65	-445.782	D	9.154	9.154	0	6.946	0	0	0	0	0	0
2001	72	23	1	318.65	-445.782	D	6.558	6.558	0	1.178	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	74	23	1	318.65	-445.782	D	9.736	9.736	0	8.459	0	0	0	0	0	0
2001	75	23	2758	335.862	-424.454	D	7.595	7.591	0.004	3.297	94.23	5.66	0	0	0	0.1
2001	76	23	2694	327.861	-425.964	D	6.616	6.586	0.03	1.234	69.97	27.1	0	0	0	2.93
2001	77	23	2589	318.383	-445.593	D	6.502	6.502	0	1.069	87.69	10.17	0	0	0	2.31
2001	78	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	79	23	1	318.65	-445.782	D	6.495	6.495	0	1.057	0	0	0	0	0	0
2001	80	23	1	318.65	-445.782	D	6.473	6.473	0	1.013	0	0	0	0	0	0
2001	81	23	1	318.65	-445.782	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	82	23	1	318.65	-445.782	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2001	83	23	1	318.65	-445.782	D	6.758	6.758	0	1.572	0	0	0	0	0	0
2001	84	23	2684	326.713	-427.014	D	6.481	6.473	0.008	1.014	85.01	12.53	0	0	0	2.45
2001	85	23	2467	334.065	-434.651	D	6.518	6.48	0.037	1.028	84.77	13.43	0	0	0	1.81
2001	86	23	2684	326.713	-427.014	D	6.469	6.468	0.001	1.004	87.32	11.33	0	0	0	1.48
2001	87	23	863	325.509	-431.992	D	6.518	6.518	0	1.102	58.21	1.59	0	0	0	0.74
2001	88	23	1	318.65	-445.782	D	7.559	7.559	0	3.227	0	0	0	0	0	0
2001	89	23	1	318.65	-445.782	D	9.145	9.145	0	6.925	0	0	0	0	0	0
2001	90	23	1	318.65	-445.782	D	7.628	7.628	0	3.376	0	0	0	0	0	0
2001	91	23	1	318.65	-445.782	D	6.481	6.481	0	1.029	0	0	0	0	0	0
2001	92	23	1	318.65	-445.782	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	9.747	9.747	0	8.488	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	8.549	8.549	0	5.467	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.507	7.507	0	3.115	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.503	7.503	0	3.108	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.145	7.145	0	2.355	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.606	7.606	0	3.329	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	101	23	1	318.65	-445.782	D	9.338	9.338	0	7.417	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	6.571	6.571	0	1.204	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.079	7.079	0	2.219	0	0	0	0	0	0
2001	105	23	2781	339.842	-425.379	D	8.945	8.943	0.002	6.422	98.75	0.48	0	0	0	0.67
2001	106	23	2789	340.496	-426.449	D	6.512	6.503	0.009	1.073	80.26	15.64	0	0	0	4.1
2001	107	23	2589	318.383	-445.593	D	6.494	6.48	0.014	1.027	76.18	20.12	0	0	0	3.69
2001	108	23	2628	320.933	-436.998	D	6.505	6.476	0.029	1.02	95.06	4	0	0	0	0.94
2001	109	23	2781	339.842	-425.379	D	6.564	6.563	0.001	1.188	98.92	0.5	0	0	0	0.55
2001	110	23	1	318.65	-445.782	D	10.01	10.01	0	9.202	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	8.281	8.281	0	4.837	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	8.135	8.135	0	4.503	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	8.008	8.008	0	4.216	0	0	0	0	0	0
2001	114	23	2781	339.842	-425.379	D	6.512	6.504	0.008	1.074	97.35	0.94	0	0	0	1.71
2001	115	23	2588	318.452	-445.8	D	6.514	6.478	0.036	1.024	97.39	1.49	0	0	0	1.12
2001	116	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	6.586	6.586	0	1.232	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	6.585	6.585	0	1.231	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	6.867	6.867	0	1.788	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.147	7.147	0	2.358	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	6.839	6.839	0	1.734	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.129	7.129	0	2.323	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.25	7.25	0	2.573	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	8.868	8.868	0	6.236	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	8.924	8.924	0	6.374	0	0	0	0	0	0
2001	127	23	2781	339.842	-425.379	D	8.407	8.405	0.001	5.127	98.65	0.16	0	0	0	1.24
2001	128	23	2790	340.421	-426.562	D	6.629	6.551	0.079	1.164	98.54	0.58	0	0	0	0.88
2001	129	23	2564	323.159	-444.002	D	6.921	6.883	0.038	1.822	99.45	0.23	0	0	0	0.32
2001	130	23	2789	340.496	-426.449	D	6.953	6.953	0	1.963	99.32	0.07	0	0	0	0.29
2001	131	23	1	318.65	-445.782	D	8.246	8.246	0	4.756	0	0	0	0	0	0
2001	132	23	2782	339.852	-425.592	D	8.87	8.737	0.133	5.917	94.49	5.42	0	0	0	0.08
2001	133	23	1	318.65	-445.782	D	6.561	6.561	0	1.185	0	0	0	0	0	0
2001	134	23	1	318.65	-445.782	D	6.804	6.804	0	1.664	0	0	0	0	0	0
2001	135	23	1	318.65	-445.782	D	6.961	6.961	0	1.979	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.897	7.897	0	3.966	0	0	0	0	0	0
2001	138	23	2694	327.861	-425.964	D	7.58	7.574	0.006	3.259	98.41	1.46	0	0	0	0.13
2001	139	23	2708	329.979	-425	D	7.772	7.713	0.059	3.561	99.15	0.76	0	0	0	0.08

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	140	23	2308	337.055	-428.737	D	7.462	7.462	0	3.019	91.8	0.03	0	0	0	0.28
2001	141	23	1	318.65	-445.782	D	8.961	8.961	0	6.464	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	6.534	6.534	0	1.131	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	6.566	6.566	0	1.193	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	6.546	6.546	0	1.156	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	6.809	6.809	0	1.673	0	0	0	0	0	0
2001	148	23	2789	340.496	-426.449	D	8.09	8.088	0.002	4.396	99.39	0.04	0	0	0	0.55
2001	149	23	2789	340.496	-426.449	D	7.077	6.968	0.108	1.993	99.47	0.27	0	0	0	0.26
2001	150	23	2758	335.862	-424.454	D	8.492	8.484	0.008	5.312	99.66	0.14	0	0	0	0.18
2001	151	23	1	318.65	-445.782	D	9.068	9.068	0	6.73	0	0	0	0	0	0
2001	152	23	1	318.65	-445.782	D	7.103	7.103	0	2.268	0	0	0	0	0	0
2001	153	23	2789	340.496	-426.449	D	7.138	7.138	0	2.341	97.21	1.05	0	0	0	1.6
2001	154	23	2418	339.946	-426.612	D	7.576	7.576	0	3.264	105.16	0.46	0	0	0	0.19
2001	155	23	1	318.65	-445.782	D	8.894	8.894	0	6.3	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	8.375	8.375	0	5.056	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.624	7.624	0	3.368	0	0	0	0	0	0
2001	158	23	2781	339.842	-425.379	D	8.168	8.143	0.025	4.522	99.66	0.13	0	0	0	0.21
2001	159	23	2653	324.014	-433.36	D	7.542	7.293	0.249	2.663	99.7	0.19	0	0	0	0.11
2001	160	23	2588	318.452	-445.8	D	7.361	7.36	0.001	2.804	99.7	0.01	0	0	0	0.25
2001	161	23	1	318.65	-445.782	D	7.369	7.369	0	2.823	0	0	0	0	0	0
2001	162	23	1	318.65	-445.782	D	7.124	7.124	0	2.312	0	0	0	0	0	0
2001	163	23	1	318.65	-445.782	D	6.931	6.931	0	1.917	0	0	0	0	0	0
2001	164	23	1	318.65	-445.782	D	7.137	7.137	0	2.339	0	0	0	0	0	0
2001	165	23	1	318.65	-445.782	D	7.321	7.321	0	2.721	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	8.275	8.275	0	4.824	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	6.521	6.521	0	1.108	0	0	0	0	0	0
2001	168	23	2468	334.002	-434.887	D	6.541	6.538	0.003	1.14	99.41	0.03	0	0	0	0.57
2001	169	23	2789	340.496	-426.449	D	6.653	6.651	0.002	1.36	99.63	0.02	0	0	0	0.37
2001	170	23	2384	338.176	-425.941	D	7	7	0	2.057	93.83	0.01	0	0	0	0.28
2001	171	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	172	23	2784	339.87	-426.019	D	7.302	7.224	0.079	2.518	99.61	0.16	0	0	0	0.23
2001	173	23	2588	318.452	-445.8	D	6.901	6.844	0.057	1.744	99.05	0.38	0	0	0	0.57
2001	174	23	2789	340.496	-426.449	D	6.726	6.611	0.115	1.283	98.52	0.54	0	0	0	0.94
2001	175	23	2789	340.496	-426.449	D	6.765	6.76	0.005	1.576	99.38	0.1	0	0	0	0.5
2001	176	23	2571	322.646	-445.476	D	8.456	8.451	0.005	5.235	99.8	0.06	0	0	0	0.08
2001	177	23	1415	329.185	-425.086	D	7.155	7.155	0	2.376	99.74	0.03	0	0	0	0.13
2001	178	23	1	318.65	-445.782	D	6.992	6.992	0	2.043	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	179	23	1	318.65	-445.782	D	9.057	9.057	0	6.704	0	0	0	0	0	0
2001	180	23	1	318.65	-445.782	D	8.855	8.855	0	6.204	0	0	0	0	0	0
2001	181	23	1	318.65	-445.782	D	8.968	8.968	0	6.482	0	0	0	0	0	0
2001	182	23	2708	329.979	-425	D	9.398	9.396	0.002	7.564	99.62	0.01	0	0	0	0.33
2001	183	23	2695	328.074	-426.025	D	7.263	7.243	0.02	2.559	99.63	0.21	0	0	0	0.15
2001	184	23	1415	329.185	-425.086	D	7.378	7.377	0.001	2.841	100	0.03	0	0	0	0.11
2001	185	23	1	318.65	-445.782	D	7.174	7.174	0	2.415	0	0	0	0	0	0
2001	186	23	2781	339.842	-425.379	D	7.048	7.042	0.005	2.144	99.59	0.01	0	0	0	0.39
2001	187	23	2789	340.496	-426.449	D	7.832	7.635	0.197	3.392	99.77	0.09	0	0	0	0.13
2001	188	23	2789	340.496	-426.449	D	8.782	8.713	0.069	5.859	99.94	0.02	0	0	0	0.04
2001	189	23	1	318.65	-445.782	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.028	7.028	0	2.115	0	0	0	0	0	0
2001	191	23	2789	340.496	-426.449	D	7.346	7.248	0.097	2.57	99.67	0.12	0	0	0	0.21
2001	192	23	2789	340.496	-426.449	D	7.103	7.063	0.04	2.187	99.64	0.04	0	0	0	0.32
2001	193	23	1	318.65	-445.782	D	7.589	7.589	0	3.293	0	0	0	0	0	0
2001	194	23	1	318.65	-445.782	D	9.103	9.103	0	6.82	0	0	0	0	0	0
2001	195	23	1	318.65	-445.782	D	6.654	6.654	0	1.367	0	0	0	0	0	0
2001	196	23	1	318.65	-445.782	D	6.685	6.685	0	1.427	0	0	0	0	0	0
2001	197	23	1	318.65	-445.782	D	7.148	7.148	0	2.362	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.972	7.972	0	4.135	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.881	7.881	0	3.931	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.405	7.405	0	2.898	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.353	7.353	0	2.789	0	0	0	0	0	0
2001	202	23	2406	339.19	-426.396	D	6.808	6.808	0	1.67	97.22	0.01	0	0	0	0.36
2001	203	23	2784	339.87	-426.019	D	6.904	6.904	0	1.864	98.86	0.05	0	0	0	0.25
2001	204	23	1	318.65	-445.782	D	7.813	7.813	0	3.782	0	0	0	0	0	0
2001	205	23	1	318.65	-445.782	D	8.301	8.301	0	4.884	0	0	0	0	0	0
2001	206	23	1	318.65	-445.782	D	8.028	8.028	0	4.26	0	0	0	0	0	0
2001	207	23	2758	335.862	-424.454	D	8.966	8.965	0.001	6.475	99.77	0.05	0	0	0	0.18
2001	208	23	2789	340.496	-426.449	D	8.95	8.905	0.046	6.326	99.43	0.52	0	0	0	0.05
2001	209	23	1513	329.974	-426.051	D	9.193	9.156	0.037	6.952	99.46	0.5	0	0	0	0.03
2001	210	23	2784	339.87	-426.019	D	8.71	8.71	0	5.852	99.21	0.1	0	0	0	0.07
2001	211	23	2789	340.496	-426.449	D	8.626	8.621	0.005	5.638	99.84	0.07	0	0	0	0.13
2001	212	23	2781	339.842	-425.379	D	8.513	8.49	0.023	5.325	99.92	0.03	0	0	0	0.05
2001	213	23	2784	339.87	-426.019	D	8.239	8.238	0.001	4.738	99.96	0.01	0	0	0	0.06
2001	214	23	1	318.65	-445.782	D	7.764	7.764	0	3.674	0	0	0	0	0	0
2001	215	23	1	318.65	-445.782	D	7.135	7.135	0	2.335	0	0	0	0	0	0
2001	216	23	2789	340.496	-426.449	D	7.075	7.049	0.025	2.158	99.4	0.37	0	0	0	0.22
2001	217	23	2588	318.452	-445.8	D	7.142	7.138	0.004	2.34	99.82	0.03	0	0	0	0.15

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	218	23	1	318.65	-445.782	D	7.208	7.208	0	2.485	0	0	0	0	0	0
2001	219	23	1	318.65	-445.782	D	7.407	7.407	0	2.902	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.7	7.7	0	3.534	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.773	7.773	0	3.694	0	0	0	0	0	0
2001	222	23	2684	326.713	-427.014	D	7.507	7.417	0.09	2.925	99.34	0.07	0	0	0	0.59
2001	223	23	2447	336.137	-430.956	D	9.781	9.058	**0.723**	6.707	98.39	1.53	0	0	0	0.08
2001	224	23	2468	334.002	-434.887	D	7.423	7.417	0.007	2.923	99.6	0.25	0	0	0	0.15
2001	225	23	2789	340.496	-426.449	D	7.596	7.587	0.009	3.288	99.15	0.76	0	0	0	0.08
2001	226	23	1	318.65	-445.782	D	6.915	6.915	0	1.885	0	0	0	0	0	0
2001	227	23	1	318.65	-445.782	D	6.848	6.848	0	1.751	0	0	0	0	0	0
2001	228	23	1	318.65	-445.782	D	7.783	7.783	0	3.714	0	0	0	0	0	0
2001	229	23	1	318.65	-445.782	D	6.675	6.675	0	1.407	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.046	7.046	0	2.151	0	0	0	0	0	0
2001	231	23	2704	329.056	-425.092	D	6.897	6.884	0.013	1.824	97.59	1.02	0	0	0	1.38
2001	232	23	2758	335.862	-424.454	D	7.192	6.996	0.196	2.05	99.26	0.25	0	0	0	0.5
2001	233	23	2781	339.842	-425.379	D	7.567	7.552	0.015	3.213	99.74	0.05	0	0	0	0.21
2001	234	23	1	318.65	-445.782	D	6.991	6.991	0	2.041	0	0	0	0	0	0
2001	235	23	1	318.65	-445.782	D	7.076	7.076	0	2.213	0	0	0	0	0	0
2001	236	23	1	318.65	-445.782	D	7.113	7.113	0	2.289	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2001	238	23	2781	339.842	-425.379	D	7.372	7.358	0.014	2.799	99.07	0.39	0	0	0	0.54
2001	239	23	2588	318.452	-445.8	D	7.551	7.365	0.187	2.813	99.05	0.71	0	0	0	0.24
2001	240	23	2571	322.646	-445.476	D	6.947	6.92	0.027	1.895	99.68	0.09	0	0	0	0.23
2001	241	23	2781	339.842	-425.379	D	7.324	7.312	0.012	2.703	99.65	0.13	0	0	0	0.23
2001	242	23	2784	339.87	-426.019	D	8.506	8.502	0.004	5.355	99.7	0.19	0	0	0	0.07
2001	243	23	1	318.65	-445.782	D	8.684	8.684	0	5.788	0	0	0	0	0	0
2001	244	23	2758	335.862	-424.454	D	8.626	8.489	0.137	5.323	99.07	0.83	0	0	0	0.1
2001	245	23	2695	328.074	-426.025	D	9.018	8.85	0.168	6.192	99.51	0.43	0	0	0	0.06
2001	246	23	1548	330.222	-426.04	D	8.308	8.278	0.03	4.83	99.86	0.06	0	0	0	0.07
2001	247	23	1415	329.185	-425.086	D	7.155	7.144	0.01	2.354	99.71	0.05	0	0	0	0.22
2001	248	23	2704	329.056	-425.092	D	7.46	7.444	0.016	2.981	99.67	0.13	0	0	0	0.2
2001	249	23	2276	336.157	-425.28	D	7.486	7.486	0	3.07	99.7	0.05	0	0	0	0.16
2001	250	23	1	318.65	-445.782	D	8.117	8.117	0	4.462	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	9.202	9.202	0	7.068	0	0	0	0	0	0
2001	252	23	2758	335.862	-424.454	D	9.201	9.111	0.091	6.838	98.61	0.84	0	0	0	0.56
2001	253	23	2789	340.496	-426.449	D	7.047	7.004	0.043	2.066	97.68	1.28	0	0	0	1.03
2001	254	23	2589	318.383	-445.593	D	6.795	6.784	0.012	1.623	99.13	0.17	0	0	0	0.69
2001	255	23	2781	339.842	-425.379	D	6.854	6.851	0.002	1.758	99.27	0.19	0	0	0	0.52
2001	256	23	2781	339.842	-425.379	D	7.028	7.004	0.024	2.066	99.5	0.25	0	0	0	0.26

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	257	23	2762	336.074	-425.006	D	7.506	7.473	0.032	3.044	99.63	0.2	0	0	0	0.17
2001	258	23	1	318.65	-445.782	D	6.961	6.96	0.001	1.977	99.82	0.01	0	0	0	0.14
2001	259	23	1	318.65	-445.782	D	6.742	6.742	0	1.541	0	0	0	0	0	0
2001	260	23	1	318.65	-445.782	D	7.078	7.078	0	2.217	0	0	0	0	0	0
2001	261	23	1	318.65	-445.782	D	9.081	9.081	0	6.764	0	0	0	0	0	0
2001	262	23	2781	339.842	-425.379	D	8.234	8.206	0.028	4.666	97.72	2.25	0	0	0	0.04
2001	263	23	1	318.65	-445.782	D	6.893	6.893	0	1.841	0	0	0	0	0	0
2001	264	23	2707	329.748	-425.023	D	7.227	7.223	0.003	2.518	99.4	0.08	0	0	0	0.53
2001	265	23	2628	320.933	-436.998	D	7.334	7.147	0.186	2.36	98.81	0.88	0	0	0	0.31
2001	266	23	2758	335.862	-424.454	D	7.951	7.924	0.028	4.026	98.22	1.62	0	0	0	0.16
2001	267	23	1456	329.977	-431.796	D	8.939	8.669	0.269	5.754	95.5	4.44	0	0	0	0.06
2001	268	23	1	318.65	-445.782	D	6.641	6.641	0	1.341	0	0	0	0	0	0
2001	269	23	1	318.65	-445.782	D	6.543	6.543	0	1.15	0	0	0	0	0	0
2001	270	23	2781	339.842	-425.379	D	6.653	6.646	0.006	1.351	99.04	0.28	0	0	0	0.67
2001	271	23	2781	339.842	-425.379	D	6.875	6.721	0.154	1.498	99.2	0.38	0	0	0	0.42
2001	272	23	2588	318.452	-445.8	D	7.103	7.084	0.019	2.229	99.59	0.11	0	0	0	0.3
2001	273	23	1	318.65	-445.782	D	7.066	7.066	0	2.193	0	0	0	0	0	0
2001	274	23	1	318.65	-445.782	D	7.111	7.111	0	2.285	0	0	0	0	0	0
2001	275	23	1	318.65	-445.782	D	6.85	6.85	0	1.755	0	0	0	0	0	0
2001	276	23	1	318.65	-445.782	D	7.64	7.64	0	3.401	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	8.468	8.468	0	5.274	0	0	0	0	0	0
2001	278	23	2704	329.056	-425.092	D	9.705	9.642	0.063	8.208	97.08	2.87	0	0	0	0.04
2001	279	23	2448	335.908	-431.021	D	7.226	7.221	0.005	2.514	94.97	3.93	0	0	0	1.08
2001	280	23	2789	340.496	-426.449	D	6.569	6.557	0.012	1.177	96.68	2.32	0	0	0	0.99
2001	281	23	2781	339.842	-425.379	D	6.614	6.612	0.002	1.284	98.2	1.13	0	0	0	0.68
2001	282	23	1	318.65	-445.782	D	7.968	7.968	0	4.125	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	284	23	2694	327.861	-425.964	D	10.221	10.218	0.004	9.779	98.13	1.74	0	0	0	0.1
2001	285	23	2704	329.056	-425.092	D	9.845	9.667	0.178	8.276	94.71	5.21	0	0	0	0.08
2001	286	23	2695	328.074	-426.025	D	9.944	9.943	0.001	9.02	99.35	0.49	0	0	0	0.11
2001	287	23	1	318.65	-445.782	D	7.49	7.49	0	3.08	0	0	0	0	0	0
2001	288	23	2628	320.933	-436.998	D	6.931	6.928	0.003	1.912	91.07	8.84	0	0	0	0.09
2001	289	23	2704	329.056	-425.092	D	7.312	7.231	0.081	2.533	91.52	8.28	0	0	0	0.2
2001	290	23	2789	340.496	-426.449	D	6.517	6.488	0.029	1.043	89.56	8.53	0	0	0	1.91
2001	291	23	2781	339.842	-425.379	D	6.55	6.547	0.003	1.157	98.64	0.86	0	0	0	0.49
2001	292	23	1	318.65	-445.782	D	6.799	6.799	0	1.653	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	8.641	8.641	0	5.686	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	9.362	9.362	0	7.476	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	9.29	9.29	0	7.294	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	296	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	297	23	641	324.033	-438.052	D	9.664	9.618	0.046	8.147	97.45	2.02	0	0	0	0.53
2001	298	23	1	318.65	-445.782	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	300	23	1415	329.185	-425.086	D	6.48	6.472	0.008	1.012	73.03	22.36	0	0	0	4.61
2001	301	23	1	318.65	-445.782	D	6.481	6.481	0	1.03	0	0	0	0	0	0
2001	302	23	1	318.65	-445.782	D	6.511	6.511	0	1.086	0	0	0	0	0	0
2001	303	23	1	318.65	-445.782	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	6.695	6.695	0	1.447	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	9.032	9.032	0	6.64	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	9.835	9.835	0	8.726	0	0	0	0	0	0
2001	307	23	2789	340.496	-426.449	D	9.78	9.685	0.095	8.324	94.66	5.24	0	0	0	0.1
2001	308	23	2623	320.666	-438.044	D	6.967	6.95	0.017	1.957	98.58	1.27	0	0	0	0.15
2001	309	23	2781	339.842	-425.379	D	9.334	8.368	**0.965**	5.041	94.85	5.02	0	0	0	0.13
2001	310	23	199	320.795	-437.944	D	8.665	8.052	**0.613**	4.315	98.38	1.5	0	0	0	0.13
2001	311	23	2758	335.862	-424.454	D	7.336	7.173	0.163	2.413	98.81	1.01	0	0	0	0.19
2001	312	23	1513	329.974	-426.051	D	7.331	7.311	0.02	2.7	98.5	0.79	0	0	0	0.71
2001	313	23	2586	318.945	-445.762	D	6.615	6.615	0.001	1.289	98.43	0.81	0	0	0	0.62
2001	314	23	1	318.65	-445.782	D	6.786	6.786	0	1.628	0	0	0	0	0	0
2001	315	23	2781	339.842	-425.379	D	6.812	6.797	0.015	1.649	95.95	2.57	0	0	0	1.48
2001	316	23	2694	327.861	-425.964	D	6.663	6.644	0.019	1.347	97	2.04	0	0	0	0.95
2001	317	23	1	318.65	-445.782	D	6.716	6.716	0	1.489	0	0	0	0	0	0
2001	318	23	1	318.65	-445.782	D	7.492	7.492	0	3.083	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	8.023	8.023	0	4.249	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.729	7.729	0	3.597	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.103	7.103	0	2.268	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	8.032	8.032	0	4.27	0	0	0	0	0	0
2001	323	23	2662	325.404	-431.803	D	8.781	8.587	0.193	5.558	79.08	20.29	0	0	0	0.63
2001	324	23	2789	340.496	-426.449	D	6.52	6.474	0.045	1.017	75.56	20.43	0	0	0	4.01
2001	325	23	2789	340.496	-426.449	D	6.471	6.47	0.001	1.008	87.49	10.62	0	0	0	1.97
2001	326	23	1	318.65	-445.782	D	6.548	6.548	0	1.159	0	0	0	0	0	0
2001	327	23	1	318.65	-445.782	D	8.475	8.475	0	5.291	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	8.774	8.774	0	6.006	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	6.66	6.66	0	1.377	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.063	7.063	0	2.186	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.026	7.026	0	2.111	0	0	0	0	0	0
2001	332	23	2789	340.496	-426.449	D	9.339	9.227	0.112	7.131	70	29.68	0	0	0	0.33
2001	333	23	2790	340.421	-426.562	D	10.218	10.218	0	9.779	93.51	6.69	0	0	0	0.04
2001	334	23	2588	318.452	-445.8	D	8.734	8.541	0.193	5.448	88.45	11.39	0	0	0	0.16

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	335	23	1	318.65	-445.782	D	6.625	6.625	0	1.31	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	6.688	6.688	0	1.434	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	6.971	6.971	0	1.999	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.231	7.231	0	2.534	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	9.653	9.653	0	8.239	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	9.943	9.943	0	9.018	0	0	0	0	0	0
2001	341	23	2781	339.842	-425.379	D	8.559	8.557	0.002	5.485	89.78	9.97	0	0	0	0.2
2001	342	23	2708	329.979	-425	D	8.548	8.445	0.103	5.22	90.75	8.69	0	0	0	0.55
2001	343	23	2684	326.713	-427.014	D	6.637	6.603	0.034	1.266	70.14	26.57	0	0	0	3.3
2001	344	23	2684	326.713	-427.014	D	6.521	6.515	0.007	1.095	86.72	12.05	0	0	0	1.24
2001	345	23	2754	334.935	-424.575	D	6.573	6.572	0.002	1.206	90.55	8.4	0	0	0	0.91
2001	346	23	1	318.65	-445.782	D	9.752	9.752	0	8.503	0	0	0	0	0	0
2001	347	23	2789	340.496	-426.449	D	11.25	9.803	**1.447**	8.639	93.78	6.09	0	0	0	0.13
2001	348	23	2552	324.659	-442.591	D	11.873	9.454	**2.418**	7.716	92.97	6.96	0	0	0	0.07
2001	349	23	2789	340.496	-426.449	D	9.093	9.077	0.016	6.753	97.35	2.58	0	0	0	0.07
2001	350	23	2781	339.842	-425.379	D	10.22	10.218	0.002	9.779	96.83	3.13	0	0	0	0.03
2001	351	23	2758	335.862	-424.454	D	10.037	9.531	**0.506**	7.917	85.6	14.23	0	0	0	0.17
2001	352	23	1	318.65	-445.782	D	6.544	6.544	0	1.152	0	0	0	0	0	0
2001	353	23	2627	320.879	-437.207	D	6.867	6.821	0.046	1.697	69.38	27.85	0	0	0	2.77
2001	354	23	2789	340.496	-426.449	D	6.473	6.47	0.003	1.008	79.5	17.58	0	0	0	2.93
2001	355	23	1	318.65	-445.782	D	6.487	6.487	0	1.042	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	8.259	8.259	0	4.788	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	6.641	6.641	0	1.34	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	359	23	2789	340.496	-426.449	D	6.509	6.507	0.002	1.079	63.53	32.22	0	0	0	4.21
2001	360	23	2781	339.842	-425.379	D	6.538	6.531	0.006	1.127	60.38	35.58	0	0	0	4.03
2001	361	23	1	318.65	-445.782	D	6.605	6.605	0	1.269	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2001	363	23	2704	329.056	-425.092	D	6.666	6.627	0.039	1.314	69.04	28.28	0	0	0	2.68
2001	364	23	2789	340.496	-426.449	D	6.571	6.55	0.022	1.163	67.25	29.88	0	0	0	2.86
2001	365	23	2789	340.496	-426.449	D	6.616	6.615	0.001	1.29	72.64	25.5	0	0	0	1.88
									2.418							
MARSHALL											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	318.65	-445.782	D	7.785	7.785	0	3.719	0	0	0	0	0	0
2001	2	23	2789	340.496	-426.449	D	7.424	7.421	0.003	2.932	82.89	16.38	0	0	0	0.71
2001	3	23	2789	340.496	-426.449	D	7.763	7.761	0.001	3.667	85.01	14.48	0	0	0	0.3

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	4	23	1	318.65	-445.782	D	7.031	7.031	0	2.121	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	6.931	6.931	0	1.919	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	6.551	6.551	0	1.165	0	0	0	0	0	0
2001	7	23	2789	340.496	-426.449	D	7.111	7.11	0.001	2.283	87.3	12.47	0	0	0	0.27
2001	8	23	2789	340.496	-426.449	D	8.335	8.335	0	4.964	86	10.95	0	0	0	0.2
2001	9	23	2789	340.496	-426.449	D	9.502	9.48	0.021	7.784	75.1	24.65	0	0	0	0.24
2001	10	23	2781	339.842	-425.379	D	7.002	6.996	0.006	2.05	78.57	20.95	0	0	0	0.44
2001	11	23	2031	334.011	-427.372	D	9.109	9.109	0	6.833	48.95	8.21	0	0	0	0.35
2001	12	23	1	318.65	-445.782	D	9.519	9.519	0	7.886	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	9.698	9.698	0	8.359	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	9.396	9.396	0	7.566	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	6.74	6.74	0	1.537	0	0	0	0	0	0
2001	16	23	1	318.65	-445.782	D	6.763	6.763	0	1.581	0	0	0	0	0	0
2001	17	23	2695	328.074	-426.025	D	7.008	6.904	0.105	1.863	74.59	24.57	0	0	0	0.84
2001	18	23	2628	320.933	-436.998	D	6.974	6.935	0.038	1.927	77.39	21.52	0	0	0	1.08
2001	19	23	2468	334.002	-434.887	D	6.894	6.888	0.006	1.832	85.29	13.78	0	0	0	0.94
2001	20	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	21	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	22	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	6.621	6.621	0	1.303	0	0	0	0	0	0
2001	24	23	2789	340.496	-426.449	D	6.723	6.723	0	1.502	68.35	26	0	0	0	2.71
2001	25	23	1638	331.229	-431.991	D	6.602	6.585	0.017	1.231	48.57	48.51	0	0	0	2.92
2001	26	23	2683	326.705	-427.245	D	6.552	6.552	0	1.166	69.47	28.46	0	0	0	1.57
2001	27	23	1	318.65	-445.782	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2001	28	23	2789	340.496	-426.449	D	6.521	6.516	0.005	1.097	70.99	27.91	0	0	0	1.08
2001	29	23	1	318.65	-445.782	D	8.908	8.908	0	6.335	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	6.819	6.819	0	1.692	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.016	7.016	0	2.09	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	6.478	6.478	0	1.025	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	6.561	6.561	0	1.185	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	6.583	6.583	0	1.226	0	0	0	0	0	0
2001	37	23	1	318.65	-445.782	D	6.528	6.528	0	1.121	0	0	0	0	0	0
2001	38	23	1	318.65	-445.782	D	8.527	8.527	0	5.415	0	0	0	0	0	0
2001	39	23	1	318.65	-445.782	D	10.07	10.07	0	9.369	0	0	0	0	0	0
2001	40	23	2704	329.056	-425.092	D	9.444	9.39	0.054	7.55	87.59	12.36	0	0	0	0.04
2001	41	23	2789	340.496	-426.449	D	6.652	6.651	0	1.361	67.54	29.97	0	0	0	2.36
2001	42	23	2781	339.842	-425.379	D	6.475	6.47	0.004	1.009	66.4	31.96	0	0	0	1.62

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	43	23	1412	329.218	-425.834	D	6.874	6.874	0	1.803	24.83	6.18	0	0	0	0.3
2001	44	23	1	318.65	-445.782	D	9.412	9.412	0	7.606	0	0	0	0	0	0
2001	45	23	2704	329.056	-425.092	D	10.231	10.218	0.013	9.779	87.17	12.72	0	0	0	0.11
2001	46	23	2784	339.87	-426.019	D	9.448	8.624	**0.825**	5.644	89.66	10.22	0	0	0	0.12
2001	47	23	2468	334.002	-434.887	D	8.48	8.241	0.238	4.747	91.7	8.25	0	0	0	0.06
2001	48	23	2789	340.496	-426.449	D	6.53	6.527	0.003	1.119	51.86	45.65	0	0	0	2.54
2001	49	23	2789	340.496	-426.449	D	6.477	6.472	0.005	1.012	76.85	21.69	0	0	0	1.45
2001	50	23	2789	340.496	-426.449	D	6.498	6.494	0.004	1.055	83.87	15.45	0	0	0	0.7
2001	51	23	1	318.65	-445.782	D	9.197	9.197	0	7.056	0	0	0	0	0	0
2001	52	23	2695	328.074	-426.025	D	8.151	8.125	0.027	4.479	84.53	15.27	0	0	0	0.2
2001	53	23	1662	330.967	-426.007	D	7.072	7.066	0.006	2.193	86.27	13.3	0	0	0	0.42
2001	54	23	2781	339.842	-425.379	D	6.789	6.785	0.003	1.626	78.11	20.82	0	0	0	1.05
2001	55	23	1	318.65	-445.782	D	9.447	9.447	0	7.697	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.222	7.222	0	2.515	0	0	0	0	0	0
2001	57	23	2789	340.496	-426.449	D	6.499	6.499	0	1.064	93.02	5.13	0	0	0	2.24
2001	58	23	2781	339.842	-425.379	D	6.523	6.517	0.006	1.099	86.51	12.42	0	0	0	1.09
2001	59	23	2662	325.404	-431.803	D	7.151	7.146	0.005	2.358	86.99	12.75	0	0	0	0.24
2001	60	23	2640	322.263	-435.121	D	6.719	6.718	0.001	1.493	89.97	9.62	0	0	0	0.47
2001	61	23	2758	335.862	-424.454	D	8.524	8.513	0.011	5.381	88.73	11.16	0	0	0	0.1
2001	62	23	1951	333.842	-434.874	D	6.743	6.742	0	1.541	94.85	4.73	0	0	0	0.33
2001	63	23	2704	329.056	-425.092	D	6.677	6.608	0.068	1.277	72.34	26.03	0	0	0	1.63
2001	64	23	1	318.65	-445.782	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	65	23	2781	339.842	-425.379	D	6.535	6.526	0.008	1.117	71.14	25.35	0	0	0	3.49
2001	66	23	2789	340.496	-426.449	D	6.477	6.471	0.006	1.01	79.68	18.13	0	0	0	2.19
2001	67	23	1	318.65	-445.782	D	6.534	6.534	0	1.132	0	0	0	0	0	0
2001	68	23	2781	339.842	-425.379	D	6.505	6.493	0.012	1.052	56.52	39.59	0	0	0	3.87
2001	69	23	1517	329.93	-425.053	D	6.48	6.471	0.01	1.009	80.43	17.46	0	0	0	2.11
2001	70	23	2781	339.842	-425.379	D	6.502	6.502	0	1.069	92.04	5	0	0	0	1.26
2001	71	23	2411	339.428	-426.135	D	8.884	8.884	0	6.276	64.58	3.72	0	0	0	0.25
2001	72	23	1	318.65	-445.782	D	6.558	6.558	0	1.178	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	74	23	199	320.795	-437.944	D	9.731	9.731	0	8.446	88.64	10.65	0	0	0	0.21
2001	75	23	2708	329.979	-425	D	7.938	7.781	0.156	3.711	89.16	10.75	0	0	0	0.09
2001	76	23	1	318.65	-445.782	D	6.567	6.567	0	1.196	0	0	0	0	0	0
2001	77	23	2684	326.713	-427.014	D	6.53	6.505	0.025	1.076	78.67	19.84	0	0	0	1.48
2001	78	23	2589	318.383	-445.593	D	6.481	6.479	0.001	1.026	91.27	7.64	0	0	0	1.27
2001	79	23	2589	318.383	-445.593	D	6.498	6.495	0.002	1.057	88.02	10.43	0	0	0	1.49
2001	80	23	2684	326.713	-427.014	D	6.487	6.473	0.013	1.015	91.88	5.99	0	0	0	2.12
2001	81	23	2694	327.861	-425.964	D	6.496	6.49	0.006	1.046	95.14	3.33	0	0	0	1.49

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	82	23	1552	330.178	-425.042	D	6.654	6.654	0.001	1.365	94	5.47	0	0	0	0.62
2001	83	23	2693	327.829	-426.17	D	6.798	6.766	0.032	1.587	91.45	8.05	0	0	0	0.5
2001	84	23	2789	340.496	-426.449	D	6.493	6.473	0.02	1.013	60.85	36.31	0	0	0	2.84
2001	85	23	2789	340.496	-426.449	D	6.485	6.482	0.004	1.031	54.63	42.47	0	0	0	2.88
2001	86	23	2789	340.496	-426.449	D	6.472	6.468	0.004	1.004	85.14	13.5	0	0	0	1.39
2001	87	23	2781	339.842	-425.379	D	6.508	6.503	0.005	1.073	88.17	10.86	0	0	0	0.98
2001	88	23	1	318.65	-445.782	D	7.559	7.559	0	3.227	0	0	0	0	0	0
2001	89	23	1	318.65	-445.782	D	9.145	9.145	0	6.925	0	0	0	0	0	0
2001	90	23	1	318.65	-445.782	D	7.628	7.628	0	3.376	0	0	0	0	0	0
2001	91	23	1	318.65	-445.782	D	6.481	6.481	0	1.029	0	0	0	0	0	0
2001	92	23	1	318.65	-445.782	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	9.747	9.747	0	8.488	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	8.549	8.549	0	5.467	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.507	7.507	0	3.115	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.503	7.503	0	3.108	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.145	7.145	0	2.355	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.606	7.606	0	3.329	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	9.338	9.338	0	7.417	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	6.571	6.571	0	1.204	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.079	7.079	0	2.219	0	0	0	0	0	0
2001	105	23	2781	339.842	-425.379	D	8.946	8.943	0.003	6.422	96.82	2.47	0	0	0	0.67
2001	106	23	2781	339.842	-425.379	D	6.51	6.503	0.007	1.072	79.04	17.05	0	0	0	3.93
2001	107	23	2571	322.646	-445.476	D	6.481	6.48	0.001	1.027	95.45	2.72	0	0	0	1.78
2001	108	23	2789	340.496	-426.449	D	6.481	6.477	0.003	1.022	86.3	12.19	0	0	0	1.57
2001	109	23	2788	340.294	-426.448	D	6.568	6.568	0	1.198	97	0.94	0	0	0	0.59
2001	110	23	1	318.65	-445.782	D	10.01	10.01	0	9.202	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	8.281	8.281	0	4.837	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	8.135	8.135	0	4.503	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	8.008	8.008	0	4.216	0	0	0	0	0	0
2001	114	23	2788	340.294	-426.448	D	6.504	6.504	0	1.073	90.45	1.1	0	0	0	1.92
2001	115	23	2789	340.496	-426.449	D	6.477	6.477	0.001	1.021	96.53	2	0	0	0	1.58
2001	116	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	6.586	6.586	0	1.232	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	6.585	6.585	0	1.231	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	6.867	6.867	0	1.788	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.147	7.147	0	2.358	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	121	23	1	318.65	-445.782	D	6.839	6.839	0	1.734	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.129	7.129	0	2.323	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.25	7.25	0	2.573	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	8.868	8.868	0	6.236	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	8.924	8.924	0	6.374	0	0	0	0	0	0
2001	127	23	1	318.65	-445.782	D	8.708	8.708	0	5.848	0	0	0	0	0	0
2001	128	23	2789	340.496	-426.449	D	6.552	6.551	0.002	1.164	98.38	0.26	0	0	0	1.31
2001	129	23	2564	323.159	-444.002	D	6.895	6.883	0.012	1.822	98.99	0.56	0	0	0	0.45
2001	130	23	2789	340.496	-426.449	D	6.956	6.953	0.003	1.963	99.39	0.23	0	0	0	0.33
2001	131	23	2012	334.218	-432.109	D	7.8	7.8	0	3.753	7.27	0	0	0	0	0.03
2001	132	23	2789	340.496	-426.449	D	8.841	8.769	0.072	5.994	81.58	18.12	0	0	0	0.29
2001	133	23	2684	326.713	-427.014	D	6.567	6.559	0.007	1.181	98.89	0.39	0	0	0	0.72
2001	134	23	2789	340.496	-426.449	D	6.746	6.745	0.001	1.546	99.34	0.14	0	0	0	0.48
2001	135	23	1	318.65	-445.782	D	6.961	6.961	0	1.979	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.897	7.897	0	3.966	0	0	0	0	0	0
2001	138	23	2694	327.861	-425.964	D	7.586	7.574	0.012	3.259	95.77	4.01	0	0	0	0.22
2001	139	23	2694	327.861	-425.964	D	8.192	7.713	0.479	3.561	97	2.85	0	0	0	0.15
2001	140	23	2781	339.842	-425.379	D	7.545	7.533	0.012	3.172	98.61	0.6	0	0	0	0.78
2001	141	23	1	318.65	-445.782	D	8.961	8.961	0	6.464	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	6.534	6.534	0	1.131	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	6.566	6.566	0	1.193	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	6.546	6.546	0	1.156	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	6.809	6.809	0	1.673	0	0	0	0	0	0
2001	148	23	2781	339.842	-425.379	D	8.048	8.048	0	4.305	98.71	0.1	0	0	0	0.84
2001	149	23	2789	340.496	-426.449	D	7.008	6.968	0.039	1.993	99.02	0.61	0	0	0	0.38
2001	150	23	2758	335.862	-424.454	D	8.497	8.484	0.013	5.312	99.07	0.72	0	0	0	0.2
2001	151	23	2708	329.979	-425	D	9.01	9.006	0.004	6.576	98.51	1.22	0	0	0	0.25
2001	152	23	2781	339.842	-425.379	D	7.059	7.059	0	2.178	99.54	0.43	0	0	0	0.16
2001	153	23	1	318.65	-445.782	D	6.992	6.992	0	2.042	0	0	0	0	0	0
2001	154	23	1	318.65	-445.782	D	7.218	7.218	0	2.506	0	0	0	0	0	0
2001	155	23	1	318.65	-445.782	D	8.894	8.894	0	6.3	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	8.375	8.375	0	5.056	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.624	7.624	0	3.368	0	0	0	0	0	0
2001	158	23	2762	336.074	-425.006	D	8.165	8.143	0.022	4.522	99.61	0.05	0	0	0	0.33
2001	159	23	641	324.033	-438.052	D	7.521	7.309	0.212	2.697	99.48	0.31	0	0	0	0.21

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	160	23	2694	327.861	-425.964	D	7.528	7.431	0.097	2.954	99.24	0.52	0	0	0	0.23
2001	161	23	2709	330.21	-424.978	D	7.85	7.761	0.088	3.667	99.67	0.21	0	0	0	0.12
2001	162	23	2789	340.496	-426.449	D	7.015	7.011	0.004	2.081	99.77	0.07	0	0	0	0.15
2001	163	23	2415	339.676	-426.124	D	6.866	6.866	0	1.787	98.78	0.03	0	0	0	0.14
2001	164	23	1	318.65	-445.782	D	7.137	7.137	0	2.339	0	0	0	0	0	0
2001	165	23	1	318.65	-445.782	D	7.321	7.321	0	2.721	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	8.275	8.275	0	4.824	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	6.521	6.521	0	1.108	0	0	0	0	0	0
2001	168	23	1	318.65	-445.782	D	6.545	6.545	0	1.153	0	0	0	0	0	0
2001	169	23	2789	340.496	-426.449	D	6.651	6.651	0	1.36	99.46	0.06	0	0	0	0.57
2001	170	23	2274	336.179	-425.778	D	7	7	0	2.057	67.3	0.02	0	0	0	0.29
2001	171	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	172	23	2652	323.833	-433.511	D	7.467	7.366	0.101	2.816	99.29	0.55	0	0	0	0.16
2001	173	23	2789	340.496	-426.449	D	6.836	6.812	0.024	1.679	95.93	2.67	0	0	0	1.4
2001	174	23	2789	340.496	-426.449	D	6.612	6.611	0	1.283	98.47	0.11	0	0	0	1.26
2001	175	23	2789	340.496	-426.449	D	6.762	6.76	0.001	1.576	98.98	0.2	0	0	0	0.67
2001	176	23	2564	323.159	-444.002	D	8.456	8.451	0.004	5.235	99.68	0.14	0	0	0	0.13
2001	177	23	2694	327.861	-425.964	D	7.158	7.155	0.003	2.376	99.57	0.17	0	0	0	0.22
2001	178	23	1445	329.477	-426.072	D	6.933	6.932	0.001	1.92	99.44	0.11	0	0	0	0.26
2001	179	23	2758	335.862	-424.454	D	8.972	8.971	0.001	6.49	99.27	0.54	0	0	0	0.06
2001	180	23	1240	328.01	-426.636	D	8.697	8.697	0	5.82	99.42	0.06	0	0	0	0.07
2001	181	23	1	318.65	-445.782	D	8.968	8.968	0	6.482	0	0	0	0	0	0
2001	182	23	2704	329.056	-425.092	D	9.406	9.396	0.01	7.564	99.41	0.38	0	0	0	0.19
2001	183	23	2695	328.074	-426.025	D	7.272	7.243	0.028	2.559	98.27	1.49	0	0	0	0.25
2001	184	23	2781	339.842	-425.379	D	7.342	7.338	0.004	2.757	99.81	0.07	0	0	0	0.13
2001	185	23	2227	335.715	-426.548	D	7.114	7.114	0	2.291	95.03	0.03	0	0	0	0.21
2001	186	23	2781	339.842	-425.379	D	7.042	7.042	0	2.144	99.24	0.05	0	0	0	0.59
2001	187	23	2789	340.496	-426.449	D	7.673	7.635	0.038	3.392	99.6	0.18	0	0	0	0.22
2001	188	23	2789	340.496	-426.449	D	8.739	8.713	0.026	5.859	99.89	0.05	0	0	0	0.06
2001	189	23	1	318.65	-445.782	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.028	7.028	0	2.115	0	0	0	0	0	0
2001	191	23	2781	339.842	-425.379	D	7.241	7.241	0	2.555	98.78	0.04	0	0	0	0.71
2001	192	23	2781	339.842	-425.379	D	7.283	7.096	0.187	2.255	99.27	0.33	0	0	0	0.4
2001	193	23	2781	339.842	-425.379	D	8.109	7.982	0.127	4.158	99.51	0.32	0	0	0	0.17
2001	194	23	2789	340.496	-426.449	D	9.164	9.072	0.092	6.741	99.45	0.48	0	0	0	0.06
2001	195	23	2624	320.719	-437.835	D	6.679	6.673	0.006	1.403	99.74	0.03	0	0	0	0.22
2001	196	23	2588	318.452	-445.8	D	6.685	6.685	0	1.427	93.71	0.02	0	0	0	0.31
2001	197	23	1	318.65	-445.782	D	7.148	7.148	0	2.362	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.972	7.972	0	4.135	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	199	23	1	318.65	-445.782	D	7.881	7.881	0	3.931	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.405	7.405	0	2.898	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.353	7.353	0	2.789	0	0	0	0	0	0
2001	202	23	2789	340.496	-426.449	D	6.808	6.808	0	1.67	99.48	0.02	0	0	0	0.48
2001	203	23	2789	340.496	-426.449	D	6.906	6.904	0.002	1.864	99.28	0.38	0	0	0	0.26
2001	204	23	1	318.65	-445.782	D	7.813	7.813	0	3.782	0	0	0	0	0	0
2001	205	23	1	318.65	-445.782	D	8.301	8.301	0	4.884	0	0	0	0	0	0
2001	206	23	1	318.65	-445.782	D	8.028	8.028	0	4.26	0	0	0	0	0	0
2001	207	23	2758	335.862	-424.454	D	8.97	8.965	0.005	6.475	99.64	0.11	0	0	0	0.22
2001	208	23	2758	335.862	-424.454	D	8.939	8.898	0.041	6.309	98.99	0.95	0	0	0	0.07
2001	209	23	1513	329.974	-426.051	D	9.172	9.156	0.017	6.952	99.21	0.74	0	0	0	0.05
2001	210	23	2789	340.496	-426.449	D	8.722	8.71	0.012	5.852	99.55	0.39	0	0	0	0.08
2001	211	23	2789	340.496	-426.449	D	8.648	8.621	0.027	5.638	99.81	0.13	0	0	0	0.07
2001	212	23	2781	339.842	-425.379	D	8.523	8.49	0.033	5.325	99.88	0.05	0	0	0	0.07
2001	213	23	2789	340.496	-426.449	D	8.241	8.238	0.003	4.738	99.86	0.03	0	0	0	0.08
2001	214	23	2784	339.87	-426.019	D	7.549	7.548	0.001	3.204	99.63	0.05	0	0	0	0.1
2001	215	23	1551	330.189	-425.292	D	6.968	6.968	0	1.993	93.63	0.03	0	0	0	0.16
2001	216	23	2758	335.862	-424.454	D	7.2	7.05	0.15	2.161	99.35	0.17	0	0	0	0.48
2001	217	23	2588	318.452	-445.8	D	7.197	7.138	0.059	2.34	99.69	0.06	0	0	0	0.25
2001	218	23	16	319.027	-443.017	D	7.255	7.255	0	2.583	99.39	0.01	0	0	0	0.35
2001	219	23	1	318.65	-445.782	D	7.407	7.407	0	2.902	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.7	7.7	0	3.534	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.773	7.773	0	3.694	0	0	0	0	0	0
2001	222	23	2781	339.842	-425.379	D	7.393	7.371	0.023	2.826	99.3	0.13	0	0	0	0.57
2001	223	23	2781	339.842	-425.379	D	9.602	9.067	**0.535**	6.729	96.7	3.19	0	0	0	0.11
2001	224	23	2597	318.971	-443.851	D	7.683	7.408	0.275	2.906	99.3	0.35	0	0	0	0.35
2001	225	23	2589	318.383	-445.593	D	7.519	7.458	0.06	3.012	99.24	0.4	0	0	0	0.36
2001	226	23	1	318.65	-445.782	D	6.915	6.915	0	1.885	0	0	0	0	0	0
2001	227	23	1	318.65	-445.782	D	6.848	6.848	0	1.751	0	0	0	0	0	0
2001	228	23	1	318.65	-445.782	D	7.783	7.783	0	3.714	0	0	0	0	0	0
2001	229	23	1	318.65	-445.782	D	6.675	6.675	0	1.407	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.046	7.046	0	2.151	0	0	0	0	0	0
2001	231	23	1	318.65	-445.782	D	6.857	6.857	0	1.768	0	0	0	0	0	0
2001	232	23	2781	339.842	-425.379	D	6.968	6.964	0.004	1.985	98.75	0.63	0	0	0	0.58
2001	233	23	2789	340.496	-426.449	D	7.602	7.601	0.001	3.318	99.64	0.07	0	0	0	0.28
2001	234	23	1412	329.218	-425.834	D	6.901	6.901	0	1.857	48.11	0.01	0	0	0	0.28
2001	235	23	2412	339.417	-425.886	D	6.974	6.974	0	2.005	94.62	0.05	0	0	0	0.31
2001	236	23	1	318.65	-445.782	D	7.113	7.113	0	2.289	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.284	7.284	0	2.645	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	238	23	2781	339.842	-425.379	D	7.362	7.358	0.004	2.799	98.76	0.28	0	0	0	0.96
2001	239	23	2758	335.862	-424.454	D	7.459	7.301	0.158	2.68	98.85	0.75	0	0	0	0.39
2001	240	23	1453	330.009	-432.544	D	7.099	6.933	0.166	1.923	99.4	0.26	0	0	0	0.34
2001	241	23	2597	318.971	-443.851	D	7.777	7.646	0.131	3.415	99.41	0.42	0	0	0	0.17
2001	242	23	2789	340.496	-426.449	D	8.594	8.502	0.092	5.355	99.04	0.88	0	0	0	0.08
2001	243	23	1455	329.987	-432.045	D	8.452	8.448	0.004	5.228	99.43	0.47	0	0	0	0.09
2001	244	23	2704	329.056	-425.092	D	8.545	8.52	0.025	5.397	98.4	1.43	0	0	0	0.16
2001	245	23	2695	328.074	-426.025	D	8.883	8.85	0.033	6.192	98.86	1.05	0	0	0	0.09
2001	246	23	1548	330.222	-426.04	D	8.285	8.278	0.008	4.83	99.7	0.18	0	0	0	0.12
2001	247	23	2709	330.21	-424.978	D	7.161	7.147	0.014	2.36	99.66	0.13	0	0	0	0.21
2001	248	23	2762	336.074	-425.006	D	7.538	7.518	0.02	3.139	99.61	0.24	0	0	0	0.15
2001	249	23	2762	336.074	-425.006	D	7.489	7.486	0.004	3.07	99.71	0.12	0	0	0	0.17
2001	250	23	1	318.65	-445.782	D	8.117	8.117	0	4.462	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	9.202	9.202	0	7.068	0	0	0	0	0	0
2001	252	23	1	318.65	-445.782	D	9.34	9.34	0	7.421	0	0	0	0	0	0
2001	253	23	2789	340.496	-426.449	D	7.005	7.004	0.001	2.066	98.34	0.2	0	0	0	1.45
2001	254	23	2588	318.452	-445.8	D	6.791	6.784	0.008	1.623	98.45	0.78	0	0	0	0.76
2001	255	23	2784	339.87	-426.019	D	6.865	6.859	0.006	1.774	98.67	0.75	0	0	0	0.59
2001	256	23	2781	339.842	-425.379	D	7.029	7.004	0.025	2.066	99.25	0.4	0	0	0	0.35
2001	257	23	2784	339.87	-426.019	D	7.529	7.48	0.049	3.058	99.2	0.57	0	0	0	0.22
2001	258	23	2589	318.383	-445.593	D	6.97	6.96	0.01	1.977	99.61	0.14	0	0	0	0.25
2001	259	23	1415	329.185	-425.086	D	6.73	6.73	0	1.517	98.7	0.5	0	0	0	0.36
2001	260	23	863	325.509	-431.992	D	7.059	7.059	0	2.178	73.89	0.28	0	0	0	0.19
2001	261	23	1	318.65	-445.782	D	9.081	9.081	0	6.764	0	0	0	0	0	0
2001	262	23	2652	323.833	-433.511	D	8.861	8.584	0.277	5.55	93.17	6.74	0	0	0	0.09
2001	263	23	2418	339.946	-426.612	D	6.898	6.898	0	1.851	99.39	0.1	0	0	0	0.33
2001	264	23	1	318.65	-445.782	D	7.236	7.236	0	2.544	0	0	0	0	0	0
2001	265	23	2789	340.496	-426.449	D	7.175	7.146	0.029	2.357	95.75	2.95	0	0	0	1.3
2001	266	23	2448	335.908	-431.021	D	7.939	7.886	0.052	3.943	98.68	1.05	0	0	0	0.28
2001	267	23	2789	340.496	-426.449	D	8.834	8.718	0.116	5.871	62.97	36.67	0	0	0	0.37
2001	268	23	2600	318.952	-443.12	D	6.651	6.651	0	1.36	95.77	2.83	0	0	0	1.39
2001	269	23	2704	329.056	-425.092	D	6.553	6.542	0.012	1.147	93.05	5.8	0	0	0	1.15
2001	270	23	2781	339.842	-425.379	D	6.706	6.646	0.059	1.351	97.87	1.41	0	0	0	0.71
2001	271	23	2783	339.861	-425.806	D	6.837	6.721	0.117	1.498	98.58	0.81	0	0	0	0.61
2001	272	23	2588	318.452	-445.8	D	7.111	7.084	0.027	2.229	99.19	0.41	0	0	0	0.39
2001	273	23	1	318.65	-445.782	D	7.066	7.066	0	2.193	0	0	0	0	0	0
2001	274	23	2758	335.862	-424.454	D	7.201	7.201	0	2.471	98.81	0.8	0	0	0	0.62
2001	275	23	2788	340.294	-426.448	D	6.809	6.809	0	1.673	97.64	0.78	0	0	0	0.31
2001	276	23	1	318.65	-445.782	D	7.64	7.64	0	3.401	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	277	23	1	318.65	-445.782	D	8.468	8.468	0	5.274	0	0	0	0	0	0
2001	278	23	2684	326.713	-427.014	D	9.878	9.657	0.221	8.248	88.09	11.83	0	0	0	0.09
2001	279	23	2704	329.056	-425.092	D	7.408	7.295	0.113	2.668	87.25	12.56	0	0	0	0.19
2001	280	23	2789	340.496	-426.449	D	6.56	6.557	0.003	1.177	96.38	2.2	0	0	0	1.4
2001	281	23	2789	340.496	-426.449	D	6.618	6.613	0.004	1.286	95.76	3.37	0	0	0	0.87
2001	282	23	1	318.65	-445.782	D	7.968	7.968	0	4.125	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	284	23	2704	329.056	-425.092	D	10.22	10.218	0.002	9.779	90.86	9.01	0	0	0	0.15
2001	285	23	2758	335.862	-424.454	D	9.804	9.66	0.143	8.257	86.51	13.37	0	0	0	0.12
2001	286	23	1548	330.222	-426.04	D	9.977	9.956	0.02	9.054	97.53	2.38	0	0	0	0.08
2001	287	23	2758	335.862	-424.454	D	7.54	7.51	0.031	3.122	94.26	5.67	0	0	0	0.08
2001	288	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2001	289	23	2758	335.862	-424.454	D	7.266	7.196	0.07	2.461	85.91	13.95	0	0	0	0.14
2001	290	23	2789	340.496	-426.449	D	6.489	6.488	0	1.043	96.57	2.31	0	0	0	1.38
2001	291	23	2789	340.496	-426.449	D	6.55	6.548	0.001	1.16	95.68	3.74	0	0	0	0.6
2001	292	23	1	318.65	-445.782	D	6.799	6.799	0	1.653	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	8.641	8.641	0	5.686	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	9.362	9.362	0	7.476	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	9.29	9.29	0	7.294	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	297	23	1	318.65	-445.782	D	9.624	9.624	0	8.162	0	0	0	0	0	0
2001	298	23	1	318.65	-445.782	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	300	23	2782	339.852	-425.592	D	6.483	6.472	0.011	1.012	79.21	17.61	0	0	0	3.19
2001	301	23	2781	339.842	-425.379	D	6.498	6.476	0.021	1.02	84.87	13.37	0	0	0	1.76
2001	302	23	1	318.65	-445.782	D	6.511	6.511	0	1.086	0	0	0	0	0	0
2001	303	23	1	318.65	-445.782	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	6.695	6.695	0	1.447	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	9.032	9.032	0	6.64	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	9.835	9.835	0	8.726	0	0	0	0	0	0
2001	307	23	2781	339.842	-425.379	D	9.728	9.675	0.053	8.296	85.51	14.38	0	0	0	0.11
2001	308	23	2758	335.862	-424.454	D	6.918	6.913	0.006	1.881	97.03	2.44	0	0	0	0.53
2001	309	23	2781	339.842	-425.379	D	8.692	8.368	0.324	5.041	94.2	5.58	0	0	0	0.21
2001	310	23	1456	329.977	-431.796	D	8.416	8.036	0.381	4.277	96.89	2.96	0	0	0	0.15
2001	311	23	2758	335.862	-424.454	D	7.236	7.173	0.063	2.413	98.48	1.27	0	0	0	0.25
2001	312	23	2789	340.496	-426.449	D	7.271	7.268	0.003	2.612	98.68	0.94	0	0	0	0.4
2001	313	23	2589	318.383	-445.593	D	6.642	6.615	0.027	1.289	79.84	18.32	0	0	0	1.85
2001	314	23	2789	340.496	-426.449	D	6.752	6.746	0.005	1.549	93.97	4.49	0	0	0	1.56
2001	315	23	2781	339.842	-425.379	D	6.804	6.797	0.008	1.649	92.48	5.22	0	0	0	2.29

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	316	23	2694	327.861	-425.964	D	6.655	6.644	0.011	1.347	93.72	4.88	0	0	0	1.38
2001	317	23	1414	329.196	-425.335	D	6.69	6.69	0	1.437	92.31	0.96	0	0	0	0.94
2001	318	23	1	318.65	-445.782	D	7.492	7.492	0	3.083	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	8.023	8.023	0	4.249	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.729	7.729	0	3.597	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.103	7.103	0	2.268	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	8.032	8.032	0	4.27	0	0	0	0	0	0
2001	323	23	1	318.65	-445.782	D	8.728	8.728	0	5.896	0	0	0	0	0	0
2001	324	23	1	318.65	-445.782	D	6.474	6.474	0	1.016	0	0	0	0	0	0
2001	325	23	2414	339.687	-426.374	D	6.47	6.47	0	1.008	112.24	5.93	0	0	0	2.66
2001	326	23	2274	336.179	-425.778	D	6.53	6.53	0	1.125	123.51	6.83	0	0	0	2.64
2001	327	23	1	318.65	-445.782	D	8.475	8.475	0	5.291	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	8.774	8.774	0	6.006	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	6.66	6.66	0	1.377	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.063	7.063	0	2.186	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.026	7.026	0	2.111	0	0	0	0	0	0
2001	332	23	2717	331.196	-426.028	D	9.47	9.234	0.236	7.15	67.48	32.29	0	0	0	0.23
2001	333	23	2589	318.383	-445.593	D	10.269	10.218	0.051	9.779	76.32	23.51	0	0	0	0.17
2001	334	23	2628	320.933	-436.998	D	9.318	8.583	**0.735**	5.546	82.17	17.69	0	0	0	0.14
2001	335	23	1	318.65	-445.782	D	6.625	6.625	0	1.31	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	6.688	6.688	0	1.434	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	6.971	6.971	0	1.999	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.231	7.231	0	2.534	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	9.653	9.653	0	8.239	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	9.943	9.943	0	9.018	0	0	0	0	0	0
2001	341	23	1	318.65	-445.782	D	7.912	7.912	0	4	0	0	0	0	0	0
2001	342	23	2704	329.056	-425.092	D	8.527	8.445	0.082	5.22	80.35	19.16	0	0	0	0.48
2001	343	23	2789	340.496	-426.449	D	6.596	6.595	0.002	1.25	66.52	29.87	0	0	0	3.62
2001	344	23	2789	340.496	-426.449	D	6.522	6.513	0.008	1.092	70.83	27.26	0	0	0	1.89
2001	345	23	2789	340.496	-426.449	D	6.576	6.574	0.002	1.209	80.59	18.18	0	0	0	1.16
2001	346	23	1	318.65	-445.782	D	9.752	9.752	0	8.503	0	0	0	0	0	0
2001	347	23	2789	340.496	-426.449	D	9.821	9.803	0.017	8.639	92.74	7.09	0	0	0	0.18
2001	348	23	2789	340.496	-426.449	D	9.496	9.231	0.265	7.142	90.5	9.43	0	0	0	0.06
2001	349	23	2789	340.496	-426.449	D	9.08	9.077	0.004	6.753	95.89	3.92	0	0	0	0.15
2001	350	23	2789	340.496	-426.449	D	10.233	10.218	0.015	9.779	93.85	6.07	0	0	0	0.04
2001	351	23	2789	340.496	-426.449	D	9.573	9.458	0.115	7.727	76.61	23.2	0	0	0	0.19
2001	352	23	2384	338.176	-425.941	D	6.542	6.542	0	1.147	88.86	3.57	0	0	0	0.13
2001	353	23	1	318.65	-445.782	D	6.815	6.815	0	1.686	0	0	0	0	0	0
2001	354	23	1	318.65	-445.782	D	6.471	6.471	0	1.009	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	355	23	1	318.65	-445.782	D	6.487	6.487	0	1.042	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	8.259	8.259	0	4.788	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	6.641	6.641	0	1.34	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	359	23	1	318.65	-445.782	D	6.512	6.512	0	1.089	0	0	0	0	0	0
2001	360	23	1	318.65	-445.782	D	6.537	6.537	0	1.138	0	0	0	0	0	0
2001	361	23	1	318.65	-445.782	D	6.605	6.605	0	1.269	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2001	363	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	364	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	365	23	1	318.65	-445.782	D	6.619	6.619	0	1.298	0	0	0	0	0	0
									0.825							
COLUMBIA											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	318.65	-445.782	D	7.785	7.785	0	3.719	0	0	0	0	0	0
2001	2	23	2789	340.496	-426.449	D	7.421	7.421	0	2.932	71.85	28.07	0	0	0	0.02
2001	3	23	1	318.65	-445.782	D	8.207	8.207	0	4.667	0	0	0	0	0	0
2001	4	23	1	318.65	-445.782	D	7.031	7.031	0	2.121	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	6.931	6.931	0	1.919	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	6.551	6.551	0	1.165	0	0	0	0	0	0
2001	7	23	1	318.65	-445.782	D	7.026	7.026	0	2.11	0	0	0	0	0	0
2001	8	23	1	318.65	-445.782	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	9	23	2789	340.496	-426.449	D	9.482	9.48	0.002	7.784	54.85	45.08	0	0	0	0.01
2001	10	23	2781	339.842	-425.379	D	6.999	6.996	0.003	2.05	54.11	45.85	0	0	0	0.02
2001	11	23	2097	334.452	-426.104	D	9.109	9.109	0	6.833	53.62	31.59	0	0	0	0.02
2001	12	23	1	318.65	-445.782	D	9.519	9.519	0	7.886	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	9.698	9.698	0	8.359	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	9.396	9.396	0	7.566	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	6.74	6.74	0	1.537	0	0	0	0	0	0
2001	16	23	1	318.65	-445.782	D	6.763	6.763	0	1.581	0	0	0	0	0	0
2001	17	23	2255	335.942	-426.039	D	6.957	6.892	0.065	1.839	63.08	36.89	0	0	0	0.03
2001	18	23	2628	320.933	-436.998	D	7.007	6.935	0.072	1.927	62.59	37.39	0	0	0	0.03
2001	19	23	2789	340.496	-426.449	D	6.863	6.861	0.002	1.778	76.39	23.56	0	0	0	0.03
2001	20	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	21	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	22	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	6.621	6.621	0	1.303	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	24	23	1	318.65	-445.782	D	6.746	6.746	0	1.549	0	0	0	0	0	0
2001	25	23	2789	340.496	-426.449	D	6.589	6.584	0.005	1.23	39.47	60.49	0	0	0	0.08
2001	26	23	1415	329.185	-425.086	D	6.555	6.554	0.001	1.171	51.37	48.51	0	0	0	0.04
2001	27	23	1	318.65	-445.782	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2001	28	23	2789	340.496	-426.449	D	6.517	6.516	0.001	1.097	58.91	41.04	0	0	0	0.03
2001	29	23	1	318.65	-445.782	D	8.908	8.908	0	6.335	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	6.819	6.819	0	1.692	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.016	7.016	0	2.09	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	6.478	6.478	0	1.025	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	6.561	6.561	0	1.185	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	6.583	6.583	0	1.226	0	0	0	0	0	0
2001	37	23	1	318.65	-445.782	D	6.528	6.528	0	1.121	0	0	0	0	0	0
2001	38	23	1	318.65	-445.782	D	8.527	8.527	0	5.415	0	0	0	0	0	0
2001	39	23	1	318.65	-445.782	D	10.07	10.07	0	9.369	0	0	0	0	0	0
2001	40	23	2757	335.63	-424.484	D	9.356	9.356	0	7.463	71.49	27.22	0	0	0	0
2001	41	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2001	42	23	2781	339.842	-425.379	D	6.473	6.47	0.003	1.009	54.72	45.24	0	0	0	0.04
2001	43	23	1546	330.244	-426.538	D	6.837	6.837	0	1.729	62.2	32.35	0	0	0	0.02
2001	44	23	1	318.65	-445.782	D	9.412	9.412	0	7.606	0	0	0	0	0	0
2001	45	23	2704	329.056	-425.092	D	10.22	10.218	0.002	9.779	84.1	15.92	0	0	0	0
2001	46	23	2789	340.496	-426.449	D	8.801	8.624	0.178	5.644	83	17	0	0	0	0
2001	47	23	2789	340.496	-426.449	D	8.071	8.052	0.019	4.315	83.93	16.07	0	0	0	0
2001	48	23	1	318.65	-445.782	D	6.531	6.531	0	1.127	0	0	0	0	0	0
2001	49	23	2789	340.496	-426.449	D	6.472	6.472	0	1.012	75.97	23.95	0	0	0	0.06
2001	50	23	2789	340.496	-426.449	D	6.494	6.494	0	1.055	78.02	22.33	0	0	0	0.04
2001	51	23	1	318.65	-445.782	D	9.197	9.197	0	7.056	0	0	0	0	0	0
2001	52	23	2695	328.074	-426.025	D	8.127	8.125	0.002	4.479	72.19	27.76	0	0	0	0.01
2001	53	23	2525	325.876	-438.073	D	7.108	7.106	0.002	2.275	71.62	28.2	0	0	0	0.01
2001	54	23	2781	339.842	-425.379	D	6.787	6.785	0.001	1.626	60.16	39.74	0	0	0	0.03
2001	55	23	1	318.65	-445.782	D	9.447	9.447	0	7.697	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.222	7.222	0	2.515	0	0	0	0	0	0
2001	57	23	2787	340.091	-426.447	D	6.499	6.499	0	1.064	90.91	10.36	0	0	0	0.1
2001	58	23	2781	339.842	-425.379	D	6.52	6.517	0.002	1.099	76.33	23.66	0	0	0	0.04
2001	59	23	2694	327.861	-425.964	D	7.144	7.142	0.002	2.348	74.57	25.37	0	0	0	0.01
2001	60	23	1	318.65	-445.782	D	6.708	6.708	0	1.473	0	0	0	0	0	0
2001	61	23	1	318.65	-445.782	D	8.524	8.524	0	5.407	0	0	0	0	0	0
2001	62	23	1	318.65	-445.782	D	6.735	6.735	0	1.527	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	63	23	2624	320.719	-437.835	D	6.679	6.618	0.062	1.295	65.54	34.42	0	0	0	0.03
2001	64	23	1	318.65	-445.782	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	65	23	1	318.65	-445.782	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2001	66	23	1	318.65	-445.782	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	67	23	1	318.65	-445.782	D	6.534	6.534	0	1.132	0	0	0	0	0	0
2001	68	23	2789	340.496	-426.449	D	6.493	6.493	0.001	1.052	61.95	37.84	0	0	0	0.1
2001	69	23	2789	340.496	-426.449	D	6.472	6.471	0.001	1.009	77.33	22.61	0	0	0	0.06
2001	70	23	2781	339.842	-425.379	D	6.502	6.502	0	1.069	87.93	12.11	0	0	0	0.04
2001	71	23	1	318.65	-445.782	D	9.154	9.154	0	6.946	0	0	0	0	0	0
2001	72	23	1	318.65	-445.782	D	6.558	6.558	0	1.178	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	74	23	1	318.65	-445.782	D	9.736	9.736	0	8.459	0	0	0	0	0	0
2001	75	23	2758	335.862	-424.454	D	7.602	7.591	0.011	3.297	81	19	0	0	0	0
2001	76	23	1	318.65	-445.782	D	6.567	6.567	0	1.196	0	0	0	0	0	0
2001	77	23	2762	336.074	-425.006	D	6.517	6.506	0.011	1.078	67.94	32	0	0	0	0.05
2001	78	23	2589	318.383	-445.593	D	6.48	6.479	0.001	1.026	83.39	16.53	0	0	0	0.05
2001	79	23	2589	318.383	-445.593	D	6.499	6.495	0.004	1.057	77.94	22.01	0	0	0	0.07
2001	80	23	2583	319.686	-445.705	D	6.493	6.473	0.02	1.013	75.73	24.2	0	0	0	0.07
2001	81	23	2789	340.496	-426.449	D	6.494	6.487	0.007	1.042	91.7	8.24	0	0	0	0.06
2001	82	23	2781	339.842	-425.379	D	6.67	6.665	0.005	1.388	90.11	9.88	0	0	0	0.03
2001	83	23	2694	327.861	-425.964	D	6.797	6.761	0.036	1.578	61.89	38.08	0	0	0	0.03
2001	84	23	1	318.65	-445.782	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	85	23	1	318.65	-445.782	D	6.478	6.478	0	1.024	0	0	0	0	0	0
2001	86	23	2400	338.672	-425.919	D	6.468	6.468	0	1.004	76.96	5.69	0	0	0	0.04
2001	87	23	2789	340.496	-426.449	D	6.509	6.508	0.002	1.081	80.48	19.45	0	0	0	0.03
2001	88	23	1	318.65	-445.782	D	7.559	7.559	0	3.227	0	0	0	0	0	0
2001	89	23	1	318.65	-445.782	D	9.145	9.145	0	6.925	0	0	0	0	0	0
2001	90	23	1	318.65	-445.782	D	7.628	7.628	0	3.376	0	0	0	0	0	0
2001	91	23	1	318.65	-445.782	D	6.481	6.481	0	1.029	0	0	0	0	0	0
2001	92	23	1	318.65	-445.782	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	9.747	9.747	0	8.488	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	8.549	8.549	0	5.467	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.507	7.507	0	3.115	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.503	7.503	0	3.108	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.145	7.145	0	2.355	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.606	7.606	0	3.329	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	9.338	9.338	0	7.417	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	102	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	6.571	6.571	0	1.204	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.079	7.079	0	2.219	0	0	0	0	0	0
2001	105	23	2781	339.842	-425.379	D	8.943	8.943	0	6.422	91.7	2.39	0	0	0	0.03
2001	106	23	2788	340.294	-426.448	D	6.503	6.503	0	1.073	82.09	13.83	0	0	0	0.15
2001	107	23	1	318.65	-445.782	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	108	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	109	23	1	318.65	-445.782	D	6.594	6.594	0	1.249	0	0	0	0	0	0
2001	110	23	1	318.65	-445.782	D	10.01	10.01	0	9.202	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	8.281	8.281	0	4.837	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	8.135	8.135	0	4.503	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	8.008	8.008	0	4.216	0	0	0	0	0	0
2001	114	23	1	318.65	-445.782	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	115	23	1	318.65	-445.782	D	6.478	6.478	0	1.024	0	0	0	0	0	0
2001	116	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	6.586	6.586	0	1.232	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	6.585	6.585	0	1.231	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	6.867	6.867	0	1.788	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.147	7.147	0	2.358	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	6.839	6.839	0	1.734	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.129	7.129	0	2.323	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.25	7.25	0	2.573	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	8.868	8.868	0	6.236	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	8.924	8.924	0	6.374	0	0	0	0	0	0
2001	127	23	1	318.65	-445.782	D	8.708	8.708	0	5.848	0	0	0	0	0	0
2001	128	23	1	318.65	-445.782	D	6.575	6.575	0	1.212	0	0	0	0	0	0
2001	129	23	2789	340.496	-426.449	D	6.686	6.685	0	1.428	98.66	1.31	0	0	0	0.03
2001	130	23	2789	340.496	-426.449	D	6.953	6.953	0	1.963	98.45	0.39	0	0	0	0.01
2001	131	23	1	318.65	-445.782	D	8.246	8.246	0	4.756	0	0	0	0	0	0
2001	132	23	2784	339.87	-426.019	D	8.778	8.769	0.009	5.994	90.66	9.28	0	0	0	0.05
2001	133	23	2628	320.933	-436.998	D	6.568	6.559	0.009	1.181	98.62	1.33	0	0	0	0.05
2001	134	23	2789	340.496	-426.449	D	6.745	6.745	0	1.546	99.43	0.29	0	0	0	0.03
2001	135	23	1	318.65	-445.782	D	6.961	6.961	0	1.979	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.897	7.897	0	3.966	0	0	0	0	0	0
2001	138	23	2704	329.056	-425.092	D	7.575	7.574	0.001	3.259	87.31	12.74	0	0	0	0.01
2001	139	23	2781	339.842	-425.379	D	7.475	7.46	0.014	3.017	92.98	7	0	0	0	0.01
2001	140	23	2781	339.842	-425.379	D	7.534	7.533	0.001	3.172	99.28	0.66	0	0	0	0.03

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	141	23	1	318.65	-445.782	D	8.961	8.961	0	6.464	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	6.534	6.534	0	1.131	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	6.566	6.566	0	1.193	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	6.546	6.546	0	1.156	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	6.809	6.809	0	1.673	0	0	0	0	0	0
2001	148	23	1	318.65	-445.782	D	8.364	8.364	0	5.03	0	0	0	0	0	0
2001	149	23	2789	340.496	-426.449	D	6.978	6.968	0.009	1.993	98.62	1.37	0	0	0	0.02
2001	150	23	2789	340.496	-426.449	D	8.46	8.459	0.001	5.254	99.53	0.49	0	0	0	0.01
2001	151	23	1	318.65	-445.782	D	9.068	9.068	0	6.73	0	0	0	0	0	0
2001	152	23	1	318.65	-445.782	D	7.103	7.103	0	2.268	0	0	0	0	0	0
2001	153	23	1	318.65	-445.782	D	6.992	6.992	0	2.042	0	0	0	0	0	0
2001	154	23	1	318.65	-445.782	D	7.218	7.218	0	2.506	0	0	0	0	0	0
2001	155	23	1	318.65	-445.782	D	8.894	8.894	0	6.3	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	8.375	8.375	0	5.056	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.624	7.624	0	3.368	0	0	0	0	0	0
2001	158	23	2781	339.842	-425.379	D	8.15	8.143	0.007	4.522	99.84	0.13	0	0	0	0.02
2001	159	23	2684	326.713	-427.014	D	7.394	7.283	0.111	2.642	98.17	1.81	0	0	0	0.01
2001	160	23	2704	329.056	-425.092	D	7.47	7.431	0.039	2.954	99.02	0.97	0	0	0	0.01
2001	161	23	2711	330.671	-424.932	D	7.786	7.761	0.025	3.667	99.6	0.4	0	0	0	0
2001	162	23	2411	339.428	-426.135	D	7.011	7.011	0	2.081	96.42	0.06	0	0	0	0.01
2001	163	23	1	318.65	-445.782	D	6.931	6.931	0	1.917	0	0	0	0	0	0
2001	164	23	1	318.65	-445.782	D	7.137	7.137	0	2.339	0	0	0	0	0	0
2001	165	23	1	318.65	-445.782	D	7.321	7.321	0	2.721	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	8.275	8.275	0	4.824	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	6.521	6.521	0	1.108	0	0	0	0	0	0
2001	168	23	1	318.65	-445.782	D	6.545	6.545	0	1.153	0	0	0	0	0	0
2001	169	23	2789	340.496	-426.449	D	6.651	6.651	0	1.36	99.96	0.13	0	0	0	0.03
2001	170	23	1	318.65	-445.782	D	7.178	7.178	0	2.423	0	0	0	0	0	0
2001	171	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	172	23	1513	329.974	-426.051	D	7.327	7.314	0.014	2.706	99.12	0.86	0	0	0	0.01
2001	173	23	2789	340.496	-426.449	D	6.812	6.812	0.001	1.679	99.17	0.72	0	0	0	0.01
2001	174	23	2789	340.496	-426.449	D	6.611	6.611	0	1.283	97.56	0.17	0	0	0	0.04
2001	175	23	2789	340.496	-426.449	D	6.762	6.76	0.001	1.576	99.49	0.37	0	0	0	0.03
2001	176	23	1513	329.974	-426.051	D	8.103	8.093	0.01	4.407	99.62	0.37	0	0	0	0.01
2001	177	23	2708	329.979	-425	D	7.163	7.155	0.008	2.376	99.68	0.32	0	0	0	0.01
2001	178	23	2758	335.862	-424.454	D	6.934	6.931	0.003	1.918	99.62	0.32	0	0	0	0.01
2001	179	23	2758	335.862	-424.454	D	8.974	8.971	0.003	6.49	99.06	0.91	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	180	23	621	323.621	-434.323	D	8.754	8.754	0	5.957	99.42	0.08	0	0	0	0
2001	181	23	1	318.65	-445.782	D	8.968	8.968	0	6.482	0	0	0	0	0	0
2001	182	23	2704	329.056	-425.092	D	9.413	9.396	0.017	7.564	97.93	2.04	0	0	0	0.01
2001	183	23	1513	329.974	-426.051	D	7.293	7.243	0.05	2.559	96.81	3.18	0	0	0	0.01
2001	184	23	2781	339.842	-425.379	D	7.342	7.338	0.004	2.757	99.77	0.18	0	0	0	0.01
2001	185	23	2405	338.909	-425.659	D	7.064	7.064	0	2.189	96	0.06	0	0	0	0.01
2001	186	23	1	318.65	-445.782	D	6.973	6.973	0	2.003	0	0	0	0	0	0
2001	187	23	2789	340.496	-426.449	D	7.643	7.635	0.008	3.392	99.69	0.3	0	0	0	0.01
2001	188	23	2789	340.496	-426.449	D	8.716	8.713	0.003	5.859	99.88	0.1	0	0	0	0
2001	189	23	1	318.65	-445.782	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.028	7.028	0	2.115	0	0	0	0	0	0
2001	191	23	1	318.65	-445.782	D	7.041	7.041	0	2.142	0	0	0	0	0	0
2001	192	23	2789	340.496	-426.449	D	7.086	7.063	0.023	2.187	99.35	0.63	0	0	0	0.02
2001	193	23	2783	339.861	-425.806	D	8.093	7.982	0.11	4.158	99.33	0.66	0	0	0	0.01
2001	194	23	2789	340.496	-426.449	D	9.194	9.072	0.122	6.741	98.1	1.9	0	0	0	0
2001	195	23	863	325.509	-431.992	D	6.685	6.684	0.001	1.426	99.98	0.06	0	0	0	0.01
2001	196	23	1	318.65	-445.782	D	6.685	6.685	0	1.427	0	0	0	0	0	0
2001	197	23	1	318.65	-445.782	D	7.148	7.148	0	2.362	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.972	7.972	0	4.135	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.881	7.881	0	3.931	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.405	7.405	0	2.898	0	0	0	0	0	0
2001	201	23	2240	336.106	-429.778	D	7.24	7.24	0	2.553	32.45	0.02	0	0	0	0
2001	202	23	2789	340.496	-426.449	D	6.81	6.808	0.002	1.67	99.18	0.76	0	0	0	0.01
2001	203	23	2789	340.496	-426.449	D	6.912	6.904	0.008	1.864	99.7	0.28	0	0	0	0.01
2001	204	23	2789	340.496	-426.449	D	7.491	7.485	0.006	3.069	99.59	0.39	0	0	0	0
2001	205	23	659	323.836	-433.564	D	8.173	8.171	0.002	4.585	99.81	0.13	0	0	0	0
2001	206	23	416	322.805	-444.101	D	8.028	8.028	0	4.26	99.66	0.15	0	0	0	0
2001	207	23	2784	339.87	-426.019	D	8.928	8.928	0	6.383	98.21	0.24	0	0	0	0.01
2001	208	23	2789	340.496	-426.449	D	8.997	8.905	0.093	6.326	97.02	2.98	0	0	0	0
2001	209	23	2789	340.496	-426.449	D	8.962	8.904	0.059	6.324	97.42	2.58	0	0	0	0
2001	210	23	2789	340.496	-426.449	D	8.711	8.71	0.001	5.852	99.54	0.9	0	0	0	0
2001	211	23	2456	334.644	-432.056	D	8.875	8.873	0.002	6.248	99.68	0.33	0	0	0	0
2001	212	23	2789	340.496	-426.449	D	8.508	8.496	0.013	5.339	99.87	0.11	0	0	0	0
2001	213	23	2784	339.87	-426.019	D	8.241	8.238	0.003	4.738	99.85	0.14	0	0	0	0
2001	214	23	2415	339.676	-426.124	D	7.548	7.548	0	3.204	91.47	0.06	0	0	0	0.01
2001	215	23	1	318.65	-445.782	D	7.135	7.135	0	2.335	0	0	0	0	0	0
2001	216	23	2789	340.496	-426.449	D	7.058	7.049	0.009	2.158	99.62	0.33	0	0	0	0.03
2001	217	23	2600	318.952	-443.12	D	7.148	7.141	0.006	2.348	99.84	0.16	0	0	0	0.01
2001	218	23	1	318.65	-445.782	D	7.208	7.208	0	2.485	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	219	23	1	318.65	-445.782	D	7.407	7.407	0	2.902	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.7	7.7	0	3.534	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.773	7.773	0	3.694	0	0	0	0	0	0
2001	222	23	1	318.65	-445.782	D	7.664	7.664	0	3.455	0	0	0	0	0	0
2001	223	23	2781	339.842	-425.379	D	9.223	9.067	0.156	6.729	97.97	2.02	0	0	0	0.01
2001	224	23	2255	335.942	-426.039	D	7.579	7.408	0.171	2.906	99.13	0.86	0	0	0	0.01
2001	225	23	2589	318.383	-445.593	D	7.527	7.458	0.069	3.012	99.54	0.44	0	0	0	0.01
2001	226	23	2555	324.03	-442.528	D	7.011	6.933	0.078	1.922	98.02	1.95	0	0	0	0.02
2001	227	23	2589	318.383	-445.593	D	6.855	6.848	0.008	1.751	99.19	0.79	0	0	0	0.02
2001	228	23	1	318.65	-445.782	D	7.783	7.783	0	3.714	0	0	0	0	0	0
2001	229	23	1	318.65	-445.782	D	6.675	6.675	0	1.407	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.046	7.046	0	2.151	0	0	0	0	0	0
2001	231	23	1	318.65	-445.782	D	6.857	6.857	0	1.768	0	0	0	0	0	0
2001	232	23	2788	340.294	-426.448	D	6.97	6.97	0	1.997	100.44	0.09	0	0	0	0.02
2001	233	23	2789	340.496	-426.449	D	7.601	7.601	0	3.318	99.87	0.1	0	0	0	0.01
2001	234	23	1	318.65	-445.782	D	6.991	6.991	0	2.041	0	0	0	0	0	0
2001	235	23	1	318.65	-445.782	D	7.076	7.076	0	2.213	0	0	0	0	0	0
2001	236	23	1	318.65	-445.782	D	7.113	7.113	0	2.289	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2001	238	23	1	318.65	-445.782	D	7.199	7.199	0	2.467	0	0	0	0	0	0
2001	239	23	2781	339.842	-425.379	D	7.29	7.272	0.018	2.619	98.91	1.07	0	0	0	0.02
2001	240	23	2781	339.842	-425.379	D	7.008	6.944	0.064	1.945	99.49	0.49	0	0	0	0.01
2001	241	23	606	323.785	-438.063	D	7.726	7.646	0.08	3.415	99.29	0.7	0	0	0	0.01
2001	242	23	2273	336.19	-426.028	D	8.557	8.502	0.055	5.355	99.06	0.94	0	0	0	0
2001	243	23	1455	329.987	-432.045	D	8.45	8.448	0.002	5.228	99.08	0.94	0	0	0	0
2001	244	23	2758	335.862	-424.454	D	8.513	8.489	0.025	5.323	97.97	2.02	0	0	0	0.01
2001	245	23	2695	328.074	-426.025	D	8.893	8.85	0.043	6.192	97.49	2.51	0	0	0	0
2001	246	23	1548	330.222	-426.04	D	8.279	8.278	0.002	4.83	99.53	0.3	0	0	0	0
2001	247	23	2155	334.883	-424.586	D	7.148	7.147	0.001	2.36	99.73	0.18	0	0	0	0.01
2001	248	23	2757	335.63	-424.484	D	7.445	7.445	0	2.983	99.21	0.84	0	0	0	0.02
2001	249	23	2781	339.842	-425.379	D	7.486	7.486	0	3.07	99.59	0.35	0	0	0	0.01
2001	250	23	1	318.65	-445.782	D	8.117	8.117	0	4.462	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	9.202	9.202	0	7.068	0	0	0	0	0	0
2001	252	23	1	318.65	-445.782	D	9.34	9.34	0	7.421	0	0	0	0	0	0
2001	253	23	1	318.65	-445.782	D	6.988	6.988	0	2.034	0	0	0	0	0	0
2001	254	23	2588	318.452	-445.8	D	6.79	6.784	0.006	1.623	98.04	1.95	0	0	0	0.03
2001	255	23	1	318.65	-445.782	D	6.853	6.853	0	1.761	0	0	0	0	0	0
2001	256	23	2385	338.165	-425.691	D	7.004	7.004	0	2.066	99.09	0.06	0	0	0	0.02
2001	257	23	2789	340.496	-426.449	D	7.503	7.48	0.023	3.058	98.09	1.9	0	0	0	0.01

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	258	23	2588	318.452	-445.8	D	6.962	6.96	0.002	1.977	99.89	0.09	0	0	0	0.01
2001	259	23	1	318.65	-445.782	D	6.742	6.742	0	1.541	0	0	0	0	0	0
2001	260	23	1	318.65	-445.782	D	7.078	7.078	0	2.217	0	0	0	0	0	0
2001	261	23	1	318.65	-445.782	D	9.081	9.081	0	6.764	0	0	0	0	0	0
2001	262	23	2781	339.842	-425.379	D	8.21	8.206	0.003	4.666	90.61	9.43	0	0	0	0
2001	263	23	1	318.65	-445.782	D	6.893	6.893	0	1.841	0	0	0	0	0	0
2001	264	23	1	318.65	-445.782	D	7.236	7.236	0	2.544	0	0	0	0	0	0
2001	265	23	2789	340.496	-426.449	D	7.146	7.146	0.001	2.357	99.36	0.58	0	0	0	0.06
2001	266	23	2789	340.496	-426.449	D	7.76	7.757	0.004	3.657	98.29	1.72	0	0	0	0.01
2001	267	23	2789	340.496	-426.449	D	8.727	8.718	0.008	5.871	75.58	24.39	0	0	0	0.04
2001	268	23	2789	340.496	-426.449	D	6.674	6.665	0.01	1.387	75.59	24.35	0	0	0	0.06
2001	269	23	2781	339.842	-425.379	D	6.561	6.54	0.021	1.143	91.96	8	0	0	0	0.04
2001	270	23	2789	340.496	-426.449	D	6.673	6.647	0.027	1.352	97.77	2.2	0	0	0	0.03
2001	271	23	2781	339.842	-425.379	D	6.738	6.721	0.017	1.498	98.7	1.26	0	0	0	0.03
2001	272	23	2588	318.452	-445.8	D	7.086	7.084	0.002	2.229	99.37	0.59	0	0	0	0.02
2001	273	23	1	318.65	-445.782	D	7.066	7.066	0	2.193	0	0	0	0	0	0
2001	274	23	2758	335.862	-424.454	D	7.201	7.201	0	2.471	94.03	6.33	0	0	0	0.02
2001	275	23	2780	339.614	-425.419	D	6.816	6.816	0	1.687	94.3	0.84	0	0	0	0.01
2001	276	23	1	318.65	-445.782	D	7.64	7.64	0	3.401	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	8.468	8.468	0	5.274	0	0	0	0	0	0
2001	278	23	2781	339.842	-425.379	D	9.793	9.656	0.137	8.246	82.4	17.59	0	0	0	0
2001	279	23	2789	340.496	-426.449	D	7.169	7.167	0.002	2.4	79.79	20.24	0	0	0	0.01
2001	280	23	2789	340.496	-426.449	D	6.558	6.557	0.001	1.177	97.79	2.12	0	0	0	0.04
2001	281	23	2789	340.496	-426.449	D	6.616	6.613	0.003	1.286	93.9	6.1	0	0	0	0.03
2001	282	23	1	318.65	-445.782	D	7.968	7.968	0	4.125	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	284	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	285	23	2758	335.862	-424.454	D	9.67	9.66	0.01	8.257	77.2	22.78	0	0	0	0
2001	286	23	1	318.65	-445.782	D	10.019	10.019	0	9.227	0	0	0	0	0	0
2001	287	23	1	318.65	-445.782	D	7.49	7.49	0	3.08	0	0	0	0	0	0
2001	288	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2001	289	23	1	318.65	-445.782	D	7.071	7.071	0	2.203	0	0	0	0	0	0
2001	290	23	1	318.65	-445.782	D	6.486	6.486	0	1.04	0	0	0	0	0	0
2001	291	23	2788	340.294	-426.448	D	6.548	6.548	0	1.16	90.84	9.16	0	0	0	0.02
2001	292	23	1	318.65	-445.782	D	6.799	6.799	0	1.653	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	8.641	8.641	0	5.686	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	9.362	9.362	0	7.476	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	9.29	9.29	0	7.294	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	297	23	1	318.65	-445.782	D	9.624	9.624	0	8.162	0	0	0	0	0	0
2001	298	23	1	318.65	-445.782	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	300	23	1	318.65	-445.782	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	301	23	2789	340.496	-426.449	D	6.48	6.477	0.004	1.021	78.61	21.37	0	0	0	0.05
2001	302	23	2757	335.63	-424.484	D	6.499	6.499	0	1.065	80.27	2.75	0	0	0	0.01
2001	303	23	1	318.65	-445.782	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	6.695	6.695	0	1.447	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	9.032	9.032	0	6.64	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	9.835	9.835	0	8.726	0	0	0	0	0	0
2001	307	23	2789	340.496	-426.449	D	9.74	9.685	0.054	8.324	85.89	14.11	0	0	0	0
2001	308	23	2623	320.666	-438.044	D	6.961	6.95	0.01	1.957	95.93	4.05	0	0	0	0.01
2001	309	23	2782	339.852	-425.592	D	8.412	8.368	0.043	5.041	87.47	12.52	0	0	0	0.01
2001	310	23	1456	329.977	-431.796	D	8.121	8.036	0.086	4.277	91.6	8.39	0	0	0	0.01
2001	311	23	2758	335.862	-424.454	D	7.188	7.173	0.015	2.413	96.74	3.25	0	0	0	0.01
2001	312	23	2788	340.294	-426.448	D	7.269	7.268	0	2.612	98.76	1.09	0	0	0	0.01
2001	313	23	2789	340.496	-426.449	D	6.61	6.605	0.005	1.27	55.45	44.43	0	0	0	0.12
2001	314	23	2788	340.294	-426.448	D	6.747	6.746	0	1.549	92.02	8	0	0	0	0.06
2001	315	23	2789	340.496	-426.449	D	6.801	6.799	0.002	1.653	92.47	7.43	0	0	0	0.11
2001	316	23	2653	324.014	-433.36	D	6.64	6.636	0.004	1.331	87.51	12.44	0	0	0	0.06
2001	317	23	1	318.65	-445.782	D	6.716	6.716	0	1.489	0	0	0	0	0	0
2001	318	23	1	318.65	-445.782	D	7.492	7.492	0	3.083	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	8.023	8.023	0	4.249	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.729	7.729	0	3.597	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.103	7.103	0	2.268	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	8.032	8.032	0	4.27	0	0	0	0	0	0
2001	323	23	1	318.65	-445.782	D	8.728	8.728	0	5.896	0	0	0	0	0	0
2001	324	23	1	318.65	-445.782	D	6.474	6.474	0	1.016	0	0	0	0	0	0
2001	325	23	1	318.65	-445.782	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	326	23	1	318.65	-445.782	D	6.548	6.548	0	1.159	0	0	0	0	0	0
2001	327	23	1	318.65	-445.782	D	8.475	8.475	0	5.291	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	8.774	8.774	0	6.006	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	6.66	6.66	0	1.377	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.063	7.063	0	2.186	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.026	7.026	0	2.111	0	0	0	0	0	0
2001	332	23	2789	340.496	-426.449	D	9.366	9.227	0.139	7.131	61.22	38.77	0	0	0	0.01
2001	333	23	2589	318.383	-445.593	D	10.487	10.218	0.27	9.779	65.14	34.85	0	0	0	0.01
2001	334	23	2789	340.496	-426.449	D	8.865	8.348	**0.517**	4.993	79.04	20.96	0	0	0	0
2001	335	23	1	318.65	-445.782	D	6.625	6.625	0	1.31	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	336	23	1	318.65	-445.782	D	6.688	6.688	0	1.434	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	6.971	6.971	0	1.999	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.231	7.231	0	2.534	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	9.653	9.653	0	8.239	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	9.943	9.943	0	9.018	0	0	0	0	0	0
2001	341	23	1	318.65	-445.782	D	7.912	7.912	0	4	0	0	0	0	0	0
2001	342	23	2704	329.056	-425.092	D	8.495	8.445	0.05	5.22	65.84	34.15	0	0	0	0.01
2001	343	23	2788	340.294	-426.448	D	6.595	6.595	0	1.25	60.92	37.61	0	0	0	0.09
2001	344	23	2789	340.496	-426.449	D	6.516	6.513	0.003	1.092	55.8	44.12	0	0	0	0.06
2001	345	23	2789	340.496	-426.449	D	6.574	6.574	0.001	1.209	71.16	28.76	0	0	0	0.04
2001	346	23	1	318.65	-445.782	D	9.752	9.752	0	8.503	0	0	0	0	0	0
2001	347	23	1	318.65	-445.782	D	9.808	9.808	0	8.653	0	0	0	0	0	0
2001	348	23	2789	340.496	-426.449	D	9.236	9.231	0.005	7.142	83.28	16.7	0	0	0	0
2001	349	23	2789	340.496	-426.449	D	9.077	9.077	0	6.753	95.42	3.62	0	0	0	0.01
2001	350	23	2789	340.496	-426.449	D	10.219	10.218	0.001	9.779	88.18	11.63	0	0	0	0
2001	351	23	2789	340.496	-426.449	D	9.521	9.458	0.063	7.727	64.9	35.08	0	0	0	0
2001	352	23	1	318.65	-445.782	D	6.544	6.544	0	1.152	0	0	0	0	0	0
2001	353	23	1	318.65	-445.782	D	6.815	6.815	0	1.686	0	0	0	0	0	0
2001	354	23	1	318.65	-445.782	D	6.471	6.471	0	1.009	0	0	0	0	0	0
2001	355	23	1	318.65	-445.782	D	6.487	6.487	0	1.042	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	8.259	8.259	0	4.788	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	6.641	6.641	0	1.34	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	359	23	1	318.65	-445.782	D	6.512	6.512	0	1.089	0	0	0	0	0	0
2001	360	23	1	318.65	-445.782	D	6.537	6.537	0	1.138	0	0	0	0	0	0
2001	361	23	1	318.65	-445.782	D	6.605	6.605	0	1.269	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2001	363	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	364	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	365	23	1	318.65	-445.782	D	6.619	6.619	0	1.298	0	0	0	0	0	0
									0.517							
HOLCIM									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	318.65	-445.782	D	7.785	7.785	0	3.719	0	0	0	0	0	0
2001	2	23	1	318.65	-445.782	D	7.39	7.39	0	2.868	0	0	0	0	0	0
2001	3	23	1	318.65	-445.782	D	8.207	8.207	0	4.667	0	0	0	0	0	0
2001	4	23	1	318.65	-445.782	D	7.031	7.031	0	2.121	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	5	23	1	318.65	-445.782	D	6.931	6.931	0	1.919	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	6.551	6.551	0	1.165	0	0	0	0	0	0
2001	7	23	1	318.65	-445.782	D	7.026	7.026	0	2.11	0	0	0	0	0	0
2001	8	23	1	318.65	-445.782	D	8.597	8.597	0	5.581	0	0	0	0	0	0
2001	9	23	1	318.65	-445.782	D	9.208	9.208	0	7.084	0	0	0	0	0	0
2001	10	23	2789	340.496	-426.449	D	6.972	6.97	0.002	1.996	38.47	61.2	0	0	0	0.28
2001	11	23	1	318.65	-445.782	D	9.068	9.068	0	6.731	0	0	0	0	0	0
2001	12	23	1	318.65	-445.782	D	9.519	9.519	0	7.886	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	9.698	9.698	0	8.359	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	9.396	9.396	0	7.566	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	6.74	6.74	0	1.537	0	0	0	0	0	0
2001	16	23	1	318.65	-445.782	D	6.763	6.763	0	1.581	0	0	0	0	0	0
2001	17	23	2789	340.496	-426.449	D	6.886	6.864	0.021	1.784	58.36	41.15	0	0	0	0.49
2001	18	23	2468	334.002	-434.887	D	7.577	6.915	**0.662**	1.887	42.39	57.31	0	0	0	0.31
2001	19	23	2789	340.496	-426.449	D	6.863	6.861	0.002	1.778	53.95	45.58	0	0	0	0.49
2001	20	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	21	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	22	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	6.621	6.621	0	1.303	0	0	0	0	0	0
2001	24	23	1	318.65	-445.782	D	6.746	6.746	0	1.549	0	0	0	0	0	0
2001	25	23	2789	340.496	-426.449	D	6.586	6.584	0.001	1.23	34.55	64.78	0	0	0	0.78
2001	26	23	2789	340.496	-426.449	D	6.544	6.536	0.008	1.136	34.23	65.32	0	0	0	0.44
2001	27	23	1	318.65	-445.782	D	6.678	6.678	0	1.413	0	0	0	0	0	0
2001	28	23	1	318.65	-445.782	D	6.528	6.528	0	1.12	0	0	0	0	0	0
2001	29	23	1	318.65	-445.782	D	8.908	8.908	0	6.335	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	6.819	6.819	0	1.692	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.016	7.016	0	2.09	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	6.478	6.478	0	1.025	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	6.561	6.561	0	1.185	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	6.617	6.617	0	1.293	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	6.583	6.583	0	1.226	0	0	0	0	0	0
2001	37	23	1	318.65	-445.782	D	6.528	6.528	0	1.121	0	0	0	0	0	0
2001	38	23	1	318.65	-445.782	D	8.527	8.527	0	5.415	0	0	0	0	0	0
2001	39	23	1	318.65	-445.782	D	10.07	10.07	0	9.369	0	0	0	0	0	0
2001	40	23	1	318.65	-445.782	D	9.399	9.399	0	7.574	0	0	0	0	0	0
2001	41	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2001	42	23	2781	339.842	-425.379	D	6.496	6.47	0.026	1.009	39.88	59.57	0	0	0	0.55
2001	43	23	1415	329.185	-425.086	D	6.874	6.874	0	1.803	50.48	48.96	0	0	0	0.4

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	44	23	1	318.65	-445.782	D	9.412	9.412	0	7.606	0	0	0	0	0	0
2001	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	46	23	2789	340.496	-426.449	D	8.637	8.624	0.014	5.644	67.1	32.84	0	0	0	0.05
2001	47	23	2468	334.002	-434.887	D	8.262	8.241	0.02	4.747	68.66	31.31	0	0	0	0.03
2001	48	23	1	318.65	-445.782	D	6.531	6.531	0	1.127	0	0	0	0	0	0
2001	49	23	1	318.65	-445.782	D	6.473	6.473	0	1.014	0	0	0	0	0	0
2001	50	23	2789	340.496	-426.449	D	6.494	6.494	0	1.055	61.33	33.98	0	0	0	0.64
2001	51	23	1	318.65	-445.782	D	9.197	9.197	0	7.056	0	0	0	0	0	0
2001	52	23	2704	329.056	-425.092	D	8.429	8.08	0.348	4.379	51.18	48.74	0	0	0	0.08
2001	53	23	641	324.033	-438.052	D	7.117	7.106	0.011	2.275	53.92	45.94	0	0	0	0.12
2001	54	23	1	318.65	-445.782	D	6.752	6.752	0	1.56	0	0	0	0	0	0
2001	55	23	1	318.65	-445.782	D	9.447	9.447	0	7.697	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.222	7.222	0	2.515	0	0	0	0	0	0
2001	57	23	1	318.65	-445.782	D	6.492	6.492	0	1.051	0	0	0	0	0	0
2001	58	23	2783	339.861	-425.806	D	6.526	6.517	0.009	1.099	59.56	39.81	0	0	0	0.64
2001	59	23	2694	327.861	-425.964	D	7.206	7.142	0.065	2.348	58	41.86	0	0	0	0.14
2001	60	23	1	318.65	-445.782	D	6.708	6.708	0	1.473	0	0	0	0	0	0
2001	61	23	1	318.65	-445.782	D	8.524	8.524	0	5.407	0	0	0	0	0	0
2001	62	23	1	318.65	-445.782	D	6.735	6.735	0	1.527	0	0	0	0	0	0
2001	63	23	2789	340.496	-426.449	D	6.702	6.6	0.102	1.261	51.85	47.76	0	0	0	0.4
2001	64	23	1	318.65	-445.782	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2001	65	23	1	318.65	-445.782	D	6.525	6.525	0	1.114	0	0	0	0	0	0
2001	66	23	1	318.65	-445.782	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	67	23	1	318.65	-445.782	D	6.534	6.534	0	1.132	0	0	0	0	0	0
2001	68	23	1	318.65	-445.782	D	6.488	6.488	0	1.042	0	0	0	0	0	0
2001	69	23	2789	340.496	-426.449	D	6.472	6.471	0.001	1.009	66.04	33.16	0	0	0	0.82
2001	70	23	2781	339.842	-425.379	D	6.502	6.502	0	1.069	77.65	21.83	0	0	0	0.64
2001	71	23	1	318.65	-445.782	D	9.154	9.154	0	6.946	0	0	0	0	0	0
2001	72	23	1	318.65	-445.782	D	6.558	6.558	0	1.178	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	74	23	1	318.65	-445.782	D	9.736	9.736	0	8.459	0	0	0	0	0	0
2001	75	23	2708	329.979	-425	D	8.323	7.781	**0.541**	3.711	71.85	28.1	0	0	0	0.04
2001	76	23	1	318.65	-445.782	D	6.567	6.567	0	1.196	0	0	0	0	0	0
2001	77	23	2789	340.496	-426.449	D	6.529	6.506	0.023	1.078	52.12	46.87	0	0	0	1.01
2001	78	23	2589	318.383	-445.593	D	6.502	6.479	0.023	1.026	59.29	39.97	0	0	0	0.74
2001	79	23	2694	327.861	-425.964	D	6.511	6.495	0.016	1.056	76.04	22.94	0	0	0	1.02
2001	80	23	2600	318.952	-443.12	D	6.642	6.473	0.169	1.014	67.77	31.38	0	0	0	0.85
2001	81	23	2704	329.056	-425.092	D	6.532	6.49	0.042	1.046	85.58	13.66	0	0	0	0.76
2001	82	23	2781	339.842	-425.379	D	6.735	6.665	0.07	1.388	80.89	18.63	0	0	0	0.49

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	83	23	2789	340.496	-426.449	D	6.893	6.747	0.147	1.549	84.48	15.3	0	0	0	0.21
2001	84	23	1	318.65	-445.782	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	85	23	1	318.65	-445.782	D	6.478	6.478	0	1.024	0	0	0	0	0	0
2001	86	23	1	318.65	-445.782	D	6.468	6.468	0	1.005	0	0	0	0	0	0
2001	87	23	1	318.65	-445.782	D	6.529	6.529	0	1.123	0	0	0	0	0	0
2001	88	23	1	318.65	-445.782	D	7.559	7.559	0	3.227	0	0	0	0	0	0
2001	89	23	1	318.65	-445.782	D	9.145	9.145	0	6.925	0	0	0	0	0	0
2001	90	23	1	318.65	-445.782	D	7.628	7.628	0	3.376	0	0	0	0	0	0
2001	91	23	1	318.65	-445.782	D	6.481	6.481	0	1.029	0	0	0	0	0	0
2001	92	23	1	318.65	-445.782	D	7.269	7.269	0	2.613	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	10.042	10.042	0	9.289	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	9.747	9.747	0	8.488	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	8.549	8.549	0	5.467	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.507	7.507	0	3.115	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.503	7.503	0	3.108	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.145	7.145	0	2.355	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.606	7.606	0	3.329	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	9.338	9.338	0	7.417	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	6.571	6.571	0	1.204	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.079	7.079	0	2.219	0	0	0	0	0	0
2001	105	23	1	318.65	-445.782	D	9.107	9.107	0	6.828	0	0	0	0	0	0
2001	106	23	1	318.65	-445.782	D	6.498	6.498	0	1.063	0	0	0	0	0	0
2001	107	23	1	318.65	-445.782	D	6.48	6.48	0	1.027	0	0	0	0	0	0
2001	108	23	1	318.65	-445.782	D	6.476	6.476	0	1.019	0	0	0	0	0	0
2001	109	23	1	318.65	-445.782	D	6.594	6.594	0	1.249	0	0	0	0	0	0
2001	110	23	1	318.65	-445.782	D	10.01	10.01	0	9.202	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	8.281	8.281	0	4.837	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	8.135	8.135	0	4.503	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	8.008	8.008	0	4.216	0	0	0	0	0	0
2001	114	23	1	318.65	-445.782	D	6.5	6.5	0	1.067	0	0	0	0	0	0
2001	115	23	1	318.65	-445.782	D	6.478	6.478	0	1.024	0	0	0	0	0	0
2001	116	23	1	318.65	-445.782	D	6.543	6.543	0	1.149	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	6.586	6.586	0	1.232	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	6.585	6.585	0	1.231	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	6.867	6.867	0	1.788	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.147	7.147	0	2.358	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	6.839	6.839	0	1.734	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	122	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.129	7.129	0	2.323	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.25	7.25	0	2.573	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	8.868	8.868	0	6.236	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	8.924	8.924	0	6.374	0	0	0	0	0	0
2001	127	23	1	318.65	-445.782	D	8.708	8.708	0	5.848	0	0	0	0	0	0
2001	128	23	1	318.65	-445.782	D	6.575	6.575	0	1.212	0	0	0	0	0	0
2001	129	23	1	318.65	-445.782	D	6.883	6.883	0	1.822	0	0	0	0	0	0
2001	130	23	2400	338.672	-425.919	D	6.94	6.94	0	1.936	84.41	0.35	0	0	0	0.25
2001	131	23	1	318.65	-445.782	D	8.246	8.246	0	4.756	0	0	0	0	0	0
2001	132	23	1	318.65	-445.782	D	8.901	8.901	0	6.317	0	0	0	0	0	0
2001	133	23	1	318.65	-445.782	D	6.561	6.561	0	1.185	0	0	0	0	0	0
2001	134	23	1	318.65	-445.782	D	6.804	6.804	0	1.664	0	0	0	0	0	0
2001	135	23	1	318.65	-445.782	D	6.961	6.961	0	1.979	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.897	7.897	0	3.966	0	0	0	0	0	0
2001	138	23	1	318.65	-445.782	D	7.89	7.89	0	3.951	0	0	0	0	0	0
2001	139	23	2789	340.496	-426.449	D	7.352	7.352	0	2.786	99.23	0.49	0	0	0	0.3
2001	140	23	2789	340.496	-426.449	D	7.462	7.462	0	3.019	98.63	0.26	0	0	0	0.27
2001	141	23	1	318.65	-445.782	D	8.961	8.961	0	6.464	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	6.534	6.534	0	1.131	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	6.54	6.54	0	1.144	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	6.507	6.507	0	1.08	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	6.566	6.566	0	1.193	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	6.546	6.546	0	1.156	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	6.809	6.809	0	1.673	0	0	0	0	0	0
2001	148	23	1	318.65	-445.782	D	8.364	8.364	0	5.03	0	0	0	0	0	0
2001	149	23	2788	340.294	-426.448	D	6.968	6.968	0	1.993	98.85	0.29	0	0	0	0.43
2001	150	23	2781	339.842	-425.379	D	8.429	8.428	0.001	5.181	96.97	2.7	0	0	0	0.16
2001	151	23	1	318.65	-445.782	D	9.068	9.068	0	6.73	0	0	0	0	0	0
2001	152	23	1	318.65	-445.782	D	7.103	7.103	0	2.268	0	0	0	0	0	0
2001	153	23	1	318.65	-445.782	D	6.992	6.992	0	2.042	0	0	0	0	0	0
2001	154	23	1	318.65	-445.782	D	7.218	7.218	0	2.506	0	0	0	0	0	0
2001	155	23	1	318.65	-445.782	D	8.894	8.894	0	6.3	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	8.375	8.375	0	5.056	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.624	7.624	0	3.368	0	0	0	0	0	0
2001	158	23	1	318.65	-445.782	D	7.996	7.996	0	4.188	0	0	0	0	0	0
2001	159	23	2789	340.496	-426.449	D	7.809	7.283	**0.526**	2.641	96.12	3.7	0	0	0	0.18
2001	160	23	2571	322.646	-445.476	D	7.473	7.36	0.113	2.804	98.6	1.2	0	0	0	0.2

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	161	23	2781	339.842	-425.379	D	7.868	7.757	0.111	3.659	98.78	1.13	0	0	0	0.09
2001	162	23	2789	340.496	-426.449	D	7.013	7.011	0.001	2.081	99.52	0.33	0	0	0	0.17
2001	163	23	2784	339.87	-426.019	D	6.866	6.866	0	1.787	98.52	0.21	0	0	0	0.2
2001	164	23	2407	339.18	-426.146	D	7.053	7.053	0	2.166	98.28	0.3	0	0	0	0.13
2001	165	23	1	318.65	-445.782	D	7.321	7.321	0	2.721	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	8.275	8.275	0	4.824	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	6.521	6.521	0	1.108	0	0	0	0	0	0
2001	168	23	1	318.65	-445.782	D	6.545	6.545	0	1.153	0	0	0	0	0	0
2001	169	23	2789	340.496	-426.449	D	6.651	6.651	0	1.36	99.27	0.2	0	0	0	0.48
2001	170	23	2399	338.683	-426.168	D	7.019	7.019	0	2.098	89.42	0.14	0	0	0	0.3
2001	171	23	1	318.65	-445.782	D	6.845	6.845	0	1.746	0	0	0	0	0	0
2001	172	23	2652	323.833	-433.511	D	7.378	7.366	0.012	2.816	98.19	1.7	0	0	0	0.11
2001	173	23	2552	324.659	-442.591	D	6.855	6.853	0.002	1.761	97.81	2	0	0	0	0.15
2001	174	23	1	318.65	-445.782	D	6.592	6.592	0	1.245	0	0	0	0	0	0
2001	175	23	2789	340.496	-426.449	D	6.761	6.76	0.001	1.576	99.2	0.24	0	0	0	0.49
2001	176	23	2564	323.159	-444.002	D	8.521	8.451	0.069	5.235	99.12	0.77	0	0	0	0.1
2001	177	23	2708	329.979	-425	D	7.227	7.155	0.072	2.376	99.22	0.6	0	0	0	0.17
2001	178	23	2758	335.862	-424.454	D	6.959	6.931	0.028	1.918	99.1	0.7	0	0	0	0.2
2001	179	23	2758	335.862	-424.454	D	9.004	8.971	0.033	6.49	98.04	1.91	0	0	0	0.05
2001	180	23	2652	323.833	-433.511	D	8.755	8.754	0.002	5.957	99.68	0.23	0	0	0	0.06
2001	181	23	1	318.65	-445.782	D	8.968	8.968	0	6.482	0	0	0	0	0	0
2001	182	23	1	318.65	-445.782	D	9.28	9.28	0	7.268	0	0	0	0	0	0
2001	183	23	2781	339.842	-425.379	D	7.23	7.171	0.059	2.409	88.26	11.55	0	0	0	0.19
2001	184	23	2781	339.842	-425.379	D	7.378	7.338	0.04	2.757	99.2	0.69	0	0	0	0.11
2001	185	23	2414	339.687	-426.374	D	7.08	7.079	0	2.22	100.66	0.11	0	0	0	0.19
2001	186	23	1	318.65	-445.782	D	6.973	6.973	0	2.003	0	0	0	0	0	0
2001	187	23	2789	340.496	-426.449	D	7.639	7.635	0.003	3.392	99.64	0.13	0	0	0	0.21
2001	188	23	2789	340.496	-426.449	D	8.719	8.713	0.006	5.859	99.74	0.19	0	0	0	0.06
2001	189	23	1	318.65	-445.782	D	7.18	7.18	0	2.428	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.028	7.028	0	2.115	0	0	0	0	0	0
2001	191	23	1	318.65	-445.782	D	7.041	7.041	0	2.142	0	0	0	0	0	0
2001	192	23	2789	340.496	-426.449	D	7.067	7.063	0.004	2.187	99.16	0.1	0	0	0	0.73
2001	193	23	2782	339.852	-425.592	D	8.07	7.982	0.087	4.158	99.07	0.76	0	0	0	0.17
2001	194	23	2789	340.496	-426.449	D	9.18	9.072	0.108	6.741	96.06	3.89	0	0	0	0.05
2001	195	23	863	325.509	-431.992	D	6.687	6.684	0.003	1.426	99.68	0.15	0	0	0	0.17
2001	196	23	1	318.65	-445.782	D	6.685	6.685	0	1.427	0	0	0	0	0	0
2001	197	23	1	318.65	-445.782	D	7.148	7.148	0	2.362	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.972	7.972	0	4.135	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.881	7.881	0	3.931	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	200	23	1	318.65	-445.782	D	7.405	7.405	0	2.898	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.353	7.353	0	2.789	0	0	0	0	0	0
2001	202	23	2789	340.496	-426.449	D	6.809	6.808	0.001	1.67	94.6	5.21	0	0	0	0.14
2001	203	23	2789	340.496	-426.449	D	6.905	6.904	0.001	1.864	99.19	0.64	0	0	0	0.14
2001	204	23	2789	340.496	-426.449	D	7.485	7.485	0	3.069	98.35	1.1	0	0	0	0.08
2001	205	23	1513	329.974	-426.051	D	7.984	7.984	0	4.161	101.92	0.21	0	0	0	0.06
2001	206	23	1	318.65	-445.782	D	8.028	8.028	0	4.26	0	0	0	0	0	0
2001	207	23	1	318.65	-445.782	D	9.042	9.042	0	6.666	0	0	0	0	0	0
2001	208	23	2789	340.496	-426.449	D	9.044	8.905	0.139	6.326	93.56	6.38	0	0	0	0.06
2001	209	23	2789	340.496	-426.449	D	9.016	8.904	0.112	6.324	94.64	5.32	0	0	0	0.04
2001	210	23	2789	340.496	-426.449	D	8.711	8.71	0.001	5.852	98.64	1.34	0	0	0	0.07
2001	211	23	2564	323.159	-444.002	D	9.176	9.169	0.008	6.985	99	0.94	0	0	0	0.04
2001	212	23	2789	340.496	-426.449	D	8.536	8.496	0.041	5.339	99.71	0.22	0	0	0	0.06
2001	213	23	2789	340.496	-426.449	D	8.273	8.238	0.035	4.738	99.42	0.53	0	0	0	0.05
2001	214	23	2784	339.87	-426.019	D	7.549	7.548	0.001	3.204	99.6	0.22	0	0	0	0.09
2001	215	23	2385	338.165	-425.691	D	6.959	6.959	0	1.974	97.67	0.06	0	0	0	0.14
2001	216	23	2789	340.496	-426.449	D	7.072	7.049	0.022	2.158	99.31	0.24	0	0	0	0.44
2001	217	23	2628	320.933	-436.998	D	7.208	7.151	0.057	2.368	99.11	0.69	0	0	0	0.2
2001	218	23	168	320.568	-438.453	D	7.255	7.255	0	2.583	92.65	0.04	0	0	0	0.34
2001	219	23	1	318.65	-445.782	D	7.407	7.407	0	2.902	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.7	7.7	0	3.534	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.773	7.773	0	3.694	0	0	0	0	0	0
2001	222	23	1	318.65	-445.782	D	7.664	7.664	0	3.455	0	0	0	0	0	0
2001	223	23	2789	340.496	-426.449	D	9.121	9.058	0.063	6.707	98.82	1.09	0	0	0	0.09
2001	224	23	2789	340.496	-426.449	D	7.637	7.365	0.272	2.813	91.02	8.74	0	0	0	0.24
2001	225	23	2255	335.942	-426.039	D	8.384	7.603	**0.782**	3.321	94.85	5.01	0	0	0	0.14
2001	226	23	2571	322.646	-445.476	D	6.955	6.915	0.04	1.885	99.35	0.29	0	0	0	0.36
2001	227	23	2468	334.002	-434.887	D	6.857	6.825	0.032	1.706	98.03	1.54	0	0	0	0.42
2001	228	23	2415	339.676	-426.124	D	7.582	7.582	0	3.277	98.18	0.23	0	0	0	0.24
2001	229	23	1	318.65	-445.782	D	6.675	6.675	0	1.407	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.046	7.046	0	2.151	0	0	0	0	0	0
2001	231	23	1	318.65	-445.782	D	6.857	6.857	0	1.768	0	0	0	0	0	0
2001	232	23	1	318.65	-445.782	D	7.006	7.006	0	2.069	0	0	0	0	0	0
2001	233	23	1	318.65	-445.782	D	8.165	8.165	0	4.572	0	0	0	0	0	0
2001	234	23	1	318.65	-445.782	D	6.991	6.991	0	2.041	0	0	0	0	0	0
2001	235	23	1	318.65	-445.782	D	7.076	7.076	0	2.213	0	0	0	0	0	0
2001	236	23	1	318.65	-445.782	D	7.113	7.113	0	2.289	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.284	7.284	0	2.645	0	0	0	0	0	0
2001	238	23	1	318.65	-445.782	D	7.199	7.199	0	2.467	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	239	23	1	318.65	-445.782	D	7.365	7.365	0	2.813	0	0	0	0	0	0
2001	240	23	1	318.65	-445.782	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2001	241	23	1	318.65	-445.782	D	7.628	7.628	0	3.376	0	0	0	0	0	0
2001	242	23	1	318.65	-445.782	D	8.243	8.243	0	4.749	0	0	0	0	0	0
2001	243	23	1	318.65	-445.782	D	8.684	8.684	0	5.788	0	0	0	0	0	0
2001	244	23	2758	335.862	-424.454	D	8.559	8.489	0.07	5.323	98.2	1.57	0	0	0	0.23
2001	245	23	2695	328.074	-426.025	D	9.206	8.85	0.356	6.192	94.67	5.27	0	0	0	0.06
2001	246	23	1548	330.222	-426.04	D	8.314	8.278	0.036	4.83	98.98	0.92	0	0	0	0.09
2001	247	23	2758	335.862	-424.454	D	7.17	7.147	0.023	2.36	99.56	0.31	0	0	0	0.14
2001	248	23	2781	339.842	-425.379	D	7.541	7.518	0.023	3.139	98.93	0.98	0	0	0	0.09
2001	249	23	2781	339.842	-425.379	D	7.489	7.486	0.004	3.07	99.26	0.61	0	0	0	0.11
2001	250	23	1	318.65	-445.782	D	8.117	8.117	0	4.462	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	9.202	9.202	0	7.068	0	0	0	0	0	0
2001	252	23	1	318.65	-445.782	D	9.34	9.34	0	7.421	0	0	0	0	0	0
2001	253	23	1	318.65	-445.782	D	6.988	6.988	0	2.034	0	0	0	0	0	0
2001	254	23	2552	324.659	-442.591	D	6.839	6.799	0.04	1.653	94.67	4.92	0	0	0	0.41
2001	255	23	2789	340.496	-426.449	D	7.015	6.859	0.156	1.774	96.49	3.19	0	0	0	0.32
2001	256	23	2789	340.496	-426.449	D	7.295	7.006	0.288	2.071	98.08	1.71	0	0	0	0.21
2001	257	23	2781	339.842	-425.379	D	8.014	7.473	**0.541**	3.044	93.12	6.75	0	0	0	0.13
2001	258	23	2588	318.452	-445.8	D	6.964	6.96	0.004	1.977	99.66	0.19	0	0	0	0.16
2001	259	23	1	318.65	-445.782	D	6.742	6.742	0	1.541	0	0	0	0	0	0
2001	260	23	1	318.65	-445.782	D	7.078	7.078	0	2.217	0	0	0	0	0	0
2001	261	23	1	318.65	-445.782	D	9.081	9.081	0	6.764	0	0	0	0	0	0
2001	262	23	1	318.65	-445.782	D	8.586	8.586	0	5.554	0	0	0	0	0	0
2001	263	23	1	318.65	-445.782	D	6.893	6.893	0	1.841	0	0	0	0	0	0
2001	264	23	1	318.65	-445.782	D	7.236	7.236	0	2.544	0	0	0	0	0	0
2001	265	23	1	318.65	-445.782	D	7.163	7.163	0	2.391	0	0	0	0	0	0
2001	266	23	1	318.65	-445.782	D	7.936	7.936	0	4.053	0	0	0	0	0	0
2001	267	23	1	318.65	-445.782	D	8.604	8.604	0	5.597	0	0	0	0	0	0
2001	268	23	2789	340.496	-426.449	D	6.694	6.665	0.029	1.387	54.26	44.33	0	0	0	1.42
2001	269	23	2571	322.646	-445.476	D	6.549	6.543	0.006	1.15	88	11.05	0	0	0	0.94
2001	270	23	1	318.65	-445.782	D	6.643	6.643	0	1.344	0	0	0	0	0	0
2001	271	23	2781	339.842	-425.379	D	6.78	6.721	0.06	1.498	95.85	3.3	0	0	0	0.84
2001	272	23	2588	318.452	-445.8	D	7.116	7.084	0.033	2.229	96.77	2.83	0	0	0	0.4
2001	273	23	1	318.65	-445.782	D	7.066	7.066	0	2.193	0	0	0	0	0	0
2001	274	23	1	318.65	-445.782	D	7.111	7.111	0	2.285	0	0	0	0	0	0
2001	275	23	1	318.65	-445.782	D	6.85	6.85	0	1.755	0	0	0	0	0	0
2001	276	23	1	318.65	-445.782	D	7.64	7.64	0	3.401	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	8.468	8.468	0	5.274	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	278	23	2781	339.842	-425.379	D	10.711	9.656	**1.056**	8.246	62.21	37.74	0	0	0	0.04
2001	279	23	2563	323.259	-443.79	D	7.156	7.153	0.002	2.373	78.34	21.66	0	0	0	0.02
2001	280	23	2789	340.496	-426.449	D	6.557	6.557	0	1.177	94.17	4.49	0	0	0	0.85
2001	281	23	2789	340.496	-426.449	D	6.618	6.613	0.005	1.286	83.59	15.92	0	0	0	0.49
2001	282	23	1	318.65	-445.782	D	7.968	7.968	0	4.125	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	284	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	285	23	1	318.65	-445.782	D	9.798	9.798	0	8.625	0	0	0	0	0	0
2001	286	23	1	318.65	-445.782	D	10.019	10.019	0	9.227	0	0	0	0	0	0
2001	287	23	1	318.65	-445.782	D	7.49	7.49	0	3.08	0	0	0	0	0	0
2001	288	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2001	289	23	1	318.65	-445.782	D	7.071	7.071	0	2.203	0	0	0	0	0	0
2001	290	23	1	318.65	-445.782	D	6.486	6.486	0	1.04	0	0	0	0	0	0
2001	291	23	1	318.65	-445.782	D	6.566	6.566	0	1.195	0	0	0	0	0	0
2001	292	23	1	318.65	-445.782	D	6.799	6.799	0	1.653	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	8.641	8.641	0	5.686	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	9.362	9.362	0	7.476	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	9.29	9.29	0	7.294	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2001	297	23	1	318.65	-445.782	D	9.624	9.624	0	8.162	0	0	0	0	0	0
2001	298	23	1	318.65	-445.782	D	6.508	6.508	0	1.081	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	6.475	6.475	0	1.018	0	0	0	0	0	0
2001	300	23	1	318.65	-445.782	D	6.471	6.471	0	1.011	0	0	0	0	0	0
2001	301	23	2789	340.496	-426.449	D	6.479	6.477	0.002	1.021	80.25	19.01	0	0	0	0.78
2001	302	23	2781	339.842	-425.379	D	6.5	6.5	0.001	1.066	85.22	14.22	0	0	0	0.49
2001	303	23	1	318.65	-445.782	D	6.572	6.572	0	1.207	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	6.695	6.695	0	1.447	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	9.032	9.032	0	6.64	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	9.835	9.835	0	8.726	0	0	0	0	0	0
2001	307	23	2781	339.842	-425.379	D	9.917	9.675	0.242	8.296	79.26	20.67	0	0	0	0.08
2001	308	23	2623	320.666	-438.044	D	7.001	6.95	0.051	1.957	94.01	5.82	0	0	0	0.17
2001	309	23	2783	339.861	-425.806	D	8.469	8.368	0.1	5.041	90.01	9.87	0	0	0	0.13
2001	310	23	2256	335.931	-425.789	D	8.11	7.919	0.191	4.016	79.13	20.7	0	0	0	0.16
2001	311	23	2758	335.862	-424.454	D	7.214	7.173	0.041	2.413	89.35	10.42	0	0	0	0.23
2001	312	23	2789	340.496	-426.449	D	7.269	7.268	0.001	2.612	96.74	3.14	0	0	0	0.16
2001	313	23	1	318.65	-445.782	D	6.615	6.615	0	1.289	0	0	0	0	0	0
2001	314	23	1	318.65	-445.782	D	6.786	6.786	0	1.628	0	0	0	0	0	0
2001	315	23	2781	339.842	-425.379	D	6.799	6.797	0.002	1.649	86.4	11.81	0	0	0	1.79
2001	316	23	2588	318.452	-445.8	D	6.649	6.627	0.022	1.314	68.03	31.14	0	0	0	0.83

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	317	23	1	318.65	-445.782	D	6.716	6.716	0	1.489	0	0	0	0	0	0
2001	318	23	1	318.65	-445.782	D	7.492	7.492	0	3.083	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	8.023	8.023	0	4.249	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.729	7.729	0	3.597	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.103	7.103	0	2.268	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	8.032	8.032	0	4.27	0	0	0	0	0	0
2001	323	23	1	318.65	-445.782	D	8.728	8.728	0	5.896	0	0	0	0	0	0
2001	324	23	1	318.65	-445.782	D	6.474	6.474	0	1.016	0	0	0	0	0	0
2001	325	23	1	318.65	-445.782	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	326	23	1	318.65	-445.782	D	6.548	6.548	0	1.159	0	0	0	0	0	0
2001	327	23	1	318.65	-445.782	D	8.475	8.475	0	5.291	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	8.774	8.774	0	6.006	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	6.66	6.66	0	1.377	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.063	7.063	0	2.186	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.026	7.026	0	2.111	0	0	0	0	0	0
2001	332	23	2789	340.496	-426.449	D	9.361	9.227	0.135	7.131	56.61	43.34	0	0	0	0.04
2001	333	23	2789	340.496	-426.449	D	12.923	10.218	**2.705**	9.779	47.33	52.6	0	0	0	0.07
2001	334	23	2789	340.496	-426.449	D	8.541	8.348	0.193	4.993	64.72	35.23	0	0	0	0.05
2001	335	23	1	318.65	-445.782	D	6.625	6.625	0	1.31	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	6.688	6.688	0	1.434	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	6.971	6.971	0	1.999	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.231	7.231	0	2.534	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	9.653	9.653	0	8.239	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	9.943	9.943	0	9.018	0	0	0	0	0	0
2001	341	23	1	318.65	-445.782	D	7.912	7.912	0	4	0	0	0	0	0	0
2001	342	23	2704	329.056	-425.092	D	8.647	8.445	0.202	5.22	48.45	51.36	0	0	0	0.19
2001	343	23	1893	333.346	-434.896	D	6.597	6.597	0	1.254	42.19	4.25	0	0	0	0.13
2001	344	23	2789	340.496	-426.449	D	6.517	6.513	0.003	1.092	38.09	61.27	0	0	0	0.62
2001	345	23	2789	340.496	-426.449	D	6.58	6.574	0.007	1.209	59.57	39.91	0	0	0	0.51
2001	346	23	2040	333.912	-425.128	D	9.729	9.729	0	8.441	66.82	29.87	0	0	0	0.32
2001	347	23	1	318.65	-445.782	D	9.808	9.808	0	8.653	0	0	0	0	0	0
2001	348	23	1	318.65	-445.782	D	9.503	9.503	0	7.842	0	0	0	0	0	0
2001	349	23	1	318.65	-445.782	D	9.319	9.319	0	7.367	0	0	0	0	0	0
2001	350	23	2789	340.496	-426.449	D	10.219	10.218	0.001	9.779	74.59	25.33	0	0	0	0.03
2001	351	23	1	318.65	-445.782	D	9.487	9.487	0	7.801	0	0	0	0	0	0
2001	352	23	1	318.65	-445.782	D	6.544	6.544	0	1.152	0	0	0	0	0	0
2001	353	23	1	318.65	-445.782	D	6.815	6.815	0	1.686	0	0	0	0	0	0
2001	354	23	1	318.65	-445.782	D	6.471	6.471	0	1.009	0	0	0	0	0	0
2001	355	23	1	318.65	-445.782	D	6.487	6.487	0	1.042	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	356	23	1	318.65	-445.782	D	8.259	8.259	0	4.788	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	6.641	6.641	0	1.34	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	6.479	6.479	0	1.026	0	0	0	0	0	0
2001	359	23	1	318.65	-445.782	D	6.512	6.512	0	1.089	0	0	0	0	0	0
2001	360	23	1	318.65	-445.782	D	6.537	6.537	0	1.138	0	0	0	0	0	0
2001	361	23	1	318.65	-445.782	D	6.605	6.605	0	1.269	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2001	363	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2001	364	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2001	365	23	1	318.65	-445.782	D	6.619	6.619	0	1.298	0	0	0	0	0	0
									2.705							

Appendix M
Upper Buffalo
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EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	2758	335.862	-424.454	D	6.907	6.88	0.027	1.816	0	0	0	0	0	99.99
2002	2	23	2758	335.862	-424.454	D	7.034	6.887	0.147	1.83	0	0	0	0	0	100
2002	3	23	2308	337.055	-428.737	D	7.311	7.288	0.023	2.652	0	0	0	0	0	100
2002	4	23	2276	336.157	-425.28	D	6.807	6.807	0	1.668	0	0	0	0	0	99.41
2002	5	23	1	318.65	-445.782	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2002	6	23	2789	340.496	-426.449	D	9.612	9.605	0.007	8.11	0	0	0	0	0	99.96
2002	7	23	2789	340.496	-426.449	D	7.933	7.93	0.004	4.04	0	0	0	0	0	100.03
2002	8	23	2784	339.87	-426.019	D	6.874	6.874	0	1.804	0	0	0	0	0	99.66
2002	9	23	1	318.65	-445.782	D	6.877	6.877	0	1.81	0	0	0	0	0	0
2002	10	23	2640	322.263	-435.121	D	9.417	9.398	0.019	7.57	0	0	0	0	0	100
2002	11	23	2758	335.862	-424.454	D	7.362	7.313	0.05	2.704	0	0	0	0	0	100
2002	12	23	2757	335.63	-424.484	D	6.775	6.775	0.001	1.605	0	0	0	0	0	99.83
2002	13	23	620	323.632	-434.572	D	7.019	7.019	0.001	2.096	0	0	0	0	0	99.68
2002	14	23	1	318.65	-445.782	D	6.95	6.95	0	1.957	0	0	0	0	0	0
2002	15	23	2651	323.652	-433.662	D	6.625	6.62	0.005	1.299	0	0	0	0	0	99.99
2002	16	23	2408	339.168	-425.897	D	6.589	6.589	0	1.239	0	0	0	0	0	99.44
2002	17	23	2758	335.862	-424.454	D	6.973	6.936	0.037	1.928	0	0	0	0	0	100
2002	18	23	2670	326.374	-430.197	D	8.743	8.736	0.007	5.914	0	0	0	0	0	99.98
2002	19	23	2684	326.713	-427.014	D	8.979	8.971	0.009	6.489	0	0	0	0	0	100
2002	20	23	2789	340.496	-426.449	D	8.863	8.858	0.005	6.211	0	0	0	0	0	99.97
2002	21	23	2154	334.894	-424.836	D	7.264	7.264	0	2.602	0	0	0	0	0	47.36
2002	22	23	1	318.65	-445.782	D	7.001	7.001	0	2.059	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	9.862	9.862	0	8.798	0	0	0	0	0	0
2002	24	23	2789	340.496	-426.449	D	9.429	9.407	0.022	7.593	0	0	0	0	0	99.99
2002	25	23	2588	318.452	-445.8	D	6.855	6.855	0	1.765	0	0	0	0	0	100.2
2002	26	23	2334	337.183	-425.984	D	6.694	6.694	0	1.445	0	0	0	0	0	69.12
2002	27	23	1	318.65	-445.782	D	6.657	6.657	0	1.373	0	0	0	0	0	0
2002	28	23	1	318.65	-445.782	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2002	29	23	1047	326.802	-427.438	D	9.816	9.816	0	8.675	0	0	0	0	0	76.35
2002	30	23	2758	335.862	-424.454	D	10.234	10.218	0.016	9.779	0	0	0	0	0	99.98
2002	31	23	2694	327.861	-425.964	D	10.177	10.155	0.022	9.603	0	0	0	0	0	99.98
2002	32	23	489	322.661	-435.114	D	7.51	7.51	0	3.122	0	0	0	0	0	99.9
2002	33	23	2758	335.862	-424.454	D	7.104	7.084	0.02	2.23	0	0	0	0	0	100.01
2002	34	23	2789	340.496	-426.449	D	6.818	6.817	0.001	1.688	0	0	0	0	0	100.08
2002	35	23	2705	329.287	-425.069	D	6.95	6.926	0.024	1.908	0	0	0	0	0	100
2002	36	23	2789	340.496	-426.449	D	6.783	6.778	0.005	1.611	0	0	0	0	0	99.98
2002	37	23	2627	320.879	-437.207	D	9.611	9.611	0	8.127	0	0	0	0	0	99.69
2002	38	23	2758	335.862	-424.454	D	9.428	9.415	0.013	7.614	0	0	0	0	0	99.98

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	39	23	2468	334.002	-434.887	D	7.724	7.724	0	3.585	0	0	0	0	0	99.37
2002	40	23	2408	339.168	-425.897	D	9.315	9.315	0	7.357	0	0	0	0	0	95.83
2002	41	23	2653	324.014	-433.36	D	8.091	8.09	0.001	4.401	0	0	0	0	0	99.98
2002	42	23	2435	337.211	-428.786	D	7.582	7.575	0.007	3.262	0	0	0	0	0	100.01
2002	43	23	2711	330.671	-424.932	D	6.625	6.614	0.011	1.288	0	0	0	0	0	100.01
2002	44	23	2628	320.933	-436.998	D	6.744	6.706	0.038	1.47	0	0	0	0	0	100
2002	45	23	2789	340.496	-426.449	D	6.59	6.586	0.004	1.234	0	0	0	0	0	99.99
2002	46	23	2155	334.883	-424.586	D	7	7	0	2.058	0	0	0	0	0	98.48
2002	47	23	2758	335.862	-424.454	D	6.669	6.668	0	1.394	0	0	0	0	0	99.85
2002	48	23	2711	330.671	-424.932	D	6.613	6.562	0.051	1.187	0	0	0	0	0	100
2002	49	23	2789	340.496	-426.449	D	6.622	6.621	0.001	1.302	0	0	0	0	0	99.91
2002	50	23	1	318.65	-445.782	D	8.708	8.708	0	5.847	0	0	0	0	0	0
2002	51	23	2781	339.842	-425.379	D	8.985	8.985	0	6.523	0	0	0	0	0	15.46
2002	52	23	2588	318.452	-445.8	D	6.913	6.911	0.002	1.879	0	0	0	0	0	99.96
2002	53	23	2757	335.63	-424.484	D	6.866	6.813	0.054	1.68	0	0	0	0	0	100
2002	54	23	2789	340.496	-426.449	D	6.695	6.687	0.008	1.432	0	0	0	0	0	100
2002	55	23	2788	340.294	-426.448	D	6.794	6.794	0	1.643	0	0	0	0	0	100.06
2002	56	23	2781	339.842	-425.379	D	8.119	8.076	0.043	4.37	0	0	0	0	0	100
2002	57	23	2628	320.933	-436.998	D	7.609	7.608	0.001	3.333	0	0	0	0	0	99.98
2002	58	23	2781	339.842	-425.379	D	6.702	6.702	0	1.46	0	0	0	0	0	99.08
2002	59	23	2781	339.842	-425.379	D	6.506	6.506	0	1.078	0	0	0	0	0	79.53
2002	60	23	1	318.65	-445.782	D	7.98	7.98	0	4.153	0	0	0	0	0	0
2002	61	23	2684	326.713	-427.014	D	9.744	9.734	0.01	8.453	0	0	0	0	0	99.99
2002	62	23	2684	326.713	-427.014	D	7.318	7.315	0.003	2.709	0	0	0	0	0	100
2002	63	23	2781	339.842	-425.379	D	7.146	7.146	0	2.357	0	0	0	0	0	99.38
2002	64	23	1	318.65	-445.782	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.141	7.141	0	2.346	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	9.603	9.603	0	8.106	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	68	23	2322	336.902	-425.247	D	8.807	8.807	0	6.087	0	0	0	0	0	96.7
2002	69	23	2708	329.979	-425	D	6.806	6.802	0.004	1.658	0	0	0	0	0	99.98
2002	70	23	2781	339.842	-425.379	D	7.351	7.35	0.001	2.783	0	0	0	0	0	99.97
2002	71	23	2711	330.671	-424.932	D	9.41	9.36	0.05	7.473	0	0	0	0	0	100
2002	72	23	2789	340.496	-426.449	D	6.873	6.862	0.012	1.779	0	0	0	0	0	100
2002	73	23	2789	340.496	-426.449	D	7.979	7.979	0	4.15	0	0	0	0	0	100.06
2002	74	23	2694	327.861	-425.964	D	10.109	10.083	0.026	9.403	0	0	0	0	0	99.99
2002	75	23	2758	335.862	-424.454	D	8.059	7.996	0.063	4.188	0	0	0	0	0	100
2002	76	23	2628	320.933	-436.998	D	8.384	8.381	0.004	5.07	0	0	0	0	0	99.94
2002	77	23	2757	335.63	-424.484	D	9.442	9.442	0	7.684	0	0	0	0	0	99.44

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	78	23	2789	340.496	-426.449	D	10.224	10.218	0.007	9.779	0	0	0	0	0	99.97
2002	79	23	2694	327.861	-425.964	D	9.49	9.428	0.062	7.648	0	0	0	0	0	100
2002	80	23	2758	335.862	-424.454	D	8.363	8.344	0.019	4.984	0	0	0	0	0	100
2002	81	23	2789	340.496	-426.449	D	6.605	6.53	0.075	1.125	0	0	0	0	0	100
2002	82	23	2789	340.496	-426.449	D	6.841	6.837	0.003	1.73	0	0	0	0	0	100.02
2002	83	23	1	318.65	-445.782	D	8.743	8.743	0	5.932	0	0	0	0	0	0
2002	84	23	2628	320.933	-436.998	D	10.226	10.218	0.008	9.779	0	0	0	0	0	99.96
2002	85	23	2789	340.496	-426.449	D	8.641	8.61	0.031	5.612	0	0	0	0	0	99.99
2002	86	23	2789	340.496	-426.449	D	7.869	7.862	0.007	3.89	0	0	0	0	0	99.96
2002	87	23	1415	329.185	-425.086	D	7.269	7.268	0.001	2.611	0	0	0	0	0	99.94
2002	88	23	2781	339.842	-425.379	D	8.663	8.66	0.004	5.731	0	0	0	0	0	99.97
2002	89	23	2694	327.861	-425.964	D	7.661	7.652	0.009	3.429	0	0	0	0	0	100.01
2002	90	23	2715	330.782	-425.876	D	8.338	8.333	0.005	4.958	0	0	0	0	0	99.98
2002	91	23	2758	335.862	-424.454	D	6.727	6.722	0.005	1.501	0	0	0	0	0	99.98
2002	92	23	2710	330.44	-424.955	D	7.647	7.635	0.011	3.393	0	0	0	0	0	99.98
2002	93	23	2710	330.44	-424.955	D	6.741	6.681	0.06	1.42	0	0	0	0	0	100
2002	94	23	2684	326.713	-427.014	D	6.641	6.633	0.008	1.326	0	0	0	0	0	99.99
2002	95	23	2781	339.842	-425.379	D	6.567	6.555	0.012	1.172	0	0	0	0	0	100
2002	96	23	68	320.129	-445.468	D	6.571	6.566	0.005	1.195	0	0	0	0	0	99.95
2002	97	23	2780	339.614	-425.419	D	8.244	8.244	0	4.753	0	0	0	0	0	100.08
2002	98	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	99	23	2758	335.862	-424.454	D	9.187	9.164	0.023	6.972	0	0	0	0	0	100
2002	100	23	2758	335.862	-424.454	D	7.526	7.522	0.004	3.149	0	0	0	0	0	100.01
2002	101	23	1041	326.867	-428.934	D	6.942	6.942	0	1.941	0	0	0	0	0	96.54
2002	102	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	103	23	2752	334.471	-424.635	D	9.389	9.389	0	7.547	0	0	0	0	0	98.23
2002	104	23	1415	329.185	-425.086	D	9.135	9.135	0	6.898	0	0	0	0	0	99.02
2002	105	23	1	318.65	-445.782	D	8.516	8.516	0	5.389	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.596	7.596	0	3.307	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	8.247	8.247	0	4.758	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	8.641	8.641	0	5.687	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.663	7.663	0	3.453	0	0	0	0	0	0
2002	110	23	2235	335.628	-424.554	D	9.49	9.49	0	7.809	0	0	0	0	0	87.5
2002	111	23	2038	333.934	-425.627	D	8.353	8.353	0	5.006	0	0	0	0	0	77.69
2002	112	23	2758	335.862	-424.454	D	6.911	6.875	0.036	1.806	0	0	0	0	0	100
2002	113	23	2684	326.713	-427.014	D	7.275	7.274	0.001	2.624	0	0	0	0	0	99.96
2002	114	23	2416	339.665	-425.875	D	8.838	8.838	0	6.163	0	0	0	0	0	99.18
2002	115	23	2758	335.862	-424.454	D	6.789	6.768	0.021	1.591	0	0	0	0	0	100
2002	116	23	375	322.611	-445.359	D	7.834	7.832	0.002	3.822	0	0	0	0	0	99.97

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	117	23	2780	339.614	-425.419	D	9.091	9.091	0	6.789	0	0	0	0	0	99.46
2002	118	23	2709	330.21	-424.978	D	8.554	8.553	0.001	5.475	0	0	0	0	0	100.02
2002	119	23	2704	329.056	-425.092	D	6.79	6.78	0.01	1.615	0	0	0	0	0	99.99
2002	120	23	2627	320.879	-437.207	D	7.87	7.869	0.001	3.905	0	0	0	0	0	99.74
2002	121	23	199	320.795	-437.944	D	9.301	9.301	0	7.322	0	0	0	0	0	30.06
2002	122	23	2684	326.713	-427.014	D	8.8	8.782	0.018	6.026	0	0	0	0	0	100
2002	123	23	2589	318.383	-445.593	D	7.246	7.228	0.018	2.527	0	0	0	0	0	99.99
2002	124	23	2762	336.074	-425.006	D	8.683	8.675	0.008	5.766	0	0	0	0	0	99.97
2002	125	23	2704	329.056	-425.092	D	8.428	8.424	0.004	5.171	0	0	0	0	0	99.99
2002	126	23	2397	338.413	-425.68	D	8.4	8.4	0	5.114	0	0	0	0	0	99.6
2002	127	23	1	318.65	-445.782	D	8.423	8.423	0	5.168	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	129	23	2789	340.496	-426.449	D	8.369	8.355	0.014	5.01	0	0	0	0	0	99.99
2002	130	23	2758	335.862	-424.454	D	6.896	6.886	0.01	1.827	0	0	0	0	0	100
2002	131	23	2781	339.842	-425.379	D	8.308	8.307	0.001	4.899	0	0	0	0	0	99.83
2002	132	23	1510	330.006	-426.798	D	9.441	9.441	0	7.683	0	0	0	0	0	39.17
2002	133	23	2789	340.496	-426.449	D	8.588	8.578	0.01	5.534	0	0	0	0	0	100
2002	134	23	2725	331.984	-427.096	D	6.758	6.758	0	1.571	0	0	0	0	0	99.66
2002	135	23	2789	340.496	-426.449	D	6.815	6.815	0	1.685	0	0	0	0	0	99.28
2002	136	23	1	318.65	-445.782	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	137	23	2684	326.713	-427.014	D	10.146	10.13	0.016	9.534	0	0	0	0	0	99.99
2002	138	23	2589	318.383	-445.593	D	7.966	7.964	0.002	4.116	0	0	0	0	0	99.96
2002	139	23	2781	339.842	-425.379	D	6.859	6.858	0.001	1.77	0	0	0	0	0	100.06
2002	140	23	2758	335.862	-424.454	D	6.923	6.896	0.027	1.848	0	0	0	0	0	100
2002	141	23	2704	329.056	-425.092	D	6.73	6.718	0.012	1.493	0	0	0	0	0	100
2002	142	23	2781	339.842	-425.379	D	6.709	6.708	0.001	1.473	0	0	0	0	0	99.9
2002	143	23	2274	336.179	-425.778	D	6.756	6.756	0	1.568	0	0	0	0	0	92.82
2002	144	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2002	145	23	1552	330.178	-425.042	D	8.304	8.303	0	4.889	0	0	0	0	0	99.58
2002	146	23	2781	339.842	-425.379	D	8.451	8.451	0	5.234	0	0	0	0	0	98.89
2002	147	23	2273	336.19	-426.028	D	8.977	8.977	0	6.505	0	0	0	0	0	83.52
2002	148	23	1	318.65	-445.782	D	8.901	8.901	0	6.317	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	9.28	9.28	0	7.267	0	0	0	0	0	0
2002	150	23	2074	334.15	-424.868	D	8.627	8.627	0	5.652	0	0	0	0	0	81.83
2002	151	23	2417	339.654	-425.626	D	7.13	7.129	0	2.323	0	0	0	0	0	99.27
2002	152	23	2274	336.179	-425.778	D	7.743	7.743	0	3.626	0	0	0	0	0	90.23
2002	153	23	1	318.65	-445.782	D	8.029	8.029	0	4.264	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.439	7.439	0	2.97	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.015	7.015	0	2.089	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	156	23	2781	339.842	-425.379	D	9.018	9.012	0.005	6.593	0	0	0	0	0	99.97
2002	157	23	2611	319.699	-440.64	D	8.766	8.761	0.005	5.975	0	0	0	0	0	99.96
2002	158	23	2571	322.646	-445.476	D	6.911	6.909	0.002	1.875	0	0	0	0	0	99.95
2002	159	23	2571	322.646	-445.476	D	6.905	6.894	0.01	1.844	0	0	0	0	0	100
2002	160	23	2758	335.862	-424.454	D	7.594	7.593	0.001	3.302	0	0	0	0	0	100.09
2002	161	23	1	318.65	-445.782	D	9.508	9.508	0	7.855	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	8.531	8.531	0	5.424	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	8.238	8.238	0	4.74	0	0	0	0	0	0
2002	164	23	2781	339.842	-425.379	D	8.09	8.09	0	4.4	0	0	0	0	0	99.97
2002	165	23	2684	326.713	-427.014	D	7.499	7.463	0.036	3.021	0	0	0	0	0	100
2002	166	23	2710	330.44	-424.955	D	6.694	6.692	0.002	1.441	0	0	0	0	0	99.85
2002	167	23	2758	335.862	-424.454	D	6.748	6.74	0.009	1.536	0	0	0	0	0	100
2002	168	23	2704	329.056	-425.092	D	6.754	6.744	0.01	1.543	0	0	0	0	0	99.98
2002	169	23	2468	334.002	-434.887	D	6.713	6.709	0.003	1.476	0	0	0	0	0	100.01
2002	170	23	2781	339.842	-425.379	D	6.886	6.885	0.001	1.825	0	0	0	0	0	100.22
2002	171	23	13	319.06	-443.766	D	7.52	7.52	0	3.145	0	0	0	0	0	48.49
2002	172	23	1	318.65	-445.782	D	8.033	8.033	0	4.272	0	0	0	0	0	0
2002	173	23	2781	339.842	-425.379	D	7.39	7.39	0	2.866	0	0	0	0	0	100.04
2002	174	23	2705	329.287	-425.069	D	7.064	7.062	0.001	2.185	0	0	0	0	0	99.83
2002	175	23	1549	330.211	-425.79	D	7.376	7.376	0	2.838	0	0	0	0	0	35.08
2002	176	23	1	318.65	-445.782	D	8.073	8.073	0	4.363	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	8.808	8.808	0	6.089	0	0	0	0	0	0
2002	178	23	2102	334.398	-424.857	D	8.826	8.826	0	6.132	0	0	0	0	0	93.28
2002	179	23	2417	339.654	-425.626	D	7.806	7.806	0	3.765	0	0	0	0	0	96.12
2002	180	23	2417	339.654	-425.626	D	7.976	7.976	0	4.144	0	0	0	0	0	94.81
2002	181	23	1	318.65	-445.782	D	8.264	8.264	0	4.798	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	6.882	6.882	0	1.82	0	0	0	0	0	0
2002	183	23	2789	340.496	-426.449	D	6.933	6.933	0.001	1.922	0	0	0	0	0	99.72
2002	184	23	2789	340.496	-426.449	D	8.857	8.857	0	6.208	0	0	0	0	0	99.47
2002	185	23	2789	340.496	-426.449	D	7.311	7.309	0.001	2.697	0	0	0	0	0	100.08
2002	186	23	2789	340.496	-426.449	D	8.178	8.174	0.004	4.592	0	0	0	0	0	99.95
2002	187	23	2781	339.842	-425.379	D	7.403	7.4	0.003	2.889	0	0	0	0	0	99.98
2002	188	23	2571	322.646	-445.476	D	7.852	7.851	0.001	3.864	0	0	0	0	0	99.96
2002	189	23	2588	318.452	-445.8	D	6.866	6.865	0.001	1.786	0	0	0	0	0	99.74
2002	190	23	2789	340.496	-426.449	D	6.765	6.764	0.001	1.583	0	0	0	0	0	99.73
2002	191	23	2374	338.285	-428.434	D	7.007	7.007	0	2.072	0	0	0	0	0	99.78
2002	192	23	2708	329.979	-425	D	7.551	7.543	0.007	3.193	0	0	0	0	0	99.99
2002	193	23	2704	329.056	-425.092	D	8.546	8.531	0.015	5.423	0	0	0	0	0	99.99
2002	194	23	2694	327.861	-425.964	D	9.332	9.318	0.014	7.364	0	0	0	0	0	100

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	195	23	2758	335.862	-424.454	D	8.941	8.934	0.007	6.398	0	0	0	0	0	99.98
2002	196	23	2684	326.713	-427.014	D	7.894	7.884	0.01	3.938	0	0	0	0	0	99.99
2002	197	23	1415	329.185	-425.086	D	7.341	7.339	0.002	2.76	0	0	0	0	0	99.89
2002	198	23	2413	339.406	-425.637	D	9.241	9.241	0	7.167	0	0	0	0	0	99.27
2002	199	23	2274	336.179	-425.778	D	8.779	8.779	0	6.018	0	0	0	0	0	93.57
2002	200	23	1	318.65	-445.782	D	9.09	9.09	0	6.785	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.7	7.7	0	3.533	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.159	7.159	0	2.385	0	0	0	0	0	0
2002	204	23	2781	339.842	-425.379	D	7.119	7.117	0.002	2.298	0	0	0	0	0	99.99
2002	205	23	2628	320.933	-436.998	D	7.42	7.411	0.009	2.912	0	0	0	0	0	99.99
2002	206	23	2789	340.496	-426.449	D	7.23	7.225	0.005	2.521	0	0	0	0	0	100.01
2002	207	23	2789	340.496	-426.449	D	7.072	7.07	0.002	2.202	0	0	0	0	0	100.06
2002	208	23	2277	336.146	-425.03	D	7.866	7.866	0	3.898	0	0	0	0	0	91.8
2002	209	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.824	7.824	0	3.806	0	0	0	0	0	0
2002	211	23	1549	330.211	-425.79	D	8.349	8.349	0	4.996	0	0	0	0	0	38.66
2002	212	23	2781	339.842	-425.379	D	7.161	7.161	0	2.387	0	0	0	0	0	100.35
2002	213	23	2322	336.902	-425.247	D	7.551	7.551	0	3.211	0	0	0	0	0	45.77
2002	214	23	2781	339.842	-425.379	D	7.321	7.317	0.005	2.713	0	0	0	0	0	99.95
2002	215	23	2704	329.056	-425.092	D	8.103	8.093	0.01	4.407	0	0	0	0	0	99.98
2002	216	23	2684	326.713	-427.014	D	7.473	7.471	0.002	3.04	0	0	0	0	0	99.93
2002	217	23	2409	339.158	-425.648	D	7.369	7.368	0	2.822	0	0	0	0	0	100.06
2002	218	23	2684	326.713	-427.014	D	6.818	6.814	0.004	1.683	0	0	0	0	0	99.98
2002	219	23	2588	318.452	-445.8	D	8.605	8.595	0.009	5.577	0	0	0	0	0	99.97
2002	220	23	2694	327.861	-425.964	D	6.915	6.913	0.002	1.882	0	0	0	0	0	99.97
2002	221	23	2789	340.496	-426.449	D	6.739	6.738	0.001	1.532	0	0	0	0	0	99.9
2002	222	23	2781	339.842	-425.379	D	7.005	7.005	0	2.068	0	0	0	0	0	99.95
2002	223	23	1412	329.218	-425.834	D	7.28	7.28	0	2.635	0	0	0	0	0	88.15
2002	224	23	1	318.65	-445.782	D	6.912	6.912	0	1.88	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	8.619	8.619	0	5.634	0	0	0	0	0	0
2002	226	23	2708	329.979	-425	D	9.994	9.992	0.002	9.152	0	0	0	0	0	99.9
2002	227	23	2209	335.38	-424.564	D	8.432	8.432	0	5.189	0	0	0	0	0	98.21
2002	228	23	1	318.65	-445.782	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	8.63	8.63	0	5.658	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	6.941	6.941	0	1.939	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	6.972	6.972	0	2.001	0	0	0	0	0	0

Appendix M
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2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	234	23	1	318.65	-445.782	D	7.651	7.651	0	3.426	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.084	7.084	0	2.23	0	0	0	0	0	0
2002	236	23	2789	340.496	-426.449	D	7.907	7.906	0	3.987	0	0	0	0	0	99.99
2002	237	23	2628	320.933	-436.998	D	8.674	8.661	0.012	5.735	0	0	0	0	0	100
2002	238	23	2589	318.383	-445.593	D	7.886	7.881	0.005	3.932	0	0	0	0	0	99.96
2002	239	23	2789	340.496	-426.449	D	7.008	6.994	0.014	2.046	0	0	0	0	0	100.01
2002	240	23	2758	335.862	-424.454	D	7.737	7.723	0.014	3.583	0	0	0	0	0	99.99
2002	241	23	2694	327.861	-425.964	D	7.186	7.169	0.017	2.406	0	0	0	0	0	99.99
2002	242	23	2704	329.056	-425.092	D	7.153	7.15	0.003	2.366	0	0	0	0	0	100.05
2002	243	23	2789	340.496	-426.449	D	7.408	7.406	0.002	2.901	0	0	0	0	0	100.01
2002	244	23	2182	335.131	-424.575	D	7.143	7.142	0.001	2.348	0	0	0	0	0	99.84
2002	245	23	1381	328.981	-426.094	D	6.924	6.924	0	1.904	0	0	0	0	0	93.3
2002	246	23	1	318.65	-445.782	D	6.972	6.972	0	2.002	0	0	0	0	0	0
2002	247	23	2780	339.614	-425.419	D	6.923	6.923	0	1.902	0	0	0	0	0	99.93
2002	248	23	2781	339.842	-425.379	D	7.288	7.285	0.003	2.646	0	0	0	0	0	99.96
2002	249	23	2789	340.496	-426.449	D	6.792	6.789	0.003	1.633	0	0	0	0	0	99.95
2002	250	23	16	319.027	-443.017	D	6.749	6.748	0.001	1.552	0	0	0	0	0	100.02
2002	251	23	1	318.65	-445.782	D	7.423	7.423	0	2.937	0	0	0	0	0	0
2002	252	23	2373	337.927	-425.951	D	7.256	7.256	0	2.585	0	0	0	0	0	92.72
2002	253	23	2758	335.862	-424.454	D	7.256	7.252	0.004	2.578	0	0	0	0	0	99.94
2002	254	23	2758	335.862	-424.454	D	7.13	7.068	0.062	2.197	0	0	0	0	0	100
2002	255	23	2758	335.862	-424.454	D	7.975	7.955	0.019	4.097	0	0	0	0	0	100
2002	256	23	2640	322.263	-435.121	D	6.691	6.681	0.01	1.42	0	0	0	0	0	100
2002	257	23	2789	340.496	-426.449	D	6.659	6.657	0.002	1.373	0	0	0	0	0	99.94
2002	258	23	2758	335.862	-424.454	D	8.406	8.336	0.07	4.965	0	0	0	0	0	100
2002	259	23	2758	335.862	-424.454	D	8.548	8.457	0.09	5.249	0	0	0	0	0	100
2002	260	23	2758	335.862	-424.454	D	7.72	7.715	0.005	3.566	0	0	0	0	0	99.96
2002	261	23	2405	338.909	-425.659	D	8.419	8.419	0	5.159	0	0	0	0	0	98.51
2002	262	23	1	318.65	-445.782	D	9.39	9.39	0	7.549	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	9.262	9.262	0	7.221	0	0	0	0	0	0
2002	264	23	2789	340.496	-426.449	D	6.795	6.794	0.001	1.644	0	0	0	0	0	100.02
2002	265	23	2758	335.862	-424.454	D	6.819	6.791	0.028	1.638	0	0	0	0	0	100
2002	266	23	2589	318.383	-445.593	D	6.607	6.606	0.001	1.273	0	0	0	0	0	100.12
2002	267	23	2789	340.496	-426.449	D	6.565	6.551	0.014	1.165	0	0	0	0	0	99.99
2002	268	23	2684	326.713	-427.014	D	6.828	6.822	0.006	1.7	0	0	0	0	0	99.97
2002	269	23	2758	335.862	-424.454	D	7.378	7.376	0.001	2.838	0	0	0	0	0	99.9
2002	270	23	2758	335.862	-424.454	D	7.446	7.394	0.052	2.876	0	0	0	0	0	100
2002	271	23	2789	340.496	-426.449	D	6.82	6.811	0.009	1.677	0	0	0	0	0	99.99
2002	272	23	2789	340.496	-426.449	D	7.261	7.251	0.01	2.575	0	0	0	0	0	100

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	273	23	2684	326.713	-427.014	D	7.337	7.337	0.001	2.755	0	0	0	0	0	99.97
2002	274	23	1	318.65	-445.782	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.523	7.523	0	3.151	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	9.147	9.147	0	6.929	0	0	0	0	0	0
2002	278	23	2758	335.862	-424.454	D	7.076	7.05	0.026	2.16	0	0	0	0	0	100
2002	279	23	2789	340.496	-426.449	D	6.809	6.806	0.003	1.667	0	0	0	0	0	100.01
2002	280	23	2711	330.671	-424.932	D	6.836	6.815	0.02	1.686	0	0	0	0	0	100
2002	281	23	2789	340.496	-426.449	D	6.576	6.571	0.005	1.204	0	0	0	0	0	100.02
2002	282	23	2571	322.646	-445.476	D	8.771	8.768	0.002	5.993	0	0	0	0	0	99.88
2002	283	23	2571	322.646	-445.476	D	9.856	9.852	0.004	8.772	0	0	0	0	0	99.98
2002	284	23	2711	330.671	-424.932	D	9.413	9.409	0.004	7.598	0	0	0	0	0	99.91
2002	285	23	2781	339.842	-425.379	D	8.974	8.973	0.001	6.494	0	0	0	0	0	99.92
2002	286	23	2684	326.713	-427.014	D	8.122	8.095	0.027	4.412	0	0	0	0	0	100
2002	287	23	2758	335.862	-424.454	D	6.538	6.526	0.013	1.116	0	0	0	0	0	99.99
2002	288	23	2641	322.503	-435.089	D	6.52	6.507	0.012	1.08	0	0	0	0	0	100.01
2002	289	23	2758	335.862	-424.454	D	6.589	6.554	0.035	1.17	0	0	0	0	0	100
2002	290	23	2571	322.646	-445.476	D	6.982	6.977	0.006	2.01	0	0	0	0	0	100.02
2002	291	23	2789	340.496	-426.449	D	6.63	6.63	0	1.32	0	0	0	0	0	99.45
2002	292	23	2694	327.861	-425.964	D	9.79	9.785	0.005	8.591	0	0	0	0	0	99.96
2002	293	23	2571	322.646	-445.476	D	9.407	9.4	0.007	7.576	0	0	0	0	0	99.99
2002	294	23	2589	318.383	-445.593	D	6.988	6.975	0.013	2.008	0	0	0	0	0	100.01
2002	295	23	2709	330.21	-424.978	D	7.282	7.275	0.007	2.625	0	0	0	0	0	99.99
2002	296	23	2758	335.862	-424.454	D	7.002	6.97	0.032	1.996	0	0	0	0	0	100
2002	297	23	2628	320.933	-436.998	D	6.761	6.758	0.003	1.571	0	0	0	0	0	99.97
2002	298	23	2704	329.056	-425.092	D	9.664	9.657	0.006	8.249	0	0	0	0	0	99.98
2002	299	23	2789	340.496	-426.449	D	9.363	9.336	0.028	7.41	0	0	0	0	0	100
2002	300	23	2709	330.21	-424.978	D	9.196	9.169	0.026	6.986	0	0	0	0	0	99.99
2002	301	23	2704	329.056	-425.092	D	10.227	10.218	0.009	9.779	0	0	0	0	0	99.98
2002	302	23	2789	340.496	-426.449	D	9.885	9.864	0.021	8.805	0	0	0	0	0	99.99
2002	303	23	2589	318.383	-445.593	D	8.941	8.913	0.028	6.348	0	0	0	0	0	100
2002	304	23	2758	335.862	-424.454	D	9.143	9.095	0.048	6.8	0	0	0	0	0	100
2002	305	23	2684	326.713	-427.014	D	8.329	8.186	0.142	4.62	0	0	0	0	0	100
2002	306	23	2711	330.671	-424.932	D	7.877	7.74	0.137	3.621	0	0	0	0	0	100
2002	307	23	2758	335.862	-424.454	D	10.219	10.218	0.001	9.779	0	0	0	0	0	99.67
2002	308	23	2758	335.862	-424.454	D	9.265	9.248	0.017	7.186	0	0	0	0	0	99.99
2002	309	23	2588	318.452	-445.8	D	9.298	9.292	0.006	7.299	0	0	0	0	0	100
2002	310	23	2589	318.383	-445.593	D	8.037	8.034	0.002	4.275	0	0	0	0	0	100.04
2002	311	23	2788	340.294	-426.448	D	6.541	6.541	0	1.146	0	0	0	0	0	83.72

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	312	23	1	318.65	-445.782	D	6.713	6.713	0	1.482	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	9.044	9.044	0	6.672	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	9.307	9.306	0.001	7.334	0	0	0	0	0	99.83
2002	315	23	2758	335.862	-424.454	D	6.811	6.808	0.002	1.672	0	0	0	0	0	100
2002	316	23	2694	327.861	-425.964	D	6.682	6.633	0.05	1.324	0	0	0	0	0	100
2002	317	23	2571	322.646	-445.476	D	6.613	6.613	0	1.285	0	0	0	0	0	100.02
2002	318	23	1	318.65	-445.782	D	7.01	7.01	0	2.079	0	0	0	0	0	0
2002	319	23	2711	330.671	-424.932	D	9.502	9.472	0.03	7.763	0	0	0	0	0	99.99
2002	320	23	2693	327.829	-426.17	D	8.945	8.878	0.067	6.261	0	0	0	0	0	100
2002	321	23	1	318.65	-445.782	D	6.706	6.705	0.001	1.467	0	0	0	0	0	100.15
2002	322	23	1	318.65	-445.782	D	6.826	6.826	0	1.707	0	0	0	0	0	0
2002	323	23	2589	318.383	-445.593	D	6.806	6.805	0.001	1.665	0	0	0	0	0	99.88
2002	324	23	2789	340.496	-426.449	D	6.494	6.493	0	1.053	0	0	0	0	0	100.25
2002	325	23	2628	320.933	-436.998	D	6.607	6.599	0.008	1.259	0	0	0	0	0	99.99
2002	326	23	2435	337.211	-428.786	D	7.048	7.005	0.043	2.068	0	0	0	0	0	100
2002	327	23	2467	334.065	-434.651	D	6.539	6.538	0.001	1.14	0	0	0	0	0	99.78
2002	328	23	1552	330.178	-425.042	D	6.63	6.629	0	1.318	0	0	0	0	0	98.8
2002	329	23	2628	320.933	-436.998	D	7.262	7.24	0.022	2.551	0	0	0	0	0	100
2002	330	23	2611	319.699	-440.64	D	6.652	6.633	0.019	1.326	0	0	0	0	0	100
2002	331	23	2711	330.671	-424.932	D	7.004	6.9	0.104	1.856	0	0	0	0	0	100
2002	332	23	2789	340.496	-426.449	D	6.588	6.586	0.002	1.234	0	0	0	0	0	99.97
2002	333	23	1	318.65	-445.782	D	6.591	6.591	0	1.243	0	0	0	0	0	95.4
2002	334	23	2758	335.862	-424.454	D	6.671	6.67	0.001	1.398	0	0	0	0	0	99.9
2002	335	23	2758	335.862	-424.454	D	6.515	6.504	0.011	1.073	0	0	0	0	0	100.01
2002	336	23	1042	326.856	-428.685	D	6.492	6.491	0	1.05	0	0	0	0	0	98.34
2002	337	23	2758	335.862	-424.454	D	7.1	7.078	0.023	2.217	0	0	0	0	0	100
2002	338	23	2704	329.056	-425.092	D	10.218	10.218	0	9.779	0	0	0	0	0	99.9
2002	339	23	2704	329.056	-425.092	D	8.649	8.615	0.034	5.623	0	0	0	0	0	100
2002	340	23	2789	340.496	-426.449	D	8.897	8.896	0.001	6.304	0	0	0	0	0	100.02
2002	341	23	1	318.65	-445.782	D	7.075	7.075	0	2.211	0	0	0	0	0	0
2002	342	23	2781	339.842	-425.379	D	7.496	7.493	0.003	3.086	0	0	0	0	0	99.98
2002	343	23	2709	330.21	-424.978	D	8.503	8.492	0.011	5.33	0	0	0	0	0	100
2002	344	23	2588	318.452	-445.8	D	6.858	6.855	0.002	1.766	0	0	0	0	0	99.93
2002	345	23	1415	329.185	-425.086	D	8.132	8.131	0.001	4.493	0	0	0	0	0	99.79
2002	346	23	2413	339.406	-425.637	D	7.969	7.969	0	4.127	0	0	0	0	0	99.03
2002	347	23	2684	326.713	-427.014	D	9.467	9.447	0.02	7.697	0	0	0	0	0	99.99
2002	348	23	2588	318.452	-445.8	D	9.196	9.192	0.004	7.043	0	0	0	0	0	99.98
2002	349	23	2274	336.179	-425.778	D	7.071	7.071	0	2.203	0	0	0	0	0	23.56
2002	350	23	1	318.65	-445.782	D	9.107	9.107	0	6.829	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	351	23	1	318.65	-445.782	D	9.67	9.67	0	8.285	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	9.899	9.899	0	8.899	0	0	0	0	0	0
2002	353	23	2758	335.862	-424.454	D	8.106	8.094	0.012	4.41	0	0	0	0	0	99.99
2002	354	23	2789	340.496	-426.449	D	6.781	6.781	0	1.617	0	0	0	0	0	100
2002	355	23	1	318.65	-445.782	D	6.532	6.532	0	1.128	0	0	0	0	0	0
2002	356	23	2694	327.861	-425.964	D	7.006	7.004	0.002	2.066	0	0	0	0	0	99.98
2002	357	23	2758	335.862	-424.454	D	7.502	7.494	0.007	3.089	0	0	0	0	0	99.95
2002	358	23	2704	329.056	-425.092	D	9.769	9.751	0.017	8.5	0	0	0	0	0	100
2002	359	23	2758	335.862	-424.454	D	7.568	7.565	0.003	3.24	0	0	0	0	0	99.96
2002	360	23	2789	340.496	-426.449	D	6.921	6.921	0	1.898	0	0	0	0	0	99.83
2002	361	23	2789	340.496	-426.449	D	6.924	6.923	0.001	1.902	0	0	0	0	0	99.73
2002	362	23	1	318.65	-445.782	D	7.067	7.067	0	2.195	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.04	7.04	0	2.14	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	10.069	10.069	0	9.364	0	0	0	0	0	0
2002	365	23	2684	326.713	-427.014	D	8.807	8.798	0.009	6.065	0	0	0	0	0	100.01
									0.147							
EXIDE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1415	329.185	-425.086	D	6.876	6.876	0	1.807	75.24	13.01	0	0	0	11.68
2002	2	23	2182	335.131	-424.575	D	6.892	6.887	0.005	1.83	85.28	9.36	0	0	0	5.32
2002	3	23	2758	335.862	-424.454	D	7.296	7.293	0.003	2.662	87.24	9.27	0	0	0	3.46
2002	4	23	2789	340.496	-426.449	D	6.81	6.809	0.001	1.673	89.92	6.54	0	0	0	3.38
2002	5	23	1549	330.211	-425.79	D	7.818	7.818	0	3.793	23.41	1.42	0	0	0	0.45
2002	6	23	2628	320.933	-436.998	D	9.615	9.603	0.013	8.106	93.6	5.71	0	0	0	0.68
2002	7	23	2597	318.971	-443.851	D	7.942	7.935	0.008	4.051	91.59	6.7	0	0	0	1.69
2002	8	23	2448	335.908	-431.021	D	6.894	6.894	0	1.844	84.9	11.16	0	0	0	4.23
2002	9	23	1	318.65	-445.782	D	6.877	6.877	0	1.81	0	0	0	0	0	0
2002	10	23	2704	329.056	-425.092	D	9.394	9.393	0.002	7.557	94.7	4.08	0	0	0	1.01
2002	11	23	1449	329.434	-425.075	D	7.304	7.301	0.004	2.679	78.85	15.1	0	0	0	6.03
2002	12	23	2468	334.002	-434.887	D	6.783	6.783	0	1.621	89.05	4.88	0	0	0	5.5
2002	13	23	1	318.65	-445.782	D	7.018	7.018	0	2.094	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	6.95	6.95	0	1.957	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	6.62	6.62	0	1.299	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	17	23	2789	340.496	-426.449	D	6.936	6.933	0.003	1.921	84.74	10.18	0	0	0	5.08
2002	18	23	2588	318.452	-445.8	D	8.764	8.764	0.001	5.982	93.93	5.44	0	0	0	0.68
2002	19	23	2155	334.883	-424.586	D	8.957	8.957	0	6.455	91.4	5.71	0	0	0	1.38
2002	20	23	2781	339.842	-425.379	D	8.883	8.882	0.001	6.27	95.51	3.89	0	0	0	0.45

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	21	23	2401	338.661	-425.669	D	7.26	7.26	0	2.594	92.35	2.57	0	0	0	0.86
2002	22	23	1	318.65	-445.782	D	7.001	7.001	0	2.059	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	9.862	9.862	0	8.798	0	0	0	0	0	0
2002	24	23	2781	339.842	-425.379	D	9.383	9.38	0.003	7.524	94.27	5.35	0	0	0	0.34
2002	25	23	641	324.033	-438.052	D	6.881	6.881	0.001	1.817	84.62	10.72	0	0	0	4.53
2002	26	23	2418	339.946	-426.612	D	6.7	6.699	0	1.456	92.22	3.87	0	0	0	4.04
2002	27	23	2236	336.149	-430.776	D	6.629	6.629	0	1.318	75.72	1.93	0	0	0	3.43
2002	28	23	1	318.65	-445.782	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2002	29	23	2781	339.842	-425.379	D	9.728	9.728	0	8.437	93.28	4.34	0	0	0	0.44
2002	30	23	2758	335.862	-424.454	D	10.246	10.218	0.028	9.779	95.33	4.33	0	0	0	0.33
2002	31	23	2684	326.713	-427.014	D	10.21	10.155	0.056	9.603	96.6	3.15	0	0	0	0.24
2002	32	23	2789	340.496	-426.449	D	7.504	7.502	0.002	3.105	96.67	3.06	0	0	0	0.27
2002	33	23	2787	340.091	-426.447	D	7.088	7.088	0	2.237	93.66	3.6	0	0	0	4.4
2002	34	23	2042	334.499	-432.847	D	6.82	6.819	0	1.694	84.12	3.16	0	0	0	1.7
2002	35	23	13	319.06	-443.766	D	6.909	6.908	0.001	1.873	86.68	9.48	0	0	0	3.79
2002	36	23	1	318.65	-445.782	D	6.828	6.828	0	1.711	0	0	0	0	0	0
2002	37	23	1	318.65	-445.782	D	9.575	9.575	0	8.033	0	0	0	0	0	0
2002	38	23	1	318.65	-445.782	D	9.403	9.403	0	7.583	0	0	0	0	0	0
2002	39	23	1	318.65	-445.782	D	7.981	7.981	0	4.154	0	0	0	0	0	0
2002	40	23	1	318.65	-445.782	D	9.566	9.566	0	8.007	0	0	0	0	0	0
2002	41	23	2781	339.842	-425.379	D	8.076	8.076	0.001	4.368	93.03	4.26	0	0	0	2.57
2002	42	23	2789	340.496	-426.449	D	7.576	7.575	0.001	3.262	94.47	4.52	0	0	0	1.09
2002	43	23	1415	329.185	-425.086	D	6.611	6.611	0	1.283	89.55	4.33	0	0	0	6.18
2002	44	23	2589	318.383	-445.593	D	6.729	6.728	0.001	1.512	85.83	6.93	0	0	0	7.16
2002	45	23	2684	326.713	-427.014	D	6.593	6.593	0	1.247	83.96	8.67	0	0	0	6.97
2002	46	23	1	318.65	-445.782	D	7.064	7.064	0	2.189	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	6.737	6.737	0	1.53	0	0	0	0	0	0
2002	48	23	2779	339.386	-425.461	D	6.563	6.562	0.001	1.185	82.87	6.3	0	0	0	10.71
2002	49	23	1413	329.207	-425.585	D	6.631	6.631	0	1.322	92.28	2.69	0	0	0	4.63
2002	50	23	1	318.65	-445.782	D	8.708	8.708	0	5.847	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	9.05	9.05	0	6.686	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	6.911	6.911	0	1.879	0	0	0	0	0	0
2002	53	23	2788	340.294	-426.448	D	6.81	6.81	0	1.674	84.73	7.61	0	0	0	7.34
2002	54	23	1	318.65	-445.782	D	6.702	6.702	0	1.46	89.96	5.43	0	0	0	4.75
2002	55	23	2788	340.294	-426.448	D	6.794	6.794	0	1.643	94.41	2.61	0	0	0	2.3
2002	56	23	623	324.229	-442.54	D	8.214	8.212	0.002	4.679	91.74	7.63	0	0	0	0.6
2002	57	23	13	319.06	-443.766	D	7.602	7.601	0.001	3.318	85.57	11.87	0	0	0	2.59
2002	58	23	1	318.65	-445.782	D	6.708	6.708	0	1.472	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	6.508	6.508	0	1.082	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	60	23	1	318.65	-445.782	D	7.98	7.98	0	4.153	0	0	0	0	0	0
2002	61	23	2589	318.383	-445.593	D	9.728	9.718	0.01	8.411	92.04	7.04	0	0	0	0.92
2002	62	23	2781	339.842	-425.379	D	7.315	7.313	0.002	2.704	94.85	4.19	0	0	0	1
2002	63	23	1	318.65	-445.782	D	7.154	7.154	0	2.374	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.141	7.141	0	2.346	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	9.603	9.603	0	8.106	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	8.845	8.845	0	6.18	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	6.753	6.753	0	1.563	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.416	7.416	0	2.922	0	0	0	0	0	0
2002	71	23	1	318.65	-445.782	D	9.328	9.328	0	7.39	0	0	0	0	0	0
2002	72	23	2277	336.146	-425.03	D	6.863	6.863	0	1.782	90.61	3.63	0	0	0	3.38
2002	73	23	1	318.65	-445.782	D	7.929	7.929	0	4.037	0	0	0	0	0	0
2002	74	23	2704	329.056	-425.092	D	10.086	10.083	0.003	9.403	93.06	6.3	0	0	0	0.63
2002	75	23	37	319.567	-443.993	D	7.976	7.973	0.003	4.136	94.47	4.94	0	0	0	0.54
2002	76	23	2588	318.452	-445.8	D	8.42	8.42	0.001	5.161	97.06	2.29	0	0	0	0.49
2002	77	23	2789	340.496	-426.449	D	9.467	9.466	0.001	7.748	97.35	1.81	0	0	0	0.29
2002	78	23	2040	333.912	-425.128	D	10.218	10.218	0	9.779	96.71	1.68	0	0	0	0.11
2002	79	23	2588	318.452	-445.8	D	9.393	9.393	0	7.557	95.04	1.55	0	0	0	0.1
2002	80	23	2277	336.146	-425.03	D	8.344	8.342	0.002	4.98	91.53	6.27	0	0	0	2.17
2002	81	23	1048	326.791	-427.189	D	6.534	6.533	0	1.131	78.99	8.88	0	0	0	10.05
2002	82	23	2696	328.288	-426.085	D	6.869	6.868	0.001	1.791	91	6.79	0	0	0	2.15
2002	83	23	2416	339.665	-425.875	D	8.617	8.617	0	5.628	90.87	1.74	0	0	0	0.78
2002	84	23	1415	329.185	-425.086	D	10.218	10.218	0	9.779	96.44	2.44	0	0	0	0.09
2002	85	23	1483	329.682	-425.064	D	8.642	8.641	0.001	5.686	97.53	2.16	0	0	0	0.09
2002	86	23	1449	329.434	-425.075	D	7.921	7.921	0	4.021	91.83	5.64	0	0	0	0.68
2002	87	23	1	318.65	-445.782	D	7.251	7.251	0	2.576	0	0	0	0	0	0
2002	88	23	2683	326.705	-427.245	D	8.74	8.74	0	5.924	96.29	0.36	0	0	0	2.09
2002	89	23	1	318.65	-445.782	D	7.67	7.669	0	3.466	98.27	0.69	0	0	0	1.02
2002	90	23	1549	330.211	-425.79	D	8.333	8.333	0	4.958	69.93	0.24	0	0	0	5.17
2002	91	23	1552	330.178	-425.042	D	6.722	6.722	0	1.501	94.24	1.72	0	0	0	3.82
2002	92	23	1242	327.988	-426.138	D	7.652	7.652	0	3.429	95.82	1.32	0	0	0	2.03
2002	93	23	381	322.546	-443.863	D	6.692	6.692	0	1.441	91.93	0.57	0	0	0	1.88
2002	94	23	1	318.65	-445.782	D	6.669	6.669	0	1.395	0	0	0	0	0	0
2002	95	23	1	318.65	-445.782	D	6.574	6.574	0	1.209	0	0	0	0	0	0
2002	96	23	2274	336.179	-425.778	D	6.554	6.554	0	1.171	90.76	0.64	0	0	0	2.66
2002	97	23	2274	336.179	-425.778	D	8.244	8.244	0	4.753	89.19	0.54	0	0	0	1.62
2002	98	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	99	23	1	318.65	-445.782	D	9.117	9.117	0	6.854	0	0	0	0	0	0
2002	100	23	1	318.65	-445.782	D	7.563	7.563	0	3.237	0	0	0	0	0	0
2002	101	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2002	102	23	1412	329.218	-425.834	D	7.414	7.414	0	2.917	85.35	0.34	0	0	0	0.99
2002	103	23	2704	329.056	-425.092	D	9.399	9.398	0	7.571	96.28	2.87	0	0	0	0.54
2002	104	23	2707	329.748	-425.023	D	9.135	9.135	0	6.898	96.6	1.21	0	0	0	0.28
2002	105	23	1	318.65	-445.782	D	8.516	8.516	0	5.389	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.596	7.596	0	3.307	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	8.247	8.247	0	4.758	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	8.641	8.641	0	5.687	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.663	7.663	0	3.453	0	0	0	0	0	0
2002	110	23	1415	329.185	-425.086	D	9.49	9.489	0	7.808	94.81	1.65	0	0	0	0.58
2002	111	23	1483	329.682	-425.064	D	8.313	8.313	0.001	4.912	97.82	1.4	0	0	0	0.49
2002	112	23	2394	338.446	-426.428	D	6.874	6.874	0	1.804	74.68	0.35	0	0	0	0.56
2002	113	23	2789	340.496	-426.449	D	7.254	7.251	0.003	2.576	98.76	0.36	0	0	0	0.86
2002	114	23	2755	335.167	-424.545	D	8.871	8.871	0	6.243	98.51	0.61	0	0	0	0.85
2002	115	23	2790	340.421	-426.562	D	6.77	6.769	0.001	1.594	97.89	0.93	0	0	0	1.12
2002	116	23	2415	339.676	-426.124	D	7.992	7.992	0	4.179	82.15	0.62	0	0	0	0.81
2002	117	23	2274	336.179	-425.778	D	9.091	9.091	0	6.789	81.57	0.63	0	0	0	0.71
2002	118	23	1	318.65	-445.782	D	8.893	8.893	0	6.297	0	0	0	0	0	0
2002	119	23	2780	339.614	-425.419	D	6.783	6.783	0.001	1.621	96.28	0.34	0	0	0	3.31
2002	120	23	2781	339.842	-425.379	D	7.886	7.885	0.001	3.941	98.3	0.14	0	0	0	1.13
2002	121	23	2155	334.883	-424.586	D	9.301	9.301	0	7.322	68.35	0.14	0	0	0	0.23
2002	122	23	2653	324.014	-433.36	D	8.843	8.841	0.001	6.17	98.84	0.69	0	0	0	0.33
2002	123	23	13	319.06	-443.766	D	7.241	7.24	0.001	2.553	98.97	0.27	0	0	0	0.66
2002	124	23	2	318.639	-445.533	D	9.127	9.125	0.002	6.875	99.21	0.45	0	0	0	0.23
2002	125	23	1989	333.97	-432.12	D	8.433	8.432	0.001	5.19	99.26	0.36	0	0	0	0.27
2002	126	23	453	323.053	-444.091	D	8.615	8.615	0	5.623	98.69	0.06	0	0	0	0.16
2002	127	23	1	318.65	-445.782	D	8.423	8.423	0	5.168	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	129	23	807	325.034	-432.512	D	8.445	8.444	0	5.219	88.54	9.63	0	0	0	1.42
2002	130	23	1415	329.185	-425.086	D	6.916	6.916	0	1.888	94.73	0.87	0	0	0	3.9
2002	131	23	2395	338.435	-426.179	D	8.332	8.332	0	4.956	98.92	0.49	0	0	0	0.32
2002	132	23	1415	329.185	-425.086	D	9.382	9.381	0	7.528	98.94	1.53	0	0	0	0.29
2002	133	23	2704	329.056	-425.092	D	8.619	8.602	0.017	5.592	97.51	2.27	0	0	0	0.22
2002	134	23	1	318.65	-445.782	D	6.748	6.747	0	1.551	95.09	0.49	0	0	0	4.29
2002	135	23	1893	333.346	-434.896	D	6.833	6.833	0	1.722	97.23	0.26	0	0	0	1.54
2002	136	23	1	318.65	-445.782	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	137	23	1	318.65	-445.782	D	10.134	10.134	0	9.545	0	0	0	0	0	0

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2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	138	23	1	318.65	-445.782	D	7.964	7.964	0	4.116	0	0	0	0	0	0
2002	139	23	2704	329.056	-425.092	D	6.865	6.865	0	1.785	95	0.2	0	0	0	4.54
2002	140	23	2563	323.259	-443.79	D	6.901	6.898	0.003	1.852	97.46	0.31	0	0	0	2.24
2002	141	23	1	318.65	-445.782	D	6.72	6.72	0	1.496	98.24	0.12	0	0	0	1.83
2002	142	23	199	320.795	-437.944	D	6.703	6.703	0	1.463	98.55	0.1	0	0	0	1.15
2002	143	23	1	318.65	-445.782	D	6.812	6.812	0	1.679	0	0	0	0	0	0
2002	144	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2002	145	23	2684	326.713	-427.014	D	8.317	8.317	0.001	4.921	98.2	0.18	0	0	0	1.46
2002	146	23	2704	329.056	-425.092	D	8.528	8.516	0.012	5.388	98.6	0.88	0	0	0	0.51
2002	147	23	2704	329.056	-425.092	D	8.975	8.974	0.001	6.497	99.48	0.06	0	0	0	0.42
2002	148	23	1	318.65	-445.782	D	8.901	8.901	0	6.317	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	9.28	9.28	0	7.267	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	8.533	8.533	0	5.428	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.158	7.158	0	2.382	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.878	7.878	0	3.924	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	8.029	8.029	0	4.264	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.439	7.439	0	2.97	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	156	23	1414	329.196	-425.335	D	9.113	9.113	0	6.844	96.32	0.08	0	0	0	0.36
2002	157	23	2694	327.861	-425.964	D	8.783	8.781	0.001	6.024	98.75	0.6	0	0	0	0.65
2002	158	23	2704	329.056	-425.092	D	6.913	6.912	0.001	1.88	98.16	0.06	0	0	0	1.81
2002	159	23	89	319.9	-440.231	D	6.908	6.908	0	1.871	96.34	0.03	0	0	0	0.74
2002	160	23	1	318.65	-445.782	D	7.528	7.528	0	3.16	12.25	0	0	0	0	0.09
2002	161	23	1	318.65	-445.782	D	9.508	9.508	0	7.855	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	8.531	8.531	0	5.424	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	8.238	8.238	0	4.74	0	0	0	0	0	0
2002	164	23	1508	330.028	-427.297	D	8.141	8.141	0	4.517	82.27	0.01	0	0	0	1.02
2002	165	23	1455	329.987	-432.045	D	7.55	7.545	0.005	3.197	98.78	0.52	0	0	0	0.68
2002	166	23	2308	337.055	-428.737	D	6.696	6.695	0.001	1.448	91.33	0.8	0	0	0	7.93
2002	167	23	2468	334.002	-434.887	D	6.751	6.75	0	1.557	97.04	0.08	0	0	0	2.6
2002	168	23	2789	340.496	-426.449	D	6.754	6.752	0.001	1.56	97.3	0.14	0	0	0	2.47
2002	169	23	2789	340.496	-426.449	D	6.717	6.716	0.001	1.488	98.05	0.04	0	0	0	1.84
2002	170	23	2784	339.87	-426.019	D	6.883	6.883	0	1.821	98.44	0.04	0	0	0	1.17
2002	171	23	1	318.65	-445.782	D	7.457	7.457	0	3.008	0	0	0	0	0	0
2002	172	23	1	318.65	-445.782	D	8.033	8.033	0	4.272	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.251	7.251	0	2.574	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.025	7.025	0	2.108	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	8.073	8.073	0	4.363	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	177	23	1	318.65	-445.782	D	8.808	8.808	0	6.089	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	8.838	8.838	0	6.163	0	0	0	0	0	0
2002	179	23	2788	340.294	-426.448	D	7.874	7.874	0	3.915	96.47	0.17	0	0	0	1.18
2002	180	23	2417	339.654	-425.626	D	7.976	7.976	0	4.144	97.48	0.09	0	0	0	0.63
2002	181	23	1	318.65	-445.782	D	8.264	8.264	0	4.798	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	6.882	6.882	0	1.82	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	6.978	6.978	0	2.014	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	8.892	8.892	0	6.295	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2002	186	23	1	318.65	-445.782	D	8.01	8.01	0	4.221	0	0	0	0	0	0
2002	187	23	1	318.65	-445.782	D	7.431	7.431	0	2.954	0	0	0	0	0	0
2002	188	23	1	318.65	-445.782	D	7.851	7.851	0	3.864	0	0	0	0	0	0
2002	189	23	1	318.65	-445.782	D	6.865	6.865	0	1.786	0	0	0	0	0	0
2002	190	23	1	318.65	-445.782	D	6.746	6.746	0	1.548	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	6.966	6.966	0	1.988	0	0	0	0	0	0
2002	192	23	2789	340.496	-426.449	D	7.746	7.745	0.002	3.631	98.72	0.49	0	0	0	0.78
2002	193	23	2781	339.842	-425.379	D	8.5	8.494	0.006	5.335	99.45	0.18	0	0	0	0.41
2002	194	23	2704	329.056	-425.092	D	9.322	9.318	0.005	7.364	99.21	0.49	0	0	0	0.26
2002	195	23	2597	318.971	-443.851	D	8.873	8.872	0.001	6.246	99.57	0.11	0	0	0	0.3
2002	196	23	1	318.65	-445.782	D	8.017	8.017	0	4.235	98.97	0.55	0	0	0	0.49
2002	197	23	2588	318.452	-445.8	D	7.428	7.428	0	2.948	98.85	0.2	0	0	0	0.58
2002	198	23	1413	329.207	-425.585	D	9.436	9.436	0	7.669	99.04	0.03	0	0	0	0.23
2002	199	23	2277	336.146	-425.03	D	8.779	8.779	0	6.018	97.98	0.04	0	0	0	0.29
2002	200	23	1	318.65	-445.782	D	9.09	9.09	0	6.785	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.7	7.7	0	3.533	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.159	7.159	0	2.385	0	0	0	0	0	0
2002	204	23	13	319.06	-443.766	D	7.089	7.089	0	2.24	54.37	0.01	0	0	0	1.2
2002	205	23	2588	318.452	-445.8	D	7.459	7.459	0	3.013	98.47	0.07	0	0	0	1.34
2002	206	23	13	319.06	-443.766	D	7.231	7.231	0.001	2.532	98.7	0.24	0	0	0	0.97
2002	207	23	2709	330.21	-424.978	D	7.065	7.064	0.001	2.189	98.81	0.03	0	0	0	0.92
2002	208	23	2035	333.967	-426.375	D	7.926	7.926	0	4.031	97.23	0.07	0	0	0	0.54
2002	209	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.824	7.824	0	3.806	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	8.482	8.482	0	5.307	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.166	7.166	0	2.398	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.644	7.644	0	3.411	0	0	0	0	0	0
2002	214	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	215	23	1	318.65	-445.782	D	7.971	7.971	0	4.133	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	216	23	1	318.65	-445.782	D	7.347	7.347	0	2.775	0	0	0	0	0	0
2002	217	23	1	318.65	-445.782	D	7.34	7.34	0	2.761	0	0	0	0	0	0
2002	218	23	1	318.65	-445.782	D	6.822	6.822	0	1.699	0	0	0	0	0	0
2002	219	23	1	318.65	-445.782	D	8.595	8.595	0	5.577	0	0	0	0	0	0
2002	220	23	1	318.65	-445.782	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	6.724	6.724	0	1.505	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.045	7.045	0	2.15	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.191	7.191	0	2.45	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	6.912	6.912	0	1.88	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	8.619	8.619	0	5.634	0	0	0	0	0	0
2002	226	23	2758	335.862	-424.454	D	9.992	9.992	0	9.152	100.46	0.03	0	0	0	0.47
2002	227	23	1	318.65	-445.782	D	8.318	8.318	0	4.925	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	8.63	8.63	0	5.658	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	6.941	6.941	0	1.939	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	6.972	6.972	0	2.001	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.651	7.651	0	3.426	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.084	7.084	0	2.23	0	0	0	0	0	0
2002	236	23	2695	328.074	-426.025	D	7.909	7.906	0.003	3.987	98.97	0.04	0	0	0	0.95
2002	237	23	2448	335.908	-431.021	D	8.682	8.661	0.02	5.735	99.12	0.51	0	0	0	0.37
2002	238	23	2588	318.452	-445.8	D	7.881	7.881	0	3.932	99.28	0.08	0	0	0	0.6
2002	239	23	1	318.65	-445.782	D	6.98	6.98	0	2.017	0	0	0	0	0	0
2002	240	23	1	318.65	-445.782	D	7.508	7.508	0	3.117	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.124	7.124	0	2.313	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.14	7.14	0	2.344	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.361	7.361	0	2.805	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.134	7.134	0	2.332	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	6.909	6.909	0	1.875	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	6.972	6.972	0	2.002	0	0	0	0	0	0
2002	247	23	2417	339.654	-425.626	D	6.923	6.923	0	1.902	96.7	0.03	0	0	0	2.83
2002	248	23	1517	329.93	-425.053	D	7.357	7.357	0	2.797	97.86	0.04	0	0	0	1.13
2002	249	23	622	323.61	-434.073	D	6.795	6.795	0	1.645	93.66	0.01	0	0	0	1.45
2002	250	23	199	320.795	-437.944	D	6.747	6.747	0	1.55	56.6	0	0	0	0	0.99
2002	251	23	1	318.65	-445.782	D	7.423	7.423	0	2.937	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.171	7.171	0	2.409	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.202	7.202	0	2.474	0	0	0	0	0	0
2002	254	23	2781	339.842	-425.379	D	7.07	7.068	0.002	2.196	96.52	0.81	0	0	0	2.7

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	255	23	2563	323.259	-443.79	D	8.098	8.097	0	4.417	98.48	0.08	0	0	0	1.34
2002	256	23	1	318.65	-445.782	D	6.68	6.68	0	1.418	0	0	0	0	0	0
2002	257	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2002	258	23	46	319.469	-441.749	D	8.372	8.372	0	5.048	90.28	0.52	0	0	0	1.13
2002	259	23	2588	318.452	-445.8	D	8.324	8.323	0.001	4.936	98.39	0.36	0	0	0	1.16
2002	260	23	2447	336.137	-430.956	D	7.821	7.813	0.009	3.78	99	0.35	0	0	0	0.62
2002	261	23	2789	340.496	-426.449	D	8.445	8.444	0.002	5.217	98.95	0.45	0	0	0	0.52
2002	262	23	1	318.65	-445.782	D	9.39	9.39	0	7.549	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	9.262	9.262	0	7.221	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	6.8	6.8	0	1.655	0	0	0	0	0	0
2002	265	23	2414	339.687	-426.374	D	6.797	6.797	0	1.649	94.52	0.18	0	0	0	2.84
2002	266	23	199	320.795	-437.944	D	6.599	6.599	0	1.258	89.74	0.07	0	0	0	5.06
2002	267	23	2704	329.056	-425.092	D	6.548	6.548	0	1.159	93.42	0.28	0	0	0	4.99
2002	268	23	2182	335.131	-424.575	D	6.826	6.826	0	1.708	93.68	0.27	0	0	0	2.33
2002	269	23	1241	327.999	-426.387	D	7.383	7.383	0	2.852	97.2	0.14	0	0	0	1.02
2002	270	23	1414	329.196	-425.335	D	7.345	7.345	0	2.772	94.69	0.06	0	0	0	3.34
2002	271	23	1415	329.185	-425.086	D	6.804	6.804	0	1.663	95.27	0.2	0	0	0	2.7
2002	272	23	1008	326.651	-429.693	D	7.238	7.238	0	2.548	99.12	0.04	0	0	0	0.79
2002	273	23	863	325.509	-431.992	D	7.337	7.337	0	2.755	42.58	0	0	0	0	0.35
2002	274	23	1	318.65	-445.782	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.523	7.523	0	3.151	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	9.147	9.147	0	6.929	0	0	0	0	0	0
2002	278	23	2750	334.007	-424.696	D	7.05	7.05	0.001	2.16	90.82	5.1	0	0	0	4.15
2002	279	23	2552	324.659	-442.591	D	6.803	6.802	0	1.66	97.14	0.23	0	0	0	2.23
2002	280	23	2789	340.496	-426.449	D	6.83	6.829	0.001	1.713	92.88	1.59	0	0	0	5.55
2002	281	23	1	318.65	-445.782	D	6.562	6.562	0	1.186	0	0	0	0	0	0
2002	282	23	1	318.65	-445.782	D	8.768	8.768	0	5.993	0	0	0	0	0	0
2002	283	23	2338	337.551	-428.716	D	9.974	9.974	0	9.103	92.68	0.66	0	0	0	0.23
2002	284	23	375	322.611	-445.359	D	9.433	9.433	0	7.662	94.52	0.52	0	0	0	0.17
2002	285	23	1046	326.812	-427.688	D	9.02	9.02	0	6.61	80.14	3.2	0	0	0	1.39
2002	286	23	2589	318.383	-445.593	D	7.886	7.886	0.001	3.942	96.48	3.04	0	0	0	0.54
2002	287	23	1	318.65	-445.782	D	6.522	6.522	0	1.109	0	0	0	0	0	0
2002	288	23	2787	340.091	-426.447	D	6.504	6.504	0	1.073	84.53	0.96	0	0	0	13.58
2002	289	23	2236	336.149	-430.776	D	6.554	6.554	0	1.17	44.18	0.24	0	0	0	2.41
2002	290	23	1	318.65	-445.782	D	6.977	6.977	0	2.01	48.9	0.02	0	0	0	2.05
2002	291	23	889	325.746	-431.731	D	6.636	6.636	0	1.331	94.65	0.58	0	0	0	2.23
2002	292	23	2781	339.842	-425.379	D	9.743	9.74	0.002	8.47	96.81	2.66	0	0	0	0.5
2002	293	23	2588	318.452	-445.8	D	9.404	9.4	0.004	7.576	97.63	2	0	0	0	0.3

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	294	23	2589	318.383	-445.593	D	6.975	6.975	0	2.008	97.49	0.76	0	0	0	1.07
2002	295	23	1	318.65	-445.782	D	7.449	7.448	0	2.991	98.37	0.53	0	0	0	0.6
2002	296	23	1	318.65	-445.782	D	7.031	7.031	0	2.121	93.04	0.21	0	0	0	0.72
2002	297	23	1	318.65	-445.782	D	6.76	6.76	0	1.575	0	0	0	0	0	0
2002	298	23	2684	326.713	-427.014	D	9.664	9.657	0.007	8.249	96.3	3.06	0	0	0	0.66
2002	299	23	2789	340.496	-426.449	D	9.38	9.336	0.045	7.41	95.86	3.65	0	0	0	0.48
2002	300	23	2597	318.971	-443.851	D	9.144	9.124	0.02	6.872	97.77	1.77	0	0	0	0.45
2002	301	23	2628	320.933	-436.998	D	10.226	10.218	0.008	9.779	98.29	1.46	0	0	0	0.22
2002	302	23	2588	318.452	-445.8	D	9.779	9.773	0.006	8.559	98.49	1.27	0	0	0	0.22
2002	303	23	13	319.06	-443.766	D	9.121	9.121	0	6.864	99.09	0.88	0	0	0	0.23
2002	304	23	2597	318.971	-443.851	D	9.103	9.1	0.003	6.81	95.33	4.27	0	0	0	0.38
2002	305	23	1	318.65	-445.782	D	7.72	7.72	0	3.576	0	0	0	0	0	0
2002	306	23	2707	329.748	-425.023	D	7.767	7.765	0.001	3.676	91.66	5.98	0	0	0	2.2
2002	307	23	2757	335.63	-424.484	D	10.218	10.218	0	9.779	94.34	3.88	0	0	0	0.35
2002	308	23	2781	339.842	-425.379	D	9.253	9.252	0.001	7.196	96.48	2.84	0	0	0	0.43
2002	309	23	2789	340.496	-426.449	D	9.324	9.322	0.002	7.375	97.21	2.5	0	0	0	0.28
2002	310	23	2781	339.842	-425.379	D	8.089	8.086	0.003	4.392	96.29	3.17	0	0	0	0.56
2002	311	23	2274	336.179	-425.778	D	6.541	6.541	0	1.146	76.74	0.7	0	0	0	1.88
2002	312	23	863	325.509	-431.992	D	6.698	6.698	0	1.452	13.68	0.16	0	0	0	0.22
2002	313	23	1	318.65	-445.782	D	9.044	9.044	0	6.672	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	9.306	9.306	0	7.334	0	0	0	0	0	0
2002	315	23	2361	337.679	-425.962	D	6.809	6.809	0	1.673	62.32	2.01	0	0	0	3.38
2002	316	23	13	319.06	-443.766	D	6.622	6.621	0.001	1.302	85.67	6.8	0	0	0	7.44
2002	317	23	2787	340.091	-426.447	D	6.607	6.607	0	1.274	85.02	3.95	0	0	0	9.32
2002	318	23	1	318.65	-445.782	D	7.01	7.01	0	2.079	0	0	0	0	0	0
2002	319	23	1048	326.791	-427.189	D	9.47	9.469	0.001	7.754	92.48	6.63	0	0	0	0.63
2002	320	23	1549	330.211	-425.79	D	8.906	8.906	0	6.33	55.41	3.3	0	0	0	5.75
2002	321	23	2418	339.946	-426.612	D	6.722	6.721	0	1.499	84.83	8.91	0	0	0	5.6
2002	322	23	1	318.65	-445.782	D	6.826	6.826	0	1.707	0	0	0	0	0	0
2002	323	23	2789	340.496	-426.449	D	6.831	6.829	0.003	1.713	87.6	6.68	0	0	0	5.71
2002	324	23	2418	339.946	-426.612	D	6.493	6.493	0	1.053	88.02	2.17	0	0	0	8.73
2002	325	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	326	23	1048	326.791	-427.189	D	7.006	7.006	0	2.07	82.73	5.75	0	0	0	11.17
2002	327	23	2209	335.38	-424.564	D	6.54	6.539	0.001	1.143	86.03	6.58	0	0	0	7.16
2002	328	23	1549	330.211	-425.79	D	6.63	6.629	0	1.318	86.95	2.57	0	0	0	4
2002	329	23	140	320.874	-445.435	D	7.361	7.36	0	2.804	93.41	4.68	0	0	0	1.02
2002	330	23	2585	319.192	-445.743	D	6.648	6.647	0	1.353	86.29	5.6	0	0	0	6.48
2002	331	23	13	319.06	-443.766	D	6.899	6.899	0	1.853	88.68	6.27	0	0	0	4.04
2002	332	23	1445	329.477	-426.072	D	6.587	6.587	0	1.235	91.45	3.56	0	0	0	3.27

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	333	23	2274	336.179	-425.778	D	6.593	6.593	0	1.247	74.2	1.84	0	0	0	2.62
2002	334	23	1	318.65	-445.782	D	6.662	6.662	0	1.382	0	0	0	0	0	0
2002	335	23	2413	339.406	-425.637	D	6.503	6.503	0	1.072	26.32	5.27	0	0	0	5.82
2002	336	23	1	318.65	-445.782	D	6.496	6.496	0	1.058	0	0	0	0	0	0
2002	337	23	2694	327.861	-425.964	D	7.101	7.101	0	2.264	84.96	9.83	0	0	0	5.27
2002	338	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	339	23	2628	320.933	-436.998	D	8.586	8.586	0	5.553	69.28	8.01	0	0	0	3.96
2002	340	23	2448	335.908	-431.021	D	8.927	8.925	0.002	6.375	89.84	9.1	0	0	0	1.08
2002	341	23	1800	332.612	-435.178	D	7.166	7.166	0	2.399	84.92	4.73	0	0	0	2.55
2002	342	23	2757	335.63	-424.484	D	7.48	7.48	0	3.058	94.85	3.59	0	0	0	0.48
2002	343	23	2706	329.518	-425.046	D	8.55	8.547	0.003	5.461	95.9	3.71	0	0	0	0.39
2002	344	23	2694	327.861	-425.964	D	6.873	6.873	0	1.801	96.53	2.86	0	0	0	1.18
2002	345	23	1242	327.988	-426.138	D	8.131	8.131	0	4.493	96.69	2.5	0	0	0	0.41
2002	346	23	2097	334.452	-426.104	D	8.216	8.216	0	4.689	96.93	1.92	0	0	0	0.37
2002	347	23	2599	318.958	-443.364	D	9.458	9.457	0.001	7.724	96.93	2.34	0	0	0	0.51
2002	348	23	2597	318.971	-443.851	D	9.281	9.264	0.017	7.226	95.77	3.76	0	0	0	0.48
2002	349	23	2788	340.294	-426.448	D	7.073	7.073	0	2.206	95.81	1.95	0	0	0	1.49
2002	350	23	1	318.65	-445.782	D	9.107	9.107	0	6.829	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	9.67	9.67	0	8.285	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	9.899	9.899	0	8.899	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	8.345	8.345	0	4.987	0	0	0	0	0	0
2002	354	23	1	318.65	-445.782	D	6.783	6.783	0	1.622	0	0	0	0	0	0
2002	355	23	1	318.65	-445.782	D	6.532	6.532	0	1.128	0	0	0	0	0	0
2002	356	23	2781	339.842	-425.379	D	7.011	7.01	0.001	2.078	78.75	13.62	0	0	0	7.49
2002	357	23	1	318.65	-445.782	D	7.591	7.59	0	3.295	89.63	8.16	0	0	0	1.95
2002	358	23	1	318.65	-445.782	D	9.674	9.673	0.001	8.292	90.35	9.12	0	0	0	0.53
2002	359	23	2588	318.452	-445.8	D	7.605	7.604	0.001	3.324	88.29	10.03	0	0	0	1.7
2002	360	23	1	318.65	-445.782	D	6.825	6.825	0	1.705	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	6.876	6.876	0	1.807	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.067	7.067	0	2.195	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.04	7.04	0	2.14	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	10.069	10.069	0	9.364	0	0	0	0	0	0
2002	365	23	1548	330.222	-426.04	D	8.825	8.824	0.001	6.128	93.81	5.42	0	0	0	0.55
									0.056							
TRIGEN KC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	2628	320.933	-436.998	D	6.88	6.878	0.003	1.811	87.28	11.49	0	0	0	1.23

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	2	23	2718	331.403	-426.104	D	6.92	6.892	0.027	1.84	92.02	7.49	0	0	0	0.48
2002	3	23	2704	329.056	-425.092	D	7.309	7.295	0.014	2.667	93.64	6.12	0	0	0	0.24
2002	4	23	2789	340.496	-426.449	D	6.811	6.809	0.002	1.673	95.66	4.06	0	0	0	0.25
2002	5	23	2373	337.927	-425.951	D	7.74	7.74	0	3.62	81.65	2.84	0	0	0	0.12
2002	6	23	2789	340.496	-426.449	D	9.625	9.605	0.02	8.11	95.52	4.4	0	0	0	0.08
2002	7	23	2395	338.435	-426.179	D	7.959	7.93	0.029	4.04	93.43	6.33	0	0	0	0.24
2002	8	23	2789	340.496	-426.449	D	6.875	6.874	0	1.804	91.77	7.67	0	0	0	0.48
2002	9	23	1	318.65	-445.782	D	6.877	6.877	0	1.81	0	0	0	0	0	0
2002	10	23	2704	329.056	-425.092	D	9.406	9.393	0.013	7.557	97.49	2.43	0	0	0	0.07
2002	11	23	2683	326.705	-427.245	D	7.322	7.306	0.016	2.691	83.5	15.63	0	0	0	0.86
2002	12	23	2789	340.496	-426.449	D	6.769	6.768	0.001	1.591	94.7	4.73	0	0	0	0.67
2002	13	23	1	318.65	-445.782	D	7.018	7.018	0	2.094	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	6.95	6.95	0	1.957	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	6.62	6.62	0	1.299	0	0	0	0	0	0
2002	16	23	2319	336.935	-425.995	D	6.589	6.589	0	1.239	88.6	5.46	0	0	0	0.51
2002	17	23	2596	318.977	-444.095	D	7.004	6.997	0.007	2.053	89.36	9.95	0	0	0	0.66
2002	18	23	2694	327.861	-425.964	D	8.734	8.733	0.001	5.906	93.85	6	0	0	0	0.06
2002	19	23	2709	330.21	-424.978	D	8.962	8.957	0.006	6.455	96.37	3.46	0	0	0	0.14
2002	20	23	2781	339.842	-425.379	D	9.008	8.882	0.127	6.27	95.42	4.52	0	0	0	0.05
2002	21	23	2779	339.386	-425.461	D	7.26	7.26	0	2.594	96.09	2.56	0	0	0	0.07
2002	22	23	1	318.65	-445.782	D	7.001	7.001	0	2.059	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	9.862	9.862	0	8.798	0	0	0	0	0	0
2002	24	23	2589	318.383	-445.593	D	9.407	9.399	0.008	7.573	95.79	4.14	0	0	0	0.04
2002	25	23	2555	324.03	-442.528	D	6.886	6.881	0.005	1.817	93.56	6.12	0	0	0	0.32
2002	26	23	1951	333.842	-434.874	D	6.707	6.706	0	1.47	96.45	2.38	0	0	0	0.33
2002	27	23	2176	335.197	-426.071	D	6.638	6.638	0	1.335	60.72	0.85	0	0	0	0.22
2002	28	23	1	318.65	-445.782	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2002	29	23	2704	329.056	-425.092	D	9.852	9.851	0.001	8.769	95.34	4.49	0	0	0	0.05
2002	30	23	2704	329.056	-425.092	D	10.332	10.218	0.114	9.779	95.87	4.09	0	0	0	0.04
2002	31	23	2589	318.383	-445.593	D	10.314	10.176	0.138	9.662	97.61	2.36	0	0	0	0.02
2002	32	23	2789	340.496	-426.449	D	7.506	7.502	0.004	3.105	97.76	2.22	0	0	0	0.02
2002	33	23	2788	340.294	-426.448	D	7.088	7.088	0	2.237	96.71	2.53	0	0	0	0.42
2002	34	23	2789	340.496	-426.449	D	6.817	6.817	0.001	1.688	97.84	2.28	0	0	0	0.2
2002	35	23	2597	318.971	-443.851	D	6.911	6.908	0.003	1.873	79.7	19.31	0	0	0	0.97
2002	36	23	1048	326.791	-427.189	D	6.815	6.815	0	1.685	63.51	3.29	0	0	0	0.26
2002	37	23	234	321.01	-437.185	D	9.611	9.611	0	8.127	95.67	3.59	0	0	0	0.05
2002	38	23	2781	339.842	-425.379	D	9.411	9.408	0.003	7.597	97.08	2.74	0	0	0	0.1
2002	39	23	2789	340.496	-426.449	D	7.657	7.655	0.003	3.434	97.67	2.26	0	0	0	0.08
2002	40	23	2235	335.628	-424.554	D	9.377	9.376	0	7.515	98.41	1.24	0	0	0	0.02

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	41	23	2789	340.496	-426.449	D	8.091	8.091	0	4.403	94.27	2.51	0	0	0	0.32
2002	42	23	2789	340.496	-426.449	D	7.58	7.575	0.005	3.262	94.57	5.19	0	0	0	0.25
2002	43	23	2758	335.862	-424.454	D	6.616	6.614	0.001	1.288	95.16	4.15	0	0	0	0.7
2002	44	23	2588	318.452	-445.8	D	6.729	6.728	0.001	1.512	94.12	5.11	0	0	0	0.77
2002	45	23	2704	329.056	-425.092	D	6.593	6.591	0.002	1.243	92.75	6.54	0	0	0	0.64
2002	46	23	1	318.65	-445.782	D	7.064	7.064	0	2.189	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	6.737	6.737	0	1.53	0	0	0	0	0	0
2002	48	23	1979	333.536	-427.893	D	6.567	6.564	0.003	1.191	90.59	7.96	0	0	0	1.49
2002	49	23	1414	329.196	-425.335	D	6.632	6.631	0.001	1.322	96.35	3.05	0	0	0	0.49
2002	50	23	1	318.65	-445.782	D	8.708	8.708	0	5.847	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	9.05	9.05	0	6.686	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	6.911	6.911	0	1.879	0	0	0	0	0	0
2002	53	23	2589	318.383	-445.593	D	6.78	6.779	0.001	1.614	87.42	11.03	0	0	0	1.53
2002	54	23	2661	325.283	-432.004	D	6.699	6.697	0.002	1.45	94.76	4.68	0	0	0	0.44
2002	55	23	2789	340.496	-426.449	D	6.794	6.794	0	1.643	97.4	2.24	0	0	0	0.23
2002	56	23	2589	318.383	-445.593	D	8.091	8.076	0.015	4.369	93.62	6.27	0	0	0	0.1
2002	57	23	1552	330.178	-425.042	D	7.672	7.666	0.006	3.459	91.08	8.61	0	0	0	0.3
2002	58	23	1	318.65	-445.782	D	6.708	6.708	0	1.472	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	6.508	6.508	0	1.082	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.98	7.98	0	4.153	0	0	0	0	0	0
2002	61	23	2789	340.496	-426.449	D	9.789	9.765	0.024	8.538	94.94	4.95	0	0	0	0.11
2002	62	23	2789	340.496	-426.449	D	7.315	7.314	0.001	2.707	96.93	3	0	0	0	0.15
2002	63	23	1	318.65	-445.782	D	7.154	7.154	0	2.374	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.141	7.141	0	2.346	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	9.603	9.603	0	8.106	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	8.845	8.845	0	6.18	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	6.753	6.753	0	1.563	0	0	0	0	0	0
2002	70	23	2781	339.842	-425.379	D	7.351	7.35	0.001	2.783	94.48	5.03	0	0	0	0.39
2002	71	23	89	319.9	-440.231	D	9.352	9.352	0	7.453	97.51	0.46	0	0	0	0.49
2002	72	23	2783	339.861	-425.806	D	6.87	6.863	0.006	1.782	97.52	2.17	0	0	0	0.26
2002	73	23	2788	340.294	-426.448	D	7.979	7.979	0	4.15	99	0.48	0	0	0	0.12
2002	74	23	2589	318.383	-445.593	D	10.103	10.09	0.013	9.423	95.18	4.74	0	0	0	0.06
2002	75	23	2571	322.646	-445.476	D	7.792	7.789	0.003	3.728	97.38	2.59	0	0	0	0.05
2002	76	23	2789	340.496	-426.449	D	8.355	8.355	0	5.009	97.35	2.12	0	0	0	0.02
2002	77	23	2789	340.496	-426.449	D	9.467	9.466	0	7.748	90.13	0.59	0	0	0	0.04
2002	78	23	2789	340.496	-426.449	D	10.218	10.218	0	9.779	97.71	1.21	0	0	0	0.01
2002	79	23	2589	318.383	-445.593	D	9.393	9.393	0	7.557	96.58	2.8	0	0	0	0.02

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	80	23	2762	336.074	-425.006	D	8.351	8.342	0.009	4.98	95.39	4.43	0	0	0	0.18
2002	81	23	2684	326.713	-427.014	D	6.534	6.533	0.001	1.131	90.54	8.2	0	0	0	1.2
2002	82	23	2695	328.074	-426.025	D	6.872	6.868	0.004	1.791	93.48	6.22	0	0	0	0.29
2002	83	23	2784	339.87	-426.019	D	8.662	8.662	0	5.737	97.26	1.5	0	0	0	0.12
2002	84	23	1415	329.185	-425.086	D	10.219	10.218	0.001	9.779	97.48	2.14	0	0	0	0.01
2002	85	23	2708	329.979	-425	D	8.643	8.641	0.002	5.686	98.02	1.86	0	0	0	0.01
2002	86	23	2684	326.713	-427.014	D	7.939	7.922	0.017	4.022	97.1	2.84	0	0	0	0.06
2002	87	23	2627	320.879	-437.207	D	7.253	7.253	0	2.579	99.27	0.43	0	0	0	0.12
2002	88	23	2684	326.713	-427.014	D	8.743	8.74	0.003	5.924	99.65	0.21	0	0	0	0.15
2002	89	23	2588	318.452	-445.8	D	7.673	7.669	0.003	3.466	99.57	0.35	0	0	0	0.08
2002	90	23	2704	329.056	-425.092	D	8.365	8.365	0	5.034	98.74	0.35	0	0	0	0.75
2002	91	23	2789	340.496	-426.449	D	6.726	6.723	0.003	1.502	98.24	1.35	0	0	0	0.44
2002	92	23	2789	340.496	-426.449	D	7.654	7.637	0.017	3.396	98.78	1.04	0	0	0	0.18
2002	93	23	2571	322.646	-445.476	D	6.699	6.697	0.001	1.452	99.12	0.72	0	0	0	0.14
2002	94	23	1	318.65	-445.782	D	6.669	6.669	0	1.395	0	0	0	0	0	0
2002	95	23	1	318.65	-445.782	D	6.574	6.574	0	1.209	0	0	0	0	0	0
2002	96	23	2781	339.842	-425.379	D	6.554	6.554	0	1.171	98.1	0.77	0	0	0	0.28
2002	97	23	2788	340.294	-426.448	D	8.245	8.245	0	4.755	99.61	0.62	0	0	0	0.16
2002	98	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	99	23	2589	318.383	-445.593	D	9.238	9.117	0.121	6.854	97.84	2.12	0	0	0	0.03
2002	100	23	1	318.65	-445.782	D	7.563	7.563	0	3.237	0	0	0	0	0	0
2002	101	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2002	102	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	103	23	2758	335.862	-424.454	D	9.391	9.389	0.001	7.547	97.75	2.17	0	0	0	0.04
2002	104	23	1415	329.185	-425.086	D	9.135	9.135	0	6.898	99.35	0.2	0	0	0	0.03
2002	105	23	1	318.65	-445.782	D	8.516	8.516	0	5.389	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.596	7.596	0	3.307	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	8.247	8.247	0	4.758	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	8.641	8.641	0	5.687	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.663	7.663	0	3.453	0	0	0	0	0	0
2002	110	23	2684	326.713	-427.014	D	9.478	9.477	0.001	7.776	98.28	1.34	0	0	0	0.05
2002	111	23	2707	329.748	-425.023	D	8.318	8.313	0.005	4.912	98.88	1.05	0	0	0	0.07
2002	112	23	2781	339.842	-425.379	D	6.877	6.877	0	1.81	96.1	0.27	0	0	0	0.4
2002	113	23	2783	339.861	-425.806	D	7.251	7.247	0.005	2.566	99.52	0.3	0	0	0	0.16
2002	114	23	2758	335.862	-424.454	D	8.871	8.871	0	6.243	101.05	0.68	0	0	0	0.16
2002	115	23	2704	329.056	-425.092	D	6.767	6.765	0.002	1.586	98.93	0.92	0	0	0	0.18
2002	116	23	1	318.65	-445.782	D	7.832	7.832	0	3.822	0	0	0	0	0	0
2002	117	23	1	318.65	-445.782	D	9.613	9.613	0	8.132	0	0	0	0	0	0
2002	118	23	1	318.65	-445.782	D	8.893	8.893	0	6.297	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	119	23	2781	339.842	-425.379	D	6.789	6.783	0.006	1.621	98.99	0.66	0	0	0	0.34
2002	120	23	2758	335.862	-424.454	D	7.905	7.903	0.002	3.98	99.72	0.11	0	0	0	0.12
2002	121	23	2041	333.901	-424.879	D	9.301	9.301	0	7.322	84.67	0.13	0	0	0	0.04
2002	122	23	2789	340.496	-426.449	D	8.903	8.806	0.097	6.083	98.04	1.93	0	0	0	0.04
2002	123	23	2588	318.452	-445.8	D	7.248	7.228	0.02	2.527	99.6	0.32	0	0	0	0.06
2002	124	23	2588	318.452	-445.8	D	9.194	9.125	0.069	6.875	99.36	0.63	0	0	0	0.02
2002	125	23	454	323.042	-443.841	D	8.435	8.409	0.027	5.135	99.63	0.35	0	0	0	0.02
2002	126	23	2255	335.942	-426.039	D	8.491	8.488	0.003	5.322	99.91	0.04	0	0	0	0.01
2002	127	23	1	318.65	-445.782	D	8.423	8.423	0	5.168	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	129	23	2661	325.283	-432.004	D	8.447	8.444	0.002	5.219	93.54	6.27	0	0	0	0.15
2002	130	23	2589	318.383	-445.593	D	7.02	7.019	0.001	2.097	98.83	0.63	0	0	0	0.16
2002	131	23	2758	335.862	-424.454	D	8.437	8.437	0	5.201	99.19	0.38	0	0	0	0.03
2002	132	23	1	318.65	-445.782	D	9.38	9.38	0	7.523	0	0	0	0	0	0
2002	133	23	2707	329.748	-425.023	D	8.635	8.602	0.033	5.592	98.09	1.88	0	0	0	0.02
2002	134	23	1	318.65	-445.782	D	6.748	6.747	0.001	1.551	99.12	0.39	0	0	0	0.47
2002	135	23	2448	335.908	-431.021	D	6.835	6.833	0.002	1.722	99.57	0.22	0	0	0	0.16
2002	136	23	1	318.65	-445.782	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	137	23	1	318.65	-445.782	D	10.134	10.134	0	9.545	92.4	0.64	0	0	0	0.02
2002	138	23	1	318.65	-445.782	D	7.964	7.964	0	4.116	0	0	0	0	0	0
2002	139	23	2684	326.713	-427.014	D	6.865	6.861	0.003	1.778	99.36	0.19	0	0	0	0.45
2002	140	23	2789	340.496	-426.449	D	6.913	6.892	0.02	1.841	98.63	1.13	0	0	0	0.25
2002	141	23	2588	318.452	-445.8	D	6.725	6.72	0.005	1.496	99.57	0.2	0	0	0	0.22
2002	142	23	2626	320.826	-437.417	D	6.706	6.703	0.002	1.463	99.66	0.13	0	0	0	0.12
2002	143	23	1	318.65	-445.782	D	6.812	6.812	0	1.679	0	0	0	0	0	0
2002	144	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2002	145	23	2709	330.21	-424.978	D	8.32	8.303	0.017	4.889	99.69	0.21	0	0	0	0.1
2002	146	23	2789	340.496	-426.449	D	8.524	8.505	0.019	5.362	99.53	0.42	0	0	0	0.04
2002	147	23	2789	340.496	-426.449	D	8.979	8.977	0.001	6.505	99.72	0.24	0	0	0	0.02
2002	148	23	1	318.65	-445.782	D	8.901	8.901	0	6.317	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	9.28	9.28	0	7.267	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	8.533	8.533	0	5.428	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.158	7.158	0	2.382	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.878	7.878	0	3.924	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	8.029	8.029	0	4.264	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.439	7.439	0	2.97	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	156	23	2704	329.056	-425.092	D	9.114	9.113	0	6.844	99.73	0.1	0	0	0	0.04
2002	157	23	2628	320.933	-436.998	D	8.799	8.786	0.014	6.035	99.25	0.71	0	0	0	0.03

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	158	23	2625	320.772	-437.626	D	6.904	6.903	0.001	1.862	99.5	0.04	0	0	0	0.15
2002	159	23	67	319.674	-440.741	D	6.908	6.908	0	1.871	99.23	0.03	0	0	0	0.07
2002	160	23	1242	327.988	-426.138	D	7.62	7.62	0	3.359	54.72	0	0	0	0	0.03
2002	161	23	1	318.65	-445.782	D	9.508	9.508	0	7.855	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	8.531	8.531	0	5.424	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	8.238	8.238	0	4.74	0	0	0	0	0	0
2002	164	23	2255	335.942	-426.039	D	8.141	8.141	0	4.517	98.92	0.01	0	0	0	0.09
2002	165	23	606	323.785	-438.063	D	7.616	7.575	0.041	3.261	99.48	0.48	0	0	0	0.04
2002	166	23	2397	338.413	-425.68	D	6.696	6.695	0.001	1.447	96.98	1.55	0	0	0	1.4
2002	167	23	2571	322.646	-445.476	D	6.744	6.744	0.001	1.543	99.34	0.06	0	0	0	0.23
2002	168	23	2781	339.842	-425.379	D	6.761	6.754	0.007	1.564	99.63	0.13	0	0	0	0.22
2002	169	23	2789	340.496	-426.449	D	6.722	6.716	0.006	1.488	99.79	0.03	0	0	0	0.17
2002	170	23	2781	339.842	-425.379	D	6.887	6.885	0.002	1.825	99.91	0.05	0	0	0	0.1
2002	171	23	452	322.413	-435.125	D	7.52	7.52	0	3.145	56.8	0	0	0	0	0.07
2002	172	23	1	318.65	-445.782	D	8.033	8.033	0	4.272	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.251	7.251	0	2.574	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.025	7.025	0	2.108	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	8.073	8.073	0	4.363	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	8.808	8.808	0	6.089	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	8.838	8.838	0	6.163	0	0	0	0	0	0
2002	179	23	2789	340.496	-426.449	D	7.874	7.874	0	3.915	99.77	0.02	0	0	0	0.15
2002	180	23	2789	340.496	-426.449	D	7.984	7.983	0.001	4.16	100	0.03	0	0	0	0.08
2002	181	23	1	318.65	-445.782	D	8.264	8.264	0	4.798	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	6.882	6.882	0	1.82	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	6.978	6.978	0	2.014	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	8.892	8.892	0	6.295	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2002	186	23	1	318.65	-445.782	D	8.01	8.01	0	4.221	0	0	0	0	0	0
2002	187	23	1	318.65	-445.782	D	7.431	7.431	0	2.954	0	0	0	0	0	0
2002	188	23	1	318.65	-445.782	D	7.851	7.851	0	3.864	0	0	0	0	0	0
2002	189	23	1	318.65	-445.782	D	6.865	6.865	0	1.786	0	0	0	0	0	0
2002	190	23	1	318.65	-445.782	D	6.746	6.746	0	1.548	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	6.966	6.966	0	1.988	0	0	0	0	0	0
2002	192	23	2789	340.496	-426.449	D	7.747	7.745	0.003	3.631	99.44	0.42	0	0	0	0.08
2002	193	23	2789	340.496	-426.449	D	8.496	8.484	0.011	5.313	99.81	0.13	0	0	0	0.04
2002	194	23	2789	340.496	-426.449	D	9.328	9.321	0.007	7.372	99.55	0.38	0	0	0	0.02
2002	195	23	660	324.477	-442.529	D	8.908	8.907	0.001	6.331	99.79	0.08	0	0	0	0.02
2002	196	23	68	320.129	-445.468	D	8.017	8.017	0	4.235	99.08	0.2	0	0	0	0.04

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	197	23	891	326.256	-437.705	D	7.421	7.421	0	2.932	98.62	0.03	0	0	0	0.04
2002	198	23	2418	339.946	-426.612	D	9.313	9.313	0	7.352	99.01	0.03	0	0	0	0.01
2002	199	23	1	318.65	-445.782	D	8.871	8.871	0	6.243	0	0	0	0	0	0
2002	200	23	1	318.65	-445.782	D	9.09	9.09	0	6.785	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.7	7.7	0	3.533	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.159	7.159	0	2.385	0	0	0	0	0	0
2002	204	23	2706	329.518	-425.046	D	7.12	7.119	0.001	2.301	99.62	0.05	0	0	0	0.18
2002	205	23	2571	322.646	-445.476	D	7.47	7.459	0.012	3.013	99.85	0.09	0	0	0	0.06
2002	206	23	37	319.567	-443.993	D	7.233	7.231	0.003	2.532	99.81	0.1	0	0	0	0.07
2002	207	23	2789	340.496	-426.449	D	7.074	7.07	0.004	2.202	99.9	0.02	0	0	0	0.07
2002	208	23	2788	340.294	-426.448	D	7.873	7.872	0.001	3.912	99.55	0.04	0	0	0	0.05
2002	209	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.824	7.824	0	3.806	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	8.482	8.482	0	5.307	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.166	7.166	0	2.398	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.644	7.644	0	3.411	0	0	0	0	0	0
2002	214	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	215	23	1	318.65	-445.782	D	7.971	7.971	0	4.133	0	0	0	0	0	0
2002	216	23	1	318.65	-445.782	D	7.347	7.347	0	2.775	0	0	0	0	0	0
2002	217	23	1	318.65	-445.782	D	7.34	7.34	0	2.761	0	0	0	0	0	0
2002	218	23	1551	330.189	-425.292	D	6.805	6.805	0	1.664	90.4	0.07	0	0	0	0.13
2002	219	23	2684	326.713	-427.014	D	8.625	8.625	0	5.648	99.43	0.06	0	0	0	0.04
2002	220	23	1	318.65	-445.782	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	6.724	6.724	0	1.505	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.045	7.045	0	2.15	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.191	7.191	0	2.45	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	6.912	6.912	0	1.88	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	8.619	8.619	0	5.634	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	9.936	9.936	0	9	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	8.318	8.318	0	4.925	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	8.63	8.63	0	5.658	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	6.941	6.941	0	1.939	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	6.972	6.972	0	2.001	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.651	7.651	0	3.426	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.084	7.084	0	2.23	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	236	23	2255	335.942	-426.039	D	7.952	7.906	0.046	3.987	99.83	0.08	0	0	0	0.09
2002	237	23	2468	334.002	-434.887	D	8.689	8.661	0.028	5.735	99.78	0.17	0	0	0	0.05
2002	238	23	2373	337.927	-425.951	D	7.797	7.797	0	3.746	54.19	0.03	0	0	0	0.02
2002	239	23	1	318.65	-445.782	D	6.98	6.98	0	2.017	0	0	0	0	0	0
2002	240	23	1	318.65	-445.782	D	7.508	7.508	0	3.117	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.124	7.124	0	2.313	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.14	7.14	0	2.344	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.361	7.361	0	2.805	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.134	7.134	0	2.332	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	6.909	6.909	0	1.875	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	6.972	6.972	0	2.002	0	0	0	0	0	0
2002	247	23	2708	329.979	-425	D	6.925	6.925	0	1.906	99.42	0.01	0	0	0	0.32
2002	248	23	2212	335.879	-430.288	D	7.338	7.337	0.001	2.756	99.3	0.02	0	0	0	0.11
2002	249	23	1	318.65	-445.782	D	6.798	6.797	0	1.65	99.75	0.01	0	0	0	0.12
2002	250	23	1	318.65	-445.782	D	6.737	6.737	0	1.53	0	0	0	0	0	0
2002	251	23	1	318.65	-445.782	D	7.423	7.423	0	2.937	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.171	7.171	0	2.409	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.202	7.202	0	2.474	0	0	0	0	0	0
2002	254	23	2781	339.842	-425.379	D	7.074	7.068	0.006	2.196	98.83	0.95	0	0	0	0.22
2002	255	23	305	322.115	-445.381	D	8.076	8.076	0	4.368	99.36	0.01	0	0	0	0.19
2002	256	23	2589	318.383	-445.593	D	6.68	6.68	0	1.418	99.6	0.03	0	0	0	0.22
2002	257	23	1048	326.791	-427.189	D	6.666	6.666	0	1.389	97.82	0.03	0	0	0	0.15
2002	258	23	2684	326.713	-427.014	D	8.379	8.372	0.008	5.048	99.54	0.31	0	0	0	0.13
2002	259	23	96	320.312	-443.961	D	8.521	8.462	0.059	5.26	99.59	0.35	0	0	0	0.05
2002	260	23	2762	336.074	-425.006	D	7.858	7.812	0.046	3.779	99.71	0.24	0	0	0	0.05
2002	261	23	2789	340.496	-426.449	D	8.444	8.444	0.001	5.217	99.75	0.22	0	0	0	0.06
2002	262	23	1	318.65	-445.782	D	9.39	9.39	0	7.549	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	9.262	9.262	0	7.221	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	6.8	6.8	0	1.655	0	0	0	0	0	0
2002	265	23	2627	320.879	-437.207	D	6.791	6.786	0.005	1.628	99.48	0.31	0	0	0	0.2
2002	266	23	2684	326.713	-427.014	D	6.605	6.605	0	1.27	99.85	0.15	0	0	0	0.76
2002	267	23	2756	335.398	-424.515	D	6.55	6.549	0	1.161	99.1	0.29	0	0	0	0.45
2002	268	23	2758	335.862	-424.454	D	6.827	6.826	0.001	1.708	99.55	0.19	0	0	0	0.21
2002	269	23	1	318.65	-445.782	D	7.39	7.39	0	2.867	0	0	0	0	0	0
2002	270	23	2684	326.713	-427.014	D	7.392	7.39	0.002	2.868	99.54	0.03	0	0	0	0.43
2002	271	23	2704	329.056	-425.092	D	6.813	6.804	0.01	1.663	99.62	0.14	0	0	0	0.22
2002	272	23	1	318.65	-445.782	D	7.197	7.197	0	2.463	0	0	0	0	0	0
2002	273	23	1	318.65	-445.782	D	7.371	7.371	0	2.827	0	0	0	0	0	0
2002	274	23	1	318.65	-445.782	D	6.966	6.966	0	1.989	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	275	23	1	318.65	-445.782	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.523	7.523	0	3.151	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	9.147	9.147	0	6.929	0	0	0	0	0	0
2002	278	23	2443	336.27	-430.011	D	7.044	7.043	0.001	2.146	90.83	8.64	0	0	0	0.56
2002	279	23	2563	323.259	-443.79	D	6.803	6.801	0.002	1.658	99.44	0.25	0	0	0	0.31
2002	280	23	2684	326.713	-427.014	D	6.823	6.818	0.004	1.692	97.47	1.74	0	0	0	0.79
2002	281	23	1	318.65	-445.782	D	6.562	6.562	0	1.186	0	0	0	0	0	0
2002	282	23	1	318.65	-445.782	D	8.768	8.768	0	5.993	0	0	0	0	0	0
2002	283	23	2788	340.294	-426.448	D	9.974	9.974	0.001	9.103	99.15	0.43	0	0	0	0.02
2002	284	23	2467	334.065	-434.651	D	9.417	9.417	0	7.619	99.02	0.32	0	0	0	0.01
2002	285	23	1	318.65	-445.782	D	9.046	9.046	0	6.677	0	0	0	0	0	0
2002	286	23	2589	318.383	-445.593	D	7.914	7.886	0.029	3.942	98.08	1.88	0	0	0	0.04
2002	287	23	1	318.65	-445.782	D	6.522	6.522	0	1.109	0	0	0	0	0	0
2002	288	23	235	321.618	-445.402	D	6.507	6.507	0.001	1.079	97.62	0.78	0	0	0	1.22
2002	289	23	2588	318.452	-445.8	D	6.548	6.548	0	1.158	92.35	0.24	0	0	0	0.32
2002	290	23	1	318.65	-445.782	D	6.977	6.977	0	2.01	98.99	0.28	0	0	0	0.37
2002	291	23	2571	322.646	-445.476	D	6.646	6.645	0.002	1.348	99.47	0.29	0	0	0	0.22
2002	292	23	2704	329.056	-425.092	D	9.795	9.785	0.01	8.591	95.46	4.48	0	0	0	0.05
2002	293	23	2571	322.646	-445.476	D	9.426	9.4	0.026	7.576	97.93	2.04	0	0	0	0.03
2002	294	23	2589	318.383	-445.593	D	6.977	6.975	0.002	2.008	99.13	0.74	0	0	0	0.09
2002	295	23	2588	318.452	-445.8	D	7.45	7.448	0.002	2.991	99.45	0.54	0	0	0	0.05
2002	296	23	1	318.65	-445.782	D	7.031	7.031	0	2.121	99.2	0.26	0	0	0	0.06
2002	297	23	1	318.65	-445.782	D	6.76	6.76	0	1.575	0	0	0	0	0	0
2002	298	23	2704	329.056	-425.092	D	9.68	9.657	0.023	8.249	96.98	2.95	0	0	0	0.07
2002	299	23	2789	340.496	-426.449	D	9.442	9.336	0.106	7.41	96.94	3	0	0	0	0.05
2002	300	23	2597	318.971	-443.851	D	9.17	9.124	0.045	6.872	97.5	2.43	0	0	0	0.06
2002	301	23	2628	320.933	-436.998	D	10.251	10.218	0.033	9.779	98.88	1.09	0	0	0	0.02
2002	302	23	2597	318.971	-443.851	D	9.862	9.834	0.028	8.723	99.05	0.93	0	0	0	0.02
2002	303	23	2597	318.971	-443.851	D	9.139	9.121	0.018	6.864	99.07	0.89	0	0	0	0.04
2002	304	23	2597	318.971	-443.851	D	9.181	9.1	0.081	6.81	97.06	2.91	0	0	0	0.03
2002	305	23	2588	318.452	-445.8	D	7.72	7.72	0	3.576	97.33	2.58	0	0	0	0.22
2002	306	23	2758	335.862	-424.454	D	7.748	7.74	0.008	3.621	96.08	3.68	0	0	0	0.21
2002	307	23	2758	335.862	-424.454	D	10.219	10.218	0.001	9.779	97.46	2.27	0	0	0	0.03
2002	308	23	2781	339.842	-425.379	D	9.258	9.252	0.006	7.196	97.87	2.04	0	0	0	0.07
2002	309	23	2781	339.842	-425.379	D	9.271	9.26	0.011	7.216	98.34	1.62	0	0	0	0.03
2002	310	23	2781	339.842	-425.379	D	8.124	8.086	0.038	4.392	97.33	2.63	0	0	0	0.05
2002	311	23	2373	337.927	-425.951	D	6.541	6.541	0	1.146	84.95	0.34	0	0	0	0.16
2002	312	23	2037	333.945	-425.876	D	6.691	6.691	0	1.439	20.67	0.13	0	0	0	0.02
2002	313	23	1	318.65	-445.782	D	9.044	9.044	0	6.672	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	314	23	2781	339.842	-425.379	D	9.339	9.339	0	7.417	96.57	0.47	0	0	0	0.91
2002	315	23	2781	339.842	-425.379	D	6.81	6.809	0.001	1.673	90.33	8	0	0	0	1.5
2002	316	23	2447	336.137	-430.956	D	6.636	6.633	0.003	1.326	93.56	5.49	0	0	0	0.86
2002	317	23	2789	340.496	-426.449	D	6.608	6.607	0.002	1.274	94.47	4.6	0	0	0	0.91
2002	318	23	2789	340.496	-426.449	D	6.861	6.861	0	1.777	86.31	1.01	0	0	0	0.45
2002	319	23	2782	339.852	-425.592	D	9.468	9.464	0.004	7.741	94.65	5.25	0	0	0	0.06
2002	320	23	2589	318.383	-445.593	D	8.404	8.404	0	5.124	92.41	4.94	0	0	0	0.9
2002	321	23	2789	340.496	-426.449	D	6.723	6.721	0.002	1.499	92.88	6.45	0	0	0	0.67
2002	322	23	1	318.65	-445.782	D	6.826	6.826	0	1.707	0	0	0	0	0	0
2002	323	23	2789	340.496	-426.449	D	6.83	6.829	0.002	1.713	94.07	5.63	0	0	0	0.35
2002	324	23	1663	331.597	-434.723	D	6.494	6.494	0	1.054	74.96	1.4	0	0	0	0.53
2002	325	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	326	23	2710	330.44	-424.955	D	7.017	7.016	0.002	2.09	93.95	4.66	0	0	0	1.34
2002	327	23	2571	322.646	-445.476	D	6.537	6.536	0.001	1.136	94.67	4.54	0	0	0	0.63
2002	328	23	1549	330.211	-425.79	D	6.63	6.629	0	1.318	95.61	1.65	0	0	0	0.32
2002	329	23	2571	322.646	-445.476	D	7.362	7.36	0.001	2.804	96.95	2.82	0	0	0	0.08
2002	330	23	2589	318.383	-445.593	D	6.648	6.647	0.001	1.353	95.46	3.78	0	0	0	0.62
2002	331	23	2599	318.958	-443.364	D	6.9	6.899	0.001	1.853	95.49	4.07	0	0	0	0.38
2002	332	23	2694	327.861	-425.964	D	6.596	6.588	0.007	1.238	95.35	4.31	0	0	0	0.36
2002	333	23	2418	339.946	-426.612	D	6.593	6.593	0	1.247	96.03	1.52	0	0	0	0.29
2002	334	23	1	318.65	-445.782	D	6.662	6.662	0	1.382	0	0	0	0	0	0
2002	335	23	2781	339.842	-425.379	D	6.503	6.503	0	1.072	79.31	17.37	0	0	0	3.03
2002	336	23	1	318.65	-445.782	D	6.496	6.496	0	1.058	0	0	0	0	0	0
2002	337	23	2597	318.971	-443.851	D	7.084	7.074	0.01	2.209	94.08	5.51	0	0	0	0.41
2002	338	23	2588	318.452	-445.8	D	10.218	10.218	0	9.779	91.83	5.83	0	0	0	0.04
2002	339	23	2628	320.933	-436.998	D	8.586	8.586	0	5.553	91.85	6.88	0	0	0	0.45
2002	340	23	2448	335.908	-431.021	D	8.935	8.925	0.01	6.375	93.83	6.05	0	0	0	0.12
2002	341	23	2183	335.664	-431.047	D	7.166	7.166	0	2.399	76.21	3.14	0	0	0	0.14
2002	342	23	2758	335.862	-424.454	D	7.48	7.48	0.001	3.058	97.55	2.21	0	0	0	0.04
2002	343	23	2704	329.056	-425.092	D	8.566	8.547	0.02	5.461	97.67	2.3	0	0	0	0.03
2002	344	23	2628	320.933	-436.998	D	6.88	6.878	0.002	1.811	98.23	1.76	0	0	0	0.09
2002	345	23	2704	329.056	-425.092	D	8.133	8.131	0.003	4.493	98.34	1.56	0	0	0	0.03
2002	346	23	2255	335.942	-426.039	D	8.217	8.216	0.001	4.689	98.64	1.29	0	0	0	0.03
2002	347	23	2597	318.971	-443.851	D	9.466	9.457	0.009	7.724	97.59	2.35	0	0	0	0.05
2002	348	23	2597	318.971	-443.851	D	9.34	9.264	0.076	7.226	96.32	3.62	0	0	0	0.05
2002	349	23	2404	338.92	-425.908	D	7.071	7.071	0	2.203	91.72	1.31	0	0	0	0.08
2002	350	23	1	318.65	-445.782	D	9.107	9.107	0	6.829	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	9.67	9.67	0	8.285	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	9.899	9.899	0	8.899	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	353	23	1623	330.718	-426.018	D	8.182	8.175	0.007	4.595	94.3	5.37	0	0	0	0.32
2002	354	23	1951	333.842	-434.874	D	6.782	6.782	0	1.619	94.91	5.11	0	0	0	0.36
2002	355	23	1	318.65	-445.782	D	6.532	6.532	0	1.128	0	0	0	0	0	0
2002	356	23	2597	318.971	-443.851	D	7.02	7.017	0.003	2.093	90.75	8.84	0	0	0	0.43
2002	357	23	2571	322.646	-445.476	D	7.595	7.59	0.005	3.295	94.84	5.04	0	0	0	0.08
2002	358	23	2571	322.646	-445.476	D	9.689	9.673	0.015	8.292	94.15	5.81	0	0	0	0.04
2002	359	23	2624	320.719	-437.835	D	7.609	7.605	0.004	3.326	93.58	6.27	0	0	0	0.14
2002	360	23	1	318.65	-445.782	D	6.825	6.825	0	1.705	0	0	0	0	0	0
2002	361	23	2788	340.294	-426.448	D	6.923	6.923	0	1.902	78.1	2.69	0	0	0	0.14
2002	362	23	1	318.65	-445.782	D	7.067	7.067	0	2.195	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.04	7.04	0	2.14	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	10.069	10.069	0	9.364	0	0	0	0	0	0
2002	365	23	1548	330.222	-426.04	D	8.828	8.824	0.004	6.128	94.57	5.27	0	0	0	0.06
									0.138							
UMC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	318.65	-445.782	D	6.842	6.842	0	1.74	0	0	0	0	0	0
2002	2	23	2789	340.496	-426.449	D	6.891	6.89	0.001	1.836	77.5	22.35	0	0	0	0.13
2002	3	23	2789	340.496	-426.449	D	7.294	7.288	0.006	2.652	80.39	19.55	0	0	0	0.05
2002	4	23	1	318.65	-445.782	D	6.816	6.816	0	1.687	0	0	0	0	0	0
2002	5	23	1	318.65	-445.782	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2002	6	23	1	318.65	-445.782	D	9.577	9.577	0	8.037	0	0	0	0	0	0
2002	7	23	1	318.65	-445.782	D	7.828	7.828	0	3.813	0	0	0	0	0	0
2002	8	23	1	318.65	-445.782	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2002	9	23	1	318.65	-445.782	D	6.877	6.877	0	1.81	0	0	0	0	0	0
2002	10	23	2789	340.496	-426.449	D	9.467	9.353	0.114	7.455	92.96	7.01	0	0	0	0.02
2002	11	23	2571	322.646	-445.476	D	7.315	7.312	0.004	2.702	93.79	6.2	0	0	0	0.02
2002	12	23	1	318.65	-445.782	D	6.82	6.82	0	1.694	0	0	0	0	0	0
2002	13	23	1	318.65	-445.782	D	7.018	7.018	0	2.094	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	6.95	6.95	0	1.957	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	6.62	6.62	0	1.299	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	17	23	2789	340.496	-426.449	D	6.946	6.933	0.014	1.921	82.07	17.88	0	0	0	0.05
2002	18	23	2789	340.496	-426.449	D	8.821	8.73	0.091	5.901	83.51	16.47	0	0	0	0.02
2002	19	23	2600	318.952	-443.12	D	9.031	8.975	0.055	6.5	92.17	7.81	0	0	0	0.01
2002	20	23	2781	339.842	-425.379	D	9.043	8.882	0.161	6.27	94.03	5.97	0	0	0	0.01
2002	21	23	2255	335.942	-426.039	D	7.268	7.267	0.001	2.609	95.38	4.67	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	22	23	1	318.65	-445.782	D	7.001	7.001	0	2.059	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	9.862	9.862	0	8.798	0	0	0	0	0	0
2002	24	23	1	318.65	-445.782	D	9.399	9.399	0	7.573	0	0	0	0	0	0
2002	25	23	1	318.65	-445.782	D	6.855	6.855	0	1.765	0	0	0	0	0	0
2002	26	23	1951	333.842	-434.874	D	6.707	6.706	0	1.47	98.18	1.53	0	0	0	0.04
2002	27	23	2789	340.496	-426.449	D	6.63	6.629	0	1.318	97.66	2.19	0	0	0	0.03
2002	28	23	1	318.65	-445.782	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2002	29	23	1	318.65	-445.782	D	9.828	9.828	0	8.707	0	0	0	0	0	0
2002	30	23	2758	335.862	-424.454	D	10.722	10.218	**0.504**	9.779	91.94	8.05	0	0	0	0.01
2002	31	23	2694	327.861	-425.964	D	11.675	10.155	**1.52**	9.603	93.76	6.24	0	0	0	0
2002	32	23	2789	340.496	-426.449	D	7.51	7.502	0.008	3.105	95.04	4.96	0	0	0	0
2002	33	23	1	318.65	-445.782	D	7.099	7.099	0	2.261	0	0	0	0	0	0
2002	34	23	1	318.65	-445.782	D	6.798	6.798	0	1.652	0	0	0	0	0	0
2002	35	23	2789	340.496	-426.449	D	6.933	6.932	0	1.921	87.88	11.9	0	0	0	0.12
2002	36	23	2693	327.829	-426.17	D	6.829	6.815	0.014	1.685	86.55	13.38	0	0	0	0.06
2002	37	23	47	319.458	-441.5	D	9.623	9.621	0.002	8.154	92.66	7.16	0	0	0	0.01
2002	38	23	2789	340.496	-426.449	D	9.417	9.412	0.005	7.605	93.69	6.24	0	0	0	0.01
2002	39	23	375	322.611	-445.359	D	7.982	7.981	0.001	4.154	96.39	3.44	0	0	0	0.01
2002	40	23	2781	339.842	-425.379	D	9.316	9.315	0.001	7.357	96.78	3.02	0	0	0	0
2002	41	23	1	318.65	-445.782	D	8.083	8.083	0	4.385	0	0	0	0	0	0
2002	42	23	1	318.65	-445.782	D	7.47	7.47	0	3.037	0	0	0	0	0	0
2002	43	23	1	318.65	-445.782	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2002	44	23	2789	340.496	-426.449	D	6.699	6.691	0.008	1.439	73.17	26.65	0	0	0	0.17
2002	45	23	2571	322.646	-445.476	D	6.605	6.604	0.001	1.269	94.78	5.25	0	0	0	0.06
2002	46	23	2448	335.908	-431.021	D	7.039	7.035	0.004	2.129	93.57	6.42	0	0	0	0.03
2002	47	23	1	318.65	-445.782	D	6.737	6.737	0	1.53	0	0	0	0	0	0
2002	48	23	2789	340.496	-426.449	D	6.562	6.562	0	1.186	96.44	3.46	0	0	0	0.18
2002	49	23	2789	340.496	-426.449	D	6.629	6.621	0.008	1.302	92.11	7.82	0	0	0	0.06
2002	50	23	1	318.65	-445.782	D	8.708	8.708	0	5.847	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	9.05	9.05	0	6.686	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	6.911	6.911	0	1.879	0	0	0	0	0	0
2002	53	23	2789	340.496	-426.449	D	6.81	6.81	0	1.674	91.35	8.48	0	0	0	0.15
2002	54	23	2789	340.496	-426.449	D	6.69	6.687	0.003	1.432	91.66	8.23	0	0	0	0.07
2002	55	23	2789	340.496	-426.449	D	6.795	6.794	0.001	1.643	94.94	5	0	0	0	0.04
2002	56	23	1	318.65	-445.782	D	8.076	8.076	0	4.369	0	0	0	0	0	0
2002	57	23	1	318.65	-445.782	D	7.469	7.469	0	3.035	0	0	0	0	0	0
2002	58	23	1	318.65	-445.782	D	6.708	6.708	0	1.472	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	6.508	6.508	0	1.082	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.98	7.98	0	4.153	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	61	23	2589	318.383	-445.593	D	9.792	9.718	0.074	8.411	90.09	9.9	0	0	0	0.01
2002	62	23	2563	323.259	-443.79	D	7.316	7.316	0	2.711	95.23	4.57	0	0	0	0
2002	63	23	1	318.65	-445.782	D	7.154	7.154	0	2.374	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.141	7.141	0	2.346	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	9.603	9.603	0	8.106	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	8.845	8.845	0	6.18	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	6.753	6.753	0	1.563	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.416	7.416	0	2.922	0	0	0	0	0	0
2002	71	23	1	318.65	-445.782	D	9.328	9.328	0	7.39	0	0	0	0	0	0
2002	72	23	1	318.65	-445.782	D	6.804	6.804	0	1.663	0	0	0	0	0	0
2002	73	23	1	318.65	-445.782	D	7.929	7.929	0	4.037	0	0	0	0	0	0
2002	74	23	1	318.65	-445.782	D	10.09	10.09	0	9.423	0	0	0	0	0	0
2002	75	23	2789	340.496	-426.449	D	8.024	7.991	0.033	4.178	75.19	24.74	0	0	0	0.07
2002	76	23	2704	329.056	-425.092	D	8.498	8.378	0.119	5.064	96.11	3.89	0	0	0	0
2002	77	23	2758	335.862	-424.454	D	9.457	9.442	0.015	7.684	95.5	4.48	0	0	0	0.01
2002	78	23	2781	339.842	-425.379	D	10.24	10.218	0.023	9.779	97.68	2.31	0	0	0	0
2002	79	23	2704	329.056	-425.092	D	10.027	9.428	**0.599**	7.648	93.88	6.11	0	0	0	0
2002	80	23	2789	340.496	-426.449	D	8.481	8.4	0.082	5.114	93.97	6.02	0	0	0	0.01
2002	81	23	1	318.65	-445.782	D	6.551	6.551	0	1.166	0	0	0	0	0	0
2002	82	23	2787	340.091	-426.447	D	6.837	6.837	0	1.73	95.56	3.74	0	0	0	0.03
2002	83	23	2787	340.091	-426.447	D	8.662	8.662	0	5.737	95.66	3.51	0	0	0	0.02
2002	84	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	96.32	2.59	0	0	0	0
2002	85	23	2694	327.861	-425.964	D	8.974	8.641	0.333	5.686	93.05	6.94	0	0	0	0.01
2002	86	23	2468	334.002	-434.887	D	7.931	7.929	0.002	4.039	99.04	0.93	0	0	0	0.03
2002	87	23	2789	340.496	-426.449	D	7.311	7.273	0.039	2.62	97.59	2.4	0	0	0	0.01
2002	88	23	2789	340.496	-426.449	D	8.723	8.669	0.054	5.753	99.12	0.85	0	0	0	0.03
2002	89	23	2571	322.646	-445.476	D	7.685	7.669	0.016	3.466	96	3.97	0	0	0	0.02
2002	90	23	2704	329.056	-425.092	D	8.366	8.365	0.001	5.034	99.05	1	0	0	0	0.08
2002	91	23	2758	335.862	-424.454	D	6.751	6.722	0.029	1.501	95.86	4.09	0	0	0	0.05
2002	92	23	1	318.65	-445.782	D	7.704	7.704	0	3.542	0	0	0	0	0	0
2002	93	23	1	318.65	-445.782	D	6.697	6.697	0	1.452	0	0	0	0	0	0
2002	94	23	2789	340.496	-426.449	D	6.631	6.626	0.005	1.311	93.55	6.37	0	0	0	0.06
2002	95	23	2789	340.496	-426.449	D	6.571	6.559	0.012	1.181	96.6	3.35	0	0	0	0.05
2002	96	23	2789	340.496	-426.449	D	6.595	6.556	0.039	1.175	98.5	1.47	0	0	0	0.04
2002	97	23	2789	340.496	-426.449	D	8.251	8.245	0.006	4.755	99.09	0.9	0	0	0	0.02
2002	98	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	99	23	2789	340.496	-426.449	D	9.166	9.162	0.004	6.968	99.41	0.57	0	0	0	0.05

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	100	23	2589	318.383	-445.593	D	7.61	7.563	0.046	3.237	98.52	1.46	0	0	0	0.02
2002	101	23	2600	318.952	-443.12	D	6.955	6.943	0.011	1.943	99.21	0.78	0	0	0	0.01
2002	102	23	2784	339.87	-426.019	D	7.407	7.407	0	2.904	98.54	0.09	0	0	0	0.01
2002	103	23	1	318.65	-445.782	D	8.889	8.889	0	6.287	0	0	0	0	0	0
2002	104	23	1	318.65	-445.782	D	8.999	8.999	0	6.559	0	0	0	0	0	0
2002	105	23	1	318.65	-445.782	D	8.516	8.516	0	5.389	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.596	7.596	0	3.307	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	8.247	8.247	0	4.758	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	8.641	8.641	0	5.687	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.663	7.663	0	3.453	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	9.387	9.387	0	7.541	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	8.234	8.234	0	4.73	0	0	0	0	0	0
2002	112	23	1	318.65	-445.782	D	6.849	6.849	0	1.754	0	0	0	0	0	0
2002	113	23	2789	340.496	-426.449	D	7.252	7.251	0	2.576	99.33	0.29	0	0	0	0.01
2002	114	23	2781	339.842	-425.379	D	8.838	8.838	0	6.163	97.65	0.29	0	0	0	0.01
2002	115	23	2781	339.842	-425.379	D	6.775	6.767	0.008	1.589	98.2	1.67	0	0	0	0.14
2002	116	23	2758	335.862	-424.454	D	8.054	8.025	0.03	4.253	96.43	3.55	0	0	0	0.02
2002	117	23	2758	335.862	-424.454	D	9.188	9.187	0.002	7.029	98.46	1.54	0	0	0	0.01
2002	118	23	1	318.65	-445.782	D	8.893	8.893	0	6.297	0	0	0	0	0	0
2002	119	23	1	318.65	-445.782	D	6.782	6.782	0	1.619	0	0	0	0	0	0
2002	120	23	1	318.65	-445.782	D	7.861	7.861	0	3.887	0	0	0	0	0	0
2002	121	23	1	318.65	-445.782	D	9.294	9.294	0	7.303	0	0	0	0	0	0
2002	122	23	2789	340.496	-426.449	D	9.15	8.806	0.344	6.083	97.1	2.9	0	0	0	0.01
2002	123	23	37	319.567	-443.993	D	7.411	7.24	0.17	2.553	98.78	1.21	0	0	0	0.01
2002	124	23	2588	318.452	-445.8	D	9.474	9.125	0.349	6.875	98.67	1.33	0	0	0	0
2002	125	23	2597	318.971	-443.851	D	8.518	8.409	0.109	5.135	99.22	0.77	0	0	0	0
2002	126	23	2255	335.942	-426.039	D	8.495	8.488	0.007	5.322	99.9	0.08	0	0	0	0
2002	127	23	1	318.65	-445.782	D	8.423	8.423	0	5.168	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	129	23	1	318.65	-445.782	D	8.462	8.462	0	5.26	0	0	0	0	0	0
2002	130	23	2789	340.496	-426.449	D	6.917	6.889	0.028	1.834	99.45	0.53	0	0	0	0.02
2002	131	23	2784	339.87	-426.019	D	8.348	8.332	0.016	4.956	99.44	0.55	0	0	0	0.01
2002	132	23	1	318.65	-445.782	D	9.38	9.38	0	7.523	0	0	0	0	0	0
2002	133	23	2789	340.496	-426.449	D	8.578	8.578	0	5.534	87.95	12	0	0	0	0.01
2002	134	23	1	318.65	-445.782	D	6.747	6.747	0	1.551	0	0	0	0	0	0
2002	135	23	1	318.65	-445.782	D	6.85	6.85	0	1.755	0	0	0	0	0	0
2002	136	23	1	318.65	-445.782	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	137	23	2611	319.699	-440.64	D	10.286	10.14	0.147	9.561	97.4	2.6	0	0	0	0
2002	138	23	2563	323.259	-443.79	D	8.454	8.39	0.064	5.091	98.22	1.77	0	0	0	0.01

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	139	23	2789	340.496	-426.449	D	7.036	6.863	0.173	1.781	97.73	2.25	0	0	0	0.02
2002	140	23	2588	318.452	-445.8	D	6.883	6.876	0.007	1.808	99.64	0.32	0	0	0	0.02
2002	141	23	2781	339.842	-425.379	D	6.768	6.713	0.055	1.482	98.75	1.22	0	0	0	0.03
2002	142	23	2789	340.496	-426.449	D	6.728	6.704	0.024	1.466	99.44	0.53	0	0	0	0.02
2002	143	23	2781	339.842	-425.379	D	6.756	6.756	0	1.568	99.27	0.21	0	0	0	0.01
2002	144	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	8.137	8.137	0	4.507	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	8.441	8.441	0	5.212	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	8.905	8.905	0	6.327	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	8.901	8.901	0	6.317	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	9.28	9.28	0	7.267	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	8.533	8.533	0	5.428	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.158	7.158	0	2.382	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.878	7.878	0	3.924	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	8.029	8.029	0	4.264	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.439	7.439	0	2.97	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	156	23	2704	329.056	-425.092	D	9.114	9.113	0.001	6.844	99.29	0.64	0	0	0	0.01
2002	157	23	2684	326.713	-427.014	D	9.319	8.755	**0.564**	5.959	95.22	4.77	0	0	0	0.01
2002	158	23	2589	318.383	-445.593	D	6.954	6.909	0.044	1.875	99.79	0.19	0	0	0	0.02
2002	159	23	2781	339.842	-425.379	D	6.94	6.899	0.041	1.853	99.81	0.17	0	0	0	0.02
2002	160	23	2758	335.862	-424.454	D	7.595	7.593	0.002	3.302	99.94	0.03	0	0	0	0.01
2002	161	23	1	318.65	-445.782	D	9.508	9.508	0	7.855	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	8.531	8.531	0	5.424	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	8.238	8.238	0	4.74	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	8.172	8.172	0	4.588	0	0	0	0	0	0
2002	165	23	2788	340.294	-426.448	D	7.432	7.432	0	2.956	97.6	0.47	0	0	0	0
2002	166	23	1	318.65	-445.782	D	6.682	6.682	0	1.422	0	0	0	0	0	0
2002	167	23	1	318.65	-445.782	D	6.744	6.744	0	1.543	0	0	0	0	0	0
2002	168	23	2789	340.496	-426.449	D	6.755	6.752	0.003	1.56	99.36	0.56	0	0	0	0.03
2002	169	23	2789	340.496	-426.449	D	6.723	6.716	0.007	1.488	99.91	0.07	0	0	0	0.02
2002	170	23	2781	339.842	-425.379	D	6.886	6.885	0.002	1.825	99.93	0.05	0	0	0	0.02
2002	171	23	1	318.65	-445.782	D	7.457	7.457	0	3.008	0	0	0	0	0	0
2002	172	23	1	318.65	-445.782	D	8.033	8.033	0	4.272	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.251	7.251	0	2.574	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.025	7.025	0	2.108	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	8.073	8.073	0	4.363	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	8.808	8.808	0	6.089	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	178	23	1	318.65	-445.782	D	8.838	8.838	0	6.163	0	0	0	0	0	0
2002	179	23	1	318.65	-445.782	D	7.841	7.841	0	3.842	0	0	0	0	0	0
2002	180	23	1	318.65	-445.782	D	8.173	8.173	0	4.59	0	0	0	0	0	0
2002	181	23	1	318.65	-445.782	D	8.264	8.264	0	4.798	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	6.882	6.882	0	1.82	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	6.978	6.978	0	2.014	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	8.892	8.892	0	6.295	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2002	186	23	2789	340.496	-426.449	D	8.175	8.174	0.001	4.592	99.84	0.04	0	0	0	0.01
2002	187	23	2758	335.862	-424.454	D	7.464	7.452	0.012	2.999	99.94	0.04	0	0	0	0.01
2002	188	23	2709	330.21	-424.978	D	8.064	8.033	0.032	4.271	99.93	0.07	0	0	0	0
2002	189	23	2707	329.748	-425.023	D	6.867	6.863	0.004	1.782	99.94	0.02	0	0	0	0.01
2002	190	23	2789	340.496	-426.449	D	6.765	6.764	0.001	1.583	99.66	0.01	0	0	0	0.01
2002	191	23	2029	334.033	-427.871	D	7.003	7.003	0	2.065	98.36	0.06	0	0	0	0.01
2002	192	23	2789	340.496	-426.449	D	7.748	7.745	0.003	3.631	99.32	0.65	0	0	0	0.01
2002	193	23	2781	339.842	-425.379	D	8.515	8.494	0.022	5.335	99.5	0.51	0	0	0	0
2002	194	23	2684	326.713	-427.014	D	9.357	9.319	0.039	7.366	99.14	0.85	0	0	0	0
2002	195	23	2597	318.971	-443.851	D	8.878	8.872	0.006	6.246	99.82	0.19	0	0	0	0
2002	196	23	1	318.65	-445.782	D	8.017	8.017	0	4.235	99.7	0.16	0	0	0	0.01
2002	197	23	1	318.65	-445.782	D	7.428	7.428	0	2.948	0	0	0	0	0	0
2002	198	23	1	318.65	-445.782	D	9.517	9.517	0	7.879	0	0	0	0	0	0
2002	199	23	1	318.65	-445.782	D	8.871	8.871	0	6.243	0	0	0	0	0	0
2002	200	23	1	318.65	-445.782	D	9.09	9.09	0	6.785	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.7	7.7	0	3.533	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.159	7.159	0	2.385	0	0	0	0	0	0
2002	204	23	2704	329.056	-425.092	D	7.121	7.119	0.002	2.301	99.93	0.04	0	0	0	0.04
2002	205	23	2255	335.942	-426.039	D	7.812	7.412	0.401	2.913	99.69	0.3	0	0	0	0.01
2002	206	23	146	320.808	-443.939	D	7.318	7.231	0.087	2.532	99.89	0.1	0	0	0	0.01
2002	207	23	2789	340.496	-426.449	D	7.163	7.07	0.093	2.202	99.94	0.05	0	0	0	0.01
2002	208	23	2789	340.496	-426.449	D	7.875	7.872	0.003	3.912	99.96	0.04	0	0	0	0.01
2002	209	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.824	7.824	0	3.806	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	8.482	8.482	0	5.307	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.166	7.166	0	2.398	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.644	7.644	0	3.411	0	0	0	0	0	0
2002	214	23	2783	339.861	-425.806	D	7.317	7.317	0	2.713	98.8	0.04	0	0	0	0.01
2002	215	23	454	323.042	-443.841	D	8.12	8.118	0.001	4.465	99.94	0.01	0	0	0	0
2002	216	23	2597	318.971	-443.851	D	7.445	7.444	0.001	2.982	99.68	0.01	0	0	0	0.01

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	217	23	1045	326.823	-427.937	D	7.403	7.402	0	2.893	99.14	0.01	0	0	0	0.01
2002	218	23	2789	340.496	-426.449	D	6.849	6.819	0.03	1.693	99.88	0.1	0	0	0	0.03
2002	219	23	2563	323.259	-443.79	D	9.324	8.627	**0.697**	5.651	99.48	0.52	0	0	0	0
2002	220	23	2588	318.452	-445.8	D	6.924	6.92	0.004	1.895	99.93	0.05	0	0	0	0.01
2002	221	23	1	318.65	-445.782	D	6.724	6.724	0	1.505	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.045	7.045	0	2.15	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.191	7.191	0	2.45	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	6.912	6.912	0	1.88	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	8.619	8.619	0	5.634	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	9.936	9.936	0	9	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	8.318	8.318	0	4.925	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	8.63	8.63	0	5.658	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	6.941	6.941	0	1.939	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	6.972	6.972	0	2.001	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.651	7.651	0	3.426	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.084	7.084	0	2.23	0	0	0	0	0	0
2002	236	23	1	318.65	-445.782	D	7.668	7.668	0	3.464	0	0	0	0	0	0
2002	237	23	2789	340.496	-426.449	D	8.618	8.587	0.031	5.557	98.91	1.05	0	0	0	0.04
2002	238	23	2555	324.03	-442.528	D	8.286	7.904	0.381	3.983	98.73	1.26	0	0	0	0.01
2002	239	23	2684	326.713	-427.014	D	7.014	6.987	0.027	2.031	99.55	0.43	0	0	0	0.02
2002	240	23	1	318.65	-445.782	D	7.508	7.508	0	3.117	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.124	7.124	0	2.313	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.14	7.14	0	2.344	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.361	7.361	0	2.805	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.134	7.134	0	2.332	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	6.909	6.909	0	1.875	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	6.972	6.972	0	2.002	0	0	0	0	0	0
2002	247	23	2781	339.842	-425.379	D	6.923	6.923	0	1.902	100.12	0.02	0	0	0	0.03
2002	248	23	2255	335.942	-426.039	D	7.37	7.337	0.033	2.756	99.85	0.13	0	0	0	0.01
2002	249	23	2628	320.933	-436.998	D	6.801	6.795	0.006	1.645	99.95	0.02	0	0	0	0.02
2002	250	23	2693	327.829	-426.17	D	6.748	6.748	0	1.552	99.49	0.01	0	0	0	0.02
2002	251	23	1	318.65	-445.782	D	7.423	7.423	0	2.937	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.171	7.171	0	2.409	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.202	7.202	0	2.474	0	0	0	0	0	0
2002	254	23	2781	339.842	-425.379	D	7.207	7.068	0.139	2.196	96.07	3.86	0	0	0	0.07
2002	255	23	54	319.815	-443.982	D	8.345	8.097	0.247	4.417	97.73	2.26	0	0	0	0.01

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	256	23	2588	318.452	-445.8	D	6.694	6.68	0.014	1.418	99.89	0.07	0	0	0	0.03
2002	257	23	2694	327.861	-425.964	D	6.679	6.672	0.007	1.402	99.89	0.06	0	0	0	0.02
2002	258	23	2789	340.496	-426.449	D	8.286	8.282	0.004	4.841	99.82	0.12	0	0	0	0.01
2002	259	23	2789	340.496	-426.449	D	8.587	8.436	0.151	5.2	98.59	1.4	0	0	0	0.01
2002	260	23	2789	340.496	-426.449	D	7.921	7.813	0.109	3.78	99.31	0.67	0	0	0	0.01
2002	261	23	2789	340.496	-426.449	D	8.447	8.444	0.003	5.217	98.76	1.24	0	0	0	0.01
2002	262	23	1	318.65	-445.782	D	9.39	9.39	0	7.549	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	9.262	9.262	0	7.221	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	6.8	6.8	0	1.655	0	0	0	0	0	0
2002	265	23	2789	340.496	-426.449	D	6.831	6.797	0.034	1.649	96.91	2.97	0	0	0	0.11
2002	266	23	2789	340.496	-426.449	D	6.629	6.604	0.025	1.267	98.67	1.25	0	0	0	0.08
2002	267	23	2758	335.862	-424.454	D	6.578	6.549	0.028	1.161	99.21	0.72	0	0	0	0.07
2002	268	23	2758	335.862	-424.454	D	6.844	6.826	0.018	1.708	99.42	0.55	0	0	0	0.03
2002	269	23	1415	329.185	-425.086	D	7.375	7.375	0	2.836	99.3	0.05	0	0	0	0.02
2002	270	23	2597	318.971	-443.851	D	7.451	7.345	0.105	2.773	99.27	0.68	0	0	0	0.05
2002	271	23	2789	340.496	-426.449	D	6.865	6.811	0.055	1.677	99.7	0.26	0	0	0	0.03
2002	272	23	2684	326.713	-427.014	D	7.305	7.238	0.067	2.548	99.68	0.31	0	0	0	0.01
2002	273	23	2704	329.056	-425.092	D	7.339	7.337	0.002	2.755	99.95	0.03	0	0	0	0.01
2002	274	23	1	318.65	-445.782	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.523	7.523	0	3.151	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	9.147	9.147	0	6.929	0	0	0	0	0	0
2002	278	23	2789	340.496	-426.449	D	7.049	7.043	0.006	2.146	99.48	0.41	0	0	0	0.12
2002	279	23	2789	340.496	-426.449	D	6.817	6.806	0.011	1.667	99.24	0.72	0	0	0	0.06
2002	280	23	2789	340.496	-426.449	D	6.839	6.829	0.011	1.713	98.8	1.07	0	0	0	0.14
2002	281	23	2589	318.383	-445.593	D	6.578	6.562	0.016	1.186	98.84	1.08	0	0	0	0.09
2002	282	23	2704	329.056	-425.092	D	9.027	9.027	0	6.628	99.25	0.22	0	0	0	0.02
2002	283	23	2781	339.842	-425.379	D	9.976	9.974	0.002	9.103	98.99	0.91	0	0	0	0
2002	284	23	2789	340.496	-426.449	D	9.419	9.414	0.004	7.612	99.1	0.85	0	0	0	0
2002	285	23	1	318.65	-445.782	D	9.046	9.046	0	6.677	0	0	0	0	0	0
2002	286	23	2695	328.074	-426.025	D	8.112	8.095	0.017	4.412	94.88	5.01	0	0	0	0.11
2002	287	23	2600	318.952	-443.12	D	6.527	6.524	0.003	1.112	97.46	2.51	0	0	0	0.07
2002	288	23	659	323.836	-433.564	D	6.523	6.507	0.015	1.08	97.25	2.71	0	0	0	0.04
2002	289	23	2790	340.421	-426.562	D	6.595	6.554	0.041	1.17	84.16	15.59	0	0	0	0.25
2002	290	23	2447	336.137	-430.956	D	7.762	7.748	0.014	3.638	95.1	4.87	0	0	0	0.02
2002	291	23	2789	340.496	-426.449	D	6.63	6.63	0	1.32	97.82	0.49	0	0	0	0.05
2002	292	23	2781	339.842	-425.379	D	9.833	9.74	0.093	8.47	93.93	6.06	0	0	0	0.01
2002	293	23	2704	329.056	-425.092	D	9.752	9.344	0.408	7.432	92.39	7.59	0	0	0	0.01
2002	294	23	2589	318.383	-445.593	D	7.019	6.975	0.044	2.008	98.02	1.97	0	0	0	0.02

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	295	23	2589	318.383	-445.593	D	7.499	7.448	0.051	2.991	98.3	1.7	0	0	0	0.01
2002	296	23	2758	335.862	-424.454	D	7.008	6.97	0.038	1.996	98.03	1.94	0	0	0	0.03
2002	297	23	2684	326.713	-427.014	D	6.803	6.758	0.045	1.571	98.88	1.1	0	0	0	0.02
2002	298	23	2684	326.713	-427.014	D	9.817	9.657	0.16	8.249	97.3	2.7	0	0	0	0
2002	299	23	2781	339.842	-425.379	D	9.853	9.336	**0.516**	7.411	96.79	3.21	0	0	0	0
2002	300	23	2789	340.496	-426.449	D	9.972	9.18	**0.791**	7.013	95.35	4.64	0	0	0	0.01
2002	301	23	2684	326.713	-427.014	D	10.699	10.218	0.481	9.779	97.43	2.57	0	0	0	0
2002	302	23	2758	335.862	-424.454	D	10.413	9.849	**0.564**	8.762	95.82	4.17	0	0	0	0.01
2002	303	23	2552	324.659	-442.591	D	10.689	9.128	**1.561**	6.882	95.34	4.66	0	0	0	0.01
2002	304	23	2552	324.659	-442.591	D	10.691	9.077	**1.614**	6.754	93.81	6.19	0	0	0	0
2002	305	23	1	318.65	-445.782	D	7.72	7.72	0	3.576	0	0	0	0	0	0
2002	306	23	2571	322.646	-445.476	D	7.783	7.777	0.007	3.701	92.78	7.18	0	0	0	0.01
2002	307	23	2789	340.496	-426.449	D	10.333	10.218	0.116	9.779	93.33	6.66	0	0	0	0
2002	308	23	2789	340.496	-426.449	D	9.253	9.25	0.003	7.192	95.69	4.32	0	0	0	0
2002	309	23	2789	340.496	-426.449	D	9.353	9.322	0.031	7.375	96.56	3.43	0	0	0	0
2002	310	23	2789	340.496	-426.449	D	8.08	8.072	0.009	4.359	92.78	7.22	0	0	0	0.01
2002	311	23	1	318.65	-445.782	D	6.545	6.545	0	1.153	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	6.713	6.713	0	1.482	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	9.044	9.044	0	6.672	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	9.306	9.306	0	7.334	0	0	0	0	0	0
2002	315	23	1	318.65	-445.782	D	6.786	6.786	0	1.628	0	0	0	0	0	0
2002	316	23	2789	340.496	-426.449	D	6.638	6.633	0.005	1.326	73.63	26.16	0	0	0	0.21
2002	317	23	1	318.65	-445.782	D	6.613	6.613	0	1.285	0	0	0	0	0	0
2002	318	23	1	318.65	-445.782	D	7.01	7.01	0	2.079	0	0	0	0	0	0
2002	319	23	1	318.65	-445.782	D	9.393	9.393	0	7.558	0	0	0	0	0	0
2002	320	23	2789	340.496	-426.449	D	8.982	8.881	0.101	6.268	74.08	25.88	0	0	0	0.03
2002	321	23	1	318.65	-445.782	D	6.705	6.705	0	1.467	0	0	0	0	0	0
2002	322	23	1	318.65	-445.782	D	6.826	6.826	0	1.707	0	0	0	0	0	0
2002	323	23	1	318.65	-445.782	D	6.805	6.805	0	1.665	0	0	0	0	0	0
2002	324	23	1	318.65	-445.782	D	6.495	6.495	0	1.057	0	0	0	0	0	0
2002	325	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	326	23	1	318.65	-445.782	D	6.938	6.938	0	1.932	0	0	0	0	0	0
2002	327	23	1	318.65	-445.782	D	6.536	6.536	0	1.136	0	0	0	0	0	0
2002	328	23	1415	329.185	-425.086	D	6.635	6.635	0	1.329	93.22	7.37	0	0	0	0.04
2002	329	23	2789	340.496	-426.449	D	7.306	7.219	0.087	2.507	84.71	15.24	0	0	0	0.05
2002	330	23	2789	340.496	-426.449	D	6.672	6.626	0.046	1.312	88.96	10.98	0	0	0	0.06
2002	331	23	2468	334.002	-434.887	D	6.952	6.899	0.053	1.853	84.58	15.37	0	0	0	0.06
2002	332	23	2588	318.452	-445.8	D	6.591	6.588	0.003	1.237	90.35	9.6	0	0	0	0.04
2002	333	23	340	322.363	-445.37	D	6.591	6.591	0	1.243	93.22	5.27	0	0	0	0.05

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	334	23	1	318.65	-445.782	D	6.662	6.662	0	1.382	0	0	0	0	0	0
2002	335	23	1	318.65	-445.782	D	6.502	6.502	0	1.07	0	0	0	0	0	0
2002	336	23	1	318.65	-445.782	D	6.496	6.496	0	1.058	0	0	0	0	0	0
2002	337	23	37	319.567	-443.993	D	7.093	7.074	0.019	2.209	87.19	12.74	0	0	0	0.06
2002	338	23	2588	318.452	-445.8	D	10.224	10.218	0.006	9.779	88.19	11.8	0	0	0	0
2002	339	23	2789	340.496	-426.449	D	8.697	8.64	0.056	5.684	64.53	35.38	0	0	0	0.08
2002	340	23	1	318.65	-445.782	D	8.705	8.705	0	5.84	0	0	0	0	0	0
2002	341	23	1	318.65	-445.782	D	7.075	7.075	0	2.211	0	0	0	0	0	0
2002	342	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	343	23	2758	335.862	-424.454	D	8.817	8.492	0.325	5.33	91.96	8.03	0	0	0	0
2002	344	23	2628	320.933	-436.998	D	6.899	6.878	0.022	1.811	94.22	5.77	0	0	0	0.01
2002	345	23	2694	327.861	-425.964	D	8.169	8.131	0.038	4.493	95.56	4.44	0	0	0	0
2002	346	23	2708	329.979	-425	D	8.226	8.216	0.01	4.689	96.75	3.24	0	0	0	0
2002	347	23	2709	330.21	-424.978	D	9.817	9.461	0.357	7.733	92.05	7.93	0	0	0	0.01
2002	348	23	2429	338.563	-428.651	D	9.604	9.351	0.253	7.448	91.98	8.01	0	0	0	0.01
2002	349	23	1	318.65	-445.782	D	7.033	7.033	0	2.126	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	9.107	9.107	0	6.829	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	9.67	9.67	0	8.285	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	9.899	9.899	0	8.899	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	8.345	8.345	0	4.987	0	0	0	0	0	0
2002	354	23	1	318.65	-445.782	D	6.783	6.783	0	1.622	0	0	0	0	0	0
2002	355	23	1	318.65	-445.782	D	6.532	6.532	0	1.128	0	0	0	0	0	0
2002	356	23	1	318.65	-445.782	D	7.006	7.006	0	2.071	0	0	0	0	0	0
2002	357	23	1	318.65	-445.782	D	7.59	7.59	0	3.295	0	0	0	0	0	0
2002	358	23	2781	339.842	-425.379	D	9.946	9.805	0.141	8.644	87.66	12.33	0	0	0	0.01
2002	359	23	1	318.65	-445.782	D	7.604	7.604	0	3.324	0	0	0	0	0	0
2002	360	23	1	318.65	-445.782	D	6.825	6.825	0	1.705	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	6.876	6.876	0	1.807	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.067	7.067	0	2.195	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.04	7.04	0	2.14	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	10.069	10.069	0	9.364	0	0	0	0	0	0
2002	365	23	2653	324.014	-433.36	D	8.862	8.822	0.04	6.123	71.72	28.19	0	0	0	0.09
									1.614							
NORANDA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	318.65	-445.782	D	6.842	6.842	0	1.74	0	0	0	0	0	0
2002	2	23	1	318.65	-445.782	D	6.882	6.882	0	1.82	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	3	23	1	318.65	-445.782	D	7.245	7.245	0	2.562	0	0	0	0	0	0
2002	4	23	1	318.65	-445.782	D	6.816	6.816	0	1.687	0	0	0	0	0	0
2002	5	23	1	318.65	-445.782	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2002	6	23	1	318.65	-445.782	D	9.577	9.577	0	8.037	0	0	0	0	0	0
2002	7	23	1	318.65	-445.782	D	7.828	7.828	0	3.813	0	0	0	0	0	0
2002	8	23	1	318.65	-445.782	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2002	9	23	1	318.65	-445.782	D	6.877	6.877	0	1.81	0	0	0	0	0	0
2002	10	23	1	318.65	-445.782	D	9.544	9.544	0	7.951	0	0	0	0	0	0
2002	11	23	1	318.65	-445.782	D	7.312	7.312	0	2.702	0	0	0	0	0	0
2002	12	23	1	318.65	-445.782	D	6.82	6.82	0	1.694	0	0	0	0	0	0
2002	13	23	1	318.65	-445.782	D	7.018	7.018	0	2.094	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	6.95	6.95	0	1.957	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	6.62	6.62	0	1.299	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	17	23	1	318.65	-445.782	D	6.997	6.997	0	2.053	0	0	0	0	0	0
2002	18	23	1	318.65	-445.782	D	8.764	8.764	0	5.982	0	0	0	0	0	0
2002	19	23	2255	335.942	-426.039	D	9.291	8.971	0.32	6.489	98.86	0.15	0	0	0.03	0.96
2002	20	23	2789	340.496	-426.449	D	8.876	8.858	0.018	6.211	98.65	0.07	0	0	0.04	1.23
2002	21	23	2789	340.496	-426.449	D	7.269	7.266	0.003	2.606	98.51	0.1	0	0	0.01	1.39
2002	22	23	1	318.65	-445.782	D	7.001	7.001	0	2.059	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	9.862	9.862	0	8.798	0	0	0	0	0	0
2002	24	23	1	318.65	-445.782	D	9.399	9.399	0	7.573	0	0	0	0	0	0
2002	25	23	1	318.65	-445.782	D	6.855	6.855	0	1.765	0	0	0	0	0	0
2002	26	23	1	318.65	-445.782	D	6.706	6.706	0	1.468	0	0	0	0	0	0
2002	27	23	2783	339.861	-425.806	D	6.626	6.626	0	1.311	89.28	0.05	0	0	0.08	4.87
2002	28	23	1	318.65	-445.782	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2002	29	23	1	318.65	-445.782	D	9.828	9.828	0	8.707	0	0	0	0	0	0
2002	30	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	31	23	1	318.65	-445.782	D	10.176	10.176	0	9.662	0	0	0	0	0	0
2002	32	23	1	318.65	-445.782	D	7.486	7.486	0	3.071	0	0	0	0	0	0
2002	33	23	1	318.65	-445.782	D	7.099	7.099	0	2.261	0	0	0	0	0	0
2002	34	23	1	318.65	-445.782	D	6.798	6.798	0	1.652	0	0	0	0	0	0
2002	35	23	1	318.65	-445.782	D	6.88	6.88	0	1.815	0	0	0	0	0	0
2002	36	23	2587	318.699	-445.781	D	6.855	6.828	0.027	1.711	90.2	0.22	0	0	1.22	8.37
2002	37	23	2704	329.056	-425.092	D	9.657	9.611	0.046	8.127	97.45	0.4	0	0	0.05	2.11
2002	38	23	2789	340.496	-426.449	D	9.706	9.412	0.294	7.605	99.18	0.13	0	0	0.04	0.66
2002	39	23	2571	322.646	-445.476	D	7.996	7.981	0.015	4.154	98.32	0.07	0	0	0.13	1.48
2002	40	23	2789	340.496	-426.449	D	9.366	9.34	0.026	7.421	99.31	0.05	0	0	0.02	0.62
2002	41	23	1	318.65	-445.782	D	8.083	8.083	0	4.385	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	42	23	1	318.65	-445.782	D	7.47	7.47	0	3.037	0	0	0	0	0	0
2002	43	23	1	318.65	-445.782	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2002	44	23	1	318.65	-445.782	D	6.728	6.728	0	1.512	0	0	0	0	0	0
2002	45	23	1	318.65	-445.782	D	6.604	6.604	0	1.269	0	0	0	0	0	0
2002	46	23	1	318.65	-445.782	D	7.064	7.064	0	2.189	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	6.737	6.737	0	1.53	0	0	0	0	0	0
2002	48	23	1	318.65	-445.782	D	6.574	6.574	0	1.21	0	0	0	0	0	0
2002	49	23	2789	340.496	-426.449	D	6.624	6.621	0.003	1.302	92.15	0.12	0	0	0.14	7.58
2002	50	23	1	318.65	-445.782	D	8.708	8.708	0	5.847	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	9.05	9.05	0	6.686	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	6.911	6.911	0	1.879	0	0	0	0	0	0
2002	53	23	1	318.65	-445.782	D	6.779	6.779	0	1.614	0	0	0	0	0	0
2002	54	23	1	318.65	-445.782	D	6.702	6.702	0	1.46	0	0	0	0	0	0
2002	55	23	1	318.65	-445.782	D	6.796	6.796	0	1.648	0	0	0	0	0	0
2002	56	23	1	318.65	-445.782	D	8.076	8.076	0	4.369	0	0	0	0	0	0
2002	57	23	1	318.65	-445.782	D	7.469	7.469	0	3.035	0	0	0	0	0	0
2002	58	23	1	318.65	-445.782	D	6.708	6.708	0	1.472	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	6.508	6.508	0	1.082	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.98	7.98	0	4.153	0	0	0	0	0	0
2002	61	23	2781	339.842	-425.379	D	9.726	9.722	0.004	8.42	95.31	0.42	0	0	0.05	4.24
2002	62	23	2789	340.496	-426.449	D	7.314	7.314	0	2.707	97.56	0.22	0	0	0.01	2.66
2002	63	23	1	318.65	-445.782	D	7.154	7.154	0	2.374	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.141	7.141	0	2.346	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	9.603	9.603	0	8.106	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	8.845	8.845	0	6.18	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	6.753	6.753	0	1.563	0	0	0	0	0	0
2002	70	23	2789	340.496	-426.449	D	7.386	7.385	0.002	2.855	92.22	0.14	0	0	0.14	7.49
2002	71	23	1	318.65	-445.782	D	9.328	9.328	0	7.39	0	0	0	0	0	0
2002	72	23	1	318.65	-445.782	D	6.804	6.804	0	1.663	0	0	0	0	0	0
2002	73	23	1	318.65	-445.782	D	7.929	7.929	0	4.037	0	0	0	0	0	0
2002	74	23	1	318.65	-445.782	D	10.09	10.09	0	9.423	0	0	0	0	0	0
2002	75	23	1	318.65	-445.782	D	7.789	7.789	0	3.728	0	0	0	0	0	0
2002	76	23	1	318.65	-445.782	D	8.42	8.42	0	5.161	0	0	0	0	0	0
2002	77	23	2789	340.496	-426.449	D	9.474	9.466	0.007	7.748	99.21	0.13	0	0	0.02	0.63
2002	78	23	2781	339.842	-425.379	D	11.059	10.218	**0.841**	9.779	99.26	0.07	0	0	0.06	0.61
2002	79	23	2789	340.496	-426.449	D	9.743	9.413	0.33	7.61	99.7	0.02	0	0	0.02	0.26
2002	80	23	1	318.65	-445.782	D	8.134	8.134	0	4.5	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	81	23	1	318.65	-445.782	D	6.551	6.551	0	1.166	0	0	0	0	0	0
2002	82	23	1	318.65	-445.782	D	6.89	6.89	0	1.836	0	0	0	0	0	0
2002	83	23	1	318.65	-445.782	D	8.743	8.743	0	5.932	0	0	0	0	0	0
2002	84	23	2704	329.056	-425.092	D	10.223	10.218	0.006	9.779	99.41	0.09	0	0	0.01	0.47
2002	85	23	2704	329.056	-425.092	D	8.799	8.641	0.158	5.686	99.51	0.06	0	0	0	0.42
2002	86	23	1	318.65	-445.782	D	7.962	7.962	0	4.113	0	0	0	0	0	0
2002	87	23	2789	340.496	-426.449	D	7.273	7.273	0.001	2.62	97.16	0.11	0	0	0.08	2.64
2002	88	23	1	318.65	-445.782	D	8.765	8.765	0	5.984	0	0	0	0	0	0
2002	89	23	2255	335.942	-426.039	D	7.669	7.656	0.013	3.438	97.57	0.03	0	0	0.18	2.21
2002	90	23	2704	329.056	-425.092	D	8.463	8.365	0.098	5.034	96.94	0.26	0	0	0.22	2.58
2002	91	23	2589	318.383	-445.593	D	6.77	6.763	0.008	1.581	97.23	0.01	0	0	0.08	2.67
2002	92	23	2789	340.496	-426.449	D	7.638	7.637	0	3.396	97.22	0.01	0	0	0.06	2.88
2002	93	23	1	318.65	-445.782	D	6.697	6.697	0	1.452	0	0	0	0	0	0
2002	94	23	1	318.65	-445.782	D	6.669	6.669	0	1.395	0	0	0	0	0	0
2002	95	23	1	318.65	-445.782	D	6.574	6.574	0	1.209	0	0	0	0	0	0
2002	96	23	2588	318.452	-445.8	D	6.587	6.566	0.02	1.195	94.46	0.02	0	0	0.46	5.06
2002	97	23	2789	340.496	-426.449	D	8.262	8.245	0.017	4.755	96.16	0.04	0	0	0.15	3.66
2002	98	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	99	23	1	318.65	-445.782	D	9.117	9.117	0	6.854	0	0	0	0	0	0
2002	100	23	2588	318.452	-445.8	D	7.601	7.563	0.037	3.237	94.25	0.01	0	0	0.9	4.85
2002	101	23	2684	326.713	-427.014	D	6.948	6.942	0.006	1.941	85.92	0.05	0	0	0.2	13.83
2002	102	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	103	23	1	318.65	-445.782	D	8.889	8.889	0	6.287	0	0	0	0	0	0
2002	104	23	1	318.65	-445.782	D	8.999	8.999	0	6.559	0	0	0	0	0	0
2002	105	23	1	318.65	-445.782	D	8.516	8.516	0	5.389	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.596	7.596	0	3.307	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	8.247	8.247	0	4.758	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	8.641	8.641	0	5.687	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.663	7.663	0	3.453	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	9.387	9.387	0	7.541	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	8.234	8.234	0	4.73	0	0	0	0	0	0
2002	112	23	1	318.65	-445.782	D	6.849	6.849	0	1.754	0	0	0	0	0	0
2002	113	23	2789	340.496	-426.449	D	7.253	7.251	0.002	2.576	97.58	0.03	0	0	0.08	2.26
2002	114	23	1	318.65	-445.782	D	8.745	8.745	0	5.937	0	0	0	0	0	0
2002	115	23	1	318.65	-445.782	D	6.743	6.743	0	1.543	0	0	0	0	0	0
2002	116	23	2588	318.452	-445.8	D	7.964	7.832	0.132	3.822	98.79	0.08	0	0	0.13	1.01
2002	117	23	2704	329.056	-425.092	D	9.361	9.341	0.019	7.425	98.36	0.1	0	0	0.11	1.43
2002	118	23	1	318.65	-445.782	D	8.893	8.893	0	6.297	0	0	0	0	0	0
2002	119	23	1	318.65	-445.782	D	6.782	6.782	0	1.619	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	120	23	2789	340.496	-426.449	D	7.918	7.913	0.005	4.002	95.81	0.01	0	0	0.04	4.12
2002	121	23	1	318.65	-445.782	D	9.294	9.294	0	7.303	0	0	0	0	0	0
2002	122	23	2784	339.87	-426.019	D	8.929	8.806	0.123	6.083	99.6	0.02	0	0	0.01	0.37
2002	123	23	2571	322.646	-445.476	D	7.284	7.228	0.056	2.527	99.13	0.01	0	0	0.03	0.82
2002	124	23	2255	335.942	-426.039	D	9.702	9.102	**0.6**	6.816	99.01	0.05	0	0	0.05	0.89
2002	125	23	2708	329.979	-425	D	8.661	8.424	0.237	5.171	98.81	0.02	0	0	0.05	1.11
2002	126	23	2789	340.496	-426.449	D	8.478	8.471	0.007	5.282	99.04	0	0	0	0.02	0.92
2002	127	23	1	318.65	-445.782	D	8.423	8.423	0	5.168	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	129	23	1	318.65	-445.782	D	8.462	8.462	0	5.26	0	0	0	0	0	0
2002	130	23	2571	322.646	-445.476	D	7.041	7.019	0.021	2.097	96.49	0.02	0	0	0.28	3.2
2002	131	23	2758	335.862	-424.454	D	8.499	8.437	0.062	5.201	98.33	0.02	0	0	0.05	1.59
2002	132	23	1	318.65	-445.782	D	9.38	9.38	0	7.523	0	0	0	0	0	0
2002	133	23	1	318.65	-445.782	D	8.506	8.506	0	5.364	0	0	0	0	0	0
2002	134	23	1	318.65	-445.782	D	6.747	6.747	0	1.551	0	0	0	0	0	0
2002	135	23	1	318.65	-445.782	D	6.85	6.85	0	1.755	0	0	0	0	0	0
2002	136	23	1	318.65	-445.782	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	137	23	2789	340.496	-426.449	D	10.1	10.1	0	9.449	89.65	1.46	0	0	0.13	7.15
2002	138	23	1	318.65	-445.782	D	7.964	7.964	0	4.116	0	0	0	0	0	0
2002	139	23	1	318.65	-445.782	D	6.861	6.861	0	1.777	0	0	0	0	0	0
2002	140	23	1	318.65	-445.782	D	6.876	6.876	0	1.808	0	0	0	0	0	0
2002	141	23	2781	339.842	-425.379	D	6.726	6.713	0.013	1.482	86.14	0.02	0	0	0.46	13.38
2002	142	23	2781	339.842	-425.379	D	6.712	6.708	0.003	1.473	82.9	0.04	0	0	0.4	16.63
2002	143	23	2401	338.661	-425.669	D	6.756	6.756	0	1.568	91.01	0.01	0	0	0.16	6.86
2002	144	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	8.137	8.137	0	4.507	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	8.441	8.441	0	5.212	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	8.905	8.905	0	6.327	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	8.901	8.901	0	6.317	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	9.28	9.28	0	7.267	0	0	0	0	0	0
2002	150	23	2781	339.842	-425.379	D	8.639	8.637	0.001	5.676	97.01	0	0	0	0.34	2.75
2002	151	23	2781	339.842	-425.379	D	7.161	7.129	0.031	2.323	98.4	0.01	0	0	0.13	1.47
2002	152	23	2781	339.842	-425.379	D	7.745	7.743	0.002	3.626	98.7	0	0	0	0.06	1.22
2002	153	23	1	318.65	-445.782	D	8.029	8.029	0	4.264	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.439	7.439	0	2.97	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	156	23	1	318.65	-445.782	D	8.887	8.887	0	6.281	0	0	0	0	0	0
2002	157	23	1	318.65	-445.782	D	8.762	8.762	0	5.977	0	0	0	0	0	0
2002	158	23	2571	322.646	-445.476	D	6.91	6.909	0	1.875	99.14	0	0	0	0.25	0.92

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	159	23	454	323.042	-443.841	D	6.991	6.908	0.083	1.871	98.2	0	0	0	0.15	1.65
2002	160	23	2758	335.862	-424.454	D	7.619	7.593	0.026	3.302	95.85	0	0	0	0.13	4.02
2002	161	23	1	318.65	-445.782	D	9.508	9.508	0	7.855	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	8.531	8.531	0	5.424	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	8.238	8.238	0	4.74	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	8.172	8.172	0	4.588	0	0	0	0	0	0
2002	165	23	1	318.65	-445.782	D	7.569	7.569	0	3.249	0	0	0	0	0	0
2002	166	23	1	318.65	-445.782	D	6.682	6.682	0	1.422	0	0	0	0	0	0
2002	167	23	1	318.65	-445.782	D	6.744	6.744	0	1.543	0	0	0	0	0	0
2002	168	23	1	318.65	-445.782	D	6.73	6.73	0	1.516	0	0	0	0	0	0
2002	169	23	375	322.611	-445.359	D	6.695	6.695	0	1.448	95.91	0	0	0	0.43	2.38
2002	170	23	2781	339.842	-425.379	D	6.889	6.885	0.004	1.825	98.28	0	0	0	0.15	1.62
2002	171	23	2276	336.157	-425.28	D	7.628	7.628	0	3.377	97.35	0	0	0	0.06	1.37
2002	172	23	1	318.65	-445.782	D	8.033	8.033	0	4.272	0	0	0	0	0	0
2002	173	23	2758	335.862	-424.454	D	7.363	7.361	0.002	2.806	91.34	0	0	0	1.9	6.72
2002	174	23	2709	330.21	-424.978	D	7.163	7.07	0.093	2.2	96.85	0.01	0	0	0.25	2.9
2002	175	23	1449	329.434	-425.075	D	7.379	7.379	0	2.843	76.47	0.01	0	0	0.6	22.26
2002	176	23	1	318.65	-445.782	D	8.073	8.073	0	4.363	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	8.808	8.808	0	6.089	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	8.838	8.838	0	6.163	0	0	0	0	0	0
2002	179	23	1	318.65	-445.782	D	7.841	7.841	0	3.842	0	0	0	0	0	0
2002	180	23	1	318.65	-445.782	D	8.173	8.173	0	4.59	0	0	0	0	0	0
2002	181	23	1	318.65	-445.782	D	8.264	8.264	0	4.798	0	0	0	0	0	0
2002	182	23	1412	329.218	-425.834	D	6.884	6.884	0	1.824	17.63	0	0	0	2.16	3.75
2002	183	23	2564	323.159	-444.002	D	7.094	6.978	0.115	2.014	97.95	0	0	0	0.24	1.81
2002	184	23	2789	340.496	-426.449	D	8.904	8.857	0.048	6.208	99.41	0	0	0	0.05	0.54
2002	185	23	2789	340.496	-426.449	D	7.394	7.309	0.085	2.697	98.27	0	0	0	0.27	1.46
2002	186	23	2429	338.563	-428.651	D	8.956	8.174	**0.782**	4.592	99.18	0	0	0	0.1	0.72
2002	187	23	2600	318.952	-443.12	D	7.694	7.471	0.223	3.04	98.5	0	0	0	0.1	1.39
2002	188	23	2588	318.452	-445.8	D	7.909	7.851	0.058	3.864	98.58	0	0	0	0.12	1.29
2002	189	23	2588	318.452	-445.8	D	6.885	6.865	0.02	1.786	97.35	0	0	0	0.34	2.31
2002	190	23	2597	318.971	-443.851	D	6.826	6.761	0.066	1.577	97.7	0	0	0	0.21	2.09
2002	191	23	2256	335.931	-425.789	D	7.087	7.024	0.063	2.107	98.71	0	0	0	0.06	1.23
2002	192	23	2429	338.563	-428.651	D	7.763	7.745	0.018	3.631	99.35	0	0	0	0.02	0.63
2002	193	23	2789	340.496	-426.449	D	8.539	8.484	0.055	5.313	99.16	0	0	0	0.13	0.7
2002	194	23	2468	334.002	-434.887	D	9.352	9.319	0.033	7.368	99.74	0.01	0	0	0.02	0.23
2002	195	23	2571	322.646	-445.476	D	8.944	8.806	0.138	6.085	99.37	0.01	0	0	0.09	0.53
2002	196	23	2571	322.646	-445.476	D	8.342	8.017	0.325	4.235	98.98	0.02	0	0	0.14	0.86
2002	197	23	2571	322.646	-445.476	D	7.795	7.428	0.367	2.948	98.95	0	0	0	0.09	0.96

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	198	23	2255	335.942	-426.039	D	9.654	9.436	0.218	7.669	99.74	0	0	0	0.02	0.24
2002	199	23	2789	340.496	-426.449	D	8.859	8.843	0.016	6.175	99.69	0	0	0	0.01	0.29
2002	200	23	2781	339.842	-425.379	D	9.392	9.391	0.002	7.551	99.7	0.01	0	0	0.01	0.23
2002	201	23	1	318.65	-445.782	D	7.7	7.7	0	3.533	0	0	0	0	0	0
2002	202	23	2236	336.149	-430.776	D	8.177	8.177	0	4.598	5.57	0	0	0	0.09	0.13
2002	203	23	1549	330.211	-425.79	D	7.235	7.235	0	2.541	40.15	0	0	0	1.69	2.86
2002	204	23	623	324.229	-442.54	D	7.091	7.091	0	2.244	44.18	0	0	0	1.06	3.15
2002	205	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2002	206	23	2571	322.646	-445.476	D	7.2	7.188	0.012	2.445	99.44	0	0	0	0.09	0.46
2002	207	23	2789	340.496	-426.449	D	7.126	7.07	0.056	2.202	99.37	0	0	0	0.04	0.59
2002	208	23	2416	339.665	-425.875	D	7.866	7.866	0	3.898	96.61	0	0	0	0.11	1.9
2002	209	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.824	7.824	0	3.806	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	8.482	8.482	0	5.307	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.166	7.166	0	2.398	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.644	7.644	0	3.411	0	0	0	0	0	0
2002	214	23	2789	340.496	-426.449	D	7.317	7.317	0	2.713	98.49	0	0	0	0.2	1.07
2002	215	23	2468	334.002	-434.887	D	8.46	8.111	0.349	4.448	98.64	0	0	0	0.2	1.16
2002	216	23	2694	327.861	-425.964	D	7.655	7.482	0.173	3.063	99.06	0	0	0	0.08	0.86
2002	217	23	2255	335.942	-426.039	D	7.406	7.402	0.004	2.892	99.04	0	0	0	0.07	0.88
2002	218	23	2571	322.646	-445.476	D	6.885	6.822	0.063	1.699	97.88	0	0	0	0.18	1.93
2002	219	23	2563	323.259	-443.79	D	8.807	8.627	0.181	5.651	99.61	0	0	0	0.01	0.38
2002	220	23	2571	322.646	-445.476	D	6.92	6.92	0.001	1.895	98.28	0	0	0	0.07	1.52
2002	221	23	2571	322.646	-445.476	D	6.789	6.724	0.065	1.505	96.29	0	0	0	0.37	3.34
2002	222	23	2781	339.842	-425.379	D	7.043	7.005	0.038	2.068	96.6	0	0	0	0.18	3.22
2002	223	23	2708	329.979	-425	D	7.281	7.28	0.001	2.635	98.42	0	0	0	0.03	1.56
2002	224	23	1	318.65	-445.782	D	6.912	6.912	0	1.88	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	8.619	8.619	0	5.634	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	9.936	9.936	0	9	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	8.318	8.318	0	4.925	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	8.63	8.63	0	5.658	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	6.941	6.941	0	1.939	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	6.972	6.972	0	2.001	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.651	7.651	0	3.426	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.084	7.084	0	2.23	0	0	0	0	0	0
2002	236	23	1	318.65	-445.782	D	7.668	7.668	0	3.464	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	237	23	1	318.65	-445.782	D	8.628	8.628	0	5.655	0	0	0	0	0	0
2002	238	23	1	318.65	-445.782	D	7.881	7.881	0	3.932	0	0	0	0	0	0
2002	239	23	1	318.65	-445.782	D	6.98	6.98	0	2.017	0	0	0	0	0	0
2002	240	23	1	318.65	-445.782	D	7.508	7.508	0	3.117	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.124	7.124	0	2.313	0	0	0	0	0	0
2002	242	23	2571	322.646	-445.476	D	7.142	7.14	0.002	2.344	87.55	0.01	0	0	3.13	9.31
2002	243	23	2597	318.971	-443.851	D	7.541	7.41	0.131	2.909	97.23	0.02	0	0	0.33	2.42
2002	244	23	2476	332.154	-435.398	D	7.296	7.165	0.131	2.396	97.45	0	0	0	0.18	2.36
2002	245	23	2708	329.979	-425	D	6.937	6.927	0.01	1.91	95.73	0	0	0	0.14	4.13
2002	246	23	1	318.65	-445.782	D	6.972	6.972	0	2.002	0	0	0	0	0	0
2002	247	23	1	318.65	-445.782	D	6.886	6.886	0	1.827	0	0	0	0	0	0
2002	248	23	2588	318.452	-445.8	D	7.237	7.236	0	2.545	95.83	0	0	0	0.5	3.58
2002	249	23	2571	322.646	-445.476	D	6.814	6.797	0.017	1.65	93.73	0	0	0	1.32	4.96
2002	250	23	2757	335.63	-424.484	D	6.77	6.756	0.014	1.567	94.69	0	0	0	0.23	5.07
2002	251	23	1549	330.211	-425.79	D	7.828	7.828	0	3.813	0	0.01	0	0	0	4.28
2002	252	23	2788	340.294	-426.448	D	7.261	7.261	0	2.596	90.71	0	0	0	0.5	9.73
2002	253	23	2597	318.971	-443.851	D	7.334	7.262	0.072	2.598	97.95	0	0	0	0.12	1.92
2002	254	23	2563	323.259	-443.79	D	7.032	7.029	0.003	2.116	97.7	0	0	0	0.29	2
2002	255	23	660	324.477	-442.529	D	8.097	8.097	0	4.417	96.68	0	0	0	0.05	1.19
2002	256	23	2571	322.646	-445.476	D	6.684	6.68	0.004	1.418	98.83	0	0	0	0.19	0.95
2002	257	23	2790	340.421	-426.562	D	6.695	6.657	0.038	1.373	96.98	0	0	0	0.3	2.72
2002	258	23	2789	340.496	-426.449	D	8.308	8.282	0.026	4.841	98.86	0	0	0	0.06	1.07
2002	259	23	2789	340.496	-426.449	D	8.436	8.436	0	5.2	96.17	0.01	0	0	0.07	3.99
2002	260	23	2398	338.694	-426.417	D	7.813	7.813	0	3.78	88.13	0.1	0	0	0.05	6.12
2002	261	23	1549	330.211	-425.79	D	8.426	8.426	0	5.175	89.94	0.2	0	0	0.04	9.94
2002	262	23	1	318.65	-445.782	D	9.39	9.39	0	7.549	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	9.262	9.262	0	7.221	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	6.8	6.8	0	1.655	0	0	0	0	0	0
2002	265	23	1	318.65	-445.782	D	6.783	6.783	0	1.622	0	0	0	0	0	0
2002	266	23	1	318.65	-445.782	D	6.606	6.606	0	1.273	0	0	0	0	0	0
2002	267	23	1	318.65	-445.782	D	6.552	6.552	0	1.167	0	0	0	0	0	0
2002	268	23	2571	322.646	-445.476	D	6.835	6.801	0.035	1.657	94.92	0.01	0	0	0.44	4.63
2002	269	23	2600	318.952	-443.12	D	7.468	7.406	0.062	2.902	95.22	0.06	0	0	0.42	4.3
2002	270	23	2789	340.496	-426.449	D	7.523	7.494	0.029	3.089	96.59	0	0	0	0.91	2.51
2002	271	23	1552	330.178	-425.042	D	6.81	6.809	0.001	1.674	96.87	0	0	0	0.06	2.88
2002	272	23	2468	334.002	-434.887	D	7.332	7.238	0.094	2.548	98.51	0	0	0	0.18	1.31
2002	273	23	2623	320.666	-438.044	D	7.426	7.384	0.042	2.855	97.97	0.01	0	0	0.11	1.91
2002	274	23	2036	333.956	-426.126	D	6.968	6.968	0	1.994	94.01	0	0	0	0.21	2.84
2002	275	23	1	318.65	-445.782	D	7.239	7.239	0	2.549	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	276	23	1	318.65	-445.782	D	7.523	7.523	0	3.151	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	9.147	9.147	0	6.929	0	0	0	0	0	0
2002	278	23	1	318.65	-445.782	D	6.953	6.953	0	1.963	0	0	0	0	0	0
2002	279	23	1	318.65	-445.782	D	6.8	6.8	0	1.655	0	0	0	0	0	0
2002	280	23	1	318.65	-445.782	D	6.811	6.811	0	1.677	0	0	0	0	0	0
2002	281	23	1	318.65	-445.782	D	6.562	6.562	0	1.186	0	0	0	0	0	0
2002	282	23	2588	318.452	-445.8	D	9.046	8.768	0.277	5.993	99.23	0.06	0	0	0.06	0.64
2002	283	23	2571	322.646	-445.476	D	10.338	9.852	0.485	8.772	99.5	0.03	0	0	0.07	0.4
2002	284	23	2588	318.452	-445.8	D	9.486	9.433	0.052	7.662	99.07	0.01	0	0	0.1	0.82
2002	285	23	2588	318.452	-445.8	D	9.227	9.046	0.181	6.677	99.48	0.02	0	0	0.02	0.48
2002	286	23	2448	335.908	-431.021	D	8.182	8.08	0.101	4.379	99.5	0.01	0	0	0	0.48
2002	287	23	1	318.65	-445.782	D	6.522	6.522	0	1.109	0	0	0	0	0	0
2002	288	23	1	318.65	-445.782	D	6.507	6.507	0	1.079	0	0	0	0	0	0
2002	289	23	1	318.65	-445.782	D	6.548	6.548	0	1.158	0	0	0	0	0	0
2002	290	23	1	318.65	-445.782	D	6.977	6.977	0	2.01	0	0	0	0	0	0
2002	291	23	1	318.65	-445.782	D	6.645	6.645	0	1.348	0	0	0	0	0	0
2002	292	23	1	318.65	-445.782	D	9.779	9.779	0	8.575	0	0	0	0	0	0
2002	293	23	1	318.65	-445.782	D	9.4	9.4	0	7.576	0	0	0	0	0	0
2002	294	23	2789	340.496	-426.449	D	6.918	6.917	0.001	1.89	97.06	0	0	0	0.77	2.2
2002	295	23	2468	334.002	-434.887	D	7.36	7.338	0.021	2.758	98.2	0.01	0	0	0.23	1.56
2002	296	23	2588	318.452	-445.8	D	7.069	7.031	0.038	2.121	97.28	0.01	0	0	0.34	2.36
2002	297	23	2588	318.452	-445.8	D	6.76	6.76	0.001	1.575	69.94	0	0	0	5.61	24.46
2002	298	23	2588	318.452	-445.8	D	9.865	9.646	0.219	8.218	99.19	0.05	0	0	0.03	0.73
2002	299	23	2571	322.646	-445.476	D	9.325	9.298	0.027	7.313	99.4	0.02	0	0	0.01	0.56
2002	300	23	2571	322.646	-445.476	D	8.987	8.965	0.022	6.476	98.6	0.03	0	0	0.21	1.17
2002	301	23	2781	339.842	-425.379	D	10.984	10.218	**0.766**	9.779	99.12	0.1	0	0	0.05	0.73
2002	302	23	2597	318.971	-443.851	D	10.663	9.834	**0.829**	8.723	99.31	0.06	0	0	0.04	0.58
2002	303	23	2571	322.646	-445.476	D	9.028	8.913	0.114	6.348	99.53	0.02	0	0	0.02	0.44
2002	304	23	2527	325.898	-438.476	D	9.078	9.077	0.001	6.754	97.8	0	0	0	0.25	1.79
2002	305	23	1	318.65	-445.782	D	7.72	7.72	0	3.576	0	0	0	0	0	0
2002	306	23	1	318.65	-445.782	D	7.777	7.777	0	3.701	0	0	0	0	0	0
2002	307	23	2789	340.496	-426.449	D	10.254	10.218	0.036	9.779	99.42	0.09	0	0	0.05	0.44
2002	308	23	2789	340.496	-426.449	D	9.253	9.25	0.003	7.192	99.73	0.05	0	0	0.01	0.26
2002	309	23	2789	340.496	-426.449	D	9.367	9.322	0.045	7.375	99.79	0.03	0	0	0.01	0.17
2002	310	23	2571	322.646	-445.476	D	8.035	8.034	0	4.275	99.49	0.02	0	0	0	0.23
2002	311	23	1	318.65	-445.782	D	6.545	6.545	0	1.153	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	6.713	6.713	0	1.482	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	9.044	9.044	0	6.672	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	9.306	9.306	0	7.334	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	315	23	1	318.65	-445.782	D	6.786	6.786	0	1.628	0	0	0	0	0	0
2002	316	23	1	318.65	-445.782	D	6.605	6.605	0	1.27	0	0	0	0	0	0
2002	317	23	1	318.65	-445.782	D	6.613	6.613	0	1.285	0	0	0	0	0	0
2002	318	23	1	318.65	-445.782	D	7.01	7.01	0	2.079	0	0	0	0	0	0
2002	319	23	1	318.65	-445.782	D	9.393	9.393	0	7.558	0	0	0	0	0	0
2002	320	23	1	318.65	-445.782	D	8.404	8.404	0	5.124	0	0	0	0	0	0
2002	321	23	1	318.65	-445.782	D	6.705	6.705	0	1.467	0	0	0	0	0	0
2002	322	23	1	318.65	-445.782	D	6.826	6.826	0	1.707	0	0	0	0	0	0
2002	323	23	1	318.65	-445.782	D	6.805	6.805	0	1.665	0	0	0	0	0	0
2002	324	23	1	318.65	-445.782	D	6.495	6.495	0	1.057	0	0	0	0	0	0
2002	325	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	326	23	1	318.65	-445.782	D	6.938	6.938	0	1.932	0	0	0	0	0	0
2002	327	23	1	318.65	-445.782	D	6.536	6.536	0	1.136	0	0	0	0	0	0
2002	328	23	1	318.65	-445.782	D	6.643	6.643	0	1.345	0	0	0	0	0	0
2002	329	23	1	318.65	-445.782	D	7.36	7.36	0	2.804	0	0	0	0	0	0
2002	330	23	1	318.65	-445.782	D	6.647	6.647	0	1.353	0	0	0	0	0	0
2002	331	23	1	318.65	-445.782	D	6.863	6.863	0	1.781	0	0	0	0	0	0
2002	332	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2002	333	23	1	318.65	-445.782	D	6.591	6.591	0	1.243	0	0	0	0	0	0
2002	334	23	1	318.65	-445.782	D	6.662	6.662	0	1.382	0	0	0	0	0	0
2002	335	23	1	318.65	-445.782	D	6.502	6.502	0	1.07	0	0	0	0	0	0
2002	336	23	1	318.65	-445.782	D	6.496	6.496	0	1.058	0	0	0	0	0	0
2002	337	23	1	318.65	-445.782	D	6.994	6.994	0	2.046	0	0	0	0	0	0
2002	338	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	95.28	0.01	0	0	0	0.34
2002	339	23	1	318.65	-445.782	D	8.558	8.558	0	5.488	0	0	0	0	0	0
2002	340	23	1	318.65	-445.782	D	8.705	8.705	0	5.84	0	0	0	0	0	0
2002	341	23	1	318.65	-445.782	D	7.075	7.075	0	2.211	0	0	0	0	0	0
2002	342	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	343	23	2588	318.452	-445.8	D	8.447	8.447	0	5.225	71.97	0.01	0	0	10.83	16.93
2002	344	23	1	318.65	-445.782	D	6.856	6.855	0	1.766	76.49	0	0	0	7.56	15.62
2002	345	23	2588	318.452	-445.8	D	8.192	8.185	0.007	4.617	97.15	0	0	0	0.37	2.47
2002	346	23	2707	329.748	-425.023	D	8.221	8.216	0.004	4.689	99.02	0	0	0	0.03	0.94
2002	347	23	2789	340.496	-426.449	D	9.589	9.461	0.128	7.733	99.17	0.13	0	0	0.04	0.66
2002	348	23	2789	340.496	-426.449	D	9.364	9.351	0.014	7.448	99.11	0.13	0	0	0.01	0.74
2002	349	23	1	318.65	-445.782	D	7.033	7.033	0	2.126	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	9.107	9.107	0	6.829	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	9.67	9.67	0	8.285	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	9.899	9.899	0	8.899	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	8.345	8.345	0	4.987	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	354	23	1	318.65	-445.782	D	6.783	6.783	0	1.622	0	0	0	0	0	0
2002	355	23	1	318.65	-445.782	D	6.532	6.532	0	1.128	0	0	0	0	0	0
2002	356	23	1	318.65	-445.782	D	7.006	7.006	0	2.071	0	0	0	0	0	0
2002	357	23	2571	322.646	-445.476	D	7.591	7.59	0.001	3.295	93.5	0.07	0	0	2.01	4.4
2002	358	23	2588	318.452	-445.8	D	9.688	9.673	0.014	8.292	97.47	0.17	0	0	0.47	1.89
2002	359	23	1	318.65	-445.782	D	7.604	7.604	0	3.324	0	0	0	0	0	0
2002	360	23	1	318.65	-445.782	D	6.825	6.825	0	1.705	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	6.876	6.876	0	1.807	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.067	7.067	0	2.195	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.04	7.04	0	2.14	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	10.069	10.069	0	9.364	0	0	0	0	0	0
2002	365	23	1	318.65	-445.782	D	8.777	8.777	0	6.014	0	0	0	0	0	0
									0.841							
INDEPENDENCE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	2704	329.056	-425.092	D	6.939	6.876	0.063	1.807	73.16	24.66	0	0	0	2.18
2002	2	23	2789	340.496	-426.449	D	7.21	6.89	0.32	1.836	81.68	17.39	0	0	0	0.92
2002	3	23	2597	318.971	-443.851	D	7.462	7.297	0.166	2.67	85.17	14.38	0	0	0	0.46
2002	4	23	2789	340.496	-426.449	D	6.81	6.809	0.001	1.673	88.82	10.65	0	0	0	0.57
2002	5	23	1	318.65	-445.782	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2002	6	23	2589	318.383	-445.593	D	9.744	9.577	0.167	8.037	82.62	17.15	0	0	0	0.22
2002	7	23	2789	340.496	-426.449	D	8.197	7.93	0.267	4.04	75.63	23.51	0	0	0	0.86
2002	8	23	2789	340.496	-426.449	D	6.875	6.874	0.001	1.804	81.14	17.95	0	0	0	0.93
2002	9	23	1	318.65	-445.782	D	6.877	6.877	0	1.81	0	0	0	0	0	0
2002	10	23	2708	329.979	-425	D	9.541	9.393	0.148	7.557	93.38	6.47	0	0	0	0.15
2002	11	23	2789	340.496	-426.449	D	7.517	7.315	0.202	2.709	66.82	31.73	0	0	0	1.45
2002	12	23	2789	340.496	-426.449	D	6.769	6.768	0.001	1.591	88.12	10.48	0	0	0	1.45
2002	13	23	1	318.65	-445.782	D	7.018	7.018	0	2.094	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	6.95	6.95	0	1.957	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	6.62	6.62	0	1.299	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	17	23	2695	328.074	-426.025	D	6.994	6.949	0.045	1.955	68.88	29.2	0	0	0	1.92
2002	18	23	2704	329.056	-425.092	D	8.745	8.733	0.012	5.906	80.98	18.83	0	0	0	0.19
2002	19	23	2758	335.862	-424.454	D	8.964	8.957	0.007	6.455	93.12	6.65	0	0	0	0.22
2002	20	23	2781	339.842	-425.379	D	8.932	8.882	0.05	6.27	93.7	6.23	0	0	0	0.06
2002	21	23	1	318.65	-445.782	D	7.216	7.216	0	2.501	0	0	0	0	0	0
2002	22	23	1	318.65	-445.782	D	7.001	7.001	0	2.059	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	23	23	1	318.65	-445.782	D	9.862	9.862	0	8.798	0	0	0	0	0	0
2002	24	23	2684	326.713	-427.014	D	9.578	9.407	0.171	7.593	88.82	11	0	0	0	0.18
2002	25	23	2552	324.659	-442.591	D	6.99	6.881	0.109	1.817	88.6	11.01	0	0	0	0.39
2002	26	23	2789	340.496	-426.449	D	6.7	6.699	0	1.456	94.56	5.37	0	0	0	0.64
2002	27	23	1	318.65	-445.782	D	6.657	6.657	0	1.373	0	0	0	0	0	0
2002	28	23	1	318.65	-445.782	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2002	29	23	2709	330.21	-424.978	D	9.778	9.753	0.025	8.506	89.74	10.16	0	0	0	0.1
2002	30	23	2711	330.671	-424.932	D	12.178	10.218	**1.96**	9.779	90.6	9.33	0	0	0	0.07
2002	31	23	2704	329.056	-425.092	D	10.236	10.155	0.081	9.603	91.98	7.98	0	0	0	0.04
2002	32	23	2789	340.496	-426.449	D	7.503	7.502	0.001	3.105	93.54	6.44	0	0	0	0.03
2002	33	23	2789	340.496	-426.449	D	7.089	7.088	0.002	2.237	93.56	5.67	0	0	0	0.83
2002	34	23	2789	340.496	-426.449	D	6.818	6.817	0.002	1.688	93.94	5.67	0	0	0	0.4
2002	35	23	2694	327.861	-425.964	D	6.988	6.926	0.062	1.908	62.99	35.5	0	0	0	1.5
2002	36	23	1	318.65	-445.782	D	6.828	6.828	0	1.711	0	0	0	0	0	0
2002	37	23	1	318.65	-445.782	D	9.575	9.575	0	8.033	0	0	0	0	0	0
2002	38	23	2725	331.984	-427.096	D	9.522	9.415	0.107	7.614	88.73	10.9	0	0	0	0.38
2002	39	23	2468	334.002	-434.887	D	7.808	7.724	0.085	3.585	90.83	8.98	0	0	0	0.18
2002	40	23	1	318.65	-445.782	D	9.566	9.566	0	8.007	0	0	0	0	0	0
2002	41	23	1	318.65	-445.782	D	8.083	8.083	0	4.385	0	0	0	0	0	0
2002	42	23	2711	330.671	-424.932	D	7.703	7.55	0.152	3.209	75.47	23.53	0	0	0	0.99
2002	43	23	2781	339.842	-425.379	D	6.621	6.617	0.004	1.293	90.03	8.06	0	0	0	1.92
2002	44	23	2596	318.977	-444.095	D	6.773	6.728	0.045	1.512	87.49	11.12	0	0	0	1.4
2002	45	23	2704	329.056	-425.092	D	6.615	6.591	0.024	1.243	84.19	14.59	0	0	0	1.22
2002	46	23	1	318.65	-445.782	D	7.064	7.064	0	2.189	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	6.737	6.737	0	1.53	0	0	0	0	0	0
2002	48	23	2596	318.977	-444.095	D	6.607	6.574	0.033	1.21	81.53	15.74	0	0	0	2.73
2002	49	23	2589	318.383	-445.593	D	6.636	6.633	0.003	1.325	93.54	5.46	0	0	0	1.03
2002	50	23	1	318.65	-445.782	D	8.708	8.708	0	5.847	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	9.05	9.05	0	6.686	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	6.911	6.911	0	1.879	0	0	0	0	0	0
2002	53	23	2589	318.383	-445.593	D	6.802	6.779	0.022	1.614	72.75	24.94	0	0	0	2.31
2002	54	23	2661	325.283	-432.004	D	6.722	6.697	0.025	1.45	88.05	10.99	0	0	0	0.95
2002	55	23	2789	340.496	-426.449	D	6.795	6.794	0.001	1.643	94.53	4.97	0	0	0	0.52
2002	56	23	2589	318.383	-445.593	D	8.443	8.076	0.367	4.369	84.69	15.09	0	0	0	0.22
2002	57	23	2709	330.21	-424.978	D	7.757	7.666	0.091	3.459	85.57	14.15	0	0	0	0.29
2002	58	23	1	318.65	-445.782	D	6.708	6.708	0	1.472	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	6.508	6.508	0	1.082	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.98	7.98	0	4.153	0	0	0	0	0	0
2002	61	23	2784	339.87	-426.019	D	9.782	9.765	0.017	8.538	82.23	17.59	0	0	0	0.17

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	62	23	1	318.65	-445.782	D	7.265	7.265	0	2.605	0	0	0	0	0	0
2002	63	23	1	318.65	-445.782	D	7.154	7.154	0	2.374	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.141	7.141	0	2.346	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	9.603	9.603	0	8.106	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	8.845	8.845	0	6.18	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	6.753	6.753	0	1.563	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.416	7.416	0	2.922	0	0	0	0	0	0
2002	71	23	2684	326.713	-427.014	D	9.356	9.355	0.001	7.46	97.7	1.39	0	0	0	1
2002	72	23	2781	339.842	-425.379	D	6.917	6.863	0.054	1.782	93.29	6.21	0	0	0	0.5
2002	73	23	2789	340.496	-426.449	D	7.98	7.979	0.001	4.15	97.74	2.15	0	0	0	0.19
2002	74	23	2609	319.563	-441.09	D	10.416	10.107	0.309	9.471	88.43	11.46	0	0	0	0.11
2002	75	23	2571	322.646	-445.476	D	7.823	7.789	0.034	3.728	94.61	5.28	0	0	0	0.11
2002	76	23	1	318.65	-445.782	D	8.42	8.42	0	5.161	0	0	0	0	0	0
2002	77	23	1	318.65	-445.782	D	9.608	9.608	0	8.119	0	0	0	0	0	0
2002	78	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	79	23	1	318.65	-445.782	D	9.393	9.393	0	7.557	0	0	0	0	0	0
2002	80	23	2662	325.404	-431.803	D	8.455	8.348	0.107	4.994	89.67	10.04	0	0	0	0.29
2002	81	23	2614	319.957	-439.987	D	6.565	6.539	0.027	1.141	73.17	24.13	0	0	0	2.69
2002	82	23	2255	335.942	-426.039	D	6.907	6.868	0.039	1.791	84.41	14.87	0	0	0	0.72
2002	83	23	1	318.65	-445.782	D	8.743	8.743	0	5.932	0	0	0	0	0	0
2002	84	23	2757	335.63	-424.484	D	10.221	10.218	0.003	9.779	94.43	5.46	0	0	0	0.02
2002	85	23	2597	318.971	-443.851	D	8.602	8.593	0.01	5.57	92.17	7.57	0	0	0	0.25
2002	86	23	2694	327.861	-425.964	D	8.346	7.921	0.425	4.021	93.7	6.17	0	0	0	0.14
2002	87	23	1242	327.988	-426.138	D	7.267	7.267	0	2.608	99.05	0.46	0	0	0	0.37
2002	88	23	2693	327.829	-426.17	D	8.802	8.74	0.062	5.924	99.17	0.52	0	0	0	0.32
2002	89	23	2588	318.452	-445.8	D	7.749	7.669	0.079	3.466	98.57	1.24	0	0	0	0.19
2002	90	23	2684	326.713	-427.014	D	8.378	8.377	0.001	5.061	97.55	0.96	0	0	0	1.41
2002	91	23	2789	340.496	-426.449	D	6.731	6.723	0.008	1.502	97.2	1.76	0	0	0	1.04
2002	92	23	2789	340.496	-426.449	D	7.72	7.637	0.083	3.396	97.41	2.23	0	0	0	0.36
2002	93	23	2571	322.646	-445.476	D	6.699	6.697	0.001	1.452	98.43	1.31	0	0	0	0.34
2002	94	23	1	318.65	-445.782	D	6.669	6.669	0	1.395	0	0	0	0	0	0
2002	95	23	1	318.65	-445.782	D	6.574	6.574	0	1.209	0	0	0	0	0	0
2002	96	23	2781	339.842	-425.379	D	6.554	6.554	0	1.171	98.46	0.53	0	0	0	0.86
2002	97	23	2789	340.496	-426.449	D	8.246	8.245	0.001	4.755	98	1.83	0	0	0	0.32
2002	98	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	99	23	2781	339.842	-425.379	D	10.305	9.162	**1.143**	6.967	93.47	6.44	0	0	0	0.09
2002	100	23	1	318.65	-445.782	D	7.563	7.563	0	3.237	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	101	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2002	102	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	103	23	1	318.65	-445.782	D	8.889	8.889	0	6.287	0	0	0	0	0	0
2002	104	23	2707	329.748	-425.023	D	9.135	9.135	0.001	6.898	99.68	0.21	0	0	0	0.07
2002	105	23	1	318.65	-445.782	D	8.516	8.516	0	5.389	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.596	7.596	0	3.307	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	8.247	8.247	0	4.758	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	8.641	8.641	0	5.687	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.663	7.663	0	3.453	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	9.387	9.387	0	7.541	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	8.234	8.234	0	4.73	0	0	0	0	0	0
2002	112	23	2789	340.496	-426.449	D	6.875	6.874	0.001	1.804	97.95	0.69	0	0	0	1.5
2002	113	23	2789	340.496	-426.449	D	7.254	7.251	0.003	2.576	98.72	0.66	0	0	0	0.64
2002	114	23	1	318.65	-445.782	D	8.745	8.745	0	5.937	0	0	0	0	0	0
2002	115	23	2684	326.713	-427.014	D	6.791	6.763	0.028	1.581	95.05	4.05	0	0	0	0.9
2002	116	23	2781	339.842	-425.379	D	7.974	7.973	0.001	4.137	97.23	2.55	0	0	0	0.11
2002	117	23	1	318.65	-445.782	D	9.613	9.613	0	8.132	0	0	0	0	0	0
2002	118	23	1	318.65	-445.782	D	8.893	8.893	0	6.297	0	0	0	0	0	0
2002	119	23	2781	339.842	-425.379	D	6.848	6.783	0.065	1.621	98.32	0.9	0	0	0	0.78
2002	120	23	2708	329.979	-425	D	7.918	7.869	0.049	3.905	99.47	0.31	0	0	0	0.22
2002	121	23	2749	333.775	-424.726	D	9.301	9.301	0	7.322	98.28	0.34	0	0	0	0.04
2002	122	23	2704	329.056	-425.092	D	9.031	8.782	0.249	6.026	90.8	9.05	0	0	0	0.15
2002	123	23	2236	336.149	-430.776	D	7.217	7.217	0	2.503	95.08	0.77	0	0	0	0.06
2002	124	23	1	318.65	-445.782	D	9.125	9.125	0	6.875	0	0	0	0	0	0
2002	125	23	1	318.65	-445.782	D	8.379	8.379	0	5.065	0	0	0	0	0	0
2002	126	23	1	318.65	-445.782	D	8.615	8.615	0	5.623	0	0	0	0	0	0
2002	127	23	1	318.65	-445.782	D	8.423	8.423	0	5.168	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	129	23	2661	325.283	-432.004	D	8.518	8.444	0.073	5.219	91.14	8.24	0	0	0	0.62
2002	130	23	2628	320.933	-436.998	D	6.958	6.934	0.024	1.925	98.07	0.96	0	0	0	0.97
2002	131	23	2758	335.862	-424.454	D	8.437	8.437	0	5.201	99.21	0.45	0	0	0	0.03
2002	132	23	1	318.65	-445.782	D	9.38	9.38	0	7.523	0	0	0	0	0	0
2002	133	23	2684	326.713	-427.014	D	9.095	8.562	**0.533**	5.497	95.67	4.26	0	0	0	0.07
2002	134	23	2789	340.496	-426.449	D	6.777	6.761	0.016	1.578	98.08	0.95	0	0	0	0.98
2002	135	23	2789	340.496	-426.449	D	6.815	6.815	0	1.685	94.31	0.6	0	0	0	0.33
2002	136	23	1	318.65	-445.782	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	137	23	1	318.65	-445.782	D	10.134	10.134	0	9.545	0	0	0	0	0	0
2002	138	23	1	318.65	-445.782	D	7.964	7.964	0	4.116	0	0	0	0	0	0
2002	139	23	2694	327.861	-425.964	D	6.922	6.865	0.058	1.785	97.63	1.45	0	0	0	0.91

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	140	23	2789	340.496	-426.449	D	6.962	6.892	0.07	1.841	96.66	2.77	0	0	0	0.57
2002	141	23	2588	318.452	-445.8	D	6.727	6.72	0.007	1.496	98.85	0.63	0	0	0	0.53
2002	142	23	2694	327.861	-425.964	D	6.706	6.705	0.001	1.466	99.41	0.3	0	0	0	0.3
2002	143	23	1	318.65	-445.782	D	6.812	6.812	0	1.679	0	0	0	0	0	0
2002	144	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	8.137	8.137	0	4.507	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	8.441	8.441	0	5.212	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	8.905	8.905	0	6.327	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	8.901	8.901	0	6.317	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	9.28	9.28	0	7.267	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	8.533	8.533	0	5.428	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.158	7.158	0	2.382	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.878	7.878	0	3.924	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	8.029	8.029	0	4.264	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.439	7.439	0	2.97	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	156	23	2707	329.748	-425.023	D	9.115	9.113	0.002	6.844	99.46	0.39	0	0	0	0.08
2002	157	23	2789	340.496	-426.449	D	8.9	8.726	0.174	5.891	97.98	1.96	0	0	0	0.06
2002	158	23	2684	326.713	-427.014	D	6.914	6.904	0.009	1.864	99.47	0.09	0	0	0	0.44
2002	159	23	1	318.65	-445.782	D	6.894	6.894	0	1.844	0	0	0	0	0	0
2002	160	23	1	318.65	-445.782	D	7.528	7.528	0	3.16	0	0	0	0	0	0
2002	161	23	1	318.65	-445.782	D	9.508	9.508	0	7.855	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	8.531	8.531	0	5.424	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	8.238	8.238	0	4.74	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	8.172	8.172	0	4.588	0	0	0	0	0	0
2002	165	23	1454	329.998	-432.294	D	7.922	7.545	0.377	3.197	98.5	1.36	0	0	0	0.13
2002	166	23	2789	340.496	-426.449	D	6.696	6.695	0	1.448	92.1	5.2	0	0	0	2.98
2002	167	23	1990	333.959	-431.871	D	6.75	6.75	0	1.556	93.34	0.03	0	0	0	0.51
2002	168	23	2781	339.842	-425.379	D	6.828	6.754	0.074	1.564	99.23	0.32	0	0	0	0.44
2002	169	23	2789	340.496	-426.449	D	6.773	6.716	0.057	1.488	99.56	0.09	0	0	0	0.35
2002	170	23	2781	339.842	-425.379	D	6.895	6.885	0.011	1.825	99.7	0.08	0	0	0	0.23
2002	171	23	2337	337.15	-425.236	D	7.628	7.628	0	3.377	97.3	0.02	0	0	0	0.23
2002	172	23	1	318.65	-445.782	D	8.033	8.033	0	4.272	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.251	7.251	0	2.574	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.025	7.025	0	2.108	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	8.073	8.073	0	4.363	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	8.808	8.808	0	6.089	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	8.838	8.838	0	6.163	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	179	23	2789	340.496	-426.449	D	7.875	7.874	0.001	3.915	99.79	0.04	0	0	0	0.28
2002	180	23	2789	340.496	-426.449	D	7.988	7.983	0.005	4.16	99.8	0.06	0	0	0	0.16
2002	181	23	1	318.65	-445.782	D	8.264	8.264	0	4.798	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	6.882	6.882	0	1.82	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	6.978	6.978	0	2.014	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	8.892	8.892	0	6.295	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2002	186	23	1	318.65	-445.782	D	8.01	8.01	0	4.221	0	0	0	0	0	0
2002	187	23	1	318.65	-445.782	D	7.431	7.431	0	2.954	0	0	0	0	0	0
2002	188	23	1	318.65	-445.782	D	7.851	7.851	0	3.864	0	0	0	0	0	0
2002	189	23	1	318.65	-445.782	D	6.865	6.865	0	1.786	0	0	0	0	0	0
2002	190	23	1	318.65	-445.782	D	6.746	6.746	0	1.548	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	6.966	6.966	0	1.988	0	0	0	0	0	0
2002	192	23	2789	340.496	-426.449	D	7.753	7.745	0.008	3.631	98.88	0.96	0	0	0	0.16
2002	193	23	2789	340.496	-426.449	D	8.515	8.484	0.031	5.313	99.68	0.25	0	0	0	0.08
2002	194	23	2789	340.496	-426.449	D	9.33	9.321	0.008	7.372	98.99	0.98	0	0	0	0.03
2002	195	23	1	318.65	-445.782	D	8.806	8.806	0	6.085	0	0	0	0	0	0
2002	196	23	1	318.65	-445.782	D	8.017	8.017	0	4.235	0	0	0	0	0	0
2002	197	23	1	318.65	-445.782	D	7.428	7.428	0	2.948	0	0	0	0	0	0
2002	198	23	1	318.65	-445.782	D	9.517	9.517	0	7.879	0	0	0	0	0	0
2002	199	23	1	318.65	-445.782	D	8.871	8.871	0	6.243	0	0	0	0	0	0
2002	200	23	1	318.65	-445.782	D	9.09	9.09	0	6.785	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.7	7.7	0	3.533	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.159	7.159	0	2.385	0	0	0	0	0	0
2002	204	23	2708	329.979	-425	D	7.132	7.119	0.014	2.301	99.51	0.11	0	0	0	0.38
2002	205	23	2563	323.259	-443.79	D	7.562	7.46	0.101	3.016	99.68	0.21	0	0	0	0.11
2002	206	23	1	318.65	-445.782	D	7.188	7.188	0	2.445	0	0	0	0	0	0
2002	207	23	1	318.65	-445.782	D	6.99	6.99	0	2.038	0	0	0	0	0	0
2002	208	23	1	318.65	-445.782	D	7.99	7.99	0	4.174	0	0	0	0	0	0
2002	209	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.824	7.824	0	3.806	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	8.482	8.482	0	5.307	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.166	7.166	0	2.398	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.644	7.644	0	3.411	0	0	0	0	0	0
2002	214	23	2782	339.852	-425.592	D	7.317	7.317	0	2.713	99.27	0.04	0	0	0	0.12
2002	215	23	2468	334.002	-434.887	D	8.113	8.111	0.002	4.448	99.97	0.02	0	0	0	0.06
2002	216	23	2694	327.861	-425.964	D	7.484	7.482	0.001	3.063	99.87	0.02	0	0	0	0.08
2002	217	23	2035	333.967	-426.375	D	7.402	7.402	0	2.892	99.41	0.01	0	0	0	0.08

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	218	23	2709	330.21	-424.978	D	6.806	6.805	0.002	1.664	99.54	0.12	0	0	0	0.29
2002	219	23	2709	330.21	-424.978	D	8.655	8.64	0.015	5.684	99.75	0.18	0	0	0	0.07
2002	220	23	1	318.65	-445.782	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	6.724	6.724	0	1.505	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.045	7.045	0	2.15	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.191	7.191	0	2.45	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	6.912	6.912	0	1.88	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	8.619	8.619	0	5.634	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	9.936	9.936	0	9	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	8.318	8.318	0	4.925	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	8.63	8.63	0	5.658	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	6.941	6.941	0	1.939	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	6.972	6.972	0	2.001	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.651	7.651	0	3.426	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.084	7.084	0	2.23	0	0	0	0	0	0
2002	236	23	2789	340.496	-426.449	D	8.053	7.906	0.147	3.987	99.57	0.21	0	0	0	0.22
2002	237	23	2561	323.441	-443.393	D	8.719	8.663	0.055	5.739	98.55	1.35	0	0	0	0.1
2002	238	23	2571	322.646	-445.476	D	7.882	7.881	0.001	3.932	99.76	0.06	0	0	0	0.13
2002	239	23	1	318.65	-445.782	D	6.98	6.98	0	2.017	0	0	0	0	0	0
2002	240	23	1	318.65	-445.782	D	7.508	7.508	0	3.117	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.124	7.124	0	2.313	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.14	7.14	0	2.344	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.361	7.361	0	2.805	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.134	7.134	0	2.332	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	6.909	6.909	0	1.875	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	6.972	6.972	0	2.002	0	0	0	0	0	0
2002	247	23	2784	339.87	-426.019	D	6.927	6.924	0.003	1.904	99.4	0.03	0	0	0	0.57
2002	248	23	2758	335.862	-424.454	D	7.373	7.326	0.047	2.732	99.64	0.14	0	0	0	0.22
2002	249	23	2704	329.056	-425.092	D	6.808	6.799	0.009	1.653	99.61	0.03	0	0	0	0.34
2002	250	23	1415	329.185	-425.086	D	6.75	6.75	0	1.555	99.47	0.01	0	0	0	0.41
2002	251	23	1	318.65	-445.782	D	7.423	7.423	0	2.937	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.171	7.171	0	2.409	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.202	7.202	0	2.474	0	0	0	0	0	0
2002	254	23	2709	330.21	-424.978	D	7.09	7.068	0.022	2.197	96.01	3.44	0	0	0	0.55
2002	255	23	2571	322.646	-445.476	D	8.076	8.076	0	4.368	99.69	0.03	0	0	0	0.39
2002	256	23	1	318.65	-445.782	D	6.68	6.68	0	1.418	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	257	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2002	258	23	2684	326.713	-427.014	D	8.441	8.372	0.069	5.048	99.12	0.58	0	0	0	0.29
2002	259	23	2597	318.971	-443.851	D	9.031	8.462	**0.569**	5.26	98.81	1.09	0	0	0	0.1
2002	260	23	2781	339.842	-425.379	D	8.017	7.812	0.205	3.779	99.25	0.63	0	0	0	0.11
2002	261	23	2784	339.87	-426.019	D	8.447	8.444	0.003	5.217	98.68	1.21	0	0	0	0.12
2002	262	23	1	318.65	-445.782	D	9.39	9.39	0	7.549	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	9.262	9.262	0	7.221	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	6.8	6.8	0	1.655	0	0	0	0	0	0
2002	265	23	2628	320.933	-436.998	D	6.854	6.786	0.067	1.628	98.82	0.74	0	0	0	0.44
2002	266	23	2644	323.22	-434.992	D	6.606	6.599	0.008	1.258	95.33	3.02	0	0	0	1.64
2002	267	23	2709	330.21	-424.978	D	6.554	6.549	0.005	1.161	98.28	0.84	0	0	0	0.92
2002	268	23	2758	335.862	-424.454	D	6.84	6.826	0.013	1.708	98.94	0.64	0	0	0	0.42
2002	269	23	1	318.65	-445.782	D	7.39	7.39	0	2.867	0	0	0	0	0	0
2002	270	23	2694	327.861	-425.964	D	7.346	7.345	0.001	2.772	98.81	0.1	0	0	0	1.19
2002	271	23	2704	329.056	-425.092	D	6.813	6.804	0.009	1.663	98.89	0.46	0	0	0	0.63
2002	272	23	1	318.65	-445.782	D	7.197	7.197	0	2.463	0	0	0	0	0	0
2002	273	23	1	318.65	-445.782	D	7.371	7.371	0	2.827	0	0	0	0	0	0
2002	274	23	1	318.65	-445.782	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.523	7.523	0	3.151	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	9.147	9.147	0	6.929	0	0	0	0	0	0
2002	278	23	2789	340.496	-426.449	D	7.088	7.043	0.045	2.146	77.2	21.73	0	0	0	1.07
2002	279	23	2599	318.958	-443.364	D	6.807	6.801	0.006	1.658	98.82	0.58	0	0	0	0.58
2002	280	23	2789	340.496	-426.449	D	6.858	6.829	0.03	1.713	92.24	5.58	0	0	0	2.18
2002	281	23	1	318.65	-445.782	D	6.562	6.562	0	1.186	0	0	0	0	0	0
2002	282	23	1	318.65	-445.782	D	8.768	8.768	0	5.993	0	0	0	0	0	0
2002	283	23	1	318.65	-445.782	D	9.852	9.852	0	8.772	0	0	0	0	0	0
2002	284	23	1	318.65	-445.782	D	9.433	9.433	0	7.662	0	0	0	0	0	0
2002	285	23	1	318.65	-445.782	D	9.046	9.046	0	6.677	0	0	0	0	0	0
2002	286	23	2789	340.496	-426.449	D	8.47	8.062	0.408	4.338	95.33	4.58	0	0	0	0.08
2002	287	23	1	318.65	-445.782	D	6.522	6.522	0	1.109	0	0	0	0	0	0
2002	288	23	2600	318.952	-443.12	D	6.525	6.506	0.019	1.078	96.25	1.49	0	0	0	2.26
2002	289	23	2589	318.383	-445.593	D	6.554	6.548	0.006	1.158	94.28	4.03	0	0	0	1.7
2002	290	23	1	318.65	-445.782	D	6.977	6.977	0	2.01	0	0	0	0	0	0
2002	291	23	1	318.65	-445.782	D	6.645	6.645	0	1.348	0	0	0	0	0	0
2002	292	23	2704	329.056	-425.092	D	10.093	9.785	0.308	8.591	90.6	9.3	0	0	0	0.09
2002	293	23	2588	318.452	-445.8	D	9.587	9.4	0.187	7.576	94.24	5.71	0	0	0	0.05
2002	294	23	2588	318.452	-445.8	D	6.977	6.975	0.002	2.008	98.51	1.36	0	0	0	0.16
2002	295	23	2588	318.452	-445.8	D	7.449	7.448	0	2.991	99.34	0.45	0	0	0	0.11

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	296	23	1	318.65	-445.782	D	7.031	7.031	0	2.121	0	0	0	0	0	0
2002	297	23	1	318.65	-445.782	D	6.76	6.76	0	1.575	0	0	0	0	0	0
2002	298	23	1	318.65	-445.782	D	9.646	9.646	0	8.218	0	0	0	0	0	0
2002	299	23	2781	339.842	-425.379	D	9.422	9.336	0.085	7.411	93.17	6.47	0	0	0	0.36
2002	300	23	2597	318.971	-443.851	D	9.666	9.124	**0.542**	6.872	92.89	6.99	0	0	0	0.12
2002	301	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	302	23	1	318.65	-445.782	D	9.773	9.773	0	8.559	0	0	0	0	0	0
2002	303	23	1	318.65	-445.782	D	8.913	8.913	0	6.348	0	0	0	0	0	0
2002	304	23	2600	318.952	-443.12	D	9.392	9.1	0.293	6.81	78.89	20.64	0	0	0	0.46
2002	305	23	2600	318.952	-443.12	D	8.25	8.109	0.141	4.444	91.74	8.02	0	0	0	0.24
2002	306	23	2758	335.862	-424.454	D	7.918	7.74	0.178	3.621	91.14	8.48	0	0	0	0.39
2002	307	23	2781	339.842	-425.379	D	10.229	10.218	0.012	9.779	93.62	6.31	0	0	0	0.07
2002	308	23	2781	339.842	-425.379	D	9.253	9.252	0.001	7.196	93.37	6.34	0	0	0	0.24
2002	309	23	2781	339.842	-425.379	D	9.262	9.26	0.003	7.216	94.42	5.39	0	0	0	0.15
2002	310	23	2789	340.496	-426.449	D	8.1	8.072	0.028	4.359	94.58	5.34	0	0	0	0.08
2002	311	23	1	318.65	-445.782	D	6.545	6.545	0	1.153	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	6.713	6.713	0	1.482	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	9.044	9.044	0	6.672	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	9.306	9.306	0	7.334	0	0	0	0	0	0
2002	315	23	2781	339.842	-425.379	D	6.81	6.809	0.001	1.673	79.85	17.68	0	0	0	2.55
2002	316	23	2236	336.149	-430.776	D	6.67	6.633	0.037	1.326	82.51	15.8	0	0	0	1.68
2002	317	23	2781	339.842	-425.379	D	6.61	6.606	0.004	1.273	88.01	10.08	0	0	0	1.91
2002	318	23	1	318.65	-445.782	D	7.01	7.01	0	2.079	0	0	0	0	0	0
2002	319	23	2781	339.842	-425.379	D	9.532	9.464	0.068	7.741	88.31	11.59	0	0	0	0.11
2002	320	23	2694	327.861	-425.964	D	8.986	8.986	0	6.527	86.22	12.03	0	0	0	1.87
2002	321	23	2789	340.496	-426.449	D	6.736	6.721	0.014	1.499	84.55	14.09	0	0	0	1.37
2002	322	23	1	318.65	-445.782	D	6.826	6.826	0	1.707	0	0	0	0	0	0
2002	323	23	2789	340.496	-426.449	D	6.829	6.829	0	1.713	94.12	1.93	0	0	0	1.92
2002	324	23	2789	340.496	-426.449	D	6.494	6.493	0	1.053	92.44	5.51	0	0	0	1.37
2002	325	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	326	23	2589	318.383	-445.593	D	6.954	6.938	0.017	1.932	85.28	12.1	0	0	0	2.62
2002	327	23	2468	334.002	-434.887	D	6.541	6.538	0.003	1.14	89.26	9.36	0	0	0	1.35
2002	328	23	1415	329.185	-425.086	D	6.635	6.635	0	1.329	95.53	3.99	0	0	0	0.59
2002	329	23	2571	322.646	-445.476	D	7.374	7.36	0.013	2.804	93.43	6.42	0	0	0	0.15
2002	330	23	1	318.65	-445.782	D	6.647	6.647	0	1.353	0	0	0	0	0	0
2002	331	23	2628	320.933	-436.998	D	6.9	6.899	0.001	1.853	83.84	14.57	0	0	0	1.66
2002	332	23	2704	329.056	-425.092	D	6.595	6.588	0.007	1.238	83.19	15.86	0	0	0	0.95
2002	333	23	1	318.65	-445.782	D	6.591	6.591	0	1.243	0	0	0	0	0	0
2002	334	23	1	318.65	-445.782	D	6.662	6.662	0	1.382	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	335	23	2789	340.496	-426.449	D	6.503	6.503	0	1.072	61.25	34.05	0	0	0	4.83
2002	336	23	1	318.65	-445.782	D	6.496	6.496	0	1.058	0	0	0	0	0	0
2002	337	23	2597	318.971	-443.851	D	7.162	7.074	0.088	2.209	87.11	12.08	0	0	0	0.81
2002	338	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	339	23	2694	327.861	-425.964	D	8.62	8.615	0.005	5.623	83.57	15.5	0	0	0	0.93
2002	340	23	2448	335.908	-431.021	D	8.992	8.925	0.068	6.375	85.46	14.22	0	0	0	0.32
2002	341	23	1	318.65	-445.782	D	7.075	7.075	0	2.211	0	0	0	0	0	0
2002	342	23	2758	335.862	-424.454	D	7.486	7.48	0.006	3.058	94.4	5.51	0	0	0	0.07
2002	343	23	2758	335.862	-424.454	D	8.733	8.492	0.241	5.33	94.64	5.31	0	0	0	0.05
2002	344	23	1	318.65	-445.782	D	6.855	6.855	0	1.766	0	0	0	0	0	0
2002	345	23	1	318.65	-445.782	D	8.185	8.185	0	4.617	0	0	0	0	0	0
2002	346	23	1	318.65	-445.782	D	8.309	8.309	0	4.902	0	0	0	0	0	0
2002	347	23	2597	318.971	-443.851	D	9.597	9.457	0.14	7.724	92.12	7.73	0	0	0	0.15
2002	348	23	175	321.056	-443.928	D	10.244	9.264	**0.981**	7.226	92.5	7.4	0	0	0	0.1
2002	349	23	1	318.65	-445.782	D	7.033	7.033	0	2.126	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	9.107	9.107	0	6.829	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	9.67	9.67	0	8.285	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	9.899	9.899	0	8.899	0	0	0	0	0	0
2002	353	23	2784	339.87	-426.019	D	8.233	8.178	0.054	4.602	87.54	11.83	0	0	0	0.63
2002	354	23	2789	340.496	-426.449	D	6.781	6.781	0	1.617	87.32	11.9	0	0	0	0.63
2002	355	23	1	318.65	-445.782	D	6.532	6.532	0	1.128	0	0	0	0	0	0
2002	356	23	2781	339.842	-425.379	D	7.011	7.01	0.001	2.078	79.04	20.44	0	0	0	0.55
2002	357	23	2571	322.646	-445.476	D	7.617	7.59	0.027	3.295	88.69	11.21	0	0	0	0.1
2002	358	23	2588	318.452	-445.8	D	9.794	9.673	0.121	8.292	85.11	14.81	0	0	0	0.08
2002	359	23	2597	318.971	-443.851	D	7.66	7.598	0.062	3.312	89.47	10.38	0	0	0	0.15
2002	360	23	1	318.65	-445.782	D	6.825	6.825	0	1.705	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	6.876	6.876	0	1.807	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.067	7.067	0	2.195	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.04	7.04	0	2.14	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	10.069	10.069	0	9.364	0	0	0	0	0	0
2002	365	23	1548	330.222	-426.04	D	8.868	8.824	0.044	6.128	85.66	14.2	0	0	0	0.13
									1.96							
MARSHALL											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	318.65	-445.782	D	6.842	6.842	0	1.74	0	0	0	0	0	0
2002	2	23	2789	340.496	-426.449	D	6.912	6.89	0.022	1.836	67.04	31.37	0	0	0	1.59
2002	3	23	2789	340.496	-426.449	D	7.358	7.288	0.07	2.652	67.7	31.45	0	0	0	0.85

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	4	23	1	318.65	-445.782	D	6.816	6.816	0	1.687	0	0	0	0	0	0
2002	5	23	1	318.65	-445.782	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2002	6	23	1	318.65	-445.782	D	9.577	9.577	0	8.037	0	0	0	0	0	0
2002	7	23	1	318.65	-445.782	D	7.828	7.828	0	3.813	0	0	0	0	0	0
2002	8	23	1	318.65	-445.782	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2002	9	23	1	318.65	-445.782	D	6.877	6.877	0	1.81	0	0	0	0	0	0
2002	10	23	2653	324.014	-433.36	D	9.684	9.528	0.156	7.91	81.46	18.21	0	0	0	0.33
2002	11	23	2789	340.496	-426.449	D	7.362	7.315	0.047	2.709	88.21	11.36	0	0	0	0.43
2002	12	23	1	318.65	-445.782	D	6.82	6.82	0	1.694	0	0	0	0	0	0
2002	13	23	1	318.65	-445.782	D	7.018	7.018	0	2.094	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	6.95	6.95	0	1.957	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	6.62	6.62	0	1.299	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	17	23	2789	340.496	-426.449	D	6.944	6.933	0.011	1.921	60.51	36.81	0	0	0	2.68
2002	18	23	2623	320.666	-438.044	D	8.871	8.773	0.098	6.005	65.5	34.21	0	0	0	0.29
2002	19	23	2758	335.862	-424.454	D	8.963	8.957	0.006	6.455	86.24	13.45	0	0	0	0.3
2002	20	23	2789	340.496	-426.449	D	8.959	8.858	0.101	6.211	83.49	16.4	0	0	0	0.11
2002	21	23	1	318.65	-445.782	D	7.216	7.216	0	2.501	0	0	0	0	0	0
2002	22	23	1	318.65	-445.782	D	7.001	7.001	0	2.059	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	9.862	9.862	0	8.798	0	0	0	0	0	0
2002	24	23	2789	340.496	-426.449	D	9.407	9.407	0	7.593	75.07	24.5	0	0	0	0.43
2002	25	23	1	318.65	-445.782	D	6.855	6.855	0	1.765	0	0	0	0	0	0
2002	26	23	1	318.65	-445.782	D	6.706	6.706	0	1.468	0	0	0	0	0	0
2002	27	23	1	318.65	-445.782	D	6.657	6.657	0	1.373	0	0	0	0	0	0
2002	28	23	1	318.65	-445.782	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2002	29	23	1	318.65	-445.782	D	9.828	9.828	0	8.707	0	0	0	0	0	0
2002	30	23	2758	335.862	-424.454	D	11.045	10.218	**0.827**	9.779	85.34	14.56	0	0	0	0.1
2002	31	23	2694	327.861	-425.964	D	10.619	10.155	0.464	9.603	86.88	13.06	0	0	0	0.06
2002	32	23	2781	339.842	-425.379	D	7.479	7.475	0.004	3.047	89.17	10.77	0	0	0	0.04
2002	33	23	2789	340.496	-426.449	D	7.088	7.088	0	2.237	86.92	9.48	0	0	0	0.88
2002	34	23	1	318.65	-445.782	D	6.798	6.798	0	1.652	0	0	0	0	0	0
2002	35	23	2255	335.942	-426.039	D	6.928	6.918	0.01	1.891	73.17	24.49	0	0	0	2.33
2002	36	23	2589	318.383	-445.593	D	6.835	6.828	0.007	1.711	76.4	22.32	0	0	0	1.25
2002	37	23	2694	327.861	-425.964	D	9.612	9.611	0	8.127	82.9	17.01	0	0	0	0.12
2002	38	23	2758	335.862	-424.454	D	9.416	9.415	0.001	7.614	87.29	12.43	0	0	0	0.14
2002	39	23	2210	335.901	-430.787	D	7.715	7.715	0.001	3.565	90.35	9.43	0	0	0	0.14
2002	40	23	2781	339.842	-425.379	D	9.315	9.315	0	7.357	92.14	6.81	0	0	0	0.08
2002	41	23	1	318.65	-445.782	D	8.083	8.083	0	4.385	0	0	0	0	0	0
2002	42	23	1	318.65	-445.782	D	7.47	7.47	0	3.037	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	43	23	1	318.65	-445.782	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2002	44	23	2694	327.861	-425.964	D	6.751	6.701	0.049	1.46	51.71	45.59	0	0	0	2.7
2002	45	23	2789	340.496	-426.449	D	6.591	6.586	0.005	1.234	76.22	22.21	0	0	0	1.57
2002	46	23	2399	338.683	-426.168	D	6.985	6.985	0	2.028	82.05	13.7	0	0	0	0.45
2002	47	23	1	318.65	-445.782	D	6.737	6.737	0	1.53	0	0	0	0	0	0
2002	48	23	2789	340.496	-426.449	D	6.568	6.562	0.006	1.186	76.04	20.5	0	0	0	3.45
2002	49	23	2708	329.979	-425	D	6.634	6.631	0.003	1.322	84.75	13.74	0	0	0	1.5
2002	50	23	1	318.65	-445.782	D	8.708	8.708	0	5.847	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	9.05	9.05	0	6.686	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	6.911	6.911	0	1.879	0	0	0	0	0	0
2002	53	23	2790	340.421	-426.562	D	6.829	6.81	0.02	1.674	60.02	37.76	0	0	0	2.23
2002	54	23	2789	340.496	-426.449	D	6.697	6.687	0.009	1.432	79.02	19.43	0	0	0	1.54
2002	55	23	2789	340.496	-426.449	D	6.794	6.794	0	1.643	87.99	11.14	0	0	0	0.74
2002	56	23	2789	340.496	-426.449	D	8.141	8.14	0	4.515	83.63	16	0	0	0	0.17
2002	57	23	1	318.65	-445.782	D	7.469	7.469	0	3.035	0	0	0	0	0	0
2002	58	23	1	318.65	-445.782	D	6.708	6.708	0	1.472	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	6.508	6.508	0	1.082	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.98	7.98	0	4.153	0	0	0	0	0	0
2002	61	23	2784	339.87	-426.019	D	9.778	9.765	0.013	8.538	75.94	23.9	0	0	0	0.16
2002	62	23	1	318.65	-445.782	D	7.265	7.265	0	2.605	0	0	0	0	0	0
2002	63	23	1	318.65	-445.782	D	7.154	7.154	0	2.374	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.141	7.141	0	2.346	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	9.603	9.603	0	8.106	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	8.845	8.845	0	6.18	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	6.753	6.753	0	1.563	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.416	7.416	0	2.922	0	0	0	0	0	0
2002	71	23	1415	329.185	-425.086	D	9.349	9.349	0	7.445	90.03	3.55	0	0	0	1.24
2002	72	23	2781	339.842	-425.379	D	6.864	6.863	0.001	1.782	86.83	12.52	0	0	0	0.62
2002	73	23	1	318.65	-445.782	D	7.929	7.929	0	4.037	0	0	0	0	0	0
2002	74	23	2789	340.496	-426.449	D	9.994	9.958	0.036	9.059	84.69	15.15	0	0	0	0.15
2002	75	23	2789	340.496	-426.449	D	8.332	7.991	0.341	4.178	82.75	17.07	0	0	0	0.18
2002	76	23	1	318.65	-445.782	D	8.42	8.42	0	5.161	0	0	0	0	0	0
2002	77	23	1	318.65	-445.782	D	9.608	9.608	0	8.119	0	0	0	0	0	0
2002	78	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	79	23	2628	320.933	-436.998	D	9.697	9.428	0.269	7.648	72.85	26.84	0	0	0	0.3
2002	80	23	2600	318.952	-443.12	D	8.379	8.294	0.085	4.869	87.39	12.44	0	0	0	0.17
2002	81	23	1	318.65	-445.782	D	6.551	6.551	0	1.166	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	82	23	2789	340.496	-426.449	D	6.837	6.837	0	1.73	76.79	22.21	0	0	0	0.72
2002	83	23	1	318.65	-445.782	D	8.743	8.743	0	5.932	0	0	0	0	0	0
2002	84	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	85	23	2789	340.496	-426.449	D	8.684	8.61	0.074	5.612	68.22	31.11	0	0	0	0.67
2002	86	23	2789	340.496	-426.449	D	7.899	7.862	0.036	3.89	91.44	8.16	0	0	0	0.39
2002	87	23	2255	335.942	-426.039	D	7.28	7.267	0.013	2.608	96.73	3.01	0	0	0	0.27
2002	88	23	2789	340.496	-426.449	D	8.729	8.669	0.059	5.753	98.19	1.13	0	0	0	0.67
2002	89	23	2563	323.259	-443.79	D	7.735	7.663	0.072	3.452	87.69	11.98	0	0	0	0.34
2002	90	23	2705	329.287	-425.069	D	8.366	8.365	0.001	5.034	96.54	1.5	0	0	0	1.76
2002	91	23	2789	340.496	-426.449	D	6.729	6.723	0.006	1.502	94.76	3.97	0	0	0	1.29
2002	92	23	2684	326.713	-427.014	D	7.682	7.652	0.029	3.429	91.89	7.68	0	0	0	0.43
2002	93	23	2789	340.496	-426.449	D	6.717	6.688	0.028	1.433	75.59	22.87	0	0	0	1.55
2002	94	23	2255	335.942	-426.039	D	6.693	6.635	0.059	1.328	85.62	13.44	0	0	0	0.94
2002	95	23	2589	318.383	-445.593	D	6.64	6.574	0.066	1.209	93.79	5.45	0	0	0	0.76
2002	96	23	2694	327.861	-425.964	D	6.585	6.562	0.023	1.187	96.78	2.65	0	0	0	0.56
2002	97	23	2789	340.496	-426.449	D	8.246	8.245	0.001	4.755	97.1	2.48	0	0	0	0.44
2002	98	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	99	23	2789	340.496	-426.449	D	9.321	9.162	0.159	6.968	87.91	11.86	0	0	0	0.23
2002	100	23	2589	318.383	-445.593	D	7.574	7.563	0.011	3.237	97.77	1.66	0	0	0	0.58
2002	101	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2002	102	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	103	23	1	318.65	-445.782	D	8.889	8.889	0	6.287	0	0	0	0	0	0
2002	104	23	1	318.65	-445.782	D	8.999	8.999	0	6.559	0	0	0	0	0	0
2002	105	23	1	318.65	-445.782	D	8.516	8.516	0	5.389	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.596	7.596	0	3.307	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	8.247	8.247	0	4.758	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	8.641	8.641	0	5.687	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.663	7.663	0	3.453	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	9.387	9.387	0	7.541	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	8.234	8.234	0	4.73	0	0	0	0	0	0
2002	112	23	1	318.65	-445.782	D	6.849	6.849	0	1.754	0	0	0	0	0	0
2002	113	23	1	318.65	-445.782	D	7.3	7.3	0	2.678	0	0	0	0	0	0
2002	114	23	1	318.65	-445.782	D	8.745	8.745	0	5.937	0	0	0	0	0	0
2002	115	23	2781	339.842	-425.379	D	6.773	6.767	0.006	1.589	57.96	36.5	0	0	0	5.54
2002	116	23	2789	340.496	-426.449	D	8.001	7.992	0.009	4.179	91.83	7.95	0	0	0	0.22
2002	117	23	2789	340.496	-426.449	D	9.187	9.187	0.001	7.029	96.53	3.27	0	0	0	0.15
2002	118	23	1	318.65	-445.782	D	8.893	8.893	0	6.297	0	0	0	0	0	0
2002	119	23	2789	340.496	-426.449	D	6.783	6.783	0	1.622	96.29	0.32	0	0	0	1.38
2002	120	23	2789	340.496	-426.449	D	7.913	7.913	0	4.002	99	0.37	0	0	0	0.64

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	121	23	1	318.65	-445.782	D	9.294	9.294	0	7.303	0	0	0	0	0	0
2002	122	23	2600	318.952	-443.12	D	8.88	8.821	0.058	6.121	77.51	22.15	0	0	0	0.34
2002	123	23	2589	318.383	-445.593	D	7.256	7.228	0.028	2.527	97.52	2.04	0	0	0	0.43
2002	124	23	1	318.65	-445.782	D	9.125	9.125	0	6.875	0	0	0	0	0	0
2002	125	23	1	318.65	-445.782	D	8.379	8.379	0	5.065	0	0	0	0	0	0
2002	126	23	1	318.65	-445.782	D	8.615	8.615	0	5.623	0	0	0	0	0	0
2002	127	23	1	318.65	-445.782	D	8.423	8.423	0	5.168	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	129	23	1	318.65	-445.782	D	8.462	8.462	0	5.26	0	0	0	0	0	0
2002	130	23	2255	335.942	-426.039	D	6.965	6.934	0.031	1.924	96.4	3.22	0	0	0	0.37
2002	131	23	2789	340.496	-426.449	D	8.337	8.332	0.005	4.956	98.74	1.15	0	0	0	0.11
2002	132	23	1	318.65	-445.782	D	9.38	9.38	0	7.523	0	0	0	0	0	0
2002	133	23	2589	318.383	-445.593	D	8.731	8.506	0.225	5.364	84.12	15.72	0	0	0	0.16
2002	134	23	1	318.65	-445.782	D	6.747	6.747	0	1.551	0	0	0	0	0	0
2002	135	23	1	318.65	-445.782	D	6.85	6.85	0	1.755	0	0	0	0	0	0
2002	136	23	1	318.65	-445.782	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	137	23	2600	318.952	-443.12	D	10.194	10.14	0.054	9.561	95.98	3.97	0	0	0	0.05
2002	138	23	2597	318.971	-443.851	D	8.391	8.39	0.001	5.091	98.58	1.42	0	0	0	0.11
2002	139	23	2694	327.861	-425.964	D	7.102	6.865	0.237	1.785	93.53	6.08	0	0	0	0.39
2002	140	23	2588	318.452	-445.8	D	6.877	6.876	0.001	1.808	98.58	0.61	0	0	0	0.79
2002	141	23	2781	339.842	-425.379	D	6.744	6.713	0.031	1.482	96.39	2.88	0	0	0	0.72
2002	142	23	2781	339.842	-425.379	D	6.723	6.708	0.015	1.473	98.41	1.12	0	0	0	0.46
2002	143	23	1	318.65	-445.782	D	6.812	6.812	0	1.679	0	0	0	0	0	0
2002	144	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	8.137	8.137	0	4.507	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	8.441	8.441	0	5.212	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	8.905	8.905	0	6.327	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	8.901	8.901	0	6.317	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	9.28	9.28	0	7.267	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	8.533	8.533	0	5.428	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.158	7.158	0	2.382	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.878	7.878	0	3.924	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	8.029	8.029	0	4.264	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.439	7.439	0	2.97	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	156	23	2704	329.056	-425.092	D	9.114	9.113	0.001	6.844	98.62	1.09	0	0	0	0.12
2002	157	23	2628	320.933	-436.998	D	8.828	8.786	0.042	6.035	95.61	4.1	0	0	0	0.28
2002	158	23	2589	318.383	-445.593	D	6.914	6.909	0.005	1.875	99.14	0.28	0	0	0	0.59
2002	159	23	2209	335.38	-424.564	D	6.91	6.91	0	1.875	99.38	0.18	0	0	0	0.33

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	160	23	1	318.65	-445.782	D	7.528	7.528	0	3.16	0	0	0	0	0	0
2002	161	23	1	318.65	-445.782	D	9.508	9.508	0	7.855	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	8.531	8.531	0	5.424	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	8.238	8.238	0	4.74	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	8.172	8.172	0	4.588	0	0	0	0	0	0
2002	165	23	2789	340.496	-426.449	D	7.611	7.432	0.179	2.956	95.14	4.64	0	0	0	0.23
2002	166	23	1	318.65	-445.782	D	6.682	6.682	0	1.422	0	0	0	0	0	0
2002	167	23	1	318.65	-445.782	D	6.744	6.744	0	1.543	0	0	0	0	0	0
2002	168	23	2781	339.842	-425.379	D	6.841	6.754	0.087	1.564	98.57	0.79	0	0	0	0.64
2002	169	23	2789	340.496	-426.449	D	6.768	6.716	0.052	1.488	99.29	0.24	0	0	0	0.47
2002	170	23	2781	339.842	-425.379	D	6.886	6.885	0.002	1.825	99.66	0.09	0	0	0	0.35
2002	171	23	1	318.65	-445.782	D	7.457	7.457	0	3.008	0	0	0	0	0	0
2002	172	23	1	318.65	-445.782	D	8.033	8.033	0	4.272	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.251	7.251	0	2.574	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.025	7.025	0	2.108	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	8.073	8.073	0	4.363	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	8.808	8.808	0	6.089	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	8.838	8.838	0	6.163	0	0	0	0	0	0
2002	179	23	1	318.65	-445.782	D	7.841	7.841	0	3.842	0	0	0	0	0	0
2002	180	23	2781	339.842	-425.379	D	7.976	7.976	0	4.144	100.2	0.09	0	0	0	0.17
2002	181	23	1	318.65	-445.782	D	8.264	8.264	0	4.798	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	6.882	6.882	0	1.82	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	6.978	6.978	0	2.014	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	8.892	8.892	0	6.295	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2002	186	23	1	318.65	-445.782	D	8.01	8.01	0	4.221	0	0	0	0	0	0
2002	187	23	1	318.65	-445.782	D	7.431	7.431	0	2.954	0	0	0	0	0	0
2002	188	23	1	318.65	-445.782	D	7.851	7.851	0	3.864	0	0	0	0	0	0
2002	189	23	1	318.65	-445.782	D	6.865	6.865	0	1.786	0	0	0	0	0	0
2002	190	23	1	318.65	-445.782	D	6.746	6.746	0	1.548	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	6.966	6.966	0	1.988	0	0	0	0	0	0
2002	192	23	2789	340.496	-426.449	D	7.747	7.745	0.002	3.631	98.47	1.23	0	0	0	0.25
2002	193	23	2781	339.842	-425.379	D	8.508	8.494	0.014	5.335	99.13	0.76	0	0	0	0.1
2002	194	23	2781	339.842	-425.379	D	9.332	9.321	0.011	7.372	97.68	2.27	0	0	0	0.05
2002	195	23	1	318.65	-445.782	D	8.806	8.806	0	6.085	0	0	0	0	0	0
2002	196	23	1	318.65	-445.782	D	8.017	8.017	0	4.235	0	0	0	0	0	0
2002	197	23	1	318.65	-445.782	D	7.428	7.428	0	2.948	0	0	0	0	0	0
2002	198	23	1	318.65	-445.782	D	9.517	9.517	0	7.879	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	199	23	1	318.65	-445.782	D	8.871	8.871	0	6.243	0	0	0	0	0	0
2002	200	23	1	318.65	-445.782	D	9.09	9.09	0	6.785	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.7	7.7	0	3.533	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.159	7.159	0	2.385	0	0	0	0	0	0
2002	204	23	2781	339.842	-425.379	D	7.127	7.117	0.01	2.298	99.28	0.08	0	0	0	0.64
2002	205	23	2448	335.908	-431.021	D	7.493	7.412	0.082	2.913	99.31	0.52	0	0	0	0.17
2002	206	23	1	318.65	-445.782	D	7.188	7.188	0	2.445	0	0	0	0	0	0
2002	207	23	1	318.65	-445.782	D	6.99	6.99	0	2.038	0	0	0	0	0	0
2002	208	23	1	318.65	-445.782	D	7.99	7.99	0	4.174	0	0	0	0	0	0
2002	209	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.824	7.824	0	3.806	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	8.482	8.482	0	5.307	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.166	7.166	0	2.398	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.644	7.644	0	3.411	0	0	0	0	0	0
2002	214	23	1552	330.178	-425.042	D	7.312	7.312	0	2.702	99.25	0.07	0	0	0	0.23
2002	215	23	2466	334.129	-434.416	D	8.112	8.111	0.002	4.448	99.91	0.04	0	0	0	0.08
2002	216	23	1412	329.218	-425.834	D	7.483	7.482	0.001	3.063	99.71	0.07	0	0	0	0.11
2002	217	23	2123	334.701	-426.093	D	7.402	7.402	0	2.892	99.51	0.03	0	0	0	0.12
2002	218	23	2789	340.496	-426.449	D	6.839	6.819	0.02	1.693	99.34	0.17	0	0	0	0.5
2002	219	23	37	319.567	-443.993	D	8.901	8.627	0.274	5.651	99.04	0.89	0	0	0	0.07
2002	220	23	1	318.65	-445.782	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	6.724	6.724	0	1.505	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.045	7.045	0	2.15	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.191	7.191	0	2.45	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	6.912	6.912	0	1.88	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	8.619	8.619	0	5.634	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	9.936	9.936	0	9	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	8.318	8.318	0	4.925	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	8.63	8.63	0	5.658	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	6.941	6.941	0	1.939	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	6.972	6.972	0	2.001	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.651	7.651	0	3.426	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.084	7.084	0	2.23	0	0	0	0	0	0
2002	236	23	2789	340.496	-426.449	D	7.918	7.906	0.012	3.987	99.4	0.18	0	0	0	0.41
2002	237	23	2781	339.842	-425.379	D	9.121	8.541	**0.58**	5.446	95.88	3.97	0	0	0	0.15

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	238	23	2588	318.452	-445.8	D	7.928	7.881	0.047	3.932	99.38	0.38	0	0	0	0.24
2002	239	23	1	318.65	-445.782	D	6.98	6.98	0	2.017	0	0	0	0	0	0
2002	240	23	1	318.65	-445.782	D	7.508	7.508	0	3.117	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.124	7.124	0	2.313	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.14	7.14	0	2.344	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.361	7.361	0	2.805	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.134	7.134	0	2.332	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	6.909	6.909	0	1.875	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	6.972	6.972	0	2.002	0	0	0	0	0	0
2002	247	23	2789	340.496	-426.449	D	6.925	6.924	0.001	1.904	99.3	0.04	0	0	0	0.7
2002	248	23	2758	335.862	-424.454	D	7.367	7.326	0.041	2.732	99.4	0.29	0	0	0	0.31
2002	249	23	2704	329.056	-425.092	D	6.805	6.799	0.006	1.653	99.5	0.05	0	0	0	0.45
2002	250	23	1241	327.999	-426.387	D	6.748	6.748	0	1.552	98.84	0.02	0	0	0	0.52
2002	251	23	1	318.65	-445.782	D	7.423	7.423	0	2.937	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.171	7.171	0	2.409	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.202	7.202	0	2.474	0	0	0	0	0	0
2002	254	23	2628	320.933	-436.998	D	7.044	7.036	0.007	2.132	96.7	2.11	0	0	0	1.19
2002	255	23	2588	318.452	-445.8	D	8.115	8.076	0.039	4.368	98.24	1.44	0	0	0	0.32
2002	256	23	2588	318.452	-445.8	D	6.682	6.68	0.002	1.418	99.15	0.18	0	0	0	0.64
2002	257	23	1415	329.185	-425.086	D	6.673	6.672	0.001	1.402	99.26	0.17	0	0	0	0.5
2002	258	23	2781	339.842	-425.379	D	8.252	8.245	0.007	4.755	99.06	0.29	0	0	0	0.64
2002	259	23	2781	339.842	-425.379	D	8.897	8.42	0.477	5.161	96.25	3.56	0	0	0	0.18
2002	260	23	2781	339.842	-425.379	D	7.899	7.812	0.087	3.779	98.88	0.89	0	0	0	0.22
2002	261	23	2789	340.496	-426.449	D	8.446	8.444	0.002	5.217	97.58	2.32	0	0	0	0.15
2002	262	23	1	318.65	-445.782	D	9.39	9.39	0	7.549	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	9.262	9.262	0	7.221	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	6.8	6.8	0	1.655	0	0	0	0	0	0
2002	265	23	2599	318.958	-443.364	D	6.861	6.793	0.068	1.641	93.08	5.49	0	0	0	1.43
2002	266	23	2589	318.383	-445.593	D	6.629	6.606	0.023	1.273	93.15	5.23	0	0	0	1.62
2002	267	23	2709	330.21	-424.978	D	6.555	6.549	0.006	1.161	97.35	1.35	0	0	0	1.3
2002	268	23	2781	339.842	-425.379	D	6.838	6.823	0.015	1.702	98.12	1.32	0	0	0	0.56
2002	269	23	2704	329.056	-425.092	D	7.377	7.375	0.002	2.836	99.3	0.46	0	0	0	0.27
2002	270	23	2623	320.666	-438.044	D	7.383	7.345	0.038	2.773	98.01	0.59	0	0	0	1.4
2002	271	23	2571	322.646	-445.476	D	6.855	6.805	0.05	1.666	98.93	0.41	0	0	0	0.66
2002	272	23	2709	330.21	-424.978	D	7.29	7.247	0.043	2.567	98.72	1.03	0	0	0	0.25
2002	273	23	2757	335.63	-424.484	D	7.365	7.365	0	2.814	99.57	0.05	0	0	0	0.29
2002	274	23	1	318.65	-445.782	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.523	7.523	0	3.151	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	277	23	1	318.65	-445.782	D	9.147	9.147	0	6.929	0	0	0	0	0	0
2002	278	23	2789	340.496	-426.449	D	7.048	7.043	0.005	2.146	95.96	1.56	0	0	0	2.45
2002	279	23	2789	340.496	-426.449	D	6.811	6.806	0.005	1.667	97.38	1.61	0	0	0	1.04
2002	280	23	2781	339.842	-425.379	D	6.831	6.818	0.013	1.691	79.33	16.58	0	0	0	4.09
2002	281	23	1	318.65	-445.782	D	6.562	6.562	0	1.186	80.54	1	0	0	0	1.49
2002	282	23	1	318.65	-445.782	D	8.768	8.768	0	5.993	0	0	0	0	0	0
2002	283	23	1	318.65	-445.782	D	9.852	9.852	0	8.772	0	0	0	0	0	0
2002	284	23	1	318.65	-445.782	D	9.433	9.433	0	7.662	0	0	0	0	0	0
2002	285	23	1	318.65	-445.782	D	9.046	9.046	0	6.677	0	0	0	0	0	0
2002	286	23	2781	339.842	-425.379	D	8.15	8.035	0.114	4.277	66.85	32.47	0	0	0	0.68
2002	287	23	1	318.65	-445.782	D	6.522	6.522	0	1.109	0	0	0	0	0	0
2002	288	23	1	318.65	-445.782	D	6.507	6.507	0	1.079	0	0	0	0	0	0
2002	289	23	2704	329.056	-425.092	D	6.562	6.552	0.01	1.167	64.62	31.17	0	0	0	4.23
2002	290	23	2781	339.842	-425.379	D	7.956	7.942	0.015	4.067	83.76	16.03	0	0	0	0.19
2002	291	23	2788	340.294	-426.448	D	6.63	6.63	0	1.32	94.38	0.98	0	0	0	0.8
2002	292	23	2781	339.842	-425.379	D	9.895	9.74	0.155	8.47	85.13	14.75	0	0	0	0.11
2002	293	23	2571	322.646	-445.476	D	9.519	9.4	0.119	7.576	86.99	12.94	0	0	0	0.07
2002	294	23	1	318.65	-445.782	D	6.976	6.975	0.001	2.008	95.4	4.19	0	0	0	0.26
2002	295	23	1	318.65	-445.782	D	7.448	7.448	0	2.991	97.73	1.03	0	0	0	0.27
2002	296	23	1415	329.185	-425.086	D	6.996	6.996	0.001	2.049	92.3	7.26	0	0	0	0.31
2002	297	23	1	318.65	-445.782	D	6.76	6.76	0	1.575	0	0	0	0	0	0
2002	298	23	2781	339.842	-425.379	D	9.517	9.51	0.007	7.862	87.56	12.24	0	0	0	0.2
2002	299	23	2789	340.496	-426.449	D	9.342	9.336	0.006	7.41	87.49	12.37	0	0	0	0.11
2002	300	23	2789	340.496	-426.449	D	9.685	9.18	**0.504**	7.013	86.63	13.27	0	0	0	0.1
2002	301	23	2694	327.861	-425.964	D	10.249	10.218	0.031	9.779	90.91	9.02	0	0	0	0.06
2002	302	23	2684	326.713	-427.014	D	9.834	9.834	0	8.723	92.82	6.74	0	0	0	0.05
2002	303	23	2597	318.971	-443.851	D	9.28	9.121	0.159	6.864	94.79	5.01	0	0	0	0.19
2002	304	23	2589	318.383	-445.593	D	9.768	9	**0.768**	6.563	86.64	13.26	0	0	0	0.1
2002	305	23	2789	340.496	-426.449	D	8.223	8.166	0.057	4.573	84.19	15.66	0	0	0	0.16
2002	306	23	2571	322.646	-445.476	D	7.795	7.777	0.018	3.701	85.16	14.66	0	0	0	0.16
2002	307	23	2789	340.496	-426.449	D	10.253	10.218	0.035	9.779	86.25	13.66	0	0	0	0.09
2002	308	23	1	318.65	-445.782	D	8.974	8.974	0	6.498	0	0	0	0	0	0
2002	309	23	1	318.65	-445.782	D	9.292	9.292	0	7.299	0	0	0	0	0	0
2002	310	23	2789	340.496	-426.449	D	8.081	8.072	0.009	4.359	90.38	9.53	0	0	0	0.09
2002	311	23	1	318.65	-445.782	D	6.545	6.545	0	1.153	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	6.713	6.713	0	1.482	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	9.044	9.044	0	6.672	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	9.306	9.306	0	7.334	0	0	0	0	0	0
2002	315	23	1	318.65	-445.782	D	6.786	6.786	0	1.628	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	316	23	2758	335.862	-424.454	D	6.655	6.633	0.022	1.326	58.93	38.1	0	0	0	2.97
2002	317	23	2789	340.496	-426.449	D	6.607	6.607	0	1.274	71.79	8.32	0	0	0	2.6
2002	318	23	1	318.65	-445.782	D	7.01	7.01	0	2.079	0	0	0	0	0	0
2002	319	23	2704	329.056	-425.092	D	9.903	9.479	0.424	7.781	70.27	29.4	0	0	0	0.33
2002	320	23	2694	327.861	-425.964	D	9.382	8.986	0.395	6.527	82.34	17.47	0	0	0	0.2
2002	321	23	2789	340.496	-426.449	D	6.722	6.721	0	1.499	80.03	18.54	0	0	0	1.51
2002	322	23	1	318.65	-445.782	D	6.826	6.826	0	1.707	0	0	0	0	0	0
2002	323	23	1	318.65	-445.782	D	6.805	6.805	0	1.665	0	0	0	0	0	0
2002	324	23	1	318.65	-445.782	D	6.495	6.495	0	1.057	0	0	0	0	0	0
2002	325	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	326	23	2789	340.496	-426.449	D	7.006	7.005	0.002	2.068	46.64	51.82	0	0	0	1.58
2002	327	23	1	318.65	-445.782	D	6.536	6.536	0	1.136	0	0	0	0	0	0
2002	328	23	1415	329.185	-425.086	D	6.635	6.635	0	1.329	90.15	9.56	0	0	0	0.81
2002	329	23	2596	318.977	-444.095	D	7.383	7.36	0.023	2.804	71.45	27.55	0	0	0	0.99
2002	330	23	2693	327.829	-426.17	D	6.653	6.628	0.025	1.315	76.56	22.01	0	0	0	1.44
2002	331	23	2621	320.559	-438.464	D	7.007	6.899	0.108	1.853	61.56	37.04	0	0	0	1.4
2002	332	23	2789	340.496	-426.449	D	6.597	6.586	0.011	1.234	72.91	25.93	0	0	0	1.17
2002	333	23	1	318.65	-445.782	D	6.591	6.591	0	1.243	0	0	0	0	0	0
2002	334	23	1	318.65	-445.782	D	6.662	6.662	0	1.382	0	0	0	0	0	0
2002	335	23	1	318.65	-445.782	D	6.502	6.502	0	1.07	0	0	0	0	0	0
2002	336	23	1	318.65	-445.782	D	6.496	6.496	0	1.058	0	0	0	0	0	0
2002	337	23	2563	323.259	-443.79	D	7.104	7.074	0.03	2.209	76.69	22.18	0	0	0	1.13
2002	338	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	339	23	2628	320.933	-436.998	D	8.644	8.586	0.059	5.553	57.56	40.57	0	0	0	1.87
2002	340	23	2789	340.496	-426.449	D	8.896	8.896	0	6.304	71.77	27.44	0	0	0	0.64
2002	341	23	1	318.65	-445.782	D	7.075	7.075	0	2.211	0	0	0	0	0	0
2002	342	23	2781	339.842	-425.379	D	7.495	7.493	0.002	3.086	85.22	14.67	0	0	0	0.08
2002	343	23	2758	335.862	-424.454	D	8.689	8.492	0.198	5.33	87.77	12.16	0	0	0	0.07
2002	344	23	1	318.65	-445.782	D	6.855	6.855	0	1.766	0	0	0	0	0	0
2002	345	23	1	318.65	-445.782	D	8.185	8.185	0	4.617	0	0	0	0	0	0
2002	346	23	1	318.65	-445.782	D	8.309	8.309	0	4.902	0	0	0	0	0	0
2002	347	23	1552	330.178	-425.042	D	9.657	9.461	0.196	7.733	84.01	15.87	0	0	0	0.13
2002	348	23	2789	340.496	-426.449	D	9.687	9.351	0.337	7.448	85.06	14.83	0	0	0	0.11
2002	349	23	1	318.65	-445.782	D	7.033	7.033	0	2.126	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	9.107	9.107	0	6.829	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	9.67	9.67	0	8.285	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	9.899	9.899	0	8.899	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	8.345	8.345	0	4.987	0	0	0	0	0	0
2002	354	23	1	318.65	-445.782	D	6.783	6.783	0	1.622	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	355	23	1	318.65	-445.782	D	6.532	6.532	0	1.128	0	0	0	0	0	0
2002	356	23	2781	339.842	-425.379	D	7.01	7.01	0.001	2.078	67.62	31.69	0	0	0	0.69
2002	357	23	1	318.65	-445.782	D	7.59	7.59	0	3.295	0	0	0	0	0	0
2002	358	23	2704	329.056	-425.092	D	9.83	9.751	0.079	8.5	76.1	23.75	0	0	0	0.16
2002	359	23	2789	340.496	-426.449	D	7.55	7.546	0.004	3.199	86.47	13.41	0	0	0	0.12
2002	360	23	1	318.65	-445.782	D	6.825	6.825	0	1.705	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	6.876	6.876	0	1.807	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.067	7.067	0	2.195	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.04	7.04	0	2.14	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	10.069	10.069	0	9.364	0	0	0	0	0	0
2002	365	23	1548	330.222	-426.04	D	8.875	8.824	0.051	6.128	58.12	41.43	0	0	0	0.45
									0.827							

COLUMBIA											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	1	318.65	-445.782	D	6.842	6.842	0	1.74	0	0	0	0	0	0
2002	2	23	2789	340.496	-426.449	D	6.891	6.89	0.001	1.836	46.37	53.59	0	0	0	0.06
2002	3	23	2789	340.496	-426.449	D	7.291	7.288	0.003	2.652	50.4	49.56	0	0	0	0.02
2002	4	23	1	318.65	-445.782	D	6.816	6.816	0	1.687	0	0	0	0	0	0
2002	5	23	1	318.65	-445.782	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2002	6	23	1	318.65	-445.782	D	9.577	9.577	0	8.037	0	0	0	0	0	0
2002	7	23	1	318.65	-445.782	D	7.828	7.828	0	3.813	0	0	0	0	0	0
2002	8	23	1	318.65	-445.782	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2002	9	23	1	318.65	-445.782	D	6.877	6.877	0	1.81	0	0	0	0	0	0
2002	10	23	2789	340.496	-426.449	D	9.382	9.353	0.029	7.455	77.24	22.75	0	0	0	0.02
2002	11	23	2468	334.002	-434.887	D	7.31	7.309	0.002	2.696	78.42	21.58	0	0	0	0.01
2002	12	23	1	318.65	-445.782	D	6.82	6.82	0	1.694	0	0	0	0	0	0
2002	13	23	1	318.65	-445.782	D	7.018	7.018	0	2.094	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	6.95	6.95	0	1.957	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	6.62	6.62	0	1.299	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	17	23	2789	340.496	-426.449	D	6.933	6.933	0	1.921	51.3	48.45	0	0	0	0.06
2002	18	23	2789	340.496	-426.449	D	8.774	8.73	0.044	5.901	55.73	44.26	0	0	0	0.01
2002	19	23	2758	335.862	-424.454	D	8.961	8.957	0.004	6.455	77.8	22.14	0	0	0	0.01
2002	20	23	2781	339.842	-425.379	D	8.923	8.882	0.041	6.27	78.46	21.54	0	0	0	0
2002	21	23	1	318.65	-445.782	D	7.216	7.216	0	2.501	0	0	0	0	0	0
2002	22	23	1	318.65	-445.782	D	7.001	7.001	0	2.059	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	9.862	9.862	0	8.798	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	24	23	1	318.65	-445.782	D	9.399	9.399	0	7.573	0	0	0	0	0	0
2002	25	23	1	318.65	-445.782	D	6.855	6.855	0	1.765	0	0	0	0	0	0
2002	26	23	1	318.65	-445.782	D	6.706	6.706	0	1.468	0	0	0	0	0	0
2002	27	23	1	318.65	-445.782	D	6.657	6.657	0	1.373	0	0	0	0	0	0
2002	28	23	1	318.65	-445.782	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2002	29	23	1	318.65	-445.782	D	9.828	9.828	0	8.707	0	0	0	0	0	0
2002	30	23	2758	335.862	-424.454	D	10.451	10.218	0.233	9.779	73.67	26.32	0	0	0	0
2002	31	23	2704	329.056	-425.092	D	10.571	10.155	0.416	9.603	79.71	20.28	0	0	0	0
2002	32	23	2781	339.842	-425.379	D	7.477	7.475	0.002	3.047	82.52	17.47	0	0	0	0
2002	33	23	1	318.65	-445.782	D	7.099	7.099	0	2.261	0	0	0	0	0	0
2002	34	23	1	318.65	-445.782	D	6.798	6.798	0	1.652	0	0	0	0	0	0
2002	35	23	2788	340.294	-426.448	D	6.933	6.932	0	1.921	63.71	35.01	0	0	0	0.07
2002	36	23	2704	329.056	-425.092	D	6.819	6.812	0.007	1.679	61.43	38.53	0	0	0	0.03
2002	37	23	2684	326.713	-427.014	D	9.611	9.611	0	8.127	72.22	27.83	0	0	0	0
2002	38	23	2789	340.496	-426.449	D	9.412	9.412	0	7.605	80.27	19.14	0	0	0	0
2002	39	23	2781	339.842	-425.379	D	7.67	7.67	0	3.467	83.84	15.07	0	0	0	0
2002	40	23	2413	339.406	-425.637	D	9.315	9.315	0	7.357	86.04	10.79	0	0	0	0
2002	41	23	1	318.65	-445.782	D	8.083	8.083	0	4.385	0	0	0	0	0	0
2002	42	23	1	318.65	-445.782	D	7.47	7.47	0	3.037	0	0	0	0	0	0
2002	43	23	1	318.65	-445.782	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2002	44	23	2789	340.496	-426.449	D	6.695	6.691	0.004	1.439	40.81	59.1	0	0	0	0.07
2002	45	23	1	318.65	-445.782	D	6.604	6.604	0	1.269	0	0	0	0	0	0
2002	46	23	1	318.65	-445.782	D	7.064	7.064	0	2.189	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	6.737	6.737	0	1.53	0	0	0	0	0	0
2002	48	23	2789	340.496	-426.449	D	6.562	6.562	0	1.186	87.32	12.23	0	0	0	0.12
2002	49	23	2789	340.496	-426.449	D	6.622	6.621	0.001	1.302	72.91	27.1	0	0	0	0.05
2002	50	23	1	318.65	-445.782	D	8.708	8.708	0	5.847	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	9.05	9.05	0	6.686	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	6.911	6.911	0	1.879	0	0	0	0	0	0
2002	53	23	2789	340.496	-426.449	D	6.81	6.81	0	1.674	73	26.91	0	0	0	0.08
2002	54	23	2789	340.496	-426.449	D	6.688	6.687	0.001	1.432	72.69	27.21	0	0	0	0.04
2002	55	23	2788	340.294	-426.448	D	6.794	6.794	0	1.643	82.63	17.51	0	0	0	0.03
2002	56	23	1	318.65	-445.782	D	8.076	8.076	0	4.369	0	0	0	0	0	0
2002	57	23	1	318.65	-445.782	D	7.469	7.469	0	3.035	0	0	0	0	0	0
2002	58	23	1	318.65	-445.782	D	6.708	6.708	0	1.472	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	6.508	6.508	0	1.082	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.98	7.98	0	4.153	0	0	0	0	0	0
2002	61	23	2784	339.87	-426.019	D	9.769	9.765	0.004	8.538	66.31	33.68	0	0	0	0
2002	62	23	1	318.65	-445.782	D	7.265	7.265	0	2.605	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	63	23	1	318.65	-445.782	D	7.154	7.154	0	2.374	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.141	7.141	0	2.346	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	9.603	9.603	0	8.106	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	8.845	8.845	0	6.18	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	6.753	6.753	0	1.563	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.416	7.416	0	2.922	0	0	0	0	0	0
2002	71	23	1	318.65	-445.782	D	9.328	9.328	0	7.39	0	0	0	0	0	0
2002	72	23	1	318.65	-445.782	D	6.804	6.804	0	1.663	0	0	0	0	0	0
2002	73	23	1	318.65	-445.782	D	7.929	7.929	0	4.037	0	0	0	0	0	0
2002	74	23	1	318.65	-445.782	D	10.09	10.09	0	9.423	0	0	0	0	0	0
2002	75	23	2758	335.862	-424.454	D	8.018	7.996	0.022	4.188	40.75	59.21	0	0	0	0.03
2002	76	23	1	318.65	-445.782	D	8.42	8.42	0	5.161	0	0	0	0	0	0
2002	77	23	1	318.65	-445.782	D	9.608	9.608	0	8.119	0	0	0	0	0	0
2002	78	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	79	23	2704	329.056	-425.092	D	9.669	9.428	0.241	7.648	79.35	20.65	0	0	0	0
2002	80	23	2789	340.496	-426.449	D	8.432	8.4	0.032	5.114	79.31	20.68	0	0	0	0.01
2002	81	23	1	318.65	-445.782	D	6.551	6.551	0	1.166	0	0	0	0	0	0
2002	82	23	1	318.65	-445.782	D	6.89	6.89	0	1.836	0	0	0	0	0	0
2002	83	23	1	318.65	-445.782	D	8.743	8.743	0	5.932	0	0	0	0	0	0
2002	84	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	85	23	2694	327.861	-425.964	D	8.775	8.641	0.134	5.686	75.81	24.18	0	0	0	0.01
2002	86	23	2789	340.496	-426.449	D	7.863	7.862	0.001	3.89	95.74	4.11	0	0	0	0.03
2002	87	23	2789	340.496	-426.449	D	7.278	7.273	0.005	2.62	91.27	8.71	0	0	0	0.01
2002	88	23	2789	340.496	-426.449	D	8.69	8.669	0.021	5.753	96.62	3.36	0	0	0	0.02
2002	89	23	2571	322.646	-445.476	D	7.674	7.669	0.005	3.466	81.17	18.78	0	0	0	0.02
2002	90	23	2694	327.861	-425.964	D	8.366	8.365	0	5.034	93.11	6.79	0	0	0	0.04
2002	91	23	2789	340.496	-426.449	D	6.725	6.723	0.002	1.502	91.05	8.97	0	0	0	0.05
2002	92	23	1	318.65	-445.782	D	7.704	7.704	0	3.542	0	0	0	0	0	0
2002	93	23	1	318.65	-445.782	D	6.697	6.697	0	1.452	0	0	0	0	0	0
2002	94	23	2789	340.496	-426.449	D	6.628	6.626	0.002	1.311	78.27	21.64	0	0	0	0.04
2002	95	23	2789	340.496	-426.449	D	6.564	6.559	0.005	1.181	87.61	12.38	0	0	0	0.04
2002	96	23	2789	340.496	-426.449	D	6.571	6.556	0.015	1.175	94.3	5.66	0	0	0	0.03
2002	97	23	2781	339.842	-425.379	D	8.246	8.244	0.002	4.753	96.94	3.09	0	0	0	0.02
2002	98	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	99	23	2789	340.496	-426.449	D	9.163	9.162	0.001	6.968	97.71	2.24	0	0	0	0.03
2002	100	23	2694	327.861	-425.964	D	7.53	7.514	0.016	3.132	95.03	4.96	0	0	0	0.02
2002	101	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	102	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	103	23	1	318.65	-445.782	D	8.889	8.889	0	6.287	0	0	0	0	0	0
2002	104	23	1	318.65	-445.782	D	8.999	8.999	0	6.559	0	0	0	0	0	0
2002	105	23	1	318.65	-445.782	D	8.516	8.516	0	5.389	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.596	7.596	0	3.307	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	8.247	8.247	0	4.758	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	8.641	8.641	0	5.687	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.663	7.663	0	3.453	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	9.387	9.387	0	7.541	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	8.234	8.234	0	4.73	0	0	0	0	0	0
2002	112	23	1	318.65	-445.782	D	6.849	6.849	0	1.754	0	0	0	0	0	0
2002	113	23	1	318.65	-445.782	D	7.3	7.3	0	2.678	0	0	0	0	0	0
2002	114	23	1	318.65	-445.782	D	8.745	8.745	0	5.937	0	0	0	0	0	0
2002	115	23	2789	340.496	-426.449	D	6.772	6.769	0.003	1.594	93.87	6.04	0	0	0	0.1
2002	116	23	2758	335.862	-424.454	D	8.037	8.025	0.012	4.253	87.29	12.7	0	0	0	0.02
2002	117	23	2758	335.862	-424.454	D	9.187	9.187	0.001	7.029	94.16	5.8	0	0	0	0
2002	118	23	1	318.65	-445.782	D	8.893	8.893	0	6.297	0	0	0	0	0	0
2002	119	23	1	318.65	-445.782	D	6.782	6.782	0	1.619	0	0	0	0	0	0
2002	120	23	1	318.65	-445.782	D	7.861	7.861	0	3.887	0	0	0	0	0	0
2002	121	23	1	318.65	-445.782	D	9.294	9.294	0	7.303	0	0	0	0	0	0
2002	122	23	2789	340.496	-426.449	D	8.815	8.806	0.009	6.083	85.22	14.76	0	0	0	0.01
2002	123	23	2789	340.496	-426.449	D	7.242	7.217	0.025	2.503	90.81	9.18	0	0	0	0.01
2002	124	23	1	318.65	-445.782	D	9.125	9.125	0	6.875	0	0	0	0	0	0
2002	125	23	1	318.65	-445.782	D	8.379	8.379	0	5.065	0	0	0	0	0	0
2002	126	23	1	318.65	-445.782	D	8.615	8.615	0	5.623	0	0	0	0	0	0
2002	127	23	1	318.65	-445.782	D	8.423	8.423	0	5.168	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	129	23	1	318.65	-445.782	D	8.462	8.462	0	5.26	0	0	0	0	0	0
2002	130	23	2789	340.496	-426.449	D	6.899	6.889	0.01	1.834	97.87	2.11	0	0	0	0.01
2002	131	23	2784	339.87	-426.019	D	8.338	8.332	0.006	4.956	97.74	2.26	0	0	0	0.01
2002	132	23	1	318.65	-445.782	D	9.38	9.38	0	7.523	0	0	0	0	0	0
2002	133	23	2789	340.496	-426.449	D	8.578	8.578	0	5.534	61.18	38.77	0	0	0	0.01
2002	134	23	1	318.65	-445.782	D	6.747	6.747	0	1.551	0	0	0	0	0	0
2002	135	23	1	318.65	-445.782	D	6.85	6.85	0	1.755	0	0	0	0	0	0
2002	136	23	1	318.65	-445.782	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	137	23	2610	319.631	-440.865	D	10.185	10.14	0.045	9.561	90.75	9.25	0	0	0	0
2002	138	23	311	322.049	-443.885	D	8.404	8.39	0.014	5.091	83.65	16.35	0	0	0	0.01
2002	139	23	2789	340.496	-426.449	D	6.927	6.863	0.065	1.781	90.91	9.07	0	0	0	0.01
2002	140	23	2781	339.842	-425.379	D	6.886	6.886	0	1.827	98.16	1.86	0	0	0	0.05

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	141	23	2781	339.842	-425.379	D	6.728	6.713	0.015	1.482	93.77	6.2	0	0	0	0.03
2002	142	23	2789	340.496	-426.449	D	6.713	6.704	0.009	1.466	97.73	2.24	0	0	0	0.02
2002	143	23	2780	339.614	-425.419	D	6.756	6.756	0	1.568	97.14	0.87	0	0	0	0.01
2002	144	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	8.137	8.137	0	4.507	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	8.441	8.441	0	5.212	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	8.905	8.905	0	6.327	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	8.901	8.901	0	6.317	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	9.28	9.28	0	7.267	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	8.533	8.533	0	5.428	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.158	7.158	0	2.382	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.878	7.878	0	3.924	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	8.029	8.029	0	4.264	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.439	7.439	0	2.97	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	156	23	1415	329.185	-425.086	D	9.113	9.113	0	6.844	97.45	2.58	0	0	0	0
2002	157	23	2684	326.713	-427.014	D	9.011	8.755	0.256	5.959	83.11	16.88	0	0	0	0.01
2002	158	23	2588	318.452	-445.8	D	6.925	6.909	0.016	1.875	99.19	0.8	0	0	0	0.02
2002	159	23	2781	339.842	-425.379	D	6.917	6.899	0.018	1.853	99.26	0.72	0	0	0	0.01
2002	160	23	2758	335.862	-424.454	D	7.594	7.593	0.001	3.302	99.82	0.14	0	0	0	0.01
2002	161	23	1	318.65	-445.782	D	9.508	9.508	0	7.855	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	8.531	8.531	0	5.424	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	8.238	8.238	0	4.74	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	8.172	8.172	0	4.588	0	0	0	0	0	0
2002	165	23	1	318.65	-445.782	D	7.569	7.569	0	3.249	0	0	0	0	0	0
2002	166	23	1	318.65	-445.782	D	6.682	6.682	0	1.422	0	0	0	0	0	0
2002	167	23	1	318.65	-445.782	D	6.744	6.744	0	1.543	0	0	0	0	0	0
2002	168	23	2789	340.496	-426.449	D	6.753	6.752	0.001	1.56	97.74	2.08	0	0	0	0.02
2002	169	23	2789	340.496	-426.449	D	6.718	6.716	0.003	1.488	99.66	0.29	0	0	0	0.02
2002	170	23	2781	339.842	-425.379	D	6.885	6.885	0.001	1.825	99.73	0.19	0	0	0	0.01
2002	171	23	1	318.65	-445.782	D	7.457	7.457	0	3.008	0	0	0	0	0	0
2002	172	23	1	318.65	-445.782	D	8.033	8.033	0	4.272	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.251	7.251	0	2.574	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.025	7.025	0	2.108	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	8.073	8.073	0	4.363	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	8.808	8.808	0	6.089	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	8.838	8.838	0	6.163	0	0	0	0	0	0
2002	179	23	1	318.65	-445.782	D	7.841	7.841	0	3.842	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	180	23	1	318.65	-445.782	D	8.173	8.173	0	4.59	0	0	0	0	0	0
2002	181	23	1	318.65	-445.782	D	8.264	8.264	0	4.798	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	6.882	6.882	0	1.82	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	6.978	6.978	0	2.014	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	8.892	8.892	0	6.295	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.36	7.36	0	2.803	0	0	0	0	0	0
2002	186	23	2789	340.496	-426.449	D	8.174	8.174	0	4.592	98.71	0.15	0	0	0	0.01
2002	187	23	2758	335.862	-424.454	D	7.455	7.452	0.003	2.999	99.88	0.12	0	0	0	0.01
2002	188	23	1552	330.178	-425.042	D	8.035	8.033	0.002	4.271	99.83	0.16	0	0	0	0
2002	189	23	1412	329.218	-425.834	D	6.863	6.863	0	1.782	93.04	0.03	0	0	0	0.01
2002	190	23	1	318.65	-445.782	D	6.746	6.746	0	1.548	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	6.966	6.966	0	1.988	0	0	0	0	0	0
2002	192	23	2789	340.496	-426.449	D	7.746	7.745	0.001	3.631	97.08	2.89	0	0	0	0.01
2002	193	23	2758	335.862	-424.454	D	8.528	8.521	0.008	5.399	97.82	2.16	0	0	0	0
2002	194	23	1415	329.185	-425.086	D	9.325	9.318	0.007	7.364	96.54	3.43	0	0	0	0
2002	195	23	623	324.229	-442.54	D	8.908	8.907	0.001	6.331	99.75	0.29	0	0	0	0
2002	196	23	1	318.65	-445.782	D	8.017	8.017	0	4.235	0	0	0	0	0	0
2002	197	23	1	318.65	-445.782	D	7.428	7.428	0	2.948	0	0	0	0	0	0
2002	198	23	1	318.65	-445.782	D	9.517	9.517	0	7.879	0	0	0	0	0	0
2002	199	23	1	318.65	-445.782	D	8.871	8.871	0	6.243	0	0	0	0	0	0
2002	200	23	1	318.65	-445.782	D	9.09	9.09	0	6.785	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.7	7.7	0	3.533	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.159	7.159	0	2.385	0	0	0	0	0	0
2002	204	23	1415	329.185	-425.086	D	7.119	7.119	0.001	2.301	99.7	0.16	0	0	0	0.03
2002	205	23	2255	335.942	-426.039	D	7.557	7.412	0.146	2.913	98.81	1.17	0	0	0	0.01
2002	206	23	2600	318.952	-443.12	D	7.25	7.231	0.019	2.532	99.71	0.27	0	0	0	0.01
2002	207	23	2789	340.496	-426.449	D	7.074	7.07	0.004	2.202	99.71	0.29	0	0	0	0.01
2002	208	23	2274	336.179	-425.778	D	7.866	7.866	0	3.898	96.27	0.03	0	0	0	0.01
2002	209	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.824	7.824	0	3.806	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	8.482	8.482	0	5.307	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.166	7.166	0	2.398	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.644	7.644	0	3.411	0	0	0	0	0	0
2002	214	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	215	23	1	318.65	-445.782	D	7.971	7.971	0	4.133	0	0	0	0	0	0
2002	216	23	1	318.65	-445.782	D	7.347	7.347	0	2.775	0	0	0	0	0	0
2002	217	23	1	318.65	-445.782	D	7.34	7.34	0	2.761	0	0	0	0	0	0
2002	218	23	2789	340.496	-426.449	D	6.829	6.819	0.011	1.693	99.56	0.43	0	0	0	0.02

Appendix M
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2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	219	23	2563	323.259	-443.79	D	8.819	8.627	0.192	5.651	97.93	2.07	0	0	0	0
2002	220	23	1	318.65	-445.782	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	6.724	6.724	0	1.505	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.045	7.045	0	2.15	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.191	7.191	0	2.45	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	6.912	6.912	0	1.88	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	8.619	8.619	0	5.634	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	9.936	9.936	0	9	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	8.318	8.318	0	4.925	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	8.63	8.63	0	5.658	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	6.941	6.941	0	1.939	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	6.972	6.972	0	2.001	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.651	7.651	0	3.426	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.084	7.084	0	2.23	0	0	0	0	0	0
2002	236	23	1	318.65	-445.782	D	7.668	7.668	0	3.464	0	0	0	0	0	0
2002	237	23	2789	340.496	-426.449	D	8.597	8.587	0.009	5.557	95.74	4.22	0	0	0	0.03
2002	238	23	2555	324.03	-442.528	D	8.053	7.904	0.149	3.983	94.8	5.19	0	0	0	0.01
2002	239	23	2684	326.713	-427.014	D	6.998	6.987	0.012	2.031	98.28	1.7	0	0	0	0.02
2002	240	23	1	318.65	-445.782	D	7.508	7.508	0	3.117	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.124	7.124	0	2.313	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.14	7.14	0	2.344	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.361	7.361	0	2.805	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.134	7.134	0	2.332	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	6.909	6.909	0	1.875	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	6.972	6.972	0	2.002	0	0	0	0	0	0
2002	247	23	2784	339.87	-426.019	D	6.924	6.924	0	1.904	100.43	0.09	0	0	0	0.02
2002	248	23	2255	335.942	-426.039	D	7.35	7.337	0.013	2.756	99.45	0.53	0	0	0	0.01
2002	249	23	2695	328.074	-426.025	D	6.796	6.794	0.001	1.644	99.79	0.07	0	0	0	0.01
2002	250	23	1009	326.641	-429.444	D	6.748	6.748	0	1.552	96.85	0.03	0	0	0	0.02
2002	251	23	1	318.65	-445.782	D	7.423	7.423	0	2.937	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.171	7.171	0	2.409	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.202	7.202	0	2.474	0	0	0	0	0	0
2002	254	23	2789	340.496	-426.449	D	7.1	7.048	0.052	2.156	87.82	12.13	0	0	0	0.05
2002	255	23	381	322.546	-443.863	D	8.193	8.097	0.096	4.417	91.28	8.71	0	0	0	0.01
2002	256	23	2588	318.452	-445.8	D	6.684	6.68	0.004	1.418	99.69	0.27	0	0	0	0.02
2002	257	23	1415	329.185	-425.086	D	6.674	6.672	0.002	1.402	99.56	0.29	0	0	0	0.02

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	258	23	2402	338.942	-426.406	D	8.282	8.282	0	4.841	97.17	1.04	0	0	0	0.01
2002	259	23	2789	340.496	-426.449	D	8.49	8.436	0.054	5.2	94.55	5.44	0	0	0	0.01
2002	260	23	2789	340.496	-426.449	D	7.852	7.813	0.039	3.78	97.24	2.75	0	0	0	0.01
2002	261	23	2789	340.496	-426.449	D	8.444	8.444	0.001	5.217	95.64	4.38	0	0	0	0.01
2002	262	23	1	318.65	-445.782	D	9.39	9.39	0	7.549	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	9.262	9.262	0	7.221	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	6.8	6.8	0	1.655	0	0	0	0	0	0
2002	265	23	2789	340.496	-426.449	D	6.811	6.797	0.014	1.649	88.97	10.94	0	0	0	0.08
2002	266	23	2789	340.496	-426.449	D	6.613	6.604	0.01	1.267	95.05	4.89	0	0	0	0.06
2002	267	23	2758	335.862	-424.454	D	6.56	6.549	0.01	1.161	96.99	2.97	0	0	0	0.05
2002	268	23	2758	335.862	-424.454	D	6.833	6.826	0.007	1.708	97.89	2.06	0	0	0	0.02
2002	269	23	1415	329.185	-425.086	D	7.376	7.375	0	2.836	99.23	0.65	0	0	0	0.01
2002	270	23	2597	318.971	-443.851	D	7.383	7.345	0.037	2.773	97.38	2.58	0	0	0	0.04
2002	271	23	2789	340.496	-426.449	D	6.828	6.811	0.018	1.677	98.76	1.2	0	0	0	0.03
2002	272	23	2762	336.074	-425.006	D	7.259	7.25	0.009	2.573	98.13	1.85	0	0	0	0.01
2002	273	23	2235	335.628	-424.554	D	7.365	7.365	0	2.814	99.32	0.09	0	0	0	0.01
2002	274	23	1	318.65	-445.782	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.523	7.523	0	3.151	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	9.147	9.147	0	6.929	0	0	0	0	0	0
2002	278	23	2789	340.496	-426.449	D	7.045	7.043	0.002	2.146	98.54	1.38	0	0	0	0.08
2002	279	23	2789	340.496	-426.449	D	6.81	6.806	0.004	1.667	97.18	2.84	0	0	0	0.04
2002	280	23	2789	340.496	-426.449	D	6.832	6.829	0.003	1.713	95.94	3.95	0	0	0	0.1
2002	281	23	2589	318.383	-445.593	D	6.569	6.562	0.007	1.186	95.29	4.66	0	0	0	0.06
2002	282	23	1413	329.207	-425.585	D	9.027	9.027	0	6.628	96.77	0.85	0	0	0	0.01
2002	283	23	1412	329.218	-425.834	D	9.995	9.995	0	9.162	93.7	0.76	0	0	0	0
2002	284	23	1	318.65	-445.782	D	9.433	9.433	0	7.662	0	0	0	0	0	0
2002	285	23	1	318.65	-445.782	D	9.046	9.046	0	6.677	0	0	0	0	0	0
2002	286	23	2255	335.942	-426.039	D	8.088	8.08	0.007	4.379	80.89	19.06	0	0	0	0.07
2002	287	23	2628	320.933	-436.998	D	6.526	6.524	0.002	1.112	88.31	11.65	0	0	0	0.05
2002	288	23	2789	340.496	-426.449	D	6.504	6.504	0	1.073	91.81	7.99	0	0	0	0.04
2002	289	23	2789	340.496	-426.449	D	6.573	6.554	0.02	1.17	57.85	42.02	0	0	0	0.13
2002	290	23	2447	336.137	-430.956	D	7.751	7.748	0.003	3.638	82.66	17.31	0	0	0	0.02
2002	291	23	1	318.65	-445.782	D	6.645	6.645	0	1.348	0	0	0	0	0	0
2002	292	23	2781	339.842	-425.379	D	9.78	9.74	0.04	8.47	79.57	20.42	0	0	0	0
2002	293	23	2704	329.056	-425.092	D	9.539	9.344	0.195	7.432	75.01	24.98	0	0	0	0.01
2002	294	23	2684	326.713	-427.014	D	6.942	6.935	0.007	1.926	92.92	7.06	0	0	0	0.02
2002	295	23	2661	325.283	-432.004	D	7.391	7.384	0.006	2.855	94.47	5.52	0	0	0	0.01
2002	296	23	2708	329.979	-425	D	7.004	6.996	0.009	2.049	91.62	8.35	0	0	0	0.02

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	297	23	2704	329.056	-425.092	D	6.758	6.757	0.002	1.569	94.45	5.48	0	0	0	0.02
2002	298	23	1	318.65	-445.782	D	9.646	9.646	0	8.218	0	0	0	0	0	0
2002	299	23	2789	340.496	-426.449	D	9.336	9.336	0	7.41	96.62	2.85	0	0	0	0.01
2002	300	23	2789	340.496	-426.449	D	9.465	9.18	0.285	7.013	80.96	19.03	0	0	0	0
2002	301	23	2704	329.056	-425.092	D	10.283	10.218	0.065	9.779	86.85	13.14	0	0	0	0
2002	302	23	2752	334.471	-424.635	D	9.973	9.849	0.124	8.762	78.31	21.69	0	0	0	0
2002	303	23	2597	318.971	-443.851	D	9.8	9.121	**0.679**	6.864	82.87	17.13	0	0	0	0
2002	304	23	2476	332.154	-435.398	D	9.67	9.085	**0.585**	6.773	80.36	19.64	0	0	0	0
2002	305	23	1	318.65	-445.782	D	7.72	7.72	0	3.576	0	0	0	0	0	0
2002	306	23	1	318.65	-445.782	D	7.777	7.777	0	3.701	0	0	0	0	0	0
2002	307	23	2789	340.496	-426.449	D	10.218	10.218	0.001	9.779	78.54	21.13	0	0	0	0
2002	308	23	1	318.65	-445.782	D	8.974	8.974	0	6.498	0	0	0	0	0	0
2002	309	23	2789	340.496	-426.449	D	9.323	9.322	0	7.375	88.87	10.71	0	0	0	0
2002	310	23	2789	340.496	-426.449	D	8.073	8.072	0.002	4.359	74.7	25.27	0	0	0	0
2002	311	23	1	318.65	-445.782	D	6.545	6.545	0	1.153	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	6.713	6.713	0	1.482	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	9.044	9.044	0	6.672	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	9.306	9.306	0	7.334	0	0	0	0	0	0
2002	315	23	1	318.65	-445.782	D	6.786	6.786	0	1.628	0	0	0	0	0	0
2002	316	23	2789	340.496	-426.449	D	6.635	6.633	0.002	1.326	41.52	58.33	0	0	0	0.09
2002	317	23	1	318.65	-445.782	D	6.613	6.613	0	1.285	0	0	0	0	0	0
2002	318	23	1	318.65	-445.782	D	7.01	7.01	0	2.079	0	0	0	0	0	0
2002	319	23	2789	340.496	-426.449	D	9.476	9.476	0	7.772	36.62	62.8	0	0	0	0.01
2002	320	23	2789	340.496	-426.449	D	8.923	8.881	0.042	6.268	44.7	55.29	0	0	0	0.01
2002	321	23	1	318.65	-445.782	D	6.705	6.705	0	1.467	0	0	0	0	0	0
2002	322	23	1	318.65	-445.782	D	6.826	6.826	0	1.707	0	0	0	0	0	0
2002	323	23	1	318.65	-445.782	D	6.805	6.805	0	1.665	0	0	0	0	0	0
2002	324	23	1	318.65	-445.782	D	6.495	6.495	0	1.057	0	0	0	0	0	0
2002	325	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	326	23	1	318.65	-445.782	D	6.938	6.938	0	1.932	0	0	0	0	0	0
2002	327	23	1	318.65	-445.782	D	6.536	6.536	0	1.136	0	0	0	0	0	0
2002	328	23	1551	330.189	-425.292	D	6.63	6.629	0	1.318	73.03	23.93	0	0	0	0.02
2002	329	23	2789	340.496	-426.449	D	7.264	7.219	0.045	2.507	58.34	41.64	0	0	0	0.02
2002	330	23	2789	340.496	-426.449	D	6.649	6.626	0.023	1.312	66.5	33.47	0	0	0	0.04
2002	331	23	2789	340.496	-426.449	D	6.917	6.887	0.03	1.83	56.02	43.94	0	0	0	0.03
2002	332	23	2789	340.496	-426.449	D	6.586	6.586	0	1.234	60.63	45.58	0	0	0	0.05
2002	333	23	1	318.65	-445.782	D	6.591	6.591	0	1.243	0	0	0	0	0	0
2002	334	23	1	318.65	-445.782	D	6.662	6.662	0	1.382	0	0	0	0	0	0
2002	335	23	1	318.65	-445.782	D	6.502	6.502	0	1.07	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	336	23	1	318.65	-445.782	D	6.496	6.496	0	1.058	0	0	0	0	0	0
2002	337	23	2597	318.971	-443.851	D	7.083	7.074	0.009	2.209	62.82	37.14	0	0	0	0.03
2002	338	23	2588	318.452	-445.8	D	10.219	10.218	0.001	9.779	66.01	34.03	0	0	0	0
2002	339	23	2789	340.496	-426.449	D	8.654	8.64	0.014	5.684	31.63	68.34	0	0	0	0.03
2002	340	23	1	318.65	-445.782	D	8.705	8.705	0	5.84	0	0	0	0	0	0
2002	341	23	1	318.65	-445.782	D	7.075	7.075	0	2.211	0	0	0	0	0	0
2002	342	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	343	23	2758	335.862	-424.454	D	8.631	8.492	0.14	5.33	73.89	26.11	0	0	0	0
2002	344	23	1	318.65	-445.782	D	6.855	6.855	0	1.766	0	0	0	0	0	0
2002	345	23	1	318.65	-445.782	D	8.185	8.185	0	4.617	0	0	0	0	0	0
2002	346	23	1	318.65	-445.782	D	8.309	8.309	0	4.902	0	0	0	0	0	0
2002	347	23	2709	330.21	-424.978	D	9.617	9.461	0.156	7.733	73.87	26.13	0	0	0	0.01
2002	348	23	2790	340.421	-426.562	D	9.486	9.351	0.135	7.448	73.29	26.71	0	0	0	0
2002	349	23	1	318.65	-445.782	D	7.033	7.033	0	2.126	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	9.107	9.107	0	6.829	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	9.67	9.67	0	8.285	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	9.899	9.899	0	8.899	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	8.345	8.345	0	4.987	0	0	0	0	0	0
2002	354	23	1	318.65	-445.782	D	6.783	6.783	0	1.622	0	0	0	0	0	0
2002	355	23	1	318.65	-445.782	D	6.532	6.532	0	1.128	0	0	0	0	0	0
2002	356	23	1	318.65	-445.782	D	7.006	7.006	0	2.071	0	0	0	0	0	0
2002	357	23	1	318.65	-445.782	D	7.59	7.59	0	3.295	0	0	0	0	0	0
2002	358	23	2781	339.842	-425.379	D	9.875	9.805	0.07	8.644	63.68	36.32	0	0	0	0.01
2002	359	23	1	318.65	-445.782	D	7.604	7.604	0	3.324	0	0	0	0	0	0
2002	360	23	1	318.65	-445.782	D	6.825	6.825	0	1.705	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	6.876	6.876	0	1.807	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.067	7.067	0	2.195	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.04	7.04	0	2.14	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	10.069	10.069	0	9.364	0	0	0	0	0	0
2002	365	23	1548	330.222	-426.04	D	8.853	8.824	0.03	6.128	38.35	61.62	0	0	0	0.03
									0.679							
HOLCIM									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	318.65	-445.782	D	6.842	6.842	0	1.74	0	0	0	0	0	0
2002	2	23	1	318.65	-445.782	D	6.882	6.882	0	1.82	0	0	0	0	0	0
2002	3	23	1	318.65	-445.782	D	7.245	7.245	0	2.562	0	0	0	0	0	0
2002	4	23	1	318.65	-445.782	D	6.816	6.816	0	1.687	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	5	23	1	318.65	-445.782	D	8.011	8.011	0	4.223	0	0	0	0	0	0
2002	6	23	1	318.65	-445.782	D	9.577	9.577	0	8.037	0	0	0	0	0	0
2002	7	23	1	318.65	-445.782	D	7.828	7.828	0	3.813	0	0	0	0	0	0
2002	8	23	1	318.65	-445.782	D	6.896	6.896	0	1.848	0	0	0	0	0	0
2002	9	23	1	318.65	-445.782	D	6.877	6.877	0	1.81	0	0	0	0	0	0
2002	10	23	1	318.65	-445.782	D	9.544	9.544	0	7.951	0	0	0	0	0	0
2002	11	23	1	318.65	-445.782	D	7.312	7.312	0	2.702	0	0	0	0	0	0
2002	12	23	1	318.65	-445.782	D	6.82	6.82	0	1.694	0	0	0	0	0	0
2002	13	23	1	318.65	-445.782	D	7.018	7.018	0	2.094	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	6.95	6.95	0	1.957	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	6.62	6.62	0	1.299	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	17	23	2468	334.002	-434.887	D	6.958	6.957	0	1.971	47.29	52.41	0	0	0	0.29
2002	18	23	2789	340.496	-426.449	D	8.746	8.73	0.015	5.901	59.21	40.35	0	0	0	0.43
2002	19	23	2758	335.862	-424.454	D	9.081	8.957	0.124	6.455	62.76	37.12	0	0	0	0.12
2002	20	23	2781	339.842	-425.379	D	9.255	8.882	0.373	6.27	68.13	31.83	0	0	0	0.04
2002	21	23	2781	339.842	-425.379	D	7.26	7.26	0	2.594	72.37	27.41	0	0	0	0.08
2002	22	23	1	318.65	-445.782	D	7.001	7.001	0	2.059	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	9.862	9.862	0	8.798	0	0	0	0	0	0
2002	24	23	1	318.65	-445.782	D	9.399	9.399	0	7.573	0	0	0	0	0	0
2002	25	23	1	318.65	-445.782	D	6.855	6.855	0	1.765	0	0	0	0	0	0
2002	26	23	1	318.65	-445.782	D	6.706	6.706	0	1.468	0	0	0	0	0	0
2002	27	23	1	318.65	-445.782	D	6.657	6.657	0	1.373	0	0	0	0	0	0
2002	28	23	1	318.65	-445.782	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2002	29	23	1	318.65	-445.782	D	9.828	9.828	0	8.707	0	0	0	0	0	0
2002	30	23	2781	339.842	-425.379	D	10.238	10.218	0.02	9.779	58.07	41.88	0	0	0	0.05
2002	31	23	2704	329.056	-425.092	D	11.326	10.155	**1.171**	9.603	63.57	36.39	0	0	0	0.04
2002	32	23	2781	339.842	-425.379	D	7.477	7.475	0.002	3.047	72.77	27.22	0	0	0	0.02
2002	33	23	1	318.65	-445.782	D	7.099	7.099	0	2.261	0	0	0	0	0	0
2002	34	23	1	318.65	-445.782	D	6.798	6.798	0	1.652	0	0	0	0	0	0
2002	35	23	1	318.65	-445.782	D	6.88	6.88	0	1.815	0	0	0	0	0	0
2002	36	23	2448	335.908	-431.021	D	6.855	6.813	0.042	1.681	46.31	53.4	0	0	0	0.29
2002	37	23	2704	329.056	-425.092	D	9.616	9.611	0.004	8.127	56.93	43.02	0	0	0	0.05
2002	38	23	2758	335.862	-424.454	D	9.42	9.415	0.005	7.614	68.42	31.47	0	0	0	0.07
2002	39	23	2565	323.059	-444.215	D	7.986	7.981	0.005	4.154	74.93	25.01	0	0	0	0.06
2002	40	23	2781	339.842	-425.379	D	9.316	9.315	0.001	7.357	81.33	18.63	0	0	0	0.03
2002	41	23	1	318.65	-445.782	D	8.083	8.083	0	4.385	0	0	0	0	0	0
2002	42	23	1	318.65	-445.782	D	7.47	7.47	0	3.037	0	0	0	0	0	0
2002	43	23	1	318.65	-445.782	D	6.601	6.601	0	1.262	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	44	23	1	318.65	-445.782	D	6.728	6.728	0	1.512	0	0	0	0	0	0
2002	45	23	1	318.65	-445.782	D	6.604	6.604	0	1.269	0	0	0	0	0	0
2002	46	23	1	318.65	-445.782	D	7.064	7.064	0	2.189	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	6.737	6.737	0	1.53	0	0	0	0	0	0
2002	48	23	1	318.65	-445.782	D	6.574	6.574	0	1.21	0	0	0	0	0	0
2002	49	23	2789	340.496	-426.449	D	6.621	6.621	0	1.302	49.14	48.98	0	0	0	0.58
2002	50	23	1	318.65	-445.782	D	8.708	8.708	0	5.847	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	9.05	9.05	0	6.686	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	6.911	6.911	0	1.879	0	0	0	0	0	0
2002	53	23	1	318.65	-445.782	D	6.779	6.779	0	1.614	0	0	0	0	0	0
2002	54	23	2788	340.294	-426.448	D	6.687	6.687	0	1.432	81.32	16.98	0	0	0	0.78
2002	55	23	2789	340.496	-426.449	D	6.795	6.794	0.001	1.643	73.52	26.09	0	0	0	0.44
2002	56	23	1	318.65	-445.782	D	8.076	8.076	0	4.369	0	0	0	0	0	0
2002	57	23	1	318.65	-445.782	D	7.469	7.469	0	3.035	0	0	0	0	0	0
2002	58	23	1	318.65	-445.782	D	6.708	6.708	0	1.472	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	6.508	6.508	0	1.082	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.98	7.98	0	4.153	0	0	0	0	0	0
2002	61	23	2781	339.842	-425.379	D	9.731	9.722	0.01	8.42	55.87	44.06	0	0	0	0.07
2002	62	23	1	318.65	-445.782	D	7.265	7.265	0	2.605	0	0	0	0	0	0
2002	63	23	1	318.65	-445.782	D	7.154	7.154	0	2.374	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	6.603	6.603	0	1.266	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.141	7.141	0	2.346	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	9.603	9.603	0	8.106	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	8.845	8.845	0	6.18	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	6.753	6.753	0	1.563	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.416	7.416	0	2.922	0	0	0	0	0	0
2002	71	23	1	318.65	-445.782	D	9.328	9.328	0	7.39	0	0	0	0	0	0
2002	72	23	1	318.65	-445.782	D	6.804	6.804	0	1.663	0	0	0	0	0	0
2002	73	23	1	318.65	-445.782	D	7.929	7.929	0	4.037	0	0	0	0	0	0
2002	74	23	1	318.65	-445.782	D	10.09	10.09	0	9.423	0	0	0	0	0	0
2002	75	23	2789	340.496	-426.449	D	8.057	7.991	0.066	4.178	55.95	43.52	0	0	0	0.53
2002	76	23	2694	327.861	-425.964	D	8.472	8.378	0.094	5.064	56.53	43.27	0	0	0	0.2
2002	77	23	2781	339.842	-425.379	D	9.432	9.431	0.001	7.657	89.85	9.87	0	0	0	0.06
2002	78	23	2758	335.862	-424.454	D	10.4	10.218	0.182	9.779	73.77	26.19	0	0	0	0.04
2002	79	23	2781	339.842	-425.379	D	11.73	9.408	**2.322**	7.597	72.09	27.88	0	0	0	0.03
2002	80	23	1	318.65	-445.782	D	8.134	8.134	0	4.5	0	0	0	0	0	0
2002	81	23	1	318.65	-445.782	D	6.551	6.551	0	1.166	0	0	0	0	0	0
2002	82	23	1	318.65	-445.782	D	6.89	6.89	0	1.836	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	83	23	1	318.65	-445.782	D	8.743	8.743	0	5.932	0	0	0	0	0	0
2002	84	23	2684	326.713	-427.014	D	10.227	10.218	0.01	9.779	71.39	28.57	0	0	0	0.04
2002	85	23	2781	339.842	-425.379	D	9.988	8.605	**1.384**	5.599	71.4	28.56	0	0	0	0.05
2002	86	23	1	318.65	-445.782	D	7.962	7.962	0	4.113	0	0	0	0	0	0
2002	87	23	2789	340.496	-426.449	D	7.274	7.273	0.001	2.62	80.56	19.21	0	0	0	0.13
2002	88	23	1	318.65	-445.782	D	8.765	8.765	0	5.984	0	0	0	0	0	0
2002	89	23	2564	323.159	-444.002	D	7.744	7.669	0.075	3.466	74.92	24.8	0	0	0	0.28
2002	90	23	2589	318.383	-445.593	D	8.716	8.668	0.049	5.75	72.77	27.14	0	0	0	0.09
2002	91	23	2789	340.496	-426.449	D	6.726	6.723	0.004	1.502	73.77	25.2	0	0	0	1.04
2002	92	23	1	318.65	-445.782	D	7.704	7.704	0	3.542	0	0	0	0	0	0
2002	93	23	1	318.65	-445.782	D	6.697	6.697	0	1.452	0	0	0	0	0	0
2002	94	23	2781	339.842	-425.379	D	6.62	6.62	0	1.3	75.62	22.82	0	0	0	0.89
2002	95	23	2781	339.842	-425.379	D	6.625	6.555	0.071	1.172	68.21	31.25	0	0	0	0.53
2002	96	23	2789	340.496	-426.449	D	6.638	6.556	0.082	1.175	85.2	14.37	0	0	0	0.42
2002	97	23	2758	335.862	-424.454	D	8.281	8.279	0.002	4.833	93.46	6.14	0	0	0	0.4
2002	98	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	99	23	1	318.65	-445.782	D	9.117	9.117	0	6.854	0	0	0	0	0	0
2002	100	23	2781	339.842	-425.379	D	7.711	7.512	0.2	3.126	73.04	26.88	0	0	0	0.09
2002	101	23	1045	326.823	-427.937	D	6.942	6.942	0	1.941	90.37	0.62	0	0	0	0.22
2002	102	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	103	23	1	318.65	-445.782	D	8.889	8.889	0	6.287	0	0	0	0	0	0
2002	104	23	1	318.65	-445.782	D	8.999	8.999	0	6.559	0	0	0	0	0	0
2002	105	23	1	318.65	-445.782	D	8.516	8.516	0	5.389	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.596	7.596	0	3.307	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	8.247	8.247	0	4.758	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	8.641	8.641	0	5.687	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.663	7.663	0	3.453	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	9.387	9.387	0	7.541	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	8.234	8.234	0	4.73	0	0	0	0	0	0
2002	112	23	1	318.65	-445.782	D	6.849	6.849	0	1.754	0	0	0	0	0	0
2002	113	23	1	318.65	-445.782	D	7.3	7.3	0	2.678	0	0	0	0	0	0
2002	114	23	1	318.65	-445.782	D	8.745	8.745	0	5.937	0	0	0	0	0	0
2002	115	23	1	318.65	-445.782	D	6.743	6.743	0	1.543	0	0	0	0	0	0
2002	116	23	839	325.77	-437.976	D	8.045	7.985	0.06	4.164	75	24.91	0	0	0	0.09
2002	117	23	2255	335.942	-426.039	D	9.354	9.341	0.012	7.425	87.62	12.3	0	0	0	0.07
2002	118	23	1	318.65	-445.782	D	8.893	8.893	0	6.297	0	0	0	0	0	0
2002	119	23	1	318.65	-445.782	D	6.782	6.782	0	1.619	0	0	0	0	0	0
2002	120	23	1	318.65	-445.782	D	7.861	7.861	0	3.887	0	0	0	0	0	0
2002	121	23	1	318.65	-445.782	D	9.294	9.294	0	7.303	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	122	23	2789	340.496	-426.449	D	8.889	8.806	0.083	6.083	88.22	11.73	0	0	0	0.05
2002	123	23	2588	318.452	-445.8	D	7.36	7.228	0.133	2.527	91.05	8.68	0	0	0	0.27
2002	124	23	2684	326.713	-427.014	D	9.316	9.104	0.212	6.82	87.64	12.31	0	0	0	0.05
2002	125	23	2684	326.713	-427.014	D	8.532	8.428	0.104	5.181	92.25	7.7	0	0	0	0.05
2002	126	23	1414	329.196	-425.335	D	8.452	8.452	0	5.237	99.81	0.1	0	0	0	0.04
2002	127	23	1	318.65	-445.782	D	8.423	8.423	0	5.168	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	8.824	8.824	0	6.129	0	0	0	0	0	0
2002	129	23	1	318.65	-445.782	D	8.462	8.462	0	5.26	0	0	0	0	0	0
2002	130	23	1	318.65	-445.782	D	7.019	7.019	0	2.097	0	0	0	0	0	0
2002	131	23	1	318.65	-445.782	D	8.523	8.523	0	5.404	0	0	0	0	0	0
2002	132	23	1	318.65	-445.782	D	9.38	9.38	0	7.523	0	0	0	0	0	0
2002	133	23	1	318.65	-445.782	D	8.506	8.506	0	5.364	0	0	0	0	0	0
2002	134	23	1	318.65	-445.782	D	6.747	6.747	0	1.551	0	0	0	0	0	0
2002	135	23	1	318.65	-445.782	D	6.85	6.85	0	1.755	0	0	0	0	0	0
2002	136	23	1	318.65	-445.782	D	7.384	7.384	0	2.855	0	0	0	0	0	0
2002	137	23	2628	320.933	-436.998	D	11.359	10.14	**1.22**	9.561	73.38	26.58	0	0	0	0.04
2002	138	23	2789	340.496	-426.449	D	9.428	8.46	**0.968**	5.257	69.12	30.81	0	0	0	0.07
2002	139	23	1	318.65	-445.782	D	6.861	6.861	0	1.777	0	0	0	0	0	0
2002	140	23	1	318.65	-445.782	D	6.876	6.876	0	1.808	0	0	0	0	0	0
2002	141	23	2789	340.496	-426.449	D	6.714	6.713	0.001	1.483	96.67	2.79	0	0	0	0.53
2002	142	23	2789	340.496	-426.449	D	6.728	6.704	0.024	1.466	95.05	4.58	0	0	0	0.36
2002	143	23	2789	340.496	-426.449	D	6.768	6.765	0.003	1.586	98.16	1.61	0	0	0	0.22
2002	144	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	8.137	8.137	0	4.507	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	8.441	8.441	0	5.212	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	8.905	8.905	0	6.327	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	8.901	8.901	0	6.317	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	9.28	9.28	0	7.267	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	8.533	8.533	0	5.428	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.158	7.158	0	2.382	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.878	7.878	0	3.924	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	8.029	8.029	0	4.264	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.439	7.439	0	2.97	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.015	7.015	0	2.089	0	0	0	0	0	0
2002	156	23	1	318.65	-445.782	D	8.887	8.887	0	6.281	0	0	0	0	0	0
2002	157	23	1	318.65	-445.782	D	8.762	8.762	0	5.977	0	0	0	0	0	0
2002	158	23	2571	322.646	-445.476	D	6.931	6.909	0.022	1.875	97.25	2.41	0	0	0	0.34
2002	159	23	2468	334.002	-434.887	D	7.026	6.907	0.119	1.87	98.38	1.4	0	0	0	0.23
2002	160	23	2708	329.979	-425	D	7.623	7.604	0.018	3.325	99.45	0.39	0	0	0	0.17

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	161	23	1	318.65	-445.782	D	9.508	9.508	0	7.855	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	8.531	8.531	0	5.424	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	8.238	8.238	0	4.74	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	8.172	8.172	0	4.588	0	0	0	0	0	0
2002	165	23	1	318.65	-445.782	D	7.569	7.569	0	3.249	0	0	0	0	0	0
2002	166	23	1	318.65	-445.782	D	6.682	6.682	0	1.422	0	0	0	0	0	0
2002	167	23	1	318.65	-445.782	D	6.744	6.744	0	1.543	0	0	0	0	0	0
2002	168	23	2789	340.496	-426.449	D	6.752	6.752	0	1.56	99.04	0.23	0	0	0	0.49
2002	169	23	2781	339.842	-425.379	D	6.719	6.718	0.002	1.492	99.52	0.21	0	0	0	0.33
2002	170	23	2781	339.842	-425.379	D	6.886	6.885	0.001	1.825	99.2	0.63	0	0	0	0.21
2002	171	23	1	318.65	-445.782	D	7.457	7.457	0	3.008	0	0	0	0	0	0
2002	172	23	1	318.65	-445.782	D	8.033	8.033	0	4.272	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.251	7.251	0	2.574	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.025	7.025	0	2.108	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.402	7.402	0	2.893	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	8.073	8.073	0	4.363	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	8.808	8.808	0	6.089	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	8.838	8.838	0	6.163	0	0	0	0	0	0
2002	179	23	1	318.65	-445.782	D	7.841	7.841	0	3.842	0	0	0	0	0	0
2002	180	23	1	318.65	-445.782	D	8.173	8.173	0	4.59	0	0	0	0	0	0
2002	181	23	1	318.65	-445.782	D	8.264	8.264	0	4.798	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	6.882	6.882	0	1.82	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	6.978	6.978	0	2.014	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	8.892	8.892	0	6.295	0	0	0	0	0	0
2002	185	23	2781	339.842	-425.379	D	7.305	7.303	0.001	2.685	99.29	0.4	0	0	0	0.18
2002	186	23	2781	339.842	-425.379	D	8.175	8.163	0.012	4.567	99.67	0.27	0	0	0	0.06
2002	187	23	2789	340.496	-426.449	D	7.503	7.423	0.08	2.937	99.26	0.6	0	0	0	0.14
2002	188	23	2628	320.933	-436.998	D	8.169	8.036	0.134	4.278	99.55	0.38	0	0	0	0.06
2002	189	23	2182	335.131	-424.575	D	6.862	6.862	0	1.779	99.54	0.19	0	0	0	0.16
2002	190	23	1	318.65	-445.782	D	6.746	6.746	0	1.548	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	6.966	6.966	0	1.988	0	0	0	0	0	0
2002	192	23	2789	340.496	-426.449	D	7.752	7.745	0.008	3.631	95.62	4.19	0	0	0	0.18
2002	193	23	2781	339.842	-425.379	D	8.546	8.494	0.053	5.335	95.27	4.66	0	0	0	0.06
2002	194	23	2758	335.862	-424.454	D	9.371	9.321	0.05	7.372	90.22	9.74	0	0	0	0.03
2002	195	23	2694	327.861	-425.964	D	8.945	8.942	0.004	6.417	99.56	0.33	0	0	0	0.08
2002	196	23	2704	329.056	-425.092	D	7.899	7.883	0.015	3.937	97.66	2.16	0	0	0	0.18
2002	197	23	2694	327.861	-425.964	D	7.339	7.339	0	2.76	99.43	0.12	0	0	0	0.29
2002	198	23	1	318.65	-445.782	D	9.517	9.517	0	7.879	0	0	0	0	0	0
2002	199	23	1	318.65	-445.782	D	8.871	8.871	0	6.243	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	200	23	1	318.65	-445.782	D	9.09	9.09	0	6.785	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.7	7.7	0	3.533	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.888	7.888	0	3.947	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.159	7.159	0	2.385	0	0	0	0	0	0
2002	204	23	1	318.65	-445.782	D	7.027	7.027	0	2.113	0	0	0	0	0	0
2002	205	23	2789	340.496	-426.449	D	7.35	7.328	0.022	2.737	96.86	2.75	0	0	0	0.39
2002	206	23	2789	340.496	-426.449	D	7.328	7.225	0.103	2.521	99.13	0.72	0	0	0	0.15
2002	207	23	2789	340.496	-426.449	D	7.093	7.07	0.023	2.202	99.27	0.6	0	0	0	0.12
2002	208	23	2781	339.842	-425.379	D	7.866	7.866	0	3.898	99.11	0.07	0	0	0	0.17
2002	209	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.824	7.824	0	3.806	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	8.482	8.482	0	5.307	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.166	7.166	0	2.398	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.644	7.644	0	3.411	0	0	0	0	0	0
2002	214	23	1	318.65	-445.782	D	7.186	7.186	0	2.439	0	0	0	0	0	0
2002	215	23	1	318.65	-445.782	D	7.971	7.971	0	4.133	0	0	0	0	0	0
2002	216	23	1	318.65	-445.782	D	7.347	7.347	0	2.775	0	0	0	0	0	0
2002	217	23	1	318.65	-445.782	D	7.34	7.34	0	2.761	0	0	0	0	0	0
2002	218	23	2789	340.496	-426.449	D	6.833	6.819	0.014	1.693	97.51	2.23	0	0	0	0.27
2002	219	23	2552	324.659	-442.591	D	9.545	8.626	**0.92**	5.649	94.43	5.53	0	0	0	0.04
2002	220	23	1	318.65	-445.782	D	6.92	6.92	0	1.895	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	6.724	6.724	0	1.505	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.045	7.045	0	2.15	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.191	7.191	0	2.45	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	6.912	6.912	0	1.88	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	8.619	8.619	0	5.634	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	9.936	9.936	0	9	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	8.318	8.318	0	4.925	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	8.739	8.739	0	5.922	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	8.63	8.63	0	5.658	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.926	7.926	0	4.031	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	6.941	6.941	0	1.939	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	6.972	6.972	0	2.001	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.651	7.651	0	3.426	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.084	7.084	0	2.23	0	0	0	0	0	0
2002	236	23	1	318.65	-445.782	D	7.668	7.668	0	3.464	0	0	0	0	0	0
2002	237	23	1	318.65	-445.782	D	8.628	8.628	0	5.655	0	0	0	0	0	0
2002	238	23	2789	340.496	-426.449	D	7.854	7.822	0.032	3.801	93.85	5.74	0	0	0	0.42

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	239	23	2784	339.87	-426.019	D	7.235	6.994	0.24	2.046	97.76	1.88	0	0	0	0.36
2002	240	23	2684	326.713	-427.014	D	7.84	7.724	0.116	3.586	98.98	0.82	0	0	0	0.2
2002	241	23	2694	327.861	-425.964	D	7.17	7.169	0	2.406	94.72	0.4	0	0	0	0.44
2002	242	23	1	318.65	-445.782	D	7.14	7.14	0	2.344	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.361	7.361	0	2.805	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.134	7.134	0	2.332	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	6.909	6.909	0	1.875	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	6.972	6.972	0	2.002	0	0	0	0	0	0
2002	247	23	1	318.65	-445.782	D	6.886	6.886	0	1.827	0	0	0	0	0	0
2002	248	23	2789	340.496	-426.449	D	7.427	7.297	0.131	2.671	98.63	1.14	0	0	0	0.23
2002	249	23	2628	320.933	-436.998	D	6.844	6.795	0.049	1.645	99.18	0.54	0	0	0	0.28
2002	250	23	1242	327.988	-426.138	D	6.748	6.748	0	1.552	98.85	0.08	0	0	0	0.32
2002	251	23	1	318.65	-445.782	D	7.423	7.423	0	2.937	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.171	7.171	0	2.409	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.202	7.202	0	2.474	0	0	0	0	0	0
2002	254	23	1	318.65	-445.782	D	6.97	6.97	0	1.997	0	0	0	0	0	0
2002	255	23	2255	335.942	-426.039	D	8.435	8.097	0.338	4.416	82.25	17.62	0	0	0	0.13
2002	256	23	2589	318.383	-445.593	D	6.725	6.68	0.045	1.418	98.95	0.66	0	0	0	0.39
2002	257	23	1415	329.185	-425.086	D	6.68	6.672	0.008	1.402	99.07	0.61	0	0	0	0.29
2002	258	23	2789	340.496	-426.449	D	8.283	8.282	0.001	4.841	97.43	2.13	0	0	0	0.11
2002	259	23	2789	340.496	-426.449	D	8.442	8.436	0.006	5.2	97.81	1.95	0	0	0	0.26
2002	260	23	2789	340.496	-426.449	D	7.832	7.813	0.02	3.78	95.48	4.38	0	0	0	0.13
2002	261	23	2789	340.496	-426.449	D	8.444	8.444	0	5.217	95.5	4.28	0	0	0	0.08
2002	262	23	1	318.65	-445.782	D	9.39	9.39	0	7.549	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	9.262	9.262	0	7.221	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	6.8	6.8	0	1.655	0	0	0	0	0	0
2002	265	23	1	318.65	-445.782	D	6.783	6.783	0	1.622	0	0	0	0	0	0
2002	266	23	2468	334.002	-434.887	D	6.608	6.608	0.001	1.275	96.8	2.01	0	0	0	1.14
2002	267	23	2789	340.496	-426.449	D	6.573	6.551	0.022	1.165	92.55	6.67	0	0	0	0.77
2002	268	23	2781	339.842	-425.379	D	6.85	6.823	0.026	1.702	93.4	6.21	0	0	0	0.39
2002	269	23	2704	329.056	-425.092	D	7.381	7.375	0.006	2.836	97.86	1.97	0	0	0	0.18
2002	270	23	2758	335.862	-424.454	D	7.429	7.394	0.034	2.876	98.25	1.06	0	0	0	0.68
2002	271	23	2781	339.842	-425.379	D	7.044	6.81	0.234	1.676	97.01	2.61	0	0	0	0.37
2002	272	23	2781	339.842	-425.379	D	7.411	7.25	0.161	2.573	96.82	2.99	0	0	0	0.19
2002	273	23	2781	339.842	-425.379	D	7.362	7.362	0	2.808	99.86	0.17	0	0	0	0.17
2002	274	23	1	318.65	-445.782	D	6.966	6.966	0	1.989	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.239	7.239	0	2.549	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.523	7.523	0	3.151	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	9.147	9.147	0	6.929	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	278	23	1	318.65	-445.782	D	6.953	6.953	0	1.963	0	0	0	0	0	0
2002	279	23	2789	340.496	-426.449	D	6.807	6.806	0.001	1.667	94.08	5.41	0	0	0	0.59
2002	280	23	1	318.65	-445.782	D	6.811	6.811	0	1.677	0	0	0	0	0	0
2002	281	23	2789	340.496	-426.449	D	6.606	6.571	0.035	1.204	86.61	12.68	0	0	0	0.72
2002	282	23	2694	327.861	-425.964	D	9.032	9.027	0.006	6.628	89.78	9.89	0	0	0	0.3
2002	283	23	1415	329.185	-425.086	D	9.995	9.995	0	9.162	98.02	1.58	0	0	0	0.06
2002	284	23	1	318.65	-445.782	D	9.433	9.433	0	7.662	0	0	0	0	0	0
2002	285	23	1	318.65	-445.782	D	9.046	9.046	0	6.677	0	0	0	0	0	0
2002	286	23	1	318.65	-445.782	D	7.886	7.886	0	3.942	0	0	0	0	0	0
2002	287	23	2710	330.44	-424.955	D	6.588	6.526	0.062	1.116	63.15	36.13	0	0	0	0.71
2002	288	23	2571	322.646	-445.476	D	6.531	6.507	0.024	1.079	81.26	18.16	0	0	0	0.58
2002	289	23	2236	336.149	-430.776	D	6.554	6.554	0	1.17	48.41	1.54	0	0	0	0.34
2002	290	23	1	318.65	-445.782	D	6.977	6.977	0	2.01	0	0	0	0	0	0
2002	291	23	1	318.65	-445.782	D	6.645	6.645	0	1.348	0	0	0	0	0	0
2002	292	23	1	318.65	-445.782	D	9.779	9.779	0	8.575	0	0	0	0	0	0
2002	293	23	2571	322.646	-445.476	D	9.762	9.4	0.362	7.576	73.18	26.73	0	0	0	0.09
2002	294	23	2573	322.153	-445.515	D	7.311	6.975	0.336	2.008	81.11	18.65	0	0	0	0.24
2002	295	23	2588	318.452	-445.8	D	7.758	7.448	0.31	2.991	89.53	10.35	0	0	0	0.12
2002	296	23	2781	339.842	-425.379	D	7.146	6.941	0.206	1.938	85.06	14.57	0	0	0	0.37
2002	297	23	2589	318.383	-445.593	D	6.917	6.76	0.157	1.575	92.59	7.13	0	0	0	0.28
2002	298	23	1	318.65	-445.782	D	9.646	9.646	0	8.218	87.17	12.81	0	0	0	0.09
2002	299	23	2781	339.842	-425.379	D	9.343	9.336	0.007	7.411	80.65	19.2	0	0	0	0.1
2002	300	23	2789	340.496	-426.449	D	11.392	9.18	**2.211**	7.013	75.28	24.65	0	0	0	0.07
2002	301	23	2704	329.056	-425.092	D	11.394	10.218	**1.177**	9.779	75.69	24.28	0	0	0	0.03
2002	302	23	2781	339.842	-425.379	D	10.795	9.849	**0.946**	8.762	62.79	37.14	0	0	0	0.08
2002	303	23	2789	340.496	-426.449	D	13.499	9.108	**4.391**	6.831	68.2	31.74	0	0	0	0.07
2002	304	23	2789	340.496	-426.449	D	12.105	9.083	**3.022**	6.769	64.38	35.57	0	0	0	0.05
2002	305	23	1	318.65	-445.782	D	7.72	7.72	0	3.576	0	0	0	0	0	0
2002	306	23	1	318.65	-445.782	D	7.777	7.777	0	3.701	0	0	0	0	0	0
2002	307	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	308	23	1	318.65	-445.782	D	8.974	8.974	0	6.498	0	0	0	0	0	0
2002	309	23	1	318.65	-445.782	D	9.292	9.292	0	7.299	0	0	0	0	0	0
2002	310	23	1	318.65	-445.782	D	8.034	8.034	0	4.275	0	0	0	0	0	0
2002	311	23	1	318.65	-445.782	D	6.545	6.545	0	1.153	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	6.713	6.713	0	1.482	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	9.044	9.044	0	6.672	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	9.306	9.306	0	7.334	0	0	0	0	0	0
2002	315	23	1	318.65	-445.782	D	6.786	6.786	0	1.628	0	0	0	0	0	0
2002	316	23	1	318.65	-445.782	D	6.605	6.605	0	1.27	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	317	23	1	318.65	-445.782	D	6.613	6.613	0	1.285	0	0	0	0	0	0
2002	318	23	1	318.65	-445.782	D	7.01	7.01	0	2.079	0	0	0	0	0	0
2002	319	23	1	318.65	-445.782	D	9.393	9.393	0	7.558	0	0	0	0	0	0
2002	320	23	1	318.65	-445.782	D	8.404	8.404	0	5.124	0	0	0	0	0	0
2002	321	23	1	318.65	-445.782	D	6.705	6.705	0	1.467	0	0	0	0	0	0
2002	322	23	1	318.65	-445.782	D	6.826	6.826	0	1.707	0	0	0	0	0	0
2002	323	23	1	318.65	-445.782	D	6.805	6.805	0	1.665	0	0	0	0	0	0
2002	324	23	1	318.65	-445.782	D	6.495	6.495	0	1.057	0	0	0	0	0	0
2002	325	23	1	318.65	-445.782	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	326	23	1	318.65	-445.782	D	6.938	6.938	0	1.932	0	0	0	0	0	0
2002	327	23	1	318.65	-445.782	D	6.536	6.536	0	1.136	0	0	0	0	0	0
2002	328	23	1	318.65	-445.782	D	6.643	6.643	0	1.345	0	0	0	0	0	0
2002	329	23	2789	340.496	-426.449	D	7.527	7.219	0.309	2.507	49.78	50.1	0	0	0	0.12
2002	330	23	2789	340.496	-426.449	D	6.666	6.626	0.04	1.312	54.67	44.92	0	0	0	0.41
2002	331	23	37	319.567	-443.993	D	7.105	6.899	0.206	1.853	40.06	59.67	0	0	0	0.27
2002	332	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2002	333	23	1	318.65	-445.782	D	6.591	6.591	0	1.243	0	0	0	0	0	0
2002	334	23	1	318.65	-445.782	D	6.662	6.662	0	1.382	0	0	0	0	0	0
2002	335	23	1	318.65	-445.782	D	6.502	6.502	0	1.07	0	0	0	0	0	0
2002	336	23	1	318.65	-445.782	D	6.496	6.496	0	1.058	0	0	0	0	0	0
2002	337	23	2597	318.971	-443.851	D	7.16	7.074	0.086	2.209	41.03	58.49	0	0	0	0.48
2002	338	23	2588	318.452	-445.8	D	10.232	10.218	0.014	9.779	52.39	47.57	0	0	0	0.03
2002	339	23	2758	335.862	-424.454	D	9.32	8.641	**0.679**	5.686	28.4	71.49	0	0	0	0.12
2002	340	23	1	318.65	-445.782	D	8.705	8.705	0	5.84	0	0	0	0	0	0
2002	341	23	1	318.65	-445.782	D	7.075	7.075	0	2.211	0	0	0	0	0	0
2002	342	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2002	343	23	2758	335.862	-424.454	D	9.457	8.492	**0.966**	5.33	60.93	39.04	0	0	0	0.04
2002	344	23	1	318.65	-445.782	D	6.855	6.855	0	1.766	0	0	0	0	0	0
2002	345	23	1	318.65	-445.782	D	8.185	8.185	0	4.617	0	0	0	0	0	0
2002	346	23	1	318.65	-445.782	D	8.309	8.309	0	4.902	0	0	0	0	0	0
2002	347	23	2781	339.842	-425.379	D	9.565	9.435	0.129	7.667	53.2	46.73	0	0	0	0.08
2002	348	23	2789	340.496	-426.449	D	9.745	9.351	0.395	7.448	51.88	48.06	0	0	0	0.06
2002	349	23	1	318.65	-445.782	D	7.033	7.033	0	2.126	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	9.107	9.107	0	6.829	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	9.67	9.67	0	8.285	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	9.899	9.899	0	8.899	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	8.345	8.345	0	4.987	0	0	0	0	0	0
2002	354	23	1	318.65	-445.782	D	6.783	6.783	0	1.622	0	0	0	0	0	0
2002	355	23	1	318.65	-445.782	D	6.532	6.532	0	1.128	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	356	23	1	318.65	-445.782	D	7.006	7.006	0	2.071	0	0	0	0	0	0
2002	357	23	1	318.65	-445.782	D	7.59	7.59	0	3.295	0	0	0	0	0	0
2002	358	23	1548	330.222	-426.04	D	10.39	9.765	**0.625**	8.538	43	56.92	0	0	0	0.09
2002	359	23	1	318.65	-445.782	D	7.604	7.604	0	3.324	0	0	0	0	0	0
2002	360	23	1	318.65	-445.782	D	6.825	6.825	0	1.705	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	6.876	6.876	0	1.807	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.067	7.067	0	2.195	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.04	7.04	0	2.14	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	10.069	10.069	0	9.364	0	0	0	0	0	0
2002	365	23	2789	340.496	-426.449	D	8.877	8.828	0.048	6.139	61.78	37.9	0	0	0	0.32
									4.391							

Appendix M
Upper Buffalo
2003 M2

EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	2758	335.862	-424.454	D	7.065	7.051	0.014	2.162	0	0	0	0	0	100
2003	2	23	2704	329.056	-425.092	D	9.343	9.327	0.016	7.386	0	0	0	0	0	100
2003	3	23	802	325.089	-433.759	D	7.919	7.912	0.007	4	0	0	0	0	0	99.98
2003	4	23	2789	340.496	-426.449	D	6.798	6.798	0	1.65	0	0	0	0	0	91.76
2003	5	23	2588	318.452	-445.8	D	7.261	7.26	0.001	2.595	0	0	0	0	0	99.84
2003	6	23	2758	335.862	-424.454	D	8.259	8.222	0.037	4.703	0	0	0	0	0	100
2003	7	23	2684	326.713	-427.014	D	7.381	7.377	0.005	2.839	0	0	0	0	0	100.05
2003	8	23	346	322.298	-443.874	D	6.711	6.711	0	1.478	0	0	0	0	0	13.19
2003	9	23	2704	329.056	-425.092	D	6.974	6.967	0.007	1.991	0	0	0	0	0	100
2003	10	23	2789	340.496	-426.449	D	6.606	6.602	0.004	1.265	0	0	0	0	0	100.01
2003	11	23	2758	335.862	-424.454	D	6.604	6.552	0.052	1.167	0	0	0	0	0	100
2003	12	23	2781	339.842	-425.379	D	6.528	6.498	0.029	1.063	0	0	0	0	0	99.99
2003	13	23	2781	339.842	-425.379	D	6.699	6.698	0.001	1.452	0	0	0	0	0	100.01
2003	14	23	2789	340.496	-426.449	D	9.153	9.15	0.002	6.938	0	0	0	0	0	99.88
2003	15	23	2758	335.862	-424.454	D	6.662	6.622	0.04	1.303	0	0	0	0	0	100
2003	16	23	2789	340.496	-426.449	D	8.292	8.274	0.018	4.822	0	0	0	0	0	99.99
2003	17	23	12	319.07	-444.015	D	7.909	7.905	0.004	3.985	0	0	0	0	0	100.01
2003	18	23	2758	335.862	-424.454	D	6.59	6.589	0.001	1.24	0	0	0	0	0	99.96
2003	19	23	1	318.65	-445.782	D	6.651	6.651	0	1.361	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	6.624	6.624	0	1.308	0	0	0	0	0	0
2003	21	23	2468	334.002	-434.887	D	7.544	7.538	0.006	3.183	0	0	0	0	0	99.98
2003	22	23	2704	329.056	-425.092	D	7.613	7.571	0.042	3.254	0	0	0	0	0	100
2003	23	23	2789	340.496	-426.449	D	7.008	6.962	0.046	1.981	0	0	0	0	0	100
2003	24	23	2589	318.383	-445.593	D	6.605	6.593	0.013	1.246	0	0	0	0	0	100.01
2003	25	23	2781	339.842	-425.379	D	6.5	6.5	0.001	1.065	0	0	0	0	0	99.78
2003	26	23	2789	340.496	-426.449	D	7.219	7.197	0.022	2.463	0	0	0	0	0	100
2003	27	23	2777	338.93	-425.542	D	6.816	6.793	0.023	1.641	0	0	0	0	0	100
2003	28	23	1	318.65	-445.782	D	8.235	8.235	0	4.732	0	0	0	0	0	0
2003	29	23	2781	339.842	-425.379	D	9.773	9.766	0.007	8.54	0	0	0	0	0	99.99
2003	30	23	2781	339.842	-425.379	D	9.138	9.129	0.009	6.885	0	0	0	0	0	99.98
2003	31	23	1415	329.185	-425.086	D	7.068	7.067	0	2.196	0	0	0	0	0	99.73
2003	32	23	2758	335.862	-424.454	D	7.082	7.079	0.002	2.22	0	0	0	0	0	99.98
2003	33	23	1	318.65	-445.782	D	6.87	6.87	0	1.795	0	0	0	0	0	0
2003	34	23	1549	330.211	-425.79	D	9.478	9.478	0	7.778	0	0	0	0	0	13.52
2003	35	23	452	322.413	-435.125	D	7.145	7.144	0.001	2.353	0	0	0	0	0	99.89
2003	36	23	2704	329.056	-425.092	D	6.61	6.566	0.044	1.194	0	0	0	0	0	100
2003	37	23	2781	339.842	-425.379	D	9.185	9.182	0.003	7.018	0	0	0	0	0	99.93
2003	38	23	2758	335.862	-424.454	D	8.027	8.005	0.022	4.209	0	0	0	0	0	100

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	39	23	2789	340.496	-426.449	D	6.875	6.875	0	1.805	0	0	0	0	0	99.42
2003	40	23	1	318.65	-445.782	D	7.657	7.657	0	3.439	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	9.339	9.339	0	7.418	0	0	0	0	0	0
2003	42	23	2758	335.862	-424.454	D	6.776	6.776	0	1.608	0	0	0	0	0	98.62
2003	43	23	2704	329.056	-425.092	D	6.535	6.52	0.014	1.106	0	0	0	0	0	100
2003	44	23	2704	329.056	-425.092	D	6.627	6.626	0.001	1.312	0	0	0	0	0	100.21
2003	45	23	1241	327.999	-426.387	D	10.218	10.218	0	9.779	0	0	0	0	0	81.04
2003	46	23	2758	335.862	-424.454	D	10.207	10.197	0.01	9.721	0	0	0	0	0	99.96
2003	47	23	2589	318.383	-445.593	D	8.487	8.453	0.034	5.24	0	0	0	0	0	100
2003	48	23	2711	330.671	-424.932	D	8.332	8.267	0.065	4.806	0	0	0	0	0	100
2003	49	23	2789	340.496	-426.449	D	6.98	6.979	0.001	2.016	0	0	0	0	0	99.97
2003	50	23	1415	329.185	-425.086	D	9.213	9.213	0	7.097	0	0	0	0	0	98.68
2003	51	23	2789	340.496	-426.449	D	9.572	9.556	0.016	7.983	0	0	0	0	0	99.99
2003	52	23	2709	330.21	-424.978	D	9.651	9.648	0.003	8.224	0	0	0	0	0	99.95
2003	53	23	2600	318.952	-443.12	D	9.504	9.493	0.011	7.818	0	0	0	0	0	99.99
2003	54	23	2758	335.862	-424.454	D	8.852	8.837	0.015	6.16	0	0	0	0	0	100
2003	55	23	2789	340.496	-426.449	D	8.5	8.491	0.009	5.329	0	0	0	0	0	99.99
2003	56	23	2781	339.842	-425.379	D	7.398	7.382	0.017	2.849	0	0	0	0	0	99.99
2003	57	23	2781	339.842	-425.379	D	8.527	8.518	0.009	5.392	0	0	0	0	0	100
2003	58	23	2628	320.933	-436.998	D	8.755	8.752	0.003	5.953	0	0	0	0	0	99.98
2003	59	23	2704	329.056	-425.092	D	8.984	8.967	0.017	6.48	0	0	0	0	0	99.99
2003	60	23	2704	329.056	-425.092	D	9.662	9.651	0.011	8.233	0	0	0	0	0	100
2003	61	23	2789	340.496	-426.449	D	9.124	9.117	0.007	6.853	0	0	0	0	0	99.99
2003	62	23	2789	340.496	-426.449	D	7.375	7.373	0.002	2.832	0	0	0	0	0	99.84
2003	63	23	2781	339.842	-425.379	D	6.982	6.981	0	2.02	0	0	0	0	0	98.33
2003	64	23	2781	339.842	-425.379	D	9.037	9.034	0.003	6.647	0	0	0	0	0	99.97
2003	65	23	2789	340.496	-426.449	D	7.579	7.573	0.006	3.258	0	0	0	0	0	99.98
2003	66	23	2789	340.496	-426.449	D	6.946	6.945	0.002	1.946	0	0	0	0	0	100.04
2003	67	23	2781	339.842	-425.379	D	7.068	7.068	0	2.196	0	0	0	0	0	95.04
2003	68	23	2628	320.933	-436.998	D	7.105	7.092	0.012	2.247	0	0	0	0	0	100
2003	69	23	2789	340.496	-426.449	D	6.558	6.547	0.01	1.158	0	0	0	0	0	99.99
2003	70	23	2789	340.496	-426.449	D	6.559	6.546	0.013	1.155	0	0	0	0	0	100
2003	71	23	2781	339.842	-425.379	D	7.11	7.11	0	2.282	0	0	0	0	0	100.01
2003	72	23	2758	335.862	-424.454	D	8.608	8.594	0.013	5.574	0	0	0	0	0	99.97
2003	73	23	2789	340.496	-426.449	D	8.603	8.594	0.009	5.574	0	0	0	0	0	99.97
2003	74	23	2694	327.861	-425.964	D	8.068	8.064	0.003	4.342	0	0	0	0	0	99.96
2003	75	23	1551	330.189	-425.292	D	7.282	7.282	0	2.639	0	0	0	0	0	100.1
2003	76	23	1	318.65	-445.782	D	8.644	8.644	0	5.692	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	8.653	8.653	0	5.713	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	78	23	2417	339.654	-425.626	D	8.846	8.846	0	6.183	0	0	0	0	0	95.46
2003	79	23	2709	330.21	-424.978	D	9.226	9.213	0.013	7.097	0	0	0	0	0	99.98
2003	80	23	2789	340.496	-426.449	D	8.846	8.841	0.005	6.169	0	0	0	0	0	100
2003	81	23	2308	337.055	-428.737	D	6.535	6.534	0.001	1.132	0	0	0	0	0	100.08
2003	82	23	2429	338.563	-428.651	D	6.574	6.574	0	1.21	0	0	0	0	0	99.37
2003	83	23	1	318.65	-445.782	D	6.82	6.82	0	1.696	0	0	0	0	0	0
2003	84	23	2789	340.496	-426.449	D	7.634	7.625	0.009	3.369	0	0	0	0	0	99.99
2003	85	23	2758	335.862	-424.454	D	8.833	8.829	0.004	6.141	0	0	0	0	0	99.95
2003	86	23	2413	339.406	-425.637	D	6.607	6.607	0	1.274	0	0	0	0	0	99.08
2003	87	23	2694	327.861	-425.964	D	8.731	8.729	0.001	5.898	0	0	0	0	0	99.99
2003	88	23	2694	327.861	-425.964	D	7.321	7.315	0.006	2.709	0	0	0	0	0	99.97
2003	89	23	2758	335.862	-424.454	D	6.532	6.531	0.001	1.126	0	0	0	0	0	99.83
2003	90	23	1	318.65	-445.782	D	6.478	6.478	0	1.023	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.231	7.231	0	2.533	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	8.075	8.075	0	4.366	0	0	0	0	0	0
2003	95	23	2758	335.862	-424.454	D	6.803	6.789	0.014	1.634	0	0	0	0	0	100.01
2003	96	23	2758	335.862	-424.454	D	8.067	8.064	0.003	4.342	0	0	0	0	0	100.01
2003	97	23	1	318.65	-445.782	D	9.082	9.082	0	6.766	0	0	0	0	0	0
2003	98	23	2789	340.496	-426.449	D	7.434	7.431	0.003	2.955	0	0	0	0	0	99.95
2003	99	23	2758	335.862	-424.454	D	7.102	7.055	0.047	2.17	0	0	0	0	0	100
2003	100	23	2758	335.862	-424.454	D	6.641	6.591	0.05	1.244	0	0	0	0	0	100
2003	101	23	2758	335.862	-424.454	D	6.493	6.478	0.014	1.024	0	0	0	0	0	100
2003	102	23	2789	340.496	-426.449	D	6.515	6.495	0.02	1.057	0	0	0	0	0	100
2003	103	23	2789	340.496	-426.449	D	6.526	6.525	0.001	1.115	0	0	0	0	0	100.04
2003	104	23	2418	339.946	-426.612	D	6.65	6.65	0	1.359	0	0	0	0	0	95.92
2003	105	23	1	318.65	-445.782	D	6.637	6.637	0	1.334	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	107	23	2780	339.614	-425.419	D	7.566	7.564	0.001	3.239	0	0	0	0	0	99.86
2003	108	23	2781	339.842	-425.379	D	7.83	7.83	0	3.818	0	0	0	0	0	99.93
2003	109	23	2411	339.428	-426.135	D	7.559	7.559	0	3.227	0	0	0	0	0	96.36
2003	110	23	1	318.65	-445.782	D	9.045	9.045	0	6.674	0	0	0	0	0	0
2003	111	23	2781	339.842	-425.379	D	7.029	7.029	0	2.116	0	0	0	0	0	100.06
2003	112	23	2758	335.862	-424.454	D	6.562	6.539	0.022	1.142	0	0	0	0	0	100
2003	113	23	2789	340.496	-426.449	D	6.593	6.588	0.005	1.237	0	0	0	0	0	99.93
2003	114	23	1549	330.211	-425.79	D	8.042	8.042	0	4.291	0	0	0	0	0	96.91
2003	115	23	2684	326.713	-427.014	D	8.384	8.375	0.009	5.056	0	0	0	0	0	99.97
2003	116	23	2694	327.861	-425.964	D	8.383	8.367	0.015	5.038	0	0	0	0	0	100

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	117	23	307	322.093	-444.882	D	7.058	7.053	0.004	2.166	0	0	0	0	0	99.98
2003	118	23	2275	336.168	-425.529	D	7.47	7.47	0	3.038	0	0	0	0	0	97.58
2003	119	23	2245	336.051	-428.532	D	7.463	7.463	0	3.023	0	0	0	0	0	81.64
2003	120	23	1357	329.243	-432.078	D	8.159	8.159	0	4.557	0	0	0	0	0	51.74
2003	121	23	1	318.65	-445.782	D	7.624	7.624	0	3.367	0	0	0	0	0	0
2003	122	23	2684	326.713	-427.014	D	8.901	8.841	0.06	6.169	0	0	0	0	0	100
2003	123	23	2589	318.383	-445.593	D	8.36	8.345	0.015	4.986	0	0	0	0	0	100
2003	124	23	2789	340.496	-426.449	D	7.252	7.246	0.006	2.565	0	0	0	0	0	100.01
2003	125	23	1	318.65	-445.782	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	8.385	8.385	0	5.081	0	0	0	0	0	0
2003	127	23	1415	329.185	-425.086	D	8.622	8.618	0.004	5.629	0	0	0	0	0	99.98
2003	128	23	2781	339.842	-425.379	D	7.98	7.978	0.001	4.149	0	0	0	0	0	100.03
2003	129	23	1	318.65	-445.782	D	7.642	7.642	0	3.407	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	8.486	8.486	0	5.317	0	0	0	0	0	0
2003	131	23	2789	340.496	-426.449	D	7.328	7.327	0	2.735	0	0	0	0	0	100.16
2003	132	23	2589	318.383	-445.593	D	6.574	6.572	0.002	1.206	0	0	0	0	0	100.02
2003	133	23	2781	339.842	-425.379	D	6.891	6.891	0	1.837	0	0	0	0	0	99.76
2003	134	23	1	318.65	-445.782	D	9.399	9.399	0	7.572	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	8.763	8.763	0	5.98	0	0	0	0	0	0
2003	136	23	2415	339.676	-426.124	D	9.348	9.348	0	7.442	0	0	0	0	0	99.45
2003	137	23	2789	340.496	-426.449	D	9.371	9.371	0	7.5	0	0	0	0	0	99.47
2003	138	23	2589	318.383	-445.593	D	9.028	9.003	0.025	6.57	0	0	0	0	0	100
2003	139	23	2589	318.383	-445.593	D	8.747	8.739	0.008	5.921	0	0	0	0	0	99.99
2003	140	23	2628	320.933	-436.998	D	8.276	8.262	0.014	4.794	0	0	0	0	0	100
2003	141	23	2588	318.452	-445.8	D	6.73	6.718	0.012	1.492	0	0	0	0	0	100.01
2003	142	23	2628	320.933	-436.998	D	7.2	7.186	0.014	2.44	0	0	0	0	0	100
2003	143	23	2628	320.933	-436.998	D	6.721	6.702	0.019	1.46	0	0	0	0	0	100
2003	144	23	2790	340.421	-426.562	D	7.802	7.793	0.009	3.737	0	0	0	0	0	99.96
2003	145	23	2758	335.862	-424.454	D	9.221	9.201	0.02	7.066	0	0	0	0	0	99.99
2003	146	23	2588	318.452	-445.8	D	7.885	7.862	0.023	3.89	0	0	0	0	0	100
2003	147	23	2789	340.496	-426.449	D	6.664	6.656	0.008	1.369	0	0	0	0	0	99.98
2003	148	23	2789	340.496	-426.449	D	6.61	6.606	0.004	1.272	0	0	0	0	0	99.99
2003	149	23	1627	330.675	-425.021	D	7.29	7.287	0.004	2.649	0	0	0	0	0	99.98
2003	150	23	2789	340.496	-426.449	D	6.617	6.617	0.001	1.293	0	0	0	0	0	100.03
2003	151	23	2758	335.862	-424.454	D	7.215	7.204	0.011	2.477	0	0	0	0	0	100.01
2003	152	23	2789	340.496	-426.449	D	7.173	7.169	0.004	2.404	0	0	0	0	0	100.02
2003	153	23	2781	339.842	-425.379	D	8.609	8.607	0.003	5.603	0	0	0	0	0	99.92
2003	154	23	2781	339.842	-425.379	D	9.133	9.118	0.014	6.857	0	0	0	0	0	99.98
2003	155	23	2704	329.056	-425.092	D	7.659	7.617	0.042	3.353	0	0	0	0	0	100

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	156	23	2628	320.933	-436.998	D	6.831	6.819	0.012	1.693	0	0	0	0	0	99.99
2003	157	23	2781	339.842	-425.379	D	8.63	8.629	0.001	5.657	0	0	0	0	0	99.71
2003	158	23	2758	335.862	-424.454	D	7.542	7.528	0.014	3.162	0	0	0	0	0	100
2003	159	23	2758	335.862	-424.454	D	7.166	7.165	0	2.397	0	0	0	0	0	99.59
2003	160	23	1	318.65	-445.782	D	6.621	6.621	0	1.301	0	0	0	0	0	0
2003	161	23	1	318.65	-445.782	D	7.499	7.499	0	3.098	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	8.817	8.817	0	6.112	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	8.874	8.874	0	6.251	0	0	0	0	0	0
2003	164	23	1415	329.185	-425.086	D	9.213	9.212	0	7.095	0	0	0	0	0	95.34
2003	165	23	2704	329.056	-425.092	D	8.29	8.28	0.01	4.835	0	0	0	0	0	99.97
2003	166	23	2789	340.496	-426.449	D	8.145	8.13	0.015	4.492	0	0	0	0	0	100
2003	167	23	2694	327.861	-425.964	D	8.108	8.099	0.009	4.422	0	0	0	0	0	99.99
2003	168	23	2704	329.056	-425.092	D	7.421	7.418	0.002	2.927	0	0	0	0	0	99.96
2003	169	23	2709	330.21	-424.978	D	8.859	8.856	0.003	6.206	0	0	0	0	0	99.99
2003	170	23	2758	335.862	-424.454	D	8.529	8.518	0.011	5.392	0	0	0	0	0	99.99
2003	171	23	2571	322.646	-445.476	D	8.203	8.182	0.02	4.611	0	0	0	0	0	99.99
2003	172	23	2588	318.452	-445.8	D	6.971	6.969	0.002	1.995	0	0	0	0	0	100.01
2003	173	23	1	318.65	-445.782	D	6.92	6.92	0	1.897	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.108	7.108	0	2.279	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.784	7.784	0	3.718	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	8.399	8.399	0	5.113	0	0	0	0	0	0
2003	177	23	2789	340.496	-426.449	D	8.727	8.724	0.004	5.885	0	0	0	0	0	100.05
2003	178	23	2758	335.862	-424.454	D	6.9	6.837	0.063	1.729	0	0	0	0	0	100
2003	179	23	2704	329.056	-425.092	D	6.652	6.647	0.005	1.353	0	0	0	0	0	99.98
2003	180	23	1415	329.185	-425.086	D	6.721	6.719	0.003	1.494	0	0	0	0	0	99.93
2003	181	23	1415	329.185	-425.086	D	7.058	7.057	0	2.175	0	0	0	0	0	100.17
2003	182	23	1551	330.189	-425.292	D	8.821	8.821	0	6.12	0	0	0	0	0	94.3
2003	183	23	2757	335.63	-424.484	D	7.463	7.463	0	3.021	0	0	0	0	0	99.73
2003	184	23	2781	339.842	-425.379	D	7.374	7.374	0	2.832	0	0	0	0	0	99.34
2003	185	23	2781	339.842	-425.379	D	6.976	6.976	0	2.01	0	0	0	0	0	94.82
2003	186	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	8.318	8.318	0	4.923	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.086	7.086	0	2.234	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.739	7.739	0	3.619	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	8.593	8.593	0	5.571	0	0	0	0	0	0
2003	192	23	2758	335.862	-424.454	D	7.223	7.2	0.023	2.47	0	0	0	0	0	100
2003	193	23	2789	340.496	-426.449	D	7.846	7.846	0.001	3.853	0	0	0	0	0	99.86
2003	194	23	2781	339.842	-425.379	D	7.249	7.249	0	2.571	0	0	0	0	0	99.97

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	195	23	2789	340.496	-426.449	D	8.422	8.421	0.001	5.165	0	0	0	0	0	99.8
2003	196	23	2780	339.614	-425.419	D	8.22	8.22	0	4.698	0	0	0	0	0	86.6
2003	197	23	2405	338.909	-425.659	D	7.027	7.027	0	2.114	0	0	0	0	0	91.63
2003	198	23	2789	340.496	-426.449	D	7.155	7.155	0	2.375	0	0	0	0	0	99.93
2003	199	23	2787	340.091	-426.447	D	7.116	7.116	0	2.295	0	0	0	0	0	98.35
2003	200	23	2789	340.496	-426.449	D	7.719	7.719	0	3.574	0	0	0	0	0	99.61
2003	201	23	2780	339.614	-425.419	D	8.558	8.558	0	5.488	0	0	0	0	0	99.8
2003	202	23	2182	335.131	-424.575	D	8.102	8.102	0	4.428	0	0	0	0	0	94.51
2003	203	23	2781	339.842	-425.379	D	7.652	7.647	0.005	3.418	0	0	0	0	0	99.99
2003	204	23	2684	326.713	-427.014	D	7.06	7.024	0.037	2.106	0	0	0	0	0	100
2003	205	23	2589	318.383	-445.593	D	6.97	6.955	0.015	1.968	0	0	0	0	0	100.01
2003	206	23	2781	339.842	-425.379	D	7.092	7.08	0.012	2.222	0	0	0	0	0	100.01
2003	207	23	2704	329.056	-425.092	D	6.833	6.833	0	1.721	0	0	0	0	0	99.72
2003	208	23	1	318.65	-445.782	D	7.085	7.085	0	2.232	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.085	7.085	0	2.233	0	0	0	0	0	0
2003	210	23	2710	330.44	-424.955	D	8.382	8.382	0	5.073	0	0	0	0	0	99.46
2003	211	23	2596	318.977	-444.095	D	9.286	9.28	0.006	7.267	0	0	0	0	0	99.96
2003	212	23	2589	318.383	-445.593	D	7.275	7.263	0.012	2.6	0	0	0	0	0	100
2003	213	23	2789	340.496	-426.449	D	6.903	6.901	0.002	1.858	0	0	0	0	0	99.98
2003	214	23	2783	339.861	-425.806	D	7.583	7.583	0	3.28	0	0	0	0	0	97.72
2003	215	23	2780	339.614	-425.419	D	7.854	7.854	0	3.872	0	0	0	0	0	98.1
2003	216	23	2758	335.862	-424.454	D	7.684	7.684	0	3.498	0	0	0	0	0	99.89
2003	217	23	1662	330.967	-426.007	D	8.441	8.441	0	5.211	0	0	0	0	0	74.69
2003	218	23	2758	335.862	-424.454	D	8.595	8.571	0.024	5.519	0	0	0	0	0	99.99
2003	219	23	2789	340.496	-426.449	D	8.412	8.399	0.012	5.113	0	0	0	0	0	100
2003	220	23	2601	319.02	-442.895	D	7.095	7.084	0.011	2.229	0	0	0	0	0	100
2003	221	23	2589	318.383	-445.593	D	6.982	6.977	0.006	2.01	0	0	0	0	0	99.97
2003	222	23	2589	318.383	-445.593	D	7.178	7.162	0.016	2.39	0	0	0	0	0	100
2003	223	23	2588	318.452	-445.8	D	7.285	7.272	0.012	2.62	0	0	0	0	0	99.99
2003	224	23	2694	327.861	-425.964	D	7.098	7.086	0.012	2.234	0	0	0	0	0	99.99
2003	225	23	2704	329.056	-425.092	D	8.251	8.25	0.001	4.767	0	0	0	0	0	100.06
2003	226	23	1415	329.185	-425.086	D	8.936	8.936	0	6.402	0	0	0	0	0	100.22
2003	227	23	1	318.65	-445.782	D	7.337	7.337	0	2.755	0	0	0	0	0	0
2003	228	23	2789	340.496	-426.449	D	7.25	7.246	0.004	2.565	0	0	0	0	0	100
2003	229	23	2789	340.496	-426.449	D	6.943	6.942	0.001	1.94	0	0	0	0	0	100.04
2003	230	23	2781	339.842	-425.379	D	6.893	6.889	0.003	1.834	0	0	0	0	0	99.95
2003	231	23	2789	340.496	-426.449	D	6.829	6.826	0.004	1.706	0	0	0	0	0	100.03
2003	232	23	2789	340.496	-426.449	D	6.862	6.86	0.002	1.775	0	0	0	0	0	99.98
2003	233	23	2789	340.496	-426.449	D	6.922	6.921	0.001	1.898	0	0	0	0	0	100.05

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	234	23	2789	340.496	-426.449	D	7.116	7.113	0.003	2.289	0	0	0	0	0	99.96
2003	235	23	2758	335.862	-424.454	D	7.034	7.023	0.012	2.104	0	0	0	0	0	100
2003	236	23	2781	339.842	-425.379	D	8.467	8.455	0.012	5.245	0	0	0	0	0	99.99
2003	237	23	2694	327.861	-425.964	D	7.846	7.841	0.005	3.843	0	0	0	0	0	99.98
2003	238	23	2781	339.842	-425.379	D	7.354	7.352	0.002	2.786	0	0	0	0	0	99.95
2003	239	23	2781	339.842	-425.379	D	7.03	7.03	0	2.119	0	0	0	0	0	99.14
2003	240	23	1	318.65	-445.782	D	7.105	7.105	0	2.273	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	8.394	8.394	0	5.101	0	0	0	0	0	0
2003	242	23	2789	340.496	-426.449	D	9.245	9.245	0	7.179	0	0	0	0	0	97.18
2003	243	23	2781	339.842	-425.379	D	9.331	9.331	0	7.397	0	0	0	0	0	99.96
2003	244	23	1550	330.2	-425.541	D	9.378	9.378	0	7.518	0	0	0	0	0	95.02
2003	245	23	2588	318.452	-445.8	D	9.776	9.776	0	8.566	0	0	0	0	0	99.58
2003	246	23	2781	339.842	-425.379	D	9.219	9.199	0.02	7.062	0	0	0	0	0	99.99
2003	247	23	2694	327.861	-425.964	D	7.77	7.676	0.094	3.48	0	0	0	0	0	100
2003	248	23	2589	318.383	-445.593	D	6.744	6.736	0.008	1.529	0	0	0	0	0	99.98
2003	249	23	2704	329.056	-425.092	D	6.886	6.87	0.016	1.795	0	0	0	0	0	100
2003	250	23	2589	318.383	-445.593	D	6.932	6.929	0.003	1.915	0	0	0	0	0	100
2003	251	23	2468	334.002	-434.887	D	7.057	7.053	0.003	2.167	0	0	0	0	0	99.99
2003	252	23	2781	339.842	-425.379	D	7.201	7.2	0.001	2.469	0	0	0	0	0	100
2003	253	23	2781	339.842	-425.379	D	7.37	7.369	0.001	2.824	0	0	0	0	0	100.04
2003	254	23	1506	330.05	-427.796	D	8.313	8.313	0	4.913	0	0	0	0	0	82.49
2003	255	23	1	318.65	-445.782	D	9.962	9.962	0	9.071	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	9.428	9.428	0	7.649	0	0	0	0	0	0
2003	257	23	2781	339.842	-425.379	D	8.654	8.651	0.004	5.708	0	0	0	0	0	99.95
2003	258	23	2308	337.055	-428.737	D	6.757	6.719	0.038	1.494	0	0	0	0	0	100
2003	259	23	2757	335.63	-424.484	D	6.648	6.646	0.002	1.351	0	0	0	0	0	99.94
2003	260	23	2781	339.842	-425.379	D	6.756	6.755	0.001	1.565	0	0	0	0	0	99.91
2003	261	23	139	320.353	-439.212	D	6.75	6.75	0	1.556	0	0	0	0	0	90.08
2003	262	23	2758	335.862	-424.454	D	7.91	7.893	0.018	3.957	0	0	0	0	0	99.99
2003	263	23	2789	340.496	-426.449	D	6.597	6.588	0.01	1.236	0	0	0	0	0	99.99
2003	264	23	2789	340.496	-426.449	D	7.055	7.049	0.006	2.158	0	0	0	0	0	99.97
2003	265	23	2684	326.713	-427.014	D	9.082	9.081	0.001	6.764	0	0	0	0	0	99.86
2003	266	23	2758	335.862	-424.454	D	6.929	6.888	0.041	1.832	0	0	0	0	0	100
2003	267	23	1415	329.185	-425.086	D	6.853	6.853	0	1.761	0	0	0	0	0	99.91
2003	268	23	2435	337.211	-428.786	D	6.852	6.838	0.013	1.732	0	0	0	0	0	100
2003	269	23	2789	340.496	-426.449	D	7.045	7.039	0.006	2.138	0	0	0	0	0	99.97
2003	270	23	2684	326.713	-427.014	D	7.488	7.461	0.026	3.018	0	0	0	0	0	99.99
2003	271	23	2758	335.862	-424.454	D	6.74	6.678	0.062	1.413	0	0	0	0	0	100
2003	272	23	2694	327.861	-425.964	D	6.552	6.531	0.02	1.127	0	0	0	0	0	99.99

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	273	23	2757	335.63	-424.484	D	6.575	6.563	0.011	1.189	0	0	0	0	0	100
2003	274	23	2694	327.861	-425.964	D	8.494	8.474	0.02	5.288	0	0	0	0	0	99.98
2003	275	23	2694	327.861	-425.964	D	6.644	6.574	0.07	1.209	0	0	0	0	0	100
2003	276	23	2762	336.074	-425.006	D	7.01	7.007	0.003	2.072	0	0	0	0	0	99.99
2003	277	23	2758	335.862	-424.454	D	6.867	6.855	0.011	1.766	0	0	0	0	0	100
2003	278	23	2711	330.671	-424.932	D	7.063	7.04	0.023	2.139	0	0	0	0	0	100
2003	279	23	12	319.07	-444.015	D	9.15	9.143	0.006	6.921	0	0	0	0	0	99.98
2003	280	23	2781	339.842	-425.379	D	7.755	7.748	0.006	3.639	0	0	0	0	0	100.01
2003	281	23	2684	326.713	-427.014	D	7.599	7.597	0.001	3.31	0	0	0	0	0	99.97
2003	282	23	1412	329.218	-425.834	D	8.913	8.913	0	6.345	0	0	0	0	0	98.1
2003	283	23	2684	326.713	-427.014	D	9.772	9.772	0	8.556	0	0	0	0	0	99.4
2003	284	23	1549	330.211	-425.79	D	9.555	9.555	0	7.98	0	0	0	0	0	79.25
2003	285	23	2704	329.056	-425.092	D	7.947	7.924	0.023	4.028	0	0	0	0	0	100
2003	286	23	2589	318.383	-445.593	D	6.946	6.944	0.002	1.944	0	0	0	0	0	99.99
2003	287	23	2781	339.842	-425.379	D	8.87	8.869	0.001	6.238	0	0	0	0	0	100.05
2003	288	23	2308	337.055	-428.737	D	6.721	6.713	0.008	1.483	0	0	0	0	0	100
2003	289	23	2781	339.842	-425.379	D	6.602	6.602	0	1.265	0	0	0	0	0	100.14
2003	290	23	2789	340.496	-426.449	D	8.094	8.079	0.016	4.375	0	0	0	0	0	100
2003	291	23	2600	318.952	-443.12	D	6.625	6.622	0.004	1.303	0	0	0	0	0	100.02
2003	292	23	2571	322.646	-445.476	D	6.598	6.595	0.003	1.251	0	0	0	0	0	100.01
2003	293	23	2468	334.002	-434.887	D	6.696	6.696	0	1.45	0	0	0	0	0	96.66
2003	294	23	2781	339.842	-425.379	D	6.723	6.719	0.003	1.495	0	0	0	0	0	100
2003	295	23	2758	335.862	-424.454	D	6.732	6.71	0.022	1.478	0	0	0	0	0	100
2003	296	23	2789	340.496	-426.449	D	6.627	6.617	0.01	1.294	0	0	0	0	0	100
2003	297	23	2781	339.842	-425.379	D	6.686	6.685	0.002	1.427	0	0	0	0	0	99.9
2003	298	23	2758	335.862	-424.454	D	8.004	7.99	0.014	4.174	0	0	0	0	0	99.99
2003	299	23	2758	335.862	-424.454	D	7.594	7.562	0.032	3.234	0	0	0	0	0	100
2003	300	23	2789	340.496	-426.449	D	6.541	6.541	0	1.146	0	0	0	0	0	100.23
2003	301	23	2755	335.167	-424.545	D	6.633	6.632	0	1.324	0	0	0	0	0	99.93
2003	302	23	2758	335.862	-424.454	D	6.55	6.53	0.02	1.125	0	0	0	0	0	100.01
2003	303	23	1	318.65	-445.782	D	7.414	7.414	0	2.919	0	0	0	0	0	0
2003	304	23	2684	326.713	-427.014	D	9.138	9.138	0	6.907	0	0	0	0	0	56.57
2003	305	23	2704	329.056	-425.092	D	9.496	9.466	0.029	7.748	0	0	0	0	0	99.99
2003	306	23	1	318.65	-445.782	D	8.79	8.79	0	6.045	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.877	7.877	0	3.922	0	0	0	0	0	0
2003	308	23	1415	329.185	-425.086	D	7.408	7.408	0	2.905	0	0	0	0	0	99.26
2003	309	23	2684	326.713	-427.014	D	8.031	8.014	0.017	4.229	0	0	0	0	0	99.99
2003	310	23	2758	335.862	-424.454	D	8.951	8.925	0.026	6.376	0	0	0	0	0	99.99
2003	311	23	2694	327.861	-425.964	D	7.902	7.865	0.038	3.895	0	0	0	0	0	100

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	312	23	2684	326.713	-427.014	D	6.627	6.624	0.003	1.307	0	0	0	0	0	99.99
2003	313	23	1415	329.185	-425.086	D	6.512	6.512	0	1.089	0	0	0	0	0	100.17
2003	314	23	2789	340.496	-426.449	D	6.613	6.612	0.001	1.284	0	0	0	0	0	99.99
2003	315	23	1	318.65	-445.782	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2003	316	23	2292	336.405	-425.269	D	9.266	9.266	0	7.232	0	0	0	0	0	97.97
2003	317	23	2758	335.862	-424.454	D	6.514	6.496	0.018	1.058	0	0	0	0	0	99.99
2003	318	23	2789	340.496	-426.449	D	6.968	6.957	0.011	1.97	0	0	0	0	0	99.99
2003	319	23	2456	334.644	-432.056	D	8.414	8.414	0	5.147	0	0	0	0	0	65.99
2003	320	23	1	318.65	-445.782	D	9.626	9.626	0	8.168	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	10.088	10.088	0	9.417	0	0	0	0	0	0
2003	322	23	2789	340.496	-426.449	D	9.877	9.876	0.001	8.836	0	0	0	0	0	100
2003	323	23	2756	335.398	-424.515	D	7.467	7.463	0.003	3.022	0	0	0	0	0	100
2003	324	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	9.817	9.817	0	8.677	0	0	0	0	0	0
2003	327	23	1415	329.185	-425.086	D	9.01	9.009	0	6.585	0	0	0	0	0	99.14
2003	328	23	2781	339.842	-425.379	D	7.262	7.262	0	2.598	0	0	0	0	0	99.94
2003	329	23	1	318.65	-445.782	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.434	7.434	0	2.961	0	0	0	0	0	0
2003	331	23	2600	318.952	-443.12	D	9.181	9.17	0.011	6.988	0	0	0	0	0	99.98
2003	332	23	2789	340.496	-426.449	D	6.843	6.839	0.004	1.734	0	0	0	0	0	99.98
2003	333	23	2668	326.131	-430.598	D	6.497	6.494	0.003	1.055	0	0	0	0	0	99.97
2003	334	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2003	335	23	2758	335.862	-424.454	D	6.671	6.659	0.013	1.376	0	0	0	0	0	99.99
2003	336	23	2308	337.055	-428.737	D	6.519	6.512	0.008	1.089	0	0	0	0	0	99.99
2003	337	23	2410	339.439	-426.385	D	8.177	8.177	0	4.598	0	0	0	0	0	99.79
2003	338	23	2758	335.862	-424.454	D	9.197	9.185	0.011	7.027	0	0	0	0	0	99.98
2003	339	23	1951	333.842	-434.874	D	8.542	8.536	0.006	5.436	0	0	0	0	0	99.99
2003	340	23	2789	340.496	-426.449	D	7.823	7.817	0.006	3.79	0	0	0	0	0	99.98
2003	341	23	2781	339.842	-425.379	D	6.659	6.656	0.003	1.37	0	0	0	0	0	99.98
2003	342	23	1	318.65	-445.782	D	8.111	8.111	0	4.449	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	10.155	10.155	0	9.603	0	0	0	0	0	0
2003	344	23	2781	339.842	-425.379	D	8.902	8.894	0.007	6.301	0	0	0	0	0	99.95
2003	345	23	2758	335.862	-424.454	D	7.571	7.558	0.013	3.226	0	0	0	0	0	99.99
2003	346	23	2781	339.842	-425.379	D	6.853	6.844	0.01	1.742	0	0	0	0	0	100.01
2003	347	23	2758	335.862	-424.454	D	9.553	9.55	0.003	7.966	0	0	0	0	0	99.91
2003	348	23	2781	339.842	-425.379	D	9.442	9.434	0.008	7.664	0	0	0	0	0	99.97
2003	349	23	2781	339.842	-425.379	D	9.064	9.064	0.001	6.72	0	0	0	0	0	99.77
2003	350	23	2789	340.496	-426.449	D	8.725	8.723	0.002	5.883	0	0	0	0	0	100

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	351	23	2789	340.496	-426.449	D	7.501	7.5	0	3.102	0	0	0	0	0	100.02
2003	352	23	2758	335.862	-424.454	D	6.936	6.935	0.001	1.926	0	0	0	0	0	99.92
2003	353	23	2611	319.699	-440.64	D	7.572	7.567	0.005	3.244	0	0	0	0	0	100.01
2003	354	23	2758	335.862	-424.454	D	6.619	6.614	0.005	1.288	0	0	0	0	0	100.01
2003	355	23	2789	340.496	-426.449	D	6.609	6.609	0	1.278	0	0	0	0	0	100.45
2003	356	23	1	318.65	-445.782	D	9.46	9.46	0	7.73	0	0	0	0	0	0
2003	357	23	2640	322.263	-435.121	D	9.48	9.464	0.016	7.742	0	0	0	0	0	100
2003	358	23	2758	335.862	-424.454	D	8.598	8.544	0.054	5.454	0	0	0	0	0	100
2003	359	23	2789	340.496	-426.449	D	6.592	6.584	0.008	1.23	0	0	0	0	0	100.01
2003	360	23	2781	339.842	-425.379	D	6.846	6.845	0.001	1.745	0	0	0	0	0	100.17
2003	361	23	2781	339.842	-425.379	D	6.757	6.757	0	1.569	0	0	0	0	0	97.38
2003	362	23	1	318.65	-445.782	D	8.719	8.719	0	5.874	0	0	0	0	0	0
2003	363	23	2704	329.056	-425.092	D	7.285	7.283	0.002	2.642	0	0	0	0	0	99.98
2003	364	23	1	318.65	-445.782	D	6.566	6.566	0	1.194	0	0	0	0	0	0
									0.094							
EXIDE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	6.999	6.999	0	2.056	0	0	0	0	0	0
2003	2	23	1	318.65	-445.782	D	9.22	9.22	0	7.114	87.1	10.43	0	0	0	3.2
2003	3	23	2758	335.862	-424.454	D	7.932	7.927	0.005	4.034	85.77	11.43	0	0	0	2.77
2003	4	23	2409	339.158	-425.648	D	6.796	6.796	0	1.647	87.67	7.06	0	0	0	5.41
2003	5	23	2789	340.496	-426.449	D	7.327	7.327	0	2.733	71	19.88	0	0	0	6.73
2003	6	23	2781	339.842	-425.379	D	8.231	8.228	0.003	4.716	91.5	7.7	0	0	0	0.76
2003	7	23	2624	320.719	-437.835	D	7.422	7.422	0.001	2.934	90.83	6.63	0	0	0	2.35
2003	8	23	2362	338.048	-428.694	D	6.719	6.719	0	1.494	88.38	3.23	0	0	0	3.41
2003	9	23	2757	335.63	-424.484	D	6.968	6.968	0	1.994	85.67	6.26	0	0	0	7.3
2003	10	23	2694	327.861	-425.964	D	6.605	6.604	0	1.268	63.56	17.47	0	0	0	18.98
2003	11	23	440	322.543	-438.117	D	6.551	6.55	0.001	1.164	70.94	13.83	0	0	0	15.23
2003	12	23	2588	318.452	-445.8	D	6.501	6.5	0.001	1.066	84.46	8.13	0	0	0	7.16
2003	13	23	2400	338.672	-425.919	D	6.698	6.698	0	1.452	90.04	5.56	0	0	0	3.15
2003	14	23	2704	329.056	-425.092	D	9.205	9.204	0.001	7.075	90.3	7.75	0	0	0	1.69
2003	15	23	1	318.65	-445.782	D	6.625	6.625	0	1.309	92.2	4.32	0	0	0	3.55
2003	16	23	2605	319.291	-441.992	D	8.256	8.256	0	4.78	92.88	4.85	0	0	0	0.51
2003	17	23	2758	335.862	-424.454	D	8.102	8.1	0.002	4.424	91.97	6.39	0	0	0	1.78
2003	18	23	2781	339.842	-425.379	D	6.6	6.6	0	1.261	82.18	9.61	0	0	0	8.13
2003	19	23	1	318.65	-445.782	D	6.651	6.651	0	1.361	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	6.624	6.624	0	1.308	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	21	23	2707	329.748	-425.023	D	7.53	7.527	0.003	3.159	94.79	4.65	0	0	0	0.59
2003	22	23	623	324.229	-442.54	D	7.562	7.562	0	3.234	93.41	2.65	0	0	0	0.37
2003	23	23	1	318.65	-445.782	D	6.876	6.876	0	1.806	0	0	0	0	0	0
2003	24	23	168	320.568	-438.453	D	6.618	6.618	0	1.295	80.24	10.4	0	0	0	5.84
2003	25	23	2182	335.131	-424.575	D	6.501	6.501	0	1.067	85.08	9.49	0	0	0	3.85
2003	26	23	2707	329.748	-425.023	D	7.266	7.257	0.008	2.589	88.14	10.2	0	0	0	1.65
2003	27	23	1	318.65	-445.782	D	6.779	6.778	0.001	1.612	90.34	5.96	0	0	0	3.69
2003	28	23	2789	340.496	-426.449	D	8.039	8.039	0	4.285	91.65	4.61	0	0	0	2.09
2003	29	23	1	318.65	-445.782	D	9.699	9.699	0	8.36	0	0	0	0	0	0
2003	30	23	1	318.65	-445.782	D	9.114	9.114	0	6.846	0	0	0	0	0	0
2003	31	23	1	318.65	-445.782	D	7.121	7.121	0	2.306	0	0	0	0	0	0
2003	32	23	1	318.65	-445.782	D	6.936	6.936	0	1.929	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	6.87	6.87	0	1.795	0	0	0	0	0	0
2003	34	23	1551	330.189	-425.292	D	9.478	9.478	0	7.778	56.38	2.01	0	0	0	0.25
2003	35	23	1	318.65	-445.782	D	7.1	7.1	0	2.263	0	0	0	0	0	0
2003	36	23	2789	340.496	-426.449	D	6.564	6.563	0	1.189	89.16	4.56	0	0	0	5.96
2003	37	23	2694	327.861	-425.964	D	9.202	9.199	0.003	7.061	94.52	4.81	0	0	0	0.54
2003	38	23	2789	340.496	-426.449	D	8.016	8.011	0.005	4.221	95.32	4.03	0	0	0	0.61
2003	39	23	346	322.298	-443.874	D	6.839	6.839	0	1.734	65.16	7.09	0	0	0	3.81
2003	40	23	2758	335.862	-424.454	D	7.768	7.768	0	3.681	86.38	5	0	0	0	0.78
2003	41	23	2359	337.701	-426.461	D	9.352	9.352	0	7.452	84.92	4.62	0	0	0	0.26
2003	42	23	1	318.65	-445.782	D	6.733	6.733	0	1.522	0	0	0	0	0	0
2003	43	23	2692	327.796	-426.377	D	6.521	6.52	0	1.106	68.28	14.12	0	0	0	17.42
2003	44	23	2790	340.421	-426.562	D	6.611	6.61	0	1.281	87.39	5.14	0	0	0	6.79
2003	45	23	1414	329.196	-425.335	D	10.218	10.218	0	9.779	86.24	4.25	0	0	0	0.52
2003	46	23	1	318.65	-445.782	D	10.176	10.176	0	9.662	0	0	0	0	0	0
2003	47	23	1	318.65	-445.782	D	8.453	8.453	0	5.24	0	0	0	0	0	0
2003	48	23	1	318.65	-445.782	D	7.865	7.865	0	3.896	0	0	0	0	0	0
2003	49	23	2588	318.452	-445.8	D	6.86	6.86	0	1.776	94.05	2.89	0	0	0	1.86
2003	50	23	2240	336.106	-429.778	D	9.195	9.195	0	7.051	40.41	1.43	0	0	0	0.43
2003	51	23	2704	329.056	-425.092	D	9.526	9.524	0.002	7.899	96.34	3.17	0	0	0	0.39
2003	52	23	2684	326.713	-427.014	D	9.716	9.716	0	8.405	97.78	1.38	0	0	0	0.3
2003	53	23	13	319.06	-443.766	D	9.494	9.493	0	7.818	95.32	3.17	0	0	0	0.98
2003	54	23	1	318.65	-445.782	D	8.727	8.727	0	5.892	0	0	0	0	0	0
2003	55	23	2597	318.971	-443.851	D	8.439	8.438	0	5.204	89.03	8.1	0	0	0	2.52
2003	56	23	2623	320.666	-438.044	D	7.488	7.485	0.003	3.069	92.95	5.73	0	0	0	1.26
2003	57	23	1415	329.185	-425.086	D	8.626	8.624	0.002	5.646	95.63	3.89	0	0	0	0.44
2003	58	23	2155	334.883	-424.586	D	8.768	8.768	0.001	5.991	96.67	2.83	0	0	0	0.33
2003	59	23	2750	334.007	-424.696	D	8.968	8.967	0.001	6.48	97.42	2.15	0	0	0	0.24

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	60	23	2413	339.406	-425.637	D	9.652	9.651	0.001	8.233	97.74	1.82	0	0	0	0.15
2003	61	23	2781	339.842	-425.379	D	9.122	9.119	0.003	6.86	94.77	3.22	0	0	0	1.98
2003	62	23	2447	336.137	-430.956	D	7.378	7.373	0.005	2.832	93.34	5.21	0	0	0	1.41
2003	63	23	2789	340.496	-426.449	D	6.994	6.99	0.004	2.037	97.68	1.3	0	0	0	0.99
2003	64	23	2704	329.056	-425.092	D	9.103	9.103	0.001	6.818	96.61	2.77	0	0	0	0.44
2003	65	23	2563	323.259	-443.79	D	7.623	7.623	0	3.366	96.27	2.98	0	0	0	0.42
2003	66	23	2709	330.21	-424.978	D	6.918	6.918	0	1.891	94.96	2.82	0	0	0	1.83
2003	67	23	1412	329.218	-425.834	D	7.058	7.058	0	2.176	94.45	0.92	0	0	0	2.24
2003	68	23	2789	340.496	-426.449	D	7.063	7.06	0.003	2.18	93.64	4.89	0	0	0	1.43
2003	69	23	1	318.65	-445.782	D	6.544	6.544	0	1.152	95.29	0.92	0	0	0	3.44
2003	70	23	2588	318.452	-445.8	D	6.561	6.56	0.001	1.183	96.71	1.04	0	0	0	2.31
2003	71	23	2149	334.949	-426.082	D	7.133	7.133	0	2.331	97.6	0.77	0	0	0	1.32
2003	72	23	2694	327.861	-425.964	D	8.684	8.683	0.001	5.787	96.62	2.12	0	0	0	1.23
2003	73	23	2600	318.952	-443.12	D	8.678	8.677	0.001	5.772	97.47	1.75	0	0	0	0.66
2003	74	23	1045	326.823	-427.937	D	8.138	8.138	0	4.509	97.12	1.36	0	0	0	0.63
2003	75	23	1	318.65	-445.782	D	7.312	7.312	0	2.702	0	0	0	0	0	0
2003	76	23	1	318.65	-445.782	D	8.644	8.644	0	5.692	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	8.653	8.653	0	5.713	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	8.871	8.871	0	6.244	0	0	0	0	0	0
2003	79	23	2597	318.971	-443.851	D	9.206	9.203	0.003	7.071	94.96	4.32	0	0	0	0.63
2003	80	23	37	319.567	-443.993	D	8.893	8.871	0.022	6.244	95.07	4.19	0	0	0	0.74
2003	81	23	2571	322.646	-445.476	D	6.546	6.545	0.001	1.154	90.81	2.49	0	0	0	6.7
2003	82	23	2467	334.065	-434.651	D	6.58	6.58	0	1.222	95.43	0.53	0	0	0	3.81
2003	83	23	1	318.65	-445.782	D	6.82	6.82	0	1.696	0	0	0	0	0	0
2003	84	23	1552	330.178	-425.042	D	7.681	7.681	0	3.492	97.24	1.69	0	0	0	0.99
2003	85	23	1922	333.594	-434.885	D	8.823	8.823	0	6.126	96.62	2.39	0	0	0	0.29
2003	86	23	1	318.65	-445.782	D	6.635	6.635	0	1.329	0	0	0	0	0	0
2003	87	23	2781	339.842	-425.379	D	8.663	8.663	0	5.739	89.93	6.78	0	0	0	0.77
2003	88	23	1	318.65	-445.782	D	7.301	7.301	0	2.679	0	0	0	0	0	0
2003	89	23	2780	339.614	-425.419	D	6.531	6.531	0	1.126	79.16	8.98	0	0	0	11.27
2003	90	23	2177	335.186	-425.822	D	6.477	6.477	0	1.022	36.53	1.57	0	0	0	4.37
2003	91	23	1	318.65	-445.782	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.231	7.231	0	2.533	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	8.075	8.075	0	4.366	0	0	0	0	0	0
2003	95	23	2758	335.862	-424.454	D	6.79	6.789	0.001	1.634	89.02	5.65	0	0	0	5.32
2003	96	23	2404	338.92	-425.908	D	8.057	8.057	0	4.325	97.33	1.4	0	0	0	0.2
2003	97	23	2248	336.018	-427.784	D	9.101	9.101	0	6.813	66.44	0.72	0	0	0	0.03
2003	98	23	2781	339.842	-425.379	D	7.437	7.433	0.003	2.959	90.83	6.9	0	0	0	2.22

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	99	23	2588	318.452	-445.8	D	6.95	6.95	0	1.956	88.88	6.01	0	0	0	4.99
2003	100	23	1	318.65	-445.782	D	6.581	6.581	0	1.223	0	0	0	0	0	0
2003	101	23	863	325.509	-431.992	D	6.479	6.479	0	1.025	88.86	0.4	0	0	0	3.28
2003	102	23	1412	329.218	-425.834	D	6.494	6.494	0	1.055	96.43	0.18	0	0	0	2.74
2003	103	23	199	320.795	-437.944	D	6.522	6.522	0	1.11	89.79	0.09	0	0	0	2.09
2003	104	23	2236	336.149	-430.776	D	6.65	6.65	0	1.359	82.43	0.1	0	0	0	1.54
2003	105	23	1	318.65	-445.782	D	6.637	6.637	0	1.334	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	107	23	199	320.795	-437.944	D	7.652	7.651	0.001	3.426	95.98	3.26	0	0	0	0.72
2003	108	23	2781	339.842	-425.379	D	7.83	7.83	0	3.818	94.22	0.7	0	0	0	1.72
2003	109	23	2407	339.18	-426.146	D	7.559	7.559	0	3.227	95.71	0.11	0	0	0	0.87
2003	110	23	2704	329.056	-425.092	D	9.015	9.008	0.007	6.582	97.47	1.9	0	0	0	0.61
2003	111	23	1	318.65	-445.782	D	7.014	7.014	0	2.087	0	0	0	0	0	0
2003	112	23	2404	338.92	-425.908	D	6.542	6.541	0	1.146	89.43	2.51	0	0	0	8.06
2003	113	23	15	319.038	-443.267	D	6.594	6.593	0.001	1.247	96.52	0.66	0	0	0	2.56
2003	114	23	1	318.65	-445.782	D	8.02	8.02	0	4.243	0	0	0	0	0	0
2003	115	23	2624	320.719	-437.835	D	8.363	8.358	0.004	5.018	96.35	1.54	0	0	0	2.07
2003	116	23	2588	318.452	-445.8	D	8.088	8.087	0.001	4.394	97.65	0.96	0	0	0	1.4
2003	117	23	1	318.65	-445.782	D	7.053	7.053	0	2.166	95.36	0.45	0	0	0	0.85
2003	118	23	199	320.795	-437.944	D	7.435	7.435	0	2.963	2.68	0	0	0	0	0.04
2003	119	23	1	318.65	-445.782	D	7.327	7.327	0	2.733	0	0	0	0	0	0
2003	120	23	1	318.65	-445.782	D	7.985	7.985	0	4.163	0	0	0	0	0	0
2003	121	23	1	318.65	-445.782	D	7.624	7.624	0	3.367	0	0	0	0	0	0
2003	122	23	2704	329.056	-425.092	D	8.846	8.842	0.004	6.173	97.56	1.8	0	0	0	0.62
2003	123	23	2789	340.496	-426.449	D	8.512	8.507	0.005	5.366	98.98	0.6	0	0	0	0.41
2003	124	23	2254	335.953	-426.288	D	7.32	7.318	0.002	2.716	99.26	0.13	0	0	0	0.53
2003	125	23	1	318.65	-445.782	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	8.385	8.385	0	5.081	0	0	0	0	0	0
2003	127	23	1415	329.185	-425.086	D	8.618	8.618	0	5.629	97.38	0.9	0	0	0	1.46
2003	128	23	2415	339.676	-426.124	D	8.007	8.007	0	4.213	98.19	0.21	0	0	0	1.47
2003	129	23	1	318.65	-445.782	D	7.642	7.642	0	3.407	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	8.486	8.486	0	5.317	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.409	7.409	0	2.907	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	6.899	6.899	0	1.854	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	9.399	9.399	0	7.572	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	8.763	8.763	0	5.98	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	9.31	9.31	0	7.344	0	0	0	0	0	0
2003	137	23	2277	336.146	-425.03	D	9.371	9.371	0	7.5	97.35	0.08	0	0	0	0.7

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	138	23	2684	326.713	-427.014	D	9.096	9.093	0.002	6.795	99.14	0.54	0	0	0	0.23
2003	139	23	1048	326.791	-427.189	D	8.791	8.79	0	6.046	98.89	0.32	0	0	0	0.29
2003	140	23	2684	326.713	-427.014	D	8.271	8.269	0.002	4.81	98.23	1.39	0	0	0	0.36
2003	141	23	1	318.65	-445.782	D	6.718	6.718	0	1.492	99.7	0.16	0	0	0	0.92
2003	142	23	1	318.65	-445.782	D	7.283	7.283	0	2.641	0	0	0	0	0	0
2003	143	23	2274	336.179	-425.778	D	6.676	6.676	0	1.409	56	0.02	0	0	0	1.51
2003	144	23	2209	335.38	-424.564	D	7.815	7.815	0	3.785	98.13	0.41	0	0	0	0.63
2003	145	23	2704	329.056	-425.092	D	9.207	9.205	0.003	7.075	98.59	0.92	0	0	0	0.43
2003	146	23	2597	318.971	-443.851	D	8.096	8.096	0	4.414	99.32	0.1	0	0	0	0.54
2003	147	23	1	318.65	-445.782	D	6.647	6.647	0	1.353	0	0	0	0	0	0
2003	148	23	1	318.65	-445.782	D	6.596	6.596	0	1.253	0	0	0	0	0	0
2003	149	23	2789	340.496	-426.449	D	7.287	7.286	0.001	2.649	94.17	2.35	0	0	0	3.49
2003	150	23	1	318.65	-445.782	D	6.615	6.614	0	1.289	95.53	0.11	0	0	0	3.69
2003	151	23	2694	327.861	-425.964	D	7.237	7.237	0	2.545	87.68	6.65	0	0	0	5.47
2003	152	23	1	318.65	-445.782	D	7.102	7.102	0	2.267	68.05	0.01	0	0	0	1.75
2003	153	23	692	324.107	-434.051	D	8.688	8.688	0	5.799	93.08	0.1	0	0	0	0.23
2003	154	23	1	318.65	-445.782	D	9.027	9.027	0	6.628	98.97	0.53	0	0	0	0.19
2003	155	23	1	318.65	-445.782	D	7.305	7.305	0	2.689	0	0	0	0	0	0
2003	156	23	1	318.65	-445.782	D	6.821	6.821	0	1.697	0	0	0	0	0	0
2003	157	23	2684	326.713	-427.014	D	8.784	8.784	0	6.03	92.26	0.12	0	0	0	0.64
2003	158	23	13	319.06	-443.766	D	7.514	7.514	0	3.132	98.41	0.17	0	0	0	0.63
2003	159	23	2236	336.149	-430.776	D	7.15	7.15	0	2.365	94.52	0.04	0	0	0	0.66
2003	160	23	2037	333.945	-425.876	D	6.623	6.623	0	1.305	75.88	0.03	0	0	0	0.92
2003	161	23	1	318.65	-445.782	D	7.499	7.499	0	3.098	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	8.817	8.817	0	6.112	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	8.874	8.874	0	6.251	0	0	0	0	0	0
2003	164	23	67	319.674	-440.741	D	9.221	9.221	0	7.117	96.24	0.12	0	0	0	0.87
2003	165	23	1551	330.189	-425.292	D	8.299	8.299	0	4.879	98.56	0.28	0	0	0	0.34
2003	166	23	1	318.65	-445.782	D	8.279	8.279	0	4.833	97.74	0.3	0	0	0	0.29
2003	167	23	2183	335.664	-431.047	D	8.102	8.102	0	4.428	96.68	0.13	0	0	0	0.33
2003	168	23	1	318.65	-445.782	D	7.645	7.645	0	3.413	97.53	0.21	0	0	0	0.4
2003	169	23	1	318.65	-445.782	D	8.946	8.946	0	6.427	100.21	0.1	0	0	0	0.16
2003	170	23	2155	334.883	-424.586	D	8.518	8.518	0	5.392	96.55	0.05	0	0	0	1.95
2003	171	23	2709	330.21	-424.978	D	8.411	8.408	0.004	5.133	98.65	0.95	0	0	0	0.37
2003	172	23	1	318.65	-445.782	D	6.969	6.969	0	1.995	98.57	0.06	0	0	0	0.85
2003	173	23	1	318.65	-445.782	D	6.92	6.92	0	1.897	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.108	7.108	0	2.279	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.784	7.784	0	3.718	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	8.399	8.399	0	5.113	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	177	23	2758	335.862	-424.454	D	8.725	8.722	0.003	5.881	96.97	2.28	0	0	0	0.71
2003	178	23	2684	326.713	-427.014	D	6.842	6.84	0.002	1.735	96.52	0.42	0	0	0	3.01
2003	179	23	30	319.242	-442.259	D	6.649	6.647	0.001	1.353	97.24	0.06	0	0	0	2.66
2003	180	23	1415	329.185	-425.086	D	6.719	6.719	0	1.494	97.62	0.04	0	0	0	1.97
2003	181	23	1549	330.211	-425.79	D	7.095	7.095	0	2.252	91.23	0.12	0	0	0	1.09
2003	182	23	1	318.65	-445.782	D	8.857	8.857	0	6.21	0	0	0	0	0	0
2003	183	23	199	320.795	-437.944	D	7.367	7.367	0	2.818	38.46	0	0	0	0	0.57
2003	184	23	13	319.06	-443.766	D	7.354	7.354	0	2.791	14.83	0	0	0	0	0.1
2003	185	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	8.318	8.318	0	4.923	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.086	7.086	0	2.234	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.739	7.739	0	3.619	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	8.593	8.593	0	5.571	0	0	0	0	0	0
2003	192	23	2589	318.383	-445.593	D	7.286	7.285	0.001	2.647	95.09	0.31	0	0	0	4.69
2003	193	23	2213	335.868	-430.039	D	7.863	7.862	0.001	3.889	98.24	0.48	0	0	0	1.18
2003	194	23	2781	339.842	-425.379	D	7.249	7.249	0	2.571	98.15	0.14	0	0	0	1.34
2003	195	23	2781	339.842	-425.379	D	8.449	8.448	0.001	5.227	99.33	0.2	0	0	0	0.39
2003	196	23	2037	333.945	-425.876	D	8.174	8.174	0	4.592	89.43	0.01	0	0	0	0.48
2003	197	23	2203	335.445	-426.06	D	7.006	7.006	0	2.07	91.38	0.02	0	0	0	2.17
2003	198	23	2274	336.179	-425.778	D	7.133	7.133	0	2.331	90.13	0.02	0	0	0	1.19
2003	199	23	1412	329.218	-425.834	D	7.137	7.137	0	2.338	88.15	0.01	0	0	0	0.87
2003	200	23	13	319.06	-443.766	D	7.66	7.66	0	3.446	42.16	0	0	0	0	0.31
2003	201	23	1	318.65	-445.782	D	8.338	8.338	0	4.97	0	0	0	0	0	0
2003	202	23	2155	334.883	-424.586	D	8.102	8.102	0	4.428	98.31	0.12	0	0	0	0.39
2003	203	23	2789	340.496	-426.449	D	7.678	7.677	0.001	3.482	98.36	0.33	0	0	0	1.36
2003	204	23	1	318.65	-445.782	D	7.015	7.015	0	2.088	0	0	0	0	0	0
2003	205	23	1	318.65	-445.782	D	6.955	6.955	0	1.968	0	0	0	0	0	0
2003	206	23	1	318.65	-445.782	D	7.058	7.058	0	2.176	0	0	0	0	0	0
2003	207	23	1	318.65	-445.782	D	6.798	6.798	0	1.652	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.085	7.085	0	2.232	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.085	7.085	0	2.233	0	0	0	0	0	0
2003	210	23	2762	336.074	-425.006	D	8.42	8.415	0.005	5.151	99.16	0.42	0	0	0	0.36
2003	211	23	2694	327.861	-425.964	D	9.346	9.34	0.006	7.421	99.42	0.28	0	0	0	0.27
2003	212	23	2789	340.496	-426.449	D	7.609	7.607	0.002	3.331	99.22	0.16	0	0	0	0.58
2003	213	23	2418	339.946	-426.612	D	6.901	6.901	0	1.858	98.02	0.08	0	0	0	1
2003	214	23	2156	335.416	-431.058	D	7.672	7.672	0	3.471	98.13	0.02	0	0	0	0.45
2003	215	23	2762	336.074	-425.006	D	7.855	7.854	0.001	3.872	98.91	0.17	0	0	0	0.77

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	216	23	1455	329.987	-432.045	D	7.888	7.882	0.006	3.934	99.27	0.19	0	0	0	0.52
2003	217	23	2789	340.496	-426.449	D	8.348	8.348	0	4.992	99.15	0.13	0	0	0	0.58
2003	218	23	2273	336.19	-426.028	D	8.604	8.603	0.001	5.595	98.93	0.22	0	0	0	0.58
2003	219	23	13	319.06	-443.766	D	8.445	8.443	0.002	5.214	99.36	0.23	0	0	0	0.38
2003	220	23	199	320.795	-437.944	D	7.079	7.079	0	2.22	95.13	0	0	0	0	0.92
2003	221	23	1	318.65	-445.782	D	6.977	6.977	0	2.01	0	0	0	0	0	0
2003	222	23	1	318.65	-445.782	D	7.162	7.162	0	2.39	0	0	0	0	0	0
2003	223	23	1	318.65	-445.782	D	7.272	7.272	0	2.62	0	0	0	0	0	0
2003	224	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2003	225	23	1	318.65	-445.782	D	8.321	8.321	0	4.931	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	8.753	8.753	0	5.955	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.337	7.337	0	2.755	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.347	7.347	0	2.776	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2003	230	23	2789	340.496	-426.449	D	6.902	6.901	0	1.859	97.44	0.03	0	0	0	2.21
2003	231	23	2789	340.496	-426.449	D	6.826	6.826	0.001	1.706	98.32	0.03	0	0	0	1.55
2003	232	23	2788	340.294	-426.448	D	6.86	6.86	0	1.775	98.52	0.04	0	0	0	1.25
2003	233	23	2789	340.496	-426.449	D	6.921	6.921	0	1.898	98.76	0.13	0	0	0	1.07
2003	234	23	2784	339.87	-426.019	D	7.114	7.113	0.001	2.289	98.15	0.02	0	0	0	1.85
2003	235	23	2784	339.87	-426.019	D	7.033	7.028	0.005	2.114	98.57	0.04	0	0	0	1.4
2003	236	23	2588	318.452	-445.8	D	8.524	8.515	0.009	5.385	99.35	0.13	0	0	0	0.49
2003	237	23	2653	324.014	-433.36	D	7.889	7.884	0.005	3.939	99.38	0.05	0	0	0	0.58
2003	238	23	2784	339.87	-426.019	D	7.376	7.375	0.001	2.835	99.17	0.01	0	0	0	0.68
2003	239	23	2413	339.406	-425.637	D	7.03	7.03	0	2.119	98.82	0.02	0	0	0	0.73
2003	240	23	1	318.65	-445.782	D	7.105	7.105	0	2.273	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	8.394	8.394	0	5.101	0	0	0	0	0	0
2003	242	23	1	318.65	-445.782	D	8.773	8.773	0	6.004	0	0	0	0	0	0
2003	243	23	1	318.65	-445.782	D	9.309	9.309	0	7.34	0	0	0	0	0	0
2003	244	23	1	318.65	-445.782	D	9.456	9.456	0	7.721	0	0	0	0	0	0
2003	245	23	1	318.65	-445.782	D	9.776	9.776	0	8.566	0	0	0	0	0	0
2003	246	23	1	318.65	-445.782	D	9.235	9.235	0	7.152	0	0	0	0	0	0
2003	247	23	2628	320.933	-436.998	D	7.688	7.674	0.014	3.476	97.92	1.46	0	0	0	0.61
2003	248	23	1	318.65	-445.782	D	6.736	6.736	0	1.529	78.74	0.01	0	0	0	2
2003	249	23	1	318.65	-445.782	D	6.844	6.844	0	1.743	0	0	0	0	0	0
2003	250	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.063	7.063	0	2.187	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.368	7.368	0	2.821	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	8.253	8.253	0	4.773	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	255	23	1	318.65	-445.782	D	9.962	9.962	0	9.071	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	9.428	9.428	0	7.649	0	0	0	0	0	0
2003	257	23	1242	327.988	-426.138	D	8.751	8.75	0.001	5.947	92.36	2.09	0	0	0	5.44
2003	258	23	375	322.611	-445.359	D	6.718	6.717	0.001	1.49	95.11	0.45	0	0	0	4.33
2003	259	23	2571	322.646	-445.476	D	6.643	6.641	0.002	1.341	96.81	0.15	0	0	0	3.07
2003	260	23	1552	330.178	-425.042	D	6.749	6.749	0	1.554	97.84	0.07	0	0	0	2.17
2003	261	23	1	318.65	-445.782	D	6.732	6.732	0	1.52	0	0	0	0	0	0
2003	262	23	2758	335.862	-424.454	D	7.894	7.893	0.002	3.957	95.55	3.61	0	0	0	0.79
2003	263	23	1048	326.791	-427.189	D	6.584	6.584	0	1.229	90.09	0.56	0	0	0	5.99
2003	264	23	37	319.567	-443.993	D	7.041	7.04	0.001	2.14	99.09	0.05	0	0	0	0.52
2003	265	23	2784	339.87	-426.019	D	9.108	9.106	0.002	6.827	99.25	0.44	0	0	0	0.13
2003	266	23	2763	336.292	-425.028	D	6.898	6.898	0	1.852	92.4	0.67	0	0	0	7.23
2003	267	23	1	318.65	-445.782	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2003	268	23	2684	326.713	-427.014	D	6.847	6.846	0.001	1.748	97.15	0.46	0	0	0	2.29
2003	269	23	2694	327.861	-425.964	D	7.05	7.05	0	2.16	98.29	0.25	0	0	0	1.54
2003	270	23	1446	329.466	-425.823	D	7.478	7.477	0.001	3.052	94.77	3.26	0	0	0	1.8
2003	271	23	1448	329.444	-425.324	D	6.674	6.674	0	1.406	83.1	1.57	0	0	0	13.63
2003	272	23	1041	326.867	-428.934	D	6.532	6.532	0	1.128	83.89	4.74	0	0	0	10.77
2003	273	23	2411	339.428	-426.135	D	6.562	6.562	0	1.187	91.39	3.36	0	0	0	3.91
2003	274	23	2789	340.496	-426.449	D	8.406	8.405	0.001	5.126	95.83	2.67	0	0	0	1.06
2003	275	23	1446	329.466	-425.823	D	6.575	6.574	0.001	1.209	95.33	0.71	0	0	0	3.77
2003	276	23	2684	326.713	-427.014	D	7.118	7.117	0.001	2.297	97.36	0.71	0	0	0	1.7
2003	277	23	2709	330.21	-424.978	D	6.856	6.855	0	1.766	91.41	0.92	0	0	0	7.52
2003	278	23	1	318.65	-445.782	D	7.274	7.273	0	2.622	96.73	0.8	0	0	0	2.2
2003	279	23	417	322.794	-443.852	D	9.313	9.312	0.001	7.348	98.56	0.77	0	0	0	0.45
2003	280	23	2597	318.971	-443.851	D	7.853	7.852	0.001	3.868	99.21	0.19	0	0	0	0.61
2003	281	23	2588	318.452	-445.8	D	7.596	7.596	0	3.306	98.82	0.13	0	0	0	0.61
2003	282	23	1412	329.218	-425.834	D	8.913	8.913	0	6.345	94.92	0.15	0	0	0	0.59
2003	283	23	1	318.65	-445.782	D	9.734	9.734	0	8.453	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	9.551	9.551	0	7.97	0	0	0	0	0	0
2003	285	23	2784	339.87	-426.019	D	7.892	7.891	0.001	3.954	96.12	2.55	0	0	0	1.32
2003	286	23	1	318.65	-445.782	D	6.944	6.944	0.001	1.944	98.21	0.13	0	0	0	1.52
2003	287	23	2588	318.452	-445.8	D	8.855	8.853	0.002	6.2	96.98	2.26	0	0	0	0.7
2003	288	23	2789	340.496	-426.449	D	6.714	6.713	0.001	1.483	91.65	1.26	0	0	0	7.07
2003	289	23	2788	340.294	-426.448	D	6.603	6.603	0	1.267	96.06	0.21	0	0	0	3.36
2003	290	23	2444	336.237	-430.247	D	8.079	8.079	0	4.375	97.48	1.78	0	0	0	0.47
2003	291	23	2362	338.048	-428.694	D	6.617	6.617	0	1.294	88.29	0.37	0	0	0	1.52
2003	292	23	1	318.65	-445.782	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2003	293	23	1	318.65	-445.782	D	6.677	6.677	0	1.412	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	294	23	2788	340.294	-426.448	D	6.722	6.722	0	1.5	89.32	0.22	0	0	0	10.05
2003	295	23	2790	340.421	-426.562	D	6.71	6.709	0.002	1.474	93.48	0.52	0	0	0	5.89
2003	296	23	1	318.65	-445.782	D	6.61	6.61	0	1.28	94.94	0.11	0	0	0	4.78
2003	297	23	2255	335.942	-426.039	D	6.712	6.711	0.001	1.478	96.67	0.15	0	0	0	2.96
2003	298	23	2277	336.146	-425.03	D	7.99	7.988	0.002	4.171	98.98	0.5	0	0	0	0.48
2003	299	23	2705	329.287	-425.069	D	7.565	7.563	0.002	3.236	89.08	7.23	0	0	0	3.62
2003	300	23	2406	339.19	-426.396	D	6.541	6.541	0	1.146	88.58	4.47	0	0	0	6.9
2003	301	23	1	318.65	-445.782	D	6.598	6.598	0	1.258	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.414	7.414	0	2.919	0	0	0	0	0	0
2003	304	23	1415	329.185	-425.086	D	9.127	9.127	0	6.88	98.51	1.42	0	0	0	1.19
2003	305	23	2704	329.056	-425.092	D	9.47	9.466	0.004	7.748	95.56	3.59	0	0	0	0.79
2003	306	23	1551	330.189	-425.292	D	8.854	8.854	0	6.202	91.97	1.76	0	0	0	0.71
2003	307	23	1	318.65	-445.782	D	7.877	7.877	0	3.922	0	0	0	0	0	0
2003	308	23	1415	329.185	-425.086	D	7.408	7.408	0	2.905	97.15	1.01	0	0	0	1.58
2003	309	23	2781	339.842	-425.379	D	8.106	8.075	0.031	4.367	97.63	1.82	0	0	0	0.55
2003	310	23	2571	322.646	-445.476	D	9.052	9.017	0.035	6.605	97.98	1.77	0	0	0	0.25
2003	311	23	37	319.567	-443.993	D	7.884	7.883	0.001	3.935	98.86	0.97	0	0	0	0.23
2003	312	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	6.51	6.51	0	1.085	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	6.616	6.616	0	1.292	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	9.37	9.37	0	7.497	0	0	0	0	0	0
2003	317	23	2781	339.842	-425.379	D	6.496	6.496	0	1.059	75.17	7.69	0	0	0	15.12
2003	318	23	2788	340.294	-426.448	D	6.957	6.957	0.001	1.97	86.06	7.33	0	0	0	6.33
2003	319	23	1	318.65	-445.782	D	8.304	8.304	0	4.891	0	0	0	0	0	0
2003	320	23	1	318.65	-445.782	D	9.626	9.626	0	8.168	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	10.088	10.088	0	9.417	0	0	0	0	0	0
2003	322	23	1	318.65	-445.782	D	9.908	9.908	0	8.922	0	0	0	0	0	0
2003	323	23	2694	327.861	-425.964	D	7.445	7.445	0	2.983	67.58	13.56	0	0	0	18.45
2003	324	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	9.817	9.817	0	8.677	0	0	0	0	0	0
2003	327	23	2704	329.056	-425.092	D	9.011	9.009	0.001	6.585	92.52	6.83	0	0	0	0.5
2003	328	23	1	318.65	-445.782	D	7.264	7.264	0	2.603	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.434	7.434	0	2.961	0	0	0	0	0	0
2003	331	23	2589	318.383	-445.593	D	9.186	9.185	0.001	7.026	93.82	4.51	0	0	0	1.61
2003	332	23	2784	339.87	-426.019	D	6.84	6.839	0	1.734	69.45	16.29	0	0	0	14.18

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	333	23	1	318.65	-445.782	D	6.494	6.494	0	1.054	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2003	335	23	2684	326.713	-427.014	D	6.661	6.66	0	1.379	86.41	6.24	0	0	0	7.16
2003	336	23	1	318.65	-445.782	D	6.513	6.513	0	1.092	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0
2003	338	23	1	318.65	-445.782	D	8.993	8.993	0	6.544	0	0	0	0	0	0
2003	339	23	2604	319.223	-442.217	D	8.537	8.531	0.007	5.422	94.65	4.89	0	0	0	0.44
2003	340	23	2684	326.713	-427.014	D	7.79	7.789	0.001	3.729	91.82	5.57	0	0	0	2.46
2003	341	23	1	318.65	-445.782	D	6.652	6.652	0	1.362	0	0	0	0	0	0
2003	342	23	1	318.65	-445.782	D	8.111	8.111	0	4.449	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	10.155	10.155	0	9.603	0	0	0	0	0	0
2003	344	23	2588	318.452	-445.8	D	8.857	8.853	0.005	6.198	92.33	6.76	0	0	0	0.92
2003	345	23	2781	339.842	-425.379	D	7.536	7.534	0.002	3.175	80.74	10.91	0	0	0	8.31
2003	346	23	2275	336.168	-425.529	D	6.845	6.844	0.001	1.742	89.61	6.69	0	0	0	3.62
2003	347	23	863	325.509	-431.992	D	9.591	9.591	0	8.076	72.17	3.47	0	0	0	1.54
2003	348	23	1	318.65	-445.782	D	9.425	9.425	0	7.641	0	0	0	0	0	0
2003	349	23	1	318.65	-445.782	D	9.203	9.203	0	7.071	0	0	0	0	0	0
2003	350	23	1	318.65	-445.782	D	8.775	8.775	0	6.01	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.444	7.444	0	2.982	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.467	7.467	0	3.031	0	0	0	0	0	0
2003	354	23	2789	340.496	-426.449	D	6.619	6.619	0	1.298	90.44	3.34	0	0	0	5.75
2003	355	23	2417	339.654	-425.626	D	6.61	6.61	0	1.279	90.39	3.23	0	0	0	3.71
2003	356	23	1	318.65	-445.782	D	9.46	9.46	0	7.73	0	0	0	0	0	0
2003	357	23	2706	329.518	-425.046	D	9.465	9.464	0.001	7.742	91.36	6.16	0	0	0	2.32
2003	358	23	2781	339.842	-425.379	D	8.555	8.546	0.009	5.459	94.91	4.45	0	0	0	0.63
2003	359	23	37	319.567	-443.993	D	6.576	6.575	0.001	1.212	93.92	2.71	0	0	0	3.2
2003	360	23	2307	336.654	-425.258	D	6.846	6.845	0.001	1.745	96.26	2.3	0	0	0	1.17
2003	361	23	1	318.65	-445.782	D	6.753	6.753	0	1.562	0	0	0	0	0	0
2003	362	23	1	318.65	-445.782	D	8.719	8.719	0	5.874	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.299	7.299	0	2.675	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	6.566	6.566	0	1.194	0	0	0	0	0	0
									0.035							
TRIGEN KC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	6.999	6.999	0	2.056	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	2	23	2597	318.971	-443.851	D	9.325	9.32	0.005	7.37	94.72	5.1	0	0	0	0.2
2003	3	23	2789	340.496	-426.449	D	7.922	7.908	0.014	3.991	92.11	7.64	0	0	0	0.24
2003	4	23	1	318.65	-445.782	D	6.784	6.784	0	1.624	0	0	0	0	0	0
2003	5	23	2789	340.496	-426.449	D	7.327	7.327	0	2.733	78.49	19.79	0	0	0	1.31
2003	6	23	2789	340.496	-426.449	D	8.243	8.238	0.005	4.738	86.79	12.98	0	0	0	0.22
2003	7	23	2624	320.719	-437.835	D	7.424	7.422	0.003	2.934	95.3	4.51	0	0	0	0.17
2003	8	23	2429	338.563	-428.651	D	6.719	6.719	0	1.494	93.8	2.1	0	0	0	0.33
2003	9	23	2781	339.842	-425.379	D	6.968	6.967	0.001	1.992	93.75	5.37	0	0	0	0.79
2003	10	23	16	319.027	-443.017	D	6.595	6.594	0.002	1.248	80.85	15.78	0	0	0	3.36
2003	11	23	2789	340.496	-426.449	D	6.553	6.552	0.001	1.168	81.56	15.76	0	0	0	2.66
2003	12	23	2588	318.452	-445.8	D	6.5	6.5	0	1.066	92.14	6.25	0	0	0	0.71
2003	13	23	2229	335.693	-426.049	D	6.723	6.722	0.001	1.5	94.08	5.35	0	0	0	0.39
2003	14	23	2708	329.979	-425	D	9.232	9.204	0.028	7.075	93.86	5.9	0	0	0	0.23
2003	15	23	2588	318.452	-445.8	D	6.628	6.625	0.003	1.309	96.18	3.48	0	0	0	0.35
2003	16	23	2588	318.452	-445.8	D	8.194	8.187	0.007	4.622	95.63	4.32	0	0	0	0.03
2003	17	23	2597	318.971	-443.851	D	8.103	8.099	0.004	4.422	95.44	4.35	0	0	0	0.2
2003	18	23	2781	339.842	-425.379	D	6.6	6.6	0	1.261	92.04	6.9	0	0	0	0.85
2003	19	23	1	318.65	-445.782	D	6.651	6.651	0	1.361	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	6.624	6.624	0	1.308	0	0	0	0	0	0
2003	21	23	2789	340.496	-426.449	D	7.538	7.533	0.005	3.171	95	4.96	0	0	0	0.07
2003	22	23	13	319.06	-443.766	D	7.565	7.565	0	3.24	97.84	2.57	0	0	0	0.04
2003	23	23	2589	318.383	-445.593	D	6.876	6.876	0.001	1.806	86.2	12.44	0	0	0	1.35
2003	24	23	2624	320.719	-437.835	D	6.625	6.624	0.001	1.308	91.62	7.52	0	0	0	0.56
2003	25	23	2781	339.842	-425.379	D	6.501	6.5	0.001	1.065	92.66	6.84	0	0	0	0.4
2003	26	23	2694	327.861	-425.964	D	7.264	7.257	0.006	2.589	78.83	20.63	0	0	0	0.53
2003	27	23	2563	323.259	-443.79	D	6.803	6.801	0.003	1.657	92.17	7.44	0	0	0	0.35
2003	28	23	2789	340.496	-426.449	D	8.039	8.039	0	4.285	94.42	4.93	0	0	0	0.23
2003	29	23	2628	320.933	-436.998	D	9.8	9.793	0.007	8.612	94.67	5.25	0	0	0	0.04
2003	30	23	1	318.65	-445.782	D	9.114	9.114	0	6.846	0	0	0	0	0	0
2003	31	23	1	318.65	-445.782	D	7.121	7.121	0	2.306	0	0	0	0	0	0
2003	32	23	1	318.65	-445.782	D	6.936	6.936	0	1.929	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	6.87	6.87	0	1.795	0	0	0	0	0	0
2003	34	23	2709	330.21	-424.978	D	9.479	9.478	0.001	7.778	95.63	3.93	0	0	0	0.04
2003	35	23	1	318.65	-445.782	D	7.1	7.1	0	2.263	0	0	0	0	0	0
2003	36	23	2789	340.496	-426.449	D	6.567	6.563	0.004	1.189	94.84	4.45	0	0	0	0.69
2003	37	23	2694	327.861	-425.964	D	9.213	9.199	0.014	7.061	96.73	3.2	0	0	0	0.05
2003	38	23	2704	329.056	-425.092	D	8.047	8.006	0.041	4.21	96.84	3.11	0	0	0	0.04
2003	39	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2003	40	23	2410	339.439	-426.385	D	7.735	7.735	0	3.609	87	3.28	0	0	0	0.04

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	41	23	2781	339.842	-425.379	D	9.355	9.355	0.001	7.458	93.31	6.44	0	0	0	0.06
2003	42	23	1415	329.185	-425.086	D	6.773	6.773	0	1.601	90.21	2.82	0	0	0	1.03
2003	43	23	2418	339.946	-426.612	D	6.522	6.521	0.001	1.107	87.8	10.38	0	0	0	1.75
2003	44	23	1415	329.185	-425.086	D	6.627	6.626	0.001	1.312	96.29	3.38	0	0	0	0.51
2003	45	23	2757	335.63	-424.484	D	10.218	10.218	0	9.779	97.19	2.36	0	0	0	0.03
2003	46	23	1	318.65	-445.782	D	10.176	10.176	0	9.662	0	0	0	0	0	0
2003	47	23	1	318.65	-445.782	D	8.453	8.453	0	5.24	0	0	0	0	0	0
2003	48	23	1	318.65	-445.782	D	7.865	7.865	0	3.896	0	0	0	0	0	0
2003	49	23	2709	330.21	-424.978	D	6.947	6.945	0.002	1.947	96.91	2.78	0	0	0	0.23
2003	50	23	2694	327.861	-425.964	D	9.215	9.213	0.002	7.097	97.37	2.5	0	0	0	0.05
2003	51	23	2704	329.056	-425.092	D	9.547	9.524	0.022	7.899	97.41	2.56	0	0	0	0.03
2003	52	23	2684	326.713	-427.014	D	9.72	9.716	0.004	8.405	99.04	0.95	0	0	0	0.03
2003	53	23	2600	318.952	-443.12	D	9.497	9.493	0.004	7.818	97.53	2.34	0	0	0	0.06
2003	54	23	2597	318.971	-443.851	D	8.861	8.853	0.007	6.2	92.13	7.67	0	0	0	0.16
2003	55	23	2597	318.971	-443.851	D	8.458	8.438	0.02	5.204	90.96	8.7	0	0	0	0.33
2003	56	23	2600	318.952	-443.12	D	7.502	7.485	0.017	3.069	95.98	3.92	0	0	0	0.09
2003	57	23	2628	320.933	-436.998	D	8.658	8.658	0	5.725	97.42	2.31	0	0	0	0.05
2003	58	23	2599	318.958	-443.364	D	8.758	8.758	0.001	5.967	97.67	1.65	0	0	0	0.03
2003	59	23	13	319.06	-443.766	D	8.963	8.962	0.001	6.467	98.65	1.24	0	0	0	0.02
2003	60	23	2704	329.056	-425.092	D	9.656	9.651	0.005	8.233	98.5	1.45	0	0	0	0.03
2003	61	23	2781	339.842	-425.379	D	9.193	9.119	0.074	6.86	98.22	1.73	0	0	0	0.05
2003	62	23	2709	330.21	-424.978	D	7.365	7.338	0.028	2.757	96.37	3.49	0	0	0	0.14
2003	63	23	2789	340.496	-426.449	D	7.002	6.99	0.012	2.037	98.66	1.24	0	0	0	0.09
2003	64	23	2588	318.452	-445.8	D	9.142	9.117	0.025	6.855	97.34	2.6	0	0	0	0.07
2003	65	23	2563	323.259	-443.79	D	7.638	7.623	0.015	3.366	97.31	2.62	0	0	0	0.07
2003	66	23	2781	339.842	-425.379	D	6.954	6.949	0.004	1.956	97.98	1.85	0	0	0	0.13
2003	67	23	2781	339.842	-425.379	D	7.068	7.068	0	2.196	99.19	0.63	0	0	0	0.14
2003	68	23	241	321.553	-443.906	D	7.109	7.094	0.015	2.249	96.46	3.43	0	0	0	0.11
2003	69	23	2588	318.452	-445.8	D	6.545	6.544	0.001	1.152	98.83	0.81	0	0	0	0.18
2003	70	23	2588	318.452	-445.8	D	6.563	6.56	0.003	1.183	98.98	0.83	0	0	0	0.16
2003	71	23	2255	335.942	-426.039	D	7.134	7.133	0.001	2.331	98.96	0.68	0	0	0	0.09
2003	72	23	2709	330.21	-424.978	D	8.621	8.594	0.026	5.574	99.08	0.82	0	0	0	0.1
2003	73	23	2597	318.971	-443.851	D	8.733	8.677	0.056	5.772	98.76	1.2	0	0	0	0.04
2003	74	23	2684	326.713	-427.014	D	8.149	8.138	0.011	4.509	99.21	0.75	0	0	0	0.04
2003	75	23	1415	329.185	-425.086	D	7.29	7.289	0	2.656	99.23	0.27	0	0	0	0.08
2003	76	23	1	318.65	-445.782	D	8.644	8.644	0	5.692	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	8.653	8.653	0	5.713	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	8.871	8.871	0	6.244	0	0	0	0	0	0
2003	79	23	2597	318.971	-443.851	D	9.332	9.203	0.129	7.071	96.64	3.31	0	0	0	0.05

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	80	23	2468	334.002	-434.887	D	8.941	8.868	0.073	6.235	96.68	3.24	0	0	0	0.09
2003	81	23	2789	340.496	-426.449	D	6.536	6.534	0.002	1.132	97.91	1.35	0	0	0	0.72
2003	82	23	2789	340.496	-426.449	D	6.574	6.574	0	1.21	97.63	0.28	0	0	0	0.32
2003	83	23	1	318.65	-445.782	D	6.82	6.82	0	1.696	0	0	0	0	0	0
2003	84	23	2694	327.861	-425.964	D	7.694	7.692	0.002	3.515	98.61	1.3	0	0	0	0.1
2003	85	23	2552	324.659	-442.591	D	8.822	8.818	0.005	6.112	97.99	1.96	0	0	0	0.03
2003	86	23	2290	336.427	-425.767	D	6.607	6.607	0	1.274	77.56	0.28	0	0	0	0.11
2003	87	23	1	318.65	-445.782	D	8.676	8.676	0	5.769	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.301	7.301	0	2.679	0	0	0	0	0	0
2003	89	23	2781	339.842	-425.379	D	6.533	6.531	0.002	1.126	86.45	11.68	0	0	0	1.85
2003	90	23	1	318.65	-445.782	D	6.478	6.478	0	1.023	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.231	7.231	0	2.533	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	8.075	8.075	0	4.366	0	0	0	0	0	0
2003	95	23	2781	339.842	-425.379	D	6.789	6.787	0.002	1.63	88.52	10.29	0	0	0	1.19
2003	96	23	2781	339.842	-425.379	D	8.058	8.057	0.001	4.325	98.71	1.28	0	0	0	0.02
2003	97	23	2270	336.223	-426.776	D	9.101	9.101	0	6.813	67.58	0.66	0	0	0	0
2003	98	23	2781	339.842	-425.379	D	7.441	7.433	0.007	2.959	91.07	8.51	0	0	0	0.41
2003	99	23	2597	318.971	-443.851	D	7.015	7.01	0.005	2.079	94.15	5.42	0	0	0	0.43
2003	100	23	1	318.65	-445.782	D	6.581	6.581	0	1.223	0	0	0	0	0	0
2003	101	23	1	318.65	-445.782	D	6.481	6.48	0	1.028	99.4	0.29	0	0	0	0.29
2003	102	23	1282	328.236	-426.127	D	6.496	6.495	0.001	1.056	99.39	0.1	0	0	0	0.22
2003	103	23	2789	340.496	-426.449	D	6.526	6.525	0.001	1.115	99.76	0.05	0	0	0	0.19
2003	104	23	2788	340.294	-426.448	D	6.65	6.65	0	1.359	99.63	0.06	0	0	0	0.15
2003	105	23	44	319.491	-442.248	D	6.636	6.636	0	1.33	7.54	0	0	0	0	0.01
2003	106	23	1	318.65	-445.782	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	107	23	2624	320.719	-437.835	D	7.655	7.651	0.004	3.426	98.07	1.88	0	0	0	0.05
2003	108	23	2789	340.496	-426.449	D	7.823	7.822	0	3.802	98.67	0.1	0	0	0	0.19
2003	109	23	2784	339.87	-426.019	D	7.559	7.559	0	3.227	98.92	0.06	0	0	0	0.09
2003	110	23	1	318.65	-445.782	D	9.045	9.045	0	6.674	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.014	7.014	0	2.087	0	0	0	0	0	0
2003	112	23	2655	324.376	-433.059	D	6.541	6.539	0.002	1.141	96.69	2.14	0	0	0	1.09
2003	113	23	2597	318.971	-443.851	D	6.596	6.593	0.003	1.247	99.27	0.44	0	0	0	0.28
2003	114	23	1	318.65	-445.782	D	8.02	8.02	0	4.243	0	0	0	0	0	0
2003	115	23	2781	339.842	-425.379	D	8.46	8.448	0.012	5.226	98.79	1.02	0	0	0	0.18
2003	116	23	2597	318.971	-443.851	D	8.378	8.369	0.009	5.042	98.86	1.03	0	0	0	0.11
2003	117	23	2589	318.383	-445.593	D	7.054	7.053	0.001	2.166	99.43	0.34	0	0	0	0.1
2003	118	23	1242	327.988	-426.138	D	7.438	7.437	0	2.968	99.22	0.02	0	0	0	0.11

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	119	23	2784	339.87	-426.019	D	7.463	7.463	0	3.023	95.57	0.29	0	0	0	0.05
2003	120	23	2271	336.212	-426.526	D	8.176	8.176	0	4.597	82.32	0.08	0	0	0	0.03
2003	121	23	1	318.65	-445.782	D	7.624	7.624	0	3.367	0	0	0	0	0	0
2003	122	23	2704	329.056	-425.092	D	8.891	8.842	0.048	6.173	98.77	1.14	0	0	0	0.09
2003	123	23	2563	323.259	-443.79	D	8.606	8.505	0.101	5.362	99.54	0.42	0	0	0	0.04
2003	124	23	606	323.785	-438.063	D	7.369	7.359	0.009	2.803	99.88	0.07	0	0	0	0.05
2003	125	23	1	318.65	-445.782	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	8.385	8.385	0	5.081	0	0	0	0	0	0
2003	127	23	2704	329.056	-425.092	D	8.627	8.618	0.01	5.629	99.18	0.59	0	0	0	0.21
2003	128	23	2758	335.862	-424.454	D	8.014	8.011	0.003	4.221	99.7	0.08	0	0	0	0.19
2003	129	23	1	318.65	-445.782	D	7.642	7.642	0	3.407	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	8.486	8.486	0	5.317	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.409	7.409	0	2.907	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	6.899	6.899	0	1.854	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	9.399	9.399	0	7.572	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	8.763	8.763	0	5.98	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	9.31	9.31	0	7.344	0	0	0	0	0	0
2003	137	23	2757	335.63	-424.484	D	9.372	9.369	0.003	7.497	99.81	0.07	0	0	0	0.05
2003	138	23	2628	320.933	-436.998	D	9.123	9.093	0.03	6.795	99.49	0.5	0	0	0	0.02
2003	139	23	2628	320.933	-436.998	D	8.788	8.783	0.005	6.027	99.68	0.29	0	0	0	0.02
2003	140	23	2684	326.713	-427.014	D	8.293	8.269	0.024	4.81	98.87	1.12	0	0	0	0.03
2003	141	23	1	318.65	-445.782	D	6.718	6.718	0	1.492	99.99	0.19	0	0	0	0.07
2003	142	23	1	318.65	-445.782	D	7.283	7.283	0	2.641	0	0	0	0	0	0
2003	143	23	1	318.65	-445.782	D	6.712	6.712	0	1.48	0	0	0	0	0	0
2003	144	23	2705	329.287	-425.069	D	7.841	7.84	0.001	3.841	99.51	0.43	0	0	0	0.06
2003	145	23	2600	318.952	-443.12	D	9.234	9.192	0.041	7.044	99.2	0.74	0	0	0	0.05
2003	146	23	2597	318.971	-443.851	D	8.115	8.096	0.019	4.414	99.84	0.13	0	0	0	0.04
2003	147	23	1	318.65	-445.782	D	6.647	6.647	0	1.353	99.86	0.03	0	0	0	0.1
2003	148	23	2781	339.842	-425.379	D	6.608	6.607	0	1.275	99.28	0.26	0	0	0	0.34
2003	149	23	2715	330.782	-425.876	D	7.291	7.287	0.005	2.649	96.16	3.32	0	0	0	0.49
2003	150	23	2496	329.078	-433.534	D	6.619	6.616	0.003	1.291	99.51	0.09	0	0	0	0.39
2003	151	23	2628	320.933	-436.998	D	7.216	7.215	0.002	2.5	90.89	8.5	0	0	0	0.55
2003	152	23	1	318.65	-445.782	D	7.102	7.102	0	2.267	97.32	0.09	0	0	0	0.19
2003	153	23	2628	320.933	-436.998	D	8.713	8.712	0	5.857	99.87	0.1	0	0	0	0.02
2003	154	23	2597	318.971	-443.851	D	9.132	9.092	0.04	6.79	96.02	3.9	0	0	0	0.07
2003	155	23	2597	318.971	-443.851	D	7.516	7.51	0.006	3.122	99.46	0.39	0	0	0	0.14
2003	156	23	2588	318.452	-445.8	D	6.822	6.821	0.001	1.697	99.59	0.16	0	0	0	0.13
2003	157	23	234	321.01	-437.185	D	8.803	8.801	0.001	6.072	99.53	0.27	0	0	0	0.04

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	158	23	13	319.06	-443.766	D	7.517	7.514	0.002	3.132	99.7	0.14	0	0	0	0.05
2003	159	23	2236	336.149	-430.776	D	7.15	7.15	0	2.365	99.42	0.03	0	0	0	0.06
2003	160	23	199	320.795	-437.944	D	6.618	6.618	0	1.297	87.53	0	0	0	0	0.1
2003	161	23	1	318.65	-445.782	D	7.499	7.499	0	3.098	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	8.817	8.817	0	6.112	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	8.874	8.874	0	6.251	0	0	0	0	0	0
2003	164	23	2627	320.879	-437.207	D	9.214	9.212	0.002	7.095	99.77	0.03	0	0	0	0.1
2003	165	23	2600	318.952	-443.12	D	8.27	8.267	0.003	4.806	99.75	0.19	0	0	0	0.05
2003	166	23	1	318.65	-445.782	D	8.28	8.279	0.001	4.833	99.63	0.24	0	0	0	0.02
2003	167	23	2787	340.091	-426.447	D	8.117	8.117	0.001	4.462	99.65	0.1	0	0	0	0.02
2003	168	23	1	318.65	-445.782	D	7.645	7.645	0	3.413	99.58	0.17	0	0	0	0.03
2003	169	23	1	318.65	-445.782	D	8.946	8.946	0	6.427	0	0	0	0	0	0
2003	170	23	2704	329.056	-425.092	D	8.517	8.516	0.001	5.387	99.68	0.03	0	0	0	0.24
2003	171	23	2709	330.21	-424.978	D	8.417	8.408	0.009	5.133	99.77	0.15	0	0	0	0.07
2003	172	23	1	318.65	-445.782	D	6.969	6.969	0	1.995	0	0	0	0	0	0
2003	173	23	1	318.65	-445.782	D	6.92	6.92	0	1.897	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.108	7.108	0	2.279	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.784	7.784	0	3.718	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	8.399	8.399	0	5.113	0	0	0	0	0	0
2003	177	23	656	323.869	-434.312	D	8.753	8.729	0.024	5.898	96.82	3.08	0	0	0	0.09
2003	178	23	2684	326.713	-427.014	D	6.845	6.84	0.005	1.735	99.18	0.34	0	0	0	0.5
2003	179	23	2694	327.861	-425.964	D	6.651	6.647	0.004	1.353	99.66	0.07	0	0	0	0.27
2003	180	23	2707	329.748	-425.023	D	6.719	6.719	0	1.494	97.69	0.01	0	0	0	0.22
2003	181	23	1	318.65	-445.782	D	7.039	7.039	0	2.138	0	0	0	0	0	0
2003	182	23	1	318.65	-445.782	D	8.857	8.857	0	6.21	0	0	0	0	0	0
2003	183	23	2758	335.862	-424.454	D	7.463	7.463	0	3.021	93.07	0.01	0	0	0	0.11
2003	184	23	2405	338.909	-425.659	D	7.374	7.374	0	2.832	86.99	0.02	0	0	0	0.04
2003	185	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	8.318	8.318	0	4.923	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.086	7.086	0	2.234	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.739	7.739	0	3.619	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	8.593	8.593	0	5.571	0	0	0	0	0	0
2003	192	23	2589	318.383	-445.593	D	7.287	7.285	0.002	2.647	99.27	0.44	0	0	0	0.34
2003	193	23	2758	335.862	-424.454	D	7.863	7.857	0.006	3.878	99.54	0.37	0	0	0	0.07
2003	194	23	1449	329.434	-425.075	D	7.266	7.266	0	2.606	99.47	0.07	0	0	0	0.11
2003	195	23	2781	339.842	-425.379	D	8.451	8.448	0.003	5.227	99.68	0.24	0	0	0	0.03
2003	196	23	2789	340.496	-426.449	D	8.239	8.239	0	4.742	99.58	0.01	0	0	0	0.04

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	197	23	2781	339.842	-425.379	D	7.028	7.027	0.001	2.114	99.85	0.04	0	0	0	0.13
2003	198	23	2789	340.496	-426.449	D	7.155	7.155	0.001	2.375	100.23	0.01	0	0	0	0.09
2003	199	23	2790	340.421	-426.562	D	7.116	7.116	0	2.295	99.52	0	0	0	0	0.08
2003	200	23	2781	339.842	-425.379	D	7.716	7.715	0	3.567	99.7	0.01	0	0	0	0.06
2003	201	23	2417	339.654	-425.626	D	8.558	8.558	0	5.488	99.44	0.02	0	0	0	0.03
2003	202	23	2235	335.628	-424.554	D	8.102	8.102	0	4.428	99.71	0.12	0	0	0	0.03
2003	203	23	2597	318.971	-443.851	D	7.687	7.681	0.006	3.492	99.68	0.25	0	0	0	0.09
2003	204	23	2589	318.383	-445.593	D	7.015	7.015	0	2.088	99.74	0.07	0	0	0	0.25
2003	205	23	1	318.65	-445.782	D	6.955	6.955	0	1.968	0	0	0	0	0	0
2003	206	23	1	318.65	-445.782	D	7.058	7.058	0	2.176	0	0	0	0	0	0
2003	207	23	1	318.65	-445.782	D	6.798	6.798	0	1.652	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.085	7.085	0	2.232	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.085	7.085	0	2.233	0	0	0	0	0	0
2003	210	23	2781	339.842	-425.379	D	8.419	8.415	0.004	5.151	99.83	0.07	0	0	0	0.03
2003	211	23	2781	339.842	-425.379	D	9.362	9.347	0.014	7.44	99.8	0.16	0	0	0	0.02
2003	212	23	2762	336.074	-425.006	D	7.614	7.605	0.009	3.327	99.88	0.05	0	0	0	0.08
2003	213	23	2781	339.842	-425.379	D	6.907	6.901	0.006	1.857	99.85	0.06	0	0	0	0.09
2003	214	23	2210	335.901	-430.787	D	7.673	7.672	0.001	3.471	99.75	0.01	0	0	0	0.04
2003	215	23	2758	335.862	-424.454	D	7.835	7.834	0.001	3.828	99.84	0.01	0	0	0	0.18
2003	216	23	2789	340.496	-426.449	D	7.732	7.718	0.014	3.573	99.64	0.3	0	0	0	0.06
2003	217	23	2758	335.862	-424.454	D	8.391	8.39	0.001	5.093	99.67	0.11	0	0	0	0.05
2003	218	23	2589	318.383	-445.593	D	8.462	8.453	0.009	5.24	99.8	0.06	0	0	0	0.11
2003	219	23	2597	318.971	-443.851	D	8.484	8.443	0.042	5.214	99.86	0.11	0	0	0	0.03
2003	220	23	2588	318.452	-445.8	D	7.096	7.094	0.002	2.25	99.94	0	0	0	0	0.07
2003	221	23	1	318.65	-445.782	D	6.977	6.977	0	2.01	99.01	0	0	0	0	0.08
2003	222	23	199	320.795	-437.944	D	7.166	7.166	0	2.398	91.62	0.01	0	0	0	0.21
2003	223	23	1	318.65	-445.782	D	7.272	7.272	0	2.62	96.15	0.14	0	0	0	0.07
2003	224	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2003	225	23	1	318.65	-445.782	D	8.321	8.321	0	4.931	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	8.753	8.753	0	5.955	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.337	7.337	0	2.755	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.347	7.347	0	2.776	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2003	230	23	2788	340.294	-426.448	D	6.902	6.901	0	1.859	99.84	0.02	0	0	0	0.21
2003	231	23	2789	340.496	-426.449	D	6.827	6.826	0.002	1.706	99.8	0.03	0	0	0	0.14
2003	232	23	2789	340.496	-426.449	D	6.863	6.86	0.004	1.775	99.81	0.05	0	0	0	0.1
2003	233	23	2789	340.496	-426.449	D	6.924	6.921	0.003	1.898	99.8	0.09	0	0	0	0.09
2003	234	23	2789	340.496	-426.449	D	7.117	7.113	0.004	2.289	99.86	0.03	0	0	0	0.1
2003	235	23	2789	340.496	-426.449	D	7.034	7.028	0.007	2.114	99.86	0.03	0	0	0	0.13

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	236	23	2588	318.452	-445.8	D	8.524	8.515	0.009	5.385	99.9	0.05	0	0	0	0.04
2003	237	23	2653	324.014	-433.36	D	7.891	7.884	0.007	3.939	99.9	0.04	0	0	0	0.05
2003	238	23	2784	339.87	-426.019	D	7.376	7.375	0.002	2.835	99.86	0.01	0	0	0	0.06
2003	239	23	2412	339.417	-425.886	D	7.03	7.03	0	2.119	99.72	0.02	0	0	0	0.06
2003	240	23	1484	330.29	-433.281	D	7.112	7.112	0	2.288	93.87	0.04	0	0	0	0.05
2003	241	23	1	318.65	-445.782	D	8.394	8.394	0	5.101	0	0	0	0	0	0
2003	242	23	2176	335.197	-426.071	D	9.175	9.175	0	7.001	104	0.09	0	0	0	0.02
2003	243	23	2764	336.51	-425.05	D	9.331	9.331	0	7.397	93.33	0.24	0	0	0	0.02
2003	244	23	1	318.65	-445.782	D	9.456	9.456	0	7.721	0	0	0	0	0	0
2003	245	23	1	318.65	-445.782	D	9.776	9.776	0	8.566	0	0	0	0	0	0
2003	246	23	1	318.65	-445.782	D	9.235	9.235	0	7.152	0	0	0	0	0	0
2003	247	23	2601	319.02	-442.895	D	7.697	7.678	0.019	3.485	99.28	0.66	0	0	0	0.05
2003	248	23	1	318.65	-445.782	D	6.736	6.736	0	1.529	0	0	0	0	0	0
2003	249	23	1	318.65	-445.782	D	6.844	6.844	0	1.743	0	0	0	0	0	0
2003	250	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.063	7.063	0	2.187	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.368	7.368	0	2.821	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	8.253	8.253	0	4.773	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	9.962	9.962	0	9.071	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	9.428	9.428	0	7.649	0	0	0	0	0	0
2003	257	23	2789	340.496	-426.449	D	8.696	8.685	0.011	5.791	93.61	6.04	0	0	0	0.36
2003	258	23	2789	340.496	-426.449	D	6.725	6.719	0.006	1.494	99.22	0.35	0	0	0	0.43
2003	259	23	2694	327.861	-425.964	D	6.653	6.646	0.007	1.351	99.49	0.19	0	0	0	0.3
2003	260	23	2758	335.862	-424.454	D	6.749	6.749	0	1.554	99.27	0.05	0	0	0	0.23
2003	261	23	1	318.65	-445.782	D	6.732	6.732	0	1.52	0	0	0	0	0	0
2003	262	23	2781	339.842	-425.379	D	7.876	7.868	0.008	3.903	95.31	4.54	0	0	0	0.14
2003	263	23	2625	320.772	-437.626	D	6.582	6.582	0	1.226	98.21	0.29	0	0	0	0.55
2003	264	23	2597	318.971	-443.851	D	7.043	7.04	0.003	2.14	99.81	0.04	0	0	0	0.05
2003	265	23	2784	339.87	-426.019	D	9.112	9.106	0.006	6.827	99.6	0.36	0	0	0	0.01
2003	266	23	2789	340.496	-426.449	D	6.897	6.897	0.001	1.849	97.16	1.74	0	0	0	1.14
2003	267	23	2789	340.496	-426.449	D	6.835	6.834	0	1.724	99.29	0.11	0	0	0	0.28
2003	268	23	168	320.568	-438.453	D	6.85	6.847	0.003	1.749	99.05	0.6	0	0	0	0.33
2003	269	23	2468	334.002	-434.887	D	7.052	7.047	0.005	2.154	99.72	0.15	0	0	0	0.12
2003	270	23	1516	329.941	-425.303	D	7.479	7.477	0.002	3.052	95.43	4.3	0	0	0	0.23
2003	271	23	2781	339.842	-425.379	D	6.682	6.682	0	1.421	96.41	1.56	0	0	0	1.72
2003	272	23	2588	318.452	-445.8	D	6.531	6.53	0	1.124	94.07	4.45	0	0	0	1.5
2003	273	23	1449	329.434	-425.075	D	6.563	6.562	0.001	1.186	98.4	1.12	0	0	0	0.31
2003	274	23	2758	335.862	-424.454	D	8.494	8.478	0.016	5.298	98.44	1.52	0	0	0	0.03

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	275	23	2597	318.971	-443.851	D	6.578	6.572	0.006	1.205	98.21	1.37	0	0	0	0.4
2003	276	23	2684	326.713	-427.014	D	7.123	7.117	0.006	2.297	99.27	0.57	0	0	0	0.11
2003	277	23	2758	335.862	-424.454	D	6.858	6.855	0.003	1.766	98.43	0.82	0	0	0	0.73
2003	278	23	2571	322.646	-445.476	D	7.277	7.273	0.004	2.622	98.93	0.83	0	0	0	0.23
2003	279	23	2597	318.971	-443.851	D	9.318	9.312	0.007	7.348	99.23	0.71	0	0	0	0.04
2003	280	23	14	319.049	-443.516	D	7.854	7.852	0.001	3.868	99.76	0.16	0	0	0	0.06
2003	281	23	2694	327.861	-425.964	D	7.61	7.609	0.001	3.336	99.71	0.18	0	0	0	0.05
2003	282	23	1412	329.218	-425.834	D	8.913	8.913	0	6.345	98.51	0.07	0	0	0	0.08
2003	283	23	1	318.65	-445.782	D	9.734	9.734	0	8.453	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	9.551	9.551	0	7.97	0	0	0	0	0	0
2003	285	23	2784	339.87	-426.019	D	7.894	7.891	0.003	3.954	96.08	3.69	0	0	0	0.21
2003	286	23	2588	318.452	-445.8	D	6.947	6.944	0.003	1.944	99.66	0.21	0	0	0	0.15
2003	287	23	2623	320.666	-438.044	D	8.899	8.885	0.014	6.277	96.5	3.4	0	0	0	0.1
2003	288	23	2789	340.496	-426.449	D	6.715	6.713	0.002	1.483	97.39	1.58	0	0	0	1
2003	289	23	2789	340.496	-426.449	D	6.604	6.603	0.001	1.267	99.4	0.21	0	0	0	0.37
2003	290	23	2789	340.496	-426.449	D	8.084	8.079	0.005	4.375	98.26	1.72	0	0	0	0.03
2003	291	23	1922	333.594	-434.885	D	6.621	6.621	0	1.302	99.17	0.34	0	0	0	0.16
2003	292	23	1	318.65	-445.782	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2003	293	23	1	318.65	-445.782	D	6.677	6.677	0	1.412	0	0	0	0	0	0
2003	294	23	2781	339.842	-425.379	D	6.72	6.719	0.001	1.495	98.78	0.17	0	0	0	1.01
2003	295	23	2789	340.496	-426.449	D	6.729	6.709	0.02	1.474	98.97	0.43	0	0	0	0.61
2003	296	23	2588	318.452	-445.8	D	6.611	6.61	0.001	1.28	99.33	0.18	0	0	0	0.41
2003	297	23	2789	340.496	-426.449	D	6.695	6.691	0.003	1.44	99.33	0.32	0	0	0	0.38
2003	298	23	2602	319.088	-442.669	D	8.002	7.979	0.023	4.151	98.66	1.23	0	0	0	0.11
2003	299	23	2704	329.056	-425.092	D	7.572	7.563	0.008	3.236	91.06	8.4	0	0	0	0.54
2003	300	23	2789	340.496	-426.449	D	6.542	6.541	0.001	1.146	96.46	2.96	0	0	0	0.59
2003	301	23	1	318.65	-445.782	D	6.598	6.598	0	1.258	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.414	7.414	0	2.919	0	0	0	0	0	0
2003	304	23	2704	329.056	-425.092	D	9.128	9.127	0	6.88	99.13	0.73	0	0	0	0.09
2003	305	23	2694	327.861	-425.964	D	9.486	9.466	0.019	7.748	97.8	2.13	0	0	0	0.07
2003	306	23	2694	327.861	-425.964	D	8.861	8.861	0	6.218	99.44	0.62	0	0	0	0.08
2003	307	23	1	318.65	-445.782	D	7.877	7.877	0	3.922	0	0	0	0	0	0
2003	308	23	2694	327.861	-425.964	D	7.409	7.408	0.001	2.905	98.82	0.76	0	0	0	0.14
2003	309	23	2249	336.007	-427.534	D	8.155	8.074	0.081	4.364	98.29	1.65	0	0	0	0.06
2003	310	23	2571	322.646	-445.476	D	9.133	9.017	0.115	6.605	98.36	1.62	0	0	0	0.02
2003	311	23	37	319.567	-443.993	D	7.887	7.883	0.005	3.935	99.13	0.85	0	0	0	0.02
2003	312	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	6.51	6.51	0	1.085	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	314	23	1	318.65	-445.782	D	6.616	6.616	0	1.292	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	9.37	9.37	0	7.497	0	0	0	0	0	0
2003	317	23	2684	326.713	-427.014	D	6.495	6.492	0.002	1.052	92.17	5.97	0	0	0	1.88
2003	318	23	2589	318.383	-445.593	D	6.754	6.751	0.003	1.557	93.82	5	0	0	0	1.18
2003	319	23	1	318.65	-445.782	D	8.304	8.304	0	4.891	0	0	0	0	0	0
2003	320	23	1	318.65	-445.782	D	9.626	9.626	0	8.168	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	10.088	10.088	0	9.417	0	0	0	0	0	0
2003	322	23	2600	318.952	-443.12	D	9.917	9.909	0.008	8.925	97.71	2.25	0	0	0	0.04
2003	323	23	2781	339.842	-425.379	D	7.479	7.473	0.005	3.044	92.41	6.66	0	0	0	0.93
2003	324	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	9.817	9.817	0	8.677	0	0	0	0	0	0
2003	327	23	1415	329.185	-425.086	D	9.014	9.009	0.004	6.585	96.76	3.14	0	0	0	0.03
2003	328	23	2236	336.149	-430.776	D	7.262	7.262	0	2.598	17.4	0.37	0	0	0	0
2003	329	23	1	318.65	-445.782	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.434	7.434	0	2.961	0	0	0	0	0	0
2003	331	23	2589	318.383	-445.593	D	9.19	9.185	0.005	7.026	95.42	4.46	0	0	0	0.1
2003	332	23	2781	339.842	-425.379	D	6.833	6.832	0.002	1.719	78.92	18.71	0	0	0	2.35
2003	333	23	1	318.65	-445.782	D	6.494	6.494	0	1.054	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2003	335	23	2695	328.074	-426.025	D	6.661	6.66	0.001	1.379	93.33	5.6	0	0	0	0.99
2003	336	23	1	318.65	-445.782	D	6.513	6.513	0	1.092	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0
2003	338	23	2597	318.971	-443.851	D	9.149	9.132	0.017	6.893	96.68	3.19	0	0	0	0.13
2003	339	23	2789	340.496	-426.449	D	8.495	8.486	0.009	5.316	95.49	4.44	0	0	0	0.07
2003	340	23	2781	339.842	-425.379	D	7.816	7.813	0.004	3.78	94.27	5.28	0	0	0	0.45
2003	341	23	1	318.65	-445.782	D	6.652	6.652	0	1.362	0	0	0	0	0	0
2003	342	23	1	318.65	-445.782	D	8.111	8.111	0	4.449	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	10.155	10.155	0	9.603	0	0	0	0	0	0
2003	344	23	2588	318.452	-445.8	D	8.91	8.853	0.057	6.198	96.48	3.48	0	0	0	0.04
2003	345	23	2781	339.842	-425.379	D	7.539	7.534	0.004	3.175	84.25	14.4	0	0	0	1.33
2003	346	23	1549	330.211	-425.79	D	6.825	6.82	0.005	1.695	92.68	6.89	0	0	0	0.41
2003	347	23	863	325.509	-431.992	D	9.592	9.591	0	8.076	85.56	4.16	0	0	0	0.25
2003	348	23	1	318.65	-445.782	D	9.425	9.425	0	7.641	0	0	0	0	0	0
2003	349	23	1	318.65	-445.782	D	9.203	9.203	0	7.071	0	0	0	0	0	0
2003	350	23	1	318.65	-445.782	D	8.775	8.775	0	6.01	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.444	7.444	0	2.982	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	6.918	6.918	0	1.892	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	353	23	1	318.65	-445.782	D	7.467	7.467	0	3.031	0	0	0	0	0	0
2003	354	23	2789	340.496	-426.449	D	6.619	6.619	0	1.298	93.4	5.34	0	0	0	0.85
2003	355	23	2789	340.496	-426.449	D	6.609	6.609	0	1.278	96.73	3.13	0	0	0	0.41
2003	356	23	1	318.65	-445.782	D	9.46	9.46	0	7.73	0	0	0	0	0	0
2003	357	23	2628	320.933	-436.998	D	9.47	9.464	0.006	7.742	94.67	5.15	0	0	0	0.16
2003	358	23	2789	340.496	-426.449	D	8.574	8.544	0.029	5.455	94.02	5.87	0	0	0	0.1
2003	359	23	2571	322.646	-445.476	D	6.573	6.569	0.004	1.2	95.92	3.62	0	0	0	0.42
2003	360	23	2780	339.614	-425.419	D	6.847	6.845	0.002	1.745	97.22	2.64	0	0	0	0.15
2003	361	23	1	318.65	-445.782	D	6.753	6.753	0	1.562	0	0	0	0	0	0
2003	362	23	1	318.65	-445.782	D	8.719	8.719	0	5.874	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.299	7.299	0	2.675	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	6.566	6.566	0	1.194	0	0	0	0	0	0
									0.129							
UMC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	6.999	6.999	0	2.056	0	0	0	0	0	0
2003	2	23	2709	330.21	-424.978	D	9.375	9.354	0.022	7.456	69.61	30.34	0	0	0	0.04
2003	3	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0
2003	4	23	1	318.65	-445.782	D	6.784	6.784	0	1.624	0	0	0	0	0	0
2003	5	23	1	318.65	-445.782	D	7.26	7.26	0	2.595	0	0	0	0	0	0
2003	6	23	1	318.65	-445.782	D	8.242	8.242	0	4.748	0	0	0	0	0	0
2003	7	23	1	318.65	-445.782	D	7.239	7.239	0	2.55	0	0	0	0	0	0
2003	8	23	1	318.65	-445.782	D	6.71	6.71	0	1.477	0	0	0	0	0	0
2003	9	23	2789	340.496	-426.449	D	6.98	6.968	0.012	1.994	96.71	3.08	0	0	0	0.2
2003	10	23	1	318.65	-445.782	D	6.587	6.587	0	1.234	0	0	0	0	0	0
2003	11	23	1	318.65	-445.782	D	6.549	6.549	0	1.161	0	0	0	0	0	0
2003	12	23	2789	340.496	-426.449	D	6.5	6.499	0.001	1.064	85.71	14.16	0	0	0	0.11
2003	13	23	2788	340.294	-426.448	D	6.7	6.699	0	1.456	87.72	11.72	0	0	0	0.07
2003	14	23	1	318.65	-445.782	D	9.224	9.224	0	7.124	0	0	0	0	0	0
2003	15	23	2789	340.496	-426.449	D	6.627	6.623	0.004	1.305	85.62	14.25	0	0	0	0.1
2003	16	23	2597	318.971	-443.851	D	8.373	8.256	0.117	4.78	88.65	11.33	0	0	0	0.02
2003	17	23	454	323.042	-443.841	D	8.1	8.099	0	4.422	92.18	5.28	0	0	0	0
2003	18	23	1	318.65	-445.782	D	6.57	6.57	0	1.203	0	0	0	0	0	0
2003	19	23	1	318.65	-445.782	D	6.651	6.651	0	1.361	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	6.624	6.624	0	1.308	0	0	0	0	0	0
2003	21	23	2789	340.496	-426.449	D	7.572	7.533	0.039	3.171	87.63	12.36	0	0	0	0.01

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	22	23	2762	336.074	-425.006	D	7.514	7.501	0.013	3.103	79.23	20.6	0	0	0	0.15
2003	23	23	2789	340.496	-426.449	D	6.965	6.962	0.003	1.981	83.86	16.07	0	0	0	0.04
2003	24	23	2790	340.421	-426.562	D	6.636	6.635	0.001	1.33	88.54	11.21	0	0	0	0.05
2003	25	23	2468	334.002	-434.887	D	6.5	6.499	0.001	1.064	90.35	9.55	0	0	0	0.03
2003	26	23	2788	340.294	-426.448	D	7.197	7.197	0	2.463	93.21	6.84	0	0	0	0.02
2003	27	23	2789	340.496	-426.449	D	6.797	6.794	0.003	1.644	87.26	12.73	0	0	0	0.04
2003	28	23	2788	340.294	-426.448	D	8.039	8.039	0	4.285	91.55	7.92	0	0	0	0.02
2003	29	23	2789	340.496	-426.449	D	9.896	9.793	0.103	8.612	70.79	29.18	0	0	0	0.03
2003	30	23	1	318.65	-445.782	D	9.114	9.114	0	6.846	0	0	0	0	0	0
2003	31	23	1412	329.218	-425.834	D	7.067	7.067	0	2.196	91.97	5.04	0	0	0	0.01
2003	32	23	1	318.65	-445.782	D	6.936	6.936	0	1.929	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	6.87	6.87	0	1.795	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	9.527	9.527	0	7.906	0	0	0	0	0	0
2003	35	23	1	318.65	-445.782	D	7.1	7.1	0	2.263	0	0	0	0	0	0
2003	36	23	2789	340.496	-426.449	D	6.563	6.563	0	1.189	85.39	13.63	0	0	0	0.14
2003	37	23	2781	339.842	-425.379	D	9.277	9.182	0.094	7.018	90.94	9.05	0	0	0	0
2003	38	23	2684	326.713	-427.014	D	8.868	8.001	**0.867**	4.199	93.9	6.1	0	0	0	0
2003	39	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.657	7.657	0	3.439	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	9.339	9.339	0	7.418	0	0	0	0	0	0
2003	42	23	1	318.65	-445.782	D	6.733	6.733	0	1.522	0	0	0	0	0	0
2003	43	23	1	318.65	-445.782	D	6.521	6.521	0	1.107	0	0	0	0	0	0
2003	44	23	2789	340.496	-426.449	D	6.611	6.61	0.001	1.281	89.32	10.52	0	0	0	0.07
2003	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2003	46	23	1	318.65	-445.782	D	10.176	10.176	0	9.662	0	0	0	0	0	0
2003	47	23	2781	339.842	-425.379	D	8.894	8.654	0.24	5.716	92.6	7.39	0	0	0	0.01
2003	48	23	2694	327.861	-425.964	D	8.671	8.275	0.396	4.824	91.97	8.02	0	0	0	0.01
2003	49	23	2789	340.496	-426.449	D	7.011	6.979	0.032	2.016	93.3	6.67	0	0	0	0.02
2003	50	23	2781	339.842	-425.379	D	9.386	9.217	0.169	7.106	96.39	3.61	0	0	0	0
2003	51	23	2704	329.056	-425.092	D	9.792	9.524	0.268	7.899	92.91	7.09	0	0	0	0
2003	52	23	2628	320.933	-436.998	D	9.716	9.704	0.012	8.373	96.82	3.15	0	0	0	0
2003	53	23	2628	320.933	-436.998	D	9.616	9.454	0.162	7.717	92.02	7.97	0	0	0	0.01
2003	54	23	2781	339.842	-425.379	D	8.931	8.774	0.157	6.006	88.68	11.31	0	0	0	0.01
2003	55	23	2709	330.21	-424.978	D	8.768	8.504	0.264	5.359	91.58	8.42	0	0	0	0
2003	56	23	2575	321.659	-445.553	D	7.559	7.488	0.071	3.075	85.7	14.25	0	0	0	0.04
2003	57	23	2597	318.971	-443.851	D	8.891	8.653	0.238	5.715	92.76	7.24	0	0	0	0.01
2003	58	23	2600	318.952	-443.12	D	8.869	8.758	0.111	5.967	94.88	5.11	0	0	0	0
2003	59	23	2617	320.215	-439.334	D	9.087	8.962	0.126	6.467	95.36	4.63	0	0	0	0
2003	60	23	2704	329.056	-425.092	D	9.815	9.651	0.164	8.233	95.8	4.19	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	61	23	2781	339.842	-425.379	D	9.39	9.119	0.271	6.86	96.34	3.66	0	0	0	0
2003	62	23	2429	338.563	-428.651	D	7.391	7.373	0.018	2.832	97.24	2.74	0	0	0	0.01
2003	63	23	2789	340.496	-426.449	D	7.007	6.99	0.017	2.037	97.64	2.35	0	0	0	0.01
2003	64	23	2758	335.862	-424.454	D	9.219	9.059	0.16	6.709	93.77	6.23	0	0	0	0
2003	65	23	2789	340.496	-426.449	D	7.583	7.573	0.01	3.258	94.87	5.1	0	0	0	0.03
2003	66	23	2789	340.496	-426.449	D	6.977	6.945	0.033	1.946	94.53	5.45	0	0	0	0.02
2003	67	23	2789	340.496	-426.449	D	7.073	7.07	0.003	2.2	98.69	1.33	0	0	0	0.02
2003	68	23	2789	340.496	-426.449	D	7.095	7.06	0.035	2.18	78.1	21.77	0	0	0	0.13
2003	69	23	2758	335.862	-424.454	D	6.654	6.548	0.106	1.16	86.82	13.1	0	0	0	0.08
2003	70	23	2704	329.056	-425.092	D	6.615	6.553	0.062	1.168	95.1	4.87	0	0	0	0.04
2003	71	23	2789	340.496	-426.449	D	7.116	7.113	0.003	2.289	98.11	1.88	0	0	0	0.02
2003	72	23	2781	339.842	-425.379	D	8.581	8.571	0.01	5.518	98.44	1.53	0	0	0	0.02
2003	73	23	2597	318.971	-443.851	D	8.864	8.677	0.187	5.772	96.8	3.19	0	0	0	0.01
2003	74	23	2589	318.383	-445.593	D	8.213	8.106	0.107	4.436	97.98	2.02	0	0	0	0.01
2003	75	23	2704	329.056	-425.092	D	7.296	7.289	0.006	2.656	99.53	0.45	0	0	0	0.01
2003	76	23	1	318.65	-445.782	D	8.644	8.644	0	5.692	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	8.653	8.653	0	5.713	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	8.871	8.871	0	6.244	0	0	0	0	0	0
2003	79	23	2684	326.713	-427.014	D	9.718	9.196	**0.522**	7.054	94.92	5.08	0	0	0	0
2003	80	23	2789	340.496	-426.449	D	9.217	8.841	0.377	6.169	93.51	6.48	0	0	0	0
2003	81	23	1	318.65	-445.782	D	6.545	6.545	0	1.154	0	0	0	0	0	0
2003	82	23	1	318.65	-445.782	D	6.586	6.586	0	1.234	0	0	0	0	0	0
2003	83	23	1	318.65	-445.782	D	6.82	6.82	0	1.696	0	0	0	0	0	0
2003	84	23	2628	320.933	-436.998	D	7.727	7.676	0.05	3.482	97.13	2.85	0	0	0	0.02
2003	85	23	2684	326.713	-427.014	D	8.837	8.823	0.014	6.126	79.74	20.22	0	0	0	0.02
2003	86	23	2789	340.496	-426.449	D	6.613	6.612	0.001	1.283	99.1	0.82	0	0	0	0.02
2003	87	23	2274	336.179	-425.778	D	8.663	8.663	0	5.739	24.72	0.04	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.301	7.301	0	2.679	0	0	0	0	0	0
2003	89	23	1	318.65	-445.782	D	6.525	6.525	0	1.115	0	0	0	0	0	0
2003	90	23	1	318.65	-445.782	D	6.478	6.478	0	1.023	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.231	7.231	0	2.533	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	8.075	8.075	0	4.366	0	0	0	0	0	0
2003	95	23	1	318.65	-445.782	D	6.747	6.747	0	1.55	0	0	0	0	0	0
2003	96	23	2781	339.842	-425.379	D	8.075	8.057	0.018	4.325	94.6	5.39	0	0	0	0.01
2003	97	23	2273	336.19	-426.028	D	9.101	9.101	0	6.813	92.8	2.75	0	0	0	0
2003	98	23	2789	340.496	-426.449	D	7.456	7.431	0.025	2.955	96.24	3.75	0	0	0	0
2003	99	23	2789	340.496	-426.449	D	7.037	7.033	0.004	2.125	97.11	2.81	0	0	0	0.07

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	100	23	2789	340.496	-426.449	D	6.641	6.591	0.05	1.244	92.92	7.01	0	0	0	0.07
2003	101	23	2789	340.496	-426.449	D	6.496	6.479	0.017	1.025	98.31	1.62	0	0	0	0.07
2003	102	23	2789	340.496	-426.449	D	6.517	6.495	0.021	1.057	99.43	0.52	0	0	0	0.04
2003	103	23	2789	340.496	-426.449	D	6.526	6.525	0.001	1.115	99.9	0.11	0	0	0	0.03
2003	104	23	2788	340.294	-426.448	D	6.65	6.65	0	1.359	99.23	0.28	0	0	0	0.03
2003	105	23	1	318.65	-445.782	D	6.637	6.637	0	1.334	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	107	23	2781	339.842	-425.379	D	7.574	7.564	0.01	3.239	94.66	5.33	0	0	0	0.01
2003	108	23	2784	339.87	-426.019	D	7.823	7.822	0	3.802	86.52	0.04	0	0	0	0.02
2003	109	23	1	318.65	-445.782	D	7.406	7.406	0	2.902	0	0	0	0	0	0
2003	110	23	1	318.65	-445.782	D	9.045	9.045	0	6.674	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.014	7.014	0	2.087	0	0	0	0	0	0
2003	112	23	2781	339.842	-425.379	D	6.543	6.541	0.002	1.146	98.65	1.27	0	0	0	0.13
2003	113	23	2758	335.862	-424.454	D	6.594	6.591	0.003	1.243	98.64	1.3	0	0	0	0.05
2003	114	23	1	318.65	-445.782	D	8.02	8.02	0	4.243	0	0	0	0	0	0
2003	115	23	2597	318.971	-443.851	D	8.522	8.341	0.181	4.977	95.7	4.29	0	0	0	0.01
2003	116	23	2781	339.842	-425.379	D	8.449	8.336	0.113	4.966	88.83	11.16	0	0	0	0.01
2003	117	23	2588	318.452	-445.8	D	7.068	7.053	0.015	2.166	98.76	1.23	0	0	0	0.02
2003	118	23	2789	340.496	-426.449	D	7.488	7.485	0.003	3.07	99.84	0.15	0	0	0	0.01
2003	119	23	2781	339.842	-425.379	D	7.485	7.484	0	3.068	99.51	0.87	0	0	0	0.01
2003	120	23	2182	335.131	-424.575	D	8.168	8.168	0	4.578	98.36	0.2	0	0	0	0.01
2003	121	23	2270	336.223	-426.776	D	7.736	7.736	0	3.612	53.25	0.26	0	0	0	0.01
2003	122	23	2781	339.842	-425.379	D	8.873	8.837	0.037	6.159	98.35	1.62	0	0	0	0.02
2003	123	23	2758	335.862	-424.454	D	9.28	8.503	**0.778**	5.356	96.88	3.11	0	0	0	0.01
2003	124	23	2255	335.942	-426.039	D	7.355	7.318	0.036	2.716	99.73	0.26	0	0	0	0.01
2003	125	23	1	318.65	-445.782	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	8.385	8.385	0	5.081	0	0	0	0	0	0
2003	127	23	2704	329.056	-425.092	D	8.64	8.618	0.022	5.629	98.26	1.72	0	0	0	0.01
2003	128	23	2758	335.862	-424.454	D	8.015	8.011	0.005	4.221	99.78	0.2	0	0	0	0.02
2003	129	23	1	318.65	-445.782	D	7.642	7.642	0	3.407	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	8.486	8.486	0	5.317	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.409	7.409	0	2.907	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	6.899	6.899	0	1.854	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	9.399	9.399	0	7.572	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	8.763	8.763	0	5.98	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	9.31	9.31	0	7.344	0	0	0	0	0	0
2003	137	23	2781	339.842	-425.379	D	9.374	9.371	0.003	7.5	99.87	0.14	0	0	0	0.01
2003	138	23	2684	326.713	-427.014	D	9.214	9.093	0.12	6.795	98.7	1.3	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	139	23	2628	320.933	-436.998	D	8.812	8.783	0.029	6.027	99.36	0.63	0	0	0	0
2003	140	23	2789	340.496	-426.449	D	8.764	8.269	0.495	4.811	94.58	5.42	0	0	0	0.01
2003	141	23	2789	340.496	-426.449	D	6.75	6.723	0.027	1.503	98.89	1.07	0	0	0	0.04
2003	142	23	2704	329.056	-425.092	D	7.22	7.179	0.04	2.426	99.47	0.49	0	0	0	0.04
2003	143	23	2571	322.646	-445.476	D	6.824	6.712	0.112	1.48	99.72	0.25	0	0	0	0.03
2003	144	23	2758	335.862	-424.454	D	8.056	7.815	0.242	3.785	99.62	0.37	0	0	0	0.01
2003	145	23	2758	335.862	-424.454	D	9.638	9.201	0.437	7.066	98.71	1.29	0	0	0	0.01
2003	146	23	2597	318.971	-443.851	D	8.48	8.096	0.384	4.414	99.39	0.6	0	0	0	0
2003	147	23	2611	319.699	-440.64	D	6.663	6.649	0.014	1.357	99.69	0.27	0	0	0	0.04
2003	148	23	2588	318.452	-445.8	D	6.643	6.596	0.047	1.253	99.79	0.18	0	0	0	0.03
2003	149	23	2563	323.259	-443.79	D	7.253	7.25	0.003	2.573	99.92	0.03	0	0	0	0.02
2003	150	23	1	318.65	-445.782	D	6.614	6.614	0	1.289	0	0	0	0	0	0
2003	151	23	2412	339.417	-425.886	D	7.202	7.202	0	2.473	98.19	0.09	0	0	0	0.05
2003	152	23	54	319.815	-443.982	D	7.213	7.171	0.042	2.409	98.93	1.06	0	0	0	0.01
2003	153	23	2694	327.861	-425.964	D	8.709	8.693	0.017	5.81	99.46	0.52	0	0	0	0
2003	154	23	2758	335.862	-424.454	D	9.333	9.114	0.219	6.847	96.27	3.73	0	0	0	0
2003	155	23	2597	318.971	-443.851	D	7.545	7.51	0.035	3.122	99.68	0.31	0	0	0	0.01
2003	156	23	2571	322.646	-445.476	D	6.879	6.821	0.058	1.697	99.81	0.17	0	0	0	0.02
2003	157	23	2708	329.979	-425	D	8.994	8.823	0.171	6.125	99.26	0.74	0	0	0	0
2003	158	23	2555	324.03	-442.528	D	7.542	7.54	0.002	3.186	99.7	0.25	0	0	0	0
2003	159	23	1	318.65	-445.782	D	7.001	7.001	0	2.06	0	0	0	0	0	0
2003	160	23	1	318.65	-445.782	D	6.621	6.621	0	1.301	0	0	0	0	0	0
2003	161	23	1	318.65	-445.782	D	7.499	7.499	0	3.098	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	8.817	8.817	0	6.112	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	8.874	8.874	0	6.251	0	0	0	0	0	0
2003	164	23	1415	329.185	-425.086	D	9.213	9.212	0	7.095	99.15	0.04	0	0	0	0.01
2003	165	23	2758	335.862	-424.454	D	8.572	8.299	0.274	4.879	97.88	2.11	0	0	0	0.01
2003	166	23	2571	322.646	-445.476	D	8.687	8.279	0.408	4.833	98.76	1.24	0	0	0	0.01
2003	167	23	2563	323.259	-443.79	D	8.216	8.097	0.119	4.417	99.47	0.53	0	0	0	0
2003	168	23	2588	318.452	-445.8	D	7.707	7.645	0.062	3.413	99.34	0.66	0	0	0	0
2003	169	23	2588	318.452	-445.8	D	8.972	8.946	0.026	6.427	99.73	0.27	0	0	0	0
2003	170	23	2684	326.713	-427.014	D	8.608	8.521	0.087	5.4	99.8	0.19	0	0	0	0.01
2003	171	23	2789	340.496	-426.449	D	9.171	8.404	**0.767**	5.124	97.17	2.83	0	0	0	0
2003	172	23	2589	318.383	-445.593	D	7.006	6.969	0.037	1.995	99.83	0.15	0	0	0	0.01
2003	173	23	1	318.65	-445.782	D	6.92	6.92	0	1.897	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.108	7.108	0	2.279	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.784	7.784	0	3.718	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	8.399	8.399	0	5.113	0	0	0	0	0	0
2003	177	23	1	318.65	-445.782	D	8.699	8.699	0	5.825	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	178	23	2571	322.646	-445.476	D	6.832	6.832	0	1.719	99.23	0.13	0	0	0	0.08
2003	179	23	2789	340.496	-426.449	D	6.651	6.647	0.004	1.352	99.81	0.14	0	0	0	0.04
2003	180	23	2684	326.713	-427.014	D	6.722	6.716	0.006	1.488	99.95	0.05	0	0	0	0.02
2003	181	23	2709	330.21	-424.978	D	7.102	7.095	0.007	2.252	99.83	0.14	0	0	0	0.01
2003	182	23	1415	329.185	-425.086	D	8.86	8.86	0	6.216	98.85	0.25	0	0	0	0
2003	183	23	2409	339.158	-425.648	D	7.561	7.56	0	3.23	99.41	0.24	0	0	0	0.01
2003	184	23	2781	339.842	-425.379	D	7.374	7.374	0	2.832	97.91	0.09	0	0	0	0.01
2003	185	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	8.318	8.318	0	4.923	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.086	7.086	0	2.234	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.739	7.739	0	3.619	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	8.593	8.593	0	5.571	0	0	0	0	0	0
2003	192	23	1	318.65	-445.782	D	7.285	7.285	0	2.647	0	0	0	0	0	0
2003	193	23	1	318.65	-445.782	D	7.83	7.83	0	3.819	0	0	0	0	0	0
2003	194	23	2788	340.294	-426.448	D	7.246	7.246	0	2.564	98.02	0.02	0	0	0	0.02
2003	195	23	2781	339.842	-425.379	D	8.471	8.448	0.023	5.227	99.64	0.35	0	0	0	0
2003	196	23	2417	339.654	-425.626	D	8.22	8.22	0	4.698	99.39	0.02	0	0	0	0.01
2003	197	23	1	318.65	-445.782	D	6.957	6.957	0	1.972	0	0	0	0	0	0
2003	198	23	2789	340.496	-426.449	D	7.156	7.155	0.001	2.375	99.9	0.07	0	0	0	0.02
2003	199	23	1951	333.842	-434.874	D	7.142	7.141	0	2.348	99.79	0.02	0	0	0	0.02
2003	200	23	2418	339.946	-426.612	D	7.719	7.719	0	3.574	99.53	0.07	0	0	0	0.01
2003	201	23	1	318.65	-445.782	D	8.338	8.338	0	4.97	0	0	0	0	0	0
2003	202	23	1	318.65	-445.782	D	8.079	8.079	0	4.375	0	0	0	0	0	0
2003	203	23	1	318.65	-445.782	D	7.552	7.552	0	3.213	0	0	0	0	0	0
2003	204	23	2704	329.056	-425.092	D	7.054	7.027	0.028	2.112	98.57	1.36	0	0	0	0.07
2003	205	23	2653	324.014	-433.36	D	7.14	6.968	0.172	1.993	99.72	0.25	0	0	0	0.03
2003	206	23	2704	329.056	-425.092	D	7.137	7.106	0.031	2.275	99.84	0.15	0	0	0	0.02
2003	207	23	1	318.65	-445.782	D	6.798	6.798	0	1.652	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.085	7.085	0	2.232	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.085	7.085	0	2.233	0	0	0	0	0	0
2003	210	23	2781	339.842	-425.379	D	8.47	8.415	0.054	5.151	99.17	0.83	0	0	0	0
2003	211	23	2781	339.842	-425.379	D	9.528	9.347	0.18	7.44	99.23	0.76	0	0	0	0
2003	212	23	2789	340.496	-426.449	D	7.705	7.607	0.098	3.331	99.49	0.5	0	0	0	0.01
2003	213	23	2789	340.496	-426.449	D	6.925	6.901	0.024	1.858	99.84	0.15	0	0	0	0.01
2003	214	23	2448	335.908	-431.021	D	7.684	7.672	0.013	3.471	99.95	0.05	0	0	0	0
2003	215	23	1	318.65	-445.782	D	7.59	7.59	0	3.294	0	0	0	0	0	0
2003	216	23	1	318.65	-445.782	D	7.802	7.802	0	3.758	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	217	23	1	318.65	-445.782	D	8.259	8.259	0	4.787	0	0	0	0	0	0
2003	218	23	2684	326.713	-427.014	D	8.668	8.602	0.066	5.592	99.87	0.11	0	0	0	0.01
2003	219	23	2600	318.952	-443.12	D	9.061	8.443	**0.619**	5.214	98.24	1.75	0	0	0	0.01
2003	220	23	2758	335.862	-424.454	D	7.285	7.066	0.219	2.193	99.67	0.3	0	0	0	0.03
2003	221	23	2589	318.383	-445.593	D	7.081	6.977	0.105	2.01	99.85	0.12	0	0	0	0.03
2003	222	23	2588	318.452	-445.8	D	7.286	7.162	0.124	2.39	99.88	0.1	0	0	0	0.03
2003	223	23	2588	318.452	-445.8	D	7.498	7.272	0.226	2.62	99.83	0.16	0	0	0	0.02
2003	224	23	2588	318.452	-445.8	D	7.213	7.207	0.006	2.483	99.62	0.37	0	0	0	0.01
2003	225	23	1	318.65	-445.782	D	8.321	8.321	0	4.931	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	8.753	8.753	0	5.955	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.337	7.337	0	2.755	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.347	7.347	0	2.776	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2003	230	23	2789	340.496	-426.449	D	6.903	6.901	0.002	1.859	100.02	0.01	0	0	0	0.03
2003	231	23	2789	340.496	-426.449	D	6.844	6.826	0.018	1.706	99.91	0.07	0	0	0	0.02
2003	232	23	2789	340.496	-426.449	D	6.882	6.86	0.022	1.775	99.87	0.11	0	0	0	0.01
2003	233	23	2789	340.496	-426.449	D	6.939	6.921	0.018	1.898	99.78	0.2	0	0	0	0.01
2003	234	23	2790	340.421	-426.562	D	7.138	7.113	0.025	2.289	99.91	0.07	0	0	0	0.01
2003	235	23	2704	329.056	-425.092	D	7.095	7.028	0.067	2.115	99.92	0.06	0	0	0	0.02
2003	236	23	2588	318.452	-445.8	D	8.895	8.515	0.38	5.385	99.25	0.74	0	0	0	0.01
2003	237	23	2684	326.713	-427.014	D	8.005	7.846	0.159	3.854	99.87	0.13	0	0	0	0.01
2003	238	23	2708	329.979	-425	D	7.365	7.352	0.013	2.787	99.98	0.02	0	0	0	0.01
2003	239	23	2781	339.842	-425.379	D	7.03	7.03	0	2.119	99.82	0.02	0	0	0	0.01
2003	240	23	1	318.65	-445.782	D	7.105	7.105	0	2.273	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	8.394	8.394	0	5.101	0	0	0	0	0	0
2003	242	23	2276	336.157	-425.28	D	9.233	9.233	0	7.147	90.1	0.22	0	0	0	0
2003	243	23	2781	339.842	-425.379	D	9.331	9.331	0	7.397	99.02	0.98	0	0	0	0
2003	244	23	1	318.65	-445.782	D	9.456	9.456	0	7.721	0	0	0	0	0	0
2003	245	23	2653	324.014	-433.36	D	9.831	9.788	0.043	8.598	99.85	0.15	0	0	0	0
2003	246	23	2588	318.452	-445.8	D	9.946	9.235	**0.711**	7.152	98.45	1.55	0	0	0	0
2003	247	23	2790	340.421	-426.562	D	7.894	7.699	0.194	3.531	99.28	0.7	0	0	0	0.02
2003	248	23	2684	326.713	-427.014	D	6.832	6.745	0.087	1.545	98.83	1.11	0	0	0	0.06
2003	249	23	2588	318.452	-445.8	D	6.844	6.844	0.001	1.743	99.9	0.06	0	0	0	0.05
2003	250	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.063	7.063	0	2.187	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.368	7.368	0	2.821	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	8.253	8.253	0	4.773	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	9.962	9.962	0	9.071	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	256	23	1	318.65	-445.782	D	9.428	9.428	0	7.649	0	0	0	0	0	0
2003	257	23	2781	339.842	-425.379	D	8.951	8.651	0.301	5.708	95.78	4.22	0	0	0	0
2003	258	23	1	318.65	-445.782	D	6.717	6.717	0	1.49	0	0	0	0	0	0
2003	259	23	2789	340.496	-426.449	D	6.647	6.645	0.002	1.349	99.75	0.15	0	0	0	0.05
2003	260	23	2781	339.842	-425.379	D	6.769	6.755	0.015	1.565	99.62	0.35	0	0	0	0.03
2003	261	23	2758	335.862	-424.454	D	6.771	6.77	0	1.596	99.73	0.11	0	0	0	0.02
2003	262	23	1	318.65	-445.782	D	7.776	7.776	0	3.698	0	0	0	0	0	0
2003	263	23	2789	340.496	-426.449	D	6.618	6.588	0.03	1.236	99.42	0.52	0	0	0	0.05
2003	264	23	2784	339.87	-426.019	D	7.103	7.049	0.055	2.158	99.8	0.19	0	0	0	0.01
2003	265	23	2784	339.87	-426.019	D	9.131	9.106	0.024	6.827	98.85	1.14	0	0	0	0
2003	266	23	2789	340.496	-426.449	D	6.897	6.897	0	1.849	100.33	0.09	0	0	0	0.01
2003	267	23	1	318.65	-445.782	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2003	268	23	2684	326.713	-427.014	D	6.858	6.846	0.012	1.748	92.11	7.7	0	0	0	0.2
2003	269	23	2563	323.259	-443.79	D	7.074	7.052	0.022	2.164	99.23	0.75	0	0	0	0.02
2003	270	23	2789	340.496	-426.449	D	7.479	7.479	0	3.055	99.79	0.06	0	0	0	0.01
2003	271	23	1	318.65	-445.782	D	6.654	6.654	0	1.366	0	0	0	0	0	0
2003	272	23	2451	335.22	-431.216	D	6.536	6.532	0.004	1.128	92.71	7.01	0	0	0	0.23
2003	273	23	2429	338.563	-428.651	D	6.576	6.562	0.014	1.187	98.86	1.07	0	0	0	0.07
2003	274	23	2707	329.748	-425.023	D	8.577	8.474	0.103	5.288	93.85	6.14	0	0	0	0.01
2003	275	23	2684	326.713	-427.014	D	6.577	6.572	0.005	1.206	93	6.84	0	0	0	0.15
2003	276	23	2597	318.971	-443.851	D	7.149	7.115	0.034	2.293	97.78	2.2	0	0	0	0.02
2003	277	23	2789	340.496	-426.449	D	6.856	6.854	0.002	1.764	99.69	0.29	0	0	0	0.02
2003	278	23	2789	340.496	-426.449	D	7.037	7.032	0.005	2.124	99.1	0.85	0	0	0	0.03
2003	279	23	2789	340.496	-426.449	D	9.47	9.344	0.126	7.431	98.37	1.62	0	0	0	0.01
2003	280	23	2600	318.952	-443.12	D	7.934	7.852	0.081	3.868	99.45	0.54	0	0	0	0.01
2003	281	23	2694	327.861	-425.964	D	7.623	7.609	0.014	3.336	99.67	0.31	0	0	0	0.01
2003	282	23	2709	330.21	-424.978	D	8.916	8.914	0.001	6.35	99.52	0.34	0	0	0	0.01
2003	283	23	1415	329.185	-425.086	D	9.772	9.772	0	8.556	99.01	0.76	0	0	0	0
2003	284	23	1	318.65	-445.782	D	9.551	9.551	0	7.97	0	0	0	0	0	0
2003	285	23	2789	340.496	-426.449	D	7.9	7.891	0.009	3.954	99.26	0.66	0	0	0	0.09
2003	286	23	2789	340.496	-426.449	D	6.929	6.894	0.036	1.843	99.36	0.61	0	0	0	0.04
2003	287	23	2789	340.496	-426.449	D	8.898	8.869	0.03	6.237	97.92	2.08	0	0	0	0
2003	288	23	1	318.65	-445.782	D	6.692	6.692	0	1.442	0	0	0	0	0	0
2003	289	23	1	318.65	-445.782	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2003	290	23	2694	327.861	-425.964	D	8.173	8.15	0.023	4.537	96.28	3.71	0	0	0	0
2003	291	23	2684	326.713	-427.014	D	6.637	6.617	0.02	1.293	98.92	1.02	0	0	0	0.06
2003	292	23	2789	340.496	-426.449	D	6.622	6.608	0.014	1.276	99.7	0.25	0	0	0	0.04
2003	293	23	2468	334.002	-434.887	D	6.7	6.696	0.004	1.45	99.84	0.09	0	0	0	0.02
2003	294	23	2789	340.496	-426.449	D	6.722	6.722	0	1.5	99.68	0.08	0	0	0	0.02

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	295	23	2684	326.713	-427.014	D	6.746	6.723	0.023	1.502	99.75	0.14	0	0	0	0.11
2003	296	23	2588	318.452	-445.8	D	6.644	6.61	0.034	1.28	99.65	0.28	0	0	0	0.07
2003	297	23	2571	322.646	-445.476	D	6.741	6.716	0.024	1.489	99.68	0.28	0	0	0	0.03
2003	298	23	1438	329.554	-427.817	D	8.463	7.987	0.477	4.168	93.38	6.6	0	0	0	0.01
2003	299	23	2563	323.259	-443.79	D	7.595	7.509	0.086	3.119	92.86	7.14	0	0	0	0
2003	300	23	13	319.06	-443.766	D	6.537	6.537	0	1.138	48.11	0.35	0	0	0	0.01
2003	301	23	1	318.65	-445.782	D	6.598	6.598	0	1.258	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.414	7.414	0	2.919	0	0	0	0	0	0
2003	304	23	1	318.65	-445.782	D	9.409	9.409	0	7.599	0	0	0	0	0	0
2003	305	23	2781	339.842	-425.379	D	9.456	9.4	0.056	7.576	91.98	8	0	0	0	0.02
2003	306	23	1	318.65	-445.782	D	8.79	8.79	0	6.045	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.877	7.877	0	3.922	0	0	0	0	0	0
2003	308	23	2758	335.862	-424.454	D	7.403	7.402	0.001	2.893	96.84	2.77	0	0	0	0.01
2003	309	23	2781	339.842	-425.379	D	8.104	8.075	0.029	4.367	97.33	2.64	0	0	0	0.02
2003	310	23	2789	340.496	-426.449	D	9.188	8.919	0.269	6.36	92.77	7.22	0	0	0	0.01
2003	311	23	2563	323.259	-443.79	D	8.093	7.883	0.21	3.935	92.69	7.3	0	0	0	0.01
2003	312	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	6.51	6.51	0	1.085	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	6.616	6.616	0	1.292	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	9.37	9.37	0	7.497	0	0	0	0	0	0
2003	317	23	1	318.65	-445.782	D	6.486	6.486	0	1.04	0	0	0	0	0	0
2003	318	23	2789	340.496	-426.449	D	6.957	6.957	0	1.97	96.23	3.57	0	0	0	0.03
2003	319	23	2781	339.842	-425.379	D	8.518	8.517	0	5.391	93.29	6.62	0	0	0	0.02
2003	320	23	1	318.65	-445.782	D	9.626	9.626	0	8.168	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	10.088	10.088	0	9.417	0	0	0	0	0	0
2003	322	23	1	318.65	-445.782	D	9.908	9.908	0	8.922	0	0	0	0	0	0
2003	323	23	1	318.65	-445.782	D	7.343	7.343	0	2.768	0	0	0	0	0	0
2003	324	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	9.817	9.817	0	8.677	0	0	0	0	0	0
2003	327	23	2704	329.056	-425.092	D	9.041	9.009	0.032	6.585	93.08	6.91	0	0	0	0
2003	328	23	1	318.65	-445.782	D	7.264	7.264	0	2.603	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.434	7.434	0	2.961	0	0	0	0	0	0
2003	331	23	2789	340.496	-426.449	D	9.173	9.167	0.005	6.981	94.67	5.31	0	0	0	0.01
2003	332	23	2789	340.496	-426.449	D	6.841	6.839	0.002	1.734	95.16	4.83	0	0	0	0.01
2003	333	23	1	318.65	-445.782	D	6.494	6.494	0	1.054	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	334	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2003	335	23	2684	326.713	-427.014	D	6.677	6.66	0.017	1.379	75.02	24.67	0	0	0	0.31
2003	336	23	1	318.65	-445.782	D	6.513	6.513	0	1.092	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0
2003	338	23	2708	329.979	-425	D	9.316	9.209	0.107	7.085	95.03	4.96	0	0	0	0.01
2003	339	23	2597	318.971	-443.851	D	8.583	8.531	0.052	5.422	96.14	3.85	0	0	0	0
2003	340	23	1	318.65	-445.782	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	341	23	2781	339.842	-425.379	D	6.661	6.656	0.006	1.37	88.46	11.52	0	0	0	0.04
2003	342	23	1	318.65	-445.782	D	8.111	8.111	0	4.449	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	10.155	10.155	0	9.603	0	0	0	0	0	0
2003	344	23	2588	318.452	-445.8	D	9.092	8.853	0.239	6.198	92.39	7.61	0	0	0	0
2003	345	23	1	318.65	-445.782	D	7.408	7.408	0	2.905	0	0	0	0	0	0
2003	346	23	2781	339.842	-425.379	D	6.853	6.844	0.01	1.742	91.43	8.53	0	0	0	0.04
2003	347	23	2589	318.383	-445.593	D	9.651	9.614	0.038	8.134	91.93	8.06	0	0	0	0
2003	348	23	2589	318.383	-445.593	D	9.507	9.425	0.082	7.641	94.02	5.98	0	0	0	0
2003	349	23	2781	339.842	-425.379	D	9.07	9.064	0.006	6.72	95.33	4.64	0	0	0	0
2003	350	23	2385	338.165	-425.691	D	8.717	8.717	0	5.869	85.93	3.55	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.444	7.444	0	2.982	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.467	7.467	0	3.031	0	0	0	0	0	0
2003	354	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	355	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2003	356	23	1	318.65	-445.782	D	9.46	9.46	0	7.73	0	0	0	0	0	0
2003	357	23	2789	340.496	-426.449	D	9.466	9.464	0.002	7.742	63.02	36.91	0	0	0	0.05
2003	358	23	1	318.65	-445.782	D	8.21	8.21	0	4.675	0	0	0	0	0	0
2003	359	23	1	318.65	-445.782	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2003	360	23	2789	340.496	-426.449	D	6.839	6.838	0.001	1.731	94.94	5.08	0	0	0	0.05
2003	361	23	2789	340.496	-426.449	D	6.762	6.76	0.002	1.575	94.72	5.29	0	0	0	0.03
2003	362	23	1	318.65	-445.782	D	8.719	8.719	0	5.874	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.299	7.299	0	2.675	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	6.566	6.566	0	1.194	0	0	0	0	0	0
									0.867							
NORANDA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	6.999	6.999	0	2.056	0	0	0	0	0	0
2003	2	23	1	318.65	-445.782	D	9.22	9.22	0	7.114	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	3	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0
2003	4	23	1	318.65	-445.782	D	6.784	6.784	0	1.624	0	0	0	0	0	0
2003	5	23	1	318.65	-445.782	D	7.26	7.26	0	2.595	0	0	0	0	0	0
2003	6	23	1	318.65	-445.782	D	8.242	8.242	0	4.748	0	0	0	0	0	0
2003	7	23	1	318.65	-445.782	D	7.239	7.239	0	2.55	0	0	0	0	0	0
2003	8	23	1	318.65	-445.782	D	6.71	6.71	0	1.477	0	0	0	0	0	0
2003	9	23	1	318.65	-445.782	D	6.922	6.922	0	1.9	0	0	0	0	0	0
2003	10	23	1	318.65	-445.782	D	6.587	6.587	0	1.234	0	0	0	0	0	0
2003	11	23	1	318.65	-445.782	D	6.549	6.549	0	1.161	0	0	0	0	0	0
2003	12	23	2789	340.496	-426.449	D	6.499	6.499	0	1.064	95.63	0.02	0	0	0.91	3.58
2003	13	23	2789	340.496	-426.449	D	6.7	6.699	0	1.456	97.74	0.02	0	0	0.26	3.09
2003	14	23	1	318.65	-445.782	D	9.224	9.224	0	7.124	0	0	0	0	0	0
2003	15	23	2571	322.646	-445.476	D	6.625	6.625	0	1.309	96.06	0.01	0	0	0.27	2.54
2003	16	23	2781	339.842	-425.379	D	8.371	8.274	0.097	4.822	97.01	0.23	0	0	0.1	2.66
2003	17	23	2236	336.149	-430.776	D	7.902	7.902	0	3.978	56.71	0	0	0	1.53	7.39
2003	18	23	1	318.65	-445.782	D	6.57	6.57	0	1.203	0	0	0	0	0	0
2003	19	23	1	318.65	-445.782	D	6.651	6.651	0	1.361	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	6.624	6.624	0	1.308	0	0	0	0	0	0
2003	21	23	1	318.65	-445.782	D	7.532	7.532	0	3.169	0	0	0	0	0	0
2003	22	23	1	318.65	-445.782	D	7.405	7.405	0	2.899	0	0	0	0	0	0
2003	23	23	1	318.65	-445.782	D	6.876	6.876	0	1.806	0	0	0	0	0	0
2003	24	23	1	318.65	-445.782	D	6.593	6.593	0	1.246	0	0	0	0	0	0
2003	25	23	1	318.65	-445.782	D	6.497	6.497	0	1.06	0	0	0	0	0	0
2003	26	23	1	318.65	-445.782	D	7.121	7.121	0	2.305	0	0	0	0	0	0
2003	27	23	2788	340.294	-426.448	D	6.794	6.794	0	1.644	88.85	0.15	0	0	0.41	10.29
2003	28	23	2788	340.294	-426.448	D	8.039	8.039	0	4.285	76.24	0.71	0	0	0.07	19.76
2003	29	23	1	318.65	-445.782	D	9.699	9.699	0	8.36	0	0	0	0	0	0
2003	30	23	1	318.65	-445.782	D	9.114	9.114	0	6.846	0	0	0	0	0	0
2003	31	23	2789	340.496	-426.449	D	7.08	7.065	0.015	2.191	98.69	0.06	0	0	0.01	1.24
2003	32	23	1	318.65	-445.782	D	6.936	6.936	0	1.929	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	6.87	6.87	0	1.795	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	9.527	9.527	0	7.906	0	0	0	0	0	0
2003	35	23	1	318.65	-445.782	D	7.1	7.1	0	2.263	0	0	0	0	0	0
2003	36	23	1	318.65	-445.782	D	6.56	6.56	0	1.182	0	0	0	0	0	0
2003	37	23	2781	339.842	-425.379	D	9.378	9.182	0.196	7.018	98.57	0.2	0	0	0.05	1.18
2003	38	23	2468	334.002	-434.887	D	8.08	8.005	0.075	4.21	99.12	0.13	0	0	0.01	0.73
2003	39	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.657	7.657	0	3.439	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	9.339	9.339	0	7.418	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	42	23	1	318.65	-445.782	D	6.733	6.733	0	1.522	0	0	0	0	0	0
2003	43	23	1	318.65	-445.782	D	6.521	6.521	0	1.107	0	0	0	0	0	0
2003	44	23	1	318.65	-445.782	D	6.659	6.659	0	1.376	0	0	0	0	0	0
2003	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2003	46	23	2589	318.383	-445.593	D	10.186	10.176	0.01	9.662	98.97	0.13	0	0	0.01	0.85
2003	47	23	2468	334.002	-434.887	D	8.714	8.625	0.088	5.648	99.25	0.1	0	0	0	0.65
2003	48	23	1	318.65	-445.782	D	7.865	7.865	0	3.896	0	0	0	0	0	0
2003	49	23	1	318.65	-445.782	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	50	23	2789	340.496	-426.449	D	9.228	9.195	0.033	7.051	97.1	0.33	0	0	0.05	2.51
2003	51	23	2447	336.137	-430.956	D	9.615	9.556	0.059	7.983	99.3	0.06	0	0	0.09	0.54
2003	52	23	2448	335.908	-431.021	D	10.574	9.738	**0.836**	8.464	99.38	0.07	0	0	0.04	0.51
2003	53	23	2588	318.452	-445.8	D	9.644	9.43	0.214	7.652	99.5	0.07	0	0	0.02	0.41
2003	54	23	1	318.65	-445.782	D	8.727	8.727	0	5.892	0	0	0	0	0	0
2003	55	23	1	318.65	-445.782	D	8.376	8.376	0	5.059	0	0	0	0	0	0
2003	56	23	1	318.65	-445.782	D	7.488	7.488	0	3.075	0	0	0	0	0	0
2003	57	23	2571	322.646	-445.476	D	8.662	8.622	0.04	5.641	97.05	0.11	0	0	0.36	2.48
2003	58	23	2588	318.452	-445.8	D	8.714	8.64	0.075	5.682	98.86	0.1	0	0	0.07	0.96
2003	59	23	2563	323.259	-443.79	D	8.999	8.962	0.038	6.467	99.15	0.06	0	0	0.04	0.75
2003	60	23	2563	323.259	-443.79	D	9.782	9.667	0.115	8.276	99.46	0.05	0	0	0.02	0.47
2003	61	23	2789	340.496	-426.449	D	9.16	9.117	0.043	6.853	99.6	0.05	0	0	0.01	0.35
2003	62	23	1	318.65	-445.782	D	7.196	7.196	0	2.461	0	0	0	0	0	0
2003	63	23	1	318.65	-445.782	D	7.002	7.002	0	2.063	0	0	0	0	0	0
2003	64	23	1	318.65	-445.782	D	9.117	9.117	0	6.855	0	0	0	0	0	0
2003	65	23	1	318.65	-445.782	D	7.603	7.603	0	3.323	0	0	0	0	0	0
2003	66	23	1	318.65	-445.782	D	6.885	6.885	0	1.825	0	0	0	0	0	0
2003	67	23	1	318.65	-445.782	D	7.083	7.083	0	2.227	0	0	0	0	0	0
2003	68	23	1	318.65	-445.782	D	7.068	7.068	0	2.198	0	0	0	0	0	0
2003	69	23	1	318.65	-445.782	D	6.544	6.544	0	1.152	0	0	0	0	0	0
2003	70	23	2468	334.002	-434.887	D	6.554	6.552	0.001	1.168	91.62	0.01	0	0	0.48	7.94
2003	71	23	2789	340.496	-426.449	D	7.118	7.113	0.005	2.289	93.41	0.04	0	0	0.06	6.48
2003	72	23	1	318.65	-445.782	D	8.466	8.466	0	5.269	0	0	0	0	0	0
2003	73	23	1	318.65	-445.782	D	8.6	8.6	0	5.587	0	0	0	0	0	0
2003	74	23	2789	340.496	-426.449	D	8.209	8.186	0.023	4.618	98.7	0.03	0	0	0.07	1.19
2003	75	23	2789	340.496	-426.449	D	7.287	7.277	0.011	2.629	97.17	0.05	0	0	0.04	2.73
2003	76	23	2784	339.87	-426.019	D	8.645	8.643	0.003	5.689	98.78	0.04	0	0	0.01	1.08
2003	77	23	2781	339.842	-425.379	D	8.723	8.722	0.001	5.881	99.18	0	0	0	0.09	0.69
2003	78	23	2758	335.862	-424.454	D	8.905	8.855	0.049	6.205	97.86	0.16	0	0	0.04	1.95
2003	79	23	2597	318.971	-443.851	D	9.32	9.203	0.117	7.071	99.61	0.06	0	0	0.01	0.33
2003	80	23	2563	323.259	-443.79	D	8.932	8.871	0.061	6.244	99.48	0.06	0	0	0	0.47

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	81	23	2789	340.496	-426.449	D	6.534	6.534	0	1.132	96.41	0.01	0	0	0.01	3.69
2003	82	23	1	318.65	-445.782	D	6.586	6.586	0	1.234	0	0	0	0	0	0
2003	83	23	1	318.65	-445.782	D	6.82	6.82	0	1.696	0	0	0	0	0	0
2003	84	23	1	318.65	-445.782	D	7.607	7.607	0	3.331	0	0	0	0	0	0
2003	85	23	1	318.65	-445.782	D	8.701	8.701	0	5.829	0	0	0	0	0	0
2003	86	23	2789	340.496	-426.449	D	6.617	6.612	0.006	1.283	93.2	0.05	0	0	0.29	6.46
2003	87	23	1	318.65	-445.782	D	8.676	8.676	0	5.769	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.301	7.301	0	2.679	0	0	0	0	0	0
2003	89	23	1	318.65	-445.782	D	6.525	6.525	0	1.115	0	0	0	0	0	0
2003	90	23	1	318.65	-445.782	D	6.478	6.478	0	1.023	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.231	7.231	0	2.533	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	8.075	8.075	0	4.366	0	0	0	0	0	0
2003	95	23	1	318.65	-445.782	D	6.747	6.747	0	1.55	0	0	0	0	0	0
2003	96	23	2704	329.056	-425.092	D	8.255	8.068	0.187	4.35	97.6	0.15	0	0	0.08	2.16
2003	97	23	2704	329.056	-425.092	D	9.106	9.096	0.01	6.801	93.3	1.82	0	0	0.02	4.86
2003	98	23	2789	340.496	-426.449	D	7.435	7.431	0.004	2.955	98.6	0.07	0	0	0	1.29
2003	99	23	2429	338.563	-428.651	D	7.033	7.033	0	2.125	98.08	0.02	0	0	0	1.56
2003	100	23	1	318.65	-445.782	D	6.581	6.581	0	1.223	0	0	0	0	0	0
2003	101	23	1	318.65	-445.782	D	6.48	6.48	0	1.028	0	0	0	0	0	0
2003	102	23	1	318.65	-445.782	D	6.496	6.496	0	1.058	0	0	0	0	0	0
2003	103	23	1	318.65	-445.782	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2003	104	23	1	318.65	-445.782	D	6.676	6.676	0	1.411	0	0	0	0	0	0
2003	105	23	1	318.65	-445.782	D	6.637	6.637	0	1.334	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	107	23	1	318.65	-445.782	D	7.437	7.437	0	2.967	0	0	0	0	0	0
2003	108	23	2789	340.496	-426.449	D	7.823	7.822	0.001	3.802	98.29	0	0	0	0.18	1.44
2003	109	23	2781	339.842	-425.379	D	7.582	7.582	0	3.277	97.43	0	0	0	0.12	2.08
2003	110	23	1	318.65	-445.782	D	9.045	9.045	0	6.674	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.014	7.014	0	2.087	0	0	0	0	0	0
2003	112	23	1	318.65	-445.782	D	6.538	6.538	0	1.139	0	0	0	0	0	0
2003	113	23	2789	340.496	-426.449	D	6.594	6.588	0.006	1.237	79.29	0.1	0	0	1.71	18.86
2003	114	23	2708	329.979	-425	D	8.034	8.025	0.009	4.255	96.17	0.02	0	0	0.14	3.67
2003	115	23	2624	320.719	-437.835	D	8.486	8.358	0.127	5.018	98.89	0.04	0	0	0.01	1.06
2003	116	23	2789	340.496	-426.449	D	8.408	8.355	0.054	5.009	99.42	0.01	0	0	0.01	0.57
2003	117	23	2789	340.496	-426.449	D	7.04	7.04	0	2.14	94.99	0	0	0	0.69	4.39
2003	118	23	2789	340.496	-426.449	D	7.487	7.485	0.002	3.07	97.69	0	0	0	0.1	2.16
2003	119	23	1	318.65	-445.782	D	7.327	7.327	0	2.733	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	120	23	1	318.65	-445.782	D	7.985	7.985	0	4.163	0	0	0	0	0	0
2003	121	23	1	318.65	-445.782	D	7.624	7.624	0	3.367	0	0	0	0	0	0
2003	122	23	1	318.65	-445.782	D	8.826	8.826	0	6.133	0	0	0	0	0	0
2003	123	23	340	322.363	-445.37	D	8.345	8.345	0	4.986	73.47	0	0	0	4.1	20.2
2003	124	23	2448	335.908	-431.021	D	7.346	7.318	0.028	2.716	97.92	0.01	0	0	0.03	2.04
2003	125	23	1	318.65	-445.782	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	8.385	8.385	0	5.081	0	0	0	0	0	0
2003	127	23	1	318.65	-445.782	D	8.67	8.67	0	5.754	0	0	0	0	0	0
2003	128	23	1	318.65	-445.782	D	8.057	8.057	0	4.326	0	0	0	0	0	0
2003	129	23	1	318.65	-445.782	D	7.642	7.642	0	3.407	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	8.486	8.486	0	5.317	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.409	7.409	0	2.907	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	6.899	6.899	0	1.854	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	9.399	9.399	0	7.572	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	8.763	8.763	0	5.98	0	0	0	0	0	0
2003	136	23	2413	339.406	-425.637	D	9.354	9.354	0	7.456	78.65	2.37	0	0	0.08	10.56
2003	137	23	2789	340.496	-426.449	D	9.385	9.371	0.014	7.5	97.56	0	0	0	0.28	2.15
2003	138	23	2600	318.952	-443.12	D	9.149	9.083	0.067	6.768	99.45	0.02	0	0	0.03	0.5
2003	139	23	2789	340.496	-426.449	D	8.827	8.796	0.031	6.059	98.27	0.01	0	0	0.23	1.49
2003	140	23	2790	340.421	-426.562	D	8.577	8.269	0.308	4.811	99.38	0.02	0	0	0.03	0.57
2003	141	23	2571	322.646	-445.476	D	6.718	6.718	0	1.492	98.06	0	0	0	0.08	2.22
2003	142	23	2274	336.179	-425.778	D	7.111	7.111	0	2.285	52.73	0	0	0	0.19	6.55
2003	143	23	1	318.65	-445.782	D	6.712	6.712	0	1.48	0	0	0	0	0	0
2003	144	23	2789	340.496	-426.449	D	7.806	7.793	0.013	3.737	99.66	0.01	0	0	0.04	0.27
2003	145	23	2781	339.842	-425.379	D	9.235	9.204	0.031	7.074	99.08	0.01	0	0	0.06	0.85
2003	146	23	37	319.567	-443.993	D	8.252	8.096	0.156	4.414	99.36	0.02	0	0	0.01	0.61
2003	147	23	2588	318.452	-445.8	D	6.648	6.647	0	1.353	94.99	0	0	0	0.06	4.92
2003	148	23	1	318.65	-445.782	D	6.596	6.596	0	1.253	0	0	0	0	0	0
2003	149	23	1	318.65	-445.782	D	7.175	7.175	0	2.418	0	0	0	0	0	0
2003	150	23	1	318.65	-445.782	D	6.614	6.614	0	1.289	0	0	0	0	0	0
2003	151	23	1	318.65	-445.782	D	7.098	7.098	0	2.258	0	0	0	0	0	0
2003	152	23	2571	322.646	-445.476	D	7.102	7.102	0	2.267	97.43	0	0	0	0.17	0.97
2003	153	23	2448	335.908	-431.021	D	8.733	8.683	0.05	5.786	98.47	0.01	0	0	0.03	1.48
2003	154	23	2789	340.496	-426.449	D	9.349	9.14	0.209	6.912	99.22	0.03	0	0	0.04	0.71
2003	155	23	2790	340.421	-426.562	D	7.663	7.66	0.003	3.446	95.02	0	0	0	0.33	4.67
2003	156	23	1	318.65	-445.782	D	6.821	6.821	0	1.697	87.86	0	0	0	0.71	11.21
2003	157	23	2789	340.496	-426.449	D	8.719	8.688	0.031	5.798	99.08	0.01	0	0	0.07	0.84
2003	158	23	2789	340.496	-426.449	D	7.568	7.56	0.008	3.23	98.8	0.01	0	0	0.05	1.13

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	159	23	2236	336.149	-430.776	D	7.15	7.15	0	2.365	86.94	0	0	0	0.16	7.6
2003	160	23	1	318.65	-445.782	D	6.621	6.621	0	1.301	0	0	0	0	0	0
2003	161	23	1	318.65	-445.782	D	7.499	7.499	0	3.098	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	8.817	8.817	0	6.112	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	8.874	8.874	0	6.251	0	0	0	0	0	0
2003	164	23	1	318.65	-445.782	D	9.225	9.225	0	7.127	0	0	0	0	0	0
2003	165	23	1	318.65	-445.782	D	8.181	8.181	0	4.608	0	0	0	0	0	0
2003	166	23	2408	339.168	-425.897	D	8.119	8.119	0	4.467	87.53	0	0	0	0.11	4.2
2003	167	23	2571	322.646	-445.476	D	8.03	8.005	0.025	4.208	98.78	0.02	0	0	0.15	1.05
2003	168	23	2587	318.699	-445.781	D	7.873	7.645	0.229	3.413	99.37	0.02	0	0	0.07	0.54
2003	169	23	2468	334.002	-434.887	D	9.78	8.927	**0.853**	6.381	99.32	0.03	0	0	0.07	0.58
2003	170	23	37	319.567	-443.993	D	8.682	8.51	0.171	5.375	99.24	0.01	0	0	0.06	0.68
2003	171	23	2588	318.452	-445.8	D	8.187	8.182	0.004	4.611	99.68	0	0	0	0.02	0.27
2003	172	23	2694	327.861	-425.964	D	7.013	6.976	0.038	2.009	96	0.02	0	0	0.2	3.78
2003	173	23	2781	339.842	-425.379	D	6.923	6.922	0.001	1.9	65.2	0.02	0	0	0.61	33.96
2003	174	23	2236	336.149	-430.776	D	7.092	7.092	0	2.245	52.92	0	0	0	0.77	6.63
2003	175	23	1	318.65	-445.782	D	7.784	7.784	0	3.718	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	8.399	8.399	0	5.113	0	0	0	0	0	0
2003	177	23	1	318.65	-445.782	D	8.699	8.699	0	5.825	0	0	0	0	0	0
2003	178	23	1	318.65	-445.782	D	6.832	6.832	0	1.719	0	0	0	0	0	0
2003	179	23	2571	322.646	-445.476	D	6.65	6.647	0.003	1.353	93.7	0	0	0	1.13	5.16
2003	180	23	2789	340.496	-426.449	D	6.797	6.718	0.078	1.493	96.68	0	0	0	0.27	3.05
2003	181	23	2764	336.51	-425.05	D	7.12	7.102	0.018	2.267	97.86	0	0	0	0.11	2.02
2003	182	23	2704	329.056	-425.092	D	8.865	8.86	0.005	6.216	99.19	0.01	0	0	0.04	0.75
2003	183	23	2789	340.496	-426.449	D	7.576	7.524	0.052	3.153	99.11	0.01	0	0	0.06	0.82
2003	184	23	2789	340.496	-426.449	D	7.423	7.375	0.048	2.836	98.51	0	0	0	0.09	1.4
2003	185	23	2789	340.496	-426.449	D	7.002	6.981	0.02	2.02	97.86	0	0	0	0.1	2.03
2003	186	23	2789	340.496	-426.449	D	7.311	7.311	0	2.701	90.2	0	0	0	1.43	8.16
2003	187	23	1549	330.211	-425.79	D	8.288	8.288	0	4.854	89.26	0	0	0	1.5	3.51
2003	188	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.086	7.086	0	2.234	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.739	7.739	0	3.619	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	8.593	8.593	0	5.571	0	0	0	0	0	0
2003	192	23	1	318.65	-445.782	D	7.285	7.285	0	2.647	0	0	0	0	0	0
2003	193	23	1	318.65	-445.782	D	7.83	7.83	0	3.819	0	0	0	0	0	0
2003	194	23	1	318.65	-445.782	D	7.262	7.262	0	2.597	0	0	0	0	0	0
2003	195	23	2781	339.842	-425.379	D	8.451	8.448	0.003	5.227	99.8	0	0	0	0.01	0.11
2003	196	23	1	318.65	-445.782	D	7.902	7.902	0	3.979	0	0	0	0	0	0
2003	197	23	1	318.65	-445.782	D	6.957	6.957	0	1.972	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	198	23	1	318.65	-445.782	D	7.183	7.183	0	2.433	0	0	0	0	0	0
2003	199	23	2418	339.946	-426.612	D	7.116	7.116	0	2.295	89.84	0	0	0	0.5	9.65
2003	200	23	2788	340.294	-426.448	D	7.719	7.719	0	3.574	95.67	0	0	0	0.1	3.87
2003	201	23	2037	333.945	-425.876	D	8.542	8.542	0	5.448	0.01	0.31	0	0	0	1.35
2003	202	23	1	318.65	-445.782	D	8.079	8.079	0	4.375	0	0	0	0	0	0
2003	203	23	1	318.65	-445.782	D	7.552	7.552	0	3.213	0	0	0	0	0	0
2003	204	23	1	318.65	-445.782	D	7.015	7.015	0	2.088	0	0	0	0	0	0
2003	205	23	2789	340.496	-426.449	D	6.944	6.943	0.001	1.942	98.03	0	0	0	0.43	1.41
2003	206	23	2789	340.496	-426.449	D	7.163	7.087	0.076	2.236	98.18	0	0	0	0.2	1.62
2003	207	23	2709	330.21	-424.978	D	6.848	6.836	0.012	1.728	97.54	0	0	0	0.13	2.31
2003	208	23	2415	339.676	-426.124	D	7.142	7.142	0	2.35	97.45	0	0	0	0.07	1.8
2003	209	23	1	318.65	-445.782	D	7.085	7.085	0	2.233	0	0	0	0	0	0
2003	210	23	2789	340.496	-426.449	D	8.42	8.407	0.013	5.131	99.88	0	0	0	0.01	0.1
2003	211	23	2781	339.842	-425.379	D	9.391	9.347	0.043	7.44	99.89	0	0	0	0.01	0.1
2003	212	23	2789	340.496	-426.449	D	7.627	7.607	0.02	3.331	99.81	0	0	0	0.01	0.18
2003	213	23	2468	334.002	-434.887	D	6.895	6.894	0.001	1.843	99.62	0	0	0	0.01	0.28
2003	214	23	2210	335.901	-430.787	D	7.673	7.672	0.001	3.471	99.78	0	0	0	0.01	0.2
2003	215	23	1954	333.809	-434.126	D	7.724	7.724	0	3.584	2.19	0	0	0	0	0.12
2003	216	23	1	318.65	-445.782	D	7.802	7.802	0	3.758	0	0	0	0	0	0
2003	217	23	1	318.65	-445.782	D	8.259	8.259	0	4.787	0	0	0	0	0	0
2003	218	23	1	318.65	-445.782	D	8.453	8.453	0	5.24	0	0	0	0	0	0
2003	219	23	1	318.65	-445.782	D	8.421	8.421	0	5.163	0	0	0	0	0	0
2003	220	23	1	318.65	-445.782	D	7.094	7.094	0	2.25	0	0	0	0	0	0
2003	221	23	1	318.65	-445.782	D	6.977	6.977	0	2.01	0	0	0	0	0	0
2003	222	23	1	318.65	-445.782	D	7.162	7.162	0	2.39	0	0	0	0	0	0
2003	223	23	1	318.65	-445.782	D	7.272	7.272	0	2.62	0	0	0	0	0	0
2003	224	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2003	225	23	2790	340.421	-426.562	D	8.286	8.283	0.003	4.843	97.27	0	0	0	0.54	2.16
2003	226	23	2709	330.21	-424.978	D	9.291	8.979	0.312	6.509	98.99	0.06	0	0	0.03	0.92
2003	227	23	2413	339.406	-425.637	D	7.273	7.273	0	2.621	68.36	0.01	0	0	0.38	14.68
2003	228	23	2789	340.496	-426.449	D	7.247	7.246	0.001	2.565	96.79	0	0	0	0.07	3.17
2003	229	23	2783	339.861	-425.806	D	6.935	6.934	0	1.925	87.32	0.01	0	0	0.09	8.87
2003	230	23	199	320.795	-437.944	D	6.905	6.905	0	1.866	15.45	0	0	0	0.01	2.55
2003	231	23	2789	340.496	-426.449	D	6.826	6.826	0	1.706	66.84	0.01	0	0	2.02	30.48
2003	232	23	2789	340.496	-426.449	D	6.864	6.86	0.004	1.775	95.54	0	0	0	0.39	4.07
2003	233	23	2789	340.496	-426.449	D	6.935	6.921	0.014	1.898	97.72	0	0	0	0.21	2.07
2003	234	23	2789	340.496	-426.449	D	7.138	7.113	0.025	2.289	98.6	0	0	0	0.12	1.27
2003	235	23	2789	340.496	-426.449	D	7.056	7.028	0.028	2.114	98.55	0	0	0	0.1	1.35
2003	236	23	2468	334.002	-434.887	D	8.646	8.537	0.109	5.438	99.36	0	0	0	0.06	0.57

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	237	23	2789	340.496	-426.449	D	8.237	7.854	0.383	3.872	99.21	0.01	0	0	0.06	0.73
2003	238	23	2789	340.496	-426.449	D	7.517	7.375	0.142	2.835	98.75	0	0	0	0.05	1.2
2003	239	23	2789	340.496	-426.449	D	7.034	7.03	0.004	2.12	98.69	0	0	0	0.04	1.26
2003	240	23	2788	340.294	-426.448	D	7.115	7.115	0	2.293	98.18	0	0	0	0.03	1.49
2003	241	23	13	319.06	-443.766	D	8.478	8.478	0	5.298	11.54	0	0	0	0.05	0.56
2003	242	23	2781	339.842	-425.379	D	9.365	9.233	0.132	7.147	99.5	0.01	0	0	0.03	0.46
2003	243	23	2758	335.862	-424.454	D	9.467	9.353	0.114	7.454	99.18	0.04	0	0	0.03	0.75
2003	244	23	1415	329.185	-425.086	D	9.428	9.428	0	7.647	99.3	0	0	0	0.03	0.2
2003	245	23	2694	327.861	-425.964	D	9.757	9.746	0.01	8.487	99.66	0.01	0	0	0.02	0.29
2003	246	23	2789	340.496	-426.449	D	9.34	9.204	0.136	7.074	99.77	0.02	0	0	0.01	0.2
2003	247	23	37	319.567	-443.993	D	7.679	7.678	0.001	3.485	99.49	0	0	0	0.01	0.38
2003	248	23	1	318.65	-445.782	D	6.736	6.736	0	1.529	0	0	0	0	0	0
2003	249	23	1	318.65	-445.782	D	6.844	6.844	0	1.743	0	0	0	0	0	0
2003	250	23	2571	322.646	-445.476	D	6.955	6.929	0.026	1.915	94.94	0.01	0	0	0.74	4.31
2003	251	23	2588	318.452	-445.8	D	7.234	7.063	0.171	2.187	97.48	0	0	0	0.17	2.34
2003	252	23	2708	329.979	-425	D	7.332	7.239	0.093	2.55	98.03	0	0	0	0.13	1.83
2003	253	23	2789	340.496	-426.449	D	7.52	7.381	0.139	2.847	98.86	0.01	0	0	0.05	1.09
2003	254	23	2781	339.842	-425.379	D	8.393	8.391	0.003	5.094	99.26	0	0	0	0.03	0.56
2003	255	23	2788	340.294	-426.448	D	10.005	10.005	0	9.188	84.06	0	0	0	0.6	1.38
2003	256	23	1	318.65	-445.782	D	9.428	9.428	0	7.649	0	0	0	0	0	0
2003	257	23	1	318.65	-445.782	D	8.74	8.74	0	5.924	0	0	0	0	0	0
2003	258	23	1	318.65	-445.782	D	6.717	6.717	0	1.49	0	0	0	0	0	0
2003	259	23	2789	340.496	-426.449	D	6.648	6.645	0.003	1.349	93.62	0	0	0	0.79	5.57
2003	260	23	2781	339.842	-425.379	D	6.77	6.755	0.016	1.565	95.62	0	0	0	0.21	4.15
2003	261	23	1414	329.196	-425.335	D	6.765	6.765	0	1.586	81.97	0.01	0	0	1.03	15.82
2003	262	23	2274	336.179	-425.778	D	7.868	7.868	0	3.903	60.1	0	0	0	0.48	3.59
2003	263	23	1	318.65	-445.782	D	6.579	6.579	0	1.219	0	0	0	0	0	0
2003	264	23	2789	340.496	-426.449	D	7.1	7.049	0.051	2.158	96.08	0.01	0	0	0.19	3.72
2003	265	23	2789	340.496	-426.449	D	9.169	9.106	0.063	6.827	99.48	0.02	0	0	0.02	0.47
2003	266	23	2789	340.496	-426.449	D	6.897	6.897	0	1.849	98.37	0	0	0	0.03	1.82
2003	267	23	1	318.65	-445.782	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2003	268	23	1	318.65	-445.782	D	6.837	6.837	0	1.73	9.47	0	0	0	0.22	4.31
2003	269	23	2789	340.496	-426.449	D	7.039	7.039	0	2.138	93.69	0.01	0	0	0.16	5.52
2003	270	23	2310	337.033	-428.239	D	7.479	7.479	0	3.055	81.33	0.02	0	0	0.12	13.37
2003	271	23	1	318.65	-445.782	D	6.654	6.654	0	1.366	0	0	0	0	0	0
2003	272	23	1	318.65	-445.782	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2003	273	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2003	274	23	1	318.65	-445.782	D	8.096	8.096	0	4.415	0	0	0	0	0	0
2003	275	23	1	318.65	-445.782	D	6.568	6.568	0	1.198	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	276	23	2571	322.646	-445.476	D	7.097	7.095	0.003	2.251	97.97	0	0	0	0.15	1.89
2003	277	23	2789	340.496	-426.449	D	6.855	6.854	0.001	1.764	96.79	0	0	0	0.06	3.14
2003	278	23	1	318.65	-445.782	D	7.273	7.273	0	2.622	0	0	0	0	0	0
2003	279	23	96	320.312	-443.961	D	9.352	9.312	0.04	7.348	99.43	0.01	0	0	0.06	0.5
2003	280	23	2789	340.496	-426.449	D	8.071	7.78	0.291	3.709	98.08	0.02	0	0	0.2	1.71
2003	281	23	2704	329.056	-425.092	D	7.652	7.609	0.043	3.336	98.41	0.01	0	0	0.07	1.51
2003	282	23	2709	330.21	-424.978	D	8.918	8.914	0.003	6.35	98.78	0	0	0	0.03	1.1
2003	283	23	2684	326.713	-427.014	D	9.836	9.772	0.064	8.556	93.69	1.04	0	0	0.26	5.01
2003	284	23	2589	318.383	-445.593	D	9.552	9.551	0.001	7.97	98.14	0.01	0	0	0.05	1.76
2003	285	23	2468	334.002	-434.887	D	7.923	7.897	0.026	3.968	99.11	0.03	0	0	0.01	0.85
2003	286	23	2571	322.646	-445.476	D	6.949	6.944	0.005	1.944	98.35	0	0	0	0.02	1.61
2003	287	23	2789	340.496	-426.449	D	8.881	8.869	0.012	6.237	99.65	0.01	0	0	0	0.34
2003	288	23	1	318.65	-445.782	D	6.692	6.692	0	1.442	0	0	0	0	0	0
2003	289	23	1	318.65	-445.782	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2003	290	23	1	318.65	-445.782	D	7.667	7.667	0	3.462	0	0	0	0	0	0
2003	291	23	2236	336.149	-430.776	D	6.617	6.617	0	1.294	94.89	0	0	0	0.02	0.54
2003	292	23	1	318.65	-445.782	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2003	293	23	1	318.65	-445.782	D	6.677	6.677	0	1.412	0	0	0	0	0	0
2003	294	23	1	318.65	-445.782	D	6.703	6.703	0	1.464	0	0	0	0	0	0
2003	295	23	1	318.65	-445.782	D	6.738	6.738	0	1.533	0	0	0	0	0	0
2003	296	23	1	318.65	-445.782	D	6.61	6.61	0	1.28	0	0	0	0	0	0
2003	297	23	2789	340.496	-426.449	D	6.696	6.691	0.004	1.44	52.17	0.18	0	0	1.68	45.97
2003	298	23	2789	340.496	-426.449	D	8.004	7.986	0.017	4.167	99.13	0.01	0	0	0	0.86
2003	299	23	2563	323.259	-443.79	D	7.513	7.509	0.005	3.119	98.81	0.02	0	0	0	1.19
2003	300	23	1	318.65	-445.782	D	6.536	6.536	0	1.135	0	0	0	0	0	0
2003	301	23	1	318.65	-445.782	D	6.598	6.598	0	1.258	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.414	7.414	0	2.919	0	0	0	0	0	0
2003	304	23	1	318.65	-445.782	D	9.409	9.409	0	7.599	0	0	0	0	0	0
2003	305	23	1	318.65	-445.782	D	9.384	9.384	0	7.535	0	0	0	0	0	0
2003	306	23	1	318.65	-445.782	D	8.79	8.79	0	6.045	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.877	7.877	0	3.922	0	0	0	0	0	0
2003	308	23	1	318.65	-445.782	D	7.389	7.389	0	2.864	0	0	0	0	0	0
2003	309	23	1	318.65	-445.782	D	7.708	7.708	0	3.55	0	0	0	0	0	0
2003	310	23	1	318.65	-445.782	D	9.017	9.017	0	6.605	0	0	0	0	0	0
2003	311	23	1	318.65	-445.782	D	7.749	7.749	0	3.641	0	0	0	0	0	0
2003	312	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	6.51	6.51	0	1.085	0	0	0	0	0	0
2003	314	23	2789	340.496	-426.449	D	6.624	6.612	0.012	1.284	90.02	0.05	0	0	0.33	9.61

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	315	23	2155	334.883	-424.586	D	7.918	7.918	0	4.014	69.95	0.12	0	0	0.07	29.89
2003	316	23	1	318.65	-445.782	D	9.37	9.37	0	7.497	0	0	0	0	0	0
2003	317	23	1	318.65	-445.782	D	6.486	6.486	0	1.04	0	0	0	0	0	0
2003	318	23	2429	338.563	-428.651	D	6.957	6.957	0	1.97	97.93	0.06	0	0	0.09	1.59
2003	319	23	2783	339.861	-425.806	D	8.519	8.517	0.001	5.391	96.95	0.06	0	0	0.26	2.68
2003	320	23	1	318.65	-445.782	D	9.626	9.626	0	8.168	0	0	0	0	0	0
2003	321	23	2789	340.496	-426.449	D	10.098	10.097	0.001	9.443	92.02	1.93	0	0	0.05	5.85
2003	322	23	1	318.65	-445.782	D	9.908	9.908	0	8.922	0	0	0	0	0	0
2003	323	23	1	318.65	-445.782	D	7.343	7.343	0	2.768	0	0	0	0	0	0
2003	324	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	9.817	9.817	0	8.677	0	0	0	0	0	0
2003	327	23	1	318.65	-445.782	D	9.125	9.125	0	6.874	0	0	0	0	0	0
2003	328	23	1	318.65	-445.782	D	7.264	7.264	0	2.603	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.434	7.434	0	2.961	0	0	0	0	0	0
2003	331	23	1	318.65	-445.782	D	9.185	9.185	0	7.026	0	0	0	0	0	0
2003	332	23	1	318.65	-445.782	D	6.842	6.842	0	1.739	0	0	0	0	0	0
2003	333	23	1	318.65	-445.782	D	6.494	6.494	0	1.054	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2003	335	23	1	318.65	-445.782	D	6.66	6.66	0	1.378	0	0	0	0	0	0
2003	336	23	2789	340.496	-426.449	D	6.515	6.512	0.003	1.089	93.79	0.02	0	0	0.61	5.59
2003	337	23	2781	339.842	-425.379	D	8.179	8.178	0.001	4.6	35.7	0.8	0	0	0.93	62.64
2003	338	23	2781	339.842	-425.379	D	9.301	9.154	0.147	6.948	98.59	0.22	0	0	0.01	1.18
2003	339	23	2597	318.971	-443.851	D	8.533	8.531	0.003	5.422	98.88	0.13	0	0	0.01	0.98
2003	340	23	1	318.65	-445.782	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	341	23	2789	340.496	-426.449	D	6.655	6.653	0.001	1.365	92.66	0.08	0	0	0.57	6.65
2003	342	23	1	318.65	-445.782	D	8.111	8.111	0	4.449	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	10.155	10.155	0	9.603	0	0	0	0	0	0
2003	344	23	2789	340.496	-426.449	D	8.895	8.894	0	6.301	96.89	0.51	0	0	0.01	1.86
2003	345	23	1	318.65	-445.782	D	7.408	7.408	0	2.905	0	0	0	0	0	0
2003	346	23	2789	340.496	-426.449	D	6.865	6.832	0.033	1.719	96.67	0.02	0	0	0.25	3.06
2003	347	23	2789	340.496	-426.449	D	9.803	9.527	0.277	7.905	97.8	0.18	0	0	0.08	1.94
2003	348	23	2781	339.842	-425.379	D	9.939	9.434	**0.505**	7.664	99.2	0.12	0	0	0.02	0.65
2003	349	23	2781	339.842	-425.379	D	9.093	9.064	0.03	6.72	98.76	0.1	0	0	0.01	1.12
2003	350	23	863	325.509	-431.992	D	8.745	8.745	0	5.935	18.89	0	0	0	0	0.37
2003	351	23	1	318.65	-445.782	D	7.444	7.444	0	2.982	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.467	7.467	0	3.031	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	354	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	355	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2003	356	23	1	318.65	-445.782	D	9.46	9.46	0	7.73	0	0	0	0	0	0
2003	357	23	1	318.65	-445.782	D	9.378	9.378	0	7.518	0	0	0	0	0	0
2003	358	23	1	318.65	-445.782	D	8.21	8.21	0	4.675	0	0	0	0	0	0
2003	359	23	1	318.65	-445.782	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2003	360	23	2789	340.496	-426.449	D	6.838	6.838	0	1.731	94.1	0.01	0	0	0.97	4.56
2003	361	23	2781	339.842	-425.379	D	6.757	6.757	0	1.569	93.91	0.07	0	0	0.27	5.47
2003	362	23	1	318.65	-445.782	D	8.719	8.719	0	5.874	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.299	7.299	0	2.675	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	6.566	6.566	0	1.194	0	0	0	0	0	0
									0.853							
INDEPENDENCE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	6.999	6.999	0	2.056	0	0	0	0	0	0
2003	2	23	1552	330.178	-425.042	D	9.427	9.354	0.073	7.456	89.15	10.4	0	0	0	0.45
2003	3	23	2789	340.496	-426.449	D	7.981	7.908	0.073	3.991	85.14	14.44	0	0	0	0.41
2003	4	23	1	318.65	-445.782	D	6.784	6.784	0	1.624	0	0	0	0	0	0
2003	5	23	1	318.65	-445.782	D	7.26	7.26	0	2.595	0	0	0	0	0	0
2003	6	23	2589	318.383	-445.593	D	8.34	8.242	0.098	4.748	69.41	30.15	0	0	0	0.43
2003	7	23	2758	335.862	-424.454	D	7.494	7.494	0	3.087	89.28	10.53	0	0	0	0.17
2003	8	23	1	318.65	-445.782	D	6.71	6.71	0	1.477	0	0	0	0	0	0
2003	9	23	2781	339.842	-425.379	D	6.973	6.967	0.006	1.992	87.03	11.34	0	0	0	1.62
2003	10	23	2789	340.496	-426.449	D	6.629	6.602	0.027	1.265	64.55	30.27	0	0	0	5.18
2003	11	23	2684	326.713	-427.014	D	6.615	6.552	0.063	1.167	63.84	31.98	0	0	0	4.18
2003	12	23	2628	320.933	-436.998	D	6.544	6.5	0.044	1.066	78.6	19.62	0	0	0	1.79
2003	13	23	2781	339.842	-425.379	D	6.699	6.698	0.001	1.452	84.91	14	0	0	0	1.07
2003	14	23	2784	339.87	-426.019	D	9.347	9.15	0.196	6.938	86.97	12.56	0	0	0	0.47
2003	15	23	2571	322.646	-445.476	D	6.63	6.625	0.005	1.309	93.73	5.53	0	0	0	0.74
2003	16	23	2597	318.971	-443.851	D	8.276	8.256	0.02	4.78	93.37	6.37	0	0	0	0.26
2003	17	23	2781	339.842	-425.379	D	7.978	7.902	0.076	3.978	92.25	7.47	0	0	0	0.28
2003	18	23	2789	340.496	-426.449	D	6.597	6.596	0	1.254	84.02	14.62	0	0	0	1.53
2003	19	23	1	318.65	-445.782	D	6.651	6.651	0	1.361	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	6.624	6.624	0	1.308	0	0	0	0	0	0
2003	21	23	2789	340.496	-426.449	D	7.575	7.533	0.042	3.171	88.2	11.67	0	0	0	0.13
2003	22	23	1	318.65	-445.782	D	7.405	7.405	0	2.899	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	23	23	2599	318.958	-443.364	D	7.043	6.946	0.097	1.948	67.2	30.62	0	0	0	2.17
2003	24	23	2600	318.952	-443.12	D	6.638	6.618	0.021	1.295	82.75	16.14	0	0	0	1.11
2003	25	23	2781	339.842	-425.379	D	6.502	6.5	0.002	1.065	85.56	13.64	0	0	0	0.8
2003	26	23	2758	335.862	-424.454	D	7.28	7.236	0.044	2.544	60.46	38.69	0	0	0	0.84
2003	27	23	2600	318.952	-443.12	D	6.812	6.801	0.012	1.657	82.28	17.21	0	0	0	0.52
2003	28	23	1	318.65	-445.782	D	8.235	8.235	0	4.732	0	0	0	0	0	0
2003	29	23	2628	320.933	-436.998	D	9.898	9.793	0.105	8.612	88.66	11.27	0	0	0	0.07
2003	30	23	1	318.65	-445.782	D	9.114	9.114	0	6.846	0	0	0	0	0	0
2003	31	23	1	318.65	-445.782	D	7.121	7.121	0	2.306	0	0	0	0	0	0
2003	32	23	1	318.65	-445.782	D	6.936	6.936	0	1.929	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	6.87	6.87	0	1.795	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	9.527	9.527	0	7.906	0	0	0	0	0	0
2003	35	23	1	318.65	-445.782	D	7.1	7.1	0	2.263	0	0	0	0	0	0
2003	36	23	2789	340.496	-426.449	D	6.582	6.563	0.019	1.189	87.62	10.84	0	0	0	1.54
2003	37	23	2704	329.056	-425.092	D	9.257	9.199	0.058	7.061	92.56	7.28	0	0	0	0.15
2003	38	23	2781	339.842	-425.379	D	8.263	8.007	0.257	4.213	90.76	9.1	0	0	0	0.14
2003	39	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.657	7.657	0	3.439	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	9.339	9.339	0	7.418	0	0	0	0	0	0
2003	42	23	1	318.65	-445.782	D	6.733	6.733	0	1.522	0	0	0	0	0	0
2003	43	23	2623	320.666	-438.044	D	6.533	6.522	0.012	1.108	65.54	30.21	0	0	0	4.24
2003	44	23	2684	326.713	-427.014	D	6.632	6.629	0.004	1.317	87.81	10.67	0	0	0	1.5
2003	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2003	46	23	1	318.65	-445.782	D	10.176	10.176	0	9.662	0	0	0	0	0	0
2003	47	23	1	318.65	-445.782	D	8.453	8.453	0	5.24	0	0	0	0	0	0
2003	48	23	1	318.65	-445.782	D	7.865	7.865	0	3.896	0	0	0	0	0	0
2003	49	23	1	318.65	-445.782	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	50	23	1412	329.218	-425.834	D	9.213	9.213	0	7.097	85.24	7.78	0	0	0	0.23
2003	51	23	2709	330.21	-424.978	D	9.796	9.537	0.259	7.933	93.46	6.48	0	0	0	0.07
2003	52	23	2709	330.21	-424.978	D	9.666	9.648	0.018	8.224	97.36	2.58	0	0	0	0.06
2003	53	23	2597	318.971	-443.851	D	9.545	9.493	0.052	7.818	92.24	7.47	0	0	0	0.29
2003	54	23	2460	334.486	-433.002	D	9.02	8.837	0.183	6.16	85.88	13.84	0	0	0	0.27
2003	55	23	2508	328.547	-436.117	D	8.781	8.466	0.315	5.27	76.22	23.04	0	0	0	0.74
2003	56	23	2711	330.671	-424.932	D	7.684	7.42	0.264	2.931	90.77	9.04	0	0	0	0.19
2003	57	23	1	318.65	-445.782	D	8.622	8.622	0	5.641	0	0	0	0	0	0
2003	58	23	1	318.65	-445.782	D	8.64	8.64	0	5.682	0	0	0	0	0	0
2003	59	23	1	318.65	-445.782	D	8.8	8.8	0	6.07	0	0	0	0	0	0
2003	60	23	1	318.65	-445.782	D	9.641	9.641	0	8.207	0	0	0	0	0	0
2003	61	23	2762	336.074	-425.006	D	9.194	9.119	0.074	6.86	90.1	8.89	0	0	0	1.01

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	62	23	2789	340.496	-426.449	D	7.714	7.373	0.341	2.832	91.3	8.41	0	0	0	0.29
2003	63	23	2781	339.842	-425.379	D	6.982	6.981	0	2.02	95.02	4.57	0	0	0	0.4
2003	64	23	2588	318.452	-445.8	D	9.427	9.117	0.31	6.855	90.3	9.59	0	0	0	0.11
2003	65	23	2468	334.002	-434.887	D	7.665	7.623	0.042	3.366	94.3	5.62	0	0	0	0.08
2003	66	23	1	318.65	-445.782	D	6.885	6.885	0	1.825	0	0	0	0	0	0
2003	67	23	1	318.65	-445.782	D	7.083	7.083	0	2.227	0	0	0	0	0	0
2003	68	23	2789	340.496	-426.449	D	7.078	7.06	0.019	2.18	86.61	12.67	0	0	0	0.72
2003	69	23	1	318.65	-445.782	D	6.544	6.544	0	1.152	0	0	0	0	0	0
2003	70	23	1	318.65	-445.782	D	6.56	6.56	0	1.183	0	0	0	0	0	0
2003	71	23	1	318.65	-445.782	D	7.082	7.082	0	2.225	0	0	0	0	0	0
2003	72	23	2710	330.44	-424.955	D	8.89	8.594	0.295	5.574	97.38	2.41	0	0	0	0.2
2003	73	23	2597	318.971	-443.851	D	9.232	8.677	**0.555**	5.772	97.5	2.42	0	0	0	0.08
2003	74	23	2684	326.713	-427.014	D	8.193	8.138	0.055	4.509	98.1	1.83	0	0	0	0.08
2003	75	23	2155	334.883	-424.586	D	7.282	7.282	0.001	2.639	99.57	0.23	0	0	0	0.21
2003	76	23	1	318.65	-445.782	D	8.644	8.644	0	5.692	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	8.653	8.653	0	5.713	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	8.871	8.871	0	6.244	0	0	0	0	0	0
2003	79	23	2684	326.713	-427.014	D	9.36	9.196	0.164	7.054	94.98	4.94	0	0	0	0.07
2003	80	23	2789	340.496	-426.449	D	9.423	8.841	**0.582**	6.169	93.74	6.07	0	0	0	0.19
2003	81	23	2789	340.496	-426.449	D	6.536	6.534	0.002	1.132	96.29	2.25	0	0	0	1.49
2003	82	23	1	318.65	-445.782	D	6.586	6.586	0	1.234	0	0	0	0	0	0
2003	83	23	1	318.65	-445.782	D	6.82	6.82	0	1.696	0	0	0	0	0	0
2003	84	23	2600	318.952	-443.12	D	7.797	7.687	0.109	3.506	95.82	3.92	0	0	0	0.26
2003	85	23	2789	340.496	-426.449	D	8.868	8.836	0.032	6.157	95.74	4.2	0	0	0	0.06
2003	86	23	1	318.65	-445.782	D	6.635	6.635	0	1.329	0	0	0	0	0	0
2003	87	23	1	318.65	-445.782	D	8.676	8.676	0	5.769	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.301	7.301	0	2.679	0	0	0	0	0	0
2003	89	23	2789	340.496	-426.449	D	6.541	6.531	0.01	1.126	72.11	24.86	0	0	0	3.03
2003	90	23	1	318.65	-445.782	D	6.478	6.478	0	1.023	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.231	7.231	0	2.533	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	8.075	8.075	0	4.366	0	0	0	0	0	0
2003	95	23	2781	339.842	-425.379	D	6.817	6.787	0.029	1.63	79.91	17.96	0	0	0	2.13
2003	96	23	1	318.65	-445.782	D	7.63	7.63	0	3.38	89.13	0.73	0	0	0	1.03
2003	97	23	1	318.65	-445.782	D	9.082	9.082	0	6.766	0	0	0	0	0	0
2003	98	23	2789	340.496	-426.449	D	7.494	7.431	0.062	2.955	78.6	20.8	0	0	0	0.6
2003	99	23	2640	322.263	-435.121	D	7.166	7.027	0.139	2.113	82.62	16.62	0	0	0	0.76
2003	100	23	1	318.65	-445.782	D	6.581	6.581	0	1.223	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	101	23	1	318.65	-445.782	D	6.48	6.48	0	1.028	0	0	0	0	0	0
2003	102	23	1	318.65	-445.782	D	6.496	6.496	0	1.058	0	0	0	0	0	0
2003	103	23	2789	340.496	-426.449	D	6.526	6.525	0	1.115	99.26	0.03	0	0	0	0.57
2003	104	23	2781	339.842	-425.379	D	6.648	6.648	0	1.355	99.92	0.06	0	0	0	0.46
2003	105	23	1	318.65	-445.782	D	6.637	6.637	0	1.334	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	107	23	1	318.65	-445.782	D	7.437	7.437	0	2.967	0	0	0	0	0	0
2003	108	23	2789	340.496	-426.449	D	7.823	7.822	0.001	3.802	99.15	0.05	0	0	0	0.36
2003	109	23	2781	339.842	-425.379	D	7.582	7.582	0	3.277	99.57	0.15	0	0	0	0.17
2003	110	23	1	318.65	-445.782	D	9.045	9.045	0	6.674	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.014	7.014	0	2.087	0	0	0	0	0	0
2003	112	23	1375	329.046	-427.59	D	6.556	6.54	0.016	1.143	90.69	7.06	0	0	0	2.25
2003	113	23	2600	318.952	-443.12	D	6.607	6.593	0.014	1.247	98.29	1.09	0	0	0	0.61
2003	114	23	1	318.65	-445.782	D	8.02	8.02	0	4.243	0	0	0	0	0	0
2003	115	23	2781	339.842	-425.379	D	8.496	8.448	0.048	5.226	96.81	2.79	0	0	0	0.4
2003	116	23	2600	318.952	-443.12	D	8.545	8.369	0.176	5.042	95.5	4.34	0	0	0	0.16
2003	117	23	1	318.65	-445.782	D	7.053	7.053	0	2.166	0	0	0	0	0	0
2003	118	23	1	318.65	-445.782	D	7.399	7.399	0	2.886	0	0	0	0	0	0
2003	119	23	1	318.65	-445.782	D	7.327	7.327	0	2.733	0	0	0	0	0	0
2003	120	23	1	318.65	-445.782	D	7.985	7.985	0	4.163	0	0	0	0	0	0
2003	121	23	1	318.65	-445.782	D	7.624	7.624	0	3.367	0	0	0	0	0	0
2003	122	23	2758	335.862	-424.454	D	8.958	8.84	0.118	6.167	96.79	2.99	0	0	0	0.22
2003	123	23	2468	334.002	-434.887	D	8.879	8.511	0.368	5.375	98.54	1.38	0	0	0	0.08
2003	124	23	12	319.07	-444.015	D	7.428	7.384	0.044	2.855	99.74	0.16	0	0	0	0.1
2003	125	23	1	318.65	-445.782	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	8.385	8.385	0	5.081	0	0	0	0	0	0
2003	127	23	2684	326.713	-427.014	D	8.696	8.619	0.078	5.632	95.7	3.84	0	0	0	0.46
2003	128	23	2704	329.056	-425.092	D	8.028	8.016	0.012	4.234	99.37	0.14	0	0	0	0.48
2003	129	23	1	318.65	-445.782	D	7.642	7.642	0	3.407	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	8.486	8.486	0	5.317	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.409	7.409	0	2.907	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	6.899	6.899	0	1.854	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	9.399	9.399	0	7.572	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	8.763	8.763	0	5.98	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	9.31	9.31	0	7.344	0	0	0	0	0	0
2003	137	23	2758	335.862	-424.454	D	9.397	9.369	0.027	7.497	99.7	0.18	0	0	0	0.11
2003	138	23	2694	327.861	-425.964	D	9.212	9.093	0.119	6.795	99.22	0.74	0	0	0	0.04
2003	139	23	1	318.65	-445.782	D	8.739	8.739	0	5.921	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	140	23	2758	335.862	-424.454	D	8.334	8.263	0.071	4.796	97.61	2.32	0	0	0	0.07
2003	141	23	1	318.65	-445.782	D	6.718	6.718	0	1.492	0	0	0	0	0	0
2003	142	23	1	318.65	-445.782	D	7.283	7.283	0	2.641	0	0	0	0	0	0
2003	143	23	1	318.65	-445.782	D	6.712	6.712	0	1.48	0	0	0	0	0	0
2003	144	23	2706	329.518	-425.046	D	7.84	7.84	0	3.841	98.38	1.51	0	0	0	0.05
2003	145	23	2704	329.056	-425.092	D	9.232	9.205	0.028	7.075	96.59	3.36	0	0	0	0.04
2003	146	23	1	318.65	-445.782	D	7.862	7.862	0	3.89	0	0	0	0	0	0
2003	147	23	1	318.65	-445.782	D	6.647	6.647	0	1.353	0	0	0	0	0	0
2003	148	23	2781	339.842	-425.379	D	6.613	6.607	0.006	1.275	98.72	0.67	0	0	0	0.61
2003	149	23	2781	339.842	-425.379	D	7.313	7.286	0.027	2.649	93.21	5.57	0	0	0	1.21
2003	150	23	2781	339.842	-425.379	D	6.657	6.617	0.041	1.293	98.95	0.22	0	0	0	0.83
2003	151	23	2789	340.496	-426.449	D	7.248	7.231	0.017	2.534	88.81	8.81	0	0	0	2.38
2003	152	23	1	318.65	-445.782	D	7.102	7.102	0	2.267	0	0	0	0	0	0
2003	153	23	1	318.65	-445.782	D	8.705	8.705	0	5.84	0	0	0	0	0	0
2003	154	23	2694	327.861	-425.964	D	9.545	9.102	0.443	6.816	89.44	10.41	0	0	0	0.14
2003	155	23	2597	318.971	-443.851	D	8.099	7.51	**0.589**	3.122	98.47	1.29	0	0	0	0.24
2003	156	23	2589	318.383	-445.593	D	6.936	6.821	0.115	1.697	99.5	0.21	0	0	0	0.29
2003	157	23	2684	326.713	-427.014	D	8.784	8.784	0.001	6.03	99.69	0.11	0	0	0	0.14
2003	158	23	1	318.65	-445.782	D	7.479	7.479	0	3.057	0	0	0	0	0	0
2003	159	23	1	318.65	-445.782	D	7.001	7.001	0	2.06	0	0	0	0	0	0
2003	160	23	1	318.65	-445.782	D	6.621	6.621	0	1.301	0	0	0	0	0	0
2003	161	23	1	318.65	-445.782	D	7.499	7.499	0	3.098	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	8.817	8.817	0	6.112	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	8.874	8.874	0	6.251	0	0	0	0	0	0
2003	164	23	2784	339.87	-426.019	D	9.23	9.229	0.001	7.137	99.59	0.18	0	0	0	0.14
2003	165	23	2709	330.21	-424.978	D	8.317	8.299	0.018	4.879	99.03	0.91	0	0	0	0.06
2003	166	23	2588	318.452	-445.8	D	8.28	8.279	0.001	4.833	99.86	0.03	0	0	0	0.11
2003	167	23	1	318.65	-445.782	D	8.005	8.005	0	4.208	0	0	0	0	0	0
2003	168	23	1	318.65	-445.782	D	7.645	7.645	0	3.413	0	0	0	0	0	0
2003	169	23	1	318.65	-445.782	D	8.946	8.946	0	6.427	0	0	0	0	0	0
2003	170	23	2709	330.21	-424.978	D	8.535	8.518	0.017	5.392	99.41	0.08	0	0	0	0.51
2003	171	23	2709	330.21	-424.978	D	8.583	8.408	0.176	5.133	99.27	0.61	0	0	0	0.13
2003	172	23	1	318.65	-445.782	D	6.969	6.969	0	1.995	0	0	0	0	0	0
2003	173	23	1	318.65	-445.782	D	6.92	6.92	0	1.897	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.108	7.108	0	2.279	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.784	7.784	0	3.718	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	8.399	8.399	0	5.113	0	0	0	0	0	0
2003	177	23	2704	329.056	-425.092	D	9.016	8.724	0.292	5.887	96.15	3.59	0	0	0	0.26
2003	178	23	2611	319.699	-440.64	D	6.916	6.834	0.082	1.723	98.15	1.03	0	0	0	0.82

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	179	23	2628	320.933	-436.998	D	6.66	6.645	0.014	1.35	99.26	0.15	0	0	0	0.58
2003	180	23	1415	329.185	-425.086	D	6.719	6.719	0	1.494	99.47	0.03	0	0	0	0.44
2003	181	23	1	318.65	-445.782	D	7.039	7.039	0	2.138	0	0	0	0	0	0
2003	182	23	1	318.65	-445.782	D	8.857	8.857	0	6.21	0	0	0	0	0	0
2003	183	23	1551	330.189	-425.292	D	7.463	7.463	0	3.021	87.48	0.01	0	0	0	0.23
2003	184	23	2275	336.168	-425.529	D	7.374	7.374	0	2.832	91.65	0.03	0	0	0	0.13
2003	185	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	8.318	8.318	0	4.923	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.086	7.086	0	2.234	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.739	7.739	0	3.619	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	8.593	8.593	0	5.571	0	0	0	0	0	0
2003	192	23	2641	322.503	-435.089	D	7.253	7.223	0.03	2.517	97.6	1.34	0	0	0	1.06
2003	193	23	2255	335.942	-426.039	D	7.866	7.862	0.004	3.889	99.5	0.04	0	0	0	0.46
2003	194	23	2789	340.496	-426.449	D	7.246	7.246	0	2.564	99.43	0.18	0	0	0	0.25
2003	195	23	2781	339.842	-425.379	D	8.455	8.448	0.008	5.227	99.21	0.69	0	0	0	0.07
2003	196	23	2789	340.496	-426.449	D	8.24	8.239	0	4.742	99.75	0.03	0	0	0	0.08
2003	197	23	2781	339.842	-425.379	D	7.033	7.027	0.005	2.114	99.64	0.11	0	0	0	0.26
2003	198	23	2789	340.496	-426.449	D	7.16	7.155	0.005	2.375	99.83	0.05	0	0	0	0.17
2003	199	23	2468	334.002	-434.887	D	7.142	7.141	0.001	2.348	99.88	0.01	0	0	0	0.12
2003	200	23	1	318.65	-445.782	D	7.564	7.564	0	3.238	0	0	0	0	0	0
2003	201	23	1	318.65	-445.782	D	8.338	8.338	0	4.97	0	0	0	0	0	0
2003	202	23	1	318.65	-445.782	D	8.079	8.079	0	4.375	0	0	0	0	0	0
2003	203	23	2661	325.283	-432.004	D	8.272	7.707	**0.565**	3.547	97.57	2.31	0	0	0	0.13
2003	204	23	2589	318.383	-445.593	D	7.055	7.015	0.04	2.088	99.21	0.24	0	0	0	0.55
2003	205	23	1	318.65	-445.782	D	6.955	6.955	0	1.968	0	0	0	0	0	0
2003	206	23	1	318.65	-445.782	D	7.058	7.058	0	2.176	0	0	0	0	0	0
2003	207	23	1	318.65	-445.782	D	6.798	6.798	0	1.652	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.085	7.085	0	2.232	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.085	7.085	0	2.233	0	0	0	0	0	0
2003	210	23	2781	339.842	-425.379	D	8.45	8.415	0.034	5.151	99.78	0.16	0	0	0	0.05
2003	211	23	2781	339.842	-425.379	D	9.474	9.347	0.126	7.44	99.55	0.41	0	0	0	0.05
2003	212	23	2781	339.842	-425.379	D	7.663	7.605	0.058	3.327	99.76	0.16	0	0	0	0.08
2003	213	23	2789	340.496	-426.449	D	6.91	6.901	0.009	1.858	99.8	0.06	0	0	0	0.14
2003	214	23	2250	335.996	-427.285	D	7.674	7.672	0.002	3.471	99.93	0.03	0	0	0	0.09
2003	215	23	2758	335.862	-424.454	D	7.838	7.834	0.004	3.828	99.39	0.26	0	0	0	0.33
2003	216	23	2789	340.496	-426.449	D	7.809	7.718	0.091	3.573	99.25	0.63	0	0	0	0.12
2003	217	23	2788	340.294	-426.448	D	8.348	8.348	0	4.992	100.07	0.14	0	0	0	0.14

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	218	23	2589	318.383	-445.593	D	8.537	8.453	0.084	5.24	99.68	0.07	0	0	0	0.25
2003	219	23	2597	318.971	-443.851	D	8.606	8.443	0.164	5.214	99.8	0.13	0	0	0	0.07
2003	220	23	1	318.65	-445.782	D	7.094	7.094	0	2.25	0	0	0	0	0	0
2003	221	23	1	318.65	-445.782	D	6.977	6.977	0	2.01	0	0	0	0	0	0
2003	222	23	1	318.65	-445.782	D	7.162	7.162	0	2.39	0	0	0	0	0	0
2003	223	23	1	318.65	-445.782	D	7.272	7.272	0	2.62	0	0	0	0	0	0
2003	224	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	0	0	0	0	0	0
2003	225	23	1	318.65	-445.782	D	8.321	8.321	0	4.931	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	8.753	8.753	0	5.955	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.337	7.337	0	2.755	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.347	7.347	0	2.776	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2003	230	23	2789	340.496	-426.449	D	6.904	6.901	0.003	1.859	99.5	0.02	0	0	0	0.5
2003	231	23	2789	340.496	-426.449	D	6.861	6.826	0.035	1.706	99.6	0.11	0	0	0	0.3
2003	232	23	2789	340.496	-426.449	D	6.909	6.86	0.05	1.775	99.66	0.13	0	0	0	0.21
2003	233	23	2789	340.496	-426.449	D	6.958	6.921	0.037	1.898	99.57	0.25	0	0	0	0.18
2003	234	23	2789	340.496	-426.449	D	7.162	7.113	0.049	2.289	99.72	0.09	0	0	0	0.19
2003	235	23	2789	340.496	-426.449	D	7.104	7.028	0.076	2.114	99.65	0.11	0	0	0	0.24
2003	236	23	2588	318.452	-445.8	D	8.611	8.515	0.096	5.385	99.5	0.4	0	0	0	0.09
2003	237	23	2653	324.014	-433.36	D	7.926	7.884	0.041	3.939	99.75	0.14	0	0	0	0.11
2003	238	23	2784	339.87	-426.019	D	7.386	7.375	0.011	2.835	99.83	0.04	0	0	0	0.12
2003	239	23	2781	339.842	-425.379	D	7.031	7.03	0.002	2.119	99.85	0.05	0	0	0	0.13
2003	240	23	1	318.65	-445.782	D	7.105	7.105	0	2.273	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	8.394	8.394	0	5.101	0	0	0	0	0	0
2003	242	23	2757	335.63	-424.484	D	9.245	9.245	0	7.177	97.86	0.23	0	0	0	0.04
2003	243	23	1415	329.185	-425.086	D	9.352	9.352	0	7.451	99.14	0.48	0	0	0	0.04
2003	244	23	1	318.65	-445.782	D	9.456	9.456	0	7.721	0	0	0	0	0	0
2003	245	23	1	318.65	-445.782	D	9.776	9.776	0	8.566	0	0	0	0	0	0
2003	246	23	1	318.65	-445.782	D	9.235	9.235	0	7.152	0	0	0	0	0	0
2003	247	23	2600	318.952	-443.12	D	7.88	7.678	0.202	3.485	98.59	1.29	0	0	0	0.12
2003	248	23	1	318.65	-445.782	D	6.736	6.736	0	1.529	0	0	0	0	0	0
2003	249	23	1	318.65	-445.782	D	6.844	6.844	0	1.743	0	0	0	0	0	0
2003	250	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.063	7.063	0	2.187	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.368	7.368	0	2.821	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	8.253	8.253	0	4.773	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	9.962	9.962	0	9.071	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	9.428	9.428	0	7.649	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	257	23	2588	318.452	-445.8	D	9.218	8.74	0.479	5.924	86.98	12.8	0	0	0	0.21
2003	258	23	2789	340.496	-426.449	D	6.745	6.719	0.026	1.494	98.48	0.67	0	0	0	0.86
2003	259	23	2790	340.421	-426.562	D	6.656	6.645	0.011	1.349	98.91	0.41	0	0	0	0.66
2003	260	23	2781	339.842	-425.379	D	6.756	6.755	0.001	1.565	99.31	0.31	0	0	0	0.45
2003	261	23	1	318.65	-445.782	D	6.732	6.732	0	1.52	0	0	0	0	0	0
2003	262	23	2704	329.056	-425.092	D	7.969	7.909	0.06	3.994	85.72	13.64	0	0	0	0.64
2003	263	23	2628	320.933	-436.998	D	6.607	6.582	0.024	1.226	98.14	0.82	0	0	0	1.04
2003	264	23	1	318.65	-445.782	D	7.014	7.014	0	2.088	0	0	0	0	0	0
2003	265	23	1	318.65	-445.782	D	9.072	9.072	0	6.741	0	0	0	0	0	0
2003	266	23	2789	340.496	-426.449	D	6.908	6.897	0.012	1.849	94.71	3.09	0	0	0	2.2
2003	267	23	2789	340.496	-426.449	D	6.836	6.834	0.002	1.724	99.18	0.26	0	0	0	0.57
2003	268	23	2653	324.014	-433.36	D	6.868	6.847	0.021	1.749	97.28	2.03	0	0	0	0.69
2003	269	23	2468	334.002	-434.887	D	7.089	7.047	0.041	2.154	99.32	0.43	0	0	0	0.25
2003	270	23	2789	340.496	-426.449	D	7.493	7.479	0.015	3.055	88.67	10.77	0	0	0	0.54
2003	271	23	2704	329.056	-425.092	D	6.679	6.674	0.005	1.406	91.33	4.87	0	0	0	3.77
2003	272	23	2600	318.952	-443.12	D	6.535	6.531	0.004	1.125	83.61	13.36	0	0	0	3.03
2003	273	23	2781	339.842	-425.379	D	6.568	6.564	0.004	1.19	94.2	5.26	0	0	0	0.54
2003	274	23	2781	339.842	-425.379	D	8.54	8.436	0.105	5.198	95.71	4.23	0	0	0	0.06
2003	275	23	2597	318.971	-443.851	D	6.628	6.572	0.057	1.205	94.08	4.95	0	0	0	0.97
2003	276	23	2684	326.713	-427.014	D	7.128	7.117	0.012	2.297	98.41	0.95	0	0	0	0.61
2003	277	23	2758	335.862	-424.454	D	6.874	6.855	0.019	1.766	97.06	1.31	0	0	0	1.63
2003	278	23	2588	318.452	-445.8	D	7.315	7.273	0.041	2.622	97.4	2.07	0	0	0	0.53
2003	279	23	2597	318.971	-443.851	D	9.378	9.312	0.066	7.348	98.02	1.88	0	0	0	0.09
2003	280	23	2601	319.02	-442.895	D	7.857	7.852	0.004	3.868	99.6	0.26	0	0	0	0.13
2003	281	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	99.82	0.16	0	0	0	0.1
2003	282	23	1	318.65	-445.782	D	8.905	8.905	0	6.328	0	0	0	0	0	0
2003	283	23	1	318.65	-445.782	D	9.734	9.734	0	8.453	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	9.551	9.551	0	7.97	0	0	0	0	0	0
2003	285	23	2789	340.496	-426.449	D	7.915	7.891	0.024	3.954	87.42	11.99	0	0	0	0.59
2003	286	23	1	318.65	-445.782	D	6.944	6.944	0	1.944	0	0	0	0	0	0
2003	287	23	2789	340.496	-426.449	D	8.877	8.869	0.009	6.237	69.65	29.36	0	0	0	0.99
2003	288	23	2789	340.496	-426.449	D	6.722	6.713	0.009	1.483	92.58	5.09	0	0	0	2.33
2003	289	23	2781	339.842	-425.379	D	6.603	6.602	0.001	1.265	98.53	0.62	0	0	0	0.87
2003	290	23	2789	340.496	-426.449	D	8.136	8.079	0.057	4.375	95.96	4	0	0	0	0.04
2003	291	23	1	318.65	-445.782	D	6.622	6.622	0	1.303	0	0	0	0	0	0
2003	292	23	1	318.65	-445.782	D	6.595	6.595	0	1.251	0	0	0	0	0	0
2003	293	23	1	318.65	-445.782	D	6.677	6.677	0	1.412	0	0	0	0	0	0
2003	294	23	2781	339.842	-425.379	D	6.725	6.719	0.006	1.495	97.75	0.26	0	0	0	1.99
2003	295	23	2757	335.63	-424.484	D	6.867	6.71	0.156	1.478	97.71	0.85	0	0	0	1.44

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	296	23	2588	318.452	-445.8	D	6.615	6.61	0.005	1.28	98.91	0.12	0	0	0	0.97
2003	297	23	2789	340.496	-426.449	D	6.715	6.691	0.023	1.44	98.34	0.88	0	0	0	0.78
2003	298	23	2468	334.002	-434.887	D	8.26	7.989	0.271	4.173	95.51	4.23	0	0	0	0.27
2003	299	23	2781	339.842	-425.379	D	7.617	7.551	0.066	3.21	86.25	12.52	0	0	0	1.23
2003	300	23	2789	340.496	-426.449	D	6.549	6.541	0.008	1.146	92.84	6.06	0	0	0	1.11
2003	301	23	1	318.65	-445.782	D	6.598	6.598	0	1.258	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.414	7.414	0	2.919	0	0	0	0	0	0
2003	304	23	2709	330.21	-424.978	D	9.049	9.049	0	6.684	98.15	1.83	0	0	0	0.17
2003	305	23	2704	329.056	-425.092	D	9.873	9.466	0.407	7.748	94.76	5.09	0	0	0	0.15
2003	306	23	1	318.65	-445.782	D	8.79	8.79	0	6.045	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.877	7.877	0	3.922	0	0	0	0	0	0
2003	308	23	1	318.65	-445.782	D	7.389	7.389	0	2.864	0	0	0	0	0	0
2003	309	23	2765	336.728	-425.072	D	8.247	8.075	0.171	4.367	90.26	9.4	0	0	0	0.34
2003	310	23	2571	322.646	-445.476	D	9.458	9.017	0.441	6.605	94.2	5.74	0	0	0	0.06
2003	311	23	1	318.65	-445.782	D	7.749	7.749	0	3.641	0	0	0	0	0	0
2003	312	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	6.51	6.51	0	1.085	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	6.616	6.616	0	1.292	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	9.37	9.37	0	7.497	0	0	0	0	0	0
2003	317	23	2789	340.496	-426.449	D	6.509	6.495	0.014	1.057	82.69	13.43	0	0	0	3.88
2003	318	23	2789	340.496	-426.449	D	7.004	6.957	0.047	1.97	86.31	12.42	0	0	0	1.26
2003	319	23	1	318.65	-445.782	D	8.304	8.304	0	4.891	0	0	0	0	0	0
2003	320	23	1	318.65	-445.782	D	9.626	9.626	0	8.168	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	10.088	10.088	0	9.417	0	0	0	0	0	0
2003	322	23	2597	318.971	-443.851	D	10.324	9.909	0.415	8.925	96.22	3.68	0	0	0	0.1
2003	323	23	2597	318.971	-443.851	D	7.75	7.433	0.317	2.959	92.88	6.85	0	0	0	0.27
2003	324	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	9.817	9.817	0	8.677	0	0	0	0	0	0
2003	327	23	1	318.65	-445.782	D	9.125	9.125	0	6.874	0	0	0	0	0	0
2003	328	23	1	318.65	-445.782	D	7.264	7.264	0	2.603	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.434	7.434	0	2.961	0	0	0	0	0	0
2003	331	23	2589	318.383	-445.593	D	9.379	9.185	0.194	7.026	87.89	11.93	0	0	0	0.18
2003	332	23	2684	326.713	-427.014	D	6.857	6.832	0.025	1.72	82.36	15.99	0	0	0	1.65
2003	333	23	1	318.65	-445.782	D	6.494	6.494	0	1.054	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	335	23	2695	328.074	-426.025	D	6.674	6.66	0.014	1.379	82.65	15.21	0	0	0	2.13
2003	336	23	1	318.65	-445.782	D	6.513	6.513	0	1.092	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0
2003	338	23	2708	329.979	-425	D	9.356	9.209	0.147	7.085	90.39	9.32	0	0	0	0.28
2003	339	23	2789	340.496	-426.449	D	8.514	8.486	0.028	5.316	90.34	9.53	0	0	0	0.13
2003	340	23	2789	340.496	-426.449	D	7.918	7.817	0.101	3.79	77.86	21.22	0	0	0	0.92
2003	341	23	2589	318.383	-445.593	D	6.652	6.652	0.001	1.362	87.8	11.12	0	0	0	1.05
2003	342	23	1	318.65	-445.782	D	8.111	8.111	0	4.449	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	10.155	10.155	0	9.603	0	0	0	0	0	0
2003	344	23	2758	335.862	-424.454	D	8.906	8.9	0.006	6.315	88.81	11	0	0	0	0.2
2003	345	23	2781	339.842	-425.379	D	7.555	7.534	0.02	3.175	75.16	22.54	0	0	0	2.29
2003	346	23	2781	339.842	-425.379	D	6.895	6.844	0.051	1.742	84.02	15.18	0	0	0	0.79
2003	347	23	1046	326.812	-427.688	D	9.592	9.591	0	8.076	87.52	9.96	0	0	0	0.56
2003	348	23	1	318.65	-445.782	D	9.425	9.425	0	7.641	0	0	0	0	0	0
2003	349	23	1	318.65	-445.782	D	9.203	9.203	0	7.071	0	0	0	0	0	0
2003	350	23	1	318.65	-445.782	D	8.775	8.775	0	6.01	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.444	7.444	0	2.982	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.467	7.467	0	3.031	0	0	0	0	0	0
2003	354	23	2789	340.496	-426.449	D	6.62	6.619	0.001	1.298	87.84	10.48	0	0	0	1.48
2003	355	23	2789	340.496	-426.449	D	6.61	6.609	0	1.278	89.73	9.6	0	0	0	1.01
2003	356	23	1	318.65	-445.782	D	9.46	9.46	0	7.73	0	0	0	0	0	0
2003	357	23	2704	329.056	-425.092	D	9.569	9.464	0.105	7.742	83.06	16.66	0	0	0	0.27
2003	358	23	2789	340.496	-426.449	D	8.782	8.544	0.237	5.455	83.79	15.97	0	0	0	0.24
2003	359	23	2597	318.971	-443.851	D	6.595	6.575	0.02	1.212	87.31	11.72	0	0	0	0.97
2003	360	23	2781	339.842	-425.379	D	6.845	6.845	0	1.745	89.76	9.9	0	0	0	0.32
2003	361	23	1	318.65	-445.782	D	6.753	6.753	0	1.562	0	0	0	0	0	0
2003	362	23	1	318.65	-445.782	D	8.719	8.719	0	5.874	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.299	7.299	0	2.675	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	6.566	6.566	0	1.194	0	0	0	0	0	0
									0.589							
MARSHALL											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	6.999	6.999	0	2.056	0	0	0	0	0	0
2003	2	23	2705	329.287	-425.069	D	9.344	9.327	0.017	7.386	67.74	31.57	0	0	0	0.69
2003	3	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	4	23	1	318.65	-445.782	D	6.784	6.784	0	1.624	0	0	0	0	0	0
2003	5	23	1	318.65	-445.782	D	7.26	7.26	0	2.595	0	0	0	0	0	0
2003	6	23	2789	340.496	-426.449	D	8.287	8.238	0.049	4.738	59.61	39.08	0	0	0	1.31
2003	7	23	2781	339.842	-425.379	D	7.535	7.443	0.091	2.98	75.76	23.69	0	0	0	0.55
2003	8	23	1	318.65	-445.782	D	6.71	6.71	0	1.477	0	0	0	0	0	0
2003	9	23	2704	329.056	-425.092	D	6.972	6.967	0.005	1.991	85.52	11.86	0	0	0	2.63
2003	10	23	2571	322.646	-445.476	D	6.587	6.587	0	1.234	83.71	15.2	0	0	0	1.2
2003	11	23	1	318.65	-445.782	D	6.549	6.549	0	1.161	0	0	0	0	0	0
2003	12	23	2789	340.496	-426.449	D	6.503	6.499	0.004	1.064	68.24	29.85	0	0	0	1.89
2003	13	23	2789	340.496	-426.449	D	6.7	6.699	0.001	1.456	72.33	26.25	0	0	0	1.37
2003	14	23	2789	340.496	-426.449	D	9.151	9.15	0.001	6.938	81.75	17.75	0	0	0	0.39
2003	15	23	2789	340.496	-426.449	D	6.654	6.623	0.032	1.305	66.76	31.21	0	0	0	2.02
2003	16	23	2597	318.971	-443.851	D	8.335	8.256	0.078	4.78	77.73	22.02	0	0	0	0.25
2003	17	23	1	318.65	-445.782	D	7.905	7.905	0	3.985	0	0	0	0	0	0
2003	18	23	1	318.65	-445.782	D	6.57	6.57	0	1.203	0	0	0	0	0	0
2003	19	23	1	318.65	-445.782	D	6.651	6.651	0	1.361	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	6.624	6.624	0	1.308	0	0	0	0	0	0
2003	21	23	2708	329.979	-425	D	7.553	7.527	0.025	3.159	74.31	25.53	0	0	0	0.17
2003	22	23	1	318.65	-445.782	D	7.405	7.405	0	2.899	99.33	22.52	0	0	0	0.31
2003	23	23	2781	339.842	-425.379	D	7.013	6.964	0.05	1.984	82.42	17.26	0	0	0	0.32
2003	24	23	2789	340.496	-426.449	D	6.65	6.635	0.015	1.33	75.01	24.06	0	0	0	0.92
2003	25	23	2789	340.496	-426.449	D	6.502	6.5	0.001	1.067	77.45	21.66	0	0	0	0.86
2003	26	23	2789	340.496	-426.449	D	7.199	7.197	0.002	2.463	70.4	28.16	0	0	0	1.45
2003	27	23	2789	340.496	-426.449	D	6.845	6.794	0.051	1.644	72.83	26.47	0	0	0	0.7
2003	28	23	2417	339.654	-425.626	D	7.966	7.966	0	4.122	73.78	20.38	0	0	0	0.28
2003	29	23	2694	327.861	-425.964	D	10.081	9.793	0.289	8.612	81.75	18.15	0	0	0	0.1
2003	30	23	13	319.06	-443.766	D	9.151	9.151	0	6.94	88.09	13.52	0	0	0	0.05
2003	31	23	1	318.65	-445.782	D	7.121	7.121	0	2.306	0	0	0	0	0	0
2003	32	23	1	318.65	-445.782	D	6.936	6.936	0	1.929	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	6.87	6.87	0	1.795	0	0	0	0	0	0
2003	34	23	2706	329.518	-425.046	D	9.487	9.484	0.003	7.793	83.14	16.73	0	0	0	0.09
2003	35	23	1	318.65	-445.782	D	7.1	7.1	0	2.263	0	0	0	0	0	0
2003	36	23	2789	340.496	-426.449	D	6.564	6.563	0.001	1.189	75.4	22.37	0	0	0	2.22
2003	37	23	2758	335.862	-424.454	D	9.25	9.191	0.059	7.041	82.78	17.07	0	0	0	0.14
2003	38	23	2684	326.713	-427.014	D	8.135	8.001	0.135	4.199	79.51	20.29	0	0	0	0.19
2003	39	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.657	7.657	0	3.439	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	9.339	9.339	0	7.418	0	0	0	0	0	0
2003	42	23	2781	339.842	-425.379	D	6.778	6.778	0	1.611	72.92	23.8	0	0	0	2.76

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	43	23	2789	340.496	-426.449	D	6.522	6.521	0.001	1.107	67.69	28.5	0	0	0	3.94
2003	44	23	2789	340.496	-426.449	D	6.612	6.61	0.001	1.281	78.79	19.44	0	0	0	1.75
2003	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2003	46	23	1	318.65	-445.782	D	10.176	10.176	0	9.662	0	0	0	0	0	0
2003	47	23	2597	318.971	-443.851	D	8.628	8.625	0.003	5.648	85.02	14.76	0	0	0	0.28
2003	48	23	2626	320.826	-437.417	D	8.197	8.196	0	4.643	87.52	11.11	0	0	0	0.9
2003	49	23	2762	336.074	-425.006	D	7.025	6.987	0.038	2.033	87.5	12.11	0	0	0	0.39
2003	50	23	2704	329.056	-425.092	D	9.252	9.213	0.039	7.097	89.62	10.29	0	0	0	0.09
2003	51	23	2704	329.056	-425.092	D	9.595	9.524	0.071	7.899	84.4	15.51	0	0	0	0.09
2003	52	23	2684	326.713	-427.014	D	9.725	9.716	0.009	8.405	93.25	6.66	0	0	0	0.07
2003	53	23	2626	320.826	-437.417	D	9.547	9.454	0.092	7.717	82.02	17.64	0	0	0	0.33
2003	54	23	2600	318.952	-443.12	D	8.931	8.853	0.078	6.2	77.85	21.88	0	0	0	0.27
2003	55	23	2600	318.952	-443.12	D	8.51	8.438	0.072	5.204	83.51	16.41	0	0	0	0.09
2003	56	23	2588	318.452	-445.8	D	7.567	7.488	0.08	3.075	80.52	19.02	0	0	0	0.47
2003	57	23	2628	320.933	-436.998	D	8.766	8.658	0.109	5.725	87.23	12.65	0	0	0	0.12
2003	58	23	2684	326.713	-427.014	D	8.812	8.768	0.045	5.991	90.13	9.77	0	0	0	0.09
2003	59	23	2600	318.952	-443.12	D	9.018	8.962	0.056	6.467	91.93	8	0	0	0	0.07
2003	60	23	2704	329.056	-425.092	D	9.766	9.651	0.114	8.233	92.65	7.3	0	0	0	0.06
2003	61	23	2781	339.842	-425.379	D	9.425	9.119	0.306	6.86	92.7	7.25	0	0	0	0.05
2003	62	23	2789	340.496	-426.449	D	7.377	7.373	0.003	2.832	94.37	5.19	0	0	0	0.41
2003	63	23	2789	340.496	-426.449	D	6.992	6.99	0.002	2.037	92.22	7.26	0	0	0	0.45
2003	64	23	2758	335.862	-424.454	D	9.526	9.059	0.467	6.709	79.33	20.45	0	0	0	0.22
2003	65	23	2789	340.496	-426.449	D	7.987	7.573	0.414	3.258	85.05	14.69	0	0	0	0.26
2003	66	23	2789	340.496	-426.449	D	6.964	6.945	0.019	1.946	90.76	8.81	0	0	0	0.43
2003	67	23	2412	339.417	-425.886	D	7.068	7.068	0	2.196	93.84	1.88	0	0	0	0.38
2003	68	23	2448	335.908	-431.021	D	7.118	7.093	0.025	2.247	73	26.56	0	0	0	0.44
2003	69	23	2155	334.883	-424.586	D	6.548	6.548	0	1.16	56.01	38.97	0	0	0	2.67
2003	70	23	2684	326.713	-427.014	D	6.553	6.552	0	1.168	89.04	10.32	0	0	0	0.71
2003	71	23	1242	327.988	-426.138	D	7.133	7.133	0	2.331	90.72	6.75	0	0	0	0.53
2003	72	23	2781	339.842	-425.379	D	8.763	8.571	0.192	5.518	94.65	4.93	0	0	0	0.42
2003	73	23	2588	318.452	-445.8	D	8.724	8.6	0.125	5.587	94.78	5.01	0	0	0	0.21
2003	74	23	2684	326.713	-427.014	D	8.151	8.138	0.013	4.509	94.54	5.32	0	0	0	0.13
2003	75	23	1414	329.196	-425.335	D	7.29	7.289	0	2.656	98.52	0.56	0	0	0	0.34
2003	76	23	1	318.65	-445.782	D	8.644	8.644	0	5.692	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	8.653	8.653	0	5.713	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	8.871	8.871	0	6.244	0	0	0	0	0	0
2003	79	23	2684	326.713	-427.014	D	9.747	9.196	**0.551**	7.054	89	10.91	0	0	0	0.09
2003	80	23	2789	340.496	-426.449	D	9.104	8.841	0.263	6.169	88.93	10.98	0	0	0	0.09
2003	81	23	1	318.65	-445.782	D	6.545	6.545	0	1.154	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	82	23	1	318.65	-445.782	D	6.586	6.586	0	1.234	0	0	0	0	0	0
2003	83	23	1	318.65	-445.782	D	6.82	6.82	0	1.696	0	0	0	0	0	0
2003	84	23	2758	335.862	-424.454	D	7.747	7.681	0.066	3.492	91.45	8.23	0	0	0	0.32
2003	85	23	2789	340.496	-426.449	D	8.848	8.836	0.012	6.157	91.48	8.43	0	0	0	0.09
2003	86	23	2274	336.179	-425.778	D	6.607	6.607	0	1.274	81.83	1.45	0	0	0	0.3
2003	87	23	1	318.65	-445.782	D	8.676	8.676	0	5.769	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.301	7.301	0	2.679	0	0	0	0	0	0
2003	89	23	1	318.65	-445.782	D	6.525	6.525	0	1.115	0	0	0	0	0	0
2003	90	23	1	318.65	-445.782	D	6.478	6.478	0	1.023	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.231	7.231	0	2.533	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	8.075	8.075	0	4.366	0	0	0	0	0	0
2003	95	23	2789	340.496	-426.449	D	6.784	6.784	0	1.624	96.47	1.97	0	0	0	1.32
2003	96	23	2781	339.842	-425.379	D	8.061	8.057	0.004	4.325	92.84	6.4	0	0	0	0.74
2003	97	23	1	318.65	-445.782	D	9.082	9.082	0	6.766	0	0	0	0	0	0
2003	98	23	2789	340.496	-426.449	D	7.442	7.431	0.011	2.955	90.29	9.64	0	0	0	0.07
2003	99	23	2758	335.862	-424.454	D	7.119	7.055	0.064	2.17	60.62	38.15	0	0	0	1.23
2003	100	23	2589	318.383	-445.593	D	6.59	6.581	0.009	1.223	92.03	6.71	0	0	0	1.26
2003	101	23	2588	318.452	-445.8	D	6.503	6.48	0.023	1.028	97.79	1.39	0	0	0	0.82
2003	102	23	2574	321.906	-445.534	D	6.517	6.496	0.021	1.058	98.69	0.61	0	0	0	0.69
2003	103	23	2789	340.496	-426.449	D	6.53	6.525	0.004	1.115	99.18	0.23	0	0	0	0.58
2003	104	23	2789	340.496	-426.449	D	6.651	6.65	0.001	1.359	99.34	0.3	0	0	0	0.45
2003	105	23	2274	336.179	-425.778	D	6.627	6.627	0	1.313	89.1	0.04	0	0	0	0.4
2003	106	23	1	318.65	-445.782	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	107	23	2758	335.862	-424.454	D	7.656	7.621	0.034	3.362	88.23	11.65	0	0	0	0.12
2003	108	23	2788	340.294	-426.448	D	7.823	7.822	0	3.802	96.58	0.09	0	0	0	0.47
2003	109	23	2407	339.18	-426.146	D	7.559	7.559	0	3.227	96.91	0.22	0	0	0	0.29
2003	110	23	1	318.65	-445.782	D	9.045	9.045	0	6.674	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.014	7.014	0	2.087	0	0	0	0	0	0
2003	112	23	2789	340.496	-426.449	D	6.544	6.541	0.003	1.147	90.13	7.09	0	0	0	2.77
2003	113	23	2475	332.385	-435.333	D	6.598	6.591	0.007	1.242	95.93	3.16	0	0	0	0.89
2003	114	23	1	318.65	-445.782	D	8.02	8.02	0	4.243	0	0	0	0	0	0
2003	115	23	2611	319.699	-440.64	D	8.585	8.341	0.244	4.977	85.72	14.08	0	0	0	0.2
2003	116	23	2781	339.842	-425.379	D	8.43	8.336	0.094	4.966	84.67	15.17	0	0	0	0.17
2003	117	23	2599	318.958	-443.364	D	7.062	7.057	0.004	2.175	97.19	2.51	0	0	0	0.25
2003	118	23	1241	327.999	-426.387	D	7.437	7.437	0	2.968	92.04	0.09	0	0	0	0.37
2003	119	23	1044	326.834	-428.186	D	7.415	7.415	0	2.92	90.87	0.37	0	0	0	0.19
2003	120	23	1	318.65	-445.782	D	7.985	7.985	0	4.163	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	121	23	1242	327.988	-426.138	D	7.753	7.753	0	3.649	100.16	1.06	0	0	0	0.23
2003	122	23	2758	335.862	-424.454	D	8.914	8.84	0.074	6.167	97.03	2.38	0	0	0	0.59
2003	123	23	2628	320.933	-436.998	D	8.945	8.511	0.435	5.375	95.16	4.68	0	0	0	0.16
2003	124	23	2255	335.942	-426.039	D	7.352	7.318	0.033	2.716	99.44	0.42	0	0	0	0.13
2003	125	23	1	318.65	-445.782	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	8.385	8.385	0	5.081	0	0	0	0	0	0
2003	127	23	2704	329.056	-425.092	D	8.634	8.618	0.017	5.629	96.12	3.56	0	0	0	0.32
2003	128	23	2758	335.862	-424.454	D	8.014	8.011	0.004	4.221	99.16	0.49	0	0	0	0.38
2003	129	23	1	318.65	-445.782	D	7.642	7.642	0	3.407	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	8.486	8.486	0	5.317	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.409	7.409	0	2.907	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	6.899	6.899	0	1.854	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	9.399	9.399	0	7.572	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	8.763	8.763	0	5.98	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	9.31	9.31	0	7.344	0	0	0	0	0	0
2003	137	23	2781	339.842	-425.379	D	9.383	9.371	0.012	7.5	99.43	0.39	0	0	0	0.16
2003	138	23	2628	320.933	-436.998	D	9.288	9.093	0.194	6.795	97.23	2.72	0	0	0	0.05
2003	139	23	2600	318.952	-443.12	D	8.837	8.783	0.054	6.027	98.6	1.34	0	0	0	0.06
2003	140	23	2684	326.713	-427.014	D	8.564	8.269	0.295	4.81	83.72	16.08	0	0	0	0.2
2003	141	23	2571	322.646	-445.476	D	6.718	6.718	0	1.492	98.15	1.69	0	0	0	0.16
2003	142	23	2627	320.879	-437.207	D	7.186	7.186	0	2.44	97.87	1.25	0	0	0	0.66
2003	143	23	2694	327.861	-425.964	D	6.696	6.691	0.005	1.439	98.86	0.54	0	0	0	0.59
2003	144	23	2707	329.748	-425.023	D	7.873	7.84	0.033	3.841	98.53	1.26	0	0	0	0.21
2003	145	23	2694	327.861	-425.964	D	9.501	9.205	0.296	7.075	96.46	3.44	0	0	0	0.1
2003	146	23	2597	318.971	-443.851	D	8.134	8.096	0.038	4.414	99.51	0.36	0	0	0	0.13
2003	147	23	2704	329.056	-425.092	D	6.65	6.649	0.001	1.357	98.21	0.14	0	0	0	1.51
2003	148	23	2762	336.074	-425.006	D	6.641	6.607	0.033	1.275	98.71	0.65	0	0	0	0.64
2003	149	23	2788	340.294	-426.448	D	7.286	7.286	0	2.649	99.2	0.06	0	0	0	0.43
2003	150	23	2789	340.496	-426.449	D	6.617	6.617	0	1.293	97.9	1.09	0	0	0	0.94
2003	151	23	2789	340.496	-426.449	D	7.24	7.231	0.009	2.534	98.63	0.21	0	0	0	1.17
2003	152	23	2589	318.383	-445.593	D	7.117	7.102	0.015	2.267	98.81	0.73	0	0	0	0.47
2003	153	23	2684	326.713	-427.014	D	8.69	8.688	0.002	5.799	99.37	0.48	0	0	0	0.06
2003	154	23	2781	339.842	-425.379	D	9.323	9.118	0.205	6.857	89.64	10.27	0	0	0	0.09
2003	155	23	2781	339.842	-425.379	D	7.833	7.715	0.119	3.565	94.15	5.5	0	0	0	0.35
2003	156	23	2704	329.056	-425.092	D	6.876	6.811	0.065	1.678	98.97	0.55	0	0	0	0.48
2003	157	23	2704	329.056	-425.092	D	8.843	8.823	0.02	6.125	97.94	1.96	0	0	0	0.1
2003	158	23	2789	340.496	-426.449	D	7.564	7.56	0.003	3.23	97.88	1.94	0	0	0	0.16
2003	159	23	2789	340.496	-426.449	D	7.15	7.15	0.001	2.365	99.55	0.13	0	0	0	0.17

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	160	23	1	318.65	-445.782	D	6.621	6.621	0	1.301	0	0	0	0	0	0
2003	161	23	1	318.65	-445.782	D	7.499	7.499	0	3.098	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	8.817	8.817	0	6.112	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	8.874	8.874	0	6.251	0	0	0	0	0	0
2003	164	23	2704	329.056	-425.092	D	9.219	9.212	0.007	7.095	99.58	0.19	0	0	0	0.21
2003	165	23	2627	320.879	-437.207	D	8.327	8.262	0.065	4.794	97.44	2.48	0	0	0	0.08
2003	166	23	2588	318.452	-445.8	D	8.282	8.279	0.004	4.833	98.48	1.39	0	0	0	0.08
2003	167	23	2789	340.496	-426.449	D	8.122	8.117	0.005	4.462	98.95	0.95	0	0	0	0.08
2003	168	23	375	322.611	-445.359	D	7.648	7.645	0.003	3.413	98.35	1.57	0	0	0	0.09
2003	169	23	2588	318.452	-445.8	D	8.947	8.946	0.002	6.427	99.48	0.49	0	0	0	0.04
2003	170	23	2707	329.748	-425.023	D	8.531	8.516	0.015	5.387	99.32	0.21	0	0	0	0.46
2003	171	23	2709	330.21	-424.978	D	9.23	8.408	**0.823**	5.133	93.68	6.23	0	0	0	0.09
2003	172	23	2589	318.383	-445.593	D	6.98	6.969	0.01	1.995	99.55	0.19	0	0	0	0.26
2003	173	23	1	318.65	-445.782	D	6.92	6.92	0	1.897	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.108	7.108	0	2.279	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.784	7.784	0	3.718	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	8.399	8.399	0	5.113	0	0	0	0	0	0
2003	177	23	1	318.65	-445.782	D	8.699	8.699	0	5.825	0	0	0	0	0	0
2003	178	23	2468	334.002	-434.887	D	6.859	6.843	0.016	1.741	96.64	2.32	0	0	0	1.05
2003	179	23	2588	318.452	-445.8	D	6.656	6.647	0.009	1.353	98.95	0.34	0	0	0	0.71
2003	180	23	2694	327.861	-425.964	D	6.721	6.719	0.003	1.494	99.28	0.21	0	0	0	0.46
2003	181	23	1552	330.178	-425.042	D	7.095	7.095	0.001	2.252	98.61	0.82	0	0	0	0.28
2003	182	23	2182	335.131	-424.575	D	8.821	8.821	0	6.12	97.03	0.65	0	0	0	0.11
2003	183	23	2276	336.157	-425.28	D	7.56	7.56	0	3.23	98.71	0.37	0	0	0	0.17
2003	184	23	2780	339.614	-425.419	D	7.374	7.374	0	2.832	97.93	0.07	0	0	0	0.17
2003	185	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	8.318	8.318	0	4.923	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.086	7.086	0	2.234	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.739	7.739	0	3.619	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	8.593	8.593	0	5.571	0	0	0	0	0	0
2003	192	23	1	318.65	-445.782	D	7.285	7.285	0	2.647	0	0	0	0	0	0
2003	193	23	2789	340.496	-426.449	D	7.846	7.846	0	3.853	100.15	0.11	0	0	0	0.53
2003	194	23	2784	339.87	-426.019	D	7.263	7.246	0.018	2.564	98.96	0.66	0	0	0	0.38
2003	195	23	2781	339.842	-425.379	D	8.507	8.448	0.059	5.227	98.82	1.07	0	0	0	0.11
2003	196	23	2155	334.883	-424.586	D	8.174	8.174	0	4.592	92.28	0.03	0	0	0	0.18
2003	197	23	1	318.65	-445.782	D	6.957	6.957	0	1.972	0	0	0	0	0	0
2003	198	23	2789	340.496	-426.449	D	7.161	7.155	0.006	2.375	99.54	0.14	0	0	0	0.34

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	199	23	2468	334.002	-434.887	D	7.142	7.141	0.001	2.348	99.85	0.03	0	0	0	0.27
2003	200	23	1	318.65	-445.782	D	7.564	7.564	0	3.238	0	0	0	0	0	0
2003	201	23	2781	339.842	-425.379	D	8.559	8.558	0.001	5.488	98.76	1.01	0	0	0	0.05
2003	202	23	2209	335.38	-424.564	D	8.102	8.102	0	4.428	97.51	0.61	0	0	0	0.05
2003	203	23	2789	340.496	-426.449	D	7.701	7.677	0.025	3.482	89.39	10.17	0	0	0	0.44
2003	204	23	2789	340.496	-426.449	D	7.067	7.04	0.027	2.139	96.56	2.61	0	0	0	0.83
2003	205	23	2623	320.666	-438.044	D	6.978	6.962	0.016	1.982	99.08	0.3	0	0	0	0.62
2003	206	23	2694	327.861	-425.964	D	7.11	7.106	0.004	2.275	99.56	0.12	0	0	0	0.35
2003	207	23	1	318.65	-445.782	D	6.798	6.798	0	1.652	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.085	7.085	0	2.232	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.085	7.085	0	2.233	0	0	0	0	0	0
2003	210	23	2709	330.21	-424.978	D	8.506	8.382	0.124	5.073	97.7	2.2	0	0	0	0.09
2003	211	23	2781	339.842	-425.379	D	9.621	9.347	0.273	7.44	98.05	1.88	0	0	0	0.07
2003	212	23	2789	340.496	-426.449	D	7.71	7.607	0.103	3.331	99.1	0.76	0	0	0	0.14
2003	213	23	2781	339.842	-425.379	D	6.93	6.901	0.029	1.857	99.46	0.31	0	0	0	0.23
2003	214	23	2210	335.901	-430.787	D	7.676	7.672	0.004	3.471	99.79	0.07	0	0	0	0.1
2003	215	23	1	318.65	-445.782	D	7.59	7.59	0	3.294	0	0	0	0	0	0
2003	216	23	2781	339.842	-425.379	D	7.664	7.664	0	3.454	97.62	0.67	0	0	0	0.39
2003	217	23	2789	340.496	-426.449	D	8.35	8.348	0.003	4.992	99.17	0.62	0	0	0	0.19
2003	218	23	2693	327.829	-426.17	D	8.675	8.602	0.073	5.592	97.96	1.81	0	0	0	0.22
2003	219	23	2589	318.383	-445.593	D	8.544	8.421	0.123	5.163	99.16	0.66	0	0	0	0.17
2003	220	23	2589	318.383	-445.593	D	7.095	7.094	0.002	2.25	98.69	0.36	0	0	0	1
2003	221	23	2589	318.383	-445.593	D	6.979	6.977	0.002	2.01	98.69	0.3	0	0	0	0.98
2003	222	23	2589	318.383	-445.593	D	7.169	7.162	0.006	2.39	99.27	0.09	0	0	0	0.67
2003	223	23	2588	318.452	-445.8	D	7.297	7.272	0.025	2.62	99.36	0.35	0	0	0	0.28
2003	224	23	1	318.65	-445.782	D	7.207	7.207	0	2.483	98.6	0.66	0	0	0	0.25
2003	225	23	1	318.65	-445.782	D	8.321	8.321	0	4.931	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	8.753	8.753	0	5.955	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.337	7.337	0	2.755	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.347	7.347	0	2.776	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2003	230	23	2789	340.496	-426.449	D	6.903	6.901	0.002	1.859	99.27	0.04	0	0	0	0.72
2003	231	23	2789	340.496	-426.449	D	6.838	6.826	0.013	1.706	99.45	0.15	0	0	0	0.4
2003	232	23	2789	340.496	-426.449	D	6.871	6.86	0.012	1.775	99.41	0.3	0	0	0	0.28
2003	233	23	2789	340.496	-426.449	D	6.928	6.921	0.007	1.898	99.31	0.44	0	0	0	0.25
2003	234	23	2789	340.496	-426.449	D	7.121	7.113	0.008	2.289	99.61	0.2	0	0	0	0.19
2003	235	23	2708	329.979	-425	D	7.109	7.028	0.081	2.115	99.31	0.19	0	0	0	0.5
2003	236	23	2589	318.383	-445.593	D	8.686	8.515	0.171	5.385	98.4	1.44	0	0	0	0.15
2003	237	23	2684	326.713	-427.014	D	7.92	7.846	0.074	3.854	99.58	0.25	0	0	0	0.17

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	238	23	2708	329.979	-425	D	7.358	7.352	0.006	2.787	99.8	0.04	0	0	0	0.19
2003	239	23	2781	339.842	-425.379	D	7.03	7.03	0	2.119	99.46	0.08	0	0	0	0.17
2003	240	23	1	318.65	-445.782	D	7.105	7.105	0	2.273	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	8.394	8.394	0	5.101	0	0	0	0	0	0
2003	242	23	2779	339.386	-425.461	D	9.233	9.233	0	7.147	99.91	0.44	0	0	0	0.06
2003	243	23	2756	335.398	-424.515	D	9.353	9.353	0	7.454	97.87	1.65	0	0	0	0.05
2003	244	23	1	318.65	-445.782	D	9.456	9.456	0	7.721	0	0	0	0	0	0
2003	245	23	2589	318.383	-445.593	D	9.791	9.776	0.015	8.566	99.2	0.69	0	0	0	0.11
2003	246	23	2588	318.452	-445.8	D	9.258	9.235	0.023	7.152	98.23	1.71	0	0	0	0.06
2003	247	23	2447	336.137	-430.956	D	8.325	7.699	**0.626**	3.531	91.69	8.12	0	0	0	0.2
2003	248	23	2588	318.452	-445.8	D	6.736	6.736	0	1.529	81.99	0.12	0	0	0	1.28
2003	249	23	1	318.65	-445.782	D	6.844	6.844	0	1.743	0	0	0	0	0	0
2003	250	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.063	7.063	0	2.187	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.368	7.368	0	2.821	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	8.253	8.253	0	4.773	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	9.962	9.962	0	9.071	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	9.428	9.428	0	7.649	0	0	0	0	0	0
2003	257	23	2762	336.074	-425.006	D	9.172	8.651	**0.521**	5.708	89.99	9.91	0	0	0	0.1
2003	258	23	1	318.65	-445.782	D	6.717	6.717	0	1.49	0	0	0	0	0	0
2003	259	23	2789	340.496	-426.449	D	6.648	6.645	0.003	1.349	98.48	0.6	0	0	0	0.88
2003	260	23	2781	339.842	-425.379	D	6.758	6.755	0.003	1.565	98.73	0.73	0	0	0	0.56
2003	261	23	2235	335.628	-424.554	D	6.77	6.77	0	1.596	99.29	0.33	0	0	0	0.34
2003	262	23	1	318.65	-445.782	D	7.776	7.776	0	3.698	0	0	0	0	0	0
2003	263	23	2781	339.842	-425.379	D	6.631	6.588	0.043	1.236	96.25	2.87	0	0	0	0.87
2003	264	23	2684	326.713	-427.014	D	7.045	7.043	0.002	2.146	98.99	0.33	0	0	0	0.65
2003	265	23	1	318.65	-445.782	D	9.072	9.072	0	6.741	0	0	0	0	0	0
2003	266	23	1	318.65	-445.782	D	6.857	6.857	0	1.769	0	0	0	0	0	0
2003	267	23	2788	340.294	-426.448	D	6.834	6.834	0	1.724	108.39	1.03	0	0	0	0.83
2003	268	23	2469	333.771	-434.951	D	6.865	6.85	0.015	1.755	91.08	7.53	0	0	0	1.39
2003	269	23	2468	334.002	-434.887	D	7.063	7.047	0.016	2.154	98.49	1.18	0	0	0	0.33
2003	270	23	2684	326.713	-427.014	D	7.478	7.461	0.017	3.018	78.28	20.6	0	0	0	1.1
2003	271	23	2789	340.496	-426.449	D	6.681	6.681	0	1.419	72.68	23.35	0	0	0	4.29
2003	272	23	2588	318.452	-445.8	D	6.532	6.53	0.002	1.124	67.27	28.18	0	0	0	4.6
2003	273	23	2789	340.496	-426.449	D	6.565	6.562	0.002	1.187	95.54	2.92	0	0	0	1.53
2003	274	23	2709	330.21	-424.978	D	8.627	8.478	0.149	5.298	83.56	16.21	0	0	0	0.23
2003	275	23	2571	322.646	-445.476	D	6.577	6.568	0.009	1.198	91.61	6.92	0	0	0	1.46
2003	276	23	2704	329.056	-425.092	D	7.13	7.118	0.013	2.299	95.66	3.75	0	0	0	0.58

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	277	23	2781	339.842	-425.379	D	6.855	6.854	0	1.764	97.66	0.52	0	0	0	1.77
2003	278	23	2789	340.496	-426.449	D	7.082	7.032	0.049	2.124	96.84	2.54	0	0	0	0.62
2003	279	23	2789	340.496	-426.449	D	9.51	9.344	0.166	7.431	95.45	4.42	0	0	0	0.13
2003	280	23	2600	318.952	-443.12	D	7.899	7.852	0.047	3.868	98.77	1.04	0	0	0	0.18
2003	281	23	2694	327.861	-425.964	D	7.617	7.609	0.008	3.336	98.92	0.9	0	0	0	0.17
2003	282	23	1552	330.178	-425.042	D	8.915	8.914	0	6.35	99.02	0.42	0	0	0	0.21
2003	283	23	1	318.65	-445.782	D	9.734	9.734	0	8.453	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	9.551	9.551	0	7.97	0	0	0	0	0	0
2003	285	23	2782	339.852	-425.592	D	7.88	7.856	0.024	3.876	82.7	16.13	0	0	0	1.16
2003	286	23	12	319.07	-444.015	D	6.96	6.944	0.017	1.944	97.84	1.54	0	0	0	0.62
2003	287	23	2781	339.842	-425.379	D	8.932	8.869	0.064	6.238	88.9	11.05	0	0	0	0.06
2003	288	23	2788	340.294	-426.448	D	6.713	6.713	0	1.483	92.88	1.33	0	0	0	2.08
2003	289	23	2788	340.294	-426.448	D	6.603	6.603	0	1.267	87.54	1.16	0	0	0	1.18
2003	290	23	2789	340.496	-426.449	D	8.117	8.079	0.038	4.375	93.11	6.83	0	0	0	0.06
2003	291	23	2684	326.713	-427.014	D	6.618	6.617	0.001	1.293	98.01	0.79	0	0	0	1.24
2003	292	23	2417	339.654	-425.626	D	6.614	6.609	0.005	1.278	98.46	0.72	0	0	0	0.77
2003	293	23	2789	340.496	-426.449	D	6.705	6.704	0.001	1.464	99.29	0.19	0	0	0	0.49
2003	294	23	2344	337.486	-427.22	D	6.722	6.722	0	1.5	94.77	0.2	0	0	0	0.38
2003	295	23	2789	340.496	-426.449	D	6.724	6.709	0.015	1.474	97.44	0.74	0	0	0	1.82
2003	296	23	2588	318.452	-445.8	D	6.637	6.61	0.027	1.28	97.64	0.95	0	0	0	1.41
2003	297	23	2789	340.496	-426.449	D	6.698	6.691	0.007	1.44	98.11	0.9	0	0	0	0.98
2003	298	23	2790	340.421	-426.562	D	8.064	7.986	0.078	4.167	92.38	7.22	0	0	0	0.4
2003	299	23	2618	320.301	-439.116	D	7.514	7.509	0.005	3.119	81.69	17.98	0	0	0	0.36
2003	300	23	1	318.65	-445.782	D	6.536	6.536	0	1.135	0	0	0	0	0	0
2003	301	23	1	318.65	-445.782	D	6.598	6.598	0	1.258	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.414	7.414	0	2.919	0	0	0	0	0	0
2003	304	23	1	318.65	-445.782	D	9.409	9.409	0	7.599	0	0	0	0	0	0
2003	305	23	2758	335.862	-424.454	D	9.655	9.433	0.222	7.661	85.98	13.76	0	0	0	0.26
2003	306	23	2758	335.862	-424.454	D	8.854	8.854	0	6.202	92.9	1.53	0	0	0	0.22
2003	307	23	1	318.65	-445.782	D	7.877	7.877	0	3.922	0	0	0	0	0	0
2003	308	23	2704	329.056	-425.092	D	7.43	7.408	0.022	2.905	95.6	4.08	0	0	0	0.32
2003	309	23	2762	336.074	-425.006	D	8.752	8.075	**0.677**	4.367	94.65	5.22	0	0	0	0.13
2003	310	23	2571	322.646	-445.476	D	9.713	9.017	**0.696**	6.605	92.7	7.25	0	0	0	0.06
2003	311	23	2589	318.383	-445.593	D	7.756	7.749	0.006	3.641	88.53	11.24	0	0	0	0.25
2003	312	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	6.51	6.51	0	1.085	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	6.616	6.616	0	1.292	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	8.07	8.07	0	4.354	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	316	23	1	318.65	-445.782	D	9.37	9.37	0	7.497	0	0	0	0	0	0
2003	317	23	2789	340.496	-426.449	D	6.497	6.495	0.002	1.057	56.4	37.34	0	0	0	6.21
2003	318	23	2789	340.496	-426.449	D	6.957	6.957	0	1.97	86.74	12.21	0	0	0	0.82
2003	319	23	2405	338.909	-425.659	D	8.517	8.517	0	5.391	50.71	9.55	0	0	0	0.18
2003	320	23	1	318.65	-445.782	D	9.626	9.626	0	8.168	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	10.088	10.088	0	9.417	0	0	0	0	0	0
2003	322	23	1	318.65	-445.782	D	9.908	9.908	0	8.922	0	0	0	0	0	0
2003	323	23	2789	340.496	-426.449	D	7.521	7.493	0.028	3.086	90.11	9.79	0	0	0	0.1
2003	324	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	9.817	9.817	0	8.677	0	0	0	0	0	0
2003	327	23	2704	329.056	-425.092	D	9.027	9.009	0.018	6.585	85.77	14.15	0	0	0	0.07
2003	328	23	1	318.65	-445.782	D	7.264	7.264	0	2.603	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.434	7.434	0	2.961	0	0	0	0	0	0
2003	331	23	2789	340.496	-426.449	D	9.242	9.167	0.074	6.981	85.49	14.24	0	0	0	0.28
2003	332	23	2789	340.496	-426.449	D	6.843	6.839	0.003	1.734	90.23	9.63	0	0	0	0.15
2003	333	23	1	318.65	-445.782	D	6.494	6.494	0	1.054	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2003	335	23	2789	340.496	-426.449	D	6.674	6.663	0.012	1.384	58.33	37.72	0	0	0	3.94
2003	336	23	1	318.65	-445.782	D	6.513	6.513	0	1.092	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0
2003	338	23	2704	329.056	-425.092	D	9.331	9.209	0.122	7.085	87.71	12.04	0	0	0	0.25
2003	339	23	2597	318.971	-443.851	D	8.544	8.531	0.014	5.422	91.95	7.96	0	0	0	0.08
2003	340	23	2789	340.496	-426.449	D	7.818	7.817	0.001	3.79	81.03	17.78	0	0	0	1.38
2003	341	23	2781	339.842	-425.379	D	6.66	6.656	0.004	1.37	77.88	21.31	0	0	0	0.78
2003	342	23	1	318.65	-445.782	D	8.111	8.111	0	4.449	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	10.155	10.155	0	9.603	0	0	0	0	0	0
2003	344	23	2588	318.452	-445.8	D	9.158	8.853	0.306	6.198	84.73	15.23	0	0	0	0.04
2003	345	23	1	318.65	-445.782	D	7.408	7.408	0	2.905	0	0	0	0	0	0
2003	346	23	2781	339.842	-425.379	D	6.855	6.844	0.011	1.742	78.17	21.14	0	0	0	0.68
2003	347	23	2628	320.933	-436.998	D	9.62	9.615	0.005	8.138	83.72	16.06	0	0	0	0.17
2003	348	23	2600	318.952	-443.12	D	9.458	9.432	0.026	7.658	87.09	12.84	0	0	0	0.06
2003	349	23	2781	339.842	-425.379	D	9.066	9.064	0.003	6.72	89.24	10.65	0	0	0	0.08
2003	350	23	1	318.65	-445.782	D	8.775	8.775	0	6.01	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.444	7.444	0	2.982	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.467	7.467	0	3.031	0	0	0	0	0	0
2003	354	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	355	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2003	356	23	1	318.65	-445.782	D	9.46	9.46	0	7.73	0	0	0	0	0	0
2003	357	23	2600	318.952	-443.12	D	9.547	9.464	0.083	7.742	79.95	19.95	0	0	0	0.1
2003	358	23	1	318.65	-445.782	D	8.21	8.21	0	4.675	0	0	0	0	0	0
2003	359	23	2789	340.496	-426.449	D	6.584	6.584	0	1.23	83.34	14.75	0	0	0	1.5
2003	360	23	2789	340.496	-426.449	D	6.84	6.838	0.002	1.731	81.54	17.9	0	0	0	0.63
2003	361	23	2405	338.909	-425.659	D	6.757	6.757	0	1.569	58.63	8.3	0	0	0	0.33
2003	362	23	1	318.65	-445.782	D	8.719	8.719	0	5.874	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.299	7.299	0	2.675	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	6.566	6.566	0	1.194	0	0	0	0	0	0
									0.823							
COLUMBIA											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	6.999	6.999	0	2.056	0	0	0	0	0	0
2003	2	23	2709	330.21	-424.978	D	9.37	9.354	0.016	7.456	36.23	63.75	0	0	0	0.02
2003	3	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0
2003	4	23	1	318.65	-445.782	D	6.784	6.784	0	1.624	0	0	0	0	0	0
2003	5	23	1	318.65	-445.782	D	7.26	7.26	0	2.595	0	0	0	0	0	0
2003	6	23	1	318.65	-445.782	D	8.242	8.242	0	4.748	0	0	0	0	0	0
2003	7	23	1	318.65	-445.782	D	7.239	7.239	0	2.55	0	0	0	0	0	0
2003	8	23	1	318.65	-445.782	D	6.71	6.71	0	1.477	0	0	0	0	0	0
2003	9	23	2789	340.496	-426.449	D	6.971	6.968	0.003	1.994	88.91	10.94	0	0	0	0.14
2003	10	23	1	318.65	-445.782	D	6.587	6.587	0	1.234	0	0	0	0	0	0
2003	11	23	1	318.65	-445.782	D	6.549	6.549	0	1.161	0	0	0	0	0	0
2003	12	23	2789	340.496	-426.449	D	6.499	6.499	0	1.064	59.53	39.73	0	0	0	0.06
2003	13	23	2788	340.294	-426.448	D	6.7	6.699	0	1.456	63.19	33.81	0	0	0	0.04
2003	14	23	1	318.65	-445.782	D	9.224	9.224	0	7.124	0	0	0	0	0	0
2003	15	23	2789	340.496	-426.449	D	6.625	6.623	0.002	1.305	58.97	40.95	0	0	0	0.05
2003	16	23	2600	318.952	-443.12	D	8.289	8.256	0.033	4.78	65.66	34.33	0	0	0	0.01
2003	17	23	1	318.65	-445.782	D	7.905	7.905	0	3.985	0	0	0	0	0	0
2003	18	23	1	318.65	-445.782	D	6.57	6.57	0	1.203	0	0	0	0	0	0
2003	19	23	1	318.65	-445.782	D	6.651	6.651	0	1.361	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	6.624	6.624	0	1.308	0	0	0	0	0	0
2003	21	23	2789	340.496	-426.449	D	7.555	7.533	0.023	3.171	63.63	36.37	0	0	0	0.01
2003	22	23	2762	336.074	-425.006	D	7.509	7.501	0.008	3.103	48.14	51.76	0	0	0	0.07
2003	23	23	2789	340.496	-426.449	D	6.963	6.962	0.001	1.981	55.8	44.2	0	0	0	0.02

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	24	23	2788	340.294	-426.448	D	6.636	6.635	0	1.33	65.39	33.23	0	0	0	0.03
2003	25	23	2788	340.294	-426.448	D	6.5	6.5	0	1.067	68.17	30.99	0	0	0	0.02
2003	26	23	1	318.65	-445.782	D	7.121	7.121	0	2.305	0	0	0	0	0	0
2003	27	23	2789	340.496	-426.449	D	6.795	6.794	0.001	1.644	62.09	37.93	0	0	0	0.02
2003	28	23	1	318.65	-445.782	D	8.235	8.235	0	4.732	0	0	0	0	0	0
2003	29	23	2781	339.842	-425.379	D	9.839	9.766	0.073	8.54	36.57	63.42	0	0	0	0.01
2003	30	23	1	318.65	-445.782	D	9.114	9.114	0	6.846	0	0	0	0	0	0
2003	31	23	1	318.65	-445.782	D	7.121	7.121	0	2.306	0	0	0	0	0	0
2003	32	23	1	318.65	-445.782	D	6.936	6.936	0	1.929	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	6.87	6.87	0	1.795	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	9.527	9.527	0	7.906	0	0	0	0	0	0
2003	35	23	1	318.65	-445.782	D	7.1	7.1	0	2.263	0	0	0	0	0	0
2003	36	23	2788	340.294	-426.448	D	6.563	6.563	0	1.189	59.6	38.5	0	0	0	0.07
2003	37	23	2781	339.842	-425.379	D	9.199	9.182	0.017	7.018	70.39	29.59	0	0	0	0
2003	38	23	2684	326.713	-427.014	D	8.386	8.001	0.385	4.199	79.19	20.81	0	0	0	0
2003	39	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.657	7.657	0	3.439	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	9.339	9.339	0	7.418	0	0	0	0	0	0
2003	42	23	1	318.65	-445.782	D	6.733	6.733	0	1.522	0	0	0	0	0	0
2003	43	23	1	318.65	-445.782	D	6.521	6.521	0	1.107	0	0	0	0	0	0
2003	44	23	2788	340.294	-426.448	D	6.61	6.61	0	1.281	67.27	31.3	0	0	0	0.05
2003	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2003	46	23	1	318.65	-445.782	D	10.176	10.176	0	9.662	0	0	0	0	0	0
2003	47	23	2781	339.842	-425.379	D	8.744	8.654	0.09	5.716	76.69	23.3	0	0	0	0.01
2003	48	23	2597	318.971	-443.851	D	8.271	8.188	0.083	4.623	74.44	25.55	0	0	0	0.01
2003	49	23	2781	339.842	-425.379	D	7.01	6.987	0.022	2.033	74.59	25.4	0	0	0	0.01
2003	50	23	2784	339.87	-426.019	D	9.203	9.195	0.008	7.051	84.25	15.73	0	0	0	0
2003	51	23	2704	329.056	-425.092	D	9.624	9.524	0.1	7.899	75.11	24.89	0	0	0	0
2003	52	23	1552	330.178	-425.042	D	9.649	9.648	0.001	8.224	89.14	10.95	0	0	0	0
2003	53	23	2628	320.933	-436.998	D	9.524	9.454	0.069	7.717	72.42	27.57	0	0	0	0.01
2003	54	23	2781	339.842	-425.379	D	8.846	8.774	0.072	6.006	65.66	34.34	0	0	0	0
2003	55	23	2628	320.933	-436.998	D	8.556	8.448	0.108	5.228	72.23	27.77	0	0	0	0
2003	56	23	2596	318.977	-444.095	D	7.529	7.488	0.041	3.075	59.47	40.51	0	0	0	0.02
2003	57	23	2597	318.971	-443.851	D	8.749	8.653	0.095	5.715	74.7	25.29	0	0	0	0
2003	58	23	2684	326.713	-427.014	D	8.801	8.768	0.033	5.991	81.06	18.93	0	0	0	0
2003	59	23	2694	327.861	-425.964	D	8.987	8.967	0.02	6.48	84.48	15.5	0	0	0	0
2003	60	23	2781	339.842	-425.379	D	9.658	9.651	0.007	8.233	87.65	12.33	0	0	0	0
2003	61	23	2781	339.842	-425.379	D	9.122	9.119	0.003	6.86	87.51	12.44	0	0	0	0
2003	62	23	1	318.65	-445.782	D	7.196	7.196	0	2.461	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	63	23	1	318.65	-445.782	D	7.002	7.002	0	2.063	0	0	0	0	0	0
2003	64	23	2758	335.862	-424.454	D	9.123	9.059	0.064	6.709	78.37	21.63	0	0	0	0
2003	65	23	2789	340.496	-426.449	D	7.577	7.573	0.003	3.258	83.13	16.84	0	0	0	0.01
2003	66	23	2789	340.496	-426.449	D	6.951	6.945	0.007	1.946	78.34	21.65	0	0	0	0.02
2003	67	23	2361	337.679	-425.962	D	7.068	7.068	0	2.196	85.01	6.25	0	0	0	0.02
2003	68	23	2789	340.496	-426.449	D	7.078	7.06	0.018	2.18	48.07	51.86	0	0	0	0.06
2003	69	23	2781	339.842	-425.379	D	6.604	6.548	0.056	1.159	61.91	38.05	0	0	0	0.04
2003	70	23	2758	335.862	-424.454	D	6.57	6.549	0.021	1.162	81.68	18.3	0	0	0	0.03
2003	71	23	2789	340.496	-426.449	D	7.114	7.113	0.001	2.289	93.13	6.81	0	0	0	0.01
2003	72	23	2781	339.842	-425.379	D	8.574	8.571	0.003	5.518	94.28	5.65	0	0	0	0.01
2003	73	23	2597	318.971	-443.851	D	8.727	8.677	0.05	5.772	88.83	11.16	0	0	0	0.01
2003	74	23	2684	326.713	-427.014	D	8.14	8.138	0.002	4.509	92.36	7.57	0	0	0	0.01
2003	75	23	2236	336.149	-430.776	D	7.277	7.277	0	2.629	71.48	0.38	0	0	0	0.01
2003	76	23	1	318.65	-445.782	D	8.644	8.644	0	5.692	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	8.653	8.653	0	5.713	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	8.871	8.871	0	6.244	0	0	0	0	0	0
2003	79	23	2704	329.056	-425.092	D	9.297	9.236	0.061	7.155	74.93	25.06	0	0	0	0
2003	80	23	2789	340.496	-426.449	D	8.986	8.841	0.146	6.169	77.35	22.65	0	0	0	0
2003	81	23	1	318.65	-445.782	D	6.545	6.545	0	1.154	0	0	0	0	0	0
2003	82	23	1	318.65	-445.782	D	6.586	6.586	0	1.234	0	0	0	0	0	0
2003	83	23	1	318.65	-445.782	D	6.82	6.82	0	1.696	0	0	0	0	0	0
2003	84	23	37	319.567	-443.993	D	7.698	7.687	0.011	3.506	90.22	9.78	0	0	0	0.01
2003	85	23	2684	326.713	-427.014	D	8.832	8.823	0.009	6.126	50.36	49.59	0	0	0	0.01
2003	86	23	199	320.795	-437.944	D	6.616	6.616	0	1.292	88.63	3.59	0	0	0	0.05
2003	87	23	1	318.65	-445.782	D	8.676	8.676	0	5.769	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.301	7.301	0	2.679	0	0	0	0	0	0
2003	89	23	1	318.65	-445.782	D	6.525	6.525	0	1.115	0	0	0	0	0	0
2003	90	23	1	318.65	-445.782	D	6.478	6.478	0	1.023	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.231	7.231	0	2.533	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	8.075	8.075	0	4.366	0	0	0	0	0	0
2003	95	23	1	318.65	-445.782	D	6.747	6.747	0	1.55	0	0	0	0	0	0
2003	96	23	2781	339.842	-425.379	D	8.06	8.057	0.003	4.325	78.31	21.69	0	0	0	0.02
2003	97	23	1	318.65	-445.782	D	9.082	9.082	0	6.766	0	0	0	0	0	0
2003	98	23	2789	340.496	-426.449	D	7.432	7.431	0	2.955	79.76	19.96	0	0	0	0.01
2003	99	23	2789	340.496	-426.449	D	7.034	7.033	0.001	2.125	89.21	10.72	0	0	0	0.05
2003	100	23	2789	340.496	-426.449	D	6.615	6.591	0.023	1.244	76.59	23.36	0	0	0	0.04
2003	101	23	2781	339.842	-425.379	D	6.486	6.478	0.008	1.024	93.42	6.52	0	0	0	0.05

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	102	23	2789	340.496	-426.449	D	6.503	6.495	0.008	1.057	97.82	2.12	0	0	0	0.03
2003	103	23	2789	340.496	-426.449	D	6.526	6.525	0	1.115	99.48	0.46	0	0	0	0.02
2003	104	23	2414	339.687	-426.374	D	6.65	6.65	0	1.359	96.71	1.09	0	0	0	0.02
2003	105	23	1	318.65	-445.782	D	6.637	6.637	0	1.334	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	107	23	2758	335.862	-424.454	D	7.625	7.621	0.003	3.362	80.31	19.7	0	0	0	0
2003	108	23	1	318.65	-445.782	D	7.49	7.49	0	3.08	0	0	0	0	0	0
2003	109	23	1	318.65	-445.782	D	7.406	7.406	0	2.902	0	0	0	0	0	0
2003	110	23	1	318.65	-445.782	D	9.045	9.045	0	6.674	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.014	7.014	0	2.087	0	0	0	0	0	0
2003	112	23	2781	339.842	-425.379	D	6.542	6.541	0.001	1.146	95.17	4.75	0	0	0	0.1
2003	113	23	2758	335.862	-424.454	D	6.592	6.591	0.001	1.243	95.17	4.85	0	0	0	0.04
2003	114	23	1	318.65	-445.782	D	8.02	8.02	0	4.243	0	0	0	0	0	0
2003	115	23	2781	339.842	-425.379	D	8.455	8.448	0.008	5.226	89.05	10.92	0	0	0	0.02
2003	116	23	2789	340.496	-426.449	D	8.403	8.355	0.048	5.009	67.82	32.17	0	0	0	0.01
2003	117	23	2606	319.359	-441.767	D	7.059	7.057	0.001	2.175	95.56	4.35	0	0	0	0.01
2003	118	23	863	325.509	-431.992	D	7.437	7.437	0	2.968	68.14	0.15	0	0	0	0.01
2003	119	23	1	318.65	-445.782	D	7.327	7.327	0	2.733	86.3	0.35	0	0	0	0.01
2003	120	23	1	318.65	-445.782	D	7.985	7.985	0	4.163	0	0	0	0	0	0
2003	121	23	1	318.65	-445.782	D	7.624	7.624	0	3.367	0	0	0	0	0	0
2003	122	23	2781	339.842	-425.379	D	8.84	8.837	0.003	6.159	99.25	0.67	0	0	0	0.04
2003	123	23	2758	335.862	-424.454	D	8.806	8.503	0.304	5.356	87.82	12.18	0	0	0	0
2003	124	23	2704	329.056	-425.092	D	7.319	7.315	0.004	2.71	99.26	0.74	0	0	0	0.01
2003	125	23	1	318.65	-445.782	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	8.385	8.385	0	5.081	0	0	0	0	0	0
2003	127	23	2781	339.842	-425.379	D	8.584	8.583	0	5.548	89.76	10.39	0	0	0	0.01
2003	128	23	1	318.65	-445.782	D	8.057	8.057	0	4.326	0	0	0	0	0	0
2003	129	23	1	318.65	-445.782	D	7.642	7.642	0	3.407	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	8.486	8.486	0	5.317	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.409	7.409	0	2.907	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	6.899	6.899	0	1.854	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	9.399	9.399	0	7.572	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	8.763	8.763	0	5.98	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	9.31	9.31	0	7.344	0	0	0	0	0	0
2003	137	23	2781	339.842	-425.379	D	9.372	9.371	0.001	7.5	99.43	0.59	0	0	0	0.01
2003	138	23	2704	329.056	-425.092	D	9.123	9.093	0.03	6.795	95.24	4.76	0	0	0	0
2003	139	23	1	318.65	-445.782	D	8.739	8.739	0	5.921	0	0	0	0	0	0
2003	140	23	2789	340.496	-426.449	D	8.465	8.269	0.195	4.811	79.15	20.84	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	141	23	2789	340.496	-426.449	D	6.732	6.723	0.009	1.503	95.25	4.7	0	0	0	0.03
2003	142	23	2781	339.842	-425.379	D	7.122	7.111	0.011	2.285	99.02	0.94	0	0	0	0.04
2003	143	23	2468	334.002	-434.887	D	6.724	6.691	0.033	1.439	98.77	1.2	0	0	0	0.03
2003	144	23	2781	339.842	-425.379	D	7.833	7.786	0.047	3.721	98.55	1.44	0	0	0	0.01
2003	145	23	2758	335.862	-424.454	D	9.269	9.201	0.068	7.066	95.07	4.93	0	0	0	0.01
2003	146	23	2597	318.971	-443.851	D	8.156	8.096	0.06	4.414	97.54	2.46	0	0	0	0
2003	147	23	2628	320.933	-436.998	D	6.649	6.646	0.003	1.351	97.41	2.51	0	0	0	0.07
2003	148	23	2588	318.452	-445.8	D	6.599	6.596	0.003	1.253	98.96	1.04	0	0	0	0.03
2003	149	23	1456	329.977	-431.796	D	7.249	7.249	0	2.572	27.11	0.02	0	0	0	0.01
2003	150	23	1	318.65	-445.782	D	6.614	6.614	0	1.289	0	0	0	0	0	0
2003	151	23	1	318.65	-445.782	D	7.098	7.098	0	2.258	0	0	0	0	0	0
2003	152	23	454	323.042	-443.841	D	7.187	7.171	0.017	2.409	95.68	4.3	0	0	0	0.01
2003	153	23	2684	326.713	-427.014	D	8.689	8.688	0.001	5.799	99.62	0.37	0	0	0	0.01
2003	154	23	2781	339.842	-425.379	D	9.19	9.118	0.072	6.857	83.44	16.56	0	0	0	0
2003	155	23	2468	334.002	-434.887	D	7.51	7.51	0	3.122	87.88	0.16	0	0	0	0.03
2003	156	23	2468	334.002	-434.887	D	6.82	6.809	0.011	1.674	99.4	0.57	0	0	0	0.02
2003	157	23	2255	335.942	-426.039	D	8.819	8.784	0.035	6.03	97.77	2.22	0	0	0	0
2003	158	23	1	318.65	-445.782	D	7.479	7.479	0	3.057	0	0	0	0	0	0
2003	159	23	1	318.65	-445.782	D	7.001	7.001	0	2.06	0	0	0	0	0	0
2003	160	23	1	318.65	-445.782	D	6.621	6.621	0	1.301	0	0	0	0	0	0
2003	161	23	1	318.65	-445.782	D	7.499	7.499	0	3.098	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	8.817	8.817	0	6.112	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	8.874	8.874	0	6.251	0	0	0	0	0	0
2003	164	23	2271	336.212	-426.526	D	9.229	9.229	0	7.137	93.47	0.12	0	0	0	0.01
2003	165	23	2758	335.862	-424.454	D	8.398	8.299	0.1	4.879	92.01	7.98	0	0	0	0.01
2003	166	23	2571	322.646	-445.476	D	8.437	8.279	0.158	4.833	95.02	4.98	0	0	0	0
2003	167	23	2789	340.496	-426.449	D	8.145	8.117	0.028	4.462	98.23	1.76	0	0	0	0
2003	168	23	2564	323.159	-444.002	D	7.65	7.645	0.006	3.413	98.03	1.95	0	0	0	0
2003	169	23	2571	322.646	-445.476	D	8.954	8.946	0.008	6.427	97.59	2.38	0	0	0	0
2003	170	23	2684	326.713	-427.014	D	8.551	8.521	0.031	5.4	99.05	0.94	0	0	0	0.01
2003	171	23	2789	340.496	-426.449	D	8.697	8.404	0.293	5.124	88.91	11.08	0	0	0	0
2003	172	23	2588	318.452	-445.8	D	6.973	6.969	0.004	1.995	99.71	0.27	0	0	0	0.01
2003	173	23	1	318.65	-445.782	D	6.92	6.92	0	1.897	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.108	7.108	0	2.279	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.784	7.784	0	3.718	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	8.399	8.399	0	5.113	0	0	0	0	0	0
2003	177	23	1	318.65	-445.782	D	8.699	8.699	0	5.825	0	0	0	0	0	0
2003	178	23	2571	322.646	-445.476	D	6.832	6.832	0	1.719	98.5	0.46	0	0	0	0.06
2003	179	23	2789	340.496	-426.449	D	6.648	6.647	0.001	1.352	99.3	0.59	0	0	0	0.03

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	180	23	2757	335.63	-424.484	D	6.717	6.716	0.001	1.489	99.67	0.31	0	0	0	0.02
2003	181	23	2780	339.614	-425.419	D	7.102	7.102	0	2.267	99.01	0.42	0	0	0	0.01
2003	182	23	1414	329.196	-425.335	D	8.86	8.86	0	6.216	98.39	0.99	0	0	0	0
2003	183	23	2784	339.87	-426.019	D	7.524	7.524	0	3.153	96.12	0.11	0	0	0	0.01
2003	184	23	2780	339.614	-425.419	D	7.374	7.374	0	2.832	88.71	0.15	0	0	0	0.01
2003	185	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	8.318	8.318	0	4.923	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.086	7.086	0	2.234	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.739	7.739	0	3.619	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	8.593	8.593	0	5.571	0	0	0	0	0	0
2003	192	23	1	318.65	-445.782	D	7.285	7.285	0	2.647	0	0	0	0	0	0
2003	193	23	1	318.65	-445.782	D	7.83	7.83	0	3.819	0	0	0	0	0	0
2003	194	23	2784	339.87	-426.019	D	7.246	7.246	0	2.564	98.75	0.08	0	0	0	0.01
2003	195	23	2781	339.842	-425.379	D	8.457	8.448	0.009	5.227	98.57	1.41	0	0	0	0
2003	196	23	2781	339.842	-425.379	D	8.22	8.22	0	4.698	98.86	0.07	0	0	0	0.01
2003	197	23	1	318.65	-445.782	D	6.957	6.957	0	1.972	0	0	0	0	0	0
2003	198	23	2789	340.496	-426.449	D	7.155	7.155	0	2.375	99.89	0.29	0	0	0	0.01
2003	199	23	2788	340.294	-426.448	D	7.116	7.116	0	2.295	99.61	0.1	0	0	0	0.01
2003	200	23	1	318.65	-445.782	D	7.564	7.564	0	3.238	0	0	0	0	0	0
2003	201	23	2417	339.654	-425.626	D	8.558	8.558	0	5.488	99.66	0.51	0	0	0	0
2003	202	23	1	318.65	-445.782	D	8.079	8.079	0	4.375	0	0	0	0	0	0
2003	203	23	1	318.65	-445.782	D	7.552	7.552	0	3.213	0	0	0	0	0	0
2003	204	23	2709	330.21	-424.978	D	7.047	7.035	0.012	2.129	92.54	7.42	0	0	0	0.05
2003	205	23	2653	324.014	-433.36	D	7.031	6.968	0.063	1.993	98.91	1.07	0	0	0	0.02
2003	206	23	2708	329.979	-425	D	7.115	7.106	0.009	2.275	99.44	0.56	0	0	0	0.01
2003	207	23	1	318.65	-445.782	D	6.798	6.798	0	1.652	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.085	7.085	0	2.232	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.085	7.085	0	2.233	0	0	0	0	0	0
2003	210	23	2781	339.842	-425.379	D	8.441	8.415	0.025	5.151	96.55	3.43	0	0	0	0
2003	211	23	2781	339.842	-425.379	D	9.424	9.347	0.077	7.44	96.76	3.24	0	0	0	0
2003	212	23	2789	340.496	-426.449	D	7.645	7.607	0.039	3.331	97.89	2.1	0	0	0	0
2003	213	23	2789	340.496	-426.449	D	6.904	6.901	0.003	1.858	99.04	0.89	0	0	0	0.01
2003	214	23	2210	335.901	-430.787	D	7.673	7.672	0.001	3.471	99.64	0.27	0	0	0	0
2003	215	23	1	318.65	-445.782	D	7.59	7.59	0	3.294	0	0	0	0	0	0
2003	216	23	1	318.65	-445.782	D	7.802	7.802	0	3.758	0	0	0	0	0	0
2003	217	23	1	318.65	-445.782	D	8.259	8.259	0	4.787	0	0	0	0	0	0
2003	218	23	2693	327.829	-426.17	D	8.622	8.602	0.02	5.592	99.19	0.8	0	0	0	0.01

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	219	23	2623	320.666	-438.044	D	8.692	8.443	0.25	5.214	92.32	7.68	0	0	0	0.01
2003	220	23	2758	335.862	-424.454	D	7.154	7.066	0.088	2.193	98.79	1.19	0	0	0	0.02
2003	221	23	2600	318.952	-443.12	D	7.016	6.98	0.036	2.018	99.46	0.51	0	0	0	0.02
2003	222	23	2588	318.452	-445.8	D	7.211	7.162	0.049	2.39	99.54	0.44	0	0	0	0.02
2003	223	23	2588	318.452	-445.8	D	7.36	7.272	0.088	2.62	99.31	0.67	0	0	0	0.01
2003	224	23	2588	318.452	-445.8	D	7.208	7.207	0.001	2.483	99.43	0.64	0	0	0	0.01
2003	225	23	1	318.65	-445.782	D	8.321	8.321	0	4.931	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	8.753	8.753	0	5.955	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.337	7.337	0	2.755	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.347	7.347	0	2.776	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2003	230	23	2789	340.496	-426.449	D	6.902	6.901	0.001	1.859	99.89	0.05	0	0	0	0.02
2003	231	23	2789	340.496	-426.449	D	6.832	6.826	0.007	1.706	99.69	0.3	0	0	0	0.01
2003	232	23	2789	340.496	-426.449	D	6.865	6.86	0.005	1.775	99.43	0.55	0	0	0	0.01
2003	233	23	2789	340.496	-426.449	D	6.923	6.921	0.002	1.898	99.3	0.7	0	0	0	0.01
2003	234	23	2789	340.496	-426.449	D	7.115	7.113	0.002	2.289	99.62	0.36	0	0	0	0.01
2003	235	23	2704	329.056	-425.092	D	7.049	7.028	0.021	2.115	99.73	0.25	0	0	0	0.02
2003	236	23	2588	318.452	-445.8	D	8.639	8.515	0.124	5.385	96.31	3.68	0	0	0	0
2003	237	23	1548	330.222	-426.04	D	7.912	7.872	0.04	3.912	99.39	0.6	0	0	0	0.01
2003	238	23	2708	329.979	-425	D	7.355	7.352	0.003	2.787	99.93	0.05	0	0	0	0.01
2003	239	23	2409	339.158	-425.648	D	7.03	7.03	0	2.119	97.04	0.06	0	0	0	0.01
2003	240	23	1	318.65	-445.782	D	7.105	7.105	0	2.273	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	8.394	8.394	0	5.101	0	0	0	0	0	0
2003	242	23	2275	336.168	-425.529	D	9.233	9.233	0	7.147	102.07	0.91	0	0	0	0
2003	243	23	2755	335.167	-424.545	D	9.353	9.353	0	7.454	94.8	3.22	0	0	0	0
2003	244	23	1	318.65	-445.782	D	9.456	9.456	0	7.721	0	0	0	0	0	0
2003	245	23	2653	324.014	-433.36	D	9.806	9.788	0.018	8.598	99.39	0.6	0	0	0	0
2003	246	23	2589	318.383	-445.593	D	9.465	9.235	0.231	7.152	94.13	5.86	0	0	0	0
2003	247	23	2790	340.421	-426.562	D	7.771	7.699	0.072	3.531	97.13	2.85	0	0	0	0.01
2003	248	23	2684	326.713	-427.014	D	6.78	6.745	0.036	1.545	95.61	4.34	0	0	0	0.04
2003	249	23	2588	318.452	-445.8	D	6.844	6.844	0	1.743	99.38	0.24	0	0	0	0.04
2003	250	23	1	318.65	-445.782	D	6.929	6.929	0	1.915	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.063	7.063	0	2.187	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.368	7.368	0	2.821	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	8.253	8.253	0	4.773	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	9.962	9.962	0	9.071	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	9.428	9.428	0	7.649	0	0	0	0	0	0
2003	257	23	2781	339.842	-425.379	D	8.77	8.651	0.12	5.708	84.64	15.35	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	258	23	1	318.65	-445.782	D	6.717	6.717	0	1.49	0	0	0	0	0	0
2003	259	23	2789	340.496	-426.449	D	6.646	6.645	0.001	1.349	99.09	0.59	0	0	0	0.04
2003	260	23	2781	339.842	-425.379	D	6.76	6.755	0.006	1.565	98.63	1.35	0	0	0	0.02
2003	261	23	2758	335.862	-424.454	D	6.771	6.77	0	1.596	99.53	0.55	0	0	0	0.01
2003	262	23	1	318.65	-445.782	D	7.776	7.776	0	3.698	0	0	0	0	0	0
2003	263	23	2789	340.496	-426.449	D	6.599	6.588	0.011	1.236	97.93	2.03	0	0	0	0.04
2003	264	23	2704	329.056	-425.092	D	7.05	7.045	0.005	2.15	99.19	0.79	0	0	0	0.02
2003	265	23	1	318.65	-445.782	D	9.072	9.072	0	6.741	0	0	0	0	0	0
2003	266	23	1	318.65	-445.782	D	6.857	6.857	0	1.769	0	0	0	0	0	0
2003	267	23	1	318.65	-445.782	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2003	268	23	2693	327.829	-426.17	D	6.852	6.846	0.006	1.748	75.58	24.28	0	0	0	0.13
2003	269	23	2789	340.496	-426.449	D	7.041	7.039	0.002	2.138	96	3.86	0	0	0	0.01
2003	270	23	1	318.65	-445.782	D	7.334	7.334	0	2.749	0	0	0	0	0	0
2003	271	23	1	318.65	-445.782	D	6.654	6.654	0	1.366	0	0	0	0	0	0
2003	272	23	2789	340.496	-426.449	D	6.535	6.533	0.002	1.13	71.48	28.31	0	0	0	0.15
2003	273	23	2468	334.002	-434.887	D	6.562	6.558	0.004	1.178	96.19	3.8	0	0	0	0.06
2003	274	23	2784	339.87	-426.019	D	8.448	8.405	0.044	5.126	77.82	22.17	0	0	0	0
2003	275	23	779	324.808	-433.022	D	6.574	6.572	0.002	1.205	79.67	20.23	0	0	0	0.09
2003	276	23	2628	320.933	-436.998	D	7.12	7.119	0.001	2.301	94.71	5.02	0	0	0	0.04
2003	277	23	1	318.65	-445.782	D	6.805	6.805	0	1.666	0	0	0	0	0	0
2003	278	23	2789	340.496	-426.449	D	7.033	7.032	0.001	2.124	96.79	3.2	0	0	0	0.02
2003	279	23	2789	340.496	-426.449	D	9.383	9.344	0.039	7.431	93.65	6.35	0	0	0	0
2003	280	23	2623	320.666	-438.044	D	7.878	7.852	0.026	3.868	97.73	2.26	0	0	0	0.01
2003	281	23	1413	329.207	-425.585	D	7.609	7.609	0	3.336	99.42	0.26	0	0	0	0.01
2003	282	23	1	318.65	-445.782	D	8.905	8.905	0	6.328	0	0	0	0	0	0
2003	283	23	1	318.65	-445.782	D	9.734	9.734	0	8.453	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	9.551	9.551	0	7.97	0	0	0	0	0	0
2003	285	23	2789	340.496	-426.449	D	7.894	7.891	0.003	3.954	97.43	2.5	0	0	0	0.06
2003	286	23	2789	340.496	-426.449	D	6.904	6.894	0.01	1.843	97.3	2.68	0	0	0	0.03
2003	287	23	2781	339.842	-425.379	D	8.871	8.869	0.003	6.238	90.75	9.23	0	0	0	0
2003	288	23	1	318.65	-445.782	D	6.692	6.692	0	1.442	0	0	0	0	0	0
2003	289	23	1	318.65	-445.782	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2003	290	23	2694	327.861	-425.964	D	8.16	8.15	0.01	4.537	86.13	13.86	0	0	0	0
2003	291	23	2684	326.713	-427.014	D	6.624	6.617	0.007	1.293	95.18	4.76	0	0	0	0.04
2003	292	23	2781	339.842	-425.379	D	6.61	6.609	0.001	1.278	99.07	0.85	0	0	0	0.03
2003	293	23	1	318.65	-445.782	D	6.677	6.677	0	1.412	0	0	0	0	0	0
2003	294	23	1	318.65	-445.782	D	6.703	6.703	0	1.464	0	0	0	0	0	0
2003	295	23	2684	326.713	-427.014	D	6.728	6.723	0.005	1.502	99.36	0.55	0	0	0	0.08
2003	296	23	2588	318.452	-445.8	D	6.624	6.61	0.014	1.28	98.55	1.39	0	0	0	0.05

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	297	23	2789	340.496	-426.449	D	6.692	6.691	0.001	1.44	97.01	2.82	0	0	0	0.04
2003	298	23	2041	333.901	-424.879	D	8.184	7.99	0.195	4.174	76.17	23.82	0	0	0	0.01
2003	299	23	2468	334.002	-434.887	D	7.558	7.522	0.036	3.149	73.16	26.84	0	0	0	0
2003	300	23	1	318.65	-445.782	D	6.536	6.536	0	1.135	0	0	0	0	0	0
2003	301	23	1	318.65	-445.782	D	6.598	6.598	0	1.258	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.414	7.414	0	2.919	0	0	0	0	0	0
2003	304	23	1	318.65	-445.782	D	9.409	9.409	0	7.599	0	0	0	0	0	0
2003	305	23	2781	339.842	-425.379	D	9.424	9.4	0.024	7.576	74.21	25.78	0	0	0	0.01
2003	306	23	1	318.65	-445.782	D	8.79	8.79	0	6.045	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.877	7.877	0	3.922	0	0	0	0	0	0
2003	308	23	1	318.65	-445.782	D	7.389	7.389	0	2.864	0	0	0	0	0	0
2003	309	23	2781	339.842	-425.379	D	8.08	8.075	0.005	4.367	89.26	10.69	0	0	0	0.04
2003	310	23	2789	340.496	-426.449	D	9.021	8.919	0.103	6.36	72.23	27.76	0	0	0	0.01
2003	311	23	2563	323.259	-443.79	D	7.982	7.883	0.1	3.935	75.6	24.39	0	0	0	0.01
2003	312	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	6.51	6.51	0	1.085	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	6.616	6.616	0	1.292	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	9.37	9.37	0	7.497	0	0	0	0	0	0
2003	317	23	1	318.65	-445.782	D	6.486	6.486	0	1.04	0	0	0	0	0	0
2003	318	23	1	318.65	-445.782	D	6.751	6.751	0	1.557	0	0	0	0	0	0
2003	319	23	1	318.65	-445.782	D	8.304	8.304	0	4.891	0	0	0	0	0	0
2003	320	23	1	318.65	-445.782	D	9.626	9.626	0	8.168	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	10.088	10.088	0	9.417	0	0	0	0	0	0
2003	322	23	1	318.65	-445.782	D	9.908	9.908	0	8.922	0	0	0	0	0	0
2003	323	23	1	318.65	-445.782	D	7.343	7.343	0	2.768	0	0	0	0	0	0
2003	324	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	9.817	9.817	0	8.677	0	0	0	0	0	0
2003	327	23	1	318.65	-445.782	D	9.125	9.125	0	6.874	0	0	0	0	0	0
2003	328	23	1	318.65	-445.782	D	7.264	7.264	0	2.603	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.434	7.434	0	2.961	0	0	0	0	0	0
2003	331	23	2789	340.496	-426.449	D	9.169	9.167	0.002	6.981	80.96	19	0	0	0	0.01
2003	332	23	2789	340.496	-426.449	D	6.84	6.839	0.001	1.734	82.45	17.6	0	0	0	0
2003	333	23	1	318.65	-445.782	D	6.494	6.494	0	1.054	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2003	335	23	2684	326.713	-427.014	D	6.674	6.66	0.013	1.379	44.09	55.77	0	0	0	0.13

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	336	23	1	318.65	-445.782	D	6.513	6.513	0	1.092	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0
2003	338	23	2784	339.87	-426.019	D	9.192	9.16	0.032	6.962	81.35	18.64	0	0	0	0.01
2003	339	23	2468	334.002	-434.887	D	8.538	8.536	0.002	5.436	85.79	14.2	0	0	0	0
2003	340	23	1	318.65	-445.782	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	341	23	2789	340.496	-426.449	D	6.655	6.653	0.002	1.365	67.5	32.36	0	0	0	0.03
2003	342	23	1	318.65	-445.782	D	8.111	8.111	0	4.449	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	10.155	10.155	0	9.603	0	0	0	0	0	0
2003	344	23	2758	335.862	-424.454	D	8.936	8.9	0.035	6.315	81.69	18.31	0	0	0	0
2003	345	23	1	318.65	-445.782	D	7.408	7.408	0	2.905	0	0	0	0	0	0
2003	346	23	2781	339.842	-425.379	D	6.848	6.844	0.004	1.742	72.66	27.3	0	0	0	0.02
2003	347	23	2589	318.383	-445.593	D	9.617	9.614	0.003	8.134	72.57	27.41	0	0	0	0.01
2003	348	23	1	318.65	-445.782	D	9.425	9.425	0	7.641	0	0	0	0	0	0
2003	349	23	1	318.65	-445.782	D	9.203	9.203	0	7.071	0	0	0	0	0	0
2003	350	23	1	318.65	-445.782	D	8.775	8.775	0	6.01	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.444	7.444	0	2.982	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.467	7.467	0	3.031	0	0	0	0	0	0
2003	354	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	355	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0
2003	356	23	1	318.65	-445.782	D	9.46	9.46	0	7.73	0	0	0	0	0	0
2003	357	23	2789	340.496	-426.449	D	9.467	9.464	0.003	7.742	32.34	67.59	0	0	0	0.02
2003	358	23	1	318.65	-445.782	D	8.21	8.21	0	4.675	0	0	0	0	0	0
2003	359	23	1	318.65	-445.782	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2003	360	23	2788	340.294	-426.448	D	6.838	6.838	0	1.731	79.2	21.86	0	0	0	0.02
2003	361	23	2385	338.165	-425.691	D	6.757	6.757	0	1.569	4.59	0.87	0	0	0	0
2003	362	23	1	318.65	-445.782	D	8.719	8.719	0	5.874	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.299	7.299	0	2.675	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	6.566	6.566	0	1.194	0	0	0	0	0	0
									0.385							
HOLCIM									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	6.999	6.999	0	2.056	0	0	0	0	0	0
2003	2	23	2709	330.21	-424.978	D	9.571	9.354	0.217	7.456	18.5	81.37	0	0	0	0.13
2003	3	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0
2003	4	23	1	318.65	-445.782	D	6.784	6.784	0	1.624	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	5	23	1	318.65	-445.782	D	7.26	7.26	0	2.595	0	0	0	0	0	0
2003	6	23	1	318.65	-445.782	D	8.242	8.242	0	4.748	0	0	0	0	0	0
2003	7	23	1	318.65	-445.782	D	7.239	7.239	0	2.55	0	0	0	0	0	0
2003	8	23	1	318.65	-445.782	D	6.71	6.71	0	1.477	0	0	0	0	0	0
2003	9	23	1	318.65	-445.782	D	6.922	6.922	0	1.9	0	0	0	0	0	0
2003	10	23	1	318.65	-445.782	D	6.587	6.587	0	1.234	0	0	0	0	0	0
2003	11	23	1	318.65	-445.782	D	6.549	6.549	0	1.161	0	0	0	0	0	0
2003	12	23	1	318.65	-445.782	D	6.5	6.5	0	1.066	0	0	0	0	0	0
2003	13	23	1	318.65	-445.782	D	6.708	6.708	0	1.473	0	0	0	0	0	0
2003	14	23	1	318.65	-445.782	D	9.224	9.224	0	7.124	0	0	0	0	0	0
2003	15	23	1	318.65	-445.782	D	6.625	6.625	0	1.309	0	0	0	0	0	0
2003	16	23	2767	337.165	-425.117	D	8.639	8.274	0.364	4.822	50.08	49.79	0	0	0	0.13
2003	17	23	2468	334.002	-434.887	D	8.105	8.101	0.005	4.425	57.77	42.19	0	0	0	0.06
2003	18	23	1	318.65	-445.782	D	6.57	6.57	0	1.203	0	0	0	0	0	0
2003	19	23	1	318.65	-445.782	D	6.651	6.651	0	1.361	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	6.624	6.624	0	1.308	0	0	0	0	0	0
2003	21	23	2784	339.87	-426.019	D	7.664	7.533	0.131	3.171	47.63	52.28	0	0	0	0.08
2003	22	23	2706	329.518	-425.046	D	7.802	7.571	0.23	3.254	24.85	74.63	0	0	0	0.52
2003	23	23	1	318.65	-445.782	D	6.876	6.876	0	1.806	0	0	0	0	0	0
2003	24	23	1	318.65	-445.782	D	6.593	6.593	0	1.246	0	0	0	0	0	0
2003	25	23	1	318.65	-445.782	D	6.497	6.497	0	1.06	0	0	0	0	0	0
2003	26	23	1	318.65	-445.782	D	7.121	7.121	0	2.305	0	0	0	0	0	0
2003	27	23	1	318.65	-445.782	D	6.778	6.778	0	1.612	0	0	0	0	0	0
2003	28	23	1	318.65	-445.782	D	8.235	8.235	0	4.732	0	0	0	0	0	0
2003	29	23	2789	340.496	-426.449	D	9.799	9.793	0.006	8.612	59.68	40.19	0	0	0	0.12
2003	30	23	2704	329.056	-425.092	D	9.818	9.151	**0.667**	6.94	64.68	35.27	0	0	0	0.05
2003	31	23	1415	329.185	-425.086	D	7.067	7.067	0	2.196	80.31	19.45	0	0	0	0.3
2003	32	23	1	318.65	-445.782	D	6.936	6.936	0	1.929	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	6.87	6.87	0	1.795	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	9.527	9.527	0	7.906	0	0	0	0	0	0
2003	35	23	1	318.65	-445.782	D	7.1	7.1	0	2.263	0	0	0	0	0	0
2003	36	23	1	318.65	-445.782	D	6.56	6.56	0	1.182	0	0	0	0	0	0
2003	37	23	2781	339.842	-425.379	D	9.214	9.182	0.032	7.018	56.51	43.44	0	0	0	0.04
2003	38	23	2789	340.496	-426.449	D	8.107	8.011	0.097	4.221	59.31	40.66	0	0	0	0.03
2003	39	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.657	7.657	0	3.439	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	9.339	9.339	0	7.418	0	0	0	0	0	0
2003	42	23	1	318.65	-445.782	D	6.733	6.733	0	1.522	0	0	0	0	0	0
2003	43	23	1	318.65	-445.782	D	6.521	6.521	0	1.107	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	44	23	1	318.65	-445.782	D	6.659	6.659	0	1.376	0	0	0	0	0	0
2003	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2003	46	23	1	318.65	-445.782	D	10.176	10.176	0	9.662	0	0	0	0	0	0
2003	47	23	2781	339.842	-425.379	D	8.891	8.654	0.237	5.716	35.27	64.51	0	0	0	0.22
2003	48	23	2789	340.496	-426.449	D	8.999	8.273	**0.725**	4.82	61.02	38.89	0	0	0	0.08
2003	49	23	1	318.65	-445.782	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	50	23	2379	338.23	-427.187	D	9.195	9.195	0	7.051	68.38	25.37	0	0	0	0.05
2003	51	23	2704	329.056	-425.092	D	10.656	9.524	**1.132**	7.899	66.09	33.87	0	0	0	0.04
2003	52	23	2789	340.496	-426.449	D	9.764	9.679	0.085	8.307	75.6	24.37	0	0	0	0.02
2003	53	23	2789	340.496	-426.449	D	9.637	9.493	0.144	7.818	66.3	33.62	0	0	0	0.08
2003	54	23	1	318.65	-445.782	D	8.727	8.727	0	5.892	0	0	0	0	0	0
2003	55	23	2781	339.842	-425.379	D	8.612	8.461	0.151	5.257	58.44	41.51	0	0	0	0.05
2003	56	23	2789	340.496	-426.449	D	7.461	7.411	0.05	2.913	37.07	62.62	0	0	0	0.32
2003	57	23	2789	340.496	-426.449	D	9.07	8.558	**0.512**	5.487	46.7	53.23	0	0	0	0.07
2003	58	23	2693	327.829	-426.17	D	8.984	8.768	0.216	5.991	57.8	42.15	0	0	0	0.05
2003	59	23	2694	327.861	-425.964	D	9.069	8.967	0.102	6.48	65.6	34.35	0	0	0	0.04
2003	60	23	2706	329.518	-425.046	D	9.673	9.651	0.022	8.233	70.48	29.49	0	0	0	0.03
2003	61	23	2781	339.842	-425.379	D	9.152	9.119	0.032	6.86	72.6	27.37	0	0	0	0.03
2003	62	23	2789	340.496	-426.449	D	7.374	7.373	0	2.832	77.18	21.49	0	0	0	0.14
2003	63	23	1	318.65	-445.782	D	7.002	7.002	0	2.063	0	0	0	0	0	0
2003	64	23	1	318.65	-445.782	D	9.117	9.117	0	6.855	0	0	0	0	0	0
2003	65	23	2789	340.496	-426.449	D	7.573	7.573	0	3.258	69.74	29.91	0	0	0	0.62
2003	66	23	2789	340.496	-426.449	D	6.951	6.945	0.006	1.946	65.93	33.8	0	0	0	0.25
2003	67	23	2781	339.842	-425.379	D	7.068	7.068	0	2.196	91.03	8.94	0	0	0	0.28
2003	68	23	1	318.65	-445.782	D	7.068	7.068	0	2.198	0	0	0	0	0	0
2003	69	23	2789	340.496	-426.449	D	6.561	6.547	0.014	1.158	50.61	48.48	0	0	0	0.9
2003	70	23	2789	340.496	-426.449	D	6.602	6.546	0.057	1.155	61.6	37.83	0	0	0	0.57
2003	71	23	2789	340.496	-426.449	D	7.117	7.113	0.004	2.289	85.53	14.04	0	0	0	0.44
2003	72	23	1	318.65	-445.782	D	8.466	8.466	0	5.269	0	0	0	0	0	0
2003	73	23	2694	327.861	-425.964	D	9.202	8.674	**0.528**	5.764	68.51	31.43	0	0	0	0.06
2003	74	23	2684	326.713	-427.014	D	8.199	8.138	0.061	4.509	84.47	15.45	0	0	0	0.08
2003	75	23	2707	329.748	-425.023	D	7.29	7.289	0	2.656	97.12	1.26	0	0	0	0.22
2003	76	23	1	318.65	-445.782	D	8.644	8.644	0	5.692	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	8.653	8.653	0	5.713	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	8.871	8.871	0	6.244	0	0	0	0	0	0
2003	79	23	2758	335.862	-424.454	D	9.22	9.213	0.007	7.097	59.58	40.36	0	0	0	0.05
2003	80	23	2781	339.842	-425.379	D	8.959	8.832	0.127	6.147	62.1	37.86	0	0	0	0.04
2003	81	23	1	318.65	-445.782	D	6.545	6.545	0	1.154	0	0	0	0	0	0
2003	82	23	1	318.65	-445.782	D	6.586	6.586	0	1.234	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	83	23	1	318.65	-445.782	D	6.82	6.82	0	1.696	0	0	0	0	0	0
2003	84	23	1	318.65	-445.782	D	7.607	7.607	0	3.331	0	0	0	0	0	0
2003	85	23	2468	334.002	-434.887	D	9.065	8.823	0.242	6.126	44.86	54.95	0	0	0	0.19
2003	86	23	2628	320.933	-436.998	D	6.629	6.616	0.012	1.292	86.41	12.79	0	0	0	0.8
2003	87	23	1	318.65	-445.782	D	8.676	8.676	0	5.769	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.301	7.301	0	2.679	0	0	0	0	0	0
2003	89	23	1	318.65	-445.782	D	6.525	6.525	0	1.115	0	0	0	0	0	0
2003	90	23	1	318.65	-445.782	D	6.478	6.478	0	1.023	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.231	7.231	0	2.533	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	8.075	8.075	0	4.366	0	0	0	0	0	0
2003	95	23	1	318.65	-445.782	D	6.747	6.747	0	1.55	0	0	0	0	0	0
2003	96	23	2781	339.842	-425.379	D	8.08	8.057	0.024	4.325	65.9	34.06	0	0	0	0.05
2003	97	23	1	318.65	-445.782	D	9.082	9.082	0	6.766	0	0	0	0	0	0
2003	98	23	2789	340.496	-426.449	D	7.434	7.431	0.002	2.955	66.3	33.47	0	0	0	0.16
2003	99	23	1	318.65	-445.782	D	6.95	6.95	0	1.956	0	0	0	0	0	0
2003	100	23	2789	340.496	-426.449	D	6.594	6.591	0.002	1.244	41.12	57.69	0	0	0	1.15
2003	101	23	2789	340.496	-426.449	D	6.49	6.479	0.011	1.025	89.65	9.47	0	0	0	0.89
2003	102	23	2789	340.496	-426.449	D	6.499	6.495	0.003	1.057	97.34	2.11	0	0	0	0.55
2003	103	23	1	318.65	-445.782	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2003	104	23	1	318.65	-445.782	D	6.676	6.676	0	1.411	0	0	0	0	0	0
2003	105	23	1	318.65	-445.782	D	6.637	6.637	0	1.334	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	107	23	1	318.65	-445.782	D	7.437	7.437	0	2.967	0	0	0	0	0	0
2003	108	23	1	318.65	-445.782	D	7.49	7.49	0	3.08	0	0	0	0	0	0
2003	109	23	1	318.65	-445.782	D	7.406	7.406	0	2.902	0	0	0	0	0	0
2003	110	23	1	318.65	-445.782	D	9.045	9.045	0	6.674	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.014	7.014	0	2.087	0	0	0	0	0	0
2003	112	23	1	318.65	-445.782	D	6.538	6.538	0	1.139	0	0	0	0	0	0
2003	113	23	2789	340.496	-426.449	D	6.605	6.588	0.017	1.237	96.6	2.82	0	0	0	0.57
2003	114	23	2704	329.056	-425.092	D	8.026	8.025	0.001	4.255	89.75	10.02	0	0	0	0.25
2003	115	23	2758	335.862	-424.454	D	8.483	8.425	0.059	5.173	88.34	11.47	0	0	0	0.19
2003	116	23	2789	340.496	-426.449	D	8.711	8.355	0.356	5.009	64.86	34.97	0	0	0	0.17
2003	117	23	2600	318.952	-443.12	D	7.086	7.057	0.028	2.175	89.69	10.09	0	0	0	0.21
2003	118	23	2275	336.168	-425.529	D	7.47	7.47	0	3.038	95.63	0.65	0	0	0	0.23
2003	119	23	2780	339.614	-425.419	D	7.485	7.484	0.001	3.068	93.61	6.28	0	0	0	0.09
2003	120	23	1517	329.93	-425.053	D	8.151	8.151	0	4.54	97.23	1.58	0	0	0	0.08
2003	121	23	1	318.65	-445.782	D	7.624	7.624	0	3.367	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	122	23	1	318.65	-445.782	D	8.826	8.826	0	6.133	0	0	0	0	0	0
2003	123	23	2789	340.496	-426.449	D	8.707	8.507	0.2	5.366	87.19	12.67	0	0	0	0.13
2003	124	23	2255	335.942	-426.039	D	7.5	7.318	0.182	2.716	98.19	1.69	0	0	0	0.12
2003	125	23	1	318.65	-445.782	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	8.385	8.385	0	5.081	0	0	0	0	0	0
2003	127	23	2781	339.842	-425.379	D	8.588	8.583	0.004	5.548	77.89	22.01	0	0	0	0.11
2003	128	23	1	318.65	-445.782	D	8.057	8.057	0	4.326	0	0	0	0	0	0
2003	129	23	1	318.65	-445.782	D	7.642	7.642	0	3.407	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	8.486	8.486	0	5.317	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.409	7.409	0	2.907	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	6.899	6.899	0	1.854	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	9.399	9.399	0	7.572	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	8.763	8.763	0	5.98	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	9.31	9.31	0	7.344	0	0	0	0	0	0
2003	137	23	2779	339.386	-425.461	D	9.372	9.371	0.001	7.5	97.8	1.84	0	0	0	0.11
2003	138	23	2684	326.713	-427.014	D	9.191	9.093	0.098	6.795	71.17	28.77	0	0	0	0.06
2003	139	23	2628	320.933	-436.998	D	8.783	8.783	0	6.027	99.37	0.56	0	0	0	0.16
2003	140	23	2708	329.979	-425	D	8.352	8.292	0.06	4.863	89.33	10.63	0	0	0	0.04
2003	141	23	2552	324.659	-442.591	D	6.811	6.723	0.088	1.502	87.27	12.08	0	0	0	0.65
2003	142	23	2596	318.977	-444.095	D	7.507	7.283	0.224	2.641	89.56	10.2	0	0	0	0.24
2003	143	23	2781	339.842	-425.379	D	6.911	6.676	0.235	1.409	95.17	4.35	0	0	0	0.48
2003	144	23	2789	340.496	-426.449	D	8.102	7.793	0.309	3.737	96.9	2.96	0	0	0	0.14
2003	145	23	2781	339.842	-425.379	D	9.635	9.204	0.431	7.074	88.86	11.07	0	0	0	0.08
2003	146	23	2447	336.137	-430.956	D	9.112	8.253	**0.859**	4.773	90.44	9.51	0	0	0	0.05
2003	147	23	2789	340.496	-426.449	D	6.822	6.656	0.167	1.369	90.46	9.11	0	0	0	0.43
2003	148	23	1	318.65	-445.782	D	6.596	6.596	0	1.253	0	0	0	0	0	0
2003	149	23	1	318.65	-445.782	D	7.175	7.175	0	2.418	0	0	0	0	0	0
2003	150	23	1	318.65	-445.782	D	6.614	6.614	0	1.289	0	0	0	0	0	0
2003	151	23	1	318.65	-445.782	D	7.098	7.098	0	2.258	0	0	0	0	0	0
2003	152	23	2789	340.496	-426.449	D	7.229	7.169	0.061	2.404	85.95	13.79	0	0	0	0.27
2003	153	23	2704	329.056	-425.092	D	8.713	8.693	0.02	5.81	97.45	2.41	0	0	0	0.14
2003	154	23	2781	339.842	-425.379	D	9.312	9.118	0.194	6.857	93.84	5.88	0	0	0	0.27
2003	155	23	2789	340.496	-426.449	D	7.687	7.66	0.027	3.446	96.56	3.17	0	0	0	0.26
2003	156	23	1	318.65	-445.782	D	6.821	6.821	0	1.697	0	0	0	0	0	0
2003	157	23	2789	340.496	-426.449	D	8.693	8.688	0.005	5.798	97.15	2.77	0	0	0	0.06
2003	158	23	2789	340.496	-426.449	D	7.561	7.56	0	3.23	87.55	12.01	0	0	0	0.1
2003	159	23	1	318.65	-445.782	D	7.001	7.001	0	2.06	0	0	0	0	0	0
2003	160	23	1	318.65	-445.782	D	6.621	6.621	0	1.301	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	161	23	1	318.65	-445.782	D	7.499	7.499	0	3.098	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	8.817	8.817	0	6.112	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	8.874	8.874	0	6.251	0	0	0	0	0	0
2003	164	23	2757	335.63	-424.484	D	9.213	9.212	0	7.095	98.91	0.5	0	0	0	0.23
2003	165	23	2709	330.21	-424.978	D	9.278	8.299	**0.98**	4.879	87.96	11.99	0	0	0	0.05
2003	166	23	2781	339.842	-425.379	D	9.405	8.119	**1.286**	4.467	83.16	16.76	0	0	0	0.08
2003	167	23	2597	318.971	-443.851	D	8.138	8.097	0.041	4.417	97.46	2.39	0	0	0	0.15
2003	168	23	12	319.07	-444.015	D	7.657	7.645	0.012	3.413	93.98	5.9	0	0	0	0.11
2003	169	23	2695	328.074	-426.025	D	8.941	8.936	0.005	6.402	97.65	2.28	0	0	0	0.05
2003	170	23	2781	339.842	-425.379	D	8.86	8.536	0.324	5.436	96.72	3.16	0	0	0	0.11
2003	171	23	2758	335.862	-424.454	D	9.632	8.408	**1.224**	5.133	89.74	10.2	0	0	0	0.05
2003	172	23	2588	318.452	-445.8	D	6.973	6.969	0.004	1.995	99.24	0.56	0	0	0	0.2
2003	173	23	1	318.65	-445.782	D	6.92	6.92	0	1.897	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.108	7.108	0	2.279	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.784	7.784	0	3.718	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	8.399	8.399	0	5.113	0	0	0	0	0	0
2003	177	23	1	318.65	-445.782	D	8.699	8.699	0	5.825	0	0	0	0	0	0
2003	178	23	1	318.65	-445.782	D	6.832	6.832	0	1.719	0	0	0	0	0	0
2003	179	23	2789	340.496	-426.449	D	6.658	6.647	0.011	1.352	98.37	1.12	0	0	0	0.49
2003	180	23	2781	339.842	-425.379	D	6.731	6.717	0.015	1.49	98.66	1.01	0	0	0	0.31
2003	181	23	2781	339.842	-425.379	D	7.104	7.102	0.002	2.267	98.03	1.75	0	0	0	0.18
2003	182	23	2708	329.979	-425	D	8.863	8.86	0.003	6.216	97.07	2.76	0	0	0	0.05
2003	183	23	2781	339.842	-425.379	D	7.561	7.56	0.001	3.23	97.5	2.4	0	0	0	0.08
2003	184	23	2411	339.428	-426.135	D	7.376	7.375	0	2.836	97.52	0.18	0	0	0	0.11
2003	185	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	8.318	8.318	0	4.923	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.086	7.086	0	2.234	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.739	7.739	0	3.619	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	8.593	8.593	0	5.571	0	0	0	0	0	0
2003	192	23	1	318.65	-445.782	D	7.285	7.285	0	2.647	0	0	0	0	0	0
2003	193	23	1	318.65	-445.782	D	7.83	7.83	0	3.819	0	0	0	0	0	0
2003	194	23	1	318.65	-445.782	D	7.262	7.262	0	2.597	0	0	0	0	0	0
2003	195	23	2781	339.842	-425.379	D	8.452	8.448	0.005	5.227	96.15	3.77	0	0	0	0.05
2003	196	23	1	318.65	-445.782	D	7.902	7.902	0	3.979	0	0	0	0	0	0
2003	197	23	1	318.65	-445.782	D	6.957	6.957	0	1.972	0	0	0	0	0	0
2003	198	23	1	318.65	-445.782	D	7.183	7.183	0	2.433	0	0	0	0	0	0
2003	199	23	2789	340.496	-426.449	D	7.121	7.116	0.005	2.295	99.63	0.12	0	0	0	0.24

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	200	23	2789	340.496	-426.449	D	7.721	7.719	0.002	3.574	99.69	0.19	0	0	0	0.16
2003	201	23	1	318.65	-445.782	D	8.338	8.338	0	4.97	0	0	0	0	0	0
2003	202	23	1	318.65	-445.782	D	8.079	8.079	0	4.375	0	0	0	0	0	0
2003	203	23	1	318.65	-445.782	D	7.552	7.552	0	3.213	0	0	0	0	0	0
2003	204	23	2789	340.496	-426.449	D	7.041	7.04	0.001	2.139	98.02	0.87	0	0	0	1.01
2003	205	23	2789	340.496	-426.449	D	7.183	6.943	0.24	1.942	96.35	3.33	0	0	0	0.32
2003	206	23	2758	335.862	-424.454	D	7.237	7.088	0.148	2.239	97.65	2.16	0	0	0	0.19
2003	207	23	2755	335.167	-424.545	D	6.837	6.836	0	1.728	99.31	0.12	0	0	0	0.28
2003	208	23	1	318.65	-445.782	D	7.085	7.085	0	2.232	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.085	7.085	0	2.233	0	0	0	0	0	0
2003	210	23	2781	339.842	-425.379	D	8.465	8.415	0.05	5.151	99.43	0.51	0	0	0	0.06
2003	211	23	2781	339.842	-425.379	D	9.667	9.347	0.319	7.44	94.15	5.8	0	0	0	0.04
2003	212	23	2789	340.496	-426.449	D	7.849	7.607	0.242	3.331	96.31	3.61	0	0	0	0.08
2003	213	23	2468	334.002	-434.887	D	6.918	6.894	0.024	1.843	99.43	0.45	0	0	0	0.13
2003	214	23	2250	335.996	-427.285	D	7.678	7.672	0.007	3.471	99.54	0.38	0	0	0	0.07
2003	215	23	1	318.65	-445.782	D	7.59	7.59	0	3.294	0	0	0	0	0	0
2003	216	23	1	318.65	-445.782	D	7.802	7.802	0	3.758	0	0	0	0	0	0
2003	217	23	1	318.65	-445.782	D	8.259	8.259	0	4.787	0	0	0	0	0	0
2003	218	23	2784	339.87	-426.019	D	8.643	8.603	0.04	5.595	99.3	0.51	0	0	0	0.18
2003	219	23	2563	323.259	-443.79	D	10.211	8.443	**1.768**	5.214	90	9.92	0	0	0	0.07
2003	220	23	2588	318.452	-445.8	D	7.238	7.094	0.144	2.25	98.4	1.37	0	0	0	0.23
2003	221	23	2255	335.942	-426.039	D	7.347	6.982	0.365	2.022	97.63	2.06	0	0	0	0.3
2003	222	23	2789	340.496	-426.449	D	7.305	7.144	0.161	2.352	98.3	1.38	0	0	0	0.32
2003	223	23	2571	322.646	-445.476	D	7.821	7.272	**0.548**	2.62	98.36	1.46	0	0	0	0.18
2003	224	23	2684	326.713	-427.014	D	7.304	7.109	0.195	2.28	95.3	4.5	0	0	0	0.19
2003	225	23	1	318.65	-445.782	D	8.321	8.321	0	4.931	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	8.753	8.753	0	5.955	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.337	7.337	0	2.755	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.347	7.347	0	2.776	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2003	230	23	2789	340.496	-426.449	D	6.903	6.901	0.001	1.859	99.39	0.26	0	0	0	0.32
2003	231	23	2789	340.496	-426.449	D	6.899	6.826	0.073	1.706	98.82	0.91	0	0	0	0.27
2003	232	23	2789	340.496	-426.449	D	6.969	6.86	0.109	1.775	98.38	1.45	0	0	0	0.17
2003	233	23	2789	340.496	-426.449	D	6.977	6.921	0.056	1.898	98.51	1.34	0	0	0	0.15
2003	234	23	2789	340.496	-426.449	D	7.148	7.113	0.036	2.289	99.24	0.64	0	0	0	0.12
2003	235	23	2789	340.496	-426.449	D	7.094	7.028	0.066	2.114	99.3	0.29	0	0	0	0.41
2003	236	23	2695	328.074	-426.025	D	9.09	8.535	**0.554**	5.433	93.44	6.48	0	0	0	0.08
2003	237	23	1548	330.222	-426.04	D	7.958	7.872	0.085	3.912	98.56	1.34	0	0	0	0.1
2003	238	23	2784	339.87	-426.019	D	7.384	7.375	0.009	2.835	99.73	0.15	0	0	0	0.11

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	239	23	2417	339.654	-425.626	D	7.03	7.03	0	2.119	99.17	0.2	0	0	0	0.13
2003	240	23	1	318.65	-445.782	D	7.105	7.105	0	2.273	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	8.394	8.394	0	5.101	0	0	0	0	0	0
2003	242	23	1	318.65	-445.782	D	8.773	8.773	0	6.004	0	0	0	0	0	0
2003	243	23	1	318.65	-445.782	D	9.309	9.309	0	7.34	0	0	0	0	0	0
2003	244	23	1	318.65	-445.782	D	9.456	9.456	0	7.721	0	0	0	0	0	0
2003	245	23	2704	329.056	-425.092	D	9.825	9.746	0.079	8.487	97.42	2.53	0	0	0	0.05
2003	246	23	2589	318.383	-445.593	D	10.409	9.235	**1.175**	7.152	80.34	19.59	0	0	0	0.07
2003	247	23	2563	323.259	-443.79	D	7.854	7.678	0.176	3.485	97.48	2.29	0	0	0	0.22
2003	248	23	2790	340.421	-426.562	D	6.773	6.749	0.024	1.553	93.56	5.29	0	0	0	1.14
2003	249	23	2684	326.713	-427.014	D	6.897	6.875	0.022	1.805	95.98	3.44	0	0	0	0.58
2003	250	23	2684	326.713	-427.014	D	6.966	6.965	0	1.988	99.19	0.31	0	0	0	0.59
2003	251	23	1	318.65	-445.782	D	7.063	7.063	0	2.187	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.368	7.368	0	2.821	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	8.253	8.253	0	4.773	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	9.962	9.962	0	9.071	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	9.428	9.428	0	7.649	0	0	0	0	0	0
2003	257	23	1	318.65	-445.782	D	8.74	8.74	0	5.924	0	0	0	0	0	0
2003	258	23	1	318.65	-445.782	D	6.717	6.717	0	1.49	0	0	0	0	0	0
2003	259	23	1	318.65	-445.782	D	6.641	6.641	0	1.341	0	0	0	0	0	0
2003	260	23	2789	340.496	-426.449	D	6.756	6.75	0.006	1.556	97.74	1.82	0	0	0	0.4
2003	261	23	2781	339.842	-425.379	D	6.776	6.772	0.004	1.6	97.73	2	0	0	0	0.23
2003	262	23	2040	333.912	-425.128	D	7.893	7.893	0	3.957	89.6	0.34	0	0	0	0.2
2003	263	23	1	318.65	-445.782	D	6.579	6.579	0	1.219	0	0	0	0	0	0
2003	264	23	2789	340.496	-426.449	D	7.091	7.049	0.042	2.158	97.34	2.34	0	0	0	0.32
2003	265	23	2784	339.87	-426.019	D	9.108	9.106	0.001	6.827	96.02	3.7	0	0	0	0.05
2003	266	23	1	318.65	-445.782	D	6.857	6.857	0	1.769	0	0	0	0	0	0
2003	267	23	1	318.65	-445.782	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2003	268	23	2789	340.496	-426.449	D	6.843	6.838	0.005	1.732	97.48	1.09	0	0	0	1.45
2003	269	23	2789	340.496	-426.449	D	7.075	7.039	0.036	2.138	94.67	4.81	0	0	0	0.52
2003	270	23	1	318.65	-445.782	D	7.334	7.334	0	2.749	0	0	0	0	0	0
2003	271	23	1	318.65	-445.782	D	6.654	6.654	0	1.366	0	0	0	0	0	0
2003	272	23	1	318.65	-445.782	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2003	273	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2003	274	23	1	318.65	-445.782	D	8.096	8.096	0	4.415	0	0	0	0	0	0
2003	275	23	2434	337.437	-428.764	D	6.629	6.574	0.056	1.209	37.98	60.89	0	0	0	1.13
2003	276	23	2589	318.383	-445.593	D	7.102	7.095	0.008	2.251	88.81	10.39	0	0	0	0.79
2003	277	23	1	318.65	-445.782	D	6.805	6.805	0	1.666	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	278	23	1	318.65	-445.782	D	7.273	7.273	0	2.622	0	0	0	0	0	0
2003	279	23	2789	340.496	-426.449	D	9.351	9.344	0.007	7.431	98.18	1.65	0	0	0	0.14
2003	280	23	2255	335.942	-426.039	D	7.959	7.849	0.109	3.861	96.44	3.45	0	0	0	0.11
2003	281	23	2694	327.861	-425.964	D	7.645	7.609	0.035	3.336	97.07	2.82	0	0	0	0.11
2003	282	23	2277	336.146	-425.03	D	8.918	8.917	0.001	6.357	98.98	0.94	0	0	0	0.12
2003	283	23	1	318.65	-445.782	D	9.734	9.734	0	8.453	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	9.551	9.551	0	7.97	0	0	0	0	0	0
2003	285	23	1	318.65	-445.782	D	7.633	7.633	0	3.387	0	0	0	0	0	0
2003	286	23	2789	340.496	-426.449	D	6.895	6.894	0.002	1.843	94	5.7	0	0	0	0.34
2003	287	23	2781	339.842	-425.379	D	8.87	8.869	0.001	6.238	80.42	19.52	0	0	0	0.02
2003	288	23	1	318.65	-445.782	D	6.692	6.692	0	1.442	0	0	0	0	0	0
2003	289	23	1	318.65	-445.782	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2003	290	23	2694	327.861	-425.964	D	8.459	8.15	0.309	4.537	50.01	49.89	0	0	0	0.1
2003	291	23	2789	340.496	-426.449	D	6.705	6.617	0.089	1.294	85.27	14.13	0	0	0	0.61
2003	292	23	2468	334.002	-434.887	D	6.61	6.604	0.006	1.268	98.05	1.47	0	0	0	0.5
2003	293	23	1	318.65	-445.782	D	6.677	6.677	0	1.412	0	0	0	0	0	0
2003	294	23	1	318.65	-445.782	D	6.703	6.703	0	1.464	0	0	0	0	0	0
2003	295	23	2611	319.699	-440.64	D	6.731	6.73	0.002	1.516	97.76	1.01	0	0	0	1.23
2003	296	23	2588	318.452	-445.8	D	6.647	6.61	0.037	1.28	95.35	3.79	0	0	0	0.86
2003	297	23	2429	338.563	-428.651	D	6.691	6.691	0	1.44	97.33	0.24	0	0	0	0.6
2003	298	23	1	318.65	-445.782	D	7.839	7.839	0	3.838	0	0	0	0	0	0
2003	299	23	1	318.65	-445.782	D	7.397	7.397	0	2.882	0	0	0	0	0	0
2003	300	23	1	318.65	-445.782	D	6.536	6.536	0	1.135	0	0	0	0	0	0
2003	301	23	1	318.65	-445.782	D	6.598	6.598	0	1.258	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.414	7.414	0	2.919	0	0	0	0	0	0
2003	304	23	1	318.65	-445.782	D	9.409	9.409	0	7.599	0	0	0	0	0	0
2003	305	23	1	318.65	-445.782	D	9.384	9.384	0	7.535	0	0	0	0	0	0
2003	306	23	1	318.65	-445.782	D	8.79	8.79	0	6.045	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.877	7.877	0	3.922	0	0	0	0	0	0
2003	308	23	1	318.65	-445.782	D	7.389	7.389	0	2.864	0	0	0	0	0	0
2003	309	23	1	318.65	-445.782	D	7.708	7.708	0	3.55	0	0	0	0	0	0
2003	310	23	2781	339.842	-425.379	D	10.73	8.891	**1.839**	6.292	39.22	60.68	0	0	0	0.1
2003	311	23	2704	329.056	-425.092	D	8.275	7.865	0.41	3.895	38.46	61.3	0	0	0	0.24
2003	312	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	6.51	6.51	0	1.085	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	6.616	6.616	0	1.292	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	9.37	9.37	0	7.497	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	317	23	1	318.65	-445.782	D	6.486	6.486	0	1.04	0	0	0	0	0	0
2003	318	23	1	318.65	-445.782	D	6.751	6.751	0	1.557	0	0	0	0	0	0
2003	319	23	1	318.65	-445.782	D	8.304	8.304	0	4.891	0	0	0	0	0	0
2003	320	23	1	318.65	-445.782	D	9.626	9.626	0	8.168	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	10.088	10.088	0	9.417	0	0	0	0	0	0
2003	322	23	1	318.65	-445.782	D	9.908	9.908	0	8.922	0	0	0	0	0	0
2003	323	23	1	318.65	-445.782	D	7.343	7.343	0	2.768	0	0	0	0	0	0
2003	324	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	9.817	9.817	0	8.677	0	0	0	0	0	0
2003	327	23	2708	329.979	-425	D	9.027	9.009	0.018	6.585	65.32	34.64	0	0	0	0.03
2003	328	23	1	318.65	-445.782	D	7.264	7.264	0	2.603	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.434	7.434	0	2.961	0	0	0	0	0	0
2003	331	23	1	318.65	-445.782	D	9.185	9.185	0	7.026	0	0	0	0	0	0
2003	332	23	1	318.65	-445.782	D	6.842	6.842	0	1.739	0	0	0	0	0	0
2003	333	23	1	318.65	-445.782	D	6.494	6.494	0	1.054	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2003	335	23	1	318.65	-445.782	D	6.66	6.66	0	1.378	0	0	0	0	0	0
2003	336	23	2789	340.496	-426.449	D	6.556	6.512	0.044	1.089	48.42	50.77	0	0	0	0.8
2003	337	23	2781	339.842	-425.379	D	8.185	8.178	0.007	4.6	41.82	57.66	0	0	0	0.54
2003	338	23	2781	339.842	-425.379	D	9.159	9.154	0.005	6.948	59.02	40.86	0	0	0	0.12
2003	339	23	2789	340.496	-426.449	D	8.528	8.486	0.042	5.316	61.28	38.67	0	0	0	0.05
2003	340	23	1	318.65	-445.782	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	341	23	2789	340.496	-426.449	D	6.658	6.653	0.004	1.365	51.67	48.03	0	0	0	0.28
2003	342	23	1	318.65	-445.782	D	8.111	8.111	0	4.449	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	10.155	10.155	0	9.603	0	0	0	0	0	0
2003	344	23	2758	335.862	-424.454	D	9.326	8.9	0.426	6.315	60.19	39.76	0	0	0	0.05
2003	345	23	1	318.65	-445.782	D	7.408	7.408	0	2.905	0	0	0	0	0	0
2003	346	23	2789	340.496	-426.449	D	6.835	6.832	0.003	1.719	69.31	30.29	0	0	0	0.4
2003	347	23	2652	323.833	-433.511	D	9.949	9.615	0.334	8.138	63.96	35.99	0	0	0	0.05
2003	348	23	2789	340.496	-426.449	D	9.529	9.43	0.099	7.653	71.86	28.11	0	0	0	0.03
2003	349	23	1	318.65	-445.782	D	9.203	9.203	0	7.071	0	0	0	0	0	0
2003	350	23	1	318.65	-445.782	D	8.775	8.775	0	6.01	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.444	7.444	0	2.982	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.467	7.467	0	3.031	0	0	0	0	0	0
2003	354	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	355	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	356	23	1	318.65	-445.782	D	9.46	9.46	0	7.73	0	0	0	0	0	0
2003	357	23	1	318.65	-445.782	D	9.378	9.378	0	7.518	0	0	0	0	0	0
2003	358	23	1	318.65	-445.782	D	8.21	8.21	0	4.675	0	0	0	0	0	0
2003	359	23	1	318.65	-445.782	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2003	360	23	1	318.65	-445.782	D	6.789	6.789	0	1.633	0	0	0	0	0	0
2003	361	23	1	318.65	-445.782	D	6.753	6.753	0	1.562	0	0	0	0	0	0
2003	362	23	1	318.65	-445.782	D	8.719	8.719	0	5.874	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.299	7.299	0	2.675	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	6.566	6.566	0	1.194	0	0	0	0	0	0
									1.839							

Appendix M
Upper Buffalo
2001 M6

EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	2789	340.496	-426.449	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.04
2001	2	23	2628	320.933	-436.998	D	7.602	7.593	0.009	3.3	0	0	0	0	0	100
2001	3	23	1415	329.185	-425.086	D	7.598	7.593	0.005	3.3	0	0	0	0	0	99.99
2001	4	23	2612	319.785	-440.422	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.97
2001	5	23	2589	318.383	-445.593	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.86
2001	6	23	14	319.049	-443.516	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.02
2001	7	23	2758	335.862	-424.454	D	7.62	7.593	0.028	3.3	0	0	0	0	0	100.01
2001	8	23	2789	340.496	-426.449	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100.01
2001	9	23	2758	335.862	-424.454	D	7.639	7.593	0.046	3.3	0	0	0	0	0	100
2001	10	23	1552	330.178	-425.042	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.85
2001	11	23	2417	339.654	-425.626	D	7.593	7.593	0	3.3	0	0	0	0	0	99.55
2001	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	13	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	0	0	0	0	0	100.67
2001	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	2711	330.671	-424.932	D	7.618	7.593	0.025	3.3	0	0	0	0	0	100.01
2001	17	23	2571	322.646	-445.476	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100.05
2001	18	23	2789	340.496	-426.449	D	7.631	7.593	0.039	3.3	0	0	0	0	0	100
2001	19	23	2758	335.862	-424.454	D	7.614	7.593	0.021	3.3	0	0	0	0	0	100
2001	20	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.19
2001	21	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	0	0	0	0	0	100.6
2001	22	23	2758	335.862	-424.454	D	7.593	7.593	0	3.3	0	0	0	0	0	99.82
2001	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	23	2781	339.842	-425.379	D	7.619	7.593	0.026	3.3	0	0	0	0	0	100
2001	25	23	2684	326.713	-427.014	D	7.624	7.593	0.031	3.3	0	0	0	0	0	100
2001	26	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100
2001	27	23	2758	335.862	-424.454	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100
2001	28	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	0	0	0	0	0	100.89
2001	29	23	2588	318.452	-445.8	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.07
2001	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	22.2
2001	31	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	0	0	0	0	0	101.03
2001	32	23	2781	339.842	-425.379	D	7.459	7.459	0	3.013	0	0	0	0	0	99.67
2001	33	23	2589	318.383	-445.593	D	7.453	7.453	0	3	0	0	0	0	0	100.09
2001	34	23	2571	322.646	-445.476	D	7.453	7.453	0	3	0	0	0	0	0	99.98
2001	35	23	2758	335.862	-424.454	D	7.454	7.453	0.001	3	0	0	0	0	0	100.2
2001	36	23	2758	335.862	-424.454	D	7.456	7.453	0.003	3	0	0	0	0	0	100.08
2001	37	23	2758	335.862	-424.454	D	7.453	7.453	0	3	0	0	0	0	0	100.23
2001	38	23	2704	329.056	-425.092	D	7.453	7.453	0.001	3	0	0	0	0	0	100.07

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	1242	327.988	-426.138	D	7.453	7.453	0.001	3	0	0	0	0	0	100.25
2001	41	23	2789	340.496	-426.449	D	7.46	7.453	0.007	3	0	0	0	0	0	100.02
2001	42	23	2789	340.496	-426.449	D	7.456	7.453	0.004	3	0	0	0	0	0	100.09
2001	43	23	2128	334.646	-424.846	D	7.453	7.453	0	3	0	0	0	0	0	99.79
2001	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	2704	329.056	-425.092	D	7.453	7.453	0	3	0	0	0	0	0	100.3
2001	46	23	2789	340.496	-426.449	D	7.486	7.453	0.033	3	0	0	0	0	0	100.01
2001	47	23	2758	335.862	-424.454	D	7.538	7.453	0.086	3	0	0	0	0	0	100
2001	48	23	2789	340.496	-426.449	D	7.511	7.453	0.058	3	0	0	0	0	0	100
2001	49	23	2789	340.496	-426.449	D	7.466	7.453	0.013	3	0	0	0	0	0	100.02
2001	50	23	2781	339.842	-425.379	D	7.453	7.453	0.001	3	0	0	0	0	0	100.08
2001	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	52	23	2704	329.056	-425.092	D	7.481	7.453	0.028	3	0	0	0	0	0	100.01
2001	53	23	2704	329.056	-425.092	D	7.464	7.453	0.012	3	0	0	0	0	0	100.01
2001	54	23	2781	339.842	-425.379	D	7.467	7.453	0.014	3	0	0	0	0	0	100.03
2001	55	23	2417	339.654	-425.626	D	7.453	7.453	0	3	0	0	0	0	0	99.97
2001	56	23	2781	339.842	-425.379	D	7.453	7.453	0	3	0	0	0	0	0	101.37
2001	57	23	2704	329.056	-425.092	D	7.461	7.453	0.008	3	0	0	0	0	0	100.04
2001	58	23	2781	339.842	-425.379	D	7.458	7.453	0.005	3	0	0	0	0	0	100.05
2001	59	23	2694	327.861	-425.964	D	7.464	7.453	0.011	3	0	0	0	0	0	100.03
2001	60	23	2781	339.842	-425.379	D	7.322	7.317	0.006	2.713	0	0	0	0	0	100.04
2001	61	23	2781	339.842	-425.379	D	7.313	7.311	0.002	2.7	0	0	0	0	0	100.09
2001	62	23	2758	335.862	-424.454	D	7.438	7.311	0.127	2.7	0	0	0	0	0	100
2001	63	23	2684	326.713	-427.014	D	7.358	7.311	0.048	2.7	0	0	0	0	0	100
2001	64	23	2789	340.496	-426.449	D	7.315	7.311	0.004	2.7	0	0	0	0	0	100.05
2001	65	23	2708	329.979	-425	D	7.346	7.311	0.035	2.7	0	0	0	0	0	100
2001	66	23	2758	335.862	-424.454	D	7.322	7.311	0.011	2.7	0	0	0	0	0	100.02
2001	67	23	2435	337.211	-428.786	D	7.33	7.311	0.019	2.7	0	0	0	0	0	100
2001	68	23	2684	326.713	-427.014	D	7.344	7.311	0.034	2.7	0	0	0	0	0	100.01
2001	69	23	2468	334.002	-434.887	D	7.318	7.311	0.007	2.7	0	0	0	0	0	100.01
2001	70	23	2781	339.842	-425.379	D	7.311	7.311	0	2.7	0	0	0	0	0	100.07
2001	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	2758	335.862	-424.454	D	7.311	7.311	0	2.7	0	0	0	0	0	101.56
2001	74	23	2	318.639	-445.533	D	7.311	7.311	0	2.7	0	0	0	0	0	99.23
2001	75	23	2758	335.862	-424.454	D	7.322	7.311	0.011	2.7	0	0	0	0	0	100.01
2001	76	23	2694	327.861	-425.964	D	7.322	7.311	0.011	2.7	0	0	0	0	0	100.02
2001	77	23	2789	340.496	-426.449	D	7.315	7.311	0.004	2.7	0	0	0	0	0	100.08

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	78	23	2628	320.933	-436.998	D	7.321	7.311	0.01	2.7	0	0	0	0	0	100.01
2001	79	23	2600	318.952	-443.12	D	7.337	7.311	0.027	2.7	0	0	0	0	0	100.01
2001	80	23	2628	320.933	-436.998	D	7.316	7.311	0.006	2.7	0	0	0	0	0	100.04
2001	81	23	2684	326.713	-427.014	D	7.311	7.311	0.001	2.7	0	0	0	0	0	100.2
2001	82	23	2789	340.496	-426.449	D	7.315	7.311	0.004	2.7	0	0	0	0	0	100.04
2001	83	23	2628	320.933	-436.998	D	7.327	7.311	0.017	2.7	0	0	0	0	0	100.02
2001	84	23	2708	329.979	-425	D	7.391	7.311	0.08	2.7	0	0	0	0	0	100
2001	85	23	2758	335.862	-424.454	D	7.393	7.311	0.082	2.7	0	0	0	0	0	100
2001	86	23	2781	339.842	-425.379	D	7.322	7.311	0.012	2.7	0	0	0	0	0	100.01
2001	87	23	2781	339.842	-425.379	D	7.311	7.311	0.001	2.7	0	0	0	0	0	100.33
2001	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	89	23	2611	319.699	-440.64	D	7.321	7.311	0.01	2.7	0	0	0	0	0	100.02
2001	90	23	2571	322.646	-445.476	D	7.324	7.311	0.014	2.7	0	0	0	0	0	100.01
2001	91	23	2588	318.452	-445.8	D	7.357	7.356	0.001	2.796	0	0	0	0	0	100.13
2001	92	23	1624	330.707	-425.769	D	7.358	7.358	0	2.8	0	0	0	0	0	89.48
2001	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	94	23	2781	339.842	-425.379	D	7.359	7.358	0.001	2.8	0	0	0	0	0	100.13
2001	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	103	23	2758	335.862	-424.454	D	7.361	7.358	0.003	2.8	0	0	0	0	0	100.07
2001	104	23	2409	339.158	-425.648	D	7.358	7.358	0	2.8	0	0	0	0	0	78.57
2001	105	23	2417	339.654	-425.626	D	7.358	7.358	0	2.8	0	0	0	0	0	100.44
2001	106	23	2758	335.862	-424.454	D	7.374	7.358	0.015	2.8	0	0	0	0	0	100
2001	107	23	2789	340.496	-426.449	D	7.368	7.358	0.01	2.8	0	0	0	0	0	100.02
2001	108	23	2704	329.056	-425.092	D	7.406	7.358	0.048	2.8	0	0	0	0	0	100
2001	109	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	0	0	0	0	0	99.9
2001	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	114	23	2711	330.671	-424.932	D	7.372	7.358	0.014	2.8	0	0	0	0	0	100.01
2001	115	23	2789	340.496	-426.449	D	7.363	7.358	0.005	2.8	0	0	0	0	0	100
2001	116	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	0	0	0	0	0	97.32

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	119	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	0	0	0	0	0	102.23
2001	120	23	2073	334.16	-425.117	D	7.358	7.358	0	2.8	0	0	0	0	0	87
2001	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	127	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	99.7
2001	128	23	2684	326.713	-427.014	D	7.649	7.639	0.01	3.4	0	0	0	0	0	100.01
2001	129	23	1415	329.185	-425.086	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100
2001	130	23	2787	340.091	-426.447	D	7.639	7.639	0	3.4	0	0	0	0	0	100.6
2001	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	132	23	2758	335.862	-424.454	D	7.655	7.639	0.016	3.4	0	0	0	0	0	100
2001	133	23	2628	320.933	-436.998	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.03
2001	134	23	2404	338.92	-425.908	D	7.639	7.639	0	3.4	0	0	0	0	0	100.16
2001	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	138	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	0	0	0	0	0	100.64
2001	139	23	2789	340.496	-426.449	D	7.647	7.639	0.008	3.4	0	0	0	0	0	100.03
2001	140	23	2789	340.496	-426.449	D	7.647	7.639	0.008	3.4	0	0	0	0	0	100.02
2001	141	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.11
2001	142	23	2758	335.862	-424.454	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.01
2001	143	23	2758	335.862	-424.454	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.15
2001	144	23	2704	329.056	-425.092	D	7.64	7.639	0.001	3.4	0	0	0	0	0	99.96
2001	145	23	2758	335.862	-424.454	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.09
2001	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	148	23	2704	329.056	-425.092	D	7.651	7.639	0.012	3.4	0	0	0	0	0	100.01
2001	149	23	2588	318.452	-445.8	D	7.642	7.639	0.003	3.4	0	0	0	0	0	100.04
2001	150	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.48
2001	151	23	1449	329.434	-425.075	D	7.639	7.639	0.001	3.4	0	0	0	0	0	99.91
2001	152	23	2628	320.933	-436.998	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100
2001	153	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.57
2001	154	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	99.84
2001	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	158	23	2704	329.056	-425.092	D	7.639	7.639	0.001	3.4	0	0	0	0	0	99.98
2001	159	23	2468	334.002	-434.887	D	7.644	7.639	0.005	3.4	0	0	0	0	0	100.03
2001	160	23	2694	327.861	-425.964	D	7.657	7.639	0.018	3.4	0	0	0	0	0	100.01
2001	161	23	2758	335.862	-424.454	D	7.646	7.639	0.007	3.4	0	0	0	0	0	100.03
2001	162	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.02
2001	163	23	2778	339.158	-425.502	D	7.639	7.639	0	3.4	0	0	0	0	0	100.07
2001	164	23	2041	333.901	-424.879	D	7.639	7.639	0	3.4	0	0	0	0	0	101.53
2001	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	166	23	2758	335.862	-424.454	D	7.639	7.639	0.001	3.4	0	0	0	0	0	99.94
2001	167	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	0	0	0	0	0	100.3
2001	168	23	305	322.115	-445.381	D	7.639	7.639	0	3.4	0	0	0	0	0	99.8
2001	169	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	0	0	0	0	0	100.02
2001	170	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	172	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.11
2001	173	23	2758	335.862	-424.454	D	7.667	7.639	0.029	3.4	0	0	0	0	0	100.01
2001	174	23	2709	330.21	-424.978	D	7.664	7.639	0.025	3.4	0	0	0	0	0	100.01
2001	175	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100
2001	176	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	0	0	0	0	0	100.03
2001	177	23	2236	336.149	-430.776	D	7.644	7.639	0.005	3.4	0	0	0	0	0	99.98
2001	178	23	1415	329.185	-425.086	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.04
2001	179	23	2758	335.862	-424.454	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.13
2001	180	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	0	0	0	0	0	100.52
2001	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	182	23	2704	329.056	-425.092	D	7.639	7.639	0.001	3.4	0	0	0	0	0	100.35
2001	183	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	0	0	0	0	0	100.06
2001	184	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.05
2001	185	23	2397	338.413	-425.68	D	7.639	7.639	0	3.4	0	0	0	0	0	97.48
2001	186	23	2409	339.158	-425.648	D	7.639	7.639	0	3.4	0	0	0	0	0	98.17
2001	187	23	2781	339.842	-425.379	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100.01
2001	188	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	0	0	0	0	0	100.16
2001	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	191	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.5
2001	192	23	2758	335.862	-424.454	D	7.67	7.639	0.032	3.4	0	0	0	0	0	100
2001	193	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	0	0	0	0	0	100.04
2001	194	23	2789	340.496	-426.449	D	7.641	7.639	0.003	3.4	0	0	0	0	0	99.98

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	195	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	100.19
2001	196	23	2758	335.862	-424.454	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.01
2001	197	23	167	320.579	-438.703	D	7.639	7.639	0	3.4	0	0	0	0	0	70.55
2001	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	201	23	2384	338.176	-425.941	D	7.639	7.639	0	3.4	0	0	0	0	0	85.11
2001	202	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	0	0	0	0	0	100.19
2001	203	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100
2001	204	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100
2001	205	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.04
2001	206	23	2401	338.661	-425.669	D	7.639	7.639	0	3.4	0	0	0	0	0	100.11
2001	207	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	101.16
2001	208	23	2781	339.842	-425.379	D	7.64	7.639	0.002	3.4	0	0	0	0	0	100.08
2001	209	23	2781	339.842	-425.379	D	7.639	7.639	0.001	3.4	0	0	0	0	0	99.94
2001	210	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	0	0	0	0	0	100.94
2001	211	23	2781	339.842	-425.379	D	7.639	7.639	0.001	3.4	0	0	0	0	0	100.02
2001	212	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.05
2001	213	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.05
2001	214	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	0	0	0	0	0	100.96
2001	215	23	2039	333.923	-425.378	D	7.639	7.639	0	3.4	0	0	0	0	0	102.09
2001	216	23	2781	339.842	-425.379	D	7.656	7.639	0.018	3.4	0	0	0	0	0	100
2001	217	23	2704	329.056	-425.092	D	7.644	7.639	0.005	3.4	0	0	0	0	0	100
2001	218	23	2573	322.153	-445.515	D	7.642	7.639	0.003	3.4	0	0	0	0	0	99.99
2001	219	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.03
2001	220	23	1415	329.185	-425.086	D	7.642	7.639	0.003	3.4	0	0	0	0	0	99.98
2001	221	23	2781	339.842	-425.379	D	7.64	7.639	0.002	3.4	0	0	0	0	0	100.06
2001	222	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.01
2001	223	23	2704	329.056	-425.092	D	7.669	7.639	0.03	3.4	0	0	0	0	0	100.01
2001	224	23	2758	335.862	-424.454	D	7.679	7.639	0.04	3.4	0	0	0	0	0	100
2001	225	23	2789	340.496	-426.449	D	7.654	7.639	0.015	3.4	0	0	0	0	0	100.01
2001	226	23	2758	335.862	-424.454	D	7.646	7.639	0.007	3.4	0	0	0	0	0	100
2001	227	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	0	0	0	0	0	100.01
2001	228	23	2235	335.628	-424.554	D	7.639	7.639	0	3.4	0	0	0	0	0	99.07
2001	229	23	2466	334.129	-434.416	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.07
2001	230	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.17
2001	231	23	2758	335.862	-424.454	D	7.68	7.639	0.041	3.4	0	0	0	0	0	100
2001	232	23	2781	339.842	-425.379	D	7.649	7.639	0.01	3.4	0	0	0	0	0	100.01
2001	233	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	0	0	0	0	0	100.18

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	235	23	1590	331.079	-434.246	D	7.639	7.639	0	3.4	0	0	0	0	0	38.61
2001	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	238	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100
2001	239	23	2758	335.862	-424.454	D	7.67	7.639	0.031	3.4	0	0	0	0	0	100.01
2001	240	23	2704	329.056	-425.092	D	7.656	7.639	0.017	3.4	0	0	0	0	0	100
2001	241	23	2758	335.862	-424.454	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100.03
2001	242	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.05
2001	243	23	2758	335.862	-424.454	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.06
2001	244	23	2704	329.056	-425.092	D	7.739	7.727	0.013	3.592	0	0	0	0	0	100
2001	245	23	2704	329.056	-425.092	D	7.738	7.731	0.008	3.6	0	0	0	0	0	100
2001	246	23	2588	318.452	-445.8	D	7.732	7.731	0.002	3.6	0	0	0	0	0	99.96
2001	247	23	2781	339.842	-425.379	D	7.734	7.731	0.003	3.6	0	0	0	0	0	100
2001	248	23	2628	320.933	-436.998	D	7.746	7.731	0.015	3.6	0	0	0	0	0	100
2001	249	23	2684	326.713	-427.014	D	7.731	7.731	0.001	3.6	0	0	0	0	0	100.15
2001	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	252	23	2694	327.861	-425.964	D	7.732	7.731	0.001	3.6	0	0	0	0	0	99.92
2001	253	23	2758	335.862	-424.454	D	7.765	7.731	0.034	3.6	0	0	0	0	0	100
2001	254	23	2626	320.826	-437.417	D	7.734	7.731	0.003	3.6	0	0	0	0	0	99.97
2001	255	23	2571	322.646	-445.476	D	7.734	7.731	0.003	3.6	0	0	0	0	0	99.96
2001	256	23	2588	318.452	-445.8	D	7.732	7.731	0.001	3.6	0	0	0	0	0	100.02
2001	257	23	2758	335.862	-424.454	D	7.759	7.731	0.028	3.6	0	0	0	0	0	100
2001	258	23	2571	322.646	-445.476	D	7.733	7.731	0.002	3.6	0	0	0	0	0	100.04
2001	259	23	2588	318.452	-445.8	D	7.731	7.731	0.001	3.6	0	0	0	0	0	100.07
2001	260	23	2789	340.496	-426.449	D	7.731	7.731	0	3.6	0	0	0	0	0	99.68
2001	261	23	2194	335.544	-428.304	D	7.731	7.731	0	3.6	0	0	0	0	0	91.1
2001	262	23	2612	319.785	-440.422	D	7.733	7.731	0.002	3.6	0	0	0	0	0	99.93
2001	263	23	375	322.611	-445.359	D	7.732	7.731	0.001	3.6	0	0	0	0	0	99.83
2001	264	23	2781	339.842	-425.379	D	7.731	7.731	0	3.6	0	0	0	0	0	100.09
2001	265	23	2789	340.496	-426.449	D	7.738	7.731	0.007	3.6	0	0	0	0	0	100.01
2001	266	23	2781	339.842	-425.379	D	7.735	7.731	0.005	3.6	0	0	0	0	0	99.99
2001	267	23	2628	320.933	-436.998	D	7.767	7.731	0.036	3.6	0	0	0	0	0	100
2001	268	23	2789	340.496	-426.449	D	7.735	7.731	0.005	3.6	0	0	0	0	0	100
2001	269	23	2589	318.383	-445.593	D	7.74	7.731	0.01	3.6	0	0	0	0	0	100
2001	270	23	2600	318.952	-443.12	D	7.738	7.731	0.008	3.6	0	0	0	0	0	100
2001	271	23	2789	340.496	-426.449	D	7.752	7.731	0.022	3.6	0	0	0	0	0	100.01
2001	272	23	2589	318.383	-445.593	D	7.739	7.731	0.008	3.6	0	0	0	0	0	100.01

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	273	23	2684	326.713	-427.014	D	7.732	7.731	0.001	3.6	0	0	0	0	0	100
2001	274	23	2704	329.056	-425.092	D	7.628	7.598	0.03	3.313	0	0	0	0	0	100
2001	275	23	2789	340.496	-426.449	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100
2001	276	23	2788	340.294	-426.448	D	7.593	7.593	0	3.3	0	0	0	0	0	99.73
2001	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	278	23	2789	340.496	-426.449	D	7.629	7.593	0.036	3.3	0	0	0	0	0	100
2001	279	23	2758	335.862	-424.454	D	7.612	7.593	0.02	3.3	0	0	0	0	0	100
2001	280	23	2789	340.496	-426.449	D	7.602	7.593	0.01	3.3	0	0	0	0	0	100
2001	281	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.98
2001	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	284	23	2704	329.056	-425.092	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.04
2001	285	23	2758	335.862	-424.454	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100.03
2001	286	23	1242	327.988	-426.138	D	7.593	7.593	0	3.3	0	0	0	0	0	100.3
2001	287	23	2758	335.862	-424.454	D	7.593	7.593	0	3.3	0	0	0	0	0	100.11
2001	288	23	2684	326.713	-427.014	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.88
2001	289	23	2711	330.671	-424.932	D	7.597	7.593	0.005	3.3	0	0	0	0	0	99.99
2001	290	23	2758	335.862	-424.454	D	7.608	7.593	0.015	3.3	0	0	0	0	0	100.01
2001	291	23	1415	329.185	-425.086	D	7.593	7.593	0	3.3	0	0	0	0	0	100.29
2001	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	293	23	1009	326.641	-429.444	D	7.593	7.593	0	3.3	0	0	0	0	0	26.57
2001	294	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	297	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	0	0	0	0	0	100
2001	298	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	0	0	0	0	0	99.15
2001	299	23	2758	335.862	-424.454	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.06
2001	300	23	2758	335.862	-424.454	D	7.659	7.593	0.067	3.3	0	0	0	0	0	100
2001	301	23	2585	319.192	-445.743	D	7.603	7.593	0.011	3.3	0	0	0	0	0	100.01
2001	302	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	0	0	0	0	0	100.03
2001	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	307	23	2789	340.496	-426.449	D	7.554	7.546	0.008	3.2	0	0	0	0	0	100.03
2001	308	23	2588	318.452	-445.8	D	7.552	7.546	0.006	3.2	0	0	0	0	0	100.04
2001	309	23	2704	329.056	-425.092	D	7.608	7.546	0.061	3.2	0	0	0	0	0	100.01
2001	310	23	2694	327.861	-425.964	D	7.558	7.546	0.012	3.2	0	0	0	0	0	100.01
2001	311	23	2781	339.842	-425.379	D	7.551	7.546	0.005	3.2	0	0	0	0	0	100.04

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	312	23	2781	339.842	-425.379	D	7.553	7.546	0.007	3.2	0	0	0	0	0	100.02
2001	313	23	2704	329.056	-425.092	D	7.602	7.546	0.056	3.2	0	0	0	0	0	100
2001	314	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.15
2001	315	23	2758	335.862	-424.454	D	7.56	7.546	0.013	3.2	0	0	0	0	0	100
2001	316	23	2588	318.452	-445.8	D	7.552	7.546	0.005	3.2	0	0	0	0	0	100.04
2001	317	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	321	23	2758	335.862	-424.454	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.03
2001	322	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.3
2001	323	23	2789	340.496	-426.449	D	7.554	7.546	0.008	3.2	0	0	0	0	0	100.02
2001	324	23	2758	335.862	-424.454	D	7.564	7.546	0.018	3.2	0	0	0	0	0	100.01
2001	325	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.11
2001	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	332	23	2684	326.713	-427.014	D	7.566	7.546	0.02	3.2	0	0	0	0	0	100.01
2001	333	23	2573	322.153	-445.515	D	7.562	7.546	0.016	3.2	0	0	0	0	0	100.01
2001	334	23	2781	339.842	-425.379	D	7.563	7.546	0.017	3.2	0	0	0	0	0	100.01
2001	335	23	2781	339.842	-425.379	D	7.591	7.591	0	3.296	0	0	0	0	0	95.83
2001	336	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	0	0	0	0	0	100.3
2001	337	23	2035	333.967	-426.375	D	7.593	7.593	0	3.3	0	0	0	0	0	31.48
2001	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	2758	335.862	-424.454	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.02
2001	341	23	2758	335.862	-424.454	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.03
2001	342	23	2758	335.862	-424.454	D	7.629	7.593	0.037	3.3	0	0	0	0	0	100
2001	343	23	2758	335.862	-424.454	D	7.62	7.593	0.027	3.3	0	0	0	0	0	100.01
2001	344	23	2704	329.056	-425.092	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.05
2001	345	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.1
2001	346	23	28	319.264	-442.757	D	7.593	7.593	0	3.3	0	0	0	0	0	10.65
2001	347	23	2704	329.056	-425.092	D	7.602	7.593	0.009	3.3	0	0	0	0	0	100
2001	348	23	2758	335.862	-424.454	D	7.612	7.593	0.019	3.3	0	0	0	0	0	100.01
2001	349	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	0	0	0	0	0	100.01
2001	350	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	0	0	0	0	0	101.34

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	351	23	2628	320.933	-436.998	D	7.613	7.593	0.02	3.3	0	0	0	0	0	100
2001	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	41.11
2001	353	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.08
2001	354	23	2588	318.452	-445.8	D	7.593	7.593	0	3.3	0	0	0	0	0	100.07
2001	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	15	319.038	-443.267	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.97
2001	359	23	2435	337.211	-428.786	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.09
2001	360	23	2758	335.862	-424.454	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.19
2001	361	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	0	0	0	0	0	100
2001	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	2711	330.671	-424.932	D	7.619	7.593	0.026	3.3	0	0	0	0	0	100
2001	364	23	2308	337.055	-428.737	D	7.607	7.593	0.014	3.3	0	0	0	0	0	100
2001	365	23	2588	318.452	-445.8	D	7.593	7.593	0	3.3	0	0	0	0	0	99.58
									0.127							
EXIDE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	2	23	2789	340.496	-426.449	D	7.595	7.593	0.003	3.3	90.72	7.39	0	0	0	1.92
2001	3	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	93.13	5.66	0	0	0	1.36
2001	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	23	2758	335.862	-424.454	D	7.595	7.593	0.003	3.3	85.17	11	0	0	0	3.85
2001	8	23	2781	339.842	-425.379	D	7.595	7.593	0.003	3.3	93.1	5.12	0	0	0	1.82
2001	9	23	2571	322.646	-445.476	D	7.599	7.593	0.006	3.3	95.24	3.47	0	0	0	1.31
2001	10	23	2589	318.383	-445.593	D	7.599	7.593	0.006	3.3	96.09	3.03	0	0	0	0.9
2001	11	23	1415	329.185	-425.086	D	7.593	7.593	0.001	3.3	96.76	2.53	0	0	0	0.82
2001	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	2413	339.406	-425.637	D	7.593	7.593	0	3.3	84.39	9.18	0	0	0	3.82
2001	17	23	2694	327.861	-425.964	D	7.594	7.593	0.001	3.3	86.12	10.88	0	0	0	2.97
2001	18	23	2684	326.713	-427.014	D	7.593	7.593	0.001	3.3	91.51	5.63	0	0	0	2.69
2001	19	23	2684	326.713	-427.014	D	7.595	7.593	0.003	3.3	82.91	12.49	0	0	0	4.61
2001	20	23	2587	318.699	-445.781	D	7.597	7.593	0.004	3.3	85.8	10.62	0	0	0	3.61

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	21	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	90.32	8.11	0	0	0	1.82
2001	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	23	2780	339.614	-425.419	D	7.593	7.593	0.001	3.3	91.9	5.63	0	0	0	2.43
2001	25	23	2588	318.452	-445.8	D	7.593	7.593	0	3.3	90.74	7.07	0	0	0	2.94
2001	26	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	27	23	16	319.027	-443.017	D	7.593	7.593	0.001	3.3	76.87	17.91	0	0	0	5.16
2001	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	89.28	9.14	0	0	0	1.56
2001	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	2781	339.842	-425.379	D	7.453	7.453	0	3	86.65	12.19	0	0	0	4.35
2001	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	23	1045	326.823	-427.937	D	7.453	7.453	0	3	87.92	3.57	0	0	0	4.9
2001	38	23	1413	329.207	-425.585	D	7.453	7.453	0	3	89.69	5.94	0	0	0	3.24
2001	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	2704	329.056	-425.092	D	7.46	7.453	0.007	3	93.07	5.28	0	0	0	1.67
2001	41	23	2600	318.952	-443.12	D	7.454	7.453	0.001	3	81.95	13.42	0	0	0	4.88
2001	42	23	1	318.65	-445.782	D	7.453	7.453	0	3	102.49	8.24	0	0	0	2.57
2001	43	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	46	23	2588	318.452	-445.8	D	7.46	7.453	0.008	3	94.23	4.27	0	0	0	1.53
2001	47	23	2589	318.383	-445.593	D	7.458	7.453	0.005	3	90.06	7.67	0	0	0	2.32
2001	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	49	23	1	318.65	-445.782	D	7.453	7.453	0	3	107.52	4.96	0	0	0	1.97
2001	50	23	1	318.65	-445.782	D	7.453	7.453	0	3	90.45	4.02	0	0	0	1.17
2001	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	52	23	1413	329.207	-425.585	D	7.453	7.453	0	3	96.48	3.2	0	0	0	1.07
2001	53	23	235	321.618	-445.402	D	7.453	7.453	0	3	98.38	3.29	0	0	0	0.92
2001	54	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	55	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	2410	339.439	-426.385	D	7.453	7.453	0	3	99.62	1.25	0	0	0	1.7
2001	58	23	2789	340.496	-426.449	D	7.453	7.453	0	3	96.8	2.73	0	0	0	1.04
2001	59	23	2588	318.452	-445.8	D	7.453	7.453	0	3	97.64	2.81	0	0	0	0.53

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	60	23	67	319.674	-440.741	D	7.317	7.317	0	2.713	98.73	2.18	0	0	0	0.49
2001	61	23	2413	339.406	-425.637	D	7.311	7.311	0	2.7	96.46	1.41	0	0	0	0.4
2001	62	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	63	23	2589	318.383	-445.593	D	7.314	7.311	0.003	2.7	95.92	2.63	0	0	0	1.52
2001	64	23	2589	318.383	-445.593	D	7.312	7.311	0.002	2.7	89.3	6.87	0	0	0	3.87
2001	65	23	2781	339.842	-425.379	D	7.312	7.311	0.001	2.7	90.11	6.73	0	0	0	3.2
2001	66	23	2588	318.452	-445.8	D	7.312	7.311	0.001	2.7	96.05	1.73	0	0	0	2.33
2001	67	23	2417	339.654	-425.626	D	7.314	7.311	0.003	2.7	94.89	3	0	0	0	2.12
2001	68	23	2781	339.842	-425.379	D	7.313	7.311	0.002	2.7	87.2	8.24	0	0	0	4.57
2001	69	23	234	321.01	-437.185	D	7.311	7.311	0	2.7	96.77	2.79	0	0	0	2.55
2001	70	23	1045	326.823	-427.937	D	7.311	7.311	0	2.7	112.68	1.61	0	0	0	2.02
2001	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	133.22	4.16	0	0	0	0.41
2001	75	23	2588	318.452	-445.8	D	7.311	7.311	0	2.7	72.66	19.33	0	0	0	7.77
2001	76	23	2588	318.452	-445.8	D	7.311	7.311	0	2.7	83.4	11.72	0	0	0	5.01
2001	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	79	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	80	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	81	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	82	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	84	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	85	23	2589	318.383	-445.593	D	7.311	7.311	0	2.7	85.35	9.12	0	0	0	5.49
2001	86	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	87	23	47	319.458	-441.5	D	7.311	7.311	0	2.7	97.13	2.17	0	0	0	0.9
2001	88	23	2684	326.713	-427.014	D	7.311	7.311	0	2.7	98.24	1.19	0	0	0	0.71
2001	89	23	167	320.579	-438.703	D	7.311	7.311	0	2.7	98.96	0.65	0	0	0	0.61
2001	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	99.36	0.64	0	0	0	0.56
2001	91	23	2781	339.842	-425.379	D	7.356	7.356	0	2.796	91.5	4.82	0	0	0	3.32
2001	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	105	23	1414	329.196	-425.335	D	7.358	7.358	0	2.8	98.14	0.35	0	0	0	2.22
2001	106	23	2789	340.496	-426.449	D	7.36	7.358	0.002	2.8	95.93	1.7	0	0	0	2.36
2001	107	23	2209	335.38	-424.564	D	7.359	7.358	0	2.8	89.26	6.38	0	0	0	4.12
2001	108	23	2625	320.772	-437.626	D	7.359	7.358	0	2.8	97.59	0.88	0	0	0	1.67
2001	109	23	1449	329.434	-425.075	D	7.359	7.358	0	2.8	98.2	0.59	0	0	0	0.96
2001	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	114	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	96.61	0.74	0	0	0	3.59
2001	115	23	2405	338.909	-425.659	D	7.359	7.358	0.001	2.8	96.66	1.09	0	0	0	2.25
2001	116	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	127	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	97.74	0.18	0	0	0	2.11
2001	128	23	2588	318.452	-445.8	D	7.642	7.639	0.003	3.4	98.23	0.31	0	0	0	1.51
2001	129	23	2758	335.862	-424.454	D	7.64	7.639	0.001	3.4	98.84	0.13	0	0	0	0.99
2001	130	23	2787	340.091	-426.447	D	7.639	7.639	0	3.4	100.1	0.07	0	0	0	0.67
2001	131	23	1199	327.783	-427.146	D	7.639	7.639	0	3.4	11.97	0	0	0	0	0.07
2001	132	23	2589	318.383	-445.593	D	7.641	7.639	0.002	3.4	97.14	1.83	0	0	0	1.06
2001	133	23	16	319.027	-443.017	D	7.64	7.639	0.001	3.4	99.21	0.06	0	0	0	0.78
2001	134	23	2397	338.413	-425.68	D	7.639	7.639	0	3.4	99.58	0.04	0	0	0	0.59
2001	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	138	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	139	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	140	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	141	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	148	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	98.23	0.02	0	0	0	1.38
2001	149	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	98.91	0.13	0	0	0	1.11
2001	150	23	2780	339.614	-425.419	D	7.639	7.639	0	3.4	99.81	0.2	0	0	0	0.77
2001	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	152	23	2588	318.452	-445.8	D	7.64	7.639	0.002	3.4	96.66	1.23	0	0	0	2.19
2001	153	23	2782	339.852	-425.592	D	7.639	7.639	0.001	3.4	97.2	0.31	0	0	0	2.52
2001	154	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	98.59	0.3	0	0	0	1.18
2001	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	158	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.54	0.02	0	0	0	0.64
2001	159	23	2706	329.518	-425.046	D	7.648	7.639	0.009	3.4	99.32	0.07	0	0	0	0.6
2001	160	23	2704	329.056	-425.092	D	7.644	7.639	0.006	3.4	99.3	0.07	0	0	0	0.64
2001	161	23	2704	329.056	-425.092	D	7.642	7.639	0.003	3.4	99.43	0.02	0	0	0	0.56
2001	162	23	2337	337.15	-425.236	D	7.639	7.639	0	3.4	99.5	0.01	0	0	0	0.42
2001	163	23	2372	337.938	-426.201	D	7.639	7.639	0	3.4	101.55	0.01	0	0	0	0.39
2001	164	23	1004	326.695	-430.69	D	7.639	7.639	0	3.4	10.37	0	0	0	0	0.04
2001	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	168	23	2586	318.945	-445.762	D	7.639	7.639	0	3.4	98.83	0.01	0	0	0	1.01
2001	169	23	1046	326.812	-427.688	D	7.639	7.639	0	3.4	98.89	0.02	0	0	0	0.77
2001	170	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	172	23	2589	318.383	-445.593	D	7.639	7.639	0	3.4	98.72	0.1	0	0	0	1.31
2001	173	23	2588	318.452	-445.8	D	7.64	7.639	0.002	3.4	97.98	0.09	0	0	0	1.98
2001	174	23	2588	318.452	-445.8	D	7.645	7.639	0.006	3.4	98.29	0.1	0	0	0	1.63
2001	175	23	2571	322.646	-445.476	D	7.642	7.639	0.003	3.4	99	0.04	0	0	0	0.99
2001	176	23	1	318.65	-445.782	D	7.643	7.639	0.004	3.4	99.2	0.06	0	0	0	0.75

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	177	23	1415	329.185	-425.086	D	7.641	7.639	0.002	3.4	99.29	0.04	0	0	0	0.65
2001	178	23	1415	329.185	-425.086	D	7.64	7.639	0.001	3.4	99.53	0.03	0	0	0	0.58
2001	179	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	99.92	0.07	0	0	0	0.53
2001	180	23	1042	326.856	-428.685	D	7.639	7.639	0	3.4	101.01	0.02	0	0	0	0.5
2001	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	182	23	413	322.197	-435.884	D	7.639	7.639	0	3.4	6.92	0	0	0	0	0.06
2001	183	23	2704	329.056	-425.092	D	7.639	7.639	0	3.4	99.1	0.38	0	0	0	0.92
2001	184	23	1282	328.236	-426.127	D	7.639	7.639	0	3.4	93.41	0.01	0	0	0	0.78
2001	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	187	23	1518	330.55	-433.519	D	7.639	7.639	0	3.4	100.75	0	0	0	0	0.7
2001	188	23	2406	339.19	-426.396	D	7.639	7.639	0	3.4	92.37	0.01	0	0	0	0.56
2001	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	191	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.14	0.08	0	0	0	0.78
2001	192	23	2787	340.091	-426.447	D	7.64	7.639	0.001	3.4	99.27	0.03	0	0	0	0.68
2001	193	23	340	322.363	-445.37	D	7.639	7.639	0	3.4	99.45	0.02	0	0	0	0.57
2001	194	23	2362	338.048	-428.694	D	7.639	7.639	0	3.4	100.88	0.28	0	0	0	0.54
2001	195	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	204	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	205	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	206	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	207	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	208	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	210	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	211	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	212	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	213	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	214	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	216	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	217	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	218	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	219	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	222	23	1415	329.185	-425.086	D	7.64	7.639	0.001	3.4	98.77	0.03	0	0	0	1.13
2001	223	23	2781	339.842	-425.379	D	7.646	7.639	0.007	3.4	98.81	0.42	0	0	0	0.77
2001	224	23	2468	334.002	-434.887	D	7.64	7.639	0.001	3.4	99.36	0.08	0	0	0	0.58
2001	225	23	2468	334.002	-434.887	D	7.639	7.639	0.001	3.4	99.35	0.29	0	0	0	0.51
2001	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	83.46	0.02	0	0	0	0.48
2001	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	228	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	92.59	1.45	0	0	0	0.85
2001	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	28.33	0	0	0	0	0.28
2001	230	23	2406	339.19	-426.396	D	7.639	7.639	0	3.4	95.57	0.04	0	0	0	0.77
2001	231	23	2788	340.294	-426.448	D	7.639	7.639	0.001	3.4	94.66	0.59	0	0	0	4.75
2001	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	110.81	0.03	0	0	0	1.91
2001	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	27.81	0	0	0	0	0.27
2001	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	238	23	2704	329.056	-425.092	D	7.642	7.639	0.004	3.4	98.51	0.21	0	0	0	1.31
2001	239	23	2571	322.646	-445.476	D	7.642	7.639	0.003	3.4	98.91	0.09	0	0	0	1.05
2001	240	23	2588	318.452	-445.8	D	7.639	7.639	0.001	3.4	99.28	0.04	0	0	0	0.81
2001	241	23	2780	339.614	-425.419	D	7.64	7.639	0.001	3.4	99.2	0.04	0	0	0	0.71
2001	242	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.73	0.14	0	0	0	0.55
2001	243	23	2074	334.15	-424.868	D	7.639	7.639	0	3.4	101.95	0.1	0	0	0	0.48
2001	244	23	2709	330.21	-424.978	D	7.728	7.727	0.001	3.592	99.06	0.12	0	0	0	0.7
2001	245	23	1415	329.185	-425.086	D	7.733	7.731	0.003	3.6	99.27	0.17	0	0	0	0.57
2001	246	23	1415	329.185	-425.086	D	7.731	7.731	0.001	3.6	99.27	0.02	0	0	0	0.55
2001	247	23	2704	329.056	-425.092	D	7.732	7.731	0.001	3.6	99.35	0.02	0	0	0	0.58
2001	248	23	2704	329.056	-425.092	D	7.732	7.731	0.002	3.6	99.26	0.04	0	0	0	0.67
2001	249	23	1242	327.988	-426.138	D	7.731	7.731	0	3.6	98.95	0.02	0	0	0	0.45
2001	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	252	23	2781	339.842	-425.379	D	7.733	7.731	0.002	3.6	97.83	0.13	0	0	0	2.04
2001	253	23	2789	340.496	-426.449	D	7.734	7.731	0.003	3.6	98.25	0.24	0	0	0	1.53
2001	254	23	2589	318.383	-445.593	D	7.732	7.731	0.002	3.6	98.78	0.09	0	0	0	1.11

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	255	23	1044	326.834	-428.186	D	7.731	7.731	0	3.6	98.49	0.1	0	0	0	0.85
2001	256	23	2040	333.912	-425.128	D	7.731	7.731	0	3.6	98.89	0.06	0	0	0	0.77
2001	257	23	2588	318.452	-445.8	D	7.731	7.731	0	3.6	99	0.06	0	0	0	0.71
2001	258	23	14	319.049	-443.516	D	7.731	7.731	0	3.6	99.35	0.02	0	0	0	0.61
2001	259	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	90.51	0.1	0	0	0	0.57
2001	260	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	261	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	262	23	2588	318.452	-445.8	D	7.732	7.731	0.001	3.6	98.2	0.2	0	0	0	1.52
2001	263	23	2588	318.452	-445.8	D	7.731	7.731	0	3.6	98.62	0.05	0	0	0	1.18
2001	264	23	2758	335.862	-424.454	D	7.732	7.731	0.001	3.6	98.97	0.13	0	0	0	0.88
2001	265	23	2589	318.383	-445.593	D	7.732	7.731	0.002	3.6	98.2	0.39	0	0	0	1.34
2001	266	23	1415	329.185	-425.086	D	7.731	7.731	0.001	3.6	97.93	0.82	0	0	0	1.11
2001	267	23	1	318.65	-445.782	D	7.732	7.731	0.002	3.6	97.27	1.98	0	0	0	0.74
2001	268	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	269	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	270	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	271	23	1415	329.185	-425.086	D	7.731	7.731	0	3.6	100.66	0.33	0	0	0	0.87
2001	272	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2001	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	278	23	1449	329.434	-425.075	D	7.593	7.593	0	3.3	98.1	1.2	0	0	0	0.74
2001	279	23	2600	318.952	-443.12	D	7.593	7.593	0	3.3	96.07	1.72	0	0	0	2.44
2001	280	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	97.43	0.97	0	0	0	1.53
2001	281	23	2704	329.056	-425.092	D	7.593	7.593	0	3.3	97.64	0.31	0	0	0	1.07
2001	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	284	23	863	325.509	-431.992	D	7.593	7.593	0	3.3	21.46	0.1	0	0	0	0.34
2001	285	23	2704	329.056	-425.092	D	7.593	7.593	0.001	3.3	97.13	1.75	0	0	0	1.2
2001	286	23	2694	327.861	-425.964	D	7.594	7.593	0.001	3.3	98.16	0.64	0	0	0	1.23
2001	287	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	97.57	1.51	0	0	0	0.95
2001	288	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	289	23	2781	339.842	-425.379	D	7.595	7.593	0.002	3.3	95.52	3.02	0	0	0	1.42
2001	290	23	2236	336.149	-430.776	D	7.594	7.593	0.001	3.3	94.4	2.99	0	0	0	2.66
2001	291	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	98.04	1.12	0	0	0	0.94
2001	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	293	23	1048	326.791	-427.189	D	7.593	7.593	0	3.3	94.5	1.01	0	0	0	1.52

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	294	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	297	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	95.84	1.28	0	0	0	2.8
2001	298	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	300	23	2684	326.713	-427.014	D	7.593	7.593	0	3.3	87.09	8.72	0	0	0	4.07
2001	301	23	46	319.469	-441.749	D	7.593	7.593	0	3.3	97.89	1.1	0	0	0	0.97
2001	302	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	53.76	0.1	0	0	0	0.25
2001	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	307	23	2781	339.842	-425.379	D	7.547	7.546	0.001	3.2	97.33	1.61	0	0	0	1.16
2001	308	23	1415	329.185	-425.086	D	7.547	7.546	0.001	3.2	99.04	0.32	0	0	0	0.89
2001	309	23	2789	340.496	-426.449	D	7.553	7.546	0.006	3.2	97.13	1.4	0	0	0	1.51
2001	310	23	2789	340.496	-426.449	D	7.552	7.546	0.006	3.2	98.34	0.58	0	0	0	1.1
2001	311	23	2468	334.002	-434.887	D	7.549	7.546	0.003	3.2	98.76	0.27	0	0	0	0.97
2001	312	23	2781	339.842	-425.379	D	7.547	7.546	0.001	3.2	98.28	0.35	0	0	0	1.47
2001	313	23	201	321.37	-445.413	D	7.546	7.546	0	3.2	98.16	0.39	0	0	0	1.22
2001	314	23	2584	319.439	-445.724	D	7.547	7.546	0.001	3.2	96.67	1.58	0	0	0	1.78
2001	315	23	2789	340.496	-426.449	D	7.547	7.546	0	3.2	97.39	0.77	0	0	0	2.13
2001	316	23	2586	318.945	-445.762	D	7.547	7.546	0.001	3.2	96.28	1.48	0	0	0	2.22
2001	317	23	166	320.59	-438.952	D	7.546	7.546	0	3.2	98.95	0.66	0	0	0	1.31
2001	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	323	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	70.89	20.88	0	0	0	8.3
2001	324	23	2602	319.088	-442.669	D	7.547	7.546	0.001	3.2	84.64	10.51	0	0	0	5.04
2001	325	23	2468	334.002	-434.887	D	7.547	7.546	0.001	3.2	94.63	3.74	0	0	0	1.8
2001	326	23	2412	339.417	-425.886	D	7.546	7.546	0	3.2	97.13	1.44	0	0	0	0.87
2001	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	332	23	2571	322.646	-445.476	D	7.548	7.546	0.002	3.2	90.25	7.93	0	0	0	1.88

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	333	23	2571	322.646	-445.476	D	7.546	7.546	0	3.2	96.55	3.95	0	0	0	0.57
2001	334	23	2588	318.452	-445.8	D	7.547	7.546	0.001	3.2	86.13	10.66	0	0	0	3.33
2001	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	1415	329.185	-425.086	D	7.593	7.593	0	3.3	73.18	1.28	0	0	0	1
2001	342	23	2758	335.862	-424.454	D	7.595	7.593	0.002	3.3	90.32	6.57	0	0	0	3.22
2001	343	23	2652	323.833	-433.511	D	7.594	7.593	0.001	3.3	89	7.72	0	0	0	3.17
2001	344	23	2588	318.452	-445.8	D	7.593	7.593	0	3.3	94.52	4.22	0	0	0	1.73
2001	345	23	2605	319.291	-441.992	D	7.593	7.593	0	3.3	95.7	3.05	0	0	0	1.21
2001	346	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	347	23	2626	320.826	-437.417	D	7.593	7.593	0	3.3	94.99	3.75	0	0	0	1.46
2001	348	23	2588	318.452	-445.8	D	7.611	7.593	0.018	3.3	95.23	3.62	0	0	0	1.15
2001	349	23	2789	340.496	-426.449	D	7.598	7.593	0.005	3.3	97.15	2.05	0	0	0	0.81
2001	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	351	23	2781	339.842	-425.379	D	7.598	7.593	0.005	3.3	92.32	5.41	0	0	0	2.28
2001	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	353	23	2588	318.452	-445.8	D	7.594	7.593	0.001	3.3	86.9	9.48	0	0	0	3.72
2001	354	23	2476	332.154	-435.398	D	7.593	7.593	0.001	3.3	84.61	10.6	0	0	0	4.71
2001	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	2781	339.842	-425.379	D	7.594	7.593	0.001	3.3	78.78	16.02	0	0	0	5.3
2001	360	23	2780	339.614	-425.419	D	7.594	7.593	0.001	3.3	71.82	21.05	0	0	0	7.07
2001	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	2781	339.842	-425.379	D	7.594	7.593	0.002	3.3	78.93	16.26	0	0	0	4.82
2001	364	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	79.96	15.17	0	0	0	4.91
2001	365	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	80.63	15.44	0	0	0	3.9
									0.018							
TRIGEN KC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	2418	339.946	-426.612	D	7.593	7.593	0	3.3	56.12	4.87	0	0	0	0.17

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	2	23	2781	339.842	-425.379	D	7.617	7.593	0.025	3.3	95.05	4.78	0	0	0	0.18
2001	3	23	2789	340.496	-426.449	D	7.6	7.593	0.007	3.3	96.43	3.46	0	0	0	0.12
2001	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	23	2694	327.861	-425.964	D	7.604	7.593	0.011	3.3	86.28	13.07	0	0	0	0.65
2001	8	23	2781	339.842	-425.379	D	7.599	7.593	0.006	3.3	95.13	4.64	0	0	0	0.24
2001	9	23	2781	339.842	-425.379	D	7.63	7.593	0.038	3.3	96.37	3.49	0	0	0	0.15
2001	10	23	2603	319.155	-442.443	D	7.627	7.593	0.034	3.3	97.27	2.65	0	0	0	0.08
2001	11	23	2758	335.862	-424.454	D	7.594	7.593	0.001	3.3	98.25	1.74	0	0	0	0.06
2001	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	2781	339.842	-425.379	D	7.599	7.593	0.007	3.3	90.41	9.13	0	0	0	0.46
2001	17	23	2588	318.452	-445.8	D	7.597	7.593	0.004	3.3	91.11	8.61	0	0	0	0.29
2001	18	23	2684	326.713	-427.014	D	7.596	7.593	0.003	3.3	96.45	3.38	0	0	0	0.22
2001	19	23	2589	318.383	-445.593	D	7.602	7.593	0.009	3.3	89.84	9.69	0	0	0	0.48
2001	20	23	2171	335.252	-427.318	D	7.61	7.593	0.018	3.3	87.07	12.32	0	0	0	0.61
2001	21	23	1893	333.346	-434.896	D	7.593	7.593	0	3.3	85.68	7.33	0	0	0	0.24
2001	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	23	2704	329.056	-425.092	D	7.599	7.593	0.006	3.3	96.44	3.36	0	0	0	0.21
2001	25	23	2588	318.452	-445.8	D	7.593	7.593	0.001	3.3	90.74	8.74	0	0	0	0.57
2001	26	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	119.68	6.87	0	0	0	0.25
2001	27	23	2682	326.697	-427.477	D	7.595	7.593	0.002	3.3	81.26	17.81	0	0	0	0.98
2001	28	23	2588	318.452	-445.8	D	7.593	7.593	0	3.3	91.85	8.05	0	0	0	0.16
2001	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	2789	340.496	-426.449	D	7.453	7.453	0	3	86.58	14.29	0	0	0	0.59
2001	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	23	1413	329.207	-425.585	D	7.453	7.453	0	3	90.91	1.81	0	0	0	0.48
2001	38	23	1415	329.185	-425.086	D	7.453	7.453	0	3	95.69	4.8	0	0	0	0.37
2001	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	1415	329.185	-425.086	D	7.457	7.453	0.004	3	97.13	2.84	0	0	0	0.07

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	41	23	2645	323.46	-434.959	D	7.458	7.453	0.005	3	82.33	16.83	0	0	0	0.88
2001	42	23	2588	318.452	-445.8	D	7.453	7.453	0	3	93.33	7.17	0	0	0	0.28
2001	43	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	46	23	2758	335.862	-424.454	D	7.588	7.453	0.136	3	97.6	2.29	0	0	0	0.11
2001	47	23	2781	339.842	-425.379	D	7.494	7.453	0.041	3	95.54	4.31	0	0	0	0.15
2001	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	49	23	2628	320.933	-436.998	D	7.453	7.453	0	3	95.35	5.08	0	0	0	0.23
2001	50	23	2684	326.713	-427.014	D	7.453	7.453	0	3	94.69	3.71	0	0	0	0.14
2001	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	52	23	2704	329.056	-425.092	D	7.454	7.453	0.002	3	97.9	2.16	0	0	0	0.1
2001	53	23	1517	329.93	-425.053	D	7.453	7.453	0.001	3	97.91	2.25	0	0	0	0.1
2001	54	23	1415	329.185	-425.086	D	7.453	7.453	0	3	96.03	4.17	0	0	0	0.22
2001	55	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	2789	340.496	-426.449	D	7.453	7.453	0	3	98	2.12	0	0	0	0.26
2001	58	23	2684	326.713	-427.014	D	7.455	7.453	0.002	3	97.77	2.17	0	0	0	0.13
2001	59	23	2589	318.383	-445.593	D	7.453	7.453	0.001	3	98.43	2.11	0	0	0	0.06
2001	60	23	2684	326.713	-427.014	D	7.317	7.317	0	2.713	98.73	1.51	0	0	0	0.06
2001	61	23	2780	339.614	-425.419	D	7.311	7.311	0	2.7	95.77	1.01	0	0	0	0.05
2001	62	23	2418	339.946	-426.612	D	7.311	7.311	0	2.7	99.17	2.26	0	0	0	0.19
2001	63	23	2589	318.383	-445.593	D	7.329	7.311	0.019	2.7	97.01	2.81	0	0	0	0.19
2001	64	23	2678	326.665	-428.404	D	7.324	7.311	0.013	2.7	91.16	8.22	0	0	0	0.63
2001	65	23	2789	340.496	-426.449	D	7.314	7.311	0.003	2.7	88.91	10.44	0	0	0	0.67
2001	66	23	2684	326.713	-427.014	D	7.316	7.311	0.005	2.7	98.56	1.23	0	0	0	0.26
2001	67	23	2781	339.842	-425.379	D	7.334	7.311	0.024	2.7	97.04	2.73	0	0	0	0.24
2001	68	23	2789	340.496	-426.449	D	7.312	7.311	0.002	2.7	89.98	9.26	0	0	0	0.74
2001	69	23	2628	320.933	-436.998	D	7.311	7.311	0	2.7	98.24	1.72	0	0	0	0.24
2001	70	23	2041	333.901	-424.879	D	7.311	7.311	0	2.7	96.05	1.56	0	0	0	0.16
2001	71	23	620	323.632	-434.572	D	7.311	7.311	0	2.7	77.53	0.69	0	0	0	0.07
2001	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	75	23	2588	318.452	-445.8	D	7.315	7.311	0.004	2.7	91.31	8.02	0	0	0	0.68
2001	76	23	2757	335.63	-424.484	D	7.312	7.311	0.002	2.7	84.85	13.94	0	0	0	1.16
2001	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	79	23	2628	320.933	-436.998	D	7.311	7.311	0	2.7	98.9	1.27	0	0	0	0.13

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	80	23	2589	318.383	-445.593	D	7.312	7.311	0.001	2.7	98.76	1.03	0	0	0	0.17
2001	81	23	1415	329.185	-425.086	D	7.315	7.311	0.004	2.7	99.01	0.87	0	0	0	0.13
2001	82	23	2781	339.842	-425.379	D	7.313	7.311	0.003	2.7	99.12	0.84	0	0	0	0.11
2001	83	23	2789	340.496	-426.449	D	7.314	7.311	0.003	2.7	99.36	0.66	0	0	0	0.07
2001	84	23	2628	320.933	-436.998	D	7.311	7.311	0	2.7	94.69	5.08	0	0	0	0.46
2001	85	23	2588	318.452	-445.8	D	7.318	7.311	0.008	2.7	93.77	5.92	0	0	0	0.3
2001	86	23	2588	318.452	-445.8	D	7.311	7.311	0	2.7	99.71	1.94	0	0	0	0.17
2001	87	23	2626	320.826	-437.417	D	7.312	7.311	0.001	2.7	97.6	2.28	0	0	0	0.1
2001	88	23	1415	329.185	-425.086	D	7.311	7.311	0	2.7	99.4	1.07	0	0	0	0.09
2001	89	23	1415	329.185	-425.086	D	7.311	7.311	0	2.7	99.49	0.69	0	0	0	0.07
2001	90	23	2128	334.646	-424.846	D	7.311	7.311	0	2.7	99.77	0.58	0	0	0	0.06
2001	91	23	2789	340.496	-426.449	D	7.356	7.356	0	2.796	94.61	3.95	0	0	0	0.61
2001	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	105	23	2781	339.842	-425.379	D	7.362	7.358	0.003	2.8	99.54	0.34	0	0	0	0.18
2001	106	23	2789	340.496	-426.449	D	7.36	7.358	0.002	2.8	94.77	4.59	0	0	0	0.62
2001	107	23	1415	329.185	-425.086	D	7.36	7.358	0.002	2.8	95.05	4.31	0	0	0	0.6
2001	108	23	2684	326.713	-427.014	D	7.363	7.358	0.004	2.8	99	0.9	0	0	0	0.16
2001	109	23	2781	339.842	-425.379	D	7.361	7.358	0.002	2.8	99.53	0.36	0	0	0	0.09
2001	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	114	23	2684	326.713	-427.014	D	7.361	7.358	0.003	2.8	99.21	0.54	0	0	0	0.33
2001	115	23	2589	318.383	-445.593	D	7.363	7.358	0.004	2.8	99.13	0.72	0	0	0	0.19
2001	116	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	127	23	2781	339.842	-425.379	D	7.644	7.639	0.006	3.4	99.71	0.1	0	0	0	0.2
2001	128	23	2588	318.452	-445.8	D	7.657	7.639	0.018	3.4	99.66	0.21	0	0	0	0.14
2001	129	23	2704	329.056	-425.092	D	7.645	7.639	0.006	3.4	99.84	0.09	0	0	0	0.08
2001	130	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.93	0.05	0	0	0	0.06
2001	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	132	23	2789	340.496	-426.449	D	7.645	7.639	0.006	3.4	98.19	1.72	0	0	0	0.11
2001	133	23	2589	318.383	-445.593	D	7.643	7.639	0.004	3.4	99.9	0.02	0	0	0	0.06
2001	134	23	1415	329.185	-425.086	D	7.641	7.639	0.003	3.4	99.91	0.03	0	0	0	0.05
2001	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	138	23	2684	326.713	-427.014	D	7.643	7.639	0.004	3.4	99.7	0.23	0	0	0	0.07
2001	139	23	2588	318.452	-445.8	D	7.669	7.639	0.03	3.4	99.8	0.14	0	0	0	0.06
2001	140	23	2589	318.383	-445.593	D	7.648	7.639	0.009	3.4	99.83	0.1	0	0	0	0.06
2001	141	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.56	0.6	0	0	0	0.04
2001	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	148	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.87	0.01	0	0	0	0.1
2001	149	23	2789	340.496	-426.449	D	7.655	7.639	0.016	3.4	99.86	0.08	0	0	0	0.08
2001	150	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.92	0.09	0	0	0	0.06
2001	151	23	1046	326.812	-427.688	D	7.639	7.639	0	3.4	101.06	0.18	0	0	0	0.04
2001	152	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	98.55	1.18	0	0	0	0.31
2001	153	23	2781	339.842	-425.379	D	7.643	7.639	0.004	3.4	99.61	0.17	0	0	0	0.24
2001	154	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.72	0.27	0	0	0	0.1
2001	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	158	23	2758	335.862	-424.454	D	7.646	7.639	0.007	3.4	99.93	0.03	0	0	0	0.06
2001	159	23	2684	326.713	-427.014	D	7.698	7.639	0.059	3.4	99.88	0.07	0	0	0	0.05
2001	160	23	2589	318.383	-445.593	D	7.665	7.639	0.027	3.4	99.95	0.02	0	0	0	0.05
2001	161	23	2704	329.056	-425.092	D	7.658	7.639	0.019	3.4	99.93	0.03	0	0	0	0.04
2001	162	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	99.97	0.01	0	0	0	0.04
2001	163	23	2413	339.406	-425.637	D	7.639	7.639	0	3.4	100.78	0.01	0	0	0	0.03
2001	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	168	23	2468	334.002	-434.887	D	7.642	7.639	0.003	3.4	99.94	0.01	0	0	0	0.08
2001	169	23	2789	340.496	-426.449	D	7.646	7.639	0.007	3.4	99.94	0.01	0	0	0	0.07
2001	170	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.97	0.01	0	0	0	0.05
2001	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	172	23	2781	339.842	-425.379	D	7.663	7.639	0.024	3.4	99.81	0.09	0	0	0	0.09
2001	173	23	2588	318.452	-445.8	D	7.65	7.639	0.011	3.4	99.77	0.1	0	0	0	0.15
2001	174	23	2468	334.002	-434.887	D	7.673	7.639	0.034	3.4	99.67	0.15	0	0	0	0.18
2001	175	23	2571	322.646	-445.476	D	7.64	7.639	0.002	3.4	99.87	0.03	0	0	0	0.1
2001	176	23	2588	318.452	-445.8	D	7.646	7.639	0.007	3.4	99.9	0.03	0	0	0	0.07
2001	177	23	2694	327.861	-425.964	D	7.64	7.639	0.001	3.4	100.01	0.03	0	0	0	0.06
2001	178	23	1241	327.999	-426.387	D	7.639	7.639	0	3.4	100.2	0.03	0	0	0	0.05
2001	179	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	97.53	0.01	0	0	0	0.04
2001	180	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	182	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	100.1	0	0	0	0	0.07
2001	183	23	2704	329.056	-425.092	D	7.643	7.639	0.004	3.4	99.85	0.13	0	0	0	0.06
2001	184	23	2756	335.398	-424.515	D	7.639	7.639	0	3.4	99.45	0.01	0	0	0	0.05
2001	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	186	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.82	0	0	0	0	0.08
2001	187	23	2781	339.842	-425.379	D	7.654	7.639	0.015	3.4	99.93	0.01	0	0	0	0.06
2001	188	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.99	0	0	0	0	0.05
2001	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	191	23	2781	339.842	-425.379	D	7.65	7.639	0.011	3.4	99.88	0.05	0	0	0	0.08
2001	192	23	2789	340.496	-426.449	D	7.66	7.639	0.021	3.4	99.9	0.02	0	0	0	0.08
2001	193	23	2571	322.646	-445.476	D	7.639	7.639	0	3.4	100.02	0.01	0	0	0	0.05
2001	194	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	195	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	204	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	205	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	206	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	207	23	2756	335.398	-424.515	D	7.639	7.639	0	3.4	99.88	0.01	0	0	0	0.05
2001	208	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.96	0.12	0	0	0	0.04
2001	209	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.74	0.1	0	0	0	0.04
2001	210	23	2322	336.902	-425.247	D	7.639	7.639	0	3.4	99.16	0.06	0	0	0	0.04
2001	211	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.92	0.02	0	0	0	0.05
2001	212	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.88	0.01	0	0	0	0.04
2001	213	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	100.75	0	0	0	0	0.03
2001	214	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	216	23	2789	340.496	-426.449	D	7.645	7.639	0.006	3.4	99.87	0.08	0	0	0	0.07
2001	217	23	1	318.65	-445.782	D	7.639	7.639	0.001	3.4	99.94	0.02	0	0	0	0.05
2001	218	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	53.07	0	0	0	0	0.03
2001	219	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	222	23	2704	329.056	-425.092	D	7.642	7.639	0.003	3.4	99.86	0.02	0	0	0	0.12
2001	223	23	2789	340.496	-426.449	D	7.658	7.639	0.019	3.4	99.51	0.42	0	0	0	0.08
2001	224	23	2588	318.452	-445.8	D	7.643	7.639	0.004	3.4	99.87	0.07	0	0	0	0.07
2001	225	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.75	0.23	0	0	0	0.04
2001	226	23	340	322.363	-445.37	D	7.639	7.639	0	3.4	72.53	0.01	0	0	0	0.03
2001	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	228	23	2397	338.413	-425.68	D	7.639	7.639	0	3.4	19.21	0.09	0	0	0	0.01
2001	229	23	2468	334.002	-434.887	D	7.639	7.639	0	3.4	100.28	0.01	0	0	0	0.09
2001	230	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.71	0.02	0	0	0	0.07
2001	231	23	2704	329.056	-425.092	D	7.64	7.639	0.001	3.4	98.53	0.78	0	0	0	0.67
2001	232	23	2684	326.713	-427.014	D	7.65	7.639	0.011	3.4	99.76	0.12	0	0	0	0.13
2001	233	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.81	0.01	0	0	0	0.07
2001	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	238	23	2781	339.842	-425.379	D	7.647	7.639	0.008	3.4	99.72	0.13	0	0	0	0.15
2001	239	23	2588	318.452	-445.8	D	7.65	7.639	0.011	3.4	99.81	0.11	0	0	0	0.1
2001	240	23	2588	318.452	-445.8	D	7.65	7.639	0.011	3.4	99.89	0.05	0	0	0	0.07
2001	241	23	2589	318.383	-445.593	D	7.65	7.639	0.011	3.4	99.9	0.05	0	0	0	0.06
2001	242	23	2781	339.842	-425.379	D	7.644	7.639	0.005	3.4	99.81	0.15	0	0	0	0.05
2001	243	23	2780	339.614	-425.419	D	7.639	7.639	0	3.4	99.98	0.11	0	0	0	0.04
2001	244	23	2704	329.056	-425.092	D	7.739	7.727	0.012	3.592	99.76	0.16	0	0	0	0.07
2001	245	23	2704	329.056	-425.092	D	7.742	7.731	0.011	3.6	99.86	0.09	0	0	0	0.05
2001	246	23	2704	329.056	-425.092	D	7.734	7.731	0.003	3.6	99.92	0.01	0	0	0	0.04
2001	247	23	2704	329.056	-425.092	D	7.736	7.731	0.005	3.6	99.93	0.01	0	0	0	0.05
2001	248	23	2704	329.056	-425.092	D	7.738	7.731	0.007	3.6	99.91	0.04	0	0	0	0.05
2001	249	23	1415	329.185	-425.086	D	7.731	7.731	0.001	3.6	99.94	0.01	0	0	0	0.04
2001	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	252	23	2789	340.496	-426.449	D	7.755	7.731	0.025	3.6	99.67	0.16	0	0	0	0.17
2001	253	23	2789	340.496	-426.449	D	7.747	7.731	0.017	3.6	99.36	0.42	0	0	0	0.22
2001	254	23	2589	318.383	-445.593	D	7.733	7.731	0.003	3.6	99.79	0.06	0	0	0	0.14
2001	255	23	2628	320.933	-436.998	D	7.731	7.731	0	3.6	99.83	0.06	0	0	0	0.07
2001	256	23	2757	335.63	-424.484	D	7.732	7.731	0.002	3.6	99.79	0.06	0	0	0	0.07
2001	257	23	2758	335.862	-424.454	D	7.735	7.731	0.004	3.6	99.81	0.1	0	0	0	0.06
2001	258	23	1048	326.791	-427.189	D	7.731	7.731	0.001	3.6	99.81	0.02	0	0	0	0.05
2001	259	23	1009	326.641	-429.444	D	7.731	7.731	0	3.6	98.86	0.13	0	0	0	0.05
2001	260	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	261	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	262	23	2781	339.842	-425.379	D	7.766	7.731	0.035	3.6	99.1	0.82	0	0	0	0.08
2001	263	23	2789	340.496	-426.449	D	7.731	7.731	0	3.6	99.39	0.01	0	0	0	0.07
2001	264	23	2758	335.862	-424.454	D	7.732	7.731	0.001	3.6	99.72	0.03	0	0	0	0.14
2001	265	23	2588	318.452	-445.8	D	7.736	7.731	0.005	3.6	99.66	0.24	0	0	0	0.1
2001	266	23	2704	329.056	-425.092	D	7.738	7.731	0.007	3.6	99.15	0.76	0	0	0	0.1
2001	267	23	2588	318.452	-445.8	D	7.74	7.731	0.009	3.6	98.78	1.16	0	0	0	0.07
2001	268	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	269	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	270	23	2758	335.862	-424.454	D	7.731	7.731	0	3.6	99.04	0.05	0	0	0	0.09
2001	271	23	2781	339.842	-425.379	D	7.753	7.731	0.023	3.6	99.77	0.13	0	0	0	0.1
2001	272	23	2589	318.383	-445.593	D	7.737	7.731	0.007	3.6	99.86	0.06	0	0	0	0.07
2001	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	274	23	2758	335.862	-424.454	D	7.598	7.598	0	3.313	108.05	0.08	0	0	0	0.11

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	278	23	2706	329.518	-425.046	D	7.595	7.593	0.002	3.3	98.92	0.97	0	0	0	0.06
2001	279	23	47	319.458	-441.5	D	7.596	7.593	0.003	3.3	98.55	1.14	0	0	0	0.28
2001	280	23	2572	322.4	-445.495	D	7.596	7.593	0.003	3.3	99.01	0.82	0	0	0	0.16
2001	281	23	2235	335.628	-424.554	D	7.593	7.593	0	3.3	99.41	0.38	0	0	0	0.11
2001	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	284	23	1047	326.802	-427.438	D	7.593	7.593	0	3.3	97.74	0.27	0	0	0	0.14
2001	285	23	2628	320.933	-436.998	D	7.602	7.593	0.009	3.3	98	1.89	0	0	0	0.12
2001	286	23	2704	329.056	-425.092	D	7.6	7.593	0.007	3.3	99.47	0.47	0	0	0	0.08
2001	287	23	2789	340.496	-426.449	D	7.605	7.593	0.012	3.3	98.9	1.03	0	0	0	0.06
2001	288	23	2624	320.719	-437.835	D	7.593	7.593	0	3.3	95.66	4.1	0	0	0	0.15
2001	289	23	2781	339.842	-425.379	D	7.598	7.593	0.005	3.3	96.39	3.47	0	0	0	0.16
2001	290	23	2441	336.336	-429.538	D	7.602	7.593	0.01	3.3	96.35	3.31	0	0	0	0.34
2001	291	23	2781	339.842	-425.379	D	7.594	7.593	0.002	3.3	99.44	0.47	0	0	0	0.12
2001	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	293	23	2209	335.38	-424.564	D	7.593	7.593	0	3.3	94.19	1.29	0	0	0	0.13
2001	294	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	297	23	2781	339.842	-425.379	D	7.596	7.593	0.004	3.3	98.81	0.98	0	0	0	0.24
2001	298	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	300	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	89	10.09	0	0	0	0.93
2001	301	23	30	319.242	-442.259	D	7.593	7.593	0	3.3	98.5	0.98	0	0	0	0.15
2001	302	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	307	23	2790	340.421	-426.562	D	7.55	7.546	0.003	3.2	98.61	1.31	0	0	0	0.1
2001	308	23	2589	318.383	-445.593	D	7.549	7.546	0.002	3.2	99.2	0.85	0	0	0	0.07
2001	309	23	2781	339.842	-425.379	D	7.622	7.546	0.076	3.2	98.47	1.42	0	0	0	0.12
2001	310	23	2588	318.452	-445.8	D	7.611	7.546	0.065	3.2	99.45	0.46	0	0	0	0.09
2001	311	23	2789	340.496	-426.449	D	7.573	7.546	0.027	3.2	99.65	0.28	0	0	0	0.07
2001	312	23	2781	339.842	-425.379	D	7.552	7.546	0.006	3.2	99.68	0.23	0	0	0	0.13
2001	313	23	2588	318.452	-445.8	D	7.546	7.546	0	3.2	99.56	0.23	0	0	0	0.11

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	314	23	2694	327.861	-425.964	D	7.551	7.546	0.005	3.2	97.5	2.29	0	0	0	0.23
2001	315	23	2781	339.842	-425.379	D	7.549	7.546	0.003	3.2	98.98	0.8	0	0	0	0.28
2001	316	23	2588	318.452	-445.8	D	7.552	7.546	0.006	3.2	99.04	0.8	0	0	0	0.19
2001	317	23	2589	318.383	-445.593	D	7.548	7.546	0.002	3.2	99.39	0.54	0	0	0	0.12
2001	318	23	14	319.049	-443.516	D	7.546	7.546	0	3.2	71.34	0.09	0	0	0	0.07
2001	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	323	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	80.87	18.3	0	0	0	0.9
2001	324	23	2589	318.383	-445.593	D	7.553	7.546	0.007	3.2	87.63	11.6	0	0	0	0.79
2001	325	23	2571	322.646	-445.476	D	7.552	7.546	0.006	3.2	96.37	3.41	0	0	0	0.23
2001	326	23	2781	339.842	-425.379	D	7.547	7.546	0	3.2	98.63	1.35	0	0	0	0.11
2001	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	332	23	2571	322.646	-445.476	D	7.55	7.546	0.004	3.2	90.03	9.66	0	0	0	0.36
2001	333	23	375	322.611	-445.359	D	7.546	7.546	0	3.2	97.78	2.57	0	0	0	0.05
2001	334	23	2588	318.452	-445.8	D	7.555	7.546	0.009	3.2	92.74	6.96	0	0	0	0.31
2001	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	96.19	4.27	0	0	0	0.22
2001	342	23	2781	339.842	-425.379	D	7.606	7.593	0.014	3.3	95.3	4.41	0	0	0	0.3
2001	343	23	1951	333.842	-434.874	D	7.596	7.593	0.004	3.3	93.31	6.21	0	0	0	0.46
2001	344	23	2589	318.383	-445.593	D	7.594	7.593	0.001	3.3	95.91	3.92	0	0	0	0.2
2001	345	23	2627	320.879	-437.207	D	7.594	7.593	0.002	3.3	97.02	2.84	0	0	0	0.14
2001	346	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	347	23	2704	329.056	-425.092	D	7.736	7.593	0.144	3.3	96.75	3.12	0	0	0	0.14
2001	348	23	2604	319.223	-442.217	D	7.739	7.593	0.146	3.3	97.02	2.89	0	0	0	0.09
2001	349	23	2789	340.496	-426.449	D	7.598	7.593	0.006	3.3	98.7	1.27	0	0	0	0.06
2001	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	351	23	1548	330.222	-426.04	D	7.614	7.593	0.021	3.3	94.14	5.63	0	0	0	0.23
2001	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	353	23	2757	335.63	-424.484	D	7.598	7.593	0.005	3.3	92.72	6.76	0	0	0	0.52
2001	354	23	2789	340.496	-426.449	D	7.596	7.593	0.003	3.3	91.79	7.59	0	0	0	0.62
2001	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1480	329.715	-425.812	D	7.593	7.593	0	3.3	20.69	0.39	0	0	0	0.02
2001	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	82.73	16.37	0	0	0	0.9
2001	360	23	2781	339.842	-425.379	D	7.598	7.593	0.005	3.3	79.98	19.12	0	0	0	0.94
2001	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	2781	339.842	-425.379	D	7.601	7.593	0.009	3.3	85.93	13.34	0	0	0	0.73
2001	364	23	2781	339.842	-425.379	D	7.602	7.593	0.009	3.3	85.44	14.05	0	0	0	0.52
2001	365	23	2790	340.421	-426.562	D	7.595	7.593	0.002	3.3	87.41	12.18	0	0	0	0.38
									0.146							
UMC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	2	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	91.06	8.88	0	0	0	0.02
2001	3	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	9	23	2789	340.496	-426.449	D	7.596	7.593	0.003	3.3	82.87	17.06	0	0	0	0.04
2001	10	23	2789	340.496	-426.449	D	7.609	7.593	0.017	3.3	84.21	15.78	0	0	0	0.03
2001	11	23	2704	329.056	-425.092	D	7.596	7.593	0.004	3.3	90.93	9.06	0	0	0	0.02
2001	12	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	76.22	6.28	0	0	0	0.01
2001	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	17	23	2704	329.056	-425.092	D	7.801	7.593	0.208	3.3	87.15	12.81	0	0	0	0.04
2001	18	23	2611	319.699	-440.64	D	7.793	7.593	0.2	3.3	87.79	12.19	0	0	0	0.03
2001	19	23	2789	340.496	-426.449	D	7.602	7.593	0.009	3.3	92.93	7.05	0	0	0	0.02
2001	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	21	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	25	23	2789	340.496	-426.449	D	7.613	7.593	0.02	3.3	73.04	26.9	0	0	0	0.07
2001	26	23	2684	326.713	-427.014	D	7.6	7.593	0.008	3.3	81.21	18.77	0	0	0	0.02
2001	27	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	28	23	2789	340.496	-426.449	D	7.601	7.593	0.008	3.3	85.69	14.29	0	0	0	0.02
2001	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	38	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	42	23	2781	339.842	-425.379	D	7.468	7.453	0.015	3	83.11	16.89	0	0	0	0.03
2001	43	23	1415	329.185	-425.086	D	7.453	7.453	0	3	88.67	11.27	0	0	0	0.01
2001	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	2704	329.056	-425.092	D	7.454	7.453	0.002	3	95.73	4.28	0	0	0	0.01
2001	46	23	2789	340.496	-426.449	D	7.75	7.453	0.297	3	95.08	4.91	0	0	0	0.01
2001	47	23	2571	322.646	-445.476	D	7.485	7.453	0.032	3	95.44	4.56	0	0	0	0.01
2001	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	49	23	2789	340.496	-426.449	D	7.453	7.453	0.001	3	92.71	7.34	0	0	0	0.03
2001	50	23	2789	340.496	-426.449	D	7.454	7.453	0.001	3	93.46	6.62	0	0	0	0.02
2001	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	52	23	2571	322.646	-445.476	D	7.459	7.453	0.007	3	93.01	7.02	0	0	0	0.02
2001	53	23	2628	320.933	-436.998	D	7.468	7.453	0.015	3	93.08	6.91	0	0	0	0.02
2001	54	23	2705	329.287	-425.069	D	7.465	7.453	0.012	3	91.27	8.72	0	0	0	0.02
2001	55	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	2789	340.496	-426.449	D	7.453	7.453	0	3	97.68	2.73	0	0	0	0.05
2001	58	23	2789	340.496	-426.449	D	7.471	7.453	0.018	3	93.04	6.94	0	0	0	0.02
2001	59	23	2589	318.383	-445.593	D	7.462	7.453	0.009	3	93.39	6.63	0	0	0	0.01
2001	60	23	2628	320.933	-436.998	D	7.321	7.317	0.004	2.713	94.91	5.09	0	0	0	0.01

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	61	23	2781	339.842	-425.379	D	7.322	7.311	0.012	2.7	94.63	5.37	0	0	0	0.01
2001	62	23	2571	322.646	-445.476	D	7.312	7.311	0.002	2.7	97.68	2.36	0	0	0	0.01
2001	63	23	2628	320.933	-436.998	D	7.513	7.311	0.202	2.7	88.81	11.16	0	0	0	0.03
2001	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	68	23	2789	340.496	-426.449	D	7.315	7.311	0.004	2.7	86.55	13.41	0	0	0	0.07
2001	69	23	2789	340.496	-426.449	D	7.319	7.311	0.009	2.7	93.8	6.19	0	0	0	0.04
2001	70	23	2758	335.862	-424.454	D	7.314	7.311	0.004	2.7	95.89	4.14	0	0	0	0.02
2001	71	23	2781	339.842	-425.379	D	7.311	7.311	0	2.7	97.82	1.66	0	0	0	0.01
2001	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	2588	318.452	-445.8	D	7.311	7.311	0	2.7	95.09	5.64	0	0	0	0.01
2001	75	23	2758	335.862	-424.454	D	7.351	7.311	0.04	2.7	94.31	5.69	0	0	0	0.01
2001	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	77	23	2704	329.056	-425.092	D	7.358	7.311	0.048	2.7	89.96	10	0	0	0	0.04
2001	78	23	2589	318.383	-445.593	D	7.316	7.311	0.006	2.7	94.73	5.28	0	0	0	0.03
2001	79	23	2589	318.383	-445.593	D	7.344	7.311	0.034	2.7	94.21	5.75	0	0	0	0.04
2001	80	23	2588	318.452	-445.8	D	7.418	7.311	0.107	2.7	92.84	7.12	0	0	0	0.04
2001	81	23	2789	340.496	-426.449	D	7.388	7.311	0.077	2.7	98	1.98	0	0	0	0.03
2001	82	23	2789	340.496	-426.449	D	7.362	7.311	0.051	2.7	98.03	1.96	0	0	0	0.02
2001	83	23	2684	326.713	-427.014	D	7.406	7.311	0.095	2.7	91.44	8.53	0	0	0	0.04
2001	84	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	85	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	86	23	2571	322.646	-445.476	D	7.312	7.311	0.001	2.7	97.87	2.3	0	0	0	0.02
2001	87	23	2789	340.496	-426.449	D	7.337	7.311	0.027	2.7	94.36	5.63	0	0	0	0.02
2001	88	23	1415	329.185	-425.086	D	7.311	7.311	0.001	2.7	96.07	4.14	0	0	0	0.01
2001	89	23	2684	326.713	-427.014	D	7.311	7.311	0.001	2.7	98.23	2.21	0	0	0	0.01
2001	90	23	1381	328.981	-426.094	D	7.311	7.311	0.001	2.7	97.88	2.27	0	0	0	0.01
2001	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2001	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	105	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	100.52	0.47	0	0	0	0.02
2001	106	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	96.83	3.95	0	0	0	0.08
2001	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	115	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	116	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	129	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.66	0.29	0	0	0	0.01
2001	130	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	99.9	0.11	0	0	0	0.01
2001	131	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	100.06	0.02	0	0	0	0.01
2001	132	23	2684	326.713	-427.014	D	7.685	7.639	0.046	3.4	99.31	0.66	0	0	0	0.04
2001	133	23	2601	319.02	-442.895	D	7.678	7.639	0.04	3.4	99.7	0.28	0	0	0	0.02
2001	134	23	2789	340.496	-426.449	D	7.645	7.639	0.006	3.4	99.89	0.12	0	0	0	0.01
2001	135	23	2398	338.694	-426.417	D	7.639	7.639	0	3.4	47.2	0.01	0	0	0	0
2001	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	138	23	1415	329.185	-425.086	D	7.642	7.639	0.003	3.4	96.52	3.44	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	139	23	2781	339.842	-425.379	D	7.667	7.639	0.028	3.4	98.53	1.46	0	0	0	0.01
2001	140	23	2781	339.842	-425.379	D	7.646	7.639	0.007	3.4	99.84	0.15	0	0	0	0.02
2001	141	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	149	23	2789	340.496	-426.449	D	7.678	7.639	0.039	3.4	99.72	0.27	0	0	0	0.01
2001	150	23	2781	339.842	-425.379	D	7.644	7.639	0.005	3.4	99.79	0.22	0	0	0	0.01
2001	151	23	2758	335.862	-424.454	D	7.66	7.639	0.021	3.4	99.5	0.49	0	0	0	0.01
2001	152	23	2789	340.496	-426.449	D	7.65	7.639	0.011	3.4	99.72	0.28	0	0	0	0.01
2001	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	158	23	2781	339.842	-425.379	D	7.682	7.639	0.043	3.4	99.95	0.03	0	0	0	0.01
2001	159	23	2628	320.933	-436.998	D	8.027	7.639	0.389	3.4	99.75	0.24	0	0	0	0.01
2001	160	23	2628	320.933	-436.998	D	7.803	7.639	0.165	3.4	99.87	0.12	0	0	0	0.01
2001	161	23	2704	329.056	-425.092	D	7.72	7.639	0.081	3.4	99.91	0.08	0	0	0	0.01
2001	162	23	2781	339.842	-425.379	D	7.645	7.639	0.006	3.4	99.98	0.03	0	0	0	0
2001	163	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	99.89	0.02	0	0	0	0
2001	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	168	23	2588	318.452	-445.8	D	7.646	7.639	0.007	3.4	99.98	0.02	0	0	0	0.01
2001	169	23	2781	339.842	-425.379	D	7.654	7.639	0.015	3.4	99.97	0.03	0	0	0	0.01
2001	170	23	2756	335.398	-424.515	D	7.639	7.639	0	3.4	99.77	0.01	0	0	0	0.01
2001	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	172	23	2781	339.842	-425.379	D	7.71	7.639	0.071	3.4	99.7	0.29	0	0	0	0.01
2001	173	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	99.8	0.18	0	0	0	0.01
2001	174	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	100.03	0.04	0	0	0	0.02
2001	175	23	2789	340.496	-426.449	D	7.646	7.639	0.008	3.4	99.9	0.08	0	0	0	0.02
2001	176	23	2789	340.496	-426.449	D	7.672	7.639	0.033	3.4	99.94	0.06	0	0	0	0.01
2001	177	23	2758	335.862	-424.454	D	7.673	7.639	0.034	3.4	99.93	0.07	0	0	0	0.01

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	178	23	2704	329.056	-425.092	D	7.653	7.639	0.015	3.4	99.95	0.06	0	0	0	0.01
2001	179	23	2758	335.862	-424.454	D	7.644	7.639	0.005	3.4	99.83	0.15	0	0	0	0.01
2001	180	23	1415	329.185	-425.086	D	7.639	7.639	0.001	3.4	100.38	0.04	0	0	0	0.01
2001	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	182	23	2704	329.056	-425.092	D	7.692	7.639	0.053	3.4	99.73	0.25	0	0	0	0.01
2001	183	23	2758	335.862	-424.454	D	7.797	7.639	0.158	3.4	99.31	0.68	0	0	0	0.01
2001	184	23	2781	339.842	-425.379	D	7.65	7.639	0.011	3.4	99.96	0.04	0	0	0	0.01
2001	185	23	2415	339.676	-426.124	D	7.639	7.639	0	3.4	99.75	0.01	0	0	0	0.01
2001	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	187	23	2781	339.842	-425.379	D	7.664	7.639	0.025	3.4	99.93	0.06	0	0	0	0.01
2001	188	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.97	0.02	0	0	0	0.01
2001	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	192	23	2789	340.496	-426.449	D	7.744	7.639	0.106	3.4	99.91	0.08	0	0	0	0.01
2001	193	23	2789	340.496	-426.449	D	7.888	7.639	0.25	3.4	99.85	0.14	0	0	0	0.01
2001	194	23	2789	340.496	-426.449	D	7.836	7.639	0.197	3.4	99.66	0.33	0	0	0	0.01
2001	195	23	2588	318.452	-445.8	D	7.704	7.639	0.065	3.4	99.97	0.03	0	0	0	0.01
2001	196	23	2588	318.452	-445.8	D	7.642	7.639	0.003	3.4	100	0.01	0	0	0	0.01
2001	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	201	23	2384	338.176	-425.941	D	7.639	7.639	0	3.4	101.45	0.02	0	0	0	0.01
2001	202	23	2789	340.496	-426.449	D	7.65	7.639	0.011	3.4	99.88	0.13	0	0	0	0.01
2001	203	23	2789	340.496	-426.449	D	7.681	7.639	0.042	3.4	99.95	0.04	0	0	0	0.01
2001	204	23	2789	340.496	-426.449	D	7.676	7.639	0.037	3.4	99.94	0.05	0	0	0	0.01
2001	205	23	2588	318.452	-445.8	D	7.662	7.639	0.023	3.4	99.96	0.04	0	0	0	0
2001	206	23	2757	335.63	-424.484	D	7.654	7.639	0.015	3.4	99.91	0.09	0	0	0	0
2001	207	23	2781	339.842	-425.379	D	7.648	7.639	0.009	3.4	99.97	0.05	0	0	0	0
2001	208	23	2789	340.496	-426.449	D	7.814	7.639	0.175	3.4	99.54	0.45	0	0	0	0.01
2001	209	23	2789	340.496	-426.449	D	7.736	7.639	0.097	3.4	99.51	0.48	0	0	0	0.01
2001	210	23	2781	339.842	-425.379	D	7.649	7.639	0.01	3.4	99.9	0.1	0	0	0	0.01
2001	211	23	2781	339.842	-425.379	D	7.664	7.639	0.026	3.4	99.95	0.05	0	0	0	0.01
2001	212	23	2781	339.842	-425.379	D	7.667	7.639	0.029	3.4	99.98	0.02	0	0	0	0.01
2001	213	23	2789	340.496	-426.449	D	7.657	7.639	0.018	3.4	99.95	0.05	0	0	0	0.01
2001	214	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	100	0.02	0	0	0	0.01
2001	215	23	2780	339.614	-425.419	D	7.639	7.639	0	3.4	99.75	0.03	0	0	0	0.01
2001	216	23	2781	339.842	-425.379	D	7.689	7.639	0.05	3.4	99.93	0.05	0	0	0	0.02

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	217	23	2610	319.631	-440.865	D	7.664	7.639	0.025	3.4	99.94	0.04	0	0	0	0.01
2001	218	23	2626	320.826	-437.417	D	7.639	7.639	0	3.4	99.77	0	0	0	0	0.01
2001	219	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	223	23	2781	339.842	-425.379	D	7.929	7.639	0.291	3.4	99.67	0.32	0	0	0	0.01
2001	224	23	2789	340.496	-426.449	D	8.157	7.639	**0.518**	3.4	99.82	0.16	0	0	0	0.01
2001	225	23	2628	320.933	-436.998	D	7.868	7.639	0.229	3.4	99.89	0.1	0	0	0	0.01
2001	226	23	2588	318.452	-445.8	D	7.924	7.639	0.286	3.4	99.59	0.39	0	0	0	0.02
2001	227	23	2589	318.383	-445.593	D	7.694	7.639	0.055	3.4	99.84	0.15	0	0	0	0.01
2001	228	23	2413	339.406	-425.637	D	7.639	7.639	0	3.4	97.15	0.02	0	0	0	0.01
2001	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	232	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.94	0.02	0	0	0	0.01
2001	233	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.81	0.02	0	0	0	0.01
2001	234	23	2386	338.533	-428.423	D	7.639	7.639	0	3.4	82.1	0.01	0	0	0	0.01
2001	235	23	2787	340.091	-426.447	D	7.639	7.639	0	3.4	100.04	0.06	0	0	0	0.01
2001	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	238	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	239	23	2781	339.842	-425.379	D	7.714	7.639	0.075	3.4	99.81	0.17	0	0	0	0.01
2001	240	23	2781	339.842	-425.379	D	7.925	7.639	0.286	3.4	99.89	0.1	0	0	0	0.01
2001	241	23	2750	334.007	-424.696	D	7.85	7.639	0.211	3.4	99.9	0.09	0	0	0	0.01
2001	242	23	2758	335.862	-424.454	D	7.733	7.639	0.094	3.4	99.8	0.19	0	0	0	0.01
2001	243	23	2781	339.842	-425.379	D	7.644	7.639	0.005	3.4	99.86	0.15	0	0	0	0.01
2001	244	23	2781	339.842	-425.379	D	7.797	7.727	0.07	3.592	99.73	0.25	0	0	0	0.01
2001	245	23	2704	329.056	-425.092	D	7.809	7.731	0.078	3.6	99.58	0.41	0	0	0	0.01
2001	246	23	2704	329.056	-425.092	D	7.738	7.731	0.007	3.6	99.95	0.05	0	0	0	0.01
2001	247	23	2704	329.056	-425.092	D	7.777	7.731	0.046	3.6	99.95	0.05	0	0	0	0.01
2001	248	23	2704	329.056	-425.092	D	7.792	7.731	0.062	3.6	99.91	0.09	0	0	0	0.01
2001	249	23	2758	335.862	-424.454	D	7.74	7.731	0.009	3.6	99.95	0.04	0	0	0	0.01
2001	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	254	23	2573	322.153	-445.515	D	7.753	7.731	0.023	3.6	99.47	0.51	0	0	0	0.02
2001	255	23	2589	318.383	-445.593	D	7.733	7.731	0.002	3.6	99.84	0.14	0	0	0	0.01

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	256	23	2622	320.612	-438.254	D	7.731	7.731	0.001	3.6	99.81	0.08	0	0	0	0.01
2001	257	23	2781	339.842	-425.379	D	7.783	7.731	0.053	3.6	99.65	0.34	0	0	0	0.01
2001	258	23	2588	318.452	-445.8	D	7.749	7.731	0.018	3.6	99.93	0.06	0	0	0	0.01
2001	259	23	67	319.674	-440.741	D	7.735	7.731	0.004	3.6	99.9	0.09	0	0	0	0.01
2001	260	23	1449	329.434	-425.075	D	7.733	7.731	0.002	3.6	99.88	0.1	0	0	0	0.01
2001	261	23	2781	339.842	-425.379	D	7.731	7.731	0	3.6	99.69	0.33	0	0	0	0.01
2001	262	23	2781	339.842	-425.379	D	7.735	7.731	0.004	3.6	97.66	2.32	0	0	0	0.01
2001	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	265	23	2789	340.496	-426.449	D	7.736	7.731	0.005	3.6	99.82	0.14	0	0	0	0.03
2001	266	23	2789	340.496	-426.449	D	7.744	7.731	0.014	3.6	99.64	0.34	0	0	0	0.02
2001	267	23	2789	340.496	-426.449	D	7.772	7.731	0.041	3.6	95.61	4.35	0	0	0	0.04
2001	268	23	2789	340.496	-426.449	D	7.774	7.731	0.043	3.6	93.34	6.62	0	0	0	0.04
2001	269	23	2781	339.842	-425.379	D	7.869	7.731	0.138	3.6	98.09	1.89	0	0	0	0.02
2001	270	23	2789	340.496	-426.449	D	7.912	7.731	0.181	3.6	99.5	0.49	0	0	0	0.01
2001	271	23	2468	334.002	-434.887	D	7.863	7.731	0.132	3.6	99.75	0.24	0	0	0	0.01
2001	272	23	2588	318.452	-445.8	D	7.75	7.731	0.02	3.6	99.86	0.13	0	0	0	0.01
2001	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	274	23	2758	335.862	-424.454	D	7.609	7.598	0.011	3.313	99.48	0.52	0	0	0	0.01
2001	275	23	2781	339.842	-425.379	D	7.598	7.593	0.005	3.3	99.7	0.32	0	0	0	0.01
2001	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	278	23	2781	339.842	-425.379	D	7.726	7.593	0.134	3.3	94.85	5.14	0	0	0	0.01
2001	279	23	2789	340.496	-426.449	D	7.596	7.593	0.003	3.3	93.61	6.39	0	0	0	0.02
2001	280	23	2468	334.002	-434.887	D	7.602	7.593	0.01	3.3	99.42	0.54	0	0	0	0.02
2001	281	23	2789	340.496	-426.449	D	7.658	7.593	0.066	3.3	97.99	2	0	0	0	0.01
2001	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	285	23	2758	335.862	-424.454	D	7.604	7.593	0.012	3.3	93.22	6.77	0	0	0	0.02
2001	286	23	2704	329.056	-425.092	D	7.62	7.593	0.027	3.3	99.34	0.65	0	0	0	0.01
2001	287	23	2789	340.496	-426.449	D	7.629	7.593	0.037	3.3	98.34	1.65	0	0	0	0.01
2001	288	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	289	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	290	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	291	23	2789	340.496	-426.449	D	7.598	7.593	0.005	3.3	97.51	2.49	0	0	0	0.01
2001	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	297	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	298	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	300	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	301	23	2789	340.496	-426.449	D	7.623	7.593	0.031	3.3	94.27	5.71	0	0	0	0.02
2001	302	23	2684	326.713	-427.014	D	7.595	7.593	0.003	3.3	97.88	2.07	0	0	0	0.01
2001	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	307	23	2781	339.842	-425.379	D	7.627	7.546	0.081	3.2	97.22	2.77	0	0	0	0.01
2001	308	23	2628	320.933	-436.998	D	7.586	7.546	0.039	3.2	98.81	1.19	0	0	0	0.01
2001	309	23	2789	340.496	-426.449	D	7.646	7.546	0.099	3.2	97.49	2.49	0	0	0	0.02
2001	310	23	2468	334.002	-434.887	D	7.726	7.546	0.18	3.2	98.46	1.52	0	0	0	0.01
2001	311	23	2789	340.496	-426.449	D	7.643	7.546	0.097	3.2	99.36	0.63	0	0	0	0.01
2001	312	23	2789	340.496	-426.449	D	7.556	7.546	0.009	3.2	99.7	0.32	0	0	0	0.01
2001	313	23	2429	338.563	-428.651	D	7.568	7.546	0.022	3.2	84.51	15.4	0	0	0	0.09
2001	314	23	2789	340.496	-426.449	D	7.547	7.546	0	3.2	97.74	2.08	0	0	0	0.03
2001	315	23	2781	339.842	-425.379	D	7.559	7.546	0.013	3.2	97.96	2	0	0	0	0.06
2001	316	23	2588	318.452	-445.8	D	7.583	7.546	0.037	3.2	97.34	2.63	0	0	0	0.03
2001	317	23	2589	318.383	-445.593	D	7.569	7.546	0.023	3.2	98.98	1.02	0	0	0	0.02
2001	318	23	2757	335.63	-424.484	D	7.547	7.546	0	3.2	99.72	0.26	0	0	0	0.01
2001	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	326	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	95.46	4.73	0	0	0	0.03
2001	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	332	23	2789	340.496	-426.449	D	7.65	7.546	0.104	3.2	86.26	13.7	0	0	0	0.03
2001	333	23	2589	318.383	-445.593	D	7.809	7.546	0.263	3.2	88.39	11.59	0	0	0	0.03

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	334	23	2789	340.496	-426.449	D	7.97	7.546	0.424	3.2	93.9	6.08	0	0	0	0.02
2001	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	342	23	2789	340.496	-426.449	D	7.682	7.593	0.089	3.3	89.18	10.79	0	0	0	0.03
2001	343	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	87.36	12.57	0	0	0	0.05
2001	344	23	2789	340.496	-426.449	D	7.609	7.593	0.016	3.3	83.9	16.06	0	0	0	0.04
2001	345	23	2789	340.496	-426.449	D	7.605	7.593	0.012	3.3	91.4	8.58	0	0	0	0.02
2001	346	23	1241	327.999	-426.387	D	7.593	7.593	0	3.3	93.06	4.99	0	0	0	0.01
2001	347	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	23	2789	340.496	-426.449	D	7.597	7.593	0.005	3.3	95.26	4.75	0	0	0	0.01
2001	349	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	99.2	0.8	0	0	0	0.01
2001	350	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	96.88	3.16	0	0	0	0.01
2001	351	23	2789	340.496	-426.449	D	7.651	7.593	0.058	3.3	88.53	11.44	0	0	0	0.03
2001	352	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	96.69	2.27	0	0	0	0
2001	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	2402	338.942	-426.406	D	7.593	7.593	0	3.3	73.82	3.72	0	0	0	0.01
2001	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.518							
NORANDA									**DELTA**	**% of Modeled Extinction by Species**						
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	2	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	3	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	10	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	99.89	0.01	0	0	0.08	0.6
2001	11	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	99.39	0.03	0	0	0.03	0.76
2001	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	13	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	98.76	0.06	0	0	0.04	1.16
2001	14	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	99.07	0.03	0	0	0.01	0.69
2001	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	17	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	55.95	0.01	0	0	23.39	36.74
2001	18	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	19	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	21	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	25	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	26	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	96.01	0.21	0	0	0.05	4.28
2001	27	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	28	23	2789	340.496	-426.449	D	7.598	7.593	0.005	3.3	93.3	0.26	0	0	0.26	6.19
2001	29	23	947	326.199	-430.712	D	7.593	7.593	0	3.3	6.77	0.44	0	0	0	3.39
2001	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	38	23	2781	339.842	-425.379	D	7.453	7.453	0	3	35.65	2.29	0	0	2.08	60.67
2001	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	42	23	2588	318.452	-445.8	D	7.475	7.453	0.023	3	96.14	0.14	0	0	0.15	3.57
2001	43	23	2704	329.056	-425.092	D	7.464	7.453	0.011	3	87.81	0.72	0	0	0.04	11.44
2001	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	46	23	2414	339.687	-426.374	D	7.453	7.453	0	3	98.24	0.04	0	0	0.16	9.3
2001	47	23	2789	340.496	-426.449	D	7.453	7.453	0	3	89.51	0.71	0	0	0.04	10.27
2001	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	49	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	50	23	2789	340.496	-426.449	D	7.455	7.453	0.002	3	95.97	0.13	0	0	0.09	3.87
2001	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	52	23	1	318.65	-445.782	D	7.453	7.453	0	3	63.31	0.01	0	0	5.69	35.26
2001	53	23	1805	332.557	-433.931	D	7.453	7.453	0	3	65.48	0.01	0	0	2.99	31.59
2001	54	23	2789	340.496	-426.449	D	7.456	7.453	0.003	3	93.89	0.15	0	0	0.74	5.25
2001	55	23	2781	339.842	-425.379	D	7.459	7.453	0.006	3	96.06	0.14	0	0	0.07	3.72
2001	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	58	23	2789	340.496	-426.449	D	7.529	7.453	0.076	3	95.82	0.1	0	0	0.16	3.92
2001	59	23	2588	318.452	-445.8	D	7.523	7.453	0.071	3	96.45	0.09	0	0	0.09	3.37
2001	60	23	2571	322.646	-445.476	D	7.333	7.317	0.017	2.713	96.43	0.07	0	0	0.2	3.32
2001	61	23	2789	340.496	-426.449	D	7.323	7.311	0.013	2.7	97.77	0.04	0	0	0.03	2.18
2001	62	23	2571	322.646	-445.476	D	7.312	7.311	0.001	2.7	98.47	0.02	0	0	0.01	1.65
2001	63	23	1893	333.346	-434.896	D	7.311	7.311	0	2.7	91.58	0.18	0	0	0.01	3.9
2001	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	68	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	69	23	2468	334.002	-434.887	D	7.311	7.311	0	2.7	95.34	0.02	0	0	0.56	4.29
2001	70	23	2789	340.496	-426.449	D	7.316	7.311	0.005	2.7	95.98	0.06	0	0	0.09	3.87
2001	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	93.25	0.32	0	0	0.09	6.52
2001	75	23	2588	318.452	-445.8	D	7.339	7.311	0.028	2.7	97.46	0.1	0	0	0.03	2.41
2001	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	79	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	80	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	81	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	82	23	2789	340.496	-426.449	D	7.35	7.311	0.04	2.7	97.28	0.01	0	0	0.21	2.5
2001	83	23	2789	340.496	-426.449	D	7.43	7.311	0.119	2.7	97.48	0.02	0	0	0.06	2.45
2001	84	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	85	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	86	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	87	23	1163	328.176	-436.121	D	7.323	7.311	0.012	2.7	95.5	0.12	0	0	0.37	4.02
2001	88	23	2758	335.862	-424.454	D	7.312	7.311	0.001	2.7	97.27	0.06	0	0	0.13	2.76
2001	89	23	2571	322.646	-445.476	D	7.392	7.311	0.081	2.7	98.77	0.04	0	0	0.09	1.11
2001	90	23	2571	322.646	-445.476	D	7.332	7.311	0.021	2.7	98.89	0.03	0	0	0.03	1.06
2001	91	23	2395	338.435	-426.179	D	7.356	7.356	0	2.796	73.76	0.12	0	0	0.01	1.57
2001	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	94	23	2781	339.842	-425.379	D	7.484	7.358	0.125	2.8	96.63	0.09	0	0	0.15	3.13
2001	95	23	2758	335.862	-424.454	D	7.359	7.358	0.001	2.8	92.17	0.22	0	0	0.05	7.59
2001	96	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	115	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	116	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	119	23	2789	340.496	-426.449	D	7.359	7.358	0.001	2.8	98.54	0	0	0	0.16	1.52

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	120	23	2789	340.496	-426.449	D	7.361	7.358	0.003	2.8	98.74	0	0	0	0.05	1.22
2001	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	130	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	76.06	0	0	0	0.02	0.16
2001	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	138	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	139	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	140	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	141	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	148	23	2468	334.002	-434.887	D	7.639	7.639	0	3.4	99.27	0	0	0	0.05	0.54
2001	149	23	2589	318.383	-445.593	D	7.742	7.639	0.103	3.4	97.7	0.01	0	0	0.2	2.09
2001	150	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	96.76	0.01	0	0	0.13	3.11
2001	151	23	2704	329.056	-425.092	D	7.647	7.639	0.008	3.4	97.81	0.02	0	0	0.05	2.13
2001	152	23	2781	339.842	-425.379	D	7.666	7.639	0.027	3.4	99	0	0	0	0.02	0.98
2001	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	154	23	2781	339.842	-425.379	D	7.674	7.639	0.035	3.4	98.25	0.01	0	0	0.08	1.66
2001	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	158	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	159	23	2571	322.646	-445.476	D	7.649	7.639	0.01	3.4	98.88	0.01	0	0	0.08	1.05
2001	160	23	2468	334.002	-434.887	D	7.645	7.639	0.006	3.4	98.75	0	0	0	0.21	1.05
2001	161	23	2468	334.002	-434.887	D	7.758	7.639	0.12	3.4	98.37	0	0	0	0.11	1.52
2001	162	23	2571	322.646	-445.476	D	7.769	7.639	0.13	3.4	98.49	0	0	0	0.11	1.39
2001	163	23	2694	327.861	-425.964	D	7.671	7.639	0.032	3.4	98.66	0	0	0	0.14	1.2
2001	164	23	2235	335.628	-424.554	D	7.639	7.639	0	3.4	95.83	0	0	0	0.01	0.45
2001	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	168	23	2588	318.452	-445.8	D	7.641	7.639	0.002	3.4	98.7	0	0	0	0.22	1.06
2001	169	23	2588	318.452	-445.8	D	7.708	7.639	0.07	3.4	98.87	0	0	0	0.06	1.07
2001	170	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	176	23	2789	340.496	-426.449	D	7.66	7.639	0.021	3.4	99.36	0	0	0	0.09	0.55
2001	177	23	2789	340.496	-426.449	D	7.794	7.639	0.155	3.4	98.72	0	0	0	0.09	1.19
2001	178	23	1415	329.185	-425.086	D	7.784	7.639	0.145	3.4	98.92	0	0	0	0.07	1
2001	179	23	2758	335.862	-424.454	D	7.717	7.639	0.078	3.4	98.95	0.01	0	0	0.05	1
2001	180	23	2758	335.862	-424.454	D	7.646	7.639	0.007	3.4	99.09	0	0	0	0.03	0.88
2001	181	23	1041	326.867	-428.934	D	7.639	7.639	0	3.4	100.79	0	0	0	0.01	0.37
2001	182	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	89.77	0.02	0	0	0.36	10.31
2001	183	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	95.52	0.02	0	0	0.12	4.39
2001	184	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	97.16	0	0	0	0.09	2.8
2001	185	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	97.96	0	0	0	0.2	2.13
2001	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	188	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.11	0	0	0	0.03	0.36
2001	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	192	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	193	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	72.22	0.02	0	0	0.5	27.23
2001	194	23	2781	339.842	-425.379	D	7.695	7.639	0.056	3.4	97.06	0.02	0	0	0.11	2.81
2001	195	23	2588	318.452	-445.8	D	7.64	7.639	0.001	3.4	98.14	0	0	0	0.08	1.92
2001	196	23	2588	318.452	-445.8	D	7.724	7.639	0.085	3.4	97.7	0	0	0	0.26	2.04
2001	197	23	2684	326.713	-427.014	D	7.641	7.639	0.002	3.4	90.25	0	0	0	0.16	9.63

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	198	23	2401	338.661	-425.669	D	7.639	7.639	0	3.4	79.32	0.04	0	0	0.08	11.67
2001	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	202	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	98.39	0	0	0	0.05	1.41
2001	203	23	2468	334.002	-434.887	D	7.644	7.639	0.005	3.4	99.21	0	0	0	0.06	0.79
2001	204	23	2571	322.646	-445.476	D	7.743	7.639	0.104	3.4	99.17	0	0	0	0.05	0.77
2001	205	23	2588	318.452	-445.8	D	7.764	7.639	0.125	3.4	99.26	0	0	0	0.03	0.71
2001	206	23	2758	335.862	-424.454	D	7.713	7.639	0.075	3.4	99.3	0	0	0	0.02	0.68
2001	207	23	2781	339.842	-425.379	D	7.671	7.639	0.032	3.4	99.33	0	0	0	0.01	0.65
2001	208	23	2789	340.496	-426.449	D	7.669	7.639	0.03	3.4	99.21	0	0	0	0.03	0.76
2001	209	23	2789	340.496	-426.449	D	7.675	7.639	0.036	3.4	99.16	0.01	0	0	0.02	0.81
2001	210	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.44	0	0	0	0.01	0.7
2001	211	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	212	23	2789	340.496	-426.449	D	7.648	7.639	0.009	3.4	99	0	0	0	0.14	0.86
2001	213	23	2789	340.496	-426.449	D	7.697	7.639	0.058	3.4	98.96	0	0	0	0.06	0.97
2001	214	23	2758	335.862	-424.454	D	7.652	7.639	0.013	3.4	99.42	0	0	0	0.03	0.57
2001	215	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.49	0	0	0	0.03	0.56
2001	216	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.19	0	0	0	0.03	0.92
2001	217	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	96.56	0	0	0	0.07	0.48
2001	218	23	2588	318.452	-445.8	D	7.675	7.639	0.036	3.4	94.24	0.01	0	0	1.22	4.54
2001	219	23	2758	335.862	-424.454	D	8.064	7.639	0.425	3.4	98.23	0	0	0	0.25	1.52
2001	220	23	2588	318.452	-445.8	D	7.988	7.639	0.349	3.4	98.83	0	0	0	0.11	1.06
2001	221	23	2789	340.496	-426.449	D	7.668	7.639	0.029	3.4	99.09	0	0	0	0.04	0.87
2001	222	23	2416	339.665	-425.875	D	7.639	7.639	0	3.4	99.22	0	0	0	0.02	0.46
2001	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	224	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	98.59	0	0	0	0.15	1.33
2001	225	23	2468	334.002	-434.887	D	7.645	7.639	0.006	3.4	98.96	0.02	0	0	0.06	0.99
2001	226	23	340	322.363	-445.37	D	7.639	7.639	0	3.4	85.23	0	0	0	0.06	1.38
2001	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	235	23	2386	338.533	-428.423	D	7.639	7.639	0	3.4	100.79	0	0	0	0.01	0.28
2001	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	237	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	238	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	239	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	242	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	243	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2001	245	23	2758	335.862	-424.454	D	7.992	7.731	0.262	3.6	98.15	0.02	0	0	0.12	1.71
2001	246	23	2588	318.452	-445.8	D	7.958	7.731	0.227	3.6	98.42	0	0	0	0.06	1.51
2001	247	23	2589	318.383	-445.593	D	7.741	7.731	0.01	3.6	99.13	0	0	0	0.05	0.81
2001	248	23	2571	322.646	-445.476	D	8.053	7.731	0.323	3.6	98.08	0.01	0	0	0.22	1.69
2001	249	23	2704	329.056	-425.092	D	7.78	7.731	0.049	3.6	98.05	0	0	0	0.08	1.86
2001	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	254	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	255	23	2588	318.452	-445.8	D	7.921	7.731	0.19	3.6	97.19	0.01	0	0	0.27	2.53
2001	256	23	2588	318.452	-445.8	D	7.768	7.731	0.037	3.6	97.64	0	0	0	0.23	2.13
2001	257	23	2588	318.452	-445.8	D	7.732	7.731	0.001	3.6	95.34	0	0	0	0.44	4.11
2001	258	23	2628	320.933	-436.998	D	7.732	7.731	0.001	3.6	98.7	0	0	0	0.04	1.22
2001	259	23	2588	318.452	-445.8	D	7.785	7.731	0.055	3.6	98.7	0	0	0	0.09	1.2
2001	260	23	2571	322.646	-445.476	D	7.847	7.731	0.116	3.6	98.74	0	0	0	0.04	1.22
2001	261	23	2789	340.496	-426.449	D	7.747	7.731	0.017	3.6	98.71	0	0	0	0.03	1.27
2001	262	23	1949	333.299	-428.153	D	7.731	7.731	0	3.6	91.23	0	0	0	0.18	6.35
2001	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	52.87	0	0	0	0.05	3.41
2001	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	265	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	266	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	267	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	268	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	269	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	270	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	271	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	272	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2001	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	278	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	279	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	280	23	2468	334.002	-434.887	D	7.594	7.593	0.001	3.3	99.25	0	0	0	0.21	0.55
2001	281	23	2789	340.496	-426.449	D	7.624	7.593	0.032	3.3	97.96	0.03	0	0	0.11	1.91
2001	282	23	489	322.661	-435.114	D	7.593	7.593	0	3.3	61.64	0.07	0	0	0.03	11.91
2001	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	285	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	286	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	287	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	288	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	289	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	290	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	291	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	97.71	0.01	0	0	0.13	2.23
2001	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	297	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	298	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	300	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	301	23	2468	334.002	-434.887	D	7.595	7.593	0.002	3.3	96.64	0.02	0	0	0.35	2.99
2001	302	23	2789	340.496	-426.449	D	7.611	7.593	0.018	3.3	97.19	0.05	0	0	0.08	2.68
2001	303	23	2322	336.902	-425.247	D	7.593	7.593	0	3.3	93.5	0.01	0	0	0.01	1.74
2001	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	307	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	308	23	2588	318.452	-445.8	D	7.582	7.546	0.036	3.2	93.87	0.02	0	0	0.67	5.45
2001	309	23	2588	318.452	-445.8	D	7.547	7.546	0.001	3.2	82.76	0	0	0	1.21	16.16
2001	310	23	2588	318.452	-445.8	D	7.549	7.546	0.003	3.2	97.62	0.01	0	0	0.19	2.29
2001	311	23	2789	340.496	-426.449	D	7.567	7.546	0.021	3.2	97.74	0.01	0	0	0.09	2.17
2001	312	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	93.95	0.03	0	0	0.13	5.94
2001	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	316	23	2704	329.056	-425.092	D	7.597	7.546	0.051	3.2	93.12	0.03	0	0	1.05	5.81
2001	317	23	2589	318.383	-445.593	D	7.563	7.546	0.017	3.2	93.75	0.08	0	0	0.06	6.13
2001	318	23	2209	335.38	-424.564	D	7.547	7.546	0	3.2	96.78	0.02	0	0	0.01	3.15
2001	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	321	23	2571	322.646	-445.476	D	7.583	7.546	0.037	3.2	96.99	0.02	0	0	0.26	2.74
2001	322	23	2789	340.496	-426.449	D	7.805	7.546	0.259	3.2	97.88	0.03	0	0	0.07	2.02
2001	323	23	2780	339.614	-425.419	D	7.546	7.546	0	3.2	96.48	0	0	0	0.02	0.39
2001	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	332	23	2571	322.646	-445.476	D	7.547	7.546	0	3.2	97.15	0.15	0	0	0.43	2.55
2001	333	23	2571	322.646	-445.476	D	7.549	7.546	0.003	3.2	96.92	0.29	0	0	0.04	2.79
2001	334	23	2468	334.002	-434.887	D	7.546	7.546	0	3.2	97.21	0.28	0	0	0.01	2.39
2001	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	95.75	0.01	0	0	0.27	4.18
2001	338	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	84.93	0.05	0	0	0.21	12.88
2001	339	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	342	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	98.72	0.09	0	0	0.03	1.18
2001	343	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	344	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	345	23	2789	340.496	-426.449	D	7.621	7.593	0.029	3.3	95.97	0.14	0	0	0.25	3.65
2001	346	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	85.42	0.55	0	0	0.11	13.92
2001	347	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	350	23	2781	339.842	-425.379	D	7.684	7.593	0.092	3.3	93.7	0.35	0	0	0.28	5.67
2001	351	23	2789	340.496	-426.449	D	7.659	7.593	0.066	3.3	99.05	0.05	0	0	0.02	0.89
2001	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.425							
INDEPENDENCE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	2	23	2789	340.496	-426.449	D	7.744	7.593	0.151	3.3	89.22	10.45	0	0	0	0.33
2001	3	23	2789	340.496	-426.449	D	7.625	7.593	0.033	3.3	91.91	7.86	0	0	0	0.23
2001	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	23	2789	340.496	-426.449	D	7.732	7.593	0.139	3.3	77.07	22.07	0	0	0	0.86
2001	8	23	2589	318.383	-445.593	D	7.656	7.593	0.063	3.3	91.31	8.43	0	0	0	0.26
2001	9	23	2789	340.496	-426.449	D	7.798	7.593	0.205	3.3	91.13	8.54	0	0	0	0.33
2001	10	23	2468	334.002	-434.887	D	7.647	7.593	0.054	3.3	90.2	9.59	0	0	0	0.22
2001	11	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	93.3	5.57	0	0	0	0.12
2001	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	2781	339.842	-425.379	D	7.648	7.593	0.056	3.3	80.9	18.26	0	0	0	0.84
2001	17	23	2588	318.452	-445.8	D	7.644	7.593	0.051	3.3	80.86	18.58	0	0	0	0.56
2001	18	23	2704	329.056	-425.092	D	7.626	7.593	0.034	3.3	91.22	8.34	0	0	0	0.43
2001	19	23	2600	318.952	-443.12	D	7.823	7.593	0.23	3.3	70.61	28.04	0	0	0	1.35
2001	20	23	2789	340.496	-426.449	D	7.655	7.593	0.062	3.3	74.68	24.37	0	0	0	0.96
2001	21	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	23	2684	326.713	-427.014	D	7.676	7.593	0.083	3.3	91.98	7.6	0	0	0	0.42
2001	25	23	2589	318.383	-445.593	D	7.766	7.593	0.174	3.3	83.67	15.74	0	0	0	0.6
2001	26	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	83.78	12.8	0	0	0	0.37
2001	27	23	2781	339.842	-425.379	D	7.643	7.593	0.051	3.3	75.05	24.06	0	0	0	0.89
2001	28	23	2684	326.713	-427.014	D	7.624	7.593	0.031	3.3	80.58	18.9	0	0	0	0.52
2001	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	23	2707	329.748	-425.023	D	7.453	7.453	0	3	97.02	4.87	0	0	0	1.09
2001	38	23	2705	329.287	-425.069	D	7.453	7.453	0	3	88.74	10.51	0	0	0	0.78
2001	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	2758	335.862	-424.454	D	7.453	7.453	0	3	90.2	9.66	0	0	0	0.17
2001	41	23	2223	335.759	-427.545	D	7.494	7.453	0.041	3	66.71	32.01	0	0	0	1.28
2001	42	23	2588	318.452	-445.8	D	7.459	7.453	0.007	3	82.22	17.24	0	0	0	0.55
2001	43	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	46	23	2781	339.842	-425.379	D	8.196	7.453	**0.744**	3	93.34	6.31	0	0	0	0.35
2001	47	23	2781	339.842	-425.379	D	7.844	7.453	0.391	3	90.81	8.9	0	0	0	0.3
2001	48	23	2589	318.383	-445.593	D	7.453	7.453	0	3	83.39	16.16	0	0	0	0.77
2001	49	23	2704	329.056	-425.092	D	7.489	7.453	0.036	3	83.13	16.39	0	0	0	0.48
2001	50	23	2155	334.883	-424.586	D	7.453	7.453	0	3	90.42	9.04	0	0	0	0.26
2001	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	52	23	2704	329.056	-425.092	D	7.474	7.453	0.021	3	94.29	5.53	0	0	0	0.2
2001	53	23	2758	335.862	-424.454	D	7.457	7.453	0.004	3	94.41	5.5	0	0	0	0.16
2001	54	23	1	318.65	-445.782	D	7.453	7.453	0	3	99.95	2.52	0	0	0	0.12
2001	55	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	2789	340.496	-426.449	D	7.459	7.453	0.006	3	95.46	4.16	0	0	0	0.41
2001	58	23	2781	339.842	-425.379	D	7.469	7.453	0.017	3	94.65	5.15	0	0	0	0.22
2001	59	23	2694	327.861	-425.964	D	7.458	7.453	0.005	3	94.1	5.83	0	0	0	0.11
2001	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2001	61	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	62	23	2787	340.091	-426.447	D	7.311	7.311	0	2.7	94.6	5.72	0	0	0	0.39
2001	63	23	2684	326.713	-427.014	D	7.515	7.311	0.205	2.7	91.78	7.79	0	0	0	0.43
2001	64	23	2789	340.496	-426.449	D	7.5	7.311	0.189	2.7	73.13	25.22	0	0	0	1.65
2001	65	23	2789	340.496	-426.449	D	7.321	7.311	0.01	2.7	69.64	28.57	0	0	0	1.79
2001	66	23	2758	335.862	-424.454	D	7.344	7.311	0.033	2.7	96.22	3.25	0	0	0	0.54
2001	67	23	2781	339.842	-425.379	D	7.402	7.311	0.092	2.7	91.07	8.37	0	0	0	0.56
2001	68	23	2694	327.861	-425.964	D	7.335	7.311	0.024	2.7	75.63	22.99	0	0	0	1.38
2001	69	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	70	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	75	23	2781	339.842	-425.379	D	7.312	7.311	0.001	2.7	94.1	5.58	0	0	0	0.34
2001	76	23	2684	326.713	-427.014	D	7.362	7.311	0.051	2.7	72.08	26.34	0	0	0	1.58
2001	77	23	2589	318.383	-445.593	D	7.312	7.311	0.001	2.7	88.84	10.31	0	0	0	0.87
2001	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	79	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	80	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	81	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	82	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	84	23	2684	326.713	-427.014	D	7.331	7.311	0.02	2.7	86.35	12.73	0	0	0	0.92
2001	85	23	2467	334.065	-434.651	D	7.402	7.311	0.091	2.7	85.75	13.57	0	0	0	0.68
2001	86	23	2684	326.713	-427.014	D	7.313	7.311	0.003	2.7	88.06	11.42	0	0	0	0.55
2001	87	23	200	320.784	-437.694	D	7.311	7.311	0	2.7	75.14	2.05	0	0	0	0.36
2001	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	89	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2001	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	105	23	2781	339.842	-425.379	D	7.362	7.358	0.004	2.8	99.28	0.44	0	0	0	0.3
2001	106	23	2781	339.842	-425.379	D	7.378	7.358	0.02	2.8	82.38	15.97	0	0	0	1.65
2001	107	23	2589	318.383	-445.593	D	7.393	7.358	0.035	2.8	78.22	20.4	0	0	0	1.39
2001	108	23	2628	320.933	-436.998	D	7.429	7.358	0.071	2.8	95.67	3.99	0	0	0	0.34
2001	109	23	2781	339.842	-425.379	D	7.362	7.358	0.004	2.8	99.31	0.5	0	0	0	0.2
2001	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	114	23	2781	339.842	-425.379	D	7.378	7.358	0.02	2.8	98.44	0.95	0	0	0	0.62
2001	115	23	2588	318.452	-445.8	D	7.447	7.358	0.089	2.8	98.09	1.5	0	0	0	0.41
2001	116	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	127	23	2781	339.842	-425.379	D	7.643	7.639	0.004	3.4	99.42	0.16	0	0	0	0.43
2001	128	23	2790	340.421	-426.562	D	7.843	7.639	0.204	3.4	99.12	0.58	0	0	0	0.3
2001	129	23	2781	339.842	-425.379	D	7.711	7.639	0.072	3.4	99.59	0.22	0	0	0	0.19
2001	130	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.84	0.06	0	0	0	0.13
2001	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	132	23	2588	318.452	-445.8	D	7.692	7.639	0.053	3.4	94.67	5.1	0	0	0	0.23
2001	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	138	23	2684	326.713	-427.014	D	7.644	7.639	0.005	3.4	98.38	1.46	0	0	0	0.16
2001	139	23	2781	339.842	-425.379	D	7.683	7.639	0.044	3.4	99.15	0.74	0	0	0	0.11

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	140	23	2386	338.533	-428.423	D	7.639	7.639	0	3.4	97.5	0.03	0	0	0	0.11
2001	141	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	148	23	2781	339.842	-425.379	D	7.645	7.639	0.007	3.4	99.75	0.04	0	0	0	0.2
2001	149	23	2789	340.496	-426.449	D	7.81	7.639	0.171	3.4	99.63	0.21	0	0	0	0.16
2001	150	23	2781	339.842	-425.379	D	7.652	7.639	0.013	3.4	99.76	0.12	0	0	0	0.13
2001	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	153	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	98.29	1.04	0	0	0	0.7
2001	154	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	100.01	0.44	0	0	0	0.19
2001	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	158	23	2781	339.842	-425.379	D	7.687	7.639	0.048	3.4	99.8	0.08	0	0	0	0.12
2001	159	23	2684	326.713	-427.014	D	7.91	7.639	0.271	3.4	99.75	0.15	0	0	0	0.1
2001	160	23	2588	318.452	-445.8	D	7.64	7.639	0.001	3.4	99.86	0.01	0	0	0	0.11
2001	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	168	23	2468	334.002	-434.887	D	7.647	7.639	0.009	3.4	99.79	0.03	0	0	0	0.18
2001	169	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	99.84	0.02	0	0	0	0.14
2001	170	23	2384	338.176	-425.941	D	7.639	7.639	0	3.4	87.36	0.01	0	0	0	0.11
2001	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	172	23	2781	339.842	-425.379	D	7.719	7.639	0.08	3.4	99.61	0.17	0	0	0	0.22
2001	173	23	2588	318.452	-445.8	D	7.722	7.639	0.083	3.4	99.26	0.38	0	0	0	0.36
2001	174	23	2789	340.496	-426.449	D	7.901	7.639	0.262	3.4	99.11	0.52	0	0	0	0.37
2001	175	23	2789	340.496	-426.449	D	7.648	7.639	0.009	3.4	99.67	0.1	0	0	0	0.24
2001	176	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.85	0.05	0	0	0	0.15
2001	177	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	99.9	0.03	0	0	0	0.12
2001	178	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	179	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	180	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	182	23	2707	329.748	-425.023	D	7.644	7.639	0.005	3.4	99.83	0.01	0	0	0	0.15
2001	183	23	2704	329.056	-425.092	D	7.664	7.639	0.026	3.4	99.72	0.17	0	0	0	0.12
2001	184	23	1415	329.185	-425.086	D	7.639	7.639	0.001	3.4	99.81	0.03	0	0	0	0.1
2001	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	186	23	2781	339.842	-425.379	D	7.65	7.639	0.011	3.4	99.8	0.01	0	0	0	0.18
2001	187	23	2781	339.842	-425.379	D	7.832	7.639	0.193	3.4	99.81	0.06	0	0	0	0.13
2001	188	23	2789	340.496	-426.449	D	7.67	7.639	0.031	3.4	99.88	0.02	0	0	0	0.1
2001	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	191	23	2781	339.842	-425.379	D	7.747	7.639	0.108	3.4	99.72	0.1	0	0	0	0.18
2001	192	23	2789	340.496	-426.449	D	7.707	7.639	0.069	3.4	99.79	0.04	0	0	0	0.18
2001	193	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	194	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	195	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	202	23	2415	339.676	-426.124	D	7.639	7.639	0	3.4	98.89	0.01	0	0	0	0.13
2001	203	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.78	0.05	0	0	0	0.12
2001	204	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	205	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	206	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	207	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.91	0.05	0	0	0	0.12
2001	208	23	2789	340.496	-426.449	D	7.668	7.639	0.029	3.4	99.56	0.35	0	0	0	0.09
2001	209	23	2789	340.496	-426.449	D	7.657	7.639	0.019	3.4	99.46	0.46	0	0	0	0.08
2001	210	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.07	0.1	0	0	0	0.08
2001	211	23	2781	339.842	-425.379	D	7.645	7.639	0.007	3.4	99.86	0.03	0	0	0	0.11
2001	212	23	2781	339.842	-425.379	D	7.653	7.639	0.014	3.4	99.89	0.02	0	0	0	0.09
2001	213	23	2781	339.842	-425.379	D	7.639	7.639	0.001	3.4	99.99	0.01	0	0	0	0.08
2001	214	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	216	23	2789	340.496	-426.449	D	7.674	7.639	0.035	3.4	99.59	0.26	0	0	0	0.15
2001	217	23	2588	318.452	-445.8	D	7.644	7.639	0.005	3.4	99.85	0.03	0	0	0	0.12

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	218	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	219	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	222	23	2684	326.713	-427.014	D	7.799	7.639	0.16	3.4	99.61	0.07	0	0	0	0.32
2001	223	23	622	323.61	-434.073	D	8.014	7.639	0.376	3.4	98.63	1.18	0	0	0	0.19
2001	224	23	2789	340.496	-426.449	D	7.648	7.639	0.01	3.4	99.67	0.22	0	0	0	0.11
2001	225	23	2789	340.496	-426.449	D	7.648	7.639	0.009	3.4	99.27	0.66	0	0	0	0.08
2001	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	231	23	2704	329.056	-425.092	D	7.668	7.639	0.03	3.4	98.9	0.56	0	0	0	0.55
2001	232	23	2781	339.842	-425.379	D	7.962	7.639	0.323	3.4	99.47	0.24	0	0	0	0.28
2001	233	23	2781	339.842	-425.379	D	7.656	7.639	0.017	3.4	99.78	0.05	0	0	0	0.18
2001	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	238	23	2781	339.842	-425.379	D	7.665	7.639	0.026	3.4	99.49	0.24	0	0	0	0.28
2001	239	23	2588	318.452	-445.8	D	7.853	7.639	0.215	3.4	99.32	0.47	0	0	0	0.2
2001	240	23	2571	322.646	-445.476	D	7.68	7.639	0.041	3.4	99.77	0.09	0	0	0	0.14
2001	241	23	2781	339.842	-425.379	D	7.652	7.639	0.013	3.4	99.73	0.08	0	0	0	0.2
2001	242	23	2781	339.842	-425.379	D	7.641	7.639	0.003	3.4	99.73	0.15	0	0	0	0.13
2001	243	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	244	23	2758	335.862	-424.454	D	7.831	7.727	0.104	3.592	99.37	0.48	0	0	0	0.15
2001	245	23	2704	329.056	-425.092	D	7.839	7.731	0.109	3.6	99.6	0.29	0	0	0	0.1
2001	246	23	2704	329.056	-425.092	D	7.756	7.731	0.026	3.6	99.87	0.04	0	0	0	0.09
2001	247	23	1415	329.185	-425.086	D	7.748	7.731	0.017	3.6	99.82	0.06	0	0	0	0.13
2001	248	23	2704	329.056	-425.092	D	7.754	7.731	0.024	3.6	99.73	0.14	0	0	0	0.13
2001	249	23	2756	335.398	-424.515	D	7.731	7.731	0	3.6	99.6	0.05	0	0	0	0.11
2001	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	252	23	2781	339.842	-425.379	D	7.899	7.731	0.168	3.6	99.15	0.5	0	0	0	0.35
2001	253	23	2790	340.421	-426.562	D	7.827	7.731	0.096	3.6	98.72	0.85	0	0	0	0.43
2001	254	23	2589	318.383	-445.593	D	7.758	7.731	0.027	3.6	99.57	0.17	0	0	0	0.27
2001	255	23	2781	339.842	-425.379	D	7.737	7.731	0.006	3.6	99.66	0.15	0	0	0	0.19
2001	256	23	2781	339.842	-425.379	D	7.771	7.731	0.04	3.6	99.69	0.17	0	0	0	0.14

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	257	23	2758	335.862	-424.454	D	7.772	7.731	0.042	3.6	99.73	0.15	0	0	0	0.12
2001	258	23	1	318.65	-445.782	D	7.731	7.731	0.001	3.6	99.9	0.01	0	0	0	0.1
2001	259	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	260	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	261	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	262	23	2781	339.842	-425.379	D	7.743	7.731	0.012	3.6	97.74	2.18	0	0	0	0.09
2001	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	264	23	2707	329.748	-425.023	D	7.736	7.731	0.006	3.6	99.64	0.08	0	0	0	0.28
2001	265	23	2628	320.933	-436.998	D	7.971	7.731	0.24	3.6	99.02	0.76	0	0	0	0.22
2001	266	23	2704	329.056	-425.092	D	7.757	7.731	0.026	3.6	99.18	0.63	0	0	0	0.18
2001	267	23	1896	333.313	-434.148	D	7.841	7.731	0.11	3.6	95.43	4.41	0	0	0	0.16
2001	268	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	269	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	270	23	2758	335.862	-424.454	D	7.748	7.731	0.018	3.6	99.53	0.26	0	0	0	0.21
2001	271	23	2781	339.842	-425.379	D	8.042	7.731	0.311	3.6	99.48	0.34	0	0	0	0.19
2001	272	23	2588	318.452	-445.8	D	7.768	7.731	0.037	3.6	99.75	0.11	0	0	0	0.14
2001	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2001	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	278	23	1415	329.185	-425.086	D	7.619	7.593	0.026	3.3	97.01	2.87	0	0	0	0.12
2001	279	23	2628	320.933	-436.998	D	7.601	7.593	0.009	3.3	94.38	5.03	0	0	0	0.6
2001	280	23	2789	340.496	-426.449	D	7.622	7.593	0.03	3.3	97.49	2.16	0	0	0	0.35
2001	281	23	2781	339.842	-425.379	D	7.598	7.593	0.005	3.3	98.65	1.1	0	0	0	0.25
2001	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	284	23	2694	327.861	-425.964	D	7.594	7.593	0.002	3.3	97.99	1.74	0	0	0	0.31
2001	285	23	2704	329.056	-425.092	D	7.671	7.593	0.079	3.3	94.83	4.95	0	0	0	0.23
2001	286	23	1415	329.185	-425.086	D	7.593	7.593	0.001	3.3	99.36	0.42	0	0	0	0.15
2001	287	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	288	23	2628	320.933	-436.998	D	7.594	7.593	0.001	3.3	90.83	8.82	0	0	0	0.28
2001	289	23	2758	335.862	-424.454	D	7.65	7.593	0.058	3.3	91.49	8.23	0	0	0	0.28
2001	290	23	2789	340.496	-426.449	D	7.673	7.593	0.08	3.3	91.01	8.37	0	0	0	0.62
2001	291	23	2781	339.842	-425.379	D	7.602	7.593	0.009	3.3	99	0.85	0	0	0	0.16
2001	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	297	23	2661	325.283	-432.004	D	7.662	7.593	0.07	3.3	97.75	1.79	0	0	0	0.46
2001	298	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	300	23	2757	335.63	-424.484	D	7.615	7.593	0.023	3.3	75.88	22.7	0	0	0	1.42
2001	301	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	302	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	307	23	2781	339.842	-425.379	D	7.602	7.546	0.056	3.2	95.91	3.89	0	0	0	0.2
2001	308	23	2684	326.713	-427.014	D	7.562	7.546	0.016	3.2	98.44	1.4	0	0	0	0.15
2001	309	23	2781	339.842	-425.379	D	8.109	7.546	**0.563**	3.2	96.09	3.66	0	0	0	0.25
2001	310	23	2588	318.452	-445.8	D	8.025	7.546	0.479	3.2	98.69	1.14	0	0	0	0.18
2001	311	23	2781	339.842	-425.379	D	7.746	7.546	0.2	3.2	98.92	0.93	0	0	0	0.15
2001	312	23	2758	335.862	-424.454	D	7.579	7.546	0.033	3.2	98.73	0.84	0	0	0	0.43
2001	313	23	2586	318.945	-445.762	D	7.547	7.546	0.001	3.2	98.91	0.82	0	0	0	0.28
2001	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	315	23	2781	339.842	-425.379	D	7.581	7.546	0.035	3.2	97.27	2.12	0	0	0	0.61
2001	316	23	2684	326.713	-427.014	D	7.586	7.546	0.04	3.2	97.61	1.98	0	0	0	0.41
2001	317	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	323	23	304	321.496	-436.914	D	7.681	7.546	0.135	3.2	82.6	16.41	0	0	0	1
2001	324	23	2789	340.496	-426.449	D	7.67	7.546	0.124	3.2	77.73	20.96	0	0	0	1.31
2001	325	23	2789	340.496	-426.449	D	7.55	7.546	0.004	3.2	88.67	10.76	0	0	0	0.63
2001	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	332	23	2789	340.496	-426.449	D	7.59	7.546	0.044	3.2	69.53	29.48	0	0	0	0.99
2001	333	23	2790	340.421	-426.562	D	7.546	7.546	0	3.2	93.07	6.66	0	0	0	0.14
2001	334	23	2588	318.452	-445.8	D	7.625	7.546	0.079	3.2	88.24	11.33	0	0	0	0.43

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	2781	339.842	-425.379	D	7.594	7.593	0.001	3.3	91.7	8.03	0	0	0	0.41
2001	342	23	2781	339.842	-425.379	D	7.701	7.593	0.108	3.3	89.4	10.01	0	0	0	0.59
2001	343	23	2684	326.713	-427.014	D	7.664	7.593	0.072	3.3	71.72	26.87	0	0	0	1.41
2001	344	23	2684	326.713	-427.014	D	7.61	7.593	0.018	3.3	87.61	11.97	0	0	0	0.42
2001	345	23	2758	335.862	-424.454	D	7.597	7.593	0.004	3.3	91.27	8.43	0	0	0	0.3
2001	346	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	347	23	2781	339.842	-425.379	D	8.59	7.593	**0.997**	3.3	93.82	5.95	0	0	0	0.23
2001	348	23	2571	322.646	-445.476	D	8.728	7.593	**1.136**	3.3	92.99	6.82	0	0	0	0.19
2001	349	23	2789	340.496	-426.449	D	7.602	7.593	0.01	3.3	97.45	2.44	0	0	0	0.13
2001	350	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	96.85	3.13	0	0	0	0.09
2001	351	23	2758	335.862	-424.454	D	7.804	7.593	0.211	3.3	85.32	14.17	0	0	0	0.51
2001	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	353	23	2619	320.387	-438.899	D	7.668	7.593	0.076	3.3	70.67	27.78	0	0	0	1.55
2001	354	23	2789	340.496	-426.449	D	7.602	7.593	0.009	3.3	81.16	17.94	0	0	0	0.91
2001	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	2789	340.496	-426.449	D	7.598	7.593	0.005	3.3	65.38	33.15	0	0	0	1.47
2001	360	23	2781	339.842	-425.379	D	7.606	7.593	0.014	3.3	61.92	36.48	0	0	0	1.6
2001	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	2781	339.842	-425.379	D	7.665	7.593	0.073	3.3	71.38	27.38	0	0	0	1.24
2001	364	23	2789	340.496	-426.449	D	7.646	7.593	0.053	3.3	68.58	30.38	0	0	0	1.04
2001	365	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	73.53	25.82	0	0	0	0.66
									1.136							
MARSHALL											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	2	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	83.33	16.27	0	0	0	0.41
2001	3	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	85.22	14.53	0	0	0	0.29

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	87.17	12.45	0	0	0	0.34
2001	8	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	86.8	11.05	0	0	0	0.26
2001	9	23	2781	339.842	-425.379	D	7.605	7.593	0.012	3.3	76	23.48	0	0	0	0.51
2001	10	23	2781	339.842	-425.379	D	7.6	7.593	0.007	3.3	77.63	22.05	0	0	0	0.32
2001	11	23	2780	339.614	-425.419	D	7.593	7.593	0	3.3	78	12.84	0	0	0	0.17
2001	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	17	23	2704	329.056	-425.092	D	7.741	7.593	0.149	3.3	74.69	24.76	0	0	0	0.55
2001	18	23	2628	320.933	-436.998	D	7.663	7.593	0.07	3.3	79.09	20.36	0	0	0	0.55
2001	19	23	2790	340.421	-426.562	D	7.607	7.593	0.014	3.3	85.8	13.83	0	0	0	0.37
2001	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	21	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	72.37	27.5	0	0	0	0.9
2001	25	23	1773	332.298	-433.693	D	7.628	7.593	0.036	3.3	50.02	48.69	0	0	0	1.29
2001	26	23	2684	326.713	-427.014	D	7.593	7.593	0.001	3.3	70.53	28.91	0	0	0	0.49
2001	27	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	28	23	2789	340.496	-426.449	D	7.606	7.593	0.013	3.3	71.52	28.12	0	0	0	0.36
2001	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	38	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	2704	329.056	-425.092	D	7.473	7.453	0.02	3	87.55	12.31	0	0	0	0.14
2001	41	23	2789	340.496	-426.449	D	7.454	7.453	0.001	3	68.77	30.51	0	0	0	0.8
2001	42	23	2781	339.842	-425.379	D	7.464	7.453	0.011	3	67.15	32.32	0	0	0	0.55

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	43	23	1042	326.856	-428.685	D	7.453	7.453	0	3	71.9	17.88	0	0	0	0.3
2001	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	2704	329.056	-425.092	D	7.458	7.453	0.005	3	86.96	12.69	0	0	0	0.35
2001	46	23	2781	339.842	-425.379	D	7.958	7.453	**0.505**	3	89.83	9.95	0	0	0	0.22
2001	47	23	2789	340.496	-426.449	D	7.546	7.453	0.094	3	90.75	9.06	0	0	0	0.19
2001	48	23	2789	340.496	-426.449	D	7.459	7.453	0.006	3	52.99	46.08	0	0	0	0.97
2001	49	23	2789	340.496	-426.449	D	7.465	7.453	0.012	3	77.63	21.9	0	0	0	0.49
2001	50	23	2789	340.496	-426.449	D	7.463	7.453	0.01	3	84.25	15.52	0	0	0	0.24
2001	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	52	23	2704	329.056	-425.092	D	7.473	7.453	0.021	3	85.49	14.25	0	0	0	0.27
2001	53	23	2706	329.518	-425.046	D	7.46	7.453	0.008	3	86.42	13.29	0	0	0	0.33
2001	54	23	2758	335.862	-424.454	D	7.459	7.453	0.007	3	78.79	20.76	0	0	0	0.47
2001	55	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	2789	340.496	-426.449	D	7.453	7.453	0	3	94.46	5.21	0	0	0	0.76
2001	58	23	2789	340.496	-426.449	D	7.467	7.453	0.014	3	87	12.61	0	0	0	0.41
2001	59	23	2611	319.699	-440.64	D	7.459	7.453	0.006	3	87.54	12.3	0	0	0	0.2
2001	60	23	2684	326.713	-427.014	D	7.318	7.317	0.002	2.713	90.29	9.63	0	0	0	0.25
2001	61	23	2781	339.842	-425.379	D	7.316	7.311	0.006	2.7	89.27	10.55	0	0	0	0.23
2001	62	23	2468	334.002	-434.887	D	7.311	7.311	0.001	2.7	95.46	4.65	0	0	0	0.19
2001	63	23	2704	329.056	-425.092	D	7.427	7.311	0.116	2.7	74.31	24.8	0	0	0	0.89
2001	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	65	23	2781	339.842	-425.379	D	7.331	7.311	0.02	2.7	72.87	25.81	0	0	0	1.33
2001	66	23	2789	340.496	-426.449	D	7.325	7.311	0.015	2.7	80.79	18.38	0	0	0	0.83
2001	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	68	23	2781	339.842	-425.379	D	7.337	7.311	0.026	2.7	58.52	39.87	0	0	0	1.62
2001	69	23	2709	330.21	-424.978	D	7.335	7.311	0.024	2.7	81.51	17.69	0	0	0	0.8
2001	70	23	2209	335.38	-424.564	D	7.311	7.311	0	2.7	94.62	5.12	0	0	0	0.49
2001	71	23	2154	334.894	-424.836	D	7.311	7.311	0	2.7	83.93	4	0	0	0	0.24
2001	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	15	319.038	-443.267	D	7.311	7.311	0	2.7	89.74	10.8	0	0	0	0.12
2001	75	23	2758	335.862	-424.454	D	7.358	7.311	0.047	2.7	89.19	10.5	0	0	0	0.32
2001	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	77	23	2694	327.861	-425.964	D	7.367	7.311	0.056	2.7	79.47	19.94	0	0	0	0.6
2001	78	23	2589	318.383	-445.593	D	7.313	7.311	0.003	2.7	91.95	7.66	0	0	0	0.49
2001	79	23	2589	318.383	-445.593	D	7.316	7.311	0.005	2.7	89.13	10.31	0	0	0	0.59
2001	80	23	2684	326.713	-427.014	D	7.343	7.311	0.032	2.7	93.17	6.03	0	0	0	0.8
2001	81	23	2694	327.861	-425.964	D	7.326	7.311	0.015	2.7	96.11	3.34	0	0	0	0.57

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	82	23	2704	329.056	-425.092	D	7.312	7.311	0.002	2.7	94.59	5.22	0	0	0	0.3
2001	83	23	2684	326.713	-427.014	D	7.356	7.311	0.045	2.7	90.07	9.59	0	0	0	0.35
2001	84	23	2789	340.496	-426.449	D	7.358	7.311	0.047	2.7	62.21	36.7	0	0	0	1.09
2001	85	23	2789	340.496	-426.449	D	7.319	7.311	0.008	2.7	56.13	42.74	0	0	0	1.17
2001	86	23	2789	340.496	-426.449	D	7.321	7.311	0.01	2.7	85.89	13.61	0	0	0	0.52
2001	87	23	2781	339.842	-425.379	D	7.322	7.311	0.012	2.7	88.71	10.92	0	0	0	0.37
2001	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	89	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2001	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	105	23	2781	339.842	-425.379	D	7.363	7.358	0.005	2.8	98.03	1.56	0	0	0	0.45
2001	106	23	2781	339.842	-425.379	D	7.374	7.358	0.016	2.8	81.46	17.06	0	0	0	1.5
2001	107	23	2571	322.646	-445.476	D	7.361	7.358	0.003	2.8	96.6	2.75	0	0	0	0.65
2001	108	23	2789	340.496	-426.449	D	7.367	7.358	0.008	2.8	87.18	12.25	0	0	0	0.58
2001	109	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	99.2	0.96	0	0	0	0.22
2001	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	114	23	2788	340.294	-426.448	D	7.358	7.358	0	2.8	101.3	1.23	0	0	0	0.77
2001	115	23	2789	340.496	-426.449	D	7.36	7.358	0.002	2.8	97.41	2.02	0	0	0	0.58
2001	116	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

Appendix M
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2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	128	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.32	0.26	0	0	0	0.44
2001	129	23	2789	340.496	-426.449	D	7.662	7.639	0.023	3.4	99.19	0.54	0	0	0	0.27
2001	130	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	99.66	0.18	0	0	0	0.19
2001	131	23	1242	327.988	-426.138	D	7.639	7.639	0	3.4	16.11	0.01	0	0	0	0.03
2001	132	23	2571	322.646	-445.476	D	7.675	7.639	0.036	3.4	90.43	8.94	0	0	0	0.63
2001	133	23	2684	326.713	-427.014	D	7.657	7.639	0.018	3.4	99.37	0.38	0	0	0	0.26
2001	134	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	99.68	0.13	0	0	0	0.19
2001	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	138	23	2694	327.861	-425.964	D	7.649	7.639	0.01	3.4	95.72	4.02	0	0	0	0.26
2001	139	23	2684	326.713	-427.014	D	7.949	7.639	0.31	3.4	97.03	2.74	0	0	0	0.23
2001	140	23	2781	339.842	-425.379	D	7.662	7.639	0.024	3.4	99.22	0.39	0	0	0	0.39
2001	141	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	148	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.29	0.1	0	0	0	0.3
2001	149	23	2789	340.496	-426.449	D	7.702	7.639	0.063	3.4	99.3	0.48	0	0	0	0.22
2001	150	23	2789	340.496	-426.449	D	7.656	7.639	0.017	3.4	99.34	0.49	0	0	0	0.17
2001	151	23	2758	335.862	-424.454	D	7.646	7.639	0.007	3.4	98.81	1.02	0	0	0	0.18
2001	152	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.5	0.43	0	0	0	0.15
2001	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	158	23	2758	335.862	-424.454	D	7.682	7.639	0.043	3.4	99.77	0.05	0	0	0	0.18
2001	159	23	2628	320.933	-436.998	D	7.895	7.639	0.256	3.4	99.6	0.23	0	0	0	0.17

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	160	23	2684	326.713	-427.014	D	7.745	7.639	0.107	3.4	99.37	0.42	0	0	0	0.21
2001	161	23	2704	329.056	-425.092	D	7.709	7.639	0.07	3.4	99.66	0.18	0	0	0	0.16
2001	162	23	2781	339.842	-425.379	D	7.644	7.639	0.006	3.4	99.88	0.06	0	0	0	0.09
2001	163	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	100.01	0.03	0	0	0	0.08
2001	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	168	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	169	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.74	0.06	0	0	0	0.22
2001	170	23	2154	334.894	-424.836	D	7.639	7.639	0	3.4	83.67	0.02	0	0	0	0.15
2001	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	172	23	2704	329.056	-425.092	D	7.728	7.639	0.089	3.4	99.2	0.62	0	0	0	0.18
2001	173	23	2789	340.496	-426.449	D	7.678	7.639	0.039	3.4	96.68	2.54	0	0	0	0.79
2001	174	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.47	0.11	0	0	0	0.44
2001	175	23	2789	340.496	-426.449	D	7.641	7.639	0.003	3.4	99.51	0.18	0	0	0	0.31
2001	176	23	2789	340.496	-426.449	D	7.642	7.639	0.004	3.4	99.74	0.11	0	0	0	0.19
2001	177	23	2684	326.713	-427.014	D	7.642	7.639	0.003	3.4	99.7	0.15	0	0	0	0.16
2001	178	23	1415	329.185	-425.086	D	7.64	7.639	0.002	3.4	99.78	0.1	0	0	0	0.14
2001	179	23	2781	339.842	-425.379	D	7.639	7.639	0.001	3.4	99.56	0.41	0	0	0	0.13
2001	180	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	99.49	0.05	0	0	0	0.12
2001	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	182	23	2694	327.861	-425.964	D	7.649	7.639	0.01	3.4	99.58	0.19	0	0	0	0.24
2001	183	23	2704	329.056	-425.092	D	7.673	7.639	0.034	3.4	98.63	1.17	0	0	0	0.2
2001	184	23	2781	339.842	-425.379	D	7.643	7.639	0.004	3.4	99.83	0.07	0	0	0	0.13
2001	185	23	2416	339.665	-425.875	D	7.639	7.639	0	3.4	99.43	0.03	0	0	0	0.12
2001	186	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.21	0.05	0	0	0	0.33
2001	187	23	2781	339.842	-425.379	D	7.676	7.639	0.037	3.4	99.65	0.13	0	0	0	0.23
2001	188	23	2789	340.496	-426.449	D	7.65	7.639	0.012	3.4	99.8	0.04	0	0	0	0.16
2001	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	191	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.43	0.04	0	0	0	0.31
2001	192	23	2781	339.842	-425.379	D	7.907	7.639	0.268	3.4	99.55	0.19	0	0	0	0.26
2001	193	23	2628	320.933	-436.998	D	7.765	7.639	0.126	3.4	99.66	0.16	0	0	0	0.19
2001	194	23	2781	339.842	-425.379	D	7.692	7.639	0.053	3.4	99.51	0.37	0	0	0	0.13
2001	195	23	2589	318.383	-445.593	D	7.651	7.639	0.012	3.4	99.88	0.03	0	0	0	0.1
2001	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.88	0.02	0	0	0	0.11
2001	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	202	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.8	0.02	0	0	0	0.17
2001	203	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.62	0.32	0	0	0	0.15
2001	204	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	205	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	206	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	207	23	2758	335.862	-424.454	D	7.648	7.639	0.009	3.4	99.76	0.1	0	0	0	0.15
2001	208	23	2781	339.842	-425.379	D	7.664	7.639	0.025	3.4	99.18	0.7	0	0	0	0.13
2001	209	23	2781	339.842	-425.379	D	7.647	7.639	0.008	3.4	99.22	0.67	0	0	0	0.12
2001	210	23	2781	339.842	-425.379	D	7.648	7.639	0.009	3.4	99.65	0.24	0	0	0	0.12
2001	211	23	2789	340.496	-426.449	D	7.658	7.639	0.019	3.4	99.8	0.09	0	0	0	0.11
2001	212	23	2781	339.842	-425.379	D	7.659	7.639	0.02	3.4	99.85	0.04	0	0	0	0.12
2001	213	23	2781	339.842	-425.379	D	7.641	7.639	0.003	3.4	99.9	0.03	0	0	0	0.11
2001	214	23	2417	339.654	-425.626	D	7.639	7.639	0.001	3.4	99.91	0.04	0	0	0	0.1
2001	215	23	2405	338.909	-425.659	D	7.639	7.639	0	3.4	99.17	0.03	0	0	0	0.09
2001	216	23	2758	335.862	-424.454	D	7.901	7.639	0.262	3.4	99.64	0.11	0	0	0	0.26
2001	217	23	2588	318.452	-445.8	D	7.71	7.639	0.071	3.4	99.75	0.05	0	0	0	0.2
2001	218	23	2589	318.383	-445.593	D	7.64	7.639	0.001	3.4	99.75	0.01	0	0	0	0.18
2001	219	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	222	23	2781	339.842	-425.379	D	7.675	7.639	0.036	3.4	99.52	0.13	0	0	0	0.35
2001	223	23	2781	339.842	-425.379	D	7.934	7.639	0.295	3.4	97.32	2.46	0	0	0	0.23
2001	224	23	2589	318.383	-445.593	D	7.968	7.639	0.329	3.4	99.45	0.26	0	0	0	0.29
2001	225	23	2589	318.383	-445.593	D	7.728	7.639	0.089	3.4	99.52	0.24	0	0	0	0.24
2001	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	232	23	2781	339.842	-425.379	D	7.646	7.639	0.007	3.4	99.01	0.65	0	0	0	0.34
2001	233	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.71	0.07	0	0	0	0.25
2001	234	23	2418	339.946	-426.612	D	7.639	7.639	0	3.4	103.87	0.02	0	0	0	0.21
2001	235	23	2323	337.303	-428.727	D	7.639	7.639	0	3.4	99.73	0.05	0	0	0	0.17
2001	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	238	23	2781	339.842	-425.379	D	7.647	7.639	0.008	3.4	99.29	0.24	0	0	0	0.47
2001	239	23	2757	335.63	-424.484	D	7.848	7.639	0.209	3.4	99.2	0.51	0	0	0	0.28
2001	240	23	2628	320.933	-436.998	D	7.902	7.639	0.263	3.4	99.56	0.24	0	0	0	0.2
2001	241	23	2588	318.452	-445.8	D	7.772	7.639	0.133	3.4	99.58	0.25	0	0	0	0.17
2001	242	23	2781	339.842	-425.379	D	7.696	7.639	0.058	3.4	99.17	0.69	0	0	0	0.14
2001	243	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	99.58	0.31	0	0	0	0.13
2001	244	23	2708	329.979	-425	D	7.746	7.727	0.019	3.592	98.91	0.85	0	0	0	0.23
2001	245	23	2704	329.056	-425.092	D	7.752	7.731	0.022	3.6	99.15	0.7	0	0	0	0.16
2001	246	23	2704	329.056	-425.092	D	7.738	7.731	0.007	3.6	99.78	0.09	0	0	0	0.13
2001	247	23	2704	329.056	-425.092	D	7.752	7.731	0.021	3.6	99.77	0.1	0	0	0	0.13
2001	248	23	2704	329.056	-425.092	D	7.754	7.731	0.023	3.6	99.7	0.18	0	0	0	0.13
2001	249	23	2758	335.862	-424.454	D	7.735	7.731	0.005	3.6	99.73	0.11	0	0	0	0.13
2001	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	253	23	2789	340.496	-426.449	D	7.734	7.731	0.003	3.6	99.35	0.21	0	0	0	0.46
2001	254	23	2588	318.452	-445.8	D	7.746	7.731	0.015	3.6	98.95	0.72	0	0	0	0.34
2001	255	23	2781	339.842	-425.379	D	7.742	7.731	0.012	3.6	99.2	0.53	0	0	0	0.26
2001	256	23	2781	339.842	-425.379	D	7.771	7.731	0.041	3.6	99.51	0.29	0	0	0	0.2
2001	257	23	2758	335.862	-424.454	D	7.788	7.731	0.057	3.6	99.43	0.38	0	0	0	0.19
2001	258	23	2589	318.383	-445.593	D	7.745	7.731	0.014	3.6	99.69	0.14	0	0	0	0.16
2001	259	23	2694	327.861	-425.964	D	7.731	7.731	0	3.6	99.29	0.49	0	0	0	0.15
2001	260	23	726	324.322	-433.293	D	7.731	7.731	0	3.6	81.07	0.31	0	0	0	0.11
2001	261	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	262	23	2704	329.056	-425.092	D	7.87	7.731	0.139	3.6	93.48	6.33	0	0	0	0.19
2001	263	23	2789	340.496	-426.449	D	7.731	7.731	0	3.6	98.92	0.1	0	0	0	0.15
2001	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	265	23	2789	340.496	-426.449	D	7.793	7.731	0.062	3.6	97.81	1.62	0	0	0	0.57
2001	266	23	2789	340.496	-426.449	D	7.786	7.731	0.056	3.6	98.88	0.86	0	0	0	0.27
2001	267	23	2789	340.496	-426.449	D	7.778	7.731	0.048	3.6	62.56	36.44	0	0	0	0.99
2001	268	23	2600	318.952	-443.12	D	7.732	7.731	0.001	3.6	96.61	2.84	0	0	0	0.53
2001	269	23	2704	329.056	-425.092	D	7.761	7.731	0.031	3.6	94.2	5.41	0	0	0	0.39
2001	270	23	2781	339.842	-425.379	D	7.869	7.731	0.138	3.6	98.48	1.25	0	0	0	0.27
2001	271	23	2789	340.496	-426.449	D	7.979	7.731	0.249	3.6	99.05	0.7	0	0	0	0.26
2001	272	23	2588	318.452	-445.8	D	7.777	7.731	0.046	3.6	99.42	0.37	0	0	0	0.21
2001	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	274	23	2758	335.862	-424.454	D	7.599	7.598	0.001	3.313	99.09	0.61	0	0	0	0.26
2001	275	23	2417	339.654	-425.626	D	7.593	7.593	0	3.3	98.92	0.72	0	0	0	0.16
2001	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	278	23	2684	326.713	-427.014	D	7.685	7.593	0.092	3.3	87.94	11.81	0	0	0	0.25
2001	279	23	2694	327.861	-425.964	D	7.646	7.593	0.053	3.3	86.28	13.34	0	0	0	0.39
2001	280	23	2789	340.496	-426.449	D	7.601	7.593	0.008	3.3	97.43	2.1	0	0	0	0.47
2001	281	23	2781	339.842	-425.379	D	7.603	7.593	0.01	3.3	96.42	3.25	0	0	0	0.34
2001	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	284	23	2704	329.056	-425.092	D	7.593	7.593	0.001	3.3	90.53	8.98	0	0	0	0.43
2001	285	23	2758	335.862	-424.454	D	7.654	7.593	0.061	3.3	86.52	13.14	0	0	0	0.34
2001	286	23	2704	329.056	-425.092	D	7.602	7.593	0.009	3.3	97.35	2.41	0	0	0	0.23
2001	287	23	2789	340.496	-426.449	D	7.607	7.593	0.014	3.3	94.08	5.75	0	0	0	0.17
2001	288	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	289	23	2781	339.842	-425.379	D	7.643	7.593	0.05	3.3	85.93	13.86	0	0	0	0.2
2001	290	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	97.15	2.32	0	0	0	0.42
2001	291	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	96.1	3.71	0	0	0	0.2
2001	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	297	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	298	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	300	23	2782	339.852	-425.592	D	7.625	7.593	0.033	3.3	81.08	17.92	0	0	0	0.99
2001	301	23	2781	339.842	-425.379	D	7.654	7.593	0.061	3.3	85.93	13.52	0	0	0	0.55
2001	302	23	1041	326.867	-428.934	D	7.593	7.593	0	3.3	11.94	0.19	0	0	0	0.02
2001	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	307	23	2781	339.842	-425.379	D	7.569	7.546	0.023	3.2	86.01	13.67	0	0	0	0.33
2001	308	23	2758	335.862	-424.454	D	7.557	7.546	0.011	3.2	97.57	2.19	0	0	0	0.26
2001	309	23	2789	340.496	-426.449	D	7.789	7.546	0.243	3.2	95.7	4	0	0	0	0.31
2001	310	23	2429	338.563	-428.651	D	7.823	7.546	0.277	3.2	97.45	2.32	0	0	0	0.23
2001	311	23	2789	340.496	-426.449	D	7.624	7.546	0.078	3.2	98.62	1.18	0	0	0	0.2
2001	312	23	2781	339.842	-425.379	D	7.55	7.546	0.004	3.2	98.57	1.21	0	0	0	0.3
2001	313	23	2589	318.383	-445.593	D	7.606	7.546	0.06	3.2	81.22	18.03	0	0	0	0.76
2001	314	23	2789	340.496	-426.449	D	7.558	7.546	0.012	3.2	94.96	4.41	0	0	0	0.63
2001	315	23	2781	339.842	-425.379	D	7.564	7.546	0.018	3.2	94.49	4.61	0	0	0	0.91

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	316	23	2684	326.713	-427.014	D	7.57	7.546	0.023	3.2	94.64	4.77	0	0	0	0.6
2001	317	23	1242	327.988	-426.138	D	7.546	7.546	0	3.2	97.49	1.01	0	0	0	0.4
2001	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	325	23	2414	339.687	-426.374	D	7.546	7.546	0	3.2	89.11	4.71	0	0	0	0.66
2001	326	23	2386	338.533	-428.423	D	7.546	7.546	0	3.2	84.03	4.83	0	0	0	0.57
2001	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	332	23	2711	330.671	-424.932	D	7.639	7.546	0.092	3.2	67.08	32.21	0	0	0	0.71
2001	333	23	2589	318.383	-445.593	D	7.568	7.546	0.022	3.2	76.07	23.44	0	0	0	0.5
2001	334	23	2628	320.933	-436.998	D	7.824	7.546	0.277	3.2	81.94	17.63	0	0	0	0.43
2001	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	342	23	2781	339.842	-425.379	D	7.662	7.593	0.069	3.3	79.64	19.77	0	0	0	0.59
2001	343	23	2789	340.496	-426.449	D	7.597	7.593	0.005	3.3	68.34	30.51	0	0	0	1.15
2001	344	23	2789	340.496	-426.449	D	7.615	7.593	0.023	3.3	71.98	27.39	0	0	0	0.63
2001	345	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	81.39	18.23	0	0	0	0.41
2001	346	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	347	23	2781	339.842	-425.379	D	7.608	7.593	0.016	3.3	92.74	7.01	0	0	0	0.25
2001	348	23	2789	340.496	-426.449	D	7.705	7.593	0.112	3.3	90.55	9.27	0	0	0	0.18
2001	349	23	2789	340.496	-426.449	D	7.596	7.593	0.003	3.3	96.7	3.18	0	0	0	0.18
2001	350	23	2781	339.842	-425.379	D	7.599	7.593	0.007	3.3	93.81	6.07	0	0	0	0.13
2001	351	23	2789	340.496	-426.449	D	7.64	7.593	0.047	3.3	76.41	23.04	0	0	0	0.55
2001	352	23	2323	337.303	-428.727	D	7.593	7.593	0	3.3	92.76	3.73	0	0	0	0.05
2001	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.505							

COLUMBIA											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	2	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	72	28.12	0	0	0	0.01
2001	3	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	9	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	54.72	45.26	0	0	0	0.02
2001	10	23	2789	340.496	-426.449	D	7.596	7.593	0.004	3.3	53.32	46.71	0	0	0	0.01
2001	11	23	2401	338.661	-425.669	D	7.593	7.593	0	3.3	62.19	36.64	0	0	0	0.01
2001	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	17	23	2704	329.056	-425.092	D	7.704	7.593	0.111	3.3	62.81	37.17	0	0	0	0.02
2001	18	23	2628	320.933	-436.998	D	7.707	7.593	0.115	3.3	63.37	36.62	0	0	0	0.02
2001	19	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	76.45	23.52	0	0	0	0.01
2001	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	21	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	24	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	25	23	2789	340.496	-426.449	D	7.606	7.593	0.013	3.3	40.48	59.5	0	0	0	0.03
2001	26	23	2704	329.056	-425.092	D	7.595	7.593	0.003	3.3	51.44	48.57	0	0	0	0.01
2001	27	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	28	23	2789	340.496	-426.449	D	7.596	7.593	0.003	3.3	58.91	41.09	0	0	0	0.01
2001	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	38	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	2102	334.398	-424.857	D	7.453	7.453	0	3	73.75	28.09	0	0	0	0.01
2001	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	42	23	2781	339.842	-425.379	D	7.46	7.453	0.008	3	54.74	45.26	0	0	0	0.01
2001	43	23	1414	329.196	-425.335	D	7.453	7.453	0	3	65.42	34.01	0	0	0	0.01
2001	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	2704	329.056	-425.092	D	7.453	7.453	0.001	3	84.1	15.92	0	0	0	0.01
2001	46	23	2789	340.496	-426.449	D	7.563	7.453	0.11	3	82.65	17.35	0	0	0	0.01
2001	47	23	2789	340.496	-426.449	D	7.46	7.453	0.008	3	84.25	15.79	0	0	0	0.01
2001	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	49	23	2789	340.496	-426.449	D	7.453	7.453	0	3	76.2	24.02	0	0	0	0.02
2001	50	23	2789	340.496	-426.449	D	7.453	7.453	0	3	78.06	22.34	0	0	0	0.01
2001	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	52	23	340	322.363	-445.37	D	7.455	7.453	0.002	3	75.07	25.01	0	0	0	0.01
2001	53	23	2155	334.883	-424.586	D	7.454	7.453	0.002	3	71.99	28.1	0	0	0	0.01
2001	54	23	2781	339.842	-425.379	D	7.455	7.453	0.002	3	60.2	39.86	0	0	0	0.01
2001	55	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	2788	340.294	-426.448	D	7.453	7.453	0	3	90.14	10.27	0	0	0	0.03
2001	58	23	2789	340.496	-426.449	D	7.459	7.453	0.006	3	76.17	23.86	0	0	0	0.02
2001	59	23	2684	326.713	-427.014	D	7.455	7.453	0.003	3	75.43	24.62	0	0	0	0.01
2001	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2001	61	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	62	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	63	23	2628	320.933	-436.998	D	7.413	7.311	0.102	2.7	66.2	33.78	0	0	0	0.02
2001	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	68	23	2789	340.496	-426.449	D	7.313	7.311	0.002	2.7	62.18	37.91	0	0	0	0.04
2001	69	23	2789	340.496	-426.449	D	7.314	7.311	0.003	2.7	77.4	22.64	0	0	0	0.02
2001	70	23	2781	339.842	-425.379	D	7.311	7.311	0	2.7	87.76	12.09	0	0	0	0.02
2001	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	75	23	2758	335.862	-424.454	D	7.314	7.311	0.004	2.7	81.05	18.95	0	0	0	0.01
2001	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	77	23	2758	335.862	-424.454	D	7.334	7.311	0.023	2.7	68.26	31.72	0	0	0	0.02
2001	78	23	2589	318.383	-445.593	D	7.312	7.311	0.001	2.7	83.46	16.54	0	0	0	0.02
2001	79	23	2589	318.383	-445.593	D	7.32	7.311	0.01	2.7	78.37	21.62	0	0	0	0.03
2001	80	23	2583	319.686	-445.705	D	7.359	7.311	0.048	2.7	75.82	24.16	0	0	0	0.03
2001	81	23	2789	340.496	-426.449	D	7.328	7.311	0.017	2.7	91.86	8.13	0	0	0	0.02
2001	82	23	2789	340.496	-426.449	D	7.32	7.311	0.009	2.7	90.67	9.34	0	0	0	0.01
2001	83	23	2684	326.713	-427.014	D	7.344	7.311	0.033	2.7	64.76	35.21	0	0	0	0.03
2001	84	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	85	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	86	23	1951	333.842	-434.874	D	7.311	7.311	0	2.7	95.04	7.03	0	0	0	0.02
2001	87	23	2789	340.496	-426.449	D	7.315	7.311	0.004	2.7	80.55	19.47	0	0	0	0.01
2001	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	89	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2001	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	105	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	101.81	2.52	0	0	0	0.02
2001	106	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	88.32	14.76	0	0	0	0.06
2001	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	115	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	116	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2001	122	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	129	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	98.76	1.28	0	0	0	0.01
2001	130	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	99.39	0.31	0	0	0	0.01
2001	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	132	23	2694	327.861	-425.964	D	7.66	7.639	0.022	3.4	97.7	2.28	0	0	0	0.03
2001	133	23	2628	320.933	-436.998	D	7.663	7.639	0.024	3.4	98.71	1.28	0	0	0	0.02
2001	134	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.75	0.28	0	0	0	0.01
2001	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	138	23	2704	329.056	-425.092	D	7.64	7.639	0.001	3.4	87.29	12.74	0	0	0	0.01
2001	139	23	2781	339.842	-425.379	D	7.651	7.639	0.012	3.4	93.19	6.8	0	0	0	0.01
2001	140	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.42	0.63	0	0	0	0.01

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	141	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	149	23	2789	340.496	-426.449	D	7.653	7.639	0.014	3.4	98.86	1.13	0	0	0	0.01
2001	150	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.57	0.44	0	0	0	0.01
2001	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	158	23	2781	339.842	-425.379	D	7.652	7.639	0.013	3.4	99.86	0.13	0	0	0	0.01
2001	159	23	2684	326.713	-427.014	D	7.764	7.639	0.125	3.4	98.76	1.23	0	0	0	0.01
2001	160	23	2694	327.861	-425.964	D	7.684	7.639	0.045	3.4	99.22	0.78	0	0	0	0.01
2001	161	23	2758	335.862	-424.454	D	7.657	7.639	0.018	3.4	99.62	0.38	0	0	0	0.01
2001	162	23	2385	338.165	-425.691	D	7.639	7.639	0	3.4	97.14	0.06	0	0	0	0.01
2001	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	168	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	169	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	99.79	0.12	0	0	0	0.01
2001	170	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	172	23	2781	339.842	-425.379	D	7.655	7.639	0.016	3.4	99.02	0.97	0	0	0	0.01
2001	173	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.23	0.75	0	0	0	0.01
2001	174	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	98.77	0.17	0	0	0	0.02
2001	175	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.73	0.34	0	0	0	0.01
2001	176	23	2789	340.496	-426.449	D	7.65	7.639	0.011	3.4	99.74	0.26	0	0	0	0.01
2001	177	23	2781	339.842	-425.379	D	7.649	7.639	0.011	3.4	99.72	0.3	0	0	0	0.01
2001	178	23	2758	335.862	-424.454	D	7.643	7.639	0.004	3.4	99.75	0.25	0	0	0	0.01
2001	179	23	2781	339.842	-425.379	D	7.64	7.639	0.002	3.4	99.35	0.7	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	180	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	99.58	0.06	0	0	0	0.01
2001	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	182	23	2704	329.056	-425.092	D	7.658	7.639	0.019	3.4	99.15	0.84	0	0	0	0.01
2001	183	23	2758	335.862	-424.454	D	7.702	7.639	0.063	3.4	97.33	2.66	0	0	0	0.01
2001	184	23	2781	339.842	-425.379	D	7.643	7.639	0.004	3.4	99.83	0.17	0	0	0	0.01
2001	185	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	95.44	0.05	0	0	0	0
2001	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	187	23	2789	340.496	-426.449	D	7.647	7.639	0.008	3.4	99.74	0.26	0	0	0	0.01
2001	188	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.85	0.1	0	0	0	0.01
2001	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	192	23	2789	340.496	-426.449	D	7.679	7.639	0.04	3.4	99.68	0.31	0	0	0	0.01
2001	193	23	2789	340.496	-426.449	D	7.731	7.639	0.092	3.4	99.41	0.58	0	0	0	0.01
2001	194	23	2789	340.496	-426.449	D	7.706	7.639	0.067	3.4	98.54	1.46	0	0	0	0
2001	195	23	2588	318.452	-445.8	D	7.641	7.639	0.002	3.4	99.94	0.06	0	0	0	0
2001	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	201	23	2780	339.614	-425.419	D	7.639	7.639	0	3.4	70.67	0.05	0	0	0	0
2001	202	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.48	0.52	0	0	0	0
2001	203	23	2789	340.496	-426.449	D	7.653	7.639	0.014	3.4	99.8	0.21	0	0	0	0
2001	204	23	2789	340.496	-426.449	D	7.646	7.639	0.007	3.4	99.68	0.33	0	0	0	0
2001	205	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.96	0.12	0	0	0	0
2001	206	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	100.11	0.11	0	0	0	0
2001	207	23	2780	339.614	-425.419	D	7.639	7.639	0	3.4	99.37	0.24	0	0	0	0.01
2001	208	23	2781	339.842	-425.379	D	7.696	7.639	0.058	3.4	97.99	2.01	0	0	0	0
2001	209	23	2789	340.496	-426.449	D	7.668	7.639	0.03	3.4	97.84	2.17	0	0	0	0
2001	210	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.93	0.59	0	0	0	0
2001	211	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	99.87	0.19	0	0	0	0
2001	212	23	2781	339.842	-425.379	D	7.647	7.639	0.008	3.4	99.93	0.08	0	0	0	0
2001	213	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.87	0.11	0	0	0	0
2001	214	23	2040	333.912	-425.128	D	7.639	7.639	0	3.4	99.34	0.05	0	0	0	0
2001	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	216	23	2789	340.496	-426.449	D	7.656	7.639	0.017	3.4	99.77	0.22	0	0	0	0.01
2001	217	23	2589	318.383	-445.593	D	7.646	7.639	0.008	3.4	99.85	0.15	0	0	0	0.01
2001	218	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	219	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	223	23	2781	339.842	-425.379	D	7.749	7.639	0.11	3.4	98.72	1.27	0	0	0	0.01
2001	224	23	2789	340.496	-426.449	D	7.833	7.639	0.194	3.4	99.34	0.65	0	0	0	0.01
2001	225	23	2684	326.713	-427.014	D	7.726	7.639	0.087	3.4	99.62	0.37	0	0	0	0.01
2001	226	23	2583	319.686	-445.705	D	7.753	7.639	0.114	3.4	98.4	1.58	0	0	0	0.02
2001	227	23	2589	318.383	-445.593	D	7.651	7.639	0.012	3.4	99.25	0.75	0	0	0	0.01
2001	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	232	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.78	0.09	0	0	0	0.01
2001	233	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	100.17	0.1	0	0	0	0.01
2001	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	238	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	239	23	2781	339.842	-425.379	D	7.666	7.639	0.027	3.4	99.27	0.72	0	0	0	0.01
2001	240	23	2781	339.842	-425.379	D	7.747	7.639	0.108	3.4	99.57	0.43	0	0	0	0.01
2001	241	23	2749	333.775	-424.726	D	7.719	7.639	0.081	3.4	99.63	0.37	0	0	0	0.01
2001	242	23	2758	335.862	-424.454	D	7.673	7.639	0.034	3.4	99.24	0.75	0	0	0	0.01
2001	243	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.4	0.63	0	0	0	0
2001	244	23	2781	339.842	-425.379	D	7.753	7.727	0.026	3.592	99.01	0.98	0	0	0	0.01
2001	245	23	2704	329.056	-425.092	D	7.758	7.731	0.028	3.6	98.25	1.75	0	0	0	0.01
2001	246	23	2704	329.056	-425.092	D	7.732	7.731	0.002	3.6	99.79	0.19	0	0	0	0.01
2001	247	23	2754	334.935	-424.575	D	7.732	7.731	0.001	3.6	99.82	0.14	0	0	0	0.01
2001	248	23	2756	335.398	-424.515	D	7.731	7.731	0.001	3.6	99.19	0.8	0	0	0	0.01
2001	249	23	2781	339.842	-425.379	D	7.731	7.731	0	3.6	99.77	0.33	0	0	0	0.01
2001	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	254	23	2588	318.452	-445.8	D	7.741	7.731	0.01	3.6	98.12	1.87	0	0	0	0.01
2001	255	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	256	23	2780	339.614	-425.419	D	7.731	7.731	0	3.6	100.1	0.06	0	0	0	0.01
2001	257	23	2781	339.842	-425.379	D	7.754	7.731	0.023	3.6	98.67	1.33	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	258	23	2588	318.452	-445.8	D	7.733	7.731	0.002	3.6	99.88	0.09	0	0	0	0.01
2001	259	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	260	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	261	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	262	23	2781	339.842	-425.379	D	7.732	7.731	0.002	3.6	91.04	8.93	0	0	0	0
2001	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	265	23	2789	340.496	-426.449	D	7.733	7.731	0.002	3.6	99.46	0.54	0	0	0	0.02
2001	266	23	2789	340.496	-426.449	D	7.735	7.731	0.004	3.6	98.65	1.34	0	0	0	0.01
2001	267	23	2789	340.496	-426.449	D	7.746	7.731	0.015	3.6	85.63	14.34	0	0	0	0.03
2001	268	23	2789	340.496	-426.449	D	7.75	7.731	0.019	3.6	76.64	23.34	0	0	0	0.02
2001	269	23	2781	339.842	-425.379	D	7.788	7.731	0.057	3.6	92.49	7.49	0	0	0	0.01
2001	270	23	2789	340.496	-426.449	D	7.795	7.731	0.064	3.6	98	1.99	0	0	0	0.01
2001	271	23	2789	340.496	-426.449	D	7.77	7.731	0.039	3.6	98.91	1.07	0	0	0	0.01
2001	272	23	2588	318.452	-445.8	D	7.736	7.731	0.005	3.6	99.42	0.57	0	0	0	0.01
2001	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	274	23	2781	339.842	-425.379	D	7.599	7.598	0	3.313	96.29	3.77	0	0	0	0.01
2001	275	23	2417	339.654	-425.626	D	7.593	7.593	0	3.3	97.67	0.86	0	0	0	0.01
2001	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	278	23	2781	339.842	-425.379	D	7.65	7.593	0.057	3.3	82.4	17.59	0	0	0	0.01
2001	279	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	74.56	25.48	0	0	0	0.01
2001	280	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	97.85	2.11	0	0	0	0.01
2001	281	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	94.11	5.89	0	0	0	0.01
2001	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	285	23	2758	335.862	-424.454	D	7.597	7.593	0.004	3.3	77.23	22.79	0	0	0	0.01
2001	286	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	287	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	288	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	289	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	290	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	291	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	90.96	9.12	0	0	0	0.01
2001	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	297	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	298	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	300	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	301	23	2789	340.496	-426.449	D	7.604	7.593	0.011	3.3	78.69	21.31	0	0	0	0.01
2001	302	23	2757	335.63	-424.484	D	7.593	7.593	0	3.3	93.38	3.2	0	0	0	0
2001	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	307	23	2781	339.842	-425.379	D	7.577	7.546	0.031	3.2	88.98	11.02	0	0	0	0.01
2001	308	23	2684	326.713	-427.014	D	7.559	7.546	0.012	3.2	95.89	4.11	0	0	0	0.01
2001	309	23	2789	340.496	-426.449	D	7.584	7.546	0.038	3.2	90.4	9.59	0	0	0	0.01
2001	310	23	2789	340.496	-426.449	D	7.609	7.546	0.063	3.2	93.15	6.85	0	0	0	0.01
2001	311	23	2789	340.496	-426.449	D	7.565	7.546	0.019	3.2	96.95	3.06	0	0	0	0.01
2001	312	23	2781	339.842	-425.379	D	7.546	7.546	0	3.2	99.14	1.05	0	0	0	0.01
2001	313	23	2789	340.496	-426.449	D	7.558	7.546	0.012	3.2	57.14	42.82	0	0	0	0.05
2001	314	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	92.3	7.97	0	0	0	0.02
2001	315	23	2789	340.496	-426.449	D	7.551	7.546	0.004	3.2	92.65	7.34	0	0	0	0.04
2001	316	23	2640	322.263	-435.121	D	7.555	7.546	0.009	3.2	87.75	12.23	0	0	0	0.03
2001	317	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	332	23	2789	340.496	-426.449	D	7.6	7.546	0.054	3.2	61.22	38.77	0	0	0	0.02
2001	333	23	2589	318.383	-445.593	D	7.662	7.546	0.116	3.2	65.14	34.85	0	0	0	0.02
2001	334	23	2789	340.496	-426.449	D	7.733	7.546	0.187	3.2	79.03	20.96	0	0	0	0.01
2001	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	342	23	2789	340.496	-426.449	D	7.636	7.593	0.043	3.3	65.96	34.02	0	0	0	0.02
2001	343	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	61.43	38.15	0	0	0	0.03
2001	344	23	2789	340.496	-426.449	D	7.6	7.593	0.007	3.3	56.01	44	0	0	0	0.02
2001	345	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	71.34	28.69	0	0	0	0.01
2001	346	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	347	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	83.35	16.72	0	0	0	0
2001	349	23	2788	340.294	-426.448	D	7.593	7.593	0	3.3	96.68	3.3	0	0	0	0.01
2001	350	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	88.29	11.65	0	0	0	0
2001	351	23	2789	340.496	-426.449	D	7.618	7.593	0.026	3.3	64.96	35.04	0	0	0	0.01
2001	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.194							
HOLCIM									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2001	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	2	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	3	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	10	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	38.41	61.44	0	0	0	0.16
2001	11	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	16	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	17	23	2789	340.496	-426.449	D	7.641	7.593	0.048	3.3	59.02	40.78	0	0	0	0.2
2001	18	23	2789	340.496	-426.449	D	8.576	7.593	**0.984**	3.3	42.53	57.27	0	0	0	0.2
2001	19	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	54.16	45.67	0	0	0	0.19
2001	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	21	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	24	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	25	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	34.7	65.07	0	0	0	0.24
2001	26	23	2789	340.496	-426.449	D	7.616	7.593	0.023	3.3	34.34	65.52	0	0	0	0.14
2001	27	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2001	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	37	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	38	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	40	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	42	23	2781	339.842	-425.379	D	7.521	7.453	0.068	3	40.03	59.79	0	0	0	0.19
2001	43	23	1415	329.185	-425.086	D	7.454	7.453	0.001	3	50.73	49.15	0	0	0	0.14

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	46	23	2789	340.496	-426.449	D	7.46	7.453	0.007	3	67.53	32.38	0	0	0	0.11
2001	47	23	2790	340.421	-426.562	D	7.46	7.453	0.007	3	68.67	31.26	0	0	0	0.09
2001	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	49	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	50	23	2789	340.496	-426.449	D	7.453	7.453	0	3	63.57	35.22	0	0	0	0.22
2001	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	52	23	2704	329.056	-425.092	D	7.603	7.453	0.15	3	50.06	49.76	0	0	0	0.19
2001	53	23	2704	329.056	-425.092	D	7.464	7.453	0.012	3	54.06	45.84	0	0	0	0.11
2001	54	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	55	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	57	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2001	58	23	2789	340.496	-426.449	D	7.472	7.453	0.02	3	59.79	39.96	0	0	0	0.26
2001	59	23	2684	326.713	-427.014	D	7.521	7.453	0.068	3	58.64	41.24	0	0	0	0.13
2001	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2001	61	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	62	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	63	23	2789	340.496	-426.449	D	7.483	7.311	0.172	2.7	52.14	47.65	0	0	0	0.22
2001	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	68	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	69	23	2789	340.496	-426.449	D	7.314	7.311	0.003	2.7	66.44	33.32	0	0	0	0.31
2001	70	23	2789	340.496	-426.449	D	7.311	7.311	0.001	2.7	77.92	21.87	0	0	0	0.24
2001	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	74	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	75	23	2758	335.862	-424.454	D	7.514	7.311	0.203	2.7	71.89	27.98	0	0	0	0.13
2001	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	77	23	2789	340.496	-426.449	D	7.365	7.311	0.055	2.7	52.63	46.98	0	0	0	0.39
2001	78	23	2589	318.383	-445.593	D	7.366	7.311	0.056	2.7	59.6	40.12	0	0	0	0.28
2001	79	23	2694	327.861	-425.964	D	7.35	7.311	0.039	2.7	77.02	22.59	0	0	0	0.39
2001	80	23	2600	318.952	-443.12	D	7.717	7.311	0.406	2.7	68.21	31.47	0	0	0	0.32
2001	81	23	2704	329.056	-425.092	D	7.412	7.311	0.101	2.7	86.13	13.58	0	0	0	0.29
2001	82	23	2789	340.496	-426.449	D	7.435	7.311	0.124	2.7	82.7	17.04	0	0	0	0.26

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	83	23	2789	340.496	-426.449	D	7.501	7.311	0.191	2.7	85.87	13.97	0	0	0	0.15
2001	84	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	85	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	86	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	87	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	89	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2001	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2001	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	96	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	115	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	116	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2001	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	122	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	123	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	130	23	2403	338.931	-426.157	D	7.639	7.639	0	3.4	98.17	0.4	0	0	0	0.15
2001	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	138	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	139	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	99.5	0.42	0	0	0	0.11
2001	140	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	100.16	0.26	0	0	0	0.1
2001	141	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	149	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.47	0.3	0	0	0	0.18
2001	150	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	97.85	2.02	0	0	0	0.14
2001	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	157	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	158	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	159	23	2789	340.496	-426.449	D	8.189	7.639	**0.551**	3.4	97.05	2.79	0	0	0	0.17
2001	160	23	2571	322.646	-445.476	D	7.772	7.639	0.133	3.4	98.94	0.9	0	0	0	0.16

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	161	23	2781	339.842	-425.379	D	7.722	7.639	0.083	3.4	98.84	1.03	0	0	0	0.13
2001	162	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.62	0.29	0	0	0	0.1
2001	163	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	99.96	0.18	0	0	0	0.1
2001	164	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	99.76	0.26	0	0	0	0.08
2001	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	168	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	169	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	99.82	0.19	0	0	0	0.18
2001	170	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	95.68	0.15	0	0	0	0.13
2001	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	172	23	2758	335.862	-424.454	D	7.649	7.639	0.011	3.4	97.94	1.94	0	0	0	0.12
2001	173	23	2789	340.496	-426.449	D	7.642	7.639	0.004	3.4	97.8	2.12	0	0	0	0.1
2001	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	175	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	99.62	0.25	0	0	0	0.19
2001	176	23	2789	340.496	-426.449	D	7.704	7.639	0.065	3.4	99.33	0.52	0	0	0	0.15
2001	177	23	2781	339.842	-425.379	D	7.735	7.639	0.096	3.4	99.33	0.55	0	0	0	0.13
2001	178	23	2758	335.862	-424.454	D	7.686	7.639	0.048	3.4	99.37	0.53	0	0	0	0.11
2001	179	23	2758	335.862	-424.454	D	7.657	7.639	0.018	3.4	98.44	1.46	0	0	0	0.1
2001	180	23	2155	334.883	-424.586	D	7.64	7.639	0.001	3.4	99.7	0.18	0	0	0	0.1
2001	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	183	23	2781	339.842	-425.379	D	7.723	7.639	0.085	3.4	91.16	8.71	0	0	0	0.13
2001	184	23	2781	339.842	-425.379	D	7.679	7.639	0.04	3.4	99.24	0.66	0	0	0	0.1
2001	185	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	99.41	0.11	0	0	0	0.09
2001	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	187	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.67	0.14	0	0	0	0.16
2001	188	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.65	0.18	0	0	0	0.14
2001	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	192	23	2789	340.496	-426.449	D	7.648	7.639	0.009	3.4	99.61	0.1	0	0	0	0.29
2001	193	23	2789	340.496	-426.449	D	7.725	7.639	0.086	3.4	99.14	0.68	0	0	0	0.18
2001	194	23	2789	340.496	-426.449	D	7.699	7.639	0.061	3.4	96.91	2.98	0	0	0	0.11
2001	195	23	2589	318.383	-445.593	D	7.644	7.639	0.006	3.4	99.75	0.15	0	0	0	0.09
2001	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	202	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	95.56	4.45	0	0	0	0.07
2001	203	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.55	0.46	0	0	0	0.08
2001	204	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.12	0.93	0	0	0	0.07
2001	205	23	2404	338.92	-425.908	D	7.639	7.639	0	3.4	99.26	0.19	0	0	0	0.07
2001	206	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	207	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	208	23	2789	340.496	-426.449	D	7.735	7.639	0.096	3.4	96.01	3.89	0	0	0	0.1
2001	209	23	2789	340.496	-426.449	D	7.696	7.639	0.057	3.4	95.46	4.46	0	0	0	0.08
2001	210	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.25	0.88	0	0	0	0.08
2001	211	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	99.28	0.66	0	0	0	0.07
2001	212	23	2789	340.496	-426.449	D	7.67	7.639	0.031	3.4	99.77	0.14	0	0	0	0.09
2001	213	23	2781	339.842	-425.379	D	7.66	7.639	0.021	3.4	99.5	0.42	0	0	0	0.08
2001	214	23	2781	339.842	-425.379	D	7.639	7.639	0.001	3.4	99.78	0.16	0	0	0	0.07
2001	215	23	2385	338.165	-425.691	D	7.639	7.639	0	3.4	97.67	0.06	0	0	0	0.07
2001	216	23	2789	340.496	-426.449	D	7.685	7.639	0.047	3.4	99.55	0.25	0	0	0	0.2
2001	217	23	2628	320.933	-436.998	D	7.706	7.639	0.067	3.4	99.18	0.66	0	0	0	0.16
2001	218	23	1046	326.812	-427.688	D	7.639	7.639	0	3.4	96.77	0.05	0	0	0	0.14
2001	219	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	223	23	2789	340.496	-426.449	D	7.681	7.639	0.042	3.4	99.05	0.8	0	0	0	0.15
2001	224	23	2789	340.496	-426.449	D	7.984	7.639	0.345	3.4	93.72	6.09	0	0	0	0.18
2001	225	23	2781	339.842	-425.379	D	8.329	7.639	**0.69**	3.4	97.15	2.69	0	0	0	0.16
2001	226	23	2468	334.002	-434.887	D	7.715	7.639	0.076	3.4	99.46	0.34	0	0	0	0.2
2001	227	23	2468	334.002	-434.887	D	7.695	7.639	0.056	3.4	98.36	1.42	0	0	0	0.22
2001	228	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	98.42	0.23	0	0	0	0.14
2001	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	237	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	238	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	239	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	242	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	243	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	244	23	2758	335.862	-424.454	D	7.832	7.727	0.106	3.592	98.86	0.98	0	0	0	0.16
2001	245	23	2704	329.056	-425.092	D	7.951	7.731	0.221	3.6	96.12	3.77	0	0	0	0.11
2001	246	23	2704	329.056	-425.092	D	7.766	7.731	0.035	3.6	99.4	0.49	0	0	0	0.1
2001	247	23	2758	335.862	-424.454	D	7.765	7.731	0.034	3.6	99.67	0.24	0	0	0	0.09
2001	248	23	2781	339.842	-425.379	D	7.757	7.731	0.026	3.6	99.16	0.76	0	0	0	0.08
2001	249	23	2781	339.842	-425.379	D	7.735	7.731	0.004	3.6	99.3	0.61	0	0	0	0.09
2001	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	254	23	2588	318.452	-445.8	D	7.806	7.731	0.075	3.6	95.87	3.92	0	0	0	0.21
2001	255	23	2781	339.842	-425.379	D	8.025	7.731	0.294	3.6	97.53	2.32	0	0	0	0.15
2001	256	23	2789	340.496	-426.449	D	8.194	7.731	0.463	3.6	98.64	1.24	0	0	0	0.12
2001	257	23	2758	335.862	-424.454	D	8.224	7.731	0.494	3.6	95.17	4.68	0	0	0	0.14
2001	258	23	2588	318.452	-445.8	D	7.736	7.731	0.006	3.6	99.7	0.19	0	0	0	0.11
2001	259	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	260	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	261	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	265	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	266	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	267	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	268	23	2789	340.496	-426.449	D	7.805	7.731	0.074	3.6	59.11	40.39	0	0	0	0.5
2001	269	23	2571	322.646	-445.476	D	7.748	7.731	0.017	3.6	88.92	10.78	0	0	0	0.3
2001	270	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	271	23	2781	339.842	-425.379	D	7.886	7.731	0.155	3.6	96.7	3.01	0	0	0	0.29
2001	272	23	2589	318.383	-445.593	D	7.795	7.731	0.065	3.6	97.03	2.78	0	0	0	0.19
2001	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2001	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2001	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Upper Buffalo
2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	278	23	2781	339.842	-425.379	D	8.044	7.593	0.452	3.3	62.16	37.71	0	0	0	0.13
2001	279	23	2571	322.646	-445.476	D	7.593	7.593	0.001	3.3	78.33	21.67	0	0	0	0.04
2001	280	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	95.42	4.55	0	0	0	0.28
2001	281	23	2789	340.496	-426.449	D	7.603	7.593	0.011	3.3	84.12	15.68	0	0	0	0.2
2001	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	285	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	286	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	287	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	288	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	289	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	290	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	291	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	294	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	297	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	298	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	299	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	300	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	301	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	80.74	19.02	0	0	0	0.24
2001	302	23	2781	339.842	-425.379	D	7.594	7.593	0.002	3.3	85.59	14.26	0	0	0	0.15
2001	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2001	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	307	23	2781	339.842	-425.379	D	7.685	7.546	0.139	3.2	83.82	16.02	0	0	0	0.16
2001	308	23	2684	326.713	-427.014	D	7.609	7.546	0.063	3.2	94.22	5.65	0	0	0	0.14
2001	309	23	2789	340.496	-426.449	D	7.624	7.546	0.078	3.2	91.74	8.08	0	0	0	0.18
2001	310	23	2789	340.496	-426.449	D	7.685	7.546	0.139	3.2	82.66	17.1	0	0	0	0.24
2001	311	23	2789	340.496	-426.449	D	7.597	7.546	0.051	3.2	89.95	9.87	0	0	0	0.19
2001	312	23	2781	339.842	-425.379	D	7.547	7.546	0.001	3.2	96.88	3.03	0	0	0	0.14
2001	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	315	23	2781	339.842	-425.379	D	7.551	7.546	0.005	3.2	87.36	11.96	0	0	0	0.69
2001	316	23	2588	318.452	-445.8	D	7.591	7.546	0.045	3.2	68.72	30.91	0	0	0	0.37

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	317	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	331	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	332	23	2789	340.496	-426.449	D	7.599	7.546	0.052	3.2	56.57	43.31	0	0	0	0.13
2001	333	23	2789	340.496	-426.449	D	8.795	7.546	**1.248**	3.2	47.26	52.52	0	0	0	0.22
2001	334	23	2789	340.496	-426.449	D	7.615	7.546	0.069	3.2	64.66	35.19	0	0	0	0.15
2001	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2001	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	339	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	342	23	2758	335.862	-424.454	D	7.804	7.593	0.212	3.3	45.75	54.05	0	0	0	0.2
2001	343	23	2362	338.048	-428.694	D	7.593	7.593	0	3.3	79.9	8.13	0	0	0	0.08
2001	344	23	2789	340.496	-426.449	D	7.601	7.593	0.009	3.3	38.25	61.55	0	0	0	0.21
2001	345	23	2789	340.496	-426.449	D	7.608	7.593	0.016	3.3	59.87	39.94	0	0	0	0.2
2001	346	23	2041	333.901	-424.879	D	7.593	7.593	0	3.3	66.48	29.71	0	0	0	0.15
2001	347	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	348	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	350	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	74.63	25.35	0	0	0	0.1
2001	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2001	365	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									1.248							

Appendix M
Upper Buffalo
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EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	2758	335.862	-424.454	D	7.618	7.593	0.025	3.3	0	0	0	0	0	100
2002	2	23	2758	335.862	-424.454	D	7.73	7.593	0.137	3.3	0	0	0	0	0	100
2002	3	23	2308	337.055	-428.737	D	7.615	7.593	0.022	3.3	0	0	0	0	0	100
2002	4	23	2040	333.912	-425.128	D	7.593	7.593	0	3.3	0	0	0	0	0	99.32
2002	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	6	23	2789	340.496	-426.449	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.02
2002	7	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.03
2002	8	23	2788	340.294	-426.448	D	7.593	7.593	0	3.3	0	0	0	0	0	99.85
2002	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	2640	322.263	-435.121	D	7.615	7.593	0.023	3.3	0	0	0	0	0	100
2002	11	23	2758	335.862	-424.454	D	7.641	7.593	0.049	3.3	0	0	0	0	0	100
2002	12	23	2235	335.628	-424.554	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.98
2002	13	23	618	323.654	-435.071	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.81
2002	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	2651	323.652	-433.662	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.03
2002	16	23	1046	326.812	-427.688	D	7.593	7.593	0	3.3	0	0	0	0	0	99.37
2002	17	23	2758	335.862	-424.454	D	7.627	7.593	0.034	3.3	0	0	0	0	0	100
2002	18	23	2628	320.933	-436.998	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.02
2002	19	23	2684	326.713	-427.014	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100.01
2002	20	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.02
2002	21	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	40.29
2002	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	2789	340.496	-426.449	D	7.619	7.593	0.026	3.3	0	0	0	0	0	100
2002	25	23	2588	318.452	-445.8	D	7.593	7.593	0	3.3	0	0	0	0	0	100.2
2002	26	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	67.73
2002	27	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	1241	327.999	-426.387	D	7.593	7.593	0	3.3	0	0	0	0	0	95.21
2002	30	23	2758	335.862	-424.454	D	7.614	7.593	0.021	3.3	0	0	0	0	0	100
2002	31	23	2694	327.861	-425.964	D	7.621	7.593	0.029	3.3	0	0	0	0	0	100
2002	32	23	452	322.413	-435.125	D	7.459	7.459	0	3.013	0	0	0	0	0	100.13
2002	33	23	2758	335.862	-424.454	D	7.472	7.453	0.019	3	0	0	0	0	0	100.01
2002	34	23	2789	340.496	-426.449	D	7.454	7.453	0.001	3	0	0	0	0	0	100.26
2002	35	23	2705	329.287	-425.069	D	7.475	7.453	0.023	3	0	0	0	0	0	100.01
2002	36	23	2789	340.496	-426.449	D	7.457	7.453	0.004	3	0	0	0	0	0	100.08
2002	37	23	2684	326.713	-427.014	D	7.453	7.453	0	3	0	0	0	0	0	100.69
2002	38	23	2758	335.862	-424.454	D	7.468	7.453	0.016	3	0	0	0	0	0	100.02

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	39	23	2468	334.002	-434.887	D	7.453	7.453	0	3	0	0	0	0	0	100.57
2002	40	23	2307	336.654	-425.258	D	7.453	7.453	0	3	0	0	0	0	0	102.24
2002	41	23	2654	324.195	-433.21	D	7.454	7.453	0.001	3	0	0	0	0	0	99.98
2002	42	23	2435	337.211	-428.786	D	7.459	7.453	0.007	3	0	0	0	0	0	100.05
2002	43	23	2711	330.671	-424.932	D	7.463	7.453	0.01	3	0	0	0	0	0	100.03
2002	44	23	2628	320.933	-436.998	D	7.488	7.453	0.035	3	0	0	0	0	0	100.01
2002	45	23	2789	340.496	-426.449	D	7.456	7.453	0.003	3	0	0	0	0	0	100.07
2002	46	23	2758	335.862	-424.454	D	7.453	7.453	0	3	0	0	0	0	0	100.22
2002	47	23	2758	335.862	-424.454	D	7.453	7.453	0	3	0	0	0	0	0	100.08
2002	48	23	2711	330.671	-424.932	D	7.499	7.453	0.047	3	0	0	0	0	0	100.01
2002	49	23	2789	340.496	-426.449	D	7.453	7.453	0.001	3	0	0	0	0	0	100.21
2002	50	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	2589	318.383	-445.593	D	7.454	7.453	0.001	3	0	0	0	0	0	100.08
2002	53	23	2757	335.63	-424.484	D	7.503	7.453	0.05	3	0	0	0	0	0	100
2002	54	23	2789	340.496	-426.449	D	7.46	7.453	0.007	3	0	0	0	0	0	100.04
2002	55	23	2789	340.496	-426.449	D	7.453	7.453	0	3	0	0	0	0	0	100.63
2002	56	23	2789	340.496	-426.449	D	7.499	7.453	0.046	3	0	0	0	0	0	100
2002	57	23	2627	320.879	-437.207	D	7.454	7.453	0.001	3	0	0	0	0	0	100.07
2002	58	23	2781	339.842	-425.379	D	7.453	7.453	0	3	0	0	0	0	0	102.61
2002	59	23	2417	339.654	-425.626	D	7.453	7.453	0	3	0	0	0	0	0	99.75
2002	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2002	61	23	2684	326.713	-427.014	D	7.324	7.311	0.013	2.7	0	0	0	0	0	100.02
2002	62	23	2684	326.713	-427.014	D	7.313	7.311	0.003	2.7	0	0	0	0	0	100
2002	63	23	2781	339.842	-425.379	D	7.311	7.311	0	2.7	0	0	0	0	0	99.38
2002	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	2780	339.614	-425.419	D	7.311	7.311	0	2.7	0	0	0	0	0	93.77
2002	69	23	2710	330.44	-424.955	D	7.315	7.311	0.004	2.7	0	0	0	0	0	100.03
2002	70	23	2781	339.842	-425.379	D	7.312	7.311	0.001	2.7	0	0	0	0	0	99.97
2002	71	23	2711	330.671	-424.932	D	7.372	7.311	0.061	2.7	0	0	0	0	0	100
2002	72	23	2789	340.496	-426.449	D	7.322	7.311	0.011	2.7	0	0	0	0	0	100.02
2002	73	23	2789	340.496	-426.449	D	7.311	7.311	0	2.7	0	0	0	0	0	100.06
2002	74	23	2694	327.861	-425.964	D	7.344	7.311	0.034	2.7	0	0	0	0	0	100
2002	75	23	2758	335.862	-424.454	D	7.378	7.311	0.067	2.7	0	0	0	0	0	100
2002	76	23	2628	320.933	-436.998	D	7.315	7.311	0.004	2.7	0	0	0	0	0	100.05
2002	77	23	2209	335.38	-424.564	D	7.311	7.311	0	2.7	0	0	0	0	0	100.37

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	78	23	2789	340.496	-426.449	D	7.319	7.311	0.009	2.7	0	0	0	0	0	100.01
2002	79	23	2694	327.861	-425.964	D	7.387	7.311	0.077	2.7	0	0	0	0	0	100
2002	80	23	2758	335.862	-424.454	D	7.332	7.311	0.021	2.7	0	0	0	0	0	100.01
2002	81	23	2789	340.496	-426.449	D	7.38	7.311	0.07	2.7	0	0	0	0	0	100
2002	82	23	2789	340.496	-426.449	D	7.314	7.311	0.003	2.7	0	0	0	0	0	100.05
2002	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	23	2628	320.933	-436.998	D	7.322	7.311	0.011	2.7	0	0	0	0	0	100.03
2002	85	23	2789	340.496	-426.449	D	7.346	7.311	0.036	2.7	0	0	0	0	0	100.01
2002	86	23	2789	340.496	-426.449	D	7.318	7.311	0.007	2.7	0	0	0	0	0	100.03
2002	87	23	2704	329.056	-425.092	D	7.311	7.311	0.001	2.7	0	0	0	0	0	99.89
2002	88	23	2789	340.496	-426.449	D	7.315	7.311	0.004	2.7	0	0	0	0	0	100.03
2002	89	23	2694	327.861	-425.964	D	7.32	7.311	0.009	2.7	0	0	0	0	0	100.01
2002	90	23	1660	330.988	-426.506	D	7.316	7.311	0.006	2.7	0	0	0	0	0	100.02
2002	91	23	2758	335.862	-424.454	D	7.361	7.356	0.004	2.796	0	0	0	0	0	100.05
2002	92	23	2710	330.44	-424.955	D	7.37	7.358	0.012	2.8	0	0	0	0	0	100.01
2002	93	23	2710	330.44	-424.955	D	7.414	7.358	0.056	2.8	0	0	0	0	0	100
2002	94	23	2684	326.713	-427.014	D	7.365	7.358	0.007	2.8	0	0	0	0	0	100.02
2002	95	23	2781	339.842	-425.379	D	7.37	7.358	0.011	2.8	0	0	0	0	0	100.02
2002	96	23	17	319.384	-445.5	D	7.363	7.358	0.004	2.8	0	0	0	0	0	100.01
2002	97	23	2780	339.614	-425.419	D	7.359	7.358	0	2.8	0	0	0	0	0	99.86
2002	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	99	23	2758	335.862	-424.454	D	7.386	7.358	0.028	2.8	0	0	0	0	0	100
2002	100	23	2758	335.862	-424.454	D	7.362	7.358	0.004	2.8	0	0	0	0	0	100.04
2002	101	23	168	320.568	-438.453	D	7.358	7.358	0	2.8	0	0	0	0	0	97.65
2002	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	103	23	1517	329.93	-425.053	D	7.358	7.358	0	2.8	0	0	0	0	0	101.16
2002	104	23	1415	329.185	-425.086	D	7.359	7.358	0	2.8	0	0	0	0	0	99.89
2002	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	110	23	2235	335.628	-424.554	D	7.358	7.358	0	2.8	0	0	0	0	0	109.37
2002	111	23	1517	329.93	-425.053	D	7.358	7.358	0	2.8	0	0	0	0	0	113.25
2002	112	23	2758	335.862	-424.454	D	7.393	7.358	0.035	2.8	0	0	0	0	0	100.01
2002	113	23	2684	326.713	-427.014	D	7.359	7.358	0.001	2.8	0	0	0	0	0	99.96
2002	114	23	411	322.219	-436.382	D	7.358	7.358	0	2.8	0	0	0	0	0	99.59
2002	115	23	2758	335.862	-424.454	D	7.378	7.358	0.02	2.8	0	0	0	0	0	100
2002	116	23	2571	322.646	-445.476	D	7.361	7.358	0.002	2.8	0	0	0	0	0	100.07

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	117	23	2780	339.614	-425.419	D	7.358	7.358	0	2.8	0	0	0	0	0	99.81
2002	118	23	1415	329.185	-425.086	D	7.359	7.358	0.001	2.8	0	0	0	0	0	100.2
2002	119	23	2704	329.056	-425.092	D	7.368	7.358	0.01	2.8	0	0	0	0	0	100.03
2002	120	23	2683	326.705	-427.245	D	7.359	7.358	0.001	2.8	0	0	0	0	0	100.15
2002	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	74.2
2002	122	23	2684	326.713	-427.014	D	7.659	7.639	0.02	3.4	0	0	0	0	0	99.99
2002	123	23	2589	318.383	-445.593	D	7.656	7.639	0.018	3.4	0	0	0	0	0	100
2002	124	23	2684	326.713	-427.014	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100
2002	125	23	1415	329.185	-425.086	D	7.643	7.639	0.004	3.4	0	0	0	0	0	100.04
2002	126	23	2128	334.646	-424.846	D	7.639	7.639	0	3.4	0	0	0	0	0	99.22
2002	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	129	23	2789	340.496	-426.449	D	7.653	7.639	0.015	3.4	0	0	0	0	0	100
2002	130	23	2758	335.862	-424.454	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100.01
2002	131	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.04
2002	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	118.97
2002	133	23	2789	340.496	-426.449	D	7.65	7.639	0.011	3.4	0	0	0	0	0	100.01
2002	134	23	2725	331.984	-427.096	D	7.639	7.639	0	3.4	0	0	0	0	0	100.06
2002	135	23	2415	339.676	-426.124	D	7.639	7.639	0	3.4	0	0	0	0	0	99.09
2002	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	137	23	2684	326.713	-427.014	D	7.659	7.639	0.02	3.4	0	0	0	0	0	100
2002	138	23	2589	318.383	-445.593	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.04
2002	139	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.06
2002	140	23	2758	335.862	-424.454	D	7.664	7.639	0.025	3.4	0	0	0	0	0	100
2002	141	23	2704	329.056	-425.092	D	7.649	7.639	0.011	3.4	0	0	0	0	0	100.01
2002	142	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.07
2002	143	23	1921	333.04	-427.914	D	7.639	7.639	0	3.4	0	0	0	0	0	94.96
2002	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	145	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	0	0	0	0	0	100.05
2002	146	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.92
2002	147	23	2413	339.406	-425.637	D	7.639	7.639	0	3.4	0	0	0	0	0	99.33
2002	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	150	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	0	0	0	0	0	92.58
2002	151	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.68
2002	152	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	0	0	0	0	0	100.17
2002	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	156	23	2781	339.842	-425.379	D	7.645	7.639	0.006	3.4	0	0	0	0	0	99.99
2002	157	23	2628	320.933	-436.998	D	7.645	7.639	0.006	3.4	0	0	0	0	0	100
2002	158	23	2571	322.646	-445.476	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.07
2002	159	23	2571	322.646	-445.476	D	7.648	7.639	0.01	3.4	0	0	0	0	0	100
2002	160	23	2756	335.398	-424.515	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.02
2002	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	164	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	0	0	0	0	0	100.05
2002	165	23	2684	326.713	-427.014	D	7.675	7.639	0.036	3.4	0	0	0	0	0	100
2002	166	23	2710	330.44	-424.955	D	7.64	7.639	0.001	3.4	0	0	0	0	0	99.97
2002	167	23	2758	335.862	-424.454	D	7.647	7.639	0.008	3.4	0	0	0	0	0	100
2002	168	23	2704	329.056	-425.092	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100.01
2002	169	23	2468	334.002	-434.887	D	7.642	7.639	0.003	3.4	0	0	0	0	0	99.98
2002	170	23	2781	339.842	-425.379	D	7.639	7.639	0.001	3.4	0	0	0	0	0	100.37
2002	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	47.2
2002	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	173	23	2409	339.158	-425.648	D	7.639	7.639	0	3.4	0	0	0	0	0	99.99
2002	174	23	1415	329.185	-425.086	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.06
2002	175	23	15	319.038	-443.267	D	7.639	7.639	0	3.4	0	0	0	0	0	11.71
2002	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	178	23	2758	335.862	-424.454	D	7.639	7.639	0	3.4	0	0	0	0	0	99.34
2002	179	23	2384	338.176	-425.941	D	7.639	7.639	0	3.4	0	0	0	0	0	98.59
2002	180	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	0	0	0	0	0	104.29
2002	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	183	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	0	0	0	0	0	100.13
2002	184	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.13
2002	185	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.01
2002	186	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	0	0	0	0	0	100.02
2002	187	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	0	0	0	0	0	100.01
2002	188	23	2571	322.646	-445.476	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.08
2002	189	23	2588	318.452	-445.8	D	7.639	7.639	0.001	3.4	0	0	0	0	0	100.18
2002	190	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.06
2002	191	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	0	0	0	0	0	100.29
2002	192	23	2711	330.671	-424.932	D	7.646	7.639	0.007	3.4	0	0	0	0	0	100.01
2002	193	23	2704	329.056	-425.092	D	7.655	7.639	0.016	3.4	0	0	0	0	0	100.01
2002	194	23	2694	327.861	-425.964	D	7.655	7.639	0.017	3.4	0	0	0	0	0	100

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	195	23	2758	335.862	-424.454	D	7.647	7.639	0.008	3.4	0	0	0	0	0	100.01
2002	196	23	2684	326.713	-427.014	D	7.649	7.639	0.01	3.4	0	0	0	0	0	100.02
2002	197	23	2704	329.056	-425.092	D	7.64	7.639	0.002	3.4	0	0	0	0	0	100.03
2002	198	23	2413	339.406	-425.637	D	7.639	7.639	0	3.4	0	0	0	0	0	100.72
2002	199	23	2032	334	-427.123	D	7.639	7.639	0	3.4	0	0	0	0	0	120.62
2002	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	204	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	99.99
2002	205	23	2628	320.933	-436.998	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100.01
2002	206	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	0	0	0	0	0	100.01
2002	207	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.06
2002	208	23	2372	337.938	-426.201	D	7.639	7.639	0	3.4	0	0	0	0	0	93.51
2002	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	211	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	0	0	0	0	0	89.29
2002	212	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	102
2002	213	23	1550	330.2	-425.541	D	7.639	7.639	0	3.4	0	0	0	0	0	9.46
2002	214	23	2781	339.842	-425.379	D	7.643	7.639	0.004	3.4	0	0	0	0	0	100.03
2002	215	23	2704	329.056	-425.092	D	7.649	7.639	0.01	3.4	0	0	0	0	0	100
2002	216	23	2684	326.713	-427.014	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.03
2002	217	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.05
2002	218	23	2684	326.713	-427.014	D	7.643	7.639	0.004	3.4	0	0	0	0	0	100.03
2002	219	23	2588	318.452	-445.8	D	7.649	7.639	0.01	3.4	0	0	0	0	0	100
2002	220	23	2694	327.861	-425.964	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.02
2002	221	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	0	0	0	0	0	99.97
2002	222	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.28
2002	223	23	807	325.034	-432.512	D	7.639	7.639	0	3.4	0	0	0	0	0	99.27
2002	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	226	23	1415	329.185	-425.086	D	7.641	7.639	0.002	3.4	0	0	0	0	0	99.99
2002	227	23	2235	335.628	-424.554	D	7.639	7.639	0	3.4	0	0	0	0	0	94.8
2002	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	236	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	0	0	0	0	0	100.35
2002	237	23	2628	320.933	-436.998	D	7.653	7.639	0.014	3.4	0	0	0	0	0	100
2002	238	23	2589	318.383	-445.593	D	7.644	7.639	0.005	3.4	0	0	0	0	0	99.99
2002	239	23	2790	340.421	-426.562	D	7.652	7.639	0.013	3.4	0	0	0	0	0	100
2002	240	23	2758	335.862	-424.454	D	7.653	7.639	0.015	3.4	0	0	0	0	0	100.01
2002	241	23	2694	327.861	-425.964	D	7.655	7.639	0.016	3.4	0	0	0	0	0	100
2002	242	23	2704	329.056	-425.092	D	7.642	7.639	0.003	3.4	0	0	0	0	0	100.05
2002	243	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.06
2002	244	23	2758	335.862	-424.454	D	7.728	7.727	0.001	3.592	0	0	0	0	0	99.87
2002	245	23	1415	329.185	-425.086	D	7.731	7.731	0	3.6	0	0	0	0	0	95.79
2002	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	247	23	2781	339.842	-425.379	D	7.731	7.731	0	3.6	0	0	0	0	0	100.18
2002	248	23	2758	335.862	-424.454	D	7.734	7.731	0.003	3.6	0	0	0	0	0	100.02
2002	249	23	2789	340.496	-426.449	D	7.734	7.731	0.003	3.6	0	0	0	0	0	99.97
2002	250	23	2604	319.223	-442.217	D	7.731	7.731	0.001	3.6	0	0	0	0	0	99.89
2002	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	252	23	2235	335.628	-424.554	D	7.731	7.731	0	3.6	0	0	0	0	0	69.92
2002	253	23	2758	335.862	-424.454	D	7.734	7.731	0.004	3.6	0	0	0	0	0	99.99
2002	254	23	2758	335.862	-424.454	D	7.789	7.731	0.058	3.6	0	0	0	0	0	100
2002	255	23	2758	335.862	-424.454	D	7.75	7.731	0.02	3.6	0	0	0	0	0	100
2002	256	23	2640	322.263	-435.121	D	7.74	7.731	0.009	3.6	0	0	0	0	0	100
2002	257	23	2789	340.496	-426.449	D	7.732	7.731	0.002	3.6	0	0	0	0	0	99.99
2002	258	23	2758	335.862	-424.454	D	7.805	7.731	0.075	3.6	0	0	0	0	0	100
2002	259	23	2758	335.862	-424.454	D	7.828	7.731	0.097	3.6	0	0	0	0	0	100
2002	260	23	2758	335.862	-424.454	D	7.736	7.731	0.005	3.6	0	0	0	0	0	100.01
2002	261	23	2397	338.413	-425.68	D	7.731	7.731	0	3.6	0	0	0	0	0	97.84
2002	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	264	23	2789	340.496	-426.449	D	7.731	7.731	0	3.6	0	0	0	0	0	100.21
2002	265	23	2758	335.862	-424.454	D	7.756	7.731	0.025	3.6	0	0	0	0	0	100
2002	266	23	2589	318.383	-445.593	D	7.731	7.731	0	3.6	0	0	0	0	0	99.94
2002	267	23	2789	340.496	-426.449	D	7.743	7.731	0.013	3.6	0	0	0	0	0	100.01
2002	268	23	2684	326.713	-427.014	D	7.736	7.731	0.005	3.6	0	0	0	0	0	100
2002	269	23	2757	335.63	-424.484	D	7.732	7.731	0.001	3.6	0	0	0	0	0	100.03
2002	270	23	2758	335.862	-424.454	D	7.781	7.731	0.051	3.6	0	0	0	0	0	100
2002	271	23	2789	340.496	-426.449	D	7.739	7.731	0.008	3.6	0	0	0	0	0	100.01
2002	272	23	2789	340.496	-426.449	D	7.74	7.731	0.01	3.6	0	0	0	0	0	100

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	273	23	2684	326.713	-427.014	D	7.731	7.731	0.001	3.6	0	0	0	0	0	99.83
2002	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	278	23	2758	335.862	-424.454	D	7.618	7.593	0.025	3.3	0	0	0	0	0	100
2002	279	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.01
2002	280	23	2711	330.671	-424.932	D	7.612	7.593	0.019	3.3	0	0	0	0	0	100
2002	281	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.04
2002	282	23	2571	322.646	-445.476	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.99
2002	283	23	2571	322.646	-445.476	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100
2002	284	23	2705	329.287	-425.069	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.01
2002	285	23	2781	339.842	-425.379	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.03
2002	286	23	2684	326.713	-427.014	D	7.621	7.593	0.028	3.3	0	0	0	0	0	100
2002	287	23	2758	335.862	-424.454	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2002	288	23	2641	322.503	-435.089	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2002	289	23	2758	335.862	-424.454	D	7.624	7.593	0.032	3.3	0	0	0	0	0	100
2002	290	23	2571	322.646	-445.476	D	7.598	7.593	0.006	3.3	0	0	0	0	0	100.02
2002	291	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	0	0	0	0	0	100.18
2002	292	23	2694	327.861	-425.964	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100
2002	293	23	2571	322.646	-445.476	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.01
2002	294	23	2589	318.383	-445.593	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100.01
2002	295	23	2704	329.056	-425.092	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.03
2002	296	23	2758	335.862	-424.454	D	7.623	7.593	0.031	3.3	0	0	0	0	0	100
2002	297	23	2628	320.933	-436.998	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100
2002	298	23	2704	329.056	-425.092	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.02
2002	299	23	2789	340.496	-426.449	D	7.626	7.593	0.033	3.3	0	0	0	0	0	100
2002	300	23	2694	327.861	-425.964	D	7.623	7.593	0.031	3.3	0	0	0	0	0	100
2002	301	23	2704	329.056	-425.092	D	7.604	7.593	0.011	3.3	0	0	0	0	0	99.99
2002	302	23	2789	340.496	-426.449	D	7.618	7.593	0.026	3.3	0	0	0	0	0	100
2002	303	23	2589	318.383	-445.593	D	7.624	7.593	0.032	3.3	0	0	0	0	0	100
2002	304	23	2758	335.862	-424.454	D	7.648	7.593	0.055	3.3	0	0	0	0	0	100
2002	305	23	2684	326.713	-427.014	D	7.7	7.548	0.151	3.204	0	0	0	0	0	100
2002	306	23	2711	330.671	-424.932	D	7.686	7.546	0.14	3.2	0	0	0	0	0	100
2002	307	23	2758	335.862	-424.454	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.09
2002	308	23	2758	335.862	-424.454	D	7.566	7.546	0.02	3.2	0	0	0	0	0	100.02
2002	309	23	2588	318.452	-445.8	D	7.553	7.546	0.007	3.2	0	0	0	0	0	100.02
2002	310	23	2589	318.383	-445.593	D	7.549	7.546	0.002	3.2	0	0	0	0	0	100.04
2002	311	23	2788	340.294	-426.448	D	7.546	7.546	0	3.2	0	0	0	0	0	100.46

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	314	23	2588	318.452	-445.8	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.12
2002	315	23	2758	335.862	-424.454	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.04
2002	316	23	2694	327.861	-425.964	D	7.591	7.546	0.045	3.2	0	0	0	0	0	100
2002	317	23	375	322.611	-445.359	D	7.547	7.546	0	3.2	0	0	0	0	0	99.87
2002	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	319	23	2711	330.671	-424.932	D	7.582	7.546	0.036	3.2	0	0	0	0	0	100.01
2002	320	23	2694	327.861	-425.964	D	7.623	7.546	0.076	3.2	0	0	0	0	0	100
2002	321	23	1	318.65	-445.782	D	7.547	7.546	0.001	3.2	0	0	0	0	0	99.99
2002	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	323	23	2	318.639	-445.533	D	7.547	7.546	0	3.2	0	0	0	0	0	100.03
2002	324	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	0	0	0	0	0	101.1
2002	325	23	2628	320.933	-436.998	D	7.553	7.546	0.007	3.2	0	0	0	0	0	100.01
2002	326	23	2435	337.211	-428.786	D	7.587	7.546	0.041	3.2	0	0	0	0	0	100
2002	327	23	2468	334.002	-434.887	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.09
2002	328	23	1415	329.185	-425.086	D	7.546	7.546	0	3.2	0	0	0	0	0	101.15
2002	329	23	2628	320.933	-436.998	D	7.568	7.546	0.022	3.2	0	0	0	0	0	100.01
2002	330	23	2611	319.699	-440.64	D	7.564	7.546	0.017	3.2	0	0	0	0	0	100.01
2002	331	23	2711	330.671	-424.932	D	7.644	7.546	0.098	3.2	0	0	0	0	0	100
2002	332	23	2789	340.496	-426.449	D	7.548	7.546	0.002	3.2	0	0	0	0	0	100.03
2002	333	23	2323	337.303	-428.727	D	7.546	7.546	0	3.2	0	0	0	0	0	85.83
2002	334	23	2758	335.862	-424.454	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.03
2002	335	23	2758	335.862	-424.454	D	7.601	7.591	0.01	3.296	0	0	0	0	0	100.01
2002	336	23	1047	326.802	-427.438	D	7.593	7.593	0	3.3	0	0	0	0	0	97.07
2002	337	23	2758	335.862	-424.454	D	7.614	7.593	0.022	3.3	0	0	0	0	0	100
2002	338	23	1415	329.185	-425.086	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.85
2002	339	23	2704	329.056	-425.092	D	7.63	7.593	0.038	3.3	0	0	0	0	0	100
2002	340	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.02
2002	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	2781	339.842	-425.379	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.01
2002	343	23	2704	329.056	-425.092	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100
2002	344	23	2587	318.699	-445.781	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.04
2002	345	23	1415	329.185	-425.086	D	7.594	7.593	0.001	3.3	0	0	0	0	0	99.99
2002	346	23	2417	339.654	-425.626	D	7.593	7.593	0	3.3	0	0	0	0	0	100.42
2002	347	23	2684	326.713	-427.014	D	7.617	7.593	0.024	3.3	0	0	0	0	0	100
2002	348	23	2588	318.452	-445.8	D	7.598	7.593	0.005	3.3	0	0	0	0	0	100.02
2002	349	23	2030	334.022	-427.622	D	7.593	7.593	0	3.3	0	0	0	0	0	11.21
2002	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	2758	335.862	-424.454	D	7.605	7.593	0.012	3.3	0	0	0	0	0	100
2002	354	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	0	0	0	0	0	99.29
2002	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	2684	326.713	-427.014	D	7.594	7.593	0.002	3.3	0	0	0	0	0	100.05
2002	357	23	2758	335.862	-424.454	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100.03
2002	358	23	2704	329.056	-425.092	D	7.614	7.593	0.022	3.3	0	0	0	0	0	100.01
2002	359	23	2758	335.862	-424.454	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100.02
2002	360	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	0	0	0	0	0	100.6
2002	361	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.17
2002	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	2684	326.713	-427.014	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100
									0.151							
EXIDE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	2694	327.861	-425.964	D	7.593	7.593	0	3.3	81.48	14.1	0	0	0	4.16
2002	2	23	2155	334.883	-424.586	D	7.601	7.593	0.008	3.3	87.74	9.28	0	0	0	2.98
2002	3	23	2789	340.496	-426.449	D	7.596	7.593	0.004	3.3	88.8	8.5	0	0	0	2.71
2002	4	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	91.73	6.66	0	0	0	1.69
2002	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	49.82	3.01	0	0	0	0.52
2002	6	23	2684	326.713	-427.014	D	7.599	7.593	0.006	3.3	92.58	5.57	0	0	0	1.88
2002	7	23	2588	318.452	-445.8	D	7.598	7.593	0.005	3.3	89.82	7.45	0	0	0	2.76
2002	8	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	86.2	11.34	0	0	0	2.49
2002	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	1415	329.185	-425.086	D	7.593	7.593	0.001	3.3	93.94	3.82	0	0	0	2.27
2002	11	23	1449	329.434	-425.075	D	7.596	7.593	0.004	3.3	80.63	13.34	0	0	0	6.06
2002	12	23	2468	334.002	-434.887	D	7.593	7.593	0	3.3	92.83	5.07	0	0	0	2.21
2002	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1043	326.845	-428.436	D	7.593	7.593	0	3.3	6.47	0.3	0	0	0	0.12
2002	17	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	86.61	10	0	0	0	3.4
2002	18	23	2588	318.452	-445.8	D	7.593	7.593	0	3.3	93.69	5.38	0	0	0	1.2
2002	19	23	1414	329.196	-425.335	D	7.593	7.593	0	3.3	92.85	5.46	0	0	0	1.58
2002	20	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	95.33	3.71	0	0	0	0.93

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	21	23	2397	338.413	-425.68	D	7.593	7.593	0	3.3	94.67	2.62	0	0	0	0.68
2002	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	2781	339.842	-425.379	D	7.594	7.593	0.001	3.3	93.7	5.32	0	0	0	1.01
2002	25	23	2585	319.192	-445.743	D	7.593	7.593	0.001	3.3	85.87	10.78	0	0	0	3.44
2002	26	23	2429	338.563	-428.651	D	7.593	7.593	0	3.3	94.23	3.79	0	0	0	1.87
2002	27	23	2029	334.033	-427.871	D	7.593	7.593	0	3.3	85.27	2.16	0	0	0	1.34
2002	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	91.3	4.25	0	0	0	1.23
2002	30	23	2758	335.862	-424.454	D	7.605	7.593	0.013	3.3	94.73	4.3	0	0	0	0.98
2002	31	23	2684	326.713	-427.014	D	7.617	7.593	0.025	3.3	96.18	3.14	0	0	0	0.69
2002	32	23	2781	339.842	-425.379	D	7.46	7.459	0.001	3.013	96.48	3.07	0	0	0	0.44
2002	33	23	2418	339.946	-426.612	D	7.453	7.453	0	3	95.23	3.67	0	0	0	2.19
2002	34	23	2789	340.496	-426.449	D	7.453	7.453	0	3	101.38	3.81	0	0	0	1.4
2002	35	23	2704	329.056	-425.092	D	7.453	7.453	0.001	3	87.6	8.84	0	0	0	3.67
2002	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	37	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	38	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	40	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	41	23	2781	339.842	-425.379	D	7.454	7.453	0.001	3	93.96	4.3	0	0	0	1.87
2002	42	23	2789	340.496	-426.449	D	7.453	7.453	0.001	3	94.07	4.48	0	0	0	1.42
2002	43	23	2706	329.518	-425.046	D	7.453	7.453	0	3	92.84	4.5	0	0	0	2.85
2002	44	23	2628	320.933	-436.998	D	7.455	7.453	0.002	3	89.67	7.11	0	0	0	3.28
2002	45	23	2684	326.713	-427.014	D	7.453	7.453	0	3	88.45	9.14	0	0	0	3.05
2002	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	2779	339.386	-425.461	D	7.455	7.453	0.002	3	88.96	6.22	0	0	0	4.97
2002	49	23	1415	329.185	-425.086	D	7.453	7.453	0	3	95.6	2.75	0	0	0	1.98
2002	50	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	2781	339.842	-425.379	D	7.453	7.453	0	3	88.59	7.8	0	0	0	3.66
2002	54	23	2588	318.452	-445.8	D	7.453	7.453	0.001	3	92.71	5.18	0	0	0	2.56
2002	55	23	2418	339.946	-426.612	D	7.453	7.453	0	3	97.17	2.59	0	0	0	1.29
2002	56	23	2588	318.452	-445.8	D	7.453	7.453	0.001	3	90.91	7.62	0	0	0	1.64
2002	57	23	2588	318.452	-445.8	D	7.453	7.453	0.001	3	84.71	11.92	0	0	0	3.48
2002	58	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2002	61	23	2588	318.452	-445.8	D	7.316	7.311	0.006	2.7	91.79	6.29	0	0	0	1.96
2002	62	23	2781	339.842	-425.379	D	7.312	7.311	0.001	2.7	94.44	4.18	0	0	0	1.41
2002	63	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	72	23	2155	334.883	-424.586	D	7.311	7.311	0	2.7	94.66	3.73	0	0	0	2.77
2002	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	23	2704	329.056	-425.092	D	7.312	7.311	0.001	2.7	91.67	6.21	0	0	0	2.25
2002	75	23	1	318.65	-445.782	D	7.312	7.311	0.001	2.7	93.44	4.85	0	0	0	1.76
2002	76	23	2	318.639	-445.533	D	7.311	7.311	0	2.7	97.74	1.64	0	0	0	0.91
2002	77	23	2789	340.496	-426.449	D	7.311	7.311	0	2.7	98.16	1.64	0	0	0	0.75
2002	78	23	2041	333.901	-424.879	D	7.311	7.311	0	2.7	99.11	1.72	0	0	0	0.43
2002	79	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	100.07	1.63	0	0	0	0.38
2002	80	23	375	322.611	-445.359	D	7.312	7.311	0.001	2.7	90.33	6.44	0	0	0	3.33
2002	81	23	1047	326.802	-427.438	D	7.311	7.311	0	2.7	86.45	9.72	0	0	0	4.15
2002	82	23	2694	327.861	-425.964	D	7.312	7.311	0.001	2.7	91.79	6.74	0	0	0	1.59
2002	83	23	2789	340.496	-426.449	D	7.311	7.311	0	2.7	98.72	1.81	0	0	0	0.63
2002	84	23	1413	329.207	-425.585	D	7.311	7.311	0	2.7	98.01	2.48	0	0	0	0.34
2002	85	23	2335	337.172	-425.735	D	7.311	7.311	0	2.7	97.85	2.08	0	0	0	0.22
2002	86	23	1552	330.178	-425.042	D	7.311	7.311	0	2.7	89.23	5.38	0	0	0	1.94
2002	87	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	88	23	1047	326.802	-427.438	D	7.311	7.311	0	2.7	98.52	0.34	0	0	0	1.63
2002	89	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	98.2	0.59	0	0	0	1.06
2002	90	23	1415	329.185	-425.086	D	7.311	7.311	0	2.7	105.87	0.36	0	0	0	3.25
2002	91	23	1414	329.196	-425.335	D	7.357	7.356	0	2.796	96.33	1.66	0	0	0	2.11
2002	92	23	1048	326.791	-427.189	D	7.358	7.358	0	2.8	96.99	1.33	0	0	0	2.04
2002	93	23	305	322.115	-445.381	D	7.358	7.358	0	2.8	97.29	0.6	0	0	0	1.42
2002	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	96	23	2780	339.614	-425.419	D	7.358	7.358	0	2.8	99.58	0.65	0	0	0	1.21
2002	97	23	2402	338.942	-426.406	D	7.358	7.358	0	2.8	98.2	0.53	0	0	0	0.97
2002	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	102	23	1242	327.988	-426.138	D	7.358	7.358	0	2.8	104.27	0.42	0	0	0	2.01
2002	103	23	2704	329.056	-425.092	D	7.358	7.358	0	2.8	97.09	2.51	0	0	0	1.38
2002	104	23	1415	329.185	-425.086	D	7.358	7.358	0	2.8	98.22	1.11	0	0	0	0.87
2002	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	110	23	1242	327.988	-426.138	D	7.358	7.358	0	2.8	101.62	1.52	0	0	0	1.63
2002	111	23	2757	335.63	-424.484	D	7.359	7.358	0	2.8	98.38	1.3	0	0	0	0.79
2002	112	23	2036	333.956	-426.126	D	7.358	7.358	0	2.8	78.54	0.37	0	0	0	0.45
2002	113	23	2789	340.496	-426.449	D	7.361	7.358	0.003	2.8	98.84	0.33	0	0	0	0.87
2002	114	23	2758	335.862	-424.454	D	7.359	7.358	0	2.8	98.05	0.6	0	0	0	1.32
2002	115	23	2468	334.002	-434.887	D	7.359	7.358	0.001	2.8	97.37	1.14	0	0	0	1.48
2002	116	23	1979	333.536	-427.893	D	7.358	7.358	0	2.8	119.33	0.83	0	0	0	2.21
2002	117	23	2041	333.901	-424.879	D	7.358	7.358	0	2.8	96.49	0.75	0	0	0	1.59
2002	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	119	23	2781	339.842	-425.379	D	7.36	7.358	0.001	2.8	98.31	0.25	0	0	0	1.56
2002	120	23	2781	339.842	-425.379	D	7.359	7.358	0.001	2.8	99.1	0.14	0	0	0	0.9
2002	121	23	946	326.21	-430.962	D	7.627	7.627	0	3.375	89.25	0.29	0	0	0	0.43
2002	122	23	2683	326.705	-427.245	D	7.64	7.639	0.001	3.4	98.95	0.56	0	0	0	0.57
2002	123	23	1	318.65	-445.782	D	7.64	7.639	0.001	3.4	99.21	0.25	0	0	0	0.49
2002	124	23	200	320.784	-437.694	D	7.64	7.639	0.001	3.4	99.16	0.34	0	0	0	0.44
2002	125	23	2386	338.533	-428.423	D	7.64	7.639	0.001	3.4	99.37	0.22	0	0	0	0.41
2002	126	23	2405	338.909	-425.659	D	7.639	7.639	0	3.4	100.03	0.04	0	0	0	0.31
2002	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	129	23	1048	326.791	-427.189	D	7.639	7.639	0	3.4	90.23	6.91	0	0	0	2.72
2002	130	23	2704	329.056	-425.092	D	7.639	7.639	0.001	3.4	97.45	0.87	0	0	0	1.79
2002	131	23	2410	339.439	-426.385	D	7.639	7.639	0	3.4	98.7	0.49	0	0	0	0.38
2002	132	23	1242	327.988	-426.138	D	7.639	7.639	0	3.4	96.78	1.5	0	0	0	0.73
2002	133	23	1415	329.185	-425.086	D	7.646	7.639	0.007	3.4	97.14	2.26	0	0	0	0.62
2002	134	23	2588	318.452	-445.8	D	7.639	7.639	0	3.4	97.46	0.5	0	0	0	1.92
2002	135	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	98.6	0.25	0	0	0	0.98
2002	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	138	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	139	23	2704	329.056	-425.092	D	7.64	7.639	0.001	3.4	98.19	0.2	0	0	0	1.57
2002	140	23	2571	322.646	-445.476	D	7.644	7.639	0.005	3.4	98.54	0.28	0	0	0	1.19
2002	141	23	1	318.65	-445.782	D	7.639	7.639	0.001	3.4	99.32	0.11	0	0	0	0.83
2002	142	23	14	319.049	-443.516	D	7.639	7.639	0	3.4	99.46	0.1	0	0	0	0.55
2002	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	145	23	2694	327.861	-425.964	D	7.64	7.639	0.001	3.4	98.7	0.17	0	0	0	1.22
2002	146	23	2704	329.056	-425.092	D	7.646	7.639	0.007	3.4	98.47	0.65	0	0	0	0.9
2002	147	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	99.33	0.04	0	0	0	0.73
2002	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	156	23	1414	329.196	-425.335	D	7.639	7.639	0	3.4	96.16	0.08	0	0	0	0.84
2002	157	23	2694	327.861	-425.964	D	7.64	7.639	0.001	3.4	98.75	0.32	0	0	0	0.95
2002	158	23	2704	329.056	-425.092	D	7.64	7.639	0.001	3.4	99.05	0.05	0	0	0	0.95
2002	159	23	15	319.038	-443.267	D	7.639	7.639	0	3.4	101.78	0.03	0	0	0	0.47
2002	160	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	21.88	0	0	0	0	0.09
2002	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	164	23	2704	329.056	-425.092	D	7.639	7.639	0	3.4	95.29	0.01	0	0	0	0.71
2002	165	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	98.4	0.53	0	0	0	1.07
2002	166	23	2785	339.88	-426.232	D	7.64	7.639	0.001	3.4	95.35	0.7	0	0	0	4.01
2002	167	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	98.78	0.06	0	0	0	1.28
2002	168	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	98.74	0.11	0	0	0	1.19
2002	169	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	99.16	0.03	0	0	0	0.81
2002	170	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.7	0.03	0	0	0	0.64
2002	171	23	2041	333.901	-424.879	D	7.639	7.639	0	3.4	11.84	0	0	0	0	0.08
2002	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	179	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	98.6	0.07	0	0	0	0.89
2002	180	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	96.78	0.05	0	0	0	0.67
2002	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	192	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	98.96	0.28	0	0	0	0.81
2002	193	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.24	0.12	0	0	0	0.65
2002	194	23	2684	326.713	-427.014	D	7.641	7.639	0.002	3.4	99	0.41	0	0	0	0.61
2002	195	23	2588	318.452	-445.8	D	7.639	7.639	0.001	3.4	99.49	0.08	0	0	0	0.57
2002	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.28	0.33	0	0	0	0.59
2002	197	23	2588	318.452	-445.8	D	7.639	7.639	0	3.4	99.48	0.12	0	0	0	0.54
2002	198	23	1048	326.791	-427.189	D	7.639	7.639	0	3.4	99.27	0.02	0	0	0	0.57
2002	199	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	101.31	0.03	0	0	0	0.57
2002	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	204	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	116.13	0.01	0	0	0	1.24
2002	205	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.23	0.04	0	0	0	0.89
2002	206	23	2589	318.383	-445.593	D	7.64	7.639	0.001	3.4	99.16	0.14	0	0	0	0.69
2002	207	23	1242	327.988	-426.138	D	7.64	7.639	0.001	3.4	99.3	0.03	0	0	0	0.64
2002	208	23	2413	339.406	-425.637	D	7.639	7.639	0	3.4	99.59	0.03	0	0	0	0.54
2002	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	214	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	216	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	217	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	218	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	219	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	226	23	2758	335.862	-424.454	D	7.639	7.639	0	3.4	100.38	0.03	0	0	0	1.16
2002	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	236	23	2704	329.056	-425.092	D	7.642	7.639	0.003	3.4	99.06	0.04	0	0	0	0.96
2002	237	23	2789	340.496	-426.449	D	7.65	7.639	0.011	3.4	98.88	0.37	0	0	0	0.74
2002	238	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.37	0.06	0	0	0	0.65
2002	239	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	247	23	2781	339.842	-425.379	D	7.731	7.731	0	3.6	99.33	0.03	0	0	0	1.26
2002	248	23	2235	335.628	-424.554	D	7.731	7.731	0	3.6	98.74	0.03	0	0	0	0.9
2002	249	23	199	320.795	-437.944	D	7.731	7.731	0	3.6	98.3	0.01	0	0	0	0.71
2002	250	23	46	319.469	-441.749	D	7.731	7.731	0	3.6	70.9	0	0	0	0	0.48
2002	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	254	23	2789	340.496	-426.449	D	7.734	7.731	0.003	3.6	97.83	0.4	0	0	0	1.75

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	255	23	375	322.611	-445.359	D	7.731	7.731	0	3.6	98.51	0.05	0	0	0	1.17
2002	256	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	257	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	258	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	101.32	0.18	0	0	0	1.08
2002	259	23	2588	318.452	-445.8	D	7.732	7.731	0.001	3.6	98.87	0.13	0	0	0	0.95
2002	260	23	1	318.65	-445.782	D	7.739	7.731	0.008	3.6	99.08	0.19	0	0	0	0.72
2002	261	23	2789	340.496	-426.449	D	7.732	7.731	0.002	3.6	99.22	0.24	0	0	0	0.61
2002	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	265	23	2788	340.294	-426.448	D	7.731	7.731	0	3.6	97.95	0.14	0	0	0	1.25
2002	266	23	89	319.9	-440.231	D	7.731	7.731	0	3.6	95.84	0.08	0	0	0	1.63
2002	267	23	2684	326.713	-427.014	D	7.731	7.731	0	3.6	98.27	0.29	0	0	0	1.67
2002	268	23	2417	339.654	-425.626	D	7.731	7.731	0	3.6	98.01	0.24	0	0	0	1.14
2002	269	23	1242	327.988	-426.138	D	7.731	7.731	0	3.6	97.57	0.11	0	0	0	0.82
2002	270	23	2694	327.861	-425.964	D	7.731	7.731	0	3.6	98.41	0.05	0	0	0	1.37
2002	271	23	2694	327.861	-425.964	D	7.731	7.731	0	3.6	98.73	0.16	0	0	0	1.11
2002	272	23	1414	329.196	-425.335	D	7.731	7.731	0	3.6	96.11	0.03	0	0	0	0.57
2002	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	77.81	0	0	0	0	0.31
2002	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	278	23	16	319.027	-443.017	D	7.593	7.593	0.001	3.3	96	1.5	0	0	0	2.42
2002	279	23	2571	322.646	-445.476	D	7.593	7.593	0	3.3	98.87	0.22	0	0	0	1.02
2002	280	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	95	1.63	0	0	0	3.46
2002	281	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	283	23	2127	334.657	-425.096	D	7.593	7.593	0	3.3	103.84	0.67	0	0	0	0.66
2002	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	102.48	0.56	0	0	0	0.54
2002	285	23	1044	326.834	-428.186	D	7.593	7.593	0	3.3	84.83	3.39	0	0	0	1.5
2002	286	23	2589	318.383	-445.593	D	7.593	7.593	0	3.3	95.91	3.01	0	0	0	1.2
2002	287	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	288	23	2788	340.294	-426.448	D	7.593	7.593	0	3.3	94.09	1.06	0	0	0	4.63
2002	289	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	97.84	0.53	0	0	0	1.83
2002	290	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	77.36	0.03	0	0	0	1.02
2002	291	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	98.75	0.54	0	0	0	0.97
2002	292	23	2781	339.842	-425.379	D	7.594	7.593	0.001	3.3	95.9	2.63	0	0	0	1.46
2002	293	23	2588	318.452	-445.8	D	7.594	7.593	0.002	3.3	97.36	1.92	0	0	0	0.8

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	294	23	2589	318.383	-445.593	D	7.593	7.593	0	3.3	99.21	0.7	0	0	0	0.66
2002	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	99.63	0.42	0	0	0	0.55
2002	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	99.99	0.2	0	0	0	0.55
2002	297	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	298	23	2628	320.933	-436.998	D	7.597	7.593	0.004	3.3	95.81	2.87	0	0	0	1.34
2002	299	23	2789	340.496	-426.449	D	7.613	7.593	0.021	3.3	95.39	3.39	0	0	0	1.22
2002	300	23	2588	318.452	-445.8	D	7.604	7.593	0.011	3.3	97.41	1.69	0	0	0	0.92
2002	301	23	2628	320.933	-436.998	D	7.596	7.593	0.004	3.3	97.94	1.46	0	0	0	0.64
2002	302	23	2588	318.452	-445.8	D	7.595	7.593	0.003	3.3	98.29	1.18	0	0	0	0.59
2002	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	97.8	0.94	0	0	0	0.65
2002	304	23	2588	318.452	-445.8	D	7.594	7.593	0.001	3.3	94.66	4.25	0	0	0	1.11
2002	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2002	306	23	2704	329.056	-425.092	D	7.548	7.546	0.001	3.2	91.07	6.53	0	0	0	2.52
2002	307	23	2756	335.398	-424.515	D	7.546	7.546	0	3.2	95.31	3.92	0	0	0	1.08
2002	308	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	96.81	2.54	0	0	0	0.8
2002	309	23	2781	339.842	-425.379	D	7.547	7.546	0.001	3.2	97.12	2.4	0	0	0	0.66
2002	310	23	2789	340.496	-426.449	D	7.548	7.546	0.001	3.2	96.17	2.88	0	0	0	1.02
2002	311	23	2156	335.416	-431.058	D	7.546	7.546	0	3.2	92.28	0.82	0	0	0	0.77
2002	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	315	23	2781	339.842	-425.379	D	7.546	7.546	0	3.2	92.02	2.96	0	0	0	2.8
2002	316	23	2588	318.452	-445.8	D	7.548	7.546	0.002	3.2	89.56	6.93	0	0	0	3.64
2002	317	23	2414	339.687	-426.374	D	7.546	7.546	0	3.2	91.52	4.2	0	0	0	3.42
2002	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	319	23	9	319.103	-444.763	D	7.547	7.546	0.001	3.2	91.95	6.3	0	0	0	1.79
2002	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	104.25	6.13	0	0	0	3.92
2002	321	23	2781	339.842	-425.379	D	7.546	7.546	0	3.2	88.21	9.12	0	0	0	2.93
2002	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	323	23	2789	340.496	-426.449	D	7.55	7.546	0.004	3.2	89.8	6.5	0	0	0	3.73
2002	324	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	95.58	2.34	0	0	0	3.05
2002	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	326	23	2684	326.713	-427.014	D	7.546	7.546	0	3.2	89.67	6.17	0	0	0	4.12
2002	327	23	2758	335.862	-424.454	D	7.548	7.546	0.001	3.2	90.56	6.86	0	0	0	2.77
2002	328	23	1242	327.988	-426.138	D	7.546	7.546	0	3.2	97.71	2.84	0	0	0	1.98
2002	329	23	2571	322.646	-445.476	D	7.547	7.546	0	3.2	94.72	4.59	0	0	0	1.01
2002	330	23	1	318.65	-445.782	D	7.547	7.546	0	3.2	91.72	6.02	0	0	0	2.51
2002	331	23	2	318.639	-445.533	D	7.546	7.546	0	3.2	92.57	6.38	0	0	0	1.89
2002	332	23	1282	328.236	-426.127	D	7.546	7.546	0	3.2	95.34	3.63	0	0	0	1.39

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	333	23	2418	339.946	-426.612	D	7.546	7.546	0	3.2	99.88	2.43	0	0	0	1.29
2002	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	335	23	2307	336.654	-425.258	D	7.591	7.591	0	3.296	6.74	1.38	0	0	0	0.54
2002	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	2684	326.713	-427.014	D	7.593	7.593	0	3.3	87.32	10.14	0	0	0	2.79
2002	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	2628	320.933	-436.998	D	7.593	7.593	0	3.3	83.33	9.63	0	0	0	2.83
2002	340	23	1	318.65	-445.782	D	7.594	7.593	0.001	3.3	88.23	9.23	0	0	0	2.57
2002	341	23	1864	333.097	-434.906	D	7.593	7.593	0	3.3	95.74	5.24	0	0	0	1.74
2002	342	23	2758	335.862	-424.454	D	7.593	7.593	0	3.3	93.96	3.53	0	0	0	1.13
2002	343	23	1415	329.185	-425.086	D	7.594	7.593	0.001	3.3	95.6	3.61	0	0	0	0.91
2002	344	23	2684	326.713	-427.014	D	7.593	7.593	0	3.3	96.75	2.84	0	0	0	0.65
2002	345	23	1415	329.185	-425.086	D	7.593	7.593	0	3.3	97.22	2.39	0	0	0	0.56
2002	346	23	1351	328.744	-426.354	D	7.593	7.593	0	3.3	96.53	1.86	0	0	0	0.54
2002	347	23	2589	318.383	-445.593	D	7.593	7.593	0.001	3.3	96.88	2.36	0	0	0	0.95
2002	348	23	2588	318.452	-445.8	D	7.6	7.593	0.007	3.3	95.06	3.65	0	0	0	1.31
2002	349	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	97.27	1.97	0	0	0	0.96
2002	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	2235	335.628	-424.554	D	7.593	7.593	0.001	3.3	80.53	13.8	0	0	0	5.58
2002	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	89.25	8.84	0	0	0	2.14
2002	358	23	1	318.65	-445.782	D	7.593	7.593	0.001	3.3	89.51	8.94	0	0	0	1.47
2002	359	23	2588	318.452	-445.8	D	7.593	7.593	0.001	3.3	87.16	9.84	0	0	0	3.09
2002	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	2706	329.518	-425.046	D	7.593	7.593	0.001	3.3	93.38	5.3	0	0	0	1.35
									0.025							
TRIGEN KC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	2628	320.933	-436.998	D	7.6	7.593	0.007	3.3	88.06	11.53	0	0	0	0.42

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	2	23	2749	333.775	-424.726	D	7.632	7.593	0.04	3.3	92.19	7.5	0	0	0	0.31
2002	3	23	2789	340.496	-426.449	D	7.606	7.593	0.014	3.3	93.94	5.81	0	0	0	0.25
2002	4	23	2789	340.496	-426.449	D	7.596	7.593	0.003	3.3	95.82	4.08	0	0	0	0.13
2002	5	23	2409	339.158	-425.648	D	7.593	7.593	0	3.3	81.94	2.85	0	0	0	0.06
2002	6	23	2781	339.842	-425.379	D	7.603	7.593	0.011	3.3	95.9	3.93	0	0	0	0.18
2002	7	23	2429	338.563	-428.651	D	7.61	7.593	0.017	3.3	92.5	7.09	0	0	0	0.41
2002	8	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	92.16	7.68	0	0	0	0.24
2002	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	2704	329.056	-425.092	D	7.6	7.593	0.007	3.3	97.53	2.31	0	0	0	0.16
2002	11	23	2686	327.19	-427.108	D	7.611	7.593	0.018	3.3	86.45	12.81	0	0	0	0.73
2002	12	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	95.06	4.73	0	0	0	0.25
2002	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	2397	338.413	-425.68	D	7.593	7.593	0	3.3	88.32	5.56	0	0	0	0.2
2002	17	23	2589	318.383	-445.593	D	7.602	7.593	0.009	3.3	89.96	9.59	0	0	0	0.47
2002	18	23	2694	327.861	-425.964	D	7.593	7.593	0.001	3.3	94.67	5.36	0	0	0	0.13
2002	19	23	2694	327.861	-425.964	D	7.599	7.593	0.007	3.3	96.48	3.4	0	0	0	0.14
2002	20	23	2758	335.862	-424.454	D	7.654	7.593	0.061	3.3	95.42	4.46	0	0	0	0.12
2002	21	23	2154	334.894	-424.836	D	7.593	7.593	0	3.3	96.22	2.56	0	0	0	0.05
2002	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	2600	318.952	-443.12	D	7.596	7.593	0.004	3.3	95.71	4.16	0	0	0	0.12
2002	25	23	2578	320.919	-445.61	D	7.598	7.593	0.006	3.3	93.61	6.11	0	0	0	0.27
2002	26	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	97.78	2.34	0	0	0	0.16
2002	27	23	2301	336.719	-426.754	D	7.593	7.593	0	3.3	91.7	1.28	0	0	0	0.11
2002	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	2704	329.056	-425.092	D	7.593	7.593	0.001	3.3	95.41	4.49	0	0	0	0.16
2002	30	23	2704	329.056	-425.092	D	7.643	7.593	0.05	3.3	95.8	4.09	0	0	0	0.11
2002	31	23	2589	318.383	-445.593	D	7.654	7.593	0.061	3.3	97.58	2.36	0	0	0	0.06
2002	32	23	2781	339.842	-425.379	D	7.461	7.459	0.003	3.013	97.68	2.27	0	0	0	0.03
2002	33	23	2789	340.496	-426.449	D	7.453	7.453	0	3	97.43	2.55	0	0	0	0.21
2002	34	23	2789	340.496	-426.449	D	7.453	7.453	0.001	3	97.96	2.27	0	0	0	0.13
2002	35	23	2704	329.056	-425.092	D	7.455	7.453	0.002	3	78.77	20.07	0	0	0	1.19
2002	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	101.9	5.41	0	0	0	0.23
2002	37	23	234	321.01	-437.185	D	7.453	7.453	0	3	97.23	3.65	0	0	0	0.12
2002	38	23	2781	339.842	-425.379	D	7.455	7.453	0.003	3	97.32	2.7	0	0	0	0.15
2002	39	23	2789	340.496	-426.449	D	7.455	7.453	0.002	3	97.85	2.17	0	0	0	0.1
2002	40	23	2128	334.646	-424.846	D	7.453	7.453	0	3	99.04	1.22	0	0	0	0.04

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	41	23	2781	339.842	-425.379	D	7.453	7.453	0	3	97.98	2.59	0	0	0	0.25
2002	42	23	2789	340.496	-426.449	D	7.456	7.453	0.003	3	94.55	5.14	0	0	0	0.36
2002	43	23	2758	335.862	-424.454	D	7.456	7.453	0.003	3	95.67	4.06	0	0	0	0.32
2002	44	23	2589	318.383	-445.593	D	7.455	7.453	0.002	3	94.58	5.12	0	0	0	0.31
2002	45	23	2704	329.056	-425.092	D	7.456	7.453	0.004	3	93.25	6.55	0	0	0	0.26
2002	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	1979	333.536	-427.893	D	7.459	7.453	0.006	3	91.92	7.44	0	0	0	0.68
2002	49	23	2064	334.259	-427.361	D	7.455	7.453	0.002	3	96.77	3.03	0	0	0	0.21
2002	50	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	2589	318.383	-445.593	D	7.454	7.453	0.001	3	88.4	10.84	0	0	0	0.9
2002	54	23	2628	320.933	-436.998	D	7.457	7.453	0.004	3	95.39	4.43	0	0	0	0.24
2002	55	23	2789	340.496	-426.449	D	7.453	7.453	0.001	3	97.89	2.16	0	0	0	0.12
2002	56	23	2588	318.452	-445.8	D	7.459	7.453	0.006	3	93.58	6.18	0	0	0	0.27
2002	57	23	1415	329.185	-425.086	D	7.456	7.453	0.003	3	90.78	8.71	0	0	0	0.51
2002	58	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2002	61	23	2781	339.842	-425.379	D	7.325	7.311	0.015	2.7	95.67	4.13	0	0	0	0.23
2002	62	23	2789	340.496	-426.449	D	7.311	7.311	0.001	2.7	96.82	2.99	0	0	0	0.21
2002	63	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	2789	340.496	-426.449	D	7.312	7.311	0.002	2.7	94.78	5.04	0	0	0	0.21
2002	71	23	168	320.568	-438.453	D	7.311	7.311	0	2.7	99.61	0.47	0	0	0	0.29
2002	72	23	2789	340.496	-426.449	D	7.319	7.311	0.009	2.7	97.84	1.99	0	0	0	0.18
2002	73	23	2780	339.614	-425.419	D	7.311	7.311	0	2.7	99.39	0.39	0	0	0	0.09
2002	74	23	2600	318.952	-443.12	D	7.315	7.311	0.005	2.7	95.02	4.79	0	0	0	0.22
2002	75	23	2571	322.646	-445.476	D	7.312	7.311	0.001	2.7	97.19	2.73	0	0	0	0.16
2002	76	23	2789	340.496	-426.449	D	7.311	7.311	0	2.7	98.16	2.14	0	0	0	0.04
2002	77	23	2327	337.259	-427.729	D	7.311	7.311	0	2.7	110.97	0.74	0	0	0	0.1
2002	78	23	2406	339.19	-426.396	D	7.311	7.311	0	2.7	99.52	1.24	0	0	0	0.03
2002	79	23	16	319.027	-443.017	D	7.311	7.311	0	2.7	97.55	2.78	0	0	0	0.08

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	80	23	2586	318.945	-445.762	D	7.316	7.311	0.005	2.7	95.31	4.38	0	0	0	0.31
2002	81	23	2684	326.713	-427.014	D	7.312	7.311	0.002	2.7	91.46	8.27	0	0	0	0.46
2002	82	23	2704	329.056	-425.092	D	7.316	7.311	0.006	2.7	93.69	6.14	0	0	0	0.21
2002	83	23	2417	339.654	-425.626	D	7.311	7.311	0	2.7	98.2	1.46	0	0	0	0.09
2002	84	23	1415	329.185	-425.086	D	7.311	7.311	0	2.7	98.48	2.16	0	0	0	0.05
2002	85	23	2787	340.091	-426.447	D	7.312	7.311	0.001	2.7	98.21	1.8	0	0	0	0.03
2002	86	23	2684	326.713	-427.014	D	7.32	7.311	0.009	2.7	97.46	2.42	0	0	0	0.13
2002	87	23	2626	320.826	-437.417	D	7.311	7.311	0	2.7	99.28	0.39	0	0	0	0.11
2002	88	23	2684	326.713	-427.014	D	7.315	7.311	0.005	2.7	99.71	0.2	0	0	0	0.11
2002	89	23	2588	318.452	-445.8	D	7.314	7.311	0.004	2.7	99.62	0.3	0	0	0	0.08
2002	90	23	1415	329.185	-425.086	D	7.311	7.311	0	2.7	99.47	0.35	0	0	0	0.32
2002	91	23	2781	339.842	-425.379	D	7.363	7.356	0.006	2.796	98.55	1.25	0	0	0	0.22
2002	92	23	2789	340.496	-426.449	D	7.377	7.358	0.019	2.8	98.79	1.04	0	0	0	0.17
2002	93	23	2571	322.646	-445.476	D	7.36	7.358	0.002	2.8	99.19	0.72	0	0	0	0.1
2002	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	96	23	2780	339.614	-425.419	D	7.359	7.358	0.001	2.8	99.25	0.72	0	0	0	0.12
2002	97	23	2789	340.496	-426.449	D	7.359	7.358	0	2.8	99.23	0.54	0	0	0	0.08
2002	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	99	23	2589	318.383	-445.593	D	7.4	7.358	0.041	2.8	97.76	2.12	0	0	0	0.12
2002	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	103	23	2758	335.862	-424.454	D	7.359	7.358	0.001	2.8	97.77	2.13	0	0	0	0.12
2002	104	23	1415	329.185	-425.086	D	7.358	7.358	0	2.8	99.7	0.18	0	0	0	0.08
2002	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	110	23	2694	327.861	-425.964	D	7.359	7.358	0	2.8	99.34	1.07	0	0	0	0.12
2002	111	23	2758	335.862	-424.454	D	7.362	7.358	0.004	2.8	99.01	0.96	0	0	0	0.1
2002	112	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	104.54	0.34	0	0	0	0.22
2002	113	23	2468	334.002	-434.887	D	7.364	7.358	0.006	2.8	99.62	0.26	0	0	0	0.12
2002	114	23	2758	335.862	-424.454	D	7.358	7.358	0	2.8	100.14	0.67	0	0	0	0.24
2002	115	23	2684	326.713	-427.014	D	7.36	7.358	0.001	2.8	98.84	0.95	0	0	0	0.25
2002	116	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	119	23	2758	335.862	-424.454	D	7.369	7.358	0.011	2.8	99.36	0.46	0	0	0	0.18
2002	120	23	2781	339.842	-425.379	D	7.361	7.358	0.003	2.8	99.87	0.11	0	0	0	0.1
2002	121	23	1517	329.93	-425.053	D	7.627	7.627	0	3.375	95.95	0.21	0	0	0	0.05
2002	122	23	2468	334.002	-434.887	D	7.684	7.639	0.045	3.4	98.26	1.66	0	0	0	0.09
2002	123	23	2588	318.452	-445.8	D	7.664	7.639	0.025	3.4	99.66	0.3	0	0	0	0.05
2002	124	23	2588	318.452	-445.8	D	7.675	7.639	0.036	3.4	99.45	0.52	0	0	0	0.04
2002	125	23	2571	322.646	-445.476	D	7.658	7.639	0.019	3.4	99.76	0.21	0	0	0	0.03
2002	126	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	100.01	0.03	0	0	0	0.02
2002	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	129	23	2628	320.933	-436.998	D	7.64	7.639	0.001	3.4	94.84	4.94	0	0	0	0.3
2002	130	23	2684	326.713	-427.014	D	7.64	7.639	0.001	3.4	99.34	0.59	0	0	0	0.14
2002	131	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.57	0.4	0	0	0	0.04
2002	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	133	23	2706	329.518	-425.046	D	7.651	7.639	0.013	3.4	98.06	1.88	0	0	0	0.06
2002	134	23	1	318.65	-445.782	D	7.641	7.639	0.002	3.4	99.41	0.38	0	0	0	0.2
2002	135	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	99.71	0.22	0	0	0	0.1
2002	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.05	0.69	0	0	0	0.07
2002	138	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	139	23	2684	326.713	-427.014	D	7.647	7.639	0.009	3.4	99.66	0.19	0	0	0	0.15
2002	140	23	2789	340.496	-426.449	D	7.669	7.639	0.03	3.4	98.97	0.88	0	0	0	0.15
2002	141	23	2588	318.452	-445.8	D	7.65	7.639	0.011	3.4	99.73	0.18	0	0	0	0.1
2002	142	23	2627	320.879	-437.207	D	7.643	7.639	0.004	3.4	99.81	0.13	0	0	0	0.06
2002	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	145	23	2704	329.056	-425.092	D	7.66	7.639	0.021	3.4	99.72	0.2	0	0	0	0.09
2002	146	23	2789	340.496	-426.449	D	7.654	7.639	0.015	3.4	99.65	0.3	0	0	0	0.06
2002	147	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.91	0.19	0	0	0	0.04
2002	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	156	23	2704	329.056	-425.092	D	7.639	7.639	0	3.4	99.42	0.1	0	0	0	0.09
2002	157	23	2684	326.713	-427.014	D	7.645	7.639	0.006	3.4	99.35	0.58	0	0	0	0.07

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	158	23	2628	320.933	-436.998	D	7.64	7.639	0.001	3.4	100.05	0.03	0	0	0	0.08
2002	159	23	2623	320.666	-438.044	D	7.639	7.639	0	3.4	99.74	0.02	0	0	0	0.04
2002	160	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	102.58	0	0	0	0	0.04
2002	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	164	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.9	0.01	0	0	0	0.05
2002	165	23	2710	330.44	-424.955	D	7.663	7.639	0.024	3.4	99.49	0.43	0	0	0	0.08
2002	166	23	2776	338.702	-425.583	D	7.641	7.639	0.002	3.4	97.8	1.5	0	0	0	0.78
2002	167	23	2571	322.646	-445.476	D	7.64	7.639	0.001	3.4	99.85	0.05	0	0	0	0.11
2002	168	23	2781	339.842	-425.379	D	7.652	7.639	0.013	3.4	99.79	0.11	0	0	0	0.11
2002	169	23	2789	340.496	-426.449	D	7.652	7.639	0.013	3.4	99.91	0.03	0	0	0	0.07
2002	170	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	99.93	0.04	0	0	0	0.06
2002	171	23	946	326.21	-430.962	D	7.639	7.639	0	3.4	83.61	0.01	0	0	0	0.05
2002	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	179	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	100.03	0.02	0	0	0	0.08
2002	180	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.88	0.03	0	0	0	0.07
2002	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	192	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.75	0.21	0	0	0	0.08
2002	193	23	2789	340.496	-426.449	D	7.647	7.639	0.008	3.4	99.86	0.09	0	0	0	0.06
2002	194	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.66	0.34	0	0	0	0.04
2002	195	23	2576	321.413	-445.571	D	7.64	7.639	0.001	3.4	99.89	0.06	0	0	0	0.04
2002	196	23	201	321.37	-445.413	D	7.639	7.639	0	3.4	100.08	0.12	0	0	0	0.04

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	197	23	2350	337.8	-428.705	D	7.639	7.639	0	3.4	99.97	0.02	0	0	0	0.04
2002	198	23	2278	336.558	-428.759	D	7.639	7.639	0	3.4	98.91	0.03	0	0	0	0.04
2002	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	204	23	2758	335.862	-424.454	D	7.642	7.639	0.003	3.4	99.85	0.03	0	0	0	0.08
2002	205	23	2571	322.646	-445.476	D	7.65	7.639	0.011	3.4	99.87	0.07	0	0	0	0.06
2002	206	23	2588	318.452	-445.8	D	7.643	7.639	0.004	3.4	99.91	0.06	0	0	0	0.05
2002	207	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	99.93	0.02	0	0	0	0.05
2002	208	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	100.05	0.02	0	0	0	0.04
2002	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	214	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	216	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	217	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	218	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	96.54	0.07	0	0	0	0.08
2002	219	23	2684	326.713	-427.014	D	7.639	7.639	0	3.4	100.03	0.06	0	0	0	0.07
2002	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	236	23	2781	339.842	-425.379	D	7.686	7.639	0.047	3.4	99.84	0.07	0	0	0	0.1
2002	237	23	2468	334.002	-434.887	D	7.658	7.639	0.019	3.4	99.81	0.13	0	0	0	0.07
2002	238	23	114	320.625	-445.446	D	7.639	7.639	0	3.4	88.05	0.05	0	0	0	0.03
2002	239	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	247	23	2757	335.63	-424.484	D	7.731	7.731	0	3.6	99.8	0.01	0	0	0	0.13
2002	248	23	2783	339.861	-425.806	D	7.731	7.731	0.001	3.6	99.82	0.01	0	0	0	0.08
2002	249	23	2588	318.452	-445.8	D	7.731	7.731	0	3.6	99.83	0.01	0	0	0	0.06
2002	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	34.44	0	0	0	0	0.02
2002	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	254	23	2789	340.496	-426.449	D	7.737	7.731	0.007	3.6	99.16	0.63	0	0	0	0.2
2002	255	23	2571	322.646	-445.476	D	7.731	7.731	0	3.6	99.32	0.01	0	0	0	0.12
2002	256	23	2589	318.383	-445.593	D	7.731	7.731	0.001	3.6	99.88	0.02	0	0	0	0.08
2002	257	23	2694	327.861	-425.964	D	7.731	7.731	0	3.6	99.29	0.03	0	0	0	0.06
2002	258	23	2684	326.713	-427.014	D	7.742	7.731	0.012	3.6	99.79	0.12	0	0	0	0.09
2002	259	23	2586	318.945	-445.762	D	7.777	7.731	0.047	3.6	99.72	0.21	0	0	0	0.07
2002	260	23	2758	335.862	-424.454	D	7.77	7.731	0.039	3.6	99.8	0.14	0	0	0	0.06
2002	261	23	2781	339.842	-425.379	D	7.732	7.731	0.001	3.6	99.85	0.14	0	0	0	0.05
2002	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	265	23	2589	318.383	-445.593	D	7.738	7.731	0.007	3.6	99.63	0.26	0	0	0	0.12
2002	266	23	2684	326.713	-427.014	D	7.731	7.731	0	3.6	99.68	0.15	0	0	0	0.22
2002	267	23	2758	335.862	-424.454	D	7.732	7.731	0.001	3.6	99.48	0.27	0	0	0	0.15
2002	268	23	2781	339.842	-425.379	D	7.733	7.731	0.002	3.6	99.7	0.17	0	0	0	0.09
2002	269	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	270	23	2684	326.713	-427.014	D	7.737	7.731	0.006	3.6	99.83	0.03	0	0	0	0.14
2002	271	23	2704	329.056	-425.092	D	7.75	7.731	0.019	3.6	99.78	0.12	0	0	0	0.1
2002	272	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	278	23	2588	318.452	-445.8	D	7.594	7.593	0.002	3.3	97.23	2.49	0	0	0	0.36
2002	279	23	2571	322.646	-445.476	D	7.597	7.593	0.004	3.3	99.67	0.23	0	0	0	0.14
2002	280	23	2684	326.713	-427.014	D	7.599	7.593	0.007	3.3	97.77	1.77	0	0	0	0.48
2002	281	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	283	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	99.3	0.39	0	0	0	0.05
2002	284	23	1951	333.842	-434.874	D	7.593	7.593	0	3.3	99.75	0.32	0	0	0	0.04
2002	285	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	286	23	2628	320.933	-436.998	D	7.603	7.593	0.011	3.3	98.06	1.84	0	0	0	0.1
2002	287	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	288	23	2571	322.646	-445.476	D	7.595	7.593	0.002	3.3	98.88	0.79	0	0	0	0.38
2002	289	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	97.44	0.25	0	0	0	0.11
2002	290	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	99.53	0.19	0	0	0	0.13
2002	291	23	2571	322.646	-445.476	D	7.597	7.593	0.004	3.3	99.65	0.28	0	0	0	0.09
2002	292	23	2704	329.056	-425.092	D	7.597	7.593	0.004	3.3	95.36	4.47	0	0	0	0.16
2002	293	23	1	318.65	-445.782	D	7.604	7.593	0.012	3.3	97.96	1.96	0	0	0	0.07
2002	294	23	2588	318.452	-445.8	D	7.595	7.593	0.003	3.3	99.31	0.68	0	0	0	0.06
2002	295	23	2588	318.452	-445.8	D	7.595	7.593	0.002	3.3	99.57	0.44	0	0	0	0.04
2002	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	100.15	0.25	0	0	0	0.04
2002	297	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	298	23	2704	329.056	-425.092	D	7.606	7.593	0.013	3.3	96.85	3.01	0	0	0	0.15
2002	299	23	2789	340.496	-426.449	D	7.648	7.593	0.055	3.3	96.92	2.96	0	0	0	0.12
2002	300	23	2588	318.452	-445.8	D	7.624	7.593	0.031	3.3	97.48	2.42	0	0	0	0.11
2002	301	23	2628	320.933	-436.998	D	7.607	7.593	0.015	3.3	98.86	1.09	0	0	0	0.06
2002	302	23	2588	318.452	-445.8	D	7.606	7.593	0.013	3.3	99.07	0.87	0	0	0	0.05
2002	303	23	2588	318.452	-445.8	D	7.604	7.593	0.011	3.3	99.07	0.85	0	0	0	0.09
2002	304	23	2588	318.452	-445.8	D	7.627	7.593	0.034	3.3	97.01	2.9	0	0	0	0.09
2002	305	23	2588	318.452	-445.8	D	7.548	7.548	0	3.204	96.89	2.54	0	0	0	0.13
2002	306	23	2758	335.862	-424.454	D	7.554	7.546	0.007	3.2	95.79	4	0	0	0	0.23
2002	307	23	2758	335.862	-424.454	D	7.547	7.546	0	3.2	97.95	2.29	0	0	0	0.08
2002	308	23	2781	339.842	-425.379	D	7.551	7.546	0.005	3.2	97.81	2.11	0	0	0	0.1
2002	309	23	2781	339.842	-425.379	D	7.553	7.546	0.007	3.2	98.32	1.64	0	0	0	0.06
2002	310	23	2781	339.842	-425.379	D	7.566	7.546	0.02	3.2	97.42	2.5	0	0	0	0.09
2002	311	23	2787	340.091	-426.447	D	7.546	7.546	0	3.2	98.79	0.39	0	0	0	0.06
2002	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	314	23	2781	339.842	-425.379	D	7.546	7.546	0	3.2	99.3	0.48	0	0	0	0.35
2002	315	23	2781	339.842	-425.379	D	7.547	7.546	0.001	3.2	92.14	7.26	0	0	0	0.71
2002	316	23	2781	339.842	-425.379	D	7.553	7.546	0.006	3.2	94.26	5.39	0	0	0	0.36
2002	317	23	2789	340.496	-426.449	D	7.55	7.546	0.004	3.2	95.1	4.6	0	0	0	0.32
2002	318	23	2418	339.946	-426.612	D	7.546	7.546	0	3.2	95.35	1.09	0	0	0	0.18
2002	319	23	2788	340.294	-426.448	D	7.548	7.546	0.002	3.2	94.75	5.13	0	0	0	0.17
2002	320	23	2589	318.383	-445.593	D	7.546	7.546	0	3.2	95.06	5.08	0	0	0	0.33
2002	321	23	2789	340.496	-426.449	D	7.55	7.546	0.003	3.2	93.29	6.43	0	0	0	0.3
2002	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	323	23	2789	340.496	-426.449	D	7.548	7.546	0.002	3.2	94.29	5.52	0	0	0	0.25
2002	324	23	2468	334.002	-434.887	D	7.546	7.546	0	3.2	99.45	1.81	0	0	0	0.23
2002	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	326	23	2753	334.703	-424.605	D	7.55	7.546	0.004	3.2	95.05	4.51	0	0	0	0.44
2002	327	23	2571	322.646	-445.476	D	7.549	7.546	0.003	3.2	95.31	4.5	0	0	0	0.23
2002	328	23	2694	327.861	-425.964	D	7.546	7.546	0	3.2	99.83	1.69	0	0	0	0.15
2002	329	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	97.34	2.72	0	0	0	0.08
2002	330	23	2589	318.383	-445.593	D	7.548	7.546	0.002	3.2	96.04	3.81	0	0	0	0.22
2002	331	23	2589	318.383	-445.593	D	7.548	7.546	0.002	3.2	95.93	4.01	0	0	0	0.16
2002	332	23	2628	320.933	-436.998	D	7.562	7.546	0.015	3.2	95.59	4.27	0	0	0	0.15
2002	333	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	98.58	1.55	0	0	0	0.11
2002	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	335	23	2781	339.842	-425.379	D	7.591	7.591	0.001	3.296	81.37	17.82	0	0	0	1.07
2002	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	2589	318.383	-445.593	D	7.608	7.593	0.015	3.3	94.28	5.49	0	0	0	0.24
2002	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	87.66	5.57	0	0	0	0.1
2002	339	23	2628	320.933	-436.998	D	7.593	7.593	0	3.3	92.31	6.93	0	0	0	0.26
2002	340	23	2781	339.842	-425.379	D	7.599	7.593	0.006	3.3	93.77	6	0	0	0	0.22
2002	341	23	2467	334.065	-434.651	D	7.593	7.593	0	3.3	95.46	3.98	0	0	0	0.13
2002	342	23	2758	335.862	-424.454	D	7.593	7.593	0	3.3	97.73	2.21	0	0	0	0.09
2002	343	23	2694	327.861	-425.964	D	7.602	7.593	0.009	3.3	97.69	2.26	0	0	0	0.07
2002	344	23	2684	326.713	-427.014	D	7.596	7.593	0.003	3.3	98.27	1.75	0	0	0	0.05
2002	345	23	1415	329.185	-425.086	D	7.595	7.593	0.002	3.3	98.49	1.49	0	0	0	0.04
2002	346	23	2154	334.894	-424.836	D	7.593	7.593	0	3.3	98.47	1.26	0	0	0	0.04
2002	347	23	2589	318.383	-445.593	D	7.598	7.593	0.006	3.3	97.51	2.39	0	0	0	0.09
2002	348	23	2588	318.452	-445.8	D	7.626	7.593	0.034	3.3	96.4	3.46	0	0	0	0.15
2002	349	23	2183	335.664	-431.047	D	7.593	7.593	0	3.3	90.94	1.28	0	0	0	0.06
2002	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	353	23	2758	335.862	-424.454	D	7.6	7.593	0.008	3.3	94.43	5.3	0	0	0	0.28
2002	354	23	2468	334.002	-434.887	D	7.593	7.593	0	3.3	94.57	5.09	0	0	0	0.17
2002	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	2588	318.452	-445.8	D	7.596	7.593	0.004	3.3	90.91	8.81	0	0	0	0.3
2002	357	23	2571	322.646	-445.476	D	7.595	7.593	0.003	3.3	94.29	5.53	0	0	0	0.16
2002	358	23	2571	322.646	-445.476	D	7.599	7.593	0.007	3.3	94.17	5.72	0	0	0	0.12
2002	359	23	2589	318.383	-445.593	D	7.595	7.593	0.003	3.3	93.86	5.91	0	0	0	0.2
2002	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	2788	340.294	-426.448	D	7.593	7.593	0	3.3	98.37	3.39	0	0	0	0.09
2002	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	2704	329.056	-425.092	D	7.595	7.593	0.002	3.3	94.73	5.13	0	0	0	0.16
									0.061							
UMC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	2	23	2789	340.496	-426.449	D	7.596	7.593	0.003	3.3	77.58	22.41	0	0	0	0.05
2002	3	23	2789	340.496	-426.449	D	7.601	7.593	0.009	3.3	80.08	19.88	0	0	0	0.03
2002	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	2789	340.496	-426.449	D	7.701	7.593	0.108	3.3	92.81	7.16	0	0	0	0.03
2002	11	23	2571	322.646	-445.476	D	7.597	7.593	0.004	3.3	93.77	6.2	0	0	0	0.02
2002	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	2789	340.496	-426.449	D	7.613	7.593	0.021	3.3	82.44	17.54	0	0	0	0.03
2002	18	23	2789	340.496	-426.449	D	7.653	7.593	0.06	3.3	85.11	14.86	0	0	0	0.03
2002	19	23	2684	326.713	-427.014	D	7.642	7.593	0.049	3.3	93.12	6.87	0	0	0	0.02
2002	20	23	2789	340.496	-426.449	D	7.684	7.593	0.092	3.3	94.17	5.82	0	0	0	0.01
2002	21	23	2781	339.842	-425.379	D	7.594	7.593	0.001	3.3	95.32	4.66	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	25	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	26	23	2468	334.002	-434.887	D	7.593	7.593	0.001	3.3	98.59	1.51	0	0	0	0.01
2002	27	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	97.89	2.13	0	0	0	0.01
2002	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	30	23	2758	335.862	-424.454	D	7.817	7.593	0.224	3.3	91.93	8.05	0	0	0	0.02
2002	31	23	2704	329.056	-425.092	D	8.29	7.593	**0.697**	3.3	93.77	6.22	0	0	0	0.01
2002	32	23	2789	340.496	-426.449	D	7.463	7.459	0.004	3.013	95.05	4.96	0	0	0	0
2002	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	35	23	2789	340.496	-426.449	D	7.453	7.453	0	3	88.25	11.95	0	0	0	0.05
2002	36	23	2704	329.056	-425.092	D	7.477	7.453	0.024	3	86.59	13.4	0	0	0	0.03
2002	37	23	47	319.458	-441.5	D	7.453	7.453	0.001	3	93.21	7.02	0	0	0	0.01
2002	38	23	2789	340.496	-426.449	D	7.456	7.453	0.003	3	93.69	6.37	0	0	0	0.02
2002	39	23	375	322.611	-445.359	D	7.453	7.453	0.001	3	97.05	3.24	0	0	0	0.01
2002	40	23	2781	339.842	-425.379	D	7.453	7.453	0	3	97.51	3	0	0	0	0.01
2002	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	42	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	43	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	44	23	2789	340.496	-426.449	D	7.465	7.453	0.012	3	74.99	24.92	0	0	0	0.1
2002	45	23	2571	322.646	-445.476	D	7.455	7.453	0.002	3	94.77	5.25	0	0	0	0.03
2002	46	23	2789	340.496	-426.449	D	7.457	7.453	0.005	3	93.58	6.42	0	0	0	0.02
2002	47	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	2789	340.496	-426.449	D	7.454	7.453	0.001	3	96.57	3.47	0	0	0	0.06
2002	49	23	2789	340.496	-426.449	D	7.469	7.453	0.017	3	92.18	7.81	0	0	0	0.03
2002	50	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	2789	340.496	-426.449	D	7.454	7.453	0.001	3	91.52	8.49	0	0	0	0.05
2002	54	23	2789	340.496	-426.449	D	7.459	7.453	0.006	3	91.93	8.07	0	0	0	0.03
2002	55	23	2789	340.496	-426.449	D	7.454	7.453	0.002	3	95.26	4.82	0	0	0	0.02
2002	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	57	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	58	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	61	23	2588	318.452	-445.8	D	7.344	7.311	0.033	2.7	90.7	9.28	0	0	0	0.02
2002	62	23	2571	322.646	-445.476	D	7.311	7.311	0	2.7	95.31	4.58	0	0	0	0
2002	63	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	75	23	2704	329.056	-425.092	D	7.335	7.311	0.024	2.7	71.77	28.11	0	0	0	0.12
2002	76	23	2694	327.861	-425.964	D	7.357	7.311	0.046	2.7	96.31	3.68	0	0	0	0.01
2002	77	23	2758	335.862	-424.454	D	7.317	7.311	0.007	2.7	96.2	3.81	0	0	0	0.02
2002	78	23	2781	339.842	-425.379	D	7.319	7.311	0.008	2.7	97.7	2.31	0	0	0	0.01
2002	79	23	2704	329.056	-425.092	D	7.52	7.311	0.209	2.7	93.88	6.1	0	0	0	0.02
2002	80	23	2789	340.496	-426.449	D	7.351	7.311	0.041	2.7	94.14	5.84	0	0	0	0.02
2002	81	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	82	23	2418	339.946	-426.612	D	7.311	7.311	0	2.7	96.45	3.85	0	0	0	0.02
2002	83	23	2788	340.294	-426.448	D	7.311	7.311	0	2.7	96.34	3.39	0	0	0	0.01
2002	84	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	107.85	2.9	0	0	0	0.01
2002	85	23	2684	326.713	-427.014	D	7.436	7.311	0.125	2.7	92.9	7.07	0	0	0	0.03
2002	86	23	2468	334.002	-434.887	D	7.315	7.311	0.004	2.7	99.08	0.93	0	0	0	0.02
2002	87	23	2789	340.496	-426.449	D	7.345	7.311	0.034	2.7	97.71	2.28	0	0	0	0.01
2002	88	23	2789	340.496	-426.449	D	7.397	7.311	0.087	2.7	99.13	0.85	0	0	0	0.02
2002	89	23	2571	322.646	-445.476	D	7.324	7.311	0.014	2.7	96.37	3.62	0	0	0	0.02
2002	90	23	2704	329.056	-425.092	D	7.312	7.311	0.002	2.7	99.33	0.67	0	0	0	0.04
2002	91	23	2758	335.862	-424.454	D	7.403	7.356	0.047	2.796	95.98	4	0	0	0	0.03
2002	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	94	23	2789	340.496	-426.449	D	7.368	7.358	0.01	2.8	94.26	5.73	0	0	0	0.03
2002	95	23	2781	339.842	-425.379	D	7.384	7.358	0.025	2.8	96.81	3.18	0	0	0	0.02
2002	96	23	2789	340.496	-426.449	D	7.445	7.358	0.087	2.8	98.6	1.39	0	0	0	0.01
2002	97	23	2781	339.842	-425.379	D	7.372	7.358	0.014	2.8	99.22	0.77	0	0	0	0.01
2002	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	99	23	2789	340.496	-426.449	D	7.368	7.358	0.009	2.8	99.41	0.57	0	0	0	0.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	100	23	2694	327.861	-425.964	D	7.415	7.358	0.057	2.8	99	0.99	0	0	0	0.02
2002	101	23	2589	318.383	-445.593	D	7.372	7.358	0.014	2.8	99.24	0.77	0	0	0	0.01
2002	102	23	2401	338.661	-425.669	D	7.358	7.358	0	2.8	99.67	0.09	0	0	0	0.01
2002	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	113	23	2788	340.294	-426.448	D	7.359	7.358	0	2.8	100.3	0.25	0	0	0	0.01
2002	114	23	2412	339.417	-425.886	D	7.358	7.358	0	2.8	99.01	0.28	0	0	0	0.01
2002	115	23	2781	339.842	-425.379	D	7.38	7.358	0.021	2.8	98.29	1.67	0	0	0	0.05
2002	116	23	2704	329.056	-425.092	D	7.386	7.358	0.028	2.8	97.74	2.24	0	0	0	0.03
2002	117	23	2781	339.842	-425.379	D	7.359	7.358	0.001	2.8	98.44	1.52	0	0	0	0.01
2002	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2002	122	23	2789	340.496	-426.449	D	7.84	7.639	0.201	3.4	97.4	2.59	0	0	0	0.01
2002	123	23	2588	318.452	-445.8	D	7.848	7.639	0.209	3.4	98.88	1.12	0	0	0	0.01
2002	124	23	2588	318.452	-445.8	D	7.831	7.639	0.192	3.4	98.93	1.07	0	0	0	0
2002	125	23	2588	318.452	-445.8	D	7.716	7.639	0.078	3.4	99.52	0.47	0	0	0	0
2002	126	23	2781	339.842	-425.379	D	7.644	7.639	0.005	3.4	99.93	0.06	0	0	0	0
2002	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	130	23	2789	340.496	-426.449	D	7.678	7.639	0.039	3.4	99.45	0.54	0	0	0	0.01
2002	131	23	2781	339.842	-425.379	D	7.656	7.639	0.017	3.4	99.44	0.55	0	0	0	0.01
2002	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	133	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	88.16	12.03	0	0	0	0.04
2002	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	137	23	2606	319.359	-441.767	D	7.708	7.639	0.069	3.4	97.43	2.57	0	0	0	0.01
2002	138	23	2789	340.496	-426.449	D	7.683	7.639	0.045	3.4	98.74	1.25	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	139	23	2789	340.496	-426.449	D	7.901	7.639	0.262	3.4	97.9	2.09	0	0	0	0.01
2002	140	23	2588	318.452	-445.8	D	7.65	7.639	0.011	3.4	99.72	0.28	0	0	0	0.01
2002	141	23	2781	339.842	-425.379	D	7.752	7.639	0.113	3.4	98.98	1.01	0	0	0	0.01
2002	142	23	2789	340.496	-426.449	D	7.686	7.639	0.047	3.4	99.47	0.52	0	0	0	0.01
2002	143	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.2	0.21	0	0	0	0.01
2002	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	156	23	1415	329.185	-425.086	D	7.639	7.639	0.001	3.4	99.21	0.64	0	0	0	0.02
2002	157	23	2628	320.933	-436.998	D	7.95	7.639	0.311	3.4	96.46	3.52	0	0	0	0.02
2002	158	23	2589	318.383	-445.593	D	7.719	7.639	0.08	3.4	99.85	0.14	0	0	0	0.01
2002	159	23	2781	339.842	-425.379	D	7.704	7.639	0.065	3.4	99.84	0.15	0	0	0	0.01
2002	160	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	100	0.03	0	0	0	0.01
2002	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	165	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	98.1	0.56	0	0	0	0.01
2002	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	168	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	99.59	0.42	0	0	0	0.01
2002	169	23	2789	340.496	-426.449	D	7.655	7.639	0.016	3.4	99.93	0.06	0	0	0	0.01
2002	170	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	99.94	0.04	0	0	0	0.01
2002	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	178	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	179	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	180	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	186	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.96	0.02	0	0	0	0.01
2002	187	23	2781	339.842	-425.379	D	7.655	7.639	0.016	3.4	99.97	0.02	0	0	0	0.01
2002	188	23	2704	329.056	-425.092	D	7.664	7.639	0.025	3.4	99.95	0.04	0	0	0	0.01
2002	189	23	2757	335.63	-424.484	D	7.646	7.639	0.007	3.4	99.99	0.02	0	0	0	0.01
2002	190	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	100.01	0.01	0	0	0	0.01
2002	191	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	99.43	0.05	0	0	0	0.01
2002	192	23	2781	339.842	-425.379	D	7.643	7.639	0.004	3.4	99.74	0.27	0	0	0	0.01
2002	193	23	2781	339.842	-425.379	D	7.653	7.639	0.014	3.4	99.67	0.33	0	0	0	0.01
2002	194	23	2684	326.713	-427.014	D	7.657	7.639	0.019	3.4	99.26	0.73	0	0	0	0.01
2002	195	23	2588	318.452	-445.8	D	7.642	7.639	0.003	3.4	99.87	0.14	0	0	0	0.01
2002	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	100.07	0.14	0	0	0	0.01
2002	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	204	23	2704	329.056	-425.092	D	7.644	7.639	0.005	3.4	99.94	0.04	0	0	0	0.02
2002	205	23	2758	335.862	-424.454	D	8.016	7.639	0.377	3.4	99.75	0.23	0	0	0	0.01
2002	206	23	2577	321.166	-445.591	D	7.759	7.639	0.12	3.4	99.93	0.06	0	0	0	0.01
2002	207	23	2789	340.496	-426.449	D	7.759	7.639	0.12	3.4	99.95	0.05	0	0	0	0.01
2002	208	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	99.96	0.02	0	0	0	0.01
2002	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	214	23	2418	339.946	-426.612	D	7.639	7.639	0	3.4	100.12	0.03	0	0	0	0.01
2002	215	23	375	322.611	-445.359	D	7.64	7.639	0.001	3.4	100.11	0.01	0	0	0	0.01
2002	216	23	2588	318.452	-445.8	D	7.64	7.639	0.001	3.4	100.25	0.01	0	0	0	0.01

Appendix M
Upper Buffalo
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	217	23	1517	329.93	-425.053	D	7.639	7.639	0	3.4	100.06	0	0	0	0	0.01
2002	218	23	2789	340.496	-426.449	D	7.696	7.639	0.057	3.4	99.89	0.09	0	0	0	0.01
2002	219	23	2571	322.646	-445.476	D	7.992	7.639	0.353	3.4	99.55	0.44	0	0	0	0.01
2002	220	23	2588	318.452	-445.8	D	7.645	7.639	0.006	3.4	99.95	0.04	0	0	0	0.01
2002	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	237	23	2789	340.496	-426.449	D	7.701	7.639	0.062	3.4	99.73	0.25	0	0	0	0.02
2002	238	23	2588	318.452	-445.8	D	7.865	7.639	0.227	3.4	98.87	1.12	0	0	0	0.02
2002	239	23	2684	326.713	-427.014	D	7.675	7.639	0.036	3.4	99.6	0.38	0	0	0	0.01
2002	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	247	23	2781	339.842	-425.379	D	7.732	7.731	0.001	3.6	99.83	0.02	0	0	0	0.01
2002	248	23	2781	339.842	-425.379	D	7.772	7.731	0.041	3.6	99.9	0.09	0	0	0	0.01
2002	249	23	2628	320.933	-436.998	D	7.742	7.731	0.011	3.6	99.97	0.02	0	0	0	0.01
2002	250	23	1415	329.185	-425.086	D	7.731	7.731	0	3.6	99.77	0.01	0	0	0	0.01
2002	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	254	23	2781	339.842	-425.379	D	7.912	7.731	0.181	3.6	97.86	2.09	0	0	0	0.05
2002	255	23	2571	322.646	-445.476	D	7.897	7.731	0.166	3.6	98.42	1.56	0	0	0	0.02

Appendix M
Upper Buffalo
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	256	23	2588	318.452	-445.8	D	7.763	7.731	0.032	3.6	99.93	0.06	0	0	0	0.01
2002	257	23	2704	329.056	-425.092	D	7.747	7.731	0.017	3.6	99.94	0.06	0	0	0	0.01
2002	258	23	2789	340.496	-426.449	D	7.734	7.731	0.003	3.6	99.94	0.07	0	0	0	0.01
2002	259	23	2789	340.496	-426.449	D	7.89	7.731	0.16	3.6	99.39	0.6	0	0	0	0.01
2002	260	23	2789	340.496	-426.449	D	7.855	7.731	0.125	3.6	99.64	0.35	0	0	0	0.01
2002	261	23	2781	339.842	-425.379	D	7.735	7.731	0.004	3.6	98.91	1.09	0	0	0	0.01
2002	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	265	23	2789	340.496	-426.449	D	7.795	7.731	0.064	3.6	97.58	2.37	0	0	0	0.05
2002	266	23	2789	340.496	-426.449	D	7.798	7.731	0.068	3.6	98.8	1.18	0	0	0	0.03
2002	267	23	2758	335.862	-424.454	D	7.81	7.731	0.079	3.6	99.28	0.69	0	0	0	0.02
2002	268	23	2758	335.862	-424.454	D	7.764	7.731	0.033	3.6	99.52	0.47	0	0	0	0.01
2002	269	23	1415	329.185	-425.086	D	7.731	7.731	0	3.6	99.9	0.04	0	0	0	0.01
2002	270	23	2588	318.452	-445.8	D	7.942	7.731	0.211	3.6	99.55	0.43	0	0	0	0.03
2002	271	23	2468	334.002	-434.887	D	7.84	7.731	0.109	3.6	99.8	0.18	0	0	0	0.01
2002	272	23	2628	320.933	-436.998	D	7.819	7.731	0.088	3.6	99.78	0.21	0	0	0	0.01
2002	273	23	2704	329.056	-425.092	D	7.735	7.731	0.004	3.6	99.97	0.02	0	0	0	0.01
2002	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	278	23	2789	340.496	-426.449	D	7.61	7.593	0.018	3.3	99.55	0.41	0	0	0	0.04
2002	279	23	2789	340.496	-426.449	D	7.616	7.593	0.024	3.3	99.28	0.7	0	0	0	0.02
2002	280	23	2789	340.496	-426.449	D	7.625	7.593	0.032	3.3	98.9	1.06	0	0	0	0.04
2002	281	23	2589	318.383	-445.593	D	7.636	7.593	0.044	3.3	98.91	1.06	0	0	0	0.03
2002	282	23	2704	329.056	-425.092	D	7.593	7.593	0	3.3	99.62	0.33	0	0	0	0.02
2002	283	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	99.17	0.84	0	0	0	0.01
2002	284	23	2468	334.002	-434.887	D	7.595	7.593	0.002	3.3	99.18	0.82	0	0	0	0
2002	285	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	286	23	2628	320.933	-436.998	D	7.644	7.593	0.052	3.3	96.26	3.71	0	0	0	0.03
2002	287	23	2600	318.952	-443.12	D	7.602	7.593	0.009	3.3	97.49	2.49	0	0	0	0.02
2002	288	23	2704	329.056	-425.092	D	7.632	7.593	0.04	3.3	97.28	2.71	0	0	0	0.01
2002	289	23	2790	340.421	-426.562	D	7.693	7.593	0.1	3.3	85.97	13.94	0	0	0	0.09
2002	290	23	2571	322.646	-445.476	D	7.608	7.593	0.016	3.3	96.12	3.86	0	0	0	0.03
2002	291	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	99.21	0.49	0	0	0	0.02
2002	292	23	2781	339.842	-425.379	D	7.632	7.593	0.039	3.3	93.92	6.06	0	0	0	0.02
2002	293	23	2694	327.861	-425.964	D	7.827	7.593	0.235	3.3	93.37	6.61	0	0	0	0.02
2002	294	23	2628	320.933	-436.998	D	7.664	7.593	0.071	3.3	98.24	1.75	0	0	0	0.01

Appendix M
Upper Buffalo
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	295	23	2628	320.933	-436.998	D	7.646	7.593	0.053	3.3	98.58	1.41	0	0	0	0.01
2002	296	23	2758	335.862	-424.454	D	7.661	7.593	0.069	3.3	98.47	1.52	0	0	0	0.01
2002	297	23	2684	326.713	-427.014	D	7.68	7.593	0.087	3.3	98.95	1.04	0	0	0	0.01
2002	298	23	2684	326.713	-427.014	D	7.678	7.593	0.085	3.3	97.26	2.73	0	0	0	0.01
2002	299	23	2789	340.496	-426.449	D	7.845	7.593	0.252	3.3	97.24	2.76	0	0	0	0.01
2002	300	23	2781	339.842	-425.379	D	8.015	7.593	0.422	3.3	96.02	3.97	0	0	0	0.01
2002	301	23	2684	326.713	-427.014	D	7.807	7.593	0.214	3.3	97.43	2.57	0	0	0	0.01
2002	302	23	2758	335.862	-424.454	D	7.87	7.593	0.277	3.3	95.8	4.19	0	0	0	0.01
2002	303	23	2571	322.646	-445.476	D	8.412	7.593	**0.819**	3.3	95.7	4.28	0	0	0	0.02
2002	304	23	2552	324.659	-442.591	D	8.263	7.593	**0.67**	3.3	93.81	6.18	0	0	0	0.01
2002	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2002	306	23	2571	322.646	-445.476	D	7.548	7.546	0.002	3.2	92.85	7.19	0	0	0	0.02
2002	307	23	2789	340.496	-426.449	D	7.596	7.546	0.05	3.2	93.33	6.66	0	0	0	0.01
2002	308	23	2789	340.496	-426.449	D	7.548	7.546	0.002	3.2	96.35	3.76	0	0	0	0.01
2002	309	23	2789	340.496	-426.449	D	7.561	7.546	0.015	3.2	96.67	3.33	0	0	0	0.01
2002	310	23	2789	340.496	-426.449	D	7.551	7.546	0.004	3.2	93.16	6.84	0	0	0	0.01
2002	311	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	316	23	2789	340.496	-426.449	D	7.555	7.546	0.008	3.2	74.39	25.5	0	0	0	0.11
2002	317	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	320	23	2789	340.496	-426.449	D	7.59	7.546	0.044	3.2	75.52	24.39	0	0	0	0.09
2002	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	328	23	1415	329.185	-425.086	D	7.546	7.546	0	3.2	92.95	7.33	0	0	0	0.02
2002	329	23	2789	340.496	-426.449	D	7.656	7.546	0.11	3.2	86.14	13.82	0	0	0	0.04
2002	330	23	2781	339.842	-425.379	D	7.645	7.546	0.099	3.2	89.16	10.81	0	0	0	0.03
2002	331	23	2789	340.496	-426.449	D	7.629	7.546	0.082	3.2	84.57	15.39	0	0	0	0.04
2002	332	23	2588	318.452	-445.8	D	7.554	7.546	0.007	3.2	90.5	9.5	0	0	0	0.02
2002	333	23	340	322.363	-445.37	D	7.546	7.546	0	3.2	94.24	5.31	0	0	0	0.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2002	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	2571	322.646	-445.476	D	7.615	7.593	0.023	3.3	86.27	13.69	0	0	0	0.05
2002	338	23	2588	318.452	-445.8	D	7.595	7.593	0.002	3.3	88.24	11.8	0	0	0	0.01
2002	339	23	2789	340.496	-426.449	D	7.638	7.593	0.045	3.3	64.6	35.29	0	0	0	0.11
2002	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	343	23	2704	329.056	-425.092	D	7.727	7.593	0.134	3.3	92.07	7.92	0	0	0	0.01
2002	344	23	2684	326.713	-427.014	D	7.629	7.593	0.036	3.3	94.26	5.74	0	0	0	0.01
2002	345	23	2694	327.861	-425.964	D	7.623	7.593	0.03	3.3	95.73	4.27	0	0	0	0.01
2002	346	23	2758	335.862	-424.454	D	7.6	7.593	0.007	3.3	96.81	3.18	0	0	0	0.01
2002	347	23	2694	327.861	-425.964	D	7.798	7.593	0.205	3.3	91.97	8.01	0	0	0	0.02
2002	348	23	2468	334.002	-434.887	D	7.709	7.593	0.117	3.3	91.96	8.02	0	0	0	0.02
2002	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	358	23	2781	339.842	-425.379	D	7.672	7.593	0.079	3.3	88.75	11.23	0	0	0	0.02
2002	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	2628	320.933	-436.998	D	7.634	7.593	0.041	3.3	76.43	23.48	0	0	0	0.1
									0.819							
NORANDA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	2	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	3	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	11	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	18	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	19	23	2781	339.842	-425.379	D	7.744	7.593	0.151	3.3	97.35	0.15	0	0	0.07	2.43
2002	20	23	2789	340.496	-426.449	D	7.618	7.593	0.025	3.3	98.91	0.07	0	0	0.03	0.99
2002	21	23	2781	339.842	-425.379	D	7.596	7.593	0.004	3.3	98.91	0.1	0	0	0	1.01
2002	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	25	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	26	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	27	23	2386	338.533	-428.423	D	7.593	7.593	0	3.3	95.44	0.05	0	0	0.04	2.22
2002	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2002	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	36	23	2588	318.452	-445.8	D	7.497	7.453	0.045	3	94.31	0.22	0	0	0.69	4.78
2002	37	23	2704	329.056	-425.092	D	7.474	7.453	0.021	3	93.76	0.36	0	0	0.14	5.75
2002	38	23	2789	340.496	-426.449	D	7.581	7.453	0.128	3	97.93	0.12	0	0	0.11	1.85
2002	39	23	2571	322.646	-445.476	D	7.465	7.453	0.013	3	97.96	0.06	0	0	0.16	1.85
2002	40	23	2789	340.496	-426.449	D	7.466	7.453	0.013	3	98.47	0.05	0	0	0.04	1.45
2002	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	42	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	43	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	49	23	2789	340.496	-426.449	D	7.457	7.453	0.004	3	95.71	0.12	0	0	0.08	4.14
2002	50	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	54	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	55	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	57	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	58	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2002	61	23	2781	339.842	-425.379	D	7.314	7.311	0.003	2.7	93.07	0.37	0	0	0.07	6.55
2002	62	23	2789	340.496	-426.449	D	7.311	7.311	0	2.7	96.09	0.22	0	0	0.01	3.71
2002	63	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	2789	340.496	-426.449	D	7.314	7.311	0.003	2.7	95.39	0.15	0	0	0.08	4.37
2002	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	75	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	77	23	2789	340.496	-426.449	D	7.313	7.311	0.003	2.7	97.92	0.13	0	0	0.06	1.96
2002	78	23	2781	339.842	-425.379	D	7.635	7.311	0.324	2.7	97.56	0.07	0	0	0.2	2.16
2002	79	23	2789	340.496	-426.449	D	7.426	7.311	0.115	2.7	98.99	0.02	0	0	0.07	0.92
2002	80	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	81	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	82	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	23	2704	329.056	-425.092	D	7.313	7.311	0.002	2.7	98.27	0.09	0	0	0.03	1.69
2002	85	23	2758	335.862	-424.454	D	7.374	7.311	0.064	2.7	98.73	0.06	0	0	0.01	1.21
2002	86	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	87	23	2789	340.496	-426.449	D	7.311	7.311	0.001	2.7	96.13	0.11	0	0	0.11	3.54
2002	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	89	23	2758	335.862	-424.454	D	7.329	7.311	0.018	2.7	98.24	0.02	0	0	0.14	1.6
2002	90	23	2704	329.056	-425.092	D	7.353	7.311	0.042	2.7	92.53	0.25	0	0	0.56	6.67
2002	91	23	2589	318.383	-445.593	D	7.368	7.356	0.011	2.796	98.23	0.01	0	0	0.05	1.72
2002	92	23	2789	340.496	-426.449	D	7.359	7.358	0	2.8	97.85	0.01	0	0	0.04	2.12
2002	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	96	23	2588	318.452	-445.8	D	7.402	7.358	0.043	2.8	97.6	0.02	0	0	0.2	2.19
2002	97	23	2789	340.496	-426.449	D	7.391	7.358	0.032	2.8	97.82	0.03	0	0	0.08	2.06
2002	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	100	23	2588	318.452	-445.8	D	7.427	7.358	0.069	2.8	96.83	0.01	0	0	0.49	2.67
2002	101	23	2684	326.713	-427.014	D	7.365	7.358	0.007	2.8	88.6	0.05	0	0	0.16	11.17
2002	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	113	23	2789	340.496	-426.449	D	7.359	7.358	0.001	2.8	96.88	0.03	0	0	0.12	3.07
2002	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	115	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	116	23	2588	318.452	-445.8	D	7.421	7.358	0.063	2.8	97.41	0.07	0	0	0.28	2.24
2002	117	23	2704	329.056	-425.092	D	7.369	7.358	0.011	2.8	96.68	0.1	0	0	0.22	3
2002	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

Appendix M
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2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	120	23	2789	340.496	-426.449	D	7.364	7.358	0.006	2.8	96.18	0.01	0	0	0.04	3.79
2002	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2002	122	23	2781	339.842	-425.379	D	7.715	7.639	0.076	3.4	99.29	0.02	0	0	0.02	0.68
2002	123	23	2571	322.646	-445.476	D	7.707	7.639	0.068	3.4	99.31	0.01	0	0	0.03	0.65
2002	124	23	2781	339.842	-425.379	D	7.997	7.639	0.358	3.4	98.03	0.04	0	0	0.09	1.84
2002	125	23	2781	339.842	-425.379	D	7.838	7.639	0.2	3.4	98.43	0.01	0	0	0.07	1.48
2002	126	23	2781	339.842	-425.379	D	7.645	7.639	0.006	3.4	98.87	0	0	0	0.02	1.12
2002	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	130	23	2571	322.646	-445.476	D	7.663	7.639	0.024	3.4	97.03	0.02	0	0	0.24	2.71
2002	131	23	2758	335.862	-424.454	D	7.69	7.639	0.052	3.4	97.83	0.02	0	0	0.07	2.08
2002	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	137	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	81.82	1.33	0	0	0.34	18.78
2002	138	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	139	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	140	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	141	23	2781	339.842	-425.379	D	7.666	7.639	0.027	3.4	93.9	0.02	0	0	0.2	5.88
2002	142	23	2781	339.842	-425.379	D	7.645	7.639	0.006	3.4	91.6	0.04	0	0	0.2	8.18
2002	143	23	2416	339.665	-425.875	D	7.639	7.639	0	3.4	96.28	0.01	0	0	0.07	3.13
2002	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	150	23	2781	339.842	-425.379	D	7.643	7.639	0.004	3.4	98.74	0	0	0	0.14	1.1
2002	151	23	2781	339.842	-425.379	D	7.683	7.639	0.044	3.4	98.93	0	0	0	0.09	0.98
2002	152	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	99.12	0	0	0	0.04	0.84
2002	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	157	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	158	23	2571	322.646	-445.476	D	7.639	7.639	0	3.4	99.75	0	0	0	0.09	0.34

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	159	23	2571	322.646	-445.476	D	7.778	7.639	0.14	3.4	99	0	0	0	0.08	0.92
2002	160	23	2781	339.842	-425.379	D	7.677	7.639	0.038	3.4	97.2	0	0	0	0.09	2.71
2002	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	168	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	169	23	235	321.618	-445.402	D	7.639	7.639	0	3.4	97.86	0	0	0	0.15	0.86
2002	170	23	2789	340.496	-426.449	D	7.645	7.639	0.006	3.4	98.91	0	0	0	0.09	1.02
2002	171	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	98.88	0	0	0	0.03	0.75
2002	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	173	23	2758	335.862	-424.454	D	7.644	7.639	0.005	3.4	96.64	0	0	0	0.74	2.63
2002	174	23	2684	326.713	-427.014	D	7.741	7.639	0.102	3.4	97.32	0.01	0	0	0.21	2.47
2002	175	23	2704	329.056	-425.092	D	7.639	7.639	0	3.4	86.69	0.01	0	0	0.34	12.48
2002	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	179	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	180	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	45.6	0	0	0	1.98	3.43
2002	183	23	2789	340.496	-426.449	D	7.809	7.639	0.17	3.4	98.64	0	0	0	0.17	1.19
2002	184	23	2781	339.842	-425.379	D	7.67	7.639	0.031	3.4	98.97	0	0	0	0.08	0.95
2002	185	23	2789	340.496	-426.449	D	7.757	7.639	0.118	3.4	98.8	0	0	0	0.18	1.01
2002	186	23	2789	340.496	-426.449	D	8.287	7.639	**0.648**	3.4	98.95	0	0	0	0.13	0.92
2002	187	23	2589	318.383	-445.593	D	7.874	7.639	0.235	3.4	98.61	0	0	0	0.09	1.29
2002	188	23	2588	318.452	-445.8	D	7.672	7.639	0.033	3.4	97.48	0	0	0	0.22	2.3
2002	189	23	2588	318.452	-445.8	D	7.676	7.639	0.037	3.4	98.71	0	0	0	0.17	1.13
2002	190	23	2588	318.452	-445.8	D	7.767	7.639	0.128	3.4	98.91	0	0	0	0.1	0.99
2002	191	23	2790	340.421	-426.562	D	7.734	7.639	0.095	3.4	99.18	0	0	0	0.04	0.78
2002	192	23	2468	334.002	-434.887	D	7.658	7.639	0.019	3.4	99.36	0	0	0	0.02	0.63
2002	193	23	2789	340.496	-426.449	D	7.68	7.639	0.041	3.4	98.79	0	0	0	0.19	1.02
2002	194	23	2468	334.002	-434.887	D	7.653	7.639	0.014	3.4	99.32	0.01	0	0	0.06	0.62
2002	195	23	2571	322.646	-445.476	D	7.736	7.639	0.097	3.4	99	0	0	0	0.15	0.85
2002	196	23	2571	322.646	-445.476	D	7.927	7.639	0.288	3.4	98.82	0.01	0	0	0.16	1.01
2002	197	23	2468	334.002	-434.887	D	8.027	7.639	0.388	3.4	99	0	0	0	0.09	0.9

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	198	23	2781	339.842	-425.379	D	7.745	7.639	0.106	3.4	99.34	0	0	0	0.04	0.61
2002	199	23	2781	339.842	-425.379	D	7.648	7.639	0.009	3.4	99.44	0	0	0	0.02	0.55
2002	200	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.52	0.01	0	0	0.01	0.58
2002	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	204	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	205	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	206	23	2571	322.646	-445.476	D	7.659	7.639	0.02	3.4	99.69	0	0	0	0.05	0.26
2002	207	23	2789	340.496	-426.449	D	7.706	7.639	0.067	3.4	99.5	0	0	0	0.04	0.46
2002	208	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	98.24	0	0	0	0.05	0.87
2002	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	214	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.01	0	0	0	0.18	0.94
2002	215	23	2468	334.002	-434.887	D	8.03	7.639	0.391	3.4	98.73	0	0	0	0.19	1.08
2002	216	23	2684	326.713	-427.014	D	7.809	7.639	0.17	3.4	99.05	0	0	0	0.08	0.86
2002	217	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	99.16	0	0	0	0.07	0.78
2002	218	23	2571	322.646	-445.476	D	7.752	7.639	0.113	3.4	98.92	0	0	0	0.09	0.99
2002	219	23	2571	322.646	-445.476	D	7.734	7.639	0.096	3.4	99.17	0	0	0	0.03	0.8
2002	220	23	2571	322.646	-445.476	D	7.64	7.639	0.001	3.4	99.15	0	0	0	0.04	0.86
2002	221	23	2571	322.646	-445.476	D	7.771	7.639	0.132	3.4	98.34	0	0	0	0.17	1.49
2002	222	23	2781	339.842	-425.379	D	7.708	7.639	0.069	3.4	98.24	0	0	0	0.09	1.67
2002	223	23	2757	335.63	-424.484	D	7.64	7.639	0.001	3.4	98.53	0	0	0	0.03	1.52
2002	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	237	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	238	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	239	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	242	23	2588	318.452	-445.8	D	7.643	7.639	0.004	3.4	93.17	0	0	0	1.7	5.09
2002	243	23	2681	326.689	-427.709	D	7.78	7.639	0.141	3.4	97.24	0.01	0	0	0.38	2.37
2002	244	23	2640	322.263	-435.121	D	7.905	7.727	0.178	3.592	98.3	0	0	0	0.12	1.58
2002	245	23	2758	335.862	-424.454	D	7.752	7.731	0.021	3.6	98.05	0	0	0	0.07	1.88
2002	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	247	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	248	23	2588	318.452	-445.8	D	7.732	7.731	0.001	3.6	98.35	0	0	0	0.19	1.35
2002	249	23	2571	322.646	-445.476	D	7.771	7.731	0.04	3.6	97.6	0	0	0	0.5	1.9
2002	250	23	2589	318.383	-445.593	D	7.759	7.731	0.028	3.6	97.7	0	0	0	0.12	2.18
2002	251	23	975	326.447	-430.701	D	7.731	7.731	0	3.6	0	0	0	0	0	2.08
2002	252	23	2788	340.294	-426.448	D	7.731	7.731	0	3.6	93.9	0	0	0	0.2	3.89
2002	253	23	2588	318.452	-445.8	D	7.807	7.731	0.076	3.6	98.06	0	0	0	0.12	1.82
2002	254	23	2571	322.646	-445.476	D	7.737	7.731	0.006	3.6	98.83	0	0	0	0.15	1.04
2002	255	23	305	322.115	-445.381	D	7.731	7.731	0	3.6	98.44	0	0	0	0.03	0.84
2002	256	23	2571	322.646	-445.476	D	7.739	7.731	0.008	3.6	99.56	0	0	0	0.08	0.38
2002	257	23	2790	340.421	-426.562	D	7.816	7.731	0.086	3.6	98.81	0	0	0	0.12	1.07
2002	258	23	2789	340.496	-426.449	D	7.754	7.731	0.023	3.6	98.66	0	0	0	0.08	1.26
2002	259	23	2789	340.496	-426.449	D	7.731	7.731	0	3.6	94.88	0	0	0	0.08	4.61
2002	260	23	2362	338.048	-428.694	D	7.731	7.731	0	3.6	91.08	0.06	0	0	0.05	5.61
2002	261	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	76.45	0.17	0	0	0.03	6.69
2002	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	265	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	266	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	267	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	268	23	2571	322.646	-445.476	D	7.806	7.731	0.075	3.6	97.86	0.01	0	0	0.19	1.95
2002	269	23	2588	318.452	-445.8	D	7.806	7.731	0.075	3.6	96.23	0.04	0	0	0.34	3.39
2002	270	23	2789	340.496	-426.449	D	7.759	7.731	0.028	3.6	96.6	0	0	0	0.9	2.5
2002	271	23	2704	329.056	-425.092	D	7.733	7.731	0.002	3.6	98.58	0	0	0	0.03	1.4
2002	272	23	2468	334.002	-434.887	D	7.862	7.731	0.132	3.6	98.99	0	0	0	0.12	0.89
2002	273	23	2694	327.861	-425.964	D	7.78	7.731	0.049	3.6	98.29	0	0	0	0.09	1.61
2002	274	23	2779	339.386	-425.461	D	7.598	7.598	0	3.313	97.74	0	0	0	0.1	1.43
2002	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	278	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	279	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	280	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	281	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	282	23	2588	318.452	-445.8	D	7.71	7.593	0.117	3.3	98.05	0.06	0	0	0.17	1.72
2002	283	23	2571	322.646	-445.476	D	7.813	7.593	0.22	3.3	98.67	0.03	0	0	0.19	1.11
2002	284	23	2588	318.452	-445.8	D	7.631	7.593	0.038	3.3	98.49	0.01	0	0	0.16	1.34
2002	285	23	453	323.053	-444.091	D	7.698	7.593	0.106	3.3	98.99	0.02	0	0	0.03	0.95
2002	286	23	2789	340.496	-426.449	D	7.643	7.593	0.05	3.3	98.95	0.01	0	0	0.01	1.03
2002	287	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	288	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	289	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	290	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	291	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	294	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	98.8	0	0	0	0.32	0.93
2002	295	23	2468	334.002	-434.887	D	7.621	7.593	0.029	3.3	98.7	0.01	0	0	0.16	1.13
2002	296	23	2588	318.452	-445.8	D	7.642	7.593	0.049	3.3	98.01	0.01	0	0	0.25	1.73
2002	297	23	2588	318.452	-445.8	D	7.594	7.593	0.001	3.3	84.15	0	0	0	2.98	12.99
2002	298	23	2588	318.452	-445.8	D	7.696	7.593	0.103	3.3	97.96	0.05	0	0	0.07	1.92
2002	299	23	2571	322.646	-445.476	D	7.604	7.593	0.011	3.3	98.36	0.02	0	0	0.03	1.6
2002	300	23	2571	322.646	-445.476	D	7.605	7.593	0.012	3.3	97.09	0.03	0	0	0.44	2.45
2002	301	23	2781	339.842	-425.379	D	7.941	7.593	0.348	3.3	97.64	0.1	0	0	0.13	2.13
2002	302	23	2588	318.452	-445.8	D	8.003	7.593	0.411	3.3	98.32	0.06	0	0	0.11	1.51
2002	303	23	2571	322.646	-445.476	D	7.639	7.593	0.046	3.3	98.69	0.02	0	0	0.05	1.24
2002	304	23	2527	325.898	-438.476	D	7.593	7.593	0.001	3.3	94.42	0	0	0	0.7	5.01
2002	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2002	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	307	23	2789	340.496	-426.449	D	7.562	7.546	0.015	3.2	98.44	0.08	0	0	0.15	1.34
2002	308	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	99.25	0.05	0	0	0.03	0.79
2002	309	23	2789	340.496	-426.449	D	7.565	7.546	0.019	3.2	99.47	0.04	0	0	0.02	0.48
2002	310	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	99.66	0.02	0	0	0	0.32
2002	311	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	316	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	317	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	331	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	332	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2002	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	109.31	0.01	0	0	0.01	1.14
2002	339	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	343	23	2588	318.452	-445.8	D	7.593	7.593	0	3.3	64.32	0.01	0	0	13.95	21.8
2002	344	23	1	318.65	-445.782	D	7.593	7.593	0.001	3.3	86.17	0	0	0	4.51	9.33
2002	345	23	2588	318.452	-445.8	D	7.598	7.593	0.005	3.3	96.37	0	0	0	0.48	3.17
2002	346	23	2704	329.056	-425.092	D	7.596	7.593	0.003	3.3	98.56	0	0	0	0.04	1.37
2002	347	23	2789	340.496	-426.449	D	7.653	7.593	0.06	3.3	98.07	0.13	0	0	0.11	1.69
2002	348	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	97.9	0.13	0	0	0.02	1.98
2002	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	357	23	2571	322.646	-445.476	D	7.593	7.593	0	3.3	83.07	0.06	0	0	5.3	11.58
2002	358	23	2588	318.452	-445.8	D	7.599	7.593	0.006	3.3	93.19	0.16	0	0	1.32	5.35
2002	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.648							
INDEPENDENCE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	2704	329.056	-425.092	D	7.755	7.593	0.162	3.3	74.65	24.56	0	0	0	0.79
2002	2	23	2789	340.496	-426.449	D	8.074	7.593	0.482	3.3	81.92	17.51	0	0	0	0.57
2002	3	23	2588	318.452	-445.8	D	7.747	7.593	0.155	3.3	84.77	14.75	0	0	0	0.48
2002	4	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	88.83	10.89	0	0	0	0.28
2002	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	6	23	2589	318.383	-445.593	D	7.662	7.593	0.069	3.3	82.26	17.08	0	0	0	0.66
2002	7	23	2789	340.496	-426.449	D	7.81	7.593	0.217	3.3	73.68	25.22	0	0	0	1.1
2002	8	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	81.55	18.01	0	0	0	0.43
2002	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	2781	339.842	-425.379	D	7.676	7.593	0.084	3.3	93.92	5.76	0	0	0	0.32
2002	11	23	2789	340.496	-426.449	D	7.781	7.593	0.188	3.3	70.01	28.47	0	0	0	1.52
2002	12	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	88.88	10.57	0	0	0	0.51
2002	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	2704	329.056	-425.092	D	7.651	7.593	0.059	3.3	69.52	29.09	0	0	0	1.39
2002	18	23	2704	329.056	-425.092	D	7.599	7.593	0.007	3.3	82.62	17.03	0	0	0	0.38
2002	19	23	2758	335.862	-424.454	D	7.601	7.593	0.009	3.3	93.2	6.62	0	0	0	0.2
2002	20	23	2781	339.842	-425.379	D	7.618	7.593	0.025	3.3	93.63	6.23	0	0	0	0.14
2002	21	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	2628	320.933	-436.998	D	7.698	7.593	0.105	3.3	88.56	11.07	0	0	0	0.37
2002	25	23	2468	334.002	-434.887	D	7.701	7.593	0.109	3.3	88.16	11.44	0	0	0	0.4
2002	26	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	94.38	5.31	0	0	0	0.28
2002	27	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	2706	329.518	-425.046	D	7.603	7.593	0.01	3.3	89.55	10.15	0	0	0	0.29
2002	30	23	2711	330.671	-424.932	D	8.501	7.593	**0.909**	3.3	90.47	9.32	0	0	0	0.21
2002	31	23	2704	329.056	-425.092	D	7.628	7.593	0.036	3.3	91.92	7.96	0	0	0	0.12
2002	32	23	2781	339.842	-425.379	D	7.459	7.459	0.001	3.013	93.58	6.44	0	0	0	0.06
2002	33	23	2789	340.496	-426.449	D	7.456	7.453	0.004	3	93.91	5.72	0	0	0	0.41
2002	34	23	2789	340.496	-426.449	D	7.455	7.453	0.003	3	94.11	5.66	0	0	0	0.28
2002	35	23	2789	340.496	-426.449	D	7.498	7.453	0.046	3	61.65	36.35	0	0	0	2
2002	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	37	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	38	23	2725	331.984	-427.096	D	7.577	7.453	0.124	3	88.62	10.98	0	0	0	0.4
2002	39	23	2468	334.002	-434.887	D	7.521	7.453	0.068	3	90.78	8.98	0	0	0	0.24
2002	40	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	42	23	2690	327.731	-426.789	D	7.597	7.453	0.144	3	76.98	21.95	0	0	0	1.07
2002	43	23	2781	339.842	-425.379	D	7.463	7.453	0.01	3	91.21	8.03	0	0	0	0.77
2002	44	23	2628	320.933	-436.998	D	7.555	7.453	0.102	3	88.35	11.03	0	0	0	0.61
2002	45	23	2704	329.056	-425.092	D	7.508	7.453	0.055	3	84.88	14.63	0	0	0	0.49
2002	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	2610	319.631	-440.865	D	7.522	7.453	0.069	3	83.16	15.61	0	0	0	1.23
2002	49	23	2589	318.383	-445.593	D	7.46	7.453	0.007	3	94.16	5.43	0	0	0	0.41
2002	50	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	2589	318.383	-445.593	D	7.484	7.453	0.032	3	74.73	23.76	0	0	0	1.51
2002	54	23	2684	326.713	-427.014	D	7.5	7.453	0.047	3	88.95	10.58	0	0	0	0.48
2002	55	23	2789	340.496	-426.449	D	7.455	7.453	0.002	3	94.95	4.84	0	0	0	0.25
2002	56	23	2589	318.383	-445.593	D	7.599	7.453	0.147	3	84.25	15.17	0	0	0	0.58
2002	57	23	2758	335.862	-424.454	D	7.498	7.453	0.045	3	84.58	14.79	0	0	0	0.63
2002	58	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2002	61	23	2781	339.842	-425.379	D	7.317	7.311	0.006	2.7	81.99	17.42	0	0	0	0.61

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	62	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	63	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	2684	326.713	-427.014	D	7.312	7.311	0.002	2.7	98.1	1.39	0	0	0	0.59
2002	72	23	2781	339.842	-425.379	D	7.382	7.311	0.071	2.7	93.84	5.8	0	0	0	0.36
2002	73	23	2781	339.842	-425.379	D	7.312	7.311	0.002	2.7	98.25	1.62	0	0	0	0.16
2002	74	23	2609	319.563	-441.09	D	7.425	7.311	0.114	2.7	88.17	11.43	0	0	0	0.41
2002	75	23	2571	322.646	-445.476	D	7.323	7.311	0.012	2.7	93.34	6.34	0	0	0	0.33
2002	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	79	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	80	23	2588	318.452	-445.8	D	7.375	7.311	0.064	2.7	89.62	9.83	0	0	0	0.55
2002	81	23	2684	326.713	-427.014	D	7.373	7.311	0.062	2.7	75.9	23.04	0	0	0	1.07
2002	82	23	2758	335.862	-424.454	D	7.372	7.311	0.062	2.7	84.85	14.7	0	0	0	0.45
2002	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	23	2235	335.628	-424.554	D	7.312	7.311	0.001	2.7	94.51	5.46	0	0	0	0.09
2002	85	23	2589	318.383	-445.593	D	7.318	7.311	0.008	2.7	90.5	9.13	0	0	0	0.39
2002	86	23	2684	326.713	-427.014	D	7.55	7.311	0.24	2.7	94.62	5.12	0	0	0	0.26
2002	87	23	2704	329.056	-425.092	D	7.311	7.311	0	2.7	99.25	0.46	0	0	0	0.23
2002	88	23	2694	327.861	-425.964	D	7.407	7.311	0.097	2.7	99.27	0.49	0	0	0	0.23
2002	89	23	2588	318.452	-445.8	D	7.401	7.311	0.09	2.7	98.86	0.97	0	0	0	0.17
2002	90	23	2684	326.713	-427.014	D	7.314	7.311	0.004	2.7	98.48	0.96	0	0	0	0.6
2002	91	23	2789	340.496	-426.449	D	7.374	7.356	0.018	2.796	97.86	1.7	0	0	0	0.45
2002	92	23	2789	340.496	-426.449	D	7.444	7.358	0.086	2.8	97.43	2.22	0	0	0	0.35
2002	93	23	2571	322.646	-445.476	D	7.36	7.358	0.002	2.8	98.43	1.31	0	0	0	0.24
2002	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	96	23	2789	340.496	-426.449	D	7.359	7.358	0	2.8	99.44	0.53	0	0	0	0.32
2002	97	23	2789	340.496	-426.449	D	7.36	7.358	0.002	2.8	98.13	1.68	0	0	0	0.19
2002	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	99	23	2781	339.842	-425.379	D	7.766	7.358	0.408	2.8	93.27	6.43	0	0	0	0.3
2002	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	104	23	1415	329.185	-425.086	D	7.359	7.358	0	2.8	99.69	0.22	0	0	0	0.16
2002	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	112	23	2789	340.496	-426.449	D	7.36	7.358	0.002	2.8	98.82	0.68	0	0	0	0.57
2002	113	23	2789	340.496	-426.449	D	7.363	7.358	0.005	2.8	98.99	0.65	0	0	0	0.36
2002	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	115	23	2628	320.933	-436.998	D	7.39	7.358	0.032	2.8	94.56	4.67	0	0	0	0.77
2002	116	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	98.02	2.45	0	0	0	0.26
2002	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	119	23	2781	339.842	-425.379	D	7.49	7.358	0.132	2.8	98.99	0.65	0	0	0	0.36
2002	120	23	2705	329.287	-425.069	D	7.424	7.358	0.065	2.8	99.54	0.29	0	0	0	0.18
2002	121	23	1449	329.434	-425.075	D	7.627	7.627	0	3.375	97.31	0.54	0	0	0	0.1
2002	122	23	2704	329.056	-425.092	D	7.738	7.639	0.099	3.4	90.6	8.96	0	0	0	0.44
2002	123	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	94.68	0.76	0	0	0	0.04
2002	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	129	23	2640	322.263	-435.121	D	7.745	7.639	0.106	3.4	96.19	3.34	0	0	0	0.47
2002	130	23	2628	320.933	-436.998	D	7.699	7.639	0.06	3.4	98.72	0.92	0	0	0	0.35
2002	131	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.45	0.44	0	0	0	0.07
2002	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	133	23	2628	320.933	-436.998	D	7.871	7.639	0.232	3.4	95.84	3.96	0	0	0	0.2
2002	134	23	2789	340.496	-426.449	D	7.676	7.639	0.037	3.4	98.67	0.94	0	0	0	0.38
2002	135	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	98.4	0.62	0	0	0	0.24
2002	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	137	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	138	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	139	23	2684	326.713	-427.014	D	7.788	7.639	0.149	3.4	98.66	1.02	0	0	0	0.32

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	140	23	2789	340.496	-426.449	D	7.756	7.639	0.117	3.4	97.74	1.95	0	0	0	0.32
2002	141	23	2588	318.452	-445.8	D	7.653	7.639	0.014	3.4	99.2	0.57	0	0	0	0.23
2002	142	23	2684	326.713	-427.014	D	7.641	7.639	0.002	3.4	99.55	0.3	0	0	0	0.14
2002	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	156	23	2711	330.671	-424.932	D	7.64	7.639	0.001	3.4	99.44	0.39	0	0	0	0.18
2002	157	23	2754	334.935	-424.575	D	7.722	7.639	0.083	3.4	98.27	1.58	0	0	0	0.16
2002	158	23	2684	326.713	-427.014	D	7.657	7.639	0.018	3.4	99.7	0.09	0	0	0	0.21
2002	159	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	160	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	165	23	2789	340.496	-426.449	D	7.869	7.639	0.23	3.4	98.47	1.31	0	0	0	0.22
2002	166	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	93.11	5.25	0	0	0	1.64
2002	167	23	1734	332.115	-435.199	D	7.639	7.639	0	3.4	99.63	0.03	0	0	0	0.19
2002	168	23	2781	339.842	-425.379	D	7.778	7.639	0.139	3.4	99.53	0.26	0	0	0	0.22
2002	169	23	2789	340.496	-426.449	D	7.759	7.639	0.12	3.4	99.78	0.07	0	0	0	0.15
2002	170	23	2781	339.842	-425.379	D	7.657	7.639	0.018	3.4	99.81	0.07	0	0	0	0.12
2002	171	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	99.18	0.02	0	0	0	0.12
2002	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	179	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.76	0.04	0	0	0	0.15
2002	180	23	2781	339.842	-425.379	D	7.645	7.639	0.006	3.4	99.81	0.06	0	0	0	0.13
2002	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	192	23	2789	340.496	-426.449	D	7.647	7.639	0.008	3.4	99.36	0.49	0	0	0	0.16
2002	193	23	2789	340.496	-426.449	D	7.66	7.639	0.021	3.4	99.72	0.17	0	0	0	0.12
2002	194	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	98.94	0.98	0	0	0	0.09
2002	195	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	204	23	2758	335.862	-424.454	D	7.667	7.639	0.028	3.4	99.76	0.07	0	0	0	0.17
2002	205	23	2468	334.002	-434.887	D	7.725	7.639	0.086	3.4	99.69	0.19	0	0	0	0.13
2002	206	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	207	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	208	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	214	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	99.86	0.03	0	0	0	0.09
2002	215	23	2468	334.002	-434.887	D	7.641	7.639	0.002	3.4	99.89	0.01	0	0	0	0.08
2002	216	23	1048	326.791	-427.189	D	7.64	7.639	0.002	3.4	99.89	0.02	0	0	0	0.08
2002	217	23	2128	334.646	-424.846	D	7.639	7.639	0	3.4	99.89	0.01	0	0	0	0.07

Appendix M
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2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	218	23	2704	329.056	-425.092	D	7.642	7.639	0.003	3.4	99.77	0.12	0	0	0	0.15
2002	219	23	2684	326.713	-427.014	D	7.648	7.639	0.009	3.4	99.7	0.18	0	0	0	0.13
2002	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	236	23	2789	340.496	-426.449	D	7.789	7.639	0.15	3.4	99.58	0.19	0	0	0	0.22
2002	237	23	2571	322.646	-445.476	D	7.678	7.639	0.039	3.4	99.03	0.81	0	0	0	0.16
2002	238	23	2571	322.646	-445.476	D	7.64	7.639	0.001	3.4	99.77	0.06	0	0	0	0.14
2002	239	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	247	23	2781	339.842	-425.379	D	7.738	7.731	0.007	3.6	99.74	0.03	0	0	0	0.24
2002	248	23	2781	339.842	-425.379	D	7.787	7.731	0.057	3.6	99.72	0.1	0	0	0	0.18
2002	249	23	2704	329.056	-425.092	D	7.749	7.731	0.018	3.6	99.82	0.02	0	0	0	0.16
2002	250	23	1415	329.185	-425.086	D	7.731	7.731	0.001	3.6	99.83	0.01	0	0	0	0.15
2002	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	254	23	2429	338.563	-428.651	D	7.756	7.731	0.025	3.6	97.6	1.95	0	0	0	0.45
2002	255	23	2571	322.646	-445.476	D	7.731	7.731	0.001	3.6	99.69	0.03	0	0	0	0.24
2002	256	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	257	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	258	23	2684	326.713	-427.014	D	7.844	7.731	0.114	3.6	99.57	0.24	0	0	0	0.19
2002	259	23	2781	339.842	-425.379	D	8.173	7.731	0.442	3.6	99.22	0.64	0	0	0	0.14
2002	260	23	2781	339.842	-425.379	D	7.934	7.731	0.204	3.6	99.55	0.34	0	0	0	0.12
2002	261	23	2781	339.842	-425.379	D	7.735	7.731	0.004	3.6	98.91	0.99	0	0	0	0.1
2002	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	265	23	2589	318.383	-445.593	D	7.844	7.731	0.113	3.6	99.19	0.57	0	0	0	0.24
2002	266	23	2644	323.22	-434.992	D	7.749	7.731	0.018	3.6	96.8	2.6	0	0	0	0.6
2002	267	23	2709	330.21	-424.978	D	7.743	7.731	0.013	3.6	98.9	0.8	0	0	0	0.3
2002	268	23	2781	339.842	-425.379	D	7.757	7.731	0.027	3.6	99.22	0.59	0	0	0	0.19
2002	269	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	270	23	2694	327.861	-425.964	D	7.733	7.731	0.003	3.6	99.5	0.1	0	0	0	0.4
2002	271	23	2704	329.056	-425.092	D	7.749	7.731	0.019	3.6	99.3	0.42	0	0	0	0.28
2002	272	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	278	23	2552	324.659	-442.591	D	7.63	7.593	0.038	3.3	82.94	15.92	0	0	0	1.14
2002	279	23	2589	318.383	-445.593	D	7.604	7.593	0.012	3.3	99.2	0.54	0	0	0	0.26
2002	280	23	2789	340.496	-426.449	D	7.638	7.593	0.045	3.3	93.05	5.64	0	0	0	1.31
2002	281	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	285	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	286	23	2789	340.496	-426.449	D	7.744	7.593	0.151	3.3	95.25	4.52	0	0	0	0.23
2002	287	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	288	23	2600	318.952	-443.12	D	7.647	7.593	0.054	3.3	97.78	1.52	0	0	0	0.7
2002	289	23	2589	318.383	-445.593	D	7.61	7.593	0.017	3.3	95.47	3.99	0	0	0	0.54
2002	290	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	291	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	292	23	2704	329.056	-425.092	D	7.724	7.593	0.131	3.3	90.44	9.29	0	0	0	0.28
2002	293	23	2588	318.452	-445.8	D	7.674	7.593	0.081	3.3	94.23	5.63	0	0	0	0.14
2002	294	23	2588	318.452	-445.8	D	7.595	7.593	0.003	3.3	98.71	1.18	0	0	0	0.1
2002	295	23	2589	318.383	-445.593	D	7.593	7.593	0.001	3.3	99.39	0.4	0	0	0	0.07

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	297	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	298	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	299	23	2781	339.842	-425.379	D	7.709	7.593	0.116	3.3	93.25	6.43	0	0	0	0.32
2002	300	23	2588	318.452	-445.8	D	7.924	7.593	0.331	3.3	92.89	6.88	0	0	0	0.23
2002	301	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	302	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	304	23	2589	318.383	-445.593	D	7.844	7.593	0.252	3.3	84.96	14.42	0	0	0	0.63
2002	305	23	2589	318.383	-445.593	D	7.668	7.548	0.12	3.204	92.64	7.06	0	0	0	0.31
2002	306	23	2704	329.056	-425.092	D	7.71	7.546	0.164	3.2	90.16	9.4	0	0	0	0.44
2002	307	23	2781	339.842	-425.379	D	7.551	7.546	0.005	3.2	93.5	6.3	0	0	0	0.22
2002	308	23	2781	339.842	-425.379	D	7.547	7.546	0.001	3.2	93.49	6.34	0	0	0	0.22
2002	309	23	2781	339.842	-425.379	D	7.549	7.546	0.003	3.2	94.14	5.72	0	0	0	0.19
2002	310	23	2781	339.842	-425.379	D	7.561	7.546	0.015	3.2	94.43	5.42	0	0	0	0.15
2002	311	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	315	23	2781	339.842	-425.379	D	7.547	7.546	0.001	3.2	81.36	17.36	0	0	0	1.35
2002	316	23	2781	339.842	-425.379	D	7.62	7.546	0.074	3.2	83.81	15.42	0	0	0	0.77
2002	317	23	2781	339.842	-425.379	D	7.557	7.546	0.01	3.2	89.19	10.14	0	0	0	0.68
2002	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	319	23	2789	340.496	-426.449	D	7.574	7.546	0.028	3.2	88.31	11.38	0	0	0	0.31
2002	320	23	2694	327.861	-425.964	D	7.547	7.546	0.001	3.2	87.24	12.17	0	0	0	0.69
2002	321	23	2789	340.496	-426.449	D	7.576	7.546	0.03	3.2	85.27	14.13	0	0	0	0.6
2002	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	323	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	97.78	2.01	0	0	0	0.63
2002	324	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	95.1	5.57	0	0	0	0.47
2002	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	326	23	2589	318.383	-445.593	D	7.591	7.546	0.044	3.2	87.34	11.75	0	0	0	0.91
2002	327	23	2468	334.002	-434.887	D	7.553	7.546	0.007	3.2	90.2	9.33	0	0	0	0.48
2002	328	23	2704	329.056	-425.092	D	7.547	7.546	0	3.2	95.95	3.96	0	0	0	0.27
2002	329	23	2789	340.496	-426.449	D	7.56	7.546	0.014	3.2	93.69	6.17	0	0	0	0.15
2002	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	331	23	2628	320.933	-436.998	D	7.549	7.546	0.003	3.2	84.77	14.72	0	0	0	0.56
2002	332	23	2704	329.056	-425.092	D	7.563	7.546	0.016	3.2	83.68	15.96	0	0	0	0.37
2002	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	335	23	2789	340.496	-426.449	D	7.591	7.591	0	3.296	63.14	35.1	0	0	0	1.73
2002	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	2588	318.452	-445.8	D	7.736	7.593	0.144	3.3	87.44	12.09	0	0	0	0.47
2002	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	2684	326.713	-427.014	D	7.602	7.593	0.009	3.3	83.77	15.69	0	0	0	0.54
2002	340	23	2789	340.496	-426.449	D	7.649	7.593	0.056	3.3	85.45	14.1	0	0	0	0.45
2002	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	2758	335.862	-424.454	D	7.595	7.593	0.003	3.3	94.3	5.52	0	0	0	0.17
2002	343	23	2704	329.056	-425.092	D	7.695	7.593	0.102	3.3	94.57	5.29	0	0	0	0.13
2002	344	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	23	2589	318.383	-445.593	D	7.686	7.593	0.093	3.3	91.89	7.84	0	0	0	0.28
2002	348	23	2581	320.179	-445.667	D	8.053	7.593	0.461	3.3	92.56	7.18	0	0	0	0.26
2002	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	2781	339.842	-425.379	D	7.659	7.593	0.066	3.3	87.69	11.76	0	0	0	0.55
2002	354	23	2468	334.002	-434.887	D	7.593	7.593	0	3.3	87.81	11.82	0	0	0	0.32
2002	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	2781	339.842	-425.379	D	7.594	7.593	0.001	3.3	79.22	20.49	0	0	0	0.39
2002	357	23	2571	322.646	-445.476	D	7.604	7.593	0.011	3.3	88.09	11.68	0	0	0	0.24
2002	358	23	2588	318.452	-445.8	D	7.643	7.593	0.05	3.3	84.98	14.78	0	0	0	0.24
2002	359	23	2589	318.383	-445.593	D	7.632	7.593	0.039	3.3	89.46	10.3	0	0	0	0.24
2002	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	2704	329.056	-425.092	D	7.612	7.593	0.02	3.3	85.82	13.85	0	0	0	0.34
									0.909							
MARSHALL											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	2	23	2789	340.496	-426.449	D	7.64	7.593	0.047	3.3	67.24	32.06	0	0	0	0.7
2002	3	23	2789	340.496	-426.449	D	7.683	7.593	0.09	3.3	67.17	32.19	0	0	0	0.63

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	2684	326.713	-427.014	D	7.704	7.593	0.111	3.3	83.17	16.24	0	0	0	0.59
2002	11	23	2789	340.496	-426.449	D	7.653	7.593	0.06	3.3	88.3	11.37	0	0	0	0.33
2002	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	2789	340.496	-426.449	D	7.619	7.593	0.027	3.3	62.02	36.93	0	0	0	1.06
2002	18	23	2684	326.713	-427.014	D	7.646	7.593	0.054	3.3	65.97	33.43	0	0	0	0.6
2002	19	23	2758	335.862	-424.454	D	7.6	7.593	0.007	3.3	86.38	13.34	0	0	0	0.28
2002	20	23	2781	339.842	-425.379	D	7.642	7.593	0.05	3.3	83.45	16.3	0	0	0	0.25
2002	21	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	75.35	24.46	0	0	0	0.48
2002	25	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	26	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	27	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	30	23	2758	335.862	-424.454	D	7.965	7.593	0.372	3.3	85.18	14.53	0	0	0	0.29
2002	31	23	2694	327.861	-425.964	D	7.799	7.593	0.207	3.3	86.8	13.04	0	0	0	0.17
2002	32	23	2781	339.842	-425.379	D	7.461	7.459	0.002	3.013	89.2	10.75	0	0	0	0.07
2002	33	23	2788	340.294	-426.448	D	7.453	7.453	0	3	90.61	9.88	0	0	0	0.49
2002	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	35	23	2758	335.862	-424.454	D	7.479	7.453	0.026	3	74.25	24.87	0	0	0	0.88
2002	36	23	2589	318.383	-445.593	D	7.467	7.453	0.014	3	77.27	22.16	0	0	0	0.59
2002	37	23	1415	329.185	-425.086	D	7.453	7.453	0	3	82.81	16.94	0	0	0	0.33
2002	38	23	2781	339.842	-425.379	D	7.453	7.453	0.001	3	88.77	11.24	0	0	0	0.26
2002	39	23	2789	340.496	-426.449	D	7.453	7.453	0.001	3	90.94	9.31	0	0	0	0.18
2002	40	23	2208	335.391	-424.814	D	7.453	7.453	0	3	94.56	6.77	0	0	0	0.17
2002	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	42	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	43	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	44	23	2694	327.861	-425.964	D	7.526	7.453	0.073	3	54.35	43.97	0	0	0	1.68
2002	45	23	2790	340.421	-426.562	D	7.464	7.453	0.011	3	77.2	22.15	0	0	0	0.66
2002	46	23	2780	339.614	-425.419	D	7.453	7.453	0	3	85.77	14.32	0	0	0	0.28
2002	47	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	2789	340.496	-426.449	D	7.466	7.453	0.014	3	79.75	18.92	0	0	0	1.35
2002	49	23	2758	335.862	-424.454	D	7.46	7.453	0.007	3	85.71	13.69	0	0	0	0.61
2002	50	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	2790	340.421	-426.562	D	7.483	7.453	0.03	3	66.3	32.36	0	0	0	1.35
2002	54	23	2781	339.842	-425.379	D	7.473	7.453	0.021	3	80.1	19.26	0	0	0	0.65
2002	55	23	2789	340.496	-426.449	D	7.453	7.453	0	3	88.93	11.03	0	0	0	0.37
2002	56	23	2789	340.496	-426.449	D	7.453	7.453	0	3	84.4	16.16	0	0	0	0.5
2002	57	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	58	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2002	61	23	2781	339.842	-425.379	D	7.316	7.311	0.005	2.7	75.88	23.63	0	0	0	0.53
2002	62	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	63	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	1414	329.196	-425.335	D	7.311	7.311	0	2.7	95.66	3.78	0	0	0	0.73
2002	72	23	2781	339.842	-425.379	D	7.313	7.311	0.002	2.7	87.76	11.92	0	0	0	0.45
2002	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	23	2789	340.496	-426.449	D	7.324	7.311	0.013	2.7	84.35	15.12	0	0	0	0.54
2002	75	23	2789	340.496	-426.449	D	7.451	7.311	0.141	2.7	81.52	18	0	0	0	0.48
2002	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	79	23	2628	320.933	-436.998	D	7.441	7.311	0.131	2.7	76.94	22.29	0	0	0	0.77
2002	80	23	2589	318.383	-445.593	D	7.349	7.311	0.038	2.7	87.84	11.75	0	0	0	0.41
2002	81	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	82	23	2789	340.496	-426.449	D	7.311	7.311	0	2.7	77.41	22.18	0	0	0	0.38
2002	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	85	23	2789	340.496	-426.449	D	7.37	7.311	0.059	2.7	69.71	29.34	0	0	0	0.95
2002	86	23	2789	340.496	-426.449	D	7.355	7.311	0.044	2.7	94.11	5.56	0	0	0	0.34
2002	87	23	2781	339.842	-425.379	D	7.326	7.311	0.016	2.7	97.02	2.75	0	0	0	0.22
2002	88	23	2425	338.567	-427.733	D	7.404	7.311	0.093	2.7	98.38	1.14	0	0	0	0.49
2002	89	23	2571	322.646	-445.476	D	7.365	7.311	0.054	2.7	88.78	10.76	0	0	0	0.47
2002	90	23	2757	335.63	-424.484	D	7.313	7.311	0.002	2.7	97.76	1.54	0	0	0	0.74
2002	91	23	2789	340.496	-426.449	D	7.369	7.356	0.013	2.796	95.6	3.84	0	0	0	0.58
2002	92	23	2684	326.713	-427.014	D	7.394	7.358	0.035	2.8	91.86	7.78	0	0	0	0.36
2002	93	23	2789	340.496	-426.449	D	7.401	7.358	0.042	2.8	72.84	26.19	0	0	0	0.97
2002	94	23	2781	339.842	-425.379	D	7.476	7.358	0.118	2.8	87.02	12.54	0	0	0	0.44
2002	95	23	2589	318.383	-445.593	D	7.502	7.358	0.143	2.8	94.3	5.38	0	0	0	0.32
2002	96	23	2694	327.861	-425.964	D	7.407	7.358	0.049	2.8	97.15	2.61	0	0	0	0.24
2002	97	23	2789	340.496	-426.449	D	7.361	7.358	0.003	2.8	97.59	2.19	0	0	0	0.22
2002	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	99	23	2781	339.842	-425.379	D	7.455	7.358	0.097	2.8	91.57	7.98	0	0	0	0.45
2002	100	23	2589	318.383	-445.593	D	7.373	7.358	0.015	2.8	97.95	1.63	0	0	0	0.42
2002	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	115	23	2781	339.842	-425.379	D	7.371	7.358	0.013	2.8	59.91	37.63	0	0	0	2.47
2002	116	23	2781	339.842	-425.379	D	7.363	7.358	0.005	2.8	92.56	7.02	0	0	0	0.44
2002	117	23	2781	339.842	-425.379	D	7.359	7.358	0.001	2.8	96.41	3.28	0	0	0	0.31
2002	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	119	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	101.15	0.35	0	0	0	0.63
2002	120	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	99.47	0.36	0	0	0	0.42

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2002	122	23	2609	319.563	-441.09	D	7.679	7.639	0.04	3.4	85.36	14.08	0	0	0	0.56
2002	123	23	2600	318.952	-443.12	D	7.679	7.639	0.04	3.4	97.69	2.02	0	0	0	0.3
2002	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	130	23	2781	339.842	-425.379	D	7.681	7.639	0.042	3.4	96.62	3.12	0	0	0	0.26
2002	131	23	2781	339.842	-425.379	D	7.644	7.639	0.005	3.4	98.71	1.17	0	0	0	0.13
2002	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	133	23	2589	318.383	-445.593	D	7.727	7.639	0.088	3.4	83.45	16.11	0	0	0	0.44
2002	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	137	23	2589	318.383	-445.593	D	7.663	7.639	0.024	3.4	95.99	3.88	0	0	0	0.14
2002	138	23	2758	335.862	-424.454	D	7.64	7.639	0.001	3.4	97.97	1.73	0	0	0	0.3
2002	139	23	2684	326.713	-427.014	D	7.977	7.639	0.339	3.4	94.16	5.59	0	0	0	0.25
2002	140	23	2588	318.452	-445.8	D	7.641	7.639	0.002	3.4	99.12	0.61	0	0	0	0.3
2002	141	23	2781	339.842	-425.379	D	7.704	7.639	0.065	3.4	97.41	2.27	0	0	0	0.31
2002	142	23	2781	339.842	-425.379	D	7.668	7.639	0.029	3.4	98.68	1.1	0	0	0	0.22
2002	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	156	23	2704	329.056	-425.092	D	7.64	7.639	0.001	3.4	98.44	1.08	0	0	0	0.28
2002	157	23	2628	320.933	-436.998	D	7.677	7.639	0.039	3.4	97.64	2.02	0	0	0	0.34
2002	158	23	2589	318.383	-445.593	D	7.648	7.639	0.009	3.4	99.47	0.23	0	0	0	0.29
2002	159	23	2758	335.862	-424.454	D	7.639	7.639	0	3.4	99.54	0.16	0	0	0	0.18

Appendix M
Upper Buffalo
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	160	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	165	23	2789	340.496	-426.449	D	7.748	7.639	0.109	3.4	94.97	4.67	0	0	0	0.37
2002	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	168	23	2781	339.842	-425.379	D	7.81	7.639	0.171	3.4	99.14	0.57	0	0	0	0.3
2002	169	23	2789	340.496	-426.449	D	7.748	7.639	0.109	3.4	99.59	0.2	0	0	0	0.2
2002	170	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	99.74	0.08	0	0	0	0.18
2002	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	179	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	180	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	101.13	0.1	0	0	0	0.15
2002	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	192	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	99.28	0.53	0	0	0	0.2
2002	193	23	2781	339.842	-425.379	D	7.648	7.639	0.01	3.4	99.36	0.5	0	0	0	0.15
2002	194	23	2781	339.842	-425.379	D	7.644	7.639	0.005	3.4	97.72	2.18	0	0	0	0.12
2002	195	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

Appendix M
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2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	204	23	2781	339.842	-425.379	D	7.661	7.639	0.022	3.4	99.65	0.08	0	0	0	0.27
2002	205	23	2789	340.496	-426.449	D	7.711	7.639	0.072	3.4	99.37	0.43	0	0	0	0.2
2002	206	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	207	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	208	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	214	23	1449	329.434	-425.075	D	7.639	7.639	0	3.4	99.78	0.05	0	0	0	0.17
2002	215	23	1951	333.842	-434.874	D	7.64	7.639	0.001	3.4	99.93	0.03	0	0	0	0.11
2002	216	23	1415	329.185	-425.086	D	7.64	7.639	0.001	3.4	99.85	0.07	0	0	0	0.1
2002	217	23	2409	339.158	-425.648	D	7.639	7.639	0	3.4	99.85	0.02	0	0	0	0.1
2002	218	23	2781	339.842	-425.379	D	7.678	7.639	0.039	3.4	99.61	0.16	0	0	0	0.24
2002	219	23	2571	322.646	-445.476	D	7.767	7.639	0.129	3.4	98.99	0.84	0	0	0	0.17
2002	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	236	23	2781	339.842	-425.379	D	7.651	7.639	0.012	3.4	99.43	0.18	0	0	0	0.4
2002	237	23	2781	339.842	-425.379	D	8.01	7.639	0.371	3.4	97.23	2.51	0	0	0	0.26

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	238	23	2588	318.452	-445.8	D	7.682	7.639	0.043	3.4	99.42	0.31	0	0	0	0.27
2002	239	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	247	23	2781	339.842	-425.379	D	7.733	7.731	0.002	3.6	99.64	0.04	0	0	0	0.31
2002	248	23	2781	339.842	-425.379	D	7.781	7.731	0.05	3.6	99.55	0.21	0	0	0	0.24
2002	249	23	2704	329.056	-425.092	D	7.743	7.731	0.012	3.6	99.75	0.04	0	0	0	0.21
2002	250	23	1414	329.196	-425.335	D	7.731	7.731	0	3.6	99.51	0.02	0	0	0	0.19
2002	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	254	23	2589	318.383	-445.593	D	7.745	7.731	0.015	3.6	98.8	0.64	0	0	0	0.55
2002	255	23	2588	318.452	-445.8	D	7.765	7.731	0.034	3.6	98.76	0.86	0	0	0	0.38
2002	256	23	2588	318.452	-445.8	D	7.735	7.731	0.005	3.6	99.59	0.15	0	0	0	0.25
2002	257	23	2704	329.056	-425.092	D	7.733	7.731	0.002	3.6	99.6	0.17	0	0	0	0.2
2002	258	23	2781	339.842	-425.379	D	7.742	7.731	0.012	3.6	99.35	0.28	0	0	0	0.38
2002	259	23	2781	339.842	-425.379	D	8.111	7.731	0.381	3.6	97.7	2.06	0	0	0	0.25
2002	260	23	2781	339.842	-425.379	D	7.839	7.731	0.109	3.6	99.32	0.51	0	0	0	0.18
2002	261	23	2781	339.842	-425.379	D	7.733	7.731	0.002	3.6	97.78	2.05	0	0	0	0.13
2002	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	265	23	2599	318.958	-443.364	D	7.846	7.731	0.115	3.6	95.11	4.13	0	0	0	0.77
2002	266	23	2589	318.383	-445.593	D	7.788	7.731	0.057	3.6	94.62	4.8	0	0	0	0.58
2002	267	23	2704	329.056	-425.092	D	7.748	7.731	0.017	3.6	98.31	1.28	0	0	0	0.43
2002	268	23	2781	339.842	-425.379	D	7.758	7.731	0.028	3.6	98.61	1.12	0	0	0	0.27
2002	269	23	2704	329.056	-425.092	D	7.734	7.731	0.003	3.6	99.43	0.37	0	0	0	0.2
2002	270	23	2611	319.699	-440.64	D	7.83	7.731	0.099	3.6	99.1	0.39	0	0	0	0.51
2002	271	23	2571	322.646	-445.476	D	7.833	7.731	0.102	3.6	99.39	0.32	0	0	0	0.29
2002	272	23	2704	329.056	-425.092	D	7.785	7.731	0.054	3.6	99.05	0.76	0	0	0	0.19
2002	273	23	2758	335.862	-424.454	D	7.731	7.731	0.001	3.6	99.67	0.04	0	0	0	0.14
2002	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	278	23	2781	339.842	-425.379	D	7.606	7.593	0.013	3.3	97.67	1.51	0	0	0	0.82
2002	279	23	2789	340.496	-426.449	D	7.602	7.593	0.01	3.3	98	1.55	0	0	0	0.46
2002	280	23	2680	326.681	-427.94	D	7.615	7.593	0.023	3.3	81.79	16.39	0	0	0	1.83
2002	281	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	103.68	1.29	0	0	0	0.6
2002	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	285	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	286	23	2758	335.862	-424.454	D	7.653	7.593	0.061	3.3	62.1	36.45	0	0	0	1.45
2002	287	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	288	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	289	23	1415	329.185	-425.086	D	7.615	7.593	0.022	3.3	66.4	31.92	0	0	0	1.68
2002	290	23	2781	339.842	-425.379	D	7.6	7.593	0.008	3.3	85.18	14.46	0	0	0	0.39
2002	291	23	2418	339.946	-426.612	D	7.593	7.593	0	3.3	98.33	1.02	0	0	0	0.28
2002	292	23	2781	339.842	-425.379	D	7.658	7.593	0.065	3.3	84.94	14.72	0	0	0	0.34
2002	293	23	2571	322.646	-445.476	D	7.644	7.593	0.051	3.3	86.97	12.85	0	0	0	0.19
2002	294	23	2588	318.452	-445.8	D	7.594	7.593	0.002	3.3	96.19	3.69	0	0	0	0.15
2002	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	99.46	1.04	0	0	0	0.13
2002	296	23	1415	329.185	-425.086	D	7.593	7.593	0.001	3.3	92.49	7.29	0	0	0	0.25
2002	297	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	298	23	2781	339.842	-425.379	D	7.597	7.593	0.004	3.3	87.15	12.48	0	0	0	0.39
2002	299	23	2789	340.496	-426.449	D	7.595	7.593	0.003	3.3	88	11.75	0	0	0	0.31
2002	300	23	2758	335.862	-424.454	D	7.831	7.593	0.238	3.3	87.61	12.13	0	0	0	0.26
2002	301	23	2694	327.861	-425.964	D	7.606	7.593	0.014	3.3	90.81	9.01	0	0	0	0.19
2002	302	23	1048	326.791	-427.189	D	7.593	7.593	0	3.3	92.68	6.73	0	0	0	0.16
2002	303	23	2588	318.452	-445.8	D	7.716	7.593	0.123	3.3	94.78	4.92	0	0	0	0.3
2002	304	23	2589	318.383	-445.593	D	7.901	7.593	0.308	3.3	86.54	13.15	0	0	0	0.3
2002	305	23	2789	340.496	-426.449	D	7.574	7.548	0.026	3.204	85.13	14.5	0	0	0	0.36
2002	306	23	2571	322.646	-445.476	D	7.554	7.546	0.007	3.2	85	14.6	0	0	0	0.42
2002	307	23	2789	340.496	-426.449	D	7.561	7.546	0.015	3.2	86.1	13.63	0	0	0	0.28
2002	308	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	309	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	310	23	2789	340.496	-426.449	D	7.55	7.546	0.004	3.2	90.26	9.56	0	0	0	0.2
2002	311	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	316	23	2781	339.842	-425.379	D	7.585	7.546	0.038	3.2	61.88	36.61	0	0	0	1.51
2002	317	23	2418	339.946	-426.612	D	7.546	7.546	0	3.2	84.92	9.85	0	0	0	1
2002	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	319	23	2711	330.671	-424.932	D	7.787	7.546	0.241	3.2	74.51	24.79	0	0	0	0.69
2002	320	23	2694	327.861	-425.964	D	7.733	7.546	0.187	3.2	81.41	18.1	0	0	0	0.49
2002	321	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	80.74	18.69	0	0	0	0.59
2002	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	326	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	46.51	51.61	0	0	0	1.93
2002	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	328	23	2704	329.056	-425.092	D	7.546	7.546	0	3.2	90.19	9.49	0	0	0	0.38
2002	329	23	2628	320.933	-436.998	D	7.577	7.546	0.031	3.2	70.05	29.14	0	0	0	0.82
2002	330	23	2704	329.056	-425.092	D	7.604	7.546	0.058	3.2	78.06	21.37	0	0	0	0.57
2002	331	23	2593	318.996	-444.827	D	7.696	7.546	0.15	3.2	64.74	34.33	0	0	0	0.94
2002	332	23	2789	340.496	-426.449	D	7.573	7.546	0.027	3.2	73.45	26.11	0	0	0	0.44
2002	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2002	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	2571	322.646	-445.476	D	7.643	7.593	0.05	3.3	77.09	22.25	0	0	0	0.66
2002	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	339	23	2628	320.933	-436.998	D	7.707	7.593	0.114	3.3	59.93	39.01	0	0	0	1.06
2002	340	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	71.85	27.48	0	0	0	0.54
2002	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	85.03	14.65	0	0	0	0.23
2002	343	23	2704	329.056	-425.092	D	7.675	7.593	0.082	3.3	87.81	12.02	0	0	0	0.18
2002	344	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	23	2628	320.933	-436.998	D	7.704	7.593	0.112	3.3	83.63	16.09	0	0	0	0.28
2002	348	23	2789	340.496	-426.449	D	7.743	7.593	0.151	3.3	84.91	14.8	0	0	0	0.29
2002	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	67.83	31.8	0	0	0	0.48
2002	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	358	23	2704	329.056	-425.092	D	7.636	7.593	0.043	3.3	78.2	21.44	0	0	0	0.35
2002	359	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	86.35	13.39	0	0	0	0.22
2002	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	2752	334.471	-424.635	D	7.615	7.593	0.022	3.3	59.4	39.42	0	0	0	1.18
									0.381							
COLUMBIA											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	2	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	46.36	53.65	0	0	0	0.02
2002	3	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	49.92	50.07	0	0	0	0.02
2002	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	2789	340.496	-426.449	D	7.622	7.593	0.029	3.3	76.83	23.15	0	0	0	0.02
2002	11	23	2468	334.002	-434.887	D	7.594	7.593	0.002	3.3	78.39	21.57	0	0	0	0.01
2002	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	51.32	48.64	0	0	0	0.02
2002	18	23	2789	340.496	-426.449	D	7.622	7.593	0.03	3.3	59.25	40.74	0	0	0	0.02
2002	19	23	2758	335.862	-424.454	D	7.598	7.593	0.005	3.3	77.95	22.04	0	0	0	0.01
2002	20	23	2781	339.842	-425.379	D	7.613	7.593	0.02	3.3	78.31	21.69	0	0	0	0.01
2002	21	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	24	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	25	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	26	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	27	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	30	23	2758	335.862	-424.454	D	7.695	7.593	0.103	3.3	73.67	26.32	0	0	0	0.01
2002	31	23	2704	329.056	-425.092	D	7.777	7.593	0.184	3.3	79.72	20.27	0	0	0	0.01
2002	32	23	2781	339.842	-425.379	D	7.46	7.459	0.001	3.013	82.59	17.46	0	0	0	0
2002	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	35	23	2781	339.842	-425.379	D	7.453	7.453	0	3	64.97	35.74	0	0	0	0.03
2002	36	23	2711	330.671	-424.932	D	7.465	7.453	0.012	3	61.41	38.58	0	0	0	0.02
2002	37	23	1047	326.802	-427.438	D	7.453	7.453	0	3	72.47	27.9	0	0	0	0.01
2002	38	23	2789	340.496	-426.449	D	7.453	7.453	0	3	83.74	17.42	0	0	0	0.01
2002	39	23	2418	339.946	-426.612	D	7.453	7.453	0	3	86.08	15.21	0	0	0	0.01
2002	40	23	2368	337.982	-427.198	D	7.453	7.453	0	3	97.48	11.52	0	0	0	0.01
2002	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	42	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	43	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	44	23	2789	340.496	-426.449	D	7.458	7.453	0.005	3	42.91	57.05	0	0	0	0.04
2002	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	2789	340.496	-426.449	D	7.453	7.453	0	3	87.94	12.32	0	0	0	0.04
2002	49	23	2789	340.496	-426.449	D	7.455	7.453	0.003	3	73.14	26.87	0	0	0	0.02
2002	50	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	2789	340.496	-426.449	D	7.453	7.453	0	3	73.4	27.04	0	0	0	0.03
2002	54	23	2789	340.496	-426.449	D	7.455	7.453	0.002	3	73.24	26.84	0	0	0	0.02
2002	55	23	2789	340.496	-426.449	D	7.453	7.453	0	3	83.16	17.1	0	0	0	0.01
2002	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	57	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	58	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2002	61	23	2781	339.842	-425.379	D	7.312	7.311	0.002	2.7	66.8	33.34	0	0	0	0.01
2002	62	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	63	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	75	23	2704	329.056	-425.092	D	7.328	7.311	0.017	2.7	38.91	61.04	0	0	0	0.05
2002	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	79	23	2704	329.056	-425.092	D	7.393	7.311	0.083	2.7	79.34	20.65	0	0	0	0.01
2002	80	23	2789	340.496	-426.449	D	7.327	7.311	0.016	2.7	79.79	20.19	0	0	0	0.01
2002	81	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	82	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	85	23	2684	326.713	-427.014	D	7.363	7.311	0.052	2.7	75.43	24.55	0	0	0	0.02
2002	86	23	2789	340.496	-426.449	D	7.312	7.311	0.001	2.7	95.99	4.11	0	0	0	0.01
2002	87	23	2789	340.496	-426.449	D	7.316	7.311	0.005	2.7	91.78	8.21	0	0	0	0.01
2002	88	23	2789	340.496	-426.449	D	7.344	7.311	0.033	2.7	96.62	3.36	0	0	0	0.02
2002	89	23	2468	334.002	-434.887	D	7.316	7.311	0.005	2.7	85.67	14.35	0	0	0	0.02
2002	90	23	2705	329.287	-425.069	D	7.311	7.311	0.001	2.7	96.94	3.02	0	0	0	0.02
2002	91	23	2781	339.842	-425.379	D	7.36	7.356	0.004	2.796	91.29	8.73	0	0	0	0.02
2002	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	94	23	2789	340.496	-426.449	D	7.362	7.358	0.004	2.8	80.27	19.78	0	0	0	0.02
2002	95	23	2781	339.842	-425.379	D	7.369	7.358	0.01	2.8	88.18	11.82	0	0	0	0.01
2002	96	23	2789	340.496	-426.449	D	7.392	7.358	0.033	2.8	94.62	5.37	0	0	0	0.01
2002	97	23	2781	339.842	-425.379	D	7.363	7.358	0.005	2.8	97.22	2.76	0	0	0	0.01
2002	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	99	23	2789	340.496	-426.449	D	7.361	7.358	0.003	2.8	97.77	2.24	0	0	0	0.02
2002	100	23	2711	330.671	-424.932	D	7.378	7.358	0.02	2.8	95.96	4.02	0	0	0	0.01
2002	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	115	23	2789	340.496	-426.449	D	7.365	7.358	0.007	2.8	93.95	6.05	0	0	0	0.03
2002	116	23	2758	335.862	-424.454	D	7.37	7.358	0.012	2.8	91.2	8.8	0	0	0	0.02
2002	117	23	2781	339.842	-425.379	D	7.359	7.358	0	2.8	94.12	5.74	0	0	0	0.01
2002	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2002	122	23	2789	340.496	-426.449	D	7.649	7.639	0.01	3.4	86.87	13.11	0	0	0	0.01
2002	123	23	2789	340.496	-426.449	D	7.666	7.639	0.028	3.4	91.03	8.97	0	0	0	0.01
2002	124	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	130	23	2789	340.496	-426.449	D	7.652	7.639	0.013	3.4	97.83	2.17	0	0	0	0.01
2002	131	23	2781	339.842	-425.379	D	7.646	7.639	0.007	3.4	97.75	2.24	0	0	0	0.01
2002	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	133	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	60.49	38.97	0	0	0	0.03
2002	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	137	23	2610	319.631	-440.865	D	7.66	7.639	0.021	3.4	90.85	9.15	0	0	0	0.01
2002	138	23	2571	322.646	-445.476	D	7.646	7.639	0.007	3.4	86.37	13.62	0	0	0	0.01
2002	139	23	2789	340.496	-426.449	D	7.735	7.639	0.096	3.4	91.46	8.54	0	0	0	0.01
2002	140	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	98.01	1.85	0	0	0	0.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	141	23	2781	339.842	-425.379	D	7.671	7.639	0.032	3.4	94.89	5.1	0	0	0	0.01
2002	142	23	2789	340.496	-426.449	D	7.656	7.639	0.017	3.4	97.78	2.21	0	0	0	0.01
2002	143	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	98.51	0.88	0	0	0	0
2002	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	156	23	2749	333.775	-424.726	D	7.639	7.639	0	3.4	96.85	2.75	0	0	0	0.01
2002	157	23	2628	320.933	-436.998	D	7.767	7.639	0.128	3.4	86.5	13.48	0	0	0	0.01
2002	158	23	2589	318.383	-445.593	D	7.668	7.639	0.029	3.4	99.44	0.56	0	0	0	0.01
2002	159	23	2781	339.842	-425.379	D	7.667	7.639	0.028	3.4	99.38	0.62	0	0	0	0.01
2002	160	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.83	0.13	0	0	0	0.01
2002	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	168	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	98.53	1.5	0	0	0	0.01
2002	169	23	2789	340.496	-426.449	D	7.645	7.639	0.006	3.4	99.76	0.24	0	0	0	0.01
2002	170	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.96	0.17	0	0	0	0.01
2002	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	179	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	180	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	186	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	100.12	0.08	0	0	0	0.01
2002	187	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	99.95	0.08	0	0	0	0
2002	188	23	2704	329.056	-425.092	D	7.641	7.639	0.002	3.4	99.95	0.11	0	0	0	0
2002	189	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	98.12	0.04	0	0	0	0
2002	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	192	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	98.86	1.21	0	0	0	0.01
2002	193	23	2780	339.614	-425.419	D	7.644	7.639	0.005	3.4	98.54	1.47	0	0	0	0.01
2002	194	23	1415	329.185	-425.086	D	7.642	7.639	0.004	3.4	97.18	2.86	0	0	0	0
2002	195	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.84	0.26	0	0	0	0
2002	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	204	23	2704	329.056	-425.092	D	7.641	7.639	0.002	3.4	99.84	0.16	0	0	0	0.01
2002	205	23	2781	339.842	-425.379	D	7.775	7.639	0.136	3.4	99.08	0.91	0	0	0	0.01
2002	206	23	2589	318.383	-445.593	D	7.665	7.639	0.026	3.4	99.83	0.17	0	0	0	0.01
2002	207	23	2781	339.842	-425.379	D	7.643	7.639	0.005	3.4	99.76	0.26	0	0	0	0.01
2002	208	23	2337	337.15	-425.236	D	7.639	7.639	0	3.4	99.15	0.03	0	0	0	0.01
2002	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	214	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	216	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	217	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	218	23	2789	340.496	-426.449	D	7.659	7.639	0.02	3.4	99.59	0.4	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	219	23	2571	322.646	-445.476	D	7.729	7.639	0.09	3.4	98.07	1.92	0	0	0	0.01
2002	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	237	23	2789	340.496	-426.449	D	7.657	7.639	0.018	3.4	98.94	1.04	0	0	0	0.02
2002	238	23	2588	318.452	-445.8	D	7.725	7.639	0.086	3.4	95.37	4.62	0	0	0	0.01
2002	239	23	2684	326.713	-427.014	D	7.654	7.639	0.015	3.4	98.47	1.52	0	0	0	0.01
2002	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	242	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	247	23	2781	339.842	-425.379	D	7.731	7.731	0	3.6	99.9	0.09	0	0	0	0.01
2002	248	23	2781	339.842	-425.379	D	7.747	7.731	0.016	3.6	99.6	0.38	0	0	0	0.01
2002	249	23	2704	329.056	-425.092	D	7.734	7.731	0.003	3.6	99.93	0.07	0	0	0	0.01
2002	250	23	1242	327.988	-426.138	D	7.731	7.731	0	3.6	99.17	0.03	0	0	0	0.01
2002	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	254	23	2789	340.496	-426.449	D	7.799	7.731	0.068	3.6	92.9	7.07	0	0	0	0.04
2002	255	23	2571	322.646	-445.476	D	7.794	7.731	0.063	3.6	93.86	6.13	0	0	0	0.01
2002	256	23	2588	318.452	-445.8	D	7.74	7.731	0.01	3.6	99.76	0.24	0	0	0	0.01
2002	257	23	2704	329.056	-425.092	D	7.734	7.731	0.004	3.6	99.72	0.29	0	0	0	0.01

Appendix M
Upper Buffalo
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	258	23	2417	339.654	-425.626	D	7.731	7.731	0	3.6	98.96	0.53	0	0	0	0.01
2002	259	23	2789	340.496	-426.449	D	7.788	7.731	0.057	3.6	97.63	2.36	0	0	0	0.01
2002	260	23	2789	340.496	-426.449	D	7.775	7.731	0.045	3.6	98.58	1.41	0	0	0	0.01
2002	261	23	2781	339.842	-425.379	D	7.732	7.731	0.001	3.6	96.04	3.92	0	0	0	0
2002	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	265	23	2789	340.496	-426.449	D	7.757	7.731	0.027	3.6	90.98	8.99	0	0	0	0.04
2002	266	23	2789	340.496	-426.449	D	7.756	7.731	0.025	3.6	95.35	4.63	0	0	0	0.02
2002	267	23	2758	335.862	-424.454	D	7.76	7.731	0.029	3.6	97.11	2.87	0	0	0	0.02
2002	268	23	2758	335.862	-424.454	D	7.744	7.731	0.013	3.6	98.24	1.75	0	0	0	0.01
2002	269	23	2704	329.056	-425.092	D	7.731	7.731	0.001	3.6	99.27	0.49	0	0	0	0.01
2002	270	23	2588	318.452	-445.8	D	7.805	7.731	0.074	3.6	98.33	1.66	0	0	0	0.02
2002	271	23	2789	340.496	-426.449	D	7.766	7.731	0.035	3.6	99.05	0.93	0	0	0	0.01
2002	272	23	2758	335.862	-424.454	D	7.743	7.731	0.012	3.6	98.64	1.35	0	0	0	0.01
2002	273	23	2758	335.862	-424.454	D	7.731	7.731	0	3.6	98.85	0.08	0	0	0	0.01
2002	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	278	23	2789	340.496	-426.449	D	7.597	7.593	0.005	3.3	98.6	1.38	0	0	0	0.03
2002	279	23	2789	340.496	-426.449	D	7.601	7.593	0.008	3.3	97.24	2.74	0	0	0	0.02
2002	280	23	2789	340.496	-426.449	D	7.601	7.593	0.008	3.3	96.04	3.92	0	0	0	0.03
2002	281	23	2589	318.383	-445.593	D	7.611	7.593	0.019	3.3	95.39	4.6	0	0	0	0.02
2002	282	23	1048	326.791	-427.189	D	7.593	7.593	0	3.3	97.89	1.23	0	0	0	0.01
2002	283	23	1046	326.812	-427.688	D	7.593	7.593	0	3.3	90.55	0.72	0	0	0	0.01
2002	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	285	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	286	23	2704	329.056	-425.092	D	7.615	7.593	0.022	3.3	86.2	13.78	0	0	0	0.02
2002	287	23	2628	320.933	-436.998	D	7.598	7.593	0.005	3.3	88.39	11.58	0	0	0	0.02
2002	288	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	92.51	7.57	0	0	0	0.01
2002	289	23	2789	340.496	-426.449	D	7.64	7.593	0.047	3.3	60.93	39.02	0	0	0	0.05
2002	290	23	2571	322.646	-445.476	D	7.595	7.593	0.003	3.3	85.9	14.11	0	0	0	0.02
2002	291	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	292	23	2781	339.842	-425.379	D	7.609	7.593	0.017	3.3	79.56	20.42	0	0	0	0.01
2002	293	23	2704	329.056	-425.092	D	7.702	7.593	0.11	3.3	77.55	22.44	0	0	0	0.01
2002	294	23	2684	326.713	-427.014	D	7.605	7.593	0.012	3.3	93.71	6.28	0	0	0	0.01
2002	295	23	2684	326.713	-427.014	D	7.599	7.593	0.007	3.3	95.29	4.72	0	0	0	0.01
2002	296	23	2758	335.862	-424.454	D	7.606	7.593	0.014	3.3	93.06	6.93	0	0	0	0.01

Appendix M
Upper Buffalo
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	297	23	1415	329.185	-425.086	D	7.596	7.593	0.003	3.3	94.97	5.02	0	0	0	0.01
2002	298	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	299	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	97.65	2.51	0	0	0	0.01
2002	300	23	2781	339.842	-425.379	D	7.737	7.593	0.144	3.3	83.08	16.91	0	0	0	0.01
2002	301	23	2704	329.056	-425.092	D	7.621	7.593	0.029	3.3	86.85	13.14	0	0	0	0.01
2002	302	23	2711	330.671	-424.932	D	7.654	7.593	0.062	3.3	78.39	21.59	0	0	0	0.01
2002	303	23	2588	318.452	-445.8	D	7.938	7.593	0.345	3.3	84.24	15.75	0	0	0	0.01
2002	304	23	2476	332.154	-435.398	D	7.829	7.593	0.236	3.3	80.35	19.64	0	0	0	0.01
2002	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2002	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	307	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	79.38	21.36	0	0	0	0.01
2002	308	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	309	23	2411	339.428	-426.135	D	7.546	7.546	0	3.2	89.45	10.64	0	0	0	0
2002	310	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	74.7	25.34	0	0	0	0.01
2002	311	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	316	23	2789	340.496	-426.449	D	7.549	7.546	0.003	3.2	42.32	57.65	0	0	0	0.05
2002	317	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	319	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	38.06	65.28	0	0	0	0.02
2002	320	23	2789	340.496	-426.449	D	7.564	7.546	0.017	3.2	46.03	53.94	0	0	0	0.04
2002	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	328	23	1415	329.185	-425.086	D	7.546	7.546	0	3.2	75.65	24.58	0	0	0	0.01
2002	329	23	2789	340.496	-426.449	D	7.601	7.546	0.055	3.2	60.95	39.03	0	0	0	0.02
2002	330	23	2781	339.842	-425.379	D	7.595	7.546	0.049	3.2	66.93	33.06	0	0	0	0.02
2002	331	23	2789	340.496	-426.449	D	7.592	7.546	0.046	3.2	58.17	41.82	0	0	0	0.02
2002	332	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	57.02	42.85	0	0	0	0.02
2002	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0

Appendix M
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2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	2588	318.452	-445.8	D	7.604	7.593	0.012	3.3	61.01	38.96	0	0	0	0.03
2002	338	23	2588	318.452	-445.8	D	7.593	7.593	0	3.3	65.97	34.01	0	0	0	0.01
2002	339	23	2789	340.496	-426.449	D	7.605	7.593	0.013	3.3	31.85	68.12	0	0	0	0.04
2002	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	343	23	2704	329.056	-425.092	D	7.649	7.593	0.056	3.3	74.03	25.97	0	0	0	0.01
2002	344	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	23	2704	329.056	-425.092	D	7.681	7.593	0.088	3.3	73.75	26.24	0	0	0	0.01
2002	348	23	2790	340.421	-426.562	D	7.653	7.593	0.061	3.3	73.28	26.71	0	0	0	0.01
2002	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	358	23	2781	339.842	-425.379	D	7.631	7.593	0.038	3.3	66.05	33.94	0	0	0	0.01
2002	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	2628	320.933	-436.998	D	7.621	7.593	0.029	3.3	45.76	54.2	0	0	0	0.04
									0.345							
HOLCIM									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2002	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	2	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	3	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	10	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	11	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	12	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	13	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	16	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	17	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	47.35	52.52	0	0	0	0.11
2002	18	23	2789	340.496	-426.449	D	7.633	7.593	0.04	3.3	60.87	38.95	0	0	0	0.18
2002	19	23	2781	339.842	-425.379	D	7.727	7.593	0.135	3.3	63.77	36.11	0	0	0	0.13
2002	20	23	2789	340.496	-426.449	D	7.783	7.593	0.19	3.3	68.23	31.68	0	0	0	0.09
2002	21	23	2417	339.654	-425.626	D	7.593	7.593	0	3.3	72.13	27.35	0	0	0	0.05
2002	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	24	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	25	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	26	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	27	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	30	23	2781	339.842	-425.379	D	7.601	7.593	0.009	3.3	58.01	41.84	0	0	0	0.15
2002	31	23	2704	329.056	-425.092	D	8.122	7.593	**0.53**	3.3	63.55	36.33	0	0	0	0.13
2002	32	23	2781	339.842	-425.379	D	7.46	7.459	0.001	3.013	72.79	27.21	0	0	0	0.04
2002	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	36	23	2789	340.496	-426.449	D	7.513	7.453	0.06	3	46.96	52.84	0	0	0	0.2
2002	37	23	2704	329.056	-425.092	D	7.455	7.453	0.002	3	57.04	42.89	0	0	0	0.13
2002	38	23	2781	339.842	-425.379	D	7.456	7.453	0.004	3	71.23	28.69	0	0	0	0.12
2002	39	23	2789	340.496	-426.449	D	7.456	7.453	0.004	3	76.04	23.95	0	0	0	0.09
2002	40	23	2789	340.496	-426.449	D	7.453	7.453	0.001	3	82.15	17.89	0	0	0	0.07
2002	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	42	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	43	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0

Appendix M
Upper Buffalo
2002 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	47	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	49	23	2789	340.496	-426.449	D	7.453	7.453	0	3	50.46	50.12	0	0	0	0.3
2002	50	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	51	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	52	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	53	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	54	23	2418	339.946	-426.612	D	7.453	7.453	0	3	82.56	17.24	0	0	0	0.31
2002	55	23	2789	340.496	-426.449	D	7.454	7.453	0.001	3	74.34	25.48	0	0	0	0.23
2002	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	57	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	58	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	59	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2002	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2002	61	23	2781	339.842	-425.379	D	7.318	7.311	0.007	2.7	56.08	43.83	0	0	0	0.12
2002	62	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	63	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	68	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	69	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	70	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	74	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	75	23	2789	340.496	-426.449	D	7.418	7.311	0.108	2.7	56.07	43.59	0	0	0	0.35
2002	76	23	2684	326.713	-427.014	D	7.415	7.311	0.104	2.7	57.54	42.25	0	0	0	0.2
2002	77	23	2781	339.842	-425.379	D	7.311	7.311	0	2.7	89.39	11.04	0	0	0	0.15
2002	78	23	2758	335.862	-424.454	D	7.378	7.311	0.068	2.7	73.7	26.17	0	0	0	0.13
2002	79	23	2781	339.842	-425.379	D	8.166	7.311	**0.855**	2.7	72.06	27.82	0	0	0	0.12
2002	80	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	81	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	82	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	84	23	2684	326.713	-427.014	D	7.314	7.311	0.004	2.7	71.31	28.54	0	0	0	0.16
2002	85	23	2781	339.842	-425.379	D	7.777	7.311	0.466	2.7	71.17	28.67	0	0	0	0.16
2002	86	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	87	23	2789	340.496	-426.449	D	7.311	7.311	0.001	2.7	80.62	19.2	0	0	0	0.18
2002	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2002	89	23	2789	340.496	-426.449	D	7.406	7.311	0.095	2.7	77.11	22.6	0	0	0	0.3
2002	90	23	2628	320.933	-436.998	D	7.336	7.311	0.025	2.7	74.3	25.49	0	0	0	0.22
2002	91	23	2781	339.842	-425.379	D	7.364	7.356	0.008	2.796	74.86	24.7	0	0	0	0.45
2002	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	94	23	2781	339.842	-425.379	D	7.359	7.358	0	2.8	77.04	23.24	0	0	0	0.33
2002	95	23	2781	339.842	-425.379	D	7.507	7.358	0.149	2.8	69.18	30.59	0	0	0	0.23
2002	96	23	2781	339.842	-425.379	D	7.533	7.358	0.175	2.8	85.83	13.99	0	0	0	0.18
2002	97	23	2758	335.862	-424.454	D	7.363	7.358	0.004	2.8	94.07	5.78	0	0	0	0.17
2002	98	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	99	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	100	23	2781	339.842	-425.379	D	7.452	7.358	0.094	2.8	76.42	23.39	0	0	0	0.19
2002	101	23	1048	326.791	-427.189	D	7.358	7.358	0	2.8	98.29	0.67	0	0	0	0.18
2002	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	113	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	115	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	116	23	2571	322.646	-445.476	D	7.386	7.358	0.028	2.8	75.95	23.84	0	0	0	0.21
2002	117	23	2781	339.842	-425.379	D	7.365	7.358	0.007	2.8	87.56	12.27	0	0	0	0.16
2002	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2002	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	122	23	2789	340.496	-426.449	D	7.69	7.639	0.052	3.4	89.58	10.34	0	0	0	0.08
2002	123	23	2589	318.383	-445.593	D	7.831	7.639	0.192	3.4	91.56	8.27	0	0	0	0.18
2002	124	23	2684	326.713	-427.014	D	7.777	7.639	0.139	3.4	91.15	8.75	0	0	0	0.1
2002	125	23	2684	326.713	-427.014	D	7.708	7.639	0.069	3.4	94.91	5.01	0	0	0	0.08
2002	126	23	2154	334.894	-424.836	D	7.639	7.639	0	3.4	99.5	0.09	0	0	0	0.05
2002	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	130	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	137	23	2628	320.933	-436.998	D	8.234	7.639	**0.595**	3.4	73.57	26.33	0	0	0	0.1
2002	138	23	2789	340.496	-426.449	D	8.211	7.639	**0.573**	3.4	68.55	31.32	0	0	0	0.14
2002	139	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	140	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	141	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	96.99	2.8	0	0	0	0.21
2002	142	23	2789	340.496	-426.449	D	7.69	7.639	0.051	3.4	95.62	4.23	0	0	0	0.15
2002	143	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	98.32	1.57	0	0	0	0.1
2002	144	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	145	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	149	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	150	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	157	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	158	23	2571	322.646	-445.476	D	7.678	7.639	0.039	3.4	98.28	1.55	0	0	0	0.17
2002	159	23	2789	340.496	-426.449	D	7.839	7.639	0.201	3.4	98.78	1.09	0	0	0	0.13
2002	160	23	2758	335.862	-424.454	D	7.667	7.639	0.028	3.4	99.54	0.35	0	0	0	0.11

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	166	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	168	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.65	0.23	0	0	0	0.16
2002	169	23	2781	339.842	-425.379	D	7.643	7.639	0.005	3.4	99.67	0.21	0	0	0	0.12
2002	170	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.35	0.54	0	0	0	0.11
2002	171	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	178	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	179	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	180	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	183	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	184	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	185	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.68	0.22	0	0	0	0.11
2002	186	23	2781	339.842	-425.379	D	7.647	7.639	0.008	3.4	99.74	0.2	0	0	0	0.08
2002	187	23	2789	340.496	-426.449	D	7.747	7.639	0.109	3.4	99.57	0.33	0	0	0	0.1
2002	188	23	2694	327.861	-425.964	D	7.743	7.639	0.105	3.4	99.62	0.3	0	0	0	0.08
2002	189	23	2758	335.862	-424.454	D	7.639	7.639	0	3.4	99.81	0.18	0	0	0	0.08
2002	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	192	23	2781	339.842	-425.379	D	7.649	7.639	0.01	3.4	97.92	1.94	0	0	0	0.14
2002	193	23	2781	339.842	-425.379	D	7.675	7.639	0.036	3.4	96.89	3.01	0	0	0	0.1
2002	194	23	2758	335.862	-424.454	D	7.662	7.639	0.023	3.4	91.34	8.58	0	0	0	0.08
2002	195	23	2704	329.056	-425.092	D	7.641	7.639	0.002	3.4	99.57	0.31	0	0	0	0.13
2002	196	23	2704	329.056	-425.092	D	7.655	7.639	0.016	3.4	98.7	1.13	0	0	0	0.18
2002	197	23	2694	327.861	-425.964	D	7.639	7.639	0	3.4	99.67	0.12	0	0	0	0.15
2002	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	199	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	204	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	205	23	2789	340.496	-426.449	D	7.688	7.639	0.049	3.4	98.56	1.28	0	0	0	0.17
2002	206	23	2789	340.496	-426.449	D	7.769	7.639	0.13	3.4	99.38	0.51	0	0	0	0.11
2002	207	23	2789	340.496	-426.449	D	7.667	7.639	0.029	3.4	99.38	0.53	0	0	0	0.09
2002	208	23	2780	339.614	-425.419	D	7.639	7.639	0	3.4	99.36	0.07	0	0	0	0.08
2002	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	210	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	211	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	212	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	213	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	214	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	216	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	217	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	218	23	2789	340.496	-426.449	D	7.663	7.639	0.024	3.4	97.7	2.15	0	0	0	0.14
2002	219	23	2571	322.646	-445.476	D	8.055	7.639	0.416	3.4	94.75	5.15	0	0	0	0.1
2002	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	231	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	232	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	233	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	234	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	235	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	236	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	237	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	238	23	2789	340.496	-426.449	D	7.701	7.639	0.062	3.4	97.89	1.9	0	0	0	0.22

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	239	23	2781	339.842	-425.379	D	8.071	7.639	0.432	3.4	98.51	1.3	0	0	0	0.19
2002	240	23	2684	326.713	-427.014	D	7.801	7.639	0.162	3.4	99.28	0.58	0	0	0	0.15
2002	241	23	1242	327.988	-426.138	D	7.639	7.639	0	3.4	96.5	0.41	0	0	0	0.22
2002	242	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	243	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2002	245	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	247	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	248	23	2789	340.496	-426.449	D	7.909	7.731	0.178	3.6	99.07	0.77	0	0	0	0.16
2002	249	23	2628	320.933	-436.998	D	7.824	7.731	0.093	3.6	99.38	0.48	0	0	0	0.13
2002	250	23	1415	329.185	-425.086	D	7.731	7.731	0	3.6	99.56	0.08	0	0	0	0.12
2002	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	254	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	255	23	2789	340.496	-426.449	D	7.945	7.731	0.215	3.6	86.85	12.94	0	0	0	0.21
2002	256	23	2589	318.383	-445.593	D	7.833	7.731	0.102	3.6	99.24	0.61	0	0	0	0.15
2002	257	23	2706	329.518	-425.046	D	7.749	7.731	0.018	3.6	99.28	0.6	0	0	0	0.12
2002	258	23	2781	339.842	-425.379	D	7.731	7.731	0.001	3.6	98.83	1.1	0	0	0	0.1
2002	259	23	2789	340.496	-426.449	D	7.742	7.731	0.012	3.6	99.2	0.65	0	0	0	0.15
2002	260	23	2789	340.496	-426.449	D	7.753	7.731	0.022	3.6	97.45	2.43	0	0	0	0.12
2002	261	23	2781	339.842	-425.379	D	7.731	7.731	0	3.6	95.23	4.98	0	0	0	0.08
2002	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	265	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2002	266	23	2468	334.002	-434.887	D	7.733	7.731	0.002	3.6	97.64	2.02	0	0	0	0.33
2002	267	23	2789	340.496	-426.449	D	7.788	7.731	0.058	3.6	93.3	6.44	0	0	0	0.26
2002	268	23	2781	339.842	-425.379	D	7.78	7.731	0.049	3.6	94.63	5.18	0	0	0	0.19
2002	269	23	2704	329.056	-425.092	D	7.738	7.731	0.007	3.6	98.23	1.64	0	0	0	0.14
2002	270	23	2758	335.862	-424.454	D	7.827	7.731	0.096	3.6	98.95	0.81	0	0	0	0.24
2002	271	23	2781	339.842	-425.379	D	8.181	7.731	0.45	3.6	97.73	2.09	0	0	0	0.18
2002	272	23	2781	339.842	-425.379	D	7.956	7.731	0.225	3.6	97.62	2.25	0	0	0	0.13
2002	273	23	2781	339.842	-425.379	D	7.731	7.731	0.001	3.6	99.75	0.17	0	0	0	0.08
2002	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2002	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	276	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	278	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	279	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	94.4	5.36	0	0	0	0.26
2002	280	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	281	23	2789	340.496	-426.449	D	7.675	7.593	0.083	3.3	87.87	11.86	0	0	0	0.27
2002	282	23	2628	320.933	-436.998	D	7.602	7.593	0.01	3.3	92.41	7.39	0	0	0	0.2
2002	283	23	1415	329.185	-425.086	D	7.593	7.593	0	3.3	98.22	1.58	0	0	0	0.17
2002	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	285	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	286	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	287	23	2571	322.646	-445.476	D	7.746	7.593	0.154	3.3	67.8	31.95	0	0	0	0.25
2002	288	23	2571	322.646	-445.476	D	7.659	7.593	0.066	3.3	81.97	17.85	0	0	0	0.19
2002	289	23	2350	337.8	-428.705	D	7.593	7.593	0	3.3	77.18	2.48	0	0	0	0.17
2002	290	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	291	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	293	23	2571	322.646	-445.476	D	7.831	7.593	0.238	3.3	75	24.84	0	0	0	0.16
2002	294	23	2573	322.153	-445.515	D	8.086	7.593	0.494	3.3	82.62	17.23	0	0	0	0.15
2002	295	23	2588	318.452	-445.8	D	7.917	7.593	0.324	3.3	91.28	8.61	0	0	0	0.12
2002	296	23	2781	339.842	-425.379	D	7.99	7.593	0.397	3.3	88.23	11.59	0	0	0	0.18
2002	297	23	2589	318.383	-445.593	D	7.897	7.593	0.304	3.3	93.06	6.81	0	0	0	0.13
2002	298	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	87.12	12.66	0	0	0	0.08
2002	299	23	2789	340.496	-426.449	D	7.6	7.593	0.007	3.3	85.83	14.04	0	0	0	0.12
2002	300	23	2789	340.496	-426.449	D	8.992	7.593	**1.4**	3.3	78.48	21.4	0	0	0	0.13
2002	301	23	2704	329.056	-425.092	D	8.126	7.593	**0.534**	3.3	75.64	24.27	0	0	0	0.09
2002	302	23	2758	335.862	-424.454	D	8.097	7.593	**0.505**	3.3	62.71	37.11	0	0	0	0.18
2002	303	23	2789	340.496	-426.449	D	10.061	7.593	**2.469**	3.3	69.53	30.31	0	0	0	0.15
2002	304	23	2789	340.496	-426.449	D	8.893	7.593	**1.301**	3.3	64.31	35.54	0	0	0	0.14
2002	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2002	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	307	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	308	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	309	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	310	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	311	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	316	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	317	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	329	23	2789	340.496	-426.449	D	7.9	7.546	0.354	3.2	50.27	49.63	0	0	0	0.1
2002	330	23	2789	340.496	-426.449	D	7.629	7.546	0.083	3.2	55.03	44.79	0	0	0	0.18
2002	331	23	2571	322.646	-445.476	D	7.834	7.546	0.287	3.2	40.56	59.26	0	0	0	0.18
2002	332	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2002	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	337	23	2588	318.452	-445.8	D	7.693	7.593	0.101	3.3	36.93	62.68	0	0	0	0.39
2002	338	23	2588	318.452	-445.8	D	7.599	7.593	0.006	3.3	52.36	47.54	0	0	0	0.1
2002	339	23	2789	340.496	-426.449	D	7.884	7.593	0.291	3.3	26.66	73.02	0	0	0	0.32
2002	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	342	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	343	23	2758	335.862	-424.454	D	8.002	7.593	0.41	3.3	60.84	39.06	0	0	0	0.1
2002	344	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	345	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	346	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	347	23	2781	339.842	-425.379	D	7.659	7.593	0.067	3.3	53.14	46.68	0	0	0	0.18
2002	348	23	2789	340.496	-426.449	D	7.771	7.593	0.178	3.3	51.87	47.98	0	0	0	0.15
2002	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	358	23	2600	318.952	-443.12	D	7.944	7.593	0.351	3.3	45.11	54.7	0	0	0	0.19
2002	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	360	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2002	365	23	2789	340.496	-426.449	D	7.676	7.593	0.083	3.3	61.82	37.97	0	0	0	0.21
									2.469							

Appendix M
Upper Buffalo
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EGU											% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	2758	335.862	-424.454	D	7.606	7.593	0.014	3.3	0	0	0	0	0	100.01
2003	2	23	2704	329.056	-425.092	D	7.612	7.593	0.02	3.3	0	0	0	0	0	100.01
2003	3	23	802	325.089	-433.759	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100
2003	4	23	2416	339.665	-425.875	D	7.593	7.593	0	3.3	0	0	0	0	0	95.17
2003	5	23	2588	318.452	-445.8	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100
2003	6	23	2758	335.862	-424.454	D	7.632	7.593	0.04	3.3	0	0	0	0	0	100
2003	7	23	2684	326.713	-427.014	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.03
2003	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	11.51
2003	9	23	2704	329.056	-425.092	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100
2003	10	23	2789	340.496	-426.449	D	7.596	7.593	0.004	3.3	0	0	0	0	0	99.98
2003	11	23	2758	335.862	-424.454	D	7.639	7.593	0.047	3.3	0	0	0	0	0	100
2003	12	23	2781	339.842	-425.379	D	7.619	7.593	0.026	3.3	0	0	0	0	0	100
2003	13	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.12
2003	14	23	2789	340.496	-426.449	D	7.595	7.593	0.003	3.3	0	0	0	0	0	99.99
2003	15	23	2758	335.862	-424.454	D	7.629	7.593	0.036	3.3	0	0	0	0	0	100.01
2003	16	23	2789	340.496	-426.449	D	7.612	7.593	0.02	3.3	0	0	0	0	0	100.01
2003	17	23	2602	319.088	-442.669	D	7.597	7.593	0.004	3.3	0	0	0	0	0	100.04
2003	18	23	2758	335.862	-424.454	D	7.593	7.593	0.001	3.3	0	0	0	0	0	99.96
2003	19	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	21	23	2468	334.002	-434.887	D	7.598	7.593	0.006	3.3	0	0	0	0	0	100.01
2003	22	23	2704	329.056	-425.092	D	7.634	7.593	0.042	3.3	0	0	0	0	0	100
2003	23	23	2789	340.496	-426.449	D	7.636	7.593	0.043	3.3	0	0	0	0	0	100
2003	24	23	2589	318.383	-445.593	D	7.604	7.593	0.011	3.3	0	0	0	0	0	100.01
2003	25	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.27
2003	26	23	2789	340.496	-426.449	D	7.614	7.593	0.021	3.3	0	0	0	0	0	100
2003	27	23	2777	338.93	-425.542	D	7.614	7.593	0.021	3.3	0	0	0	0	0	100
2003	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	29	23	2781	339.842	-425.379	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100.01
2003	30	23	2781	339.842	-425.379	D	7.603	7.593	0.011	3.3	0	0	0	0	0	100.02
2003	31	23	1415	329.185	-425.086	D	7.593	7.593	0	3.3	0	0	0	0	0	99.73
2003	32	23	2758	335.862	-424.454	D	7.461	7.459	0.002	3.013	0	0	0	0	0	100.05
2003	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	2640	322.263	-435.121	D	7.454	7.453	0.001	3	0	0	0	0	0	100.16
2003	36	23	2704	329.056	-425.092	D	7.493	7.453	0.04	3	0	0	0	0	0	100.01
2003	37	23	2781	339.842	-425.379	D	7.457	7.453	0.004	3	0	0	0	0	0	100.07
2003	38	23	2758	335.862	-424.454	D	7.476	7.453	0.023	3	0	0	0	0	0	100.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	39	23	2789	340.496	-426.449	D	7.453	7.453	0	3	0	0	0	0	0	99.42
2003	40	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	42	23	2780	339.614	-425.419	D	7.453	7.453	0	3	0	0	0	0	0	104.64
2003	43	23	2704	329.056	-425.092	D	7.466	7.453	0.013	3	0	0	0	0	0	100
2003	44	23	2704	329.056	-425.092	D	7.453	7.453	0.001	3	0	0	0	0	0	100.35
2003	45	23	2781	339.842	-425.379	D	7.453	7.453	0	3	0	0	0	0	0	98.9
2003	46	23	2758	335.862	-424.454	D	7.466	7.453	0.013	3	0	0	0	0	0	100.02
2003	47	23	2600	318.952	-443.12	D	7.49	7.453	0.037	3	0	0	0	0	0	100.01
2003	48	23	2711	330.671	-424.932	D	7.523	7.453	0.071	3	0	0	0	0	0	100
2003	49	23	2789	340.496	-426.449	D	7.453	7.453	0.001	3	0	0	0	0	0	100.3
2003	50	23	1242	327.988	-426.138	D	7.453	7.453	0	3	0	0	0	0	0	101.18
2003	51	23	2789	340.496	-426.449	D	7.472	7.453	0.019	3	0	0	0	0	0	100.01
2003	52	23	1415	329.185	-425.086	D	7.457	7.453	0.004	3	0	0	0	0	0	100.06
2003	53	23	2600	318.952	-443.12	D	7.466	7.453	0.014	3	0	0	0	0	0	100.02
2003	54	23	2758	335.862	-424.454	D	7.47	7.453	0.017	3	0	0	0	0	0	100.01
2003	55	23	2789	340.496	-426.449	D	7.462	7.453	0.01	3	0	0	0	0	0	100.03
2003	56	23	2781	339.842	-425.379	D	7.469	7.453	0.017	3	0	0	0	0	0	100.02
2003	57	23	2781	339.842	-425.379	D	7.463	7.453	0.01	3	0	0	0	0	0	100.02
2003	58	23	2628	320.933	-436.998	D	7.456	7.453	0.003	3	0	0	0	0	0	100.09
2003	59	23	2704	329.056	-425.092	D	7.472	7.453	0.02	3	0	0	0	0	0	100.02
2003	60	23	2704	329.056	-425.092	D	7.331	7.317	0.014	2.713	0	0	0	0	0	100.01
2003	61	23	2789	340.496	-426.449	D	7.32	7.311	0.009	2.7	0	0	0	0	0	100.02
2003	62	23	2789	340.496	-426.449	D	7.313	7.311	0.002	2.7	0	0	0	0	0	99.99
2003	63	23	2781	339.842	-425.379	D	7.311	7.311	0	2.7	0	0	0	0	0	100.08
2003	64	23	2789	340.496	-426.449	D	7.314	7.311	0.004	2.7	0	0	0	0	0	100.04
2003	65	23	2789	340.496	-426.449	D	7.317	7.311	0.006	2.7	0	0	0	0	0	100.03
2003	66	23	2789	340.496	-426.449	D	7.312	7.311	0.002	2.7	0	0	0	0	0	100.04
2003	67	23	2788	340.294	-426.448	D	7.311	7.311	0	2.7	0	0	0	0	0	96.16
2003	68	23	2628	320.933	-436.998	D	7.323	7.311	0.012	2.7	0	0	0	0	0	100.01
2003	69	23	2789	340.496	-426.449	D	7.32	7.311	0.01	2.7	0	0	0	0	0	100.01
2003	70	23	2789	340.496	-426.449	D	7.323	7.311	0.012	2.7	0	0	0	0	0	100.02
2003	71	23	2781	339.842	-425.379	D	7.311	7.311	0	2.7	0	0	0	0	0	100.01
2003	72	23	2758	335.862	-424.454	D	7.326	7.311	0.015	2.7	0	0	0	0	0	100.01
2003	73	23	2789	340.496	-426.449	D	7.321	7.311	0.01	2.7	0	0	0	0	0	100.02
2003	74	23	2694	327.861	-425.964	D	7.314	7.311	0.004	2.7	0	0	0	0	0	99.98
2003	75	23	1415	329.185	-425.086	D	7.311	7.311	0	2.7	0	0	0	0	0	99.91
2003	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	78	23	2209	335.38	-424.564	D	7.311	7.311	0	2.7	0	0	0	0	0	98.7
2003	79	23	2707	329.748	-425.023	D	7.326	7.311	0.016	2.7	0	0	0	0	0	100.01
2003	80	23	2789	340.496	-426.449	D	7.317	7.311	0.006	2.7	0	0	0	0	0	100.04
2003	81	23	2308	337.055	-428.737	D	7.311	7.311	0.001	2.7	0	0	0	0	0	100.21
2003	82	23	1951	333.842	-434.874	D	7.311	7.311	0	2.7	0	0	0	0	0	99.68
2003	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	2789	340.496	-426.449	D	7.32	7.311	0.01	2.7	0	0	0	0	0	100.01
2003	85	23	2758	335.862	-424.454	D	7.316	7.311	0.005	2.7	0	0	0	0	0	100.02
2003	86	23	2781	339.842	-425.379	D	7.311	7.311	0	2.7	0	0	0	0	0	100.41
2003	87	23	2694	327.861	-425.964	D	7.312	7.311	0.002	2.7	0	0	0	0	0	100.05
2003	88	23	2694	327.861	-425.964	D	7.317	7.311	0.006	2.7	0	0	0	0	0	100
2003	89	23	2758	335.862	-424.454	D	7.311	7.311	0.001	2.7	0	0	0	0	0	100.51
2003	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	95	23	2758	335.862	-424.454	D	7.371	7.358	0.013	2.8	0	0	0	0	0	100.01
2003	96	23	2758	335.862	-424.454	D	7.361	7.358	0.003	2.8	0	0	0	0	0	100.07
2003	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	98	23	2789	340.496	-426.449	D	7.361	7.358	0.003	2.8	0	0	0	0	0	100.04
2003	99	23	2758	335.862	-424.454	D	7.404	7.358	0.046	2.8	0	0	0	0	0	100.01
2003	100	23	2758	335.862	-424.454	D	7.404	7.358	0.046	2.8	0	0	0	0	0	100.01
2003	101	23	2758	335.862	-424.454	D	7.371	7.358	0.013	2.8	0	0	0	0	0	100.01
2003	102	23	2789	340.496	-426.449	D	7.376	7.358	0.018	2.8	0	0	0	0	0	100.01
2003	103	23	2789	340.496	-426.449	D	7.359	7.358	0.001	2.8	0	0	0	0	0	100.04
2003	104	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	0	0	0	0	0	99.7
2003	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	107	23	2758	335.862	-424.454	D	7.36	7.358	0.002	2.8	0	0	0	0	0	100.21
2003	108	23	2780	339.614	-425.419	D	7.359	7.358	0	2.8	0	0	0	0	0	99.86
2003	109	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	0	0	0	0	0	101.76
2003	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	111	23	2781	339.842	-425.379	D	7.359	7.358	0	2.8	0	0	0	0	0	100.33
2003	112	23	2758	335.862	-424.454	D	7.379	7.358	0.021	2.8	0	0	0	0	0	100.01
2003	113	23	2789	340.496	-426.449	D	7.362	7.358	0.004	2.8	0	0	0	0	0	100.04
2003	114	23	1449	329.434	-425.075	D	7.358	7.358	0	2.8	0	0	0	0	0	98.23
2003	115	23	2684	326.713	-427.014	D	7.369	7.358	0.01	2.8	0	0	0	0	0	100.02
2003	116	23	2694	327.861	-425.964	D	7.375	7.358	0.017	2.8	0	0	0	0	0	100

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	117	23	340	322.363	-445.37	D	7.363	7.358	0.004	2.8	0	0	0	0	0	100.02
2003	118	23	2397	338.413	-425.68	D	7.358	7.358	0	2.8	0	0	0	0	0	100.27
2003	119	23	2040	333.912	-425.128	D	7.358	7.358	0	2.8	0	0	0	0	0	124.43
2003	120	23	917	325.972	-431.222	D	7.358	7.358	0	2.8	0	0	0	0	0	76.61
2003	121	23	413	322.197	-435.884	D	7.627	7.627	0	3.375	0	0	0	0	0	8.34
2003	122	23	2684	326.713	-427.014	D	7.706	7.639	0.068	3.4	0	0	0	0	0	100
2003	123	23	2589	318.383	-445.593	D	7.655	7.639	0.016	3.4	0	0	0	0	0	100.01
2003	124	23	2789	340.496	-426.449	D	7.645	7.639	0.006	3.4	0	0	0	0	0	100.01
2003	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	127	23	2704	329.056	-425.092	D	7.643	7.639	0.004	3.4	0	0	0	0	0	100
2003	128	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.03
2003	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	131	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	0	0	0	0	0	100.16
2003	132	23	2588	318.452	-445.8	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100
2003	133	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.14
2003	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	136	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	0	0	0	0	0	97.11
2003	137	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.12
2003	138	23	2589	318.383	-445.593	D	7.667	7.639	0.029	3.4	0	0	0	0	0	100
2003	139	23	2600	318.952	-443.12	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100.01
2003	140	23	2628	320.933	-436.998	D	7.653	7.639	0.015	3.4	0	0	0	0	0	100
2003	141	23	2588	318.452	-445.8	D	7.65	7.639	0.011	3.4	0	0	0	0	0	100
2003	142	23	2628	320.933	-436.998	D	7.652	7.639	0.013	3.4	0	0	0	0	0	100.01
2003	143	23	2628	320.933	-436.998	D	7.656	7.639	0.017	3.4	0	0	0	0	0	100
2003	144	23	2789	340.496	-426.449	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100
2003	145	23	2758	335.862	-424.454	D	7.662	7.639	0.024	3.4	0	0	0	0	0	100.01
2003	146	23	2588	318.452	-445.8	D	7.662	7.639	0.024	3.4	0	0	0	0	0	100
2003	147	23	2789	340.496	-426.449	D	7.646	7.639	0.007	3.4	0	0	0	0	0	100
2003	148	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	0	0	0	0	0	100.02
2003	149	23	1627	330.675	-425.021	D	7.643	7.639	0.004	3.4	0	0	0	0	0	100.01
2003	150	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	0	0	0	0	0	100.03
2003	151	23	2758	335.862	-424.454	D	7.65	7.639	0.011	3.4	0	0	0	0	0	100.01
2003	152	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	0	0	0	0	0	99.99
2003	153	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	0	0	0	0	0	100.02
2003	154	23	2781	339.842	-425.379	D	7.656	7.639	0.017	3.4	0	0	0	0	0	100
2003	155	23	2704	329.056	-425.092	D	7.681	7.639	0.042	3.4	0	0	0	0	0	100

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	156	23	2628	320.933	-436.998	D	7.65	7.639	0.011	3.4	0	0	0	0	0	100
2003	157	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.14
2003	158	23	2758	335.862	-424.454	D	7.652	7.639	0.014	3.4	0	0	0	0	0	100.01
2003	159	23	2758	335.862	-424.454	D	7.639	7.639	0	3.4	0	0	0	0	0	100.46
2003	160	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	12.96
2003	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	164	23	1048	326.791	-427.189	D	7.639	7.639	0	3.4	0	0	0	0	0	101.13
2003	165	23	2704	329.056	-425.092	D	7.65	7.639	0.011	3.4	0	0	0	0	0	100.01
2003	166	23	2789	340.496	-426.449	D	7.654	7.639	0.015	3.4	0	0	0	0	0	100
2003	167	23	2694	327.861	-425.964	D	7.648	7.639	0.009	3.4	0	0	0	0	0	100.02
2003	168	23	2704	329.056	-425.092	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.05
2003	169	23	2704	329.056	-425.092	D	7.642	7.639	0.004	3.4	0	0	0	0	0	100.01
2003	170	23	2758	335.862	-424.454	D	7.651	7.639	0.013	3.4	0	0	0	0	0	100
2003	171	23	2571	322.646	-445.476	D	7.66	7.639	0.022	3.4	0	0	0	0	0	100
2003	172	23	2588	318.452	-445.8	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.01
2003	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	177	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	0	0	0	0	0	100.03
2003	178	23	2758	335.862	-424.454	D	7.697	7.639	0.058	3.4	0	0	0	0	0	100
2003	179	23	2704	329.056	-425.092	D	7.644	7.639	0.005	3.4	0	0	0	0	0	100
2003	180	23	2704	329.056	-425.092	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.07
2003	181	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	0	0	0	0	0	100.45
2003	182	23	1201	327.762	-426.647	D	7.639	7.639	0	3.4	0	0	0	0	0	99.61
2003	183	23	2758	335.862	-424.454	D	7.639	7.639	0	3.4	0	0	0	0	0	100.09
2003	184	23	2780	339.614	-425.419	D	7.639	7.639	0	3.4	0	0	0	0	0	100.23
2003	185	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	0	0	0	0	0	102.91
2003	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	192	23	2758	335.862	-424.454	D	7.661	7.639	0.022	3.4	0	0	0	0	0	100.01
2003	193	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.13
2003	194	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	99.97

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	195	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	0	0	0	0	0	99.99
2003	196	23	2030	334.022	-427.622	D	7.639	7.639	0	3.4	0	0	0	0	0	94.76
2003	197	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	0	0	0	0	0	97.19
2003	198	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	0	0	0	0	0	101.47
2003	199	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	0	0	0	0	0	101.46
2003	200	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	0	0	0	0	0	100.04
2003	201	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.53
2003	202	23	2209	335.38	-424.564	D	7.639	7.639	0	3.4	0	0	0	0	0	94.78
2003	203	23	2781	339.842	-425.379	D	7.643	7.639	0.005	3.4	0	0	0	0	0	100.01
2003	204	23	2684	326.713	-427.014	D	7.673	7.639	0.034	3.4	0	0	0	0	0	100
2003	205	23	2589	318.383	-445.593	D	7.653	7.639	0.014	3.4	0	0	0	0	0	100.01
2003	206	23	2781	339.842	-425.379	D	7.65	7.639	0.011	3.4	0	0	0	0	0	100.02
2003	207	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	0	0	0	0	0	100.32
2003	208	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	210	23	2710	330.44	-424.955	D	7.639	7.639	0	3.4	0	0	0	0	0	100.22
2003	211	23	67	319.674	-440.741	D	7.647	7.639	0.008	3.4	0	0	0	0	0	100.01
2003	212	23	2589	318.383	-445.593	D	7.651	7.639	0.012	3.4	0	0	0	0	0	100.01
2003	213	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.03
2003	214	23	2410	339.439	-426.385	D	7.639	7.639	0	3.4	0	0	0	0	0	101.46
2003	215	23	2235	335.628	-424.554	D	7.639	7.639	0	3.4	0	0	0	0	0	99.35
2003	216	23	2758	335.862	-424.454	D	7.639	7.639	0.001	3.4	0	0	0	0	0	100.07
2003	217	23	2409	339.158	-425.648	D	7.639	7.639	0	3.4	0	0	0	0	0	93.35
2003	218	23	2758	335.862	-424.454	D	7.665	7.639	0.027	3.4	0	0	0	0	0	100
2003	219	23	2789	340.496	-426.449	D	7.652	7.639	0.013	3.4	0	0	0	0	0	100.01
2003	220	23	2601	319.02	-442.895	D	7.649	7.639	0.011	3.4	0	0	0	0	0	100.01
2003	221	23	2589	318.383	-445.593	D	7.644	7.639	0.005	3.4	0	0	0	0	0	99.98
2003	222	23	2589	318.383	-445.593	D	7.654	7.639	0.015	3.4	0	0	0	0	0	100.01
2003	223	23	2588	318.452	-445.8	D	7.651	7.639	0.012	3.4	0	0	0	0	0	100.01
2003	224	23	2684	326.713	-427.014	D	7.65	7.639	0.011	3.4	0	0	0	0	0	100.01
2003	225	23	2704	329.056	-425.092	D	7.64	7.639	0.001	3.4	0	0	0	0	0	99.99
2003	226	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	0	0	0	0	0	100.03
2003	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	228	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	0	0	0	0	0	100.03
2003	229	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.04
2003	230	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	0	0	0	0	0	100.06
2003	231	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	0	0	0	0	0	100.05
2003	232	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.02
2003	233	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	0	0	0	0	0	100.05

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	234	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.03
2003	235	23	2758	335.862	-424.454	D	7.65	7.639	0.011	3.4	0	0	0	0	0	100.01
2003	236	23	2789	340.496	-426.449	D	7.652	7.639	0.013	3.4	0	0	0	0	0	100.02
2003	237	23	2684	326.713	-427.014	D	7.644	7.639	0.005	3.4	0	0	0	0	0	100.03
2003	238	23	2780	339.614	-425.419	D	7.641	7.639	0.002	3.4	0	0	0	0	0	100.05
2003	239	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	100.18
2003	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	242	23	2412	339.417	-425.886	D	7.639	7.639	0	3.4	0	0	0	0	0	96.01
2003	243	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	0	0	0	0	0	99.96
2003	244	23	1415	329.185	-425.086	D	7.727	7.727	0	3.592	0	0	0	0	0	98.29
2003	245	23	2588	318.452	-445.8	D	7.731	7.731	0	3.6	0	0	0	0	0	100.02
2003	246	23	2781	339.842	-425.379	D	7.754	7.731	0.023	3.6	0	0	0	0	0	100
2003	247	23	2694	327.861	-425.964	D	7.824	7.731	0.093	3.6	0	0	0	0	0	100
2003	248	23	2589	318.383	-445.593	D	7.738	7.731	0.007	3.6	0	0	0	0	0	100.02
2003	249	23	2704	329.056	-425.092	D	7.745	7.731	0.014	3.6	0	0	0	0	0	100
2003	250	23	2589	318.383	-445.593	D	7.733	7.731	0.002	3.6	0	0	0	0	0	100
2003	251	23	2468	334.002	-434.887	D	7.734	7.731	0.003	3.6	0	0	0	0	0	100.02
2003	252	23	2782	339.852	-425.592	D	7.732	7.731	0.001	3.6	0	0	0	0	0	99.88
2003	253	23	2789	340.496	-426.449	D	7.731	7.731	0.001	3.6	0	0	0	0	0	100.12
2003	254	23	726	324.322	-433.293	D	7.731	7.731	0	3.6	0	0	0	0	0	73.32
2003	255	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	257	23	2789	340.496	-426.449	D	7.735	7.731	0.004	3.6	0	0	0	0	0	99.99
2003	258	23	2308	337.055	-428.737	D	7.765	7.731	0.034	3.6	0	0	0	0	0	100
2003	259	23	2209	335.38	-424.564	D	7.733	7.731	0.002	3.6	0	0	0	0	0	99.92
2003	260	23	2781	339.842	-425.379	D	7.732	7.731	0.001	3.6	0	0	0	0	0	100
2003	261	23	14	319.049	-443.516	D	7.731	7.731	0	3.6	0	0	0	0	0	86.22
2003	262	23	2758	335.862	-424.454	D	7.748	7.731	0.018	3.6	0	0	0	0	0	100
2003	263	23	2789	340.496	-426.449	D	7.739	7.731	0.009	3.6	0	0	0	0	0	99.99
2003	264	23	2789	340.496	-426.449	D	7.736	7.731	0.006	3.6	0	0	0	0	0	99.99
2003	265	23	2684	326.713	-427.014	D	7.732	7.731	0.001	3.6	0	0	0	0	0	100.07
2003	266	23	2758	335.862	-424.454	D	7.768	7.731	0.038	3.6	0	0	0	0	0	100
2003	267	23	1415	329.185	-425.086	D	7.731	7.731	0	3.6	0	0	0	0	0	99.91
2003	268	23	2435	337.211	-428.786	D	7.743	7.731	0.012	3.6	0	0	0	0	0	99.99
2003	269	23	2789	340.496	-426.449	D	7.737	7.731	0.006	3.6	0	0	0	0	0	99.99
2003	270	23	2684	326.713	-427.014	D	7.756	7.731	0.026	3.6	0	0	0	0	0	99.99
2003	271	23	2758	335.862	-424.454	D	7.787	7.731	0.056	3.6	0	0	0	0	0	100
2003	272	23	2694	327.861	-425.964	D	7.749	7.731	0.018	3.6	0	0	0	0	0	100

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	273	23	2756	335.398	-424.515	D	7.741	7.731	0.01	3.6	0	0	0	0	0	99.99
2003	274	23	2694	327.861	-425.964	D	7.62	7.598	0.022	3.313	0	0	0	0	0	100
2003	275	23	2694	327.861	-425.964	D	7.656	7.593	0.064	3.3	0	0	0	0	0	100
2003	276	23	1415	329.185	-425.086	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100
2003	277	23	2758	335.862	-424.454	D	7.603	7.593	0.01	3.3	0	0	0	0	0	100
2003	278	23	1660	330.988	-426.506	D	7.614	7.593	0.022	3.3	0	0	0	0	0	100
2003	279	23	2652	323.833	-433.511	D	7.6	7.593	0.008	3.3	0	0	0	0	0	100.01
2003	280	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100
2003	281	23	2684	326.713	-427.014	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.04
2003	282	23	1414	329.196	-425.335	D	7.593	7.593	0	3.3	0	0	0	0	0	100.05
2003	283	23	2684	326.713	-427.014	D	7.593	7.593	0	3.3	0	0	0	0	0	100.21
2003	284	23	200	320.784	-437.694	D	7.593	7.593	0	3.3	0	0	0	0	0	78.59
2003	285	23	2704	329.056	-425.092	D	7.616	7.593	0.024	3.3	0	0	0	0	0	100.01
2003	286	23	2589	318.383	-445.593	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.03
2003	287	23	2781	339.842	-425.379	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.05
2003	288	23	2308	337.055	-428.737	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100.03
2003	289	23	2416	339.665	-425.875	D	7.593	7.593	0	3.3	0	0	0	0	0	99.14
2003	290	23	2789	340.496	-426.449	D	7.609	7.593	0.016	3.3	0	0	0	0	0	100.01
2003	291	23	2600	318.952	-443.12	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100.04
2003	292	23	2571	322.646	-445.476	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100.01
2003	293	23	2236	336.149	-430.776	D	7.593	7.593	0	3.3	0	0	0	0	0	98.88
2003	294	23	2781	339.842	-425.379	D	7.596	7.593	0.003	3.3	0	0	0	0	0	100
2003	295	23	2758	335.862	-424.454	D	7.613	7.593	0.02	3.3	0	0	0	0	0	100.01
2003	296	23	2789	340.496	-426.449	D	7.601	7.593	0.009	3.3	0	0	0	0	0	100.01
2003	297	23	2781	339.842	-425.379	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.09
2003	298	23	2758	335.862	-424.454	D	7.608	7.593	0.015	3.3	0	0	0	0	0	100.02
2003	299	23	2758	335.862	-424.454	D	7.625	7.593	0.032	3.3	0	0	0	0	0	100
2003	300	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	0	0	0	0	0	99.77
2003	301	23	2757	335.63	-424.484	D	7.593	7.593	0	3.3	0	0	0	0	0	99.81
2003	302	23	2758	335.862	-424.454	D	7.61	7.593	0.018	3.3	0	0	0	0	0	100.02
2003	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	304	23	1048	326.791	-427.189	D	7.593	7.593	0	3.3	0	0	0	0	0	75.58
2003	305	23	2704	329.056	-425.092	D	7.584	7.548	0.035	3.204	0	0	0	0	0	100
2003	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	308	23	2704	329.056	-425.092	D	7.547	7.546	0	3.2	0	0	0	0	0	100.33
2003	309	23	2684	326.713	-427.014	D	7.564	7.546	0.018	3.2	0	0	0	0	0	100
2003	310	23	2758	335.862	-424.454	D	7.576	7.546	0.029	3.2	0	0	0	0	0	100
2003	311	23	2694	327.861	-425.964	D	7.585	7.546	0.039	3.2	0	0	0	0	0	100.01

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	312	23	2684	326.713	-427.014	D	7.549	7.546	0.003	3.2	0	0	0	0	0	100.02
2003	313	23	1415	329.185	-425.086	D	7.546	7.546	0	3.2	0	0	0	0	0	100.17
2003	314	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.17
2003	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	316	23	2041	333.901	-424.879	D	7.546	7.546	0	3.2	0	0	0	0	0	99.46
2003	317	23	2758	335.862	-424.454	D	7.563	7.546	0.016	3.2	0	0	0	0	0	100.01
2003	318	23	2789	340.496	-426.449	D	7.557	7.546	0.011	3.2	0	0	0	0	0	100.01
2003	319	23	2418	339.946	-426.612	D	7.546	7.546	0	3.2	0	0	0	0	0	92.03
2003	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	322	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	0	0	0	0	0	100.07
2003	323	23	2757	335.63	-424.484	D	7.55	7.546	0.003	3.2	0	0	0	0	0	100.04
2003	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	327	23	1415	329.185	-425.086	D	7.546	7.546	0	3.2	0	0	0	0	0	100.39
2003	328	23	2781	339.842	-425.379	D	7.547	7.546	0	3.2	0	0	0	0	0	100.22
2003	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	331	23	2600	318.952	-443.12	D	7.56	7.546	0.013	3.2	0	0	0	0	0	100.01
2003	332	23	2789	340.496	-426.449	D	7.55	7.546	0.003	3.2	0	0	0	0	0	100.05
2003	333	23	947	326.199	-430.712	D	7.549	7.546	0.003	3.2	0	0	0	0	0	100.01
2003	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	335	23	2758	335.862	-424.454	D	7.602	7.591	0.012	3.296	0	0	0	0	0	99.99
2003	336	23	2308	337.055	-428.737	D	7.599	7.593	0.007	3.3	0	0	0	0	0	100.04
2003	337	23	2409	339.158	-425.648	D	7.593	7.593	0	3.3	0	0	0	0	0	98.39
2003	338	23	2758	335.862	-424.454	D	7.606	7.593	0.013	3.3	0	0	0	0	0	100.01
2003	339	23	1951	333.842	-434.874	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100
2003	340	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	0	0	0	0	0	100.02
2003	341	23	2781	339.842	-425.379	D	7.595	7.593	0.003	3.3	0	0	0	0	0	100.05
2003	342	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	29.14
2003	344	23	2781	339.842	-425.379	D	7.601	7.593	0.008	3.3	0	0	0	0	0	100
2003	345	23	2758	335.862	-424.454	D	7.605	7.593	0.013	3.3	0	0	0	0	0	100.01
2003	346	23	2781	339.842	-425.379	D	7.602	7.593	0.009	3.3	0	0	0	0	0	100.01
2003	347	23	2758	335.862	-424.454	D	7.596	7.593	0.004	3.3	0	0	0	0	0	100.02
2003	348	23	2781	339.842	-425.379	D	7.602	7.593	0.009	3.3	0	0	0	0	0	100.02
2003	349	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	0	0	0	0	0	100.08
2003	350	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	0	0	0	0	0	100

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	351	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	0	0	0	0	0	100.21
2003	352	23	2758	335.862	-424.454	D	7.594	7.593	0.001	3.3	0	0	0	0	0	100.08
2003	353	23	67	319.674	-440.741	D	7.598	7.593	0.005	3.3	0	0	0	0	0	100.02
2003	354	23	2758	335.862	-424.454	D	7.597	7.593	0.005	3.3	0	0	0	0	0	100.03
2003	355	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	0	0	0	0	0	99.97
2003	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	2640	322.263	-435.121	D	7.612	7.593	0.019	3.3	0	0	0	0	0	100.01
2003	358	23	2758	335.862	-424.454	D	7.652	7.593	0.06	3.3	0	0	0	0	0	100
2003	359	23	2789	340.496	-426.449	D	7.6	7.593	0.007	3.3	0	0	0	0	0	100
2003	360	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	0	0	0	0	0	99.98
2003	361	23	2414	339.687	-426.374	D	7.593	7.593	0	3.3	0	0	0	0	0	99.07
2003	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	2704	329.056	-425.092	D	7.595	7.593	0.002	3.3	0	0	0	0	0	99.98
2003	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.093							
EXIDE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	2588	318.452	-445.8	D	7.593	7.593	0	3.3	85.14	10.2	0	0	0	2.81
2003	3	23	2758	335.862	-424.454	D	7.596	7.593	0.004	3.3	84.59	11.24	0	0	0	4.22
2003	4	23	2409	339.158	-425.648	D	7.593	7.593	0	3.3	85.16	6.85	0	0	0	2.16
2003	5	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	72.03	20.29	0	0	0	7.48
2003	6	23	2781	339.842	-425.379	D	7.594	7.593	0.001	3.3	90.2	7.59	0	0	0	2.21
2003	7	23	2575	321.659	-445.553	D	7.593	7.593	0.001	3.3	92.7	5.27	0	0	0	1.9
2003	8	23	1951	333.842	-434.874	D	7.593	7.593	0	3.3	92.76	3.38	0	0	0	1.31
2003	9	23	2777	338.93	-425.542	D	7.593	7.593	0	3.3	90.49	4.92	0	0	0	4.38
2003	10	23	2684	326.713	-427.014	D	7.594	7.593	0.001	3.3	72.24	19.41	0	0	0	8.38
2003	11	23	440	322.543	-438.117	D	7.595	7.593	0.002	3.3	78.83	15.22	0	0	0	5.9
2003	12	23	2589	318.383	-445.593	D	7.594	7.593	0.001	3.3	89.12	8.55	0	0	0	2.45
2003	13	23	2413	339.406	-425.637	D	7.593	7.593	0	3.3	92.82	5.75	0	0	0	1.2
2003	14	23	2589	318.383	-445.593	D	7.594	7.593	0.001	3.3	92.43	5.43	0	0	0	2.14
2003	15	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	94.41	4.34	0	0	0	1.4
2003	16	23	67	319.674	-440.741	D	7.593	7.593	0	3.3	94.23	4.71	0	0	0	0.88
2003	17	23	2781	339.842	-425.379	D	7.594	7.593	0.001	3.3	90.38	6.79	0	0	0	2.88
2003	18	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	86.96	10.18	0	0	0	3
2003	19	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	21	23	1415	329.185	-425.086	D	7.594	7.593	0.001	3.3	94.63	4.31	0	0	0	1.02
2003	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	102.17	2.91	0	0	0	0.56
2003	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	24	23	199	320.795	-437.944	D	7.593	7.593	0	3.3	86.43	11.18	0	0	0	1.95
2003	25	23	2155	334.883	-424.586	D	7.593	7.593	0	3.3	89.05	9.95	0	0	0	1.29
2003	26	23	1627	330.675	-425.021	D	7.597	7.593	0.004	3.3	86.94	9.87	0	0	0	3.15
2003	27	23	2588	318.452	-445.8	D	7.594	7.593	0.002	3.3	92.49	5.92	0	0	0	1.52
2003	28	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	94.2	4.78	0	0	0	0.91
2003	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	2789	340.496	-426.449	D	7.454	7.453	0.001	3	93.34	4.63	0	0	0	2.25
2003	37	23	2704	329.056	-425.092	D	7.454	7.453	0.002	3	94.08	4.88	0	0	0	1.13
2003	38	23	2789	340.496	-426.449	D	7.455	7.453	0.003	3	93.33	5.47	0	0	0	1.27
2003	39	23	375	322.611	-445.359	D	7.453	7.453	0	3	93.18	9.57	0	0	0	2.58
2003	40	23	2129	335.167	-431.069	D	7.453	7.453	0	3	100.21	5.93	0	0	0	1.57
2003	41	23	2035	333.967	-426.375	D	7.453	7.453	0	3	96.18	5.23	0	0	0	0.96
2003	42	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	43	23	2692	327.796	-426.377	D	7.453	7.453	0.001	3	76.86	15.33	0	0	0	8.24
2003	44	23	2429	338.563	-428.651	D	7.453	7.453	0.001	3	92.22	5.39	0	0	0	2.66
2003	45	23	1201	327.762	-426.647	D	7.453	7.453	0	3	74.09	3.65	0	0	0	1.44
2003	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	49	23	1	318.65	-445.782	D	7.453	7.453	0	3	97.32	2.95	0	0	0	1.36
2003	50	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	51	23	2704	329.056	-425.092	D	7.453	7.453	0.001	3	96.25	2.88	0	0	0	1.06
2003	52	23	2684	326.713	-427.014	D	7.453	7.453	0	3	98.61	1.31	0	0	0	0.78
2003	53	23	2589	318.383	-445.593	D	7.453	7.453	0	3	95.5	3.45	0	0	0	1.67
2003	54	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	55	23	2589	318.383	-445.593	D	7.453	7.453	0	3	89.79	8.34	0	0	0	2.28
2003	56	23	2684	326.713	-427.014	D	7.456	7.453	0.003	3	93.09	5.58	0	0	0	1.37
2003	57	23	1415	329.185	-425.086	D	7.454	7.453	0.001	3	95.51	3.82	0	0	0	0.94
2003	58	23	2155	334.883	-424.586	D	7.453	7.453	0.001	3	96.79	2.75	0	0	0	0.66
2003	59	23	2749	333.775	-424.726	D	7.453	7.453	0.001	3	97.66	2.11	0	0	0	0.51

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	60	23	2397	338.413	-425.68	D	7.317	7.317	0	2.713	97.74	1.8	0	0	0	0.47
2003	61	23	2781	339.842	-425.379	D	7.314	7.311	0.003	2.7	93.18	4.56	0	0	0	2.37
2003	62	23	2571	322.646	-445.476	D	7.315	7.311	0.005	2.7	94.16	4.26	0	0	0	1.64
2003	63	23	2789	340.496	-426.449	D	7.316	7.311	0.005	2.7	98.04	1.27	0	0	0	0.74
2003	64	23	2758	335.862	-424.454	D	7.311	7.311	0.001	2.7	96.67	2.76	0	0	0	0.78
2003	65	23	68	320.129	-445.468	D	7.311	7.311	0	2.7	96.38	2.96	0	0	0	0.68
2003	66	23	2704	329.056	-425.092	D	7.311	7.311	0	2.7	96.71	2.3	0	0	0	1.39
2003	67	23	1414	329.196	-425.335	D	7.311	7.311	0	2.7	98.41	0.86	0	0	0	1.11
2003	68	23	2789	340.496	-426.449	D	7.313	7.311	0.002	2.7	93.41	4.92	0	0	0	1.71
2003	69	23	2588	318.452	-445.8	D	7.311	7.311	0	2.7	98.87	0.93	0	0	0	1.36
2003	70	23	2588	318.452	-445.8	D	7.312	7.311	0.002	2.7	98.1	1	0	0	0	1.02
2003	71	23	2781	339.842	-425.379	D	7.311	7.311	0	2.7	98.36	0.69	0	0	0	0.74
2003	72	23	2694	327.861	-425.964	D	7.311	7.311	0.001	2.7	96.52	2.07	0	0	0	1.51
2003	73	23	2589	318.383	-445.593	D	7.312	7.311	0.001	2.7	97.61	1.36	0	0	0	1.15
2003	74	23	113	320.126	-439.722	D	7.311	7.311	0	2.7	98.88	0.82	0	0	0	1.01
2003	75	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	2588	318.452	-445.8	D	7.312	7.311	0.001	2.7	93.77	4.3	0	0	0	2.08
2003	80	23	2588	318.452	-445.8	D	7.319	7.311	0.008	2.7	93.53	4.2	0	0	0	2.3
2003	81	23	2572	322.4	-445.495	D	7.312	7.311	0.001	2.7	94.51	2.55	0	0	0	3.01
2003	82	23	2468	334.002	-434.887	D	7.311	7.311	0	2.7	98.73	0.53	0	0	0	1.62
2003	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	1413	329.207	-425.585	D	7.311	7.311	0	2.7	97.63	1.59	0	0	0	1.66
2003	85	23	1951	333.842	-434.874	D	7.311	7.311	0	2.7	96.86	2.35	0	0	0	0.95
2003	86	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	87	23	2335	337.172	-425.735	D	7.311	7.311	0	2.7	86.3	6.51	0	0	0	2.59
2003	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	2781	339.842	-425.379	D	7.312	7.311	0.001	2.7	85.56	9.49	0	0	0	5.17
2003	90	23	2399	338.683	-426.168	D	7.311	7.311	0	2.7	70.65	3.09	0	0	0	3.1
2003	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	95	23	2684	326.713	-427.014	D	7.359	7.358	0.001	2.8	91.98	4.82	0	0	0	3.41
2003	96	23	2336	337.161	-425.485	D	7.358	7.358	0	2.8	98.69	1.4	0	0	0	0.43
2003	97	23	1413	329.207	-425.585	D	7.358	7.358	0	2.8	76.01	0.83	0	0	0	0.12
2003	98	23	2781	339.842	-425.379	D	7.361	7.358	0.002	2.8	90.34	6.84	0	0	0	2.9

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	99	23	2588	318.452	-445.8	D	7.359	7.358	0.001	2.8	91.11	6.18	0	0	0	2.76
2003	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	104.83	0.44	0	0	0	1.43
2003	102	23	1041	326.867	-428.934	D	7.358	7.358	0	2.8	100.4	0.18	0	0	0	1.08
2003	103	23	2397	338.413	-425.68	D	7.358	7.358	0	2.8	100.92	0.1	0	0	0	0.93
2003	104	23	1552	330.178	-425.042	D	7.358	7.358	0	2.8	100.35	0.11	0	0	0	0.84
2003	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	107	23	2781	339.842	-425.379	D	7.359	7.358	0.001	2.8	94.51	3.73	0	0	0	1.85
2003	108	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	100.51	0.47	0	0	0	1.06
2003	109	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	97.15	0.1	0	0	0	0.66
2003	110	23	2781	339.842	-425.379	D	7.363	7.358	0.005	2.8	97.58	1.28	0	0	0	1.18
2003	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	112	23	2404	338.92	-425.908	D	7.359	7.358	0.001	2.8	94.37	2.42	0	0	0	3.52
2003	113	23	2588	318.452	-445.8	D	7.359	7.358	0.001	2.8	98.2	0.62	0	0	0	1.24
2003	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	115	23	2625	320.772	-437.626	D	7.363	7.358	0.004	2.8	96.28	1.54	0	0	0	2.2
2003	116	23	2588	318.452	-445.8	D	7.359	7.358	0.001	2.8	97.36	0.96	0	0	0	1.69
2003	117	23	2612	319.785	-440.422	D	7.358	7.358	0	2.8	101.66	0.37	0	0	0	1.01
2003	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2003	122	23	2704	329.056	-425.092	D	7.642	7.639	0.003	3.4	98.06	1	0	0	0	0.95
2003	123	23	2468	334.002	-434.887	D	7.643	7.639	0.004	3.4	98.99	0.37	0	0	0	0.64
2003	124	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	99.46	0.13	0	0	0	0.39
2003	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	127	23	2758	335.862	-424.454	D	7.639	7.639	0.001	3.4	98.51	0.39	0	0	0	1.15
2003	128	23	2780	339.614	-425.419	D	7.639	7.639	0	3.4	99.04	0.11	0	0	0	0.89
2003	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	137	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	98.46	0.06	0	0	0	0.65

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	138	23	2684	326.713	-427.014	D	7.64	7.639	0.001	3.4	99.05	0.47	0	0	0	0.54
2003	139	23	1047	326.802	-427.438	D	7.639	7.639	0	3.4	99.08	0.27	0	0	0	0.53
2003	140	23	2628	320.933	-436.998	D	7.64	7.639	0.001	3.4	98.26	1.02	0	0	0	0.74
2003	141	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	101.15	0.16	0	0	0	0.42
2003	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	143	23	890	325.735	-431.482	D	7.639	7.639	0	3.4	72.7	0.03	0	0	0	0.69
2003	144	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	99.21	0.37	0	0	0	0.85
2003	145	23	2684	326.713	-427.014	D	7.641	7.639	0.002	3.4	98.72	0.58	0	0	0	0.7
2003	146	23	2588	318.452	-445.8	D	7.639	7.639	0	3.4	99.38	0.08	0	0	0	0.63
2003	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	149	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	94.83	1.84	0	0	0	3.47
2003	150	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	98.44	0.1	0	0	0	1.44
2003	151	23	16	319.027	-443.017	D	7.639	7.639	0	3.4	84.07	5	0	0	0	10.49
2003	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	79.56	0.01	0	0	0	0.88
2003	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	97.33	0.09	0	0	0	0.68
2003	154	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.09	0.53	0	0	0	0.55
2003	155	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	157	23	977	326.425	-430.203	D	7.639	7.639	0	3.4	97.18	0.09	0	0	0	0.69
2003	158	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.4	0.12	0	0	0	0.6
2003	159	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.56	0.02	0	0	0	0.52
2003	160	23	1628	331.338	-434.484	D	7.639	7.639	0	3.4	101.06	0.03	0	0	0	0.47
2003	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.42	0.04	0	0	0	0.73
2003	165	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	99.48	0.17	0	0	0	0.51
2003	166	23	2042	334.499	-432.847	D	7.639	7.639	0	3.4	98.06	0.17	0	0	0	0.44
2003	167	23	2183	335.664	-431.047	D	7.639	7.639	0	3.4	98.71	0.08	0	0	0	0.43
2003	168	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.21	0.15	0	0	0	0.41
2003	169	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	103.78	0.09	0	0	0	0.38
2003	170	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	99.07	0.05	0	0	0	0.76
2003	171	23	1415	329.185	-425.086	D	7.641	7.639	0.002	3.4	98.75	0.65	0	0	0	0.61
2003	172	23	15	319.038	-443.267	D	7.639	7.639	0	3.4	99.53	0.05	0	0	0	0.54
2003	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	177	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	96.82	1.75	0	0	0	1.51
2003	178	23	2684	326.713	-427.014	D	7.643	7.639	0.004	3.4	97.97	0.34	0	0	0	1.69
2003	179	23	2608	319.495	-441.316	D	7.642	7.639	0.003	3.4	98.87	0.05	0	0	0	1.07
2003	180	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	99.23	0.03	0	0	0	0.84
2003	181	23	1414	329.196	-425.335	D	7.639	7.639	0	3.4	97.42	0.07	0	0	0	0.66
2003	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	183	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	80.16	0.01	0	0	0	0.49
2003	184	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	38.21	0.01	0	0	0	0.19
2003	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	192	23	2588	318.452	-445.8	D	7.641	7.639	0.002	3.4	97.25	0.16	0	0	0	2.67
2003	193	23	2782	339.852	-425.592	D	7.64	7.639	0.001	3.4	98.69	0.18	0	0	0	1.15
2003	194	23	2780	339.614	-425.419	D	7.639	7.639	0	3.4	99.33	0.11	0	0	0	0.99
2003	195	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.42	0.15	0	0	0	0.72
2003	196	23	2035	333.967	-426.375	D	7.639	7.639	0	3.4	88.43	0.01	0	0	0	0.47
2003	197	23	2209	335.38	-424.564	D	7.639	7.639	0	3.4	99.89	0.01	0	0	0	1.13
2003	198	23	2409	339.158	-425.648	D	7.639	7.639	0	3.4	94.8	0.01	0	0	0	0.81
2003	199	23	2396	338.424	-425.93	D	7.639	7.639	0	3.4	101.82	0.01	0	0	0	0.69
2003	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	118.38	0.01	0	0	0	0.62
2003	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	202	23	2385	338.165	-425.691	D	7.639	7.639	0	3.4	98.92	0.09	0	0	0	0.61
2003	203	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	98.37	0.17	0	0	0	1.48
2003	204	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	205	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	206	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	207	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	210	23	2758	335.862	-424.454	D	7.641	7.639	0.003	3.4	98.76	0.56	0	0	0	0.73
2003	211	23	2684	326.713	-427.014	D	7.642	7.639	0.003	3.4	99.22	0.21	0	0	0	0.59
2003	212	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	99.32	0.11	0	0	0	0.59
2003	213	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.07	0.07	0	0	0	0.61
2003	214	23	2418	339.946	-426.612	D	7.639	7.639	0	3.4	99.72	0.01	0	0	0	0.5
2003	215	23	2758	335.862	-424.454	D	7.64	7.639	0.001	3.4	99.14	0.12	0	0	0	0.85

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	216	23	2758	335.862	-424.454	D	7.643	7.639	0.005	3.4	99.06	0.14	0	0	0	0.81
2003	217	23	2413	339.406	-425.637	D	7.639	7.639	0	3.4	99.09	0.11	0	0	0	0.79
2003	218	23	1449	329.434	-425.075	D	7.639	7.639	0.001	3.4	99.15	0.11	0	0	0	0.75
2003	219	23	1	318.65	-445.782	D	7.64	7.639	0.002	3.4	99.22	0.15	0	0	0	0.64
2003	220	23	2588	318.452	-445.8	D	7.639	7.639	0	3.4	98.83	0	0	0	0	0.6
2003	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	230	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	99.13	0.02	0	0	0	1.17
2003	231	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.24	0.03	0	0	0	0.81
2003	232	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.33	0.04	0	0	0	0.68
2003	233	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.5	0.09	0	0	0	0.6
2003	234	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	98.99	0.02	0	0	0	0.97
2003	235	23	2781	339.842	-425.379	D	7.647	7.639	0.008	3.4	99.1	0.03	0	0	0	0.89
2003	236	23	2588	318.452	-445.8	D	7.645	7.639	0.006	3.4	99.18	0.08	0	0	0	0.75
2003	237	23	2626	320.826	-437.417	D	7.643	7.639	0.004	3.4	99.33	0.02	0	0	0	0.65
2003	238	23	2234	335.639	-424.803	D	7.64	7.639	0.001	3.4	99.39	0.01	0	0	0	0.57
2003	239	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	99.38	0.02	0	0	0	0.52
2003	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	242	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	243	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2003	245	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	247	23	2628	320.933	-436.998	D	7.738	7.731	0.007	3.6	97.49	1.24	0	0	0	1.27
2003	248	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	102.05	0.01	0	0	0	0.89
2003	249	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	255	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	257	23	2704	329.056	-425.092	D	7.734	7.731	0.003	3.6	96.44	0.8	0	0	0	2.74
2003	258	23	2571	322.646	-445.476	D	7.733	7.731	0.002	3.6	97.58	0.44	0	0	0	1.98
2003	259	23	2571	322.646	-445.476	D	7.735	7.731	0.004	3.6	98.7	0.14	0	0	0	1.18
2003	260	23	2704	329.056	-425.092	D	7.731	7.731	0	3.6	98.99	0.06	0	0	0	0.86
2003	261	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	262	23	2780	339.614	-425.419	D	7.732	7.731	0.001	3.6	95.19	3.24	0	0	0	1.41
2003	263	23	2684	326.713	-427.014	D	7.731	7.731	0	3.6	96.98	0.59	0	0	0	2.03
2003	264	23	1	318.65	-445.782	D	7.732	7.731	0.001	3.6	99.46	0.05	0	0	0	0.38
2003	265	23	2781	339.842	-425.379	D	7.732	7.731	0.001	3.6	99.32	0.39	0	0	0	0.31
2003	266	23	2763	336.292	-425.028	D	7.731	7.731	0	3.6	96.28	0.63	0	0	0	3.1
2003	267	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	268	23	2589	318.383	-445.593	D	7.732	7.731	0.002	3.6	98.27	0.33	0	0	0	1.43
2003	269	23	2684	326.713	-427.014	D	7.731	7.731	0.001	3.6	98.89	0.22	0	0	0	0.98
2003	270	23	2155	334.883	-424.586	D	7.731	7.731	0.001	3.6	95.15	2.11	0	0	0	2.42
2003	271	23	2417	339.654	-425.626	D	7.731	7.731	0	3.6	93.66	1.4	0	0	0	4.57
2003	272	23	1047	326.802	-427.438	D	7.731	7.731	0.001	3.6	90.9	5.13	0	0	0	3.89
2003	273	23	2780	339.614	-425.419	D	7.731	7.731	0	3.6	94.95	3.5	0	0	0	1.46
2003	274	23	2781	339.842	-425.379	D	7.599	7.598	0.001	3.313	97.57	1.45	0	0	0	1.2
2003	275	23	1922	333.594	-434.885	D	7.596	7.593	0.003	3.3	98.04	0.6	0	0	0	1.38
2003	276	23	200	320.784	-437.694	D	7.594	7.593	0.001	3.3	98.36	0.52	0	0	0	1.14
2003	277	23	1552	330.178	-425.042	D	7.593	7.593	0	3.3	95.86	0.74	0	0	0	3.49
2003	278	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	98.18	0.53	0	0	0	1.58
2003	279	23	2571	322.646	-445.476	D	7.593	7.593	0.001	3.3	98.47	0.59	0	0	0	0.99
2003	280	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	99.29	0.16	0	0	0	0.74
2003	281	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	99.48	0.09	0	0	0	0.63
2003	282	23	1008	326.651	-429.693	D	7.593	7.593	0	3.3	98.9	0.12	0	0	0	0.57
2003	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	285	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	95.17	2.5	0	0	0	2.42
2003	286	23	1	318.65	-445.782	D	7.594	7.593	0.001	3.3	99.05	0.09	0	0	0	0.93
2003	287	23	2589	318.383	-445.593	D	7.593	7.593	0.001	3.3	95.71	2.68	0	0	0	1.72
2003	288	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	95.93	1.15	0	0	0	2.94
2003	289	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	98.41	0.21	0	0	0	1.24
2003	290	23	2323	337.303	-428.727	D	7.593	7.593	0	3.3	98.47	1.48	0	0	0	0.8
2003	291	23	2418	339.946	-426.612	D	7.593	7.593	0	3.3	99.49	0.41	0	0	0	0.68
2003	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	294	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	95.45	0.18	0	0	0	4.12
2003	295	23	2790	340.421	-426.562	D	7.595	7.593	0.003	3.3	96.63	0.47	0	0	0	2.91
2003	296	23	2588	318.452	-445.8	D	7.594	7.593	0.001	3.3	98.14	0.1	0	0	0	1.88
2003	297	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	98.47	0.15	0	0	0	1.41
2003	298	23	2209	335.38	-424.564	D	7.594	7.593	0.001	3.3	98.83	0.52	0	0	0	0.69
2003	299	23	2664	325.646	-431.402	D	7.594	7.593	0.002	3.3	90.4	5.98	0	0	0	3.66
2003	300	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	92.77	4.68	0	0	0	2.54
2003	301	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	304	23	1415	329.185	-425.086	D	7.593	7.593	0	3.3	92.61	1.33	0	0	0	3.32
2003	305	23	2704	329.056	-425.092	D	7.55	7.548	0.002	3.204	94.35	3.47	0	0	0	2.26
2003	306	23	1044	326.834	-428.186	D	7.546	7.546	0	3.2	91.63	1.74	0	0	0	1.08
2003	307	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	308	23	1415	329.185	-425.086	D	7.546	7.546	0	3.2	98.46	1.03	0	0	0	0.82
2003	309	23	2781	339.842	-425.379	D	7.569	7.546	0.022	3.2	97.79	1.43	0	0	0	0.8
2003	310	23	2468	334.002	-434.887	D	7.564	7.546	0.018	3.2	97.93	1.53	0	0	0	0.55
2003	311	23	1	318.65	-445.782	D	7.547	7.546	0.001	3.2	98.83	0.97	0	0	0	0.4
2003	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	317	23	2789	340.496	-426.449	D	7.546	7.546	0	3.2	85.79	8.63	0	0	0	5.5
2003	318	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	89.22	7.35	0	0	0	3.56
2003	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	323	23	2694	327.861	-425.964	D	7.547	7.546	0	3.2	72.91	14.69	0	0	0	12.54
2003	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	327	23	2705	329.287	-425.069	D	7.547	7.546	0	3.2	92	6.7	0	0	0	1.47
2003	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	331	23	2589	318.383	-445.593	D	7.547	7.546	0.001	3.2	93.53	4.33	0	0	0	2.35
2003	332	23	2781	339.842	-425.379	D	7.547	7.546	0	3.2	73.93	17.3	0	0	0	8.8

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	335	23	1048	326.791	-427.189	D	7.591	7.591	0.001	3.296	89.78	6.48	0	0	0	3.7
2003	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	339	23	2628	320.933	-436.998	D	7.595	7.593	0.003	3.3	93.76	4.96	0	0	0	1.24
2003	340	23	2684	326.713	-427.014	D	7.594	7.593	0.001	3.3	92.61	5.55	0	0	0	1.8
2003	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	342	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	2587	318.699	-445.781	D	7.595	7.593	0.002	3.3	89.72	7.82	0	0	0	2.47
2003	345	23	2781	339.842	-425.379	D	7.596	7.593	0.003	3.3	84.74	10.82	0	0	0	4.43
2003	346	23	2694	327.861	-425.964	D	7.595	7.593	0.002	3.3	91.15	6.94	0	0	0	1.91
2003	347	23	199	320.795	-437.944	D	7.593	7.593	0	3.3	93.39	4.4	0	0	0	1
2003	348	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	2787	340.091	-426.447	D	7.593	7.593	0	3.3	94.3	3.38	0	0	0	1.9
2003	355	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	95.16	3.38	0	0	0	1.36
2003	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	2758	335.862	-424.454	D	7.594	7.593	0.001	3.3	91.88	5.92	0	0	0	2.26
2003	358	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	94.08	4.36	0	0	0	1.56
2003	359	23	2587	318.699	-445.781	D	7.595	7.593	0.002	3.3	96.06	2.72	0	0	0	1.22
2003	360	23	2235	335.628	-424.554	D	7.593	7.593	0.001	3.3	96.91	2.31	0	0	0	0.76
2003	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.022							
TRIGEN KC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	2	23	2589	318.383	-445.593	D	7.599	7.593	0.007	3.3	94.72	5.11	0	0	0	0.17
2003	3	23	2789	340.496	-426.449	D	7.603	7.593	0.011	3.3	92.39	7.29	0	0	0	0.33
2003	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	5	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	79.53	20.02	0	0	0	1.43
2003	6	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	86.46	12.93	0	0	0	0.64
2003	7	23	2572	322.4	-445.495	D	7.596	7.593	0.003	3.3	96.12	3.68	0	0	0	0.17
2003	8	23	1951	333.842	-434.874	D	7.593	7.593	0	3.3	96.61	2.16	0	0	0	0.12
2003	9	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	95.57	4.24	0	0	0	0.45
2003	10	23	2600	318.952	-443.12	D	7.597	7.593	0.005	3.3	82.67	16.08	0	0	0	1.25
2003	11	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	82.96	16.06	0	0	0	1.03
2003	12	23	2588	318.452	-445.8	D	7.594	7.593	0.001	3.3	93.41	6.21	0	0	0	0.24
2003	13	23	2780	339.614	-425.419	D	7.595	7.593	0.002	3.3	94.47	5.4	0	0	0	0.15
2003	14	23	2468	334.002	-434.887	D	7.625	7.593	0.033	3.3	95.12	4.64	0	0	0	0.23
2003	15	23	2588	318.452	-445.8	D	7.6	7.593	0.008	3.3	96.45	3.44	0	0	0	0.13
2003	16	23	2588	318.452	-445.8	D	7.596	7.593	0.003	3.3	95.83	4.13	0	0	0	0.07
2003	17	23	2588	318.452	-445.8	D	7.595	7.593	0.003	3.3	95.39	4.29	0	0	0	0.3
2003	18	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	92.65	6.95	0	0	0	0.29
2003	19	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	21	23	2789	340.496	-426.449	D	7.596	7.593	0.003	3.3	95.53	4.41	0	0	0	0.1
2003	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	97.1	2.56	0	0	0	0.05
2003	23	23	2589	318.383	-445.593	D	7.594	7.593	0.002	3.3	87.53	12.04	0	0	0	0.47
2003	24	23	2628	320.933	-436.998	D	7.595	7.593	0.002	3.3	92.31	7.51	0	0	0	0.19
2003	25	23	2781	339.842	-425.379	D	7.596	7.593	0.004	3.3	93.04	6.87	0	0	0	0.13
2003	26	23	2552	324.659	-442.591	D	7.596	7.593	0.003	3.3	80.18	18.84	0	0	0	1
2003	27	23	2571	322.646	-445.476	D	7.597	7.593	0.005	3.3	92.68	7.17	0	0	0	0.19
2003	28	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	94.81	4.91	0	0	0	0.1
2003	29	23	2628	320.933	-436.998	D	7.596	7.593	0.003	3.3	94.67	5.25	0	0	0	0.11
2003	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	2155	334.883	-424.586	D	7.453	7.453	0	3	96.29	3.85	0	0	0	0.1
2003	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	2789	340.496	-426.449	D	7.462	7.453	0.01	3	95.5	4.26	0	0	0	0.26
2003	37	23	2694	327.861	-425.964	D	7.46	7.453	0.007	3	96.71	3.21	0	0	0	0.12
2003	38	23	305	322.115	-445.381	D	7.47	7.453	0.018	3	96.25	3.66	0	0	0	0.1
2003	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	2787	340.091	-426.447	D	7.453	7.453	0	3	168.35	6.28	0	0	0	0.21

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	41	23	2781	339.842	-425.379	D	7.453	7.453	0	3	93.64	6.37	0	0	0	0.18
2003	42	23	2709	330.21	-424.978	D	7.453	7.453	0	3	96.01	3.04	0	0	0	0.37
2003	43	23	2789	340.496	-426.449	D	7.455	7.453	0.003	3	89.4	9.95	0	0	0	0.67
2003	44	23	1415	329.185	-425.086	D	7.455	7.453	0.002	3	96.35	3.58	0	0	0	0.21
2003	45	23	2781	339.842	-425.379	D	7.453	7.453	0	3	97.78	2.36	0	0	0	0.1
2003	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	49	23	2694	327.861	-425.964	D	7.456	7.453	0.003	3	97.41	2.53	0	0	0	0.14
2003	50	23	2704	329.056	-425.092	D	7.454	7.453	0.001	3	97.7	2.41	0	0	0	0.1
2003	51	23	2704	329.056	-425.092	D	7.462	7.453	0.01	3	97.59	2.35	0	0	0	0.1
2003	52	23	2684	326.713	-427.014	D	7.455	7.453	0.002	3	99.12	0.9	0	0	0	0.07
2003	53	23	2588	318.452	-445.8	D	7.455	7.453	0.003	3	97.39	2.58	0	0	0	0.12
2003	54	23	2589	318.383	-445.593	D	7.456	7.453	0.004	3	91.81	7.9	0	0	0	0.38
2003	55	23	2589	318.383	-445.593	D	7.475	7.453	0.022	3	91.87	7.82	0	0	0	0.33
2003	56	23	2589	318.383	-445.593	D	7.467	7.453	0.015	3	95.97	3.93	0	0	0	0.11
2003	57	23	2684	326.713	-427.014	D	7.453	7.453	0	3	98.73	2.26	0	0	0	0.08
2003	58	23	2608	319.495	-441.316	D	7.453	7.453	0	3	98.61	1.59	0	0	0	0.06
2003	59	23	1	318.65	-445.782	D	7.453	7.453	0.001	3	99.12	1.2	0	0	0	0.05
2003	60	23	1415	329.185	-425.086	D	7.319	7.317	0.003	2.713	98.51	1.47	0	0	0	0.07
2003	61	23	2789	340.496	-426.449	D	7.348	7.311	0.038	2.7	97.79	2.1	0	0	0	0.12
2003	62	23	2628	320.933	-436.998	D	7.337	7.311	0.027	2.7	96.78	3.07	0	0	0	0.15
2003	63	23	2789	340.496	-426.449	D	7.327	7.311	0.016	2.7	98.71	1.23	0	0	0	0.07
2003	64	23	2588	318.452	-445.8	D	7.33	7.311	0.019	2.7	97.49	2.42	0	0	0	0.11
2003	65	23	2571	322.646	-445.476	D	7.322	7.311	0.011	2.7	97.31	2.6	0	0	0	0.1
2003	66	23	2781	339.842	-425.379	D	7.316	7.311	0.005	2.7	98.38	1.55	0	0	0	0.11
2003	67	23	2781	339.842	-425.379	D	7.312	7.311	0.001	2.7	99.33	0.57	0	0	0	0.07
2003	68	23	2588	318.452	-445.8	D	7.323	7.311	0.012	2.7	96.58	3.29	0	0	0	0.13
2003	69	23	2588	318.452	-445.8	D	7.312	7.311	0.002	2.7	99.28	0.79	0	0	0	0.08
2003	70	23	2588	318.452	-445.8	D	7.316	7.311	0.005	2.7	99.15	0.8	0	0	0	0.07
2003	71	23	2781	339.842	-425.379	D	7.312	7.311	0.001	2.7	99.31	0.62	0	0	0	0.05
2003	72	23	2704	329.056	-425.092	D	7.335	7.311	0.024	2.7	99.09	0.79	0	0	0	0.12
2003	73	23	2588	318.452	-445.8	D	7.343	7.311	0.032	2.7	99.04	0.88	0	0	0	0.08
2003	74	23	2628	320.933	-436.998	D	7.318	7.311	0.007	2.7	99.51	0.45	0	0	0	0.07
2003	75	23	1415	329.185	-425.086	D	7.311	7.311	0	2.7	99.9	0.21	0	0	0	0.06
2003	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	2589	318.383	-445.593	D	7.358	7.311	0.048	2.7	96.53	3.32	0	0	0	0.16

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	80	23	2476	332.154	-435.398	D	7.34	7.311	0.03	2.7	96.42	3.34	0	0	0	0.25
2003	81	23	2789	340.496	-426.449	D	7.315	7.311	0.005	2.7	98.37	1.34	0	0	0	0.3
2003	82	23	2789	340.496	-426.449	D	7.311	7.311	0	2.7	99.35	0.28	0	0	0	0.13
2003	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	2684	326.713	-427.014	D	7.312	7.311	0.002	2.7	98.67	1.28	0	0	0	0.16
2003	85	23	2571	322.646	-445.476	D	7.312	7.311	0.002	2.7	98.07	1.92	0	0	0	0.09
2003	86	23	2405	338.909	-425.659	D	7.311	7.311	0	2.7	111.39	0.35	0	0	0	0.08
2003	87	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	2781	339.842	-425.379	D	7.316	7.311	0.005	2.7	87.48	11.73	0	0	0	0.82
2003	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	95	23	1498	330.138	-429.79	D	7.36	7.358	0.002	2.8	88.81	10.21	0	0	0	0.97
2003	96	23	2789	340.496	-426.449	D	7.359	7.358	0	2.8	98.96	1.28	0	0	0	0.04
2003	97	23	1449	329.434	-425.075	D	7.358	7.358	0	2.8	75.98	0.75	0	0	0	0.01
2003	98	23	2781	339.842	-425.379	D	7.366	7.358	0.008	2.8	93.61	6.04	0	0	0	0.38
2003	99	23	2589	318.383	-445.593	D	7.365	7.358	0.007	2.8	94.57	5.13	0	0	0	0.3
2003	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	101	23	2589	318.383	-445.593	D	7.359	7.358	0.001	2.8	99.74	0.28	0	0	0	0.11
2003	102	23	2684	326.713	-427.014	D	7.36	7.358	0.002	2.8	99.88	0.1	0	0	0	0.08
2003	103	23	2789	340.496	-426.449	D	7.36	7.358	0.001	2.8	99.96	0.05	0	0	0	0.07
2003	104	23	2780	339.614	-425.419	D	7.359	7.358	0	2.8	100.28	0.05	0	0	0	0.07
2003	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	107	23	2684	326.713	-427.014	D	7.361	7.358	0.002	2.8	98.08	1.83	0	0	0	0.1
2003	108	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	100.48	0.08	0	0	0	0.09
2003	109	23	2417	339.654	-425.626	D	7.358	7.358	0	2.8	99.43	0.06	0	0	0	0.06
2003	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	112	23	641	324.033	-438.052	D	7.362	7.358	0.004	2.8	97.9	1.7	0	0	0	0.43
2003	113	23	2589	318.383	-445.593	D	7.363	7.358	0.005	2.8	99.48	0.41	0	0	0	0.13
2003	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	115	23	2781	339.842	-425.379	D	7.371	7.358	0.013	2.8	98.83	0.99	0	0	0	0.19
2003	116	23	2601	319.02	-442.895	D	7.366	7.358	0.007	2.8	98.82	1.02	0	0	0	0.15
2003	117	23	2613	319.871	-440.204	D	7.359	7.358	0.001	2.8	99.76	0.19	0	0	0	0.08
2003	118	23	1415	329.185	-425.086	D	7.358	7.358	0	2.8	101.74	0.02	0	0	0	0.07

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	119	23	2040	333.912	-425.128	D	7.358	7.358	0	2.8	101.97	0.23	0	0	0	0.06
2003	120	23	2209	335.38	-424.564	D	7.358	7.358	0	2.8	92.92	0.06	0	0	0	0.04
2003	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2003	122	23	2628	320.933	-436.998	D	7.688	7.639	0.049	3.4	99.49	0.41	0	0	0	0.1
2003	123	23	2579	320.672	-445.629	D	7.71	7.639	0.071	3.4	99.68	0.26	0	0	0	0.06
2003	124	23	2704	329.056	-425.092	D	7.651	7.639	0.012	3.4	99.9	0.07	0	0	0	0.03
2003	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	127	23	2758	335.862	-424.454	D	7.657	7.639	0.018	3.4	99.62	0.26	0	0	0	0.12
2003	128	23	2758	335.862	-424.454	D	7.646	7.639	0.007	3.4	99.86	0.06	0	0	0	0.09
2003	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	137	23	2756	335.398	-424.515	D	7.642	7.639	0.003	3.4	99.88	0.05	0	0	0	0.05
2003	138	23	2628	320.933	-436.998	D	7.653	7.639	0.014	3.4	99.53	0.43	0	0	0	0.04
2003	139	23	2628	320.933	-436.998	D	7.642	7.639	0.003	3.4	99.76	0.26	0	0	0	0.04
2003	140	23	2628	320.933	-436.998	D	7.651	7.639	0.012	3.4	99.07	0.87	0	0	0	0.06
2003	141	23	1	318.65	-445.782	D	7.639	7.639	0.001	3.4	100.18	0.19	0	0	0	0.03
2003	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	144	23	2155	334.883	-424.586	D	7.64	7.639	0.001	3.4	99.55	0.36	0	0	0	0.07
2003	145	23	2589	318.383	-445.593	D	7.68	7.639	0.041	3.4	99.55	0.38	0	0	0	0.06
2003	146	23	2588	318.452	-445.8	D	7.655	7.639	0.016	3.4	99.87	0.09	0	0	0	0.04
2003	147	23	2588	318.452	-445.8	D	7.64	7.639	0.001	3.4	100.04	0.03	0	0	0	0.04
2003	148	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.7	0.25	0	0	0	0.14
2003	149	23	1623	330.718	-426.018	D	7.645	7.639	0.006	3.4	98.03	1.62	0	0	0	0.37
2003	150	23	2662	325.404	-431.803	D	7.647	7.639	0.009	3.4	99.79	0.08	0	0	0	0.14
2003	151	23	2589	318.383	-445.593	D	7.64	7.639	0.001	3.4	92.58	6.51	0	0	0	0.98
2003	152	23	2589	318.383	-445.593	D	7.639	7.639	0	3.4	99.71	0.06	0	0	0	0.1
2003	153	23	2624	320.719	-437.835	D	7.639	7.639	0	3.4	100.09	0.09	0	0	0	0.06
2003	154	23	2588	318.452	-445.8	D	7.658	7.639	0.019	3.4	96.39	3.44	0	0	0	0.17
2003	155	23	2589	318.383	-445.593	D	7.647	7.639	0.009	3.4	99.7	0.21	0	0	0	0.1
2003	156	23	2589	318.383	-445.593	D	7.641	7.639	0.002	3.4	99.83	0.13	0	0	0	0.06
2003	157	23	2628	320.933	-436.998	D	7.64	7.639	0.001	3.4	99.76	0.17	0	0	0	0.05

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	158	23	2588	318.452	-445.8	D	7.641	7.639	0.002	3.4	99.91	0.11	0	0	0	0.05
2003	159	23	2571	322.646	-445.476	D	7.639	7.639	0.001	3.4	99.95	0.02	0	0	0	0.04
2003	160	23	1202	328.425	-436.111	D	7.639	7.639	0	3.4	93.62	0.01	0	0	0	0.04
2003	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	164	23	2610	319.631	-440.865	D	7.642	7.639	0.003	3.4	99.95	0.02	0	0	0	0.07
2003	165	23	2589	318.383	-445.593	D	7.642	7.639	0.003	3.4	99.9	0.09	0	0	0	0.05
2003	166	23	1	318.65	-445.782	D	7.64	7.639	0.001	3.4	99.97	0.15	0	0	0	0.04
2003	167	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	100.04	0.06	0	0	0	0.03
2003	168	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	100.07	0.15	0	0	0	0.03
2003	169	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	170	23	2704	329.056	-425.092	D	7.642	7.639	0.003	3.4	99.91	0.03	0	0	0	0.09
2003	171	23	2684	326.713	-427.014	D	7.648	7.639	0.009	3.4	99.84	0.1	0	0	0	0.08
2003	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	177	23	2640	322.263	-435.121	D	7.651	7.639	0.013	3.4	97.36	2.45	0	0	0	0.19
2003	178	23	2684	326.713	-427.014	D	7.649	7.639	0.01	3.4	99.59	0.22	0	0	0	0.21
2003	179	23	2694	327.861	-425.964	D	7.648	7.639	0.009	3.4	99.84	0.06	0	0	0	0.11
2003	180	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	99.76	0.01	0	0	0	0.08
2003	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	183	23	2337	337.15	-425.236	D	7.639	7.639	0	3.4	97.49	0.01	0	0	0	0.05
2003	184	23	2397	338.413	-425.68	D	7.639	7.639	0	3.4	95.7	0.02	0	0	0	0.04
2003	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	192	23	2589	318.383	-445.593	D	7.641	7.639	0.002	3.4	99.31	0.39	0	0	0	0.37
2003	193	23	2684	326.713	-427.014	D	7.644	7.639	0.005	3.4	99.78	0.17	0	0	0	0.09
2003	194	23	2758	335.862	-424.454	D	7.639	7.639	0.001	3.4	99.89	0.04	0	0	0	0.08
2003	195	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	99.75	0.17	0	0	0	0.06
2003	196	23	2412	339.417	-425.886	D	7.639	7.639	0	3.4	98.89	0.01	0	0	0	0.05

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	197	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	99.96	0.03	0	0	0	0.09
2003	198	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.94	0.01	0	0	0	0.07
2003	199	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	99.95	0	0	0	0	0.05
2003	200	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	99.6	0.01	0	0	0	0.05
2003	201	23	2416	339.665	-425.875	D	7.639	7.639	0	3.4	99.19	0.01	0	0	0	0.05
2003	202	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	100.53	0.09	0	0	0	0.05
2003	203	23	2781	339.842	-425.379	D	7.644	7.639	0.005	3.4	99.78	0.11	0	0	0	0.11
2003	204	23	2589	318.383	-445.593	D	7.64	7.639	0.001	3.4	99.7	0.07	0	0	0	0.16
2003	205	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	206	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	207	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	210	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.96	0.07	0	0	0	0.06
2003	211	23	2781	339.842	-425.379	D	7.646	7.639	0.007	3.4	99.83	0.12	0	0	0	0.05
2003	212	23	2684	326.713	-427.014	D	7.65	7.639	0.011	3.4	99.92	0.03	0	0	0	0.06
2003	213	23	2781	339.842	-425.379	D	7.649	7.639	0.01	3.4	99.9	0.05	0	0	0	0.06
2003	214	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.99	0.01	0	0	0	0.04
2003	215	23	2758	335.862	-424.454	D	7.64	7.639	0.002	3.4	99.92	0.01	0	0	0	0.1
2003	216	23	2781	339.842	-425.379	D	7.65	7.639	0.011	3.4	99.72	0.22	0	0	0	0.08
2003	217	23	2781	339.842	-425.379	D	7.639	7.639	0.001	3.4	100.06	0.09	0	0	0	0.07
2003	218	23	2589	318.383	-445.593	D	7.65	7.639	0.011	3.4	99.89	0.03	0	0	0	0.1
2003	219	23	2589	318.383	-445.593	D	7.665	7.639	0.026	3.4	99.87	0.07	0	0	0	0.06
2003	220	23	2588	318.452	-445.8	D	7.642	7.639	0.003	3.4	99.92	0	0	0	0	0.05
2003	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	99.99	0	0	0	0	0.04
2003	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	105.8	0.01	0	0	0	0.11
2003	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	100.95	0.11	0	0	0	0.06
2003	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	230	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	99.75	0.01	0	0	0	0.1
2003	231	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.92	0.02	0	0	0	0.07
2003	232	23	2789	340.496	-426.449	D	7.645	7.639	0.006	3.4	99.91	0.04	0	0	0	0.05
2003	233	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	99.92	0.06	0	0	0	0.05
2003	234	23	2789	340.496	-426.449	D	7.645	7.639	0.006	3.4	99.93	0.03	0	0	0	0.06
2003	235	23	2789	340.496	-426.449	D	7.649	7.639	0.01	3.4	99.91	0.02	0	0	0	0.08

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	236	23	2588	318.452	-445.8	D	7.646	7.639	0.007	3.4	99.91	0.03	0	0	0	0.06
2003	237	23	2628	320.933	-436.998	D	7.645	7.639	0.006	3.4	99.92	0.02	0	0	0	0.06
2003	238	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.93	0.01	0	0	0	0.05
2003	239	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.9	0.01	0	0	0	0.04
2003	240	23	1698	331.856	-434.961	D	7.639	7.639	0	3.4	99.39	0.03	0	0	0	0.04
2003	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	242	23	1242	327.988	-426.138	D	7.639	7.639	0	3.4	67.46	0.06	0	0	0	0.04
2003	243	23	1627	330.675	-425.021	D	7.639	7.639	0	3.4	86.16	0.22	0	0	0	0.04
2003	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2003	245	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	247	23	2628	320.933	-436.998	D	7.742	7.731	0.011	3.6	99.29	0.62	0	0	0	0.1
2003	248	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	249	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	257	23	2781	339.842	-425.379	D	7.745	7.731	0.015	3.6	97.33	2.37	0	0	0	0.3
2003	258	23	2789	340.496	-426.449	D	7.743	7.731	0.012	3.6	99.47	0.33	0	0	0	0.19
2003	259	23	2684	326.713	-427.014	D	7.746	7.731	0.015	3.6	99.7	0.18	0	0	0	0.12
2003	260	23	1415	329.185	-425.086	D	7.731	7.731	0	3.6	99.79	0.05	0	0	0	0.09
2003	261	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	262	23	2789	340.496	-426.449	D	7.734	7.731	0.003	3.6	95.38	4.31	0	0	0	0.33
2003	263	23	2627	320.879	-437.207	D	7.731	7.731	0	3.6	98.99	0.29	0	0	0	0.17
2003	264	23	2588	318.452	-445.8	D	7.734	7.731	0.004	3.6	99.92	0.04	0	0	0	0.04
2003	265	23	2781	339.842	-425.379	D	7.734	7.731	0.003	3.6	99.67	0.31	0	0	0	0.03
2003	266	23	2789	340.496	-426.449	D	7.732	7.731	0.002	3.6	98.08	1.39	0	0	0	0.5
2003	267	23	2789	340.496	-426.449	D	7.731	7.731	0	3.6	99.25	0.1	0	0	0	0.12
2003	268	23	2588	318.452	-445.8	D	7.736	7.731	0.005	3.6	99.39	0.43	0	0	0	0.19
2003	269	23	2571	322.646	-445.476	D	7.738	7.731	0.007	3.6	99.77	0.13	0	0	0	0.09
2003	270	23	2781	339.842	-425.379	D	7.732	7.731	0.002	3.6	96.76	2.94	0	0	0	0.36
2003	271	23	2781	339.842	-425.379	D	7.732	7.731	0.001	3.6	98.1	1.46	0	0	0	0.53
2003	272	23	2589	318.383	-445.593	D	7.732	7.731	0.001	3.6	94.95	4.49	0	0	0	0.5
2003	273	23	2711	330.671	-424.932	D	7.733	7.731	0.002	3.6	98.83	1.11	0	0	0	0.11
2003	274	23	2781	339.842	-425.379	D	7.606	7.598	0.008	3.313	98.53	1.41	0	0	0	0.07

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	275	23	2588	318.452	-445.8	D	7.605	7.593	0.013	3.3	98.57	1.26	0	0	0	0.17
2003	276	23	2628	320.933	-436.998	D	7.6	7.593	0.007	3.3	99.52	0.41	0	0	0	0.09
2003	277	23	2758	335.862	-424.454	D	7.599	7.593	0.006	3.3	99.12	0.59	0	0	0	0.3
2003	278	23	2571	322.646	-445.476	D	7.598	7.593	0.006	3.3	99.35	0.52	0	0	0	0.15
2003	279	23	2588	318.452	-445.8	D	7.596	7.593	0.004	3.3	99.35	0.57	0	0	0	0.09
2003	280	23	2588	318.452	-445.8	D	7.594	7.593	0.001	3.3	99.79	0.14	0	0	0	0.07
2003	281	23	1047	326.802	-427.438	D	7.593	7.593	0.001	3.3	99.75	0.14	0	0	0	0.06
2003	282	23	977	326.425	-430.203	D	7.593	7.593	0	3.3	99.64	0.06	0	0	0	0.06
2003	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	285	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	95.9	3.65	0	0	0	0.44
2003	286	23	2588	318.452	-445.8	D	7.597	7.593	0.004	3.3	99.77	0.15	0	0	0	0.1
2003	287	23	2628	320.933	-436.998	D	7.599	7.593	0.006	3.3	96.03	3.71	0	0	0	0.27
2003	288	23	2789	340.496	-426.449	D	7.598	7.593	0.005	3.3	98.25	1.37	0	0	0	0.4
2003	289	23	2789	340.496	-426.449	D	7.595	7.593	0.003	3.3	99.68	0.22	0	0	0	0.13
2003	290	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	98.37	1.67	0	0	0	0.06
2003	291	23	2467	334.065	-434.651	D	7.593	7.593	0	3.3	99.53	0.33	0	0	0	0.06
2003	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	294	23	2781	339.842	-425.379	D	7.595	7.593	0.002	3.3	99.46	0.14	0	0	0	0.38
2003	295	23	2451	335.22	-431.216	D	7.634	7.593	0.041	3.3	99.42	0.32	0	0	0	0.27
2003	296	23	2588	318.452	-445.8	D	7.595	7.593	0.003	3.3	99.68	0.18	0	0	0	0.16
2003	297	23	2781	339.842	-425.379	D	7.599	7.593	0.006	3.3	99.54	0.31	0	0	0	0.18
2003	298	23	2684	326.713	-427.014	D	7.609	7.593	0.016	3.3	98.53	1.31	0	0	0	0.17
2003	299	23	1449	329.434	-425.075	D	7.604	7.593	0.011	3.3	92.84	6.77	0	0	0	0.4
2003	300	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	96.83	2.97	0	0	0	0.21
2003	301	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	304	23	1415	329.185	-425.086	D	7.593	7.593	0	3.3	98.83	0.73	0	0	0	0.27
2003	305	23	2694	327.861	-425.964	D	7.556	7.548	0.008	3.204	97.78	2.04	0	0	0	0.19
2003	306	23	2684	326.713	-427.014	D	7.546	7.546	0	3.2	99.06	0.61	0	0	0	0.12
2003	307	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	308	23	2694	327.861	-425.964	D	7.548	7.546	0.002	3.2	99.18	0.77	0	0	0	0.07
2003	309	23	2294	336.796	-428.499	D	7.606	7.546	0.06	3.2	98.62	1.3	0	0	0	0.08
2003	310	23	2571	322.646	-445.476	D	7.606	7.546	0.059	3.2	98.54	1.41	0	0	0	0.05
2003	311	23	2588	318.452	-445.8	D	7.549	7.546	0.003	3.2	99.14	0.85	0	0	0	0.03
2003	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	317	23	2684	326.713	-427.014	D	7.553	7.546	0.006	3.2	93.36	6.05	0	0	0	0.6
2003	318	23	2589	318.383	-445.593	D	7.556	7.546	0.01	3.2	94.61	5.01	0	0	0	0.39
2003	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	322	23	2589	318.383	-445.593	D	7.551	7.546	0.005	3.2	97.71	2.21	0	0	0	0.09
2003	323	23	2781	339.842	-425.379	D	7.55	7.546	0.004	3.2	88.2	10.63	0	0	0	1.2
2003	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	327	23	2709	330.21	-424.978	D	7.548	7.546	0.002	3.2	96.82	3.1	0	0	0	0.07
2003	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	331	23	2589	318.383	-445.593	D	7.549	7.546	0.003	3.2	95.64	4.16	0	0	0	0.23
2003	332	23	2781	339.842	-425.379	D	7.549	7.546	0.002	3.2	79.71	18.89	0	0	0	1.44
2003	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	335	23	1415	329.185	-425.086	D	7.593	7.591	0.002	3.296	93.88	5.63	0	0	0	0.48
2003	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	2589	318.383	-445.593	D	7.611	7.593	0.019	3.3	96.72	3.14	0	0	0	0.14
2003	339	23	2789	340.496	-426.449	D	7.598	7.593	0.005	3.3	95.46	4.41	0	0	0	0.14
2003	340	23	2781	339.842	-425.379	D	7.598	7.593	0.005	3.3	94.47	5.17	0	0	0	0.37
2003	341	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	342	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	2588	318.452	-445.8	D	7.615	7.593	0.022	3.3	96.24	3.66	0	0	0	0.11
2003	345	23	2781	339.842	-425.379	D	7.601	7.593	0.008	3.3	86.15	13.17	0	0	0	0.69
2003	346	23	2628	320.933	-436.998	D	7.602	7.593	0.009	3.3	93.02	6.77	0	0	0	0.22
2003	347	23	234	321.01	-437.185	D	7.593	7.593	0	3.3	93.53	4.51	0	0	0	0.12
2003	348	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	94.83	4.96	0	0	0	0.29
2003	355	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	96.68	3.13	0	0	0	0.14
2003	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	2781	339.842	-425.379	D	7.599	7.593	0.006	3.3	95.56	4.24	0	0	0	0.22
2003	358	23	2789	340.496	-426.449	D	7.605	7.593	0.012	3.3	94.03	5.72	0	0	0	0.26
2003	359	23	2571	322.646	-445.476	D	7.602	7.593	0.009	3.3	96.29	3.56	0	0	0	0.16
2003	360	23	2758	335.862	-424.454	D	7.596	7.593	0.003	3.3	97.28	2.63	0	0	0	0.09
2003	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.071							
UMC											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES (km)**		**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	2781	339.842	-425.379	D	7.605	7.593	0.012	3.3	73.3	26.61	0	0	0	0.09
2003	3	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	23	2789	340.496	-426.449	D	7.629	7.593	0.036	3.3	96.87	3.07	0	0	0	0.06
2003	10	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	11	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	85.98	14.02	0	0	0	0.04
2003	13	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	88.05	11.75	0	0	0	0.02
2003	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	15	23	2789	340.496	-426.449	D	7.605	7.593	0.013	3.3	85.7	14.27	0	0	0	0.03
2003	16	23	2588	318.452	-445.8	D	7.703	7.593	0.11	3.3	89.02	10.96	0	0	0	0.02
2003	17	23	375	322.611	-445.359	D	7.593	7.593	0	3.3	91.91	5.26	0	0	0	0
2003	18	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	19	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	21	23	2789	340.496	-426.449	D	7.618	7.593	0.025	3.3	88.4	11.59	0	0	0	0.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES(km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	22	23	2704	329.056	-425.092	D	7.632	7.593	0.039	3.3	78.81	21.14	0	0	0	0.05
2003	23	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	83.71	16.27	0	0	0	0.02
2003	24	23	2790	340.421	-426.562	D	7.594	7.593	0.001	3.3	88.87	11.17	0	0	0	0.02
2003	25	23	2790	340.421	-426.562	D	7.595	7.593	0.003	3.3	90.48	9.54	0	0	0	0.01
2003	26	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	93.3	6.77	0	0	0	0.01
2003	27	23	2789	340.496	-426.449	D	7.597	7.593	0.005	3.3	87.57	12.41	0	0	0	0.02
2003	28	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	92.04	7.83	0	0	0	0.01
2003	29	23	2789	340.496	-426.449	D	7.636	7.593	0.044	3.3	70.79	29.13	0	0	0	0.09
2003	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	1415	329.185	-425.086	D	7.593	7.593	0	3.3	96.06	5.26	0	0	0	0.01
2003	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	2789	340.496	-426.449	D	7.453	7.453	0	3	86.54	13.82	0	0	0	0.05
2003	37	23	2789	340.496	-426.449	D	7.493	7.453	0.04	3	90.12	9.87	0	0	0	0.01
2003	38	23	2684	326.713	-427.014	D	7.764	7.453	0.311	3	93.81	6.18	0	0	0	0.01
2003	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	42	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	43	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	44	23	2789	340.496	-426.449	D	7.455	7.453	0.002	3	89.54	10.54	0	0	0	0.03
2003	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	23	2781	339.842	-425.379	D	7.628	7.453	0.175	3	92.34	7.64	0	0	0	0.02
2003	48	23	2694	327.861	-425.964	D	7.692	7.453	0.239	3	91.39	8.58	0	0	0	0.03
2003	49	23	2789	340.496	-426.449	D	7.495	7.453	0.043	3	93.74	6.26	0	0	0	0.01
2003	50	23	2781	339.842	-425.379	D	7.537	7.453	0.084	3	96.63	3.36	0	0	0	0.01
2003	51	23	2704	329.056	-425.092	D	7.558	7.453	0.106	3	93.02	6.97	0	0	0	0.01
2003	52	23	2628	320.933	-436.998	D	7.458	7.453	0.006	3	97.12	2.92	0	0	0	0.01
2003	53	23	2589	318.383	-445.593	D	7.563	7.453	0.11	3	92.52	7.46	0	0	0	0.02
2003	54	23	2781	339.842	-425.379	D	7.511	7.453	0.058	3	88.52	11.46	0	0	0	0.02
2003	55	23	2704	329.056	-425.092	D	7.557	7.453	0.104	3	91.44	8.55	0	0	0	0.01
2003	56	23	2575	321.659	-445.553	D	7.533	7.453	0.081	3	86.49	13.47	0	0	0	0.04
2003	57	23	2588	318.452	-445.8	D	7.591	7.453	0.138	3	93	7	0	0	0	0.01
2003	58	23	2589	318.383	-445.593	D	7.515	7.453	0.062	3	94.97	5.03	0	0	0	0.01
2003	59	23	2589	318.383	-445.593	D	7.521	7.453	0.068	3	95.5	4.5	0	0	0	0.01
2003	60	23	2705	329.287	-425.069	D	7.387	7.317	0.071	2.713	95.86	4.13	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	61	23	2781	339.842	-425.379	D	7.424	7.311	0.113	2.7	96.59	3.4	0	0	0	0.01
2003	62	23	2468	334.002	-434.887	D	7.329	7.311	0.018	2.7	97.59	2.41	0	0	0	0.01
2003	63	23	2789	340.496	-426.449	D	7.332	7.311	0.022	2.7	97.77	2.23	0	0	0	0.01
2003	64	23	2781	339.842	-425.379	D	7.386	7.311	0.076	2.7	94.05	5.94	0	0	0	0.01
2003	65	23	2789	340.496	-426.449	D	7.323	7.311	0.012	2.7	94.29	5.69	0	0	0	0.02
2003	66	23	2789	340.496	-426.449	D	7.353	7.311	0.042	2.7	94.68	5.31	0	0	0	0.01
2003	67	23	2789	340.496	-426.449	D	7.317	7.311	0.006	2.7	98.8	1.17	0	0	0	0.01
2003	68	23	2789	340.496	-426.449	D	7.373	7.311	0.063	2.7	80.89	19.04	0	0	0	0.07
2003	69	23	2758	335.862	-424.454	D	7.534	7.311	0.224	2.7	87.13	12.84	0	0	0	0.03
2003	70	23	2704	329.056	-425.092	D	7.443	7.311	0.133	2.7	95.22	4.76	0	0	0	0.02
2003	71	23	2781	339.842	-425.379	D	7.317	7.311	0.007	2.7	98.22	1.76	0	0	0	0.01
2003	72	23	2789	340.496	-426.449	D	7.32	7.311	0.009	2.7	98.47	1.52	0	0	0	0.02
2003	73	23	2571	322.646	-445.476	D	7.415	7.311	0.105	2.7	97.36	2.63	0	0	0	0.01
2003	74	23	2589	318.383	-445.593	D	7.376	7.311	0.065	2.7	98.77	1.22	0	0	0	0.01
2003	75	23	2704	329.056	-425.092	D	7.319	7.311	0.009	2.7	99.65	0.34	0	0	0	0.01
2003	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	2694	327.861	-425.964	D	7.503	7.311	0.192	2.7	94.97	5.02	0	0	0	0.01
2003	80	23	2789	340.496	-426.449	D	7.433	7.311	0.123	2.7	93.5	6.48	0	0	0	0.02
2003	81	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	82	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	2589	318.383	-445.593	D	7.341	7.311	0.031	2.7	97.5	2.48	0	0	0	0.03
2003	85	23	2684	326.713	-427.014	D	7.316	7.311	0.005	2.7	80.22	19.74	0	0	0	0.07
2003	86	23	2789	340.496	-426.449	D	7.313	7.311	0.002	2.7	99.33	0.71	0	0	0	0.01
2003	87	23	2035	333.967	-426.375	D	7.311	7.311	0	2.7	92.2	0.15	0	0	0	0.01
2003	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	96	23	2781	339.842	-425.379	D	7.382	7.358	0.024	2.8	94.05	5.95	0	0	0	0.01
2003	97	23	1415	329.185	-425.086	D	7.358	7.358	0	2.8	98.36	2.37	0	0	0	0
2003	98	23	2789	340.496	-426.449	D	7.372	7.358	0.014	2.8	96.69	3.32	0	0	0	0.01
2003	99	23	2789	340.496	-426.449	D	7.37	7.358	0.012	2.8	97.13	2.85	0	0	0	0.03

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	100	23	2789	340.496	-426.449	D	7.458	7.358	0.1	2.8	93.43	6.54	0	0	0	0.03
2003	101	23	2781	339.842	-425.379	D	7.402	7.358	0.043	2.8	98.38	1.6	0	0	0	0.02
2003	102	23	2789	340.496	-426.449	D	7.41	7.358	0.052	2.8	99.48	0.51	0	0	0	0.02
2003	103	23	2789	340.496	-426.449	D	7.361	7.358	0.003	2.8	99.91	0.1	0	0	0	0.01
2003	104	23	2789	340.496	-426.449	D	7.359	7.358	0	2.8	99.55	0.26	0	0	0	0.01
2003	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	107	23	2781	339.842	-425.379	D	7.363	7.358	0.005	2.8	94.75	5.26	0	0	0	0.01
2003	108	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	101.81	0.04	0	0	0	0.01
2003	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	112	23	2781	339.842	-425.379	D	7.364	7.358	0.005	2.8	98.83	1.17	0	0	0	0.05
2003	113	23	2757	335.63	-424.484	D	7.365	7.358	0.006	2.8	98.82	1.17	0	0	0	0.02
2003	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	115	23	2588	318.452	-445.8	D	7.458	7.358	0.1	2.8	96.75	3.23	0	0	0	0.02
2003	116	23	2781	339.842	-425.379	D	7.396	7.358	0.038	2.8	89.18	10.78	0	0	0	0.04
2003	117	23	2588	318.452	-445.8	D	7.375	7.358	0.017	2.8	99.19	0.81	0	0	0	0.01
2003	118	23	2781	339.842	-425.379	D	7.362	7.358	0.003	2.8	99.87	0.13	0	0	0	0.01
2003	119	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	99.05	0.69	0	0	0	0.01
2003	120	23	2780	339.614	-425.419	D	7.358	7.358	0	2.8	99.22	0.14	0	0	0	0.01
2003	121	23	977	326.425	-430.203	D	7.627	7.627	0	3.375	83.11	0.41	0	0	0	0.01
2003	122	23	2781	339.842	-425.379	D	7.689	7.639	0.05	3.4	99.41	0.58	0	0	0	0.02
2003	123	23	2758	335.862	-424.454	D	8.074	7.639	0.435	3.4	97.6	2.39	0	0	0	0.01
2003	124	23	2789	340.496	-426.449	D	7.688	7.639	0.049	3.4	99.74	0.26	0	0	0	0.01
2003	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	127	23	2704	329.056	-425.092	D	7.668	7.639	0.03	3.4	99.24	0.75	0	0	0	0.01
2003	128	23	2758	335.862	-424.454	D	7.648	7.639	0.009	3.4	99.87	0.13	0	0	0	0.01
2003	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	137	23	2781	339.842	-425.379	D	7.643	7.639	0.004	3.4	99.87	0.14	0	0	0	0.01
2003	138	23	2628	320.933	-436.998	D	7.698	7.639	0.059	3.4	98.89	1.11	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	139	23	2628	320.933	-436.998	D	7.656	7.639	0.017	3.4	99.45	0.54	0	0	0	0.01
2003	140	23	2789	340.496	-426.449	D	7.863	7.639	0.224	3.4	95.36	4.63	0	0	0	0.01
2003	141	23	2789	340.496	-426.449	D	7.697	7.639	0.058	3.4	98.93	1.05	0	0	0	0.02
2003	142	23	2758	335.862	-424.454	D	7.725	7.639	0.087	3.4	99.72	0.27	0	0	0	0.02
2003	143	23	2552	324.659	-442.591	D	7.876	7.639	0.237	3.4	99.76	0.23	0	0	0	0.01
2003	144	23	2781	339.842	-425.379	D	7.902	7.639	0.263	3.4	99.67	0.32	0	0	0	0.01
2003	145	23	2704	329.056	-425.092	D	7.988	7.639	0.349	3.4	99.18	0.81	0	0	0	0.01
2003	146	23	2588	318.452	-445.8	D	7.924	7.639	0.285	3.4	99.57	0.42	0	0	0	0.01
2003	147	23	2611	319.699	-440.64	D	7.672	7.639	0.033	3.4	99.76	0.22	0	0	0	0.01
2003	148	23	2588	318.452	-445.8	D	7.751	7.639	0.112	3.4	99.83	0.15	0	0	0	0.01
2003	149	23	2571	322.646	-445.476	D	7.644	7.639	0.005	3.4	99.96	0.03	0	0	0	0.01
2003	150	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	151	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	94.19	0.09	0	0	0	0.02
2003	152	23	2589	318.383	-445.593	D	7.69	7.639	0.052	3.4	99.18	0.81	0	0	0	0.01
2003	153	23	2589	318.383	-445.593	D	7.656	7.639	0.018	3.4	99.62	0.38	0	0	0	0
2003	154	23	2589	318.383	-445.593	D	7.74	7.639	0.101	3.4	97.14	2.85	0	0	0	0.01
2003	155	23	2588	318.452	-445.8	D	7.681	7.639	0.042	3.4	99.82	0.17	0	0	0	0.01
2003	156	23	2571	322.646	-445.476	D	7.749	7.639	0.11	3.4	99.85	0.14	0	0	0	0.01
2003	157	23	2781	339.842	-425.379	D	7.739	7.639	0.1	3.4	99.41	0.58	0	0	0	0.01
2003	158	23	2588	318.452	-445.8	D	7.64	7.639	0.001	3.4	99.81	0.23	0	0	0	0
2003	159	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	160	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	164	23	2704	329.056	-425.092	D	7.639	7.639	0	3.4	99.88	0.03	0	0	0	0.01
2003	165	23	2758	335.862	-424.454	D	7.884	7.639	0.245	3.4	99.04	0.95	0	0	0	0.01
2003	166	23	2571	322.646	-445.476	D	7.925	7.639	0.286	3.4	99.25	0.74	0	0	0	0.01
2003	167	23	2571	322.646	-445.476	D	7.737	7.639	0.098	3.4	99.68	0.31	0	0	0	0.01
2003	168	23	2588	318.452	-445.8	D	7.699	7.639	0.06	3.4	99.52	0.48	0	0	0	0
2003	169	23	2588	318.452	-445.8	D	7.654	7.639	0.015	3.4	99.78	0.21	0	0	0	0
2003	170	23	2684	326.713	-427.014	D	7.731	7.639	0.092	3.4	99.9	0.09	0	0	0	0.01
2003	171	23	2468	334.002	-434.887	D	8.097	7.639	0.458	3.4	98.2	1.79	0	0	0	0.01
2003	172	23	2589	318.383	-445.593	D	7.696	7.639	0.057	3.4	99.86	0.14	0	0	0	0.01
2003	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	178	23	2571	322.646	-445.476	D	7.64	7.639	0.001	3.4	99.98	0.11	0	0	0	0.03
2003	179	23	2789	340.496	-426.449	D	7.649	7.639	0.01	3.4	99.88	0.12	0	0	0	0.01
2003	180	23	2628	320.933	-436.998	D	7.653	7.639	0.014	3.4	99.96	0.04	0	0	0	0.01
2003	181	23	2684	326.713	-427.014	D	7.649	7.639	0.01	3.4	99.91	0.09	0	0	0	0.01
2003	182	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	99.64	0.16	0	0	0	0.01
2003	183	23	2413	339.406	-425.637	D	7.639	7.639	0	3.4	99.66	0.12	0	0	0	0.01
2003	184	23	2413	339.406	-425.637	D	7.639	7.639	0	3.4	100.3	0.07	0	0	0	0.01
2003	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	192	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	193	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	194	23	2413	339.406	-425.637	D	7.639	7.639	0	3.4	98.72	0.02	0	0	0	0.01
2003	195	23	2781	339.842	-425.379	D	7.652	7.639	0.013	3.4	99.73	0.27	0	0	0	0.01
2003	196	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	100.06	0.02	0	0	0	0.01
2003	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	198	23	2789	340.496	-426.449	D	7.64	7.639	0.002	3.4	99.96	0.06	0	0	0	0.01
2003	199	23	2468	334.002	-434.887	D	7.639	7.639	0	3.4	100.06	0.02	0	0	0	0.01
2003	200	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	99.89	0.05	0	0	0	0.01
2003	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	204	23	2694	327.861	-425.964	D	7.696	7.639	0.057	3.4	99.3	0.67	0	0	0	0.03
2003	205	23	2684	326.713	-427.014	D	7.924	7.639	0.285	3.4	99.79	0.2	0	0	0	0.02
2003	206	23	2704	329.056	-425.092	D	7.677	7.639	0.038	3.4	99.86	0.13	0	0	0	0.01
2003	207	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	210	23	2781	339.842	-425.379	D	7.663	7.639	0.024	3.4	99.07	0.93	0	0	0	0.01
2003	211	23	2781	339.842	-425.379	D	7.735	7.639	0.096	3.4	99.39	0.6	0	0	0	0.01
2003	212	23	2789	340.496	-426.449	D	7.732	7.639	0.093	3.4	99.65	0.34	0	0	0	0.01
2003	213	23	2789	340.496	-426.449	D	7.676	7.639	0.037	3.4	99.87	0.13	0	0	0	0.01
2003	214	23	2789	340.496	-426.449	D	7.651	7.639	0.012	3.4	99.95	0.03	0	0	0	0
2003	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	216	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	217	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	218	23	2684	326.713	-427.014	D	7.72	7.639	0.081	3.4	99.93	0.05	0	0	0	0.01
2003	219	23	2589	318.383	-445.593	D	8.109	7.639	0.47	3.4	99.11	0.88	0	0	0	0.02
2003	220	23	2571	322.646	-445.476	D	7.952	7.639	0.313	3.4	99.82	0.16	0	0	0	0.02
2003	221	23	2589	318.383	-445.593	D	7.836	7.639	0.198	3.4	99.9	0.08	0	0	0	0.02
2003	222	23	2589	318.383	-445.593	D	7.851	7.639	0.212	3.4	99.92	0.07	0	0	0	0.01
2003	223	23	2588	318.452	-445.8	D	7.929	7.639	0.29	3.4	99.87	0.12	0	0	0	0.01
2003	224	23	2588	318.452	-445.8	D	7.647	7.639	0.008	3.4	99.65	0.35	0	0	0	0.01
2003	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	230	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.97	0.01	0	0	0	0.01
2003	231	23	2789	340.496	-426.449	D	7.672	7.639	0.033	3.4	99.92	0.07	0	0	0	0.01
2003	232	23	2789	340.496	-426.449	D	7.677	7.639	0.038	3.4	99.9	0.1	0	0	0	0.01
2003	233	23	2789	340.496	-426.449	D	7.67	7.639	0.031	3.4	99.85	0.15	0	0	0	0.01
2003	234	23	2790	340.421	-426.562	D	7.673	7.639	0.035	3.4	99.93	0.07	0	0	0	0.01
2003	235	23	2704	329.056	-425.092	D	7.752	7.639	0.113	3.4	99.95	0.04	0	0	0	0.01
2003	236	23	2588	318.452	-445.8	D	7.904	7.639	0.265	3.4	99.57	0.42	0	0	0	0.01
2003	237	23	2684	326.713	-427.014	D	7.785	7.639	0.146	3.4	99.93	0.06	0	0	0	0.01
2003	238	23	2758	335.862	-424.454	D	7.654	7.639	0.015	3.4	99.99	0.01	0	0	0	0.01
2003	239	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.93	0.02	0	0	0	0.01
2003	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	242	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	78.21	0.19	0	0	0	0.01
2003	243	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	98.56	0.97	0	0	0	0.01
2003	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2003	245	23	2684	326.713	-427.014	D	7.758	7.731	0.027	3.6	99.85	0.14	0	0	0	0.01
2003	246	23	2588	318.452	-445.8	D	8.099	7.731	0.369	3.6	98.69	1.31	0	0	0	0.01
2003	247	23	2789	340.496	-426.449	D	7.958	7.731	0.228	3.6	99.46	0.52	0	0	0	0.02
2003	248	23	2628	320.933	-436.998	D	7.905	7.731	0.175	3.6	99.13	0.85	0	0	0	0.03
2003	249	23	2588	318.452	-445.8	D	7.732	7.731	0.002	3.6	99.86	0.06	0	0	0	0.02
2003	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	256	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	257	23	2781	339.842	-425.379	D	7.853	7.731	0.122	3.6	95.77	4.22	0	0	0	0.01
2003	258	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	259	23	2789	340.496	-426.449	D	7.736	7.731	0.005	3.6	99.84	0.13	0	0	0	0.02
2003	260	23	2789	340.496	-426.449	D	7.76	7.731	0.029	3.6	99.67	0.32	0	0	0	0.01
2003	261	23	2758	335.862	-424.454	D	7.731	7.731	0.001	3.6	99.73	0.1	0	0	0	0.01
2003	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	263	23	2789	340.496	-426.449	D	7.814	7.731	0.083	3.6	99.56	0.43	0	0	0	0.02
2003	264	23	2758	335.862	-424.454	D	7.822	7.731	0.091	3.6	99.79	0.2	0	0	0	0.01
2003	265	23	2781	339.842	-425.379	D	7.744	7.731	0.014	3.6	99.09	0.91	0	0	0	0
2003	266	23	2789	340.496	-426.449	D	7.731	7.731	0	3.6	99.86	0.08	0	0	0	0
2003	267	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	268	23	2684	326.713	-427.014	D	7.743	7.731	0.012	3.6	92.4	7.42	0	0	0	0.18
2003	269	23	2571	322.646	-445.476	D	7.76	7.731	0.029	3.6	99.32	0.66	0	0	0	0.01
2003	270	23	2789	340.496	-426.449	D	7.731	7.731	0	3.6	99.93	0.05	0	0	0	0.01
2003	271	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	272	23	2451	335.22	-431.216	D	7.743	7.731	0.013	3.6	93.51	6.41	0	0	0	0.07
2003	273	23	2790	340.421	-426.562	D	7.768	7.731	0.037	3.6	98.92	1.06	0	0	0	0.02
2003	274	23	2789	340.496	-426.449	D	7.643	7.598	0.044	3.313	94.31	5.68	0	0	0	0.01
2003	275	23	2684	326.713	-427.014	D	7.605	7.593	0.012	3.3	94.2	5.73	0	0	0	0.06
2003	276	23	2588	318.452	-445.8	D	7.624	7.593	0.032	3.3	98.39	1.59	0	0	0	0.02
2003	277	23	2789	340.496	-426.449	D	7.595	7.593	0.003	3.3	99.72	0.29	0	0	0	0.01
2003	278	23	2789	340.496	-426.449	D	7.6	7.593	0.007	3.3	99.16	0.83	0	0	0	0.02
2003	279	23	2789	340.496	-426.449	D	7.662	7.593	0.069	3.3	98.74	1.25	0	0	0	0.01
2003	280	23	2600	318.952	-443.12	D	7.661	7.593	0.069	3.3	99.54	0.45	0	0	0	0.01
2003	281	23	2684	326.713	-427.014	D	7.606	7.593	0.013	3.3	99.76	0.24	0	0	0	0.01
2003	282	23	1415	329.185	-425.086	D	7.594	7.593	0.001	3.3	99.77	0.23	0	0	0	0.01
2003	283	23	1048	326.791	-427.189	D	7.593	7.593	0	3.3	98.18	0.75	0	0	0	0.01
2003	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	285	23	2789	340.496	-426.449	D	7.618	7.593	0.025	3.3	99.32	0.65	0	0	0	0.03
2003	286	23	2781	339.842	-425.379	D	7.66	7.593	0.068	3.3	99.41	0.57	0	0	0	0.02
2003	287	23	2789	340.496	-426.449	D	7.605	7.593	0.013	3.3	98.01	1.99	0	0	0	0.01
2003	288	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	289	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	290	23	2611	319.699	-440.64	D	7.604	7.593	0.012	3.3	96.87	3.13	0	0	0	0.01
2003	291	23	2684	326.713	-427.014	D	7.641	7.593	0.049	3.3	99.08	0.9	0	0	0	0.02
2003	292	23	2789	340.496	-426.449	D	7.625	7.593	0.032	3.3	99.74	0.25	0	0	0	0.02
2003	293	23	2571	322.646	-445.476	D	7.601	7.593	0.008	3.3	99.9	0.08	0	0	0	0.01
2003	294	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	100.04	0.08	0	0	0	0.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	295	23	2684	326.713	-427.014	D	7.654	7.593	0.062	3.3	99.82	0.14	0	0	0	0.04
2003	296	23	2588	318.452	-445.8	D	7.674	7.593	0.081	3.3	99.7	0.28	0	0	0	0.03
2003	297	23	2789	340.496	-426.449	D	7.639	7.593	0.046	3.3	99.65	0.33	0	0	0	0.02
2003	298	23	2710	330.44	-424.955	D	7.865	7.593	0.272	3.3	93.38	6.59	0	0	0	0.02
2003	299	23	2571	322.646	-445.476	D	7.652	7.593	0.06	3.3	93.09	6.91	0	0	0	0.01
2003	300	23	2418	339.946	-426.612	D	7.593	7.593	0	3.3	85.05	0.69	0	0	0	0
2003	301	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	305	23	2781	339.842	-425.379	D	7.575	7.548	0.027	3.204	92.93	7.03	0	0	0	0.04
2003	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	308	23	2758	335.862	-424.454	D	7.547	7.546	0.001	3.2	97.44	2.73	0	0	0	0.01
2003	309	23	2781	339.842	-425.379	D	7.581	7.546	0.035	3.2	97.54	2.45	0	0	0	0.02
2003	310	23	2789	340.496	-426.449	D	7.713	7.546	0.167	3.2	93.39	6.59	0	0	0	0.02
2003	311	23	2468	334.002	-434.887	D	7.662	7.546	0.116	3.2	92.67	7.31	0	0	0	0.02
2003	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	317	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	318	23	2789	340.496	-426.449	D	7.547	7.546	0	3.2	96.8	3.22	0	0	0	0.03
2003	319	23	2788	340.294	-426.448	D	7.546	7.546	0	3.2	93.07	6.57	0	0	0	0.03
2003	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	327	23	2704	329.056	-425.092	D	7.559	7.546	0.013	3.2	93.06	6.93	0	0	0	0.01
2003	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	331	23	2789	340.496	-426.449	D	7.553	7.546	0.007	3.2	94.68	5.33	0	0	0	0.01
2003	332	23	2789	340.496	-426.449	D	7.549	7.546	0.003	3.2	95.16	4.82	0	0	0	0.01
2003	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	335	23	2694	327.861	-425.964	D	7.622	7.591	0.031	3.296	76.14	23.7	0	0	0	0.16
2003	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	2758	335.862	-424.454	D	7.704	7.593	0.111	3.3	95.07	4.92	0	0	0	0.01
2003	339	23	2588	318.452	-445.8	D	7.619	7.593	0.026	3.3	96.23	3.76	0	0	0	0.01
2003	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	341	23	2789	340.496	-426.449	D	7.605	7.593	0.012	3.3	88.85	11.16	0	0	0	0.02
2003	342	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	2588	318.452	-445.8	D	7.696	7.593	0.103	3.3	92.53	7.46	0	0	0	0.01
2003	345	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	2789	340.496	-426.449	D	7.611	7.593	0.019	3.3	92.21	7.77	0	0	0	0.02
2003	347	23	2589	318.383	-445.593	D	7.616	7.593	0.023	3.3	92.22	7.77	0	0	0	0.01
2003	348	23	1	318.65	-445.782	D	7.63	7.593	0.038	3.3	94.17	5.82	0	0	0	0.01
2003	349	23	2789	340.496	-426.449	D	7.598	7.593	0.005	3.3	95.41	4.61	0	0	0	0.01
2003	350	23	2038	333.934	-425.627	D	7.593	7.593	0	3.3	80.76	3.33	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	63.04	36.92	0	0	0	0.14
2003	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	360	23	2789	340.496	-426.449	D	7.596	7.593	0.003	3.3	95.22	4.75	0	0	0	0.02
2003	361	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	94.75	5.22	0	0	0	0.01
2003	362	23	1	318.65	-445.782	D	7.593	7.593	0.000	3.3	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.47							
NORANDA									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	3	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	10	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	11	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	98.47	0.02	0	0	0.29	1.13
2003	13	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	98.89	0.02	0	0	0.08	0.97
2003	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	15	23	2571	322.646	-445.476	D	7.593	7.593	0	3.3	99.17	0.01	0	0	0.09	0.89
2003	16	23	2789	340.496	-426.449	D	7.68	7.593	0.088	3.3	96.51	0.23	0	0	0.12	3.14
2003	17	23	2236	336.149	-430.776	D	7.593	7.593	0	3.3	60.08	0.01	0	0	2.29	11.09
2003	18	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	19	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	21	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	23	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	24	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	25	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	26	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	27	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	95.95	0.16	0	0	0.16	3.89
2003	28	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	89.95	0.78	0	0	0.03	9.38
2003	29	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	2789	340.496	-426.449	D	7.609	7.593	0.016	3.3	98.85	0.06	0	0	0.01	1.09
2003	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	37	23	2781	339.842	-425.379	D	7.532	7.453	0.08	3	96.2	0.18	0	0	0.14	3.47
2003	38	23	2468	334.002	-434.887	D	7.478	7.453	0.026	3	97.58	0.13	0	0	0.04	2.25
2003	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	42	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	43	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	44	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	46	23	2589	318.383	-445.593	D	7.457	7.453	0.004	3	97.31	0.13	0	0	0.03	2.59
2003	47	23	2571	322.646	-445.476	D	7.491	7.453	0.039	3	98.22	0.1	0	0	0.01	1.67
2003	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	49	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	50	23	2790	340.421	-426.562	D	7.478	7.453	0.025	3	95.83	0.22	0	0	0.08	3.87
2003	51	23	2571	322.646	-445.476	D	7.493	7.453	0.041	3	98.84	0.05	0	0	0.16	0.96
2003	52	23	2789	340.496	-426.449	D	7.846	7.453	0.393	3	98.44	0.07	0	0	0.1	1.4
2003	53	23	2588	318.452	-445.8	D	7.534	7.453	0.082	3	98.55	0.07	0	0	0.06	1.32
2003	54	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	55	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	56	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	57	23	2571	322.646	-445.476	D	7.489	7.453	0.036	3	96.41	0.11	0	0	0.44	3.04
2003	58	23	2588	318.452	-445.8	D	7.498	7.453	0.045	3	97.98	0.09	0	0	0.13	1.81
2003	59	23	2571	322.646	-445.476	D	7.478	7.453	0.026	3	98.57	0.05	0	0	0.07	1.31
2003	60	23	2571	322.646	-445.476	D	7.365	7.317	0.048	2.713	98.47	0.05	0	0	0.07	1.41
2003	61	23	2789	340.496	-426.449	D	7.326	7.311	0.015	2.7	98.72	0.05	0	0	0.02	1.22
2003	62	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	63	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	64	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	65	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	68	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	69	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	70	23	2468	334.002	-434.887	D	7.314	7.311	0.003	2.7	96.52	0.01	0	0	0.2	3.34
2003	71	23	2789	340.496	-426.449	D	7.319	7.311	0.008	2.7	96.24	0.04	0	0	0.04	3.68
2003	72	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	73	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	74	23	2789	340.496	-426.449	D	7.327	7.311	0.016	2.7	98	0.02	0	0	0.11	1.89
2003	75	23	2789	340.496	-426.449	D	7.323	7.311	0.012	2.7	97.6	0.04	0	0	0.03	2.34
2003	76	23	2781	339.842	-425.379	D	7.312	7.311	0.002	2.7	98.2	0.02	0	0	0.01	1.87
2003	77	23	2781	339.842	-425.379	D	7.312	7.311	0.001	2.7	99.38	0	0	0	0.08	0.56
2003	78	23	2781	339.842	-425.379	D	7.341	7.311	0.031	2.7	96.06	0.1	0	0	0.08	3.77
2003	79	23	2589	318.383	-445.593	D	7.354	7.311	0.044	2.7	98.85	0.06	0	0	0.02	1.07
2003	80	23	2571	322.646	-445.476	D	7.331	7.311	0.021	2.7	98.32	0.06	0	0	0.01	1.62

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	81	23	2468	334.002	-434.887	D	7.311	7.311	0	2.7	98.31	0.01	0	0	0	1.61
2003	82	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	85	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	86	23	2789	340.496	-426.449	D	7.319	7.311	0.009	2.7	95.84	0.06	0	0	0.18	3.94
2003	87	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	96	23	2707	329.748	-425.023	D	7.453	7.358	0.094	2.8	95.05	0.14	0	0	0.18	4.63
2003	97	23	2704	329.056	-425.092	D	7.362	7.358	0.004	2.8	83.18	1.63	0	0	0.05	15.13
2003	98	23	2789	340.496	-426.449	D	7.362	7.358	0.004	2.8	98.81	0.05	0	0	0	1.18
2003	99	23	2467	334.065	-434.651	D	7.358	7.358	0	2.8	98.63	0.02	0	0	0	1.08
2003	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	103	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	104	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	108	23	2789	340.496	-426.449	D	7.36	7.358	0.002	2.8	99.3	0	0	0	0.08	0.64
2003	109	23	2781	339.842	-425.379	D	7.358	7.358	0	2.8	99.04	0	0	0	0.07	1.31
2003	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	112	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	113	23	2789	340.496	-426.449	D	7.37	7.358	0.012	2.8	89.7	0.1	0	0	0.85	9.37
2003	114	23	2749	333.775	-424.726	D	7.371	7.358	0.013	2.8	97.28	0.02	0	0	0.1	2.6
2003	115	23	2588	318.452	-445.8	D	7.462	7.358	0.103	2.8	98.46	0.02	0	0	0.02	1.5
2003	116	23	2789	340.496	-426.449	D	7.384	7.358	0.026	2.8	98.67	0.01	0	0	0.02	1.3
2003	117	23	2789	340.496	-426.449	D	7.359	7.358	0.001	2.8	97.83	0	0	0	0.32	2.04
2003	118	23	2789	340.496	-426.449	D	7.36	7.358	0.002	2.8	98.03	0	0	0	0.09	1.87
2003	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2003	122	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	123	23	270	321.866	-445.392	D	7.639	7.639	0	3.4	85.07	0	0	0	2.5	12.34
2003	124	23	2789	340.496	-426.449	D	7.676	7.639	0.037	3.4	98.37	0.01	0	0	0.02	1.6
2003	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	127	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	136	23	2409	339.158	-425.648	D	7.639	7.639	0	3.4	70.99	2.13	0	0	0.2	27.31
2003	137	23	2789	340.496	-426.449	D	7.66	7.639	0.021	3.4	98.1	0	0	0	0.22	1.68
2003	138	23	2589	318.383	-445.593	D	7.671	7.639	0.032	3.4	98.72	0.01	0	0	0.07	1.2
2003	139	23	2789	340.496	-426.449	D	7.683	7.639	0.045	3.4	98.65	0	0	0	0.18	1.17
2003	140	23	2790	340.421	-426.562	D	7.833	7.639	0.194	3.4	98.96	0.01	0	0	0.06	0.97
2003	141	23	2571	322.646	-445.476	D	7.639	7.639	0.001	3.4	99.03	0	0	0	0.04	1
2003	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	108.92	0	0	0	0.3	7.61
2003	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	144	23	2789	340.496	-426.449	D	7.643	7.639	0.005	3.4	99.07	0.01	0	0	0.12	0.77
2003	145	23	2781	339.842	-425.379	D	7.686	7.639	0.048	3.4	99.31	0	0	0	0.04	0.64
2003	146	23	2588	318.452	-445.8	D	7.739	7.639	0.1	3.4	98.95	0.01	0	0	0.02	1.02
2003	147	23	2588	318.452	-445.8	D	7.64	7.639	0.001	3.4	98.08	0	0	0	0.02	1.85
2003	148	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	149	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	150	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	152	23	2571	322.646	-445.476	D	7.639	7.639	0	3.4	99.1	0	0	0	0.07	0.37
2003	153	23	2789	340.496	-426.449	D	7.694	7.639	0.055	3.4	98.41	0.01	0	0	0.03	1.55
2003	154	23	2789	340.496	-426.449	D	7.771	7.639	0.133	3.4	98.6	0.02	0	0	0.07	1.31
2003	155	23	2790	340.421	-426.562	D	7.643	7.639	0.004	3.4	96.24	0	0	0	0.25	3.52
2003	156	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	93.95	0	0	0	0.38	5.95
2003	157	23	2789	340.496	-426.449	D	7.659	7.639	0.02	3.4	98.41	0.01	0	0	0.12	1.48
2003	158	23	2789	340.496	-426.449	D	7.646	7.639	0.007	3.4	98.63	0.01	0	0	0.05	1.31

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	159	23	2338	337.551	-428.716	D	7.639	7.639	0	3.4	95.63	0	0	0	0.11	5.17
2003	160	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	12.7	0	0	0	0.02	0.61
2003	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	164	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	165	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	166	23	2407	339.18	-426.146	D	7.639	7.639	0	3.4	90.48	0	0	0	0.04	1.57
2003	167	23	2571	322.646	-445.476	D	7.664	7.639	0.026	3.4	98.78	0.01	0	0	0.15	1.06
2003	168	23	2571	322.646	-445.476	D	7.862	7.639	0.223	3.4	99.37	0.01	0	0	0.07	0.55
2003	169	23	2571	322.646	-445.476	D	8.172	7.639	**0.533**	3.4	98.77	0.02	0	0	0.13	1.08
2003	170	23	2588	318.452	-445.8	D	7.759	7.639	0.121	3.4	98.81	0.01	0	0	0.1	1.09
2003	171	23	2588	318.452	-445.8	D	7.641	7.639	0.002	3.4	99.49	0	0	0	0.03	0.53
2003	172	23	2628	320.933	-436.998	D	7.681	7.639	0.042	3.4	96.9	0.02	0	0	0.14	2.94
2003	173	23	2781	339.842	-425.379	D	7.64	7.639	0.001	3.4	78.04	0.02	0	0	0.39	21.67
2003	174	23	659	323.836	-433.564	D	7.639	7.639	0	3.4	103.88	0	0	0	1.01	8.64
2003	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	178	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	179	23	2571	322.646	-445.476	D	7.646	7.639	0.008	3.4	97.92	0	0	0	0.37	1.71
2003	180	23	2789	340.496	-426.449	D	7.79	7.639	0.151	3.4	98.45	0	0	0	0.13	1.43
2003	181	23	2758	335.862	-424.454	D	7.669	7.639	0.03	3.4	98.79	0	0	0	0.06	1.15
2003	182	23	2781	339.842	-425.379	D	7.642	7.639	0.003	3.4	98.63	0	0	0	0.07	1.29
2003	183	23	2789	340.496	-426.449	D	7.695	7.639	0.057	3.4	99.2	0	0	0	0.06	0.74
2003	184	23	2789	340.496	-426.449	D	7.697	7.639	0.058	3.4	98.81	0	0	0	0.08	1.12
2003	185	23	2789	340.496	-426.449	D	7.667	7.639	0.028	3.4	98.56	0	0	0	0.07	1.37
2003	186	23	2781	339.842	-425.379	D	7.639	7.639	0.001	3.4	93.87	0	0	0	0.91	5.24
2003	187	23	1659	330.999	-426.755	D	7.639	7.639	0	3.4	94.65	0	0	0	2.44	5.63
2003	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	192	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	193	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	194	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	195	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.67	0	0	0	0.03	0.29
2003	196	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	198	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	199	23	2787	340.091	-426.447	D	7.639	7.639	0	3.4	95.51	0	0	0	0.21	3.99
2003	200	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	97.51	0	0	0	0.07	2.66
2003	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	204	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	205	23	2789	340.496	-426.449	D	7.641	7.639	0.002	3.4	99.07	0	0	0	0.22	0.73
2003	206	23	2789	340.496	-426.449	D	7.756	7.639	0.117	3.4	98.88	0	0	0	0.12	0.99
2003	207	23	2704	329.056	-425.092	D	7.66	7.639	0.021	3.4	98.74	0	0	0	0.07	1.2
2003	208	23	2780	339.614	-425.419	D	7.639	7.639	0	3.4	98.82	0	0	0	0.03	0.92
2003	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	210	23	2789	340.496	-426.449	D	7.644	7.639	0.005	3.4	99.68	0	0	0	0.04	0.27
2003	211	23	2781	339.842	-425.379	D	7.66	7.639	0.021	3.4	99.76	0	0	0	0.01	0.23
2003	212	23	2789	340.496	-426.449	D	7.655	7.639	0.016	3.4	99.77	0	0	0	0.01	0.22
2003	213	23	2468	334.002	-434.887	D	7.641	7.639	0.002	3.4	99.89	0	0	0	0.01	0.16
2003	214	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.92	0	0	0	0.01	0.2
2003	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	216	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	217	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	218	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	219	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	225	23	2790	340.421	-426.562	D	7.642	7.639	0.003	3.4	97.09	0	0	0	0.58	2.35
2003	226	23	2684	326.713	-427.014	D	7.782	7.639	0.143	3.4	97.55	0.05	0	0	0.09	2.31
2003	227	23	2758	335.862	-424.454	D	7.639	7.639	0	3.4	85.87	0	0	0	0.27	10.71
2003	228	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	97.53	0	0	0	0.06	2.63
2003	229	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	94.04	0.01	0	0	0.06	5.55
2003	230	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	66.47	0	0	0	0.03	5.89
2003	231	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	86.11	0.01	0	0	0.9	13.62
2003	232	23	2790	340.421	-426.562	D	7.647	7.639	0.009	3.4	98.07	0	0	0	0.17	1.77
2003	233	23	2789	340.496	-426.449	D	7.666	7.639	0.027	3.4	98.91	0	0	0	0.1	0.99
2003	234	23	2789	340.496	-426.449	D	7.675	7.639	0.036	3.4	99.06	0	0	0	0.08	0.85
2003	235	23	2789	340.496	-426.449	D	7.68	7.639	0.041	3.4	99.05	0	0	0	0.07	0.88
2003	236	23	2468	334.002	-434.887	D	7.734	7.639	0.096	3.4	99.21	0	0	0	0.08	0.71

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	237	23	2789	340.496	-426.449	D	7.964	7.639	0.325	3.4	99.05	0	0	0	0.07	0.88
2003	238	23	2789	340.496	-426.449	D	7.788	7.639	0.15	3.4	98.84	0	0	0	0.05	1.11
2003	239	23	2789	340.496	-426.449	D	7.645	7.639	0.006	3.4	99.15	0	0	0	0.03	0.85
2003	240	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	99.18	0	0	0	0.02	1.01
2003	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	29.45	0	0	0	0.09	1.1
2003	242	23	2781	339.842	-425.379	D	7.694	7.639	0.055	3.4	98.6	0.01	0	0	0.09	1.3
2003	243	23	2758	335.862	-424.454	D	7.687	7.639	0.048	3.4	97.76	0.04	0	0	0.08	2.12
2003	244	23	1415	329.185	-425.086	D	7.727	7.727	0	3.592	98.74	0	0	0	0.08	0.52
2003	245	23	2684	326.713	-427.014	D	7.737	7.731	0.006	3.6	99.32	0.01	0	0	0.04	0.64
2003	246	23	2789	340.496	-426.449	D	7.794	7.731	0.063	3.6	99.46	0.02	0	0	0.02	0.5
2003	247	23	1	318.65	-445.782	D	7.732	7.731	0.001	3.6	99.62	0	0	0	0.01	0.28
2003	248	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	249	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	250	23	2571	322.646	-445.476	D	7.786	7.731	0.055	3.6	97.82	0	0	0	0.32	1.86
2003	251	23	2584	319.439	-445.724	D	7.973	7.731	0.243	3.6	98.34	0	0	0	0.11	1.54
2003	252	23	2789	340.496	-426.449	D	7.859	7.731	0.128	3.6	98.65	0	0	0	0.09	1.26
2003	253	23	2789	340.496	-426.449	D	7.866	7.731	0.136	3.6	98.87	0.01	0	0	0.05	1.08
2003	254	23	2789	340.496	-426.449	D	7.732	7.731	0.001	3.6	98.92	0	0	0	0.06	1.04
2003	255	23	1283	328.91	-435.84	D	7.731	7.731	0	3.6	93.89	0	0	0	1.79	3.98
2003	256	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	257	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	258	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	259	23	2789	340.496	-426.449	D	7.739	7.731	0.008	3.6	97.99	0	0	0	0.25	1.76
2003	260	23	2781	339.842	-425.379	D	7.761	7.731	0.03	3.6	97.96	0	0	0	0.1	1.94
2003	261	23	1414	329.196	-425.335	D	7.731	7.731	0	3.6	90.59	0.01	0	0	0.57	8.68
2003	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	59.96	0	0	0	0.57	4.15
2003	263	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	264	23	2789	340.496	-426.449	D	7.802	7.731	0.071	3.6	97.36	0.01	0	0	0.13	2.51
2003	265	23	2781	339.842	-425.379	D	7.762	7.731	0.031	3.6	98.84	0.02	0	0	0.04	1.1
2003	266	23	2789	340.496	-426.449	D	7.731	7.731	0	3.6	99.27	0	0	0	0.02	0.92
2003	267	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	268	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	28.94	0	0	0	0.22	4.31
2003	269	23	2789	340.496	-426.449	D	7.731	7.731	0	3.6	95.87	0.01	0	0	0.11	3.79
2003	270	23	2410	339.439	-426.385	D	7.731	7.731	0	3.6	87.58	0.01	0	0	0.09	9.42
2003	271	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	272	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	273	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	274	23	1	318.65	-445.782	D	7.598	7.598	0	3.313	0	0	0	0	0	0
2003	275	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	276	23	2571	322.646	-445.476	D	7.596	7.593	0.003	3.3	98.38	0	0	0	0.12	1.53
2003	277	23	2790	340.421	-426.562	D	7.594	7.593	0.001	3.3	97.93	0	0	0	0.04	1.99
2003	278	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	279	23	2578	320.919	-445.61	D	7.617	7.593	0.024	3.3	98.85	0.01	0	0	0.12	1.02
2003	280	23	2781	339.842	-425.379	D	7.891	7.593	0.298	3.3	98.08	0.01	0	0	0.2	1.71
2003	281	23	2704	329.056	-425.092	D	7.637	7.593	0.045	3.3	98.48	0.01	0	0	0.07	1.45
2003	282	23	1415	329.185	-425.086	D	7.596	7.593	0.004	3.3	98.8	0	0	0	0.04	1.14
2003	283	23	2684	326.713	-427.014	D	7.623	7.593	0.03	3.3	85.25	0.94	0	0	0.68	13.13
2003	284	23	2600	318.952	-443.12	D	7.594	7.593	0.001	3.3	98.27	0.01	0	0	0.05	1.64
2003	285	23	2571	322.646	-445.476	D	7.61	7.593	0.017	3.3	98.62	0.02	0	0	0.01	1.35
2003	286	23	2571	322.646	-445.476	D	7.601	7.593	0.008	3.3	98.99	0	0	0	0.01	1
2003	287	23	2789	340.496	-426.449	D	7.598	7.593	0.005	3.3	99.05	0.01	0	0	0	0.95
2003	288	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	289	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	290	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	291	23	1767	332.364	-435.189	D	7.593	7.593	0	3.3	96.48	0	0	0	0.01	0.22
2003	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	294	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	295	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	296	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	297	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	70.24	0.24	0	0	1.04	28.48
2003	298	23	2789	340.496	-426.449	D	7.602	7.593	0.009	3.3	98.33	0.01	0	0	0.01	1.66
2003	299	23	2571	322.646	-445.476	D	7.596	7.593	0.003	3.3	98.25	0.02	0	0	0	1.73
2003	300	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	301	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	305	23	1	318.65	-445.782	D	7.548	7.548	0	3.204	0	0	0	0	0	0
2003	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	308	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	309	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	310	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	311	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	314	23	2789	340.496	-426.449	D	7.571	7.546	0.025	3.2	95.62	0.05	0	0	0.14	4.19

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	315	23	2780	339.614	-425.419	D	7.546	7.546	0	3.2	82.8	0.13	0	0	0.04	16.99
2003	316	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	317	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	318	23	2386	338.533	-428.423	D	7.546	7.546	0	3.2	98.29	0.06	0	0	0.12	2.18
2003	319	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	95.61	0.06	0	0	0.39	4.01
2003	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	321	23	2789	340.496	-426.449	D	7.547	7.546	0	3.2	82.35	1.73	0	0	0.13	16
2003	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	331	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	332	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	335	23	1	318.65	-445.782	D	7.591	7.591	0	3.296	0	0	0	0	0	0
2003	336	23	2789	340.496	-426.449	D	7.602	7.593	0.01	3.3	97.99	0.02	0	0	0.19	1.79
2003	337	23	2704	329.056	-425.092	D	7.595	7.593	0.003	3.3	66.46	1.25	0	0	0.45	31.81
2003	338	23	2781	339.842	-425.379	D	7.678	7.593	0.086	3.3	97.43	0.18	0	0	0.03	2.36
2003	339	23	2588	318.452	-445.8	D	7.594	7.593	0.002	3.3	97.82	0.1	0	0	0.01	2.05
2003	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	341	23	2789	340.496	-426.449	D	7.595	7.593	0.003	3.3	96.74	0.08	0	0	0.25	2.95
2003	342	23	976	326.436	-430.452	D	7.593	7.593	0	3.3	27.31	0.01	0	0	0	0.62
2003	343	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	96.66	0.51	0	0	0.01	2.89
2003	345	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	2789	340.496	-426.449	D	7.674	7.593	0.082	3.3	98.76	0.02	0	0	0.09	1.13
2003	347	23	2781	339.842	-425.379	D	7.741	7.593	0.148	3.3	95.19	0.21	0	0	0.19	4.41
2003	348	23	2781	339.842	-425.379	D	7.853	7.593	0.261	3.3	98.31	0.1	0	0	0.05	1.54
2003	349	23	2789	340.496	-426.449	D	7.622	7.593	0.03	3.3	98.59	0.08	0	0	0.01	1.33
2003	350	23	452	322.413	-435.125	D	7.593	7.593	0	3.3	10.3	0	0	0	0	0.6
2003	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	360	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	98.1	0.02	0	0	0.36	1.66
2003	361	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	97.64	0.07	0	0	0.11	2.26
2003	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.533							
INDEPENDENCE											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	2684	326.713	-427.014	D	7.696	7.593	0.104	3.3	89.07	10.53	0	0	0	0.39
2003	3	23	2789	340.496	-426.449	D	7.647	7.593	0.055	3.3	85.88	13.55	0	0	0	0.58
2003	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	6	23	2600	318.952	-443.12	D	7.629	7.593	0.036	3.3	68.84	29.87	0	0	0	1.29
2003	7	23	2757	335.63	-424.484	D	7.593	7.593	0	3.3	88.73	10.47	0	0	0	0.32
2003	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	23	2781	339.842	-425.379	D	7.603	7.593	0.01	3.3	90.12	9.01	0	0	0	0.88
2003	10	23	2789	340.496	-426.449	D	7.656	7.593	0.063	3.3	66.83	31.19	0	0	0	1.97
2003	11	23	2684	326.713	-427.014	D	7.748	7.593	0.156	3.3	66.04	32.46	0	0	0	1.5
2003	12	23	2628	320.933	-436.998	D	7.715	7.593	0.122	3.3	79.57	19.85	0	0	0	0.58
2003	13	23	2781	339.842	-425.379	D	7.596	7.593	0.003	3.3	85.57	14.07	0	0	0	0.34
2003	14	23	2789	340.496	-426.449	D	7.84	7.593	0.247	3.3	88.68	10.88	0	0	0	0.44
2003	15	23	2571	322.646	-445.476	D	7.605	7.593	0.012	3.3	94.18	5.55	0	0	0	0.27
2003	16	23	2589	318.383	-445.593	D	7.613	7.593	0.02	3.3	93.33	6.38	0	0	0	0.29
2003	17	23	2781	339.842	-425.379	D	7.651	7.593	0.058	3.3	92.09	7.54	0	0	0	0.37
2003	18	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	84.66	14.73	0	0	0	0.51
2003	19	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	21	23	2789	340.496	-426.449	D	7.619	7.593	0.026	3.3	88.83	10.96	0	0	0	0.21
2003	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	23	23	2599	318.958	-443.364	D	7.787	7.593	0.195	3.3	70.64	28.35	0	0	0	1.01
2003	24	23	2589	318.383	-445.593	D	7.645	7.593	0.052	3.3	83.28	16.31	0	0	0	0.41
2003	25	23	2781	339.842	-425.379	D	7.598	7.593	0.006	3.3	86.04	13.72	0	0	0	0.25
2003	26	23	2789	340.496	-426.449	D	7.612	7.593	0.02	3.3	60.15	38.02	0	0	0	1.83
2003	27	23	2628	320.933	-436.998	D	7.61	7.593	0.018	3.3	82.58	17.1	0	0	0	0.32
2003	28	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	29	23	2628	320.933	-436.998	D	7.637	7.593	0.044	3.3	88.54	11.25	0	0	0	0.2
2003	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	2789	340.496	-426.449	D	7.502	7.453	0.049	3	88.81	10.65	0	0	0	0.54
2003	37	23	2704	329.056	-425.092	D	7.494	7.453	0.041	3	91.64	8.11	0	0	0	0.26
2003	38	23	2781	339.842	-425.379	D	7.576	7.453	0.123	3	88.31	11.38	0	0	0	0.32
2003	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	42	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	43	23	2628	320.933	-436.998	D	7.477	7.453	0.024	3	67.36	30.8	0	0	0	1.85
2003	44	23	2684	326.713	-427.014	D	7.462	7.453	0.009	3	88.77	10.7	0	0	0	0.55
2003	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	48	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	49	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	50	23	1048	326.791	-427.189	D	7.453	7.453	0	3	95.55	8.73	0	0	0	0.4
2003	51	23	2704	329.056	-425.092	D	7.566	7.453	0.113	3	93.83	5.99	0	0	0	0.19
2003	52	23	2684	326.713	-427.014	D	7.462	7.453	0.009	3	97.42	2.47	0	0	0	0.14
2003	53	23	2589	318.383	-445.593	D	7.504	7.453	0.052	3	92.37	7.26	0	0	0	0.37
2003	54	23	1833	332.86	-435.167	D	7.558	7.453	0.106	3	86.3	13.15	0	0	0	0.55
2003	55	23	2507	328.74	-436.008	D	7.759	7.453	0.306	3	78.68	20.48	0	0	0	0.85
2003	56	23	2711	330.671	-424.932	D	7.674	7.453	0.221	3	90.74	9.03	0	0	0	0.23
2003	57	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	58	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	59	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	60	23	1	318.65	-445.782	D	7.317	7.317	0	2.713	0	0	0	0	0	0
2003	61	23	2711	330.671	-424.932	D	7.467	7.311	0.156	2.7	90.76	8.66	0	0	0	0.58

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	62	23	2789	340.496	-426.449	D	7.622	7.311	0.311	2.7	91.67	8	0	0	0	0.32
2003	63	23	2781	339.842	-425.379	D	7.311	7.311	0	2.7	95.34	4.57	0	0	0	0.19
2003	64	23	2588	318.452	-445.8	D	7.474	7.311	0.164	2.7	90.92	8.82	0	0	0	0.25
2003	65	23	2468	334.002	-434.887	D	7.339	7.311	0.028	2.7	94.28	5.6	0	0	0	0.12
2003	66	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	67	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	68	23	2789	340.496	-426.449	D	7.327	7.311	0.016	2.7	86.48	12.72	0	0	0	0.8
2003	69	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	70	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	71	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	72	23	2758	335.862	-424.454	D	7.568	7.311	0.257	2.7	97.78	1.96	0	0	0	0.27
2003	73	23	2588	318.452	-445.8	D	7.617	7.311	0.306	2.7	97.98	1.85	0	0	0	0.17
2003	74	23	2610	319.631	-440.865	D	7.345	7.311	0.035	2.7	98.75	1.12	0	0	0	0.14
2003	75	23	2757	335.63	-424.484	D	7.312	7.311	0.001	2.7	99.66	0.2	0	0	0	0.12
2003	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	2684	326.713	-427.014	D	7.366	7.311	0.056	2.7	94.8	4.94	0	0	0	0.27
2003	80	23	2789	340.496	-426.449	D	7.562	7.311	0.251	2.7	92.53	6.95	0	0	0	0.51
2003	81	23	2789	340.496	-426.449	D	7.316	7.311	0.005	2.7	97.12	2.27	0	0	0	0.61
2003	82	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	2589	318.383	-445.593	D	7.374	7.311	0.063	2.7	95.98	3.55	0	0	0	0.47
2003	85	23	2789	340.496	-426.449	D	7.323	7.311	0.012	2.7	95.7	4.12	0	0	0	0.18
2003	86	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	87	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	2789	340.496	-426.449	D	7.33	7.311	0.019	2.7	73.35	25.21	0	0	0	1.44
2003	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	95	23	2758	335.862	-424.454	D	7.41	7.358	0.051	2.8	83.42	15.46	0	0	0	1.12
2003	96	23	2588	318.452	-445.8	D	7.358	7.358	0	2.8	99.99	0.82	0	0	0	0.42
2003	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	98	23	2781	339.842	-425.379	D	7.407	7.358	0.049	2.8	85.23	14.01	0	0	0	0.76
2003	99	23	2684	326.713	-427.014	D	7.516	7.358	0.158	2.8	84.34	15.01	0	0	0	0.65
2003	100	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	101	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	102	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	103	23	2789	340.496	-426.449	D	7.359	7.358	0.001	2.8	99.91	0.03	0	0	0	0.21
2003	104	23	2781	339.842	-425.379	D	7.359	7.358	0	2.8	99.81	0.06	0	0	0	0.18
2003	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	107	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	108	23	2789	340.496	-426.449	D	7.359	7.358	0.001	2.8	99.9	0.05	0	0	0	0.16
2003	109	23	2781	339.842	-425.379	D	7.359	7.358	0	2.8	99.82	0.14	0	0	0	0.12
2003	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	112	23	2588	318.452	-445.8	D	7.393	7.358	0.035	2.8	96.1	3.17	0	0	0	0.73
2003	113	23	2589	318.383	-445.593	D	7.387	7.358	0.029	2.8	98.75	0.98	0	0	0	0.28
2003	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	115	23	2781	339.842	-425.379	D	7.409	7.358	0.051	2.8	96.79	2.8	0	0	0	0.42
2003	116	23	2694	327.861	-425.964	D	7.469	7.358	0.111	2.8	96.03	3.66	0	0	0	0.31
2003	117	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	118	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	119	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2003	122	23	2781	339.842	-425.379	D	7.782	7.639	0.143	3.4	98.75	1.04	0	0	0	0.21
2003	123	23	2571	322.646	-445.476	D	7.893	7.639	0.254	3.4	99.02	0.85	0	0	0	0.13
2003	124	23	2684	326.713	-427.014	D	7.694	7.639	0.055	3.4	99.77	0.16	0	0	0	0.07
2003	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	127	23	2694	327.861	-425.964	D	7.768	7.639	0.129	3.4	98.13	1.57	0	0	0	0.3
2003	128	23	2704	329.056	-425.092	D	7.667	7.639	0.028	3.4	99.66	0.13	0	0	0	0.21
2003	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	137	23	2758	335.862	-424.454	D	7.675	7.639	0.036	3.4	99.77	0.13	0	0	0	0.1
2003	138	23	2704	329.056	-425.092	D	7.696	7.639	0.057	3.4	99.26	0.66	0	0	0	0.09
2003	139	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	140	23	2571	322.646	-445.476	D	7.681	7.639	0.042	3.4	98.49	1.38	0	0	0	0.13
2003	141	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	142	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	143	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	144	23	2706	329.518	-425.046	D	7.639	7.639	0	3.4	98.18	1.5	0	0	0	0.14
2003	145	23	2704	329.056	-425.092	D	7.651	7.639	0.012	3.4	96.71	3.18	0	0	0	0.11
2003	146	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	147	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	148	23	2781	339.842	-425.379	D	7.651	7.639	0.012	3.4	99.11	0.65	0	0	0	0.25
2003	149	23	2781	339.842	-425.379	D	7.691	7.639	0.053	3.4	97.56	1.85	0	0	0	0.59
2003	150	23	2781	339.842	-425.379	D	7.745	7.639	0.106	3.4	99.52	0.2	0	0	0	0.28
2003	151	23	2789	340.496	-426.449	D	7.652	7.639	0.013	3.4	89.03	8.01	0	0	0	2.96
2003	152	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	153	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	154	23	2628	320.933	-436.998	D	7.89	7.639	0.251	3.4	93.28	6.43	0	0	0	0.3
2003	155	23	2588	318.452	-445.8	D	8.322	7.639	**0.683**	3.4	99.07	0.73	0	0	0	0.21
2003	156	23	2589	318.383	-445.593	D	7.847	7.639	0.208	3.4	99.67	0.19	0	0	0	0.15
2003	157	23	2684	326.713	-427.014	D	7.64	7.639	0.001	3.4	99.71	0.09	0	0	0	0.14
2003	158	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	159	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	160	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	164	23	2756	335.398	-424.515	D	7.64	7.639	0.001	3.4	99.72	0.11	0	0	0	0.1
2003	165	23	2704	329.056	-425.092	D	7.652	7.639	0.013	3.4	99.4	0.53	0	0	0	0.09
2003	166	23	14	319.049	-443.516	D	7.64	7.639	0.001	3.4	99.82	0.03	0	0	0	0.09
2003	167	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	168	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	169	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	170	23	2704	329.056	-425.092	D	7.691	7.639	0.052	3.4	99.74	0.08	0	0	0	0.19
2003	171	23	2684	326.713	-427.014	D	7.804	7.639	0.165	3.4	99.45	0.4	0	0	0	0.15
2003	172	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	177	23	2640	322.263	-435.121	D	7.941	7.639	0.303	3.4	98.52	1.2	0	0	0	0.28
2003	178	23	2600	318.952	-443.12	D	7.794	7.639	0.155	3.4	98.87	0.73	0	0	0	0.39

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	179	23	2608	319.495	-441.316	D	7.672	7.639	0.033	3.4	99.65	0.12	0	0	0	0.23
2003	180	23	2704	329.056	-425.092	D	7.64	7.639	0.001	3.4	99.82	0.03	0	0	0	0.17
2003	181	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	182	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	183	23	2041	333.901	-424.879	D	7.639	7.639	0	3.4	95.41	0.02	0	0	0	0.11
2003	184	23	2102	334.398	-424.857	D	7.639	7.639	0	3.4	95.57	0.03	0	0	0	0.09
2003	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	192	23	2625	320.772	-437.626	D	7.674	7.639	0.035	3.4	98.14	1	0	0	0	0.86
2003	193	23	2758	335.862	-424.454	D	7.647	7.639	0.008	3.4	99.73	0.04	0	0	0	0.22
2003	194	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.56	0.12	0	0	0	0.17
2003	195	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.35	0.51	0	0	0	0.12
2003	196	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	99.64	0.02	0	0	0	0.09
2003	197	23	2781	339.842	-425.379	D	7.646	7.639	0.007	3.4	99.73	0.09	0	0	0	0.18
2003	198	23	2789	340.496	-426.449	D	7.645	7.639	0.007	3.4	99.84	0.04	0	0	0	0.13
2003	199	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.89	0.01	0	0	0	0.09
2003	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	201	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	203	23	2704	329.056	-425.092	D	7.94	7.639	0.301	3.4	98.03	1.72	0	0	0	0.26
2003	204	23	2589	318.383	-445.593	D	7.7	7.639	0.061	3.4	99.43	0.23	0	0	0	0.34
2003	205	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	206	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	207	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	210	23	2781	339.842	-425.379	D	7.654	7.639	0.015	3.4	99.73	0.15	0	0	0	0.13
2003	211	23	2781	339.842	-425.379	D	7.705	7.639	0.066	3.4	99.57	0.33	0	0	0	0.1
2003	212	23	2781	339.842	-425.379	D	7.691	7.639	0.052	3.4	99.8	0.11	0	0	0	0.09
2003	213	23	2789	340.496	-426.449	D	7.653	7.639	0.014	3.4	99.86	0.05	0	0	0	0.08
2003	214	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.94	0.02	0	0	0	0.08
2003	215	23	2758	335.862	-424.454	D	7.645	7.639	0.006	3.4	99.69	0.12	0	0	0	0.2
2003	216	23	2781	339.842	-425.379	D	7.705	7.639	0.066	3.4	99.37	0.47	0	0	0	0.16
2003	217	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.71	0.15	0	0	0	0.12

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	218	23	2589	318.383	-445.593	D	7.751	7.639	0.112	3.4	99.75	0.04	0	0	0	0.21
2003	219	23	2588	318.452	-445.8	D	7.748	7.639	0.11	3.4	99.79	0.1	0	0	0	0.12
2003	220	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	221	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	222	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	223	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	224	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	230	23	2781	339.842	-425.379	D	7.645	7.639	0.006	3.4	99.77	0.01	0	0	0	0.22
2003	231	23	2789	340.496	-426.449	D	7.706	7.639	0.068	3.4	99.77	0.09	0	0	0	0.14
2003	232	23	2789	340.496	-426.449	D	7.725	7.639	0.086	3.4	99.78	0.11	0	0	0	0.11
2003	233	23	2789	340.496	-426.449	D	7.702	7.639	0.063	3.4	99.73	0.17	0	0	0	0.1
2003	234	23	2789	340.496	-426.449	D	7.71	7.639	0.072	3.4	99.81	0.07	0	0	0	0.12
2003	235	23	2789	340.496	-426.449	D	7.751	7.639	0.112	3.4	99.77	0.08	0	0	0	0.15
2003	236	23	2588	318.452	-445.8	D	7.707	7.639	0.068	3.4	99.62	0.24	0	0	0	0.14
2003	237	23	67	319.674	-440.741	D	7.677	7.639	0.038	3.4	99.81	0.07	0	0	0	0.12
2003	238	23	2758	335.862	-424.454	D	7.652	7.639	0.013	3.4	99.86	0.03	0	0	0	0.1
2003	239	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.92	0.04	0	0	0	0.09
2003	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	242	23	2209	335.38	-424.564	D	7.639	7.639	0	3.4	99.81	0.24	0	0	0	0.12
2003	243	23	1415	329.185	-425.086	D	7.639	7.639	0	3.4	101.84	0.5	0	0	0	0.1
2003	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2003	245	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	246	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	247	23	2628	320.933	-436.998	D	7.871	7.731	0.14	3.6	98.58	1.24	0	0	0	0.18
2003	248	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	249	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	257	23	2588	318.452	-445.8	D	7.93	7.731	0.2	3.6	86.74	12.69	0	0	0	0.57
2003	258	23	2789	340.496	-426.449	D	7.787	7.731	0.056	3.6	98.99	0.65	0	0	0	0.36
2003	259	23	2789	340.496	-426.449	D	7.756	7.731	0.026	3.6	99.36	0.38	0	0	0	0.25
2003	260	23	2781	339.842	-425.379	D	7.733	7.731	0.002	3.6	99.48	0.29	0	0	0	0.19
2003	261	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	262	23	2684	326.713	-427.014	D	7.783	7.731	0.052	3.6	91.16	8.06	0	0	0	0.78
2003	263	23	2628	320.933	-436.998	D	7.799	7.731	0.068	3.6	98.85	0.82	0	0	0	0.33
2003	264	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	265	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	266	23	2789	340.496	-426.449	D	7.758	7.731	0.027	3.6	96.74	2.37	0	0	0	0.88
2003	267	23	2789	340.496	-426.449	D	7.734	7.731	0.003	3.6	99.5	0.25	0	0	0	0.24
2003	268	23	2588	318.452	-445.8	D	7.762	7.731	0.031	3.6	98.09	1.47	0	0	0	0.45
2003	269	23	2571	322.646	-445.476	D	7.786	7.731	0.055	3.6	99.45	0.37	0	0	0	0.18
2003	270	23	2781	339.842	-425.379	D	7.741	7.731	0.01	3.6	92.3	6.94	0	0	0	0.76
2003	271	23	2781	339.842	-425.379	D	7.744	7.731	0.013	3.6	94.87	4.01	0	0	0	1.12
2003	272	23	2600	318.952	-443.12	D	7.741	7.731	0.011	3.6	85.34	13.64	0	0	0	1.03
2003	273	23	2781	339.842	-425.379	D	7.741	7.731	0.01	3.6	94.5	5.29	0	0	0	0.2
2003	274	23	2781	339.842	-425.379	D	7.646	7.598	0.047	3.313	95.76	4.11	0	0	0	0.14
2003	275	23	2588	318.452	-445.8	D	7.71	7.593	0.117	3.3	95.07	4.51	0	0	0	0.43
2003	276	23	2628	320.933	-436.998	D	7.621	7.593	0.029	3.3	98.92	0.84	0	0	0	0.24
2003	277	23	2758	335.862	-424.454	D	7.637	7.593	0.044	3.3	98.34	1.02	0	0	0	0.64
2003	278	23	2588	318.452	-445.8	D	7.653	7.593	0.061	3.3	98.33	1.32	0	0	0	0.35
2003	279	23	2588	318.452	-445.8	D	7.627	7.593	0.035	3.3	98.27	1.52	0	0	0	0.21
2003	280	23	2589	318.383	-445.593	D	7.596	7.593	0.004	3.3	99.59	0.25	0	0	0	0.16
2003	281	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	99.84	0.15	0	0	0	0.11
2003	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	285	23	2789	340.496	-426.449	D	7.605	7.593	0.013	3.3	86.94	11.92	0	0	0	1.14
2003	286	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	287	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	69.13	28.54	0	0	0	2.32
2003	288	23	2789	340.496	-426.449	D	7.613	7.593	0.021	3.3	94.66	4.41	0	0	0	0.93
2003	289	23	2781	339.842	-425.379	D	7.595	7.593	0.002	3.3	99.08	0.63	0	0	0	0.31
2003	290	23	2789	340.496	-426.449	D	7.615	7.593	0.023	3.3	95.8	4.09	0	0	0	0.12
2003	291	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	292	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	294	23	2781	339.842	-425.379	D	7.607	7.593	0.015	3.3	99.03	0.24	0	0	0	0.73
2003	295	23	2708	329.979	-425	D	7.936	7.593	0.344	3.3	98.72	0.67	0	0	0	0.61

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	296	23	2588	318.452	-445.8	D	7.605	7.593	0.012	3.3	99.52	0.12	0	0	0	0.36
2003	297	23	2789	340.496	-426.449	D	7.637	7.593	0.045	3.3	98.76	0.87	0	0	0	0.37
2003	298	23	2429	338.563	-428.651	D	7.772	7.593	0.18	3.3	95.19	4.39	0	0	0	0.42
2003	299	23	2781	339.842	-425.379	D	7.717	7.593	0.124	3.3	88.35	11	0	0	0	0.65
2003	300	23	2789	340.496	-426.449	D	7.612	7.593	0.02	3.3	93.52	6.1	0	0	0	0.39
2003	301	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	304	23	1415	329.185	-425.086	D	7.593	7.593	0	3.3	97.56	1.82	0	0	0	0.51
2003	305	23	2704	329.056	-425.092	D	7.715	7.548	0.167	3.204	94.51	5.04	0	0	0	0.44
2003	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	308	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	309	23	2043	334.488	-432.597	D	7.68	7.546	0.134	3.2	93.51	6.01	0	0	0	0.47
2003	310	23	2571	322.646	-445.476	D	7.761	7.546	0.215	3.2	94.77	5.09	0	0	0	0.14
2003	311	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	317	23	2789	340.496	-426.449	D	7.585	7.546	0.039	3.2	84.99	13.76	0	0	0	1.25
2003	318	23	2789	340.496	-426.449	D	7.635	7.546	0.089	3.2	87.58	11.79	0	0	0	0.63
2003	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	322	23	2589	318.383	-445.593	D	7.792	7.546	0.246	3.2	96.19	3.58	0	0	0	0.23
2003	323	23	2588	318.452	-445.8	D	7.671	7.546	0.124	3.2	91.04	8.27	0	0	0	0.69
2003	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	331	23	2589	318.383	-445.593	D	7.648	7.546	0.102	3.2	88.14	11.45	0	0	0	0.41
2003	332	23	2694	327.861	-425.964	D	7.587	7.546	0.04	3.2	82.07	16.93	0	0	0	1
2003	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	335	23	2704	329.056	-425.092	D	7.617	7.591	0.026	3.296	83.61	15.37	0	0	0	1.03
2003	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	2707	329.748	-425.023	D	7.751	7.593	0.159	3.3	90.4	9.29	0	0	0	0.31
2003	339	23	2789	340.496	-426.449	D	7.609	7.593	0.016	3.3	90.25	9.5	0	0	0	0.25
2003	340	23	2789	340.496	-426.449	D	7.685	7.593	0.093	3.3	78.76	20.22	0	0	0	1.03
2003	341	23	2589	318.383	-445.593	D	7.594	7.593	0.001	3.3	88.52	11.17	0	0	0	0.35
2003	342	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	2758	335.862	-424.454	D	7.595	7.593	0.002	3.3	88.48	10.96	0	0	0	0.54
2003	345	23	2781	339.842	-425.379	D	7.643	7.593	0.051	3.3	77.58	21.5	0	0	0	0.92
2003	346	23	2781	339.842	-425.379	D	7.682	7.593	0.089	3.3	84.42	15.16	0	0	0	0.42
2003	347	23	2684	326.713	-427.014	D	7.593	7.593	0	3.3	89.23	10.15	0	0	0	0.22
2003	348	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	89.19	10.36	0	0	0	0.47
2003	355	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	90.06	9.62	0	0	0	0.33
2003	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	2781	339.842	-425.379	D	7.659	7.593	0.066	3.3	85.1	14.35	0	0	0	0.56
2003	358	23	2789	340.496	-426.449	D	7.701	7.593	0.108	3.3	84.06	15.36	0	0	0	0.59
2003	359	23	2588	318.452	-445.8	D	7.642	7.593	0.049	3.3	87.98	11.66	0	0	0	0.36
2003	360	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	89.85	9.86	0	0	0	0.2
2003	361	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.683							
MARSHALL											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	2789	340.496	-426.449	D	7.61	7.593	0.017	3.3	70.52	28.64	0	0	0	0.83
2003	3	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	6	23	2781	339.842	-425.379	D	7.67	7.593	0.078	3.3	66.84	32.27	0	0	0	0.89
2003	7	23	2781	339.842	-425.379	D	7.697	7.593	0.104	3.3	76.31	23.21	0	0	0	0.47
2003	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	23	2704	329.056	-425.092	D	7.606	7.593	0.014	3.3	87.85	11.22	0	0	0	0.93
2003	10	23	2571	322.646	-445.476	D	7.593	7.593	0.001	3.3	84.17	15.29	0	0	0	0.41
2003	11	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	23	2789	340.496	-426.449	D	7.604	7.593	0.011	3.3	69.38	29.99	0	0	0	0.64
2003	13	23	2789	340.496	-426.449	D	7.595	7.593	0.003	3.3	73.07	26.49	0	0	0	0.46
2003	14	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	83.17	16.45	0	0	0	0.44
2003	15	23	2789	340.496	-426.449	D	7.673	7.593	0.081	3.3	68.48	30.8	0	0	0	0.72
2003	16	23	2704	329.056	-425.092	D	7.653	7.593	0.06	3.3	80.52	19.1	0	0	0	0.38
2003	17	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	18	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	19	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	21	23	2704	329.056	-425.092	D	7.606	7.593	0.014	3.3	75.4	24.28	0	0	0	0.31
2003	22	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	59.97	13.6	0	0	0	0.15
2003	23	23	2781	339.842	-425.379	D	7.646	7.593	0.053	3.3	82.41	17.31	0	0	0	0.28
2003	24	23	2789	340.496	-426.449	D	7.624	7.593	0.031	3.3	75.53	24.08	0	0	0	0.4
2003	25	23	2789	340.496	-426.449	D	7.596	7.593	0.003	3.3	77.94	21.8	0	0	0	0.27
2003	26	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	71.09	28.39	0	0	0	0.52
2003	27	23	2789	340.496	-426.449	D	7.678	7.593	0.085	3.3	73.09	26.52	0	0	0	0.39
2003	28	23	2781	339.842	-425.379	D	7.593	7.593	0	3.3	75.22	20.78	0	0	0	0.11
2003	29	23	2684	326.713	-427.014	D	7.718	7.593	0.125	3.3	81.67	18.04	0	0	0	0.29
2003	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	89.52	13.74	0	0	0	0.13
2003	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	2756	335.398	-424.515	D	7.454	7.453	0.001	3	83.54	16.28	0	0	0	0.26
2003	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	2789	340.496	-426.449	D	7.455	7.453	0.003	3	76.56	22.7	0	0	0	0.76
2003	37	23	2781	339.842	-425.379	D	7.485	7.453	0.032	3	80.47	19.22	0	0	0	0.32
2003	38	23	2684	326.713	-427.014	D	7.51	7.453	0.058	3	77.78	21.74	0	0	0	0.48
2003	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	42	23	2781	339.842	-425.379	D	7.453	7.453	0	3	75.27	24.54	0	0	0	0.98

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	43	23	2789	340.496	-426.449	D	7.455	7.453	0.002	3	69.76	28.93	0	0	0	1.4
2003	44	23	2789	340.496	-426.449	D	7.456	7.453	0.003	3	79.81	19.59	0	0	0	0.65
2003	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	23	2589	318.383	-445.593	D	7.455	7.453	0.003	3	84.88	14.77	0	0	0	0.41
2003	48	23	2628	320.933	-436.998	D	7.453	7.453	0.001	3	88.61	11.11	0	0	0	0.41
2003	49	23	2704	329.056	-425.092	D	7.503	7.453	0.051	3	88.81	10.92	0	0	0	0.28
2003	50	23	2704	329.056	-425.092	D	7.475	7.453	0.022	3	90.37	9.46	0	0	0	0.19
2003	51	23	2704	329.056	-425.092	D	7.482	7.453	0.029	3	84.91	14.83	0	0	0	0.26
2003	52	23	2684	326.713	-427.014	D	7.457	7.453	0.004	3	93.55	6.34	0	0	0	0.18
2003	53	23	2573	322.153	-445.515	D	7.529	7.453	0.076	3	82.14	17.35	0	0	0	0.51
2003	54	23	2589	318.383	-445.593	D	7.497	7.453	0.044	3	75.27	24.19	0	0	0	0.55
2003	55	23	2628	320.933	-436.998	D	7.487	7.453	0.034	3	81.74	18.04	0	0	0	0.22
2003	56	23	2588	318.452	-445.8	D	7.543	7.453	0.09	3	81.2	18.39	0	0	0	0.41
2003	57	23	2628	320.933	-436.998	D	7.513	7.453	0.061	3	87.37	12.4	0	0	0	0.23
2003	58	23	2684	326.713	-427.014	D	7.478	7.453	0.025	3	90.18	9.66	0	0	0	0.18
2003	59	23	2589	318.383	-445.593	D	7.484	7.453	0.031	3	91.94	7.93	0	0	0	0.14
2003	60	23	2704	329.056	-425.092	D	7.368	7.317	0.051	2.713	92.6	7.25	0	0	0	0.16
2003	61	23	2781	339.842	-425.379	D	7.437	7.311	0.126	2.7	93.08	6.78	0	0	0	0.15
2003	62	23	2789	340.496	-426.449	D	7.316	7.311	0.005	2.7	94.59	5.2	0	0	0	0.23
2003	63	23	2789	340.496	-426.449	D	7.314	7.311	0.004	2.7	92.62	7.14	0	0	0	0.25
2003	64	23	2758	335.862	-424.454	D	7.595	7.311	0.284	2.7	80.28	19.27	0	0	0	0.44
2003	65	23	2781	339.842	-425.379	D	7.601	7.311	0.29	2.7	85.24	14.37	0	0	0	0.39
2003	66	23	2789	340.496	-426.449	D	7.342	7.311	0.031	2.7	91.32	8.43	0	0	0	0.26
2003	67	23	2788	340.294	-426.448	D	7.311	7.311	0	2.7	98.25	1.89	0	0	0	0.19
2003	68	23	2789	340.496	-426.449	D	7.328	7.311	0.017	2.7	73.9	25.45	0	0	0	0.65
2003	69	23	1552	330.178	-425.042	D	7.311	7.311	0	2.7	58.92	40.86	0	0	0	1.22
2003	70	23	2684	326.713	-427.014	D	7.312	7.311	0.001	2.7	89.81	10.17	0	0	0	0.3
2003	71	23	2704	329.056	-425.092	D	7.311	7.311	0	2.7	92.98	6.88	0	0	0	0.25
2003	72	23	2781	339.842	-425.379	D	7.491	7.311	0.18	2.7	94.86	4.63	0	0	0	0.51
2003	73	23	2588	318.452	-445.8	D	7.406	7.311	0.095	2.7	96.05	3.63	0	0	0	0.32
2003	74	23	2628	320.933	-436.998	D	7.319	7.311	0.008	2.7	96.5	3.31	0	0	0	0.23
2003	75	23	2705	329.287	-425.069	D	7.311	7.311	0	2.7	99.08	0.5	0	0	0	0.19
2003	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	2684	326.713	-427.014	D	7.516	7.311	0.205	2.7	88.81	10.89	0	0	0	0.3
2003	80	23	2789	340.496	-426.449	D	7.396	7.311	0.086	2.7	88.72	10.95	0	0	0	0.33
2003	81	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	82	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	2781	339.842	-425.379	D	7.346	7.311	0.035	2.7	91.91	7.46	0	0	0	0.63
2003	85	23	2789	340.496	-426.449	D	7.315	7.311	0.005	2.7	91.55	8.18	0	0	0	0.27
2003	86	23	2788	340.294	-426.448	D	7.311	7.311	0	2.7	108.83	1.87	0	0	0	0.22
2003	87	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	95	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	97.78	1.99	0	0	0	0.48
2003	96	23	2781	339.842	-425.379	D	7.37	7.358	0.012	2.8	93.48	6.23	0	0	0	0.29
2003	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	98	23	2789	340.496	-426.449	D	7.363	7.358	0.005	2.8	90.72	9.14	0	0	0	0.16
2003	99	23	2684	326.713	-427.014	D	7.438	7.358	0.08	2.8	65.99	32.97	0	0	0	1.04
2003	100	23	2589	318.383	-445.593	D	7.379	7.358	0.02	2.8	92.91	6.6	0	0	0	0.5
2003	101	23	2588	318.452	-445.8	D	7.414	7.358	0.056	2.8	98.34	1.36	0	0	0	0.31
2003	102	23	2578	320.919	-445.61	D	7.409	7.358	0.051	2.8	99.14	0.6	0	0	0	0.26
2003	103	23	2789	340.496	-426.449	D	7.369	7.358	0.01	2.8	99.57	0.22	0	0	0	0.23
2003	104	23	2789	340.496	-426.449	D	7.361	7.358	0.003	2.8	99.58	0.26	0	0	0	0.21
2003	105	23	1239	328.021	-426.885	D	7.358	7.358	0	2.8	88.46	0.04	0	0	0	0.16
2003	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	107	23	2781	339.842	-425.379	D	7.375	7.358	0.017	2.8	88.96	10.8	0	0	0	0.25
2003	108	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	100.82	0.09	0	0	0	0.22
2003	109	23	2413	339.406	-425.637	D	7.358	7.358	0	2.8	98.75	0.22	0	0	0	0.18
2003	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	112	23	2789	340.496	-426.449	D	7.365	7.358	0.007	2.8	92.69	6.23	0	0	0	1.1
2003	113	23	2476	332.154	-435.398	D	7.371	7.358	0.013	2.8	96.65	2.94	0	0	0	0.42
2003	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	115	23	2589	318.383	-445.593	D	7.461	7.358	0.103	2.8	87.27	12.22	0	0	0	0.52
2003	116	23	2781	339.842	-425.379	D	7.388	7.358	0.03	2.8	84.35	15.08	0	0	0	0.57
2003	117	23	2589	318.383	-445.593	D	7.362	7.358	0.004	2.8	97.84	1.94	0	0	0	0.26
2003	118	23	1242	327.988	-426.138	D	7.358	7.358	0	2.8	101.75	0.1	0	0	0	0.21
2003	119	23	890	325.735	-431.482	D	7.358	7.358	0	2.8	96.89	0.28	0	0	0	0.18
2003	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	121	23	1242	327.988	-426.138	D	7.627	7.627	0	3.375	95.28	1.01	0	0	0	0.23
2003	122	23	2758	335.862	-424.454	D	7.762	7.639	0.123	3.4	98.72	0.89	0	0	0	0.4
2003	123	23	2684	326.713	-427.014	D	7.931	7.639	0.292	3.4	96.68	3.05	0	0	0	0.27
2003	124	23	2789	340.496	-426.449	D	7.683	7.639	0.044	3.4	99.49	0.41	0	0	0	0.1
2003	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	127	23	2758	335.862	-424.454	D	7.663	7.639	0.024	3.4	98.2	1.56	0	0	0	0.25
2003	128	23	2758	335.862	-424.454	D	7.646	7.639	0.007	3.4	99.47	0.33	0	0	0	0.2
2003	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	137	23	2758	335.862	-424.454	D	7.655	7.639	0.016	3.4	99.55	0.33	0	0	0	0.13
2003	138	23	2589	318.383	-445.593	D	7.735	7.639	0.096	3.4	97.57	2.32	0	0	0	0.11
2003	139	23	2589	318.383	-445.593	D	7.67	7.639	0.031	3.4	98.67	1.22	0	0	0	0.11
2003	140	23	2628	320.933	-436.998	D	7.774	7.639	0.135	3.4	86.18	13.36	0	0	0	0.46
2003	141	23	1922	333.594	-434.885	D	7.64	7.639	0.001	3.4	98.14	1.72	0	0	0	0.07
2003	142	23	2627	320.879	-437.207	D	7.64	7.639	0.001	3.4	99.12	0.66	0	0	0	0.29
2003	143	23	2694	327.861	-425.964	D	7.65	7.639	0.012	3.4	99.29	0.47	0	0	0	0.24
2003	144	23	2758	335.862	-424.454	D	7.675	7.639	0.036	3.4	98.77	1.03	0	0	0	0.2
2003	145	23	2684	326.713	-427.014	D	7.872	7.639	0.233	3.4	97.75	2.1	0	0	0	0.15
2003	146	23	2588	318.452	-445.8	D	7.676	7.639	0.037	3.4	99.6	0.27	0	0	0	0.14
2003	147	23	2704	329.056	-425.092	D	7.64	7.639	0.002	3.4	99.4	0.14	0	0	0	0.46
2003	148	23	2758	335.862	-424.454	D	7.713	7.639	0.074	3.4	99.18	0.56	0	0	0	0.26
2003	149	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.67	0.06	0	0	0	0.19
2003	150	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	98.59	1.09	0	0	0	0.36
2003	151	23	2789	340.496	-426.449	D	7.664	7.639	0.025	3.4	99.39	0.21	0	0	0	0.4
2003	152	23	2589	318.383	-445.593	D	7.665	7.639	0.026	3.4	99.14	0.61	0	0	0	0.26
2003	153	23	2626	320.826	-437.417	D	7.64	7.639	0.001	3.4	99.5	0.36	0	0	0	0.11
2003	154	23	2781	339.842	-425.379	D	7.739	7.639	0.1	3.4	91.07	8.71	0	0	0	0.22
2003	155	23	2781	339.842	-425.379	D	7.772	7.639	0.134	3.4	96.44	3.25	0	0	0	0.31
2003	156	23	2704	329.056	-425.092	D	7.761	7.639	0.123	3.4	99.26	0.51	0	0	0	0.23
2003	157	23	2704	329.056	-425.092	D	7.652	7.639	0.013	3.4	98.49	1.35	0	0	0	0.17
2003	158	23	2781	339.842	-425.379	D	7.642	7.639	0.004	3.4	98.56	1.31	0	0	0	0.14
2003	159	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.9	0.08	0	0	0	0.12

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	160	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	164	23	2704	329.056	-425.092	D	7.649	7.639	0.011	3.4	99.73	0.13	0	0	0	0.15
2003	165	23	2628	320.933	-436.998	D	7.679	7.639	0.04	3.4	98.28	1.58	0	0	0	0.14
2003	166	23	1	318.65	-445.782	D	7.642	7.639	0.003	3.4	99.15	0.75	0	0	0	0.11
2003	167	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.4	0.53	0	0	0	0.11
2003	168	23	340	322.363	-445.37	D	7.642	7.639	0.003	3.4	98.71	1.19	0	0	0	0.1
2003	169	23	1	318.65	-445.782	D	7.64	7.639	0.001	3.4	99.44	0.44	0	0	0	0.09
2003	170	23	2758	335.862	-424.454	D	7.673	7.639	0.034	3.4	99.68	0.1	0	0	0	0.23
2003	171	23	2704	329.056	-425.092	D	8.116	7.639	0.477	3.4	95.49	4.34	0	0	0	0.17
2003	172	23	2589	318.383	-445.593	D	7.656	7.639	0.018	3.4	99.68	0.18	0	0	0	0.14
2003	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	178	23	2468	334.002	-434.887	D	7.666	7.639	0.027	3.4	97.6	1.84	0	0	0	0.56
2003	179	23	2588	318.452	-445.8	D	7.659	7.639	0.02	3.4	99.43	0.29	0	0	0	0.29
2003	180	23	2694	327.861	-425.964	D	7.645	7.639	0.006	3.4	99.63	0.18	0	0	0	0.21
2003	181	23	2704	329.056	-425.092	D	7.64	7.639	0.001	3.4	99.38	0.56	0	0	0	0.16
2003	182	23	2182	335.131	-424.575	D	7.639	7.639	0	3.4	99.79	0.31	0	0	0	0.14
2003	183	23	2777	338.93	-425.542	D	7.639	7.639	0	3.4	100.13	0.21	0	0	0	0.13
2003	184	23	2397	338.413	-425.68	D	7.639	7.639	0	3.4	98.36	0.06	0	0	0	0.13
2003	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	192	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	193	23	2788	340.294	-426.448	D	7.639	7.639	0	3.4	99.41	0.1	0	0	0	0.32
2003	194	23	2781	339.842	-425.379	D	7.664	7.639	0.025	3.4	99.26	0.48	0	0	0	0.26
2003	195	23	2781	339.842	-425.379	D	7.676	7.639	0.037	3.4	99.02	0.79	0	0	0	0.19
2003	196	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	92.19	0.02	0	0	0	0.14
2003	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	198	23	2789	340.496	-426.449	D	7.647	7.639	0.008	3.4	99.65	0.11	0	0	0	0.25

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	199	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.76	0.03	0	0	0	0.18
2003	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	201	23	2789	340.496	-426.449	D	7.639	7.639	0	3.4	99.01	0.85	0	0	0	0.13
2003	202	23	2235	335.628	-424.554	D	7.639	7.639	0	3.4	97.93	0.65	0	0	0	0.14
2003	203	23	2789	340.496	-426.449	D	7.656	7.639	0.017	3.4	93.7	5.66	0	0	0	0.64
2003	204	23	2789	340.496	-426.449	D	7.673	7.639	0.034	3.4	96.9	2.48	0	0	0	0.62
2003	205	23	2628	320.933	-436.998	D	7.665	7.639	0.026	3.4	99.43	0.21	0	0	0	0.35
2003	206	23	2684	326.713	-427.014	D	7.644	7.639	0.005	3.4	99.64	0.1	0	0	0	0.26
2003	207	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	210	23	2704	329.056	-425.092	D	7.696	7.639	0.057	3.4	97.4	2.39	0	0	0	0.22
2003	211	23	2789	340.496	-426.449	D	7.801	7.639	0.162	3.4	98.52	1.33	0	0	0	0.15
2003	212	23	2789	340.496	-426.449	D	7.741	7.639	0.102	3.4	99.37	0.5	0	0	0	0.14
2003	213	23	2781	339.842	-425.379	D	7.683	7.639	0.045	3.4	99.58	0.28	0	0	0	0.14
2003	214	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.85	0.04	0	0	0	0.1
2003	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	216	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.63	0.66	0	0	0	0.34
2003	217	23	2781	339.842	-425.379	D	7.641	7.639	0.002	3.4	99.27	0.49	0	0	0	0.31
2003	218	23	2628	320.933	-436.998	D	7.714	7.639	0.075	3.4	99.11	0.65	0	0	0	0.25
2003	219	23	2588	318.452	-445.8	D	7.732	7.639	0.094	3.4	99.37	0.39	0	0	0	0.24
2003	220	23	2589	318.383	-445.593	D	7.642	7.639	0.003	3.4	99.35	0.22	0	0	0	0.47
2003	221	23	2589	318.383	-445.593	D	7.644	7.639	0.005	3.4	99.43	0.18	0	0	0	0.42
2003	222	23	2589	318.383	-445.593	D	7.652	7.639	0.013	3.4	99.62	0.07	0	0	0	0.32
2003	223	23	2588	318.452	-445.8	D	7.67	7.639	0.031	3.4	99.52	0.26	0	0	0	0.22
2003	224	23	2588	318.452	-445.8	D	7.639	7.639	0	3.4	98.82	0.65	0	0	0	0.18
2003	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	230	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.65	0.03	0	0	0	0.32
2003	231	23	2789	340.496	-426.449	D	7.663	7.639	0.024	3.4	99.66	0.14	0	0	0	0.2
2003	232	23	2789	340.496	-426.449	D	7.659	7.639	0.02	3.4	99.59	0.26	0	0	0	0.15
2003	233	23	2789	340.496	-426.449	D	7.651	7.639	0.012	3.4	99.57	0.3	0	0	0	0.13
2003	234	23	2789	340.496	-426.449	D	7.65	7.639	0.011	3.4	99.71	0.17	0	0	0	0.13
2003	235	23	2711	330.671	-424.932	D	7.762	7.639	0.123	3.4	99.56	0.13	0	0	0	0.31
2003	236	23	2588	318.452	-445.8	D	7.764	7.639	0.125	3.4	98.98	0.79	0	0	0	0.23
2003	237	23	2684	326.713	-427.014	D	7.707	7.639	0.069	3.4	99.69	0.12	0	0	0	0.19

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	238	23	2758	335.862	-424.454	D	7.646	7.639	0.007	3.4	99.8	0.03	0	0	0	0.16
2003	239	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	99.91	0.07	0	0	0	0.12
2003	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	242	23	2779	339.386	-425.461	D	7.639	7.639	0	3.4	92.63	0.41	0	0	0	0.15
2003	243	23	2758	335.862	-424.454	D	7.639	7.639	0	3.4	97.95	1.65	0	0	0	0.14
2003	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2003	245	23	2589	318.383	-445.593	D	7.74	7.731	0.009	3.6	99.21	0.59	0	0	0	0.21
2003	246	23	2588	318.452	-445.8	D	7.741	7.731	0.01	3.6	98.13	1.71	0	0	0	0.16
2003	247	23	2789	340.496	-426.449	D	8.09	7.731	0.36	3.6	93.06	6.58	0	0	0	0.36
2003	248	23	2588	318.452	-445.8	D	7.731	7.731	0	3.6	100.53	0.15	0	0	0	0.53
2003	249	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	257	23	2704	329.056	-425.092	D	7.946	7.731	0.215	3.6	89.97	9.75	0	0	0	0.27
2003	258	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	259	23	2789	340.496	-426.449	D	7.738	7.731	0.007	3.6	99.17	0.52	0	0	0	0.32
2003	260	23	2781	339.842	-425.379	D	7.737	7.731	0.006	3.6	99.08	0.65	0	0	0	0.25
2003	261	23	2235	335.628	-424.554	D	7.731	7.731	0	3.6	99.35	0.32	0	0	0	0.17
2003	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	263	23	2781	339.842	-425.379	D	7.835	7.731	0.105	3.6	97.07	2.61	0	0	0	0.32
2003	264	23	2684	326.713	-427.014	D	7.737	7.731	0.006	3.6	99.45	0.31	0	0	0	0.24
2003	265	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	266	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	267	23	2788	340.294	-426.448	D	7.731	7.731	0	3.6	93.66	0.88	0	0	0	0.36
2003	268	23	2788	340.294	-426.448	D	7.746	7.731	0.015	3.6	91.22	7.52	0	0	0	1.27
2003	269	23	2571	322.646	-445.476	D	7.75	7.731	0.019	3.6	98.68	1.07	0	0	0	0.25
2003	270	23	2684	326.713	-427.014	D	7.742	7.731	0.012	3.6	81.97	16.51	0	0	0	1.52
2003	271	23	2789	340.496	-426.449	D	7.731	7.731	0	3.6	73.94	23.73	0	0	0	2.4
2003	272	23	2588	318.452	-445.8	D	7.736	7.731	0.006	3.6	69.82	28.57	0	0	0	1.59
2003	273	23	2789	340.496	-426.449	D	7.736	7.731	0.006	3.6	96.53	2.93	0	0	0	0.53
2003	274	23	2684	326.713	-427.014	D	7.706	7.598	0.107	3.313	87.95	11.7	0	0	0	0.36
2003	275	23	2571	322.646	-445.476	D	7.616	7.593	0.023	3.3	93.8	5.66	0	0	0	0.54
2003	276	23	2628	320.933	-436.998	D	7.614	7.593	0.021	3.3	96.22	3.45	0	0	0	0.34

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	277	23	2781	339.842	-425.379	D	7.593	7.593	0.001	3.3	98.93	0.53	0	0	0	0.62
2003	278	23	2789	340.496	-426.449	D	7.658	7.593	0.066	3.3	97.41	2.15	0	0	0	0.44
2003	279	23	2789	340.496	-426.449	D	7.68	7.593	0.088	3.3	96.11	3.6	0	0	0	0.29
2003	280	23	2589	318.383	-445.593	D	7.633	7.593	0.04	3.3	98.88	0.9	0	0	0	0.22
2003	281	23	2684	326.713	-427.014	D	7.6	7.593	0.008	3.3	99.14	0.7	0	0	0	0.18
2003	282	23	1415	329.185	-425.086	D	7.593	7.593	0	3.3	99.58	0.32	0	0	0	0.18
2003	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	285	23	2600	318.952	-443.12	D	7.627	7.593	0.034	3.3	96.36	2.97	0	0	0	0.68
2003	286	23	2589	318.383	-445.593	D	7.622	7.593	0.029	3.3	98.31	1.36	0	0	0	0.33
2003	287	23	2781	339.842	-425.379	D	7.618	7.593	0.025	3.3	88.9	10.94	0	0	0	0.17
2003	288	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	96.9	1.38	0	0	0	0.69
2003	289	23	2418	339.946	-426.612	D	7.593	7.593	0	3.3	91.67	1.22	0	0	0	0.43
2003	290	23	2789	340.496	-426.449	D	7.608	7.593	0.015	3.3	92.96	6.89	0	0	0	0.16
2003	291	23	2684	326.713	-427.014	D	7.596	7.593	0.003	3.3	98.86	0.69	0	0	0	0.43
2003	292	23	2789	340.496	-426.449	D	7.605	7.593	0.012	3.3	98.98	0.72	0	0	0	0.3
2003	293	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	99.64	0.18	0	0	0	0.22
2003	294	23	2787	340.091	-426.447	D	7.593	7.593	0	3.3	93.86	0.2	0	0	0	0.18
2003	295	23	2789	340.496	-426.449	D	7.63	7.593	0.037	3.3	98.71	0.62	0	0	0	0.68
2003	296	23	2588	318.452	-445.8	D	7.656	7.593	0.063	3.3	98.5	0.94	0	0	0	0.55
2003	297	23	2789	340.496	-426.449	D	7.607	7.593	0.014	3.3	98.71	0.86	0	0	0	0.44
2003	298	23	2790	340.421	-426.562	D	7.645	7.593	0.053	3.3	91.71	7.67	0	0	0	0.62
2003	299	23	2600	318.952	-443.12	D	7.597	7.593	0.005	3.3	79.69	19.95	0	0	0	0.38
2003	300	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	301	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	305	23	2758	335.862	-424.454	D	7.642	7.548	0.094	3.204	86.17	13.08	0	0	0	0.75
2003	306	23	2235	335.628	-424.554	D	7.546	7.546	0	3.2	97.02	1.6	0	0	0	0.33
2003	307	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	308	23	2704	329.056	-425.092	D	7.591	7.546	0.045	3.2	95.72	4.12	0	0	0	0.16
2003	309	23	2711	330.671	-424.932	D	8.065	7.546	**0.519**	3.2	95.21	4.61	0	0	0	0.17
2003	310	23	2571	322.646	-445.476	D	7.912	7.546	0.366	3.2	93.59	6.28	0	0	0	0.13
2003	311	23	2589	318.383	-445.593	D	7.55	7.546	0.004	3.2	88.45	11.18	0	0	0	0.38
2003	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	316	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	317	23	2789	340.496	-426.449	D	7.551	7.546	0.005	3.2	58.83	38.94	0	0	0	2.26
2003	318	23	2789	340.496	-426.449	D	7.547	7.546	0	3.2	87.79	12.02	0	0	0	0.67
2003	319	23	2359	337.701	-426.461	D	7.546	7.546	0	3.2	97.9	18.44	0	0	0	0.52
2003	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	323	23	2789	340.496	-426.449	D	7.557	7.546	0.01	3.2	89.72	10.01	0	0	0	0.27
2003	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	327	23	2704	329.056	-425.092	D	7.554	7.546	0.008	3.2	85.72	14.12	0	0	0	0.18
2003	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	331	23	2789	340.496	-426.449	D	7.616	7.546	0.07	3.2	85.79	13.86	0	0	0	0.35
2003	332	23	2789	340.496	-426.449	D	7.551	7.546	0.004	3.2	90.27	9.64	0	0	0	0.1
2003	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	335	23	2789	340.496	-426.449	D	7.61	7.591	0.019	3.296	59.43	38.42	0	0	0	2.15
2003	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	2758	335.862	-424.454	D	7.706	7.593	0.113	3.3	87.91	11.77	0	0	0	0.32
2003	339	23	2588	318.452	-445.8	D	7.599	7.593	0.007	3.3	92.07	7.74	0	0	0	0.2
2003	340	23	2789	340.496	-426.449	D	7.595	7.593	0.002	3.3	81.69	17.92	0	0	0	0.43
2003	341	23	2789	340.496	-426.449	D	7.603	7.593	0.01	3.3	78.72	20.99	0	0	0	0.29
2003	342	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	2588	318.452	-445.8	D	7.713	7.593	0.121	3.3	84.74	15.15	0	0	0	0.12
2003	345	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	2781	339.842	-425.379	D	7.611	7.593	0.018	3.3	79.92	19.7	0	0	0	0.38
2003	347	23	2603	319.155	-442.443	D	7.597	7.593	0.005	3.3	84.24	15.56	0	0	0	0.2
2003	348	23	2610	319.631	-440.865	D	7.606	7.593	0.013	3.3	87.44	12.41	0	0	0	0.15
2003	349	23	2781	339.842	-425.379	D	7.595	7.593	0.002	3.3	89.32	10.61	0	0	0	0.11
2003	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	2600	318.952	-443.12	D	7.627	7.593	0.034	3.3	79.79	19.9	0	0	0	0.31
2003	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	84.6	14.97	0	0	0	0.51
2003	360	23	2789	340.496	-426.449	D	7.595	7.593	0.003	3.3	81.86	17.81	0	0	0	0.36
2003	361	23	2235	335.628	-424.554	D	7.593	7.593	0	3.3	79.59	11.27	0	0	0	0.16
2003	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.519							
COLUMBIA											**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DELTA DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	2	23	2758	335.862	-424.454	D	7.601	7.593	0.009	3.3	39.16	60.8	0	0	0	0.04
2003	3	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	4	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	5	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	6	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	7	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	8	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	9	23	2789	340.496	-426.449	D	7.602	7.593	0.009	3.3	89.03	10.93	0	0	0	0.04
2003	10	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	11	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	12	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	60.28	39.8	0	0	0	0.02
2003	13	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	65.27	34.95	0	0	0	0.01
2003	14	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	15	23	2789	340.496	-426.449	D	7.599	7.593	0.006	3.3	59.02	40.97	0	0	0	0.02
2003	16	23	2604	319.223	-442.217	D	7.624	7.593	0.031	3.3	65.45	34.54	0	0	0	0.01
2003	17	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	18	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	19	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	21	23	2789	340.496	-426.449	D	7.607	7.593	0.014	3.3	65.06	34.94	0	0	0	0.01
2003	22	23	2704	329.056	-425.092	D	7.618	7.593	0.025	3.3	47.55	52.43	0	0	0	0.02
2003	23	23	2468	334.002	-434.887	D	7.596	7.593	0.003	3.3	53.32	46.69	0	0	0	0.01

Appendix M
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2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	24	23	2789	340.496	-426.449	D	7.593	7.593	0.001	3.3	66.51	33.61	0	0	0	0.01
2003	25	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	68.88	31.32	0	0	0	0.01
2003	26	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	27	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	62.4	37.6	0	0	0	0.01
2003	28	23	1195	327.827	-428.143	D	7.593	7.593	0	3.3	16.74	6.8	0	0	0	0
2003	29	23	2789	340.496	-426.449	D	7.623	7.593	0.031	3.3	36.93	63.04	0	0	0	0.04
2003	30	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	31	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	32	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	35	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	36	23	2789	340.496	-426.449	D	7.453	7.453	0	3	60.63	39.17	0	0	0	0.03
2003	37	23	2781	339.842	-425.379	D	7.461	7.453	0.008	3	66.95	33.07	0	0	0	0.01
2003	38	23	2628	320.933	-436.998	D	7.589	7.453	0.136	3	79.2	20.79	0	0	0	0
2003	39	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	42	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	43	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	44	23	2789	340.496	-426.449	D	7.453	7.453	0	3	68.87	32.01	0	0	0	0.02
2003	45	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	46	23	1	318.65	-445.782	D	7.453	7.453	0	3	0	0	0	0	0	0
2003	47	23	2781	339.842	-425.379	D	7.518	7.453	0.065	3	76.24	23.75	0	0	0	0.01
2003	48	23	2589	318.383	-445.593	D	7.524	7.453	0.071	3	74.22	25.77	0	0	0	0.01
2003	49	23	2789	340.496	-426.449	D	7.481	7.453	0.028	3	74.87	25.13	0	0	0	0.01
2003	50	23	2781	339.842	-425.379	D	7.457	7.453	0.004	3	85.28	14.77	0	0	0	0.01
2003	51	23	2704	329.056	-425.092	D	7.492	7.453	0.039	3	75.52	24.48	0	0	0	0.01
2003	52	23	1415	329.185	-425.086	D	7.453	7.453	0.001	3	89.15	11.03	0	0	0	0.01
2003	53	23	2589	318.383	-445.593	D	7.499	7.453	0.046	3	74.24	25.75	0	0	0	0.01
2003	54	23	2781	339.842	-425.379	D	7.479	7.453	0.026	3	65.4	34.59	0	0	0	0.01
2003	55	23	2628	320.933	-436.998	D	7.497	7.453	0.044	3	72.1	27.9	0	0	0	0.01
2003	56	23	2602	319.088	-442.669	D	7.5	7.453	0.048	3	60.6	39.38	0	0	0	0.02
2003	57	23	2589	318.383	-445.593	D	7.505	7.453	0.052	3	75.12	24.87	0	0	0	0.01
2003	58	23	2684	326.713	-427.014	D	7.469	7.453	0.016	3	81.48	18.54	0	0	0	0.01
2003	59	23	2694	327.861	-425.964	D	7.463	7.453	0.01	3	85.05	14.97	0	0	0	0
2003	60	23	2781	339.842	-425.379	D	7.319	7.317	0.003	2.713	87.77	12.29	0	0	0	0
2003	61	23	2781	339.842	-425.379	D	7.312	7.311	0.001	2.7	87.62	12.43	0	0	0	0.01
2003	62	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	63	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	64	23	2781	339.842	-425.379	D	7.341	7.311	0.03	2.7	79.21	20.79	0	0	0	0.01
2003	65	23	2789	340.496	-426.449	D	7.315	7.311	0.004	2.7	81.8	18.22	0	0	0	0.01
2003	66	23	2789	340.496	-426.449	D	7.321	7.311	0.011	2.7	78.93	21.06	0	0	0	0.01
2003	67	23	2789	340.496	-426.449	D	7.311	7.311	0	2.7	91.9	6.65	0	0	0	0.01
2003	68	23	2789	340.496	-426.449	D	7.341	7.311	0.031	2.7	52.26	47.71	0	0	0	0.03
2003	69	23	2781	339.842	-425.379	D	7.428	7.311	0.117	2.7	62.46	37.52	0	0	0	0.02
2003	70	23	2758	335.862	-424.454	D	7.355	7.311	0.044	2.7	81.95	18.04	0	0	0	0.01
2003	71	23	2781	339.842	-425.379	D	7.312	7.311	0.001	2.7	93.52	6.44	0	0	0	0.01
2003	72	23	2789	340.496	-426.449	D	7.314	7.311	0.003	2.7	94.42	5.61	0	0	0	0.02
2003	73	23	2694	327.861	-425.964	D	7.341	7.311	0.03	2.7	91.2	8.8	0	0	0	0.01
2003	74	23	2628	320.933	-436.998	D	7.312	7.311	0.001	2.7	95.8	4.3	0	0	0	0.01
2003	75	23	863	325.509	-431.992	D	7.311	7.311	0	2.7	91.88	0.49	0	0	0	0.01
2003	76	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	79	23	2704	329.056	-425.092	D	7.332	7.311	0.021	2.7	74.88	25.11	0	0	0	0.01
2003	80	23	2789	340.496	-426.449	D	7.358	7.311	0.047	2.7	77.34	22.65	0	0	0	0.01
2003	81	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	82	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	83	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	84	23	2589	318.383	-445.593	D	7.317	7.311	0.007	2.7	90.71	9.3	0	0	0	0.02
2003	85	23	2684	326.713	-427.014	D	7.314	7.311	0.003	2.7	51.15	48.84	0	0	0	0.03
2003	86	23	200	320.784	-437.694	D	7.311	7.311	0	2.7	95.33	3.86	0	0	0	0.02
2003	87	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	89	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	90	23	1	318.65	-445.782	D	7.311	7.311	0	2.7	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	7.356	7.356	0	2.796	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	95	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	96	23	2781	339.842	-425.379	D	7.365	7.358	0.007	2.8	78.39	21.59	0	0	0	0.01
2003	97	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	98	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	83.8	17.77	0	0	0	0.01
2003	99	23	2789	340.496	-426.449	D	7.362	7.358	0.004	2.8	89.33	10.7	0	0	0	0.02
2003	100	23	2789	340.496	-426.449	D	7.404	7.358	0.046	2.8	77.96	22.02	0	0	0	0.02
2003	101	23	2781	339.842	-425.379	D	7.377	7.358	0.019	2.8	93.55	6.45	0	0	0	0.02

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	102	23	2789	340.496	-426.449	D	7.377	7.358	0.019	2.8	97.93	2.07	0	0	0	0.01
2003	103	23	2789	340.496	-426.449	D	7.359	7.358	0.001	2.8	99.54	0.43	0	0	0	0.01
2003	104	23	2789	340.496	-426.449	D	7.358	7.358	0	2.8	98.51	1.04	0	0	0	0.01
2003	105	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	107	23	2781	339.842	-425.379	D	7.36	7.358	0.001	2.8	80.32	19.71	0	0	0	0.01
2003	108	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	109	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	110	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	112	23	2781	339.842	-425.379	D	7.36	7.358	0.002	2.8	95.62	4.43	0	0	0	0.04
2003	113	23	2758	335.862	-424.454	D	7.36	7.358	0.002	2.8	95.64	4.37	0	0	0	0.02
2003	114	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	115	23	2781	339.842	-425.379	D	7.366	7.358	0.008	2.8	89.3	10.71	0	0	0	0.02
2003	116	23	2789	340.496	-426.449	D	7.374	7.358	0.016	2.8	68.78	31.19	0	0	0	0.02
2003	117	23	2589	318.383	-445.593	D	7.359	7.358	0.001	2.8	96.75	3.29	0	0	0	0.01
2003	118	23	1043	326.845	-428.436	D	7.358	7.358	0	2.8	114.75	0.25	0	0	0	0.01
2003	119	23	754	324.559	-433.032	D	7.358	7.358	0	2.8	98.12	0.39	0	0	0	0.01
2003	120	23	1	318.65	-445.782	D	7.358	7.358	0	2.8	0	0	0	0	0	0
2003	121	23	1	318.65	-445.782	D	7.627	7.627	0	3.375	0	0	0	0	0	0
2003	122	23	2781	339.842	-425.379	D	7.648	7.639	0.009	3.4	99.32	0.67	0	0	0	0.02
2003	123	23	2758	335.862	-424.454	D	7.799	7.639	0.16	3.4	90.23	9.76	0	0	0	0.01
2003	124	23	2704	329.056	-425.092	D	7.644	7.639	0.005	3.4	99.29	0.71	0	0	0	0
2003	125	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	127	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	92.86	7.75	0	0	0	0.01
2003	128	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	129	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	137	23	2781	339.842	-425.379	D	7.64	7.639	0.002	3.4	99.43	0.58	0	0	0	0
2003	138	23	2704	329.056	-425.092	D	7.652	7.639	0.013	3.4	95.44	4.56	0	0	0	0
2003	139	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	140	23	2789	340.496	-426.449	D	7.723	7.639	0.084	3.4	81.37	18.62	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	141	23	2789	340.496	-426.449	D	7.659	7.639	0.02	3.4	95.37	4.62	0	0	0	0.01
2003	142	23	2781	339.842	-425.379	D	7.669	7.639	0.03	3.4	99.22	0.77	0	0	0	0.01
2003	143	23	2468	334.002	-434.887	D	7.712	7.639	0.073	3.4	98.88	1.11	0	0	0	0.01
2003	144	23	2781	339.842	-425.379	D	7.701	7.639	0.062	3.4	98.61	1.38	0	0	0	0.01
2003	145	23	2758	335.862	-424.454	D	7.707	7.639	0.068	3.4	97.08	2.91	0	0	0	0.01
2003	146	23	2589	318.383	-445.593	D	7.679	7.639	0.041	3.4	98.1	1.9	0	0	0	0.01
2003	147	23	2628	320.933	-436.998	D	7.645	7.639	0.006	3.4	97.93	2.07	0	0	0	0.02
2003	148	23	2588	318.452	-445.8	D	7.646	7.639	0.007	3.4	99.06	0.94	0	0	0	0.01
2003	149	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	62.58	0.06	0	0	0	0.01
2003	150	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	151	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	152	23	65	319.695	-441.239	D	7.659	7.639	0.02	3.4	96.54	3.46	0	0	0	0.01
2003	153	23	2628	320.933	-436.998	D	7.64	7.639	0.001	3.4	99.73	0.3	0	0	0	0
2003	154	23	2781	339.842	-425.379	D	7.668	7.639	0.029	3.4	83.44	16.56	0	0	0	0.01
2003	155	23	2429	338.563	-428.651	D	7.639	7.639	0	3.4	97.29	0.19	0	0	0	0.01
2003	156	23	2790	340.421	-426.562	D	7.659	7.639	0.021	3.4	99.53	0.47	0	0	0	0.01
2003	157	23	2781	339.842	-425.379	D	7.661	7.639	0.022	3.4	98.27	1.72	0	0	0	0.01
2003	158	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	159	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	160	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	161	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	164	23	1414	329.196	-425.335	D	7.639	7.639	0	3.4	98.17	0.13	0	0	0	0.01
2003	165	23	2758	335.862	-424.454	D	7.727	7.639	0.089	3.4	96.36	3.64	0	0	0	0.01
2003	166	23	2571	322.646	-445.476	D	7.743	7.639	0.104	3.4	96.85	3.15	0	0	0	0.01
2003	167	23	2789	340.496	-426.449	D	7.661	7.639	0.022	3.4	98.98	1.02	0	0	0	0
2003	168	23	2789	340.496	-426.449	D	7.645	7.639	0.006	3.4	98.82	1.19	0	0	0	0
2003	169	23	2468	334.002	-434.887	D	7.643	7.639	0.004	3.4	98.1	1.9	0	0	0	0
2003	170	23	2684	326.713	-427.014	D	7.671	7.639	0.032	3.4	99.56	0.43	0	0	0	0.01
2003	171	23	2790	340.421	-426.562	D	7.804	7.639	0.166	3.4	92.27	7.72	0	0	0	0.01
2003	172	23	2588	318.452	-445.8	D	7.646	7.639	0.007	3.4	99.73	0.26	0	0	0	0.01
2003	173	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	177	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	178	23	2571	322.646	-445.476	D	7.639	7.639	0	3.4	100.17	0.38	0	0	0	0.02
2003	179	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.5	0.49	0	0	0	0.01

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	180	23	2758	335.862	-424.454	D	7.641	7.639	0.002	3.4	99.74	0.26	0	0	0	0.01
2003	181	23	2781	339.842	-425.379	D	7.639	7.639	0	3.4	100.25	0.25	0	0	0	0
2003	182	23	1412	329.218	-425.834	D	7.639	7.639	0	3.4	100.22	0.76	0	0	0	0.01
2003	183	23	2409	339.158	-425.648	D	7.639	7.639	0	3.4	102.83	0.12	0	0	0	0.01
2003	184	23	2102	334.398	-424.857	D	7.639	7.639	0	3.4	94.77	0.16	0	0	0	0.01
2003	185	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	192	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	193	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	194	23	2417	339.654	-425.626	D	7.639	7.639	0	3.4	85.68	0.07	0	0	0	0.01
2003	195	23	2781	339.842	-425.379	D	7.644	7.639	0.005	3.4	98.92	1.07	0	0	0	0.01
2003	196	23	2780	339.614	-425.419	D	7.639	7.639	0	3.4	99.53	0.06	0	0	0	0.01
2003	197	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	198	23	2789	340.496	-426.449	D	7.639	7.639	0.001	3.4	100.16	0.23	0	0	0	0.01
2003	199	23	2418	339.946	-426.612	D	7.639	7.639	0	3.4	100.05	0.08	0	0	0	0.01
2003	200	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	201	23	2397	338.413	-425.68	D	7.639	7.639	0	3.4	99.83	0.49	0	0	0	0
2003	202	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	203	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	204	23	2704	329.056	-425.092	D	7.661	7.639	0.022	3.4	96.05	3.93	0	0	0	0.03
2003	205	23	2684	326.713	-427.014	D	7.743	7.639	0.105	3.4	99.14	0.85	0	0	0	0.01
2003	206	23	2710	330.44	-424.955	D	7.65	7.639	0.011	3.4	99.51	0.49	0	0	0	0.01
2003	207	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	208	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	210	23	2781	339.842	-425.379	D	7.65	7.639	0.011	3.4	96.14	3.87	0	0	0	0.01
2003	211	23	2781	339.842	-425.379	D	7.679	7.639	0.04	3.4	97.38	2.61	0	0	0	0.01
2003	212	23	2789	340.496	-426.449	D	7.674	7.639	0.035	3.4	98.51	1.49	0	0	0	0
2003	213	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.19	0.81	0	0	0	0
2003	214	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.71	0.22	0	0	0	0
2003	215	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	216	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	217	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	218	23	2694	327.861	-425.964	D	7.664	7.639	0.025	3.4	99.64	0.35	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	219	23	2589	318.383	-445.593	D	7.823	7.639	0.184	3.4	96.43	3.56	0	0	0	0.01
2003	220	23	2468	334.002	-434.887	D	7.761	7.639	0.122	3.4	99.19	0.8	0	0	0	0.01
2003	221	23	2589	318.383	-445.593	D	7.707	7.639	0.068	3.4	99.66	0.33	0	0	0	0.01
2003	222	23	2628	320.933	-436.998	D	7.721	7.639	0.082	3.4	99.69	0.3	0	0	0	0.01
2003	223	23	2588	318.452	-445.8	D	7.75	7.639	0.111	3.4	99.49	0.5	0	0	0	0.01
2003	224	23	2588	318.452	-445.8	D	7.64	7.639	0.001	3.4	99.27	0.63	0	0	0	0.01
2003	225	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	230	23	2789	340.496	-426.449	D	7.64	7.639	0.001	3.4	99.93	0.05	0	0	0	0.01
2003	231	23	2789	340.496	-426.449	D	7.651	7.639	0.012	3.4	99.72	0.28	0	0	0	0.01
2003	232	23	2789	340.496	-426.449	D	7.648	7.639	0.009	3.4	99.54	0.48	0	0	0	0.01
2003	233	23	2789	340.496	-426.449	D	7.643	7.639	0.004	3.4	99.55	0.49	0	0	0	0
2003	234	23	2789	340.496	-426.449	D	7.642	7.639	0.003	3.4	99.72	0.32	0	0	0	0
2003	235	23	2704	329.056	-425.092	D	7.675	7.639	0.036	3.4	99.83	0.17	0	0	0	0.01
2003	236	23	2571	322.646	-445.476	D	7.721	7.639	0.083	3.4	97.8	2.19	0	0	0	0.01
2003	237	23	2684	326.713	-427.014	D	7.676	7.639	0.037	3.4	99.71	0.28	0	0	0	0.01
2003	238	23	2758	335.862	-424.454	D	7.643	7.639	0.004	3.4	99.98	0.04	0	0	0	0.01
2003	239	23	2397	338.413	-425.68	D	7.639	7.639	0	3.4	100.77	0.05	0	0	0	0
2003	240	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	242	23	2155	334.883	-424.586	D	7.639	7.639	0	3.4	71.36	0.64	0	0	0	0
2003	243	23	2040	333.912	-425.128	D	7.639	7.639	0	3.4	91.87	3.12	0	0	0	0.01
2003	244	23	1	318.65	-445.782	D	7.727	7.727	0	3.592	0	0	0	0	0	0
2003	245	23	2684	326.713	-427.014	D	7.742	7.731	0.011	3.6	99.45	0.55	0	0	0	0.01
2003	246	23	2589	318.383	-445.593	D	7.833	7.731	0.103	3.6	94.31	5.68	0	0	0	0.01
2003	247	23	2789	340.496	-426.449	D	7.815	7.731	0.084	3.6	97.84	2.14	0	0	0	0.01
2003	248	23	2628	320.933	-436.998	D	7.802	7.731	0.071	3.6	96.63	3.35	0	0	0	0.02
2003	249	23	2588	318.452	-445.8	D	7.731	7.731	0.001	3.6	99.77	0.24	0	0	0	0.01
2003	250	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	251	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	257	23	2781	339.842	-425.379	D	7.779	7.731	0.049	3.6	84.64	15.35	0	0	0	0.01

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	258	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	259	23	2789	340.496	-426.449	D	7.732	7.731	0.002	3.6	99.49	0.5	0	0	0	0.01
2003	260	23	2789	340.496	-426.449	D	7.742	7.731	0.012	3.6	98.8	1.19	0	0	0	0.01
2003	261	23	2758	335.862	-424.454	D	7.731	7.731	0.001	3.6	99.48	0.53	0	0	0	0.01
2003	262	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	263	23	2789	340.496	-426.449	D	7.761	7.731	0.031	3.6	98.33	1.65	0	0	0	0.01
2003	264	23	2704	329.056	-425.092	D	7.743	7.731	0.013	3.6	99.24	0.76	0	0	0	0.01
2003	265	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	266	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	267	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	268	23	2684	326.713	-427.014	D	7.737	7.731	0.006	3.6	76.63	23.26	0	0	0	0.11
2003	269	23	2789	340.496	-426.449	D	7.733	7.731	0.002	3.6	96.17	3.81	0	0	0	0.01
2003	270	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	271	23	1	318.65	-445.782	D	7.731	7.731	0	3.6	0	0	0	0	0	0
2003	272	23	2789	340.496	-426.449	D	7.735	7.731	0.004	3.6	73.52	26.44	0	0	0	0.05
2003	273	23	2468	334.002	-434.887	D	7.741	7.731	0.01	3.6	96.21	3.77	0	0	0	0.02
2003	274	23	2781	339.842	-425.379	D	7.616	7.598	0.018	3.313	79.28	20.73	0	0	0	0.01
2003	275	23	2656	324.557	-432.909	D	7.598	7.593	0.005	3.3	82.87	17.09	0	0	0	0.04
2003	276	23	2628	320.933	-436.998	D	7.595	7.593	0.002	3.3	95.1	4.88	0	0	0	0.02
2003	277	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	278	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	96.72	3.26	0	0	0	0.01
2003	279	23	2789	340.496	-426.449	D	7.614	7.593	0.022	3.3	95.08	4.91	0	0	0	0.01
2003	280	23	2628	320.933	-436.998	D	7.614	7.593	0.021	3.3	98.06	1.94	0	0	0	0.01
2003	281	23	1414	329.196	-425.335	D	7.593	7.593	0	3.3	99.83	0.25	0	0	0	0.01
2003	282	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	283	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	285	23	2789	340.496	-426.449	D	7.6	7.593	0.007	3.3	97.5	2.48	0	0	0	0.02
2003	286	23	2789	340.496	-426.449	D	7.613	7.593	0.02	3.3	97.49	2.5	0	0	0	0.01
2003	287	23	2781	339.842	-425.379	D	7.594	7.593	0.001	3.3	91.02	8.99	0	0	0	0
2003	288	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	289	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	290	23	2628	320.933	-436.998	D	7.597	7.593	0.005	3.3	87.83	12.16	0	0	0	0.01
2003	291	23	2684	326.713	-427.014	D	7.609	7.593	0.017	3.3	95.72	4.27	0	0	0	0.02
2003	292	23	2781	339.842	-425.379	D	7.596	7.593	0.003	3.3	99.14	0.85	0	0	0	0.01
2003	293	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	294	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	295	23	2694	327.861	-425.964	D	7.606	7.593	0.013	3.3	99.43	0.55	0	0	0	0.03
2003	296	23	2588	318.452	-445.8	D	7.626	7.593	0.033	3.3	98.59	1.38	0	0	0	0.02

Appendix M
Upper Buffalo
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	297	23	2789	340.496	-426.449	D	7.594	7.593	0.002	3.3	97.15	2.81	0	0	0	0.02
2003	298	23	2749	333.775	-424.726	D	7.699	7.593	0.107	3.3	75.74	24.25	0	0	0	0.01
2003	299	23	2571	322.646	-445.476	D	7.617	7.593	0.025	3.3	75.22	24.77	0	0	0	0
2003	300	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	301	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	304	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	305	23	2781	339.842	-425.379	D	7.56	7.548	0.012	3.204	77.19	22.79	0	0	0	0.03
2003	306	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	308	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	309	23	2781	339.842	-425.379	D	7.554	7.546	0.008	3.2	89.36	10.64	0	0	0	0.02
2003	310	23	2781	339.842	-425.379	D	7.612	7.546	0.066	3.2	74.82	25.18	0	0	0	0.01
2003	311	23	2468	334.002	-434.887	D	7.601	7.546	0.055	3.2	75.57	24.42	0	0	0	0.01
2003	312	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	317	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	318	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	319	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	320	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	322	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	323	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	324	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	327	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	328	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	331	23	2789	340.496	-426.449	D	7.549	7.546	0.002	3.2	80.95	19.04	0	0	0	0.01
2003	332	23	2789	340.496	-426.449	D	7.547	7.546	0.001	3.2	82.45	17.54	0	0	0	0
2003	333	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	335	23	2684	326.713	-427.014	D	7.616	7.591	0.025	3.296	45.95	53.99	0	0	0	0.07

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	336	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	337	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	338	23	2781	339.842	-425.379	D	7.626	7.593	0.034	3.3	81.52	18.47	0	0	0	0.01
2003	339	23	2468	334.002	-434.887	D	7.594	7.593	0.001	3.3	85.71	14.22	0	0	0	0.01
2003	340	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	341	23	2789	340.496	-426.449	D	7.597	7.593	0.004	3.3	67.88	32.14	0	0	0	0.01
2003	342	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	344	23	2758	335.862	-424.454	D	7.609	7.593	0.016	3.3	81.72	18.28	0	0	0	0.01
2003	345	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	346	23	2789	340.496	-426.449	D	7.6	7.593	0.008	3.3	74.63	25.38	0	0	0	0.01
2003	347	23	2589	318.383	-445.593	D	7.597	7.593	0.004	3.3	75.01	24.96	0	0	0	0.01
2003	348	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	349	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	350	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	354	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	355	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	356	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	357	23	2789	340.496	-426.449	D	7.594	7.593	0.001	3.3	32.37	67.65	0	0	0	0.05
2003	358	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	359	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	360	23	2789	340.496	-426.449	D	7.593	7.593	0	3.3	79.4	21.5	0	0	0	0.01
2003	361	23	2385	338.165	-425.691	D	7.593	7.593	0	3.3	12.68	2.4	0	0	0	0
2003	362	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	7.593	7.593	0	3.3	0	0	0	0	0	0
									0.184							
HOLCIM									**DELTA**		**% of Modeled Extinction by Species**					
YEAR	**DAY**	**HR**	**RECEPTOR**	**COORDINATES**	**(km)**	**TYPE**	**DV(Total)**	**DV(BKG)**	**DV**	**F(RH)**	**%_SO4**	**%_NO3**	**%_OC**	**%_EC**	**%_PMC**	**%_PMF**
2003	1	23	1	318.65	-445.782	D	6.999	6.999	0	2.056	0	0	0	0	0	0
2003	2	23	2709	330.21	-424.978	D	9.571	9.354	0.217	7.456	18.5	81.37	0	0	0	0.13
2003	3	23	1	318.65	-445.782	D	7.872	7.872	0	3.912	0	0	0	0	0	0
2003	4	23	1	318.65	-445.782	D	6.784	6.784	0	1.624	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	5	23	1	318.65	-445.782	D	7.26	7.26	0	2.595	0	0	0	0	0	0
2003	6	23	1	318.65	-445.782	D	8.242	8.242	0	4.748	0	0	0	0	0	0
2003	7	23	1	318.65	-445.782	D	7.239	7.239	0	2.55	0	0	0	0	0	0
2003	8	23	1	318.65	-445.782	D	6.71	6.71	0	1.477	0	0	0	0	0	0
2003	9	23	1	318.65	-445.782	D	6.922	6.922	0	1.9	0	0	0	0	0	0
2003	10	23	1	318.65	-445.782	D	6.587	6.587	0	1.234	0	0	0	0	0	0
2003	11	23	1	318.65	-445.782	D	6.549	6.549	0	1.161	0	0	0	0	0	0
2003	12	23	1	318.65	-445.782	D	6.5	6.5	0	1.066	0	0	0	0	0	0
2003	13	23	1	318.65	-445.782	D	6.708	6.708	0	1.473	0	0	0	0	0	0
2003	14	23	1	318.65	-445.782	D	9.224	9.224	0	7.124	0	0	0	0	0	0
2003	15	23	1	318.65	-445.782	D	6.625	6.625	0	1.309	0	0	0	0	0	0
2003	16	23	2767	337.165	-425.117	D	8.639	8.274	0.364	4.822	50.08	49.79	0	0	0	0.13
2003	17	23	2468	334.002	-434.887	D	8.105	8.101	0.005	4.425	57.77	42.19	0	0	0	0.06
2003	18	23	1	318.65	-445.782	D	6.57	6.57	0	1.203	0	0	0	0	0	0
2003	19	23	1	318.65	-445.782	D	6.651	6.651	0	1.361	0	0	0	0	0	0
2003	20	23	1	318.65	-445.782	D	6.624	6.624	0	1.308	0	0	0	0	0	0
2003	21	23	2784	339.87	-426.019	D	7.664	7.533	0.131	3.171	47.63	52.28	0	0	0	0.08
2003	22	23	2706	329.518	-425.046	D	7.802	7.571	0.23	3.254	24.85	74.63	0	0	0	0.52
2003	23	23	1	318.65	-445.782	D	6.876	6.876	0	1.806	0	0	0	0	0	0
2003	24	23	1	318.65	-445.782	D	6.593	6.593	0	1.246	0	0	0	0	0	0
2003	25	23	1	318.65	-445.782	D	6.497	6.497	0	1.06	0	0	0	0	0	0
2003	26	23	1	318.65	-445.782	D	7.121	7.121	0	2.305	0	0	0	0	0	0
2003	27	23	1	318.65	-445.782	D	6.778	6.778	0	1.612	0	0	0	0	0	0
2003	28	23	1	318.65	-445.782	D	8.235	8.235	0	4.732	0	0	0	0	0	0
2003	29	23	2789	340.496	-426.449	D	9.799	9.793	0.006	8.612	59.68	40.19	0	0	0	0.12
2003	30	23	2704	329.056	-425.092	D	9.818	9.151	**0.667**	6.94	64.68	35.27	0	0	0	0.05
2003	31	23	1415	329.185	-425.086	D	7.067	7.067	0	2.196	80.31	19.45	0	0	0	0.3
2003	32	23	1	318.65	-445.782	D	6.936	6.936	0	1.929	0	0	0	0	0	0
2003	33	23	1	318.65	-445.782	D	6.87	6.87	0	1.795	0	0	0	0	0	0
2003	34	23	1	318.65	-445.782	D	9.527	9.527	0	7.906	0	0	0	0	0	0
2003	35	23	1	318.65	-445.782	D	7.1	7.1	0	2.263	0	0	0	0	0	0
2003	36	23	1	318.65	-445.782	D	6.56	6.56	0	1.182	0	0	0	0	0	0
2003	37	23	2781	339.842	-425.379	D	9.214	9.182	0.032	7.018	56.51	43.44	0	0	0	0.04
2003	38	23	2789	340.496	-426.449	D	8.107	8.011	0.097	4.221	59.31	40.66	0	0	0	0.03
2003	39	23	1	318.65	-445.782	D	6.79	6.79	0	1.635	0	0	0	0	0	0
2003	40	23	1	318.65	-445.782	D	7.657	7.657	0	3.439	0	0	0	0	0	0
2003	41	23	1	318.65	-445.782	D	9.339	9.339	0	7.418	0	0	0	0	0	0
2003	42	23	1	318.65	-445.782	D	6.733	6.733	0	1.522	0	0	0	0	0	0
2003	43	23	1	318.65	-445.782	D	6.521	6.521	0	1.107	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	44	23	1	318.65	-445.782	D	6.659	6.659	0	1.376	0	0	0	0	0	0
2003	45	23	1	318.65	-445.782	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2003	46	23	1	318.65	-445.782	D	10.176	10.176	0	9.662	0	0	0	0	0	0
2003	47	23	2781	339.842	-425.379	D	8.891	8.654	0.237	5.716	35.27	64.51	0	0	0	0.22
2003	48	23	2789	340.496	-426.449	D	8.999	8.273	**0.725**	4.82	61.02	38.89	0	0	0	0.08
2003	49	23	1	318.65	-445.782	D	6.86	6.86	0	1.776	0	0	0	0	0	0
2003	50	23	2379	338.23	-427.187	D	9.195	9.195	0	7.051	68.38	25.37	0	0	0	0.05
2003	51	23	2704	329.056	-425.092	D	10.656	9.524	**1.132**	7.899	66.09	33.87	0	0	0	0.04
2003	52	23	2789	340.496	-426.449	D	9.764	9.679	0.085	8.307	75.6	24.37	0	0	0	0.02
2003	53	23	2789	340.496	-426.449	D	9.637	9.493	0.144	7.818	66.3	33.62	0	0	0	0.08
2003	54	23	1	318.65	-445.782	D	8.727	8.727	0	5.892	0	0	0	0	0	0
2003	55	23	2781	339.842	-425.379	D	8.612	8.461	0.151	5.257	58.44	41.51	0	0	0	0.05
2003	56	23	2789	340.496	-426.449	D	7.461	7.411	0.05	2.913	37.07	62.62	0	0	0	0.32
2003	57	23	2789	340.496	-426.449	D	9.07	8.558	**0.512**	5.487	46.7	53.23	0	0	0	0.07
2003	58	23	2693	327.829	-426.17	D	8.984	8.768	0.216	5.991	57.8	42.15	0	0	0	0.05
2003	59	23	2694	327.861	-425.964	D	9.069	8.967	0.102	6.48	65.6	34.35	0	0	0	0.04
2003	60	23	2706	329.518	-425.046	D	9.673	9.651	0.022	8.233	70.48	29.49	0	0	0	0.03
2003	61	23	2781	339.842	-425.379	D	9.152	9.119	0.032	6.86	72.6	27.37	0	0	0	0.03
2003	62	23	2789	340.496	-426.449	D	7.374	7.373	0	2.832	77.18	21.49	0	0	0	0.14
2003	63	23	1	318.65	-445.782	D	7.002	7.002	0	2.063	0	0	0	0	0	0
2003	64	23	1	318.65	-445.782	D	9.117	9.117	0	6.855	0	0	0	0	0	0
2003	65	23	2789	340.496	-426.449	D	7.573	7.573	0	3.258	69.74	29.91	0	0	0	0.62
2003	66	23	2789	340.496	-426.449	D	6.951	6.945	0.006	1.946	65.93	33.8	0	0	0	0.25
2003	67	23	2781	339.842	-425.379	D	7.068	7.068	0	2.196	91.03	8.94	0	0	0	0.28
2003	68	23	1	318.65	-445.782	D	7.068	7.068	0	2.198	0	0	0	0	0	0
2003	69	23	2789	340.496	-426.449	D	6.561	6.547	0.014	1.158	50.61	48.48	0	0	0	0.9
2003	70	23	2789	340.496	-426.449	D	6.602	6.546	0.057	1.155	61.6	37.83	0	0	0	0.57
2003	71	23	2789	340.496	-426.449	D	7.117	7.113	0.004	2.289	85.53	14.04	0	0	0	0.44
2003	72	23	1	318.65	-445.782	D	8.466	8.466	0	5.269	0	0	0	0	0	0
2003	73	23	2694	327.861	-425.964	D	9.202	8.674	**0.528**	5.764	68.51	31.43	0	0	0	0.06
2003	74	23	2684	326.713	-427.014	D	8.199	8.138	0.061	4.509	84.47	15.45	0	0	0	0.08
2003	75	23	2707	329.748	-425.023	D	7.29	7.289	0	2.656	97.12	1.26	0	0	0	0.22
2003	76	23	1	318.65	-445.782	D	8.644	8.644	0	5.692	0	0	0	0	0	0
2003	77	23	1	318.65	-445.782	D	8.653	8.653	0	5.713	0	0	0	0	0	0
2003	78	23	1	318.65	-445.782	D	8.871	8.871	0	6.244	0	0	0	0	0	0
2003	79	23	2758	335.862	-424.454	D	9.22	9.213	0.007	7.097	59.58	40.36	0	0	0	0.05
2003	80	23	2781	339.842	-425.379	D	8.959	8.832	0.127	6.147	62.1	37.86	0	0	0	0.04
2003	81	23	1	318.65	-445.782	D	6.545	6.545	0	1.154	0	0	0	0	0	0
2003	82	23	1	318.65	-445.782	D	6.586	6.586	0	1.234	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	83	23	1	318.65	-445.782	D	6.82	6.82	0	1.696	0	0	0	0	0	0
2003	84	23	1	318.65	-445.782	D	7.607	7.607	0	3.331	0	0	0	0	0	0
2003	85	23	2468	334.002	-434.887	D	9.065	8.823	0.242	6.126	44.86	54.95	0	0	0	0.19
2003	86	23	2628	320.933	-436.998	D	6.629	6.616	0.012	1.292	86.41	12.79	0	0	0	0.8
2003	87	23	1	318.65	-445.782	D	8.676	8.676	0	5.769	0	0	0	0	0	0
2003	88	23	1	318.65	-445.782	D	7.301	7.301	0	2.679	0	0	0	0	0	0
2003	89	23	1	318.65	-445.782	D	6.525	6.525	0	1.115	0	0	0	0	0	0
2003	90	23	1	318.65	-445.782	D	6.478	6.478	0	1.023	0	0	0	0	0	0
2003	91	23	1	318.65	-445.782	D	6.547	6.547	0	1.157	0	0	0	0	0	0
2003	92	23	1	318.65	-445.782	D	6.893	6.893	0	1.842	0	0	0	0	0	0
2003	93	23	1	318.65	-445.782	D	7.231	7.231	0	2.533	0	0	0	0	0	0
2003	94	23	1	318.65	-445.782	D	8.075	8.075	0	4.366	0	0	0	0	0	0
2003	95	23	1	318.65	-445.782	D	6.747	6.747	0	1.55	0	0	0	0	0	0
2003	96	23	2781	339.842	-425.379	D	8.08	8.057	0.024	4.325	65.9	34.06	0	0	0	0.05
2003	97	23	1	318.65	-445.782	D	9.082	9.082	0	6.766	0	0	0	0	0	0
2003	98	23	2789	340.496	-426.449	D	7.434	7.431	0.002	2.955	66.3	33.47	0	0	0	0.16
2003	99	23	1	318.65	-445.782	D	6.95	6.95	0	1.956	0	0	0	0	0	0
2003	100	23	2789	340.496	-426.449	D	6.594	6.591	0.002	1.244	41.12	57.69	0	0	0	1.15
2003	101	23	2789	340.496	-426.449	D	6.49	6.479	0.011	1.025	89.65	9.47	0	0	0	0.89
2003	102	23	2789	340.496	-426.449	D	6.499	6.495	0.003	1.057	97.34	2.11	0	0	0	0.55
2003	103	23	1	318.65	-445.782	D	6.523	6.523	0	1.11	0	0	0	0	0	0
2003	104	23	1	318.65	-445.782	D	6.676	6.676	0	1.411	0	0	0	0	0	0
2003	105	23	1	318.65	-445.782	D	6.637	6.637	0	1.334	0	0	0	0	0	0
2003	106	23	1	318.65	-445.782	D	6.669	6.669	0	1.396	0	0	0	0	0	0
2003	107	23	1	318.65	-445.782	D	7.437	7.437	0	2.967	0	0	0	0	0	0
2003	108	23	1	318.65	-445.782	D	7.49	7.49	0	3.08	0	0	0	0	0	0
2003	109	23	1	318.65	-445.782	D	7.406	7.406	0	2.902	0	0	0	0	0	0
2003	110	23	1	318.65	-445.782	D	9.045	9.045	0	6.674	0	0	0	0	0	0
2003	111	23	1	318.65	-445.782	D	7.014	7.014	0	2.087	0	0	0	0	0	0
2003	112	23	1	318.65	-445.782	D	6.538	6.538	0	1.139	0	0	0	0	0	0
2003	113	23	2789	340.496	-426.449	D	6.605	6.588	0.017	1.237	96.6	2.82	0	0	0	0.57
2003	114	23	2704	329.056	-425.092	D	8.026	8.025	0.001	4.255	89.75	10.02	0	0	0	0.25
2003	115	23	2758	335.862	-424.454	D	8.483	8.425	0.059	5.173	88.34	11.47	0	0	0	0.19
2003	116	23	2789	340.496	-426.449	D	8.711	8.355	0.356	5.009	64.86	34.97	0	0	0	0.17
2003	117	23	2600	318.952	-443.12	D	7.086	7.057	0.028	2.175	89.69	10.09	0	0	0	0.21
2003	118	23	2275	336.168	-425.529	D	7.47	7.47	0	3.038	95.63	0.65	0	0	0	0.23
2003	119	23	2780	339.614	-425.419	D	7.485	7.484	0.001	3.068	93.61	6.28	0	0	0	0.09
2003	120	23	1517	329.93	-425.053	D	8.151	8.151	0	4.54	97.23	1.58	0	0	0	0.08
2003	121	23	1	318.65	-445.782	D	7.624	7.624	0	3.367	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	122	23	1	318.65	-445.782	D	8.826	8.826	0	6.133	0	0	0	0	0	0
2003	123	23	2789	340.496	-426.449	D	8.707	8.507	0.2	5.366	87.19	12.67	0	0	0	0.13
2003	124	23	2255	335.942	-426.039	D	7.5	7.318	0.182	2.716	98.19	1.69	0	0	0	0.12
2003	125	23	1	318.65	-445.782	D	8.789	8.789	0	6.042	0	0	0	0	0	0
2003	126	23	1	318.65	-445.782	D	8.385	8.385	0	5.081	0	0	0	0	0	0
2003	127	23	2781	339.842	-425.379	D	8.588	8.583	0.004	5.548	77.89	22.01	0	0	0	0.11
2003	128	23	1	318.65	-445.782	D	8.057	8.057	0	4.326	0	0	0	0	0	0
2003	129	23	1	318.65	-445.782	D	7.642	7.642	0	3.407	0	0	0	0	0	0
2003	130	23	1	318.65	-445.782	D	8.486	8.486	0	5.317	0	0	0	0	0	0
2003	131	23	1	318.65	-445.782	D	7.409	7.409	0	2.907	0	0	0	0	0	0
2003	132	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	133	23	1	318.65	-445.782	D	6.899	6.899	0	1.854	0	0	0	0	0	0
2003	134	23	1	318.65	-445.782	D	9.399	9.399	0	7.572	0	0	0	0	0	0
2003	135	23	1	318.65	-445.782	D	8.763	8.763	0	5.98	0	0	0	0	0	0
2003	136	23	1	318.65	-445.782	D	9.31	9.31	0	7.344	0	0	0	0	0	0
2003	137	23	2779	339.386	-425.461	D	9.372	9.371	0.001	7.5	97.8	1.84	0	0	0	0.11
2003	138	23	2684	326.713	-427.014	D	9.191	9.093	0.098	6.795	71.17	28.77	0	0	0	0.06
2003	139	23	2628	320.933	-436.998	D	8.783	8.783	0	6.027	99.37	0.56	0	0	0	0.16
2003	140	23	2708	329.979	-425	D	8.352	8.292	0.06	4.863	89.33	10.63	0	0	0	0.04
2003	141	23	2552	324.659	-442.591	D	6.811	6.723	0.088	1.502	87.27	12.08	0	0	0	0.65
2003	142	23	2596	318.977	-444.095	D	7.507	7.283	0.224	2.641	89.56	10.2	0	0	0	0.24
2003	143	23	2781	339.842	-425.379	D	6.911	6.676	0.235	1.409	95.17	4.35	0	0	0	0.48
2003	144	23	2789	340.496	-426.449	D	8.102	7.793	0.309	3.737	96.9	2.96	0	0	0	0.14
2003	145	23	2781	339.842	-425.379	D	9.635	9.204	0.431	7.074	88.86	11.07	0	0	0	0.08
2003	146	23	2447	336.137	-430.956	D	9.112	8.253	**0.859**	4.773	90.44	9.51	0	0	0	0.05
2003	147	23	2789	340.496	-426.449	D	6.822	6.656	0.167	1.369	90.46	9.11	0	0	0	0.43
2003	148	23	1	318.65	-445.782	D	6.596	6.596	0	1.253	0	0	0	0	0	0
2003	149	23	1	318.65	-445.782	D	7.175	7.175	0	2.418	0	0	0	0	0	0
2003	150	23	1	318.65	-445.782	D	6.614	6.614	0	1.289	0	0	0	0	0	0
2003	151	23	1	318.65	-445.782	D	7.098	7.098	0	2.258	0	0	0	0	0	0
2003	152	23	2789	340.496	-426.449	D	7.229	7.169	0.061	2.404	85.95	13.79	0	0	0	0.27
2003	153	23	2704	329.056	-425.092	D	8.713	8.693	0.02	5.81	97.45	2.41	0	0	0	0.14
2003	154	23	2781	339.842	-425.379	D	9.312	9.118	0.194	6.857	93.84	5.88	0	0	0	0.27
2003	155	23	2789	340.496	-426.449	D	7.687	7.66	0.027	3.446	96.56	3.17	0	0	0	0.26
2003	156	23	1	318.65	-445.782	D	6.821	6.821	0	1.697	0	0	0	0	0	0
2003	157	23	2789	340.496	-426.449	D	8.693	8.688	0.005	5.798	97.15	2.77	0	0	0	0.06
2003	158	23	2789	340.496	-426.449	D	7.561	7.56	0	3.23	87.55	12.01	0	0	0	0.1
2003	159	23	1	318.65	-445.782	D	7.001	7.001	0	2.06	0	0	0	0	0	0
2003	160	23	1	318.65	-445.782	D	6.621	6.621	0	1.301	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	161	23	1	318.65	-445.782	D	7.499	7.499	0	3.098	0	0	0	0	0	0
2003	162	23	1	318.65	-445.782	D	8.817	8.817	0	6.112	0	0	0	0	0	0
2003	163	23	1	318.65	-445.782	D	8.874	8.874	0	6.251	0	0	0	0	0	0
2003	164	23	2757	335.63	-424.484	D	9.213	9.212	0	7.095	98.91	0.5	0	0	0	0.23
2003	165	23	2709	330.21	-424.978	D	9.278	8.299	**0.98**	4.879	87.96	11.99	0	0	0	0.05
2003	166	23	2781	339.842	-425.379	D	9.405	8.119	**1.286**	4.467	83.16	16.76	0	0	0	0.08
2003	167	23	2597	318.971	-443.851	D	8.138	8.097	0.041	4.417	97.46	2.39	0	0	0	0.15
2003	168	23	12	319.07	-444.015	D	7.657	7.645	0.012	3.413	93.98	5.9	0	0	0	0.11
2003	169	23	2695	328.074	-426.025	D	8.941	8.936	0.005	6.402	97.65	2.28	0	0	0	0.05
2003	170	23	2781	339.842	-425.379	D	8.86	8.536	0.324	5.436	96.72	3.16	0	0	0	0.11
2003	171	23	2758	335.862	-424.454	D	9.632	8.408	**1.224**	5.133	89.74	10.2	0	0	0	0.05
2003	172	23	2588	318.452	-445.8	D	6.973	6.969	0.004	1.995	99.24	0.56	0	0	0	0.2
2003	173	23	1	318.65	-445.782	D	6.92	6.92	0	1.897	0	0	0	0	0	0
2003	174	23	1	318.65	-445.782	D	7.108	7.108	0	2.279	0	0	0	0	0	0
2003	175	23	1	318.65	-445.782	D	7.784	7.784	0	3.718	0	0	0	0	0	0
2003	176	23	1	318.65	-445.782	D	8.399	8.399	0	5.113	0	0	0	0	0	0
2003	177	23	1	318.65	-445.782	D	8.699	8.699	0	5.825	0	0	0	0	0	0
2003	178	23	1	318.65	-445.782	D	6.832	6.832	0	1.719	0	0	0	0	0	0
2003	179	23	2789	340.496	-426.449	D	6.658	6.647	0.011	1.352	98.37	1.12	0	0	0	0.49
2003	180	23	2781	339.842	-425.379	D	6.731	6.717	0.015	1.49	98.66	1.01	0	0	0	0.31
2003	181	23	2781	339.842	-425.379	D	7.104	7.102	0.002	2.267	98.03	1.75	0	0	0	0.18
2003	182	23	2708	329.979	-425	D	8.863	8.86	0.003	6.216	97.07	2.76	0	0	0	0.05
2003	183	23	2781	339.842	-425.379	D	7.561	7.56	0.001	3.23	97.5	2.4	0	0	0	0.08
2003	184	23	2411	339.428	-426.135	D	7.376	7.375	0	2.836	97.52	0.18	0	0	0	0.11
2003	185	23	1	318.65	-445.782	D	6.948	6.948	0	1.953	0	0	0	0	0	0
2003	186	23	1	318.65	-445.782	D	7.233	7.233	0	2.538	0	0	0	0	0	0
2003	187	23	1	318.65	-445.782	D	8.318	8.318	0	4.923	0	0	0	0	0	0
2003	188	23	1	318.65	-445.782	D	7.459	7.459	0	3.013	0	0	0	0	0	0
2003	189	23	1	318.65	-445.782	D	7.086	7.086	0	2.234	0	0	0	0	0	0
2003	190	23	1	318.65	-445.782	D	7.739	7.739	0	3.619	0	0	0	0	0	0
2003	191	23	1	318.65	-445.782	D	8.593	8.593	0	5.571	0	0	0	0	0	0
2003	192	23	1	318.65	-445.782	D	7.285	7.285	0	2.647	0	0	0	0	0	0
2003	193	23	1	318.65	-445.782	D	7.83	7.83	0	3.819	0	0	0	0	0	0
2003	194	23	1	318.65	-445.782	D	7.262	7.262	0	2.597	0	0	0	0	0	0
2003	195	23	2781	339.842	-425.379	D	8.452	8.448	0.005	5.227	96.15	3.77	0	0	0	0.05
2003	196	23	1	318.65	-445.782	D	7.902	7.902	0	3.979	0	0	0	0	0	0
2003	197	23	1	318.65	-445.782	D	6.957	6.957	0	1.972	0	0	0	0	0	0
2003	198	23	1	318.65	-445.782	D	7.183	7.183	0	2.433	0	0	0	0	0	0
2003	199	23	2789	340.496	-426.449	D	7.121	7.116	0.005	2.295	99.63	0.12	0	0	0	0.24

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	200	23	2789	340.496	-426.449	D	7.721	7.719	0.002	3.574	99.69	0.19	0	0	0	0.16
2003	201	23	1	318.65	-445.782	D	8.338	8.338	0	4.97	0	0	0	0	0	0
2003	202	23	1	318.65	-445.782	D	8.079	8.079	0	4.375	0	0	0	0	0	0
2003	203	23	1	318.65	-445.782	D	7.552	7.552	0	3.213	0	0	0	0	0	0
2003	204	23	2789	340.496	-426.449	D	7.041	7.04	0.001	2.139	98.02	0.87	0	0	0	1.01
2003	205	23	2789	340.496	-426.449	D	7.183	6.943	0.24	1.942	96.35	3.33	0	0	0	0.32
2003	206	23	2758	335.862	-424.454	D	7.237	7.088	0.148	2.239	97.65	2.16	0	0	0	0.19
2003	207	23	2755	335.167	-424.545	D	6.837	6.836	0	1.728	99.31	0.12	0	0	0	0.28
2003	208	23	1	318.65	-445.782	D	7.085	7.085	0	2.232	0	0	0	0	0	0
2003	209	23	1	318.65	-445.782	D	7.085	7.085	0	2.233	0	0	0	0	0	0
2003	210	23	2781	339.842	-425.379	D	8.465	8.415	0.05	5.151	99.43	0.51	0	0	0	0.06
2003	211	23	2781	339.842	-425.379	D	9.667	9.347	0.319	7.44	94.15	5.8	0	0	0	0.04
2003	212	23	2789	340.496	-426.449	D	7.849	7.607	0.242	3.331	96.31	3.61	0	0	0	0.08
2003	213	23	2468	334.002	-434.887	D	6.918	6.894	0.024	1.843	99.43	0.45	0	0	0	0.13
2003	214	23	2250	335.996	-427.285	D	7.678	7.672	0.007	3.471	99.54	0.38	0	0	0	0.07
2003	215	23	1	318.65	-445.782	D	7.59	7.59	0	3.294	0	0	0	0	0	0
2003	216	23	1	318.65	-445.782	D	7.802	7.802	0	3.758	0	0	0	0	0	0
2003	217	23	1	318.65	-445.782	D	8.259	8.259	0	4.787	0	0	0	0	0	0
2003	218	23	2784	339.87	-426.019	D	8.643	8.603	0.04	5.595	99.3	0.51	0	0	0	0.18
2003	219	23	2563	323.259	-443.79	D	10.211	8.443	**1.768**	5.214	90	9.92	0	0	0	0.07
2003	220	23	2588	318.452	-445.8	D	7.238	7.094	0.144	2.25	98.4	1.37	0	0	0	0.23
2003	221	23	2255	335.942	-426.039	D	7.347	6.982	0.365	2.022	97.63	2.06	0	0	0	0.3
2003	222	23	2789	340.496	-426.449	D	7.305	7.144	0.161	2.352	98.3	1.38	0	0	0	0.32
2003	223	23	2571	322.646	-445.476	D	7.821	7.272	**0.548**	2.62	98.36	1.46	0	0	0	0.18
2003	224	23	2684	326.713	-427.014	D	7.304	7.109	0.195	2.28	95.3	4.5	0	0	0	0.19
2003	225	23	1	318.65	-445.782	D	8.321	8.321	0	4.931	0	0	0	0	0	0
2003	226	23	1	318.65	-445.782	D	8.753	8.753	0	5.955	0	0	0	0	0	0
2003	227	23	1	318.65	-445.782	D	7.337	7.337	0	2.755	0	0	0	0	0	0
2003	228	23	1	318.65	-445.782	D	7.347	7.347	0	2.776	0	0	0	0	0	0
2003	229	23	1	318.65	-445.782	D	6.982	6.982	0	2.021	0	0	0	0	0	0
2003	230	23	2789	340.496	-426.449	D	6.903	6.901	0.001	1.859	99.39	0.26	0	0	0	0.32
2003	231	23	2789	340.496	-426.449	D	6.899	6.826	0.073	1.706	98.82	0.91	0	0	0	0.27
2003	232	23	2789	340.496	-426.449	D	6.969	6.86	0.109	1.775	98.38	1.45	0	0	0	0.17
2003	233	23	2789	340.496	-426.449	D	6.977	6.921	0.056	1.898	98.51	1.34	0	0	0	0.15
2003	234	23	2789	340.496	-426.449	D	7.148	7.113	0.036	2.289	99.24	0.64	0	0	0	0.12
2003	235	23	2789	340.496	-426.449	D	7.094	7.028	0.066	2.114	99.3	0.29	0	0	0	0.41
2003	236	23	2695	328.074	-426.025	D	9.09	8.535	**0.554**	5.433	93.44	6.48	0	0	0	0.08
2003	237	23	1548	330.222	-426.04	D	7.958	7.872	0.085	3.912	98.56	1.34	0	0	0	0.1
2003	238	23	2784	339.87	-426.019	D	7.384	7.375	0.009	2.835	99.73	0.15	0	0	0	0.11

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	239	23	2417	339.654	-425.626	D	7.03	7.03	0	2.119	99.17	0.2	0	0	0	0.13
2003	240	23	1	318.65	-445.782	D	7.105	7.105	0	2.273	0	0	0	0	0	0
2003	241	23	1	318.65	-445.782	D	8.394	8.394	0	5.101	0	0	0	0	0	0
2003	242	23	1	318.65	-445.782	D	8.773	8.773	0	6.004	0	0	0	0	0	0
2003	243	23	1	318.65	-445.782	D	9.309	9.309	0	7.34	0	0	0	0	0	0
2003	244	23	1	318.65	-445.782	D	9.456	9.456	0	7.721	0	0	0	0	0	0
2003	245	23	2704	329.056	-425.092	D	9.825	9.746	0.079	8.487	97.42	2.53	0	0	0	0.05
2003	246	23	2589	318.383	-445.593	D	10.409	9.235	**1.175**	7.152	80.34	19.59	0	0	0	0.07
2003	247	23	2563	323.259	-443.79	D	7.854	7.678	0.176	3.485	97.48	2.29	0	0	0	0.22
2003	248	23	2790	340.421	-426.562	D	6.773	6.749	0.024	1.553	93.56	5.29	0	0	0	1.14
2003	249	23	2684	326.713	-427.014	D	6.897	6.875	0.022	1.805	95.98	3.44	0	0	0	0.58
2003	250	23	2684	326.713	-427.014	D	6.966	6.965	0	1.988	99.19	0.31	0	0	0	0.59
2003	251	23	1	318.65	-445.782	D	7.063	7.063	0	2.187	0	0	0	0	0	0
2003	252	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	253	23	1	318.65	-445.782	D	7.368	7.368	0	2.821	0	0	0	0	0	0
2003	254	23	1	318.65	-445.782	D	8.253	8.253	0	4.773	0	0	0	0	0	0
2003	255	23	1	318.65	-445.782	D	9.962	9.962	0	9.071	0	0	0	0	0	0
2003	256	23	1	318.65	-445.782	D	9.428	9.428	0	7.649	0	0	0	0	0	0
2003	257	23	1	318.65	-445.782	D	8.74	8.74	0	5.924	0	0	0	0	0	0
2003	258	23	1	318.65	-445.782	D	6.717	6.717	0	1.49	0	0	0	0	0	0
2003	259	23	1	318.65	-445.782	D	6.641	6.641	0	1.341	0	0	0	0	0	0
2003	260	23	2789	340.496	-426.449	D	6.756	6.75	0.006	1.556	97.74	1.82	0	0	0	0.4
2003	261	23	2781	339.842	-425.379	D	6.776	6.772	0.004	1.6	97.73	2	0	0	0	0.23
2003	262	23	2040	333.912	-425.128	D	7.893	7.893	0	3.957	89.6	0.34	0	0	0	0.2
2003	263	23	1	318.65	-445.782	D	6.579	6.579	0	1.219	0	0	0	0	0	0
2003	264	23	2789	340.496	-426.449	D	7.091	7.049	0.042	2.158	97.34	2.34	0	0	0	0.32
2003	265	23	2784	339.87	-426.019	D	9.108	9.106	0.001	6.827	96.02	3.7	0	0	0	0.05
2003	266	23	1	318.65	-445.782	D	6.857	6.857	0	1.769	0	0	0	0	0	0
2003	267	23	1	318.65	-445.782	D	6.83	6.83	0	1.715	0	0	0	0	0	0
2003	268	23	2789	340.496	-426.449	D	6.843	6.838	0.005	1.732	97.48	1.09	0	0	0	1.45
2003	269	23	2789	340.496	-426.449	D	7.075	7.039	0.036	2.138	94.67	4.81	0	0	0	0.52
2003	270	23	1	318.65	-445.782	D	7.334	7.334	0	2.749	0	0	0	0	0	0
2003	271	23	1	318.65	-445.782	D	6.654	6.654	0	1.366	0	0	0	0	0	0
2003	272	23	1	318.65	-445.782	D	6.53	6.53	0	1.124	0	0	0	0	0	0
2003	273	23	1	318.65	-445.782	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2003	274	23	1	318.65	-445.782	D	8.096	8.096	0	4.415	0	0	0	0	0	0
2003	275	23	2434	337.437	-428.764	D	6.629	6.574	0.056	1.209	37.98	60.89	0	0	0	1.13
2003	276	23	2589	318.383	-445.593	D	7.102	7.095	0.008	2.251	88.81	10.39	0	0	0	0.79
2003	277	23	1	318.65	-445.782	D	6.805	6.805	0	1.666	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	278	23	1	318.65	-445.782	D	7.273	7.273	0	2.622	0	0	0	0	0	0
2003	279	23	2789	340.496	-426.449	D	9.351	9.344	0.007	7.431	98.18	1.65	0	0	0	0.14
2003	280	23	2255	335.942	-426.039	D	7.959	7.849	0.109	3.861	96.44	3.45	0	0	0	0.11
2003	281	23	2694	327.861	-425.964	D	7.645	7.609	0.035	3.336	97.07	2.82	0	0	0	0.11
2003	282	23	2277	336.146	-425.03	D	8.918	8.917	0.001	6.357	98.98	0.94	0	0	0	0.12
2003	283	23	1	318.65	-445.782	D	9.734	9.734	0	8.453	0	0	0	0	0	0
2003	284	23	1	318.65	-445.782	D	9.551	9.551	0	7.97	0	0	0	0	0	0
2003	285	23	1	318.65	-445.782	D	7.633	7.633	0	3.387	0	0	0	0	0	0
2003	286	23	2789	340.496	-426.449	D	6.895	6.894	0.002	1.843	94	5.7	0	0	0	0.34
2003	287	23	2781	339.842	-425.379	D	8.87	8.869	0.001	6.238	80.42	19.52	0	0	0	0.02
2003	288	23	1	318.65	-445.782	D	6.692	6.692	0	1.442	0	0	0	0	0	0
2003	289	23	1	318.65	-445.782	D	6.601	6.601	0	1.262	0	0	0	0	0	0
2003	290	23	2694	327.861	-425.964	D	8.459	8.15	0.309	4.537	50.01	49.89	0	0	0	0.1
2003	291	23	2789	340.496	-426.449	D	6.705	6.617	0.089	1.294	85.27	14.13	0	0	0	0.61
2003	292	23	2468	334.002	-434.887	D	6.61	6.604	0.006	1.268	98.05	1.47	0	0	0	0.5
2003	293	23	1	318.65	-445.782	D	6.677	6.677	0	1.412	0	0	0	0	0	0
2003	294	23	1	318.65	-445.782	D	6.703	6.703	0	1.464	0	0	0	0	0	0
2003	295	23	2611	319.699	-440.64	D	6.731	6.73	0.002	1.516	97.76	1.01	0	0	0	1.23
2003	296	23	2588	318.452	-445.8	D	6.647	6.61	0.037	1.28	95.35	3.79	0	0	0	0.86
2003	297	23	2429	338.563	-428.651	D	6.691	6.691	0	1.44	97.33	0.24	0	0	0	0.6
2003	298	23	1	318.65	-445.782	D	7.839	7.839	0	3.838	0	0	0	0	0	0
2003	299	23	1	318.65	-445.782	D	7.397	7.397	0	2.882	0	0	0	0	0	0
2003	300	23	1	318.65	-445.782	D	6.536	6.536	0	1.135	0	0	0	0	0	0
2003	301	23	1	318.65	-445.782	D	6.598	6.598	0	1.258	0	0	0	0	0	0
2003	302	23	1	318.65	-445.782	D	6.533	6.533	0	1.13	0	0	0	0	0	0
2003	303	23	1	318.65	-445.782	D	7.414	7.414	0	2.919	0	0	0	0	0	0
2003	304	23	1	318.65	-445.782	D	9.409	9.409	0	7.599	0	0	0	0	0	0
2003	305	23	1	318.65	-445.782	D	9.384	9.384	0	7.535	0	0	0	0	0	0
2003	306	23	1	318.65	-445.782	D	8.79	8.79	0	6.045	0	0	0	0	0	0
2003	307	23	1	318.65	-445.782	D	7.877	7.877	0	3.922	0	0	0	0	0	0
2003	308	23	1	318.65	-445.782	D	7.389	7.389	0	2.864	0	0	0	0	0	0
2003	309	23	1	318.65	-445.782	D	7.708	7.708	0	3.55	0	0	0	0	0	0
2003	310	23	2781	339.842	-425.379	D	10.73	8.891	**1.839**	6.292	39.22	60.68	0	0	0	0.1
2003	311	23	2704	329.056	-425.092	D	8.275	7.865	0.41	3.895	38.46	61.3	0	0	0	0.24
2003	312	23	1	318.65	-445.782	D	6.667	6.667	0	1.392	0	0	0	0	0	0
2003	313	23	1	318.65	-445.782	D	6.51	6.51	0	1.085	0	0	0	0	0	0
2003	314	23	1	318.65	-445.782	D	6.616	6.616	0	1.292	0	0	0	0	0	0
2003	315	23	1	318.65	-445.782	D	8.07	8.07	0	4.354	0	0	0	0	0	0
2003	316	23	1	318.65	-445.782	D	9.37	9.37	0	7.497	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	317	23	1	318.65	-445.782	D	6.486	6.486	0	1.04	0	0	0	0	0	0
2003	318	23	1	318.65	-445.782	D	6.751	6.751	0	1.557	0	0	0	0	0	0
2003	319	23	1	318.65	-445.782	D	8.304	8.304	0	4.891	0	0	0	0	0	0
2003	320	23	1	318.65	-445.782	D	9.626	9.626	0	8.168	0	0	0	0	0	0
2003	321	23	1	318.65	-445.782	D	10.088	10.088	0	9.417	0	0	0	0	0	0
2003	322	23	1	318.65	-445.782	D	9.908	9.908	0	8.922	0	0	0	0	0	0
2003	323	23	1	318.65	-445.782	D	7.343	7.343	0	2.768	0	0	0	0	0	0
2003	324	23	1	318.65	-445.782	D	6.656	6.656	0	1.371	0	0	0	0	0	0
2003	325	23	1	318.65	-445.782	D	7.217	7.217	0	2.505	0	0	0	0	0	0
2003	326	23	1	318.65	-445.782	D	9.817	9.817	0	8.677	0	0	0	0	0	0
2003	327	23	2708	329.979	-425	D	9.027	9.009	0.018	6.585	65.32	34.64	0	0	0	0.03
2003	328	23	1	318.65	-445.782	D	7.264	7.264	0	2.603	0	0	0	0	0	0
2003	329	23	1	318.65	-445.782	D	6.515	6.515	0	1.095	0	0	0	0	0	0
2003	330	23	1	318.65	-445.782	D	7.434	7.434	0	2.961	0	0	0	0	0	0
2003	331	23	1	318.65	-445.782	D	9.185	9.185	0	7.026	0	0	0	0	0	0
2003	332	23	1	318.65	-445.782	D	6.842	6.842	0	1.739	0	0	0	0	0	0
2003	333	23	1	318.65	-445.782	D	6.494	6.494	0	1.054	0	0	0	0	0	0
2003	334	23	1	318.65	-445.782	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2003	335	23	1	318.65	-445.782	D	6.66	6.66	0	1.378	0	0	0	0	0	0
2003	336	23	2789	340.496	-426.449	D	6.556	6.512	0.044	1.089	48.42	50.77	0	0	0	0.8
2003	337	23	2781	339.842	-425.379	D	8.185	8.178	0.007	4.6	41.82	57.66	0	0	0	0.54
2003	338	23	2781	339.842	-425.379	D	9.159	9.154	0.005	6.948	59.02	40.86	0	0	0	0.12
2003	339	23	2789	340.496	-426.449	D	8.528	8.486	0.042	5.316	61.28	38.67	0	0	0	0.05
2003	340	23	1	318.65	-445.782	D	7.637	7.637	0	3.396	0	0	0	0	0	0
2003	341	23	2789	340.496	-426.449	D	6.658	6.653	0.004	1.365	51.67	48.03	0	0	0	0.28
2003	342	23	1	318.65	-445.782	D	8.111	8.111	0	4.449	0	0	0	0	0	0
2003	343	23	1	318.65	-445.782	D	10.155	10.155	0	9.603	0	0	0	0	0	0
2003	344	23	2758	335.862	-424.454	D	9.326	8.9	0.426	6.315	60.19	39.76	0	0	0	0.05
2003	345	23	1	318.65	-445.782	D	7.408	7.408	0	2.905	0	0	0	0	0	0
2003	346	23	2789	340.496	-426.449	D	6.835	6.832	0.003	1.719	69.31	30.29	0	0	0	0.4
2003	347	23	2652	323.833	-433.511	D	9.949	9.615	0.334	8.138	63.96	35.99	0	0	0	0.05
2003	348	23	2789	340.496	-426.449	D	9.529	9.43	0.099	7.653	71.86	28.11	0	0	0	0.03
2003	349	23	1	318.65	-445.782	D	9.203	9.203	0	7.071	0	0	0	0	0	0
2003	350	23	1	318.65	-445.782	D	8.775	8.775	0	6.01	0	0	0	0	0	0
2003	351	23	1	318.65	-445.782	D	7.444	7.444	0	2.982	0	0	0	0	0	0
2003	352	23	1	318.65	-445.782	D	6.918	6.918	0	1.892	0	0	0	0	0	0
2003	353	23	1	318.65	-445.782	D	7.467	7.467	0	3.031	0	0	0	0	0	0
2003	354	23	1	318.65	-445.782	D	6.572	6.572	0	1.206	0	0	0	0	0	0
2003	355	23	1	318.65	-445.782	D	6.617	6.617	0	1.294	0	0	0	0	0	0

Appendix M
Upper Buffalo
2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	356	23	1	318.65	-445.782	D	9.46	9.46	0	7.73	0	0	0	0	0	0
2003	357	23	1	318.65	-445.782	D	9.378	9.378	0	7.518	0	0	0	0	0	0
2003	358	23	1	318.65	-445.782	D	8.21	8.21	0	4.675	0	0	0	0	0	0
2003	359	23	1	318.65	-445.782	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2003	360	23	1	318.65	-445.782	D	6.789	6.789	0	1.633	0	0	0	0	0	0
2003	361	23	1	318.65	-445.782	D	6.753	6.753	0	1.562	0	0	0	0	0	0
2003	362	23	1	318.65	-445.782	D	8.719	8.719	0	5.874	0	0	0	0	0	0
2003	363	23	1	318.65	-445.782	D	7.299	7.299	0	2.675	0	0	0	0	0	0
2003	364	23	1	318.65	-445.782	D	6.566	6.566	0	1.194	0	0	0	0	0	0
									1.839							

Appendix M
Mammoth Cave
MC 2001 M2

NORANDA									DELTA		% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	955.838	-260.274	D	8.321	8.321	0	4.93	0	0	0	0	0	0
2001	2	23	1	955.838	-260.274	D	7.927	7.927	0	4.03	0	0	0	0	0	0
2001	3	23	297	944.609	-246.761	D	9.291	9.244	0.047	7.18	96.9	0.06	0	0	0.34	2.7
2001	4	23	300	962.092	-244.663	D	6.849	6.791	0.059	1.64	92.44	0.15	0	0	0.73	6.68
2001	5	23	48	963.533	-256.561	D	7.191	7.181	0.01	2.43	84.57	0.49	0	0	0.92	14.03
2001	6	23	201	945.153	-251.338	D	7.908	7.908	0	3.99	35.49	3.18	0	0	0.31	52.87
2001	7	23	297	944.609	-246.761	D	6.935	6.924	0.011	1.91	85.66	0.32	0	0	1	13
2001	8	23	21	963.025	-258.479	D	7.789	7.789	0	3.73	77.32	0.97	0	0	0.33	21.36
2001	9	23	1	955.838	-260.274	D	7.465	7.465	0	3.03	0	0	0	0	0	0
2001	10	23	297	944.609	-246.761	D	7.169	7.169	0	2.41	90.45	0.15	0	0	1.24	5.03
2001	11	23	297	944.609	-246.761	D	6.481	6.481	0	1.03	83.41	0.15	0	0	4.1	13.15
2001	12	23	1	955.838	-260.274	D	7.422	7.422	0	2.94	0	0	0	0	0	0
2001	13	23	172	943.804	-252.427	D	6.54	6.54	0	1.14	101.78	0.01	0	0	0.29	1.01
2001	14	23	1	955.838	-260.274	D	7.089	7.089	0	2.24	0	0	0	0	0	0
2001	15	23	290	946.175	-247.503	D	8.998	8.947	0.051	6.43	92.52	1.55	0	0	0.37	5.56
2001	16	23	4	958.757	-259.923	D	6.795	6.795	0	1.65	18.05	0.72	0	0	0.47	31.41
2001	17	23	1	955.838	-260.274	D	6.81	6.81	0	1.67	0	0	0	0	0	0
2001	18	23	1	955.838	-260.274	D	6.912	6.912	0	1.88	0	0	0	0	0	0
2001	19	23	1	955.838	-260.274	D	9.612	9.612	0	8.13	0	0	0	0	0	0
2001	20	23	1	955.838	-260.274	D	7.586	7.586	0	3.29	0	0	0	0	0	0
2001	21	23	1	955.838	-260.274	D	6.719	6.719	0	1.5	0	0	0	0	0	0
2001	22	23	297	944.609	-246.761	D	6.505	6.501	0.004	1.07	96.2	0.07	0	0	0.28	3.41
2001	23	23	297	944.609	-246.761	D	6.516	6.515	0.001	1.1	90.49	0.06	0	0	1.11	8.42
2001	24	23	302	963.548	-244.486	D	6.973	6.959	0.015	1.97	84.67	0.27	0	0	0.55	14.5
2001	25	23	1	955.838	-260.274	D	6.751	6.751	0	1.56	0	0	0	0	0	0
2001	26	23	1	955.838	-260.274	D	6.556	6.556	0	1.18	0	0	0	0	0	0
2001	27	23	172	943.804	-252.427	D	6.648	6.645	0.003	1.35	59.34	0.43	0	0	2.5	37.74
2001	28	23	1	955.838	-260.274	D	6.546	6.546	0	1.15	0	0	0	0	0	0
2001	29	23	143	962.978	-251.984	D	6.65	6.65	0	1.36	5.04	0	0	0	3.86	6.03
2001	30	23	1	955.838	-260.274	D	9.209	9.209	0	7.09	0	0	0	0	0	0
2001	31	23	8	961.676	-259.571	D	7.134	7.13	0.005	2.32	72.29	0.47	0	0	3.55	23.7
2001	32	23	1	955.838	-260.274	D	7.005	7.005	0	2.07	0	0	0	0	0	0
2001	33	23	65	951.641	-256.135	D	6.549	6.522	0.027	1.11	77.97	0.29	0	0	1.64	20.1
2001	34	23	144	944.641	-253.256	D	6.47	6.47	0	1.01	30.38	2.16	0	0	0.82	61.57
2001	35	23	297	944.609	-246.761	D	6.473	6.473	0	1.01	70.93	0.44	0	0	1.44	27.39
2001	36	23	6	960.217	-259.747	D	6.755	6.753	0.003	1.56	73.9	0.25	0	0	1.25	24.58
2001	37	23	297	944.609	-246.761	D	6.59	6.584	0.005	1.23	82.54	0.14	0	0	1.56	15.76
2001	38	23	201	945.153	-251.338	D	6.553	6.546	0.007	1.16	79.49	0.14	0	0	0.84	19.49

Appendix M
Mammoth Cave
MC 2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	39	23	1	955.838	-260.274	D	6.628	6.628	0	1.32	0	0	0	0	0	0
2001	40	23	1	955.838	-260.274	D	8.097	8.097	0	4.42	0	0	0	0	0	0
2001	41	23	9	954.269	-259.534	D	7.296	7.282	0.015	2.64	98.25	0.13	0	0	0.13	1.49
2001	42	23	1	955.838	-260.274	D	6.473	6.473	0	1.01	0	0	0	0	0	0
2001	43	23	1	955.838	-260.274	D	7.214	7.214	0	2.5	0	0	0	0	0	0
2001	44	23	1	955.838	-260.274	D	8.153	8.153	0	4.55	0	0	0	0	0	0
2001	45	23	1	955.838	-260.274	D	10.113	10.113	0	9.49	0	0	0	0	0	0
2001	46	23	8	961.676	-259.571	D	10.244	10.218	0.026	9.78	96.53	0.61	0	0	0.35	2.51
2001	47	23	1	955.838	-260.274	D	10.219	10.176	0.043	9.66	99.26	0.18	0	0	0.03	0.52
2001	48	23	1	955.838	-260.274	D	6.637	6.637	0	1.33	0	0	0	0	0	0
2001	49	23	1	955.838	-260.274	D	6.469	6.469	0	1.01	0	0	0	0	0	0
2001	50	23	1	955.838	-260.274	D	6.47	6.47	0	1.01	0	0	0	0	0	0
2001	51	23	297	944.609	-246.761	D	6.609	6.605	0.005	1.27	85.74	0.02	0	0	1.41	12.84
2001	52	23	6	960.217	-259.747	D	6.572	6.565	0.006	1.19	77.07	0.09	0	0	1.73	21.12
2001	53	23	65	951.641	-256.135	D	7.4	7.4	0	2.89	35.58	0.01	0	0	6.13	9.66
2001	54	23	1	955.838	-260.274	D	6.624	6.624	0	1.31	0	0	0	0	0	0
2001	55	23	1	955.838	-260.274	D	6.622	6.622	0	1.3	0	0	0	0	0	0
2001	56	23	3	958.027	-260.011	D	8.216	8.213	0.003	4.68	82.08	0.01	0	0	1.15	16.72
2001	57	23	1	955.838	-260.274	D	6.508	6.508	0	1.08	0	0	0	0	0	0
2001	58	23	1	955.838	-260.274	D	6.484	6.484	0	1.04	0	0	0	0	0	0
2001	59	23	1	955.838	-260.274	D	6.524	6.524	0	1.11	0	0	0	0	0	0
2001	60	23	1	955.838	-260.274	D	6.468	6.468	0	1	0	0	0	0	0	0
2001	61	23	17	960.106	-258.832	D	6.667	6.661	0.006	1.38	83.44	0.22	0	0	1.27	15.09
2001	62	23	8	961.676	-259.571	D	6.695	6.693	0.001	1.44	94.38	0.04	0	0	0.14	5.5
2001	63	23	6	960.217	-259.747	D	8.942	8.942	0	6.42	97	0	0	0	0.4	2.09
2001	64	23	1	955.838	-260.274	D	6.604	6.604	0	1.27	0	0	0	0	0	0
2001	65	23	1	955.838	-260.274	D	6.489	6.489	0	1.05	0	0	0	0	0	0
2001	66	23	1	955.838	-260.274	D	6.538	6.538	0	1.14	0	0	0	0	0	0
2001	67	23	204	947.34	-251.078	D	6.517	6.505	0.012	1.08	85.2	0.22	0	0	2.05	12.52
2001	68	23	1	955.838	-260.274	D	6.556	6.556	0	1.18	0	0	0	0	0	0
2001	69	23	1	955.838	-260.274	D	6.504	6.504	0	1.07	0	0	0	0	0	0
2001	70	23	1	955.838	-260.274	D	6.472	6.472	0	1.01	0	0	0	0	0	0
2001	71	23	1	955.838	-260.274	D	7.563	7.563	0	3.24	0	0	0	0	0	0
2001	72	23	9	954.269	-259.534	D	8.29	8.28	0.01	4.84	85.36	0.23	0	0	1.58	12.8
2001	73	23	1	955.838	-260.274	D	6.496	6.496	0	1.06	80.96	0.06	0	0	0.36	18.92
2001	74	23	172	943.804	-252.427	D	7.642	7.641	0.001	3.4	91.48	0.05	0	0	0.08	8.4
2001	75	23	297	944.609	-246.761	D	8.398	8.388	0.01	5.09	90.4	0.09	0	0	0.71	8.79
2001	76	23	21	963.025	-258.479	D	6.852	6.851	0.001	1.76	79.38	0.39	0	0	0.69	19.47
2001	77	23	1	955.838	-260.274	D	6.606	6.606	0	1.27	0	0	0	0	0	0

Appendix M
Mammoth Cave
MC 2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	78	23	1	955.838	-260.274	D	6.47	6.47	0	1.01	0	0	0	0	0	0
2001	79	23	1	955.838	-260.274	D	8.494	8.494	0	5.34	0	0	0	0	0	0
2001	80	23	1	955.838	-260.274	D	9.355	9.355	0	7.46	0	0	0	0	0	0
2001	81	23	1	955.838	-260.274	D	6.655	6.655	0	1.37	0	0	0	0	0	0
2001	82	23	1	955.838	-260.274	D	6.566	6.566	0	1.19	0	0	0	0	0	0
2001	83	23	1	955.838	-260.274	D	6.528	6.528	0	1.12	22.74	0	0	0	15.96	31.33
2001	84	23	1	955.838	-260.274	D	6.471	6.471	0	1.01	0	0	0	0	0	0
2001	85	23	1	955.838	-260.274	D	6.475	6.475	0	1.02	0	0	0	0	0	0
2001	86	23	1	955.838	-260.274	D	6.484	6.484	0	1.04	0	0	0	0	0	0
2001	87	23	1	955.838	-260.274	D	6.469	6.469	0	1.01	0	0	0	0	0	0
2001	88	23	1	955.838	-260.274	D	6.522	6.522	0	1.11	0	0	0	0	0	0
2001	89	23	1	955.838	-260.274	D	7.526	7.526	0	3.16	0	0	0	0	0	0
2001	90	23	119	945.479	-254.084	D	9.126	9.126	0	6.88	66.18	0	0	0	8.19	14.81
2001	91	23	21	963.025	-258.479	D	7.689	7.572	0.117	3.26	98.05	0.18	0	0	0.11	1.65
2001	92	23	204	947.34	-251.078	D	6.497	6.496	0.001	1.06	80.58	0.05	0	0	5.41	13.91
2001	93	23	204	947.34	-251.078	D	9.211	9.211	0	7.09	74.68	0	0	0	4.9	7.68
2001	94	23	119	945.479	-254.084	D	7.474	7.474	0	3.05	76.11	0	0	0	6.17	10.71
2001	95	23	119	945.479	-254.084	D	7.27	7.27	0	2.62	85.12	0	0	0	4.25	9.18
2001	96	23	1	955.838	-260.274	D	7.29	7.29	0	2.66	0	0	0	0	0	0
2001	97	23	1	955.838	-260.274	D	6.892	6.892	0	1.84	0	0	0	0	0	0
2001	98	23	1	955.838	-260.274	D	7.045	7.045	0	2.15	0	0	0	0	0	0
2001	99	23	1	955.838	-260.274	D	7.218	7.218	0	2.51	0	0	0	0	0	0
2001	100	23	1	955.838	-260.274	D	7.665	7.665	0	3.46	0	0	0	0	0	0
2001	101	23	1	955.838	-260.274	D	8.547	8.547	0	5.46	0	0	0	0	0	0
2001	102	23	297	944.609	-246.761	D	7.008	7.007	0.001	2.07	85.61	0	0	0	1.68	12.66
2001	103	23	297	944.609	-246.761	D	6.663	6.634	0.029	1.33	87.79	0.02	0	0	1.3	10.88
2001	104	23	172	943.804	-252.427	D	6.595	6.568	0.027	1.2	94.6	0	0	0	0.77	4.62
2001	105	23	300	962.092	-244.663	D	7.506	7.457	0.049	3.01	97.04	0.05	0	0	0.2	2.71
2001	106	23	1	955.838	-260.274	D	6.701	6.701	0	1.46	0	0	0	0	0	0
2001	107	23	1	955.838	-260.274	D	6.491	6.491	0	1.05	0	0	0	0	0	0
2001	108	23	1	955.838	-260.274	D	6.47	6.47	0	1.01	0	0	0	0	0	0
2001	109	23	8	961.676	-259.571	D	6.491	6.471	0.02	1.01	89.17	0.13	0	0	0.92	9.79
2001	110	23	1	955.838	-260.274	D	6.588	6.588	0	1.24	0	0	0	0	0	0
2001	111	23	1	955.838	-260.274	D	6.729	6.729	0	1.51	0	0	0	0	0	0
2001	112	23	1	955.838	-260.274	D	6.824	6.824	0	1.7	0	0	0	0	0	0
2001	113	23	1	955.838	-260.274	D	6.933	6.933	0	1.92	0	0	0	0	0	0
2001	114	23	297	944.609	-246.761	D	7.708	7.705	0.004	3.54	96.23	0.23	0	0	0.76	2.76
2001	115	23	1	955.838	-260.274	D	6.473	6.473	0	1.01	0	0	0	0	0	0
2001	116	23	254	944.206	-249.594	D	6.513	6.513	0	1.09	65.14	0	0	0	10.34	23.71

Appendix M
Mammoth Cave
MC 2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	117	23	302	963.548	-244.486	D	6.582	6.577	0.005	1.22	86.28	0.02	0	0	2.44	11.24
2001	118	23	1	955.838	-260.274	D	6.825	6.785	0.04	1.63	98.73	0	0	0	0.08	1.19
2001	119	23	1	955.838	-260.274	D	6.478	6.478	0	1.02	0	0	0	0	0	0
2001	120	23	49	953.21	-256.876	D	6.909	6.909	0	1.88	63.58	0	0	0	2.87	5.94
2001	121	23	1	955.838	-260.274	D	7.171	7.171	0	2.41	0	0	0	0	0	0
2001	122	23	1	955.838	-260.274	D	7.725	7.725	0	3.59	0	0	0	0	0	0
2001	123	23	1	955.838	-260.274	D	6.77	6.77	0	1.6	0	0	0	0	0	0
2001	124	23	1	955.838	-260.274	D	6.731	6.731	0	1.52	0	0	0	0	0	0
2001	125	23	1	955.838	-260.274	D	6.779	6.779	0	1.61	0	0	0	0	0	0
2001	126	23	1	955.838	-260.274	D	6.68	6.68	0	1.42	0	0	0	0	0	0
2001	127	23	1	955.838	-260.274	D	7.908	7.908	0	3.99	0	0	0	0	0	0
2001	128	23	8	961.676	-259.571	D	9.225	9.14	0.085	6.91	98.64	0.14	0	0	0.09	1.12
2001	129	23	6	960.217	-259.747	D	6.678	6.677	0.001	1.41	95.71	0.02	0	0	0.75	3.59
2001	130	23	275	944.098	-248.678	D	7.12	7.06	0.061	2.18	96.42	0	0	0	0.63	2.95
2001	131	23	299	946.066	-246.588	D	7.67	7.656	0.014	3.44	95.72	0	0	0	0.68	3.6
2001	132	23	302	963.548	-244.486	D	8.573	8.544	0.029	5.45	97.97	0.09	0	0	0.15	1.78
2001	133	23	1	955.838	-260.274	D	6.498	6.498	0	1.06	0	0	0	0	0	0
2001	134	23	1	955.838	-260.274	D	6.515	6.511	0.005	1.09	90.47	0	0	0	1.79	7.72
2001	135	23	297	944.609	-246.761	D	6.788	6.769	0.02	1.59	93.46	0	0	0	0.83	5.7
2001	136	23	297	944.609	-246.761	D	6.79	6.781	0.009	1.62	90.44	0	0	0	1.48	8.07
2001	137	23	297	944.609	-246.761	D	6.791	6.789	0.002	1.63	85.52	0	0	0	3.08	11.42
2001	138	23	288	944.718	-247.676	D	6.995	6.995	0	2.05	64.59	0	0	0	5.06	20.73
2001	139	23	1	955.838	-260.274	D	7.618	7.618	0	3.36	0	0	0	0	0	0
2001	140	23	8	961.676	-259.571	D	8.965	8.951	0.015	6.44	98.65	0	0	0	0.13	1.21
2001	141	23	5	959.487	-259.835	D	8.935	8.893	0.041	6.3	98.29	0	0	0	0.21	1.51
2001	142	23	8	961.676	-259.571	D	7.506	7.452	0.054	3	98.18	0.03	0	0	0.14	1.65
2001	143	23	9	954.269	-259.534	D	6.528	6.519	0.009	1.1	83.05	0.01	0	0	2.78	14.17
2001	144	23	21	963.025	-258.479	D	6.654	6.638	0.016	1.33	87.3	0.01	0	0	1.25	11.43
2001	145	23	49	953.21	-256.876	D	6.651	6.617	0.035	1.29	84.81	0.02	0	0	1.52	13.64
2001	146	23	200	964.214	-249.977	D	6.601	6.59	0.011	1.24	83.03	0.03	0	0	2.22	14.73
2001	147	23	1	955.838	-260.274	D	6.629	6.619	0.01	1.3	82.31	0.02	0	0	3.36	14.31
2001	148	23	1	955.838	-260.274	D	6.83	6.829	0.001	1.71	92.18	0	0	0	1.9	5.84
2001	149	23	8	961.676	-259.571	D	6.656	6.655	0.001	1.37	95.77	0.01	0	0	0.64	3.65
2001	150	23	1	955.838	-260.274	D	6.665	6.665	0	1.39	0	0	0	0	0	0
2001	151	23	1	955.838	-260.274	D	7.206	7.206	0	2.48	0	0	0	0	0	0
2001	152	23	6	960.217	-259.747	D	8.934	8.898	0.036	6.31	98.23	0.18	0	0	0.24	1.36
2001	153	23	17	960.106	-258.832	D	7.452	7.435	0.017	2.96	94.4	0.02	0	0	0.63	4.95
2001	154	23	1	955.838	-260.274	D	6.702	6.702	0	1.46	0	0	0	0	0	0
2001	155	23	293	961.474	-245.666	D	8.438	8.438	0	5.2	87.12	0	0	0	1.06	8.61

Appendix M
Mammoth Cave
MC 2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	156	23	1	955.838	-260.274	D	9.181	9.181	0	7.02	0	0	0	0	0	0
2001	157	23	297	944.609	-246.761	D	8.297	8.294	0.003	4.87	95.81	0	0	0	1.33	2.87
2001	158	23	300	962.092	-244.663	D	9.083	8.865	0.218	6.23	99.1	0.05	0	0	0.07	0.78
2001	159	23	8	961.676	-259.571	D	8.714	8.705	0.008	5.84	99.46	0.01	0	0	0.02	0.49
2001	160	23	1	955.838	-260.274	D	6.742	6.742	0	1.54	0	0	0	0	0	0
2001	161	23	1	955.838	-260.274	D	6.564	6.564	0	1.19	0	0	0	0	0	0
2001	162	23	275	944.098	-248.678	D	6.705	6.664	0.041	1.39	97.24	0	0	0	0.43	2.34
2001	163	23	254	944.206	-249.594	D	6.882	6.827	0.056	1.71	96.72	0	0	0	0.25	3.03
2001	164	23	275	944.098	-248.678	D	6.828	6.815	0.014	1.69	97.62	0	0	0	0.14	2.24
2001	165	23	293	961.474	-245.666	D	7.534	7.534	0	3.17	88.2	0.01	0	0	0.21	10.7
2001	166	23	172	943.804	-252.427	D	9.214	9.188	0.026	7.03	99.01	0.01	0	0	0.11	0.88
2001	167	23	5	959.487	-259.835	D	8.578	8.561	0.017	5.5	99.41	0.02	0	0	0.04	0.53
2001	168	23	1	955.838	-260.274	D	6.654	6.654	0	1.37	0	0	0	0	0	0
2001	169	23	1	955.838	-260.274	D	6.589	6.589	0	1.24	0	0	0	0	0	0
2001	170	23	1	955.838	-260.274	D	6.66	6.66	0	1.38	0	0	0	0	0	0
2001	171	23	297	944.609	-246.761	D	7.542	7.467	0.074	3.03	97.53	0.01	0	0	0.37	2.09
2001	172	23	205	948.069	-250.991	D	8.026	7.897	0.129	3.97	99.27	0.01	0	0	0.05	0.68
2001	173	23	302	963.548	-244.486	D	8.492	8.348	0.144	4.99	99.51	0.01	0	0	0.03	0.46
2001	174	23	1	955.838	-260.274	D	6.799	6.799	0	1.65	0	0	0	0	0	0
2001	175	23	1	955.838	-260.274	D	6.943	6.943	0	1.94	0	0	0	0	0	0
2001	176	23	1	955.838	-260.274	D	6.761	6.761	0	1.58	0	0	0	0	0	0
2001	177	23	1	955.838	-260.274	D	7.053	7.053	0	2.17	0	0	0	0	0	0
2001	178	23	1	955.838	-260.274	D	7.57	7.57	0	3.25	0	0	0	0	0	0
2001	179	23	178	948.178	-251.906	D	7.256	7.256	0	2.59	16.02	0	0	0	1.06	1.75
2001	180	23	1	955.838	-260.274	D	7.673	7.673	0	3.47	0	0	0	0	0	0
2001	181	23	1	955.838	-260.274	D	8.64	8.64	0	5.68	0	0	0	0	0	0
2001	182	23	297	944.609	-246.761	D	8.685	8.639	0.047	5.68	97.8	0	0	0	0.31	1.88
2001	183	23	7	960.946	-259.659	D	8.426	8.352	0.074	5	98.21	0.01	0	0	0.07	1.71
2001	184	23	8	961.676	-259.571	D	6.975	6.974	0.001	2.01	97.57	0.01	0	0	0.12	2.28
2001	185	23	300	962.092	-244.663	D	8.634	8.37	0.264	5.04	98.84	0.09	0	0	0.11	0.97
2001	186	23	21	963.025	-258.479	D	8.853	8.851	0.002	6.19	97.75	0.01	0	0	0.08	2.17
2001	187	23	1	955.838	-260.274	D	6.665	6.665	0	1.39	0	0	0	0	0	0
2001	188	23	302	963.548	-244.486	D	7.183	7.144	0.039	2.35	98.52	0	0	0	0.31	1.17
2001	189	23	283	960.856	-246.67	D	8.766	8.724	0.041	5.89	96.64	0	0	0	0.34	3.01
2001	190	23	3	958.027	-260.011	D	8.706	8.679	0.027	5.78	96.32	0.14	0	0	0.19	3.35
2001	191	23	1	955.838	-260.274	D	8.911	8.911	0	6.34	0	0	0	0	0	0
2001	192	23	1	955.838	-260.274	D	7.13	7.13	0	2.32	0	0	0	0	0	0
2001	193	23	1	955.838	-260.274	D	6.631	6.631	0	1.32	0	0	0	0	0	0
2001	194	23	1	955.838	-260.274	D	6.773	6.773	0	1.6	0	0	0	0	0	0

Appendix M
Mammoth Cave
MC 2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	195	23	1	955.838	-260.274	D	6.594	6.594	0	1.25	0	0	0	0	0	0
2001	196	23	1	955.838	-260.274	D	6.623	6.623	0	1.31	0	0	0	0	0	0
2001	197	23	1	955.838	-260.274	D	6.686	6.686	0	1.43	0	0	0	0	0	0
2001	198	23	1	955.838	-260.274	D	7.367	7.367	0	2.82	0	0	0	0	0	0
2001	199	23	297	944.609	-246.761	D	7.434	7.408	0.026	2.91	98.89	0	0	0	0.21	0.9
2001	200	23	186	954.01	-251.209	D	9.793	9.159	**0.634**	6.96	99.37	0.01	0	0	0.04	0.58
2001	201	23	172	943.804	-252.427	D	8.042	7.998	0.044	4.19	98.79	0.02	0	0	0.07	1.12
2001	202	23	119	945.479	-254.084	D	9.132	9.099	0.033	6.81	99.28	0.01	0	0	0.09	0.61
2001	203	23	275	944.098	-248.678	D	7.197	7.19	0.006	2.45	97.58	0	0	0	0.25	2.16
2001	204	23	297	944.609	-246.761	D	7.105	7.103	0.002	2.27	98.53	0	0	0	0.08	1.38
2001	205	23	297	944.609	-246.761	D	7.089	7.086	0.003	2.23	96.13	0	0	0	0.72	3.1
2001	206	23	297	944.609	-246.761	D	8.024	8.015	0.009	4.23	99.56	0	0	0	0.08	0.35
2001	207	23	297	944.609	-246.761	D	9.97	9.572	0.397	8.03	99.2	0.04	0	0	0.08	0.68
2001	208	23	297	944.609	-246.761	D	9.47	9.446	0.023	7.7	99.44	0.04	0	0	0.02	0.5
2001	209	23	297	944.609	-246.761	D	9.672	9.557	0.114	7.99	99.34	0	0	0	0.11	0.55
2001	210	23	297	944.609	-246.761	D	10.034	9.587	0.447	8.07	99.25	0.04	0	0	0.08	0.64
2001	211	23	1	955.838	-260.274	D	8.918	8.918	0	6.36	97	0.03	0	0	0.12	3.28
2001	212	23	1	955.838	-260.274	D	6.978	6.978	0	2.01	0	0	0	0	0	0
2001	213	23	1	955.838	-260.274	D	7.051	7.051	0	2.16	0	0	0	0	0	0
2001	214	23	1	955.838	-260.274	D	7.116	7.116	0	2.3	0	0	0	0	0	0
2001	215	23	268	955.866	-248.2	D	8.457	8.315	0.143	4.92	99.43	0.01	0	0	0.07	0.49
2001	216	23	8	961.676	-259.571	D	8.582	8.582	0	5.54	95.79	0.03	0	0	0.19	3.85
2001	217	23	1	955.838	-260.274	D	6.955	6.955	0	1.97	0	0	0	0	0	0
2001	218	23	1	955.838	-260.274	D	7.558	7.558	0	3.22	0	0	0	0	0	0
2001	219	23	1	955.838	-260.274	D	6.813	6.813	0	1.68	0	0	0	0	0	0
2001	220	23	1	955.838	-260.274	D	7.498	7.498	0	3.1	0	0	0	0	0	0
2001	221	23	297	944.609	-246.761	D	9.359	9.172	0.187	6.99	99.46	0.04	0	0	0.07	0.43
2001	222	23	1	955.838	-260.274	D	9.28	8.934	0.346	6.4	99.27	0.03	0	0	0.04	0.66
2001	223	23	8	961.676	-259.571	D	9.229	8.956	0.273	6.45	99.72	0.01	0	0	0.01	0.26
2001	224	23	8	961.676	-259.571	D	7.603	7.583	0.02	3.28	99.59	0	0	0	0.01	0.39
2001	225	23	8	961.676	-259.571	D	6.828	6.827	0.001	1.71	98.39	0	0	0	0.04	1.54
2001	226	23	1	955.838	-260.274	D	7.735	7.735	0	3.61	0	0	0	0	0	0
2001	227	23	1	955.838	-260.274	D	7.075	7.075	0	2.21	0	0	0	0	0	0
2001	228	23	297	944.609	-246.761	D	7.198	7.18	0.017	2.43	97.68	0.01	0	0	0.3	2.01
2001	229	23	21	963.025	-258.479	D	8.061	8.045	0.016	4.3	98.54	0.01	0	0	0.16	1.3
2001	230	23	302	963.548	-244.486	D	7.141	7.026	0.115	2.11	97.54	0.01	0	0	0.36	2.09
2001	231	23	297	944.609	-246.761	D	8.271	8.223	0.048	4.71	98.55	0.07	0	0	0.11	1.26
2001	232	23	1	955.838	-260.274	D	6.964	6.964	0	1.98	0	0	0	0	0	0
2001	233	23	177	947.449	-251.993	D	6.865	6.865	0	1.79	33.06	0	0	0	0.27	18.2

Appendix M
Mammoth Cave
MC 2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	234	23	119	945.479	-254.084	D	6.797	6.786	0.011	1.63	98.8	0	0	0	0.23	0.97
2001	235	23	9	954.269	-259.534	D	7.187	7.167	0.02	2.4	95.04	0	0	0	0.42	4.54
2001	236	23	1	955.838	-260.274	D	7.982	7.962	0.019	4.11	97.06	0.01	0	0	0.24	2.69
2001	237	23	172	943.804	-252.427	D	7.138	7.124	0.014	2.31	98.2	0	0	0	0.18	1.62
2001	238	23	297	944.609	-246.761	D	8.537	8.507	0.031	5.37	98.28	0	0	0	0.25	1.47
2001	239	23	21	963.025	-258.479	D	9.608	9.497	0.111	7.83	98.34	0.06	0	0	0.09	1.51
2001	240	23	1	955.838	-260.274	D	8.001	8.001	0	4.2	0	0	0	0	0	0
2001	241	23	6	960.217	-259.747	D	8.168	8.111	0.057	4.45	98.72	0.03	0	0	0.1	1.15
2001	242	23	292	952.732	-246.719	D	8.236	8.109	0.127	4.44	99.65	0	0	0	0.03	0.32
2001	243	23	297	944.609	-246.761	D	8.45	8.446	0.004	5.22	98.38	0	0	0	0.15	1.45
2001	244	23	275	944.098	-248.678	D	9.322	9.18	0.141	7.01	99.18	0.05	0	0	0.04	0.74
2001	245	23	9	954.269	-259.534	D	6.866	6.864	0.002	1.78	98.09	0.02	0	0	0.12	1.81
2001	246	23	201	945.153	-251.338	D	8.871	8.871	0	6.24	87.77	0	0	0	0.03	0.99
2001	247	23	1	955.838	-260.274	D	8.485	8.485	0	5.31	0	0	0	0	0	0
2001	248	23	1	955.838	-260.274	D	7.517	7.517	0	3.14	0	0	0	0	0	0
2001	249	23	1	955.838	-260.274	D	7.188	7.188	0	2.44	0	0	0	0	0	0
2001	250	23	1	955.838	-260.274	D	7.47	7.47	0	3.04	0	0	0	0	0	0
2001	251	23	1	955.838	-260.274	D	7.607	7.607	0	3.33	0	0	0	0	0	0
2001	252	23	1	955.838	-260.274	D	7.669	7.669	0	3.47	0	0	0	0	0	0
2001	253	23	48	963.533	-256.561	D	8.887	8.745	0.142	5.94	98.85	0.13	0	0	0.03	0.98
2001	254	23	1	955.838	-260.274	D	6.816	6.816	0	1.69	0	0	0	0	0	0
2001	255	23	1	955.838	-260.274	D	6.953	6.953	0	1.96	0	0	0	0	0	0
2001	256	23	1	955.838	-260.274	D	7.244	7.244	0	2.56	0	0	0	0	0	0
2001	257	23	1	955.838	-260.274	D	7.01	7.01	0	2.08	0	0	0	0	0	0
2001	258	23	1	955.838	-260.274	D	6.708	6.708	0	1.47	0	0	0	0	0	0
2001	259	23	1	955.838	-260.274	D	6.716	6.716	0	1.49	0	0	0	0	0	0
2001	260	23	297	944.609	-246.761	D	6.87	6.87	0	1.8	64.75	0	0	0	12.84	21.79
2001	261	23	302	963.548	-244.486	D	7.628	7.627	0.001	3.38	75.73	0	0	0	7.16	16.96
2001	262	23	297	944.609	-246.761	D	9.311	9.228	0.083	7.13	99.13	0.03	0	0	0.08	0.76
2001	263	23	21	963.025	-258.479	D	9.318	9.263	0.055	7.22	99.2	0.06	0	0	0.03	0.7
2001	264	23	64	950.912	-256.222	D	7.12	7.055	0.065	2.17	96.21	0.03	0	0	0.44	3.31
2001	265	23	8	961.676	-259.571	D	7.268	7.244	0.024	2.56	94.73	0.01	0	0	0.22	5.04
2001	266	23	297	944.609	-246.761	D	7.394	7.393	0.001	2.87	93.21	0	0	0	1.82	5.09
2001	267	23	287	963.77	-246.317	D	8.625	8.32	0.306	4.93	99.53	0.02	0	0	0.03	0.42
2001	268	23	1	955.838	-260.274	D	6.766	6.766	0	1.59	0	0	0	0	0	0
2001	269	23	1	955.838	-260.274	D	6.543	6.543	0	1.15	0	0	0	0	0	0
2001	270	23	1	955.838	-260.274	D	6.615	6.615	0	1.29	0	0	0	0	0	0
2001	271	23	1	955.838	-260.274	D	6.843	6.843	0	1.74	0	0	0	0	0	0
2001	272	23	1	955.838	-260.274	D	6.971	6.971	0	2	0	0	0	0	0	0

Appendix M
Mammoth Cave
MC 2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	273	23	1	955.838	-260.274	D	7.355	7.355	0	2.79	0	0	0	0	0	0
2001	274	23	1	955.838	-260.274	D	6.919	6.919	0	1.89	0	0	0	0	0	0
2001	275	23	1	955.838	-260.274	D	7.312	7.308	0.004	2.7	50.71	0.15	0	0	1.54	47.57
2001	276	23	302	963.548	-244.486	D	7.306	7.272	0.034	2.62	92.97	0.01	0	0	0.33	6.7
2001	277	23	1	955.838	-260.274	D	7.837	7.837	0	3.83	0	0	0	0	0	0
2001	278	23	297	944.609	-246.761	D	7.678	7.674	0.004	3.48	99.01	0.1	0	0	0.07	0.79
2001	279	23	119	945.479	-254.084	D	8.845	8.67	0.174	5.76	98.84	0.17	0	0	0.02	0.97
2001	280	23	1	955.838	-260.274	D	6.504	6.504	0	1.07	0	0	0	0	0	0
2001	281	23	1	955.838	-260.274	D	6.505	6.505	0	1.08	0	0	0	0	0	0
2001	282	23	1	955.838	-260.274	D	6.547	6.547	0	1.16	0	0	0	0	0	0
2001	283	23	1	955.838	-260.274	D	6.658	6.658	0	1.38	0	0	0	0	0	0
2001	284	23	1	955.838	-260.274	D	7.682	7.682	0	3.5	0	0	0	0	0	0
2001	285	23	1	955.838	-260.274	D	9.717	9.717	0	8.41	0	0	0	0	0	0
2001	286	23	1	955.838	-260.274	D	9.566	9.566	0	8.01	0	0	0	0	0	0
2001	287	23	2	956.568	-260.187	D	8.865	8.82	0.045	6.12	99.02	0.17	0	0	0.09	0.71
2001	288	23	8	961.676	-259.571	D	6.783	6.783	0	1.62	70.84	0.06	0	0	2.44	25.49
2001	289	23	6	960.217	-259.747	D	7.203	7.203	0	2.48	77.99	2.31	0	0	0.12	19.53
2001	290	23	1	955.838	-260.274	D	6.542	6.542	0	1.15	0	0	0	0	0	0
2001	291	23	1	955.838	-260.274	D	6.518	6.518	0	1.1	0	0	0	0	0	0
2001	292	23	297	944.609	-246.761	D	6.59	6.59	0	1.24	35.25	0	0	0	9.59	38.92
2001	293	23	300	962.092	-244.663	D	6.974	6.948	0.025	1.95	93.29	0.08	0	0	1.05	5.58
2001	294	23	274	963.153	-247.32	D	7.287	7.287	0	2.65	51.2	0	0	0	0.06	0.43
2001	295	23	1	955.838	-260.274	D	8.044	8.044	0	4.3	0	0	0	0	0	0
2001	296	23	1	955.838	-260.274	D	8.705	8.705	0	5.84	0	0	0	0	0	0
2001	297	23	1	955.838	-260.274	D	9.069	9.069	0	6.73	0	0	0	0	0	0
2001	298	23	9	954.269	-259.534	D	8.579	8.565	0.014	5.51	93.82	0.19	0	0	0.27	5.72
2001	299	23	1	955.838	-260.274	D	6.473	6.473	0	1.01	0	0	0	0	0	0
2001	300	23	1	955.838	-260.274	D	6.499	6.499	0	1.07	0	0	0	0	0	0
2001	301	23	1	955.838	-260.274	D	6.509	6.509	0	1.08	0	0	0	0	0	0
2001	302	23	1	955.838	-260.274	D	6.496	6.496	0	1.06	0	0	0	0	0	0
2001	303	23	1	955.838	-260.274	D	6.497	6.497	0	1.06	0	0	0	0	0	0
2001	304	23	1	955.838	-260.274	D	6.494	6.494	0	1.06	0	0	0	0	0	0
2001	305	23	1	955.838	-260.274	D	6.665	6.665	0	1.39	0	0	0	0	0	0
2001	306	23	1	955.838	-260.274	D	8.952	8.952	0	6.44	0	0	0	0	0	0
2001	307	23	172	943.804	-252.427	D	8.78	8.656	0.123	5.72	99.24	0.1	0	0	0.04	0.62
2001	308	23	1	955.838	-260.274	D	6.553	6.553	0	1.17	0	0	0	0	0	0
2001	309	23	1	955.838	-260.274	D	6.696	6.696	0	1.45	0	0	0	0	0	0
2001	310	23	1	955.838	-260.274	D	6.484	6.484	0	1.04	0	0	0	0	0	0
2001	311	23	1	955.838	-260.274	D	6.477	6.477	0	1.02	0	0	0	0	0	0

Appendix M
Mammoth Cave
MC 2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	312	23	290	946.175	-247.503	D	6.538	6.522	0.016	1.11	85.89	0.09	0	0	1.25	12.76
2001	313	23	21	963.025	-258.479	D	6.913	6.913	0	1.88	57.16	0.07	0	0	0.61	42.24
2001	314	23	172	943.804	-252.427	D	6.606	6.557	0.049	1.18	91.56	0.03	0	0	1.09	7.32
2001	315	23	5	959.487	-259.835	D	6.917	6.902	0.015	1.86	89.44	0.1	0	0	0.27	10.19
2001	316	23	1	955.838	-260.274	D	6.597	6.597	0	1.25	0	0	0	0	0	0
2001	317	23	1	955.838	-260.274	D	6.535	6.535	0	1.13	0	0	0	0	0	0
2001	318	23	1	955.838	-260.274	D	6.569	6.569	0	1.2	0	0	0	0	0	0
2001	319	23	297	944.609	-246.761	D	6.617	6.617	0	1.29	52.47	0	0	0	17.03	30.17
2001	320	23	297	944.609	-246.761	D	6.874	6.864	0.01	1.78	95.63	0.02	0	0	0.81	3.53
2001	321	23	1	955.838	-260.274	D	7.099	7.097	0.003	2.26	96.69	0.01	0	0	0.1	3.12
2001	322	23	1	955.838	-260.274	D	7.437	7.437	0	2.97	0	0	0	0	0	0
2001	323	23	300	962.092	-244.663	D	8.722	8.629	0.092	5.66	99.36	0.1	0	0	0.05	0.49
2001	324	23	21	963.025	-258.479	D	7.287	7.276	0.011	2.63	99.39	0.11	0	0	0.03	0.47
2001	325	23	1	955.838	-260.274	D	6.485	6.485	0	1.04	0	0	0	0	0	0
2001	326	23	297	944.609	-246.761	D	6.533	6.532	0.001	1.13	96.13	0.07	0	0	0.25	3.62
2001	327	23	1	955.838	-260.274	D	7.441	7.441	0	2.97	0	0	0	0	0	0
2001	328	23	1	955.838	-260.274	D	10.097	10.097	0	9.44	0	0	0	0	0	0
2001	329	23	297	944.609	-246.761	D	9.125	9.1	0.025	6.81	94.59	0.02	0	0	0.53	4.87
2001	330	23	302	963.548	-244.486	D	7.233	7.204	0.028	2.48	94.01	0.07	0	0	0.22	5.7
2001	331	23	297	944.609	-246.761	D	9.596	9.549	0.047	7.96	96.84	0.09	0	0	0.23	2.83
2001	332	23	6	960.217	-259.747	D	9.4	9.33	0.069	7.4	97.74	0.09	0	0	0.1	2.06
2001	333	23	297	944.609	-246.761	D	10.218	10.218	0	9.78	98.13	0.19	0	0	0.01	0.84
2001	334	23	119	945.479	-254.084	D	8.111	8.111	0	4.45	80.74	0.25	0	0	0.05	7.95
2001	335	23	297	944.609	-246.761	D	6.99	6.98	0.009	2.02	94.09	0.01	0	0	0.93	4.97
2001	336	23	8	961.676	-259.571	D	6.873	6.864	0.008	1.78	88.39	0.12	0	0	0.27	11.21
2001	337	23	201	945.153	-251.338	D	6.639	6.639	0	1.34	47.55	0.55	0	0	0.27	41.93
2001	338	23	1	955.838	-260.274	D	6.902	6.902	0	1.86	0	0	0	0	0	0
2001	339	23	1	955.838	-260.274	D	6.707	6.707	0	1.47	0	0	0	0	0	0
2001	340	23	297	944.609	-246.761	D	9.343	9.342	0.001	7.43	92.37	0	0	0	2.73	5.05
2001	341	23	119	945.479	-254.084	D	9.838	9.762	0.076	8.53	98.06	0.2	0	0	0.24	1.5
2001	342	23	297	944.609	-246.761	D	9.694	9.683	0.011	8.32	99.21	0.1	0	0	0.03	0.65
2001	343	23	296	963.659	-245.401	D	7.437	7.437	0	2.97	99.33	0.04	0	0	0.01	0.65
2001	344	23	1	955.838	-260.274	D	6.657	6.657	0	1.37	0	0	0	0	0	0
2001	345	23	1	955.838	-260.274	D	7.693	7.693	0	3.52	0	0	0	0	0	0
2001	346	23	1	955.838	-260.274	D	8.05	8.05	0	4.31	0	0	0	0	0	0
2001	347	23	297	944.609	-246.761	D	10.353	10.218	0.135	9.78	99.28	0.06	0	0	0.07	0.58
2001	348	23	297	944.609	-246.761	D	9.487	9.402	0.085	7.58	99.12	0.16	0	0	0.03	0.69
2001	349	23	6	960.217	-259.747	D	6.896	6.896	0	1.85	77.63	0	0	0	3.62	18.61
2001	350	23	1	955.838	-260.274	D	7.309	7.309	0	2.7	0	0	0	0	0	0

Appendix M
Mammoth Cave
MC 2001 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	351	23	1	955.838	-260.274	D	8.91	8.841	0.069	6.17	99.45	0.14	0	0	0.02	0.38
2001	352	23	21	963.025	-258.479	D	8.818	8.805	0.013	6.08	99.36	0.15	0	0	0.04	0.44
2001	353	23	297	944.609	-246.761	D	6.642	6.636	0.006	1.33	74.35	0.33	0	0	0.87	24.46
2001	354	23	1	955.838	-260.274	D	6.576	6.576	0	1.22	0	0	0	0	0	0
2001	355	23	3	958.027	-260.011	D	6.492	6.472	0.019	1.01	51.56	0.66	0	0	4.72	43.05
2001	356	23	172	943.804	-252.427	D	6.523	6.519	0.004	1.1	91.01	0.08	0	0	0.24	8.67
2001	357	23	8	961.676	-259.571	D	8.284	8.263	0.021	4.8	96.69	0.45	0	0	0.24	2.62
2001	358	23	1	955.838	-260.274	D	6.539	6.539	0	1.14	0	0	0	0	0	0
2001	359	23	1	955.838	-260.274	D	6.506	6.506	0	1.08	0	0	0	0	0	0
2001	360	23	7	960.946	-259.659	D	6.523	6.521	0.002	1.11	66.76	0.62	0	0	1.86	30.7
2001	361	23	290	946.175	-247.503	D	6.688	6.679	0.009	1.42	66.04	0.43	0	0	2.62	30.91
2001	362	23	8	961.676	-259.571	D	6.779	6.762	0.017	1.58	66.54	0.81	0	0	1.67	30.99
2001	363	23	200	964.214	-249.977	D	7.479	7.47	0.009	3.04	74.31	0.31	0	0	1.72	23.65
2001	364	23	1	955.838	-260.274	D	6.534	6.534	0	1.13	0	0	0	0	0	0
2001	365	23	1	955.838	-260.274	D	6.549	6.549	0	1.16	0	0	0	0	0	0
									0.634							

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NORANDA									DELTA		% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	1	955.838	-260.274	D	7.121	7.121	0	2.305	0	0	0	0	0	0
2002	2	23	1	955.838	-260.274	D	7.031	7.031	0	2.122	0	0	0	0	0	0
2002	3	23	1	955.838	-260.274	D	7.181	7.181	0	2.43	0	0	0	0	0	0
2002	4	23	172	943.804	-252.427	D	7.318	7.316	0.002	2.712	95.45	0.1	0	0	0.42	4.01
2002	5	23	300	962.092	-244.663	D	6.768	6.765	0.003	1.586	96.47	0.09	0	0	0.27	3.18
2002	6	23	119	945.479	-254.084	D	9.158	9.139	0.019	6.91	98.29	0.16	0	0	0.35	1.19
2002	7	23	1	955.838	-260.274	D	9.043	9.043	0	6.668	0	0	0	0	0	0
2002	8	23	48	963.533	-256.561	D	8.419	8.413	0.006	5.146	96.24	0.56	0	0	0.34	2.84
2002	9	23	1	955.838	-260.274	D	7.465	7.465	0	3.027	0	0	0	0	0	0
2002	10	23	297	944.609	-246.761	D	9.847	9.703	0.144	8.371	99.16	0.1	0	0	0.06	0.68
2002	11	23	8	961.676	-259.571	D	9.876	9.755	0.121	8.509	98.77	0.21	0	0	0.03	0.98
2002	12	23	9	954.269	-259.534	D	9.289	9.146	0.143	6.926	99.01	0.12	0	0	0.11	0.76
2002	13	23	302	963.548	-244.486	D	8.411	8.379	0.032	5.065	97.53	0.15	0	0	0.07	2.24
2002	14	23	297	944.609	-246.761	D	7.201	7.198	0.003	2.466	87.08	0.11	0	0	1.29	11.54
2002	15	23	21	963.025	-258.479	D	7.034	7.034	0	2.127	91.07	0.16	0	0	0.22	8.82
2002	16	23	1	955.838	-260.274	D	6.664	6.664	0	1.386	0	0	0	0	0	0
2002	17	23	302	963.548	-244.486	D	6.958	6.951	0.007	1.958	73.95	0.7	0	0	2.49	22.87
2002	18	23	1	955.838	-260.274	D	9.044	9.044	0	6.671	0	0	0	0	0	0
2002	19	23	1	955.838	-260.274	D	9.071	9.071	0	6.739	0	0	0	0	0	0
2002	20	23	1	955.838	-260.274	D	8.57	8.57	0	5.517	0	0	0	0	0	0
2002	21	23	297	944.609	-246.761	D	8.224	8.209	0.015	4.672	94.25	0.14	0	0	0.42	5.19
2002	22	23	172	943.804	-252.427	D	7.051	7.039	0.012	2.138	94.97	0.1	0	0	0.3	4.62
2002	23	23	1	955.838	-260.274	D	9.886	9.886	0	8.864	0	0	0	0	0	0
2002	24	23	21	963.025	-258.479	D	10.102	10.049	0.053	9.31	95.67	0.56	0	0	0.35	3.42
2002	25	23	1	955.838	-260.274	D	8.632	8.632	0	5.664	0	0	0	0	0	0
2002	26	23	297	944.609	-246.761	D	6.752	6.751	0.001	1.558	93.43	0.17	0	0	0.56	5.76
2002	27	23	1	955.838	-260.274	D	8.327	8.327	0	4.945	0	0	0	0	0	0
2002	28	23	1	955.838	-260.274	D	8.78	8.78	0	6.022	0	0	0	0	0	0
2002	29	23	1	955.838	-260.274	D	10.161	10.161	0	9.619	0	0	0	0	0	0
2002	30	23	297	944.609	-246.761	D	10.252	10.218	0.035	9.779	98.83	0.29	0	0	0.05	0.82
2002	31	23	297	944.609	-246.761	D	9.613	9.61	0.003	8.124	99.51	0.1	0	0	0.01	0.38
2002	32	23	297	944.609	-246.761	D	8.654	8.648	0.006	5.702	86.15	1.12	0	0	1.26	11.48
2002	33	23	1	955.838	-260.274	D	6.894	6.894	0	1.844	0	0	0	0	0	0
2002	34	23	172	943.804	-252.427	D	6.888	6.816	0.072	1.687	96.1	0.08	0	0	0.62	3.2
2002	35	23	21	963.025	-258.479	D	8.302	8.263	0.039	4.796	94.65	0.3	0	0	0.17	4.88
2002	36	23	1	955.838	-260.274	D	6.742	6.742	0	1.539	0	0	0	0	0	0
2002	37	23	1	955.838	-260.274	D	6.926	6.926	0	1.909	0	0	0	0	0	0
2002	38	23	1	955.838	-260.274	D	9.543	9.543	0	7.949	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	39	23	172	943.804	-252.427	D	8.594	8.552	0.042	5.473	98.08	0.06	0	0	0.14	1.73
2002	40	23	300	962.092	-244.663	D	7.338	7.31	0.028	2.699	98.86	0.05	0	0	0.03	1.06
2002	41	23	6	960.217	-259.747	D	8.006	7.993	0.012	4.183	94.29	0.11	0	0	0.51	5.11
2002	42	23	1	955.838	-260.274	D	7.74	7.74	0	3.621	0	0	0	0	0	0
2002	43	23	297	944.609	-246.761	D	6.848	6.834	0.014	1.723	89.43	0.16	0	0	0.75	9.67
2002	44	23	8	961.676	-259.571	D	6.801	6.801	0	1.657	36.49	1.09	0	0	0.97	63.02
2002	45	23	1	955.838	-260.274	D	6.598	6.598	0	1.257	0	0	0	0	0	0
2002	46	23	297	944.609	-246.761	D	6.671	6.669	0.002	1.396	73.87	0.05	0	0	3.59	22.45
2002	47	23	8	961.676	-259.571	D	6.964	6.951	0.012	1.96	70.75	0.12	0	0	1.63	27.49
2002	48	23	8	961.676	-259.571	D	6.687	6.687	0	1.431	76.97	0.23	0	0	0.43	22.27
2002	49	23	1	955.838	-260.274	D	6.573	6.573	0	1.207	0	0	0	0	0	0
2002	50	23	1	955.838	-260.274	D	6.592	6.592	0	1.245	0	0	0	0	0	0
2002	51	23	297	944.609	-246.761	D	8.743	8.717	0.026	5.869	98.16	0.06	0	0	0.15	1.63
2002	52	23	8	961.676	-259.571	D	8.568	8.499	0.069	5.348	90.13	1.16	0	0	0.58	8.13
2002	53	23	1	955.838	-260.274	D	7.455	7.455	0	3.005	0	0	0	0	0	0
2002	54	23	1	955.838	-260.274	D	7.568	7.568	0	3.248	0	0	0	0	0	0
2002	55	23	1	955.838	-260.274	D	6.532	6.532	0	1.129	0	0	0	0	0	0
2002	56	23	1	955.838	-260.274	D	6.666	6.666	0	1.389	0	0	0	0	0	0
2002	57	23	297	944.609	-246.761	D	8.674	8.635	0.04	5.67	97.34	0.26	0	0	0.24	2.16
2002	58	23	1	955.838	-260.274	D	7.436	7.436	0	2.965	0	0	0	0	0	0
2002	59	23	8	961.676	-259.571	D	6.952	6.949	0.003	1.955	84.42	0.63	0	0	1.17	13.78
2002	60	23	300	962.092	-244.663	D	6.543	6.543	0	1.149	77.28	0.04	0	0	5.41	16.19
2002	61	23	1	955.838	-260.274	D	8.459	8.459	0	5.253	0	0	0	0	0	0
2002	62	23	186	954.01	-251.209	D	8.372	8.28	0.092	4.836	99.39	0.08	0	0	0.05	0.48
2002	63	23	144	944.641	-253.256	D	7.068	7.067	0	2.196	83.24	0.32	0	0	0.93	15.44
2002	64	23	160	956.307	-251.861	D	6.698	6.695	0.003	1.448	84.8	0.31	0	0	0.29	14.62
2002	65	23	1	955.838	-260.274	D	6.627	6.627	0	1.313	0	0	0	0	0	0
2002	66	23	1	955.838	-260.274	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2002	67	23	1	955.838	-260.274	D	6.657	6.657	0	1.372	0	0	0	0	0	0
2002	68	23	290	946.175	-247.503	D	7.899	7.884	0.015	3.939	98.33	0.1	0	0	0.1	1.47
2002	69	23	1	955.838	-260.274	D	6.807	6.807	0	1.668	0	0	0	0	0	0
2002	70	23	1	955.838	-260.274	D	6.577	6.577	0	1.215	0	0	0	0	0	0
2002	71	23	1	955.838	-260.274	D	9.098	9.098	0	6.807	0	0	0	0	0	0
2002	72	23	172	943.804	-252.427	D	9.383	9.382	0.001	7.528	98.93	0.04	0	0	0.17	0.78
2002	73	23	172	943.804	-252.427	D	8.897	8.884	0.013	6.274	99.66	0.02	0	0	0.02	0.3
2002	74	23	1	955.838	-260.274	D	7.251	7.251	0	2.574	0	0	0	0	0	0
2002	75	23	172	943.804	-252.427	D	9.546	9.467	0.08	7.749	99.16	0.1	0	0	0.09	0.65
2002	76	23	21	963.025	-258.479	D	9.189	9.168	0.021	6.983	99.32	0.05	0	0	0.02	0.6
2002	77	23	172	943.804	-252.427	D	9.652	9.411	0.241	7.605	99.82	0.01	0	0	0.03	0.14

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	78	23	1	955.838	-260.274	D	9.94	9.923	0.017	8.965	99.88	0	0	0	0.01	0.1
2002	79	23	119	945.479	-254.084	D	9.712	9.711	0.001	8.392	98.56	0	0	0	0.45	0.74
2002	80	23	1	955.838	-260.274	D	9.133	9.133	0	6.894	0	0	0	0	0	0
2002	81	23	1	955.838	-260.274	D	6.943	6.943	0	1.942	0	0	0	0	0	0
2002	82	23	275	944.098	-248.678	D	6.634	6.616	0.017	1.293	87.55	0.11	0	0	2.02	10.32
2002	83	23	302	963.548	-244.486	D	6.559	6.556	0.003	1.174	91.95	0.06	0	0	0.35	7.64
2002	84	23	275	944.098	-248.678	D	8.054	8.049	0.005	4.308	99.61	0	0	0	0.09	0.28
2002	85	23	172	943.804	-252.427	D	9.609	9.598	0.011	8.092	98.66	0	0	0	0.13	1.19
2002	86	23	1	955.838	-260.274	D	7.517	7.517	0	3.137	0	0	0	0	0	0
2002	87	23	1	955.838	-260.274	D	7.042	7.042	0	2.143	0	0	0	0	0	0
2002	88	23	1	955.838	-260.274	D	7.001	7.001	0	2.061	0	0	0	0	0	0
2002	89	23	297	944.609	-246.761	D	9.193	9.158	0.034	6.958	98.85	0.09	0	0	0.05	1.01
2002	90	23	1	955.838	-260.274	D	8.453	8.453	0	5.24	0	0	0	0	0	0
2002	91	23	1	955.838	-260.274	D	7.093	7.093	0	2.249	0	0	0	0	0	0
2002	92	23	1	955.838	-260.274	D	7.012	7.012	0	2.082	0	0	0	0	0	0
2002	93	23	297	944.609	-246.761	D	7.883	7.869	0.014	3.906	98.54	0.09	0	0	0.03	1.34
2002	94	23	1	955.838	-260.274	D	7.837	7.837	0	3.835	0	0	0	0	0	0
2002	95	23	1	955.838	-260.274	D	7.386	7.386	0	2.858	0	0	0	0	0	0
2002	96	23	1	955.838	-260.274	D	6.595	6.595	0	1.25	0	0	0	0	0	0
2002	97	23	1	955.838	-260.274	D	6.554	6.554	0	1.172	0	0	0	0	0	0
2002	98	23	1	955.838	-260.274	D	6.879	6.879	0	1.814	0	0	0	0	0	0
2002	99	23	172	943.804	-252.427	D	9.28	9.27	0.01	7.241	97.21	0.13	0	0	0.17	2.49
2002	100	23	1	955.838	-260.274	D	7.506	7.506	0	3.115	0	0	0	0	0	0
2002	101	23	1	955.838	-260.274	D	6.881	6.881	0	1.818	0	0	0	0	0	0
2002	102	23	1	955.838	-260.274	D	8.527	8.527	0	5.413	0	0	0	0	0	0
2002	103	23	297	944.609	-246.761	D	8.563	8.563	0	5.5	71.64	0.54	0	0	0.63	25
2002	104	23	297	944.609	-246.761	D	8.986	8.982	0.004	6.517	98.32	0.06	0	0	0.24	1.36
2002	105	23	1	955.838	-260.274	D	8.946	8.946	0	6.427	0	0	0	0	0	0
2002	106	23	1	955.838	-260.274	D	7.383	7.383	0	2.851	0	0	0	0	0	0
2002	107	23	1	955.838	-260.274	D	7.75	7.75	0	3.641	0	0	0	0	0	0
2002	108	23	1	955.838	-260.274	D	7.74	7.74	0	3.621	0	0	0	0	0	0
2002	109	23	297	944.609	-246.761	D	7.372	7.372	0	2.829	61.8	0	0	0	9.39	28.88
2002	110	23	172	943.804	-252.427	D	8.282	8.205	0.077	4.663	98.7	0.03	0	0	0.18	1.08
2002	111	23	144	944.641	-253.256	D	8.913	8.693	0.22	5.81	99.62	0.02	0	0	0.03	0.33
2002	112	23	302	963.548	-244.486	D	7.526	7.514	0.013	3.13	96.6	0.08	0	0	0.12	3.21
2002	113	23	1	955.838	-260.274	D	6.638	6.638	0	1.336	0	0	0	0	0	0
2002	114	23	1	955.838	-260.274	D	7.612	7.612	0	3.342	0	0	0	0	0	0
2002	115	23	302	963.548	-244.486	D	8.037	8.034	0.003	4.275	95.56	0.28	0	0	0.35	3.81
2002	116	23	1	955.838	-260.274	D	6.533	6.533	0	1.13	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	117	23	1	955.838	-260.274	D	7.832	7.832	0	3.823	0	0	0	0	0	0
2002	118	23	297	944.609	-246.761	D	8.558	8.552	0.006	5.474	94.96	0	0	0	0.36	4.66
2002	119	23	1	955.838	-260.274	D	6.796	6.796	0	1.647	0	0	0	0	0	0
2002	120	23	297	944.609	-246.761	D	6.656	6.656	0	1.37	51.87	0	0	0	15.84	31.73
2002	121	23	292	952.732	-246.719	D	9.557	9.557	0	7.985	77.45	0	0	0	3.93	18.04
2002	122	23	8	961.676	-259.571	D	9.861	9.824	0.037	8.697	97.09	0.22	0	0	0.24	2.45
2002	123	23	1	955.838	-260.274	D	7.522	7.522	0	3.149	0	0	0	0	0	0
2002	124	23	1	955.838	-260.274	D	6.692	6.692	0	1.441	0	0	0	0	0	0
2002	125	23	1	955.838	-260.274	D	6.717	6.717	0	1.491	0	0	0	0	0	0
2002	126	23	1	955.838	-260.274	D	6.997	6.997	0	2.051	0	0	0	0	0	0
2002	127	23	297	944.609	-246.761	D	8.645	8.607	0.038	5.603	97.99	0	0	0	0.29	1.72
2002	128	23	302	963.548	-244.486	D	8.903	8.791	0.112	6.048	98.66	0.03	0	0	0.09	1.22
2002	129	23	172	943.804	-252.427	D	7.965	7.932	0.033	4.046	97.68	0.09	0	0	0.17	2.05
2002	130	23	8	961.676	-259.571	D	6.968	6.968	0	1.993	95.08	0.05	0	0	0.45	4.43
2002	131	23	1	955.838	-260.274	D	6.757	6.757	0	1.569	0	0	0	0	0	0
2002	132	23	1	955.838	-260.274	D	8.555	8.555	0	5.481	0	0	0	0	0	0
2002	133	23	297	944.609	-246.761	D	9.258	9.228	0.03	7.136	98.25	0.18	0	0	0.19	1.37
2002	134	23	1	955.838	-260.274	D	7.198	7.198	0	2.466	0	0	0	0	0	0
2002	135	23	254	944.206	-249.594	D	6.74	6.74	0	1.537	72.92	0	0	0	2.19	7.61
2002	136	23	275	944.098	-248.678	D	6.805	6.805	0	1.666	79.31	0	0	0	2.21	17.7
2002	137	23	301	962.82	-244.575	D	8.964	8.961	0.002	6.466	98.6	0.07	0	0	0.25	0.96
2002	138	23	302	963.548	-244.486	D	8.37	8.362	0.008	5.026	99.67	0	0	0	0.01	0.31
2002	139	23	1	955.838	-260.274	D	7.13	7.13	0	2.324	0	0	0	0	0	0
2002	140	23	1	955.838	-260.274	D	6.626	6.626	0	1.312	0	0	0	0	0	0
2002	141	23	1	955.838	-260.274	D	6.718	6.718	0	1.493	0	0	0	0	0	0
2002	142	23	1	955.838	-260.274	D	6.623	6.623	0	1.306	0	0	0	0	0	0
2002	143	23	1	955.838	-260.274	D	6.664	6.664	0	1.386	0	0	0	0	0	0
2002	144	23	297	944.609	-246.761	D	6.838	6.838	0	1.731	52.52	0	0	0	9.88	29.36
2002	145	23	297	944.609	-246.761	D	6.995	6.995	0	2.048	61.32	0	0	0	8.13	27.02
2002	146	23	78	961.123	-254.995	D	8.841	8.689	0.153	5.8	98.45	0.06	0	0	0.32	1.17
2002	147	23	287	963.77	-246.317	D	8.748	8.69	0.057	5.804	99.1	0.02	0	0	0.1	0.78
2002	148	23	297	944.609	-246.761	D	7.945	7.944	0.001	4.073	98.45	0	0	0	0.04	1.39
2002	149	23	1	955.838	-260.274	D	7.791	7.791	0	3.731	0	0	0	0	0	0
2002	150	23	1	955.838	-260.274	D	8.266	8.266	0	4.803	0	0	0	0	0	0
2002	151	23	297	944.609	-246.761	D	8.099	8.067	0.033	4.348	98.18	0	0	0	0.24	1.58
2002	152	23	1	955.838	-260.274	D	7.741	7.397	0.344	2.882	97.95	0.01	0	0	0.19	1.84
2002	153	23	3	958.027	-260.011	D	7.947	7.837	0.11	3.834	94.8	0.03	0	0	0.37	4.8
2002	154	23	297	944.609	-246.761	D	7.886	7.82	0.066	3.796	96.73	0	0	0	0.22	3.05
2002	155	23	302	963.548	-244.486	D	7.379	7.377	0.002	2.839	98.29	0	0	0	0.37	1.33

Appendix M
Mammoth Cave
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	156	23	297	944.609	-246.761	D	7.878	7.873	0.005	3.913	98.46	0.05	0	0	0.19	1.31
2002	157	23	297	944.609	-246.761	D	9.831	9.504	0.327	7.847	99.21	0.08	0	0	0.06	0.65
2002	158	23	1	955.838	-260.274	D	8.494	8.494	0	5.335	0	0	0	0	0	0
2002	159	23	1	955.838	-260.274	D	8.096	8.096	0	4.413	0	0	0	0	0	0
2002	160	23	1	955.838	-260.274	D	6.985	6.985	0	2.028	0	0	0	0	0	0
2002	161	23	1	955.838	-260.274	D	6.735	6.735	0	1.525	0	0	0	0	0	0
2002	162	23	1	955.838	-260.274	D	6.723	6.723	0	1.502	0	0	0	0	0	0
2002	163	23	297	944.609	-246.761	D	7.347	7.343	0.004	2.768	95.15	0	0	0	0.66	4.18
2002	164	23	297	944.609	-246.761	D	9.158	8.851	0.307	6.194	98.69	0.02	0	0	0.17	1.11
2002	165	23	21	963.025	-258.479	D	8.438	8.436	0.002	5.2	98.47	0.01	0	0	0.12	1.4
2002	166	23	1	955.838	-260.274	D	6.794	6.794	0	1.643	0	0	0	0	0	0
2002	167	23	1	955.838	-260.274	D	6.748	6.748	0	1.552	86.54	0	0	0	0.47	6.89
2002	168	23	1	955.838	-260.274	D	7.002	7.001	0	2.061	86.06	0.02	0	0	0.34	13.54
2002	169	23	1	955.838	-260.274	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2002	170	23	1	955.838	-260.274	D	6.775	6.775	0	1.606	0	0	0	0	0	0
2002	171	23	1	955.838	-260.274	D	6.659	6.659	0	1.377	0	0	0	0	0	0
2002	172	23	1	955.838	-260.274	D	6.808	6.808	0	1.67	0	0	0	0	0	0
2002	173	23	1	955.838	-260.274	D	6.654	6.654	0	1.367	0	0	0	0	0	0
2002	174	23	1	955.838	-260.274	D	6.693	6.693	0	1.443	0	0	0	0	0	0
2002	175	23	1	955.838	-260.274	D	7.734	7.734	0	3.606	0	0	0	0	0	0
2002	176	23	1	955.838	-260.274	D	7.504	7.504	0	3.109	0	0	0	0	0	0
2002	177	23	1	955.838	-260.274	D	8.294	8.294	0	4.868	0	0	0	0	0	0
2002	178	23	297	944.609	-246.761	D	9.02	9.02	0	6.612	91.45	0.07	0	0	0.16	13.98
2002	179	23	297	944.609	-246.761	D	9.272	9.197	0.075	7.056	97.87	0.15	0	0	0.3	1.68
2002	180	23	297	944.609	-246.761	D	8.508	8.274	0.234	4.822	99.48	0	0	0	0.08	0.44
2002	181	23	302	963.548	-244.486	D	7.425	7.316	0.109	2.712	99.16	0	0	0	0.08	0.76
2002	182	23	172	943.804	-252.427	D	7.569	7.463	0.106	3.023	98.86	0	0	0	0.16	0.98
2002	183	23	172	943.804	-252.427	D	7.229	7.202	0.028	2.472	98.95	0	0	0	0.11	0.94
2002	184	23	172	943.804	-252.427	D	7.258	7.255	0.003	2.583	98.9	0	0	0	0.11	0.97
2002	185	23	172	943.804	-252.427	D	7.318	7.317	0.001	2.714	99.36	0	0	0	0.04	0.57
2002	186	23	1	955.838	-260.274	D	6.911	6.911	0	1.878	0	0	0	0	0	0
2002	187	23	1	955.838	-260.274	D	7.19	7.19	0	2.449	0	0	0	0	0	0
2002	188	23	1	955.838	-260.274	D	6.668	6.668	0	1.393	0	0	0	0	0	0
2002	189	23	1	955.838	-260.274	D	6.791	6.791	0	1.636	0	0	0	0	0	0
2002	190	23	49	953.21	-256.876	D	8.135	8.135	0	4.503	54.99	0	0	0	3.42	7.31
2002	191	23	9	954.269	-259.534	D	8.769	8.488	0.281	5.321	99.16	0.02	0	0	0.09	0.72
2002	192	23	21	963.025	-258.479	D	8.911	8.906	0.005	6.33	95.93	0.21	0	0	0.07	3.76
2002	193	23	177	947.449	-251.993	D	6.898	6.898	0	1.852	42.06	0.01	0	0	0.07	10.21
2002	194	23	1	955.838	-260.274	D	9.797	9.797	0	8.621	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	195	23	1	955.838	-260.274	D	9.106	9.106	0	6.825	0	0	0	0	0	0
2002	196	23	1	955.838	-260.274	D	7.26	7.26	0	2.593	0	0	0	0	0	0
2002	197	23	119	945.479	-254.084	D	7.088	7.088	0	2.237	60.37	0.03	0	0	1.04	13.33
2002	198	23	297	944.609	-246.761	D	8.877	8.218	**0.659**	4.692	99.01	0.01	0	0	0.15	0.83
2002	199	23	302	963.548	-244.486	D	9.078	8.86	0.218	6.217	98.95	0.02	0	0	0.11	0.92
2002	200	23	8	961.676	-259.571	D	8.933	8.635	0.299	5.67	97.98	0.06	0	0	0.09	1.86
2002	201	23	8	961.676	-259.571	D	8.072	7.989	0.084	4.172	97.78	0.01	0	0	0.1	2.12
2002	202	23	119	945.479	-254.084	D	7.807	7.797	0.01	3.746	97.49	0	0	0	0.28	2.23
2002	203	23	275	944.098	-248.678	D	7.551	7.288	0.263	2.652	98.16	0.01	0	0	0.27	1.56
2002	204	23	119	945.479	-254.084	D	9.122	8.581	**0.541**	5.542	99.07	0.02	0	0	0.1	0.8
2002	205	23	9	954.269	-259.534	D	9.343	9.184	0.159	7.023	99.83	0	0	0	0.01	0.16
2002	206	23	9	954.269	-259.534	D	7.598	7.593	0.004	3.302	99.6	0	0	0	0.02	0.38
2002	207	23	297	944.609	-246.761	D	7.79	7.762	0.028	3.669	96.81	0	0	0	0.58	2.6
2002	208	23	302	963.548	-244.486	D	8.339	8.339	0.001	4.972	94.42	0	0	0	0.4	5.23
2002	209	23	1	955.838	-260.274	D	7.604	7.604	0	3.325	0	0	0	0	0	0
2002	210	23	1	955.838	-260.274	D	7.479	7.479	0	3.056	0	0	0	0	0	0
2002	211	23	2	956.568	-260.187	D	8.164	8.092	0.072	4.405	98.78	0.01	0	0	0.25	0.97
2002	212	23	1	955.838	-260.274	D	8.954	8.878	0.076	6.26	98.3	0.1	0	0	0.14	1.46
2002	213	23	9	954.269	-259.534	D	7.067	7.058	0.009	2.176	98.68	0	0	0	0.11	1.2
2002	214	23	297	944.609	-246.761	D	6.72	6.719	0.001	1.495	97.63	0	0	0	0.22	2.05
2002	215	23	275	944.098	-248.678	D	6.699	6.698	0.001	1.454	97.86	0	0	0	0.27	1.89
2002	216	23	254	944.206	-249.594	D	6.753	6.753	0	1.562	97.73	0	0	0	0.16	1.81
2002	217	23	275	944.098	-248.678	D	7.024	7.024	0	2.107	97.44	0	0	0	0.16	1.44
2002	218	23	172	943.804	-252.427	D	7.507	7.506	0	3.114	99.65	0	0	0	0.02	0.51
2002	219	23	1	955.838	-260.274	D	6.739	6.739	0	1.533	0	0	0	0	0	0
2002	220	23	1	955.838	-260.274	D	6.594	6.594	0	1.249	0	0	0	0	0	0
2002	221	23	1	955.838	-260.274	D	6.624	6.624	0	1.308	0	0	0	0	0	0
2002	222	23	297	944.609	-246.761	D	6.612	6.607	0.005	1.275	95.56	0	0	0	1.28	3.12
2002	223	23	297	944.609	-246.761	D	8.866	8.742	0.124	5.93	98.42	0.04	0	0	0.14	1.4
2002	224	23	297	944.609	-246.761	D	7.753	7.734	0.019	3.607	98.29	0.01	0	0	0.13	1.57
2002	225	23	1	955.838	-260.274	D	6.66	6.66	0	1.378	0	0	0	0	0	0
2002	226	23	1	955.838	-260.274	D	7.874	7.874	0	3.916	0	0	0	0	0	0
2002	227	23	297	944.609	-246.761	D	9.343	9.342	0	7.427	87.93	0.01	0	0	3.95	6.85
2002	228	23	1	955.838	-260.274	D	8.622	8.622	0	5.64	0	0	0	0	0	0
2002	229	23	1	955.838	-260.274	D	9.14	9.14	0	6.911	0	0	0	0	0	0
2002	230	23	297	944.609	-246.761	D	8.982	8.936	0.046	6.403	98.41	0.01	0	0	0.2	1.39
2002	231	23	296	963.659	-245.401	D	9.252	8.853	0.399	6.199	99.04	0.05	0	0	0.06	0.85
2002	232	23	172	943.804	-252.427	D	8.778	8.342	0.436	4.979	99.3	0.01	0	0	0.04	0.65
2002	233	23	9	954.269	-259.534	D	7.317	7.31	0.007	2.7	97.92	0	0	0	0.06	2

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	234	23	275	944.098	-248.678	D	6.759	6.752	0.008	1.56	98.04	0	0	0	0.07	1.88
2002	235	23	297	944.609	-246.761	D	7.384	7.384	0	2.854	90.67	0	0	0	3.01	6.76
2002	236	23	1	955.838	-260.274	D	9.198	9.028	0.17	6.631	99.1	0.03	0	0	0.1	0.78
2002	237	23	8	961.676	-259.571	D	7.757	7.745	0.012	3.632	98.46	0	0	0	0.1	1.46
2002	238	23	1	955.838	-260.274	D	7.439	7.439	0	2.971	0	0	0	0	0	0
2002	239	23	1	955.838	-260.274	D	7.325	7.325	0	2.73	0	0	0	0	0	0
2002	240	23	1	955.838	-260.274	D	8.66	8.66	0	5.73	0	0	0	0	0	0
2002	241	23	1	955.838	-260.274	D	7.533	7.533	0	3.173	0	0	0	0	0	0
2002	242	23	1	955.838	-260.274	D	7.238	7.238	0	2.548	0	0	0	0	0	0
2002	243	23	1	955.838	-260.274	D	6.76	6.76	0	1.575	0	0	0	0	0	0
2002	244	23	1	955.838	-260.274	D	7.088	7.088	0	2.239	0	0	0	0	0	0
2002	245	23	297	944.609	-246.761	D	7.338	7.313	0.025	2.705	97.91	0	0	0	0.35	1.74
2002	246	23	297	944.609	-246.761	D	6.936	6.918	0.017	1.893	95.78	0	0	0	0.68	3.52
2002	247	23	165	959.952	-251.422	D	6.977	6.957	0.02	1.97	93.41	0	0	0	0.26	6.31
2002	248	23	1	955.838	-260.274	D	6.553	6.553	0	1.168	0	0	0	0	0	0
2002	249	23	1	955.838	-260.274	D	6.614	6.614	0	1.288	0	0	0	0	0	0
2002	250	23	1	955.838	-260.274	D	6.777	6.777	0	1.61	0	0	0	0	0	0
2002	251	23	1	955.838	-260.274	D	6.628	6.628	0	1.316	0	0	0	0	0	0
2002	252	23	1	955.838	-260.274	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	253	23	1	955.838	-260.274	D	6.513	6.513	0	1.091	0	0	0	0	0	0
2002	254	23	1	955.838	-260.274	D	6.807	6.807	0	1.67	0	0	0	0	0	0
2002	255	23	1	955.838	-260.274	D	6.568	6.568	0	1.199	0	0	0	0	0	0
2002	256	23	1	955.838	-260.274	D	6.848	6.848	0	1.752	0	0	0	0	0	0
2002	257	23	1	955.838	-260.274	D	7.456	7.456	0	3.006	0	0	0	0	0	0
2002	258	23	119	945.479	-254.084	D	8.626	8.597	0.028	5.581	97.58	0	0	0	0.48	1.94
2002	259	23	1	955.838	-260.274	D	8.812	8.638	0.174	5.678	98.9	0.04	0	0	0.07	1
2002	260	23	5	959.487	-259.835	D	7.493	7.468	0.025	3.033	97.44	0.01	0	0	0.08	2.46
2002	261	23	297	944.609	-246.761	D	8.513	8.509	0.005	5.37	99.36	0.02	0	0	0.02	0.58
2002	262	23	1	955.838	-260.274	D	8.73	8.73	0	5.9	0	0	0	0	0	0
2002	263	23	297	944.609	-246.761	D	8.304	8.303	0	4.889	98.02	0.02	0	0	0.64	1.47
2002	264	23	21	963.025	-258.479	D	9.709	9.311	0.397	7.347	99.42	0.06	0	0	0.06	0.46
2002	265	23	287	963.77	-246.317	D	8.146	8.023	0.123	4.249	99.44	0.01	0	0	0.04	0.51
2002	266	23	8	961.676	-259.571	D	7.112	7.112	0	2.287	75.63	0.01	0	0	0.76	13.41
2002	267	23	1	955.838	-260.274	D	6.594	6.594	0	1.248	0	0	0	0	0	0
2002	268	23	1	955.838	-260.274	D	6.709	6.709	0	1.474	0	0	0	0	0	0
2002	269	23	1	955.838	-260.274	D	9.8	9.8	0	8.63	0	0	0	0	0	0
2002	270	23	1	955.838	-260.274	D	9.763	9.763	0	8.533	0	0	0	0	0	0
2002	271	23	1	955.838	-260.274	D	8.694	8.694	0	5.812	0	0	0	0	0	0
2002	272	23	1	955.838	-260.274	D	7.259	7.259	0	2.592	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	273	23	1	955.838	-260.274	D	7.49	7.49	0	3.081	0	0	0	0	0	0
2002	274	23	1	955.838	-260.274	D	8.92	8.92	0	6.363	0	0	0	0	0	0
2002	275	23	1	955.838	-260.274	D	8.978	8.978	0	6.508	0	0	0	0	0	0
2002	276	23	1	955.838	-260.274	D	7.716	7.716	0	3.568	0	0	0	0	0	0
2002	277	23	297	944.609	-246.761	D	8.137	8.128	0.009	4.487	98.53	0.03	0	0	0.16	1.29
2002	278	23	6	960.217	-259.747	D	8.267	8.191	0.076	4.631	98	0.03	0	0	0.23	1.73
2002	279	23	297	944.609	-246.761	D	7.026	7.025	0.001	2.109	92.2	0	0	0	2.15	5.72
2002	280	23	119	945.479	-254.084	D	7.197	7.169	0.028	2.404	96.39	0.05	0	0	0.21	3.35
2002	281	23	1	955.838	-260.274	D	6.576	6.576	0	1.214	0	0	0	0	0	0
2002	282	23	1	955.838	-260.274	D	7.13	7.13	0	2.325	0	0	0	0	0	0
2002	283	23	1	955.838	-260.274	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2002	284	23	172	943.804	-252.427	D	9.786	9.786	0	8.593	99.79	0	0	0	0.02	0.09
2002	285	23	172	943.804	-252.427	D	9.732	9.622	0.11	8.156	99.33	0.05	0	0	0.06	0.56
2002	286	23	172	943.804	-252.427	D	8.994	8.665	0.329	5.743	99.47	0.07	0	0	0.02	0.44
2002	287	23	1	955.838	-260.274	D	6.588	6.588	0	1.237	0	0	0	0	0	0
2002	288	23	1	955.838	-260.274	D	8.454	8.454	0	5.242	0	0	0	0	0	0
2002	289	23	1	955.838	-260.274	D	7.081	7.081	0	2.223	0	0	0	0	0	0
2002	290	23	1	955.838	-260.274	D	6.562	6.562	0	1.187	0	0	0	0	0	0
2002	291	23	48	963.533	-256.561	D	6.601	6.597	0.004	1.254	75.33	0.45	0	0	4.54	19.66
2002	292	23	297	944.609	-246.761	D	8.323	8.309	0.013	4.904	99.59	0.06	0	0	0.05	0.3
2002	293	23	172	943.804	-252.427	D	9.293	9.18	0.114	7.012	99.55	0.06	0	0	0.02	0.36
2002	294	23	8	961.676	-259.571	D	6.894	6.894	0.001	1.844	98.21	0.05	0	0	0.18	1.6
2002	295	23	1	955.838	-260.274	D	6.634	6.634	0	1.327	0	0	0	0	0	0
2002	296	23	1	955.838	-260.274	D	6.651	6.651	0	1.361	0	0	0	0	0	0
2002	297	23	1	955.838	-260.274	D	6.715	6.715	0	1.486	0	0	0	0	0	0
2002	298	23	275	944.098	-248.678	D	8.963	8.963	0	6.47	69.42	3.19	0	0	0.11	5.97
2002	299	23	302	963.548	-244.486	D	9.441	9.225	0.215	7.127	98.37	0.35	0	0	0.05	1.24
2002	300	23	8	961.676	-259.571	D	7.5	7.5	0	3.1	79.62	0.48	0	0	1.64	11.24
2002	301	23	119	945.479	-254.084	D	9.267	9.267	0	7.235	92.75	0	0	0	0.72	3.21
2002	302	23	119	945.479	-254.084	D	9.594	9.594	0	8.083	80.7	0	0	0	0.28	2.61
2002	303	23	48	963.533	-256.561	D	8.73	8.73	0	5.899	91.7	0	0	0	3.16	5.04
2002	304	23	1	955.838	-260.274	D	7.853	7.853	0	3.869	0	0	0	0	0	0
2002	305	23	1	955.838	-260.274	D	8.121	8.121	0	4.47	0	0	0	0	0	0
2002	306	23	1	955.838	-260.274	D	6.565	6.565	0	1.193	0	0	0	0	0	0
2002	307	23	275	944.098	-248.678	D	6.794	6.782	0.011	1.62	98.45	0.11	0	0	0.16	1.29
2002	308	23	297	944.609	-246.761	D	10.537	9.34	**1.197**	7.42	99.48	0.08	0	0	0.04	0.4
2002	309	23	172	943.804	-252.427	D	9.61	9.409	0.201	7.599	99.57	0.05	0	0	0.02	0.37
2002	310	23	119	945.479	-254.084	D	8.441	8.387	0.054	5.085	99.48	0.08	0	0	0.01	0.43
2002	311	23	172	943.804	-252.427	D	8.099	8.099	0	4.421	95.61	0.01	0	0	0.25	3.99

Appendix M
Mammoth Cave
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	312	23	297	944.609	-246.761	D	6.801	6.798	0.003	1.651	97.96	0.02	0	0	0.07	1.94
2002	313	23	1	955.838	-260.274	D	6.882	6.882	0	1.82	0	0	0	0	0	0
2002	314	23	1	955.838	-260.274	D	8.096	8.096	0	4.414	0	0	0	0	0	0
2002	315	23	298	945.337	-246.674	D	8.249	8.219	0.03	4.694	98.38	0.13	0	0	0.06	1.43
2002	316	23	1	955.838	-260.274	D	7.176	7.176	0	2.419	0	0	0	0	0	0
2002	317	23	1	955.838	-260.274	D	6.984	6.984	0	2.026	0	0	0	0	0	0
2002	318	23	297	944.609	-246.761	D	6.93	6.921	0.009	1.899	95.86	0.02	0	0	0.78	3.33
2002	319	23	172	943.804	-252.427	D	8.641	8.641	0	5.686	98.16	0.16	0	0	0.14	1.12
2002	320	23	119	945.479	-254.084	D	9.437	9.437	0	7.671	98.83	0.16	0	0	0.09	0.96
2002	321	23	1	955.838	-260.274	D	8.142	8.142	0	4.52	0	0	0	0	0	0
2002	322	23	204	947.34	-251.078	D	7.545	7.536	0.008	3.179	95.11	0.31	0	0	0.45	4.12
2002	323	23	3	958.027	-260.011	D	7.895	7.868	0.027	3.903	95.94	0.54	0	0	0.38	3.13
2002	324	23	9	954.269	-259.534	D	7.122	7.101	0.021	2.264	98.1	0.07	0	0	0.06	1.76
2002	325	23	285	962.313	-246.493	D	7.77	7.704	0.066	3.542	94.29	0.25	0	0	0.69	4.77
2002	326	23	1	955.838	-260.274	D	7.495	7.495	0	3.09	0	0	0	0	0	0
2002	327	23	3	958.027	-260.011	D	6.776	6.775	0.001	1.605	94.8	0.04	0	0	0.43	4.64
2002	328	23	295	962.931	-245.49	D	6.674	6.673	0.001	1.405	73.32	0.02	0	0	9.03	17.53
2002	329	23	172	943.804	-252.427	D	7.102	7.1	0.003	2.262	91.64	0.01	0	0	1.18	7.13
2002	330	23	3	958.027	-260.011	D	9.572	9.572	0	8.025	87.99	0	0	0	0.98	6.73
2002	331	23	1	955.838	-260.274	D	9.13	9.13	0	6.886	0	0	0	0	0	0
2002	332	23	119	945.479	-254.084	D	6.92	6.92	0	1.896	91.19	0.08	0	0	0.21	5.23
2002	333	23	297	944.609	-246.761	D	6.8	6.794	0.006	1.643	87.22	0.26	0	0	1.37	11.15
2002	334	23	8	961.676	-259.571	D	6.983	6.974	0.009	2.006	65.37	0.84	0	0	3.04	30.73
2002	335	23	1	955.838	-260.274	D	6.593	6.593	0	1.247	0	0	0	0	0	0
2002	336	23	297	944.609	-246.761	D	6.514	6.51	0.004	1.086	78.21	0.36	0	0	1.39	20.06
2002	337	23	119	945.479	-254.084	D	7.025	7.019	0.006	2.097	77.13	0.26	0	0	0.7	21.89
2002	338	23	1	955.838	-260.274	D	8.31	8.31	0	4.906	0	0	0	0	0	0
2002	339	23	1	955.838	-260.274	D	9.492	9.492	0	7.814	0	0	0	0	0	0
2002	340	23	1	955.838	-260.274	D	7.848	7.848	0	3.858	0	0	0	0	0	0
2002	341	23	297	944.609	-246.761	D	7.639	7.62	0.019	3.36	95.27	0.31	0	0	0.23	4.17
2002	342	23	172	943.804	-252.427	D	8.067	7.959	0.108	4.106	98.91	0.02	0	0	0.22	0.85
2002	343	23	6	960.217	-259.747	D	7.708	7.682	0.026	3.493	99.67	0.01	0	0	0.02	0.3
2002	344	23	1	955.838	-260.274	D	8.116	8.116	0	4.461	0	0	0	0	0	0
2002	345	23	1	955.838	-260.274	D	10.176	10.176	0	9.662	0	0	0	0	0	0
2002	346	23	275	944.098	-248.678	D	9.907	9.876	0.031	8.836	98.69	0.19	0	0	0.13	0.98
2002	347	23	275	944.098	-248.678	D	10.06	10.058	0.001	9.335	98.17	0.22	0	0	0.08	1.42
2002	348	23	1	955.838	-260.274	D	9.07	9.07	0	6.736	0	0	0	0	0	0
2002	349	23	3	958.027	-260.011	D	8.908	8.846	0.061	6.183	98.23	0.32	0	0	0.13	1.32
2002	350	23	8	961.676	-259.571	D	10.249	9.648	**0.601**	8.225	99.21	0.06	0	0	0.15	0.58

Appendix M
Mammoth Cave
MC 2002 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	351	23	297	944.609	-246.761	D	9.781	9.485	0.296	7.796	99.76	0.01	0	0	0.01	0.22
2002	352	23	1	955.838	-260.274	D	7.237	7.237	0	2.546	0	0	0	0	0	0
2002	353	23	1	955.838	-260.274	D	8.404	8.404	0	5.124	0	0	0	0	0	0
2002	354	23	8	961.676	-259.571	D	8.959	8.947	0.012	6.431	86.01	0.27	0	0	1	12.71
2002	355	23	297	944.609	-246.761	D	7.257	7.208	0.049	2.485	70.71	0.65	0	0	1.97	26.66
2002	356	23	8	961.676	-259.571	D	7.412	7.401	0.011	2.89	91.49	0.42	0	0	0.38	7.71
2002	357	23	1	955.838	-260.274	D	7.073	7.073	0	2.207	0	0	0	0	0	0
2002	358	23	1	955.838	-260.274	D	9.363	9.363	0	7.48	0	0	0	0	0	0
2002	359	23	1	955.838	-260.274	D	8.999	8.999	0	6.56	0	0	0	0	0	0
2002	360	23	1	955.838	-260.274	D	7.552	7.552	0	3.212	0	0	0	0	0	0
2002	361	23	172	943.804	-252.427	D	8.283	8.283	0.001	4.843	88.05	0.93	0	0	0.43	10.34
2002	362	23	290	946.175	-247.503	D	8.512	8.186	0.326	4.618	98.7	0.11	0	0	0.17	1.02
2002	363	23	297	944.609	-246.761	D	7.407	7.407	0.001	2.903	72.07	0.02	0	0	6.27	21.58
2002	364	23	1	955.838	-260.274	D	7.556	7.556	0	3.221	0	0	0	0	0	0
2002	365	23	1	955.838	-260.274	D	8.267	8.267	0	4.806	0	0	0	0	0	0
									1.197							

Appendix M
Mammoth Cave
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NORANDA									DELTA		% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	955.838	-260.274	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2003	2	23	1	955.838	-260.274	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2003	3	23	159	955.578	-251.949	D	8.918	8.918	0	6.358	47.26	0	0	0	1.66	2.58
2003	4	23	119	945.479	-254.084	D	7.909	7.906	0.002	3.987	97.84	0.11	0	0	0.16	1.86
2003	5	23	227	964.103	-249.062	D	8.726	8.577	0.149	5.533	98.91	0.08	0	0	0.15	0.85
2003	6	23	33	962.185	-257.652	D	9.037	9.037	0	6.654	57	4.81	0	0	0.02	16.68
2003	7	23	297	944.609	-246.761	D	8.135	8.126	0.009	4.483	97.14	0.12	0	0	0.07	2.67
2003	8	23	8	961.676	-259.571	D	7.706	7.64	0.066	3.404	94.24	0.07	0	0	0.41	5.27
2003	9	23	8	961.676	-259.571	D	7.799	7.784	0.014	3.718	59.29	2.6	0	0	2.54	35.56
2003	10	23	1	955.838	-260.274	D	7.506	7.506	0	3.113	0	0	0	0	0	0
2003	11	23	1	955.838	-260.274	D	7.068	7.068	0	2.197	0	0	0	0	0	0
2003	12	23	1	955.838	-260.274	D	6.642	6.642	0	1.343	0	0	0	0	0	0
2003	13	23	297	944.609	-246.761	D	6.785	6.747	0.038	1.55	86.15	0.45	0	0	0.66	12.75
2003	14	23	9	954.269	-259.534	D	8.782	8.568	0.214	5.511	98.13	0.17	0	0	0.17	1.52
2003	15	23	1	955.838	-260.274	D	7.471	7.471	0	3.039	0	0	0	0	0	0
2003	16	23	1	955.838	-260.274	D	7.326	7.326	0	2.732	0	0	0	0	0	0
2003	17	23	1	955.838	-260.274	D	8.874	8.874	0	6.252	0	0	0	0	0	0
2003	18	23	21	963.025	-258.479	D	7.705	7.703	0.002	3.539	97.73	0.27	0	0	0.14	1.8
2003	19	23	297	944.609	-246.761	D	9.119	9.059	0.06	6.709	96.64	0.16	0	0	0.24	2.96
2003	20	23	5	959.487	-259.835	D	7.31	7.275	0.035	2.625	77.44	0.73	0	0	1.52	20.31
2003	21	23	1	955.838	-260.274	D	7.461	7.406	0.055	2.901	96.24	0.2	0	0	0.15	3.41
2003	22	23	1	955.838	-260.274	D	7.563	7.563	0	3.236	0	0	0	0	0	0
2003	23	23	1	955.838	-260.274	D	7.681	7.681	0	3.491	0	0	0	0	0	0
2003	24	23	1	955.838	-260.274	D	7.423	7.423	0	2.936	0	0	0	0	0	0
2003	25	23	297	944.609	-246.761	D	6.94	6.86	0.08	1.775	92.78	0.21	0	0	0.86	6.15
2003	26	23	290	946.175	-247.503	D	7.409	7.375	0.034	2.836	90.54	0.34	0	0	1.05	8.07
2003	27	23	1	955.838	-260.274	D	7.363	7.363	0	2.81	0	0	0	0	0	0
2003	28	23	1	955.838	-260.274	D	6.9	6.9	0	1.856	0	0	0	0	0	0
2003	29	23	172	943.804	-252.427	D	9.678	9.675	0.003	8.296	99.35	0.02	0	0	0.12	0.47
2003	30	23	1	955.838	-260.274	D	9.253	9.253	0	7.199	0	0	0	0	0	0
2003	31	23	1	955.838	-260.274	D	8.53	8.53	0	5.421	0	0	0	0	0	0
2003	32	23	1	955.838	-260.274	D	9.424	9.349	0.075	7.444	98.64	0.15	0	0	0.1	1.11
2003	33	23	297	944.609	-246.761	D	8.589	8.555	0.034	5.48	99.08	0.1	0	0	0.02	0.79
2003	34	23	1	955.838	-260.274	D	7.806	7.806	0	3.765	0	0	0	0	0	0
2003	35	23	297	944.609	-246.761	D	8.171	8.166	0.005	4.574	94.1	0.45	0	0	0.59	4.87
2003	36	23	1	955.838	-260.274	D	7.153	7.153	0	2.372	0	0	0	0	0	0
2003	37	23	1	955.838	-260.274	D	7.339	7.339	0	2.76	0	0	0	0	0	0
2003	38	23	1	955.838	-260.274	D	9.465	9.465	0	7.745	0	0	0	0	0	0

Appendix M
Mammoth Cave
MC 2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	39	23	297	944.609	-246.761	D	8.137	8.134	0.004	4.5	97.37	0.09	0	0	0.18	2.38
2003	40	23	297	944.609	-246.761	D	7.2	7.158	0.042	2.382	94.15	0.07	0	0	1.34	4.44
2003	41	23	302	963.548	-244.486	D	9.711	9.568	0.143	8.014	99.07	0.16	0	0	0.08	0.69
2003	42	23	300	962.092	-244.663	D	9.656	9.591	0.065	8.073	94.83	0.22	0	0	0.22	4.73
2003	43	23	8	961.676	-259.571	D	7.813	7.812	0.001	3.778	77.73	1.49	0	0	0.8	19.94
2003	44	23	297	944.609	-246.761	D	6.834	6.824	0.009	1.704	96.3	0.05	0	0	0.58	3.06
2003	45	23	297	944.609	-246.761	D	8.993	8.958	0.036	6.457	98.69	0.08	0	0	0.09	1.13
2003	46	23	1	955.838	-260.274	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2003	47	23	1	955.838	-260.274	D	10.218	10.218	0	9.779	0	0	0	0	0	0
2003	48	23	1	955.838	-260.274	D	8.967	8.967	0	6.481	0	0	0	0	0	0
2003	49	23	297	944.609	-246.761	D	8.595	8.57	0.025	5.515	98.53	0.1	0	0	0.16	1.2
2003	50	23	200	964.214	-249.977	D	8.574	8.567	0.008	5.508	94.35	0.94	0	0	0.21	4.49
2003	51	23	290	946.175	-247.503	D	9.571	9.571	0	8.021	93.09	0.01	0	0	2.48	3.96
2003	52	23	1	955.838	-260.274	D	9.469	9.469	0	7.754	0	0	0	0	0	0
2003	53	23	1	955.838	-260.274	D	10.155	10.155	0	9.603	0	0	0	0	0	0
2003	54	23	1	955.838	-260.274	D	8.606	8.606	0	5.601	0	0	0	0	0	0
2003	55	23	6	960.217	-259.747	D	8.402	8.402	0	5.119	52.64	0	0	0	6.74	13.47
2003	56	23	30	959.996	-257.917	D	7.38	7.38	0	2.846	18.52	0	0	0	0.44	3.64
2003	57	23	1	955.838	-260.274	D	7.711	7.711	0	3.557	0	0	0	0	0	0
2003	58	23	1	955.838	-260.274	D	9.81	9.81	0	8.658	0	0	0	0	0	0
2003	59	23	1	955.838	-260.274	D	9.644	9.644	0	8.213	0	0	0	0	0	0
2003	60	23	297	944.609	-246.761	D	7.787	7.786	0.001	3.721	91.12	0	0	0	2.87	6.01
2003	61	23	172	943.804	-252.427	D	9.879	9.332	**0.547**	7.401	99.62	0.06	0	0	0.02	0.3
2003	62	23	1	955.838	-260.274	D	7.38	7.38	0	2.847	0	0	0	0	0	0
2003	63	23	1	955.838	-260.274	D	6.768	6.768	0	1.591	0	0	0	0	0	0
2003	64	23	172	943.804	-252.427	D	9.551	9.434	0.117	7.664	99.17	0.08	0	0	0.08	0.66
2003	65	23	1	955.838	-260.274	D	9.398	9.2	0.198	7.064	99.45	0.09	0	0	0.02	0.45
2003	66	23	1	955.838	-260.274	D	8.691	8.691	0	5.805	0	0	0	0	0	0
2003	67	23	1	955.838	-260.274	D	6.844	6.844	0	1.742	0	0	0	0	0	0
2003	68	23	5	959.487	-259.835	D	7.979	7.966	0.014	4.12	94.81	0.43	0	0	0.4	4.37
2003	69	23	1	955.838	-260.274	D	6.863	6.863	0	1.782	0	0	0	0	0	0
2003	70	23	119	945.479	-254.084	D	6.551	6.551	0	1.166	75.69	0	0	0	7.36	19.84
2003	71	23	297	944.609	-246.761	D	6.883	6.881	0.002	1.817	66.7	0.01	0	0	11.35	21.9
2003	72	23	201	945.153	-251.338	D	7.777	7.719	0.058	3.574	98.96	0.03	0	0	0.08	0.93
2003	73	23	1	955.838	-260.274	D	8.914	8.914	0	6.348	98.77	0	0	0	0.01	0.28
2003	74	23	1	955.838	-260.274	D	8.043	8.043	0	4.294	0	0	0	0	0	0
2003	75	23	1	955.838	-260.274	D	8.48	8.48	0	5.304	0	0	0	0	0	0
2003	76	23	1	955.838	-260.274	D	8.12	8.12	0	4.468	0	0	0	0	0	0
2003	77	23	1	955.838	-260.274	D	8.521	8.521	0	5.4	0	0	0	0	0	0

Appendix M
Mammoth Cave
MC 2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	78	23	1	955.838	-260.274	D	9.308	9.308	0	7.339	0	0	0	0	0	0
2003	79	23	1	955.838	-260.274	D	8.503	8.503	0	5.358	0	0	0	0	0	0
2003	80	23	119	945.479	-254.084	D	8.724	8.69	0.034	5.804	96.82	0.09	0	0	0.39	2.7
2003	81	23	21	963.025	-258.479	D	7.46	7.46	0	3.015	49.23	3.37	0	0	0.08	47.38
2003	82	23	172	943.804	-252.427	D	6.618	6.612	0.006	1.283	94.55	0.01	0	0	0.77	4.64
2003	83	23	8	961.676	-259.571	D	6.644	6.608	0.036	1.277	87.81	0.05	0	0	1.02	11.11
2003	84	23	297	944.609	-246.761	D	6.989	6.989	0	2.036	86.26	0.25	0	0	0.95	12.05
2003	85	23	8	961.676	-259.571	D	8.621	8.58	0.041	5.54	97.85	0.25	0	0	0.05	1.84
2003	86	23	9	954.269	-259.534	D	7.033	7.032	0.001	2.124	97.87	0.06	0	0	0.06	2.03
2003	87	23	1	955.838	-260.274	D	7.178	7.178	0	2.424	0	0	0	0	0	0
2003	88	23	5	959.487	-259.835	D	8.371	8.344	0.026	4.985	98.32	0.13	0	0	0.05	1.51
2003	89	23	1	955.838	-260.274	D	7.624	7.624	0	3.368	0	0	0	0	0	0
2003	90	23	297	944.609	-246.761	D	7.04	7.039	0.001	2.138	88.57	0.02	0	0	1.44	9.97
2003	91	23	302	963.548	-244.486	D	6.55	6.549	0	1.162	89.2	0.05	0	0	0.97	10.01
2003	92	23	1	955.838	-260.274	D	6.784	6.784	0	1.623	0	0	0	0	0	0
2003	93	23	1	955.838	-260.274	D	6.921	6.921	0	1.897	0	0	0	0	0	0
2003	94	23	1	955.838	-260.274	D	6.957	6.957	0	1.971	0	0	0	0	0	0
2003	95	23	302	963.548	-244.486	D	8.295	8.286	0.009	4.849	93.78	0.41	0	0	0.59	5.21
2003	96	23	1	955.838	-260.274	D	7.489	7.489	0	3.078	0	0	0	0	0	0
2003	97	23	275	944.098	-248.678	D	9.573	9.517	0.056	7.88	99.62	0	0	0	0.09	0.28
2003	98	23	1	955.838	-260.274	D	9.388	9.174	0.215	6.997	99.88	0	0	0	0.01	0.1
2003	99	23	1	955.838	-260.274	D	10.113	10.113	0	9.486	0	0	0	0	0	0
2003	100	23	1	955.838	-260.274	D	9.706	9.706	0	8.379	0	0	0	0	0	0
2003	101	23	1	955.838	-260.274	D	7.068	7.068	0	2.197	0	0	0	0	0	0
2003	102	23	1	955.838	-260.274	D	6.568	6.568	0	1.198	0	0	0	0	0	0
2003	103	23	1	955.838	-260.274	D	6.608	6.608	0	1.277	0	0	0	0	0	0
2003	104	23	8	961.676	-259.571	D	6.713	6.708	0.005	1.473	95.61	0.01	0	0	0.45	3.92
2003	105	23	296	963.659	-245.401	D	7.206	7.206	0	2.481	73.72	0.01	0	0	0.46	18.91
2003	106	23	1	955.838	-260.274	D	7.317	7.317	0	2.712	0	0	0	0	0	0
2003	107	23	31	960.725	-257.829	D	7.724	7.71	0.014	3.555	92.54	0.02	0	0	0.55	6.88
2003	108	23	302	963.548	-244.486	D	8.064	8.063	0	4.34	77.92	1.02	0	0	0.29	20.4
2003	109	23	143	962.978	-251.984	D	7.831	7.831	0	3.822	89.93	0.16	0	0	0.18	7.23
2003	110	23	1	955.838	-260.274	D	7.279	7.279	0	2.634	0	0	0	0	0	0
2003	111	23	1	955.838	-260.274	D	8.721	8.712	0.009	5.857	87.53	0.16	0	0	1.46	10.85
2003	112	23	21	963.025	-258.479	D	7.673	7.672	0.001	3.472	81.56	0.06	0	0	1.49	16.93
2003	113	23	1	955.838	-260.274	D	6.902	6.902	0	1.861	0	0	0	0	0	0
2003	114	23	1	955.838	-260.274	D	6.879	6.879	0	1.813	0	0	0	0	0	0
2003	115	23	1	955.838	-260.274	D	9.478	9.478	0	7.778	0	0	0	0	0	0
2003	116	23	1	955.838	-260.274	D	8.895	8.895	0	6.301	0	0	0	0	0	0

Appendix M
Mammoth Cave
MC 2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	117	23	1	955.838	-260.274	D	6.72	6.72	0	1.496	0	0	0	0	0	0
2003	118	23	1	955.838	-260.274	D	6.81	6.81	0	1.675	0	0	0	0	0	0
2003	119	23	302	963.548	-244.486	D	7.493	7.466	0.027	3.029	95.94	0.06	0	0	0.98	3.03
2003	120	23	297	944.609	-246.761	D	7.442	7.435	0.007	2.962	98.3	0	0	0	0.14	1.55
2003	121	23	297	944.609	-246.761	D	7.585	7.584	0.001	3.281	97.41	0.01	0	0	0.46	2.23
2003	122	23	8	961.676	-259.571	D	9.315	9.24	0.075	7.165	98.01	0.21	0	0	0.3	1.48
2003	123	23	1	955.838	-260.274	D	8.839	8.839	0	6.164	0	0	0	0	0	0
2003	124	23	1	955.838	-260.274	D	7.485	7.485	0	3.069	0	0	0	0	0	0
2003	125	23	1	955.838	-260.274	D	8.499	8.499	0	5.347	0	0	0	0	0	0
2003	126	23	297	944.609	-246.761	D	9.87	9.87	0	8.819	88.96	0	0	0	2.82	4.72
2003	127	23	288	944.718	-247.676	D	9.336	9.336	0	7.412	91.06	0	0	0	2.88	5.43
2003	128	23	9	954.269	-259.534	D	9.223	9.054	0.169	6.697	98.98	0.08	0	0	0.13	0.82
2003	129	23	302	963.548	-244.486	D	8.675	8.675	0	5.766	97.07	0	0	0	0.61	2.55
2003	130	23	1	955.838	-260.274	D	8.308	8.308	0	4.902	0	0	0	0	0	0
2003	131	23	8	961.676	-259.571	D	8.097	8.089	0.008	4.399	89.24	0.21	0	0	0.51	10.05
2003	132	23	8	961.676	-259.571	D	6.606	6.604	0.001	1.269	85.77	0.01	0	0	1.5	12.71
2003	133	23	1	955.838	-260.274	D	6.614	6.614	0	1.288	0	0	0	0	0	0
2003	134	23	297	944.609	-246.761	D	6.843	6.832	0.011	1.72	96.3	0.01	0	0	0.29	3.4
2003	135	23	302	963.548	-244.486	D	8.942	8.769	0.173	5.995	98.24	0.19	0	0	0.23	1.34
2003	136	23	6	960.217	-259.747	D	8.381	8.203	0.178	4.659	99.43	0.02	0	0	0.05	0.49
2003	137	23	297	944.609	-246.761	D	9.177	9.165	0.012	6.975	99.17	0.02	0	0	0.06	0.75
2003	138	23	1	955.838	-260.274	D	9.009	9.009	0	6.585	0	0	0	0	0	0
2003	139	23	1	955.838	-260.274	D	8.693	8.693	0	5.81	0	0	0	0	0	0
2003	140	23	172	943.804	-252.427	D	9.061	8.905	0.156	6.327	99.42	0.01	0	0	0.11	0.46
2003	141	23	1	955.838	-260.274	D	9.468	9.296	0.172	7.308	99.64	0.03	0	0	0.03	0.3
2003	142	23	1	955.838	-260.274	D	7.287	7.287	0	2.65	96.15	0	0	0	0.59	4.76
2003	143	23	1	955.838	-260.274	D	6.912	6.912	0	1.879	0	0	0	0	0	0
2003	144	23	1	955.838	-260.274	D	6.666	6.666	0	1.389	0	0	0	0	0	0
2003	145	23	6	960.217	-259.747	D	7.419	7.419	0	2.928	21.69	0	0	0	4.15	6.67
2003	146	23	3	958.027	-260.011	D	9.044	9.044	0	6.672	53.6	0	0	0	0.74	1.3
2003	147	23	1	955.838	-260.274	D	7.389	7.389	0	2.865	0	0	0	0	0	0
2003	148	23	8	961.676	-259.571	D	6.904	6.904	0	1.863	85.82	0	0	0	1.42	12.66
2003	149	23	8	961.676	-259.571	D	7.743	7.743	0	3.627	74.52	0.01	0	0	1.93	23.34
2003	150	23	172	943.804	-252.427	D	6.923	6.923	0	1.901	104.43	0	0	0	0.35	1.14
2003	151	23	48	963.533	-256.561	D	7.34	7.32	0.02	2.72	91.9	0.2	0	0	0.8	7.1
2003	152	23	1	955.838	-260.274	D	7.97	7.97	0	4.129	0	0	0	0	0	0
2003	153	23	1	955.838	-260.274	D	6.813	6.813	0	1.682	0	0	0	0	0	0
2003	154	23	297	944.609	-246.761	D	8.834	8.765	0.069	5.985	98.17	0.03	0	0	0.13	1.67
2003	155	23	21	963.025	-258.479	D	8.321	8.296	0.025	4.872	99.13	0.02	0	0	0.03	0.81

Appendix M
Mammoth Cave
MC 2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	156	23	1	955.838	-260.274	D	7.214	7.214	0	2.497	0	0	0	0	0	0
2003	157	23	1	955.838	-260.274	D	6.974	6.974	0	2.005	0	0	0	0	0	0
2003	158	23	144	944.641	-253.256	D	9.509	9.509	0	7.859	85.33	0	0	0	2.2	5.42
2003	159	23	1	955.838	-260.274	D	8.65	8.57	0.08	5.515	97.3	0.01	0	0	0.54	2.15
2003	160	23	3	958.027	-260.011	D	6.923	6.904	0.019	1.863	93.48	0.02	0	0	0.79	5.72
2003	161	23	1	955.838	-260.274	D	6.784	6.757	0.027	1.569	93.07	0.01	0	0	0.65	6.28
2003	162	23	1	955.838	-260.274	D	8.376	8.376	0	5.059	0	0	0	0	0	0
2003	163	23	297	944.609	-246.761	D	9.307	9.186	0.121	7.028	97.86	0.03	0	0	0.11	1.99
2003	164	23	297	944.609	-246.761	D	8.562	8.546	0.016	5.459	98.1	0	0	0	0.08	1.82
2003	165	23	297	944.609	-246.761	D	8.611	8.546	0.065	5.458	99.58	0	0	0	0.08	0.34
2003	166	23	171	964.325	-250.892	D	8.691	8.516	0.175	5.388	99.26	0.01	0	0	0.06	0.67
2003	167	23	1	955.838	-260.274	D	8.592	8.528	0.064	5.417	99.44	0.03	0	0	0.04	0.49
2003	168	23	8	961.676	-259.571	D	8.664	8.642	0.023	5.687	99.61	0.02	0	0	0.02	0.33
2003	169	23	293	961.474	-245.666	D	7.867	7.867	0	3.901	85.71	0	0	0	0.85	5.51
2003	170	23	1	955.838	-260.274	D	8.654	8.654	0	5.718	0	0	0	0	0	0
2003	171	23	1	955.838	-260.274	D	8.171	8.171	0	4.584	0	0	0	0	0	0
2003	172	23	1	955.838	-260.274	D	6.641	6.641	0	1.341	0	0	0	0	0	0
2003	173	23	1	955.838	-260.274	D	6.602	6.602	0	1.265	0	0	0	0	0	0
2003	174	23	1	955.838	-260.274	D	6.639	6.639	0	1.336	0	0	0	0	0	0
2003	175	23	1	955.838	-260.274	D	6.704	6.704	0	1.466	0	0	0	0	0	0
2003	176	23	1	955.838	-260.274	D	6.805	6.805	0	1.665	0	0	0	0	0	0
2003	177	23	297	944.609	-246.761	D	7.389	7.388	0.001	2.864	98.39	0.03	0	0	0.32	1.18
2003	178	23	1	955.838	-260.274	D	8.626	8.553	0.073	5.475	99.43	0.06	0	0	0.04	0.47
2003	179	23	3	958.027	-260.011	D	6.645	6.645	0	1.348	87.71	0.04	0	0	0.61	7.6
2003	180	23	6	960.217	-259.747	D	6.645	6.645	0	1.349	81.31	0.01	0	0	0.78	13.56
2003	181	23	288	944.718	-247.676	D	7.209	7.209	0	2.488	82.49	0	0	0	5.96	11.29
2003	182	23	149	948.287	-252.822	D	8.609	8.609	0	5.609	42.66	0	0	0	1.74	3.42
2003	183	23	1	955.838	-260.274	D	8.095	8.095	0	4.412	0	0	0	0	0	0
2003	184	23	1	955.838	-260.274	D	7.426	7.426	0	2.942	0	0	0	0	0	0
2003	185	23	297	944.609	-246.761	D	6.984	6.974	0.011	2.005	98.42	0	0	0	0.1	1.47
2003	186	23	188	955.468	-251.034	D	7.459	7.459	0	3.013	64.87	0	0	0	1.9	3.18
2003	187	23	1	955.838	-260.274	D	8.565	8.565	0	5.504	0	0	0	0	0	0
2003	188	23	302	963.548	-244.486	D	8.937	8.919	0.018	6.361	97.49	0.08	0	0	0.57	1.86
2003	189	23	302	963.548	-244.486	D	8.543	8.519	0.025	5.394	96.82	0.08	0	0	0.48	2.62
2003	190	23	297	944.609	-246.761	D	7.853	7.852	0	3.867	98.56	0	0	0	0.31	0.93
2003	191	23	171	964.325	-250.892	D	9.471	9.437	0.035	7.67	98.36	0.01	0	0	0.2	1.43
2003	192	23	1	955.838	-260.274	D	8.765	8.765	0	5.985	0	0	0	0	0	0
2003	193	23	302	963.548	-244.486	D	7.113	7.086	0.026	2.234	95.6	0	0	0	0.4	3.99
2003	194	23	34	962.914	-257.564	D	7.446	7.446	0	2.986	70.24	0.03	0	0	0.59	24

Appendix M
Mammoth Cave
MC 2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	195	23	1	955.838	-260.274	D	8.344	8.333	0.011	4.958	98.92	0.01	0	0	0.18	0.88
2003	196	23	8	961.676	-259.571	D	7.215	7.175	0.04	2.417	99.23	0	0	0	0.07	0.69
2003	197	23	3	958.027	-260.011	D	8.304	8.262	0.042	4.794	95.8	0.08	0	0	0.96	3.15
2003	198	23	1	955.838	-260.274	D	7.455	7.455	0	3.004	0	0	0	0	0	0
2003	199	23	1	955.838	-260.274	D	6.976	6.976	0	2.009	0	0	0	0	0	0
2003	200	23	1	955.838	-260.274	D	8.444	8.44	0.004	5.209	99.71	0	0	0	0.03	0.23
2003	201	23	1	955.838	-260.274	D	7.777	7.777	0	3.702	0	0	0	0	0	0
2003	202	23	297	944.609	-246.761	D	7.998	7.987	0.01	4.169	99.15	0.01	0	0	0.11	0.73
2003	203	23	297	944.609	-246.761	D	9.348	9.284	0.065	7.276	99.15	0.04	0	0	0.06	0.75
2003	204	23	1	955.838	-260.274	D	8.544	8.544	0	5.455	0	0	0	0	0	0
2003	205	23	1	955.838	-260.274	D	8.161	8.161	0	4.561	0	0	0	0	0	0
2003	206	23	1	955.838	-260.274	D	6.787	6.787	0	1.63	0	0	0	0	0	0
2003	207	23	1	955.838	-260.274	D	6.973	6.973	0	2.003	0	0	0	0	0	0
2003	208	23	1	955.838	-260.274	D	7.671	7.671	0	3.469	0	0	0	0	0	0
2003	209	23	297	944.609	-246.761	D	7.568	7.492	0.076	3.084	96.97	0.01	0	0	0.37	2.66
2003	210	23	21	963.025	-258.479	D	9.19	9.066	0.125	6.725	98.76	0.1	0	0	0.04	1.09
2003	211	23	1	955.838	-260.274	D	7.175	7.175	0	2.417	0	0	0	0	0	0
2003	212	23	9	954.269	-259.534	D	8.358	8.189	0.17	4.626	99.38	0.01	0	0	0.07	0.54
2003	213	23	9	954.269	-259.534	D	8.639	8.495	0.144	5.338	99.43	0.01	0	0	0.06	0.5
2003	214	23	299	946.066	-246.588	D	8.081	7.811	0.269	3.778	98.45	0.03	0	0	0.14	1.38
2003	215	23	172	943.804	-252.427	D	8.701	8.573	0.127	5.524	98.89	0.04	0	0	0.22	0.84
2003	216	23	297	944.609	-246.761	D	8.114	8.04	0.074	4.289	98.82	0.03	0	0	0.21	0.94
2003	217	23	1	955.838	-260.274	D	8.075	7.773	0.302	3.694	98.88	0.03	0	0	0.08	1.01
2003	218	23	8	961.676	-259.571	D	7.072	7.072	0	2.205	31.96	0.01	0	0	2.57	9.47
2003	219	23	1	955.838	-260.274	D	8.11	8.11	0	4.446	0	0	0	0	0	0
2003	220	23	1	955.838	-260.274	D	7.724	7.724	0	3.585	0	0	0	0	0	0
2003	221	23	1	955.838	-260.274	D	7.706	7.706	0	3.545	0	0	0	0	0	0
2003	222	23	1	955.838	-260.274	D	8.556	8.556	0	5.483	0	0	0	0	0	0
2003	223	23	1	955.838	-260.274	D	7.884	7.884	0	3.937	0	0	0	0	0	0
2003	224	23	1	955.838	-260.274	D	8.494	8.494	0	5.337	0	0	0	0	0	0
2003	225	23	1	955.838	-260.274	D	7.635	7.635	0	3.392	0	0	0	0	0	0
2003	226	23	1	955.838	-260.274	D	7.821	7.821	0	3.799	0	0	0	0	0	0
2003	227	23	275	944.098	-248.678	D	7.742	7.74	0.002	3.62	98.06	0	0	0	0.37	1.56
2003	228	23	119	945.479	-254.084	D	7.822	7.796	0.026	3.744	99.09	0	0	0	0.05	0.86
2003	229	23	119	945.479	-254.084	D	7.628	7.628	0	3.375	8.7	0	0	0	0.24	2.19
2003	230	23	1	955.838	-260.274	D	8.609	8.609	0	5.61	0	0	0	0	0	0
2003	231	23	1	955.838	-260.274	D	7.266	7.266	0	2.606	0	0	0	0	0	0
2003	232	23	1	955.838	-260.274	D	7.122	7.122	0	2.307	0	0	0	0	0	0
2003	233	23	275	944.098	-248.678	D	7.192	7.18	0.012	2.428	98.06	0	0	0	0.24	1.69

Appendix M
Mammoth Cave
MC 2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	234	23	297	944.609	-246.761	D	8.29	8.033	0.257	4.271	98.77	0.01	0	0	0.18	1.04
2003	235	23	34	962.914	-257.564	D	8.582	8.447	0.136	5.224	98.38	0.01	0	0	0.05	1.56
2003	236	23	1	955.838	-260.274	D	6.998	6.998	0	2.053	0	0	0	0	0	0
2003	237	23	1	955.838	-260.274	D	6.762	6.762	0	1.58	0	0	0	0	0	0
2003	238	23	1	955.838	-260.274	D	6.942	6.942	0	1.94	0	0	0	0	0	0
2003	239	23	297	944.609	-246.761	D	7.83	7.779	0.051	3.705	99.25	0	0	0	0.11	0.64
2003	240	23	119	945.479	-254.084	D	9.41	8.973	0.437	6.494	98.7	0.04	0	0	0.08	1.18
2003	241	23	1	955.838	-260.274	D	8.494	8.494	0	5.335	0	0	0	0	0	0
2003	242	23	297	944.609	-246.761	D	9.618	9.475	0.143	7.771	98.64	0.04	0	0	0.29	1.03
2003	243	23	297	944.609	-246.761	D	9.275	9.162	0.113	6.968	99.48	0.02	0	0	0.05	0.44
2003	244	23	1	955.838	-260.274	D	9.065	9.065	0	6.724	0	0	0	0	0	0
2003	245	23	298	945.337	-246.674	D	10.148	10.1	0.048	9.449	98.75	0.09	0	0	0.12	1.02
2003	246	23	297	944.609	-246.761	D	10.24	10.218	0.022	9.779	99.48	0	0	0	0.15	0.35
2003	247	23	172	943.804	-252.427	D	9.184	9.114	0.07	6.847	99.5	0	0	0	0.07	0.43
2003	248	23	1	955.838	-260.274	D	7.433	7.433	0	2.959	0	0	0	0	0	0
2003	249	23	1	955.838	-260.274	D	7.193	7.193	0	2.455	0	0	0	0	0	0
2003	250	23	1	955.838	-260.274	D	7.079	7.079	0	2.219	0	0	0	0	0	0
2003	251	23	1	955.838	-260.274	D	7.396	7.396	0	2.879	0	0	0	0	0	0
2003	252	23	1	955.838	-260.274	D	7.104	7.104	0	2.271	0	0	0	0	0	0
2003	253	23	1	955.838	-260.274	D	6.982	6.982	0	2.022	0	0	0	0	0	0
2003	254	23	1	955.838	-260.274	D	7.139	7.139	0	2.342	0	0	0	0	0	0
2003	255	23	1	955.838	-260.274	D	6.853	6.853	0	1.762	0	0	0	0	0	0
2003	256	23	1	955.838	-260.274	D	6.867	6.867	0	1.789	0	0	0	0	0	0
2003	257	23	172	943.804	-252.427	D	7.971	7.967	0.004	4.123	98.2	0	0	0	0.22	1.58
2003	258	23	5	959.487	-259.835	D	8.61	8.559	0.051	5.489	97.56	0.07	0	0	0.07	2.3
2003	259	23	1	955.838	-260.274	D	6.641	6.641	0	1.341	0	0	0	0	0	0
2003	260	23	1	955.838	-260.274	D	6.71	6.71	0	1.477	0	0	0	0	0	0
2003	261	23	1	955.838	-260.274	D	6.869	6.869	0	1.794	0	0	0	0	0	0
2003	262	23	1	955.838	-260.274	D	7.146	7.138	0.008	2.34	99.1	0	0	0	0.17	0.73
2003	263	23	2	956.568	-260.187	D	7.41	7.41	0	2.908	76.46	0	0	0	0.35	13.23
2003	264	23	1	955.838	-260.274	D	6.853	6.853	0	1.762	0	0	0	0	0	0
2003	265	23	1	955.838	-260.274	D	9.361	9.361	0	7.475	0	0	0	0	0	0
2003	266	23	1	955.838	-260.274	D	7.891	7.891	0	3.954	0	0	0	0	0	0
2003	267	23	297	944.609	-246.761	D	6.816	6.815	0.001	1.686	95.15	0	0	0	0.47	4.32
2003	268	23	172	943.804	-252.427	D	7.129	7.117	0.011	2.298	96.3	0.02	0	0	0.45	3.23
2003	269	23	6	960.217	-259.747	D	6.974	6.946	0.028	1.948	98.11	0	0	0	0.15	1.74
2003	270	23	21	963.025	-258.479	D	8.652	8.61	0.042	5.611	98.71	0.09	0	0	0.13	1.07
2003	271	23	1	955.838	-260.274	D	7.242	7.242	0	2.557	0	0	0	0	0	0
2003	272	23	1	955.838	-260.274	D	7.071	7.071	0	2.203	0	0	0	0	0	0

Appendix M
Mammoth Cave
MC 2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	273	23	1	955.838	-260.274	D	6.565	6.565	0	1.193	0	0	0	0	0	0
2003	274	23	1	955.838	-260.274	D	8.586	8.586	0	5.553	0	0	0	0	0	0
2003	275	23	1	955.838	-260.274	D	6.585	6.585	0	1.231	0	0	0	0	0	0
2003	276	23	177	947.449	-251.993	D	6.502	6.502	0	1.07	11.05	0	0	0	15.57	27.15
2003	277	23	8	961.676	-259.571	D	6.643	6.629	0.014	1.317	75.21	0.08	0	0	2.55	22.16
2003	278	23	1	955.838	-260.274	D	6.607	6.607	0	1.275	0	0	0	0	0	0
2003	279	23	297	944.609	-246.761	D	7.909	7.862	0.047	3.889	97.14	0.14	0	0	0.17	2.54
2003	280	23	300	962.092	-244.663	D	6.947	6.93	0.017	1.917	96.19	0.01	0	0	0.15	3.64
2003	281	23	172	943.804	-252.427	D	6.796	6.795	0.001	1.645	95.08	0	0	0	0.1	4.66
2003	282	23	159	955.578	-251.949	D	6.828	6.828	0	1.712	12.82	0	0	0	0.03	4.42
2003	283	23	1	955.838	-260.274	D	7.64	7.64	0	3.403	0	0	0	0	0	0
2003	284	23	1	955.838	-260.274	D	7.336	7.336	0	2.754	0	0	0	0	0	0
2003	285	23	172	943.804	-252.427	D	8.322	8.288	0.034	4.855	99.14	0.02	0	0	0.16	0.67
2003	286	23	8	961.676	-259.571	D	7.03	7.028	0.002	2.115	99.33	0	0	0	0.06	0.6
2003	287	23	297	944.609	-246.761	D	8.447	8.432	0.015	5.19	98.33	0.16	0	0	0.18	1.33
2003	288	23	1	955.838	-260.274	D	7.539	7.539	0	3.184	0	0	0	0	0	0
2003	289	23	297	944.609	-246.761	D	6.675	6.649	0.026	1.356	91.51	0.06	0	0	0.66	7.77
2003	290	23	275	944.098	-248.678	D	8.578	8.578	0.001	5.534	92.74	0	0	0	1.5	5.59
2003	291	23	31	960.725	-257.829	D	8.988	8.988	0	6.532	92.82	0	0	0	0.56	6.26
2003	292	23	271	960.967	-247.585	D	6.908	6.835	0.073	1.726	95.06	0.03	0	0	0.85	4.07
2003	293	23	8	961.676	-259.571	D	6.843	6.826	0.017	1.708	91.78	0.01	0	0	0.26	7.93
2003	294	23	8	961.676	-259.571	D	7.925	7.887	0.038	3.945	92.16	0.53	0	0	0.48	6.82
2003	295	23	1	955.838	-260.274	D	6.622	6.622	0	1.304	0	0	0	0	0	0
2003	296	23	119	945.479	-254.084	D	6.59	6.589	0.001	1.239	96.53	0	0	0	1.04	2.47
2003	297	23	1	955.838	-260.274	D	6.66	6.66	0	1.378	0	0	0	0	0	0
2003	298	23	1	955.838	-260.274	D	6.831	6.831	0	1.716	0	0	0	0	0	0
2003	299	23	297	944.609	-246.761	D	9.21	9.123	0.087	6.87	98.74	0.18	0	0	0.04	1.04
2003	300	23	48	963.533	-256.561	D	7.415	7.415	0	2.92	88.77	0.01	0	0	3.58	6.04
2003	301	23	297	944.609	-246.761	D	7.192	7.187	0.005	2.442	93.63	0.15	0	0	0.73	5.47
2003	302	23	241	954.519	-249.29	D	8.89	8.851	0.039	6.194	98.78	0.12	0	0	0.05	1.05
2003	303	23	99	948.505	-254.653	D	6.737	6.737	0	1.53	0.33	1.89	0	0	0	98.04
2003	304	23	1	955.838	-260.274	D	6.981	6.981	0	2.02	0	0	0	0	0	0
2003	305	23	297	944.609	-246.761	D	7.123	7.111	0.012	2.286	93.69	0.04	0	0	0.43	5.84
2003	306	23	297	944.609	-246.761	D	7.367	7.364	0.004	2.811	95.81	0.01	0	0	0.05	4.13
2003	307	23	300	962.092	-244.663	D	7.303	7.303	0	2.685	50.06	0.01	0	0	18.15	30.11
2003	308	23	1	955.838	-260.274	D	7.192	7.192	0	2.452	0	0	0	0	0	0
2003	309	23	9	954.269	-259.534	D	9.026	8.863	0.162	6.225	99.57	0.01	0	0	0.08	0.33
2003	310	23	21	963.025	-258.479	D	9.432	9.281	0.151	7.269	99.81	0.01	0	0	0.01	0.17
2003	311	23	34	962.914	-257.564	D	8.363	8.363	0	5.029	95.49	0	0	0	0	0.06

Appendix M
Mammoth Cave
MC 2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	312	23	1	955.838	-260.274	D	6.813	6.813	0	1.681	0	0	0	0	0	0
2003	313	23	1	955.838	-260.274	D	6.578	6.578	0	1.218	0	0	0	0	0	0
2003	314	23	1	955.838	-260.274	D	6.801	6.801	0	1.658	0	0	0	0	0	0
2003	315	23	1	955.838	-260.274	D	6.924	6.924	0	1.903	0	0	0	0	0	0
2003	316	23	22	954.159	-258.619	D	8.48	8.443	0.036	5.216	98.31	0.04	0	0	0.19	1.46
2003	317	23	3	958.027	-260.011	D	6.896	6.896	0	1.849	25.14	0.27	0	0	0.04	7.01
2003	318	23	1	955.838	-260.274	D	6.506	6.506	0	1.078	0	0	0	0	0	0
2003	319	23	1	955.838	-260.274	D	8.492	8.492	0	5.33	0	0	0	0	0	0
2003	320	23	254	944.206	-249.594	D	9.588	9.588	0	8.067	100.44	0	0	0	0.03	0.23
2003	321	23	290	946.175	-247.503	D	8.583	8.583	0	5.546	93.95	0	0	0	2.3	3.72
2003	322	23	1	955.838	-260.274	D	8.803	8.803	0	6.076	0	0	0	0	0	0
2003	323	23	172	943.804	-252.427	D	9.235	9.233	0.002	7.148	99.27	0.01	0	0	0.1	0.54
2003	324	23	172	943.804	-252.427	D	7.085	7.084	0	2.23	48.19	0.28	0	0	1.08	50.37
2003	325	23	297	944.609	-246.761	D	7.283	7.279	0.003	2.635	81.32	0.09	0	0	0.23	18.36
2003	326	23	1	955.838	-260.274	D	7.719	7.719	0	3.575	0	0	0	0	0	0
2003	327	23	1	955.838	-260.274	D	7.79	7.79	0	3.731	0	0	0	0	0	0
2003	328	23	297	944.609	-246.761	D	8.162	8.141	0.021	4.516	96.85	0.29	0	0	0.28	2.58
2003	329	23	1	955.838	-260.274	D	7.218	7.218	0	2.505	0	0	0	0	0	0
2003	330	23	1	955.838	-260.274	D	6.917	6.917	0	1.89	0	0	0	0	0	0
2003	331	23	275	944.098	-248.678	D	8.603	8.603	0	5.594	60.46	0	0	0	3.25	5.13
2003	332	23	119	945.479	-254.084	D	8.84	8.84	0	6.167	91.81	0.01	0	0	2.97	5.19
2003	333	23	172	943.804	-252.427	D	7.808	7.807	0.002	3.767	78.77	0.64	0	0	0.55	20.03
2003	334	23	301	962.82	-244.575	D	7.408	7.401	0.007	2.891	94.83	0.21	0	0	0.09	4.85
2003	335	23	285	962.313	-246.493	D	7.062	7.055	0.007	2.17	79.66	0.79	0	0	2.03	17.51
2003	336	23	1	955.838	-260.274	D	6.532	6.532	0	1.128	0	0	0	0	0	0
2003	337	23	1	955.838	-260.274	D	6.585	6.585	0	1.232	0	0	0	0	0	0
2003	338	23	1	955.838	-260.274	D	9.664	9.664	0	8.266	0	0	0	0	0	0
2003	339	23	8	961.676	-259.571	D	9.432	9.358	0.075	7.466	99.25	0.18	0	0	0.03	0.54
2003	340	23	1	955.838	-260.274	D	8.504	8.504	0	5.36	0	0	0	0	0	0
2003	341	23	1	955.838	-260.274	D	7.15	7.15	0	2.366	0	0	0	0	0	0
2003	342	23	1	955.838	-260.274	D	7.337	7.337	0	2.755	0	0	0	0	0	0
2003	343	23	1	955.838	-260.274	D	7.388	7.388	0	2.862	0	0	0	0	0	0
2003	344	23	297	944.609	-246.761	D	8.685	8.68	0.004	5.78	98.64	0.02	0	0	0.17	1.18
2003	345	23	47	962.803	-256.649	D	8.499	8.474	0.025	5.288	97.71	0.14	0	0	0.19	1.96
2003	346	23	1	955.838	-260.274	D	7.466	7.466	0	3.028	0	0	0	0	0	0
2003	347	23	1	955.838	-260.274	D	8.365	8.365	0	5.034	0	0	0	0	0	0
2003	348	23	3	958.027	-260.011	D	9.738	9.738	0	8.464	51.19	0.01	0	0	6.3	10.35
2003	349	23	172	943.804	-252.427	D	9.577	9.507	0.07	7.854	98.76	0.11	0	0	0.1	1.02
2003	350	23	9	954.269	-259.534	D	8.553	8.506	0.047	5.364	98.9	0.12	0	0	0.19	0.79

Appendix M
Mammoth Cave
MC 2003 M2

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	351	23	21	963.025	-258.479	D	8.106	8.105	0.001	4.434	98.74	0.17	0	0	0.07	0.97
2003	352	23	302	963.548	-244.486	D	8.799	8.727	0.071	5.894	95.37	0.37	0	0	0.44	3.82
2003	353	23	1	955.838	-260.274	D	9.199	9.199	0	7.061	0	0	0	0	0	0
2003	354	23	1	955.838	-260.274	D	7.769	7.769	0	3.684	0	0	0	0	0	0
2003	355	23	297	944.609	-246.761	D	6.932	6.932	0	1.921	53.68	1.99	0	0	1.29	43.07
2003	356	23	1	955.838	-260.274	D	7.503	7.503	0	3.108	0	0	0	0	0	0
2003	357	23	9	954.269	-259.534	D	8.867	8.542	0.325	5.45	98.89	0.13	0	0	0.11	0.87
2003	358	23	21	963.025	-258.479	D	8.42	8.397	0.023	5.107	98.97	0.17	0	0	0.06	0.8
2003	359	23	1	955.838	-260.274	D	7.559	7.559	0	3.228	0	0	0	0	0	0
2003	360	23	1	955.838	-260.274	D	6.933	6.933	0	1.923	0	0	0	0	0	0
2003	361	23	1	955.838	-260.274	D	6.898	6.898	0	1.852	0	0	0	0	0	0
2003	362	23	1	955.838	-260.274	D	7.136	7.136	0	2.337	0	0	0	0	0	0
2003	363	23	297	944.609	-246.761	D	8.313	8.292	0.021	4.864	99.3	0.08	0	0	0.07	0.54
2003	364	23	9	954.269	-259.534	D	7.886	7.742	0.144	3.625	99.46	0.09	0	0	0.04	0.41
									0.547							

Appendix M
Mammoth Cave
MC 2001 M6

NORANDA									DELTA		% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	1	23	1	955.838	-260.274	D	7.641	7.641	0	3.404	0	0	0	0	0	0
2001	2	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	3	23	297	944.609	-246.761	D	7.761	7.639	0.122	3.4	98.55	0.06	0	0	0.16	1.23
2001	4	23	300	962.092	-244.663	D	7.745	7.639	0.107	3.4	96.08	0.17	0	0	0.37	3.38
2001	5	23	48	963.533	-256.561	D	7.649	7.639	0.01	3.4	86.25	0.48	0	0	0.82	12.45
2001	6	23	144	944.641	-253.256	D	7.639	7.639	0	3.4	44.51	4.03	0	0	0.27	46.5
2001	7	23	297	944.609	-246.761	D	7.66	7.639	0.021	3.4	92.62	0.35	0	0	0.5	6.52
2001	8	23	21	963.025	-258.479	D	7.64	7.639	0.001	3.4	85.83	1	0	0	0.2	12.98
2001	9	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	10	23	297	944.609	-246.761	D	7.639	7.639	0	3.4	94.21	0.16	0	0	0.73	2.94
2001	11	23	297	944.609	-246.761	D	7.639	7.639	0	3.4	94.22	0.17	0	0	1.38	4.44
2001	12	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	13	23	172	943.804	-252.427	D	7.639	7.639	0	3.4	100.04	0.01	0	0	0.1	0.35
2001	14	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	15	23	290	946.175	-247.503	D	7.662	7.639	0.023	3.4	83.26	1.41	0	0	0.95	14.38
2001	16	23	7	960.946	-259.659	D	7.639	7.639	0	3.4	42.41	1.41	0	0	0.39	26.29
2001	17	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	18	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	19	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	20	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	21	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	22	23	297	944.609	-246.761	D	7.651	7.639	0.012	3.4	98.71	0.08	0	0	0.09	1.13
2001	23	23	297	944.609	-246.761	D	7.641	7.639	0.003	3.4	96.62	0.07	0	0	0.39	2.92
2001	24	23	297	944.609	-246.761	D	7.672	7.639	0.033	3.4	93.28	0.28	0	0	0.23	6.2
2001	25	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	26	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	27	23	172	943.804	-252.427	D	7.644	7.639	0.005	3.4	80.14	0.59	0	0	1.2	18.06
2001	28	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	10.39	0	0	0	2.55	3.98
2001	29	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	11.23	0	0	0	2.56	3.99
2001	30	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	31	23	8	961.676	-259.571	D	7.644	7.639	0.005	3.4	76.22	0.5	0	0	3.04	20.26
2001	32	23	1	955.838	-260.274	D	7.505	7.505	0	3.112	0	0	0	0	0	0
2001	33	23	65	951.641	-256.135	D	7.557	7.5	0.058	3.1	90.58	0.34	0	0	0.68	8.4
2001	34	23	172	943.804	-252.427	D	7.5	7.5	0	3.1	57.78	4.14	0	0	0.51	37.97
2001	35	23	297	944.609	-246.761	D	7.5	7.5	0.001	3.1	87.62	0.56	0	0	0.6	11.36
2001	36	23	1	955.838	-260.274	D	7.505	7.5	0.005	3.1	87.96	0.3	0	0	0.56	11.18
2001	37	23	297	944.609	-246.761	D	7.51	7.5	0.011	3.1	92.33	0.14	0	0	0.68	6.87
2001	38	23	172	943.804	-252.427	D	7.513	7.5	0.014	3.1	91	0.16	0	0	0.37	8.47

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	39	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	40	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	41	23	9	954.269	-259.534	D	7.504	7.5	0.005	3.1	94.95	0.13	0	0	0.39	4.53
2001	42	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	43	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	44	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	45	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	46	23	8	961.676	-259.571	D	7.511	7.5	0.011	3.1	90.95	0.57	0	0	1.04	7.45
2001	47	23	1	955.838	-260.274	D	7.518	7.5	0.018	3.1	98.13	0.18	0	0	0.09	1.61
2001	48	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	49	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	50	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	51	23	297	944.609	-246.761	D	7.509	7.5	0.01	3.1	93.62	0.02	0	0	0.63	5.74
2001	52	23	6	960.217	-259.747	D	7.51	7.5	0.011	3.1	87.5	0.11	0	0	0.94	11.46
2001	53	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	54	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	55	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	56	23	3	958.027	-260.011	D	7.509	7.5	0.01	3.1	93.25	0.02	0	0	0.43	6.31
2001	57	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	58	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	59	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2001	60	23	1	955.838	-260.274	D	7.409	7.409	0	2.908	0	0	0	0	0	0
2001	61	23	2	956.568	-260.187	D	7.416	7.406	0.01	2.9	90.44	0.24	0	0	0.73	8.62
2001	62	23	8	961.676	-259.571	D	7.408	7.406	0.003	2.9	97.41	0.04	0	0	0.06	2.58
2001	63	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	97.9	0	0	0	0.39	2.06
2001	64	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	65	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	66	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	67	23	204	947.34	-251.078	D	7.432	7.406	0.026	2.9	93.46	0.24	0	0	0.89	5.42
2001	68	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	69	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	70	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	71	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	72	23	8	961.676	-259.571	D	7.415	7.406	0.01	2.9	83.62	0.12	0	0	1.73	14.55
2001	73	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	93.72	0.07	0	0	0.14	7.64
2001	74	23	172	943.804	-252.427	D	7.408	7.406	0.003	2.9	96.85	0.05	0	0	0.03	3.11
2001	75	23	297	944.609	-246.761	D	7.422	7.406	0.016	2.9	93.53	0.09	0	0	0.48	5.91
2001	76	23	21	963.025	-258.479	D	7.406	7.406	0.001	2.9	85.72	0.42	0	0	0.48	13.47
2001	77	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	78	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	79	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	80	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	81	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	82	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	83	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	63.91	0.01	0	0	21.28	41.77
2001	84	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	85	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	86	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	87	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	88	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	89	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2001	90	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	94.75	0	0	0	5.42	9.8
2001	91	23	8	961.676	-259.571	D	7.324	7.269	0.055	2.612	95.93	0.14	0	0	0.26	3.67
2001	92	23	204	947.34	-251.078	D	7.265	7.263	0.002	2.6	91.16	0.05	0	0	2.49	6.4
2001	93	23	204	947.34	-251.078	D	7.263	7.263	0	2.6	95.56	0	0	0	8.99	14.08
2001	94	23	3	958.027	-260.011	D	7.263	7.263	0	2.6	86.97	0	0	0	5.4	9.25
2001	95	23	204	947.34	-251.078	D	7.263	7.263	0	2.6	88.47	0	0	0	3.75	8.06
2001	96	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	97	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	98	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	99	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	100	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	101	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	102	23	297	944.609	-246.761	D	7.264	7.263	0.002	2.6	92.96	0	0	0	0.83	6.26
2001	103	23	297	944.609	-246.761	D	7.312	7.263	0.049	2.6	93.16	0.02	0	0	0.73	6.1
2001	104	23	172	943.804	-252.427	D	7.317	7.263	0.054	2.6	97.48	0	0	0	0.36	2.16
2001	105	23	300	962.092	-244.663	D	7.315	7.263	0.052	2.6	97.16	0.02	0	0	0.19	2.63
2001	106	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	107	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	108	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	109	23	8	961.676	-259.571	D	7.307	7.263	0.045	2.6	95.4	0.14	0	0	0.38	4.09
2001	110	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	111	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	112	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	113	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	114	23	297	944.609	-246.761	D	7.264	7.263	0.001	2.6	87.98	0.22	0	0	2.54	9.21
2001	115	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	116	23	297	944.609	-246.761	D	7.263	7.263	0	2.6	84.31	0	0	0	5.06	11.61

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	117	23	302	963.548	-244.486	D	7.271	7.263	0.008	2.6	92.26	0.02	0	0	1.38	6.35
2001	118	23	9	954.269	-259.534	D	7.314	7.263	0.051	2.6	99.04	0	0	0	0.06	0.91
2001	119	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2001	120	23	119	945.479	-254.084	D	7.263	7.263	0	2.6	105.05	0	0	0	5.04	10.5
2001	121	23	1	955.838	-260.274	D	7.535	7.535	0	3.175	0	0	0	0	0	0
2001	122	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	123	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	124	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	125	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	126	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	127	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	128	23	8	961.676	-259.571	D	7.581	7.546	0.034	3.2	96.34	0.13	0	0	0.26	3.27
2001	129	23	1	955.838	-260.274	D	7.549	7.546	0.003	3.2	98.15	0.01	0	0	0.33	1.58
2001	130	23	297	944.609	-246.761	D	7.689	7.546	0.143	3.2	98.57	0	0	0	0.25	1.18
2001	131	23	298	945.337	-246.674	D	7.573	7.546	0.027	3.2	97.81	0	0	0	0.35	1.85
2001	132	23	297	944.609	-246.761	D	7.558	7.546	0.012	3.2	94.41	0.07	0	0	0.43	5.09
2001	133	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	134	23	1	955.838	-260.274	D	7.557	7.546	0.011	3.2	96.55	0	0	0	0.65	2.8
2001	135	23	297	944.609	-246.761	D	7.593	7.546	0.047	3.2	97.44	0	0	0	0.33	2.24
2001	136	23	297	944.609	-246.761	D	7.567	7.546	0.021	3.2	96.12	0	0	0	0.6	3.29
2001	137	23	297	944.609	-246.761	D	7.55	7.546	0.004	3.2	92.21	0	0	0	1.66	6.16
2001	138	23	297	944.609	-246.761	D	7.546	7.546	0	3.2	80.87	0	0	0	3.8	15.8
2001	139	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	140	23	8	961.676	-259.571	D	7.566	7.546	0.02	3.2	98.86	0	0	0	0.11	1.03
2001	141	23	48	963.533	-256.561	D	7.586	7.546	0.04	3.2	98	0	0	0	0.23	1.76
2001	142	23	8	961.676	-259.571	D	7.575	7.546	0.028	3.2	96.58	0.03	0	0	0.26	3.12
2001	143	23	9	954.269	-259.534	D	7.568	7.546	0.021	3.2	93.74	0.01	0	0	1.02	5.23
2001	144	23	21	963.025	-258.479	D	7.586	7.546	0.04	3.2	95.32	0.01	0	0	0.46	4.22
2001	145	23	49	953.21	-256.876	D	7.626	7.546	0.08	3.2	93.98	0.02	0	0	0.6	5.4
2001	146	23	200	964.214	-249.977	D	7.57	7.546	0.023	3.2	92.89	0.03	0	0	0.93	6.16
2001	147	23	1	955.838	-260.274	D	7.567	7.546	0.021	3.2	92.11	0.02	0	0	1.5	6.39
2001	148	23	1	955.838	-260.274	D	7.549	7.546	0.002	3.2	97.14	0	0	0	0.71	2.17
2001	149	23	8	961.676	-259.571	D	7.548	7.546	0.001	3.2	98.17	0.01	0	0	0.27	1.56
2001	150	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	151	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	152	23	8	961.676	-259.571	D	7.696	7.679	0.017	3.487	96.05	0.16	0	0	0.56	3.23
2001	153	23	8	961.676	-259.571	D	7.703	7.685	0.018	3.5	94.81	0.02	0	0	0.58	4.59
2001	154	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	155	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	83.59	0	0	0	1.5	11.82

Appendix M
Mammoth Cave
MC 2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	156	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	157	23	297	944.609	-246.761	D	7.69	7.685	0.005	3.5	97.4	0	0	0	0.82	1.77
2001	158	23	297	944.609	-246.761	D	7.821	7.685	0.136	3.5	98.32	0.03	0	0	0.14	1.51
2001	159	23	8	961.676	-259.571	D	7.689	7.685	0.004	3.5	98.81	0.01	0	0	0.05	1.13
2001	160	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	161	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	162	23	275	944.098	-248.678	D	7.768	7.685	0.083	3.5	98.78	0	0	0	0.19	1.03
2001	163	23	172	943.804	-252.427	D	7.787	7.685	0.102	3.5	98.32	0	0	0	0.13	1.55
2001	164	23	275	944.098	-248.678	D	7.711	7.685	0.026	3.5	98.85	0	0	0	0.07	1.08
2001	165	23	81	963.311	-254.73	D	7.685	7.685	0	3.5	88.31	0.01	0	0	0.14	7.29
2001	166	23	172	943.804	-252.427	D	7.703	7.685	0.019	3.5	98.4	0	0	0	0.17	1.42
2001	167	23	21	963.025	-258.479	D	7.692	7.685	0.007	3.5	98.46	0.01	0	0	0.12	1.41
2001	168	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	169	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	170	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	171	23	297	944.609	-246.761	D	7.773	7.685	0.088	3.5	97.95	0.01	0	0	0.31	1.73
2001	172	23	9	954.269	-259.534	D	7.774	7.685	0.089	3.5	98.94	0.01	0	0	0.07	0.99
2001	173	23	302	963.548	-244.486	D	7.753	7.685	0.069	3.5	98.9	0.01	0	0	0.06	1.03
2001	174	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	175	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	176	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	177	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	178	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	179	23	9	954.269	-259.534	D	7.685	7.685	0	3.5	5.66	0	0	0	0.29	0.47
2001	180	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	181	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	182	23	302	963.548	-244.486	D	7.847	7.772	0.075	3.692	98.5	0	0	0	0.21	1.28
2001	183	23	2	956.568	-260.187	D	7.836	7.776	0.06	3.7	97.62	0.01	0	0	0.09	2.28
2001	184	23	7	960.946	-259.659	D	7.778	7.776	0.001	3.7	98.35	0	0	0	0.08	1.53
2001	185	23	300	962.092	-244.663	D	7.932	7.776	0.156	3.7	98	0.06	0	0	0.19	1.75
2001	186	23	48	963.533	-256.561	D	7.779	7.776	0.003	3.7	98.07	0.01	0	0	0.07	1.89
2001	187	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2001	188	23	297	944.609	-246.761	D	7.806	7.776	0.03	3.7	98.03	0	0	0	0.42	1.55
2001	189	23	302	963.548	-244.486	D	7.81	7.776	0.034	3.7	95.35	0	0	0	0.46	4.18
2001	190	23	3	958.027	-260.011	D	7.796	7.776	0.02	3.7	94.68	0.08	0	0	0.28	4.97
2001	191	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2001	192	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2001	193	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2001	194	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0

Appendix M
Mammoth Cave
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	195	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2001	196	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2001	197	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2001	198	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2001	199	23	297	944.609	-246.761	D	7.804	7.776	0.028	3.7	99.01	0	0	0	0.19	0.8
2001	200	23	172	943.804	-252.427	D	8.128	7.776	0.352	3.7	98.57	0.01	0	0	0.08	1.34
2001	201	23	172	943.804	-252.427	D	7.816	7.776	0.039	3.7	98.64	0.01	0	0	0.08	1.26
2001	202	23	119	945.479	-254.084	D	7.795	7.776	0.019	3.7	98.61	0.01	0	0	0.18	1.19
2001	203	23	275	944.098	-248.678	D	7.785	7.776	0.009	3.7	98.41	0	0	0	0.16	1.43
2001	204	23	297	944.609	-246.761	D	7.779	7.776	0.003	3.7	99.09	0	0	0	0.05	0.85
2001	205	23	297	944.609	-246.761	D	7.782	7.776	0.006	3.7	98.32	0	0	0	0.32	1.39
2001	206	23	297	944.609	-246.761	D	7.782	7.776	0.006	3.7	99.25	0	0	0	0.13	0.61
2001	207	23	297	944.609	-246.761	D	7.964	7.776	0.188	3.7	98.01	0.03	0	0	0.22	1.74
2001	208	23	297	944.609	-246.761	D	7.788	7.776	0.012	3.7	98.75	0.04	0	0	0.04	1.18
2001	209	23	297	944.609	-246.761	D	7.875	7.776	0.099	3.7	99.08	0	0	0	0.16	0.76
2001	210	23	297	944.609	-246.761	D	7.989	7.776	0.213	3.7	98.15	0.04	0	0	0.19	1.63
2001	211	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	93.42	0.03	0	0	0.31	8.36
2001	212	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2001	213	23	1	955.838	-260.274	D	7.863	7.863	0	3.892	0	0	0	0	0	0
2001	214	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	215	23	1	955.838	-260.274	D	7.951	7.867	0.084	3.9	98.99	0	0	0	0.13	0.87
2001	216	23	8	961.676	-259.571	D	7.867	7.867	0	3.9	96.3	0.03	0	0	0.16	3.34
2001	217	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	218	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	219	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	220	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	221	23	297	944.609	-246.761	D	7.968	7.867	0.101	3.9	98.9	0.03	0	0	0.15	0.92
2001	222	23	9	954.269	-259.534	D	8.038	7.867	0.171	3.9	98.4	0.03	0	0	0.09	1.48
2001	223	23	8	961.676	-259.571	D	8.036	7.867	0.169	3.9	99.5	0.01	0	0	0.02	0.47
2001	224	23	8	961.676	-259.571	D	7.887	7.867	0.021	3.9	99.61	0	0	0	0.01	0.38
2001	225	23	8	961.676	-259.571	D	7.869	7.867	0.002	3.9	99.38	0	0	0	0.01	0.61
2001	226	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	227	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	228	23	297	944.609	-246.761	D	7.881	7.867	0.015	3.9	97.42	0.01	0	0	0.33	2.23
2001	229	23	21	963.025	-258.479	D	7.878	7.867	0.011	3.9	97.88	0.01	0	0	0.23	1.88
2001	230	23	302	963.548	-244.486	D	8.003	7.867	0.136	3.9	98.09	0.01	0	0	0.28	1.62
2001	231	23	119	945.479	-254.084	D	7.897	7.867	0.03	3.9	97.8	0.04	0	0	0.18	1.98
2001	232	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	233	23	119	945.479	-254.084	D	7.867	7.867	0	3.9	76.18	0.01	0	0	0.19	12.84

Appendix M
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MC 2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	234	23	119	945.479	-254.084	D	7.889	7.867	0.022	3.9	99.45	0	0	0	0.1	0.44
2001	235	23	9	954.269	-259.534	D	7.912	7.867	0.045	3.9	97.92	0	0	0	0.18	1.91
2001	236	23	1	955.838	-260.274	D	7.889	7.867	0.022	3.9	97.4	0.01	0	0	0.21	2.39
2001	237	23	172	943.804	-252.427	D	7.889	7.867	0.022	3.9	98.9	0	0	0	0.11	1
2001	238	23	297	944.609	-246.761	D	7.904	7.867	0.038	3.9	98.52	0	0	0	0.21	1.27
2001	239	23	48	963.533	-256.561	D	7.932	7.867	0.065	3.9	96.76	0.05	0	0	0.18	3.02
2001	240	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	241	23	1	955.838	-260.274	D	7.92	7.867	0.053	3.9	98.58	0.01	0	0	0.11	1.3
2001	242	23	297	944.609	-246.761	D	7.959	7.867	0.092	3.9	99.49	0	0	0	0.04	0.47
2001	243	23	297	944.609	-246.761	D	7.871	7.867	0.004	3.9	98.36	0	0	0	0.15	1.49
2001	244	23	275	944.098	-248.678	D	7.934	7.867	0.068	3.9	98.1	0.04	0	0	0.09	1.77
2001	245	23	9	954.269	-259.534	D	7.871	7.867	0.004	3.9	99.02	0.02	0	0	0.06	0.91
2001	246	23	172	943.804	-252.427	D	7.867	7.867	0	3.9	98.87	0	0	0	0.02	0.72
2001	247	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	248	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	249	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	250	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	251	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	252	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	253	23	48	963.533	-256.561	D	7.93	7.867	0.063	3.9	97.37	0.13	0	0	0.08	2.42
2001	254	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	255	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	256	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	257	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	258	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	259	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	260	23	297	944.609	-246.761	D	7.867	7.867	0	3.9	80.6	0	0	0	7.14	12.12
2001	261	23	302	963.548	-244.486	D	7.868	7.867	0.001	3.9	83.42	0	0	0	4.94	11.7
2001	262	23	297	944.609	-246.761	D	7.914	7.867	0.047	3.9	98.27	0.02	0	0	0.17	1.54
2001	263	23	21	963.025	-258.479	D	7.892	7.867	0.026	3.9	98.11	0.06	0	0	0.09	1.75
2001	264	23	1	955.838	-260.274	D	7.954	7.867	0.087	3.9	97.49	0.03	0	0	0.3	2.18
2001	265	23	8	961.676	-259.571	D	7.896	7.867	0.029	3.9	95.97	0.01	0	0	0.17	3.85
2001	266	23	297	944.609	-246.761	D	7.868	7.867	0.002	3.9	96.39	0	0	0	0.95	2.66
2001	267	23	302	963.548	-244.486	D	8.044	7.867	0.177	3.9	99.19	0.02	0	0	0.05	0.75
2001	268	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	269	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	270	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	271	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	272	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0

Appendix M
Mammoth Cave
MC 2001 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	273	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2001	274	23	1	955.838	-260.274	D	7.648	7.648	0	3.421	0	0	0	0	0	0
2001	275	23	1	955.838	-260.274	D	7.645	7.639	0.007	3.4	70.25	0.11	0	0	0.93	28.69
2001	276	23	297	944.609	-246.761	D	7.693	7.639	0.054	3.4	95.88	0.01	0	0	0.21	3.91
2001	277	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	278	23	297	944.609	-246.761	D	7.64	7.639	0.001	3.4	97.4	0.1	0	0	0.2	2.24
2001	279	23	119	945.479	-254.084	D	7.708	7.639	0.069	3.4	97.05	0.17	0	0	0.05	2.73
2001	280	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	281	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	282	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	283	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	284	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	285	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	286	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	287	23	2	956.568	-260.187	D	7.657	7.639	0.018	3.4	97.61	0.17	0	0	0.26	1.97
2001	288	23	8	961.676	-259.571	D	7.639	7.639	0	3.4	86.15	0.08	0	0	1.22	12.74
2001	289	23	3	958.027	-260.011	D	7.639	7.639	0	3.4	63.86	1.9	0	0	0.2	32.75
2001	290	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	291	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	292	23	297	944.609	-246.761	D	7.639	7.639	0	3.4	58.41	0	0	0	6	24.32
2001	293	23	300	962.092	-244.663	D	7.673	7.639	0.034	3.4	95.34	0.06	0	0	0.73	3.87
2001	294	23	302	963.548	-244.486	D	7.639	7.639	0	3.4	70.22	0	0	0	0.04	0.27
2001	295	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	296	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	297	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	298	23	1	955.838	-260.274	D	7.646	7.639	0.007	3.4	85.69	0.25	0	0	0.63	13.44
2001	299	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	300	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	301	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	302	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	303	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	304	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2001	305	23	1	955.838	-260.274	D	7.55	7.55	0	3.208	0	0	0	0	0	0
2001	306	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	307	23	172	943.804	-252.427	D	7.592	7.546	0.046	3.2	97.92	0.09	0	0	0.13	1.86
2001	308	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	309	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	310	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	311	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	312	23	290	946.175	-247.503	D	7.582	7.546	0.036	3.2	94.28	0.1	0	0	0.5	5.12
2001	313	23	21	963.025	-258.479	D	7.547	7.546	0.001	3.2	74.96	0.08	0	0	0.36	24.54
2001	314	23	172	943.804	-252.427	D	7.666	7.546	0.119	3.2	96.87	0.03	0	0	0.4	2.71
2001	315	23	21	963.025	-258.479	D	7.575	7.546	0.029	3.2	94.93	0.1	0	0	0.13	4.84
2001	316	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	317	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	318	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	319	23	297	944.609	-246.761	D	7.546	7.546	0	3.2	75.73	0	0	0	9.1	16.12
2001	320	23	297	944.609	-246.761	D	7.561	7.546	0.015	3.2	97.3	0.01	0	0	0.5	2.19
2001	321	23	1	955.838	-260.274	D	7.551	7.546	0.005	3.2	98.34	0.01	0	0	0.05	1.62
2001	322	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	323	23	300	962.092	-244.663	D	7.58	7.546	0.034	3.2	98.28	0.09	0	0	0.14	1.49
2001	324	23	21	963.025	-258.479	D	7.55	7.546	0.004	3.2	98.37	0.11	0	0	0.1	1.42
2001	325	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	326	23	297	944.609	-246.761	D	7.55	7.546	0.003	3.2	98.55	0.07	0	0	0.09	1.3
2001	327	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	328	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2001	329	23	297	944.609	-246.761	D	7.589	7.546	0.043	3.2	96.31	0.01	0	0	0.36	3.32
2001	330	23	302	963.548	-244.486	D	7.584	7.546	0.038	3.2	95.65	0.06	0	0	0.16	4.13
2001	331	23	297	944.609	-246.761	D	7.593	7.546	0.047	3.2	96.17	0.07	0	0	0.29	3.48
2001	332	23	8	961.676	-259.571	D	7.602	7.546	0.056	3.2	96.7	0.07	0	0	0.15	3.08
2001	333	23	297	944.609	-246.761	D	7.546	7.546	0	3.2	97.96	0.19	0	0	0.04	2.56
2001	334	23	172	943.804	-252.427	D	7.546	7.546	0	3.2	95.91	0.22	0	0	0.06	8.75
2001	335	23	297	944.609	-246.761	D	7.704	7.679	0.025	3.487	97.92	0.01	0	0	0.32	1.74
2001	336	23	8	961.676	-259.571	D	7.701	7.685	0.016	3.5	94.24	0.12	0	0	0.13	5.51
2001	337	23	144	944.641	-253.256	D	7.685	7.685	0	3.5	73.11	0.77	0	0	0.15	23.91
2001	338	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	339	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	340	23	297	944.609	-246.761	D	7.685	7.685	0	3.5	80.82	0	0	0	6.66	12.35
2001	341	23	119	945.479	-254.084	D	7.722	7.685	0.037	3.5	95.46	0.18	0	0	0.61	3.75
2001	342	23	275	944.098	-248.678	D	7.691	7.685	0.007	3.5	98.49	0.1	0	0	0.07	1.35
2001	343	23	21	963.025	-258.479	D	7.685	7.685	0	3.5	98.53	0.04	0	0	0.02	1.29
2001	344	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	345	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	346	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	347	23	297	944.609	-246.761	D	7.748	7.685	0.063	3.5	98.14	0.06	0	0	0.2	1.6
2001	348	23	297	944.609	-246.761	D	7.723	7.685	0.039	3.5	97.95	0.15	0	0	0.08	1.82
2001	349	23	8	961.676	-259.571	D	7.685	7.685	0	3.5	81.19	0	0	0	2.24	11.47
2001	350	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2001	351	23	1	955.838	-260.274	D	7.713	7.685	0.028	3.5	98.74	0.14	0	0	0.07	1.05
2001	352	23	21	963.025	-258.479	D	7.69	7.685	0.005	3.5	98.52	0.15	0	0	0.1	1.22
2001	353	23	297	944.609	-246.761	D	7.697	7.685	0.012	3.5	88.34	0.38	0	0	0.39	10.89
2001	354	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	355	23	3	958.027	-260.011	D	7.724	7.685	0.039	3.5	78.13	1	0	0	2.06	18.8
2001	356	23	172	943.804	-252.427	D	7.696	7.685	0.011	3.5	96.93	0.09	0	0	0.08	2.9
2001	357	23	21	963.025	-258.479	D	7.696	7.685	0.011	3.5	94.08	0.4	0	0	0.44	5.07
2001	358	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	359	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	360	23	8	961.676	-259.571	D	7.689	7.685	0.004	3.5	86.94	0.79	0	0	0.7	11.55
2001	361	23	290	946.175	-247.503	D	7.699	7.685	0.014	3.5	79.12	0.51	0	0	1.59	18.78
2001	362	23	8	961.676	-259.571	D	7.717	7.685	0.032	3.5	83.62	0.83	0	0	0.8	14.75
2001	363	23	287	963.77	-246.317	D	7.704	7.685	0.02	3.5	88.13	0.36	0	0	0.73	10.78
2001	364	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2001	365	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
									0.352							

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NORANDA									DELTA		% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	1	23	1	955.838	-260.274	D	7.641	7.641	0	3.4	0	0	0	0	0	0
2002	2	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	3	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	4	23	172	943.804	-252.427	D	7.644	7.639	0.005	3.4	98.33	0.11	0	0	0.15	1.43
2002	5	23	300	962.092	-244.663	D	7.645	7.639	0.007	3.4	98.55	0.09	0	0	0.1	1.25
2002	6	23	119	945.479	-254.084	D	7.647	7.639	0.008	3.4	95.55	0.15	0	0	0.98	3.32
2002	7	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	8	23	48	963.533	-256.561	D	7.641	7.639	0.002	3.4	91.28	0.75	0	0	0.85	7.18
2002	9	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	10	23	297	944.609	-246.761	D	7.702	7.639	0.063	3.4	97.81	0.1	0	0	0.17	1.93
2002	11	23	8	961.676	-259.571	D	7.692	7.639	0.053	3.4	96.92	0.21	0	0	0.1	2.78
2002	12	23	3	958.027	-260.011	D	7.717	7.639	0.078	3.4	98.1	0.11	0	0	0.22	1.57
2002	13	23	302	963.548	-244.486	D	7.663	7.639	0.024	3.4	96.47	0.16	0	0	0.1	3.27
2002	14	23	297	944.609	-246.761	D	7.645	7.639	0.006	3.4	94.47	0.09	0	0	0.55	4.9
2002	15	23	21	963.025	-258.479	D	7.64	7.639	0.001	3.4	95.03	0.17	0	0	0.12	4.73
2002	16	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	17	23	302	963.548	-244.486	D	7.649	7.639	0.01	3.4	82.33	0.7	0	0	1.67	15.32
2002	18	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	19	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	20	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	21	23	1	955.838	-260.274	D	7.657	7.639	0.018	3.4	94.91	0.14	0	0	0.35	4.6
2002	22	23	172	943.804	-252.427	D	7.659	7.639	0.02	3.4	97.19	0.09	0	0	0.17	2.55
2002	23	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	24	23	8	961.676	-259.571	D	7.664	7.639	0.025	3.4	89.11	0.53	0	0	0.97	9.39
2002	25	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	26	23	297	944.609	-246.761	D	7.64	7.639	0.002	3.4	95.83	0.17	0	0	0.36	3.72
2002	27	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	28	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	29	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	30	23	297	944.609	-246.761	D	7.655	7.639	0.016	3.4	97.25	0.29	0	0	0.15	2.32
2002	31	23	297	944.609	-246.761	D	7.64	7.639	0.001	3.4	98.77	0.1	0	0	0.03	1.08
2002	32	23	119	945.479	-254.084	D	7.508	7.505	0.003	3.11	68	0.84	0	0	3.06	28.13
2002	33	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	34	23	172	943.804	-252.427	D	7.614	7.5	0.114	3.1	97.68	0.07	0	0	0.37	1.88
2002	35	23	171	964.325	-250.892	D	7.538	7.5	0.039	3.1	93.78	0.32	0	0	0.18	5.73
2002	36	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	37	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	38	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	39	23	172	943.804	-252.427	D	7.569	7.5	0.07	3.1	98.71	0.03	0	0	0.09	1.17
2002	40	23	300	962.092	-244.663	D	7.532	7.5	0.033	3.1	99.05	0.05	0	0	0.03	0.87
2002	41	23	8	961.676	-259.571	D	7.514	7.5	0.014	3.1	94.86	0.11	0	0	0.46	4.59
2002	42	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	43	23	297	944.609	-246.761	D	7.524	7.5	0.024	3.1	94.06	0.15	0	0	0.42	5.38
2002	44	23	21	963.025	-258.479	D	7.5	7.5	0	3.1	59.05	1.77	0	0	0.57	37.47
2002	45	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	46	23	297	944.609	-246.761	D	7.503	7.5	0.003	3.1	88.27	0.06	0	0	1.61	10.08
2002	47	23	8	961.676	-259.571	D	7.528	7.5	0.028	3.1	87.6	0.15	0	0	0.69	11.57
2002	48	23	8	961.676	-259.571	D	7.5	7.5	0	3.1	90.56	0.27	0	0	0.17	8.96
2002	49	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	50	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	51	23	297	944.609	-246.761	D	7.513	7.5	0.014	3.1	96.21	0.06	0	0	0.32	3.43
2002	52	23	8	961.676	-259.571	D	7.539	7.5	0.04	3.1	82.32	0.96	0	0	1.11	15.62
2002	53	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	54	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	55	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	56	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	57	23	297	944.609	-246.761	D	7.515	7.5	0.015	3.1	92.64	0.25	0	0	0.71	6.4
2002	58	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2002	59	23	8	961.676	-259.571	D	7.505	7.5	0.005	3.1	90.18	0.68	0	0	0.72	8.45
2002	60	23	297	944.609	-246.761	D	7.41	7.409	0	2.91	89.61	0.05	0	0	2.64	7.73
2002	61	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	62	23	172	943.804	-252.427	D	7.442	7.406	0.036	2.9	98.42	0.08	0	0	0.13	1.36
2002	63	23	172	943.804	-252.427	D	7.406	7.406	0	2.9	91.44	0.35	0	0	0.48	7.81
2002	64	23	8	961.676	-259.571	D	7.411	7.406	0.006	2.9	92.2	0.34	0	0	0.13	7.34
2002	65	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	66	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	67	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	68	23	2	956.568	-260.187	D	7.411	7.406	0.006	2.9	95.63	0.09	0	0	0.29	4
2002	69	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	70	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	71	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	72	23	172	943.804	-252.427	D	7.407	7.406	0.001	2.9	98.76	0.05	0	0	0.23	1.06
2002	73	23	275	944.098	-248.678	D	7.411	7.406	0.006	2.9	99.14	0.02	0	0	0.06	0.8
2002	74	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	75	23	172	943.804	-252.427	D	7.435	7.406	0.03	2.9	97.47	0.1	0	0	0.28	2.15
2002	76	23	48	963.533	-256.561	D	7.414	7.406	0.009	2.9	98.11	0.05	0	0	0.08	1.79
2002	77	23	172	943.804	-252.427	D	7.512	7.406	0.107	2.9	99.52	0	0	0	0.09	0.38

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	78	23	1	955.838	-260.274	D	7.415	7.406	0.009	2.9	99.76	0	0	0	0.02	0.23
2002	79	23	119	945.479	-254.084	D	7.406	7.406	0	2.9	96.51	0	0	0	1.47	2.45
2002	80	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	81	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	82	23	297	944.609	-246.761	D	7.446	7.406	0.041	2.9	95.04	0.12	0	0	0.79	4.06
2002	83	23	302	963.548	-244.486	D	7.413	7.406	0.007	2.9	97	0.06	0	0	0.13	2.82
2002	84	23	275	944.098	-248.678	D	7.407	7.406	0.002	2.9	98.87	0	0	0	0.29	0.87
2002	85	23	172	943.804	-252.427	D	7.41	7.406	0.005	2.9	96.26	0	0	0	0.38	3.4
2002	86	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	87	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	88	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	89	23	297	944.609	-246.761	D	7.418	7.406	0.013	2.9	96.45	0.09	0	0	0.16	3.3
2002	90	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2002	91	23	1	955.838	-260.274	D	7.269	7.269	0	2.61	0	0	0	0	0	0
2002	92	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	93	23	297	944.609	-246.761	D	7.268	7.263	0.005	2.6	96.23	0.08	0	0	0.07	3.61
2002	94	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	95	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	96	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	97	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	98	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	99	23	1	955.838	-260.274	D	7.273	7.263	0.01	2.6	96.81	0.06	0	0	0.23	2.92
2002	100	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	101	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	102	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	103	23	297	944.609	-246.761	D	7.263	7.263	0	2.6	72.61	0.54	0	0	0.84	33.33
2002	104	23	297	944.609	-246.761	D	7.265	7.263	0.002	2.6	95.77	0.06	0	0	0.62	3.6
2002	105	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	106	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	107	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	108	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	109	23	297	944.609	-246.761	D	7.263	7.263	0	2.6	72.06	0	0	0	7.3	22.46
2002	110	23	9	954.269	-259.534	D	7.316	7.263	0.053	2.6	98.32	0.01	0	0	0.25	1.43
2002	111	23	119	945.479	-254.084	D	7.34	7.263	0.077	2.6	98.8	0.02	0	0	0.09	1.09
2002	112	23	302	963.548	-244.486	D	7.27	7.263	0.007	2.6	93.43	0.07	0	0	0.24	6.26
2002	113	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	114	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	115	23	302	963.548	-244.486	D	7.264	7.263	0.001	2.6	85.63	0.25	0	0	1.19	12.86
2002	116	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	117	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	118	23	64	950.912	-256.222	D	7.269	7.263	0.006	2.6	94.71	0	0	0	0.38	4.92
2002	119	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2002	120	23	297	944.609	-246.761	D	7.263	7.263	0	2.6	72.57	0	0	0	9.3	18.63
2002	121	23	300	962.092	-244.663	D	7.535	7.535	0	3.18	81.45	0	0	0	3.25	15.01
2002	122	23	8	961.676	-259.571	D	7.562	7.546	0.016	3.2	92.03	0.2	0	0	0.69	7.08
2002	123	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	124	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	125	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	126	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	127	23	297	944.609	-246.761	D	7.583	7.546	0.037	3.2	97.7	0	0	0	0.33	1.96
2002	128	23	302	963.548	-244.486	D	7.601	7.546	0.055	3.2	96.94	0.03	0	0	0.2	2.83
2002	129	23	8	961.676	-259.571	D	7.571	7.546	0.025	3.2	96.41	0.03	0	0	0.28	3.28
2002	130	23	8	961.676	-259.571	D	7.546	7.546	0	3.2	95.71	0.05	0	0	0.42	4.13
2002	131	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	132	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	133	23	297	944.609	-246.761	D	7.558	7.546	0.012	3.2	95.22	0.18	0	0	0.57	4.05
2002	134	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	135	23	172	943.804	-252.427	D	7.546	7.546	0	3.2	93.46	0	0	0	1.17	4.03
2002	136	23	297	944.609	-246.761	D	7.546	7.546	0	3.2	87.87	0	0	0	1.17	9.5
2002	137	23	301	962.82	-244.575	D	7.547	7.546	0.001	3.2	96.39	0.07	0	0	0.75	2.88
2002	138	23	302	963.548	-244.486	D	7.549	7.546	0.003	3.2	99.08	0	0	0	0.04	0.87
2002	139	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	140	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	141	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	142	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	143	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	144	23	297	944.609	-246.761	D	7.546	7.546	0	3.2	81.27	0	0	0	6.04	17.94
2002	145	23	297	944.609	-246.761	D	7.546	7.546	0	3.2	81.56	0	0	0	5.23	17.37
2002	146	23	21	963.025	-258.479	D	7.641	7.546	0.095	3.2	97.25	0.04	0	0	0.6	2.12
2002	147	23	227	964.103	-249.062	D	7.582	7.546	0.035	3.2	98.37	0.01	0	0	0.19	1.43
2002	148	23	297	944.609	-246.761	D	7.547	7.546	0.001	3.2	98.83	0	0	0	0.04	1.18
2002	149	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	150	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	151	23	297	944.609	-246.761	D	7.612	7.546	0.066	3.2	99.05	0	0	0	0.13	0.82
2002	152	23	2	956.568	-260.187	D	8	7.679	0.321	3.49	97.88	0.01	0	0	0.2	1.91
2002	153	23	3	958.027	-260.011	D	7.78	7.685	0.095	3.5	93.86	0.03	0	0	0.43	5.67
2002	154	23	297	944.609	-246.761	D	7.771	7.685	0.086	3.5	97.44	0	0	0	0.17	2.38
2002	155	23	302	963.548	-244.486	D	7.688	7.685	0.003	3.5	98.71	0	0	0	0.28	1.01

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	156	23	297	944.609	-246.761	D	7.687	7.685	0.002	3.5	96.02	0.05	0	0	0.49	3.43
2002	157	23	297	944.609	-246.761	D	7.828	7.685	0.143	3.5	97.96	0.08	0	0	0.16	1.81
2002	158	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	159	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	160	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	161	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	162	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	163	23	297	944.609	-246.761	D	7.69	7.685	0.005	3.5	96.59	0	0	0	0.47	2.95
2002	164	23	302	963.548	-244.486	D	7.884	7.685	0.199	3.5	97.78	0.02	0	0	0.31	1.9
2002	165	23	21	963.025	-258.479	D	7.686	7.685	0.001	3.5	96.38	0.01	0	0	0.29	3.26
2002	166	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	167	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	97.24	0	0	0	0.17	2.55
2002	168	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	93.31	0.01	0	0	0.16	6.33
2002	169	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	170	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	171	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	172	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	173	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	174	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	175	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	176	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	177	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	178	23	297	944.609	-246.761	D	7.685	7.685	0	3.5	70.4	0.05	0	0	0.16	13.98
2002	179	23	297	944.609	-246.761	D	7.724	7.685	0.039	3.5	95.47	0.12	0	0	0.66	3.75
2002	180	23	297	944.609	-246.761	D	7.873	7.685	0.188	3.5	99.31	0	0	0	0.11	0.58
2002	181	23	302	963.548	-244.486	D	7.803	7.685	0.118	3.5	99.25	0	0	0	0.07	0.68
2002	182	23	172	943.804	-252.427	D	7.901	7.772	0.129	3.69	99.1	0	0	0	0.13	0.78
2002	183	23	172	943.804	-252.427	D	7.813	7.776	0.036	3.7	99.24	0	0	0	0.08	0.68
2002	184	23	172	943.804	-252.427	D	7.781	7.776	0.004	3.7	99.29	0	0	0	0.07	0.63
2002	185	23	172	943.804	-252.427	D	7.777	7.776	0.001	3.7	99.35	0	0	0	0.04	0.54
2002	186	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2002	187	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2002	188	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2002	189	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2002	190	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	83.72	0	0	0	3.02	6.46
2002	191	23	1	955.838	-260.274	D	7.981	7.776	0.205	3.7	98.77	0.01	0	0	0.14	1.08
2002	192	23	21	963.025	-258.479	D	7.779	7.776	0.003	3.7	93.19	0.15	0	0	0.13	6.49
2002	193	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	56.39	0.01	0	0	0.06	8.57
2002	194	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	195	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2002	196	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2002	197	23	119	945.479	-254.084	D	7.776	7.776	0	3.7	90.32	0.05	0	0	0.78	10
2002	198	23	297	944.609	-246.761	D	8.321	7.776	**0.545**	3.7	98.75	0.01	0	0	0.19	1.06
2002	199	23	8	961.676	-259.571	D	7.969	7.776	0.192	3.7	98.67	0.01	0	0	0.16	1.16
2002	200	23	1	955.838	-260.274	D	7.994	7.776	0.218	3.7	96.95	0.03	0	0	0.14	2.88
2002	201	23	8	961.676	-259.571	D	7.852	7.776	0.076	3.7	97.51	0.01	0	0	0.11	2.38
2002	202	23	119	945.479	-254.084	D	7.791	7.776	0.015	3.7	98.26	0	0	0	0.2	1.54
2002	203	23	297	944.609	-246.761	D	8.219	7.776	0.443	3.7	98.96	0	0	0	0.15	0.88
2002	204	23	172	943.804	-252.427	D	8.145	7.776	0.369	3.7	98.55	0.01	0	0	0.16	1.28
2002	205	23	119	945.479	-254.084	D	7.863	7.776	0.086	3.7	99.62	0	0	0	0.03	0.35
2002	206	23	9	954.269	-259.534	D	7.78	7.776	0.004	3.7	99.63	0	0	0	0.02	0.37
2002	207	23	297	944.609	-246.761	D	7.819	7.776	0.043	3.7	97.9	0	0	0	0.38	1.71
2002	208	23	302	963.548	-244.486	D	7.777	7.776	0.001	3.7	95.43	0	0	0	0.32	4.23
2002	209	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2002	210	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2002	211	23	1	955.838	-260.274	D	7.856	7.776	0.08	3.7	98.86	0	0	0	0.23	0.9
2002	212	23	1	955.838	-260.274	D	7.824	7.776	0.048	3.7	97.07	0.07	0	0	0.24	2.62
2002	213	23	9	954.269	-259.534	D	7.877	7.863	0.014	3.89	99.2	0	0	0	0.07	0.72
2002	214	23	297	944.609	-246.761	D	7.87	7.867	0.003	3.9	99.02	0	0	0	0.09	0.86
2002	215	23	275	944.098	-248.678	D	7.868	7.867	0.001	3.9	99.21	0	0	0	0.1	0.67
2002	216	23	275	944.098	-248.678	D	7.867	7.867	0	3.9	99.41	0	0	0	0.05	0.62
2002	217	23	275	944.098	-248.678	D	7.867	7.867	0	3.9	99.03	0	0	0	0.05	0.5
2002	218	23	172	943.804	-252.427	D	7.867	7.867	0	3.9	99.62	0	0	0	0.02	0.39
2002	219	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	220	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	221	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	222	23	297	944.609	-246.761	D	7.879	7.867	0.012	3.9	98.51	0	0	0	0.43	1.05
2002	223	23	297	944.609	-246.761	D	7.931	7.867	0.064	3.9	96.71	0.04	0	0	0.29	2.96
2002	224	23	297	944.609	-246.761	D	7.886	7.867	0.019	3.9	98.31	0.01	0	0	0.13	1.56
2002	225	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	226	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	227	23	297	944.609	-246.761	D	7.867	7.867	0	3.9	74.18	0	0	0	8.36	14.49
2002	228	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	229	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	230	23	297	944.609	-246.761	D	7.926	7.867	0.059	3.9	98.63	0	0	0	0.17	1.2
2002	231	23	302	963.548	-244.486	D	8.093	7.867	0.226	3.9	98.17	0.04	0	0	0.12	1.67
2002	232	23	172	943.804	-252.427	D	8.124	7.867	0.257	3.9	98.75	0.01	0	0	0.07	1.17
2002	233	23	119	945.479	-254.084	D	7.875	7.867	0.008	3.9	98.25	0	0	0	0.05	1.68

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	234	23	275	944.098	-248.678	D	7.882	7.867	0.015	3.9	99.13	0	0	0	0.03	0.84
2002	235	23	275	944.098	-248.678	D	7.867	7.867	0	3.9	84.18	0	0	0	4.2	9.44
2002	236	23	1	955.838	-260.274	D	7.999	7.867	0.133	3.9	98.72	0.02	0	0	0.14	1.12
2002	237	23	8	961.676	-259.571	D	7.882	7.867	0.016	3.9	98.79	0	0	0	0.08	1.13
2002	238	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	239	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	240	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	241	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	242	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	243	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	244	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	245	23	297	944.609	-246.761	D	7.913	7.867	0.046	3.9	98.93	0	0	0	0.18	0.89
2002	246	23	297	944.609	-246.761	D	7.896	7.867	0.03	3.9	97.79	0	0	0	0.36	1.85
2002	247	23	297	944.609	-246.761	D	7.901	7.867	0.034	3.9	96.46	0	0	0	0.15	3.39
2002	248	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	249	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	250	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	251	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	252	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	253	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	254	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	255	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	256	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	257	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	258	23	9	954.269	-259.534	D	7.919	7.867	0.052	3.9	98.66	0	0	0	0.28	1.07
2002	259	23	1	955.838	-260.274	D	7.989	7.867	0.123	3.9	98.34	0.02	0	0	0.1	1.53
2002	260	23	8	961.676	-259.571	D	7.898	7.867	0.032	3.9	98.06	0.01	0	0	0.06	1.87
2002	261	23	297	944.609	-246.761	D	7.871	7.867	0.004	3.9	99.29	0.02	0	0	0.03	0.66
2002	262	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	263	23	297	944.609	-246.761	D	7.867	7.867	0	3.9	94.84	0.02	0	0	1.56	3.55
2002	264	23	21	963.025	-258.479	D	8.096	7.867	0.229	3.9	98.9	0.05	0	0	0.13	0.93
2002	265	23	171	964.325	-250.892	D	7.965	7.867	0.099	3.9	99.29	0.01	0	0	0.05	0.65
2002	266	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	89.86	0.01	0	0	0.41	7.18
2002	267	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	268	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	269	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	270	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	271	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	272	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	273	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2002	274	23	1	955.838	-260.274	D	7.648	7.648	0	3.42	0	0	0	0	0	0
2002	275	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	276	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	277	23	297	944.609	-246.761	D	7.643	7.639	0.004	3.4	96.48	0.03	0	0	0.38	3.11
2002	278	23	1	955.838	-260.274	D	7.672	7.639	0.033	3.4	95.09	0.03	0	0	0.57	4.31
2002	279	23	297	944.609	-246.761	D	7.64	7.639	0.002	3.4	96.46	0	0	0	0.98	2.61
2002	280	23	297	944.609	-246.761	D	7.661	7.639	0.022	3.4	96.28	0.04	0	0	0.23	3.45
2002	281	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	282	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	283	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	284	23	172	943.804	-252.427	D	7.639	7.639	0	3.4	99.85	0	0	0	0.04	0.18
2002	285	23	172	943.804	-252.427	D	7.71	7.639	0.071	3.4	98.79	0.04	0	0	0.12	1.06
2002	286	23	172	943.804	-252.427	D	7.778	7.639	0.139	3.4	98.71	0.06	0	0	0.05	1.17
2002	287	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	288	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	289	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	290	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	291	23	47	962.803	-256.649	D	7.646	7.639	0.007	3.4	87.24	0.46	0	0	2.34	9.96
2002	292	23	297	944.609	-246.761	D	7.644	7.639	0.005	3.4	98.94	0.06	0	0	0.13	0.86
2002	293	23	172	943.804	-252.427	D	7.688	7.639	0.049	3.4	98.89	0.06	0	0	0.07	0.98
2002	294	23	8	961.676	-259.571	D	7.64	7.639	0.001	3.4	99.04	0.05	0	0	0.11	1.03
2002	295	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	296	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	297	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	298	23	172	943.804	-252.427	D	7.639	7.639	0	3.4	9.94	2.52	0	0	0.15	10.58
2002	299	23	302	963.548	-244.486	D	7.729	7.639	0.091	3.4	96.06	0.34	0	0	0.13	3.48
2002	300	23	8	961.676	-259.571	D	7.639	7.639	0	3.4	86.37	0.48	0	0	1.64	11.24
2002	301	23	9	954.269	-259.534	D	7.639	7.639	0	3.4	90.91	0	0	0	1.59	7.16
2002	302	23	119	945.479	-254.084	D	7.639	7.639	0	3.4	104.67	0	0	0	0.68	6.32
2002	303	23	48	963.533	-256.561	D	7.639	7.639	0	3.4	80.84	0	0	0	7.78	12.39
2002	304	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2002	305	23	1	955.838	-260.274	D	7.55	7.55	0	3.21	0	0	0	0	0	0
2002	306	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	307	23	275	944.098	-248.678	D	7.556	7.546	0.01	3.2	98.46	0.11	0	0	0.16	1.29
2002	308	23	297	944.609	-246.761	D	8.2	7.546	**0.654**	3.2	98.96	0.07	0	0	0.08	0.9
2002	309	23	119	945.479	-254.084	D	7.685	7.546	0.139	3.2	99.29	0.04	0	0	0.03	0.64
2002	310	23	119	945.479	-254.084	D	7.569	7.546	0.023	3.2	98.82	0.08	0	0	0.01	1.09
2002	311	23	172	943.804	-252.427	D	7.547	7.546	0.001	3.2	98.2	0.01	0	0	0.11	1.74

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	312	23	297	944.609	-246.761	D	7.553	7.546	0.006	3.2	99.04	0.02	0	0	0.03	0.91
2002	313	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	314	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	315	23	302	963.548	-244.486	D	7.557	7.546	0.011	3.2	95.53	0.13	0	0	0.17	4.17
2002	316	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	317	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	318	23	297	944.609	-246.761	D	7.56	7.546	0.014	3.2	97.55	0.02	0	0	0.46	1.97
2002	319	23	172	943.804	-252.427	D	7.546	7.546	0	3.2	96.6	0.16	0	0	0.43	3.37
2002	320	23	119	945.479	-254.084	D	7.546	7.546	0	3.2	96.56	0.16	0	0	0.26	2.87
2002	321	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	322	23	295	962.931	-245.49	D	7.555	7.546	0.009	3.2	96.07	0.2	0	0	0.39	3.36
2002	323	23	8	961.676	-259.571	D	7.557	7.546	0.011	3.2	90.65	0.49	0	0	0.96	7.92
2002	324	23	119	945.479	-254.084	D	7.57	7.546	0.023	3.2	98.32	0.07	0	0	0.06	1.56
2002	325	23	290	946.175	-247.503	D	7.598	7.546	0.052	3.2	92.46	0.2	0	0	0.89	6.45
2002	326	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	327	23	8	961.676	-259.571	D	7.549	7.546	0.003	3.2	98.23	0.04	0	0	0.15	1.59
2002	328	23	302	963.548	-244.486	D	7.548	7.546	0.002	3.2	89.77	0.03	0	0	3.32	6.88
2002	329	23	172	943.804	-252.427	D	7.55	7.546	0.004	3.2	94.54	0.01	0	0	0.78	4.72
2002	330	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	83.46	0	0	0	2.67	18.45
2002	331	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2002	332	23	172	943.804	-252.427	D	7.546	7.546	0	3.2	101.69	0.09	0	0	0.09	2.16
2002	333	23	297	944.609	-246.761	D	7.557	7.546	0.011	3.2	93.41	0.25	0	0	0.69	5.64
2002	334	23	8	961.676	-259.571	D	7.555	7.546	0.009	3.2	67.39	0.81	0	0	2.87	28.95
2002	335	23	1	955.838	-260.274	D	7.679	7.679	0	3.49	0	0	0	0	0	0
2002	336	23	297	944.609	-246.761	D	7.695	7.685	0.01	3.5	91.71	0.42	0	0	0.51	7.36
2002	337	23	119	945.479	-254.084	D	7.697	7.685	0.012	3.5	89.09	0.29	0	0	0.33	10.28
2002	338	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	339	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	340	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	341	23	297	944.609	-246.761	D	7.703	7.685	0.019	3.5	95.2	0.32	0	0	0.24	4.25
2002	342	23	275	944.098	-248.678	D	7.782	7.685	0.097	3.5	98.74	0.02	0	0	0.26	0.99
2002	343	23	1	955.838	-260.274	D	7.701	7.685	0.016	3.5	99.46	0.01	0	0	0.03	0.5
2002	344	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	345	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	346	23	275	944.098	-248.678	D	7.701	7.685	0.016	3.5	97.2	0.19	0	0	0.31	2.3
2002	347	23	275	944.098	-248.678	D	7.686	7.685	0.001	3.5	97.35	0.2	0	0	0.13	2.33
2002	348	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	349	23	47	962.803	-256.649	D	7.71	7.685	0.025	3.5	95.72	0.31	0	0	0.37	3.6
2002	350	23	8	961.676	-259.571	D	8.014	7.685	0.329	3.5	98.31	0.05	0	0	0.33	1.31

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2002	351	23	297	944.609	-246.761	D	7.898	7.685	0.213	3.5	99.6	0.01	0	0	0.02	0.37
2002	352	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	353	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	354	23	8	961.676	-259.571	D	7.706	7.685	0.021	3.5	90.88	0.31	0	0	0.64	8.17
2002	355	23	297	944.609	-246.761	D	7.747	7.685	0.062	3.5	77.62	0.61	0	0	1.5	20.28
2002	356	23	8	961.676	-259.571	D	7.69	7.685	0.005	3.5	83.51	0.57	0	0	0.75	15.18
2002	357	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	358	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	359	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	360	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	361	23	172	943.804	-252.427	D	7.686	7.685	0.001	3.5	90.55	0.92	0	0	0.34	8.16
2002	362	23	290	946.175	-247.503	D	7.889	7.685	0.204	3.5	97.88	0.1	0	0	0.3	1.73
2002	363	23	297	944.609	-246.761	D	7.686	7.685	0.001	3.5	79.98	0.02	0	0	4.49	15.44
2002	364	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2002	365	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
									0.654							

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NORANDA									DELTA		% of Modeled Extinction by Species					
YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	1	23	1	955.838	-260.274	D	7.641	7.641	0	3.404	0	0	0	0	0	0
2003	2	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	3	23	3	958.027	-260.011	D	7.639	7.639	0	3.4	57.95	0	0	0	5.72	8.9
2003	4	23	9	954.269	-259.534	D	7.642	7.639	0.003	3.4	98.46	0.1	0	0	0.13	1.32
2003	5	23	200	964.214	-249.977	D	7.71	7.639	0.071	3.4	97.58	0.08	0	0	0.35	1.99
2003	6	23	5	959.487	-259.835	D	7.639	7.639	0	3.4	43.03	3.69	0	0	0.03	23.28
2003	7	23	297	944.609	-246.761	D	7.65	7.639	0.011	3.4	97.5	0.11	0	0	0.06	2.33
2003	8	23	8	961.676	-259.571	D	7.724	7.639	0.085	3.4	95.56	0.07	0	0	0.32	4.05
2003	9	23	8	961.676	-259.571	D	7.651	7.639	0.012	3.4	52.92	2.09	0	0	3	41.99
2003	10	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	11	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	12	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	13	23	297	944.609	-246.761	D	7.706	7.639	0.068	3.4	92.74	0.44	0	0	0.34	6.49
2003	14	23	3	958.027	-260.011	D	7.736	7.639	0.098	3.4	95.55	0.24	0	0	0.41	3.79
2003	15	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	16	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	17	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	18	23	21	963.025	-258.479	D	7.642	7.639	0.003	3.4	97.99	0.29	0	0	0.12	1.59
2003	19	23	275	944.098	-248.678	D	7.689	7.639	0.05	3.4	95.43	0.18	0	0	0.33	4.06
2003	20	23	8	961.676	-259.571	D	7.69	7.639	0.051	3.4	85.49	0.76	0	0	0.95	12.8
2003	21	23	1	955.838	-260.274	D	7.702	7.639	0.063	3.4	96.76	0.2	0	0	0.13	2.92
2003	22	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	23	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	24	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	25	23	297	944.609	-246.761	D	7.798	7.639	0.159	3.4	96.55	0.22	0	0	0.39	2.83
2003	26	23	290	946.175	-247.503	D	7.686	7.639	0.047	3.4	93.22	0.31	0	0	0.75	5.72
2003	27	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	28	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	29	23	172	943.804	-252.427	D	7.64	7.639	0.001	3.4	98.3	0.02	0	0	0.35	1.33
2003	30	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	31	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	32	23	1	955.838	-260.274	D	7.535	7.505	0.029	3.112	96.12	0.14	0	0	0.31	3.42
2003	33	23	275	944.098	-248.678	D	7.52	7.5	0.021	3.1	98.41	0.11	0	0	0.04	1.43
2003	34	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	35	23	297	944.609	-246.761	D	7.501	7.5	0.002	3.1	84.18	0.4	0	0	1.67	13.74
2003	36	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	37	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	38	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	39	23	297	944.609	-246.761	D	7.507	7.5	0.007	3.1	98.48	0.08	0	0	0.1	1.35
2003	40	23	297	944.609	-246.761	D	7.556	7.5	0.056	3.1	95.83	0.07	0	0	0.95	3.15
2003	41	23	302	963.548	-244.486	D	7.561	7.5	0.062	3.1	97.62	0.17	0	0	0.23	1.97
2003	42	23	302	963.548	-244.486	D	7.56	7.5	0.061	3.1	93.19	0.29	0	0	0.29	6.24
2003	43	23	8	961.676	-259.571	D	7.5	7.5	0.001	3.1	73.76	1.39	0	0	0.96	23.9
2003	44	23	297	944.609	-246.761	D	7.517	7.5	0.017	3.1	98.13	0.05	0	0	0.29	1.53
2003	45	23	297	944.609	-246.761	D	7.541	7.5	0.041	3.1	98.7	0.08	0	0	0.09	1.13
2003	46	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	47	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	48	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	49	23	297	944.609	-246.761	D	7.524	7.5	0.024	3.1	98.3	0.1	0	0	0.19	1.41
2003	50	23	21	963.025	-258.479	D	7.506	7.5	0.006	3.1	92.72	0.86	0	0	0.25	6.2
2003	51	23	290	946.175	-247.503	D	7.5	7.5	0	3.1	82.56	0.01	0	0	6.95	11.08
2003	52	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	53	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	54	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	55	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	170.94	0.01	0	0	18.34	36.91
2003	56	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	57	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	58	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	59	23	1	955.838	-260.274	D	7.5	7.5	0	3.1	0	0	0	0	0	0
2003	60	23	297	944.609	-246.761	D	7.411	7.409	0.001	2.908	90.88	0	0	0	2.97	6.22
2003	61	23	119	945.479	-254.084	D	7.618	7.406	0.212	2.9	98.94	0.06	0	0	0.05	0.94
2003	62	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	63	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	64	23	172	943.804	-252.427	D	7.454	7.406	0.048	2.9	97.72	0.08	0	0	0.25	1.95
2003	65	23	1	955.838	-260.274	D	7.477	7.406	0.071	2.9	98.36	0.08	0	0	0.06	1.5
2003	66	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	67	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	68	23	172	943.804	-252.427	D	7.411	7.406	0.005	2.9	85.27	0.39	0	0	1.27	13.07
2003	69	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	70	23	119	945.479	-254.084	D	7.406	7.406	0	2.9	96.23	0	0	0	3.27	8.82
2003	71	23	297	944.609	-246.761	D	7.407	7.406	0.002	2.9	72.79	0.01	0	0	9.32	17.99
2003	72	23	172	943.804	-252.427	D	7.436	7.406	0.031	2.9	97.86	0.03	0	0	0.17	1.95
2003	73	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	100.91	0	0	0	0.02	0.52
2003	74	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	75	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	76	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	77	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0

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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	78	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	79	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	80	23	8	961.676	-259.571	D	7.436	7.406	0.03	2.9	96.28	0.06	0	0	0.45	3.22
2003	81	23	21	963.025	-258.479	D	7.406	7.406	0	2.9	41.14	2.84	0	0	0.09	56.08
2003	82	23	172	943.804	-252.427	D	7.421	7.406	0.015	2.9	97.99	0.01	0	0	0.29	1.73
2003	83	23	8	961.676	-259.571	D	7.475	7.406	0.07	2.9	94.2	0.05	0	0	0.48	5.27
2003	84	23	297	944.609	-246.761	D	7.406	7.406	0	2.9	89.93	0.26	0	0	0.73	9.31
2003	85	23	172	943.804	-252.427	D	7.421	7.406	0.016	2.9	94.12	0.22	0	0	0.16	5.52
2003	86	23	144	944.641	-253.256	D	7.406	7.406	0.001	2.9	98.49	0.03	0	0	0.05	1.7
2003	87	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	88	23	119	945.479	-254.084	D	7.416	7.406	0.01	2.9	95.18	0.1	0	0	0.15	4.56
2003	89	23	1	955.838	-260.274	D	7.406	7.406	0	2.9	0	0	0	0	0	0
2003	90	23	297	944.609	-246.761	D	7.408	7.406	0.003	2.9	95.73	0.03	0	0	0.54	3.73
2003	91	23	302	963.548	-244.486	D	7.27	7.269	0.001	2.612	95.73	0.05	0	0	0.37	3.83
2003	92	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	93	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	94	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	95	23	302	963.548	-244.486	D	7.266	7.263	0.003	2.6	80.84	0.36	0	0	1.92	16.89
2003	96	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	97	23	275	944.098	-248.678	D	7.315	7.263	0.053	2.6	99.51	0	0	0	0.12	0.38
2003	98	23	1	955.838	-260.274	D	7.347	7.263	0.084	2.6	99.65	0	0	0	0.03	0.32
2003	99	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	100	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	101	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	102	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	103	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	104	23	8	961.676	-259.571	D	7.27	7.263	0.007	2.6	97.32	0.01	0	0	0.28	2.42
2003	105	23	301	962.82	-244.575	D	7.263	7.263	0	2.6	81.29	0.01	0	0	0.34	13.96
2003	106	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	107	23	8	961.676	-259.571	D	7.28	7.263	0.017	2.6	93.66	0.02	0	0	0.48	5.84
2003	108	23	302	963.548	-244.486	D	7.263	7.263	0	2.6	71.76	0.92	0	0	0.39	27.25
2003	109	23	4	958.757	-259.923	D	7.263	7.263	0	2.6	80.4	0.14	0	0	0.31	12.7
2003	110	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	111	23	1	955.838	-260.274	D	7.272	7.263	0.009	2.6	86.4	0.08	0	0	1.6	11.92
2003	112	23	21	963.025	-258.479	D	7.264	7.263	0.001	2.6	85.6	0.06	0	0	1.16	13.16
2003	113	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	114	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	115	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	116	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	117	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	118	23	1	955.838	-260.274	D	7.263	7.263	0	2.6	0	0	0	0	0	0
2003	119	23	302	963.548	-244.486	D	7.288	7.263	0.025	2.6	95.55	0.03	0	0	1.08	3.35
2003	120	23	302	963.548	-244.486	D	7.268	7.263	0.006	2.6	97.33	0	0	0	0.25	2.41
2003	121	23	297	944.609	-246.761	D	7.535	7.535	0.001	3.175	97.31	0.01	0	0	0.47	2.25
2003	122	23	2	956.568	-260.187	D	7.579	7.546	0.033	3.2	94.85	0.19	0	0	0.83	4.13
2003	123	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	124	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	125	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	126	23	297	944.609	-246.761	D	7.546	7.546	0	3.2	87.77	0	0	0	7.57	12.66
2003	127	23	297	944.609	-246.761	D	7.546	7.546	0	3.2	89.77	0	0	0	5.48	10.34
2003	128	23	302	963.548	-244.486	D	7.623	7.546	0.076	3.2	97.64	0.06	0	0	0.31	2
2003	129	23	302	963.548	-244.486	D	7.546	7.546	0	3.2	98.29	0	0	0	0.39	1.64
2003	130	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	131	23	8	961.676	-259.571	D	7.552	7.546	0.006	3.2	85.02	0.18	0	0	0.71	14.1
2003	132	23	8	961.676	-259.571	D	7.548	7.546	0.002	3.2	93.96	0.02	0	0	0.64	5.39
2003	133	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	134	23	297	944.609	-246.761	D	7.562	7.546	0.015	3.2	97.52	0.01	0	0	0.2	2.28
2003	135	23	302	963.548	-244.486	D	7.627	7.546	0.081	3.2	96.06	0.16	0	0	0.55	3.24
2003	136	23	1	955.838	-260.274	D	7.645	7.546	0.099	3.2	98.92	0.02	0	0	0.1	0.97
2003	137	23	297	944.609	-246.761	D	7.554	7.546	0.008	3.2	98.56	0.01	0	0	0.1	1.34
2003	138	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	139	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	140	23	172	943.804	-252.427	D	7.627	7.546	0.081	3.2	98.72	0.01	0	0	0.24	1.02
2003	141	23	1	955.838	-260.274	D	7.615	7.546	0.069	3.2	99	0.03	0	0	0.09	0.89
2003	142	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	94.98	0	0	0	0.61	4.95
2003	143	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	144	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	145	23	172	943.804	-252.427	D	7.546	7.546	0	3.2	199.03	0	0	0	39.77	65.72
2003	146	23	64	950.912	-256.222	D	7.546	7.546	0	3.2	72.63	0	0	0	3.03	5.82
2003	147	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	148	23	8	961.676	-259.571	D	7.547	7.546	0.001	3.2	94.07	0	0	0	0.61	5.41
2003	149	23	8	961.676	-259.571	D	7.546	7.546	0	3.2	84.48	0.01	0	0	1.27	15.34
2003	150	23	172	943.804	-252.427	D	7.546	7.546	0	3.2	100.72	0	0	0	0.13	0.42
2003	151	23	290	946.175	-247.503	D	7.558	7.546	0.012	3.2	74.32	0.97	0	0	1.38	23.33
2003	152	23	1	955.838	-260.274	D	7.679	7.679	0	3.487	0	0	0	0	0	0
2003	153	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	154	23	297	944.609	-246.761	D	7.759	7.685	0.074	3.5	98.11	0.02	0	0	0.13	1.73
2003	155	23	21	963.025	-258.479	D	7.709	7.685	0.024	3.5	99.03	0.02	0	0	0.03	0.91

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	156	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	157	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	158	23	144	944.641	-253.256	D	7.685	7.685	0	3.5	94.17	0	0	0	1.99	4.9
2003	159	23	8	961.676	-259.571	D	7.803	7.685	0.118	3.5	98	0	0	0	0.39	1.6
2003	160	23	3	958.027	-260.011	D	7.725	7.685	0.04	3.5	97.09	0.01	0	0	0.35	2.55
2003	161	23	1	955.838	-260.274	D	7.734	7.685	0.049	3.5	96.48	0.01	0	0	0.33	3.19
2003	162	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	163	23	297	944.609	-246.761	D	7.8	7.685	0.116	3.5	97.42	0.02	0	0	0.13	2.43
2003	164	23	297	944.609	-246.761	D	7.704	7.685	0.019	3.5	98.2	0	0	0	0.08	1.72
2003	165	23	297	944.609	-246.761	D	7.751	7.685	0.066	3.5	99.54	0	0	0	0.09	0.37
2003	166	23	171	964.325	-250.892	D	7.796	7.685	0.111	3.5	98.74	0.01	0	0	0.1	1.16
2003	167	23	2	956.568	-260.187	D	7.732	7.685	0.047	3.5	99.19	0.01	0	0	0.07	0.73
2003	168	23	8	961.676	-259.571	D	7.7	7.685	0.015	3.5	99.41	0.01	0	0	0.04	0.55
2003	169	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	96.03	0	0	0	0.78	4.97
2003	170	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	171	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	172	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	173	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	174	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	175	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	176	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	177	23	297	944.609	-246.761	D	7.685	7.685	0	3.5	95.44	0.03	0	0	0.86	3.2
2003	178	23	1	955.838	-260.274	D	7.714	7.685	0.029	3.5	98.53	0.06	0	0	0.11	1.31
2003	179	23	7	960.946	-259.659	D	7.685	7.685	0	3.5	95.01	0.03	0	0	0.28	3.5
2003	180	23	3	958.027	-260.011	D	7.685	7.685	0	3.5	92.44	0.01	0	0	0.38	6.67
2003	181	23	254	944.206	-249.594	D	7.685	7.685	0	3.5	75.84	0	0	0	5.07	9.64
2003	182	23	99	948.505	-254.653	D	7.772	7.772	0	3.692	82.56	0	0	0	4.47	8.8
2003	183	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	184	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	185	23	297	944.609	-246.761	D	7.79	7.776	0.014	3.7	98.91	0	0	0	0.07	1.02
2003	186	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	187	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	188	23	302	963.548	-244.486	D	7.785	7.776	0.009	3.7	94.24	0.07	0	0	1.33	4.35
2003	189	23	297	944.609	-246.761	D	7.793	7.776	0.017	3.7	95	0.04	0	0	0.81	4.16
2003	190	23	297	944.609	-246.761	D	7.777	7.776	0.001	3.7	99.02	0	0	0	0.24	0.7
2003	191	23	297	944.609	-246.761	D	7.808	7.776	0.032	3.7	97.72	0.01	0	0	0.27	2
2003	192	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	193	23	302	963.548	-244.486	D	7.823	7.776	0.046	3.7	97.66	0	0	0	0.21	2.12
2003	194	23	21	963.025	-258.479	D	7.776	7.776	0	3.7	71.59	0.04	0	0	0.49	19.51

Appendix M
Mammoth Cave
MC 2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	195	23	1	955.838	-260.274	D	7.791	7.776	0.014	3.7	99.16	0	0	0	0.14	0.69
2003	196	23	2	956.568	-260.187	D	7.823	7.776	0.046	3.7	99.38	0	0	0	0.06	0.56
2003	197	23	3	958.027	-260.011	D	7.797	7.776	0.021	3.7	91.02	0.07	0	0	2.08	6.82
2003	198	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	199	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	200	23	1	955.838	-260.274	D	7.779	7.776	0.002	3.7	99.49	0	0	0	0.07	0.47
2003	201	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	202	23	297	944.609	-246.761	D	7.785	7.776	0.009	3.7	98.95	0.01	0	0	0.14	0.91
2003	203	23	297	944.609	-246.761	D	7.805	7.776	0.029	3.7	97.86	0.04	0	0	0.15	1.95
2003	204	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	205	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	206	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	207	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	208	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	209	23	297	944.609	-246.761	D	7.879	7.776	0.102	3.7	97.82	0	0	0	0.26	1.91
2003	210	23	21	963.025	-258.479	D	7.841	7.776	0.065	3.7	97.41	0.09	0	0	0.1	2.4
2003	211	23	1	955.838	-260.274	D	7.776	7.776	0	3.7	0	0	0	0	0	0
2003	212	23	119	945.479	-254.084	D	7.896	7.776	0.12	3.7	99.09	0.01	0	0	0.11	0.79
2003	213	23	119	945.479	-254.084	D	8.002	7.863	0.138	3.892	99.36	0.01	0	0	0.07	0.57
2003	214	23	297	944.609	-246.761	D	8.132	7.867	0.265	3.9	98.46	0.01	0	0	0.14	1.38
2003	215	23	21	963.025	-258.479	D	7.974	7.867	0.107	3.9	98.67	0.01	0	0	0.29	1.02
2003	216	23	297	944.609	-246.761	D	7.936	7.867	0.069	3.9	98.74	0.01	0	0	0.23	1.02
2003	217	23	1	955.838	-260.274	D	8.095	7.867	0.228	3.9	98.54	0.02	0	0	0.1	1.34
2003	218	23	8	961.676	-259.571	D	7.867	7.867	0	3.9	58.95	0.01	0	0	2.57	9.47
2003	219	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	220	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	221	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	222	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	223	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	224	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	225	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	226	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	227	23	275	944.098	-248.678	D	7.871	7.867	0.004	3.9	99.22	0	0	0	0.15	0.65
2003	228	23	172	943.804	-252.427	D	7.892	7.867	0.025	3.9	99.08	0	0	0	0.05	0.87
2003	229	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	230	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	231	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	232	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	233	23	275	944.098	-248.678	D	7.891	7.867	0.024	3.9	99.09	0	0	0	0.11	0.8

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	234	23	297	944.609	-246.761	D	8.117	7.867	0.25	3.9	98.72	0	0	0	0.19	1.09
2003	235	23	9	954.269	-259.534	D	8.001	7.867	0.134	3.9	98.2	0.01	0	0	0.05	1.74
2003	236	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	237	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	238	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	239	23	297	944.609	-246.761	D	7.916	7.867	0.049	3.9	99.23	0	0	0	0.11	0.66
2003	240	23	119	945.479	-254.084	D	8.131	7.867	0.264	3.9	97.62	0.03	0	0	0.15	2.2
2003	241	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	242	23	297	944.609	-246.761	D	7.97	7.867	0.103	3.9	97.83	0.02	0	0	0.47	1.67
2003	243	23	297	944.609	-246.761	D	7.919	7.867	0.052	3.9	98.76	0.02	0	0	0.12	1.09
2003	244	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	245	23	300	962.092	-244.663	D	7.892	7.867	0.025	3.9	97.42	0.08	0	0	0.29	2.21
2003	246	23	297	944.609	-246.761	D	7.878	7.867	0.011	3.9	98.74	0	0	0	0.38	0.88
2003	247	23	172	943.804	-252.427	D	7.899	7.867	0.032	3.9	98.76	0	0	0	0.17	1.06
2003	248	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	249	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	250	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	251	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	252	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	253	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	254	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	255	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	256	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	257	23	172	943.804	-252.427	D	7.874	7.867	0.007	3.9	98.94	0	0	0	0.13	0.93
2003	258	23	8	961.676	-259.571	D	7.912	7.867	0.045	3.9	97.11	0.04	0	0	0.09	2.76
2003	259	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	260	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	261	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	262	23	1	955.838	-260.274	D	7.879	7.867	0.013	3.9	99.45	0	0	0	0.1	0.45
2003	263	23	3	958.027	-260.011	D	7.867	7.867	0	3.9	85.58	0	0	0	0.31	11.85
2003	264	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	265	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	266	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	267	23	297	944.609	-246.761	D	7.869	7.867	0.002	3.9	98.35	0	0	0	0.16	1.48
2003	268	23	119	945.479	-254.084	D	7.882	7.867	0.015	3.9	97.36	0.03	0	0	0.31	2.3
2003	269	23	1	955.838	-260.274	D	7.915	7.867	0.048	3.9	98.97	0	0	0	0.08	0.95
2003	270	23	21	963.025	-258.479	D	7.886	7.867	0.019	3.9	97.02	0.08	0	0	0.32	2.57
2003	271	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	272	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	273	23	1	955.838	-260.274	D	7.867	7.867	0	3.9	0	0	0	0	0	0
2003	274	23	1	955.838	-260.274	D	7.648	7.648	0	3.421	0	0	0	0	0	0
2003	275	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	276	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	15.34	0	0	0	6.48	11.15
2003	277	23	8	961.676	-259.571	D	7.662	7.639	0.023	3.4	86.35	0.09	0	0	1.4	12.17
2003	278	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	279	23	297	944.609	-246.761	D	7.677	7.639	0.038	3.4	96.53	0.09	0	0	0.22	3.16
2003	280	23	297	944.609	-246.761	D	7.665	7.639	0.026	3.4	97.79	0.01	0	0	0.09	2.11
2003	281	23	172	943.804	-252.427	D	7.641	7.639	0.002	3.4	97.94	0	0	0	0.04	2.08
2003	282	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	34.39	0	0	0	0.03	3.98
2003	283	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	284	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	285	23	9	954.269	-259.534	D	7.667	7.639	0.028	3.4	98.93	0.01	0	0	0.21	0.85
2003	286	23	8	961.676	-259.571	D	7.641	7.639	0.002	3.4	99.44	0	0	0	0.06	0.54
2003	287	23	297	944.609	-246.761	D	7.645	7.639	0.006	3.4	95.63	0.16	0	0	0.49	3.72
2003	288	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	289	23	297	944.609	-246.761	D	7.688	7.639	0.05	3.4	95.92	0.07	0	0	0.31	3.71
2003	290	23	275	944.098	-248.678	D	7.639	7.639	0	3.4	85.45	0	0	0	3.13	11.68
2003	291	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	89.1	0	0	0	0.92	10.27
2003	292	23	48	963.533	-256.561	D	7.768	7.639	0.129	3.4	97.76	0.02	0	0	0.39	1.84
2003	293	23	8	961.676	-259.571	D	7.672	7.639	0.033	3.4	96.21	0.01	0	0	0.12	3.66
2003	294	23	8	961.676	-259.571	D	7.67	7.639	0.031	3.4	90.48	0.28	0	0	0.61	8.63
2003	295	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	296	23	9	954.269	-259.534	D	7.641	7.639	0.002	3.4	98.88	0	0	0	0.34	0.81
2003	297	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	298	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	299	23	297	944.609	-246.761	D	7.681	7.639	0.042	3.4	97.25	0.16	0	0	0.1	2.5
2003	300	23	47	962.803	-256.649	D	7.639	7.639	0	3.4	91.18	0.01	0	0	3.34	5.62
2003	301	23	297	944.609	-246.761	D	7.643	7.639	0.004	3.4	93.2	0.21	0	0	0.78	5.82
2003	302	23	119	945.479	-254.084	D	7.664	7.639	0.025	3.4	97.89	0.11	0	0	0.08	1.92
2003	303	23	119	945.479	-254.084	D	7.639	7.639	0	3.4	1.05	4.45	0	0	0.01	89.7
2003	304	23	1	955.838	-260.274	D	7.639	7.639	0	3.4	0	0	0	0	0	0
2003	305	23	297	944.609	-246.761	D	7.567	7.55	0.017	3.208	95.83	0.03	0	0	0.28	3.87
2003	306	23	297	944.609	-246.761	D	7.551	7.546	0.005	3.2	96.87	0.01	0	0	0.04	3.08
2003	307	23	293	961.474	-245.666	D	7.546	7.546	0	3.2	46.03	0	0	0	22.04	36.4
2003	308	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	309	23	1	955.838	-260.274	D	7.631	7.546	0.084	3.2	99.09	0.01	0	0	0.18	0.73
2003	310	23	21	963.025	-258.479	D	7.626	7.546	0.08	3.2	99.58	0.01	0	0	0.03	0.38
2003	311	23	8	961.676	-259.571	D	7.546	7.546	0	3.2	97.76	0	0	0	0.01	0.2

Appendix M
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YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	312	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	313	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	314	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	315	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	316	23	297	944.609	-246.761	D	7.566	7.546	0.02	3.2	96.39	0.04	0	0	0.45	3.12
2003	317	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	318	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	319	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	320	23	172	943.804	-252.427	D	7.546	7.546	0	3.2	100.53	0	0	0	0.04	0.32
2003	321	23	290	946.175	-247.503	D	7.546	7.546	0	3.2	92.48	0	0	0	3.06	4.95
2003	322	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	323	23	172	943.804	-252.427	D	7.547	7.546	0.001	3.2	98.09	0.01	0	0	0.3	1.62
2003	324	23	172	943.804	-252.427	D	7.547	7.546	0	3.2	58.89	0.35	0	0	0.86	40.26
2003	325	23	297	944.609	-246.761	D	7.55	7.546	0.004	3.2	85.94	0.1	0	0	0.18	13.79
2003	326	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	327	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	328	23	297	944.609	-246.761	D	7.554	7.546	0.008	3.2	91.49	0.28	0	0	0.81	7.44
2003	329	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	330	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	331	23	1	955.838	-260.274	D	7.546	7.546	0	3.2	0	0	0	0	0	0
2003	332	23	119	945.479	-254.084	D	7.546	7.546	0	3.2	78.87	0	0	0	7.66	13.36
2003	333	23	172	943.804	-252.427	D	7.548	7.546	0.002	3.2	81.73	0.7	0	0	0.47	17.16
2003	334	23	300	962.092	-244.663	D	7.553	7.546	0.007	3.2	94.69	0.21	0	0	0.09	5
2003	335	23	300	962.092	-244.663	D	7.687	7.679	0.008	3.487	81.06	0.77	0	0	1.97	16.2
2003	336	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	337	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	338	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	339	23	8	961.676	-259.571	D	7.717	7.685	0.032	3.5	98.25	0.17	0	0	0.09	1.49
2003	340	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	341	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	342	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	343	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	344	23	297	944.609	-246.761	D	7.687	7.685	0.002	3.5	97.3	0.01	0	0	0.34	2.32
2003	345	23	28	958.537	-258.093	D	7.699	7.685	0.014	3.5	95.64	0.13	0	0	0.38	3.85
2003	346	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	347	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	348	23	3	958.027	-260.011	D	7.685	7.685	0	3.5	73.9	0.01	0	0	22.05	36.22
2003	349	23	172	943.804	-252.427	D	7.731	7.685	0.046	3.5	97.86	0.1	0	0	0.19	1.85
2003	350	23	119	945.479	-254.084	D	7.704	7.685	0.019	3.5	97.22	0.13	0	0	0.5	2.16

Appendix M
Mammoth Cave
MC 2003 M6

YEAR	DAY	HR	RECEPTOR	COORDINATES	(km)	TYPE	DV(Total)	DV(BKG)	DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
2003	351	23	21	963.025	-258.479	D	7.686	7.685	0.001	3.5	98.07	0.17	0	0	0.11	1.63
2003	352	23	302	963.548	-244.486	D	7.727	7.685	0.043	3.5	91.69	0.37	0	0	0.82	7.13
2003	353	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	354	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	355	23	297	944.609	-246.761	D	7.685	7.685	0	3.5	66.16	2.45	0	0	0.9	30.07
2003	356	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	357	23	9	954.269	-259.534	D	7.815	7.685	0.13	3.5	97.17	0.12	0	0	0.31	2.39
2003	358	23	21	963.025	-258.479	D	7.694	7.685	0.01	3.5	97.56	0.17	0	0	0.15	2.12
2003	359	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	360	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	361	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	362	23	1	955.838	-260.274	D	7.685	7.685	0	3.5	0	0	0	0	0	0
2003	363	23	297	944.609	-246.761	D	7.693	7.685	0.008	3.5	98.24	0.08	0	0	0.2	1.48
2003	364	23	9	954.269	-259.534	D	7.743	7.685	0.058	3.5	98.79	0.09	0	0	0.09	1.02
									0.265							

Appendix N

Holcim-Clarksville BART Analysis

April 24, 2008

BART FIVE FACTOR ANALYSIS ▪ HOLCIM (US) INC

CLARKSVILLE, MISSOURI

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April 24, 2008

Project 081701.0004

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1. EXECUTIVE SUMMARY

This report documents the determination of the Best Available Retrofit Technology (BART) as proposed by Holcim (US) Inc. (Holcim) for the Portland cement manufacturing plant located in Clarksville, Missouri (Clarksville plant). This analysis is for the kiln system. Currently, particulate matter emissions from the kiln are controlled by an electrostatic precipitator. The Clarksville plant has other lesser emitting BART-eligible emissions units, all of which have Particulate Matter Control Devices (PMCDs) installed. The negligible visibility impairment attributable to these sources concludes that no additional controls are necessary to satisfy the requirements of the BART rule.[1]

Holcim used the U.S. Environmental Protection Agency's (EPA's) guidelines[2] in 40 CFR Part 51 to determine BART for the kiln. Specifically, Holcim conducted a five-step analysis to determine BART for SO_2, NOX, and PM_{10} that included the following:

1. Identifying all available retrofit control technologies;
2. Eliminating technically infeasible control technologies;
3. Evaluating the control effectiveness of remaining control technologies;
4. Evaluating impacts and document the results;
5. Evaluating visibility impacts

Based on the five-step analysis, Holcim proposes the following as BART:

Kiln:

- PM_{10} – Holcim has determined that the existing electrostatic precipitator constitutes BART. This control device is effective for controlling PM_{10} from a wet kiln.

- NO_X – Holcim has determined that BART for the Holcim Clarksville Kiln is the installation and operation of a Mid Kiln Firing (MKF) system.

- SO_2 – Holcim proposes that no additional SO_2 controls are required for BART compliance. Additional SO_2 controls would require significant expenditures relative to the visibility improvements and are not justified.

The proposed BART control strategies will result in reductions of the visibility impacts attributable to the Clarksville plant. A summary of the visibility improvement at Class I areas based on the existing emission rates and proposed BART emission rates is provided in Table 1-1.

[1] Holcim submitted an inventory of all of the BART-eligible emission sources to the MDNR. Based on a review of this information, the MDNR concluded that the contributions from particulate matter from the non-kiln sources to visibility impairment is negligible and further analysis of these smaller particulate matter sources was not required. Meeting with the MDNR dated January 23, 2008.

[2] 40 CFR 51, Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations

TABLE 1-1. VISIBILITY IMPAIRMENT IMPROVEMENT

	Mingo National Wildlife Refuge	Hercules Glades Wilderness Area	Upper Buffalo Wilderness Area
Existing 98% Impact (Δdv)	1.01	0.81	0.61
BART 98% Impact (Δdv)	0.92	0.72	0.60
Improvement 98% Impact (Δdv)	8.9%	11.1	1.6%

2. INTRODUCTION AND BACKGROUND

On July 1, 1999, the U.S. EPA published the final Regional Haze Rule (RHR). The objective of the RHR is to improve visibility in 156 specific areas across with United States, known as Class I areas. The Clean Air Act defines Class I areas as certain national parks (over 6000 acres), wilderness areas (over 5000 acres), national memorial parks (over 5000 acres), and international parks that were in existence on August 7, 1977.

On July 6, 2005, the EPA published amendments to its 1999 RHR, often called the Best Available Retrofit Technology (BART) rule, which included guidance for making source-specific BART determinations. The BART rule defines BART-eligible sources as sources that meet the following criteria:

(1) Have potential emissions of at least 250 tons per year of a visibility-impairing pollutant,
(2) Began operation between August 7, 1962 and August 7, 1977, and
(3) Are included as one of the 26 listed source categories in the guidance.

A BART-eligible source is subject to BART if the source is "reasonably anticipated to cause or contribute to visibility impairment in any federal mandatory Class I area." EPA has determined that a source is reasonably anticipated to contribute to visibility impairment if the 98th percentile visibility impacts from the source are greater than 0.5 delta deciviews (Δdv) when compared against a natural background. Air quality modeling is the tool that is used to determine a source's visibility impacts.

Once it is determined that a source is subject to BART, a BART determination must address air pollution control measures for the source. The visibility regulations define BART as follows:

> *"…an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant which is emitted by…[a BART-eligible source]. The emission limitation must be established on a case-by-case basis, taking into consideration the technology available, the cost of compliance, the energy and non air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonable be anticipated to result from the use of such technology.*

Specifically, the BART rule states that a BART determination should address the following five statutory factors:

1. Existing controls
2. Cost of controls
3. Energy and non-air quality environmental impacts
4. Remaining useful life of the source
5. Degree of visibility improvement as a result of controls

Further, the BART rule indicates that the five basic steps in a BART analysis can be summarized as follows:

1. Identify all available retrofit control technologies;
2. Eliminate technically infeasible control technologies;
3. Evaluate the control effectiveness of remaining control technologies;
4. Evaluate impacts and document the results;
5. Evaluate visibility impacts

A BART determination should be made for each visibility affecting pollutant (VAP) by following the five steps listed above for each VAP.

BART applicability was determined for the Clarksville plant based on an applicability analysis performed by the MDNR and a refined applicability analysis performed by Holcim. Both analyses determined that the kiln is subject to BART. The details of the applicability determination can be found in Section 3.

Subsequently, Holcim performed an analysis to determine BART for each VAP for the kiln. The VAPs emitted by the kiln include NO_x, SO_2, and particulate matter with a mass mean diameter smaller than ten microns (PM_{10}) of various forms (filterable coarse particulate matter [PM_c], filterable fine particle matter [PM_f], elemental carbon [EC], inorganic condensable particulate matter [IOR CPM] as sulfates [SO_4], and organic condensable particulate matter [OR CPM] also referred to as secondary organic aerosols [SOA]). The BART determinations for SO_2 and NO_X can be found in Sections 4 and 5 respectively.

3. BART APPLICABILITY DETERMINATION

As stated in Section 2, a BART-eligible source is subject-to-BART if the source is "reasonably anticipated to cause or contribute to visibility impairment in any federal mandated Class I area." EPA has determined that a source is reasonably anticipated to contribute to visibility impairment if the 98th percentile of the visibility impacts from the source is greater than 0.5 Δdv when compared against a natural background. The MDNR conducted air quality modeling for the kiln to predict the existing visibility impairment attributable to the Clarksville plant in the following Class I areas:

- Mingo National Wildlife Refuge
- Hercules Glade Wilderness Area
- Upper Buffalo Wilderness Area

Based on this modeling, the MDNR concluded that the Clarksville plant was subject to BART since the 98th percentile of the visibility impacts attributable to the kiln are greater than 0.5 Δdv when compared against a natural background for a Class I area.

The modeling methods and procedures that Holcim followed were consistent with the methods and procedures that were followed in the MDNR's original modeling. Table 3-1 summarizes the emission rates that were modeled for SO_2, NO_X, and PM_{10}[3]. The SO_2 and NO_x emission rates are the highest actual 24-hour emission rates based on 2003-2007 continuous emissions monitoring system (CEMS) data. The PM_{10} emission rates are based on data included in Holcim's BART survey.

TABLE 3-1. MODELED 24-HOUR EMISSIONS (AS AN HOURLY EQUIVALENT)

SO_2 (lb/hr)	NO_X (lb/hr)	Total PM_{10} (lb/hr)
4889.38	3049.38	51.82

Table 3-2 summarizes the stack parameters that were used to model the kiln.

TABLE 3-2. SUMMARY OF STACK PARAMETERS

Parameter	Value
Actual Stack height (ft)	250
Stack Diameter (ft)	21.7
Exhaust Velocity (ft/s)	34.3
Exhaust Temperature (F)	367

The results of the modeling indicate that the 98th percentile of the visibility impacts are greater than 0.5 Δdv when compared against a natural background. Since the visibility impacts are greater than 0.5 Δdv, the kiln is subject to BART. The results of the modeling are summarized in Table 3-3.

[3] The non-kiln PM_{10} emissions were included in the model as part of the kiln PM_{10} emissions.

TABLE 3-3. SUMMARY OF 98TH PERCENTILE VISIBILITY IMPACTS AND NUMBER OF DAYS WITH VISIBILITY IMPACT GREATER THAN 0.5 ΔDV

Class I Area	Visibility Impairment	
	98th % Δdv	Days > 0.5 Δdv
Mingo Wilderness	1.01	75
Hercules Glades Wilderness	0.81	40
Upper Buffalo Wilderness	0.61	33

Table 3-4 provides a breakdown of the visibility impacts listed in Table 3-3 by each VAP for the high (98^{th} percentile) day (note that the specific percentiles vary from day to day, and location to location, the breakdown listed is an example of one event only).

TABLE 3-4. BREAKDOWN OF POLLUTANT SPECIFIC CONTRIBUTIONS TO VISIBILITY FOR THE 98TH PERCENTILE DAY.

Class I Area	Visibility Impairment Attributable to SO_4 (%)	Visibility Impairment Attributable to NO_3 (%)	Visibility Impairment Attributable to SOA (%)	Visibility Impairment Attributable to EC (%)	Visibility Impairment Attributable to PM_c (%)	Visibility Impairment Attributable to PM_f (%)	Total Visibility Impairment (Δdv)
Mingo Wilderness	98.6	1.2	0	0	0	0.2	1.01
Hercules Glades Wilderness	42.3	57.5	0	0	0	0.2	0.81
Upper Buffalo Wilderness	95.7	4.2	0	0	0	0.1	0.61

As shown in Table 3-4, the most significant contributors to the visibility impairment are sulfates (SO_4) and nitrates (NO_3). The SO_4 contribution is from the chemical conversion of SO_2 emitted by the kiln to SO_4. The NO_3 contribution is entirely from the chemical conversion of NO_X emitted from the kiln. The contribution of PM_{10} to the total visibility impairment can be estimated as the sum of the contributions from SOA, EC, PMc, and PMf. The PM_{10} contribution is much smaller (<1%) than the contribution from SO_2 and NO_X.

4. SO_2 BART EVALUATION

Sulfur, in the form of metallic sulfides (pyrite), sulfate, or organosulfur compounds, is often found in the raw materials used to manufacture cement and in the solid and liquid fuels burned in cement kilns.[4] The raw materials and fuels for the Clarksville plant are no exception. Sulfur dioxide can be generated by the oxidation of sulfur compounds in the raw materials and fuels during operation of the pyroprocess. Constituents found in fuels, raw materials, and in-process materials, such as the alkali metals (sodium and potassium), calcium carbonate, and calcium oxide react with SO_2 formed in the pyroprocess and much of the sulfur leaves the process in the principle product of the kiln system called clinker.

The kiln is the only BART source which emits SO_2, thus an SO_2 BART evaluation was performed only for the kiln. The maximum actual 24-hour kiln SO_2 emission rate that was modeled for the BART applicability determination is summarized in Table 4-1. .

TABLE 4-1. EXISTING ACTUAL MAXIMUM 24-HOUR SO_2 EMISSION RATES

	SO_2 24-Hour Emission Rate ton/24-hr	SO_2 Hourly Equivalent Emission Rate lb/hr
Kiln	58.67	4889.38

4.1 IDENTIFICATION OF AVAILABLE RETROFIT SO_2 CONTROL TECHNOLOGIES

Step 1 of the BART determination is the identification of all available retrofit SO_2 control technologies. A list of control technologies was obtained by reviewing the U.S. EPA's Clean Air Technology Center, publicly-available air permits, applications, and technical literature published by the U.S. EPA, state agencies, and Regional Planning Organizations (RPOs).

The available retrofit SO_2 control technologies are summarized in Table 4-2.

TABLE 4-2. AVAILABLE SO_2 CONTROL TECHNOLOGIES

SO_2 Control Technologies
Fuel Substitution
Raw Material Substitution
Dry Lime Injection/Scrubbing
Wet Lime Scrubbing

[4] Miller, F. MacGregor and Hawkins, Garth J., "Formation and Emission of Sulfur Dioxide from the Portland Cement Industry", *Proceedings of the Air and Waste Management Association*, June 18-22, 2000.

4.2 ELIMINATE TECHNICALLY INFEASIBLE SO_2 CONTROL TECHNOLOGIES

Step 2 of the BART determination is to eliminate technically infeasible SO_2 control technologies that were identified in Step 1.

4.2.1 FUEL SUBSTITUTION

Holcim uses a mixture of coal, petroleum coke, alternative fuels (synfuel), and oil as the primary fuels for the kiln. For example, the 2007 actual fuel usage breakdown on an energy input basis, was 3.4 percent coal, 84 percent petroleum coke, 11.8 percent synfuel, and 0.8 percent oil (the fuel usages are also on an as received basis). The sulfur content of the petroleum coke is approximately 5.72 percent and the sulfur content of the coal is approximately 3.45 percent.

The design of the long wet kiln system is such that some of the SO_2 resulting from fuel combustion may be emitted and the rest is absorbed in clinker or CKD. Therefore, if Holcim reduces sulfur in the fuel input to the kiln, a corresponding reduction in SO_2 emissions from the kiln would be expected. Fuel sulfur content could be reduced by burning a coal with a lower sulfur content of 0.7 percent, in lieu of the current coal/coke, which would result in a lower overall fuel sulfur content.

Determining the specific reduction in SO_2 emissions from a reduction in fuel sulfur is complicated as the reactions in the kiln system are complex. The sulfur is introduced into the system in the fuel as well as the raw materials (pyrites) and the sulfur exits the kiln system in the product (clinker), the cement kiln dust (CKD), and out the stack as SO_2. Further, although the sulfur in the clinker is small on a percentage basis, the magnitude of the clinker production is extremely large (greater than 1 million tons per year). Consequently, small changes in the amount of sulfur absorbed in the product can dramatically change the amount of SO_2 emitted. The variation in sulfur in the raw materials from the quarry, the clinker quality requirement determined by the market, and the kiln conditions can all cause significant changes in kiln operating parameters, such as kiln burning temperature, kiln excess Oxygen, etc. These changes can have a strong impact on the sulfur absorbed in the clinker and CKD and hence on SO_2 emissions. These operating conditions can also strongly change how the fuel sulfur affects SO_2 emissions. Reviewing the data yields that there is no linear correlation between fuel sulfur and SO_2 emissions. To calculate an SO_2 control effectiveness, based on switching to a lower sulfur fuel, a high number of assumptions must be made with a very low confidence in the accuracy. Regardless, an attempt has been made.

The assumptions, based on long term averages in 2007, which can vary significantly on an annual and short term (24-hr) basis, include that 65 percent of sulfur input in the kiln system is from fuel, 35 percent of sulfur input is from raw materials, and approximately 30-35 percent of total sulfur input is estimated to ultimately be emitted as SO_2 in the stack.

Based on the 2007 data, if all of the current coal and coke is replaced with low sulfur coal, the sulfur input from fuel is calculated to be reduced by approximately 85 percent. Following is a summary of the sulfur input reduction from the use of low sulfur coal. The low sulfur coal has a lower heat content (26 Gj/Metric ton) and higher moisture content

than the coke currently being used (33 Gj/Metric ton), so a higher volume of low sulfur coal is needed than coke reduced.

<u>Current – 2007 Average</u>

Coke Usage:	160,915 metric tons
Low Heat Content	32.510 Gj/Mt
Sulfur Content:	5.72 %
Sulfur Input from Coke:	9,204 metric tons
Current Coal Usage:	9,432 metric tons
Low Heat Content	22.177 Gj/Mt
Sulfur Content:	3.45 %
Sulfur Input from Coal:	325 metric tons

Total Sulfur Input from Coke/Coal: 9,529 metric tons

<u>Low Sulfur Coal Replacement</u>

Coal Usage:	208,546 metric tons
Heat Content	26.266 Gj/Mt
Sulfur Content:	0.7 %

Total Sulfur Input from Coal: 1,459 metric tons

<u>Net reduction in sulfur input from coal:</u>

9,529 metric tons – 1,459 metric tons = 8,070 metric tons = 8,893 tons

The SO_2 reduction calculation, based on the calculated sulfur reduction, is very complicated. The pyrite sulfur from the raw materials can volatilize at relatively low temperatures in the kiln, in an area where the sulfur comes in contact with the kiln feed that has only minimally been calcined into CaO. Consequently, less of this sulfur reacts with the CaO and thus is emitted. Again, if the sulfur reacted with the CaO, it would be absorbed into the clinker and CKD. The fuel sulfur, on the other hand, enters the kiln in the burning zone and travels the entire length of the kiln, coming in contact with much higher concentrations of CaO, thus having a much greater chance of being absorbed. Consequently, there is no simple linear relationship between fuel sulfur and SO_2 emissions that can be used to confidently calculate an SO_2 reduction.

The fuel sulfur reduction of 8,893 tons corresponds with a 54 percent reduction of the total sulfur (fuel and raw material sulfur) input to the kiln system in 2007. As mentioned above, a large fraction of fuel sulfur would have been absorbed by the CaO in the system, and thus would not have been emitted as SO_2, while SO_2 emitted from the pyrite in the raw materials has less of a chance of being absorbed, so there is not a directly proportional reduction in SO_2 with the sulfur reduction from the fuels, nor with the total sulfur reduction. Holcim estimates that based on the year 2007 data, the actual SO_2 reduction is about 40% - 50%.

These reductions are the maximum reductions in tons of SO_2 that can be expected, especially if overall emissions of SO_2 increase from other sources (such as raw materials). As mentioned previously, the actual reduction will vary significantly, especially on a short term basis. Holcim estimates that the net reduction in SO_2 would be in the range of 40 percent to 50 percent.

Holcim considers this technology to be technically feasible and will consider it further.

4.2.2 RAW MATERIAL SUBSTITUTION / SELECTIVE MINING

In a long wet kiln, not only the pyritic sulfur, but total sulfur in the raw materials will have an impact on SO_2 emissions.

Part of the pyritic sulfur reacts with oxygen and forms SO_2 at the relatively lower temperature zone of the kiln. The rest of the sulfur, such as sulfates and sulfur compounds, enters the kiln at higher temperature zones, where more SO_2 is volatized. Some of this SO_2 will pass the length of the kiln without being absorbed and will thus be emitted to the stack.

Using raw materials with lower sulfur content can reduce the potential for SO_2 emissions from a wet kiln system. The limestone, shale, and other raw materials used at the Clarksville plant contain pyrites and total sulfur in varying concentrations. If zones or layers in the on-site quarry could be identified and mined selectively such that lower sulfur content materials are used, the emission rate of SO_2 could be reduced. Holcim has conducted a complete quarry investigation, and based on the quarry scheduling optimization (QSO) model and computation, after 1-2 years of mining, the plant will be facing an area that has an even higher total sulfur content than that currently being used. Thus, there will be a higher total sulfur content in the raw material in the next 3-10 years. The total sulfur in the raw materials is expected to increase by an additional ~30% without selective quarrying, and by ~20% if some form of selective quarrying can be identified. Similarly, no significant reduction of pyritic sulfur from selective mining is anticipated.

Selective mining is not considered a technically feasible SO_2 control technology for the kiln. Moreover, Holcim is concerned that actual annual emissions resulting from normal variability at the plant will lead to an increase in SO_2 emissions as a result of total sulfur increases in the raw materials from the quarry. This variability will need to be considered in any potential BART control strategy.

4.2.3 DRY LIME INJECTION/DRY LIME SCRUBBING

Dry Lime Injection, or Dry Lime Scrubbing (DLS), consists of injecting hydrated lime, $Ca(OH)_2$, into the flue gas. The $Ca(OH)_2$ reacts with SO_2 in the flue gas stream to create fine particles of $CaSO_3$ or $CaSO_4$. The particles are collected in the particulate matter control device (PMCD) serving the kiln.

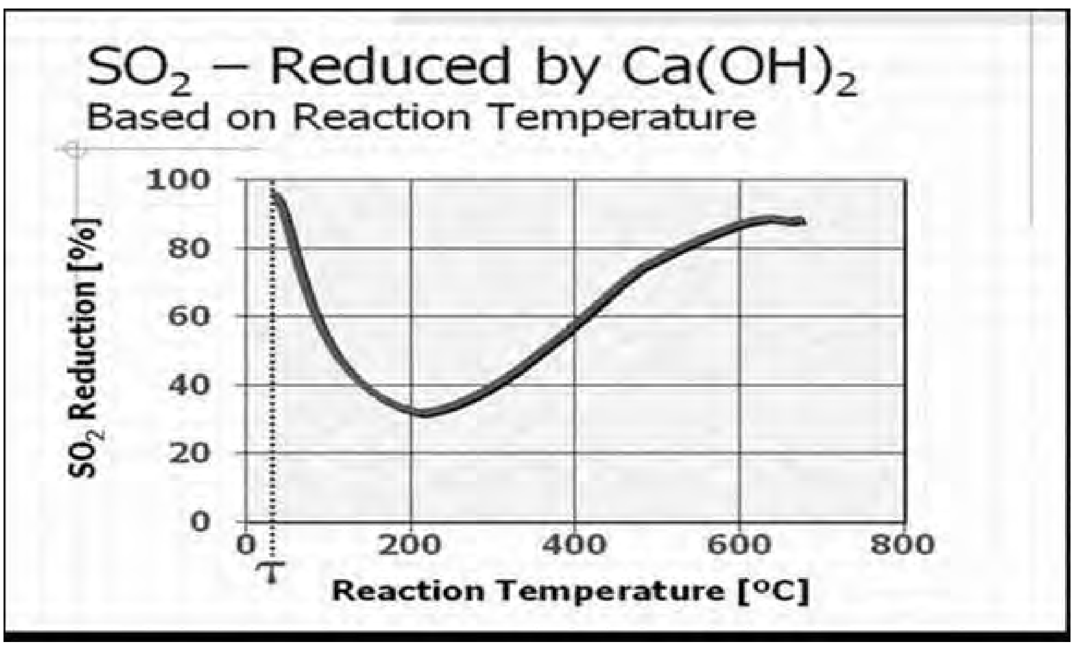
The current PMCD was not sized/designed to handle the additional particulate matter loading that would result from this technology. Consequently, adding DLS could cause

PM emissions and opacity to increase above permitted levels requiring Holcim to replace the existing PMCD (an ESP) with a new PMCD (a Baghouse).

Holcim is aware of only one other long term application of this technology on a wet kiln, which is on a smaller wet kiln in Belgium. Consequently, very little data exists to directly quantify the feasibility or benefit (emission reduction) of such a system. Regardless, Holcim is considering the technology to be technically feasible.

The effectiveness of DLS is impacted by both the temperature and the residence time/air flow rate at the location it is injected. At Clarksville, the injection point would be between the kiln outlet and the PMCD. At this location, the temperature is approximately 200 deg C (415 deg F). The temperature can not be increased at this location as the plant has limitations on the inlet temperature to the PMCD from both the Portland Cement MACT and the Hazardous Waste Combustion MACT in order to meet the Dioxin/Furan (D/F) limit. Further, lowering the temperature would lead to lower ESP efficiency and opacity problems. Figure 4-1 is a plot of SO_2 reduction versus reaction temperature from a commonly used article entitled “What is Achievable with Today’s Technologies”, Mark S. Terry, Krupp Polysius Corp, 2001. As indicated in the figure, at a temperature of 200 deg C (415 deg F), the reduction level is approximately 30 percent, which is the lowest reduction level over the temperature range presented.

FIGURE 4-1. SO_2 REDUCTION VERSUS REACTION TEMPERATURE FOR HYDRATED LIME



The molar ratio of lime (calcium source) to SO_2 is much higher than in a typical coal fired boiler due to a number of factors, some of which include the higher CO_2 and dust levels in the cement kiln system exhaust. The CO_2 competes with SO_2,in the reaction with the lime, and the higher dust loading reduces the even distribution of the lime in the gas. Based on a communication with the Obourg plant in Belgium, a molar ratio of between 4:1 and 6:1

has been used. The larger size of the Clarksville kiln will make it more difficult to evenly distribute the lime to the kiln gas and thus Holcim anticipates that a molar ratio of 6:1 will be required to achieve a maximum control efficiency of 20 - 30 percent.

Holcim considers this technology to be technically feasible and will consider it further.

4.2.4 WET LIME SCRUBBING

Wet lime scrubbing (WLS) is a name for a traditional tailpipe wet scrubber. This process involves passing the flue gas from the main PMCD through a sprayed aqueous suspension of $Ca(OH)_2$ or $CaCO_3$ (limestone) that is contained in an appropriate scrubbing device. In the case of the Clarksville plant, the basic underlying economics would dictate the use of ground limestone as the scrubbing reagent. Use of the cement kiln dust as a scrubbing reagent was not considered as a viable option for Clarksville due to its high chlorine content and a large amount of inerts. In WLS, the aqueous suspension of scrubbing reagent is not taken to dryness as it is in DLS. The SO_2 reacts with the scrubbing reagent to form $CaSO_3.H_20$ or gypsum that is collected and retained as aqueous sludge. The sludge is either dewatered and disposed of or used as synthetic gypsum.

The scrubbing efficiency of WLS can vary from an estimated 80 percent to 95 percent of the SO_2 in the flue gas treated by the scrubber[5]. Further, WLS is a high maintenance process with high rates of downtime expected from build up or plug up of mist-eliminators or spray nozzles and the severe wear and corrosion of components. Holcim has found that high levels of hydrocarbons (THC) in the gas stream have caused significant corrosivity and foam build-up at their Dundee plant. Further, it significantly influences the system availability and the efficiency. The THC levels at the Clarksville plant may also lead to build up and plugging, and thus an availability (uptime) of the WLS of 95 percent is assumed.

Despite these identified drawbacks, WLS is considered a technically feasible BART option.

4.3 RANK OF TECHNICALLY FEASIBLE SO_2 CONTROL OPTIONS BY EFFECTIVENESS

The third step in the BART analysis is to rank the technically feasible options according to effectiveness. Table 4-3 provides the effectiveness of each technology in the form of an annual average efficiency.

[5] Assessment of Control Technology Options for BART-Eligible Sources Steam Electric Boilers, Industrial Boilers, Cement Plants and Paper and Pulp Facilities. Prepared by Northeast States for Coordinated Air Use Management In Partnership with The Mid-Atlantic/Northeast Visibility Union, March 2005, Page 4-21, Table IV-4. Range of Removal Efficiencies of Wet SO2 Scrubbers for Long Wet Kilns.

TABLE 4-3. RANKING OF TECHNICALLY FEASIBLE KILN SO_2 CONTROL TECHNOLOGIES BY EFFECTIVENESS

Control Technology	Effectiveness SO_2 Reduction (Percent Reduction – Annual Basis)
Wet Lime Scrubbing	80-95%
Fuel Substitution	40-50%
Dry Lime Scrubbing	20-30%

4.4 EVALUATION OF IMPACTS FOR FEASIBLE SO_2 CONTROLS

Step four of the BART analysis procedure is the impact analysis. The BART determination guidelines list the four factors to be considered in the impact analysis:

- Cost of compliance
- Energy impacts
- Non-air quality impacts; and
- The remaining useful life of the source

Holcim has conducted an impact analysis for the remaining SO_2 control options.

4.4.1 WET LIME SCRUBBING

Cost of Compliance

Holcim utilized a recent WLS vendor bid as the basis for the economic analysis to determine the annualized cost for WLS. Holcim divided the annualized cost of WLS by the annual tons of SO_2 reduced to determine the cost effectiveness for WLS. The "annual tons reduced" were determined by subtracting the estimated controlled annual emissions from the existing annual emissions. The existing annual emissions should be considered both on a projected actual and a potential to emit (PTE) basis. The projected actual (PA) annual SO_2 emissions provided to the MDNR in the recent Mid Kiln Firing (MKF) permit application was 11,481 tons/year[6]. The PTE listed in the MKF permit is 13,298 tons/year. The estimated controlled annual emissions were calculated by applying an 80 percent to 95 percent control efficiency and a 95 percent control device uptime, to the projected actual annual and PTE emissions. Table 4-4 provides a summary of the cost effectiveness analysis related to WLS. The detailed cost analysis table is provided in Appendix A.

The equipment cost includes both the WLS system and a limestone preparation system. The limestone preparation system includes 2 Ball Mills used to grind the limestone received to a specific fineness.

[6] The projected actual annual emission rate was determined as part of the construction permit application process to support the August 27, 2007 Mid Kiln Firing construction permit. Permit Number 082007-019.

The cost effectiveness analysis does not include the cost to construct a new exhaust stack, which may be needed to employ the WLS technology, and it does not include the possible additional cost for the equipment relocation on site due to the limited space available for the WLS system.

The control cost factors were obtained from the EPA's Control Cost Manual, 6th Edition. Some of the factors have been scaled, as indicated, based on the construction being a retrofit, rather than Greenfield, and company knowledge of the actual cost of similar size/type projects.

Two factors that significantly increase the cost of this technology are the need to reheat the exhaust gas and the cost of sludge disposal.

Exhaust Gas Reheat

A common concern of utilizing a wet scrubber on a cement kiln exhaust gas is the probable formation of a detached plume resulting in opacity violations. For a typical cement kiln stack, if the exhaust gas contains NH_3, HCl, and SO_2, sub-micron aerosols of NH_4Cl and $(NH_4)2SO_4$ may form when the gas temperature is reduced after exiting the stack. A detached plume is predicted to occur when the exhaust gas is cooled to the dew point at or near the exit of the stack and prior to the dilution of the aerosol forming constituents. The wet scrubber requires the exhaust gas to be cooled to the dew point at the inlet of the scrubber. As the temperature of the exhaust gas is cooled in the scrubber, a visible plume condition is nearly assured. The sub-micron NH_4Cl aerosol will be formed and is difficult to remove in the scrubber. This problem has been reported for wet scrubbers used at cement plants. As the plant is subject to a 20 percent opacity limitation from both the PCMACT and HWCMACT, even a small increase in opacity could lead to an exceedance of the standard, which is not acceptable. Based on information from Holcim's Dundee, Michigan plant, Holcim anticipates that the temperature of the exhaust gas at the exit of the scrubber would be approximately 170 deg F. To keep the sub-micron particles from forming at the exit of the stack, reheating the exhaust gas, after the scrubber, is required. Without having any data to determine an optimum outlet temperature for the stack gas (after a scrubber is installed), Holcim has conservatively determined that to counteract this effect, the exhaust gas would need to be reheated to the current gas temperature after the ESP of approximately 380 deg F. This re-heating would most likely be achieved using natural gas combustion. The natural gas combustion would lead to a 97 ton/year increase in NO_x emissions that would negatively impact visibility gains from the SO_2 reduction.

Sludge Disposal

The sludge generated from the WLS system may require disposal. Therefore, Holcim has determined the cost of disposal based on a bid from Area Disposal Services, Inc. for the disposal fee ($36/ton), as well as the cost for trailer rental ($120/month) and transportation ($220/load).

WLS may also lead to an increase in PM emissions because some particles of limestone or $CaSO_3$ will be entrained in the flue gas and subsequently be emitted from the scrubber. WLS is also known to increase emissions of sulfuric acid mist.[7]

TABLE 4-4. COST ANALYSIS SUMMARY FOR WET LIME SCRUBBING

Control Case	Control Effectiveness (%)	Annual Cost ($/yr)	Existing Annual Emissions (tons/yr)	Pollutant* Removed (tons/yr)	Cost** Effectiveness ($/ton)	Cost*** Impact ($/ton clinker)
WLS – PA	80%	$24,706,548	11,481	8,726	$2,863	$20
WLS – PA	95%	$25,246,115	11,481	10,362	$2,460	$21
WLS – PTE	80%	$25,161,975	13,298	10,106	$2,514	$21
WLS – PTE	95%	$25,786,935	13,298	12,001	$2,166	$21

*Assumes 95% uptime.
**Includes 97 tons of NOx generated.
***Based on a maximum historical actual clinker production rate of 1,215,708 tons/year.

The significant increases in cost per ton of clinker produced from using WLS, as shown in Table 4-4, would likely eliminate any profit margin currently realized by the plant. Thus, it would not be economically feasible to operate the plant with WLS.

Energy Impacts

A wet scrubber requires an additional fan of considerable horsepower to move the flue gas through the scrubber. The exhaust gas reheat requirement will utilize approximately 1,000,000 MMcf/year of natural gas, which will itself lead to an increase in NOx emissions of 97 tons/yr.

Non Air-Quality Impacts

Without reheating, a frequent steam plume and/or detached plume can be expected at the discharge of the wet scrubber that would result in visual impairment in the area.

The WLS technology could generate over 50,000 tons per year of waste (sludge) that will require disposal in a landfill.

Remaining Useful Life

The remaining useful life of the kiln does not impact the annualized cost of WLS because the useful life is anticipated to be at least as long as the capital cost recovery period, which is 15 years.

4.4.2 FUEL SUBSTITUTION

Cost of Compliance

[7] *Innovations in Portland Cement* Manufacturing, Portland Cement Association, 2004, pg. 660 & 669

The increased cost of using low sulfur coal includes the relative increase in fuel cost as well as the cost of a new coal mill system. Low sulfur coal is harder than the current coal/coke utilized and has a lower heat content; consequently, a higher volume of coal grinding will be needed than the current mill can achieve. The increased grinding requirement would also have an additional energy requirement. A bid for a new coal mill, classifier, and mill motors, was obtained from GEBR. Pfeiffer USA Inc. Table 4-5 provides a summary of the cost effectiveness analysis related to Fuel Substitution. The detailed cost analysis table is provided in Appendix A.

The cost effectiveness analysis does not include the cost to construct any new storage or handling facilities for the low sulfur coal that may be required.

The control cost factors were obtained from the EPA's Control Cost Manual, 6th Edition. Some of the factors have been scaled, as indicated, based on the construction being a retrofit, rather than greenfield, and company knowledge of the actual cost of similar size/type projects.

TABLE 4-5. COST ANALYSIS SUMMARY FOR FUEL SUBSTITUTION

Control Case	Control Effectiveness (%)	Annual Cost ($/yr)	Existing Annual Emissions (tons/yr)	Pollutant Removed (tons/yr)	Cost Effectiveness ($/ton)	Cost* Impact ($/ton clinker)
Fuel Sub – PA	40%	$27,022,178	11,481	4,592	$5,884	$22
Fuel Sub – PA	50%	$27,022,178	11,481	5,741	$4,707	$22
Fuel Sub – PTE	40%	$27,022,178	13,298	5,319	$5,080	$22
Fuel Sub – PTE	50%	$27,022,178	13,298	6,649	$4,064	$22

*Based on a maximum historical actual clinker production rate of 1,215,708 tons/year

The significant increases in cost per ton of clinker produced from using Fuel Substitution, as shown in Table 4-5, would likely eliminate any profit margin currently realized by the plant. Thus, it would not be economically feasible to operate the plant with Fuel Substitution.

Energy Impacts

The low sulfur coal will require additional energy for grinding. The actual increase is difficult to estimate.

Non Air-Quality Impacts

None.

Remaining Useful Life

The remaining useful life of the kiln does not impact the annualized cost because the useful life is anticipated to be at least as long as the capital cost recovery period, which is 15 years. However, the existing coal mill would need to be replaced at a significant expense.

4.4.3 DRY LIME SCRUBBING

Cost of Compliance

The increased cost of DLS includes the cost of hydrated lime as well as the injection system and replacing the existing ESP with a new baghouse. As the DLS injection system would likely be a custom application, Holcim's engineering department has estimated that the DLS injection system equipment cost would be approximately $1,000,000. Holcim obtained a bid for retrofitting the existing ESP with a Baghouse from GE Energy. A detailed analysis has not yet been completed to determine if the retrofit will be capable of handling the additional dust loading from the DLS system.

The quantity of hydrated lime required is calculated below on a PA and PTE basis as follows:

<u>Hydrated Lime Requirement.</u>

PA Basis:

The projected actual annual emission level of SO_2 is 11,481 tons

A molar ratio of 6:1, $Ca(OH)_2$ to SO_2, is required. The $Ca(OH)_2$ required is calculated by multiplying by the ratio of molecular weights:

6 x 11,481 tons SO_2 x (74 ton $Ca(OH)_2$/ 64 SO_2) = 79,649 tons $Ca(OH)_2$

The estimated purity of the hydrated lime is 96.8 percent $Ca(OH)_2$. Consequently, the amount required is scaled as follows:

79,649 tons $Ca(OH)_2$ / 0.968 = 82,282 tons hydrated lime

PTE Basis:

The PTE annual emission level of SO_2 is 13,298 tons

A molar ratio of 6:1, $Ca(OH)_2$ to SO_2, is required. The $Ca(OH)_2$ required is calculated by multiplying by the ratio of molecular weights:

6 x 13,298 tons SO_2 x (74 ton $Ca(OH)_2$/ 64 SO_2) = 92,255 tons $Ca(OH)_2$

The estimated purity of the hydrated lime is 96.8 percent $Ca(OH)_2$. Consequently, the amount required is scaled as follows:

92,255 tons $Ca(OH)_2$ / 0.968 = 95,304 tons hydrated lime

Table 4-6 provides a summary of the cost effectiveness analysis related to DLS. The detailed cost analysis table is provided in Appendix A. The control cost factors were obtained from the EPA's Control Cost Manual, 6^{th} Edition. Some of the factors have been

scaled, as indicated, based on the construction being a retrofit, rather than greenfield, and company knowledge of the actual cost of similar size/type projects.

TABLE 4-6. COST ANALYSIS SUMMARY FOR DRY LIME SCRUBBING

Control Case	Control Effectiveness (%)	Annual Cost ($/yr)	Existing Annual Emissions (tons/yr)	Pollutant Removed (tons/yr)	Cost Effectiveness ($/ton)	Cost* Impact ($/ton clinker)
DLS – PA	20%	$15,607,401	11,481	2,181	$7,155	$13
DLS – PA	30%	$15,607,401	11,481	3,272	$4,770	$13
DLS – PTE	20%	$17,638,856	13,298	2,527	$6,981	$15
DLS – PTE	30%	$17,638,856	13,298	3,790	$4,654	$15

*Based on a maximum historical actual clinker production rate of 1,215,708 tons/year

The significant increases in cost per ton of clinker produced from using DLS, as shown in Table 4-6, would likely eliminate any profit margin currently realized by the plant. Thus, it would not be economically feasible to operate the plant with DLS.

Energy Impacts
Additional electricity is needed for the pump used to inject the lime into the kiln gas.

Non Air-Quality Impacts
Utilizing DLS could also increase the amount of CKD sent to the landfill.

Remaining Useful Life
The remaining useful life of the kiln does not impact the annualized cost because the useful life is anticipated to be at least as long as the capital cost recovery period, which is 15 years.

4.5 EVALUATION OF VISIBILITY IMPACT OF FEASIBLE SO_2 CONTROLS

A final impact analysis was conducted to assess the visibility improvement for the existing emission rate when compared to the emission rate of WLS, Fuel Substitution, and DLS. The existing emission rates, and emission rates associated with controls, were modeled using CALPUFF. The existing emission rate is the same rate that was modeled for the BART applicability analysis. The SO_2 emission rate associated with WLS, Fuel Substitution, and DLS is the existing emission rates less the average anticipated control of 87.5 percent, 45 percent, and 25 percent respectively. The emission rates are summarized in Table 4-7.

TABLE 4-7. SUMMARY OF EMISSION RATES MODELED IN SO_2 CONTROL VISIBILITY IMPACT ANALYSIS

Emission Rate Scenario	Emission Rate		
	SO_2 (lb/hr)	NO_X (lb/hr)	PM_{10} (lb/hr)
WLS – 87.5%	611	3,049	51.82
Fuel Substitution – 45%	2,689	3,049	51.82
DLS – 25%	3,667	3,049	51.82
Base case – Max 24-hr avg.	4,889	3,049	51.82

Comparisons of the existing visibility impacts and the visibility impacts based on WLS, Fuel Substitution, and DLS are provided in Table 4-8. The visibility improvement associated with the controls are also shown in Table 4-8; this value was calculated as the difference between the existing visibility impairment and the visibility impairment for the controlled emission rates as measured by the 98th percentile modeled visibility impact.

TABLE 4-8. SUMMARY OF MODELED IMPACTS FROM SO_2 CONTROL VISIBILITY IMPACT ANALYSIS

	Mingo National Wildlife Refuge	Hercules Glades Wilderness Area	Upper Buffalo Wilderness Area
Existing 98% Impact (Δdv)	1.01	0.81	0.61
WLS 98% Impact (Δdv)	0.48	0.31	0.21
WLS Improvement 98% Impact (Δdv)	0.53	0.50	0.40
Fuel Subs. 98% Impact (Δdv)	0.70	0.58	0.37
Fuel Subs Improvement 98% Impact (Δdv)	0.31	0.23	0.24
DLS 98% Impact (Δdv)	0.87	0.70	0.48
DLS Improvement 98% Impact (Δdv)	0.14	0.11	0.13

4.6 PROPOSED BART FOR SO_2

In order to determine BART for SO_2, Holcim reviewed each control option's availability, as well as its cost of compliance, energy impacts, and non-air quality impacts, as well as the remaining useful life of the kiln. Table 4-9 summarizes the cost effectiveness for the controls based on the tons of SO_2 reduced and the visibility improvement in deciviews.

TABLE 4-9. SUMMARY OF COST EFFECTIVENESS OF SO_2 CONTROL OPTIONS

Control Option*	Existing Emissions (tons/yr)	Reduced Annual Emissions (tons/yr)	Annual Cost ($/yr)	Cost** Effectiveness ($/ton)	Cost Impact ($/ton clinker)
WLS–PA–80%	11,481	8,726	$24,706,548	$2,863	$20
Fuel Sub – PA - 40%	11,481	4,592	$27,022,178	$5,884	$22
DLS – PA - 20%	11,481	2,181	$15,607,401	$7,155	$13

*The worst case scenario from a cost effectiveness perspective is provided.

**Includes 97 tons of NOx generated for WLS

Control Type **WLS–PA–80%** Class I Area	Base 98th Percentile Impact (DV)	Controlled 98th Percentile Impact (DV)	98th Percentile Improvement (DV)	98th Percentile Improvement (%)	Cost Effectiveness ($/DV)
Mingo	1.01	0.48	0.53	52.5	$46,616,128
Hercules	0.81	0.31	0.50	61.7	$49,413,096
Buffalo	0.61	0.21	0.40	65.6	$61,766,370

Control Type **Fuel Subs.** Class I Area	Base 98th Percentile Impact (DV)	Controlled 98th Percentile Impact (DV)	98th Percentile Improvement (DV)	98th Percentile Improvement (%)	Cost Effectiveness ($/DV)
Mingo	1.01	0.70	0.31	30.7	$87,168,317
Hercules	0.81	0.58	0.23	28.4	$117,487,732
Buffalo	0.61	0.37	0.24	39.3	$112,592,410

Control Type **DLS** Class I Area	Base 98th Percentile Impact (DV)	Controlled 98th Percentile Impact (DV)	98th Percentile Improvement (DV)	98th Percentile Improvement (%)	Cost Effectiveness ($/DV)
Mingo	1.01	0.87	0.14	13.9	$111,481,434
Hercules	0.81	0.70	0.11	13.6	$141,885,461
Buffalo	0.61	0.48	0.13	21.3	$120,056,929

Based on the five step analysis outlined by EPA, this analysis demonstrates that the cost of compliance associated with WLS, Fuel Substitution, and DLS is extremely high on a $/ton of SO_2 removed basis, and especially on a $/DV of improvement basis. A cost range of $46 million - $141 million/DV is well beyond expectations of the BART program. Holcim has concluded that the current inherent scrubbing by the cement kiln process is the only feasible control and no additional BART control option is economically feasible. Notwithstanding, Holcim has been diligently working on capturing SO_3 in clinker and significantly increased SO3 in the clinker in the past five years. Holcim continues to work on process optimization to further increase the SO_3 capture in the clinker.

5. NO_X BART EVALUATION

In Portland cement kilns, the NO_X that is generated is primarily classified into one of two categories, i.e., thermal NO_X or fuel NO_X[8]. Thermal NO_X occurs as a result of the high-temperature oxidation of molecular nitrogen present in the combustion air. Fuel NO_X is created by the oxidation of nitrogenous compounds present in the fuel. It is also possible for nitrogenous compounds to be present in the raw material feed and become oxidized to form additional NO_X referred to as feed NO_X.

Due to the high flame temperature in the burning zone of the rotary kiln (3400^o F), NO_X emissions from the kiln tend to be mainly comprised of thermal NO_X. Although NO_X emissions from cement kilns include both nitrogen oxide (NO) and nitrogen dioxide (NO_2), typically, less than 10% of the total NO_X in the flue gas is NO_2.[9]

The kiln is the only BART source which emits NO_x, thus a NO_x BART evaluation was performed only for the kiln. The maximum actual 24-hour kiln NO_x emission rate that was modeled for the BART applicability determination is summarized in Table 4-1. The NO_x 24-hour maximum actual emission rate was determined from analyzer data for November 24, 2007.

TABLE 5-1. EXISTING ACTUAL MAXIMUM 24-HOUR NO_x EMISSION RATES

	NO_x 24-Hour Emission Rate ton/24-hr	NO_x Hourly Equivalent Emission Rate lb/hr
Kiln	36.59 (73,185 lbs)	3,049

5.1 IDENTIFICATION OF AVAILABLE RETROFIT NO_X CONTROL TECHNOLOGIES

Step 1 of the BART determination is the identification of all available retrofit NO_X control technologies. A list of control technologies was obtained by reviewing the U.S. EPA's Clean Air Technology Center, control equipment vendor information, publicly-available air permits, applications, and technical literature published by the U.S. EPA and the RPOs.

The available retrofit NO_X control technologies are summarized in Table 5-2.

[8] NO_X Formation and Variability in Portland Cement Kiln Systems, Penta Engineering, December 1998.

[9] IBID.

TABLE 5-2. POSSIBLE NO_X CONTROL TECHNOLOGIES

Kiln Control Technologies
Low NO_X Burner Flue Gas Recirculation CKD Insufflation Mid-Kiln Firing of Tires Selective Noncatalytic Reduction Selective Catalytic Reduction

5.2 ELIMINATE TECHNICALLY INFEASIBLE NO_X CONTROL TECHNOLOGIES

Step 2 of the BART determination is to eliminate technically infeasible NO_X control technologies that were identified in Step 1.

5.2.1 LOW-NO_X BURNER IN THE ROTARY KILN

Low NO_x burners (LNBs) reduce the amount of NO_x formed at the flame. The principle of all LNBs is the same: stepwise or staged combustion and localized exhaust gas recirculation (i.e. at the flame). As applied to the rotary cement kiln, the low-NO_X burner creates primary and secondary combustion zones at the end of the main burner pipe to reduce the amount of NO_x initially formed at the flame. In the high-temperature primary zone, combustion is initiated in a fuel-rich environment in the presence of a less than stoichiometric oxygen concentration. The oxygen-deficient condition at the primary combustion site minimizes thermal and fuel NO_X formation and produces free radicals that chemically reduce some of the NO_X that is being generated in the flame.

In the secondary zone, combustion is completed in an oxygen-rich environment. The temperature in the secondary combustion zone is much lower than in the first; therefore, lower NO_X formation is achieved as combustion is completed. CO that has been generated in the primary combustion zone as an artifact of the sub-stoichiometric combustion is fully oxidized in the secondary combustion zone.

Low-NO_X burners are considered to be a technically feasible option for NO_X control. As Holcim already has a LNB, the technology will not be considered further.

5.2.2 FLUE GAS RECIRCULATION

Flue gas recirculation involves the use of oxygen-deficient flue gas from some point in the process as a substitute for primary air in the main burner pipe in the rotary kiln. Flue gas recirculation (FGR) lowers the peak flame temperature and develops localized reducing conditions in the burning zone through a significant reduction of the oxygen content of the primary combustion “air.” The intended effect of the lower flame temperature and reducing conditions in the flame is to decrease both thermal and fuel NO_X formation in the rotary kiln.

While FGR is a practiced control technology in the electric utility industry, Holcim is not aware of any attempt to apply FGR to a cement kiln because of the unique process requirements of the industry, i.e., a hot flame is required to complete the chemical reactions that form clinker minerals from the raw materials. The process of producing clinker in a cement kiln requires the heating of raw materials to about 2700°F for a brief but appropriate time to allow the desired chemical reactions that form the clinker minerals to occur. A short, high-temperature flame of about 3400°F is necessary to meet this process requirement. The long/lazy flame that would be produced by FGR would result in the production of lower or unacceptable quality clinker because of the resulting undesirable mineralogy. Clinkering reactions must take place in an oxidizing atmosphere in the burning zone to generate clinker that can be used to produce acceptable cement. FGR would tend to produce localized or general reducing conditions that also could detrimentally affect clinker quality. Due to these important limitations on the application of FGR and the lack of a successful demonstration on a cement kiln in the United States, FGR is not a technically feasible control option for NO_X control at this time.

5.2.3 CEMENT KILN DUST INSUFFLATION

Cement kiln dust (CKD) is a residual byproduct that can be produced by any of the four basic types of cement kiln systems. CKD is most often treated as a waste even though there are some beneficial uses. However, as a means of recycling usable CKD to the cement pyroprocess, CKD sometimes is injected or insufflated into the burning zone of the rotary kiln in or near the main flame. The presence of these cold solids within or in close proximity to the flame has the effect of cooling the flame and/or the burning zone thereby reducing the formation of thermal NO_X. The insufflation process is somewhat counterintuitive because a basic requirement of a cement kiln is a very hot flame to heat the clinkering raw materials to about 2700^{o} F in as short a time as possible. The Clarksville plant already uses this technology and it is already included in the baseline. Therefore, this option is removed from consideration for BART.

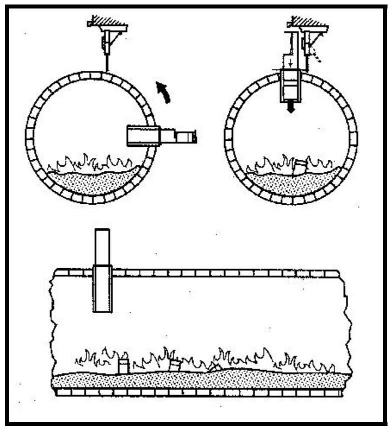
5.2.4 MID-KILN FIRING OF SOLID FUEL WITH MIXING AIR FAN

Secondary combustion is defined as follows: a portion of the fuel is fired in a location other than the burning zone. This reduces thermal NO_x generation because the temperature in the secondary combustion zone is less than 2100 °F. Mid-kiln firing (MKF) of solid fuels is an example of secondary combustion and includes fuels such as used tires, oil filter fluff, plastics, spent activated carbon and carbon black, asphalt shingles, diaper manufacturing waste, and other combustible solids. MKF improves clinker process energy efficiency, allows for greater operational flexibility with respect to fuel types, and is currently listed as a NOx control technology in 10 CSR 10-6.380 Control of NOx Emissions from Portland Cement Kilns.

An example of a MKF system is the Cadence feed form MKF technology which was first introduced in 1989. It is comprised of three primary components: (1) a staging arm or "feed fork," that picks up the fuel modules and positions them for entry into the kiln, (2) two pivoting doors that open to allow the fuel to drop into the kiln, and (3) a drop tube that

extends through the side wall of the kiln. In addition to these basic components, feed fork technology also requires a delivery system which positions the fuel models so they can be picked up by the feed fork and a mechanism for opening the doors so the fuel can enter the kiln. Due to rotation of the kiln, fuel can only be injected once per revolution from the top, as shown in Figure 5-1.

FIGURE 5-1. MID-KILN FIRING SCHEMATIC[10]



High-pressure air, in the range of a 2-10 percent replacement of the primary combustion air, could be injected through the shell of the rotary kiln and into the calcining zone to where a mixing air fan mixes the air with the gas and fuel within the rotary kiln for more complete combustion of the solid fuel.

By adding fuel mid-kiln, MKF changes both the flame temperature and flame length. These changes should reduce thermal NO_X formation by burning part of the fuel at a lower temperature and by creating reducing conditions at the mid-kiln fuel injection point which may destroy some of the NO_X formed upstream in the kiln burning zone.

Clarksville has the largest long kiln in the world. The kiln has a 7 meter diameter and a very high thermal capacity. Using whole tires to replace 10% of total fuel consumption will require four whole tires being fed to the mid-kiln door per kiln revolution, 12% fuel replacement would require 5 tires per revolution. The maximum tire feed rate per revolution that Holcim is aware of, on similar applications, is three tires per revolution. Holcim is concerned that the greater the number of tires fed per revolution, on a continuous basis, the greater the potential for process upsets from unstable feeding. Holcim has found that kilns being fed even one to three tires per revolution can have problems with stable, uniform feeding. In addition, if too many tires burn at the bottom of the kiln, a high local temperature could result which would disturb the normal operation of the kiln and potentially increase NOx. Further, due to the large kiln diameter, the reducing zone created by burning tires may only impact a small cross section of the entire cross section of the kiln, thus having less of an overall reduction in NOx than anticipated.

[10] NO_X Control Technologies for the Cement Industry, EC/R Incorporated, Chapel Hill, NC, USA, U.S. EPA Contract NO. 68-D98-025, U.S. EPA RTP, September 19, 2000.

In an effort to better understand these uncertainties, Holcim hired CINAR Company, the expert in this field, to conduct modeling of the system and to predict NOx reduction. Their study predicted that a 15% NOx reduction would occur at 10% replacement (replace 10% of the current fuel with tires) and 27% NOx reduction for 15% replacement.

To then determine the thermal substitution rate (TSR) of tires that the Clarksville plant is capable of utilizing, three additional factors must be considered:

1. Tire availability. The local market only has sustainable resources of 10-12% TSR;
2. Tire feeding limit: 12% TSR equates to five tires being fed per revolution.
3. The thermal stability of operation in a large kiln. 15% TSR is predicted to be the maximum for short term periods, whereas 10-12% TSR is predicted to be achievable on a long term basis.

Based on the lack of experience using MKF of tires on kilns the size of Clarksville, Holcim is relying on the computer modeling (regardless of the general uncertainty that exists with computer models) to estimate the NOx reduction. Holcim anticipates that MKF of tires may achieve up to 20% percent NOx reduction at a TSR of 12 percent on a long term basis.

MKF is considered to be a technically feasible option for NOx control. Further, Holcim has already received a construction permit that would allow the installation of MKF, whereas other technologies would require a new construction permit application process, the result of which is unknown.

5.2.5 SELECTIVE NONCATALYTIC REDUCTION

In the relatively narrow temperature window of 1600 to 1995°F, ammonia (NH_3) reacts with NO_x without the need for a catalyst to form water and molecular nitrogen in accordance with the following simplified reactions.

$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$
$2NO_2 + 4NH_3 + O_2 \rightarrow 3N_2 + 6H_2O$

As applied to NO_x control from cement kilns and other combustion sources, this technology is called selective noncatalytic reduction (SNCR). Above this temperature range, the NH_3 is oxidized to NO_x thereby increasing NO_x emissions. Below this temperature range, the reaction rate is too slow for completion and unreacted NH_3 may be emitted from the pyroprocess. This temperature window generally is available at some location within the rotary kiln. The NH_3 could be delivered to the kiln shell through the use of anhydrous NH_3, or an aqueous solution of NH_3 (ammonium hydroxide) or urea.

A concern about application of SNCR technology is the breakthrough of unreacted NH_3 as "ammonia slip" and its subsequent reaction in the atmosphere with SO_2, sulfur trioxide (SO_3), hydrogen chloride (HCl) and/or chlorine (Cl_2) to form a detached plume of sub-

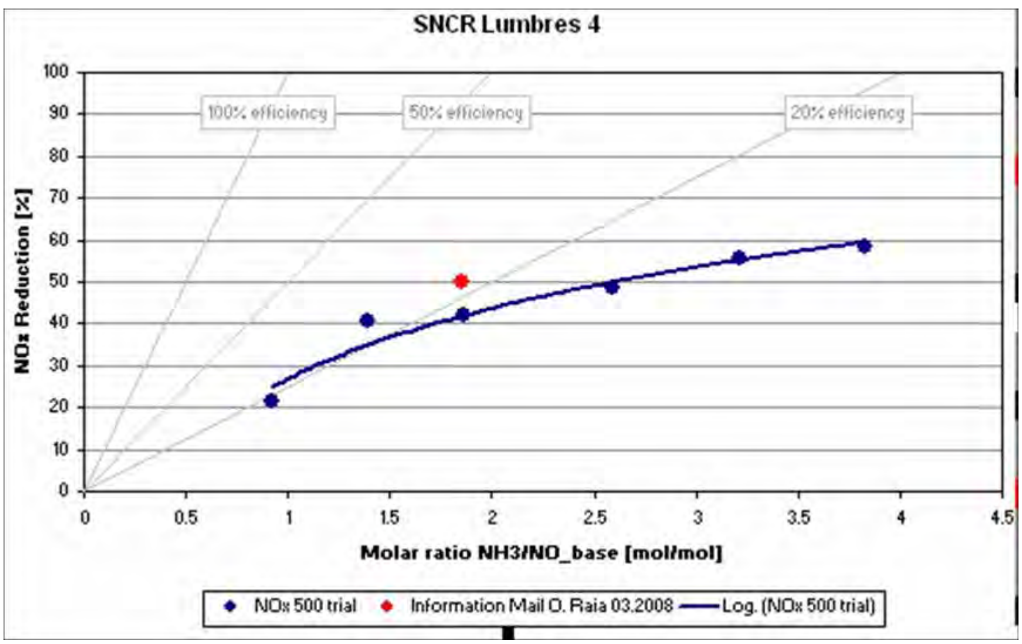
micron particles. As NH_3 or Urea injection rates are increased, to attempt to achieve higher levels of reduction, NH_3 emission levels are increased.

Industry Experience

Ash Grove Cement Company installed a full scale SNCR system on one of its wet kilns in Midlothian, Texas. Ash Grove has reported that it is achieving a 35 to 40% NOx reduction; however, as this application has just started, no data is available to verify this reduction is being achieved or on what averaging period or the long term sustainability.[11]

Holcim's wet plant in Lumbres, France utilizes SNCR. It is the earliest application of SNCR on a long kiln in the world and has been running for multiple years. The plant has found that NH_3 slip increases as the urea injection rate increases especially when the molar ratio is more than 1.0 (i.e. the NH_3 added is more than needed for the reaction). At this level, significant amounts of NH_3 are unreacted. The plant reports achieving 20 percent NOx reduction at a 1.0 molar ratio of NH_3/NOx and 40 percent at a molar ratio of 1.5 as shown in Figure 5-2.

FIGURE 5-2. NOX REDUCTION VERSUS NH3 MOLAR RATIO OBSERVED AT HOLCIM LUMBRES PLANT.



However, at 20 percent NOx reduction, the NH_3 slip is reported to be 10 mg/m3, while at 40 percent reduction, the NH_3 slip can be 20 – 30 mg/m^3 (a 50 percent to 100 percent increase). Based on experiences at many cement plants with SO_2 and HCl in the exhaust gas, which is also the case for the Clarksville plant, a 20 mg/Nm3 NH_3 increase would cause a severe increase in plume visibility. The Lumbres plant is also smaller than

[11] BART Five Factor Analysis. Ash Grove Cement Company Montana City, Montana. Dated June 2007. Page 5-9.

Clarksville, having a diameter of only 3.3 meters versus Clarksville's 7 meter diameter kiln. The larger diameter of Clarksville's kiln would make distribution of the reagent across the kiln more difficult, and would reduce the effectiveness to an unknown degree.

Based on the concerns with NH_3 slip at high molar ratios, and the uncertainty regarding the level of effectiveness of the reagent in Clarksville's large diameter kiln, Holcim anticipates that at a molar ratio of about 1.0, an average annual control efficiency of 20 percent could likely be achieved without excessive NH_3 slip. However, a pilot study would need to be conducted to verify this. Regardless, SNCR is considered to be a technically feasible option for NO_X control.

5.2.6 SELECTIVE CATALYTIC REDUCTION

Selective Catalytic Reduction (SCR) is an add-on control technology for the control of emissions of the oxides of nitrogen (NO_x) from a combustion process. SCR has been successfully employed in the electric power industry. The basic SCR system consists of a system of catalyst grids placed in series with each other within a vessel that is located in a part of the process where the normal flue gas temperature is in the required range. An ammonia-containing reagent is injected at a controlled rate upstream of the catalyst grids that are designed to ensure relatively even flue gas distribution within the grids, to provide good mixing of the reagent and flue gas, and to result in minimum ammonia (NH_3) slip.[12] The NH_3 reacts with NO_x compounds (i.e., NO and NO_2) on the surface of the catalyst in equal molar amounts (i.e., one molecule of NH_3 reacts with one molecule of NO_x). Common reagents include aqueous NH_3, anhydrous NH_3 and urea [$(NH_2)_2CO$]. In the presence of the catalyst, the injected ammonia is converted by OH^- radicals to ammonia radicals (i.e., NH_2^-), which, in turn, react with NO_x to form N_2 and H_2O. The SCR catalyst enables the necessary reactions to occur at lower temperatures than those required for Selective Non-Catalytic Reduction (SNCR). While catalysts can be effective over a larger range of temperatures, the optimal temperature range for SCR is 570 - 750º F.

The catalyst system used in SCR applications usually consists of (1) a porous honeycomb of a ceramic substrate onto which catalyst has been attached to the surface of the ceramic material, or (2) a flat or corrugated plate onto which catalytic material has been deposited on the surface. A porous metal oxide with a high surface area-to-volume ratio acts as a catalyst base. On this base, typically titanium dioxide (TiO_2), one or more metal oxide catalysts are deposited in various concentrations. In SCR applications, the active catalyst material typically consists of vanadium pentoxide (V_2O_5), tungsten trioxide (WO_3), and molybdenum trioxide (MoO_3) in various combinations. The composition, also known as the catalyst formulation, is tailored by the catalyst vendor to best suit a particular SCR application. Catalyst deactivation through poisoning, fouling, masking, sintering and erosion are common problems for SCR catalysts that, without careful process design and operation, could be exacerbated. If not fouled by sulfur dioxide (SO_2), the catalysts used in SCR have a propensity to oxidize sulfur dioxide (SO_2) in the flue gas to sulfur trioxide (SO_3), a more undesirable pollutant.

[12] Slip refers to the quantity of unreacted reagent that exits the SCR reactor.

Because the reaction rate of NH_3 and NO_X is temperature dependent, the temperature of the flue gas stream to be controlled is the most important consideration in applying SCR technology to any combustion source. The optimum temperature range for SCR application is about 300º C (570º F) to 450º C (840º F). This range of normal process temperature would occur within the kiln of a long wet kiln, rather than in the exhaust gas between the wet kiln and the PMCD inlet.

SCR has not been applied to any wet cement plant in the world and is not considered an available technology.

As explained in more detail below, a technology is considered "available" if it can be obtained by the applicant through commercial channels or is otherwise available within the common sense meaning of the term. An available technology is “applicable” if it can reasonably be installed and operated on the source type under consideration. A technology that is available and applicable is technically feasible. Availability in this context is further explained using the following process commonly used for bringing a control technology concept to reality as a commercial product: concept stage; research and patenting; bench scale or laboratory testing; pilot scale testing; licensing and commercial demonstration; and Commercial sales.

A control technique is considered available, within the context presented above, if it has reached the licensing and commercial sales stage of development. A source would not be required to experience extended time delays or resource penalties to allow research to be conducted on a new technique. Neither is it expected that an applicant would be required to experience extended trials to learn how to apply a technology on a totally new and dissimilar source type. Consequently, technologies in the pilot scale testing stages of development would not be considered available. An exception would be if the technology were proposed and permitted under the qualifications of an innovative control device consistent with the provisions of 40 CFR 52.21(v) or, where appropriate, the applicable SIP [in which case it would be considered available].

Therefore, SCR is eliminated from further consideration as BART for NO_x control at the Clarksville plant.

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5.3 RANK OF TECHNICALLY FEASIBLE NO_X CONTROL OPTIONS BY EFFECTIVENESS

The third step in the BART analysis is to rank the technically feasible options according to effectiveness. Table 5-3 presents potential NO_X technically feasible control technologies by effectiveness.

TABLE 5-3. RANKING OF TECHNICALLY FEASIBLE KILN NO_X CONTROL TECHNOLOGIES BY EFFECTIVENESS

Control Technology	Effectiveness NO_X Emissions Level (%)
MKF	20%
SNCR	20%
LNB, CKD Insufflation, and Synfuel	Already utilized at Clarksville

5.4 EVALUATION OF IMPACTS FOR FEASIBLE NO_X CONTROLS

Step four for the BART analysis procedure is the impact analysis. The BART determination guidelines list four factors to be considered in the impact analysis:

- Cost of compliance
- Energy impacts
- Non-air quality impacts; and
- The remaining useful life of the source

5.4.1 MKF

Cost of Compliance

Holcim anticipates that MKF and SNCR have relatively the same level of effectiveness. Because SNCR would require a pilot study to prove or verify the effectiveness of NOx reduction, Holcim is accepting the use of MKF as BART. As Holcim is accepting the most stringent control option available as BART, the cost of compliance is not required to be evaluated.

Energy Impacts and Non Air-Quality Impacts

There are no known adverse energy or non-air impacts from MKF. MKF of tires has the benefit of eliminating tires from landfills and illegal dumping. It also reduces CO_2 emissions (a Green House Gas) and reduces fossil fuel use.

Remaining Useful Life

The remaining useful life of the kiln does not impact the annualized costs of MKF because the useful life is anticipated to be at least as long as the capital cost recovery period, which would be 15 years.

5.5 EVALUATION OF VISIBILITY IMPACT OF FEASIBLE NO_X CONTROLS

The final impact analysis was conducted to assess the visibility improvement for existing emission rates when compared to the emission rate with MKF. The existing emission rates and emission rates associated with MKF were modeled using CALPUFF. The existing emission rates are the same rates that were modeled for the BART applicability analysis. The NO_x emission rate associated with MKF

was the existing emission rate less an average reduction of 20 percent. The emission rate is summarized in Table 5-4.

TABLE 5-4. SUMMARY OF EMISSION RATES MODELED IN NO_X CONTROL VISIBILITY IMPACT ANALYSIS

Emission Rate Scenario	Emission Rate SO_2 (lb/hr)	 NO_X (lb/hr)	 PM_{10} (lb/hr)
MKF,	4,889	2,440	51.82
Base case – High 24 hr average	4,889	3,049	51.82

Comparisons of the 98th percentile existing visibility impacts and the visibility impacts based on MKF are provided in Table 5-5. The visibility improvement associated with MKF are also shown in Table 5-5; this was calculated as the difference between the existing visibility impairment and the visibility impairment for the remaining control options as measured by the 98th percentile modeled visibility impact.

TABLE 5-5. NO_X CONTROL VISIBILITY IMPACT ANALYSIS

	Existing 98% Impact (Δdv)	MKF 98% Impact (Δdv)	Improvement
Mingo	1.01	0.92	8.9%
Hercules	0.81	0.72	11.1%
Upper Buffalo	0.61	0.60	1.6%

As seen in Tables 5-5, the MKF option results in a visibility improvement of up to 11.1 percent in the Hercules Glades Class I area.

5.6 PROPOSED BART FOR NO_X

Based on the five step analysis outlined by EPA, MKF was identified as the highest ranking feasible add-on control technology. Energy and environmental impacts were assessed for this technology and the visibility improvements were evaluated against existing conditions. Consistent with EPA guidance, economic impacts were not assessed as Holcim was willing to utilize the highest ranked control technology. The visibility impact analysis demonstrates that the utilization of MKF to achieve a 2,440 lb/hr NO_x emission rate results in up to an 11.1 percent visibility improvement. Neither non-air quality nor energy impacts associated with this control technology eliminate it in favor of retaining the existing rates as BART.

Holcim has determined that BART for the facility is MKF. Based on the lack of site specific, or significant industry data, for the use of this technology on wet cement kilns, it is possible that Holcim will further evaluate the MKF system and determine that MKF results in limited or no additional benefit. In the future, an alternative technology or methodology may become feasible and could be implemented as needed. Holcim will continue to utilize the NOx controls that are already in place, including LNB, insufflation, and the use of alternative fuels as available.

Appendix A. Control Cost Tables

Table A-1. Wet Limestone Scrubber Control Cost Analysis Based on Projected Actual Emissions and 80% Control.

Direct Costs			
Purchased Equipment Costs			
	Wet Scrubber Unit including Limestone Prep System		$10,524,352
	Instrumentation (15% of EC)		$1,578,653
	Sales Tax (5% of EC)		$526,218
	Freight (5% of EC)		$526,218
		Subtotal, Purchased Equipment Cost (PEC)	$13,155,441
Direct Installation Costs			
	Foundation (10% of PEC)		$1,315,544
	Supports (10% of PEC)		$1,315,544
	Handling and Erection (50% of PEC)		$6,577,720
	Electrical (10% of PEC)		$1,315,544
	Piping (30% of PEC)		$3,946,632
	Extending gas line 1/2 mile to plant		$500,000
	Insulation for Ductwork (5% of PEC)		$657,772
	Painting (1% of PEC)		$131,554
		Subtotal, Direct Installation Cost	$15,760,311
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$28,915,752**
Indirect Costs			
	Engineering (10% of PEC)		$1,315,544
	Construction and Field Expense (15% of PEC)		$1,973,316
	Contractor Fees (10% of PEC)		$1,315,544
	Start-up (1% of PEC)		$131,554
	Performance Test (1% of PEC)		$131,554
	Contingencies (5% of PEC)		$657,772
		Total Indirect Cost	**$5,525,285**
	Total Capital Investment (TCI)		**$34,441,037**
Direct Annual Costs			
Hours per Year	(365 days per year, 24 hours per day), 90% Uptime		7,884
Operating Labor			
	Operator (8 men/yr, 2,080 hrs/yr, $64.50/hr)		$1,073,280
	Supervisor (15% of operator)		$160,992
		Subtotal, Operating Labor	$1,234,272
Maintenance			
	Labor (6 men/yr, 2,080 hrs/yr, $64.50/hr)		$804,960
	Material (5% of Total Direct Cost)		$ 1,445,788
		Subtotal, Maintenance	$2,250,748
Utilities			
	Electricity		
	Pump (kW)		2,342
	Cost ($/kW-hr)		$0.0410
		Subtotal, Electricity	$757,054
	Limestone for slurry		
	Amount Required (ton/yr)		13,961
	Cost ($/ton)		$3.00
		Subtotal, Lime	$41,883
	Water		
	Amount Required (gpm)		122.0
	Cost ($/1000 gallons)		$1.00
		Subtotal, Water	$64,128
	Sludge Disposal		
	Amount Generated (tpy)		57,943
	Disposal Fee ($/ton)		$36.00
	Monthly Rent for Trailer @ $120/month		$1,440
	Cost for Box Transportation @ $220/load (assume 17 tons/trailer)		$749,853
		Subtotal, Sludge	$2,837,247
		Subtotal, Utilities	$3,700,312
	Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)		
	Gas Required (MMCF/yr)		1,020,986
	Cost ($/MMBTU)		$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$17,456,454**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$2,091,012
Administrative (2% TCI)			$688,821
Property Tax (1% TCI)			$344,410
Insurance (1% TCI)			$344,410
Capital Recovery	(15 year life, 7 percent interest)		$3,781,441
		Total Indirect Annual Cost	**$7,250,094**
Conclusion			
	Total Annualized Cost		**$24,706,548**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 80%, 95% uptime		**8,726**
	Pollutant Generated - NOx tons/yr		**97**
	Net Pollutant Removed - tons/yr		**8,629**
	Cost Per Ton of Pollutant Removed		**$2,863**

Table A-2. Wet Limestone Scrubber Control Cost Analysis Based on Projected Actual Emissions and 95% Control.

Direct Costs			
Purchased Equipment Costs			
	Wet Scrubber Unit including Limestone Prep System		$10,524,352
	Instrumentation (15% of EC)		$1,578,653
	Sales Tax (5% of EC)		$526,218
	Freight (5% of EC)		$526,218
		Subtotal, Purchased Equipment Cost (PEC)	$13,155,441
Direct Installation Costs			
	Foundation (10% of PEC)		$1,315,544
	Supports (10% of PEC)		$1,315,544
	Handling and Erection (50% of PEC)		$6,577,720
	Electrical (10% of PEC)		$1,315,544
	Piping (30% of PEC)		$3,946,632
	Extending gas line 1/2 mile to plant		$500,000
	Insulation for Ductwork (5% of PEC)		$657,772
	Painting (1% of PEC)		$131,554
		Subtotal, Direct Installation Cost	$15,760,311
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$28,915,752**
Indirect Costs			
	Engineering (10% of PEC)		$1,315,544
	Construction and Field Expense (15% of PEC)		$1,973,316
	Contractor Fees (10% of PEC)		$1,315,544
	Start-up (1% of PEC)		$131,554
	Performance Test (1% of PEC)		$131,554
	Contingencies (5% of PEC)		$657,772
		Total Indirect Cost	**$5,525,285**
	Total Capital Investment (TCI)		**$34,441,037**
Direct Annual Costs			
Hours per Year	(365 days per year, 24 hours per day), 90% Uptime		7,884
Operating Labor			
	Operator (8 men/yr, 2,080 hrs/yr, $64.50/hr)		$1,073,280
	Supervisor (15% of operator)		$160,992
		Subtotal, Operating Labor	$1,234,272
Maintenance			
	Labor (6 men/yr, 2,080 hrs/yr, $64.50/hr)		$804,960
	Material (5% of Total Direct Cost)		$ 1,445,788
		Subtotal, Maintenance	$2,250,748
Utilities			
	Electricity		
	Pump (kW)		2,342
	Cost ($/kW-hr)		$0.0410
		Subtotal, Electricity	$757,054
	Limestone for slurry		
	Amount Required (ton/yr)		16,579
	Cost ($/ton)		$3.00
		Subtotal, Lime	$49,736
	Water		
	Amount Required (gpm)		122.0
	Cost ($/1000 gallons)		$1.00
		Subtotal, Water	$64,128
	Sludge Disposal		
	Amount Generated (tpy)		68,808
	Disposal Fee ($/ton)		$36.00
	Monthly Rent for Trailer @ $120/month		$1,440
	Cost for Box Transportation @ $220/load (assume 17 tons/trailer)		$890,450
		Subtotal, Sludge	$3,368,961
		Subtotal, Utilities	$4,239,878
	Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)		
	Gas Required (MMCF/yr)		1,020,986
	Cost ($/MMBTU)		$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$17,996,021**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$2,091,012
Administrative (2% TCI)			$688,821
Property Tax (1% TCI)			$344,410
Insurance (1% TCI)			$344,410
Capital Recovery	(15 year life, 7 percent interest)		$3,781,441
		Total Indirect Annual Cost	**$7,250,094**
Conclusion			
	Total Annualized Cost		**$25,246,115**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 95%, 95% uptime		**10,362**
	Pollutant Generated - NOx tons/yr		**97**
	Net Pollutant Removed - tons/yr		**10,265**
	Cost Per Ton of Pollutant Removed		**$2,460**

Table A-3. Wet Limestone Scrubber Control Cost Analysis Based on PTE and 80% Control

Direct Costs			
Purchased Equipment Costs			
	Wet Scrubber Unit including Limestone Prep System		$10,524,352
	Instrumentation (15% of EC)		$1,578,653
	Sales Tax (5% of EC)		$526,218
	Freight (5% of EC)		$526,218
		Subtotal, Purchased Equipment Cost (PEC)	$13,155,441
Direct Installation Costs			
	Foundation (10% of PEC)		$1,315,544
	Supports (10% of PEC)		$1,315,544
	Handling and Erection (50% of PEC)		$6,577,720
	Electrical (10% of PEC)		$1,315,544
	Piping (30% of PEC)		$3,946,632
	Extending gas line 1/2 mile to plant		$500,000
	Insulation for Ductwork (5% of PEC)		$657,772
	Painting (1% of PEC)		$131,554
		Subtotal, Direct Installation Cost	$15,760,311
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$28,915,752**
Indirect Costs			
	Engineering (10% of PEC)		$1,315,544
	Construction and Field Expense (15% of PEC)		$1,973,316
	Contractor Fees (10% of PEC)		$1,315,544
	Start-up (1% of PEC)		$131,554
	Performance Test (1% of PEC)		$131,554
	Contingencies (5% of PEC)		$657,772
		Total Indirect Cost	**$5,525,285**
	Total Capital Investment (TCI)		**$34,441,037**
Direct Annual Costs			
Hours per Year	(365 days per year, 24 hours per day), 90% Uptime		7,884
Operating Labor			
	Operator (8 men/yr, 2,080 hrs/yr, $64.50/hr)		$1,073,280
	Supervisor (15% of operator)		$160,992
		Subtotal, Operating Labor	$1,234,272
Maintenance			
	Labor (6 men/yr, 2,080 hrs/yr, $64.50/hr)		$804,960
	Material (5% of Total Direct Cost)		$ 1,445,788
		Subtotal, Maintenance	$2,250,748
Utilities			
	Electricity		
	Pump (kW)		2,342
	Cost ($/kW-hr)		$0.0410
		Subtotal, Electricity	$757,054
	Limestone for slurry		
	Amount Required (ton/yr)		16,170
	Cost ($/ton)		$3.00
		Subtotal, Lime	$48,511
	Water		
	Amount Required (gpm)		122.0
	Cost ($/1000 gallons)		$1.00
		Subtotal, Water	$64,128
	Sludge Disposal		
	Amount Generated (tpy)		67,113
	Disposal Fee ($/ton)		$36.00
	Monthly Rent for Trailer @ $120/month		$1,440
	Cost for Box Transportation @ $220/load (assume 17 tons/trailer)		$868,526
		Subtotal, Sludge	$3,286,046
		Subtotal, Utilities	$4,155,739
	Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)		
	Gas Required (MMCF/yr)		1,020,986
	Cost ($/MMBTU)		$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$17,911,881**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$2,091,012
Administrative (2% TCI)			$688,821
Property Tax (1% TCI)			$344,410
Insurance (1% TCI)			$344,410
Capital Recovery	(15 year life, 7 percent interest)		$3,781,441
		Total Indirect Annual Cost	**$7,250,094**
Conclusion			
	Total Annualized Cost		**$25,161,975**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr) - PTE		**13,298**
	Pollutant Removed (tons SO_2/yr) - 80%, 95% uptime		**10,106**
	Pollutant Generated - NOx tons/yr		**97**
	Net Pollutant Removed - tons/yr		**10,009**
	Cost Per Ton of Pollutant Removed		**$2,514**

Table A-4. Wet Limestone Scrubber Control Cost Analysis Based on PTE and 95% Control

Direct Costs			
Purchased Equipment Costs			
	Wet Scrubber Unit including Limestone Prep System		$10,524,352
	Instrumentation (15% of EC)		$1,578,653
	Sales Tax (5% of EC)		$526,218
	Freight (5% of EC)		$526,218
		Subtotal, Purchased Equipment Cost (PEC)	$13,155,441
Direct Installation Costs			
	Foundation (10% of PEC)		$1,315,544
	Supports (10% of PEC)		$1,315,544
	Handling and Erection (50% of PEC)		$6,577,720
	Electrical (10% of PEC)		$1,315,544
	Piping (30% of PEC)		$3,946,632
	Extending gas line 1/2 mile to plant		$500,000
	Insulation for Ductwork (5% of PEC)		$657,772
	Painting (1% of PEC)		$131,554
		Subtotal, Direct Installation Cost	$15,760,311
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$28,915,752**
Indirect Costs			
	Engineering (10% of PEC)		$1,315,544
	Construction and Field Expense (15% of PEC)		$1,973,316
	Contractor Fees (10% of PEC)		$1,315,544
	Start-up (1% of PEC)		$131,554
	Performance Test (1% of PEC)		$131,554
	Contingencies (5% of PEC)		$657,772
		Total Indirect Cost	**$5,525,285**
	Total Capital Investment (TCI)		**$34,441,037**
Direct Annual Costs			
Hours per Year	(365 days per year, 24 hours per day), 90% Uptime		7,884
Operating Labor			
	Operator (8 men/yr, 2,080 hrs/yr, $64.50/hr)		$1,073,280
	Supervisor (15% of operator)		$160,992
		Subtotal, Operating Labor	$1,234,272
Maintenance			
	Labor (6 men/yr, 2,080 hrs/yr, $64.50/hr)		$804,960
	Material (5% of Total Direct Cost)		$ 1,445,788
		Subtotal, Maintenance	$2,250,748
Utilities			
	Electricity		
	Pump (kW)		2,342
	Cost ($/kW-hr)		$0.0410
		Subtotal, Electricity	$757,054
	Limestone for slurry		
	Amount Required (ton/yr)		19,202
	Cost ($/ton)		$3.00
		Subtotal, Lime	$57,607
	Water		
	Amount Required (gpm)		122.0
	Cost ($/1000 gallons)		$1.00
		Subtotal, Water	$64,128
	Sludge Disposal		
	Amount Generated (tpy)		79,697
	Disposal Fee ($/ton)		$36.00
	Monthly Rent for Trailer @ $120/month		$1,440
	Cost for Box Transportation @ $220/load (assume 17 tons/trailer)		$1,031,374
		Subtotal, Sludge	$3,901,910
		Subtotal, Utilities	$4,780,698
	Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)		
	Gas Required (MMCF/yr)		1,020,986
	Cost ($/MMBTU)		$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$18,536,841**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$2,091,012
Administrative (2% TCI)			$688,821
Property Tax (1% TCI)			$344,410
Insurance (1% TCI)			$344,410
Capital Recovery	(15 year life, 7 percent interest)		$3,781,441
		Total Indirect Annual Cost	**$7,250,094**
Conclusion			
	Total Annualized Cost		**$25,786,935**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr) - PTE		**13,298**
	Pollutant Removed (tons SO_2/yr) - 95%, 95% uptime		**12,001**
	Pollutant Generated - NOx tons/yr		**97**
	Net Pollutant Removed - tons/yr		**11,904**
	Cost Per Ton of Pollutant Removed		**$2,166**

Table A-5. Fuel Substitution Control Cost Analysis Based on Projected Actual Emissions and 40% Control .

Direct Costs			
Purchased Equipment Costs			
	New Coal Mill and associated equipment		$3,864,000
	Instrumentation (15% of EC)		$579,600
	Sales Tax (5% of EC)		$193,200
	Freight (5% of EC)		$193,200
		Subtotal, Purchased Equipment Cost (PEC)	$4,830,000
Direct Installation Costs			
	Foundation (10% of PEC)		$483,000
	Supports (10% of PEC)		$483,000
	Handling and Erection (50% of PEC)		$2,415,000
	Electrical (10% of PEC)		$483,000
	Piping (30% of PEC)		$1,449,000
	Insulation for Ductwork (5% of PEC)		$9,660
	Painting (1% of PEC)		$48,300
		Subtotal, Direct Installation Cost	$5,370,960
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$10,200,960**
Indirect Costs			
	Engineering (10% of PEC)		$483,000
	Construction and Field Expense (15% of PEC)		$724,500
	Contractor Fees (10% of PEC)		$483,000
	Start-up (1% of PEC)		$48,300
	Performance Test (1% of PEC)		$48,300
	Contingencies (5% of PEC)		$241,500
		Total Indirect Cost	**$2,028,600**
	Total Capital Investment (TCI)		**$12,229,560**
Direct Annual Costs			
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)			
	Reduction in coke usage (metric ton/yr)		188,959
	Heat Value (Gj / Mt)		32.510
	Heat (Gj / yr)		6,143,045
	Cost ($/Gj)		$1.74
		Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)		11,076
	Heat Value (Gj / Mt)		22.177
	Heat (Gj / yr)		245,627
	Cost ($/Gj)		$2.41
		Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)		244,891
	Heat Value (Gj / Mt)		26.266
	Heat (Gj / yr)		6,432,296
	Cost ($/Gj)		$5.67
		Subtotal, increase in Low Sulfur Coal cost	$36,471,116
		Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs			
Administrative (2% TCI)			$244,591
Property Tax (1% TCI)			$122,296
Insurance (1% TCI)			$122,296
Capital Recovery	(15 year life, 7 percent interest)		$1,342,740
		Total Indirect Annual Cost	**$1,831,922**
Conclusion			
	Total Annualized Cost		**$27,022,178**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 40%		**4,592**
	Cost Per Ton of Pollutant Removed		**$5,884**

Table A-6. Fuel Substitution Control Cost Analysis Based on Projected Actual Emissions and 50% Control .

Direct Costs		
Purchased Equipment Costs		
	New Coal Mill and associated equipment	$3,864,000
	Instrumentation (15% of EC)	$579,600
	Sales Tax (5% of EC)	$193,200
	Freight (5% of EC)	$193,200
	Subtotal, Purchased Equipment Cost (PEC)	$4,830,000
Direct Installation Costs		
	Foundation (10% of PEC)	$483,000
	Supports (10% of PEC)	$483,000
	Handling and Erection (50% of PEC)	$2,415,000
	Electrical (10% of PEC)	$483,000
	Piping (30% of PEC)	$1,449,000
	Insulation for Ductwork (5% of PEC)	$9,660
	Painting (1% of PEC)	$48,300
	Subtotal, Direct Installation Cost	$5,370,960
Site Preparation		N/A
Buildings		N/A
	Total Direct Cost	**$10,200,960**
Indirect Costs		
	Engineering (10% of PEC)	$483,000
	Construction and Field Expense (15% of PEC)	$724,500
	Contractor Fees (10% of PEC)	$483,000
	Start-up (1% of PEC)	$48,300
	Performance Test (1% of PEC)	$48,300
	Contingencies (5% of PEC)	$241,500
	Total Indirect Cost	**$2,028,600**
	Total Capital Investment (TCI)	**$12,229,560**
Direct Annual Costs		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)		
	Reduction in coke usage (metric ton/yr)	188,959
	Heat Value (Gj / Mt)	32.510
	Heat (Gj / yr)	6,143,045
	Cost ($/Gj)	$1.74
	Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)	11,076
	Heat Value (Gj / Mt)	22.177
	Heat (Gj / yr)	245,627
	Cost ($/Gj)	$2.41
	Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)	244,891
	Heat Value (Gj / Mt)	26.266
	Heat (Gj / yr)	6,432,296
	Cost ($/Gj)	$5.67
	Subtotal, increase in Low Sulfur Coal cost	$36,471,116
	Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs		
Administrative (2% TCI)		$244,591
Property Tax (1% TCI)		$122,296
Insurance (1% TCI)		$122,296
Capital Recovery	(15 year life, 7 percent interest)	$1,342,740
	Total Indirect Annual Cost	**$1,831,922**
Conclusion		
	Total Annualized Cost	**$27,022,178**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**11,481**
	Pollutant Removed (tons SO_2/yr) - 50%	**5,741**
	Cost Per Ton of Pollutant Removed	**$4,707**

Table A-7. Fuel Substitution Control Cost Analysis Based on PTE and 40% Control.

Direct Costs			
Purchased Equipment Costs			
	New Coal Mill and associated equipment		$3,864,000
	Instrumentation (15% of EC)		$579,600
	Sales Tax (5% of EC)		$193,200
	Freight (5% of EC)		$193,200
		Subtotal, Purchased Equipment Cost (PEC)	$4,830,000
Direct Installation Costs			
	Foundation (10% of PEC)		$483,000
	Supports (10% of PEC)		$483,000
	Handling and Erection (50% of PEC)		$2,415,000
	Electrical (10% of PEC)		$483,000
	Piping (30% of PEC)		$1,449,000
	Insulation for Ductwork (5% of PEC)		$9,660
	Painting (1% of PEC)		$48,300
		Subtotal, Direct Installation Cost	$5,370,960
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$10,200,960**
Indirect Costs			
	Engineering (10% of PEC)		$483,000
	Construction and Field Expense (15% of PEC)		$724,500
	Contractor Fees (10% of PEC)		$483,000
	Start-up (1% of PEC)		$48,300
	Performance Test (1% of PEC)		$48,300
	Contingencies (5% of PEC)		$241,500
		Total Indirect Cost	**$2,028,600**
	Total Capital Investment (TCI)		**$12,229,560**
Direct Annual Costs			
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)			
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)			
	Reduction in coke usage (metric ton/yr)		188,959
	Heat Value (Gj / Mt)		32.510
	Heat (Gj / yr)		6,143,045
	Cost ($/Gj)		$1.74
		Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)		11,076
	Heat Value (Gj / Mt)		22.177
	Heat (Gj / yr)		245,627
	Cost ($/Gj)		$2.41
		Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)		244,891
	Heat Value (Gj / Mt)		26.266
	Heat (Gj / yr)		6,432,296
	Cost ($/Gj)		$5.67
		Subtotal, increase in Low Sulfur Coal cost	$36,471,116
		Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs			
Administrative (2% TCI)			$244,591
Property Tax (1% TCI)			$122,296
Insurance (1% TCI)			$122,296
Capital Recovery	(15 year life, 7 percent interest)		$1,342,740
		Total Indirect Annual Cost	**$1,831,922**
Conclusion			
	Total Annualized Cost		**$27,022,178**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**13,298**
	Pollutant Removed (tons SO_2/yr) - 40%		**5,319**
	Cost Per Ton of Pollutant Removed		**$5,080**

Table A-8. Fuel Substitution Control Cost Analysis Based on PTE and 50% Control.

Direct Costs		
Purchased Equipment Costs		
	New Coal Mill and associated equipment	$3,864,000
	Instrumentation (15% of EC)	$579,600
	Sales Tax (5% of EC)	$193,200
	Freight (5% of EC)	$193,200
	Subtotal, Purchased Equipment Cost (PEC)	$4,830,000
Direct Installation Costs		
	Foundation (10% of PEC)	$483,000
	Supports (10% of PEC)	$483,000
	Handling and Erection (50% of PEC)	$2,415,000
	Electrical (10% of PEC)	$483,000
	Piping (30% of PEC)	$1,449,000
	Insulation for Ductwork (5% of PEC)	$9,660
	Painting (1% of PEC)	$48,300
	Subtotal, Direct Installation Cost	$5,370,960
Site Preparation		N/A
Buildings		N/A
	Total Direct Cost	**$10,200,960**
Indirect Costs		
	Engineering (10% of PEC)	$483,000
	Construction and Field Expense (15% of PEC)	$724,500
	Contractor Fees (10% of PEC)	$483,000
	Start-up (1% of PEC)	$48,300
	Performance Test (1% of PEC)	$48,300
	Contingencies (5% of PEC)	$241,500
	Total Indirect Cost	**$2,028,600**
	Total Capital Investment (TCI)	**$12,229,560**
Direct Annual Costs		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)		
	Reduction in coke usage (metric ton/yr)	188,959
	Heat Value (Gj / Mt)	32.510
	Heat (Gj / yr)	6,143,045
	Cost ($/Gj)	$1.74
	Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)	11,076
	Heat Value (Gj / Mt)	22.177
	Heat (Gj / yr)	245,627
	Cost ($/Gj)	$2.41
	Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)	244,891
	Heat Value (Gj / Mt)	26.266
	Heat (Gj / yr)	6,432,296
	Cost ($/Gj)	$5.67
	Subtotal, increase in Low Sulfur Coal cost	$36,471,116
	Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs		
Administrative (2% TCI)		$244,591
Property Tax (1% TCI)		$122,296
Insurance (1% TCI)		$122,296
Capital Recovery	(15 year life, 7 percent interest)	$1,342,740
	Total Indirect Annual Cost	**$1,831,922**
Conclusion		
	Total Annualized Cost	**$27,022,178**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**13,298**
	Pollutant Removed (tons SO_2/yr) - 50%	**6,649**
	Cost Per Ton of Pollutant Removed	**$4,064**

Table A-9. Dry Lime Scrubbing - Control Cost Analysis Based on Projected Actual Emissions and 20% Control.

Direct Costs			
Purchased Equipment Costs			
	Dry Lime Injection System		$1,000,000
	Retrofit ESPs with Baghouse		$3,000,000
	Total Equipment Cost		$4,000,000
	Instrumentation (15% of EC)		$600,000
	Sales Tax (5% of EC)		$200,000
	Freight (5% of EC)		$200,000
		Subtotal, Purchased Equipment Cost (PEC)	$5,000,000
Direct Installation Costs			
	Foundation (10% of PEC)		$500,000
	Supports (10% of PEC)		$500,000
	Handling and Erection (50% of PEC)		$2,500,000
	Electrical (10% of PEC)		$500,000
	Piping (30% of PEC)		$1,500,000
	Insulation for Ductwork (5% of PEC)		$10,000
	Painting (1% of PEC)		$50,000
		Subtotal, Direct Installation Cost	$5,560,000
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$10,560,000**
Indirect Costs			
	Engineering (10% of PEC)		$500,000
	Construction and Field Expense (15% of PEC)		$750,000
	Contractor Fees (10% of PEC)		$500,000
	Start-up (1% of PEC)		$50,000
	Performance Test (1% of PEC)		$50,000
	Contingencies (5% of PEC)		$250,000
		Total Indirect Cost	**$2,100,000**
	Total Capital Investment (TCI)		**$12,660,000**
Direct Annual Costs			
Operating Labor			
	Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Supervisor (15% of operator)		$1,314
		Subtotal, Operating Labor	$10,074
Maintenance			
	Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$ 528,000
		Subtotal, Maintenance	$536,760
Lime			
	Hydrated lime/Sulfur molar ratio, min. Ca/S		6.0
	MW of Ca(OH)2		74
	MW of SO2		64
	Purity of the Comercial lime %		96.8
	Lime Required - Short Tons		82282
	Cost ($/short ton)		$ 156.00
		Subtotal, Lime	$12,836,066
		Total Direct Annual Costs	**$13,382,900**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$328,100
Administrative (2% TCI)			$253,200
Property Tax (1% TCI)			$126,600
Insurance (1% TCI)			$126,600
Capital Recovery	(15 year life, 7 percent interest)		$1,390,000
		Total Indirect Annual Cost	**$2,224,500**
Conclusion			
	Total Annualized Cost		**$15,607,401**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 20% removal, 95% uptime		**2,181**
	Cost Per Ton of Pollutant Removed		**$7,155**

Table A-10. Dry Lime Scrubbing - Control Cost Analysis Based on Projected Actual Emissions and 30% Control.

Direct Costs				
	Purchased Equipment Costs			
		Dry Lime Injection System		$1,000,000
		Retrofit ESPs with Baghouse		$3,000,000
		Total Equipment Cost		$4,000,000
		Instrumentation (15% of EC)		$600,000
		Sales Tax (5% of EC)		$200,000
		Freight (5% of EC)		$200,000
			Subtotal, Purchased Equipment Cost (PEC)	$5,000,000
	Direct Installation Costs			
		Foundation (10% of PEC)		$500,000
		Supports (10% of PEC)		$500,000
		Handling and Erection (50% of PEC)		$2,500,000
		Electrical (10% of PEC)		$500,000
		Piping (30% of PEC)		$1,500,000
		Insulation for Ductwork (5% of PEC)		$10,000
		Painting (1% of PEC)		$50,000
			Subtotal, Direct Installation Cost	$5,560,000
	Site Preparation			N/A
	Buildings			N/A
			Total Direct Cost	**$10,560,000**
Indirect Costs				
		Engineering (10% of PEC)		$500,000
		Construction and Field Expense (15% of PEC)		$750,000
		Contractor Fees (10% of PEC)		$500,000
		Start-up (1% of PEC)		$50,000
		Performance Test (1% of PEC)		$50,000
		Contingencies (5% of PEC)		$250,000
			Total Indirect Cost	**$2,100,000**
		Total Capital Investment (TCI)		**$12,660,000**
Direct Annual Costs				
	Operating Labor			
		Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
		Supervisor (15% of operator)		$1,314
			Subtotal, Operating Labor	$10,074
	Maintenance			
		Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
		Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$ 528,000
			Subtotal, Maintenance	$536,760
	Lime			
		Hydrated lime/Sulfur molar ratio, min. Ca/S		6.0
		MW of Ca(OH)2		74
		MW of SO2		64
		Purity of the Comercial lime %		96.8
		Lime Required - Short Tons		82282
		Cost ($/short ton)		$ 156.00
			Subtotal, Lime	$12,836,066
			Total Direct Annual Costs	**$13,382,900**
Indirect Annual Costs				
	Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$328,100
	Administrative (2% TCI)			$253,200
	Property Tax (1% TCI)			$126,600
	Insurance (1% TCI)			$126,600
	Capital Recovery	(15 year life, 7 percent interest)		$1,390,000
			Total Indirect Annual Cost	**$2,224,500**
Conclusion				
		Total Annualized Cost		**$15,607,401**
		Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
		Pollutant Removed (tons SO_2/yr) - 30% removal, 95% uptime		**3,272**
		Cost Per Ton of Pollutant Removed		**$4,770**

Table A-11. Dry Lime Scrubbing - Control Cost Analysis Based on PTE and 20% Control.

Direct Costs			
Purchased Equipment Costs			
	Dry Lime Injection System		$1,000,000
	Retrofit ESPs with Baghouse		$3,000,000
	Total Equipment Cost		$4,000,000
	Instrumentation (15% of EC)		$600,000
	Sales Tax (5% of EC)		$200,000
	Freight (5% of EC)		$200,000
		Subtotal, Purchased Equipment Cost (PEC)	$5,000,000
Direct Installation Costs			
	Foundation (10% of PEC)		$500,000
	Supports (10% of PEC)		$500,000
	Handling and Erection (50% of PEC)		$2,500,000
	Electrical (10% of PEC)		$500,000
	Piping (30% of PEC)		$1,500,000
	Insulation for Ductwork (5% of PEC)		$10,000
	Painting (1% of PEC)		$50,000
		Subtotal, Direct Installation Cost	$5,560,000
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$10,560,000**
Indirect Costs			
	Engineering (10% of PEC)		$500,000
	Construction and Field Expense (15% of PEC)		$750,000
	Contractor Fees (10% of PEC)		$500,000
	Start-up (1% of PEC)		$50,000
	Performance Test (1% of PEC)		$50,000
	Contingencies (5% of PEC)		$250,000
		Total Indirect Cost	**$2,100,000**
	Total Capital Investment (TCI)		**$12,660,000**
Direct Annual Costs			
Operating Labor			
	Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Supervisor (15% of operator)		$1,314
		Subtotal, Operating Labor	$10,074
Maintenance			
	Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$ 528,000
		Subtotal, Maintenance	$536,760
Lime			
	Hydrated lime/Sulfur molar ratio, min. Ca/S		6.0
	MW of Ca(OH)2		74
	MW of SO2		64
	Purity of the Comercial lime %		96.8
	Lime Required - Short Tons		95305
	Cost ($/short ton)		$ 156.00
		Subtotal, Lime	$14,867,521
		Total Direct Annual Costs	**$15,414,355**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$328,100
Administrative (2% TCI)			$253,200
Property Tax (1% TCI)			$126,600
Insurance (1% TCI)			$126,600
Capital Recovery	(15 year life, 7 percent interest)		$1,390,000
		Total Indirect Annual Cost	**$2,224,500**
Conclusion			
	Total Annualized Cost		**$17,638,856**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**13,298**
	Pollutant Removed (tons SO_2/yr) - 20% removal, 95% uptime		**2,527**
	Cost Per Ton of Pollutant Removed		**$6,981**

Table A-12. Dry Lime Scrubbing - Control Cost Analysis Based on PTE and 30% Control.

Direct Costs			
Purchased Equipment Costs			
	Dry Lime Injection System		$1,000,000
	Retrofit ESPs with Baghouse		$3,000,000
	Total Equipment Cost		$4,000,000
	Instrumentation (15% of EC)		$600,000
	Sales Tax (5% of EC)		$200,000
	Freight (5% of EC)		$200,000
		Subtotal, Purchased Equipment Cost (PEC)	$5,000,000
Direct Installation Costs			
	Foundation (10% of PEC)		$500,000
	Supports (10% of PEC)		$500,000
	Handling and Erection (50% of PEC)		$2,500,000
	Electrical (10% of PEC)		$500,000
	Piping (30% of PEC)		$1,500,000
	Insulation for Ductwork (5% of PEC)		$10,000
	Painting (1% of PEC)		$50,000
		Subtotal, Direct Installation Cost	$5,560,000
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$10,560,000**
Indirect Costs			
	Engineering (10% of PEC)		$500,000
	Construction and Field Expense (15% of PEC)		$750,000
	Contractor Fees (10% of PEC)		$500,000
	Start-up (1% of PEC)		$50,000
	Performance Test (1% of PEC)		$50,000
	Contingencies (5% of PEC)		$250,000
		Total Indirect Cost	**$2,100,000**
	Total Capital Investment (TCI)		**$12,660,000**
Direct Annual Costs			
Operating Labor			
	Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Supervisor (15% of operator)		$1,314
		Subtotal, Operating Labor	$10,074
Maintenance			
	Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$ 528,000
		Subtotal, Maintenance	$536,760
Lime			
	Hydrated lime/Sulfur molar ratio, min. Ca/S		6.0
	MW of Ca(OH)2		74
	MW of SO2		64
	Purity of the Comercial lime %		96.8
	Lime Required - Short Tons		95305
	Cost ($/short ton)		$ 156.00
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Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$328,100
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Insurance (1% TCI)			$126,600
Capital Recovery	(15 year life, 7 percent interest)		$1,390,000
		Total Indirect Annual Cost	**$2,224,500**
Conclusion			
	Total Annualized Cost		**$17,638,856**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**13,298**
	Pollutant Removed (tons SO_2/yr) - 30% removal, 95% uptime		**3,790**
	Cost Per Ton of Pollutant Removed		**$4,654**

Appendix O

Holcim-Clarksville BART Analysis

June 12, 2008

BART FIVE FACTOR ANALYSIS ▪ HOLCIM (US) INC
CLARKSVILLE, MISSOURI

Prepared by:

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June 12, 2008

Project 081701.0004

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1. EXECUTIVE SUMMARY

This report documents the determination of the Best Available Retrofit Technology (BART) as proposed by Holcim (US) Inc. (Holcim) for the Portland cement manufacturing plant located in Clarksville, Missouri (Clarksville plant). This analysis is for the kiln system. Currently, particulate matter emissions from the kiln are controlled by an electrostatic precipitator. The Clarksville plant has other lesser emitting BART-eligible emissions units, all of which have Particulate Matter Control Devices (PMCDs) installed. The negligible visibility impairment attributable to these sources concludes that no additional controls are necessary to satisfy the requirements of the BART rule.[1]

Holcim used the U.S. Environmental Protection Agency's (EPA's) guidelines[2] in 40 CFR Part 51 to determine BART for the kiln. Specifically, Holcim conducted a five-step analysis to determine BART for SO_2, NOX, and PM_{10} that included the following:

1. Identifying all available retrofit control technologies;
2. Eliminating technically infeasible control technologies;
3. Evaluating the control effectiveness of remaining control technologies;
4. Evaluating impacts and document the results;
5. Evaluating visibility impacts

Based on the five-step analysis, Holcim proposes the following as BART:

Kiln:

- PM_{10} – Holcim has determined that the existing electrostatic precipitator constitutes BART. This control device is effective for controlling PM_{10} from a wet kiln.

- NO_X – Holcim has determined that BART for the Holcim Clarksville Kiln is the installation and operation of a Mid Kiln Firing (MKF) system or equivalent technologies that will achieve a 20 percent reduction in the maximum daily NO_X emission rate of 73,185 lbs that was used for visibility impact modeling.

- SO_2 – Holcim proposes that BART for the Holcim Clarksville Kiln is fuel substitution or equivalent technologies that will achieve a 23 percent reduction in the maximum daily SO_2 emission rate of 117,345 lbs that was used for visibility impact modeling.

The proposed BART control strategies will result in reductions of the visibility impacts attributable to the Clarksville plant. A summary of the visibility improvement at Class I areas based on the existing emission rates and proposed BART emission rates is provided in Table 1-1.

[1] Holcim submitted an inventory of all of the BART-eligible emission sources to the MDNR. Based on a review of this information, the MDNR concluded that the contributions from particulate matter from the non-kiln sources to visibility impairment is negligible and further analysis of these smaller particulate matter sources was not required. Meeting with the MDNR dated January 23, 2008.

[2] 40 CFR 51, Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations

TABLE 1-1. VISIBILITY IMPAIRMENT IMPROVEMENT

	Mingo National Wildlife Refuge	Hercules Glades Wilderness Area	Upper Buffalo Wilderness Area
Existing 98% Impact (Δdv)	1.01	0.81	0.61
BART 98% Impact (Δdv)	0.79	0.64	0.48
Improvement 98% Impact (Δdv)	22%	21%	22%

2. INTRODUCTION AND BACKGROUND

On July 1, 1999, the U.S. EPA published the final Regional Haze Rule (RHR). The objective of the RHR is to improve visibility in 156 specific areas across with United States, known as Class I areas. The Clean Air Act defines Class I areas as certain national parks (over 6000 acres), wilderness areas (over 5000 acres), national memorial parks (over 5000 acres), and international parks that were in existence on August 7, 1977.

On July 6, 2005, the EPA published amendments to its 1999 RHR, often called the Best Available Retrofit Technology (BART) rule, which included guidance for making source-specific BART determinations. The BART rule defines BART-eligible sources as sources that meet the following criteria:

(1) Have potential emissions of at least 250 tons per year of a visibility-impairing pollutant,
(2) Began operation between August 7, 1962 and August 7, 1977, and
(3) Are included as one of the 26 listed source categories in the guidance.

A BART-eligible source is subject to BART if the source is "reasonably anticipated to cause or contribute to visibility impairment in any federal mandatory Class I area." EPA has determined that a source is reasonably anticipated to contribute to visibility impairment if the 98^{th} percentile visibility impacts from the source are greater than 0.5 delta deciviews (Δdv) when compared against a natural background. Air quality modeling is the tool that is used to determine a source's visibility impacts.

Once it is determined that a source is subject to BART, a BART determination must address air pollution control measures for the source. The visibility regulations define BART as follows:

> *"…an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant which is emitted by…[a BART-eligible source]. The emission limitation must be established on a case-by-case basis, taking into consideration the technology available, the cost of compliance, the energy and non air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonable be anticipated to result from the use of such technology.*

Specifically, the BART rule states that a BART determination should address the following five statutory factors:

1. Existing controls
2. Cost of controls
3. Energy and non-air quality environmental impacts
4. Remaining useful life of the source
5. Degree of visibility improvement as a result of controls

Further, the BART rule indicates that the five basic steps in a BART analysis can be summarized as follows:

1. Identify all available retrofit control technologies;
2. Eliminate technically infeasible control technologies;
3. Evaluate the control effectiveness of remaining control technologies;
4. Evaluate impacts and document the results;
5. Evaluate visibility impacts

A BART determination should be made for each visibility affecting pollutant (VAP) by following the five steps listed above for each VAP.

BART applicability was determined for the Clarksville plant based on an applicability analysis performed by the MDNR and a refined applicability analysis performed by Holcim. Both analyses determined that the kiln is subject to BART. The details of the applicability determination can be found in Section 3.

Subsequently, Holcim performed an analysis to determine BART for each VAP for the kiln. The VAPs emitted by the kiln include NO_x, SO_2, and particulate matter with a mass mean diameter smaller than ten microns (PM_{10}) of various forms (filterable coarse particulate matter [PM_c], filterable fine particle matter [PM_f], elemental carbon [EC], inorganic condensable particulate matter [IOR CPM] as sulfates [SO_4], and organic condensable particulate matter [OR CPM] also referred to as secondary organic aerosols [SOA]). The BART determinations for SO_2 and NO_X can be found in Sections 4 and 5 respectively.

3. BART APPLICABILITY DETERMINATION

As stated in Section 2, a BART-eligible source is subject-to-BART if the source is "reasonably anticipated to cause or contribute to visibility impairment in any federal mandated Class I area." EPA has determined that a source is reasonably anticipated to contribute to visibility impairment if the 98th percentile of the visibility impacts from the source is greater than 0.5 Δdv when compared against a natural background. The MDNR conducted air quality modeling for the kiln to predict the existing visibility impairment attributable to the Clarksville plant in the following Class I areas:

- Mingo National Wildlife Refuge
- Hercules Glade Wilderness Area
- Upper Buffalo Wilderness Area

Based on this modeling, the MDNR concluded that the Clarksville plant was subject to BART since the 98th percentile of the visibility impacts attributable to the kiln are greater than 0.5 Δdv when compared against a natural background for a Class I area.

The modeling methods and procedures that Holcim followed were consistent with the methods and procedures that were followed in the MDNR's original modeling. Table 3-1 summarizes the emission rates that were modeled for SO_2, NO_X, and PM_{10}[3]. The SO_2 and NO_x emission rates are the highest actual 24-hour emission rates based on 2003-2007 continuous emissions monitoring system (CEMS) data. The PM_{10} emission rates are based on data included in Holcim's BART survey.

TABLE 3-1. MODELED 24-HOUR EMISSIONS (AS AN HOURLY EQUIVALENT)

SO_2 (lb/hr)	NO_X (lb/hr)	Total PM_{10} (lb/hr)
4889.38	3049.38	51.82

Table 3-2 summarizes the stack parameters that were used to model the kiln.

TABLE 3-2. SUMMARY OF STACK PARAMETERS

Parameter	Value
Actual Stack height (ft)	250
Stack Diameter (ft)	21.7
Exhaust Velocity (ft/s)	34.3
Exhaust Temperature (F)	367

The results of the modeling indicate that the 98th percentile of the visibility impacts are greater than 0.5 Δdv when compared against a natural background. Since the visibility impacts are greater than 0.5 Δdv, the kiln is subject to BART. The results of the modeling are summarized in Table 3-3.

[3] The non-kiln PM_{10} emissions were included in the model as part of the kiln PM_{10} emissions.

TABLE 3-3. SUMMARY OF 98TH PERCENTILE VISIBILITY IMPACTS AND NUMBER OF DAYS WITH VISIBILITY IMPACT GREATER THAN 0.5 ΔDV

Class I Area	Visibility Impairment	
	98th % Δdv	Days > 0.5 Δdv
Mingo Wilderness	1.01	75
Hercules Glades Wilderness	0.81	40
Upper Buffalo Wilderness	0.61	33

Table 3-4 provides a breakdown of the visibility impacts listed in Table 3-3 by each VAP for the high (98th percentile) day (note that the specific percentiles vary from day to day, and location to location, the breakdown listed is an example of one event only).

TABLE 3-4. BREAKDOWN OF POLLUTANT SPECIFIC CONTRIBUTIONS TO VISIBILITY FOR THE 98TH PERCENTILE DAY.

Class I Area	Visibility Impairment Attributable to SO_4 (%)	Visibility Impairment Attributable to NO_3 (%)	Visibility Impairment Attributable to SOA (%)	Visibility Impairment Attributable to EC (%)	Visibility Impairment Attributable to PM_c (%)	Visibility Impairment Attributable to PM_f (%)	Total Visibility Impairment (Δdv)
Mingo Wilderness	98.6	1.2	0	0	0	0.2	1.01
Hercules Glades Wilderness	42.3	57.5	0	0	0	0.2	0.81
Upper Buffalo Wilderness	95.7	4.2	0	0	0	0.1	0.61

As shown in Table 3-4, the most significant contributors to the visibility impairment are sulfates (SO_4) and nitrates (NO_3). The SO_4 contribution is from the chemical conversion of SO_2 emitted by the kiln to SO_4. The NO_3 contribution is entirely from the chemical conversion of NO_X emitted from the kiln. The contribution of PM_{10} to the total visibility impairment can be estimated as the sum of the contributions from SOA, EC, PMc, and PMf. The PM_{10} contribution is much smaller (<1%) than the contribution from SO_2 and NO_X.

4. SO_2 BART EVALUATION

Sulfur, in the form of metallic sulfides (pyrite), sulfate, or organosulfur compounds, is often found in the raw materials used to manufacture cement and in the solid and liquid fuels burned in cement kilns.[4] The raw materials and fuels for the Clarksville plant are no exception. Sulfur dioxide can be generated by the oxidation of sulfur compounds in the raw materials and fuels during operation of the pyroprocess. Constituents found in fuels, raw materials, and in-process materials, such as the alkali metals (sodium and potassium), calcium carbonate, and calcium oxide react with SO_2 formed in the pyroprocess and much of the sulfur leaves the process in the principle product of the kiln system called clinker.

The kiln is the only BART source which emits SO_2, thus an SO_2 BART evaluation was performed only for the kiln. The maximum actual 24-hour kiln SO_2 emission rate that was modeled for the BART applicability determination is summarized in Table 4-1.

TABLE 4-1. EXISTING ACTUAL MAXIMUM 24-HOUR SO_2 EMISSION RATES

	SO_2 24-Hour Emission Rate ton/24-hr	SO_2 Hourly Equivalent Emission Rate lb/hr
Kiln	58.67	4889.38

4.1 IDENTIFICATION OF AVAILABLE RETROFIT SO_2 CONTROL TECHNOLOGIES

Step 1 of the BART determination is the identification of all available retrofit SO_2 control technologies. A list of control technologies was obtained by reviewing the U.S. EPA's Clean Air Technology Center, publicly-available air permits, applications, and technical literature published by the U.S. EPA, state agencies, and Regional Planning Organizations (RPOs).

The available retrofit SO_2 control technologies are summarized in Table 4-2.

TABLE 4-2. AVAILABLE SO_2 CONTROL TECHNOLOGIES

SO_2 Control Technologies
Fuel Substitution
Raw Material Substitution
Dry Lime Injection/Scrubbing
Wet Lime Scrubbing

[4] Miller, F. MacGregor and Hawkins, Garth J., "Formation and Emission of Sulfur Dioxide from the Portland Cement Industry", *Proceedings of the Air and Waste Management Association*, June 18-22, 2000.

4.2 ELIMINATE TECHNICALLY INFEASIBLE SO_2 CONTROL TECHNOLOGIES

Step 2 of the BART determination is to eliminate technically infeasible SO_2 control technologies that were identified in Step 1.

4.2.1 FUEL SUBSTITUTION

Holcim uses a mixture of coal, petroleum coke, alternative fuels (synfuel), and oil as the primary fuels for the kiln. For example, the 2007 actual fuel usage breakdown on an energy input basis, was 3.4 percent coal, 84 percent petroleum coke, 11.8 percent synfuel, and 0.8 percent oil (the fuel usages are also on an as received basis). The sulfur content of the petroleum coke is approximately 5.72 percent and the sulfur content of the coal is approximately 3.45 percent. Oil is typically used during preheat of the kiln after a maintenance outage. Coal is also typically used during the kiln startup after an extended shutdown. Coal offers better flame control and appropriate heat distribution during heatup and ramp up of production. The main source of solid fuel for the kiln is petroleum coke.

The design of the long wet kiln system is such that some of the SO_2 resulting from fuel combustion may be emitted and the rest is absorbed in clinker or CKD. Therefore, if Holcim reduces sulfur in the fuel input to the kiln, a corresponding reduction in SO_2 emissions from the kiln would be expected. Holcim contacted fuel suppliers and found a low sulfur PRB coal, 0.7 % sulfur, and a regionally available 3.0% sulfur coal that could be used in lieu of the current coal/coke, which would result in a lower overall fuel sulfur content. A number of coal sources were rejected for high chlorine content. For example, a 1.0 percent sulfur source was found but the chlorine content was 1.3 percent (the mine has recently shut down as well), another mine had coal with sulfur in the 1.0 percent and 2.5 percent range, but with chlorine contents in the 0.3 percent range. Further, a 2.8 percent sulfur coal was identified, but it also had too high of a chlorine content, 0.12 percent, to be usable. The 3.0 percent sulfur coal is reported as having a chlorine content of 0.05 percent which is preferable (Note that the 2007 average chlorine content in the coke was 0.08 percent. A summary of the coal composition data obtained is provided in Appendix A. In addition, the plant is subject to chlorine input limitations from HWCMACT). Chlorine contents higher than current levels would very likely cause visible plumes/opacity issues as further described in Appendix B.

Determining the specific reduction in SO_2 emissions from a reduction in fuel sulfur is complicated as the reactions in the kiln system are complex. The sulfur is introduced into the system in the fuel as well as the raw materials (pyrites) and the sulfur exits the kiln system in the product (clinker), the cement kiln dust (CKD), and out the stack as SO_2. Further, although the sulfur in the clinker is small on a percentage basis, the magnitude of the clinker production is extremely large (greater than 1 million tons per year). Consequently, small changes in the amount of sulfur absorbed in the product can dramatically change the amount of SO_2 emitted. The variation in sulfur in the raw materials from the quarry, the clinker quality requirement determined by the market, and the kiln conditions can all cause significant changes in kiln operating parameters, such as kiln burning temperature, kiln excess Oxygen, etc. These changes can have a strong impact on the sulfur absorbed in the clinker and CKD and hence on SO_2 emissions. These operating conditions can also strongly change how the fuel sulfur affects SO_2 emissions. Reviewing the data yields that there is no linear correlation between fuel sulfur and SO_2

emissions. Although these parameters were continuously monitored and controlled, to calculate an SO_2 control effectiveness, based on switching to a lower sulfur fuel, a high number of assumptions must be made with a very low confidence in the accuracy. Regardless, an attempt has been made.

The assumptions, based on long term averages in 2007, which can vary significantly on an annual and short term (24-hr) basis, include that 65 percent of sulfur input in the kiln system is from fuel, 35 percent of sulfur input is from raw materials, and approximately 30-35 percent of total sulfur input is estimated to ultimately be emitted as SO_2 in the stack.

Low Sulfur PRB Coal – 0.7 percent sulfur

Based on the 2007 data, if all of the current coal and coke is replaced with a 0.7 percent low sulfur coal, the sulfur input from fuel is calculated to be reduced by approximately 85 percent. Following is a summary of the sulfur input reduction from the use of low sulfur coal. The low sulfur PRB coal has a lower heat content (26 Gj/Metric ton) and higher moisture content than the coke currently being used (33 Gj/Metric ton), so a higher volume of low sulfur PRB coal is needed than coke reduced.

Current – 2007 Average

Coke Usage:	160,915 metric tons
Low Heat Content	32.510 Gj/Mt
Sulfur Content:	5.72 %
Sulfur Input from Coke:	9,204 metric tons
Current Coal Usage:	9,432 metric tons
Low Heat Content	22.177 Gj/Mt
Sulfur Content:	3.45 %
Sulfur Input from Coal:	325 metric tons

Total Sulfur Input from Coke/Coal: 9,529 metric tons

Low Sulfur PRB Coal Replacement

Coal Usage:	208,546 metric tons
Heat Content	26.266 Gj/Mt
Sulfur Content:	0.7 %

Total Sulfur Input from Coal: 1,459 metric tons

Net reduction in sulfur input from coal:

9,529 metric tons – 1,459 metric tons = 8,070 metric tons = 8,893 tons

The SO_2 reduction calculation, based on the calculated sulfur reduction, is very complicated. The pyrite sulfur from the raw materials can volatilize at relatively low temperatures in the kiln, in an area where the sulfur comes in contact with the kiln feed that has only minimally been calcined into CaO. Consequently, less of this sulfur reacts with the CaO and thus is emitted. Again, if the sulfur reacted with the CaO, it would be absorbed into the clinker and CKD. The fuel sulfur, on the other hand, enters the kiln in

the burning zone and travels the entire length of the kiln, coming in contact with much higher concentrations of CaO, thus having a much greater chance of being absorbed. Consequently, there is no simple linear relationship between fuel sulfur and SO_2 emissions that can be used to confidently calculate an SO_2 reduction.

The fuel sulfur reduction of 8,893 tons corresponds with a 54 percent reduction of the total sulfur (fuel and raw material sulfur) input to the kiln system in 2007. As mentioned above, a large fraction of fuel sulfur would have been absorbed by the CaO in the system, and thus would not have been emitted as SO_2, while SO_2 emitted from the pyrite in the raw materials has less of a chance of being absorbed, so there is not a directly proportional reduction in SO_2 with the sulfur reduction from the fuels, nor with the total sulfur reduction. Holcim estimates that based on the year 2007 data, the actual SO_2 reduction is about 40% - 50%.

<u>Regional Coal – 3.0 percent.</u>
Using calculation methods similar to the low sulfur PRB coal case, a scenario that included replacing the current coal/coke with a 3.0 percent coal was evaluated. This scenario results in a sulfur input reduction of approximately 28 percent. Holcim estimates that the actual SO_2 reduction from this fuel switch would be approximately 20 - 25 percent.

These reductions are the maximum reductions in tons of SO_2 that can be expected. As mentioned previously, the actual reduction will vary significantly, especially on a short term basis. Holcim estimates that the net reduction in SO_2 for 3.0 percent sulfur coal would be 20-25 percent and for low sulfur PRB coal would be in the range of 40 percent to 50 percent.

Holcim considers this technology to be technically feasible and will consider it further.

4.2.2 RAW MATERIAL SUBSTITUTION / SELECTIVE MINING

In a long wet kiln, not only the pyritic sulfur, but total sulfur in the raw materials will have an impact on SO_2 emissions.

Part of the pyritic sulfur reacts with oxygen and forms SO_2 at the relatively lower temperature zone of the kiln. The rest of the sulfur, such as sulfates and sulfur compounds, enters the kiln at higher temperature zones, where more SO_2 is volatized. Some of this SO_2 will pass the length of the kiln without being absorbed and will thus be emitted to the stack.

Using raw materials with lower sulfur content can reduce the potential for SO_2 emissions from a wet kiln system. The limestone, shale, and other raw materials used at the Clarksville plant contain pyrites and total sulfur in varying concentrations. If zones or layers in the on-site quarry could be identified and mined selectively such that lower sulfur content materials are used, the emission rate of SO_2 could theoretically be reduced.

The Clarksville Quarry Scheduling Optimization (QSO) Model was created specifically for predicting relevant mineralogical parameters related to clinker production. Major oxides (Ca, Mg, Si, and Fe) are the primary focus of this predictive model. The sampling protocol and data analysis required for major oxide components was never intended to be adequate

for the accurate prediction of minor components, such as sulfur and sulfur compounds (See Appendix C for additional discussions on selective mining limitations based on Holcim's QSO (Quarry Scheduling Optimization) computer model).

Based on the lack of available data to predict if selective mining would be feasible, Holcim has concluded that selective mining is not considered a technically feasible SO_2 control technology for the kiln.

4.2.3 DRY LIME INJECTION/DRY LIME SCRUBBING

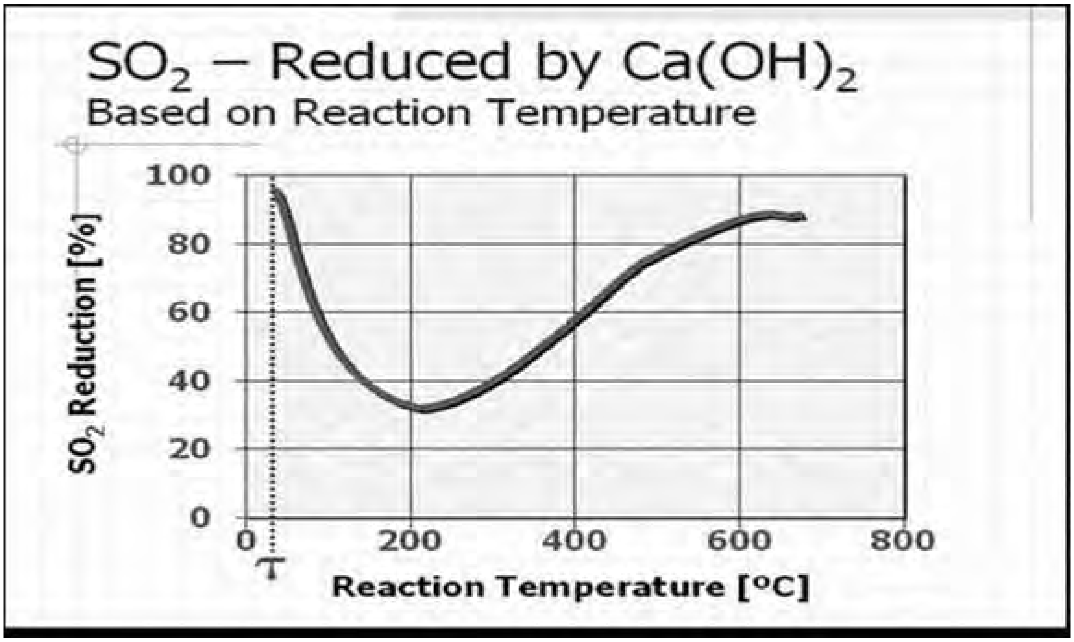
Dry Lime Injection, or Dry Lime Scrubbing (DLS), consists of injecting hydrated lime, $Ca(OH)_2$, into the flue gas. The $Ca(OH)_2$ reacts with SO_2 in the flue gas stream to create fine particles of $CaSO_3$ or $CaSO_4$. The particles are collected in the particulate matter control device (PMCD) serving the kiln.

The current PMCD was not sized/designed to handle the additional particulate matter loading that would result from this technology. Consequently, adding DLS could cause PM emissions and opacity to increase above permitted levels requiring Holcim to replace the existing PMCD (an ESP) with a new PMCD (a Baghouse).

Holcim is aware of only one other long term application of this technology on a wet kiln, which is on a smaller wet kiln in Belgium. Consequently, very little data exists to directly quantify the feasibility or benefit (emission reduction) of such a system. Regardless, Holcim is considering the technology to be technically feasible.

The effectiveness of DLS is impacted by both the temperature and the residence time/air flow rate at the location it is injected. At Clarksville, the injection point would be between the kiln outlet and the PMCD. At this location, the temperature is approximately 200 deg C (415 deg F). The temperature can not be increased at this location as the plant has limitations on the inlet temperature to the PMCD from both the Portland Cement MACT and the Hazardous Waste Combustion MACT in order to meet the Dioxin/Furan (D/F) limit. Further, lowering the temperature would lead to lower ESP efficiency and opacity problems. Figure 4-1 is a plot of SO_2 reduction versus reaction temperature from a commonly used article entitled "What is Achievable with Today's Technologies", Mark S. Terry, Krupp Polysius Corp, 2001. As indicated in the figure, at a temperature of 200 deg C (415 deg F), the reduction level is approximately 30 percent, which is the lowest reduction level over the temperature range presented.

FIGURE 4-1. SO_2 REDUCTION VERSUS REACTION TEMPERATURE FOR HYDRATED LIME



The molar ratio of lime (calcium source) to SO_2 is much higher than in a typical coal fired boiler due to a number of factors, some of which include the higher CO_2 and dust levels in the cement kiln system exhaust. The CO_2 competes with SO_2,in the reaction with the lime, and the higher dust loading reduces the even distribution of the lime in the gas. Based on a communication with the Obourg plant in Belgium, a molar ratio of between 4:1 and 6:1 has been used. The larger size of the Clarksville kiln will make it more difficult to evenly distribute the lime to the kiln gas and thus Holcim anticipates that a molar ratio of 6:1 will be required to achieve a maximum control efficiency of 20 - 30 percent.

Holcim considers this technology to be technically feasible and will consider it further.

4.2.4 WET LIME SCRUBBING

Wet lime scrubbing (WLS) is a name for a traditional tailpipe wet scrubber. This process involves passing the flue gas from the main PMCD through a sprayed aqueous suspension of $Ca(OH)_2$ or $CaCO_3$ (limestone) that is contained in an appropriate scrubbing device. In the case of the Clarksville plant, the basic underlying economics would dictate the use of ground limestone as the scrubbing reagent. Use of the cement kiln dust as a scrubbing reagent was not considered as a viable option for Clarksville due to its high chlorine content and a large amount of inerts. In WLS, the aqueous suspension of scrubbing reagent is not taken to dryness as it is in DLS. The SO_2 reacts with the scrubbing reagent to form $CaSO_3.H_20$ or gypsum that is collected and retained as aqueous sludge. The sludge is either dewatered and disposed of or used as synthetic gypsum.

The scrubbing efficiency of WLS can vary from an estimated 80 percent to 95 percent of the SO_2 in the flue gas treated by the scrubber[5]. Further, WLS is a high maintenance process with high rates of downtime expected from build up or plug up of mist-eliminators or spray nozzles and the severe wear and corrosion of components. Holcim has found that high levels of hydrocarbons (THC) in the gas stream have caused significant corrosivity and foam build-up at their Dundee plant. Further, it significantly influences the system availability and the efficiency. The THC levels at the Clarksville plant may also lead to build up and plugging, and thus an availability (uptime) of the WLS of 95 percent is assumed.

Despite these identified drawbacks, WLS is considered a technically feasible BART option.

4.3 RANK OF TECHNICALLY FEASIBLE SO_2 CONTROL OPTIONS BY EFFECTIVENESS

The third step in the BART analysis is to rank the technically feasible options according to effectiveness. Table 4-3 provides the effectiveness of each technology in the form of an annual average efficiency.

TABLE 4-3. RANKING OF TECHNICALLY FEASIBLE KILN SO_2 CONTROL TECHNOLOGIES BY EFFECTIVENESS

Control Technology	Effectiveness SO_2 Reduction (Percent Reduction – Annual Basis)
Wet Lime Scrubbing	80-95%
Fuel Substitution	20-50%
Dry Lime Scrubbing	20-30%

4.4 EVALUATION OF IMPACTS FOR FEASIBLE SO_2 CONTROLS

Step four of the BART analysis procedure is the impact analysis. The BART determination guidelines list the four factors to be considered in the impact analysis:

- Cost of compliance
- Energy impacts
- Non-air quality impacts; and
- The remaining useful life of the source

Holcim has conducted an impact analysis for the remaining SO_2 control options.

[5] Assessment of Control Technology Options for BART-Eligible Sources Steam Electric Boilers, Industrial Boilers, Cement Plants and Paper and Pulp Facilities. Prepared by Northeast States for Coordinated Air Use Management In Partnership with The Mid-Atlantic/Northeast Visibility Union, March 2005, Page 4-21, Table IV-4. Range of Removal Efficiencies of Wet SO2 Scrubbers for Long Wet Kilns.

4.4.1 WET LIME SCRUBBING

Cost of Compliance

Holcim utilized a recent WLS vendor bid, scaled to 2012 dollars[6], as the basis for the economic analysis to determine the annualized cost for WLS. Holcim divided the annualized cost of WLS by the annual tons of SO_2 reduced to determine the cost effectiveness for WLS. The "annual tons reduced" were determined by subtracting the estimated controlled annual emissions from the existing annual emissions. The existing annual emissions should be considered both on a projected actual and a potential to emit (PTE) basis. The projected actual (PA) annual SO_2 emissions provided to the MDNR in the recent Mid Kiln Firing (MKF) permit application was 11,481 tons/year[7]. The PTE listed in the MKF permit is 13,298 tons/year. The estimated controlled annual emissions were calculated by applying an 80 percent to 95 percent control efficiency and a 95 percent control device uptime, to the projected actual annual and PTE emissions. Table 4-4 provides a summary of the cost effectiveness analysis related to WLS. The detailed cost analysis table is provided in Appendix D.

The equipment cost includes both the WLS system and a limestone preparation system. The limestone preparation system includes 2 Ball Mills used to grind the limestone received to a specific fineness.

The cost effectiveness analysis does not include the cost to construct a new exhaust stack, which may be needed to employ the WLS technology, and it does not include the possible additional cost for the equipment relocation on site due to the limited space available for the WLS system.

The control cost factors were obtained from the EPA's Control Cost Manual, 6th Edition.

Two factors that significantly increase the cost of this technology are the need to reheat the exhaust gas and the cost of sludge disposal.

<u>Exhaust Gas Reheat</u>

A common concern of utilizing a wet scrubber on a cement kiln exhaust gas is the probable formation of a detached plume resulting in opacity violations. For a typical cement kiln stack, if the exhaust gas contains NH_3, HCl, and SO_2, sub-micron aerosols of NH_4Cl and $(NH_4)2SO_4$ may form when the gas temperature is reduced after exiting the stack. A detached plume is predicted to occur when the exhaust gas is cooled to the dew point at or near the exit of the stack and prior to the dilution of the aerosol forming constituents. The wet scrubber requires the exhaust gas to be cooled to the dew point at the inlet of the scrubber. As the temperature of the exhaust gas is cooled in the scrubber, a visible plume

[6] The most recent U.S. Department of Labor, Producer Price Index Industry Data, from April 2004 – April 2008 indicates that costs have increased by the ratio of 143.2/102.9 over the last 5 year period (or 8.06 points per year). The original bid was from 2005. Consequently, the equipment cost was scaled up to 2012 (8 years) by multiplying by the following percentage (100 + (8 x 8.06)) percent = 1.645.

[7] The projected actual annual emission rate was determined as part of the construction permit application process to support the August 27, 2007 Mid Kiln Firing construction permit. Permit Number 082007-019.

condition is nearly assured. The sub-micron NH_4Cl aerosol will be formed and is difficult to remove in the scrubber. This problem has been reported for wet scrubbers used at cement plants. As the plant is subject to a 20 percent opacity limitation from both the PCMACT and HWCMACT, even a small increase in opacity could lead to an exceedance of the standard, which is not acceptable. Based on information from Holcim's Dundee, Michigan plant, Holcim anticipates that the temperature of the exhaust gas at the exit of the scrubber would be approximately 170 deg F. To keep the sub-micron particles from forming at the exit of the stack, reheating the exhaust gas, after the scrubber, is required. A thorough evaluation of the stack gas constituents was conducted by Holcim and it was determined that to prevent an unacceptable increase in opacity from occurring, the stack gas would need to be reheated (if a scrubber is installed) to at least the current gas temperature after the ESP of approximately 380 deg F (see Appendix B for the detailed analysis). This re-heating would most likely be achieved using natural gas combustion. The natural gas combustion would lead to a 97 ton/year increase in NO_x emissions that would negatively impact visibility gains from the SO_2 reduction.

Sludge Disposal

The sludge generated from the WLS system may require disposal. Therefore, Holcim has determined the cost of disposal based on a bid from Area Disposal Services, Inc. for the disposal fee ($36/ton), as well as the cost for trailer rental ($120/month) and transportation ($220/load). In addition, Holcim also looked at the corresponding cost of building an onsite landfill for disposal, but based on information provided by MDNR, the time and resources required to obtain a permit, and the additional liability associated with an onsite landfill, Holcim decided not to pursue that option.

WLS may also lead to an increase in PM emissions because some particles of limestone or $CaSO_3$ will be entrained in the flue gas and subsequently be emitted from the scrubber. WLS is also known to increase emissions of sulfuric acid mist.[8]

TABLE 4-4. COST ANALYSIS SUMMARY FOR WET LIME SCRUBBING

Control Case	Control Effectiveness (%)	Annual Cost ($/yr)	Existing Annual Emissions (tons/yr)	Pollutant* Removed (tons/yr)	Cost** Effectiveness ($/ton)	Cost*** Impact ($/ton clinker)
WLS – PA	80%	$24,385,436	11,481	8,726	$2,826	$20
WLS – PA	95%	$24,925,003	11,481	10,362	$2,428	$21
WLS – PTE	80%	$24,840,863	13,298	10,106	$2,482	$20
WLS – PTE	95%	$25,465,823	13,298	12,001	$2,139	$21

*Assumes 95% uptime.

**Includes 97 tons of NOx generated.

***Based on a maximum historical actual clinker production rate of 1,215,708 tons/year.

8 *Innovations in Portland Cement* Manufacturing, Portland Cement Association, 2004, pg. 660 & 669

The significant increases in cost per ton of clinker produced from using WLS, as shown in Table 4-4, would likely eliminate any profit margin currently realized by the plant. Thus, it would not be economically feasible to operate the plant with WLS.

Energy Impacts

A wet scrubber requires an additional fan of considerable horsepower to move the flue gas through the scrubber. The exhaust gas reheat requirement will utilize approximately 1,000,000 MMcf/year of natural gas, which will itself lead to an increase in NOx emissions of 97 tons/yr.

Non Air-Quality Impacts

Without reheating, a frequent steam plume and/or detached plume can be expected at the discharge of the wet scrubber that would result in visual impairment in the area.

The WLS technology could generate over 50,000 tons per year of waste (sludge) that will require disposal in a landfill.

Remaining Useful Life

The remaining useful life of the kiln does not impact the annualized cost of WLS because the useful life is anticipated to be at least as long as the capital cost recovery period, which is 15 years.

4.4.2 FUEL SUBSTITUTION

Cost of Compliance

<u>Low sulfur PRB coal</u>

The increased cost of using low sulfur PRB coal (0.7 percent sulfur) includes the relative increase in fuel cost as well as the cost of a new coal mill system. Low sulfur PRB coal is harder than the current coal/coke utilized and has a lower heat content; consequently, a higher volume of coal grinding will be needed than the current mill can achieve. The increased grinding requirement would also have an additional energy requirement. A bid for a new coal mill, classifier, and mill motors, was obtained from GEBR. Pfeiffer USA Inc. and was scaled to 2012 dollars[9],

<u>Regional 3.0 percent sulfur coal</u>

The increased cost of using a regional 3.0 percent sulfur coal includes the relative increase in fuel cost as well as the cost of a new primary air fan and associated equipment. The 3.0 percent sulfur coal has a lower heat content than coke; consequently, a higher volume of coal will be needed that will require a larger primary air fan. Holcim is proposing to

[9] The most recent U.S. Department of Labor, Producer Price Index Industry Data, from April 2004 – April 2008 indicates that costs have increased by the ratio of 143.2/102.9 over the last 5 year period (or 8.06 points per year). The original bid was from 2007. Consequently, the equipment cost was scaled up to 2012 (5 years) by multiplying by the ratio of 143.2/102.9.

change the coal mill primary air fan and associated equipment. Reducing the capital cost does not have a significant impact on the outcome of the cost analysis. That is, eliminating the capitol cost completely only reduces the cost from $1,286/ton SO2 to $1,039/ton SO_2. Consequently, Holcim has chosen to not spend additional time and effort documenting these costs.

Table 4-5 provides a summary of the cost effectiveness analysis related to Fuel Substitution. The detailed cost analysis table is provided in Appendix D.

The cost effectiveness analysis does not include the cost to construct any new storage or handling facilities for the low sulfur PRB coal that may be required.

The control cost factors were obtained from the EPA's Control Cost Manual, 6th Edition.

TABLE 4-5. COST ANALYSIS SUMMARY FOR FUEL SUBSTITUTION

Control Case	Control Effectiveness (%)	Annual Cost ($/yr)	Existing Annual Emissions (tons/yr)	Pollutant Removed (tons/yr)	Cost Effectiveness ($/ton)	Cost* Impact ($/ton clinker)
Fuel Sub – PA	23%	$3,933,016	11,481	2,641	$1,489	$3
Fuel Sub – PA	40%	$27,218,156	11,481	4,592	$5,927	$22
Fuel Sub – PA	50%	$27,218,156	11,481	5,741	$4,741	$22
Fuel Sub – PTE	23%	$3,933,016	13,298	3,059	$1,286	$3
Fuel Sub – PTE	40%	$27,218,156	13,298	5,319	$5,117	$22
Fuel Sub – PTE	50%	$27,218,156	13,298	6,649	$4,094	$22

*Based on a maximum historical actual clinker production rate of 1,215,708 tons/year

The 3.0 percent sulfur coal option (used 23 percent control as the average) is cost effective and will be considered further.

The low sulfur PRB coal option (40 to 50 percent control) is not cost effective and results in significant increases in cost per ton of clinker produced that would likely eliminate any profit margin currently realized by the plant. Thus, it would not be economically feasible to operate the plant with the low sulfur PRB coal scenario.

In addition, for this analysis Holcim did consider the blending of solid fuel but considered it also to not be cost effective. In order to properly blend solid fuels for a precise distribution to control sulfur and chlorine inputs and not disrupt production due to fuel quality swings, an additional solid fuel equipment handling system would have to be installed. At a minimum, for each additional solid fuel used a system consisting of feed chutes, transfer conveyors, a storage silo, and a weigh belt would be required. It was conservatively estimated that the cost would be similar to the cost of a new mill and thus increase the cost well above the 3.0% sulfur coal option.

Energy Impacts
The low sulfur PRB coal will require additional energy for grinding. The actual increase is difficult to estimate. The regional coal option also relies that a reliable source of tire derived fuel (TDF) and Hazardous Waste Derived Fuel (HWDF) is available to supplement 23% of the thermal requirements for clinker production

Non Air-Quality Impacts
None.

Remaining Useful Life
The remaining useful life of the kiln does not impact the annualized cost because the useful life is anticipated to be at least as long as the capital cost recovery period, which is 15 years.

4.4.3 DRY LIME SCRUBBING

Cost of Compliance
The increased cost of DLS includes the cost of hydrated lime as well as the injection system and replacing the existing ESP with a new baghouse. As the DLS injection system would likely be a custom application, Holcim's engineering department has estimated that the DLS injection system equipment cost would be approximately $1,000,000. Holcim obtained a bid for retrofitting the existing ESP with a Baghouse from GE Energy. A detailed analysis has not yet been completed to determine if the retrofit will be capable of handling the additional dust loading from the DLS system.

The quantity of hydrated lime required is calculated below on a PA and PTE basis as follows:

<u>Hydrated Lime Requirement.</u>

PA Basis:

The projected actual annual emission level of SO_2 is 11,481 tons

A molar ratio of 6:1, $Ca(OH)_2$ to SO_2, is required. The $Ca(OH)_2$ required is calculated by multiplying by the ratio of molecular weights:

6 x 11,481 tons SO_2 x (74 ton $Ca(OH)_2$/ 64 SO_2) = 79,649 tons $Ca(OH)_2$

The estimated purity of the hydrated lime is 96.8 percent $Ca(OH)_2$. Consequently, the amount required is scaled as follows:

79,649 tons $Ca(OH)_2$ / 0.968 = 82,282 tons hydrated lime

PTE Basis:

The PTE annual emission level of SO_2 is 13,298 tons

A molar ratio of 6:1, $Ca(OH)_2$ to SO_2, is required. The $Ca(OH)_2$ required is calculated by multiplying by the ratio of molecular weights:

6 x 13,298 tons SO_2 x (74 ton $Ca(OH)_2$/ 64 SO_2) = 92,255 tons $Ca(OH)_2$

The estimated purity of the hydrated lime is 96.8 percent $Ca(OH)_2$. Consequently, the amount required is scaled as follows:

92,255 tons $Ca(OH)_2$ / 0.968 = 95,304 tons hydrated lime

Table 4-6 provides a summary of the cost effectiveness analysis related to DLS. The detailed cost analysis table is provided in Appendix D. The control cost factors were obtained from the EPA's Control Cost Manual, 6th Edition.

TABLE 4-6. COST ANALYSIS SUMMARY FOR DRY LIME SCRUBBING

Control Case	Control Effectiveness (%)	Annual Cost ($/yr)	Existing Annual Emissions (tons/yr)	Pollutant Removed (tons/yr)	Cost Effectiveness ($/ton)	Cost* Impact ($/ton clinker)
DLS – PA	20%	$14,725,124	11,481	2,181	$6,750	$12
DLS – PA	30%	$14,725,124	11,481	3,272	$4,500	$12
DLS – PTE	20%	$16,756,579	13,298	2,527	$6,632	$14
DLS – PTE	30%	$16,756,579	13,298	3,790	$4,421	$14

*Based on a maximum historical actual clinker production rate of 1,215,708 tons/year

The significant increases in cost per ton of clinker produced from using DLS, as shown in Table 4-6, would likely eliminate any profit margin currently realized by the plant. Thus, it would not be economically feasible to operate the plant with DLS.

Energy Impacts
Additional electricity is needed for the pump used to inject the lime into the kiln gas.

Non Air-Quality Impacts
Utilizing DLS could also increase the amount of CKD sent to the landfill.

Remaining Useful Life
The remaining useful life of the kiln does not impact the annualized cost because the useful life is anticipated to be at least as long as the capital cost recovery period, which is 15 years.

4.5 EVALUATION OF VISIBILITY IMPACT OF FEASIBLE SO_2 CONTROLS

A final impact analysis was conducted to assess the visibility improvement for the existing emission rate when compared to the emission rate of WLS, Fuel Substitution, and DLS. The existing emission rates, and emission rates associated with controls, were modeled using CALPUFF. The existing emission rate is the same rate that was modeled for the BART applicability analysis. The SO_2

emission rate associated with WLS, Fuel Substitution, and DLS is the existing emission rates less the average anticipated control of 87.5 percent, 45 percent and 23 percent, and 25 percent respectively. The emission rates are summarized in Table 4-7.

TABLE 4-7. SUMMARY OF EMISSION RATES MODELED IN SO_2 CONTROL VISIBILITY IMPACT ANALYSIS

Emission Rate Scenario	Emission Rate		
	SO_2 (lb/hr)	NO_X (lb/hr)	PM_{10} (lb/hr)
WLS – 87.5%	611	3,049	51.82
Fuel Substitution – 45%	2,689	3,049	51.82
Fuel Substitution – 23%	3,765	3,049	51.82
DLS – 25%	3,667	3,049	51.82
Base case – Max 24-hr avg.	4,889	3,049	51.82

Comparisons of the existing visibility impacts and the visibility impacts based on WLS, Fuel Substitution, and DLS are provided in Table 4-8. The visibility improvement associated with the controls are also shown in Table 4-8; this value was calculated as the difference between the existing visibility impairment and the visibility impairment for the controlled emission rates as measured by the 98th percentile modeled visibility impact.

TABLE 4-8. SUMMARY OF MODELED IMPACTS FROM SO_2 CONTROL VISIBILITY IMPACT ANALYSIS

	Mingo National Wildlife Refuge	Hercules Glades Wilderness Area	Upper Buffalo Wilderness Area
Existing 98% Impact (Δdv)	1.01	0.81	0.61
WLS 98% Impact (Δdv)	0.48	0.31	0.21
WLS Improvement 98% Impact (Δdv)	0.53	0.50	0.40
(45% Control) Fuel Subs. 98% Impact (Δdv)	0.70	0.58	0.37
Fuel Subs Improvement 98% Impact (Δdv)	0.31	0.23	0.24
(23% Control) Fuel Subs. 98% Impact (Δdv)	0.87	0.72	0.48
Fuel Subs Improvement 98% Impact (Δdv)	0.14	0.09	0.13
DLS 98% Impact (Δdv)	0.87	0.70	0.48
DLS Improvement 98% Impact (Δdv)	0.14	0.11	0.13

4.6 PROPOSED BART FOR SO_2

Holcim reviewed each control option's availability, as well as its cost of compliance, energy impacts, and non-air quality impacts, as well as the remaining useful life of the kiln. Table 4-9 summarizes the cost effectiveness for the controls based on the tons of SO_2 reduced and the visibility improvement in deciviews.

TABLE 4-9. SUMMARY OF COST EFFECTIVENESS OF SO_2 CONTROL OPTIONS

Control Option*	Existing Emissions (tons/yr)	Reduced Annual Emissions (tons/yr)	Annual Cost ($/yr)	Cost** Effectiveness ($/ton)	Cost Impact ($/ton clinker)
WLS–PA–80%	11,481	8,726	$24,385,436	$2,826	$20
Fuel Sub–PA-40%	11,481	4,592	$27,218,156	$5,927	$22
Fuel Sub–PA–23%	11,481	2,641	$3,933,016	$1,489	$3
DLS – PA - 20%	11,481	2,181	$14,725,124	$6,750	$12

*The worst case scenario from a cost effectiveness perspective is provided.
**Includes 97 tons of NOx generated for WLS

Control Type **WLS–PA–80%** Class I Area	Base 98th Percentile Impact (DV)	Controlled 98th Percentile Impact (DV)	98th Percentile Improvement (DV)	98th Percentile Improvement (%)	Cost Effectiveness ($/DV)
Mingo	1.01	0.48	0.53	52.5	$46,010,256
Hercules	0.81	0.31	0.50	61.7	$48,770,872
Buffalo	0.61	0.21	0.40	65.6	$60,963,590
Control Type **Fuel Subs. – 40%** Class I Area	Base 98th Percentile Impact (DV)	Controlled 98th Percentile Impact (DV)	98th Percentile Improvement (DV)	98th Percentile Improvement (%)	Cost Effectiveness ($/DV)
Mingo	1.01	0.70	0.31	30.7	$87,800,502
Hercules	0.81	0.58	0.23	28.4	$118,339,807
Buffalo	0.61	0.37	0.24	39.3	$113,408,982
Control Type **Fuel Subs. - 23%** Class I Area	Base 98th Percentile Impact (DV)	Controlled 98th Percentile Impact (DV)	98th Percentile Improvement (DV)	98th Percentile Improvement (%)	Cost Effectiveness ($/DV)
Mingo	1.01	0.87	0.14	13.9	$28,092,971
Hercules	0.81	0.72	0.09	11.1	$43,700,177
Buffalo	0.61	0.48	0.13	21.3	$30,253,969
Control Type **DLS-20%** Class I Area	Base 98th Percentile Impact (DV)	Controlled 98th Percentile Impact (DV)	98th Percentile Improvement (DV)	98th Percentile Improvement (%)	Cost Effectiveness ($/DV)
Mingo	1.01	0.87	0.14	13.9	$105,179,459
Hercules	0.81	0.70	0.11	13.6	$133,864,766
Buffalo	0.61	0.48	0.13	21.3	$113,270,187

Based on the five step analysis outlined by EPA, this analysis demonstrates that the cost of compliance associated with WLS, Fuel Substitution with low sulfur PRB coal, and DLS is extremely high on a $/ton of SO_2 removed basis, and especially on a $/DV of improvement basis, and is not economically feasible, especially if the cost per ton of clinker produced is taken into account. Fuel Substitution with a regional 3.0 percent sulfur coal, resulting in a 23 percent reduction in SO_2 emissions, is economically feasible and is being proposed as BART.

Holcim proposes that BART for SO_2 for the Holcim Clarksville Kiln is fuel substitution or equivalent technologies that will achieve a 23 percent reduction in the maximum daily SO_2 emission rate of 117,345 lbs.

To comply with this determination, Holcim is proposing an enforceable limit of 23% reduction in the maximum daily SO_2 emission rate of 117,345 lbs used for modeling visibility impairment. As documented throughout this report, fluctuations in daily kiln operations and inputs, and the uncertainty in predicting the daily absorption of sulfur in the clinker, Holcim proposes that the enforcement of the reduction be based on a 30 day rolling average.

In Portland cement kilns, the NO_X that is generated is primarily classified into one of two categories, i.e., thermal NO_X or fuel NO_X[10]. Thermal NO_X occurs as a result of the high-temperature oxidation of molecular nitrogen present in the combustion air. Fuel NO_X is created by the oxidation of nitrogenous compounds present in the fuel. It is also possible for nitrogenous compounds to be present in the raw material feed and become oxidized to form additional NO_X referred to as feed NO_X.

Due to the high flame temperature in the burning zone of the rotary kiln (3400^{o} F), NO_X emissions from the kiln tend to be mainly comprised of thermal NO_X. Although NO_X emissions from cement kilns include both nitrogen oxide (NO) and nitrogen dioxide (NO_2), typically, less than 10% of the total NO_X in the flue gas is NO_2.[11]

The kiln is the only BART source which emits NO_x, thus a NO_x BART evaluation was performed only for the kiln. The maximum actual 24-hour kiln NO_x emission rate that was modeled for the BART applicability determination is summarized in Table 4-1. The NO_x 24-hour maximum actual emission rate was determined from analyzer data for November 24, 2007.

TABLE 5-1. EXISTING ACTUAL MAXIMUM 24-HOUR NO_x EMISSION RATES

	NO_x 24-Hour Emission Rate ton/24-hr	NO_x Hourly Equivalent Emission Rate lb/hr
Kiln	36.59 (73,185 lbs)	3,049

5.1 IDENTIFICATION OF AVAILABLE RETROFIT NO_X CONTROL TECHNOLOGIES

Step 1 of the BART determination is the identification of all available retrofit NO_X control technologies. A list of control technologies was obtained by reviewing the U.S. EPA's Clean Air Technology Center, control equipment vendor information, publicly-available air permits, applications, and technical literature published by the U.S. EPA and the RPOs.

The available retrofit NO_X control technologies are summarized in Table 5-2.

[10] NO_X Formation and Variability in Portland Cement Kiln Systems, Penta Engineering, December 1998.

[11] IBID.

TABLE 5-2. POSSIBLE NO_X CONTROL TECHNOLOGIES

Kiln Control Technologies
Low NO_X Burner Flue Gas Recirculation CKD Insufflation Mid-Kiln Firing of Tires Selective Noncatalytic Reduction Selective Catalytic Reduction

5.2 ELIMINATE TECHNICALLY INFEASIBLE NO_X CONTROL TECHNOLOGIES

Step 2 of the BART determination is to eliminate technically infeasible NO_X control technologies that were identified in Step 1.

5.2.1 LOW-NO_X BURNER IN THE ROTARY KILN

Low NO_x burners (LNBs) reduce the amount of NO_x formed at the flame. The principle of all LNBs is the same: stepwise or staged combustion and localized exhaust gas recirculation (i.e. at the flame). As applied to the rotary cement kiln, the low-NO_X burner creates primary and secondary combustion zones at the end of the main burner pipe to reduce the amount of NO_x initially formed at the flame. In the high-temperature primary zone, combustion is initiated in a fuel-rich environment in the presence of a less than stoichiometric oxygen concentration. The oxygen-deficient condition at the primary combustion site minimizes thermal and fuel NO_X formation and produces free radicals that chemically reduce some of the NO_X that is being generated in the flame.

In the secondary zone, combustion is completed in an oxygen-rich environment. The temperature in the secondary combustion zone is much lower than in the first; therefore, lower NO_X formation is achieved as combustion is completed. CO that has been generated in the primary combustion zone as an artifact of the sub-stoichiometric combustion is fully oxidized in the secondary combustion zone.

Low-NO_X burners are considered to be a technically feasible option for NO_X control. As Holcim already has a LNB, the technology will not be considered further.

5.2.2 FLUE GAS RECIRCULATION

Flue gas recirculation involves the use of oxygen-deficient flue gas from some point in the process as a substitute for primary air in the main burner pipe in the rotary kiln. Flue gas recirculation (FGR) lowers the peak flame temperature and develops localized reducing conditions in the burning zone through a significant reduction of the oxygen content of the primary combustion "air." The intended effect of the lower flame temperature and reducing conditions in the flame is to decrease both thermal and fuel NO_X formation in the rotary kiln.

While FGR is a practiced control technology in the electric utility industry, Holcim is not aware of any attempt to apply FGR to a cement kiln because of the unique process requirements of the industry, i.e., a hot flame is required to complete the chemical reactions that form clinker minerals from the raw materials. The process of producing clinker in a cement kiln requires the heating of raw materials to about 2700°F for a brief but appropriate time to allow the desired chemical reactions that form the clinker minerals to occur. A short, high-temperature flame of about 3400°F is necessary to meet this process requirement. The long/lazy flame that would be produced by FGR would result in the production of lower or unacceptable quality clinker because of the resulting undesirable mineralogy. Clinkering reactions must take place in an oxidizing atmosphere in the burning zone to generate clinker that can be used to produce acceptable cement. FGR would tend to produce localized or general reducing conditions that also could detrimentally affect clinker quality. Due to these important limitations on the application of FGR and the lack of a successful demonstration on a cement kiln in the United States, FGR is not a technically feasible control option for NO_X control at this time.

5.2.3 CEMENT KILN DUST INSUFFLATION

Cement kiln dust (CKD) is a residual byproduct that can be produced by any of the four basic types of cement kiln systems. CKD is most often treated as a waste even though there are some beneficial uses. However, as a means of recycling usable CKD to the cement pyroprocess, CKD sometimes is injected or insufflated into the burning zone of the rotary kiln in or near the main flame. The presence of these cold solids within or in close proximity to the flame has the effect of cooling the flame and/or the burning zone thereby reducing the formation of thermal NO_X. The insufflation process is somewhat counterintuitive because a basic requirement of a cement kiln is a very hot flame to heat the clinkering raw materials to about 2700^{o} F in as short a time as possible. The Clarksville plant already uses this technology and it is already included in the baseline. Therefore, this option is removed from consideration for BART.

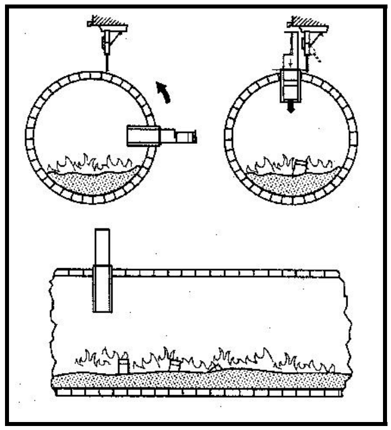
5.2.4 MID-KILN FIRING OF SOLID FUEL WITH MIXING AIR FAN

Secondary combustion is defined as follows: a portion of the fuel is fired in a location other than the burning zone. This reduces thermal NO_x generation because the temperature in the secondary combustion zone is less than 2100 °F. Mid-kiln firing (MKF) of solid fuels is an example of secondary combustion and includes fuels such as used tires, oil filter fluff, plastics, spent activated carbon and carbon black, asphalt shingles, diaper manufacturing waste, and other combustible solids. MKF improves clinker process energy efficiency, allows for greater operational flexibility with respect to fuel types, and is currently listed as a NOx control technology in 10 CSR 10-6.380 Control of NOx Emissions from Portland Cement Kilns.

An example of a MKF system is the Cadence feed form MKF technology which was first introduced in 1989. It is comprised of three primary components: (1) a staging arm or "feed fork," that picks up the fuel modules and positions them for entry into the kiln, (2) two pivoting doors that open to allow the fuel to drop into the kiln, and (3) a drop tube that

extends through the side wall of the kiln. In addition to these basic components, feed fork technology also requires a delivery system which positions the fuel models so they can be picked up by the feed fork and a mechanism for opening the doors so the fuel can enter the kiln. Due to rotation of the kiln, fuel can only be injected once per revolution from the top, as shown in Figure 5-1.

FIGURE 5-1. MID-KILN FIRING SCHEMATIC[12]



High-pressure air, in the range of a 2-10 percent replacement of the primary combustion air, could be injected through the shell of the rotary kiln and into the calcining zone to where a mixing air fan mixes the air with the gas and fuel within the rotary kiln for more complete combustion of the solid fuel.

By adding fuel mid-kiln, MKF changes both the flame temperature and flame length. These changes should reduce thermal NO_X formation by burning part of the fuel at a lower temperature and by creating reducing conditions at the mid-kiln fuel injection point which may destroy some of the NO_X formed upstream in the kiln burning zone.

Clarksville has the largest long kiln in the world. The kiln has a 7 meter diameter and a very high thermal capacity. Using whole tires to replace 10% of total fuel consumption will require four whole tires being fed to the mid-kiln door per kiln revolution, 12% fuel replacement would require 5 tires per revolution. The maximum tire feed rate per revolution that Holcim is aware of, on similar applications, is three tires per revolution. Holcim is concerned that the greater the number of tires fed per revolution, on a continuous basis, the greater the potential for process upsets from unstable feeding. Holcim has found that kilns being fed even one to three tires per revolution can have problems with stable, uniform feeding. In addition, if too many tires burn at the bottom of the kiln, a high local temperature could result which would disturb the normal operation of the kiln and potentially increase NOx. Further, due to the large kiln diameter, the reducing zone created by burning tires may only impact a small cross section of the entire cross section of the kiln, thus having less of an overall reduction in NOx than anticipated.

[12] NO_X Control Technologies for the Cement Industry, EC/R Incorporated, Chapel Hill, NC, USA, U.S. EPA Contract NO. 68-D98-025, U.S. EPA RTP, September 19, 2000.

In an effort to better understand these uncertainties, Holcim hired CINAR Company, the expert in this field, to conduct modeling of the system and to predict NOx reduction. Their study predicted that a 15% NOx reduction would occur at 10% replacement (replace 10% of the current fuel with tires) and 27% NOx reduction for 15% replacement.

To then determine the thermal substitution rate (TSR) of tires that the Clarksville plant is capable of utilizing, three additional factors must be considered:

1. Tire availability. The local market only has sustainable resources of 10-12% TSR;
2. Tire feeding limit: 12% TSR equates to five tires being fed per revolution.
3. The thermal stability of operation in a large kiln. 15% TSR is predicted to be the maximum for short term periods, whereas 10-12% TSR is predicted to be achievable on a long term basis.

Based on the lack of experience using MKF of tires on kilns the size of Clarksville, Holcim is relying on the computer modeling (regardless of the general uncertainty that exists with computer models) to estimate the NOx reduction. Holcim anticipates that MKF of tires may achieve up to 20% percent NOx reduction at a TSR of 12 percent on a long term basis.

Tires also have the benefit of a lower sulfur content (the Rubber Manufacturers Association reports a value of 1.83 percent) relative to the current coal/coke used. However, without conducting testing, it is unknown if utilizing tires at the mid-kiln location will result in the same reduction in SO_2 emissions predicted for reductions in fuel sulfur. Consequently, a reduction in SO_2 emissions from the use of tires was not considered further.

MKF is considered to be a technically feasible option for NOx control. Further, Holcim has already received a construction permit that would allow the installation of MKF, whereas other technologies would require a new construction permit application process, the result of which is unknown.

5.2.5 SELECTIVE NONCATALYTIC REDUCTION

In the relatively narrow temperature window of 1600 to 1995°F, ammonia (NH_3) reacts with NO_x without the need for a catalyst to form water and molecular nitrogen in accordance with the following simplified reactions.

$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$
$2NO_2 + 4NH_3 + O_2 \rightarrow 3N_2 + 6H_2O$

As applied to NO_x control from cement kilns and other combustion sources, this technology is called selective noncatalytic reduction (SNCR). Above this temperature range, the NH_3 is oxidized to NO_x thereby increasing NO_x emissions. Below this temperature range, the reaction rate is too slow for completion and unreacted NH_3 may be

emitted from the pyroprocess. This temperature window generally is available at some location within the rotary kiln. The NH_3 could be delivered to the kiln shell through the use of anhydrous NH_3, or an aqueous solution of NH_3 (ammonium hydroxide) or urea.

A concern about application of SNCR technology is the breakthrough of unreacted NH_3 as "ammonia slip" and its subsequent reaction in the atmosphere with SO_2, sulfur trioxide (SO_3), hydrogen chloride (HCl) and/or chlorine (Cl_2) to form a detached plume of sub-micron particles. As NH_3 or Urea injection rates are increased, to attempt to achieve higher levels of reduction, NH_3 emission levels are increased.

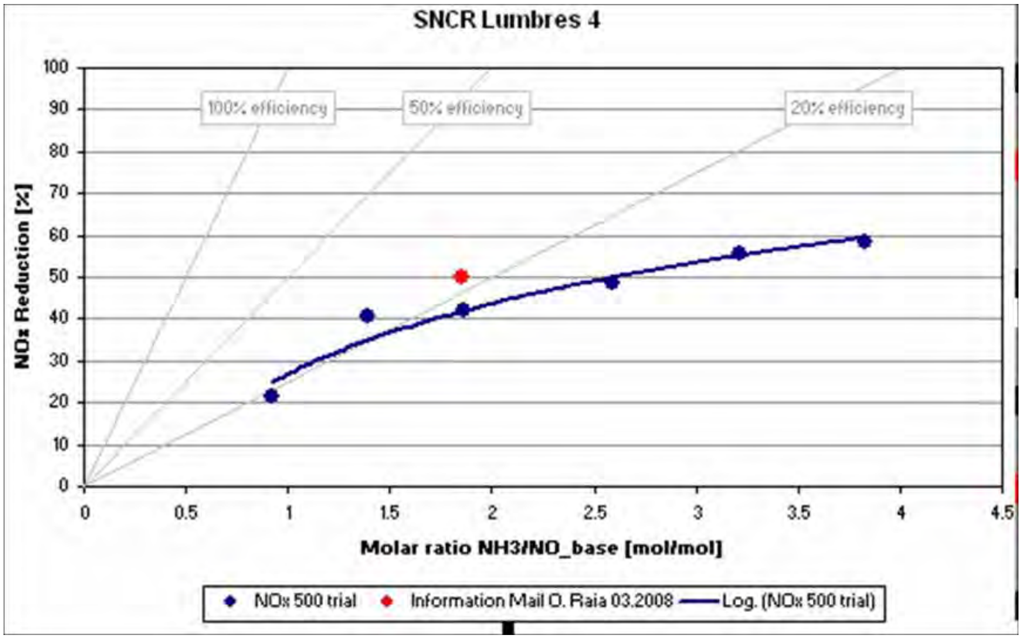
Industry Experience

Ash Grove Cement Company installed a full scale SNCR system on one of its wet kilns in Midlothian, Texas. Ash Grove has reported that it is achieving a 35 to 40% NOx reduction; however, as this application has just started, no data is available to verify this reduction is being achieved or on what averaging period or the long term sustainability.[13]

Holcim's wet plant in Lumbres, France utilizes SNCR. It is the earliest application of SNCR on a long kiln in the world and has been running for multiple years. The plant has found that NH_3 slip increases as the urea injection rate increases especially when the molar ratio is more than 1.0 (i.e. the NH_3 added is more than needed for the reaction). At this level, significant amounts of NH_3 are unreacted. The plant reports achieving 20 percent NOx reduction at a 1.0 molar ratio of NH_3/NOx and 40 percent at a molar ratio of 1.5 as shown in Figure 5-2.

[13] BART Five Factor Analysis. Ash Grove Cement Company Montana City, Montana. Dated June 2007. Page 5-9.

FIGURE 5-2. NOX REDUCTION VERSUS NH3 MOLAR RATIO OBSERVED AT HOLCIM LUMBRES PLANT.



However, at 20 percent NOx reduction, the NH_3 slip is reported to be 10 mg/m3, while at 40 percent reduction, the NH_3 slip can be 20 – 30 mg/m^3 (a 50 percent to 100 percent increase). Based on experiences at many cement plants with SO_2 and HCl in the exhaust gas, which is also the case for the Clarksville plant, a 20 mg/Nm3 NH_3 increase would cause a severe increase in plume visibility. The Lumbres plant is also smaller than Clarksville, having a diameter of only 3.3 meters versus Clarksville's 7 meter diameter kiln. The larger diameter of Clarksville's kiln would make distribution of the reagent across the kiln more difficult, and would reduce the effectiveness to an unknown degree.

NO_X reductions from SNCR systems can vary considerably based on site specific conditions, most notably being the type of kiln. For example, the NO_X reduction at the long wet kiln at Lumber is lower at a given ammonia molar ratio than observed at similar size preheater/pre-calciner (PH/PC) kilns. Some of the reasons for this lower relative NO_X reduction include:

- In a long wet kiln, the NH_3 is sprayed in the kiln itself, rather than being sprayed in the ductworks in a PH/PC kiln. A kiln's diameter is much larger than the ductwork diameter which makes it more difficult for the liquid NH_3 to be evenly distributed across the entire cross section of the gas stream.
- Studies have shown that in long kilns, the gas stream can be highly stratified over the cross section. The relatively heavy CO_2 released from the raw materials tends to stay on the top and bottom of the raw material bed, while lighter O_2 tends to float to the top of the kiln cylinder. This theory has been proven by many actual measurements at the plant. In contrast, the ductwork in PH/PC kiln systems are mostly vertical and this stratification is not observed, or is much less than in the

horizontal kiln system. The combination of stratification in the kiln cylinder, and less even distribution of NH_3, compound the problem of poor contact between the NH_3 and NO_X.

- The reaction of NH_3 and NO_X includes multiple steps that require O_2. In the areas of the long kiln that are lacking in O_2, the reaction rate is significantly lower, and thus NOx reduction is significantly lower relative to a well mixed gas stream.

Based on the concerns with NH_3 slip at high molar ratios, and the uncertainty regarding the level of effectiveness of the reagent in Clarksville's large diameter kiln, Holcim anticipates that at a molar ratio of about 1.0, an average annual control efficiency of 20 percent could likely be achieved without excessive NH_3 slip. However, a pilot study would need to be conducted to verify this. Regardless, SNCR is considered to be a technically feasible option for NO_X control.

5.2.6 SELECTIVE CATALYTIC REDUCTION

Selective Catalytic Reduction (SCR) is an add-on control technology for the control of emissions of the oxides of nitrogen (NO_x) from a combustion process. SCR has been successfully employed in the electric power industry. The basic SCR system consists of a system of catalyst grids placed in series with each other within a vessel that is located in a part of the process where the normal flue gas temperature is in the required range. An ammonia-containing reagent is injected at a controlled rate upstream of the catalyst grids that are designed to ensure relatively even flue gas distribution within the grids, to provide good mixing of the reagent and flue gas, and to result in minimum ammonia (NH_3) slip.[14] The NH_3 reacts with NO_X compounds (i.e., NO and NO_2) on the surface of the catalyst in equal molar amounts (i.e., one molecule of NH_3 reacts with one molecule of NO_X). Common reagents include aqueous NH_3, anhydrous NH_3 and urea $[(NH_2)_2CO]$. In the presence of the catalyst, the injected ammonia is converted by OH^- radicals to ammonia radicals (i.e., NH_2^-), which, in turn, react with NO_X to form N_2 and H_2O. The SCR catalyst enables the necessary reactions to occur at lower temperatures than those required for Selective Non-Catalytic Reduction (SNCR). While catalysts can be effective over a larger range of temperatures, the optimal temperature range for SCR is 570 - 750º F.

The catalyst system used in SCR applications usually consists of (1) a porous honeycomb of a ceramic substrate onto which catalyst has been attached to the surface of the ceramic material, or (2) a flat or corrugated plate onto which catalytic material has been deposited on the surface. A porous metal oxide with a high surface area-to-volume ratio acts as a catalyst base. On this base, typically titanium dioxide (TiO_2), one or more metal oxide catalysts are deposited in various concentrations. In SCR applications, the active catalyst material typically consists of vanadium pentoxide (V_2O_5), tungsten trioxide (WO_3), and molybdenum trioxide (MoO_3) in various combinations. The composition, also known as the catalyst formulation, is tailored by the catalyst vendor to best suit a particular SCR application. Catalyst deactivation through poisoning, fouling, masking, sintering and erosion are common problems for SCR catalysts that, without careful process design and

[14] Slip refers to the quantity of unreacted reagent that exits the SCR reactor.

operation, could be exacerbated. If not fouled by sulfur dioxide (SO_2), the catalysts used in SCR have a propensity to oxidize sulfur dioxide (SO_2) in the flue gas to sulfur trioxide (SO_3), a more undesirable pollutant.

Because the reaction rate of NH_3 and NO_X is temperature dependent, the temperature of the flue gas stream to be controlled is the most important consideration in applying SCR technology to any combustion source. The optimum temperature range for SCR application is about 300º C (570º F) to 450º C (840º F). This range of normal process temperature would occur within the kiln of a long wet kiln, rather than in the exhaust gas between the wet kiln and the PMCD inlet.

SCR has not been applied to any wet cement plant in the world and is not considered an available technology.

As explained in more detail below, a technology is considered "available" if it can be obtained by the applicant through commercial channels or is otherwise available within the common sense meaning of the term. An available technology is “applicable” if it can reasonably be installed and operated on the source type under consideration. A technology that is available and applicable is technically feasible. Availability in this context is further explained using the following process commonly used for bringing a control technology concept to reality as a commercial product: concept stage; research and patenting; bench scale or laboratory testing; pilot scale testing; licensing and commercial demonstration; and Commercial sales.

A control technique is considered available, within the context presented above, if it has reached the licensing and commercial sales stage of development. A source would not be required to experience extended time delays or resource penalties to allow research to be conducted on a new technique. Neither is it expected that an applicant would be required to experience extended trials to learn how to apply a technology on a totally new and dissimilar source type. Consequently, technologies in the pilot scale testing stages of development would not be considered available. An exception would be if the technology were proposed and permitted under the qualifications of an innovative control device consistent with the provisions of 40 CFR 52.21(v) or, where appropriate, the applicable SIP [in which case it would be considered available].

Therefore, SCR is eliminated from further consideration as BART for NO_x control at the Clarksville plant.

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5.3 RANK OF TECHNICALLY FEASIBLE NO_X CONTROL OPTIONS BY EFFECTIVENESS

The third step in the BART analysis is to rank the technically feasible options according to effectiveness. Table 5-3 presents potential NO_X technically feasible control technologies by effectiveness.

TABLE 5-3. RANKING OF TECHNICALLY FEASIBLE KILN NO_X CONTROL TECHNOLOGIES BY EFFECTIVENESS

Control Technology	Effectiveness NO_X Emissions Level (%)
MKF	20%
SNCR	20%
LNB, CKD Insufflation, and Synfuel	Already utilized at Clarksville

5.4 EVALUATION OF IMPACTS FOR FEASIBLE NO_X CONTROLS

Step four for the BART analysis procedure is the impact analysis. The BART determination guidelines list four factors to be considered in the impact analysis:

- Cost of compliance
- Energy impacts
- Non-air quality impacts; and
- The remaining useful life of the source

5.4.1 MKF

Cost of Compliance

Holcim anticipates that MKF and SNCR have relatively the same level of effectiveness. Because SNCR would require a pilot study to prove or verify the effectiveness of NOx reduction and the potential associated opacity issues due to ammonia slip (see Appendix B), Holcim is accepting the use of MKF as BART. As Holcim is accepting the most stringent control option available as BART, the cost of compliance is not required to be evaluated.

Energy Impacts and Non Air-Quality Impacts

There are no known adverse energy or non-air impacts from MKF. MKF of tires has the benefit of eliminating tires from landfills and illegal dumping. It also reduces CO_2 emissions (a Green House Gas) and reduces fossil fuel use.

Remaining Useful Life

The remaining useful life of the kiln does not impact the annualized costs of MKF because the useful life is anticipated to be at least as long as the capital cost recovery period, which would be 15 years.

5.5 EVALUATION OF VISIBILITY IMPACT OF FEASIBLE NO_X CONTROLS

The final impact analysis was conducted to assess the visibility improvement for existing emission rates when compared to the emission rate with MKF. The existing emission rates and emission rates associated with MKF were modeled using CALPUFF. The existing emission rates are the same rates that were modeled for the BART applicability analysis. The NO_x emission rate associated with MKF

was the existing emission rate less an average reduction of 20 percent. The emission rate is summarized in Table 5-4.

TABLE 5-4. SUMMARY OF EMISSION RATES MODELED IN NO_X CONTROL VISIBILITY IMPACT ANALYSIS

Emission Rate Scenario	Emission Rate SO_2 (lb/hr)	 NO_X (lb/hr)	 PM_{10} (lb/hr)
MKF,	4,889	2,440	51.82
Base case – High 24 hr average	4,889	3,049	51.82

Comparisons of the 98th percentile existing visibility impacts and the visibility impacts based on MKF are provided in Table 5-5. The visibility improvement associated with MKF are also shown in Table 5-5; this was calculated as the difference between the existing visibility impairment and the visibility impairment for the remaining control options as measured by the 98th percentile modeled visibility impact.

TABLE 5-5. NO_X CONTROL VISIBILITY IMPACT ANALYSIS

	Existing 98% Impact (Δdv)	MKF 98% Impact (Δdv)	Improvement
Mingo	1.01	0.92	8.9%
Hercules	0.81	0.72	11.1%
Upper Buffalo	0.61	0.60	1.6%

As seen in Tables 5-5, the MKF option results in a visibility improvement of up to 11.1 percent in the Hercules Glades Class I area.

5.6 PROPOSED BART FOR NO_X

Based on the five step analysis outlined by EPA, MKF was identified as the highest ranking feasible add-on control technology. Energy and environmental impacts were assessed for this technology and the visibility improvements were evaluated against existing conditions. Consistent with EPA guidance, economic impacts were not assessed as Holcim was willing to utilize the highest ranked control technology. The visibility impact analysis demonstrates that the utilization of MKF to achieve a 2,440 lb/hr NO_x emission rate results in up to an 11.1 percent visibility improvement. Neither non-air quality nor energy impacts associated with this control technology eliminate it in favor of retaining the existing rates as BART.

Holcim has determined that BART for the Holcim Clarksville Kiln is the installation and operation of a Mid Kiln Firing (MKF) system or equivalent that will achieve a 20 percent reduction in the maximum daily NO_X emission rate of 73,185 lbs.

To comply with this determination, Holcim is proposing an enforceable limit of a 20% reduction in the maximum daily NO_X emission rate of 73,185 lbs used for modeling visibility impairment. As documented in this report, the dynamics in daily kiln operations and inputs and the lack of

information on predicting short term actual reductions from MKF, Holcim proposes that the enforcement of the reduction be based on a 30 day rolling average.

Based on the lack of site specific, or significant industry data, for the use of this technology on wet cement kilns, it is possible that Holcim will further evaluate the MKF system and determine that MKF results in limited or no additional benefit. In the future, an alternative technology or methodology may become feasible and could be implemented as needed. Holcim will continue to utilize the NOx controls that are already in place, including LNB, insufflation, and the use of alternative fuels as available.

6. BART SUMMARY

Based on the five-step analysis, Holcim proposes the following as BART:

Kiln:

- PM_{10} – Holcim has determined that the existing electrostatic precipitator constitutes BART. This control device is effective for controlling PM_{10} from a wet kiln.

- NO_X – Holcim has determined that BART for the Holcim Clarksville Kiln is the installation and operation of a Mid Kiln Firing (MKF) system or equivalent that will achieve a 20 percent reduction in the maximum daily NO_X emission rate of 73,185 lbs.

- SO_2 – Holcim proposes that BART for the Holcim Clarksville Kiln is fuel substitution or equivalent that will achieve a 23 percent reduction in the maximum daily SO_2 emission rate of 117,345 lbs.

The proposed BART control strategies will result in reductions of the visibility impacts attributable to the Clarksville plant. A summary of the visibility improvement at Class I areas based on the existing emission rates and proposed BART emission rates is provided in Table 6-1.

TABLE 6-1. VISIBILITY IMPAIRMENT IMPROVEMENT

	Mingo National Wildlife Refuge	Hercules Glades Wilderness Area	Upper Buffalo Wilderness Area
Existing 98% Impact (Δdv)	1.01	0.81	0.61
BART 98% Impact (Δdv)	0.79	0.64	0.48
Improvement 98% Impact (Δdv)	22%	21%	22%

Holcim proposes to implement BART on or before 5 years after EPA approval of Missouri's Regional Haze Rule State Implementation Plan as per 40 CFR 51 Appendix Y. Because the actual implementation date is at least 5 years from the date of this document, Holcim requests that it not be bound to the technologies reviewed during this analysis, but to the percent reductions stated in the report. Changes in technology may offer opportunities to obtain even better reductions with lower cost impact.

Due to the variability in kiln operation and inputs as referenced in the report, Holcim proposes to comply with an enforceable limit of 23% reduction in SO2 emissions and 20% reduction in NOx emissions from the daily maximum emission rates, as modeled, on a 30 day rolling average.

APPENDIX A. COAL COMPOSITION DATA

Appendix A. Coal Composition Data - Holcim Clarksville BART Analysis Options:

	Regional Coals		PRB Coal	
Area	**Illinois**	**Illinois**	**Colorado**	
Company **Mine name**	**Peabody COALSALES LLC** **Gateway Mine**	**Knighthawk** **KHC Mines, primarily Pairie Eagle Mine**	**COALSALES LLC** **Twentymile Mine**	
		FOB Lone Eagle (KHC Dock, Mile post 105)	**Rail:** Energy, CO to Cora, IL via UP Rail **Barge:** Cora, IL to Clarksville	
Transportation Mode	**Barge**	**Truck & Barge**	**0.7% Sulfur Coal**	
Sulfur %	2.83%	3.00%	0.70%	**Sulfur %**
Ash %	8.60%	8.50%	10.00%	**Ash %**
Volatiles %	35.50%	37.00%	34.40%	**Volatiles %**
Moisture %	13.50%	12.50%	10.00%	**Moisture %**
Hydrogen %	5.00%	5.20%	5.00%	**Hydrogen %**
HGI	52	55	45	**HGI**
Chlorine %	0.12%	0.05%	0.01%	**Chlorine %**
mmbtu/lb	11,000	11,100	11,300	**mmbtu/lb**
HHV MJ/MT	25,582	25,814	26,279	**HHV MJ/MT**
LHV MJ/MT	25,567	25,800	26,266	**LHV MJ/MT**
Ultimate (Dry)				**Ultimate (Dry)**
Ash %	9.90%	9.00%	11.00%	Ash %
Hydrogen	5.00%	5.20%	5.00%	Hydrogen
Total Carbon	71.40%	72.00%	69.60%	Total Carbon
Nitrogen	1.30%	1.40%	1.70%	Nitrogen
Sulfur	3.28%	3.10%	0.54%	Sulfur
Chlorine	0.12%	0.04%	0.01%	Chlorine
Oxygen	9.00%	9.40%	10.75%	Oxygen
Ash Mineral (Dry)				**Ash Mineral (Dry)**
Silicon Dioxide	51.40%	50.70%	60.00%	Silicon Dioxide
Aluminum Oxide	19.70%	20.50%	25.10%	Aluminum Oxide
Titamium Dioxide	1.00%	1.00%	0.90%	Titamium Dioxide
Calcium Oxide	4.20%	3.50%	4.00%	Calcium Oxide
Iron Oxide	16.30%	15.80%	3.10%	Iron Oxide
Magnesium Oxide	1.00%	1.00%	1.40%	Magnesium Oxide
Potassium Oxide	2.20%	2.20%	1.30%	Potassium Oxide
Sodium Oxide	1.30%	0.70%	1.20%	Sodium Oxide
Sulfur Trioxide	2.60%	2.70%	1.50%	Sulfur Trioxide
Phos Pentoxide	0.20%	0.20%	0.90%	Phos Pentoxide
Strontium Oxide	0.10%		0.20%	Strontium Oxide
Barium Oxide	0.10%		0.40%	Barium Oxide
Manganese Oxide	0.10%	0.10%	0.10%	Manganese Oxide
Vanadim Pentroxide				
Nickel Oxide				
Undetermined		1.80%		

APPENDIX B. REVIEW OF THE POTENTIAL FOR PLUME OPACITY EXCEEDANCES RESULTING FROM THE USE OF A WET SCRUBBER

Appendix B. Review of the Potential for Plume Opacity Exceedances Resulting from the Use of a Wet Scrubber.

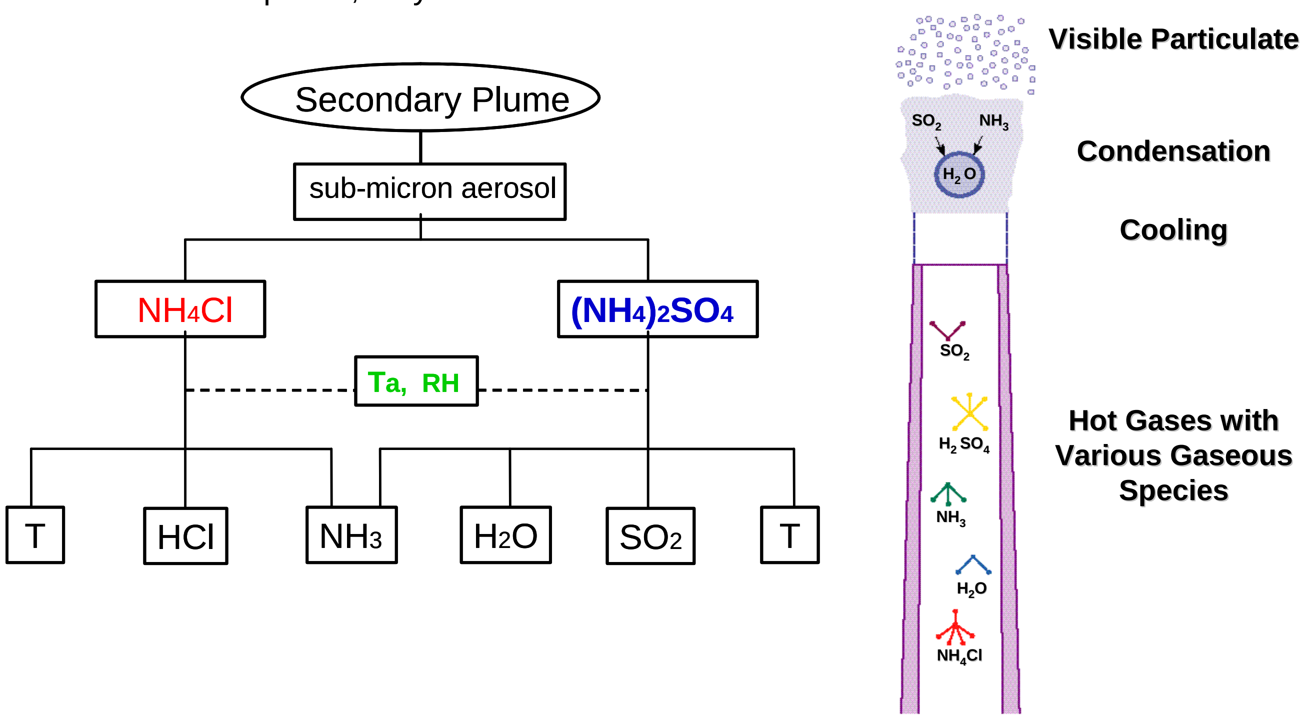
Nianzhi Wang, MPC-E

In the BART analysis for Holcim's Clarksville (CV) facility, a wet scrubber has been evaluated as a BART control option for SO_2. Although, a scrubber was shown to be technically feasible, it was also determined that reheating of the exhaust gas would be necessary to avoid a detached/attached plume. Following is an analysis of the gas stream to determine the specific temperature needed for the plume reheating requirement. The kiln system is currently controlled by an ESP and currently has an outlet gas temperature of approximately 380 deg F.

Background - The plume problem in cement manufacturing process

To evaluate the reheating requirement, we have to briefly introduce the plume problem in cement plants and potential risk of a visible plume after the scrubber.

The following figure shows the chemical reactions for most common types of plume in the cement manufacturing process, Although SO_3 and Total Hydrocarbons (THC) may also contribute to the plume, they have not been considered.



T = Stack Temperature, RH = Ambient Relative Humidity, Ta = Ambient Temperature

Some of the key points relevant to the diagram include:

- Both $(NH4)_2SO4$ and NH_4Cl are sub-micron aerosols that form at relatively low stack temperatures. $(NH4)_2SO4$ formation needs condensed moisture to occur. Whereas NH_4Cl solid can quickly form directly from the gas phase of NH_3 and HCl although with condensed moisture the reaction rate will be much faster.
- Sub-micron aerosols are similar in size to the wave length of light and thus strongly scatter the light and block light transmission through the stack gas. Figure 1 provides an example of relative light extinction versus particle size. For example, a $PM_{0.5}$ particle has an extinction efficiency approximately an order of magnitude greater than that of PM_{10}.

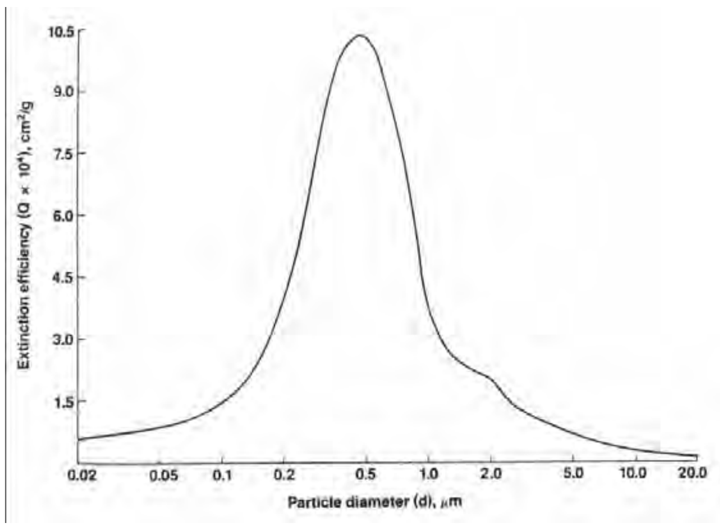


Figure 1. Extinction Efficiency Factor Verses Particle Diameter.

- The particle light extinction efficiency factor indicates the total light flux scattered and absorbed by a particle. Aerosols in the 0.2 - 1.0 μm diameter range are particularly effective in scattering visible light (wavelength: about 0.4 - 0.7 μm) on a unit mass basis, with a peak attenuation at 0.5 μm.

- The particles of either very large (>5 μm) or very small (<0.1 μm) diameter are much less effective in light attenuation.

- Plume aerosols usually form outside of the stack when the gas temperature is quickly cooled down and moisture is condensed, but the precursors have not had sufficient time to be diluted with ambient air. This situation is most dominant in occurrence on cold, calm and humid days.

Supplement A, at the end of this document, contains examples of historical visible plume problems in the cement industry and related studies.

Problems Associated with Using a Wet Scrubber on the Clarksville Kiln Exhaust Gas (in-stack)

- If a wet scrubber is installed after the Clarksville kiln, the kiln gas will need to be quenched and cooled down to the dew point temperature at the inlet of the scrubber (a similar condition of gas cooling in the presence of high humidity that can occur at the exit of a stack). If the gas has NH_3 and HCl, they can quickly react to form aerosols (fine particulate matter). These very fine particulates are controlled with a much lower efficiency than larger PM and thus can increase PM levels of the form of PM that leads to the highest plume visibility.

- In addition, the scrubber can not remove all NH_3 or SO_2 in the gas stream. The typical SO_2 reduction in a scrubber is about 90%. The NH_3 removal is governed by the equilibrium between the gas and the scrubber slurry liquid. Figure 2 provides the NH_3 gas-liquid equilibrium graph at a pH of 6. The NH_3 remaining in the effluent can be up to 10 ppm depending on the type of scrubber, the pH set point in the scrubber, and the scrubber influent NH_3 concentration. The remaining SO_2 and NH_3 in the scrubber effluent could react with the NH_4Cl aerosols already present in the gas and further increase plume visibility.

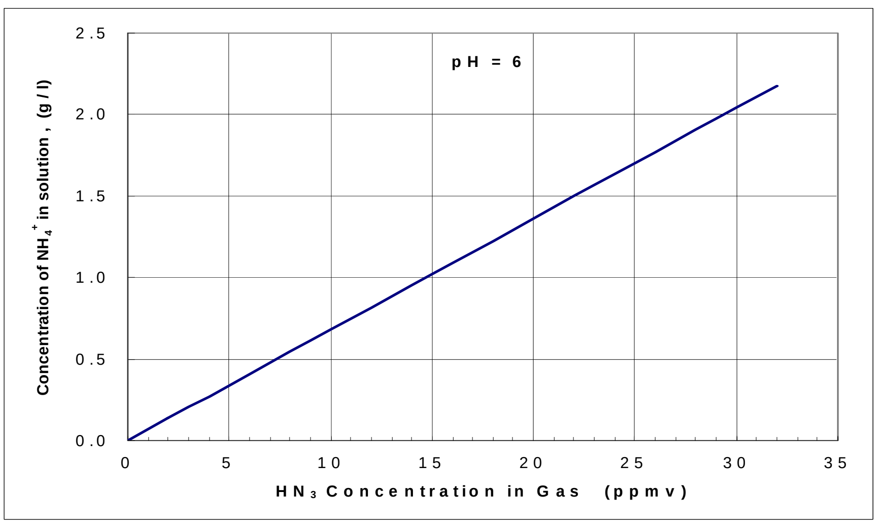


Figure 2. Concentration of NH_4^+ versus HN3 Concentration in Gas

- The gas temperature after the scrubber is much lower than the kiln gas temperature. Besides the aerosols formed at the inlet of the scrubber, more aerosols may also form in the cold and wet stack, and therefore, increase opacity.

Several scrubber vendors have confirmed the above phenomena with scrubber use:

- As an example, a vendor evaluated building a wet scrubber for one of Holcim's PH/PC plants. A PH/PC kiln system typically has two gas effluent streams, one contains high NH_3 (main stack) and the other contains high HCl (by-pass stack). Usually, both streams are introduced to a control device at the same inlet,

However, in this situation, the vendor provided the following concerns/comments in doing so as part of a feasibility study for the plant[1]:

> *"Mixing the NH_3 and HCl streams at the inlet will indeed produce an NH_4Cl salt that will be submicron in size".*
>
> *"This will result in opacity, I am sure it will be greater than 20%. Once this salt is formed, it will be very difficult to remove. Therefore, the preferred treatment would be to absorb the gases before they have a chance to react".*
>
> *"As we discussed, the two separate gas streams can be treated with individual scrubbers. However, it would be less expensive to perform the scrubbing in a single, large vessel with two separate inlet barrel"*

The scrubber system was ultimately built by Monsanto. And, even though the problem was acknowledged, and the system was designed to prevent the visible plume problem, the plant still has challenges with plume formation during the winter.

<u>Kiln gas emission concentrations and opacity</u>

- Holcim, as well as other companies, have found that at about 5ppm NH_4Cl or 10ppm $(NH4)_2SO4$, detached plumes can form outside of the stack if the stack gas is not hot enough to allow for significant dilution prior to condensation or if it is a very cold day in winter. Both aerosols will form quickly when the stack gas is cooled down by very cold ambient air.

- Stack temperatures for wet kilns are typically about 350 F. PH/PC kilns have similar stack temperatures when their in-line raw mills are not running. During these periods, PH/PC kilns have also observed a higher frequency of visible plumes as the precursors, NH_3, HCl and SO2, are not absorbed in the in-line raw mill.

Some specific examples of plants with visible plumes caused by constituents with concentrations similar to those in the Clarksville plant include:

- The CEMEX plant at Cementos Guadalajara, a 4 stage PH/PC kiln, had a highly visible plume caused by NH_4Cl. To resolve the problem, the plant added two additional stages that increased pollutant adsorption (HCl emissions were reduced to 5 ppm) and the plume disappeared. The reported stack temperature is 260 C (500 deg. F) which is much hotter than that of Holcim's Clarksville plant. Further, Clarksville's long wet kiln does not have the benefit of the stages in the PH/PC kiln for enhanced adsorption.

[1] *Steven Meyer, product Manager of Monsanto Company. Letter to Holcim for feasibility study of wet scrubber project, 10/29/1998*

- Holcim's Mississauga plant had a highly visible plume during the winter until they eliminated condensed moisture formation by heating the gas and reducing the HCl concentrations to less than 3-5 ppm. Holcim's Clarksville kiln can have HCl concentrations much higher than 5 ppm as will be discussed in a following section.

- Holcim's Untervaz plant in Switzerland has a wet scrubber as well as high levels of HCl and NH_3 in the kiln gas, and they have reported visible plumes during the winter especially when the in-line raw mill is down and the pollutant concentrations are higher.

Impact of Temperature on Visibility – Reaction Rate Based Equations

Solid NH_4Cl aerosols can form directly from the gas phase through the following reversible chemical reaction when the temperature drops:

$$NH_4Cl\ (s) = HCl\ (g) + NH_3\ (g)$$

The thermodynamic criteria for the reaction to occur is determined by the equilibrium constant Kp, which can be expressed by the following equation[2]

$$\ln Kp = 34.266 - 21196/T$$

where T is the temperature (K). The chemical reaction takes place if the product of partial pressures of HCl and NH_3 in gas is greater than Kp, i.e. $(pHCl \cdot pNH_3) > Kp$ (pHCl & pNH_3 are both in atm). This reaction can keep going to form NH_4Cl until the partial pressures of NH_3 and HCl have dropped to a level such that their product is less than Kp.

If the CV plant utilized a wet scrubber, and we assume the scrubber inlet temperature after quenching is 170 deg F or 76.6 deg C, the Kp would be 3.6 E-12. In the kiln gas, concentrations as low as 1-2 ppm (1.0 E-06 - 2.0 E-6) NH_3 and HCl will make the $(pHCl \cdot pNH_3) > Kp$, and the reaction will not stop until both gas phases drop down to 1-2 ppm. Thus, almost all NH_3 and HCl with a concentration higher than 1-2 ppm in the kiln gas will form NH_4Cl aerosols in the scrubber.

Reheating the stack gas after the scrubber has two purposes:

1) Dissociate the newly formed NH4Cl solid

2) Prevent the formation of aerosols from NH_3 and HCl from forming again in the stack or near the stack. The higher the reheating temperature, the longer the

[2] P. Goldfinger, G. Verhaegen, "Stability of the Gaseous Ammonium Chloride Molecule", The Journal of chemical Physics, 50(1), 1467-1471 (1969)

gas has to disperse and be diluted with ambient air, so that the product of both NH_3 and HCl concentrations would not be higher than Kp, and no aerosol formation would occur.

An example of how reheating temperature affects the opacity in a power plant is depicted in Figure 3[3]. The precursor of the visible plume in this case is SO_3, (as opposed to NH_4Cl).

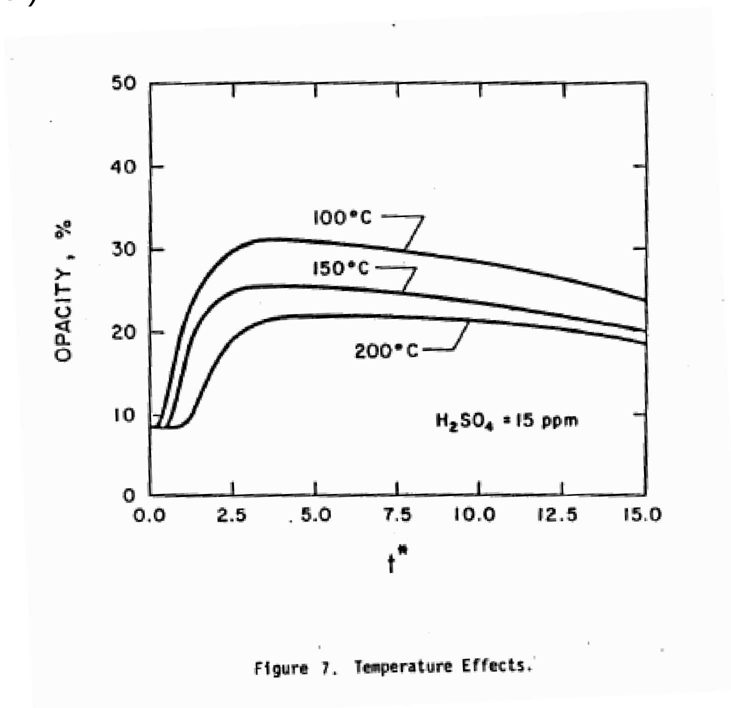


Figure 3. Gas Temperature Effect on Opacity Verses Time (t*)

Although reheating the stack gas to a temperature above the acid gas dew point may help to reduce corrosion problems and in-stack opacity, it may not be enough to avoid a plume outside of the stack. When the gas exits the stack, the temperature will quickly drop to below the acid dew point. Acid gas may be condensed, and acid water droplets may occur that will speed up other reactions in the liquid phase.

Figure 4 shows an example for stack gas containing SO_3. The gas temperature in the stack is much higher than the acid dew point, but once it goes out of the stack it takes only one second for the plume temperature T_P to drop below the dew point temperature T_{DP} and cause higher opacity levels.

[3] J. J. Martin Hughes, "Fine Particle Model for Detached Plume Opacity", Virginia State University, 16th Annual Meeting of the Fine Particle Society, April, 1985.

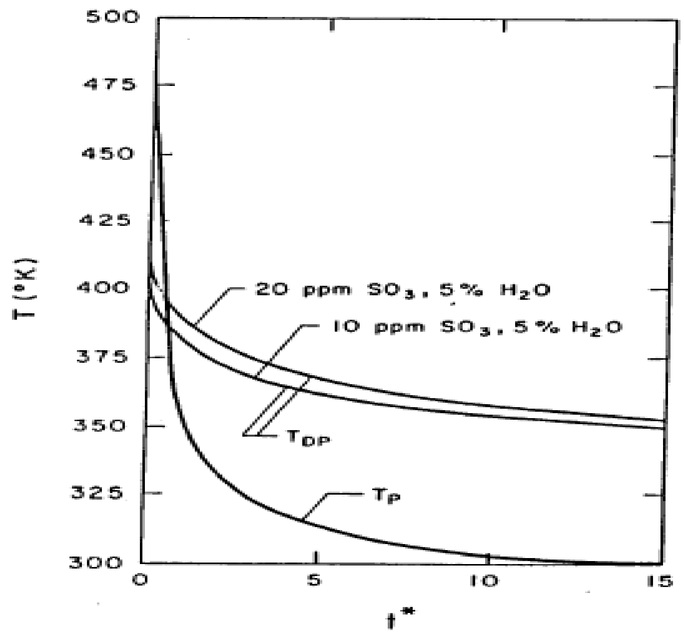


Figure 4. Stack gas temperature vs. Acid Dew Point and Time

Besides pollutant concentrations, other factors such as the stack gas temperature and moisture, the ambient air temperature and humidity, wind speed, sunlight and sky clarity, stack size and height effect plume visibility. Therefore, it is almost impossible to predict the exact reheating temperature required. Regardless, a mathematical model has been established to provide a simplified simulation of NH_4Cl formation outside of the stack based on the actual conditions at the CV plant.

Estimating the Reheat Temperature for CV based on Plant Data

The NH_3 and HCl emission concentration will control the plume formation as SO_2 concentrations are likely to be sufficiently high as to not be limiting in any equations. Table 1 summarizes the CV annual stack testing for 2002 - 2007. Although HCl was relatively low in 2007, it can and has varied significantly over the last five years.

Table 1. HCl and NH_3 Stack Test Data for Clarksville – 2002 thru 2007.

CV Emission		HCl		NH3
	ppmd	ppmw	ppmd	ppmw
2002	**12.8**	9.1	**36.2**	25.7
2003	**30.3**	21.5	**20.6**	14.6
2004	**26.9**	19.1	**27.1**	19.2
2005	**14.4**	10.3	**16.0**	11.5
2006	**8.0**	5.6	**22.5**	15.7
2007	**2.7**	1.9	**24.9**	17.6
Average	15.9	11.2	24.6	17.4

Please note that this data is from once per year stack testing not a Continuous Emission Monitor (CEM) and thus the annual and daily emission levels may vary considerably from these values. Further, the peak annual emission may be much higher than the test average. For example, during the three hours of stack tests in 2004, the maximum hourly HCl concentration was 70% higher than the minimum and 23% higher than the average.

Further, under current operations in 2007, the plant found that during some cold days, the plume outside of the stack was visible, but it did not reach 20% opacity.

The current stack temperature is about 350 F, and the temperature at the outlet of the ESP is about 380 F. The lower temperature in the stack is due to heat loss in the ductworks and the I.D. fan. Therefore, a reheating temperature of 380 F is proposed to maintain the current stack temperature of 350 F and eliminate the plume formation after the scrubber.

Using the 2007 stack test data (2 ppm HCl and 18 ppm NH_3), a reheat temperature of 380 F, or 350 F stack temperature, might not be necessary since based on our modeling result, the total HCl and NH_3 as aerosols after the scrubber should not be higher than in the original kiln gas.

However, HCl concentrations in the prior years have been as much as 10 times higher than 2007, reaching over 20 ppm in 2003 and 2004, while the NH_3 concentrations were nearly 20 ppm. These levels are considered to be highly probable of causing a visible plume at the current exhaust temperatures. Reviewing historical data, it was found that stack temperatures during these time periods were much higher than current temperatures. For example, the stack temperature was maintained at approximately 700 deg. F in 2003 and approximately 450 deg F (480 deg F at the outlet of the ESP) in 2004 (100 F higher than the proposed reheating temperature). The higher temperatures likely prevented significant visible plumes from occurring.

Regarding the use of a wet scrubber, even if some reduction in HCl occurred (such as 20%), the total HCl concentration after the scrubber would still be significantly higher than that in the kiln gas in 2007. Under this scenario, reheating to an ESP outlet of 380 F, or 350 F stack temperature, would likely not be sufficient to assure a stack opacity below 20% and additional re-heating would likely be required. Consequently, the proposed 380 F reheating temperature should be considered as an average for the year. That is, if the HCl and NH_3 concentrations reach 20 ppm in the kiln gas, the reheat temperature may need to be 480 deg F or higher in the winter, while if the HCl and NH_3 concentrations drop to 2007 levels or below, a reheat temperature of less than 380 deg F may be sufficient in the summer. Therefore, considering the variation in the HCl and NH_3 concentrations, an annual average reheat temperature of 380 deg F may be sufficient.

Is scrubbing half of the exhaust stream, and using the unscrubbed half for reheat, a viable option?

A scenario in which half or the exhaust gas stream is scrubbed, and the other half is not, followed by recombining the gas streams, was also considered. If feasible, this scenario would result in the unscrubbed gas providing the heat source to re-heat the scrubbed gas up to a temperature midway between the scrubbed gas temperature of approximately 170 deg F and the unscrubbed gas temperature of approximately 380 deg F, resulting in a mid-range temperature gas stream of approximately 275 deg F. Unfortunately, as discussed previously, the variability in precursor pollutant (HCl and NH_3) concentrations would most certainly lead to a visible plume at this low temperature and re-heating would continue to be required up to the originally identified average temperature of 380 deg F. This option was one of the scenarios evaluated in the modeling exercise discussed in the following sections.

Mathematical analysis of the impact of reheating temperature on CV visible plume

Using the equation described previously,

$$\ln K_p = 34.266 - 21196/T$$

a mathematical model was established to simulate NH_4Cl formation outside of the stack. Based on Holcim's experience with visible plumes at multiple plants, an NH_4Cl aerosol concentration of 5ppm in the atmosphere is used as the criteria for a highly visible plume outside of the stack. In reality, some of Holcim's plants control their NH_4Cl aerosol concentrations to less than 1-3 ppm to avoid visible plume formation.

This model only considers the gas temperature reduction due to mixing with ambient air and does not consider any reduction due to radiation. Thus, the actual condition will be worse than what the model predicts.

NH_4Cl formation was simulated for the following scenarios:

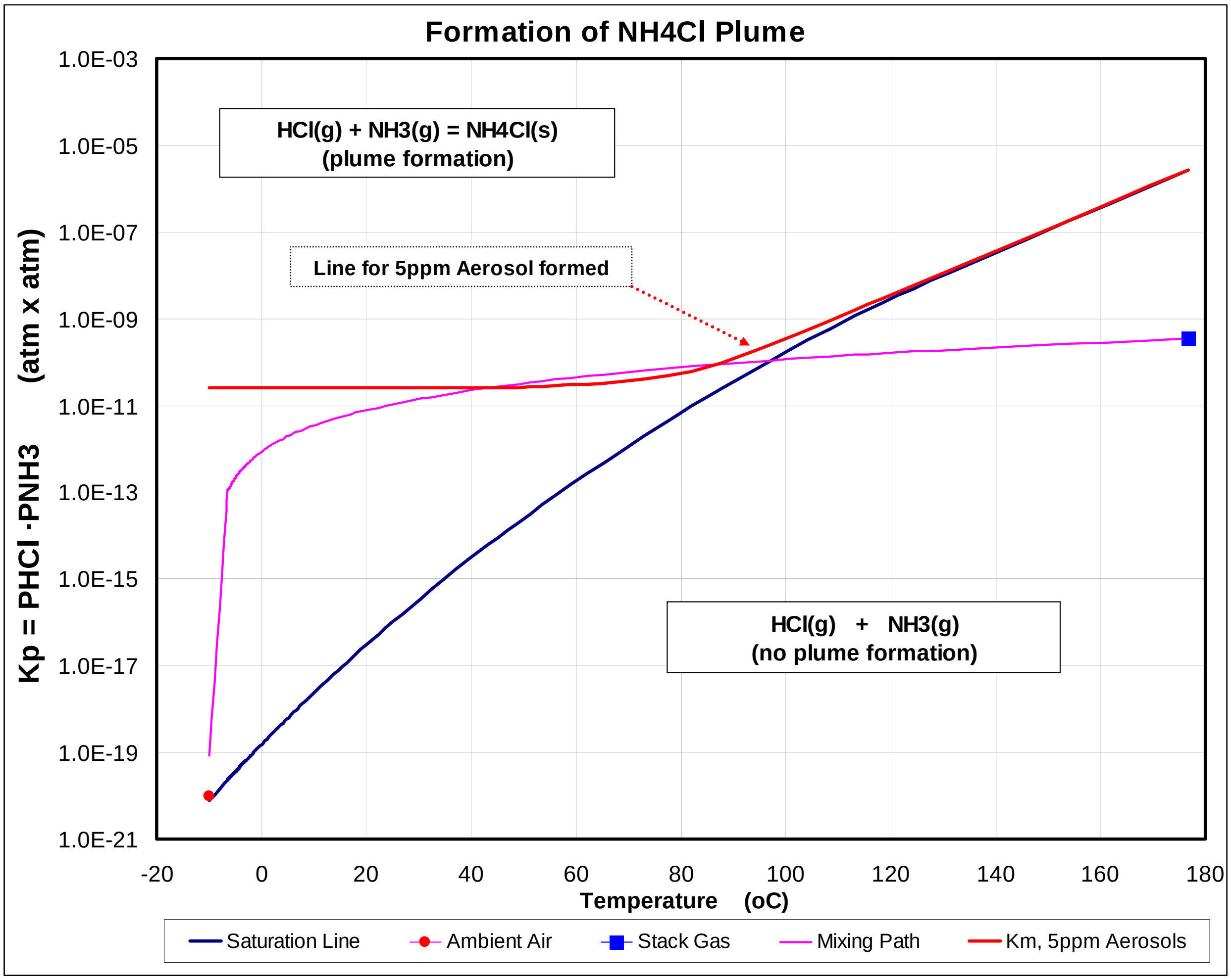
- Scenario 1. Maximum stack testing NH_3 and HCl concentrations for the last 4 years, reheating to 380F and Winter Condition
- Scenario 2. Maximum stack testing NH_3 and HCl concentrations for the last 4 years, reheating to 380F and Summer Condition
- Scenario 3. Maximum stack testing NH_3 and HCl concentrations for the last 4 years, reheating of 50% kiln gas (300F) and Winter Condition
- Scenario 4. Maximum stack testing NH_3 and HCl concentrations for the last 4 years, reheating of 50% kiln gas (300F) and winter Condition
- Scenario 5. Average of the NH_3 and HCl concentrations for the last 4 years, reheating of 50% kiln gas (300F) and winter Condition

- Scenario 6. Average of the NH_3 and HCl concentrations for the last 4 years, reheating of 50% kiln gas (300F) and summer Condition
- Scenario 7. Average of the NH_3 and HCl concentrations for the last 4 years, reheating of 380 F and summer Condition
- Scenario 8. Maximum stack testing NH_3 and HCl concentrations for the last 4 years, reheating to 480F and Winter Condition

Additional Model Assumptions/Calculations:

The model assumes that in each interval 50% of the original stack gas volume will be diluted with ambient air. Based on this dilution, and with respect to the ambient and stack gas specific heat, the temperature of the mixture will be calculated. Next, the Kp line which represents the equilibrium condition is drawn by inserting the temperature in the above formula. The corresponding concentration of HCl and NH_3 of the gas mixture is calculated at each interval, converted to partial pressures and multiplied with each other to find the Mixing Path value (Km). The Mixing Path (Km) at the corresponding temperature represents the calculated gas conditions at that interval. Then the Km+5 line which corresponds to the concentration of NH_3 and HCl that will result in the formation of at least 5 ppm of aerosols is drawn,. At any point that the Mixing Path and Km+5 lines cross each other at least 5 ppm of aerosols has been formed.

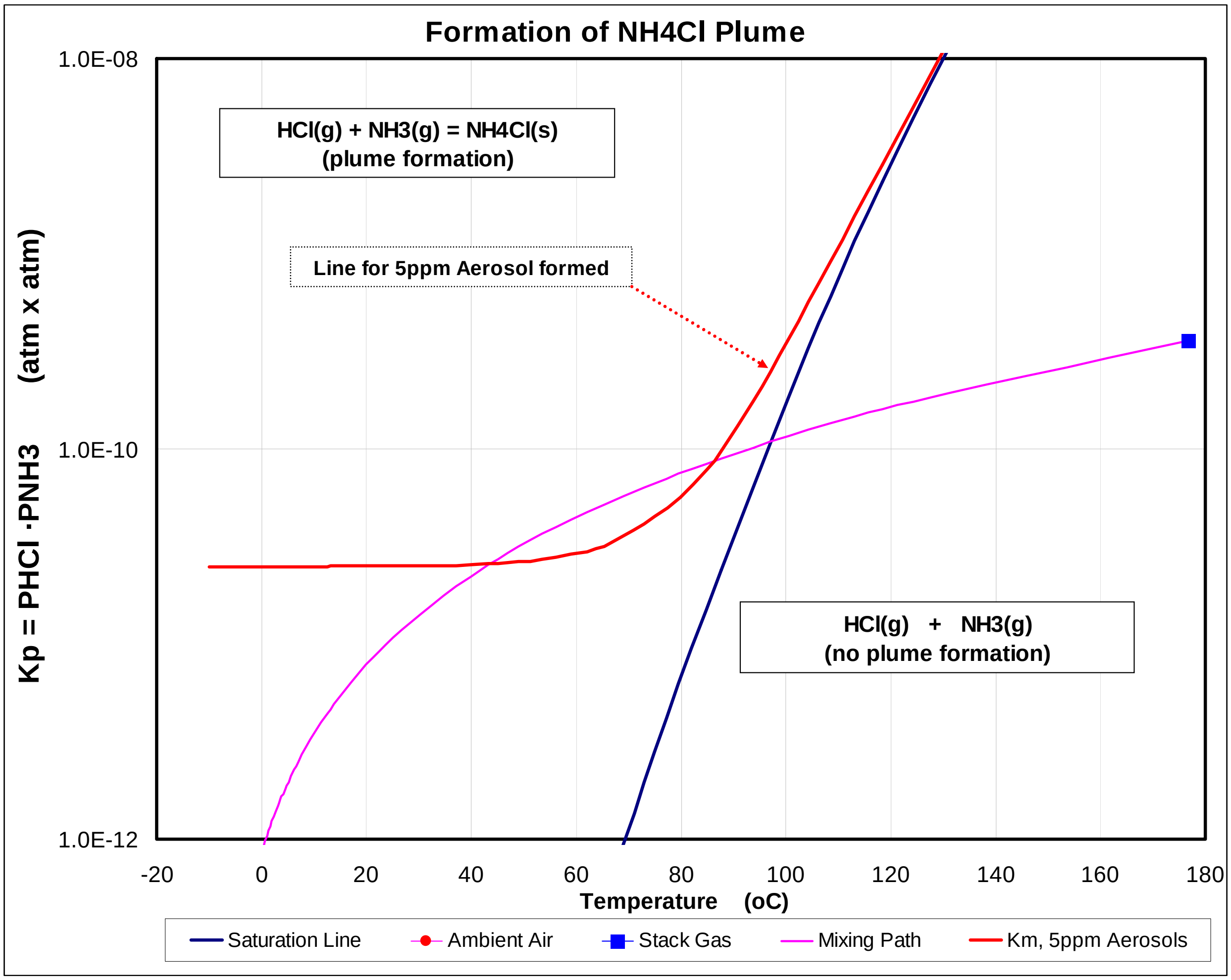
Scenario 1 (Figure 5) represents the 380°F reheating temperature and stack temperature of 350°F, an ambient temperature of 14°F (representing a typical winter temperature), and the five year maximum NH_3 and HCl concentrations of 27 ppmv, dry. Furthermore, it shows that the Km and Mixing path lines cross at around 85°F and will form more than 5 ppm of aerosol NH_4Cl. Thus, a visible plume would be predicted.



Conditions	° F	° C
Ambient Air Temperature	14	-10
Reheating Temperature	380	193
Stack Temperature	350	177
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

Figure 5

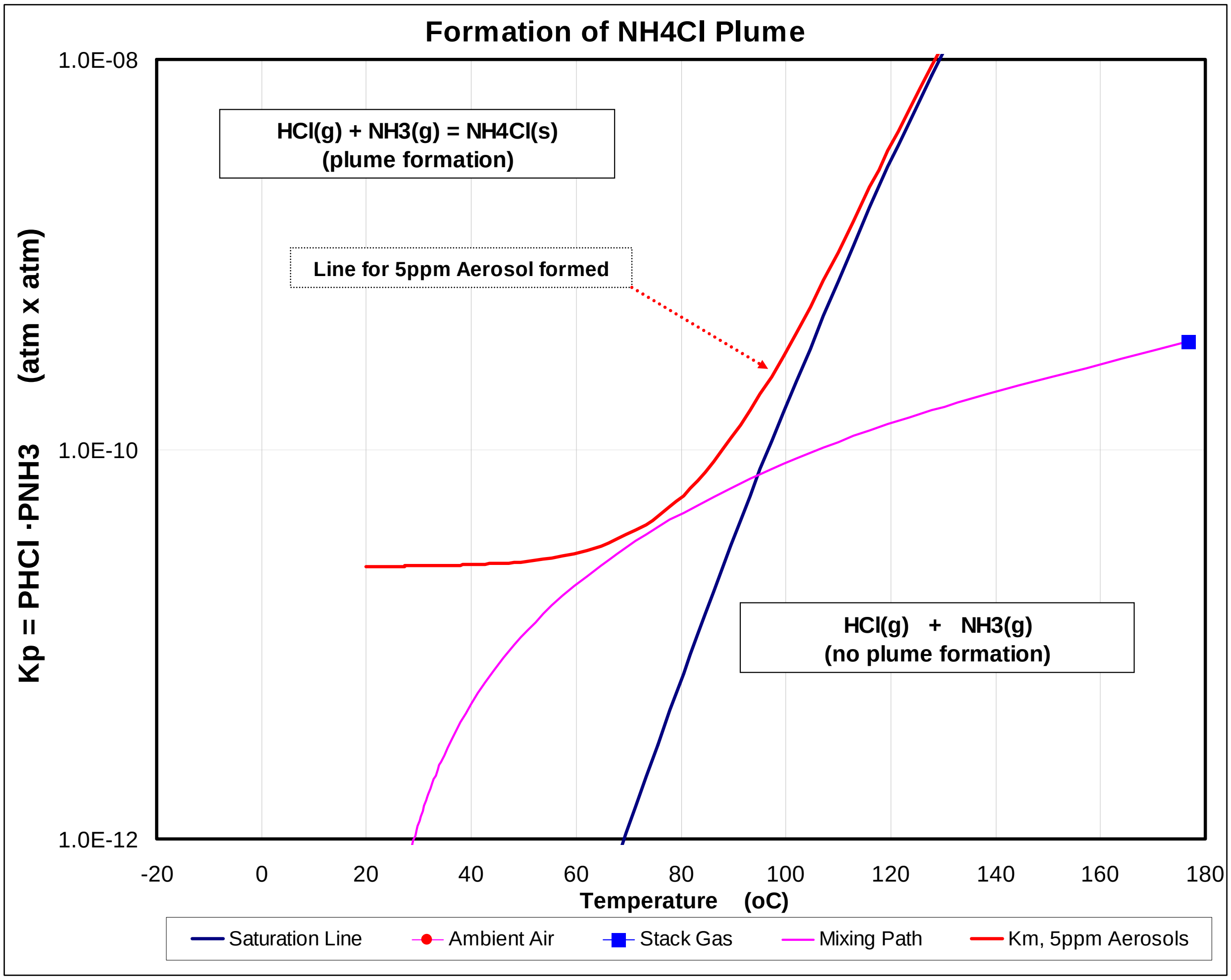
Figure 6 has the same ambient and stack temperatures as well as pollutant concentrations as Scenario 1, but provides more detail (zoomed in view) where the Km and Mixing Path lines cross.



Conditions	°F	°C
Ambient Air Temperature	14	-10
Reheating Temperature	380	193
Stack Temperature	350	177
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

Figure 6

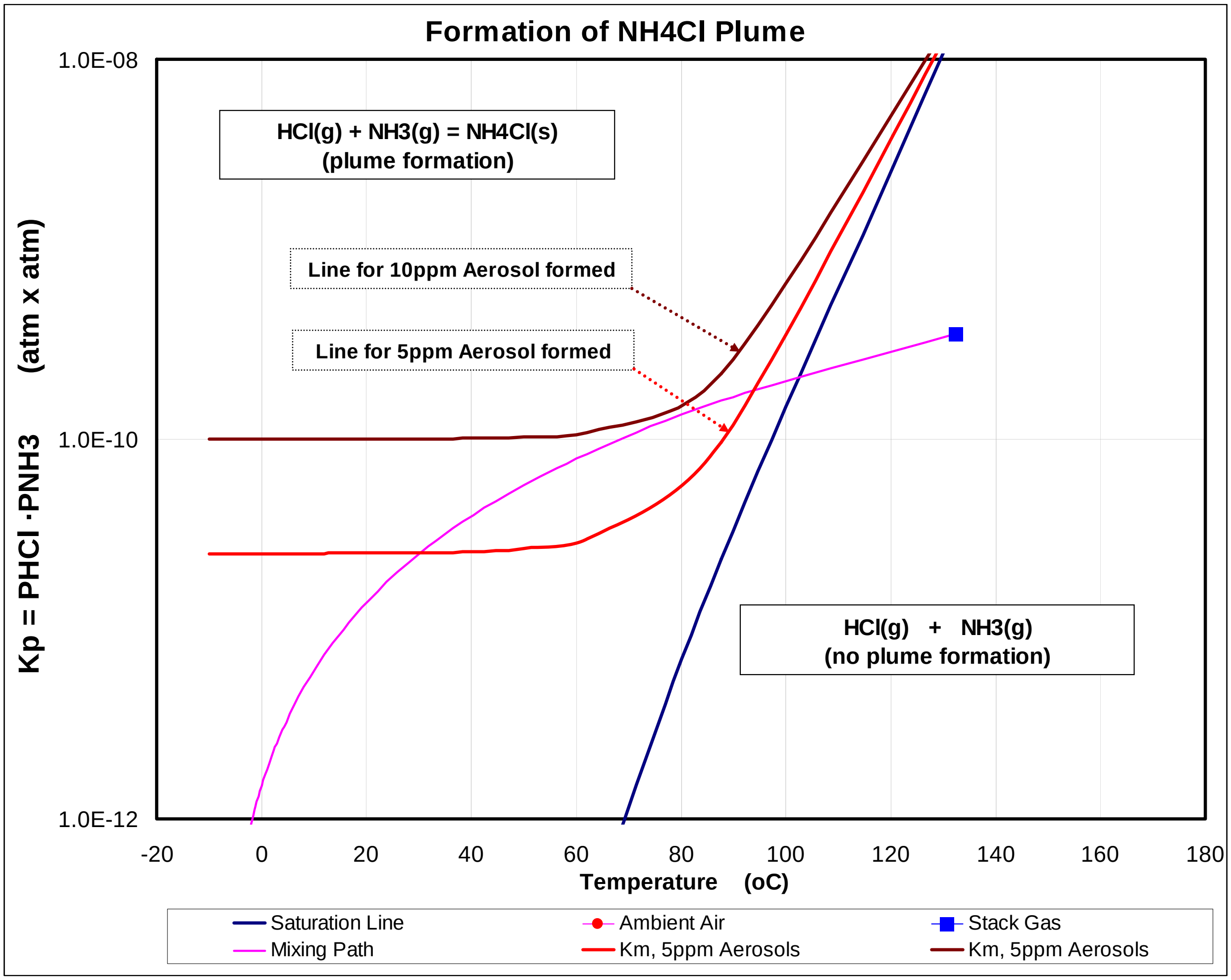
Scenario 2 (Figure 7) represents the situation in Figures 5 & 6 (380 F reheating and 350 F stack temperature) but at a typical spring/summer temperature of 68°F. At these conditions, the Mixing Path barely misses the line representing 5 ppm aerosol NH_4Cl formation. Thus, a visible plume formation is not anticipated.



Conditions	°F	°C
Ambient Air Temperature	68	20
Reheating Temperature	380	193
Stack Temperature	350	177
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

Figure 7

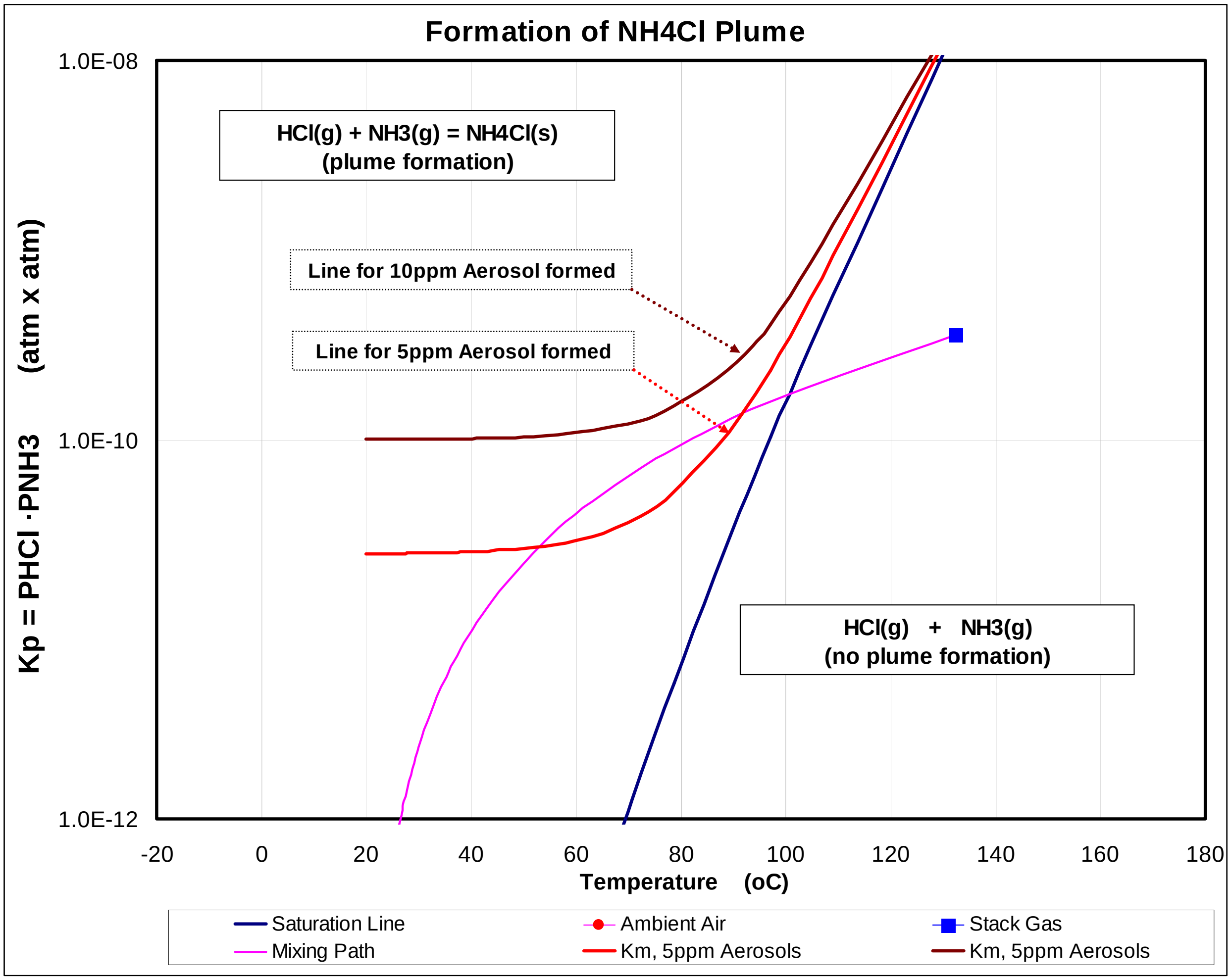
Scenario 3 (Figure 8) provides a reheating gas temperature of 300 °F corresponding to a stack temperature of 270 °F and the maximum 5 year pollutant concentration of 27 ppmv, dry at winter ambient conditions. At this stack temperature, the Mixing Path crosses the 5 ppm aerosol NH_4Cl formation line and nearly crosses a 10 ppm aerosol NH_4Cl line. This scenario has a very high risk of a visible plume problem with >20% opacity.



Conditions	°F	°C
Ambient Air Temperature	14	-10
Reheating Temperature	300	149
Stack Temperature	270	132
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

Figure 8

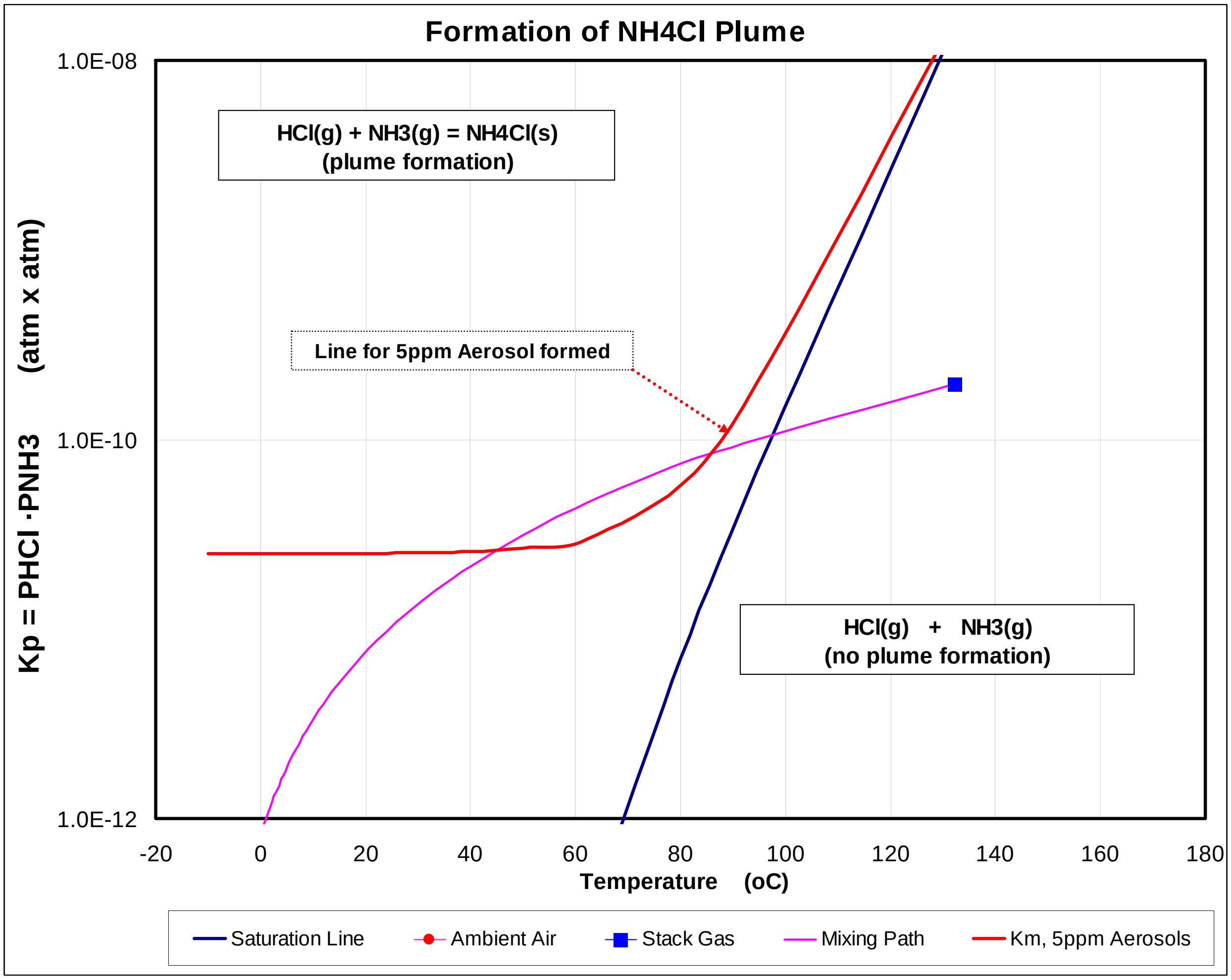
Scenario 4 (Figure 9) provides a reheating gas temperature of 300 °F corresponding to a stack temperature of 270 °F and the maximum 5 year pollutant concentration of 27 ppmv, dry (same as Scenario 3) but at typical spring/summer ambient temperatures. At this stack temperature, the Mixing Path still crosses the 5 ppm aerosol NH_4Cl formation line. This scenario also has a high risk of a visible plume problem. However, it is not predicted to be as severe as the previous scenario.



Conditions	°F	°C
Ambient Air Temperature	68	20
Reheating Temperature	300	149
Stack Temperature	270	132
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

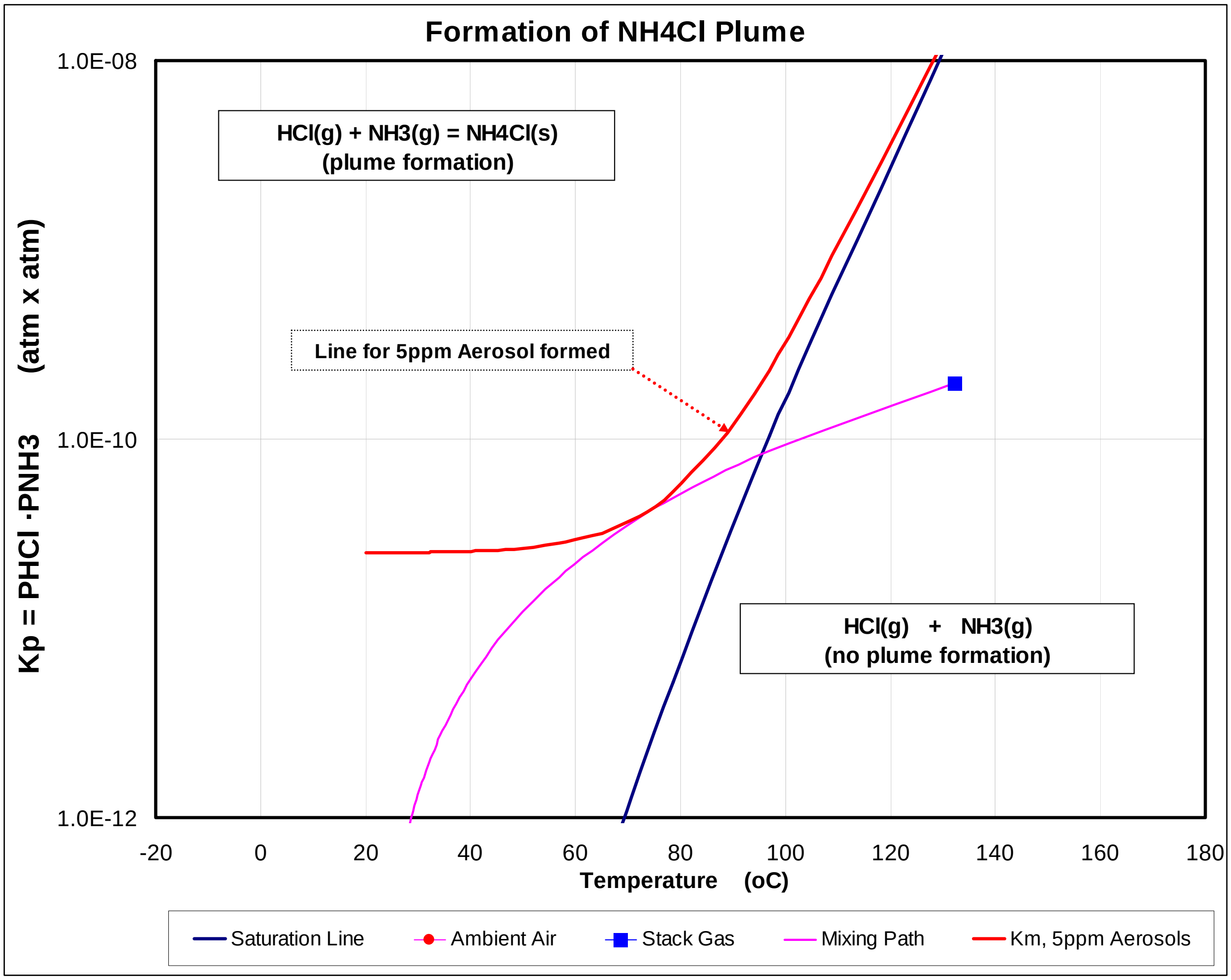
Figure 9

Scenarios 5 and 6 (Figure 10 and Figure 11). Under these temperatures, the average 5 year concentration of NH_3 (25 ppmv, dry) and HCl (16 ppmv, dry) is predicted to form more than 5 ppm of aerosol NH_4Cl at an average winter temperature (Figure 10) and close to 5 ppm at an average summer (Figure 11) ambient temperature.



Conditions	°F	°C
Ambient Air Temperature	14	-10
Reheating Temperature	300	149
Stack Temperature	270	132
HCl Concentration (ppmv, dry)	16	
NH_3 Concentration (ppmv, dry)	25	

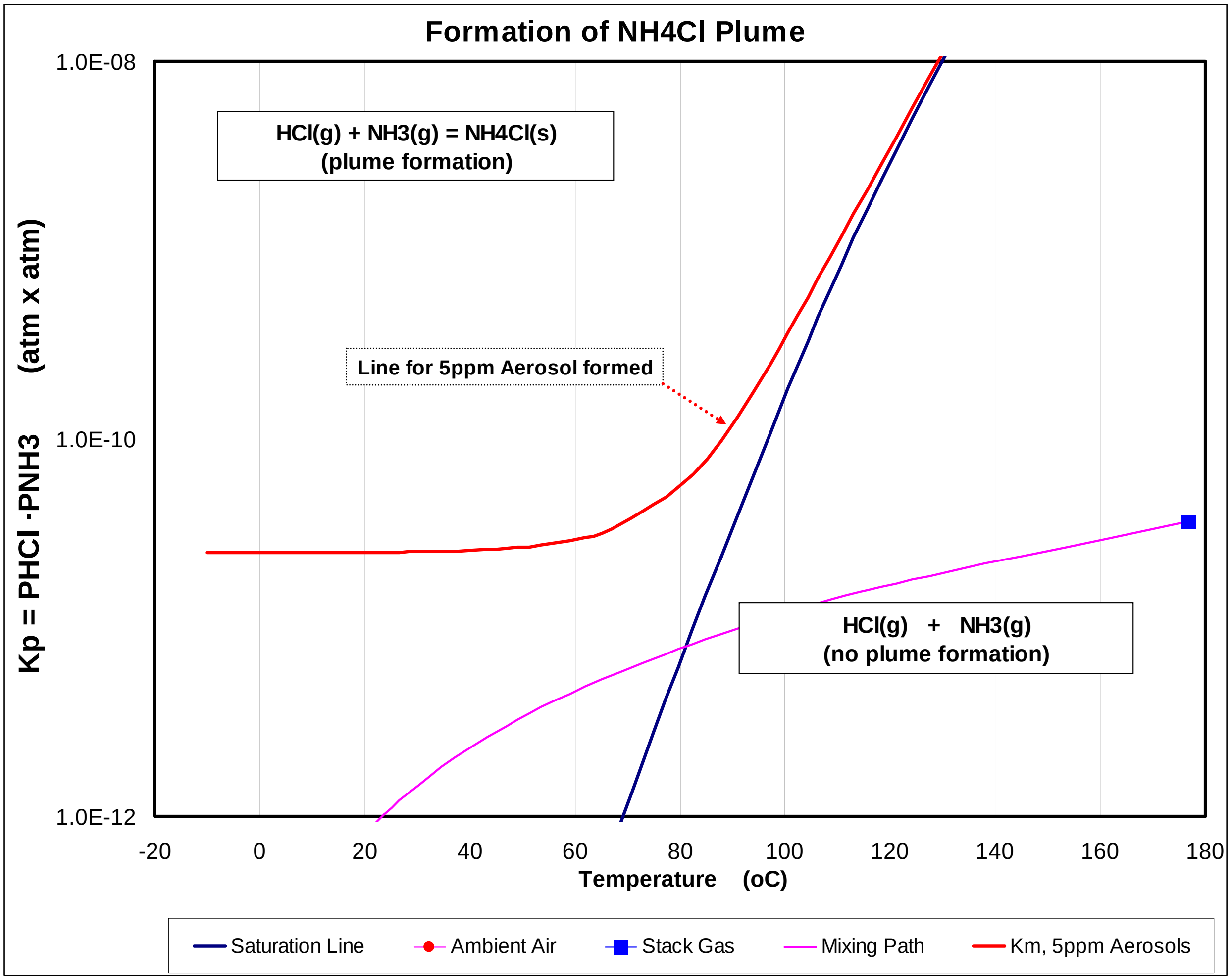
Figure 10



Conditions	°F	°C
Ambient Air Temperature	68	20
Reheating Temperature	300	149
Stack Temperature	270	132
HCl Concentration (ppmv, dry)	16	
NH_3 Concentration (ppmv, dry)	25	

Figure 11

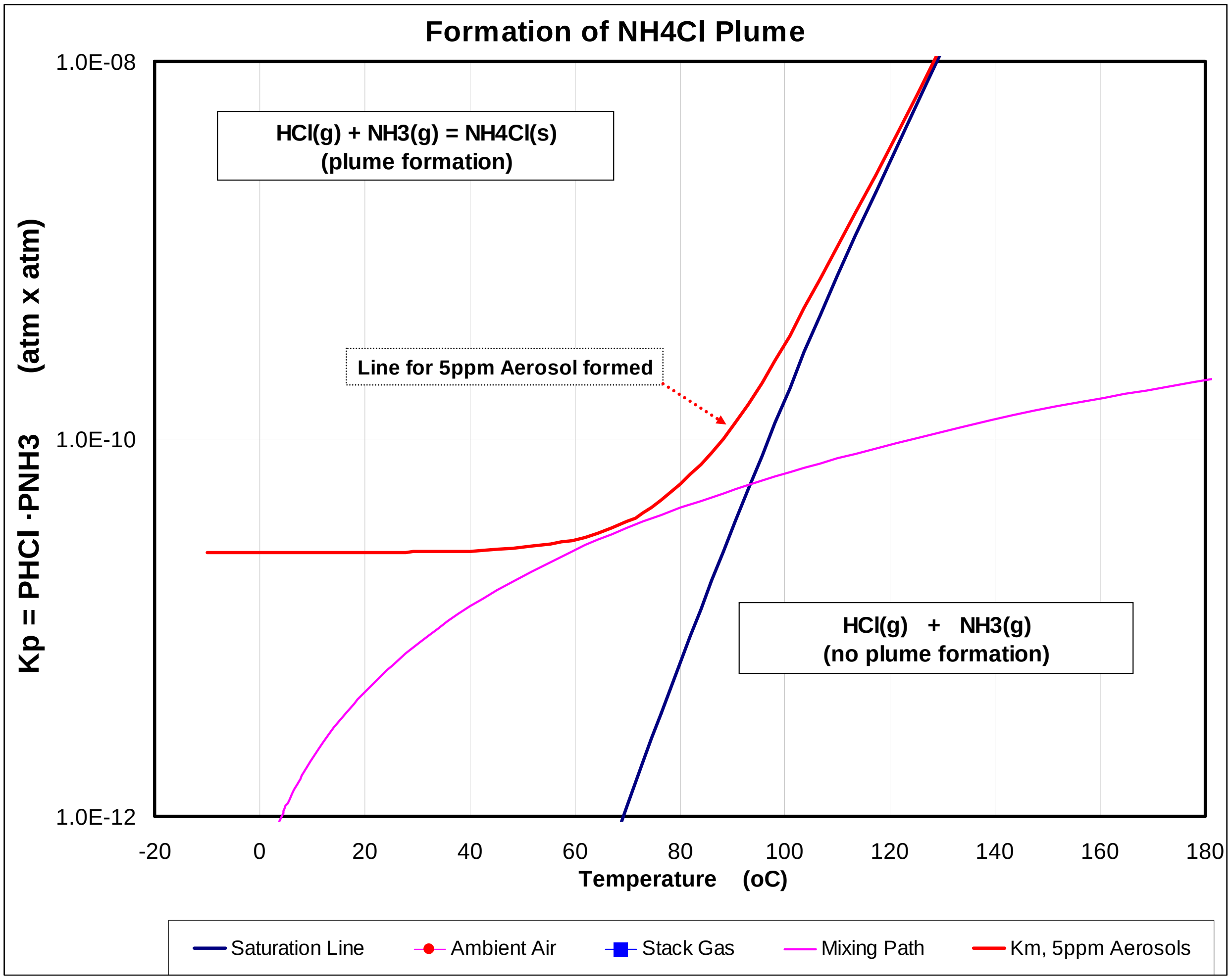
Scenario 7 (Figure 12) represents the actual 2007 condition of the Clarksville plant at a typical winter temperature. It is apparent that the Mixing Path line and Km are not crossing since the total HCl concentration is only 3 ppm. Note that the HCl concentration in 2007 was the lowest of the 5 years and could vary to more than 30 ppm as found in 2003.



Conditions	°F	°C
Ambient Air Temperature	14	-10
Reheating Temperature	380	193
Stack Temperature	350	177
HCl Concentration (ppmv, dry)	3	
NH_3 Concentration (ppmv, dry)	25	

Figure 12

Scenario 8 (Figure 13) shows the actual 2004 conditions of the plant at a typical winter ambient condition. Although the HCl and NH_3 concentrations are relatively high, the high stack temperature (480 deg F) allows for dilution and the Mixing Path line does not cross the Km line and therefore less than a 5 ppm aerosol NH_4Cl concentration is predicted.



Conditions	°F	°C
Ambient Air Temperature	14	-10
Reheating Temperature	480	249
Stack Temperature	450	232
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

Figure 13

Conclusion

In conclusion, the stack temperature needed to prevent a visible plume from occurring is highly dependent on the ambient temperature, the concentrations of HCl and NH_3 in the gas stream, as well as other factors. Due to the normal variability in HCl and NH_3 concentrations, it is virtually assured that the combination of higher HCl and NH_3 concentrations and lowering the stack gas temperature below current levels (380 deg F at the exit of ESP and 350 deg F at stack) would lead to a visible plume condition.

Supplement A: Some Examples of plume problems in cement Industry

The first regulatory action concerning secondary plumes in the cement industry occurred in 1979 at Glens Falls Cement, Glens Falls, New York, USA. Plume studies were conducted by EPA and stack test contractors by sampling the plume using a tethered balloon.

The secondary plume was observed to have an average opacity of ~85% while the in-stack opacity was only 10%. The tests revealed that the particulate matter recovered from the plume was mainly crystals of ammonium sulphate. The tests indicated that the primary components of the stack effluent were $(NH4)_2SO4$ (4.5 ppm), SO_2 (200 ppm), NH_3 (170 ppm), moisture (20%). The ammonium sulphate in the stack gas was responsible for the 10% in-stack opacity.

The secondary plume was also observed at Lehigh Cement in Leeds, Alabama, USA. Testing conducted in 1981 indicated that the major species responsible for the plume was ammonium chloride, NH4Cl.

Similar tests were conducted in 1987 at Kaiser Cement in Permamenti, California, USA. The results revealed that NH4Cl was also responsible for the visible secondary plume. The secondary plume tests conducted in 1987 at Southwestern Portland Cement in Victorville, California, USA, also revealed that NH4Cl was responsible for the visible secondary plume.

In 1986, EPA conducted a source and process sampling program at the South Dakota Cement Company, Rapid City, South Dakota, USA. The samples collected from the secondary plume contain up to 67% NH4Cl. Further tests indicated that the NH3 exists mainly in the shale that accounts for about 20% of raw mix. The plant has a dry process with a 4-stage preheater, vertical roller mill for raw grinding and a main baghouse for dedusting. A severe ammonia recirculation was observed, with an average NH3 content in shale being 6.2 ppm while up to 159 ppm NH_3 was found in the baghouse dust. It was also observed that the NH3 content in the baghouse dust was reduced substantially when gas temperature increased from 170 deg C (compound operation) to 250 deg C (direction operation).

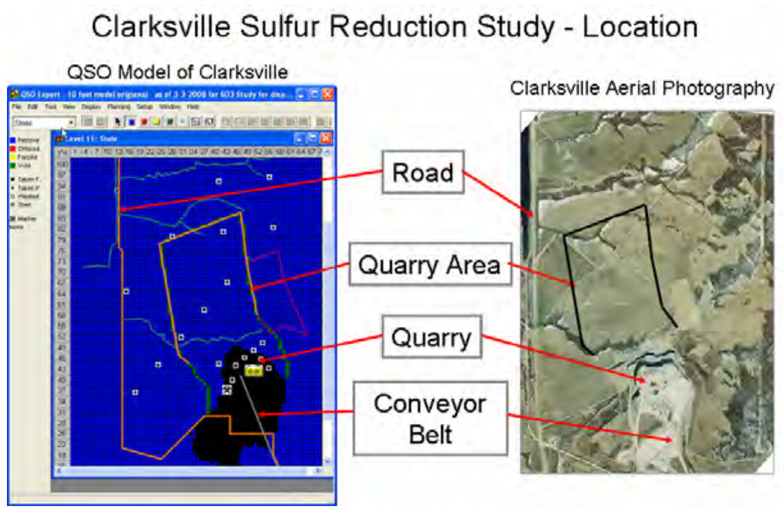
The secondary plumes in cement plants are not limited to the USA. They have also been reported by a Mexican cement company which determined through plant measurements that NH4Cl was responsible for the visible plume.

Other examples include the Lone Star Industries' Cape Girardeau Cement Plant, MO, USA and the Inland Cement, Edmonton, AB, Canada. Both plants experienced secondary plumes due to formation of ammonium sulphate.

APPENDIX C. SELECTIVE MINING – QUARRY SCHEDULING OPTIMIZATION DISCUSSION

Appendix C. Selective Mining – Quarry Scheduling Optimization Discussion

Holcim (US) Inc. evaluated the Clarksville Quarry Scheduling Optimization (QSO) model for sulfur emissions.

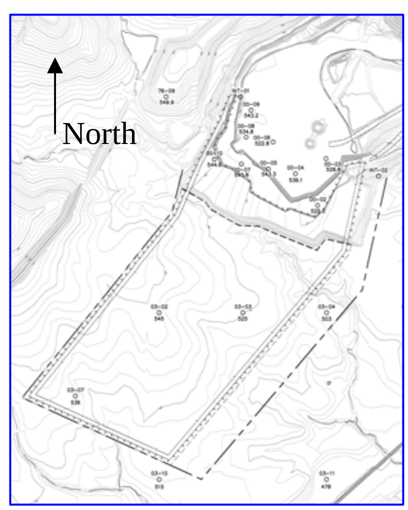


The model is based on statistical and spatial analysis of data obtained through drill core sub sampling. Validation of relevant data is insured through the analysis of varagrams and histograms. This validation insures that correlation between samples is relevant.

The Clarksville QSO Model was created specifically for predicting relevant mineralogical parameters related to clinker production. Major oxides (Ca, Mg, Si, and Fe) are the primary focus of this predictive model. The sampling protocol and data analysis required for major oxide components was never intended to be adequate for the accurate prediction of minor components, such as sulfur and sulfur compounds.

When placed under scrutiny, existing data was found to be inadequate for accurate prediction of S content in the potentially quarried shale. Spatial relationships between core samples were found to be inappropriate for the sensitivity needed to make accurate predictions. The reason for this is the geologic nature of the Maquiketa Shale and Kimmswick Limestone, of which the primary sulfur mineral is pyrite (FeS).

One of the most important chemical processes in organic-rich marine sediments, such as Maquiketa shale, is decomposition of organic matter (OM)in bacterial sulphate reduction. Bacterial sulphate reduction produces bisulphide. Bisulphite can be partially oxidized or can react with OM and reactive metal species. All these reactions may be bacterially mediated. The reaction of reduced sulfur with reactive dissolved iron and iron minerals, if available, results in the formation of iron sulphides. The most common iron sulphide in pyrite.



The amount of pyrite formation in marine sediments is largely determined by the availability of sulphate, reactive iron and reactive OM during the formation of

the sediments. The locations of the reactive iron and sulphate are a random occurrence, usually along planes of weakness or channels of solubility during rock forming (induration). The pyrite is formed as nodules or clusters of mineralization and is not evenly distributed spatially throughout the shale and limestone.

Therefore the chance of intercepting a pyrite cluster of mineralization by core drilling is known as a ‘nugget’ effect. Intercepting a pyrite cluster will give artificially high sulfur values in the model and, conversely, not intercepting pyrite mineralization can give low values.

In the planned mining area only 5 core holes were drilled (DH-2, DH-3, DH-4 and DH-7). While the spacing of the drill holes are adequate for predicting major oxides, they are too far apart and too few to accurately predict clustered mineralogy such as pyrite.

APPENDIX D. BART CONTROL COST TABLES

Table D-1. Wet Limestone Scrubber Control Cost Analysis Based on Projected Actual Emissions and 80% Control.

Direct Costs			
Purchased Equipment Costs			
	Wet Scrubber Unit including Limestone Prep System, inflated to 2012 dollars		$17,317,574
	Instrumentation (10% of EC)		$1,731,757
	Freight (5% of EC)		$865,879
		Subtotal, Purchased Equipment Cost (PEC)	$19,915,210
Direct Installation Costs			
	Foundation (6% of PEC)		$1,194,913
	Supports (6% of PEC)		$1,194,913
	Handling and Erection (40% of PEC)		$7,966,084
	Electrical (1% of PEC)		$199,152
	Piping (30% of PEC)		$5,974,563
	Extending gas line 1/2 mile to plant		$500,000
	Insulation for Ductwork (1% of PEC)		$199,152
	Painting (1% of PEC)		$199,152
		Subtotal, Direct Installation Cost	$17,427,929
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$37,343,139**
Indirect Costs			
	Engineering (10% of PEC)		$1,991,521
	Construction and Field Expense (10% of PEC)		$1,991,521
	Contractor Fees (10% of PEC)		$1,991,521
	Start-up (1% of PEC)		$199,152
	Performance Test (1% of PEC)		$199,152
	Contingencies (3% of PEC)		$597,456
		Total Indirect Cost	**$6,970,324**
	Total Capital Investment (TCI)		**$44,313,462**
Direct Annual Costs			
Hours per Year	(365 days per year, 24 hours per day), 90% Uptime		7,884
Operating Labor			
	Operator 2 x 3,573 hours/year, $50/hr)		$357,300
	Supervisor (15% of operator)		$53,595
		Subtotal, Operating Labor	$410,895
Maintenance			
	Labor (2 x 820 hours/year, $50/hr)		$82,000
	Material (5% of Total Direct Cost)		$ 1,867,157
		Subtotal, Maintenance	$1,949,157
Utilities			
	Electricity		
	Pump (kW)		2,342
	Cost ($/kW-hr)		$0.0410
		Subtotal, Electricity	$757,054
	Limestone for slurry		
	Amount Required (ton/yr)		13,961
	Cost ($/ton)		$3.00
		Subtotal, Limestone	$41,883
	Water		
	Amount Required (gpm)		122.0
	Cost ($/1000 gallons)		$1.00
		Subtotal, Water	$64,128
	Sludge Disposal		
	Amount Generated (tpy)		57,943
	Disposal Fee ($/ton)		$36.00
	Monthly Rent for Trailer @ $120/month		$1,440
	Cost for Box Transportation @ $220/load (assume 17 tons/trailer)		$749,853
		Subtotal, Sludge	$2,837,247
		Subtotal, Utilities	$3,700,312
	Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)		
	Gas Required (MMCF/yr)		1,020,986
	Cost ($/MMBTU)		$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$16,331,486**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$1,416,031
Administrative (2% TCI)			$886,269
Property Tax (1% TCI)			$443,135
Insurance (1% TCI)			$443,135
Capital Recovery	(15 year life, 7 percent interest)		$4,865,380
		Total Indirect Annual Cost	**$8,053,950**
Conclusion			
	Total Annualized Cost		**$24,385,436**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 80%, 95% uptime		**8,726**
	Pollutant Generated - NOx tons/yr		**97**
	Net Pollutant Removed - tons/yr		**8,629**
	Cost Per Ton of Pollutant Removed		**$2,826**

Table D-2. Wet Limestone Scrubber Control Cost Analysis Based on Projected Actual Emissions and 95% Control.

Direct Costs			
Purchased Equipment Costs			
	Wet Scrubber Unit including Limestone Prep System, inflated to 2012 dollars		$17,317,574
	Instrumentation (10% of EC)		$1,731,757
	Freight (5% of EC)		$865,879
		Subtotal, Purchased Equipment Cost (PEC)	$19,915,210
Direct Installation Costs			
	Foundation (6% of PEC)		$1,194,913
	Supports (6% of PEC)		$1,194,913
	Handling and Erection (40% of PEC)		$7,966,084
	Electrical (1% of PEC)		$199,152
	Piping (30% of PEC)		$5,974,563
	Extending gas line 1/2 mile to plant		$500,000
	Insulation for Ductwork (1% of PEC)		$199,152
	Painting (1% of PEC)		$199,152
		Subtotal, Direct Installation Cost	$17,427,929
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$37,343,139**
Indirect Costs			
	Engineering (10% of PEC)		$1,991,521
	Construction and Field Expense (10% of PEC)		$1,991,521
	Contractor Fees (10% of PEC)		$1,991,521
	Start-up (1% of PEC)		$199,152
	Performance Test (1% of PEC)		$199,152
	Contingencies (3% of PEC)		$597,456
		Total Indirect Cost	**$6,970,324**
	Total Capital Investment (TCI)		**$44,313,462**
Direct Annual Costs			
Hours per Year	(365 days per year, 24 hours per day), 90% Uptime		7,884
Operating Labor			
	Operator 2 x 3,573 hours/year, $50/hr)		$357,300
	Supervisor (15% of operator)		$53,595
		Subtotal, Operating Labor	$410,895
Maintenance			
	Labor (2 x 820 hours/year, $50/hr)		$82,000
	Material (5% of Total Direct Cost)		$ 1,867,157
		Subtotal, Maintenance	$1,949,157
Utilities			
	Electricity		
	Pump (kW)		2,342
	Cost ($/kW-hr)		$0.0410
		Subtotal, Electricity	$757,054
	Limestone for slurry		
	Amount Required (ton/yr)		16,579
	Cost ($/ton)		$3.00
		Subtotal, Lime	$49,736
	Water		
	Amount Required (gpm)		122.0
	Cost ($/1000 gallons)		$1.00
		Subtotal, Water	$64,128
	Sludge Disposal		
	Amount Generated (tpy)		68,808
	Disposal Fee ($/ton)		$36.00
	Monthly Rent for Trailer @ $120/month		$1,440
	Cost for Box Transportation @ $220/load (assume 17 tons/trailer)		$890,450
		Subtotal, Sludge	$3,368,961
		Subtotal, Utilities	$4,239,878
	Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)		
	Gas Required (MMCF/yr)		1,020,986
	Cost ($/MMBTU)		$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$16,871,053**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$1,416,031
Administrative (2% TCI)			$886,269
Property Tax (1% TCI)			$443,135
Insurance (1% TCI)			$443,135
Capital Recovery	(15 year life, 7 percent interest)		$4,865,380
		Total Indirect Annual Cost	**$8,053,950**
Conclusion			
	Total Annualized Cost		**$24,925,003**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 95%, 95% uptime		**10,362**
	Pollutant Generated - NOx tons/yr		**97**
	Net Pollutant Removed - tons/yr		**10,265**
	Cost Per Ton of Pollutant Removed		**$2,428**

Table D-3. Wet Limestone Scrubber Control Cost Analysis Based on PTE and 80% Control

Direct Costs			
Purchased Equipment Costs			
	Wet Scrubber Unit including Limestone Prep System, inflated to 2012 dollars		$17,317,574
	Instrumentation (10% of EC)		$1,731,757
	Freight (5% of EC)		$865,879
		Subtotal, Purchased Equipment Cost (PEC)	$19,915,210
Direct Installation Costs			
	Foundation (6% of PEC)		$1,194,913
	Supports (6% of PEC)		$1,194,913
	Handling and Erection (40% of PEC)		$7,966,084
	Electrical (1% of PEC)		$199,152
	Piping (30% of PEC)		$5,974,563
	Extending gas line 1/2 mile to plant		$500,000
	Insulation for Ductwork (1% of PEC)		$199,152
	Painting (1% of PEC)		$199,152
		Subtotal, Direct Installation Cost	$17,427,929
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$37,343,139**
Indirect Costs			
	Engineering (10% of PEC)		$1,991,521
	Construction and Field Expense (10% of PEC)		$1,991,521
	Contractor Fees (10% of PEC)		$1,991,521
	Start-up (1% of PEC)		$199,152
	Performance Test (1% of PEC)		$199,152
	Contingencies (3% of PEC)		$597,456
		Total Indirect Cost	**$6,970,324**
	Total Capital Investment (TCI)		**$44,313,462**
Direct Annual Costs			
Hours per Year	(365 days per year, 24 hours per day), 90% Uptime		7,884
Operating Labor			
	Operator 2 x 3,573 hours/year, $50/hr)		$357,300
	Supervisor (15% of operator)		$53,595
		Subtotal, Operating Labor	$410,895
Maintenance			
	Labor (2 x 820 hours/year, $50/hr)		$82,000
	Material (5% of Total Direct Cost)		$ 1,867,157
		Subtotal, Maintenance	$1,949,157
Utilities			
	Electricity		
	Pump (kW)		2,342
	Cost ($/kW-hr)		$0.0410
		Subtotal, Electricity	$757,054
	Limestone for slurry		
	Amount Required (ton/yr)		16,170
	Cost ($/ton)		$3.00
		Subtotal, Lime	$48,511
	Water		
	Amount Required (gpm)		122.0
	Cost ($/1000 gallons)		$1.00
		Subtotal, Water	$64,128
	Sludge Disposal		
	Amount Generated (tpy)		67,113
	Disposal Fee ($/ton)		$36.00
	Monthly Rent for Trailer @ $120/month		$1,440
	Cost for Box Transportation @ $220/load (assume 17 tons/trailer)		$868,526
		Subtotal, Sludge	$3,286,046
		Subtotal, Utilities	$4,155,739
	Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)		
	Gas Required (MMCF/yr)		1,020,986
	Cost ($/MMBTU)		$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$16,786,914**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$1,416,031
Administrative (2% TCI)			$886,269
Property Tax (1% TCI)			$443,135
Insurance (1% TCI)			$443,135
Capital Recovery	(15 year life, 7 percent interest)		$4,865,380
		Total Indirect Annual Cost	**$8,053,950**
Conclusion			
	Total Annualized Cost		**$24,840,863**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr) - PTE		**13,298**
	Pollutant Removed (tons SO_2/yr) - 80%, 95% uptime		**10,106**
	Pollutant Generated - NOx tons/yr		**97**
	Net Pollutant Removed - tons/yr		**10,009**
	Cost Per Ton of Pollutant Removed		**$2,482**

Table D-4. Wet Limestone Scrubber Control Cost Analysis Based on PTE and 95% Control

Direct Costs			
Purchased Equipment Costs			
	Wet Scrubber Unit including Limestone Prep System, inflated to 2012 dollars		$17,317,574
	Instrumentation (10% of EC)		$1,731,757
	Freight (5% of EC)		$865,879
		Subtotal, Purchased Equipment Cost (PEC)	$19,915,210
Direct Installation Costs			
	Foundation (6% of PEC)		$1,194,913
	Supports (6% of PEC)		$1,194,913
	Handling and Erection (40% of PEC)		$7,966,084
	Electrical (1% of PEC)		$199,152
	Piping (30% of PEC)		$5,974,563
	Extending gas line 1/2 mile to plant		$500,000
	Insulation for Ductwork (1% of PEC)		$199,152
	Painting (1% of PEC)		$199,152
		Subtotal, Direct Installation Cost	$17,427,929
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$37,343,139**
Indirect Costs			
	Engineering (10% of PEC)		$1,991,521
	Construction and Field Expense (10% of PEC)		$1,991,521
	Contractor Fees (10% of PEC)		$1,991,521
	Start-up (1% of PEC)		$199,152
	Performance Test (1% of PEC)		$199,152
	Contingencies (3% of PEC)		$597,456
		Total Indirect Cost	**$6,970,324**
	Total Capital Investment (TCI)		**$44,313,462**
Direct Annual Costs			
Hours per Year	(365 days per year, 24 hours per day), 90% Uptime		7,884
Operating Labor			
	Operator 2 x 3,573 hours/year, $50/hr)		$357,300
	Supervisor (15% of operator)		$53,595
		Subtotal, Operating Labor	$410,895
Maintenance			
	Labor (2 x 820 hours/year, $50/hr)		$82,000
	Material (5% of Total Direct Cost)		$ 1,867,157
		Subtotal, Maintenance	$1,949,157
Utilities			
	Electricity		
	Pump (kW)		2,342
	Cost ($/kW-hr)		$0.0410
		Subtotal, Electricity	$757,054
	Limestone for slurry		
	Amount Required (ton/yr)		19,202
	Cost ($/ton)		$3.00
		Subtotal, Lime	$57,607
	Water		
	Amount Required (gpm)		122.0
	Cost ($/1000 gallons)		$1.00
		Subtotal, Water	$64,128
	Sludge Disposal		
	Amount Generated (tpy)		79,697
	Disposal Fee ($/ton)		$36.00
	Monthly Rent for Trailer @ $120/month		$1,440
	Cost for Box Transportation @ $220/load (assume 17 tons/trailer)		$1,031,374
		Subtotal, Sludge	$3,901,910
		Subtotal, Utilities	$4,780,698
	Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)		
	Gas Required (MMCF/yr)		1,020,986
	Cost ($/MMBTU)		$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$17,411,873**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$1,416,031
Administrative (2% TCI)			$886,269
Property Tax (1% TCI)			$443,135
Insurance (1% TCI)			$443,135
Capital Recovery	(15 year life, 7 percent interest)		$4,865,380
		Total Indirect Annual Cost	**$8,053,950**
Conclusion			
	Total Annualized Cost		**$25,465,823**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr) - PTE		**13,298**
	Pollutant Removed (tons SO_2/yr) - 95%, 95% uptime		**12,001**
	Pollutant Generated - NOx tons/yr		**97**
	Net Pollutant Removed - tons/yr		**11,904**
	Cost Per Ton of Pollutant Removed		**$2,139**

Table D-5. Fuel Substitution Control Cost Analysis Based on Projected Actual Emissions and 23% Control .

Direct Costs		
Purchased Equipment Costs		
	New Coal Mill I.D. Fan and associated equipment	$2,000,000
	Instrumentation (10% of EC)	$200,000
	Freight (5% of EC)	$100,000
	Subtotal, Purchased Equipment Cost (PEC)	$2,300,000
Direct Installation Costs		
	Foundation (6% of PEC)	$138,000
	Supports (6% of PEC)	$138,000
	Handling and Erection (40% of PEC)	$920,000
	Electrical (1% of PEC)	$23,000
	Piping (30% of PEC)	$690,000
	Insulation for Ductwork (1% of PEC)	$1,000
	Painting (1% of PEC)	$23,000
	Subtotal, Direct Installation Cost	$1,933,000
Site Preparation		N/A
Buildings		N/A
	Total Direct Cost	**$4,233,000**
Indirect Costs		
	Engineering (10% of PEC)	$230,000
	Construction and Field Expense (10% of PEC)	$230,000
	Contractor Fees (10% of PEC)	$230,000
	Start-up (1% of PEC)	$23,000
	Performance Test (1% of PEC)	$23,000
	Contingencies (3% of PEC)	$69,000
	Total Indirect Cost	**$805,000**
	Total Capital Investment (TCI)	**$5,038,000**
Direct Annual Costs		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)		
	Reduction in coke usage (metric ton/yr)	188,959
	Heat Value (Gj / Mt)	32.510
	Heat (Gj / yr)	6,143,045
	Cost ($/Gj)	$1.74
	Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)	11,076
	Heat Value (Gj / Mt)	22.177
	Heat (Gj / yr)	245,627
	Cost ($/Gj)	$2.41
	Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)	198,736
	Cost ($/Mt)	$72.76
	Subtotal, increase in Low Sulfur Coal cost	$14,459,211
	Total Direct Annual Cost (increase)	**$3,178,351**
Indirect Annual Costs		
Administrative (2% TCI)		$100,760
Property Tax (1% TCI)		$50,380
Insurance (1% TCI)		$50,380
Capital Recovery	(15 year life, 7 percent interest)	$553,145
	Total Indirect Annual Cost	**$754,665**
Conclusion		
	Total Annualized Cost	**$3,933,016**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**11,481**
	Pollutant Removed (tons SO_2/yr) - 23%	**2,641**
	Cost Per Ton of Pollutant Removed	**$1,489**

Table D-6. Fuel Substitution Control Cost Analysis Based on Projected Actual Emissions and 40% Control .

Direct Costs		
Purchased Equipment Costs		
	New Coal Mill and associated equipment	$5,374,302
	Instrumentation (10% of EC)	$537,430
	Freight (5% of EC)	$268,715
	Subtotal, Purchased Equipment Cost (PEC)	$6,180,447
Direct Installation Costs		
	Foundation (6% of PEC)	$370,827
	Supports (6% of PEC)	$370,827
	Handling and Erection (40% of PEC)	$2,472,179
	Electrical (1% of PEC)	$61,804
	Piping (30% of PEC)	$1,854,134
	Insulation for Ductwork (1% of PEC)	$2,687
	Painting (1% of PEC)	$61,804
	Subtotal, Direct Installation Cost	$5,194,263
Site Preparation		N/A
Buildings		N/A
	Total Direct Cost	**$11,374,710**
Indirect Costs		
	Engineering (10% of PEC)	$618,045
	Construction and Field Expense (10% of PEC)	$618,045
	Contractor Fees (10% of PEC)	$618,045
	Start-up (1% of PEC)	$61,804
	Performance Test (1% of PEC)	$61,804
	Contingencies (3% of PEC)	$185,413
	Total Indirect Cost	**$2,163,157**
	Total Capital Investment (TCI)	**$13,537,867**
Direct Annual Costs		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)		
	Reduction in coke usage (metric ton/yr)	188,959
	Heat Value (Gj / Mt)	32.510
	Heat (Gj / yr)	6,143,045
	Cost ($/Gj)	$1.74
	Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)	11,076
	Heat Value (Gj / Mt)	22.177
	Heat (Gj / yr)	245,627
	Cost ($/Gj)	$2.41
	Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)	244,891
	Heat Value (Gj / Mt)	26.266
	Heat (Gj / yr)	6,432,296
	Cost ($/Gj)	$5.67
	Subtotal, increase in Low Sulfur Coal cost	$36,471,116
	Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs		
Administrative (2% TCI)		$270,757
Property Tax (1% TCI)		$135,379
Insurance (1% TCI)		$135,379
Capital Recovery	(15 year life, 7 percent interest)	$1,486,385
	Total Indirect Annual Cost	**$2,027,900**
Conclusion		
	Total Annualized Cost	**$27,218,156**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**11,481**
	Pollutant Removed (tons SO_2/yr) - 40%	**4,592**
	Cost Per Ton of Pollutant Removed	**$5,927**

Table D-7. Fuel Substitution Control Cost Analysis Based on Projected Actual Emissions and 50% Control .

Direct Costs			
Purchased Equipment Costs			
	New Coal Mill and associated equipment		$5,374,302
	Instrumentation (10% of EC)		$537,430
	Freight (5% of EC)		$268,715
		Subtotal, Purchased Equipment Cost (PEC)	$6,180,447
Direct Installation Costs			
	Foundation (6% of PEC)		$370,827
	Supports (6% of PEC)		$370,827
	Handling and Erection (40% of PEC)		$2,472,179
	Electrical (1% of PEC)		$61,804
	Piping (30% of PEC)		$1,854,134
	Insulation for Ductwork (1% of PEC)		$2,687
	Painting (1% of PEC)		$61,804
		Subtotal, Direct Installation Cost	$5,194,263
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$11,374,710**
Indirect Costs			
	Engineering (10% of PEC)		$618,045
	Construction and Field Expense (10% of PEC)		$618,045
	Contractor Fees (10% of PEC)		$618,045
	Start-up (1% of PEC)		$61,804
	Performance Test (1% of PEC)		$61,804
	Contingencies (3% of PEC)		$185,413
		Total Indirect Cost	**$2,163,157**
	Total Capital Investment (TCI)		**$13,537,867**
Direct Annual Costs			
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)			
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)			
	Reduction in coke usage (metric ton/yr)		188,959
	Heat Value (Gj / Mt)		32.510
	Heat (Gj / yr)		6,143,045
	Cost ($/Gj)		$1.74
		Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)		11,076
	Heat Value (Gj / Mt)		22.177
	Heat (Gj / yr)		245,627
	Cost ($/Gj)		$2.41
		Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)		244,891
	Heat Value (Gj / Mt)		26.266
	Heat (Gj / yr)		6,432,296
	Cost ($/Gj)		$5.67
		Subtotal, increase in Low Sulfur Coal cost	$36,471,116
		Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs			
Administrative (2% TCI)			$270,757
Property Tax (1% TCI)			$135,379
Insurance (1% TCI)			$135,379
Capital Recovery	(15 year life, 7 percent interest)		$1,486,385
		Total Indirect Annual Cost	**$2,027,900**
Conclusion			
	Total Annualized Cost		**$27,218,156**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 50%		**5,741**
	Cost Per Ton of Pollutant Removed		**$4,741**

Table D-8. Fuel Substitution Control Cost Analysis Based on PTE and 23% Control.

Direct Costs		
Purchased Equipment Costs		
	New Coal Mill I.D. Fan and associated equipment	$2,000,000
	Instrumentation (10% of EC)	$200,000
	Freight (5% of EC)	$100,000
	Subtotal, Purchased Equipment Cost (PEC)	$2,300,000
Direct Installation Costs		
	Foundation (6% of PEC)	$138,000
	Supports (6% of PEC)	$138,000
	Handling and Erection (40% of PEC)	$920,000
	Electrical (1% of PEC)	$23,000
	Piping (30% of PEC)	$690,000
	Insulation for Ductwork (1% of PEC)	$1,000
	Painting (1% of PEC)	$23,000
	Subtotal, Direct Installation Cost	$1,933,000
Site Preparation		N/A
Buildings		N/A
	Total Direct Cost	**$4,233,000**
Indirect Costs		
	Engineering (10% of PEC)	$230,000
	Construction and Field Expense (10% of PEC)	$230,000
	Contractor Fees (10% of PEC)	$230,000
	Start-up (1% of PEC)	$23,000
	Performance Test (1% of PEC)	$23,000
	Contingencies (3% of PEC)	$69,000
	Total Indirect Cost	**$805,000**
	Total Capital Investment (TCI)	**$5,038,000**
Direct Annual Costs		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)		
	Reduction in coke usage (metric ton/yr)	188,959
	Heat Value (Gj / Mt)	32.510
	Heat (Gj / yr)	6,143,045
	Cost ($/Gj)	$1.74
	Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)	11,076
	Heat Value (Gj / Mt)	22.177
	Heat (Gj / yr)	245,627
	Cost ($/Gj)	$2.41
	Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)	198,736
	Cost ($/Mt)	$72.76
	Subtotal, increase in Low Sulfur Coal cost	$14,459,211
	Total Direct Annual Cost (increase)	**$3,178,351**
Indirect Annual Costs		
Administrative (2% TCI)		$100,760
Property Tax (1% TCI)		$50,380
Insurance (1% TCI)		$50,380
Capital Recovery	(15 year life, 7 percent interest)	$553,145
	Total Indirect Annual Cost	**$754,665**
Conclusion		
	Total Annualized Cost	**$3,933,016**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**13,298**
	Pollutant Removed (tons SO_2/yr) - 23%	**3,059**
	Cost Per Ton of Pollutant Removed	**$1,286**

Table D-9. Fuel Substitution Control Cost Analysis Based on PTE and 40% Control.

Direct Costs		
Purchased Equipment Costs		
	New Coal Mill and associated equipment	$5,374,302
	Instrumentation (10% of EC)	$537,430
	Freight (5% of EC)	$268,715
	Subtotal, Purchased Equipment Cost (PEC)	$6,180,447
Direct Installation Costs		
	Foundation (6% of PEC)	$370,827
	Supports (6% of PEC)	$370,827
	Handling and Erection (40% of PEC)	$2,472,179
	Electrical (1% of PEC)	$61,804
	Piping (30% of PEC)	$1,854,134
	Insulation for Ductwork (1% of PEC)	$2,687
	Painting (1% of PEC)	$61,804
	Subtotal, Direct Installation Cost	$5,194,263
Site Preparation		N/A
Buildings		N/A
	Total Direct Cost	**$11,374,710**
Indirect Costs		
	Engineering (10% of PEC)	$618,045
	Construction and Field Expense (10% of PEC)	$618,045
	Contractor Fees (10% of PEC)	$618,045
	Start-up (1% of PEC)	$61,804
	Performance Test (1% of PEC)	$61,804
	Contingencies (3% of PEC)	$185,413
	Total Indirect Cost	**$2,163,157**
	Total Capital Investment (TCI)	**$13,537,867**
Direct Annual Costs		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)		
	Reduction in coke usage (metric ton/yr)	188,959
	Heat Value (Gj / Mt)	32.510
	Heat (Gj / yr)	6,143,045
	Cost ($/Gj)	$1.74
	Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)	11,076
	Heat Value (Gj / Mt)	22.177
	Heat (Gj / yr)	245,627
	Cost ($/Gj)	$2.41
	Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)	244,891
	Heat Value (Gj / Mt)	26.266
	Heat (Gj / yr)	6,432,296
	Cost ($/Gj)	$5.67
	Subtotal, increase in Low Sulfur Coal cost	$36,471,116
	Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs		
Administrative (2% TCI)		$270,757
Property Tax (1% TCI)		$135,379
Insurance (1% TCI)		$135,379
Capital Recovery	(15 year life, 7 percent interest)	$1,486,385
	Total Indirect Annual Cost	**$2,027,900**
Conclusion		
	Total Annualized Cost	**$27,218,156**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**13,298**
	Pollutant Removed (tons SO_2/yr) - 40%	**5,319**
	Cost Per Ton of Pollutant Removed	**$5,117**

Table D-10. Fuel Substitution Control Cost Analysis Based on PTE and 50% Control.

Direct Costs			
Purchased Equipment Costs			
	New Coal Mill and associated equipment		$5,374,302
	Instrumentation (10% of EC)		$537,430
	Freight (5% of EC)		$268,715
		Subtotal, Purchased Equipment Cost (PEC)	$6,180,447
Direct Installation Costs			
	Foundation (6% of PEC)		$370,827
	Supports (6% of PEC)		$370,827
	Handling and Erection (40% of PEC)		$2,472,179
	Electrical (1% of PEC)		$61,804
	Piping (30% of PEC)		$1,854,134
	Insulation for Ductwork (1% of PEC)		$2,687
	Painting (1% of PEC)		$61,804
		Subtotal, Direct Installation Cost	$5,194,263
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$11,374,710**
Indirect Costs			
	Engineering (10% of PEC)		$618,045
	Construction and Field Expense (10% of PEC)		$618,045
	Contractor Fees (10% of PEC)		$618,045
	Start-up (1% of PEC)		$61,804
	Performance Test (1% of PEC)		$61,804
	Contingencies (3% of PEC)		$185,413
		Total Indirect Cost	**$2,163,157**
	Total Capital Investment (TCI)		**$13,537,867**
Direct Annual Costs			
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)			
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)			
	Reduction in coke usage (metric ton/yr)		188,959
	Heat Value (Gj / Mt)		32.510
	Heat (Gj / yr)		6,143,045
	Cost ($/Gj)		$1.74
		Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)		11,076
	Heat Value (Gj / Mt)		22.177
	Heat (Gj / yr)		245,627
	Cost ($/Gj)		$2.41
		Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)		244,891
	Heat Value (Gj / Mt)		26.266
	Heat (Gj / yr)		6,432,296
	Cost ($/Gj)		$5.67
		Subtotal, increase in Low Sulfur Coal cost	$36,471,116
		Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs			
Administrative (2% TCI)			$270,757
Property Tax (1% TCI)			$135,379
Insurance (1% TCI)			$135,379
Capital Recovery	(15 year life, 7 percent interest)		$1,486,385
		Total Indirect Annual Cost	**$2,027,900**
Conclusion			
	Total Annualized Cost		**$27,218,156**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**13,298**
	Pollutant Removed (tons SO_2/yr) - 50%		**6,649**
	Cost Per Ton of Pollutant Removed		**$4,094**

Table D -11. Dry Lime Scrubbing - Control Cost Analysis Based on Projected Actual Emissions and 20% Control.

Direct Costs				
Purchased Equipment Costs				
	Dry Lime Injection System			$1,000,000
	Retrofit ESPs with Baghouse			$3,000,000
	Total Equipment Cost			$4,000,000
	Instrumentation (10% of EC)			$400,000
	Freight (5% of EC)			$200,000
		Subtotal, Purchased Equipment Cost (PEC)		$4,600,000
Direct Installation Costs				
	Foundation (6% of PEC)			$276,000
	Supports (6% of PEC)			$276,000
	Handling and Erection (40% of PEC)			$1,840,000
	Electrical (1% of PEC)			$46,000
	Piping (30% of PEC)			$0
	Insulation for Ductwork (1% of PEC)			$2,000
	Painting (1% of PEC)			$0
		Subtotal, Direct Installation Cost		$2,440,000
Site Preparation				N/A
Buildings				N/A
		Total Direct Cost		**$7,040,000**
Indirect Costs				
	Engineering (10% of PEC)			$460,000
	Construction and Field Expense (10% of PEC)			$460,000
	Contractor Fees (10% of PEC)			$460,000
	Start-up (1% of PEC)			$46,000
	Performance Test (1% of PEC)			$46,000
	Contingencies (3% of PEC)			$138,000
		Total Indirect Cost		**$1,610,000**
	Total Capital Investment (TCI)			**$8,650,000**
Direct Annual Costs				
Operating Labor				
	Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)			$8,760
	Supervisor (15% of operator)			$1,314
		Subtotal, Operating Labor		$10,074
Maintenance				
	Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)			$8,760
	Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$	352,000
		Subtotal, Maintenance		$360,760
Lime				
	Hydrated lime/Sulfur molar ratio, min. Ca/S			6.0
	MW of Ca(OH)2			74
	MW of SO2			64
	Purity of the Comercial lime %			96.8
	Lime Required - Short Tons			82282
	Cost ($/short ton)		$	156.00
		Subtotal, Lime		$12,836,066
		Total Direct Annual Costs		**$13,206,900**
Indirect Annual Costs				
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)				$222,500
Administrative (2% TCI)				$173,000
Property Tax (1% TCI)				$86,500
Insurance (1% TCI)				$86,500
Capital Recovery	(15 year life, 7 percent interest)			$949,724
		Total Indirect Annual Cost		**$1,518,224**
Conclusion				
	Total Annualized Cost			**$14,725,124**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)			**11,481**
	Pollutant Removed (tons SO_2/yr) - 20% removal, 95% uptime			**2,181**
	Cost Per Ton of Pollutant Removed			**$6,750**

Table D-12. Dry Lime Scrubbing - Control Cost Analysis Based on Projected Actual Emissions and 30% Control.

Direct Costs				
Purchased Equipment Costs				
	Dry Lime Injection System			$1,000,000
	Retrofit ESPs with Baghouse			$3,000,000
	Total Equipment Cost			$4,000,000
	Instrumentation (10% of EC)			$400,000
	Freight (5% of EC)			$200,000
		Subtotal, Purchased Equipment Cost (PEC)		$4,600,000
Direct Installation Costs				
	Foundation (6% of PEC)			$276,000
	Supports (6% of PEC)			$276,000
	Handling and Erection (40% of PEC)			$1,840,000
	Electrical (1% of PEC)			$46,000
	Piping (30% of PEC)			$0
	Insulation for Ductwork (1% of PEC)			$2,000
	Painting (1% of PEC)			$0
		Subtotal, Direct Installation Cost		$2,440,000
Site Preparation				N/A
Buildings				N/A
		Total Direct Cost		**$7,040,000**
Indirect Costs				
	Engineering (10% of PEC)			$460,000
	Construction and Field Expense (10% of PEC)			$460,000
	Contractor Fees (10% of PEC)			$460,000
	Start-up (1% of PEC)			$46,000
	Performance Test (1% of PEC)			$46,000
	Contingencies (3% of PEC)			$138,000
		Total Indirect Cost		**$1,610,000**
	Total Capital Investment (TCI)			**$8,650,000**
Direct Annual Costs				
Operating Labor				
	Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)			$8,760
	Supervisor (15% of operator)			$1,314
		Subtotal, Operating Labor		$10,074
Maintenance				
	Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)			$8,760
	Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$	352,000
		Subtotal, Maintenance		$360,760
Lime				
	Hydrated lime/Sulfur molar ratio, min. Ca/S			6.0
	MW of Ca(OH)2			74
	MW of SO2			64
	Purity of the Comercial lime %			96.8
	Lime Required - Short Tons			82282
	Cost ($/short ton)		$	156.00
		Subtotal, Lime		$12,836,066
		Total Direct Annual Costs		**$13,206,900**
Indirect Annual Costs				
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)				$222,500
Administrative (2% TCI)				$173,000
Property Tax (1% TCI)				$86,500
Insurance (1% TCI)				$86,500
Capital Recovery	(15 year life, 7 percent interest)			$949,724
		Total Indirect Annual Cost		**$1,518,224**
Conclusion				
	Total Annualized Cost			**$14,725,124**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)			**11,481**
	Pollutant Removed (tons SO_2/yr) - 30% removal, 95% uptime			**3,272**
	Cost Per Ton of Pollutant Removed			**$4,500**

Table D-13. Dry Lime Scrubbing - Control Cost Analysis Based on PTE and 20% Control.

Direct Costs			
Purchased Equipment Costs			
	Dry Lime Injection System		$1,000,000
	Retrofit ESPs with Baghouse		$3,000,000
	Total Equipment Cost		$4,000,000
	Instrumentation (10% of EC)		$400,000
	Freight (5% of EC)		$200,000
		Subtotal, Purchased Equipment Cost (PEC)	$4,600,000
Direct Installation Costs			
	Foundation (6% of PEC)		$276,000
	Supports (6% of PEC)		$276,000
	Handling and Erection (40% of PEC)		$1,840,000
	Electrical (1% of PEC)		$46,000
	Piping (30% of PEC)		$0
	Insulation for Ductwork (1% of PEC)		$2,000
	Painting (1% of PEC)		$0
		Subtotal, Direct Installation Cost	$2,440,000
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$7,040,000**
Indirect Costs			
	Engineering (10% of PEC)		$460,000
	Construction and Field Expense (10% of PEC)		$460,000
	Contractor Fees (10% of PEC)		$460,000
	Start-up (1% of PEC)		$46,000
	Performance Test (1% of PEC)		$46,000
	Contingencies (3% of PEC)		$138,000
		Total Indirect Cost	**$1,610,000**
	Total Capital Investment (TCI)		**$8,650,000**
Direct Annual Costs			
Operating Labor			
	Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Supervisor (15% of operator)		$1,314
		Subtotal, Operating Labor	$10,074
Maintenance			
	Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$ 352,000
		Subtotal, Maintenance	$360,760
Lime			
	Hydrated lime/Sulfur molar ratio, min. Ca/S		6.0
	MW of Ca(OH)2		74
	MW of SO2		64
	Purity of the Comercial lime %		96.8
	Lime Required - Short Tons		95305
	Cost ($/short ton)		$ 156.00
		Subtotal, Lime	$14,867,521
		Total Direct Annual Costs	**$15,238,355**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$222,500
Administrative (2% TCI)			$173,000
Property Tax (1% TCI)			$86,500
Insurance (1% TCI)			$86,500
Capital Recovery	(15 year life, 7 percent interest)		$949,724
		Total Indirect Annual Cost	**$1,518,224**
Conclusion			
	Total Annualized Cost		**$16,756,579**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**13,298**
	Pollutant Removed (tons SO_2/yr) - 20% removal, 95% uptime		**2,527**
	Cost Per Ton of Pollutant Removed		**$6,632**

Table D-14. Dry Lime Scrubbing - Control Cost Analysis Based on PTE and 30% Control.

Direct Costs			
Purchased Equipment Costs			
	Dry Lime Injection System		$1,000,000
	Retrofit ESPs with Baghouse		$3,000,000
	Total Equipment Cost		$4,000,000
	Instrumentation (10% of EC)		$400,000
	Freight (5% of EC)		$200,000
		Subtotal, Purchased Equipment Cost (PEC)	$4,600,000
Direct Installation Costs			
	Foundation (6% of PEC)		$276,000
	Supports (6% of PEC)		$276,000
	Handling and Erection (40% of PEC)		$1,840,000
	Electrical (1% of PEC)		$46,000
	Piping (30% of PEC)		$0
	Insulation for Ductwork (1% of PEC)		$2,000
	Painting (1% of PEC)		$0
		Subtotal, Direct Installation Cost	$2,440,000
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$7,040,000**
Indirect Costs			
	Engineering (10% of PEC)		$460,000
	Construction and Field Expense (10% of PEC)		$460,000
	Contractor Fees (10% of PEC)		$460,000
	Start-up (1% of PEC)		$46,000
	Performance Test (1% of PEC)		$46,000
	Contingencies (3% of PEC)		$138,000
		Total Indirect Cost	**$1,610,000**
	Total Capital Investment (TCI)		**$8,650,000**
Direct Annual Costs			
Operating Labor			
	Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Supervisor (15% of operator)		$1,314
		Subtotal, Operating Labor	$10,074
Maintenance			
	Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$ 352,000
		Subtotal, Maintenance	$360,760
Lime			
	Hydrated lime/Sulfur molar ratio, min. Ca/S		6.0
	MW of Ca(OH)2		74
	MW of SO2		64
	Purity of the Comercial lime %		96.8
	Lime Required - Short Tons		95305
	Cost ($/short ton)		$ 156.00
		Subtotal, Lime	$14,867,521
		Total Direct Annual Costs	**$15,238,355**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$222,500
Administrative (2% TCI)			$173,000
Property Tax (1% TCI)			$86,500
Insurance (1% TCI)			$86,500
Capital Recovery	(15 year life, 7 percent interest)		$949,724
		Total Indirect Annual Cost	**$1,518,224**
Conclusion			
	Total Annualized Cost		**$16,756,579**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**13,298**
	Pollutant Removed (tons SO_2/yr) - 30% removal, 95% uptime		**3,790**
	Cost Per Ton of Pollutant Removed		**$4,421**

Appendix P

Holcim-Clarksville BART Analysis

July 24, 2008

BART FIVE FACTOR ANALYSIS ▪ HOLCIM (US) INC
CLARKSVILLE, MISSOURI

Prepared by:

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July 24, 2008

Project 081701.0004

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1. EXECUTIVE SUMMARY

This report documents the determination of the Best Available Retrofit Technology (BART) as proposed by Holcim (US) Inc. (Holcim) for the Portland cement manufacturing plant located in Clarksville, Missouri (Clarksville plant). This analysis is for the kiln system. Currently, particulate matter emissions from the kiln are controlled by an electrostatic precipitator. The Clarksville plant has other lesser emitting BART-eligible emissions units, all of which have Particulate Matter Control Devices (PMCDs) installed. The negligible visibility impairment attributable to these sources concludes that no additional controls are necessary to satisfy the requirements of the BART rule.[1]

Holcim used the U.S. Environmental Protection Agency's (EPA's) guidelines[2] in 40 CFR Part 51 to determine BART for the kiln. Specifically, Holcim conducted a five-step analysis to determine BART for SO_2, NOX, and PM_{10} that included the following:

1. Identifying all available retrofit control technologies;
2. Eliminating technically infeasible control technologies;
3. Evaluating the control effectiveness of remaining control technologies;
4. Evaluating impacts and document the results;
5. Evaluating visibility impacts

Based on the five-step analysis, Holcim proposes the following as BART:

Kiln:

- PM_{10} – Holcim has determined that the existing electrostatic precipitator constitutes BART. This control device is effective for controlling PM_{10} from a wet kiln.

- NO_X – Holcim has determined that BART for the Holcim Clarksville Kiln is the installation and operation of a Mid Kiln Firing (MKF) system or equivalent technologies that will achieve a 20 percent reduction in the maximum daily NO_X emission rate of 73,185 lbs that was used for visibility impact modeling.

- SO_2 – Holcim proposes that BART for the Holcim Clarksville Kiln is fuel substitution or equivalent technologies that will achieve a 23 percent reduction in the maximum daily SO_2 emission rate of 117,345 lbs that was used for visibility impact modeling.

The proposed BART control strategies will result in reductions of the visibility impacts attributable to the Clarksville plant. A summary of the visibility improvement at Class I areas based on the existing emission rates and proposed BART emission rates is provided in Table 1-1.

[1] Holcim submitted an inventory of all of the BART-eligible emission sources to the MDNR. Based on a review of this information, the MDNR concluded that the contributions from particulate matter from the non-kiln sources to visibility impairment is negligible and further analysis of these smaller particulate matter sources was not required. Meeting with the MDNR dated January 23, 2008.

[2] 40 CFR 51, Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations

TABLE 1-1. VISIBILITY IMPAIRMENT IMPROVEMENT

	Mingo National Wildlife Refuge	Hercules Glades Wilderness Area	Upper Buffalo Wilderness Area
Existing 98% Impact (Δdv)	1.01	0.81	0.61
BART 98% Impact (Δdv)	0.79	0.64	0.48
Improvement 98% Impact (Δdv)	22%	21%	22%

2. INTRODUCTION AND BACKGROUND

On July 1, 1999, the U.S. EPA published the final Regional Haze Rule (RHR). The objective of the RHR is to improve visibility in 156 specific areas across with United States, known as Class I areas. The Clean Air Act defines Class I areas as certain national parks (over 6000 acres), wilderness areas (over 5000 acres), national memorial parks (over 5000 acres), and international parks that were in existence on August 7, 1977.

On July 6, 2005, the EPA published amendments to its 1999 RHR, often called the Best Available Retrofit Technology (BART) rule, which included guidance for making source-specific BART determinations. The BART rule defines BART-eligible sources as sources that meet the following criteria:

(1) Have potential emissions of at least 250 tons per year of a visibility-impairing pollutant,
(2) Began operation between August 7, 1962 and August 7, 1977, and
(3) Are included as one of the 26 listed source categories in the guidance.

A BART-eligible source is subject to BART if the source is "reasonably anticipated to cause or contribute to visibility impairment in any federal mandatory Class I area." EPA has determined that a source is reasonably anticipated to contribute to visibility impairment if the 98^{th} percentile visibility impacts from the source are greater than 0.5 delta deciviews (Δdv) when compared against a natural background. Air quality modeling is the tool that is used to determine a source's visibility impacts.

Once it is determined that a source is subject to BART, a BART determination must address air pollution control measures for the source. The visibility regulations define BART as follows:

> *"…an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant which is emitted by…[a BART-eligible source]. The emission limitation must be established on a case-by-case basis, taking into consideration the technology available, the cost of compliance, the energy and non air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonable be anticipated to result from the use of such technology.*

Specifically, the BART rule states that a BART determination should address the following five statutory factors:

1. Existing controls
2. Cost of controls
3. Energy and non-air quality environmental impacts
4. Remaining useful life of the source
5. Degree of visibility improvement as a result of controls

Further, the BART rule indicates that the five basic steps in a BART analysis can be summarized as follows:

1. Identify all available retrofit control technologies;
2. Eliminate technically infeasible control technologies;
3. Evaluate the control effectiveness of remaining control technologies;
4. Evaluate impacts and document the results;
5. Evaluate visibility impacts

A BART determination should be made for each visibility affecting pollutant (VAP) by following the five steps listed above for each VAP.

BART applicability was determined for the Clarksville plant based on an applicability analysis performed by the MDNR and a refined applicability analysis performed by Holcim. Both analyses determined that the kiln is subject to BART. The details of the applicability determination can be found in Section 3.

Subsequently, Holcim performed an analysis to determine BART for each VAP for the kiln. The VAPs emitted by the kiln include NO_x, SO_2, and particulate matter with a mass mean diameter smaller than ten microns (PM_{10}) of various forms (filterable coarse particulate matter [PM_c], filterable fine particle matter [PM_f], elemental carbon [EC], inorganic condensable particulate matter [IOR CPM] as sulfates [SO_4], and organic condensable particulate matter [OR CPM] also referred to as secondary organic aerosols [SOA]). The BART determinations for SO_2 and NO_X can be found in Sections 4 and 5 respectively.

3. BART APPLICABILITY DETERMINATION

As stated in Section 2, a BART-eligible source is subject-to-BART if the source is "reasonably anticipated to cause or contribute to visibility impairment in any federal mandated Class I area." EPA has determined that a source is reasonably anticipated to contribute to visibility impairment if the 98th percentile of the visibility impacts from the source is greater than 0.5 Δdv when compared against a natural background. The MDNR conducted air quality modeling for the kiln to predict the existing visibility impairment attributable to the Clarksville plant in the following Class I areas:

- Mingo National Wildlife Refuge
- Hercules Glade Wilderness Area
- Upper Buffalo Wilderness Area

Based on this modeling, the MDNR concluded that the Clarksville plant was subject to BART since the 98th percentile of the visibility impacts attributable to the kiln are greater than 0.5 Δdv when compared against a natural background for a Class I area.

The modeling methods and procedures that Holcim followed were consistent with the methods and procedures that were followed in the MDNR's original modeling. Table 3-1 summarizes the emission rates that were modeled for SO_2, NO_X, and PM_{10}[3]. The SO_2 and NO_x emission rates are the highest actual 24-hour emission rates based on 2003-2007 continuous emissions monitoring system (CEMS) data. The PM_{10} emission rates are based on data included in Holcim's BART survey.

TABLE 3-1. MODELED 24-HOUR EMISSIONS (AS AN HOURLY EQUIVALENT)

SO_2 (lb/hr)	NO_X (lb/hr)	Total PM_{10} (lb/hr)
4889.38	3049.38	51.82

Table 3-2 summarizes the stack parameters that were used to model the kiln.

TABLE 3-2. SUMMARY OF STACK PARAMETERS

Parameter	Value
Actual Stack height (ft)	250
Stack Diameter (ft)	21.7
Exhaust Velocity (ft/s)	34.3
Exhaust Temperature (F)	367

The results of the modeling indicate that the 98th percentile of the visibility impacts are greater than 0.5 Δdv when compared against a natural background. Since the visibility impacts are greater than 0.5 Δdv, the kiln is subject to BART. The results of the modeling are summarized in Table 3-3.

[3] The non-kiln PM_{10} emissions were included in the model as part of the kiln PM_{10} emissions.

TABLE 3-3. SUMMARY OF 98TH PERCENTILE VISIBILITY IMPACTS AND NUMBER OF DAYS WITH VISIBILITY IMPACT GREATER THAN 0.5 ΔDV

Class I Area	Visibility Impairment 98th % Δdv	Visibility Impairment Days > 0.5 Δdv
Mingo Wilderness	1.01	75
Hercules Glades Wilderness	0.81	40
Upper Buffalo Wilderness	0.61	33

Table 3-4 provides a breakdown of the visibility impacts listed in Table 3-3 by each VAP for the high (98th percentile) day (note that the specific percentiles vary from day to day, and location to location, the breakdown listed is an example of one event only).

TABLE 3-4. BREAKDOWN OF POLLUTANT SPECIFIC CONTRIBUTIONS TO VISIBILITY FOR THE 98TH PERCENTILE DAY.

Class I Area	Visibility Impairment Attributable to SO_4 (%)	Visibility Impairment Attributable to NO_3 (%)	Visibility Impairment Attributable to SOA (%)	Visibility Impairment Attributable to EC (%)	Visibility Impairment Attributable to PM_c (%)	Visibility Impairment Attributable to PM_f (%)	Total Visibility Impairment (Δdv)
Mingo Wilderness	98.6	1.2	0	0	0	0.2	1.01
Hercules Glades Wilderness	42.3	57.5	0	0	0	0.2	0.81
Upper Buffalo Wilderness	95.7	4.2	0	0	0	0.1	0.61

As shown in Table 3-4, the most significant contributors to the visibility impairment are sulfates (SO_4) and nitrates (NO_3). The SO_4 contribution is from the chemical conversion of SO_2 emitted by the kiln to SO_4. The NO_3 contribution is entirely from the chemical conversion of NO_X emitted from the kiln. The contribution of PM_{10} to the total visibility impairment can be estimated as the sum of the contributions from SOA, EC, PMc, and PMf. The PM_{10} contribution is much smaller (<1%) than the contribution from SO_2 and NO_X.

4. SO_2 BART EVALUATION

Sulfur, in the form of metallic sulfides (pyrite), sulfate, or organosulfur compounds, is often found in the raw materials used to manufacture cement and in the solid and liquid fuels burned in cement kilns.[4] The raw materials and fuels for the Clarksville plant are no exception. Sulfur dioxide can be generated by the oxidation of sulfur compounds in the raw materials and fuels during operation of the pyroprocess. Constituents found in fuels, raw materials, and in-process materials, such as the alkali metals (sodium and potassium), calcium carbonate, and calcium oxide react with SO_2 formed in the pyroprocess and much of the sulfur leaves the process in the principle product of the kiln system called clinker.

The kiln is the only BART source which emits SO_2, thus an SO_2 BART evaluation was performed only for the kiln. The maximum actual 24-hour kiln SO_2 emission rate that was modeled for the BART applicability determination is summarized in Table 4-1.

TABLE 4-1. EXISTING ACTUAL MAXIMUM 24-HOUR SO_2 EMISSION RATES

	SO_2 24-Hour Emission Rate ton/24-hr	SO_2 Hourly Equivalent Emission Rate lb/hr
Kiln	58.67	4889.38

4.1 IDENTIFICATION OF AVAILABLE RETROFIT SO_2 CONTROL TECHNOLOGIES

Step 1 of the BART determination is the identification of all available retrofit SO_2 control technologies. A list of control technologies was obtained by reviewing the U.S. EPA's Clean Air Technology Center, publicly-available air permits, applications, and technical literature published by the U.S. EPA, state agencies, and Regional Planning Organizations (RPOs).

The available retrofit SO_2 control technologies are summarized in Table 4-2.

TABLE 4-2. AVAILABLE SO_2 CONTROL TECHNOLOGIES

SO_2 Control Technologies
Fuel Substitution
Raw Material Substitution
Dry Lime Injection/Scrubbing
Wet Lime Scrubbing

[4] Miller, F. MacGregor and Hawkins, Garth J., "Formation and Emission of Sulfur Dioxide from the Portland Cement Industry", *Proceedings of the Air and Waste Management Association*, June 18-22, 2000.

4.2 ELIMINATE TECHNICALLY INFEASIBLE SO_2 CONTROL TECHNOLOGIES

Step 2 of the BART determination is to eliminate technically infeasible SO_2 control technologies that were identified in Step 1.

4.2.1 FUEL SUBSTITUTION

Holcim uses a mixture of coal, petroleum coke, alternative fuels (synfuel), and oil as the primary fuels for the kiln. For example, the 2007 actual fuel usage breakdown on an energy input basis, was 3.4 percent coal, 84 percent petroleum coke, 11.8 percent synfuel, and 0.8 percent oil (the fuel usages are also on an as received basis). The sulfur content of the petroleum coke is approximately 5.72 percent and the sulfur content of the coal is approximately 3.45 percent. Oil is typically used during preheat of the kiln after a maintenance outage. Coal is also typically used during the kiln startup after an extended shutdown. Coal offers better flame control and appropriate heat distribution during heatup and ramp up of production. The main source of solid fuel for the kiln is petroleum coke.

The design of the long wet kiln system is such that some of the SO_2 resulting from fuel combustion may be emitted and the rest is absorbed in clinker or CKD. Therefore, if Holcim reduces sulfur in the fuel input to the kiln, a corresponding reduction in SO_2 emissions from the kiln would be expected. Holcim contacted fuel suppliers and found a low sulfur Colorado (CO) coal, 0.7 % sulfur, and a regionally available 3.0% sulfur coal that could be used in lieu of the current coal/coke, which would result in a lower overall fuel sulfur content. A number of coal sources were rejected for high chlorine content. For example, a 1.0 percent sulfur source was found but the chlorine content was 1.3 percent (the mine has recently shut down as well), another mine had coal with sulfur in the 1.0 percent and 2.5 percent range, but with chlorine contents in the 0.3 percent range. Further, a 2.8 percent sulfur coal was identified, but it also had too high of a chlorine content, 0.12 percent, to be usable. The 3.0 percent sulfur coal is reported as having a chlorine content of 0.05 percent which is preferable (Note that the 2007 average chlorine content in the coke was 0.08 percent. A summary of the coal composition data obtained is provided in Appendix A. In addition, the plant is subject to chlorine input limitations from HWCMACT. Chlorine contents higher than current levels would very likely cause visible plumes/opacity issues as further described in Appendix B.

Powder River Basin (PRB) coal, which can have a sulfur content in the range of 0.35 percent, was not considered a feasible alternative fuel due to a number of issues. These include difficult physical characteristics, a higher cost of transportation verses the CO coal, the lower heat content relative to the CO coal, and others. The high moisture content and short auto-ignition time lead to an increased risk of spontaneous combustion relative to other coal sources that is further exacerbated by the fact that the PRB coal would need to be delivered via barge. The use of PRB coal could also require the replacement of current coal handling equipment to meet the Class II Division 2, Group F, National Electrical Code (NEC). Further , the lower energy content of PRB coal would require increased volumetric throughput verses the CO coal. Table 4-3 provides a summary of the characteristics of PRB coal verses regular bituminous coal.

TABLE 4-3. CHARACTERISTICS OF PRB COAL VS. REGULAR BITUMINOUS COAL

	PRB Coal	Bituminous Coal
Moisture	20 – 30%	6 – 12%
Ash	4 - 6%	6 – 18%
Volatiles	30 – 32%	33 – 43%
Fixed Carbon	34 – 38%	45 – 60%
LHV (Btu/lb)	8,000 – 9,000	11,000 – 14,000
Explosibility Index	208 bar.m/s	< 180 bar.m/s
Maximum pressure developed during an explosion	115 psi	< 100 psi
Minimum explosive concentration	20 g/m³	60 g/m³
Auto-Ignition times	15-30 days	90 – 120 days

Determining the specific reduction in SO_2 emissions from a reduction in fuel sulfur is complicated as the reactions in the kiln system are complex. The sulfur is introduced into the system in the fuel as well as the raw materials (pyrites) and the sulfur exits the kiln system in the product (clinker), the cement kiln dust (CKD), and out the stack as SO_2. Further, although the sulfur in the clinker is small on a percentage basis, the magnitude of the clinker production is extremely large (greater than 1 million tons per year). Consequently, small changes in the amount of sulfur absorbed in the product can dramatically change the amount of SO_2 emitted. The variation in sulfur in the raw materials from the quarry, the clinker quality requirement determined by the market, and the kiln conditions can all cause significant changes in kiln operating parameters, such as kiln burning temperature, kiln excess Oxygen, etc. These changes can have a strong impact on the sulfur absorbed in the clinker and CKD and hence on SO_2 emissions. These operating conditions can also strongly change how the fuel sulfur affects SO_2 emissions. Reviewing the data yields that there is no linear correlation between fuel sulfur and SO_2 emissions. Although these parameters were continuously monitored and controlled, to calculate an SO_2 control effectiveness, based on switching to a lower sulfur fuel, a high number of assumptions must be made with a very low confidence in the accuracy. Regardless, an attempt has been made.

The assumptions, based on long term averages in 2007, which can vary significantly on an annual and short term (24-hr) basis, include that 65 percent of sulfur input in the kiln system is from fuel, 35 percent of sulfur input is from raw materials, and approximately 30-35 percent of total sulfur input is estimated to ultimately be emitted as SO_2 in the stack.

<u>Low Sulfur CO Coal – 0.7 percent sulfur</u>
Based on the 2007 data, if all of the current coal and coke is replaced with a 0.7 percent low sulfur coal, the sulfur input from fuel is calculated to be reduced by approximately 85 percent (Synfuel levels were held constant and tires were not included as they have a

higher sulfur content than the Low Sulfur CO coal) . Following is a summary of the sulfur input reduction from the use of low sulfur coal. The low sulfur CO coal has a lower heat content (26 Gj/Metric ton) and higher moisture content than the coke currently being used (33 Gj/Metric ton), so a higher volume of low sulfur CO coal is needed than coke reduced.

<u>Current – 2007 Average from coal/coke</u>

Coke Usage:	160,915 metric tons
Low Heat Content	32.510 Gj/Mt
Sulfur Content:	5.72 %
Sulfur Input from Coke:	9,204 metric tons
Current Coal Usage:	9,432 metric tons
Low Heat Content	22.177 Gj/Mt
Sulfur Content:	3.45 %
Sulfur Input from Coal:	325 metric tons

Total Sulfur Input from Coke/Coal: 9,529 metric tons

<u>Low Sulfur CO Coal Replacement</u>

Coal Usage:	208,546 metric tons
Heat Content	26.266 Gj/Mt
Sulfur Content:	0.7 %

Total Sulfur Input from Coal: 1,459 metric tons

<u>Net reduction in sulfur input from coal:</u>

9,529 metric tons – 1,459 metric tons = 8,070 metric tons = 8,893 tons

The SO_2 reduction calculation, based on the calculated sulfur reduction, is very complicated. The pyrite sulfur from the raw materials can volatilize at relatively low temperatures in the kiln, in an area where the sulfur comes in contact with the kiln feed that has only minimally been calcined into CaO. Consequently, less of this sulfur reacts with the CaO and thus is emitted. Again, if the sulfur reacted with the CaO, it would be absorbed into the clinker and CKD. The fuel sulfur, on the other hand, enters the kiln in the burning zone and travels the entire length of the kiln, coming in contact with much higher concentrations of CaO, thus having a much greater chance of being absorbed. Consequently, there is no simple linear relationship between fuel sulfur and SO_2 emissions that can be used to confidently calculate an SO_2 reduction.

The fuel sulfur reduction of 8,893 tons corresponds with a 54 percent reduction of the total sulfur (fuel and raw material sulfur) input to the kiln system in 2007. As mentioned above, a large fraction of fuel sulfur would have been absorbed by the CaO in the system, and thus would not have been emitted as SO_2, while SO_2 emitted from the pyrite in the raw materials has less of a chance of being absorbed, so there is not a directly proportional reduction in SO_2 with the sulfur reduction from the fuels, nor with the total sulfur reduction. Holcim estimates that based on the year 2007 data, the actual SO_2 reduction is about 40% - 50%.

Regional Coal – 3.0 percent.

A scenario that includes replacing the current coal/coke with a 3.0 percent coal was also evaluated. In this scenario, a revised fuel mix is used that includes:

1) replacing the current coal and coke usage making up approximately 87.5 percent of the fuel mix with a 3.0 percent sulfur coal at 72 percent of the fuel mix,
2) increasing Synfuel from approximately 12 percent to 18 percent of the fuel mix, and
3) using tires at approximately 12 percent of the fuel mix (as discussed in MKF section).

The details of the scenario are as follows:

Current – 2007 Average from coal/coke

Coke Usage:	160,915 metric tons
Low Heat Content	32.510 Gj/Mt
Sulfur Content:	5.72 %
Sulfur Input from Coke:	9,204 metric tons
Current Coal Usage:	9,432 metric tons
Low Heat Content	22.177 Gj/Mt
Sulfur Content:	3.45 %
Sulfur Input from Coal:	325 metric tons

Total Sulfur Input from Coke/Coal: 9,529 metric tons

Regional 3.0 Percent Sulfur Coal Scenario – Fuel Mix Changes

3.0 % Coal Usage:	169,241 metric tons
Low Heat Content	25.8 Gj/Mt
Sulfur Content:	3.0 %
Sulfur Input from Coal:	5,077 metric tons
Synfuel Usage (Increase):	4,520 metric tons
Low Heat Content	20.2 Gj/Mt
Sulfur Content:	0.21 %
Sulfur Input from Synfuel:	10 metric tons
Tires:	25,500 metric tons
Low Heat Content	28.0 Gj/Mt
Sulfur Content:	1.83 %
Sulfur Input from Tires:	467 metric tons

Total Sulfur Input from 3.0 percent Coal Scenario: 5,554 metric tons

Net reduction in sulfur input from 3.0 percent coal scenario:

9,529 metric tons – 5,554 metric tons = 3,966 metric tons = 4,372 tons

The result is a net reduction of approximately 42 percent in the sulfur input from the fuel mix which corresponds to an overall sulfur input reduction of approximately 28 percent.

Holcim estimates that the actual SO_2 reduction from this fuel switch would be approximately 20-25 percent.

These reductions are the maximum reductions in tons of SO_2 that can be expected. As mentioned previously, the actual reduction will vary significantly, especially on a short term basis. Holcim estimates that the net reduction in SO_2 for 3.0 percent sulfur coal scenario would be 20-25 percent and for low sulfur CO coal would be in the range of 40 percent to 50 percent.

Holcim considers this technology to be technically feasible and will consider it further.

4.2.2 RAW MATERIAL SUBSTITUTION / SELECTIVE MINING

In a long wet kiln, not only the pyritic sulfur, but total sulfur in the raw materials will have an impact on SO_2 emissions.

Part of the pyritic sulfur reacts with oxygen and forms SO_2 at the relatively lower temperature zone of the kiln. The rest of the sulfur, such as sulfates and sulfur compounds, enters the kiln at higher temperature zones, where more SO_2 is volatized. Some of this SO_2 will pass the length of the kiln without being absorbed and will thus be emitted to the stack.

Using raw materials with lower sulfur content can reduce the potential for SO_2 emissions from a wet kiln system. The limestone, shale, and other raw materials used at the Clarksville plant contain pyrites and total sulfur in varying concentrations. If zones or layers in the on-site quarry could be identified and mined selectively such that lower sulfur content materials are used, the emission rate of SO_2 could theoretically be reduced.

The Clarksville Quarry Scheduling Optimization (QSO) Model was created specifically for predicting relevant mineralogical parameters related to clinker production. Major oxides (Ca, Mg, Si, and Fe) are the primary focus of this predictive model. The sampling protocol and data analysis required for major oxide components was never intended to be adequate for the accurate prediction of minor components, such as sulfur and sulfur compounds (See Appendix C for additional discussions on selective mining limitations based on Holcim's QSO (Quarry Scheduling Optimization) computer model).

Based on the lack of available data to predict if selective mining would be feasible, Holcim has concluded that selective mining is not considered a technically feasible SO_2 control technology for the kiln.

4.2.3 DRY LIME INJECTION/DRY LIME SCRUBBING

Dry Lime Injection, or Dry Lime Scrubbing (DLS), consists of injecting hydrated lime, $Ca(OH)_2$, into the flue gas. The $Ca(OH)_2$ reacts with SO_2 in the flue gas stream to create fine particles of $CaSO_3$ or $CaSO_4$. The particles are collected in the particulate matter control device (PMCD) serving the kiln.

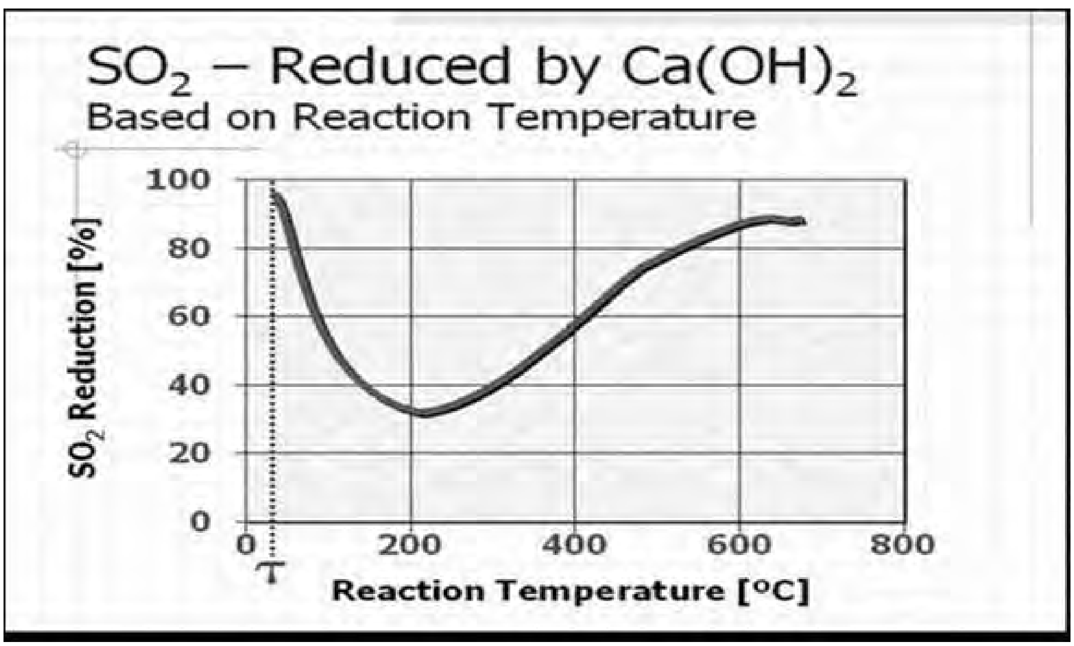
The current PMCD was not sized/designed to handle the additional particulate matter loading that would result from this technology. Consequently, adding DLS could cause

PM emissions and opacity to increase above permitted levels requiring Holcim to replace the existing PMCD (an ESP) with a new PMCD (a Baghouse).

Holcim is aware of only one other long term application of this technology on a wet kiln, which is on a smaller wet kiln in Belgium. Consequently, very little data exists to directly quantify the feasibility or benefit (emission reduction) of such a system. Regardless, Holcim is considering the technology to be technically feasible.

The effectiveness of DLS is impacted by both the temperature and the residence time/air flow rate at the location it is injected. At Clarksville, the injection point would be between the kiln outlet and the PMCD. At this location, the temperature is approximately 200 deg C (415 deg F). The temperature can not be increased at this location as the plant has limitations on the inlet temperature to the PMCD from both the Portland Cement MACT and the Hazardous Waste Combustion MACT in order to meet the Dioxin/Furan (D/F) limit. Further, lowering the temperature would lead to lower ESP efficiency and opacity problems. Figure 4-1 is a plot of SO_2 reduction versus reaction temperature from a commonly used article entitled “What is Achievable with Today’s Technologies”, Mark S. Terry, Krupp Polysius Corp, 2001. As indicated in the figure, at a temperature of 200 deg C (415 deg F), the reduction level is approximately 30 percent, which is the lowest reduction level over the temperature range presented.

FIGURE 4-1. SO_2 REDUCTION VERSUS REACTION TEMPERATURE FOR HYDRATED LIME



The molar ratio of lime (calcium source) to SO_2 is much higher than in a typical coal fired boiler due to a number of factors, some of which include the higher CO_2 and dust levels in the cement kiln system exhaust. The CO_2 competes with SO_2,in the reaction with the lime, and the higher dust loading reduces the even distribution of the lime in the gas. Based on a communication with the Obourg plant in Belgium, a molar ratio of between 4:1 and 6:1

has been used. The larger size of the Clarksville kiln will make it more difficult to evenly distribute the lime to the kiln gas and thus Holcim anticipates that a molar ratio of 6:1 will be required to achieve a maximum control efficiency of 20 - 30 percent.

Holcim considers this technology to be technically feasible and will consider it further.

4.2.4 WET LIME SCRUBBING

Wet lime scrubbing (WLS) is a name for a traditional tailpipe wet scrubber. This process involves passing the flue gas from the main PMCD through a sprayed aqueous suspension of $Ca(OH)_2$ or $CaCO_3$ (limestone) that is contained in an appropriate scrubbing device. In the case of the Clarksville plant, the basic underlying economics would dictate the use of ground limestone as the scrubbing reagent. Use of the cement kiln dust as a scrubbing reagent was not considered as a viable option for Clarksville due to its high chlorine content and a large amount of inerts. In WLS, the aqueous suspension of scrubbing reagent is not taken to dryness as it is in DLS. The SO_2 reacts with the scrubbing reagent to form $CaSO_3.H_20$ or gypsum that is collected and retained as aqueous sludge. The sludge is either dewatered and disposed of or used as synthetic gypsum.

The scrubbing efficiency of WLS can vary from an estimated 80 percent to 95 percent of the SO_2 in the flue gas treated by the scrubber[5]. Further, WLS is a high maintenance process with high rates of downtime expected from build up or plug up of mist-eliminators or spray nozzles and the severe wear and corrosion of components. Holcim has found that high levels of hydrocarbons (THC) in the gas stream have caused significant corrosivity and foam build-up at their Dundee plant. Further, it significantly influences the system availability and the efficiency. The THC levels at the Clarksville plant may also lead to build up and plugging, and thus an availability (uptime) of the WLS of 95 percent is assumed.

Despite these identified drawbacks, WLS is considered a technically feasible BART option.

4.3 RANK OF TECHNICALLY FEASIBLE SO_2 CONTROL OPTIONS BY EFFECTIVENESS

The third step in the BART analysis is to rank the technically feasible options according to effectiveness. Table 4-4 provides the effectiveness of each technology in the form of an annual average efficiency.

[5] Assessment of Control Technology Options for BART-Eligible Sources Steam Electric Boilers, Industrial Boilers, Cement Plants and Paper and Pulp Facilities. Prepared by Northeast States for Coordinated Air Use Management In Partnership with The Mid-Atlantic/Northeast Visibility Union, March 2005, Page 4-21, Table IV-4. Range of Removal Efficiencies of Wet SO2 Scrubbers for Long Wet Kilns.

TABLE 4-4. RANKING OF TECHNICALLY FEASIBLE KILN SO_2 CONTROL TECHNOLOGIES BY EFFECTIVENESS

Control Technology	Effectiveness SO_2 Reduction (Percent Reduction – Annual Basis)
Wet Lime Scrubbing	80-95%
Fuel Substitution	20-50%
Dry Lime Scrubbing	20-30%

4.4 EVALUATION OF IMPACTS FOR FEASIBLE SO_2 CONTROLS

Step four of the BART analysis procedure is the impact analysis. The BART determination guidelines list the four factors to be considered in the impact analysis:

- Cost of compliance
- Energy impacts
- Non-air quality impacts; and
- The remaining useful life of the source

Holcim has conducted an impact analysis for the remaining SO_2 control options.

4.4.1 WET LIME SCRUBBING

Cost of Compliance

Holcim utilized a recent WLS vendor bid, scaled to 2012 dollars[6], as the basis for the economic analysis to determine the annualized cost for WLS. Holcim divided the annualized cost of WLS by the annual tons of SO_2 reduced to determine the cost effectiveness for WLS. The "annual tons reduced" were determined by subtracting the estimated controlled annual emissions from the existing annual emissions. The existing annual emissions should be considered both on a projected actual and a potential to emit (PTE) basis. The projected actual (PA) annual SO_2 emissions provided to the MDNR in the recent Mid Kiln Firing (MKF) permit application was 11,481 tons/year[7]. The PTE listed in the MKF permit is 13,298 tons/year. The estimated controlled annual emissions were calculated by applying an 80 percent to 95 percent control efficiency and a 95 percent control device uptime, to the projected actual annual and PTE emissions. Table 4-5 provides a summary of the cost effectiveness analysis related to WLS. The detailed cost analysis table is provided in Appendix D.

6 The most recent U.S. Department of Labor, Producer Price Index Industry Data, from April 2004 – April 2008 indicates that costs have increased by the ratio of 143.2/102.9 over the last 5 year period (or 8.06 points per year). The original bid was from 2005. Consequently, the equipment cost was scaled up to 2012 (8 years) by multiplying by the following percentage (100 + (8 x 8.06)) percent = 1.645.

7 The projected actual annual emission rate was determined as part of the construction permit application process to support the August 27, 2007 Mid Kiln Firing construction permit. Permit Number 082007-019.

The equipment cost includes both the WLS system and a limestone preparation system. The limestone preparation system includes 2 Ball Mills used to grind the limestone received to a specific fineness.

The cost effectiveness analysis does not include the cost to construct a new exhaust stack, which may be needed to employ the WLS technology, and it does not include the possible additional cost for the equipment relocation on site due to the limited space available for the WLS system.

The control cost factors were obtained from the EPA's Control Cost Manual, 6th Edition.

Two factors that significantly increase the cost of this technology are the need to reheat the exhaust gas and the cost of sludge disposal.

Exhaust Gas Reheat

A common concern of utilizing a wet scrubber on a cement kiln exhaust gas is the probable formation of a detached plume resulting in opacity violations. For a typical cement kiln stack, if the exhaust gas contains NH_3, HCl, and SO_2, sub-micron aerosols of NH_4Cl and $(NH_4)2SO_4$ may form when the gas temperature is reduced after exiting the stack. A detached plume is predicted to occur when the exhaust gas is cooled to the dew point at or near the exit of the stack and prior to the dilution of the aerosol forming constituents. The wet scrubber requires the exhaust gas to be cooled to the dew point at the inlet of the scrubber. As the temperature of the exhaust gas is cooled in the scrubber, a visible plume condition is nearly assured. The sub-micron NH_4Cl aerosol will be formed and is difficult to remove in the scrubber. This problem has been reported for wet scrubbers used at cement plants. As the plant is subject to a 20 percent opacity limitation from both the PCMACT and HWCMACT, even a small increase in opacity could lead to an exceedance of the standard, which is not acceptable. Based on information from Holcim's Dundee, Michigan plant, Holcim anticipates that the temperature of the exhaust gas at the exit of the scrubber would be approximately 170 deg F. To keep the sub-micron particles from forming at the exit of the stack, reheating the exhaust gas, after the scrubber, is required. A thorough evaluation of the stack gas constituents was conducted by Holcim and it was determined that to prevent an unacceptable increase in opacity from occurring, the stack gas would need to be reheated (if a scrubber is installed) to at least the current gas temperature after the ESP of approximately 380 deg F (see Appendix B for the detailed analysis). This re-heating would most likely be achieved using natural gas combustion. The natural gas combustion would lead to a 97 ton/year increase in NO_x emissions that would negatively impact visibility gains from the SO_2 reduction.

Sludge Disposal

The sludge generated from the WLS system may require disposal. Therefore, Holcim has determined the cost of disposal based on a bid from Area Disposal Services, Inc. for the disposal fee ($36/ton), as well as the cost for trailer rental ($120/month) and transportation ($220/load). In addition, Holcim also looked at the corresponding cost of building an onsite landfill for disposal, but based on information provided by MDNR, the time and

resources required to obtain a permit, and the additional liability associated with an onsite landfill, Holcim decided not to pursue that option.

WLS may also lead to an increase in PM emissions because some particles of limestone or $CaSO_3$ will be entrained in the flue gas and subsequently be emitted from the scrubber. WLS is also known to increase emissions of sulfuric acid mist.[8]

TABLE 4-5. COST ANALYSIS SUMMARY FOR WET LIME SCRUBBING

Control Case	Control Effectiveness (%)	Annual Cost ($/yr)	Existing Annual Emissions (tons/yr)	Pollutant* Removed (tons/yr)	Cost** Effectiveness ($/ton)	Cost*** Impact ($/ton clinker)
WLS – PA	80%	$24,385,436	11,481	8,726	$2,826	$20
WLS – PA	95%	$24,925,003	11,481	10,362	$2,428	$21
WLS – PTE	80%	$24,840,863	13,298	10,106	$2,482	$20
WLS – PTE	95%	$25,465,823	13,298	12,001	$2,139	$21

*Assumes 95% uptime.
**Includes 97 tons of NOx generated.
***Based on a maximum historical actual clinker production rate of 1,215,708 tons/year.

The significant increases in cost per ton of clinker produced from using WLS, as shown in Table 4-5, would likely eliminate any profit margin currently realized by the plant. Thus, it would not be economically feasible to operate the plant with WLS.

Energy Impacts
A wet scrubber requires an additional fan of considerable horsepower to move the flue gas through the scrubber. The exhaust gas reheat requirement will utilize approximately 1,000,000 MMcf/year of natural gas, which will itself lead to an increase in NOx emissions of 97 tons/yr.

Non Air-Quality Impacts
Without reheating, a frequent steam plume and/or detached plume can be expected at the discharge of the wet scrubber that would result in visual impairment in the area.

The WLS technology could generate over 50,000 tons per year of waste (sludge) that will require disposal in a landfill.

Remaining Useful Life
The remaining useful life of the kiln does not impact the annualized cost of WLS because the useful life is anticipated to be at least as long as the capital cost recovery period, which is 15 years.

8 *Innovations in Portland Cement* Manufacturing, Portland Cement Association, 2004, pg. 660 & 669

4.4.2 FUEL SUBSTITUTION

Cost of Compliance

Low sulfur CO coal

The increased cost of using low sulfur CO coal (0.7 percent sulfur) includes the relative increase in fuel cost as well as the cost of a new coal mill system. Low sulfur CO coal is harder than the current coal/coke utilized and has a lower heat content; consequently, a higher volume of coal grinding will be needed than the current mill can achieve. The increased grinding requirement would also have an additional energy requirement. A bid for a new coal mill, classifier, and mill motors, was obtained from GEBR. Pfeiffer USA Inc. and was scaled to 2012 dollars[9],

Regional 3.0 percent sulfur coal

The increased cost of the regional 3.0 percent sulfur coal scenario includes the relative increase in fuel cost as well as the cost of a new primary air fan and associated equipment. The 3.0 percent sulfur coal has a lower heat content than coke; consequently, a higher volume of coal will be needed that will require a larger primary air fan. Holcim is proposing to change the coal mill primary air fan and associated equipment. Reducing the capital cost does not have a significant impact on the outcome of the cost analysis. That is, eliminating the capitol cost completely only reduces the cost from $1,286/ton SO2 to $1,039/ton SO_2. Consequently, Holcim has chosen to not spend additional time and effort documenting these costs.

Table 4-6 provides a summary of the cost effectiveness analysis related to Fuel Substitution. The detailed cost analysis table is provided in Appendix D.

The cost effectiveness analysis does not include the cost to construct any new storage or handling facilities for the low sulfur CO coal that may be required.

The control cost factors were obtained from the EPA's Control Cost Manual, 6th Edition.

[9] The most recent U.S. Department of Labor, Producer Price Index Industry Data, from April 2004 – April 2008 indicates that costs have increased by the ratio of 143.2/102.9 over the last 5 year period (or 8.06 points per year). The original bid was from 2007. Consequently, the equipment cost was scaled up to 2012 (5 years) by multiplying by the ratio of 143.2/102.9.

TABLE 4-6. COST ANALYSIS SUMMARY FOR FUEL SUBSTITUTION

Control Case	Control Effectiveness (%)	Annual Cost ($/yr)	Existing Annual Emissions (tons/yr)	Pollutant Removed (tons/yr)	Cost Effectiveness ($/ton)	Cost* Impact ($/ton clinker)
Fuel Sub – PA	23%	$3,933,016	11,481	2,641	$1,489	$3
Fuel Sub – PA	40%	$27,218,156	11,481	4,592	$5,927	$22
Fuel Sub – PA	50%	$27,218,156	11,481	5,741	$4,741	$22
Fuel Sub – PTE	23%	$3,933,016	13,298	3,059	$1,286	$3
Fuel Sub – PTE	40%	$27,218,156	13,298	5,319	$5,117	$22
Fuel Sub – PTE	50%	$27,218,156	13,298	6,649	$4,094	$22

*Based on a maximum historical actual clinker production rate of 1,215,708 tons/year

The 3.0 percent sulfur coal option (used 23 percent control as the average) is cost effective and will be considered further.

The low sulfur CO coal option (40 to 50 percent control) is not cost effective and results in significant increases in cost per ton of clinker produced that would likely eliminate any profit margin currently realized by the plant. Thus, it would not be economically feasible to operate the plant with the low sulfur CO coal scenario.

In addition, for this analysis Holcim did consider the blending of solid fuel but considered it also to not be cost effective. In order to properly blend solid fuels for a precise distribution to control sulfur and chlorine inputs and not disrupt production due to fuel quality swings, an additional solid fuel equipment handling system would have to be installed. At a minimum, for each additional solid fuel used a system consisting of feed chutes, transfer conveyors, a storage silo, and a weigh belt would be required. It was conservatively estimated that the cost would be similar to the cost of a new mill and thus increase the cost well above the 3.0% sulfur coal option.

Energy Impacts

The low sulfur CO coal will require additional energy for grinding. The actual increase is difficult to estimate. The regional coal option also relies that a reliable source of tire derived fuel (TDF) and Hazardous Waste Derived Fuel (HWDF) is available to supplement 23% of the thermal requirements for clinker production

Non Air-Quality Impacts

None.

Remaining Useful Life

The remaining useful life of the kiln does not impact the annualized cost because the useful life is anticipated to be at least as long as the capital cost recovery period, which is 15 years.

4.4.3 DRY LIME SCRUBBING

Cost of Compliance

The increased cost of DLS includes the cost of hydrated lime as well as the injection system and replacing the existing ESP with a new baghouse. As the DLS injection system would likely be a custom application, Holcim's engineering department has estimated that the DLS injection system equipment cost would be approximately $1,000,000. Holcim obtained a bid for retrofitting the existing ESP with a Baghouse from GE Energy. A detailed analysis has not yet been completed to determine if the retrofit will be capable of handling the additional dust loading from the DLS system.

The quantity of hydrated lime required is calculated below on a PA and PTE basis as follows:

<u>Hydrated Lime Requirement.</u>

PA Basis:

The projected actual annual emission level of SO_2 is 11,481 tons

A molar ratio of 6:1, $Ca(OH)_2$ to SO_2, is required. The $Ca(OH)_2$ required is calculated by multiplying by the ratio of molecular weights:

6 x 11,481 tons SO_2 x (74 ton $Ca(OH)_2$/ 64 SO_2) = 79,649 tons $Ca(OH)_2$

The estimated purity of the hydrated lime is 96.8 percent $Ca(OH)_2$. Consequently, the amount required is scaled as follows:

79,649 tons $Ca(OH)_2$ / 0.968 = 82,282 tons hydrated lime

PTE Basis:

The PTE annual emission level of SO_2 is 13,298 tons

A molar ratio of 6:1, $Ca(OH)_2$ to SO_2, is required. The $Ca(OH)_2$ required is calculated by multiplying by the ratio of molecular weights:

6 x 13,298 tons SO_2 x (74 ton $Ca(OH)_2$/ 64 SO_2) = 92,255 tons $Ca(OH)_2$

The estimated purity of the hydrated lime is 96.8 percent $Ca(OH)_2$. Consequently, the amount required is scaled as follows:

92,255 tons $Ca(OH)_2$ / 0.968 = 95,304 tons hydrated lime

Table 4-7 provides a summary of the cost effectiveness analysis related to DLS. The detailed cost analysis table is provided in Appendix D. The control cost factors were obtained from the EPA's Control Cost Manual, 6th Edition.

TABLE 4-7. COST ANALYSIS SUMMARY FOR DRY LIME SCRUBBING

Control Case	Control Effectiveness (%)	Annual Cost ($/yr)	Existing Annual Emissions (tons/yr)	Pollutant Removed (tons/yr)	Cost Effectiveness ($/ton)	Cost* Impact ($/ton clinker)
DLS – PA	20%	$14,725,124	11,481	2,181	$6,750	$12
DLS – PA	30%	$14,725,124	11,481	3,272	$4,500	$12
DLS – PTE	20%	$16,756,579	13,298	2,527	$6,632	$14
DLS – PTE	30%	$16,756,579	13,298	3,790	$4,421	$14

*Based on a maximum historical actual clinker production rate of 1,215,708 tons/year

The significant increases in cost per ton of clinker produced from using DLS, as shown in Table 4-7, would likely eliminate any profit margin currently realized by the plant. Thus, it would not be economically feasible to operate the plant with DLS.

Energy Impacts
Additional electricity is needed for the pump used to inject the lime into the kiln gas.

Non Air-Quality Impacts
Utilizing DLS could also increase the amount of CKD sent to the landfill.

Remaining Useful Life
The remaining useful life of the kiln does not impact the annualized cost because the useful life is anticipated to be at least as long as the capital cost recovery period, which is 15 years.

4.5 EVALUATION OF VISIBILITY IMPACT OF FEASIBLE SO_2 CONTROLS

A final impact analysis was conducted to assess the visibility improvement for the existing emission rate when compared to the emission rate of WLS, Fuel Substitution, and DLS. The existing emission rates, and emission rates associated with controls, were modeled using CALPUFF. The existing emission rate is the same rate that was modeled for the BART applicability analysis. The SO_2 emission rate associated with WLS, Fuel Substitution, and DLS is the existing emission rates less the average anticipated control of 87.5 percent, 45 percent and 23 percent, and 25 percent respectively. The emission rates are summarized in Table 4-8.

TABLE 4-8. SUMMARY OF EMISSION RATES MODELED IN SO_2 CONTROL VISIBILITY IMPACT ANALYSIS

Emission Rate Scenario	Emission Rate		
	SO_2 (lb/hr)	NO_X (lb/hr)	PM_{10} (lb/hr)
WLS – 87.5%	611	3,049	51.82
Fuel Substitution – 45%	2,689	3,049	51.82
Fuel Substitution – 23%	3,765	3,049	51.82
DLS – 25%	3,667	3,049	51.82
Base case – Max 24-hr avg.	4,889	3,049	51.82

Comparisons of the existing visibility impacts and the visibility impacts based on WLS, Fuel Substitution, and DLS are provided in Table 4-9. The visibility improvement associated with the controls are also shown in Table 4-9; this value was calculated as the difference between the existing visibility impairment and the visibility impairment for the controlled emission rates as measured by the 98th percentile modeled visibility impact.

TABLE 4-9. SUMMARY OF MODELED IMPACTS FROM SO_2 CONTROL VISIBILITY IMPACT ANALYSIS

	Mingo National Wildlife Refuge	Hercules Glades Wilderness Area	Upper Buffalo Wilderness Area
Existing 98% Impact (Δdv)	1.01	0.81	0.61
WLS 98% Impact (Δdv)	0.48	0.31	0.21
WLS Improvement 98% Impact (Δdv)	0.53	0.50	0.40
(45% Control) Fuel Subs. 98% Impact (Δdv)	0.70	0.58	0.37
Fuel Subs Improvement 98% Impact (Δdv)	0.31	0.23	0.24
(23% Control) Fuel Subs. 98% Impact (Δdv)	0.87	0.72	0.48
Fuel Subs Improvement 98% Impact (Δdv)	0.14	0.09	0.13
DLS 98% Impact (Δdv)	0.87	0.70	0.48
DLS Improvement 98% Impact (Δdv)	0.14	0.11	0.13

4.6 PROPOSED BART FOR SO_2

Holcim reviewed each control option's availability, as well as its cost of compliance, energy impacts, and non-air quality impacts, as well as the remaining useful life of the kiln. Table 4-10 summarizes the cost effectiveness for the controls based on the tons of SO_2 reduced and the visibility improvement in deciviews.

TABLE 4-10. SUMMARY OF COST EFFECTIVENESS OF SO_2 CONTROL OPTIONS

Control Option*	Existing Emissions (tons/yr)	Reduced Annual Emissions (tons/yr)	Annual Cost ($/yr)	Cost** Effectiveness ($/ton)	Cost Impact ($/ton clinker)
WLS–PA–80%	11,481	8,726	$24,385,436	$2,826	$20
Fuel Sub–PA-40%	11,481	4,592	$27,218,156	$5,927	$22
Fuel Sub–PA–23%	11,481	2,641	$3,933,016	$1,489	$3
DLS – PA - 20%	11,481	2,181	$14,725,124	$6,750	$12

*The worst case scenario from a cost effectiveness perspective is provided.

**Includes 97 tons of NOx generated for WLS

Control Type **WLS–PA–80%** Class I Area	Base 98th Percentile Impact (DV)	Controlled 98th Percentile Impact (DV)	98th Percentile Improvement (DV)	98th Percentile Improvement (%)	Cost Effectiveness ($/DV)
Mingo	1.01	0.48	0.53	52.5	$46,010,256
Hercules	0.81	0.31	0.50	61.7	$48,770,872
Buffalo	0.61	0.21	0.40	65.6	$60,963,590
Control Type **Fuel Subs. – 40%** Class I Area	Base 98th Percentile Impact (DV)	Controlled 98th Percentile Impact (DV)	98th Percentile Improvement (DV)	98th Percentile Improvement (%)	Cost Effectiveness ($/DV)
Mingo	1.01	0.70	0.31	30.7	$87,800,502
Hercules	0.81	0.58	0.23	28.4	$118,339,807
Buffalo	0.61	0.37	0.24	39.3	$113,408,982
Control Type **Fuel Subs. - 23%** Class I Area	Base 98th Percentile Impact (DV)	Controlled 98th Percentile Impact (DV)	98th Percentile Improvement (DV)	98th Percentile Improvement (%)	Cost Effectiveness ($/DV)
Mingo	1.01	0.87	0.14	13.9	$28,092,971
Hercules	0.81	0.72	0.09	11.1	$43,700,177
Buffalo	0.61	0.48	0.13	21.3	$30,253,969
Control Type **DLS-20%** Class I Area	Base 98th Percentile Impact (DV)	Controlled 98th Percentile Impact (DV)	98th Percentile Improvement (DV)	98th Percentile Improvement (%)	Cost Effectiveness ($/DV)
Mingo	1.01	0.87	0.14	13.9	$105,179,459
Hercules	0.81	0.70	0.11	13.6	$133,864,766
Buffalo	0.61	0.48	0.13	21.3	$113,270,187

Based on the five step analysis outlined by EPA, this analysis demonstrates that the cost of compliance associated with WLS, Fuel Substitution with low sulfur CO coal, and DLS is extremely high on a $/ton of SO_2 removed basis, and especially on a $/DV of improvement basis, and is not economically feasible, especially if the cost per ton of clinker produced is taken into account. Fuel Substitution with a regional 3.0 percent sulfur coal, resulting in a 23 percent reduction in SO_2 emissions, is economically feasible and is being proposed as BART.

Holcim proposes that BART for SO_2 for the Holcim Clarksville Kiln is fuel substitution or equivalent technologies that will achieve a 23 percent reduction in the maximum daily SO_2 emission rate of 117,345 lbs.

Consistent with BART applicability which is determined on a daily basis, Holcim proposes to comply with an enforceable limit for SO_2 of 90,356 lbs/day which is a 23% reduction in the maximum daily SO_2 emission rate of 117,345 lbs.

In Portland cement kilns, the NO_X that is generated is primarily classified into one of two categories, i.e., thermal NO_X or fuel NO_X[10]. Thermal NO_X occurs as a result of the high-temperature oxidation of molecular nitrogen present in the combustion air. Fuel NO_X is created by the oxidation of nitrogenous compounds present in the fuel. It is also possible for nitrogenous compounds to be present in the raw material feed and become oxidized to form additional NO_X referred to as feed NO_X.

Due to the high flame temperature in the burning zone of the rotary kiln (3400° F), NO_X emissions from the kiln tend to be mainly comprised of thermal NO_X. Although NO_X emissions from cement kilns include both nitrogen oxide (NO) and nitrogen dioxide (NO_2), typically, less than 10% of the total NO_X in the flue gas is NO_2.[11]

The kiln is the only BART source which emits NO_x, thus a NO_x BART evaluation was performed only for the kiln. The maximum actual 24-hour kiln NO_x emission rate that was modeled for the BART applicability determination is summarized in Table 5-1. The NO_x 24-hour maximum actual emission rate was determined from analyzer data for November 24, 2007.

TABLE 5-1. EXISTING ACTUAL MAXIMUM 24-HOUR NO_X EMISSION RATES

	NO_x 24-Hour Emission Rate ton/24-hr	NO_x Hourly Equivalent Emission Rate lb/hr
Kiln	36.59 (73,185 lbs)	3,049

5.1 IDENTIFICATION OF AVAILABLE RETROFIT NO_X CONTROL TECHNOLOGIES

Step 1 of the BART determination is the identification of all available retrofit NO_X control technologies. A list of control technologies was obtained by reviewing the U.S. EPA's Clean Air Technology Center, control equipment vendor information, publicly-available air permits, applications, and technical literature published by the U.S. EPA and the RPOs.

The available retrofit NO_X control technologies are summarized in Table 5-2.

[10] NO_X Formation and Variability in Portland Cement Kiln Systems, Penta Engineering, December 1998.

[11] IBID.

TABLE 5-2. POSSIBLE NO_X CONTROL TECHNOLOGIES

Kiln Control Technologies
Low NO_X Burner Flue Gas Recirculation CKD Insufflation Mid-Kiln Firing of Tires Selective Noncatalytic Reduction Selective Catalytic Reduction

5.2 ELIMINATE TECHNICALLY INFEASIBLE NO_X CONTROL TECHNOLOGIES

Step 2 of the BART determination is to eliminate technically infeasible NO_X control technologies that were identified in Step 1.

5.2.1 LOW-NO_X BURNER IN THE ROTARY KILN

Low NO_x burners (LNBs) reduce the amount of NO_x formed at the flame. The principle of all LNBs is the same: stepwise or staged combustion and localized exhaust gas recirculation (i.e. at the flame). As applied to the rotary cement kiln, the low-NO_X burner creates primary and secondary combustion zones at the end of the main burner pipe to reduce the amount of NO_x initially formed at the flame. In the high-temperature primary zone, combustion is initiated in a fuel-rich environment in the presence of a less than stoichiometric oxygen concentration. The oxygen-deficient condition at the primary combustion site minimizes thermal and fuel NO_X formation and produces free radicals that chemically reduce some of the NO_X that is being generated in the flame.

In the secondary zone, combustion is completed in an oxygen-rich environment. The temperature in the secondary combustion zone is much lower than in the first; therefore, lower NO_X formation is achieved as combustion is completed. CO that has been generated in the primary combustion zone as an artifact of the sub-stoichiometric combustion is fully oxidized in the secondary combustion zone.

Low-NO_X burners are considered to be a technically feasible option for NO_X control. As Holcim already has a LNB, the technology will not be considered further.

5.2.2 FLUE GAS RECIRCULATION

Flue gas recirculation involves the use of oxygen-deficient flue gas from some point in the process as a substitute for primary air in the main burner pipe in the rotary kiln. Flue gas recirculation (FGR) lowers the peak flame temperature and develops localized reducing conditions in the burning zone through a significant reduction of the oxygen content of the primary combustion "air." The intended effect of the lower flame temperature and reducing conditions in the flame is to decrease both thermal and fuel NO_X formation in the rotary kiln.

While FGR is a practiced control technology in the electric utility industry, Holcim is not aware of any attempt to apply FGR to a cement kiln because of the unique process requirements of the industry, i.e., a hot flame is required to complete the chemical reactions that form clinker minerals from the raw materials. The process of producing clinker in a cement kiln requires the heating of raw materials to about 2700°F for a brief but appropriate time to allow the desired chemical reactions that form the clinker minerals to occur. A short, high-temperature flame of about 3400°F is necessary to meet this process requirement. The long/lazy flame that would be produced by FGR would result in the production of lower or unacceptable quality clinker because of the resulting undesirable mineralogy. Clinkering reactions must take place in an oxidizing atmosphere in the burning zone to generate clinker that can be used to produce acceptable cement. FGR would tend to produce localized or general reducing conditions that also could detrimentally affect clinker quality. Due to these important limitations on the application of FGR and the lack of a successful demonstration on a cement kiln in the United States, FGR is not a technically feasible control option for NO_X control at this time.

5.2.3 CEMENT KILN DUST INSUFFLATION

Cement kiln dust (CKD) is a residual byproduct that can be produced by any of the four basic types of cement kiln systems. CKD is most often treated as a waste even though there are some beneficial uses. However, as a means of recycling usable CKD to the cement pyroprocess, CKD sometimes is injected or insufflated into the burning zone of the rotary kiln in or near the main flame. The presence of these cold solids within or in close proximity to the flame has the effect of cooling the flame and/or the burning zone thereby reducing the formation of thermal NO_X. The insufflation process is somewhat counterintuitive because a basic requirement of a cement kiln is a very hot flame to heat the clinkering raw materials to about 2700^{o}F in as short a time as possible. The Clarksville plant already uses this technology and it is already included in the baseline. Therefore, this option is removed from consideration for BART.

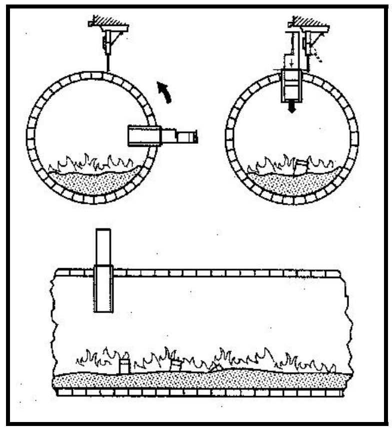
5.2.4 MID-KILN FIRING OF SOLID FUEL WITH MIXING AIR FAN

Secondary combustion is defined as follows: a portion of the fuel is fired in a location other than the burning zone. This reduces thermal NO_x generation because the temperature in the secondary combustion zone is less than 2100 °F. Mid-kiln firing (MKF) of solid fuels is an example of secondary combustion and includes fuels such as used tires, oil filter fluff, plastics, spent activated carbon and carbon black, asphalt shingles, diaper manufacturing waste, and other combustible solids. MKF improves clinker process energy efficiency, allows for greater operational flexibility with respect to fuel types, and is currently listed as a NOx control technology in 10 CSR 10-6.380 Control of NOx Emissions from Portland Cement Kilns.

An example of a MKF system is the Cadence feed form MKF technology which was first introduced in 1989. It is comprised of three primary components: (1) a staging arm or "feed fork," that picks up the fuel modules and positions them for entry into the kiln, (2) two pivoting doors that open to allow the fuel to drop into the kiln, and (3) a drop tube that

extends through the side wall of the kiln. In addition to these basic components, feed fork technology also requires a delivery system which positions the fuel models so they can be picked up by the feed fork and a mechanism for opening the doors so the fuel can enter the kiln. Due to rotation of the kiln, fuel can only be injected once per revolution from the top, as shown in Figure 5-1.

FIGURE 5-1. MID-KILN FIRING SCHEMATIC[12]



High-pressure air, in the range of a 2-10 percent replacement of the primary combustion air, could be injected through the shell of the rotary kiln and into the calcining zone to where a mixing air fan mixes the air with the gas and fuel within the rotary kiln for more complete combustion of the solid fuel.

By adding fuel mid-kiln, MKF changes both the flame temperature and flame length. These changes should reduce thermal NO_X formation by burning part of the fuel at a lower temperature and by creating reducing conditions at the mid-kiln fuel injection point which may destroy some of the NO_X formed upstream in the kiln burning zone.

Clarksville has the largest long kiln in the world. The kiln has a 7 meter diameter and a very high thermal capacity. Using whole tires to replace 10% of total fuel consumption will require four whole tires being fed to the mid-kiln door per kiln revolution, 12% fuel replacement would require 5 tires per revolution. The maximum tire feed rate per revolution that Holcim is aware of, on similar applications, is three tires per revolution. Holcim is concerned that the greater the number of tires fed per revolution, on a continuous basis, the greater the potential for process upsets from unstable feeding. Holcim has found that kilns being fed even one to three tires per revolution can have problems with stable, uniform feeding. In addition, if too many tires burn at the bottom of the kiln, a high local temperature could result which would disturb the normal operation of the kiln and potentially increase NOx. Further, due to the large kiln diameter, the reducing zone created by burning tires may only impact a small cross section of the entire cross section of the kiln, thus having less of an overall reduction in NOx than anticipated.

[12] NO_X Control Technologies for the Cement Industry, EC/R Incorporated, Chapel Hill, NC, USA, U.S. EPA Contract NO. 68-D98-025, U.S. EPA RTP, September 19, 2000.

In an effort to better understand these uncertainties, Holcim hired CINAR Company, the expert in this field, to conduct modeling of the system and to predict NOx reduction. Their study predicted that a 15% NOx reduction would occur at 10% replacement (replace 10% of the current fuel with tires) and 27% NOx reduction for 15% replacement.

To then determine the thermal substitution rate (TSR) of tires that the Clarksville plant is capable of utilizing, three additional factors must be considered:

1. Tire availability. The local market only has sustainable resources of 10-12% TSR;
2. Tire feeding limit: 12% TSR equates to five tires being fed per revolution.
3. The thermal stability of operation in a large kiln. 15% TSR is predicted to be the maximum for short term periods, whereas 10-12% TSR is predicted to be achievable on a long term basis.

Based on the lack of experience using MKF of tires on kilns the size of Clarksville, Holcim is relying on the computer modeling (regardless of the general uncertainty that exists with computer models) to estimate the NOx reduction. Holcim anticipates that MKF of tires may achieve up to 20% percent NOx reduction at a TSR of 12 percent on a long term basis.

Tires also have the benefit of a lower sulfur content (the Rubber Manufacturers Association reports a value of 1.83 percent) relative to the current coal/coke used as accounted for in the Fuel Substitution – Regional 3.0 percent sulfur coal scenario (See Section 4.2.1) for SO_2 control

MKF is considered to be a technically feasible option for NOx control. Further, Holcim has already received a construction permit that would allow the installation of MKF, whereas other technologies would require a new construction permit application process, the result of which is unknown.

5.2.5 SELECTIVE NONCATALYTIC REDUCTION

In the relatively narrow temperature window of 1600 to 1995°F, ammonia (NH_3) reacts with NO_x without the need for a catalyst to form water and molecular nitrogen in accordance with the following simplified reactions.

$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$
$2NO_2 + 4NH_3 + O_2 \rightarrow 3N_2 + 6H_2O$

As applied to NO_x control from cement kilns and other combustion sources, this technology is called selective noncatalytic reduction (SNCR). Above this temperature range, the NH_3 is oxidized to NO_x thereby increasing NO_x emissions. Below this temperature range, the reaction rate is too slow for completion and unreacted NH_3 may be emitted from the pyroprocess. This temperature window generally is available at some

location within the rotary kiln. The NH_3 could be delivered to the kiln shell through the use of anhydrous NH_3, or an aqueous solution of NH_3 (ammonium hydroxide) or urea.

A concern about application of SNCR technology is the breakthrough of unreacted NH_3 as "ammonia slip" and its subsequent reaction in the atmosphere with SO_2, sulfur trioxide (SO_3), hydrogen chloride (HCl) and/or chlorine (Cl_2) to form a detached plume of sub-micron particles. As NH_3 or Urea injection rates are increased, to attempt to achieve higher levels of reduction, NH_3 emission levels are increased.

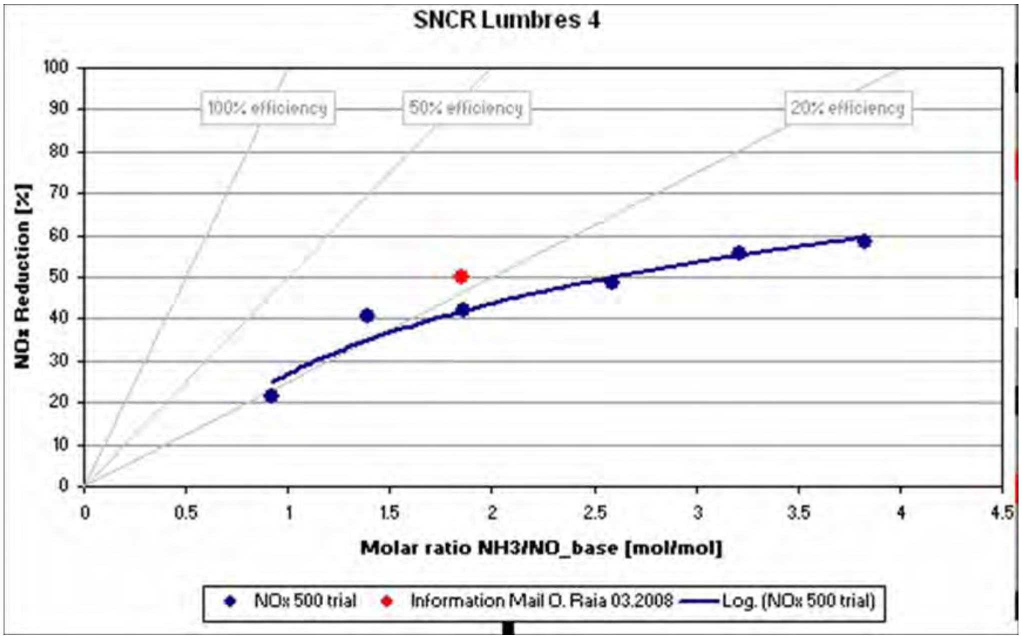
Industry Experience

Ash Grove Cement Company installed a full scale SNCR system on one of its wet kilns in Midlothian, Texas. Ash Grove has reported that it is achieving a 35 to 40% NOx reduction; however, as this application has just started, no data is available to verify this reduction is being achieved or on what averaging period or the long term sustainability.[13]

Holcim's wet plant in Lumbres, France utilizes SNCR. It is the earliest application of SNCR on a long kiln in the world and has been running for multiple years. The plant has found that NH_3 slip increases as the urea injection rate increases especially when the molar ratio is more than 1.0 (i.e. the NH_3 added is more than needed for the reaction). At this level, significant amounts of NH_3 are unreacted. The plant reports achieving 20 percent NOx reduction at a 1.0 molar ratio of NH_3/NOx and 40 percent at a molar ratio of 1.5 as shown in Figure 5-2.

[13] BART Five Factor Analysis. Ash Grove Cement Company Montana City, Montana. Dated June 2007. Page 5-9.

FIGURE 5-2. NOX REDUCTION VERSUS NH3 MOLAR RATIO OBSERVED AT HOLCIM LUMBRES PLANT.



However, at 20 percent NOx reduction, the NH_3 slip is reported to be 10 mg/m3, while at 40 percent reduction, the NH_3 slip can be 20 – 30 mg/m^3 (a 50 percent to 100 percent increase). Based on experiences at many cement plants with SO_2 and HCl in the exhaust gas, which is also the case for the Clarksville plant, a 20 mg/Nm3 NH_3 increase would cause a severe increase in plume visibility. The Lumbres plant is also smaller than Clarksville, having a diameter of only 3.3 meters versus Clarksville's 7 meter diameter kiln. The larger diameter of Clarksville's kiln would make distribution of the reagent across the kiln more difficult, and would reduce the effectiveness to an unknown degree.

NO_X reductions from SNCR systems can vary considerably based on site specific conditions, most notably being the type of kiln. For example, the NO_X reduction at the long wet kiln at Lumber is lower at a given ammonia molar ratio than observed at similar size preheater/pre-calciner (PH/PC) kilns. Some of the reasons for this lower relative NO_X reduction include:

- In a long wet kiln, the NH_3 is sprayed in the kiln itself, rather than being sprayed in the ductworks in a PH/PC kiln. A kiln's diameter is much larger than the ductwork diameter which makes it more difficult for the liquid NH_3 to be evenly distributed across the entire cross section of the gas stream.
- Studies have shown that in long kilns, the gas stream can be highly stratified over the cross section. The relatively heavy CO_2 released from the raw materials tends to stay on the top and bottom of the raw material bed, while lighter O_2 tends to float to the top of the kiln cylinder. This theory has been proven by many actual measurements at the plant. In contrast, the ductwork in PH/PC kiln systems are mostly vertical and this stratification is not observed, or is much less than in the

horizontal kiln system. The combination of stratification in the kiln cylinder, and less even distribution of NH_3, compound the problem of poor contact between the NH_3 and NO_X.

- The reaction of NH_3 and NO_X includes multiple steps that require O_2. In the areas of the long kiln that are lacking in O_2, the reaction rate is significantly lower, and thus NOx reduction is significantly lower relative to a well mixed gas stream.

Based on the concerns with NH_3 slip at high molar ratios, and the uncertainty regarding the level of effectiveness of the reagent in Clarksville's large diameter kiln, Holcim anticipates that at a molar ratio of about 1.0, an average annual control efficiency of 20 percent could likely be achieved without excessive NH_3 slip. However, a pilot study would need to be conducted to verify this. Regardless, SNCR is considered to be a technically feasible option for NO_X control.

5.2.6 SELECTIVE CATALYTIC REDUCTION

Selective Catalytic Reduction (SCR) is an add-on control technology for the control of emissions of the oxides of nitrogen (NO_x) from a combustion process. SCR has been successfully employed in the electric power industry. The basic SCR system consists of a system of catalyst grids placed in series with each other within a vessel that is located in a part of the process where the normal flue gas temperature is in the required range. An ammonia-containing reagent is injected at a controlled rate upstream of the catalyst grids that are designed to ensure relatively even flue gas distribution within the grids, to provide good mixing of the reagent and flue gas, and to result in minimum ammonia (NH_3) slip.[14] The NH_3 reacts with NO_X compounds (i.e., NO and NO_2) on the surface of the catalyst in equal molar amounts (i.e., one molecule of NH_3 reacts with one molecule of NO_X). Common reagents include aqueous NH_3, anhydrous NH_3 and urea $[(NH_2)_2CO]$. In the presence of the catalyst, the injected ammonia is converted by OH^- radicals to ammonia radicals (i.e., NH_2^-), which, in turn, react with NO_X to form N_2 and H_2O. The SCR catalyst enables the necessary reactions to occur at lower temperatures than those required for Selective Non-Catalytic Reduction (SNCR). While catalysts can be effective over a larger range of temperatures, the optimal temperature range for SCR is 570 - 750º F.

The catalyst system used in SCR applications usually consists of (1) a porous honeycomb of a ceramic substrate onto which catalyst has been attached to the surface of the ceramic material, or (2) a flat or corrugated plate onto which catalytic material has been deposited on the surface. A porous metal oxide with a high surface area-to-volume ratio acts as a catalyst base. On this base, typically titanium dioxide (TiO_2), one or more metal oxide catalysts are deposited in various concentrations. In SCR applications, the active catalyst material typically consists of vanadium pentoxide (V_2O_5), tungsten trioxide (WO_3), and molybdenum trioxide (MoO_3) in various combinations. The composition, also known as the catalyst formulation, is tailored by the catalyst vendor to best suit a particular SCR application. Catalyst deactivation through poisoning, fouling, masking, sintering and erosion are common problems for SCR catalysts that, without careful process design and

[14] Slip refers to the quantity of unreacted reagent that exits the SCR reactor.

operation, could be exacerbated. If not fouled by sulfur dioxide (SO_2), the catalysts used in SCR have a propensity to oxidize sulfur dioxide (SO_2) in the flue gas to sulfur trioxide (SO_3), a more undesirable pollutant.

Because the reaction rate of NH_3 and NO_x is temperature dependent, the temperature of the flue gas stream to be controlled is the most important consideration in applying SCR technology to any combustion source. The optimum temperature range for SCR application is about 300º C (570º F) to 450º C (840º F). This range of normal process temperature would occur within the kiln of a long wet kiln, rather than in the exhaust gas between the wet kiln and the PMCD inlet.

SCR has not been applied to any wet cement plant in the world and is not considered an available technology.

As explained in more detail below, a technology is considered "available" if it can be obtained by the applicant through commercial channels or is otherwise available within the common sense meaning of the term. An available technology is “applicable” if it can reasonably be installed and operated on the source type under consideration. A technology that is available and applicable is technically feasible. Availability in this context is further explained using the following process commonly used for bringing a control technology concept to reality as a commercial product: concept stage; research and patenting; bench scale or laboratory testing; pilot scale testing; licensing and commercial demonstration; and Commercial sales.

A control technique is considered available, within the context presented above, if it has reached the licensing and commercial sales stage of development. A source would not be required to experience extended time delays or resource penalties to allow research to be conducted on a new technique. Neither is it expected that an applicant would be required to experience extended trials to learn how to apply a technology on a totally new and dissimilar source type. Consequently, technologies in the pilot scale testing stages of development would not be considered available. An exception would be if the technology were proposed and permitted under the qualifications of an innovative control device consistent with the provisions of 40 CFR 52.21(v) or, where appropriate, the applicable SIP [in which case it would be considered available].

Therefore, SCR is eliminated from further consideration as BART for NO_x control at the Clarksville plant.

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5.3 RANK OF TECHNICALLY FEASIBLE NO_X CONTROL OPTIONS BY EFFECTIVENESS

The third step in the BART analysis is to rank the technically feasible options according to effectiveness. Table 5-3 presents potential NO_X technically feasible control technologies by effectiveness.

TABLE 5-3. RANKING OF TECHNICALLY FEASIBLE KILN NO_X CONTROL TECHNOLOGIES BY EFFECTIVENESS

Control Technology	Effectiveness NO_X Emissions Level (%)
MKF	20%
SNCR	20%
LNB, CKD Insufflation, and Synfuel	Already utilized at Clarksville

5.4 EVALUATION OF IMPACTS FOR FEASIBLE NO_X CONTROLS

Step four for the BART analysis procedure is the impact analysis. The BART determination guidelines list four factors to be considered in the impact analysis:

- Cost of compliance
- Energy impacts
- Non-air quality impacts; and
- The remaining useful life of the source

5.4.1 MKF

Cost of Compliance

Holcim anticipates that MKF and SNCR have relatively the same level of effectiveness. Because SNCR would require a pilot study to prove or verify the effectiveness of NOx reduction and the potential associated opacity issues due to ammonia slip (see Appendix B), Holcim is accepting the use of MKF as BART. As Holcim is accepting the most stringent control option available as BART, the cost of compliance is not required to be evaluated. Regardless, a cost analysis has been conducted for informational purposes.

Table 5-4 provides a summary of the cost effectiveness analysis related to MKF. The detailed cost analysis table is provided in Appendix D. The control cost factors were obtained from the EPA's Control Cost Manual, 6th Edition.

TABLE 5-4. COST ANALYSIS SUMMARY FOR MKF

Control Case	Control Effectiveness (%)	Annual Cost ($/yr)	Existing Annual Emissions (tons/yr)	Pollutant Removed (tons/yr)	Cost Effectiveness ($/ton)
MKF – PA	20%	$594,680	6,414	1,283	$464
MKF – PTE	20%	$594,680	8,462	1,692	$351

Energy Impacts and Non Air-Quality Impacts
There are no known adverse energy or non-air impacts from MKF. MKF of tires has the benefit of eliminating tires from landfills and illegal dumping. It also reduces CO_2 emissions (a Green House Gas) and reduces fossil fuel use.

Remaining Useful Life
The remaining useful life of the kiln does not impact the annualized costs of MKF because the useful life is anticipated to be at least as long as the capital cost recovery period, which would be 15 years.

5.4.2 SNCR

Cost of Compliance
As SNCR would require a pilot test, and the level of control/feasibility is in question, Holcim can not prepare a detailed cost analysis. However, an analysis was recently conducted for a portland plant with a wet process kiln in Midlothian Texas which reported a cost effectiveness of $2200/ton[15] which is significantly more than the $351/ton - $464ton for MKF. Regardless, as Holcim is accepting the most stringent control option available as BART, the cost of compliance is not required to be evaluated.

5.5 EVALUATION OF VISIBILITY IMPACT OF FEASIBLE NO_X CONTROLS

The final impact analysis was conducted to assess the visibility improvement for existing emission rates when compared to the emission rate with MKF. The existing emission rates and emission rates associated with MKF were modeled using CALPUFF. The existing emission rates are the same rates that were modeled for the BART applicability analysis. The NO_x emission rate associated with MKF was the existing emission rate less an average reduction of 20 percent. The emission rate is summarized in Table 5-5.

TABLE 5-5. SUMMARY OF EMISSION RATES MODELED IN NO_X CONTROL VISIBILITY IMPACT ANALYSIS

	Emission Rate		
Emission Rate Scenario	SO_2 (lb/hr)	NO_X (lb/hr)	PM_{10} (lb/hr)
MKF,	4,889	2,440	51.82
Base case – High 24 hr average	4,889	3,049	51.82

Comparisons of the 98th percentile existing visibility impacts and the visibility impacts based on MKF are provided in Table 5-6. The visibility improvements associated with MKF are also shown in Table 5-6; this was calculated as the difference between the existing visibility impairment and the visibility

[15] Assessment of NOx Emissions Reductions Strategies for Cement Kilns – Ellis County, Texas, Final Report. TCEQ Contract No. 582-04-65589, Work Order No.05-06. July 14, 2006. Page 1-12.

impairment for the remaining control options as measured by the 98th percentile modeled visibility impact.

TABLE 5-6. NO_X CONTROL VISIBILITY IMPACT ANALYSIS

	Existing 98% Impact (Δdv)	MKF 98% Impact (Δdv)	Improvement
Mingo	1.01	0.92	8.9%
Hercules	0.81	0.72	11.1%
Upper Buffalo	0.61	0.60	1.6%

As seen in Tables 5-6, the MKF option results in a visibility improvement of up to 11.1 percent in the Hercules Glades Class I area.

5.6 PROPOSED BART FOR NO_X

Based on the five step analysis outlined by EPA, MKF was identified as the highest ranking feasible add-on control technology. Economic, energy and environmental impacts were assessed for this technology and the visibility improvements were evaluated against existing conditions. The visibility impact analysis demonstrates that the utilization of MKF to achieve a 2,440 lb/hr NO_x emission rate results in up to an 11.1 percent visibility improvement. Neither non-air quality nor energy impacts associated with this control technology eliminate it in favor of retaining the existing rates as BART.

Holcim has determined that BART for the Holcim Clarksville Kiln is the installation and operation of a Mid Kiln Firing (MKF) system or equivalent that will achieve a 20 percent reduction in the maximum daily NO_X emission rate of 73,185 lbs.

Consistent with BART applicability, which is determined on a daily basis, Holcim proposes to comply with an enforceable limit for NOx of 58,548 lbs/day which is a 20% reduction in the maximum daily NO_X emission rate of 73,185 lbs.

Based on the lack of site specific, or significant industry data, for the use of this technology on wet cement kilns, it is possible that Holcim will further evaluate the MKF system and determine that MKF results in limited or no additional benefit. In the future, an alternative technology or methodology may become feasible and could be implemented as needed. Holcim will continue to utilize the NOx controls that are already in place, including LNB, insufflation, and the use of alternative fuels as available.

6. BART SUMMARY

Based on the five-step analysis, Holcim proposes the following as BART:

Kiln:

- PM_{10} – Holcim has determined that the existing electrostatic precipitator constitutes BART. This control device is effective for controlling PM_{10} from a wet kiln.

- NO_X – Holcim has determined that BART for the Holcim Clarksville Kiln is the installation and operation of a Mid Kiln Firing (MKF) system or equivalent that will achieve a 20 percent reduction in the maximum daily NO_X emission rate of 73,185 lbs.

- SO_2 – Holcim proposes that BART for the Holcim Clarksville Kiln is fuel substitution or equivalent that will achieve a 23 percent reduction in the maximum daily SO_2 emission rate of 117,345 lbs.

The proposed BART control strategies will result in reductions of the visibility impacts attributable to the Clarksville plant. A summary of the visibility improvement at Class I areas based on the existing emission rates and proposed BART emission rates is provided in Table 6-1.

TABLE 6-1. VISIBILITY IMPAIRMENT IMPROVEMENT

	Mingo National Wildlife Refuge	Hercules Glades Wilderness Area	Upper Buffalo Wilderness Area
Existing 98% Impact (Δdv)	1.01	0.81	0.61
BART 98% Impact (Δdv)	0.79	0.64	0.48
Improvement 98% Impact (Δdv)	22%	21%	22%

Holcim proposes to implement BART on or before 5 years after EPA approval of Missouri's Regional Haze Rule State Implementation Plan as per 40 CFR 51 Appendix Y. Because the actual implementation date is at least 5 years from the date of this document, Holcim requests that it not be bound to the technologies reviewed during this analysis, but to the daily limits stated in the report. Changes in technology may offer opportunities to obtain even better reductions with lower cost impact.

Consistent with BART applicability which is determined on a daily basis, Holcim proposes to comply with an enforceable limit for SO_2 of 90,356 lbs/day which is a 23% reduction in the maximum daily SO_2 emission rate of 117,345 lbs.and a NOx limit of 58,548 lbs/day which is a 20% reduction in the maximum daily NO_X emission rate of 73,185 lbs..

APPENDIX A. COAL COMPOSITION DATA

Appendix A. Coal Composition Data - Holcim Clarksville BART Analysis Options:

	Regional Coals		CO Coal	
Area	**Illinois**	**Illinois**	**Colorado**	
Company **Mine name**	**Peabody COALSALES LLC** **Gateway Mine**	**Knighthawk** **KHC Mines, primarily Pairie Eagle Mine**	**COALSALES LLC** **Twentymile Mine**	
		FOB Lone Eagle (KHC Dock, Mile post 105)	**Rail:** Energy, CO to Cora, IL via UP Rail **Barge:** Cora, IL to Clarksville	
Transportation Mode	**Barge**	**Truck & Barge**	**0.7% Sulfur Coal**	
Sulfur %	2.83%	3.00%	0.70%	**Sulfur %**
Ash %	8.60%	8.50%	10.00%	**Ash %**
Volatiles %	35.50%	37.00%	34.40%	**Volatiles %**
Moisture %	13.50%	12.50%	10.00%	**Moisture %**
Hydrogen %	5.00%	5.20%	5.00%	**Hydrogen %**
HGI	52	55	45	**HGI**
Chlorine %	0.12%	0.05%	0.01%	**Chlorine %**
mmbtu/lb	11,000	11,100	11,300	**mmbtu/lb**
HHV MJ/MT	25,582	25,814	26,279	**HHV MJ/MT**
LHV MJ/MT	25,567	25,800	26,266	**LHV MJ/MT**
Ultimate (Dry)				**Ultimate (Dry)**
Ash %	9.90%	9.00%	11.00%	Ash %
Hydrogen	5.00%	5.20%	5.00%	Hydrogen
Total Carbon	71.40%	72.00%	69.60%	Total Carbon
Nitrogen	1.30%	1.40%	1.70%	Nitrogen
Sulfur	3.28%	3.10%	0.54%	Sulfur
Chlorine	0.12%	0.04%	0.01%	Chlorine
Oxygen	9.00%	9.40%	10.75%	Oxygen
Ash Mineral (Dry)				**Ash Mineral (Dry)**
Silicon Dioxide	51.40%	50.70%	60.00%	Silicon Dioxide
Aluminum Oxide	19.70%	20.50%	25.10%	Aluminum Oxide
Titamium Dioxide	1.00%	1.00%	0.90%	Titamium Dioxide
Calcium Oxide	4.20%	3.50%	4.00%	Calcium Oxide
Iron Oxide	16.30%	15.80%	3.10%	Iron Oxide
Magnesium Oxide	1.00%	1.00%	1.40%	Magnesium Oxide
Potassium Oxide	2.20%	2.20%	1.30%	Potassium Oxide
Sodium Oxide	1.30%	0.70%	1.20%	Sodium Oxide
Sulfur Trioxide	2.60%	2.70%	1.50%	Sulfur Trioxide
Phos Pentoxide	0.20%	0.20%	0.90%	Phos Pentoxide
Strontium Oxide	0.10%		0.20%	Strontium Oxide
Barium Oxide	0.10%		0.40%	Barium Oxide
Manganese Oxide	0.10%	0.10%	0.10%	Manganese Oxide
Vanadim Pentroxide				
Nickel Oxide				
Undetermined		1.80%		

APPENDIX B. REVIEW OF THE POTENTIAL FOR PLUME OPACITY EXCEEDANCES RESULTING FROM THE USE OF A WET SCRUBBER

Appendix B. Review of the Potential for Plume Opacity Exceedances Resulting from the Use of a Wet Scrubber.

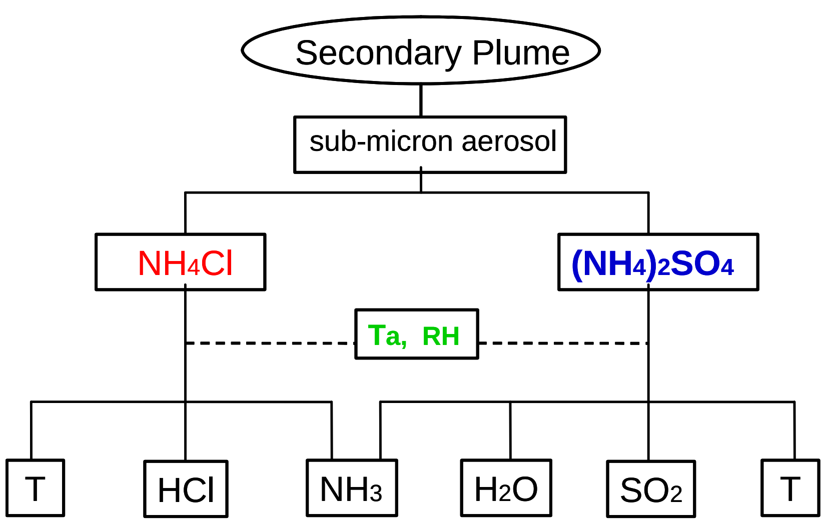
Nianzhi Wang, MPC-E

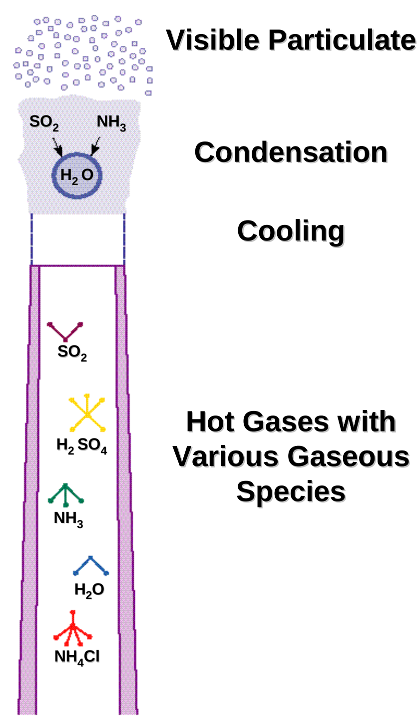
In the BART analysis for Holcim's Clarksville (CV) facility, a wet scrubber has been evaluated as a BART control option for SO_2. Although, a scrubber was shown to be technically feasible, it was also determined that reheating of the exhaust gas would be necessary to avoid a detached/attached plume. Following is an analysis of the gas stream to determine the specific temperature needed for the plume reheating requirement. The kiln system is currently controlled by an ESP and currently has an outlet gas temperature of approximately 380 deg F.

Background - The plume problem in cement manufacturing process

To evaluate the reheating requirement, we have to briefly introduce the plume problem in cement plants and potential risk of a visible plume after the scrubber.

The following figure shows the chemical reactions for most common types of plume in the cement manufacturing process, Although SO_3 and Total Hydrocarbons (THC) may also contribute to the plume, they have not been considered.





T = Stack Temperature, RH = Ambient Relative Humidity, Ta = Ambient Temperature

Some of the key points relevant to the diagram include:

- Both $(NH4)_2SO4$ and NH_4Cl are sub-micron aerosols that form at relatively low stack temperatures. $(NH4)_2SO4$ formation needs condensed moisture to occur. Whereas NH_4Cl solid can quickly form directly from the gas phase of NH_3 and HCl although with condensed moisture the reaction rate will be much faster.
- Sub-micron aerosols are similar in size to the wave length of light and thus strongly scatter the light and block light transmission through the stack gas. Figure 1 provides an example of relative light extinction versus particle size. For example, a $PM_{0.5}$ particle has an extinction efficiency approximately an order of magnitude greater than that of PM_{10}.

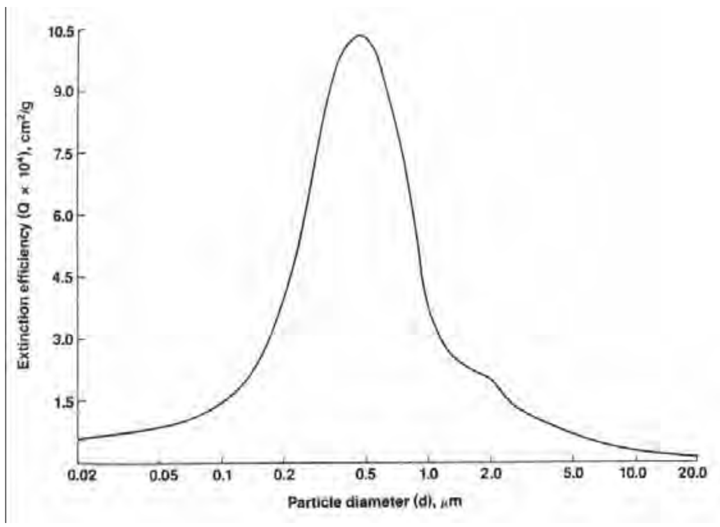


Figure 1. Extinction Efficiency Factor Verses Particle Diameter.

- The particle light extinction efficiency factor indicates the total light flux scattered and absorbed by a particle. Aerosols in the 0.2 - 1.0 μm diameter range are particularly effective in scattering visible light (wavelength: about 0.4 - 0.7 μm) on a unit mass basis, with a peak attenuation at 0.5 μm.

- The particles of either very large (>5 μm) or very small (<0.1 μm) diameter are much less effective in light attenuation.

- Plume aerosols usually form outside of the stack when the gas temperature is quickly cooled down and moisture is condensed, but the precursors have not had sufficient time to be diluted with ambient air. This situation is most dominant in occurrence on cold, calm and humid days.

Supplement A, at the end of this document, contains examples of historical visible plume problems in the cement industry and related studies.

Problems Associated with Using a Wet Scrubber on the Clarksville Kiln Exhaust Gas (in-stack)

- If a wet scrubber is installed after the Clarksville kiln, the kiln gas will need to be quenched and cooled down to the dew point temperature at the inlet of the scrubber (a similar condition of gas cooling in the presence of high humidity that can occur at the exit of a stack). If the gas has NH_3 and HCl, they can quickly react to form aerosols (fine particulate matter). These very fine particulates are controlled with a much lower efficiency than larger PM and thus can increase PM levels of the form of PM that leads to the highest plume visibility.

- In addition, the scrubber can not remove all NH_3 or SO_2 in the gas stream. The typical SO_2 reduction in a scrubber is about 90%. The NH_3 removal is governed by the equilibrium between the gas and the scrubber slurry liquid. Figure 2 provides the NH_3 gas-liquid equilibrium graph at a pH of 6. The NH_3 remaining in the effluent can be up to 10 ppm depending on the type of scrubber, the pH set point in the scrubber, and the scrubber influent NH_3 concentration. The remaining SO_2 and NH_3 in the scrubber effluent could react with the NH_4Cl aerosols already present in the gas and further increase plume visibility.

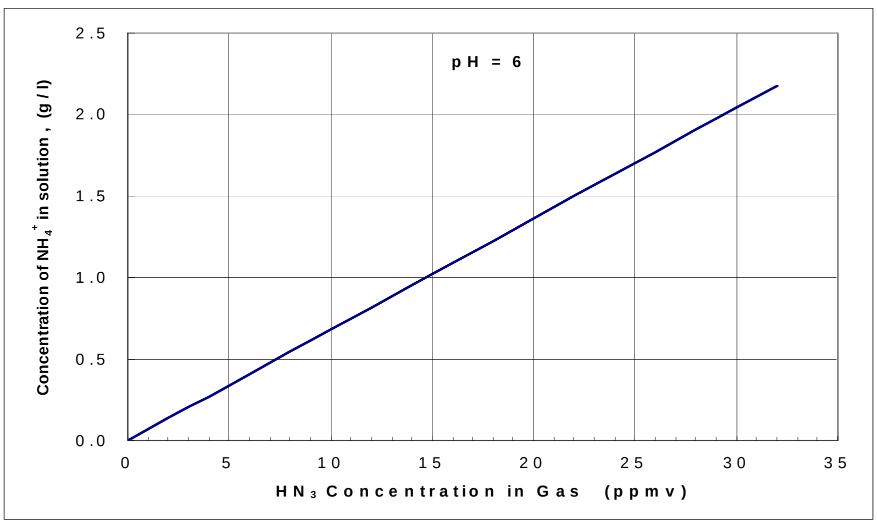


Figure 2. Concentration of NH_4^+ versus HN3 Concentration in Gas

- The gas temperature after the scrubber is much lower than the kiln gas temperature. Besides the aerosols formed at the inlet of the scrubber, more aerosols may also form in the cold and wet stack, and therefore, increase opacity.

Several scrubber vendors have confirmed the above phenomena with scrubber use:

- As an example, a vendor evaluated building a wet scrubber for one of Holcim's PH/PC plants. A PH/PC kiln system typically has two gas effluent streams, one contains high NH_3 (main stack) and the other contains high HCl (by-pass stack). Usually, both streams are introduced to a control device at the same inlet,

However, in this situation, the vendor provided the following concerns/comments in doing so as part of a feasibility study for the plant[1]:

> *"Mixing the NH_3 and HCl streams at the inlet will indeed produce an NH_4Cl salt that will be submicron in size".*
>
> *"This will result in opacity, I am sure it will be greater than 20%. Once this salt is formed, it will be very difficult to remove. Therefore, the preferred treatment would be to absorb the gases before they have a chance to react".*
>
> *"As we discussed, the two separate gas streams can be treated with individual scrubbers. However, it would be less expensive to perform the scrubbing in a single, large vessel with two separate inlet barrel"*

The scrubber system was ultimately built by Monsanto. And, even though the problem was acknowledged, and the system was designed to prevent the visible plume problem, the plant still has challenges with plume formation during the winter.

<u>Kiln gas emission concentrations and opacity</u>

- Holcim, as well as other companies, have found that at about 5ppm NH_4Cl or 10ppm $(NH4)_2SO4$, detached plumes can form outside of the stack if the stack gas is not hot enough to allow for significant dilution prior to condensation or if it is a very cold day in winter. Both aerosols will form quickly when the stack gas is cooled down by very cold ambient air.

- Stack temperatures for wet kilns are typically about 350 F. PH/PC kilns have similar stack temperatures when their in-line raw mills are not running. During these periods, PH/PC kilns have also observed a higher frequency of visible plumes as the precursors, NH_3, HCl and SO2, are not absorbed in the in-line raw mill.

Some specific examples of plants with visible plumes caused by constituents with concentrations similar to those in the Clarksville plant include:

- The CEMEX plant at Cementos Guadalajara, a 4 stage PH/PC kiln, had a highly visible plume caused by NH_4Cl. To resolve the problem, the plant added two additional stages that increased pollutant adsorption (HCl emissions were reduced to 5 ppm) and the plume disappeared. The reported stack temperature is 260 C (500 deg. F) which is much hotter than that of Holcim's Clarksville plant. Further, Clarksville's long wet kiln does not have the benefit of the stages in the PH/PC kiln for enhanced adsorption.

[1] *Steven Meyer, product Manager of Monsanto Company. Letter to Holcim for feasibility study of wet scrubber project, 10/29/1998*

- Holcim's Mississauga plant had a highly visible plume during the winter until they eliminated condensed moisture formation by heating the gas and reducing the HCl concentrations to less than 3-5 ppm. Holcim's Clarksville kiln can have HCl concentrations much higher than 5 ppm as will be discussed in a following section.

- Holcim's Untervaz plant in Switzerland has a wet scrubber as well as high levels of HCl and NH_3 in the kiln gas, and they have reported visible plumes during the winter especially when the in-line raw mill is down and the pollutant concentrations are higher.

Impact of Temperature on Visibility – Reaction Rate Based Equations

Solid NH_4Cl aerosols can form directly from the gas phase through the following reversible chemical reaction when the temperature drops:

$$NH_4Cl\ (s) = HCl\ (g) + NH_3\ (g)$$

The thermodynamic criteria for the reaction to occur is determined by the equilibrium constant Kp, which can be expressed by the following equation[2]

$$\ln Kp = 34.266 - 21196/T$$

where T is the temperature (K). The chemical reaction takes place if the product of partial pressures of HCl and NH_3 in gas is greater than Kp, i.e. $(pHCl \cdot pNH_3) > Kp$ (pHCl & pNH_3 are both in atm). This reaction can keep going to form NH_4Cl until the partial pressures of NH_3 and HCl have dropped to a level such that their product is less than Kp.

If the CV plant utilized a wet scrubber, and we assume the scrubber inlet temperature after quenching is 170 deg F or 76.6 deg C, the Kp would be 3.6 E-12. In the kiln gas, concentrations as low as 1-2 ppm (1.0 E-06 - 2.0 E-6) NH_3 and HCl will make the $(pHCl \cdot pNH_3) > Kp$, and the reaction will not stop until both gas phases drop down to 1-2 ppm. Thus, almost all NH_3 and HCl with a concentration higher than 1-2 ppm in the kiln gas will form NH_4Cl aerosols in the scrubber.

Reheating the stack gas after the scrubber has two purposes:

1) Dissociate the newly formed NH4Cl solid

2) Prevent the formation of aerosols from NH_3 and HCl from forming again in the stack or near the stack. The higher the reheating temperature, the longer the

[2] P. Goldfinger, G. Verhaegen, "Stability of the Gaseous Ammonium Chloride Molecule", The Journal of chemical Physics, 50(1), 1467-1471 (1969)

gas has to disperse and be diluted with ambient air, so that the product of both NH_3 and HCl concentrations would not be higher than Kp, and no aerosol formation would occur.

An example of how reheating temperature affects the opacity in a power plant is depicted in Figure 3[3]. The precursor of the visible plume in this case is SO_3, (as opposed to NH_4Cl).

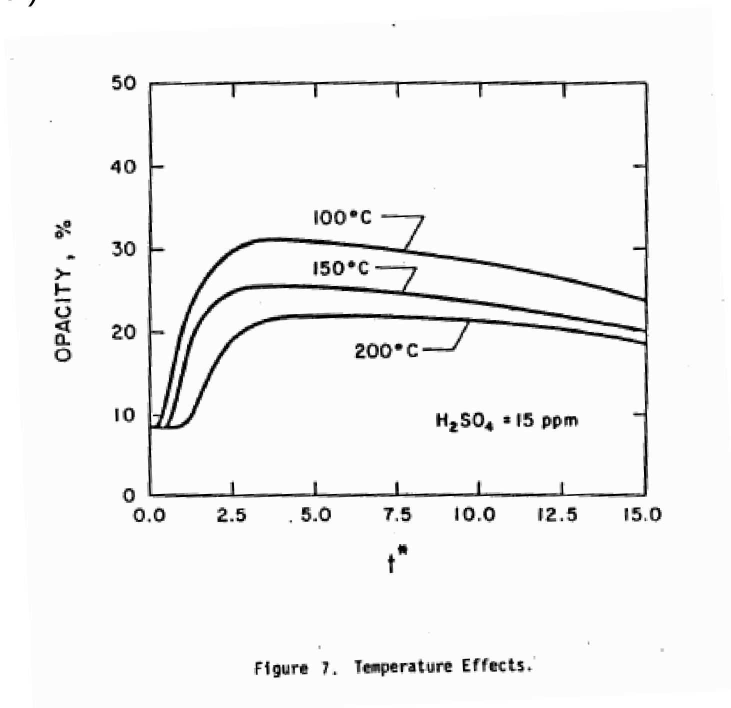


Figure 3. Gas Temperature Effect on Opacity Verses Time (t*)

Although reheating the stack gas to a temperature above the acid gas dew point may help to reduce corrosion problems and in-stack opacity, it may not be enough to avoid a plume outside of the stack. When the gas exits the stack, the temperature will quickly drop to below the acid dew point. Acid gas may be condensed, and acid water droplets may occur that will speed up other reactions in the liquid phase.

Figure 4 shows an example for stack gas containing SO_3. The gas temperature in the stack is much higher than the acid dew point, but once it goes out of the stack it takes only one second for the plume temperature T_P to drop below the dew point temperature T_{DP} and cause higher opacity levels.

[3] J. J. Martin Hughes, "Fine Particle Model for Detached Plume Opacity", Virginia State University, 16th Annual Meeting of the Fine Particle Society, April, 1985.

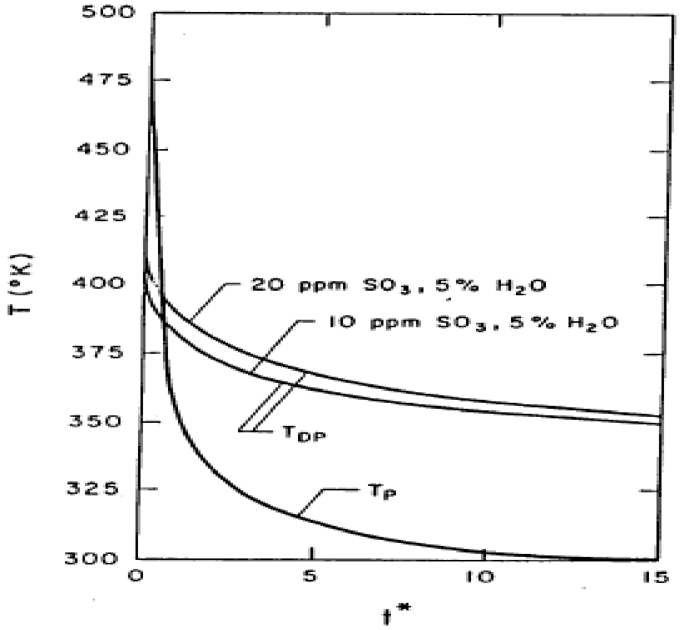


Figure 4. Stack gas temperature vs. Acid Dew Point and Time

Besides pollutant concentrations, other factors such as the stack gas temperature and moisture, the ambient air temperature and humidity, wind speed, sunlight and sky clarity, stack size and height effect plume visibility. Therefore, it is almost impossible to predict the exact reheating temperature required. Regardless, a mathematical model has been established to provide a simplified simulation of NH_4Cl formation outside of the stack based on the actual conditions at the CV plant.

Estimating the Reheat Temperature for CV based on Plant Data

The NH_3 and HCl emission concentration will control the plume formation as SO_2 concentrations are likely to be sufficiently high as to not be limiting in any equations. Table 1 summarizes the CV annual stack testing for 2002 - 2007. Although HCl was relatively low in 2007, it can and has varied significantly over the last five years.

Table 1. HCl and NH_3 Stack Test Data for Clarksville – 2002 thru 2007.

CV Emission		HCl		NH3
	ppmd	ppmw	ppmd	ppmw
2002	12.8	9.1	36.2	25.7
2003	30.3	21.5	20.6	14.6
2004	26.9	19.1	27.1	19.2
2005	14.4	10.3	16.0	11.5
2006	8.0	5.6	22.5	15.7
2007	2.7	1.9	24.9	17.6
Average	15.9	11.2	24.6	17.4

Please note that this data is from once per year stack testing not a Continuous Emission Monitor (CEM) and thus the annual and daily emission levels may vary considerably from these values. Further, the peak annual emission may be much higher than the test average. For example, during the three hours of stack tests in 2004, the maximum hourly HCl concentration was 70% higher than the minimum and 23% higher than the average.

Further, under current operations in 2007, the plant found that during some cold days, the plume outside of the stack was visible, but it did not reach 20% opacity.

The current stack temperature is about 350 F, and the temperature at the outlet of the ESP is about 380 F. The lower temperature in the stack is due to heat loss in the ductworks and the I.D. fan. Therefore, a reheating temperature of 380 F is proposed to maintain the current stack temperature of 350 F and eliminate the plume formation after the scrubber.

Using the 2007 stack test data (2 ppm HCl and 18 ppm NH_3), a reheat temperature of 380 F, or 350 F stack temperature, might not be necessary since based on our modeling result, the total HCl and NH_3 as aerosols after the scrubber should not be higher than in the original kiln gas.

However, HCl concentrations in the prior years have been as much as 10 times higher than 2007, reaching over 20 ppm in 2003 and 2004, while the NH_3 concentrations were nearly 20 ppm. These levels are considered to be highly probable of causing a visible plume at the current exhaust temperatures. Reviewing historical data, it was found that stack temperatures during these time periods were much higher than current temperatures. For example, the stack temperature was maintained at approximately 700 deg. F in 2003 and approximately 450 deg F (480 deg F at the outlet of the ESP) in 2004 (100 F higher than the proposed reheating temperature). The higher temperatures likely prevented significant visible plumes from occurring.

Regarding the use of a wet scrubber, even if some reduction in HCl occurred (such as 20%), the total HCl concentration after the scrubber would still be significantly higher than that in the kiln gas in 2007. Under this scenario, reheating to an ESP outlet of 380 F, or 350 F stack temperature, would likely not be sufficient to assure a stack opacity below 20% and additional re-heating would likely be required. Consequently, the proposed 380 F reheating temperature should be considered as an average for the year. That is, if the HCl and NH_3 concentrations reach 20 ppm in the kiln gas, the reheat temperature may need to be 480 deg F or higher in the winter, while if the HCl and NH_3 concentrations drop to 2007 levels or below, a reheat temperature of less than 380 deg F may be sufficient in the summer. Therefore, considering the variation in the HCl and NH_3 concentrations, an annual average reheat temperature of 380 deg F may be sufficient.

Is scrubbing half of the exhaust stream, and using the unscrubbed half for reheat, a viable option?

A scenario in which half or the exhaust gas stream is scrubbed, and the other half is not, followed by recombining the gas streams, was also considered. If feasible, this scenario would result in the unscrubbed gas providing the heat source to re-heat the scrubbed gas up to a temperature midway between the scrubbed gas temperature of approximately 170 deg F and the unscrubbed gas temperature of approximately 380 deg F, resulting in a mid-range temperature gas stream of approximately 275 deg F. Unfortunately, as discussed previously, the variability in precursor pollutant (HCl and NH_3) concentrations would most certainly lead to a visible plume at this low temperature and re-heating would continue to be required up to the originally identified average temperature of 380 deg F. This option was one of the scenarios evaluated in the modeling exercise discussed in the following sections.

Mathematical analysis of the impact of reheating temperature on CV visible plume

Using the equation described previously,

$$\ln Kp = 34.266 - 21196/T$$

a mathematical model was established to simulate NH_4Cl formation outside of the stack. Based on Holcim's experience with visible plumes at multiple plants, an NH_4Cl aerosol concentration of 5ppm in the atmosphere is used as the criteria for a highly visible plume outside of the stack. In reality, some of Holcim's plants control their NH_4Cl aerosol concentrations to less than 1-3 ppm to avoid visible plume formation.

This model only considers the gas temperature reduction due to mixing with ambient air and does not consider any reduction due to radiation. Thus, the actual condition will be worse than what the model predicts.

NH_4Cl formation was simulated for the following scenarios:

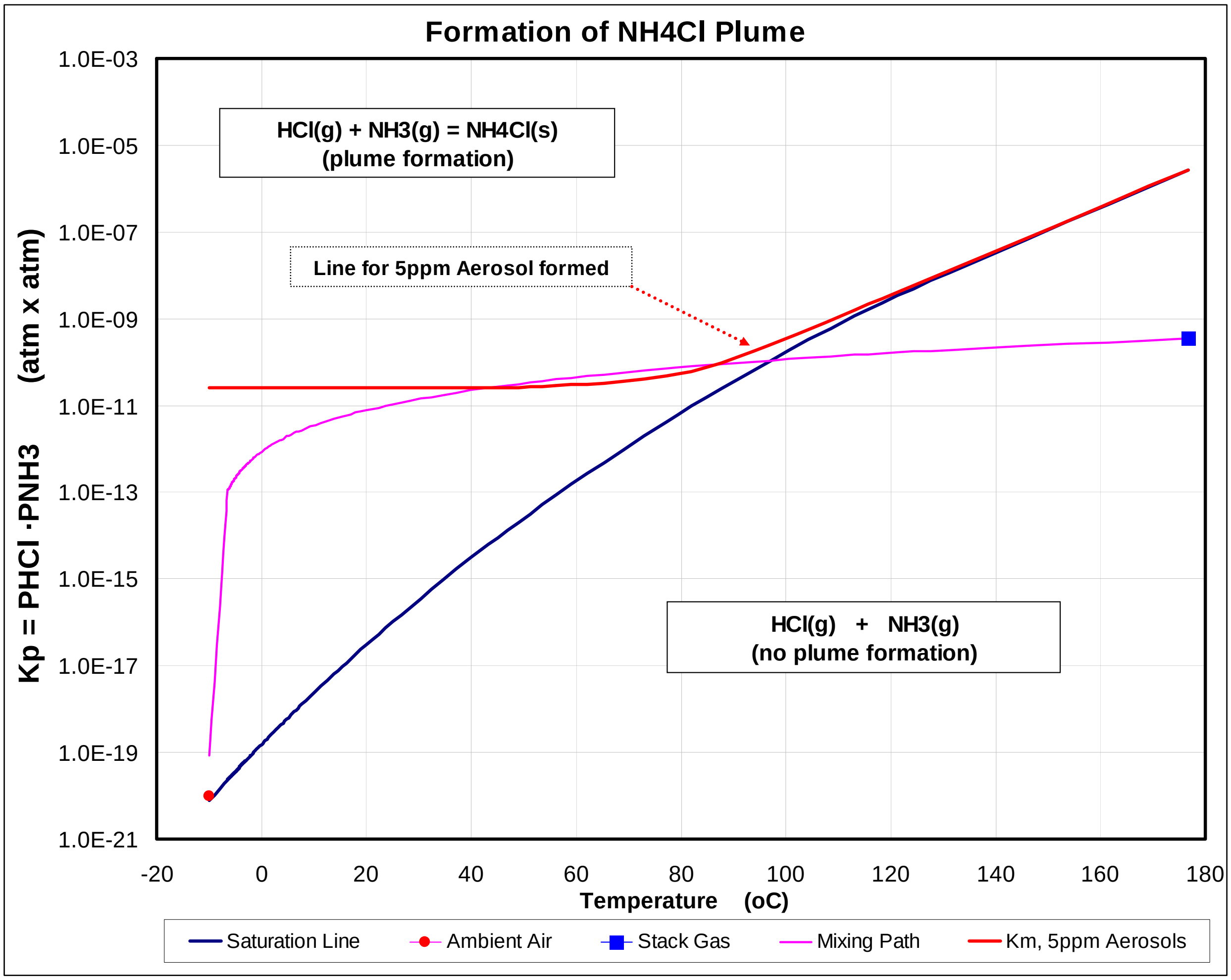
- Scenario 1. Maximum stack testing NH_3 and HCl concentrations for the last 4 years, reheating to 380F and Winter Condition
- Scenario 2. Maximum stack testing NH_3 and HCl concentrations for the last 4 years, reheating to 380F and Summer Condition
- Scenario 3. Maximum stack testing NH_3 and HCl concentrations for the last 4 years, reheating of 50% kiln gas (300F) and Winter Condition
- Scenario 4. Maximum stack testing NH_3 and HCl concentrations for the last 4 years, reheating of 50% kiln gas (300F) and winter Condition
- Scenario 5. Average of the NH_3 and HCl concentrations for the last 4 years, reheating of 50% kiln gas (300F) and winter Condition

- Scenario 6. Average of the NH_3 and HCl concentrations for the last 4 years, reheating of 50% kiln gas (300F) and summer Condition
- Scenario 7. Average of the NH_3 and HCl concentrations for the last 4 years, reheating of 380 F and summer Condition
- Scenario 8. Maximum stack testing NH_3 and HCl concentrations for the last 4 years, reheating to 480F and Winter Condition

Additional Model Assumptions/Calculations:

The model assumes that in each interval 50% of the original stack gas volume will be diluted with ambient air. Based on this dilution, and with respect to the ambient and stack gas specific heat, the temperature of the mixture will be calculated. Next, the Kp line which represents the equilibrium condition is drawn by inserting the temperature in the above formula. The corresponding concentration of HCl and NH_3 of the gas mixture is calculated at each interval, converted to partial pressures and multiplied with each other to find the Mixing Path value (Km). The Mixing Path (Km) at the corresponding temperature represents the calculated gas conditions at that interval. Then the Km+5 line which corresponds to the concentration of NH_3 and HCl that will result in the formation of at least 5 ppm of aerosols is drawn,. At any point that the Mixing Path and Km+5 lines cross each other at least 5 ppm of aerosols has been formed.

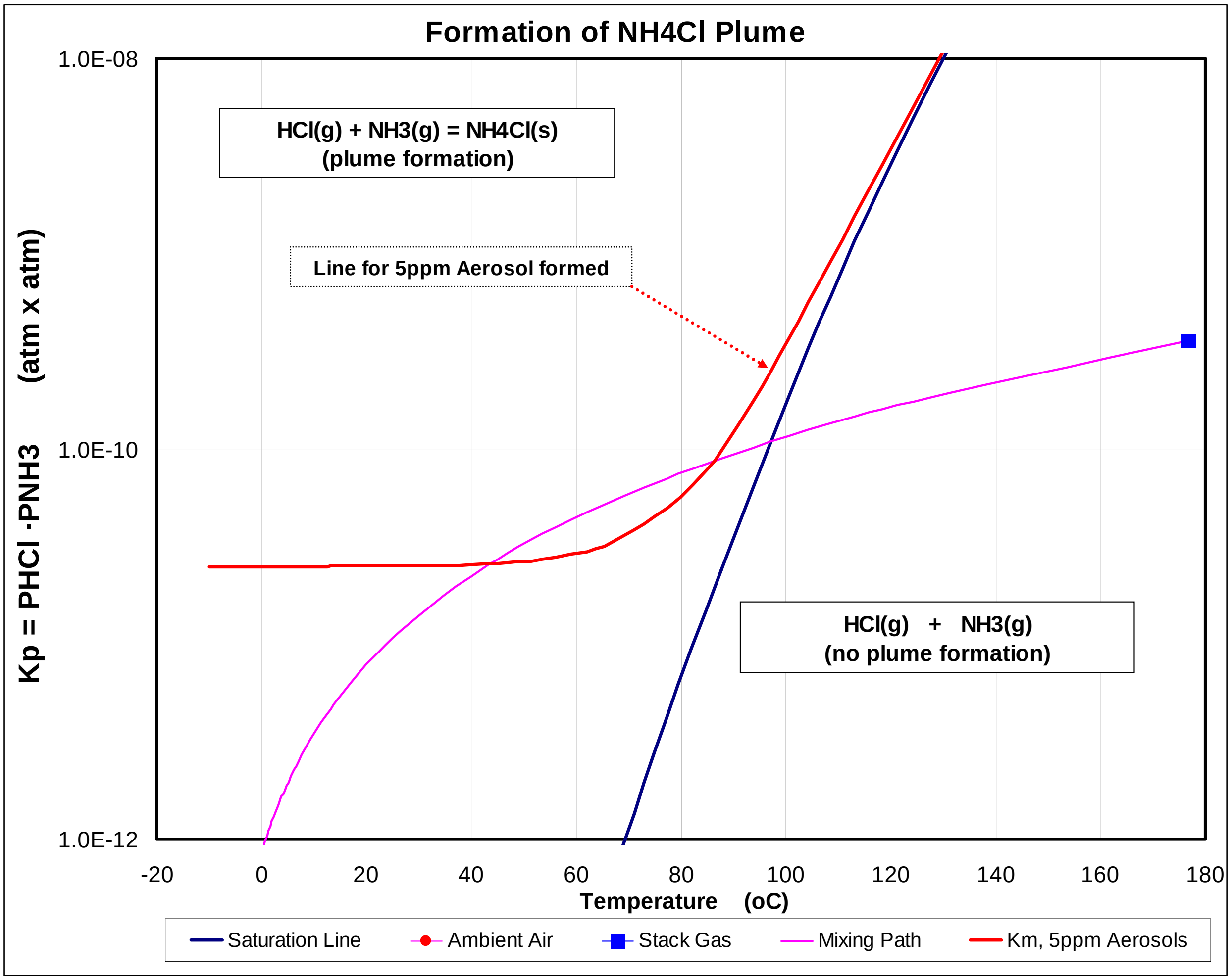
Scenario 1 (Figure 5) represents the 380°F reheating temperature and stack temperature of 350°F, an ambient temperature of 14°F (representing a typical winter temperature), and the five year maximum NH_3 and HCl concentrations of 27 ppmv, dry. Furthermore, it shows that the Km and Mixing path lines cross at around 85°F and will form more than 5 ppm of aerosol NH_4Cl. Thus, a visible plume would be predicted.



Conditions	° F	° C
Ambient Air Temperature	14	-10
Reheating Temperature	380	193
Stack Temperature	350	177
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

Figure 5

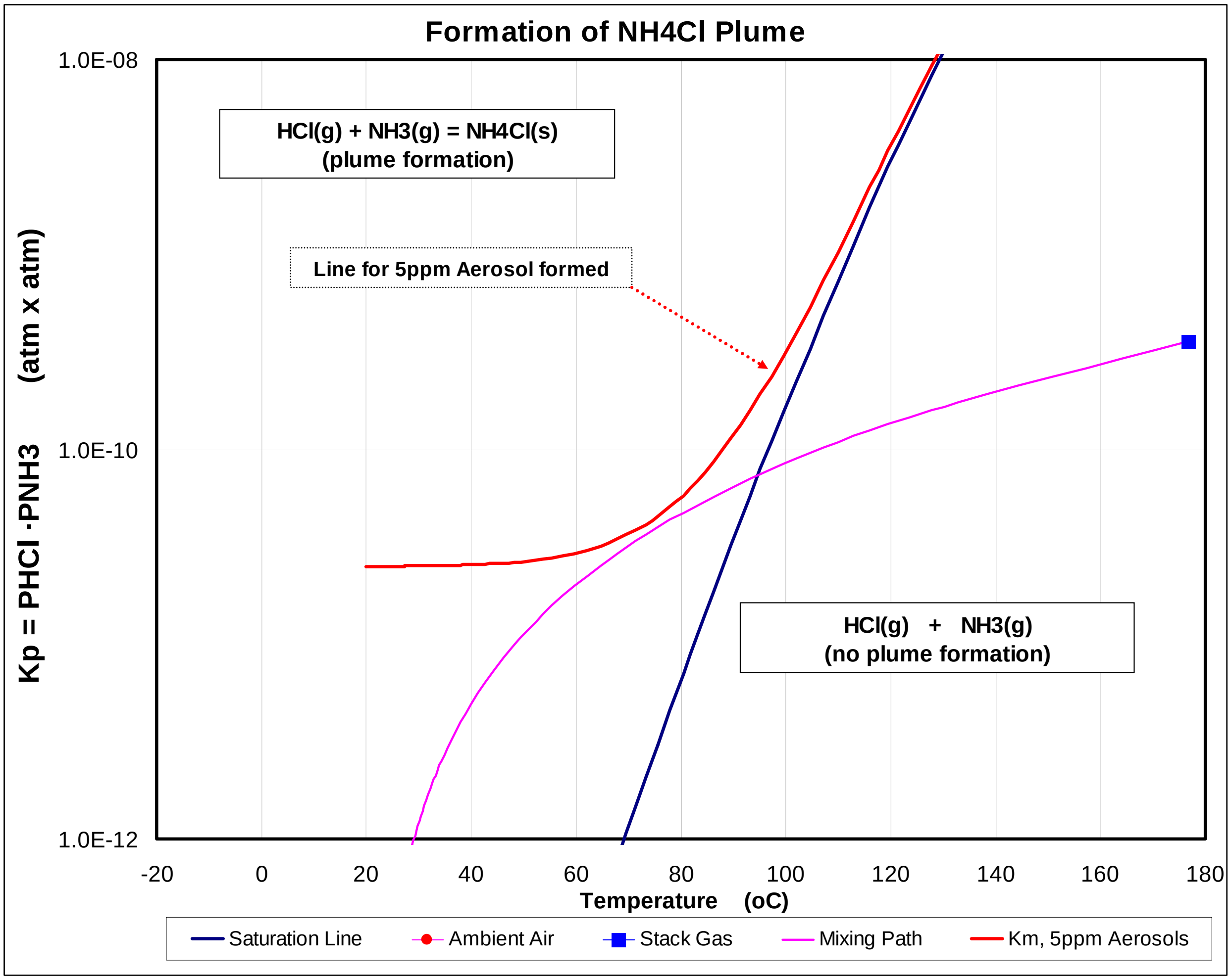
Figure 6 has the same ambient and stack temperatures as well as pollutant concentrations as Scenario 1, but provides more detail (zoomed in view) where the Km and Mixing Path lines cross.



Conditions	°F	°C
Ambient Air Temperature	14	-10
Reheating Temperature	380	193
Stack Temperature	350	177
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

Figure 6

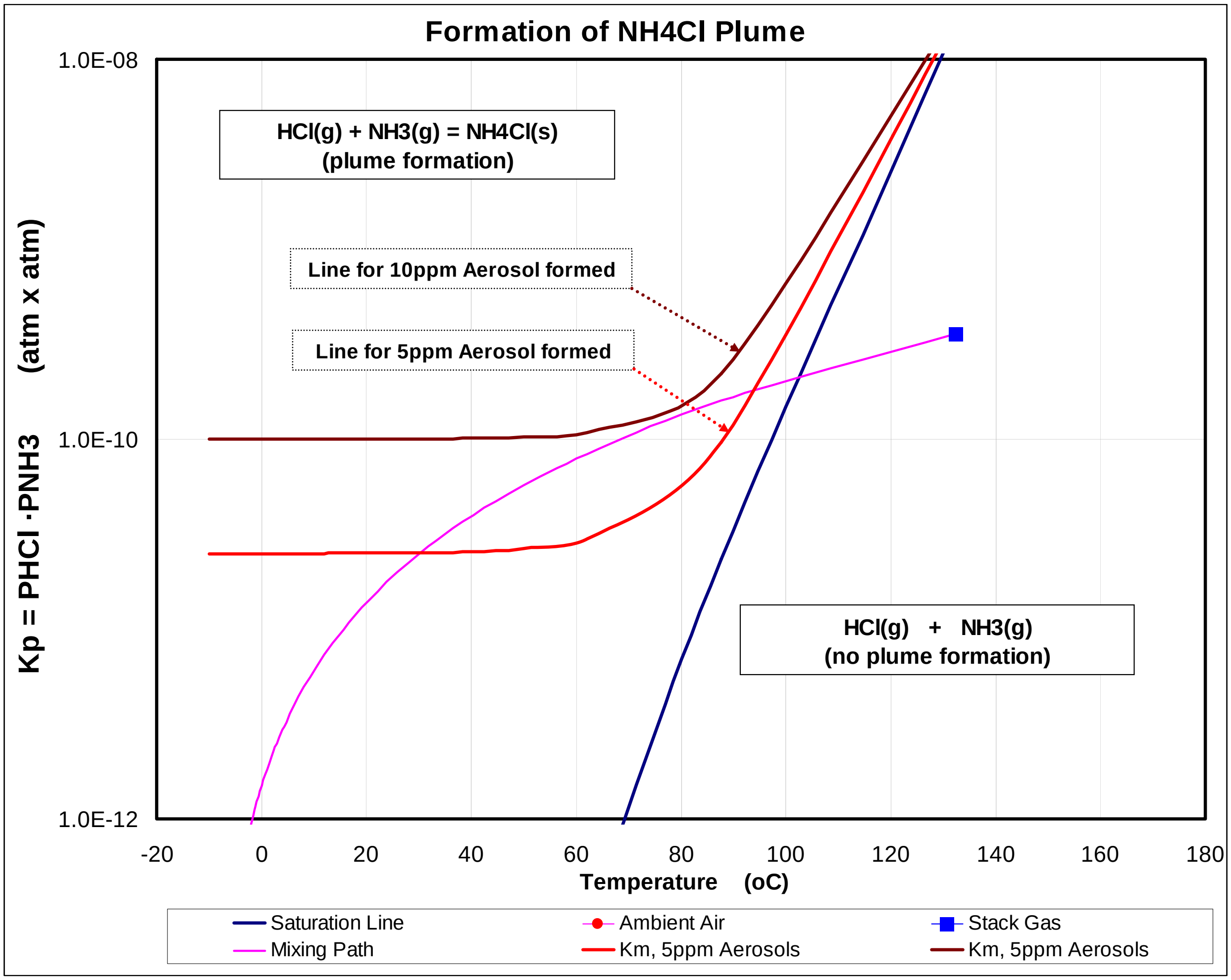
Scenario 2 (Figure 7) represents the situation in Figures 5 & 6 (380 F reheating and 350 F stack temperature) but at a typical spring/summer temperature of 68°F. At these conditions, the Mixing Path barely misses the line representing 5 ppm aerosol NH_4Cl formation. Thus, a visible plume formation is not anticipated.



Conditions	°F	°C
Ambient Air Temperature	68	20
Reheating Temperature	380	193
Stack Temperature	350	177
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

Figure 7

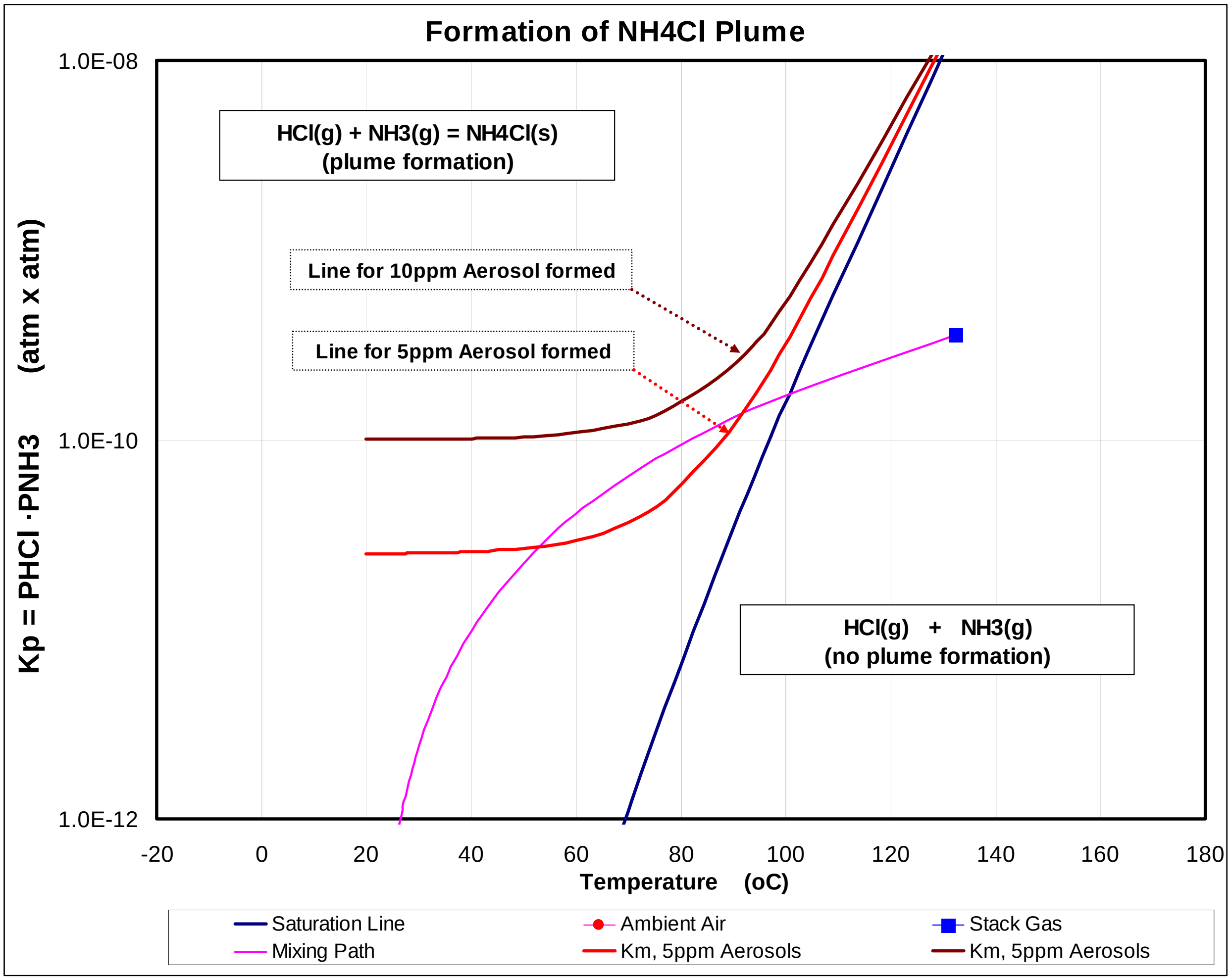
Scenario 3 (Figure 8) provides a reheating gas temperature of 300 °F corresponding to a stack temperature of 270 °F and the maximum 5 year pollutant concentration of 27 ppmv, dry at winter ambient conditions. At this stack temperature, the Mixing Path crosses the 5 ppm aerosol NH_4Cl formation line and nearly crosses a 10 ppm aerosol NH_4Cl line. This scenario has a very high risk of a visible plume problem with >20% opacity.



Conditions	°F	°C
Ambient Air Temperature	14	-10
Reheating Temperature	300	149
Stack Temperature	270	132
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

Figure 8

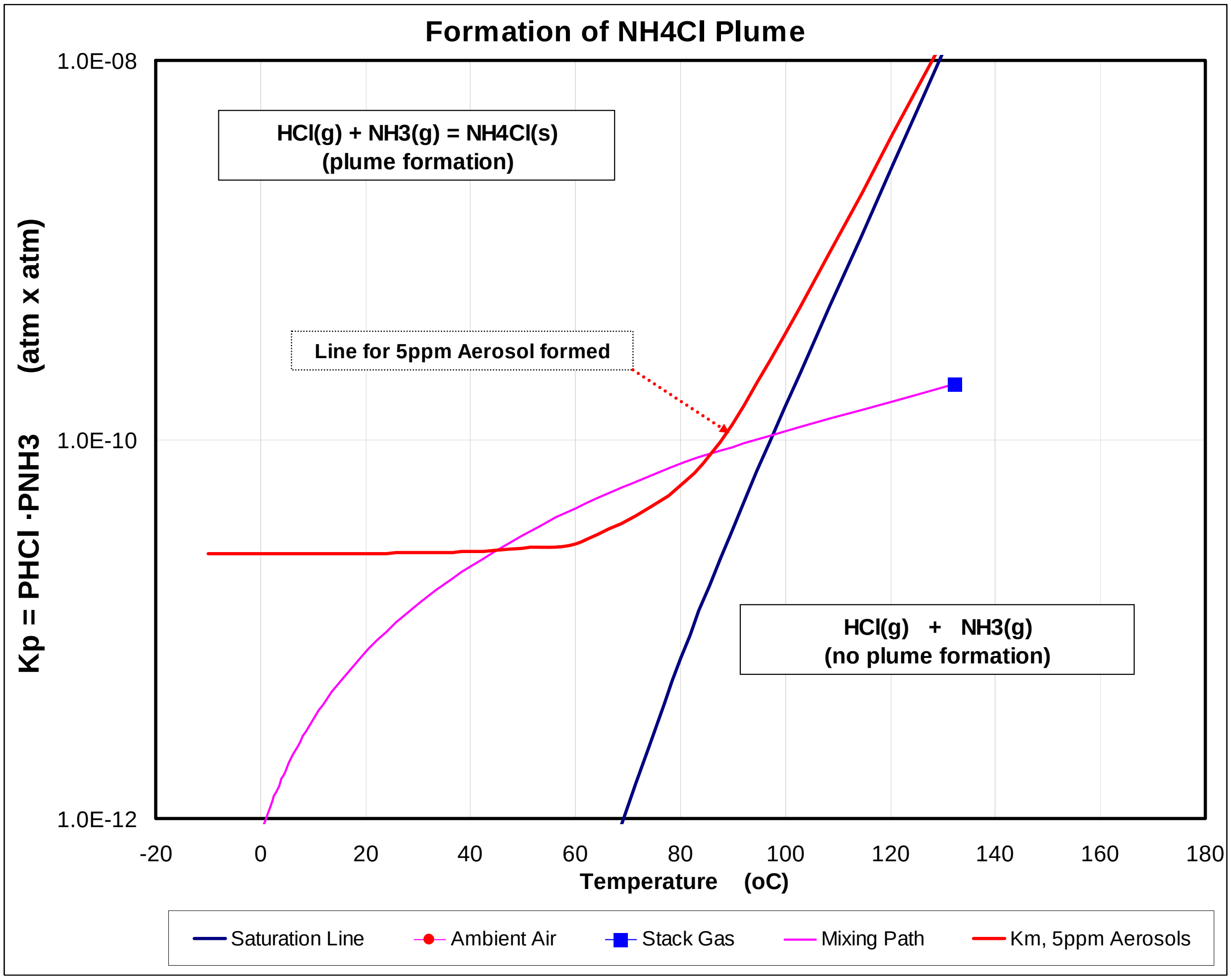
Scenario 4 (Figure 9) provides a reheating gas temperature of 300 °F corresponding to a stack temperature of 270 °F and the maximum 5 year pollutant concentration of 27 ppmv, dry (same as Scenario 3) but at typical spring/summer ambient temperatures. At this stack temperature, the Mixing Path still crosses the 5 ppm aerosol NH_4Cl formation line. This scenario also has a high risk of a visible plume problem. However, it is not predicted to be as severe as the previous scenario.



Conditions	°F	°C
Ambient Air Temperature	68	20
Reheating Temperature	300	149
Stack Temperature	270	132
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

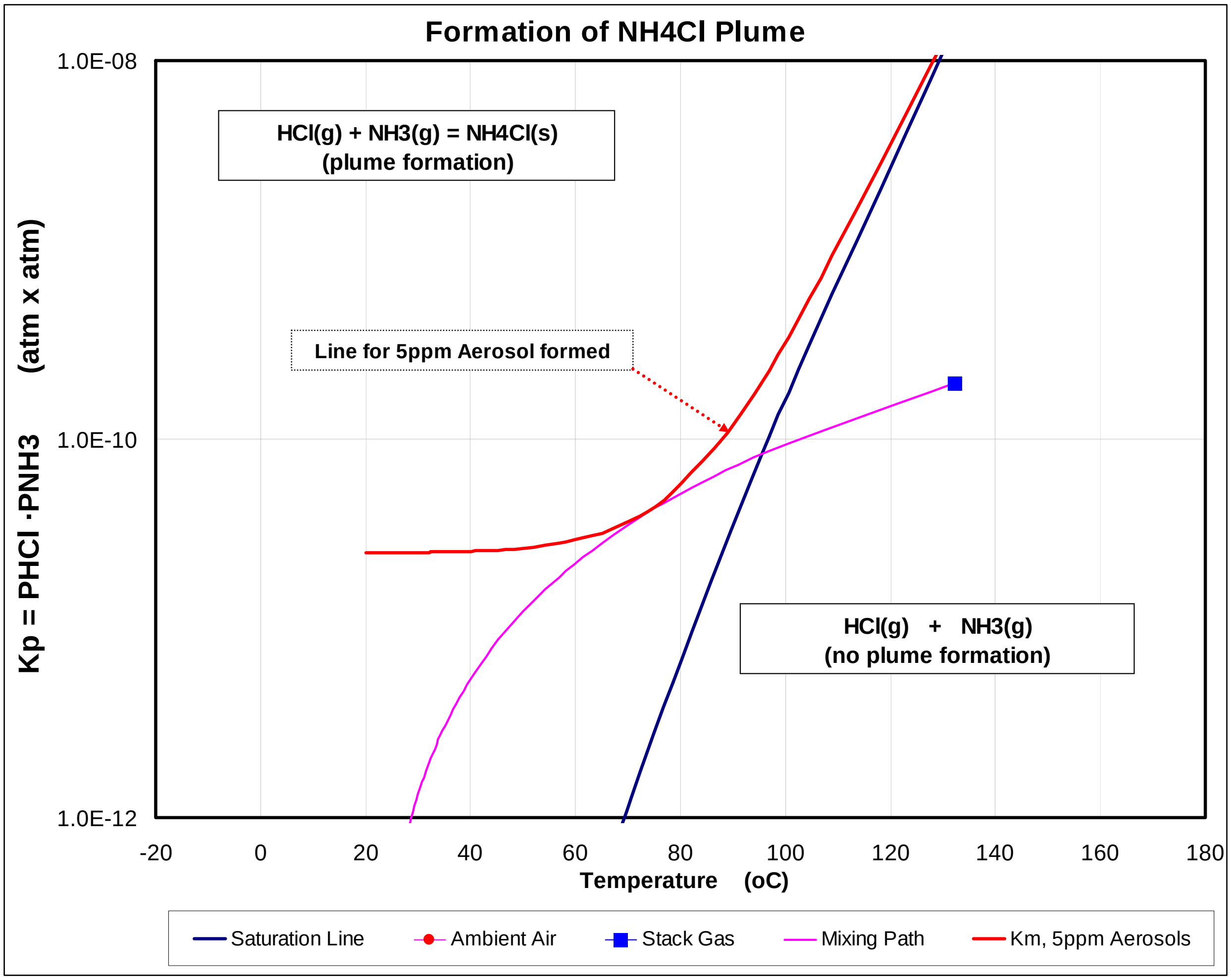
Figure 9

Scenarios 5 and 6 (Figure 10 and Figure 11). Under these temperatures, the average 5 year concentration of NH_3 (25 ppmv, dry) and HCl (16 ppmv, dry) is predicted to form more than 5 ppm of aerosol NH_4Cl at an average winter temperature (Figure 10) and close to 5 ppm at an average summer (Figure 11) ambient temperature.



Conditions	°F	°C
Ambient Air Temperature	14	-10
Reheating Temperature	300	149
Stack Temperature	270	132
HCl Concentration (ppmv, dry)	16	
NH_3 Concentration (ppmv, dry)	25	

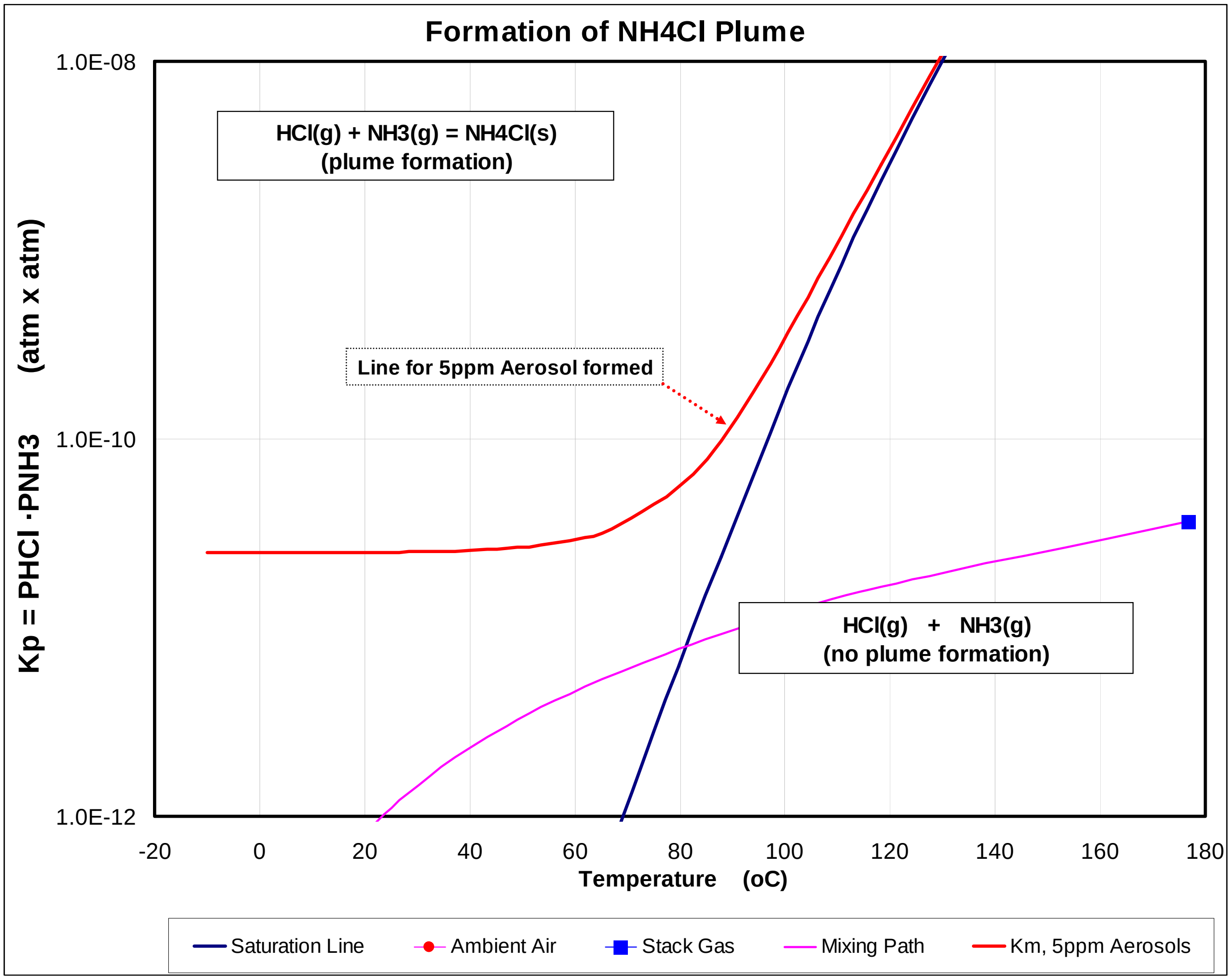
Figure 10



Conditions	°F	°C
Ambient Air Temperature	68	20
Reheating Temperature	300	149
Stack Temperature	270	132
HCl Concentration (ppmv, dry)	16	
NH_3 Concentration (ppmv, dry)	25	

Figure 11

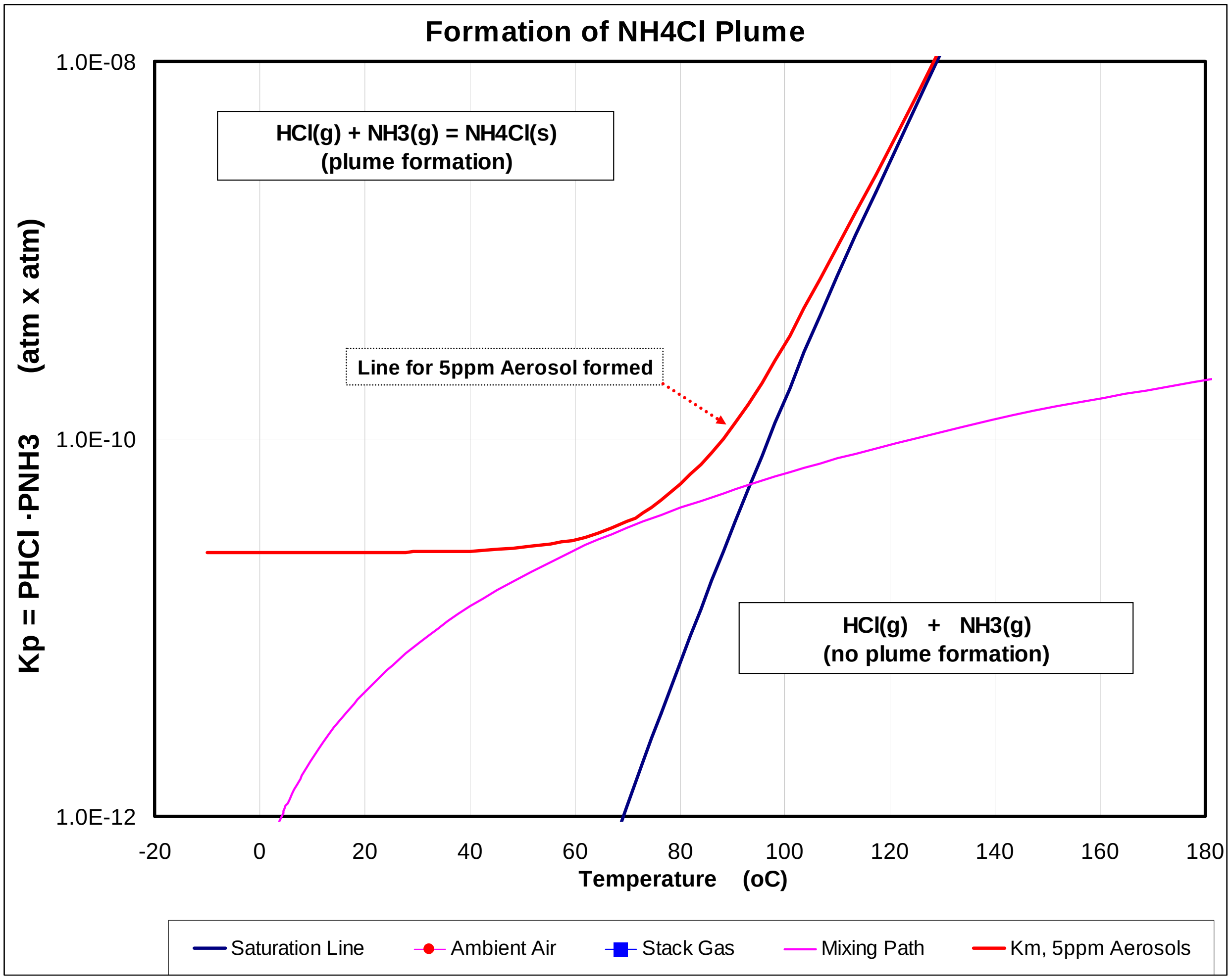
Scenario 7 (Figure 12) represents the actual 2007 condition of the Clarksville plant at a typical winter temperature. It is apparent that the Mixing Path line and Km are not crossing since the total HCl concentration is only 3 ppm. Note that the HCl concentration in 2007 was the lowest of the 5 years and could vary to more than 30 ppm as found in 2003.



Conditions	°F	°C
Ambient Air Temperature	14	-10
Reheating Temperature	380	193
Stack Temperature	350	177
HCl Concentration (ppmv, dry)	3	
NH_3 Concentration (ppmv, dry)	25	

Figure 12

Scenario 8 (Figure 13) shows the actual 2004 conditions of the plant at a typical winter ambient condition. Although the HCl and NH_3 concentrations are relatively high, the high stack temperature (480 deg F) allows for dilution and the Mixing Path line does not cross the Km line and therefore less than a 5 ppm aerosol NH_4Cl concentration is predicted.



Conditions	°F	°C
Ambient Air Temperature	14	-10
Reheating Temperature	480	249
Stack Temperature	450	232
HCl Concentration (ppmv, dry)	27	
NH_3 Concentration (ppmv, dry)	27	

Figure 13

Conclusion

In conclusion, the stack temperature needed to prevent a visible plume from occurring is highly dependent on the ambient temperature, the concentrations of HCl and NH_3 in the gas stream, as well as other factors. Due to the normal variability in HCl and NH_3 concentrations, it is virtually assured that the combination of higher HCl and NH_3 concentrations and lowering the stack gas temperature below current levels (380 deg F at the exit of ESP and 350 deg F at stack) would lead to a visible plume condition.

Supplement A: Some Examples of plume problems in cement Industry

The first regulatory action concerning secondary plumes in the cement industry occurred in 1979 at Glens Falls Cement, Glens Falls, New York, USA. Plume studies were conducted by EPA and stack test contractors by sampling the plume using a tethered balloon.

The secondary plume was observed to have an average opacity of ~85% while the in-stack opacity was only 10%. The tests revealed that the particulate matter recovered from the plume was mainly crystals of ammonium sulphate. The tests indicated that the primary components of the stack effluent were $(NH4)_2SO4$ (4.5 ppm), SO_2 (200 ppm), NH_3 (170 ppm), moisture (20%). The ammonium sulphate in the stack gas was responsible for the 10% in-stack opacity.

The secondary plume was also observed at Lehigh Cement in Leeds, Alabama, USA. Testing conducted in 1981 indicated that the major species responsible for the plume was ammonium chloride, NH4Cl.

Similar tests were conducted in 1987 at Kaiser Cement in Permamenti, California, USA. The results revealed that NH4Cl was also responsible for the visible secondary plume. The secondary plume tests conducted in 1987 at Southwestern Portland Cement in Victorville, California, USA, also revealed that NH4Cl was responsible for the visible secondary plume.

In 1986, EPA conducted a source and process sampling program at the South Dakota Cement Company, Rapid City, South Dakota, USA. The samples collected from the secondary plume contain up to 67% NH4Cl. Further tests indicated that the NH3 exists mainly in the shale that accounts for about 20% of raw mix. The plant has a dry process with a 4-stage preheater, vertical roller mill for raw grinding and a main baghouse for dedusting. A severe ammonia recirculation was observed, with an average NH3 content in shale being 6.2 ppm while up to 159 ppm NH_3 was found in the baghouse dust. It was also observed that the NH3 content in the baghouse dust was reduced substantially when gas temperature increased from 170 deg C (compound operation) to 250 deg C (direction operation).

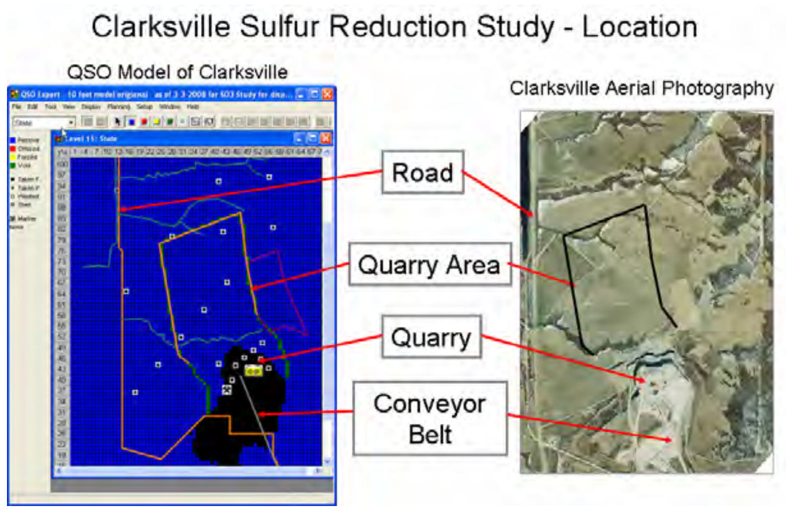
The secondary plumes in cement plants are not limited to the USA. They have also been reported by a Mexican cement company which determined through plant measurements that NH4Cl was responsible for the visible plume.

Other examples include the Lone Star Industries' Cape Girardeau Cement Plant, MO, USA and the Inland Cement, Edmonton, AB, Canada. Both plants experienced secondary plumes due to formation of ammonium sulphate.

APPENDIX C. SELECTIVE MINING – QUARRY SCHEDULING OPTIMIZATION DISCUSSION

Appendix C. Selective Mining – Quarry Scheduling Optimization Discussion

Holcim (US) Inc. evaluated the Clarksville Quarry Scheduling Optimization (QSO) model for sulfur emissions.

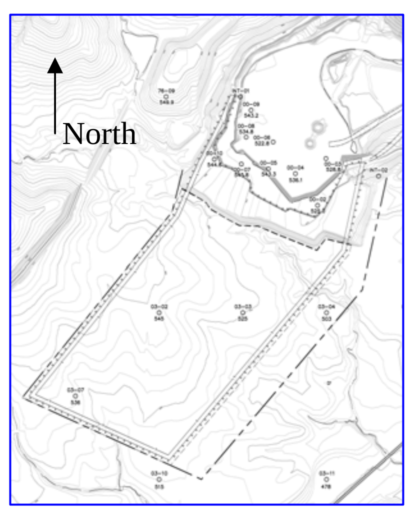


The model is based on statistical and spatial analysis of data obtained through drill core sub sampling. Validation of relevant data is insured through the analysis of varagrams and histograms. This validation insures that correlation between samples is relevant.

The Clarksville QSO Model was created specifically for predicting relevant mineralogical parameters related to clinker production. Major oxides (Ca, Mg, Si, and Fe) are the primary focus of this predictive model. The sampling protocol and data analysis required for major oxide components was never intended to be adequate for the accurate prediction of minor components, such as sulfur and sulfur compounds.

When placed under scrutiny, existing data was found to be inadequate for accurate prediction of S content in the potentially quarried shale. Spatial relationships between core samples were found to be inappropriate for the sensitivity needed to make accurate predictions. The reason for this is the geologic nature of the Maquiketa Shale and Kimmswick Limestone, of which the primary sulfur mineral is pyrite (FeS).

One of the most important chemical processes in organic-rich marine sediments, such as Maquiketa shale, is decomposition of organic matter (OM)in bacterial sulphate reduction. Bacterial sulphate reduction produces bisulphide. Bisulphite can be partially oxidized or can react with OM and reactive metal species. All these reactions may be bacterially mediated. The reaction of reduced sulfur with reactive dissolved iron and iron minerals, if available, results in the formation of iron sulphides. The most common iron sulphide in pyrite.



The amount of pyrite formation in marine sediments is largely determined by the availability of sulphate, reactive iron and reactive OM during the formation of

the sediments. The locations of the reactive iron and sulphate are a random occurrence, usually along planes of weakness or channels of solubility during rock forming (induration). The pyrite is formed as nodules or clusters of mineralization and is not evenly distributed spatially throughout the shale and limestone.

Therefore the chance of intercepting a pyrite cluster of mineralization by core drilling is known as a ‘nugget’ effect. Intercepting a pyrite cluster will give artificially high sulfur values in the model and, conversely, not intercepting pyrite mineralization can give low values.

In the planned mining area only 5 core holes were drilled (DH-2, DH-3, DH-4 and DH-7). While the spacing of the drill holes are adequate for predicting major oxides, they are too far apart and too few to accurately predict clustered mineralogy such as pyrite.

Table D-1. Wet Limestone Scrubber Control Cost Analysis Based on Projected Actual Emissions and 80% Control.

Direct Costs			
Purchased Equipment Costs			
	Wet Scrubber Unit including Limestone Prep System, inflated to 2012 dollars		$17,317,574
	Instrumentation (10% of EC)		$1,731,757
	Freight (5% of EC)		$865,879
		Subtotal, Purchased Equipment Cost (PEC)	$19,915,210
Direct Installation Costs			
	Foundation (6% of PEC)		$1,194,913
	Supports (6% of PEC)		$1,194,913
	Handling and Erection (40% of PEC)		$7,966,084
	Electrical (1% of PEC)		$199,152
	Piping (30% of PEC)		$5,974,563
	Extending gas line 1/2 mile to plant		$500,000
	Insulation for Ductwork (1% of PEC)		$199,152
	Painting (1% of PEC)		$199,152
		Subtotal, Direct Installation Cost	$17,427,929
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$37,343,139**
Indirect Costs			
	Engineering (10% of PEC)		$1,991,521
	Construction and Field Expense (10% of PEC)		$1,991,521
	Contractor Fees (10% of PEC)		$1,991,521
	Start-up (1% of PEC)		$199,152
	Performance Test (1% of PEC)		$199,152
	Contingencies (3% of PEC)		$597,456
		Total Indirect Cost	**$6,970,324**
	Total Capital Investment (TCI)		**$44,313,462**
Direct Annual Costs			
Hours per Year	(365 days per year, 24 hours per day), 90% Uptime		7,884
Operating Labor			
	Operator 2 x 3,573 hours/year, $50/hr)		$357,300
	Supervisor (15% of operator)		$53,595
		Subtotal, Operating Labor	$410,895
Maintenance			
	Labor (2 x 820 hours/year, $50/hr)		$82,000
	Material (5% of Total Direct Cost)		$ 1,867,157
		Subtotal, Maintenance	$1,949,157
Utilities			
	Electricity		
	Pump (kW)		2,342
	Cost ($/kW-hr)		$0.0410
		Subtotal, Electricity	$757,054
	Limestone for slurry		
	Amount Required (ton/yr)		13,961
	Cost ($/ton)		$3.00
		Subtotal, Limestone	$41,883
	Water		
	Amount Required (gpm)		122.0
	Cost ($/1000 gallons)		$1.00
		Subtotal, Water	$64,128
	Sludge Disposal		
	Amount Generated (tpy)		57,943
	Disposal Fee ($/ton)		$36.00
	Monthly Rent for Trailer @ $120/month		$1,440
	Cost for Box Transportation @ $220/load (assume 17 tons/trailer)		$749,853
		Subtotal, Sludge	$2,837,247
		Subtotal, Utilities	$3,700,312
	Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)		
	Gas Required (MMCF/yr)		1,020,986
	Cost ($/MMBTU)		$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$16,331,486**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$1,416,031
Administrative (2% TCI)			$886,269
Property Tax (1% TCI)			$443,135
Insurance (1% TCI)			$443,135
Capital Recovery	(15 year life, 7 percent interest)		$4,865,380
		Total Indirect Annual Cost	**$8,053,950**
Conclusion			
	Total Annualized Cost		**$24,385,436**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 80%, 95% uptime		**8,726**
	Pollutant Generated - NOx tons/yr		**97**
	Net Pollutant Removed - tons/yr		**8,629**
	Cost Per Ton of Pollutant Removed		**$2,826**

Table D-2. Wet Limestone Scrubber Control Cost Analysis Based on Projected Actual Emissions and 95% Control.

Direct Costs			
Purchased Equipment Costs			
	Wet Scrubber Unit including Limestone Prep System, inflated to 2012 dollars		$17,317,574
	Instrumentation (10% of EC)		$1,731,757
	Freight (5% of EC)		$865,879
		Subtotal, Purchased Equipment Cost (PEC)	$19,915,210
Direct Installation Costs			
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	Electricity		
	Pump (kW)		2,342
	Cost ($/kW-hr)		$0.0410
		Subtotal, Electricity	$757,054
	Limestone for slurry		
	Amount Required (ton/yr)		16,579
	Cost ($/ton)		$3.00
		Subtotal, Lime	$49,736
	Water		
	Amount Required (gpm)		122.0
	Cost ($/1000 gallons)		$1.00
		Subtotal, Water	$64,128
	Sludge Disposal		
	Amount Generated (tpy)		68,808
	Disposal Fee ($/ton)		$36.00
	Monthly Rent for Trailer @ $120/month		$1,440
	Cost for Box Transportation @ $220/load (assume 17 tons/trailer)		$890,450
		Subtotal, Sludge	$3,368,961
		Subtotal, Utilities	$4,239,878
	Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)		
	Gas Required (MMCF/yr)		1,020,986
	Cost ($/MMBTU)		$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$16,871,053**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$1,416,031
Administrative (2% TCI)			$886,269
Property Tax (1% TCI)			$443,135
Insurance (1% TCI)			$443,135
Capital Recovery	(15 year life, 7 percent interest)		$4,865,380
		Total Indirect Annual Cost	**$8,053,950**
Conclusion			
	Total Annualized Cost		**$24,925,003**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 95%, 95% uptime		**10,362**
	Pollutant Generated - NOx tons/yr		**97**
	Net Pollutant Removed - tons/yr		**10,265**
	Cost Per Ton of Pollutant Removed		**$2,428**

Table D-3. Wet Limestone Scrubber Control Cost Analysis Based on PTE and 80% Control

Direct Costs			
Purchased Equipment Costs			
	Wet Scrubber Unit including Limestone Prep System, inflated to 2012 dollars		$17,317,574
	Instrumentation (10% of EC)		$1,731,757
	Freight (5% of EC)		$865,879
		Subtotal, Purchased Equipment Cost (PEC)	$19,915,210
Direct Installation Costs			
	Foundation (6% of PEC)		$1,194,913
	Supports (6% of PEC)		$1,194,913
	Handling and Erection (40% of PEC)		$7,966,084
	Electrical (1% of PEC)		$199,152
	Piping (30% of PEC)		$5,974,563
	Extending gas line 1/2 mile to plant		$500,000
	Insulation for Ductwork (1% of PEC)		$199,152
	Painting (1% of PEC)		$199,152
		Subtotal, Direct Installation Cost	$17,427,929
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$37,343,139**
Indirect Costs			
	Engineering (10% of PEC)		$1,991,521
	Construction and Field Expense (10% of PEC)		$1,991,521
	Contractor Fees (10% of PEC)		$1,991,521
	Start-up (1% of PEC)		$199,152
	Performance Test (1% of PEC)		$199,152
	Contingencies (3% of PEC)		$597,456
		Total Indirect Cost	**$6,970,324**
	Total Capital Investment (TCI)		**$44,313,462**
Direct Annual Costs			
Hours per Year	(365 days per year, 24 hours per day), 90% Uptime		7,884
Operating Labor			
	Operator 2 x 3,573 hours/year, $50/hr)		$357,300
	Supervisor (15% of operator)		$53,595
		Subtotal, Operating Labor	$410,895
Maintenance			
	Labor (2 x 820 hours/year, $50/hr)		$82,000
	Material (5% of Total Direct Cost)	$	1,867,157
		Subtotal, Maintenance	$1,949,157
Utilities			
	Electricity		
	Pump (kW)		2,342
	Cost ($/kW-hr)		$0.0410
		Subtotal, Electricity	$757,054
	Limestone for slurry		
	Amount Required (ton/yr)		16,170
	Cost ($/ton)		$3.00
		Subtotal, Lime	$48,511
	Water		
	Amount Required (gpm)		122.0
	Cost ($/1000 gallons)		$1.00
		Subtotal, Water	$64,128
	Sludge Disposal		
	Amount Generated (tpy)		67,113
	Disposal Fee ($/ton)		$36.00
	Monthly Rent for Trailer @ $120/month		$1,440
	Cost for Box Transportation @ $220/load (assume 17 tons/trailer)		$868,526
		Subtotal, Sludge	$3,286,046
		Subtotal, Utilities	$4,155,739
	Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)		
	Gas Required (MMCF/yr)		1,020,986
	Cost ($/MMBTU)		$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$16,786,914**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$1,416,031
Administrative (2% TCI)			$886,269
Property Tax (1% TCI)			$443,135
Insurance (1% TCI)			$443,135
Capital Recovery	(15 year life, 7 percent interest)		$4,865,380
		Total Indirect Annual Cost	**$8,053,950**
Conclusion			
	Total Annualized Cost		**$24,840,863**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr) - PTE		**13,298**
	Pollutant Removed (tons SO_2/yr) - 80%, 95% uptime		**10,106**
	Pollutant Generated - NOx tons/yr		**97**
	Net Pollutant Removed - tons/yr		**10,009**
	Cost Per Ton of Pollutant Removed		**$2,482**

Table D-4. Wet Limestone Scrubber Control Cost Analysis Based on PTE and 95% Control

Direct Costs			
	Purchased Equipment Costs		
		Wet Scrubber Unit including Limestone Prep System, inflated to 2012 dollars	$17,317,574
		Instrumentation (10% of EC)	$1,731,757
		Freight (5% of EC)	$865,879
		Subtotal, Purchased Equipment Cost (PEC)	$19,915,210
	Direct Installation Costs		
		Foundation (6% of PEC)	$1,194,913
		Supports (6% of PEC)	$1,194,913
		Handling and Erection (40% of PEC)	$7,966,084
		Electrical (1% of PEC)	$199,152
		Piping (30% of PEC)	$5,974,563
		Extending gas line 1/2 mile to plant	$500,000
		Insulation for Ductwork (1% of PEC)	$199,152
		Painting (1% of PEC)	$199,152
		Subtotal, Direct Installation Cost	$17,427,929
	Site Preparation		N/A
	Buildings		N/A
		Total Direct Cost	**$37,343,139**
Indirect Costs			
		Engineering (10% of PEC)	$1,991,521
		Construction and Field Expense (10% of PEC)	$1,991,521
		Contractor Fees (10% of PEC)	$1,991,521
		Start-up (1% of PEC)	$199,152
		Performance Test (1% of PEC)	$199,152
		Contingencies (3% of PEC)	$597,456
		Total Indirect Cost	**$6,970,324**
		Total Capital Investment (TCI)	**$44,313,462**
Direct Annual Costs			
	Hours per Year	(365 days per year, 24 hours per day), 90% Uptime	7,884
	Operating Labor		
		Operator 2 x 3,573 hours/year, $50/hr)	$357,300
		Supervisor (15% of operator)	$53,595
		Subtotal, Operating Labor	$410,895
	Maintenance		
		Labor (2 x 820 hours/year, $50/hr)	$82,000
		Material (5% of Total Direct Cost)	$ 1,867,157
		Subtotal, Maintenance	$1,949,157
	Utilities		
		Electricity	
		Pump (kW)	2,342
		Cost ($/kW-hr)	$0.0410
		Subtotal, Electricity	$757,054
		Limestone for slurry	
		Amount Required (ton/yr)	19,202
		Cost ($/ton)	$3.00
		Subtotal, Lime	$57,607
		Water	
		Amount Required (gpm)	122.0
		Cost ($/1000 gallons)	$1.00
		Subtotal, Water	$64,128
		Sludge Disposal	
		Amount Generated (tpy)	79,697
		Disposal Fee ($/ton)	$36.00
		Monthly Rent for Trailer @ $120/month	$1,440
		Cost for Box Transportation @ $220/load (assume 17 tons/trailer)	$1,031,374
		Subtotal, Sludge	$3,901,910
		Subtotal, Utilities	$4,780,698
		Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)	
		Gas Required (MMCF/yr)	1,020,986
		Cost ($/MMBTU)	$10.06
		Subtotal, Natural Gas	$10,271,123
		Total Direct Annual Costs	**$17,411,873**
Indirect Annual Costs			
	Overhead (60% of sum of operating, supervisor, maintenance labor & materials)		$1,416,031
	Administrative (2% TCI)		$886,269
	Property Tax (1% TCI)		$443,135
	Insurance (1% TCI)		$443,135
	Capital Recovery	(15 year life, 7 percent interest)	$4,865,380
		Total Indirect Annual Cost	**$8,053,950**
Conclusion			
		Total Annualized Cost	**$25,465,823**
		Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr) - PTE	**13,298**
		Pollutant Removed (tons SO_2/yr) - 95%, 95% uptime	**12,001**
		Pollutant Generated - NOx tons/yr	**97**
		Net Pollutant Removed - tons/yr	**11,904**
		Cost Per Ton of Pollutant Removed	**$2,139**

Table D-5. Fuel Substitution Control Cost Analysis Based on Projected Actual Emissions and 23% Control .

Direct Costs			
Purchased Equipment Costs			
	New Coal Mill I.D. Fan and associated equipment		$2,000,000
	Instrumentation (10% of EC)		$200,000
	Freight (5% of EC)		$100,000
		Subtotal, Purchased Equipment Cost (PEC)	$2,300,000
Direct Installation Costs			
	Foundation (6% of PEC)		$138,000
	Supports (6% of PEC)		$138,000
	Handling and Erection (40% of PEC)		$920,000
	Electrical (1% of PEC)		$23,000
	Piping (30% of PEC)		$690,000
	Insulation for Ductwork (1% of PEC)		$1,000
	Painting (1% of PEC)		$23,000
		Subtotal, Direct Installation Cost	$1,933,000
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$4,233,000**
Indirect Costs			
	Engineering (10% of PEC)		$230,000
	Construction and Field Expense (10% of PEC)		$230,000
	Contractor Fees (10% of PEC)		$230,000
	Start-up (1% of PEC)		$23,000
	Performance Test (1% of PEC)		$23,000
	Contingencies (3% of PEC)		$69,000
		Total Indirect Cost	**$805,000**
	Total Capital Investment (TCI)		**$5,038,000**
Direct Annual Costs			
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)			
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)			
	Reduction in coke usage (metric ton/yr)		188,959
	Heat Value (Gj / Mt)		32.510
	Heat (Gj / yr)		6,143,045
	Cost ($/Gj)		$1.74
		Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)		11,076
	Heat Value (Gj / Mt)		22.177
	Heat (Gj / yr)		245,627
	Cost ($/Gj)		$2.41
		Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)		198,736
	Changes in Synfuel and Tires have not been considered due to the highly variable nature of their cost		
	Cost of low sulfur coal ($/Mt)		$72.76
		Subtotal, increase in Low Sulfur Coal cost	$14,459,211
		Total Direct Annual Cost (increase)	**$3,178,351**
Indirect Annual Costs			
Administrative (2% TCI)			$100,760
Property Tax (1% TCI)			$50,380
Insurance (1% TCI)			$50,380
Capital Recovery	(15 year life, 7 percent interest)		$553,145
		Total Indirect Annual Cost	**$754,665**
Conclusion			
	Total Annualized Cost		**$3,933,016**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 23%		**2,641**
	Cost Per Ton of Pollutant Removed		**$1,489**

Table D-6. Fuel Substitution Control Cost Analysis Based on Projected Actual Emissions and 40% Control .

Direct Costs		
Purchased Equipment Costs		
	New Coal Mill and associated equipment	$5,374,302
	Instrumentation (10% of EC)	$537,430
	Freight (5% of EC)	$268,715
	Subtotal, Purchased Equipment Cost (PEC)	$6,180,447
Direct Installation Costs		
	Foundation (6% of PEC)	$370,827
	Supports (6% of PEC)	$370,827
	Handling and Erection (40% of PEC)	$2,472,179
	Electrical (1% of PEC)	$61,804
	Piping (30% of PEC)	$1,854,134
	Insulation for Ductwork (1% of PEC)	$2,687
	Painting (1% of PEC)	$61,804
	Subtotal, Direct Installation Cost	$5,194,263
Site Preparation		N/A
Buildings		N/A
	Total Direct Cost	**$11,374,710**
Indirect Costs		
	Engineering (10% of PEC)	$618,045
	Construction and Field Expense (10% of PEC)	$618,045
	Contractor Fees (10% of PEC)	$618,045
	Start-up (1% of PEC)	$61,804
	Performance Test (1% of PEC)	$61,804
	Contingencies (3% of PEC)	$185,413
	Total Indirect Cost	**$2,163,157**
	Total Capital Investment (TCI)	**$13,537,867**
Direct Annual Costs		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)		
	Reduction in coke usage (metric ton/yr)	188,959
	Heat Value (Gj / Mt)	32.510
	Heat (Gj / yr)	6,143,045
	Cost ($/Gj)	$1.74
	Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)	11,076
	Heat Value (Gj / Mt)	22.177
	Heat (Gj / yr)	245,627
	Cost ($/Gj)	$2.41
	Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)	244,891
	Heat Value (Gj / Mt)	26.266
	Heat (Gj / yr)	6,432,296
	Cost ($/Gj)	$5.67
	Subtotal, increase in Low Sulfur Coal cost	$36,471,116
	Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs		
Administrative (2% TCI)		$270,757
Property Tax (1% TCI)		$135,379
Insurance (1% TCI)		$135,379
Capital Recovery	(15 year life, 7 percent interest)	$1,486,385
	Total Indirect Annual Cost	**$2,027,900**
Conclusion		
	Total Annualized Cost	**$27,218,156**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**11,481**
	Pollutant Removed (tons SO_2/yr) - 40%	**4,592**
	Cost Per Ton of Pollutant Removed	**$5,927**

Table D-7. Fuel Substitution Control Cost Analysis Based on Projected Actual Emissions and 50% Control .

Direct Costs			
Purchased Equipment Costs			
	New Coal Mill and associated equipment		$5,374,302
	Instrumentation (10% of EC)		$537,430
	Freight (5% of EC)		$268,715
		Subtotal, Purchased Equipment Cost (PEC)	$6,180,447
Direct Installation Costs			
	Foundation (6% of PEC)		$370,827
	Supports (6% of PEC)		$370,827
	Handling and Erection (40% of PEC)		$2,472,179
	Electrical (1% of PEC)		$61,804
	Piping (30% of PEC)		$1,854,134
	Insulation for Ductwork (1% of PEC)		$2,687
	Painting (1% of PEC)		$61,804
		Subtotal, Direct Installation Cost	$5,194,263
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$11,374,710**
Indirect Costs			
	Engineering (10% of PEC)		$618,045
	Construction and Field Expense (10% of PEC)		$618,045
	Contractor Fees (10% of PEC)		$618,045
	Start-up (1% of PEC)		$61,804
	Performance Test (1% of PEC)		$61,804
	Contingencies (3% of PEC)		$185,413
		Total Indirect Cost	**$2,163,157**
	Total Capital Investment (TCI)		**$13,537,867**
Direct Annual Costs			
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)			
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)			
	Reduction in coke usage (metric ton/yr)		188,959
	Heat Value (Gj / Mt)		32.510
	Heat (Gj / yr)		6,143,045
	Cost ($/Gj)		$1.74
		Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)		11,076
	Heat Value (Gj / Mt)		22.177
	Heat (Gj / yr)		245,627
	Cost ($/Gj)		$2.41
		Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)		244,891
	Heat Value (Gj / Mt)		26.266
	Heat (Gj / yr)		6,432,296
	Cost ($/Gj)		$5.67
		Subtotal, increase in Low Sulfur Coal cost	$36,471,116
		Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs			
Administrative (2% TCI)			$270,757
Property Tax (1% TCI)			$135,379
Insurance (1% TCI)			$135,379
Capital Recovery	(15 year life, 7 percent interest)		$1,486,385
		Total Indirect Annual Cost	**$2,027,900**
Conclusion			
	Total Annualized Cost		**$27,218,156**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 50%		**5,741**
	Cost Per Ton of Pollutant Removed		**$4,741**

Table D-8. Fuel Substitution Control Cost Analysis Based on PTE and 23% Control.

Direct Costs

Purchased Equipment Costs		
	New Coal Mill I.D. Fan and associated equipment	$2,000,000
	Instrumentation (10% of EC)	$200,000
	Freight (5% of EC)	$100,000
	Subtotal, Purchased Equipment Cost (PEC)	$2,300,000
Direct Installation Costs		
	Foundation (6% of PEC)	$138,000
	Supports (6% of PEC)	$138,000
	Handling and Erection (40% of PEC)	$920,000
	Electrical (1% of PEC)	$23,000
	Piping (30% of PEC)	$690,000
	Insulation for Ductwork (1% of PEC)	$1,000
	Painting (1% of PEC)	$23,000
	Subtotal, Direct Installation Cost	$1,933,000
Site Preparation		N/A
Buildings		N/A
	Total Direct Cost	**$4,233,000**

Indirect Costs

Engineering (10% of PEC)	$230,000
Construction and Field Expense (10% of PEC)	$230,000
Contractor Fees (10% of PEC)	$230,000
Start-up (1% of PEC)	$23,000
Performance Test (1% of PEC)	$23,000
Contingencies (3% of PEC)	$69,000
Total Indirect Cost	**$805,000**
Total Capital Investment (TCI)	**$5,038,000**

Direct Annual Costs

Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)

Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)	
Reduction in coke usage (metric ton/yr)	188,959
Heat Value (Gj / Mt)	32.510
Heat (Gj / yr)	6,143,045
Cost ($/Gj)	$1.74
Subtotal, reduction in coke cost	-$10,688,898
Reduction in coal usage (metric ton/yr)	11,076
Heat Value (Gj / Mt)	22.177
Heat (Gj / yr)	245,627
Cost ($/Gj)	$2.41
Subtotal, reduction in coal cost	-$591,962
Increase in low sulfur coal usage - Amount Required (metric ton/yr)	198,736
Changes in Synfuel and Tires have not been considered due to the highly variable nature of their cost	
Cost of low sulfur coal ($/Mt)	$72.76
Subtotal, increase in Low Sulfur Coal cost	$14,459,211
Total Direct Annual Cost (increase)	**$3,178,351**

Indirect Annual Costs

Administrative (2% TCI)		$100,760
Property Tax (1% TCI)		$50,380
Insurance (1% TCI)		$50,380
Capital Recovery	(15 year life, 7 percent interest)	$553,145
	Total Indirect Annual Cost	**$754,665**

Conclusion

Total Annualized Cost	**$3,933,016**
Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**13,298**
Pollutant Removed (tons SO_2/yr) - 23%	**3,059**
Cost Per Ton of Pollutant Removed	**$1,286**

Table D-9. Fuel Substitution Control Cost Analysis Based on PTE and 40% Control.

Direct Costs		
Purchased Equipment Costs		
	New Coal Mill and associated equipment	$5,374,302
	Instrumentation (10% of EC)	$537,430
	Freight (5% of EC)	$268,715
	Subtotal, Purchased Equipment Cost (PEC)	$6,180,447
Direct Installation Costs		
	Foundation (6% of PEC)	$370,827
	Supports (6% of PEC)	$370,827
	Handling and Erection (40% of PEC)	$2,472,179
	Electrical (1% of PEC)	$61,804
	Piping (30% of PEC)	$1,854,134
	Insulation for Ductwork (1% of PEC)	$2,687
	Painting (1% of PEC)	$61,804
	Subtotal, Direct Installation Cost	$5,194,263
Site Preparation		N/A
Buildings		N/A
	Total Direct Cost	**$11,374,710**
Indirect Costs		
	Engineering (10% of PEC)	$618,045
	Construction and Field Expense (10% of PEC)	$618,045
	Contractor Fees (10% of PEC)	$618,045
	Start-up (1% of PEC)	$61,804
	Performance Test (1% of PEC)	$61,804
	Contingencies (3% of PEC)	$185,413
	Total Indirect Cost	**$2,163,157**
	Total Capital Investment (TCI)	**$13,537,867**
Direct Annual Costs		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)		
	Reduction in coke usage (metric ton/yr)	188,959
	Heat Value (Gj / Mt)	32.510
	Heat (Gj / yr)	6,143,045
	Cost ($/Gj)	$1.74
	Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)	11,076
	Heat Value (Gj / Mt)	22.177
	Heat (Gj / yr)	245,627
	Cost ($/Gj)	$2.41
	Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)	244,891
	Heat Value (Gj / Mt)	26.266
	Heat (Gj / yr)	6,432,296
	Cost ($/Gj)	$5.67
	Subtotal, increase in Low Sulfur Coal cost	$36,471,116
	Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs		
Administrative (2% TCI)		$270,757
Property Tax (1% TCI)		$135,379
Insurance (1% TCI)		$135,379
Capital Recovery	(15 year life, 7 percent interest)	$1,486,385
	Total Indirect Annual Cost	**$2,027,900**
Conclusion		
	Total Annualized Cost	**$27,218,156**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**13,298**
	Pollutant Removed (tons SO_2/yr) - 40%	**5,319**
	Cost Per Ton of Pollutant Removed	**$5,117**

Table D-10. Fuel Substitution Control Cost Analysis Based on PTE and 50% Control.

Direct Costs		
Purchased Equipment Costs		
	New Coal Mill and associated equipment	$5,374,302
	Instrumentation (10% of EC)	$537,430
	Freight (5% of EC)	$268,715
	Subtotal, Purchased Equipment Cost (PEC)	$6,180,447
Direct Installation Costs		
	Foundation (6% of PEC)	$370,827
	Supports (6% of PEC)	$370,827
	Handling and Erection (40% of PEC)	$2,472,179
	Electrical (1% of PEC)	$61,804
	Piping (30% of PEC)	$1,854,134
	Insulation for Ductwork (1% of PEC)	$2,687
	Painting (1% of PEC)	$61,804
	Subtotal, Direct Installation Cost	$5,194,263
Site Preparation		N/A
Buildings		N/A
	Total Direct Cost	**$11,374,710**
Indirect Costs		
	Engineering (10% of PEC)	$618,045
	Construction and Field Expense (10% of PEC)	$618,045
	Contractor Fees (10% of PEC)	$618,045
	Start-up (1% of PEC)	$61,804
	Performance Test (1% of PEC)	$61,804
	Contingencies (3% of PEC)	$185,413
	Total Indirect Cost	**$2,163,157**
	Total Capital Investment (TCI)	**$13,537,867**
Direct Annual Costs		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of maximum annual clinker production (1,215,708 tons) to 2007 actual clinker production (1,035,283 tons)		
Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage to maximum actual production levels)		
	Reduction in coke usage (metric ton/yr)	188,959
	Heat Value (Gj / Mt)	32.510
	Heat (Gj / yr)	6,143,045
	Cost ($/Gj)	$1.74
	Subtotal, reduction in coke cost	-$10,688,898
	Reduction in coal usage (metric ton/yr)	11,076
	Heat Value (Gj / Mt)	22.177
	Heat (Gj / yr)	245,627
	Cost ($/Gj)	$2.41
	Subtotal, reduction in coal cost	-$591,962
	Increase in low sulfur coal usage - Amount Required (metric ton/yr)	244,891
	Heat Value (Gj / Mt)	26.266
	Heat (Gj / yr)	6,432,296
	Cost ($/Gj)	$5.67
	Subtotal, increase in Low Sulfur Coal cost	$36,471,116
	Total Direct Annual Cost (increase)	**$25,190,256**
Indirect Annual Costs		
Administrative (2% TCI)		$270,757
Property Tax (1% TCI)		$135,379
Insurance (1% TCI)		$135,379
Capital Recovery	(15 year life, 7 percent interest)	$1,486,385
	Total Indirect Annual Cost	**$2,027,900**
Conclusion		
	Total Annualized Cost	**$27,218,156**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**13,298**
	Pollutant Removed (tons SO_2/yr) - 50%	**6,649**
	Cost Per Ton of Pollutant Removed	**$4,094**

Table D -11. Dry Lime Scrubbing - Control Cost Analysis Based on Projected Actual Emissions and 20% Control.

Direct Costs				
Purchased Equipment Costs				
	Dry Lime Injection System			$1,000,000
	Retrofit ESPs with Baghouse			$3,000,000
	Total Equipment Cost			$4,000,000
	Instrumentation (10% of EC)			$400,000
	Freight (5% of EC)			$200,000
		Subtotal, Purchased Equipment Cost (PEC)		$4,600,000
Direct Installation Costs				
	Foundation (6% of PEC)			$276,000
	Supports (6% of PEC)			$276,000
	Handling and Erection (40% of PEC)			$1,840,000
	Electrical (1% of PEC)			$46,000
	Piping (30% of PEC)			$0
	Insulation for Ductwork (1% of PEC)			$2,000
	Painting (1% of PEC)			$0
		Subtotal, Direct Installation Cost		$2,440,000
Site Preparation				N/A
Buildings				N/A
		Total Direct Cost		**$7,040,000**
Indirect Costs				
	Engineering (10% of PEC)			$460,000
	Construction and Field Expense (10% of PEC)			$460,000
	Contractor Fees (10% of PEC)			$460,000
	Start-up (1% of PEC)			$46,000
	Performance Test (1% of PEC)			$46,000
	Contingencies (3% of PEC)			$138,000
		Total Indirect Cost		**$1,610,000**
	Total Capital Investment (TCI)			**$8,650,000**
Direct Annual Costs				
Operating Labor				
	Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)			$8,760
	Supervisor (15% of operator)			$1,314
		Subtotal, Operating Labor		$10,074
Maintenance				
	Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)			$8,760
	Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$	352,000
		Subtotal, Maintenance		$360,760
Lime				
	Hydrated lime/Sulfur molar ratio, min. Ca/S			6.0
	MW of Ca(OH)2			74
	MW of SO2			64
	Purity of the Comercial lime %			96.8
	Lime Required - Short Tons			82282
	Cost ($/short ton)		$	156.00
		Subtotal, Lime		$12,836,066
		Total Direct Annual Costs		**$13,206,900**
Indirect Annual Costs				
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)				$222,500
Administrative (2% TCI)				$173,000
Property Tax (1% TCI)				$86,500
Insurance (1% TCI)				$86,500
Capital Recovery	(15 year life, 7 percent interest)			$949,724
		Total Indirect Annual Cost		**$1,518,224**
Conclusion				
	Total Annualized Cost			**$14,725,124**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)			**11,481**
	Pollutant Removed (tons SO_2/yr) - 20% removal, 95% uptime			**2,181**
	Cost Per Ton of Pollutant Removed			**$6,750**

Table D-12. Dry Lime Scrubbing - Control Cost Analysis Based on Projected Actual Emissions and 30% Control.

Direct Costs			
Purchased Equipment Costs			
	Dry Lime Injection System		$1,000,000
	Retrofit ESPs with Baghouse		$3,000,000
	Total Equipment Cost		$4,000,000
	Instrumentation (10% of EC)		$400,000
	Freight (5% of EC)		$200,000
		Subtotal, Purchased Equipment Cost (PEC)	$4,600,000
Direct Installation Costs			
	Foundation (6% of PEC)		$276,000
	Supports (6% of PEC)		$276,000
	Handling and Erection (40% of PEC)		$1,840,000
	Electrical (1% of PEC)		$46,000
	Piping (30% of PEC)		$0
	Insulation for Ductwork (1% of PEC)		$2,000
	Painting (1% of PEC)		$0
		Subtotal, Direct Installation Cost	$2,440,000
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$7,040,000**
Indirect Costs			
	Engineering (10% of PEC)		$460,000
	Construction and Field Expense (10% of PEC)		$460,000
	Contractor Fees (10% of PEC)		$460,000
	Start-up (1% of PEC)		$46,000
	Performance Test (1% of PEC)		$46,000
	Contingencies (3% of PEC)		$138,000
		Total Indirect Cost	**$1,610,000**
	Total Capital Investment (TCI)		**$8,650,000**
Direct Annual Costs			
Operating Labor			
	Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Supervisor (15% of operator)		$1,314
		Subtotal, Operating Labor	$10,074
Maintenance			
	Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$ 352,000
		Subtotal, Maintenance	$360,760
Lime			
	Hydrated lime/Sulfur molar ratio, min. Ca/S		6.0
	MW of Ca(OH)2		74
	MW of SO2		64
	Purity of the Comercial lime %		96.8
	Lime Required - Short Tons		82282
	Cost ($/short ton)		$ 156.00
		Subtotal, Lime	$12,836,066
		Total Direct Annual Costs	**$13,206,900**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$222,500
Administrative (2% TCI)			$173,000
Property Tax (1% TCI)			$86,500
Insurance (1% TCI)			$86,500
Capital Recovery	(15 year life, 7 percent interest)		$949,724
		Total Indirect Annual Cost	**$1,518,224**
Conclusion			
	Total Annualized Cost		**$14,725,124**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**11,481**
	Pollutant Removed (tons SO_2/yr) - 30% removal, 95% uptime		**3,272**
	Cost Per Ton of Pollutant Removed		**$4,500**

Table D-13. Dry Lime Scrubbing - Control Cost Analysis Based on PTE and 20% Control.

Direct Costs			
Purchased Equipment Costs			
	Dry Lime Injection System		$1,000,000
	Retrofit ESPs with Baghouse		$3,000,000
	Total Equipment Cost		$4,000,000
	Instrumentation (10% of EC)		$400,000
	Freight (5% of EC)		$200,000
		Subtotal, Purchased Equipment Cost (PEC)	$4,600,000
Direct Installation Costs			
	Foundation (6% of PEC)		$276,000
	Supports (6% of PEC)		$276,000
	Handling and Erection (40% of PEC)		$1,840,000
	Electrical (1% of PEC)		$46,000
	Piping (30% of PEC)		$0
	Insulation for Ductwork (1% of PEC)		$2,000
	Painting (1% of PEC)		$0
		Subtotal, Direct Installation Cost	$2,440,000
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$7,040,000**
Indirect Costs			
	Engineering (10% of PEC)		$460,000
	Construction and Field Expense (10% of PEC)		$460,000
	Contractor Fees (10% of PEC)		$460,000
	Start-up (1% of PEC)		$46,000
	Performance Test (1% of PEC)		$46,000
	Contingencies (3% of PEC)		$138,000
		Total Indirect Cost	**$1,610,000**
	Total Capital Investment (TCI)		**$8,650,000**
Direct Annual Costs			
Operating Labor			
	Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Supervisor (15% of operator)		$1,314
		Subtotal, Operating Labor	$10,074
Maintenance			
	Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$ 352,000
		Subtotal, Maintenance	$360,760
Lime			
	Hydrated lime/Sulfur molar ratio, min. Ca/S		6.0
	MW of Ca(OH)2		74
	MW of SO2		64
	Purity of the Comercial lime %		96.8
	Lime Required - Short Tons		95305
	Cost ($/short ton)		$ 156.00
		Subtotal, Lime	$14,867,521
		Total Direct Annual Costs	**$15,238,355**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$222,500
Administrative (2% TCI)			$173,000
Property Tax (1% TCI)			$86,500
Insurance (1% TCI)			$86,500
Capital Recovery	(15 year life, 7 percent interest)		$949,724
		Total Indirect Annual Cost	**$1,518,224**
Conclusion			
	Total Annualized Cost		**$16,756,579**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**13,298**
	Pollutant Removed (tons SO_2/yr) - 20% removal, 95% uptime		**2,527**
	Cost Per Ton of Pollutant Removed		**$6,632**

Table D-14. Dry Lime Scrubbing - Control Cost Analysis Based on PTE and 30% Control.

Direct Costs			
Purchased Equipment Costs			
	Dry Lime Injection System		$1,000,000
	Retrofit ESPs with Baghouse		$3,000,000
	Total Equipment Cost		$4,000,000
	Instrumentation (10% of EC)		$400,000
	Freight (5% of EC)		$200,000
		Subtotal, Purchased Equipment Cost (PEC)	$4,600,000
Direct Installation Costs			
	Foundation (6% of PEC)		$276,000
	Supports (6% of PEC)		$276,000
	Handling and Erection (40% of PEC)		$1,840,000
	Electrical (1% of PEC)		$46,000
	Piping (30% of PEC)		$0
	Insulation for Ductwork (1% of PEC)		$2,000
	Painting (1% of PEC)		$0
		Subtotal, Direct Installation Cost	$2,440,000
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$7,040,000**
Indirect Costs			
	Engineering (10% of PEC)		$460,000
	Construction and Field Expense (10% of PEC)		$460,000
	Contractor Fees (10% of PEC)		$460,000
	Start-up (1% of PEC)		$46,000
	Performance Test (1% of PEC)		$46,000
	Contingencies (3% of PEC)		$138,000
		Total Indirect Cost	**$1,610,000**
	Total Capital Investment (TCI)		**$8,650,000**
Direct Annual Costs			
Operating Labor			
	Operator (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Supervisor (15% of operator)		$1,314
		Subtotal, Operating Labor	$10,074
Maintenance			
	Labor (0.5 hr/shift, 3 shifts/day, 365 d/yr, $16/hr)		$8,760
	Material (5% of Total Direct Cost). Increased to account for high rate of damaged bags that is expected.		$ 352,000
		Subtotal, Maintenance	$360,760
Lime			
	Hydrated lime/Sulfur molar ratio, min. Ca/S		6.0
	MW of Ca(OH)2		74
	MW of SO2		64
	Purity of the Comercial lime %		96.8
	Lime Required - Short Tons		95305
	Cost ($/short ton)		$ 156.00
		Subtotal, Lime	$14,867,521
		Total Direct Annual Costs	**$15,238,355**
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & materials)			$222,500
Administrative (2% TCI)			$173,000
Property Tax (1% TCI)			$86,500
Insurance (1% TCI)			$86,500
Capital Recovery	(15 year life, 7 percent interest)		$949,724
		Total Indirect Annual Cost	**$1,518,224**
Conclusion			
	Total Annualized Cost		**$16,756,579**
	Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)		**13,298**
	Pollutant Removed (tons SO_2/yr) - 30% removal, 95% uptime		**3,790**
	Cost Per Ton of Pollutant Removed		**$4,421**

Table D-15. Mid Kiln Firing Control Cost Analysis Based on PA and 20% Control.

Direct Costs			
Purchased Equipment Costs			
	MKF System		$1,576,009
	Instrumentation (10% of EC)		$157,601
	Freight (5% of EC)		$78,800
		Subtotal, Purchased Equipment Cost (PEC)	$1,812,410
Direct Installation Costs			
	Foundation (6% of PEC)		$108,745
	Supports (6% of PEC)		$108,745
	Handling and Erection (40% of PEC)		$724,964
	Electrical (1% of PEC)		$18,124
	Piping (30% of PEC)		$543,723
	Insulation for Ductwork (1% of PEC)		$788
	Painting (1% of PEC)		$18,124
		Subtotal, Direct Installation Cost	$1,523,213
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$3,335,623**
Indirect Costs			
	Engineering (10% of PEC)		$181,241
	Construction and Field Expense (10% of PEC)		$181,241
	Contractor Fees (10% of PEC)		$181,241
	Start-up (1% of PEC)		$18,124
	Performance Test (1% of PEC)		$18,124
	Contingencies (3% of PEC)		$54,372
		Total Indirect Cost	**$634,344**
	Total Capital Investment (TCI)		**$3,969,967**
Direct Annual Costs			
Ideally, alternative fuels will cost less than current fuels, such that there is either a reduction in fuel cost or no net increase in fuel cost such that the direct annual cost of the system is zero			
Indirect Annual Costs			
Administrative (2% TCI)			$79,399
Property Tax (1% TCI)			$39,700
Insurance (1% TCI)			$39,700
Capital Recovery	(15 year life, 7 percent interest)		$435,881
		Total Indirect Annual Cost	**$594,680**
Conclusion			
	Total Annualized Cost		**$594,680**
	Pollutant Emission Rate Prior to MKF (tons NO_x/yr)		**6,414**
	Pollutant Removed (tons NO_x/yr) - 20%		**1,283**
	Cost Per Ton of Pollutant Removed		**$464**

Table D-16. Mid Kiln Firing Control Cost Analysis Based on PTE and 20% Control.

Direct Costs			
Purchased Equipment Costs			
	MKF System		$1,576,009
	Instrumentation (10% of EC)		$157,601
	Freight (5% of EC)		$78,800
		Subtotal, Purchased Equipment Cost (PEC)	$1,812,410
Direct Installation Costs			
	Foundation (6% of PEC)		$108,745
	Supports (6% of PEC)		$108,745
	Handling and Erection (40% of PEC)		$724,964
	Electrical (1% of PEC)		$18,124
	Piping (30% of PEC)		$543,723
	Insulation for Ductwork (1% of PEC)		$788
	Painting (1% of PEC)		$18,124
		Subtotal, Direct Installation Cost	$1,523,213
Site Preparation			N/A
Buildings			N/A
		Total Direct Cost	**$3,335,623**
Indirect Costs			
	Engineering (10% of PEC)		$181,241
	Construction and Field Expense (10% of PEC)		$181,241
	Contractor Fees (10% of PEC)		$181,241
	Start-up (1% of PEC)		$18,124
	Performance Test (1% of PEC)		$18,124
	Contingencies (3% of PEC)		$54,372
		Total Indirect Cost	**$634,344**
	Total Capital Investment (TCI)		**$3,969,967**
Direct Annual Costs			
Ideally, alternative fuels will cost less than current fuels, such that there is either a reduction in fuel cost or no net increase in fuel cost such that the direct annual cost of the system is zero			
Indirect Annual Costs			
Administrative (2% TCI)			$79,399
Property Tax (1% TCI)			$39,700
Insurance (1% TCI)			$39,700
Capital Recovery	(15 year life, 7 percent interest)		$435,881
		Total Indirect Annual Cost	**$594,680**
Conclusion			
	Total Annualized Cost		**$594,680**
	Pollutant Emission Rate Prior to MKF (tons NO_x/yr)		**8,462**
	Pollutant Removed (tons NO_x/yr) - 20%		**1,692**
	Cost Per Ton of Pollutant Removed		**$351**

Appendix Q

Holcim-Clarksville SO_2 Control Cost Evaluation

Direct Costs	**Holcim**	**MDNR**	
Purchased Equipment Costs			
New Coal Mill ID Fan and associated equipment	$2,000,000	$1,000,000	Holcim Estimate; Historical Fan Cost
Instrumentation (10% of EC)	$200,000	$100,000	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012
Sales Tax (5% of EC)	$100,000	$50,000	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012
Freight (5% of EC)	$100,000	$50,000	0.05 A
Subtotal, Purchased Equipment Cost (PEC)	$2,400,000	$1,200,000	B
Direct Installation Costs			
Foundation (6% of PEC)	$144,000	$72,000	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012
Supports (6% of PEC)	$144,000	$72,000	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012
Handling and Erection (40% of PEC)	$960,000	$480,000	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012
Electrical (1% of PEC)	$24,000	$12,000	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012
Piping (30% of PEC)	$720,000	$360,000	0.30 B CCM
Insulation for Ductwork (1% of PEC)	$24,000	$12,000	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012
Painting (1% of PEC)	$24,000	$12,000	0.01 B CCM
Subtotal, Direct Installation Cost	$2,040,000	$1,020,000	
Site Preparation	N/A	N/A	
Buildings	N/A	N/A	
Total Direct Cost	**$4,440,000**	**$2,220,000**	
Indirect Costs			
Engineering (10% of PEC)	$240,000	$120,000	CCM
Construction and Field Expense (10% of PEC)	$240,000	$120,000	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012
Contractor Fees (10% of PEC)	$240,000	$120,000	CCM
Start-up (1% of PEC)	$24,000	$12,000	CCM
Performance Test (1% of PEC)	$24,000	$12,000	CCM
Contingencies (3% of PEC)	$72,000	$36,000	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012
Total Indirect Cost	**$840,000**	**$420,000**	
Total Capital Investment (TCI)	**$5,280,000**	**$2,640,000**	

Direct Annual Costs

Scaled up from 2007 annual average clinker production to 3-yr average clinker production

Increased Fuel Cost (calculated by scaling 2007 annual average fuel usage by the ratio of 3-year average clinker production (1,169,667 tons) to 2007 actual clinker production (1,035,283 tons)

					2007 (1,035,283 tons c	Scaled to (3 yr average tons clinker)
#######	Reduction in coke usage (metric ton/yr)	181,802		Holcim Engineering Estim	160,915	181,802
	Heat Value (Gj / Mt)	32.510		Holcim Plant Data		
	Heat (Gj / yr)	5,910,397		Holcim Engineering Estimate		
	Cost ($/Gj)	$1.74		Holcim Plant Data		
	Subtotal, reduction in coke cost	-$10,284,091	-$10,284,091			
#######	Reduction in coal usage (metric ton/yr)	10,656		Holcim Engineering Estim	9,432	10,656
	Heat Value (Gj / Mt)	22.177		Holcim Plant Data		
	Heat (Gj / yr)	236,325		Holcim Engineering Estimate		
	Cost ($/Gj)	$2.41		Holcim Plant Data		
	Subtotal, reduction in coal cost	-$569,543	-$569,543			
#######	Increase in low sulfur coal usage - Amount Requir	198,736		Holcim Engineering Estim	208,546	235,616
	Heat Value (Gj / Mt)		25.818	Holcim Engineering Estimate		
	Heat (Gj / yr)		5,131,033	Holcim Engineering Estimate		
	Cost ($/Mt) or Cost ($/Gj)	$72.76	$2.82	Holcim Marketing and Engineering Estimate		
	Subtotal, increase in Low Sulfur Coal cost	$14,459,211	$14,460,031			
	Total Direct Annual Cost (increase)	**$3,605,577**	**$3,606,397**			

Indirect Annual Costs

Administrative (2% TCI)	$105,600	$52,800	0.02 TCI
Property Tax (1% TCI)	$52,800	$26,400	0.01 TCI
Insurance (1% TCI)	$52,800	$26,400	0.01 TCI
Capital Re (15 year life, 7 percent interest)	$579,716	$289,858	
Total Indirect Annual Cost	**$790,916**	**$395,458**	

Conclusion

Total Annualized Cost	**$4,396,493**	**$4,001,855**		
Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**11,675**	**11,675**		11675.16667 Average SO2 Emissions of 3 latest full production years
Pollutant Removed (tons SO_2/yr) - 23%	**3,152**	**3,152**	27% Removal	
Cost Per Ton of Pollutant Removed	**$1,395**	**$1,270**		

Pollutant Emitted after Control	8,523	8,523	tons/year
Maximum Actual Historical Clinker Production (t	1,169,667	1,169,667	
Incremental Cost/ton clinker	$ 4	$3.42	

2007 baseline - Holcim Provided in BART Writeup
65% Sulfur Input from Fuel
35% Sulfur Input from Raw Materials
30-35% Sulfur Emitted from Stack

From permit
1169667 Average Production of 3 latest full production years
1611840 Maximum Clinker Production @ 184 TPH
13298 TPY SO2 @ 16.5 lb/ton
6,432,296 Gj/yr Heat Input from Fuel at Maximum Clinker Production

							Maximum Annual Clinker Scaled from 2007 Fuel Use				(TPY)	(TPY)	Raw Material		
	Cost per Gj	S%	BTU/lb	GJ/Mton	$/Mton fuel	$/ton fuel	Ex/Repl Use (MT)	GJ/yr	Fuel S Input (TPY)	Baseline (TPY)	Fuel SO2 Unc	Fuel SO2 Cont	SO2 (TPY)	Overall SO2 (TPY)	
Existing Coal	$2.41	3.45%	9534.49	22.177	$53.45	$48.49	10,656.31	236,325	9,706.55		19,394.93	7,757.97		11,682.67	
Pet Coke	$1.74	5.72%	13976.93	32.51	$56.57	$51.32	181,802	5,910,397	10,978.11		21,935.67	8,774.27		12,698.97	
3%S Coal	$2.81815	3.00%	11100	25.81833508	$72.76	$66.01	198,736	5,131,033	7,250.06		14,486.55	5,794.62		9,719.32	0.7309
Tires		1.83%	13432.5	31.24367441			24,705.02	771,875.48	498.35		995.77	597.46			
PRB Coal	$5.67	0.70%	11300.00	26.28353031	$149.03	$135.20	244,727	6,432,296	1,661.74		3,320.37	1,328.15		5,252.85	0.3950
Other								529,387.51							
0.9478171 MMBTU/Gj										12,475.12	24,926.90	9,970.76	3,327.24		

429.927	BTU/lb per Gj/MetricTon
2.2046	lb/kg
1000	kg/Metric Ton

5,660,420.15 [Max Heat Input] - 12% TDF

Baseline is All Fuel as Pet Coke

60% Fuel SO2 Control (Coal/Coke)

40% Fuel SO2 Control (Tires)

Tires

26.865	MMBTU/short ton
13432.5	BTU/lb
1.83	%S TDF

Modeled	4889.375 lb SO2/hour	117345 lb SO2/day	12/2/2004	4069.382956	TPD Clinker	28.83606711 lb/ton clinker
	3049.375 lb NOx/hour	73185 lb NOx/day	11/24/2007	3762.70105	TPD Clinker	19.45012347 lb/ton clinker

MAX 30-day average	80529.88431 lb SO2/day	12/10/05	1/8/06	20.95549232 lb/ton clinker
	52858.73258 lb NOx/day	10/29/07-	11/27/07	13.78776969 lb/ton clinker

30-day Clinker
104587.71 Metric Tons
104338.4 Metric Tons

2007 Ann Avg lb/ton SO2	17.31083175
2007 Ann Avg lb/ton Nox	10.05306488
2006 Ann Avg lb/ton SO2	13.64712331
2006 Ann Avg lb/ton Nox	8.583653198
2005 Ann Avg lb/ton SO2	11.16488906
2005 Ann Avg lb/ton Nox	5.768385811

Percentile	SO2	UNC (lb/day)	CON(lb/day)	lb/30days	Limits
Max	2415897	80529.9	58786.827	1763604.81	27% Control for SO2 from 30-day Maximum
0.95	2239006	74633.53333	54482.47933		
0.9	2043221	68107.36667	49718.37767		
0.8	1824675	60822.5	44400.425		
0.7	1666853	55561.76667	40560.08967		
0.6	1509100	50303.33333	36721.43333		
0.5	1344408	44813.6	32713.928		

Percentile	NOX	UNC (lb/day)	CON(lb/day)	lb/30days	
Max	1585762	52858.73333	42286.98667	1268609.6	20% Control for NOX from 30-day maximum
0.95	1251125	41704.16667	33363.33333		
0.9	1089332	36311.06667	29048.85333		
0.8	921089	30702.96667	24562.37333		
0.7	855838	28527.93333	22822.34667		
0.6	730787	24359.56667	19487.65333		
0.5	629996	20999.86667	16799.89333		

Direct Costs		MDNR Alt						
Purchased Equipment Costs								
Wet Scrubber Unit including Limestone Prep System	$10,524,352	$7,670,653	Based on Ash Grove Cement Company - Moapa Plant Cost Estimate from Enviro-chem quote (65% of installed price plus 25% possible increase). Scaled using ratio of airflows to the 0.6 power					
Instrumentation (15% of EC)	$1,578,653	$1,150,598	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012					
Sales Tax (5% of EC)	$526,218	$383,533	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012					
Freight (5% of EC)	$526,218	$383,533	CCM					
Subtotal, Purchased Equipment Cost (PEC)	$13,155,441	$9,588,317	Moapa Airflow	311,360	acfm	0.41	Bypass Fraction
			Clarksville Airflow - Permit Limit	828,969	acfm	489,092	acfm (scaled for bypass)
Direct Installation Costs							
Foundation (10% of PEC)	$1,315,544	$958,832	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012				
Supports (10% of PEC)	$1,315,544	$958,832	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012				
Handling and Erection (50% of PEC)	$6,577,720	$4,794,158	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012				
Electrical (10% of PEC)	$1,315,544	$958,832	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012				
Piping (30% of PEC)	$3,946,632	$2,876,495	CCM				
Extending gas line 1/2 mile to plant	$500,000	$500,000	Engineering Estimate				
Insulation for Ductwork (5% of PEC)	$657,772	$479,416	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012				
Painting (1% of PEC)	$131,554	$95,883	CCM				
Subtotal, Direct Installation Cost	$15,760,311	$11,622,447					
Buildings	N/A	N/A					
Total Direct Cost	**$28,915,752**	**$21,210,764**					

Indirect Costs				
Engineering (10% of PEC)		$1,315,544	$958,832	CCM
Construction and Field Expense (15% of PEC)		$1,973,316	$1,438,248	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012
Contractor Fees (10% of PEC)		$1,315,544	$958,832	CCM
Start-up (1% of PEC)		$131,554	$95,883	CCM
Performance Test (1% of PEC)		$131,554	$95,883	CCM
Contingencies (5% of PEC)		$657,772	$479,416	Holcim Regional Capital Expense Manager - Engineering Estimate for 2012
	Total Indirect Cost	**$5,525,285**	**$4,027,093**	
Total Capital Investment (TCI)		**$34,441,037**	**$25,237,857**	
Direct Annual Costs				
Hours (365 days per year, 24 hours per day), 90% Uptime		7,884	7,884	
Operating Labor				
Operator (8 men/yr, 2,080 hrs/yr, $64.50/hr) 4 men/yr		$1,073,280	$1,073,280	Estimate - 8 man years, 2,080 hrs/yr *64.50. Holcim Durkee
Supervisor (15% of operator)		$160,992	$160,992	CCM
	Subtotal, Operating Labor	$1,234,272	$1,234,272	
Maintenance				
Labor (6 men/yr, 2,080 hrs/yr, $64.50/hr) 3 men/yr		$804,960	$804,960	Estimate - 6 man years, 2,080 hrs/yr *64.50. Holcim Durkee
Material (5% of Total Direct Cost)		$ 1,445,788	$1,060,538	Holcim Lee Island PSD
	Subtotal, Maintenance	$2,250,748	$1,865,498	
Utilities				
Electricity				
Pump (kW)		2,342	1,707	Scaled using Moapa data and ratio of airflows to the 0.6 power
Cost ($/kW-hr)		$0.0410	$0.041	Clarksville Budget - 2011
	Subtotal, Electricity	$757,054	$551,617	
Limestone for slurry				

Amount Required (ton/yr)	15,972	9,423	(1.6 tons CaCO3/ ton SO2 Removed. From NLA evaluation = 1.03/1.0 molar ratio.
Cost ($/ton)	$3.00	$3	
Subtotal, Lime	$47,915	$28,270	
Water			
Amount Required (gpm)	122.0	89	Scaled using Moapa data and ratio of airflows to the 0.6 power
Cost ($/1000 gallons)	$1.00	$1	Plant Estimate
Subtotal, Water	$57,716	$42,054	
Sludge Disposal			
Amount Generated (tpy)	66,288	39,110	Scale to synthetic gypsum CaSO4-2H20 MW (170) / SO2 MW(64) / 80 percent purity lime / 50 percent moisture
Disposal Fee ($/ton)	$36.00	$36	Bid from Area Disposal Services, Inc.
Monthly Rent for Trailer @ $120/month	$1,440	$1,440	Bid from Area Disposal Services, Inc.
Cost for Box Transportation @ $220/load (assume 17 tons/trailer)	$857,851	$506,132	Bid from Area Disposal Services, Inc.
Subtotal, Sludge	$3,245,677	$1,915,540	
Subtotal, Utilities	$4,108,361	$2,537,480	
Natural Gas Reheat (assuming a 210 deg F temp drop and reheat)			
Gas Required (MMCF/yr)	1,074,722	634,135	See Calculations Below
Cost ($/MMBTU)	$10.06	$10.06	Missouri Energy Bulletin - April 10 2008
Subtotal, Natural Gas	$10,811,708	$6,379,395	
Total Direct Annual Costs	**$18,405,089**	**$12,016,646**	
Indirect Annual Costs			
Overhead (60% of sum of operating, supervisor, maintenance labor & material	$2,091,012	$1,859,862	
Administrative (2% TCI)	$688,821	$504,757	0.02 TCI
Property Tax (1% TCI)	$344,410	$252,379	0.01 TCI
Insurance (1% TCI)	$344,410	$252,379	0.01 TCI
Capita (15 year life, 7 percent interest)	$3,781,441	$2,770,981	
Total Indirect Annual Cost	**$7,250,094**	**$5,640,357**	

Conclusion

Total Annualized Cost	**$25,655,183**	**$17,657,003**			
Pollutant Emission Rate Prior to Scrubber (tons SO_2/yr)	**11,675**	**11,675**		11675.16667	Ave SO2 Emissions of 3 latest full prod yrs
Pollutant Removed (tons SO_2/yr) - 90% Removal, 95% Uptime	**9,982**	**5,890**	90% removal, 95% uptime		MDNR bypass with reheat and 95% uptime (designed to get 50% SO2 Control from Base)
Pollutant Generated - NOx tons/yr				**72**	
Net Pollutant Removed - tons/yr	**9,982**	**5,890**			
Cost Per Ton of Pollutant Removed	**$2,570**	**$2,998**			

Pollutant Emitted after Control	1,693	5,786	tons/year		
Maximum Actual Historical Clinker Production (tons)	1,169,667	1,169,667		1169667	Average Production of 3 latest full production years
Incremental Cost/ton clinker	$ 22	$15.10			

Standard temperature	68	68	F
Density of air	0.0026	0.0026	lb-mole/scf
Specific heat of exhaust gas	7.542	7.542	Btu/lb-mole F
Specific heat of steam 14.7 psia 220 - 600 deg F	8.46	8.46	Btu/lb-mole F
Exhaust gas percent water	35%	0.35	Percent
Specific heat of exhaust gas	7.86	7.8633	Btu/lb-mole F
Exhaust gas temperature after WLS	170	256	Deg. F Based on Holcim Durkee Scrubber Design. NW Email
Current ESP outlet gas temp	380	380	Deg F
Heat input	3.60	1.868	Btu/acf
Exhaust gas flow rate - 367	828969	828,969	acfm
Exhaust gas flow rate - reduced temperature	631,404	717751.17	
Unit natural gas cost	$10.06	$10.06	Missouri Energy Bulletin - April 10 2008
Natural gas requirement - Based on 90% Plant Uptime, 95% Scrubber Uptime	1,074,722	634134.703	MMBTU/yr
Natural Gas Cost	$10,811,708	$6,379,395.11	/yr
Additional NOx Generated	140	140	lbs/MMscf. AP-42 Section 1.4-1. *** LNB Control Included
Conversion	1050	1050	MMBTU / MMSCF. Approximate Value
Natural gas requirement in MMscf/yr	1023.5	603.94	MMSCF/yr
NOx generated - tons/yr	72	42.28	tons/year

Appendix R

Holcim-Clarksville BART Draft Consent Agreement

August 18, 2008

STATE OF MISSOURI
Matt Blunt, Governor • Doyle Childers, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

AUG 1 8 2008

Mr. Alan Greer
Plant Manager
Holcim – Clarksville
14738 Highway 79
Clarksville, MO 63336

Re: Best Available Retrofit Technology (BART) finding and Consent Agreement for Clarksville's kiln system

Dear Mr. Greer:

The following is a summary of the Department of Natural Resources finding for BART on the Clarksville kiln system. With respect to oxides of nitrogen (NOx), the department has received a portion of this study from CINAR Company detailing the emission reductions achieved by mid-kiln firing of tire-derived fuel (TDF). The department is requesting the full study to complete the necessary technical review. Based on confirmation of the results from this study, the department will likely find that mid-kiln firing of TDF will result in a cost-effective control on NOx that will satisfy BART for Holcim-Clarksville. This finding is supported by the following:

(1) the kiln system already utilizes low-NOx burners in the kiln;
(2) the kiln system already utilizes cement kiln dust insufflation for NOx control;
(3) the department concurs with the finding of technical infeasibility for flue gas recirculation and selective catalytic reduction due to lack of commercial application for these technologies on the type of kiln system operated at Clarksville (long, wet);
(4) the department concurs that selective non-catalytic reduction (SNCR) and mid-kiln firing of tires are technically feasible (with some caveats regarding SNCR performance in a long, wet kiln system); and
(5) the cost effectiveness of the mid-kiln firing NOx control and the increased certainty of emission reduction supports its choice over SNCR in this specific case.

The evaluation for control of sulfur dioxide (SO_2) for the Clarksville kiln system included fuel substitution, raw material substitution, dry scrubbing, and wet scrubbing. The department concurs with your finding that fuel substitution and dry/wet scrubbing are technically feasible for SO_2 control. The department has some reservations with the scrubbing technology cost analysis used in your proposal. However, the department's analyses demonstrate the cost of scrubbing technology would significantly impact the Clarksville kiln's ability to compete in the cement production market (e.g. nearly $20/ton clinker produced). Therefore, the department has found

that switching to a lower sulfur fuel with the use of TDF will satisfy the SO_2 BART requirements for the Clarksville kiln system.

The enclosed draft consent agreement documents the department's findings for BART. The department has determined the emission limits in the agreement should be expressed as 30-day rolling averages to allow for operational variability in the kiln system and to remain consistent with the averaging time utilized by the Environmental Protection Agency's (EPA) presumptive BART findings for electric generating units. This draft agreement has not been shared with EPA Region VII staff and will undergo their review before signature to ensure it is "approvable" for inclusion in the regional haze State Implementation Plan.

There are two specific issues in the agreement for your technical review: (1) missing continuous emission monitor data substitution and (2) calibration/quality assurance of the emission monitoring system. These two provisions have been designed to encourage a discussion between Holcim and the department regarding these important monitoring issues.

Overall, Holcim's willingness to provide the necessary information to address the federal regional haze requirements has been encouraging. At this point, we look forward to finalizing the agreement and incorporating it into the regional haze State Implementation Plan. If you have questions about the emission limits or other technical details, please contact Jeffry D. Bennett with the department's Air Pollution Control Program at P.O. Box 176, Jefferson City, Missouri 65102 or by telephone at (573) 751-8406. If you have questions regarding the legal requirements of the agreement, please contact Sarah Callier with the department's Division of Environmental Quality at (573) 522-9911.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

James L. Kavanaugh

James L. Kavanaugh
Director

JLK:jbt

Enclosure

c: Ms. Sarah Callier, Division of Environmental Quality, Legal Counsel

REGIONAL HAZE AGREEMENT

The parties hereto, the Missouri Department of Natural Resources and Holcim (US) Incorporated- Clarksville, having agreed that entry of this Regional Haze Agreement (hereinafter "Agreement") is in the best interest of the parties and the public health and the environment, hereby represent and state as follows:

JURISDICTION

1. The Missouri Department of Natural Resources (hereinafter "Department") is a duly authorized state agency created under Chapter 640 of the Revised Statutes of Missouri (as amended) to administer the programs assigned to it related to environmental control and the conservation and management of natural resources.

2. Chapter 643 of the Revised Statutes of Missouri (as amended) provides that the Director of the Department, on behalf of the Missouri Air Conservation Commission, administers the provisions of the Missouri Air Conservation Law.

3. Holcim (US) Incorporated- Clarksville (hereinafter "Holcim") is a Missouri corporation in good standing and registered to do business in Missouri in accordance with Missouri laws and is subject to the Missouri Air Conservation Law and the regulations adopted thereunder. Holcim is the legal and rightful owner of the facility listed in paragraph 17.

4. Pursuant to RSMo 643.060, the Director has authority and jurisdiction to issue this Agreement and to enforce the same. In any action by the Department to enforce the terms of this Agreement, Holcim agrees not to contest the authority or jurisdiction of the Director to issue this Agreement.

5. The terms of this Agreement shall be construed in accordance with the applicable laws of the state of Missouri and the United States.

STATEMENT OF PURPOSE

6. In entering into this Agreement, it is the mutual objective of the Department and Holcim to reduce the contributions of emissions from the facility, listed in paragraph 17, to regional haze at Mingo National Wildlife Refuge, Hercules Glade Wilderness Area, and Upper Buffalo Wilderness Area (in Arkansas), and to establish a schedule by which Holcim will achieve reductions in air pollution emissions of visibility impairing pollutants. This Agreement establishes enforceable emission limits pursuant to the Department's requirements to comply with the regional haze regulations identified in this Agreement which require the use of Best Available Retrofit Technology (BART) to applicable emission sources. This Agreement is not the result of any enforcement action or alleged non-compliance with any law, regulation, permit, or order and will enable Holcim

to timely comply with the Environmental Protection Agency (EPA) and the Department deadlines for BART and other unforeseen consequences.

PARTIES BOUND

7. This Agreement shall apply to and be binding upon the parties, their agents, successors, and assigns and upon all persons, contractors, and consultants acting under or for either the Department or Holcim or both.

8. The parties agree to undertake all actions required of them by the terms and conditions of this Agreement.

9. Notwithstanding the terms of any contract, Holcim is responsible for compliance with this Agreement and for insuring that its contractors and agents comply with this Agreement.

10. The activities conducted under this Agreement are subject to approval by the Department. Holcim shall make all reasonable efforts to provide all necessary information consistent with this Agreement requested by the Department.

LIABILITY

11. Nothing in this Agreement shall be considered an admission of any fact or acknowledgement of any liability by any party, nor shall anything in this Agreement be considered an admission of any fact or acknowledgement of any violation of any law, regulation, permit or order but will enable Holcim to timely comply with established EPA and Department deadlines for compliance with the regional haze regulations and other unforeseen requirements. Neither the State of Missouri nor any agency thereof shall be held out as a party of any contract entered into by Holcim in carrying out activities pursuant to this Agreement.

FINDINGS OF FACTS

12. In 1977, the U.S. Congress adopted §169 (42 U.S.C. 7491) of the Clean Air Act (CAA), setting forth the national visibility goal of restoring pristine conditions in national parks and wilderness areas designated as Class I Areas. When the CAA was again amended in 1990, Congress added §169B (42 U.S.C. 7492), authorizing further research and regular assessments of the progress made for visibility improvement.

13. EPA's Regional Haze Rule, 40 CFR 51.308 (Part P), was adopted July 1, 1999 and went into effect on August 30, 1999. The Regional Haze Rule aimed at achieving national visibility goals by 2064. This rulemaking addresses the combined visibility effects of various pollution sources over a wide geographic region. The 1999 Regional Haze Rule also singles out certain older emission sources that have not been regulated under other provisions of the CAA for

additional controls. Therefore, older sources that contribute to visibility impairment in Class I areas are required to implement BART.

14. On May 24, 2002, the U.S. Court of Appeals, D.C. District Court ruled on a challenge brought by the American Corn Growers Association against EPA's Regional Haze Rule of 1999. *American Corn Growers Association v. EPA*, 291 F.3d 1. The Court denied the American Corn Growers Association's challenge to the Regional Haze Rule and remanded the case to EPA. Pursuant to this remand, EPA proposed revisions to the Regional Haze Rule.

15. On July 6, 2005, EPA published a revision to the Regional Haze Rule, including Appendix Y, "Guidelines for BART Determinations Under the Regional Haze Rule," which provides direction to states on determining which older sources may need to install BART and how to determine BART.

16. Appendix Y of the Regional Haze Rule requires states to identify sources constructed between 1962 and 1977 in certain industrial categories, including portland cement production. Then, each state is allowed to consider whether the predicted (modeled) impact from each source's emissions on Class I areas has less than a significant contribution on visibility impairment (0.5 deciview). After both screening and refined air quality modeling evaluations for Missouri sources, Holcim was identified as a significant contributor to visibility impairment at Mingo Wildlife Refuge and Hercules Glade Wilderness Area in Missouri and Upper Buffalo Wilderness Area in Arkansas and was therefore required to install BART. The Department also determined that the magnitude of the direct Particulate Matter (PM) visibility impacts from Holcim at the relevant Class I areas were very minimal when compared to the overall impact. In addition, the controls already installed for direct PM emissions were evaluated and were determined to be sufficient to satisfy the BART requirements.

17. Based on these findings, the Department requested an evaluation of BART controls for Sulfur Dioxide (SO_{2}) and Oxides of Nitrogen (NO_{x}) emissions at Holcim. An initial BART proposal was submitted by Holcim on April 20, 2008. Comments were provided by the Department which resulted in three additional submittals to clarify information and explore additional control options. Subsequent comments were provided to ask for clarification of some additional options for BART. As a result, Holcim has now provided sufficient information for the Department's BART finding at the Clarksville facility for the kiln system (including the following emission point ID).

A. EP-14

18. The Department's BART finding is based on the use of mid-kiln firing of tires and reduced sulfur fuel sources (coal, tires, and synthetic fuel) to control NO_x and SO_2 respectively from kiln operation.

AGREEMENT AND COMPLIANCE PLAN

19. Holcim agrees to fire fuels containing less than three percent sulfur by weight at all times in the Clarksville kiln system.

20. Unless otherwise specified in the Agreement, Holcim agrees to meet the following emission limits for the kiln system as expeditiously as practicable, but no later than five years after approval of Missouri's regional haze plan:

   A. NO_x - 42,287 lb/day using a 30-day rolling average
   B. SO_2 - 58,787 lb/day using a 30-day rolling average

21. Compliance with the limits listed in paragraph 20 shall be based on the continuous emission monitoring (CEM) system employed as of the effective date of this Agreement or an equivalent system utilized by Holcim that has been approved by the Department. The methodology listed in subparagraphs A through D below shall be employed for the substitution of missing CEM data during periods of kiln operation for either NO_x or SO_2. For purposes of this Agreement, Kiln operation is defined as periods of time when the kiln is heated and rotation is occurring (NO_x emissions may occur when no fuel is being fired due to the residual heat in the kiln).

   A. 1-4 missing hours – the average of the hour preceding and the hour following the missing hours will be used;
   B. 5 – 24 missing hours – the maximum hourly emissions measured in the preceding month will be used for each missing hour;
   C. Over 24 missing hours up to 5 days – the maximum hourly emissions in the preceding three months will be used for each missing hour;
   D. Over 5 missing days – the maximum hourly emissions in the preceding 12 months will be used for each missing hour.

22. The continuous emission monitoring system shall be calibrated quarterly for SO_2 and NO_x emission measurement in accordance with an approved Quality Assurance Project Plan (QAPP) to be submitted no later than 90 days after the effective date of this Agreement. The QAPP shall address collection of all necessary parameters to calculate SO_2 and NO_x emissions, including flow-rate and concentration of the pollutants in the exit stream (measured in parts per million).

23. The emission limits in this Agreement shall be incorporated into any construction or operation permits issued for Holcim – Clarksville.

24. This Agreement shall be proposed by the Department for incorporation into the Regional Haze State Implementation Plan for Missouri.

CONCLUSIONS OF LAW

25. Holcim is a person within the meaning of RSMo 643.020.

26. RSMo 643.060.4 provides that the Director of the Missouri Department of Natural Resources is responsible for administering and enforcing the Missouri Air Conservation Law, investigating complaints, issuing orders and taking all actions necessary to implement the Missouri Air Conservation Law. RSMO 643.060.2 provides that the Director is authorized to enter into contracts as he deems necessary for carrying out the provisions of the Missouri Air Conservation Law. In addition, the Missouri Air Conservation Commission is granted the legal authority under RSMo 643.050 to develop and implement regulations and enter into agreements to control air pollution.

BEST PROFESSIONAL JUDGMENT

27. The requirements of this Agreement represent the best professional judgment of the Department based on information available as of the effective date of this Agreement. If circumstances change significantly so that data related to the commitments of this Agreement indicates an imminent threat of danger to the public health, safety or the environment or if the Department determines there is a significantly different threat other than the issues addressed herein, then the Department reserves the right to modify dates or requirements herein as it deems reasonably necessary to comply with the regional haze regulations, provided that the Department gives Holcim at least 90 days notice and an opportunity to submit a compliance schedule after the 90 day notice period. Holcim further reserves the right to appeal any such modifications or additional requirements in accordance with paragraph 30.

FORCE, MAJEURE, EXCUSABLE DELAY, MODIFICATION

28. The following shall constitute the governing terms for force majeure, excusable delay, and modification of the Agreement:

   A. Holcim shall perform the requirements under this Agreement within the time limits set forth herein unless the performance is prevented or delayed solely by events which constitute a force majeure. For purposes of this Agreement a force majeure is defined as any event beyond the control of Holcim which could not be overcome by due diligence and which delays or prevents performance by a date required by this Agreement. Such events do not include increased costs of performance or changed economic circumstances. Any delay caused in whole or in part by action or inaction by municipal, state, or federal regulatory authorities or third parties unrelated to Holcim shall be considered a force majeure and shall not be deemed a violation of any obligation required by this Agreement.

B. Holcim shall have the burden of proving claims of force majeure. Failure to comply by reason of force majeure shall not be construed as a violation of this Agreement.

C. Holcim shall notify the Department in writing within ten (10) days after becoming aware of an event which Holcim knew or reasonably should have known constituted force majeure. Such notice shall estimate the anticipated length of delay, its cause, measures to be taken to minimize the delay, and an estimated timetable for implementation of these measures. Failure to comply with the notice provision of this section may constitute a waiver of Holcim's right to assert a force majeure claim and may be grounds for the Department, at its sole discretion, to deny Holcim an extension of time for performance.

D. Within ten (10) days of the receipt of written notice from Holcim of a force majeure event, the Department shall notify Holcim of the extent to which modifications to this Agreement are necessary. In the event that the Department and Holcim cannot agree that a force majeure event has occurred or if there is no agreement on the length of the extension, the dispute shall be resolved as set forth in paragraph 30.

E. Any modifications to any provision of this Agreement shall not alter the schedule for performance or completion of other tasks required by this Agreement, unless specifically agreed to by the parties in writing and incorporated into this Agreement.

F. This Agreement may be amended by mutual agreement of the Department and Holcim. Such amendments shall be in writing, shall have as their effective date the date on which they are signed by both parties and shall be incorporated into this Agreement.

DISPUTE RESOLUTION

29. The parties recognize that a dispute may arise between them regarding implementation of the action to be taken as herein set forth or other terms or provisions of this Agreement.

A. If such dispute arises, the parties will endeavor to settle it by informal negotiations between themselves. If the parties cannot resolve the issue informally within a reasonable period of time, either of the parties may notify the other in writing stating its position with regard to the dispute and the reasons therefore. A party receiving such a notice of dispute will respond in writing within ten (10) days stating its position. The Department or Holcim shall then have an additional ten (10) day period or such longer time as the parties agree to respond. If the parties are still unable to reach an agreement, the matter shall be referred to the Director

of the Division of Environmental Quality, who shall decide the matter and provide a written statement of his decision which shall be incorporated into the Agreement

B. This dispute resolution procedure shall not preclude any party from having direct recourse to court if otherwise available Missouri law.

OTHER CLAIMS AND PARTIES

30. Nothing in this Agreement shall constitute or be construed as a release for any claim, cause of action or demand in law or equity against any person, firm, partnership, or corporation not a signatory to this Agreement for any liability it may have arising out of or relating in any way to this Agreement.

EFFECTIVE DATE, TERMINATION

31. This Agreement shall become effective when signed by the Director of the Missouri Department of Natural Resources or his designee.

32. This Agreement will be terminated at such time that it is superseded by a future agreement, regulation, or other enforceable document that contains equivalent or more stringent emission limits. The Department will provide written notice to Holcim of said termination. Such notice shall not be unreasonably withheld.

AUTHORIZATION OF SIGNATORIES TO EXECUTE THE AGREEMENT AND BIND THE PARTIES

33. The parties hereto have affixed their signatures on the dates inserted below to acknowledge their agreement to this Agreement. The signatories to this Agreement certify that they are authorized to execute and to legally bind the parties they represent to this Agreement.

Appendix S

Holcim-Clarksville BART Final Consent Agreement

April 19, 2009

REGIONAL HAZE AGREEMENT

The parties hereto, the Missouri Department of Natural Resources and Holcim (US) Inc. ("Holcim"), having agreed that entry of this Regional Haze Agreement (hereinafter "Agreement") is in the best interest of the parties and the public health and the environment, hereby represent and state as follows:

JURISDICTION

1. The Missouri Department of Natural Resources (hereinafter "Department") is a duly authorized state agency created under Chapter 640 of the Revised Statutes of Missouri (as amended) to administer the programs assigned to it related to environmental control and the conservation and management of natural resources.

2. Chapter 643 of the Revised Statutes of Missouri (as amended) provides that the Director of the Department, on behalf of the Missouri Air Conservation Commission, administers the provisions of the Missouri Air Conservation Law.

3. Holcim is a Delaware corporation in good standing and registered to do business in Missouri in accordance with Missouri laws and is subject to the Missouri Air Conservation Law and the regulations adopted thereunder. Holcim owns and operates a portland cement manufacturing facility located in Clarksville, Pike County, Missouri ("Clarksville Plant"). Holcim is a person within the meaning of RSMo 643.020.

4. Pursuant to RSMo 643.060, the Director has authority and jurisdiction to issue this Agreement and to enforce the same. In any action by the Department to enforce the terms of this Agreement, Holcim agrees not to contest the authority or jurisdiction of the Director to enter into and enforce this Agreement. RSMo 643.060.4 provides that the Director of the Missouri Department of Natural Resources is responsible for administering and enforcing the Missouri Air Conservation Law, investigating complaints, issuing orders and taking all actions necessary to implement the Missouri Air Conservation Law. RSMo 643.060.2 provides that the Director is authorized to enter into contracts as he deems necessary for carrying out the provisions of the Missouri Air Conservation Law. In addition, the Missouri Air Conservation Commission is granted the legal authority under RSMo 643.050 to develop and implement regulations and enter into agreements to control air pollution.

5. The terms of this Agreement shall be construed in accordance with the applicable laws of the state of Missouri and the United States.

STATEMENT OF PURPOSE

6. In entering into this Agreement, it is the mutual objective of the Department and Holcim to reduce the contributions of emissions from the Clarksville Plant to

regional haze at Mingo National Wildlife Refuge, Hercules Glade Wilderness Area, and Upper Buffalo Wilderness Area (in Arkansas), and to establish a schedule by which Holcim will achieve reductions in air pollution emissions of visibility impairing pollutants. This Agreement establishes enforceable emission limits for Emission Point EP-14 (main kiln stack) pursuant to the Department's requirements to comply with the regional haze regulations identified in this Agreement which require the use of Best Available Retrofit Technology (BART) to applicable emission sources. This Agreement is not the result of any enforcement action or alleged non-compliance with any law, regulation, permit, or order and will enable Holcim to timely comply with the United States Environmental Protection Agency (EPA) and the Department deadlines for BART.

PARTIES BOUND

7. This Agreement shall apply to and be binding upon the parties, their agents, successors, and assigns and upon all persons, contractors, and consultants acting under or for either the Department or Holcim or both. Any changes in ownership or corporate status, including but not limited to any transfer of assets or real or personal property (other than as set forth in the next sentence), shall not affect the responsibilities of Holcim under this Agreement. If Holcim sells or otherwise transfers the Clarksville Plant, Holcim shall cause as a condition of such sale, the buyer of the Clarksville Plant to assume the obligations of Holcim under this Agreement in writing upon which Holcim shall be relieved of its obligations under the Agreement. In such event, Holcim shall provide thirty (30) days prior written notice of such assumption to the Department.

8. The parties agree to undertake all actions required of them by the terms and conditions of this Agreement.

9. Notwithstanding the terms of any contract, Holcim is responsible for its compliance with this Agreement and for insuring that its contractors and agents comply with this Agreement.

10. The activities conducted under this Agreement are subject to oversight and approval by the Department as provided in this Agreement and other sources of law. Holcim shall make all reasonable efforts to provide all necessary information consistent with this Agreement requested by the Department.

LIABILITY

11. Nothing in this Agreement shall be considered an admission of any fact or acknowledgement of any liability by any party, nor shall anything in this Agreement be considered an admission of any fact or acknowledgement of any violation of any law, regulation, permit or order but will enable Holcim to timely comply with established EPA and Department deadlines for compliance with the regional haze

regulations and requirements. Neither the State of Missouri nor any agency thereof shall be held out as a party to any contract entered into by Holcim in carrying out activities pursuant to this Agreement.

BACKGROUND

12. In 1977, the U.S. Congress adopted § 169 (42 U.S.C. 7491) of the Clean Air Act (CAA), setting forth the national visibility goal of restoring pristine conditions in national parks and wilderness areas designated as Class I Areas. When the CAA was again amended in 1990, Congress added § 169B (42 U.S.C. 7492), authorizing further research and regular assessments of the progress made for visibility improvement.

13. EPA's Regional Haze Rule, 40 CFR 51.308 (Part P), was adopted July 1, 1999 and went into effect on August 30, 1999. The Regional Haze Rule aimed at achieving national visibility goals by 2064. This rulemaking addresses the combined visibility effects of various pollution sources over a wide geographic region. The 1999 Regional Haze Rule also singles out certain older emission sources that have not been regulated under other provisions of the CAA for additional controls. Therefore, older sources that contribute to visibility impairment in Class I areas are required to implement BART.

14. On May 24, 2002, the U.S. Court of Appeals, D.C. District Court ruled on a challenge brought by the American Corn Growers Association against EPA's Regional Haze Rule of 1999. *American Corn Growers Association v. EPA*, 291 F.3d 1. The Court denied the American Corn Growers Association's challenge to the Regional Haze Rule and remanded the case to EPA. Pursuant to this remand, EPA proposed revisions to the Regional Haze Rule.

15. On July 6, 2005, EPA published a revision to the Regional Haze Rule, including Appendix Y, "Guidelines for BART Determinations Under the Regional Haze Rule," which provides direction to states on determining which older sources may need to install BART and how to determine BART.

16. Appendix Y of the Regional Haze Rule requires states to identify sources constructed between 1962 and 1977 in certain industrial categories, including Portland cement production. Then, each state is allowed to consider whether the predicted (modeled) impact from each source's emissions on Class I areas has less than a significant contribution on visibility impairment (0.5 deciview). After both screening and refined air quality modeling evaluations for Missouri sources, Holcim was identified as a contributor to visibility impairment at Mingo Wildlife Refuge and Hercules Glade Wilderness Area in Missouri and Upper Buffalo Wilderness Area in Arkansas due to its Sulfur Dioxide (SO_2) and Oxides of Nitrogen (NO_x) emissions and is therefore required to install BART. The Department also determined that the magnitude of the direct Particulate Matter (PM) visibility impacts from Holcim at the relevant Class I areas was very minimal. In addition, the controls already installed

for direct PM emissions were evaluated and were determined to be sufficient to satisfy the BART requirements.

17. Based on these findings, the Department requested an evaluation of BART controls for SO_2 and NO_x emissions at Holcim. An initial BART proposal was submitted by Holcim on April 20, 2008. Comments were provided by the Department which resulted in three additional submittals to clarify information and explore additional control options. Subsequent comments were provided to ask for clarification of some additional options for BART. As a result, Holcim provided sufficient information for the Department's BART finding at the Clarksville Plant for the kiln system: EP-14 (main kiln stack)

18. The Department's BART finding is based on the use of mid-kiln firing of tires and reduced sulfur fuel sources (coal, tires, and synthetic fuel) to control NO_x and SO_2 respectively from kiln operation.

AGREEMENT AND COMPLIANCE PLAN

Subject to the terms and conditions contained herein, the parties agree as follows:

19. This Agreement applies only to operation of the Clarksville Plant kiln system (Emission Point ID EP-14 main kiln stack). Unless otherwise specified in the Agreement, Holcim agrees to meet the following emission limits for the kiln system as expeditiously as practicable after approval of Missouri's regional haze plan, but no later than four years after approval of Missouri's regional haze plan:

    A. NO_x – 42,287 lb/day using a 30-day rolling average
    B. SO_2 – 58,787 lb/day using a 30-day rolling average

20. Compliance with the limits listed in paragraph 19 shall be based on the existing continuous emission monitoring (CEM) system or an equivalent system utilized by Holcim that has been approved by the Department at all times when (a) fuel is being combusted in the kiln or (b) the kiln shell temperature exceeds 200°F and kiln rotation is occurring. When the circumstances described in (a) and (b) above are not present, no CEM data is required. Holcim shall be subject to the above listed monitoring requirements upon the EPA's approval of Missouri's regional haze plan.

    Except for routine CEMS calibration and maintenance activities, missing data due to CEMS availability will be filled by using the following methods:

    If the monitor data availability is at least 90.0% over the preceding 30 day rolling average, the owner or operator shall calculate substitute data for each hour of each missing data period according to the following procedure:

    (I) For a missing data period of less than or equal to 24 hours, substitute the average of the hourly concentrations recorded by a pollutant concentration monitor for the hour before and the hour after the missing data period.

(II) For the missing data period of more than 24 hours, substitute the greater of:
(a) The 95th percentile hourly pollutant concentration recorded by a pollutant concentration monitor during the previous 720 quality-assured monitor operating hours; or
(b) The average of the hourly concentrations recorded by a pollutant concentration monitor for the hour before and the hour after the missing data period.

If the monitor data availability is less than 90.0% for the previous thirty (30) day rolling average, the following substitution or another alternative method agreed to by the Department will be utilized:

SO_2 – 3,355 pounds per hour for each missing hour, and
NO_X – 2,202 pounds per hour for each missing hour.

For routine CEMS calibration and maintenance activities, missing emission data will be substituted using the average of the hour before and the hour after the activity.

21. As identified in item 20, Holcim shall calibrate and comply with the continuous emission monitoring system applicable requirements per 40 CFR, Part 60, Appendix F, Quality Assurance Procedure 1 or other equivalent procedure approved by the Department. At the request of the Department, Holcim will provide results of any audits and RATAs. Holcim will be subject to the above calibration and quality assurance requirements upon the EPA's approval of Missouri's regional haze plan.

22. As identified in paragraph 20, Holcim shall record the hourly CEM data or data supporting lack of kiln operation to demonstrate compliance with the limits in paragraph 19. Holcim shall maintain these records for a period of no less than five years. These records shall be kept at the Clarksville Plant; however, they may be maintained at a subsequent site provided that Holcim notifies the Department in writing thirty (30) days before any records are moved and provides the department with the address of the site where the records will be maintained and the name of a contact person in the event the Department needs to inquire as to the records. Holcim shall submit an annual report to the Department detailing the daily and 30-day rolling average emission SO2 and NOx emission rates. The first annual report will be due one year and 60 days after EPA's approval of Missouri's regional haze plan. Subsequent reports will be due on this same date each year.

23. The emission limits in this Agreement shall be incorporated into any construction or operation permits issued for Holcim at the Clarksville Plant.

24. This Agreement shall be proposed by the Department for incorporation into the Regional Haze State Implementation Plan for Missouri.

BEST PROFESSIONAL JUDGMENT

25. The requirements of this Agreement represent the best professional judgment of the Department based on information available as of the effective date of this Agreement. If circumstances change significantly so that data related to the commitments of this Agreement indicates an imminent threat of danger to the public health, safety or the environment or if the Department determines there is a significantly different threat other than the issues addressed herein, then the Department reserves the right to modify dates or requirements herein as it deems reasonably necessary to comply with the regional haze regulations, provided that the Department gives Holcim at least 90 days notice and an opportunity to propose a compliance schedule during the 90 days notice period. Holcim further reserves the right to seek review of any such modifications or additional requirements in accordance with paragraph 27.

FORCE, MAJEURE, EXCUSABLE DELAY, MODIFICATION

26. The following shall constitute the governing terms for force majeure, excusable delay, and modification of the Agreement:

A. Except as set forth in paragraph G. below, Holcim shall perform the requirements under this Agreement within the time limits set forth herein unless the performance is prevented or delayed solely by events which constitute a force majeure. For purposes of this Agreement a force majeure is defined as any event beyond the control of Holcim which could not be overcome by due diligence and which delays or prevents performance by a date required by this Agreement. Such events do not include increased costs of performance or changed economic circumstances.

B. Holcim shall have the burden of proving all claims of force majeure. Failure to comply by reason of force majeure shall not be construed as a violation of this Agreement.

C. Holcim shall notify the Department in writing within ten (10) days after becoming aware of an event which Holcim knew or reasonably should have known constituted force majeure. Such notice shall estimate the anticipated length of delay, its cause, measures to be taken to minimize the delay, and an estimated timetable for implementation of these measures. Failure to comply with the notice provision of this section shall constitute grounds for the Department, at its sole discretion, to deny Holcim an extension of time for performance.

D. Within sixty (60) days of the receipt of written notice from Holcim of a force majeure event, the Department shall notify Holcim of the extent to which

modifications to this Agreement are necessary. In the event that the Department and Holcim cannot agree that a force majeure event has occurred or if there is no agreement on the length of the extension, the dispute shall be resolved as set forth in paragraph 27.

E. Any modifications to any provision of this Agreement shall not alter the schedule for performance or completion of other tasks required by this Agreement, unless specifically agreed to by the parties in writing and incorporated into this Agreement.

F. This Agreement may be amended by mutual agreement of the Department and Holcim. Such amendments shall be in writing, shall have as their effective date the date on which they are signed by both parties and shall be incorporated into this Agreement.

G. Holcim, voluntarily and of its own accord and for reasons unrelated to this Agreement has indicated in November 2008 that it will cease clinker production at the Clarksville Plant during the first quarter of 2009. Upon permanent cessation of operation of the Clarksville Plant kiln, Holcim at its election may formalize such permanent cessation of the kiln in a letter to the Department's Director of the Division of Environmental Quality in which it may agree that any operating permits and construction permits issued by the Air Pollution Control Program for the kiln system shall be terminated. In the event that Holcim sends the letter and agrees to the termination of such permits, this Agreement shall be null and void and of no further force and effect, except that Holcim shall submit any compliance reports required to be submitted hereunder up to the date of such termination.

DISPUTE RESOLUTION

27. The parties recognize that a dispute may arise between them regarding implementation of the action to be taken as herein set forth or other terms or provisions of this Agreement.

A. If such dispute arises, the parties will endeavor to settle it by informal negotiations between themselves. If the parties cannot resolve the issue informally within a reasonable period of time, either of the parties may commence a non-contested case by notifying the other in writing stating its position with regard to the dispute and its rationale. A party receiving such a notice of dispute will respond in writing within thirty (30) days stating its position. The Department or Holcim shall then have an additional thirty (30) day period or such longer time as the parties agree to respond. If the parties are still unable to reach an agreement, the matter shall be referred to the Department's Director of the Division of Environmental Quality, who shall

decide the matter and provide a written statement of his decision which shall be incorporated into the Agreement.

B. This dispute resolution procedure shall not preclude any party from having direct recourse to court if otherwise available under Missouri law.

OTHER CLAIMS AND PARTIES

28. Nothing in this Agreement shall constitute or be construed as a release for any claim, cause of action or demand in law or equity against any person, firm, partnership, or corporation not a signatory to this Agreement for any liability it may have arising out of or relating in any way to this Agreement.

EFFECTIVE DATE, TERMINATION

29. This Agreement shall become effective when signed by the Director of the Missouri Department of Natural Resources or his designee.

30. Except as expressly set forth in paragraph 26.G., this Agreement will be terminated at such time that it is superseded by a future agreement, regulation, or other enforceable document that contains equivalent or more stringent emission limits.

AUTHORIZATION OF SIGNATORIES TO EXECUTE THE AGREEMENT AND BIND THE PARTIES

31. The parties hereto have affixed their signatures on the dates inserted below to acknowledge their agreement to this Agreement. The signatories to this Agreement certify that they are authorized to execute and to legally bind the parties they represent to this Agreement.

HOLCIM (US) INC.

Walt Precourt

By: Walt Precourt
Title: Vice President – Environmental and Governmental Affairs
Date: April 3, 2009

MISSOURI DEPARTMENT OF NATURAL RESOURCES

James L Kavanaugh

By: James L. Kavanaugh
Title: Air Pollution Control Program, Director
Date: April 14, 2009

Appendix T

Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program

June 1, 2007
rev

Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Air Quality Policy Division
Geographic Strategies Group
Research Triangle Park, NC

TABLE OF CONTENTS

Abbreviations and Acronyms

BACT - Best Available Control Technology

BART - Best Available Retrofit Technology

CAA - Clean Air Act

CAIR - Clean Air Interstate Rule

CFR - Code of Federal Regulations

dv - Deciviews

EPA - Environmental Protection Agency

FLM - Federal Land Manager

FR - Federal Register

NOx - A mixture of nitrogen dioxide (NO_2), nitric oxide (NO), and other nitrogen oxide gases

NAAQS - National Ambient Air Quality Standard

OAQPS - Office of Air Quality Planning and Standards

$PM_{2.5}$ - Particulate Matter of 2.5 microns or less in size

RHR - Regional Haze Rule

RPG - Reasonable Progress Goal

RPO - Regional Planning Organization

SIP - State Implementation Plan

yr - Year

1.0 INTRODUCTION

The purpose of this document is to provide guidance to States in setting reasonable progress goals (RPGs) as part of their regional haze state implementation plans (SIPs) and in deciding those measures necessary to meet these goals. We emphasize that this document is merely guidance and that States or the Environmental Protection Agency (EPA) may elect to follow or deviate from this guidance, as appropriate. The ultimate determination of whether a given SIP submission by a State meets the statutory requirements of sections 169A and 169B of the Clean Air Act (CAA) and the regional haze regulations at 40 CFR 51.300 - 309 will be accomplished through notice and comment rulemaking in which the facts and circumstances of each State submission will be evaluated by EPA.

Under the Tribal Authority Rule, 40 CFR part 49, Tribes have the authority to seek "treatment as a State" for purposes of administering certain CAA programs, including the regional haze program. Whether Tribes seek this authority or not, EPA encourages Tribes to participate in the regional planning efforts to address visibility and to consult with neighboring States as they develop their regional haze SIPs. We hope that this guidance will provide Tribes with an understanding of the process for establishing RPGs that will assist them in the consultation process.

1.1 Legislative and Regulatory History

The CAA was amended in August 1977, and a new section 169A was added for the protection of visibility in mandatory class I Federal areas (Class I areas) of great scenic importance. In section 169A(a)(1), Congress established the national goal for visibility protection:

> *Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution.*

Section 169A(a)(4), in part, requires EPA to "promulgate regulations to assure reasonable progress toward meeting the national goal." The CAA also requires States to submit SIPs containing such emission limits, schedules of compliance, and other measures as may be necessary to make reasonable progress toward meeting the goal.[1]

[1] CAA §169A(b)(2).

In the CAA Amendments of 1990, Congress added section 169B to strengthen and reaffirm the national goal. Section169B(e) calls for EPA to "carry out the Administrator's regulatory responsibilities under [section 169A], including criteria for measuring 'reasonable progress' toward the national goal."

In response to these mandates, EPA promulgated the regional haze rule (RHR) on July 1, 1999.[2] Under section 51.308(d)(1) of this rule, States must "establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions" for each Class I area within a State. These RPGs must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period.[3]

The RHR also requires States to submit a long-term strategy that includes such measures as are necessary to achieve the RPG for each Class I area.[4] The regulations require States to consider major and minor stationary sources, mobile sources, and area sources in developing their long-term strategies. In addition, States must submit a SIP that contains either emission limitations representing best available retrofit technology (BART) for certain sources put into operation between 1962 and 1977 *or* alternative measures that provide for greater reasonable progress than BART.[5] The BART requirements were addressed in a rule revising certain provisions of the regulations in section 51.308(e) and promulgating the BART Guidelines.[6]

1.2 Meaning of the Term "Reasonable Progress Goal"

States must establish RPGs, measured in deciviews (dv), for each Class I area for the purpose of improving visibility on the haziest days and ensuring no degradation in visibility on the clearest days over the period of each implementation plan.[7] RPGs are interim goals that represent incremental visibility improvement over time toward the goal of natural background conditions and are developed in consultation with other affected States and Federal Land

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[2] 64 FR 35714 (codified at 40 CFR 51.300-309).

[3] 40 CFR 51.308(d)(1).

[4] 40 CFR 51.308(d)(3).

[5] 40 CFR 51.308(e).

[6] 70 FR 39104 (July 6, 2005).

[7] 40 CFR 51.308(d)(1).

Managers (FLM).[8]

In determining what would constitute reasonable progress, section 169A(g) of the CAA requires States to consider the following four factors:

- The costs of compliance;
- The time necessary for compliance;
- The energy and non-air quality environmental impacts of compliance; and
- The remaining useful life of existing sources that contribute to visibility impairment.[9]

States must demonstrate in their SIPs how these factors are taken into consideration in selecting the RPG for each Class I area in the State.

The discussion of the statutory factors in this guidance is largely aimed at helping States apply these factors in considering measures for point sources. States may find that the factors can be applied to sources other than point sources; the meaning of the factors, however, should not be unduly strained in order to fit non-point sources. In other words, if common sense dictates that a particular statutory factor cannot be applied to a particular source category, then the State's analysis may reflect that fact, and emissions reductions from such sources may still be included in the SIP.

As noted above, the RHR establishes an additional analytical requirement for States in the process of establishing the RPG. This analytical requirement requires States to determine the rate of improvement in visibility needed to reach natural conditions by 2064, and to set each RPG taking this "glidepath" into account.[10] (The process for determining the glidepath is discussed later in this document.) EPA adopted this approach, in part, to ensure that States use a common analytical framework that accounts for the regional differences affecting visibility and, in part, to ensure an informed and equitable decision making process. The glidepath is not a presumptive target, and States may establish a RPG that provides for greater, lesser, or equivalent visibility improvement as that described by the glidepath.

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[8] 40 CFR 51.308(d)(1)(iv) and 51.308(i).

[9] CAA §169A(g)(1); 40 CFR 51.308(d)(1)(i)(A).

[10] 40 CFR 51.308(d)(1)(i)(B).

In deciding what amount of emissions reduction is appropriate in setting the RPG, you should take into account the fact that the long-term goal of no manmade impairment encompasses several planning periods. It is reasonable for you to defer reductions to later planning periods in order to maintain a consistent glidepath toward the long-term goal.

1.3 Relationship of Reasonable Progress to BART and the Long-Term Strategy

The RPGs, the long-term strategy, and BART (or alternative measures in lieu of BART) are the three main elements of the regional haze SIPs that States are required to submit by December 17, 2007. The long-term strategy and BART emissions limitations or other alternative measures, including cap-and-trade programs or other economic incentive approaches, are inherently related to the RPG. The long-term strategy is the compilation of "enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the [RPGs],"[11] and is the means through which the State ensures that its RPG will be met. BART emissions limits (or alternative measures in lieu of BART, such as the Clean Air Interstate Rule (CAIR)) are one set of measures that must be included in the SIP to ensure that an area makes reasonable progress toward the national goal, and the visibility improvement resulting from BART (or a BART alternative) is included in the development of the RPG.

[11] 40 CFR 51.308(d)(3),

2.0 OVERVIEW OF THE PROCESS FOR DEVELOPING THE RPG

Development of the RPG for each Class I area should be a collaborative process among State, local, and Tribal authorities, Regional Planning Organizations (RPOs), and FLMs. Steps for developing RPGs will be briefly outlined in this section of the guidance, along with references to other guidance and rules where additional detail can be found. The remaining sections of this guidance expand on particular aspects of these steps. In addition, as this is guidance for States in developing RPGs, the use of "you" through the rest of the document refers to States.

2.1 Establish Baseline and Natural Visibility Conditions

To track progress toward the national goal, the RHR, among other things, requires you to establish the "baseline conditions" representing visibility for the best and worst days at the time the regional haze program is established for each Class I area. Once established, the baseline represents the starting point from which reasonable progress will be measured. The RHR also requires you to estimate "natural conditions" for each Class I area that represents the visiblity conditions that would exist in the absence of man-made impairment.

As explained in the RHR, the baseline for each Class I area is the average visibility (in dv) for the 20 percent most impaired days, or "worst days", and for the 20 percent least impaired days, or "best days," for the years 2000 through 2004.[12] Using available monitoring data for the 2000 to 2004 time period, you are required to calculate the baseline by averaging the annual values (in dv) for the 20 percent worst days in each year (yr) to produce a single value (in dv) that represents the baseline conditions for the worst days. You should follow the same approach for determining the value that represents the baseline conditions for the best days. Natural conditions at each Class I area are also expressed by reference to the level of visibility (in dv) for the 20 percent most impaired and least impaired days.[13]

[12] 64 FR at 35730.

[13] For more detail on determining baseline and natural conditions, you can review the preamble and regulations in the RHR, 64 FR at 35728 – 35730, 40 CFR 51.308(d)(2), EPA's *Guidance for Tracking Progress Under the Regional Haze Rule*, EPA-454/B-03-004 (September 2003) available at www.epa.gov/ttn/oarpg/t1/memoranda/rh_tpurhr_gd.pdf, and EPA's *Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Rule*, EPA-454/B-03-005 (September 2003) available at www.epa.gov/ttn/oarpg/t1/memoranda/rh_envcurhr_gd.pdf.

2.2 Determine the Glidepath, or Uniform Rate of Progress

By comparing baseline conditions with natural conditions, you can determine the uniform rate of visibility improvement, or progress, needed to reach natural conditions by 2064 for each Class I area. Figure 1, below, illustrates the basic steps in the process for calculating the uniform rate of progress toward natural conditions for the first planning period at a hypothetical Class I area.

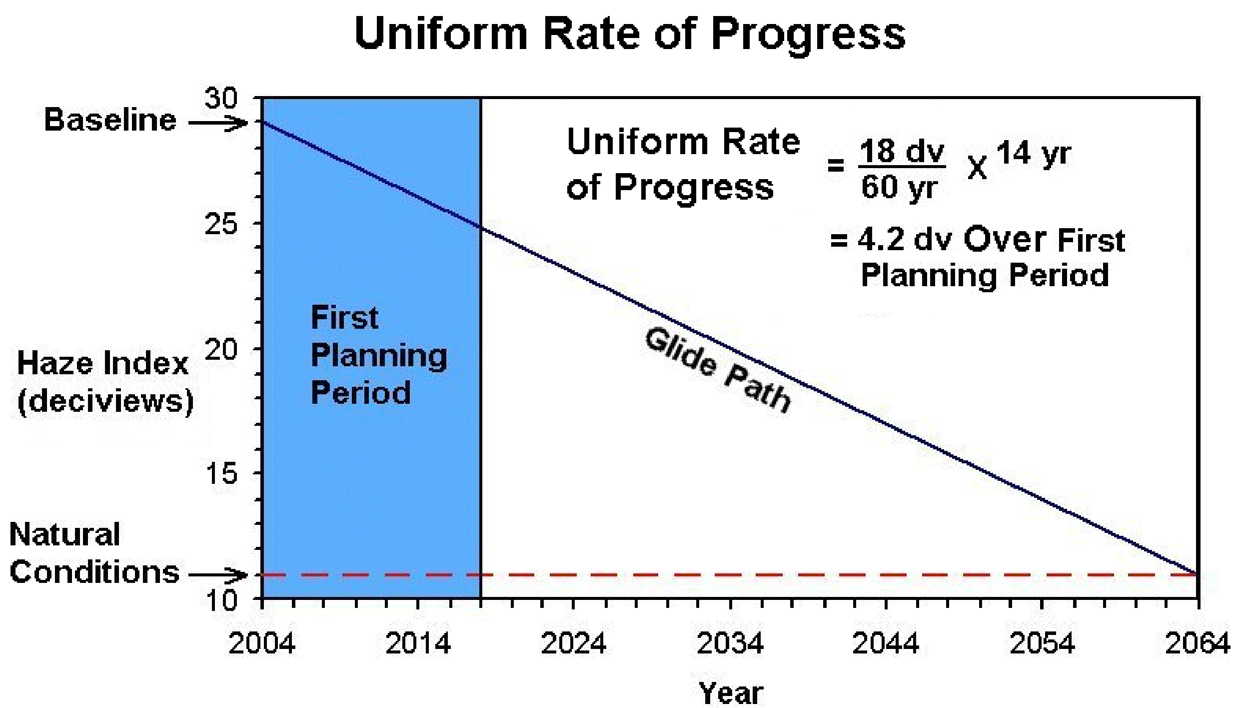

Figure 1

Figure 1 Example of a Uniform Rate of Progress

- Compare baseline conditions to natural conditions. The difference between these two represents the amount of progress needed to reach natural visibility conditions. In this example, the State has determined that the baseline for the 20 percent worst days for the Class I area is 29 dv and estimated that natural background is 11 dv, a difference of 18 dv.

- Calculate the annual average visibility improvement needed to reach natural conditions by 2064 by dividing the total amount of improvement needed by 60 years (the period between 2004 and 2064). In this example, this value is 0.3 dv/yr.

- Multiply the annual average visibility improvement needed by the number of years in the first planning period (the period from 2004 until 2018). In this example, this value is 4.2 dv. This is the uniform rate of progress that would be needed during the first planning period to attain natural visibility conditions by 2064.

If you were to achieve this steady improvement in visibility over the next 60 years, you would reach the national goal by 2064.

2.3 Identify and Analyze the Measures Aimed at Achieving the Uniform Rate of Progress.

The next step in setting an RPG is to identify and analyze the measures aimed at achieving the uniform rate of progress and to determine whether these measures are reasonable based on the statutory factors identified in Section 1.2 above. To meet this requirement, we suggest the following approach which ensures that States consider all reasonable measures in developing their regional haze SIPs:

- Identify the key pollutants and sources and/or source categories that are contributing to visibility impairment at each Class I area. The sources of impairment for the most impaired and least impaired days may differ. Section 3 discusses this process.

- Identify the control measures and associated emission reductions that are expected to result from compliance with existing rules *and* other available measures for the sources and source categories that contribute significantly to visibility impairment. This is covered in more detail in Section 4.

- Determine what additional control measures would be reasonable based on the statutory factors and other relevant factors for the sources and/or source categories you have identified.

- Estimate through the use of air quality models the improvement in visibility that would result from implementation of the control measures you have found to be reasonable and compare this to the uniform rate of progress.

Another possible approach that some States and RPOs are using is to "back out" the measures necessary to achieve the uniform rate of progress. In this process, States are using dispersion modeling to estimate the visibility impacts of a specific percentage reduction in visibility impairing pollutants. The resulting visibility conditions are then compared to the uniform rate of progress. Using this process, States will be able to identify a percentage

reduction in visibility impairing pollutants that would provide progress at or beyond the uniform rate of progress. In a separate step, States would consider the statutory factors along with other relevant factors to select appropriate measures to achieve the identified reduction in emissions. States can thus identify the measures that would be needed to achieve the uniform rate of progress at a Class I area and determine whether such measures are reasonable.

2.4 Establish a RPG

In developing a RPG, you must consult with other States with emissions sources that may reasonably be anticipated to cause or contribute to visibility impairment at Class I areas in your State.[14] The regulations anticipate that States may not always agree on what measures would be reasonable or on the appropriateness of a RPG. We encourage States to work together early and often to resolve such issues. In addition, the FLMs may provide insight and assistance to States in identifying regional approaches to address the RPG.

The improvement in visibility resulting from implementation of the measures you have found to be reasonable, considering the uniform rate of progress, is the amount of progress that represents your RPG. The regional haze rule requires you to clearly support your RPG determination in your SIP submission based on the statutory factors. [15]

[14] 40 CFR 51.308(d)(1)(iv).

[15] 40 CFR 51.308(d)(1)(i)(A).

3.0 IDENTIFYING KEY POLLUTANTS AND SOURCE CATEGORIES FOR THE FIRST PLANNING PERIOD

This process begins with the identification of key pollutants and source categories that contribute to visibility impairment at the Class I area. Such analysis has been the subject of considerable study over the past decade, including studies by the Grand Canyon Visibility Transport Commission and ongoing work by RPOs. For the purpose of this document, it is assumed that analyses identifying the key pollutants contributing to visibility impairment have been conducted for each Class I area.

3.1 Identification of Source Categories From Which These Pollutants and Their Precursors Are Emitted

Once the key pollutants contributing to visibility impairment at each Class I area have been identified, the sources or source categories responsible for emitting these pollutants or pollutant precursors can also be determined. There are several tools and techniques being employed by the RPOs to do so, including analysis of emission inventories, source apportionment, trajectory analysis, and atmospheric modeling. Technical guidance on these tools and techniques is beyond the scope of this document. Instead, this document focuses on policy considerations relevant to the identification of which source categories should be considered as part of the regional haze SIP development process.

When identifying the sources or source categories responsible for regional haze, you should consider the relationship between the RPG and the requirements for long-term strategies. The regulations require States to consider major and minor stationary sources, as well as mobile and area sources, in developing long-term strategies.[16] At a minimum, the regulations require you to consider several factors when developing a long-term strategy, including the following:

- Emissions reductions due to ongoing air pollution control programs, including measures to address reasonably attributable visibility impairment and those taken to attain the fine particulate matter ($PM_{2.5}$) national ambient air quality standards (NAAQS).
- Measures to mitigate the impact of construction activities.
- Smoke management techniques for agricultural and forestry management purposes.

[16] 40 CFR 51.308(d)(3)(iv).

- Anticipated visibility effects from changes in point, area, and mobile source emissions.[17]

As illustrated by these factors, States should consider a broad array of sources and activities when deciding which sources or source categories contribute significantly to visibility impairment.

[17] 40 CFR 51.308(d)(3)(v).

4.0 IDENTIFY CONTROL MEASURES FOR CONTRIBUTING SOURCE CATEGORIES FOR THE FIRST PLANNING PERIOD

There are numerous possible conceptual approaches that you can use to identify control measures for the long-term strategy and the related RPG. We suggest beginning by concentrating on possible emissions reductions of several pollutant species from a few selected source sectors, focusing on those source categories that may have the greatest impact on visibility at Class I areas, considering cost and the other factors discussed further in Section 5.0.

4.1 Consideration of Emissions Reductions from State, Federal, and Local Control Measures

One important factor to keep in mind when establishing a RPG is that you cannot adopt a RPG that represents less visibility improvement than is expected to result from the implementation of other CAA requirements.[18] You must therefore determine the amount of emission reductions that can be expected from identified sources or source categories as a result of requirements at the local, State, and federal levels during the planning period of the SIP and the resulting improvements in visibility at Class I areas. Given the significant emissions reductions that we anticipate to result from BART, the CAIR, and the implementation of other CAA programs, including the ozone and $PM_{2.5}$ NAAQS, for many States this will be an important step in determining your RPG, and it may be all that is necessary to achieve reasonable progress in the first planning period for some States.

The first step in this process is to identify the baseline emissions inventory year on which your strategies are based. For the first RHR SIP, we anticipate that States will use 2002 as the baseline year for emission inventories.[19] If you do use 2002, you may take credit in your long-term strategy for emission reductions achieved after 2002. This includes emission reductions from measures implemented to attain the ozone and $PM_{2.5}$ NAAQS,[20] and Federal programs, such as the national mobile source program and federal standards for hazardous air pollutants (air toxics).

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[18] 40 CFR 51.308(d)(1)(vi).

[19] 40 CFR 51.308(d)(3)(iii) provides that the baseline emission inventory year is presumed to be the most recent year of the consolidated emissions inventory for the SIP. A memorandum from OAQPS, entitled *2002 Base Year Emission Inventory SIP Planning: 8-hr Ozone, PM 2.5, and Regional Haze Programs (*November 18, 2002) (“2002 EI Memo”), identifies 2002 as the anticipated baseline emission inventory year for regional haze. See www.epa.gov/ttn/oarpg/t1/memoranda/2002bye_gm.pdf

[20] 2002 EI Memo at 3-4.

4.2 Identification of Additional Emissions Control Strategies for the Source Categories Identified

After determining the amount of emissions reductions of visibility impairing pollutants that may be expected from implementation of other CAA programs, you will be ready to identify any additional measures that are reasonable. The RHR gives States wide latitude to determine additional control requirements, and there are many ways to approach identifying additional reasonable measures; however, you must at a minimum, consider the four statutory factors. Based on the contribution from certain source categories and the magnitude of their emissions you may determine that little additional analysis is required to determine further controls are not warranted for that category. As discussed further in section 5, you have considerable flexibility in how you take these factors into consideration. In addition to source-specific controls, emissions cap-and-trade programs may be considered. Sources of information on control techniques for specific source categories include the RACT/BACT/LAER Clearinghouse and EPA's AIRControlNet database.[21]

One approach that you could take to streamline what could be an extremely complex task would be to first identify alternative control scenarios with different levels of stringency. Each control scenario would assume application of specific control levels or measures to the sources or source categories you have identified as the significant sources of visibility impairment. As indicated previously in section 4.1, the starting point for this assessment is the visibility improvement achieved as a result of BART, the CAIR, and the implementation of other CAA programs, including other measures for attainment of the ozone and $PM_{2.5}$ NAAQS. You would then consider whether any additional control scenarios are reasonable based on your consideration of the statutory factors and any other factors you have determined are relevant.

Another approach you could take, consistent with the "back out" approach discussed in section 2.3, would involve identifying the set of emissions control measures that achieves the target percentage reductions in visibility-impairing pollutants associated with progress at or beyond the uniform rate of progress. The selection of control measures to include in this set would be guided by your consideration of the statutory factors and any other factors you have determined are relevant.

Note that for some sources determined to be subject to BART, the State will already have completed a BART analysis. Since the BART analysis is based, in part, on an assessment of many of the same factors that must be addressed in establishing the RPG, it is reasonable to

[21] Information on AirControlNETcan be found at www.epa.gov/ttn/ecas/econtool.html. The RACT/BACT/LAER Clearinghouse is located at http://cfpub.epa.gov/rblc/htm/bl02.cfm.

conclude that any control requirements imposed in the BART determination also satisfy the RPG-related requirements for source review in the first RPG planning period. Hence, you may conclude that no additional emissions controls are necessary for these sources in the first planning period.

5.0 APPLYING STATUTORY FACTORS TO POTENTIALLY AFFECTED STATIONARY SOURCES

In determining reasonable progress, CAA §169A(g)(1) requires States to take into consideration a number of factors. However, you have flexibility in how to take into consideration these statutory factors and any other factors that you have determined to be relevant. For example, the factors could be used to select which sources or activities should or should not be regulated, or they could be used to determine the level or stringency of control, if any, for selected sources or activities, or some combination of both. The factors may be considered both individually and/or in combination. As noted in section 4.1, given the significant emissions reductions that we anticipate to result from BART, the CAIR, and the implementation of other CAA programs, these reductions may be all that is necessary to achieve reasonable progress in the first planning period for some States. Also, as noted in section 4.2, it is not necessary for you to reassess the reasonable progress factors for sources subject to BART for which you have already completed a BART analysis.

5.1 Reasonable Progress Statutory Factor (a): Costs of Compliance

The first factor to take into consideration is the "costs of compliance." In this context we believe that the cost of compliance factor can be interpreted to encompass the cost of compliance for individual sources or source categories, and more broadly the implication of compliance costs to the health and vitality of industries within a state. For additional guidance on applying the cost of compliance factor to stationary sources, you may wish to consult the BART guidelines, referenced above.

To assess compliance costs for individual sources or source categories potentially subject to emission limitations, we suggest that you use established control cost analysis techniques. For stationary sources, generally this involves the following:[22]

a) Identify the emissions units to be controlled;

b) Identify the design parameters for emissions controls; and

c) Develop cost estimates based upon those design parameters.

[22] As noted above, application of the cost factor to non-point sources is beyond the scope of this guidance. This is also true for mobile sources.

You should evaluate both average and incremental costs. To maintain and improve consistency wherever possible, cost estimates should be based on EPA's *Air Pollution Control Cost Manual*.[23]

In considering the cost of compliance factor, you should keep in mind that different pollutants differently impact visibility impairment. For example, on a ton basis, sulfur dioxide-related particles have a greater impact on visibility impairment than crustal material. Therefore, in assessing additional emissions reduction strategies for source categories or individual, large scale sources, simple cost effectiveness estimates based on a dollar-per-ton calculation may not be as meaningful as a dollar-per-deciview calculation, especially if the strategies reduce different groups of pollutants.

5.2 Reasonable Progress Statutory Factor (b): Time Necessary for Compliance

The second factor is the "time necessary for compliance." It may be appropriate for you to use this factor to adjust the RPG to reflect the degree of improvement in visibility achievable within the period of the first SIP if the time needed for full implementation of a control measure (or measures) will extend beyond 2018. For example, if you anticipate that constraints on the availability of construction labor will preclude the installation of controls at all sources of a particular category by 2018, the visibility improvement anticipated from installation of controls at the percentage of sources that *could* be controlled within the strategy period should be considered in setting the RPG and in establishing the SIP requirements to meet the RPG.

5.3 Reasonable Progress Statutory Factor (c): Energy and Non-Air Impacts

The third factor is "energy and non-air environmental impacts." In assessing energy impacts, you may want to consider whether the energy requirements associated with a control technology result in energy penalties. For example, controls on diesel engines may decrease the engine's fuel efficiency, leading to an increase in diesel fuel consumption. Or, a particular control may require a fuel unavailable in the area. To the extent that these considerations are quantifiable they should be included in the engineering analyses supporting compliance cost estimates.

Some examples of non-air environmental impacts that you may wish to consider, are the effects of the waste stream that may be generated by a particular control technology, and/or other

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[23] Any additional information used for the cost calculations, including any information supplied by vendors that affects your assumptions regarding purchased equipment costs, equipment life, replacement of major components, and any other element of the calculation that differs from the *Control Cost Manual*, should be documented. EPA's *Control Cost Manual* is located at: www.epa.gov/ttncatc1/products.html#cccinfo.

resource consumption rates such as water, water supply, and waste water disposal. To the extent that these considerations are quantifiable, they should also be included in the analyses supporting compliance cost estimates.

For additional guidance on applying this factor to stationary sources, you may wish to consult the BART Guidelines, referenced above.

5.4 Reasonable Progress Statutory Factor (d): The Remaining Useful Life of the Source

The fourth statutory factor is "the remaining useful life of any existing source subject to [reasonable progress] requirements." This factor is generally best treated as one element of the overall cost analysis. The "remaining useful life" of a source, if it represents a relatively short time period, may affect the annualized costs of retrofit controls. For example, the methods for calculating annualized costs in EPA's *Air Pollution Control Cost Manual* require the use of a specified time period for amortization that varies based upon the type of control. If the remaining useful life of the source will clearly exceed this time period, the remaining useful life factor has essentially no effect on control costs and on the reasonable progress determination process. Where the remaining useful life of the source is less than the time period for amortizing the costs of the retrofit control, you may wish to use this shorter time period in your cost calculations.

For additional guidance on applying this factor to stationary sources, you may wish to consult the BART Guidelines, referenced above.

Appendix U

Consultation Meeting Minutes

Central Class I Areas Consultation Process Kick-off Call
April 3, 2007

PARTICIPANTS

States

Arkansas: Tony Davis, Mark McCorkle
Illinois: Rob Kaleel
Indiana: Chris Pedersen, Ken Ritter
Iowa: Matthew Johnson, Wendy Rains
Kansas: Lynn Deahl, Tom Gross, Andy Hawkins, Erika Stanley
Kentucky: Martin Luther, John Lyons
Louisiana: Jim Orgeron
Missouri: Jim Kavanaugh, Calvin Ku, Wayne Graf, David Lamb, Terry Rowles, Wendy Vit
Ohio: Bob Hodanbosi
Oklahoma: Patty ?
Tennessee: Julie Aslinger, Barry Stephens
Texas: Jim Price

Tribes

Kialegee Tribal Town: Henry Harjo
Kickapoo Tribe: Patricia Stender
Sac and Fox Nation: Rick Campbell

RPOs

CENRAP: Jeff Peltola
Midwest RPO: Kirk Baker
SESARM: John Hornback
VISTAS: Pat Brewer

Federal Land Managers

Forest Service: Judith Logan, Ann Mebane
National Park Service: Bruce Polkowsky
U.S. Fish and Wildlife Service: Tim Allen

U.S. EPA

EPA Region 7: Bob Fenemore
EPA Region 6: Joe Kordzi
EPA Region 4: Brenda Johnson

NOTES

The goal of the first call was to kick off the communication and consultation process for the four central Class I areas in Missouri and Arkansas. The latest modeling analyses show that the four Class I areas are either meeting their 2018 goals or are very close to doing so, but the Long-Term Strategy element of the regional haze SIP still needs to be addressed. One expectation of this process is to get everyone’s input on the 2018 emissions being used to support the modeling to ensure that the best available information is reflected.

The regional haze SIPs need to be completed by December 2007. The goal is to wrap up the central Class I areas consultation process in the fall of 2007.

The tribes within CENRAP were contacted, but there may be additional tribes outside of CENRAP that need to be contacted and given an opportunity to participate in the process. Henry Harjo will provide an updated list of tribal contacts.

CENRAP is planning an additional 2018 Base G run that will include several inventory corrections and incorporate refinery initiatives in Texas and Louisiana. CENRAP may also conduct a run based on the EPA's latest IPM 3.0 results to bracket a range of EGU futures. Results will be shared with this group as they become available.

In addition to the CENRAP effort, MDNR is planning additional modeling runs for the central Class I areas. The hope is to get feedback through the consultation process on known controls that are not currently reflected in the modeling runs, including additional BART controls and any ozone or PM2.5 SIP controls, multi-pollutants strategies, etc.

Illinois is developing a model-ready file that reflects their new multi-pollutant strategy and will make it available to this group.

VISTAS has recently updated their modeling by correcting the monthly allocation of fires and making adjustments to utility emissions in Georgia, Florida, and North Carolina. The results are largely unchanged for the central Class I areas.

The technical analysis to date was developed to provide a way to determine what states should be considered for inclusion in consultation. Multiple criteria were used in determining the impacting states. KDHE developed the Q/D, and MDNR recently conducted the PMF analysis, along with obtaining the PSAT results from Environ. While AOI results are older, they provide another piece of information. Each analysis method has it's strength and weaknesses, with the merging of the results in the table helping to focus on areas and states which are more likely to impact the Central Class I areas.

Discussion comments by FLM and EPA representatives indicated their support of the analysis already conducted. Overall comments indicated this was a good first step and that source area identifications were worthwhile.

Participants in the central Class I area consultation process are encouraged to review the draft Consultation Plan and provide feedback. Justification should be provided if there's disagreement on who should be included or excluded from the process.

Once there's agreement on who should be included in the process, participating states are asked to review and provide comments on the 2018 NOx and SO2 emissions that were distributed in Excel format prior to the call. States are asked to mark where there are known BART controls, CAIR controls, or ozone/PM2.5 SIP controls in the spreadsheets.

Any communications regarding the consultation process or consultation plan should be sent to Mark McCorkle (MAC@adeq.state.ar.us), Calvin Ku (calvin.ku@dnr.mo.gov), and Jeff Peltola (jeff_peltola@yahoo.com).

Action Items:

1. Comments on the consultation plan should be provided within three weeks.

2. CENRAP will share new modeling results. No due date

3. Illinois will share new model ready file when developed. No due date

4. States begin to evaluate 2018 emissions and on the books controls, provide information . No due date

5. A dedicated page for the central Class I area consultation process will be established on the CENRAP website in the near future.

6. An email will be distributed to request everyone's availability for upcoming conference calls on the following dates: May 9 or 10; June 6, 7, or 8.

Central Class I Areas Consultation Process Call
May 11, 2007

PARTICIPANTS

States
Arkansas: Mark McCorkle
Illinois: Rob Kaleel, Jeff Sprague
Indiana: Chris Pederson, Mark Derf
Iowa: Matthew Johnson
Kansas: Tom Gross, Andy Hawkins, Erika Stanley, Doug Watson
Kentucky: Tom Hardin
Missouri: Calvin Ku, Wayne Graf, David Lamb, Terry Rowles, Wendy Vit
Ohio: Bob Hodanbosi
Oklahoma: Lee Warden
Tennessee: Didn't get name
Texas: Jim Price

Tribes
Kickapoo Tribe: Patricia Stender

RPOs
CENRAP: Jeff Peltola
Midwest RPO: Kirk Baker, Mike Koerber
VISTAS: Pat Brewer

Federal Land Managers
Forest Service: Cindy Huber
National Park Service: Bruce Polkowsky
U.S. Fish and Wildlife Service: Meredith Bond

U.S. EPA
No EPA representatives were on the call

Notes

Comments on the consultation plan were received from Illinois, Louisiana and Kansas. Illinois committed to provide emission reductions information from it's multi-pollutants strategy in our technical analyses. Louisiana submitted a letter to Missouri and Arkansas requesting to be excused from further involvement in process based on the criteria to include or exclude the state from the consultation process. Arkansas and Missouri both acknowledged that it was no longer necessary for Louisiana to be involved. Kansas asked for clarification on why they are included in the consultation process but are not listed as a contributing state. The plan will be finalized as is, including the comment letter and e-mail from these states. Any future agreements or decisions resulting from the discussions will be documented.

CENRAP Base G modeling results are expected to be available by the end of May, according to Jeff Peltola. We will provide Base G projections by next consultation call, scheduled on June 7, 2007.

Illinois is finalizing model-ready emissions files reflecting their multi-pollutant strategy and will provide the files as soon as they are completed.

A dedicated space has been set up on CENRAP's website for posting documents related to the central Class I areas consultation process-- http://www.cenrap.org/projects.asp. The consultation plan, emissions inventory spreadsheets, and other documents have been posted.

There was discussion about the request to review and confirm the 2018 emissions inventory information that supports the modeling analyses and long-term strategy. States were asked to provide feedback on detailed emissions spreadsheets by May 25. Several states said they'd be able to provide comments by May 25. States working with Midwest RPO may not respond because they are focusing their efforts on developing a new 2018 inventory that incorporates IPM 3.0 results for the utility sector.

The MRPO future-year inventory effort is differentiating between strategies that states "will do" and those that states "may do." For the central Class I areas consultation process, the initial 2018 inventory review should focus on states' "will do" strategies.

Kansas proposed setting a cutoff of 500 tons/year for emissions units to review on the emissions inventory spreadsheets; no decision was made on this issue.

Several states expressed difficulty with the long-term strategy element of the SIP. There are concerns about not having authority over certain emissions activities such as prescribed burning. There are also concerns about the lack of certainty regarding control strategies until too late in the process to incorporate the information in the SIP by the deadline. It was mentioned that Chapters 10 and 11 for Long Term Strategy would be difficult to put in regulatory language.

Bruce Polkowsky commented that the long-term strategy involves evaluating the sources impacting visibility by applying the four-factors analysis to determine what strategies are reasonable. If this can't be completed with the timeframe of the December 2007 deadline, the regional haze SIP should include a commitment to review those sources within 5 years and implement the reasonable measures within 10 years.

Kirk Baker commented that Midwest RPO's modeling shows that the central Class I areas are not all meeting their 2018 uniform rate of progress goals. The modeling results among the RPOs may never be consistent, but it's important to understand why the results are different. Mike Koerber asked what the thinking was by Missouri and Arkansas, were they considering that they would work toward a modeled goal, or would they be looking at reasonable progress by evaluating sources by the four-factor analysis? Missouri indicated they would be working to model a uniform rate of progress.

Action Items

Missouri will follow up with states on the review and confirmation of the 2018 emissions inventory and control options.

Central Class I Areas Consultation Process Call
June 7, 2007

PARTICIPANTS

States
Arkansas: Mark McCorkle
Illinois: Rob Kaleel, Scott Leopold
Indiana: Chris Pedersen, Jay Koch
Kansas
Kentucky: Lona Brewer
Louisiana: Jim Orgeron
Missouri: Wayne Graf, Terry Rowles, Wendy Vit
Oklahoma: Cheryl Bradley, Scott Thomas, Lee Warden
Tennessee: Julie Aslinger
Texas: Jocelyn Mellberg

RPOs
CENRAP: Jeff Peltola
VISTAS: John Hornback

Federal Land Managers
Forest Service: Judy Logan, Ann Mebane
U.S. Fish and Wildlife Service: Tim Allen

U.S. EPA
EPA Region 4: Rick Gillham, Brenda Johnson
EPA Region 7: Amy Algoe-Eakin, Bob Fenemore

Tribes
(unknown)

Notes

Prior to the call, Jeff Peltola distributed a copy of the newly released June 1, 2007 revisions to EPA's Reasonable Progress Guidance.

Wendy Vit summarized comments received from Illinois, Kansas, Tennessee, and Texas on the 2018 emissions inventory. Several states provided information on expected controls that are not reflected in CENRAP's Base G modeling. Illinois provided emissions model-ready files showing substantial emission reductions from their EGU multi-pollutant rule. Kentucky, Oklahoma, and Midwest RPO responded that they would provide information on their 2018 emissions when available. A written summary of the comments will be posted on the central Class I area webpage when completed (http://www.cenrap.org/projects.asp).

Jeff Peltola reported on the CENRAP Base G modeling results that were recently released. The results show improved visibility relative to uniform rate-of-progress for 2018 compared to the previous Base F. CENRAP plans an additional control sensitivity modeling run with cost-curve criteria equivalent to <$5,000/ton for Q/5D sources to aid in discussions on what controls might be reasonable. In addition, CENRAP plans another 2018 modeling run based on the 2018 IPM 3.0 results with edits provided by

states, including revisions made through the Midwest RPO process. Other non-EGU emission reductions based on the comments received through this consultation process may be incorporated as well.

Mark McCorkle noted that in its technical support document, CENRAP plans to present visibility projections based on the new IMPROVE equation only and provide results based on the old IMPROVE equation as part of the weight-of-evidence analysis section.

John Hornback reported that VISTAS doesn't have any modeling updates to share. VISTAS is in the process of documenting their technical work and providing support for their member's regional haze SIPs.

Wayne Graf gave an overview of the Missouri timeline for regional haze SIP completion by the December 2007 deadline. The plan is to develop a draft of the plan by June/July and a final plan by August. The plan would then need to be put on public notice by September and go to public hearing in October for submission to EPA in December. The technical support document that ENVIRON is developing for CENRAP will be a key element of the plan. It will be a living document that will be updated as better information is made available.

Arkansas will post their regional haze SIP schedule on the central Class I area webpage.

Oklahoma gave an update on their consultation process. They are completing a packet of information to distribute to tribes and states. They plan to consult with tribes first and then consult with states.

It was decided that this will be the last scheduled consultation call for the time being. If there's a need, additional call(s) will be arranged. At the CENRAP Steering Committee meeting next week, there will be discussion about wrapping up consultation processes. Arkansas will take the lead on preparing a letter for participants in the central Class I areas consultation that documents the process.

Amy Algoe-Eakin commented that the newly released regional haze guidance on determining reasonable progress may provide information relevant to the consultation processes.

Appendix V

Applicable State Rules

EFFECTIVE STATE RULES

10 CSR 10-6.300 Conformity of General Federal Actions to State Implementation Plans

PURPOSE: This rule implements section 176(c) of the Clean Air Act, as amended (42 U.S.C. 7401 et seq.) and regulations under 40 CFR part 51 subpart W, with respect to the conformity of general federal actions to the applicable implementation plan. Under those authorities, no department, agency or instrumentality of the federal government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an applicable implementation plan. This rule sets forth policy, criteria, and procedures for demonstrating and assuring conformity of such actions to the applicable implementation plan. This rule applies to all areas in the state of Missouri which are designated as nonattainment or maintenance for any criteria pollutant or standard for which there is a national ambient air quality standard.

Editor's Note: The following material is incorporated into this rule by reference:

1) 42 ***United States Code*** *7401 and 7472 (Washington D.C.: U.S. Government Printing Office, 1989)*

2) 40 ***Code of Federal Regulatons*** *part 50; part 51, subpart W, Revised as of July 1, 1995; and part 81 (Washington, D.C.: U.S. Government Printing Office, 1995);*

3) 23 ***United States Code*** *(Washington D.C.: U.S. Government Printing Office, 1995);*

4) 49 ***United States Code*** *1601 and 1607 (Washington, D.C.: U.S. Governmental Printing Office, 1995);*

5) 23 ***United States Code 134 (Washington D.C.: U.S. Government Printing Office, 1995);***

6) 40 Code *of Federal Regulations (Washington D.C.: U.S. Government Printing Office, 1995);*

*7) Environmental Protection Agency "****Compilation of Air Pollutant Emission Factors (AP42)****" 5th Edition, Jan. 1995, Office of Air Quality Planning and Standards, Office of Air and Radiation, E.P.A. Research Triangle Park, NC 27711);*

8) ***Guidelines on Air Quality Models*** *(Revised July 1986) (Research Triangle Park, N.C.: U.S. Environmental Protection Agency 1986).*

In accordance with section 536.031(4), RSMo, the full text of material incorporated by reference will be made available to any interested person at the Office of the Secretary of State and the headquarters of the adopting state agency.

(1) General.

(A) No department, agency or instrumentality of the federal government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an applicable implementation plan.

(B) Under Clean Air Act (CAA) section 176(c) and 40 CFR part 51 subpart W, a federal agency must make a determination that a federal action conforms to the applicable implementation plan in accordance with the requirements of this rule before the action is taken.

(C) Subsection (1)(B) of this rule does not include federal actions where either--

1. A National Environmental Policy Act (NEPA) analysis was completed as evidenced by a final environmental assessment (EA), environmental impact statement (EIS), or finding of no significant impact (FONSI) that was prepared prior to January 31, 1994; or

2. All of the following conditions are met:

A. Prior to January 31, 1994, an EA was commenced or a contract was awarded to develop the specific environmental analysis;

B. Sufficient environmental analysis is completed by March 15, 1994, so that the federal agency may determine that the federal action is in conformity with the specific requirements and the purposes of the applicable implementation plan pursuant to the agency's affirmative obligation under section 176(c) of the CAA; and

C. A written determination of conformity under section 176(c) of the CAA has been made by the federal agency responsible for the federal action by March 15, 1994.

(D) Notwithstanding any provision of this rule, a determination that an action is in conformity with the applicable implementation plan does not exempt the action from any other requirements of the applicable implementation plan, the NEPA, or the CAA.

(2) Definitions.

(A) Terms used but not defined in this rule shall have the meaning given them by the CAA and Environmental Protection Agency's (EPA's) regulations, in that order of priority. Definitions for some terms used in this rule may be found in 10 CSR 10-6.020.

(B) Additional definitions specific to this rule are as follows:

1. Affected federal land manager—the federal agency or the federal official charged with direct responsibility for management of an area designated as Class I under the CAA (42 U.S.C. 7472) that is located within one hundred kilometers (100 km) of the proposed federal action;

2. Applicable implementation plan—the (portion) of the implementation plan, or most recent revision thereof, which has been approved under section 110 of the CAA, or promulgated under section 110(c) of the CAA (federal implementation plan), or promulgated or approved pursuant to regulations promulgated under section 301(d) of the CAA and which implements the relevant requirements of the CAA;

3. Area wide air quality modeling analysis—an assessment on a scale that includes the entire nonattainment or maintenance area which uses an air quality dispersion model to determine the effects of emissions on air quality;

4. CAA—the Clean Air Act, as amended;

5. Cause or contribute to a new violation—a federal action that—

A. Causes a new violation of a national ambient air quality standard (NAAQS) at a location in a nonattainment or maintenance area which would otherwise not be in violation of the standard during the future period in question if the federal action were not taken; or

B. Contributes, in conjunction with other reasonably foreseeable actions, to a new violation of a NAAQS at a location in a nonattainment or maintenance area in a manner that would increase the frequency or severity of the new violation;

6. Caused by, as used in the terms "direct emissions" and "indirect emissions"—emissions that would not otherwise occur in the absence of the federal action;

7. Criteria pollutant or standard—any pollutant for which there is established a NAAQS at 40 CFR part 50;

8. Direct emissions—those emissions of a criteria pollutant or its precursors that are caused or initiated by the federal action and occur at the same time and place as the action;

9. Emergency—a situation where extremely quick action on the part of the federal agencies involved is needed and where the timing of such federal activities makes it impractical to meet the requirements of this rule, such as natural disasters like hurricanes or earthquakes, civil disturbances such as terrorist acts, and military mobilizations;

10. Emissions budgets—those portions of the total allowable emissions defined in an EPA approved revision to the applicable implementation plan for a certain date for the purpose of meeting reasonable further progress milestones or attainment or maintenance demonstrations, for any criteria pollutant or its precursors, specifically allocated by the applicable implementation plan to mobile sources, to any stationary source or class of stationary sources, to any federal action or class of action, to any class of area sources, or to any subcategory of the emissions inventory. The allocation system must be specific enough to assure meeting the criteria of section 176(c)(1)(B) of the CAA. An emissions budget may be expressed in terms of an annual period, a daily period, or other period established in the applicable implementation plan;

11. Emission offsets, for purposes of section (8) of this rule—emissions reductions which are quantifiable, consistent with the applicable implementation plan attainment and reasonable further progress demonstrations, surplus to reductions required by, and credited to, other applicable implementation plan provisions, enforceable under both state and federal law, and permanent within the time frame specified by the program. Emissions reductions intended to be achieved as emissions offsets under this rule must be monitored and enforced in a manner equivalent to that under EPA's new source review requirements;

12. Emissions that a federal agency has a continuing program responsibility for—emissions that are specifically caused by an agency carrying out its authorities, and does not include emissions that occur due to subsequent activities, unless such activities are required by the federal agency. Where an agency, in performing its normal program responsibilities, takes actions itself or imposes conditions that result in air pollutant emissions by a nonfederal entity taking subsequent actions, such emissions are covered by the meaning of a continuing program responsibility;

13. EPA—the United States Environmental Protection Agency;

14. Federal action—any activity engaged in by a department, agency, or instrumentality of the federal government, or any activity that a department, agency or instrumentality of the federal government supports in any way, provides financial assistance for, licenses, permits, or approves, other than activities related to transportation plans, programs, and projects developed, funded, or approved under Title 23 U.S.C. or the Federal Transit Act (49 U.S.C. 1601 et seq.). Where the federal action is a permit, license, or other approval for some aspect of a nonfederal undertaking, the relevant activity is the part, portion, or phase of the nonfederal undertaking that requires the federal permit, license, or approval;

15. Federal agency—for purposes of this rule, a federal department, agency, or instrumentality of the federal government;

16. Increase the frequency or severity of any existing violation of any standard in any area—to cause a nonattainment area to exceed a standard more often or to cause a violation at a greater concentration than previously existed or would otherwise exist during the future period in question, if the project were not implemented;

17. Indirect emissions—those emissions of a criteria pollutant or its precursors that—

A. Are caused by the federal action, but may occur later in time or may be farther removed in distance from the action itself but are still reasonably foreseeable; and

B. The federal agency can practicably control and will maintain control due to a continuing program responsibility of the federal agency, including, but not limited to—

(I) Traffic on or to, or stimulated or accommodated by, a proposed facility which is related to increases or other changes in the scale or timing of operations of such facility;

(II) Emissions related to the activities of employees of contractors or federal employees;

(III) Emissions related to employee commutation and similar programs to increase average vehicle occupancy imposed on all employers of a certain size in the locality; or

(IV) Emissions related to the use of federal facilities under lease or temporary permit.

18. Local air quality modeling analysis—an assessment of localized impacts on a scale smaller than the entire nonattainment or maintenance area, including, for example, congested roadway intersections and highways or transit terminals, which uses an air quality dispersion model to determine the effects of emissions on air quality;

19. Maintenance area—any geographic region of the United States previously designated nonattainment pursuant to the CAA Amendments of 1990 and subsequently redesignated to attainment subject to the requirement to develop a maintenance plan under section 175A of the CAA;

20. Maintenance plan—a revision to the applicable implementation plan, meeting the requirements of section 175A of the CAA;

21. Metropolitan planning organization (MPO)—that organization designated as being responsible, together with the state, for conducting the continuing, cooperative, and comprehensive planning process under 23 U.S.C. 134 and 49 U.S.C. 1607;

22. Milestone—has the meaning given in sections 182(g)(1) and 189(c)(1) of the CAA. A milestone consists of an emissions level and the date on which it is required to be achieved;

23. National ambient air quality standards (NAAQS)—those standards established pursuant to section 109 of the CAA and include standards for carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone, particulate matter (PM_{10}), and sulfur dioxide (SO_2);

24. NEPA—the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.);

25. Nonattainment area (NAA)—any geographic area of the United States which has been designated as nonattainment under section 107 of the CAA and described in 40 CFR part 81;

26. Precursors of a criteria pollutant—

A. For ozone, nitrogen oxides (NO_x) (unless an area is exempted from NO_x requirements under section 182(f) of the CAA), and volatile organic compounds (VOCs); and

B. For PM_{10}, those pollutants described in the PM_{10} nonattainment area applicable implementation plan as significant contributors to the PM_{10} levels;

27. Reasonably foreseeable emissions—projected future indirect emissions that are identified at the time the conformity determination is made; the location of such emissions is known to the extent adequate to determine the impact of such emissions; and the emissions are quantifiable, as described and documented by the federal agency based on its own information and after reviewing any information presented to the federal agency;

28. Regionally significant action—a federal action for which the direct and indirect emissions of any pollutant represent ten percent (10%) or more of a nonattainment or maintenance area's emissions inventory for that pollutant;

29. Regional water or wastewater projects—include construction, operation, and maintenance of water or wastewater conveyances, water or wastewater treatment facilities, and water storage reservoirs which affect a large portion of a nonattainment or maintenance area; and

30. Total of direct and indirect emissions—the sum of direct and indirect emissions increases and decreases caused by the federal action; that is, the net emissions considering all direct and indirect emissions. Any emissions decreases used to reduce such total shall have already occurred or shall be enforceable under state and federal law. The portion of emissions which are exempt or presumed to conform under subsections (3)(C), (D), (E), or (F) of this rule are not included in the "total of direct and indirect emissions," except as provided in subsection (3)(J). The "total of direct and indirect emissions" includes emissions of criteria pollutants and emissions of precursors of criteria pollutants. The segmentation of projects for conformity analyses when emissions are reasonably foreseeable is not permitted by this rule.

(3) Applicability.

(A) Conformity determinations for federal actions related to transportation plans, programs, and projects developed, funded, or approved under Title 23 U.S.C. or the Federal Transit Act (49 U.S.C. 1601 et seq.) must meet the procedures and criteria of 10 CSR 10-2.390 and 10 CSR 10-5.480, in lieu of the procedures set forth in this rule.

(B) For federal actions not covered by subsection (3)(A) of this rule, a conformity determination is required for each pollutant where the total of direct and indirect emissions in a nonattainment or maintenance area caused by a federal action would equal or exceed any of the rates in paragraph (3)(B)1. or 2. of this rule.

1. For purposes of subsection (3)(B) of this rule, the following rates apply in nonattainment areas (NAAs):

	Tons/Year
Ozone (VOC or NO_x)	
Serious NAAs	50
Severe NAAs	25
Extreme NAAs	10
Other ozone NAAs outside an ozone transport region	100

Marginal and moderate NAAs inside an ozone transport region	
VOC	50
NO_x	100
Carbon monoxide	
All NAAs	100
SO_2 or NO_2	
All NAAs	100
PM_{10}	
Moderate NAAs	100
Serious NAAs	70
Pb	
All NAAs	25

2. For purposes of subsection (3)(B) of this rule, the following rates apply in maintenance areas:

	Tons/Year
Ozone (NO_x), SO_2 or NO_2	
All maintenance areas	100
Ozone (VOC)	
Maintenance areas inside an ozone transport region	50
Maintenance areas outside an ozone transport region	100
Carbon monoxide	
All maintenance areas	100
PM_{10}	
All maintenance areas	100
Pb	
All maintenance areas	25

(C) The requirements of this rule shall not apply to—

1. Actions where the total of direct and indirect emissions are below the emissions levels specified in subsection (3)(B) of this rule;

2. The following actions which would result in no emissions increase or an increase in emissions that is clearly de minimis:

A. Judicial and legislative proceedings;

B. Continuing and recurring activities such as permit renewals where activities conducted will be similar in scope and operation to activities currently being conducted;

C. Rulemaking and policy development and issuance;

D. Routine maintenance and repair activities, including repair and maintenance of administrative sites, roads, trails, and facilities;

E. Civil and criminal enforcement activities, such as investigations, audits, inspections, examinations, prosecutions, and the training of law enforcement personnel;

F. Administrative actions such as personnel actions, organizational changes, debt management or collection, cash management, internal agency audits, program budget proposals, and matters relating to the administration and collection of taxes, duties and fees;

G. The routine, recurring transportation of material and personnel;

H. Routine movement of mobile assets, such as ships and aircraft, in home port reassignments and stations (when no new support facilities or personnel are required) to perform as operational groups or for repair or overhaul;

I. Maintenance dredging and debris disposal where no new depths are required, applicable permits are secured, and disposal will be at an approved disposal site;

J. With respect to existing structures, properties, facilities and lands where future activities conducted will be similar in scope and operation to activities currently being conducted at the existing structures, properties, facilities, and lands, actions such as relocation of personnel, disposition of federally-owned existing structures, properties, facilities, and lands, rent subsidies, operation and maintenance cost subsidies, the exercise of receivership or conservatorship authority, assistance in purchasing structures, and the production of coins and currency;

K. The granting of leases, licenses such as for exports and trade, permits, and easements where activities conducted will be similar in scope and operation to activities currently being conducted;

L. Planning, studies, and provision of technical assistance;

M. Routine operation of facilities, mobile assets and equipment;

N. Transfers of ownership, interests, and titles in land, facilities, and real and personal properties, regardless of the form or method of the transfer;

O. The designation of empowerment zones, enterprise communities, or viticultural areas;

P. Actions by any of the federal banking agencies or the federal reserve banks, including actions regarding charters, applications, notices, licenses, the supervision or examination of depository institutions or depository institution holding companies, access to the discount window, or the provision of financial services to banking organizations or to any department, agency or instrumentality of the United States;

Q. Actions by the Board of Governors of the Federal Reserve System or any federal reserve bank to effect monetary or exchange rate policy;

R. Actions that implement a foreign affairs function of the United States;

S. Actions (or portions thereof) associated with transfers of land, facilities, title, and real properties through an enforceable contract or lease agreement where the delivery of the deed is required to occur promptly after a specific, reasonable condition is met, such as promptly after the land is certified as meeting the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and where the federal agency does not retain continuing authority to control emissions associated with the lands, facilities, title, or real properties;

T. Transfers of real property, including land, facilities, and related personal property from a federal entity to another federal entity and assignments of real property, including land, facilities, and related personal property from a federal entity to another federal entity for subsequent deeding to eligible applicants; and

U. Actions by the Department of the Treasury to effect fiscal policy and to exercise the borrowing authority of the United States;

3. Actions where the emissions are not reasonably foreseeable, such as the following:

A. Initial Outer Continental Shelf lease sales which are made on a broad scale and are followed by exploration and development plans on a project level; and

B. Electric power marketing activities that involve the acquisition, sale and transmission of electric energy; and

4. Individual actions which implement a decision to conduct or carry out a program that has been found to conform to the applicable implementation plan, such as prescribed burning actions which are consistent with a land management plan that has been found to conform to the applicable implementation plan.

(D) Notwithstanding the other requirements of this rule, a conformity determination is not required for the following federal actions (or portion thereof):

1. The portion of an action that includes major new or modified stationary sources that require a permit under the new source review (NSR) program (section 173 of the CAA) or the prevention of significant deterioration (PSD) program (Title I, part C of the CAA);

2. Actions in response to emergencies or natural disasters such as hurricanes, earthquakes, etc., which are commenced on the order of hours or days after the emergency or disaster and, if applicable, which meet the requirements of subsection (3)(E) of this rule;

3. Research, investigations, studies, demonstrations, or training other than those exempted under paragraph (3)(C)2, of this rule, where no environmental detriment is incurred or the particular action furthers air quality research, as determined by the department;

4. Alteration and additions of existing structures as specifically required by new or existing applicable environmental legislation or environmental regulations (for example, hush houses for aircraft engines and scrubbers for air emissions); and

5. Direct emissions from remedial and removal actions carried out under the CERCLA and associated regulations to the extent such emissions either comply with the substantive requirements of the PSD/NSR permitting program or are exempted from other environmental regulation under the provisions of CERCLA and applicable regulations issued under CERCLA.

(E) Federal actions which are part of a continuing response to an emergency or disaster under paragraph (3)(D)2. of this rule and which are to be taken more than six (6) months after the commencement of the response to the emergency or disaster under paragraph (3)(D)2. of this rule are exempt from the requirements of this rule only if--

1. The federal agency taking the actions makes a written determination that, for a specified period not to exceed an additional six (6) months, it is impractical to prepare the conformity analyses which would otherwise be required and the actions cannot be delayed due to overriding concerns for public health and welfare, national security interests and foreign policy commitments; or

2. For actions which are to be taken after those actions covered by paragraph (3)(E)1. of this rule, the federal agency makes a new determination as provided in paragraph (3)(E)1. of this rule.

(F) Notwithstanding other requirements of this rule, individual actions or classes of actions specified by individual federal agencies that have met the criteria set forth in either paragraph (3)(G)1. or 2. and the procedures set forth in subsection (3)(H) of this rule are presumed to conform, except as provided in subsection (3)(J) of this rule.

(G) The federal agency must meet the criteria for establishing activities that are presumed to conform by fulfilling the requirements set forth in either paragraph (3)(G)1. or 2. of this rule.

1. The federal agency must clearly demonstrate using methods consistent with this rule that the total of direct and indirect emissions from the type of activities which would be presumed to conform would not--

A. Cause or contribute to any new violation of any standard in any area;

B. Interfere with provisions in the applicable implementation plan for maintenance of any standard;

C. Increase the frequency or severity of any existing violation of any standard in any area; or

D. Delay timely attainment of any standard or any required interim emission reductions or other milestones in any area including, where applicable, emission levels specified in the applicable implementation plan for purposes of—

(I) A demonstration of reasonable further progress;

(II) A demonstration of attainment; or

(III) A maintenance plan; or

2. The federal agency must provide documentation that the total of direct and indirect emissions from such future actions would be below the emission rates for a conformity determination that are established in subsection (3)(B) of this rule, based, for example, on similar actions taken over recent years.

(H) In addition to meeting the criteria for establishing exemptions set forth in paragraph (3)(G)1. or 2. of this rule, the following procedures must also be complied with to presume that activities will conform:

1. The federal agency must identify through publication in the Federal Register its list of proposed activities that are presumed to conform and the analysis, assumptions, emissions factors, and criteria used as the basis for the presumptions;

2. The federal agency must notify the appropriate EPA regional office(s), state and local air quality agencies and, where applicable, the agency designated under section 174 of the CAA and the MPO and provide at least thirty (30) days for the public to comment on the list of proposed activities presumed to conform;

3. The federal agency must document its response to all the comments received and make the comments, response, and final list of activities available to the public upon request; and

4. The federal agency must publish the final list of such activities in the *Federal Register*.

(I) Notwithstanding the other requirements of this rule, when the total of direct and indirect emissions of any pollutant from a federal action does not equal or exceed the rates specified in subsection (3)(B) of this rule, but represents ten percent (10%) or more of a nonattainment or maintenance area's total emissions of that pollutant, the action is defined as a regionally significant action and the requirements of sections (1) and (5) (10) of this rule shall apply for the federal action.

(J) Where an action presumed to be ***de minimis*** under paragraph (3)(C)1. or 2. of this rule or otherwise presumed to conform under subsection (3)(F) of this rule is a regionally significant action or where an action otherwise presumed to conform under subsection (3)(F) of this rule does not in fact meet one (1) of the criteria in paragraph (3)(G)1. of this rule, that action shall not be considered ***de minimis*** or presumed to conform and the requirements of sections (1) and (5) (10) of this rule shall apply for the federal action.

(K) The provisions of this rule shall apply in all nonattainment and maintenance areas.

(L) Any measures used to affect or determine applicability of this rule, as determined under this section, must result in projects that are in fact ***de minimis***, must result in such ***de minimis*** levels prior to the time the applicability determination is made, and must be state or federally enforceable. Any measures that are intended to reduce air quality impacts for this purpose must be identified (including the identification and quantification of all emission reductions claimed) and the process for implementation (including any necessary funding of such measures and tracking of such emission reductions) and enforcement of such measures must be described, including an implementation schedule containing explicit timelines for implementation. Prior to a determination of applicability, the federal agency making the determination must obtain written commitments from the appropriate persons or agencies to implement any measures which are identified as conditions for making such determinations. Such written commitment shall describe such mitigation measures and the nature of the commitment, in a manner consistent with the previous sentence. After this rule is approved by EPA as a revision to the applicable implementation plan, enforceability through the applicable implementation plan of any measures necessary for a determination of applicability will apply to all persons who agree to reduce direct and indirect emissions associated with a federal action for a conformity applicability determination.

(4) Conformity Analysis. Any federal department, agency, or instrumentality of the federal government taking an action subject to 40 CFR part 51 subpart W and this rule must make its own conformity determination consistent with the requirements of this rule. In making its conformity determination, a federal agency must consider comments from any interested parties. Where multiple federal agencies have jurisdiction for various aspects of a project, a federal agency may choose to adopt the analysis of another federal agency (to the extent the proposed action and impacts analyzed are the same as the project for which a conformity determination is required) or develop its own analysis in order to make its conformity determination.

(5) Reporting Requirements.

(A) A federal agency making a conformity determination under section (8) must provide to the appropriate EPA regional office(s), state and local air quality agencies and, where applicable, affected federal land managers, the agency designated under section 174 of the CAA and the MPO a thirty (30)-day notice which describes the proposed action and the federal agency's draft conformity determination on the action.

(B) A federal agency must notify the appropriate EPA regional office(s), state and local air quality agencies and, where applicable, affected federal land managers, the agency designated under section 174 of the CAA and the MPO within thirty (30) days after making a final conformity determination under section (8).

(6) Public Participation and Consultation.

(A) Upon request by any person regarding a specific federal action, a federal agency must make available for review its draft conformity determination under section (8) with supporting materials which describe the analytical methods, assumptions, and conclusions relied upon in making the applicability analysis and draft conformity determination.

(B) A federal agency must make public its draft conformity determination under section (8) by placing a notice by prominent advertisement in a daily newspaper of general circulation in the areas affected by the action and by providing thirty (30) days for written public comment prior to taking any formal action on the draft determination. This comment period may be concurrent with any other public involvement, such as occurs in the NEPA process.

(C) A federal agency must document its response to all the comments received on its draft conformity determination under section (8) and make the comments and responses available, upon request by any person regarding a specific federal action, within thirty (30) days of the final conformity determination.

(D) A federal agency must make public its final conformity determination under section (8) for a federal action by placing a notice by prominent advertisement in a daily newspaper of general circulation in the areas affected by the action within thirty (30) days of the final conformity determination.

(7) Frequency of Conformity Determinations.

(A) The conformity status of a federal action automatically lapses five (5) years from the date a final conformity determination is reported under section (5), unless the federal action has been completed or a continuous program has been commenced to implement that federal action within a reasonable time.

(B) Ongoing federal activities at a given site showing continuous progress are not new actions and do not require periodic redeterminations so long as the emissions associated with such activities are within the scope of the final conformity determination reported under section (5).

(C) If, after the conformity determination is made, the federal action is changed so that there is an increase in the total of direct and indirect emissions above the levels in subsection (3)(B), a new conformity determination is required.

(8) Criteria for Determining Conformity of General Federal Actions.

(A) An action required under section (3) to have a conformity determination for a specific pollutant, will be determined to conform to the applicable implementation plan if, for each pollutant that exceeds the rates in subsection (3)(B), or otherwise requires a conformity determination due to the total of direct and indirect emissions from the action, the action meets the requirements of subsection (8)(C) of this rule, and meets any of the following requirements:

1. For any criteria pollutant, the total of direct and indirect emissions from the action are specifically identified and accounted for in the applicable implementation plan's attainment or maintenance demonstration;

2. For ozone or nitrogen dioxide, the total of direct and indirect emissions from the action are fully offset within the same nonattainment or maintenance area through a revision to the applicable implementation plan or a measure similarly enforceable under state and federal law that effects emission reductions so that there is no net increase in emissions of that pollutant;

3. For any criteria pollutant, except ozone and nitrogen dioxide, the total of direct and indirect emissions from the action meet the requirements—

A. Specified in subsection (8)(B) of this rule, based on areawide air quality modeling analysis and local air quality modeling analysis; or

B. Specified in paragraph (8)(A)5. of this rule and, for local air quality modeling analysis, the requirement of subsection (8)(B) of this rule;

4. For CO or PM_{10}—

A. Where the department determines (in accordance with sections (5) and (6) and consistent with the applicable implementation plan) that an areawide air quality modeling analysis is not needed, the total of direct and indirect emissions from the action meet the requirements specified in subsection (8)(B) of this rule, based on local air quality modeling analysis; or

B. Where the department determines (in accordance with sections (5) and (6) and consistent with the applicable implementation plan) that an areawide air quality modeling analysis is appropriate and that a local air quality modeling analysis is not needed, the total of direct and indirect emissions from the action meet the requirements specified in subsection (8)(B) of this rule, based on areawide modeling, or meet the requirements of paragraph (8)(A)5. of this rule; or

5. For ozone or nitrogen dioxide, and for purposes of subparagraphs (8)(A)3.B. and (8)(A)4.B. of this rule, each portion of the action or the action as a whole meets any of the following requirements:

A. Where EPA has approved a revision to an area's attainment or maintenance demonstration after 1990 and the state makes a determination as provided in part (I) or where the state makes a commitment as provided in part (II). Any such determination or commitment shall be made in compliance with sections (5) and (6).

(I) The total of direct and indirect emissions from the action (or portion thereof) is determined and documented by the department to result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, would not exceed the emissions budgets specified in the applicable implementation plan.

(II) The total of direct and indirect emissions from the action (or portion thereof) is determined by the department to result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, would exceed an emissions budget specified in the applicable implementation plan and the department makes a written commitment to EPA which includes the following:

(a) A specific schedule for adoption and submittal of a revision to the applicable implementation plan which would achieve the needed emission reductions prior to the time emissions from the federal action would occur;

(b) Identification of specific measures for incorporation into the applicable implementation plan which would result in a level of emissions which, together with all other emissions in the nonattainment or maintenance area, would not exceed any emissions budget specified in the applicable implementation plan;

(c) A demonstration that all existing applicable implementation plan requirements are being implemented in the area for the pollutants affected by the federal action, and that local authority to implement additional requirements has been fully pursued;

(d) A determination that the responsible federal agencies have required all reasonable mitigation measures associated with their action; and

(e) Written documentation including all air quality analyses supporting the conformity determination.

(III) Where a federal agency made a conformity determination based on a state commitment under part (8)(A)5.A.(II) of this rule, such a state commitment is automatically deemed a call for an implementation plan revision by EPA under section 110(k)(5) of the CAA, effective on the date of the federal conformity determination and requiring response within eighteen (18) months or any shorter time within which the state commits to revise the applicable implementation plan;

B. The action (or portion thereof), as determined by the MPO, is specifically included in a current transportation plan and transportation improvement program which have been found to conform to the applicable implementation plan under 10 CSR 10-2.390 or 10 CSR 10-5.480;

C. The action (or portion thereof) fully offsets its emissions within the same nonattainment or maintenance area through a revision to the applicable implementation plan or an equally enforceable measure that effects emission reductions equal to or greater than the total of direct and indirect emissions from the action so that there is no net increase in emissions of that pollutant;

D. Where EPA has not approved a revision to the relevant implementation plan attainment or maintenance demonstration since 1990, the total of direct and indirect emissions from the action for the future years (described in subsection (9)(D) of this rule) do not increase emissions with respect to the baseline emissions, and--

(I) The baseline emissions reflect the historical activity levels that occurred in the geographic area affected by the proposed federal action during-—

(a) Calendar year 1990;

(b) The calendar year that is the basis for the classification (or, where the classification is based on multiple years, the year that is most representative in terms of the level of activity), if a classification is promulgated in 40 CFR part 81; or

(c) The year of the baseline inventory in the PM_{10} applicable implementation plan; and

(II) The baseline emissions are the total of direct and indirect emissions calculated for the future years (described in subsection (9)(D) of this rule) using the historic activity levels (described in part (8)(A)5.D.(I) of this rule) and appropriate emission factors for the future years; or

E. Where the action involves regional water or wastewater projects, such projects are sized to meet only the needs of population projections that are in the applicable implementation plan, based on assumptions regarding per capita use that are developed or approved in accordance with subsection (9)(A).

(B) The areawide and local air quality modeling analyses must--

1. Meet the requirements in section (9); and

2. Show that the action does not--

A. Cause or contribute to any new violation of any standard in any area; or

B. Increase the frequency or severity of any existing violation of any standard in any area.

(C) Notwithstanding any other requirements of this section, an action subject to this rule may not be determined to conform to the applicable implementation plan unless the total of direct and indirect emissions from the action is in compliance or consistent with all relevant requirements and milestones contained in the applicable implementation plan, such as elements identified as part of the reasonable further progress schedules, assumptions specified in the attainment or maintenance demonstration, prohibitions, numerical emission limits, and work practice requirements, and such action is otherwise in compliance with all relevant requirements of the applicable implementation plan.

(D) Any analyses required under this section must be completed, and any mitigation requirements necessary for a finding of conformity must be identified in compliance with section (10), before the determination of conformity is made.

(9) Procedures for Conformity Determinations of General Federal Actions.

(A) The analyses required under this rule must be based on the latest planning assumptions.

1. All planning assumptions (including, but not limited to, per capita water and sewer use, vehicle miles traveled per capita or per household, trip generation per household, vehicle occupancy, household size, vehicle fleet mix, vehicle ownership, wood stoves per household, and the geographic distribution of population growth) must be derived from the estimates of current and future population, employment, travel, and congestion most recently developed by the MPO. The conformity determination must also be based on the latest assumptions about current and future background concentrations and other federal actions.

2. Any revisions to these estimates used as part of the conformity determination, including projected shifts in geographic location or level of population, employment, travel, and congestion, must be approved by the MPO or other agency authorized to make such estimates for the area.

(B) The analyses required under this rule must be based on the latest and most accurate emission estimation techniques available as described below, unless such techniques are inappropriate. If such techniques are inappropriate and written approval of the EPA regional administrator is obtained for any modification or substitution, they may be modified or another technique substituted on a case-by-case basis or, where appropriate, on a generic basis for a specific federal agency program.

1. For motor vehicle emissions, the most current version of the motor vehicle emissions model specified by EPA for use in the preparation or revision of implementation plans in the state or area must be used for the conformity analysis as specified below:

A. The EPA must publish in the *Federal Register* a notice of availability of any new motor vehicle emissions model; and

B. A grace period of three (3) months shall apply during which the motor vehicle emissions model previously specified by EPA as the most current version may be used. Conformity analyses for which the analysis was begun during the grace period or no more than three (3) years before the *Federal Register* notice of availability of the latest emission model may continue to use the previous version of the model specified by EPA.

2. For nonmotor vehicle sources, including stationary and area source emissions, the latest emission factors specified by EPA in the "Compilation of Air Pollutant Emission Factors (AP-42)" must be used for the conformity analysis unless more accurate emission data are available, such as actual stack test data from stationary sources which are part of the conformity analysis.

(C) The air quality modeling analyses required under this rule must be based on the applicable air quality models, databases, and other requirements specified in the most recent version of the "Guideline on Air Quality Models (Revised)" (1986), including supplements (EPA publication no. 450/2-78-027R), unless--

1. The guideline techniques are inappropriate, in which case the model may be modified or another model substituted on a case-by-case basis or, where appropriate, on a generic basis for a specific federal agency program; and

2. Written approval of the EPA regional administrator is obtained for any modification or substitution.

(D) The analyses required under this rule must be based on the total of direct and indirect emissions from the action and must reflect emission scenarios that are expected to occur under each of the following cases:

1. The CAA mandated attainment year or, if applicable, the farthest year for which emissions are projected in the maintenance plan;

2. The year during which the total of direct and indirect emissions from the action for each pollutant analyzed is expected to be the greatest on an annual basis; and

3. Any year for which the applicable implementation plan specifies an emissions budget.

(10) Mitigation of Air Quality Impacts.

(A) Any measures that are intended to mitigate air quality impacts must be identified (including the identification and quantification of all emission reductions claimed) and the process for implementation (including any necessary funding of such measures and tracking of such emission reductions) and enforcement of such measures must be described, including an implementation schedule containing explicit timelines for implementation.

(B) Prior to determining that a federal action is in conformity, the federal agency making the conformity determination must obtain written commitments from the appropriate persons or agencies to implement any mitigation measures which are identified as conditions for making conformity determinations. Such written commitment shall describe such mitigation measures and the nature of the commitment, in a manner consistent with subsection (10)(A) of this rule.

(C) Persons or agencies voluntarily committing to mitigation measures to facilitate positive conformity determinations must comply with the obligations of such commitments.

(D) In instances where the federal agency is licensing, permitting or otherwise approving the action of another governmental or private entity, approval by the federal agency must be conditioned on the other entity meeting the mitigation measures set forth in the conformity determination, as provided in subsection (10)(A) of this rule.

(E) When necessary because of changed circumstances, mitigation measures may be modified so long as the new mitigation measures continue to support the conformity determination in accordance with sections (8) and (9) and this section. Any proposed change in the mitigation measures is subject to the reporting requirements of section (5) and the public participation requirements of section (6).

(F) Written commitments to mitigation measures must be obtained prior to a positive conformity determination and such commitments must be fulfilled.

(G) After this rule is approved by EPA as an implementation plan revision, any agreements, including mitigation measures, necessary for a conformity determination will be both state and federally enforceable. Enforceability through the applicable implementation plan will apply to all persons who agree to mitigate direct and indirect emissions associated with a federal action for a conformity determination.

(11) Savings Provision. The federal conformity rules under 40 CFR part 51 subpart W, in addition to any existing applicable state requirements, establish the conformity criteria and procedures necessary to meet the requirements of Clean Air Act section 176(c) until such time as this rule is approved by EPA as an implementation plan revision. Following EPA approval of this rule as a revision to the applicable implementation plan (or a portion thereof), the approved (or approved portion of the) state criteria and procedures will govern conformity determinations and the federal conformity regulations contained in 40 CFR part 93 will apply only for the portion, if any, of the state's conformity provisions that is not approved by EPA. In addition, any previously applicable implementation plan requirements relating to conformity remain enforceable until the state revises its applicable implementation plan to specifically remove them and that revision is approved by EPA.

AUTHORITY: section 643.050, RSMo 1994. Original rule filed Oct. 4, 1994, effective May 28, 1995. Amended: Filed Jan. 30, 1996, effective Sept. 30, 1996.*
**Original authority 1965, amended 1972, 1992, 1993, 1995.*

10 CSR 10-6.362 Clean Air Interstate Rule Annual NO_x Trading Program

PURPOSE: This rule adopts the U.S. Environmental Protection Agency's (EPA) regional trading program for nitrogen oxides, which was developed to meet the requirements of the Clean Air Interstate Rule. The Clean Air Interstate Rule was published on May 12, 2005. The evidence supporting the need for this proposed rulemaking, per section 536.016, RSMo, is the U.S. Environmental Protection Agency's Clean Air Interstate Rule published on May 12, 2005.

PUBLISHER'S NOTE: The secretary of state has determined that the publication of the entire text of the material which is incorporated by reference as a portion of this rule would be unduly cumbersome or expensive. This material as incorporated by reference in this rule shall be maintained by the agency at its headquarters and shall be made available to the public for inspection and copying at no more than the actual cost of reproduction. This note applies only to the reference material. The entire text of the rule is printed here.

(1) Applicability.

(A) Except as provided in subsection (1)(B) of this rule—

1. The following units in this state shall be Clean Air Interstate Rule (CAIR) nitrogen oxides (NO_x) units, and any source that includes one (1) or more such units shall be a CAIR NO_x source, subject to the requirements of this rule: any stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine serving at any time, since the later of November 15, 1990 or the startup of the unit's combustion chamber, a generator with nameplate capacity of more than twenty-five (25) megawatts electric (MWe) producing electricity for sale.

2. If a stationary boiler or stationary combustion turbine that, under paragraph (1)(A)1. of this rule, is not a CAIR NO_x unit begins to combust fossil fuel or to serve a generator with nameplate capacity of more than twenty-five (25) MWe producing electricity for sale, the unit shall become a CAIR NO_x unit as provided in paragraph (1)(A)1. of this rule on the first date on which it both combusts fossil fuel and serves such generator.

(B) The units in the state that meet the requirements set forth in subparagraph (1)(B)1.A., (1)(B)2.A., or (1)(B)2.B. of this rule shall not be CAIR NO_x units—

1. Cogenerator exemption.

A. Any unit that is a CAIR NO_x unit under paragraph (1)(A)1. or 2. of this rule—

(I) Qualifying as a cogeneration unit during the twelve (12)-month period starting on the date the unit first produces electricity and continuing to qualify as a cogeneration unit; and

(II) Not serving at any time, since the later of November 15, 1990 or the startup of the unit's combustion chamber, a generator with nameplate capacity of more than twenty-five (25) MWe supplying in any calendar year more than one-third of the unit's potential electric output capacity or two hundred nineteen thousand (219,000) megawatt hours (MWh), whichever is greater, to any utility power distribution system for sale.

B. If a unit qualifies as a cogeneration unit during the twelve (12)-month period starting on the date the unit first produces electricity and meets the requirements of subparagraph (1)(B)1.A. of this rule for at least one (1) calendar year, but subsequently no longer meets all such requirements, the unit shall become a CAIR NO_x unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of part (1)(B)1.A.(II) of this rule.

2. Solid waste incinerator exemption.

A. Any unit that is a CAIR NO_x unit under paragraph (1)(A)1. or 2. of this rule commencing operation before January 1, 1985—

(I) Qualifying as a solid waste incineration unit; and

(II) With an average annual fuel consumption of non-fossil fuel for 1985–1987 exceeding eighty percent (80%) (on a British thermal unit (Btu) basis) and an average annual fuel consumption of non-fossil fuel for any three (3) consecutive calendar years after 1990 exceeding eighty percent (80%) (on a Btu basis).

B. Any unit that is a CAIR NO_x unit under paragraph (1)(A)1. or 2. of this rule commencing operation on or after January 1, 1985—

(I) Qualifying as a solid waste incineration unit; and

(II) With an average annual fuel consumption of non-fossil fuel for the first three (3) calendar years of operation exceeding eighty percent (80%) (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any three (3) consecutive calendar years after 1990 exceeding eighty percent (80%) (on a Btu basis).

C. If a unit qualifies as a solid waste incineration unit and meets the requirements of subparagraph (1)(B)2.A. or B. of this rule for at least three (3) consecutive calendar years, but subsequently no longer meets all such requirements, the unit shall become a CAIR NO_x unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a solid waste incineration unit or January 1 after the first three (3) consecutive calendar years after 1990 for which the unit has an average annual fuel consumption of fossil fuel of twenty percent (20%) or more.

(C) Retired Unit Exemption. Unless otherwise noted in this section of the rule, all of the sections of 40 CFR 96.105 promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(2) Definitions.

(A) Definitions for key words and phrases used in this rule may be found in sections 40 CFR 96.102 and 96.103 of 40 CFR 96 subpart AA promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(B) Definitions of certain terms specified in this rule, other than those defined in this rule section, may be found in 10 CSR 10-6.020.

(3) General Provisions.

(A) Unless otherwise noted in this section of the rule, 40 CFR 96.106, 96.107, and 96.108 as well as all of the sections of 40 CFR 96 subparts BB, CC (excluding any reference to 40 CFR 96 subpart EE), DD, FF, GG, and II promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(B) NO_x Allowances.

1. Timing requirements for CAIR NO_x allowance allocations.

A. By October 31, 2006, the permitting authority will submit to the administrator the CAIR NO_x allowance allocations, in a format prescribed by the administrator, for the calendar years in 2009, 2010, 2011, 2012, 2013, and 2014 consistent with the allocations listed in Table I of this rule.

B. By October 31, 2006, the permitting authority will submit to the administrator the CAIR NO_x allowance allocations, in a format prescribed by the administrator, for the calendar year beginning 2015 and extending through ten (10) calendar years consistent with the allocations listed in Table I of this rule.

C. By October 31, 2015 and October 31 of every tenth year following, the permitting authority will submit to the administrator the CAIR NO_x allowance allocations, in a format prescribed by the administrator, for the calendar year ten (10) years in the future and extending through ten (10) calendar years consistent with the allocations listed in Table I of this rule.

2. NO_x allowance allocations.

A. The state trading program NO_x budget allocated by the director under subparagraphs (3)(B)2.B. and (3)(B)2.C. of this rule for a calendar year will equal fifty-nine thousand eight hundred seventy-one (59,871) tons for 2009–2014 and forty-nine thousand eight hundred ninety-two (49,892) tons for 2015 and beyond.

B. The following NO_x budget units shall be allocated NO_x allowances for each calendar year in accordance with Table I of paragraph (3)(B)2.B. of this rule.

_Table I

Facility ID	Facility Name	Unit ID	Portion Statewide Pool	NO_x Allocation 2009–2014	NO_x Allocation 2015 and Beyond
2076	ASBURY	1	1.842%	1,097	914
2079	HAWTHORN STATION	5A	5.531%	3,294	2,743
2079	HAWTHORN STATION	6	0.053%	31	26
2079	HAWTHORN STATION	7	0.031%	18	15
2079	HAWTHORN STATION	8	0.027%	16	13
2079	HAWTHORN STATION	9	0.116%	69	58
2080	MONTROSE STATION	1	1.530%	911	759
2080	MONTROSE STATION	2	1.589%	947	788
2080	MONTROSE STATION	3	1.581%	942	784
2081	NORTHEAST #11		0.005%	3	2
2081	NORTHEAST #12		0.004%	2	2
2081	NORTHEAST #13		0.011%	7	6
2081	NORTHEAST #14		0.009%	5	5
2081	NORTHEAST #15		0.008%	4	4
2081	NORTHEAST #16		0.005%	3	2
2081	NORTHEAST #17		0.011%	6	5
2081	NORTHEAST #18		0.007%	4	3
2082	FAIRGROUNDS		0.004%	2	2
2092	RALPH GREEN	3	0.015%	9	8
2094	SIBLEY	1	0.514%	306	255
2094	SIBLEY	2	0.512%	305	254
2094	SIBLEY	3	3.319%	1,977	1,646
2096	AMEREN VIADUCT		0.001%	—	—
2098	LAKE ROAD	6	0.910%	542	452
2098	LAKE ROAD	5	0.009%	5	4
2102	HOWARD BEND		0.002%	1	1
2103	LABADIE	1	4.890%	2,913	2,425
2103	LABADIE	2	5.033%	2,998	2,496
2103	LABADIE	3	5.589%	3,329	2,772
2103	LABADIE	4	5.009%	2,984	2,484
2104	MERAMEC	1	1.225%	730	607
2104	MERAMEC	2	1.134%	676	562
2104	MERAMEC	3	1.966%	1,171	975
2104	MERAMEC	4	2.985%	1,778	1,480
2104	MERAMEC	GT1	0.000%	2	2
2104	MERAMEC	GT2	0.000%	3	2
2107	SIOUX	1	3.891%	2,318	1,930
2107	SIOUX	2	3.832%	2,282	1,900
2122	CHILLICOTHE		0.003%	2	2
2123	COLUMBIA	6	0.068%	41	34
2123	COLUMBIA	7	0.073%	44	36
2123	COLUMBIA	8	0.001%	1	—
2132	BLUE VALLEY POWER	3	0.270%	161	134
2132	BLUE VALLEY POWER	GT1	0.000%	—	—
2161	JAMES RIVER	GT1	0.025%	15	12
2161	JAMES RIVER	GT2	0.015%	9	8
2161	JAMES RIVER	3	0.492%	293	244
2161	JAMES RIVER	4	0.604%	360	300
2161	JAMES RIVER	5	1.031%	614	511
2167	NEW MADRID POWER PLANT	1	4.611%	2,747	2,287
2167	NEW MADRID POWER PLANT	2	5.095%	3,035	2,527
2168	THOMAS HILL ENERGY CENTER	MB1	1.891%	1,126	938
2168	THOMAS HILL ENERGY CENTER	MB2	2.792%	1,663	1,385
2168	THOMAS HILL ENERGY CENTER	MB3	6.793%	4,046	3,369
2169	CHAMOIS POWER PLANT	2	0.530%	315	263
6065	IATAN STATION	1	6.699%	3,990	3,322
6074	GREENWOOD ENERGY CENTER	1	0.021%	12	10
6074	GREENWOOD ENERGY CENTER	2	0.020%	12	10
6074	GREENWOOD ENERGY CENTER	3	0.024%	14	12
6074	GREENWOOD ENERGY CENTER	4	0.025%	15	12
6155	RUSH ISLAND	1	4.838%	2,882	2,399

6155	RUSH ISLAND	2	4.613%	2,748	2,287
6195	SOUTHWEST	1	2.248%	1,339	1,115
6195	SOUTHWEST	CT1A	0.005%	3	2
6195	SOUTHWEST	CT1B	0.005%	3	2
6195	SOUTHWEST	CT2A	0.005%	3	2
6195	SOUTHWEST	CT2B	0.005%	3	2
6223	EMPIRE	3A	0.004%	2	2
6223	EMPIRE	3B	0.004%	2	2
6223	EMPIRE	4A	0.003%	2	2
6223	EMPIRE	4B	0.003%	2	2
6563	EMPIRE—ENERGY□CENTER 1		0.036%	21	18
6563	EMPIRE—ENERGY□CENTER 2		0.031%	19	16
6650	MEXICO		0.003%	2	2
6651	MOBERLY		0.002%	2	1
6652	MOREAU		0.003%	2	2
6768	SIKESTON	1	2.612%	1,556	1,295
7296	STATE LINE UNIT 1	1	0.131%	78	65
7296	STATE LINE UNIT 1	2-1	0.204%	122	101
7296	STATE LINE UNIT 1	2-2	0.256%	153	127
7604	ST. FRANCIS POWER PL	1	0.155%	92	77
7604	ST. FRANCIS POWER PL	2	0.117%	70	58
7749	ESSEX POWER PLANT	1	0.018%	11	9
7754	NODAWAY POWER PLANT	1	0.019%	11	9
7754	NODAWAY POWER PLANT	2	0.018%	11	9
7848	HOLDEN POWER PLANT	1	0.004%	2	2
7848	HOLDEN POWER PLANT	2	0.006%	4	3
7848	HOLDEN POWER PLANT	3	0.004%	2	2
7903	MCCARTNEY	MGS1A	0.002%	1	1
7903	MCCARTNEY	MGS1B	0.002%	1	1
7903	MCCARTNEY	MGS2A	0.002%	1	1
7903	MCCARTNEY	MGS2B	0.002%	1	1
7964	PENO CREEK ENERGY CTR	CT1A	0.003%	2	1
7964	PENO CREEK ENERGY CTR	CT1B	0.003%	2	1
7964	PENO CREEK ENERGY CTR	CT2A	0.003%	2	1
7964	PENO CREEK ENERGY CTR	CT2B	0.003%	2	1
7964	PENO CREEK ENERGY CTR	CT3A	0.003%	2	1
7964	PENO CREEK ENERGY CTR	CT3B	0.003%	2	1
7964	PENO CREEK ENERGY CTR	CT4A	0.003%	1	1
7964	PENO CREEK ENERGY CTR	CT4B	0.002%	1	1
8567	HIGGINSVILLE		0.006%	3	3
55178	MEP PLEASANT HILL	CT-1	0.166%	99	82
55178	MEP PLEASANT HILL	CT-2	0.153%	91	76
55234	AUDRAIN GENERATING	CT1	0.001%	1	1
55234	AUDRAIN GENERATING	CT2	0.001%	1	—
55234	AUDRAIN GENERATING	CT3	0.001%	1	—
55234	AUDRAIN GENERATING	CT4	0.001%	1	—
55234	AUDRAIN GENERATING	CT5	0.001%	1	1
55234	AUDRAIN GENERATING	CT6	0.000%	—	—
55234	AUDRAIN GENERATING	CT7	0.000%	—	—
55234	AUDRAIN GENERATING	CT8	0.001%	—	—
55447	COLUMBIA ENERGY CTR	CT01	0.001%	1	1
55447	COLUMBIA ENERGY CTR	CT02	0.001%	1	1
55447	COLUMBIA ENERGY CTR	CT03	0.001%	1	—
55447	COLUMBIA ENERGY CTR	CT04	0.001%	—	—
	Energy Efficiency/Renewable Energy set aside			300	300
	Total		100.000%	59,871	49,892

C. Any unit subject to section (1) of this rule other than those listed in Table I of this subsection will not be allocated NO_x budget allowances under this rule.

D. *Reserved.*

E. Any person seeking set-aside allowances for energy efficiency and renewable generation projects shall meet the requirements of subparagraph (3)(B)2.E. of this rule.

(I) The purpose for establishing this set-aside is to allocate allowances to serve as incentives for saving or generating electricity through the implementation of energy efficiency and renewable generation projects as defined in this section.

(a) Each energy efficiency and renewable generation set-aside shall contain the number of NO_x allowances as provided in Table I of this subsection.

(b) Awards of allowances will be available only to eligible energy efficiency or renewable generation projects that—

I. Commence operation after September 1, 2005;

II. Reduce electricity use, generate electricity from renewable resources or provide combined heat and power benefits during the twelve (12)-month energy efficiency/renewable energy project period of January 1, 2008 through December 31, 2008 or subsequent twelve (12)-month energy efficiency/renewable energy project periods; and

III. In an application submitted by March 1 of each year, include adequate documentation of these energy savings, renewable energy generation or combined heat and power benefits.

(c) Projects will be awarded allowances for the control period following the twelve (12)-month energy efficiency/
renewable energy project period during which the qualifying project activities took place. For example, sponsors of project activities that take place during the twelve (12)-month energy efficiency/renewable energy project period of January 1, 2008 through December 31, 2008 will receive allowances for the 2009 control period.

(d) Eligible projects located in Missouri may qualify for awards from the set-aside for up to seven (7) consecutive control periods. Eligible projects located outside Missouri may qualify for awards for up to five (5) consecutive control periods.

(e) Department actions on applications for awards from the set-aside. The department shall act upon applications as follows:

I. By May 31 of the control period for which NO_x allowances are requested, the department shall take the following actions:

a. For each application, the department shall determine whether the project is eligible and the application is complete and shall notify the applicant of its determination; and

b. For the eligible and complete applications, the department shall calculate the total number of allowances which the projects are qualified to receive, not to exceed the total number of allowances allocated to the set-aside as provided in Table I of this subsection, and shall award said allowances to eligible energy efficiency or renewable generation projects.

II. If the number of allowances awarded is fewer than allowances allocated to the set-aside as provided in Table I of this subsection, the department shall transfer surplus allowances to the accounts of the electric utilities listed in Table I of this subsection on a pro rata basis in the same proportion as allocations to NO_x budget units set forth in Table I of this subsection.

III. If the number of allowances claimed for award is more than allowances allocated to the set-aside as provided in Table I of this subsection, the department shall allocate awards to sponsors of eligible projects as follows:

a. Up to the first one hundred fifty (150) allowances in the set-aside shall be awarded for eligible projects located in Missouri, as follows. Up to the first sixty (60) allowances shall be awarded for eligible energy efficiency projects in the order that the projects first achieved eligible status. The remaining allowances shall be awarded for eligible projects located in Missouri in the order the projects first achieved eligible status, regardless of the type of project; and

b. The remaining allowances in the set-aside shall be awarded for eligible projects on a pro rata basis in proportion to total remaining claims for awards, regardless of project location.

(II) Project eligibility. Allocations from the energy efficiency and renewable generation set-aside may be requested by any entity, including an electric utility listed in Table I of this subsection or its affiliate, that implements and demonstrates eligible projects as defined in this subparagraph.

(a) Eligibility requirements. The department shall establish requirements for project eligibility and shall determine which projects are eligible to receive awards from the set-aside.

(b) Only the following shall be eligible for awards from the set-aside:

I. Energy efficiency projects resulting in reduced or more efficient electricity use through the voluntary installation, replacement, or modification of equipment, fixtures, or materials in a building or facility.

a. Energy efficiency projects may be directed toward or located within buildings or facilities owned, leased, operated or controlled by an electric utility listed in Table I of this subsection or its affiliate. Eligibility requirements for these projects shall be the same as for any other energy efficiency project.

b. Energy efficiency projects may include demand-side programs that result in reduced or more efficient electricity use;

II. Renewable generation projects, includes electric generation from wind, photovoltaic systems, biogas and hydropower projects. Renewable generation projects do not include nuclear power projects. Eligible biogas

projects include projects to generate electricity from methane gas captured from sanitary landfills, wastewater treatment plants, sewage treatment plants or agricultural livestock waste treatment systems. Eligible hydropower projects are restricted to systems—

a. That are certified by the Low Impact Hydropower Institute;

b. That employ a head of ten feet (10') or less; or

c. Employing a head greater than ten feet (10') that make use of a dam that existed prior to the effective date of this rule;

III. Renewable biomass generation projects include projects in which one (1) or more biomass fuels is fired separately or co-fired with one (1) or more fossil fuels to generate electricity. Biomass includes wood and wood waste, energy crops such as switchgrass and agricultural wastes such as crop and animal waste. Electric generation from combustion of municipal solid waste is not included; and

IV. Combined heat and power (CHP) projects that use integrated technologies, including cogeneration, which convert fuel to electric, thermal, and mechanical energy for on-site or local use. In the case of electricity generation, combined heat and power can include export of power to the local electric utility transmission grid. The thermal energy from combined heat and power systems can be created and used in the form of steam, hot or chilled water for process, space heating or cooling, or other applications. To be eligible, the combined heat and power installation must meet or exceed technology-specific efficiency thresholds that will be established by the department.

(c) Additional eligibility requirements shall include the following:

I. Project information must be submitted on forms provided by the department. After the effective date of this rule, any revision to the department-supplied forms will be presented to the regulated community for a forty-five (45)-day comment period;

II. Only projects that are not required by federal government regulation and that are not and will not be used to generate compliance or permitting credits otherwise in the state implementation plan (SIP) are eligible to receive allowances from the set-aside;

III. Only electricity generation or savings that are not the basis for an award of CAIR annual NO_x allowance from a set-aside in another state's CAIR annual NO_x rule can be the basis for a claim from the Missouri set-aside;

IV. Only projects that equal at least one (1) ton of NO_x emissions, using conventional arithmetic rounding, are eligible to receive allowances from the set-aside. Multiple projects may be aggregated into a single allowance allocation request to equal one (1) or more tons of NO_x emissions;

V. Only projects that commence operation after September 1, 2005, are eligible to receive allowances from the set-aside;

VI. Sponsors must establish a compliance account or general account in EPA's NO_x Allowance Tracking System (NATS). The application for an award from the set-aside must be submitted to the department by the CAIR authorized account representative or alternate CAIR authorized account representative for the compliance account or general account; and

VII. Location of eligible projects.

a. To be eligible, an energy efficiency project or combined heat and power project must be located within Missouri.

b. To be eligible, a renewable generation project or biomass generation project may be located within or outside of Missouri and must meet the following criteria:

(i) The number of allowances awarded to a renewable generation project or biomass generation project located within or outside of Missouri shall be calculated based on the amount of power the facility delivers to Missouri end-use customers. The sponsor must certify and demonstrate the amount of power from the renewable generation project or biomass generation project that is delivered to Missouri end-use customers; and

(ii) If the renewable generation project or biomass generation project is located outside of Missouri, the project must be sponsored by a Missouri electric generation and transmission cooperative, a Missouri electric distribution utility or the affiliate of a Missouri electric distribution utility. For the purpose of this rule, "affiliate" shall be defined as in 4 CSR 240-20.010.

(d) Pre-application project review. Sponsors of new energy efficiency/renewable energy projects must submit a request for pre-application project review by March 31 of the year prior to the control period for which set-aside awards will be claimed. For example, a project sponsor intending to apply for an award of 2009 control period allowances must request a pre-application project review by March 31, 2008, and may request the review at any time prior to that date. Pre-application project reviews will cover eligibility requirements and proposed measurement and verification procedures. The request for pre-application project review must be submitted on forms provided by the department. After the effective date of this rule, any revision to the department-supplied forms will be presented to the regulated community for a forty-five (45)-day comment period;

(e) Eligibility for any project may be claimed by only one (1) entity. The department shall determine procedures to be followed if multiple claims of eligibility for the same project are received.

(III) Applications and calculations of awards. To qualify for an award of allowances from the set-aside an applicant must meet the following requirements:

(a) The project must be eligible as provided in part (3)(B)2.E.(II) of this rule;

(b) By March 1 following the twelve (12)-month energy efficiency/renewable energy project period during which the eligible project activities occurred, the department must receive a complete application that meets the following requirements:

I. The application shall be prepared on forms provided by the department and must be submitted by the project's CAIR authorized account representative or alternate CAIR authorized account representative. After the effective date of this rule, any revision to the department-supplied forms will be presented to the regulated community for a forty-five (45)-day comment period;

II. The applicant must demonstrate electricity savings or renewable generation and calculate the NO_x allowance award requested using methods that adhere to measurement and verification standards approved by the department. The department shall have the right to require verification of data and calculations that are presented in an application as a condition for awarding allowances to the applicant. Verification may include site visits by agents of the department; and

III. If the applicant intends to reapply in subsequent years, the application must indicate the stream of benefits that is expected in subsequent years;

(c) The department shall determine methods for calculating awards of allowances based upon the following principles:

I. Allowances awarded to end-use electrical energy efficiency projects shall be calculated as the number of MWh of electricity saved during a twelve (12)-month energy efficiency/renewable energy project period multiplied by an emissions factor of 1.5 pounds of NO_x per MWh appropriately converted and rounded to tons using conventional arithmetic rounding. The department shall provide a factor to adjust the calculation of electricity saved to account for transmission and distribution line losses;

II. Allowances awarded to renewable generation projects from wind, photovoltaic systems, biogas and hydropower projects shall be calculated as the number of MWh of electricity generated during a twelve (12)-month energy efficiency/renewable energy project period multiplied by an emissions factor of 1.5 pounds of NO_x per MWh appropriately converted and rounded to tons using conventional arithmetic rounding;

III. Allowances awarded to renewable biomass generation projects shall be calculated based on net NO_x emission reductions, appropriately converted and rounded to tons using conventional arithmetic rounding where—

a. Net NO_x emissions shall be calculated as the number of MWh of electricity generated during a twelve (12)-month energy efficiency/renewable energy project period multiplied by an emissions factor of 1.5 pounds of NO_x per MWh, minus the tons of NO_x emitted by the renewable generating project during the twelve (12)-month energy efficiency/renewable energy project period; and

b. When biomass is co-fired with other fuels, its share of electric generation and NO_x emissions shall be calculated based on its share of the total heat content of all fuels used in the co-firing process; and

IV. Allowances awarded to combined heat and power (CHP) projects shall be calculated based on the difference between actual NO_x emissions from the CHP system and the NO_x emissions that would be emitted by an equivalent business-as-usual (BAU) system. An equivalent BAU system consists of a conventional power plant that produces electricity plus a conventional industrial boiler that produces useful heat (heat used for space, water or industrial process heat). The department shall provide efficiency and NO_x emission rates to be used in calculating NO_x emissions from the equivalent BAU system. In addition, to qualify for an award, a CHP system shall be required to achieve an efficiency threshold. The threshold shall be set by the department and the efficiency of the CHP system shall be calculated based on a method provided by the department; and

(d) The sponsor of a project located in Missouri that receives an award from the set-aside may reapply for set-aside awards for up to an additional six (6) consecutive control periods by meeting the following requirements. The sponsor of a project located outside of Missouri that receives an award from the set-aside may reapply for set-aside awards for up to an additional four (4) consecutive control periods by meeting the following requirements:

I. Reapplication must be received by March 1 following the last day of the twelve (12)-month energy efficiency/
renewable energy project period during which the energy efficiency and renewable electric generation activities took place; and

II. The reapplication must be prepared on forms provided by the department and must be submitted by the project's CAIR authorized account representative or alternate CAIR authorized account representative. After the effective date of this rule, any revision to the department-supplied forms will be presented to the regulated community for a forty-five (45)-day comment period;

3. Compliance supplement pool.

A. For any CAIR NO_x unit in the state that achieves NO_x emission reductions in 2007 and 2008 that are not necessary to comply with any state or federal emissions limitation applicable during such years, the CAIR designated representative of the unit may request early reduction credits, and allocation of CAIR NO_x allowance**s** from the compliance supplement pool in accordance with the following:

(I) The owners and operators of such CAIR NO_x unit shall monitor and report the NO_x emissions rate and the heat input of the unit in accordance with section (4) of this rule in each calendar year for which early reduction credit is requested;

(II) The CAIR designated representative of such CAIR NO_x unit shall submit to the permitting authority by May 1, 2009 a request, in a format specified by the permitting authority, for allocation of an amount of CAIR NO_x allowances from the compliance supplement pool not exceeding the sum of the amounts (in tons) of the unit's NO_x

emission reductions in 2007 and 2008 that are not necessary to comply with any state or federal emissions limitation applicable during such years, determined in accordance with section (4) of this rule; and

(III) For units subject to the Acid Rain Program that do not have an applicable NO_x emission limit, the Acid Rain Program NO_x emission rate limit that would have applied had the unit been limited by Acid Rain Program NO_x requirements or state emission rate limit shall be utilized to determine the number of potential CAIR NO_x allowances those units may receive.

B. For any CAIR NO_x unit in the state whose compliance with CAIR NO_x emissions limitation for the calendar year 2009 would create an undue risk to the reliability of electricity supply during such calendar year, the CAIR designated representative of the unit may request the allocation of CAIR NO_x allowances from the compliance supplement pool in accordance with the following:

(I) The CAIR designated representative of such CAIR NO_x unit shall submit to the permitting authority by May 1, 2009 a request, in a format specified by the permitting authority, for allocation of an amount of CAIR NO_x allowances from the compliance supplement pool not exceeding the minimum amount of CAIR NO_x allowances necessary to remove such undue risk to the reliability of electricity supply; and

(II) In the request under paragraph (3)(B)3. of this rule, the CAIR designated representative of such CAIR NO_x unit shall demonstrate that, in the absence of allocation to the unit of the amount of CAIR NO_x allowances requested, the unit's compliance with CAIR NO_x emissions limitation for the calendar year 2009 would create an undue risk to the reliability of electricity supply during such calendar year. This demonstration must include a showing that it would not be feasible for the owners and operators of the unit to:

(a) Obtain a sufficient amount of electricity from other electricity generation facilities, during the installation of control technology at the unit for compliance with the CAIR NO_x emissions limitation, to prevent such undue risk; or

(b) Obtain under subparagraphs (3)(B)3.A. and C. of this rule, or otherwise obtain, a sufficient amount of CAIR NO_x allowances to prevent such undue risk.

C. The permitting authority will review each request under subparagraphs (3)(B)3.A. and B. of this rule submitted by May 1, 2009 and will allocate CAIR NO_x allowances for the calendar year 2009 to CAIR NO_x units in the state and covered by such request as follows:

(I) Upon receipt of each such request, the permitting authority will make any necessary adjustments to the request to ensure that the amount of the CAIR NO_x allowances requested meets the requirements of subparagraph (3)(B)3.A. or B. of this rule;

(II) If the total amount of CAIR NO_x allowances in all requests (as adjusted under part (3)(B)3.C.(I) of this rule) is not more than nine thousand forty-four (9,044), the permitting authority will allocate to each CAIR NO_x unit covered by such requests the amount of CAIR NO_x allowances requested (as adjusted under part (3)(B)3.C.(I) of this rule); and

(III) If the total amount of CAIR NO_x allowances in all requests (as adjusted under part (3)(B)3.C.(I) of this rule) is more than nine thousand forty-four (9,044), the permitting authority will allocate CAIR NO_x allowances to each CAIR NO_x unit covered by such requests as follows:

(a) The compliance supplement pool shall be divided into two (2) pools of three thousand fifteen (3,015) allowances and six thousand twenty-nine (6,029) allowances each;

(b) Units located in Buchanan, Jackson or Jasper County that combust at least one hundred thousand (100,000) passenger tire equivalents in each of 2007 and 2008 shall be eligible to request CAIR NO_x allowances from the smaller pool;

(c) CAIR NO_x allowances from the smaller pool shall be allocated according to the following formula:

Unit's allocation = Unit's adjusted allocation × (3,015/Total adjusted allocations for eligible units)

Where:
"Unit's allocation" is the number of CAIR NO_x allowances allocated to the unit from the state's compliance supplement pool.
"Unit's adjusted allocation" is the amount of CAIR NO_x allowances requested for the unit under subparagraphs (3)(B)3.A. and B. of this rule, as adjusted under part (3)(B)3.C.(I) of this rule.
"Total adjusted allocations for eligible units" is the sum of the amounts of allocations requested under subparagraphs (3)(B)3.A. and B. of this rule, as adjusted under paragraph (3)(B)1. of this rule by the units identified in subpart (3)(B)3.C.(III)(b) of this rule.

(d) Units that receive CAIR NO_x allowances from the smaller portion of the compliance supplement pool shall not be eligible to receive CAIR NO_x allowances from the remaining portion of the compliance supplement pool; and

(e) Any CAIR NO_x allowances not allocated under subpart (3)(C)3.C. (III)(c) shall be added to the pool of six thousand twenty-nine (6,029) allowances and allocated according to the following formula:

Unit's allocation = Unit's adjusted allocation × ((6,029 + Remainder from first allocation)/Total adjusted allocations for eligible units)

Where:

“Unit’s allocation” is the number of CAIR NO_x allowances allocated to the unit from the state’s compliance supplement pool.
“Unit’s adjusted allocation” is the amount of CAIR NO_x allowances requested for the unit under subparagraphs (3)(B)3.A. and B. of this rule, as adjusted under part (3)(B)3.C.(I) of this rule.
“Remainder from first allocation” is the amount of CAIR NO_x allowances from the smaller pool not allocated under subparagraph (3)(C)3.C.
“Total adjusted allocations for eligible units” is the sum of the amounts of allocations requested for all units under subparagraphs (3)(B)3.A. and B. of this rule, as adjusted under part (3)(B)3.C.(I) of this rule by units that were not allocated CAIR NO_x allowances under subparagraph (3)(C)3.C. of this rule; and

4. By November 30, 2009, the permitting authority will determine, and submit to the administrator, the allocations under subparagraphs (3)(B)3.B. and (3)(B)3.C. of this rule; and

5. By January 1, 2010, the administrator will record the allocations under subparagraphs (3)(B)3.B. and (3)(B)3.C. of this rule.

(4) Reporting and Record Keeping. Unless otherwise noted in this section of the rule, all of the sections of 40 CFR 96 subpart HH promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(5) Test Methods. *(Not Applicable)*

AUTHORITY: section 643.050, RSMo 2000. Original rule filed Oct. 2, 2006, effective May 30, 2007.*

**Original authority: 643.050, RSMo 1965, amended 1972, 1992, 1993, 1995.*

10 CSR 10-6.364 Clean Air Interstate Rule Seasonal NO_x Trading Program

PURPOSE: This rule adopts the U.S. Environmental Protection Agency's (EPA) regional trading program for nitrogen oxides, which was developed to meet the requirements of the Clean Air Interstate Rule. The evidence supporting the need for this proposed rulemaking, per section 536.016, RSMo, is the U.S. Environmental Protection Agency's Clean Air Interstate Rule published on May 12, 2005.

PUBLISHER'S NOTE: The secretary of state has determined that the publication of the entire text of the material which is incorporated by reference as a portion of this rule would be unduly cumbersome or expensive. This material as incorporated by reference in this rule shall be maintained by the agency at its headquarters and shall be made available to the public for inspection and copying at no more than the actual cost of reproduction. This note applies only to the reference material. The entire text of the rule is printed here.

(1) Applicability.

(A) Except as provided in subsection (1)(B) of this rule—

1. The following units in this state shall be Clean Air Interstate Rule (CAIR) nitrogen oxides (NO_x) Ozone Season units, and any source that includes one or more such units shall be a CAIR NO_x Ozone Season source, subject to the requirements of this rule: any stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine serving at any time, since the later of November 15, 1990 or the startup of the unit's combustion chamber, a generator with nameplate capacity of more than twenty-five (25) megawatts electric (MWe) producing electricity for sale; and

2. If a stationary boiler or stationary combustion turbine that, under paragraph (1)(A)1. of this rule, is not a CAIR NO_x Ozone Season unit begins to combust fossil fuel or to serve a generator with nameplate capacity of more than twenty-five (25) MWe producing electricity for sale, the unit shall become a CAIR NO_x Ozone Season unit as provided in paragraph (1)(A)1. of this rule on the first date on which it both combusts fossil fuel and serves such generator; or

3. Units in Bollinger, Butler, Cape Girardeau, Carter, Clark, Crawford, Dent, Dunklin, Franklin, Gasconade, Iron, Jefferson, Lewis, Lincoln, Madison, Marion, Mississippi, Montgomery, New Madrid, Oregon, Pemiscot, Perry, Pike, Ralls, Reynolds, Ripley, St. Charles, St. Francois, St. Louis, Ste. Genevieve, Scott, Shannon, Stoddard, Warren, Washington and Wayne counties and the City of St. Louis which are not CAIR NO_x Ozone Season units under paragraphs (1)(A)1., (1)(A)2. and (1)(B) shall be Clean Air Interstate Rule (CAIR) nitrogen oxides (NO_x) Ozone Season units, and any source that includes one (1) or more such units shall be a CAIR NO_x Ozone Season source if**—**

A. Electric generating units that serve a generator with a nameplate capacity greater than twenty-five megawatts (25 MW) and—

(I) For non-cogeneration units—

(a) Commenced operation before January 1, 1997, and served a generator producing electricity for sale under a firm contract to the electric grid during 1995 or 1996; or

(b) Commenced operation in 1997 or 1998 and served a generator producing electricity for sale under a firm contract to the electric grid during 1997 or 1998; or

(c) Commenced operation on or after January 1, 1999, and served or serves at any time a generator producing electricity for sale; and

(II) For cogeneration units—

(a) Commenced operation before January 1, 1997, and failed to qualify as an unaffected unit under 40 CFR 72.6(b)(4) for 1995 or 1996 under the Acid Rain Program; or

(b) Commenced operation in 1997 or 1998 and failed to qualify as an unaffected unit under 40 CFR 72.6(b)(4) for 1997 or 1998 under the Acid Rain Program; or

(c) Commenced operation on or after January 1, 1999, and failed or fails to qualify as an unaffected unit under 40 CFR 72.6(b)(4) for any year under the Acid Rain Program; and

B. Non-electric generating boilers, combined cycle systems, and combustion turbines that have a maximum design heat input greater than two hundred fifty (250) million British thermal units per hour (mmBtu/hr) and—

(I) For non-cogeneration units—

(a) Commenced operations before January 1, 1997, and did not serve a generator producing electricity for sale under a firm contract to the electric grid during 1995 or 1996; or

(b) Commenced operations in 1997 or 1998 and did not serve a generator producing electricity for sale under a firm contract to the electric grid during 1997 or 1998; or

(c) Commenced operation on or after January 1, 1999, and:

I. At no time served or serves a generator producing electricity for sale; or

II. At any time served or serves a generator with a nameplate capacity of twenty-five (25) MW or less producing electricity for sale, and with the potential to use no more than fifty percent (50%) of the potential electrical output capacity of the unit; and

(II) For cogeneration units—

(a) Commenced operation before January 1, 1997, and qualified as an unaffected unit under 40 CFR 72.6(b)(4) for 1995 or 1996 under the Acid Rain Program; or

(b) Commenced operation in 1997 or 1998 and qualified as an unaffected unit under 40 CFR 72.6(b)(4) for 1997 or 1998 under the Acid Rain Program; or

(c) Commenced operation on or after January 1, 1999, and qualified or qualifies as an unaffected unit under 40 CFR 72.6(b)(4) for each year under the Acid Rain Program.

(III) Exemptions. The director shall provide the administrator written notice of the issuance of any permit under section (3) of this rule and, upon request, a copy of the permit. Notwithstanding paragraph (1)(A)3. of this rule, a unit shall not be a CAIR NO_x Ozone Season unit if the unit has a federally enforceable permit that:

(a) Restricts the unit to burning only natural gas or fuel oil;

(b) Restricts the unit's operating hours to the number calculated by dividing twenty-five (25) tons of potential mass emissions by the unit's maximum potential hourly NO_x mass emissions;

(c) Requires that the unit's maximum potential NO_x mass emissions be calculated by multiplying the unit's maximum rated hourly heat input by the highest default NO_x emission rate applicable to the unit under 40 CFR 75.19(c), Table LM-2;

(d) Requires that the owner or operator of the unit shall retain at the source that includes the unit, for five (5) years, records demonstrating that the operating hours restriction, the fuel use restriction, and the other requirements of the permit related to these restrictions were met; and

(e) Requires that the owner or operator of the unit shall report the unit's hours of operation (treating any partial hour of operation as a whole hour of operation) during each control period to the director by November 1 of each year for which the unit is subject to the federally enforceable permit.

(IV) A CAIR NO_x Ozone Season unit may not qualify for an exemption unless the emissions after the exemption do not exceed the lesser of twenty-five (25) tons or the amount of allocations allocated to them. The owner or operator of a CAIR NO_x Ozone Season unit that is allocated CAIR NO_x Ozone Season allowances under section (3) of this rule, which requests an exemption under part (1)(A)3.B.III. of this rule, will surrender to the administrator the CAIR NO_x Ozone Season allowances for the control period after qualifying and every year after for which the exemption remains in place.

(V) Loss of exemption. If, for any control period, the unit does not comply with the fuel use restriction under subpart (1)(A)3.B.(III)(a) of this rule or the operating hours restriction subpart (1)(A)3.B.(III)(b) and subpart (1)(A)3.B.(III)(c) of this rule, or the fuel use or the operating hour restrictions are removed from the unit's federally enforceable permit or otherwise becomes no longer applicable, the unit shall be a NO_x budget unit, subject to the requirements of this rule. Such unit shall be treated as commencing operation and, for a unit under paragraph (1)(A)3. of this rule, commencing commercial operation on September 30 of the control period for which the fuel use restriction or the operating hours restriction is no longer applicable or during which the unit does not comply with the fuel use restriction or the operating hours restriction.

(B) The units in the state that meet the requirements set forth in subparagraph (1)(B)1.A., (1)(B)2.A., or (1)(B)2.B. of this rule shall not be CAIR NO_x Ozone Season units—

1. Cogenerator exemption.

A. Any unit that is a CAIR Ozone Season NO_x unit under paragraph (1)(A)1. or 2. of this rule—

(I) Qualifying as a cogeneration unit during the twelve (12)-month period starting on the date the unit first produces electricity and continuing to qualify as a cogeneration unit; and

(II) Not serving at any time, since the later of November 15, 1990 or the startup of the unit's combustion chamber, a generator with nameplate capacity of more than twenty-five (25) MWe supplying in any calendar year more than one-third of the unit's potential electric output capacity or two hundred nineteen thousand (219,000) megawatt hours (MWh), whichever is greater, to any utility power distribution system for sale.

B. If a unit qualifies as a cogeneration unit during the twelve (12)-month period starting on the date the unit first produces electricity and meets the requirements of subparagraph (1)(B)1.A. of this rule for at least one (1) calendar year, but subsequently no longer meets all such requirements, the unit shall become a CAIR Ozone Season NO_x unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of part (1)(B)1.A.(I) of this rule.

2. Solid waste incinerator exemption.

A. Any unit that is a CAIR NO_x Ozone Season unit under paragraph (1)(A)1. or 2. of this rule commencing operation before January 1, 1985—

(I) Qualifying as a solid waste incineration unit; and

(II) With an average annual fuel consumption of non-fossil fuel for 1985–1987 exceeding eighty percent (80%)(on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any three (3) consecutive calendar years after 1990 exceeding eighty percent (80%)(on a Btu basis).

B. Any unit that is a CAIR NO_x Ozone Season unit under paragraph (1)(A)1. or 2. of this rule commencing operation on or after January 1, 1985—

(I) Qualifying as a solid waste incineration unit; and

(II) With an average annual fuel consumption of non-fossil fuel for the first three (3) calendar years of operation exceeding eighty percent (80%)(on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any three (3) consecutive calendar years after 1990 exceeding eighty percent (80%)(on a Btu basis).

C. If a unit qualifies as a solid waste incineration unit and meets the requirements of subparagraph (1)(B)2.A. or B. of this rule for at least three (3) consecutive calendar years, but subsequently no longer meets all such requirements, the unit shall become a CAIR NO_x Ozone Season unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a solid waste incineration unit or January 1 after the first three (3)

consecutive calendar years after 1990 for which the unit has an average annual fuel consumption of fossil fuel of twenty percent (20%) or more.

(C) Retired Unit Exemption. Unless otherwise noted in this section of the rule, all of the sections of 40 CFR 96.305 promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(2) Definitions.

(A) Definitions for key words and phrases used in this rule may be found in sections 40 CFR 96.302 and 96.303 of 40 CFR 96 subpart AAAA promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(B) Definitions for key words and phrases used in paragraph (1)(A)3. of this rule may be found in sections 40 CFR 97.2 subpart A promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(C) Cogenerator—(for the purposes of paragraph (1)(A).3. of this rule) A cogeneration facility which:

1. For a unit that commenced construction on or prior to November 15, 1990, was constructed for the purpose of supplying equal to or less than one-third its potential electrical output capacity or equal to or less than two hundred nineteen thousand (219,000) MWe-hrs actual electric output on an annual basis to any utility power distribution system for sale (on a gross basis). If the purpose of construction is not known, the administrator will presume that actual operation from 1985 through 1987 is consistent with such purpose. However, if in any three (3) calendar year period after November 15, 1990, such unit sells to a utility power distribution system an annual average of more than one-third of its potential electrical output capacity and more than two hundred nineteen thousand (219,000) MWe-hrs actual electric output (on a gross basis), that unit shall be an affected unit, subject to the requirements of the Acid Rain Program; or

2. For units which commenced construction after November 15, 1990, supplies equal to or less than one-third its potential electrical output capacity or equal to or less than two hundred nineteen thousand (219,000) MWe-hrs actual electric output on an annual basis to any utility power distribution system for sale (on a gross basis). However, if in any three (3) calendar year period after November 15, 1990, such unit sells to a utility power distribution system an annual average of more than one-third of its potential electrical output capacity and more than two hundred nineteen thousand (219,000) MWe-hrs actual electric output (on a gross basis), that unit shall be an affected unit, subject to the requirements of the Acid Rain Program.

(D) Definitions of certain terms specified in this rule, other than those defined in this rule section, may be found in 10 CSR 10-6.020.

(3) General Provisions.

(A) Unless otherwise noted in this section, 40 CFR 96.306, 96.307, and 96.308 as well as all of the sections of 40 CFR 96 subparts BBBB, CCCC, DDDD, FFFF, GGGG, and IIII promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(B) CAIR NO_x Ozone Season Allowances.

1. Timing requirements for CAIR NO_x Ozone Season Allowance allocations.

A. By October 31, 2006, the permitting authority will submit to the administrator the CAIR NO_x Ozone Season Allowance allocations, in a format prescribed by the administrator, for the control periods in 2009, 2010, 2011, 2012, 2013, and 2014 consistent with the allocations established in Table I and Table II of this subsection.

B. By October 31, 2006, the permitting authority will submit to the administrator the CAIR NO_x Ozone Season Allowance allocations, in a format prescribed by the administrator, for the control period beginning 2015 and extending through ten (10) control periods consistent with the allocations established in Table I and Table II of this subsection.

C. By October 31, 2015 and October 31 of every tenth year following, the permitting authority will submit to the administrator CAIR NO_x Ozone Season Allowance allocations, in a format prescribed by the administrator, for the control period ten (10) years in the future and extending through ten (10) control periods consistent with Table I and Table II of this subsection.

2. CAIR NO_x Ozone Season Allowance allocations.

A. The state trading program NO_x budget allocated by the director under subparagraphs (3)(B)2.B. and (3)(B)2.C. of this rule for a control period will equal twenty-six thousand seven hundred thirty-seven (26,737) tons for 2009-2014 and twenty-two thousand two hundred ninety (22,290) tons for 2015 and beyond.

B. The following CAIR NO_x ozone season units shall be allocated NO_x allowances for each control period in accordance with Table I of subparagraph (3)(B)2.B. of this rule._

Table I

Facility ID	Facility Name	Unit ID	Portion Statewide Pool	NO_x Allocation 2009–2014	NO_x Allocation 2015 and beyond
2076	ASBURY	1	1.85%	493	410
2079	HAWTHORN STATION	5A	5.51%	1,469	1,224
2079	HAWTHORN STATION	6	0.09%	25	21
2079	HAWTHORN STATION	7	0.05%	13	11
2079	HAWTHORN STATION	8	0.04%	11	9
2079	HAWTHORN STATION	9	0.23%	62	51
2080	MONTROSE STATION	1	1.53%	408	340
2080	MONTROSE STATION	2	1.55%	414	345
2080	MONTROSE STATION	3	1.63%	435	363
2081	NORTHEAST #11		0.01%	2	2
2081	NORTHEAST #12		0.01%	2	1
2081	NORTHEAST #13		0.02%	4	3
2081	NORTHEAST #14		0.01%	3	3
2081	NORTHEAST #15		0.01%	3	2
2081	NORTHEAST #16		0.01%	2	2
2081	NORTHEAST #17		0.01%	4	3
2081	NORTHEAST #18		0.01%	3	3
2082	FAIRGROUNDS		0.01%	2	2
2092	RALPH GREEN		0.03%	8	7
2094	SIBLEY	1	0.52%	138	115
2094	SIBLEY	2	0.50%	135	112
2094	SIBLEY	3	3.31%	884	737
2096	AMEREN VIADUCT		0.00%	—	—
2098	LAKE ROAD	6	0.86%	231	192
2098	LAKE ROAD (GAS TURBINE)	5	0.02%	5	4
2102	HOWARD BEND CT		0.00%	1	1
2103	LABADIE	1	4.57%	1,220	1,017
2103	LABADIE	2	4.84%	1,292	1,076
2103	LABADIE	3	5.19%	1,384	1,153
2103	LABADIE	4	4.81%	1,283	1,069
2104	MERAMEC	1	1.25%	333	278
2104	MERAMEC	2	1.14%	305	254
2104	MERAMEC	3	1.98%	529	441
2104	MERAMEC	4	2.89%	770	641
2104	MERAMEC	GT1		—	—
2107	SIOUX	1	3.68%	981	817
2107	SIOUX	2	3.68%	982	818
2122	CHILLICOTHE		0.01%	2	2
2123	COLUMBIA	6	0.09%	24	20
2123	COLUMBIA	7	0.10%	28	23
2123	COLUMBIA	8	0.00%	1	—
2132	BLUE VALLEY POWER	3	0.31%	84	70
2132	BLUE VALLEY POWER	GT1	0.00%	—	—
2161	JAMES RIVER	GT1	0.05%	13	11
2161	JAMES RIVER	GT2	0.03%	9	7
2161	JAMES RIVER	3	0.48%	129	108
2161	JAMES RIVER	4	0.62%	164	137
2161	JAMES RIVER	5	1.07%	285	238
2167	NEW MADRID POWER PLA	1	4.76%	1,271	1,059
2167	NEW MADRID POWER PLA	2	4.94%	1,318	1,098
2168	THOMAS HILL ENERGY C	MB1	1.90%	506	422
2168	THOMAS HILL ENERGY C	MB2	2.73%	729	608
2168	THOMAS HILL ENERGY C	MB3	6.63%	1,769	1,474
2169	CHAMOIS POWER PLANT	2	0.52%	138	115
6065	IATAN STATION	1	7.04%	1,877	1,564
6074	GREENWOOD ENERGY CENT	1	0.04%	10	9
6074	GREENWOOD ENERGY CENT	2	0.04%	10	8
6074	GREENWOOD ENERGY CENT	3	0.04%	12	10
6074	GREENWOOD ENERGY CENT	4	0.04%	11	9
6155	RUSH ISLAND	1	5.05%	1,346	1,122
6155	RUSH ISLAND	2	4.58%	1,221	1,018

6195	SOUTHWEST	1	2.28%	609	507
6195	SOUTHWEST	CT1A	0.01%	3	2
6195	SOUTHWEST	CT1B	0.01%	3	2
6195	SOUTHWEST	CT2A	0.01%	2	2
6195	SOUTHWEST	CT2B	0.01%	2	2
6223	EMPIRE	3A	0.01%	2	2
6223	EMPIRE	3B	0.01%	2	2
6223	EMPIRE	4A	0.01%	2	2
6223	EMPIRE	4B	0.01%	2	2
6563	EMPIRE—ENERGY CENTER 1		0.06%	16	13
6563	EMPIRE—ENERGY CENTER 2		0.04%	9	8
6650	MEXICO		0.00%	1	1
6651	MOBERLY		0.00%	1	1
6652	MOREAU		0.01%	2	1
6768	SIKESTON	1	2.62%	698	582
7296	STATE LINE UNIT 1	1	0.17%	46	38
7296	STATE LINE UNIT 1	2-1	0.32%	85	71
7296	STATE LINE UNIT 1	2-2	0.37%	98	82
7604	ST. FRANCIS POWER PL	1	0.21%	55	46
7604	ST. FRANCIS POWER PL	2	0.18%	49	41
7749	ESSEX POWER PLANT	1	0.03%	9	8
7754	NODAWAY POWER PLANT	1	0.04%	10	8
7754	NODAWAY POWER PLANT	2	0.03%	9	7
7848	HOLDEN POWER PLANT	1	0.01%	2	2
7848	HOLDEN POWER PLANT	2	0.01%	3	3
7848	HOLDEN POWER PLANT	3	0.01%	3	2
7903	MCCARTNEY	MGS1A	0.00%	1	1
7903	MCCARTNEY	MGS1B	0.00%	1	1
7903	MCCARTNEY	MGS2A	0.00%	1	1
7903	MCCARTNEY	MGS2B	0.00%	1	1
7964	PENO CREEK ENERGY CTR	CT1A	0.01%	2	1
7964	PENO CREEK ENERGY CTR	CT1B	0.01%	1	1
7964	PENO CREEK ENERGY CTR	CT2A	0.01%	2	1
7964	PENO CREEK ENERGY CTR	CT2B	0.01%	2	1
7964	PENO CREEK ENERGY CTR	CT3A	0.01%	1	1
7964	PENO CREEK ENERGY CTR	CT3B	0.01%	1	1
7964	PENO CREEK ENERGY CTR	CT4A	0.01%	1	1
7964	PENO CREEK ENERGY CTR	CT4B	0.00%	1	1
8567	HIGGINSVILLE		0.01%	3	3
55178	MEP PLEASANT HILL	CT-1	0.28%	75	63
55178	MEP PLEASANT HILL	CT-2	0.25%	67	56
55234	AUDRAIN GENERATING	CT1	0.00%	1	—
55234	AUDRAIN GENERATING	CT2	0.00%	—	—
55234	AUDRAIN GENERATING	CT3	0.00%	—	—
55234	AUDRAIN GENERATING	CT4	0.00%	—	—
55234	AUDRAIN GENERATING	CT5	0.00%	—	—
55234	AUDRAIN GENERATING	CT6	0.00%	—	—
55234	AUDRAIN GENERATING	CT7	0.00%	—	—
55234	AUDRAIN GENERATING	CT8	0.00%	—	—
55447	COLUMBIA ENERGY CTR	CT01	0.00%	1	1
55447	COLUMBIA ENERGY CTR	CT02	0.00%	—	—
55447	COLUMBIA ENERGY CTR	CT03	0.00%	—	—
55447	COLUMBIA ENERGY CTR	CT04	0.00%	—	—
	Total		100.00%	26,678	22,231

C. The following existing non-electric generating unit (EGU) boilers shall be allocated NOx allowances for each control period in accordance with Table II of subparagraph (3)(E)2.C of this rule.

Table II

Non-EGUs Boilers Per Ozone Season	**Unit**	**NO_x Allocation per Unit Tons**
Anheuser Busch	6	14
Trigen Ashley Street Station Boiler	5	9
Trigen Ashley Street Station Boiler	6	36

D. Any unit subject to subsection (1)(B) of this rule, other than those listed in Tables I and II of this subsection, will not be allocated CAIR NO_x Ozone Season Allowances under this rule.

(4) Reporting and Record Keeping. Unless otherwise noted in this section, all of the sections of 40 CFR 96 subpart HHHH promulaged as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(5) Test Methods. *(Not Applicable)*

AUTHORITY: section 643.050, RSMo 2000. Original rule filed Oct. 2, 2006, effective May 30, 2007.

**Original authority: 643.050, RSMo 1965, amended 1972, 1992, 1993, 1995.*

10 CSR 10-6.366 Clean Air Interstate Rule SO_2 Trading Program

PURPOSE: This rule adopts the U.S. Environmental Protection Agency's (EPA) regional trading program for sulfur dioxide, which was developed to meet the requirements of the Clean Air Interstate Rule. The evidence supporting the need for this proposed rulemaking, per section 536.016, RSMo, is the U.S. Environmental Protection Agency's Clean Air Interstate Rule published on May 12, 2005.

PUBLISHER'S NOTE: The secretary of state has determined that the publication of the entire text of the material which is incorporated by reference as a portion of this rule would be unduly cumbersome or expensive. This material as incorporated by reference in this rule shall be maintained by the agency at its headquarters and shall be made available to the public for inspection and copying at no more than the actual cost of reproduction. This note applies only to the reference material. The entire text of the rule is printed here.

(1) Applicability.

(A) Except as provided in subsection (1)(B) of this rule:

1. The following units in this state shall be Clean Air Interstate Rule (CAIR) sulfur dioxide (SO_2) units, and any source that includes one or more such units shall be a CAIR SO_2 source, subject to the requirements of this rule: any stationary, fossil-fuel-fired boiler or stationary, fossil-fuel-fired combustion turbine serving at any time, since the later of November 15, 1990 or the startup of the unit's combustion chamber, a generator with nameplate capacity of more than twenty-five (25) megawatts electric (MWe) producing electricity for sale.

2. If a stationary boiler or stationary combustion turbine that, under paragraph (1)(A)1. of this rule, is not a CAIR SO_2 unit begins to combust fossil fuel or to serve a generator with nameplate capacity of more than twenty-five (25) MWe producing electricity for sale, the unit shall become a CAIR SO_2 unit as provided in paragraph (1)(A)1. of this rule on the first date on which it both combusts fossil fuel and serves such generator.

(B) The units in the state that meet the requirements set forth in subparagraph (1)(B)1.A., (1)(B)2.A., or (1)(B)2.B. of this rule shall not be CAIR SO_2 units:

1. Cogenerator exemption.

A. Any unit that is a CAIR SO_2 unit under paragraph (1)(A)1. or 2. of this rule—

(I) Qualifying as a cogeneration unit during the twelve (12)-month period starting on the date the unit first produces electricity and continuing to qualify as a cogeneration unit; and

(II) Not serving at any time, since the later of November 15, 1990 or the startup of the unit's combustion chamber, a generator with nameplate capacity of more than twenty-five (25) MWe supplying in any calendar year more than one-third of the unit's potential electric output capacity or two hundred nineteen thousand (219,000) megawatt hours (MWh), whichever is greater, to any utility power distribution system for sale.

B. If a unit qualifies as a cogeneration unit during the twelve (12)-month period starting on the date the unit first produces electricity and meets the requirements of subparagraph (1)(B)1.A. of this rule for at least one (1) calendar year, but subsequently no longer meets all such requirements, the unit shall become a CAIR SO_2 unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of part (1)(B)1.A.(II) of this rule.

2. Solid waste incinerator exemption.

A. Any unit that is a CAIR SO_2 unit under paragraph (1)(A)1. or 2. of this rule commencing operation before January 1, 1985—

(I) Qualifying as a solid waste incineration unit; and

(II) With an average annual fuel consumption of non-fossil fuel for 1985–1987 exceeding eighty percent (80%) (on a British thermal unit (Btu) basis) and an average annual fuel consumption of non-fossil fuel for any three (3) consecutive calendar years after 1990 exceeding eighty percent (80%) (on a Btu basis).

B. Any unit that is a CAIR SO_2 unit under paragraph (1)(A)1. or 2. of this rule commencing operation on or after January 1, 1985—

(I) Qualifying as a solid waste incineration unit; and

(II) With an average annual fuel consumption of non-fossil fuel for the first three (3) calendar years of operation exceeding eighty percent (80%) (on a Btu basis) and an average annual fuel consumption of non-fossil fuel for any three (3) consecutive calendar years after 1990 exceeding eighty percent (80%) (on a Btu basis).

C. If a unit qualifies as a solid waste incineration unit and meets the requirements of subparagraph (1)(B)2.A. or B. of this rule for at least three (3) consecutive calendar years, but subsequently no longer meets all such requirements, the unit shall become a CAIR SO_2 unit starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a solid waste incineration unit or January 1 after the first three (3) consecutive calendar years after 1990 for which the unit has an average annual fuel consumption of fossil fuel of twenty percent (20%) or more.

(C) Retired Unit Exemption. Unless otherwise noted in this section of the rule, all of the sections of 40 CFR 96.205 promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(2) Definitions.

(A) Definitions for key words and phrases used in this rule may be found in sections 40 CFR 96.202 and 96.203 of 40 CFR 96 subpart AAA promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(B) Definitions of certain terms specified in this rule, other than those defined in this rule section, may be found in 10 CSR 10-6.020.

(3) General Provisions. Unless otherwise noted in this section, 40 CFR 96.206, 96.207, and 96.208 as well as all of the sections of 40 CFR 96 subparts BBB, CCC, DDD, FFF, GGG, and III promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(4) Reporting and Record Keeping. Unless otherwise noted in this section, all of the sections of 40 CFR 96 subpart HHH promulgated as of April 28, 2006 are hereby incorporated by reference in this rule, as published by the Office of the Federal Register, U.S. National Archives and Records, 700 Pennsylvania Avenue NW, Washington, D.C. 20408. This rule does not incorporate any subsequent amendments or additions.

(5) Test Methods. *(Not Applicable)*

AUTHORITY: section 643.050, RSMo 2000. Original rule filed Oct. 2, 2006, effective May 30, 2007.

**Original authority: 643.050, RSMo 1965, amended 1972, 1992, 1993, 1995.*

10 CSR 10-6.350 Emission Limitations and Emissions Trading of Oxides of Nitrogen

PURPOSE: The purpose of this rule is to reduce the emissions of nitrogen oxides (NO_x) and establish a NO_x emissions trading program for the state of Missouri. The reductions in NO_x emissions will reduce the transport of ozone and its precursors within the state of Missouri and to other states as required under the Clean Air Act.

(1) Applicability.

(A) This rule applies to any fossil fuel-fired electric generating unit that serves a generator with a nameplate capacity of greater than twenty-five megawatts (25 MW).

(B) Exemptions.

1. Any unit under subsection (1)(A) of this rule which demonstrates, using the emission estimation methods outlined in paragraph (5)(E)1. of this rule, that the unit's mass NO_x emissions are twenty-five (25) tons or less during the control period is exempt from the requirements of this rule.

2. The provisions of section (3) of this rule shall not apply to any emergency standby generators, internal combustion engines and peaking combustion turbine units demonstrated to operate less than four hundred (400) hours per control period averaged over the three (3) most recent years of operation, which have installed and maintained in proper operation a nonresettable engine hour meter.

(C) Loss of Exemption. If the exemption limit in paragraph (1)(B)1. or (1)(B)2. of this rule is exceeded, the exemption shall not apply and the owner or operator must notify the staff director or designee within thirty (30) days. If the owner or operator can demonstrate to the staff director or designee that the exemption limit was exceeded due to emergency operations or uncontrollable circumstances, the exemption in paragraph (1)(B)1. or (1)(B)2. of this rule shall apply.

(D) Compliance with this rule shall not relieve any owner or operator of the responsibility to comply fully with applicable provisions of the Air Conservation Law and rules or any other requirements under local, state or federal law. Specifically, compliance with this rule shall not violate the permit conditions previously established under 10 CSR 10-6.060 or 10 CSR 10-6.065.

(E) Affected sources in the counties of Bollinger, Butler, Cape Girardeau, Carter, Clark, Crawford, Dent, Dunklin, Franklin, Gasconade, Iron, Jefferson, Lewis, Lincoln, Madison, Marion, Mississippi, Montgomery, New Madrid, Oregon, Pemiscot, Perry, Pike, Ralls, Reynolds, Ripley, St. Charles, St. Francois, St. Louis, Ste. Genevieve, Scott, Shannon, Stoddard, Warren, Washington and Wayne counties and the City of St. Louis may demonstrate compliance with the provisions of this rule using compliance with 10 CSR 10-6.360, provided that the emission rate of each unit does not exceed 0.25 or 0.18 pound per million British thermal units (mmBtu), whichever is applicable.

(F) The requirements of sections (3), (4), and (5) of this rule will not apply to the control period beginning in 2009 and any control period thereafter.

(2) Definitions.

(A) Definitions of certain terms in this rule, other than those specified in this rule section, may be found in 10 CSR 10-6.020.

(B) Account certificate of representation—The completed and signed submission for certifying the designation of a NO_x authorized account representative for an affected unit or a group of identified affected units who is authorized to represent the owners or operators of such unit or units and of the affected units at such source or sources with regard to matters under the NO_x trading program.

(C) Account number—The identification number given to each NO_x trading program account.

(D) Automated data acquisition and handling system—That component of the Continuous Emissions Monitoring System, or other emissions monitoring system approved for use by the department, designed to interpret and convert individual output signals from pollutant concentration monitors, and other component parts of the monitoring system to produce a continuous record of the measured parameters in the measurement units required in this rule.

(E) Average emission rate—The simple average of the hourly NO_x emission rate as recorded by monitoring systems approved in section (5) of this rule.

(F) Boiler—An enclosed fossil or other fuel-fired combustion device used to produce heat and to transfer heat to recirculating water, steam, or other medium.

(G) Combined cycle system—A system comprised of one or more combustion turbines, heat recovery steam generators, and steam turbines configured to improve overall efficiency of electricity generation or steam production.

(H) Combustion turbine—An enclosed fossil or other fuel-fired device that is comprised of a compressor, a combustor, and a turbine, and in which the flue gas resulting from the combustion of fuel in the combustor passes through the turbine, rotating the turbine.

(I) Common stack—A single flue through which emissions from two or more NO_x units are exhausted.

(J) Compliance account—A NO_x allow-ance tracking system account, established for an affected unit, in which the NO_x allowance allocations for the unit are initially recorded and in which are held NO_x allowances available for use by the unit for a control period for the purpose of meeting the unit's NO_x emission limitation.

(K) Continuous emissions monitoring system (CEMS)—The equipment required by this rule to sample, analyze, measure, and provide, by readings taken at least once every fifteen (15) minutes of the measured parameters, a permanent record of NO_x emissions, expressed in tons per hour for NO_x.

(L) Control period—The period beginning May 1 of a calendar year and ending on September 30 of the same calendar year.

(M) Cyclone EGU—An electric generating unit (EGU) with a fossil fuel-fired boiler consisting of one or more horizontal cylindrical barrels that utilize tangentially applied air to produce a swirling combustion pattern of coal and air.

(N) Early reduction credit (ERC)—NO_x emission reductions in the years 2000, 2001, 2002 and 2003 that are below the limits specified in subsection (3)(A) of this rule. ERCs will only be available for use during the years of 2004 and 2005. When calculating ERCs or performing calculations involving ERCs, ERCs shall always be rounded down to the nearest ton.

(O) Electric generating unit (EGU)—Any fossil fuel-fired boiler or turbine that serves an electrical generator with the potential to use more than fifty percent (50%) of the usable energy from the boiler or turbine to generate electricity.

(P) Emergency standby generator—A generator operated only during times of loss of primary power at the facility that is beyond the control of the owner or operator of the facility or during routine maintenance.

(Q) Fossil fuel—Natural gas, petroleum, coal, or any form of solid, liquid or gaseous fuel derived from such material.

(R) Fossil fuel-fired—With regard to a unit, the combustion of fossil fuel, alone or in combination with any other fuel, where fossil fuel is projected to comprise more than fifty percent (50%) of the annual heat input.

(S) Generator—A device that produces electricity.

(T) Heat input—The product (expressed as million British thermal units per hour) of the gross calorific value of the fuel (expressed as British thermal units per pound) and the fuel feed rate into a combustion device (expressed as pounds per hour), as measured, recorded and reported to the department by the NO_x authorized account representative and as determined by the director in accordance with this rule and does not include the heat derived from preheated combustion air, recirculated flue gases, or exhaust from other sources.

(U) Nameplate capacity—The maximum electrical generating output (expressed as megawatt) that a generator can sustain over a specified period of time when not restricted by seasonal or other deratings, as listed in the National Allowance Data Base (NADB) under the data field "NAMECAP" if the generator is listed in the NADB or as measured in accordance with the United States Department of Energy standards. For generators not listed in the NADB, the nameplate capacity shall be used.

(V) NO_x allowance—An authorization by the department under the NO_x trading program to emit one (1) ton of NO_x during the control period of the specified year or of any year thereafter.

(W) NO_x allowance tracking system—The system by which the director records allocations, deductions and transfers of NO_x allowances under the NO_x trading program.

(X) NO_x allowance transfer deadline—Close of business on December 31 following the control period or, if December 31 is not a business day, close of business on the first business day thereafter and is the deadline by which NO_x allowances may be submitted for recording in an affected unit's compliance account, or the overdraft account of the installation where the unit is located.

(Y) NO_x authorized account representative—The person who is authorized by the owners or operators of the unit to represent and legally bind each owner and operator in matters pertaining to the NO_x trading program.

(Z) NO_x emissions limitation—For an affected unit, the tonnage equivalent of the NO_x emissions rate available for compliance deduction for the unit and for a control period adjusted by any deductions of such NO_x allowances to account for actual utilization for the control period or to an account for excess emissions for a prior control period or to account for withdrawal from the NO_x trading program or for a change in regulatory status for an affected unit.

(AA) NO_x emission rate—The amount of NO_x emitted by a combustion unit in pounds per million British thermal units of heat input as recorded by monitoring devices approved in section (5) of this rule.

(BB) NO_x opt-in unit—An EGU whose owner or operator has requested to become an affected unit under the NO_x trading program and has been approved by the department.

(CC) NO_x unit—Any fossil fuel-fired stationary boiler, combustion turbine, internal combustion engine or combined cycle system.

(DD) Opt-in—To voluntarily become an affected unit under the NO_x trading program.

(EE) Overdraft account—The NO_x allowance tracking system account established by the director for each NO_x authorized account representative.

(FF) Passenger tire equivalent (PTE)—The weight of waste tires or parts of waste tires equivalent to the average weight of one (1) passenger tire. The average weight of one (1) passenger tire is equal to twenty (20) pounds.

(GG) Peaking combustion unit—A combustion turbine normally reserved for operation during the hours of highest daily, weekly, or seasonal loads.

(HH) Serial number—When referring to NO_x allowances, the unique identification number assigned to each NO_x allowance.

(II) Tire-derived fuel—The end product of a process that converts whole scrap tires into a specific chipped form capable of being used as fuel.

(JJ) Unit load—The total output of a unit in any control period produced by combusting a given heat input of fuel expressed in terms of the total electrical generation (expressed as megawatt) produced by the unit including generation for use within the plant, and/or in the case of a unit that uses heat input for purposes other than electrical generation, the total steam flow (lb/hr) produced by the unit, including steam for use by the unit.

(KK) Unit operating day—A calendar day in which a unit combusts any fuel.

(LL) Unit operating hour or hour of unit operation—Any hour or fraction of an hour during which a unit combusts fuel.

(MM) Utilization—The heat input (ex-pressed as million British thermal units per hour) for a unit.

(3) General Provisions.

(A) NO_x Emissions Limitations. Beginning May 1, 2004, the following NO_x emission rates shall apply:

1. EGUs located in the counties of Bollinger, Butler, Cape Girardeau, Carter, Clark, Crawford, Dent, Dunklin, Gasconade, Iron, Lewis, Lincoln, Madison, Marion, Mississippi, Montgomery, New Madrid, Oregon, Pemiscot, Perry, Phelps, Pike, Ralls, Reynolds, Ripley, St. Charles, St. Francois, Ste. Genevieve, Scott, Shannon, Stoddard, Warren, Washington and Wayne, shall limit emissions of NO_x to the more stringent of a rate of 0.25 lbs NO_x/million British thermal units per hour (mmBtu) of heat input during the control period or any applicable permitted NO_x limitation under 10 CSR 10-6.060.

2. EGUs located in the City of St. Louis and the counties of Franklin, Jefferson and St. Louis shall limit emissions of NO_x to the more stringent rate of 0.18 lbs NO_x/mmBtu of heat input during the control period, or any applicable permitted NO_x limitation under 10 CSR 10-6.060. For the purpose of calculating ERCs under subparagraph (3)(B)5.C. of this rule, the regulated NO_x emission rate (NO_xER_r) for units located in these areas shall be 0.25 lbs NO_x/mmBtu.

3. EGUs located in the counties of Buchanan, Jackson, Jasper, or Randolph shall limit emissions of NO_x to the more stringent rate of any applicable permitted NO_x limitation under 10 CSR 10-6.060 or the less stringent of:

A. 0.35 lbs NO_x/mmBtu of heat input during the control period; or

B. 0.68 lbs NO_x/mmBtu of heat input during the control period, provided that the unit is a cyclone EGU and burns tire-derived fuel in a quantity of at least one hundred thousand (100,000) PTEs per year. For installations with multiple cyclone EGUs, compliance with the one hundred thousand (100,000) PTE burned per year may also be based on the average number of PTEs burned per cyclone EGU.

4. EGUs located in any county not identified in paragraph (3)(A)1., (3)(A)2., or (3)(A)3. of this rule shall limit emissions of NO_x to the more stringent of a rate of 0.35 lbs NO_x/mmBtu of heat input during the control period or any applicable permitted NO_x limitation under 10 CSR 10-6.060.

5. In lieu of complying with the applicable emission limitations in paragraph (3)(A)1. through (3)(A)4. of this rule, any affected unit may comply through the NO_x emissions trading program under subsection (3)(B) of this rule.

(B) NO_x Emissions Trading Program.

1. NO_x authorized account representative. The NO_x authorized account representative shall have the responsibilities and meet the requirements identified in this subsection.

A. Each affected unit shall have only one NO_x authorized account representative with respect to all matters under the NO_x trading program. Each affected unit may have only one (1) alternate NO_x authorized account representative who may act on behalf of the NO_x authorized account representative.

B. A NO_x authorized account representative may be responsible for multiple units at an installation or within a system of installations with the same owner.

C. The department will act on a valid submission made on behalf of owners or operators of an affected unit only if the submission has been made, signed and certified by the NO_x authorized account representative or the alternate NO_x authorized account representative.

D. Each unit must submit an account certificate of representation no later than January 1, 2004 or December 31 of the year in which the rule becomes applicable for units installed after January 1, 2004.

2. NO_x allowance tracking system.

A. NO_x allowance tracking system accounts. The department will establish one (1) compliance account for each NO_x unit and one (1) overdraft account for each NO_x authorized account representative with one (1) or more NO_x units. Allocations of NO_x allowances pursuant to paragraphs (3)(B)3. or (3)(B)10. of this rule and deductions or transfers of NO_x allowances pursuant to paragraphs (3)(B)3., (3)(B)7., (3)(B)9., or (3)(B)10. of this rule will be recorded in the compliance accounts or overdraft accounts.

B. Establishment of accounts.

(I) Compliance accounts and overdraft accounts. Upon receipt of a complete account certificate of representation, the department will establish—

(a) A compliance account for each affected NO_x unit for which the account certificate of representation was submitted; and

(b) An overdraft account for each NO_x authorized account representative for which the account certificate of representation was submitted.

(II) Account identification. The department will assign a unique identifying number to each compliance account and each overdraft account.

C. Recording of NO_x allowance allocations.

(I) The department will record the NO_x allowances for the 2004 control period in the NO_x units' compliance accounts.

(II) Serial numbers for allocated NO_x allowances. The department will assign each NO_x allowance a unique identification number that will include digits identifying the year for which the NO_x allowance is allocated.

3. NO_x allowances.

A. Projected NO_x allowances.

(I) By March 1, 2004, the NO_x authorized account representative for each affected unit shall submit to the department a report containing the following:

(a) The projected control period NO_x emission rate for each affected unit;

(b) The average of the three (3) most recent control period heat inputs, unless those three (3) periods are not representative of normal operation; and

(c) A plan identifying the methodology for compliance with subsection (3)(A) of this rule.

(II) The department will review each report and make any amendments within fifteen (15) working days.

(III) The department will develop a summary of projected NO_x allowances on a unit by unit and statewide basis for distribution on or before May 1 of each year using Equation 1 of this rule.

Equation 1:

$$\frac{HIp \times ERp}{2000} = NOxALp$$

where:

HI_p =the projected control period heat input for each NO_x unit;

ER_p =the projected control period emission rate for each NO_x unit; and

NO_xAL_p =the projected NO_x allowance for each NO_x unit rounded down to the nearest ton (in tons).

B. Control period NO_x allowances.

(I) By October 31 following each control period, each NO_x authorized account representative shall submit to the department the actual total control period heat input and actual average emission rate in a compliance report consistent with requirements of section (4) of this rule for each affected NO_x unit.

(II) By November 15 following each control period, the department will issue a notice to each NO_x authorized account representative of the actual NO_x allowances recorded in the unit compliance account for each affected NO_x unit using Equation 2 of this rule.

Equation 2:

$$\frac{HIa \times Err}{2000} = NOxALa$$

where:

HI_a =the actual control period heat input for each NO_x unit;

ER_r =the allowable control period emission rate for each NO_x unit as determined in paragraphs (3)(A)1. through (3)(A)4. of this rule; and

NO_xAL_a =the actual NO_x allowance for each unit for the control period rounded down to the nearest ton (in tons).

4. Compliance. By the end of the NO_x allowance transfer deadline, each NO_x unit shall have sufficient NO_x allowances in their compliance account to allow for the deductions in subparagraph (3)(B)4.B. of this rule.

A. NO_x allowance transfer deadline. The NO_x allowances are available to be deducted for compliance with a unit's NO_x emissions limitation for a control period in a given year only if the NO_x allowances—

(I) Were allocated for a control period in a prior year or the same year; and

(II) Are held in the unit's compliance account or the unit's overdraft account as of the NO_x allowance transfer deadline for that control period.

B. Deductions for compliance.

(I) The director will deduct NO_x allowances to cover the unit's NO_x emissions for the control period—

(a) From the compliance account; and

(b) Only if no more NO_x allowances available under subparagraph (3)(B)4.A. of this rule remain in the compliance account, from the overdraft account. In deducting allowances for units from the overdraft account, the director will begin with the unit having the compliance account with the lowest NO_x Allowance Tracking System account number and end with the unit having the compliance account with the highest NO_x Allowance Tracking System account number.

(II) The director will deduct NO_x allowances until the number of NO_x allowances deducted for the control period equals the number of tons of NO_x emissions, determined in accordance with part (3)(B)4.B.(III) of this rule, from the unit for the control period for which compliance is being determined; or until no more NO_x allowances available under subparagraph (3)(B)4.A. of this rule remain in the respective account.

(III) For a NO_x unit that is allocated NO_x allowances under part (3)(B)3.B.(II) of this rule for a control period, the department will deduct NO_x allowances under subparagraph (3)(B)4.B. or (3)(B)4.E. of this rule to account for the actual utilization of the unit during the control period. The department will calculate the number of NO_x allowances to be deducted to account for the unit's actual utilization using Equation 3 of this rule.

Equation 3:

$$\Sigma HI_a \times ER_a = NO_xAL_d$$

where:

HI_a =the actual control period heat input for each NO_x unit;

ER_a =the actual control period emission rate for each NO_x unit; and

NO_xAL_d =the number of NO_x allowances that will be deducted from each NO_x unit's compliance account (rounded down to the nearest allowance).

C. Identification of NO_x allowances by serial number.

(I) The NO_x authorized account representative may identify by serial number the NO_x allowances to be deducted from the unit's compliance account under subparagraph (3)(B)4.B., (3)(B)4.D., or (3)(B)4.E. of this rule. Such identification will be made in the compliance certification report submitted in accordance with paragraph (4)(A)1. of this rule.

(II) The staff director will deduct NO_x allowances for a control period from the compliance account, in the absence of an identification or in the case of a partial identification of NO_x allowances by serial number under part (3)(B)4.C.(I) of this rule, or the overdraft account in the following order:

(a) Those NO_x allowances that were allocated for the control period to the unit under part (3)(B)3.B.(II) of this rule;

(b) Those NO_x allowances that were allocated for the control period to any unit and transferred and recorded in the account pursuant to paragraphs (3)(B)7. and (3)(B)8. of this rule, in order of their date of recording;

(c) Those NO_x allowances that were allocated for a prior control period to the unit under part (3)(B)3.B.(II) of this rule; and

(d) Those NO_x allowances that were allocated for a prior control period to any unit and transferred and recorded in the account pursuant to paragraphs (3)(B)7. and (3)(B)8. of this rule, in order of their date of recording.

D. Deductions for units sharing a common stack. In the case of units sharing a common stack and having emissions that are not separately monitored or apportioned in accordance with section (4) of this rule—

(I) The NO_x authorized account representative of the units shall identify the percentage of NO_x allowances to be deducted from each such unit's compliance account to cover the unit's share of NO_x emissions from the common stack for a control period. Such identification shall be made in the compliance certification report submitted in accordance with paragraph (4)(A)1. of this rule.

(II) Notwithstanding part (3)(B)4.B.(II) of this rule, the director will deduct NO_x allowances for each unit until the number of NO_x allowances deducted equals the unit's identified percentage (under part (3)(B)4.D.(I) of this rule) of the number of tons of NO_x emissions, as determined in accordance with section (4) of this rule, from the common stack for the control period for which compliance is being determined or, if no percentage is identified, an equal percentage for each unit, plus the number of allowances required for deduction to account for actual utilization under subparagraph (4)(A)1.G. of this rule for the control period.

E. The director will record in the appropriate compliance account or overdraft account all deductions from such an account pursuant to subparagraphs (3)(B)4.B. and (3)(B)4.D. of this rule.

5. Banking.

A. NO_x allowances may be banked for future use or transfer into a compliance account or an overdraft account, as follows:

(I) Any NO_x allowance that is held in a compliance account or an overdraft account, will remain in such account until the NO_x allowance is deducted or transferred under paragraphs (3)(B)4., (3)(B)5., (3)(B)6., or (3)(B)7. of this rule.

(II) The director will designate, as a banked NO_x allowance, any NO_x allowance that remains in a compliance account or an overdraft account after the director has made all deductions for a given control period from the compliance account or overdraft account pursuant to paragraph (3)(B)4. of this rule.

B. Each year, starting in 2005, after the director has completed the designation of banked NO_x allowances under part (3)(B)5.A.(II) of this rule and before May 1 of the year, the department will determine the extent to which banked NO_x allowances may be used for compliance in the control period for the current year, as follows:

(I) The director will determine the total number of banked NO_x allowances held in compliance accounts or overdraft accounts.

(II) If the total number of banked NO_x allowances determined, under part (3)(B)5.B.(I) of this rule, to be held in compliance accounts or overdraft accounts is less than or equal to ten percent (10%) of the sum of the NO_x trading program allocations for the previous control period, any banked NO_x allowance may be deducted for compliance in accordance with paragraph (3)(B)4. of this rule.

(III) If the total number of banked NO_x allowances determined, under part (3)(B)5.B.(I) of this rule, and held in compliance accounts or overdraft accounts exceeds ten percent (10%) of the sum of the state trading program allocations for the previous control period, any banked allowance may be deducted for compliance in accordance with paragraph (3)(B)4. of this rule, except as follows:

(a) The director will determine the adjustment factor using Equation 4 of this rule.

Equation 4:

$$AF = \frac{0.1 \times \sum NO_xAL_a}{\sum NO_xAL_b}$$

where:

AF =the adjustment factor;
$\sum NO_xAL_a$ =the sum of the statewide NO_x allowance allocated for the previous control period; and
$\sum NO_xAL_b$ =the sum of the banked NO_x allowances as determined under part (3)(B)5.B.(I) of this rule on January 1 of the current year;

(b) The director will determine the number of banked NO_x allowances in the account that may be deducted for compliance in accordance with paragraph (3)(B)4. of this rule using Equation 5 of this rule. Any banked NO_x allowances in excess of the product of Equation 5 may be deducted for compliance in accordance with paragraph (3)(B)4. of this rule, except that, if such NO_x allowances are used to make a deduction, two (2) such NO_x allowances must be deducted for each deduction of one (1) NO_x allowance required under paragraph (3)(B)4. of this rule.

Equation 5:

$$AF \times NO_xAL_b$$

where
AF =the adjustment factor calculated in Equation 4; and
NO_xAL_b =the number of NO_x allowances in a NO_x unit's account;

(IV) Geographic flow control.

(a) Banked NO_x allowances made available for use in parts (3)(B)5.B.(II) and (3)(B)5.B.(III) of this rule may be traded on a one to one (1:1) basis unless otherwise specified in subparts (3)(B)5.B.(IV)(b) and (3)(B)5.B.(IV)(c) of this rule.

(b) Banked NO_x allowances made available for use in parts (3)(B)5.B.(II) and (3)(B)5.B.(III) of this rule may be traded from the control region for which paragraphs (3)(A)3. and (3)(A)4. of this rule are applicable to the control region for which paragraph (3)(A)1. of this rule is applicable on a one and one-half to one (1.5:1) basis.

(c) Banked NO_x allowances made available for use in part (3)(B)5.B.(II) and (3)(B)5.B.(III) of this rule may be traded from the control region for which paragraphs (3)(A)1., (3)(A)3. and (3)(A)4. of this rule are applicable to the control region for which paragraph (3)(A)2. of this rule is applicable on a one and one-half to one (1.5:1) basis.

C. Early reductions. For any affected NO_x unit that reduces its NO_x emission rate in the 2000, 2001, 2002 or 2003 control period, the owner or operator of the unit may request early reduction credits, and the department will allocate ERCs by January 31 of each year to the unit in accordance with the following requirements.

(I) Each NO_x unit for which the owner or operator requests any ERCs under part (3)(B)5.C.(IV) of this rule shall monitor NO_x emissions in accordance with section (4) of this rule for each control period for which such ERCs are requested. The unit's monitoring system availability shall be not less than ninety percent (90%) during the control period, and the unit must not have been found to be in violation of any applicable state or federal emissions or emissions-related requirements.

(II) NO_x emission rate and heat input under parts (3)(B)5.C.(III) through (3)(B)5.C.(V) of this rule shall be determined in accordance with section (4) of this rule.

(III) Each NO_x unit for which the owner or operator requests any ERCs under part (3)(B)5.C.(IV) of this rule shall reduce its NO_x emission rate, for each control period for which ERCs are requested, to less than the applicable requirement of subsection (3)(A) of this rule.

(IV) The NO_x authorized account representative of a NO_x unit that meets the requirements of parts (3)(B)5.C.(I) and (3)(B)5.C.(III) of this rule may submit to the department a request for ERCs for the unit based on NO_x emission rate reductions made by the unit in the control period for 2000, 2001, 2002 or 2003 in accordance with part (3)(B)5.C.(III) of this rule.

(a) In the ERC request, the NO_x authorized account representative may request ERCs for such control period using Equation 6 of this rule.

Equation 6:

$$ERC = HI_a \times (NO_xER_r - NO_xER_a) \div 2000$$

where:

ERC =the ERCs accrued rounded down to the nearest ton of NO_x;

HI_a =the actual control period heat input for each NO_x unit;

NO_xER_r =the regulated NO_x emission rate as identified in paragraphs (3)(A)1. through (3)(A)4. of this rule; and

NO_xER_a =the actual control period emission rate for each NO_x unit.

(b) The ERC request must be submitted, in a format specified by the department, by October 31 of the year in which the NO_x emission rate reductions are made.

(V) The department will allocate NO_x allowances no later than January 31 to NO_x units meeting the requirements of parts (3)(B)5.C.(I) and (3)(B)5.C.(III) of this rule and covered by early reduction requests meeting the requirements of subpart (3)(B)5.C.(IV)(b) of this rule.

(VI) NO_x allowances recorded under part (3)(B)5.C.(V) of this rule may be deducted for compliance under paragraph (3)(B)3. of this rule for the control periods in 2004 or 2005. Notwithstanding subparagraph (3)(B)5.A. of this rule, the director will deduct as retired any NO_x allowance that is recorded under part (3)(B)5.C.(V) of this rule and is not deducted for compliance in accordance with paragraph (3)(B)3. of this rule for the control period in 2004 or 2005.

(VII) NO_x allowances recorded under part (3)(B)5.C.(V) of this rule are not treated as banked allowances in 2005 for the purposes of subparagraphs (3)(B)5.A. and (3)(B)5.B. of this rule.

(VIII) Compliance set-aside account.

(a) The department will establish a compliance set-aside account, which will contain fifty percent (50%) of the ERCs, rounded down to the nearest ton, that are issued in accordance with part (3)(B)5.C.(II) of this rule.

(b) Fifty percent (50%) of the ERCs, rounded down to the nearest ton, in the compliance set-aside account will be sold to the NO_x authorized account representatives that apply for the ERCs and can demonstrate that the ERCs will be used for compliance by a unit that is in a research, development or trial stage for new air pollution control technology. If less than fifty percent (50%) of the ERCs are needed for these units, the remainder will be sold in accordance with subpart (3)(B)5.C.(VIII)(c) of this rule.

(c) The remaining ERCs in the compliance set-aside account will be sold in the order of request.

(d) NO_x authorized account representatives must request all of the ERCs needed from the compliance set-aside account for the 2004 and 2005 control periods by February 28, 2004. The request for ERCs shall include the following information:

I. The owner and operator;

II. The NO_x authorized account representative;

III. The NO_x unit identification number and name;

IV. The number of ERCs being requested; and

V. The overdraft or compliance account number.

(e) The department shall set the market rate for ERCs by February 1, 2004. Market rate shall not be set at a value below five hundred dollars ($500) per ERC nor in excess of one thousand dollars ($1,000) per ERC, and shall be established based on the following in the order listed:

I. The average rate of exchange of NO_x credits and ERCs in the Missouri NO_x Emissions Trading Program; and

II. The most recent control cost data available.

(f) The department shall notify the successful purchasers of ERCs by April 1, 2004 and payment shall be made by the purchaser to the sellers by April 15, 2004 for ERCs purchased. Once payment has been received by the sellers, they shall notify the department and the appropriate ERCs shall be transferred to the appropriate account by May 1, 2004.

(g) The ERCs will be sold from the compliance set-aside account on a percentage basis. Each purchaser will purchase a portion of each seller's ERCs.

(h) Once the appropriate ERCs are transferred to the purchaser's account, the ERCs are non-transferrable.

(i) Any ERC allowances remaining in the compliance set-aside account after May 1, 2004, will be returned to the unit that generated the ERCs by May 15, 2004.

(IX) All ERCs will be retired on January 31, 2006.

6. Account error. The director may correct any error in any NO_x Allowance Tracking System account. Within ten (10) business days of making such correction, the director will notify the NO_x authorized account representative for the account. The NO_x authorized account representative will then have ten (10) business days to appeal the correction if they feel the correction was made in error.

7. NO_x allowance transfers. The NO_x authorized account representatives seeking the recording of a NO_x allowance transfer shall submit the transfer request to the director. To be considered correctly submitted, the NO_x allowance transfer shall include the following elements in a format specified by the director:

A. The numbers identifying both the transferor and transferee accounts;

B. A specification by serial number of each NO_x allowance to be transferred; and

C. The printed name and signature of the NO_x authorized account representative of the transferor account and the date signed.

8. Department recording.

A. Within five (5) business days of receiving a NO_x allowance transfer, except as provided in subparagraph (3)(B)9.B. of this rule, the department will record a NO_x allowance transfer by moving each NO_x allowance from the transferor account to the transferee account as specified by the request, provided that—

(I) The transfer is correctly submitted under paragraph (3)(B)8. of this rule;

(II) The transferor account includes each NO_x allowance identified by serial number in the transfer; and

(III) The transfer meets all other requirements of this paragraph.

B. A NO_x allowance transfer that is submitted for recording following the NO_x allowance transfer deadline and that includes any NO_x allowances allocated for a control period prior to or the same as the control period to which the NO_x allowance transfer deadline applies will not be recorded until after completion of the process of recording of NO_x allowance allocations of this rule.

C. Where a NO_x allowance transfer submitted for recording fails to meet the requirements of subparagraph (3)(B)7. of this rule, the department will not record such transfer.

9. Notification.

A. Notification of recording. Within five (5) business days of recording of a NO_x allowance transfer under paragraph (3)(B)8. of this rule, the department will notify each NO_x authorized account representative of the transfer in writing.

B. Notification of nonrecording. Within ten (10) business days of receipt of a NO_x allowance transfer that fails to meet the requirements of paragraph (3)(B)7. of this rule, the department will notify in writing the NO_x authorized account representatives of both accounts subject to the transfer of—

(I) A decision not to record the transfer; and

(II) The reasons for such nonrecording.

10. Individual EGU opt-ins. An EGU that is not an affected unit under subsection (1)(A) of this rule that vents all of its emissions to a stack may qualify to become a NO_x opt-in unit under this paragraph of this rule. A NO_x opt-in unit will not be allowed to participate in the NO_x trading program without prior approval.

A. A NO_x opt-in unit shall have a NO_x authorized account representative.

B. Request for initial NO_x opt-in. In order to request to opt-in to the trading program, the NO_x authorized account representative of the unit must submit to the department at any time the following:

(I) The projected NO_x emission rate for each affected unit;

(II) The average of the three (3) most recent years heat input on a monthly basis over the control period for each affected unit; and

(III) A plan detailing the methodology for compliance with paragraph (3)(B)10. of this rule.

C. The department will review the request and respond within ninety (90) days of the date of receipt of the request.

D. Request for opting-in to the NO_x trading program must be received by the department no later than February 1 of the same year as the control period that the NO_x opt-in unit requests to begin participation in the NO_x trading program.

E. The NO_x opt-in units shall establish a baseline heat input and a baseline NO_x emissions rate under the requirements of subsection (5)(G) of this rule. After calculating the baseline heat input and the baseline NO_x emissions rate for the NO_x opt-in unit, the department will notify the NO_x authorized account representative of the unit of the resulting baseline.

F. The established baseline shall be the regulated NO_x emission rate for the opt-in unit. The NO_x opt-in unit shall meet the same schedule as all NO_x units with respect to all deadlines and schedules. The allowances issued to the opt-in unit under this paragraph shall be calculated using Equation 7 of this rule.

Equation 7:

$$\frac{HIopt \times ERopt}{2000} = NOxALopt$$

where:

HI_{opt} =the actual control period heat input for the NO_x opt-in unit;

ER_{opt} =the baseline emission rate for the NO_x opt-in unit as determined under subsection (5)(F) of this rule; and

NO_xAL_{opt} =the actual NO_x allowances for the opt-in unit for the control period (in tons).

G. If at any time before the approval of a NO_x opt-in unit, the department determines that the unit does not qualify as a NO_x opt-in unit under this paragraph, the department will issue a denial of the NO_x opt-in request for the unit.

H. Withdrawal of NO_x opt-in request. A NO_x authorized account representative of a unit may withdraw its request to opt-in at any time prior to the approval for the NO_x opt-in unit. Once the request for a NO_x opt-in unit is withdrawn, a NO_x authorized account representative seeking to reapply must submit a new request for a NO_x opt-in unit under this subsection.

I. Effective date. The effective date of the initial NO_x opt-in shall be May 1 of the first control period starting after the approval of the NO_x opt-in unit by the department. The unit shall be a NO_x opt-in unit and an affected NO_x unit as of the effective date of the approval and be subject to the requirements of this rule.

J. Change in regulatory status. When a NO_x opt-in unit becomes an affected unit, the NO_x authorized account representative shall notify the department in writing of such change in the NO_x opt-in unit's regulatory status within thirty (30) days of such change.

K. Withdrawal from NO_x trading program. A NO_x opt-in unit may withdraw from the NO_x trading program if it meets the following requirements:

(I) To withdraw from the NO_x trading program, the NO_x authorized account representative of a NO_x opt-in unit shall submit to the department a request to withdraw effective as of a specified date prior to May 1 or after September 30. The submission shall be made no later than ninety (90) days prior to the requested effective date of withdrawal.

(II) Before a NO_x opt-in unit may withdraw from the NO_x trading program, the following conditions must be met.

(a) For the control period immediately before the withdrawal is to be effective, the NO_x authorized account representative must submit or must have submitted to the department an annual compliance certification report.

(b) If the NO_x opt-in unit has excess emissions for the control period immediately before the withdrawal is to be effective, the department will deduct from the NO_x opt-in unit's compliance account, or the overdraft account of the affected unit where the affected unit is located, the full amount required for the control period.

(III) A NO_x opt-in unit that withdraws from the NO_x trading program shall comply with all requirements under the NO_x trading program concerning all years for which such NO_x opt-in unit was a NO_x opt-in unit, even if such requirements must be complied with after the withdrawal takes effect.

(IV) Notification procedures shall be as follows:

(a) After the requirements for withdrawal under this paragraph have been met, the department will issue a notification to the NO_x authorized account representative of the NO_x opt-in unit of the acceptance of the withdrawal of the NO_x opt-in unit as of a specified effective date that is after such requirements have been met and that is prior to May 1 or after September 30.

(b) If the requirements for withdrawal under this paragraph have not been met, the department will issue a notification to the NO_x authorized account representative of the NO_x opt-in unit that the NO_x opt-in unit's request to withdraw is denied. If the NO_x opt-in unit's request to withdraw is denied, the NO_x opt-in unit shall remain subject to the requirements for a NO_x opt-in unit.

(V) A NO_x opt-in unit shall continue to be a NO_x opt-in unit until the effective date of the withdrawal.

(VI) Once a NO_x opt-in unit withdraws from the NO_x trading program, the NO_x authorized account representative may not submit another application for the NO_x opt-in unit prior to the date that is four (4) years after the date on which the withdrawal became effective.

11. Output based emissions trading of NO_x. *(Reserved)*

(4) Reporting and Record Keeping.

(A) Reporting.

1. A compliance certification report for each affected unit subject to section (3) of this rule shall be submitted to the department by October 31 following each control period. The report shall include:

A. The owner and operator;

B. The NO_x authorized account representative;

C. NO_x unit name, compliance and overdraft account numbers;

D. NO_x emission rate limitation (lb/mmBtu);

E. Actual NO_x emission rate (lb/mmBtu) for the control period;

F. Actual heat input (mmBtu) for the control period. The unit's total heat input for the control period in each year will be determined in accordance with section (5) of this rule; and

G. Actual NO_x mass emissions (tons) for the control period.

2. Reporting shall be based on the test methods identified in section (5) of this rule. Any unit with valid continuous emission montoring system (CEMS) data for the control period must use that data to determine compliance with the provisions of this rule. The owner or operator for each affected unit which performs non-CEMS testing to demonstrate compliance of a unit subject to section (3) of this rule shall submit:

A. A control period report identifying monthly fuel usage and monthly total heat input by December 31 of the same year as the control period; and

B. A written report of all stack tests completed after controls are effective to the department within sixty (60) days after completion of sample and data collection.

(B) Record Keeping.

1. Each owner or operator of an affected unit subject to section (3) of this rule shall maintain records of the following:

A. Total fuel consumed during the control period;

B. The total heat input for each emissions unit during the control period;

C. Reports of all stack testing conducted to meet the requirements of this rule;

D. All other data collected by a CEMS necessary to convert the monitoring data to the units of the applicable emission limitation;

E. All performance evaluations conducted in the past year;

F. All monitoring device calibration checks;

G. All monitoring system, monitoring device and performance testing measurements;

H. Records of adjustments and maintenance performed on monitoring systems and devices; and

I. A log identifying each period during which the CEMS or alternate procedure was inoperative, except for zero and span checks, and the nature of the repairs and adjustments performed to make the system operative.

2. All records must be kept on-site for a period of five (5) years and made available to the department upon request.

3. Each owner or operator of any gas- or oil-fired unit that qualifies for the low-emitter exemption in paragraph (1)(B)1. of this rule or the low hours of operation exemption in paragraph (1)(B)2. of this rule, shall maintain records of the total operating hours during which fuel is consumed for each emission unit during the control period. In the event that another record keeping schedule has been previously approved for the EGU and is included as an operating permit condition, the EGU may use that schedule to comply with this requirement.

(5) Test Methods and Monitoring. For units subject to this rule, the following requirements shall apply:

(A) Compliance shall be measured during the control period;

(B) All valid data shall be used for calculating NO_x emissions rates;

(C) Coal-Fired Units. Any coal-affected unit subject to this rule shall install, certify, operate, maintain, and quality assure a NO_x and diluent CEMS pursuant to the requirements in 40 CFR part 75;

(D) Non-Exempt Peaking Units. Any gas- or oil-fired peaking unit that is subject to the emission limitation or trading aspects of this rule shall:

1. Install, certify, operate, maintain, and quality assure a NO_x and diluent CEMS; or

2. Install, certify, operate, and quality assure fuel-metering equipment pursuant to 40 CFR part 75, Appendix D and shall establish a NO_x-to-load curve pursuant to 40 CFR part 75, Appendix E;

(E) Exempt Units.

1. The following hierarchy of methods may be used to determine if a unit qualifies for the low-emitter exemption in paragraph (1)(B)1. of this rule. If data is not available for an emission estimation method or an emission estimation method is impractical for a source, then the subsequent emission estimation method should be used in its place:

A. CEMS as specified in 10 CSR 10-6.110;

B. Stack tests as specified in 10 CSR 10-6.110;

C. Material/mass balance;

D. AP-42 (Environmental Protection Agency (EPA) Compilation of Emission Factors) or FIRE (Factor Information and Retrieval System) (as updated);

E. Other EPA documents as specified in 10 CSR 10-6.110;

F. Sound engineering calculations; or

G. Facilities shall obtain department pre-approval of emission estimation methods other than those listed in subparagraphs (5)(E)1.A. through (5)(E)1.F. of this rule before using such method to estimate emissions. In the event that such method has previously been approved for the EGU and included as an operating permit condition, the EGU may use that method to comply with this requirement.

2. Any gas- or oil-fired unit that qualifies for the low-emitter exemption in paragraph (1)(B)1. or the low hours of operation exemption in paragraph (1)(B)2. shall install and operate a non-resettable hour meter or determine the hours of operation for each emission unit during the control period. In the event that another monitoring method has previously been approved for the EGU and included as an operating permit condition, the EGU may use that method to comply with this requirement.

(F) Opt-In Units. Any unit that opts into the trading program, pursuant to paragraph (3)(B)10., shall be monitored consistent with the provisions of subsections (5)(D) and (5)(E) above. For the purpose of establishing the baseline allowance allocation, an opt-in unit shall install, certify, operate, maintain, and quality assure the monitoring device(s) and collect data for at least one (1) control season prior to submission of an opt-in application.

AUTHORITY: section 643.050, RSMo 2000. Original rule filed Feb. 15, 2000, effective Sept. 30, 2000. Amended: Filed Dec. 4, 2002, effective Aug. 30, 2003. Amended: Filed Oct. 2, 2006, effective May 30, 2007.*

*Original authority: 203.050, RSMo 1965, amended 1972, transferred to 643.050, RSMo 1986, amended 1992, 1993, 1995.

10 CSR 10-6.360 Control of NO_x Emissions From Electric Generating Units and Non-Electric Generating Boilers

PURPOSE: This rule reduces emissions of oxides of nitrogen (NO_x) to ensure compliance with the federal NO_x control plan to reduce the transport of air pollutants. The rule establishes an emission budget for large electric generating units and non-electric generating boilers. The evidence supporting the need for this proposed rulemaking, per section 536.016, RSMo, is the U.S. Environmental Protection Agency NO_x State Implementation Plan (SIP) Call dated April 21, 2004.

(1) Applicability.

(A) This rulemaking shall apply throughout Bollinger, Butler, Cape Girardeau, Carter, Clark, Crawford, Dent, Dunklin, Franklin, Gasconade, Iron, Jefferson, Lewis, Lincoln, Madison, Marion, Mississippi, Montgomery, New Madrid, Oregon, Pemiscot, Perry, Pike, Ralls, Reynolds, Ripley, St. Charles, St. Francois, St. Louis, Ste. Genevieve, Scott, Shannon, Stoddard, Warren, Washington and Wayne counties and the City of St. Louis.

(B) The following units shall be NO_x budget units, and any source that includes one (1) or more such units shall be a NO_x budget source, subject to the requirements of this rule:

1. Electric generating units that serve a generator with a nameplate capacity greater than twenty-five megawatts (25 MW) and—

A. For non-cogeneration units—

(I) Commenced operation before January 1, 1997, and served a generator producing electricity for sale under a firm contract to the electric grid during 1995 or 1996; or

(II) Commenced operation in 1997 or 1998 and served a generator producing electricity for sale under a firm contract to the electric grid during 1997 or 1998; or

(III) Commenced operation on or after January 1, 1999, and served or serves at any time a generator producing electricity for sale; and

B. For cogeneration units—

(I) Commenced operation before January 1, 1997, and failed to qualify as an unaffected unit under 40 CFR 72.6(b)(4) for 1995 or 1996 under the Acid Rain Program; or

(II) Commenced operation in 1997 or 1998 and failed to qualify as an unaffected unit under 40 CFR 72.6(b)(4) for 1997 or 1998 under the Acid Rain Program; or

(III) Commenced operation on or after January 1, 1999, and failed or fails to qualify as an unaffected unit under 40 CFR 72.6(b)(4) for any year under the Acid Rain Program; and

2. Non-electric generating boilers, combined cycle systems, and combustion turbines that have a maximum design heat input greater than two hundred fifty (250) million British thermal units per hour (mmBtu/hr) and—

A. For non-cogeneration units—

(I) Commenced operations before January 1, 1997, and did not serve a generator producing electricity for sale under a firm contract to the electric grid during 1995 or 1996; or

(II) Commenced operations in 1997 or 1998 and did not serve a generator producing electricity for sale under a firm contract to the electric grid during 1997 or 1998; or

(III) Commenced operation on or after January 1, 1999, and:

(a) At no time served or serves a generator producing electricity for sale; or

(b) At any time served or serves a generator with a nameplate capacity of twenty-five (25) MW or less producing electricity for sale, and with the potential to use no more than fifty percent (50%) of the potential electrical output capacity of the unit; and

B. For cogeneration units—

(I) Commenced operation before January 1, 1997, and qualified as an unaffected unit under 40 CFR 72.6(b)(4) for 1995 or 1996 under the Acid Rain Program; or

(II) Commenced operation in 1997 or 1998 and qualified as an unaffected unit under 40 CFR 72.6(b)(4) for 1997 or 1998 under the Acid Rain Program; or

(III) Commenced operation on or after January 1, 1999, and qualified or qualifies as an unaffected unit under 40 CFR 72.6(b)(4) for each year under the Acid Rain Program.

(C) Exemptions. The director shall provide the administrator written notice of the issuance of any permit under subsection (3)(C) of this rule and, upon request, a copy of the permit. Notwithstanding subsection (1)(A) of this rule, a unit shall not be a NO_x budget unit if the unit has a federally enforceable permit that:

1. Restricts the unit to burning only natural gas or fuel oil;

2. Restricts the unit's operating hours to the number calculated by dividing twenty-five (25) tons of potential mass emissions by the unit's maximum potential hourly NO_x mass emissions;

3. Requires that the unit's maximum potential NO_x mass emissions be calculated by multiplying the unit's maximum rated hourly heat input by the highest default NO_x emission rate applicable to the unit under 40 CFR 75.19(c), Table LM-2;

4. Requires that the owner or operator of the unit shall retain at the source that includes the unit, for five (5) years, records demonstrating that the operating hours restriction, the fuel use restriction, and the other requirements of the permit related to these restrictions were met; and

5. Requires that the owner or operator of the unit shall report the unit's hours of operation (treating any partial hour of operation as a whole hour of operation) during each control period to the director by November 1 of each year for which the unit is subject to the federally enforceable permit.

(D) Loss of Exemption. If, for any control period, the unit does not comply with the fuel use restriction under paragraph (1)(C)1. of this rule or the operating hours restriction under paragraphs (1)(C)2. and 3. of this rule, or the fuel use or the operating hour restrictions are removed from the unit's federally enforceable permit or otherwise becomes no longer applicable, the unit shall be a NO_x budget unit, subject to the requirements of this rule. Such unit shall be treated as commencing operation and, for a unit under paragraph (1)(B)1. of this rule, commencing commercial operation on September 30 of the control period for which the fuel use restriction or the operating hours restriction is no longer applicable or during which the unit does not comply with the fuel use restriction or the operating hours restriction.

(E) Retired Unit Exemption. This subsection applies to any NO_x budget unit that is permanently retired.

1. Standard provisions.

A. Any NO_x budget unit that is permanently retired shall be exempt from the NO_x budget trading program, except for the provision of subsection (1)(E), sections (1) and (2), subsections (3)(E), (3)(F) and (3)(G) of this rule.

B. The exemption under subparagraph (1)(E)1.A. of this rule shall become effective the day on which the unit is permanently retired. Within thirty (30) days of permanent retirement, the NO_x authorized account representative shall submit a statement to the director. A copy of the statement shall be submitted to the administrator. The statement shall state that the unit is permanently retired and will comply with the requirements of paragraph (1)(E)2. of this rule.

C. After receipt of the notice under subparagraph (1)(E)1.B. of this rule, the director will amend any permit covering the source at which the unit is located to add the provisions and requirements of the exemption under subparagraph (1)(E)1.A. and paragraph (1)(E)2. of this rule.

2. Special provisions.

A. A unit exempt under this subsection shall not emit any nitrogen oxides, starting on the date that the exemption takes effect.

B. The owners and operators and, to the extent applicable, the NO_x authorized account representative of a unit exempt under this section shall comply with the requirements of the NO_x budget trading program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.

C. *Reserved*

D. For a period of five (5) years from the date the records are created, the owners and operators of a unit exempt under this section shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The five (5)-year period for keeping records may be extended for cause, at any time prior to the end of the period, in writing by the director or the administrator. The owners and operators bear the burden of proof that the unit is permanently retired.

E. A unit exempt under subsection (1)(E) of this rule and located at a source that is required, except for this exemption, would be required to have a Title V or a non-Title V operating permit, shall not resume operation unless the NO_x authorized account representative of the source submits a complete NO_x budget permit application for the unit not less than eighteen (18) months prior to the later of May 1, 2007 or the date on which the unit is to first resume operation.

3. Loss of exemption. For the purpose of applying monitoring requirements under section (4) of this rule, a unit that loses its exemption under subsection (1)(E) of this rule shall be treated as a unit that commences operation or commercial operation on the first date on which the unit resumes operation. On the earlier of the following dates, a unit exempt under subsection (1)(E) of this rule shall lose its exemption:

A. The date on which the NO_x authorized account representative submits a NO_x budget permit application under subparagraph (1)(E)2.E. of this rule; or

B. The date on which the NO_x authorized account representative is required under subparagraph (1)(E)2.E. of this rule to submit a NO_x budget permit application.

(F) Compliance with this rule shall not relieve any owner or operator of the responsibility to comply fully with applicable provisions of the Air Conservation Law and rules or any other requirements under local, state or federal law. Specifically, compliance with this rule shall not violate the permit conditions previously established under 10 CSR 10-6.060 or 10 CSR 10-6.065.

(G) Computation of Time.

1. Unless otherwise stated, any time period scheduled under the NO_x budget trading program to begin on the occurrence of an act or event, shall begin on the day the act or event occurs.

2. Unless otherwise stated, any time period scheduled under the NO_x budget trading program to begin before the occurrence of an act or event, shall be computed so that the period ends the day before the act or event occurs.

3. Unless otherwise stated, if the final day of any time period under the NO_x budget trading program falls on a weekend or a state or federal holiday, the time period shall be extended to the next business day.

(H) The requirements of sections (3), (4) and (5) of this rule will not apply to the control period beginning in 2009 and any control period therafter.

(2) Definitions.

(A) Account certificate of representation—The completed and signed submission required by subsection (3)(B) of this rule for certifying the designation of a NO_x authorized account representative for a NO_x budget source or a group of identified NO_x budget sources who is authorized to represent the owners and operators of such source or sources and of the NO_x budget units at such source or sources with regard to matters under the NO_x budget trading program.

(B) Account number—The identification number given by the administrator to each NO_x allowance tracking system account.

(C) Acid rain emissions limitation—As defined in 40 CFR 72.2, a limitation on emissions of sulfur dioxide or nitrogen oxides under the Acid Rain Program under Title IV of the Clean Air Act.

(D) Administrator—The administrator of the United States Environmental Protection Agency or the administrator's duly authorized representative.

(E) Affiliate—Any person including an individual, corporation, service company, corporate subsidiary, firm, partnership, incorporated or unincorporated association, political subdivision including a public utility district, city, town, county, or a combination of political subdivisions, which directly or indirectly, through one (1) or more intermediaries, controls, is controlled by, or is under common control with the regulated electrical corporation.

(F) Allocate or allocation—The determination by the director or the administrator of the number of NO_x allowances to be initially credited to a NO_x budget unit or an allocation set-aside.

(G) Automated data acquisition and handling system (DAHS)—That component of the continuous emissions monitoring system (CEMS), or other emissions monitoring system approved for use under section (4) of this rule, designed to interpret and convert individual output signals from pollutant concentration monitors, flow monitors, diluent gas monitors, and other component parts of the monitoring system to produce a continuous record of the measured parameters in the measurement units required in this rule.

(H) Boiler—An enclosed fossil or other fuel-fired combustion device used to produce heat and to transfer heat to recirculating water, steam, or other medium.

(I) CAA—The Clean Air Act, 42 U.S.C. 7401, as amended by Pub. L. No. 101-595 (November 15, 1990).

(J) Combined cycle system—A system comprised of one (1) or more combustion turbines, heat recovery steam generators, and steam turbines configured to improve overall efficiency of electricity generation or steam production.

(K) Combustion turbine—An enclosed fossil or other fuel-fired device that is comprised of a compressor, a combustor, and a turbine, and in which the flue gas resulting from the combustion of fuel in the combustor passes through the turbine, rotating the turbine.

(L) Commence commercial operation—With regard to a unit that serves a generator, to have begun to produce steam, gas, or other heated medium used to generate electricity for sale or use, including test generation. Except as provided in subsection (1)(E) of this rule, for a unit that is a NO_x budget unit under section (1) of this rule on the date the unit commences commercial operation, such date shall remain the unit's date of commencement of commercial operation even if the unit is subsequently modified, reconstructed, or repowered. Except as provided in subsections (1)(E) or (3)(H) of this rule, for a unit that is not a NO_x budget unit under section (1) of this rule on the date the unit commences commercial operation, the date the unit becomes a NO_x budget unit under section (1) of this rule shall be the unit's date of commencement of commercial operation.

(M) Commence operation—To have begun any mechanical, chemical, or electronic process, including, with regard to a unit, start-up of a unit's combustion chamber. Except as provided in subsection (1)(E) of this rule, for a unit that is a NO_x budget unit under section (1) of this rule on the date of commencement of operation, such date shall remain the unit's date of commencement of operation even if the unit is subsequently modified, reconstructed, or repowered. Except as provided in subsection (1)(E) of this rule or subsection (3)(H) of this rule, for a unit that is not a NO_x budget unit under section (1) of this rule on the date of commencement of operation, the date the unit becomes a NO_x budget unit under section (1) of this rule shall be the unit's date of commencement of operation.

(N) Common stack—A single flue through which emissions from two (2) or more units are exhausted.

(O) Compliance account—NO_x allowance tracking system account, established by the administrator for a NO_x budget unit under subsection (3)(F) of this rule, in which the NO_x allowance allocations for the unit are initially recorded and in which are held NO_x allowances available for use by the unit for a control period for the purpose of meeting the unit's NO_x emissions limitation.

(P) Compliance certification—A submission to the director or the administrator, that is required under subsection (3)(D) of this rule to report a NO_x budget source's or a NO_x budget unit's compliance or noncompliance with this part and that is signed by the NO_x authorized account representative in accordance with subsection (3)(B) of this rule.

(Q) Continuous emissions monitoring system (CEMS)—The equipment required under section (4) of this rule to sample, analyze, measure, and provide, by readings taken at least once every fifteen (15) minutes of the measured parameters, a permanent record of nitrogen oxides emissions, expressed in tons per hour for nitrogen oxides. The following systems are component parts included, consistent with 40 CFR 75, in a continuous emissions monitoring system:

1. Flow monitor;
2. Nitrogen oxides pollutant concentration monitors;
3. Diluent gas monitor (oxygen or carbon dioxide) when such monitoring is required by section (4) of this rule;
4. A continuous moisture monitor when such monitoring is required by section (4) of this rule; and
5. An automated data acquisition and handling system.

(R) Control period—The period beginning May 1 of a calendar year and ending on September 30 of the same calendar year.

(S) Emissions—Air pollutants exhausted from a unit or source into the atmosphere, as measured, recorded, and reported to the administrator by the NO_x authorized account representative and as determined by the administrator in accordance with section (4) of this rule.

(T) Energy Information Administration—The Energy Information Administration of the United States Department of Energy.

(U) Fossil fuel—Natural gas, petroleum, coal, or any form of solid, liquid, or gaseous fuel derived from such material.

(V) Fossil fuel-fired—With regard to a unit, the combustion of fossil fuel, alone or in combination with any other fuel, where fossil fuel—

1. Actually combusted comprises more than fifty percent (50%) of the annual heat input on a Btu basis during any year starting in 1995 or, if a unit had no heat input starting in 1995, during the last year of operation of the unit prior to 1995; or

2. Is projected to comprise more than fifty percent (50%) of the annual heat input on a Btu basis during any year; provided that the unit shall be "fossil fuel-fired" as of the date, during such year, on which the unit begins combusting fossil fuel.

(W) General account—A NO_x allowance tracking system account, established under subsection (3)(F) of this rule, that is not a compliance account or an overdraft account.

(X) Generator—A device that produces electricity.

(Y) Heat input—The product (in mmBtu/time) of the gross calorific value of the fuel (in Btu/lb) and the fuel feed rate into a combustion device (in mass of fuel/time), as measured, recorded, and reported to the administrator by the NO_x authorized account representative and as determined by the administrator in accordance with section (4) of this rule, and does not include the heat derived from preheated combustion air, recirculated flue gases, or exhaust from other sources.

(Z) Life-of-the-unit, firm power contractual arrangement—A unit participation power sales agreement under which a utility or industrial customer reserves, or is entitled to receive, a specified amount or percentage of nameplate capacity and associated energy from any specified unit and pays its proportional amount of such unit's total costs, pursuant to a contract—

1. For the life of the unit;

2. For a cumulative term of no less than thirty (30) years, including contracts that permit an election for early termination; or

3. For a period equal to or greater than twenty-five (25) years or seventy percent (70%) of the economic useful life of the unit determined as of the time the unit is built, with option rights to purchase or release some portion of the nameplate capacity and associated energy generated by the unit at the end of the period.

(AA) Maximum design heat input—The ability of a unit to combust a stated maximum amount of fuel per hour on a steady state basis, as determined by the physical design and physical characteristics of the unit.

(BB) Maximum potential hourly heat input—An hourly heat input used for reporting purposes when a unit lacks certified monitors to report heat input. If the unit intends to use Appendix D of 40 CFR 75 to report heat input, this value should be calculated, in accordance with 40 CFR 75, using the maximum fuel flow rate and the maximum gross calorific value. If the unit intends to use a flow monitor and a diluent gas monitor, this value should be reported, in accordance with 40 CFR 75, using the maximum potential flow rate and either the maximum carbon dioxide concentration (in percent CO_2) or the minimum oxygen concentration (in percent O_2).

(CC) Maximum potential NO_x emission rate—The NO_x emission rate of nitrogen oxides (in lb/mmBtu) calculated in accordance with section 3 of Appendix F of 40 CFR 75, using the maximum potential nitrogen oxides concentration as defined in section 2 of Appendix A of 40 CFR 75, and either the maximum oxygen concentration (in percent O_2) or the minimum carbon dioxide concentration (in percent CO_2), under all operating conditions of the unit except for unit start-up, shutdown, and upsets.

(DD) Maximum rated hourly heat input—A unit-specific maximum hourly heat input (mmBtu) which is the higher of the manufacturer's maximum rated hourly heat input or the highest observed hourly heat input.

(EE) Monitoring system—Any monitoring system that meets the requirements of section (4) of this rule, including a continuous emissions monitoring system, an excepted monitoring system, or an alternative monitoring system.

(FF) Nameplate capacity—The maximum electrical generating output (in MW) that a generator can sustain over a specified period of time when not restricted by seasonal or other deratings as measured in accordance with the United States Department of Energy standards.

(GG) Non-Title V permit—A federally enforceable permit administered by the director pursuant to the CAA and regulatory authority under the CAA, other than Title V of the CAA and 40 CFR 70 or 40 CFR 71.

(HH) NO_x allowance—An authorization by the department or the administrator under the NO_x budget trading program to emit up to one (1) ton of nitrogen oxides during the control period of the specified year or of any year thereafter.

(II) NO_x allowance deduction or deduct NO_x allowances—The permanent withdrawal of NO_x allowances by the administrator from a NO_x allowance tracking system compliance account or overdraft account to account for the number of tons of emissions from a NO_x budget unit for a control period, determined in accordance with section (4) of this rule, or for any other NO_x allowance surrender obligation under this part.

(JJ) NO_x allowances held or hold NO_x allowances—The NO_x allowances recorded by the administrator, or submitted to the administrator for recordation, in accordance with subsections (3)(F) and (G) of this rule, in a NO_x allowance tracking system account.

(KK) NO_x allowance tracking system—The system by which the administrator records allocations, deductions, and transfers of NO_x allowances under the NO_x budget trading program.

(LL) NO_x allowance tracking system account—An account in the NO_x allowance tracking system established by the administrator for purposes of recording the allocation, holding, transferring, or deducting of NO_x allowances.

(MM) NO_x allowance transfer deadline—Midnight of November 30 or, if November 30 is not a business day, midnight of the first business day thereafter and is the deadline by which NO_x allowances may be submitted for recordation in a NO_x budget unit's compliance account, or the overdraft account of the source where the unit is located, in order to meet the unit's NO_x budget emissions limitation for the control period immediately preceding such deadline.

(NN) NO_x authorized account representative—For a NO_x budget source or NO_x budget unit at the source, the natural person who is authorized by the owners and operators of the source and all NO_x budget units at the source, in accordance with subsection (3)(B) of this rule, to represent and legally bind each owner and operator in matters pertaining to the NO_x budget trading program or, for a general account, the natural person who is authorized, in accordance with subsection (3)(F) of this rule, to transfer or otherwise dispose of NO_x allowances held in the general account.

(OO) NO_x budget emissions limitation—For a NO_x budget unit, the tonnage equivalent of the NO_x allowances available for compliance deduction for the unit and for a control period under subparagraph (3)(F)5.A. or B. of this rule for the control period or to account for excess emissions for a prior control period under subparagraph (3)(F)5.D. of this rule or to account for withdrawal from the NO_x budget program.

(PP) NO_x budget permit—The legally binding and federally enforceable written document, or portion of such document, issued by the director, including any permit revisions, specifying the NO_x budget trading program requirements applicable to a NO_x budget source, to each NO_x budget unit at the NO_x budget source, and to the owners and operators and the NO_x authorized account representative of the NO_x budget source and each NO_x budget unit.

(QQ) NO_x budget source—A source that includes one (1) or more NO_x budget units.

(RR) NO_x budget trading program—A multi-state nitrogen oxides air pollution control and emission reduction program established in accordance with this rule and pursuant to 40 CFR 51.121, as a means of mitigating the interstate transport of ozone and nitrogen oxides, an ozone precursor.

(SS) NO_x budget unit—A unit that is subject to the NO_x budget trading program emissions limitation under section (1) or paragraph (3)(H)1. of this rule.

(TT) Operating—With regard to a unit under part (3)(C)3.D.(II) and paragraph (3)(H)1. of this rule, having documented heat input for more than eight hundred seventy-six (876) hours in the six (6) months immediately preceding the submission of an application for an initial NO_x budget permit under subparagraph (3)(H)4.A. of this rule.

(UU) Operator—Any person who operates, controls, or supervises a NO_x budget unit, or a NO_x budget source and shall include, but not be limited to, any holding company, utility system, or plant manager of such a unit or source.

(VV) Overdraft account—The NO_x allowance tracking system account, established by the administrator under subsection (3)(F) of this rule, for each NO_x budget source where there are two (2) or more NO_x budget units.

(WW) Owner—Any of the following persons:

1. Any holder of any portion of the legal or equitable title in a NO_x budget unit;
2. Any holder of a leasehold interest in a NO_x budget unit;
3. Any purchaser of power from a NO_x budget unit under a life-of-the-unit, firm power contractual arrangement. However, unless expressly provided for in a leasehold agreement, owner shall not include a passive lessor, or a person who has an equitable interest through such lessor, whose rental payments are not based, either directly or indirectly, upon the revenues or income from the NO_x budget unit; or
4. With respect to any general account, any person who has an ownership interest with respect to the NO_x allowances held in the general account and who is subject to the binding agreement for the NO_x authorized account representative to represent that person's ownership interest with respect to NO_x allowances.

(XX) Receive or receipt of—When referring to the director or the administrator, to come into possession of a document, information, or correspondence (whether sent in writing or by authorized electronic transmission), as indicated in an official correspondence log, or by a notation made on the document, information, or correspondence, by the director or the administrator in the regular course of business.

(YY) Recordation, record, or recorded—With regard to NO_x allowances, the movement of NO_x allowances by the administrator from one (1) NO_x allowance tracking system account to another, for purposes of allocation, transfer, or deduction.

(ZZ) Reference method—Any direct test method of sampling and analyzing for an air pollutant as specified in Appendix A of 40 CFR 60.

(AAA) Serial number—When referring to NO_x allowances, the unique identification number assigned to each NO_x allowance by the administrator, under subparagraph (3)(F)4.C. of this rule.

(BBB) Source—Any governmental, institutional, commercial, or industrial structure, installation, plant, building, or facility that emits or has the potential to emit any regulated air pollutant under the CAA. For purposes of section 502(c) of the CAA, a "source," including a "source" with multiple units, shall be considered a single "facility."

(CCC) State—One (1) of the forty-eight (48) contiguous states and the District of Columbia specified in 40 CFR 51.121, or any non-federal authority in or including such states or the District of Columbia (including local agencies, and statewide agencies) or any eligible Indian tribe in an area of such state or the District of Columbia, that adopts a NO_x budget trading program pursuant to 40 CFR 51.121. To the extent a state incorporates by reference the provisions of this part, the term "state" shall mean the incorporating state. The term "state" shall have its conventional meaning where such meaning is clear from the context.

(DDD) State trading program NO_x budget—The total number of tons apportioned to all NO_x budget units in a given state, in accordance with the NO_x budget trading program, for use in a given control period.

(EEE) Submit or serve—To send or transmit a document, information, or correspondence to the person specified in accordance with the applicable regulation—

1. In person;

2. By United States Postal Service; or

3. By other means of dispatch or transmission and delivery. Compliance with any "submission," "service," or "mailing" deadline shall be determined by the date of dispatch, transmission, or mailing and not the date of receipt.

(FFF) Title V operating permit—A permit issued under Title V of the CAA and 40 CFR 70 or 40 CFR 71.

(GGG) Title V operating permit regulations—The regulations that the administrator has approved or issued as meeting the requirements of Title V of the CAA and 40 CFR 70 or 40 CFR 71.

(HHH) Ton or tonnage—Any "short ton" (i.e., two thousand (2,000) pounds). For the purpose of determining compliance with the NO_x budget emissions limitation, total tons for a control period shall be calculated as the sum of all recorded hourly emissions (or the tonnage equivalent of the recorded hourly emissions rates) in accordance with section (4) of this rule, with any remaining fraction of a ton equal to or greater than 0.50 ton deemed to equal one (1) ton and any fraction of a ton less than 0.50 ton deemed to equal zero tons.

(III) Unit—a fossil fuel-fired stationary boiler, combustion turbine, or combined cycle system.

(JJJ) Unit load—The total (i.e., gross) output of a unit in any control period (or other specified time period) produced by combusting a given heat input of fuel, expressed in terms of:

1. The total electrical generation (MW) produced by the unit, including generation for use within the plant; or

2. In the case of a unit that uses heat input for purposes other than electrical generation, the total steam pressure (psia) produced by the unit, including steam for use by the unit.

(KKK) Unit operating day—A calendar day in which a unit combusts any fuel.

(LLL) Unit operating hour or hour of unit operation—Any hour or fraction of an hour during which a unit combusts fuel.

(MMM) Utilization—The heat input (expressed in mmBtu/time) for a unit. The unit's total heat input for the control period in each year will be determined in accordance with 40 CFR 75 if the NO_x budget unit was otherwise subject to the requirements of 40 CFR 75 for the year, or will be based on the best available data reported to the administrator for the unit if the unit was not otherwise subject to the requirements of 40 CFR 75 for the year.

(NNN) Definitions of certain terms specified in this rule, other than those defined in this rule section, may be found in 10 CSR 10-6.020.

(3) General Provisions.

(A) Standard Requirements.

1. Permit requirements.

A. The NO_x authorized account representative of each NO_x budget source required to have a federally enforceable permit and each NO_x budget unit required to have a federally enforceable permit at the source shall:

(I) Submit to the director a complete NO_x budget permit application under paragraph (3)(C)3. of this rule in accordance with the deadlines specified in subparagraphs (3)(C)2.B. and C. of this rule; and

(II) Submit in a timely manner any supplemental information that the director determines is necessary in order to review a NO_x budget permit application and issue or deny a NO_x budget permit.

B. The owners and operators of each NO_x budget source required to have a federally enforceable permit and each NO_x budget unit required to have a federally enforceable permit at the source shall have a NO_x budget permit issued by the director and operate the unit in compliance with such NO_x budget permit.

C. The owners and operators of a NO_x budget source that is not otherwise required to have a federally enforceable permit are not required to submit a NO_x budget permit application, and to have a NO_x budget permit, under subsection (3)(C) of this rule for such NO_x budget source.

2. Monitoring requirements.

A. The owners and operators and, to the extent applicable, the NO_x authorized account representative of each NO_x budget source and each NO_x budget unit at the source shall comply with the monitoring requirements of section (4) of this rule.

B. The emissions measurements recorded and reported in accordance with section (4) of this rule shall be used to determine compliance by the unit with the NO_x budget emissions limitation under paragraph (3)(A)3. of this rule.

3. Nitrogen oxides requirements.

A. The owners and operators of each NO_x budget source and each NO_x budget unit at the source shall hold NO_x allowances available for compliance deductions under paragraph (3)(F)5. of this rule, as of the NO_x allowance transfer deadline, in the unit's compliance account and the source's overdraft account in an amount not less than the total emissions for the control period from the unit, as determined in accordance with section (4) of this rule.

B. Each ton of nitrogen oxides emitted in excess of the NO_x budget emissions limitation shall constitute a separate violation of this rule, the CAA, and applicable state law.

C. A NO_x budget unit shall be subject to the requirements under subparagraph (3)(A)3.A. of this rule starting on the later of May 1, 2007 or the date on which the unit commences operation.

D. NO_x allowances shall be held in, deducted from, or transferred among NO_x allowance tracking system accounts in accordance with subsections (3)(E), (F), (G), and (H) of this rule.

E. A NO_x allowance shall not be deducted, in order to comply with the requirements under subparagraph (3)(A)3.A. of this rule, for a control period in a year prior to the year for which the NO_x allowance was allocated.

F. A NO_x allowance allocated by the director or the administrator under the NO_x budget trading program is a limited authorization to emit one (1) ton of nitrogen oxides in accordance with the NO_x budget trading program. No provision of the NO_x budget trading program, the NO_x budget permit application, the NO_x budget permit, or an exemption under subsection (1)(E) of this rule and no provision of law shall be construed to limit the authority of the United States or the state to terminate or limit such authorization.

G. A NO_x allowance allocated by the director or the administrator under the NO_x budget trading program does not constitute a property right.

H. Upon recordation by the administrator under subsections (3)(F), (G), or (H) of this rule, every allocation, transfer, or deduction of a NO_x allowance to or from a NO_x budget unit's compliance account or the overdraft account of the source where the unit is located is deemed to amend automatically, and become a part of, any NO_x budget permit of the NO_x budget unit by operation of law without any further review.

4. Excess emissions requirements. The owners and operators of a NO_x budget unit that has excess emissions in any control period shall:

A. Surrender the NO_x allowances required for deduction under part (3)(F)5.D.(I) of this rule; and

B. Pay any fine, penalty, or assessment or comply with any other remedy imposed under part (3)(F)5.D.(III) of this rule.

5. Record keeping and reporting requirements.

A. Unless otherwise provided, the owners and operators of the NO_x budget source and each NO_x budget unit at the source shall keep on-site at the source each of the following documents for a period of five (5) years from the date the document is created. This period may be extended for cause, at any time prior to the end of five (5) years, in writing by the director or the administrator.

(I) The account certificate of representation for the NO_x authorized account representative for the source and each NO_x budget unit at the source and all documents that demonstrate the truth of the statements in the account certificate of representation, in accordance with paragraph (3)(B)4.; provided that the certificate and documents shall be retained on-site at the source beyond such five (5)-year period until such documents are superseded because of the submission of a new account certificate of representation changing the NO_x authorized account representative.

(II) All emissions monitoring information, in accordance with section (4) of this rule; provided that to the extent that section (4) of this rule provides for a three (3)-year period for record keeping, the three (3)-year period shall apply.

(III) Copies of all reports, compliance certifications, and other submissions and all records made or required under the NO_x budget trading program.

(IV) Copies of all documents used to complete a NO_x budget permit application and any other submission under the NO_x budget trading program or to demonstrate compliance with the requirements of the NO_x budget trading program.

B. The NO_x authorized account representative of a NO_x budget source and each NO_x budget unit at the source shall submit the reports and compliance certifications required under the NO_x budget trading program, including those under subsections (3)(D), (3)(H), or section (4) of this rule.

6. Liability.

A. Any person who knowingly violates any requirement or prohibition of the NO_x budget trading program, a NO_x budget permit, or an exemption under subsection (1)(E) of this rule shall be subject to enforcement pursuant to applicable state or federal law.

B. Any person who knowingly makes a false material statement in any record, submission, or report under the NO_x budget trading program shall be subject to criminal enforcement pursuant to the applicable state or federal law.

C. No permit revision shall excuse any violation of the requirements of the NO_x budget trading program that occurs prior to the date that the revision takes effect.

D. Each NO_x budget source and each NO_x budget unit shall meet the requirements of the NO_x budget trading program.

E. Any provision of the NO_x budget trading program that applies to a NO_x budget source (including a provision applicable to the NO_x authorized account representative of a NO_x budget source) shall also apply to the owners and operators of such source and of the NO_x budget units at the source.

F. Any provision of the NO_x budget trading program that applies to a NO_x budget unit (including a provision applicable to the NO_x authorized account representative of a NO_x budget unit) shall also apply to the owners and operators of such unit. Except with regard to the requirements applicable to units with a common stack under section (4) of this rule, the owners and operators and the NO_x authorized account representative of one NO_x budget unit shall not be liable for any violation by any other NO_x budget unit of which they are not owners or operators or the NO_x authorized account representative and that is located at a source of which they are not owners or operators or the NO_x authorized account representative.

7. Effect on other authorities. No provision of the NO_x budget trading program, a NO_x budget permit application, a NO_x budget permit, or an exemption under subsection (1)(E) of this rule shall be construed as exempting or excluding the owners and operators and, to the extent applicable, the NO_x authorized account representative of a NO_x budget source or NO_x budget unit from compliance with any other provision of the applicable, approved state implementation plan, a federally enforceable permit, or the CAA.

(B) NO_x Authorized Account Representative for NO_x Budget Sources.

1. Responsibilities of the NO_x authorized account representative.

A. Except as provided under paragraph (3)(B)2. of this rule, each NO_x budget source, including all NO_x budget units at the source, shall have one (1) and only one (1) NO_x authorized account representative, with regard to all matters under the NO_x budget trading program concerning the source or any NO_x budget unit at the source.

B. The NO_x authorized account representative of the NO_x budget source shall be selected by an agreement binding on the owners and operators of the source and all NO_x budget units at the source.

C. Upon receipt by the administrator of a complete account certificate of representation under paragraph (3)(B)4. of this rule, the NO_x authorized account representative of the source shall represent and, by his or her representations, actions, inactions, or submissions, legally bind each owner and operator of the NO_x budget source represented and each NO_x budget unit at the source in all matters pertaining to the NO_x budget trading program, not withstanding any agreement between the NO_x authorized account representative and such owners and operators. The owners and operators shall be bound by any decision or order issued to the NO_x authorized account representative by the director, the administrator, or a court regarding the source or unit.

D. No NO_x budget permit shall be issued, and no NO_x allowance tracking system account shall be established for a NO_x budget unit at a source, until the administrator has received a complete account certificate of representation under paragraph (3)(B)4. of this rule for a NO_x authorized account representative of the source and the NO_x budget units at the source.

E. NO_x budget trading program submissions.

(I) Each submission under the NO_x budget trading program shall be submitted, signed, and certified by the NO_x authorized account representative for each NO_x budget source on behalf of which the submission is made. Each such submission shall include the following certification statement by the NO_x authorized account representative: "I am authorized to make this submission on behalf of the owners and operators of the NO_x budget sources or NO_x budget units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment."

(II) The director and the administrator will accept or act on a submission made on behalf of owner or operators of a NO_x budget source or a NO_x budget unit only if the submission has been made, signed, and certified in accordance with part (3)(B)1.E.(I) of this rule.

2. Alternate NO_x authorized account representative.

A. An account certificate of representation may designate one (1) and only one (1) alternate NO_x authorized account representative who may act on behalf of the NO_x authorized account representative. The agreement by which the alternate NO_x authorized account representative is selected shall include a procedure for authorizing the alternate NO_x authorized account representative to act in lieu of the NO_x authorized account representative.

B. Upon receipt by the administrator of a complete account certificate of representation under paragraph (3)(B)4. of this rule, any representation, action, inaction, or submission by the alternate NO_x authorized account representative shall be deemed to be a representation, action, inaction, or submission by the NO_x authorized account representative.

C. Except in paragraphs (3)(B)2. through 4., (3)(F)2. and subparagraph (3)(B)1.A. of this rule, whenever the term "NO_x authorized account representative" is used in this part, the term shall be construed to include the alternate NO_x authorized account representative.

3. Changing the NO_x authorized account representative and the alternate NO_x authorized account representative; changes in the owners and operators.

A. Changing the NO_x authorized account representative. The NO_x authorized account representative may be changed at any time upon receipt by the administrator of a superseding complete account certificate of representation under paragraph (3)(B)4. of this rule. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous NO_x authorized account representative prior to the time and date when the administrator receives the superseding account certificate of representation shall be binding on the new NO_x authorized account representative and the owners and operators of the NO_x budget source and the NO_x budget units at the source.

B. Changing the alternate NO_x authorized account representative. The alternate NO_x authorized account representative may be changed at any time upon receipt by the administrator of a superseding complete account certificate of representation under paragraph (3)(B)4. of this rule. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous alternate NO_x authorized account representative prior to the time and date when the administrator receives the superseding account certificate of representation shall be binding on the new alternate NO_x authorized account representative and the owners and operators of the NO_x budget source and the NO_x budget units at the source.

C. Changes in the owners and operators.

(I) In the event a new owner or operator of a NO_x budget source or a NO_x budget unit is not included in the list of owners and operators submitted in the account certificate of representation, such new owner or operator shall be deemed to be subject to and bound by the account certificate of representation, the representations, actions, inactions, and submissions of the NO_x authorized account representative and any alternate NO_x authorized account representative of the source or unit, and the decisions, orders, actions, and inactions of the director or the administrator, as if the new owner or operator were included in such list.

(II) Within thirty (30) days following any change in the owners or operators of a NO_x budget source or a NO_x budget unit, including the addition of a new owner or operator, the NO_x authorized account representative or alternate NO_x authorized account representative shall submit a revision to the account certificate of representation amending the list of owners and operators to include the change.

4. Account certificate of representation.

A. A complete account certificate of representation for a NO_x authorized account representative or an alternate NO_x authorized account representative shall include the following elements in a format prescribed by the administrator:

(I) Identification of the NO_x budget source and each NO_x budget unit at the source for which the account certificate of representation is submitted.

(II) The name, address, e-mail address (if any), telephone number, and facsimile transmission number (if any) of the NO_x authorized account representative and any alternate NO_x authorized account representative.

(III) A list of the owners and operators of the NO_x budget source and of each NO_x budget unit at the source.

(IV) The following certification statement by the NO_x authorized account representative and any alternate NO_x authorized account representative: "I certify that I was selected as the NO_x authorized account representative or alternate NO_x authorized account representative, as applicable, by an agreement binding on the owners and operators of the NO_x budget source and each NO_x budget unit at the source. I certify that I have all the necessary authority to carry out my duties and responsibilities under the NO_x budget trading program on behalf of the owners and operators of the NO_x budget source and of each NO_x budget unit at the source and that each such owner and operator shall be fully bound by my representations, actions, inactions, or submissions and by any decision or order issued to me by the director, the administrator, or a court regarding the source or unit."

(V) The signature of the NO_x authorized account representative and any alternate NO_x authorized account representative and the dates signed.

B. Unless otherwise required by the director or the administrator, documents of agreement referred to in the account certificate of representation shall not be submitted to the director or the administrator. Neither the director nor the administrator shall be under any obligation to review or evaluate the sufficiency of such documents, if submitted.

5. Objections concerning the NO_x authorized account representative.

A. Once a complete account certificate of representation under paragraph (3)(B)4. of this rule has been submitted and received, the director and the administrator will rely on the account certificate of representation unless and until a superseding complete account certificate of representation under paragraph (3)(B)4. of this rule is received by the administrator.

B. Except as provided in subparagraph (3)(B)3.A. or B. of this rule, no objection or other communication submitted to the director or the administrator concerning the authorization, or any representation, action, inaction, or submission of the NO_x authorized account representative shall affect any representation, action, inaction, or submission of the NO_x authorized account representative or the finality of any decision or order by the director or the administrator under the NO_x budget trading program.

C. Neither the director nor the administrator will adjudicate any private legal dispute concerning the authorization or any representation, action, inaction, or submission of any NO_x authorized account representative, including private legal disputes concerning the proceeds of NO_x allowance transfers.

(C) NO_x Budget Permits.

1. General NO_x budget trading program permit requirements.

A. For each NO_x budget source required to have a federally enforceable permit, such permit shall include a NO_x budget permit administered by the director.

(I) For NO_x budget sources required to have a Title V operating permit, the NO_x budget portion of the Title V permit shall be administered in accordance with the director's Title V operating permits regulations promulgated under 40 CFR 70 or 71, except as provided otherwise by subsection (3)(C) or (H) of this rule.

(II) For NO_x budget sources required to have a non-Title V permit, the NO_x budget portion of the non-Title V permit shall be administered in accordance with the director's regulations promulgated to administer non-Title V permits, except as provided otherwise by subsection (3)(C) or (H) of this rule.

B. Each NO_x budget permit (including a draft or proposed NO_x budget permit, if applicable) shall contain all applicable NO_x budget trading program requirements and shall be a complete and segregable portion of the permit under subparagraph (3)(C)1.A. of this rule.

2. Submission of NO_x budget permit applications.

A. The NO_x authorized account representative of any NO_x budget source required to have a federally enforceable permit shall submit to the director a complete NO_x budget permit application under paragraph (3)(C)3. of this rule by the applicable deadline in subparagraph (3)(C)3.B. of this rule.

B. Application time.

(I) For NO_x budget sources required to have a Title V operating permit:

(a) For any source, with one (1) or more NO_x budget units under section (1) of this rule that commence operation before January 1, 2006, the NO_x authorized account representative shall submit a complete NO_x budget permit application under paragraph (3)(C)3. of this rule covering such NO_x budget units to the director at least eighteen (18) months (or such lesser time provided under the director's Title V operating permits regulations for final action on a permit application) before May 1, 2007.

(b) For any source, with any NO_x budget unit under section (1) of this rule that commences operation on or after January 1, 2006, the NO_x authorized account representative shall submit a complete NO_x budget permit application under paragraph (3)(C)3. of this rule covering such NO_x budget unit to the director at least eighteen (18) months (or such lesser time provided under the director's Title V operating permits regulations for final action on a permit application) before the later of May 1, 2007 or the date on which the NO_x budget unit commences operation.

(II) For NO_x budget sources required to have a non-Title V permit:

(a) For any source, with one (1) or more NO_x budget units under section (1) of this rule that commence operation before January 1, 2006, the NO_x authorized account representative shall submit a complete NO_x budget permit application under paragraph (3)(C)3. of this rule covering such NO_x budget units to the director at least eighteen (18) months (or such lesser time provided under the director's non-Title V permits regulations for final action on a permit application) before May 1, 2007.

(b) For any source, with any NO_x budget unit under section (1) of this rule that commences operation on or after January 1, 2006, the NO_x authorized account representative shall submit a complete NO_x budget permit application under paragraph (3)(C)3. of this rule covering such NO_x budget unit to the director at least eighteen (18) months (or such lesser time provided under the director's non-Title V permits regulations for final action on a permit application) before the later of May 1, 2007 or the date on which the NO_x budget unit commences operation.

C. Duty to reapply.

(I) For a NO_x budget source required to have a Title V operating permit, the NO_x authorized account representative shall submit a complete NO_x budget permit application under paragraph (3)(C)3. of this rule for the NO_x budget source covering the NO_x budget units at the source in accordance with the director's Title V operating permits regulations addressing operating permit renewal.

(II) For a NO_x budget source required to have a non-Title V permit, the NO_x authorized account representative shall submit a complete NO_x budget permit application under paragraph (3)(C)3. of this rule for the NO_x budget source covering the NO_x budget units at the source in accordance with the director's non-Title V permits regulations addressing permit renewal.

3. Information requirements for NO_x budget permit applications. A complete NO_x budget permit application shall include the following elements concerning the NO_x budget source for which the application is submitted, in a format prescribed by the director:

A. Identification of the NO_x budget source, including plant name and the Office of Regulatory Information Systems (ORIS) or facility code assigned to the source by the Energy Information Administration, if applicable;

B. Identification of each NO_x budget unit at the NO_x budget source and whether it is a NO_x budget unit under section (1) of this rule or under subsection (3)(H) of this rule; and

C. The standard requirements under subsection (3)(A) of this rule.

4. NO_x budget permit contents.

A. Each NO_x budget permit (including any draft or proposed NO_x budget permit, if applicable) will contain, in a format prescribed by the director, all elements required for a complete NO_x budget permit application under paragraph (3)(C)3. of this rule as approved or adjusted by the director.

B. Each NO_x budget permit is deemed to incorporate automatically the definitions of terms under section (2) of this rule and, upon recordation by the administrator under subsections (3)(F), (G), or (H) of this rule, every allocation, transfer, or deduction of a NO_x allowance to or from the compliance accounts of the NO_x budget units covered by the permit or the overdraft account of the NO_x budget source covered by the permit.

5. Effective date of initial NO_x budget permit. The initial NO_x budget permit covering a NO_x budget unit for which a complete NO_x budget permit application is timely submitted under subparagraph (3)(C)2.B.of this rule shall become effective by the later of:

A. May 1, 2007;

B. May 1 of the year in which the NO_x budget unit commences operation, if the unit commences operation on or before May 1 of that year;

C. The date on which the NO_x budget unit commences operation, if the unit commences operation during a control period; or

D. May 1 of the year following the year in which the NO_x budget unit commences operation, if the unit commences operation on or after October 1 of the year.

6. NO_x budget permit revisions.

A. For a NO_x budget source with a Title V operating permit, except as provided in subparagraph (3)(C)4.B. of this rule, the director will revise the NO_x budget permit, as necessary, in accordance with the director's Title V operating permits regulations addressing permit revisions.

B. For a NO_x budget source with a non-Title V permit, except as provided in subparagraph (3)(C)4.B. of this rule, the director will revise the NO_x budget permit, as necessary, in accordance with the director's non-Title V permits regulations addressing permit revisions.

(D) Compliance Certification.

1. Compliance certification report.

A. For each control period in which one (1) or more NO_x budget units at a source are subject to the NO_x budget emissions limitation, the NO_x authorized account representative of the source shall submit to the director and the administrator by November 30 of that year, a compliance certification report for each source covering all such units.

B. The NO_x authorized account representative shall include in the compliance certification report under subparagraph (3)(D)1.A. of this rule the following elements, in a format prescribed by the administrator, concerning each unit at the source and subject to the NO_x budget emissions limitation for the control period covered by the report:

(I) Identification of each NO_x budget unit;

(II) At the NO_x authorized account representative's option, the serial numbers of the NO_x allowances that are to be deducted from each unit's compliance account under paragraph (3)(F)5. of this rule for the control period;

(III) At the NO_x authorized account representative's option, for units sharing a common stack and having emissions that are not monitored separately or apportioned in accordance with section (4) of this rule, the percentage of NO_x allowances that is to be deducted from each unit's compliance account under subparagraph (3)(F)5.E. of this rule; and

(IV) The compliance certification under subparagraph (3)(D)1.C. of this rule.

C. In the compliance certification report under subparagraph (3)(D)1.A. of this rule, the NO_x authorized account representative shall certify, based on reasonable inquiry of those persons with primary responsibility for operating the source and the NO_x budget units at the source in compliance with the NO_x budget trading program, whether each NO_x budget unit for which the compliance certification is submitted was operated during the calendar year covered by the report in compliance with the requirements of the NO_x budget trading program applicable to the unit, including:

(I) Whether the unit was operated in compliance with the NO_x budget emissions limitation;

(II) Whether the monitoring plan that governs the unit has been maintained to reflect the actual operation and monitoring of the unit, and contains all information necessary to attribute emissions to the unit, in accordance with section (4) of this rule;

(III) Whether all the emissions from the unit, or a group of units (including the unit) using a common stack, were monitored or accounted for through the missing data procedures and reported in the quarterly monitoring reports, including whether conditional data were reported in the quarterly reports in accordance with section (4) of this rule. If conditional data were reported, the owner or operator shall indicate whether the status of all conditional data has been resolved and all necessary quarterly report resubmissions have been made;

(IV) Whether the facts that form the basis for certification under section (4) of this rule of each monitor at the unit or a group of units (including the unit) using a common stack, or for using an excepted monitoring method or alternative monitoring method approved under section (4) of this rule, if any, has changed; and

(V) If a change is required to be reported under part (3)(D)1.C.(IV) of this rule, specify the nature of the change, the reason for the change, when the change occurred, and how the unit's compliance status was determined subsequent to the change, including what method was used to determine emissions when a change mandated the need for monitor recertification.

2. Director's and administrator's action on compliance certifications.

A. The director or the administrator may review and conduct independent audits concerning any compliance certification or any other submission under the NO_x budget trading program and make appropriate adjustments of the information in the compliance certifications or other submissions.

B. The administrator may deduct NO_x allowances from or transfer NO_x allowances to a unit's compliance account or a source's overdraft account based on the information in the compliance certifications or other submissions, as adjusted under subparagraph (3)(D)2.A. of this rule.

(E) NO_x Allowance Allocations.

1. The state trading program NO_x budget allocated by the director under paragraphs (3)(E)2. and (3)(E)3. of this rule for a control period will equal the total number of tons of emissions apportioned to the NO_x budget units in Missouri for the control period, as determined by the applicable, approved state implementation plan.

2. The following NO_x budget units shall be allocated NO_x allowances for each control period in accordance with Table I of paragraph (3)(E)2.

_Table I

NO_x Budget Unit	**Unit**	**Percentage of 1995 Heat Input**	**NO_x Allowances by Unit**
Associated Electric Cooperative—	1	8.49	1126

New Madrid			
Associated Electric Cooperative—New Madrid	2	8.91	1182
Ameren—Howard Bend	1	0.02	3
Ameren—Labadie	1	8.64	1146
Ameren—Labadie	2	9.52	1263
Ameren—Labadie	3	10.92	1449
Ameren—Labadie	4	10.09	1339
Ameren—Meramec	1	0.86	114
Ameren—Meramec	2	0.66	88
Ameren—Meramec	3	1.14	152
Ameren—Meramec	4	2.11	280
Ameren—Meramec	5	0.04	5
Ameren—Rush Island	1	10.59	1405
Ameren—Rush Island	2	10.52	1395
Ameren—Sioux	1	6.10	809
Ameren—Sioux	2	5.47	726
Ameren—Viaduct	1	0.03	4
City of Sikeston	1	5.88	780
Energy efficiency and renewable generation projects set-aside			134

3. The following existing non-EGU boilers shall be allocated NOx allowances for each control period in accordance with Table II of paragraph (3)(E)3.

Table II

Non-EGUs Boilers	**Unit**	**NO_x Limitation per Unit Tons Per Ozone Season**
Anheuser Busch	6	14
Trigen Ashley Street Station Boiler	5	9
Trigen Ashley Street Station Boiler	6	36

4. Any unit subject to subsection (1)(B) other than those listed in Tables I and II of this subsection will not be allocated NO_x budget allowances under this rule.

5. *Reserved*

6. Any person seeking set aside NO_x allowances for energy efficiency and renewable generation projects shall meet the requirements of paragraph (3)(E)6. of this rule.

A. The purpose for establishing these set-asides is to allocate NO_x allowances to serve as incentives for saving or generating electricity through the implementation of energy efficiency and renewable generation projects as defined in this section.

(I) Each energy efficiency and renewable generation set-aside shall contain the number of NO_x allowances as provided in Table I of this subsection.

(II) Awards of NO_x allowances will be available only to eligible energy efficiency or renewable generation projects that—

(a) Commence operation after September 1, 2005;

(b) Reduce electricity use, generate electricity from renewable resources or provide combined heat and power benefits during the period of May 1 through September 30, 2006, or subsequent control periods; and

(c) In an application submitted by November 30 of each year, include adequate documentation of these energy savings, renewable energy generation or combined heat and power benefits.

(III) Projects will be awarded NO_x allowances denominated for the control period following the control period during which the qualifying project activities took place. For example, sponsors of project activities that take place during the 2006 control period will receive NO_x allowances denominated for the 2007 control period.

(IV) Projects may qualify for awards from the set-aside for up to five (5) consecutive control periods.

(V) Department actions on applications for awards from the set-aside. The department shall act upon applications as follows:

(a) By March 1 preceding the control period for which NO_x allowances are requested, the department shall take the following actions:

I. For each application, the department shall determine whether the project is eligible and the application is complete and shall notify the applicant of its determination.

II. For the eligible and complete applications, the department shall calculate the total number of NO_x allowances which the projects are qualified to receive, not to exceed the total number of NO_x allowances allocated to the set-aside as provided in Table I of this subsection, and shall award said NO_x allowances to eligible energy efficiency or renewable generation projects.

(b) If the number of NO_x allowances awarded is fewer than NO_x allowances allocated to the set-aside as provided in Table I of this subsection, the department shall transfer surplus NO_x allowances to the accounts of the electric utilities listed in Table I of this subsection on a pro rata basis in the same proportion as allocations to NO_x budget units set forth in Table I of this subsection.

(c) If the number of NO_x allowances claimed for award is more than NO_x allowances allocated to the set-aside as provided in Table I of this subsection, the department shall determine awards based on each applicant's position in an eligible projects queue that will be established by the department.

B. Project eligibility. Allocations from the energy efficiency and renewable generation set-aside may be requested by any entity, including an electric utility listed in Table I of this subsection or its affiliate, that implements and demonstrates eligible projects as defined in this subparagraph.

(I) Eligibility requirements. The department shall establish requirements for project eligibility and shall determine which projects are eligible to receive awards from the set-aside.

(II) Only the following shall be eligible for awards from the set-aside:

(a) Energy efficiency projects resulting in reduced or more efficient electricity use through the voluntary modification of maintenance and operating procedures in a building or facility or the voluntary installation, replacement, or modification of equipment, fixtures, or materials in a building or facility.

I. Energy efficiency projects may be directed toward or located within buildings or facilities owned, leased, operated or controlled by an electric utility listed in Table I of this subsection or its affiliate. Eligibility requirements for these projects shall be the same as for any other energy efficiency project.

II. Energy efficiency projects may include demand side programs that result in reduced or more efficient electricity use;

(b) Renewable generation projects, including electric generation from wind, photovoltaic systems, biogas, geothermal and hydropower projects. Renewable generation projects do not include nuclear power projects. Eligible biogas projects include projects to generate electricity from methane gas captured from sanitary landfills, wastewater treatment plants, sewage treatment plants or agricultural livestock waste treatment systems. Eligible hydropower projects are restricted to systems—

I. That are certified by the Low Impact Hydropower Institute;

II. That employ a head of ten feet (10') or less; or

III. Employing a head greater than ten feet (10') that make use of a dam that existed prior to the effective date of this rule;

(c) Renewable biomass generation projects including projects in which one (1) or more biomass fuels is fired separately or co-fired with one (1) or more fossil fuels to generate electricity. Biomass includes wood and wood waste, energy crops such as switchgrass and agricultural wastes such as crop and animal waste. Electric generation from combustion of municipal solid waste is not included; and

(d) Combined heat and power projects that use integrated technologies, including cogeneration, which convert fuel to electric, thermal, and mechanical energy for on-site or local use. In the case of electricity generation combined heat and power can include export of power to the local electric utility transmission grid. The thermal energy from combined heat and power systems can be created and used in the form of steam, hot or chilled water for process, space heating or cooling, or other applications. To be eligible, the combined heat and power installation must meet or exceed technology-specific efficiency thresholds that will be established by the department.

(III) Additional eligibility requirements shall include the following:

(a) NO_x authorized account representative must be designated for the project on forms provided by the department;

(b) Only projects that are not required by federal government regulation and that are not and will not be used to generate compliance or permitting credits otherwise in the SIP are eligible to receive NO_x allowances from the set-aside;

(c) Only projects that equal at least one (1) ton of NO_x emissions, using conventional arithmetic rounding, are eligible to receive NO_x allowances from the set-aside. Multiple projects may be aggregated into a single NO_x allowance allocation request to equal one (1) or more tons of NO_x emissions;

(d) Only projects that commence operation after September 1, 2005 are eligible to receive NO_x allowances from the set-aside;

(e) Location of the project:

I. Renewable generation projects and renewable biomass generation projects, as defined in subpart (3)(E)6.B.(II)(C) of this rule located anywhere in the state of Missouri are eligible if the generation facility meets all other eligibility requirements and—

a. The facility is owned, leased, operated or controlled by an electric utility listed in Table I of this subsection or an affiliate and generates electricity that is primarily intended to be marketed or distributed to end users who are included in the utility's native load or who are located in the Missouri SIP region; or

b. The facility supplies power through a power purchase contract to an electric utility listed in Table I of this subsection or an affiliate and the power purchased is primarily intended to be marketed or distributed to end users who are included in the utility's native load or who are located in the Missouri SIP region.

II. Energy efficiency projects and combined heat and power projects, as defined in subpart (3)(E)6.B.(II)(d) of this rule, must be located in the area described in subsection (1)(A) of this rule to be eligible to receive NO_x allowances from the set-aside.

(IV) Pre-application eligibility review. Project sponsors may request a pre-application eligibility review preceding project activities that will serve as the basis for an application for awards from the set-aside. The review will cover eligibility requirements that can be determined prior to receipt of a complete application for awards. The request for early eligibility review must be submitted on forms provided by the department.

(V) Eligibility for any project may be claimed by only one (1) entity. The department shall determine procedures to be followed if multiple claims of eligibility for the same project are received.

C. Applications and calculations of awards. To qualify for an award of NO_x allowances from the set-aside an applicant must meet the following requirements:

(I) The project must be eligible as provided in paragraph (3)(E)6. of this rule;

(II) A complete application must be received by the last business day of November following the period of May 1 through September 30 during which the eligible project activities occurred. The application shall—

(a) Be prepared on forms provided by the department and must be submitted by the project's NO_x authorized account representative;

(b) Be submitted with certification by a professional engineer attesting that information and calculations submitted in the application are complete and accurate.

I. The department shall have the right to require verification of data and calculations that are presented in an application as a condition for awarding NO_x allowances to the applicant; and

II. Verification may include site visits by agents of the department;

(c) Demonstrate electricity savings or renewable generation and calculate the NO_x allowance award requested using methods that adhere to measurement and verification standards approved by the department; and

(d) If the applicant intends to reapply in subsequent years, the application must indicate the stream of benefits that is expected in subsequent years;

(III) The department shall determine methods for calculating awards of NO_x allowances based upon the following principles:

(a) NO_x allowances awarded to end-use electrical energy efficiency projects shall be calculated as the number of megawatt hours (MWh) of electricity saved during a control period multiplied by an emissions factor of 1.5 pounds of NO_x per MWh appropriately converted and rounded to tons using conventional arithmetic rounding. The department shall provide a factor to adjust the calculation of electricity saved to account for transmission and distribution line losses;

(b) NO_x allowances awarded to renewable generation projects from wind, photovoltaic systems, biogas, geothermal and hydropower projects shall be calculated as the number of kilowatt hours of electricity generated during a control period multiplied by an emissions factor of 1.5 pounds of NO_x per MWh appropriately converted and rounded to tons using conventional arithmetic rounding;

(c) NO_x allowances awarded to renewable biomass generation projects shall be calculated based on net NO_x emission reductions, appropriately converted and rounded to tons using conventional arithmetic rounding where—

I. Net NO_x emissions shall be calculated as the number of kilowatt hours of electricity generated during a control period multiplied by an emissions factor of 1.5 pounds of NO_x per MWh, minus the tons of NO_x emitted by the renewable generating project during the control period; and

II. When biomass is co-fired with other fuels, its share of electric generation and NO_x emissions shall be calculated based on its share of the total heat content of all fuels used in the co-firing process; and

(d) The department shall determine methods for calculating NO_x allowances for combined heat and power projects; and

(IV) A project's NO_x authorized account representative may reapply for set-aside awards for up to five (5) consecutive control periods by meeting the following requirements:

(a) Reapplication must be received by the last business day of November following the last day of the control period during which the energy efficiency and renewable electric generation activities took place;

(b) The reapplication must be prepared on forms provided by the department and must be submitted by the project's NO_x authorized account representative; and

(c) The application must be submitted with certification by a professional engineer attesting that information and calculations submitted in the application are complete and accurate.

(F) NO_x Allowance Tracking System.

1. NO_x allowance tracking system accounts.

A. Nature and function of compliance accounts and overdraft accounts. Consistent with subparagraph (3)(F)2.A. of this rule, the administrator will establish one (1) compliance account for each NO_x budget unit and one (1) overdraft account for each source with one (1) or more NO_x budget units. Allocations of NO_x allowances pursuant to subsection (3)(E) or paragraph (3)(H)9. of this rule and deductions or transfers of NO_x allowances pursuant to paragraphs (3)(D)2., (3)(F)5., (3)(F)7., subsection (3)(G), or subsection (3)(H) of this rule will be recorded in the compliance accounts or overdraft accounts in accordance with subsection (3)(F) of this rule.

B. Nature and function of general accounts. Consistent with subparagraph (3)(F)2.B. of this rule, the administrator will establish, upon request, a general account for any person. Transfers of NO_x allowances pursuant to subsection (3)(G) of this rule will be recorded in the general account in accordance with subsection (3)(F) of this rule.

2. Establishment of accounts.

A. Compliance accounts and overdraft accounts. Upon receipt of a complete account certificate of representation under paragraph (3)(B)4. of this rule, the administrator will establish—

(I) A compliance account for each NO_x budget unit for which the account certificate of representation was submitted; and

(II) An overdraft account for each source for which the account certificate of representation was submitted and that has two (2) or more NO_x budget units.

B. General accounts.

(I) Any person may apply to open a general account for the purpose of holding and transferring NO_x allowances. A complete application for a general account shall be submitted to the administrator and shall include the following elements in a format prescribed by the administrator:

(a) Name, mailing address, e-mail address (if any), telephone number, and facsimile transmission number (if any) of the NO_x authorized account representative and any alternate NO_x authorized account representative;

(b) At the option of the NO_x authorized account representative, organization name and type of organization;

(c) A list of all persons subject to a binding agreement for the NO_x authorized account representative or any alternate NO_x authorized account representative to represent their ownership interest with respect to the NO_x allowances held in the general account;

(d) The following certification statement by the NO_x authorized account representative and any alternate NO_x authorized account representative: "I certify that I was selected as the NO_x authorized account representative or the alternate NO_x authorized account representative, as applicable, by an agreement that is binding on all persons who have an ownership interest with respect to NO_x allowances held in the general account. I certify that I have all the necessary authority to carry out my duties and responsibilities under the NO_x budget trading program on behalf of such persons and that each such person shall be fully bound by my representations, actions, inactions, or submissions and by any order or decision issued to me by the administrator or a court regarding the general account.";

(e) The signature of the NO_x authorized account representative and any alternate NO_x authorized account representative and the dates signed; and

(f) Unless otherwise required by the director or the administrator, documents of agreement referred to in the account certificate of representation shall not be submitted to the permitting authority or the administrator. Neither the director nor the administrator shall be under any obligation to review or evaluate the sufficiency of such documents, if submitted.

(II) Upon receipt by the administrator of a complete application for a general account under part (3)(F)2.B.(I) of this rule:

(a) The administrator will establish a general account for the person or persons for whom the application is submitted;

(b) The NO_x authorized account representative and any alternate NO_x authorized account representative for the general account shall represent and, by his or her representations, actions, inactions, or submissions, legally bind each person who has an ownership interest with respect to NO_x allowances held in the general account in all matters pertaining to the NO_x budget trading program, notwithstanding any agreement between the NO_x authorized account representative or any alternate NO_x authorized account representative and such person. Any such person shall be bound by any order or decision issued to the NO_x authorized account representative or any alternate NO_x authorized account representative by the administrator or a court regarding the general account;

(c) Each submission concerning the general account shall be submitted, signed, and certified by the NO_x authorized account representative or any alternate NO_x authorized account representative for the persons having an ownership interest with respect to NO_x allowances held in the general account. Each such submission shall include the following certification statement by the NO_x authorized account representative or any alternate NO_x authorized account representative: “I am authorized to make this submission on behalf of the persons having an ownership interest with respect to the NO_x allowances held in the general account. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.”; and

(d) The administrator will accept or act on a submission concerning the general account only if the submission has been made, signed, and certified in accordance with subpart (3)(F)2.B.(II)(c) of this rule.

(III) NO_x authorized account representative for general accounts.

(a) An application for a general account may designate one (1) and only one (1) NO_x authorized account representative and one (1) and only one (1) alternate NO_x authorized account representative who may act on behalf of the NO_x authorized account representative. The agreement by which the alternate NO_x authorized account representative is selected shall include a procedure for authorizing the alternate NO_x authorized account representative to act in lieu of the NO_x authorized account representative.

(b) Upon receipt by the administrator of a complete application for a general account under part (3)(F)2.B.(I) of this rule, any representation, action, inaction, or submission by any alternate NO_x authorized account representative shall be deemed to be a representation, action, inaction, or submission by the NO_x authorized account representative.

(IV) Changes in account representatives for general accounts; changes in owners and operators.

(a) The NO_x authorized account representative for a general account may be changed at any time upon receipt by the administrator of a superseding complete application for a general account under part (3)(F)2.B.(I) of this rule. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous NO_x authorized account representative prior to the time and date when the administrator receives the superseding application for a general account shall be binding on the new NO_x authorized account representative and the persons with an ownership interest with respect to the NO_x allowances in the general account.

(b) The alternate NO_x authorized account representative for a general account may be changed at any time upon receipt by the administrator of a superseding complete application for a general account under part (3)(F)2.B.(I) of this rule. Notwithstanding any such change, all representations, actions, inactions, and submissions by the previous alternate NO_x authorized account representative prior to the time and date when the administrator receives the superseding application for a general account shall be binding on the new alternate NO_x authorized account representative and the persons with an ownership interest with respect to the NO_x allowances in the general account.

(c) Changes in the owners and operators.

I. In the event a new person having an ownership interest with respect to NO_x allowances in the general account is not included in the list of such persons in the account certificate of representation, such new person shall be deemed to be subject to and bound by the account certificate of representation, the representation, actions, inactions, and submissions of the NO_x authorized account representative and any alternate NO_x authorized account representative of the source or unit, and the decisions, orders, actions, and inactions of the administrator, as if the new person were included in such list.

II. Within thirty (30) days following any change in the persons having an ownership interest with respect to NO_x allowances in the general account, including the addition of persons, the NO_x authorized account representative or any alternate NO_x authorized account representative shall submit a revision to the application for a general account amending the list of persons having an ownership interest with respect to the NO_x allowances in the general account to include the change.

(V) Objections concerning the NO_x authorized account representative for a general account.

(a) Once a complete application for a general account under part (3)(F)2.B.(I) of this rule has been submitted and received, the administrator will rely on the application unless and until a superseding complete application for a general account under part (3)(F)2.B.(I) of this rule is received by the administrator.

(b) Except as provided in part (3)(F)2.B.(IV) of this rule, no objection or other communication submitted to the administrator concerning the authorization, or any representation, action, inaction, or submission of the NO_x authorized account representative or any alternate NO_x authorized account representative for a general account shall affect any representation, action, inaction, or submission of the NO_x authorized account representative or any alternate NO_x authorized account representative or the finality of any decision or order by the administrator under the NO_x budget trading program.

(c) The administrator will not adjudicate any private legal dispute concerning the authorization or any representation, action, inaction, or submission of the NO_x authorized account representative or any alternate NO_x authorized account representative for a general account, including private legal disputes concerning the proceeds of NO_x allowance transfers.

C. Account identification. The administrator will assign a unique identifying number to each account established under subparagraphs (3)(F)2.A. or B. of this rule.

3. Responsibilities of NO_x authorized account representative.

A. Following the establishment of a NO_x allowance tracking system account, all submissions to the administrator pertaining to the account, including, but not limited to, submissions concerning the deduction or transfer of NO_x allowances in the account, shall be made only by the NO_x authorized account representative for the account.

B. NO_x authorized account representative identification. The administrator will assign a unique identifying number to each NO_x authorized account representative.

4. Recordation of NO_x allowance allocations.

A. The administrator will record the NO_x allowances for 2007 and 2008 in the NO_x budget units' compliance accounts and the allocation set-asides, as allocated under subsection (3)(E) of this rule.

B. Each year, after the administrator has made all deductions from a NO_x budget unit's compliance account and the overdraft account pursuant to paragraph (3)(F)5. of this rule, the administrator will record NO_x allowances, as allocated to the unit under subsection (3)(E) of this rule or under part (3)(H)9.A.(II) of this rule, in the compliance account for the year after the last year for which NO_x allowances were previously allocated to the compliance account. Each year, the administrator will also record NO_x allowances, as allocated under subsection (3)(E) of this rule, in the allocation set-aside for the year after the last year for which NO_x allowances were previously allocated to an allocation set-aside.

C. Serial numbers for allocated NO_x allowances. When allocating NO_x allowances to and recording them in an account, the administrator will assign each NO_x allowance a unique identification number that will include digits identifying the year for which the NO_x allowance is allocated.

5. Compliance.

A. NO_x allowance transfer deadline. The NO_x allowances are available to be deducted for compliance with a unit's NO_x budget emissions limitation for a control period in a given year only if the NO_x allowances—

(I) Were allocated for a control period in a prior year or the same year; and

(II) Are held in the unit's compliance account, or the overdraft account of the source where the unit is located, as of the NO_x allowance transfer deadline for that control period or are transferred into the compliance account or overdraft account by a NO_x allowance transfer correctly submitted for recordation under paragraph (3)(G)1. of this rule by the NO_x allowance transfer deadline for that control period.

B. Deductions for compliance.

(I) Following the recordation, in accordance with paragraph (3)(G)2. of this rule, of NO_x allowance transfers submitted for recordation in the unit's compliance account or the overdraft account of the source where the unit is located by the NO_x allowance transfer deadline for a control period, the administrator will deduct NO_x allowances available under subparagraph (3)(F)5.A. of this rule to cover the unit's emissions (as determined in accordance with section (4) of this rule) for the control period—

(a) From the compliance account; and

(b) Only if no more NO_x allowances available under subparagraph (3)(F)5.A. of this rule remain in the compliance account, from the overdraft account. In deducting NO_x allowances for units at the source from the overdraft account, the administrator will begin with the unit having the compliance account with the lowest NO_x allowance tracking system account number and end with the unit having the compliance account with the highest NO_x allowance tracking system account number (with account numbers sorted beginning with the left-most character and ending with the right-most character and the letter characters assigned values in alphabetical order and less than all numeric characters).

(II) The administrator will deduct NO_x allowances first under subpart (3)(F)5.B.(I)(a) of this rule and then under subpart (3)(F)5.B.(I)(b) of this rule—

(a) Until the number of NO_x allowances deducted for the control period equals the number of tons of emissions, determined in accordance with section (4) of this rule, from the unit for the control period for which compliance is being determined; or

(b) Until no more NO_x allowances available under subparagraph (3)(F)5.A. of this rule remain in the respective account.

C. Identification of NO_x allowances.

(I) Identification of NO_x allowances by serial number. The NO_x authorized account representative for each compliance account may identify by serial number the NO_x allowances to be deducted from the unit's compliance account under subparagraph (3)(F)5.B., D., or E. of this rule. Such identification shall be made in the compliance certification report submitted in accordance with paragraph (3)(D)1. of this rule.

(II) First-in, first-out. The administrator will deduct NO_x allowances for a control period from the compliance account, in the absence of an identification or in the case of a partial identification of NO_x allowances by serial number under part (3)(F)5.C.(I) of this rule, or the overdraft account on a first-in, first-out (FIFO) accounting basis in the following order:

(a) Those NO_x allowances that were allocated for the control period to the unit under subsection (3)(E) or (H) of this rule;

(b) Those NO_x allowances that were allocated for the control period to any unit and transferred and recorded in the account pursuant to subsection (3)(G) of this rule, in order of their date of recordation; (c) Those NO_x allowances that were allocated for a prior control period to the unit under subsection (3)(E) or (H) of this rule; and

(d) Those NO_x allowances that were allocated for a prior control period to any unit and transferred and recorded in the account pursuant to subsection (3)(G) of this rule, in order of their date of recordation.

D. Deductions for excess emissions.

(I) After making the deductions for compliance under subparagraph (3)(F)5.B. of this rule, the administrator will deduct from the unit's compliance account or the overdraft account of the source where the unit is located a number of NO_x allowances, allocated for a control period after the control period in which the unit has excess emissions, equal to three (3) times the number of the unit's excess emissions.

(II) If the compliance account or overdraft account does not contain sufficient NO_x allowances, the administrator will deduct the required number of NO_x allowances, regardless of the control period for which they were allocated, whenever NO_x allowances are recorded in either account.

(III) Any NO_x allowance deduction required under subparagraph (3)(F)5.D. of this rule shall not affect the liability of the owners and operators of the NO_x budget unit for any fine, penalty, or assessment, or their obligation to comply with any other remedy, for the same violation, as ordered under the CAA or applicable state law. The following guidelines will be followed in assessing fines, penalties or other obligations:

(a) For purposes of determining the number of days of violation, if a NO_x budget unit has excess emissions for a control period, each day in the control period (one hundred fifty-three (153) days) constitutes a day in violation unless the owners and operators of the unit demonstrate that a lesser number of days should be considered; and

(b) Each ton of excess emissions is a separate violation.

E. Deductions for units sharing a common stack. In the case of units sharing a common stack and having emissions that are not separately monitored or apportioned in accordance with section (4) of this rule—

(I) The NO_x authorized account representative of the units may identify the percentage of NO_x allowances to be deducted from each such unit's compliance account to cover the unit's share of emissions from the common stack for a control period. Such identification shall be made in the compliance certification report submitted in accordance with paragraph (3)(D)1. of this rule; and

(II) Notwithstanding subpart (3)(F)5.B.(II)(a) of this rule, the administrator will deduct NO_x allowances for each such unit until the number of NO_x allowances deducted equals the unit's identified percentage (under part (3)(F)5.E.(I) of this rule) of the number of tons of emissions, as determined in accordance with section (4) of this rule, from the common stack for the control period for which compliance is being determined or, if no percentage is identified, an equal percentage for each such unit.

F. The administrator will record in the appropriate compliance account or overdraft account all deductions from such an account pursuant to subparagraph (3)(F)5.B., D., or E. of this rule.

6. Banking.

A. NO_x allowances may be banked for future use or transfer in a compliance account, an overdraft account, or a general account, as follows:

(I) Any NO_x allowance that is held in a compliance account, an overdraft account, or a general account will remain in such account unless and until the NO_x allowance is deducted or transferred under paragraphs (3)(D)2., (3)(F)5., (3)(F)7., subsection (3)(G), or subsection (3)(H) of this rule.

(II) The administrator will designate, as a "banked" NO_x allowance, any NO_x allowance that remains in a compliance account, an overdraft account, or a general account after the administrator has made all deductions for a given control period from the compliance account or overdraft account pursuant to paragraph (3)(F)5. of this rule and that was allocated for that control period or a control period in a prior year.

B. Each year starting in 2008, after the administrator has completed the designation of banked NO_x allowances under part (3)(F)6.A.(II) of this rule and before May 1 of the year, the administrator will determine the extent to which banked NO_x allowances may be used for compliance in the control period for the current year, as follows:

(I) The administrator will determine the total number of banked NO_x allowances held in compliance accounts, overdraft accounts, or general accounts.

(II) If the total number of banked NO_x allowances determined, under part (3)(F)6.B.(I) of this rule, to be held in compliance accounts, overdraft accounts, or general accounts is less than or equal to ten percent (10%) of the sum of the state trading program NO_x budgets for the control period for the states in which NO_x budget units are located, any banked NO_x allowance may be deducted for compliance in accordance with paragraph (3)(F)5. of this rule.

(III) If the total number of banked NO_x allowances determined, under part (3)(F)6.B.(I) of this rule, to be held in compliance accounts, overdraft accounts, or general accounts exceeds ten percent (10%) of the sum of the state trading program NO_x budgets for the control period for the states in which NO_x budget units are located, any banked NO_x allowance may be deducted for compliance in accordance with paragraph (3)(F)5. of this rule, except as follows:

(a) The administrator will determine the following ratio: 0.10 multiplied by the sum of the state trading program NO_x budgets for the control period for the states in which NO_x budget units are located and divided by the total number of banked NO_x allowances determined, under part (3)(F)6.B.(I) of this rule, to be held in compliance accounts, overdraft accounts, or general accounts.

(b) The administrator will multiply the number of banked NO_x allowances in each compliance account or overdraft account. The resulting product is the number of banked NO_x allowances in the account that may be deducted for compliance in accordance with paragraph (3)(F)5. of this rule. Any banked NO_x allowances in excess of the resulting product may be deducted for compliance in accordance with paragraph (3)(F)5. of this rule, except that, if such NO_x allowances are used to make a deduction, two (2) such NO_x allowances must be deducted for each deduction of one (1) NO_x allowance required under paragraph (3)(F)5. of this rule.

C. Any NO_x budget unit may reduce its NO_x emission rate in the 2002 through the 2006 control period, the owner or operator of the unit may request early reduction credits, and the permitting authority may allocate NO_x allowances in 2007 to the unit in accordance with the following requirements:

(I) Each NO_x budget unit for which the owner or operator requests any early reduction credits under part (3)(F)6.C.(IV) of this rule shall monitor emissions in accordance with section (4) of this rule starting prior to the first control period for which ERCs are requested and for each control period for which such early reduction credits are requested. The unit's monitoring system availability shall be not less than ninety percent (90%) during the applicable control period, and the unit must be in compliance with any applicable state or federal emissions or emissions-related requirements;

(II) NO_x emission rate and heat input under part (3)(F)6.C.(III) through (V) of this rule shall be determined in accordance with section (4) of this rule;

(III) Each NO_x budget unit for which the owner or operator requests any early reduction credits under part (3)(F)6.C.(IV) of this rule shall reduce its NO_x emission rate, for each control period for which early reduction credits are requested, to:

(a) Less than 0.25 lb/mmBtu in the years 2002 and 2003;

(b) Less than 0.25 lb/mmBtu in the years 2004 and 2005 for sources located in an area listed in subsection (1)(A) other than the City of St. Louis and the counties of Franklin, Jefferson, and St. Louis; or

(c) Less than 0.18 lb/mmBtu in the years 2004 through 2006 for sources located in the City of St. Louis and the counties of Franklin, Jefferson, and St. Louis.

(d) The calculation of early reduction credits in any year from 2002 through 2006 must be below any applicable limitation, which is more stringent than the requirements of subparts (a) through (c) of this part.

(IV) The NO_x authorized account representative of a NO_x budget unit that meets the requirements of part (3)(F)6.C.(I) and (III) of this rule may submit to the director a request for early reduction credits for the unit based on NO_x emission rate reductions made by the unit in the control period for 2002 or 2006 in accordance with part (3)(F)6.C.(III) of this rule.

(a) In the early reduction credit request, the NO_x authorized account representative may request early reduction credits for such control period in an amount equal to the unit's heat input for such control period multiplied by the difference between the applicable NO_x emission rate in part (3)(F)6.C.(III) of this rule and the unit's NO_x emission rate rounded to the nearest ton.

(b) The early reduction credit request must be submitted, in a format specified by the director, by October 31 of the year in which the NO_x emission rate reductions on which the request is based are made or such later date approved by the permitting authority;

(V) The director will allocate NO_x allowances, to NO_x budget units meeting the requirements of part (3)(F)6.C.(I) and (III) of this rule and covered by early reduction requests meeting the requirements of subpart (3)(F)6.C.(IV)(b) of this rule, in accordance with the following procedures:

(a) Upon receipt of each early reduction credit request, the director will accept the request only if the requirements of parts (3)(F)6.C.(I), (III), and subpart (3)(F)6.C.(IV)(b) of this rule are met and, if the request is accepted, will make any necessary adjustments to the request to ensure that the amount of the early reduction credits requested meets the requirement of parts (3)(F)6.C.(II) and (IV) of this rule;

(b) The director will allocate not more than five thousand six hundred thirty (5,630) ERCs over the period from 2002 through 2006, as follows:

I. The director will allocate not more than one half (1/2) of the total ERCs in the years 2002 and 2003;

II. The director will allocate not more than one half (1/2) of the total ERCs in the years 2004 and 2005; and

III. The director will allocate any remaining allowances during the year 2006;

(c) If the number of ERC allowances requested for a reduction achieved in a given control period from 2002 through 2006 is less than the number of ERCs to be distributed in accordance with the requirements of part (b) of this subparagraph, the director will allocate to each budget EGU one (1) allowance for each accepted ERC requested; and

(d) If the number of ERC allowances requested for a reduction achieved in a given control period from 2002 through 2006 is greater than the number of ERCs to be distributed in accordance with the requirements of part (b) of this subparagraph, the director will allocate to each budget EGU allowances for accepted requests on a pro rata basis;

(VI) The director will submit to the administrator the allocations of NO_x allowances determined under part (3)(F)6.C.(V) of this rule by the dates listed in subparts (a) and (b) of this part. The administrator will record such allocations to the extent that they are consistent with the requirements of parts (3)(F)6.C.(I) through (V) of this rule:

(a) For the years 2002 and 2003, the director will submit NO_x allowances on or before April 1, 2006;

(b) For the years 2004 through 2006, the director will submit NO_x allowances on or before April 1, 2007;

(VII) NO_x allowances recorded under part (3)(F)6.C.(VI) of this rule may be deducted for compliance under paragraph (3)(F)5. of this rule for the control periods in 2007 or 2008. Notwithstanding subparagraph (3)(F)6.A. of this rule, the administrator will deduct as retired any NO_x allowance that is recorded under part (3)(F)6.C.(VI) of this rule and is not deducted for compliance in accordance with paragraph (3)(F)5. of this rule for the control period in 2007 or 2008; and

(VIII) NO_x allowances recorded under part (3)(F)6.C.(VI) of this rule are not treated as banked NO_x allowances in 2007, and are treated as banked allowances in 2008, for the purposes of subparagraphs (3)(A)3., (3)(A)4. and (3)(A)5. of this rule.

7. Account error. The administrator may, at his or her sole discretion and on his or her own motion, correct any error in any NO_x allowance tracking system account. Within ten (10) business days of making such correction, the administrator will notify the NO_x authorized account representative for the account.

8. Closing of general accounts.

A. The NO_x authorized account representative of a general account may instruct the administrator to close the account by submitting a statement requesting deletion of the account from the NO_x allowance tracking system and by correctly submitting for recordation under paragraph (3)(G)1. of this rule a NO_x allowance transfer of all NO_x allowances in the account to one (1) or more other NO_x allowance tracking system accounts.

B. If a general account shows no activity for a period of a year or more and does not contain any NO_x allowances, the administrator may notify the NO_x authorized account representative for the account that the account will be closed and deleted from the NO_x allowance tracking system following twenty (20) business days after the notice is sent. The account will be closed after the twenty (20)-day period unless before the end of the twenty (20)-day period the administrator receives a correctly submitted transfer of NO_x allowances into the account under paragraph (3)(G)1. of this rule or a statement submitted by the NO_x authorized account representative demonstrating to the satisfaction of the administrator good cause as to why the account should not be closed.

(G) NO_x Allowance Transfers.

1. Submission of NO_x allowance transfers. The NO_x authorized account representatives seeking recordation of a NO_x allowance transfer shall submit the transfer to the administrator. To be considered correctly submitted, the NO_x allowance transfer shall include the following elements in a format specified by the administrator:

A. The numbers identifying both the transferor and transferee accounts;

B. A specification by serial number of each NO_x allowance to be transferred; and

C. The printed name and signature of the NO_x authorized account representative of the transferor account and the date signed.

2. EPA recordation.

A. Within five (5) business days of receiving a NO_x allowance transfer, except as provided in subparagraph (3)(G)2.B. of this rule, the administrator will record a NO_x allowance transfer by moving each NO_x allowance from the transferor account to the transferee account as specified by the request, provided that—

(I) The transfer is correctly submitted under paragraph (3)(G)1. of this rule;

(II) The transferor account includes each NO_x allowance identified by serial number in the transfer; and

(III) The transfer meets all other requirements of this rule.

B. A NO_x allowance transfer that is submitted for recordation following the NO_x allowance transfer deadline and that includes any NO_x allowances allocated for a control period prior to or the same as the control period to which the NO_x allowance transfer deadline applies will not be recorded until after completion of the process of recordation of NO_x allowance allocations in subparagraph (3)(F)4.B. of this rule.

C. Where a NO_x allowance transfer submitted for recordation fails to meet the requirements of subparagraph (3)(G)2.A. of this rule, the administrator will not record such transfer.

3. Notification.

A. Notification of recordation. Within five (5) business days of recordation of a NO_x allowance transfer under paragraph (3)(G)2. of this rule, the administrator will notify each party to the transfer. Notice will be given to the NO_x authorized account representatives of both the transferor and transferee accounts.

B. Notification of non-recordation. Within ten (10) business days of receipt of a NO_x allowance transfer that fails to meet the requirements of subparagraph (3)(G)2.A. of this rule, the administrator will notify the NO_x authorized account representatives of both accounts subject to the transfer of—

(I) A decision not to record the transfer; and

(II) The reasons for such non-recordation.

C. Nothing in this section shall preclude the submission of a NO_x allowance transfer for recordation following notification of non-recordation.

(H) *Reserved*

(4) Reporting and Record Keeping.

(A) General Requirements. The owners and operators, and to the extent applicable, the NO_x authorized account representative of a NO_x budget unit, shall comply with the monitoring and reporting requirements as provided in this rule and in subpart H of 40 CFR part 75. For purposes of complying with such requirements, the definitions in section (2) of this rule and in 40 CFR 72.2 shall apply, and the terms "affected unit," "designated representative," and "continuous emission monitoring system" (or "CEMS") in 40 CFR 75 shall be replaced by the terms "NO_x budget unit," "NO_x authorized account representative," and "continuous emission monitoring system" (or "CEMS"), respectively, as defined in section (2) of this rule.

1. Requirements for installation, certification, and data accounting. The owner or operator of each NO_x budget unit must meet the following requirements:

A. Install all monitoring systems required under section (4) for monitoring mass. This includes all systems required to monitor NO_x emission rate, concentration, heat input, and flow, in accordance with 40 CFR 75.72 and 75.76;

B. Install all monitoring systems for monitoring heat input, if required under subsection (4)(G) of this rule for developing NO_x allowance allocations;

C. Successfully complete all certification tests required under subsection (4)(B) of this rule and meet all other provisions of this rule and 40 CFR 75 applicable to the monitoring systems under subparagraphs (4)(A)1.A. and B. of this rule; and

D. Record, and report data from the monitoring systems under subparagraphs (4)(A)1.A. and B. of this rule.

2. Compliance dates. The owner or operator must meet the requirements of subparagraphs (4)(A)1.A. through C. of this rule on or before the following dates and must record and report data on and after the following dates:

A. NO_x budget units for which the owner or operator intends to apply for early reduction credits under subparagraph (3)(F)6.C. of this rule must comply with the requirements of section (4) of this rule by May 1, 2006;

B. Except for NO_x budget units under subparagraphs (4)(A)2.A. of this rule, NO_x budget units under section (1) of this rule that commence operation before January 1, 2006, must comply with the requirements of section (4) of this rule by May 1, 2006;

C. NO_x budget units under section (1) of this rule that commence operation on or after January 1, 2006 and that report on an annual basis under paragraph (4)(E)4. of this rule must comply with the requirements of section (4) of this rule by the later of the following dates:

(I) May 1, 2006; or

(II) The earlier of:

(a) One hundred eighty (180) days after the date on which the unit commences operation; or

(b) For units under paragraph (1)(B)1. of this rule, ninety (90) days after the date on which the unit commences commercial operation;

D. NO_x budget units under section (1) of this rule that commence operation on or after January 1, 2006 and that report on a control season basis under paragraph (4)(E)4. of this rule must comply with the requirements of section (4) of this rule by the later of the following dates:

(I) The earlier of:

(a) One hundred eighty (180) days after the date on which the unit commences operation; or

(b) For units under paragraph (1)(B)1. of this rule, ninety (90) days after the date on which the unit commences commercial operation;

(II) However, if the applicable deadline under part (4)(A)2.D.(I) of this rule does not occur during a control period, May 1, immediately following the date determined in accordance with part (4)(A)2.D.(I) of this rule;

E. For a NO_x budget unit with a new stack or flue for which construction is completed after the applicable deadline under subparagraphs (4)(A)2.A., B., or C. or subsection (3)(H) of this rule:

(I) Ninety (90) days after the date on which emissions first exit to the atmosphere through the new stack or flue;

(II) However, if the unit reports on a control season basis under paragraph (4)(E)4. of this rule and the applicable deadline under part (4)(A)2.E.(I) of this rule does not occur during the control period, May 1 immediately following the applicable deadline in part (4)(A)2.E.(I) of this rule.

3. Reporting data prior to initial certification.

A. The owner or operator of a NO_x budget unit that misses the certification deadline under subparagraph (4)(A)2.A. of this rule is not eligible to apply for early reduction credits. The owner or operator of the unit becomes subject to the certification deadline under subparagraph (4)(A)2.B. of this rule.

B. The owner or operator of a NO_x budget unit under subparagraph (4)(A)2.C. or D. of this rule must determine, record and report mass, heat input (if required for purposes of allocations) and any other values required to determine mass (e.g. NO_x emission rate and heat input or concentration and stack flow) using the provisions of 40 CFR 75.70(g), from the date and hour that the unit starts operating until all required certification tests are successfully completed.

4. Prohibitions.

A. No owner or operator of a NO_x budget unit or a non-NO_x budget unit monitored under 40 CFR 75.72(b)(2)(ii) shall use any alternative monitoring system, alternative reference method, or any other alternative for the required continuous emission monitoring system without having obtained prior written approval in accordance with subsection (4)(F) of this rule.

B. No owner or operator of a NO_x budget unit or a non-NO_x budget unit monitored under 40 CFR 75.72(b)(2)(ii) shall operate the unit so as to discharge, or allow to be discharged, emissions to the atmosphere without accounting for all such emissions in accordance with the applicable provisions of section (4) of this rule and 40 CFR 75 except as provided for in 40 CFR 75.74.

C. No owner or operator of a NO_x budget unit or a non-NO_x budget unit monitored under 40 CFR 75.72(b)(2)(ii) shall disrupt the continuous emission monitoring system, any portion thereof, or any other approved emission monitoring method, and thereby avoid monitoring and recording mass emissions discharged into the atmosphere, except for periods of recertification or periods when calibration, quality assurance testing, or maintenance is performed in accordance with the applicable provisions of section (4) of this rule and 40 CFR 75 except as provided for in 40 CFR 75.74.

D. No owner or operator of a NO_x budget unit or a non-NO_x budget unit monitored under 40 CFR 75.72(b)(2)(ii) shall retire or permanently discontinue use of the continuous emission monitoring system, any component thereof, or any other approved emission monitoring system under section (4) of this rule, except under any one (1) of the following circumstances:

(I) During the period that the unit is covered by a retired unit exemption under subsection (1)(E) of this rule that is in effect;

(II) The owner or operator is monitoring emissions from the unit with another certified monitoring system approved, in accordance with the applicable provisions of section (4) and 40 CFR 75, by the director for use at that unit that provides emission data for the same pollutant or parameter as the retired or discontinued monitoring system; or

(III) The NO_x authorized account representative submits notification of the date of certification testing of a replacement monitoring system in accordance with subparagraph (4)(B)2.B. of this rule.

(B) Initial Certification and Recertification Procedures.

1. The owner or operator of a NO_x budget unit that is subject to an acid rain emissions limitation shall comply with the initial certification and recertification procedures of 40 CFR 75, except that:

A. If, prior to January 1, 2005, the administrator approved a petition under 40 CFR 75.17(a) or (b) for apportioning the NO_x emission rate measured in a common stack or a petition under 40 CFR 75.66 for an alternative to a requirement in 40 CFR 75.17, the NO_x authorized account representative shall resubmit the petition to the administrator under paragraph (4)(F)1. of this rule to determine if the approval applies under the NO_x budget trading program.

B. For any additional CEMS required under the common stack provisions in 40 CFR 75.72, or for any concentration CEMS used under the provisions of 40 CFR 75.71(a)(2), the owner or operator shall meet the requirements of paragraph (4)(B)2. of this rule.

2. The owner or operator of a NO_x budget unit that is not subject to an acid rain emissions limitation shall comply with the following initial certification and recertification procedures, except that the owner or operator of a unit that qualifies to use the low mass emissions excepted monitoring methodology under 40 CFR 75.19 shall also meet the requirements of paragraph (4)(B)3. of this rule and the owner or operator of a unit that qualifies to use an alternative monitoring system under subpart E of 40 CFR 75 shall also meet the requirements of paragraph (4)(B)4. of this rule. The owner or operator of a NO_x budget unit that is subject to an acid rain emissions limitation, but requires additional CEMS under the common stack provisions in 40 CFR 75.72, or that uses a concentration CEMS under 40 CFR 75.71(a)(2) also shall comply with the following initial certification and recertification procedures.

A. Requirements for initial certification. The owner or operator shall ensure that each monitoring system required by subpart H of 40 CFR 75 (which includes the automated data acquisition and handling system) successfully completes all of the initial certification testing required under 40 CFR 75.20. The owner or operator shall ensure that all applicable certification tests are successfully completed by the deadlines specified in paragraph (4)(A)2. of this rule. In addition, whenever the owner or operator installs a monitoring system in order to meet the requirements of this rule in a location where no such monitoring system was previously installed, initial certification according to 40 CFR 75.20 is required.

B. Requirements for recertification. Whenever the owner or operator makes a replacement, modification, or change in a certified monitoring system that the administrator or the director determines significantly affects the ability of the system to accurately measure or record mass emissions or heat input or to meet the requirements of 40 CFR 75.21 or Appendix B to 40 CFR 75, the owner or operator shall recertify the monitoring system according to 40 CFR 75.20(b). Furthermore, whenever the owner or operator makes a replacement, modification, or change to the flue gas handling system or the unit's operation that the administrator or the director determines to significantly change the flow or concentration profile, the owner or operator shall recertify the continuous emissions monitoring system according to 40 CFR 75.20(b). Examples of changes which require recertification include: replacement of the analyzer, change in location or orientation of the sampling probe or site, or changing of flow rate monitor polynomial coefficients.

C. Certification approval process for initial certifications and recertification.

(I) Notification of certification. The NO_x authorized account representative shall submit to the appropriate EPA regional office and the permitting authority a written notice of the dates of certification in accordance with subsection (4)(D) of this rule.

(II) Certification application. The NO_x authorized account representative shall submit to the director a certification application for each monitoring system required under subpart H of 40 CFR 75. A complete certification application shall include the information specified in subpart H of 40 CFR 75.

(III) Except for units using the low mass emission excepted methodology under 40 CFR 75.19, the provisional certification date for a monitor shall be determined using the procedures set forth in 40 CFR 75.20(a)(3). A provisionally certified monitor may be used under the NO_x budget trading program for a period not to exceed one hundred twenty (120) days after receipt by the director of the complete certification application for the monitoring system or component thereof under part (4)(B)2.C.(II) of this rule. Data measured and recorded by the provisionally certified monitoring system or component thereof, in accordance with the requirements of 40 CFR 75, will be considered valid quality-assured data (retroactive to the date and time of provisional certification), provided that the director does not invalidate the provisional certification by issuing a notice of disapproval within one hundred twenty (120) days of receipt of the complete certification application by the director.

(IV) Certification application formal approval process. The director will issue a written notice of approval or disapproval of the certification application to the owner or operator within one hundred twenty (120) days of receipt of the complete certification application under part (4)(B)2.C.(II) of this rule. In the event the permitting authority does not issue such a notice within such one hundred twenty (120)-day period, each monitoring system which meets the applicable performance requirements of 40 CFR 75 and is included in the certification application will be deemed certified for use under the NO_x budget trading program.
(a) Approval notice. If the certification application is complete and shows that each monitoring system meets the applicable performance requirements of 40 CFR 75, then the director will issue a written notice of approval of the certification application within one hundred twenty (120) days of receipt.

(b) Incomplete application notice. A certification application will be considered complete when all of the applicable information required to be submitted under part (4)(B)2.C.(II) of this rule has been received by the director. If the certification application is not complete, then the director will issue a written notice of incompleteness that sets a reasonable date by which the NO_x authorized account representative must submit the additional information required to complete the certification application. If the NO_x authorized account representative does not comply with the notice of incompleteness by the specified date, then the director may issue a notice of disapproval under subpart (4)(B)2.C.(IV)(c) of this rule.

(c) Disapproval notice. If the certification application shows that any monitoring system or component thereof does not meet the performance requirements of this rule, or if the certification application is incomplete and the requirement for disapproval under subpart (4)(B)2.C.(IV)(b) of this rule has been met, the director will issue a written notice of disapproval of the certification application. Upon issuance of such notice of disapproval, the provisional certification is invalidated by the director and the data measured and recorded by each uncertified monitoring system or component thereof shall not be considered valid quality-assured data beginning with the date and hour of provisional certification. The owner or operator shall follow the procedures for loss of certification in part (4)(B)2.C.(V) of this rule for each monitoring system or component thereof which is disapproved for initial certification.

(d) Audit decertification. The director may issue a notice of disapproval of the certification status of a monitor in accordance with paragraph (4)(C)2. of this rule.

(V) Procedures for loss of certification. If the permitting authority issues a notice of disapproval of a certification application under subpart (4)(B)2.C.(IV)(c) of this rule or a notice of disapproval of certification status under subpart (4)(B)2.C.(IV)(d) of this rule, then—

(a) The owner or operator shall substitute the following values, for each hour of unit operation during the period of invalid data beginning with the date and hour of provisional certification and continuing until the time, date, and hour specified under 40 CFR 75.20(a)(5)(i):

I. For units using or intending to monitor for NO_x emission rate and heat input or for units using the low mass emission excepted methodology under 40 CFR 75.19, the maximum potential NO_x emission rate and the maximum potential hourly heat input of the unit; and

II. For units intending to monitor for mass emissions using a pollutant concentration monitor and a flow monitor, the maximum potential concentration of and the maximum potential flow rate of the unit under section 2.1 of Appendix A of 40 CFR 75;

(b) The NO_x authorized account representative shall submit a notification of certification retest dates and a new certification application in accordance with parts (4)(B)2.C.(I) and (II) of this rule; and

(c) The owner or operator shall repeat all certification tests or other requirements that were failed by the monitoring system, as indicated in the director's notice of disapproval, no later than thirty (30) unit operating days after the date of issuance of the notice of disapproval.

3. Initial certification and recertification procedures for low mass emission units using the excepted methodologies under 40 CFR 75.19. The owner or operator of a gas-fired or oil-fired unit using the low mass emissions excepted methodology under 40 CFR 75.19 shall meet the applicable general operating requirements of 40 CFR 75.10, the applicable requirements of 40 CFR 75.19, and the applicable certification requirements of subsection (4)(B) of this rule, except that the excepted methodology shall be deemed provisionally certified for use under the NO_x budget trading program, as of the following dates:

A. For units that are reporting on an annual basis under paragraph (4)(E)4. of this rule—

(I) For a unit that commenced operation before its compliance deadline under paragraph (4)(B)2. of this rule, from January 1 of the year following submission of the certification application for approval to use the low mass emissions excepted methodology under 40 CFR 75.19 until the completion of the period for the director review; or

(II) For a unit that commenced operation after its compliance deadline under paragraph (4)(B)2. of this rule, the date of submission of the certification application for approval to use the low mass emissions excepted methodology under 40 CFR 75.19 until the completion of the period for director review; or

B. For units that are reporting on a control period basis under part (4)(E)2.C.(II) of this rule:

(I) For a unit that commenced operation before its compliance deadline under paragraph (4)(B)2. of this rule, where the certification application is submitted before May 1, from May 1 of the year of the submission of the certification application for approval to use the low mass emissions excepted methodology under 40 CFR 75.19 until the completion of the period for the director review;

(II) For a unit that commenced operation before its compliance deadline under paragraph (4)(B)2. of this rule, where the certification application is submitted after May 1, from May 1 of the year following submission of the certification application for approval to use the low mass emissions excepted methodology under 40 CFR 75.19 until the completion of the period for the director review; or

(III) For a unit that commences operation after its compliance deadline under paragraph (4)(B)2. of this rule, where the unit commences operation before May 1, from May 1 of the year that the unit commenced operation, until the completion of the period for the director's review; or

(IV) For a unit that has not operated after its compliance deadline under paragraph (4)(B)2. of this rule, where the certification application is submitted after May 1, but before October 1, from the date of submission of a certification application for approval to use the low mass emissions excepted methodology under 40 CFR 75.19 until the completion of the period for the director's review.

4. Certification/recertification procedures for alternative monitoring systems. The NO_x authorized account representative representing the owner or operator of each unit applying to monitor using an alternative monitoring system approved by the administrator and, if applicable, the director under subpart E of 40 CFR 75 shall apply for certification to the permitting authority prior to use of the system under the trading program. The NO_x authorized account representative shall apply for recertification following a replacement, modification or change according to the procedures in paragraph (4)(B)2. of this rule. The owner or operator of an alternative monitoring system shall comply with the notification and application requirements for certification according to the procedures specified in subparagraph (4)(B)2.C. of this rule and 40 CFR 75.20(f).

(C) Out of Control Periods.

1. Whenever any monitoring system fails to meet the quality assurance requirements of Appendix B of 40 CFR 75, data shall be substituted using the applicable procedures in subpart D, Appendix D, or Appendix E of 40 CFR 75.

2. Audit decertification. Whenever both an audit of a monitoring system and a review of the initial certification or recertification application reveal that any system or compo-
nent should not have been certified or recertified because it did not meet a particular performance specification or other requirement under subsection (4)(B) of this rule or the applicable provisions of 40 CFR 75, both at the time of the initial certification or recertification application submission and at the time of the audit, the director will issue a notice of disapproval of the certification status of such system or component. For the purposes of this paragraph, an audit shall be either a field audit or an audit of any information submitted to the permitting authority or the administrator. By issuing the notice of disapproval, the director revokes prospectively the certification status of the system or component. The data measured and recorded by the system or component shall not be considered valid quality-assured data from the date of issuance of the notification of the revoked certification status until the date and time that the owner or operator completes subsequently approved initial certification or recertification tests. The owner or operator shall follow the initial certification or recertification procedures in subsection (4)(B) of this rule for each disapproved system.

(D) Notifications. The NO_x authorized account representative for a NO_x budget unit shall submit written notice to the permitting authority and the administrator in accordance with 40 CFR 75.61, except that if the unit is not subject to an acid rain emissions limitation, the notification is only required to be sent to the director.

(E) Record Keeping and Reporting.

1. General provisions.

A. The NO_x authorized account representative shall comply with all record keeping and reporting requirements in this section and with the requirements of subparagraph (3)(B)1.E. of this rule.

B. If the NO_x authorized account representative for a NO_x budget unit subject to an acid rain emission limitation who signed and certified any submission that is made under subpart F or G of 40 CFR 75 and which includes data and information required under section (4) of this rule or subpart H of 40 CFR 75 is not the same person as the designated representative or the alternative designated representative for the unit under 40 CFR 72, the submission must also be signed by the designated representative or the alternative designated representative.

2. Monitoring plans.

A. The owner or operator of a unit subject to an acid rain emissions limitation shall comply with requirements of 40 CFR 75.62, except that the monitoring plan shall also include all of the information required by subpart H of 40 CFR 75.

B. The owner or operator of a unit that is not subject to an acid rain emissions limitation shall comply with requirements of 40 CFR 75.62, except that the monitoring plan is only required to include the information required by subpart H of 40 CFR 75.

3. Certification applications. The NO_x authorized account representative shall submit an application to the permitting authority within forty-five (45) days after completing all initial certification or recertification tests required under subsection (4)(B) of this rule including the information required under subpart H of 40 CFR 75.

4. Quarterly reports. The NO_x authorized account representative shall submit quarterly reports, as follows:

A. If a unit is subject to an acid rain emission limitation or if the owner or operator of the NO_x budget unit chooses to meet the annual reporting requirements of section (4) of this rule, the NO_x authorized account representative shall submit a quarterly report for each calendar quarter beginning with:

(I) For units that elect to comply with the early reduction credit provisions under paragraph (3)(F)6. of this rule, the calendar quarter that includes the date of initial provisional certification under part (4)(B)2.C.(III) of this rule. Data shall be reported from the date and hour corresponding to the date and hour of provisional certification;

(II) For units commencing operation prior to May 1, 2006 that are not required to certify monitors by May 1, 2005 under subparagraph (4)(A)2.A. of this rule, the earlier of the calendar quarter that includes the date of initial provisional certification under part (4)(B)2.C.(III) of this rule or, if the certification tests are not completed by May 1, 2006, the partial calendar quarter from May 1, 2006 through June 30, 2006. Data shall be recorded and reported from the earlier of the date and hour corresponding to the date and hour of provisional certification or the first hour on May 1, 2006; or

(III) For a unit that commences operation after May 1, 2006, the calendar quarter in which the unit commences operation. Data shall be reported from the date and hour corresponding to when the unit commenced operation.

B. If a NO_x budget unit is not subject to an acid rain emission limitation, then the NO_x authorized account representative shall either:

(I) Meet all of the requirements of 40 CFR 75 related to monitoring and reporting mass emissions during the entire year and meet the reporting deadlines specified in subparagraph (4)(E)4.A. of this rule; or

(II) Submit quarterly reports only for the periods from the earlier of May 1 or the date and hour that the owner or operator successfully completes all of the recertification tests required under 40 CFR 75.74(d)(3) through September 30 of each year in accordance with the provisions of 40 CFR 75.74(b). The NO_x authorized account representative shall submit a quarterly report for each calendar quarter, beginning with:

(a) For units that elect to comply with the early reduction credit provisions under paragraph (3)(F)6. of this rule, the calendar quarter that includes the date of initial provisional certification under part (4)(B)2.C.(III) of this rule. Data shall be reported from the date and hour corresponding to the date and hour of provisional certification;

(b) For units commencing operation prior to May 1, 2006 that are not required to certify monitors by May 1, 2005 under subparagraph (4)(A)2.A. of this rule, the earlier of the calendar quarter that includes the date of initial provisional certification under part (4)(B)2.C.(III) of this rule, or if the certification tests are not completed by May 1, 2006, the partial calendar quarter from May 1, 2006 through June 30, 2006. Data shall be reported from the earlier of the date and hour corresponding to the date and hour of provisional certification or the first hour of May 1, 2006;

(c) For units that commence operation after May 1, 2006 during the control period, the calendar quarter in which the unit commences operation. Data shall be reported from the date and hour corresponding to when the unit commenced operation;

(d) For units that commence operation after May 1, 2006 and before May 1 of the year in which the unit commences operation, the earlier of the calendar quarter that includes the date of initial provisional certification under part (4)(B)2.C.(III) of this rule or, if the certification tests are not completed by May 1 of the year in which the unit commences operation, May 1 of the year in which the unit commences operation. Data shall be reported from the earlier of the date and hour corresponding to the date and hour of provisional certification or the first hour of May 1 of the year after the unit commences operation; or

(e) For units that commence operation after May 1, 2006 and after September 30 of the year in which the unit commences operation, the earlier of the calendar quarter that includes the date of initial provisional certification under part (4)(B)2.C.(III) of this rule or, if the certification tests are not completed by May 1 of the year after the unit commences operation, May 1 of the year after the unit commences operation. Data shall be reported from the earlier of the date and hour corresponding to the date and hour of provisional certification or the first hour of May 1 of the year after the unit commences operation.

C. The NO_x authorized account representative shall submit each quarterly report to the administrator within thirty (30) days following the end of the calendar quarter covered by the report. Quarterly reports shall be submitted in the manner specified in subpart H of 40 CFR 75 and 40 CFR 75.64.

(I) For units subject to an acid rain emissions limitation, quarterly reports shall include all of the data and information required in subpart H of 40 CFR 75 for each NO_x budget unit (or group of units using a common stack) as well as information required in subpart G of 40 CFR 75.

(II) For units not subject to an acid rain emissions limitation, quarterly reports are only required to include all of the data and information required in subpart H of 40 CFR 75 for each NO_x budget unit (or group of units using a common stack).

D. Compliance certification. The NO_x authorized account representative shall submit to the administrator a compliance certification in support of each quarterly report based on reasonable inquiry of those persons with primary responsibility for ensuring that all of the unit's emissions are correctly and fully monitored. The certification shall state that:

(I) The monitoring data submitted were recorded in accordance with the applicable requirements of this rule and 40 CFR 75, including the quality assurance procedures and specifications;

(II) For a unit with add-on emission controls and for all hours where data are substituted in accordance with 40 CFR 75.34(a)(1), the add-on emission controls were operating within the range of parameters listed in the monitoring plan and the substitute values do not systematically underestimate emissions; and

(III) For a unit that is reporting on a control period basis under paragraph (4)(E)4. of this rule, the NO_x emission rate and concentration values substituted for missing data under subpart D of 40 CFR 75 are calculated using only values from a control period and do not systematically underestimate emissions.

(F) Petitions.

1. The NO_x authorized account representative of a NO_x budget unit that is subject to an acid rain emissions limitation may submit a petition under 40 CFR 75.66 to the administrator requesting approval to apply an alternative to any requirement of section (4) of this rule.

A. Application of an alternative to any requirement of section (4) of this rule is in accordance with section (4) of this rule only to the extent that the petition is approved by the administrator, in consultation with the permitting authority.

B. Notwithstanding subparagraph (4)(F)1.A. of this rule, if the petition requests approval to apply an alternative to a requirement concerning any additional CEMS required under the common stack provisions of 40 CFR 75.72, the petition is governed by paragraph (4)(F)2. of this rule.

2. The NO_x authorized account representative of a NO_x budget unit that is not subject to an acid rain emissions limitation may submit a petition under 40 CFR 75.66 to the director and the administrator requesting approval to apply an alternative to any requirement of section (4) of this rule.

A. The NO_x authorized account representative of a NO_x budget unit that is subject to an acid rain emissions limitation may submit a petition under 40 CFR 75.66 to the director and the administrator requesting approval to apply an alternative to a requirement concerning any additional CEMS required under the common stack provisions of 40 CFR 75.72 or a concentration CEMS used under 40 CFR 75.71(a)(2).

B. Application of an alternative to any requirement of section (4) of this rule is in accordance with section (4) of this rule only to the extent the petition under paragraph (4)(F)2. of this rule is approved by both the permitting authority and the administrator.

(G) Additional Requirements to Provide Heat Input Data for Allocations Purposes.

1. The owner or operator of a unit that elects to monitor and report mass emissions using a concentration system and a flow system shall also monitor and report heat input at the unit level using the procedures set forth in 40 CFR 75 for any source located in a state developing source allocations based upon heat input.

2. The owner or operator of a unit that monitors and reports mass emissions using a concentration system and a flow system shall also monitor and report heat input at the unit level using the procedures set forth in 40 CFR 75 for any source that is applying for early reduction credits under paragraph (3)(F)6. of this rule.

(H) Record Keeping and Reporting Maintenance.

1. Unless otherwise provided, the owners and operators of the NO_x budget source and each NO_x budget unit at the source shall keep on-site at the source each of the following documents for a period of five (5) years from the date the document is created. This period may be extended for cause, at any time prior to the end of five (5) years, in writing by the director or the administrator.

A. The account certificate of representation for the NO_x authorized account representative for the source and each NO_x budget unit at the source and all documents that demonstrate the truth of the statements in the account certificate of representation, in accordance with paragraph (3)(B)4.; provided that the certificate and documents shall be retained on-site at the source beyond such five (5)-year period until such documents are superseded because of the submission of a new account certificate of representation changing the NO_x authorized account representative.

B. All emissions monitoring information, in accordance with section (4) of this rule; provided that to the extent that section (4) of this rule provides for a three (3)-year period for record keeping, the three (3)-year period shall apply.

C. Copies of all reports, compliance certifications, and other submissions and all records made or required under the NO_x budget trading program.

D. Copies of all documents used to complete a NO_x budget permit application and any other submission under the NO_x budget trading program or to demonstrate compliance with the requirements of the NO_x budget trading program.

2. The NO_x authorized account representative of a NO_x budget source and each NO_x budget unit at the source shall submit the reports and compliance certifications required under the NO_x budget trading program, including those under subsections (3)(D), (3)(H), or section (4) of this rule.

(5) Test Methods. (Not Applicable)

AUTHORITY: section 643.050, RSMo 2000. Original rule filed Feb. 14, 2005, effective Oct. 30, 2005. Amended: Filed Oct. 2, 2006, effective May 30, 2007.*

**Original authority: 643.050, RSMo 1965, amended 1972, 1992, 1993, 1995.*

10 CSR 10-6.380 Control of NO_x Emissions From Portland Cement Kilns

PURPOSE: This rule reduces emissions of oxides of nitrogen (NO_x) to ensure compliance with the federal NO_x control plan to reduce the transport of air pollutants. The rule establishes NO_x control equipment and NO_x emission levels for cement kilns. The evidence supporting the need for this proposed rulemaking per section 536.016, RSMo, is the U.S. Environmental Protection Agency NO_x *State Implementation Plan (SIP) Call dated April 21, 2004.*

(1) Applicability. This rule applies to any cement kiln located in the counties of Bollinger, Butler, Cape Girardeau, Carter, Clark, Crawford, Dent, Dunklin, Franklin, Gasconade, Iron, Jefferson, Lewis, Lincoln, Madison, Marion, Mississippi, Montgomery, New Madrid, Oregon, Pemiscot, Perry, Pike, Ralls, Reynolds, Ripley, St. Charles, St. Francois, St. Louis, Ste. Genevieve, Scott, Shannon, Stoddard, Warren, Washington and Wayne counties and the City of St. Louis that—

(A) Is a long dry kiln with an actual process rate of at least twelve tons of clinker produced per hour (12 TPH);

(B) Is a long wet kiln with an actual process rate of at least ten (10) TPH;

(C) Is a preheater kiln with an actual process rate of at least sixteen (16) TPH; or

(D) Is a precalciner or preheater/precalciner kiln with an actual process rate of at least twenty-two (22) TPH.

(2) Definitions.

(A) Clinker—The product of a Portland cement kiln from which finished cement is manufactured by milling and grinding.

(B) Long-dry kiln—A kiln fourteen feet (14') or larger in diameter, four hundred feet (400') or greater in length, which employs no preheating of the feed and the inlet feed to the kiln is dry.

(C) Long-wet kiln—A kiln fourteen feet (14') or larger in diameter, four hundred feet (400') or greater in length, which employs no preheating of the feed and the inlet feed to the kiln is a slurry.

(D) Low-NO_x burners—A type of cement kiln burner (a device that functions as an injector of fuel and combustion air into kiln to produce a flame that burns as close as possible to the center line of the kiln) that has a series of channels or orifices that 1) allow for the adjustment of the volume, velocity, pressure, and/or direction of the air carrying the fuel, known as primary air, into the kiln, and 2) impart high momentum and turbulence to the fuel stream to facilitate mixing of the fuel and secondary air.

(E) Mid-kiln firing—Secondary firing in kiln systems by injecting fuel at an intermediate point in the kiln system using a specially designed fuel injection mechanism for the purpose of decreasing NO_x emissions through—

1. The burning of part of the fuel at a lower temperature; and
2. The creation of reducing conditions at the point of initial combustion.

(F) Portland cement—A hydraulic cement produced by pulverizing clinker consisting essentially of hydraulic calcium silicates, usually containing one (1) or more of the forms of calcium sulfate as an interground addition.

(G) Portland cement kiln—A system, including any solid, gaseous or liquid fuel combustion equipment, used to calcine and fuse raw materials, including limestone and clay, to produce Portland cement clinker.

(H) Preheater/precalciner kiln—A kiln where the feed to the kiln system is preheated in cyclone chambers and that utilizes a second burner to provide heat for calcination of material prior to the material entering the rotary kiln which forms clinker.

(I) Preheater kiln—A kiln where the feed to the kiln system is preheated in cyclone chambers prior to the final fusion, which forms clinker.

(J) Recoverable fuel—Fuels that have been permitted for use for energy recovery under 10 CSR 10-6.065.

(K) Renewable fuel—Renewable energy resources that include but are not limited to solar (photovoltaic), wind, and biomass. Biomass includes but is not limited to: agricultural crops and crop waste, untreated wood and wood wastes, livestock waste, wastepaper, and organic municipal solid waste.

(L) Definitions of certain terms specified in this rule, other than those defined in this rule section, may be found in 10 CSR 10-6.020.

(3) General Provisions.

(A) Beginning May 1, 2007 an owner or operator of any Portland cement kiln subject to this rule shall not operate the kiln during the period starting May 1 and ending September 30 of each year, unless the kiln installs and operates with one (1) of the following:

1. Low-NO_x burners;
2. Mid-kiln firing;
3. An alternative control technology that is approved by the staff director, and incorporated in the federally approved SIP, and is proven to achieve emission reductions of thirty percent (30%) or greater;
4. An emission rate of:

A. For long-wet kilns—6.8 pounds of NO_x per ton of clinker produced, averaged over the period from May 1 through September 30 of each year.

B For long-dry kilns—6.0 pounds of NO_x per ton of clinker produced, averaged over the period from May 1 through September 30 of each year.

C. For preheater kilns—4.1 pounds of NO_x per ton of clinker produced, averaged over the period from May 1 through September 30 of each year.

D. For preheater/precalciner kilns—2.7 pounds of NO_x per ton of clinker produced, averaged over the period from May 1 through September 30 of each year; or

5. The findings of a case-by-case study committed to and conducted by the owner or operator and approved by the staff director, and incorporated into the federally approved SIP, taking into account energy, environmental, and economic impacts and other costs to determine an emission limitation that is achievable for the installation through application of production processes or available methods, systems and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of NO_x.

(B) To meet the requirements of paragraph (3)(A)3. or (3)(A)5. of this rule, the owner or operator may take into account as a portion of the required NO_x reductions, physical and quantifiable measures to increase energy efficiency, reduce energy demand, or increase use of renewable or recoverable fuels.

(C) Excess Emissions During Start-Up, Shutdown, or Malfunction. If the owner or operator provides notice of excess emissions pursuant to state rule 10 CSR 10-6.050(3)(B), the director will determine whether the excess emissions are attributable to start-up, shutdown or malfunction conditions, pursuant to rule 10 CSR 10-6.050(3)(C). If the director determines that the excess emissions are attributable to such conditions, and if such excess emissions cause a kiln to exceed the applicable emission limits in this rule, the director will determine whether enforcement action is warranted, as provided in rule 10 CSR 10-6.050(3)(C). If the director determines that the excess emissions are attributable to a start-up, shutdown, or malfunction condition and does not warrant enforcement action, those emissions would not be included in the calculation of ozone season NO_x emissions.

(4) Reporting and Record Keeping.

(A) Reporting Requirements. The owner or operator of a kiln subject to this rule shall comply with the following requirements:

1. By May 1, 2007, the owner or operator shall submit to the staff director the identification number and type of each unit subject to this rule, the name and address of the plant where the unit is located, and the name and telephone number of the person responsible for demonstrating compliance with this rule;

2. The owner or operator shall submit to the staff director by October 31 of each year, beginning in the year 2007, an annual report documenting for that unit:

A. The emissions, in pounds of NO_x per ton of clinker produced from each affected Portland cement kiln during the period from May 1 through September 30;

B. The results of any performance testing; and

C. Cement kiln clinker production, in tons, from May 1 through September 30; and

3. If the owner or operator elects to comply with paragraph (3)(A)3. or (3)(A)5. of this rule, the owner or operator will supply, starting April 2008, the staff director with a report as specified in the compliance plan.

(B) Record Keeping Requirements.

1. Any owner or operator of a unit subject to this rule shall produce and maintain records, which shall include, but are not limited to the results of any initial performance test, the results of any subsequent performance tests, the date, time and duration of any start-up, shutdown or malfunction in the operation of any of the cement kilns or the emissions monitoring equipment, as applicable.

2. If an owner or operator elects to use subsection (3)(B) of this rule as part of the compliance plan, the owner or operator must retain records as agreed to in the approved compliance plan.

3. Daily cement kiln clinker production in tons per day.

4. Any applicable monitoring data.

5. All records required to be produced or maintained shall be retained on-site for a minimum of five (5) years and made available upon request.

(C) Monitoring Requirements.

1. An owner or operator complying with paragraph (3)(A)1. or (3)(A)2. of this rule shall maintain and operate the device according to the manufacturer's specifications as approved by the permitting agency. The monitoring shall:

A. Include parameters indicated in the manufacturer's specifications and recommendations for the low-NO_x burner or mid-kiln firing system as approved by the permitting agency; and

B. Identify the specific operation conditions to be monitored and correlation between the operating conditions and NO_x emission rate.

2. An owner or operator complying with paragraph (3)(A)3., (3)(A)4., or (3)(A)5. of this rule shall complete an initial performance test by May 1, 2007 and subsequent performance tests, on an annual basis, consistent with the requirements of section (5) of this rule.

3. An owner or operator may comply with the requirements in paragraph (4)(C)1. through the use of an alternative compliance method approved by the staff director and incorporated in the federally approved SIP.

4. Any deviation from the operating conditions or specifications, which result in an increase in NO_x emissions, established in this paragraph constitute a violation of this rule, unless the owner or operator demonstrates to the satisfaction of the director that the deviation did not result in an increase in NO_x emissions.

(5) Test Methods. NO_x emission level testing shall use one (1) of the following methods as specified by 40 CFR part 60 Appendix A—Reference Methods:

(A) Method 7—Determination of Nitrogen Oxide Emissions from Stationary Sources;

(B) Method 7A—Determination of Nitrogen Oxide Emissions from Stationary Sources—Ion Chromatographic Method;

(C) Method 7C—Determination of Nitrogen Oxide Emissions from Stationary Sources—Alkaline-Permanganate/Colorimetric Method;

(D) Method 7D—Determination of Nitrogen Oxide Emissions from Stationary Sources—Alkaline-Permanganate/Ion Chromatographic Method; or

(E) Method 7E—Determination of Nitrogen Oxide Emissions from Stationary Sources (Instrumental Analyzer Procedure).

AUTHORITY: section 643.050, RSMo 2000. Original rule filed Feb. 14, 2005, effective Oct. 30, 2005.*

**Original authority: 643.050, RSMo 1965, amended 1972, 1992, 1993, 1995.*

10 CSR 10-6.390 Control of NO_x Emissions From Large Stationary Internal Combustion Engines

PURPOSE: This rule reduces emissions of oxides of nitrogen (NO_x) to ensure compliance with the federal NO_x control plan to reduce the transport of air pollutants. This rule establishes emission levels for large stationary internal combustion engines. The evidence supporting the need for this proposed rulemaking, per section 536.016, RSMo, is the U.S. Environmental Protection Agency NO_x State Implementation Plan (SIP) Call dated April 21, 2004.

(1) Applicability. This rule applies to any large stationary internal combustion engine located in the counties of Bollinger, Butler, Cape Girardeau, Carter, Clark, Crawford, Dent, Dunklin, Franklin, Gasconade, Iron, Jefferson, Lewis, Lincoln, Madison, Marion, Mississippi, Montgomery, New Madrid, Oregon, Pemiscot, Perry, Pike, Ralls, Reynolds, Ripley, St. Charles, St. Francois, St. Louis, Ste. Genevieve, Scott, Shannon, Stoddard, Warren, Washington, and Wayne counties and the City of St. Louis greater than one thousand three hundred (1,300) horsepower that—

(A) Emitted greater than one (1) ton per day of NO_x on average during the period from May 1 through September 30 of 1995, 1996, or 1997; or

(B) Begins operation after September 30, 1997.

(C) Any stationary internal combustion engine that meets the definition of emergency standby engine in subsection (2)(C) of this rule is exempt from this rule.

(2) Definitions.

(A) Diesel engine—A compression ignited (CI) two- or four-stroke engine in which liquid fuel is injected into the combustion chamber and ignited when the air charge has been compressed to a temperature sufficiently high for auto-ignition.

(B) Dual fuel engine—Compression ignited stationary internal combustion engine that is capable of burning liquid fuel and gaseous fuel simultaneously.

(C) Emergency standby engine—An internal combustion engine used only when normal electrical power or natural gas service is interrupted, or for the emergency pumping of water for either fire protection or flood relief. An emergency standby engine may not be operated to supplement a primary power source when the load capacity or rating of the primary power source has been either reached or exceeded.

(D) Engine rating—The output of an engine as determined by the engine manufacturer and listed on the nameplate of the unit, regardless of any derating.

(E) Higher heating value (HHV)—The total heat liberated per mass of fuel burned in British thermal units (Btu) per pound, when fuel and dry air at standard conditions undergo complete combustion and all resultant products are brought to their standard states at standard conditions. If certification of the HHV is not provided by the third party fuel supplier, it shall be determined by one of the following test methods: ASTM D2015-85 for solid fuels; ASTM D240-87 or ASTM D2382-88 for liquid hydrocarbon fuels; or ASTM D1826-88 or ASTM D1945-81 in conjunction with ASTM D3588-89 for gaseous fuels. These methods are all incorporated by reference as specified at 40 CFR 52.3002.

(F) Lean-burn engine—Any two- or four-stroke spark ignited (SI) engine with greater than four percent (4%) oxygen in the engine exhaust.

(G) Maintenance operation—Normal routine maintenance on any stationary internal combustion engine subject to this rule or the use of an emergency standby engine and fuel system during testing, repair and routine maintenance to verify its readiness for emergency standby use.

(H) Output—The shaft work output from any engine plus the energy reclaimed by any useful heat recovery system.

(I) Peak load—The maximum instantaneous operating load.

(J) Permitted capacity factor—The annual permitted fuel use divided by the manufacturers specified maximum fuel consumption times eight thousand seven hundred sixty (8,760) hours per year.

(K) Rich-burn engine—A two- or four-stroke SI engine where the oxygen content in the exhaust stream before any dilution is one percent (1%) or less measured on a dry basis.

(L) Stationary internal combustion engine—Internal combustion engine of the reciprocating type that is either attached to a foundation at a facility or is designed to be capable of being carried or moved from one (1) location to another and remains at a single site at a building, structure, facility, or installation for more than twelve (12) consecutive months. Any engine or engines that replace an engine at a site that is intended to perform the same or similar function as the engine replaced is included in calculating the consecutive time period. Nonroad engines and engines used solely for competition are not stationary internal combustion engines.

(M) Stoichiometric air/fuel ratio—The air/fuel ratio where all fuel and all oxygen in the air/fuel mixture will be consumed.

(N) Unit—Any diesel, lean-burn, or rich-burn stationary internal combustion engine as defined in this section.

(O) Utilization rate—The amount of an engine's capacity reported in horsepower-hours that is utilized.

(P) Definitions of certain terms used in this rule, other than those specified in this rule, may be found in 10 CSR 10-6.020.

(3) General Provisions.

(A) An owner or operator of a large stationary internal combustion engine meeting the applicability of paragraph (1)(A)1. of this rule shall calculate the allowable NO_x emission rate for each applicable engine using:

$$ER = (NO_{x\ act}/UR) \times 1.102 \times 10^{-6} \times 0.1$$

where,

ER = the allowable emission rate for each engine in grams per horsepower-hour;

$NO_{x\ act}$ = the highest actual NO_x emissions, reported in tons per control period, for the period from May 1 through September 30 for one of the years 1995, 1996, or 1997 based on the best available emission information for each engine; and

UR = the utilization rate in horse-power-hours during the same period as $NO_{x\ act}$

(B) An owner or operator of a large stationary internal combustion engine meeting the applicability of paragraph (1)(A)2. of this rule shall not operate an engine to exceed the permitted emission rate or the following emission rate, whichever is more stringent:

1. For rich-burn SI engines 3.0 grams per horsepower-hour; or
2. For lean-burn SI engines 3.0 grams per horsepower-hour;

(C) An owner or operator of a large stationary internal combustion engine may choose to establish a facility-wide NO_x emissions cap in lieu of compliance with subsection (3)(A) of this rule. If the owner or operator elects to comply with the requirements of subsection (3)(A), the owner or operator shall submit a commitment in writing no later than May 1, 2005, to the director stating the intent to comply with that subsection. If the owner or operator commits to comply with this subsection rather than subsection (3)(A) of this rule, the owner or operator shall submit the following to the director:

1. The facility-wide NO_x emissions from the year of data that would be used in paragraph (3)(A)1. of this rule on a unit-by-unit basis;
2. The number of tons of NO_x emission reductions that would be required in paragraph (3)(A)1. of this rule on a unit-by-unit basis;
3. A detailed inventory of all engines being used to comply with the NO_x emission cap including the:
   A. Uncontrolled emission rate of all engines at the facility;
   B. Controlled emission rate for all engines being controlled under the NO_x emissions cap;
   C. Capacity of each engine at the facility; and
   D. Utilization rate of each engine at the facility; and
4. The controlled NO_x emissions from the facility during the control period, May 1 through September 30.

(D) To meet the requirements of subsection (3)(A) or (3)(B) of this rule, the owner or operator may take into account as a portion of the required NO_x reductions, physical and quantifiable measures to increase energy efficiency, reduce energy demand, or increase use of renewable fuels.

(E) Monitoring Requirements.

1. Any owner or operator meeting the applicability of section (1) of this rule shall not operate such equipment unless it is equipped with one of the following:
   A. A continuous emissions monitoring system (CEMS), which meets the applicable requirements of 40 CFR part 60, subpart A, Appendix B, and complies with the quality assurance procedures specified in 40 CFR part 60, Appendix F. The CEMS shall be used to demonstrate compliance with the applicable emission limit; or
   B. A calculational and record keeping procedure based upon actual NO_x emissions testing and correlations with operating parameters. The installation, implementation and use of such an alternate calculational and record keeping procedure must be approved by the director and EPA and incorporated into the SIP in writing prior to implementation.
2. The CEMS or approved alternate monitoring procedure shall be operated and maintained in accordance with an on-site CEMS or alternate monitoring plan approved by the director.

(F) Excess Emissions During Start-Up, Shutdown, or Malfunction. If the owner or operator provides notice of excess emissions pursuant to state rule 10 CSR 10-6.050(3)(B), the director will determine whether the excess emissions are attributable to start-up, shutdown or malfunction conditions, pursuant to rule 10 CSR 10-6.050(3)(C). If the director determines that the excess emissions are attributable to such conditions, and if such excess emissions cause a kiln to exceed the applicable emission limits in this rule, the director will determine whether enforcement action is warranted, as provided in rule 10 CSR 10-6.050(3)(C). If the director determines that the excess emissions are attributable to a start-up, shutdown, or malfunction condition and does not warrant enforcement action, those emissions would not be included in the calculation of ozone season NO_x emissions.

(4) Reporting and Record Keeping.

(A) Reporting Requirements. The owner or operator subject to this rule shall comply with the following requirements:

1. The owner or operator shall submit to the director the identification number and type of each unit subject to this rule, the name and address of the plant where the unit is located, and the name and telephone number of the person responsible for demonstrating compliance with this rule before May 1, 2007;

2. The owner or operator shall submit an annual report documenting for each controlled unit the total NO_x emissions from May 1 through September 30 of each year to the director by November 1 of that year, beginning in 2007; and

3. The owner or operator of a unit subject to this rule and operating a CEMS shall submit an excess emissions monitoring systems performance report, in accordance with the requirements of 40 CFR 60.7(c) and 60.13.

(B) Record Keeping Requirements. Any owner or operator of a unit subject to this rule shall maintain all records necessary to demonstrate compliance with this rule for a period of five (5) years at the plant at which the subject unit is located. The records shall be made available to the director upon request. The owner or operator shall maintain records of the following information for each day of the control period the unit is operated:

1. The identification number of each unit and the name and address of the plant where the unit is located for each unit subject to the requirements of this rule;

2. The calendar date of record;

3. The number of hours the unit is operated during each day including start-ups, shutdowns, malfunctions, and the type and duration of maintenance and repair;

4. The date and results of each emissions inspection;

5. A summary of any emissions corrective maintenance taken;

6. The results of all compliance tests; and

7. If a unit is equipped with a CEMS—

A. The identification of time periods during which NO_x standards are exceeded, the reason for the exceedance, and action taken to correct the exceedance and to prevent similar future exceedances; and

B. The identification of the time periods for which operating conditions and pollutant data were not obtained including reasons for not obtaining sufficient data and a description of corrective actions taken.

(5) Test Methods. *(Not Applicable)*

AUTHORITY: section 643.050, RSMo 2000. Original rule filed Feb. 14, 2005, effective Oct. 30, 2005.*

**Original authority: 643.050, RSMo 1965, amended 1972, 1992, 1993, 1995.*

Appendix W

CENRAP Regional Haze Control Strategy Analysis Plan

Jeff Peltola

From: Gregory Stella [gms@alpinegeophysics.com]
Sent: Tuesday, May 09, 2006 3:53 PM
To: Jeff Peltola
Cc: 'Seltz, John'; mac@adeq.state.ar.us; 'T. W. Tesche'; 'Wilkinson, Jim'
Subject: Final CENRAP Regional Haze Control Strategy Analysis Plan

Attachments: Alpine Geophysics Final Report (9 May '06).pdf

Alpine Geophysics Final Report...

VIA E-MAIL

9 May 2006

Mr. Jeff Peltola
CENRAP Technical Director
10005 S. Pennsylvania, Ste C
Oklahoma City, OK 73159

Dear Jeff:

The scientists at Alpine Geophysics are pleased to submit the attached document titled "Final CENRAP Regional Haze Control Strategy Analysis Plan" as outlined in Task 6 of our previously submitted quotation and work plan.

This document and associated materials are the product of our development and application of a quantitative procedure to identify and prioritize potential regional haze control strategies for Class I areas failing to meet visibility goal objectives. Additionally, we have addressed as many of the comments on the draft control strategy analysis plan as submitted to Alpine (April 25 and later) as we have determined to be within the scope of our original proposal to CENRAP.

To facilitate subsequent use of this methodology by CENRAP or others, this Final Report describes the various analytical steps and provides examples of this procedure (both in the body of the report and in supporting in appendixes). Document appendices and relevant technical support information have archived on the Alpine Geophysics project website facilitating easy access by interested parties. The login and password to access these data is provided below.

```
ftp> ftp.alpinegeophysics.com
login> cenrap
pass> pass4ftp
```

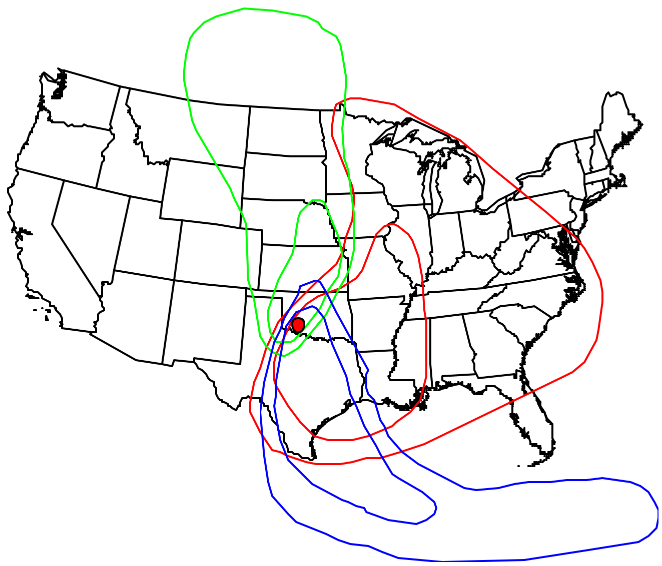
Should you have any questions or problems accessing these files and supporting materials, please contact me at your convenience.

Respectfully yours,

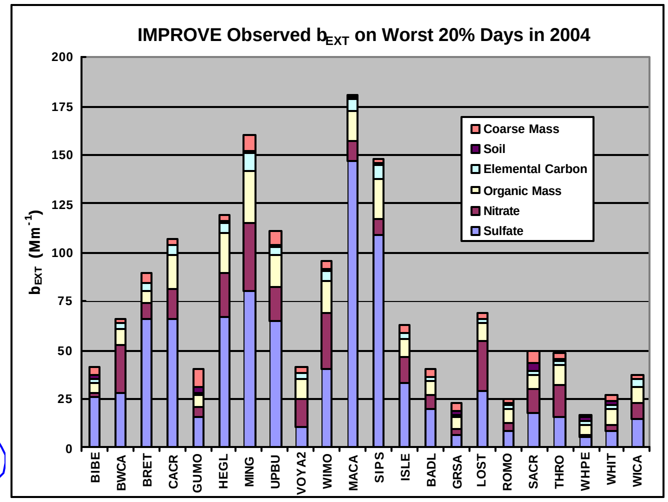
Gregory Stella
Senior Scientist
Alpine Geophysics, LLC
Burnsville, NC 28714

Final Report

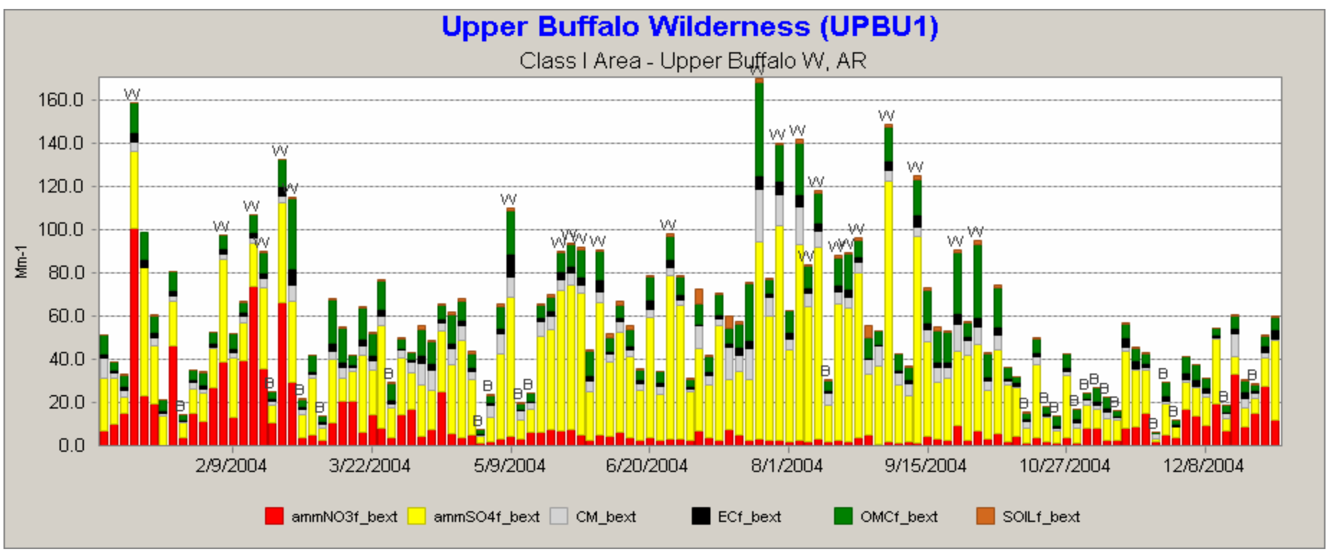
CENRAP REGIONAL HAZE CONTROL STRATEGY ANALYSIS PLAN



Wichita Mountains Areas of Influence (AOIs)



b_{ext} on CENRAP Worst 20% Days in 2004



Daily Variation in $PM_{2.5}$ Components at Upper Buffalo Wilderness

Prepared by

Mr. Gregory M. Stella
Dr. Jim Wilkinson
Dr. T. W. Tesche
Alpine Geophysics, LLC

Prepared for

CENRAP/CENSARA
10005 S. Pennsylvania, Ste C
Oklahoma City, OK 73159

9 May 2006

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EXECUTIVE SUMMARY

The Implementation and Control Strategies (ICS) Workgroup of the Central Regional Air Planning Association (CENRAP), together with other workgroups and state, tribal and federal agencies, have been working for more than four years gathering information for developing regional haze (RH) control strategies for pertinent Class I areas within and adjacent to the CENRAP states and tribes. In late February 2006, under the direction of the CENRAP Technical Director, Alpine Geophysics, LLC was contracted to assist the ICS in this effort. Building upon information developed by the ICS and others, Alpine was charged with developing a quantitative procedure to identify and prioritize potential RH control strategies to be tested by CENRAP modelers. Alpine formulated a methodology for constructing control strategy recommendations based on presently available information and submitted a Work Plan detailing this approach to the ICS/CENRAP leadership for review and approval.

Using the results of preliminary and more recent CENRAP visibility projection modeling together with current information on the composition of visibility-impairing fine particulate aerosols at 22 Class I monitors, Alpine identified residual visibility progress 'increments' that potentially require additional regional and/or subregional emission reductions to achieve visibility goals[1]. We synthesized pertinent 'attribution of haze' documents, CENRAP CAMx/CMAQ visibility modeling results, our own fine particulate modeling in the central U.S, and other technical reports, papers, and analyses bearing directly on the quantification of emissions-source/visibility-receptor impacts at the ten CENRAP Class I and twelve adjoining areas.

Complementing this task, we synthesized a number of recent regional modeling studies helpful in relating emissions reductions of visibility precursors (e.g. SO_2, NO_X) in upwind source regions (Areas of Influence or AOIs) to the improvement in visibility (in deciviews or Mm^{-1}) at downwind Class I areas. Figures ES-1 and ES-2 present ‘level 1’ AOI plots for sulfate and nitrate impacts at the Big Bend, Guadalupe, Wichita Mountains, Breton Island, Voyageurs, and Boundary Waters Class I Areas, respectively. Three distinct levels of AOI have been estimated for each visibility precursor and Class I areas, but the controls most likely to be considered for modeling will be drawn from the closest (i.e., AOI level 1 or AOI-1) area of influence for each Class I area/visibility precursor pair.

[1] We use the term ‘increment’ to denote the difference between the modeled visibility at a Class I area in 2018 compared to the value based on the Reasonable Progress Goal (RPG) glide path, evaluated at the same time period. A positive increment means that the modeled visibility at the Class I area is ‘poorer’ than the level associated with the linear FPG glide path. Accordingly, CENRAP may wish to consider recommending additional precursor controls to ameliorate such a positive visibility increment. In contrast, a negative increment suggests that the modeled growth and emissions controls by 2018 may produce better visibility conditions at the monitor when compared to the linear glide path.

We then deduced from available regional modeling studies 'rules of thumb' relating percentage or tonnage reductions in visibility reducing precursors (e.g., SO_2, NO_X, ammonia, and VOCs) on the expected impact on visibility downwind. These 'rules of thumb', i.e., source-receptor relationships, were essential in estimating the amounts of incremental precursor emissions reductions in regions upwind of each of the various Class I areas that CENRAP modelers should consider in the prescription of initial RH control strategy simulations.

Once an emissions reduction target was determined for each Class I area showing visibility projections above the uniform rate of progress line (i.e., a positive visibility increment), we applied a master list of controls on sources within the Class I AOIs to formulate the CENRAP Control Strategy plan, including cost-effectiveness as a key element.

Alpine's analysis of the most recent CENRAP visibility projection data identified six Class I areas within the CENRAP domain whose projected visibility falls above the uniform rate of progress line (i.e., a projected positive visibility increment). On this basis, we quantified their associated AOIs, emission reduction estimates for reaching 2018 reasonable progress objectives, and potential incremental emission reductions worthy of annual CMAQ/CAMx modeling. For each area, sulfate and to a lesser extent, nitrate reductions were shown to be most beneficial during the 20 percent worst visibility days in 2002.

As each of these areas (and all of the other Class I AOIs in the CENRAP domain) are dominated by EGU SO_2 and NO_X emissions and many of the Class I area AOIs intersect with States currently excluded by the EPA CAIR rule, a region-wide strategy for additional EGU emission reductions at CAIR levels for the non-CAIR EGUs may be beneficial to each Class I area in the CENRAP domain projected below the uniform rate of progress line. An alternate intra-state trading permutation of this regional approach is also recommended for review by CENRAP.

In lieu of a single regional control option applied consistently across the entire CENRAP domain, individual subregional control applications are proposed to reduce emissions within certain Class I area AOIs. Based on the single precursor emission reduction target calculations defined by the ICS, subregional control strategies can be defined for three of the Class I areas projected to be above the reasonable progress glide path[2]. In each case, the marginal cost curves (based on the application of all available control options on all controllable industries and source types) allow the selection of control technologies which attains the ICS defined, AOI-1 specific emission reduction targets.

However, the application of incremental control on all controllable point and area sources within certain AOIs still fails to meet the visibility objectives of three Class I areas modeled to be above the reasonable progress glide slope. In fact, as a result of the implementation of the exhaustive list of additional controls in each primary AOI, Alpine has determined that these three Class I areas[3] will be unable to achieve a level of emissions reduction necessary to bring these areas under the reasonable progress line. Influences such as incrementally uncontrollable source categories, cost-effectiveness limitations and international and inter-RPO emissions transport are barriers that prevent strategies from being configured for these Class I areas within the confines of the CENRAP domain.

[2] These areas include Boundary Waters, Wichita Mountains, and Voyageurs.

[3] These areas include Big Bend, Breton Island, and Guadalupe Mountains.

Although application of the exhaustive list of available control technologies to sources within the AOIs for each of the Class I areas failing to achieve ICS identified emission reduction targets, emission reductions beyond the base case should not be forsaken as a result. Indeed, *significant emission reductions may be warranted* in order to prepare impacted States and tribes for future attainment demonstrations where these measures may set the basis for defining and meeting future progress goals.

It should be noted that although this report and associated material includes controls for particular sources or source categories as options to consider for further photochemical modeling, it does not necessarily indicate that they will be modeled, and does not imply that these strategies ultimately will be implemented.

Finally, while the this methodology was developed and tested for regional haze control programs, with very minor adaptation, the same methods can be used effectively to aid in the design of regional 8-hr ozone and annual $PM_{2.5}$ NAAQS attainment strategies.

Figure ES-1. Level I Areas of Influence (AOI-1) for Sulfate associated with the Big Bend, Guadalupe, Wichita Mountains, Breton Island, Voyageur, and Boundary Waters Class I Areas.

Figure ES-2. Level I Areas of Influence (AOI-1) for Nitrate Associated with the Big Bend, Guadalupe, Wichita Mountains, Breton Island, Voyageur, and Boundary Waters Class I Areas.

1.0 INTRODUCTION

The Implementation and Control Strategies (ICS) Workgroup of the Central Regional Air Planning Association (CENRAP), together with other workgroups and state, tribal and federal agencies, have worked for more than four years in developing the foundation for constructing regional haze (RH) control strategies for pertinent Class I areas (Table 1-1) within and adjacent to the CENRAP states and tribes (Seltz, 2006a,b; Anderson; 2005; Sharp and Anderson, 2005). In late February 2006, Alpine Geophysics, LLC (AG) was contracted to assist the ICS in these ongoing efforts. Specifically, using information developed by the ICS and others, AG was charged with developing a quantitative procedure to identify and prioritize potential RH control strategies to be tested by CENRAP modelers. Alpine formulated a methodology for constructing control strategy recommendations based on presently available information and submitted a Work Plan detailing this approach to the ICS/CENRAP leadership for review (Tesche and Stella, 2006).

Table 1-1. Class I Areas Addressed in this Study.

RPO	Class I Area	ST	Name
CENRAP	Big Bend Nat'l Park	TX	BIBE
CENRAP	Boundary Waters	MN	BWCA
CENRAP	Breton Island	LA	BRET
CENRAP	Caney Creek	AR	CACR
CENRAP	Guadalupe Mountains	TX	GUMO
CENRAP	Hercules-Glades	MO	HEGL
CENRAP	Mingo	MO	MING
CENRAP	Upper Buffalo	AR	UPBU
CENRAP	Voyageurs	MN	VOYA2
CENRAP	Wichita Mountains	OK	WIMO
VISTAS	Mammoth Cave	KY	MACA
VISTAS	Sipsey Wilderness	AL	SIPS
MRPO	Isle Royale	MI	ISLE
WRAP	Badlands	SD	BADL
WRAP	Great Sand Dunes	CO	GRSA
WRAP	Lostwood Wilderness	ND	LOST
WRAP	Rocky Mtn Nat'l Park	CO	ROMO
WRAP	Salt Creek	NM	SACR
WRAP	Theodore Roosevlt	ND	THRO
WRAP	Wheeler Peak	NM	WHPE
WRAP	White Mountain	NM	WHIT
WRAP	Wind Cave	SD	WICA

Based on comments received, the approved Work Plan was implemented, culminating in the quantitative methodology for identifying potentially viable regional haze control strategies for the CENRAP states and tribes. Using the most pertinent aerometric, emissions and air quality modeling data available, we implemented this methodology and, in this report, present a set of recommendations for regional haze precursor emissions reduction strategies. These recommendations, once reviewed and refined by the ICS and Modeling workgroup, will be passed on to the CENRAP Emissions and Air Quality Modeling contractors (ENVIRON International Corporation and the University of California, Riverside) for quantitative testing with the SMOKE/CMAQ/CAMx regional modeling systems.

To facilitate subsequent use of this methodology, this report describes the various analytical steps and provides examples (both in the body of the report and in supporting appendixes). In addition, relevant technical support information, data sets, and analysis software have been supplied to CENRAP for posting on their project website for access by interested parties.

1.1 Study Overview

Preliminary (Typ02a) and more recent (Typ02b) modeling projections from the CMAQ Base18b/Typ02 scenarios (Morris et al., 2006b) have indicated that some Class I areas within or near the CENRAP domain may achieve the 2018 Reasonable Progress Goals (RPG) under current 'on-the-books' and 'on-the-way' controls while others may not unless additional emissions reductions are implemented (see Figures 1-1 and 1-2). As shown in Figure 1-1, six CENRAP Class I Areas (Big Bend, Guadalupe, Wichita Mountains, Breton Island, Voyageur, and Boundary Waters) are projected, by the latest CMAQ modeling, to have somewhat higher visibility metrics (deciviews) when compared to the 2018 RPG glide paths. While Boundary Waters does not explicitly appear in Figure 1-1 due to data base insufficiencies, recent modeling by various RPOs suggests that Boundary Waters responds similarly to Voyageurs. Accordingly, it is thus included as one of the six projected Class I areas where additional precursor controls might be considered by CENRAP/ICS.

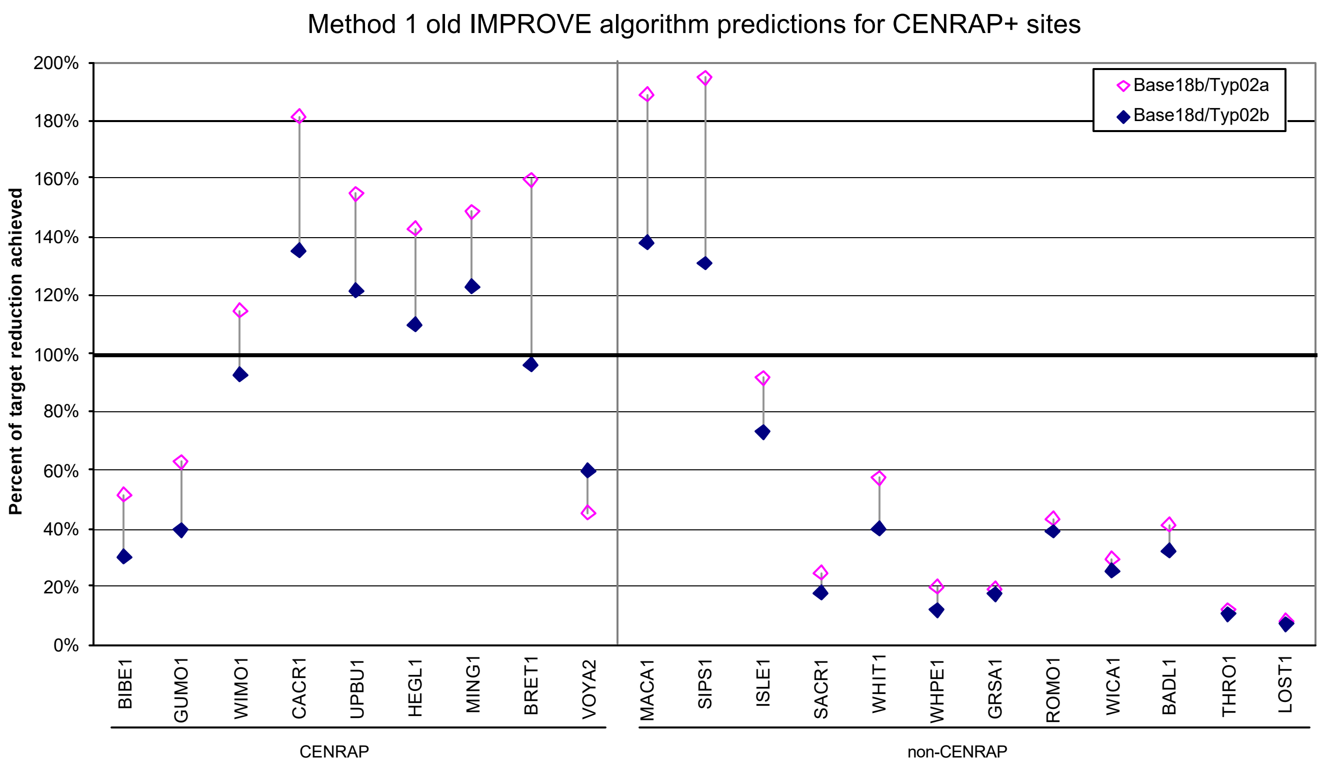


Figure 1-1. Current Visibility Projections (Base 18d/Typ02b) at CENRAP and Other Class I Sites (Source: Morris et al., 2006b).

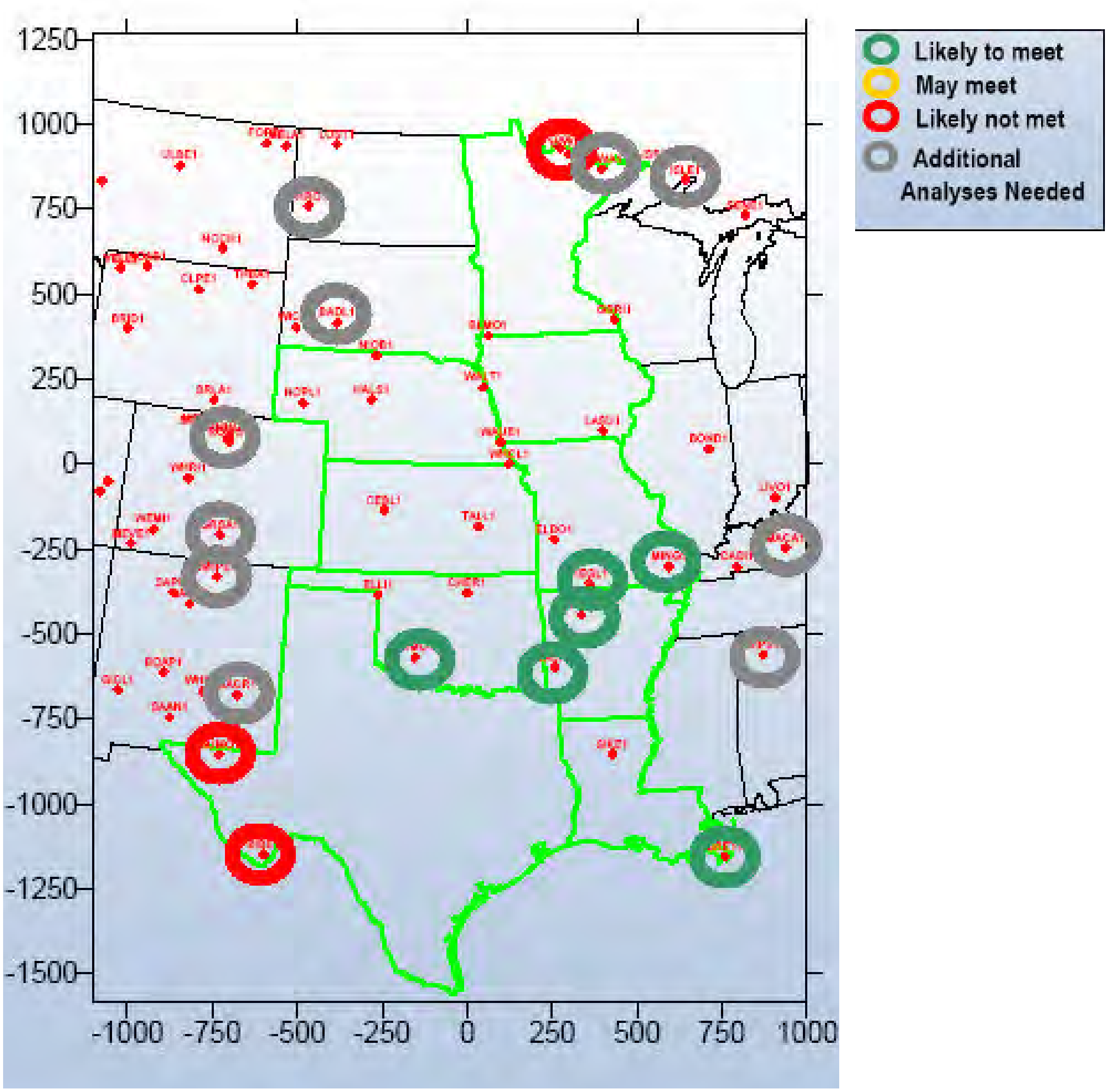


Figure 1-2. Preliminary Visibility Projections by State (Source: Morris et al., 2006b)

To prepare for the modeling of potential additional control strategies, an intensified effort has been undertaken by the ICS work group over the past two years to 'set the stage' for this activity (see for example ICS, 2005, Seltz, 2006). Consonant with these plans and on behalf of CENRAP, the ICS workgroup seeks to integrate focused contractor support with ongoing workgroup activities to accomplish the following objectives:

> Analyze existing regional haze modeling inventories developed by CENRAP, the States, tribes, and other RPOs;

> Synthesize available and pertinent air quality and meteorological data and recent 'attribution of haze studies' by CENRAP and the other RPOs;

> Review preliminary 2018 RPG modeling by CENRAP and other RPOs to identify the key Class I areas for which additional emissions reductions may be needed;

> Develop a prioritized set of regional and subregional precursor emissions control scenarios aimed at achieving the RPG at the CENRAP Class I areas; and

> Monitor the initial 2018 control strategy modeling performed by the CENRAP modeling team to ascertain whether subsequent strategies need to be refined or new strategies developed.

The project Work Plan (Tesche and Stella, 2006) describes in detail how these objectives have been addressed in cooperation with ICS and CENRAP.

1.2 Approach, Assumptions, and Constraints

Development of recommendations for potential CENRAP regional haze control strategy simulations was a three-step process. First, we assembled available information useful in quantifying the reductions in fine particulate aerosol concentrations needed to satisfy CENRAP's preliminary regional haze visibility projections. Naturally, the principal focus was on the Class I areas within the CENRAP region that were estimated to not meet the 2018 Reasonable Further Progress (RFP) glide paths. Based on preliminary and more recent modeling (Morris et al., 2006b), some Class I areas did meet the 2018 RFP glide paths while others did not. As new visibility projections for the Class I areas become available, the ICS may wish to re-examine this study's strategy recommendations in order to account for more up-to-date estimates.

The second step involved developing Areas of Influence (AOIs) upwind of each Class I area within which common 'visibility precursor-Class I receptor' impacts could be aggregated into similar groupings. We used results of numerous statistical and pattern recognition studies, as well as pertinent regional photochemical aerosol modeling by Alpine and ENVIRON scientists as well as other groups (including the RPOs). These analyses culminated in quantitative 'rules of thumb' relating emissions reductions of visibility-impairing precursors (in tons/day) to ambient aerosol concentrations at each of the ten (10) CENRAP Class I monitors. We also developed these quantitative source-receptor relationships for a dozen Class I areas in adjoining RPOs to the extent possible give available data, project resources and schedule. As of this writing,

CENRAP Modeling contractors are still performing focused particulate source apportionment modeling (CAMx PSAT) over the region. Once this work is completed, the ICS may wish to re-examine our methodology and strategy recommendations to determine if refined source-receptor relationships alter in any way our present findings and conclusions.

The third step synthesized the results of the first two, together with information on the estimated 2018 CENRAP emissions inventory and the cost-effectiveness of various controls, to deduce a prioritized set of RH control strategies containing elements of both regional emissions reductions and targeted reductions within the AOIs closest to those six CENRAP Class I areas for which positive visibility increments were estimated (Morris et al., 2006b). We used the most up-to-date modeling inventory supplied by the CENRAP Modeling contractor; however, the current round of inventory corrections and refinements will undoubtedly lead to refined emissions data sets in coming months. Thus, another constraint limiting the 'shelf-life' of this study's recommendations is the accuracy and representativeness of the draft 2018 emissions data used in developing this plan's precursor emissions control recommendations.

While project work scope precluded re-running the strategy development process described in this report with updated CAMx/PSAT and CMAQ visibility projections expected in late May or early June 2006, the methodological tools are cataloged and archived should the ICS wish to undertake this activity at a later time.

1.3 Structure of Report

This report is organized as follows. Section 2 provides a brief background on the Regional Haze Rule (RHR) and the role that CENRAP and the other RPOs are playing in developing strategies that will show progress in meeting Reasonable Progress Goals by 2018. We also discuss key considerations that influence the design of regional and subregional control strategies in the context of the RHR. Our technical approach is summarized in Section 3. Details of our methodology are given in the Work Plan (Tesche and Stella, 2006a). In Section 4 we describe the information available to characterize the daily and annul composition of $PM_{2.5}$ constituents (sulfate, nitrate, elemental carbon, etc) at the various IMPROVE monitors in the CENRAP and adjoining Class I Areas. We also describe the method to relate the modeled deciview (dv) or extinction coefficient (Mm^{-1}) – derived from the most recent CENRAP visibility projection modeling – to the fine particulate component concentrations at each Class I area expressed in units of mass per unit volume (i.e., $\mu g/m^3$).

Section 5 presents the quantitative methods for converting these concentration increments (whose reductions will likely achieve the individual Class I areas visibility goals by 2108) to mass emissions rate reductions for the primary particulate aerosol precursors, NO_X and SO_2. In addition, the section describes the methods used to construct Area of Influence (AOI) domains surrounding each Class I area based on historical data analysis, statistical pattern recognition studies, and various photochemical and aerosol modeling studies performed throughout the eastern U.S. by Alpine, ENVIRON, state, tribal and federal regulatory agencies, the Southern

Appalachian Mountains Initiative (SAMI), the RPOs, and university scientists[4]. In Section 6, the information developed in the two preceding chapters is used, together with original analyses of the 2018 regional haze inventories and control technology cost-effectiveness information, to construct a series of curves from which quantitative estimates of suggested precursor emissions controls (within specific AOIs) are developed for each Class I Area in CENRAP projected above the reasonable progress glide path in 2018. Our summary and recommendations are presented in Section 7.

1.4 Technical Support Resources

Several technical appendixes and support documents are provided to accommodate the extensive tabular and graphical information underpinning our methodology. Some appendixes constitute simple tabular data or emissions summaries (in Excel format) while other appendixes contain information in PowerPoint or Adobe Acrobat formats. Finally, the study's Work Plan, Final Report, Technical Support Documents (i.e., the appendixes and other materials), and a compilation of science reports, professional papers and journal articles have been transferred to CENRAP for uploading to their project ftp site.

[4] The AOI methodology was carried out by Dr. Jim Wilkinson of Alpine whose recent Ph.D. original research and Dissertation from Georgia Tech focused on the development of the AOI methodology for regional haze, ozone, and $PM_{2.5}$ control strategy modeling in the eastern U.S.

2.0 CONTEXT FOR REGIONAL HAZE STRATEGY DEVELOPMENT

Section 169A of the Clean Air Act (CCA) sets forth a national goal for visibility which is the "prevention of any future, and the remedying of any existing, impairment of visibility in Class I areas which impairment results from manmade air pollution." In 1999, EPA published a final rule to address a type of visibility impairment known as regional haze (64 FR 35714). The Regional Haze Rule (RHR) requires States to submit implementation plans (SIPs) to address regional haze visibility impairment in federally-protected parks and wilderness areas (i.e., the Class I scenic areas identified in the Clean Air Act). The 1999 rule was issued to fulfill a long-standing EPA commitment to address regional haze under the authority and requirements of sections 169A and 169B of the CAA. In essence, the RHR prescribes that states are to make efforts to improve visibility in 156 Class I areas at such rates that "natural conditions" would be achieved in each area by 2064. A 'reasonable rate of progress' corresponds to linear improvement in visibility, as characterized in units of deciview (dv), between current conditions during the base period of 2000-2004 and natural conditions at the end point of 2064. It is important to note that a modeled 2018 visibility condition at a Class I monitor – numerically equaling the monitor's RPG goal – is not meant to imply 'attainment' of any standard nor is lesser modeled progress in reaching a particular RPG indicative of 'nonattainment'. Indeed, as will be discussed later, progress in attaining visibility improvements at some CENRAP monitors (in Texas and Minnesota) may be thwarted by substantial contributions of visibility precursors from Mexico and Canada over which the States and Tribes have no direct control.

2.1 Role of CENRAP and the Other Regional Planning Organizations (RPOs)

CENRAP is one of five Regional Planning Organizations (RPOs) that have responsibility for coordinating development of State Implementation Plans (SIPs) and Tribal Implementation Plans (TIPs) in selected areas of the U.S. to address the requirements of the Regional Haze Rule (RHR). The RHR visibility SIPs/TIPs are due in 2007/2008. CENRAP modeling results may also form the regional component for 8-hour ozone and fine particulate ($PM_{2.5}$) SIPs/TIPs that are also expected to be due in 2007/2008. CENRAP is a regional partnership of states, tribes, federal agencies, stakeholders and citizen groups established to initiate and coordinate activities associated with the management of regional haze and other air quality issues within the CENRAP states. The CENRAP region includes states and tribal lands located within the boundaries of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma and Texas.

The regional emissions and fine particulate/visibility modeling for CENRAP is being performed by the Emissions and Air Quality Modeling Contractor that is comprised of staff from ENVIRON International Corporation (ENVIRON) and the University of California, Riverside (UCR). The ENVIRON/UCR team performs the emissions and air quality modeling simulations for states and tribes within the CENRAP region, providing analytical results used in developing implementation plans under the EPA Regional Haze Rule. Alpine Geophysics serves as the Technical Advisor to CENRAP, working interactively with the emissions and air quality modelers at ENVIRON and UCR.

2.2 Considerations in Designing Regional Haze Control Strategies

Where the year 2018 base case modeling does not show an acceptable regional haze or visibility glide slope for a Class I area within or adjacent to the CENRAP domain, additional (and possibly substantial) emission reductions will most likely be required to show reasonable progress in meeting 2108 visibility goals. Due to the unique location, meteorology, and emission sources within an area of influence to each Class I area, individualized control strategies reducing emissions from the remaining residual sources or source types are most likely to achieve required results. It is highly unlikely that a single cost effective "across-the-board" reduction strategy will achieve the visibility goals for every Class I area.

Although emissions located within areas of direct proximity to Class I area monitors will generally have the greatest influence on attaining visibility goals, these sources may not be the only ones with significant impact on the air quality. Using methods such as localized geography analysis (e.g., within 200km of Class I area boundaries) to initially identify source types and pollutants with the greatest influence will only provide part of the picture. In reality, other methods will also provide information related to transport sources impacting a Class I area. These other methods can include back trajectory analysis, residence time probability, source apportionment modeling (PSAT, OSAT, TSSA), and the cause of haze (COH) studies performed in the past two years by the various RPOs including CENRAP. Other geographic studies, such as identifying sources that have an impact on more than one Class I area are also warranted. These methods can also help to limit or refine geography, pollutants, or source categories of interest for additional reduction potential in each Class I area.

Using these techniques in addition to review of the future year base case emissions inventories and assigned control strategies will allow CENRAP and the ICS Workgroup to further define incremental reduction allowing for the attainment of Class I area air quality or visibility objectives.

2.3 Resources Available to this Study

The reference section of this report and the technical discussions in Sections 4 through 6 identify the major data bases, reports, modeling output files and other resources used in this study. Certain regional modeling and data analysis studies performed by the RPOs and their contractors were particularly useful in developing source-receptor relationships for the various Class I areas. These include: (a) the recent (25 April 2006) visibility projections for the CENRAP and adjoining RPOs recently described by Morris et al. (2006b), (b) monitoring information for the various Class I areas of interest, summarized on the IMPROVE website, and (c) the most recent 2018 SMOKE emissions inventory developed for CENRAP by various state, tribal and federal agencies and contractors.

3.0 TECHNICAL APPROACH

As described in the Work Plan (Tesche and Stella, 2006b), our technical approach consisted of six (6) tasks which are summarized briefly here to provide background for the more detailed technical discussions given in subsequent chapters.

<u>Task 1: Synthesize Relevant Regional Haze Aerometric Analyses:</u> The objective of Task 1 was to synthesize pertinent 'attribution of haze' documents, CENRAP CAMx/CMAQ visibility modeling results, and other technical reports, papers, and analyses bearing directly on the quantification of emissions-source/visibility-receptor impacts at the 10 CENRAP Class I areas and adjoining areas. This Task was aimed at quantifying what is known about source-receptor relationships at the 10 CENRAP Class I areas on the basis of emissions, air chemistry and meteorological statistical analyses and receptor modeling studies.

<u>Task 2: Review Existing Inventories and Control Scenario Strategy Options:</u> This involved a concise summarization of existing regional haze modeling inventories and associated local, State, Tribal and Federal control programs to determine available incremental controls on sources or source types affecting visibility increments (i.e., differences between the modeled 2018 visibility level and the RFP glide slope for the particular Class I Area). In addition, we attempted to confirm future year control plans and reduction scenarios necessary to accomplish incremental reduction analysis. The product of this effort was a set of suggestions for alternate incremental control strategies based on analysis of available emissions, monitoring, and modeled data.

The Task 2 review was conducted in a top down fashion starting with an analysis of the major source categories in the domains of interest (based on results from Tasks 1 and 3) to determine which major categories have the highest residual contribution to the area. Once the highest source types were identified, subcategories within those source types were reviewed. In addition to reviewing the residual emission categories in the future year base, we also identified reductions that have already occurred within each category or at specific units. This allows CENRAP to determine if certain source categories that have yet to be controlled under the base case have the potential for reduction or if source types already reduced have reached the full cost-effective potential. Finally, unit level tables of emission comparisons from 2002 to 2018 were developed that facilitate ICS's review of existing emission reductions and the assignment of new cost-effective controls to units using the best control for the scenario.

Once the list of potential sources available for reduction were identified, we used relevant control strategy information extracted from EPA's AirControlNET (Pechan, 2005) and other sources to further define the most cost-effective strategies for these sources. Since AirConrolNET does not allow for the interactive processing of new inventories (it comes preconfigured with inventories and control strategies applied), this extract was performed outside of the AirConrolNET model to assign incremental control programs. Finally, we ran every accessible control strategy against the identified source list to develop incremental cost curves necessary to design command and control or cost-effectiveness based control strategies by source or domain. This master list of controls was then used in the development of our final control strategy recommendations.

Task 3: Synthesize Relevant Regional Haze Source Attribution Modeling: Complementing Task 1, work under Task 3 was aimed at synthesizing key results from recent regional modeling studies helpful relating emissions reductions of visibility precursors (e.g. SO_2, NO_X) in upwind source regions to the improvement in visibility (in deciviews or, alternatively, in Mm^{-1}) at downwind Class I. More specifically, we attempted to extract from available regional modeling studies useful 'rules of thumb' relating percentage or tonnage reductions in visibility reducing precursors (e.g., SO_2, NO_X, ammonia, and VOCs) on the expected impact on visibility downwind. These 'rules of thumb' or source-receptor relationships were essential in estimating the amounts of precursor emissions to be reduced in regions upwind of each of the various Class I areas.

Task 4: Develop CENRAP Control Strategy Plan: The objective of Task 4 was to assemble the findings and technical work products from Tasks 1 through 3, supplemented with any additional information provided by the ICS Workgroup or CENRAP Modeling contractors, and construct the CENRAP Control Strategy Plan. As described in subsequent chapters, this plan addresses feasible regional haze control strategies with each one including both regional and sub-regional elements.

More specifically, using the results of the most recent CENRAP visibility projection modeling (Morris et al., 2006b), we identified six Class I areas that potentially require additional regional and/or subregional incremental emission reductions to achieve reasonable progress visibility goals. Once an emissions reduction target was determined for each Class I area, we used the master list of controls developed in Task 2 to formulate the CENRAP Control Strategy plan, including cost-effectiveness as a key element. This plan identifies specific source categories (e.g., SIC, SCC, plant ID), and emissions reductions to be implemented. The specificity of the prescribed control scenarios recommended in the plan is sufficient to allow the CENRAP modeling contractors to readily implement the suggested changes through the SMOKE model input stream.

The CENRAP Control Strategy Plan is intended to identify the specific sources and/or source categories where additional control is available with emphasis on known incremental reductions first (e.g., BART). Using this plan as a starting point, CENRAP is equipped to assess the present strategy recommendations and identify any new assumptions (recent or new facility configurations, updated control strategy information from the states and tribes), emergent data sets (e.g., CAMx PSAT modeling; updated 2018 CMAQ visibility projections), corrected modeling inventories, and so on that were unavailable during the three-week time period when this plan was developed.

Task 5: Review Control Strategy Plan With ICS: The project team participated in a teleconference call on 13 April 2006 with the CENRAP ICS Workgroup to discuss the study methodology, findings, and recommendations.

Task 6: Final Report: To the maximum extend feasible within this project's work scope, we incorporated written responses from CENRAP on the 10 April draft report, culminating in this final document.

4.0 ESTIMATION OF RESIDUAL VISIBILITY IMPROVEMENT NEEDS

The estimation of residual visibility improvement needs (i.e., the aerosol species concentration reductions [mass per unit volume] at each Class I monitor) was performed through three activities: (a) literature review and synthesis, (b) analysis of current CMAQ visibility projections and IMPROVE measurements at the Class I sites, and (c) integration of this information into a computational scheme for use in later tasks.

4.1 Literature Review and Synthesis of Pertinent Source-Receptor Information

Our synthesis of *existing* source-receptor information for the CENRAP and adjacent Class I area was guided by the following set of questions for which specific answers were sought in recent reports, papers, RPO and science meeting presentations, as well as recent one-atmosphere modeling studies. These core questions include:

> **What aerosol components are responsible for haze?**
- What are the major components for best, worst and average days visibility days across the CENRAP domain and how do they compare?
- How variable are they episodically, seasonally, inter-annually?
- What site characteristics best group sites with similar patterns of major components?
- How do the relative concentrations of the major components compare with the relative emission rates nearby and regionally?

> **What is meteorology's role in the causes of haze?**
- How do meteorological conditions influencing the CENRAP Class I areas differ for best, worst and typical haze conditions?
- What empirical relationships are their between meteorological conditions and haziness?
- How well can haze conditions be predicted solely using meteorological factors?
- What characteristics best group CENRAP Class I sites with similar relationships between meteorological conditions and haze?
- How well can inter-annual variations in haze be accounted for by variations in meteorological conditions at the CENRAP Class I areas?

> **What are the emission sources responsible for haze?**
- What geographic areas are associated with transported air that arrives at sites on best, typical and worst haze days in the CENRAP region?
- Are the emission characteristics of the transport areas consistent with the aerosol components responsible for haze?
- What do the aerosol characteristics on best, typical and worst days indicate about CENERAP or upwind emissions sources?
- What does the spatial and temporal pattern analysis indicate about the locations and time periods associated with sources responsible for haze?
- What evidence is there for urban impacts on haze at the CENRAP Class I areas and what is the magnitude and frequency when evident?

- What connections can be made between sample periods with unusual species concentrations and activity of highly sporadic sources (e.g. major fires, dust storms)?
- What can be inferred about impacts from sources in other states, other RPOs and other countries, particularly Mexico and Canada?
- What refinements to default natural haze levels can be made using ambient monitoring and emission data?

> **Are there detectable and/or statistically significant multi-year trends in the causes of haze?**
- Are the aerosol components responsible for haze changing?
  Where changes are seen, are they the result of meteorological or emissions changes?
- Where emissions are known to have changed, are there corresponding changes in haze levels?

With these questions in mind, we surveyed the literature relevant to the CENRAP Class I areas in order *to summarize*:

> **Characteristics of Each CENRAP Monitoring Site**
- Their representation of the Class I area and nearby Class I areas;
- Relationship to terrain features, bodies of water, etc;
- Proximity to major point sources, cities, etc.

> **Meteorological Characteristics of Each CENRAP Monitoring Site**
- Expected mesoscale flow patterns of interest (sea/land breeze, mountain/valley winds, convergence zones, nocturnal jets, etc.);
- Orographic precipitation patterns (i.e. favored for precipitation, or in rain-shadow);
- Inversion layers;
- Potential for transport from cities and other significant sources/source areas.

> **Visibility-Aerosol Related Data Analyses**
- Descriptive statistics and interpretation for aerosol data- individual components and reconstructed extinction
- Key aerosol species component spatial and seasonal patterns (e.g., Best 20%, middle 60%, worst 20% reconstructed extinction days and seasonal patterns by site)
- Spatial and seasonal patterns of aerosol components frequency distributions.
- Aerosol component data in light of emissions sources, monitoring site settings, back trajectories
- Results of cluster, CART, and other pattern-recognition analyses to group sites with similar patterns in aerosol component contributions to haze

> **Back Trajectory Analyses**
  - Results of back trajectory end point data for each CENRAP Class I area;
  - Back trajectory summary statistics residence time by season, best 20% and worst 20% reconstructed extinction and aerosol components for all CENRAP Class I areas;
  - Conditional probability maps for high and low extinction and aerosol components.
  - Results of emissions density maps giving location information, site setting information, etc., and
  - Mesoscale meteorological analyses complementing back trajectories.

Of course, complete answers to all these questions could not be developed in the course of this three week study; however, sufficient information was available that, when distilled into key tabular and graphical summaries, provided a solid foundation for continued efforts in Task 1 and especially Task 2 (discussed in Section 5). Key reports and modeling summaries synthesized during this initial review were supplied to CENRAP for uploading onto the CENSARA project website for easy access by interested CENRAP workgroup members or stakeholders.

4.2 Preliminary Visibility Estimates for Class I Areas

The visibility projection estimates for 2018 available at the time this study was performed (Typ02a) were developed in early 2006 by ENVIRON/UCR and presented at the February CENRAP meetings in Baton Rouge, LA. Appendix B presents these preliminary visibility projections for the ten (10) CENRAP Class I areas and the twelve (12) outlying Class I areas in the WRAP, MRPO, and VISTAS domains. After the draft report had been prepared, Morris et al., (2006b) published an updated set of visibility projections (Typ02b). Given the importance of using the most up to date projections possible, where feasible we repeated our technical work using the updated projections (See Table 1-1 for a visual comparison of the differences). Table 4-1 lists the following information derived from these more recent CENRAP projections of Morris et al., (2006b).

> Visibility (in dv) on the 20% worst days in 2002;

> The 2000-2004 visibility baseline (in dv);

> The 2018 visibility goal (in dv) based on the requirements of the Regional Haze Rule;

> The CMAQ-forecasted 2018 visibility levels on the 20% worst days;

> The ‘increment’ in visibility, expressed in dv (calculated as the difference between the 2018 goal and the 2018 forecast. Negative values (presented in red in Table 2) denote that additional visibility improvement needed to achieve the desired 2018 progress goal; and

> The ‘increment’ in visibility, expressed in units of inverse mega-meters (Mm^{-1}).

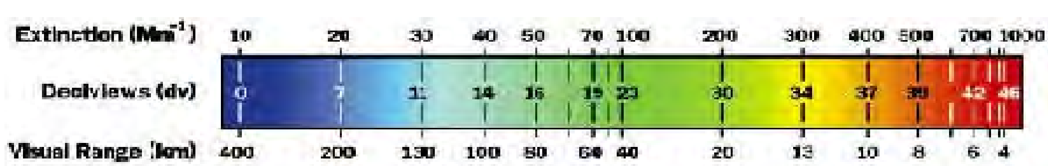
Table 4-1. Reasonable Progress Goal Estimates and ‘Increments’.

				W20%	2000/2004	2018	2018	Deciview	Ext	Annual
				Bkgrnd	Baseline	Goal	Forecast	Incre	Incre	f(RH)
RPO	Class I Area	ST	Name	DV	DV	DV	DV	DV	Mm-1	
CENRAP	Big Bend Nat'l Park	TX	BIBE	6.93	17.10	14.73	16.39	1.66	7.9	2.1
CENRAP	Boundary Waters	MN	BWCA	11.21	18.30	16.62	17.54	0.92	5.1	3.3
CENRAP	Breton Island	LA	BRET	11.53	25.59	22.31	22.45	0.14	1.3	3.8
CENRAP	Caney Creek	AR	CACR	11.33	25.34	22.07	20.91	-1.16	-10.0	3.2
CENRAP	Guadalupe Mountains	TX	GUMO	7.02	17.48	15.04	16.53	1.49	7.2	1.8
CENRAP	Hercules-Glades	MO	HEGL	11.27	25.63	22.28	21.94	-0.34	-3.1	3.1
CENRAP	Mingo	MO	MING	11.27	26.49	22.94	22.13	-0.81	-7.7	3.2
CENRAP	Upper Buffalo	AR	UPBU	11.28	25.31	22.03	21.33	-0.70	-6.1	3.1
CENRAP	Voyageurs	MN	VOYA2	11.09	18.46	16.74	17.43	0.69	3.8	3.4
CENRAP	Wichita Mountains	OK	WIMO	11.07	23.06	20.26	20.47	0.21	1.6	2.6
VISTAS	Mammoth Cave	KY	MACA	11.53	29.94	25.65	24.01	-1.64	-19.7	3.2
VISTAS	Sipsey Wilderness	AL	SIPS	11.39	27.71	23.91	22.72	-1.19	-12.3	3.3
MRPO	Isle Royale	MI	ISLE	11.22	20.28	18.16	18.74	0.58	3.7	3.5
WRAP	Badlands	SD	BADL	7.30	17.00	14.74	16.37	1.63	7.7	2.6
WRAP	Great Sand Dunes	CO	GRSA	7.10	13.20	11.78	12.96	1.18	4.1	2.0
WRAP	Lostwood Wilderness	ND	LOST	7.33	19.49	16.66	19.28	2.62	15.8	2.9
WRAP	Rocky Mtn Nat'l Park	CO	ROMO	7.05	14.15	12.49	13.51	1.02	3.7	2.1
WRAP	Salt Creek	NM	SACR	6.99	18.05	15.47	17.59	2.12	11.1	1.8
WRAP	Theodore Roosevlt	ND	THRO	7.31	17.66	15.24	17.40	2.16	11.1	3.7
WRAP	Wheeler Peak	NM	WHPE	7.04	11.26	10.27	11.14	0.87	2.5	1.9
WRAP	White Mountain	NM	WHIT	6.98	14.06	12.41	13.40	0.99	3.6	1.8
WRAP	Wind Cave	SD	WICA	7.24	15.81	13.81	15.30	1.49	6.4	2.5

The relationship between deciviews (dv) and inverse megameters (Mm^{-1}) is described in detail by Malm, (1999). Equation 4-1 defines the Haze Index (HI):

$$HI = 10 \ln(b_{ext}/10) \qquad (4\text{-}1)$$

where HI is the haze index (deciviews [dv]) and b_{ext} is the light extinction coefficient (Mm^{-1}). Thus, one deciview is approximately equal to 11.05 Mm^{-1} and a change of one dv represents a change of approximately ten percent in b_{ext}, “which is a small but perceptible scenic change under many circumstances”. Malm (1999) provides the following graphical representation between the extinction (Mm^{-1}), deciviews, and visual range (km):



The measured light extinction at the Class I areas for the 20% worst days each year are available at http://vista.cira.colostate.edu/views/web/AnnualSummaryDev/Composition.aspx, the IMPROVE site. The most recent measured extinction values (in Mm^{-1}) for the various Class I monitors are listed in Table 4-2, presented in Figure 4-1, and also given in Appendix B. For the most part, IMPROVE extinction measurements for the 20% worst days are available for 2004, the most recent year analyzed. These data are presented as extinction totals for the individual visibility-impairing chemical species: sulfate; nitrate; organic mass; elemental carbon; soil; and

coarse mass. Table 4-3 lists the fractional extinction for each chemical species. Finally, the IMPROVE data for each species at the 22 Class I monitors are presented as a function of time in the appendices to this document. These time series plots reveal the seasonal and daily variation in the visibility-impairing components throughout the year at teach site. Figures 4-2 and 4-3 present the absolute and fractional extinction values listed in Tables 4-2 and 4-3 in the form of stacked bar charts for ease of comparison.

Table 4-2. Measured Extinction at Class I Areas.

				Measured Extinction (Mm^{-1}) on 20% Worst Days in 2004						
					Amm	Organic	Elem	Soil	Coarse	
RPO	Class I Area	ST	Name	Sulfate	Nitrate	Mass	Carbon	Mass	Mass	Total
CENRAP	Big Bend Nat'l Park	TX	BIBE	25.86	1.57	5.85	1.80	2.21	4.55	41.84
CENRAP	Boundary Waters	MN	BWCA	28.09	24.78	7.76	2.94	0.44	2.10	66.11
CENRAP	Breton Island	LA	BRET	65.60	8.49	6.13	4.26	0.40	4.45	89.33
CENRAP	Caney Creek	AR	CACR	65.68	15.43	17.95	4.27	0.79	2.66	106.78
CENRAP	Guadalupe Mountains	TX	GUMO	15.92	4.98	5.51	1.30	2.83	9.99	40.53
CENRAP	Hercules-Glades	MO	HEGL	67.23	21.92	21.14	5.12	0.88	2.85	119.14
CENRAP	Mingo	MO	MING	80.44	35.11	26.10	8.95	1.55	8.40	160.55
CENRAP	Upper Buffalo	AR	UPBU	64.43	17.39	16.47	4.48	0.90	7.23	110.90
CENRAP	Voyageurs	MN	VOYA2	10.16	15.14	9.94	2.68	0.46	2.84	41.22
CENRAP	Wichita Mountains	OK	WIMO	40.78	28.25	16.64	4.67	0.70	4.06	95.10
VISTAS	Mammoth Cave	KY	MACA	146.48	10.78	15.58	5.33	1.04	1.76	180.97
VISTAS	Sipsey Wilderness	AL	SIPS	109.27	8.09	20.22	7.06	0.95	2.66	148.25
MRPO	Isle Royale	MI	ISLE	33.33	12.64	9.71	2.93	0.48	3.51	62.60
WRAP	Badlands	SD	BADL	20.05	6.58	7.53	1.55	0.75	3.60	40.06
WRAP	Great Sand Dunes	CO	GRSA	6.20	2.78	6.44	1.30	2.11	3.78	22.61
WRAP	Lostwood Wilderness	ND	LOST	28.44	26.00	9.02	2.22	0.41	2.73	68.82
WRAP	Rocky Mtn Nat'l Park	CO	ROMO	8.19	4.73	6.37	2.00	1.11	2.78	25.18
WRAP	Salt Creek	NM	SACR	17.74	12.42	7.04	2.24	4.18	6.08	49.70
WRAP	Theodore Roosevlt	ND	THRO	15.68	16.28	9.95	2.52	0.55	2.99	47.97
WRAP	Wheeler Peak	NM	WHPE	5.69	1.26	4.98	2.05	1.59	1.29	16.86
WRAP	White Mountain	NM	WHIT	8.77	2.49	8.52	2.11	1.58	3.81	27.28
WRAP	Wind Cave	SD	WICA	14.27	8.91	8.35	3.17	0.79	2.08	37.57

4.3 Estimation of Visibility-Impairing Concentration Increments

The information in Tables 4-1 through 4-3 as well as other data provided in the appendices of this document was used to estimate the extent to which additional visibility-impairing precursor emissions reductions might be needed on the basis of current estimates of the projected positive increments and the chemical composition of fine particulate aerosol at the six CENRAP Class I monitors on the worst 20% days. The next step was to transform the visibility increment estimates into concentration increment estimates based on current IMPROVE algorithms. Using the modeled visibility increment (Mm^{-1}) estimates and annual f(RH) values (Table 4-1) together with the measured sulfate, nitrate, OC, EC, soil, and course mass fractions from the IMPROVE Class I monitors (Tables 4-2 and 4-3), we deduced the atmospheric concentrations of the six species groups ($\mu g/m^3$) using the standard IMPROVE equation (EPA, 2003). These concentrations were calculated assuming: (a) the required concentration reductions would be met by each precursor in proportion to the most recent IMPROVE distribution at each Class I monitor (Table 4-4); and (b) the concentration reductions would be met by each precursor individually (Table 4-5).

Table 4-3. Extinction Fraction for 20% Worst Days by Class I Area.

				Extinction Fraction for 20% Worst Days by Class I Area					
				Amm	Amm	Organic	Elem	Soil	Coarse
RPO	Class I Area	ST	Name	Sulfate	Nitrate	Mass	Carbon	Mass	Mass
CENRAP	Big Bend Nat'l Park	TX	BIBE	0.62	0.04	0.14	0.04	0.05	0.11
CENRAP	Boundary Waters	MN	BWCA	0.42	0.37	0.12	0.04	0.01	0.03
CENRAP	Breton Island	LA	BRET	0.73	0.10	0.07	0.05	0.00	0.05
CENRAP	Caney Creek	AR	CACR	0.62	0.14	0.17	0.04	0.01	0.02
CENRAP	Guadalupe Mountains	TX	GUMO	0.39	0.12	0.14	0.03	0.07	0.25
CENRAP	Hercules-Glades	MO	HEGL	0.56	0.18	0.18	0.04	0.01	0.02
CENRAP	Mingo	MO	MING	0.50	0.22	0.16	0.06	0.01	0.05
CENRAP	Upper Buffalo	AR	UPBU	0.58	0.16	0.15	0.04	0.01	0.07
CENRAP	Voyageurs	MN	VOYA2	0.25	0.37	0.24	0.07	0.01	0.07
CENRAP	Wichita Mountains	OK	WIMO	0.43	0.30	0.17	0.05	0.01	0.04
VISTAS	Mammoth Cave	KY	MACA	0.81	0.06	0.09	0.03	0.01	0.01
VISTAS	Sipsey Wilderness	AL	SIPS	0.74	0.05	0.14	0.05	0.01	0.02
MRPO	Isle Royale	MI	ISLE	0.53	0.20	0.16	0.05	0.01	0.06
WRAP	Badlands	SD	BADL	0.50	0.16	0.19	0.04	0.02	0.09
WRAP	Great Sand Dunes	CO	GRSA	0.27	0.12	0.28	0.06	0.09	0.17
WRAP	Lostwood Wilderness	ND	LOST	0.41	0.38	0.13	0.03	0.01	0.04
WRAP	Rocky Mtn Nat'l Park	CO	ROMO	0.33	0.19	0.25	0.08	0.04	0.11
WRAP	Salt Creek	NM	SACR	0.36	0.25	0.14	0.05	0.08	0.12
WRAP	Theodore Roosevlt	ND	THRO	0.33	0.34	0.21	0.05	0.01	0.06
WRAP	Wheeler Peak	NM	WHPE	0.34	0.07	0.30	0.12	0.09	0.08
WRAP	White Mountain	NM	WHIT	0.32	0.09	0.31	0.08	0.06	0.14
WRAP	Wind Cave	SD	WICA	0.38	0.24	0.22	0.08	0.02	0.06

Table 4-4. Required Concentration Reductions: All Species.

				Reduction in All Species (µg/m3) to Eliminate DV Increment Assuming Controls in Proportion of Area-Specific Composition					
RPO	Class I Area	ST	Name	Sulfate	Nitrate	OC	EC	Soil	Coarse
CENRAP	Big Bend Nat'l Park	TX	BIBE	0.77	0.05	0.28	0.03	0.42	1.43
CENRAP	Boundary Waters	MN	BWCA	0.22	0.19	0.15	0.02	0.03	0.27
CENRAP	Breton Island	LA	BRET	0.08	0.01	0.02	0.01	0.01	0.11
CENRAP	Caney Creek	AR	CACR						
CENRAP	Guadalupe Mountains	TX	GUMO	0.53	0.16	0.25	0.02	0.50	2.97
CENRAP	Hercules-Glades	MO	HEGL						
CENRAP	Mingo	MO	MING						
CENRAP	Upper Buffalo	AR	UPBU						
CENRAP	Voyageurs	MN	VOYA2	0.09	0.14	0.23	0.02	0.04	0.44
CENRAP	Wichita Mountains	OK	WIMO	0.09	0.06	0.07	0.01	0.01	0.11
VISTAS	Mammoth Cave	KY	MACA						
VISTAS	Sipsey Wilderness	AL	SIPS						
MRPO	Isle Royale	MI	ISLE	0.19	0.07	0.14	0.02	0.03	0.34
WRAP	Badlands	SD	BADL	0.50	0.16	0.36	0.03	0.14	1.16
WRAP	Great Sand Dunes	CO	GRSA	0.19	0.08	0.29	0.02	0.38	1.13
WRAP	Lostwood Wilderness	ND	LOST	0.75	0.69	0.52	0.05	0.09	1.05
WRAP	Rocky Mtn Nat'l Park	CO	ROMO	0.19	0.11	0.24	0.03	0.17	0.69
WRAP	Salt Creek	NM	SACR	0.73	0.51	0.39	0.05	0.93	2.26
WRAP	Theodore Roosevlt	ND	THRO	0.33	0.34	0.57	0.06	0.13	1.15
WRAP	Wheeler Peak	NM	WHPE	0.15	0.03	0.19	0.03	0.24	0.32
WRAP	White Mountain	NM	WHIT	0.21	0.06	0.28	0.03	0.21	0.84
WRAP	Wind Cave	SD	WICA	0.32	0.20	0.36	0.05	0.13	0.59

Table 4-5. Required Concentration Reductions: One Specie.

RPO	Class I Area	ST	Name	Reduction in One Specie (µg/m3) to Eliminate DV Increment Assuming Controls on Only 1 Specie					
				Sulfate	Nitrate	OC	EC	Soil	Coarse
CENRAP	Big Bend Nat'l Park	TX	BIBE	1.25	1.25	1.97	0.79	7.88	13.13
CENRAP	Boundary Waters	MN	BWCA	0.51	0.51	1.27	0.51	5.08	8.46
CENRAP	Breton Island	LA	BRET	0.12	0.12	0.33	0.13	1.31	2.19
CENRAP	Caney Creek	AR	CACR						
CENRAP	Guadalupe Mountains	TX	GUMO	1.34	1.34	1.81	0.72	7.23	12.05
CENRAP	Hercules-Glades	MO	HEGL						
CENRAP	Mingo	MO	MING						
CENRAP	Upper Buffalo	AR	UPBU						
CENRAP	Voyageurs	MN	VOYA2	0.37	0.37	0.95	0.38	3.81	6.35
CENRAP	Wichita Mountains	OK	WIMO	0.21	0.21	0.40	0.16	1.61	2.68
VISTAS	Mammoth Cave	KY	MACA						
VISTAS	Sipsey Wilderness	AL	SIPS						
MRPO	Isle Royale	MI	ISLE	0.35	0.35	0.92	0.37	3.67	6.12
WRAP	Badlands	SD	BADL	0.99	0.99	1.93	0.77	7.73	12.88
WRAP	Great Sand Dunes	CO	GRSA	0.68	0.68	1.02	0.41	4.07	6.78
WRAP	Lostwood Wilderness	ND	LOST	1.82	1.82	3.96	1.58	15.85	26.41
WRAP	Rocky Mtn Nat'l Park	CO	ROMO	0.59	0.59	0.94	0.37	3.74	6.24
WRAP	Salt Creek	NM	SACR	2.05	2.05	2.77	1.11	11.09	18.49
WRAP	Theodore Roosevlt	ND	THRO	1.00	1.00	2.77	1.11	11.07	18.45
WRAP	Wheeler Peak	NM	WHPE	0.45	0.45	0.63	0.25	2.54	4.23
WRAP	White Mountain	NM	WHIT	0.67	0.67	0.90	0.36	3.60	6.00
WRAP	Wind Cave	SD	WICA	0.85	0.85	1.60	0.64	6.39	10.65

Following the IMPROVE methodology, the relationship between the extinction (Mm^{-1}) of an individual chemical species and the volumetric mass concentration is as follows:

$$b_{Sulfate} = 3 \cdot f(RH) \cdot [SO4]$$

$$b_{Nitrate} = 3 \cdot f(RH) \cdot [NO3]$$

$$b_{EC} = 10 \cdot [EC]$$

$$b_{OM} = 4 \cdot [OM]$$

$$b_{Soil} = 1 \cdot [Soil]$$

$$b_{CM} = 0.6 \cdot [CM]$$

$$b_{Ray} = 10\ Mm^{-1}$$

$$b_{ext} = b_{Ray} + b_{Sulfate} + b_{Nitrate} + b_{EC} + b_{OM} + b_{Soil} + b_{CM}$$

The numeric coefficient at the beginning of each equation is the dry scattering or absorption efficiency. The f(RH) term is a monthly-average relative humidity adjustment factor. The terms in the brackets are the concentrations in micrograms per cubic meter ($\mu g/m^3$) that will need to be reduced on the 20% worst days at the Class I monitor to make up for the projected visibility 'increment'.

Rearranging yields a solution for the aerosol concentrations as a function of the measured or modeled extinction:

$[SO4] = b_{Sulfate} / [3 \cdot f(RH)]$

$[NO3] = b_{Nitrate} / [3 \cdot f(RH)]$

$[EC] = b_{EC} / 10$

$[OM] = b_{OM} / 4$

$[Soil] = b_{Soil}$

$[CM] = b_{CM} / 0.6$

Note that the sulfate (SO_4) and nitrate (NO_3) components are hygroscopic because their extinction coefficients depend upon relative humidity. The concentrations, in square brackets, are in $\mu g/m^3$ and b_{ext} is in units of Mm^{-1}. The Rayleigh scattering term (b_{Ray}) has a default value of 10 Mm^{-1}, as recommended in EPA guidance for tracking reasonable progress (EPA, 2003). The effect of relative humidity variability on the extinction coefficients for SO_4 and NO_3 can be estimated in several ways, but given the scope of this analysis, we calculated annual average Class I areas-specific monthly f(RH) values (last column of Table 4-1) from the seasonal f(RH) data provided by EPA in the BART guidelines.

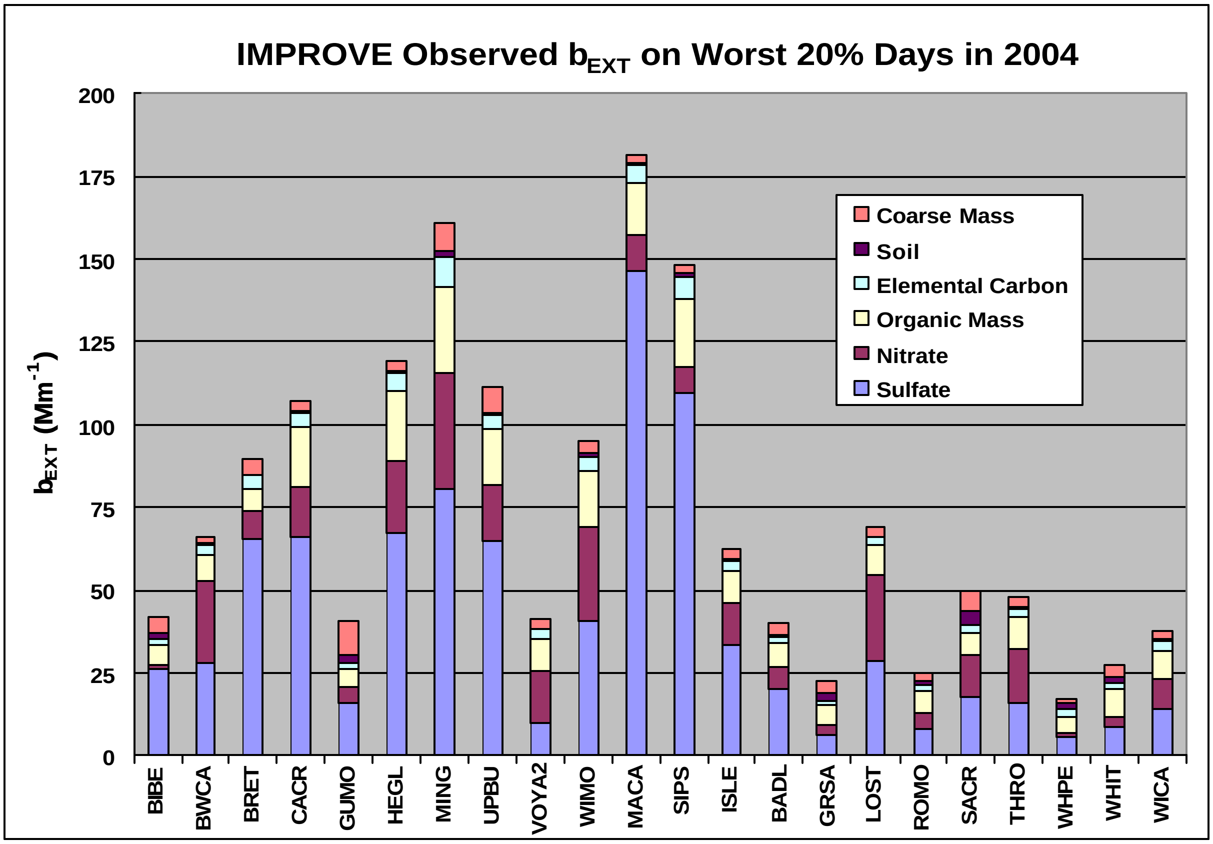


Figure 4-1. Measured Extinction Coefficients at Class I Areas Based on IMPROVE Data.

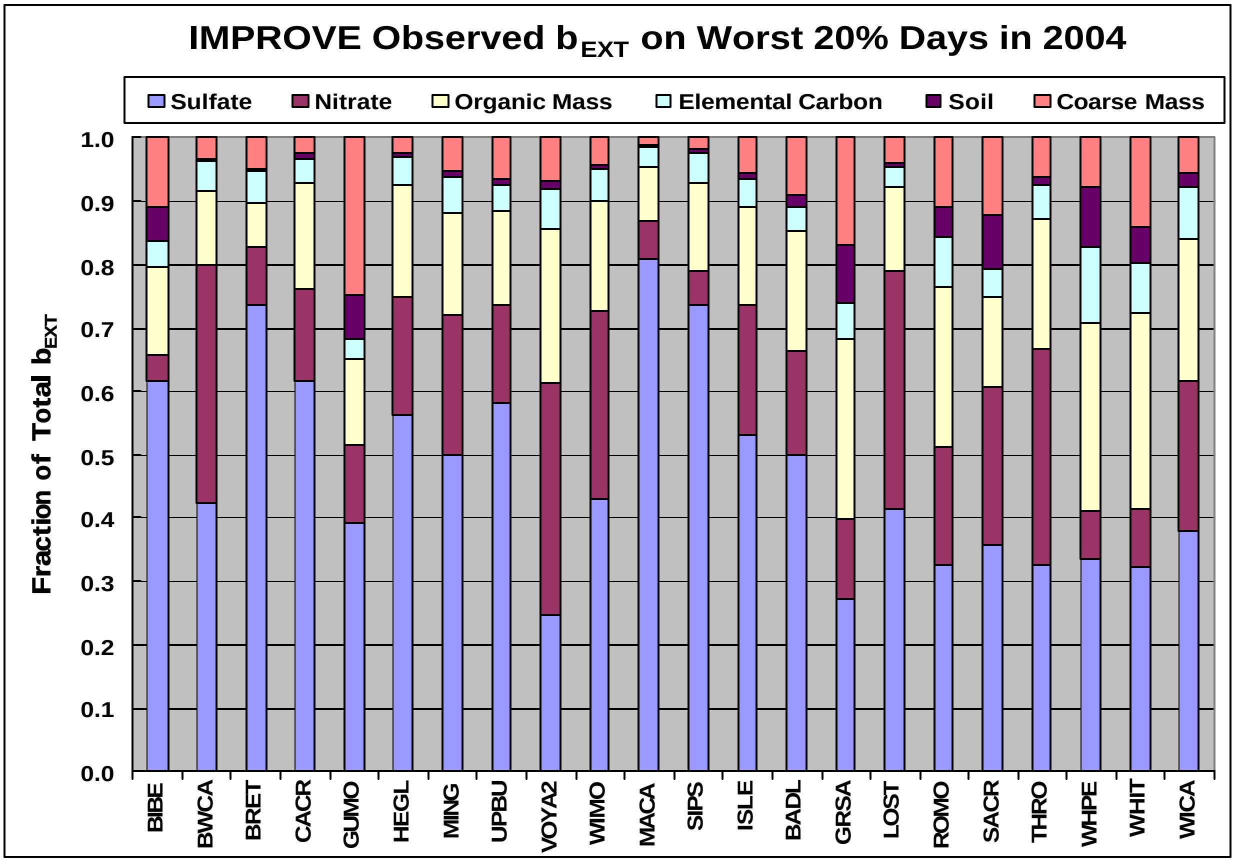


Figure 4-2. Measured Fractional Extinction at Class I Areas Based on IMPROVE Data.

5.0 ESTIMATION OF EMISSIONS REDUCTION NEEDS

5.1 Development of the Areas of Influence (AOI)

To quantify the incremental emissions reductions needed to ameliorate positive visibility increments at Class I areas, it was first necessary to identify those regions that adversely impact visibility at the Class I areas. These Areas of Influence (AOI) directly identify the source regions whose emissions impact a Class I area. Further, an AOI can also be constructed such that it provides a quantitative assessment of the impact of the emissions from a source region on such metrics as $PM_{2.5}$ concentration at a Class I area. This should not be confused with source apportionment where source regions are assigned quantitative culpability to an overall air quality metric such as sulfate concentration or light extinction. Instead, an AOI ideally describes geographically the emissions source regions and magnitude of, say, the impact that a one ton reduction in SO_2 emissions has on sulfate concentration ($\mu g/m^3$) at a Class I area.

An AOI can be constructed based on a variety of data such as: sensitivities derived from the Decoupled Direct Method (DDM) (Yang *et al.*, 1997; Mendoza *et al.*, 2000); brute force sensitivities; various forms of back trajectory analysis which examine air mass residence time (e.g., Schichtel *et al.*, 2006; DRI, 2005c); and methods that combine back trajectory analyses with such information as emissions impact potential (e.g., Raffuse *et al.*, 2005). Over the last two years, one or more of these methods has been used to construct AOIs or AOI-like diagrams for all the Class I areas of interest to this study. Therefore, it was necessary to identify, gather, and synthesize these data from the many sources so that a consistent set of AOIs could be constructed.

Appendix C is a compendium of AOI data for each Class I area of interest that could be extracted from the body of literature that is available. The first six slides of Appendix C provide examples of the data that were available to construct the AOIs – references are provided on each slide. Ultimately, the Residence Time Difference plots (DRI, 2005c), the Probability of Regional Source Contribution to Haze (PORSCH) plots (Raffuse *et al*., 2005), the Tagged Species Source Apportionment (TSSA) results (Tonnesen and Wang, 2004; UCR, 2006), and a good deal of engineering judgment were used to construct a consistent set of AOIs for each Class I area.

Residence Time Difference (RTD) plots were constructed based on Back Trajectory Residence Time (BTRT) plots. Back trajectory analyses use meteorological fields to estimate the most likely geographical path an air mass traversed to end at a particular receptor. Of note, the meteorological field can be based on interpolation of observations, modeled (e.g., from a prognostic meteorological model such as MM5), or a hybrid field based on combined modeled and observed values. The method essentially reverses the wind field, moving an air mass backward in time. Back trajectories oversimplify actual atmospheric conditions in that dispersion is ignored. Further, the potential emissions source regions that impact a receptor are underestimated given that it is impossible to track every air parcel impacting the receptor.

The BTRT estimates that were developed by DRI (2005b) and used in this study were estimated using HYSPLIT (Draxler and Hess, 1997; NOAA, 2006). HYSPLIT uses archived three dimensional meteorological fields generated from observations and short-term meteorological forecasts. The model produces a series of endpoints representing longitude, latitude, and

elevation of the parcel at one-hour intervals. BTRT plots at each site were calculated for all days, by month, and by best and worst twenty percentile days (DRI, 2005c). BTRT plots give the fraction of total hours that an air parcel resided over each specific geographical area. RTD plots were created by subtracting the map for all days at a site from the map for the 20% worst days by pollutant. RTD plots were computed for the twenty percentile worst sulfate, nitrate, organic carbon, elemental carbon, fine soil, and coarse mass days.

The worst twenty percentile sulfate RTD plots, for example, shows the difference in residence time between the worst sulfate days and all days. If the number is positive, then the residence time on the worst sulfate days is greater than on all days. The residence time difference map simply shows the areas that air was more frequently (positive numbers) passing over on worst case days compared to all days.

The PORSCH system is a suite of GIS tools that combines modeled backward wind trajectories, monitored concentrations, meteorological conditions, and emissions estimates to estimate probable regions of influence. PORSCH combines ensemble backward trajectories with chemically speciated emissions data to estimate the trajectory-emissions density-weighted area likely to impact a receptor site. PORSCH can do this for a single day or a suite of days though for purposes of this study, only data relevant to the 20% worst haze days were extracted.

As the name implies Tagged Species Source Apportionment (TSSA) uses "Tagged Chemical Species," or tracers, to track chemical transformations and transport of each chemical species or precursor species during an air quality model run. Key chemical species are identified for specific emissions source regions or emissions source categories. These tagged chemical species are tracked during all phases of the air quality modeling run (e.g., advection, diffusion, deposition, chemical transformation), and the end results are three dimensional fields in time showing source attribution of the chemical species for any grid cell in model domain. When chemical species are tagged by emissions source region, this provides valuable corroborative evidence for identifying key AOI regions.

Slides 8 through 82 of Appendix C contain the raw data that was extracted from the literature base, which served as the foundation to develop the AOIs for the ten CENRAP Class I areas. Slides 84 through 184 of Appendix C contain the raw data from which AOIs were synthesized for the nine WRAP and two VISTAS Class I areas that border the CENRAP states. Because RTD plots were available for the entire suite of twenty-one Class I areas, they served as the primary basis from which the AOIs were estimated. The RTD plots were manually examined to determine "natural break-points" in residence time difference (only positive values were considered in these plots as positive values indicate air mass residence was greatest in these geographical areas on the 20% worst haze days).

In many cases, these "natural break-points" were difficult to determine given that the scales on the RTD plots were not consistent; hence, engineering judgment was used to place a "break-point." For virtually all Class I areas, it was possible to determine at least two "break-points" and in some instances, three and four "break-points" were determined. For purposes of this effort, a "break-point" was generally placed where the residence time difference transition was on the order of a factor of ten and over large geographical areas. Little pockets of large RTD transitions, such as might occur over Lake Michigan or the Gulf of Mexico, were merged into a

larger "break-point." Once a "break-point" was determined, a hand drawn contour was placed on the plot to indicate the Level 1, 2, or greater "break-point." This was done for each of the chemical species classes: sulfate; nitrate; organic carbon; elemental carbon; fine soils; and coarse material, at each Class I area. For clarification purposes, the Level 1 "break-point" is always the smallest polygon closest to the Class I area, and subsequent Level 2, 3, or greater "break-points" cover progressively larger areas.

Once the RTD "break-points" were determined, the plots were manually compared to the supporting PORSCH and TSSA data in order to determine if a "break-point" needed to expanded, contracted, or moved. The PORSCH data were used primarily to determine if the spatial extent of a "break-point" was adequate and the TSSA data were used to determine if the areas of emissions impact potential were captured within the spatial extent of the RTD "break-points." Based on this reconciliation effort, the Level 1, 2, or greater "break-point" contours were manually adjusted on the plots. Again, a great deal of engineering judgment was used in how these data were combined. This initial effort resulted in the development of 126 plots (six pollutants times twenty-one Class I areas) consisting of one or more "break-point" contours.

Next, each plot was manually compared to the remaining plots to determine if any of the Level 1, 2 or greater "break-point" contours were similar in their geographic placement. If a set of contours from different Class I areas had similar geographic placement, the plots were combined into a single set of contours. In many cases, the "break-point" contours were again manually adjusted so that different plots could be combined into a single set representing multiple Class I areas and multiple pollutants.

This final set of manually created, combined "break-point" contours is what is referred to as the Area of Influence (AOI) for each Class I area. However, these hand drawn AOIs are useless in their current form since it would have been far too time consuming to try to manually extract the counties over which an AOI passed – a step which is necessary if one is to determine the emissions impact potential from a geographic area (i.e., AOI) that impacts a Class I site. Therefore, it is necessary to convert the hand drawn AOIs into a geocoded, electronic file.

Geocoding of the hand drawn AOIs is accomplished by first scanning the image into an electronic file. The scanned image is then registered to a known set of geographical objects. In this case, the geographical objects are the political boundaries of the United States. The function of registering the scanned image, which itself is a political boundaries map of the United States with a set of hand drawn AOIs, is performed using a Geographic Information System (GIS). Secondly, the registered scanned image is rectified so that the image retains its geographic relationship to real world coordinates. Finally, the contours of the rectified image are digitized.

The final set of AOIs is shown in Slides 136 to 143 of Appendix C. These represent the geocoded AOIs that are used to extract a list of counties whose emissions sources have the greatest potential to impact the air quality at a Class I area. Again, ARC/Info was used to extract the counties within each AOI. Figure 5-1 is an example geocoded AOI for the Boundary Waters and Voyageurs Class I areas. Note the distinction between the Level 1 and Level 2 AOIs for both sulfate-to-SO_2 and nitrate-to-NO_X sensitivities.

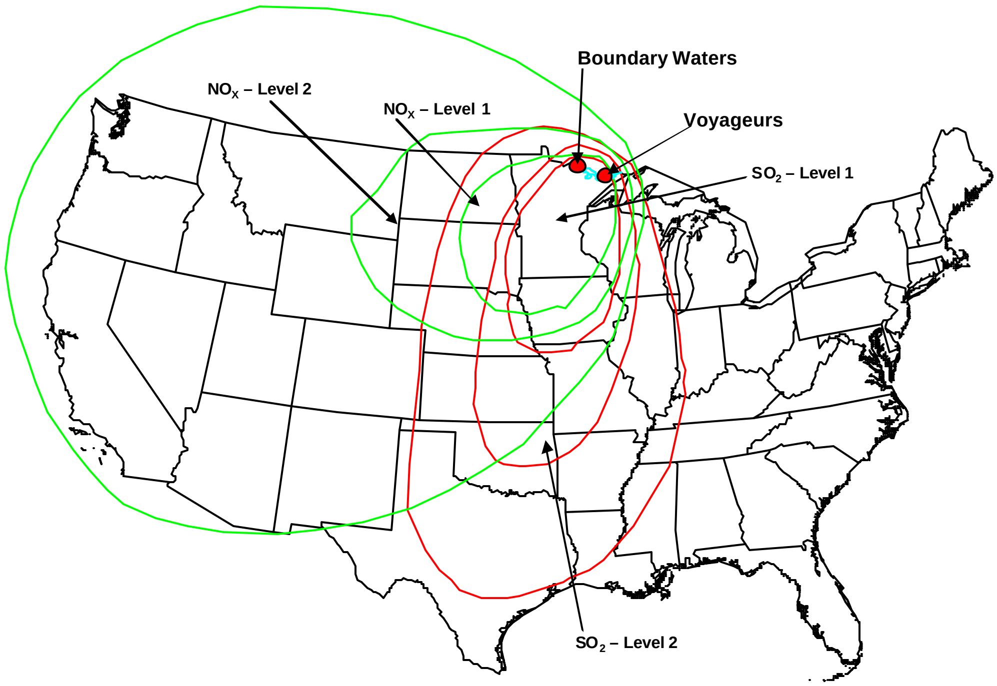


Figure 5-1. Example Geocoded AOI for Boundary Waters and Voyageurs Class I areas. Green contours delineate areas of influence where NO_X emissions impact aerosol nitrate at the Class I areas. Red contours delineate areas of influence where SO_2 emissions impact aerosol sulfate at Class I areas.

5.2 Development of Visibility Impairing Pollutant Concentrations to Precursor Emissions Sensitivity Coefficients

Though a list of counties can now be identified whose emissions sources have the greatest potential to impact air quality at a Class I area, this list has limited value until a quantitative value to associate emissions to air quality is estimated. Ideally, these associative values take the form of $\mu g/m^3$ of pollutant reduced per ton per day of precursor emissions reduced. For example, -0.001 $\mu g/m^3$ of sulfate per ton per day SO_2 reduced tells one that for each ton of SO_2 reduced within an AOI, the Class I area will exhibit a decrease of 0.001 $\mu g/m^3$ in sulfate concentration. This value is referred to as a sensitivity value and is very powerful at informing efforts such as those pursued in this study. A great deal of work has been performed to ascertain such sensitivities, and it is from this body of knowledge that sensitivities specific to the current efforts have been derived.

Tesche *et al.* (2003c) conducted a suite of brute force sensitivity runs using the CAMx and CMAQ air quality modeling (AQM) systems over the eastern United States on behalf of VISTAS. By systematically perturbing the global inventory (e.g., reducing global NO_X emissions by 10%) and rerunning the AQM, they developed a suite of metrics that provided the maximum reduction to say the peak, modeled ammonium nitrate. By converting the 10% NO_X reduction to actual tons per day NO_X reduction, which is simply done by taking 10% of the

emissions in the AQM-ready emissions files, and dividing that into the peak concentration reduction, the sensitivity that is of most importance is realized. Though this value is a more global sensitivity, its use is still valid for our needs. Indeed, by assuming that such a sensitivity is valid across the domain, this general purpose sensitivity value can be extended to all the AOIs of interest by computing the value of a 10% reduction in each of the AOIs and dividing this number into the general sensitivity value derived from the average of all the sensitivities, by pollutant of course, estimated by Tesche *et al.* (2003c).

Appendix D shows an Excel workbook containing the summary data (i.e., worksheet named "General") from Tesche *et al.* (2003c). The worksheet shows the results of the specific sensitivity analyses conducted, and the results of our efforts to compute a general purpose sensitivity value. Once a general purpose sensitivity value was computed, it was recast in a form specific to the Class I areas of interest. This was done by assuming that the general purpose sensitivity (e.g., $\mu g/m^3$ sulfate reduction per 10% reduction in SO_2 emissions) was valid across the domain and dividing this number by the tons per day value deduced from a 10% reduction of a precursor pollutant in the AOI of interest.

Though a general purpose sensitivity value was estimated for all Class I areas and AOIs of interest, other sensitivity information that was more specific to certain Class I areas was available from work done at the Georgia Institute of Technology (GIT, 2006). Researchers at GIT conducted numerous brute force sensitivity runs of the CMAQ AQM on behalf of VISTAS. One component of these efforts was to conduct specific emissions source region and emissions source category sensitivity experiments to determine light extinction sensitivities to a reduction in one ton of precursor emissions at Mingo Wilderness, Upper Buffalo, Caney Creek, Hercules Glade, Breton Island, Sipsey, and Mammoth Cave. The emissions source regions for the GIT efforts (GIT, 2006) included the individual VISTAS states, the clustered CENRAP states, and the clustered MANE-VU states. The GIT (2006) results were extracted and summaries were prepared for the combined Mingo Wilderness-Upper Buffalo-Caney Creek-Hercules Glade AOIs, the Breton Island AOI, the Sipsey AOI, and the Mammoth Cave AOI. The results of these efforts were summarized in Appendix D, Excel worksheet "Class I Specific."

Finally, the results of the sensitivity summary efforts were combined in order to prepare a consistent set of sensitivity values by AOI. This summary is presented in Appendix D, Excel worksheet "Summary" and in Table 5-1.

Table 5-1. Synthesis of Sensitivity Values for Each Class I Area by AOI level. Units should be interpreted as reduction in nitrate (sulfate) concentration ($\mu g/m^3$) per average daily ton reduction in NO_X (SO_2) emissions in the specified AOI Level (see Figure 4-5 for an example of the delineation of the AOI Level).

Abb	Class I	RPO	Level 1 NOX ug/m**3/ton	Level 1 SO2 ug/m**3/ton	Level 2 NOX ug/m**3/ton	Level 2 SO2 ug/m**3/ton
badl	Badlands	WRAP	-0.001	-0.008	-0.003	-0.002
bibe	Big Bend	CENRAP	-0.002	-0.004	-0.001	-0.001
bowa	Boundary Waters	CENRAP	-0.002	-0.006	-0.004	-0.002
bret	Breton Island	CENRAP	-0.00008	-0.002	-0.00005	-0.0007
cacr	Caney Creek	CENRAP	-0.0004	-0.003	-0.002	-0.002
grsa	Great Sand Dunes	WRAP	-0.003	-0.02	--	-0.0005
gumo	Guadalupe Mountains	CENRAP	-0.01	-0.004	-0.002	-0.001
herc	Hercules Glade	CENRAP	-0.0004	-0.003	-0.002	-0.002
lost	Lostwood Wilderness	WRAP	-0.01	-0.008	-0.003	-0.002
maca	Mammoth Cave	VISTAS	-0.001	-0.005	-0.0008	-0.005
ming	Mingo Wilderness	CENRAP	-0.0004	-0.003	-0.002	-0.002
romo	Rocky Mountain	WRAP	-0.007	-0.02	-0.003	-0.0005
sacr	Salt Creek	WRAP	-0.01	-0.08	-0.002	-0.0007
sips	Sipsey Wilderness	VISTAS	-0.001	-0.007	-0.0008	-0.005
thro	Theodore Roosevelt	WRAP	-0.01	-0.008	-0.003	-0.002
upbu	Upper Buffalo	CENRAP	-0.0004	-0.003	-0.002	-0.002
voya	Voyageurs	CENRAP	-0.002	-0.006	-0.004	-0.002
whmo	White Mountain	WRAP	-0.01	-0.08	-0.002	-0.0007
whpe	Wheeler Peak	WRAP	-0.01	-0.08	-0.002	-0.0007
wica	Wind Cave	WRAP	-0.001	-0.008	-0.003	-0.002
wich	Wichita Mountain	CENRAP	-0.005	-0.001	-0.003	-0.0004

5.3 Estimated Emissions Reductions Necessary to Attain 2018 Glide Path

Now that the visibility 'increment' (Table 4-4 [proportional species reduction] and Table 4-5 [single specie reduction]) and the chemical species-to-precursor emissions sensitivity coefficients (Table 5-1) are known by Class I area, it is a simple matter to compute the annualized, incremental emissions reductions that are needed at each Class I area to attain the 2018 glide path. This is accomplished by dividing the visibility 'increment' by the sensitivity coefficient and multiplying by 365.

Table 5-2 shows the required incremental reductions of SO_2 and NO_X emissions that are estimated to be required in order for the Class I areas to meet the glide slope by 2018. The estimated SO_2 and NO_X reductions in Table 5-2 are proportional to chemical species contributions during the 20% worst haze days. In contrast, Table 5-3 shows the estimated SO_2 and NO_X emissions reductions if only one chemical species is reduced. The emissions reductions requirements in Tables 5-2 and 5-3 are reported to two significant figures.

For example, in order for Big Bend to meet the 2018 visibility glide path, approximately 73,000 tons per year of incremental SO_2 emissions reductions (Table 5-2) from SO_2 emissions source

residing in the Level 1 AOI (Figure 5-2) are required assuming that incremental emissions reductions are developed based on a proportional reduction in the chemical species. Hence, in addition to the estimated incremental SO_2 emissions reductions of 73,000 tons per year, estimated incremental NO_X emissions reductions of 8,000 tons per year are also expected to be required. Additionally, incremental emissions reductions in coarse material, soil, elemental carbon, and organic compounds are also necessary if, again, emissions reductions are based on proportional reductions in the chemical species, though these reductions were not estimated given that reasonably available emissions control scenarios exist only for NO_X and SO_2.

If only one chemical specie is controlled, for example sulfate, then precursor SO_2 incremental emissions reductions from emissions sources located within the SO_2 Level 1 AOI (Figure 5-2) are estimated to be 120,000 tons per year (Table 5-3). On the other hand, if only nitrate is controlled, precursor NO_X incremental emissions reductions from emissions sources located within the NO_X Level 1 AOI (Figure 5-2) are estimated to be 210,000 tons per year.

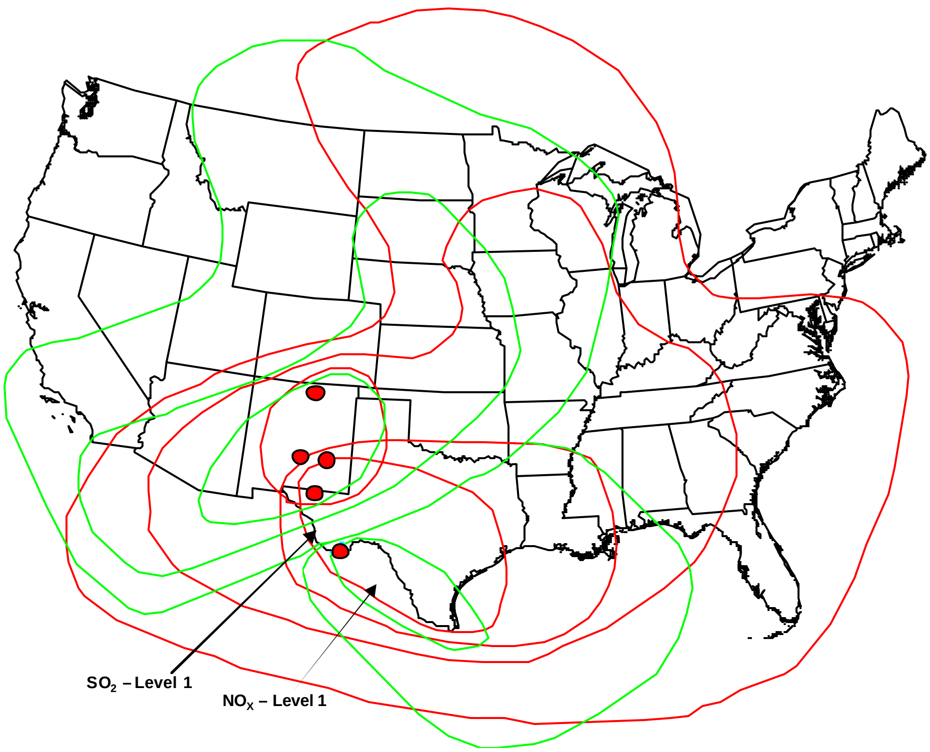


Figure 5-2. Geocoded AOIs for Big Bend, Guadalupe Mountain, Salt Creek, White Mountain, and Wheeler Peak. The Big Bend Level 1 AOI for SO_2 and NO_X are identified.

Table 5-2. SO_2 and NO_X Emissions Reduction Requirements (tons per year) Assuming Proportional Reductions in Sulfate and Nitrate.

Class I Area	ST	Proportional Reduction Requirements (ug/m3) Sulfate	Nitrate	OC	EC	Soil	Coarse	Level 1 AOI (ug/m3/ton reduced) sulfate-to-SO2	nitrate-to-NOX	Required SO2 Emissions Reductions (tons / year)	Required NOX Emissions Reductions (tons / year)
Big Bend Nat'l Park	TX	0.77	0.05	0.28	0.03	0.42	1.43	-0.004	-0.002	73,000	8,000
Boundary Waters	MN	0.22	0.19	0.15	0.02	0.03	0.27	-0.006	-0.004	13,000	19,000
Breton Island	LA	0.08	0.01	0.02	0.01	0.01	0.11	-0.0001	-0.000007	226,000	572,000
Caney Creek	AR							-0.0002	-0.00001		
Guadalupe Mountains	TX	0.53	0.16	0.25	0.02	0.50	2.97	-0.004	-0.01	50,000	4,000
Hercules-Glades	MO							-0.00019	0.0000		
Mingo	MO							-0.0002	-0.00001		
Upper Buffalo	AR							-0.0002	-0.00001		
Voyageurs	MN	0.09	0.14	0.23	0.02	0.04	0.44	-0.006	-0.004	5,700	14,000
Wichita Mountains	OK	0.09	0.06	0.07	0.01	0.01	0.11	-0.001	-0.005	32,000	4,500
Mammoth Cave	KY							-0.005	-0.001		
Sipsey Wilderness	AL							-0.007	-0.001		
Isle Royale	MI	0.19	0.07	0.14	0.02	0.03	0.34	-0.006	-0.004	11,000	7,000
Badlands	SD	0.50	0.16	0.36	0.03	0.14	1.16	-0.008	-0.001	23,000	45,000
Great Sand Dunes	CO	0.19	0.08	0.29	0.02	0.38	1.13	-0.02	-0.003	3,400	10,000
Lostwood Wilderness	ND	0.75	0.69	0.52	0.05	0.09	1.05	-0.008	-0.01	35,000	19,000
Rocky Mtn Nat'l Park	CO	0.19	0.11	0.24	0.03	0.17	0.69	-0.02	-0.007	3,500	5,800
Salt Creek	NM	0.73	0.51	0.39	0.05	0.93	2.26	-0.004	-0.01	68,800	13,000
Theodore Roosevlt	ND	0.33	0.34	0.57	0.06	0.13	1.15	-0.008	-0.01	15,000	12,000
Wheeler Peak	NM	0.15	0.03	0.19	0.03	0.24	0.32	-0.08	-0.01	690	800
White Mountain	NM	0.21	0.06	0.28	0.03	0.21	0.84	-0.08	-0.01	990	1,500
Wind Cave	SD	0.32	0.20	0.36	0.05	0.13	0.59	-0.008	-0.001	15,000	56,000

Table 5-3. SO_2 and NO_X Emissions Reduction Requirements (tons per year) Assuming a Single Chemical Species is Controlled.

Class I Area	ST	Reduction Requirement Assuming Single Species Control (ug/m3) Sulfate	Nitrate	OC	EC	Soil	Coarse	Level 1 AOI (ug/m3/ton reduced) sulfate-to-SO2	nitrate-to-NOX	Required SO2 Emissions Reductions (tons / year)	Required NOX Emissions Reductions (tons / year)
Big Bend Nat'l Park	TX	1.25	1.25	1.97	0.79	7.88	13.13	-0.004	-0.002	120,000	210,000
Boundary Waters	MN	0.51	0.51	1.27	0.51	5.08	8.46	-0.006	-0.004	32,000	51,000
Breton Island	LA	0.12	0.12	0.33	0.13	1.31	2.19	-0.0001	-0.000007	308,000	6,010,000
Caney Creek	AR							-0.0002	-0.00001		
Guadalupe Mountains	TX	1.34	1.34	1.81	0.72	7.23	12.05	-0.004	-0.01	130,000	33,000
Hercules-Glades	MO							-0.00019	0.0000		
Mingo	MO							-0.0002	-0.00001		
Upper Buffalo	AR							-0.0002	-0.00001		
Voyageurs	MN	0.37	0.37	0.95	0.38	3.81	6.35	-0.006	-0.004	23,000	37,000
Wichita Mountains	OK	0.21	0.21	0.40	0.16	1.61	2.68	-0.001	-0.005	75,000	15,000
Mammoth Cave	KY							-0.005	-0.001		
Sipsey Wilderness	AL							-0.007	-0.001		
Isle Royale	MI	0.35	0.35	0.92	0.37	3.67	6.12	-0.006	-0.004	22,000	35,000
Badlands	SD	0.99	0.99	1.93	0.77	7.73	12.88	-0.008	-0.001	46,000	280,000
Great Sand Dunes	CO	0.68	0.68	1.02	0.41	4.07	6.78	-0.02	-0.003	12,000	82,000
Lostwood Wilderness	ND	1.82	1.82	3.96	1.58	15.85	26.41	-0.008	-0.01	84,000	52,000
Rocky Mtn Nat'l Park	CO	0.59	0.59	0.94	0.37	3.74	6.24	-0.02	-0.007	11,000	31,000
Salt Creek	NM	2.05	2.05	2.77	1.11	11.09	18.49	-0.004	-0.01	192,800	50,000
Theodore Roosevlt	ND	1.00	1.00	2.77	1.11	11.07	18.45	-0.008	-0.01	45,000	36,000
Wheeler Peak	NM	0.45	0.45	0.63	0.25	2.54	4.23	-0.08	-0.01	2,100	11,000
White Mountain	NM	0.67	0.67	0.90	0.36	3.60	6.00	-0.08	-0.01	3,100	16,000
Wind Cave	SD	0.85	0.85	1.60	0.64	6.39	10.65	-0.008	-0.001	39,000	240,000

6.0 PRIORITIZED CENRAP EMISSIONS REDUCTION SCENARIOS

6.1 Summary of Emission Inventories Used in Control Plan Development

A necessary component of the control strategy design is a thorough review of the emission inventories that are used in the modeling of the future year base case. This inventory can shed light on the residual emissions from sources or source categories defined to be within areas of transport or impact of a Class I area. We obtained and used the current CENRAP future year (2018) base case and 2002 base year emissions to conduct a review of the top emitting categories and pollutants within identified impact areas.

The SMOKE-ready modeling files for both 2002 and 2018 base year and base cases were obtained from CENRAP's emissions modeling contractor (UCR) in addition to a supplementary county level summary of onroad source emissions produced from the gridded, temporalized MOBILE6-based emissions output. Using the annualization methods confirmed with UCR and identified in the SMOKE file headers, each SMOKE input file was converted to annual emissions and summed for the geography and domain of interest.

Tables 6-1 and 6-2 present the major source category breakdown of these emissions for the entire CENRAP domain. AOI-specific breakdowns are presented in Appendix E of this document for those CENRAP Class I areas projected to be above the reasonable progress glide slope. Because the SMOKE-ready files were used in this analysis, the particulate matter transport factor is included in the PM emission summaries. This factor is applied to account for the removal of a substantial portion of fugitive dust emissions near a source by surrounding vegetation and structures when such emissions are used in regional scale modeling analyses.

Table 6-1. CENRAP 2002 Base Year Annual Emissions Summary.

	CENRAP 2002 Base Year Annual Emissions (Tons)						
Source Category	**VOC**	**NOx**	**CO**	**SO2**	**PM-10**	**PM-2.5**	**NH3**
Fuel Comb. Elec. Util.	13,838	1,006,914	290,478	1,545,327	79,429	53,475	4,462
Fuel Comb. Industrial	74,226	907,445	387,579	568,270	118,626	78,412	6,243
Fuel Comb. Other	151,527	98,457	435,320	34,605	67,380	65,556	4,870
Chemical & Allied Product Mfg	56,154	37,002	117,918	140,403	10,946	8,503	13,254
Metals Processing	8,178	16,197	115,827	86,425	14,930	6,486	4
Petroleum & Related Industries	486,785	306,947	274,187	81,950	10,442	7,408	819
Other Industrial Processes	150,388	107,908	119,678	89,127	235,401	74,228	206,676
Solvent Utilization	799,050	392	248	21	1,338	1,110	17
Storage & Transport	200,946	9,023	39,075	2,416	17,321	5,294	220
Waste Disposal & Recycling	58,790	16,836	248,560	5,319	57,500	53,804	9,914
Highway Vehicles	985,527	1,780,289	13,178,713	51,829	100,256	94,514	51,512
Off-highway	660,216	966,296	4,358,200	95,522	83,090	76,924	1,365
Natural Sources	0	0	0	0	0	0	80,213
Miscellaneous	310,871	150,474	4,538,131	47,040	4,325,839	1,062,364	1,440,416
CENRAP Total	**3,956,494**	**5,404,181**	**24,103,914**	**2,748,255**	**5,122,496**	**1,588,078**	**1,819,983**

Table 6-2. 2018 Base Case Annual Emissions Summary.

Source Category	CENRAP 2018 Base Case Annual Emissions (Tons)						
	VOC	NOx	CO	SO2	PM-10	PM-2.5	NH3
Fuel Comb. Elec. Util.	15,963	800,509	231,161	1,397,945	125,999	106,402	12,188
Fuel Comb. Industrial	87,300	985,108	470,053	562,732	134,652	93,244	7,942
Fuel Comb. Other	139,826	93,527	348,628	33,555	57,292	55,498	4,932
Chemical & Allied Product Mfg	91,937	52,915	200,036	229,435	17,361	13,383	23,977
Metals Processing	14,600	24,603	200,166	154,071	23,811	10,838	6
Petroleum & Related Industries	519,225	320,126	287,198	106,536	13,818	9,753	1,077
Other Industrial Processes	215,126	162,931	163,154	133,203	316,220	100,922	285,113
Solvent Utilization	1,095,270	663	426	35	2,563	2,116	19
Storage & Transport	227,269	12,122	69,548	3,325	23,808	7,380	298
Waste Disposal & Recycling	73,117	19,379	296,493	7,704	67,637	63,084	14,019
Highway Vehicles	447,496	445,651	7,466,397	7,335	24,845	12,522	73,128
Off-highway	384,203	263,701	5,067,432	995	43,831	40,311	606
Natural Sources	0	0	0	0	0	0	80,213
Miscellaneous	212,436	107,761	3,200,076	57,923	3,968,055	903,434	1,921,843
CENRAP Total	**3,523,767**	**3,288,994**	**18,000,769**	**2,694,795**	**4,819,893**	**1,418,889**	**2,425,360**

As 2002 pre- and post-modeled emission summaries were provided on the input data files, we were able to verify the emission totals for each State and SCC in the modeling domain (Pechan, 2006). However, as 2018 summaries were not available in time to review the files for this analysis, we have not confirmed that these 2018 emission totals are as expected by the ICS.

Our review was conducted in a top down fashion starting with an analysis of the major source categories in the domains of interest to determine which major categories have the highest residual contribution to the area. Once the highest source types were identified, subcategories within those source types were reviewed. Again, a ranking of the highest residual sub source types was performed and additional analyses on these categories were conducted. Table 6-3 presents a percentage based contribution of residual emissions by major source category for the CENRAP domain. Tables for each CENRAP Class I AOI projected to be above the glide slope for reasonable progress are presented in Appendix E of this document.

In addition to reviewing the residual emission categories in the future year base, it was important to identify reductions that have already occurred within each category or at specific units. This will allow the ICS to determine if certain source categories that have yet to be controlled under the future year base case have the potential for reduction or if source types already reduced have reached the full cost-effective potential. Table 6-4 presents this information in annual tons for all sources in the CENRAP domain, while Table 6-5 presents the same information in terms of percent change from 2002.

Finally, once each subcategory was identified, unit level tables of emission comparisons from 2002 to 2018 were developed allowing the ICS to review existing emission reductions and providing the ability to assign new cost-effective controls to units using the best control for the scenario. These tables present comparisons of 2002 and 2018 emission levels, by pollutant, and future year control technology assignment (by IPM forecasting) for EGU sources. Since unit-

specific technology assignments were not identified in the SMOKE control packets nor in documentation obtained for use in this project, these units do not have associated future year technology identification data.

Ultimately, the ICS' final control strategy decisions will include the application of BART applicable source reductions in the future year base case. However, as these sources and their associated reductions were unavailable for this project, they too are not included in this analysis.

Table 6-3. CENRAP 2018 Base Case Annual Residual Emissions Contribution Summary.

	CENRAP 2018 Base Case Annual Emissions (Percent of Total)						
Source Category	**VOC**	**NOx**	**CO**	**SO2**	**PM-10**	**PM-2.5**	**NH3**
Fuel Comb. Elec. Util.	0%	24%	1%	52%	3%	7%	1%
Fuel Comb. Industrial	2%	30%	3%	21%	3%	7%	0%
Fuel Comb. Other	4%	3%	2%	1%	1%	4%	0%
Chemical & Allied Product Mfg	3%	2%	1%	9%	0%	1%	1%
Metals Processing	0%	1%	1%	6%	0%	1%	0%
Petroleum & Related Industries	15%	10%	2%	4%	0%	1%	0%
Other Industrial Processes	6%	5%	1%	5%	7%	7%	12%
Solvent Utilization	31%	0%	0%	0%	0%	0%	0%
Storage & Transport	6%	0%	0%	0%	0%	1%	0%
Waste Disposal & Recycling	2%	1%	2%	0%	1%	4%	1%
Highway Vehicles	13%	14%	41%	0%	1%	1%	3%
Off-highway	11%	8%	28%	0%	1%	3%	0%
Natural Sources	0%	0%	0%	0%	0%	0%	3%
Miscellaneous	6%	3%	18%	2%	82%	64%	79%
CENRAP Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 6-4. CENRAP Annual Emissions Change (Tons).

	CENRAP Annual Emissions Change -- 2002 to 2018 (Tons)						
Source Category	**VOC**	**NOx**	**CO**	**SO2**	**PM-10**	**PM-2.5**	**NH3**
Fuel Comb. Elec. Util.	2,125	-206,405	-59,317	-147,382	46,570	52,927	7,727
Fuel Comb. Industrial	13,075	77,663	82,475	-5,538	16,025	14,832	1,699
Fuel Comb. Other	-11,701	-4,930	-86,692	-1,050	-10,087	-10,058	62
Chemical & Allied Product Mfg	35,783	15,913	82,118	89,032	6,416	4,880	10,723
Metals Processing	6,422	8,405	84,338	67,647	8,882	4,352	3
Petroleum & Related Industries	32,441	13,179	13,011	24,587	3,377	2,346	258
Other Industrial Processes	64,738	55,023	43,475	44,076	80,819	26,694	78,437
Solvent Utilization	296,220	271	178	14	1,225	1,006	2
Storage & Transport	26,323	3,099	30,473	909	6,487	2,086	77
Waste Disposal & Recycling	14,328	2,542	47,933	2,385	10,137	9,281	4,105
Highway Vehicles	-538,032	-1,334,638	-5,712,316	-44,495	-75,411	-81,992	21,616
Off-highway	-276,012	-702,595	709,233	-94,527	-39,258	-36,612	-759
Natural Sources	0	0	0	0	0	0	0
Miscellaneous	-98,436	-42,714	-1,338,055	10,883	-357,784	-158,930	481,427
CENRAP Total	**-432,727**	**-2,115,187**	**-6,103,145**	**-53,460**	**-302,603**	**-169,189**	**605,376**

Table 6-5. CENRAP Annual Emissions Change (Percent).

	CENRAP Annual Emissions Change -- 2002 to 2018 (Percent)						
Source Category	**VOC**	**NOx**	**CO**	**SO2**	**PM-10**	**PM-2.5**	**NH3**
Fuel Comb. Elec. Util.	15%	-20%	-20%	-10%	59%	99%	173%
Fuel Comb. Industrial	18%	9%	21%	-1%	14%	19%	27%
Fuel Comb. Other	-8%	-5%	-20%	-3%	-15%	-15%	1%
Chemical & Allied Product Mfg	64%	43%	70%	63%	59%	57%	81%
Metals Processing	79%	52%	73%	78%	59%	67%	67%
Petroleum & Related Industries	7%	4%	5%	30%	32%	32%	31%
Other Industrial Processes	43%	51%	36%	49%	34%	36%	38%
Solvent Utilization	37%	69%	72%	66%	92%	91%	13%
Storage & Transport	13%	34%	78%	38%	37%	39%	35%
Waste Disposal & Recycling	24%	15%	19%	45%	18%	17%	41%
Highway Vehicles	-55%	-75%	-43%	-86%	-75%	-87%	42%
Off-highway	-42%	-73%	16%	-99%	-47%	-48%	-56%
Natural Sources	0%	0%	0%	0%	0%	0%	0%
Miscellaneous	-32%	-28%	-29%	23%	-8%	-15%	33%
CENRAP Total	**-11%**	**-39%**	**-25%**	**-2%**	**-6%**	**-11%**	**33%**

6.2 Process in Preparing Files for Control Plan Modeling

In addition to the SMOKE emission files, the 2018 growth and control packets were obtained from UCR for additional application and verification of future year scenario assignment. Since the CENRAP utilized version of the SMOKE processor does not replace control efficiency, rule effectiveness, and rule penetration values in the output files generated using the growth and control modules of the model, Alpine manually applied these values to the 2018 non-EGU and stationary area source files for which the packets were applied. This step was necessary to duplicate the inventories that went into the results of CENRAP's reasonable progress modeling and to ensure that any incremental assignment of control technologies did not duplicate emission reductions already assumed in the future year base case.

The 2018 IPM file used by CENRAP for EGU sources was also obtained and matched to the 2018 base case inventory of EGU sources. This step was conducted for reasons similar to those identified above for non-EGU and stationary area sources and to ensure that incremental controls assigned to these source types did not duplicate existing base case assumptions. Because IPM does not assign a control efficiency with each control device applied to SO_2 and NO_X, we made some assumptions, based on IPM documentation, as to what pollutant specific level of reduction was applied in the future year base case runs. These assumptions, by primary and secondary control device code combinations for SO_2 and NO_X, are presented in Tables 6-6 and 6-7, respectively.

Since many of the control technology control cost equations within AirControlNET require additional unit-level characteristic data, we also made matches of the SMOKE IDA files to CENRAP NIF, EPA NEI, or EPA CAMD CEM data sets to obtain these variables when missing.

Unit level boiler capacity (MMBtu/hr) or NETDC (MW) values are required for capital and operating and maintenance cost calculations for many of the EGU technologies. In cases where these nameplate capacity values could not be identified, emission weighted (based on the final EPA 2002 NEI) were assigned to boilers using a primary (highest emitting) SCC. Table 6-8 presents these weighted capacities. Additionally, stack flow, sulfur content, and primary SCC assignment were necessary to cross-reference available incremental control technologies to the base case emissions inventory data. These variables were obtained where matches could be found, in priority order of CENRAP, CAMD, and EPA datasets, respectively.

Table 6-6. IPM Post Processing Assigned Device Codes and Applied SO_2 Control Efficiencies.

Primary Device Code	Secondary Device Code	Description	CE	RE
0	0	No Control	0	0
119	0	Dry Scrubber	90	100
141	0	Wet Scrubber	90	100

Table 6-7. IPM Post Processing Assigned Device Codes and Applied NO_X Control Efficiencies.

Primary Device Code	Secondary Device Code	Description	CE	RE
0	0	UNCONTROLLED	0	0
26	0	FLUE GAS RECIRCULATION	35	100
26	29	FLUE GAS RECIRCULATION + LOW EXCESS AIR FIRING	35	100
26	204	FLUE GAS RECIRCULATION + OVERFIRE AIR	40	100
28	0	STEAM OR WATER INJECTION	65	100
28	32	STEAM OR WATER INJECTION + AMMONIA INJECTION	65	100
28	204	STEAM OR WATER INJECTION + OVERFIRE AIR	90	100
28	205	STEAM OR WATER INJECTION + LOW NOX BURNERS	90	100
29	0	LOW EXCESS AIR FIRING	35	100
32	0	AMMONIA INJECTION	55	100
32	28	AMMONIA INJECTION + STEAM OR WATER INJECTION	65	100
139	0	SCR (SELECTIVE CATALYTIC REDUCTION)	90	100
139	28	SCR (SELECTIVE CATALYTIC REDUCTION) + STEAM OR WATER INJECTION	95	100
139	71	SCR (SELECTIVE CATALYTIC REDUCTION) + FLUID BED DRY SCRUBBER	90	100
139	204	SCR (SELECTIVE CATALYTIC REDUCTION) + OVERFIRE AIR	90	100
139	205	SCR (SELECTIVE CATALYTIC REDUCTION) + LOW NOX BURNERS	94	100
140	0	NSCR (NON-SELECTIVE CATALYTIC REDUCTION)	90	100
140	29	NSCR (NON-SELECTIVE CATALYTIC REDUCTION) + LOW EXCESS AIR FIRING	90	100
140	71	NSCR (NON-SELECTIVE CATALYTIC REDUCTION) + FLUID BED DRY SCRUBBER	90	100
140	204	NSCR (NON-SELECTIVE CATALYTIC REDUCTION) + OVERFIRE AIR	90	100
140	205	NSCR (NON-SELECTIVE CATALYTIC REDUCTION) + LOW NOX BURNERS	90	100
204	0	OVERFIRE AIR	40	100
204	26	OVERFIRE AIR + FLUE GAS RECIRCULATION	40	100
204	205	OVERFIRE AIR + LOW NOX BURNERS	50	100
205	0	LOW NOX BURNERS	50	100
205	26	LOW NOX BURNERS + FLUE GAS RECIRCULATION	60	100
205	28	LOW NOX BURNERS + STEAM OR WATER INJECTION	50	100
205	32	LOW NOX BURNERS + AMMONIA INJECTION	50	100
205	204	LOW NOX BURNERS + OVERFIRE AIR	50	100

6.3 Application of AirControlNET Technologies

AirControlNET is a control technology analysis tool developed to support the U.S. EPA in its analyses of air pollution policies and regulations (Pechan, 2005). The tool provides data on emission sources, potential pollution control measures and emission reductions, and the costs of implementing those controls.

The core of AirControlNET is a relational database system in which control technologies are linked to sources within EPA emissions inventories. The system contains a database of control measure applicability, efficiency, and cost information for reducing the emissions contributing to ambient concentrations of ozone, PM_{10}, $PM_{2.5}$, SO_2, NO_X, as well as visibility impairment (regional haze) from point, area, and mobile sources. PM_{10} and $PM_{2.5}$ as included in AirControlNET represent primary emissions of PM. The control measure data file in AirControlNET includes not only the technology's control efficiency, and calculated emission reductions for that source, but also estimates the costs (annual and capital) for application of the control measure.

Since the existing version of AirControlNET contains the preprocessed application of control technologies to a predetermined set of EPA emission inventories, direct use of the model in this analysis was not possible. However, Alpine received approval from EPA's Innovative Strategies and Economics Group (ISEG) to modify the AirControlNET version 4.1 source code and data tables in order to make it useful to this study (Sorrels, 2006). The results of the application of this modified version of the code still retain the applicability, efficiency, and cost information from the unmodified version of the source code, but were applied to the CENRAP modeling inventories with updated price index scalars to reflect control costs in 2005-dollars.

Using the modified inventories identified in Section 6.2 above, we ran every available control strategy in AirControlNET against the EGU, non-EGU point, and stationary area source inventories to develop a master list of available, *incremental* control strategies for the entire CENRAP 36 km domain necessary for the ICS to design command-and-control or cost-effectiveness based control strategies by source or domain. Mobile source controls were not processed under this assignment as it would have required multiple iterative runs of the EPA NONROAD and MOBILE6 models to generate the appropriate information. This master list of controls was used in the final development of the control strategy plan as described in the following sections.

Since AirControlNET's control cost equations take into consideration the useful remaining life of installed equipment and estimate the costs of compliance with these measures, two of the four reasonable progress goal considerations (see Section 6.6) are directly met through the results of the model's output.

Table 6-8. Emissions Weighted NETDC (MW) Association.

SCC	Description	NETDC (MW)
10100201	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Pulverized Coal: Wet Bottom (Bituminous Coal)	200
10100202	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Pulverized Coal: Dry Bottom (Bituminous Coal)	500
10100203	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Cyclone Furnace (Bituminous Coal)	200
10100212	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Pulverized Coal: Dry Bottom (Tangential) (Bituminous Coal)	500
10100215	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Cell Burner (Bituminous Coal)	1300
10100218	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Atmospheric Fluidized Bed Combustion: Circulating Bed (Bitum. Coal)	200
10100222	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Pulverized Coal: Dry Bottom (Subbituminous Coal)	400
10100223	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Cyclone Furnace (Subbituminous Coal)	400
10100226	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Pulverized Coal: Dry Bottom Tangential (Subbituminous Coal)	500
10100401	External Combustion Boilers; Electric Generation; Residual Oil; Grade 6 Oil: Normal Firing	400
10100404	External Combustion Boilers; Electric Generation; Residual Oil; Grade 6 Oil: Tangential Firing	500
10100501	External Combustion Boilers; Electric Generation; Distillate Oil; Grades 1 and 2 Oil	400
10100601	External Combustion Boilers; Electric Generation; Natural Gas; Boilers > 100 Million Btu/hr except Tangential	400
10100701	External Combustion Boilers; Electric Generation; Process Gas; Boilers > 100 Million Btu/hr	200
10100801	External Combustion Boilers; Electric Generation; Petroleum Coke; All Boiler Sizes	600
10101204	External Combustion Boilers; Electric Generation; Solid Waste; Tire Derived Fuel : Shredded	200
10300811	External Combustion Boilers; Commercial/Institutional; Landfill Gas; Landfill Gas	200
20100101	Internal Combustion Engines; Electric Generation; Distillate Oil (Diesel); Turbine	200
20100109	Internal Combustion Engines; Electric Generation; Distillate Oil (Diesel); Turbine: Exhaust	200
20100201	Internal Combustion Engines; Electric Generation; Natural Gas; Turbine	200
	All other boilers	100

6.4 Development of AOI-Based Cost Curves

Each Class I area in the CENRAP modeling domain has an associated set of AOIs as identified in other areas of this document. In order to best determine where emission reduction has the greatest benefit, this geography was designed to limit the available source type list from including all sources within the entire domain.

Using a geocoded county list from these AOIs, we parsed the master list of incremental control measures from all non-mobile source types and sources located within the boundaries of the AOIs. This parsed list was then sorted on in incremental cost-effectiveness (marginal cost) basis to determine the most cost effective control suite necessary to attain emission reduction targets for specific pollutants within each AOI. Each individual source or source category (unit or county-SCC combination) had its own cost effectiveness curve generated. In aggregate, the results of these applications are cost curves for each visibility impairing pollutant for all EGU, non-EGU point, and stationary area source within the geographic domain of the AOI. Incremental controls on mobile sources were not considered in this analysis. An illustrative example of the steps involved with the cost effectiveness curve design can be found in the Appendix F of this document. Figures 6-1, 6-2 and Appendix G present actual cost curves for AOI-1 areas associated with the six CENRAP Class I areas projected to be above the reasonable progress glide path.

6.5 Application of Cost Curves to Emission Reduction Needs

Two sets of cost curves have been developed for each pollutant-Class I AOI-1 combination identified as of interest to the ICS. The first marginal cost curve includes the application of all available control measures to all applicable source types within the AOI. The second curve is the result of limiting the control measure application to only the top three residual emission subcategories identified in the 2018 base case for each AOI-pollutant combination. These two curves will allow the ICS to determine if limiting the control scenario to only the highest residual categories will attain reasonable glide path emission reduction objectives while presumably minimizing the number and type of controlled sources in each AOI.

Within each AOI, an emissions reduction target has been established based on the review of relevant and available regional haze aerometric analyses and source attribution modeling. Each emissions reduction target sets the “solve point” of the cost curve and allows us to identify the most cost effective sources of reduction for the pollutants of interest within each impacted AOI.

It is noted that each pollutant-based cost curve developed for this analysis is mutually exclusive of each other pollutant’s cost curve and does not consider the feasibility of multiple control technologies being applied to any one source. Additionally, the information provided in these cost curves is representative of the primary pollutant of control and does not reflect any co-control applicability or disbenefit as a result of the application of that control.

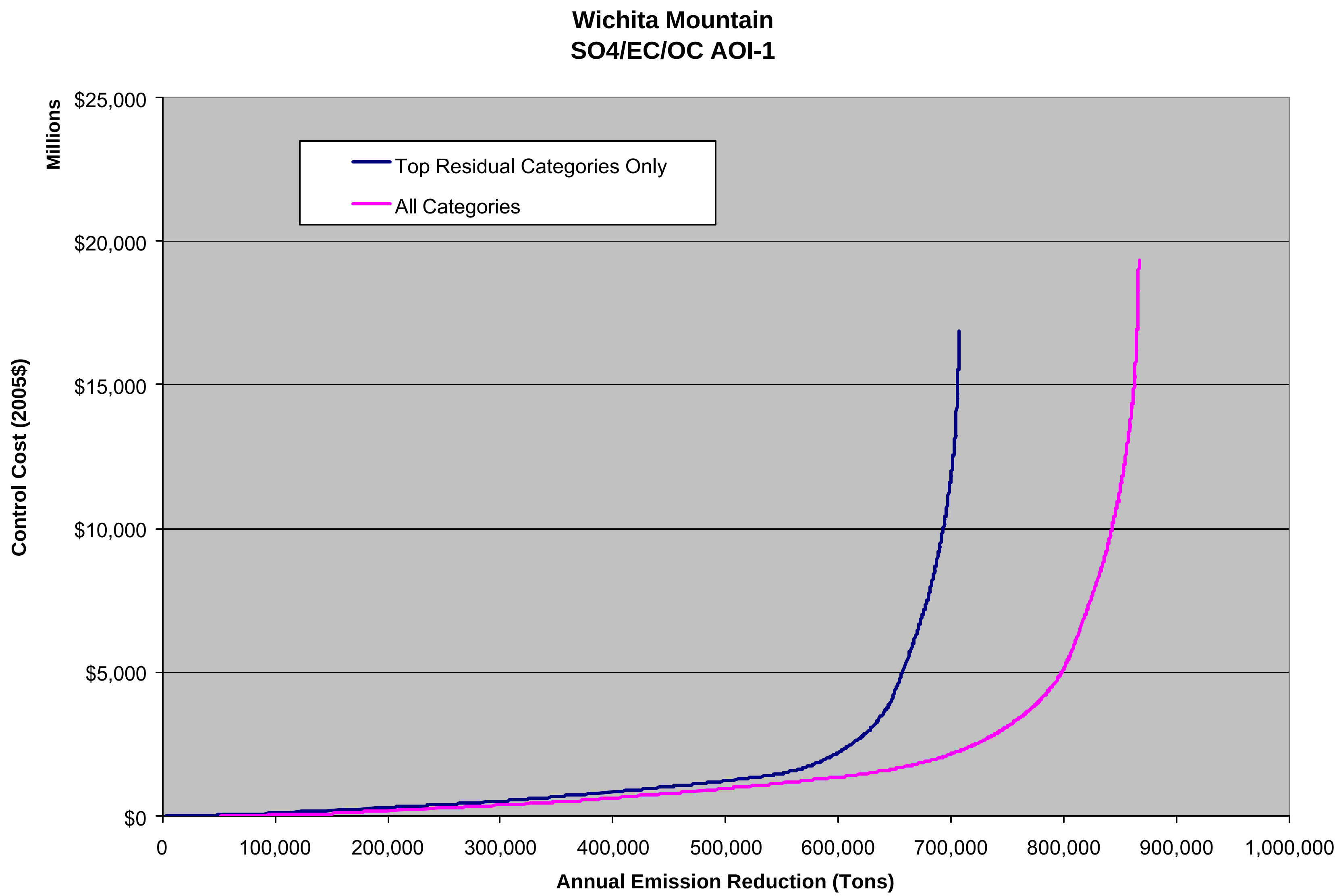


Figure 6-1. Marginal Cost Curve for Wichita Mountain SO4/EC/OC AOI-1.

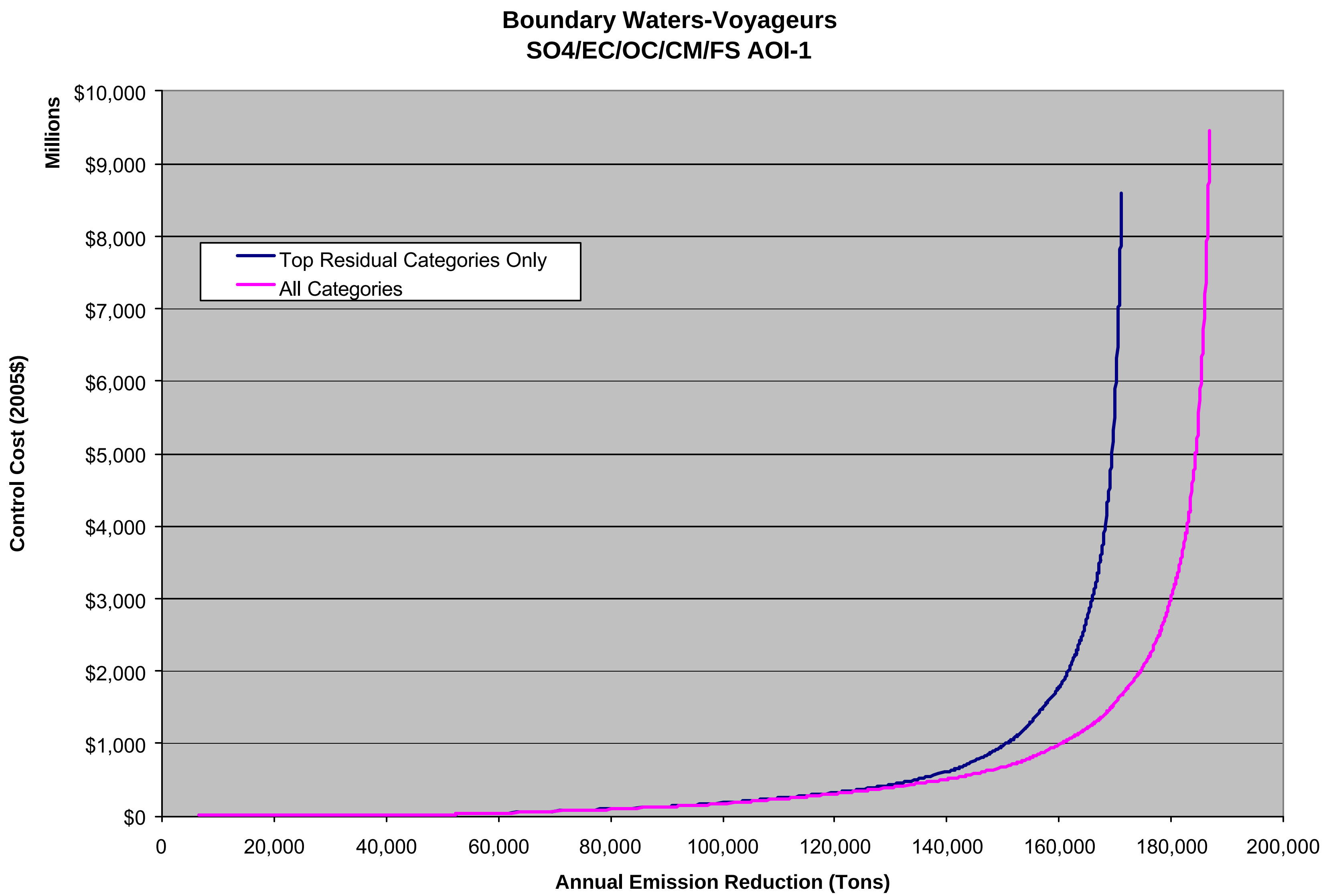


Figure 6-2. Marginal Cost Curve for Boundary Waters – Voyageurs SO4/EC/OC/CM/FS AOI-1.

6.6 Four Factor Analysis for RPG

As part of the regional haze program requirements outlined in 40 CFR 51.308, there are four factors which have been identified as mandatory for purposes of establishing a reasonable progress goal for any mandatory Class I area within a State.

40 CFR 51.308(d)(1)(i)(A) Consider the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected sources, and include a demonstration showing how these factors were taken into consideration in selecting the goal.

6.6.1 Cost of Compliance

The cost of compliance factor is used to determine whether compliance costs for sources are reasonable compared to the emission reductions and visibility improvement they will achieve. Costs should be determined for one-time capital costs and ongoing annual operation, maintenance, and upkeep costs.

Through the application of control technologies using the cost equations from the AirControlNET source code, we have identified individual units for control application, identified the design parameters for emission controls, and developed cost estimates based on those design parameters. An estimation of annualized cost of control, based on a one-time capital cost and continual operating and maintenance costs are included in this estimate, where parameters were available in the AirControlNET equations. This application of control cost analysis as applied to the incremental reduction sources defined in this study meets the application of the cost of compliance statutory factor.

6.6.2 Time Necessary for Compliance

The time necessary for compliance factor may be used to adjust the reasonable progress goals to reflect the degree of improvement achievable within the long term strategy period, as opposed to the improvement expected at full implementation of a control measure, if the time needed for full compliance exceeds the length of the long term strategy period. For example, if vendor availability within the period of the long term strategy could not meet the full requirements of the installation schedule outlined by the control strategy, the reasonable progress goals should reflect the visibility improvement anticipated from installation of controls at the percentage of sources that *could* be controlled within the strategy period.

In this particular analysis, a time necessary for compliance factor could not be determined simply based on the emissions inventory and a list of control measures applicable to controllable sources. An eventual SIP could include control strategies that extend beyond the 2018 milestone and the visibility improvement anticipated from installation of controls at the percentage of sources that *could not* be controlled within the first strategy period would have to be counted in a later SIP. Each of these elements would need to be determined on a unit by unit basis.

6.6.3 Energy and Non-Air Quality Environmental Impacts of Compliance

The energy and non-air impacts factor is meant to consider whether the energy requirements (the amount, type, and availability of energy) of the control technology result in energy penalties or benefits. For example, a particular control may require a fuel, water may be required for a cooling tower, or a landfill may be required for disposal of solid waste byproduct, each which are directly unavailable in the area. Since these impacts are State and site specific, they are not addressed in this analysis. Upon the final configuration of the control strategies by the ICS, each participating State, tribe and affected entity should review the control plan to determine whether significant energy burdens or benefits comes as a direct result of the application of a control technology. If determined to be so, the State should quantify this value and include it in the final submitted SIP.

6.6.4 Remaining Useful Life of Potentially Affected Sources

The statutory factor of the remaining useful life of the source is applicable only to those measures which would require retrofitting of control devices at *existing* sources. The remaining useful life of a source affects the annualized costs of retrofit controls and is included in the methods used for calculating annualized costs in the control cost equations modified from EPA's AirControlNET.

CENRAP's emission projections, as well as the control cost equations applied by Alpine, account for the remaining useful life between the year of the reasonable progress analysis and the date the facility permanently stops operations. Since source specific retirements are taken into consideration with the CENRAP forecasts (units are shut down in the year of their retirement) and average retirement rates are applied to control technologies within the control analysis equations, the statutory factor of the remaining useful life of the source has been considered.

In summary, the basis of our resulting control strategy recommendations provide a demonstration of those reasonable progress goal requirements which could be taken into consideration to meet visibility objectives with the data provided for this analysis. The remaining factors are State, tribal and site dependant and could not be addressed here.

7.0 SUMMARY AND RECOMMENDATIONS

7.1 Summary

Alpine's review of all data discussed in the previous sections of this document have identified six Class I areas (Big Bend National Park, Breton Island, Boundary Waters, Guadalupe Mountains, Wichita Mountain, and Voyageurs) within the CENRAP domain, their particular AOIs, ICS defined emission reduction targets, and potential incremental emission reductions recommended for CENRAP modeling. For each area, sulfate and to a lesser extent, nitrate reductions were shown to be most beneficial during the 20 percent worst visibility days in 2002.

Alpine has configured subregional control strategies based on direction provided by the ICS to use single precursor emission reduction assumptions with a marginal cost per ton cutoff of $5,000 per ton reduced. Emission targets were identified by the ICS for each Class I area AOI to exceed the reasonable progress glide slope. These targets were established as 25 percent more reduction than was identified in Table 5-3 and were to be taken from any available source, not just those identified as having the highest residual emissions contribution to the Class I area AOI. Table 7-1 presents a summary of each of these strategies.

Table 7-1. Subregional control strategy summary for single precursor emission reduction targets.

		SO2 Annual Emission Reduction (Tons)			Control Strategy
Class I Area	ST	ICS Established Reduction Target	Subregional Control Strategy Reductions	Control Strategy Total Cost ($2005)	Average Cost Per Ton ($/ton reduced)
Breton Island	LA	385,000	119,966	$203,443,093	$1,696
Boundary Waters	MN	40,000	46,301	$107,233,124	$2,316
Voyageurs	MN	28,750			
Wichita Mountains	OK	93,750	99,479	$21,752,713	$219
Guadalupe Mountains	TX	162,500	115,936	$319,001,184	$2,752
Big Bend Nat'l Park	TX	150,000			

For three of the six CENRAP Class I areas projected to be above the reasonable progress glide slope in 2018, control strategies have been prepared which meet the emission reduction targets recommended by the ICS. These areas (Boundary Waters, Wichita Mountains, and Voyageurs) all can meet the ICS defined targets while staying within the single precursor, $5,000 per ton reduced limitations.

We also have determined that as a result of the implementation of the list of additional point and area source controls in each primary AOI the remaining three Class I areas within the CENRAP domain (Big Bend National Park, Breton Island, and Guadalupe Mountains) modeled to be above the reasonable progress glide slope will be unable to achieve a level of emissions reduction necessary to bring these areas under the glide slope by 2018 using the ICS identified control strategy definitions. Influences such as incrementally uncontrollable source categories, marginal cost effectiveness values greater than $5,000 per ton reduced, and international and inter-RPO emission transport prevent strategies from being configured for these Class I areas.

In particular, recent BRAVO research (see, for example Barna et al. 2006) shows that Mexican SO_2 sources account for up to 23% of the observed annual sulfate levels at Big Bend. During the summer months, Mexican SO_2 emissions sources can account for as much as 70% of the sulfate at Big Bend. Barna et al. also show that SO_2 emission sources for the Eastern U.S. are the biggest culprit to high sulfate at Big Bend during the high $PM_{2.5}$ summer days; and SO_2 from the Eastern US and Texas are the biggest contributor to high sulfate at Big Bend during the high $PM_{2.5}$ fall days.

In both of these episode examples, regardless of the emissions reduction achieved by CENRAP with the available source category and technology applications, there still is an emissions component which is directly out of their control. Additional consultation with inter-RPO and international agencies may be required to adequately co-configure strategies to bring these areas into attainment.

7.2 Recommendations

7.2.1 Regional Controls

As each of the six Class I areas projected to be above the reasonable progress glide path (and all of the other Class I AOIs in the CENRAP domain) are dominated by EGU SO_2 and NO_X emissions and many of these area AOIs intersect with States currently excluded by the EPA CAIR rule, *we recommend that CENRAP consider a control scenario which would reduce EGU emissions in non-CAIR States to levels comparable to those promulgated by EPA in the final CAIR regulation.* In addition to this regional strategy proposal, *we further recommend that the ICS consider individual CENRAP States within Class I area AOIs projected above the reasonable progress glide slope to meet CAIR emissions budgets without the interstate trading aspect of the rule*. This nuance may prevent emission reductions from being transferred to areas outside of the influential zones of the affected Class I areas and focus the reductions in those upwind areas with greatest impact on meeting visibility objective goals.

These regional controls could be modeled in multiple ways. Two noted methods being to develop an additional IPM run configured to take into account the CAIR reductions within non-CAIR States with or without the constraint of trading noted above. The second method would be to determine an emission budget (following EPA methods in the CAIR final rule) to determine State level targets for emission reduction. Using these targets, CENRAP could then apply the marginal cost curves developed for this analysis, but limit the solution to only EGU sources identified as "CAIR eligible". This approach would not take into account any trading or participation in the bank and trade system, but would give an estimate of the regional emission reductions associated with the strategy.

7.2.2 Subregional Controls

In lieu of a single regional control option applied consistently across the entire CENRAP domain, individual subregional controls could be applied to reduce emissions within certain Class I area AOIs. Based on the single precursor emission reduction target calculations defined elsewhere in this document, subregional control strategies can be defined for three of the Class I areas projected to be above the reasonable progress glide path. In each case, the marginal cost

curves (based on the application of all available control options on all controllable industries and source types) allow the selection of control technologies for sources within an AOI-1 that attains the ICS defined emission reduction targets. Details of these control strategies are presented in Tables 7-2 and 7-3. Note that as Boundary Waters and Voyageurs are associated within the same AOI-1, the larger of the two emission reduction targets was used to configure a control strategy that would meet both areas' needs.

However, as noted in this document, the application of incremental control on all controllable point and area sources within the AOIs still fails to meet the visibility objectives of three Class I areas modeled to be above the reasonable progress glide slope. For this reason, *we additionally recommend that the ICS consider applying the remaining reasonably cost effective control technologies to sources within States and tribal lands contained in the boundaries of the three target Class I area AOIs.* As part of the demonstration of reasonable progress, the application of reasonably cost effective controls to all emission sources and source types through a process as described in this document appears to provide support that the four reasonable progress goal considerations were taken into account where available. As is demonstrated for the Boundary Waters and Voyageurs AOI-1 above, the AOI-1 for Big Bend and Guadalupe Mountains share the same emission reduction target. In this case, however, the target cannot be fully achieved. Tables 7-4 and 7-5 present the details of these strategies.

For those Class I areas outside of CENRAP's domain who based on CENRAP modeling did not forecast below the reasonable progress glide slope, we submit to the ICS our data of incremental control strategy application and cost curves based on existing modeling and inventory assumptions provided by CENRAP to date for purposes of consultation with those States in which the affected Class I areas are located. We have not presented these non-CENRAP data as part of this document but much of the basic information is presented, where appropriate, in the supporting appendixes.

ALPINE GEOPHYSICS

Table 7-2. Subregional control strategy defined for Boundary Waters / Voyageurs SO4 AOI-1.

FIPSST	FIPSCNTY	State	County	Plant ID	Plant Name	Point ID	SIC	Control Measure	BOWA/VOYA SO2 Control Application Ton Reduced	Cost ($2005)	Marginal CPT
27	037	Minnesota	Dakota Co	2703700011	FLINT HILLS RESOURCES LP - PINE BEND	EU111	2911	Sulfur Recovery and/or Tail Gas Treatment	290	$401,526	$1,383
27	037	Minnesota	Dakota Co	2703700011	FLINT HILLS RESOURCES LP - PINE BEND	EU045	2911	Sulfur Recovery and/or Tail Gas Treatment	286	$395,189	$1,383
27	037	Minnesota	Dakota Co	2703700011	FLINT HILLS RESOURCES LP - PINE BEND	EU088	2911	Sulfur Recovery and/or Tail Gas Treatment	62	$86,034	$1,383
27	163	Minnesota	Washington Co	2716300003	MARATHON ASHLAND PETROLEUM LLC	EU019	2911	Sulfur Recovery and/or Tail Gas Treatment	11	$14,854	$1,383
~~55~~	~~123~~	~~Wisconsin~~	~~Vernon Co~~	~~663020930~~	~~DAIRYLAND POWER COOP GENOA STATION-EOP~~	~~B20~~	~~4911~~	~~FGD Wet Scrubber~~	~~16,904~~	~~$28,492,444~~	~~$1,686~~
19	179	Iowa	Wapello Co	90-07-001	IPL - OTTUMWA GENERATING STATION	143977	4911	FGD Wet Scrubber	15,897	$28,492,444	$1,792
19	113	Iowa	Linn Co	57-01-004	0	0	0	FGD	2,042	$4,302,128	$2,107
55	123	Wisconsin	Vernon Co	663020930	DAIRYLAND POWER COOP GENOA STATION-EOP	B20	4911	FGD Wet Scrubber	12,569	$28,492,444	$2,267
31	109	Nebraska	Lancaster Co	0005	NPPD SHELDON STATION	001	4911	FGD Wet Scrubber	6,079	$16,556,061	$2,724
19	193	Iowa	Woodbury Co	97-04-010	MIDAMERICAN ENERGY CO. - GEORGE NEAL NOR	148780	4911	FGD Wet Scrubber	9,065	$28,492,444	$3,143
								Overall Control Strategy	**46,301**	**$107,233,124**	**$2,316**

Duplicate entry in 2018d modeling inventory.

Table 7-3. Subregional control strategy defined for Wichita Mountains SO4 AOI-1.

FIPSST	FIPSCNTY	State	County	Plant ID	Plant Name	Point ID	SIC	Control Measure	WIMO SO2 Control Application Ton Reduced	Cost ($2005)	Marginal CPT
29	093	Missouri	Iron Co	0008	DOE RUN COMPANY-GLOVER SMELTER	8390	3339	FGD	51,834	$4,351,167	$84
48	201	Texas	Harris Co	37	HOUSTON PLANT	000008	2819	Increase % Conversion to Meet NSPS (99.7)	3,486	$670,008	$192
22	033	Louisiana	East Baton Rouge Par	0033	RHODIA INC/BR FAC	02	2869	Increase % Conversion to Meet NSPS (99.7)	7,090	$1,884,093	$266
22	005	Louisiana	Ascension Par	0007	DUPONT CHEMICALS/BURNSIDE PLANT	01	2819	Increase % Conversion to Meet NSPS (99.7)	11,284	$3,896,018	$345
29	099	Missouri	Jefferson Co	0003	DOE RUN COMPANY-HERCULANEUM SMELTER	11722	3339	FGD	10,653	$4,320,204	$406
48	201	Texas	Harris Co	37	HOUSTON PLANT	000011	2819	Increase % Conversion to Meet NSPS (99.7)	5,953	$2,510,908	$422
22	005	Louisiana	Ascension Par	0028	PCS NITROGEN FERTILIZER,L.P./GEISMAR	01	2873	Increase % Conversion to Meet NSPS (99.7)	9,179	$4,120,315	$449
								Overall Control Strategy	**99,479**	**$21,752,713**	**$219**

Table 7-4. Subregional control strategy defined for Breton Island SO4 AOI-1.

FIPSST	FIPSCNTY	State	County	Plant ID	Plant Name	Point ID	SIC	Control Measure	BRET SO2 Control Application Ton Reduced	Cost ($2005)	Marginal CPT
22	033	Louisiana	East Baton Rouge Par	0033	RHODIA INC/BR FAC	02	2869	Increase % Conversion to Meet NSPS (99.7)	7,090	$1,884,093	$266
22	005	Louisiana	Ascension Par	0007	DUPONT CHEMICALS/BURNSIDE PLANT	01	2819	Increase % Conversion to Meet NSPS (99.7)	11,284	$3,896,018	$345
22	005	Louisiana	Ascension Par	0028	PCS NITROGEN FERTILIZER,L.P./GEISMAR	01	2873	Increase % Conversion to Meet NSPS (99.7)	9,179	$4,120,315	$449
22	033	Louisiana	East Baton Rouge Par	0033	RHODIA INC/BR FAC	03	2869	Increase % Conversion to Meet NSPS (99.7)	2,693	$1,884,093	$700
01	097	Alabama	Mobile Co	5009	AKZO NOBEL CHEMICALS INC	004	2819	Increase % Conversion to Meet NSPS (99.7)	2,183	$1,817,521	$832
12	113	Florida	Santa Rosa Co	1130005	EXXONMOBIL PRODUCTION COMPANY	34	1311	Sulfur Recovery and/or Tail Gas Treatment	1,702	$2,354,901	$1,383
22	033	Louisiana	East Baton Rouge Par	0015	EXXONMOBIL REF & SUPPLY CO/B R REFINERY	68	2911	Sulfur Recovery and/or Tail Gas Treatment	64	$88,364	$1,383
22	033	Louisiana	East Baton Rouge Par	0015	EXXONMOBIL REF & SUPPLY CO/B R REFINERY	69	2911	Sulfur Recovery and/or Tail Gas Treatment	64	$88,364	$1,383
22	095	Louisiana	St. John The Baptist	0013	MARATHON ASHLAND PETROLEUM LLC/LA REFINI	14	2911	Sulfur Recovery and/or Tail Gas Treatment	47	$64,441	$1,383
22	095	Louisiana	St. John The Baptist	0013	MARATHON ASHLAND PETROLEUM LLC/LA REFINI	70	2911	Sulfur Recovery and/or Tail Gas Treatment	31	$42,396	$1,383
22	095	Louisiana	St. John The Baptist	0013	MARATHON ASHLAND PETROLEUM LLC/LA REFINI	V2	2911	Sulfur Recovery and/or Tail Gas Treatment	26	$35,613	$1,383
22	077	Louisiana	Pointe Coupee Par	0005	LA GENERATING LLC/BIG CAJUN 2 PWR PLNT	01	4911	FGD Wet Scrubber	16,126	$28,492,444	$1,767
22	077	Louisiana	Pointe Coupee Par	0005	LA GENERATING LLC/BIG CAJUN 2 PWR PLNT	02	4911	FGD Wet Scrubber	15,618	$28,492,444	$1,824
12	033	Florida	Escambia Co	0330045	GULF POWER COMPANY CRIST ELECTRIC GENERA	6	4911	FGD Wet Scrubber	11,179	$20,964,424	$1,875
22	077	Louisiana	Pointe Coupee Par	0005	LA GENERATING LLC/BIG CAJUN 2 PWR PLNT	03	4911	FGD Wet Scrubber	15,022	$28,492,444	$1,897
01	097	Alabama	Mobile Co	1001	ALABAMA POWER COMPANY - BARRY	004	4911	FGD Wet Scrubber	8,396	$18,827,395	$2,242
28	059	Mississippi	Jackson Co	2805900058	CHEVRON PRODUCTS COMPANY, PASCAGOULA REF	051	2911	FGD	1,638	$4,349,179	$2,655
22	051	Louisiana	Jefferson Par	0004	CYTEC INDUSTRIES,INC/FORTIER PLNT	57	2821	Increase % Conversion to Meet NSPS (99.7)	1,087	$3,027,047	$2,784
01	097	Alabama	Mobile Co	1001	ALABAMA POWER COMPANY - BARRY	003	4911	FGD Wet Scrubber	4,712	$13,574,846	$2,881
01	097	Alabama	Mobile Co	1001	ALABAMA POWER COMPANY - BARRY	002	4911	FGD Wet Scrubber	4,631	$13,522,645	$2,920
01	047	Alabama	Dallas Co	0003	INTERNATIONAL PAPER COMPANY	003	2611	FGD	1,971	$7,156,048	$3,630
12	033	Florida	Escambia Co	0330045	GULF POWER COMPANY CRIST ELECTRIC GENERA	4	4911	FGD Wet Scrubber	2,734	$10,069,644	$3,683
12	033	Florida	Escambia Co	0330045	GULF POWER COMPANY CRIST ELECTRIC GENERA	5	4911	FGD Wet Scrubber	2,489	$10,198,414	$4,097
								Overall Control Strategy	**119,966**	**$203,443,093**	**$1,696**

Table 7-5. Subregional control strategy defined for Big Bend / Guadalupe Mountains SO4 AOI-1.

FIPSST	FIPSCNTY	State	County	Plant ID	Plant Name	Point ID	SIC	Control Measure	BIBE/GUMO SO2 Control Application Ton Reduced	Cost ($2005)	Marginal CPT
48	201	Texas	Harris Co	37	HOUSTON PLANT	000008	2819	Increase % Conversion to Meet NSPS (99.7)	3,486	$670,008	$192
48	201	Texas	Harris Co	37	HOUSTON PLANT	000011	2819	Increase % Conversion to Meet NSPS (99.7)	5,953	$2,510,908	$422
48	039	Texas	Brazoria Co	10	SWEENY REFINERY PETROCHEM	000203	2911	FGD	883	$429,763	$487
48	355	Texas	Nueces Co	3	CORPUS CHRISTI REFINERY	000174	2911	Sulfur Recovery and/or Tail Gas Treatment	1,430	$1,978,038	$1,383
48	167	Texas	Galveston Co	1	TEXAS CITY REFINERY	000239	2911	Sulfur Recovery and/or Tail Gas Treatment	478	$660,954	$1,383
48	039	Texas	Brazoria Co	10	SWEENY REFINERY PETROCHEM	000205	2911	Sulfur Recovery and/or Tail Gas Treatment	374	$518,052	$1,383
48	161	Texas	Freestone Co	9	EMBRIDGE ENERGY TEAGUE PL	000004	1311	Sulfur Recovery and/or Tail Gas Treatment	324	$448,705	$1,383
48	355	Texas	Nueces Co	3	CORPUS CHRISTI REFINERY	000174	2911	Sulfur Recovery and/or Tail Gas Treatment	63	$86,977	$1,383
48	201	Texas	Harris Co	39	DEER PARK PLANT	001295	2911	Sulfur Recovery and/or Tail Gas Treatment	56	$77,549	$1,383
48	355	Texas	Nueces Co	3	CORPUS CHRISTI REFINERY	000174	2911	Sulfur Recovery and/or Tail Gas Treatment	49	$67,251	$1,383
48	355	Texas	Nueces Co	20	CORPUS CHRISTI EAST PLANT	000156	2911	Sulfur Recovery and/or Tail Gas Treatment	27	$37,762	$1,383
48	201	Texas	Harris Co	39	DEER PARK PLANT	000208	2911	FGD	4,942	$8,474,217	$1,715
48	175	Texas	Goliad Co	2	COLETO CREEK PLANT	000001	4911	FGD Wet Scrubber	14,490	$28,492,444	$1,966
48	389	Texas	Reeves Co	2	WAHA PLANT	000031	4922	FGD	3,653	$8,153,168	$2,232
48	167	Texas	Galveston Co	5	TEXAS CITY REFINERY	000068	2911	FGD	2,293	$5,993,771	$2,614
48	029	Texas	Bexar Co	63	SOMMERS DEELY SPRUCE PWR	000002	4911	FGD Wet Scrubber	9,755	$28,492,444	$2,921
48	029	Texas	Bexar Co	63	SOMMERS DEELY SPRUCE PWR	000004	4911	FGD Wet Scrubber	9,595	$28,492,444	$2,970
48	029	Texas	Bexar Co	63	SOMMERS DEELY SPRUCE PWR	000004	4911	FGD Wet Scrubber	9,128	$28,492,444	$3,121
48	331	Texas	Milam Co	1	ALCOA SANDOW PLANT	000011	3334	FGD	14,306	$49,048,714	$3,429
48	331	Texas	Milam Co	1	ALCOA SANDOW PLANT	000010	3334	FGD	14,305	$49,048,714	$3,429
48	331	Texas	Milam Co	1	ALCOA SANDOW PLANT	000012	3334	FGD	14,143	$49,048,714	$3,468
48	349	Texas	Navarro Co	11	STREETMAN PLANT	000015	3295	FGD	2,443	$9,903,980	$4,054
48	227	Texas	Howard Co	1	BIG SPRING REFINERY	000267	2911	FGD	2,060	$9,638,812	$4,679
48	135	Texas	Ector Co	22	GOLDSMITH GASOLINE PLANT	000133	1321	FGD	1,700	$8,235,351	$4,844
								Overall Control Strategy	**115,936**	**$319,001,184**	**$2,752**

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Appendix X

Missouri Smoke Management Plan

Missouri
Department of
Natural Resources

Smoke Management Plan

December 2007

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1.0 Introduction

Natural resource management's objective is to create, maintain and restore ecosystems. Many tools are available to managers to accomplish these objectives. One of the more important tools is prescribed fire (controlled open burning). The unhealthy ecosystems that exist today are often a result of past management strategies. The undesired effect of controlling natural fires in an attempt to save trees and property results in some tree and shrub species becoming established that would normally be eliminated by such fires. Other consequences are that insect infestations may go unchecked for many years and dangerous levels of combustible material can build up. Prescribed fires can correct these situations.

Prescribed fires are conducted within the limits of a fire plan and prescription that describes both the acceptable range of weather, moisture, fuel, and fire behavior parameters, and the ignition method to achieve the desired effects. Prescribed fire is a cost-effective and ecologically sound tool for forest, range, and wetland management. Its use reduces the potential for destructive wildfires and thus maintains long-term air quality. Also, the practice removes logging residues, controls insects and disease, improves wildlife habitat and forage production, increases water yield, maintains natural succession of plant communities, and reduces the need for pesticides and herbicides.[1]

There is a reemphasis on public land management and ecosystem restoration. Land managers are actively managing areas in an attempt to make them healthy. Prescribed fires are proactive tools that simulate the natural fires that might occur in an area due to such events as lightning. This management attempts to mimic the frequency, size, and severity of fires that might occur in an area through natural causes.

In 1995, a Federal Wildland Fire Management Policy and Program Review was conducted in response to the unhealthy condition of our public wildlands, and the

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[1] EPA's National Agriculture Compliance Assistance Center – www.epa.gov/agriculture/tburn.html

increase in unplanned fires that occurred in 1987, 1988, 1992 and again in 1994. As a result of this review, the five principal Federal fire/land management agencies [the Forest Service (FS) under the Department of Agriculture; and the Bureau of Land Management (BLM), National Park Service (NPS), Fish and Wildlife Service (FWS), and the Bureau of Indian Affairs (BIA) under the Department of the Interior] agreed on need for several changes to existing fire/land management practices. Their recommendations include the reintroduction of fire (allowing it to play its natural role) into Federal land management programs in "an ongoing and systematic manner, consistent with public health and environmental quality considerations." The goals of this change in land management policy are to reduce unnatural fuel densities that contribute to increasing unplanned fire hazards, and to restore wildland ecosystems to their healthy natural states. The Federal agencies previously mentioned began increasing the use of fire in their most vulnerable wildlands in 1997. Annual treatment targets for all Federal land management agencies will be increased to more than 5 million acres per year by 2005.[2]

Wildland and prescribed fires had about equal acres burned in Missouri in 2006. As reported to the National Interagency Coordination Center, there was over 24,000 acres burned by wildland fires and over 21,000 acres burned by prescribed fires. On a national scale, Missouri was 28th in acres burned through wildland and prescribed fires in 2006. By comparison, in year 2000 over 13,000 acres were burned by wildland fires and over 8,000 acres by prescribed fires.[3]

The increased use of fire to restore ecosystems is a positive for the ecosystem, but is a concern for air quality. The smoke that can result from prescribed fires can have adverse effects on human health and welfare. Difficult and painful breathing, aggravated asthma, and respiratory illness are all linked to elevated particulate matter in the air. Approximately eighty to ninety percent (80-90%) of wildfire smoke (by mass) is within the fine particulate size class ($PM_{2.5}$). This high percentage of fine particulate size highlights the concern about smoke.

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[2] EPA's Interim Air Quality Policy on Wildland and Prescribed Fires (U.S. EPA 1998)
[3] www.nifc.gov/stats/ytd_st.htm

The major air pollutant of concern is the smoke produced. Smoke from prescribed fires is a complex mixture of carbon, tars, liquids, and different gases. This open combustion source produces particles of widely ranging size, depending to some extent on the rate of energy release of the fire. The major pollutants from wildland burning are particulate, carbon monoxide, and volatile organics. Nitrogen oxides are emitted at rates of from 1 to 4 grams/kilogram burned, depending on combustion temperatures. Emissions of sulfur oxides are negligible.[4]

Minimizing the adverse effects of smoke results from a concerted effort to utilize prescribed fires in a beneficial manner consistent with proven management strategies. These strategies include understanding and using meteorological conditions when scheduling burning to avoid sending smoke into a sensitive area, controlling the rate of emissions to promote dilution and dispersion, and minimizing smoke output per unit area through emissions reduction techniques.

In addition to minimizing the adverse effects that smoke can have on human health and welfare, smoke management is becoming increasingly important to meet federal and state air quality regulations. National Ambient Air Quality Standards (NAAQS) for particulate matter are a concern, especially for fine particulates. Fine particulates are those most closely associated with negative human health effects and with visibility reductions in the form of regional haze. In 1999, the U.S. EPA issued regional haze regulations to manage and mitigate visibility impairment from regional haze sources. The regional haze regulations call for states to establish goals for improving the visibility at Class I national parks and wildernesses. Missouri has two (2) Class I areas in the state, Mingo Wilderness Area and Hercules Glade Wilderness Area. See Appendix 4.1 for their location within the state. Fire, while not considered to be a main source of visibility impairment in any Class I area, is one source of regional haze.

[4] EPA's National Agriculture Compliance Assistance Center – www.epa.gov/agriculture/tburn.html

Both regulators and land managers recognize the importance of fires and the resulting smoke. Regulators understand the important tool that fire provides to land managers in managing ecosystems. Land managers understand the importance of minimizing smoke production in meeting federal and state air quality standards. Smoke management is an increasingly important component of an air program that aims to protect human health and welfare and meet air quality standards while still providing for necessary prescribed fires.

2.0 Background

The purpose of the Missouri Smoke Management Plan (SMP) is to identify the responsibilities of the Missouri Department of Natural Resources, federal land managers, and state land managers to coordinate procedures that mitigate the impacts of prescribed fire and wildland fire used for resource benefits on public health, safety and visibility. This plan is designed to meet the policies of the U.S. Environmental Protection Agency's (EPA) Interim Air Quality Policy on Wildland and Prescribed Fires (April 1998). A complete copy of the policy can be found in the Appendix.

The EPA will allow States/tribes flexibility in their approach to regulating fires managed for resource benefits. They are not required to change their existing fire regulations if those regulations adequately protect air quality. However, there are incentives for States/tribes to certify to EPA that they have adopted and are implementing a SMP that includes the basic components identified in this policy. The main incentive is that, as long as fires do not cause or significantly contribute to daily or annual $PM_{2.5}$ and PM_{10} NAAQS violations, States/tribes may allow participation by burners in the basic SMP to be voluntary and the SMP does not have to be adopted into the State Implementation Plan (SIP). Another incentive is the commitment by EPA to use its discretion not to redesignate an area as nonattainment when fires cause or significantly contribute to PM NAAQS violations, if the State/tribe required those fires to be conducted within a basic SMP. Rather, if fires

cause or significantly contribute to violations, States/tribes will be required to review the adequacy of the SMP, in cooperation with wildland owners/managers, and make appropriate improvements.[5]

Consistent with these policies, the department's Air Pollution Control Program has contacted the various federal and state land managers that work within Missouri to develop this SMP. Federal land managers are subject to laws and requirements through federal planning mandates. This includes the preparation of short and long-term plans and the evaluation of environmental impacts. The Appendix contains a copy of the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide that standardizes procedures specifically associated with the planning and implementation of prescribed fires on a federal level. The United States Department of Agriculture (USDA) Forest Service has the National Forest Management Act, the U.S. Department of the Interior has the Integrated Resource Management Plan, the National Park Service has the Resource Management Plan and the Fish and Wildlife Service has the Comprehensive Conservation Plan. State land managers also have requirements similar to those of federal land managers for preparing burn plans.

3.0 Smoke Management Plan

States/tribes will be allowed the flexibility (prior to measuring violations of the PM or $PM_{2.5}$ NAAQS attributable to fires managed for resource benefits) to decide when a SMP is needed and how the program will be designed to prevent adverse air quality impacts. This does not preclude wildland owners/managers from including smoke management components in burn plans for fires that they conduct in the absence of an applicable State/tribal program.[6]

[5] EPA's Interim Air Quality Policy on Wildland and Prescribed Fires (U.S. EPA 1998)
[6] EPA's Interim Air Quality Policy on Wildland and Prescribed Fires (U.S. EPA 1998)

The SMP establishes a basic framework of procedures and requirements for managing smoke from fires managed for resource benefits and are typically developed by States/tribes with cooperation and participation by wildland owners/managers. The purpose of a SMP is to mitigate the nuisance and public safety hazards (e.g., on roadways and at airports) posed by smoke intrusions into populated areas; to prevent deterioration of air quality and NAAQS violations; and to address visibility impacts in mandatory Class I Federal areas. Some strong indications that an area needs a SMP are: (1) citizens increasingly complain of smoke intrusions; (2) the trend of monitored air quality values is increasing (approaching the daily or annual NAAQS for $PM_{2.5}$ or PM_{10}) because of significant contributions from fires managed for resource benefits; (3) fires cause or significantly contribute to monitored air quality that is already greater than 85 percent of the daily or annual NAAQS for $PM_{2.5}$ or PM_{10}; or (4) fires in the area significantly contribute to visibility impairment in mandatory Class I Federal areas.[7]

None of the four indicators listed above currently shows a problem in Missouri.

State/tribal air quality managers, public wildland managers, private and Indian wildland owners/managers, and the general public should collaborate in the development and implementation of a State/tribal SMP. The State/tribal air quality manager must certify in a letter to the Administrator of EPA that at least a basic program has been adopted and implemented in order to receive special consideration under this policy of air quality data resulting from fire impacts, as explained in section VII of EPA's interim air quality policy. The SMP does not have to be incorporated into the SIP/Tribal Implementation Plan (TIP) or be Federally enforceable, however. The following describes the basic components of a certifiable SMP. There is considerable latitude within the components for individual State/tribal preferences.[8]

[7] EPA's Interim Air Quality Policy on Wildland and Prescribed Fires (U.S. EPA 1998)
[8] EPA's Interim Air Quality Policy on Wildland and Prescribed Fires (U.S. EPA 1998)

Basic components of a smoke management program identified in the Interim Policy include:

- Authorization to Burn
- Minimizing Air Pollutant Emissions
- Smoke Management Components of Burn Plans
    - *Actions to Minimize Fire Emissions*
    - *Air Quality Monitoring*
    - *Evaluate Smoke Dispersion*
    - *Public Notification and Exposure Reduction Procedures*
- Public education and awareness
- Surveillance and Enforcement
- Program evaluation

These components outlined in the Interim Policy are present in the federal and state land managers burn plans for Missouri. Land managers have detailed planning and implementation procedures for their prescribed fires. As an example, Appendix 4.4 contains the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide for federal land managers. This guide provides consistent interagency policy for what is minimally acceptable for prescribed fire planning and implementations. Within this guide, procedures for fire projects are outlined in great detail. These projects are analyzed under the National Environmental Policy Act.[9]

The Missouri Air Conservation Commission has authority under statute 643.050 to promulgate regulations to preserve and protect the state's air resources. At this time, the department intends to allow federal and state land managers to maintain authority to prepare and implement burn plans and to voluntarily notify us of their fire plans. These federal and state land managers will maintain their present protocol for preparing fire plans and seeking authorization to implement fire plans. The department will maintain this voluntary smoke management plan since these prescribed fires have not resulted in air quality problems and will coordinate, to the extent possible, the prescribed burns in

the state. If these prescribed fires cause or significantly contribute to violations, the department's Air Pollution Control Program will review the adequacy of the SMP, in cooperation with wildland owners/managers, and make appropriate improvements. Copies and examples of federal and state land manager burns plans can be found in the Appendix.

3.1 Authorization to Burn

The EPA does not directly regulate the use of fire within a State or on Indian lands. The EPA's authority is to enforce the requirements of the CAA. The CAA requires States and tribes to attain and maintain the NAAQS adopted to protect public health and welfare. This policy recommends that States/tribes implement SMP's to mitigate the public health and welfare impacts of fires managed for resource benefits. While SMP's will also mitigate nuisance smoke intrusions, nuisance issues have been left for the individual air quality agencies to address.[10]

If a State/tribe determines that a SMP is needed, they can adopt any type of program they believe will prevent NAAQS violations and address visibility impairment. For example, general fire regulations may establish basic parameters, such as wind speed, direction, location and distance to sensitive receptors, etc., within which fires can be ignited or naturally ignited fire can be allowed to continue to burn. States/tribes may allow wildland owners/managers to voluntarily notify them of fire plans or may require prior authorization. They may also exempt de minimis fires (fires that will cover fewer than X acres or consume less than Y tons of fuel, as established by the State/tribe) from meeting the regulations. Such regulations leave much discretion to wildland owners/managers as to when to ignite fires, and what management strategy to follow with naturally ignited fires. States/tribes may exercise enforcement authorities when wildland owners/managers are found to have ignited the fire outside of the parameters of the rule,

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[9] Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide (September 2006)
[10] EPA's Interim Air Quality Policy on Wildland and Prescribed Fires (U.S. EPA 1998)

or not to have appropriately responded to air quality impacts caused by naturally ignited fires. General fire regulations may be adequate for areas where fires managed for resource benefits rarely cause or contribute to air quality problems. However, when plans to use fire on a large scale could cause significant air quality impacts, or several wildland owners/managers within an airshed are expected to use fires concurrently, a more structured SMP requiring cooperation and coordination of fire activities may be required to minimize emissions and mitigate the air quality impacts.[11]

Federal and state land manager burn plans contain multiple reviews and approvals prior to authorization. These reviews include procedural and technical reviews of the plan. In addition, individual burns are subject to burn/no-burn decisions prior to initiating a burn.

The state's open burning regulations provide exemptions for open burning associated with agricultural activities related to the growing and harvesting of crops and for open burning for natural resource management purposes. There is language within the regulations that makes it a violation to permit open burning which causes or constitutes a public health hazard, nuisance, or a hazard to vehicular or air traffic. This allows the director a great deal of authority to prevent or stop burning that is occurring.

The department's Air Pollution Control Program is in the process of replacing the state's four (4) existing open burning regulations with a new rule. The new rule consolidates the existing rule requirements and is written to improve rule compliance and enforcement.

3.2 Minimizing Air Pollutant Emissions

When the use of fire is selected as the best means to accomplish management goals, there are several ways to reduce emissions from a single fire. The approaches fall into four categories and their applicability varies by fuel type, (1) minimize the area burned, (2)

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[11] EPA's Interim Air Quality Policy on Wildland and Prescribed Fires (U.S. EPA 1998)

reduce the fuel loading in the area to be burned, (3) reduce the amount of fuel consumed by the fire, (4) minimize emissions per ton of fuel consumed. These emission reduction techniques rely almost exclusively on reducing the amount of fuel consumed by a particular fire.[12]

Basic smoke management practices could include, among other practices, steps that will minimize air pollutant emissions during and after the burn, evaluate dispersion conditions to minimize exposure of sensitive populations, actions to notify populations and authorities at sensitive receptors and contingency actions during the fire to reduce exposure of people at such receptors, identify steps taken to monitor the effects of the fire on air quality, and identify procedures to ensure that burners are using basic smoke management practices.

3.3 Smoke Management Components of Burn Plans

Actions to Minimize Fire Emissions

The burn plan should show the steps taken by the respective entity prior to, during, and after the burn to reduce air emissions. This could include such activities as reducing the burn acreage, using non-fire alternatives, and rapid and complete mop-ups in an area.

Air Quality Monitoring

The burn plan should identify how the burn may affect air quality in sensitive areas near the prescribed burn and how this will be monitored. Personnel should at a minimum visually monitor the progress of the burn and evaluate the burns potential to interfere with the people and property in the vicinity. This would include mechanisms to alert the public should the burn present a problem. For burns expected to take more than a day, other monitoring techniques that might include PM monitors may be necessary to determine concentrations near sensitive areas.

[12] EPA's Interim Air Quality Policy on Wildland and Prescribed Fires (U.S. EPA 1998)

Evaluate Smoke Dispersion

The burn plan should identify the anticipated dispersion of the smoke from the burn site prior to the event. Effort should be made to minimize the exposure of sensitive populations to smoke and to avoid impacting the visibility in Class I Federal areas. This would also include efforts to minimize the impact of smoke along highways and airways. The distance and directions to sensitive areas should be evaluated and checked against atmospheric conditions. Wind speed, wind direction, mixing heights, and other dispersion conditions should have minimum requirements that need to be met prior to authorizing a burn.

Public Notification and Exposure Reduction Procedures

The burn plan should identify actions that will be taken prior to initiating a burn to make local authorities aware of actions being taken in their area. This would also include contingency actions to be taken should a burn go beyond its predicted dispersion area and impact sensitive populations and areas.

3.4 Public Education and Awareness

The department's Air Pollution Control Program will be coordinating the promulgation of new rule 10 CSR 10-6.045 Open Burning Requirements with an educational effort to improve the rules visibility within the state. Pamphlets explaining the new rule and the harmful effects of smoke will be produced and made available to the regional offices, other state agencies, and to other interested organizations to distribute. The department's Air Pollution Control Program will focus on groups that could potentially have a significant impact on air monitoring through open burning, such as farmers that burn crop stubble or land managers that utilize prescribed burns.

3.5 Surveillance and Enforcement

Missouri has five (5) regional offices covering all areas of the state. In addition, satellite offices are located in several of the regions. Staff in these offices are involved in monitoring compliance with state regulations and in enforcing those regulations.

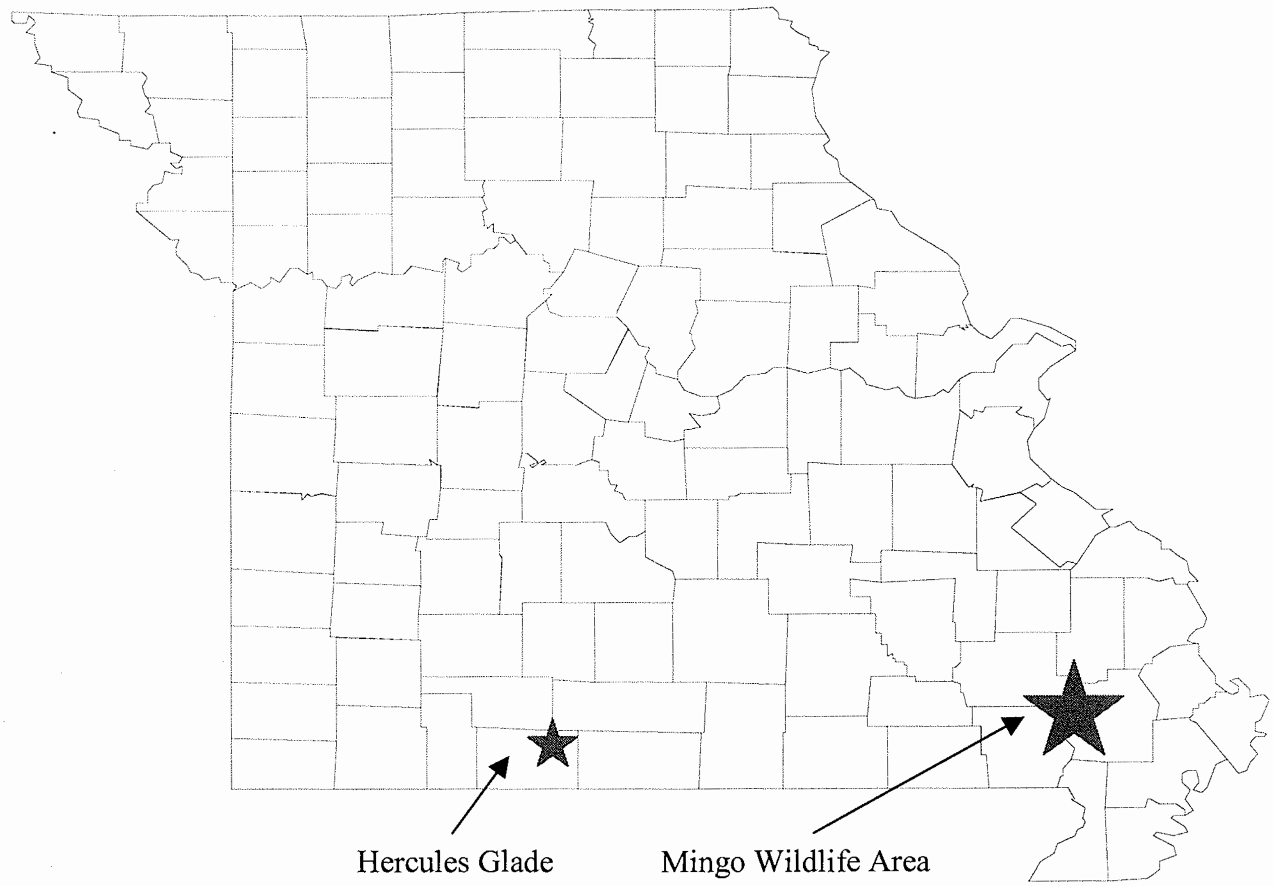
3.6 Program Evaluation

The department’s Air Pollution Control Program monitors the state’s air resources through a network of air monitoring sites located throughout the state. A map of the statewide network is found in the appendix.

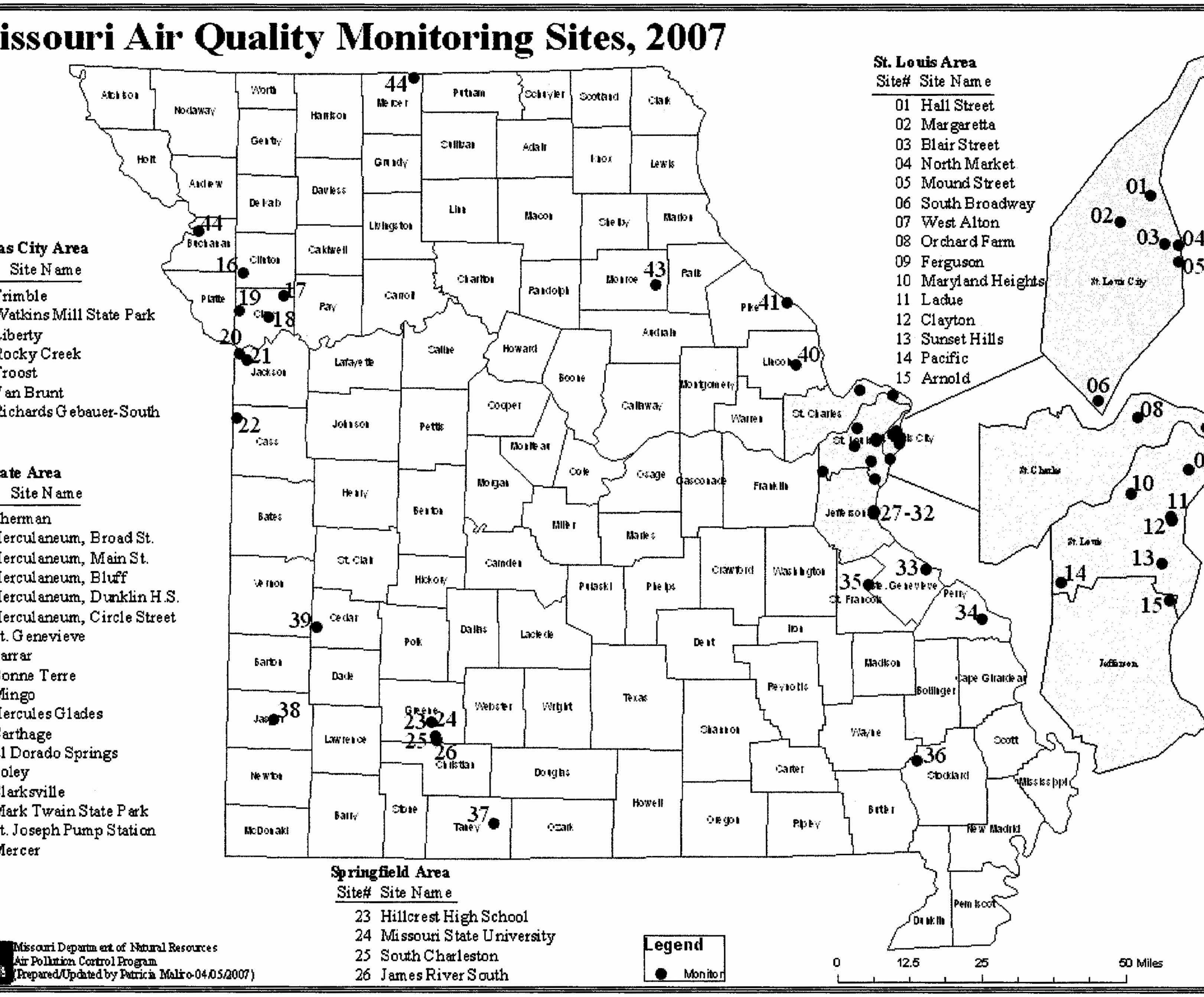
The Missouri Department of Natural Resources and Local Agencies in St. Louis City, St. Louis County, and Springfield operate approximately 201 ambient air quality monitoring instruments at 44 locations in the state. The intent of this network is to determine the nature of the air quality in the state, and determine the location and severity of any problems. Monitors evaluate pollutant levels related to the National Ambient Air Quality Standards, which are health and welfare based standards developed by the U.S. Environmental Protection Agency. Trends from these monitoring sites indicate changes in air quality over time, and provide information on air quality relationships in various parts of the state. In addition, monitoring for various air toxics is conducted, as well as monitoring to understand the chemical makeup of some air pollutants, to help evaluate pollutant sources and controls.

4.0 Appendix

4.1 Map of Class I Areas within the state of Missouri



4.2 Map of Statewide Network of Air Monitoring Sites


issouri Air Quality Monitoring Sites, 2007
St. Louis Area
Site# Site Name
01 Hall Street
02 Margaretta
03 Blair Street
04 North Market
05 Mound Street
06 South Broadway
07 West Alton
08 Orchard Farm
09 Ferguson
10 Maryland Heights
11 Ladue
12 Clayton
13 Sunset Hills
14 Pacific
15 Arnold
as City Area
Site Name
'rimble
Vatkins Mill State Park
iberty
locky Creek
'roost
'an Brunt
lichards Gebauer-South
ate Area
Site Name
herman
Ierculaneum, Broad St.
Ierculaneum, Main St.
Ierculaneum, Bluff
Ierculaneum, Dunklin H.S.
Ierculaneum, Circle Street
t. Genevieve
arrar
onne Terre
lingo
Iercules Glades
arthage
l Dorado Springs
oley
larksville
Iark Twain State Park
t. Joseph Pump Station
lercer
Springfield Area
Site# Site Name
23 Hillcrest High School
24 Missouri State University
25 South Charleston
26 James River South
Legend
Monitor
0 12.5 25 50 Miles
Missouri Department of Natural Resources
Air Pollution Control Program
(Prepared/Updated by Patricia Maliro-04/05/2007)

4.3 EPA's Interim Air Quality Policy on Wildland and Prescribed Fires

INTERIM

AIR QUALITY POLICY ON WILDLAND AND PRESCRIBED FIRES

April 23, 1998

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LIST OF WHITE PAPERS AVAILABLE ON THE WORLD WIDE WEB

Background on the Role of Fire

What Wildland Fire Conditions Minimize Emissions and Hazardous Air Pollutants and Can Land Management Goals Still Be Met?

Air Monitoring for Wildland Fire Operations

Emissions Inventories for SIP Development

Estimating Natural Emissions From Wildland and Prescribed Fire

I. PURPOSE

This policy statement has been prepared in response to plans by some Federal, tribal and State wildland owners/managers to significantly increase the use of wildland and prescribed fires to achieve resource benefits in the wildlands.[1] Many wildland ecosystems are considered to be unhealthy as a result of past management strategies. The absence of fire effects has allowed plant species (e.g., trees and shrubs) that would normally be eliminated by fires to proliferate, vegetation to become dense and insect infestations to go unchecked. Wildland owners/managers plan to significantly increase their use of fires to correct these unhealthy conditions and to reduce the risk of wildfires to public and fire fighter safety. The largest increases are expected mainly on Federal lands in western States in ecosystems where fires would naturally occur every few years (35 years or less) if not suppressed. Fire has continued to be a management tool used by many public and private wildland owners/managers in the southeastern States. However, Federal land managers in the southeast also plan to significantly increase their use of fire above current annual levels.

This policy statement integrates two public policy goals, (1) to allow fire to function, as nearly as possible, in its natural role in maintaining healthy wildland ecosystems, and (2) to protect public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility. This document provides guidance on mitigating air pollution impacts caused by fires in the wildlands and the wildland/urban interface. It identifies the responsibilities of wildland owners/managers and State/tribal air quality managers to work together to coordinate fire activities, minimize air pollutant emissions, manage smoke from wildland and prescribed fires managed for resource benefits, and establish emergency action programs to mitigate the unavoidable impacts on the public. This policy is not intended to limit opportunities by private wildland owners/ managers to use fire so that burning can be increased on publicly owned wildlands. Thoughtful use of fire by private, public and Indian wildland owners/managers within SMP's is promoted to maintain healthy wildland ecosystems. Neither is this policy intended to

[1]This document contains EPA policy and, therefore, does not establish or affect legal rights or obligations. It does not establish a binding norm and it is not finally determinative of the issues addressed. In applying this policy in any particular case, the EPA will consider its applicability to the specific facts of that case, the underlying validity of the interpretations set forth in this memorandum, and any other relevant considerations, including any that may be required under applicable law and regulations.

imply that States/tribes should relax existing SMP's or limit a State's/tribe's ability to regulate fires managed for resource benefits.

The EPA used a deliberative process involving a multi-stakeholder workgroup to develop recommendations for this policy. The workgroup did not reach consensus on all of the issues raised. The EPA addressed all of the recommendations and concerns raised by the stakeholders to the extent possible. The multi-stakeholder workgroup also produced several "white papers" on a number of topics previously identified in earlier drafts of the policy as Appendices to the policy. These papers will be published as a separate document and can also be found on EPA's TTN2000 website:
http://134.67.104.12/html/o3pmrh/pbissu.htm, and on the Western States Air Resources Council (WESTAR) website: http://www.westar.org/proj_frame.html. A list of these papers is provided in the Table of Contents.

II. SCOPE AND APPLICABILITY

The EPA does not directly regulate the use of fire within a State or on Indian lands. The EPA's authority is to enforce the requirements of the CAA. The CAA requires States and tribes to attain and maintain the NAAQS adopted to protect public health and welfare. This policy recommends that States/tribes implement SMP's to mitigate the public health and welfare impacts of fires managed for resource benefits. While SMP's will also mitigate nuisance smoke intrusions, nuisance issues have been left for the individual air quality agencies to address.

This policy applies to all wildland and prescribed fires managed to achieve resource benefits on public, Indian and privately owned wildlands, regardless of the cause of ignition (e.g., lightning, arson, accidental, land management decision, etc.) or purpose of the fire (e.g., natural, resource management, hazard reduction, etc.).

Federal land management agencies sometimes manage naturally ignited fires to achieve resource benefits. Planning for naturally ignited fires is obviously limited, but the agencies require fire management plans to be included in land use plans for an area before a naturally ignited fire can be managed for resource benefits. Fires ignited in areas without fire management plans are

unwanted or wildfires. The interface between this policy and the Natural Events Policy[2] regarding ambient PM_{10} concentrations caused by wildfires is addressed in section VII.

This policy does not apply to other open burning activities, such as burning at residential, commercial or industrial sites; open burning of land clearing waste or construction debris. It also does not apply to open burning of agricultural waste, crop residue or land in the USDA Conservation Reserve Program. The EPA is working with the USDA Agriculture Air Quality Task Force to develop equitable policies for emissions from activities that could be classified as agricultural burning.

This policy addresses the impacts of air pollutant emissions from fires managed for resource benefits on public health and welfare. The primary indicators of public health impacts used are ambient air quality impacts above the NAAQS for fine particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$), and particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}). There are both 24-hour (daily) and annual NAAQS for $PM_{2.5}$ and PM_{10}. Emissions of nitrogen oxides (NO_x), VOC, and CO from fires can also impact the NAAQS for NO_2, O_3, and CO. However, the actions required to reduce VOC and CO emissions are the same as those recommended in this document to mitigate impacts on the $PM_{2.5}$, and PM_{10} NAAQS. Emissions of NO_x, on the other hand, can increase under some of the burning conditions used to decrease emissions of other pollutants.

The effects of fire emissions on the public welfare aspects of the NAAQS for PM are addressed in terms of visibility impairment and regional haze. The policy also addresses the treatment of fire emissions to meet other CAA requirements, such as prevention of significant deterioration (PSD) and conformity with SIP's or TIP's.

III. BACKGROUND

A. The Role of Fire in the Wildlands

The role of fire in North American ecosystems has been undergoing change since people began to play a more active role in managing their natural resources. Native Americans actively used fire to alter vegetative patterns, to ease travel, or for hunting purposes. Prior to European

[2]See memorandum from Mary D. Nichols, Assistant Administrator for Air and Radiation to EPA Regional Offices titled Areas Affected by PM_{10} Natural Events, May 30, 1996.

settlement, fire played a natural role as a necessary disturbance phenomena, keeping fuel density in check as well as insects and the diseases they carry, thereby maintaining North American wildlands in a healthy state. After European settlement and the introduction of grazing herds of cattle and sheep, and the practice of fire suppression, public land management agencies have recognized that not allowing fire to play its natural role in our wildlands has had unintended negative effects. When forests and grasslands are not allowed to burn naturally (lighting serving as the principal source of ignition) the result can be heavy accumulation of dead vegetation which provides fuel for unwanted fires (wildfires). Because of this unhealthy build-up of fuels, the risk of catastrophic wildfires is much greater as evidenced by several recent fires in our national forests and other publicly owned lands. These fires put firefighters and the general public in danger while destroying millions of acres of forests and costing millions of dollars to suppress. The lack of fire also has unintended ecological effects, leading to the loss of habitat for rare species and the decline of ecosystems. Fire exclusion can lead to an alteration in natural community types, and an important loss of biodiversity. Many plant and animal species are on the decline because they exist in fire-dependent habitats that haven't burned in decades. This situation has led to a rethinking of Federal land management and fire management policy.

B. Changes in Fire Management Policy

In 1995, a Federal Wildland Fire Management Policy and Program Review was conducted in response to the unhealthy condition of our public wildlands, and the increase in unplanned fires that occurred in 1987, 1988, 1992 and again in 1994. As a result of this review, the five principal Federal fire/land management agencies [the Forest Service (FS) under the Department of Agriculture; and the Bureau of Land Management (BLM), National Park Service (NPS), Fish and Wildlife Service (FWS), and the Bureau of Indian Affairs (BIA) under the DOI] agreed on need for several changes to existing fire/land management practices. Their recommendations include the reintroduction of fire (allowing it to play its natural role) into Federal land management programs in "an ongoing and systematic manner, consistent with public health and environmental quality considerations." The goals of this change in land management policy are to reduce unnatural fuel densities that contribute to increasing unplanned fire hazards, and to restore wildland ecosystems to their healthy natural states. The Federal agencies previously mentioned

began increasing the use of fire in their most vulnerable wildlands in 1997. Annual treatment targets for all Federal land management agencies will be increased to more than 5 million acres per year by 2005.

C. Air Quality Considerations

Burning wildland vegetation causes emissions of many different chemical compounds such as small particles, No_x, CO and organic compounds. The components and quantity of emissions depends in part on the types of fuel burned, its moisture content, and the temperature of combustion. Complex organic materials may be absorbed into or onto condensed smoke particles. Tests indicate that, on average, 90 percent of smoke particles from wildland and prescribed fires are PM_{10}, and 70 percent are $PM_{2.5}$.

Historically, EPA's NAAQS for PM have tended to focus emission control efforts on "coarse" particles--those larger than $PM_{2.5}$. Before 1987, EPA's PM standards focused on "Total Suspended Particles," including particles as large as 100 micrometers in diameter. The EPA revised the standards in 1987 to focus control on PM_{10} in response to new science showing that it was the smaller particles capable of penetrating deeply into the lungs that were associated with the most adverse health effects. For comparison, a human hair is about 70 micrometers in diameter.

The most recent review of health studies focused attention on the need to better address the "fine" fraction particles - $PM_{2.5}$. These more recent studies provide consistent and coherent, "evidence that serious health effects (mortality, exacerbation of chronic disease, increased hospital admissions, etc.) are associated with exposures to ambient levels of PM found in contemporary urban airsheds even at concentrations below current U. S. PM standards" (Criteria Document-U.S. EPA 1996a, p. 13-1). PM concentrations currently found in many communities are associated with adverse health effects in the general population, including increased mortality and morbidity, altered lung function, increased respiratory symptoms, aggravated respiratory and cardiovascular disease. Sensitive sub-populations, such as children, the aged and those with existing cardiopulmonary or infectious respiratory disease, may experience effects at lower levels of PM than the general population, and the severity of effects might be greater. These studies are the basis for the July, 1997 promulgation of new NAAQS for $PM_{2.5}$, which are designed to

protect public health, with an adequate margin of safety.

Fine particles are also a major cause of visibility impairment in such places as national parks that are valued for their scenic views and recreation.

D. <u>Visibility Impairment</u>

Visibility conditions are affected by scattering and absorption of light by particles and gases. The fine particles most responsible for visibility impairment are sulfates, nitrates, organic compounds, soot and soil dust. Fine particles are more efficient per unit mass than coarse particles at scattering light. Light scattering efficiencies also go up as humidity rises, due to water adsorption on fine particles, which allow the particles to grow to sizes comparable to the wavelength of light. There are distinct regional variations in visibility between eastern and western States, due, to generally higher relative humidities in the East. Naturally occurring visual range in the East may be between 105 to 190 kilometers, while natural visual range in the West is between 190 to 270 kilometers.

Visibility is an important public welfare consideration because of its significance to enjoyment of daily activities in all parts of the country. Protection of visibility as a public welfare consideration is addressed nationally through the secondary PM NAAQS which are equivalent to the primary PM NAAQS. Visibility protection is particularly important in the 156 mandatory Class I Federal areas, "Areas of Great Scenic Importance," and is addressed for these areas by the special provisions of Sections 169A and 169 B of the CAA.

The effects of smoke from wildland and prescribed fires on air quality will be discussed throughout this document. The term air quality, as used in this document, refers to ambient concentrations of pollutants (primarily PM in locations accessible to the general public), and, where applicable, to impacts on visibility in mandatory Class I Federal areas. Thus, wherever this document discusses the need for wildland owners/managers to consider the impacts of their actions on air quality, this may include consideration of the effects of their actions on visibility in mandatory Class I Federal areas.

Existing requirements to consider effects on visibility which are reasonably attributable to a single nearby source or small number of sources are contained in the regulations published by EPA in 1980 at 40 CFR 51.300 (Protection of Visibility). Additional regulations are currently

being developed to address impairment of visibility that is more regional in its character and origins ("regional haze"). This interim policy may be revised to be made consistent with the regional haze rules when they become final.

Please refer to the white paper, "Background on the Role of Fire," for more complete background information. See Section I to obtain a copy.

IV. DESCRIPTION OF POLICY

The EPA's policy regarding wildland and prescribed fires managed for resource benefits is that owners/managers of public, private and Indian wildlands should collaborate with State/tribal air quality managers (air regulators) to achieve their goals of: (1) allowing fire to function in its natural role in the wildlands, and (2) protecting public health and welfare by minimizing smoke impacts. The EPA urges air quality managers to participate in public land use planning activities which involve selecting appropriate resource management treatments, including the use of fire, and to help identify air quality criteria for fire management plans. Air quality managers are urged to help evaluate the potential impacts of alternative resource treatments and assure that air quality concerns (also visibility and regional haze concerns, where appropriate) are adequately addressed in the public land use planning process. They are urged to solicit information from private and Indian wildland owners/managers on plans to use fire for resource management, to encourage them to consider appropriate alternative treatments, and to assist them in evaluating the potential air quality impacts of alternatives to meet particular management objectives.

Wildland owners/managers are urged to: (1) notify air quality managers of plans to significantly increase their future use of fire for resource management, (2) consider the air quality impacts of fires and take appropriate steps to mitigate those impacts, (3) consider appropriate alternative treatments, (4) and participate in the development and implementation of State/tribal SMP's.

The EPA will allow States/tribes flexibility in their approach to regulating fires managed for resource benefits. They are not required to change their existing fire regulations if those regulations adequately protect air quality. However, there are incentives for States/tribes to certify to EPA that they have adopted and are implementing a SMP that includes the basic components identified in this policy. The main incentive is that, as long as fires do not cause or

significantly contribute to daily or annual PM2.5 and PM10 NAAQS violations, States/tribes may allow participation by burners in the basic SMP to be voluntary and the SMP does not have to be adopted into the SIP. Another incentive is the commitment by EPA to use its discretion not to redesignate an area as nonattainment when fires cause or significantly contribute (see section VII.B.) to PM NAAQS violations, if the State/tribe required those fires to be conducted within a basic SMP. Rather, if fires cause or significantly contribute violations, States/tribes will be required to review the adequacy of the SMP, in cooperation with wildland owners/managers, and make appropriate improvements.

If States/tribes do not certify that a basic SMP is being implemented, no special consideration will be given to PM violations attributed to fires managed for resource benefits. Rather, EPA will call for a SIP revision to incorporate a basic SMP and/or will notify the governor of the State or the tribal government that the area should be redesignated as nonattainment. The SMP adopted in response to the SIP/TIP call must require mandatory participation for greater than de minimis fires, and must be adopted into the SIP/TIP so that it is Federally enforceable. Also, the SIP/TIP must meet all other CAA requirements applicable to nonattainment areas.

Fire data requirements for SIP's/TIP's are addressed in section VIII of this policy. Guidance for meeting CAA requirements to show conformity of Federal fire activities with SIP's, to address visibility/regional haze impacts, and to address prevention of significant deterioration of air quality are addressed in section IX.

The following are guiding principles for implementing this policy:

- Air quality and visibility impacts from fires managed for resource benefits should be treated equitably with other source impacts.
- Land and vegetation management practices should be promoted that are best for wildland ecosystems, yet protect public health and avoid visibility impairment.
- States/tribes should foster collaborative relationships among wildland owners/managers, air quality managers and the public to develop and implement SMP's.
- States/tribes will be allowed the flexibility (prior to measuring violations of the $PM_{2.5}$ or PM_{10} NAAQS attributable to fires managed for resource benefits) to decide when a SMP

is needed and how the program will be designed to prevent adverse air quality impacts. This does not preclude wildland owners/managers from including smoke management components in burn plans for fires they conduct in the absence of an applicable State/tribal program.

- All parties (wildland owners/managers, air quality managers and the public) are expected to act in good faith and will be held accountable for implementing their respective parts of fire and SMP's.

V. COLLABORATION AMONG LAND AND AIR QUALITY MANAGERS

Wildland owners/managers and air quality managers can overcome the barriers to achieving their goals of: (1) returning fire to its natural role in the wildlands and (2) protecting air quality and visibility, by working together toward those ends. Wildland owners/managers should notify State/tribal air quality managers if they are planning to significantly increase the use of fire to manage wildland resources. Air quality managers with Federal/State/local public wildlands within their jurisdictions have a responsibility to participate in the public planning processes conducted for the management of those publicly owned lands. To arrive at the best choice of resource treatments and response to fire, it is essential that the air quality impacts of planned land management activities are adequately addressed. Air quality managers, by participating in the public land use planning process, can help select the scope of land uses; help evaluate alternative management tools and help identify when fire is appropriate; and review projected air quality and visibility impacts. Air quality managers should also consult with private wildland owners/managers to determine long-range resource management objectives and help them evaluate the applicability of alternative treatments based on air quality and visibility considerations.

Wildland owners/managers also have a responsibility to participate with the other stakeholders and State/tribal air quality managers in developing rules and SMP's for fires managed for resource benefits. Air quality managers that intend to develop or revise regulations, plans or policies applicable to fires should solicit the early participation of all affected wildland owners/managers in making those revisions.

A. <u>Land and Vegetation Management</u>

Wildlands are managed by Federal, State and local public agencies (referred to in this document as public land management agencies); tribal and BIA authorities; and private land owners. The goals of public land management agencies vary, but are generally to develop, maintain and enhance wildlife habitat; protect endangered plant and animal species; preserve and protect cultural resources, scenic vistas and wilderness; provide for recreation; and to sustain production of natural resources. The goals of private wildland owners/managers may be sustained production of natural resources, preservation of wildlife habitat, improved grazing conditions, etc. The goals of tribal wildland owners/managers are generally similar to public land management agency goals, but may also include aspects of private land owners. Another common goal of all wildland owners/managers is to minimize the potential for catastrophic wildfires that could result from heavy accumulations of vegetative fuels.

1. Alternative Treatments

Wildland owners/managers may have an array of tools, including fire, that can be used to accomplish land use plans, depending on the resource benefits to be achieved. Several factors should be considered when selecting appropriate treatments. Those factors include the costs of treatment, the environmental impacts (e.g., air and water quality, soils, wildlife, etc.), and whether fire must be used to meet management objectives. The best combination of treatments are those that meet management goals with the most favorable environmental impacts at the most reasonable costs.

a. <u>Utilization and mechanical treatments</u>

Mechanical treatments may be appropriate tools when management objectives are to reduce fuel density to reduce a wildfire hazard, or to remove logging waste materials (slash) to prepare a site for replanting or natural regeneration. On-site chipping or crushing of woody material, removal of slash for off-site burning or biomass utilization, whole tree harvesting, and yarding (pulling out) of unmerchantable material may accomplish these goals. Mechanical treatments are normally limited to accessible areas, terrain that is not excessively rough, slopes of 40 percent or less, sites that are not wet, areas not designated as national parks or wilderness, areas not protected for threatened and endangered species and areas without cultural or paleological resources.

b. Chemical treatments

When the management objective is to preclude, reduce or remove live vegetation and/or specific plant species from a site, chemical treatments may be appropriate tools. Other potential environmental impacts caused by applying chemicals must also be considered, however.

c. Fire treatments

Fire is one of the basic tools relied upon by wildland owners/managers to achieve a myriad of management objectives in fire dependent ecosystems. Most North American plant communities evolved with recurring fire and, therefore, are dependent on recurring fire for maintenance. The natural fire return interval may vary from 1-2 years for prairies, 3-7 years for some long-needle pine species, 30-50 years for species such as California chaparral, and over one hundred years for species such as lodgepole pine and coastal Douglas-fir. When one management objective is to maintain a fire dependent ecosystem the effects of fire cannot be duplicated by other tools. In such cases, fire may be the preferred management tool even when other treatments may be equally effective for meeting other objectives. Fire can also be used to reduce heavy fuel loads and prevent catastrophic wildfires.

When fire is the chosen management tool, a combination of treatment methods may be the best approach to achieving the desired resource benefits with minimum air quality impacts. Combinations of treatments may include mechanically pretreating an area to thin the fuel load prior to the use of fire.

2. Role of Federal Land Managers (FLM's)

The major Federal agencies with land management responsibilities include the USDA FS, the DOI NPS, and FWS, BLM, and BIA. These agencies manage national parks, forests, monuments, wilderness areas, prairie grasslands, sea shores, Indian lands, wildlife refuges, etc. The Department of Defense and Department of Energy also manage millions of acres of Federal land at military bases, training centers and for other purposes.

a. Federal land use and fire management planning

Federal land use planning is an open process for setting land use and management goals and objectives. The planning process is designed for public participation, and must comply with NEPA. State/tribal air quality managers are given the opportunity to participate in land use

planning as part of normal intergovernmental consultation procedures. It is important for air quality managers to participate in public land use planning decisions to ensure that air quality concerns are adequately addressed. Through the public participation process, issues are identified and alternatives are discussed regarding methods for implementing land management activities such as trail building, improvement of wildlife habitat, timber harvesting, use of fire, etc. The environmental impacts of these activities are analyzed including, among other things, impacts on cultural resources, wildlife, vegetation, soils, riparian areas, wetlands, water quality, air quality, and visibility. Consideration of the air quality impacts of land management activities is essential to arriving at the best choice of treatments and response to fire.

Two or more levels of land use planning are conducted by FLM's to achieve management goals. First, broad scale and long-range land use plans must be developed for administrative units (e.g., forests, parks, refuges, sanctuaries, etc.). The land use plan identifies the scope of actions and goals for the lands and resources administered, and typically covers a 10 to 15-year period.

In addition to land use plans, there are other shorter term (typically 1-5 years) planning efforts where decisions are made concerning specific activities and programs, including the use of fire to achieve resource benefits. These may include programmatic plans, such as FMP's, or specific project plans.

The FMP's are strategic plans that define how wildland and prescribed fires will be managed to meet land use objectives. The FMP's must contain prescriptive criteria which are measurable and will guide selection of appropriate management actions in response to fires. The criteria can relate to suppression actions or describe when fire can be managed to gain resource benefits. This allows the use of a full range of appropriate management responses to fire, which may include: full suppression of a wildland fire; suppression on part of a wildland fire while allowing another portion of the fire to continue playing a natural ecological role and achieve resource benefits; or the use of prescribed fire.

Project plans are strategic plans to accomplish specific actions and goals established in a land use plan. Project plans may involve decisions regarding trade-offs between using mechanical, chemical and fire treatments. When projects include fires treatments, burn plans are also required. Burn plans are operational plans for managing specific fires. Burn plans prepared by

FLM's should include smoke management components to minimize fire emissions and mitigate air quality impacts.

b. <u>Evaluating environmental impacts</u>

Federal agencies evaluate the environmental impacts of the tools used for resource management on publicly owned lands using NEPA. They generally consider the impacts on, among other things, plant and animal species in the area, aquatic life, cultural resources, soil conditions, riparian areas, wetlands, water quality, air quality and visibility. Such analyses should be undertaken at both the individual project planning level and at the regional planning level if warranted by the extent of similar activities over a large area.

The impacts of resource management activities, particularly fire, on air quality can vary significantly by region. The impacts can be strongly affected by meteorology; existing air quality; the size, timing and duration of the activity; and other activities occurring in the same airshed at the same time. State/tribal air quality managers can provide technical assistance with evaluating potential air quality impacts, thus aiding FLM's in their selection of tools and evaluation of the environmental impacts.

Air quality and visibility impact evaluations of fire activities on Federal lands should:

- include recent historic (e.g. 10 years) and projected (life of the plan) annual or seasonal emissions from wildland and prescribed fires. Emission projections should be based on estimates provided by wildland owners/managers of acres burned, pre-burn fuel loading by vegetation type and consumption,
- be related to analyses of cumulative impacts of fires on regional and subregional air quality, when possible.
- identify applicable regulations, plans or policies (e.g. burn plans, authorization to burn, conformity, etc.),
- identify sensitive receptors,
- include description of planned measures to reduce smoke impacts,
- identify the potential for smoke intrusions into sensitive areas, and model air quality and visibility impacts, when possible,
- describe ambient air monitoring plans, when appropriate.

3. Role of State and Other Public Land Managers

State and local land management agencies manage publicly owned lands similar to Federal lands. These agencies differ from agency to agency, but can include forestry, conservation, park service, or fish and game agencies, as well as State or local fire protection agencies. Many agencies prepare long-range land use plans as well as project specific plans. The FMP's, similar to those prepared by Federal agencies, may also be prepared. Public land management agencies generally assess the environmental impacts of proposed projects, such as fires managed for resource benefits, although the impacts evaluated vary from agency to agency.

Some State/local wildland managers also have responsibilities for private lands. Such responsibilities may include using fires and other fuels reduction programs aimed at reducing the potential for wildfires in the wildland/urban interface.

Land use planning for State and locally owned wildlands, although somewhat different from the Federal process, also requires preparation of written documents that are subject to public review. State/local wildland managers should notify air quality managers of long-range plans to use fire for resource management. They should consider alternative management tools and evaluate the potential air quality impacts of fires. State/local wildland managers should also participate in the development of State SMP's.

4. Role of Private Land Managers

Private wildland owners/managers may or may not prepare written land use or project plans depending on the organization and the size of the property. States/tribes may or may not require written plans, but activities on privately owned lands must meet all applicable State and Federal environmental requirements. State requirements include any specific SIP requirements applicable to private land owners which are designed to ensure that the State complies with CAA requirements. Private land owners/managers should provide information to the State on long-range plans to use fire for resource management and should participate in the development of State SMP's.

5. Role of Indian Land Managers

Land use plans for Indian wildlands are not subject to review by the general public and are not subject to State regulations. Activities on Indian lands must meet the requirements of the CAA and the TIP, however, if one has been adopted. It is important that Indian wildland managers consider alternative vegetation management tools and consider the air quality impacts of the management practices chosen both on and off of Indian lands. They are encouraged to collaborate with other near-by wildland owners/managers and air quality managers on regional SMP's to assure that fires managed for resource benefits will not cause adverse air quality impacts at sensitive receptors in the region.

6. Role of Air Quality Managers

State air quality managers which have publicly owned wildlands within their jurisdiction, have a responsibility to participate in the public planning process conducted for those lands to be assured that air quality concerns are adequately addressed and they can meet the goals of their SIP's. They can participate in selecting the scope of land uses, identify air quality issues, and participate in evaluating and selecting alternative resource management tools. They can also participate in identifying basic air quality criteria for fire prescriptions. To accomplish this, air quality agencies should heed solicitations of public participation from land managers and contact public land management agencies within their jurisdiction

State/tribal air quality managers should also encourage private and Indian wildland owners/managers to consider alternative treatments and help them evaluate the potential air quality impacts of alternatives to meet particular management objectives.

B. Air Quality Management

State/tribal air quality managers are responsible for adopting plans and rules sufficient to attain and maintain national and State air quality standards, prevent significant deterioration of air quality, remedy existing visibility impairment and prevent future impairment in mandatory Class I Federal areas caused by manmade sources of pollution. This is accomplished mainly by developing SIP's and TIP's. The SIP's/TIP's include all programs and rules required by the CAA to meet and assure maintenance of Federal standards. The SIP's/TIP's are frequently amended as State/tribal rules are revised and new rules are adopted to meet changing CAA requirements. The

EPA has the authority to adopt and implement Federal Implementation Plans (FIP's) to address air quality protection in areas where States or tribes do not adopt plans.

1. Role of State/Local Air Quality Managers

The SIP's are developed in an extensive public process involving workshops and public hearings in which all stakeholders are invited to participate in developing the technical components of the plans including: (1) emission inventories; (2) modeling analyses; (3) attainment demonstrations; (4) transportation and general conformity emission budgets; (5) analyses of air quality data; and (6) control strategy development. State/local air quality managers should solicit information on the planned use of fire for resource management from all wildland owners/managers, just as they obtain information on other emission sources within their jurisdiction, when fires are expected to significantly impact air quality. Air quality managers should also work with adjacent States to mitigate potential impacts from interstate transport of smoke.

2. Role of Tribal Air Quality Managers

Eligible tribes may develop TIP's to administer CAA requirements on Indian lands. The CAA recognizes tribal governments as the most appropriate parties to regulate the environment on Indian lands and grants EPA the authority to approve tribal programs. The EPA has developed strategies for Federally implementing CAA requirements if tribes do not adopt TIP's.

Tribal air quality managers should solicit information on the planned use of fire for resource management within their jurisdiction and the potential for air quality impacts on or from adjacent jurisdictions. They are encouraged to collaborate with other near-by air quality managers to develop regional SMP's which assure that fire activities will not cause adverse air quality impacts at sensitive receptors in the region.

3. Role of Public Land Managers

Public land managers have the responsibility to participate with the other stakeholders and air quality managers in developing SIP's. Public land managers, as experts in what is needed to meet land use and other environmental objectives, need to provide information on the areas that are to be treated with fire, air pollutant emissions estimates, and assistance in developing programs to track emissions, monitor air quality and visibility, and mitigate air quality impacts.

The FLM's of mandatory Class I Federal areas must participate in the development of SIP's for regional haze and visibility impairment. Congress gave FLM's a key consulting role in the administration of visibility protection and "affirmative responsibility to protect air quality related values (including visibility) in mandatory Class I Federal areas." [See section 165 of the CAA.]

VI. SMOKE MANAGEMENT PROGRAMS (SMP's)

The SMP's establish a basic framework of procedures and requirements for managing smoke from fires managed for resource benefits and are typically developed by States/tribes with cooperation and participation by wildland owners/managers. The purposes of SMP's are to mitigate the nuisance and public safety hazards (e.g., on roadways and at airports) posed by smoke intrusions into populated areas; to prevent deterioration of air quality and NAAQS violations; and to address visibility impacts in mandatory Class I Federal areas. Some strong indications that an area needs a SMP are: (1) citizens increasingly complain of smoke intrusions; (2) the trend of monitored air quality values is increasing (approaching the daily or annual NAAQS for $PM_{2.5}$ or PM_{10}) because of significant contributions from fires managed for resource benefits; (3) fires cause or significantly contribute to monitored air quality that is already greater than 85 percent of the daily or annual NAAQS for $PM_{2.5}$ or PM_{10}; or (4) fires in the area significantly contribute to visibility impairment in mandatory Class I Federal areas.

If a State/tribe determines that a SMP is needed, they can adopt any type of program they believe will prevent NAAQS violations and address visibility impairment. For example, general fire regulations may establish basic parameters, such as wind speed, direction, location and distance to sensitive receptors, etc., within which fires can be ignited or naturally ignited fire can be allowed to continue to burn. States/tribes may allow wildland owners/managers to voluntarily notify them of fire plans or may require prior authorization. They may also exempt de minimis fires (fires that will cover fewer than X acres or consume less than Y tons of fuel, as established by the State/tribe) from meeting the regulations. Such regulations leave much discretion to wildland owners/managers as to when to ignite fires, and what management strategy to follow with naturally ignited fires. States/tribes may exercise enforcement authorities when wildland owners/managers are found to have ignited the fire outside of the parameters of the rule, or not to

have appropriately responded to air quality impacts caused by naturally ignited fires.

General fire regulations may be adequate for areas where fires managed for resource benefits rarely cause or contribute to air quality problems. However, when plans to use fire on a large scale could cause significant air quality impacts, or several wildland owners/managers within an airshed are expected to use fires concurrently, a more structured SMP requiring cooperation and coordination of fire activities may be required to minimize emissions and mitigate the air quality impacts.

State/tribal air quality managers, public wildland managers, private and Indian wildland owners/managers, and the general public should collaborate in the development and implementation of State/tribal SMP's. The State/tribal air quality manager must certify in a letter to the Administrator of EPA that at least a basic program has been adopted and implemented in order to receive special consideration under this policy of air quality data resulting from fire impacts, as explained in section VII. The SMP does not have to be incorporated into the SIP/TIP or be Federally enforceable, however. The following describes the basic components (A - F) of a certifiable SMP. There is considerable latitude within the components for individual State/tribal preferences.

A. Authorization to Burn

The SMP should include a process for authorizing or granting approval to manage fires for resource benefits within a region, State, or on Indian lands and identify a central authority responsible for implementing the program. The process may be as simple as receiving applications for permission to burn and granting approval via telephone or facsimile. The SMP central authority must review fire applications, consult with the applicants, if necessary, and promptly make burn/no burn decisions. When authorizing a fire, the authority should consider all open burning activities (land clearing and construction wastes, agricultural wastes, etc.) allowed within an airshed. The central authority should strive to treat public and private wildland owners/managers equitably when authorizing fires. Neighboring States/tribes are encouraged to create partnerships to coordinate fire projects when inter-jurisdictional impacts are expected, so as to meet air quality and fire management objectives. Fire emissions should be minimized and the air quality impacts should be mitigated regardless of political boundaries.

States/tribes may or may not require written burn plans for de minimis fires, especially if the central authority records pertinent fire information. However, written burn plans are strongly recommended for greater than de minimis fires. Burn plans should be prepared by the wildland owners/managers. The central authority should assist private land owners that cannot prepare their own plans. When written burn plans are required, especially for fires on publicly owned lands, they should include such information as the:

- location and description of the area to be burned,
- personnel responsible for managing the fire,
- type of vegetation to be burned,
- area (acres) to be burned,
- amount of fuel to be consumed (tons/acre),
- fire prescription including smoke management components (discussed below),
- criteria the fire manager will use for making burn/no burn decisions,
- safety and contingency plans addressing smoke intrusions.

The central authority's criteria for authorizing fires should be based on existing air quality and the ability of the airshed to disperse emissions (e.g., meteorological conditions) from all burning activities on the day of the burn. For fires lasting longer than one day, predicted meteorological conditions for several days should be considered to avoid aggravating existing problems. Persons receiving authorization to ignite fires must comply with all applicable local, State, tribal and Federal requirements. Persons responsible for managing greater than de minimis fires should be adequately trained in fire and smoke management. Fire managers should be required to follow the authorized burn plan or explain why it was necessary to deviate from the plan.

B. Minimizing Air Pollutant Emissions

The SMP should encourage wildland owners/managers to consider the alternative treatments discussed in section V.A.1., above. Public land managers typically consider and evaluate alternative treatments that may achieve management objectives, their costs and the environmental impacts of each method. States/tribes should assist private land owners to also identify economically feasible treatments that will meet their objectives with minimum air pollutant

emissions. When the use of fire is selected as the best means to accomplish management goals, there are several ways to reduce emissions from a single fire. The approaches fall into four categories and their applicability varies by fuel type, (1) minimize the area burned, (2) reduce the fuel loading in the area to be burned, (3) reduce the amount of fuel consumed by the fire, (4) minimize emissions per ton of fuel consumed. These emission reduction techniques rely almost exclusively on reducing the amount of fuel consumed by a particular fire. The excluded fuels could be consumed by a subsequent fire, however, unless they are removed from the area or biologically decompose. Also, generally these techniques cannot be used to reduce emissions from naturally ignited fires.

Emission reduction techniques are discussed further in the white paper "What Wildland Fire Conditions Minimize Emissions and Hazardous Air Pollutants and Can Land Management Goals Still be Met?" See Section I to obtain a copy.

C. <u>Smoke Management Components of Burn Plans</u>

When burn plans are required they should include the following smoke management components.

1. Actions to Minimize Fire Emissions

The burn plan should document the steps taken prior to the burn and actions that will be taken during and after the burn to reduce air pollutant emissions. This includes measures that will be taken to reduce residual smoke, such as rapid and complete mop-ups, mop-ups of certain fuels, etc.

2. Evaluate Smoke Dispersion

The central authority should evaluate dispersion conditions prior to authorizing fires. Burn plans should evaluate potential smoke impacts at sensitive receptors and time fires to minimize exposure of sensitive populations and avoid visibility impacts in mandatory Class I Federal areas. The plan should identify the distance and direction from the burn site to local sensitive receptor areas and to regional/interstate areas where appropriate. Fire prescriptions submitted prior to the day of the fire must specify minimum requirements for the atmospheric capacity for smoke dispersal such as minimum surface and upper level wind speeds, desired wind direction, minimum mixing height, and dispersion index. It may be necessary to purchase

meteorological services from private companies if they are not available from the National Weather Service.

3. Public Notification and Exposure Reduction Procedures

The plan should identify actions that will be taken to notify populations and authorities (e.g., local air quality managers) at sensitive receptors, including those in adjacent jurisdictions, prior to the fire. The plan should also identify contingency actions that will be taken during a fire to reduce the exposure of people at sensitive receptors if smoke intrusions occur. The central authority should perform these functions, if needed, for some private land owners. Appropriate short-term (less than 24-hour) contingency actions may, among other things, include:

- Notifying the affected public (especially sensitive populations) of elevated pollutant concentrations,
- Suggesting actions to be taken by sensitive persons to minimize their exposure (e.g., remain indoors, avoid vigorous activity, avoid exposure to tobacco smoke and other respiratory irritants),
- Providing clean-air facilities for sensitive persons,
- Halting ignitions of any new open burning that could impact the same area,
- Analyzing the fire situation and identifying alternative management responses upon becoming aware that a fire is out of air quality prescription with regard to the air quality criteria, (Federal land management agencies perform a Wildland Fire Situation Analysis)[3],
- Consulting State/tribal air quality managers regarding appropriate short-term fire management response to abate verified impacts,
- Implementing management responses that will mitigate the adverse impacts to public health,

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[3] A Wildland Fire Situation Analysis (WFSA) is a decision-making process that evaluates alternative fire management strategies considering fire fighter and public safety, risk to property and resources, fire fighting resources available, land management objectives, and environmental, social, economic and political constraints. The environmental and social constraints considered include, among other things, how air quality and/or visibility will be affected at sensitive receptors by each alternative fire management strategy. The positive, neutral or negative effects of each alternative on the criteria above are weighed to select the appropriate management response to the fire. Therefore, while mitigating air quality and visibility impacts must be considered by the FLM when managing a fire that is not within a prescription, they are just two of several important criteria evaluated.

- Reporting the steps taken to mitigate adverse impacts to the public and appropriate State/tribal agencies after they have been completed.

4. Air Quality Monitoring

The plan should identify how the effects of the fire on air quality at sensitive receptors, and visibility in mandatory Class I Federal areas will be monitored. The extent of the monitoring plan should match the size of the fire. For small fires, visual monitoring of the direction of the smoke plume and monitoring nuisance complaints by the public may be sufficient. Other monitoring techniques include posting personnel on vulnerable roadways to look for visibility impairment and initiate safety measures for motorists; posting personnel at other sensitive receptors to look for smoke intrusions; using aircraft to track the progress of smoke plumes; and continued tracking of meteorological conditions during the fire. For large fires expected to last more than one day, locating real-time PM monitors at sensitive receptors may be warranted to facilitate timely response to smoke impacts. If needed, the central authority may perform these monitoring functions for some private land owners.

For additional information on monitoring wildland fire impacts see the white paper "Air Monitoring for Wildland Fire Operations." See Section I to obtain a copy.

D. Public Education and Awareness

The SMP should establish criteria for issuing health advisories when necessary, and procedures for notifying potentially affected populations, including those in adjacent jurisdictions, of planned fires. A program should be implemented to explain the use and importance of fire for ecosystem management, the implications to public health and safety, and the goals of the SMP. Wildland and air quality managers should work with the press to announce pre-fire health advisories, and post-fire results including such things as the management objectives met; smoke intrusions observed, and/or successful minimization of air quality impacts.

E. Surveillance and Enforcement

The SMP should include procedures to ensure that wildland owners/managers will comply with the requirements of the SMP. Fire managers must follow the burn plan, including the fire prescription and smoke management components, or explain any deviations from the plan. Memorandums of understanding may be used to specify the responsibilities of each State/tribal

agency in implementing the SMP.

F. Program Evaluation

The SMP should provide for periodic review by all stakeholders of its effectiveness and revision of the program as necessary. The effectiveness review should be based on observations such as reports of smoke intrusions, nuisance complaints, and monitored air quality impacts. Post-burn reports should be required for fires that exceed their air quality prescription and/or fires that cause smoke impacts at sensitive receptors. Post-burn reports for escaped fires should describe the incident, describe the contingency plan implemented, and provide recommendations to prevent future smoke related problems.

State/tribal SMP's should include procedures for re-evaluating the effectiveness of rules and regulations every 3 to 5 years. Such procedures should involve all the original participants (e.g., wildland owners/managers, air quality managers, the public, etc.) and should review the:

- Acres of fires managed for resource benefits planned for the next 5 years,
- Need to expand the scope of the program to include authorization of other open burning,
- Need for changes in the SMP.

G. Optional Air Quality Protection

The following components are not required in a basic SMP, but States/tribes may adopt more stringent SMP's or include additional smoke management requirements. For example, "special protection zones" may be established to provide better protection against smoke impacts. Special protection zones could be buffers (e.g., 10 - 25 miles) around wildland/urban interface areas, nonattainment areas, or mandatory Class I Federal areas. Additional requirements for burns within a special protection zone may include no burning if high pollution levels already exist in the area. Also, special protections may only be required for burns that will last overnight, for multi-day burns or burns during specific seasons.

States/tribes may also establish "performance standards" that would trigger implementation of additional smoke management requirements if exceeded in an area. The performance standards could set limits on the frequency and intensity (e.g., hours/day, PM concentration, visibility impairment) of smoke intrusions. Implementation of performance

standards may require real-time monitoring of air quality. Additional requirements for fires after the performance standards are exceeded may include better dispersion parameters (e.g., increased wind speed, mixing height, dispersion index, etc.).

VII. ACCOUNTABILITY

A. Role of State/Tribal Air Quality Managers

High PM concentrations attributable to fires managed for resource benefits are valid air quality data that can be used to determine the attainment status of the area represented by the data for both the daily and annual NAAQS. State/tribal air quality managers are responsible for monitoring citizen complaints and air quality trends attributable to fires to determine when a SMP is needed to minimize emissions and mitigate air quality impacts. Air quality managers should initiate the collaborative process needed to develop and adopt regulations for a SMP. If the State/tribal air quality manager certifies in a letter to the Administrator of EPA that at least a basic program (described in section VI) has been adopted and implemented, special consideration will be given under this policy to air quality data resulting from fires managed for resource benefits.

1. Wildfires

High PM concentrations attributable to wildfires (unwanted wildland fires) can be treated as due to a natural event under EPA's Natural Events Policy. The Natural Events Policy provides that when areas violate the PM_{10} NAAQS due to a natural event, EPA will: (1) exercise its discretion, under section 107(d)(3) of the CAA, not to redesignate areas as nonattainment if the State develops and implements a plan to respond to the health impacts of natural events; and, (2) redesignate nonattainment areas as attainment by applying appendix K, on a case-by-case basis, to discount [ambient air quality] data in circumstances where an area would attain but for exceedances that result from uncontrollable natural events. The elements of a State/tribal action plan to respond to the health impacts of natural events are described in the Natural Events policy statement. The EPA plans to revise the Natural Events Policy to also cover $PM_{2.5}$ NAAQS violations.

2. Fires Managed for Resource Benefits

High PM concentrations attributable to fires managed for resource benefits will be given special consideration under this policy, as described in section VII.B., if the State/tribe has

certified to EPA that it is implementing a basic SMP. States/tribes should flag monitored values influenced by fires when submitting the data to EPA's Atmospheric Information Retrieval System. They must also document the basis for flagging the data. Supporting information could include the location of fires relative to the monitor, meteorological data such as wind speed and direction, filter analyses indicating heavy carbon deposits, the sample date (collected during the fire season), and the absence of other carbon sources during that period, among other things. The documentation should address the possible influence of other carbon sources such as wood-fired boilers, residential wood combustion and wildfires. The type and amount of documentation should be sufficient to demonstrate that fires managed for resource benefits caused flagged values to be above the level of the annual NAAQS. The documentation should be made available to the public for review. [For example, newspaper announcements, periodic air quality reports, distribution at public meetings.]

When smoke intrusions cause high PM concentrations, air quality managers have two goals: (1) to reduce immediate impacts on public health, and (2) to take appropriate steps to mitigate future impacts. To meet these goals, air quality managers must contact the wildland owner/manager responsible for the fire(s) to determine the cause of the impacts. The air quality manager should verify that contingency actions to reduce exposure are being implemented, and determine whether, (i) the fire was authorized, (ii) a burn plan (including the smoke management components) was followed, (iii) the prescription failed and why.

If requirements of the SMP were not met, the State/tribe can exercise various enforcement authorities to address the problem. If the fire manager complied with the SMP, the adequacy of the requirements should be reviewed. If air quality data are frequently flagged as resulting from failure of the smoke management components of the burn plan, EPA will call on the State/tribe to work with wildland owners/managers to improve future burn plans and the SMP. When a fire managed for resource benefits breaks out of its fire prescription, and cannot be returned to the prescription, the fire manager will treat it as a wildfire for the purposes of suppression. However, any resulting high PM concentrations must continue to be addressed under this policy, and the data can not be treated as due to a wildfire natural event.

B. Role of the Environmental Protection Agency

1. Impacts with a SMP

If fires managed for resource benefits cause or significantly contribute to violations (see definition) of the daily or annual $PM_{2.5}$ or PM_{10} NAAQS, the State/tribe must submit the following documentation to EPA to avoid a SIP/TIP call or redesignation of the area to nonattainment:

- Evidence supporting the finding that flagged air quality values were due to fires managed for resource benefits,
- Evidence that the fires were subject to a certified State/tribal SMP.

The State/tribe may consider that such fires caused or significantly contributed to violations of the daily NAAQS if 25 percent of all the PM concentrations that are above the level of the daily NAAQS, have been flagged as being due to fire impacts.

The State/tribe may consider that such fires caused or significantly contributed to violations of the annual NAAQS if the sum of the measured concentrations for all days flagged as due to fires, divided by the total number of sample days (fire days plus non-fire days) is greater than or equal to 25 percent of the annual NAAQS (i.e., 4 $\mu g/m^3$ for $PM_{2.5}$ or 12 $\mu g/m^3$ for PM_{10}).

If the evidence is convincing, EPA will exercise its discretion under section 107(d)(3) not to redesignate the area as nonattainment. Rather, following the first NAAQS violation based on 3 calendar years of PM air quality data, EPA will call on the State/tribe to review the effectiveness of the SMP in collaboration with wildland owners/managers and make appropriate improvements to mitigate future air quality impacts. The same procedure will be followed if a second NAAQS violation occurs the following year. If fires cause or significantly contribute to a third consecutive NAAQS violation, EPA will call for the SMP to be made part of the SIP/TIP and be Federally enforceable.[4] If the area was designated nonattainment previously, EPA will also call on the State/tribe to review the effectiveness of the SMP and make appropriate improvements.

2. Impacts Without a SMP

If a certified SMP has not been implemented, EPA will not give special consideration to the high PM concentrations attributed to fires managed for resource benefits that cause or

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[4]For example, the first violation of the PM_{10} NAAQS may be determined using air quality data for calendar years 1997-1999. Subsequently, 1998-2000 data for the same area could show a second violation, and data for 1999-2001 could identify a third violation for the area.

significantly contribute to: (1) violations of a $PM_{2.5}$ or PM_{10} NAAQS, (2) visibility impairment in mandatory Class I Federal areas, or (3) failure to achieve reasonable progress toward the national visibility goal. Rather, EPA will call for adoption of the basic SMP, described in section VI, as part of the SIP/TIP for PM and visibility. The EPA will also notify the governor of the State or the tribal government that the area should be redesignated as nonattainment. The SMP adopted in response to the SIP/TIP call must require mandatory participation for greater than de minimis fires, must be adopted into the SIP/TIP, and must be Federally enforceable. The SIP/TIP will also have to meet all other CAA requirements applicable to nonattainment areas.

3. Interstate Transport of Smoke

Several key provisions of the CAA address interstate pollutant transport. Section 110(a)(2)(D) provides that a SIP must contain provisions preventing subject sources from contributing significantly to nonattainment problems or interfering with maintenance in any other State. That section also prohibits interference with any SIP required measures under part C to prevent significant deterioration or to protect visibility. Section 169A authorizes EPA to promulgate regulations requiring states that "may reasonably be anticipated to cause or contribute to" visibility impairment in mandatory Class I Federal areas to include in their SIP's measures necessary to eliminate or reduce such impairment. Section 126 provides that, in response to petitions from government entities regarding significant pollutant transport, EPA may prescribe certain corrective measures. Also, sections 169B, 176A and 184 contain provisions for cooperatively addressing interstate pollution problems by establishing interstate transport regions and commissions to address region wide pollution and visibility concerns. The EPA promulgated a final rule, pursuant to the requirements of section 301(d) of the CAA that authorizes eligible Indian tribes to also implement these provisions.[5] If fires managed for resource benefits in one State (or on Indian lands) cause or significantly contribute to NAAQS violations in another State (or on Indian lands), EPA is authorized to take action under section 110(k)(5) of the CAA to address the problem. If, among other things, EPA finds that a SIP/TIP is substantially inadequate to attain or maintain the NAAQS, it may require the SIP/TIP to be revised to correct the

[5]See Volume 63 Federal Register 7254, February 12, 1998.

inadequacy (e.g., transported smoke).

C. Role of Wildland Owners/Managers

Wildland owners/managers are responsible for following State/tribal regulations applicable to fires, obtaining authorization to burn, and following the approved burn plan, when one is required. Owners/managers are responsible for taking appropriate actions to control the fire and reduce exposure to smoke when adverse air quality impacts result from a failure of the air quality prescription or an escaped fire.

There is a special need for fires managed by Federal agencies to have burn plans that include smoke management components. Fires managed by Federal agencies are most likely to impact air quality in recreation areas (national parks, forest, etc.) and impair visibility in mandatory Class I Federal areas. The EPA encourages Federal agencies to include smoke management components in all burn plans, regardless of the existence of a State/tribal SMP.

VIII. DATA ON WILDLAND and PRESCRIBED FIRES

Most of a State/tribal program to protect air quality is contained in a SIP or TIP. Since the use of fire for resource management is expected to increase substantially, especially on Federal lands, State/tribal air quality managers will need information to develop potential annual or seasonal air pollutant emission estimates for SIP/TIP planning. As for any source, emissions from fires can be estimated by multiplying the estimated level of activity by an emission factor. The level of activity for fire is the mass of biomass (fuel) consumed, usually expressed in tons. Emission factors expressed in pounds per ton of fuel consumed are available in EPA's publication AP-42 (which is scheduled to be updated). Emission factors are derived from an estimate of overall combustion efficiency (i.e. stoichiometric ratio). The mass of fuel consumed is the product of fire size (acres), pre-burn fuel loading (tons per acre), and fuel consumption (percent of pre-burn loading). An emission inventory can be compiled by the affected air agency for an individual fire, a statistical class of fires, a burn program, or a population of fires in a given area over a period of time based on this information.

Federal land management agencies currently collect data on wildland and prescribed fires, however, no standard reporting format is followed. These raw data are usually limited to the time and approximate location of the fire, fire perimeter area, weather (occasionally) and a

qualitative description of fuels at the point of ignition. The data are not collected for the purpose of calculating air pollutant emissions and are probably inadequate for that purpose.

A National Interagency Fire Statistics Information Project has been initiated to develop an easily accessible system for storing a set of commonly agreed upon fire data. Post-burn data, such as that described above, on future wildland and prescribed fires would be stored in this database. The database will be accessible by air quality managers to estimate past, current, and future emission trends from this source category.

The EPA encourages the Federal land management agencies to develop the fire statistics database and FLM's to report fire data to the system. These fire data will be needed by air quality managers in regions where most wildland and prescribed fires occur on Federal lands. Air quality managers should request similar fire data for wildland and prescribed fires on State, private and Indian wildlands as well as information on other types of open burning to complete their emission inventories.

Statewide emissions from fire use in all 50 states during 1989 have been estimated based on a survey of [Federal, State and private] land owners/managers. [Ref. Peterson/Ward] Also, a spatially resolved inventory of prescribed burning by county for 1990 and by 50km grid for 1995, 2015 and 2040 was prepared for 10 western States as part of the Grand Canyon Visibility Transport Commission's activities. [Ref. Peterson/Lahm] The emission estimates are based on fuel models derived from 14 types of vegetative cover spatially mapped throughout the area and estimates of fuel loadings as either low, medium or high. The procedures followed by Peterson and Lahm to estimate emissions for the western states provide a good model for developing emissions estimates for other areas, also.

Further information on developing emissions estimates and the data required can be found in the white paper "Emission Inventories for SIP Development." See Section I to obtain a copy.

IX. MEETING OTHER CLEAN AIR ACT REQUIREMENTS

A. Demonstrate Conformity of Federal Activities

Activities on Federal lands must meet the requirements of the CAA, including the provisions of section 176(c), that such activities "conform" to the purpose of the applicable SIP. The EPA's Conformity rules, implementing the provisions of section 176(c), only apply to

Federal actions taken within a nonattainment or maintenance area. The Transportation Conformity rules govern transit-related activities, and all other type of activities are governed by the General Conformity rules. The rules require a Federal agency to demonstrate, prior to initiating a project, that its action conforms to all applicable requirements in a SIP and will not cause or contribute to NAAQS violations. The General Conformity rules provide Federal agencies with several options for demonstrating conformity. The following options are most typically followed : (1) a modeling demonstration to show that emissions from the project will not increase the frequency or severity of a NAAQS violation, (2) obtaining emission reductions that offset the new project emissions, or (3) showing that the project's emissions are already included in, or accommodated by, the emissions inventory of the SIP for the relevant nonattainment or maintenance area. Federal activities occurring on tribal lands will be addressed by EPA consistent with its Tribal Air Rule and the requirements of the CAA.

The above procedures can be followed to demonstrate conformity of fire projects for a Federal land management agency's administrative units based on the FMP's developed for such units. The demonstration can be made on an annual basis for all burns within the airshed of a nonattainment or maintenance area. Alternatively, the demonstration can be made for each individual fire project conducted at the administrative unit.

In addition to the previously cited methods for demonstrating conformity of Federal fire projects, EPA will pursue, in consultation with the other Federal agencies, adding an alternative method to the General Conformity rules through rulemaking. At a minimum, EPA believes that the alternate method should require a Federal agency to document that its fire projects are managed within a certified SMP. The SMP also must require regional coordination (cooperation of all jurisdictions in an airshed) of burn plan authorization and real-time air quality monitoring at sensitive receptors, when warranted, in addition to the basic program components discussed in section VI.

B. Visibility/Regional Haze Requirements

The EPA's visibility regulations (45 FR 80084, December 2, 1980) protect mandatory Class I Federal areas from manmade impairment that is "reasonably attributable" to a single emission source or small group of sources. FLM's for mandatory Class I Federal areas have a key

consultative role and responsibility to participate in the development of SIP's for visibility impairment that is reasonably attributable to specific sources. In Part C of the CAA which includes the visibility protection mandate, Congress assigned FLM's the "affirmative responsibility to protect air quality related values (including visibility)" in mandatory Class I Federal areas. Under EPA's regulations, States must take appropriate actions to address all sources of visibility impairment, including fires, in response to a FLM's certification of reasonably attributable impairment in mandatory Class I Federal areas.

A new regulatory program to protect mandatory Class I Federal areas from "regional haze" impairment was proposed by EPA on July 31, 1997 (62 FR 41137). After the regional haze rules become final, States will need to address the impacts of fires and other contributing sources on meeting reasonable progress in their control strategy analyses, as well as during periodic progress assessments. The EPA will revisit this section of the Air Quality Policy on Wildland and Prescribed Fires after the final rules for implementing the regional haze program have been promulgated. The EPA will also develop guidance on assessing natural background visibility to aid in implementing the regional haze rules, and will consider the following paper at that time. The white paper "Estimating Natural Emissions From Wildland and Prescribed Fire" presents preliminary options for defining natural wildland and prescribed fire emissions that may or may not be consistent with the final regional haze rules. See Section I to obtain a copy.

C. **Prevention of Significant Deterioration**

Title I, part C of the CAA requires SIP's to include provisions to prevent the significant deterioration of air quality in areas designated as attainment or unclassifiable for any NAAQS. "Significant deterioration" for any pollutant is defined as an unacceptable incremental increase in ambient concentrations above the baseline concentration for that pollutant in an area. The PSD "increments" have been established for SO_2, NO_2, and PM_{10}. The EPA adopted NAAQS for $PM_{2.5}$, which became effective on September 16, 1997. However, no increments have yet been promulgated for $PM_{2.5,}$

The SIP's are required to contain emission limits and such other measures as may be necessary to prevent significant deterioration of air quality. See section 161 of the Act. In addition, SIP's are required to include a preconstruction review permit program for new and

modified major stationary sources. See section 165 of the Act. The SIP's must ensure that increases in emissions from all types air pollution sources do not cause the allowable increment for a pollutant to be exceeded.

While fires managed for resource benefits generally are not subject to a preconstruction review and the issuance of a PSD permit, the emissions from such activities may affect the air quality in a PSD area. Under adverse conditions, the combined PM emissions from increased fire activities and from other sources could possibly result in ambient concentrations that exceed the allowable PSD increments for PM. Historically, EPA has often regarded fires managed for resource benefits to be temporary activities.[6] The PM emissions resulting from fire activities differ from the PM emissions generated by most other sources because they are generally short-lived. That is, the burning generally is carried out infrequently at a specific location (once every 5-20 years) and the duration tends to be short (approximately 1-2 days). Even with the proposed increased utilization of fire as a resource management tool, the resulting PM emissions are expected to be relatively uncommon at a particular location and of short duration.

Section 163(c)(1)(C) of the Act authorizes States with approved PSD programs to exclude (with the Administrator's approval) concentrations of PM caused by "construction or other temporary emission-related activities" when determining compliance with the PSD increments. The EPA generally supports the concept of allowing States with approved SIP's to exclude emissions caused by temporary managed fire activities from increment analyses, provided the exclusion does not result in permanent or long-term air quality deterioration. Nevertheless, the decision as to whether PM emissions from fire activities should be counted against the PSD increments for PM is a decision to be made by individual States. The EPA expects States to consider the extent to which a particular type of prescribed burning activity is truly temporary, as opposed to those activities which can be expected to occur in a particular area with some regularity over a period of time.

[6]See Volume 58 Federal Register 31633, June 3, 1993.

DEFINITIONS

Air Quality: The characteristics of the ambient air (all locations accessible to the general public) as indicated by concentrations of the six air pollutants for which national standards have been established [i.e., particulate matter (PM), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), carbon monoxide (CO) and lead], and by visibility in mandatory Federal Class I areas. For the purposes of this policy, concentrations of PM are taken as the primary indicators of ambient air quality.

Air Quality Manager: The regulatory body responsible for managing the air quality protection program for a State, local or tribal government.

Air Quality Related Values (AQRV): Those special attributes of a mandatory Class I Federal area that deterioration of air quality may adversely affect. Some examples of AQRV include: flora and fauna, water, visibility, and odor among others.

Ambient Air: That portion of the atmosphere, external to buildings, to which the general public has access.

Administrative Unit: A unit of land (Forest, Refuge, Park, etc.) under the administration of a public land management agency.

AP-42: The Environmental Protection Agency's (EPA) Compilation of Air Pollutant Emission Factors for stationary point, area, and mobile sources. An emission factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. Emission factors are then used to estimate the magnitude of a source's pollutant emissions.

The plan includes the project objective, fire prescription (including smoke management components), personnel, organization, equipment, etc.

Class I Area: An area set aside under the Clean Air Act (CAA) to receive the most stringent protection from air quality degradation. Mandatory Class I Federal areas are (1) international parks, (2) national wilderness areas which exceed 5,000 acres in size, (3) national memorial parks which exceed 5,000 acres in size, and (4) national parks which exceed 6,000 acres and were in existence prior to the 1977 CAA Amendments. The extent of a mandatory Class I Federal area includes subsequent changes in boundaries, such as park expansions.

De Minimis Fires: Fires that will cover fewer than X acres or consume less than Y tons of fuel, as established by a State or tribe.

Federal Implementation Plan (FIP): A plan (or portion thereof) promulgated by the Administrator, as provided for under the CAA and any applicable EPA regulations, including regulations governing tribal air plans, to fill all or a portion of a gap or otherwise correct all or a portion of an inadequacy in a State or tribal implementation plan (TIP), and which may include enforceable emission limitations or other control measures, means or techniques (including economic incentives, such as marketable permits or auctions of emissions allowances), and provides for attainment of the relevant national ambient air quality standard (NAAQS).

Federal Land Manager (FLM): With respect to any lands in the United States, the Secretary of the Federal department with authority over such lands. Generally, the Secretaries delegate their authority to specific elements within each department. For example, the National Park Service and the Fish and Wildlife Service manage those areas under the authority of the Department of the Interior.

Fire Dependent Ecosystem: A community of plants and animals that must experience recurring disturbances by fire, in order to sustain its natural plant succession, structure and composition of vegetation, and maintain appropriate fuel loading and nutrient cycling to ensure proper ecosystem function.

Fire Management Plan (FMP): A strategic plan that defines a program to manage wildland and prescribed fires, and documents the FMP to meet management objectives outlined in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, burn plans and prevention plans.

Fuel: Includes combustible vegetative matter such as grass, trees, shrubs, limbs, branches, duff, and stumps.

Indian Land: Indian land in this document refers to Indian country which is (a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation, (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the

limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same. [See 18 U.S.C. 1151.]

Land Use Plan: A broad scale, long range plan (e.g., forest plan, refuge plan or resource management plan) that identifies the scope of actions and goals for the land and resources administered by a land owner/manager.

National Ambient Air Quality Standards (NAAQS): Standards for maximum acceptable concentrations of pollutants in the ambient air to protect public health with an adequate margin of safety, and to protect public welfare from any known or anticipated adverse effects of such pollutants (e.g., visibility impairment, soiling, materials damage, etc.) in the ambient air.

National Environmental Policy Act (NEPA): Establishes procedures that Federal agencies must follow in making decisions on Federal actions which may impact the environment. Procedures include evaluation of environmental effects of proposed actions, and alternatives to proposed actions; involvement of the public and cooperating agencies.

Nuisance Smoke: Amounts of smoke in the ambient air which interfere with a right or privilege common to members of the public, including the use or enjoyment of public or private resources.

Particulate Matter (PM): Any airborne finely divided material, except uncombined water, which exists as a solid or liquid at standard conditions (e.g., dust, smoke, mist, fumes, or smog).

$PM_{2.5}$: Particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

PM_{10}: Particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers (including $PM_{2.5}$).

Prescribed Fire: Any fire ignited by management actions to meet specific objectives (i.e., managed to achieve resource benefits).

Prescription: Measurable criteria which guide selection of appropriate management response and actions. Prescription criteria may include the meteorological conditions affecting the area under prescription, as well as factors related to the state of the area to be burned such as

the fuel moisture condition and other physical parameters. Other criteria which may be considered include safety, economic, public health, environmental, geographic, administrative, social or legal considerations, and ecological and land use objectives.

Prevention of Significant Deterioration (PSD): A requirement in the CAA, which establishes the maximum allowable increases in ambient air concentrations of selected air pollutants above baseline concentrations in areas designated as Class I, Class II, or Class III.

Project Plan: A strategic plan for accomplishing specific actions and goals (objectives) established in a land use plan. A project may include several activities such as cutting and hauling trees and shrubs, planting trees, building trails, and fire treatment.

Regional Haze: Generally, concentrations of fine particles in the atmosphere extending up to hundreds of miles across a region and promoting noticeably hazy conditions; wide-spread visibility impairment, especially in mandatory Class I Federal areas where visibility is an important value.

Sensitive Receptors: Population centers such as towns and villages, camp grounds and trails, hospitals, nursing homes, schools, roads, airports, mandatory Class I Federal areas, etc. where smoke and air pollutants can adversely affect public health, safety and welfare.

Smoke Management Program (SMP): Establishes a basic framework of procedures and requirements for managing smoke from fires that are managed for resource benefits. The purposes of SMP's are to mitigate the nuisance and public safety hazards (e.g., on roadways and at airports) posed by smoke intrusions into populated areas; to prevent deterioration of air quality and NAAQS violations; and to address visibility impacts in mandatory Class I Federal areas in accordance with the regional haze rules.

State Implementation Plan (SIP): A CAA required document in which States adopt emission reduction measures necessary to attain and maintain NAAQS, and meet other requirements of the Act.

Suppression: A management action intended to protect identified values from a fire, extinguish a fire, or alter a fire's direction of spread.

Tribal Implementation Plan (TIP): A document authorized by the CAA in which eligible tribes adopt emission reduction measures necessary to attain and maintain NAAQS, and

meet other requirements of the CAA for lands within tribal jurisdictions.

Violation of the PM NAAQS: As revised in 1997, the daily PM_{10} standard is violated when the 99th percentile of the distribution of 24-hour concentrations for a period of 1 year (averaged over 3 calendar years) exceeds 150 $\mu g/m^3$ at any monitor within an area. The annual PM_{10} standard is violated when the arithmetic average of 24-hour concentrations for a period of 1 year (averaged over 3 calendar years) exceeds 50 $\mu g/m^3$ at any monitor within an area.

The new NAAQS levels for $PM_{2.5}$ are set at a daily concentration less than or equal to 65 $\mu g/m^3$, and an annual mean concentration of less than or equal to 15 $\mu g/m^3$. The daily standard is violated when the 98th percentile of the distribution of the 24-hour concentrations for a period of 1 year (averaged over 3 calendar years) exceeds 65 $\mu g/m^3$ at any monitor within an area. The annual standard is violated when the annual arithmetic mean of the 24-hour concentrations from a network of one or more population-oriented monitors (averaged over 3 calendar years) exceeds 15 $\mu g/m^3$. Compliance with the annual $PM_{2.5}$ NAAQS is based on population-oriented monitors because the health information, upon which the standard is based, relates area-wide health statistics to area-wide air quality as measured by one or more monitors.

Volatile Organic Compounds (VOC): Any organic compound which participates in atmospheric photochemical reactions, which are measured by a reference method, an equivalent method, or an alternative method. Some compounds are specifically listed as exempt due to their having negligible photochemical reactivity. [See 40 CFR 51.100.] Photochemical reactions of VOC's with oxides of nitrogen and sulfur can produce O_3 and PM.

Wildfire: An unwanted wildland fire.

Wildland: An area where development is generally limited to roads, railroads, power lines, and widely scattered structures. The land is not cultivated (i.e., the soil is disturbed less frequently than once in 10 years), is not fallow, and is not in the United States Department of Agriculture (USDA) Conservation Reserve Program. The land may be neglected altogether or managed for such purposes as wood or forage production, wildlife, recreation, wetlands or protective plant cover. **[The distinction between wildlands, to which the recommendations in this document apply, and agricultural lands is subject to further discussion.]**

Wildland Fire: Any non-structural fire, other than prescribed fire, that occurs in the

wildland. Note: Wildland fires include unwanted (wild) fires and naturally ignited fires that are managed within a prescription to achieve resource benefits.

Wildland Fire Situation Analysis (WFSA): A real time decision-making process carried out by federal land management agencies to select an appropriate management response to wildland fire. The WFSA considers fire fighter and public safety, risk to property and resources, fire fighting resources available, land management objectives and environmental, social economic and political constraints. The environmental and social constraints considered include, among other things, how air quality and/or visibility will be affected at sensitive receptors by each alternative fire management strategy.

Wildland/Urban Interface: The line, area or zone where structures and other human development meets or intermingles with the wildland.

4.4 Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide

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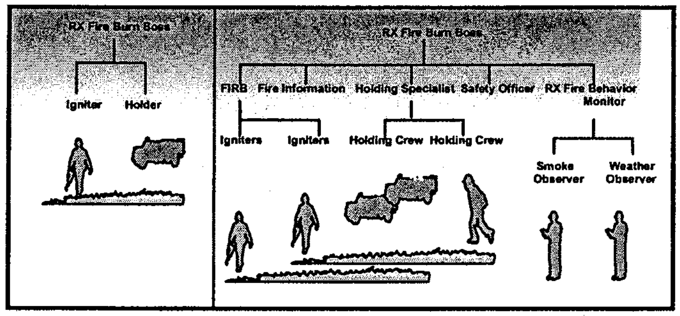
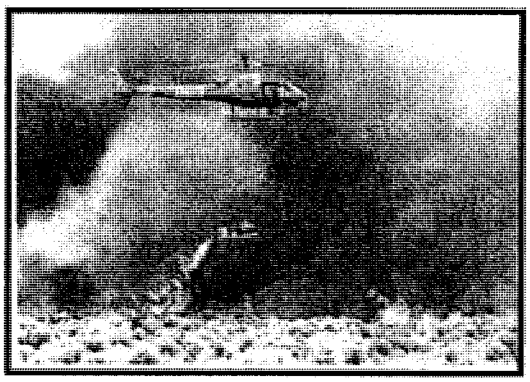
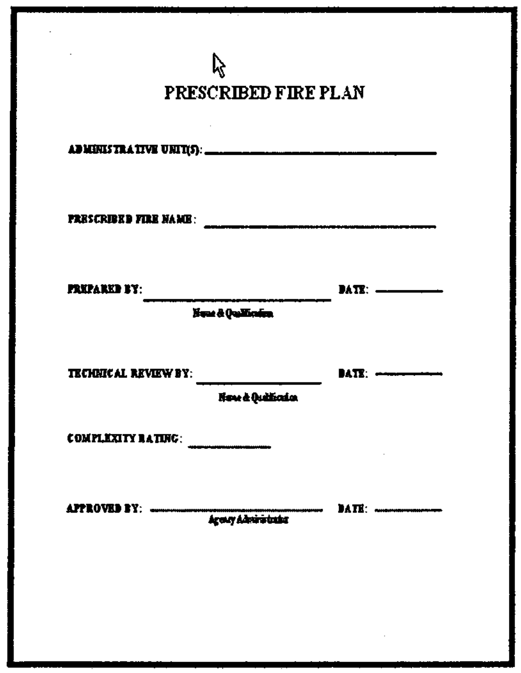
Interagency Prescribed Fire

Planning and Implementation Procedures Reference Guide






PRESCRIBED FIRE PLAN

ADMINISTRATIVE UNIT(S): ____________

PRESCRIBED FIRE NAME: ____________

PREPARED BY: ____________ DATE: ______
Name & Qualification

TECHNICAL REVIEW BY: ____________ DATE: ______
Name & Qualification

COMPLEXITY RATING: ______

APPROVED BY: ____________ DATE: ______
Agency Administrator

September 2006

Foreword

"Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide" (2006 Guide) provides standardized procedures, specifically associated with the planning and implementation of prescribed fire. These procedures meet all policy requirements described in the 2003 ***Interagency Strategy for the Implementation of Federal Wildland Fire Management Policy.*** The 2006 guide provides unified direction and guidance for prescribed fire planning and implementation for the Department of the Interior's Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), the National Park Service (NPS), the United States Fish and Wildlife Service (USFWS) and the United States Department of Agriculture Forest Service (USDA FS).

Prior to implementing Prescribed Fire under the standards in the 2006 Guide, local units must have ensured compliance with National Environmental Policy Act (NEPA), National Historical Preservation Act (NHPA) and Endangered Species Act (ESA) requirements.

This Implementation Procedures Reference Guide (2006 Guide) meets requirements of National Fire and Aviation Executive Board (NFAEB) task to develop common language and unified direction or guidance for agency/bureau manuals, directive handbooks, and guidelines to complete final implementation of this policy.

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Branch of Fire Management
Chief

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Deputy Director

Mike Wallace (Acting)
National Park Service
Division of Fire & Aviation Management
Chief

Executive Summary

Fire is an essential ecological process in many fire dependent ecosystems. In large areas of the country, fire exclusion from these ecosystems has led to unhealthy forest, woodland and rangeland conditions. These areas are at risk of intense, severe wildfires that threaten communities and cause significant damage to key ecological components.

As one component of fire management, prescribed fire is used to alter, maintain, or restore vegetative communities; achieve desired resource conditions; and to protect life, property, and values that would be degraded and/or destroyed by wildfire.

Federal Prescribed Fire Programs are guided by the principles of the 1995 Federal Wildland Fire Management Policy and Program Review and the 2001 update. Collectively these principles establish that wildfire suppression, wildland fire use, and prescribed fire programs be implemented equally, consistently and concurrently, as a means to avoid fire risks. The policy emphasizes firefighter safety as a consideration in planning and a priority in operations (Wildland Fire Management Policy, June, 2003).

This guide supports the Interagency Strategy for the Implementation of Federal Wildland Fire Management Policy. It provides unified direction and guidance for prescribed fire planning and implementation for the Department of the Interior's Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), the National Park Service (NPS), the United States Fish and Wildlife Service (USFWS) and the United States Department of Agriculture Forest Service (USDA FS).

This guide partially replaces the original Wildland and Prescribed Fire Management Policy Implementation Procedures and Reference Guide (USDI/ USDA 1998)[1] which established consistent agreement between agencies regarding federal policy direction related to prescribed fire planning and implementation.

Contents

Introduction

Purpose

The purpose of this guide is to provide consistent interagency policy, establish common terms and definitions and identify planning and implementation processes for prescribed fire.

The guide describes what is **minimally** acceptable for prescribed fire planning and implementation. Agencies may choose to provide more restrictive standards and policy direction, but must adhere to these **minimums**.

Scope

This guide provides policy and direction to implement existing federal policy and has been developed with tribal, state, county, and local cooperators in mind. While some of these guidelines will not fit all non-federal cooperators, the intent is to include everyone by establishing a planning and implementation guide that might result in that outcome.

Prescribed Fire Program Goals

Interagency Prescribed Fire Program goals are to:

- Provide for firefighter and public safety as the first priority.
- Ensure that risk management is incorporated into all prescribed fire planning and implementation.
- Use prescribed fire in a safe, carefully planned, and cost-efficient manner.
- Reduce wildfire risk to communities, municipal watersheds and other values and to benefit, protect, maintain, sustain, and enhance natural and cultural resources.
- Utilize prescribed fire to restore natural ecological processes and functions, and to achieve land management objectives.

Authorities

All use of prescribed fire will be supported by a Land/Resource Management Plan (L/RMP) and/or Fire Management Plans (FMP). Prescribed fire projects can only be implemented through an approved Prescribed Fire Plan. Specific authorities exist for each agency to utilize prescribed fire (See Appendix A). All project decisions to use prescribed fire are subject to the agency's analysis, documentation, and disclosure requirements for complying with the National Environmental Policy Act (NEPA).

During prescribed fire planning and operations, all federal agencies will accept each other's standards for qualifications. The minimum qualifications standard is National Wildland Fire Coordinating Group (NWCG) Wildland and Prescribed Fire Qualifications System Guide, 2000 (PMS 310-1). State, local cooperators and contractors working on federal agency prescribed fires must meet the NWCG PMS 310-1 standards unless local agreements specify otherwise.

The main reference glossary for this guide is the NWCG glossary, which is updated periodically: http://www.nwcg.gov/.

This guide is not intended to address interagency business rules. Reference individual agency's business rules for direction.

Prescribed Fire Planning Process

Common planning documents to ensure quality prescribed fire plans include:

Land/Resource Management Plan (L/RMP)

Overall direction is provided to the Wildland Fire Management Program by Land/Resource Management Plans (L/RMP). These plans serve as the document to initiate, analyze, and provide the basis for using prescribed fire to meet resource management objectives.

Fire Management Plan (FMP)

All burnable acres will be covered by a Fire Management Plan (FMP). The FMP is the cornerstone plan for managing a Wildland Fire Management Program and should flow directly from the L/RMP. FMPs may be developed for a Fire Planning Unit (FPU) that crosses jurisdictional boundaries. Where the Wildland Fire Management Program crosses jurisdictional boundaries, or where

program coordination is essential, the FMP will require interagency coordination. Most FMPs are anticipated to fall into this category.

National Environmental Policy Act (NEPA)

Resource and prescribed fire objectives for specific prescribed fire projects are derived from the NEPA analysis. **The entire prescribed fire project area must be analyzed under NEPA.** NEPA documents that identify and analyze the effects of using or not using prescribed fire treatment projects may include Environmental Impact Statements (EIS), Environmental Assessments (EA), and Categorical Exclusion (CE).

Other authorities that may be utilized to guide analysis and determination of NEPA compliance are Healthy Forest Restoration Act (HFRA), Healthy Forest Initiative (HFI), and the Tribal Forest Protection Act (TFPA).

Prescribed fire planning and related NEPA analysis should always occur at the largest possible spatial and temporal scales.

Implementation Organization and Qualifications

During prescribed fire planning and operations, all federal agencies will accept each other's standards for qualifications. The minimum qualifications standard is National Wildland Fire Coordinating Group (NWCG) Wildland and Prescribed Fire Qualifications System Guide, 2000 (PMS 310-1). State, local cooperators and contractors working on federal agency prescribed fires must meet the NWCG PMS 310-1 standards unless local agreements specify otherwise. No less than the organization described in the approved Prescribed Fire Plan may be used for implementation. The complexity of each prescribed fire or phase of fire(s) determines the organization(s) needed to safely achieve the objectives specified in the Prescribed Fire Plan.

Minimum Supervisory Qualifications determined by prescribed fire complexity:

Table 1. Qualifications requirements related to Prescribed Fire Complexity.

	Complexity		
Position	**High**	**Moderate-Low**	**Low**
RXM1	Optional	Optional	Optional
RXM2	Not Allowed	Optional	Optional
RXB1	Required	Optional	Optional
RXB2	Not Allowed	Required	Optional
RXB3	Not Allowed	Not Allowed	Required
FIRB	Optional	Optional	Optional
Holding Specialist: Holding functions will be managed by personnel qualified at the appropriate ICS wildland fire operations position as required by complexity, assigned resources and operational span of control. For some projects, there may be no holding requirements or the holding duties are assumed by the Burn Boss.			

High, Moderate, and Low complexity prescribed fires are determined through the required NWCG Prescribed Fire Complexity Rating System Guide.

Prescribed Fire Burn Boss Type 3 (RXB3):

Adoption of the RXB3 position is up to each agency. Non-federal RXB3s must meet the qualifications as listed in the table below unless local agreements specify otherwise.

An RXB3 will only be allowed to implement low complexity prescribed fires where the possibility of spread or spotting outside the project area is negligible to non-existent; multiple fuel models are not involved and aerial operations are not involved;.

The requirements for Prescribed Fire Burn Boss Type 3 are:

Table 2. Requirements for Prescribed Fire Burn Boss Type 3

Training:	Required: S-290 Intermediate Wildland Fire Behavior Suggested: S-234 Ignition Operations
Prerequisite Experience:	Incident Commander, Type 5 **OR** Advanced Firefighter/Squad Boss **AND** Satisfactory position performance as a Prescribed Fire Burn Boss Type 3
Physical Fitness:	Moderate
Other Position Assignments that will Maintain Currency:	Prescribed Fire Burn Boss Type 2 Prescribed Fire Burn Boss Type 1 Fire Use Manager Prescribed Fire Manager Type 1 Prescribed Fire Manager Type 2

Responsibilities

Prior to prescribed fire implementation, thorough planning and review processes must be conducted. All prescribed fire actions must be developed from resource/fire management objectives carried forward from FMP's and L/RMP's. A specific implementation plan for each prescribed fire must be completed, reviewed, and approved before ignition can begin.

The Agency Administrator has final approval authority for all Prescribed Fire Plans, unless special circumstances warrant higher review and concurrence (such as may occur during higher Preparedness Levels or for extremely large, complex projects). Although the Agency Administrator has final approval authority for the Prescribed Fire Plan and the Agency Administrator Pre-Ignition Approval checklist, the Prescribed Fire Burn Boss has the responsibility to make the on-site tactical "GO/NO-GO" decision. The Prescribed Fire Burn Boss ensures that all prescription, staffing, equipment, and other plan specifications are met before, during, and after the prescribed fire.

Every Prescribed Fire Plan must receive a technical review. The Technical Reviewer and Prescribed Fire Plan Preparer must be qualified or have been previously qualified as a Prescribed Fire Burn Boss at an experience level equal to or higher than the complexity being reviewed. Either **the Prescribed Fire Plan Preparer or Technical Reviewer must be currently qualified.**

Only a RXB1 can review plans at high complexity. An RXB2 can review plans of moderate to low complexity. An RXB3 is not allowed to function as a Prescribed Fire Plan Preparer (see Chapter 3, section C.) or Technical Reviewer.

Agency or individual unit policy may dictate additional reviews. Interagency Prescribed Fire Plans require approval from all appropriate Agency Administrators and a technical review. Listed below are the prescribed fire and implementation position roles and responsibilities:

Agency Administrator

For the purposes of this document, the Agency Administrator is defined as the Line Officer (or designee) of the agency or jurisdiction that has responsibility for the prescribed fire. These usually include the: NPS Park Superintendent, BIA Agency Superintendent, USFS Forest Supervisor, BLM District/Field Office Manager, FWS Project Leader, State Forest Officer, and/or Fire Chief.

The Agency Administrator is responsible to:

1. Approve Prescribed Fire Plans. When approving a plan, understand the risks associated with it. Ensure that the plan has been reviewed and recommended for approval by the Technical Reviewer who was not the primary preparer of the plan.
2. Ensure that only trained and qualified personnel participate in the implementation portion of the prescribed fire.
3. Ensure that projects are monitored, evaluated, and documented in the project file.
4. Sign, date, and provide an expiration date for the approval to burn on the Agency Administrator Pre-Ignition Approval Checklist (Reference Burn Plan Template, Appendix B).
5. Understand and approve the Complexity Analysis (PMS 424 January 2004).
6. Ensure that all prescribed fires are conducted in accordance with the approved implementation plan and established standards and guidelines.
7. Ensure that periodic reviews and inspections of the Prescribed Fire Program are completed.
8. Determine if and when the Agency Administrator is to be notified that contingency actions are being taken.
9. Report all wildfires resulting from prescribed fires through the chain of command.

10. Declare an escaped prescribed fire a wildfire (if responsibility is assigned in the plan).
11. Ensure that escaped prescribed fires are reviewed according to established guidelines.

Technical Reviewer

The Technical Reviewer is responsible for reviewing each Prescribed Fire Plan element for content as well as evaluating the risk and Complexity Analysis to ensure that the stated goals and objectives can be safely and successfully achieved when properly implemented. The Technical Reviewer shall be qualified or previously qualified as a Burn Boss at or above the level of project complexity. At a minimum, NWCG qualifications will be accepted. The Technical Reviewer should have local knowledge of the area, experience burning in similar fuel types, and/or conduct an on-site review. **The Technical Reviewer must be someone other than the primary preparer of the plan.** An off-unit technical review is encouraged to provide an additional independent perspective. It is acceptable for other specialists to review certain portions of the plan however; a primary Technical Reviewer must be designated as technical review signatory. For example, a fire behavior analyst may review the fire behavior calculations; the aviation manager may review the air operations plan; and/or a resource specialist may review impacts to their resource of interests. It is recommended that at least once every year, each unit should send a moderate or high complexity Prescribed Fire Plan off-unit for technical review.

The Technical Reviewer is responsible to:

1. Ensure that Prescribed Fire Plans meet agency policy and direction.
2. Ensure that the Complexity Analysis accurately represents the project, so the Agency Administrator understands the identified risks and the mitigating measures enacted. This may require on-site review in Wildland Urban Interface (WUI) or high complexity situations by the Technical Reviewer.
3. Check the prescription parameters against the fuel types to ensure that the project as planned has a reasonable chance of meeting the resource management objectives.
4. Ensure that the fire behavior calculations and/or prescription parameters are appropriate and within the acceptable range.
5. Ensure that the ignition, holding and contingency plans are consistent with the predicted fire behavior.
6. Complete and sign the Technical Review Checklist (See Burn Plan Template, Appendix B) and the Prescribed Fire Plan signature page.

Prescribed Fire Plan Preparer

For the purpose of this document, the Prescribed Fire Plan Preparer is defined as the individual responsible for the preparation of the Prescribed Fire Plan. Several people may be involved in the preparation of the Prescribed Fire Plan, but the Prescribed Fire Plan Preparer is responsible for the final plan content. The primary preparer of the Prescribed Fire Plan will sign the signature page.

The preparer is responsible to:

1. Prepare the Prescribed Fire Plan in accordance with this guide's policy and direction.
2. Coordinate with the resource management and/or technical specialists to ensure that the plan meets management and operational objectives.
3. Interact with the Technical Reviewer to ensure that all plan elements are adequately addressed.
4. Complete and sign the Complexity Analysis.

Prescribed Fire Burn Boss (RXB1/RXB2/RXB3)

The Prescribed Fire Burn Boss is responsible to the Agency Administrator, Prescribed Fire Manager, or FMO/local fire management organization for implementing the Prescribed Fire Plan.

The Prescribed Fire Burn Boss is responsible to:

1. Review the Prescribed Fire Plan prior to implementation and ensure all required elements and objectives are addressed.
2. Inspect the burn unit to validate Prescribed Fire Plan elements including areas of special concern as well ensuring that holding/contingency plans adequately address expected fire behavior outside the unit(s).
3. Obtain current weather and smoke management forecasts, updates, and special advisories from a meteorologist.
4. Maintain communication with the Agency Administrator, Prescribed Fire Manager, or FMO/local fire management organization.
5. Ensure that the Agency Administrator Pre-Ignition Approval Checklist is valid (See Burn Plan Template, Appendix B)
6. Take to the field those portions of the Prescribed Fire Plan necessary for completing the briefing and safe project implementation.
7. Complete and sign the Prescribed Fire GO/NO-GO Checklist (See Burn Plan Template, Appendix B).
8. Ensure availability of any contingency resources and management of those resources if deployed.
9. Ensure that all operations are conducted in a safe manner and in accordance with the approved plan and established standards and guidelines.
10. Verify qualifications of all assigned personnel. Conduct the personnel/safety briefing to ensure a safe operation.
11. Conduct the test fire and document the results.
12. Supervise assigned personnel and direct the ignition, holding and monitoring operations. The Prescribed Fire Burn Boss will be responsible for implementation including mop-up and patrol unless otherwise assigned to other qualified personnel.
13. Declare the prescribed fire out unless the responsibility for it is formally passed to another Prescribed Fire Burn Boss, Prescribed Fire Manager or the local fire management organization.
14. Determine when the prescribed fire is not within prescription parameters (both short and long term) or is not meeting objectives.
15. Declare an escaped prescribed fire a wildfire (if responsibility is assigned in the plan).
16. Manage the incident or oversee the transition to another Incident Commander if an escape occurs.
17. Ensure that reports are completed.
18. Coordinate with adjacent landowners, cooperators and permittees as designated in the Prescribed Fire Plan.

Fire Management Officer (FMO)/ Fire Program Manager

The Fire Management Officer (FMO)/Fire Program Manager is responsible to the Agency Administrator for planning, implementing and monitoring of the Prescribed Fire Program in accordance with policy and direction.

The FMO/Fire Program Manager is responsible to:

1. Ensure compliance with National, Regional, tribal and local fire policy and direction, as well as applicable state and local laws.
2. Ensure that Preparedness Level Restrictions are adhered to. At National Preparedness Levels Four and Five, prescribed fire implementation is restricted. See the National Interagency Mobilization Guide for details.
3. Ensure that both the Prescribed Fire Plan Preparer and the Technical Reviewer are qualified or qualified less currency at the level of complexity or higher.
4. Ensure that trained and qualified personnel are available to participate in the Prescribed Fire Program.
5. Assign the Prescribed Fire Burn Boss.
6. Ensure a Prescribed Fire Plan with written approval exists for each prescribed fire project.
7. Review the Prescribed Fire Plan to assess the impact of the project on the unit's workload; include the project in the unit's Annual Work Plan; assess the unit's

ability to implement the project; and assess the need for additional implementation resources.

8. Ensure that all prescribed fires are conducted in accordance with the approved Prescribed Fire Plan and established standards and guidelines.
9. Declare an escaped prescribed fire a wildfire (if responsibility is assigned in the plan).
10. Act as liaison/coordinator to the Agency Administrator, Prescribed Fire Manager and/or Prescribed Fire Burn Boss, local dispatch office, other units, other agencies, air quality authorities, news media, transportation agencies, and safety officials.
11. Ensure that projects are reported through the local office and comply with national reporting guidelines.
12. Ensure that fuels management projects and interagency support actions are reported through the proper reporting systems.
13. Ensure that periodic reviews and inspections of the Prescribed Fire Program are completed.
14. Update Agency Administrator on the progress of the prescribed fire (as necessary).
15. Ensure that projects are monitored, evaluated and documented as a part of the project file.

Prescribed Fire Manager (RXM1/RXM2)

The Prescribed Fire Manager is responsible for implementing and coordinating assigned prescribed fire activities. A Prescribed Fire Manager may be assigned during periods when multiple simultaneous prescribed fires are being conducted; when multiple prescribed fires will be conducted within a short time frame; or where there is complex interagency involvement.

The Prescribed Fire Manager is responsible to:

1. Review Prescribed Fire Plans prior to implementation.
2. Monitor all prescribed fire operations.
3. Ensure that all operations are conducted in a safe manner and in accordance with the approved plan(s) and established standards and guidelines.
4. Act as coordinator/liaison between the burn organization(s) and other offices, agencies, air quality authorities, news media, transportation agencies, safety officials, and interested public.
5. Declare an escaped prescribed fire a wildfire (if responsibility is assigned in the plan).
6. Obtain and interpret long-term weather information.
7. Brief the Burn Bosses and direct operational assignments according to policies, priorities and standards.
8. Set priorities for allocation of resources.
9. Ensure the completion of all required documentation including the evaluation and documentation of accomplishments, fire behavior and fire effects, operation procedures, and cost summaries.

Firing Boss (FIRB)

The Firing Boss reports to the Prescribed Fire Burn Boss and is responsible for supervising and directing ground and/or aerial ignition operations according to established standards in the Prescribed Fire Plan.

The Firing Boss is responsible to:

1. Review the Prescribed Fire Plan and the burn unit prior to implementation.
2. Brief personnel on project objectives and ignition operations.
3. Complete the test fire according to the ignition plan at the direction of the Prescribed Fire Burn Boss.
4. Conduct ignition operations in a safe manner according to the ignition plan.
5. Identify the impacts of ignition on the control and desired fire effects.
6. Coordinate ignition operations with the Holding Specialist.

Holding Specialist

The supervisory position in charge of the holding forces reports to the Prescribed Fire Burn Boss. There is no specific NWCG approved prescribed fire position for this function. This position is assigned by name and title using PMS 310-1 mnemonics. Holding functions will be managed by personnel qualified at the appropriate Incident Command System (ICS) wildland fire operations standard and as required by the prescribed fire complexity, assigned resources, and operational span of control.

The Holding Specialist is responsible to:

1. Review the Prescribed Fire Plan and the burn unit prior to implementation.
2. Brief holding personnel on project objectives and holding operations.
3. Conduct holding operations in a safe manner according to the holding plan.
4. Coordinate holding operations with the Firing Boss.
5. Confine the fire to a predetermined area, mop up, and patrol.
6. Maintain communication with Burn Boss on holding progress and/or problems.

For some prescribed fires, there may be no holding requirements or the holding duties are assumed by the Prescribed Fire Burn Boss.

Fire Effects Monitor (FEMO)

The Fire Effects Monitor (FEMO) is responsible for collecting the onsite weather, fire behavior, and fire effects information needed to assess whether the fire is achieving established resource management objectives.

The FEMO is responsible to:

1. Review the monitoring plan prior to implementation.
2. Monitor, obtain, and record weather data.
3. Monitor and record fire behavior data throughout the burn operations.
4. Recon the burn unit/area assigned.
5. Plot the burn area and perimeter on a map.
6. Monitor and record smoke management information.
7. Monitor first order fire effects.
8. Provide monitoring summary of the fire.
9. Provide fire behavior and weather information to burn personnel as appropriate.

Helitorch Manager (HTMG)

The Helitorch Manager is responsible to manage the helitorch operation, supervise the mixing operation, and provide technical assistance to the Prescribed Fire Burn Boss/Ignition Specialist. The HTMG may also serve as Helicopter Manager and Helitorch Manager or Helicopter Parking Tender (but not both).

Plastic Sphere Dispenser Operator (PLDO)

The Plastic Sphere Dispenser Operator (PLDO) is responsible for the preparation, operation, maintenance, and care of the dispenser. The PLDO reports to the Ignition Specialist.

Helitorch Mixmaster (HTMM)

The Helitorch Mixmaster (HTMM) is responsible for supervising the mixing/filling operations. The HTMM may also serve as Helitorch Manager or Helicopter Manager.

Resource Specialist or Resource Advisor (READ)

The Resource Specialist/READ is responsible for ensuring the prescribed fire project is planned and implemented in a manner supporting the unit's resource management goals and objectives. The Resource Specialist/READ is responsible to the Agency Administrator.

The Resource Specialist/READ is responsible to:

1. Ensure resource management representation in the preparation of the Prescribed Fire Plan.
2. Ensure a review of Prescribed Fire Plans is conducted before each plan is submitted for approval.
3. Evaluate the prescribed fire project in terms of meeting objectives..
4. Provide resource information and direction to the Prescribed Fire Burn Boss.

5. Present information at briefings on resources, priorities, and issues of concern.
6. Coordinate with adjacent landowners, cooperators and permittees as designated in Prescribed Fire plan or by Burn Boss.

Amendments

There may be a need to make amendments to the Prescribed Fire Plan. These are changes to the Prescribed Fire Plan that require Agency Administrator signature. When changes are necessary, plans must be amended to identify the affected sections; the reason for the change(s); and have the changes clearly identified. For amendments, the same standards for Prescribed Fire Plan preparation, review, and approval apply.

Common reasons for amending the Prescribed Fire Plan may include:

- Changes to objectives.
- Changes to complexity.
- Changes to fire behavior prescription parameters.
- Changes to project area boundaries resulting in either an increase or decrease in area.
- Reduction in resource capabilities identified as required in the plan.
- Major changes to ignition methods including ground ignition to aerial ignition; aerial ignition to hand ignition; hand drip torch ignition to use of terra torch ignition (includes ATV mounted ignition devices); and/or hand ignition from roadways to hand ignition from boats or other watercraft.

To avoid having to amend the Prescribed Fire Plan, flexibility should be built into the plan that will allow for a range of adjustments during the prescribed fire. When building flexibility, the range of identified options must remain within the scope of the Complexity Analysis.

Examples of flexibility that can be built into a prescribed fire plan:

- The Prescribed Fire Plan may state that on burn day and subsequent days of the prescribed fire, a mix of the number and kinds of hand crews and engines may be modified as long as stated production capabilities are not compromised.
- As the prescribed fire progresses from ignition to holding to mop up and patrol, specified capabilities and/or types of resources may be adjusted. If these flexibilities are built into the Prescribed Fire Plan, there must be a clear statement as to the work capability requirements of the resources at the various stages of the prescribed fire.
- Minor changes in burn unit boundaries to facilitate holding and/or ignition, as long as the area in question has been in the NEPA document, requires no change in holding or ignition resources and is within the project boundaries.
- Additional resources may be assigned to the project without amending the burn plan if the addition of these resources does not change the complexity of the burn or require additional supervisory positions. These changes must be documented in the daily briefing.

Safety

The Federal Wildland Fire Policy states that firefighter and public safety is first priority. Prescribed Fire Plans and activities must reflect this commitment. Every person involved in a prescribed fire is responsible for identifying safety issues and concerns. It is the responsibility of each individual participating in prescribed fire activities to notify immediate supervisor of any possible misunderstanding of assigned tasks or safety concerns related to the assignment.

NWCG established Work/Rest Guidelines and span of control apply equally to wildland and prescribed fire operations. The management of crew, overhead, and support personnel rest to assure safe, productive fire operations is the responsibility of all supervisory fire management personnel (refer to *NWCG Interagency Incident Business Management Handbook*, PMS 902, NFES 3139).

Exposure to smoke during prescribed fire operations can be a significant safety concern. Research has shown that exposure to smoke on prescribed fires, especially in holding and ignition positions, often exceeds that on wildfire. At a minimum, smoke exposure must be addressed in the Job Hazard Analysis (JHA) and smoke management element. Public safety impacts from smoke should be addressed in the Smoke Management and Air Quality Element as well as the Public, Personnel Safety, Medical Element.

Transportation and use of any product containing chemicals (drip torch fuel, aviation gas, sphere dispensers, fusees, fuel thickener, etc.) must be in compliance with the Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard (29 CFR 1910.1200) and Department of Transportation Regulations (49 CFR Part 171), and agency specific guidance. Material Safety Data Sheets (MSDS) for hazardous materials used on projects should be consulted in developing the JHA.

The SAFENET form and process is designed for reporting and correcting unsafe situations and is applicable to prescribed fire applications.

The risk management process identified in the NWCG Incident Response Pocket Guide (IRPG, PMS 410-1) helps ensure that critical factors and risks associated with prescribed fire operations are considered during decision making. This process should be applied to all prescribed fire planning and operations.

Consider using a Safety Officer on high complexity prescribed fires and others where the complexity analysis shows the need or indicates a higher than normal hazard.

A qualified Safety Officer is defined as a currently qualified Safety Officer, at any Type level (Types 1, 2 or 3), as defined by the NWCG, *Wildland and Prescribed Fire Qualification System Guide* (PMS 310-1).

Prescribed Fire Plan

The Prescribed Fire Plan is the site-specific implementation document. It is a legal document that provides the Agency Administrator the information needed to approve the plan and the Prescribed Fire Burn Boss with all the information needed to implement the prescribed fire. Prescribed fire projects must be implemented in compliance with the written plan.

Prescribed Fire Plans will vary in their degree of detail. The size and complexity of the prescribed fire project will determine the level of detail required. The Prescribed Fire Plan Template (Appendix B) must be utilized. Each element must be addressed and then assembled in the sequence identified in the template. Should an element not apply to a specific prescribed fire plan, not applicable (N/A) may be utilized. Programmatic plans for multiple units under like conditions may be appropriate. Additional information may be added as appendices.

If an interagency mixed ownership Prescribed Fire Plan is being prepared, the development of all appropriate elements within the plan will be conducted in an interagency setting. Interagency agreements and Memorandums of Understanding (MOU) and/or private land owner agreements are required to implement prescribed fire on multiple ownerships.

Listed below are the planning explanations of each individual element required as part of a complete Prescribed Fire Plan and implementation policy related to the element.

Element 1. Signature Page

The following information must be included on the signature page:

1. Administrative unit name.
2. Prescribed Fire Unit (burn unit)/Project name.
3. At a minimum, three dated signatures are required: a Prescribed Fire Plan Preparer, a Technical Reviewer, and an Agency Administrator. Additional signatures may be included as required by the individual unit.
4. Final determined complexity rating(s).
5. If the plan needs to be amended, the signed and dated amendments must be attached to the Prescribed Fire Plan (see Chapter 4).

Element 2. GO/NO-GO Checklists

Agency Administrator Pre-Ignition Approval Checklist

The Agency Administrator's Pre-Ignition Approval Checklist (Burn Plan Template, Appendix B) is required to be completed. The Agency Administrator's Pre-Ignition Approval Checklist evaluates whether compliance requirements, Prescribed Fire Plan's elements, and internal and external notification(s) have been completed and expresses the Agency Administrator's intent to implement the Prescribed Fire Plan. The checklist establishes the expiration date for the implementation of the Prescribed Fire Plan. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval is required. An 'acting' Agency Administrator may sign the Agency Administrator Pre-Ignition Approval Checklist if authority to do so has been delegated. If the Prescribed Fire Plan is amended, a review and re-validation of the Agency Administrator Pre-Ignition Approval Checklist would be required and included in the Project File.

Prescribed Fire GO/NO-GO Checklist

Prior to all ignition operations, the assigned Prescribed Fire Burn Boss will complete and sign the Prescribed Fire GO/NO-GO Checklist (Burn Plan Template, Appendix B). This checklist is a minimum standard and agencies may elect to add questions and/or approval signatures. For each day of active ignition on a prescribed fire, a separate daily GO/NO-GO Checklist is required.

Element 3. Complexity Analysis

Risk management is a foundation for all prescribed fire activities. Risks and uncertainties

relating to prescribed fire activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity. At a minimum, those risks from the Complexity Analysis that are rated high and can not be mitigated will be identified with a discussion of the risks associated in the Summary Complexity Rating Rationale. This discussion will also be included in the Complexity Analysis Summary page (Burn Plan Template, Appendix B).

The Prescribed Fire Complexity Rating must be completed utilizing the Prescribed Fire Complexity Rating System Guide, NWCG, January, 2004 (or current version).

The purpose of the complexity rating process is to provide:

- Assignment of a complexity rating of high, moderate, or low to the prescribed fire.
- Management and implementation personnel a relative ranking as to the overall complexity of a specific prescribed fire project.
- A process that can be used to identify Prescribed Fire Plan elements or characteristics that may pose special problems or concerns.
- A process that identifies mitigation activities needed to reduce the risk/hazard to the implementation personnel and public as well as mitigating potential resource damage.

A preliminary rating will be completed early in the Prescribed Fire Plan development stage. This will identify potential concerns that may be mitigated during the plan preparation process. Once the Prescribed Fire Plan is near completion, the final complexity rating is made. The final complexity rating will be used as a basis for determining prescribed fire organization, Prescribed Fire Burn Boss level, and mitigation measures.

The Summary Complexity Rating Rationale will clearly justify the summary rating for prescribed fire organization and Prescribed Fire Burn Boss level. It must also identify those risks from the Complexity Analysis that are rated high and can not be mitigated and will provide a discussion of the risks associated. The Complexity Analysis must be signed by the Prescribed Fire Plan Preparer and the Agency Administrator and attached as an appendix to the Prescribed Fire Plan. The Complexity Analysis Summary will be attached to the Prescribed Fire Plan following the GO/NO-GO Checklists.

Separate prescriptions and/or burn organizations for different stages of implementation may result in multiple Complexity Analyses and ratings. For example, a plan may have separate prescriptions for spring and fall burning which may require different organizations and constitute the need for additional complexity analyses.

If a prescribed fire complexity changes which results in different Prescribed Fire Burn Boss qualifications, a separate complexity analysis is required. For example, for certain prescribed fires conducted over time, progressive or sequential actions may reduce complexity, organization and Prescribed Fire Burn Boss qualifications. (e.g. a large scale, high complexity prescribed fire has been black-lined, portions burned and operations suspended for a period of time then resumed to continue or finish the prescribed fire). In this case, a separate Complexity Analysis will be developed to reflect the reduced complexity rating and will be included in the appendix of the Prescribed Fire Plan.

Element 4. Description of the Prescribed Fire Area

A. Physical Description

This section of the plan will describe the physical features of the prescribed fire area.

- Location: Narrative description of the location of the prescribed fire project including a legal description, UTM and/or latitude/longitude (decimal degrees; NAD83 preferred), county, and state.
- Size: Area, in acres, of the prescribed fire project with a breakdown by prescribed fire unit and/or ownership if applicable.

- Topography: Identify the upper and lower range of elevation, slope(s) –maximum/minimum and average, and aspect(s) of the prescribed fire project.

- Project Boundary: **The project boundary defines that area where fire will be ignited and may be allowed to burn (some agencies previously called this Maximum Management Area or Allowable Area).** Describe the physical, natural and/or human made boundaries (including multiple units) of the prescribed fire project. This will be done through maps and may include narratives. The entire prescribed fire project area must be analyzed under NEPA.

B. Vegetation/Fuels Description

This is a description of current vegetation and fuels in the project area and should discuss history including past environmental effects or land management practices and how they have impacted the fuel characteristics. Identify any reference material used.

- Describe the structure and composition of the vegetation type(s) and fuel characteristics. This description may include natural or activity fuels, total fuel load (both live and dead) in tons/acre, dead fuel load by time-lag size classes, live fuel load (woody/herbaceous), fuel bed depth, and vertical and horizontal arrangement within the project boundary.

- Describe the percent of the unit composed of each vegetative type and the corresponding fuel model(s).

- Identify conditions (fuels, slope, and aspect) in and adjacent to boundaries that may be a potential threat for escaped fire.

- Identify any abiotic conditions like airshed, climate, soils, etc. as appropriate.

C. Description of Unique Features and Resources:

List and discuss special features, hazards, regulations, issues, constraints, etc. Examples may include: fences to protect, power poles, historical/cultural sites, threatened and endangered species or habitat, etc.

D. Maps:

Maps will be developed and included in the Prescribed Fire Plan. At a minimum, the plan will include a vicinity and project map. The number of maps, map size and scale, legend and level of detail should be appropriate for the complexity of the project. All maps will include the standard mapping elements: title, name of preparer(s), date, north arrow, scale, and legend.

- Vicinity Map: Shows prominent features including roads, streams, water sources, towns, structures, and the proximity of the burn unit(s) to these features. Transportation route(s) will be identified. Map scale will be such that the burn units can be located on the ground and in sufficient detail to guide implementation.

- Project Map(s): The project map(s) identify features in sufficient detail to guide and assist in operational implementation of the prescribed fire. Topographic, vegetative, or aerial photo maps should be used as the base map. ICS map display symbols, identified in the Fireline Handbook PMS 410-1 will be used as appropriate. Examples of features that should be included on the project map(s) are: project boundary, individual unit boundaries, ownership, fireline locations, natural barriers, fuel model locations, proposed ignition patterns and sequence, critical holding points, hazards, safety

zones, escape routes, helispots, areas of special concern, smoke management issues (predicted plume dispersion, sensitive receptors, etc), escaped fire contingency actions (primary and secondary control lines, trigger points, etc), water sources, location of treatment monitoring plots, etc. if these are significant in communicating project implementation.

Element 5. Goals and Objectives

A short summary description will be developed that identifies the purpose of the prescribed fire and the resource management goals from the supporting L/RMPs and/or NEPA documents. The summary will identify desired future conditions of the prescribed fire project. This should be consistent with the appropriate land management goals. Include a discussion of future Fire Regime Condition Class (FRCC) post-treatment conditions if applicable.

Describe in clear, concise statements the specific measurable resource and fire objectives for this prescribed fire. Objectives will be measurable and quantifiable so prescription elements can be developed to meet those objectives and the success of the project can be determined following implementation.

Element 6. Funding

Identify the funding source(s) and estimated cost(s) of the prescribed fire. Itemize by phase if desired.

Element 7. Prescription

Prescription is defined as the measurable criteria that define a range of conditions during which a prescribed fire may be ignited and held as a prescribed fire.

The plan prescription will describe a range of low to high limits for the environmental (weather, topography, fuels, etc.) and fire behavior (flame lengths, rate of spread, spotting distance, etc.) parameters required to meet Prescribed Fire Plan objectives while meeting smoke management and control objectives.

Parameters are quantitative variables expressed as a range that result in acceptable fire behavior and smoke management.

The range of prescribed fire behavior characteristics (outputs such as: flame lengths, rates of spread, scorch heights, mortality, spotting, etc.) identified in the plan will help determine the acceptable combination of environmental parameters (inputs such as: weather, topography and fuels) under which the prescribed fire can be conducted. In many cases, burning under the extremes of all prescriptive parameters would not meet or possibly exceed the desired prescribed fire behavior characteristics and are therefore out of prescription. The Prescribed Fire Burn Boss must ensure that the prescriptive parameters and fire behavior characteristics as identified in the Prescribed Fire Plan are not exceeded. Empirical evidence (historical evidence or researched data) and judgment may be utilized to identify or calibrate prescriptions. Weaknesses in modeling can be overridden, but must be justified with empirical evidence and/or verified actual fire behavior.

Separate prescriptions may be needed for multiple fuel model conditions to address seasonal differences and/or types of ignition (black lining, aerial ignition, etc). Separate prescriptions may result in multiple complexity ratings and burn organizations. For example, a separate prescription is needed for black-lining operations if conditions will be significantly different from the primary prescription or if the holding resources differ from those identified for ignition and holding phases. Separate prescriptions may result in the need to identify multiple levels of management, organizational structures, implementation measures, and pre-burn considerations.

Holding and contingency plans must be developed with the consideration of the predicted fire behavior outside the project boundary(s). Fire behavior characteristics for fuel models within the maximum spotting distance and/or adjacent to the project boundaries must be considered and modeled using worst-case fire behavior predictions. These predictions will be identified from fire behavior model runs or empirical evidence of the hottest, driest, and windiest prescription limits identified in the Prescribed Fire Plan, along with the most

extreme environmental conditions (slope, aspect) identified.

A short fire behavior narrative that summarizes the fire behavior identified in the prescription and discusses how it will achieve the desired treatment objectives may be included.

When used, fire behavior calculations must be developed using an appropriate fire behavior modeling program. Include modeling and/or empirical evidence documentation as an appendix or in the fire behavior narrative.

Element 8. Scheduling

Identify the general ignition time frame(s) (i.e. time of day, duration of ignition) or season(s) and note any dates when the project may not be conducted. For prescribed fires with multiple ignitions or burn days, list projected duration.

At National Preparedness Levels Four and Five, prescribed fire implementation is restricted. See National Interagency Mobilization Guide for details.

Element 9. Pre-burn Considerations

Describe on and off-site actions and considerations that need to be conducted prior to implementation. Examples include clearances; line to be built; preparation of critical holding points; snags to be felled or protected; equipment to be pre-positioned; special features to be protected; warning signs to be placed; weather recording; fuels condition sampling; monitoring needs; responsibility; and timeframes.

Describe any fuel sampling and weather data that may need to be obtained (See Element 14: Test Fire). This data should be taken at the project site. If this is not possible, use the closest representative site.

The plan will include a list of organizations (including media) and individuals that are to be notified prior to ignition, with information necessary to make the contacts. Reasonable efforts will be made to notify adjacent land owners (or their agents) and other potentially impacted publics. Attempts and/or actual notifications will be documented with date and method and placed in the Project File.

Identify in the burn plan the method and frequency for obtaining weather and smoke management forecast(s).

Spot weather or local area forecasts are required prior to ignition, on all ignition days and any days the fire is actively spreading. A copy of the forecast will be included in the Project File. The Prescribed Fire Burn Boss or other person in charge of mop-up and patrol will also obtain and review the spot weather or area forecast to determine if mop up and patrol resources are adequate.

Element 10. Briefing

All assigned personnel must be briefed at the beginning of each operational period to ensure personnel safety considerations (including the JHA) and prescribed fire objectives and operations are clearly defined and understood. Briefing checklists are required to be included in the Prescribed Fire Plan and will include the following elements:

- Burn Organization and Assignments
- Burn Objectives and Prescription
- Description of the Prescribed Fire Area
- Expected Weather & Fire Behavior
- Communications
- Ignition Plan
- Holding Plan
- Contingency Plan and Assignments
- Wildfire Conversion
- Safety and Medical Plan

The briefing checklist should list briefing topics only, not re-state what is listed in the Prescribed Fire Plan for that element.

The Prescribed Fire Burn Boss will ensure that any new personnel arriving to the prescribed fire receives a briefing prior to assignment.

An Incident Action Plan (IAP) is optional, it is recommended for large multi-day or high complexity prescribed fires.

If aerial ignition devices will be used, include an Aerial Ignition briefing.

Element 11. Organization & Equipment

The complexity of each prescribed fire determines the organization capabilities needed to safely achieve the objectives specified in the Prescribed Fire Plan. Specify the minimum required implementation organization to meet the capabilities (line production rates, etc.) by position, equipment, and the supplies needed for all phases of the prescribed fire until declared out. At a minimum, a Prescribed Fire Burn Boss will be assigned to every prescribed fire. Positions that may not be filled as collateral duty will be identified in the organization chart of the Prescribed Fire Plan.

Standard ICS fire management principles for span of control and length of assignments will be adhered to when developing burn implementation organization(s) and used in managing prescribed fires. On prescribed fires with large organizations, use the ICS organization and staffing commensurate with the level of complexity. Consider the use of a Prescribed Fire Manager in conducting multiple prescribed fires.

Before implementation (all phases) of the prescribed fire, documentation in the form of an organization chart must be completed. Any changes to the organization during implementation must be documented. Any changes that reflect modification of the capabilities, equipment or supplies will require an amendment. Different organizations may be identified for different phases of implementation (i.e. holding v. mop-up and patrol, different ignition operations, different prescriptions).

Multiple prescriptions for one Prescribed Fire Plan are permissible and in some cases required (Element 7). Multiple prescriptions may require identifying and developing multiple organizations.

The Prescribed Fire Burn Boss is responsible for implementation including mop-up and patrol until the responsibility is formally passed to a Prescribed Fire Burn Boss, Prescribed Fire Manager or the local fire management organization.

Element 12. Communication

Develop communications plan specific to the project's implementation to address safety and tactical resource management needs. Identify and assign command, tactical, and air operations frequencies as needed. Also include any required telephone numbers. Cover under an Incident Action Plan, if utilized.

Element 13. Public & Personnel Safety, Medical

Describe provisions to be made for public and personnel safety. All personnel who are within the active burn area are required to wear personal protective equipment. Identify and analyze the safety hazards unique to the individual prescribed fire project and specify personnel safety and emergency procedures. Include safety hazards (including smoke exposure and impacts) and measures taken to reduce those hazards. Specify emergency medical procedures, evacuation methods, and emergency facilities to be used. A Job Hazard Analysis (JHA) is required for each prescribed fire project and will be attached to the Prescribed Fire Plan as an appendix.

Element 14. Test Fire

Provisions for a test fire are required and results must be recorded. The test fire must be ignited in a representative location and in an area that can be easily controlled. The purpose of the test fire is to verify that the prescribed fire behavior characteristics will meet management objectives and to verify predicted smoke dispersion. In many applications, analysis of the initial ignitions may provide adequate test fire results. On multiple-day projects, evaluation of current active fire behavior, in lieu of a test fire, may provide a comparative basis for continuing and must be documented. If in doubt however, initiate a separate test fire and evaluate results.

Prior to ignition of both the test fire and ignition operations, compare the Prescribed Fire Plan prescription elements, both individually and collectively, against local area or spot weather forecasts, other predicted conditions, and the actual conditions onsite (See element 9: Pre-Burn Considerations) to ensure that predicted

fire behavior will take place and/or weather parameters will not change to the point of the burn going out of prescription.

Element 15. Ignition Plan

Describe planned ignition operations including firing methods, devices, techniques, sequences, patterns, and ignition staffing for single or multiple unit operations. Maps showing proposed firing patterns may be included. If aerial ignition (or other aerial operations) is planned, cover aviation operations, organization, and safety within the Prescribed Fire Plan, Aerial Ignition Plan, or in an agency specific Aviation Operating Plan (Refer to the Interagency Helicopter Operations Guide, {NFES #1885} and the Interagency Aerial Ignition Guide {NFES #1080}for more detailed information on this topic). Multiple prescriptions and ignition operations (blackline, primary, aerial, etc.) may require identifying and developing multiple ignition organizations.

Element 16. Holding Plan

Describe general procedures to be used for operations to maintain the fire within the project area and meet project objectives until the fire is declared out. This may include mop-up and/or patrol procedures. Describe critical holding points (if any) and mitigation actions. Critical holding points will be identified on the project map. Describe minimum capabilities needed for all phases of implementation (see Element 11: Organization and Equipment). If used, attach or reference modeling outputs or worksheets (i.e. Fireline Handbook production rates, BEHAVE, etc.) and/or documented empirical evidence to justify minimum holding resources required.

Different organizations may be identified for different phases of implementation (i.e. holding v. mop-up and patrol, different ignition operations, different prescriptions). Multiple prescriptions may require identifying multiple complexity ratings and developing multiple holding organizations.

If onsite resources are insufficient to meet the prescribed fire plan objectives, then the Burn Boss should implement the Contingency Plan or Wildfire Conversion.

Element 17. Contingency Plan

"...If the objectives are not being met the Contingency Plan, a required component of the Prescribed Fire Burn Plan, is implemented. If the Contingency Plan is successful at bringing the project back within the scope of the Prescribed Fire Burn Plan the project continues. If contingency objectives are not met the prescribed fire is converted to a wildfire and Extended Attack is undertaken."

Interagency Strategy for the Implementation of Federal Wildland Fire Management Policy, June 20, 2003, page 12.

Contingency planning is intended for more than just a response to an escaped fire. The contingency plan is the portion of the Prescribed Fire Plan that considers possible but unlikely events and the contingency resources and actions needed to mitigate those events.

Contingency planning is the determination of initial actions and additional resources needed if the prescribed fire is not meeting, exceeds, or threatens to exceed:

- Project or unit boundary
- Objectives
- Prescription parameters
- Minimum implementation organization
- Smoke impacts
- Other Prescribed Fire Plan elements

The contingency plan will establish trigger points or limits that indicate when additional holding resources and actions are needed.

Contingency planning includes the additional resources required, and the maximum acceptable response time for those resources. Resource needs should be based on fire behavior outputs tied to the worst case fire behavior scenario (as modeled in Element 7: Prescription). Separate contingency plans may be necessary and appropriate to address seasonal differences, types of ignitions or phases of the burn implementation as described in the prescriptions and ignition and holding plans developed for the burn.

Verify and document availability of identified contingency resources and response time on day of implementation. If contingency resources availability falls below plan levels, actions must be taken to secure operations until identified contingency resources are replaced.

The same contingency resource can be identified for multiple prescribed fire projects. When specific contingency resources are identified for more than one prescribed fire, the local fire management organization(s) must evaluate and document adequacy of all contingency resources within the area. This evaluation must consider:

- Local, current, and predicted fire danger
- Local and regional wildland fire activities.

Once a contingency resource is committed to a specific wildland fire action (wildfire, wildland fire use or prescribed fire), it can no longer be considered a contingency resource for another prescribed fire project and a suitable replacement contingency resource must be identified or the ignition halted.

The Agency Administrator will determine if and when they are to be notified that contingency actions are being taken.

If the contingency actions are successful at bringing the project back within the scope of the Prescribed Fire Plan, the project may continue. If contingency actions are not successful by the end of the next burning period, then the prescribed fire will be converted to a wildfire.

Element 18. Wildfire Conversion

The Prescribed Fire Plan will specify who has the authority to declare a wildfire. A prescribed fire must be declared a wildfire by those identified in the plan when that person(s) determines that the contingency actions have failed or are likely to fail and cannot be mitigated by the end of the next burning period by on-site holding forces and any listed contingency resources. In addition, an escaped prescribed fire must be declared a wildfire when the fire has spread outside the project boundary, or is likely to do so, and cannot be contained by the end of the next burning period. A prescribed fire can be converted to a wildfire for reasons other than an escape.

Describe the actions to be taken when a prescribed fire is declared a wildfire (refer to Wildland Fire and Aviation Program Management and Operations Guide {BIA--Blue Book} and Interagency Standards for Fire and Aviation {Red Book}). Description will include:

- Wildfire declaration (by whom)
- IC assignment
- Notifications: dispatch, Agency Administrator, adjacent land owners, etc.
- Extended attack actions and opportunities to aid in suppression efforts.

After a wildfire declaration, an escaped prescribed fire cannot be returned to prescribed fire status. A WFSA will define appropriate future management actions.

Element 19. Smoke Management & Air Quality

Describe how the project will comply with local community, County, State, Tribal, and Federal air quality regulations. Identify what permits, if any, need to be obtained. Identify smoke sensitive areas including population centers, recreation areas, hospitals, airports, transportation corridors, schools, non-attainment areas, Class I air sheds, and restricted areas that may be impacted. Include modeling outputs and mitigation strategies and techniques to reduce the impacts of smoke production, if required by State Implementation Plans (SIPs) and/or State or local regulations. Reference the Smoke Management Guide for Prescribed and Wildland Fire 2001 Edition for other smoke management planning suggestions and smoke management techniques for reducing or redistributing emissions.

Special considerations must be taken to address smoke when the project is in a non-attainment area for a National Ambient Air Quality Standards including insuring compliance with SIP/TIP provisions and addressing Conformity. Projects which will potentially impact Class I areas should address any efforts to minimize smoke impacts on visibility. Comply with all local, State, Tribal and Federal pre-burn and post-burn data reporting requirements.

Element 20. Monitoring

Prescribed fire monitoring is defined as the collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a management objective. Describe the monitoring that will be required to ensure that Prescribed Fire Plan objectives are met. For the prescribed fire, at a minimum specify the weather, fire behavior and fuels information (forecast and observed) and smoke dispersal monitoring required during all phases of the project and the procedures for acquiring it, including who and when.

Element 21. Post-burn Activities

Describe the post-burn activities that must be completed. This may include post-burn report, safety mitigation measures, and rehabilitation needs including those as a result of pre-burn activities undertaken.

Appendices.

Include all the required appendices.

A. Maps

B. Technical Review Checklist

C. Complexity Analysis

D. Job Hazard Analysis

E. Fire Behavior Modeling Documentation or Empirical Documentation

Project File

All prescribed fire Project Files will contain the following information. Agencies and/or administrative units may require additional information.

1. Prescribed Fire Plan
2. Monitoring data including weather, fire behavior, fire effects and smoke dispersal observations
3. Weather forecasts
4. Notifications
5. Documented prescribed fire organization(s)
6. Any agreements related to implementation
7. Multiple day GO/NO-GO checklist(s), if applicable
8. Re-validation of the Agency Administrator Pre-Ignition Approval checklist

Depending on the scope and complexity of the prescribed fire, optional information and/or further documentation that may be included in the Project File include:

1. After Action Review (see Chapter 8)
2. Incident Action Plans, Unit Logs
3. Press releases, etc
4. Implementation costs
5. Actual ignition patterns and sequences used
6. Smoke management information
7. Agency individual fire occurrence form
8. Detailed Post Burn Report
9. NEPA documentation
10. Permits

Reviews

After Action Review (AAR)

Each operational shift on a prescribed fire should have an informal After Action Review (AAR). Certain events or a culmination of events that may affect future prescribed fire implementation and/or policy should be submitted via the Roll-up documentation (Found at http://www.wildfirelessons.net). The questions to answer in conducting an AAR are:

1. What did we set out to do (what was planned)?
2. What actually happened?
3. Why did it happen that way?
4. What should be sustained? What can be improved?

Escaped Fire Reviews

The Agency Administrator will be notified of an escaped fire. The Agency Administrator is required to make the proper notifications. All prescribed fires declared a wildfire will have an investigative review initiated by the Agency Administrator. The level and scope of the review will be determined by policy and procedures in Wildland Fire and Aviation Program Management and Operations Guide (BIA--Blue Book) or Interagency Standards for Fire and Aviation (Red Book).

The goal of the escaped prescribed fire review process is to guide future program actions by minimizing future resource damage and/or preventing future escapes from occurring by gathering knowledge and insight for incorporation into future resource management and prescribed fire planning. The objectives of the review are to:

- Determine if the Prescribed Fire Plan was adequate for the project and complied with policy and guidance related to prescribe fire planning and implementation.
- Determine if the prescription, actions, and procedures set forth in the Prescribed Fire Plan were followed.
- Describe and document factual information pertaining to the review.
- Determine if overall policy, guidance, and procedures relating to prescribed fire operations are adequate.
- Determine the level of awareness and the understanding of the personnel involved, in regard to procedures and guidance.

At a minimum, the escaped fire review report will include the following elements:

1. An analysis of seasonal severity, weather events, and on-site conditions leading up to the wildfire declaration.
2. An analysis of the actions taken leading up to the wildfire declaration for consistency with the Prescribed Fire Plan.
3. An analysis of the Prescribed Fire Plan for consistency with policy.
4. An analysis of the prescribed fire prescription and associated environmental parameters.
5. A review of the approving line officer's qualifications, experience, and involvement.
6. A review of the qualifications and experience of key personnel involved.
7. A summary of causal agents contributing to the wildfire declaration.

Document the incident, including all actions prior to and after the escape. Set up a file that includes all pertinent information, i.e., the Prescribed Fire Plan; a chronology of events including the prescribed fire report; unit logs and individual statements; weather forecasts including any spot forecasts; weather information taken on site and Remote Automated Weather Station (RAWS) and National Fire Danger Rating System (NFDRS) data for the day of the escape from the nearest station(s); photos; and all other pertinent information. Since all prescribed fires are planned management actions, an escape may lead to a Tort Claim and liability issues. Special attention to documentation is critical.

An independent review team is recommended for conducting escaped fire reviews. The number of individuals assigned to the team and their functional expertise should be commensurate with the scope and focus of the review. Interagency participation is highly recommended for all prescribed fire reviews.

References

NWCG Glossary of Wildland Fire Terminology PMS 205

Additional definitions found in the NWCG glossary of Project Management Terms (http://www.nwcg.gov/teams/pmo/products/glossaries.htm)

National Fire & Aviation Executive Board, Federal Fire Policy Directives Task Group – Common Policy Language, November 19, 2004

Interagency Strategy for the Implementation of Federal Wildland Fire Management policy, September 7, 2004

Smoke Management Guide for Prescribed and Wildland Fire 2001 Edition, December 2001

Restoring Fire Adapted Ecosystems on federal Lands - A Cohesive Fuel Treatment Strategy for Protecting People and Sustaining Natural resources. August 2, 2002

10-Year Comprehensive Strategy Implementation Plan, May 2002

Prescribed Fire Complexity Rating System Guide PMS 424, January 2002

Review and Update of the 1995 Federal Wildland Fire Management Policy, January 2001.

Cerro Grande Prescribed Fire Investigative Report - National Park Service, May 18, 2000

Sawtooth Mountain Prescribed Fire Burnover Fatality - Bureau of Indian Affairs Fort Apache Agency, Arizona May 14, 2003

Lowden Ranch Prescribed Fire Review Final Report - Bureau of Land Management, July 22, 1999

Wildland and Prescribed Fire Qualifications System Guide PMS 310-1 January 2002

Appendix A: Laws and Authorities

Organic Administration Act of June 4, 1897 (16 U. S. C. 551

Weeks Law, Act of March 1, 1911 (16 U. S. C. 563)

National Park Service Act of 1916 as amended (67 Stat. 495; 16 U.S.C. 1 et seq.)

Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C. 594)

Clark-McNary Act of 1928 (45 Stat. 221; 16 U. S. C. 487)

McSweeney-McNary Act of 1928 (45 Stat. 221; 16 U.S.C. 487)

Economy Act of June 30, 1932 (47 Stat. 417; 31 U.S.C. 1535)

Taylor Grazing Act of June 28, 1934 (48 Stat. 1269; 43 U.S.C. 315)

Oregon and California Act of August 28, 1937 (50 Stat. 875; 43 U.S.C. 1181e)

Bankhead-Jones Farm Tenant Act of July 22, 1937 (7 U. S. C. 1010 - 1011)

Federal Property and Administrative Service Act of 1949 (40 U.S.C. 471; et seq.)

Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66; 42 U.S.C. 1856a)

Clean Air Act of July 14, 1955, as amended (42 U. S. C. 7401 et seq.)

Multiple-Use Sustained Yield Act of 1960 (16 U. S. C. 528)

Wilderness Act of 1964 (16 U. S. C. 1131 - 1132)

National Wildlife Refuge System Administration Act of 1966 as amended (80 Stat. 927; 16 U.S.C. 668dd through 668ee)

National Environmental Policy Act of 1969 (42 U. S. C. 4321)

Alaska Native Claims Settlement Act of 1971 (85 Stat. 688; 43 U.S.C. 1601)

Endangered Species Act of 1973 (16 U. S. C. 1531 - 1544)

Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121)

Federal Fire Prevention and Control Act of 1974 (88 Stat. 1535; 15 U.S.C. 2201)

National Forest Management Act of 1976 (16 U. S. C. 1600 et seq.)

Federal Land Policy and Management Act of 1976 (90 Stat. 2743)

Federal Grant and Cooperative Agreement Act of 1977 (P.L. 950224, as amended by P.L. 97-258, September 13, 1982 (96 Stat. 1003; 31 U.S.C. 6301 thru 6308)

Alaska National Interest Lands Conservation Act of 1980 (94 Stat. 2371)

Supplemental Appropriation Act of September 10, 1982 (96 Stat. 837)

Wildfire Suppression Assistance Act of 1989 (P.L. 100-428, as amended by P.L. 101-11, April 7, 1989), 42 U. S. C. 1856

Indian Self-Determination and Education Assistance Act (PL 93-638) as amended

National Indian Forest Resources Management Act (P. L. 101-630 November 28, 1990)

Tribal Self-Governance Act of 1994 (P.L. 103-413)

Department of the Interior and Related Agencies Appropriations Act, Fiscal Year 1995 (P.L. 103-332)

National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57)

Federal Financial Assistance Management Act of 1999 (P.L. 106-107)

Healthy Forest Restoration Act of 2003 (P.L. 108-18, 117 Stat. 1887)

Tribal Forest Protection Act of 2004 (P.L. 108-287)

Department of the Interior, Departmental Manual; Part 620: Wildland Fire Management; Chapter 4: Fuels Management and Wildland-Urban Interface Community Assistance

Department of Agriculture, US Forest Service Manual; FSM 5100: Fire Management; Chapter 5140: Fire Use

National Historic Preservation Act (1966 as amended)

Appendix B: Prescribed Fire Plan Template

A standardized, reproducible template form for the Prescribed Fire Plan development process is included in this appendix. A standardized format is provided for the Prescribed Fire Plan in PDF. An electronic version editable in Word is also available. Users should prepare the plan using the electronic version.

In the electronic Word version, the Project Name and/or Unit Name should be entered in the document's header which will automatically appear on each following page of the plan.

To insert information into the document's header:

1. Double-click in the header region (upper region of each page displayed on the screen).
2. Type Project and/or Unit information.
3. Double-click *outside* the header region in the body of the document.

You may also access the header under **View > Headers and Footers**. This will open the header region for edits automatically. After entering the information, go again to **View > Headers and Footers** which will return you to being able to enter information into the body of the document.

PRESCRIBED FIRE PLAN

ADMINISTRATIVE UNIT(S): ____________________________________

PRESCRIBED FIRE NAME: ______________________________________

PREPARED BY: ____________________________ DATE: __________

Name & Qualification

TECHNICAL REVIEW BY: ______________________ DATE: __________

Name & Qualification

COMPLEXITY RATING: ________________

APPROVED BY: ____________________________ DATE: ___________

Agency Administrator

Project Name: ____________________

Unit Name: ____________________

ELEMENT 2: AGENCY ADMINISTRATOR PRE-IGNITION APPROVAL CHECKLIST

Instructions: The Agency Administrator's Pre-Ignition Approval is the intermediate planning review process (i.e. between the Prescribed Fire Complexity Rating System Guide and Go/No-Go Checklist) that should be completed before a prescribed fire can be implemented. The Agency Administrator's Pre-Ignition Approval evaluates whether compliance requirements, Prescribed Fire Plan elements, and internal and external notifications have been or will be completed and expresses the Agency Administrator's intent to implement the Prescribed Fire Plan. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

YES	NO	KEY ELEMENT QUESTIONS
		Is the Prescribed Fire Plan up to date? *Hints: amendments, seasonality.*
		Will all compliance requirements be completed? *Hints: cultural, threatened and endangered species, smoke management, NEPA.*
		Is risk management in place and the residual risk acceptable? *Hints: Prescribed Fire Complexity Rating Guide completed with rational and mitigation measures identified and documented?*
		Will all elements of the Prescribed Fire Plan be met? *Hints: Preparation work, mitigation, weather, organization, prescription, contingency resources*
		Will all internal and external notifications and media releases be completed? *Hints: Preparedness level restrictions*
		Will key agency staff be fully briefed and understand prescribed fire implementation?
		Are there any other extenuating circumstances that would preclude the successful implementation of the plan?
		Have you determined if and when you are to be notified that contingency actions are being taken? Will this be communicated to the Burn Boss?
		Other:

Recommended by: ______________________________ Date: __________
FMO/Prescribed Fire Burn Boss

Approved by: ______________________________ Date: __________
Agency Administrator

Approval expires (date): ______________________________

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 2: PRESCRIBED FIRE GO/NO-GO CHECKLIST

	YES	NO
A. Has the burn unit experienced unusual drought conditions or contain above normal fuel loadings which were not considered in the prescription development? If NO proceed with checklist., if YES go to item B.		
B. If YES have appropriate changes been made to the Ignition and Holding plan and the Mop Up and Patrol Plans? If YES proceed with checklist below, if NO STOP.		

YES	NO	QUESTIONS
		Are ALL fire prescription elements met?
		Are ALL smoke management specifications met?
		Has ALL required current and projected fire weather forecast been obtained and are they favorable?
		Are ALL planned operations personnel and equipment on-site, available, and operational?
		Has the availability of ALL contingency resources been checked, and are they available?
		Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?
		Have all the pre-burn considerations identified in the Prescribed Fire Plan been completed or addressed?
		Have ALL the required notifications been made?
		Are ALL permits and clearances obtained?
		In your opinion, can the burn be carried out according to the Prescribed Fire Plan and will it meet the planned objective?

If all the questions were answered "YES" proceed with a test fire. Document the current conditions, location, and results

______________________________ Burn Boss

______________________________ Date

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 3 COMPLEXITY ANALYSIS SUMMARY

PRESCRIBED FIRE NAME			
ELEMENT	**RISK**	**POTENTIAL CONSEQUENCE**	**TECHNICAL DIFFICULTY**
1. Potential for escape			
2. The number and dependence of activities			
3. Off-site Values			
4 On-Site Values			
5. Fire Behavior			
6. Management organization			
7. Public and political interest			
8. Fire Treatment objectives			
9 Constraints			
10 Safety			
11. Ignition procedures/ methods			
12. Interagency coordination			
13. Project logistics			
14 Smoke management			

COMPLEXITY RATING SUMMARY	
	OVERALL RATING
RISK	
CONSEQUENCES	
TECHNICAL DIFFICULTY	
SUMMARY COMPLEXITY DETERMINATION	
RATIONALE:	

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 4: DESCRIPTION OF PRESCRIBED FIRE AREA

A. Physical Description

1. Location:
2. Size:
3. Topography:
4. Project Boundary:

B. Vegetation/Fuels Description:

1. On-site fuels data
2. Adjacent fuels data

C. Description of Unique Features:

ELEMENT 5: GOALS AND OBJECTIVES

A. Goals:

B. Objectives:

1. Resource objectives:
2. Prescribed fire objectives:

ELEMENT 6: FUNDING:

A. Cost:

B. Funding source:

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 7: PRESCRIPTION

A. Environmental Prescription:

B. Fire Behavior Prescription:

ELEMENT 8: SCHEDULING

A. Ignition Time Frames/Season(s):

B. Projected Duration:

C. Constraints:

ELEMENT 9: PRE-BURN CONSIDERATIONS

A. Considerations:

1. On Site:

2. Off Site

B. Method and Frequency for Obtaining Weather and Smoke Management Forecast(s):

C. Notifications:

ELEMENT 10: BRIEFING

Briefing Checklist:

- ☐ Burn Organization
- ☐ Burn Objectives
- ☐ Description of Burn Area

Project Name: ______________________________

Unit Name: ______________________________

- ☐ Expected Weather & Fire Behavior
- ☐ Communications
- ☐ Ignition plan
- ☐ Holding Plan
- ☐ Contingency Plan
- ☐ Wildfire Conversion
- ☐ Safety

ELEMENT 11: ORGANIZATION AND EQUIPMENT

A. Positions:

B. Equipment:

C. Supplies:

ELEMENT 12: COMMUNICATION

A. Radio Frequencies

1. Command Frequency(s):
2. Tactical Frequency(s):
3. Air Operations Frequency(s):

B. Telephone Numbers:

ELEMENT 13: PUBLIC AND PERSONNEL SAFETY, MEDICAL

A. Safety Hazards:

Project Name: ______________________________

Unit Name: ______________________________

B. Measures Taken to Reduce the Hazards:

C. Emergency Medical Procedures:

D. Emergency Evacuation Methods:

E. Emergency facilities:

ELEMENT 14 TEST FIRE

A. Planned location:

B. Test Fire Documentation:

1. Weather conditions On-Site:
2. Test Fire Results:

ELEMENT 15: IGNITION PLAN

A. Firing Methods:

B. Devices:

C. Techniques:

D. Sequences:

E. Patterns:

F. Ignition Staffing:

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 16: HOLDING PLAN

A. General Procedures for Holding:

B. Critical Holding Points and Actions:

C. Minimum Organization or Capabilities Needed:

ELEMENT 17: CONTINGENCY PLAN

A. Trigger Points:

B. Actions Needed:

C. Additional Resources and Maximum Response Time(s):

ELEMENT 18: WILDFIRE CONVERSION

A. Wildfire Declared By:

B. IC Assignment:

C. Notifications:

D. Extended Attack Actions and Opportunities to Aid in Fire Suppression:

ELEMENT 19: SMOKE MANAGEMENT AND AIR QUALITY

A. Compliance:

Project Name: ______________________________

Unit Name: ______________________________

B. Permits to be Obtained:

C. Smoke Sensitive Areas:

D. Impacted Areas:

E. Mitigation Strategies and Techniques to Reduce Smoke Impacts:

ELEMENT 20: MONITORING

A. Fuels Information (forecast and observed) Required and Procedures:

B. Weather Monitoring Required and Procedures:

C. Fire Behavior Monitoring Required and Procedures:

D. Monitoring Required To Ensure That Prescribed Fire Plan Objectives Are Met:

E. Smoke Dispersal Monitoring Required and Procedures:

ELEMENT 21: POST-BURN ACTIVITIES

Post-burn Activities That Must be Completed:

Project Name: ______________________________

Unit Name: ______________________________

APPENDICES

A. Maps: Vicinity and Project
B. Technical Review Checklist
C. Complexity Analysis
D. Job Hazard Analysis
E. Fire Behavior Modeling Documentation or Empirical Documentation (unless it is included in the fire behavior narrative in Element 7; Prescription)

Project Name: ______________________________

Unit Name: ______________________________

A: MAPS

1. Vicinity Map:

Project Name: ______________________________

Unit Name: ______________________________

2. Project Map:

Project Name: ______________________________

Unit Name: ______________________________

C. TECHNICAL REVIEWER CHECKLIST

PRESCRIBED FIRE PLAN ELEMENTS:	S /U	COMMENTS
1. Signature page		
2. GO/NO-GO Checklists		
3. Complexity Analysis Summary		
4. Description of the Prescribed Fire Area		
5. Goals and Objectives		
6. Funding		
7. Prescription		
8. Scheduling		
9. Pre-burn Considerations		
10. Briefing		
11. Organization and Equipment		
12. Communication		
13. Public and Personnel Safety, Medical		
14. Test Fire		
15. Ignition Plan		
16. Holding Plan		
17. Contingency Plan		
18. Wildfire Conversion		
19. Smoke Management and Air Quality		
20. Monitoring		
21. Post-burn Activities		
Appendix A: Maps		
Appendix B: Complexity Analysis		
Appendix C: JHA		
Appendix D: Fire Prediction Modeling Runs		
Other		

S = Satisfactory **U = Unsatisfactory**

Recommended for Approval: **Not Recommended for Approval:**

______________________ ______________ ______________

Technical Reviewer Qualification and currency (Y/N) Date

☐ **Approval is recommended subject to the completion of all requirements listed in the comments section, or on the Prescribed Fire Plan.**

Project Name: ______________________________

Unit Name: ______________________________

C: COMPLEXITY ANALYSIS

Project Name: ______________________________

Unit Name: ______________________________

D. JOB HAZARD ANALYSIS

Project Name: ______________________________

Unit Name: ______________________________

E. FIRE BEHAVIOR MODELING DOCUMENTATION OR EMPIRICAL DOCUMENTATION

4.5 National Park Service Burn Plans

A. SIGNATURE PAGE

GEORGE WASHINGTON CARVER NATIONAL MONUMENT PRESCRIBED FIRE PLAN

UNIT NAME: UNITS 3, 4, 5, 6,

Prepared By: /s/Scott Bressler ____ Date: 03/22/06
RXB2

Reviewed By: /s/ Bobby Bloodworth ______ Date: 3/21/06
Fire Management Officer

______________________ Date: _______
Fire Program Coordinator (Dena Matteson)

______________________ Date: _______
Chief Ranger (Lana Henry)

______________________ Date: _______
Supervisory Facility Operations Specialist (Sue Reiss)

Regional Review By: /s/ Scott Beacham ______ Date: 4/10/05

Technical Review By: /s/ Eric Allen ____________ Date: 4/4/05
RXB2

Approved By: ______________________ Date: _______
Superintendent

TABLE OF CONTENTS

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APPENDECIES

1. Technical Reviewer Checklist and Comments
2. Reviewers' Comments
3. Maps
4. Risk Mitigation and Complexity Worksheets
5. Fire Modeling Outputs
6. Agency Administrator Go/No-Go Pre-ignition Approval
7. Prescribed Fire Operations Go/No-Go Checklist
8. IAP/Briefing Guide
9. Adequate Holding Resources Worksheet
10. Post-Project Analysis
11. Prescribed Fire Monitoring Form
12. Job Hazard Analysis
13. 5 Year Burn Schedule

B. EXECUTIVE SUMMARY

Tall grass prairies once covered more than 140 million acres of the United States, from Indiana to Kansas and from Canada to Texas. Nearly all of it is gone, plowed under for agriculture. Prairies respond to their environment, which includes soil type, water availability, and natural processes such as grazing and fire. Most ecologists agree that for the last 5,000 years, prairie vegetation would have mostly disappeared if it had not been for the burning of these grasslands. After climate it can be said that *fire* is the next most important determinant in the spread and maintenance of prairie grassland.

Remnants of these tall grass prairies can be found at George Washington Carver National Monument. With management ignited prescribed fire, these fragile ecosystems will be preserved for generations to come.

This plan encompasses all nine burn units in the park. All nine will not be burned in any one year. The five year burn schedule in the park's Fire Management Plan and the entry of individual burn units in NFPORS will dictate which units will get treated each year.

C. DESCRIPTION OF PRESCRIBED FIRE AREA

GENERAL AREA: **George Washington Carver National Monument/2 miles west of Diamond, MO.**

LOCATION:

1. Latitude N 36' 59' 17" (36.98836)
   Longitude W 94' 21' 22" (096.35480)

Fire Management Zone: Suppression (Tallgrass Prairie).

GEOGRAPHIC ATTRIBUTES:

Size: 88 total acres

Elevation: 1050'

Slope Range: 0-5%

Aspect Range: Flat to rolling

DESCRIPTION OF PROJECT BOUNDARIES:

The units scheduled for treatment are outlined in the five year schedule in the park's fire management plan. For this year, FY2006, units 3, 4, 5, 6, and 7b will be treated. Units 3 and 6 will be combined since they lie adjacent to one another.

Units 3 and 6: The north boundary will be the woods north of unit 6. The east boundary will be the woods and the service road separating these units from unit4. The south boundary will be the barbed wired fence south of unit 3. The west boundary will be the park boundary.

Unit 4: The east boundary will be the service road the separates units 4 and 5 and the mowed cool season grasses around the visitor center construction zone. The north boundary will be the woods north of unit 4. The west and south boundaries will be the service road.

Unit 5: The north boundary will be the mowed line adjacent to the park's development sub-zone. The east boundary will be the park boundary. The south boundary with be the park boundary. The west boundary will be the service road that separates units 4 and 5, and the barbed wire fence that extends from the service road to the south park boundary.

Unit 7b: The north boundary will be the woods north of the unit. The east boundary will be the park boundary. The south boundary will be the manicured lawn. The west boundary will be the woods west of the unit.

VEGETATION DESCRIPTION:

Fuel Model 3 occurs throughout the units. Some woody species are encroaching into the prairies. Fuel Model 9 and 1 surround the units.

Vegetation type	Fuel Model NFFL	Estimated Acres	Estimated Tons Per Acre
100% Tall grass prairie	3	80	3

PROJECT MAP (attachment)

VICINITY MAP (attachment)

D. GOALS AND OBJECTIVES

GOALS

1. Provide for firefighter safety.
2. Promote public awareness and support for the NPS Fire Management Program.
3. Restore fire and associated natural ecological processes in order to retain species composition and other characteristics of natural communities.
4. Maintain and expand prairie complexes.
5. Reduce hazardous fuels.
6. Keep the fire from escaping or damaging public or government property.
7. Enhance Wildlife habitat.
8. Provide for training opportunities for firefighters.

SPECIFIC OBJECTIVES:	PROPOSED REDUCTION WITHIN ONE YEAR	ACTUAL RESULTS
Burn units with low to moderate intensity	75-95%	
Top-kill woody species encroaching prairies	>75%	

Range of Acceptable Results Expected Across The Project Area

Throughout the entire unit a mosaic of different levels of fire severity are desired and acceptable.

E. PROJECT COMPLEXITY

This burn rates as a low complexity project that should pose no unusual risks to personnel safety or property. Burn duration will be 24 hours or less, with isolated residual burning expected in fuel jackpots.

HAZARD, RISK AND COMPLEXITY WORKSHEETS (attached)

F. ORGANIZATION

The Burn Boss may order additional resources to assist with the project as long as no slopovers or spot fires are occurring. The holding resource worksheet and Fireline Handbook will be used to determine adequate number and type of holding resources for each scenario. Specific resources will be identified in an incident action plan prepared prior to each operational period during the implementation of the burn. While FM3 is the fuel model that represents the burn units, FM9 surrounds the units and is the fuel model used on the holding resources worksheet to determine adequate holding resources.

Total of (12) persons will be the minimum required conducting the prescribed fire.

Overhead Personnel:
1 Burn Boss/ Incident Commander (RXB2)

Additional Crews/Personnel/Resources For Daytime Holding and Ignition Operations:
2 FFT2 – Ignition Crew
2 Type 6 engines with engine boss and operator.
2 ATVs with Water Tanks and operators
3 FFT2- Holding Crew

G. ESTIMATED PROJECT COSTS (non-base, other agency, contract):

Costs will be primarily for personnel and equipment preparing and conducting burn operations. The unit requires some preparation. Firing operations and post firing patrols should be of short duration with the goal of keeping overall costs low.

FUNCTION	**PROJECTED WORK HOURS/**	**PROJECTED COSTS***
Planning	8/Rx Fire Plan development, site visit	$100.00
Unit Preparation	40/brush hog line	$1000.00
Operations (including burning, holding, mop-up)	96	$4800.00
Monitoring & Evaluation	16	$100.00

TOTAL PROJECTED COST $6000.00 divided by 88_ acres = $68.18 PER ACRE

*Required information in final report: ACTUAL COSTS, COST PER ACRE, WORK HOURS PER ACRE.

H. SCHEDULING

Proposed Ignition Date:	March 22- April 12, 2006
Projected Burn Duration:	Less than 6 hours
Actual Ignition Date:	
Date Declared Out:	
Date DI-1202 Submitted:	

I. PRE-BURN CONSIDERATIONS

PREPARATION NEEDS ON SITE:

1. Eight to twelve foot wide fire lines will be mowed around the perimeter of burn units.

2. Rangers or designated traffic control will be available with 5 "smoke ahead" signs for V highway and the road adjacent to the park on the east.

3. Reduce fuel jackpots near control lines (cut and stack or scatter) within 100 ft. of control line.

4. Check all control lines for debris and remove as appropriate.

5. Coordinate burn schedule with GWCA staff to maximize chance of achieving objectives while minimizing impacts to park observations/visitation.

6. Ensure radios, and handtools for each assigned person, will be on scene.

7. Ensure minimum of six drip torches and 30 gallons of drip torch fuel will be on scene. This will be provided by resources assigned.

8. Take pre-burn photos of unit and record photo point locations.

9. Ensure engines can fill from either the hydrant near the visitor center or from a porta-tank. Hydrant will be tested the morning of the burn and necessary hardware attached to allow engines to quickly fill. If porta-tank is used, it will be filled and a pump set up with hardware to attach to an engine. The pump will be started to ensure its reliability before ignition begins. This will be done by resources assigned.

OFF SITE:

1. Coordinate daily weather and burn conditions monitoring with park staff for at least four days prior to ignition date.

2. Ensure notifications are made.

3. Ensure local media is contacted as appropriate.

4. Brief assigned personnel and park staff as appropriate.

5. Burn Boss will coordinate escape and other wildfire coverage with MDC (Neosho 417-451-4158) and Diamond VFD (417-325-4442 fire chief)

6. Spot weather forecast will be obtained from NWS in Springfield, MO (417-863-9124)

J. PRESCRIBED FIRE PRESCRIPTION

NFFL Fuel Models used: 3 100%

PRESCRIPTION

Weather	Range
Relative Humidity %	25-50%
Wind Direction	All
Mid Flame Wind Speed	0-8
Fuel Moisture (1 hour)	8-16%
(10 hour)	
(100 hour)	
Mixing height	≥1500'
Transport winds	≥7

FIRE CHARACTERISTICS

Characteristics	Range
Rate of Spread (chains/hour)	23-185
Flame Length (feet)	5.8-16
Fireline Intensity (btu/ft/s)	259-2342

K. IGNITION AND HOLDING ACTIONS

The Burn Boss or Ignition Specialist will thoroughly describe the firing plan and safety considerations to all burn personnel at the pre-burn briefing. Everyone will be provided a copy of the project map. Firing operations for the entire unit should be completed in one day.

Firing and Ignition:
A test fire will be lit near the main point of origin of the burn. The Burn Boss will decide the location of the test fire, which will depend on current and forecasted winds. Fuels and topography will be representative of most of the project. The Burn Boss will decide at that point to initiate the main burn or not.

Strip head fire will be used on the downwind side to establish a "black line". Once enough black is established on the down wind side, a ring fire technique will be used to finish off each unit. The Burn Boss and Ignition Specialist will develop an ignition plan prior to the pre-burn briefing. They will consider the current and expected weather for the day, primarily wind direction, to decide where to start ignition.

This plan will be explained to all burn personnel at the pre-burn briefing. Once a unit is complete, the Burn Boss will hold another briefing prior to igniting the next unit.

If prescription parameters are exceeded during project execution, the Burn Boss should terminate ignition operations at a safe and appropriate location based on fire behavior, fuels topography and weather conditions. If the project area comes back into prescription based on current and forecasted weather, ignition operations may continue. If not, the project area is put into a mop-up and patrol status. Holding actions shall maintain control of the fire until a decision to continue, postpone or extinguish the prescribed fire is made and the Agency Administrator or their designee is notified. The Burn Boss will document this decision process on a unit log.

Holding Actions:
All ATV's will be mobile and used accordingly to provide adequate patrol behind ignition teams. Engines will be used to lay down wet lines to ignite from. They will also perform structure protection near the visitor center and maintenance building. Holding crew personnel will take appropriate suppression actions on all slopovers and spot fires

Mop-Up Operations:
Mop-up will occur only for the purpose of maintaining control of the burn. Jackpots, snags, or problem areas will be secured through the use of water or foam. Chainsaw and handtools will only be used when other methods are not practical.

L. WILDLAND FIRE TRANSITION PLAN

1. If spot fires or slopovers occur, the Holding Squad Leader will initially supervise suppression actions.

2. If spot fires and/or slopovers cannot be controlled within one burning period with on site resources the Burn Boss will convert the fire to a wildland fire. A Wildland Fire Situation Analysis (WFSA) will be completed.

3. If the burn is converted to a wildland fire, the Burn Boss will make the declaration and assume the role of Incident Commander until relieved by an Incident Commander Type III (ICT3). If the Burn Boss is not a qualified ICT3, one will be ordered through the Missouri/Iowa Interagency Coordination Center (MOCC). The burn boss will immediately notify Park Dispatch (**417-325-4151**) and the Park Superintendent of the change in status to a wildland fire and will order resources through MOCC.

4. The Burn Boss will coordinate safety considerations with the section leaders (Holding, Ignition, and Monitoring) to provide and ensure the safety of ALL personnel assigned. All personnel will be assigned holding or suppression duties.

5. Water sources (drafting sites, hydrants, etc.) will be identified on the project map.

M. PROTECTION OF SENSITIVE FEATURES

N. PUBLIC AND PERSONNEL SAFETY

1. A safety briefing will be given at the pre-burn briefing and at the start of each operational period. All personnel will be advised of Lookouts, Communications, Escape Routes, and Safety Zones. Any other potential safety hazards will be pointed out and mitigated as soon as possible upon identification of hazard.

2. All burn personnel will wear standard firefighting personal protective equipment. They will carry a fire shelter and fire tool at all times.

3. Only red-carded personnel will be utilized during the burn.

4. All standard wildland firefighter safety rules will be strictly enforced (ref: Fireline Handbook).

5. V Hwy and the county road adjacent to the east boundary of the park will be signed to warn motorists of smoke and fire along the road. A total of five (5) signs will be need to sign the roads adjacent to the park. If smoke becomes a problem on the highway, then the burn boss will instigate traffic control using the park staff or burn staff under the following guidelines:

Monitoring Highway Visibility

Minimum Acceptable Visibility	Posted Speed Limit
< 100 Feet	Stop ALL traffic
100 Feet*	15 MPH
152 Feet*	20 MPH
216 Feet	25 MPH

* Requires that vehicles be stopped and told to proceed slowly

6. EMERGENCY MEDICAL PROCEDURES:

- EMT or First Responder assigned the day of the burn.
- First Aid equipment available and location made known to all burn personnel.
- Burn Boss notified immediately of injury.
- Burn Boss will coordinate with EMT/First Responder.
- Burn Boss will notify Park Dispatch of an injury and will follow up with information as soon as the injury has been assessed.
- EMT/First Responder will assess injury and begin treatment.
- Once injury has been assessed, the Burn Boss or designee will activate the appropriate EMS response for evacuation of injured personnel.
- If personnel need to be evacuated, park dispatch will dispatch/contact EMS resources from the following table:

RESOURCE	CONTACT PHONE NUMBER	LOCATION
METS (Metro Emergency Transport Service)	911	Joplin, MO
Newton County Ambulance Service	911	Newton County
Life Flight Dispatch Air Evac 1	911	 Joplin, MO
St. John's Regional Health Center Burn Unit	417-885-2876	Springfield, MO

O. SMOKE MANAGEMENT AND AIR QUALITY

COMPLIANCE:

In the state of Missouri, prescribed fire is considered to be agricultural burning and there are no burn or smoke permit requirements to ignite a prescribed burn. However, agency standards require meeting minimum requirements for mixing height and transport winds. The minimum mixing height is 1500 feet and a minimum transport wind of 7 mph. A smoke management forecast will be obtained the day of the prescribed burn and attached to the plan.

MODELING:

A smoke projection map is attached for all proposed wind directions.

MITIGATION:

Smoke production will be light to moderate, but will lift and disperse adequately as long as the burn is conducted within smoke management guidelines.

P. INTERAGENCY COORDINATION AND PUBLIC NOTIFICATION

1. The GWCA fire coordinator will produce a press release a minimum of two (2) days before the burn. Generally a single media release made prior to the particular burn season (fall or spring) suffices.

2. Fire management staff will notify the following at least one week prior to the proposed ignition date:
   - Park Superintendent
   - Senior Management Staff & District Rangers

3. Fire management staff will notify the following at least two days prior to the proposed ignition date:

MDC Forestry(Neosho-Gary Smith District Forester)	417-451-4158
MOCC	573-341-7455
Newton County Sheriff's Office	417-451-8333
Diamond Fire Department(Mark Garbett, Fire Chief)	417-325-4442
Neosho Fire (Greg Hickman, Fire Chief)	417-451-8021
Carthage Fire Department	417-237-7100
MWRO (Connie Burns)	402-661-1756
National Weather Service – Springfield, MO	417-863-9124

Park Neighbors:

Elza Winter	417-325-6212
Mike Funderburgh	417-325-5116
Jess Holler	417-325-6268
Melvin Alford	417-325-5280
Glen & Randi Brown	417-325-6292

4. The GWCA fire coordinator will provide advance notification to any groups who have made reservations to visit the park on the proposed burn day.
5. Additional contact information:

Bobby Bloodworth (Ozark FMO)	573-323-4236 x252 office
	573-300-0840 cell
Scott Bressler (Ozark Engine Foreman)	573-323-8234 x24 office
	573-300-0842 cell

Scott Beacham (MWR Fuels Specialist)	402-661-1768 office 402-651-8789 cell
Moria Painter (Ozark Fire Program Asst.)	573-323-4236 x233 office 573-300-0847 cell

**Notifications are to be made before the day of the burn, by either the Burn Boss, Fire Program Clerk, Fire Management Officer or designated person. Notifications will be recorded into dispatcher's log and on the original burn plan with the time, date and agency/person notified.

AGENCY/PERSON CONTACTED	DATE	TIME	CONTACTED BY

Q. MONITORING AND EVALUATION PROCEDURES

PRE-IGNITION:

Before ignition of the burn unit begins, an on-site weather observation will be taken no more than 30 minutes prior to ignition. The Burn Boss or designated person will be responsible for obtaining a fire weather and smoke management forecast for the day of the burn. The need for fire effects plots, transects, and/or photo points will be determined by Resource and Fire Management staff in consultation with Midwest Region and Ozark Ecoregion Fire Ecologists. Resource and Fire Management staff will determine the monitoring schedule and location(s).

The nearest associated NFDRS/WIMS station is at Mt. Vernon, MO (GOES ID#573063C8) Outputs from this station will be tracked, beginning at least one week prior to the proposed ignition date. Spot weather forecasts will be requested prior to the burn and each consecutive day of the burn from the **Springfield, MO NWS** office (417-863-9124). Actual on-site weather information will be reported back to the weather forecaster to help improve the forecasts during the burn.

DURING THE BURN:

During the burn, specific parameters will be observed and recorded on the attached observation form. The completed form will then be attached to the original burn plan. Included on this form will be smoke, weather, and fire behavior observations. The burn boss will determine if photo documentation is required and assign this duty to the FEMO(s) or designated observer. The burn boss will determine monitoring schedule as needed but observations will be taken at least hourly.

POST-BURN:

Post burn monitoring will occur as Resource and Fire Management staff in consultation with Midwest Region and Ozark Ecoregion Fire Ecologists determine the need.

R. POST FIRE REHABILITATION

"Light Hand on the Land" guidelines will be used to help minimize rehab needs. The following list of standards for the rehabilitation burn units can be adjusted for specific burn unit needs.

1. Flush cut stumps.
2. Remove flagging.
3. Build water bars on fire lines that are located on steep slopes.
4. Cover firelines to blend in with surrounding vegetation **after** the fire has been declared out.
5. Repair or stabilize damage to road shoulders.
6. Snag hazard trees at the discretion of the burn boss and holding specialist.
7. Close all access created by fire personnel and equipment.
8. Any other rehab as directed by appropriate Resource Management personnel.

No special rehab needs are anticipated for this burn unit.

S. POST FIRE REPORTS

Post fire reports shall be the responsibility of the burn boss and should be submitted within seven (7) days of the completion of the burn to the Ozark National Scenic Riverways Fire Management Office. The Fire Management Officer and Fire Program Assistant (FPA) will incorporate any long-term monitoring data or reports into the burn documentation package as they come available. The FPA will be responsible for entering required prescribed fire reporting information, including the 1202 and employee experience records, into SACS when they become available.

Documentation Package:

Documentation	YES	NO	N/A
1. Original Signed Plan			
2. All Reviewer Comments			

3. All Maps			
4. Notification Checklist			
5. Permits			
6. Weather Forecast			
7. Smoke Forecast			
8. Agency Administrator Go/No Go Checklist			
9. Operational Go/No Go Checklist			
10. Daily Validation			
11. Unit Logs			
12. Enter into Prescribed Files by FPA			
13. 1202 Completed and Entered into SACS			

T. APPENDICES

1. Technical Reviewer Checklist and Comments
2. Reviewers' Comments
3. Maps
4. Risk Mitigation and Complexity Worksheets
5. Fire Modeling Outputs
6. Agency Administrator Go/No-Go Pre-ignition Approval
7. Prescribed Fire Operations Go/No-Go Checklist
8. IAP/Briefing Guide
9. Adequate Holding Resources Worksheet
10. Post-Project Analysis
11. Prescribed Fire Monitoring Form
12. Job Hazard Analysis
13. 5 Year Burn Schedule

APPENDIX #1
PRESCRIBED FIRE PLAN - TECHNICAL REVIEW

Park: George Washington Carver National Monument

Project Name: Unit, 3, 4, 5, 6, 7b

Prescribed Fire Plan Elements		Status	Date	Initial
a.	Signature Page	+	04/04/05	
b.	Executive Summary	+	04/04/05	
c.	Description of Prescribed Fire Area	0	04/04/05	
d.	Goals and Objectives	+	04/04/05	
e.	Project Complexity/Risk	+	04/04/05	
f.	Organization	+	04/04/05	
g.	Cost	0	04/04/05	
h.	Scheduling	+	04/04/05	
i.	Preburn Considerations	+	04/04/05	
j.	Prescription	0	04/04/05	
k.	Ignition & Holding Actions	+	04/04/05	
l.	Wildland Fire Transition Plan	+	04/04/05	
m.	Protection of Sensitive Features	+	04/04/05	
n.	Public and Firefighter Safety	+	04/04/05	
o.	Smoke Management	+	04/04/05	
p.	Interagency Coordination and Public Information	+	04/04/05	
q.	Monitoring	+	04/04/05	
r.	Post Fire Rehabilitation	+	04/04/05	
s.	Post Fire Reports	+	04/04/05	
t.	Appendices	NC		

+ Adequate – Meets NPS Standards
0 Adequate with modification. See comments.
- Deficient. See comments.
NC Unable to evaluate.

Signature: /s/Eric Allen Date: 4/4/05

Title: Fire Use Module Leader Office: Jewel Cave NM

APPENDIX #2
REVIEWERS' COMMENTS

Fire Management Officer:

This plan has been updated with new dates and costs. It has meet all review requirements and is ready for GWCA's approval. Bobby Bloodworth, Fire Management Officer

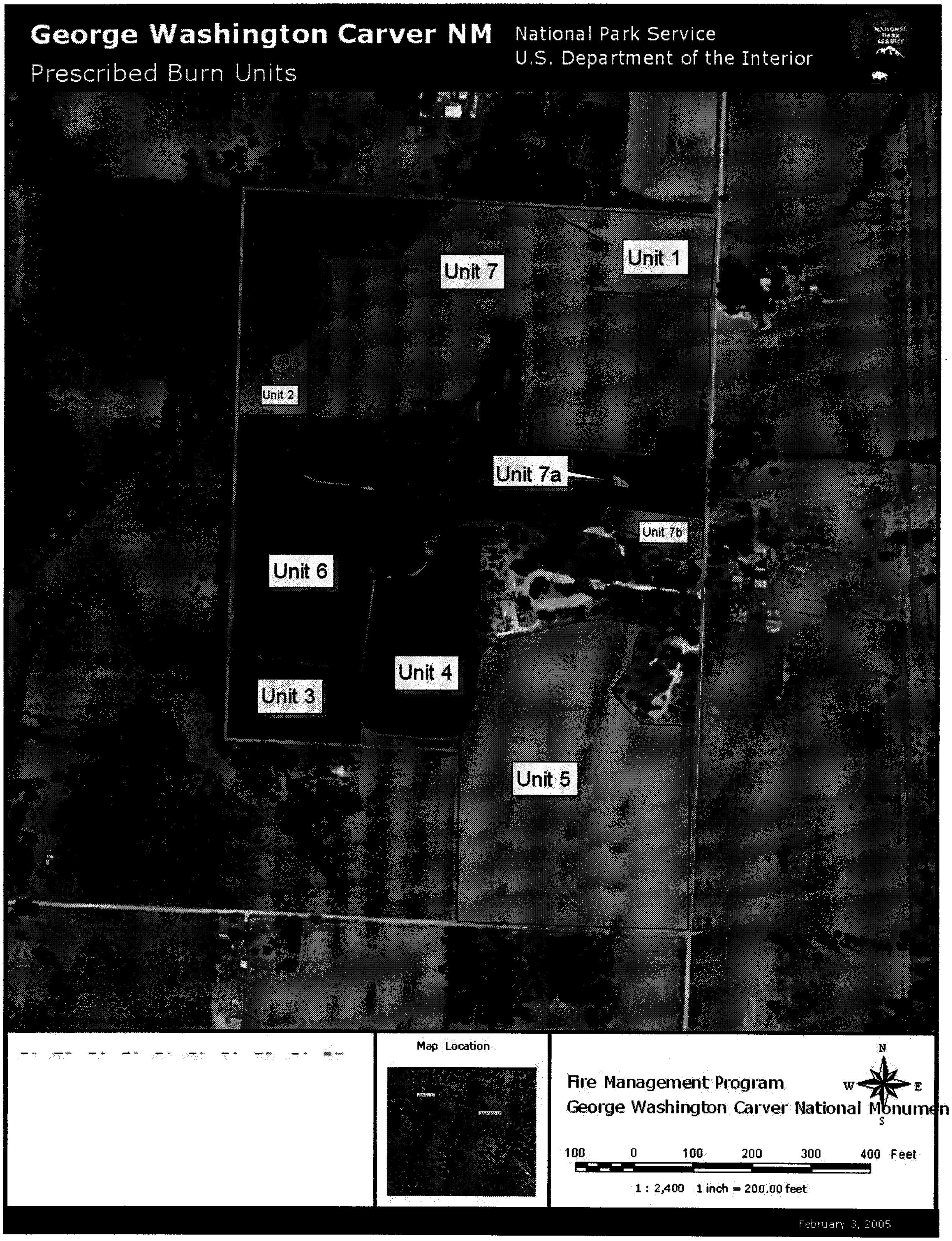
Chief Ranger:

Chief of Natural Resources:

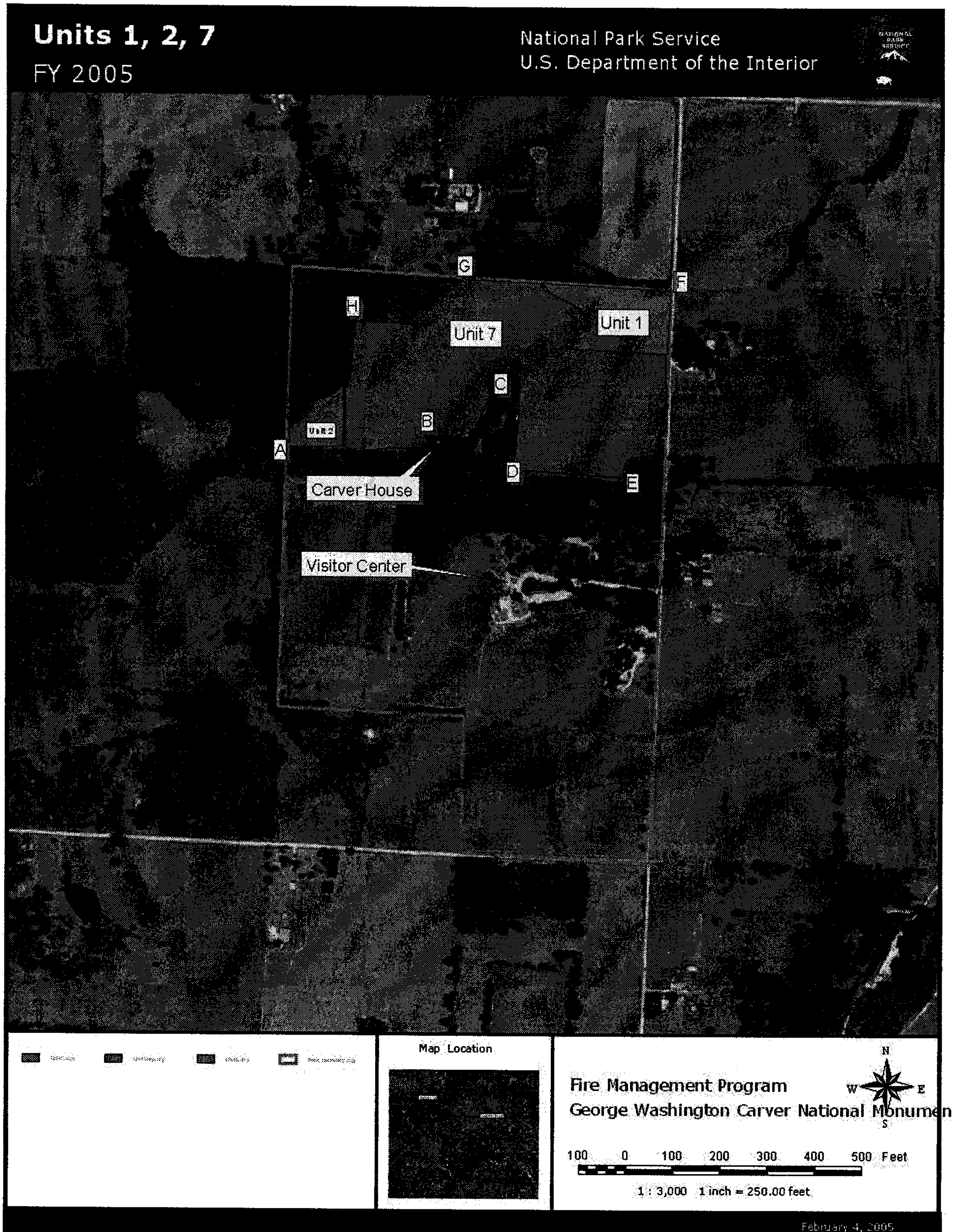
Park Superintendent:

Regional Review:

Appendix 3



George Washington Carver NM
Prescribed Burn Units
National Park Service
U.S. Department of the Interior
Unit 1
Unit 7
Unit 2
Unit 7a
Unit 7b
Unit 6
Unit 4
Unit 3
Unit 5
Map Location
Fire Management Program
George Washington Carver National Monumen
N
W
E
S
100 0 100 200 300 400 Feet
1 : 2,400 1 inch = 200.00 feet
February 3, 2005



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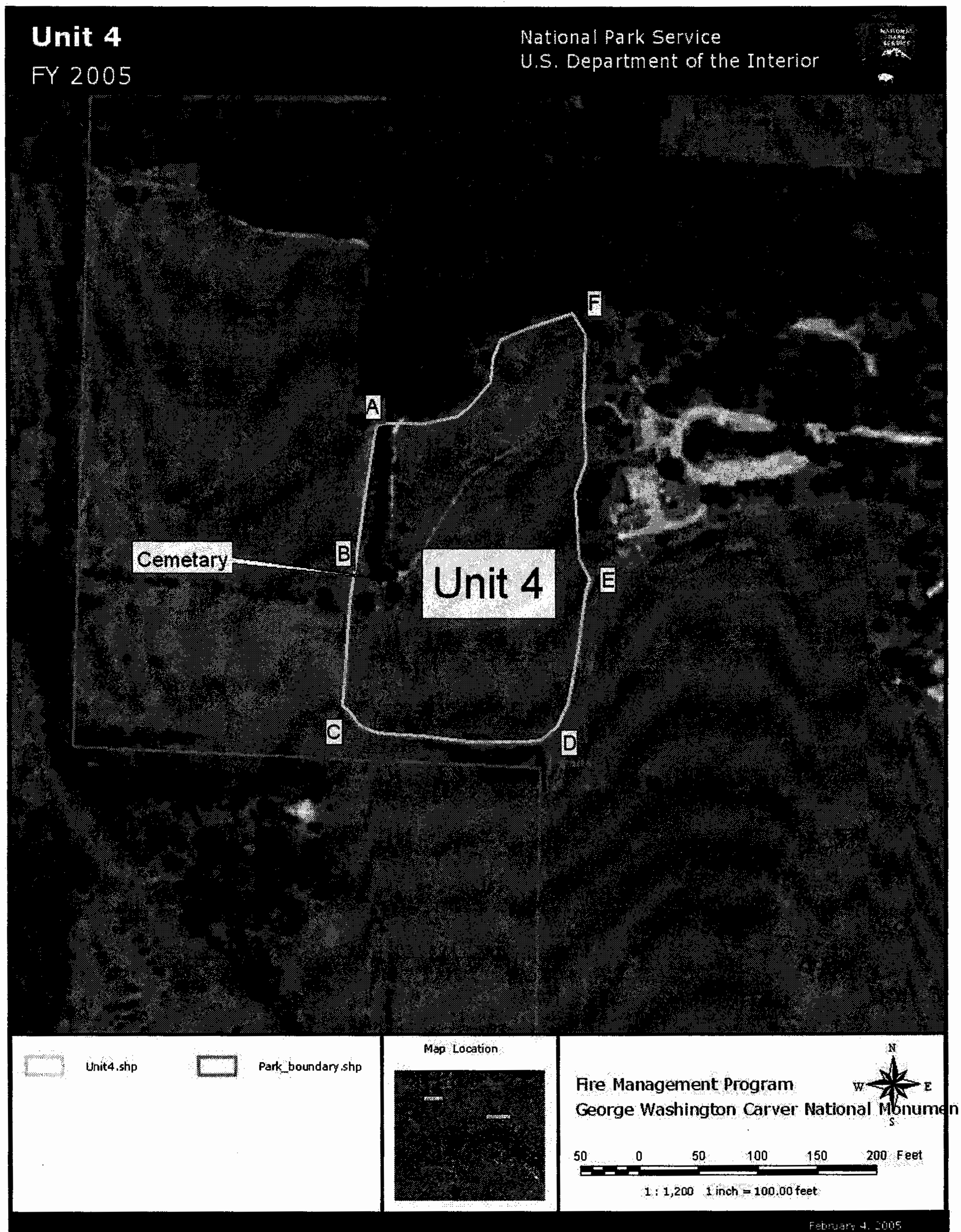

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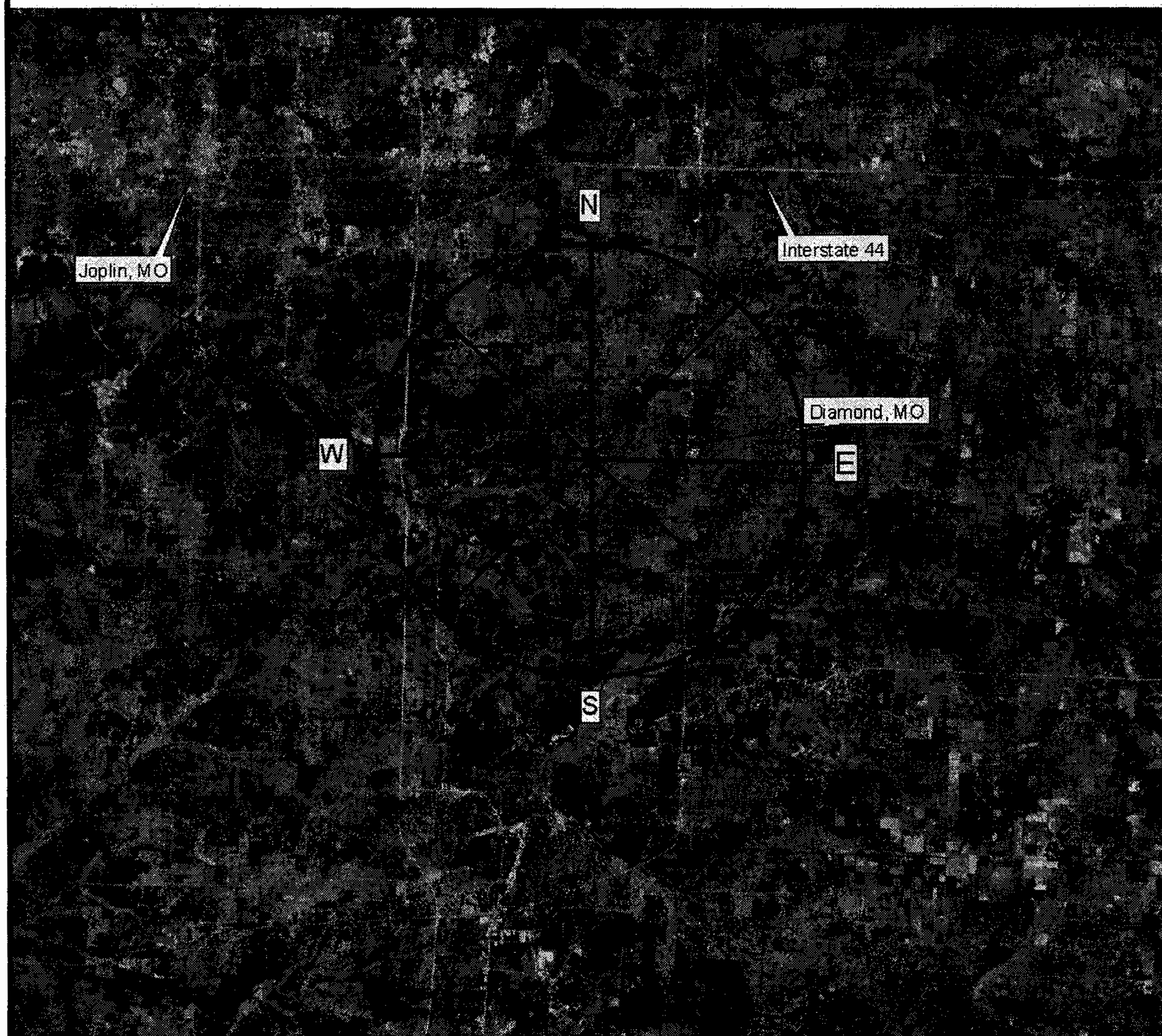
George Washington Carver NM

Smoke Dispersal Map

National Park Service
U.S. Department of the Interior



Park_boundary.shp

Map Location

Fire Management Program
George Washington Carver National Monumen

N W E S

0.5 0 0.5 1 1.5 2 Miles

1 : 63,360 1 inch = 1.00 miles

February 4, 2005

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APPENDIX#4
Quarry Prescribed Fire
Hazard Rating Guide

Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
Environmental Data						
a. Seasonal severity	Energy Release Component below 90th percentile levels.	Energy Release Component at or above 90 th percentile levels – above average drought conditions.	Energy Release Component at or above 97th percentile levels – severe drought conditions.	Low probability for problematic fire behavior or difficulty in holding activities.	Some potential for problematic fire behavior or difficulty in holding activities.	High probability problematic fire behavior and difficulty in contr
b. Fire Behavior	Flame lengths confined to surface fuels, spread rates low.	Flame lengths extending into shrub and tree regeneration, spread rates moderate.	Flame lengths highly variable, frequently involving individual tree crowns, spread rates moderate to fast.	Low probability of difficulty in holding fire or for adverse fire effects.	Some potential for fire behavior to approach upper prescription limits and cause undesirable effects.	High potential fo fire behavior to create holding problems, excee prescription ranges, and cau undesirable effe
c. Fuels	Surface fuels light with open tree canopies, small shrub component present.	Surface fuels moderate with variable forest stand density and moderate shrub presence.	High surface fuel loading with dense shrub component and dense stands with abundant regeneration.	Fuels present no specific implementation problems.	Fuels will have a marked effect on implementation activities and holding force requirements.	Fuels will dramatically affe management organization an qualifications fo implementation.
d. Weather	Weather stable, winds light and predictable, no frontal activity.	Weather slightly variable, winds present but light, occasional gusts, no frontal activity.	Weather highly variable, winds near prescriptive limits, gusts prevalent, frontal activity possible.	Little impact on implementation.	Weather variation will require mitigation actions involving additional resources.	Weather will se as a major influence on organization, personnel qualifications, a specific implementation actions.
e. Topography	Low variability in slope and aspect.	Some variability in slope and aspect, will affect fuel moisture and fire behavior.	High variability in slope and aspect, major implications on fire behavior and must be considered in prescription development and implementation.	Little influence on burn implementation.	Consideration of topography during planning process is necessary.	Topography will necessitate mitigation actio to be develope and firing patte and ignition methods to be modified to redu impacts.

Agency Values						
a. Ecological and Environmental Considerations	Fire poses little threat to cause adverse effects or long- term disturbances to natural resource values. No T and E species or critical habitat.	Fire poses moderate threat of adverse effects on natural resources and may cause short- to mid-term alterations or inconveniences such as air quality. Small amounts of T and E species present.	Fire poses high potential for adverse effects to natural resource values or to cause long- term degradations in air quality. Some T and E species present and/ or critical habitat.	Low probability for adverse impacts and little need for mitigation actions.	Mitigation actions may need to be developed to ensure desirable outcomes. Some short- term effects may have to be accepted.	Prescribed Fire Plan must addre mitigation actior to prevent undesirable outcomes.
b. Social and Cultural Values	No known social or cultural values in or adjacent to the project area.	Features of social or cultural value have been identified in and adjacent to the project area. Mitigation measures can be accomplished.	High social or cultural values have been identified in or adjacent to the project area. Mitigation actions are difficult to accomplish.	Severe fire behavior or fire outside the unit would not damage the identified values.	Severe fire behavior or fire outside the unit poses potential for moderate damage to special values. Concerned parties are aware and supportive of the project.	Excessive fire severity or fire outside the unit have adverse effects (substan damage to or potential destruction of th special sites). Acceptance by concerned parti is low.
c. Project Duration and Logistics	Fire planned to be of short duration, logistical needs easily accommodated.	Fire planned to be of short to moderate duration, logistical needs pose some difficulty.	Fire planned to be of moderate to long duration, logistical needs create much difficulty in accomplishing.	No consequences because of duration or logistics.	Duration may impact firefighters and public and logistical needs must be specifically addressed.	Long duration fi necessitates greater informat dissemination, mitigation to remove impacts firefighters and public, and logistical needs must be met or project postpon
d. Smoke and Air Quality Management	Few smoke sensitive areas near project area. No potential scheduling conflicts with cooperators.	Multiple smoke sensitive areas, mitigation actions minimize impacts, low potential for scheduling conflicts.	Multiple smoke sensitive areas near burn area, mitigation actions unable to remove all impacts, duration increases impacts, high potential for scheduling conflicts.	No adverse smoke consequences.	Mitigation actions must address smoke impacts, and coordination is required to confirm scheduling.	Mitigation actior must be develop regulatory agen must concur, scheduling conf may restrict implementation.

Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
Public Values						
a. Land use values	No commercial or agriculture activities near planned burn area.	Some commercial or agricultural activities near burn unit, some managed wildlands (recreation, timber, range values).	Planned burn directly adjacent to urban, commercial, and/ or agriculture areas.	No impacts from land use values.	Escaped fire onto nearby managed land causes some impacts to commercial values. Prescribed Fire Plan must consider actions to prevent fire movement onto commercial and/ or agriculture lands.	Escaped fire ont nearby manage land causes significant impac to commercial values. Mitigatio actions must ref additional resou needs to protect urban, commerc and/ or agricultu areas. If mitigati cannot be accomplished, b must be postponed.
b. Dwellings	No permanent or part-time residences present in area.	Some residences ½ mile or less from burn area.	Planned burn is located in wildland-urban interface zone, permanent residences in close proximity.	No impacts from dwellings.	Plan must address actions to ensure adequate protection of residences.	Notification of al concerned homeowners, residents, and visitors, coordination wit local fire protect organizations is needed, and mitigation action must adequatel address potentia fire escapes.
c. Non-dwellings	No non- dwellings present.	Some outbuildings and non- residences ½ mile or less from burn area.	Commercial structures in close proximity to burn area.	No impacts.	Planning must consider these non- dwellings.	Planning and implementation must adequatel address all measures to prevent any adverse impacts

Human Factors						
a. Firefighter	Little firefighter exposure.	Some firefighter exposure due to fire duration and smoke.	Potential for high firefighter exposure to smoke during burn and to fire during holding actions.	No specific problems, implement standard safety measures.	Mitigation measures to eliminate smoke exposure.	Mitigation measures must address smoke exposure, use o mechanized equipment to eliminate exposu to fire.
b. Public	No public exposure.	Some public exposure, mitigation actions can remove/ minimize exposure.	Public may be exposed to high smoke concentrations for moderately long periods, especially during nighttime hours.	No adverse consequences anticipated.	Mitigation actions necessary to provide for maximum public safety.	Mitigation action must be develop coordinated with other emergency organizations ar fully understood prior to ignition.
c. Fire Management	No problems with commitment and acceptance by park staff members.	No problems with commitment but some unwillingness to support and prioritize the prescribed fire over other activities.	Park staff not committed to using prescribed fire as a tool and not willing to support and prioritize prescribed fire over other activities.	No adverse consequences.	Park staff must be briefed on need and importance of prescribed fire.	Park manageme team must be informed of prescribed fire objectives, supp needs, and prior

PRESCRIBED FIRE RISK ANALYSIS WORKSHEET

Hazard Element	Hazard Probability			Potential Consequences			*Risk (Exhibit 4)
	L	M	H	L	M	H	
1. Environmental Data							
a. Seasonal severity		X		X			M
b. Fire Behavior		X		X			M
c. Fuels	X			X			L
d. Weather		X		X			M
e. Topography	X			X			L
2. Agency Values							
a. Ecological and Environmental Considerations	X			X			L
b. Social and Cultural Values	X			X			L
c. Project Duration and Logistics	X			X			L
d. Smoke and Air Quality Management		X		X			M
3. Public Values							
a. Land use values	X			X			L
b. Dwellings		X		X			M
c. Non-dwellings		X		X			M
4. Human Factors							
a. Firefighter		X			X		M
b. Public	X			X			L
c. Fire Management	X			X			L

PRESCRIBED FIRE RISK MITIGATION TABLE

Hazard Element	Risk	Mitigations / Controls Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.	Residual Risk	Referen[…] In Prescri[…] Fire Plan
Environmental Data				
a. Seasonal Severity	M	The ignition methods will be adjusted to reflect the time of year, day, fuel, and weather conditions.	L	F. Organiza[…] K. Ignition a[…] Holding Act[…]
b. Fire Behavior	M	Firing patterns and directions will change depending on wind direction and fire behavior.	L	K. Ignition a[…] Holding Act[…]
c. Fuels	L	. ______	______	______
d. Weather	M	Firing patterns and ignition times will be dependent upon the weather meeting prescription parameters. If weather exceeds prescription parameters, the burn will not be implemented.	L	K. Ignition a[…] Holding Act[…] Test Fire, Fi[…] and Ignition[…]
e. Topography	L	______	L	______
Agency Values				
a. Ecological and environmental considerations	L	______	______	______
b. Social and Cultural values	L	______	______	- ______
c. Project duration and logistics	L	______	______	______
d. Smoke and Air Quality Management	M	Firing patterns and directions will change depending on wind direction and fire behavior. This will allow smoke to disperse and lower smoke impacts to V Highway.	L	K. Ignition a[…] Holding Act[…] Test Fire, F[…] and Ignition[…]
Hazard Element	Risk	Mitigations / Controls	Residual Risk	Referen[…]

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		Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.		In Prescril Fire Plan
ublic Values				
a. Land use values	L	————————	———	———
b. Dwellings	M	Engines will be placed around dwellings with protection lines deployed around the house.	L	I. Pre-burn consideratic M. Protectic sensitive features
c. Non-dwellings	M	Engines will provide protection and pretreatment with deployed hoselays.	L	I. Pre-burn consideratic M. Protectic sensitive features
uman Factors				
a. Firefighter	M	Burn Boss will ensure that a complete safety briefing is provided for all assigned personnel. All standard wildland firefighter safety rules will be strictly enforced (ref. Fireline Handbook). Effects of smoke will be managed by limiting prolonged exposure for holding personnel as much as possible. Complete mitigation of smoke exposure hazard may not be possible.	M	N. Public ar Personnel Safety
b. Public	L	————————	L	———
c. Fire Management	L	————————	L	———

PRESCRIBED FIRE COMPLEXITY RATING WORKSHEET

	Complexity Element	L	M	H
Primary Factors	1. Life and Safety		X	
	2. Threats to Boundaries		X	
	3. Management Organization	X		
	4. Political Concerns	X		
	SUBTOTAL OF PRIMARY FACTORS	2	2	
Secondary Factors	5. Objectives	X		
	6. Fuels and Fire Behavior	X		
	7. Air Quality Values	X		
	8. Improvements	X		
	9. Logistics	X		
	10. Natural, Cultural and Social Values	X		
	11. Tactical Operations	X		
	12. Interagency Coordination	X		
	SUBTOTAL OF SECONDARY FACTORS	8		
	TOTAL COUNT OF COMPLEXITY VALUES	10	2	

(Column header "Complexity Value" spans L, M, H.)

QUALIFICATIONS DETERMINATION TABLE:

	Prescribed Fire Burn Boss Type 2 (RXB2)	Prescribed Fire Burn Boss Type 1 (RXB1)
Primary Factors rated "H"	Less than 2	2 or more
	AND	OR
Total Count rated "H"	Less than 4	4 or more
		OR
	Minimum required on all prescribed fires.	When deemed appropriate by the agency administrator or unit Fire Management Officer.

Prescribed Fire Burn Boss Level Indicated (check one):	**RXB1**		**RXB2**	**X**

PREPARED BY: /s/ Scott Bressler DATE: 02/05/05

APPROVAL BY: ______________________ DATE: ____________
Agency Administrator

REVIEWED BY: ______________________ DATE: ____________
(Burn Boss immediately prior to burning

Appendix 5

```
WELCOME TO THE BEHAVE SYSTEM
  BURN SUBSYSTEM
    FIRE1 PROGRAM: VERSION 4.4 -- FEBRUARY 1997

DEVELOPED BY:  THE FIRE BEHAVIOR RESEARCH WORK UNIT
               INTERMOUNTAIN FIRE SCIENCES LABORATORY
               MISSOULA, MONTANA

YOU ARE RESPONSIBLE FOR SUPPLYING VALID INPUT AND FOR
  CORRECTLY INTERPRETING THE FIRE BEHAVIOR PREDICTIONS.

ASSUMPTIONS, LIMITATIONS, AND APPLICATION OF MATHEMATICAL
  MODELS USED IN THIS PROGRAM ARE IN:
  Andrews, Patricia L. "BEHAVE: Fire behavior prediction and
    fuel modeling system--BURN subsystem, Part 1", INT-GTR-194, 1986
  Andrews, Patricia L., and Chase, Carolyn H. "BEHAVE: Fire
    behavior prediction and fuel modeling system--BURN
    subsystem, Part 2", INT-GTR-260, 1989


DIRECT
 1--FUEL MODEL -------------      3 -- TALL GRASS, 2.5 FT (75 CM)
 2--1-HR FUEL MOISTURE, % --     8.0  10.0  12.0  14.0  16.0
 7--MIDFLAME WINDSPEED, MI/H     2.0   4.0   6.0   8.0
 8--TERRAIN SLOPE, % -------     5.0
 9--DIRECTION OF WIND VECTOR   180.0
      DEGREES CLOCKWISE
       FROM UPHILL
10--DIRECTION OF SPREAD ----    DIRECTION OF MAXIMUM SPREAD
      CALCULATIONS                TO  BE CALCULATED
      DEGREES CLOCKWISE
       FROM UPHILL


=================================================================
RATE OF SPREAD, CH/H                                       (V4.4)
=================================================================
  1-HR   I       MIDFLAME WIND, MI/H
  MOIS   I
         I    2.0    4.0    6.0    8.0
   (%)   I--------------------------------------------------------
         I
  8.0    I   33.    77.   128.   185.
         I
 10.0    I   30.    69.   116.   167.
         I
 12.0    I   28.    64.   107.   154.
         I
 14.0    I   25.    59.    99.   143.
```

16.0	I	23.	54.	90.	130.

HEAT PER UNIT AREA, BTU/SQFT (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	I	689.	689.	689.	689.
10.0	I	662.	662.	662.	662.
12.0	I	648.	648.	648.	648.
14.0	I	635.	635.	635.	635.
16.0	I	610.	610.	610.	610.

FIRELINE INTENSITY, BTU/FT/S (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	I	418.	971.	1620.	2342.
10.0	I	362.	841.	1403.	2028.
12.0	I	327.	759.	1267.	1832.
14.0	I	297.	689.	1150.	1662.
16.0	I	259.	602.	1005.	1453.

FLAME LENGTH, FT (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	I	7.2	10.6	13.5	16.0

10.0	6.8	10.0	12.6	14.9
12.0	6.5	9.5	12.0	14.3
14.0	6.2	9.1	11.5	13.6
16.0	5.8	8.5	10.8	12.8

REACTION INTENSITY, BTU/SQFT/M (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	2691.	2691.	2691.	2691.
10.0	2585.	2585.	2585.	2585.
12.0	2532.	2532.	2532.	2532.
14.0	2481.	2481.	2481.	2481.
16.0	2383.	2383.	2383.	2383.

EFFECTIVE WINDSPEED, MI/H (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	2.0	4.0	6.0	8.0
10.0	2.0	4.0	6.0	8.0
12.0	2.0	4.0	6.0	8.0
14.0	2.0	4.0	6.0	8.0
16.0	2.0	4.0	6.0	8.0

DIRECTION OF MAXIMUM SPREAD, DEG (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	180.	180.	180.	180.
10.0	180.	180.	180.	180.
12.0	180.	180.	180.	180.
14.0	180.	180.	180.	180.
16.0	180.	180.	180.	180.

SIZE-LINKED-TO-DIRECT
1--RATE OF SPREAD, CH/H --- OUTPUT FROM DIRECT. RANGE= 23. TO 185.
2--EFFECTIVE WIND, CH/H --- OUTPUT FROM DIRECT. RANGE= 2.0 TO 8.0
3--ELAPSED TIME, HR ------- .5

AREA, ACRES (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	18.9	66.8	141.0	238.7
10.0	15.4	54.3	114.5	193.9
12.0	13.1	46.2	97.4	165.0
14.0	11.2	39.6	83.6	141.5
16.0	9.3	32.8	69.2	117.2

PERIMETER, CHAINS (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	50.	100.	154.	213.
10.0	45.	90.	139.	192.
12.0	42.	83.	128.	177.

14.0	39.	77.	119.	164.
16.0	35.	70.	108.	149.

LENGTH-TO-WIDTH RATIO (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	1.5	2.0	2.5	3.0
10.0	1.5	2.0	2.5	3.0
12.0	1.5	2.0	2.5	3.0
14.0	1.5	2.0	2.5	3.0
16.0	1.5	2.0	2.5	3.0

FORWARD SPREAD DISTANCE, CH (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	16.6	38.4	64.1	92.7
10.0	14.9	34.6	57.8	83.6
12.0	13.8	32.0	53.3	77.1
14.0	12.7	29.6	49.4	71.4
16.0	11.6	26.9	45.0	65.0

BACKING SPREAD DISTANCE, CH (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	2.4	2.8	2.8	2.7

10.0	I	2.2	2.5	2.5	2.5
	I				
12.0	I	2.0	2.3	2.3	2.3
	I				
14.0	I	1.9	2.1	2.2	2.1
	I				
16.0	I	1.7	1.9	2.0	1.9

MAXIMUM WIDTH OF FIRE, CH (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	I	12.7	20.6	26.8	31.8
10.0	I	11.4	18.6	24.2	28.7
12.0	I	10.6	17.2	22.3	26.5
14.0	I	9.8	15.9	20.6	24.5
16.0	I	8.9	14.5	18.8	22.3

CONTAIN-LINKED-TO-DIRECT-AND-SIZE

```
 1--RUN OPTION -------------    1.=COMPUTE LINE BUILDING RATE
 2--MODE OF ATTACK ---------    2.=REAR
 3--RATE OF SPREAD, CH/H ---    OUTPUT FROM DIRECT. RANGE=    23. TO   185.
 4--INITIAL FIRE SIZE, AC --    OUTPUT FROM SIZE.   RANGE=     9. TO   239.
 5--LENGTH-TO-WIDTH RATIO --    OUTPUT FROM SIZE.   RANGE=   1.5 TO    3.0
 6--BURNED AREA TARGET, AC -  400.0
```

TOTAL LENGTH OF LINE, CHAINS (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	I	292.*	289.#	291.#	294.#
10.0	I	298.*	297.#	298.#	302.#
12.0	I	303.*	302.#	304.#	308.#
14.0	I	309.*	308.#	311.#	315.#
16.0	I	315.*	315.#	319.#	323.#

I

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

= CONTROL EFFORTS AT THE HEAD OF THE FIRE WILL PROBABLY BE INEFFECTIVE.

TOTAL CONTAINMENT TIME, HOURS (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	3.5*	1.2#	.5#	.2#
10.0	4.1*	1.5#	.7#	.3#
12.0	4.6*	1.7#	.8#	.4#
14.0	5.2*	1.9#	1.0#	.5#
16.0	5.9*	2.2#	1.2#	.7#

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

= CONTROL EFFORTS AT THE HEAD OF THE FIRE WILL PROBABLY BE INEFFECTIVE.

TOTAL LINE BUILDING RATE, CH/H (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	82.*	239.#	553.#	1372.#
10.0	72.*	202.#	438.#	933.#
12.0	65.*	179.#	373.#	734.#
14.0	60.*	160.#	323.#	604.#

```
          I
16.0      I     53.*  140.#  275.#  489.#
          I

            * = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
                  HAND CREWS.
                EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
                  AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

            # = CONTROL EFFORTS AT THE HEAD OF THE FIRE
                  WILL PROBABLY BE INEFFECTIVE.
```

```
DIRECT
 1--FUEL MODEL -------------      9 -- HARDWOOD LITTER
 2--1-HR FUEL MOISTURE, % --     8.0  10.0  12.0  14.0  16.0
 3--10-HR FUEL MOISTURE, % -     9.0
 4--100-HR FUEL MOISTURE, %     14.0
 7--MIDFLAME WINDSPEED, MI/H     2.0   4.0   6.0   8.0
 8--TERRAIN SLOPE, % -------     5.0
 9--DIRECTION OF WIND VECTOR      .0
     DEGREES CLOCKWISE
      FROM UPHILL
10--DIRECTION OF SPREAD ----      .0  (DIRECTION OF MAX SPREAD)
    CALCULATIONS
     DEGREES CLOCKWISE
      FROM UPHILL
```

```
=================================================================
RATE OF SPREAD, CH/H                                       (V4.4)
=================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I     2.0     4.0     6.0     8.0
   (%)    I-----------------------------------------------------
          I
 8.0      I     2.      5.     10.     16.
          I
10.0      I     2.      5.      9.     15.
          I
12.0      I     2.      5.      8.     13.
          I
```

14.0	2.	4.	8.	12.
16.0	2.	4.	7.	11.

HEAT PER UNIT AREA, BTU/SQFT (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	343.	343.	343.	343.
10.0	330.	330.	330.	330.
12.0	323.	323.	323.	323.
14.0	317.	317.	317.	317.
16.0	304.	304.	304.	304.

FIRELINE INTENSITY, BTU/FT/S (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	14.	34.	64.	102.
10.0	12.	30.	55.	88.
12.0	11.	27.	50.	80.
14.0	10.	24.	45.	72.
16.0	9.	21.	40.	63.

FLAME LENGTH, FT (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0

8.0	I	1.5	2.3	3.0	3.8
10.0	I	1.4	2.1	2.9	3.5
12.0	I	1.3	2.0	2.7	3.4
14.0	I	1.3	2.0	2.6	3.2
16.0	I	1.2	1.8	2.4	3.0

REACTION INTENSITY, BTU/SQFT/M (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	I	2221.	2221.	2221.	2221.
10.0	I	2134.	2134.	2134.	2134.
12.0	I	2090.	2090.	2090.	2090.
14.0	I	2049.	2049.	2049.	2049.
16.0	I	1969.	1969.	1969.	1969.

EFFECTIVE WINDSPEED, MI/H (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	I	2.0	4.0	6.0	8.0
10.0	I	2.0	4.0	6.0	8.0
12.0	I	2.0	4.0	6.0	8.0
14.0	I	2.0	4.0	6.0	8.0
16.0	I	2.0	4.0	6.0	8.0

SIZE-LINKED-TO-DIRECT
1--RATE OF SPREAD, CH/H --- OUTPUT FROM DIRECT. RANGE= 2. TO 16.
2--EFFECTIVE WIND, CH/H --- OUTPUT FROM DIRECT. RANGE= 2.0 TO 8.0

3--ELAPSED TIME, HR ------- 1.0

AREA, ACRES (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	.3	1.3	3.5	7.2
10.0	.3	1.1	2.9	5.9
12.0	.2	.9	2.4	5.0
14.0	.2	.8	2.1	4.3
16.0	.2	.7	1.7	3.6

PERIMETER, CHAINS (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	7.	14.	24.	37.
10.0	6.	13.	22.	33.
12.0	5.	12.	20.	31.
14.0	5.	11.	19.	29.
16.0	5.	10.	17.	26.

LENGTH-TO-WIDTH RATIO (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	1.5	2.0	2.5	3.0
10.0	1.5	2.0	2.5	3.0
12.0	1.5	2.0	2.5	3.0

14.0	I	1.5	2.0	2.5	3.0
16.0	I	1.5	2.0	2.5	3.0

FORWARD SPREAD DISTANCE, CH (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	I	2.2	5.4	10.1	16.2
10.0	I	2.0	4.9	9.1	14.6
12.0	I	1.8	4.5	8.4	13.4
14.0	I	1.7	4.2	7.8	12.5
16.0	I	1.5	3.8	7.1	11.3

BACKING SPREAD DISTANCE, CH (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	I	.3	.4	.4	.5
10.0	I	.3	.3	.4	.4
12.0	I	.3	.3	.4	.4
14.0	I	.2	.3	.3	.4
16.0	I	.2	.3	.3	.3

MAXIMUM WIDTH OF FIRE, CH (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	I	1.7	2.9	4.2	5.5

```
 10.0     I     1.5     2.6     3.8     5.0
          I
 12.0     I     1.4     2.4     3.5     4.6
          I
 14.0     I     1.3     2.2     3.3     4.3
          I
 16.0     I     1.2     2.0     3.0     3.9
```

```
CONTAIN-LINKED-TO-DIRECT-AND-SIZE
 1--RUN OPTION -------------     1.=COMPUTE LINE BUILDING RATE
 2--MODE OF ATTACK ---------     2.=REAR
 3--RATE OF SPREAD, CH/H ---     OUTPUT FROM DIRECT. RANGE=     2. TO    16.
 4--INITIAL FIRE SIZE, AC --     OUTPUT FROM SIZE.   RANGE=     0. TO     7.
 5--LENGTH-TO-WIDTH RATIO --     OUTPUT FROM SIZE.   RANGE=    1.5 TO    3.0
 6--BURNED AREA TARGET, AC -   100.0
```

```
==================================================================
TOTAL LENGTH OF LINE, CHAINS                                (V4.4)
==================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I     2.0     4.0     6.0     8.0
   (%)    I-------------------------------------------------------
          I
  8.0     I   200.    203.    201.    200.*
          I
 10.0     I   205.    208.    207.    205.
          I
 12.0     I   208.    212.    211.    210.
          I
 14.0     I   211.    215.    214.    213.
          I
 16.0     I   215.    218.    218.    217.
          I

            * = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
                 HAND CREWS.
               EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
                 AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.
```

```
==================================================================
TOTAL CONTAINMENT TIME, HOURS                               (V4.4)
==================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I     2.0     4.0     6.0     8.0
   (%)    I-------------------------------------------------------
          I
  8.0     I   44.3    17.3     8.7     5.0*
          I
 10.0     I   50.5    19.9    10.1     5.9
```

12.0	55.9	22.1	11.3	6.7
14.0	61.3	24.4	12.5	7.4
16.0	68.6	27.3	14.1	8.5

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

TOTAL LINE BUILDING RATE, CH/H (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 2.0	4.0	6.0	8.0
8.0	5.	12.	23.	40.*
10.0	4.	10.	20.	35.
12.0	4.	10.	19.	32.
14.0	3.	9.	17.	29.
16.0	3.	8.	15.	26.

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

APPENDIX #6
AGENCY ADMINISTRATOR
GO/NO-GO PRE-IGNITION APPROVAL

Prescribed Fire Name: Date:

A) Instructions

The Agency Administrator's Go/No-Go Pre-Ignition Approval is the first of two GO/NO-GO decisions that must be completed before a prescribed fire can be implemented. The Agency Administrator's Go/No-Go Pre-Ignition Approval is the final management approval prior to execution of the prescribed fire and evaluates whether compliance requirements, prescribed fire plan elements, and internal and external notifications have been completed. The Agency Administrator's Go/No-Go Pre-Ignition Approval is valid for 30 days. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

B) Key Elements

1. Is the prescribed fire plan up to date?
   Hints: changes, amendments, seasonality.

2. Have all compliance requirements been completed?
   Hints: cultural, threatened and endangered species, smoke management.

3. Is risk management in place and the residual risk acceptable?
   Hints: Prescribed Fire Mitigation Table and Prescribed Fire Complexity Rating Guide completed with rationale and mitigations identified.

4. Will all elements of the prescribed fire plan be met?
   Hint: preparation work, mitigation, weather, organization, prescription.

5. Have all internal and external notifications and media releases been completed?

6. Are key park staff fully briefed, and understand the implementation of the prescribed fire?

7. Other?

Recommended by:______________________________ Date ____________________
FMO/Burn Boss

Approved by:__________________________________ Date ____________________
Park Superintendent

Approval expires: _________(May not be more than 30 days after approved date.)
Date

APPENDIX #7
Prescribed Fire Operations
GO/NO-GO Checklist

Prescribed Fire Name: Units 3,4,5,6, and 7b Date:

	YES	NO
- Has Agency Administrator GO/NO-GO Pre-Ignition Approval been approved?		
Narrative/Comments:		
- Are current and forecasted weather conditions favorable for execution of the prescribed fire? (hints: spot weather, dialogue with fire weather forecaster, climatological analysis complete)		
Narrative/Comments:		
- Have all key personnel listed on the Incident Action Plan (IAP) been briefed with an opportunity to give feedback? (hints: safety, objectives, assignments)		
Narrative/Comments:		
- Has all pre-burn preparedness work been completed? (hints: fuels and weather observations, signs, closures, smoke management, unit preparation)		
Narrative/Comments:		
- Are all equipment and supplies required in the prescribed fire plan in place and functional? (hints: pumps, radios, ignition devices, hose lays, vehicles, aviation, etc.)		
Narrative/Comments:		
- Are all holding resources described in the IAP committed and can be on-scene within specified time frames?		
Narrative/Comments:		
- Are all personnel certified for their assigned positions? (hints: Check Red Cards)		
Narrative/Comments:		
- There are no extenuating circumstances that preclude successful completion of this project? (hints: regional & national preparedness, unusual circumstances, unusual drought, outstanding issues, other fires, recent fire escapes, etc.)		
Narrative/Comments:		
IF ALL BOXES HAVE BEEN CHECKED "YES" YOU MAY PROCEED WITH THE TEST FIRE.		

	YES	NO
TEST FIRE DOCUMENTATION AND RESULTS:		
- Observed Fire Behavior within Prescription?		
Narrative/Comments:		
- Test fire was successful?		
Narrative/Comments:		
- Are all prescription parameters in the prescribed fire plan favorable for implementing the project? (hints: each plan element, pre-burn, smoke management, cooperator coordination)		
Narrative/Comments:		
IF LAST 3 BOXES ARE ALL "YES", YOU MAY PROCEED WITH PRESCRIBED FIRE.		

Signatures

<u>RX BURN BOSS:</u>	<u>IGNITION SPECIALIST:</u>
<u>HOLDING OPERATIONS:</u>	<u>DATE:</u>

APPENDIX #8

IAP/BRIEFING GUIDE

I. Present Handouts
   A. Map of Burn
   B. Organization Chart

II. Describe Area Of Burn
   A. Vegetation Type
   B. Acreage
   C. Slope
   D. Roads/Access
   E. High Values at risk
   F. Water Sources-natural, tanker and hydrants
   G. Natural/Manmade barriers

III. Weather Forecast- Use National Weather Service "Forestry" and "Smoke Management" Forecasts for applicable Zones. Use "Fire Weather Special Request" Form if updates are deemed necessary.
   A. Wind direction and Speed
   B. Relative Humidity
   C. Temperatures
   D. Predicted Changes

IV. Organization
   A. Organization Chart – Location on Map
   B. Equipment - tankers, refueling, etc.
   C. Fire Monitoring
   D. Any other resources
   E. Transition Fire Plan

V. Firing Sequence
   A. Test fire
   B. Type and Sequence of Firing

VI. Radio Assignments
   A. Given Day of Burn
   B. Communication Plan

VII. Safety
   A. Winds
   B. Escape Routes and Safe Zones
   C. Hazards – crew and equipment (wildlife, research plots, trash, etc.)
   D. Personal Protective equipment (PPE)
   E. Refueling – fuel handling, gloves, spilling, etc.
   F. Activation of emergency and headlights on major roads
   G. Other public safety considerations

VIII. Comments and Questions Period

APPENDIX #9

ADEQUATE HOLDING RESOURCES WORKSHEET

Project Name: Units 3, 4, 5, 6, and 7b Fuel Models Inside Project Area: 3

Prepared By/Date: Bobby Bloodworth Fuel Models Outside Project Area: 9

Characteristics	Output type	Modeling Predictions Inside Project Area	Modeling Predictions Outside Project Area	Unit of Measure
CRITICAL FIRE INPUTS	1 Hr Fuel Moisture	8	8	%
	Wind Speed	8	8	MPH
	Slope	5	5	%
KEY FIRE BEHAVIOR OUTPUTS	Rate of Spread	185	16	ch/hr
	Fire line Intensity	2342	102	BTU/ft/sec
	Flame Length	16	3.8	Feet
	POI			%
	Spotting Distance			Miles
	Scorch Height			Feet
FIRE SIZE	Projection Time	.5	1	Hours
	Forward Spread	92.7	16.2	Chains
	Backward Spread	2.7	0.5	Chains
FIRE CONTAINMENT	Method Of Attack	Rear	Rear	Head/Rear
	Max Escape Target	400	100	Acres
	Max Containment Time	5.9	68.6	Hours
	Total Line Building Rate	1372	40	Ch/hr

1. Choose worst case total line building rate above that is needed for containment of slop over or spot fire : 40ch/hr
2. Estimate potential number spot fires or slop overs at on time: 1
3. TOTAL LINE BUILDING RATE NEEDED (multiply line 1 times line 2) 40ch/hr
4. Production Rates: Ease of Access: POOR-FAIR-GOOD-EXCELLEN(circle)
   Fuel Resistance to Control LOW- MODERATE-HIGH-EXTREME(circle)

(refer to fire line handbook) Hand Crew Production 8 ch/hr
Engine Production (Crew of 2) 25 ch/hr
Dozer Production (Type ___) ______ch/hr

On Site Organization	Total # Planned On Burn	Total # Available for Spot Fire or Slop Over Control		Line Building Production Rates		Spot Fire or Slop Over Line Building Capacity
Overhead	1		x	8	ch/hr	
Firing Crew	2	2	X	8	ch/hr	16
Holding	3	2	X	8	ch/hr	16
Other Personnel			X	8	ch/hr	
Engine (Crew of 2)	2	1	X	25	ch/hr	25
Dozer (Size)			X		ch/hr	
Other Equipment: ATV's	2	2	X	8	ch/hr	16

5. TOTAL SLOP OVER OR SPOT FIRE LINE BUILDING RATE CAPACITY 73 ch/hr

6. DETERMINATION OF ADEQUATE HOLDING RESOURCES (Line 5 minus Line 3) 33 ch/hr

If number on line 6 is positive then adequate holding forces will be available. If number is negative, more holding resources are needed to control potential spot fires or slopovers.

APPENDIX #10
POST-PROJECT EVALUATION

Instructions for Completion of Post-Project Evaluation Form

This form is to be completed and submitted for review within 30 days of declaring the project complete.
Block 1 Self-explanatory
Block 2 Copy of the Project Objectives as listed in the Project Plan.
Block 3 Give quantitative results of how well objectives were met, i.e. % of 1 hour and 10 hour fuels removed, % of burn area with fuels reduced, % of area with acceptable/unacceptable scorch, etc.
Block 4 Give a short narrative of problems encountered and suggestions for improving or refining operations and prescriptions i.e. firing pattern, equipment limitations, drought index, effectiveness of barriers.
Block 5 Self-explanatory - for providing feedback to the Program

Block 1)
Individual Leading Evaluation:______________________________

Management:____
Project Name:____________________________________

Acres Treated:____________________________________
Fire Number:_____________________________________

Total Cost:______________________________________
Cost/Acre:____________________

(Block 2)
Objectives:

(Block 3)
Results:

(Block 4)
Problems Encountered, Methods to Improve Next Operation:

Review & Signature:

Burn Boss:____________________________________

Comments:

FMO: ____________________________________

Comments:

APPENDIX #11

PRESCRIBED FIRE MONITORING FORM

RVATIONS FIRE NAME: LOCATION: DATE: OBSERVER:

	ELEV	TIME	WIND DIR	WIND SPEED	DRY BULB	WET BULB	RH/DP	ASPECT	FDRM	PIG	REMARKS

SMOKE OBSERVATIONS

ATION	ROS	ROS DIR	FL	FZD	FUEL MODEL	% SHADING	MIX HGT	DIR	COLOR	VISIBILITY	5% SL

Appendix #12
JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION George Washington Carver NM	3. UNIT Units 3, 4, 5, 6, 7b
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST Scott Bressler	5. JOB TITLE Supervisory Forestry Technician	6. DATE PREPARED 01-18-02

7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGINEERING CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE
1. Ignition Operations	A. Proximity to intense heat and erratic fire behavior.	A. Use Personal Protective Equipment (PPE), maintain close supervision, and lookouts. Thorough briefing on expected fire behavior. Adjust ignition patterns as needed to reduce exposure and fire behavior.
	B. Noise of fire obscures verbal warnings.	B. Handheld radios for all ignition personnel.
	C. Ignition sources.	C. Use only qualified personnel for ignition operations. Igniters stay alert to location of torch flame. Close air vent when not igniting. Make sure that target area is clear before using hand flares or very pistols. Wear proper PPE.
	D. Incorrect ignition locations. Careless ignition use.	D. Thorough briefing of ignition plan. Follow burn boss's instructions. Know location of other igniters and personnel. Radios for all igniters. Close supervision.
	E. Poor footing, heavy fuels accumulation.	E. Be constantly aware; identify hazard areas; slow down.
	F. Poor visibility due to smoke.	F. Post lookouts on roads to gauge visibility. Stage emergency vehicles with headlights and emergency lights on along roads to alert traffic. Use law enforcement to control traffic.
2. Motor Vehicle Operation	A. General operations and public traffic.	A. Defensive driving techniques. Observe posted speed limits and obey all driving laws and regulations. Use spotter when backing. Use headlights while driving.
	B. Secure loads.	B. Check loads for security before departing – use tie downs.
	C. Hauling flammable substances.	

	D. Transporting sharp tools.	C. Use appropriate containers for hauling drip torch fuels and gasoline. Secure containers on vehicle. D. Use guards and secure tools in engine compartments or on vehicles.

JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION George Washington Carver NM	3. UNIT Units 3, 4, 5, 6, 7b
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST Scott Bressler	5. JOB TITLE Supervisory Forestry Technician	6. DATE PREPARED 01-18-02
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGINEERING CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE	
2. Motor Vehicle Operation (Cont.)	E. Loading vehicles. F. Trailer use. G. Smoke on Roadways	E. Use of proper lifting techniques. F. Use safe loading and operation procedures. Refer to Job Hazard Analysis on trailer use. Use spotter when backing. G. Use smoke ahead signs and smoke monitors.	
3. ATV Operation	A. Operation accidents	A. Proper ATV procedures. Refer to Job Hazard Analysis on ATV operations for more detail. Use qualified atv operators and wear DOT approved helmets.	
4.Holding Operations	A. Proximity to intense heat and erratic fire behavior. B. Fatigue C. Excessive Smoke Exposure D. ATV Operations E. Poor visibility due to	A. Use Personal Protective Equipment (PPE), maintain close supervision. Thorough briefing on expected fire behavior. Use appropriate tactics to insure personnel are not subjected to unnecessary heat. B. Rotate personnel on different tasks. Limit smoke exposure. Take adequate breaks. Drink plenty of water. C. Rotate personnel so that one group is not always in the smoke. D. Stay alert and watch for ATV traffic on fireline	

5. Mop-up Operations	smoke. A. Poor footing B. Falling snags	E. Stay alert. Watch for tripping and overhead hazards, sudden drop-offs, ATV traffic. A. Be constantly aware; identify hazard areas; slow down. B. Be alert, post lookouts when necessary. Flag off dangerous areas. Watch for strong winds. Use qualified fallers only.

JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION George Washington Carver NM	3. UNIT Units 3, 4, 5, 6, 7b
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST Scott Bressler	5. JOB TITLE Supervisory Forestry Technician	6. DATE PREPARED 01-18-02
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGINEERING - CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE	
6. Monitoring Operations	C. Fatigue A. Possibility of entrapment B. Proximity to intense heat and erratic fire behavior.	C. Rotate personnel on different tasks. Take adequate breaks. Drink plenty of water. A. Stay in communication and relay location to Burn Boss and Ignition Specialists. Identified escape routes and safe zones in briefing. B. Use Personal Protective Equipment (PPE), maintain close supervision. Thorough briefing on expected fire behavior. Use appropriate tactics to insure personnel are not subjected to unnecessary heat.	

10. SUPERVISOR'S SIGNATURE	11. TITLE	12. DATE

Appendix #13
5 Year Burn Schedule

Fiscal Year	*Burn Unit Name*	*Acres Total*	*Acres Grassland*	*Acres Woods*	*Project Type*	*Project Classific*
2004	Unit 4/South Central Carver Branch	21	11	10	Prescribed Burn	Hazard Fuel Re
2004	Unit 1	4	4	0	Prescribed Burn	Hazard Fuel Re
2004	Unit 2	3.5	3	0.5	Prescribed Burn	Hazard Fuel Redu
2004	7/East Carver Branch/North Central Carver Branch	82	51	31	Prescribed Burn	Hazard Fuel Redu
Totals		110.5	69	41.5		
2005	Unit 4/South Central Carver Branch	21	11	10	Prescribed Burn	Hazard Fuel Redu
2005	Unit 5	42	42	0	Prescribed Burn	Hazard Fuel Re
2005	Unit 3	3	3	0	Prescribed Burn	Hazard Fuel Re
2005	Unit 6/West Carver Branch	17	15	2	Prescribed Burn	Hazard Fuel Redu
2005	Unit 7b/Southeast Carver Branch	5	3	2	Prescribed Burn	Hazard Fuel Re
Totals		88	72	14		
2006	7/East Carver Branch/North Central Carver Branch	82	51	31	Prescribed Burn	Hazard Fuel Redu
2006	Unit 1	4	4	0	Prescribed Burn	Hazard Fuel Re
2006	Unit 2	3.5	3	0.5	Prescribed Burn	Hazard Fuel Redu
2006	Unit 8/Harkin's Area	4.5	1.5	3	Prescribed Burn	Hazard Fuel Redu
Totals		94	59.5	34.5		
2007	Repeat 2005					
2007	Unit 4/South Central Carver Branch	21	11	10	Prescribed Burn	Hazard Fuel Redu
2007	Unit 5	42	42	0	Prescribed Burn	Hazard Fuel Re
2007	Unit 3	3	3	0	Prescribed Burn	Hazard Fuel Redu
2007	Unit 6/West Carver Branch	17	15	2	Prescribed Burn	Hazard Fuel Redu
2007	Unit 7b/Southeast Carver Branch	5	3	2	Prescribed Burn	Hazard Fuel Re
Totals		88	74	14		
2008	Repeat 2006					
2008	7/East Carver Branch/North Central Carver Branch	82	51	31	Prescribed Burn	Hazard Fuel Re
2008	Unit 1	4	4	0	Prescribed Burn	Hazard Fuel Redu
2008	Unit 2	3.5	3	0.5	Prescribed Burn	Hazard Fuel Redu
2008	Unit 8/Harkin's Area	4.5	1.5	3	Prescribed Burn	Hazard Fuel Re
Totals		94	59.5	34.5		

*Note: Five Year Burn schedule was not actually implemented until FY2005, so projects are one year behind schedule.

A. SIGNATURE PAGE

OZARK NATIONAL SCENIC RIVERWAYS
PRESCRIBED FIRE PLAN

UNIT NAME: Stegall Mountain

Prepared By: /s/Scott Bressler ________ Date: 10/02/001
Lead Forestry Technician/Engine Foreman

Reviewed By: /s/Bobby Bloodworth ______ Date: 2/17/06
Fire Management Officer

______________________ Date: __________
Chief Natural Resources

______________________ Date: __________
Chief Ranger

______________________ Date: __________
Missouri Department of Conservation

Regional
Review By: /s/Bobby Bloodworth ________________ Date: 1/29/02
MWR Fuels Specialist

Technical
Review By: /s/Mike Beasly __________ Date: 11/29/01
Fuel Management Specialist
Yosemite National Park

Approved By: ______________________ Date: __________
Superintendent

TABLE OF CONTENTS

APPENDECIES

B. EXECUTIVE SUMMARY

This will be the fifth entry with prescribed fire in this unit. It was previously burned in spring of 1994,1996, 1998 and 2002. The unit is part of Stegall Mountain Natural Area. Missouri Department of Conservation (MDC) and Ozark National Scenic Riverways (ONSR) have jointly developed management direction. Most of the area is a mosaic of glade and Savannah sites, which have become more forested and the glades, therefore, are "in imminent danger of...losing their open glade species."

The goals for this burn are to restore fire and associated natural processes to the natural communities in order to retain species composition and other characteristics of natural communities. This goal was developed jointly by ONSR and MDC during the natural area nomination process and is supported by the ONSR Resource Management Plan (RMP) project statements: OZAR #125 Develop/Implement Natural Area Management Plans; OZAR #73 Monitor and Mitigate Identified Park Threats; OZAR #121 Monitor and Protect Select Vegetation Communities; and OZAR #253 Participate on State Wildlife Management in the Park. The approved 1994 ONSR Fire Management Plan direction is to "maintain natural processes;" it allows prescribed burns "predicated on adequate vegetation studies, prescription development and coordination with adjacent agencies within the Natural Zone." The ONSR glade vegetation study and Stegall Mountain Natural Area Nomination provide the basis for establishing quantifiable objectives, developed through coordination with MDC and ONSR biologists.

C. DESCRIPTION OF PRESCRIBED FIRE AREA

GENERAL AREA:

LOCATION:

Legal:

1. T 28 N, R 2 W, SEC 17, 18, 19, 20
2. Latitude N 37'05 00"
   Longitude W 91'12 30"
3. UTM Zone_____, Easting__. Northing__.

Fire Management Zone: Suppression (Mixed Hardwood Forest).

District: North .

GEOGRAPHIC ATTRIBUTES:

Size: 1015 – 693 acres on Missouri Department of Conservation and 322 on Ozark National Scenic Riverways.

Elevation Range: Upper 1348' – Lower 680' – Change in Elevation 668'

Slope Range: 5-45%

Aspect Range: Generally northwest. East slopes, ridge-tops and west slopes occur on two main ridges.

DESCRIPTION OF PROJECT BOUNDARIES:

This area includes portions of Peck Ranch Wildlife Area managed by the Missouri Department of Conservation and Stegall Mountain near Rocky Falls is managed by Ozark National Scenic Riverways. The area is all in a State Natural Area. The boundary is divided into sections A-J based on landmarks, as indicated on the Project Map. The east boundary is the Ozark Trail (a hiking trail), Kelley Hollow Drainage and an old logging spur from the ridge road to the south. The south boundary is an old logging road and an improved gravel road leading to Stegall Mtn. Lookout Tower. The west boundary is the drainage in White Oak Hollow and 700' of hand-line to Shannon County road #525. The north boundary from west to east includes Shannon County road #525, Rocky Creek and about ½ mile of a dirt road from Rocky Falls to the Ozark Trail at the mouth of Kelley Hollow.

VEGETATION DESCRIPTION:

95% of the fuels adjacent to the unit are classified as Fuel Model 9.

Vegetation type	Fuel Model NFFL	Estimated Acres	Estimated Tons Per Acre
80% Oak-Pine Forest	9	812	3.5
20% Rhyolyte Glades	1	203	4

PROJECT MAP (attachment)

VICINITY MAP (attachment)

D. GOALS AND OBJECTIVES

GOALS

1. Provide for firefighter safety.
2. Burn with 1000 hour fuel moisture of approximately 17-19% to produce a moderately intense burn that will minimize damage to over-story trees, yet maximize the reduction of woody encroachment on glade and Savannah sites.
3. Promote natural ecological processes
4. Reduce hazardous fuels.
5. Promote public awareness and support for the NPS Fire Management Program.
6. Keep the fire from escaping or damaging public or government property.
7. Enhance Wildlife habitat.
8. Protect riparian areas.
9. Provide for training opportunities for firefighters.
10. Provide an opportunity to work with other agencies in a fire environment.

SPECIFIC OBJECTIVES:	PROPOSED REDUCTION WITHIN ONE YEAR	ACTUAL RESULTS
Kill saplings less than 4 inches d.b.h. in upland forest (ELT-ridge and side slope), opening up the stand structure for a more Savannah like appearance.	20-40%	
Top kill blackjack oak, winged elm and winged sumac <2 inches d.b.h. on glades and in glade margins.	70-90%	
Top kill blackjack oak and winged elm >2 inches d.b.h. on glades and in glade margins.	50-70%	
Burn unit with moderate intensity	75-90%	

<u>Range of Acceptable Results Expected Across The Project Area</u>

Throughout the entire unit a mosaic of different levels of fire severity are desired and acceptable.

E. PROJECT COMPLEXITY

This burn rates as a low complexity project that should pose no unusual risks to personnel safety or property. Burn duration will be 24 hours or less, with isolated residual burning expected in fuel jackpots.

HAZARD, RISK AND COMPLEXITY WORKSHEETS (attached)

F. ORGANIZATION

This burn unit overlaps two public ownerships, NPS and MDC. In order to ensure responsibility for the fire resides with an employee of that agency, the burn will be conducted under a unified command structure (I.C.S.). NPS and MDC will share Burn Boss responsibilities. The burn organization will be set up under the I.C.S. structure.

Personnel:

1. Fire Program Coordinators — NPS and MDC
2. Prescribed Burn Bosses — NPS and MDC
3. Division A — TBD
4. Division B — TBD
5. Division C — TBD
6. Group D/Interior Ignition Team — TBD
7. Fire Effects Monitors — NPS and MDC
8. Safety Officer — TBD
9. Fire Weather — TBD
10. Crew: Respective agencies will assign available, qualified individuals to specific teams by day prior to burn.

Burn will be divided into four divisions/groups. Each division will have both ignition and holding personnel assigned. Each division will work an ignition and holding team. MDC will be assigned Division B, C and Group D and will need to provide a Burn Boss, Ignition Crews, Holding Personnel, Holding Bosses and Ignition Bosses. NPS will be assigned Division A and provide a Burn Boss, Ignition Boss, Ignition Crew, Holding Boss and Holding Personnel. NPS will provide two type 6 wildland fire engines with operators that will be utilized in DIV B and C.

There will be one ignition team (Group D) with two persons that will ignite interior portions of the unit.

The structure and terminology of the burn will be under the Incident Command System (I.C.S.). However, personnel will not be required to be NIMS qualified to serve in certain position on this burn. (Example: A person will not be required to be a DIVS in order to supervise activities on a division.)

Equipment:

The Following equipment will be on hand the day of the burn:

NPS
6 Backpack pumps
2 portable pumps
500' of 1" hose
2 chainsaws
10 fire rakes
5 pulaskis
5 shovels
2 ATV's with water
2 Type 6 Wildland Fire Engines
2 Backpack Leaf Blowers
4 Drip Torches
30 Gal Drip Torch Fuel
2 Belt Weather Kits
Radios: Portable and Mobile

MDC
1 Tractor/plow (stand-by in Eminence Area)
1 Slip-on Pumper
2 Chainsaws
10 Fire Rakes
1 Portable Pump
2 Backpack Pumps
2 ATV's w/ water
4 Drip Torches
25 Gal Drip Torch Fuel
2 First Aid Kits
3 Backpack Leaf Blowers
2 Belt Weather Kits
4 Flappers
Radios: Portable and Mobile

Three portable pumps will be available with hose. Most holding will take place with crews and water carrying ATV's. A Type 6 NPS Fire engine with foam will be deployed at the top of Stegall Mountain along with an MDC pumper. Another NPS type 6 engine with foam will be positioned along north boundary road. One dozer (MDC) will be staged (location to be determined the day of the burn).

G. ESTIMATED PROJECT COSTS (non-base, other agency, contract):

FUNCTION	**PROJECTED WORK HOURS/**	**PROJECTED COSTS***
Planning	26/Rx Fire Plan development, site visit	$1000.00
Unit Preparation	78/blow line, hazard tree mitigation, brush hog line	$6500.00
Operations (including burning, holding, mop-up)	208	$11000.00
Monitoring & Evaluation	52 (collateral assignment) site visit coordination between OZAR staff and	$1000.00

TOTAL PROJECTED COST $ 19,500.00 divided by 322 acres = $ 60.56 PER ACRE
*Required information in final report: ACTUAL COSTS, COST PER ACRE, WORK HOURS PER ACRE.

H. SCHEDULING

Proposed Ignition Date:	January 25-April 25, 2006
Projected Burn Duration:	16 hours (8 hrs ignition, 8 hrs burning and 2 days mop-up.)
Actual Ignition Date:	
Date Declared Out:	
Date DI-1202 Submitted:	

I. PRE-BURN CONSIDERATIONS

PREPARATION NEEDS ON SITE:

Preparation tasks are assigned by each agency representative. See appendix 3 for maps of burn unit.

NPS – Remove leaf litter from tread of Ozark Trail and logging spur to Division A-B break. Place torch refueling cans in safe place along perimeter near Points 2 and 4. Orange ribbon will be placed along perimeter to mark hazards such as snags, etc. Hang white ribbon at division breaks and points A-J along perimeter.

MDC – Clear debris from around wooden electric line poles on one mile of Tower electrical line. Put in hand lines three feet wide to mineral soil along upper portion of White Oak Hollow (DIV B) and between White Oak Drainage and Shannon County Road #526. Grade Tower Road. Place refueling cans along perimeter near points 6 and 7. Complete radio coordination and radio checks.

OFF SITE:

1. Coordinate daily weather and burn conditions monitoring with park staff for at least four days prior to ignition date.

2. Ensure notifications are made.

3. Ensure local media is contacted as appropriate.

4. Brief assigned personnel and park staff as appropriate.

5. Burn Bosses will coordinate escape and other wildfire coverage with other NPS Districts, MDC (Eminence 226-3616) and USFS (325-4233).

6. Spot weather forecast will be obtained from NWS in Paducah, KY (502)744-0321

7. Each Burn Boss will ensure agency equipment is prepared 3 days before burn, and personnel are available to fill positions.

Special Precautions/Regulations: (Utility lines, historical sites, safety, etc.)

1. All NPS burn personnel will wear standard fire fighting leather boots, Nomex Pants and Shirt, leather gloves and hard had. NPS personnel will carry a fire shelter at all times. MDC personnel will meet agency specific requirements for PPE.

2. All standard wildland firefighter safety rules (LCES and 10 standard orders) will be strictly enforced (see Fireline Handbook).

3. NEPA compliance. The ONSR Resource Management Plan and Fire Management Plan which has an accompanying E.A. identifies prescribed burning as a permitted activity in the natural zone. No rare or endangered species are known to be in the area, except for state-listed *Viola Cuculatta,* which grows in a wet seep near Rocky Falls that is too wet to burn.

4. Fire Tower – It is bordered by >10 feet of green grass and a large gravel parking area on the north side. Heat from fire is a concern, so area within 100' should be burned out slowly, using water/foam if needed to limit heat production.

5. Electric ROW – Watch for arcing in heavy smoke. Rake around poles to prevent them from catching fire.

6. No foam concentrate or solution will be handled, mixed or sprayed within 50' of any water source, including wet seeps containing *Viola Cuculatta.*

7. Minimize smoke concentrations by burning with a daytime visibility of at least 6 miles and a minimum mixing height of 500 meters (1640 feet); a transport windspeed of at least 9 mph and a following nighttime forecast of no area fog and a minimum nightime 20' windspeed of 6 mph.

8. The ignition team lighting spot fires on central ridge will have radios and stay in visual contact of each other during ignition. Safety zones will be in rocky areas of glades.

9. The ignition team lighting in Terrapin Hollow will light walking down hollow toward Shannon County Road #525. Safety zones will be downhill, staying in the stream channel, to the road.

J. PRESCRIBED FIRE PRESCRIPTION

NFFL Fuel Models used: 80% FM 9 – 20% FM 3

PRESCRIPTION

Weather	Range
Temperature F	55-75
Relative Humidity %	22-45%
Wind Direction	SSE-N (Prefer SW)
Mid Flame Wind Speed	2-5
Fuel Moisture (1 hour)	5-10%
(10 hour)	8-12%
(100 hour)	15-21%
Mixing height	1500'
Transport winds	9

FIRE CHARACTERISTICS
This unit should be burned under moderate conditions that produce a fire severity low enough to retain over-story trees, but high enough to open up the under-story, reduce the dead biomass and minimize smoke. Characteristics are based on a head fire.

Characteristics	Range
Rate of Spread (chains/hour)	1.5-12.5
Flame Length (feet)	1.4-3.6
Fireline Intensity (btu/ft/s)	11-89

K. IGNITION AND HOLDING ACTIONS

All personnel will attend briefing prior to burn. Tactics and assignments will be covered. Lookouts, Communications, Escape Routes and Safety Zones will be discussed. Individual job assignments and instructions will be given to each crew-member. Maps, firing and contingency plans will be made available to each crew-member.

Firing and Ignition:
A test fire will be set near the tower at point 1 (see appendix 3). Both ignition teams and all holding resources will be located at the test fire site. After test fire, a two-person ignition team (Group D) will ignite the central ridge starting near Point 11 and light towards the tower (Point 1). At the same time, one ignition team will black-line the top part of the burn near the tower and roads. Coordinated perimeter ignition will then take place down White Oak Hollow and Kelley Hollow. After significant progress has been made, another ignition team (Group D) will ignite Terrapin Hollow. All three-ignition teams should reach the bottom of the unit at the same time then finish by igniting the bottom from Points 3-5 and Points 7-5. Close coordination via radio will be necessary between ignition and holding personnel to ensure that the operation proceeds safely and efficiently.

Firing Sequence:
Refer to Appendix 3 for a map illustrating the ignition sequence.

If prescription parameters are exceeded during project execution, the Burn Boss should terminate ignition operations at a safe and appropriate location based on fire behavior, fuels topography and weather conditions. If the project area comes back into prescription based on current and forecasted weather, ignition operations may continue. If not, the project area is put into a mop-up and patrol status. Holding actions shall maintain control of the fire until a decision to continue, postpone or extinguish the prescribed fire is made and the Agency Administrator or their designee is notified. The Burn Boss will document this decision process on a unit log.

Holding Actions:
Each division will have ignition and holding personnel. Holding teams will secure the fire line with engines, ATV's and hand-tools. Engines and water carrying ATV's will patrol behind ignition teams lighting from roads and trails. Water sources (drafting sites, etc.) will be identified on the project map.

Mop-Up Operations:
Mop-up will occur only for the purpose of maintaining control of the burn. Jackpots, snags, or problem areas will be secured through the use of water or foam. Chainsaw and handtools will only be used when other methods are not practical.

L. WILDLAND FIRE TRANSITION PLAN

1. Stage an MDC dozer within a ten-minute response time prior to ignition. Coordinate with Eminence District Forester.

2. The secondary lines will be Kelley Creek on the east, The Ozark Trail on the southeast, Rocky Creek on the north and northwest and the woods trail out Mule Mountain south of White Oak Hollow.

3. Minor Escape-Spot fires and slop-overs that fall within the secondary lines and are controllable with hand crews-holding crews will suppress spot fires or slop-overs, and ignition may continue.

4. Major Escape-Spot fires regardless of location that can not be fought with hand crews. On NPS land, the NPS Burn Boss will be IC. On state lands, the MDC Burn Boss will be IC. The Burn Boss will notify **MDC-Eminence (573-226-3616), USFS-Winona (573-325-4143) and NPS-Van Buren (573-323-4236 ext.233)** and request for state dozer and crews if needed. An ICT3 will be available through the Forest Service in Winona.
5. If the escape cannot be contained within 1 burning period by on-site personnel, the fire will be converted to a wildland fire and resources will be ordered as needed by the IC.
6. The Burn Boss will coordinate safety considerations with the section leaders (Holding, Ignition, and Monitoring) to provide and ensure the safety of ALL personnel assigned. All personnel will be assigned holding or suppression duties.

M. PROTECTION OF SENSITIVE FEATURES

The fire tower and adjacent radio building will be protected with a wet line and a black line around their perimeters. The NPS Historian will do an on-site inspection for cultural resources on NPS lands. If any cultural or historical areas are found to be in the unit, burn personnel will be notified and measures will be taken to protect those areas.

N. PUBLIC AND PERSONNEL SAFETY

1. A safety briefing will be given at the pre-burn briefing and at the start of each operational period. All personnel will be advised of Lookouts, Communications, Escape Routes, and Safety Zones. Any other potential safety hazards will be pointed out and mitigated as soon as possible upon identification of hazard.

2. All NPS burn personnel will wear standard firefighting personal protective equipment (leather boots, leather gloves, Nomex Clothing and hard hat). They will carry a fire shelter and fire tool at all times. MDC personnel will adhere to that agency's requirements for PPE.

3. Only red-carded personnel or cooperators who meet their own agency's qualifications will be utilized during the burn.

4. All standard wildland firefighter safety rules will be strictly enforced (ref: Fireline Handbook).

5. H Highway and NN Highway will be signed to warn motorists of smoke along the road. If necessary, a road guard will be placed on the road to slow traffic. Visibility will be monitored on the highways during the burn and also after dark.

6. The public will be kept at a safe distance from the fire lines.

7. Escape Routes and Safety Zones will be identified prior to the burn.

8. EMERGENCY MEDICAL PROCEDURES:

- EMT or First Responder assigned the day of the burn.
- First Aid equipment available and location made known to all burn personnel.
- Burn Boss notified immediately of injury.
- Burn Boss will coordinate with EMT/First Responder.
- Burn Boss will notify Park Dispatch of an injury and will follow up with information as soon as the injury has been assessed.
- EMT/First Responder will assess injury and begin treatment.
- Once injury has been assessed, the Burn Boss or designee will activate the appropriate EMS response for evacuation of injured personnel.
- If personnel need to be evacuated, park dispatch will dispatch/contact EMS resources from the following table:

RESOURCE	CONTACT PHONE NUMBER	LOCATION
Eminence Ambulance/Sheriff Winona Ambulance	573-226-3615 800-262-3477	Eminence, MO Winona, MO
St. Francis Hospital	417-934-2246	Mtn. View, MO
Life Flight Dispatch Air Evac 1	800-247-3822	 West Plains, MO

O. SMOKE MANAGEMENT AND AIR QUALITY

This area is remote with few nearby residences. The nearest towns are Eminence 10 miles NW, Winona 8 miles SW, Ellington 17 miles NE, Bunker 25 miles N, Fremont 10 miles S and Van Buren 12 miles SE. One person will periodically check H and NN highways to ensure at least 1.5 miles visibility is maintained.

COMPLIANCE:

In the state of Missouri, prescribed fire is considered to be agricultural burning and there are no burn or smoke permit requirements to ignite a prescribed burn. However, agency standards require meeting minimum requirements for mixing height and transport winds. The minimum mixing height is 1500 feet and a minimum transport wind of 9 mph. A smoke management forecast will be obtained the day of the prescribed burn and attached to the plan.

MODELING:

A smoke projection map is attached for all proposed wind directions.

MITIGATION:

Smoke production will be light to moderate, but will lift and disperse adequately as long as the burn is conducted within smoke management guidelines.

P. INTERAGENCY COORDINATION AND PUBLIC NOTIFICATION

1. The park Fire Education, Prevention and Information Specialist will handle press releases a minimum of two (2) days before the burn. Generally a single media release made prior to the particular burn season (fall or spring) suffices.

2. Fire management staff will notify the following at least one week prior to the proposed ignition date:
   - Park Superintendent
   - Senior Management Staff & District Rangers

3. NPS Fire management staff will notify the following at least two days prior to the proposed ignition date:

Missouri Department of Conservation	573-226-3616
USFS	573-325-4233
MOCC in Rolla, MO	573-341-7484
MWRO (Connie Burns)	402-221-3476
National Weather Service – Paducah, KY	502-744-0321

MDC Burn Boss will contact local landowners, The Nature Conservancy and local volunteer fire departments (Eminence and Winona).

**Notifications are to be made the day of the burn, the day before by either the Burn Boss, Fire Program Clerk, Fire Management Officer or designated person. Notifications will be recorded into dispatcher's log and on the original burn plan with the time, date and agency/person notified.

AGENCY/PERSON CONTACTED	DATE	TIME	CONTACTED BY

Q. MONITORING AND EVALUATION PROCEDURES

The monitoring will include fire weather; fuel moisture; fire behavior; burn emissions; post fire effects on vegetation; and a video tape of burn at one hour intervals from Stegall Tower area (unless MDC films the burn from a helicopter).

Fire weather monitoring will include comparison of spot weather forecasts with on-site observations for wind speed and direction, temperature, and relative humidity taken every hour while the burn is in progress.

Fuel moistures for 10 hour fuels will be collected and dried to determine fuel moistures. On-site readings will be compared with fuel stick moistures at the Big Springs Automated Weather Station on at least 3 days prior to the burn.

Several agencies including the NPS, MDC, NBS, University of Missouri and Washington University have extensive monitoring plots located on Stegall Mountain. The following is a list of fire monitoring projects that are occurring:
Alan Rebertus and Richard Guyette-Fire history, Ecotones, landscape patterns, tree morality and recruitment
Gary Wilson-Same
Dr. Templeton- Collared lizards
Dr. Van Gilder-Turkeys
Lisa Thomas-Herbaceous species response
Before ignition of the burn unit begins, an on-site weather observation will be taken no more than 30 minutes prior to ignition. The burn boss or designated person will be responsible for obtaining a fire weather and smoke management forecast for the day of the burn.

The nearest associated NFDRS/WIMS station is at Van Buren (#031201). Outputs from this station will be tracked, beginning at least one week prior to the proposed ignition date. Spot weather forecasts will be requested prior to the burn and each consecutive day of the burn from the **Paducah, KY NWS** office (502-744-0321). Actual on-site weather information will be reported back to the weather forecaster to help improve the forecasts during the burn.

Burn emissions will be monitored by mapping plume trajectory at least three times during the burn. Background visibility will be estimated directly downwind in miles from Stegall Tower prior to and after ignition is completed.

POST-BURN:

Post burn monitoring will occur as Resource and Fire Management staff in consultation with Midwest Region and Ozark Ecoregion Fire Ecologists determines the need.

R. POST FIRE REHABILITATION

"Light Hand on the Land" guidelines will be used to help minimize rehab needs. The following list of standards for the rehabilitation burn units can be adjusted for specific burn unit needs.

1. Flush cut stumps.
2. Remove flagging.
3. Build water bars on fire lines that are located on steep slopes.
4. Cover firelines to blend in with surrounding vegetation **after** the fire has been declared out.
5. Repair or stabilize damage to road shoulders.
6. Snag hazard trees at the discretion of the burn boss and holding specialist.

7. Close all access created by fire personnel and equipment.
8. Any other rehab as directed by appropriate Resource Management personnel.

No special rehab needs are anticipated for this burn unit.

S. POST FIRE REPORTS

Post fire reports shall be the responsibility of the burn boss and should be submitted within seven (7) days of the completion of the burn to the Ozark National Scenic Riverways Fire Management Office. The Fire Management Officer and Fire Program Assistant (FPA) will incorporate any long-term monitoring data or reports into the burn documentation package as they come available. The FPA will be responsible for entering required prescribed fire reporting information, including the 1202 and employee experience records, into SACS when they become available.

<u>Documentation Package</u>:

Documentation	YES	NO	N/A
1. Original Signed Plan			
2. All Reviewer Comments			
3. All Maps			
4. Notification Checklist			
5. Permits			
6. Weather Forecast			
7. Smoke Forecast			
8. Agency Administrator Go/No Go Checklist			
9. Operational Go/No Go Checklist			
10. Daily Validation			
11. Unit Logs			
12. Enter into Prescribed Files by FPA			
13. 1202 Completed and Entered into SACS			

T. APPENDICES

1. Technical Reviewer Checklist and Comments
2. Reviewers' Comments
3. Maps
4. Risk Mitigation and Complexity Worksheets
5. Fire Modeling Outputs
6. Agency Administrator Go/No-Go Pre-ignition Approval
7. Prescribed Fire Operations Go/No-Go Checklist
8. IAP/Briefing Guide
9. Adequate Holding Resources Worksheet
10. Post-Project Analysis
11. Prescribed Fire Monitoring Form

APPENDIX #1
PRESCRIBED FIRE PLAN - TECHNICAL REVIEW

Park:______________________________________

Project Name:________________________________

Prescribed Fire Plan Elements		Status	Date	Initial
a.	Signature Page			
b.	Executive Summary			
c.	Description of Prescribed Fire Area			
d.	Goals and Objectives			
e.	Project Complexity/Risk			
f.	Organization			
g.	Cost			
h.	Scheduling			
i.	Preburn Considerations			
j.	Prescription			
k.	Ignition & Holding Actions			
l.	Wildland Fire Transition Plan			
m.	Protection of Sensitive Features			
n.	Public and Firefighter Safety			
o.	Smoke Management			
p.	Interagency Coordination and Public Information			
q.	Monitoring			
r.	Post Fire Rehabilitation			
s,	Post Fire Reports			
t.	Appendices			

Status Coding:
+ Adequate – Meets NPS Standards
0 Adequate with modification. See comments.
- Deficient. See comments.
NC Unable to evaluate.

Comments:

Signature:_______________________________________ Date:_________________________

Title:________________________________ Office:____________________________________

APPENDIX #2
REVIEWERS' COMMENTS

Fire Management Officer:
This plan has been updated to reflect FY2006 dates and costs. My name appears on two signature lines. I reviewed the original plan as the MWR fuels specialist and now I am the FMO for Ozark NSR.

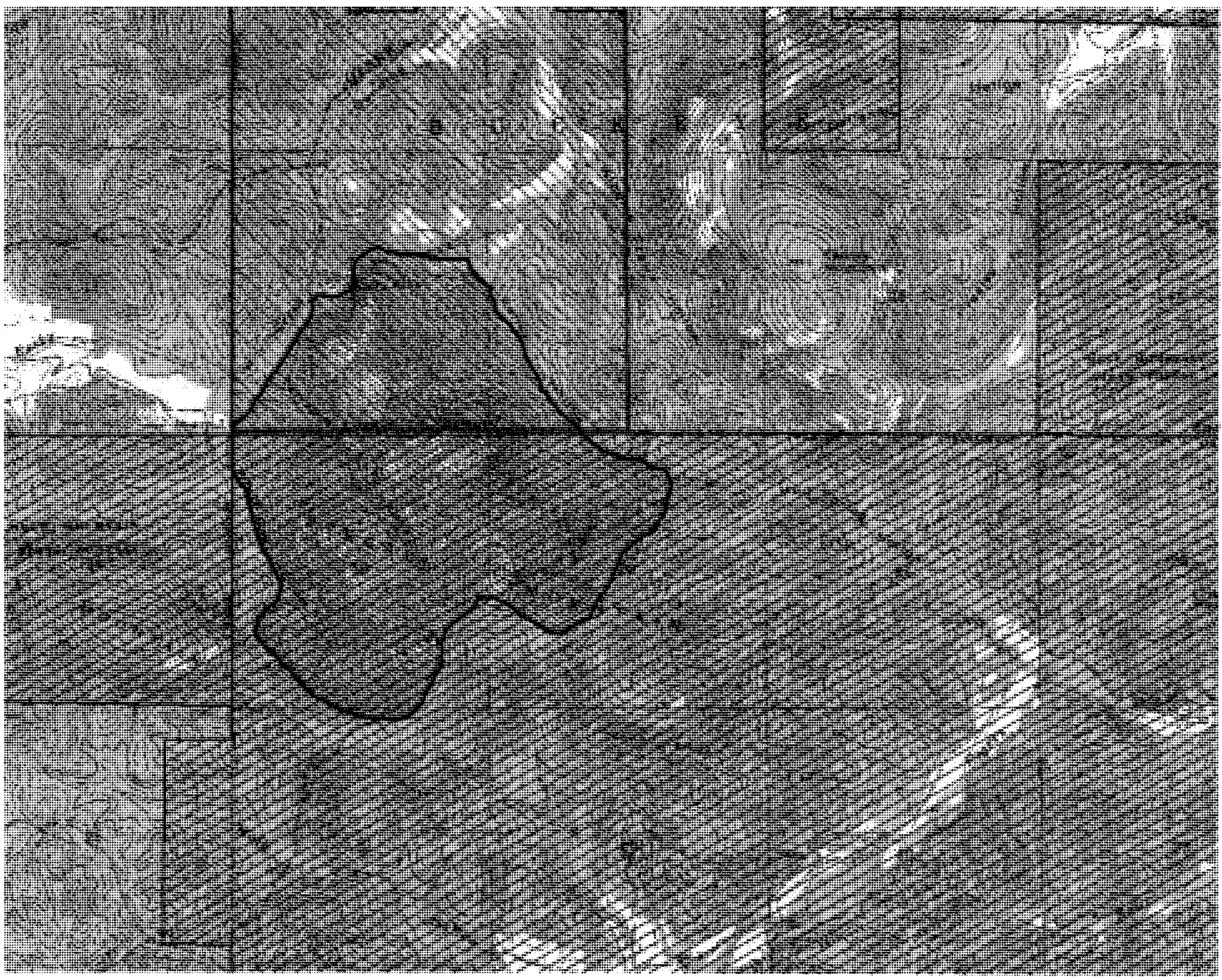
Chief Ranger:

Chief of Natural Resources:

Park Superintendent:

APPENDIX #3

ATTACH MAPS HERE



APPENDIX#4
Stegall Mountain Prescribed Fire
Hazard Rating Guide

Hazard Element	Hazard Probability L	Hazard Probability M	Hazard Probability H	Potential Consequences L	Potential Consequences M	Potential Consequences H
Environmental Data						
a. Seasonal severity	Energy Release Component below 90th percentile levels.	Energy Release Component at or above 90 th percentile levels – above average drought conditions.	Energy Release Component at or above 97th percentile levels – severe drought conditions.	Low probability for problematic fire behavior or difficulty in holding activities.	Some potential for problematic fire behavior or difficulty in holding activities.	High probability problematic fire behavior and difficulty in cont
b. Fire Behavior	Flame lengths confined to surface fuels, spread rates low.	Flame lengths extending into shrub and tree regeneration, spread rates moderate.	Flame lengths highly variable, frequently involving individual tree crowns, spread rates moderate to fast.	Low probability of difficulty in holding fire or for adverse fire effects.	Some potential for fire behavior to approach upper prescription limits and cause undesirable effects.	High potential fo fire behavior to create holding problems, exce prescription ranges, and cau undesirable effe
c. Fuels	Surface fuels light with open tree canopies, small shrub component present.	Surface fuels moderate with variable forest stand density and moderate shrub presence.	High surface fuel loading with dense shrub component and dense stands with abundant regeneration.	Fuels present no specific implementation problems.	Fuels will have a marked effect on implementation activities and holding force requirements.	Fuels will dramatically aff management organization an qualifications fo implementation
d. Weather	Weather stable, winds light and predictable, no frontal activity.	Weather slightly variable, winds present but light, occasional gusts, no frontal activity.	Weather highly variable, winds near prescriptive limits, gusts prevalent, frontal activity possible.	Little impact on implementation.	Weather variation will require mitigation actions involving additional resources.	Weather will se as a major influence on organization, personnel qualifications, a specific implementation actions.
e. Topography	Low variability in slope and aspect.	Some variability in slope and aspect, will affect fuel moisture and fire behavior.	High variability in slope and aspect, major implications on fire behavior and must be considered in prescription development and implementation.	Little influence on burn implementation.	Consideration of topography during planning process is necessary.	Topography wil necessitate mitigation actio to be develope and firing patte and ignition methods to be modified to redu impacts.

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Agency Values						
a. Ecological and Environmental Considerations	Fire poses little threat to cause adverse effects or long- term disturbances to natural resource values. No T and E species or critical habitat.	Fire poses moderate threat of adverse effects on natural resources and may cause short- to mid- term alterations or inconveniences such as air quality. Small amounts of T and E species present.	Fire poses high potential for adverse effects to natural resource values or to cause long- term degradations in air quality. Some T and E species present and/ or critical habitat.	Low probability for adverse impacts and little need for mitigation actions.	Mitigation actions may need to be developed to ensure desirable outcomes. Some short- term effects may have to be accepted.	Prescribed Fire Plan must addre mitigation actior to prevent undesirable outcomes.
b. Social and Cultural Values	No known social or cultural values in or adjacent to the project area.	Features of social or cultural value have been identified in and adjacent to the project area. Mitigation measures can be accomplished.	High social or cultural values have been identified in or adjacent to the project area. Mitigation actions are difficult to accomplish.	Severe fire behavior or fire outside the unit would not damage the identified values.	Severe fire behavior or fire outside the unit poses potential for moderate damage to special values. Concerned parties are aware and supportive of the project.	Excessive fire severity or fire outside the unit have adverse effects (substan damage to or potential destruction of th special sites). Acceptance by concerned parti is low.
c. Project Duration and Logistics	Fire planned to be of short duration, logistical needs easily accommodated.	Fire planned to be of short to moderate duration, logistical needs pose some difficulty.	Fire planned to be of moderate to long duration, logistical needs create much difficulty in accomplishing.	No consequences because of duration or logistics.	Duration may impact firefighters and public and logistical needs must be specifically addressed.	Long duration fi necessitates greater informat dissemination, mitigation to remove impacts firefighters and t public, and logistical needs must be met or project postpone
d. Smoke and Air Quality Management	Few smoke sensitive areas near project area. No potential scheduling conflicts with cooperators.	Multiple smoke sensitive areas, mitigation actions minimize impacts, low potential for scheduling conflicts.	Multiple smoke sensitive areas near burn area, mitigation actions unable to remove all impacts, duration increases impacts, high potential for scheduling conflicts.	No adverse smoke consequences.	Mitigation actions must address smoke impacts, and coordination is required to confirm scheduling.	Mitigation actior must be develop regulatory agen must concur, scheduling confl may restrict implementation.

Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
Public Values						
a. Land use values	No commercial or agriculture activities near planned burn area.	Some commercial or agricultural activities near burn unit, some managed wildlands (recreation, timber, range values).	Planned burn directly adjacent to urban, commercial, and/ or agriculture areas.	No impacts from land use values.	Escaped fire onto nearby managed land causes some impacts to commercial values. Prescribed Fire Plan must consider actions to prevent fire movement onto commercial and/ or agriculture lands.	Escaped fire on nearby manage land causes significant impa to commercial values. Mitigatio actions must ref additional resou needs to protec urban, commerc and/ or agricult areas. If mitigati cannot be accomplished, b must be postponed.
b. Dwellings	No permanent or part-time residences present in area.	Some residences ½ mile or less from burn area.	Planned burn is located in wildland-urban interface zone, permanent residences in close proximity.	No impacts from dwellings.	Plan must address actions to ensure adequate protection of residences.	Notification of a concerned homeowners, residents, and visitors, coordination wit local fire protect organizations is needed, and mitigation actior must adequatel address potenti fire escapes.
c. Non-dwellings	No non- dwellings present.	Some outbuildings and non- residences ½ mile or less from burn area.	Commercial structures in close proximity to burn area.	No impacts.	Planning must consider these non- dwellings.	Planning and implementation must adequatel address all measures to prevent any adverse impact

Human Factors						
a. Firefighter	Little firefighter exposure.	Some firefighter exposure due to fire duration and smoke.	Potential for high firefighter exposure to smoke during burn and to fire during holding actions.	No specific problems, implement standard safety measures.	Mitigation measures to eliminate smoke exposure.	Mitigation measures must address smoke exposure, use o mechanized equipment to eliminate expos to fire.
b. Public	No public exposure.	Some public exposure, mitigation actions can remove/ minimize exposure.	Public may be exposed to high smoke concentrations for moderately long periods, especially during nighttime hours.	No adverse consequences anticipated.	Mitigation actions necessary to provide for maximum public safety.	Mitigation actior must be develop coordinated with other emergenc organizations ar fully understood prior to ignition.
c. Fire Management	No problems with commitment and acceptance by park staff members.	No problems with commitment but some unwillingness to support and prioritize the prescribed fire over other activities.	Park staff not committed to using prescribed fire as a tool and not willing to support and prioritize prescribed fire over other activities.	No adverse consequences.	Park staff must be briefed on need and importance of prescribed fire.	Park manageme team must be informed of prescribed fire objectives, supp needs, and prio

PRESCRIBED FIRE RISK ANALYSIS WORKSHEET

Hazard Element	Hazard Probability			Potential Consequences			*Risk (Exhibit 4)
	L	M	H	L	M	H	
1. Environmental Data							
a. Seasonal severity		X		X			M
b. Fire Behavior		X		X			M
c. Fuels		X		X			L
d. Weather		X		X			M
e. Topography		X		X			M
2. Agency Values							
a. Ecological and Environmental Considerations	X			X			L
b. Social and Cultural Values	X			X			L
c. Project Duration and Logistics	X			X			L
d. Smoke and Air Quality Management	X			X			L
3. Public Values							
a. Land use values	X			X			L
b. Dwellings	X			X			L
c. Non-dwellings	X			X			L
4. Human Factors							
a. Firefighter		X			X		M
b. Public	X			X			L
c. Fire Management	X			X			L

PRESCRIBED FIRE RISK MITIGATION TABLE

Hazard Element	Risk	Mitigations / Controls Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.	Residual Risk	Referen In Prescri Fire Plan
Environmental Data				
a. Seasonal Severity	M	The ignition methods will be adjusted to reflect the time of year, day, fuel, and weather conditions.	L	F. Organiza K. Ignition a Holding Act
b. Fire Behavior	M	Firing patterns and directions will change depending on wind direction and fire behavior.	L	K. Ignition a Holding Act
c. Fuels	L	.		
d. Weather	M	Firing patterns and ignition times will be dependent upon the weather meeting prescription parameters. If weather exceeds prescription parameters, the burn will not be implemented.	L	K. Ignition a Holding Act Test Fire, Fi and Ignition
e. Topography	M	Firing patterns and ignition techniques will take advantage of the topography to maintain safety and achieve the objectives.	L	K. Ignition a Holding Act Test Fire, Fi and Ignition
Agency Values				
a. Ecological and environmental considerations	L			
b. Social and Cultural values	L			-
c. Project duration and logistics	L			
d. Smoke and Air Quality Management	L			
Hazard Element	Risk	Mitigations / Controls	Residual Risk	Referen

		Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.		In Prescri[bed] Fire Plan
Public Values				
a. Land use values	L	________	____	____
b. Dwellings	M	Stegall Mountain Lookout Tower and outbuildings will be protected using engines and ATV's.	L	K. Ignition a[nd] Holding
c. Non-dwellings	L	________	____	____
Human Factors				
a. Firefighter	M	Burn Boss will ensure that a complete safety briefing is provided for all assigned personnel. All standard wildland firefighter safety rules will be strictly enforced (ref. Fireline Handbook). Effects of smoke will be managed by limiting prolonged exposure for holding personnel as much as possible. Complete mitigation of smoke exposure hazard may not be possible.	M	N. Public a[nd] Personnel Safety
b. Public	L	________	L	____
c. Fire Management	L	________	L	____

PRESCRIBED FIRE COMPLEXITY RATING WORKSHEET

	Complexity Element	L	M	H
		Complexity Value		
Primary Factors	1. Life and Safety	X		
	2. Threats to Boundaries	X		
	3. Management Organization		X	
	4. Political Concerns		X	
	SUBTOTAL OF PRIMARY FACTORS	2	2	
Secondary Factors	5. Objectives	X		
	6. Fuels and Fire Behavior		X	
	7. Air Quality Values	X		
	8. Improvements	X		
	9. Logistics	X		
	10. Natural, Cultural and Social Values	X		
	11. Tactical Operations		X	
	12. Interagency Coordination		X	
	SUBTOTAL OF SECONDARY FACTORS	5	3	
	TOTAL COUNT OF COMPLEXITY VALUES	7	5	

QUALIFICATIONS DETERMINATION TABLE:

	Prescribed Fire Burn Boss Type 2 (RXB2)	Prescribed Fire Burn Boss Type 1 (RXB1)
Primary Factors rated "H"	Less than 2	2 or more
	AND	OR
Total Count rated "H"	Less than 4	4 or more
		OR
	Minimum required on all prescribed fires.	When deemed appropriate by the agency administrator or unit Fire Management Officer.

Prescribed Fire Burn Boss Level Indicated (check one):	**RXB1**		**RXB2**	**X**

PREPARED BY: /s/ Scott Bressler DATE: 09-14-01

APPROVAL BY: ______________________ DATE: ______________
Agency Administrator

REVIEWED BY: ______________________ DATE: ______________
(Burn Boss immediately prior to burning

APPENDIX #5

FIRE MODELING OUTPUTS (Fuel Model 9)

APPENDIX #6
AGENCY ADMINISTRATOR
GO/NO-GO PRE-IGNITION APPROVAL

Prescribed Fire Name: Date:

A) Instructions
The Agency Administrator's Go/No-Go Pre-Ignition Approval is the first of two GO/NO-GO decisions that must be completed before a prescribed fire can be implemented. The Agency Administrator's Go/No-Go Pre-Ignition Approval is the final management approval prior to execution of the prescribed fire and evaluates whether compliance requirements, prescribed fire plan elements, and internal and external notifications have been completed. The Agency Administrator's Go/No-Go Pre-Ignition Approval is valid for 30 days. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

B) Key Elements
1. Is the prescribed fire plan up to date?
   Hints: changes, amendments, seasonality.

2. Have all compliance requirements been completed?
   Hints: cultural, threatened and endangered species, smoke management.

3. Is risk management in place and the residual risk acceptable?
   Hints: Prescribed Fire Mitigation Table and Prescribed Fire Complexity Rating Guide completed with rationale and mitigations identified.

4. Will all elements of the prescribed fire plan be met?
   Hint: preparation work, mitigation, weather, organization, prescription.

5. Have all internal and external notifications and media releases been completed?

6. Are key park staff fully briefed, and understand the implementation of the prescribed fire?

7. Other?

Recommended by: ______________________________ Date ________________
FMO/Burn Boss

Approved by: ______________________________ Date________________
Park Superintendent

Approval expires: ____________ (May not be more than 30 days after approved date.)
Date

APPENDIX #7
Prescribed Fire Operations
GO/NO-GO Checklist

Prescribed Fire Name: Date:

	YES	NO
- Has Agency Administrator GO/NO-GO Pre-Ignition Approval been approved?		
Narrative/Comments:		
- Are current and forecasted weather conditions favorable for execution of the prescribed fire? (hints: spot weather, dialogue with fire weather forecaster, climatological analysis complete)		
Narrative/Comments:		
- Have all key personnel listed on the Incident Action Plan (IAP) been briefed with an opportunity to give feedback? (hints: safety, objectives, assignments)		
Narrative/Comments:		
- Has all pre-burn preparedness work been completed? (hints: fuels and weather observations, signs, closures, smoke management, unit preparation)		
Narrative/Comments:		
- Are all equipment and supplies required in the prescribed fire plan in place and functional? (hints: pumps, radios, ignition devices, hose lays, vehicles, aviation, etc.)		
Narrative/Comments:		
- Are all holding resources described in the IAP committed and can be on-scene within specified time frames?		
Narrative/Comments:		
- Are all personnel certified for their assigned positions? (hints: Check Red Cards)		
Narrative/Comments:		
- There are no extenuating circumstances that preclude successful completion of this project? (hints: regional & national preparedness, unusual circumstances, unusual drought, outstanding issues, other fires, recent fire escapes, etc.)		
Narrative/Comments:		
IF ALL BOXES HAVE BEEN CHECKED "YES" YOU MAY PROCEED WITH THE TEST FIRE.		

	YES	NO
TEST FIRE DOCUMENTATION AND RESULTS:		
- Observed Fire Behavior within Prescription?		
Narrative/Comments:		
- Test fire was successful?		
Narrative/Comments:		
- Are all prescription parameters in the prescribed fire plan favorable for implementing the project? (hints: each plan element, pre-burn, smoke management, cooperator coordination)		
Narrative/Comments:		
IF LAST 3 BOXES ARE ALL "YES", YOU MAY PROCEED WITH PRESCRIBED FIRE.		

Signatures

RX BURN BOSS:	IGNITION SPECIALIST:
HOLDING OPERATIONS:	DATE:

APPENDIX #8

IAP/BRIEFING GUIDE

I. Present Handouts

- **A. Map of Burn**
- **B. Organization Chart**

II. Describe Area Of Burn

- **A. Vegetation Type**
- **B. Acreage**
- **C. Slope**
- **D. Roads/Access**
- **E. High Values at risk**
- **F. Water Sources-natural, tanker and hydrants**
- **G. Natural/Manmade barriers**

III. Weather Forecast- Use National Weather Service "Forestry" and "Smoke Management" Forecasts for applicable Zones. Use "Fire Weather Special Request" Form if updates are deemed necessary.

- **A. Wind direction and Speed**
- **B. Relative Humidity**
- **C. Temperatures**
- **D. Predicted Changes**

IV. Organization

- **A. Organization Chart – Location on Map**
- **B. Equipment - tankers, refueling, etc.**
- **C. Fire Monitoring**
- **D. Any other resources**
- **E. Transition Fire Plan**

V. Firing Sequence

- **A. Test fire**
- **B. Type and Sequence of Firing**

VI. Radio Assignments

- **A. Given Day of Burn**
- **B. Communication Plan**

VII. Safety

- **A. Winds**
- **B. Escape Routes and Safe Zones**
- **C. Hazards – crew and equipment (wildlife, research plots, trash, etc.)**
- **D. Personal Protective equipment (PPE)**
- **E. Refueling – fuel handling, gloves, spilling, etc.**
- **F. Activation of emergency and headlights on major roads**
- **G. Other public safety considerations**

VIII. Comments and Questions Period

APPENDIX #9

ADEQUATE HOLDING RESOURCES WORKSHEET

Project Name: Stegall Mountain RX Fuel Models Inside Project Area: 9

Prepared By/Date: Scott Bressler 09-14-01 Fuel Models Outside Project Area: 9

Characteristics	Output type	Modeling Predictions Inside Project Area	Modeling Predictions Outside Project Area	Unit of Measure
CRITICAL FIRE INPUTS	1 Hr Fuel Moisture		5	%
	Wind Speed		5	MPH
	Slope		45	%
KEY FIRE BEHAVIOR OUTPUTS	Rate of Spread		13	ch/hr
	Fire line Intensity		89	BTU/ft/sec
	Flame Length		3.6	Feet
	POI		60	%
	Spotting Distance			Miles
	Scorch Height			Feet
FIRE SIZE	Projection Time		1	Hours
	Forward Spread		12.5	Chains
	Backward Spread		0.6	Chains
FIRE CONTAINMENT	Method Of Attack		Rear	Head/Rear
	Max Escape Target		200	Acres
	Max Containment Time		10.5	Hours
	Total Line Building Rate		28	Ch/hr

1. Choose worst case total line building rate above that is needed for containment of slop over or spot fire : 28ch/hr
2. Estimate potential number spot fires or slop overs at on time: 1
3. TOTAL LINE BUILDING RATE NEEDED (multiply line 1 times line 2) 28ch/hr
4. Production Rates: Ease of Access: POOR-FAIR-GOOD-EXCELLEN(circle)
   Fuel Resistance to Control LOW- MODERATE-HIGH-EXTREME(circle)

(refer to fire line handbook) Hand Crew Production 8 ch/hr
Engine Production (Crew of 2) 25 ch/hr
Dozer Production (Type ___) ch/hr

On Site Organization	Total # Planned On Burn	Total # Available for Spot Fire or Slop Over Control		Line Building Production Rates		Spot Fire or Slop Over Line Building Capacity
Overhead	6	3	X	8	ch/hr	24
Firing Crew	10	4	X	8	ch/hr	32
Holding	15	6	X	8	ch/hr	48
Other Personnel			X	8	ch/hr	
Engine (Crew of 2)	2	1	X	25	ch/hr	25
Dozer (Size)			X		ch/hr	
Other Equipment			X		ch/hr	

5. **TOTAL SLOP OVER OR SPOT FIRE LINE BUILDING RATE CAPACITY 124 ch/hr**

6. DETERMINATION OF ADEQUATE HOLDING RESOURCES (Line 5 minus Line 3) 96 ch/hr

If number on line 6 is positive then adequate holding forces will be available. If number is negative, more holding resources are needed to control potential spot fires or slopovers.

APPENDIX #10
POST-PROJECT EVALUATION

Instructions for Completion of Post-Project Evaluation Form

This form is to be completed and submitted for review within 30 days of declaring the project complete.
Block 1 Self-explanatory
Block 2 Copy of the Project Objectives as listed in the Project Plan.
Block 3 Give quantitative results of how well objectives were met, i.e. % of 1 hour and 10 hour fuels removed, % of burn area with fuels reduced, % of area with acceptable/unacceptable scorch, etc.
Block 4 Give a short narrative of problems encountered and suggestions for improving or refining operations and prescriptions i.e. firing pattern, equipment limitations, drought index, effectiveness of barriers.
Block 5 Self-explanatory - for providing feedback to the Program

Block 1)
Individual Leading Evaluation:________________________________

Management:________________________________ **Project Name:**______________________________

Acres Treated:________________________________ **Fire Number:**______________________________

Total Cost:
Cost/Acre:________________________________

(Block 2)
Objectives:

(Block 3)
Results:

(Block 4)
Problems Encountered, Methods to Improve Next Operation:

Review & Signature:

Burn Boss:______________________________

Comments:

FMO: ______________________________

Comments:

APPENDIX #11

PRESCRIBED FIRE MONITORING FORM

RVATIONS FIRE NAME: DATE:

LOCATION: OBSERVER:

	ELEV	TIME	WIND DIR	WIND SPEED	DRY BULB	WET BULB	RH/DP	ASPECT	FDRM	PIG	REMARKS

SMOKE OBSERVATIONS

CATION	ROS	ROS DIR	FL	FZD	FUEL MODEL	% SHADING	MIX HGT	DIR	COLOR	VISIBILITY	5% SL

JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION Ozark National Scenic Riverways	3. UNIT Stegall Mountain
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST Scott Bressler	5. JOB TITLE Engine Foreman	6. DATE PREPARED 01-18-02
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGINEERING CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE	
1. Ignition Operations	A. Proximity to intense heat and erratic fire behavior.	A. Use Personal Protective Equipment (PPE), maintain close supervision, and lookouts. Thorough briefing on expected fire behavior. Adjust ignition patterns as needed to reduce exposure and fire behavior.	
	B. Noise of fire obscures verbal warnings.	B. Handheld radios for all ignition personnel.	
	C. Ignition sources.	C. Use only qualified personnel for ignition operations. Igniters stay alert to location of torch flame. Close air vent when not igniting. Make sure that target area is clear before using hand flares or very pistols. Wear proper PPE.	
	D. Incorrect ignition locations. Careless ignition use.	D. Thorough briefing of ignition plan. Follow burn boss's instructions. Know location of other igniters and personnel. Radios for all igniters. Close supervision.	
	E. Poor footing, heavy fuels accumulation.	E. Be constantly aware; identify hazard areas; slow down.	
	F. Poor visibility due to smoke.	F. Post lookouts on roads to gauge visibility. Stage emergency vehicles with headlights and emergency lights on along roads to alert traffic. Use law enforcement to control traffic.	
2. Motor Vehicle Operation	A. General operations and public traffic.	A. Defensive driving techniques. Observe posted speed limits and obey all driving laws and regulations. Use spotter when backing. Use headlights while driving.	
	B. Secure loads.	B. Check loads for security before departing – use tie downs.	
	C. Hauling flammable substances.	C. Use appropriate containers for hauling	
	D. Transporting sharp		

	tools.	drip torch fuels and gasoline. Secure containers on vehicle. D. Use guards and secure tools in engine compartments or on vehicles.

JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION Ozark National Scenic Riverways	3. UNIT Stegall Mountain
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST Scott Bressler	5. JOB TITLE Engine Foreman	6. DATE PREPARED 01-18-02
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGINEERING CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE	
2. Motor Vehicle Operation (Cont.)	E. Loading vehicles. F. Trailer use. G. Smoke on Roadways	E. Use of proper lifting techniques. F. Use safe loading and operation procedures. Refer to Job Hazard Analysis on trailer use. Use spotter when backing. G. Use smoke ahead signs and smoke monitors.	
3. ATV Operation	A. Operation accidents	A. Proper ATV procedures. Refer to Job Hazard Analysis on ATV operations for more detail. Use qualified atv operators and wear DOT approved helmets.	
4.Holding Operations	A. Proximity to intense heat and erratic fire behavior. B. Fatigue C. Excessive Smoke Exposure D. ATV Operations E. Poor visibility due to smoke.	A. Use Personal Protective Equipment (PPE), maintain close supervision. Thorough briefing on expected fire behavior. Use appropriate tactics to insure personnel are not subjected to unnecessary heat. B. Rotate personnel on different tasks. Limit smoke exposure. Take adequate breaks. Drink plenty of water. C. Rotate personnel so that one group is not always in the smoke. D. Stay alert and watch for ATV traffic on fireline E. Stay alert. Watch for tripping and overhead hazards, sudden drop-offs, ATV traffic.	
5. Mop-up Operations	A. Poor footing		

	B. Falling snags	A. Be constantly aware; identify hazard areas; slow down. B. Be alert, post lookouts when necessary. Flag off dangerous areas. Watch for strong winds. Use qualified fallers only.

JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION Ozark National Scenic Riverways	3. UNIT Stegall Mountain
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST Scott Bressler	5. JOB TITLE Engine Foreman	6. DATE PREPARED 01-18-02
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGIN-EERING - CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE	
	C. Fatigue	C. Rotate personnel on different tasks. Take adequate breaks. Drink plenty of water.	
6. Monitoring Operations	A. Possibility of entrapment B. Proximity to intense heat and erratic fire behavior.	A. Stay in communication and relay location to Burn Boss and Ignition Specialists. Identified escape routes and safe zones in briefing. B. Use Personal Protective Equipment (PPE), maintain close supervision. Thorough briefing on expected fire behavior. Use appropriate tactics to insure personnel are not subjected to unnecessary heat.	

10. SUPERVISOR'S SIGNATURE	11. TITLE	12. DATE
/s/Bobby Bloodworth	FMO	2-17-06

A. SIGNATURE PAGE

WILSONS CREEK NATIONAL BATTLEFIELD

PRESCRIBED FIRE PLAN

UNIT NAME: SW-1, SW-2, NW-5, 6, 7

Prepared By: /s/ Bobby Bloodworth ______ Date: 3/18/2005
Bobby Bloodworth
Ozark NSR FMO

Reviewed By: ____________________ Date: ____________
Gary Sullivan
Chief of Resource Management

Regional
Reviewed By: /s/Scott Beacham ____________ Date: 4-12-05 ______

Technical
Review By: /s/Chad Suppa ________ Date: 4/6/05 ________
Buffalo Fire Use Foreman

Approved By: ________________________ Date: ______________
Superintendent

FirePro Project #
Account Number:

Copies of approved plan will be sent to:

PRESCRIBED FIRE PLAN - TECHNICAL REVIEW

Park: **Wilson's Creek National Battlefield**

Project Name: SW-1, SW-2, NW-5, 6, 7

Prescribed Fire Plan Elements		Status	Date	Initial
a.	Signature Page	+	4-6-05	CS
b.	Executive Summary	+	4-6-05	CS
c.	Description of Prescribed Fire Area	+	4-6-05	CS
d.	Goals and Objectives	O	4-6-05	CS
e.	Project Complexity/Risk	+	4-6-05	CS
f.	Organization	+	4-6-05	CS
g.	Cost	+	4-6-05	CS
h.	Scheduling	+	4-6-05	CS
i.	Preburn Considerations	O	4-6-05	CS
j.	Prescription	+	4-6-05	CS
k.	Ignition & Holding Actions	+	4-6-05	CS
l.	Wildland Fire Transition Plan	+	4-6-05	CS
m.	Protection of Sensitive Features	+	4-6-05	CS
n.	Public and Firefighter Safety	O	4-6-05	CS
o.	Smoke Management	+	4-6-05	CS
p.	Interagency Coordination and Public Information	+	4-6-05	CS
q.	Monitoring	+	4-6-05	CS
r.	Post Fire Rehabilitation	+	4-6-05	CS
s.	Post Fire Reports	+	4-6-05	CS
t.	Appendices	O	4-6-05	CS

Status Coding:
+ Adequate – Meets NPS Standards
0 Adequate with modification. See comments.
- Deficient. See comments.
NC Unable to evaluate.

Comments:
Sec D : May want to word first objective as something that is physically measurable. (This is measure by the fire effects crew during post burn surveys, BB).
Sec J : Line J, Medical Plan is in Appendix 16 and Com plan is in Appendix 17. (corrected, BB)
Sec N : Include number for Cox Air evac in Med plan. (911, corrected, BB)
Sec U : #1- titles needed for headers of pages (will include in the future, BB)
#4 Consider lowering your elapse time in the Behave runs (will do so in the future, BB)
#12 Notifiactions- are all contacts notified. (Yes by the park, BB)
#13- #4 firefighter safety needs to be changed to medium. (corrected, BB)
#16 Medical Plan- Would like to see addresses (towns) and phone numbers for Cox air evac or radio freq. (The air evac is handle thru 911 dispatch and will fly to local hospital, BB)

Signature: /s/Chad Suppa Date: 4-07-05

Title: Foreman Office: Buffalo NR

REVIEWERS' COMMENTS

Fire Management Officer:

Chief Ranger:

Chief of Natural Resources:

Park Superintendent:

Regional Review:

The Project map is missing. One needs to be made with all relevant information such as: burn units, water sources, roads, and structures.... This map needs to be made before Prescribed Burn and distributed to burn personnel. I approve of the Holding Forces Worksheet Justification, as long as conditions are as stated, on burn day. Found a typo on pg 55, Prescribed Fire Risk Analysis Worksheet. 1d Weather, the risk should be M.

Plan meets NPS standards

Table of Contents

B. EXECUTIVE SUMMARY

This burn supports the park's broad historic landscape restoration efforts to reestablish native plants and open savanna found during the civil war battle on August 10, 1861, for which the park was established. This project is part of continuing sequence of entry and maintenance burn projects to restore this historic landscape. The park brochure (1992) entitled "A Guide to Historic Landscape Restoration" reads:

> *"Prior to European settlement, savanna covered one third of Missouri. Today, only a few remnants of original savanna remain. Reestablishing an example of this unique biological community is not only an investment in our future but will, with time, recreate the 1861 landscape that was the stage for this important battle."*

This project also supports the following specific objectives found in the park Fire Management Plan:

- To utilize prescribed fire as a professional management tool to restore and perpetuate the natural environment and its processes and the historic scene. Initially, the park may implement prescribed burning for savanna restoration and preservation. Ultimately, as research provides the necessary knowledge and management recommendations, prescribed fire use are envisioned to be utilized for other management purposes.
- To research the proper role and effects of fire upon the park's natural and affected historical resources to provide management recommendations.

C. DESCRIPTION OF PRESCRIBED FIRE AREA

GENERAL AREA: The area is flat to rolling grasslands and hardwood timber with Wilson's Creek bisecting the park through the center from north to south.

LOCATION:

Legal:

1. T 28 N, R 23 W, SEC 23
2. Latitude N 37 07' 07" (37.1185)
   Longitude W 93 25' 04"(93.4178)
3. UTM Zone 15, Easting 462883. Northing 4108105.

Fire Management Zone: Suppression.

District: N/A .

GEOGRAPHIC ATTRIBUTES:

Size: SW-1: 56.6 acres
SW-2: 124.1 acres
NW-5: 6.7 acres
NE-6: 25 acres
NE-7: 73.3 acres

Elevation Range: 1080 to 1250 ft.

Slope Range: 0-10 %.

Aspect Range: Both burn units are fully exposed with a southern to western aspect.

DESCRIPTION OF PROJECT BOUNDARIES:

NW-5: The eastern boundary is Wilson's creek and the northern line is the park boundary. On the south the unit is bordered by the tour road and to the west a mowed line.

NW-6: The unit is bordered by the tour road to the south and on the west a maintenance road. The northern boundary is a paved county road and on the east a mowed line.

NW-7: This unit is surrounded by paved roads to the north, south and east. On the west side, the unit is bordered by Wilson's creek.

SW-1: The northern boundary is a creek and the tour road. On the east and south, the unit is bordered by a service road. The western boundary is the park boundary and ZZ highway.

SW-2: The northern boundary is a service road. On the east, the unit is bordered by a mowed field. The southern boundary is a tram road and on the west is the park boundary and ZZ highway.

VEGETATION DESCRIPTION:

The unit is 88% fuel model 3 and 12% fuel model 9. Located within each burn unit are small pockets of hardwood timber less than 1 total acre. The fuel model surrounding the burn units is Fuel Model 1. This is indicated in the Holding forces worksheet. Fuel Model 1 is used to calculate holding resources. The area surrounding the park is pastureland with some residential areas with manicured lawns. The pasture lands surrounding these units are severely grazed with grass of less than 2 inches at this time of year. A justification to the holding worksheet for a lower number of holding resources will be added in that Fuel Model 1 will grossly over predict rate of spread and fire line intensity.

Vegetation Type	Fuel Model NFFL	Estimated Acres	Estimated Tons Per Acre
Short/Tall Grass	1/3	577	2 - 6

PROJECT MAP (Appendix #1) The burn boss will assign points on the map for ease of communication while units are burned.

VICINITY MAP (Appendix #1)

D. GOALS AND OBJECTIVES

GOALS

1. Provide for Firefighter safety.
2. Reduce wildfire risk to urban interface improvements immediately outside of the park boundary, as well as historic park improvements,
3. Restore fire and associated natural processes in order to retain tall grass prairie species composition and hardwood savannas, characteristic of the park's historic natural communities an average of 10 to 12 oak trees per acre.
4. Provide training opportunity for firefighters

SPECIFIC OBJECTIVES:	PROPOSED REDUCTION WITHIN ONE YEAR	ACTUAL RESULTS
Burn unit with a moderate severity burn.	75-95%	
Reduce 1-hour fuel loading (litter layer).	50-80%	
Reduce 10-hour fuels.	40-70%	
Top-kill of saplings greater than 1.4 meters tall and less then 2.5 meters tall in the forested areas and where hardwoods are encroaching in historic open fields.	>40%	

Range of Acceptable Results Expected across the Project Area

Throughout the entire unit a mosaic of different levels of fire severity are desired and acceptable.

E. RISK MANAGEMENT

This burn project has a low risk value as calculated by the hazard risk analysis process. Assessing reasonable risks and the mitigation to lower these risks generates this low rating. This is documented on the Hazard Rating Guide, Prescribed Fire Risk Analysis Worksheet, and Job Hazard Analysis.

F. PROJECT COMPLEXITY

This burn rates as a low complexity project that should pose no unusual risks to personnel safety or property. Burn duration will be 8 hours or less both units combined.

HAZARD, RISK AND COMPLEXITY WORKSHEETS (attached)

G. ORGANIZATION

The Burn Boss may order additional resources to assist with the project before ignition if in their professional judgment, they are needed. This may be done after consultation with the project coordinator or Ozark Fire Management Officer. All non-park resources will be ordered and committed to the prescribed fire project through the Missouri Interagency Dispatch Center (MOCC). The holding resource worksheet and Fireline Handbook will be used to determine adequate number and type of holding resources for each scenario. Specific resources will be identified in an incident action plan prepared prior to each operational period during the implementation of the burn. It is anticipated that one or both Mid-west Fire Use Modules will be used. The regional office will provide a burn boss if Ozark NSR or Buffalo NR can not.

A total of Fourteen (14) persons will be the minimum required conducting the prescribed fire.

Overhead Personnel:
1 Burn Boss/ Incident Commander (RXB2)(The Burn Boss can serve as Ignition Specialist)
1 Holding Specialist (Single Resource Boss Qualified or higher)
1 Fire Effects Monitor

Additional Crews/Personnel/Resources For Daytime Holding and Ignition Operations:
3 FFT2 – Ignition Crew
2 Type 6 engines with operator and asst. operator
4 ATVs with Water Tanks and operators

H. ESTIMATED PROJECT COSTS (non-base, other agency, contract):

Costs will be primarily for personnel and equipment preparing and conducting burn operations. The unit requires some preparation. Firing operations and post firing patrols should be of short duration with the goal of keeping overall costs low.

FUNCTION	PROJECTED WORK HOURS/	PROJECTED COSTS*
Planning	10 hours (base salary paid) Rx Fire Plan development	$0.00
Unit Preparation	20 hours blow line, hazard tree mitigation, brush hog line	$4000.00
Operations (including burning, holding, mop-up)	50	$2500.00
Travel	12 people (includes per diem and lodging) X 4 days	$6000.0
Monitoring & Evaluation	2 (collateral assignment) site visit coordination between WICR staff and FMO.	$200.00

TOTAL PROJECTED COST _$ 12,700.00__ divided by 285.7_ acres = $ 44.45 PER ACRE
*Required information in final report: ACTUAL COSTS, COST PER ACRE, WORK HOURS PER ACRE.

I. SCHEDULING

Proposed Ignition Date:	March to Nov. 2005
Projected Burn Duration:	1 day total
Actual Ignition Date:	
Date Declared Out:	
Date DI-1202 Submitted:	

J. PRE-BURN CONSIDERATIONS

ON SITE PREPARATION NEEDS:

A. Construct a 6-8 foot wide mow line in grass along the park's boundary.

B. Mow a 3 foot clear diameter around each power pole within the units and remove the thatch from mowing. The thatch to be thrown into the unit.

C. Foam the Edwards Cabin the day of the burn and have a 8 to 10 foot mowed line in place.

D. Prepare 20 gallons of burn mix.

E. Access the nearest remote automated weather station at least two days prior to the ignition date to assess fuel moisture and weather conditions.

F. Take fuel moisture samples from the site and calculate % fuel moisture for 1-hr. fuels one day prior to the burn.

G. Set-up four all-terrain vehicles outfitted with water tank and pump and one all-terrain vehicle outfitted for patrol. Transport ATVs to burn site.

H. DAY OF BURN: Set up "Prescribed Burn" and "Smoke" signs along the Tour Road, Wire Road, ZZ Highway and Route 182.

I. Fill at least 4 bladder bags and place on the engines.

J. Program handheld radios for frequencies identified in the Communications Plan (Appendix #17).

OFF SITE:

A. WICR staff will purchase needed equipment and supplies.

B. WICR staff will notify local fire departments of the scheduled burn and their role.

C. WICR staff will complete a press release at least one week prior to the proposed burn in the local newspaper.

D. At least a week prior to the burn, WICR staff will contact the adjacent landowners with a press release of the proposed burn.

SPECIAL PRECAUTIONS/REGULATIONS:

A. All improvements (power poles, traffic and park signs) will be cleared around of fuel prior to the burn.

B. Smoke Ahead signs will be placed along ZZ Highway and Route 182.

Safety Hazards: Visitor safety; smoke on Route 182 and Hwy. ZZ and along control lines. Crew safety; safety zones, visibility, and exposure to smoke. **Mitigation:** The area, including all trails, will be closed while burning. Visibility on roads will be monitored and controlled. "Smoke Ahead" and/or "Prescribed Burn" signs will be posted. Strip burning may be used to increase heat to reduce smoke output. All personnel will have PPE. Escape routes and safety zones will be identified. Engines and Atvs will have headlights on.

K. PRESCRIBED FIRE PRESCRIPTION

NFFL Fuel Models used: 1 & 3
Fuel Model 3 for the burn unit and Fuel Model 1 for fuel surrounding the burn units.

BURNING PRESCRIPTION AND OBSERVED CONDITIONS:

Prior to ignition, compare prescription elements, both individually and collectively, against local weather forecasts and any other predicted conditions. During implementation of the burn, if objectives are not being met, further ignition shall be evaluated; therefore, prescription parameters must be wide to accommodate established objectives while staying within fire personnel capabilities. All changes to the prescription parameters must be approved with same level of authority required for the plan approval.

The prescription is based on fuel moisture, wind speed and relative humidity. Temperature ranges will not be used as a constraint.

Fuel Model 3

ENVIRONMENTAL VARIABLES	HOT	OPTIMUM	COOL	OBSERVED*
Relative Humidity (%):	20	30	50	
Wind Direction:	S/SW to N/NW	S/SW	S/SW to N/NW	
Wind Speed (midflame):	8 mph	4 mph	2 mph	
Dead Fuel Moisture (%) 1 Hour:	5	8	10	

*At time of ignition

PREDICTED FIRE BEHAVIOR	HOT	OPTIMUM	COOL	OBSERVED*
Rate of Spread (ch/h):	235	78	30	
Fireline Intensity (Btu/ft/s):	3369	980	370	
Flame Length (ft):	18.9	10.7	6.8	

*Standard observation time

See Appendixes for BEHAVE Projections

Fuel Model 1

ENVIRONMENTAL VARIABLES	HOT	OPTIMUM	COOL	OBSERVED*
Relative Humidity (%):	20	30	80	
Wind Direction:	S/SW to N/NW	S/SW	S/SW to N/NW	
Wind Speed (midflame):	8 mph	4 mph	2 mph	
Dead Fuel Moisture (%) 1 Hour:	5	8	10	

*At time of ignition

PREDICTED FIRE BEHAVIOR	HOT	OPTIMUM	COOL	OBSERVED*
Rate of Spread (ch/h):	256	53	10	
Fireline Intensity (Btu/ft/s):	434	81	11	
Flame Length (ft):	7.7	3.4	1.4	

*Standard observation time

See Appendixes for BEHAVE Projections

Behave Projections

Fuel Model 3 is used for predictions within the units and Fuel Model 1 outside of the unit. The fuels outside of the burn unit are mowed hay fields and hardwood forest. All units will be surrounded by fuel model 1. **Note:** The high fire intensities and rate of spreads predicted will be interior in each unit. This will be mitigated by the burn boss with firing patterns and sequences. During black lining operations, fire intensities will be low due to burning on the low end of the prescription and the fact that intensities are over predicted in these blocks.

L. IGNITION AND HOLDING ACTIONS

The Burn Boss or Ignition Specialist will thoroughly describe the firing plan and safety considerations to all burn personnel at the pre-burn briefing. Everyone will be provided a copy of the project map. Firing operations for the entire unit should be completed in one to two days. After the unit has been fired and mop up has been completed, the burn will be turned over to the Resource Management Specialist at Wilson's Creek. He will set up daily patrols as needed until the fire is out. The resource specialist will be the person to call the fire out. Once the fire is called out, the Ozark NSR Fire Management Office will be notified.

TEST IGNITION:

A test ignition at the burn site will be conducted with a drip torch to observe ignition and combustion rates on the actual day of the burn. The burn boss will decide this location based on current wind direction. All holding resources will be present at the site. If the observed burning conditions or fire behavior is not acceptable, the test burn will be suppressed and the primary burn project delayed. If deemed successful, firing of the primary unit may continue.

FIRING AND IGNITION:

The Burn Boss will determine prevailing wind direction and create a buffer strip on the downwind side of the burn. Once completed, the flanks will be ignited working up-wind. As the fire backs against the wind, the Burn Boss may decide to use short strip head fires to keep the burn moving into the wind or to keep the backing fire even across the unit. This interior ignition will be at the discretion of the Burn Boss. In the event that smoke becomes an issue, the Burn Boss will decide whether to stop the burn or continue depending on the stage of burn completion. At this point the Burn Boss can ring fire the unit decreasing smoke production and time of burning. The Burn Boss will document these decisions on a unit log.

HOLDING ACTIONS:

The holding team will secure the fireline using handtools, water unit ATV's, engines, possible hose lays and backpack pumps. No night operations are planned. Ignition of these units will be completed in less than eight hours. The holding resources will follow up the ignitors immediately mopping up the line creating a cold line. Once the burn has been completed, the lines will be mopped up interior to 100 feet.

MOP-UP OPERATIONS:

The fire will be mopped up at least 100' in from the lines as soon as possible. This will be done before all resources are released from the incident. No night operations are planned or anticipated.

Burn unit boundaries will be hand ignited with drip torches or atv torches. The unit interior will also be hand ignited with drip torches or atv torches at the direction of the Burn Boss with coordination of the Ignition Specialist.

M. WILDLAND FIRE TRANSITION PLAN

1. If spot fires or slopovers occur, the Holding Specialist will initially supervise suppression actions.

2. If spot fires and/or slopovers cannot be controlled within one burning period with on-site resources the Burn Boss will convert the prescribed fire to a wildland fire. A Wildland Fire Situation Analysis (WFSA) will be completed. Any suppression actions will be in accordance with the Ozark National Scenic Riverways Fire Management Plan.

3. If the burn is converted to a wildland fire, the Burn Boss will make the declaration and assume the role of Incident Commander until relieved by an Incident Commander Type III (ICT3). An Incident Commander Type III will be ordered and used in the organization of the burn. The I.C. will immediately notify **Mark Twain National Forest Dispatch (573-341-7455) and WICR Superintendent** of the change in status to a wildfire and will order the appropriate resources. The I.C. will also complete a WFSA. Dispatch will order additional resources specified by the I.C., and suppression actions on the escape fire will be conducted using the most appropriate suppression response. Any suppression actions will be in accordance with the Wilson's Creek National Battlefield Fire Management Plan. On-scene individuals will be utilized and assigned to suppression positions.

4. If the Burn Boss is occupied on the escaped fire, the Holding Specialist will assume command of the prescribed fire, and begin operations to hold and mop-up the prescribed fire.

5. Water sources will be identified on the project map.

N. PROTECTION OF SENSITIVE FEATURES

A. Archeological features should not be impacted by the project, as control lines will be raked or mowed, as often as possible utilizing existing roads and trails, as no soil disturbance is anticipated during project preparation. Any cultural sites discovered during the pending survey requiring mitigation would be identified and prepared prior to ignition.

B. No foam concentrate or solution will be handled, mixed, or sprayed within 50 feet of any water source.

O. PUBLIC AND PERSONNEL SAFETY

A. "Prescribed Burn-Do Not Report" and/or "Smoke Ahead" signs will be posted along ZZ Highway and Route 182.

B. Traffic control will be conducted by assigned burn personnel and/or Park Rangers along the park road if smoke emissions are impacting driving visibility.

C. A safety briefing will be given at the pre-burn briefing and at the start of each operational period. An Incident Action Plan describing burn operations, objectives, personnel/division assignments, and radio frequency information will be distributed to all personnel. A project map and spot weather forecast will be distributed, as well. All personnel will be advised of Lookouts, Communications, Escape Routes, and Safety Zones. Any potential safety hazards (power lines) will be pointed out.

D. All burn personnel will wear standard fire fighting leather boots, Nomex clothing, leather gloves, and a hard hat. They will carry a fire shelter and a fire tool at all times.

E. All standard wildland fire fighter safety rules will be strictly enforced (ref: Fireline Handbook).

F. Ensure safety of FEMO with Burn Boss and maintain effective communication with ignition and holding teams.

G. The public will be kept at a safe distance from the firelines. Authorized personnel must accompany all visitors and press.

H. In case of an accident or injury involving fireline personnel or the public, refer to the Medical Plan (Appendix #16).

I. Only red-carded personnel or cooperators who meet their own agency's qualifications will be utilized during the burn.

1. EMERGENCY MEDICAL PROCEDURES:

- EMT or First Responder assigned the day of the burn.
- First Aid equipment available and location made known to all burn personnel.
- Burn Boss notified immediately of injury.
- Burn Boss will coordinate with EMT/First Responder.
- Burn Boss will notify Park Dispatch of an injury and will follow up with information as soon as the injury has been assessed.
- EMT/First Responder will assess injury and begin treatment.
- Once injury has been assessed, the Burn Boss or designee will activate the appropriate EMS response for evacuation of injured personnel.
- If personnel need to be evacuated, park dispatches will dispatch/contact EMS resources from the following table or the Medical Unit Plan (ICS-206) located in the Appendix.

RESOURCE	CONTACT PHONE NUMBER	LOCATION
Cox Air Care	911	Springfield, MO.
Brookline VFD	911	Springfield, MO.

P. SMOKE MANAGEMENT AND AIR QUALITY

COMPLIANCE:

In the state of Missouri, prescribed fire is considered to be agricultural burning and there are no burn or smoke permit requirements. The Air Pollution Control Dept. of the Missouri Dept. of Natural Resources will be notified prior to the burn.

MODELING:

Weather and Smoke Management forecasts will be obtained from the National Weather Service Forecast Office in Springfield, Missouri. A Smoke Trajectory Map has been completed to show the preferred wind direction in relationship to the critical receptors listed below.

MITIGATION:

A. Moderate smoke volume and/or decreased visibility may occur along the ZZ Highway, immediately west of the project, as well as on the county road 182. Park personnel will

assist with traffic control if visibility poses a safety problem for road traffic. Highway warning signs will be posted along nearby public roads.

B. Critical receptor points are:

• Battlefield, Missouri	3 miles northeast
• Republic, Missouri	3 miles northwest
• Springfield, Missouri	6 miles northeast
• Nixa, Missouri	6 miles southeast

C. If enough smoke does drift towards across the ZZ Highway, or other roads near the park, to impact traffic safety, the Burn Boss will determine if further burning operations should be suspended, if smaller strips should be ignited, or if traffic control should be initiated.

D. Considering the small area to be burned, little smoke impact to park neighbors and nearby communities is expected. Smoke along Highway ZZ is of greater concern than long-range smoke impacts; therefore the preferred wind direction is S to SW. Nighttime smoke will drift downstream along Wilson's Creek and the James River away from the critical receptors.

E. Smoke emissions and behavior will be continually monitored and documented on a smoke observation form. Any significant change in smoke emissions and/or column behavior will be reported to the Burn Boss.

F. All sensitive and critical areas were identified and smoke trajectories plotted. In the appendix a smoke trajectory map illustrates a smoke trajectory with the preferred north, west or east airflow.

G. Smoke concentrations will be minimized by burning with a daytime visibility of at least 15 miles, a minimum mixing height of 1100 feet, a transport wind speed of at least 9 mph, and a following nighttime forecast of no area fog.

Q. INTERAGENCY COORDINATION AND PUBLIC NOTIFICATION

PRE-BURN COORDINATION ACTIONS & MEDIA RELEASES:

A. Wilson's Creek National Battlefield staff will prepare a news release at least one week prior to the burn. A news release will be posted in nearby public places and will also be distributed to local media contacts.

B. Mandatory and optional notifications will be made on or prior to the day of the burn by the dispatcher as specified below.

C. The appropriate Sheriff's Offices will be notified on the day of the burn by the dispatcher.

D. The Missouri State Highway Patrol will be notified prior to the burn.

E. Affected adjacent landowners will be contacted the day before the burn by the dispatcher or Burn Boss.

F. An Information Officer may be ordered for the burn if deemed necessary by the Fire Management Officer and/or Superintendent.

G. Notify the Park Superintendent and/or Information Officer at least one week prior to the proposed ignition date.

NOTIFICATIONS: Located in the Appendix # 12

R. MONITORING AND EVALUATION PROCEDURES

PRE-IGNITION:

There are currently no fire effects plots utilizing NPS monitoring protocol located within the project boundary. The Prairie Cluster I & M Monitoring Crew are providing all long-term monitoring at this site.

DURING THE BURN:

A. During the burn, on site monitoring will be conducted by the lead FEMO and other assigned FEMO's. These people will be responsible for the collection and documentation of the following environmental parameters: temperature, relative humidity, mid-flame wind speed, flame length, flame height, flame zone depth, and rate of spread. These measurements will be made every 30 minutes or at the discretion of the Burn Boss.

B. Fire monitoring on I & M Prairie Cluster plots will be conducted with the above information recorded. Fire monitor will take before and after photographs of plots at pre-determined photo points.

C. I & M Prairie Cluster crew will monitor plots. Documentation of fire behavior will be included in post-burn summary. The fire monitor on the burn will prepare a fire monitor's report and submit to the Burn Boss or designated person.

Transect Plots: Established by Resource Management staff and/or the Prairie Cluster I & M crew.

Photo Points: Will be established by the Ozark fire effects crew.

D. Monitors will maintain communication with the Burn Boss, Ignition, and Holding Specialists to ensure safe operations when working in the interior of the burn.

POST-BURN:

After the burn, a fire critique will be conducted by the Fire Management Officer, Burn Boss, selected members of the prescribed burn team, and the park staff to evaluate the level at which the burn objectives were accomplished.

S. POST FIRE REHABILITATION

A. The fire staff will evaluate all temporary fire lines once the Burn Boss has declared the prescribed burn out. If it is determined that rehabilitation work is necessary, it will be completed with project funds within six months of burn completion.

B. If any firelines are made barren of natural vegetation, leaves, needles, grass, or other native natural organic material will be replaced to encourage growth of vegetation.

C. Branches will be placed across the lines in order to discourage their use as ATV or hiking trails.

D. All flagging will be removed.

T. POST FIRE REPORTS

A. The Burn Boss/I.C. and Lead FEMO will maintain an ICS-214's (Unit Logs) throughout each operational period.

B. The Lead FEMO will prepare and submit an individual report that includes hourly weather, fire behavior and smoke observation data to the Ozark Fire Management Officer.

C. The Burn Boss will prepare an Individual Fire Report, DI-1202, within five days of declaring the fire out.

D. The Burn Boss will prepare a post burn report and submit a copy to the FMO along with a copy of the Fire Monitor report.

E. The FMO will prepare a project accomplishment report in NFPORS and SACS.

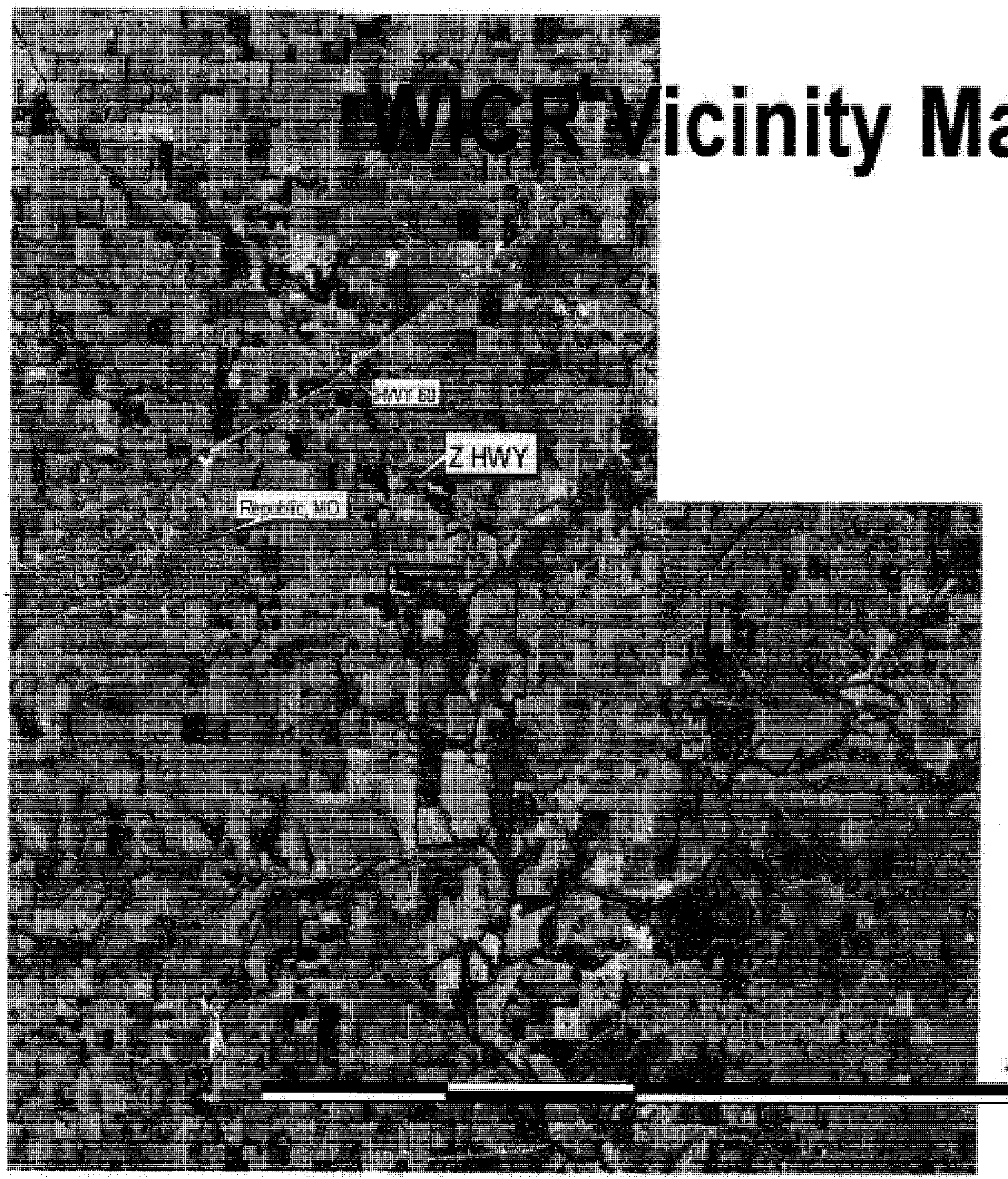
F. Ozark Fire Management staff will maintain a project file that includes the burn unit plan, spot weather forecasts, and all required reports.

Documentation	YES	NO	N/A
1. Original Signed Plan			
2. All Reviewer Comments			
3. All Maps			
4. Notification Checklist			
5. Permits			
6. Weather Forecast			
7. Smoke Forecast			
8. Agency Administrator Go/No Go Checklist			
9. Operational Go/No Go Checklist			
10. Daily Validation			
11. Unit Logs			
12. Enter into Prescribed Files by FPA			
13. 1202 Completed and Entered into SACS			
14. Other			

U. APPENDICES

1. Maps (Vicinity and Project)
2. Smoke trajectory Map
3. Complexity Assessment
4. BEHAVE Projections
5. Agency Administrators GO/NO-GO
6. Operational GO/NO-GO
7. Job Hazard Analysis
8. IAP/Briefing Guide
9. Adequate Holding Resources Worksheet
10. Post Project Evaluation
11. Prescribed Monitoring Form
12. Pre-burn Notification List
13. Prescribed Fire Risk Analysis Worksheet
14. Hazard Rating Guide
15. Prescribed Fire Risk Mitigation Table
16. Medical Unit Plan
17. Communication Unit Plan

WICR Vicinity Map



APPENDIX #1

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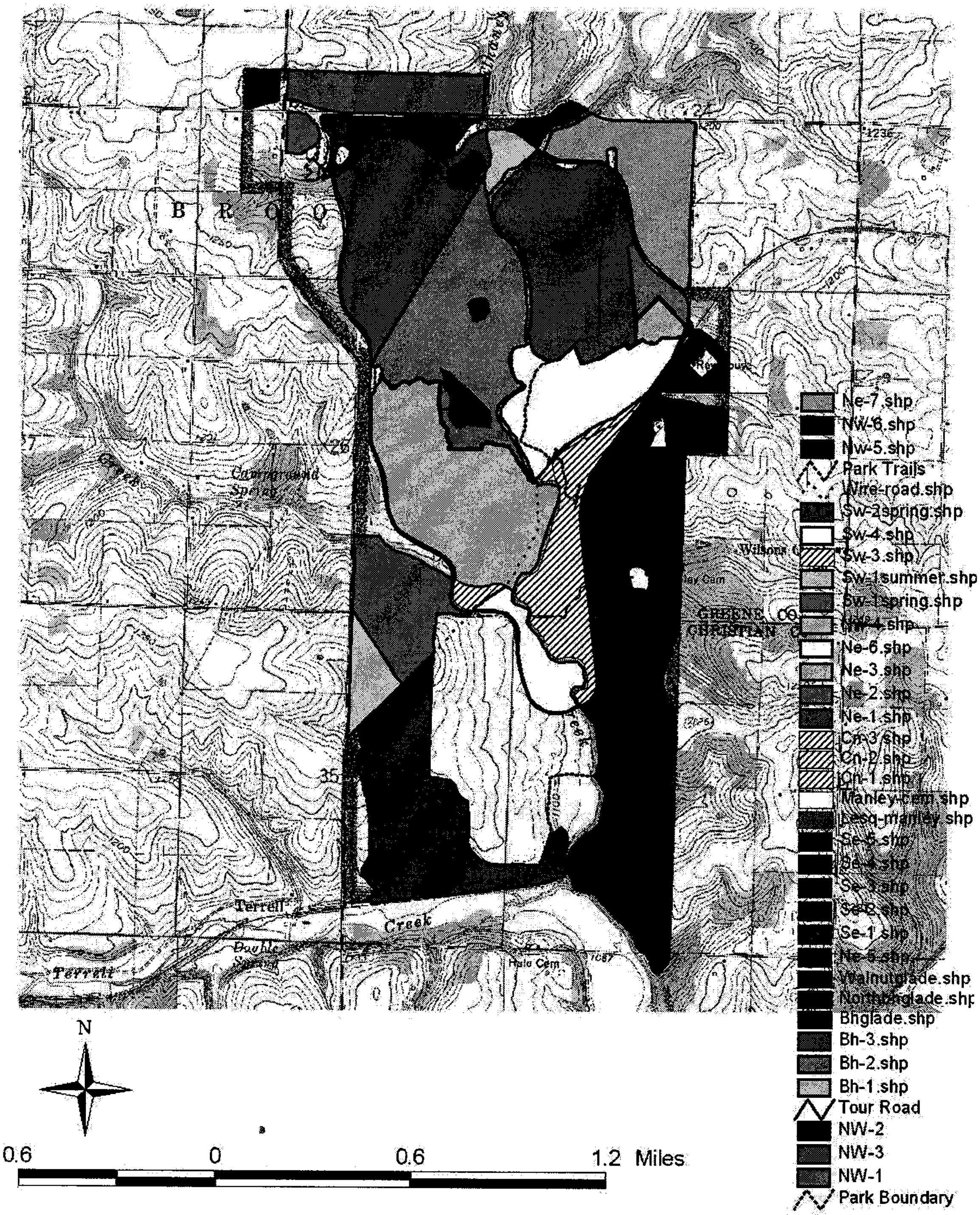
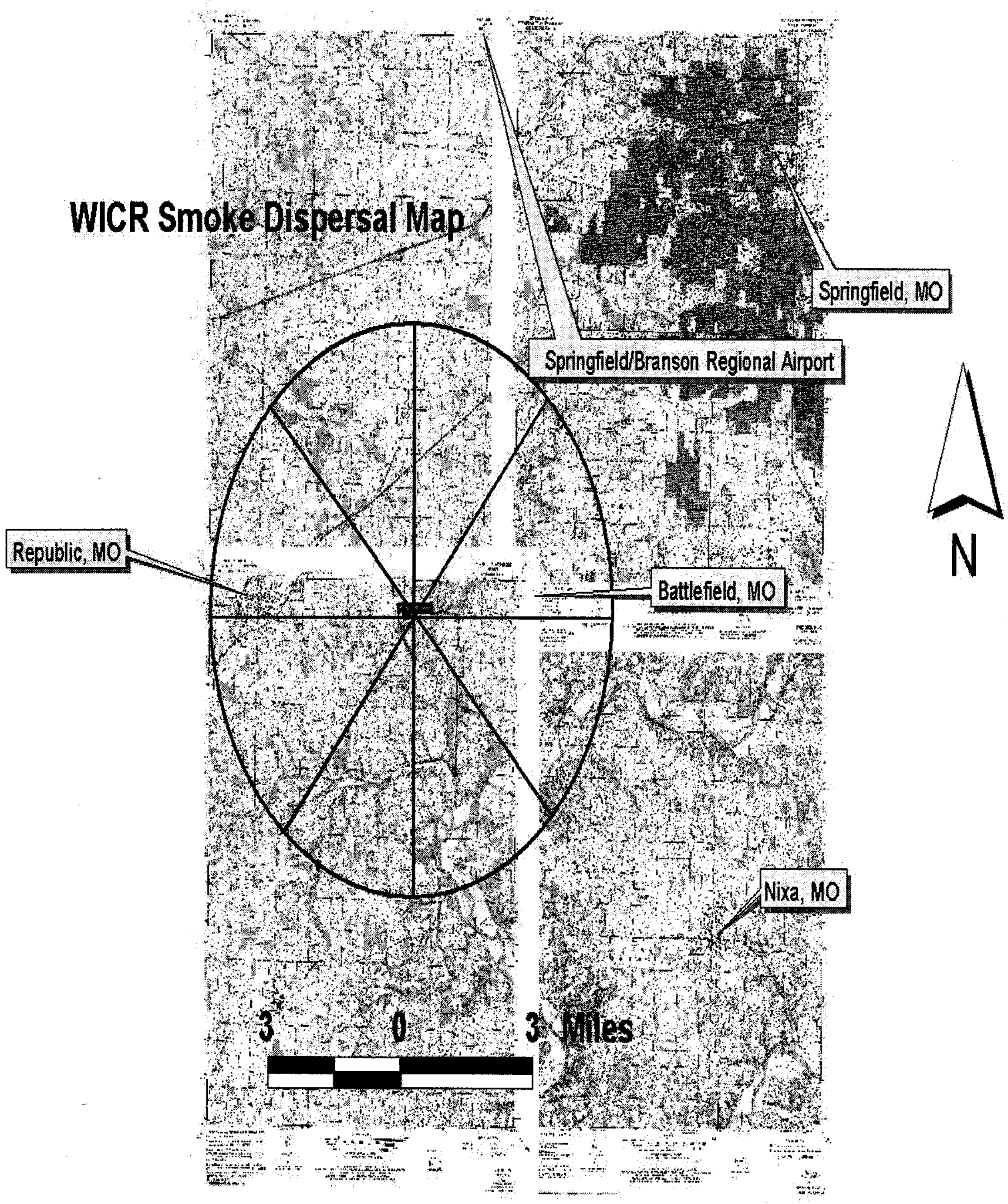
Prescribed Fire Units
Wilson's Creek National Battlefield




WICR Smoke Dispersal Map
Springfield, MO
Springfield/Branson Regional Airport
Republic, MO
Battlefield, MO
Nixa, MO
N
3 0 3 Miles

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Appendix #3
PRESCRIBED FIRE COMPLEXITY RATING WORKSHEET

	Complexity Element	Complexity Value L	M	H
Primary Factors	1. Life and Safety	X		
	2. Threats to Boundaries	X		
	3. Management Organization	X		
	4. Political Concerns	X		
	SUBTOTAL OF PRIMARY FACTORS	4		
Secondary Factors	5. Objectives	X		
	6. Fuels and Fire Behavior	X		
	7. Air Quality Values	X		
	8. Improvements		X	
	9. Logistics	X		
	10. Natural, Cultural and Social Values		X	
	11. Tactical Operations	X		
	12. Interagency Coordination	X		
	SUBTOTAL OF SECONDARY FACTORS	6	2	
	TOTAL COUNT OF COMPLEXITY VALUES	10	2	

QUALIFICATIONS DETERMINATION TABLE:

	Prescribed Fire Burn Boss Type 2 (RXB2)	Prescribed Fire Burn Boss Type 1 (RXB1)
Primary Factors rated "H"	Less than 2	2 or more
	AND	OR
Total Count rated "H"	Less than 4	4 or more
		OR
	Minimum required on all prescribed fires.	When deemed appropriate by the agency administrator or unit Fire Management Officer.

Prescribed Fire Burn Boss Level Indicated (check one):	RXB1		RXB2	X

PREPARED BY: /s/ Bobby Bloodworth DATE: 3/18/05

APPROVAL BY: ____________________ DATE: ____________________
Agency Administrator

REVIEWED BY: ____________________ DATE: ____________________
(Burn Boss immediately prior to burning

Appendix #4
Behave Projections
Fuel Model 3

```
WELCOME TO THE BEHAVE SYSTEM
  BURN SUBSYSTEM
    FIRE1 PROGRAM: VERSION 4.4 -- FEBRUARY 1997

DEVELOPED BY:  THE FIRE BEHAVIOR RESEARCH WORK UNIT
               INTERMOUNTAIN FIRE SCIENCES LABORATORY
               MISSOULA, MONTANA

YOU ARE RESPONSIBLE FOR SUPPLYING VALID INPUT AND FOR
  CORRECTLY INTERPRETING THE FIRE BEHAVIOR PREDICTIONS.

ASSUMPTIONS, LIMITATIONS, AND APPLICATION OF MATHEMATICAL
  MODELS USED IN THIS PROGRAM ARE IN:
  Andrews, Patricia L. "BEHAVE: Fire behavior prediction and
    fuel modeling system--BURN subsystem, Part 1", INT-GTR-194, 1986
  Andrews, Patricia L., and Chase, Carolyn H. "BEHAVE: Fire
    behavior prediction and fuel modeling system--BURN
    subsystem, Part 2", INT-GTR-260, 1989


DIRECT
 1--FUEL MODEL -------------      3 -- TALL GRASS, 2.5 FT (75 CM)
 2--1-HR FUEL MOISTURE, % --    4.0    5.0    6.0    7.0    8.0    9.0   10.0
 7--MIDFLAME WINDSPEED, MI/H     .0    2.0    4.0    6.0    8.0   10.0
 8--TERRAIN SLOPE, % -------    5.0
 9--DIRECTION OF WIND VECTOR     .0
      DEGREES CLOCKWISE
       FROM UPHILL
10--DIRECTION OF SPREAD ----     .0   (DIRECTION OF MAX SPREAD)
    CALCULATIONS
      DEGREES CLOCKWISE
       FROM UPHILL


=================================================================
RATE OF SPREAD, CH/H                                       (V4.4)
=================================================================
  1-HR    I      MIDFLAME WIND, MI/H
  MOIS    I
          I      .0     2.0     4.0     6.0     8.0    10.0
   (%)    I-------------------------------------------------------
          I
 4.0      I     6.    47.    108.    180.    260.    346.
          I
```

5.0	5.	43.	98.	163.	235.	313.
6.0	5.	39.	89.	149.	215.	286.
7.0	5.	36.	83.	138.	199.	265.
8.0	4.	34.	78.	129.	186.	248.
9.0	4.	32.	73.	122.	176.	234.
10.0	4.	30.	70.	116.	168.	223.

FIRELINE INTENSITY, BTU/FT/S (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
4.0	91.	722.	1657.	2756.	3977.	5297.
5.0	77.	612.	1404.	2335.	3369.	4487.
6.0	67.	531.	1218.	2025.	2922.	3892.
7.0	59.	471.	1081.	1797.	2593.	3454.
8.0	54.	427.	980.	1629.	2350.	3131.
9.0	50.	394.	905.	1504.	2171.	2891.
10.0	47.	370.	848.	1410.	2035.	2711.

FLAME LENGTH, FT (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
4.0	3.6	9.3	13.6	17.2	20.4	23.2
5.0	3.3	8.6	12.6	15.9	18.9	21.5
6.0	3.1	8.1	11.8	14.9	17.7	20.2
7.0	2.9	7.6	11.2	14.1	16.7	19.1

8.0	I	2.8	7.3	10.7	13.5	16.0	18.2
9.0	I	2.7	7.0	10.3	13.0	15.4	17.6
10.0	I	2.6	6.8	10.0	12.6	15.0	17.1

```
SIZE-LINKED-TO-DIRECT
 1--RATE OF SPREAD, CH/H ---   OUTPUT FROM DIRECT. RANGE=    4.  TO  346.
 2--EFFECTIVE WIND, CH/H ---   OUTPUT FROM DIRECT. RANGE=     .1 TO   10.0
 3--ELAPSED TIME, HR -------     .1
```

AREA, ACRES (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
4.0	I	.1	1.5	5.3	11.1	18.7	28.0
5.0	I	.1	1.2	4.3	9.0	15.3	22.8
6.0	I	.1	1.0	3.6	7.6	12.8	19.1
7.0	I	.0	.9	3.1	6.5	10.9	16.4
8.0	I	.0	.8	2.7	5.7	9.6	14.4
9.0	I	.0	.7	2.4	5.1	8.6	12.8
10.0	I	.0	.6	2.2	4.6	7.8	11.7

PERIMETER, CHAINS (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
4.0	I	3.	14.	28.	43.	60.	77.
5.0	I	3.	13.	25.	39.	54.	70.
6.0	I	3.	12.	23.	36.	49.	64.
7.0	I	2.	11.	21.	33.	46.	59.
8.0	I	2.	10.	20.	31.	43.	55.

9.0	I	2.	10.	19.	29.	40.	52.
	I						
10.0	I	2.	9.	18.	28.	38.	50.

CONTAIN-LINKED-TO-DIRECT-AND-SIZE

1--RUN OPTION -------------	1.=COMPUTE LINE BUILDING RATE				
2--MODE OF ATTACK ---------	2.=REAR				
3--RATE OF SPREAD, CH/H ---	OUTPUT FROM DIRECT.	RANGE=	4.	TO	346.
4--INITIAL FIRE SIZE, AC --	OUTPUT FROM SIZE.	RANGE=	0.	TO	28.
5--LENGTH-TO-WIDTH RATIO --	OUTPUT FROM SIZE.	RANGE=	1.0	TO	3.5
6--BURNED AREA TARGET, AC -	10.0				

==

TOTAL LENGTH OF LINE, CHAINS (V4.4)

==

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H					
	I	.0	2.0	4.0	6.0	8.0	10.0
4.0	I	40.	41.#	41.#	-1.#	-1.#	-1.#
5.0	I	41.	42.#	41.#	-1.#	-1.#	-1.#
6.0	I	41.	43.#	42.#	42.#	-1.#	-1.#
7.0	I	41.	43.*	43.#	43.#	-1.#	-1.#
8.0	I	42.	44.*	43.#	44.#	-1.#	-1.#
9.0	I	42.	44.*	44.#	44.#	45.#	-1.#
10.0	I	42.	45.*	44.#	45.#	45.#	-1.#

-1 = INITIAL AREA IS EITHER LARGER THAN OR NEARLY EQUAL TO THE BURNED AREA TARGET.

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

= CONTROL EFFORTS AT THE HEAD OF THE FIRE WILL PROBABLY BE INEFFECTIVE.

==

TOTAL CONTAINMENT TIME, HOURS (V4.4)

==

1-HR I MIDFLAME WIND, MI/H
MOIS I

(%)	.0	2.0	4.0	6.0	8.0	10.0
4.0	2.7	.3#	.1#	-1.0#	-1.0#	-1.0#
5.0	3.1	.3#	.1#	-1.0#	-1.0#	-1.0#
6.0	3.5	.4#	.1#	.0#	-1.0#	-1.0#
7.0	3.8	.4*	.1#	.0#	-1.0#	-1.0#
8.0	4.1	.5*	.1#	.0#	-1.0#	-1.0#
9.0	4.4	.5*	.2#	.1#	.0#	-1.0#
10.0	4.7	.6*	.2#	.1#	.0#	-1.0#

-1 = INITIAL AREA IS EITHER LARGER THAN OR NEARLY EQUAL TO THE BURNED AREA TARGET.

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

= CONTROL EFFORTS AT THE HEAD OF THE FIRE WILL PROBABLY BE INEFFECTIVE.

TOTAL LINE BUILDING RATE, CH/H (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
4.0	15.	151.#	717.#	-1.#	-1.#	-1.#
5.0	13.	128.#	516.#	-1.#	-1.#	-1.#
6.0	12.	112.#	407.#	1963.#	-1.#	-1.#
7.0	11.	100.*	340.#	1221.#	-1.#	-1.#
8.0	10.	91.*	295.#	908.#	-1.#	-1.#
9.0	9.	84.*	264.#	738.#	3971.#	-1.#
10.0	9.	79.*	241.#	631.#	2391.#	-1.#

-1 = INITIAL AREA IS EITHER LARGER THAN OR NEARLY

EQUAL TO THE BURNED AREA TARGET.

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

= CONTROL EFFORTS AT THE HEAD OF THE FIRE WILL PROBABLY BE INEFFECTIVE.

```
SIZE-LINKED-TO-DIRECT
 1--RATE OF SPREAD, CH/H ---   OUTPUT FROM DIRECT. RANGE=    4.  TO  346.
 2--EFFECTIVE WIND, CH/H ---   OUTPUT FROM DIRECT. RANGE=     .1 TO   10.0
 3--ELAPSED TIME, HR -------     .1

SIZE-LINKED-TO-DIRECT
 1--RATE OF SPREAD, CH/H ---   OUTPUT FROM DIRECT. RANGE=    4.  TO  346.
 2--EFFECTIVE WIND, CH/H ---   OUTPUT FROM DIRECT. RANGE=     .1 TO   10.0
 3--ELAPSED TIME, HR -------    1.0
```

AREA, ACRES (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
4.0	8.	152.	527.	1107.	1870.	2799.
5.0	6.	124.	430.	904.	1526.	2285.
6.0	5.	104.	360.	756.	1277.	1912.
7.0	5.	89.	309.	648.	1095.	1639.
8.0	4.	78.	271.	568.	960.	1437.
9.0	4.	70.	242.	508.	858.	1285.
10.0	3.	64.	220.	462.	780.	1167.

PERIMETER, CHAINS (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0

```
  4.0     I    31.   143.   281.   432.   595.   770.
          I
  5.0     I    28.   129.   254.   390.   538.   695.
          I
  6.0     I    26.   118.   232.   357.   492.   636.
          I
  7.0     I    24.   109.   215.   331.   456.   589.
          I
  8.0     I    22.   102.   201.   310.   427.   551.
          I
  9.0     I    21.    97.   190.   293.   403.   521.
          I
 10.0     I    20.    92.   181.   279.   385.   497.
```

```
CONTAIN-LINKED-TO-DIRECT-AND-SIZE
 1--RUN OPTION -------------    1.=COMPUTE LINE BUILDING RATE
 2--MODE OF ATTACK ---------    2.=REAR
 3--RATE OF SPREAD, CH/H ---    OUTPUT FROM DIRECT. RANGE=     4. TO   346.
 4--INITIAL FIRE SIZE, AC --    OUTPUT FROM SIZE.   RANGE=     3. TO  2799.
 5--LENGTH-TO-WIDTH RATIO --    OUTPUT FROM SIZE.   RANGE=   1.0 TO    3.5
 6--BURNED AREA TARGET, AC -  100.0
```

```
==================================================================
TOTAL LENGTH OF LINE, CHAINS                                (V4.4)
==================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I       .0     2.0     4.0     6.0     8.0    10.0
  (%)     I-------------------------------------------------------
          I
 4.0      I   117.    -1.#    -1.#    -1.#    -1.#    -1.#
          I
 5.0      I   118.    -1.#    -1.#    -1.#    -1.#    -1.#
          I
 6.0      I   118.    -1.#    -1.#    -1.#    -1.#    -1.#
          I
 7.0      I   119.   116.*    -1.#    -1.#    -1.#    -1.#
          I
 8.0      I   120.   117.*    -1.#    -1.#    -1.#    -1.#
          I
 9.0      I   120.   117.*    -1.#    -1.#    -1.#    -1.#
          I
10.0      I   121.   118.*    -1.#    -1.#    -1.#    -1.#
          I

          -1 = INITIAL AREA IS EITHER LARGER THAN OR NEARLY
                  EQUAL TO THE BURNED AREA TARGET.

           * = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
                 HAND CREWS.
               EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
                 AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.
```

= CONTROL EFFORTS AT THE HEAD OF THE FIRE
WILL PROBABLY BE INEFFECTIVE.

```
=================================================================
TOTAL CONTAINMENT TIME, HOURS                              (V4.4)
=================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I      .0     2.0     4.0     6.0     8.0    10.0
   (%)    I-------------------------------------------------------
          I
  4.0     I     5.8   -1.0#   -1.0#   -1.0#   -1.0#   -1.0#
          I
  5.0     I     6.7   -1.0#   -1.0#   -1.0#   -1.0#   -1.0#
          I
  6.0     I     7.7   -1.0#   -1.0#   -1.0#   -1.0#   -1.0#
          I
  7.0     I     8.6      .1*  -1.0#   -1.0#   -1.0#   -1.0#
          I
  8.0     I     9.4      .2*  -1.0#   -1.0#   -1.0#   -1.0#
          I
  9.0     I    10.2      .3*  -1.0#   -1.0#   -1.0#   -1.0#
          I
 10.0     I    10.9      .4*  -1.0#   -1.0#   -1.0#   -1.0#
          I
```

-1 = INITIAL AREA IS EITHER LARGER THAN OR NEARLY
EQUAL TO THE BURNED AREA TARGET.

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

= CONTROL EFFORTS AT THE HEAD OF THE FIRE
WILL PROBABLY BE INEFFECTIVE.

```
=================================================================
TOTAL LINE BUILDING RATE, CH/H                             (V4.4)
=================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I      .0     2.0     4.0     6.0     8.0    10.0
   (%)    I-------------------------------------------------------
          I
  4.0     I     20.     -1.#    -1.#    -1.#    -1.#    -1.#
          I
  5.0     I     17.     -1.#    -1.#    -1.#    -1.#    -1.#
          I
  6.0     I     15.     -1.#    -1.#    -1.#    -1.#    -1.#
          I
```

```
 7.0     I    14.  1301.*   -1.#    -1.#    -1.#    -1.#
         I
 8.0     I    13.   584.*   -1.#    -1.#    -1.#    -1.#
         I
 9.0     I    12.   389.*   -1.#    -1.#    -1.#    -1.#
         I
10.0     I    11.   298.*   -1.#    -1.#    -1.#    -1.#
         I

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                 EQUAL TO THE BURNED AREA TARGET.

           * = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
                HAND CREWS.
              EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
                AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

           # = CONTROL EFFORTS AT THE HEAD OF THE FIRE
                WILL PROBABLY BE INEFFECTIVE.
```

Fuel Model 1

```
WELCOME TO THE BEHAVE SYSTEM
  BURN SUBSYSTEM
    FIRE1 PROGRAM: VERSION 4.4 -- FEBRUARY 1997

DEVELOPED BY:  THE FIRE BEHAVIOR RESEARCH WORK UNIT
               INTERMOUNTAIN FIRE SCIENCES LABORATORY
               MISSOULA, MONTANA

YOU ARE RESPONSIBLE FOR SUPPLYING VALID INPUT AND FOR
  CORRECTLY INTERPRETING THE FIRE BEHAVIOR PREDICTIONS.

ASSUMPTIONS, LIMITATIONS, AND APPLICATION OF MATHEMATICAL
  MODELS USED IN THIS PROGRAM ARE IN:
  Andrews, Patricia L. "BEHAVE: Fire behavior prediction and
    fuel modeling system--BURN subsystem, Part 1", INT-GTR-194, 1986
  Andrews, Patricia L., and Chase, Carolyn H. "BEHAVE: Fire
    behavior prediction and fuel modeling system--BURN
    subsystem, Part 2", INT-GTR-260, 1989


DIRECT
 1--FUEL MODEL -------------     1 -- SHORT GRASS, 1 FT (30 CM)
 2--1-HR FUEL MOISTURE, % --    5.0    6.0    7.0    8.0    9.0   10.0
 7--MIDFLAME WINDSPEED, MI/H     .0    2.0    4.0    6.0    8.0   10.0
 8--TERRAIN SLOPE, % -------    5.0
 9--DIRECTION OF WIND VECTOR     .0
      DEGREES CLOCKWISE
       FROM UPHILL
10--DIRECTION OF SPREAD ----     .0   (DIRECTION OF MAX SPREAD)
    CALCULATIONS
```

DEGREES CLOCKWISE
FROM UPHILL

RATE OF SPREAD, CH/H (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
5.0	5.	19.	65.	143.	256.	297.*
6.0	5.	18.	61.	135.	242.	270.*
7.0	4.	17.	58.	128.	228.	242.*
8.0	4.	16.	53.	117.	199.*	199.*
9.0	3.	13.	46.	101.	136.*	136.*
10.0	3.	10.	35.	65.*	65.*	65.*

* MEANS YOU HIT THE WIND LIMIT.

FIRELINE INTENSITY, BTU/FT/S (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
5.0	8.	32.	110.	243.	434.	504.*
6.0	8.	30.	102.	225.	402.	449.*
7.0	7.	28.	93.	207.	370.	392.*
8.0	6.	24.	81.	180.	305.*	305.*
9.0	5.	18.	62.	138.	186.*	186.*
10.0	3.	11.	38.	70.*	70.*	70.*

* MEANS YOU HIT THE WIND LIMIT.

FLAME LENGTH, FT (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
5.0	1.2	2.2	3.9	5.6	7.4	7.9*
6.0	1.1	2.2	3.8	5.4	7.1	7.5*
7.0	1.1	2.1	3.6	5.2	6.8	7.0*
8.0	1.0	1.9	3.4	4.9	6.3*	6.3*
9.0	.9	1.7	3.0	4.3	5.0*	5.0*
10.0	.7	1.4	2.4	3.2*	3.2*	3.2*

* MEANS YOU HIT THE WIND LIMIT.

SIZE-LINKED-TO-DIRECT
1--RATE OF SPREAD, CH/H --- OUTPUT FROM DIRECT. RANGE= 3. TO 297.
2--EFFECTIVE WIND, CH/H --- OUTPUT FROM DIRECT. RANGE= .4 TO 8.6
3--ELAPSED TIME, HR ------- 1.0

AREA, ACRES (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
5.0	3.	25.	188.	701.	1816.	2319.
6.0	3.	22.	168.	627.	1625.	1943.
7.0	3.	20.	149.	557.	1443.	1590.
8.0	2.	17.	125.	468.	1116.	1116.
9.0	2.	12.	93.	348.	566.	566.
10.0	1.	7.	55.	153.	153.	153.

PERIMETER, CHAINS (V4.4)

1-HR I MIDFLAME WIND, MI/H
MOIS I

(%)	.0	2.0	4.0	6.0	8.0	10.0
5.0	21.	58.	168.	344.	587.	675.
6.0	20.	55.	159.	325.	555.	614.
7.0	19.	51.	149.	307.	523.	553.
8.0	17.	47.	137.	281.	457.	457.
9.0	15.	41.	118.	242.	318.	318.
10.0	11.	31.	90.	158.	158.	158.

```
CONTAIN-LINKED-TO-DIRECT-AND-SIZE
 1--RUN OPTION -------------     1.=COMPUTE LINE BUILDING RATE
 2--MODE OF ATTACK ---------     2.=REAR
 3--RATE OF SPREAD, CH/H ---     OUTPUT FROM DIRECT. RANGE=     3. TO   297.
 4--INITIAL FIRE SIZE, AC --     OUTPUT FROM SIZE.   RANGE=     1. TO  2319.
 5--LENGTH-TO-WIDTH RATIO --     OUTPUT FROM SIZE.   RANGE=    1.1 TO    3.2
 6--BURNED AREA TARGET, AC -   10.0
```

TOTAL LENGTH OF LINE, CHAINS (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
5.0	36.	-1.	-1.*	-1.*	-1.*	-1.#
6.0	36.	-1.	-1.*	-1.*	-1.*	-1.*
7.0	36.	-1.	-1.	-1.*	-1.*	-1.*
8.0	37.	-1.	-1.	-1.*	-1.*	-1.*
9.0	37.	-1.	-1.	-1.*	-1.*	-1.*
10.0	38.	37.	-1.	-1.	-1.	-1.

-1 = INITIAL AREA IS EITHER LARGER THAN OR NEARLY EQUAL TO THE BURNED AREA TARGET.

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

= CONTROL EFFORTS AT THE HEAD OF THE FIRE
WILL PROBABLY BE INEFFECTIVE.

TOTAL CONTAINMENT TIME, HOURS (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
5.0	1.3	-1.0	-1.0*	-1.0*	-1.0*	-1.0#
6.0	1.5	-1.0	-1.0*	-1.0*	-1.0*	-1.0*
7.0	1.7	-1.0	-1.0	-1.0*	-1.0*	-1.0*
8.0	2.1	-1.0	-1.0	-1.0*	-1.0*	-1.0*
9.0	2.8	-1.0	-1.0	-1.0*	-1.0*	-1.0*
10.0	4.4	.3	-1.0	-1.0	-1.0	-1.0

-1 = INITIAL AREA IS EITHER LARGER THAN OR NEARLY
EQUAL TO THE BURNED AREA TARGET.

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

= CONTROL EFFORTS AT THE HEAD OF THE FIRE
WILL PROBABLY BE INEFFECTIVE.

TOTAL LINE BUILDING RATE, CH/H (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H .0	2.0	4.0	6.0	8.0	10.0
5.0	28.	-1.	-1.*	-1.*	-1.*	-1.#
6.0	24.	-1.	-1.*	-1.*	-1.*	-1.*
7.0	21.	-1.	-1.	-1.*	-1.*	-1.*
8.0	18.	-1.	-1.	-1.*	-1.*	-1.*
9.0	13.	-1.	-1.	-1.*	-1.*	-1.*
10.0	9.	138.	-1.	-1.	-1.	-1.

APPENDIX #5
AGENCY ADMINISTRATOR
GO/NO-GO PRE-IGNITION APPROVAL

Prescribed Fire Name: Date:

A) Instructions

The Agency Administrator's Go/No-Go Pre-Ignition Approval is the first of two GO/NO-GO decisions that must be completed before a prescribed fire can be implemented. The Agency Administrator's Go/No-Go Pre-Ignition Approval is the final management approval prior to execution of the prescribed fire and evaluates whether compliance requirements, prescribed fire plan elements, and internal and external notifications have been completed. The Agency Administrator's Go/No-Go Pre-Ignition Approval is valid for 30 days. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

B) Key Elements

1. Is the prescribed fire plan up to date?
   Hints: changes, amendments, seasonality.

2. Have all compliance requirements been completed?
   Hints: cultural, threatened and endangered species, smoke management.

3. Is risk management in place and the residual risk acceptable?
   Hints: Prescribed Fire Mitigation Table and Prescribed Fire Complexity Rating Guide completed with rationale and mitigations identified.

4. Will all elements of the prescribed fire plan be met?
   Hint: preparation work, mitigation, weather, organization, prescription.

5. Have all internal and external notifications and media releases been completed?

6. Are key park staff fully briefed, and understand the implementation of the prescribed fire?

7. Other?

Recommended by: ______________________________ Date ________________
FMO/Burn Boss

Approved by: __________________________________ Date________________
Park Superintendent

Approval expires: ___________ (May not be more than 30 days after approved date.)
Date

APPENDIX #6
Prescribed Fire Operations
GO/NO-GO Checklist

Prescribed Fire Name: Date:

	YES	NO
- Has Agency Administrator GO/NO-GO Pre-Ignition Approval been approved?		
Narrative/Comments:		
- Are current and forecasted weather conditions favorable for execution of the prescribed fire? (hints: spot weather, dialogue with fire weather forecaster, climatological analysis complete)		
Narrative/Comments:		
- Have all key personnel listed on the Incident Action Plan (IAP) been briefed with an opportunity to give feedback? (hints: safety, objectives, assignments)		
Narrative/Comments:		
- Has all pre-burn preparedness work been completed? (hints: fuels and weather observations, signs, closures, smoke management, unit preparation)		
Narrative/Comments:		
- Are all equipment and supplies required in the prescribed fire plan in place and functional? (hints: pumps, radios, ignition devices, hose lays, vehicles, aviation, etc.)		
Narrative/Comments:		
- Are all holding resources described in the IAP committed and can be on-scene within specified time frames?		
Narrative/Comments:		
- Are all personnel certified for their assigned positions? (hints: Check Red Cards)		
Narrative/Comments:		
- There are no extenuating circumstances that preclude successful completion of this project? (hints: regional & national preparedness, unusual circumstances, unusual drought, outstanding issues, other fires, recent fire escapes, etc.)		
Narrative/Comments:		
IF ALL BOXES HAVE BEEN CHECKED "YES" YOU MAY PROCEED WITH THE TEST FIRE.		
TEST FIRE DOCUMENTATION AND RESULTS:		

	YES	NO
- Observed Fire Behavior within Prescription?		
Narrative/Comments:		
- Test fire was successful?		
Narrative/Comments:		
- Are all prescription parameters in the prescribed fire plan favorable for implementing the project? (hints: each plan element, pre-burn, smoke management, cooperator coordination)		
Narrative/Comments:		
IF LAST 3 BOXES ARE ALL "YES", YOU MAY PROCEED WITH PRESCRIBED FIRE.		

Signatures

RX BURN BOSS:	IGNITION SPECIALIST:
HOLDING OPERATIONS:	DATE:

Appendix # 7
JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION Wilson's Creek National Battlefield	3. UNIT All Prescribed Fire
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST B. Bloodworth	5. JOB TITLE Ozark FMO	6. DATE PREPARED 2-13-04
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGINEERING CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE	
1. Ignition Operations	A. Proximity to intense heat and erratic fire behavior.	A. Use Personal Protective Equipment (PPE), maintain close supervision, and lookouts. Thorough briefing on expected fire behavior. Adjust ignition patterns as needed to reduce exposure and fire behavior.	
	B. Noise of fire obscures verbal warnings.	B. Handheld radios for all ignition personnel.	
	C. Ignition sources.	C. Use only qualified personnel for ignition operations. Igniters stay alert to location of torch flame. Close air vent when not igniting. Make sure that target area is clear before using hand flares or very pistols. Wear proper PPE.	
	D. Incorrect ignition locations. Careless ignition use.	D. Thorough briefing of ignition plan. Follow burn boss's instructions. Know location of other igniters and personnel. Radios for all igniters. Close supervision.	
	E. Poor footing, heavy fuels accumulation.	E. Be constantly aware; identify hazard areas; slow down.	
	F. Poor visibility due to smoke.	F. Post lookouts on roads to gauge visibility. Stage emergency vehicles with headlights and emergency lights on along roads to alert traffic. Use law enforcement to control traffic.	
2. Motor Vehicle Operation	A. General operations and public traffic.	A. Defensive driving techniques. Observe posted speed limits and obey all driving laws and regulations. Use spotter when	
	B. Secure loads.		

	C. Hauling flammable substances. D. Transporting sharp tools.	backing. B. Check loads for security before departing – use tie downs. C. Use appropriate containers for hauling drip torch fuels and gasoline. Secure containers on vehicle. D. Use guards and secure tools in engine compartments or on vehicles.

JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION Wilson's Creek National Battlefield	3. UNIT All Prescribed Fire
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST B. Bloodworth	5. JOB TITLE Ozark FMO	6. DATE PREPARED 2-13-04
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGINEERING CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE	
2. Motor Vehicle Operation (Cont.)	E. Loading vehicles. F. Trailer use. G. Smoke on Roadways	E. Use of proper lifting techniques. F. Use safe loading and operation procedures. Refer to Job Hazard Analysis on trailer use. Use spotter when backing. G. Use smoke ahead signs and smoke monitors.	
3. ATV Operation	A. Operation accidents	A. Proper ATV procedures. Refer to Job Hazard Analysis on ATV operations for more detail. Use qualified atv operators and wear DOT approved helmets. Only one rider per atv.	
4.Holding Operations	A. Proximity to intense heat and erratic fire behavior. B. Fatigue	A. Use Personal Protective Equipment (PPE), maintain close supervision. Thorough briefing on expected fire behavior. Use appropriate tactics to insure personnel are not subjected to unnecessary heat. B. Rotate personnel on different tasks. Limit smoke exposure. Take adequate	

		breaks. Drink plenty of water.
	C. Excessive Smoke Exposure	C. Rotate personnel so that one group is not always in the smoke.
	D. ATV Operations	D. Stay alert and watch for ATV traffic on fireline
	E. Poor visibility due to smoke.	E. Stay alert. Watch for tripping and overhead hazards, sudden drop-offs, ATV traffic.
5. Mop-up Operations	A. Poor footing	A. Be constantly aware; identify hazard areas; slow down.
	B. Falling snags	B. Be alert, post lookouts when necessary. Flag off dangerous areas. Watch for strong winds. Use qualified fallers only.

JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION Wilson's Creek National Battlefield	3. UNIT All Prescribed Fire
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST B. Bloodworth	5. JOB TITLE Ozark FMO	6. DATE PREPARED 2-13-04
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGIN-EERING - CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE	

	C. Fatigue	C. Rotate personnel on different tasks. Take adequate breaks. Drink plenty of water.
6. Monitoring Operations	A. Possibility of entrapment	A. Stay in communication and relay location to Burn Boss and Ignition Specialists. Identified escape routes and safe zones in briefing.
	B. Proximity to intense heat and erratic fire behavior.	B. Use Personal Protective Equipment (PPE), maintain close supervision. Thorough briefing on expected fire behavior. Use appropriate tactics to insure personnel are not subjected to unnecessary heat.

10. SUPERVISOR'S SIGNATURE	11. TITLE	12. DATE
/s/Bobby Bloodworth	FMO	3-18-05

APPENDIX # 8
IAP/BRIEFING GUIDE

I. **Present Handouts**
   - A. **Map of Burn**
   - B. **Organization Chart**

II. **Describe Area Of Burn**
   - A. **Vegetation Type**
   - B. **Acreage**
   - C. **Slope**
   - D. **Roads/Access**
   - E. **High Values at risk**
   - F. **Water Sources-natural, tanker and hydrants**
   - G. **Natural/Manmade barriers**

III. **Weather Forecast- Use National Weather Service "Forestry" and "Smoke Management" Forecasts for applicable Zones. Use "Fire Weather Special Request" Form if updates are deemed necessary.**
   - A. **Wind direction and Speed**
   - B. **Relative Humidity**
   - C. **Temperatures**
   - D. **Predicted Changes**

IV. **Organization**
   - A. **Organization Chart – Location on Map**
   - B. **Equipment - tankers, refueling, etc.**
   - C. **Fire Monitoring**
   - D. **Any other resources**
   - E. **Transition Fire Plan**

V. **Firing Sequence**
   - A. **Test fire**
   - B. **Type and Sequence of Firing**

VI. **Radio Assignments**
   - A. **Given Day of Burn**
   - B. **Communication Plan**

VII. **Safety**
   - A. **Winds**
   - B. **Escape Routes and Safe Zones**
   - C. **Hazards – crew and equipment (wildlife, research plots, trash, etc.)**
   - D. **Personal Protective equipment (PPE)**
   - E. **Refueling – fuel handling, gloves, spilling, etc.**
   - F. **Activation of emergency and headlights on major roads**
   - G. **Other public safety considerations**

VIII. **Comments and Questions Period**

APPENDIX # 9

ADEQUATE HOLDING RESOURCES WORKSHEET

Project Name: SW-1, SW-2, NW-5 NW-6 & NW - 7 Fuel Models Inside Project Area: 3
Prepared By/Date: Bloodworth 2-13-04 Fuel Models Outside Project Area: 1

Characteristics	Output type	Modeling Predictions Inside Project Area	Modeling Predictions Outside Project Area	Unit of Measure
CRITICAL FIRE INPUTS	1 Hr Fuel Moisture	5	5	%
	Wind Speed	8	8	MPH
	Slope	5	5	%
KEY FIRE BEHAVIOR OUTPUTS	Rate of Spread	235	276	ch/hr
	Fire line Intensity	3369	434	BTU/ft/sec
	Flame Length	18.9	7.7	Feet
	POI			%
	Spotting Distance			Miles
	Scorch Height			Feet
FIRE SIZE	Projection Time			Hours
	Forward Spread			Chains
	Backward Spread			Chains
FIRE CONTAINMENT	Method Of Attack	Rear	Rear	Head/Rear
	Max Escape Target	10	10	Acres
	Max Containment Time	1	1	Hours
	Total Line Building Rate	-1	-1	Ch/hr

1. Choose worst case total line building rate above that is needed for containment of slop over or spot fire : -1 h/hr
2. Estimate potential number spot fires or slop overs at on time: 1
3. TOTAL LINE BUILDING RATE NEEDED (multiply line 1 times line 2) -1ch/hr
4. Production Rates: Ease of Access: POOR-FAIR-GOOD-EXCELLENT(circle)
   Fuel Resistance to Control LOW- MODERATE-HIGH-EXTREME(circle)

(refer to fire line handbook) Hand Crew Production 8 ch/hr
Engine Production (Crew of 2) 12 ch/hr
Dozer Production (Type ___) ____ ch/hr

On Site Organization	Total # Planned On Burn	Total # Available for Spot Fire or Slop Over Control		Line Building Production Rates		Spot Fire or Slop Over Line Building Capacity
Overhead	3	0	X	8	ch/hr	0
Firing Crew	3	2	X	4	ch/hr	8
Holding (ATV w/ water)	4	4	X	12	ch/hr	48
Other Personnel			X		ch/hr	
Engine (Crew of 2)	2	2	X	12	ch/hr	24
Dozer (Size)			X		ch/hr	
Other Equipment			X		ch/hr	

5. TOTAL SLOP OVER OR SPOT FIRE LINE BUILDING RATE CAPACITY = 80 ch/hr

6. DETERMINATION OF ADEQUATE HOLDING RESOURCES (Line 5 minus Line 3) 80 ch/hr
If number on line 6 is positive then adequate holding forces will be available. If number is negative, more holding resources are needed to control potential spot fires or slopovers.

Holding Forces Worksheet Justification: The Behave runs for Fuel Model 1 indicate that the fire is to intense for direct attack and that the initial area is larger or nearly equal to the burn area target. Fuel Model 1 is being used to try and represent the fuel bed outside of the burn unit. However it grossly over estimates ROS, FL and FI within the existing fuels surrounding these burn units. The fuel beds that are next to these burn units are severly grazed pasture land with grass that is less than 2 inches tall. The grass within the pastures are cool season with a live moisture content between 250 to 300%. Fires that do occur in these areas exhibit slow rates of spread and low intensity. The Flame Lenghts are less than 1 foot are very easliy control. The existing organization within this burn plan is suffient to control any spots or slop-overs that may occur.

APPENDIX #10
POST-PROJECT EVALUATION

Instructions for Completion of Post-Project Evaluation Form

This form is to be completed and submitted for review within 30 days of declaring the project complete.
Block 1 Self-explanatory
Block 2 Copy of the Project Objectives as listed in the Project Plan.
Block 3 Give quantitative results of how well objectives were met, i.e. % of 1 hour and 10 hour fuels removed, % of burn area with fuels reduced, % of area with acceptable/unacceptable scorch, etc.
Block 4 Give a short narrative of problems encountered and suggestions for improving or refining operations and prescriptions i.e. firing pattern, equipment limitations, drought index, effectiveness of barriers.
Block 5 Self-explanatory - for providing feedback to the Program

Block 1)
Individual Leading Evaluation:________________________________

Management:________________________________ **Project Name:**______________________________

Acres Treated:______________________________ **Fire Number:**______________________________

Total Cost:
Cost/Acre:__________________________________

(Block 2)
Objectives:

(Block 3)
Results:

(Block 4)
Problems Encountered, Methods to Improve Next Operation:

Review & Signature:

Burn Boss:__________________________

Comments:

FMO: __________________________

Comments:

APPENDIX #11

PRESCRIBED FIRE MONITORING FORM

ATHER OBSERVATIONS

FIRE NAME: NW-1 NW-2 & NW- 3

LOCATION:

DATE:

OBSERVER:

CATION	ELEV	TIME	WIND DIR	WIND SPEED	DRY BULB	WET BULB	RH/DP	ASPECT	FDRM	PIG	REMARKS

E BEHAVIOR/SMOKE OBSERVATIONS

E	LOCATION	ROS	ROS DIR	FL	FZD	FUEL MODEL	% SHADING	MIX HGT	DIR	COLOR	VISIBILITY	% SLOPE

MARKS:

Appendix # 12
Pre-burn Notifications List

Mandatory Contact List: All persons or entities on this list will be contacted prior to ignition.

Name	Agency	Phone Number	Date Notified
Dispatcher	Green County Sheriff	(417)868-4040	Burn day
Dispatcher	Christian County Sheriff	(417)581-2332	Burn day
Dispatcher	Missouri State Patrol	(417)895-6868	Burn day
Dispatcher	Battlefield VFD	(417)868-4040	Burn day
Dispatcher	Clever VFD	(417)868-4040	Burn day
KAMO Electric Coop	Vinita, OK	(918)256-5551 x217	2 days prior
U.S. Forest Service	Mark Twain N.F., Ava District	(417)683-4428	Burn day
Barnes, Richard	Air Pollution Control Dept., Missouri Dept. of Natural Resources, Springfield, MO	(471)891-4328	1 week prior
Parker, Duane	State Forester, Missouri Dept. of Conservation, Springfield, MO	(417)895-6880	

Optional Cooperator Contact List: Every effort will be made to contact these cooperators before ignition, however , notification is optional and is not required.

Name	Agency	Phone Number	Date Notified
Davis, William	Director, National Weather Service	869-4491 or 863-7889	1 week prior
Shumway, Steve	National Weather Service	869-4491 or 863-7889	1 week prior

Optional Media Contact List: Every effort will be made to contact these members of the media by phone before ignition, however, notification is optional and is not required.

Name	Agency	Phone Number	Date Notified
Newsroom	KWFC Radio	869-0891	1 week prior
Newsroom	KY3 TV	268-3299 or 268-3200	1 week prior
Newsroom	KSMU	836-5878	1 week prior
Newsroom	KTTS	869-2153	1 week prior
Newsroom	KOLR TV	862-1010	1 week prior
Newsroom	KSPR TV	831-1234	1 week prior

Optional Park Neighbor Contact List: Every effort will be made to contact these park neighbors by phone or mail before ignition, however, notification is optional and is not required.

Name	Agency	Phone Number	Date Notified
Blackwell, D.	Park Neighbor	(417)883-9962	1 week prior
Bybee, L.J.	Park Neighbor	Unlisted	1 week prior
Carroll, Leo	Park Neighbor	(417)869-9787	1 week prior
Dulan, Frances	Park Neighbor	(417)865-6915	1 week prior
Hash, Robert	Park Neighbor	(Warsaw, MO)	1 week prior
Heston, Wayne	Park Neighbor	(417)732-8226	1 week prior
Keet, James	Park Neighbor	(417)887-8711	1 week prior
Kary, Bill	Park Neighbor	(417)889-6440	

Lloyd, Wilma	Park Neighbor	Unlisted	1 week prior
McConnell, Harry	Park Neighbor	(417)732-2592	1 week prior
McDaniel, Ralph	Park Neighbor	(417)881-5517	1 week prior
McElhaney, Dorothy	Park Neighbor	Virginia	1 week prior
McKeel, L.B.	Park Neighbor	(417)883-0998	1 week prior
Neuman, Robert	Park Neighbor	(417)732-6759	1 week prior
Nicolaides	Park Neighbor	(417)732-1930	1 week prior
Perkins, E.	Park Neighbor	(417)862-1494	1 week prior
Rhodes, Gene	Park Neighbor	(417)732-7906	1 week prior
Roller, Mac	Park Neighbor	Unlisted	1 week prior
Sanders, Vernon	Park Neighbor	(417)732-2867	1 week prior
Sheppard, Charles	Park Neighbor	(417)866-7374	1 week prior
Steele, Harry Stephen	Park Neighbor	Unlisted	1 week prior
Twitty, Jo	Park Neighbor	Unlisted	1 week prior

Appendix # 13
PRESCRIBED FIRE RISK ANALYSIS WORKSHEET

Hazard Element	Hazard Probability			Potential Consequences			*Risk (Exhibit 4)
	L	M	H	L	M	H	
1. Environmental Data							
a. Seasonal severity	X			X			L
b. Fire Behavior	X			X			L
c. Fuels	X			X			L
d. Weather		X		X			M
e. Topography	X			X			L
2. Agency Values							
a. Ecological and Environmental Considerations		X			X		M
b. Social and Cultural Values		X			X		M
c. Project Duration and Logistics	X			X			L
d. Smoke and Air Quality Management	X			X			L
3. Public Values							
a. Land use values	X			X			L
b. Dwellings		X			X		M
c. Non-dwellings	X			X			L
4. Human Factors							
a. Firefighter	X			X			L
b. Public	X			X			L
c. Fire Management	X			X			L

APPENDIX # 14
SW-1, SW-2, NW-5 NW-6 & NW -7 Prescribed Fire
Hazard Rating Guide

Hazard Element Environmental Data	Hazard Probability L	Hazard Probability M	Hazard Probability H	Potential Consequences L	Potential Consequences M	Potential Consequences H
a. Seasonal severity	Energy Release Component below 90th percentile levels.	Energy Release Component at or above 90 th percentile levels -- above average drought conditions.	Energy Release Component at or above 97th percentile levels -- severe drought conditions.	Low probability for problematic fire behavior or difficulty in holding activities.	Some potential for problematic fire behavior or difficulty in holding activities.	High probability problematic fire behavior and difficulty in contr
b. Fire Behavior	Flame lengths confined to surface fuels, spread rates low.	Flame lengths extending into shrub and tree regeneration, spread rates moderate.	Flame lengths highly variable, frequently involving individual tree crowns, spread rates moderate to fast.	Low probability of difficulty in holding fire or for adverse fire effects.	Some potential for fire behavior to approach upper prescription limits and cause undesirable effects.	High potential fo fire behavior to create holding problems, excee prescription ranges, and cau undesirable effe
c. Fuels	Surface fuels light with open tree canopies, small shrub component present.	Surface fuels moderate with variable forest stand density and moderate shrub presence.	High surface fuel loading with dense shrub component and dense stands with abundant regeneration.	Fuels present no specific implementation problems.	Fuels will have a marked effect on implementation activities and holding force requirements.	Fuels will dramatically affe management organization an qualifications fo implementation.
d. Weather	Weather stable, winds light and predictable, no frontal activity.	Weather slightly variable, winds present but light, occasional gusts, no frontal activity.	Weather highly variable, winds near prescriptive limits, gusts prevalent, frontal activity possible.	Little impact on implementation.	Weather variation will require mitigation actions involving additional resources.	Weather will ser as a major influence on organization, personnel qualifications, a specific implementation actions.
e. Topography	Low variability in slope and aspect.	Some variability in slope and aspect, will affect fuel moisture and fire behavior.	High variability in slope and aspect, major implications on fire behavior and must be considered in prescription development and implementation.	Little influence on burn implementation.	Consideration of topography during planning process is necessary.	Topography will necessitate mitigation actior to be developed and firing patter and ignition methods to be modified to redu impacts.

Agency Values						
a. Ecological and Environmental Considerations	Fire poses little threat to cause adverse effects or long- term disturbances to natural resource values. No T and E species or critical habitat.	Fire poses moderate threat of adverse effects on natural resources and may cause short- to mid-term alterations or inconveniences such as air quality. Small amounts of T and E species present.	Fire poses high potential for adverse effects to natural resource values or to cause long- term degradations in air quality. Some T and E species present and/ or critical habitat.	Low probability for adverse impacts and little need for mitigation actions.	Mitigation actions may need to be developed to ensure desirable outcomes. Some short- term effects may have to be accepted.	Prescribed Fire Plan must addr mitigation actio to prevent undesirable outcomes.
b. Social and Cultural Values	No known social or cultural values in or adjacent to the project area.	Features of social or cultural value have been identified in and adjacent to the project area. Mitigation measures can be accomplished.	High social or cultural values have been identified in or adjacent to the project area. Mitigation actions are difficult to accomplish.	Severe fire behavior or fire outside the unit would not damage the identified values.	Severe fire behavior or fire outside the unit poses potential for moderate damage to special values. Concerned parties are aware and supportive of the project.	Excessive fire severity or fire outside the unit have adverse effects (substan damage to or potential destruction of th special sites). Acceptance by concerned parti is low.
c. Project Duration and Logistics	Fire planned to be of short duration, logistical needs easily accommodated.	Fire planned to be of short to moderate duration, logistical needs pose some difficulty.	Fire planned to be of moderate to long duration, logistical needs create much difficulty in accomplishing.	No consequences because of duration or logistics.	Duration may impact firefighters and public and logistical needs must be specifically addressed.	Long duration fi necessitates greater informat dissemination, mitigation to remove impacts firefighters and public, and logistical needs must be met or project postpon
d. Smoke and Air Quality Management	Few smoke sensitive areas near project area. No potential scheduling conflicts with cooperators.	Multiple smoke sensitive areas, mitigation actions minimize impacts, low potential for scheduling conflicts.	Multiple smoke sensitive areas near burn area, mitigation actions unable to remove all impacts, duration increases impacts, high potential for scheduling conflicts.	No adverse smoke consequences.	Mitigation actions must address smoke impacts, and coordination is required to confirm scheduling.	Mitigation actio must be develop regulatory agen must concur, scheduling conf may restrict implementation

Hazard Element	Hazard Probability L	Hazard Probability M	Hazard Probability H	Potential Consequences L	Potential Consequences M	Potential Consequences H
Public Values						
a. Land use values	No commercial or agriculture activities near planned burn area.	Some commercial or agricultural activities near burn unit, some managed wildlands (recreation, timber, range values).	Planned burn directly adjacent to urban, commercial, and/ or agriculture areas.	No impacts from land use values.	Escaped fire onto nearby managed land causes some impacts to commercial values. Prescribed Fire Plan must consider actions to prevent fire movement onto commercial and/ or agriculture lands.	Escaped fire on nearby manage land causes significant impa to commercial values. Mitigatic actions must ref additional resou needs to protec urban, commerc and/ or agricultu areas. If mitigati cannot be accomplished, b must be postponed.
b. Dwellings	No permanent or part-time residences present in area.	Some residences ½ mile or less from burn area.	Planned burn is located in wildland-urban interface zone, permanent residences in close proximity.	No impacts from dwellings.	Plan must address actions to ensure adequate protection of residences.	Notification of a concerned homeowners, residents, and visitors, coordination wit local fire protect organizations is needed, and mitigation actior must adequatel address potenti fire escapes.
c. Non-dwellings	No non- dwellings present.	Some outbuildings and non- residences ½ mile or less from burn area.	Commercial structures in close proximity to burn area.	No impacts.	Planning must consider these non- dwellings.	Planning and implementation must adequatel address all measures to prevent any adverse impacts

Human Factors						
a. Firefighter	Little firefighter exposure.	Some firefighter exposure due to fire duration and smoke.	Potential for high firefighter exposure to smoke during burn and to fire during holding actions.	No specific problems, implement standard safety measures.	Mitigation measures to eliminate smoke exposure.	Mitigation measures must address smoke exposure, use o mechanized equipment to eliminate expos to fire.
b. Public	No public exposure.	Some public exposure, mitigation actions can remove/ minimize exposure.	Public may be exposed to high smoke concentrations for moderately long periods, especially during nighttime hours.	No adverse consequences anticipated.	Mitigation actions necessary to provide for maximum public safety.	Mitigation actior must be develop coordinated wit other emergenc organizations ar fully understood prior to ignition.
c. Fire Management	No problems with commitment and acceptance by park staff members.	No problems with commitment but some unwillingness to support and prioritize the prescribed fire over other activities.	Park staff not committed to using prescribed fire as a tool and not willing to support and prioritize prescribed fire over other activities.	No adverse consequences.	Park staff must be briefed on need and importance of prescribed fire.	Park manageme team must be informed of prescribed fire objectives, supp needs, and prior

Appendix #15
PRESCRIBED FIRE RISK MITIGATION TABLE

Hazard Element	Risk	Mitigations / Controls Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.	Residual Risk	Referen[illegible] In Prescri[illegible] Fire Plan
Environmental Data				
a. Seasonal Severity	L		L	
b. Fire Behavior	L		L	
c. Fuels	L	———	———	———
d. Weather	M	Firing patterns and ignition times will be dependent upon the weather meeting prescription parameters. If weather exceeds prescription parameters, the burn will not be implemented. Weather forecast will be obtained and close attention will be paid to frontal passages.	L	K. Ignition a[illegible] Holding Act[illegible] Test Fire, F[illegible] and Ignition Burn Prescription
e. Topography	L		L	
Agency Values				
a. Ecological and environmental considerations	M	———	M	———
b. Social and Cultural values	M	The plan addresses sites found within the unit through the exclusion of these areas. Adequate holding resources have been calculated to quickly contain an escaped fire.	M	Holding Resources Worksheet/[illegible] Burn consideratio[illegible]
c. Project duration and logistics	L	———	L	———
d. Smoke and Air Quality Management	L	———	L	———

	Risk	Mitigations / Controls Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.	Residual Risk	Referen In Prescri Fire Plan
ublic Values				
a. Land use values	L		L	
b. Dwellings	M	There is one historic structure located within the burn unit which is excluded from the burn and will an engine stationed by it until secure.	M	Pre-burn consideratio Holding acti Holding forc worksheet
c. Non-dwellings	L		L	
uman Factors				
a. Firefighter	L		L	
b. Public	L		L	
c. Fire Management	L		L	

Appendix # 16
Medical Plan (ICS-206)

MEDICAL AID STATIONS	LOCATION	PARAMEDICS	
		YES	NO
4 1st Responders on-site with a burn kit in the fire engine	On-site		X

6. TRANSPORTATION

A. AMBULANCE SERVICES

NAME	ADDRESS	PHONE	PARAMEDICS	
			YES	NO
Brookline VFD		911		

B. AIR EVACUATION

NAME	LOCATION	PARAMEDICS	
		YES	NO
Cox Air Care	3801 S. National Avenue	X	

7. HOSPITALS

NAME	ADDRESS	TRAVEL TIME		PHONE	HELIPAD		BURN CENTER	
		AIR	GRND		YES	NO	YES	NO
Cox South Medical Center	3801 S. National Ave., Springfield, MO	10 min	20 min	269-6000	X			X
St. Johns Regional Health Center	1235 E. Cherokee	10 min	25 min	885-2876	X		X	

8. MEDICAL EMERGENCY PROCEDURES

If a person is injured it will be immediately reported to the Burn Boss. The Burn Boss will relay this information to the Visitor Center (732-2662). The Visitor Center will dispatch EMS support, while the Burn Boss calls the appropriate emergency phone number (911).

9. PREPARED BY	10. REVIEWED BY (SAFETY OFFICER)
B. Bloodworth	

Appendix # 17
Communication Plan (ICS-205)

INCIDENT RADIO COMMUNICATIONS PLAN ICS - 205			**1. INCIDENT NAME:** SW-1, SW-2, NW-5 NW-6 & NW- 7	**2. PREPARED** **DATE:** 2/13/04 **TIME :** 1400	**3. OPERATIONAL PERIOD** **DATE:** **TIME :**
SYSTEM/CACHE	**CHANNEL**	**FUNCTION**	**FREQUENCY**	**ASSIGNMENT**	**REMARKS**
		Air to Ground	169.150	Burn Boss, Holding Boss and Ignition Boss	
		Command	Rx 173.760 Tx 173.760 141.3	Burn Boss, Ignition Boss, and Division Supervisors	May also use Cellular Phone
		NIFC Tac. 3	168.600 Direct	Holding	
		NIFC Tac. 2	168.200 Direct	Ignition	
5. PREPARED BY (Ozark FMO) B. Bloodworth					

A. SIGNATURE PAGE

WILSONS CREEK NATIONAL BATTLEFIELD

PRESCRIBED FIRE PLAN

UNIT NAME: CORE AREA

Prepared By: /s/ Bobby Bloodworth — Date: 12/28/2001
Bobby Bloodworth
MWR-Fuels Specialist

Reviewed By: /s/ Gary Sullivan — Date: 1/15/02
Gary Sullivan
Chief of Resource Management

Regional
Reviewed By: /s/ Fred Bird — Date: 2/6/02

Technical
Review By: /s/ Doug Alexander — Date: 1-30-02
MWRO

Approved By: ______________________ — Date: ______________
Superintendent

FirePro Project #WICR-0202
Account Number:

Copies of approved plan will be sent to:

PRESCRIBED FIRE PLAN - TECHNICAL REVIEW

Park:_**Wilson's Creek National Battlefield**______

Project Name:__**Core Area**___________________________

Prescribed Fire Plan Elements		Status	Date	Initial
a.	Signature Page	+	1/30/2002	DGA
b.	Executive Summary	+	1/30/2002	DGA
c.	Description of Prescribed Fire Area	0	1/30/2002	DGA
d.	Goals and Objectives	+	1/30/2002	DGA
e.	Project Complexity/Risk	+	1/30/2002	DGA
f.	Organization	0	1/30/2002	DGA
g.	Cost	+	1/30/2002	DGA
h.	Scheduling	+	1/30/2002	DGA
i.	Preburn Considerations	+	1/30/2002	DGA
j.	Prescription	+	1/30/2002	DGA
k.	Ignition & Holding Actions	0	1/30/2002	DGA
l.	Wildland Fire Transition Plan	+	1/30/2002	DGA
m.	Protection of Sensitive Features	+	1/30/2002	DGA
n.	Public and Firefighter Safety	+	1/30/2002	DGA
o.	Smoke Management	+	1/30/2002	DGA
p.	Interagency Coordination and Public Information	+	1/30/2002	DGA
q.	Monitoring	+	1/30/2002	DGA
r.	Post Fire Rehabilitation	+	1/30/2002	DGA
s.	Post Fire Reports	+	1/30/2002	DGA
t.	Appendices	0	1/30/2002	DGA

Status Coding:
+ Adequate – Meets NPS Standards
0 Adequate with modification. See comments.
- Deficient. See comments.
NC Unable to evaluate.

Comments:

c. Vegetation Description.." .., there will always be two engines – one to contain the slopover & one to control the ignited unit." This line seems out of place. (Done RLB 1-30-02)

f. Organization- 15 as stated in organization chart instead of 13 on the Holding Worksheet. (Done (RLB 1-30-02)

k. No night shift or next day planning for resources. Will the fire be called out after the first day? (RLB 1-30-02)

l. t. No post fire critique identified. (RLB 1-30-02)

t. Holding Worksheet- all overhead are unavailable for production rate calculations. (RLB 1-30-02)

Signature:__*/s/Doug Alexander*____________________ Date:_______1/30/2002_____

Title:_Wildland Fire Management Spec.____ Office:__MWRO_________

REVIEWERS' COMMENTS

Fire Management Officer:

Chief Ranger:

N/A

Chief of Natural Resources: Comments incorporated into this plan by B. Bloodworth 1/15/02

Park Superintendent:

Regional FMO

Page 13/14, where are the fire behavior predictions? I would like to see the FL, ROS, listed in the charts for the weather parameters that you have identified. RLB 2/7/02

Page 14, last paragraph. Spelling error, its not "migrated" but mitigated. Done RLB.

Page 15, If you are going to described the ignition sequence then I need to be able to go to the map appendix and visualize the wind, topography and sequence of events. Not require to have firing map (CH.10) RLB.

Page 58, Appendix #9, I don't like the words "positive and negative" why not greater

than or less than? Easier to understand. FRB 2/6/02 Standard Form.

Table of Contents

B. EXECUTIVE SUMMARY

This burn supports the park's broad historic landscape restoration efforts to reestablish native plants and open savanna found during the civil war battle on August 10, 1861, for which the park was established. This project is part of continuing sequence of entry and maintenance burn projects to restore this historic landscape. The park brochure (1992) entitled "A Guide to Historic Landscape Restoration" reads:

> *"Prior to European settlement, savanna covered one third of Missouri. Today, only a few remnants of original savanna remain. Reestablishing an example of this unique biological community is not only an investment in our future but will, with time, recreate the 1861 landscape that was the stage for this important battle."*

This project also supports the following specific objectives found in the park Fire Management Plan:

- To utilize prescribed fire as a professional management tool to restore and perpetuate the natural environment and its processes and the historic scene. Initially, the park may implement prescribed burning for savanna restoration and preservation. Ultimately, as research provides the necessary knowledge and management recommendations, prescribed fire use are envisioned to be utilized for other management purposes.
- To research the proper role and effects of fire upon the park's natural and affected historical resources to provide management recommendations.

C. DESCRIPTION OF PRESCRIBED FIRE AREA

GENERAL AREA:

LOCATION:

Legal:

1. T 28 N, R 23 W, SEC 23,24,25,26 & 36
2. Latitude N 93 24' 30"
   Longitude W 37 06' 30"
3. UTM Zone_____, Easting__. Northing__.

Fire Management Zone: Suppression.

District: N/A .

GEOGRAPHIC ATTRIBUTES:
Size: 676.6 acres

Elevation Range: 1080 to 1250 ft.

Slope Range: 0-10 %.

Aspect Range: Wilson's Creek runs north to south bisecting the unit. Lands east of Wilson's Creek have a generally west aspect and visa versa.

DESCRIPTION OF PROJECT BOUNDARIES:

The unit is bounded on all sides by the 18-foot-wide asphalt park tour road, which begins and ends at the park Visitor Center in the northwest corner of the park. The Old Wire Road, Wilson's Creek, secondary roads and trails form the boundaries between interior units shown on the Project Map (Appendix #1). These interior units will be designated, as blocks of which there will be four.

Block #1: This interior unit will include bloody Hill and the Edwards Cabin. The boundaries are everything east of Wilson's Creek, west of the Tour Road and North of the Wire Road (BH-1, BH-2, BH-3, NW-4).

Block 2: This unit will include the Ray Cornfield, Ray Orchard and the Pulaski Battery. The Tour Road is on located on the East, Wilson's Creek to the West and the Wire Road to the South (NE-2, NE-3, NE-4, NE-6)

Block 3: This includes all land south of the Wire road but still inside the Tour Road. Wilson's Creek splits this block in half (CN-1, CN-2, CN-3, SW-3, SW-4).

Block 4a &b: The critical habitat for *Lesquerella filiformis* is located in this block 4 a & b. This block will be excluded in the spring/fall burn windows and burned in the summer as a separate block within this plan. Block 4 is located on North Bloody hill and block 4 b is located by the weather station site (Walnut and North Glade).

Note: Block 4 a & b may be included in the entire burn project if these areas show no *Lesquerella filiformis* plants in the plots located within these blocks. In some years, *Lesquerella filiformis does not* appear.

VEGETATION DESCRIPTION:

The unit is 88% fuel model 2 and 12% fuel model 9. The fuel model surrounding the burn unit is often fuel model 9. This is indicated in the Holding forces worksheet. Fuel model 9 is used to calculate holding resources, as FM1 and FM3 overpredict fire behavior The area surrounding the park is pastureland with some residential areas. For the purpose of calculating fire behavior, percentages of 80% in fuel model 2 and 20% in fuel model 9 will be used.

Vegetation Type	Fuel Model NFFL	Estimated Acres	Estimated Tons Per Acre
Short/Tall Grass	1/3	577	2 - 6
Hardwood litter	9	80	2 - 10

PROJECT MAP (Appendix #1) The burn boss will assign points on the map for ease of communication while units are burned.

VICINITY MAP (Appendix #1)

D. GOALS AND OBJECTIVES

GOALS

1. Reduce wildfire risk to urban interface improvements immediately outside of the park boundary, as well as historic park improvements,
2. Restore fire and associated natural processes in order to retain tall grass prairie species composition and hardwood savannas, characteristic of the park's historic natural communities an average of 10 to 12 oak trees per acre.
3. Protect riparian areas.
4. Provide training opportunity for firefighters

SPECIFIC OBJECTIVES:	PROPOSED REDUCTION WITHIN ONE YEAR	ACTUAL RESULTS
Burn unit with a moderate severity burn.	75-95%	
Reduce 1-hour fuel loading (litter layer).	50-80%	
Reduce 10-hour fuels.	40-70%	
Top-kill of saplings greater than 1.4 meters tall and less then 2.5 meters tall in the forested areas and where hardwoods are encroaching in historic open fields.	>40%	

Range of Acceptable Results Expected across the Project Area

Throughout the entire unit a mosaic of different levels of fire severity are desired and acceptable.

E. RISK MANAGEMENT

This burn project has a low risk value as calculated by the hazard risk analysis process. Assessing reasonable risks and the mitigation to lower these risks generates this low rating. This is documented on the Hazard Rating Guide, Prescribed Fire Risk Analysis Worksheet, and Job Hazard Analysis.

F. PROJECT COMPLEXITY

This burn rates as a low complexity project that should pose no unusual risks to personnel safety or property. Burn duration will be 24 hours or less per interior blocks/unit, with isolated residual burning expected in fuel jackpots.

HAZARD, RISK AND COMPLEXITY WORKSHEETS (attached)

G. ORGANIZATION

The Burn Boss may order additional resources to assist with the project before ignition if in their professional judgement they are needed. This may be done after consultation with the project coordinator or Ozark Fire Management Officer. All non-park resources will be ordered and committed to the prescribed fire project through the Missouri Interagency Dispatch Center (MOCC). The holding resource worksheet and Fireline Handbook will be used to determine adequate number and type of holding resources for each scenario. Specific resources will be identified in an incident action plan prepared prior to each operational period during the implementation of the burn. It is anticipated that one or both Mid-west Fire Use Modules will be used. The regional office will provide a burn boss if Ozark NSR or Buffalo NR can not.

A total of Fifteen (15) persons will be the minimum required conducting the prescribed fire.

Overhead Personnel:
1 Burn Boss/ Incident Commander (RXB2)
1 Ignition Specialist (RXI2)
1 Holding Squad Leader (FFT1)
1 Fire Effects Monitor

Additional Crews/Personnel/Resources For Daytime Holding and Ignition Operations:
3 FFT2 – Ignition Crew
2 Type 6 engine with operator and asst. operator
4 ATVs with Water Tanks and operators.

H. ESTIMATED PROJECT COSTS (non-base, other agency, contract):

Costs will be primarily for personnel and equipment preparing and conducting burn operations. The unit requires some preparation. Firing operations and post firing patrols should be of short duration with the goal of keeping overall costs low.

FUNCTION	PROJECTED WORK HOURS/	PROJECTED COSTS*
Planning	10 hours (base salary paid) Rx Fire Plan development	$0.00
Unit Preparation	20 hours blow line, hazard tree mitigation, brush hog line	$300.00

Operations (including burning, holding, mop-up)	50	$750.00
Travel	12 people (includes per diem and lodging) X 4 days	$3990.0
Monitoring & Evaluation	2 (collateral assignment) site visit coordination between WICR staff and FMO.	$250.00

TOTAL PROJECTED COST <u>$ 5290.00</u> divided by <u>657</u> acres = <u>$ 8.05</u> PER ACRE
*Required information in final report: ACTUAL COSTS, COST PER ACRE, WORK HOURS PER ACRE.

I. SCHEDULING

Proposed Ignition Date:	Oct. 1 2002 to Sept. 30th 2002
Projected Burn Duration:	5-6 days total
Actual Ignition Date:	
Date Declared Out:	
Date DI-1202 Submitted:	

J. PRE-BURN CONSIDERATIONS

ON SITE PREPARATION NEEDS:

A. Construct a leaf blown and wet line (on the day of the burn) around block # 4 this serves to exclude critical habitat for *Lesquerella filiformis* found in the area of the Lyon's marker on top of North Bloody hill glade and Walnut glade. Cedar trees, brush and other ladder fuels will be removed 60 ft. inside the burn along the control line. Limb any low-hanging branches and remove any large woody debris, including snags, within 60 feet of the fireline.

B. Remove hardwood litter from all roadways and trails to be utilized as control line including the Wire Road and hiking trail. Remove any low-hanging branches or woody debris that may interfere with a wildland fire engine or ATV travelling along these routes.

C. Construct a 6-8 foot wide mow line in grass around the edge of all split rail fences and cannons, which are being protected. In all fields, the split rail fences and cannons are not to be burned.

D. Foam the Edwards Cabin the day of the burn and have a 8 to 10 foot mowed line in place.

E. Prepare 20 gallons of burn mix.

F. Access the nearest remote automated weather station at least two days prior to the ignition date to assess fuel moisture and weather conditions.

G. Take fuel moisture samples from the site and calculate % fuel moisture for 1-hr. fuels one day prior to the burn.

H. Set-up four all-terrain vehicles outfitted with water tank and pump and one all-terrain vehicle outfitted for patrol. Transport ATVs to burn site.

I. DAY OF BURN: Set up "Prescribed Burn" and "Smoke" signs along the Tour Road, Wire Road, ZZ Highway and Route 182.

J. Close all trails adjacent to and in the project area.

K. Fill at least 4 bladder bags and place on the engines.

L. Program handheld radios for frequencies identified in the Communications Plan (Appendix #16).

OFF SITE:

A. WICR staff will purchase needed equipment and supplies.

B. WICR staff will notify local fire departments of the scheduled burn and their role.

C. WICR staff will complete a press release at least one week prior to the proposed burn in the local newspaper.

D. At least a week prior to the burn, WICR staff will contact the adjacent landowners with a press release of the proposed burn.

SPECIAL PRECAUTIONS/REGULATIONS:

A. All improvements (fences, cannons, wayside exhibits and cabin) will be cleared around of fuel prior to the burn.

B. Ignition will stop short of riparian areas and allow the fire to back and go out or holding forces will stop the fire.

C. Endangered species habitat areas adjacent to the Lyon's marker, North Bloody Hill Glade and Walnut Glade will be protected with a wet and leaf blown line.

D. A herpetological study is ongoing within all burn blocks. After each burn unit is complete, personnel will put out smoldering cover boards (map located in appendix).

Safety Hazards: Visitor safety; smoke on the Loop Rd. and Hwy. ZZ and along control lines. Crew safety; safety zones, visibility, and exposure to smoke. **Mitigation:** The area,

including all trails, will be closed while burning. Visibility on roads will be monitored and controlled. "Smoke Ahead" and/or "Prescribed Burn" signs will be posted. The tour road will be kept open but closed when visibility is reduced to 100 yards. Strip burning may be used to increase heat to reduce smoke output. All personnel will have PPE. Escape routes and safety zones will be identified. Engines and Atvs will have headlights on.

K. PRESCRIBED FIRE PRESCRIPTION

NFFL Fuel Models used: 3 & 9 80% and 20 %

BURNING PRESCRIPTION AND OBSERVED CONDITIONS:

A prescribed fire prescription containing those key parameters needed to achieve desired results (see page 7). Prior to ignition, compare prescription elements, both individually and collectively, against local weather forecasts and any other predicted conditions. During implementation of the burn, if objectives are not being met, further ignition shall be evaluated; therefore, prescription parameters must be wide to accommodate established objectives while staying within fire personnel capabilities. All changes to the prescription parameters must be approved with same level of authority required for the plan approval.

The prescription is based on fuel moisture, wind speed and relative humidity. Temperature ranges will not be used as a constraint.

Blocks 1, 2 and 3

ENVIRONMENTAL VARIABLES	HOT	OPTIMUM	COOL	OBSERVED*
Temperature (dry bulb %):				
Relative Humidity (%):	20	30	50	
Wind Direction:	S/SW to N/NW	S/SW		
Wind Speed (midflame):	8 mph	4 mph	2 mph	
Dead Fuel Moisture (%) 1 Hour:	5	8	10	
10 Hour:	8	11	14	
1000 Hour:	14	18	20	

*At time of ignition

PREDICTED FIRE BEHAVIOR	HOT	OPTIMUM	COOL	OBSERVED*
Rate of Spread (ch/h):	192.5		26	
Heat per Unit Area (Btu/ft2):				
Fireline Intensity (Btu/ft/s):				
Flame Length (ft):	18.5		6.0	

*Standard observation time
See Appendixes for BEHAVE Projections

Block 4 a & b

ENVIRONMENTAL VARIABLES	HOT	OPTIMUM	COOL	OBSERVED*
Temperature (dry bulb %):				
Relative Humidity (%):	20	30	80	
Wind Direction:	S/SW to N/NW	S/SW		
Wind Speed (midflame):	8 mph	4 mph	2 mph	
Dead Fuel Moisture (%) 1 Hour:	5	8	10	
10 Hour:	8	11	14	
1000 Hour:	14	18	20	

*At time of ignition

PREDICTED FIRE BEHAVIOR	HOT	OPTIMUM	COOL	OBSERVED*
Rate of Spread (ch/h):				
Heat per Unit Area (Btu/ft2):				
Fireline Intensity (Btu/ft/s):				
Flame Length (ft):				

*Standard observation time
See Appendixes for BEHAVE Projections

Behave Projections

The Behave projections are located in the appendixes. Fuel models 2, 3, and 9 represent blocks 1, 2 and 3. Fuel models 2 & 9 represent block 4. Fuel model 9 is used to calculate the holding forces worksheet due to the fact that fuel model 3 will overpredict fire behavior. The fuels outside of the burn unit are mowed hay fields and hardwood forest. Block 4 will be surrounded by fuel 3 that was burned in the spring will have a live moisture content at the time block 4 is burned of over 300%. **Note:** The high fire intensities and rate of spreads predicted will be interior in each blocks. This will be migrated by the burn boss with firing patterns and sequences. During black lining operations, fire intensities will be low due to burning on the low end of the prescription and the fact that intensities are over predicted in these blocks.

L. IGNITION AND HOLDING ACTIONS

TEST IGNITION:

A test burn will be ignited near the main point of origin of the burn. Fuels and topography will be representative of most of the project. The Burn Boss will decide at that point to initiate the main

burn or not. It is most likely that the test burn will be conducted near the junction of the Wire Road and Tour Road (near wayside exhibit #5).

FIRING AND IGNITION:

The firing order will depend largely on wind direction the day of the burn. The burn will be broken down into blocks. The area containing the T&E species habitat is part of block #1, but will be treated in the Summer/Fall. Each block will be treated separately from the others. Since the basic shape of each unit is a rectangle, the downwind firelines will be "blacked-out" in order to make them more secure. A combination of strip head and strip backing ignition methods will be used to build good secure buffer zones along the firelines. Once the exterior firelines, cannons, block #4 and the Edwards cabin are secure, the Burn Boss will determine the best strategy for completing each block.

HOLDING ACTIONS:

All engines and ATV's will be mobile and used accordingly to provide adequate patrol behind the ignition teams. A hoselay, atv with water or engine patrol will be in place along the T & E species habitat exclusion line. Two wildland engines will be used to patrol behind ignition, one engine will patrol on roadways just outside the park boundary, while the fourth engine is on stand-by for water shuttles. Water sources include fill sites at the resource management office, as well as the hydrant at the park Visitor Center. The bulk of handcrew resources will be committed to holding and patrol immediately behind ignition operations.

MOP-UP OPERATIONS:

The fire will be mopped up at least 200' in from the lines as soon as possible. This will be done before all resources are released from the incident. This may require that the fire be staffed all night for one or two nights until this is accomplished. The fire will be checked every day until no smokes are seen for two days in a row.

Burn unit boundaries will be hand ignited with drip torches or atv torches. The unit interior will also be hand ignited with drip torches or atv torches at the direction of the Burn Boss with coordination of the Ignition Specialist.

The Burn Boss or Ignition Specialist will thoroughly describe the firing plan and safety considerations to all burn personnel at the pre-burn briefing. Everyone will be provided a copy of the project map. Firing operations for the entire unit should be completed in one to two days. After the unit has been fired and and mop up has been completed, the burn will be turned over to the resource management specialist at Wilson' Creek. He will set up daily patrols as needed until the fire is out. The resource specialist will be the person to call the fire out. Once the fire is called out, the Ozark NSR Fire Management Office will be notified.

M. WILDLAND FIRE TRANSITION PLAN

ESCAPED FIRES:
An escaped fire is an unwanted fire outside the project boundaries that has exceeded holding resource capabilities. If the prescribed fire exceeds project boundaries and/or slopovers and spot fires are not contained within one burning period, the fire will be declared an escaped fire and a Wildland Fire Situation Analysis (WFSA) will be completed. At the time of conversion to an escaped fire, ignition operations within the unit will continue only if deemed to be in the interest of safety and should follow the defined alternatives as outlined in the WFSA.

In case of a fire detected outside the project boundary, designated holding forces will proceed promptly to the spot fire or "slop-over" and initiate the appropriate strategy (direct or indirect) as determined by the Burn Boss and holding specialist. Firing operations may cease at the discretion of the Burn Boss. Any fire that escapes the project boundary will receive aggressive initial attack with the on-site resources. Infrequent and easily managed spots outside of the burn unit will not necessarily cause a conversion to an escaped fire.

Contingency lines have been drawn using human-made and natural features, which form logical barriers to the spread of fire. All holding personnel will be familiarized, during the briefing, with the contingency area boundaries and associated holding lines. Contingency holding lines include Highway ZZ west and a creek and unpaved road to the south. To the north escape across the Tour Road is unlikely, but Highway 182 could then be utilized as a contingency line. Escape west across the Tour Road is even less likely, but contingency lines would include the park boundary and Highway ZZ.

All escaped fires will trigger the conversion of the prescribed fire (unit and escape) to a wildfire. The primary priority will be public and personnel safety followed by protection of structures and cultural resources. At the time of conversion, the Burn Boss will become the Incident Commander and remain as such until the fire exceeds this individual's qualifications and capabilities and/or a transition can take place.

The I.C. will immediately notify **Mark Twain National Forest Dispatch (573-364-4621 x484) and WICR Superintendent** of the change in status to a wildfire and will order the appropriate resources. The I.C. will also complete a WFSA (see following page). Dispatch will order additional resources specified by the I.C., and suppression actions on the escape fire will be conducted using the most appropriate suppression response. Any suppression actions will be in accordance with the Wilson's Creek National Battlefield Fire Management Plan. On-scene individuals will be utilized and assigned to suppression positions. If management of the escaped fire is turned over to an incident management team (IMT), prescribed fire personnel may be assembled as a division in charge of the burn unit portion of the converted fire.

Resource:	Location and Phone Number:	Response Time:
1. 1 Type VI+ Wildland Engines	1.Fire Chief's Office (417-882-2014)	1. <1 hr.
2.	2.	2.
3.	3.	3.
4.	4.	4.

N. PROTECTION OF SENSITIVE FEATURES

A. Archeological features should not be impacted by the project, as control lines will be raked or mowed, as often as possible utilizing existing roads and trails, as no soil disturbance is anticipated during project preparation. Any cultural sites discovered during the pending survey requiring mitigation would be identified and prepared prior to ignition.

B. The federally listed *Lesquerella filiformis* is known to be utilizing the proposed burn unit area, however an exclusion line will be constructed to exclude habitat for *Lesquerella filiformis* from treatment, during the spring burn treatment. This step exempts the park from undertaking formal consultation with the U.S. Fish and Wildlife Service regarding potential impacts under NEPA. After the *Lesquerella filiformis* dies and cures in the late summer, block # 4 will be treated with prescribed fire.

C. No foam concentrate or solution will be handled, mixed, or sprayed within 50 feet of any water source.

O. PUBLIC AND PERSONNEL SAFETY

A. "Prescribed Burn-Do Not Report" and/or "Smoke Ahead" signs will be posted along major streets and highways near the burn site.

B. Traffic control will be conducted by assigned burn personnel and/or Park Rangers along the park road if smoke emissions are impacting driving visibility.

C. A safety briefing will be given at the pre-burn briefing and at the start of each operational period. An Incident Action Plan describing burn operations, objectives, personnel/division assignments, and radio frequency information will be distributed to all personnel. A project map and spot weather forecast will be distributed, as well. All personnel will be advised of

Lookouts, Communications, Escape Routes, and Safety Zones. Any potential safety hazards (power lines) will be pointed out.

D. All burn personnel will wear standard fire fighting leather boots, Nomex clothing, leather gloves, and a hard hat. They will carry a fire shelter and a fire tool at all times.

E. All standard wildland fire fighter safety rules will be strictly enforced (ref: Fireline Handbook).
F. Ensure safety of FEMO with IC and maintain effective communication with ignition and holding teams.

G. The public will be kept at a safe distance from the firelines. Authorized personnel must accompany all visitors and press.

H. In case of an accident or injury involving fireline personnel or the public, refer to the Medical Plan (Appendix #16).

I. Only red-carded personnel or cooperators who meet their own agency's qualifications will be utilized during the burn.

1. EMERGENCY MEDICAL PROCEDURES:

- EMT or First Responder assigned the day of the burn.
- First Aid equipment available and location made known to all burn personnel.
- Burn Boss notified immediately of injury.
- Burn Boss will coordinate with EMT/First Responder.
- Burn Boss will notify Park Dispatch of an injury and will follow up with information as soon as the injury has been assessed.
- EMT/First Responder will assess injury and begin treatment.
- Once injury has been assessed, the Burn Boss or designee will activate the appropriate EMS response for evacuation of injured personnel.
- If personnel need to be evacuated, park dispatches will dispatch/contact EMS resources from the following table or the Medical Unit Plan (ICS-206) located in the Appendix.

RESOURCE	CONTACT PHONE NUMBER	LOCATION
Cox Air Care	911	Springfield, MO.
Brookline VFD	911	Springfield, MO.

P. SMOKE MANAGEMENT AND AIR QUALITY

COMPLIANCE:

In the state of Missouri, prescribed fire is considered to be agricultural burning and there are no burn or smoke permit requirements. The Air Pollution Control Dept. of the Missouri Dept. of Natural Resources will be notified prior to the burn.

MODELING:

Weather and Smoke Management forecasts will be obtained from the National Weather Service Forecast Office in Springfield, Missouri. A Smoke Trajectory Map has been completed to show the preferred wind direction in relationship to the critical receptors listed below.

MITIGATION:

A. Moderate smoke volume and/or decreased visibility may occur along the ZZ Highway, immediately west of the project, as well as on the county road south of the park. Park personnel will assist with traffic control if visibility poses a safety problem for road traffic. Highway warning signs will be posted along nearby public roads.

B. Critical receptor points are:

• Battlefield, Missouri	3 miles northeast
• Republic, Missouri	3 miles northwest
• Springfield, Missouri	6 miles northeast
• Nixa, Missouri	6 miles southeast

C. If enough smoke does drift towards across the ZZ Highway, or other roads near the park, to impact traffic safety, the Burn Boss will determine if further burning operations should be suspended, if smaller strips should be ignited, or if traffic control should be initiated.

D. Considering the small area to be burned, little smoke impact to park neighbors and nearby communities is expected. Smoke along Highway ZZ is of greater concern than long-range smoke impacts; therefore the preferred wind direction is S to SW. Nighttime smoke will drift downstream along Wilson's Creek and the James River away from the critical receptors.

E. Smoke emissions and behavior will be continually monitored and documented on a smoke observation form. Any significant change in smoke emissions and/or column behavior will be reported to the Burn Boss.

F. All sensitive and critical areas were identified and smoke trajectories plotted. In the appendix a smoke trajectory map illustrates a smoke trajectory with the preferred north, west or east airflow.

G. Smoke concentrations will be minimized by burning with a daytime visibility of at least 15 miles, a minimum mixing height of 1100 feet, a transport wind speed of at least 9 mph, and a following nighttime forecast of no area fog.

Q. INTERAGENCY COORDINATION AND PUBLIC NOTIFICATION

PRE-BURN COORDINATION ACTIONS & MEDIA RELEASES:

A. Wilson's Creek National Battlefield staff will prepare a news release at least one week prior to the burn. A news release will be posted in nearby public places and will also be distributed to local media contacts.

B. Mandatory and optional notifications will be made on or prior to the day of the burn by the dispatcher as specified below.

C. The appropriate Sheriff's Offices will be notified on the day of the burn by the dispatcher.

D. The Missouri State Highway Patrol will be notified prior to the burn.

E. Affected adjacent landowners will be contacted the day before the burn by the dispatcher or Burn Boss.

F. An Information Officer may be ordered for the burn if deemed necessary by the Fire Management Officer and/or Superintendent.

G. Notify the Park Superintendent and/or Information Officer at least one week prior to the proposed ignition date.

NOTIFICATIONS: Located in the Appendix # 12

R. MONITORING AND EVALUATION PROCEDURES

PRE-IGNITION:

There are currently no fire effects plots utilizing NPS monitoring protocol located within the project boundary. The Prairie Cluster I & M Monitoring Crew are providing all long-term monitoring at this site. Two I & M plots are located in BH-3 unit.

DURING THE BURN:

A. During the burn, on site monitoring will be conducted by the lead FEMO and other assigned FEMO's. These people will be responsible for the collection and documentation of the following environmental parameters: temperature, relative humidity, mid-flame wind speed, flame length, flame height, flame zone depth, and rate of spread. These measurements will be made every 30 minutes or at the discretion of the Burn Boss.

B. Fire monitoring on I & M Prairie Cluster plots will be conducted with the above information recorded. Fire monitor will take before and after photographs of plots at pre-determined photo points.

C. I & M Prairie Cluster crew will monitor plots. Documentation of fire behavior will be included in post-burn summary. Fire monitor on the burn will prepare a fire monitor's report and submit to the Burn Boss or designated person.

Transect Plots: Established by Resource Management staff and/or the Prairie Cluster I & M crew.

Photo Points: Will be established by the Ozark fire effects crew.

D. Monitors will maintain communication with the Burn Boss, Ignition, and Holding Specialists to ensure safe operations when working in the interior of the burn.

POST-BURN:

After the burn, a fire critique will be conducted by the Fire Management Officer, Burn Boss, selected members of the prescribed burn team, and the park staff to evaluate the level at which the burn objectives were accomplished.

S. POST FIRE REHABILITATION

A. The fire staff will evaluate all temporary fire lines once the Burn Boss has declared the prescribed burn out. If it is determined that rehabilitation work is necessary, it will be completed with project funds within six months of burn completion.

B. If any firelines are made barren of natural vegetation, leaves, needles, grass, or other native natural organic material will be replaced to encourage growth of vegetation.

C. Branches will be placed across the lines in order to discourage their use as ATV or hiking trails.

D. All flagging will be removed.

T. POST FIRE REPORTS

A. The Burn Boss/I.C. and Lead FEMO will maintain an ICS-214's (Unit Logs) throughout each operational period.

B. The Lead FEMO will prepare and submit an individual report that includes hourly weather, fire behavior and smoke observation data.

C. The Burn Boss will prepare an Individual Fire Report, DI-1202, within five days of declaring the fire out.

D. The Burn Boss will prepare a post burn report and submit a copy to the FMO along with a copy of the Fire Monitor report.

E. The FMO will prepare a project accomplishment report in the National Park Service Wildland Fire Management Computer System.

F. Ozark Fire Management staff will maintain a project file that includes the burn unit plan, spot weather forecasts, and all required reports.

Documentation	**YES**	**NO**	**N/A**
1. Original Signed Plan			
2. All Reviewer Comments			
3. All Maps			
4. Notification Checklist			
5. Permits			
6. Weather Forecast			
7. Smoke Forecast			
8. Agency Administrator Go/No Go Checklist			
9. Operational Go/No Go Checklist			
10. Daily Validation			
11. Unit Logs			
12. Enter into Prescribed Files by FPA			
13. 1202 Completed and Entered into SACS			
14. Other			

U. APPENDICES

1. Maps (Vicinity and Project)
2. Smoke trajectory Map
3. Complexity Assessment
4. BEHAVE Projections
5. Agency Administrators GO/NO-GO
6. Operational GO/NO-GO
7. Job Hazard Analysis
8. IAP/Briefing Guide
9. Adequate Holding Resources Worksheet
10. Post Project Evaluation
11. Prescribed Monitoring Form
12. Pre-burn Notification List
13. Prescribed Fire Risk Analysis Worksheet
14. Hazard Rating Guide
15. Prescribed Fire Risk Mitigation Table
16. Medical Unit Plan
17. Communication Unit Plan

APPENDIX #1

ATTACH MAPS HERE

Appendix #3
PRESCRIBED FIRE COMPLEXITY RATING WORKSHEET

	Complexity Element	Complexity Value L	M	H
Primary Factors	1. Life and Safety	X		
	2. Threats to Boundaries	X		
	3. Management Organization	X		
	4. Political Concerns	X		
	SUBTOTAL OF PRIMARY FACTORS	4		
Secondary Factors	5. Objectives	X		
	6. Fuels and Fire Behavior	X		
	7. Air Quality Values	X		
	8. Improvements		X	
	9. Logistics	X		
	10. Natural, Cultural and Social Values		X	
	11. Tactical Operations	X		
	12. Interagency Coordination	X		
	SUBTOTAL OF SECONDARY FACTORS	6	2	
	TOTAL COUNT OF COMPLEXITY VALUES	10	2	

QUALIFICATIONS DETERMINATION TABLE:

	Prescribed Fire Burn Boss Type 2 (RXB2)	Prescribed Fire Burn Boss Type 1 (RXB1)
Primary Factors rated "H"	Less than 2	2 or more
	AND	OR
Total Count rated "H"	Less than 4	4 or more
		OR
	Minimum required on all prescribed fires.	When deemed appropriate by the agency administrator or unit Fire Management Officer.

Prescribed Fire Burn Boss Level Indicated (check one):	RXB1		RXB2	X

PREPARED BY: /s/ Bobby Bloodworth DATE: 12/18/01

APPROVAL BY: ____________________ DATE: ____________________
Agency Administrator

REVIEWED BY: ____________________ DATE: ____________________
(Burn Boss immediately prior to burning

Appendix #4
Behave Projections
Fuel 9

```
WELCOME TO THE BEHAVE SYSTEM
  BURN SUBSYSTEM
    FIRE1 PROGRAM: VERSION 4.4 - FEBRUARY 1997

DEVELOPED BY:  THE FIRE BEHAVIOR RESEARCH WORK UNIT
               INTERMOUNTAIN FIRE SCIENCES LABORATORY
               MISSOULA, MONTANA

YOU ARE RESPONSIBLE FOR SUPPLYING VALID INPUT AND FOR
  CORRECTLY INTERPRETING THE FIRE BEHAVIOR PREDICTIONS.

ASSUMPTIONS, LIMITATIONS, AND APPLICATION OF MATHEMATICAL
  MODELS USED IN THIS PROGRAM ARE IN:
  Andrews, Patricia L. "BEHAVE: Fire behavior prediction and
    fuel modeling system—BURN subsystem, Part 1", INT-GTR-194, 1986
  Andrews, Patricia L., and Chase, Carolyn H. "BEHAVE: Fire
    behavior prediction and fuel modeling system—BURN
    subsystem, Part 2", INT-GTR-260, 1989


DIRECT
 1—FUEL MODEL -------------      9 - HARDWOOD LITTER
 2—1-HR FUEL MOISTURE, % --     5.0   7.0   9.0  11.0  13.0
 3—10-HR FUEL MOISTURE, % -     8.0
 4—100-HR FUEL MOISTURE, %     12.0
 7—MIDFLAME WINDSPEED, MI/H     1.0   3.0   5.0   7.0   9.0
 8—TERRAIN SLOPE, % -------     5.0
 9—DIRECTION OF WIND VECTOR      .0
     DEGREES CLOCKWISE
      FROM UPHILL
10—DIRECTION OF SPREAD ----      .0  (DIRECTION OF MAX SPREAD)
    CALCULATIONS
     DEGREES CLOCKWISE
      FROM UPHILL


RATE OF SPREAD, CH/H                                       (V4.4)
=====================================================================
  1-HR   I      MIDFLAME WIND, MI/H
  MOIS   I
         I    1.0    3.0    5.0    7.0    9.0
  (%)    I--------------------------------------------------------
         I
  5.0    I    1.     5.    10.    16.    25.
         I
  7.0    I    1.     4.     8.    14.    21.
         I
  9.0    I    1.     3.     7.    12.    19.
         I
 11.0    I    1.     3.     7.    11.    17.
```

13.0	1.	3.	6.	10.	16.

HEAT PER UNIT AREA, BTU/SQFT (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	390.	390.	390.	390.	390.
7.0	355.	355.	355.	355.	355.
9.0	335.	335.	335.	335.	335.
11.0	326.	326.	326.	326.	326.
13.0	320.	320.	320.	320.	320.

FIRELINE INTENSITY, BTU/FT/S (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	11.	32.	69.	117.	177.
7.0	8.	25.	53.	90.	136.
9.0	7.	21.	44.	76.	114.
11.0	6.	19.	39.	67.	101.
13.0	6.	17.	36.	61.	92.

FLAME LENGTH, FT (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	1.3	2.2	3.1	4.0	4.9
7.0	1.2	2.0	2.8	3.6	4.3
9.0	1.1	1.8	2.6	3.3	4.0
11.0	1.0	1.7	2.4	3.1	3.8

```
13.0     I    1.0    1.7    2.3    3.0    3.6
```

```
SIZE-LINKED-TO-DIRECT
 1—RATE OF SPREAD, CH/H ---   OUTPUT FROM DIRECT. RANGE=    1.  TO   25.
 2—EFFECTIVE WIND, CH/H ---   OUTPUT FROM DIRECT. RANGE=    1.0 TO    9.0
 3—ELAPSED TIME, HR -------     .2
```

```
AREA, ACRES                                                 (V4.4)
==========================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I    1.0    3.0    5.0    7.0    9.0
  (%)     I-----------------------------------------------------
          I
  5.0     I     .0     .0     .1     .3     .6
          I
  7.0     I     .0     .0     .1     .2     .4
          I
  9.0     I     .0     .0     .1     .2     .3
          I
 11.0     I     .0     .0     .1     .2     .3
          I
 13.0     I     .0     .0     .1     .1     .3
```

```
PERIMETER, CHAINS                                           (V4.4)
==========================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I    1.0    3.0    5.0    7.0    9.0
  (%)     I-----------------------------------------------------
          I
  5.0     I    1.     3.     5.     8.    11.
          I
  7.0     I    1.     2.     4.     6.     9.
          I
  9.0     I    1.     2.     4.     6.     8.
          I
 11.0     I    1.     2.     3.     5.     8.
          I
 13.0     I    1.     2.     3.     5.     7.
```

```
CONTAIN-LINKED-TO-DIRECT-AND-SIZE
 1—RUN OPTION -------------    1.=COMPUTE LINE BUILDING RATE
 2—MODE OF ATTACK ---------    2.=REAR
 3—RATE OF SPREAD, CH/H ---    OUTPUT FROM DIRECT. RANGE=    1. TO   25.
 4—INITIAL FIRE SIZE, AC --    OUTPUT FROM SIZE.   RANGE=    0. TO    1.
 5—LENGTH-TO-WIDTH RATIO --    OUTPUT FROM SIZE.   RANGE=   1.3 TO   3.3
 6—BURNED AREA TARGET, AC -  10.0
```

```
TOTAL LENGTH OF LINE, CHAINS                                (V4.4)
==========================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
```

(%)	1.0	3.0	5.0	7.0	9.0
5.0	63.	67.	67.	67.*	67.*
7.0	65.	69.	69.	69.	69.*
9.0	66.	70.	70.	70.	70.*
11.0	67.	70.	70.	71.	71.*
13.0	68.	70.	70.	71.	71.

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

TOTAL CONTAINMENT TIME, HOURS (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	20.5	7.1	3.3	1.8*	1.1*
7.0	25.0	8.7	4.0	2.3	1.4*
9.0	28.9	10.0	4.6	2.6	1.7*
11.0	32.1	11.0	5.1	2.9	1.9*
13.0	35.0	11.8	5.5	3.2	2.1

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TOTAL LINE BUILDING RATE, CH/H (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	3.	9.	21.	37.*	59.*
7.0	3.	8.	17.	31.	48.*
9.0	2.	7.	15.	27.	42.*

11.0	I	2.	6.	14.	24.	38.*
	I					
13.0	I	2.	6.	13.	22.	35.
	I					

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CONTAIN-LINKED-TO-DIRECT-AND-SIZE

1—RUN OPTION -------------	2.=COMPUTE BURNED AREA				
2—MODE OF ATTACK ---------	2.=REAR				
3—RATE OF SPREAD, CH/H ---	OUTPUT FROM DIRECT.	RANGE=	1.	TO	25.
4—INITIAL FIRE SIZE, AC --	OUTPUT FROM SIZE.	RANGE=	0.	TO	1.
5—LENGTH-TO-WIDTH RATIO --	OUTPUT FROM SIZE.	RANGE=	1.3	TO	3.3
7—TOTAL LINE BLDG RATE---- CH/H	64.0				

TOTAL LENGTH OF LINE, CHAINS (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
	I					
5.0	I	1.	3.	7.	16.*	50.*
	I					
7.0	I	1.	2.	5.	12.	28.*
	I					
9.0	I	1.	2.	5.	9.	20.*
	I					
11.0	I	1.	2.	4.	8.	17.*
	I					
13.0	I	1.	2.	4.	7.	14.
	I					

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

TOTAL CONTAINMENT TIME, HOURS (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
	I					
5.0	I	.0	.0	.1	.2*	.8*
	I					
7.0	I	.0	.0	.1	.2	.4*
	I					
9.0	I	.0	.0	.1	.1	.3*

11.0	.0	.0	.1	.1	.3*
13.0	.0	.0	.1	.1	.2

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EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

FINAL FIRE SIZE, ACRES (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	0.	0.	0.	1.*	6.*
7.0	0.	0.	0.	1.	2.*
9.0	0.	0.	0.	0.	1.*
11.0	0.	0.	0.	0.	1.*
13.0	0.	0.	0.	0.	1.

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

Fuel Models 2 & 9

```
WELCOME TO THE BEHAVE SYSTEM
   BURN SUBSYSTEM
     FIRE1 PROGRAM: VERSION 4.4 - FEBRUARY 1997

 DEVELOPED BY:  THE FIRE BEHAVIOR RESEARCH WORK UNIT
                INTERMOUNTAIN FIRE SCIENCES LABORATORY
                MISSOULA, MONTANA

 YOU ARE RESPONSIBLE FOR SUPPLYING VALID INPUT AND FOR
   CORRECTLY INTERPRETING THE FIRE BEHAVIOR PREDICTIONS.

 ASSUMPTIONS, LIMITATIONS, AND APPLICATION OF MATHEMATICAL
   MODELS USED IN THIS PROGRAM ARE IN:
   Andrews, Patricia L. "BEHAVE: Fire behavior prediction and
     fuel modeling system—BURN subsystem, Part 1", INT-GTR-194, 1986
   Andrews, Patricia L., and Chase, Carolyn H. "BEHAVE: Fire
     behavior prediction and fuel modeling system—BURN
     subsystem, Part 2", INT-GTR-260, 1989


 DIRECT
  1—TWO FUEL MODEL CONCEPT - 60%  9 - HARDWOOD LITTER
                             40%  2 - TIMBER (GRASS AND UNDERSTORY)
  2—1-HR FUEL MOISTURE, % --   5.0   7.0   9.0  11.0  13.0
  3—10-HR FUEL MOISTURE, % -   8.0
  4—100-HR FUEL MOISTURE, %   12.0
  5—LIVE HERBACEOUS MOIS, %  300.0
  7—MIDFLAME WINDSPEED, MI/H   1.0   3.0   5.0   7.0   9.0
  8—TERRAIN SLOPE, % -------   5.0
  9—DIRECTION OF WIND VECTOR    .0
       DEGREES CLOCKWISE
        FROM UPHILL
 10—DIRECTION OF SPREAD ----    .0  (DIRECTION OF MAX SPREAD)
     CALCULATIONS
       DEGREES CLOCKWISE
        FROM UPHILL


 FUEL MODEL  9   (60%)

 RATE OF SPREAD, CH/H                                       (V4.4)
```

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	1.	5.	10.	16.	25.
7.0	1.	4.	8.	14.	21.
9.0	1.	3.	7.	12.	19.
11.0	1.	3.	7.	11.	17.

13.0	1.	3.	6.	10.	16.

FUEL MODEL 2 (40%)

RATE OF SPREAD, CH/H (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	3.	10.	22.	40.	62.
7.0	2.	9.	21.	37.	58.
9.0	2.	8.	19.	34.	54.
11.0	2.	7.	17.	30.	47.
13.0	1.	4.	9.	15.	24.

FUEL MODEL 9 (60%) FUEL MODEL 2 (40%)

WEIGHTED RATE OF SPREAD, CH/H (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	2.	7.	15.	26.	40.
7.0	2.	6.	13.	23.	36.
9.0	2.	5.	12.	21.	33.
11.0	1.	5.	11.	19.	29.
13.0	1.	3.	7.	12.	19.

FUEL MODEL 9 (60%)

HEAT PER UNIT AREA, BTU/SQFT (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	390.	390.	390.	390.	390.

7.0	I	355.	355.	355.	355.	355.
9.0	I	335.	335.	335.	335.	335.
11.0	I	326.	326.	326.	326.	326.
13.0	I	320.	320.	320.	320.	320.

FUEL MODEL 2 (40%)

HEAT PER UNIT AREA, BTU/SQFT (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	I	456.	456.	456.	456.	456.
7.0	I	435.	435.	435.	435.	435.
9.0	I	418.	418.	418.	418.	418.
11.0	I	375.	375.	375.	375.	375.
13.0	I	196.	196.	196.	196.	196.

FUEL MODEL 9 (60%)

FIRELINE INTENSITY, BTU/FT/S (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	I	11.	32.	69.	117.	177.
7.0	I	8.	25.	53.	90.	136.
9.0	I	7.	21.	44.	76.	114.
11.0	I	6.	19.	39.	67.	101.
13.0	I	6.	17.	36.	61.	92.

FUEL MODEL 2 (40%)

FIRELINE INTENSITY, BTU/FT/S (V4.4)

1-HR MOIS	I	MIDFLAME WIND, MI/H

(%)	1.0	3.0	5.0	7.0	9.0
5.0	22.	81.	186.	334.	521.
7.0	19.	71.	164.	295.	460.
9.0	17.	64.	147.	265.	413.
11.0	13.	50.	115.	206.	322.
13.0	4.	13.	31.	55.	86.

FUEL MODEL 9 (60%)

FLAME LENGTH, FT (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	1.3	2.2	3.1	4.0	4.9
7.0	1.2	2.0	2.8	3.6	4.3
9.0	1.1	1.8	2.6	3.3	4.0
11.0	1.0	1.7	2.4	3.1	3.8
13.0	1.0	1.7	2.3	3.0	3.6

FUEL MODEL 2 (40%)

FLAME LENGTH, FT (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	1.9	3.4	5.0	6.5	8.0
7.0	1.7	3.2	4.7	6.2	7.6
9.0	1.7	3.0	4.5	5.9	7.2
11.0	1.5	2.7	4.0	5.2	6.4
13.0	.8	1.5	2.2	2.8	3.5

SIZE-LINKED-TO-DIRECT

```
1—RATE OF SPREAD, CH/H ---    OUTPUT FROM DIRECT. RANGE=    1.  TO   40.
2—EFFECTIVE WIND, CH/H ---    OUTPUT FROM DIRECT. RANGE=    1.0 TO    9.0
3—ELAPSED TIME, HR -------      .2
```

AREA, ACRES (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	.0	.1	.3	.8	1.6
7.0	.0	.1	.3	.7	1.3
9.0	.0	.1	.2	.5	1.1
11.0	.0	.0	.2	.4	.9
13.0	.0	.0	.1	.2	.4

PERIMETER, CHAINS (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	1.	4.	7.	12.	18.
7.0	1.	3.	7.	11.	16.
9.0	1.	3.	6.	10.	15.
11.0	1.	3.	5.	9.	13.
13.0	1.	2.	4.	6.	9.

CONTAIN-LINKED-TO-DIRECT-AND-SIZE

```
1—RUN OPTION -------------    1.=COMPUTE LINE BUILDING RATE
2—MODE OF ATTACK ---------    2.=REAR
3—RATE OF SPREAD, CH/H ---    OUTPUT FROM DIRECT. RANGE=    1.  TO   40.
4—INITIAL FIRE SIZE, AC --    OUTPUT FROM SIZE.   RANGE=    0.  TO    2.
5—LENGTH-TO-WIDTH RATIO --    OUTPUT FROM SIZE.   RANGE=    1.3 TO    3.3
6—BURNED AREA TARGET, AC -  10.0
```

TOTAL LENGTH OF LINE, CHAINS (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	60.	62.	60.*	59.*	58.#

7.0	61.	64.	62.*	61.*	60.*
9.0	62.	65.	64.*	63.*	62.*
11.0	64.	67.	66.*	65.*	64.*
13.0	67.	70.	70.	70.	70.

• = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

= CONTROL EFFORTS AT THE HEAD OF THE FIRE WILL PROBABLY BE INEFFECTIVE.

TOTAL CONTAINMENT TIME, HOURS (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	14.9	4.4	1.8*	.9*	.5#
7.0	17.2	5.1	2.1*	1.1*	.6*
9.0	19.3	5.7	2.4*	1.2*	.7*
11.0	22.2	6.7	2.8*	1.5*	.9*
13.0	34.3	10.6	4.7	2.6	1.6

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TOTAL LINE BUILDING RATE, CH/H (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	4.	14.	33.*	65.*	116.#
7.0	4.	12.	29.*	56.*	98.*

```
 9.0    I     3.     11.     27.*    50.*    86.*
        I
11.0    I     3.     10.     23.*    43.*    73.*
        I
13.0    I     2.      7.     15.     27.     43.
        I
```

```
    •  = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
               HAND CREWS.
             EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
               AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

          # = CONTROL EFFORTS AT THE HEAD OF THE FIRE
               WILL PROBABLY BE INEFFECTIVE.
```

```
CONTAIN-LINKED-TO-DIRECT-AND-SIZE
 1—RUN OPTION -------------     2.=COMPUTE BURNED AREA
 2—MODE OF ATTACK ---------     2.=REAR
 3—RATE OF SPREAD, CH/H ---     OUTPUT FROM DIRECT. RANGE=     1. TO    40.
 4—INITIAL FIRE SIZE, AC --     OUTPUT FROM SIZE.   RANGE=     0. TO     2.
 5—LENGTH-TO-WIDTH RATIO --     OUTPUT FROM SIZE.   RANGE=    1.3 TO    3.3
 7—TOTAL LINE BLDG RATE----    64.0
     CH/H
```

```
TOTAL LENGTH OF LINE, CHAINS                                    (V4.4)
  1-HR   I       MIDFLAME WIND, MI/H
  MOIS   I
         I    1.0    3.0    5.0    7.0    9.0
   (%)   I-------------------------------------------------------
         I
 5.0     I    1.      5.    14.*   63.*   -2.#
         I
 7.0     I    1.      4.    11.*   40.*   -2.*
         I
 9.0     I    1.      4.    10.*   30.*   -2.*
         I
11.0     I    1.      3.     8.*   22.*   -2.*
         I
13.0     I    1.      2.     5.    10.    21.
         I
```

```
          -2 = FORWARD RATE OF SPREAD IS EITHER GREATER THAN
                 OR NEARLY EQUAL TO LINE BUILDING RATE PER FLANK.

    •  = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
               HAND CREWS.
             EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
               AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

          # = CONTROL EFFORTS AT THE HEAD OF THE FIRE
               WILL PROBABLY BE INEFFECTIVE.
```

TOTAL CONTAINMENT TIME, HOURS (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	.0	.1	.2*	1.0*	-2.0#
7.0	.0	.1	.2*	.6*	-2.0*
9.0	.0	.1	.2*	.5*	-2.0*
11.0	.0	.0	.1*	.3*	-2.0*
13.0	.0	.0	.1	.1	.3

-2 = FORWARD RATE OF SPREAD IS EITHER GREATER THAN OR NEARLY EQUAL TO LINE BUILDING RATE PER FLANK.

• = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

= CONTROL EFFORTS AT THE HEAD OF THE FIRE WILL PROBABLY BE INEFFECTIVE.

FINAL FIRE SIZE, ACRES (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	0.	0.	1.*	11.*	-2.#
7.0	0.	0.	1.*	5.*	-2.*
9.0	0.	0.	1.*	3.*	-2.*
11.0	0.	0.	0.*	2.*	-2.*
13.0	0.	0.	0.	0.	2.

-2 = FORWARD RATE OF SPREAD IS EITHER GREATER THAN OR NEARLY EQUAL TO LINE BUILDING RATE PER FLANK.
= FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.
= CONTROL EFFORTS AT THE HEAD OF THE FIRE WILL PROBABLY BE INEFFECTIVE.

Fuel Models 3 & 9

```
WELCOME TO THE BEHAVE SYSTEM
  BURN SUBSYSTEM
    FIRE1 PROGRAM: VERSION 4.4 -- FEBRUARY 1997

DEVELOPED BY:  THE FIRE BEHAVIOR RESEARCH WORK UNIT
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ASSUMPTIONS, LIMITATIONS, AND APPLICATION OF MATHEMATICAL
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  Andrews, Patricia L., and Chase, Carolyn H. "BEHAVE: Fire
    behavior prediction and fuel modeling system--BURN
    subsystem, Part 2", INT-GTR-260, 1989


DIRECT
 1--TWO FUEL MODEL CONCEPT - 80%  3 -- TALL GRASS, 2.5 FT (75 CM)
                             20%  9 -- HARDWOOD LITTER
 2--1-HR FUEL MOISTURE, % --    5.0    7.0    9.0   11.0   13.0
 3--10-HR FUEL MOISTURE, % -    8.0
 4--100-HR FUEL MOISTURE, %    12.0
 7--MIDFLAME WINDSPEED, MI/H    1.0    3.0    5.0    7.0    9.0
 8--TERRAIN SLOPE, % -------    5.0
 9--DIRECTION OF WIND VECTOR     .0
      DEGREES CLOCKWISE
       FROM UPHILL
10--DIRECTION OF SPREAD ----     .0  (DIRECTION OF MAX SPREAD)
    CALCULATIONS
      DEGREES CLOCKWISE
       FROM UPHILL


FUEL MODEL  3   (80%)

=================================================================
RATE OF SPREAD, CH/H                                       (V4.4)
=================================================================
  1-HR   I       MIDFLAME WIND, MI/H
  MOIS   I
         I    1.0     3.0     5.0     7.0     9.0
  (%)    I------------------------------------------------------
         I
 5.0     I   20.     69.    129.    198.    273.
         I
 7.0     I   17.     58.    109.    168.    231.
         I
```

9.0	I	15.	52.	97.	148.	205.
11.0	I	14.	47.	89.	136.	187.
13.0	I	13.	44.	82.	126.	173.

FUEL MODEL 9 (20%)

RATE OF SPREAD, CH/H (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	I	1.	5.	10.	16.	25.
7.0	I	1.	4.	8.	14.	21.
9.0	I	1.	3.	7.	12.	19.
11.0	I	1.	3.	7.	11.	17.
13.0	I	1.	3.	6.	10.	16.

FUEL MODEL 3 (80%) FUEL MODEL 9 (20%)

WEIGHTED RATE OF SPREAD, CH/H (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	I	17.	56.	105.	162.	223.
7.0	I	14.	47.	89.	137.	189.
9.0	I	12.	42.	79.	121.	167.
11.0	I	11.	38.	72.	111.	153.
13.0	I	11.	36.	67.	103.	142.

FUEL MODEL 3 (80%)

HEAT PER UNIT AREA, BTU/SQFT (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	783.	783.	783.	783.	783.
7.0	712.	712.	712.	712.	712.
9.0	673.	673.	673.	673.	673.
11.0	654.	654.	654.	654.	654.
13.0	642.	642.	642.	642.	642.

FUEL MODEL 9 (20%)

HEAT PER UNIT AREA, BTU/SQFT (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	390.	390.	390.	390.	390.
7.0	355.	355.	355.	355.	355.
9.0	335.	335.	335.	335.	335.
11.0	326.	326.	326.	326.	326.
13.0	320.	320.	320.	320.	320.

FUEL MODEL 3 (80%)

FIRELINE INTENSITY, BTU/FT/S (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	293.	987.	1855.	2840.	3919.

7.0	I	225.	760.	1428.	2186.	3016.
9.0	I	189.	636.	1195.	1830.	2525.
11.0	I	168.	565.	1062.	1626.	2243.
13.0	I	152.	514.	966.	1480.	2041.

FUEL MODEL 9 (20%)

FIRELINE INTENSITY, BTU/FT/S (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	I	11.	32.	69.	117.	177.
7.0	I	8.	25.	53.	90.	136.
9.0	I	7.	21.	44.	76.	114.
11.0	I	6.	19.	39.	67.	101.
13.0	I	6.	17.	36.	61.	92.

FUEL MODEL 3 (80%)

FLAME LENGTH, FT (V4.4)

1-HR MOIS (%)	I	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	I	6.1	10.7	14.3	17.4	20.2
7.0	I	5.4	9.5	12.7	15.5	17.9
9.0	I	5.0	8.8	11.7	14.3	16.5
11.0	I	4.7	8.3	11.1	13.5	15.7
13.0	I	4.5	7.9	10.6	12.9	15.0

FUEL MODEL 9 (20%)

```
=================================================================
FLAME LENGTH, FT                                           (V4.4)
=================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I    1.0    3.0    5.0    7.0    9.0
  (%)     I-------------------------------------------------------
          I
  5.0     I    1.3    2.2    3.1    4.0    4.9
          I
  7.0     I    1.2    2.0    2.8    3.6    4.3
          I
  9.0     I    1.1    1.8    2.6    3.3    4.0
          I
 11.0     I    1.0    1.7    2.4    3.1    3.8
          I
 13.0     I    1.0    1.7    2.3    3.0    3.6


SIZE-LINKED-TO-DIRECT
 1--RATE OF SPREAD, CH/H ---   OUTPUT FROM DIRECT. RANGE=   11.  TO  223.
 2--EFFECTIVE WIND, CH/H ---   OUTPUT FROM DIRECT. RANGE=   1.0 TO    9.0
 3--ELAPSED TIME, HR -------     .2


=================================================================
AREA, ACRES                                                (V4.4)
=================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I    1.0    3.0    5.0    7.0    9.0
  (%)     I-------------------------------------------------------
          I
  5.0     I    1.1    6.8   17.2   31.9   50.6
          I
  7.0     I     .8    4.8   12.3   22.9   36.3
          I
  9.0     I     .6    3.8    9.7   18.0   28.4
          I
 11.0     I     .5    3.2    8.1   15.0   23.8
          I
 13.0     I     .4    2.7    6.9   12.9   20.4


=================================================================
PERIMETER, CHAINS                                          (V4.4)
=================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I    1.0    3.0    5.0    7.0    9.0
  (%)     I-------------------------------------------------------
          I
```

```
  5.0     I    12.     31.     52.     76.    101.
          I
  7.0     I    10.     26.     44.     64.     85.
          I
  9.0     I     9.     23.     39.     57.     76.
          I
 11.0     I     8.     21.     36.     52.     69.
          I
 13.0     I     7.     20.     33.     48.     64.


CONTAIN-LINKED-TO-DIRECT-AND-SIZE
 1--RUN OPTION -------------     1.=COMPUTE LINE BUILDING RATE
 2--MODE OF ATTACK ---------     2.=REAR
 3--RATE OF SPREAD, CH/H ---     OUTPUT FROM DIRECT. RANGE=     11. TO    223.
 4--INITIAL FIRE SIZE, AC --     OUTPUT FROM SIZE.   RANGE=      0. TO     51.
 5--LENGTH-TO-WIDTH RATIO --     OUTPUT FROM SIZE.   RANGE=     1.3 TO    3.3
 6--BURNED AREA TARGET, AC -   10.0


=================================================================
TOTAL LENGTH OF LINE, CHAINS                               (V4.4)
=================================================================
  1-HR    I       MIDFLAME WIND, MI/H
  MOIS    I
          I     1.0    3.0    5.0    7.0    9.0
  (%)     I-----------------------------------------------------
          I
 5.0      I    40.*   38.#   -1.#   -1.#   -1.#
          I
 7.0      I    41.*   39.#   -1.#   -1.#   -1.#
          I
 9.0      I    41.*   40.#   -1.#   -1.#   -1.#
          I
11.0      I    42.*   41.#   41.#   -1.#   -1.#
          I
13.0      I    43.*   41.#   41.#   -1.#   -1.#
          I

            -1 = INITIAL AREA IS EITHER LARGER THAN OR NEARLY
                   EQUAL TO THE BURNED AREA TARGET.

             * = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
                  HAND CREWS.
                EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
                  AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

             # = CONTROL EFFORTS AT THE HEAD OF THE FIRE
                  WILL PROBABLY BE INEFFECTIVE.


=================================================================
TOTAL CONTAINMENT TIME, HOURS                              (V4.4)
=================================================================
```

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	.8*	.1#	-1.0#	-1.0#	-1.0#
7.0	1.0*	.1#	-1.0#	-1.0#	-1.0#
9.0	1.2*	.2#	-1.0#	-1.0#	-1.0#
11.0	1.4*	.2#	.0#	-1.0#	-1.0#
13.0	1.6*	.3#	.1#	-1.0#	-1.0#

-1 = INITIAL AREA IS EITHER LARGER THAN OR NEARLY EQUAL TO THE BURNED AREA TARGET.

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

= CONTROL EFFORTS AT THE HEAD OF THE FIRE WILL PROBABLY BE INEFFECTIVE.

TOTAL LINE BUILDING RATE, CH/H (V4.4)

1-HR MOIS (%)	MIDFLAME WIND, MI/H 1.0	3.0	5.0	7.0	9.0
5.0	51.*	590.#	-1.#	-1.#	-1.#
7.0	40.*	292.#	-1.#	-1.#	-1.#
9.0	34.*	205.#	-1.#	-1.#	-1.#
11.0	30.*	164.#	1251.#	-1.#	-1.#
13.0	27.*	139.#	704.#	-1.#	-1.#

-1 = INITIAL AREA IS EITHER LARGER THAN OR NEARLY EQUAL TO THE BURNED AREA TARGET.

* = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY HAND CREWS.
EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS, AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

```
          # = CONTROL EFFORTS AT THE HEAD OF THE FIRE
               WILL PROBABLY BE INEFFECTIVE.


CONTAIN-LINKED-TO-DIRECT-AND-SIZE
 1--RUN OPTION -------------    2.=COMPUTE BURNED AREA
 2--MODE OF ATTACK ---------    2.=REAR
 3--RATE OF SPREAD, CH/H ---    OUTPUT FROM DIRECT. RANGE=    11. TO   223.
 4--INITIAL FIRE SIZE, AC --    OUTPUT FROM SIZE.   RANGE=     0. TO    51.
 5--LENGTH-TO-WIDTH RATIO --    OUTPUT FROM SIZE.   RANGE=    1.3 TO    3.3
 7--TOTAL LINE BLDG RATE----   64.0
     CH/H


===================================================================
TOTAL LENGTH OF LINE, CHAINS                                  (V4.4)
===================================================================
  1-HR   I       MIDFLAME WIND, MI/H
  MOIS   I
         I     1.0     3.0     5.0     7.0     9.0
  (%)    I---------------------------------------------------------
         I
 5.0     I    27.*    -2.#    -2.#    -2.#    -2.#
         I
 7.0     I    19.*    -2.#    -2.#    -2.#    -2.#
         I
 9.0     I    16.*    -2.#    -2.#    -2.#    -2.#
         I
11.0     I    13.*    -2.#    -2.#    -2.#    -2.#
         I
13.0     I    12.*    -2.#    -2.#    -2.#    -2.#
         I

        -2 = FORWARD RATE OF SPREAD IS EITHER GREATER THAN
                OR NEARLY EQUAL TO LINE BUILDING RATE PER FLANK.

          * = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
               HAND CREWS.
             EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
               AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

          # = CONTROL EFFORTS AT THE HEAD OF THE FIRE
               WILL PROBABLY BE INEFFECTIVE.


===================================================================
TOTAL CONTAINMENT TIME, HOURS                                 (V4.4)
===================================================================
  1-HR   I       MIDFLAME WIND, MI/H
  MOIS   I
         I     1.0     3.0     5.0     7.0     9.0
  (%)    I---------------------------------------------------------
         I
```

```
  5.0      I      .4*  -2.0#  -2.0#  -2.0#  -2.0#
           I
  7.0      I      .3*  -2.0#  -2.0#  -2.0#  -2.0#
           I
  9.0      I      .2*  -2.0#  -2.0#  -2.0#  -2.0#
           I
 11.0      I      .2*  -2.0#  -2.0#  -2.0#  -2.0#
           I
 13.0      I      .2*  -2.0#  -2.0#  -2.0#  -2.0#
           I

          -2 = FORWARD RATE OF SPREAD IS EITHER GREATER THAN
                 OR NEARLY EQUAL TO LINE BUILDING RATE PER FLANK.

           * = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
                HAND CREWS.
              EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
                AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

           # = CONTROL EFFORTS AT THE HEAD OF THE FIRE
                WILL PROBABLY BE INEFFECTIVE.


==================================================================
FINAL FIRE SIZE, ACRES                                      (V4.4)
==================================================================
  1-HR     I        MIDFLAME WIND, MI/H
  MOIS     I
           I      1.0    3.0    5.0    7.0    9.0
  (%)      I-------------------------------------------------------
           I
  5.0      I      5.*    -2.#   -2.#   -2.#   -2.#
           I
  7.0      I      3.*    -2.#   -2.#   -2.#   -2.#
           I
  9.0      I      2.*    -2.#   -2.#   -2.#   -2.#
           I
 11.0      I      1.*    -2.#   -2.#   -2.#   -2.#
           I
 13.0      I      1.*    -2.#   -2.#   -2.#   -2.#
           I

          -2 = FORWARD RATE OF SPREAD IS EITHER GREATER THAN
                 OR NEARLY EQUAL TO LINE BUILDING RATE PER FLANK.

           * = FIRE IS TOO INTENSE FOR DIRECT ATTACK BY
                HAND CREWS.
              EQUIPMENT SUCH AS DOZERS, PUMPERS, PLOWS,
                AND RETARDANT AIRCRAFT CAN BE EFFECTIVE.

           # = CONTROL EFFORTS AT THE HEAD OF THE FIRE
                WILL PROBABLY BE INEFFECTIVE.
```

APPENDIX #5
AGENCY ADMINISTRATOR
<u>GO/NO-GO PRE-IGNITION APPROVAL</u>

Prescribed Fire Name: Date:

<u>A) Instructions</u>
The Agency Administrator's Go/No-Go Pre-Ignition Approval is the first of two GO/NO-GO decisions that must be completed before a prescribed fire can be implemented. The Agency Administrator's Go/No-Go Pre-Ignition Approval is the final <u>management</u> approval prior to execution of the prescribed fire and evaluates whether compliance requirements, prescribed fire plan elements, and internal and external notifications have been completed. The Agency Administrator's Go/No-Go Pre-Ignition Approval is valid for 30 days. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

<u>B) Key Elements</u>

1. Is the prescribed fire plan up to date?
   Hints: changes, amendments, seasonality.

2. Have all compliance requirements been completed?
   Hints: cultural, threatened and endangered species, smoke management.

3. Is risk management in place and the residual risk acceptable?
   Hints: Prescribed Fire Mitigation Table and Prescribed Fire Complexity Rating Guide completed with rationale and mitigations identified.

4. Will all elements of the prescribed fire plan be met?
   Hint: preparation work, mitigation, weather, organization, prescription.

5. Have all internal and external notifications and media releases been completed?

6. Are key park staff fully briefed, and understand the implementation of the prescribed fire?

7. Other?

Recommended by: ______________________________ Date ________________
FMO/Burn Boss

Approved by: __________________________________ Date________________
Park Superintendent

Approval expires: ___________ (May not be more than 30 days after approved date.)
Date

APPENDIX #6
Prescribed Fire Operations
GO/NO-GO Checklist

Prescribed Fire Name: Date:

	YES	NO
- Has Agency Administrator GO/NO-GO Pre-Ignition Approval been approved?		
Narrative/Comments:		
- Are current and forecasted weather conditions favorable for execution of the prescribed fire? (hints: spot weather, dialogue with fire weather forecaster, climatological analysis complete)		
Narrative/Comments:		
- Have all key personnel listed on the Incident Action Plan (IAP) been briefed with an opportunity to give feedback? (hints: safety, objectives, assignments)		
Narrative/Comments:		
- Has all pre-burn preparedness work been completed? (hints: fuels and weather observations, signs, closures, smoke management, unit preparation)		
Narrative/Comments:		
- Are all equipment and supplies required in the prescribed fire plan in place and functional? (hints: pumps, radios, ignition devices, hose lays, vehicles, aviation, etc.)		
Narrative/Comments:		
- Are all holding resources described in the IAP committed and can be on-scene within specified time frames?		
Narrative/Comments:		
- Are all personnel certified for their assigned positions? (hints: Check Red Cards)		
Narrative/Comments:		
- There are no extenuating circumstances that preclude successful completion of this project? (hints: regional & national preparedness, unusual circumstances, unusual drought, outstanding issues, other fires, recent fire escapes, etc.)		
Narrative/Comments:		
IF ALL BOXES HAVE BEEN CHECKED "YES" YOU MAY PROCEED WITH THE TEST FIRE.		
TEST FIRE DOCUMENTATION AND RESULTS:		

	YES	NO
- Observed Fire Behavior within Prescription?		
Narrative/Comments:		
- Test fire was successful?		
Narrative/Comments:		
- Are all prescription parameters in the prescribed fire plan favorable for implementing the project? (hints: each plan element, pre-burn, smoke management, cooperator coordination)		
Narrative/Comments:		
IF LAST 3 BOXES ARE ALL "YES", YOU MAY PROCEED WITH PRESCRIBED FIRE.		

Signatures

RX BURN BOSS:	IGNITION SPECIALIST:
HOLDING OPERATIONS:	DATE:

Appendix # 7

JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION Wilson's Creek National Battlefield	3. UNIT Core Area
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST B. Bloodworth	5. JOB TITLE Fuels Specialist	6. DATE PREPARED 12-28-01
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGINEERING CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE	
1. Ignition Operations	A. Proximity to intense heat and erratic fire behavior.	A. Use Personal Protective Equipment (PPE), maintain close supervision, and lookouts. Thorough briefing on expected fire behavior. Adjust ignition patterns as needed to reduce exposure and fire behavior.	
	B. Noise of fire obscures verbal warnings.	B. Handheld radios for all ignition personnel.	
	C. Ignition sources.	C. Use only qualified personnel for ignition operations. Igniters stay alert to location of torch flame. Close air vent when not igniting. Make sure that target area is clear before using hand flares or very pistols. Wear proper PPE.	
	D. Incorrect ignition locations. Careless ignition use.	D. Thorough briefing of ignition plan. Follow burn boss's instructions. Know location of other igniters and personnel. Radios for all igniters. Close supervision.	
	E. Poor footing, heavy fuels accumulation.	E. Be constantly aware; identify hazard areas; slow down.	
	F. Poor visibility due to smoke.	F. Post lookouts on roads to gauge visibility. Stage emergency vehicles with headlights and emergency lights on along roads to alert traffic. Use law enforcement to control traffic.	
2. Motor Vehicle Operation	A. General operations and public traffic.	A. Defensive driving techniques. Observe posted speed limits and obey all driving laws and regulations. Use spotter when	
	B. Secure loads.		

	C. Hauling flammable substances. D. Transporting sharp tools.	backing. B. Check loads for security before departing – use tie downs. C. Use appropriate containers for hauling drip torch fuels and gasoline. Secure containers on vehicle. D. Use guards and secure tools in engine compartments or on vehicles.

JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION Wilson's Creek National Battlefield	3. UNIT Core Area
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST B. Bloodworth	5. JOB TITLE Fuels Specialist	6. DATE PREPARED 12-28-01
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGINEERING CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE	
2. Motor Vehicle Operation (Cont.)	E. Loading vehicles. F. Trailer use. G. Smoke on Roadways	E. Use of proper lifting techniques. F. Use safe loading and operation procedures. Refer to Job Hazard Analysis on trailer use. Use spotter when backing. G. Use smoke ahead signs and smoke monitors.	
3. ATV Operation	A. Operation accidents	A. Proper ATV procedures. Refer to Job Hazard Analysis on ATV operations for more detail. Use qualified atv operators and wear DOT approved helmets. Only one rider per atv.	
4.Holding Operations	A. Proximity to intense heat and erratic fire behavior. B. Fatigue	A. Use Personal Protective Equipment (PPE), maintain close supervision. Thorough briefing on expected fire behavior. Use appropriate tactics to insure personnel are not subjected to unnecessary heat. B. Rotate personnel on different tasks. Limit smoke exposure. Take adequate	

		breaks. Drink plenty of water.
	C. Excessive Smoke Exposure	C. Rotate personnel so that one group is not always in the smoke.
	D. ATV Operations	D. Stay alert and watch for ATV traffic on fireline
	E. Poor visibility due to smoke.	E. Stay alert. Watch for tripping and overhead hazards, sudden drop-offs, ATV traffic.
5. Mop-up Operations	A. Poor footing	A. Be constantly aware; identify hazard areas; slow down.
	B. Falling snags	B. Be alert, post lookouts when necessary. Flag off dangerous areas. Watch for strong winds. Use qualified fallers only.

JOB HAZARD ANALYSIS

United States Department of Interior NATIONAL PARK SERVICE	1. WORK PROJECT/ACTIVITY Prescribed Fire	2. LOCATION Wilson's Creek National Battlefield	3. UNIT Core Area
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST B. Bloodworth	5. JOB TITLE Fuels Specialist	6. DATE PREPARED 12-28-01
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS ENGIN-EERING - CONTROLS – SUBSTITUTION - ADMINISTRATIVE CONTROLS - PPE	

	C. Fatigue	C. Rotate personnel on different tasks. Take adequate breaks. Drink plenty of water.
6. Monitoring Operations	A. Possibility of entrapment	A. Stay in communication and relay location to Burn Boss and Ignition Specialists. Identified escape routes and safe zones in briefing.
	B. Proximity to intense heat and erratic fire behavior.	B. Use Personal Protective Equipment (PPE), maintain close supervision. Thorough briefing on expected fire behavior. Use appropriate tactics to insure personnel are not subjected to unnecessary heat.

10. SUPERVISOR'S SIGNATURE	11. TITLE	12. DATE

APPENDIX # 8
IAP/BRIEFING GUIDE

I. Present Handouts

- **A. Map of Burn**
- **B. Organization Chart**

II. Describe Area Of Burn

- **A. Vegetation Type**
- **B. Acreage**
- **C. Slope**
- **D. Roads/Access**
- **E. High Values at risk**
- **F. Water Sources-natural, tanker and hydrants**
- **G. Natural/Manmade barriers**

III. Weather Forecast- Use National Weather Service "Forestry" and "Smoke Management" Forecasts for applicable Zones. Use "Fire Weather Special Request" Form if updates are deemed necessary.

- **A. Wind direction and Speed**
- **B. Relative Humidity**
- **C. Temperatures**
- **D. Predicted Changes**

IV. Organization

- **A. Organization Chart – Location on Map**
- **B. Equipment - tankers, refueling, etc.**
- **C. Fire Monitoring**
- **D. Any other resources**
- **E. Transition Fire Plan**

V. Firing Sequence

- **A. Test fire**
- **B. Type and Sequence of Firing**

VI. Radio Assignments

- **A. Given Day of Burn**
- **B. Communication Plan**

VII. Safety

- **A. Winds**
- **B. Escape Routes and Safe Zones**
- **C. Hazards – crew and equipment (wildlife, research plots, trash, etc.)**
- **D. Personal Protective equipment (PPE)**
- **E. Refueling – fuel handling, gloves, spilling, etc.**
- **F. Activation of emergency and headlights on major roads**
- **G. Other public safety considerations**

VIII. Comments and Questions Period

APPENDIX # 9

ADEQUATE HOLDING RESOURCES WORKSHEET

Project Name: Core Area (All Blocks) Fuel Models Inside Project Area: 3 & 9
Prepared By/Date: Bloodworth 12-28-01 Fuel Models Outside Project Area: 9 (E)

Characteristics	Output type	Modeling Predictions Inside Project Area	Modeling Predictions Outside Project Area	Unit of Measure
CRITICAL FIRE INPUTS	1 Hr Fuel Moisture	5	5	%
	Wind Speed	9	9	MPH
	Slope	30	30	%
KEY FIRE BEHAVIOR OUTPUTS	Rate of Spread	26	26.0	ch/hr
	Fire line Intensity	186	186	BTU/ft/sec
	Flame Length	5	5.0	Feet
	POI	70	70	%
	Spotting Distance		0.3	Miles
	Scorch Height			Feet
FIRE SIZE	Projection Time			Hours
	Forward Spread			Chains
	Backward Spread			Chains
FIRE CONTAINMENT	Method Of Attack	Rear	Rear	Head/Rear
	Max Escape Target	10	10	Acres
	Max Containment Time	1	1	Hours
	Total Line Building Rate	63	63	Ch/hr

1. Choose worst case total line building rate above that is needed for containment of slop over or spot fire : 63h/hr
2. Estimate potential number spot fires or slop overs at on time: 1
3. TOTAL LINE BUILDING RATE NEEDED (multiply line 1 times line 2) 63ch/hr
4. Production Rates: Ease of Access: POOR-FAIR-GOOD-EXCELLEN(circle)
   Fuel Resistance to Control LOW- MODERATE-HIGH-EXTREME(circle)

(refer to fire line handbook) Hand Crew Production 8 ch/hr
Engine Production (Crew of 2) 8 ch/hr
Dozer Production (Type ___) ch/hr

On Site Organization	Total # Planned On Burn	Total # Available for Spot Fire or Slop Over Control		Line Building Production Rates		Spot Fire or Slop Over Line Building Capacity
Overhead	4	0	X	8	ch/hr	0
Firing Crew	3	2	X	8	ch/hr	16
Holding (ATV w/ water)	4	4	X	8	ch/hr	32
Other Personnel			X	8	ch/hr	0
Engine (Crew of 2)	2	1	X	25	ch/hr	25
Dozer (Size)			X		ch/hr	
Other Equipment			X		ch/hr	

5. TOTAL SLOP OVER OR SPOT FIRE LINE BUILDING RATE CAPACITY = 75 ch/hr

6. DETERMINATION OF ADEQUATE HOLDING RESOURCES (Line 5 minus Line 3)__+12____ch/hr
If number on line 6 is positive then adequate holding forces will be available. If number is negative, more holding resources are needed to control potential spot fires or slopovers.

APPENDIX #10
POST-PROJECT EVALUATION

Instructions for Completion of Post-Project Evaluation Form

This form is to be completed and submitted for review within 30 days of declaring the project complete.
Block 1 Self-explanatory
Block 2 Copy of the Project Objectives as listed in the Project Plan.
Block 3 Give quantitative results of how well objectives were met, i.e. % of 1 hour and 10 hour fuels removed, % of burn area with fuels reduced, % of area with acceptable/unacceptable scorch, etc.
Block 4 Give a short narrative of problems encountered and suggestions for improving or refining operations and prescriptions i.e. firing pattern, equipment limitations, drought index, effectiveness of barriers.
Block 5 Self-explanatory - for providing feedback to the Program

Block 1)
Individual Leading Evaluation:______________________________

Management:______________________________ **Project Name:**______________________________

Acres Treated:______________________________ **Fire Number:**______________________________

Total Cost:
Cost/Acre:______________________________

(Block 2)
Objectives:

(Block 3)
Results:

(Block 4)
Problems Encountered, Methods to Improve Next Operation:

Review & Signature:

Burn Boss:______________________________

Comments:

FMO: ______________________________

Comments:

APPENDIX #11

PRESCRIBED FIRE MONITORING FORM

ATHER OBSERVATIONS

FIRE NAME:
LOCATION:

DATE:
OBSERVER:

CATION	ELEV	TIME	WIND DIR	WIND SPEED	DRY BULB	WET BULB	RH/DP	ASPECT	FDRM	PIG	REMARKS

E BEHAVIOR/SMOKE OBSERVATIONS

IE	LOCATION	ROS	ROS DIR	FL	FZD	FUEL MODEL	% SHADING	MIX HGT	DIR	COLOR	VISIBILITY	% SLOPE

MARKS:

Appendix # 12
Pre-burn Notifications List

Mandatory Contact List: All persons or entities on this list will be contacted prior to ignition.

Name	Agency	Phone Number	Date Notified
Dispatcher	Green County Sheriff	(417)868-4040	Burn day
Dispatcher	Christian County Sheriff	(417)581-2332	Burn day
Dispatcher	Missouri State Patrol	(417)895-6868	Burn day
Dispatcher	Battlefield VFD	(417)868-4040	Burn day
Dispatcher	Clever VFD	(417)868-4040	Burn day
KAMO Electric Coop	Vinita, OK	(918)256-5551 x217	2 days prior
U.S. Forest Service	Mark Twain N.F., Ava District	(417)683-4428	Burn day
Barnes, Richard	Air Pollution Control Dept., Missouri Dept. of Natural Resources, Springfield, MO	(471)891-4328	1 week prior
Parker, Duane	State Forester, Missouri Dept. of Conservation, Springfield, MO	(417)895-6880	

Optional Cooperator Contact List: Every effort will be made to contact these cooperators before ignition, however , notification is optional and is not required.

Name	Agency	Phone Number	Date Notified
Davis, William	Director, National Weather Service	869-4491 or 863-7889	1 week prior
Shumway, Steve	National Weather Service	869-4491 or 863-7889	1 week prior

Optional Media Contact List: Every effort will be made to contact these members of the media by phone before ignition, however, notification is optional and is not required.

Name	Agency	Phone Number	Date Notified
Newsroom	KWFC Radio	869-0891	1 week prior
Newsroom	KY3 TV	268-3299 or 268-3200	1 week prior
Newsroom	KSMU	836-5878	1 week prior
Newsroom	KTTS	869-2153	1 week prior
Newsroom	KOLR TV	862-1010	1 week prior
Newsroom	KSPR TV	831-1234	1 week prior

Optional Park Neighbor Contact List: Every effort will be made to contact these park neighbors by phone or mail before ignition, however, notification is optional and is not required.

Name	Agency	Phone Number	Date Notified
Blackwell, D.	Park Neighbor	(417)883-9962	1 week prior
Bybee, L.J.	Park Neighbor	Unlisted	1 week prior
Carroll, Leo	Park Neighbor	(417)869-9787	1 week prior
Dulan, Frances	Park Neighbor	(417)865-6915	1 week prior
Hash, Robert	Park Neighbor	(Warsaw, MO)	1 week prior
Heston, Wayne	Park Neighbor	(417)732-8226	1 week prior
Keet, James	Park Neighbor	(417)887-8711	1 week prior
Kary, Bill	Park Neighbor	(417)889-6440	

Lloyd, Wilma	Park Neighbor	Unlisted	1 week prior
McConnell, Harry	Park Neighbor	(417)732-2592	1 week prior
McDaniel, Ralph	Park Neighbor	(417)881-5517	1 week prior
McElhaney, Dorothy	Park Neighbor	Virginia	1 week prior
McKeel, L.B.	Park Neighbor	(417)883-0998	1 week prior
Neuman, Robert	Park Neighbor	(417)732-6759	1 week prior
Nicolaides	Park Neighbor	(417)732-1930	1 week prior
Perkins, E.	Park Neighbor	(417)862-1494	1 week prior
Rhodes, Gene	Park Neighbor	(417)732-7906	1 week prior
Roller, Mac	Park Neighbor	Unlisted	1 week prior
Sanders, Vernon	Park Neighbor	(417)732-2867	1 week prior
Sheppard, Charles	Park Neighbor	(417)866-7374	1 week prior
Steele, Harry Stephen	Park Neighbor	Unlisted	1 week prior
Twitty, Jo	Park Neighbor	Unlisted	1 week prior

Appendix # 13
PRESCRIBED FIRE RISK ANALYSIS WORKSHEET

Hazard Element	Hazard Probability			Potential Consequences			*Risk (Exhibit 4)
	L	M	H	L	M	H	
1. Environmental Data							
a. Seasonal severity	X			X			L
b. Fire Behavior	X			X			L
c. Fuels	X			X			L
d. Weather		X		X			L
e. Topography	X			X			L
2. Agency Values							
a. Ecological and Environmental Considerations		X			X		M
b. Social and Cultural Values		X			X		M
c. Project Duration and Logistics	X			X			L
d. Smoke and Air Quality Management	X			X			L
3. Public Values							
a. Land use values	X			X			L
b. Dwellings		X			X		M
c. Non-dwellings	X			X			L
4. Human Factors							
a. Firefighter		X		X			L
b. Public	X			X			L
c. Fire Management	X			X			L

APPENDIX # 14
Core Area Prescribed Fire
Hazard Rating Guide

Hazard Element Environmental Data	Hazard Probability L	Hazard Probability M	Hazard Probability H	Potential Consequences L	Potential Consequences M	Potential Consequences H
a. Seasonal severity	Energy Release Component below 90th percentile levels.	Energy Release Component at or above 90 th percentile levels – above average drought conditions.	Energy Release Component at or above 97th percentile levels – severe drought conditions.	Low probability for problematic fire behavior or difficulty in holding activities.	Some potential for problematic fire behavior or difficulty in holding activities.	High probability problematic fire behavior and difficulty in cont
b. Fire Behavior	Flame lengths confined to surface fuels, spread rates low.	Flame lengths extending into shrub and tree regeneration, spread rates moderate.	Flame lengths highly variable, frequently involving individual tree crowns, spread rates moderate to fast.	Low probability of difficulty in holding fire or for adverse fire effects.	Some potential for fire behavior to approach upper prescription limits and cause undesirable effects.	High potential f fire behavior to create holding problems, exce prescription ranges, and ca undesirable eff
c. Fuels	Surface fuels light with open tree canopies, small shrub component present.	Surface fuels moderate with variable forest stand density and moderate shrub presence.	High surface fuel loading with dense shrub component and dense stands with abundant regeneration.	Fuels present no specific implementation problems.	Fuels will have a marked effect on implementation activities and holding force requirements.	Fuels will dramatically aff management organization ar qualifications fo implementation
d. Weather	Weather stable, winds light and predictable, no frontal activity.	Weather slightly variable, winds present but light, occasional gusts, no frontal activity.	Weather highly variable, winds near prescriptive limits, gusts prevalent, frontal activity possible.	Little impact on implementation.	Weather variation will require mitigation actions involving additional resources.	Weather will se as a major influence on organization, personnel qualifications, a specific implementation actions.
e. Topography	Low variability in slope and aspect.	Some variability in slope and aspect, will affect fuel moisture and fire behavior.	High variability in slope and aspect, major implications on fire behavior and must be considered in prescription development and implementation.	Little influence on burn implementation.	Consideration of topography during planning process is necessary.	Topography wil necessitate mitigation actio to be develope and firing patte and ignition methods to be modified to red impacts.

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Agency Values						
a. Ecological and Environmental Considerations	Fire poses little threat to cause adverse effects or long- term disturbances to natural resource values. No T and E species or critical habitat.	Fire poses moderate threat of adverse effects on natural resources and may cause short- to mid- term alterations or inconveniences such as air quality. Small amounts of T and E species present.	Fire poses high potential for adverse effects to natural resource values or to cause long- term degradations in air quality. Some T and E species present and/ or critical habitat.	Low probability for adverse impacts and little need for mitigation actions.	Mitigation actions may need to be developed to ensure desirable outcomes. Some short- term effects may have to be accepted.	Prescribed Fire Plan must addr mitigation actio to prevent undesirable outcomes.
b. Social and Cultural Values	No known social or cultural values in or adjacent to the project area.	Features of social or cultural value have been identified in and adjacent to the project area. Mitigation measures can be accomplished.	High social or cultural values have been identified in or adjacent to the project area. Mitigation actions are difficult to accomplish.	Severe fire behavior or fire outside the unit would not damage the identified values.	Severe fire behavior or fire outside the unit poses potential for moderate damage to special values. Concerned parties are aware and supportive of the project.	Excessive fire severity or fire outside the unit have adverse effects (substa damage to or potential destruction of t special sites). Acceptance by concerned part is low.
c. Project Duration and Logistics	Fire planned to be of short duration, logistical needs easily accommodated.	Fire planned to be of short to moderate duration, logistical needs pose some difficulty.	Fire planned to be of moderate to long duration, logistical needs create much difficulty in accomplishing.	No consequences because of duration or logistics.	Duration may impact firefighters and public and logistical needs must be specifically addressed.	Long duration f necessitates greater informa dissemination, mitigation to remove impact firefighters and public, and logistical needs must be met or project postpor
d. Smoke and Air Quality Management	Few smoke sensitive areas near project area. No potential scheduling conflicts with cooperators.	Multiple smoke sensitive areas, mitigation actions minimize impacts, low potential for scheduling conflicts.	Multiple smoke sensitive areas near burn area, mitigation actions unable to remove all impacts, duration increases impacts, high potential for scheduling conflicts.	No adverse smoke consequences.	Mitigation actions must address smoke impacts, and coordination is required to confirm scheduling.	Mitigation actio must be develo regulatory ager must concur, scheduling con may restrict implementation

Hazard Element	Hazard Probability L	Hazard Probability M	Hazard Probability H	Potential Consequences L	Potential Consequences M	Potential Consequences H
Public Values						
a. Land use values	No commercial or agriculture activities near planned burn area.	Some commercial or agricultural activities near burn unit, some managed wildlands (recreation, timber, range values).	Planned burn directly adjacent to urban, commercial, and/ or agriculture areas.	No impacts from land use values.	Escaped fire onto nearby managed land causes some impacts to commercial values. Prescribed Fire Plan must consider actions to prevent fire movement onto commercial and/ or agriculture lands.	Escaped fire or nearby manage land causes significant impa to commercial values. Mitigati actions must re additional reso needs to protec urban, commer and/ or agricult areas. If mitiga cannot be accomplished, must be postponed.
b. Dwellings	No permanent or part-time residences present in area.	Some residences ½ mile or less from burn area.	Planned burn is located in wildland-urban interface zone, permanent residences in close proximity.	No impacts from dwellings.	Plan must address actions to ensure adequate protection of residences.	Notification of a concerned homeowners, residents, and visitors, coordination wi local fire protec organizations i needed, and mitigation actio must adequate address potent fire escapes.
c. Non-dwellings	No non- dwellings present.	Some outbuildings and non- residences ½ mile or less from burn area.	Commercial structures in close proximity to burn area.	No impacts.	Planning must consider these non- dwellings.	Planning and implementatior must adequate address all measures to prevent any adverse impac

Human Factors						
a. Firefighter	Little firefighter exposure.	Some firefighter exposure due to fire duration and smoke.	Potential for high firefighter exposure to smoke during burn and to fire during holding actions.	No specific problems, implement standard safety measures.	Mitigation measures to eliminate smoke exposure.	Mitigation measures mus address smoke exposure, use mechanized equipment to eliminate expos to fire.
b. Public	No public exposure.	Some public exposure, mitigation actions can remove/ minimize exposure.	Public may be exposed to high smoke concentrations for moderately long periods, especially during nighttime hours.	No adverse consequences anticipated.	Mitigation actions necessary to provide for maximum public safety.	Mitigation actio must be develo coordinated wit other emergen organizations a fully understoo prior to ignition
c. Fire Management	No problems with commitment and acceptance by park staff members.	No problems with commitment but some unwillingness to support and prioritize the prescribed fire over other activities.	Park staff not committed to using prescribed fire as a tool and not willing to support and prioritize prescribed fire over other activities.	No adverse consequences.	Park staff must be briefed on need and importance of prescribed fire.	Park managem team must be informed of prescribed fire objectives, sup needs, and pric

Appendix #15
PRESCRIBED FIRE RISK MITIGATION TABLE

Hazard Element	Risk	Mitigations / Controls Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.	Residual Risk	Referen In Prescr Fire Plan
Environmental Data				
a. Seasonal Severity	L		L	
b. Fire Behavior	L		L	
c. Fuels	L	———	———	———
d. Weather	M	Firing patterns and ignition times will be dependent upon the weather meeting prescription parameters. If weather exceeds prescription parameters, the burn will not be implemented. Weather forecast will be obtained and close attention will be paid to frontal passages.	L	K. Ignition a Holding Ac Test Fire, F and Ignitior Burn Prescriptio
e. Topography	L		L	
Agency Values				
a. Ecological and environmental considerations	M	———	M	———
b. Social and Cultural values	M	The plan addresses sites found within the unit through the exclusion of these areas. Adequate holding resources have been calculated to quickly contain an escaped fire.	M	Holding Resources Worksheet Burn considerati
c. Project duration and logistics	L	———	L	———
d. Smoke and Air Quality Management	L	———	L	———

	Risk	Mitigations / Controls Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.	Residual Risk	Referen[...] In Prescr[...] Fire Plan
Public Values				
a. Land use values	L		L	
b. Dwellings	M	There is one historic structure located within the burn unit which is excluded from the burn and will an engine stationed by it until secure.	M	Pre-burn considerati[...] Holding ac[...] Holding for[...] worksheet
c. Non-dwellings	L		L	
Human Factors				
a. Firefighter	L		L	
b. Public	L		L	
c. Fire Management	L		L	

Appendix # 16
Medical Plan (ICS-206)

MEDICAL AID STATIONS	LOCATION	PARAMEDICS	
		YES	NO
4 1st Responders on-site with a burn kit in the fire engine	On-site		X

6. TRANSPORTATION

A. AMBULANCE SERVICES

NAME	ADDRESS	PHONE	PARAMEDICS	
			YES	NO
Brookline VFD		911		

B. AIR EVACUATION

NAME	LOCATION	PARAMEDICS	
		YES	NO
Cox Air Care	3801 S. National Avenue	X	

7. HOSPITALS

NAME	ADDRESS	TRAVEL TIME		PHONE	HELIPAD		BURN CENTER	
		AIR	GRND		YES	NO	YES	NO
Cox South Medical Center	3801 S. National Ave., Springfield, MO	10 min	20 min	269-6000	X			X
St. Johns Regional Health Center	1235 E. Cherokee	10 min	25 min	885-2876	X		X	

8. MEDICAL EMERGENCY PROCEDURES

If a person is injured it will be immediately reported to the Burn Boss. The Burn Boss will relay this information to the Visitor Center (732-2662). The Visitor Center will dispatch EMS support, while the Burn Boss calls the appropriate emergency phone number (911).

9. PREPARED BY	10. REVIEWED BY (SAFETY OFFICER)
B. Bloodworth	

Appendix # 17
Communication Plan (ICS-205)

INCIDENT RADIO COMMUNICATIONS PLAN ICS - 205			1. INCIDENT NAME: Core Area Prescribed Fire	2. PREPARED DATE: 12/27/01 TIME: 1400	3. OPERATIONAL PERIOD DATE: TIME:
SYSTEM/CACHE	**CHANNEL**	**FUNCTION**	**FREQUENCY**	**ASSIGNMENT**	**REMARKS**
		Air to Ground	169.150	Burn Boss, Holding Boss and Ignition Boss	
		Command	Rx 173.760 Tx 173.760 141.3	Burn Boss, Ignition Boss, and Division Supervisors	May also use Cellular Phone
		NIFC Tac. 3	168.600 Direct	Holding	
		NIFC Tac. 2	168.200 Direct	Ignition	

5. PREPARED BY (MWR-Fuels Specialist)
B. Bloodworth

4.6 U.S. Fish and Wildlife Service Burn Plans

PRESCRIBED FIRE PLAN

Refuge or Station: Mingo National Wildlife Refuge

Unit: Sifford

Prepared By: ______________________________ Date: ______
Thad Herzberger, Prescribed Fire Specialist

Reviewed By: ______________________________ Date: ______
Richard Speer, Refuge Operations Specialist

Reviewed By: ______________________________ Date: ______
Clifford Berger, Region 3, South Zone Fire Management Officer

The approved Prescribed Fire Plan constitutes the authority to burn, pending approval of Section 7 Consultations, Environmental Assessments, or other required documents. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Prescribed burning conditions established in the plan are firm limits. Actions taken in compliance with the approved Prescribed Fire Plan will be fully supported, but personnel will be held accountable for actions taken which are not in compliance with the approved plan.

Approved By: ______________________________ Date: ______
Kathleen A. Burchett, Refuge Manager

Valid Until ____________

Prescribed Fire Plan Implementation

To be completed prior to the burn. Attach additional copies of this page to the burn plan as necessary.

DELEGATION OF AUTHORITY

(To be completed only if the Burn Boss is NOT a U.S. Fish and Wildlife Service employee)

Effective this date, ________________________ is hereby delegated the authority to execute this approved prescribed burn plan subject to the stipulations listed below under ABurn Boss Concurrence@.

____________________________________ ____________________________________ __________

__Refuge Manager/Agency Administrator Date

Burn Boss Concurrence

(To be completed in all cases)

As the burn boss who will conduct this prescribed burn, I certify that I have reviewed this Prescribed Fire Plan, that conditions described in this Plan are substantially still the same, and I believe the prescribed burn can meet the planned objectives when carried out according to this Plan

I also understand that:

S Any changes to this plan must be approved by the Agency Administrator or his/her acting in writing

S ALL questions on the Go/No Go Checklist must be honestly answered AYes@ before the burn proceeds

S The execution of this plan shall be halted if the prescribed burning conditions established in the plan are no longer present.

S I am responsible for all aspects of the burn until relieved by the Agency Administrator or his/her acting.

I accept the responsibility of conducting this burn.

____________________________ Date:________________

Prescribed Fire Burn Boss

PRESCRIBED FIRE PLAN

Refuge: Mingo NWR | Refuge Burn Number: Sifford

Sub Station: None | Fire Number: ______

Name of Area: Grazing unit 19 (N & S) | Unit No.: None

Acres To Be Burned: 95 acres | Perimeter Of Burn: ______

Legal Description: Lat. N 36° 56.40' Long. W 090° 14.5'

Township T27N Range R7E Section 31

County and State: Wayne Co., Missouri

Is a Section 7 Consultation being forwarded to Fish and Wildlife Enhancement for review? Yes (**NO**) (circle).

I. GENERAL DESCRIPTION OF BURN UNIT

Physical Features and Vegetation Cover Types:

- The Sifford Unit is located on Mingo NWR, and consists of a north unit (Sifford North) and a south unit (Sifford South). The two units are separated by a narrow bottomland hardwood corridor. Sifford North is a 40 acre burn unit, and Sifford South is a 55 acre burn unit.
- Access to this unit can be gained from 2 locations, one from the east, and one from the west. The western access is via Highway "T", which runs east and west about .5 miles south of the unit. The eastern access is via Spillway Road (an interior refuge road) which runs east and west adjacent to the unit. Both access routes meet on the south boundary of the unit. The south boundary is an old railroad levee covered in short grasses such as fescue (*Festuca spp.*). The western access route crosses private land, and prior approval to use this access has been obtained.
- The unit consists of primarily fescue and broomsedge.

Primary Resource Objectives of Unit:

- Prescribed fire will be used to promote and improve conditions for native prairie grasses to increase wildlife habitat values.
- Fire will also be used to remove undesirable exotic grass and forb species within the unit and promote growth of desirable prairie grass species.

Objectives of Fire:

- Consume 80% of dead/dormant vegetation on site.
- Promote growth of desirable prairie species.
- Stress or kill exotic species within the burned portion of this unit.

Acceptable Range of Results:

- Burn coverage should be ≥90%.
- Burn ≥60% of populations of cool season exotic species.

Type of Transects:

- No transects will be established.

Photo Documentation:

- Pre and post-burn photographs will be up to station personnel.

II. Pre-Burn Monitoring

Vegetation Type	Acres	%	FBPS Fuel Model
Tallgrass fescue and broomsedge	95	100	FM 3 Tallgrass
Total	95	100	

Complexity Worksheet

Station Mingo National Wildlife Refuge **Burn Unit Name** Sifford

Element	Sub Element	Rating Value (L-M-H)		Rationale
Potential for Escape	**Risk**	Preliminary	L	Potential for escape is slight, due to the adjacent bottomland hardwood, and adequate ATV/ sprayer access along the entire perimeter.
		Final	L	All sides of the units will be mowed breaks, 15-20 feet wide.
	Potential Consequences	Preliminary	L	An escape would result in very little damage. All sides of the unit are bordered by bottomland hardwood, that would unlikely carry fire. The units are surrounded by refuge land.
		Final	L	No Change
	Technical Difficulty	Preliminary	L	Holding on this prescribed fire will be supervised at the Firefighter Type II level. The entire perimeter of the burn will be accessible by ATV w/ sprayer.
		Final	L	No Change.
Number & Dependency of Activities	**Risk**	Preliminary	L	Ignition will be carried out using two igniters working in opposite direction from one another, starting on the upwind side. All ignition activities will be coordinated by the burn boss. Holding crews will be within eye sight of one another throughout the burn.
		Final	L	No Change.
	Potential Consequences	Preliminary	L	The burn boss will supervise the ignition sequence and coordinate the holding crews to mitigate any potential safety problems.
		Final	L	No Change.
	Technical Difficulty	Preliminary	L	Since all crew members will be within eye sight of one another, minimal difficulty in coordination will occur. The holding crews and igniters will coordinate the rate of ignition dependant on holding difficulty.
		Final	L	No Change.
Off-Site Values	**Risk**	Preliminary	L	All adjacent land is refuge bottomland hardwood. Minimal damage would result from an escape fire, and the burned fuels would recover quickly.
		Final	L	No Change.
	Potential Consequences	Preliminary	L	In the case of an escaped fire on refuge land, burned fuels will recover quickly and cause minimal damage.
		Final	L	No Change.
	Technical Difficulty	Preliminary	L	Protection of off-site values requires no special management, equipment, or skills.
		Final	L	No Change.
On-Site Values	**Risk**	Preliminary	L	There are no internal features present that require special attention in planning or implementation.
		Final	L	No Change.
	Potential Consequences	Preliminary	L	There are no internal features to be adversely affected by this burn.

		Final	L	No Change.
	Technical Difficulty	Preliminary	L	No special skills or operating procedures are required.
		Final	L	No Change.
Fire Behavior	Risk	Preliminary	L	This burn unit is representative of Fuel Model 3. Fire behavior could be high, but short in duration. The terrain is flat and should pose no control problems within the prescription parameters.
		Final	L	No change
	Potential Consequences	Preliminary	L	Fire behavior outside of the unit would be less than that experienced within the unit. Under most conditions, fire behavior intensity would decrease in the adjacent bottomland hardwoods.
		Final	L	The unit boundaries consist of 15-20 foot mowed fire breaks. A type VI engine will be able to access the western boundary, and ATV's will have access to the entire perimeter. Holding should not pose a problem.
	Technical Difficulty	Preliminary	L	Standard fire safety precautions are adequate to ensure personnel safety. The potential for slopovers is low due to the fuel type and mowed fire breaks surrounding the unit. Spotting potential is low, due to the adjacent bottomland hardwood fuel type.
		Final	L	No Change.
Management Organization	Risk	Preliminary	L	A burn boss with a crew size of no less then 4 qualified firefighters is necessary to safely implement this prescribed fire.
		Final	L	No Change.
	Potential Consequences	Preliminary	L	No major problems related to supervision or communication is expected due to the small size of the crew and unit.
		Final	L	No Change.
	Technical Difficulty	Preliminary	L	The primary fire crew will consist of local unit personnel. No special supervision is required. All crew members will be briefed on safety, communication, and ignition procedures.
		Final	L	No Change.
Public & Political Interest	Risk	Preliminary	L	This burn unit is located near the southwest boundary of the refuge. There has been no public or political controversy related to prescribed burning on the refuge
		Final	L	No Change.
	Potential Consequences	Preliminary	L	In the event that the fire would escape the unit; little if any public, political, or media attention would result.
		Final	L	No Change.
	Technical Difficulty	Preliminary	L	No special notifications to the media will be needed.
		Final	L	No Change.
Fire Treatment Objectives	Risk	Preliminary	L	Fire treatment objectives for this unit consist of reducing duff, reducing exotic species, and promote native prairie grass species.

		Final	L	No Change.
	Potential Consequences	Preliminary	L	If unit is not burned before spring green-up, the objectives may not be met.
		Final	L	No Change.
	Technical Difficulty	Preliminary	L	Standard hand held drip torches will be used to ignite the unit. Standard burn techniques should easily accomplish objectives.
		Final	L	No Change.
Constraints	Risk	Preliminary	L	There are no special constraints related to access, water sources, firelines, specific tactics, or equipment use.
		Final	L	No Change.
	Potential Consequences	Preliminary	L	There are no major constraints on the timing of this burn except for the time of the year in which the project should be accomplished. An early spring burn is most suitable at this time.
		Final	L	No Change.
	Technical Difficulty	Preliminary	L	Constraints do not increase the difficulty of this prescribed fire.
		Final	L	No Change.
Safety	Risk	Preliminary	L	Safety issues mainly consist of footing along fire breaks, snakes and reptiles, and hazards associated with vehicles and ATV operation.
		Final	L	These issues are easily identified and mitigated in the pre-burn briefings.
	Potential Consequences	Preliminary	L	The potential for serious accidents/injuries to firefighters during the burn would be minimal.
		Final	L	To mitigate the potential safety issues around the unit, the ATV operator(s) will scout the ignition route prior to the actual burn. Only properly trained personnel will operate ATV'(s). All fire equipment will have the headlights on to be as visible as possible.
	Technical Difficulty	Preliminary	L	Safety concerns can be easily mitigated through LCES and will be covered in the pre-burn briefing.
		Final	L	No Change.
Ignition Procedures Methods	Risk	Preliminary	L	Firing sequence and timing are not critical to meet burn objectives. The entire burn unit is readily visible to the burn boss. A well-established black line will be in place on the downwind side before proceeding along the flanks.
		Final	L	No Change
	Potential Consequences	Preliminary	L	Firing methods and procedures must be coordinated to provide for adequate safety and to reduce the risk of an escaped fire situation. This coordination must be handled by the burn boss.
		Final	L	A very detailed briefing explaining the firing sequence will be given. Also all crew members will have an opportunity to walk the perimeter of the unit prior to ignition.
	Technical Difficulty	Preliminary	L	Ignition techniques and sequences will be discussed in detail during the briefing. All personnel on the burn will have hand-held radios, or be working in tandem with someone who does.
		Final	L	No Change.

Interagency Coordination	**Risk**	Preliminary	L	The project does not involve another land management agency.
		Final	L	No Change.
	Potential Consequences	Preliminary	L	Burn can be completed as planned.
		Final	L	No Change.
	Technical Difficulty	Preliminary	L	No Interagency issues
		Final	L	No Change.
Project Logistics	**Risk**	Preliminary	L	This project requires minimal logistical support and most supplies needed to conduct the burn are readily available. No special equipment or communication needs will be required. Project should be completed in one day.
		Final	L	No Change.
	Potential Consequences	Preliminary	L	Problems related to logistics will not increase the risk of escape or affect the completion of the project.
		Final	L	No Change.
	Technical Difficulty	Preliminary	L	No special logistical support issues and supplies and personnel are readily available and easily obtained.
		Final	L	No Change.
Smoke Management	**Risk**	Preliminary	M	This unit is bordered by the Refuge's Wilderness area on the West, North, and East sides. .Impacts of smoke on the Wilderness area will be minimal. The wilderness is a smoke sensitive area, but the smoke concerns are limited due to the short burn duration of this fuel model and the small size of the unit.
		Final	L	Potential problems will be mitigated by burning only smaller sections of the unit on different burn days and conducting mop up as needed, to eliminate residual smoke issues.
	Potential Consequences	Preliminary	L	The implementation of this project should have no impact on public residences or roads. Firefighter exposure to smoke is expected to be minimal due to the lack of holding associated with the man-made firebreaks and should not cause any health and safety concerns. Firefighters will be rotated in and out of heavy smoke areas.
		Final	L	No Change.
	Technical Difficulty	Preliminary	L	This project will require no special operational procedures to provide for smoke management. There will be limitations on wind directions, mixing heights, and dispersal rates to minimize impacts to smoke sensitive areas.
		Final	L	No Change.

SUMMARY COMPLEXITY RATING

RISK OVERALL RATING ____Low___

POTENTIAL CONSEQUENCES OVERALL RATING ____Low_

TECHNICAL DIFFICULTY OVERALL RATING _____Low____

SUMMARY COMPLEXITY RATING ___Low__

RATIONALE: This project rates at a Low complexity due to adequate fire breaks on all sides that are easily accessible with an ATV(s) with sprayer(s). All elements rated a low complexity due to the low potential for escape, values at risk (on and off-site), public and political interest, constraints, interagency coordination, logistics, and smoke management.

Prepared by: ____**Date:** _______________
Thad Herzberger, Prescribed Fire Specialist

Approved by: ____ **Date:** _______________
Clifford Berger, Region 3, South Zone Fire Management Officer
(Agency Administrator)

III. PLANNING AND ACTIONS

Complexity Analysis Results:

- This is a low rated complexity burn requiring at minimum a Prescribed Fire Burn Boss Type III.

Site preparation:

- Fire breaks will be mowed with a tractor and bushhog-type mower deck. Fire breaks will be at least 15 feet wide. If possible, a disked line will be established in conjunction with the mowed line. The ATV operator(s) and burn boss will scout the unit to check for potential hazards.

Mowed Firebreaks:

- A mow line will be completed on the all sides of the unit. The levee that serves as the western boundary will also be mowed.
- The mow lines will be approximately 15 feet wide and will be installed by refuge personnel just prior to ignition.

Weather Information Required:

- The Burn Boss will request a spot weather forecast the morning of the scheduled burn from the National Weather Service in Paducah, KY (270)744-6440 or via the internet @ www.crh.noaa.gov/pah/forecast/firewx.shtml . In addition, a general fire weather forecast can be obtained via the internet @ www.crh.noaa.gov/pah/forecast/firewx.shtml . The general fire weather forecast should not replace the required spot weather forecast. Information regarding fronts, inversions, wind speed, direction and changes will be used to determine if weather will meet prescription. On site weather information (wind speed and direction, temperature, and relative humidity) will be collected just prior to ignition. If information is inconsistent with the weather forecast, another spot weather forecast will be obtained from the National Weather Service.

Safety Considerations and Protection of Sensitive Features:

- No sensitive features within the unit.

Special Safety Precautions Needing Attention:

- Crew members will need to be constantly aware of what and where the ignition team and holding forces are. Constant communication between ignition crews and the burn boss will be essential to safely and efficiently complete this burn.
- It will be important to establish minimally adequate control line width (100') on downwind perimeter of unit to prevent potential spot-overs.
- Only qualified personnel will operate ATV(s).

Special Constraints and Considerations: None

Burn Day Contacts:

Name Address (if required)	Phone Number	Date of Contact	Time of Contact
Stoddard County Sheriff (911)	573-568-4654		
Puxico VFD	573-222-3162		
Wappapello VFD	573-222-8475		
Mingo Job Corps	573-222-3537		
Wayne County Sheriff	573-224-3219		
Zone FMO (Cliff Berger)	217-224-8580 217-242-8583c		
Prescribed Fire Specialist (Thad Herzberger)	618-997-3344x322 618-889-6269c		

Communication and Coordination on the Burn:

- Crew members will carry handheld radios on the burn.
- Engines will be equipped with mobile radios.
- Radio communication will be on Channel 1 (Refuge Repeater A)
- Plain text will be used at all times.
- Burn boss will brief crew and coordinate all activities.
- If some crew members do not have radios, they will be paired with a member who does.

COMMUNICATIONS PLAN

FIRE COMMUNICATIONS CHANNELS AND FREQUENCIES FOR MINGO NWR					
Channel	Name	Rx Frequency	Code	TX Frequency	Code
1	Refuge Car/Car Repeater A	164.625		163.150	
2	Repeater D	164.625		163.150	1A
3	Gipsy	151.190		159.345	5A
4	Mutual Aid	155.475		155.475	
5	Civil Defense	155.145		155.145	
6	Stoddard County	155.190		159.030	2B

Medical Plan

Medical Emergency Procedures
Brief Description: In case of injury needing immediate medical attention, the burn boss or designated fire crew member will contact County Dispatch Office (911) for dispatching of nearest ambulance. The nature of injury will need to be conveyed from burn site through dispatchers to ambulance crew to insure proper response. If the nature of the injury requires medi-vac to trauma or burn center request air ambulance from St. Louis through dispatchers. Allow ambulance crew to coordinate communications with air ambulance.
Ambulances

Name	Address	Phone Number	Paramedics Yes	No
Stoddard County		624-8951		
Wappapello		222-8250	X	

Air Ambulances				
Name	Address	Phone Number		
AIR-EVAC	Poplar Bluff	1-800-247-3822		

Hospitals			
Name Helipad	Location	Phone Number	Travel Time (Air/Ground)
Three Rivers	Poplar Bluff	573-727-2566	15min/40min
St. Francis Medical Center	Cape Girardeau	573-331-3000	25 min/60/min

Nearest Burn Center		
St. Louis Burn Center 35 minutes by air		
Supplies on Board		
<u>Item</u>	<u>Location</u>	<u>Person Responsible</u>

Medical Emergencies

In the event that a medical emergency beyond the capability of the people on site occurs, **911** or calling County dispatch needs to be initiated, identifying the extent of injuries, location, access and contact person on site. This can be done through the Refuge office dispatcher. First aid will be administered on site, and the Burn Boss will determine if the burn operation can safely continue without jeopardizing the well being of the injured party or the safety of the remaining firefighters.

IV. IGNITION, BURNING AND CONTROL

	Planned or Proposed	Actual
Scheduling: Approx. Date(s)	Jan. 15 – Apr.15 Oct.15 - Dec.15	
Time of Day	0900-1800	

Acceptable Range

FBPS Fuel Model 3	Low Fire Behavior	High Fire Behavior	Actual
Temperature	30	90	
Relative Humidity	65	25	
Wind Speed (20' forecast)	2	18	
Wind Speed (mid-flame)	2	14	
Wind Direction	All		
Cloud Cover (%)	100	0	
ENVIRONMENTAL CONDITIONS			
Soil Moisture	N/A	N/A	
1 hr. Fuel Moisture	15	5	
10 hr. FM	N/A	N/A	
100 hr. FM	N/A	N/A	
Woody Live Fuel Moisture	N/A	N/A	
Herb. Live Fuel Moisture	N/A	N/A	
Litter/Duff Moisture	N/A	N/A	
FIRE BEHAVIOR			
Type of Fire (H,B,F)	BACKING	HEAD	
Rate of Spread	25	482	
Fireline Intensity	283	6926	
Flame Length	6	26.3	

Cumulative effects of weather and drought on fire behavior:

- Prolonged drought will cause drying of larger fuels and possibly litter, duff, and soil layers which do not normally burn. The fuel models do not account for these fuels burning. With a drought situation, you can expect higher flame lengths, highly increased fireline intensity, resistance to control efforts, prolonged smoldering of large logs and duff layers, difficult mop-up, and lingering smoke problems.
- Wet areas that you were counting on as a barrier may be much lower than necessary to conduct a safe burn. Water sources may be dried up.
- Drought will have much less effect on grasses (FBPS fuel model 1 and 3) since fuels are composed mostly of 1-hour fuels which will be more affected by temperature and relative humidity than prolonged drought.
- Spring burning often has wet woody fuels from winter precipitation. If winter precipitation has been below average for the area, consider postponing burning for the season or until after a rain.
- If drought conditions are severe enough you may have to postpone the burn, use additional resources for holding, burn under the low fire behavior conditions within the prescription, and monitor fire behavior more closely.

Where to get information on cumulative drought conditions

- Monitor whether precipitation is below normal at your station (But be careful - precipitation can be above normal for the year, but BELOW normal for the last 4 or 5 months, leading to abnormally dry conditions)
- Nearby automated weather stations will probably calculate fuel moistures and NFDRS (National Fire Danger Rating System) indices which indicate what the burning conditions are for a general area.
- The nearest fire dispatch may have current conditions including what the live fuel moistures are doing
- The ERC (Energy Release Component) is a good indicator of when burning conditions are getting severe. Many refuges use the Burning Index - another NFDRS output, but it fluctuates more rapidly than the ERC (not as good for long-term trends)
- Internet - Keetch-Byram drought index, departure from average greenness, Palmer Drought Index are sources that can be accessed for information on regional conditions, sometimes down to county level. This data can be found at the Wildland Fire Assessment System (WFAS) on the Internet
- NRCS may have soil moisture data.
- Some states issue range fire indices daily. Consult with the National Weather Service. These are sometimes available on the Internet.

If you are in drought conditions you may have to do something to mitigate the effects

- Postpone burn
- Have additional holding forces on hand
- Have additional water sources available

- Burn under less severe conditions
- Spend greater effort on mop-up
- Monitor the fire more often to make sure it's out
- IF NOTHING ELSE: make a note that you should consult with your Zone FMO if the nearest weather station is showing below normal precipitation.

Ignition Technique and Sequence: Ignition will be carried out using hand-held drip torch(es). A backing fire will be used to establish blacklines on the downwind side(s) along the firebreak. Ignition sequence will depend on wind direction, working into the wind whenever possible. The actual firing pattern will be decided the day of the burn by the burn boss based on personnel and equipment availability, weather, and fuel conditions.

Test Fire: A test fire will be conducted in the downwind corner of the burn unit. The burn boss will observe the test fire to ensure wind direction and burning conditions are within predicted and required parameters. However, the use of a single test fire at one moment is not sufficient. During all times of active ignition the prescribed fire will be monitored, and will be terminated if objectives and safety requirements are not being met. If conditions are not within these parameters the test fire will be extinguished and burn postponed until conditions allow for continuation. The downwind perimeter will be ignited allowing the fire to back/flank into the wind. A control line of at least a minimum of 100 feet will be established before teams continue with ignition along flanks. Unit will be completed by lighting a head fire on upwind perimeter of unit.

Ignition Teams: Two ignition teams will be used. Both teams will be made up of a driptorch operator, and one person on an ATV w/sprayer, spot checking along the line. Both teams will ignite and hold as they proceed. A **minimum** of 100' of blackline will be established before the teams continue up the east and west flanks. Due to the small size of the unit, the burn boss should have visual contact with both ignition teams at all times. An engine with slip-on unit will be on stand-by on the western boundary. A minimum of 5 personnel (Burn Boss + 4) are required for safe completion of the burn. However, if more personnel are available the day of the burn, they will serve as additional holding resources.

Prescribed Fire Organization (Following is the minimum list of qualified positions and equipment to safely accomplish this burn. If additional personnel and/or equipment are available they may be used to fill various positions at the discretion of the burn boss):

Positions/Equipment	Quantity
RXB3	1

FFT2	4
Equipment	
Floto-pump, Mini Mark, other portable pump (with required hose and fittings)	1(staged)
Type VI Engine	1(staged)
ATV w/ 40gal. sprayer Polaris Sportsman w/ 50gal. sprayer	Must have at least one

Other: Minimum crew size required will be 5 (Burn Boss + 4) for this burn unit. More people will be utilized as holding resources for the prescribed burn, if available.

Prescription monitoring:

- The Burn Boss or a designated fire crew member will take and record on-site weather observations prior to and periodically (as needed) throughout the ignition. These observations along with the spot weather forecast will be used to determine if conditions are within prescription to ignite and continue firing operations.

Holding and Control:

Critical Control Problems: No critical control problems are foreseen. All boundaries are adjacent to bottomland hardwood with moist ground litter and some standing water. Ignition will occur in conjunction with a wetline using the ATV(s) with sprayers. The wetline will be within the mowed line. A pumper unit will be available to assist holding on the line if necessary.

Water Refill Points: The ATV(s) will be able to refill from the Engine stationed on the west levee. The engine will be able to refill using the floto-pump located at Battle Shell Lake (South west of the unit) or at Ditch 10 (East of the Unit).

Contingency Plan for Escaped Fire:

- In the event of a slopover, the Burn Boss will be notified immediately and will decide if it is necessary to continue or cease ignition.
- The slopover will be declared an escaped fire if it can not be contained within an hour with on-site resources or if structures are threatened regardless of the containment time.
- If the slop-over has been considered an escaped/wildfire, the most qualified fire crew member will then assume the role of the Incident Commander. The IC will determine the most

appropriate suppression strategy to contain and control the fire. Direct attack is the preferred method of control and will be used unless otherwise directed by the IC.

- It shall be covered in the briefing the current qualifications and red-card status of the entire fire crew on-site.
- Available holding forces will perform initial attack.
- If additional resources are needed to contain the escape, outside resources can be ordered directly through Puxico or Wappapello VFDs (See contact list for #s).
- If direct attack is not possible, providing protection to life and private dwellings will be the first priority. Indirect attack will be implemented with the use of the contingency map provided. **(See Contingency Map)**

Contingency Plan for Escaped Fire (Are there crews standing by to initial attack or will people doing other jobs be called upon to do initial attack, who must be called in case of an escape, what radio frequencies will be used, etc.)

1. If the fire escapes to the north, direct attack will be used. If this should fail, there are no distinct anchor points within ¾ mile of the unit. The best option would be to tie the Auto Tour Route into Ditch 10 (approximately ¾ - 1 mile north of the unit). The fuel type north of the unit is wet bottomland hardwood, and would not likely carry fire. However, if needed, a short handline from the Auto Tour Route to Ditch 7 which connects into ditch 10, would be sufficient to hold a burnout operation.

2. If the fire escapes to the west, direct attack will be utilized. If this should fail, the Auto Tour Route (runs on the southern boundary of the unit, and then turns to the north about ½ mile west of the unit) can be used as an anchor point for a burnout operation.

3. If the fire escapes to the south, again direct attack will be used. If this fails, the Auto Tour Route can serve as a contingency, to establish an anchor point. If the fire crosses the road, the next potential holding point is an east/west short grass levee approximately 100 yards south of the Auto Tour Route. The vegetation surrounding the levee is representative of Fuel Model 3.

4. If the fire escapes to the east, direct attack tactics will be used. If this should fail the fire crew will fall back and burn out along Ditch 10, which runs north to south, approximately ½ mile to the east.

If fire escapes the following actions will be taken:

A. If fire burns outside the specified perimeter limits, and cannot be quickly contained by on-site resources, the fire will then become a wildfire.
B. All prescribed firing operations will cease.
C. Available holding forces will perform initial attack.
D. The burn boss or highest wildfire qualified individual on site will assume the duties of Incident Commander until relieved.
E. Safety and protection of private property will be the highest priorities.

F. If in the opinion of the burn boss, on-site resources cannot contain the fire, the county dispatch will be contacted.

Contingency resources will be requested via radio or cell phone from **(Wayne or Stoddard County)Dispatch**. Fire resources are available from the Puxico Fire Department, approximately 3 miles from the burn unit. **Communication between the VFD and refuge personnel will be critical. Refuge personnel will provide the VFD's with refuge radios to provide adequate communication!**

Resources at risk:
In the event the escaped fire has the potential to threaten private individuals, structures, livestock, or other non government property, the county dispatch office will be notified with a request for law enforcement to contact home owners and assist with possible evacuation, road closures, and to request structure protection with Volunteer Fire Department structural fire equipment. County dispatch will also be notified should assistance be needed with traffic control and road closings due to hazardous smoke conditions.

Mop Up and Patrol:
All fires will be mopped up and patrolled to mitigate the threat of smoke and/or escape problems. In all cases, each burn will be patrolled a **minimum** of once immediately prior to abandoning for the evening. The unit will be mopped up no less than 100 feet off of the control line. This may be increased if strong winds are forecasted after completion of the prescribed burn at the burn boss' discretion. The unit will be ground checked the next day and additional days if necessary.

V. SMOKE MANAGEMENT

Permits required:
- No Permit Required.

Distance and Direction from Smoke Sensitive areas

Refuge Wilderness Area	Adjacent on the west, north, and east sides
Town of Puxico	East approximately 2-3 miles
Hwy 51	East approximately 3 miles
Hwy T	Southwest approximately 1 mile

Necessary Transport Wind Direction, Speed and Mixing Height:

Transport Wind Speed: minimum 5 mph.
Wind Direction: All directions
Mixing Height: minimum 500 feet.

Test fires will indicate if smoke dispersal and wind direction objectives are being met. Smoke dispersal information will be obtained from the National Weather Service Office as a part of the spot weather forecast.

Visibility Hazards (roads,airports, etc.):
Same as SSA's listed above. Heavy smoke may occur along the perimeter of the burn unit which could directly impact fire crew members.

Actions to Reduce Visibility Hazard(s):

- All burning parameters as specified in this plan will be followed. Planned wind and atmospheric conditions will allow smoke to rise and disperse. The burn will not be conducted with a wind direction which will put smoke directly into the occupied farmsteads that are immediately adjacent to the burn unless the occupant has given permission to do so. Smoke dispersal conditions which allow smoke to lift over farmsteads and roads are acceptable. Smoke management contingency plans will be initiated immediately if needed.
- Mop-up will begin as needed when firing is completed. If needed, mop-up will continue after the burn until all smoke visibility hazards are removed as determined by the burn boss.
- Visibility hazards will be discussed during the pre-burn briefing. Fire engines on the firelines should travel slowly with headlights on at all times. Communication between engine operators and fire line personnel will be maintained for the duration of the burn, and all line personnel will be made aware of equipment movements.
- For all units, use traffic control personnel where necessary and "smoke ahead" signs on any roads where smoke may be a visibility hazard.

Smoke Management Contingency Plan:
If changes in weather conditions or other factors occur that cause imminent smoke problems, the following plan will be initiated:

1) All attempts will be made to reduce smoke emissions from the burn as quickly as possible. This may include immediate shut down of the burn and suppression of any area of the unit still on fire. Mopup will also be initiated in order to eliminate as much smoke production as possible.

2) If additional resources are needed to extinguish the burn and eliminate further smoke production, they will be called in through the refuge dispatch system and may include fire departments, personnel from other refuges, or other state and federal agencies in the area.

3) Smoke signs following DOT requirements should be placed prior to the burn on roads that may be impacted by smoke, traffic control should be initiated by a burn crew member with communications

with a traffic controller and the burn boss. The county sheriff or other law enforcement personnel may be called to assist with local traffic control, including temporary closure of area roads if deemed necessary.

4) If it appears that smoke from the burn will impact local communities or other smoke sensitive locations, all efforts will be made to identify the potential problem areas and inform the public so that local actions to reduce impacts such as closing up buildings and moving sensitive individuals away from the impacted area can occur.

5) The burn boss will remain on site until the smoke problems are resolved or until relieved by an individual appointed by the line officer.

Personnel involved in traffic monitoring and control should wear high-visibility safety vest and should use a vehicle with emergency warning lights when available.

Residual Smoke Problems:

- Residual smoke will be limited due to the short residency time of grass fuel models. Where holdover smoke may be a concern, rapid and complete mop-up will be completed. Attempts will be made to complete the burn prior to sunset to prevent as much residual smoke as possible.

Particulate emissions in Tons/Acre and how calculated: N/A

VI. FUNDING AND PERSONNEL

RX Project Cost Estimate: (Budget Estimate. A matrix which provides an estimate and will capture the actual expenses will be used. Capture all costs associated with the project relate to FIREBASE.)

Category	Phase				Total
	Crew Size	**Regular hours**	**Avg. wage**		
Burn Crew	5	40	20.00	0	800.00
Administration	1	10	19.00	0	190.00
Site Prep.	1	3	19.00	0	57.00
Travel/ Per Diem	n/a	n/a	n/a	n/a	

Equipment (Admin., Site prep, Ignition & Control)				0	525.00
TOTAL				0	1572.00

Estimated Cost Per Acre ___
9263 Funds Requested 1572.00 ___
Other Funds Requested 0.00

VII. BURN DAY ACTIVITIES

Crew Briefing Points:
A thorough briefing emphasizing all hazards, escape routes, and any special considerations relative to the burn will be discussed on site prior to ignition. All crew members will have maps of the unit. This will include a drive around review with all crew. The Go-No-Go checklist will be completed prior to the burn.

Prescribed Burn Briefing Outline attached.

- Park all vehicles in a safe area, pointed away from fire. Leave keys in the ignition and close all windows.
- Provide for plenty of drinking water, juices or other non-caffeinated drinks. Rotate ignition crews when necessary.
- Limit exposure of personnel to smoke and CO exposure, rotate personnel.
- Always keep track of personnel working next to you, and make your where-abouts known when you change positions.
- Give clear and concise instructions, and make sure they are understood.
- Wear proper PPE and keep shirt sleeves down.
- Avoid spilling fuel on PPE. Fill torches and fuel containers ONLY on the ground. Label and date all fuel containers.
- Communicate any changes in weather or other significant events to burn boss immediately.
- Make sure everyone is on the correct radio channel .

Personnel Escape Plan:
- Safety zones for this unit will include; black, grazing fields, areas of no or light fuel, open water, and roadways.
- Escape routes will include; black, areas with no fuel or light fuel, roadways and open water.
- It will be the responsibility of every individual that they have escape routes and safety zones picked out at all times.

Special Safety Requirements:
- ATV operators will have agency determined 'ATV Operators Course'.

Rehabilitation Needs:-None anticipated

DI 1202 Submission Date:

Special Problems:

See attached Go-No-Go checklist.

Prescribed Burn Briefing Outline

I. **Burn Organization**
   A. Organizational Chart/Personnel Assignments
   B. Equipment Assignments
   C. Other Resources
II. **Burn Objectives**
III. **Description of Burn Area**
   A. Review Map of Burn/Topographical Features/Acreage
   B. Values at Risk
   C. Problem Areas
   D. Fuel Type (Both Inside and Outside the Burn Unit)
   E. Roads/Access
   F. Water Sources
   G. Natural/Manmade Barriers
IV. **Expected Weather**
   A. Wind Direction and Speed
   B. Relative Humidity
   C. Temperature
   D. Fuel Moisture
   E. Atmospheric Stability
   F. Predicted Changes
V. **Communications**
   A. Procedures
   B. Frequencies/Channels
      1. Burn Crew
      2. Dispatch
      3. Cooperators
      4. Others
VI. **Firing Sequence**
   A. Test Burn
   B. Ignition Equipment (Type, Number, Etc.)
   C. Pattern and Sequence of Firing (Map)
VII. **Contingency Plan**
   A. Slop Over vs. Escape
   B. Assignments/Organizational Chart
   C. Strategy
   D. Tactics
VIII. Safety
   A. Inspect Personal Protective Equipment

B. Lookouts, Escape Routes and Safety Zones
C. Hazards (Footing, Natural, Man made, Smoke [visibility], Etc.)
D. Potential Problems
E. Other (Air Operations, Flammable Fuel Handling, Etc.)

GO-NO-GO CHECKLIST

Unit: Sifford Pasture

Yes___ No___ Do you have an **APPROVED** prescribed fire plan?

Yes___ No___ Are **ALL** fire prescription elements met?

Yes___ No___ Are **ALL** smoke management specifications met?

Yes___ No___ Are **ALL** permits and clearances obtained?

Yes___ No___ Has an area spot weather forecast been obtained and is it favorable?

Yes___ No___ Are **ALL** required personnel in the prescribed fire plan on site?

Yes___ No___ Has the contingency planning process adequately considered fuels adjacent to and within a reasonable proximity to the burn area?

Yes___ No___ Has the availability of **ALL** contingency resources been checked, and are they available?

Yes___ No___ Have **ALL** personnel been briefed on the project objectives and their assignment?

Yes___ No___ Have **ALL** personnel been briefed on their safety hazards, escape routes, and safety zones?

Yes___ No___ Have **ALL** the required notifications been made?

Yes___ No___ Are the on-site holding forces adequate for containment under the expected conditions?

Yes___ No___ In **YOUR OPINION**, can the prescribed fire meet the planned objectives, and can it be carried out according to the approved plan?

I certify that I have reviewed the burn objectives and that I am in agreement that the Prescribed Fire Complexity Analysis is correct and that all the above questions were answered "**YES.**"

_______________________________ ______________

Prescribed Fire Burn Boss Date

_______________________________ ______________

Refuge Manager Date

Proceed with a test fire and document the current conditions, location, and results.

VIII: CRITIQUE OF BURN

Were Burn Objectives Within Acceptable Range of Results:

What Would be Done Differently to Obtain Better Results:

Was There Any Deviation from Plans (why):
Problems and general Comments:

IX. POST BURN MONITORING

Visual Inspection - Date: ______

Length of Time After Burn:______

Vegetative Transacts:

Comments on Habitat Conditions, etc.:

Photo Documentation:

Other:

X. FOLLOW-UP EVALUATION

Follow-up Date: _________ Refuge Burn Number:_____
Length of Time After Burn:

Vegetative Transects:

Comments on Habitat Condition:

Photo Documentation:

Other:

Appendix B: Prescribed Fire Plan Template

A standardized, reproducible template form for the Prescribed Fire Plan development process is included in this appendix. A standardized format is provided for the Prescribed Fire Plan in PDF. An electronic version editable in Word is also available. Users should prepare the plan using the electronic version.

In the electronic Word version, the Project Name and/or Unit Name should be entered in the document's header which will automatically appear on each following page of the plan.

To insert information into the document's header:

1. Double-click in the header region (upper region of each page displayed on the screen).
2. Type Project and/or Unit information.
3. Double-click *outside* the header region in the body of the document.

You may also access the header under **View** > **Headers and Footers**. This will open the header region for edits automatically. After entering the information, go again to **View** > **Headers and Footers** which will return you to being able to enter information into the body of the document.

PRESCRIBED FIRE PLAN

ADMINISTRATIVE UNIT(S): ______________________________

PRESCRIBED FIRE NAME: ______________________________

PREPARED BY: ______________________________ **DATE:** __________

Name & Qualification

TECHNICAL REVIEW BY: ______________________________ **DATE:** __________

Name & Qualification

COMPLEXITY RATING: ______________

APPROVED BY: ______________________________ **DATE:** __________

Agency Administrator

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 2: AGENCY ADMINISTRATOR PRE-IGNITION APPROVAL CHECKLIST

Instructions: The Agency Administrator's Pre-Ignition Approval is the intermediate planning review process (i.e. between the Prescribed Fire Complexity Rating System Guide and Go/No-Go Checklist) that should be completed before a prescribed fire can be implemented. The Agency Administrator's Pre-Ignition Approval evaluates whether compliance requirements, Prescribed Fire Plan elements, and internal and external notifications have been or will be completed and expresses the Agency Administrator's intent to implement the Prescribed Fire Plan. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

YES	NO	KEY ELEMENT QUESTIONS
		Is the Prescribed Fire Plan up to date? *Hints: amendments, seasonality.*
		Will all compliance requirements be completed? *Hints: cultural, threatened and endangered species, smoke management, NEPA.*
		Is risk management in place and the residual risk acceptable? *Hints: Prescribed Fire Complexity Rating Guide completed with rational and mitigation measures identified and documented?*
		Will all elements of the Prescribed Fire Plan be met? *Hints: Preparation work, mitigation, weather, organization, prescription, contingency resources*
		Will all internal and external notifications and media releases be completed? *Hints: Preparedness level restrictions*
		Will key agency staff be fully briefed and understand prescribed fire implementation?
		Are there any other extenuating circumstances that would preclude the successful implementation of the plan?
		Have you determined if and when you are to be notified that contingency actions are being taken? Will this be communicated to the Burn Boss?
		Other:

Recommended by: ______________________________ Date: __________

FMO/Prescribed Fire Burn Boss

Approved by: ______________________________ Date: __________

Agency Administrator

Approval expires (date): ______________________________

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 2: PRESCRIBED FIRE GO/NO-GO CHECKLIST

	YES	NO
A. Has the burn unit experienced unusual drought conditions or contain above normal fuel loadings which were not considered in the prescription development? If NO proceed with checklist., if YES go to item B.		
B. If YES have appropriate changes been made to the Ignition and Holding plan and the Mop Up and Patrol Plans? If YES proceed with checklist below, if NO STOP.		

YES	NO	QUESTIONS
		Are ALL fire prescription elements met?
		Are ALL smoke management specifications met?
		Has ALL required current and projected fire weather forecast been obtained and are they favorable?
		Are ALL planned operations personnel and equipment on-site, available, and operational?
		Has the availability of ALL contingency resources been checked, and are they available?
		Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?
		Have all the pre-burn considerations identified in the Prescribed Fire Plan been completed or addressed?
		Have ALL the required notifications been made?
		Are ALL permits and clearances obtained?
		In your opinion, can the burn be carried out according to the Prescribed Fire Plan and will it meet the planned objective?

If all the questions were answered "YES" proceed with a test fire. Document the current conditions, location, and results

______________________________ ______________________________

Burn Boss Date

Project Name: ____

Unit Name: ____

ELEMENT 3 COMPLEXITY ANALYSIS SUMMARY

PRESCRIBED FIRE NAME			
ELEMENT	**RISK**	**POTENTIAL CONSEQUENCE**	**TECHNICAL DIFFICULTY**
1. Potential for escape			
2. The number and dependence of activities			
3. Off-site Values			
4 On-Site Values			
5. Fire Behavior			
6. Management organization			
7. Public and political interest			
8. Fire Treatment objectives			
9 Constraints			
10 Safety			
11. Ignition procedures/ methods			
12. Interagency coordination			
13. Project logistics			
14 Smoke management			

COMPLEXITY RATING SUMMARY	
	OVERALL RATING
RISK	
CONSEQUENCES	
TECHNICAL DIFFICULTY	
SUMMARY COMPLEXITY DETERMINATION	
RATIONALE:	

Project Name: ____

Unit Name: ____

ELEMENT 4: DESCRIPTION OF PRESCRIBED FIRE AREA

A. Physical Description

1. Location:
2. Size:
3. Topography:
4. Project Boundary:

B. Vegetation/Fuels Description:

1. On-site fuels data
2. Adjacent fuels data

C. Description of Unique Features:

ELEMENT 5: GOALS AND OBJECTIVES

A. Goals:

B. Objectives:

1. Resource objectives:
2. Prescribed fire objectives:

ELEMENT 6: FUNDING:

A. Cost:

B. Funding source:

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 7: PRESCRIPTION

A. Environmental Prescription:

B. Fire Behavior Prescription:

ELEMENT 8: SCHEDULING

A. Ignition Time Frames/Season(s):

B. Projected Duration:

C. Constraints:

ELEMENT 9: PRE-BURN CONSIDERATIONS

A. Considerations:

1. On Site:

2. Off Site

B. Method and Frequency for Obtaining Weather and Smoke Management Forecast(s):

C. Notifications:

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 10: BRIEFING

Briefing Checklist:

Burn Organization

Burn Objectives

Description of Burn Area

Expected Weather & Fire Behavior

Communications

Ignition plan

Holding Plan

Contingency Plan

Wildfire Conversion

Safety

ELEMENT 11: ORGANIZATION AND EQUIPMENT

A. Positions:

B. Equipment:

C. Supplies:

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 12: COMMUNICATION

A. Radio Frequencies

1. Command Frequency(s):

2. Tactical Frequency(s):

3. Air Operations Frequency(s):

B. Telephone Numbers:

ELEMENT 13: PUBLIC AND PERSONNEL SAFETY, MEDICAL

A. Safety Hazards:

B. Measures Taken to Reduce the Hazards:

C. Emergency Medical Procedures:

D. Emergency Evacuation Methods:

E. Emergency facilities:

ELEMENT 14 TEST FIRE

A. Planned location:

B. Test Fire Documentation:

1. Weather conditions On-Site:

2. Test Fire Results:

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 15: IGNITION PLAN

A. Firing Methods:

B. Devices:

C. Techniques:

D. Sequences:

E. Patterns:

F. Ignition Staffing:

ELEMENT 16: HOLDING PLAN

A. General Procedures for Holding:

B. Critical Holding Points and Actions:

C. Minimum Organization or Capabilities Needed:

ELEMENT 17: CONTINGENCY PLAN

A. Trigger Points:

B. Actions Needed:

C. Additional Resources and Maximum Response Time(s):

Project Name: ______________________________

Unit Name: ______________________________

ELEMENT 18: WILDFIRE CONVERSION

A. Wildfire Declared By:

B. IC Assignment:

C. Notifications:

D. Extended Attack Actions and Opportunities to Aid in Fire Suppression:

ELEMENT 19: SMOKE MANAGEMENT AND AIR QUALITY

A. Compliance:

B. Permits to be Obtained:

C. Smoke Sensitive Areas/Receptors:

D. Impacted Areas:

E. Mitigation Strategies and Techniques to Reduce Smoke Impacts:

ELEMENT 20: MONITORING

A. Fuels Information (forecast and observed) Required and Procedures:

B. Weather Monitoring Required and Procedures:

C. Fire Behavior Monitoring Required and Procedures:

D. Monitoring Required To Ensure That Prescribed Fire Plan Objectives Are Met:

Project Name: ______________________________

Unit Name: ______________________________

E. Smoke Dispersal Monitoring Required and Procedures:

ELEMENT 21: POST-BURN ACTIVITIES

Post-burn Activities That Must be Completed:

Project Name: ______________________________

Unit Name: ______________________________

APPENDICES

A. Maps: Vicinity and Project
B. Technical Review Checklist
C. Complexity Analysis
D. Job Hazard Analysis
E. Fire Behavior Modeling Documentation or Empirical Documentation (unless it is included in the fire behavior narrative in Element 7; Prescription)

Project Name: ____________________

Unit Name: ____________________

A: MAPS

1. Vicinity Map:

Project Name: ______________________________

Unit Name: ______________________________

2. Project Map:

Project Name: ______________________________

Unit Name: ______________________________

C. TECHNICAL REVIEWER CHECKLIST

PRESCRIBED FIRE PLAN ELEMENTS:	S /U	COMMENTS
1. Signature page		
2. GO/NO-GO Checklists		
3. Complexity Analysis Summary		
4. Description of the Prescribed Fire Area		
5. Goals and Objectives		
6. Funding		
7. Prescription		
8. Scheduling		
9. Pre-burn Considerations		
10. Briefing		
11. Organization and Equipment		
12. Communication		
13. Public and Personnel Safety, Medical		
14. Test Fire		
15. Ignition Plan		
16. Holding Plan		
17. Contingency Plan		
18. Wildfire Conversion		
19. Smoke Management and Air Quality		
20. Monitoring		
21. Post-burn Activities		
Appendix A: Maps		
Appendix B: Complexity Analysis		
Appendix C: JHA		
Appendix D: Fire Prediction Modeling Runs		
Other		

S = Satisfactory **U = Unsatisfactory**

Recommended for Approval: **Not Recommended for Approval:**

______________________ ______________ ________________

Technical Reviewer Qualification and currency (Y/N) Date

€Approval is recommended subject to the completion of all requirements listed in the comments section, or on the Prescribed Fire Plan.

Project Name: ______________________________

Unit Name: ______________________________

C: COMPLEXITY ANALYSIS

Project Name: ______________________________

Unit Name: ______________________________

D. JOB HAZARD ANALYSIS

Project Name: ________________________________

Unit Name: ________________________________

E. FIRE BEHAVIOR MODELING DOCUMENTATION OR EMPIRICAL DOCUMENTATION

4.7 U.S. Army Corp of Engineers Burn Plans

U.S. ARMY CORPS OF ENGINEERS

HARRY S. TRUMAN DAM & RESERVOIR

PRESCRIBED BURN PLAN

PROJECT DESCRIPTION	
Area/Field, Stand or Unit No.: Browington Switchgrass Lease Unit D-15/16	
Prepared by: Jason Hurley	**Date:** NOV-9-2006
RX Burn Boss approval:	**Date:**
Location description (attach map): Henry Co. T40 - R25W - Section 17,18,20	
Acreage: 160	
Site description: native switchgrass prairie, annual weeds, woody invasion.	
Sensitive areas: Private pasture and the village of Browington to the west; private wooded property to the south	
Risk Assessment Value (attach Risk Assessment Worksheet): 15	

PRESCRIPTION			
Burn objectives: To burn >95% of the unit. Top kill 85% of woody plants <5ft tall. Stimulate native forb growth for the following growing season.			
Preferred timing: Feb. 15th to May 15th.			
Desired fire behavior: Use a ring head fire method to burn the unit. > 95% of fuel is consumed.			
Conditions needed:		Range	Ideal
	Temperature	40 – 80 deg. F.	65
	Relative humidity	25 – 50%	35%
	1 hr. fuel moisture	3 – 7%	5%
	10 hr. fuel moisture		
	Midflame windspeed	3 - 15	8
	Wind direction	Any except east	Southwest

Smoke management:

Desired atmospheric conditions:Unstable atmospheric conditions preferred for smoke dispersal.

Mixing height (>1650' recommended):

Ventilation rate (>6000 m^3/sec recommended):

Air quality restrictions that apply: **None for Henry Co.**

Firelines: Wheat or mowed fireline along west perimeter, lake on the north and east side, county road on the south side.

Adjacent fuels: Native mixed prairie and the village of Browington on the west. Private wooded property on the south. Lake on the north and east

PROJECT RESOURCES
Prescribed Fire Burn Boss: Jason Hurley
Crew size: Four + (4)
Ignition/holding crew(s): 2 crews with 2 members on each crew

Suppression crew(s): none		
Other crew members: Mop-up will be done by the same crews after the unit is burned.		
Hand equipment:	Number	Assignment
Drip torches	2	Hurley, Smith
Backpack pumps	2	Cordrey, Abdoler
Swatters	0	
Broom rakes	4	Hurley, Smith, Cordrey, Abdloer
Chainsaws	1	Smith
Backpack blowers	2	Hurley, Smith
Weather kit or Kestral	1	Hurley
Other:		
Mechanized equipment:	Number	Assignment
ATVs	0	
Tractor/Gator	1	Hurley, Smith
Pickup with water unit	1	Hurley
Dozer	0	
ATV water unit	2	Abdoler, Cordrey
Pulled water unit	0	
Other:		
Other equipment:	Number	Assignment
Matches	Each crew member	Hurley
Portable radios	Each crew member	Hurley
Blower fuel	2 gal.	Hurley
Drip torch fuel	15 gal.	Hurley
Bolt cutters	1	Hurley
Pliers	4	Hurley, Smith, Cordrey, Abdoler
Drinking water	3 gal.	Hurley
Food	0	
Compass	1	Hurley
Aerial photos, maps, topos	2	Hurley
First aid kits	1	Hurley
Cell phone	1	Hurley
Other:		

LOGISTICS

Weather monitoring: Forecast day before planned burn. On-site weather just prior to ignition.

Public notifications:

VFDs: Deepwater (660) 696-2722
Henry County Sheriffs Department (660) 885-5587
MDC –Camdenton Forestry Dispatch (573)346-2210 Pat x221
Other adjacent land oweners

Ignition plan (attach map): Ignition will begin at point "A to B" to establish a black line. Crew 1 will fire towards "C" and crew 2 will fire towards "B" meeting in the middle. Upon Completion of field 1 move to field 2 and begin fire at point "B to E" to establish a black line. Crew 1 will run fire from "E to F"

Contingency plans:
Fire out of prescription: After fire is ignited, crews will adjust to weather changes as necessary
Minor escapes (spotovers): Holding crews will handle spot fires.
Moderates escapes: Firing crews will be notified of the escape. Further ignition will cease. Firing crews, as needed, will assist holding crews to extinguish the escaped fire.
Major escape: Ignition will cease. One member from each firing crew will serve as holding crew for the prescribed burn. The remaining burn crew will take action to suppress the escaped fire. Back-up resources will be notified and measures will be taken to contain the fire within the Dept. area.

BURN PLAN REVIEW AND APPROVAL

Low risk assessment (value 8-13) – Operations Manager or Park Manager

Signature: Date:

Moderate risk assessment (value 14-22) – Operations Manager or Park Manager

Signature: Date:

High risk assessment (value 23+) – Operations Manager or Park Manager

Signature: Date:

RE-APPROVAL**

I certify that this burn plan is still valid and the risk criteria (new construction, fuels, etc.) have not changed.

RXBB Signature: Date:

I certify that this burn plan is still valid and the risk criteria (new construction, fuels, etc.) have not changed.

RXBB Signature: Date:

I certify that this burn plan is still valid and the risk criteria (new construction, fuels, etc.) have not changed.

RXBB Signature: Date:

I certify that this burn plan is still valid and the risk criteria (new construction, fuels, etc.) have not changed.

RXBB Signature: Date:

** A burn plan may be used for repeat burns of an area without rewrite if the Prescribed Fire Burn Boss certifies that the plan is still valid and none of the risk assessment criteria (such as new construction or developments, fuel type, smoke impacts, etc.) have changed.

DAY OF BURN CHECKLIST

Area/Field, Stand or Unit No.:

Date:

Burn Day Checklist (Go/No Go):
Refer to contents of Burn Plan

______ Notifications made

______ All equipment present and in working order

______ Personnel on site with proper personal protective equipment

______ Personnel briefed on procedures and contingencies

______ Personnel briefed on communications and safety zones

______ Backup resources available

______ Weather within prescription Time: ___________

Wind speed: ___________ Direction: _________

Temperature: ___________ RH: ____________

______ First aid kits fully stocked

Emergency medical services: Nevada Reg. Medical Center 417- 667-3355
Name Phone

I certify that all items on the checklist are "go" for the burn:

____

Prescribed Fire Burn Boss

POST-BURN EVALUATION

Weather

Pre-burn

Time: ____________

Temperature: ____________

Relative humidity: ____________

Windspeed: ____________

Direction: ____________

Post-burn

Time: ____________

Temperature: ____________

Relative humidity: ____________

Windspeed: ____________

Direction: ____________

Fire behavior

Rate-of-spread: ____________

Flame lengths: ____________

Circumstances of any erratic fire behavior:

Smoke dispersal during burn:

Percent of area burned:

Amount of fuel consumed:

Any public interest during burn – pro or con:

RISK ASSESSMENT AND REVIEW LEVEL WORKSHEET

Record score for each criterion, total numerical value, refer to chart to determine review level, attach worksheet to burn plan, initiate review process.

Assessment prepared by: Jason Hurley (Name) 11-9-06 (Date)

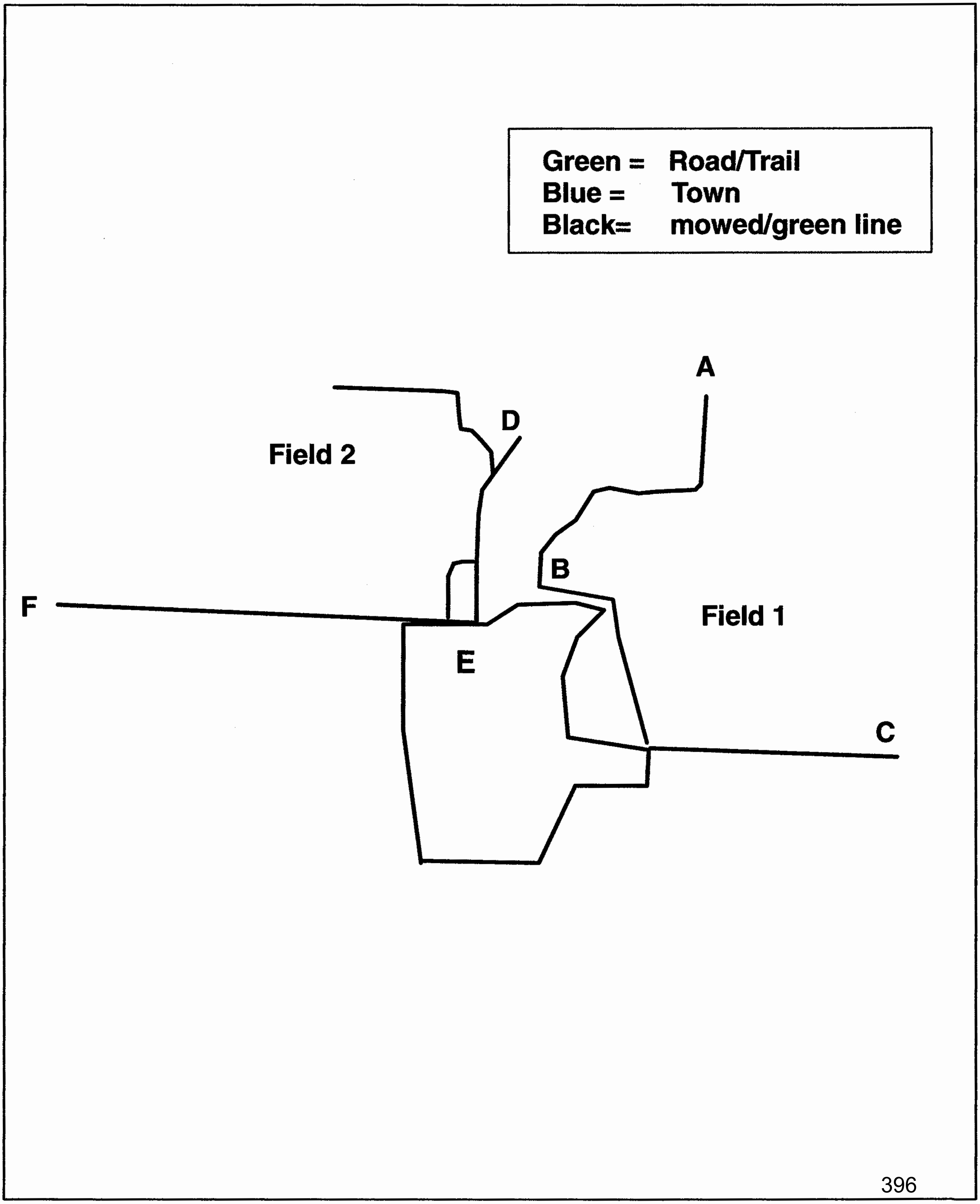
for: Browington Swithcgrass LU D-15/16 (Area) 160 (Burn Acres)

ASSESSMENT CRITERIA	VALUE 1	2	3	4	Score
FUEL TYPE (Based on BEHAVE fuel models. Select the fuel type with the highest value)	Herbaceous or herbaceous dominated, Models 1-3	Old field or shrub dominated, Models 4-7	Timber litter; branches and leaves, Models 8-10	Slash, Models 11-13	1
SIZE OF BURN AREA* (acres)	≤ 80 ac.	81-160 ac.	161-320 ac.	>320 ac.	2
ESCAPE POTENTIAL	No adjacent fuel	Adjacent fuel with low ignition probability	Adjacent fuel with moderate ignition probability	Adjacent fuel with high ignition probability	3
ADJOINING HAZARDS	No adjoining private land or high value resources	Adjoining private land, but no high value resources	High value developments within 1/4-1/2 mile	High value developments within 1/4 mile	3
TOPOGRAPHY	Topography flat to gently rolling, 0-10% slopes	Topography gentle to moderate, 11-20% slopes	Topography moderate to severe, 21-30% slopes	Topography severe, slopes often >30%	1
POTENTIAL IMPACT OF SMOKE ON TRAFFIC	No impact	1/4-1/2 mile from secondary roads	<1/2 mile from major highway or <1/4 mile from secondary roads	<1/4 mile from major highway	2
IMPACT OF SMOKE ON RESIDENTIAL, INDUSTRIAL OR HIGH PUBLIC USE AREAS*	No impact	Isolated residences. Low public use.	Small rural community or groups of dwellings. Moderate public use	Large residential area or industrial site. High public use.	3
PLANNING	Approved area plan with site specific burn objectives; OR previously approved burn unit; OR private land with approved burn plan**	Area plan approved or in progress. Burning identified as an approved management practice.	Area plan approved or in progress. Burning not mentioned as an approved management practice.	No area plan approved or in progress	1
				Total Assessment Value	15

REQUIRED REVIEW AND APPROVAL

Low Risk: Assessment Value 8-13
Moderate Risk: Assessment Value 14-22
High Risk: Assessment Value >22

LU D-15/16
Burn Map



US ARMY CORPS OF ENGINEERS
CLARENCE CANNON DAM & MARK TWAIN LAKE

PRESCRIBED BURN PLAN

LANDOWNER/OPERATOR__Mark Twain Lake____________ DATE: ____________
ACRES TO BURN__________ PLANNED DATE FOR BURN____________________
LOCATION: COMPARTMENT NO.____ TRACT NO.____ FIELD NO. ____________
TOWNSHIP__________ RANGE________ SECTION____________________

A. DESCRIPTION OF BURN AREA:

1. Land Use:____

2. Vegetation Cover

a. Primary Vegetation Composition: (Check One)

- ❑ Warm Season Grass
- ❑ Cool Season Grass
- ❑ Warm/Cool Season Grass Mix
- ❑ Successional Field
- ❑ Forest
- ❑ Other ______________

b. Woody Plants:

Species	Size	Plants/Acre

c. Herbaceous Plants:

Species	Cured	Green	
Cool Season Grass			
Warm Season Grass			
Broad Leaf Plants			

3. Slope:__________ Aspect:__________ Soil Type:____________________

B. OBJECTIVE AND TIMING OF BURN:

Control Woody Plants____(Full Leaf)
Stimulate WS Grass____(1-3" WSG)
Reduce CS Grass____(1-3" WSG)
Reduce Wildfire Hazard____(1-3" WSG)

Improve Wildlife Habitat____(1-3" WSG)
Remove Litter____(1-3")
Stimulate Forbs____(Before Forbs Grow)
Other: ____________________

____

C. SPECIFIED CONDITIONS FOR DAY OF BURN:

1. Air Temperature __50__ to __80 F__ .
2. Relative Humidity __25%__ to __50%__ .
3. Wind - Direction _____ Speed __5__ to __20__ .
4. Soil Damp to Touch at Time of Burn.
5. Ignition Plan (see burn plan map).
   A. Starting Time ____ AM or PM (Avoid mid-day burns if possible).
   B. Method(s) of Firing ______________________________

______________ ______________________________

____

D. PREPARATION OF AREA FOR BURNING:

1. Firebreak Construction: (Show on Burn Plan Map.)

	Width	Length	Date		Width	Length	Date
Plowed	______	______	______	Cool Season Grass	______	______	______ ______
Disked	______	______	______	Burned	______	______	______
Mowed	______	______	______ ______ ______				

2. Existing Firebreaks: (Show on Burn Plan Map.)
   Describe:______________________________

3. Snag Felling Necessary: Yes _____ No _____ (Show on Map.)

4. Potential Hazardous Areas: (Show on Map.) (Show Protection Plan.)
   Describe:______________________________

E. ADJACENT AREAS:
Special Precaution Areas (Show on Map):

F. TOOLS/EQUIPMENT NEEDED: 200 gallon pumper, 50 gallon pumper on Gator, Blowers, Handtools, (See Attached List).

G. MANPOWER NEEDS:
4 Corps crew members.

H. SPECIAL PRECAUTIONS TO PREVENT FIRE ESCAPE: Secure back fire line, check for spot-over, constant communications.

I. SUPPRESSION PLAN IF FIRE ESCAPES: 1-2 crew members stay with prescribed burn (stop ignition), the remaining members suppress spotover.

J. PATROL AND MOP UP PLAN: Extinguish all hot spots, Secure fireline, Check for spot-overs.

U.S. ARMY CORPS OF ENGINEERS
CLARENCE CANNON DAM &
MARK TWAIN LAKE

Area Number (Name)________________
Field No.(s). ________________
Tract No. ________________
Compartment No. ________________

Prescribed Burn Plan

K. Pre-Burn Checklist:

1. Weather forecast ______________________________
   (National Weather Service 660-447-1887)
2. Necessary Firebreaks Constructed ______________________________
3. Tools/Equipment/Manpower Ready ______________________________
4. Notifications: (The following numbers should be called and informed of planned burning operations and locations. Certain numbers can be excluded depending on burn location).

PHONE NOS. CONTACT			CONTACTED	UNABLE TO CONTACT
________	Monroe County Sheriff (Contact Monroe County 911 Dispatch)	(660) 327-5175	________	________
________	Ralls County Sheriff	(573) 985-5611	________	________
________	Monroe City Rural Fire Dept (Contact Monroe County 911 Dispatch)	(573) 735-4431	________	________
________	Paris City Fire Department (Contact Monroe County 911 Dispatch)	(660) 327-5175	________	________
________	Perry Rural Fire Association	(573) 565-3300	________	________
________	Indian Creek Fee Booth	(573) 735-4672	________	________
________	Ray Behrens Fee Booth	(573) 565-3408	________	________
________	Indian Creek Marina	(573) 735-4075	________	________
________	Blackjack Marina	(573) 565-2233	________	________
________	Department of Natural Resources Mark Twain State Park Superintendent Charles Hess	(573) 565-3440	________	________

Adjacent landowners
(adjacent landowners shall be identified and notified prior to burning).

________	________________	( )________	________	________
________	________________	( )________	________	________
________	________________	( )________	________	________
________	________________	( )________	________	________
________	________________	( )________	________	________

U.S.ARMY CORPS OF ENGINEERS
CLARENCE CANNON DAM &

MARK TWAIN LAKE

Prescribed Burn Plan Prepared By:

Park Ranger

Date

Concurrence and Recommended Implementation of the Prescribed Burn Plan:

Natural Resource Program Leader

Date

POST BURN EVALUATION

COMPARTMENT NO. ______________________________ DATE OF BURN ____________________
ACRES BURNED _______ TRACT NO. ________________ FIELD NO. _________________________
TOWNSHIP_________ RANGE_________ SECTION_______________________

EVALUATION - DATE OF BURN

1. WEATHER FORECAST: Temp._____ Humidity _____ Wind - Speed _____ Direction __________
   Sunny/Partly Cloudy/Cloudy-Weather Fronts or Changes ____________

2. ACTUAL WEATHER AT BURN: Temp. _____ Humidity _____ Wind-Speed _____ Direction _____
   Sunny/Partly Cloudy/Cloudy-Weather Fronts or Changes ______________________________

3. BURNING METHOD:____

4. FIRE BEHAVIOR: (Circle One)
   a. Spotting (none/few/many)
   b. Difficulty in Control (yes/no)
   c. Convection Column (yes/no)
   d. Fire Whirls (yes/no)

Comments:____
____

5. OBJECTIVE ACCOMPLISHMENTS:
____
____
____

6. POST BURN MANAGEMENT PLAN: LAND USE ___________________________________
   Planned Treatment: ____
   Est. Need for Future Burn:____
___

7. REMARKS:
____
____

EVALUATION BY ___________________________ DATE:____________________________

FOLLOW-UP EVALUATION

(60-90 days after burn)

1. Objective Accomplishment:
____
____
____

2. Post Burn Management Plan: Land Use:____
   Planned Treatment:____
   Estimated Need for Future Burn:____

3. Remarks:
____
____
____
____

EVALUATION BY ___________________________ DATE :______________________________

BURN PLAN
CLEARWATER LAKE PROJECT

Area/Unit: Clearwater Lake, River Road Right Bank Board Walk

Prepared By: Jason Wilson
Date: 6-7-06

Legal Description: (with map) T28N, R3E, S5 & 6

Acreage: 4 acre

Site Description: Board walk has been pushed into piles and needs to be burned in order for new walk to be built.

Fire Sensitive Areas: none

Smoke Sensitive Areas: River Road Park north of burn site.

Fire Lines: Blown trail, Black River.

Adjacent Fuels: Timber

Burn Objectives: Debris removal site prep.

Prescription:

Preferred Timing- Early morning, June-July
Desired behavior- ring headfire

	Range	Ideal
Temperature	30-95	65-80
Relative Humidity	25-65	40
Wind Direction	variable	South

Project Resources:

Crew Size: 4

Burn Boss: Jason Wilson

Ignition/Holding Crew(s): 2

Suppression Crew(s):

Equipment:

Hand Equipment

Needed(x)		Number
X	drip torch	2
	backpack pump	
	swatters	
X	fire rakes	4
	bow rakes	
	chainsaw	
X	backpack blower	1
	Other (list)	

Mechanized Equipment

Needed(x)		Number
	ATV	
	tractor	
	pickup w/ water unit	
	dozer	
	ATV water unit	
	pulled water unit	
	Other(list)	

Other Equipment

Needed		Number
X	matches	2
X	portable radios	6
X	blower fuel	
X	drip torch fuel	
	bolt cutters	
	pliers	
X	drinking water	
	food	
	compass	
X	area maps, topos	
	Other(list)	

Weather Monitoring: Missouri Department of Conservation, Clearwater forestry prior to burn

Public Notifications: MDC Forestry, Sheriff

Burn Plan Review/Approval (Name, Title, Date):

Operations Manager

Project Branch Chief, Resource/Recreation

District Forester (if required)

Little Rock District
U. S. Army Corps of Engineers
P. O. Box 867
Little Rock, Arkansas 72203-0867

Regulation
No. 1130-2-32

Project Operations
Project Fire Management

1. Purpose. The purpose of this regulation is to provide guidelines to Little Rock District project managers and employees in fire management operations, including prescribed burning, and preparing and responding to wildfire situations. The regulation is intended to be flexible; therefore, of value to all projects, and to provide the necessary foundation to establish standards for all fire management operations.

2. Applicability. This memorandum is to be implemented at all Corps of Engineers water resource development projects in the Little Rock District.

3. References.

a. ER 1130-2-540, Project Operations, Environmental Stewardship Operations and Maintenance Policies dated 15 November 1996.

b. National Wildfire Coordinating Group. 1993. National Interagency Incident Management System, Wildland Fire Qualification Guide 310-1.

c. National Wildfire Coordinating Group. 2000.Wildfire and Prescribed Fire Qualification System Guide, National Wildfire Coordinating Group, Incident Operations Standards Working Team

4. Public Safety. If a wildfire threat is considered eminent, potential impacts on public safety should immediately be evaluated. It is imperative that no communication be taken for granted in notifying the visiting public related to the danger from fire and keeping resident and project office personnel informed. An immediate communication should be opened between the park ranger or park attendant nearest the fire and resident or project office to insure that there is an appropriate first response and that future decisions related to extinguishing the fire can be based on the most accurate information. Local law enforcement and fire fighting response agencies

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This regulation suspersedes SWLOM 1130-2-32 dated 4 March 1991.

should be kept informed. Project Managers or their counterparts may authorize evacuations for Public Safety. In the event evacuation is deemed necessary, the evacuation needs to be orderly. Instructions should be simple, clearly stated, and easily understood. Project Offices and Gate Shacks should have emergency phone numbers and a prior action plan established in the event of wildfires. All new employees and gate attendants should be briefed, and action plans should be routinely discussed and re-evaluated during employee safety meetings prior to recreation seasons and/or high fire danger periods, and with gate attendants during pre-work conferences. Burn Bans and posted notices during periods of high fire danger, notifications in local papers, coordination with local governments and other appropriate restrictions are some methods by which projects may control the danger of wildfires in public use area. Periodic fuels reduction prescribed burns during the off season are useful in controlling hazardous fuel levels, but should be accomplished in conjunction with written prescribed burn plans, professional fire crews, and coordinated with appropriate agencies.

5. Local Flexibility. Operations Managers may develop a fully trained and qualified project fire management force at project locations if the program is based on the training and certification requirements established in the Wildland Fire Qualifications Subsystem Guide 310-1, Parts one and two, prepared by the National Wildfire Coordinating Group (NWCG). Compliance with training and certification requirements will be the responsibility of the Operations Manager or his designated evaluator. The project would act as the Home Unit for deployment, if applicable. Projects that would not benefit from this level of operation may elect to develop OMP fire protection plans that depend on local agency agreements solely or in part.

6. Employee Safety. Local initiative may be the most effective in determining how much training is needed, how much is available, from whom, and which employees need it. However, all individuals who will be actively engaged in support of prescribed burning activities must receive, at a minimum, training comparable to the standard fire fighting training: S-110, Basic Fire Suppression; S-130, Basic Fire; and I-100, Incident Command System Orientation. This training is also recommended for individuals who might be first responders to wildfire situations. All Employees confronted with wildfire situations may, of necessity, participate in evacuation, dispatch, or other indirect duties when the situation merits. However, only adequately trained and physically fit personnel, as referenced under employee fitness, are recommended to engage in extinguishing a wildfire situation other than those considered easily extinguishable and unthreatening. Appropriate training may be coordinated through the District Forester, or through the Arkansas-Oklahoma interagency Coordinating Center, (www.fs.fed.us/oonf/fire/index.html).

7. Employee Fitness. Any individual who will be actively engaged in conducting prescribed burning must enroll in the project office medical surveillance program, and receive a doctor's physical and clearance to be able to perform arduous, moderate, or light physical exercise depending on the individual's fitness level. Through proper planning, prescribed fires should not exceed moderate intensity. The individual along with the doctor will be responsible for assessing the individual's abilities with respect to fitness level and individuals generally should

govern the extent and pace of their physical activity. The individual will arrange for appropriate duty through the Operations Manager. Operation's Managers may elect to appoint a project contact person to act in this capacity. Project personnel designated to coordinate Fire Management requirements or evaluate fire training needs should receive advanced fire management training, and have a thorough knowledge of fire management and qualifications established under the 1999 Wildland and Prescribed Fire Qualification System PMS 310-1, established by the National Wildfire Coordinating Group (www.fed.us/fire/310-1/)

8. Equipment, Vehicles, and Personal Protective Equipment. In times of high fire danger, backpack sprayers and flappers should be carried in each ranger and inspection vehicle. Individuals with the proper equipment can extinguish small fires with quick action. Other equipment should be readily available at the resident or project office. In no case should vehicles be parked in an area where there is the possibility that heat, sparks, or fire could damage or cause combustible parts to burn. On projects where the potential for threats from wildfire are considered high, and/or local response may be delayed, adequate first response equipment such as backpack sprayers or small vehicle mounted pumpers are recommended. All equipment and tools should be inventoried, serviced, and readied annually and when local fire danger becomes high. Employees directly involved in fire management activities will use the proper personal protective equipment (PPE) as recommended in the safety manual. However, steel toe shoes will be discretionary to the individual per the recommendations under the National Wildfire Coordinating Group.

9. Fire Fighting Agreements. To accomplish wildland fire management for prescribed burn and fire control, the projects may enter into reciprocal agreements with appropriate public organizations or agencies. Such agreements may provide for re-imbursement of any or all costs incurred in performing wildland fire management actions on Corps lands for prescribed burn and fire management activities. Such agreements should include a waiver from claims for compensation (typically reciprocal) of any loss, damage, personal injury, or death resulting in the performance of the agreement. Operations Managers are encouraged to accomplish wildland fire management through reciprocal agreements and/or appropriately trained and equipped personnel. Fire Management requires close and continuous coordination with other resource management and fire control agencies to ensure mutual understanding of respective levels of responsibility and reciprocity.

10. Fire Reports. Appendix A is a check-off fire reporting form (SWL 423) and Appendix B is a sample Prescribed Burn Plan. SWL Form 423 will provide an informational document when hired labor or local fire departments or districts are called to respond to fires on the project. Appendix 2, the Arkansas Forestry Commission's Prescribed Burn Plan standard form will provide an informational document for developing prescribed burn plans provided project personnel have the appropriate training and authority. These forms are examples to be used and may be modified for individual project use. Completed forms will be maintained at the Resident or Project Office. The district Forester should also be notified of fire management activities to facilitate any public inquiries. When park facilities are damaged by fire, a memorandum will be

drafted detailing the extent of the fire, the estimated amount of damages, and an estimate of the time that the facility will be lost to the public.

Appendix (2)
1. Appendix A, Fire Fighting and Response
2. Appendix B, Prescribed Burn Plan

BENJAMIN H. BUTLER
Colonel, Corps of Engineers
Commanding

Distribution: F

APPENDIX A

LITTLE ROCK DISTRICT
FIRE FIGHTING AND RESPONSE

1. PROJECT:

2. DATE: ____

3. TIME OF NOTIFICATION: ______________________________

4. LOCATION: ____
____

5. CAUSE OF FIRE: ______________________________________

6. TYPE OF RESPONSE: ___________________________________
____

7. PERSONNEL INVOLVED (CORPS AND OTHER): ________________
____

8. EQUIPMENT USED (CORPS AND OTHER): ___________________
____

9. EXTENT OF LOSS: _____________________________________

10. PRIVATE PROPERTY LOSS: _______________________________
____

11. TIME EXTINGUISHED THE FIRE: ___________________________

12. ESTIMATED ACREAGE BURNED: ____________________________

13. RELATED INJURIES AND/OR DEATHS: ________________________

14. INDIVIDUAL MAKING REPORT: _____________________________

APPENDIX B

ARKANSAS FORESTRY COMMISSION
PRESCRIBED BURN PLAN

1. **UNIT INFORMATION**
   Landowner's name and phone#: ______
   Tract size (acres): ______
   Location (S/T/R): ______
   County: ______

2. **OFFICIAL NOTIFICATION BEFORE BURN**
   AFC Dispatch: ______
   Sheriffs: ______
   FireDept.: ______

3. **NEIGHBOR NOTIFICATIONS (within ¼ mile)**
   Name & Phone: ______
   Name&Phone: ______
   Name&Phone: ______
   Name&Phone: ______
   Name&Phone: ______

4. **PRESCRIBED BURN OBJECTIVE**

- ☐ Natural Regeneration site prep
- ☐ Artificial Regeneration site prep
- ☐ Windrows
- ☐ Slash

- [ ] Other(define)____________________
- [ ] Undesirable Species
- [ ] Hazard Reduction
- [ ] Wildlife Habitat

Other burn objectives:____________________

PREPARED	APPROVED
Burn Boss:__________	Supervisor__________
Date:__________	Date:__________

5. **MANAGING THE BURN (Describe how each of the following will be addressed)**

Fireline preparation:____________________

Firing Techniques:____________________

Fire sensitive areas (adjacent young pine plantations, buildings, etc.): ____________________

____

____

____

Smoke sensitive areas (smoke screening map prepared on topographic and/or county road that will identify roads, drainages, and residences): ____________________

____

____

____

____

Contingencies (include safety zone, escape routes, escape response procedures): ____________________

____

____

____

____

____

BURNING ASSIGNMENTS

Burn Boss: ____________________

INSTRUCTIONS TO IGNITION PERSONNEL

Ignition Person	Instructions

1) ____________________

____

____

2) ____________________

____

____

DIVISION ASSIGNMENT

Division A

Crew Member ______________ Assignment

____

____

Division B

Crew Member ______________ Assignment

____

____

Division C

Crew Member ______________ Assignment

____

____

Division D

Crew Member ______________ Assignment

____

____

Division E

Crew Member ______________ Assignment

____

____

SPECIAL ASSIGNMENT

Crew Member ______________________ Division Location & Assignment ______________________

______________________ ______________________

EQUIPMENT ASSIGNMENT BY DIVISION

	A	B	C	D	E	F	BB	IP	SA
PPE									
Plow Unit									
Torch									
Rakes									
Fuel									
Water									
Food									
Radios									
Extra Radio Battery									
ATV									
Chainsaw									
First Aid Kit									
Other									

Provide for the prescribed burn crew a map with physical and topographic features and division assignment boundaries. Designate safety zones, drop points, and what equipment and materials are located at these drop points.

BURN DAY CHECKLIST

Date of Burn:____________

Parameters	Recommended Do Not Burn Conditions	Recommended Range	Forecasted Weather Conditions
Date of Burn			
Air Temp (°F)			
Relative Humidity (°/°)	<or = 25%		
Prob. Of Ignition	>or = 80%		
Windspeed			
Wind Direction			
Smoke Category Day	1 or 5		

CHECK (✔) AND BURN ONLY IF ALL ITEMS ARE ADDRESSED:

- ☐ Burning assignments
- ☐ Map for crew
- ☐ Extra precautions for fire sensitive areas
- ☐ Smoke sensitive areas not threatened
- ☐ Official notifications made
- ☐ Neighbor notifications made
- ☐ Personal Protective Equipment in use
- ☐ Transport truck(s) and other equipment in a safe area
- ☐ Fireline width adequate
- ☐ Forecasted temperature within recommended range
- ☐ Forecasted relative humidity > 25%
- ☐ Forecasted probability of ignition < 80%
- ☐ Forecasted mid flame wind speed within recommended range
- ☐ Forecasted wind direction as recommended
- ☐ Forecasted smoke Category day 2, 3, or 4

Hourly Belt Weather Recording During the Burn

	1	2	3	4	5	6	7	8
Temp								
RH								
Wind speed								
Wind direction								

PRESCRIBED BURN PLAN

LANDOWNER: U.S.A.C.E. WAPPAPELLO LAKE DATE: 11-1-05

NAME OF AREA: Bounds Crk

DATES FOR BURN: Feb-Mar ACTUAL BURN DATE: ____________

LEGAL DESCRIPTION: TOWNSHIP 29 RANGE 5 SECTION 26

LAND USE: old field

VALUE

ASSESMENT CRITERIA

	1	2	3	4	Score
FUEL TYPE	Herbaceous or Herbaceous Dominated	Old field or Shrub dominated	Timber litter-Branches and leaves	Slash	2
SIZE OF BURN AREA (acres)	0-10	10-20	20-30	>30	4
ESCAPE POTENTIAL	No adjacent Fuel.	Adjacent fuel W/low ignition Probability	Adjacent fuel W/moderate Ignition Probability	Adjacent fuel W/high ignition Probability	3
ADJOINING HAZARDS	No adjoining Private land or High value Resources	Adjoining Private land But no high Value resources	High value Developments In ¼ to ½ mi.	High value Developments In < ¼ mi.	1
TOPOGRAPHY	Flat to gently Rolling, < 5%	Gentle to Moderate 5-10%	Moderate To severe 11-30%	Severe slopes Often >30	2
POTENTIAL IMPACT OF SMOKE ON TRAFFIC	No impact	¼ - ½ mi. from secondary roads	< ½ mi. from major highway or < ¼ mi. from secondary roads	<1/4 mi. from major highway	4
IMPACT OF SMOKE ON RESIDENTIAL, INDUSTRIAL OR HIGH PUBLIC USE AREAS	No impact	Isolated residences, low public use	Small rural community, Moderate public use	Large residential area industrial site high public use	3

PRESCRIPTION:

Desired fire behavior: Ring fire reduce woody vegetation

Desired temperature: 50°/70° Desired humidity: 25%-50%

Desired wind direction: S

417

Fire line construction: Dozer/Roads

Note: All fire lines will be rechecked prior to ignition.

Ignition method(s): Back burn along Roads - Ring

Note: See burn plan map.

PROJECT RESOURCES:

Crew size: 8

Burn Boss James

Ignition crew 2

Suppression crew 6

Smoke spotters State Modot

Note: smoke spotters do not have to be fire team members.

Hand Equipment:

Needed

X Drip torches
___ Backpack pumps
X Rakes
___ Chainsaws
X Backpack blowers
X Flappers

Mechanized Equipment:

Needed

X Mule w/ water unit
___ Tractor w/ disk
X Pickup w/ water unit
X Dozer

WEATHER MONITORING: National weather service, weather station, onsite temperature, humidity, wind speed and directions. NWS 447-1887

PUBLIC NOTFICATIONS:

City of Greenville

Adjacent Landowners	
Missouri Department of conservation	223-4525
U.S. Forest Service	785-1475
Wayne County Sheriff	224-3219
Butler County Sheriff	785-8444
Wappapello Fire Department	222-8342
Greenville Fire Department	224-3221
Chaonia Fire Department	297-3206
Patterson Community Fire Department	856-4974

MoDOT - Silva

BURN PLAN
PREPARED BY: ______________ DATE: 11-1-05

CHECKED BY: ______________ DATE: 11/7/05
NATURAL RESOURCES SPECIALIST

APPROVED BY: ______________ DATE: 11/9/05
OPERATIONS MANAGER or
ASSISTANT OPERATIONS MANAGER

QQ_B_GREENVILLE_MO_SW_

Bounds Creek

Scale 1:6068

MrSID GEOVIEWER
WINDOWS 95/98/2000/NT

420

4.8 Missouri Department of Conservation Burn Plan

INSTRUCTIONS
MDC BURN PLAN

Following are specific instructions for completing each section of the MDC burn plan:

PROJECT DESCRIPTION

Area/Field, Stand or Unit No.:	Place all designations here as to area, management unit, field or stand number, project designation, landowner, etc. Multiple small fields or stands in close proximity to each other with similar management objectives and fuel types may be lumped together on one burn plan.
Prepared by:	Name of the person who actually completed the burn plan even if completed by Prescribed Fire Planner.
Date:	Date the plan was prepared.
RXBB signature:	Certified Prescribed Fire Burn Boss who has reviewed the plan and area to be burned and accepts responsibility for the plan being complete and accurate.
Date:	Date the plan signed by the Prescribed Fire Burn Boss.
Location:	List the legal description (section, township, range) or latitude and longitude of the burn location. Provide map(s) that illustrate topography, county roads, project boundaries, vegetative cover and ignition plan.
Acreage:	List the acres within the planned burn area boundary.
Site description:	List the plant communities and estimate proportions of each (i.e., 20% prairie, 40% savannah, 40% idled cropfield). List the fuels – type and estimated tonnage using NRCS estimators for forage grasses. For other fuels, estimate amount (light, moderate, heavy). List the terrain slopes and aspects if they are expected to be a factor in the resulting fire behavior or fire effects.
Sensitive areas:	List any areas or ownerships that may be sensitive to a prescribed fire or the smoke. Include areas such as: houses/structures, towns/cities, airports, landowners that need special attention, roads/highways. Also include any areas within the burn unit that will require special attention, i.e., powerlines, wet areas near roads and trails, concentrations of snags or high fuel loads near the boundary. If there are any streams with permanent flow or permanent pools, be sure to note them and secure the Fisheries Regional Supervisor's approval. Burn plans that include Natural Areas must be reviewed by the Natural History Biologist.
Risk Assessment Value:	List the risk assessment value (8-32) from the Risk Assessment and Review Level Worksheet. Attach a copy of the worksheet to the plan.

PRESCRIPTION

Burn objectives:	The stated objectives for the burn need to be clear and quantifiable so the project can be evaluated for success or if planned management needs to be altered. "Burn it to see what happens" isn't quantifiable. Even if you are interested in evaluating the results of "returning fire to its

natural role in the ecosystem," you have a general idea of what the impacts will be. List those impacts quantifiably. For example, amount of litter removed, type or amount of herbaceous vegetation encouraged, species/sizes/percents of woody species removed. Select your desired conditions, write the objectives and then evaluate the burn to see if either your expectations or the management program need to be modified.

Preferred timing:	List the calendar dates and any phenologic (plant development) indicators such as: April 1 desired but within March 15-April 15 period. Prefer dogwood leaves to be size of squirrel's ear, or bluestems with 1-3" of new growth. NOTE: Plant development indicators are optional.
Desired fire behavior:	Fire behavior needed to achieve your objectives: hot or cool, head or backing fire, flame length if known, amount of fuel consumed or percent of area burned.
Conditions needed:	List the range of acceptable temperatures, relative humidities, fuel moistures, mid-flame wind speeds (eye-level winds) and wind directions that will give you the desired fire behavior and then list the "ideal" or best set of conditions, if you could pick them exactly. Fire behavior parameters will be required using BEHAVE PLUS fire behavior modeling software. You can determine the 1- and 10-hour fuel moisture for your burns using the basic guidelines provided during the Level 3 training and then verify them by taking on-site weather before the burn.
BEHAVE run results:	Preparers of the burn plan should model the expected fire behavior for both the headfire and backfire and record the visual estimates of the fire behavior in the post-burn evaluation portion of the plan. BEHAVE PLUS will give you estimated rates of spread, flame length, heat/ft^2 and fireline intensity. Each of these factors influences the effectiveness of the burn and the staff/equipment needs on the fireline. Use these expected parameters to determine how the fire should behave. Also make a BEHAVE PLUS run on any adjacent fuel that may create a problem in case of an escape. This allows you to plan contingencies should an escape occur.
Smoke Management	
Desired atmospheric conditions:	Most burns will be conducted under unstable atmospheric conditions to get maximum lift of the smoke. Unstable atmospheres are typically present on clear to partly cloudy days. Cloudy to overcast days are typically stable conditions and smoke will not rise or dissipate. The plan should contain minimum atmospheric conditions of mixing heights greater than 1650 feet and ventilation rates in excess of 6000 cubic meters per second. These figures are calculated by the weather forecasters and should be available on the twice daily forecasts. These criteria will provide for good smoke rise and mixing with the atmosphere. These are not requirements for all burns, especially if smoke will not be a problem such as in rural areas with few roads or houses or in the deep Ozarks where there are extensive public ownerships and smoke management concerns are negligible.
Air quality:	List any air quality restrictions from DNR air quality standards, city or county ordinances, etc.

Firelines:	List the approximate lengths and types of firebreaks, including natural breaks. Note the timing of firebreak establishment and any follow-up firebreak inspections close to or on the day of the burn.
Adjacent fuels:	List adjacent fuels around the project area and make note of any with a high potential for problems in the event of an escape. BEHAVE PLUS estimates of fire behavior in these fuels, though not mandatory, will provide you expected fire activity should you experience an escape.

PROJECT RESOURCES

Prescribed Fire Burn Boss:	List the certified Prescribed Fire Burn Boss who will conduct the burn. List multiple names if assignment for the burn will be made at a later date.
Crew size:	Total number of able bodies needed and levels of training, if needed for specialized tasks.
Ignition/holding crews:	Number of crews and number on each crew.
Suppression crews:	Number of crews and number on each crew.
Other crew members:	List other needed personnel for media contact, temporary conservation area road closures, weather recording, go-fors, etc.
Equipment:	Using the list, check those standard items needed and the number to be available. Expand the list under each category to list all of the equipment needed on site before you start your burn. Personal safety gear – hard hats, gloves, boots, etc. – need not be listed as these are required by policy and are the responsibility of anyone working on a fire.

LOGISTICS

Weather monitoring:	List the sources of weather information that will be used and the timing of the weather checks (before, during and after the fire).
Notifications:	List the people or agencies to be contacted and their phone or radio numbers. List may include, but need not be limited to, affected MDC regional and other supervisors, Fire Zone Managers, related agencies, news media, rural fire departments, sheriff, 911 Dispatch and adjacent landowners.
Ignition plan:	Provide a brief narrative of the planned ignition strategy and sequence On map(s) attached to the plan indicate: - Project boundary - Firebreaks by type - Placement of personnel and equipment - Firing sequence including wind direction - Hazards either inside or outside the burn area that may cause a problem with conducting the burn - wet spots, fences without gates, fuel jackpots (brushpiles, patches of dense cover), steep slopes, etc.
NOTE:	All items on the map should be identified in the map legend.
Ignition sequence:	Start ignition = X

Crew Movement = arrows
Crew Designations = numbers (1, 2, 3, etc.)
Map Locations = letters (A, B, C, etc.) references for either ignition progress or crew placement, mark these key points on the ground for positive identification by burn crew members

Contingency plans: What you will do in the event of a problem with the burn?

NOTE: Any fire outside the control line is considered an "escape."

NOTE: Escape routes for personnel should be specified in the event of a major escape or whenever going "into the black" is not sufficient. This is especially important on burns where high fuel loads or terrain make entrapment of personnel more hazardous.

Fire out of prescription: Specify what your actions will be if conditions move outside the prescription after the burn has been ignited. Are there points when the fire will be shut down? Will there be a point where the firing will continue, even if conditions become better or worse than the prescription dictates? Any different actions by crews or backups should the conditions move out of prescription in either direction?

Minor escapes: Minor escapes are "spotovers" or small ignitions outside the control line that can be handled by the ignition and holding crews working that portion of the line.

Moderate escapes: Moderate escapes are fires outside the control line that are beyond the control of the crew on that portion of the line, but that can be contained by the prescribed fire crew on the burn.

Major escape: Major escapes are fires outside the control line that tax the limits of the on-site crew and necessitate calling backup forces or require the use of secondary suppression boundaries. The secondary lines should be specified in this section to facilitate crew movement in the event of a major escape.

BURN PLAN REVIEW AND APPROVAL

Burn plans must receive regional supervisor approval by the individuals specified in the Risk Assessment and Review Level Worksheet. Regional Supervisors must be Incident Commander (IC) or Prescribed Fire Burn Boss (RXBB) qualified to sign. If a Regional Supervisor lacks either of these qualifications, they will select a member of their staff who is qualified as an IC or RXBB to sign on their behalf. All private land burns conducted by MDC personnel must follow the review process for Moderate Risk or High Risk burns based upon the total assessment value.

RE-APPROVAL

A burn plan may be used for repeat burns of an area without rewrite if the Prescribed Fire Burn Boss certifies that the plan is still valid and none of the risk assessment criteria (such as new construction or developments on adjoining land, fuel type or conditions, smoke impacts, etc.) have changed. The Prescribed Fire Burn Boss certifies by way of signing and dating the original plan.

DAY OF BURN CHECKLIST

To be checked off and signed by the Prescribed Fire Burn Boss as a final check that everything is in order before initiating the burn. Insert name and phone number of nearest emergency medical service. Burn Plans that are reused from a previous burn shall have a new Day of Burn Checklist attached and completed.

POST-BURN EVALUATION

To be completed on-site by the Prescribed Fire Burn Boss upon completion of the burn. Weather is to be recorded before ignition and after the firing is completed on small burns. Weather should be checked periodically during large landscape burns. Burn Plans that are reused from a previous burn shall have a new Post-Burn evaluation attached and completed.

NOTE: THE BURN PLAN SHOULD HAVE FOUR DOCUMENTS ATTACHED

- Map(s) that illustrate topography, county roads, project boundaries, vegetative cover and ignition plan
- Risk Assessment and Review Level Worksheet
- Day of Burn Checklist
- Post-Burn Evaluation

Robert Ferris, M.D., F.A.C.O.G.
Lorraine Fincke-Dodson, M.D., F.A.C.O.G.
Allison Huebert, M.D., F.A.C.O.G.

Women's Clinic
OF JEFFERSON CITY, P.C.

Kevin Bredeman, D.O., F.A.C.O.G.
Brian Stephens, M.D., F.A.C.O.G.
Lisa Graessle, Nurse Practitioner

PATIENT REGISTRATION

PLEASE PRINT

Dr. ____________________

Appt. Date ______________

Primary Care Physician ______________________________

Patient Name ____
(Last) (First) (Middle) (Maiden)

Address: ____

City, State, Zip: ____

Home Phone: (____) ______________ Cell Phone: (____) ______________ Patient's Soc. Sec. #_____-____-______ Date of Birth___-___-____

Marital Status: ❐ Single ❐ Married ❐ Divorced ❐ Widowed

Patient's Employer: ______________________________ Address: ______________________________

Work Phone: (____) ____________________ Extensions ______________ Occupation: ____________________

Spouse: ______________________ Cell Phone: (____) ______________ Soc. Sec. #_____-____-______ Date of Birth___-___-____

Spouse's Employer ____ Work Phone: (____) ______________

Contact Person (not living with you)

Name ______________________________________ Relationship ______________________________

Home Phone (____) ________________ Cell Phone: (____) ________________

Please fill out this section if responsible party is other than patient.

Name: ____ Soc. Sec. #_____-____-______

Address: ____

Home Phone Number: (____) ________________ Birthdate: ______________ How Related: ________________

Employer: ____ Work Phone Number: (____) ________________

Authorization

I authorize any holder of medical or other information about me to release to the Social Security Administration and Centers for Medicare and Medicaid Services or its intermediaries or carrier or any other commercial insurance company, any information needed for this or a related claim. I permit a copy of this authorization to be used in place of the original, and request payment of medical insurance benefits to the party who accepts assignment. Relations pertaining to Medicare/Medicaid assignment of benefits apply. I understand that I am financially responsible for all charges not covered by this authorization.

SIGNATURE OF PATIENT OR LEGAL GUARDIAN IF PATIENT IS A MINOR:

X ____ Date __________________________

MISSOURI DEPARTMENT OF CONSERVATION

PRESCRIBED BURN PLAN

PROJECT DESCRIPTION	
Area/Field, Stand or Unit No.:	
Prepared by:	**Date:**
RX Burn Boss approval:	**Date:**
Location description (attach map):	
Acreage:	
Site description:	
Sensitive areas:	
Risk Assessment Value (attach Risk Assessment Worksheet):	

PRESCRIPTION			
Burn objectives:			
Preferred timing:			
Desired fire behavior:			
Conditions needed:		Range	Ideal
	Temperature		
	Relative humidity		
	1 hr. fuel moisture		
	10 hr. fuel moisture		
	Midflame windspeed		
	Wind direction		

BEHAVE run results:			
Burn area fuel model(s):			Adjacent area fuel model(s):
	Head	Back	Head
Rate of spread (ch/hr or ft/min)			
Heat/unit area (BTU/ft^2)			
Fireline intensity (BTU/ft/sec)			
Flame length (ft)			
Smoke management: Desired atmospheric conditions: Mixing height (>1650' recommended): Ventilation rate (>6000 m^3/sec recommended): Air quality restrictions that apply:			
Firelines:			
Adjacent fuels:			

PROJECT RESOURCES		
Prescribed Fire Burn Boss:		
Crew size:		
Ignition/holding crew(s):		
Suppression crew(s):		
Other crew members:		
Hand equipment:	Number	Assignment
Drip torches		
Backpack pumps		
Swatters		
Broom rakes		
Chainsaws		
Backpack blowers		
Belt weather kit or Kestral		
Other:		
Mechanized equipment:	Number	Assignment
ATVs		
Tractor		
Pickup with water unit		
Dozer		
ATV water unit		
Pulled water unit		
Other:		
Other equipment:	Number	Assignment
Matches		
Portable radios		
Blower fuel		
Drip torch fuel		
Bolt cutters		
Pliers		
Drinking water		
Food		
Compass		
Aerial photos, maps, topos		

First aid kits		
Cell phone		
Other:		
Other:		

LOGISTICS

Weather monitoring:

Public notifications:

RFDs:
Law enforcement:
MDC regional office/field offices/fire zone dispatch:
Adjacent landowners:
Other:

Ignition plan (attach map):

Contingency plans:

Fire out of prescription:
Minor escapes (spotovers):
Moderates escapes:
Major escape:

BURN PLAN REVIEW AND APPROVAL

Low risk assessment (value 8-13) – Forestry, Wildlife or Private Land Services Regional Supervisor*

Signature: Date:

Moderate risk assessment (value 14-22) – Forestry and Wildlife or Private Land Services Regional Supervisor

Signature: Date:

Signature: Date:

High risk assessment (value 23+) – Fire Management Coordination Team

Signature: Date:

Fisheries Regional Supervisor approval if riparian zones involved

Signature: Date:

Natural History Biologist approval if Natural Area involved

Signature: Date:

RE-APPROVAL**

I certify that this burn plan is still valid and the risk criteria (new construction, fuels, etc.) have not changed.

RXBB Signature: Date:

I certify that this burn plan is still valid and the risk criteria (new construction, fuels, etc.) have not changed.

RXBB Signature: Date:

I certify that this burn plan is still valid and the risk criteria (new construction, fuels, etc.) have not

changed. RXBB Signature: Date:
I certify that this burn plan is still valid and the risk criteria (new construction, fuels, etc.) have not changed. RXBB Signature: Date:

* Regional Supervisors must be Incident Commander (IC) or Prescribed Fire Burn Boss (RXBB) qualified to sign. If a Regional Supervisor lacks this experience, they will select a member of their staff who is qualified as an IC or RXBB to sign on their behalf.

** A burn plan may be used for repeat burns of an area without rewrite if the Prescribed Fire Burn Boss certifies that the plan is still valid and none of the risk assessment criteria (such as new construction or developments, fuel type, smoke impacts, etc.) have changed.

DAY OF BURN CHECKLIST

Area/Field, Stand or Unit No.:

Date:

Burn Day Checklist (Go/No Go):
Refer to contents of Burn Plan

______ Notifications made

______ All equipment present and in working order

______ Personnel on site with proper personal protective equipment

______ Personnel briefed on procedures and contingencies

______ Personnel briefed on communications and safety zones

______ Backup resources available

______ Weather within prescription Time: ____________

Wind speed: ____________ Direction: ____________

Temperature: ____________ RH: ____________

______ First aid kits fully stocked

Emergency medical services: ____
Name Phone

I certify that all items on the checklist are "go" for the burn:

____
Prescribed Fire Burn Boss

POST-BURN EVALUATION

Weather

Pre-burn
Time: ________________
Temperature: __________
Relative humidity:________
Windspeed: ___________
Direction: _____________

Post-burn
Time: ________________
Temperature: __________
Relative humidity:________
Windspeed: ___________
Direction: _____________

Fire behavior

Rate-of-spread: ________________
Flame lengths: _________________

Circumstances of any erratic fire behavior:

Smoke dispersal during burn:

Percent of area burned:

Amount of fuel consumed:

Any public interest during burn – pro or con:

4.9 Missouri Natural Resources Conservation Service Burn Plan

Part MO413 – Prescribed Burning
Subpart B - Policy

MO413.10 Prescribed Burning.

A. Natural Resources Conservation Service (NRCS) assistance to private landowners in Missouri during the application of prescribed burning is prohibited. Missouri NRCS employees will not be present during prescribed burns on private land.

B. Prescribed burning may be planned by NRCS employees on all land uses to manipulate or manage the vegetation to meet specific resource management objectives. Planning will be in accordance with the National Planning Procedures Handbook, Prescribed Burning (Code 338) practice standard criteria, Section IV, Missouri Field Office Technical Guide, GM 190 – Part 413 Subpart B and this Missouri amendment to national policy.

MO413.11 Training.

A. Missouri NRCS employees who include Prescribed Burning (Code 338) as a practice utilized in the conservation planning process or who anticipate becoming involved with planning Prescribed Burning will be provided with training opportunities necessary to acquire the knowledge and experience required to meet the various levels of Missouri NRCS job approval.

B. It is the employee's responsibility to maintain documentation of training received and a record of experience on form MO A-2, *Request for Prescribed Burning Job Approval.*

C. NRCS employees will only participate in burn training on public lands with a representative of the public land agency on-site. All burn training must be carried out with the supervision of a qualified burn boss from NRCS, Missouri Department of Conservation (MDC), private contractor (e.g. Technical Service Providers) or other approved entity.

D. Under no circumstances shall an NRCS employee, attending training, initiate the burn.

MO413.12 Certification and Authority.

A. The State Conservationist will designate an NRCS employee to be the "State Prescribed Burn Specialist" (SPBS).

B. The SPBS shall have **Prescription (Rx) Burn Planner 2** job approval authority. SPBS duties include: 1) Reviewing requests for job approval authority; 2) Providing consultation to the State Resource Conservationist (SRC) for job approval authorities and other related duties; 3) Coordinating/providing necessary training.

C. Area Conservationists will designate an employee from within their area to be the "Area Prescribed Burn Specialist" (APBS).

D. APBS shall have **Rx Burn Planner 2** job approval authority. APBS duties include: 1) Reviewing area requests for job approval; 2) Maintaining area job approval records; 3) coordinating area job approvals with SPBS; 4) Annually forwarding copies of area summaries of job approvals to State Grassland Conservationist.

E. The following steps outline the process for acquiring NRCS job approval authority for prescribed burning:

(1) The State Resource Conservationist, in consultation with the SPBS, will determine and grant all job approvals and/or changes.

(2) Requests for initial job approval and changes in job approval originate with the employee and are submitted on MO A-2, *"Request for Prescribed Burning Job Approval"* to the APBS.

(3) If the APBS concurs, the original request with a recommended job approval level will be forwarded to the SPBS. If the APBS does not concur, the request is returned to the employee with the reasons for non-concurrence and actions needed before the request is resubmitted.

(4) If the SPBS concurs, the original request will be forwarded to the SRC for approval. After approval, the SPBS will record the information and return the original MO A-2 to the APBS. The APBS will make copies from the original for the files and return the original form to the employee. APBS will record summaries of job approvals on the Burn Job Approval excel spreadsheet and forward the spreadsheet to the State Grassland Conservationist each October. If the SPBS or SRC does not concur, the request will be returned to the APBS with the reason for non-concurrence and actions needed before the request is resubmitted.

(5) After completion of this training approval, employees will maintain a record of prescribed burning activity for each fiscal year on form MO A-2, "Record of Activity" section. The APBS will review this record and at least one burn plan with the employee once every three years.

(6) A request for change in level of job approval will be made by submitting a copy of the original request form with the accumulated record of activity, following steps 1-4 described above.

F. NRCS will have three job approval levels for employees developing conservation plans and/or practice specifications that incorporate Prescribed Burning (Code 338).

(1) **Awareness:** This job approval authorizes an employee to include prescribed burning as a practice utilized in the conservation planning process. This level of job approval is required for any employee who discusses prescribed burning as an alternative with a landowner or incorporates prescribed burning as a practice in the conservation plan, regardless of whether they write the actual burn plan. Awareness approval does **not** authorize employees to write prescribed burn plan prescriptions except when they are

actively pursuing **Rx Burn Planner 1** job approval authority.

a. To qualify for **Awareness** approval, an employee must attain 16 hours of awareness training by attending the approved MO-NRCS Prescribed Burn Awareness classroom instruction (or SRC approved equivalent) and participating in the application of one prescribed burn while under the supervision of a qualified burn boss from NRCS, MDC, private contractor (e.g. Technical Service Providers) or other approved entities.

b. Once an employee receives **Awareness** job approval, there will be no further requirements to maintain this level of job approval.

(2) **Rx Burn Planner 1:** This job approval authorizes an employee to prepare prescribed burning plans on private land with <60 acres in one firing sequence (plan can cover more than 60 acres), a slope restriction of <12% (average slope) and fuels that include:

- all herbaceous species
- non-volatile woody species
- a limited number (<25% coverage) of live volatile woody species* less than 4 feet tall that will not contribute to a significant change in fire intensity or behavior
- dead woody fuel that will not contribute to a significant change in fire intensity or behavior

**Live volatile woody species are those that have a chemical make-up that causes them to be somewhat "explosive," especially during certain seasons. Examples include eastern red cedar, shortleaf pine, blackberry vines, serecia lespedeza, honeysuckle, and sumac.*

All plans must be checked for completeness by an individual with **Rx Burn Planner 2** job approval. For training purposes only, an employee can, under the supervision of a qualified burn boss from NRCS, MDC, private contractor (e.g. Technical Service Providers) or other approved entity, actively participate in the application of prescribed burning plans on public lands.

a. To qualify for **Rx Burn Planner 1** job approval, an employee must complete the requirements outlined below within 3 years of satisfactorily completing the MDC Level 2 classroom instruction and the NRCS supplement to this course:

- Develop three prescribed burning plans. Plans will be reviewed by a person with **Rx Burn Planner 2** Job Approval Authority.
- Serve as a crew member during the application of two prescribed burning plans on public lands under the supervision of a qualified burn boss from NRCS, MDC, private contractor (e.g. Technical Service Providers) or other approved entity.
- Assist with two post-burn evaluations.
- Assist in one (60-90 day) follow-up evaluation.

b. To maintain **Rx Burn Planner 1** approval, an employee must prepare one prescribed burn plan within 3 years and serve as a crew member during the application of one prescribed burning plan on public lands under the supervision of a qualified burn boss from NRCS, MDC, private contractor (e.g. Technical Service Providers) or other approved entity or demonstrate good prescribed burning judgment, knowledge, and skill, be recommended by the APBS and SPBS, and be approved by the SRC.

c. All employees with **Rx Burn Planner 1** job approval will have each burn plan reviewed for completeness by an **Rx Burn Planner 2** level employee.

(3) **Rx Burn Planner 2:** This job approval authorizes an employee to prepare prescribed burning plans on private land with no slope restrictions that are <320 acres in one firing sequence (plan can cover more than 320 acres) with fuels that include:

- all herbaceous species
- non-volatile woody species
- live volatile woody species* less than 4 feet tall
- a limited number (<25% coverage) of live volatile woody species* greater than 4 feet tall that will not contribute to a significant change in fire intensity or behavior
- dead woody fuel that will not contribute to a significant change in fire intensity or behavior

Rx Burn Planner 2 job approval also authorizes an employee to check burn plans prepared by employees with **Rx Burn Planner 1** approval and serve as burn boss in the application of prescribed burning plans within his/her job approval authority on land owned or operated by NRCS (e.g., Plant Material Center).

*NRCS employees are not authorized to write, implement, review, or approve prescribed burn plans that exceed **Rx Burn Planner 2** criteria.*

a. To qualify for **Rx Burn Planner 2** approval, an employee with **Rx Burn Planner 1** approval must satisfactorily complete the MDC Level 3 classroom instruction and develop five or more prescribed burn plans, two of which must meet **Rx Burn Planner 2** criteria. All plans must be reviewed by an employee with **Rx Burn Planner 2** job approval.

b. To maintain **Rx Burn Planner 2** approval, an employee must prepare and/or review three prescribed burn plans within 3 years and serve as a crew member during the application of one prescribed burning plan on public lands under the supervision of a qualified burn boss from NRCS, MDC, private contractor (e.g. Technical Service Providers) or other approved entity or demonstrate good prescribed burning judgment, knowledge, and skill, be recommended by the APBS and SPBS, and be approved by the SRC.

G. The SRC, in consultation with the SPBS, may grant job approval authority to employees who have previous education and experience.

H. Employees who are actively involved in planning prescribed burns are encouraged to pursue other continuing education courses to expand their knowledge and skills (e.g., National Wildfire Coordination Group courses).

I. Refer to Table 1, *"Missouri Job Approval Authority for Prescribed Burning"*, for a summary of job approval level criteria/policies.

J. If an employee fails to follow established NRCS policies, procedures and practice criteria for Prescribed Burning (Code 338), his/her job approval will be revoked.

MO413.13 Planning Prescribed Burns.

A. Only trained employees with appropriate job approval will provide planning assistance on prescribed burning. A detailed plan for the proposed burn area will be prepared using Job Sheet Agron-18. All prescribed burn plans will contain the following statement:

"On-site assistance by NRCS personnel to accomplish burning operations on private land is not authorized. NRCS staff, cooperating organizations or cooperating state agencies are not authorized to provide assistance to carryout any portion of this plan as an official NRCS representative."

B. Landowners should be encouraged to attend the standardized MDC/NRCS Landowner Prescribed Burn Workshop prior to receiving the prescribed burn plan. Either the landowner or a representative with legal Power of Attorney must sign the burn plan following review with an NRCS employee. A signed copy of the prescribed burn plan must be retained in the landowner's field office case file.

MO413.14 Technical Planning and Application Assistance.

A. NRCS employees are only permitted to participate in the application of prescribed burns on public land as required for training and job approval authorization. All participation in training burns must have prior approval by the employee's supervisor.

B. Any onsite assistance by NRCS personnel to private landowners during the application of prescribed burning is prohibited. Follow-up assistance with landowners and operators to evaluate the effects of their burning operations is permitted.

C. Employees are authorized to participate on prescribed burns on lands owned or operated by NRCS (e.g., Plant Material Center) for the purpose of maintaining or applying treatments. All such burns will be carried out with supervision of a qualified burn boss from NRCS, MDC, private contractor (e.g. Technical Service Providers) or other approved entity.

MO413.15 Safety.

A. All employees attending training will wear appropriate personal protective equipment (PPE) when participating in a prescribed burn activity. Mandatory PPE includes:

Provided by the employee:

- Long sleeved shirts and pants made of 100% cotton or wool or NOMEX material. Shirts should be of sufficient length to allow overlap of gloves and shall be worn with sleeves down and fastened and shirt tails tucked into pants. Pants shall not have cuffs or frayed bottoms and must extend to cover boot tops. Hats, coats, and coveralls must meet these fabric requirements.
- Leather boots (preferably lace-up with a heavy, lug sole)
- Leather gloves

Provided by NRCS:

- Eye protection including safety glasses or goggles
- Hardhat on any burn that includes forest or woodland in the burn area or burns that include live volatile woody species greater than 4 feet tall.
- Hearing protection if the employee is operating motorized equipment (i.e. blower or chainsaw)

B. Smoke management will be considered during prescribed burn planning activities. The following criteria apply to all activities regardless of job approval level:

- NRCS prescribed burn planning assistance is not allowed on fields that are within 1/8 mile of a road with an Average Annual Daily Traffic (AADT) of 1200 as estimated by the Missouri Department of Transportation. Reference the following website for statewide information:
  `http://www.modot.org/safety/trafficvolumemaps.htm`
- Special consideration must be given to sites that are located in airsheds of concentrated residences or areas with moderate public use or visibility.
- All plans shall be written so that the planned wind direction takes smoke away from roads, residences, or other sensitive areas.
- No planning shall occur within one mile of an airport unless the landowner acquires written approval from that airport authority.

MO413.12 Certification and Authority

Table 1. MISSOURI JOB APPROVAL AUTHORITY FOR PRESCRIBED BURNING

Factor / Class	Awareness	Rx Burn Planner 1	Rx Burn Planner 2 (3/)
Duties/Activities	Include practice Prescribed Burning (Code 338) in Conservation Planning Process	Prepare burn plans with restrictions on size, vegetation, and slope. All plans must be submitted to an Rx Burn Planner 2 for approval	Prepare burn plans with restrictions on size and vegetation. Review plans written by Rx Burn Planner 1 staff. Serve as Burn Boss on prescribed burns on land owned or operated by NRCS (PMCs).
Required Classroom Training	NRCS Awareness Training (or SRC approved equivalent)	MDC Level 2 NRCS Supplement	MDC Level 2 NRCS Supplement MDC Level 3
Qualifications to Obtain	Following classroom instruction, participate on 1 prescribed burn on public land	Following classroom instruction, prepare 3 burn plans and participate on 2 prescribed burns on public land and post-burn evaluations	Following classroom instruction, prepare 5 or more burn plans of which 2 meet Rx Burn Planner 2 criteria
Acres 1/	NA	60	320
Vegetation 2/	NA	Non volatile herbaceous and woody species with < 25% volatile woody species < 4' tall that will not cause a change in fire behavior	Non volatile herbaceous and woody species with <25% volatile woody species > 4' tall that will not cause a change in fire behavior
Terrain	NA	< 12% (average slope)	No slope restrictions
Smoke Management 4/	NA	> 1/8 mile from state highway with an AADT of 1200; > 1 mile from airport	>1/8 mile from state highway with an AADT of 1200; >1 mile from airport
Currency/Maintenance	None	Write 1 burn plan and participate on 1 burn (public land) per 3 years	Write or review 3 burn plans and participate on 1 burn (public land) per 3 years

1/ Acres: Contiguous acres to be burned on a single management unit on one day during the same growing season are considered to be one prescribed burn. Total acres for any prescribed burn cannot exceed the Acres limits for the appropriate job classification.

2/ Volatile species for Missouri are those that have a chemical make-up that causes them to be somewhat "explosive" especially during certain seasons. They include, but are not limited to, eastern red cedar, shortleaf pine, blackberry vines, serecia lespedeza, honeysuckle, and sumac.

3/ NRCS assistance on prescribed burn sites that exceed Rx Burn Planner 2 criteria is limited to conservation planning only.

4/ Special consideration must be given to sites that are located in airsheds with concentrated residences or areas with moderate public use or visibility;

NRCS *MO A-2* *February 2006*

REQUEST FOR PRESCRIBED BURNING JOB APPROVAL

Employee ______________________________ **Location** ______________________

SECTION 1: AWARENESS - JOB APPROVAL

A. Awareness Classroom Training Received: Date: M_____ Y_____

B. Participate in Prescribed Burning:
1. Site______________________ Acres_________ Date_____________
   Burn Boss _____________________________

SECTION 2: Rx BURN PLANNER 1 - JOB APPROVAL

A. MDC Level 2 Training Received: Date: M_____ Y_____
NRCS Supplemental Training Received: Date: M_____ Y_____

B. Prepared Prescribed Burning Plans:

1. Site______________________ Acres_________ Date_____________
   Reviewed By _____________________________ Date_____________
2. Site______________________ Acres_________ Date_____________
   Reviewed By _____________________________ Date_____________
3. Site______________________ Acres_________ Date_____________
   Reviewed By _____________________________ Date_____________

(Attach Burn Plans with Review Comments)

C. Participate in Prescribed Burning:
1. Site______________________ Acres_________ Date_____________
   Burn Boss _____________________________
2. Site______________________ Acres_________ Date_____________
   Burn Boss _____________________________

D. Experience with Equipment:

Pumper/Sprayer___________	Date_____	Sling Psychrometer _____	Date_____
Drip Torch _____________	Date_____	Wind Meter____________	Date_____
Backpack Pump__________	Date_____	Rake_________________	Date_____
Swatter________________	Date_____	Backpack Blower_______	Date_____
Handheld Weather Station	Date_____		

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E. <u>Assist in Post Burn Evaluations</u>:

1. Site____________________ Acres________ Date____________
   Burn Boss ______________________________
2. Site____________________ Acres________ Date____________
   Burn Boss ______________________________

F. <u>Assist in (60-90 day) Post Burn Evaluation</u>:

1. Site____________________ Acres________ Date____________
   Rx 2 person ___________________________________

SECTION 3: Rx BURN PLANNER 2 - JOB APPROVAL

A. <u>MDC Level 3 Training Received</u>: Date: M_____ Y_____

B. <u>Prepared Prescribed Plans</u>:

1. Site____________________ Acres________ Date____________
   Reviewed By ____________________________ Date____________
2. Site____________________ Acres________ Date____________
   Reviewed By ____________________________ Date____________
3. Site____________________ Acres________ Date____________
   Reviewed By ____________________________ Date____________
4. Site____________________ Acres________ Date____________
   Reviewed By ____________________________ Date____________
5. Site____________________ Acres________ Date____________
   Reviewed By ____________________________ Date____________

(Attach Burn Plans with Review Comments)

<u>Request for Job Approval</u>: Awareness ☐ Rx 1 ☐ Rx 2 ☐

Employee's Signature:________________________________ Date__________
Employee's Signature:________________________________ Date__________
Employee's Signature:________________________________ Date__________

<u>Recommended Job Approval</u>: Awareness ☐ Rx 1 ☐ Rx 2 ☐

(APBS) Signature:________________________________ Date__________
(APBS) Signature:________________________________ Date__________
(APBS) Signature:________________________________ Date__________

<u>Recommended for Job Approval</u>: Rx 1 ☐ Rx 2 ☐

(SPBS) Signature:________________________________ Date__________
(SPBS) Signature:________________________________ Date__________

Approved for Job Approval : Rx 1 ☐ Rx 2 ☐

(SRC) Signature:________________________________ Date__________
(SRC) Signature:________________________________ Date__________

Record of Activity for FY________						
Date	**Plans**		**Burns**		**Post Burn Evaluation**	
	Burn Level	Acres	Burn Level	Acres	Type *	Acres

* ***DOB*** *(day of burn evaluation);* ***DAB*** *(60-90 days after burn evaluation)*

Three Year Review By:______________________________ Date:__________________________

Comments:____

____

____

____

NRCS Natural Resources Conservation Service

Prescribed Burn Plan

"On-site assistance by NRCS personnel to accomplish burning operations on private land is not authorized. NRCS staff, cooperating organizations or cooperating state agencies are not authorized to provide assistance to carryout any portion of this plan as an official NRCS representative."

andowner/Operator: ______ County: ______

Address: ______

Phone: ______ Acres to Burn: ______ Planned Timing of Burn: ______

arm and Tract # : ______ CRP Sign-up Number: ______

Field(s): ______ T: ______ R: ______ Section: ______

A. Description of Burn Area:

1. Land Use: ______

2. Present Plant Cover:

a. Woody Plants

Species:	Height (ft.)	Basal Diameter (in.)	% Canopy

b. Herbaceous Plants

Species:	Height (ft.)	Tons / Acre
Cool Season Grasses		
Warm Season Grasses		
Forbs / Broadleaf:		

3. Topography:

	a.Slope %		b. Aspect
field no.			
field no.			
field no.			
field no.			
field no.			

B. Objective and Growth Stage for Burn:

Stimulate Warm Season Grass (WSG) (1-3" new growth)
Control Woody Plants (full leaf)
Stimulate Cool Season Grass (CSG) (1-3" new growth)
Distribute Grazing (1-3 " new growth)
Reduce Wildfire Hazard
Stimulate Forbs
Reduce CSG Growth (1-3" new growth WSG)
Remove litter / Create Bare Ground

Additional / Detailed Objective(s):

C. Acceptable Conditions for Prescribed Burns:

	20 ft. (above ground) Wind Speed in Miles per Hour *						
Humidity	4	6	8	10	12	14	16
25-34%	C-S	C-S	C-S	C			
35-39%	C-S	C-S	C-S	C-S	C		
40-44%	C-S	C-S	C-S	C-S	C-S	C	
45-59%	C-S	C-S	C-S	C-S	C-S	C-S	C
60-69%	S	C-S	C-S	C-S	C-S	C-S	C-S
70-79%		S	C-S	C-S	C-S	C-S	C-S
80-89%			S	C-S	C-S	C-S	C

* Most weather forecasts give wind speeds measured at 20 feet above ground. Eye level wind speed is approximately 1/2 of the 20 ft. wind speed

C = 60-90% cloud cover **or** <u>Before</u> 10:00 AM or <u>After</u> 3:00 PM
S = 0-59% cloud cover **or** from 10:00 AM till 3:00 PM

Specific or Ideal Weather Conditions:

1. Comments:

Starting time of the burn will generally be before 10:00 AM or After 3:00 PM when humidity, temperature and and wind speed / direction are favorable for safe burning. Between 10:00 AM and 3:00 PM temperature and wind speeds are at their daily highest and humidity at its lowest. Be more cautious of starting a burn during this time frame. Review the table above for humidity, cloud cover, and wind speed guidance.

****** The best wind direction for burning is:**
****** <u>Plan map</u> firing sequence wind direction:**
****** Alternative wind direction(s) [firing sequence must be altered]:**

2. Ignition Plan and Firing Sequence: (See the plan map)

The Ring-Head Fire method will be used. Two burn crews will start at the downwind corner / side of the field and travel in opposite directions to "ring" the field, meeting in the upwind corner / side of the field.

*** Parties igniting a prescribed burn may be liable for damages resulting from the fire and smoke, and control costs, should the fire escape the designated area.**

Additional Instructions:

D. **Preparation of Area for Burning:**

1. Firebreak Construction:

a. Firebreak width will be two times the height of the adjacent vegetation

b. Plowed, disked, and burned firebreaks, being essentially devoid of fuel, provide the least danger of fire escape.

c. Close mowed and cool season grass firebreaks have fuel available that can provide an avenue for fire escape. Smoke from green growth reduces visibility inhibiting burn monitoring

d. High mowed fire intensity reduction lines (8-12" stubble) will be installed if fine fuel exceeds 1.5 tons / acre. Line width will be at least 10 feet at 1.5 - 3 tons / acre and 20 feet at > 3 tons / acre.

e. Kind of Firebreak:

Kind of Firebreak		Width
Disked / Plowed:		
Close Mowed:		
Cool Season Grass:		
High Mowed Intensity Reduction:		
Other Firebreaks i.e.		
raked, black lines:		

*** See plan map for location and extent of firebreaks**

*** Firebreaks should be installed as far in advance (6 months) of anticipated burning period as possible**

f. Existing Firebreaks: (describe here and show location and extent on the plan map)

g. Potential Hazards Present within the Burn Area:

(describe here and show location and extent on the plan map)

. Adjacent Areas: (outside of burn area)

1. Special Precaution Areas: (describe here and show location on the plan map)

2. Backup or Secondary Firebreaks: (describe here and show locations on the plan map)

F. Equipment / Personnel Needs:

1. Safety Equipment:

- ☑ Clothing - natural fiber (cotton, wool)
- ☑ Boots - leather
- ☑ Gloves - leather, cotton, wool
- ☑ Bandanas / Face Mask
- ☑ Goggles
- ☑ First Aid Kit
- ☑ Drinking Water

2. Tools / [redacted] check equipment required and state numbers of tool needed)

[redacted]00-300 gallon backup water supply with pump, 100 ft. of hose and hand wand
[redacted]TV w/ Sprayer (hose and hand wand)
[redacted]rip Torch(es)
[redacted]ackpack Sprayer(s)
[redacted]lapper(s)
[redacted]lower(s)

☐ Cell Phone
☐ Radios
☐ Broom Rake(s)
☐ Wire Cutters
☐ Chain Saw

3. Personnel Needed:

☐ total no. of people needed
Designated Fireboss: ☐ (name of person)
☐ Ignition crew (no. of people using a drip torch)
☐ Holding crew (no. of people using flapper, rake, backpack, ATV w/ Sprayer containing the fire in the designated area)
☐ Mop-Up Crew (no. of people following the holding crew checking for escapes, using flappers, rakes, backpack, ATV w/ sprayer)
☐ Traffic Control Spotters (no.)

* Using the Ring-Head Fire Method of Ignition typically two crews with 2 to three people each are used. One person lights the fire with the drip torch, with one crew member serving as the holding crew putting out fire along the firebreak if needed, trailed by another person serving as the mop-up crew, watching for escapes

**** Anyone with heart, respiratory, or mobility impairments will not participate in the burn.**

G. Special Considerations:

1. Precautions to Prevent Fire Escape:

- ☑ Check Firebreaks
- ☑ Check tools and Equipment
- ☑ Check and monitor weather conditions
- ☑ Review the burn plan with all crew members
- ☑ Review with crew members plan to handle an escape, who does what and goes where
- ☑ Check fire behavior with a test fire in down wind corner / side of burn area
- ☑ Allow back and flank fires to burn 50 ft. into the burn area before lighting the head fire

2. Suppression Plan if Fire Escapes:

- ☑ Cease Ignition
- ☑ Leave sufficient personnel with the prescribed burn to prevent further escape
- ☑ Remainder of personnel move to suppress the escape
- ☑ One person will be designated to bring the backup water supply
- ☑ One person will call the fire department

3. Patrol and Mop-Up:

- ☑ The burn crews will remain on-site until all fires are extinguished
- ☑ Patrol the firebreaks before leaving the site
- ☑ Check wooded areas for spot-overs

H. Prescribed Burn Plan Map:

- ☐ See Attached Sketch
- ☐ See Attached Aerial Photocopy

1. Plan Map Requirements:

- ☑ North Arrow
- ☑ Planned Wind Direction
- ☑ Firing Crew Designations
- ☑ Firing Direction
- ☑ Firing Sequence
- ☑ Location of Backup Water Supply
- ☑ Firebreaks:
  - ☐ Existing Firebreaks
  - ☐ Hand lines (raked, blower)
  - ☐ Burned Firebreak (black lines)
  - ☐ Cool Season Grass
  - ☐ Plowed / Disked
  - ☐ Close Mowed
  - ☐ High Mowed Intensity Reduction
  - ☐ Secondary / Backup Firebreaks
- ☑ Land uses (fuel types) Surrounding Burn Area
- ☑ Special Precaution Area(s) {inside and outside burn area}
- ☑ Other Items: (optional)
  - ☐ Ingress / Egress (escape) Route(s)
  - ☐ Gate Location(s)
  - ☐ Fences

lan Prepared By: ______________________ Date: ________
(signature)

lan Checked By: ______________________ Date: ________
(signature)

have requested the preparation of this burn plan; my signature establishes my acceptance of full liability resulting from implementation of this plan.

Landowner/Legal Power-of-Attorney: ______________________ Date: ________
(signature)

This plan is valid for three years from the time it was written and approved, or unless ignificant changes have occurred in or adjacent to the areas this plan covers. Plans older ıan three years from the approval date may be reviewed by a certified prescribed burn planner and reapproved.

e-Approved By: ______________________ Date: ________

Re-Approved By: ______________________ Date: ________

NRCS Natural Resources Conservation Service

Pre-Burn Checklist (Day of the Burn):

Landowner/Operator: ______________________ Field(s): ____________

*** Parties igniting a prescribed burn may be liable for damages resulting from the fire and smoke, and control costs, should the fire escape the designated area.**

1.	Weather Forecasts Obtained?		Yes		No
2.	Weather Forecast Favorable?		Yes		No
3.	Necessary Firebreaks Constructed?		Yes		No
4.	Potential Hazards Accounted For?		Yes		No
5.	Special Caution Areas Noted?		Yes		No
6.	Backup and Secondary Firebreak Locations Noted?		Yes		No
7.	Safety Equipment Adequate?		Yes		No
8.	Tools / Equipment On Site and in Operable Condition?		Yes		No
9.	Personnel Needed are Available?		Yes		No
10.	Special Considerations Reviewed with Crew?		Yes		No

11. Actual Weather at Time of Burn:

	Temperature		Humidity		Wind Speed at eye level
	Cloud Cover %				Wind Direction
					Fronts / Changes Expected?

12.	Neighbors Informed?		Yes		No

Name: ______________________ Phone #: ____________

Name: ______________________ Phone #: ____________

13. Other Notifications:

		Phone No.			Phone No.
	MO Depart. of Conservation			Sheriff	
	Highway Patrol			Police	
	Fire Department			Other:	

14.	Necessary Permits Acquired?		Yes		No
15.	Are Any Restrictions to Open Burning in Place?		Yes		No
16.	Did Test Fire Behave as Expected?		Yes		No

If no, explain reason(s) and response:

Checked by: ______________________ Date: ____________

NRCS Natural Resources Conservation Service

Post-Burn Evaluation (Day of Burn):

Landowner/Operator: ______ Field(s): ______

1. Firing Method Used?

2. Timing of Burn:

Start:		(AM)		(PM)
Completed:		(AM)		(PM)

3. Observed Weather Changes During Burn:

4. Fire Behavior:

Escapes		None		Few		Many
Difficult to Control				Yes		No
Convection column				Yes		No
Fire Swirls				Yes		No

5. Objectives of Burn Met?

6. Additional Treatment Needed? Yes No

If yes, explain:

7. Timing (mm/yy) and Objective of Next Burn?

8. Additional Comments:

Checked by: ______

Date: ______

NRCS Natural Resources Conservation Service

Follow -Up Evaluation (60-90 Days after the burn):

Landowner/Operator: ____________ Field(s): ____________

1. Objectives of Burn Met? Yes / No

   If no, explain:

2. Additional Treatment Needed? Yes / No

   If yes, explain:

3. Timing (mm/yy) and Objective of Next Burn?

4. Additional Comments:

Checked by: ____________________ Date: ____________

4.10 The Nature Conservancy Burn Plan

RECEIVED
2006 NOV -4 PM 1:39
AIR POLLUTION
CONTROL PGM

The Nature Conservancy

SAVING THE LAST GREAT PLACES ON EARTH

PRESCRIBED BURN PLAN

State: Missouri
Preserve/Site: Chilton Creek Preserve
Burn Unit: Slusher Hollow

Fire Planner(s):
Name: Justin Hills /Blane Heumann
Title: TNC Preserves Manager

Signature

28 Feb 04
Date

Fire Leader:
Name: Justin Hills /Blane Heumann
Title: TNC Preserves Manager

Signature

28 Feb 04
Date

Fire Manager:
Name: Doug Ladd
Title: TNC Dir. of Conservation Science

Signature

9 MARCH 04
Date

1. **LOCATION:**

Preserve/Site:	Chilton Creek Preserve
Burn Unit:	Slusher Hollow
Map Location:	T28N R1W Sec.18
Unit Area:	438 acres
County/State:	Carter/ Shannon County, Missouri
Ownership:	TNC- 438 acres

2. **SOURCES OF EMERGENCY ASSISTANCE:**

Fire: Eminence MDC Forestry 573-226-3616, and (Van Buren) 573-323-8515

Law Enforcement: Shannon County Sheriff, Eminence 573-226-3615; Carter County Sheriff, Van Buren 573-323-4510

Medical: Ambulance- 573-323-8323, nearest hospital in Poplar Bluff, MO

Nearest Phone to Unit: TNC Mobile Phone
MDC Peck Ranch Office 573-323-4249
TNC Ozarks Office 573-323-8790

3. **PERMITS AND OFFICIAL NOTIFICATIONS:**

Burn Permit/Notification Required? Yes / No
Source(s):

Air Quality Permit/Notification Required? Yes / No
Source(s):

Other Notifications Required? Yes / No
Source(s):

Eminence MDC Forestry	**573-226-3616**
Van Buren MDC Forestry	**573-323-8515**
MDC Wildlife (Peck Ranch)	**573-323-4249**
Shannon County Sheriff	**573-226-3615**
Carter County Sheriff	**573-323-4510**
National Park Service	**573-323-4236**
US Forest Service- Winona District	**573-325-4233**

4. **NEIGHBOR NOTIFICATIONS:**

Preserve neighbors, including numerous absentee landowners, will be notified in writing at least one week prior to burning. All neighbors living within a mile of the fire units will be contacted the morning of the burn. See attached list of names and addresses.

5. UNIT DESCRIPTION:

Vegetation Types	Fuel Models	% of Unit Area	% Slope	Aspect
Leaf litter woods	8	13	0-10	45-180°
Savanna-Woods-uplands	9	85	0-50*	0-360°
Glade-Savanna	2	2	5-20	120-280°

*Slope percent greater than 35 is a very small percentage of the unit.

Fire Unit Narrative Description:

The site consists of dry and dry-mesic oak and oak-pine woodlands on the highly dissected river hills adjacent to the Current River with grassy and rocky dolomite glades scattered over some of the south and west facing slopes. Glade vegetation is dominated by Little Bluestem (Andropogon scoparius) and frequent expanses of exposed bedrock. Upland woods in the unit are degraded savanna and open woodland with sparse fine grassy fuels and leaf litter. South facing steep slopes are covered with open cherty oak and pine woods, often with discontinuous fuels. North and east facing uplands are closed forest with thicker leaf litter accumulations. Upland waterways have more sparse leaf litter and an abundance of grasses and sedges that are often green through the winter.

Maps Attached:

Preserve location map:	<u>Yes</u> / No
Preserve burn unit map:	<u>Yes</u> / No
Preserve fuels map:	Yes / <u>No</u>
Burn unit map with ignition pattern, hazards, etc:	Yes / <u>No</u>
Aerial photograph:	<u>Yes</u> / No
Smoke Screening Map	<u>Yes</u> / No
Other:	

6. PRESCRIBED BURN JUSTIFICATION:

Type of Burn (ecological management, hazard reduction, training, or research):

Ecological Management

Burn Unit Management Goal(s):

Implementation of a physical process (fire) known to be pervasive during the genesis and perpetuation of these woodland systems. TNC fire management goals are congruent with MDC and NPS management and strategies.

Specific Burn Objectives:

Increase vigor and abundance of conservative native species; Increase fine fuel species; Reduce leaf litter accumulations; Reduce oak sapling densities and increase light penetration to groundcover layer; Stimulate Shortleaf Pine reproduction.

7. FUEL AND WEATHER PRESCRIPTION

Guidance Parameters:

Wind Direction(s)	**225°-45° (excludes 45°-225°)**
Air Temperature (°F)	**30-75**
Relative Humidity (%)	**25-70**
20 ft wind speed (mph)	**3-15**
Days since rain	**<7 (some moisture present in soil)**

Required Parameters:	MAX	MIN	PREFERRED (if applicable)
Wind Direction(s)			any
Effective Windspeed (mph)	6.5	2.5	
1-Hour Fuel Moisture (%)	4.6	14	
10-Hour Fuel Moisture (%)	5.6	15	
100-Hour Fuel Moisture (%)	6.6	16	
Live Fuel Moisture (%)			>30%
Atmospheric Mixing Height (ft)			>500 m.

8. PREDICTED FIRE BEHAVIOR

	Fuel Model		
	#9	#8	#2
Max. Headfire Flame Length (ft)	3.9	1.5	9.3
Min. Headfire Flame Length (ft)	1.6	0.6	3.8
Max. HF Rate of Spread (ch/hr)	15	3	76
Min. HF Rate of Spread (ch/hr)	3	1	12
Max. Backfire Flame Length (ft)	0.9	0.3	2.1
Min. Backfire Flame Length (ft)	0.6	0.2	1.4
Max BF Rate of Spread (ch/hr)	1	0	3
Min. BF Rate of Spread (ch/hr)	0	0	1
Max. Scorch Height			

9. FIRE BEHAVIOR NARRATIVE:

Fire coverage should be at least 60% with fire behavior of low to moderate intensity. Interior ignition along the bases of slopes may be needed to ensure rapid burn out and achieve moderate intensity fire behavior.

10. SMOKE MANAGEMENT PLAN

Smoke screening procedures completed? Yes / No

List downwind/downdrainage smoke sensitive areas:
List other smoke sensitive areas:
- Highway D and residences east approximately 4-5 miles.
- Current River Logyard Access and Hwy HH 2 miles northwest of unit.
- Hwy M and residences 1.5 miles southeast of unit.

Map of smoke sensitive areas attached? Yes / No

Describe desirable smoke behavior and smoke management actions:
No critical smoke sensitive areas exist for this burn unit. However, because of the size of the unit, surface fire should be nearly complete at sunset if transport winds are predicted to fall below 9 mph after sunset. If evening winds are from the north or west and low mixing heights occur, smoke will be monitored on M and D highways. If smoke accumulates in these areas, stumps and snags producing heavy smoke should be extinguished. Communications with other natural resource management agencies prior to burning will ensure that multiple large unit burns within the smoke screening area will not be attempted during marginal smoke dispersion conditions. Holding crews on the down wind side of the unit will be occasionally rotated with other holding crews if necessary to minimize extended continuous exposure to thick smoke.

11. CREW ORGANIZATION

Qualified fire leader(s):
One TNC approved fire leader.

Crew Number:
One 7 person TNC crew meeting TNC fitness, training, and experience requirements, augmented by two volunteer spotters, all equipped with required safety clothing and equipment: Nomex coveralls, hard hats, goggles, and leather gloves and boots.

Organization chart attached? Yes / No

12. EQUIPMENT

Required items:	**Available**
Pumper on site	Yes / No
Six radios	Yes / No
Protective clothing	Yes / No
Two first aid kits	Yes / No
Two weather kits	Yes / No
Fire shelters*	Yes / No

* Fire Shelters are available, but not required to be carried by all crew members as per Fire Manager's memo of Justification. Crew are required to carry matches at all times.

Equipment Item	Number	Source
Water Pack	6	TNC
Fire Rakes	6	TNC
Blowers	2	TNC
Drip Torch (plus extra fuel)	4	TNC
Mop-Up Tool set	4	TNC
Water Jug (5 gal.)	5	TNC
ATV	2	TNC

13. BURN DURATION

Note: This burn includes nighttime burning hours.

Time (indicate minutes or hours) for:

Baseline Preparation:	4 hours
Spreading Fire:	2hours
Interior fire burnout:	3hour
Mop-up:	3+ Hours
Total Duration:	**12+ Hours**

14. MANAGING THE BURN:

Firebreak preparations:

Firelines will use existing ridge roads from point O north to AA and west to AK. Hand line will be constructed from AK south to AM. Existing road again used from AM to AN. Hand lines will be constructed along the south from AN to O. Roads will be blown free of litter and raked free of continuous grassy fuels. Hand lines will be cut free of brush and raked or blown free of litter 4'-5' wide. Hand lines from AK to bottom of the south slope below AL, the line will be constructed 8'-10' wide. Dead standing trees, snags, within 30' of firelines will be raked around to prevent spotting hazards. Large piles of heavy wood within 30' of the line from point AA counterclockwise to O will be cut and dispersed. Within 50', east and west of line from point AK to AO, all standing dead trees and or snags are to be felled. All map reference points will be clearly marked at the appropriate on the ground locations.

Firing techniques and ignition pattern:

Ideally, the perimeter of the unit will be ignited using two ignition crews, starting at a common point on the south, north, or east ridgetop, and proceeding in opposite directions around the perimeter. After a safe burn in has been achieved around the west and southeast ridgetop perimeter, perimeter ignition will ignite along the steep slopes of the south line, AN-AQ. Ignition crews on the upwind side of the unit will proceed more slowly than the other crews, communicating with the burn boss to prevent fire from overlapping other perimeter lines. Perimeter ignition may be hastened by firing

crews using two torches, firing interior of the perimeter at the same time the perimeter is ignited. Interior ignition will be necessary along the interior creek to speed up burnout.

Crew communication:

Via two-way hand held radios. A mobile phone will be available in pumper truck on site.

Note: Radio communication is not always possible due to size and topographic variation of unit. Crews should be aware of possible problems and be prepared to relay messages.

Fire behavior and weather monitoring:

A fire weather forecast will be obtained from the National Weather Service on the morning of the burn. A forecast for burn day weather, evening and nighttime weather and smoke dispersion and second day extended weather will be obtained. On-site weather will be measured within one hour of ignition, and during and after the burn as needed.

Holding:

Holding will be accomplished with crew members using water pack, and fire rake or flapper as appropriate, following igniters

Fire sensitive areas:

Hunting cabin ca. 0.5 mile north of point AK. Fuels between the cabin and fire unit are woodland fuels.

MDC MOFEP site 9 borders along the west boundary of the fire unit.

Contingencies:

Minor spots will be immediately extinguished by line crews. In the event of an escape, 4 crew members will be designated to contain and patrol the burn unit fire. All other crew will engage in direct or indirect suppression efforts as directed by the burn boss. Any escape threatening adjacent property will require the immediate contact of MDC Forestry suppression crews to help contain the escape.

Potential hazards to crew:

-Steep slopes and large topographic relief has the potential to create up drafts of wind that could result in locally severe fire behavior such as fire whirls and candling of cedar or shortleaf pine.

- South wind direction in this hollow is highly modified by the topography, and winds can potentially funnel in the side hollows that is significantly different than prevailing winds.

- Numerous snags along the perimeter may ignite and pose spotting threats. The prevalence of this tree type and its ecological importance makes complete removal prior to ignition untenable. Any near the perimeter will be raked or blown around.

- Rugged terrain and large unit size will potentially confound suppression of any escapes due to disorientation. All crew persons will have unit maps and compass and be familiar with the unit. Fire lines will be marked onsite with reference points that correspond with maps.

-Fuel loading outside of unit and adjacent to TNC ownership is greater than within the fire unit. Suppression crews should be prepared for more intense fire behavior if spotting occurs outside of the fire unit.

Mop-up:

Perimeter threats will be mopped up immediately following the burn. At least two crew members will remain on site until all surface fire is extinguished. Periodic checks of the unit will be done by crew or designates for at least two days following the burn to ensure that all fire is extinguished.

Public relations:

MDC Forestry will be contacted 24 hours prior to bum day and coordination will be made on the location of the MDC dozer for contingency planning.

MDC, NPS, and USFS offices will be notified the day of the burn.

Follow-up assignments:

Post-burn data will be collected and fire assessment and summary report will be prepared by the bum boss.

15. DOCUMENTATION

Does the site have a Site Conservation Plan?	Yes / <u>No</u>
Review of Laws and Regulations complete?	<u>Yes</u> / No
Site Fire Management Plan complete?	Yes / <u>No</u>
Site Wildfire Response Plan complete?	Yes / <u>No</u>
Site/ element Monitoring Plan complete?	<u>Yes</u> / No

Exemptions or modifications of TNC burn requirements and guidelines:
Fire management and site wildfire planning included in Site Conservation Plan, in progress.

16. LEGAL CONSIDERATIONS

Describe the ownership/management responsibility of this site:

TNC owned and managed preserve.

Releases/waivers required? Yes / <u>No</u>
Releases/waivers attached? Yes / <u>No</u>

last update burnplan.doc 1/6/04

PRE-BURN CHECKLIST AND CREW BRIEFING

Preserve: **Fire Unit:** **Date:**

A. PRIOR TO CREW BRIEFING

- ☐ Fire Unit is as described in plan.
- ☐ Required firebreaks complete.
- ☐ Permits obtained. Give permit #'s:
- ☐ Official and neighbor notifications complete.
- ☐ Required equipment is on-site and functioning.
- ☐ Planned ignition and containment methods are appropriate.
- ☐ List of emergency phone numbers are in each vehicle.
- ☐ Planned contingencies and mop-up are appropriate.

B CREW BRIEFING

- ☐ Each crew member has a burn unit map.
- ☐ Fire Unit size and boundaries discussed.
- ☐ Fire Unit hazards discussed.
- ☐ Purpose of burn.
- ☐ Anticipated fire and smoke behavior.
- ☐ Review of equipment and troubleshooting.
- ☐ Check crew qualifications.
- ☐ Review organization of crew and assignments.
- ☐ Review methods of ignition, holding, mop-up, communications.
- ☐ Review contact with the public; traffic concerns.
- ☐ Location of vehicles, keys, and nearest phone.
- ☐ Location of back-up equipment, supplies, and water.
- ☐ Review all contingencies including escape routes.
- ☐ Review mop-up procedures.
- ☐ Answer questions from crew.
- ☐ Give crew members the opportunity to decline participation.

C. PRIOR TO IGNITION

- ☐ Weather and fuel conditions are within prescriptions.
- ☐ Weather forecast, obtained within two hours of ignition, says prescribed weather will hold for two hours past expected duration of burn.
- ☐ Crew members have required protective clothing.
- ☐ Crew members have matches.
- ☐ Conduct test burn.

D. BEFORE LEAVING BURN UNIT

- ☐ Mop-up completed as described in prescription.
- ☐ Next morning inspection arranged.
- ☐ Notifications of completed burn (if required).

E. NOTE ANY MODIFICATIONS TO RX

Fire Leader: **Date:**

The Nature Conservancy Burn Rx
Slusher Hollow Burn Unit

Neighbor Notifications:

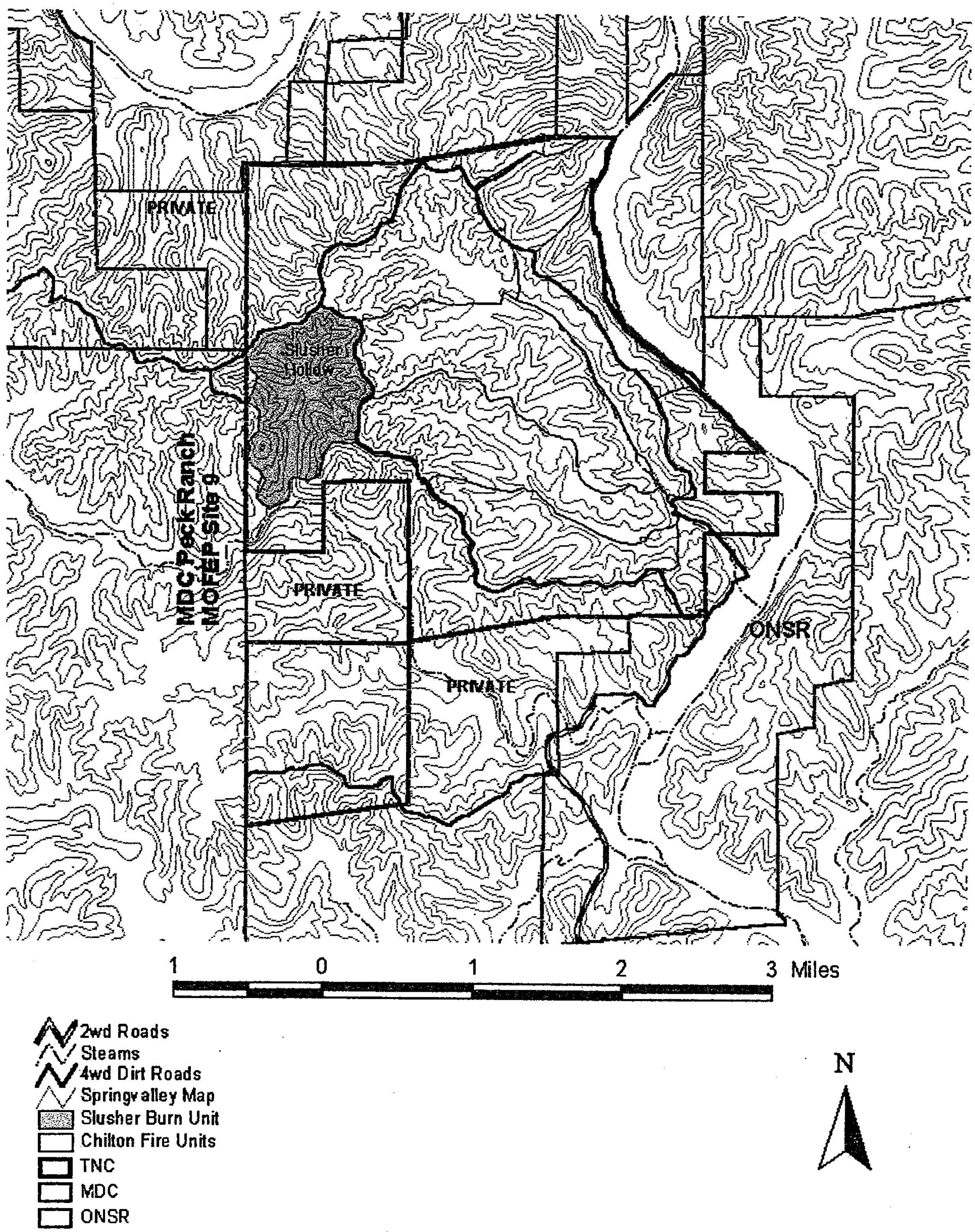
Residences given **written** notification **and contacted** the day of the burn:

	Names	Address	Phone
1.	Peck Ranch CA, MDC	Rt. 1 Box 1395, Winona, MO 65588	573-323-4249

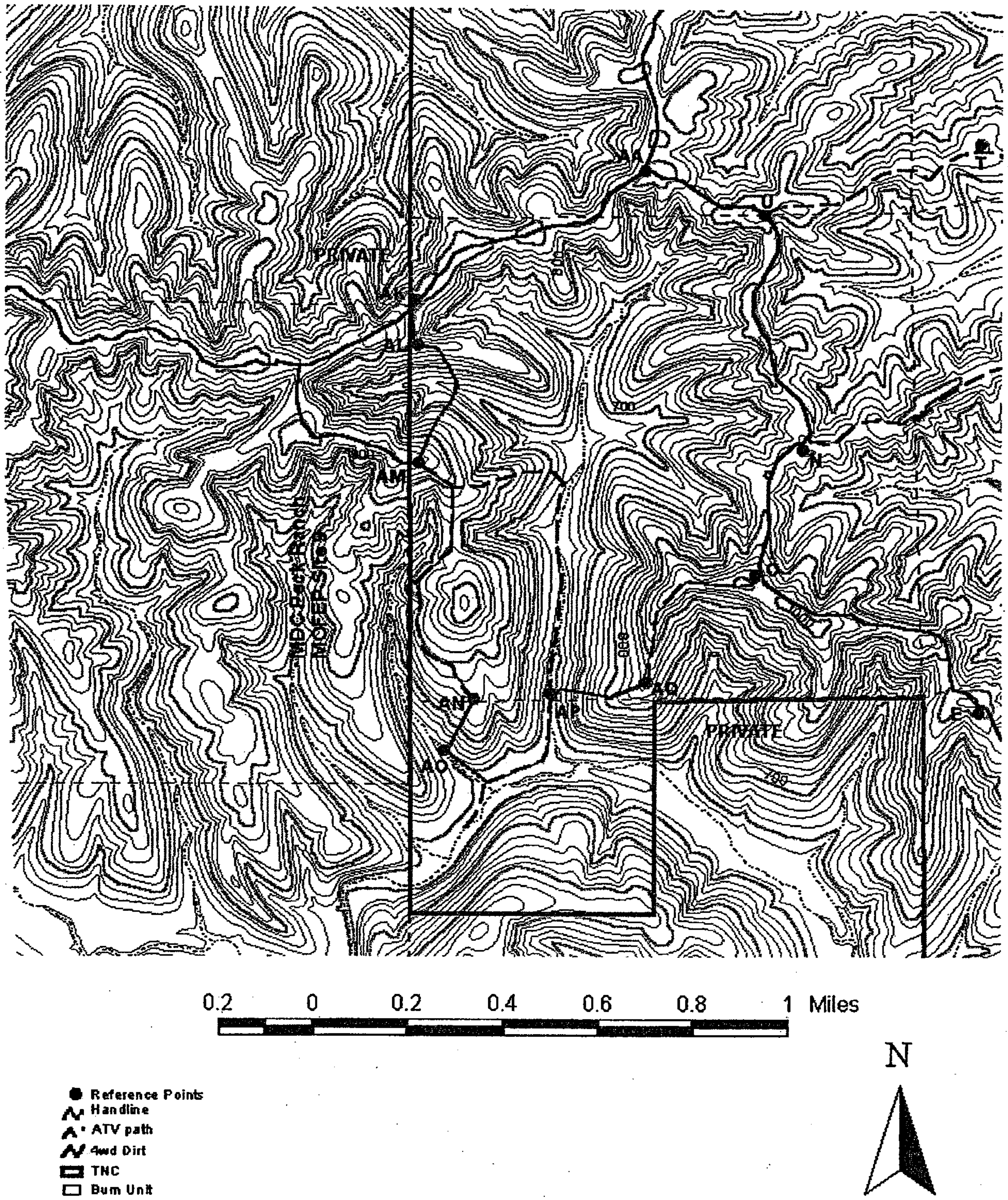
Other neighboring land owners given **written** notification prior to burning:

	Names	Address
2.	Richard Schwartz	P.O. Box 1508, Poplar Bluff, MO 63902
3.	Don Dazey	P.O. Box 613, Van Buren, MO 63965
4.	Larry Ogden	HCR 2, Van Buren, MO 63965
5.	Doug Dawson	HCR 2 Box 2186, Van Buren, MO 63965
6.	Eric McSpadden	P.O. Box 298, Van Buren, MO 63965
7.	Bill Gourley	Rt. 7 Box 264, Poplar Bluff, MO 63901
8.	Robbie Williams	P.O. Box 174, Van Buren, MO 63965
9.	David Burlison	14621 Big Timber Ln, Chesterfield, MO 63017
10.	E.D Piles	5501 Grace, St Louis, MO 63116
11.	Bill Clark	618 Lakemont ct, Ft. Wayne, IN 46845
12.	David Bland	P.O. Box 848, Van Buren, MO 63965
13.	Karl Wolf	125 W Swon Ave, St Louis, MO 63119

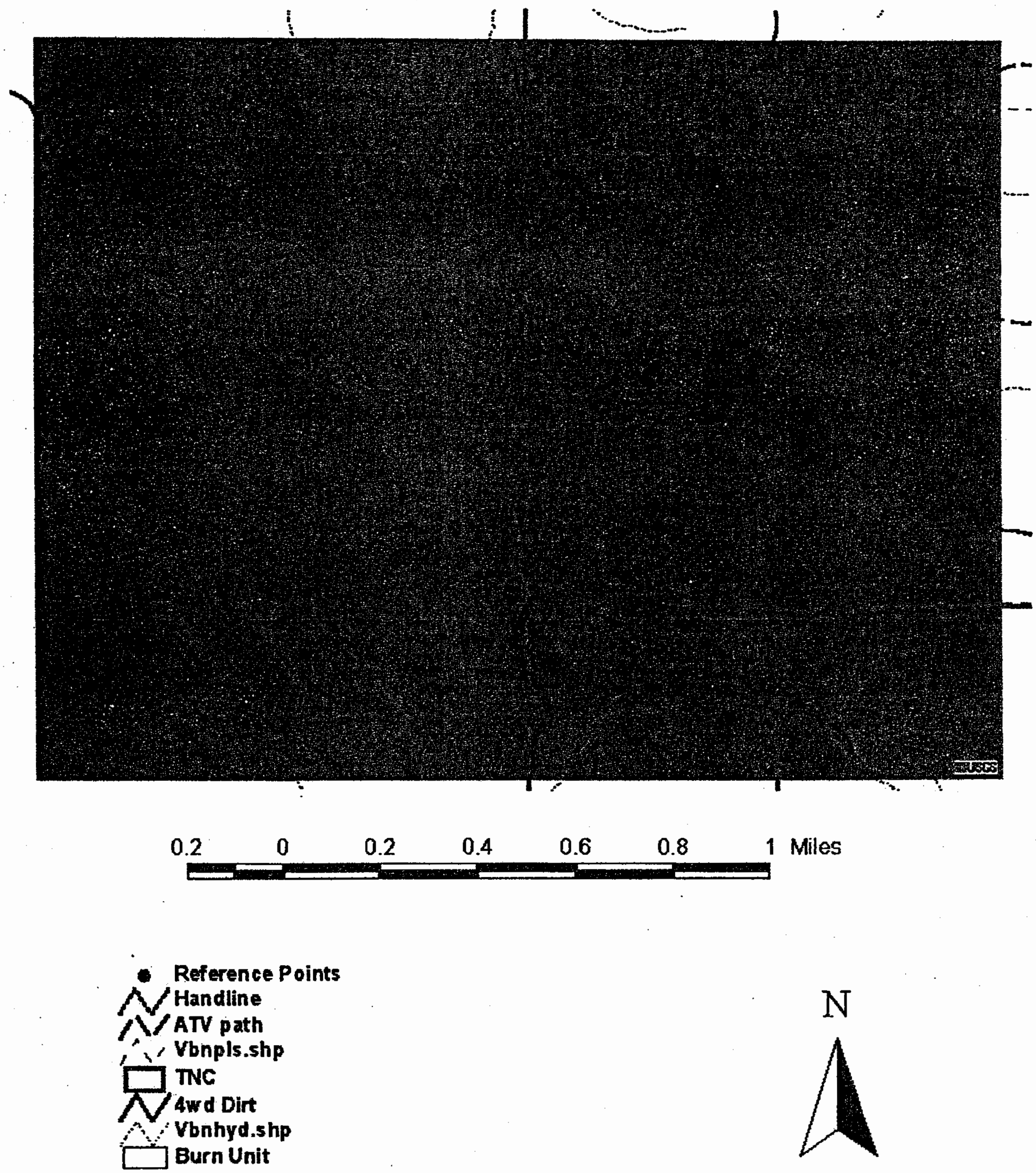
Slusher Hollow



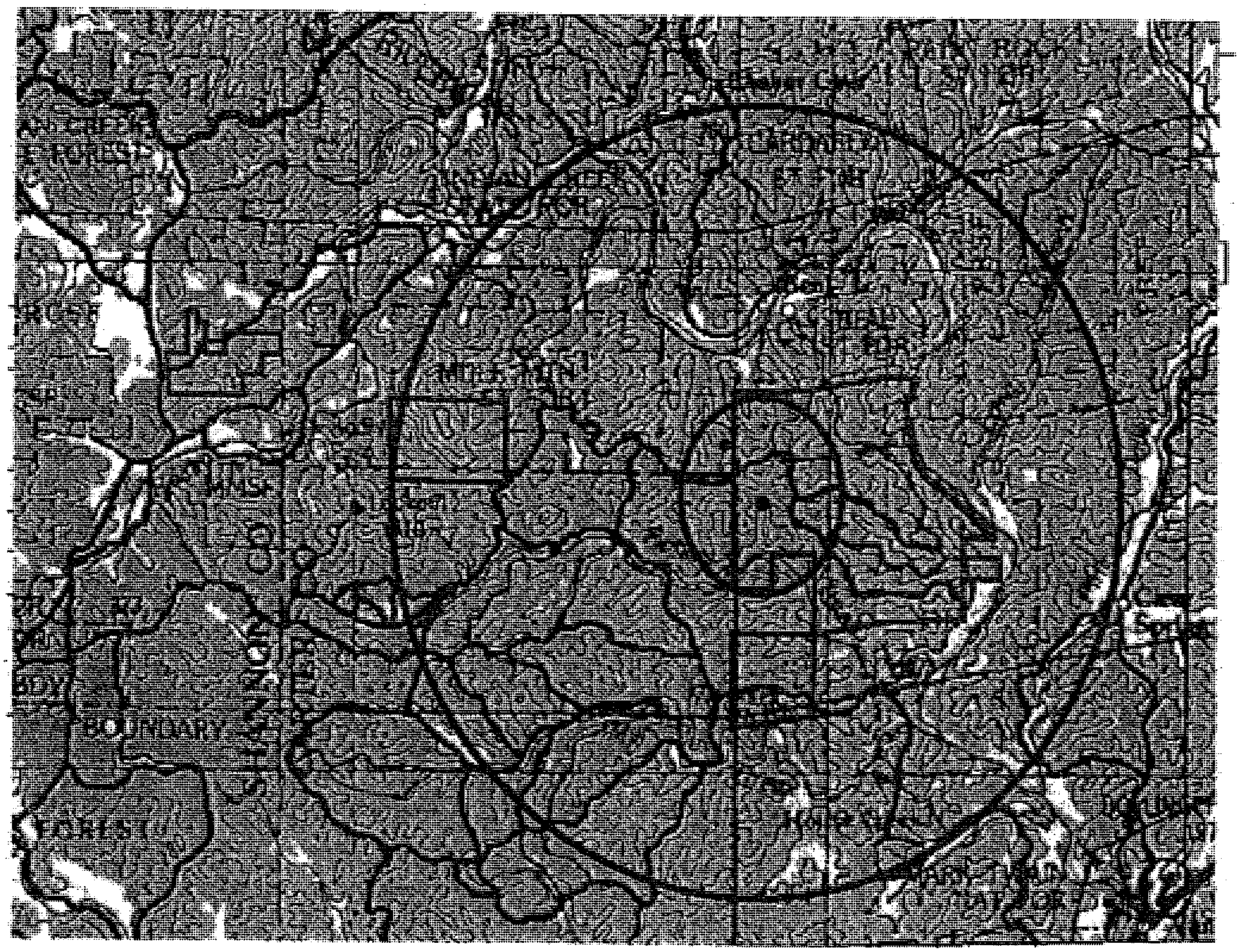
Slusher Hollow



Slusher Hollow



Slusher Hollow



Smoke Screening Map

- **Burn Unit**
  Smoke Sensitive Areas
- **Hunting Cabin**

4.11 Missouri Division of State Parks Burn Plans

Policy: N03 BURN PROCEDURES	Section: N. NATURAL RESOURCE MANAGEMENT		
	Issued: Original	Revised: 08/21/98	Page: 1 of 3

By policy, the Division of State Parks supports using fire to manage park resources. Fire is an option for many operations' tasks, and essential for many aspects of natural resource management.

Fire can also cause serious damage to property and it can cause personal injury. There are safety and health issues related to smoke dispersal and highway traffic, and fire frequently creates public relations issues. Misusing or accidentally losing control of fire can have serious impacts on our ability to use it again in the future. These impacts may extend to other agencies as well.

Therefore, while the Division intends that fire be a very accessible tool for its staff to use, it also requires adherence to a specific organization and planning process. This policy summarizes those items, with reference to a Burn Procedures Manual for specific details.

DEFINITIONS:

Open Burns: All purposefully ignited, non-contained fires in state parks.

Ecological Burns: Fires intended to accomplish goals of a facility's Natural Resource Management Plan, Ecological Stewardship Plan (Policy 402), scientific research project, or that will impact more than five acres of natural vegetation on undeveloped land.

Operational Burns: Fires planned for facility management, other than natural resource management, that impact no more than five acres of undeveloped, naturally-vegetated land.

Non-regulated Burns: Fires that are exempt from the normal burn planning process. For operational burns this is limited to brush, leaf, and debris piles, and leaf-filled ditches. For ecological burns this is limited to slash or debris piles, and black lining preparatory to conducting prescribed burns. Burning trash is prohibited.

Regulated Burns: Operational fires that require burn plan and qualified Incident Commanders to lead them. Includes all burns not specifically listed as Non-Regulated.

High-risk Fires: Fires conducted in highly flammable weather conditions or fuels, or that have especially sensitive features that may be affected by an escape. Specific rating criteria are provided in the Burn Procedures Manual.

FIRE PROGRAM ORGANIZATION:

Administration

Division Director: Approves Ecological Stewardship Plans.
Chief, Natural Resource Management Section: Approves ecological burn requests, advises on Operational Burn requests that effect native vegetation or use of off-site incident commanders, designates a fire program coordinator, and sets annual priorities for ecological burns.
Director, Operations and Resource Management Program: Approves ecological burns when burn bans are issued.
District Supervisor: Approves operational and open burn requests; ensures compliance with local and state air and traffic safety regulations/ordinances.

Program Coordination, Certification and Scheduling

Fire Program Coordinator: Responsible for overall management of the Division's fire program. Approve all burn plans for ecological and regulated operational burns, organizes an annual burn schedule by priority, and approves go/no-go burn decisions for high-risk fires. This person also maintains certification lists, keeps the Burn Procedures Manual current, and assists with burn plan development.

Burn Implementation

Burn Coordinator:	For a specific fire, writes the burn plan, organizes personnel and equipment, assures that fire lines are prepared, and writes the burn report.
Incident Commander:	For a specific fire, makes most go/no-go burn decisions, and supervises all aspects of individual burn operations.
Facility Manager:	Assumes responsibility for monitoring all fires from the time active burning is complete until all smoldering embers and risk of re-ignition are past.

BURN PROCEDURES:

This policy automatically provides the administrative authority to conduct operational burns, or to engage in short-term fire use in natural zones. Long-term burn programs on undeveloped park land require an approved Ecological Stewardship Management Plan, per Policy N05.

Requests to conduct operational burns are to be approved by the District Supervisor (in consultation with the Chief, Natural Resource Management Section, if they involve natural zones.) Once approved, they may be scheduled at the discretion of the facility manager unless they require burn bosses or trained support staff from off-site. Then they must be coordinated through the Fire Program Coordinator, who will give first priority to ecological burns. Operational burns must not conflict with the facilities' Natural Resource Management Plan or preempt planned ecological burns.

Requests to conduct ecological burns are evaluated by the Fire Program Coordinator, who will consult with the facility and appropriate natural resource steward to establish regional priorities. The Chief, Natural Resource Management Section will approve all ecological burns in the form of an annual prescribed burn schedule.

Once a request is approved for a regulated burn, a written plan must be filed that describes burn objectives; desired weather/fuel conditions, special risks, the expected ignition pattern, and escape contingencies. All plans must follow the guidelines provided in the Burn Procedures Manual and be approved by the facility manager and the fire program coordinator.

Once a fire is complete, the Incident Commander will relinquish authority over it to the facility administrator or designee. That person is responsible for overseeing, monitoring, and mop-up work until the fire is totally extinguished or all threat of escape outside the burn unit is over. A burn report must be submitted to the Fire Program Coordinator according to standards set in the Burn Procedures Manual.

CERTIFICATION REQUIREMENTS:

Anyone regularly working with prescribed or wild fires is required to attain a specified minimum level of training. Before assuming any position of authority over burn operations, or independently supervising workers, one must be certified by the Division at the proper level. There are three levels of certification, and they relate to different levels of fire experience and formal training that is needed to safely accomplish various tasks associated with prescribed burns.

Level I certification is recommended for all people who may occasionally work with prescribed or wild fires. Level I certification is required for all people who regularly do so.

Level II certification is required in order to assume any supervisory role over fire operations or people working on a fire, at a single facility. All incident commanders and crew leaders must be certified at this level.

Level III certification is required in order to serve as incident commander for burns at multiple facilities, or on high-risk fires. It is also required of the Fire Program Coordinator.

Certification criteria for each level are detailed in the Burn Procedures Manual.

Reference: **Burn Procedures Manual**

PRESCRIBED FIRE BURN PLAN

PARK:

BURN UNIT:

BURN UNIT LEGAL DESCRIPTION:

COMPLEXITY LEVEL OF THE PROJECT: _____

Prepared by:______________________________ Date: _______________
Name Title
Facility Manager: _____________________ Date: _______________

All responsibility for monitoring the prescribed burn is transferred to the Facility Manager or designee after the initial burn is completed.

Approved by: ____________________________ Date: _______________
Fire Program Coordinator

Approvers Comments:

The Burn Boss has reviewed and understands the considerations of this plan.

Burn Boss - Year 1: ____________________________ Date: _______________

Burn Boss - Year 2: ____________________________ Date: _______________

Burn Boss - Year 3: ____________________________ Date: _______________

Burn Boss - Year 4: ____________________________ Date: _______________

Burn Boss - Year 5: ____________________________ Date: _______________

I. BURN AREA DESCRIPTION

Project Name: _______________ Legal Description: T32N, R33W, S ½, SE¼ Sec. 17

Acres: ________

State: ____________ County: _______________________

Understory:

Topography:

II. OBJECTIVES

Fire Use Objectives (First Order Effects):

Resource Objectives:

Preferred Burn Frequency

III. FUELS

Slash Production:

A. Type:
B. . Quantity:
C. Location:

Description of Fuels on Site and Adjacent (species, arrangement, continuity, age, etc.):

(<u>Aids to Determining Fuel Models For Estimating Fire Behavior</u>, Hal E. Anderson)

Organic Layer Depth _____inches Surface Fuel Depth _____inches Years fuels have rested _____

IV. VICINITY MAP (Less Magnified to view potential risks outside of the unit)

V. PROJECT MAP

VI. WEATHER PARAMETERS, FIRE BEHAVIOR PREDICTIONS AND FUEL MODELS

(These guidelines are intended to guide the burn coordinator in selecting a preferred burn opportunity.)

A. Weather Parameters

Weather	Preferred Range	Optimum	* Spot Forecast
Temperature:			
Relative Humidity:			
Wind Direction:			
Wind Speed (midflame)			
Transport Wind Direction (range)			
Fuel Moisture: 1 Hour:			
1000 Hour:			
Woody – live:			
KB Drought Index			
Palmer Index			

*At time of ignition

List any combinations of parameters you would exclude from your burn window:

Narrative Information:

**These are strictly guidelines. Some combinations of these parameters can be exceeded with the approval of the Fire Program Coordinator.

B. Fire Behavior Predictions:

(Based on inputs from section A to the BEHAVE fire prediction model)

Fuel Model: 3

Characteristics:	Model Predictions for Preferred Parameters	Model Predictions for Optimum Parameters
Headfire Rate of Spread:		
Backfire Rate of Spread:		
Headfire Flame Length:		
Backfire Flame Length:		
Spotting Distance		
Probability of Ignition		

*Standard Observed Time

Fire Behavior Narrative:

**A backfire is very difficult to predict with the current behave programs available. These backfire predictions were estimated from minimum conditions.

VII. RECOMMENDED STAFFING LEVELS

A. Blacklining and Burn Preparation

ATTACH ORGANIZATION CHART

B. Burning Operation

ATTACH ORGANIZATIONAL CHART

Burn Coordinator:
Burn Boss:
Facility Manager:
Crew Size:
Traffic Management:

C. Mop-up and Patrol

Crew Leader:

Crew Size:

D. Equipment Required

VIII. SCHEDULING

A. Projected Burn Duration:

B. Burn Window Constraints:

C. Preferred Burn Season:

IX. PREBURN CONSIDERATIONS

A. Site Preparation Needs:

B. Special Precautions/Regulations (Human, cultural, restrictive burn days, etc.):

See Attached Ignition Map

X. FIRING TECHNIQUES

A. Test Burn Procedures:

B. Firing Operations and Ignition Procedures:

ATTACH IGNITION SEQUENCE MAP FOR THIS SECTION

XI. HOLDING ACTIONS

A. Holding Procedures:

Personnel Assigned:

Equipment Assigned:

Crew:

Narrative of Holding Assignment:
<u>Days prior to burn:</u>

<u>Day of the burn:</u>

B. Water Sources

C. Potential Holding Problems:

D. Countermeasures on Critical Holding Points:

E. Protection of Sensitive Features:

F. Mop-up Procedures:

G. Post-burn Patrol

XII. SAFETY HAZARDS

A. Safety Equipment

1. First Aid Kit
2. Drinking Water
3. Hard Hat
4. Ear Protection – For Blowers
5. Fire Resistant Clothing
6. Leather Gloves
7. Leather Boots
8. water coolers, Gatorade, snacks if temperatures warrant.
9. Recommended Accessories (i.e. Respiration Filter, Goggles etc.)

B. List Hazards

XIII. CONTINGENCY PLAN

(List procedures for handling fire across the designated fireline according to the outlined categories listed below.)

A. **Fire Outside of Designated Burn Unit:**
(Spot Fire or Slop Over)

B. **Fire Outside of the Ecological Stewardship Management (ESM) area of which can be handled with onsite resources:**
(This is considered an "escape". Refer to area map.)
**** If the escape spreads outside of the ESM area and exceeds that which can be handled by the onsite resources than it will be declared a "wildfire".***

C. **Contingency Plan in the Event the Prescribed Fire becomes a "Wildfire":**
(Of which can <u>not</u> be handled with onsite resources.)

XIV. SMOKE MANAGEMENT PLAN

A. **Distance and direction to smoke sensitive area(s):**

C. **Transport wind speed and direction:**

D. **Visibility hazard(s), roads, airports, etc.:**

E. **Actions to reduce impacts to visibility hazards:**

F. **Traffic Management Plan**

ATTACH SMOKE VECTORING MAP FOR THIS SECTION

XV. WEATHER INFORMATION

(Monitor weather prior to burn, during burn operation, and postburn.)

A. Spot Weather Forecast (phone contact)

1.) Spot weather forecast will be requested following weather observation one day prior to the burn between 1300 and 1600 and the morning of the burn and communicate with the fire weather forecaster supplemental information to achieve a more accurate forecast.
2.) Burn Boss or designee will take weather readings with belt weather kit every hour during ignition.
3.) Notify visitor center staff to contact and relay information to fire weather forecaster during the burn if behavior not consistent with predictions.

B. Internet and Dial up Weather Stations

1.) Monitor Fire Weather Forecast on the National Weather Service and other related web sites.

C. Weather Radio

1.) If needed monitor weather by weather radio on hand held radio.

XVI. NOTIFICATION AND ACCESS

Agency & Individual Notification

Name	Phone Number	Needed ? Y/N
Fire Weather Forecast		Y
Fire Program Coordinator		Y
District Office		Y
MO Dept. of Conservation		Y
Mindenmines City Hall		Y
Barton County Fire Dept.		Y
Jim McClendon		Y
DEQ Regional Office		Y

Signing Plan, Road & Trail Closures

The following roads will be closed while burning is in progress:

XVII. PUBLIC SAFETY

(For example, are trail parking lots empty, traffic concerns, and use of headlights in smoke)

XVIII. COMMUNICATIONS AND DISPATCH

A. Communication Tree

1.) Use channel 1 on hand held and mobile radios.

a. Communicate all information through your crew specialist.
b. Crew specialists communicate all information to the Burn Boss.
c. If any crewmember is unable to reach the Burn Boss relay through the Visitor Center. If that is not possible make arrangements to break off one crewmember on an ATV to notify burn boss.

B. In case of declaration of wildfire

1.) Use Mutual Aide Channel on hand held for Fire Dept.
2.) If assisting Use MDC channel on hand held for Dept. of Conservation

XIX. BRIEFING GUIDE AND PREBURN CHECKLIST

A. Brief all participants on the burn plan with special emphasis on ignition patterns and schedules. Identify safety zones and escape routes to everyone.

B. Key Briefing Points

1. **History of Project Area**
2. **Objectives & Constraints**
3. **Maps and Assignment Sheets**
4. **Introduction of Personnel by Positions and line of authority**

5. Ignition Plan Objectives & Possible Problems
6. Holding Plan Objectives & Possible Problems
7. Phases of Ignition & Holding Operations
8. General Weather & Spot Weather Forecasts
9. Weather Data Collection Procedures
10. Contingency Plan
11. Safety and Medical Evacuation Plan
12. Any health considerations
13. Mop-up Plan
14. Communications Plan
15. Location of vehicle keys
16. Any questions from crew members
17. Preburn Checklist

C. PREBURN CHECKLIST

- a. Is burn plan complete and approved?
- b. Have firelines been completed and inspected?
- c. Have utility poles and posts been cleared around?
- d. Have all fire behavior guidelines been reviewed?
- e. Have all smoke management guidelines been reviewed?
- f. Is the current and projected fire weather forecast favorable?
- g. Are all personnel requested in the prescribed burn plan on-site, or have arrangements been made to link them with the fire crews?
- h. Have all personnel been briefed on the prescribed burn plan?
- i. Have all personnel been briefed on safety hazards, escape routes, and safety zones?
- j. Is all of the required equipment in place and in working order?
- k. Are available (including back-up) resources adequate for containment of escapes?
- l. Have the burn leaders reviewed the contingency plan?
- m Have all notification calls been made?
- n. Do all crew leaders have radios?
- o. Has extra fuel, water packs, and other supplies, been placed at strategic locations?

VISITOR CENTER DISPATCHER
FACT SHEET

1. If the Burn Boss contacts the park office for assistance because the fire has escaped and been declared "wildfire".

1.) Notify Doug Rusk at Stockton State Park.

2.) Request any remaining park staff for assistance.

4.) If fire is approaching or on private property then Burn Boss will instruct park office staff to notify the **Liberal Volunteer Fire Dept. (417)843-5245, and Barton County Fire Dept. (417)682-5541.**

5.) **If buildings are in danger dial 911** for immediate assistance.

2. Inform Fire Dept. dispatcher of the best access to the area.

- From Hwy. NN - Go West 4 miles on Central Rd. past railroad tracks to 150th Lane and follow 150th lane North to unit on West side of the road.
- From Liberal take K to P then to 150th lane and go south past visitor center to unit.

3. Inform Fire Dept. dispatcher of the proper equipment needed for control.

- Only hand tools, water, and blowers can be used while on the park property unless fire is threatening a structure.
- Burn Boss will request dozers if needed to protect buildings.

f. ~~ESM~~ DSP Policy/
prescribed burns

STATE OF MISSOURI
Mel Carnahan, Governor • David A. Shorr, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF STATE PARKS
P.O. Box 176 Jefferson City, MO 65102-0176 (314)751-2479
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DATE: March 24, 1995

TO: Parks with prescribed burn programs

FROM: Paul Nelson, Natural History Program Paul

SUBJECT: Prescribed burn planning guidelines

From 1975 through the end of last burn season, 525 prescribed burns totalling 54,444 acres have been conducted on a total of nearly 19,000 acres of state park lands. Our safety record has been excellent with very incidents and little involvement of private properties.

This spring, over 400 acres of private woods and pasture (including a close approach on a residence) burned as a result of four different state park originated prescribed burns.

Prescribed burning carries some very significant responsibilities and liabilities; thus I think it is time to review and reinforce our prescribed burning protocols.

* * * * * * * * *

To conduct a prescribed burn at any state park facility, you must at a minimum have or do the following things:

A) A burn plan approved by the Natural History Program, is to be on hand for every state park prescribed burn. This plan must emphasize in particular the range of normally acceptable weather parameters for conducting the burn, ignition patterns and fireline locations, escape contigencies, and special safety or control considerations to take into account. These plans may be faxed if necessary, and approval is by signature of the prescribed burn coordinator or Natural History Program director.

B) A fire weather forecast (National Weather Service -- 314/447-1887) is to be obtained at least the morning before the burn, and a record made of burn day temperature, wind speed and direction, relative humidity ranges, cloud cover, atmospheric stability, and smoke dispersal predictions. A record is also to be made (for woodland burns) of next day weather predictions.

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C) Trails into burn units are to be posted and closed the morning of the burn, or earlier if necessary to protect the public.

D) All prescribed burn bosses (including those from other agencies) must be at least S-390 certified, unless special authorization is granted by the Natural History Program.

E) The Natural History Program (myself, Ken, or Mike) and Regional Supervisors are to be notified (if available) prior to ignition the day of the burn. For normal mid-range weather conditions, the decision to proceed rests with the designated burn boss.

If relative humidity, wind speed, or fuelbed moisture approach the extreme limit set for it by the burn plan, permission to conduct the burn must be requested of either Ken or myself, or our designee. Permission to conduct the burn may be denied if fire weather forecaster weather predictions are deemed excessive due to risk to private or other park resources, inadequate personnel, local burn bans, numerous recent or ongoing area wildfires, or prolonged dry spells with greatly diminished fuelbed and 100 and 1000 hour fuel moistures.

F) For all woodland burns, or grassland burns where snags or smouldering woody debris may be present, there must be one or more persons assigned to post-burn mop-up and patrol duties through the evening hours. If burning conditions remain volatile through the night, this need may continue through the night at the burn bosses' discretion. There must also be a crew (one person minimum, depending on forecasted conditions) assigned the following day unless it rains. The first line check must take place early in the morning prior to the onset of good burning conditions. The intensity and duration of the mop-up and patrol duties may need to increase according to the severity of the nightime and subsequent daily weather conditions. Responsibilities for mop-up and at least periodic patrol do not end until all smouldering embers and debris are completely extinguished.

G) A follow-up burn report is to be submitted to the Natural History Program, which at a minimum will provide notations documenting parameters and considerations specified by the burn plan. Brief notes on fire behavior should be included, and all notable incidences (such as escapes) detailed. This may be done as notes on a copy of the burn plan itself. The Natural History Program is to be notified within the same day of any significant escapes from the burn unit, and especially if they involve private land or required extra assistance by other agency or fire department personnel. Contact Paul Nelson (314/897-4550) or Ken McCarty (314-642-8723) at home if an escape occurs on a weekend or holiday.

* * * * * * * * *

At the end of this burn season, I will call a meeting of all current or potential burn bosses to review the problems and escape scenarios that have occured in previous years. This will be conducted as a training exercise for all prescribed burn boss staff. Also, a work group will be established to review and update a set of prescribed burn procedures that will guide us on the use of fire in its very necessary role of managing natural ecosystems, or other uses. This will be attached to the Ecological Stewardship Management Policy which is also undergoing revision. Your input and suggestions on the above procedures will be welcome.

Keep in mind that the continued administrative and public acceptance of our prescribed burn program directly correlates to our safety record. Also, the likelihood of an escape or problem greatly diminishes as burn preparation and planning -- and the degree of training and experience of the burn leaders in technique and fire behavior theory -- increases.

In closing, I wish to emphasize that we are entering the very windy, unstable, and unpredictable weather conditions of spring. Even though we have a number of important burns yet to complete, everyone needs to be especially cautious and cognizant of how their fire is going to behave, and what might happen if it escapes.

Ken McCarty is designated as the Division's Prescribed Burn Coordinator. Please contact Ken if you have any questions.

Thanks.

c: Doug Eiken
Regional Supervisors
Ken McCarty
Mike Currier

1. We have been given conditional authority to proceed as usual with prescribed burns, **anywhere not suffering drought conditions**.

According to the National Drought Monitor, that currently means we can proceed with prescribed burns anywhere in Missouri except the bootheel and extreme northwest Missouri. Conditions change, and you will need to keep track of this. You can check out current drought status at:

National Drought Monitor at *http://enso.unl.edu/monitor/monitor.html* This is a product of the USDA, NOAA and other agenies that is updated weekly. It is a good reference to use.

Palmer Drought Index at *http://www.fs.fed.us/land/wfas/* This is best for long-term drought prediction, and uses a formula involving temperature and precipitation. Not as good for short-term forecasting.

Keetch-Byram (Soil Moisture) Drought Index at the same site as above, *http://www.fs.fed.us/land/wfas/*. This is updated daily. It models soil and duff layer moisture, with the index linked to fire behavior attributes. It is routinely used by fire managers for planning purposes.

2. **Any burn occuring in a drought area requires approval by the Division Director** prior to ignition. Route requests through me.

3. All burns must have an approved burn plan. Burn plans from previous years must be updated and newly signed.

4. The appropriate DEQ regional office must be notified that we are planning to burn, preferably the day prior to igniting any unit.

5. The fire program coordinator (me) must be notified of all planned burns, the day of or day prior to ignition.

6 Burns that are considered complex {termed "high risk" in the burn policy} require approval of the fire program coordinator or Director, Operations and Resource Management Program prior to ignition.

Examples of complex burns include those: ignited at prescription extremes; when the Keetch-Byrum Index is over 500; under "very high" or "extreme" NFDRS rating; "extremely unstable" atmospheric conditions; when 1000 hr fuel moistures are 15% or less; or that pose significant control challenges or risks. All of the ratings/indexes are readily available via the internet. Fuel moisture trends can also readily be tracked (we can provide you with up-to-the-minute graphs from any of several Missouri automated fire weather stations) and work well for planning purposes.